GE
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GE Industrial Solutions is a first class global supplier of low and medium voltage products including wiring devices, residential and industrial electrical distribution components, automation products, enclosures and switchboards. Demand for the company's products comes from wholesalers, installers, panelboard builders, contractors, OEMs and utilities worldwide.

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GE Industrial Solutions

Controls and Power Electronics

ED.04

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Controls and Power Electronics

ED.04

For industrial applications

GE imagination at work

Controls and Power Electronics

	Intro	
POWER DEVICES	Contactors and overload relays	A
	Auxiliary relays and contactors	B
	Motor protection devices	C
	Applications	D
	Main switches	E
AUXILIARY DEVICES	Control and signalling units	F
	Electronic relays and limit switches	G
POWER ELECTRONICS	Speed drive units	H
	Soft starters	I
	Lighting dimmer-stabilizer/Numerical index	J/X

Controls and Power Electronics

A

Contactors and thermal overload relays

Efficor - Global contactors

Compact starter either with thermal overload relay or manual motor starter.

A.2

Series EA - Minicontactors

Three pole minicontactors
7A (AC3)
16A (AC1)

A.42

Series M - Contactors

3 and 4P (4NO, 2NO+2NC, 4NC)
6, 9 and 12A (AC-3)
20A (AC-1) Control circuit AC and DC

A.44

Series CL - Contactors

3 and 4P (4NO, 2NO+2NC) 9 to 105A (AC-3) 25 to 140A (AC-1) AC, DC and with electronic module

A.52

Series CK - Contactors

3 and 4P (4NO) 150 to 825A (AC-3) 200 to 1250A (AC-1)
AC, DC and with electronic module

A.62

Series MTO - Thermal overload relays

For minicontactors series M from 0.11 to 14A

A.68

Series RT - Thermal overload relays

For contactors series CL and CK from 0.16 to 850A
Class 10A, 10, 20, 30

A.70

Series RE - Electronic overload relays

For contactors series CL from 0.1 to 150A

A.74

EntelliPro

Intelligent motor management relay

A.76

Series CSCN - Contactors for capacitors switching

A.144

Series 390.R - Clapper contactors

40A to 800A (AC-3)
45A to 1200A (AC-1)

A.150

B

Plug-in relays and auxiliary contactors

Series PRC - Plug-in relays

Miniature plug-in relays
Standard 8-11 pin plug-in relays
Interface relay

B.2

Series M - Auxiliary contactors

Ith = 16A

B.8

Series RL - Auxiliary contactors

Ith = 20A

B.14

C

Motor protection devices

Surion - Manual motor starter

Thermal and magnetic protection - Magnetic protection only
Setting ranges from 0.1 to 63A

C.2

Series SFK - Motor protection circuit breaker

Thermal and magnetic protection of AC and DC motors
Setting ranges from 0.1 to 25A

C.32

D

Applications

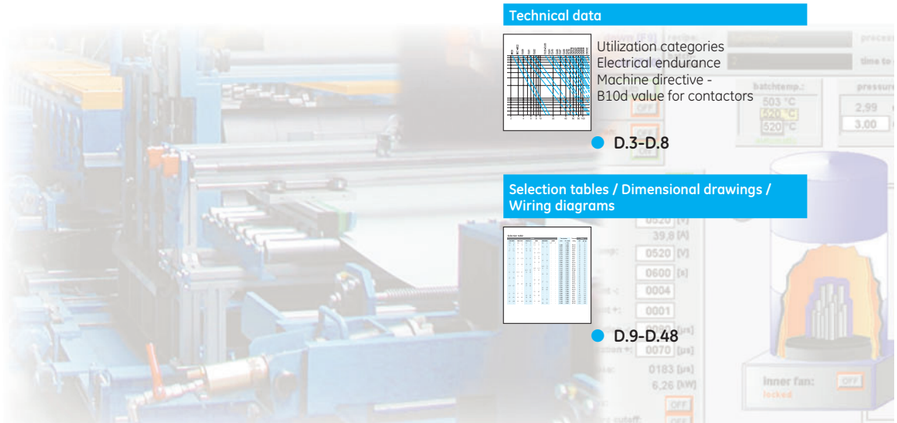
Technical data

Utilization categories
Electrical endurance
Machine directive -
B10d value for contactors

D.3-D.8

Selection tables / Dimensional drawings / Wiring diagrams

D.9-D.48



Controls and Power Electronics

E

Main switches

Series ML

Standard programme
Main switches and emergency-stop switches for machinery

enclosed switches

● E.4

Switches for photovoltaic applications

To isolate the solar panels from the inverter, from 16 to 100Adc

● E.13

F

Control and signalling units

Series P9 - Panel mounting - Units Ø 22 mm

● F.8

Series P9 - Base mounting

● F.23

Series P9 - Push-button stations / Equipped boxes

● F.24-F.25

Series P9 - Common accessories

● F.30

Series 077 - Units Ø 30 mm

● F.42

Series 105 - Signalling devices

● F.57

G

Electronic relays and limit switches

Series NMV - Multivoltage relays

22.5mm module
Direct supply voltage (24-240V AC/DC)
With transformer

● G.2

Series D - Single voltage electronic timers

45mm module
Direct supply voltage

● G.3

Limit switches

Series IS and IM
Metal and thermoplastic limit switches
Series IUG
Thermoplastic limit switches
Series IZ
Miniature thermoplastic limit switches
Series 114FCT
Three pole limit switches

● G.22

Pressure switches

Series 115

● G.36

H

Speed drive units

VAT20

Single-phase or three-phase digital inverters for controlling the speed of three-phase induction AC motors from 0.2 to 2.2 kW IP20 or IP65

● H.2

VAT200

From 0.4 to 2.2kW at 200V, single phase power supply
From 0.4 to 7.5kW at 200V, three phase power supply
From 0.75 to 11kW at 400V, three phase power supply

● H.8

AF6 drives

Drives designed for general purpose applications

● H.18

I

Softstarters

ASTAT S - Soft starter

Small soft starter with integral by-pass

● I.3

ASTAT XT - Digital soft starter

Digital soft starter for 3 phase standard induction motors

● I.8

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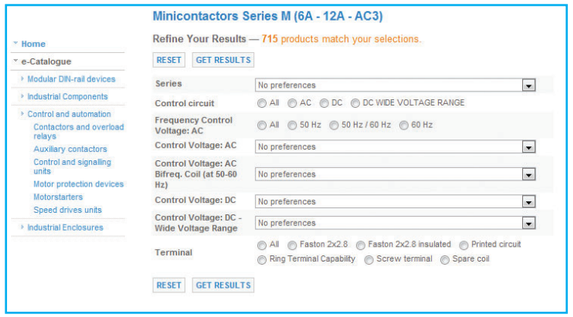

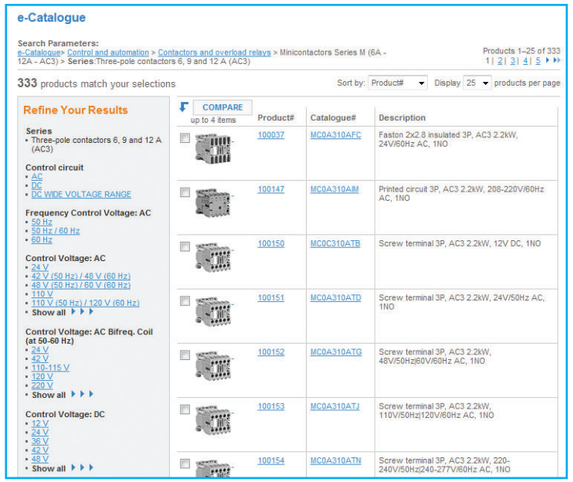

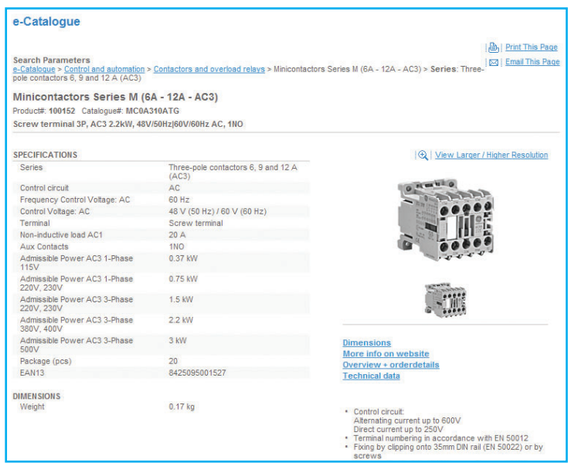

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- Product pages contain all available data: **technical specifications, dimensional and CAD drawings, product descriptions**, ...
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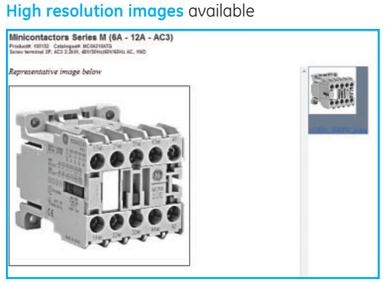
High resolution images available



Contactors and Overload Relays

Order codes

A.2 New **Efficor** global contactors

A.42 **Series EA** - Three pole minicontactors

A.44 **Series M** - Three and four pole contactors

A.52 **Series CL** - Three and four pole contactors

A.62 **Series CK** - Three and four pole contactors

A.68 **Series MTO** - Thermal overload relays

A.70 **Series RT** - Thermal overload relays

A.74 **Series RE** - Electronic overload relay

A.76 **EntelliPro** - Intelligent motor management relay

A.144 **Series CSCN** - Contactors for capacitors switching

A.150 **Series 390.R** - Clapper contactors

Technical data

A.83 Series M

A.91 Series CL

A.102 Series CK

A.120 Series MTO

A.122 Series RT

A.128 Series RE

Dimensional drawings

A.110 Series M

A.112 Series CL

A.118 Series CK

A.121 Series MTO

A.126 Series RT

A.130 Series RE

Wiring diagrams

A.131 Series M

A.132 Series CL

A.133 Series CK

POWER DEVICES — Contactors and overload relays — A

Auxiliary relays and contactors — B

Motor protection devices — C

Applications — D

Main switches — E

AUXILIARY DEVICES — Control and signalling units — F

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POWER ELECTRONICS — Speed drive units — H

Soft starters — I

Lighting dimmer-stabilizer/Numerical index — J/X

Efficor™

Most reliable technology

- Standard materials for food & beverage and transportation purposes ... complying the latest rail standards
- Highest reliable product performance for worldwide applications
- Energy efficient design ... ecological mindset

Best electrical endurance
Electrical endurance > 1.7 million operations
AC3 category at rated current

Reliability data per standard EN ISO 13849-1
EC09-12 $2x10^6$ops
EC18-25 $1.7x10^6$ops
EC32-40 $1.37x10^6$ops

Widest temperature operation
from -40°C to +55°C
Suitable for extreme temperatures

Reduced flammability risk and lower toxicity
For demanding applications as lifts, appliances and transportation

Lowest noise production: 32dBA
Perfect answer to demanding applications like hospitals

Compliant with International standards for plastic parts
NF 16-101 & NF 16-102
DIN 5510.2
Safe ecological plastic for all applications

Only one frame covering 9 up to 40A series
Three different depths
- Depth 1: 9A up to 18A
- Depth 2: 25A
- Depth 3: 32A up to 40A

High installation benefits

- Smart, various wiring and connectivity technologies ... fast assembly of starter solutions
- Smaller product dimensions for panel design and motor control centers ... integrated auxiliary contacts in standard product
- Modular and compact motor starter solutions

Best in class

- Highest B10d data as per ISO.13849-1
- Optimized power per size
- Lower number of stock keeping units ... reducing stock complexity for distributors, panelbuilders and OEM customers
- Outstanding range of power contactors and motor starter solutions ... including wide range of accessories

Standards

IEC/EN 60947-1
IEC/EN 60947-4-1
IEC/EN 60947-5-1
EN 50005
UL 508
CSA 22.2/14
VDE 0660/102

Approvals

(1)

(1) In progress

A new dimension

New

Compact starter

Significant space reduction in the cabinet: Compact starter either with thermal overload relay or manual motor starter.

Starter mounting plates for friendly maintenance (easy removal of MMS Surion and/or contactor).
Busbar systems and wiring kits allow safe cabling avoiding mistakes, guaranteeing finger safe protection up to 6kV.

Contactor with manual motor starter
Link module for compact starter
Full coil access at the bottom

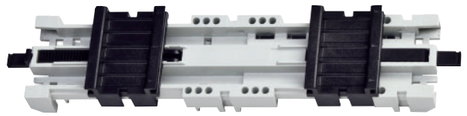
Contactor with thermal overload relay
Uniformity in compact design
Thermal overload relay mounted direct to the contactor.
All connections available

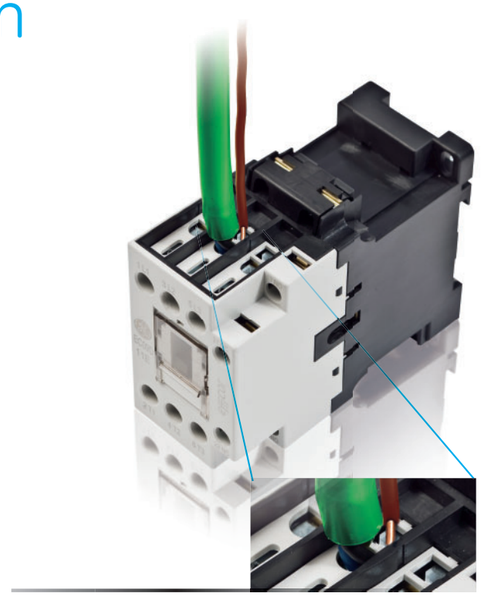
New

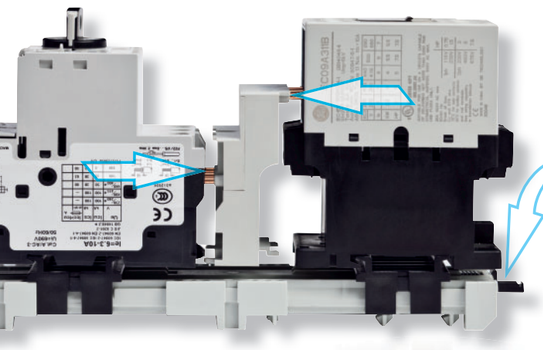
Secure connection

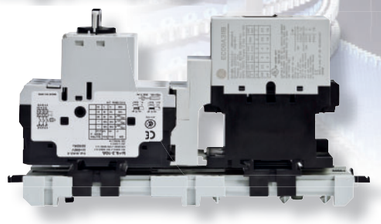
Smart connectivity

- Design of intelligent base plate









Time saving

Main advantages

Double box terminals

Identical torque (2.2 Nm) **for 9A up to 40A contactors**.
No need for different screwdrivers.

- Double box clamps for the whole range
- Cables from 0.75mm² up to 16mm² in the same box clamps terminal for 4kW up to 18.5kW.
- No risk for loosing cables
- Avoid temperature rising on the small cable

No tools needed

Mounting or dismounting the contactors on/from the DIN-rail can be done without tools.
Even for the mounting of accessories and auxiliaries to the contactor no tools are required.

Quick assembly of direct online starter

- User friendly design of link modules and base plates to combine manual motor starter and contactor.
- Smart busbar systems and wiring kits.

Easy identification

Self explanatory description of the catalogue number is an important advantage

Example: **EC 09 A 3 11 B 230**

EC: Means **E**fficor **C**ontactor range
09: 9A in AC3 application
A: **Type of control voltage**
A stands for AC
D stands for DC
3: **Number of main poles**
3 stands for 3 poles
4 stands for 4 poles
B stands for 2NO + 2NC
11: Number of auxiliary contacts built-in **1**NO and **1**NC
B: **Type of terminal**
B stands for Box terminal
R stands for Ring terminal
230: Coil voltage
W: **End character for DC contactors**
W stands for Wide voltage and built-in diode
L stands for Low consumption

New

3 pole contactors - Double box terminals

Max. operating current		Admissible power AC3				Electrical endurance	Aux. cont.		Control circuit							
									AC			DC				
Not inductive load AC1 A	Motors <440V 3Ph 50/60Hz AC3 A	220-230V kW HP	380-400V kW HP	440V kW HP	500V kW HP	Cat. AC3 Operations	NO	NC	Voltage	Cat. no.	Ref. no.	Voltage	Cat. no.[1]	Ref. no.	Pack
25	**9**	2.2 3	**4** ***5.5***	4 *5.5*	5.5 *7.5*	1.7x10⁶	1	1	12	EC09A311B012	**267001**	12	EC09D311B012**W**	**267085**	5
							1	1	24	EC09A311B024	**267002**	24	EC09D311B024**W**	**267086**	5
							1	1	42	EC09A311B042	**267003**	36	EC09D311B036**W**	**267087**	5
							1	1	48	EC09A311B048	**267004**	48	EC09D311B048**W**	**267088**	5
							1	1	110	EC09A311B110	**267005**	60	EC09D311B060**W**	**267089**	5
							1	1	120	EC09A311B120	**267006**	72	EC09D311B072**W**	**267090**	5
							1	1	208	EC09A311B208	**267007**	110	EC09D311B110**W**	**267091**	5
							1	1	230	EC09A311B230	**267008**	125	EC09D311B125**W**	**267092**	5
							1	1	240	EC09A311B240	**267009**	230	EC09D311B230**W**	**267093**	5
							1	1	400	EC09A311B400	**267010**	250	EC09D311B250**W**	**267094**	5
							1	1	440	EC09A311B440	**267011**	440	EC09D311B440**W**	**267095**	5
							1	1	480	EC09A311B480	**267012**	24	EC09D311B024**L**	**267096**	5
							1	1	500	EC09A311B500	**267013**	48	EC09D311B048**L**	**267097**	5
							1	1	575	EC09A311B575	**269075**	110	EC09D311B110**L**	**267098**	5
							1	1	600	EC09A311B600	**267014**	230	EC09D311B230**L**	**267099**	5
25	**12**	3 4	**5.5** ***7.5***	5.5 *7.5*	7.5 *10*	1.7x10⁶	1	1	12	EC12A311B012	**267015**	12	EC12D311B012**W**	**267100**	5
							1	1	24	EC12A311B024	**267016**	24	EC12D311B024**W**	**267101**	5
							1	1	42	EC12A311B042	**267017**	36	EC12D311B036**W**	**267102**	5
							1	1	48	EC12A311B048	**267018**	48	EC12D311B048**W**	**267103**	5
							1	1	110	EC12A311B110	**267019**	60	EC12D311B060**W**	**267104**	5
							1	1	120	EC12A311B120	**267020**	72	EC12D311B072**W**	**267105**	5
							1	1	208	EC12A311B208	**267021**	110	EC12D311B110**W**	**267106**	5
							1	1	230	EC12A311B230	**267022**	125	EC12D311B125**W**	**267107**	5
							1	1	240	EC12A311B240	**267023**	230	EC12D311B230**W**	**267108**	5
							1	1	400	EC12A311B400	**267024**	250	EC12D311B250**W**	**267109**	5
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							1	1	600	EC12A311B600	**267028**	230	EC12D311B230**L**	**267114**	5
32	**18**	4 *5.5*	**7.5** ***10***	7.5 *10*	10 *13.5*	1.7x10⁶	1	1	12	EC18A311B012	**267029**	12	EC18D311B012**W**	**267115**	5
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45	**25**	7.5 *10*	**11** ***15***	12 *16*	15 *20*	1.5x10⁶	1	1	12	EC25A311B012	**267043**	12	EC25D311B012**W**	**267130**	1
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60	**32**	9 *12*	**15** ***22***	15 *22*	18 *25*	1.5x10⁶	0	0	12	EC32A300B012	**267057**	12	EC32D300B012**W**	**267145**	1
							0	0	24	EC32A300B024	**267058**	24	EC32D300B024**W**	**267146**	1
							0	0	42	EC32A300B042	**267059**	36	EC32D300B036**W**	**267147**	1
							0	0	48	EC32A300B048	**267060**	48	EC32D300B048**W**	**267148**	1
							0	0	110	EC32A300B110	**267061**	60	EC32D300B060**W**	**267149**	1
							0	0	120	EC32A300B120	**267062**	72	EC32D300B072**W**	**267150**	1
							0	0	208	EC32A300B208	**267063**	110	EC32D300B110**W**	**267151**	1
							0	0	230	EC32A300B230	**267064**	125	EC32D300B125**W**	**267152**	1
							0	0	240	EC32A300B240	**267065**	230	EC32D300B230**W**	**267153**	1
							0	0	400	EC32A300B400	**267066**	250	EC32D300B250**W**	**267154**	1
							0	0	440	EC32A300B440	**267067**	440	EC32D300B440**W**	**267155**	1
							0	0	480	EC32A300B480	**267068**	24	EC32D300B024**L**	**267156**	1
							0	0	500	EC32A300B500	**267069**	48	EC32D300B048**L**	**267157**	1
							0	0	575	EC32A300B575	**269079**	110	EC32D300B110**L**	**267158**	1
							0	0	600	EC32A300B600	**267070**	230	EC32D300B230**L**	**267159**	1
60	**40**	11 *15*	**18.5** ***25***	22 *30*	25 *34*	1.5x10⁶	0	0	12	EC40A300B012	**267071**	12	EC40D300B012**W**	**267160**	1
							0	0	24	EC40A300B024	**267072**	24	EC40D300B024**W**	**267161**	1
							0	0	42	EC40A300B042	**267073**	36	EC40D300B036**W**	**267162**	1
							0	0	48	EC40A300B048	**267074**	48	EC40D300B048**W**	**267163**	1
							0	0	110	EC40A300B110	**267075**	60	EC40D300B060**W**	**267164**	1
							0	0	120	EC40A300B120	**267076**	72	EC40D300B072**W**	**267165**	1
							0	0	208	EC40A300B208	**267077**	110	EC40D300B110**W**	**267166**	1
							0	0	230	EC40A300B230	**267078**	125	EC40D300B125**W**	**267167**	1
							0	0	240	EC40A300B240	**267079**	230	EC40D300B230**W**	**267168**	1
							0	0	400	EC40A300B400	**267080**	250	EC40D300B250**W**	**267169**	1
							0	0	440	EC40A300B440	**267081**	440	EC40D300B440**W**	**267170**	1
							0	0	480	EC40A300B480	**267082**	24	EC40D300B024**L**	**267171**	1
							0	0	500	EC40A300B500	**267083**	48	EC40D300B048**L**	**267172**	1
							0	0	575	EC40A300B575	**269080**	110	EC40D300B110**L**	**267173**	1
							0	0	600	EC40A300B600	**267084**	230	EC40D300B230**L**	**267174**	1

(1) End character: **W** = Wide voltage and built-in diode
L = Low consumption

4 pole contactors - Double box terminals

Max. operating current		Admissible power AC1				Electrical endurance	Power cont.		Control circuit						
									AC			DC			
Not inductive load AC1 A	Motors <440V 3Ph 50/60Hz AC3 A	220-230V kW	380-400V kW	440V kW	500V kW	Cat. AC1 Operations	NO	NC	Voltage	Cat. no.	Ref. no.	Voltage	Cat. no.(1)	Ref. no.	Pack
25	12	9.5	**16.5**	18	21.5	4×10⁵	4	0	12	EC12A400B012	**267175**	12	EC12D400B012**W**	**267231**	5
							4	0	24	EC12A400B024	**267176**	24	EC12D400B024**W**	**267232**	5
							4	0	42	EC12A400B042	**267177**	36	EC12D400B036**W**	**267233**	5
							4	0	48	EC12A400B048	**267178**	48	EC12D400B048**W**	**267234**	5
							4	0	110	EC12A400B110	**267179**	60	EC12D400B060**W**	**267235**	5
							4	0	120	EC12A400B120	**267180**	72	EC12D400B072**W**	**267236**	5
							4	0	208	EC12A400B208	**267181**	110	EC12D400B110**W**	**267237**	5
							4	0	230	EC12A400B230	**267182**	125	EC12D400B125**W**	**267238**	5
							4	0	240	EC12A400B240	**267183**	230	EC12D400B230**W**	**267239**	5
							4	0	400	EC12A400B400	**267184**	250	EC12D400B250**W**	**267240**	5
							4	0	440	EC12A400B440	**267185**	440	EC12D400B440**W**	**267241**	5
							4	0	480	EC12A400B480	**267186**				
							4	0	500	EC12A400B500	**267187**	24	EC12D400B024**L**	**267242**	5
							4	0	575	EC12A400B575	**269081**	48	EC12D400B048**L**	**267243**	5
							4	0	600	EC12A400B600	**267188**	110	EC12D400B110**L**	**267244**	5
							4	0				230	EC12D400B230**L**	**267245**	5
32	18	12	**22**	23	27.5	6×10⁵	4	0	12	EC18A400B012	**267189**	12	EC18D400B012**W**	**267246**	5
							4	0	24	EC18A400B024	**267190**	24	EC18D400B024**W**	**267247**	5
							4	0	42	EC18A400B042	**267191**	36	EC18D400B036**W**	**267248**	5
							4	0	48	EC18A400B048	**267192**	48	EC18D400B048**W**	**267249**	5
							4	0	110	EC18A400B110	**267193**	60	EC18D400B060**W**	**267250**	5
							4	0	120	EC18A400B120	**267194**	72	EC18D400B072**W**	**267251**	5
							4	0	208	EC18A400B208	**267195**	110	EC18D400B110**W**	**267252**	5
							4	0	230	EC18A400B230	**267196**	125	EC18D400B125**W**	**267253**	5
							4	0	240	EC18A400B240	**267197**	230	EC18D400B230**W**	**267254**	5
							4	0	400	EC18A400B400	**267198**	250	EC18D400B250**W**	**267255**	5
							4	0	440	EC18A400B440	**267199**	440	EC18D400B440**W**	**267256**	5
							4	0	480	EC18A400B480	**267200**				
							4	0	500	EC18A400B500	**267201**	24	EC18D400B024**L**	**267257**	5
							4	0	575	EC18A400B575	**269082**	48	EC18D400B048**L**	**267258**	5
							4	0	600	EC18A400B600	**267202**	110	EC18D400B110**L**	**267259**	5
							4	0				230	EC18D400B230**L**	**267260**	5
45	25	17	**29**	32	39	6.5x10⁵	4	0	12	EC25A400B012	**267203**	12	EC25D400B012**W**	**267261**	5
							4	0	24	EC25A400B024	**267204**	24	EC25D400B024**W**	**267262**	5
							4	0	42	EC25A400B042	**267205**	36	EC25D400B036**W**	**267263**	5
							4	0	48	EC25A400B048	**267206**	48	EC25D400B048**W**	**267264**	5
							4	0	110	EC25A400B110	**267207**	60	EC25D400B060**W**	**267265**	5
							4	0	120	EC25A400B120	**267208**	72	EC25D400B072**W**	**267266**	5
							4	0	208	EC25A400B208	**267209**	110	EC25D400B110**W**	**267267**	5
							4	0	230	EC25A400B230	**267210**	125	EC25D400B125**W**	**267268**	5
							4	0	240	EC25A400B240	**267211**	230	EC25D400B230**W**	**267269**	5
							4	0	400	EC25A400B400	**267212**	250	EC25D400B250**W**	**267270**	5
							4	0	440	EC25A400B440	**267213**	440	EC25D400B440**W**	**267271**	5
							4	0	480	EC25A400B480	**267214**				
							4	0	500	EC25A400B500	**267215**	24	EC25D400B024**L**	**267272**	5
							4	0	575	EC25A400B575	**269083**	48	EC25D400B048**L**	**267273**	5
							4	0	600	EC25A400B600	**267216**	110	EC25D400B110**L**	**267274**	5
							4	0				230	EC25D400B230**L**	**267275**	5
60	32	22.5	**39.5**	43	52	8×10⁵	4	0	12	EC32A400B012	**267217**	12	EC32D400B012**W**	**267276**	1
							4	0	24	EC32A400B024	**267218**	24	EC32D400B024**W**	**267277**	1
							4	0	42	EC32A400B042	**267219**	36	EC32D400B036**W**	**267278**	1
							4	0	48	EC32A400B048	**267220**	48	EC32D400B048**W**	**267279**	1
							4	0	110	EC32A400B110	**267221**	60	EC32D400B060**W**	**267280**	1
							4	0	120	EC32A400B120	**267222**	72	EC32D400B072**W**	**267281**	1
							4	0	208	EC32A400B208	**267223**	110	EC32D400B110**W**	**267282**	1
							4	0	230	EC32A400B230	**267224**	125	EC32D400B125**W**	**267283**	1
							4	0	240	EC32A400B240	**267225**	230	EC32D400B230**W**	**267284**	1
							4	0	400	EC32A400B400	**267226**	250	EC32D400B250**W**	**267285**	1
							4	0	440	EC32A400B440	**267227**	440	EC32D400B440**W**	**267286**	1
							4	0	480	EC32A400B480	**267228**				
							4	0	500	EC32A400B500	**267229**	24	EC32D400B024**L**	**267287**	1
							4	0	575	EC32A400B575	**269084**	48	EC32D400B048**L**	**267288**	1
							4	0	600	EC32A400B600	**267230**	110	EC32D400B110**L**	**267289**	1
							4	0				230	EC32D400B230**L**	**267290**	1

(1) End character: **W** = Wide voltage and built-in diode
L = Low consumption

New

2NO - 2NC contactors - Double box terminals

Max. operating current		Admissible power AC3				Electrical endurance	Power cont.		Control circuit						
									AC			DC			
Not inductive load AC1 A	Motors <440V 3Ph 50/60Hz AC3 A	220-230V kW HP	380-400V kW HP	440V kW HP	500V kW HP	Cat. AC3 Operations	NO	NC	Voltage	Cat. no.	Ref. no.	Voltage	Cat. no.[1]	Ref. no.	Pack
25	12	3 4	**5.5** ***7.5***	5.5 *7.5*	7.5 *10*	1.7x10⁶	2	2	12	EC12AB00B012	**267291**	12	EC12DB00B012**W**	**267347**	5
							2	2	24	EC12AB00B024	**267292**	24	EC12DB00B024**W**	**267348**	5
							2	2	42	EC12AB00B042	**267293**	36	EC12DB00B036**W**	**267349**	5
							2	2	48	EC12AB00B048	**267294**	48	EC12DB00B048**W**	**267350**	5
							2	2	110	EC12AB00B110	**267295**	60	EC12DB00B060**W**	**267351**	5
							2	2	120	EC12AB00B120	**267296**	72	EC12DB00B072**W**	**267352**	5
							2	2	208	EC12AB00B208	**267297**	110	EC12DB00B110**W**	**267353**	5
							2	2	230	EC12AB00B230	**267298**	125	EC12DB00B125**W**	**267354**	5
							2	2	240	EC12AB00B240	**267299**	230	EC12DB00B230**W**	**267355**	5
							2	2	400	EC12AB00B400	**267300**	250	EC12DB00B250**W**	**267356**	5
							2	2	440	EC12AB00B440	**267301**	440	EC12DB00B440**W**	**267357**	5
							2	2	480	EC12AB00B480	**267302**				
							2	2	500	EC12AB00B500	**267303**	24	EC12DB00B024**L**	**267358**	5
							2	2	575	EC12AB00B575	**269115**	48	EC12DB00B048**L**	**267359**	5
							2	2	600	EC12AB00B600	**267304**	110	EC12DB00B110**L**	**267360**	5
							2	2				230	EC12DB00B230**L**	**267361**	5
32	18	4 *5.5*	**7.5** ***10***	7.5 *10*	10 *13.5*	1.5x10⁶	2	2	12	EC18AB00B012	**267305**	12	EC18DB00B012**W**	**267362**	5
							2	2	24	EC18AB00B024	**267306**	24	EC18DB00B024**W**	**267363**	5
							2	2	42	EC18AB00B042	**267307**	36	EC18DB00B036**W**	**267364**	5
							2	2	48	EC18AB00B048	**267308**	48	EC18DB00B048**W**	**267365**	5
							2	2	110	EC18AB00B110	**267309**	60	EC18DB00B060**W**	**267366**	5
							2	2	120	EC18AB00B120	**267310**	72	EC18DB00B072**W**	**267367**	5
							2	2	208	EC18AB00B208	**267311**	110	EC18DB00B110**W**	**267368**	5
							2	2	230	EC18AB00B230	**267312**	125	EC18DB00B125**W**	**267369**	5
							2	2	240	EC18AB00B240	**267313**	230	EC18DB00B230**W**	**267370**	5
							2	2	400	EC18AB00B400	**267314**	250	EC18DB00B250**W**	**267371**	5
							2	2	440	EC18AB00B440	**267315**	440	EC18DB00B440**W**	**267372**	5
							2	2	480	EC18AB00B480	**267316**				
							2	2	500	EC18AB00B500	**267317**	24	EC18DB00B024**L**	**267373**	5
							2	2	575	EC18AB00B575	**269116**	48	EC18DB00B048**L**	**267374**	5
							2	2	600	EC18AB00B600	**267318**	110	EC18DB00B110**L**	**267375**	5
							2	2				230	EC18DB00B230**L**	**267376**	5
45	25	7.5 *10*	**11** ***15***	12 *16*	15 *20*	1.5x10⁶	2	2	12	EC25AB00B012	**267319**	12	EC25DB00B012**W**	**267377**	5
							2	2	24	EC25AB00B024	**267320**	24	EC25DB00B024**W**	**267378**	5
							2	2	42	EC25AB00B042	**267321**	36	EC25DB00B036**W**	**267379**	5
							2	2	48	EC25AB00B048	**267322**	48	EC25DB00B048**W**	**267380**	5
							2	2	110	EC25AB00B110	**267323**	60	EC25DB00B060**W**	**267381**	5
							2	2	120	EC25AB00B120	**267324**	72	EC25DB00B072**W**	**267382**	5
							2	2	208	EC25AB00B208	**267325**	110	EC25DB00B110**W**	**267383**	5
							2	2	230	EC25AB00B230	**267326**	125	EC25DB00B125**W**	**267384**	5
							2	2	240	EC25AB00B240	**267327**	230	EC25DB00B230**W**	**267385**	5
							2	2	400	EC25AB00B400	**267328**	250	EC25DB00B250**W**	**267386**	5
							2	2	440	EC25AB00B440	**267329**	440	EC25DB00B440**W**	**267387**	5
							2	2	480	EC25AB00B480	**267330**				
							2	2	500	EC25AB00B500	**267331**				
							2	2	575	EC25AB00B575	**269117**				
							2	2	600	EC25AB00B600	**267332**				
60	32	9 *12*	**15** ***22***	15 *22*	18 *25*	1.5x10⁶	2	2	12	EC32AB00B012	**267333**	12	EC32DB00B012**W**	**267392**	1
							2	2	24	EC32AB00B024	**267334**	24	EC32DB00B024**W**	**267393**	1
							2	2	42	EC32AB00B042	**267335**	36	EC32DB00B036**W**	**267394**	1
							2	2	48	EC32AB00B048	**267336**	48	EC32DB00B048**W**	**267395**	1
							2	2	110	EC32AB00B110	**267337**	60	EC32DB00B060**W**	**267396**	1
							2	2	120	EC32AB00B120	**267338**	72	EC32DB00B072**W**	**267397**	1
							2	2	208	EC32AB00B208	**267339**	110	EC32DB00B110**W**	**267398**	1
							2	2	230	EC32AB00B230	**267340**	125	EC32DB00B125**W**	**267399**	1
							2	2	240	EC32AB00B240	**267341**	230	EC32DB00B230**W**	**267400**	1
							2	2	400	EC32AB00B400	**267342**	250	EC32DB00B250**W**	**267401**	1
							2	2	440	EC32AB00B440	**267343**	440	EC32DB00B440**W**	**267402**	1
							2	2	480	EC32AB00B480	**267344**				
							2	2	500	EC32AB00B500	**267345**				
							2	2	575	EC32AB00B575	**269118**				
							2	2	600	EC32AB00B600	**267346**				

(1) End character: **W** = Wide voltage and built-in diode
L = Low consumption

New

Auxiliary contactors - Double box terminals - Ith 20A

Contacts		Control circuit						
		AC			DC			
NO •3 •4	NC •1 •2	Voltage	Cat. no.	Ref. no.	Voltage	Cat. no.(1)	Ref. no.	Pack
4	0	12	ECACA440B012	**268140**	12	ECACD440B012**W**	**268210**	5
4	0	24	ECACA440B024	**268141**	24	ECACD440B024**W**	**268211**	5
4	0	42	ECACA440B042	**268142**	36	ECACD440B036**W**	**268212**	5
4	0	48	ECACA440B048	**268143**	48	ECACD440B048**W**	**268213**	5
4	0	110	ECACA440B110	**268144**	60	ECACD440B060**W**	**268214**	5
4	0	120	ECACA440B120	**268145**	72	ECACD440B072**W**	**268215**	5
4	0	208	ECACA440B208	**268146**	110	ECACD440B110**W**	**268216**	5
4	0	230	ECACA440B230	**268147**	125	ECACD440B125**W**	**268217**	5
4	0	240	ECACA440B240	**268148**	230	ECACD440B230**W**	**268218**	5
4	0	400	ECACA440B400	**268149**	250	ECACD440B250**W**	**268219**	5
4	0	440	ECACA440B440	**268150**	400	ECACD440B440**W**	**268220**	5
4	0	480	ECACA440B480	**268151**				
4	0	500	ECACA440B500	**268152**	24	ECACD440B024**L**	**268221**	5
4	0	575	ECACA440B575	**268673**	48	ECACD440B048**L**	**268222**	5
4	0	600	ECACA440B600	**268153**	110	ECACD440B110**L**	**268223**	5
4	0				230	ECACD440B230**L**	**268224**	5
3	1	12	ECACA431B012	**268154**	12	ECACD431B012**W**	**268225**	5
3	1	24	ECACA431B024	**268155**	24	ECACD431B024**W**	**268226**	5
3	1	42	ECACA431B042	**268156**	36	ECACD431B036**W**	**268227**	5
3	1	48	ECACA431B048	**268157**	48	ECACD431B048**W**	**268228**	5
3	1	110	ECACA431B110	**268158**	60	ECACD431B060**W**	**268229**	5
3	1	120	ECACA431B120	**268159**	72	ECACD431B072**W**	**268230**	5
3	1	208	ECACA431B208	**268160**	110	ECACD431B110**W**	**268231**	5
3	1	230	ECACA431B230	**268161**	125	ECACD431B125**W**	**268232**	5
3	1	240	ECACA431B240	**268162**	230	ECACD431B230**W**	**268233**	5
3	1	400	ECACA431B400	**268163**	250	ECACD431B250**W**	**268234**	5
3	1	440	ECACA431B440	**268164**	400	ECACD431B440**W**	**268235**	5
3	1	480	ECACA431B480	**268165**				
3	1	500	ECACA431B500	**268166**	24	ECACD431B024**L**	**268236**	5
3	1	575	ECACA431B575	**268674**	48	ECACD431B048**L**	**268237**	5
3	1	600	ECACA431B600	**268167**	110	ECACD431B110**L**	**268238**	5
3	1				230	ECACD431B230**L**	**268239**	5
2	2	12	ECACA422B012	**268168**	12	ECACD422B012**W**	**268240**	5
2	2	24	ECACA422B024	**268169**	24	ECACD422B024**W**	**268241**	5
2	2	42	ECACA422B042	**268170**	36	ECACD422B036**W**	**268242**	5
2	2	48	ECACA422B048	**268171**	48	ECACD422B048**W**	**268243**	5
2	2	110	ECACA422B110	**268172**	60	ECACD422B060**W**	**268244**	5
2	2	120	ECACA422B120	**268173**	72	ECACD422B072**W**	**268245**	5
2	2	208	ECACA422B208	**268174**	110	ECACD422B110**W**	**268246**	5
2	2	230	ECACA422B230	**268175**	125	ECACD422B125**W**	**268247**	5
2	2	240	ECACA422B240	**268176**	230	ECACD422B230**W**	**268248**	5
2	2	400	ECACA422B400	**268177**	250	ECACD422B250**W**	**268249**	5
2	2	440	ECACA422B440	**268178**	400	ECACD422B440**W**	**268250**	5
2	2	480	ECACA422B480	**268179**				
2	2	500	ECACA422B500	**268180**	24	ECACD422B024**L**	**268251**	5
2	2	575	ECACA422B575	**268675**	48	ECACD422B048**L**	**268252**	5
2	2	600	ECACA422B600	**268181**	110	ECACD422B110**L**	**268253**	5
2	2				230	ECACD422B230**L**	**268254**	5
1	3	12	ECACA413B012	**268182**	12	ECACD413B012**W**	**268400**	5
1	3	24	ECACA413B024	**268183**	24	ECACD413B024**W**	**268401**	5
1	3	42	ECACA413B042	**268184**	36	ECACD413B036**W**	**268402**	5
1	3	48	ECACA413B048	**268185**	48	ECACD413B048**W**	**268403**	5
1	3	110	ECACA413B110	**268186**	60	ECACD413B060**W**	**268404**	5
1	3	120	ECACA413B120	**268187**	72	ECACD413B072**W**	**268405**	5
1	3	208	ECACA413B208	**268188**	110	ECACD413B110**W**	**268406**	5
1	3	230	ECACA413B230	**268189**	125	ECACD413B125**W**	**268407**	5
1	3	240	ECACA413B240	**268190**	230	ECACD413B230**W**	**268408**	5
1	3	400	ECACA413B400	**268191**	250	ECACD413B250**W**	**268409**	5
1	3	440	ECACA413B440	**268192**	400	ECACD413B440**W**	**268410**	5
1	3	480	ECACA413B480	**268193**				
1	3	500	ECACA413B500	**268194**	24	ECACD413B024**L**	**268411**	5
1	3	575	ECACA413B575	**268676**	48	ECACD413B048**L**	**268412**	5
1	3	600	ECACA413B600	**268195**	110	ECACD413B110**L**	**268413**	5
1	3				230	ECACD413B230**L**	**268414**	5
0	4	12	ECACA404B012	**268196**	12	ECACD404B012**W**	**268270**	5
0	4	24	ECACA404B024	**268197**	24	ECACD404B024**W**	**268271**	5
0	4	42	ECACA404B042	**268198**	36	ECACD404B036**W**	**268272**	5
0	4	48	ECACA404B048	**268199**	48	ECACD404B048**W**	**268273**	5
0	4	110	ECACA404B110	**268200**	60	ECACD404B060**W**	**268274**	5
0	4	120	ECACA404B120	**268201**	72	ECACD404B072**W**	**268275**	5
0	4	208	ECACA404B208	**268202**	110	ECACD404B110**W**	**268276**	5
0	4	230	ECACA404B230	**268203**	125	ECACD404B125**W**	**268277**	5
0	4	240	ECACA404B240	**268204**	230	ECACD404B230**W**	**268278**	5
0	4	400	ECACA404B400	**268205**	250	ECACD404B250**W**	**268279**	5
0	4	440	ECACA404B440	**268206**	400	ECACD404B440**W**	**268280**	5
0	4	480	ECACA404B480	**268207**				
0	4	500	ECACA404B500	**268208**	24	ECACD404B024**L**	**268281**	5
0	4	575	ECACA404B575	**268677**	48	ECACD404B048**L**	**268282**	5
0	4	600	ECACA404B600	**268209**	110	ECACD404B110**L**	**268283**	5
0	4				230	ECACD404B230**L**	**268284**	5

(1) End character: **W** = Wide voltage and built-in diode
L = Low consumption

Catalogue number structure

Example: **ECACA440B012**

EC: Means **E**fficor **C**ontactor range
AC: **A**uxiliary **C**ontact
A: **A** stands for AC
D stands for DC
4: Available contacts
40 4NO/0NC
31 3NO/1NC
22 2NO/2NC
13 1NO/3NC
04 0NO/4NC
B: **Type of terminal**
B stands for Box terminal
R stands for Ring terminal
012: Coil voltage (012 up to 600V)

New

Spare coils for contactors and auxiliary contactors - Box clamp terminals

	Voltage	Use for	Cat. no.	Ref. no.	Pack
AC coil Voltage in AC 50/60Hz	12Vac	EC09A...EC18A, ECACA...B	ECCS1A012S	**268687**	5
	24Vac	EC09A...EC18A, ECACA...B	ECCS1A024S	**268688**	5
	42Vac	EC09A...EC18A, ECACA...B	ECCS1A042S	**268689**	5
	48Vac	EC09A...EC18A, ECACA...B	ECCS1A048S	**268690**	5
	110Vac	EC09A...EC18A, ECACA...B	ECCS1A110S	**268691**	5
	120Vac	EC09A...EC18A, ECACA...B	ECCS1A120S	**268692**	5
	208Vac	EC09A...EC18A, ECACA...B	ECCS1A208S	**268693**	5
	230Vac	EC09A...EC18A, ECACA...B	ECCS1A230S	**268694**	5
	240Vac	EC09A...EC18A, ECACA...B	ECCS1A240S	**268695**	5
	400Vac	EC09A...EC18A, ECACA...B	ECCS1A400S	**268696**	5
	440Vac	EC09A...EC18A, ECACA...B	ECCS1A440S	**268697**	5
	480Vac	EC09A...EC18A, ECACA...B	ECCS1A480S	**268698**	5
	500Vac	EC09A...EC18A, ECACA...B	ECCS1A500S	**268699**	5
	575Vac	EC09A...EC18A, ECACA...B	ECCS1A575S	**268984**	5
	600Vac	EC09A...EC18A, ECACA...B	ECCS1A600S	**268700**	5
DC Wide Voltage range (W) Operating range: +25% Un -30% Un	12Vdc	EC09D...EC18D, ECACD...B	ECCS1D012S	**268701**	5
	24Vdc	EC09D...EC18D, ECACD...B	ECCS1D024S	**268702**	5
	36Vdc	EC09D...EC18D, ECACD...B	ECCS1D036S	**268703**	5
	48Vdc	EC09D...EC18D, ECACD...B	ECCS1D048S	**268704**	5
	60Vdc	EC09D...EC18D, ECACD...B	ECCS1D060S	**268705**	5
	72Vdc	EC09D...EC18D, ECACD...B	ECCS1D072S	**268706**	5
	110Vdc	EC09D...EC18D, ECACD...B	ECCS1D110S	**268707**	5
	125Vdc	EC09D...EC18D, ECACD...B	ECCS1D125S	**268708**	5
	230Vdc	EC09D...EC18D, ECACD...B	ECCS1D230S	**268709**	5
	250Vdc	EC09D...EC18D, ECACD...B	ECCS1D250S	**268710**	5
	440Vdc	EC09D...EC18D, ECACD...B	ECCS1D440S	**268711**	5
DC Low Consumption (L) VDC < 3.3W for EC09 up to EC18	24Vdc	EC09D...EC18D, ECACD...B	ECCS1D024SL	**268712**	5
	48Vdc	EC09D...EC18D, ECACD...B	ECCS1D048SL	**268713**	5
	110Vdc	EC09D...EC18D, ECACD...B	ECCS1D110SL	**268714**	5
	230Vdc	EC09D...EC18D, ECACD...B	ECCS1D230SL	**268715**	5
AC coil Voltage in AC 50/60Hz	12Vac	EC25A...EC40A...B	ECCS2A012S	**268716**	5
	24Vac	EC25A...EC40A...B	ECCS2A024S	**268717**	5
	42Vac	EC25A...EC40A...B	ECCS2A042S	**268718**	5
	48Vac	EC25A...EC40A...B	ECCS2A048S	**268719**	5
	110Vac	EC25A...EC40A...B	ECCS2A110S	**268720**	5
	120Vac	EC25A...EC40A...B	ECCS2A120S	**268721**	5
	208Vac	EC25A...EC40A...B	ECCS2A208S	**268722**	5
	230Vac	EC25A...EC40A...B	ECCS2A230S	**268723**	5
	240Vac	EC25A...EC40A...B	ECCS2A240S	**268724**	5
	400Vac	EC25A...EC40A...B	ECCS2A400S	**268725**	5
	440Vac	EC25A...EC40A...B	ECCS2A440S	**268726**	5
	480Vac	EC25A...EC40A...B	ECCS2A480S	**268727**	5
	500Vac	EC25A...EC40A...B	ECCS2A500S	**268728**	5
	575Vac	EC25A...EC40A...B	ECCS2A575S	**268985**	5
	600Vac	EC25A...EC40A...B	ECCS2A600S	**268729**	5
DC Wide Voltage range (W) Operating range: +25% Un -30% Un	12Vdc	EC25AD...EC40D...B	ECCS2D012S	**268730**	5
	24Vdc	EC25AD...EC40D...B	ECCS2D024S	**268731**	5
	36Vdc	EC25AD...EC40D...B	ECCS2D036S	**268732**	5
	48Vdc	EC25AD...EC40D...B	ECCS2D048S	**268733**	5
	60Vdc	EC25AD...EC40D...B	ECCS2D060S	**268734**	5
	72Vdc	EC25AD...EC40D...B	ECCS2D072S	**268735**	5
	110Vdc	EC25AD...EC40D...B	ECCS2D110S	**268736**	5
	125Vdc	EC25AD...EC40D...B	ECCS2D125S	**268737**	5
	230Vdc	EC25AD...EC40D...B	ECCS2D230S	**268738**	5
	250Vdc	EC25AD...EC40D...B	ECCS2D250S	**268739**	5
	440Vdc	EC25AD...EC40D...B	ECCS2D440S	**268740**	5
DC Low Consumption (L) VDC < 5.5W for EC25 up to EC40	24Vdc	EC25AD...EC40D...B	ECCS2D024SL	**268741**	5
	48Vdc	EC25AD...EC40D...B	ECCS2D048SL	**268742**	5
	110Vdc	EC25AD...EC40D...B	ECCS2D110SL	**268743**	5
	230Vdc	EC25AD...EC40D...B	ECCS2D230SL	**268744**	5

Accessories for contactors

Auxiliary contact blocks

	Contacts				Box clamp terminals		
	NO	NC	NO EM	NC EM	Cat. no.	Ref. no.	Pack
	•3 •4	•1 •2	•7 •8	•5 •6			
Frontal auxiliary blocks							
	2 contacts						
	1	1	-	-	ECFA211S	**268872**	5
	2	0	-	-	ECFA220S	**268873**	5
	0	2	-	-	ECFA202S	**268874**	5
	4 contacts						
	4	0	-	-	ECFA440S	**268881**	5
	3	1	-	-	ECFA431S	**268882**	5
	2	2	-	-	ECFA422S	**268883**	5
	1	3	-	-	ECFA413S	**268884**	5
	0	4	-	-	ECFA404S	**268885**	5
	1	1	1	1	ECFA422SE	**268886**	5
Lateral auxiliary blocks							
	Contact block						
	2	0	-	-	ECLA220S	**268899**	10
	1	1	-	-	ECLA211S	**268900**	10
	0	2	-	-	ECLA202S	**268901**	10
	Mechanical interlock						
	0	0	-	-	ECMI	**268908**	10
	0	2	-	-	ECMI02S	**268910**	10

Pneumatic timer[1]

	NO	NC	Time	Type	Box clamp terminals Cat. no.	Ref. no.	Pack
	•7 •8	•5 •6					
	1	1	0.1-30 s	delay ON	ECPT30SC	**268913**	5
	1	1	1 -60 s	delay ON	ECPT60SC	**268914**	5
	1	1	0.1-30 s	delay OFF	ECPT30SD	**268916**	5
	1	1	1 -60 s	delay OFF	ECPT60SD	**268917**	5

All accessories can be used with all type of contactors.
(1) Use only with contactor coil in AC voltage.

New

Accessories for contactors (continued)

Mechanical latch

NC	Use with	Coil voltage 50/60HZ	Coil voltage DC	Box clamp terminals Cat. no.	Box clamp terminals Ref. no.	Pack
5 / 6						
1	EC09A up to EC18A, ECACA	24-32V	-	ECML1AS032	**268919**	5
1	EC09A up to EC18A, ECACA	42-60V	-	ECML1AS060	**268920**	5
1	EC09A up to EC18A, ECACA	110-127V	-	ECML1AS127	**268921**	5
1	EC09A up to EC18A, ECACA	220-240V	-	ECML1AS277	**268922**	5
1	EC09A up to EC18A, ECACA	380-480V	-	ECML1AS480	**268923**	5
1	EC09A up to EC18A, ECACA	500-690V	-	ECML1AS660	**268924**	5
1	EC25A up to EC40A	24-32V	-	ECML2AS032	**268925**	5
1	EC25A up to EC40A	42-60V	-	ECML2AS060	**268926**	5
1	EC25A up to EC40A	110-127V	-	ECML2AS127	**268927**	5
1	EC25A up to EC40A	220-240V	-	ECML2AS277	**268928**	5
1	EC25A up to EC40A	380-480V	-	ECML2AS480	**268929**	5
1	EC25A up to EC40A	500-690V	-	ECML2AS660	**268930**	5
1	EC09D up to EC18D, ECACD	-	24-36V	ECML1DS036	**269325**(1)	5
1	EC09D up to EC18D, ECACD	-	42-48V	ECML1DS048	**269326**(1)	5
1	EC09D up to EC18D, ECACD	-	60-72V	ECML1DS072	**269327**(1)	5
1	EC09D up to EC18D, ECACD	-	110-277V	ECML1DS177	**269328**(1)	5
1	EC09D up to EC18D, ECACD	-	220-250V	ECML1DS250	**269329**(1)	5
1	EC09D up to EC18D, ECACD	-	440V	ECML1DS440	**269330**(1)	5
1	EC25D up to EC40D	-	24-36V	ECML2DS036	**269331**(1)	5
1	EC25D up to EC40D	-	42-48V	ECML2DS048	**269332**(1)	5
1	EC25D up to EC40D	-	60-72V	ECML2DS072	**269333**(1)	5
1	EC25D up to EC40D	-	110-277V	ECML2DS277	**269334**(1)	5
1	EC25D up to EC40D	-	220-250V	ECML2DS250	**269335**(1)	5
1	EC25D up to EC40D	-	440V	ECML2DS440	**269336**(1)	5

(1) No use with DC version low consumption

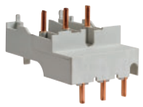
Surge suppressor (plug-in)

Description	Suppressor type	Voltage	Cat. no.	Ref. no.	Pack
Diode type, DC 12-440V	DI	DC	ECSUDI440	**268931**	10
RC type, AC 24-48V	RC	AC	ECSURC048	**268932**	10
RC type, AC 50-127V	RC	AC	ECSURC127	**268933**	10
RC type, AC 130-250V	RC	AC	ECSURC250	**268934**	10
RC type, AC 230-440V	RC	AC	ECSURC440	**268935**	10
RC type, AC 400-600V	RC	AC	ECSURC600	**268936**	10
Varistor type, AC/DC 24-48V	VA	AC/DC	ECSUVA048	**268937**	10
Varistor type, AC/DC 50-127V	VA	AC/DC	ECSUVA127	**268938**	10
Varistor type, AC/DC 130-250V	VA	AC/DC	ECSUVA250	**268939**	10
Varistor type, AC/DC 230-440V	VA	AC/DC	ECSUVA440	**268940**	10
Varistor type, AC/DC 400-600V	VA	AC/DC	ECSUVA600	**268941**	10

New

Accessories for starters

Fuseless starter kits

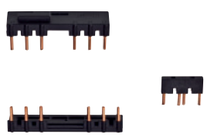


Use with	Description	Cat. no.	Ref. no.	Pack
GPS1 - EC09A up to EC25A	Link module	ECM1AL25	**268954**	5
GPS1 - EC32A	Link module	ECM1AL32	**268955**	5
GPS2 - EC32A and EC40A	Link module	ECM2AL40	**268956**	5
GPS1 - EC09 up to EC25	25A - 60mm busbar adapter 45x200mm	PBF23EBDA	**107152**	4
GPS2 - EC32 up to EC40	63A - 60mm busbar adapter 54x200	PBF23ECDA	**107153**	4
EC09-EC40	45mm busbar adapter empty for reversing/star-delta application	ECBSRSD1	**267403**	4
EC09-EC40	54mm busbar adapter empty for reversing/star-delta application	ECBSRSD2	**267404**	4
EC09-EC40	9mm busbar adapter empty for contactor lateral blocks	ECBSLS	**267405**	10
	60mm universal busbar support	ECBS60S	**267406**	10
	Lateral protection for universal busbar support	ECBSLP	**267407**	10
GPS1 - EC09 up to EC32	Base plate 45mm	ECBP45	**268962**	5
GPS2 - EC32 and EC40	Base plate 55mm	ECBP55	**268953**	5

Wiring kits for reversing starters

Use with	Description	Cat. no.	Ref. no.	Pack
EC09A up to EC25A	Suitable to be used for upper and lower connections with and without overload relay **with** mechanical interlock	ECKS1RV	**268948**	1
EC32A and EC40A	Suitable to be used for upper and lower connections with and without overload relay **with** mechanical interlock	ECKS2RV	**268950**	1

Wiring kits for star delta starters

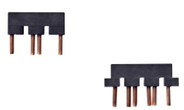


Use with	Description	Cat. no.	Ref. no.	Pack
EC09 up to EC25	Suitable to be used for upper and lower connections with and without overload relay	ECKS1YD	**268951**	1
EC32 and EC40	Suitable to be used for upper and lower connections with and without overload relay	ECKS2YD	**268952**	1

Parallel busbar

Use with	Description	Cat. no.	Ref. no.	Pack
EC09 up to EC25	Parallel busbar for 2 contactors	ECBB1B2	**268942**	5
EC32 and EC40	Parallel busbar for 2 contactors	ECBB2B2	**268945**	5

Parallel poles



Use with	Description	Cat. no.	Ref. no.	Pack
EC09 up to EC25	3 poles in parallel	EC3PP1B	**268943**	6
EC09 up to EC25	4 poles in parallel	EC4PP1B	**268944**	6
EC32 and EC40	3 poles in parallel	EC3PP2B	**268946**	6
EC32 and EC40	4 poles in parallel	EC4PP2B	**268947**	6

New

Thermal overload relays

Thermal overload relays

Trip class 10

Setting range		Fuses			Box clamp terminals		
Min. A	Max. A	AM A	gL-gG A	Use with	Cat. no.	Ref. no.	Pack
0.16	0.26	2	2	EC09 EC12 EC18	ECRT1B10B	**268996**	5
0.25	0.41	2	2		ECRT1B10C	**268997**	5
0.40	0.65	2	2		ECRT1B10D	**268998**	5
0.65	1.10	2	4		ECRT1B10F	**268999**	5
1.00	1.50	4	6		ECRT1B10G	**269000**	5
1.30	1.90	4	6		ECRT1B10H	**269001**	5
1.80	2.70	6	10		ECRT1B10J	**269002**	5
2.50	4.00	8	16		ECRT1B10K	**269003**	5
4.00	6.30	12	20		ECRT1B10L	**269004**	5
5.50	8.50	16	20		ECRT1B10M	**269005**	5
8.00	12.00	20	25		ECRT1B10N	**269006**	5
10.00	16.00	25	35		ECRT1B10P	**269007**	5
14.50	18.00	32	50		ECRT1B10S	**269008**	5
17.50	22.00	40	63		ECRT1B10T	**269009**	5
8.00	12.00	20	25	EC25 EC32 EC40	ECRT2B10N	**268103**	5
10.00	16.00	25	35		ECRT2B10P	**268104**	5
14.50	18.00	32	50		ECRT2B10S	**268105**	5
17.50	22.00	40	63		ECRT2B10T	**268106**	5
21.00	26.00	40	63		ECRT2B10U	**268107**	5
25.00	32.00	50	80		ECRT2B10V	**268108**	5
30.00	40.00	63	100		ECRT2B10W	**268109**	5

Accessories

Use with	Description	Cat. no.	Ref. no.	Pack
Base for separate mounting				
ECRT1	DIN EN500022-35	ECRT1BS	**268963**	1
ECRT2	DIN EN500022-35	ECRT2BS	**268964**	1
Push-button with flexible cable				
ECRT1	0.5 m	RTXS	**113855**	1
	1 m	RTXSL	**113856**	1
	backside reset	RTXBS	**108864**	1
Remote electrical reset				
ECRT1 and ECRT2	12 VAC/DC	RTXRRB	**113661**	1
	24 VAC/DC	RTXRRD	**113662**	1
	48 VAC/DC	RTXRRG	**113663**	1
	110-240VAC/DC	RTXRRJ	**113664**	1
	220/415VAC/DC	RTXRRN	**113665**	1
	380/480VAC/DC	RTXRRU	**113666**	1

New

Conformity to standards

IEC/EN 60947-1	GB14048.4
IEC/EN 60947-4-1	UL508
IEC/EN 60947-5-1	UL486E
IEC/EN 60947-5-4	CSA2.22-14
EN50011	NF F16 101/102
EN50012	
EN50005	

Approvals/Marking

(1) (1) (1) (1)

(1) In progress

Mounting positions

Installation capabilities

With de-rating values

-10% connection voltage -10% disconnection voltage with same rated power, data compared to vertical mounting

+10% disconnection voltage +10% connection voltage with same rated power, data compared to vertical mounting

Ambient conditions

Storage temperature	-55°C to +80°C
Operation temperature	-40°C to +55°C
	-40°C to +70°C (1)
Altitude	<2000m

(1) From 100% to 110% of rated control voltage, without additional auxiliary blocks

Climatic resistance (IEC 68-2)

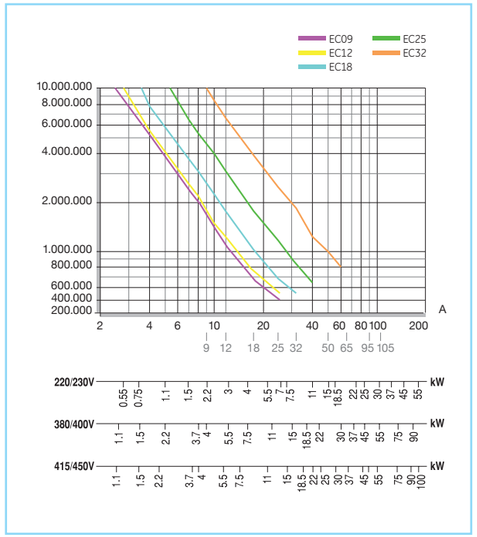
Continuous tests 40 / 125 / 56	
Cold (72h)	
Temperature	-40°C
Dry heat (96h)	
Temperature	+125°C
Relative humidity	< 50%
Humid heat (56h)	
Temperature	+40°C
Relative humidity	95%
Cyclic tests (6 cycles)	
Humid heat	
First half-cycle	
Low temperature	+25°C
Relative humidity	93%
Second half-cycle	
Low temperature	+55°C
Relative humidity	95°C

Terminal capacity and tightening torque

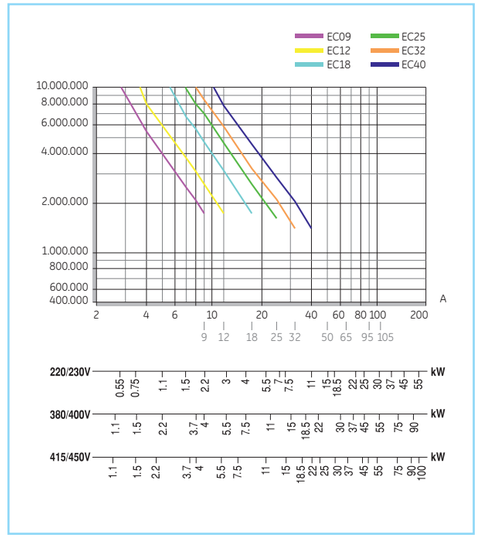
Conventional Thermal Current (Ith)	(A)	Head type	EC09 - EC18	EC25	EC32 - EC40
Box terminals			32	45	60
Solid, stranded and finely stranded w/o end sleeve	(mm^2)	Slot & PZ2	0.75...6	0.75...10	0.75...16
Finely stranded with end sleeve	(mm^2)	Slot & PZ2	0.75...6	0.75...10	0.75...16
Finely stranded w/o end sleeve	(mm^2)	Slot & PZ2	0.75...6	0.75...10	0.75...16
AWG wires			18...10	18...8	18...6
Tightening torque	(Nm) (Lb x in.)		2.2 / 20	2.2 / 20	2.2 / 20
Finely stranded w/o end sleeve	(mm^2)	Slot & PZ2	0.75...6	0.75...10	0.75...16
AWG wires			18...10	18...8	18...6
Tightening torque	(Nm) (Lb x in.)		2.2 / 20	2.2 / 20	2.2 / 20
Finely stranded with end sleeve	(mm^2)	Slot & PZ2	0.75...6	0.75...10	0.75...16
AWG wires			18...10	18...8	18...6
Tightening torque	(Nm) (Lb x in.)		2.2 / 20	2.2 / 20	2.2 / 20

Electrical endurance

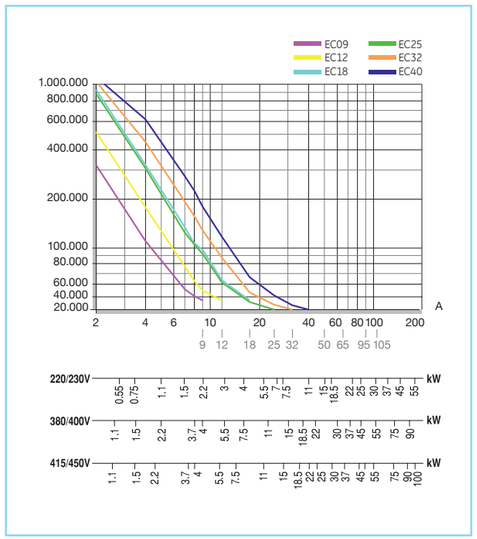
Category AC1 (3P & 4P contactors)



Category AC3 (3P contactors)



Category AC4 (3P contactors)



Power circuit

		EC 09	EC 12	EC18	EC 25	EC 32	EC 40
Three pole version							
Rated thermal current Ith at θ ≤ 55°C	(A)	25	25	32	45	60	60
Rated operational current Ie AC-3	(A)	9	12	18	25	32	40
Rated operational voltage Ue	(V)	690V acc. IEC 60947-4-1 / 600V acc. UL-CSA					
Four pole version							
Rated thermal current Ith at θ ≤ 55°C	(A)	-	25	32	45	60	-
Rated operational voltage Ue	(V)	690V acc. IEC 60947-4-1 / 600V acc. UL-CSA					
Three and four pole version							
Rated insulation voltage Ui	(V)	1000V acc. IEC 60947-4-1 / 600V acc. UL-CSA					
Maximum continuous current AC-1	(A)	25	25	32	45	60	60
Frequency limits	(Hz)	25...400	25...400	25...400	25...400	25...400	25...400
Making capacity (RMS) (IEC- 60947) U = 500V	(A)	220	220	220	315	520	520
Breaking capacity (RMS) (acc. IEC-60947)							
Ue = 500V	(A)	220	220	220	315	520	520
Ue = 690V	(A)	120	120	120	144	232	232
Short-time current from cold state							
1s	(A)	570	570	570	790	1265	1265
5s	(A)	254	254	254	355	565	565
10s	(A)	180	180	180	250	400	400
30s	(A)	104	104	104	145	231	231
1min	(A)	74	74	74	102	164	164
3min	(A)	42	42	42	60	95	95
Recovery time	(min)	10	10	10	10	10	10
Protection against short-circuit with fuses without thermal overload relay							
Coordination type 1							
gL-gG (U = 500V, 50kA or U = 415V, 80kA)	(A)	40	40	50	63	80	80
Coordination type 2							
gL-gG (U = 500V, 50kA or U = 415V, 80kA)	(A)	25	35	40	50	63	80
Average Impedance per pole	(mΩ)	2.25	2.25	2.25	1.6	1.2	1.2
Power dissipation per pole							
AC-1	(W)	1.41	1.41	2.30	3.24	4.32	4.32
AC-3	(W)	0.18	0.32	0.73	1.00	1.23	1.92
Insulation resistance							
Between adjacent poles	(MΩ)	>10	>10	>10	>10	>10	>10
Between poles and earth	(MΩ)	>10	>10	>10	>10	>10	>10
Between input and output	(MΩ)	>10	>10	>10	>10	>10	>10

Control circuit - Alternating current

		EC09 up to EC18	EC25 up to EC40
Rated insulation voltage Ui	(V)	1000	1000
Standard voltages Us 50Hz	(V)	12-600	12-600
Standard voltages Us 60Hz	(V)	12-600	12-600
Voltage operating limits 50/60Hz coils			
Operating 50Hz xUs		0.8 -1.1	0.8 -1.1
Operating 60Hz xUs		0.85-1.1	0.85-1.1
Pick-up 50Hz xUs		0.5...0.8	0.6...0.8
Pick-up 60Hz xUs		0.85-1.1	0.85-1.1
Drop out 50Hz xUs		0.35....0.55	0.30....0.55
Drop out 60Hz xUs		0.35....0.55	0.30....0.55
Maximum consumption bifrequency coils (cold state)			
Magnetic circuit closed (50Hz/60Hz)	(VA)	9.8 / 6.8	11.4 / 7.6
Magnetic circuit opened (50Hz/60Hz)	(VA)	70.1 / 68.2	144 / 138
Power factor			
Magnetic circuit closed cos φ		0.24	0.20
Magnetic circuit opened cos φ		0.85	0.70
Opening and closing times			
Values between +10% Us and –20% Us			
Making time on energisation (NO)	(ms)	10 - 25	10 - 25
Breaking time on de-energisation (NO)	(ms)	5 - 15	5 - 15
Values at Us			
Making time on energisation (NO)	(ms)	10 - 25	10 - 25
Making time on de-energisation (NO)	(ms)	5 - 15	5 - 15
Mechanical endurance			
Bifrequency coils (at 50Hz)	10^6 ops.	10	10
Maximum rate			
AC-1 at rated power	ops./h	1200	1200
AC-2 at rated power	ops./h	1200	1000
AC-3 at rated power	ops./h	1200	1000
AC-4 at rated power	ops./h	360	240
No load	ops./h	7200	7200

Control circuit - Direct current

		Coils with Wide voltage range		Coils with Low consumption	
		EC09 up to EC18	EC25 up to EC40	EC09 up to EC18	EC25 up to EC40
Rated insulation voltage Ui	(V)	1000	1000	1000	1000
Standard voltages Us DC	(V)	12 - 400	12 - 400	12 - 400	12 - 400
Operating Limits					
Operating xUs	(VDC)	0.70 - 1.25	0.70 - 1.25	0.80 - 1.1	0.80 - 1.1
Pick Up xUs	(VDC)	0.45 - 0.65	0.45 - 0.65	0.48 - 0.68	0.48 - 0.68
Drop Out xUs	(VDC)	0.12 - 0.30	0.12 - 0.30	0.12 - 0.30	0.12 - 0.30
Maximum consumption at Us					
Magnet circuit open and closed (cold state)	(W)	7.5	9.5	3.6	5.5
Opening and closing times					
Values between +10% Us and –20% Us					
Making time on energisation (NO)	(ms)	33 - 78	35 - 154	47 - 173	48 - 96
Breaking time on de-energisation (NO)	(ms)	14 - 18	15 - 26	12 - 15	8 - 26
Values at Us					
Making time on energisation (NO)	(ms)	33 - 78	35 - 66	44 - 83	33 - 75
Breaking time on de-energisation (NO)	(ms)	14 - 18	15 - 24	13 - 20	12 - 24
Mechanical endurance					
	10^6 ops.	10	10	10	10
Maximum rate					
AC-1 at rated power	ops./h	1200	1200	1200	1200
AC-2 at rated power	ops./h	1200	1000	1200	1000
AC-3 at rated power	ops./h	1200	1000	1200	1000
AC-4 at rated power	ops./h	360	240	360	240
No load	ops./h	7200	7200	7200	7200

(1) 4.4 for 230 Vdc version

New

Built-in auxiliary contacts

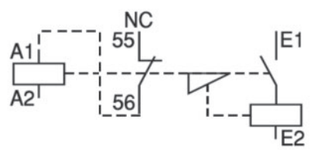
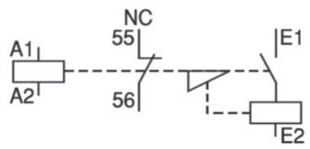
		EC09 up to EC25
Rated insulation voltage Ui according to IEC 60947	(V)	1000
Rated thermal current Ith a θ ≤ 55°C	(A)	10
Making capacity (r.m.s.) acc. to IEC 60947		
AC-15 Ue ≤ 400V, 50/60Hz	(A)	105
DC-13 Ue ≤ 220Vdc	(A)	105
Breaking capacity (r.m.s.) acc. to IEC 60947		
AC-15 Ue ≤ 400V, 50/60Hz	(A)	105
DC-13 Ue ≤ 220Vdc	(A)	2
AC-15 rated voltage and current Ue-Ie according to IEC	(V-A)	110/120-10 220/230-10 380/400-6 415/450-5 500-4 690/660-2
according to UL, CSA		A600
DC-13 rated voltage and current Ue-Ie according to IEC	(V-A)	24-6 48-4 110-2 220-0.7 440-0.35
according to UL, CSA		Q600
Electrical endurance	10^6 ops.	0.2
Minimum operational power (operational safety)		17 V - 5mA
Short-circuit protection Max. fuse class gl-gG without welding	(A)	10
Insulation resistance Between contacts Between contacts and earth	(MΩ) (MΩ)	>10
Guaranteed no overlap between NO and NC contacts		
Space		1.3mm
Impedance of the contacts	(MΩ)	2.7

Auxiliary contact blocks

		ECFA/ECLA
Rated insulation voltage Ui according to IEC 60947	(V)	1000
Rated thermal current Ith at θ ≤ 55°C	(A)	10
Making capacity (leff) according to IEC 60947		
AC-15 Ue ≤ 400V, 50/60Hz	(A)	60
DC-13 Ue ≤ 220Vdc	(A)	60
Breaking capacity (leff) according to IEC 60947		
AC-15 Ue ≤ 400V, 50/60Hz	(A)	60
DC-13 Ue ≤ 220V, DC	(A)	0.95
AC-15 rated voltage and current Ue-Ie according to IEC	(V-A)	110/120-6 220/230- 6 380/400-4 415/450-3.5 500-2.5 690/660-1.5
according to UL, CSA		A600
DC-13 rated voltage and current Ue-Ie according to IEC	(V-A)	24-4 48-2 110-0.7 220-0.3 440-0.15
according to UL, CSA		Q600
Electrical endurance	10^6 ops.	0.2
Mechanical endurance	10^6 ops.	10
Minimum operational current (operational safety)		17-5 V-mA
Short-circuit protection Max. fuse class gl-gG without welding	(A)	10
Insulation resistance Between contacts Between contacts and earth	(MΩ) (MΩ)	>10
Guaranteed no overlap between NO and NC contacts		
Space		1.6mm for ECFA / 2.2mm for ECLA
Impedance of the contacts	(MΩ)	2.7

New

Mechanical latch blocks

Rated insulation voltage Ui	(V)	1000
Standard voltages Us: 50 to 60Hz and DC	(V)	24-660 & 24-440
Operating limits		85% to 110%
Consumption for unlatching (auto cut-out)		
24 to 72V		30W / 25VA
110 to 440V		15W / 12VA
Electrical unlatching control		18
Minimum impulse	(ms)	15 – 25
Maintained		Auto cut by internal contact
Manual unlatching control		By manual push-button
Electrical making control		
Minimum pulse	(ms)	40 (auto cut)
Manual making control		By manual push-button
Auxiliary contact NC		
AC-15 utilisation according to IEC	(V-A)	110/120-6 220/230-6 380/400-4 415/450-3.5 500-2.5 690/660-1.5
according to UL/CSA		A600
DC-13 utilisation according to IEC	(V-A)	24-4 48-2 110-0.7 220-0.3 440-0.15
according to UL/CSA		Q600
Mechanical endurance	10^6 ops.	0.2
Wiring diagrams		
Alternating current		
Alternating current / Direct current		

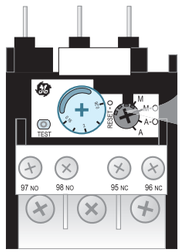
Terminal capacity

Terminal capacity		Screw plate ECMLSA,ECMLSD
Flexible wire	(mm^2)	2x0.5...2.5
AWG wire	(mm^2)	2x20...14
Standard gauge		A3
Tightening torque	(Nm/Lb·in)	1.1 / 10

New

Thermal mechanical overload relays for contactors from 0.16 to 40A

- Control circuit up to 690VAC
- Power circuit ECRT1, ECRT2: up to 690V
- Thermal protection against balanced overload.
- Three-pole differential (phase unbalance protection).
- Automatic ambient temperature compensation.
- Front mounted selector for choosing utilization current.
- Manual trip lever (tripping test).
- Tripping indicator (0-1).
- IP20 protection
- Reset button, 4 positions:
  - Manual RESET
  - Manual RESET and STOP
  - Automatic RESET with STOP
  - Automatic RESET without STOP



Manual RESET

Manual RESET and STOP

Automatic RESET with STOP

Automatic RESET without STOP

IEC/EN 60947-4-1
Ui=690V
Tripping current 120% of current setting

Standards

IEC 7 EN 60947-4-1
IEC EN 60947-5-1
GB14048.4
UL508
CSA22.2/14
VDE 0660

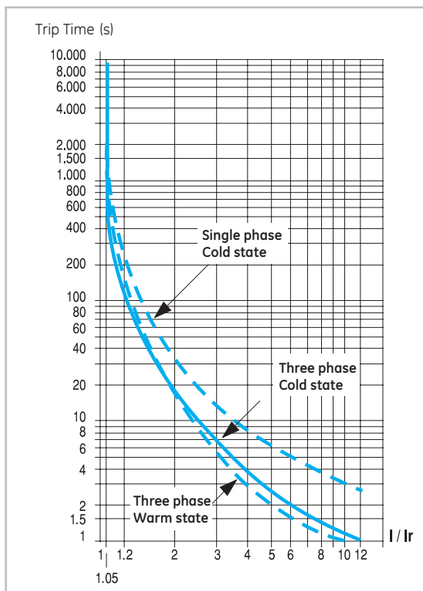
Approvals/Marking

(1)

(1) (1) (1)

(1) In progress

Tripping curves



Multiples of setting current

New

Thermal mechanical overload relays

Class		10A
Setting range	(A)	0.16...40
Suitable for		All Efficor contactors
Main circuit		
Rated insulation voltage	(V)	690
Frequency limits	(Hz)	0-400
Control circuit		
Rated insulation voltage (IEC60947-4) Ui	(V)	690
Rated thermal current Ith	(A)	10
Operation current		
AC-15 - rated voltage and current Ue-Ie	(V-A)	110/120-3 220/230-2 380/400-1 480/500-0.8 690/660-0.3
DC-13 - rated voltage and current Ue-Ie	(V-A)	24-2 48-1.4 110-0.6 220-0.3 440-0.1
Utilisation according UL and CSA		B600-Q600
Protective fuse type gL	(A)	10
Terminal capacity	(mm^2)	0.75..10
Tightening capacity	(Nm)	2.2 / 20

Terminal capacity

Clamp terminal - Flexible	(mm^2)		0.75...10
			18..8
Clamp terminal - Standard gauge			B6
			2.2 / 20

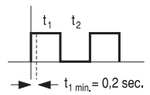
Ambient conditions

Storage temperature	-55°C to +80°C
Operation temperature (compensated)	-25°C to +60°C
Altitude <2000 m	without any changes in characteristics
Relative humidity	40°C, 95% no cond.
Protection treatment	Salt spary test

Remote electrical reset

Power consumption	
AC	100VA
DC	100W

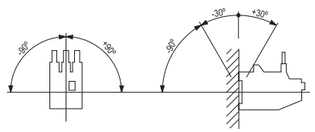
Coils not suitable for continuous operating duty



t_1 = 1 sec. ◆ t_2 = 30 sec.
t_1 = 5 sec. ◆ t_2 = 90 sec.
t_1 = 10 sec. ◆ t_2 = 180 sec.

(t_1 = ON time t_2 = OFF time)

Mounting positions



Inclination angle axis Y and Z: ±30°

New

Coordination table Type 2 with 50kA at 415V and 500V

Thermal Overload Relay	Current Setting range (Aac)	415VAC												500VAC							
		Rated Power (kW)	Rated Current (A)	"r" Current (kA)	"q" Current (kA)	With MCCB as SCPD								Rated Power (kW)	Rated Current (A)	"r" Current (kA)	"q" Current (kA)	With Fuse MMS as SCPD			
						SCPD		Contactor		SCPD (MCCB)		Contactor						SCPD		Contactor	
						Type	Rat. (Aac)	Type	Rat. (Aac)	Type	Rat. (Aac)	Type	Rat. (Aac)					Type	Rat. (Aac)	Type	Rat. (Aac)
ECRT1B10B	0.16 - 0.26	0.06	0.21	1	80	MMS	0.26	EC09A3	9	-	-	-	-	0.06	0.17	1	50	MMS	0.26	EC09A3	9
ECRT1B10C	0.25 - 0.41	0.09	0.31	1	80	Fuse	2	EC09A3	9	-	-	-	-	0.12	0.33	1	50	Fuse	2	EC09A3	9
ECRT1B10D	0.4 - 0.65	0.12	0.4	1	80	Fuse	4	EC09A3	9	-	-	-	-	0.18	0.48	1	50	Fuse	4	EC09A3	9
ECRT1B10F	0.65 - 1.1	0.25	0.8	1	80	Fuse	4	EC09A3	9	-	-	-	-	0.25	0.66	1	50	Fuse	4	EC09A3	9
ECRT1B10G	1.0 - 1.5	0.37	1.1	1	80	Fuse	6	EC09A3	9	-	-	-	-	0.55	1.2	1	50	Fuse	6	EC09A3	9
ECRT1B10H	1.3 - 1.9	0.55	1.5	1	80	Fuse	6	EC09A3	9	-	-	-	-	0.75	1.5	1	50	Fuse	6	EC09A3	9
ECRT1B10J	1.8 - 2.7	0.75	1.9	1	80	Fuse	6	EC09A3	9	-	-	-	-	1.1	2.1	1	50	Fuse	6	EC09A3	9
ECRT1B10K	2.5 - 4.0	1.5	3.4	1	80	Fuse	10	EC09A3	9	-	-	-	-	1.5	2.6	1	50	Fuse	10	EC09A3	9
ECRT1B10L	4.0 - 6.3	2.2	4.5	1	80	Fuse	16	EC09A3	9	-	-	-	-	3	5.3	1	50	Fuse	16	EC09A3	9
ECRT1B10M	5.5 - 8.5	3	6.5	1	80	Fuse	20	EC09A3	9	-	-	-	-	3.7	6	1	50	Fuse	20	EC09A3	9
ECRT1B10N/ ECRT2B10N	8.0 - 12	4	8	1	80	Fuse	25	EC09A3	9	MCCB	12.5	EC25A3	25	5.5	9	1	50	Fuse	25	EC09A3	9
ECRT1B10P/ ECRT2B10P	10.0 - 16.0	5.5	11	1	80	Fuse	35	EC012A3	12	MCCB	12.5	EC25A3	25	7.5	12	1	50	Fuse	35	EC12A3	12
ECRT1B10S/ ECRT2B10S	14.5 - 18.0	7.5	14.8	1	80	Fuse	40	EC018A3	18	MCCB	20	EC25A3	32	10	15.5	1	50	Fuse	40	EC18A3	18
ECRT1B10T/ ECRT2B10T	17.5 - 22	-	-	-	-	-	-	-	-		-	-	-	11	18.4	3	50	Fuse	40	EC18A3	18
ECRT2B10U	21.0 - 26	11	21	3	80	Fuse	50	EC025A3	25	MCCB	30	EC25A3	32	15	23	3	50	Fuse	50	EC25A3	25
ECRT2B10V	25.0 - 32.0	15	28	3	80	Fuse	63	EC032A3	32	MCCB	30	EC32A3	32	17.5	26.5	3	50	Fuse	63	EC32A3	32
ECRT2B10W	30.0 - 40	18.5	35	3	80	Fuse	80	EC040A3	40	MCCB	50	EC40A3	40	22	33	3	50	Fuse	80	EC40A3	40

Thermal overload relays, Trip Class: 10A
Rated operational voltage: 415Vac, 500Vac
Rated insulation voltage: 690Vac
Rated frequency: 50Hz.
Rated duty: Eight hour duty
Pollution degree: 3
Rated conditional short-circuit protection device current: 80kA at 415Vac; 50kA at 500Vac

Surion GPS high breaking capacity (Thermal Magnetic). Coordination Type 2 - 65kA at 380/400 & 415V

Motor[1]			Manual Motor Starter				Contactor	Box clamp		Links
Rated Power	Rated current (A)		Cat.No.	Rated current (In)	Thermal current	Magnetic current	Series	Smallest wire Cu (pvc)[2]	Minimum frontal electrical safety clearence	Cat.No.
kW	380/400V	415V		(A)	Setting range (A)	(A)		380/415V (mm^2)	(mm)	
0.06	0.23	0.21	GPS1BHAB	0.25	0.16-0.25	3.2	EC9A..	0.75	20	ECM1AL25
0.09	0.34	0.31	GPS1BHAC	0.4	0.25-0.4	5.2	EC9A..	0.75	20	ECM1AL25
0.12	0.44	0.4	GPS1BHAD	0.63	0.4-0.63	8.2	EC9A..	0.75	20	ECM1AL25
0.18	0.65	0.63	GPS1BHAE	1	0.63-1	13	EC9A..	0.75	20	ECM1AL25
0.25	0.9	0.8	GPS1BHAE	1	0.63-1	13	EC9A..	0.75	20	ECM1AL25
0.37	1.25	1.1	GPS1BHAF	1.6	1-1.6	20.5	EC9A..	0.75	20	ECM1AL25
0.55	1.6	1.5	GPS1BHAF	1.6	1-1.6	20.5	EC9A..	0.75	20	ECM1AL25
0.75	2	1.9	GPS1BHAG	2.5	1.6-2.5	32.5	EC9A..	0.75	20	ECM1AL25
1.1	2.6	2.5	GPS1BHAH	4	2.5-4	52	EC9A..	0.75	20	ECM1AL25
1.5	3.5	3.4	GPS1BHAH	4	2.5-4	52	EC9A..	0.75	20	ECM1AL25
2.2	5	4.5	GPS1BHAJ	6.3	4-6.3	82	EC9A..	0.75	20	ECM1AL25
3	7	6.5	GPS1BHAK	10	6.3-10	130	EC9A..	1.5	20	ECM1AL25
4	9	8	GPS1BHAK	10	6.3-10	130	EC9A..	1.5	20	ECM1AL25
5.5	12	11	GPS1BHAL	13	9-1.3	169	EC12A..	2.3	20	ECM1AL25
7.5	16	14	GPS1BHAM	16	11.0-16	208	EC18A..	4	20	ECM1AL25
11	22.5	21	GPS1BHAP	25	19-25	325	EC25A..	6	20	ECM1AL25
15	30	28	GPS1BHAR	32	24-32	416	EC32A..	6	20	ECM1AL32
18.5	37	35	GPS2BHAS	40	28-40	520	EC40A..	10	20	ECM1AL32

(1) Current are relevant to four pole motors not having special characteristics of torque. Inrush currents: ≤ 8 time rated current for ≤ 1s.
(2) The minimum cycle cross-sections are referred to an ambient temperature of 30°C max. in free air and are selected to withstand the maximum let-through energy and the motor rated current. Besides the user has to consider the drop voltage, the type of laying and ambient temperature.

Record Plus Coordination Type 2 at 80kA at 380/400 & 415V

Motor[1]			MCCB				Contactor			Overload relay		Box clamp	Clearance
Rated Power	Rated current (A)		Cat.No.	Rated current (In)	Thermal Current	Magnetic Current		**Operating current**	**Admissible power**		Setting Range	Smallest wire Cu (pvc)[2]	Min. frontal electrical safety clearance
kW	380/400V	415V		(A)	Setting range (A)	(A)	Series	A	P(kW)	Series		380/415V (mm^2)	mm
4	9	8	FD63	12.5	12.5	169	EC25A..	25	11	ECRT2	8-12	1.5	20
5.5	12	11	FD63	12.5	12.5	169	EC25A..	25	11	ECRT2	10-16	1.5	20
7.5	16	14.8	FD63	20	20	210	EC32A..	32	15	ECRT2	14.5-18	4	20
11	22.5	21	FD63	30	30	300	EC32A..	32	15	ECRT3	21-26	6	20
15	30	28	FD63	30	30	450	EC32A..	32	15	ECRT3	25-35	6	20
18.5	37	35	FD63	50	50	500	EC40A..	40	18.5	ECRT3	30-40	10	20

Record Plus Coordination Type 2 at 80kA at 500/525V

Motor[1]			MCCB				Contactor			Overload relay		Box clamp	Clearance
Rated Power	Rated current (A)		Cat.No.	Rated current (In)	Thermal Current	Magnetic Current		**Operating current**	**Admissible power**		Setting Range	Smallest wire Cu (pvc)[2]	Min. frontal electrical safety clearance
kW	380/400V	415V		(A)	Setting range (A)	(A)		A	P(kW)	Series		380/415V (mm^2)	mm
7.5	12		FD63	12.5	12.5	-	EC32A..	32	15	ECRT2	10-19	4	20
11	18.4		FD63	20	20	-	EC32A..	32	18.5	ECRT3	17.5-25	6	20
15	23		FD63	30	30	-	EC40A..	40	18.5	ECRT3	21-29	6	20
18.5	29		FD63	30	30	-	EC40A..	40	18.5	ECRT3	25-35	10	20

(1) Current are relevant to four pole motors not having special characteristics of torque. Inrush currents: ≤ 8 time rated current for ≤ 1s.
(2) The minimum cycle cross-sections are referred to an ambient temperature of 30°C max. in free air and are selected to withstand the maximum let-through energy and the motor rated current. Besides the user has to consider the drop voltage, the type of laying and ambient temperature.

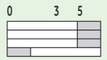
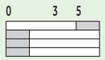
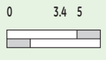
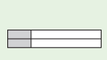
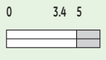
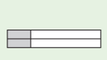
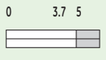
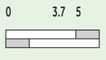
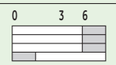
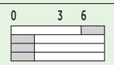
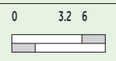
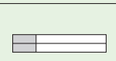
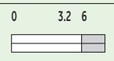
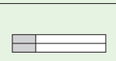
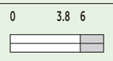
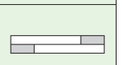
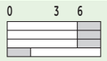
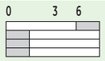
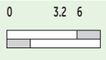
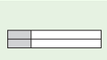
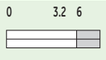
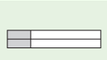
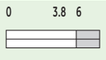
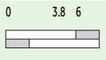
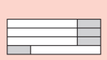
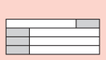
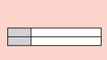
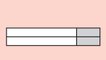
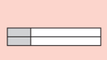
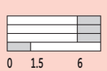
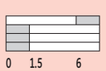
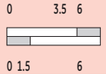
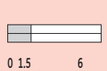
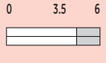
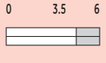
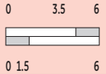
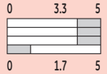
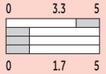
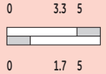
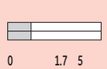
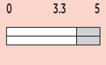
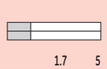
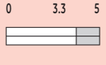
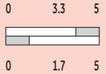
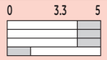
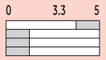
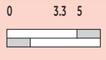
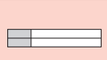
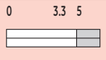
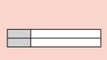
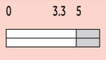
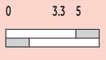
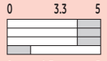
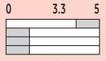
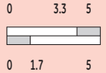
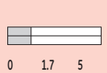
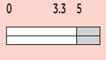
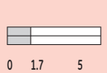
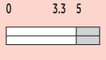
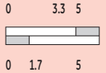
Contact sequence

Device	Rating	Basic contactor	Built-in auxiliary		Auxiliary contact blocks - Front mounted-4P		
			NO	NC	40	.04	22
3P contactors 3NO	EC09 EC12 EC18	0 3.5 5	0 3.5 5	0 2 5	0 3 5	0 1.3 5	0 1.3 5
	EC25	0 4 6	0 3.5 6	0 1.7 6	0 3 6	0 1.3 6	0 1.3 6
	EC32 EC40	0 4 6			0 3 6	0 1.2 6	0 1.2 6
4P contactors 4NO	EC12 EC18						
							0 1.5 6
4P contactors 2NO+2NC	EC09 EC12 EC18	0 3.3 5			0 3.3 5	0 1.7 5	0 3.3 5
	EC25 EC32 EC40	0 4 6			0 4 6	0 2 6	0 4 6

Contact sequence (auxiliary contactors)

4P contactors 4NO	ECAC09 ECAC12 ECAC18 ECAC25	0 3.3 5	0 3.3 5	0 1.7 5	0 3.3 5
4P contactors 2NO+2NC	ECAC09 ECAC12 ECAC18 ECAC25	0 3.3 5	0 3.3 5	0 1.7 5	0 3.3 5

New

	Auxiliary contact blocks - Front mounted-2P				Auxiliary contact blocks - Front mounted-2P		
31	13	11	02	20	02	20	11
							
							
							
							
							
							
							
							

Terminal numbering

3P and 4P contactors

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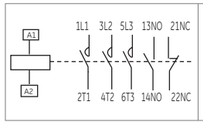	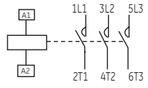	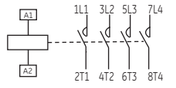	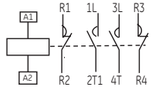	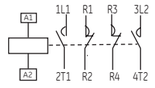

Auxiliary contactors

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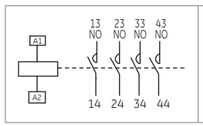	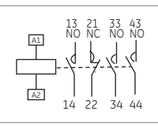	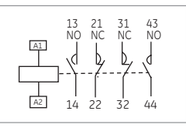	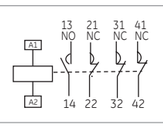	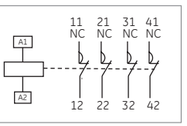

Auxiliary contact blocks - Front mounting

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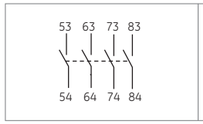	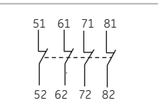	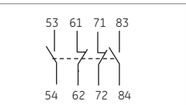	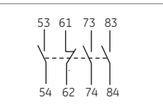	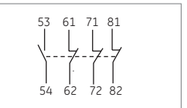

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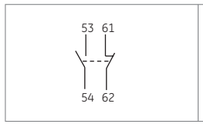
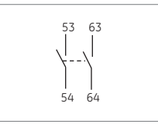
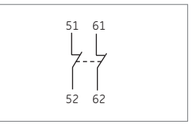
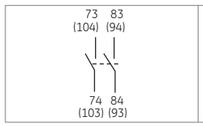
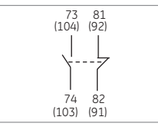
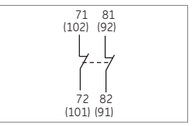
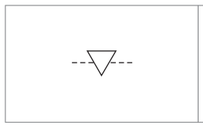
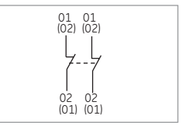
		

Auxiliary contact blocks - Lateral mounting

ECLA20	ECLA11	ECLA02
		

Mechanical and mechanical/electrical interlock

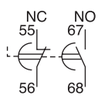
ECMI	ECMI02
	

New

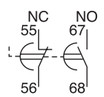
Terminal numbering (continued)

Pneumatic timer blocks

ECPTD

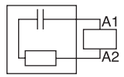


ECPTC

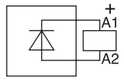


Voltage suppressor blocks

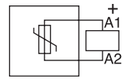
ECSURC



ECSUDI

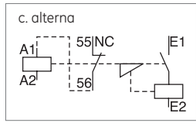


ECSUVI

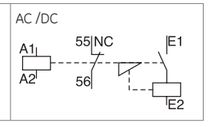


Mechanical latch block

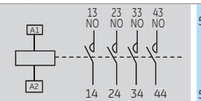
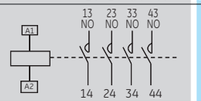
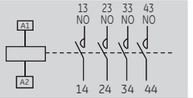
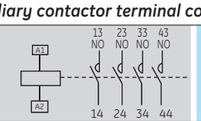
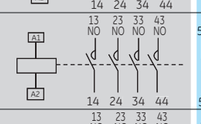
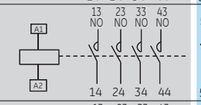
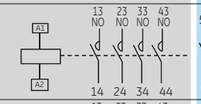
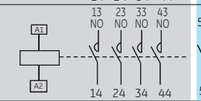
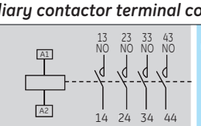
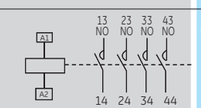
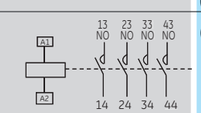
ECMLA



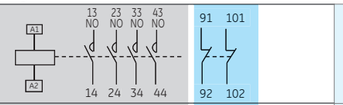
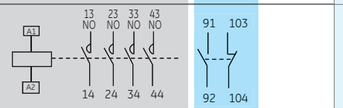
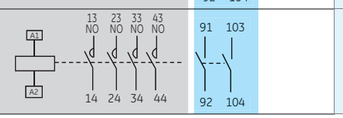
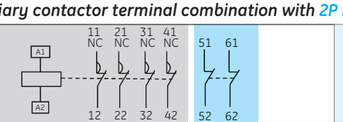
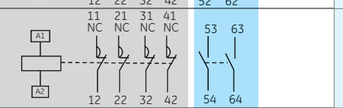
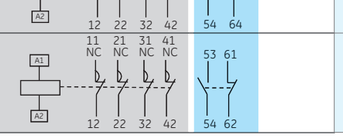
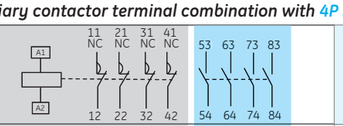
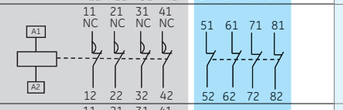
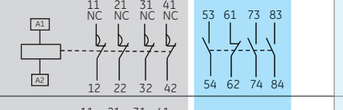
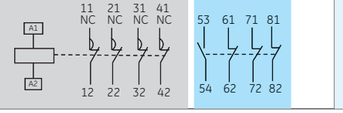
ECMLD



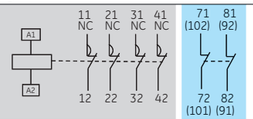
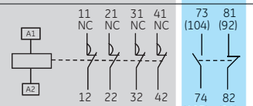
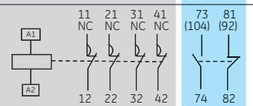
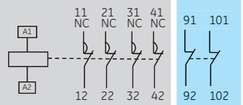
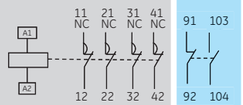
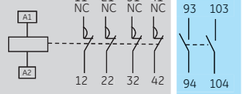
Terminal numbering according to EN 50011

Auxiliary contacts	Description	NO	NC	*Possible basic auxiliary contactors + Auxiliary contacts blocks to be added*
4NO auxiliary contactor terminal combination with 2P FRONTAL block				
	42E	4	2	ECACA440 ECACD440 +ECFA202
	60E	6	0	ECACA440 ECACD440 +ECFA220
	51E	5	1	ECACA440 ECACD440 +ECFA211
4NO auxiliary contactor terminal combination with 4P FRONTAL block				
	80E	8	0	ECACA440 ECACD440 +ECFA440
	44E	4	4	ECACA440 ECACD440 +ECFA440
	62E	6	2	ECACA440 ECACD440 +ECFA422
	71E	7	1	ECACA440 ECACD440 +ECFA431
	53E	5	3	ECACA440 ECACD440 +ECLFA413
4NO auxiliary contactor terminal combination with LATERAL - block mounted on the RIGHT side of contactor				
	42	4	2	ECACA440 ECACD440 +ECLA202
	51	5	1	ECACA440 ECACD440 +ECLA211
	60	6	0	ECACA440 ECACD440 +ECLA220

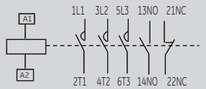
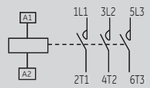
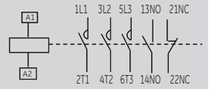
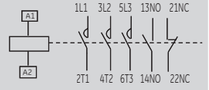
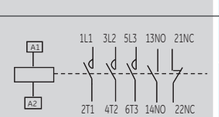
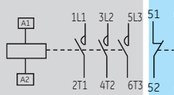
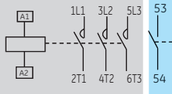
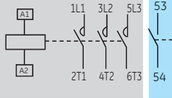
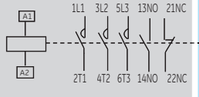
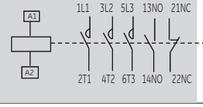
Terminal numbering according to EN 50011 (continued 1)

Auxiliary contacts	Description	NO	NC	*Possible basic auxiliary contactors + Auxiliary contacts blocks to be added*
4NO auxiliary contactor terminal combination with LATERAL - block mounted on the LEFT side of contactor				
	42	4	2	**ECACA440** **ECACD440** **+ECLA202**
	51	5	1	**ECACA440** **ECACD440** **+ECLA211**
	6	6	0	**ECACA440** **ECACD440** **+ECLA220**
4NC auxiliary contactor terminal combination with 2P FRONTAL block				
	06E	6	0	**ECACA404** **ECACD404** **+ECFA202**
	24E	2	4	**ECACA404** **ECACD404** **+ECFA220**
	15E	5	1	**ECACD404** **ECACA404** **+ECFA211**
4NC auxiliary contactor terminal combination with 4P FRONTAL block				
	44E	4	4	**ECACA404** **ECACD404** **+ECFA440**
	08E	0	8	**ECACA404** **ECACD404** **+ECFA404**
	26E	2	6	**ECACA404** **ECACD404** **+ECFA422**
	35E	3	5	**ECACA404** **ECACD404** **+ECFA431**
	17E	1	7	**ECACA404** **ECACD404** **+ECLFA413**

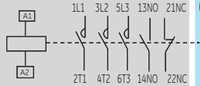
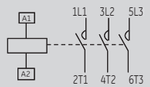
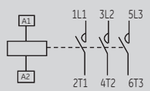
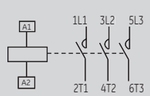
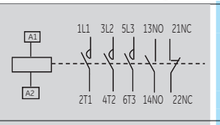
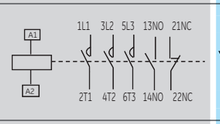
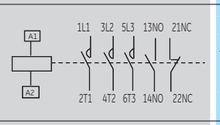
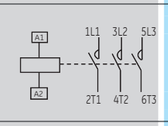
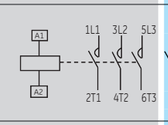
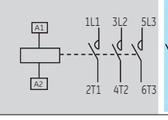
Terminal numbering according to EN 50011 (continued 2)

Auxiliary contacts	Description	NO	NC	*Possible basic auxiliary contactors + Auxiliary contacts blocks to be added*
4NC auxiliary contactor terminal combination with LATERAL - block mounted on the RIGHT side of contactor				
	42	0	6	**ECACA404** **ECACD404** **+ECLA202**
	15	1	5	**ECACA404** **ECACD404** **+ECLA211**
	24	2	4	**ECACA404** **ECACD404** **+ECLA220**
4NC auxiliary contactor terminal combination with LATERAL - block mounted on the LEFT side of contactor				
	42	4	2	**ECACA440** **ECACD440** **+ECLA202**
	51	5	1	**ECACA440** **ECACD440** **+ECLA211**
	6	6	0	**ECACA440** **ECACD440** **+ECLA220**

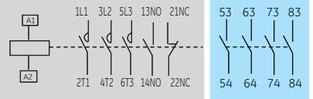
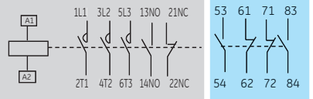
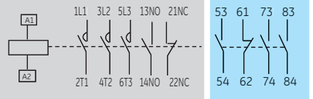
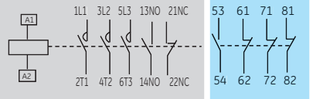
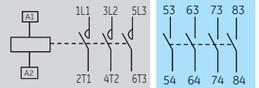
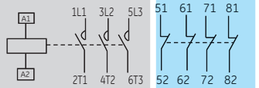
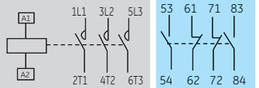
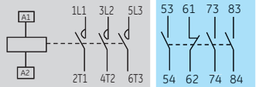
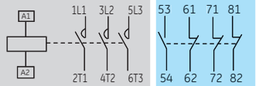
Terminal numbering according to EN 50012

Auxiliary contacts	Description	NO	NC	*Possible basic auxiliary contactors + Auxiliary contacts blocks to be added*
Terminal numbering according to EN 50012				
	11E	1	1	**EC09A311..EC25A311** **EC09D311..EC25D311**
	-	0	0	**EC32A300..EC40A300** **EC32D300..EC40D300**
***FRONT** mounted auxiliary contact blocks with 2 contacts each*				
	13	1	3	**EC09A311..EC25A311** **EC09D311..EC25D311** **+ECFA202**
	31	3	1	**EC09A311..EC25A311** **EC09D311..EC25D311** **+ECFA220**
	22	2	2	**EC09A311..EC25A311** **EC09D311..EC25D311** **+ECFA211**
	02	0	2	**EC32A300..EC40A300** **EC32D300..EC40D300** **+ECFA202**
	20	2	0	**EC32A300..EC40A300** **EC32D300..EC40D300** **+ECFA220**
	11	1	1	**EC32A300..EC40A300** **EC32D300..EC40D300** **+ECFA211**
***LATERAL** mounted auxiliary contact blocks with 2 contacts each - **RIGHT** side mounted*				
	13	1	3	**EC09A311..EC25A311** **EC09D311..EC25D311** **+ECLA220**
	22	2	2	**EC09A311..EC25A311** **EC09D311..EC25D311** **+ECLA211**

Terminal numbering according to EN 50012 (continued 1)

Auxiliary contacts	Description	NO	NC	*Possible basic auxiliary contactors + Auxiliary contacts blocks to be added*
***LATERAL** mounted auxiliary contact blocks with 2 contacts each - **RIGHT** side mounted (continued)*				
	31	3	1	**EC09A311..EC25A311** **EC09D311..EC25D311** **+ECLA220**
	02	0	2	**EC32A300..EC40A300** **EC32D300..EC40D300** **+ECLA202**
	11	1	1	**EC32A300..EC40A300** **EC32D300..EC40D300** **+ECLA211**
	20	2	0	**EC32A300..EC40A300** **EC32D300..EC40D300** **+ECLA220**
***LATERAL** mounted auxiliary contact blocks with 2 contacts each - **LEFT** side mounted*				
	13	1	3	**EC09A311..EC25A311** **EC09D311..EC25D311** **+ECLA202**
	22	2	2	**EC09D311..EC25D311** **EC09A311..EC25A311** **+ECLA211**
	31	3	1	**EC09A311..EC25A311** **EC09D311..EC25D311** **+ECLA220**
	02	0	2	**EC32A300..EC40A300** **EC32D300..EC40D300** **+ECLA202**
	11	1	1	**EC32A300..EC40A300** **EC32D300..EC40D300** **+ECLA211**
	20	2	0	**EC32A300..EC40A300** **EC32D300..EC40D300** **+ECLA220**

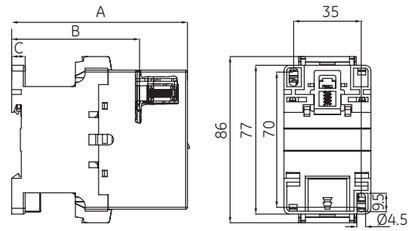
Terminal numbering according to EN 50012 (continued 2)

Auxiliary contacts	Description	NO	NC	*Possible basic auxiliary contactors + Auxiliary contacts blocks to be added*
***FRONT** mounted auxiliary contact blocks with 4 contacts each*				
	51	5	1	**EC09A311..EC25A311** **EC09D311..EC25D311** **+ECFA440**
	15	1	5	**EC09A311..EC25A311** **EC09D311..EC25D311** **+ECFA404**
	33	3	3	**EC09A311..EC25A311** **EC09D311..EC25D311** **+ECFA422**
	42	4	2	**EC09A311..EC25A311** **EC09D311..EC25D311** **+ECFA431**
	24	2	4	**EC09A311..EC25A311** **EC09D311..EC25D311** **+ECFA413**
	40	4	0	**EC09A311..EC25A311** **EC09D311..EC25D311** **+ECFA440**
	04	0	4	**EC09A311..EC25A311** **EC09D311..EC25D311** **+ECFA404**
	22	2	2	**EC32A300..EC40A300** **EC32D300..EC40D300** **+ECFA422**
	31	3	1	**EC32A300..EC40A300** **EC32D300..EC40D300** **+ECFA431**
	13	1	3	**EC32A300..EC40A300** **EC32D300..EC40D300** **+ECFA413**

New

Dimensions and weights

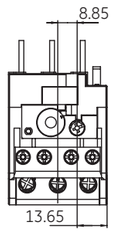
Contactors

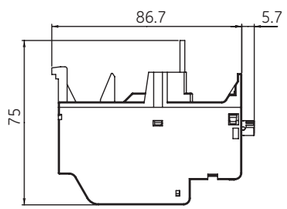


Dimensions in mm	EC09A3 - EC18A3	EC25A3	EC32A3 - EC40A3	EC09D3 - EC18D3	EC25D3	EC32D3 - EC40D3
A	92	97	102	102	110	115
B	66.2	66.2	67.2	76.2	80.2	81.2
C	7	7	7	7	7	7
Weight in g	350	490	530	620	700	740

Thermal overload relay ECRT1

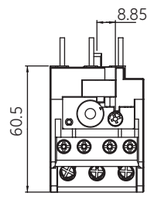
186 g

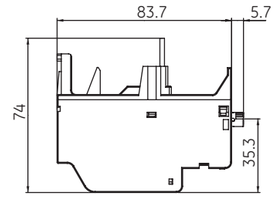




Thermal overload relay ECRT2

194 g

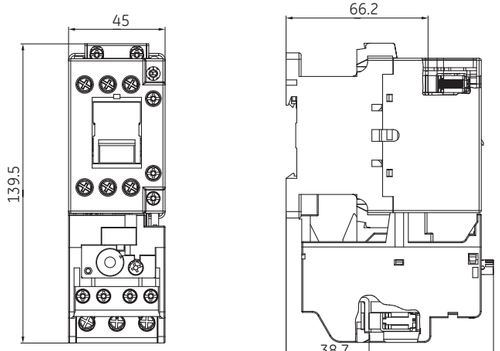


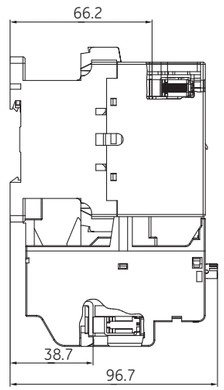


New

Combination of contactor EC09A-12A-18A and thermal overload relay ECRT1

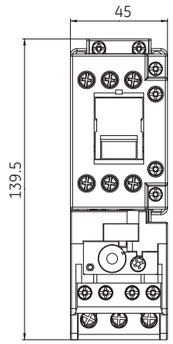
536 g

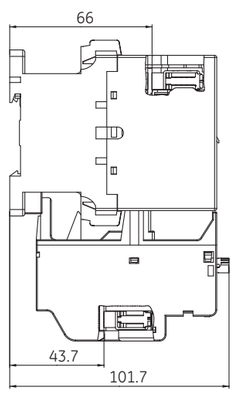




Combination of contactor EC25A and thermal overload relay ECRT2

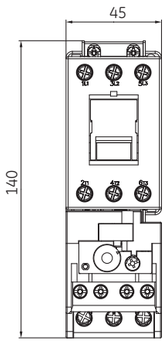
680 g

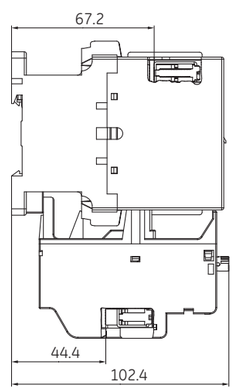




Combination of contactor EC32A-40A and thermal overload relay ECRT2

790 g

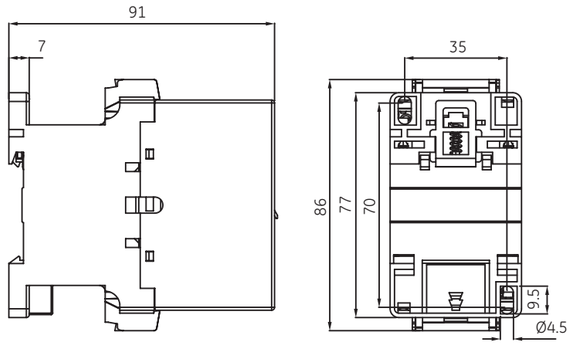




Dimensions and weights

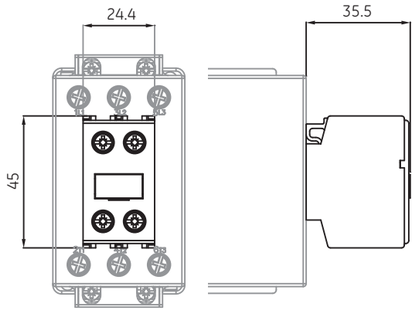
Auxiliary contactors ECACA

330 g



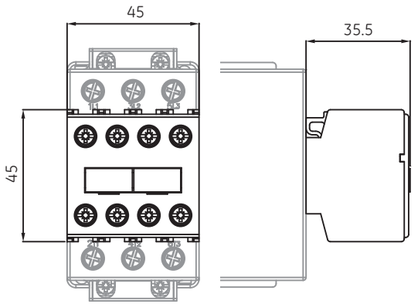
Frontal auxiliary contact block 2P ECFA2S

42 g



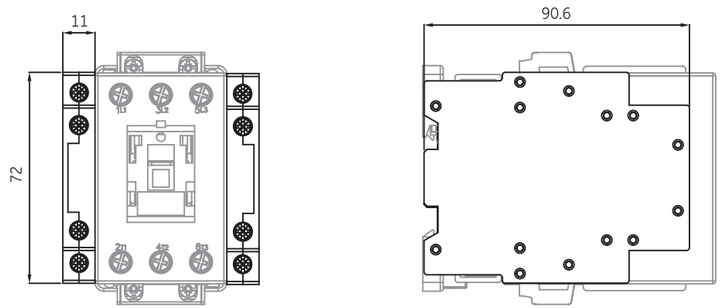
Frontal auxiliary contact block 4P ECFA4S

74 g



Lateral auxiliary contact block ECLA

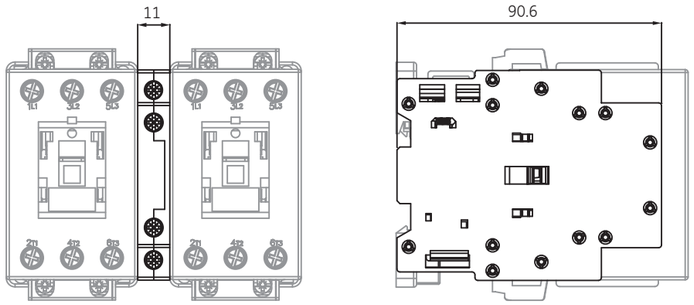
70 g



New

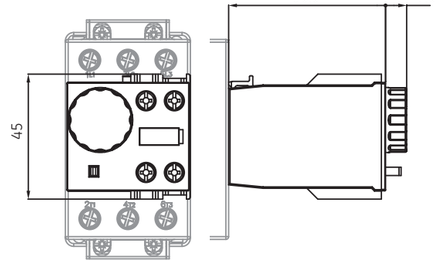
Lateral auxiliary mechanical interlock ECMI

52 g



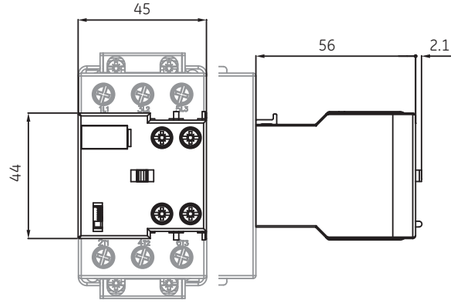
Pneumatic timer ECPT

78 g



Mechanical latch ECML

113 g

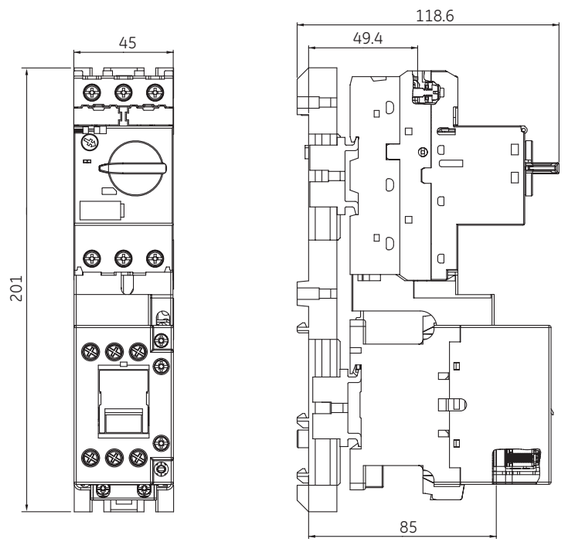


New

Dimensions and weights

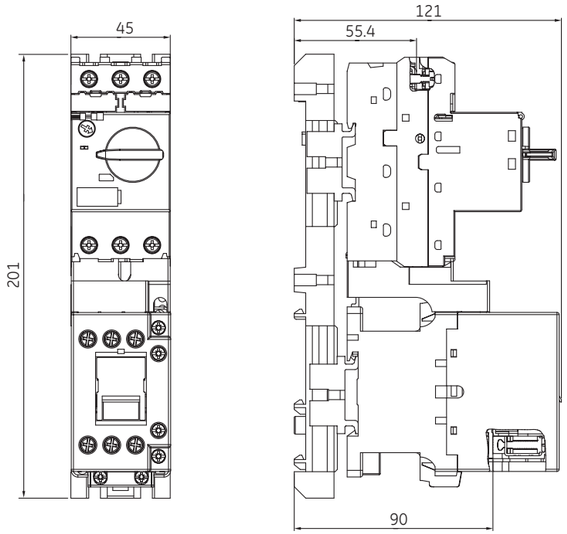
Starter combination of manual motor starter Surion GPS1 and contactor EC09A-12A-18A

787 g



Starter combination of manual motor starter Surion GPS1 and contactor EC25A

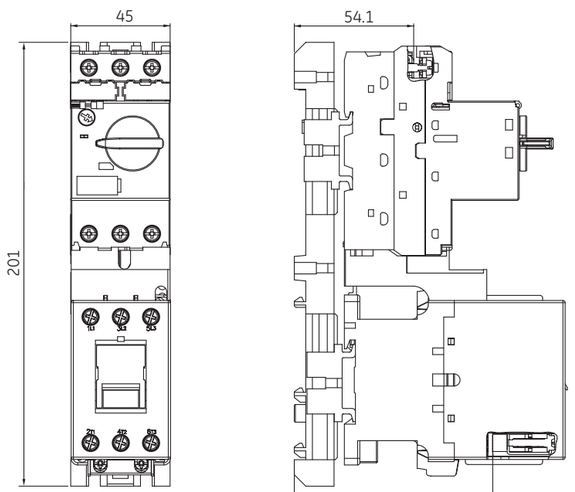
927 g



New

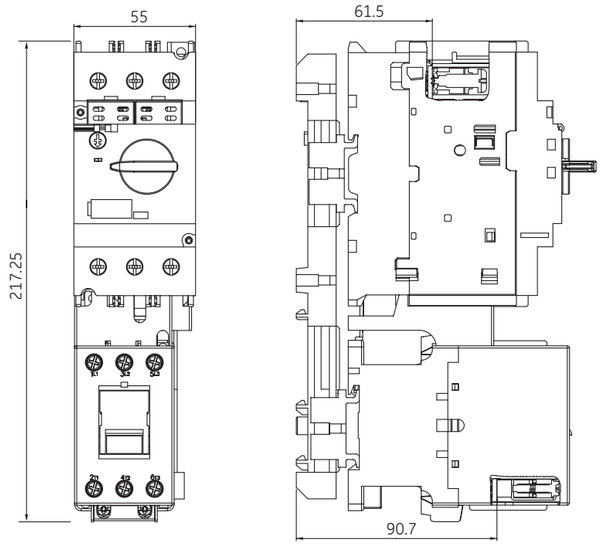
Starter combination of manual motor starter Surion GPS1 and contactor EC32A

967 g

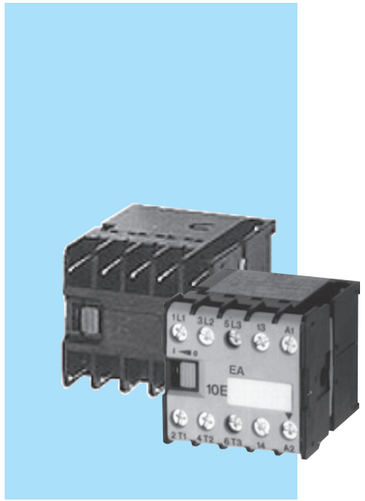


Starter combination of manual motor starter Surion GPS2 and contactor EC40A

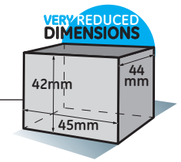
1368 g



New



Three pole minicontactors
7A (AC3)
16A (AC1)



- Control circuit:
  - Alternating current up to 230VAC at 50/60Hz
  - Direct current up to 110VDC
- Low consumption:
  - Only 1.2 WDC
  - 2.4W In AC
- Power circuit: Up to 400VAC
- Rating:
  - 7.3A AC3 at 400V
  - 16A AC1
  - Ith 16A
  - AC15: - 6A 230V
    - 4A 400V
- Motor rating AC-3 duty, 3 phases
  - 230V 1.5kW
  - 400/415V 3kW
- Very reduced dimensions: 42/45/44mm (HxWxD)
- Lateral carrier
- Terminal numbering in accordance with EN 50012
- Fixing by clipping onto 35mm DIN rail (EN 50022-35) or by screws
- Terminal versions:
  - Screws as standard
  - Solder pin for circuit board application
- Integrated one auxiliary contact block: 1NO or 1NC
- No accessories
  - No available additional auxiliary contacts
  - Stand-alone thermal protection

Standards

IEC/EN 60947-1
IEC/EN 60947-4-1
VDE 0660
BS5424

Approvals

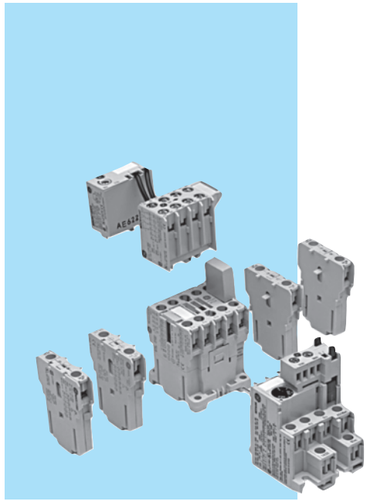
UL CSA

NEW in 2013

AC contactors

Power rating AC3 (kW)				Auxiliary contacts						
230V	400V	Terminal	Poles	NO	NC	Control circuit	Voltage	Cat. no.	Ref. no.	Pack
1.5	3	Screw	3	1	0	AC	24	EA07A310S024	**247990**	10
1.5	3	Screw	3	0	1	AC	24	EA07A301S024	**247991**	10
1.5	3	Screw	3	1	0	AC	48	EA07A310S048	**247992**	10
1.5	3	Screw	3	0	1	AC	48	EA07A301S048	**247993**	10
1.5	3	Screw	3	1	0	AC	110	EA07A310S110	**247994**	10
1.5	3	Screw	3	0	1	AC	110	EA07A301S110	**247995**	10
1.5	3	Screw	3	1	0	AC	230	EA07A310S230	**247996**	10
1.5	3	Screw	3	0	1	AC	230	EA07A301S230	**247997**	10
1.5	3	Screw	3	1	0	DC	24	EA07D310S024	**247998**	10
1.5	3	Screw	3	0	1	DC	24	EA07D301S024	**247999**	10
1.5	3	Screw	3	1	0	DC	110	EA07D310S110	**248000**	10
1.5	3	Screw	3	0	1	DC	110	EA07D301S110	**248001**	10
1.1	1.5	Solder pin	3	1	0	AC	24	EA07A310I024	**248004**	10
1.1	1.5	Solder pin	3	0	1	AC	24	EA07A301I024	**248005**	10
1.1	1.5	Solder pin	3	1	0	DC	48	EA07D310I048	**248006**	10
1.1	1.5	Solder pin	3	0	1	DC	48	EA07D301I048	**248007**	10
1.1	1.5	Solder pin	3	1	0	DC	110	EA07D310I110	**248008**	10
1.1	1.5	Solder pin	3	0	1	DC	110	EA07D301I110	**248009**	10
1.1	1.5	Solder pin	3	1	0	AC	230	EA07A310I230	**248002**	10
1.1	1.5	Solder pin	3	0	1	AC	230	EA07A301I230	**248003**	10

NEW in 2013



Three and four pole contactors 9 and 12A (AC3) 20A (AC1)

- Control circuit: Alternating current up to 600V
  Direct current up to 440V
- Terminal numbering in accordance with EN 50012
- Fixing by clipping onto 35 mm DIN rail (EN 50022-35) or by screws
- Screws and fast-on terminals protected against accidental contact in accordance with VDE 0106 T.100 and VBG4
- Versions: Ring terminal and printed circuit terminals
- Facility to mount instant and timed auxiliary contact blocks and voltage suppressor block
- Degree of protection IP20 (EN 60529).
- Maximum number of auxiliary contacts to be added: 6

Standards

IEC/EN 60947-1	BS 4794
IEC/EN 60947-4-1	NFC 63-110
IEC/EN 60947-5-1	CSA C22.2/14
EN 50003	VDE 0660
EN 50005	SEV 10254
EN 50012	JIS C8325
UL 508	JEM 1038
NEMA ICS-1	CENELEC HD 419

Approvals

cULus IMQ RINA

Lloyd's Register Bureau Veritas CE

(Contact GE for details)

Order codes ● pg. A.45
Auxiliary contact blocks ● pg. A.48
Accessories ● pg. A.50
Technical data ● pg. A.83
Terminal numbering ● pg. A.89
Dimensions ● pg. A.110

General data

		MC1...	MC2...
Maximum number of poles		4	4
Rated thermal current (Ith) θ ≤ 60° [1]	(A)	20	20
Rated operational current Ie [2] **(3x440V, 50/60Hz, AC3)**	(A)	9	12
Rated insulation current Ui	(V)	750	750
Rated operational current Ue	(V)	690	690

Standard voltages

To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit (other voltages on request)

Alternating current (V). Bifrequency coil

♦	10	1	2	9	3	4	5	6	7	8	12	13
AC 50/60Hz	12	24	42	48	110 115	120	220	230	240	440	380	400

Operating voltages limits with bifrequency coils:
With 60Hz =0.85 to 1.1 x Us
With 50Hz =0.8 to 1.1 x Us in continuous service (ED=100%) with a maximum ambient temperature of 40°C

Alternating current (V).

♦	A	E	G	K	M	N	S	U	W	Y
AC 50Hz			48	115 127		220 240	260	380 400	415 440	500
AC 60Hz	6	32	60		208 220	240 277		440	480	600

Direct current (V)

♦	A	B	C	D	E	F	G	H	I	J	K	L	N	17	R	S	16
DC	6	12	32	24	36	42	48	60	72	110	120	125	220	230	240	250	440

Direct current (V) - *Wide voltage range*

♦	WD	WE	WG	WI	WJ	WN
DC	24	33	48	72	110	220

Three pole contactors

Max.operat.current		Admissible power AC3					Aux. contacts		Control circuit: Alternating current		Control circuit: Direct current	
Non-inductive loads	Motors <440V, 3 ~ 50/60Hz	1-phase		3-phase								
		115V	220V	220V 230V	380V 400V	500V	•3 | •4	•1 | •2	Cat. no. [1]	Pack	Cat. no. [1]	Pack
AC1 [2]	AC3 [3]	kW HP	kW HP	kW HP	kW HP	kW HP						
A	A								*Ref. no. see bottom*		*Ref. no. see bottom*	
Terminal: screw												
20	9	0.56	1.12	2.2	4	4	1	0	**MC1A310AT ♦**	20	**MC1C310AT ♦**	10
		0.75	*1.5*	*3*	*5.5*	*5.5*	0	1	**MC1A301AT ♦**	20	**MC1C301AT ♦**	10
20	12	0.75	2	3	5.5	5.5	1	0	**MC2A310AT ♦**	20	**MC2C310AT ♦**	10
		1	*2.6*	*4*	*7.3*	*7.3*	0	1	**MC2A301AT ♦**	20	**MC2C301AT ♦**	10
Terminal: ring terminal												
20	9	0.56	1.12	2.2	4	4	1	0	**MC1A310AR ♦**	20	**MC1C310AR ♦**	10
		0.75	*1.5*	*3*	*5.5*	*5.5*	0	1	**MC1A301AR ♦**	20	**MC1C301AR ♦**	10
20	12	0.75	2	3	5.5	5.5	1	0	**MC2A310AR ♦**	20	**MC2C310AR ♦**	10
		1	*2.6*	*4*	*7.3*	*7.3*	0	1	**MC2A301AR ♦**	20	**MC2C301AR ♦**	10
Terminal: faston 2x2.8 insulated (5)												
16 [4]	9	0.56	1.12	2.2	4	4	1	0	**MC1A310AF ♦**	20	**MC1C310AF ♦**	10
		0.75	*1.5*	*3*	*5.5*	*5.5*	0	1	**MC1A301AF ♦**	20	**MC1C301AF ♦**	10
Terminal: printed circuit												
20	9	0.56	1.12	2.2	4	4	1	0	**MC1A310AI ♦**	20	**MC1C310AI ♦**	10
		0.75	*1.5*	*3*	*5.5*	*5.5*	0	1	**MC1A301AI ♦**	20	**MC1C301AI ♦**	10
20	12	0.75	2	3	5.5	5.5	1	0	**MC2A310AI ♦**	20	**MC2C310AI ♦**	10
		1	*2.6*	*4*	*7.3*	*7.3*	0	1	**MC2A301AI ♦**	20	**MC2C301AI ♦**	10

Spare coil

MB0A ♦	10	**MB0C ♦**	10

(1) To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit (other voltages on request) (see A.44)
(2) Electrical endurance AC-1: MC1... 0.3 x 10^6 operations
MC2... 0.35 x 10^6 operations
(3) Electrical endurance AC-3: MC1... (9A) = 0.85 x 10^6 operations
MC2... (12A)= 0.6 x 10^6 operations
(4) Terminal with wire 1.5 mm^2: Ie = 16A
with wire 1 mm^2: Ie = 10A
Insulated terminal type B 2.8 x 0.8 and wire 1 mm^2 Ie = 8A in accordance with DIN 46247.
(5) Fast-on 1 x 6.3 terminals on request (replace letter **F** by **H** in the catalogue number)

For reference numbers, see chapter X, pg. X.2

Three pole interface contactors

Max. oper. current		Admissible power AC3					Aux. contacts		Voltage 24V D.C, coil 1.2W (1)			Voltage 24V D.C, coil 2W (2)		
Non-inductive load AC1	Motors <440V, 3 ~ 50/60Hz AC3 (3)	1-phase 115V	1-phase 220V	3-phase 220V 230V	3-phase 380V 400V	3-phase 500V	•3 | •4	•1 | •2	Cat. no. (1)	Ref. no.	Pack	Cat. no. (1)	Ref. no.	Pack
A	A	kW	kW	kW	kW	kW								
Terminal: screw														
20	9	0.56	1.12	2.2	4	4	1	0	**MC1I310ATD**	100572	10	**MC1K310ATD**	100576	10
							0	1	**MC1I301ATD**	100573	10	**MC1K301ATD**	100577	10
20	12	0.75	2	3	5.5	5.5	1	0	**MC2I310ATD**	100559	10	**MC2K310ATD**	103590	10
							0	1	**MC2I301ATD**	100538	10	**MC2K301ATD**	103591	10

Spare coil

M80ID	100470	10	**M80KD**	100471	10

(1) No possibility of adding instantaneous auxiliary contact blocks.
(2) Facility to mount an instantaneous auxiliary contact block of two contacts or two instantaneous auxiliary contact blocks of one contact.
(3) Electrical endurance AC-3:
MC0... (6A) = 1.2 x 10^6 operations.
MC1... (9A) = 0.85 x 10^6 operations.
MC2... (12A) = 0.6 x 10^6 operations.

Multipack. Series M

To reduce the amount of waste packaging material and to save time during installation, we offer the opportunity to order contactors in a multipack without the individual packaging.

	Product	**Type**	**Standard pack**	**Multipack** (1)
	Contactors	MC1...MC2a	20	**40**

(1) The quantity ordered must be a multiple of the quantity in each multipack (with the same frame/size and coil voltage)

How to order

To order a multipack, add the suffix **MP** to the standard catalogue number

Example			Standard pack	**Multipack**
			MC0A310ATN	MC0A310ATN **MP** (40 pieces)

Four poles contactors

Max.oper.current		Admissible power AC3					Poles		Control circuit: Alternating current		Control circuit: Direct current	
Non-inductive load	Motors <440V, 3 ~ 50/60Hz	1-phase		3-phase								
		115V	220V	220V 230V	380V 400V	500V						
AC1 [2]	AC3 [3]	kW HP	kW HP	kW HP	kW HP	kW HP			Cat. no. [1]	Pack	Cat. no. [1]	Pack
A	A								*Ref. no. see bottom*		*Ref. no. see bottom*	
Screw terminal												
20	9	**AC1**					4	0	**MC1A400AT ♦**	20	**MC1C400AT ♦**	10
		2.3	4.4	7.5	13	17	2	2	**MC1AB00AT ♦**	20	**MC1CB00AT ♦**	10
		-	-	-	-	-	0	4	**MC1AA00AT ♦**	20		
		AC3										
		0.56	1.12	2.2	4	4						
		0.75	*1.5*	*3*	*5.5*	*5.5*						
20	12	**AC1**					4	0	**MC2A400AT ♦**	20	**MC2C400AT ♦**	10
		2.3	4.4	7.5	13	17	2	2	**MC2AB00AT ♦**	20	**MC2CB00AT ♦**	10
		-	-	-	-	-						
		AC3										
		0.75	2	3	5.5	5.5						
		1	*2.6*	*4*	*7.3*	*7.3*						
Terminal: faston 2x2.8 insulated (5)												
16 [4]	9	**AC1**					4	0	**MC1A400AF ♦**	20	**MC1C400AF ♦**	10
		2.3	4.4	7.5	13	17	2	2	**MC1AB00AF ♦**	20	**MC1CB00AF ♦**	10
		-	-	-	-	-	0	4	**MC1AA00AF ♦**	20		
		AC3										
		0.56	1.12	2.2	4	4						
		0.75	*1.5*	*3*	*5.5*	*5.5*						
Terminal: printed circuit												
20	9	**AC1**					4	0	**MC1A400AI ♦**	20	**MC1C400AI ♦**	10
		2.3	4.4	7.5	13	17	2	2	**MC1AB00AI ♦**	20	**MC1CB00AI ♦**	10
		-	-	-	-	-	0	4	**MC1AA00AI ♦**	20		
		AC3										
		0.56	1.12	2.2	4	4						
		0.75	*1.5*	*3*	*5.5*	*5.5*						
Spare coil									**MB0A ♦**	10	**MB0C ♦**	10

(1) To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit (see A.44)

(2) Electrical endurance AC-1: MC1... 0.3 x 10^6 operations
MC2... 0.35 x 10^6 operations

(3) Electrical endurance AC-3: MC1... (9A) = 0.85 x 10^6 operations
MC2... (12A)= 0.6 x 10^6 operations

(4) Terminal with wire 1.5 mm^2: Ie = 16A
with wire 1 mm^2: Ie = 10A
Insulated terminal type B 2.8 x 0.8 and wire of 1 mm^2 Ie = 8A in accordance with DIN 46247.

(5) Faston 1 x 6.3 terminals on request, (replace letter **F** by **H** in the catalogue number).

For reference numbers, see chapter X, pg. X.2

Instantaneous auxiliary contact blocks

Front mounting

Number contacts	Combinations with basic contactor 10E	Contacts in acc. with EN 50012	Contacts in acc.with EN 50005	Aux.contacts •3 •4	Aux.contacts •1 •2	Cat. no.	Ref. no.	Pack
• Two or four additional contacts, to cover combinations of 3 or 5 contacts without increasing the surface are of the basic contactor								
Screw terminal								
2	21E	11		1	1	**MACN211AT**	100999	10
2	12E	02		0	2	**MACN202AT**	100998	10
2			20	2	0	**MARN220AT**	100994	10
2			11	1	1	**MARN211AT**	100993	10
2			02	0	2	**MARN202AT**	100992	10
4	41E	31		3	1	**MACN431AT**	100997	10
4	32E	22		2	2	**MACN422AT**	100996	10
4	23E	13		1	3	**MACN413AT**	100995	10
4			40	4	0	**MARN440AT**	100991	10
4			31	3	1	**MARN431AT**	100990	10
4			22	2	2	**MARN422AT**	100989	10
4			13	1	3	**MARN413AT**	100988	10
4			04	0	4	**MARN404AT**	100987	10
Ring terminal								
2	21E	11		1	1	**MACN211AR**	103557	10
2	12E	02		0	2	**MACN202AR**	103558	10
2			20	2	0	**MARN220AR**	103349	10
2			11	1	1	**MARN211AR**	103350	10
2			02	0	2	**MARN202AR**	103351	10
4	41E	31		3	1	**MACN431AR**	103559	10
4	32E	22		2	2	**MACN422AR**	103560	10
4	23E	13		1	3	**MACN413AR**	103561	10
4			40	4	0	**MARN440AR**	103352	10
4			31	3	1	**MARN431AR**	103353	10
4			22	2	2	**MARN422AR**	103354	10
4			13	1	3	**MARN413AR**	103355	10
4			04	0	4	**MARN404AR**	103300	10

Instantaneous auxiliary contact blocks *(continued)*

Lateral mounting

Number contacts	Combinations with basic contactor 10E	Contacts in acc. with EN 50012	Contacts in acc.with EN 50005	Aux.contacts •3 •4	Aux.contacts •1 •2	Cat. no.	Ref. no.	Pack
• One or two additional blocks, to cover combinations of 1 or 2 contacts without increasing the height of the basic unit contactor								
Screw terminal								
1	20	10		1	0	**MACL110AT**	100560	10
1	11E	01		0	1	**MACL101AT**	100561	10
Ring terminal								
1	20	10		1	0	**MACL110AR**	103555	10
1	11E	01		0	1	**MACL101AR**	103556	10
Terminal: faston 2x2.8 insulated (1)								
1	20	10		1	0	**MACL110AF**	100562	10
1	11E	01		0	1	**MACL101AF**	100563	10
Terminal: printed circuit								
1	20	10		1	0	**MACL110AI**	100564	10
1	11E	01		0	1	**MACL101AI**	100565	10
• One or two additional blocks, when up to 6 or 7 contacts are needed (combination possible with frontal blocks) • One or two additional blocks on both sides, to cover up to five contacts (combination possible only with lateral blocks)								
Screw terminal								
1			10	1	0	**MARL110ATS**	100519	10
1			01	0	1	**MARL101ATS**	100520	10
Ring terminal								
1			10	1	0	**MARL110ARS**	103299	10
1			01	0	1	**MARL101ARS**	103298	10
Terminal: faston 2x2.8 insulated (1)								
1			10	1	0	**MARL110AFS**	100521	10
1			01	0	1	**MARL101AFS**	100522	10
Terminal: printed circuit								
1			10	1	0	**MARL110AIS**	100523	10
1			01	0	1	**MARL101AIS**	100524	10

(1) Terminal with wire 1 mm^2: Ie = 10A
Insulated terminal type B 2.8 x 0.8 with wire 1 mm^2: Ie = 8A, in accordance with DIN 46247

Accessories

Electronic timer block

For use with:	Time	Function	Ue	Cat. no.	Ref. no.	Pack
Lateral or front fixing to the contactor						
MCR..MC_ ...	0.5 - 60 seg.	delay ON	24... 250V AC/DC	**MREBC10AC2**	100541	10
MCR..MC_ ...	0.2 - 24 seg.	delay ON	24...250V AC/DC	**MREBC20AC2**	100542	10

DIN rail adaptor for electronic timer block

For use with:						
For fixing onto EN 50022-35						
MREBC...				**MVB0R**	100543	10

Voltage suppressor block

For use with:	Type	Control	Ue	Cat. no.	Ref. no.	Pack
Connection and (plug-in) fixing on to the connector						
MCRA,MC_ ...	R/C	AC	12...60V 50/60Hz	**MP0AAE1**	100544	10
MCRA,MC_ ...	R/C	AC	72...250V 50/60Hz	**MP0AAE2**	100545	10
MCRC,MC_ ...	Diode	DC	6...250V DC	**MP0CAE3**	100546	10
MCRC,MC_ ...	Varistor	AC/DC	24-48V	**MP0DAE4**	100536	10

Pole paralleling links

For use with:	Phases	Terminal capacity	Ue	Cat. no.	Ref. no.	Pack
To connect two, three or four phases in parallel						
MC_ ...	2, 3, 4 (parallel)	Ø4.5mm - 16mm^2		**MVP0C**	100600	10

Mechanical interlock

For use with:				Cat. no.	Ref. no.	Pack
Mechanical interlock and pole jumpers						
MCR, MC_ ...				**MMH0**	100547	10

Identification

For use with:				Cat. no.	Ref. no.	Pack
MCR, MC_ ...	Labels (10 sheets of 260 labels)			**EAT 260**	100548	1
MCR, MC_ ...	Labelling plate base. Plug-in labelling plate bases (50 pieces in one pack)			**SPR**	100549	1

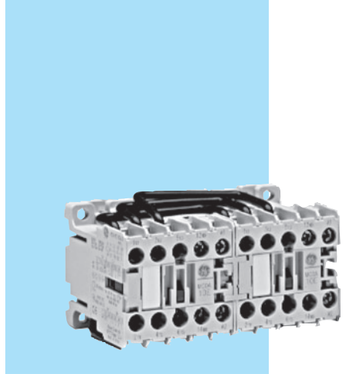
Direct-on-line starters

6 to 12A (AC-3)

- Power circuit: up to 690V AC
- Control circuit: up to 600V AC
- Polycarbonate enclosure (IP40 - IP65)
  - Shock resistance
  - Total insulation ⧈
  - 4 knock-out input holes PG13.5
  - Cable entry in the base
- Terminals protected against accidental contact
- 16 setting ranges from 0.11 up to 14A
- Start contact block

Series M - Direct-on-line starters

	Push-buttons	Protection degree	Cat. no.	Ref. no	Pack
Empty boxes	Start/Stop + Reset	IP40	**MG0004PAT0**	209780	1
		IP65	**MG0006PAT0**	209781	1
	Reset only	IP40	**MG0004RAT0**	137567	1
		IP65	**MG0006RAT0**	116402	1
	Start/Emergency stop	IP40	**MG0004QAT0**	137566	1
		IP65	**MG0006QAT0**	116074	1
Start contact block	Laterally mounted to the contactor, allowing the electrical operation the box push-button which incises on it.		**MAGL110AT**	100608	1



Reversing starters

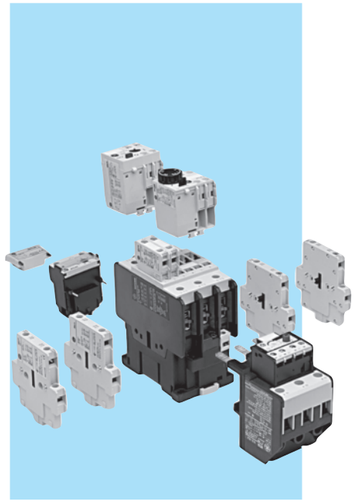
6 to 12A (AC-3)

- Power circuit: up to 690V AC
- Control circuit: up to 600V AC
  up to 250V DC
- Assembled versions on request.
- Screw and push-on terminals protected against accidental contact.
- Protection degree IP20 in accordance with EN 60529.
- Facility to mount instant and timed auxiliary contact blocks and voltage suppressor blocks.

Series M - Reversing starters

	Description	For use with contactor	ac/dc	Cat. no.	Ref. no.	Pack.
Wiring kits for reversing starters	Suitable to be usd with link modules Upper and lower connections without overload relays	MC1.., MC2..	ac/dc	**WKMIU**	101421	1

Wiring diagrams ● page A.134
Dimensions ● page A.137



Three and four pole contactors
9 to 105A (AC3)
25 to 140A (AC1)

- Control circuit: Alternating current up to 690V
  Direct current up to 440V
- Terminal numbering in accordance with EN 50005 and EN 50012
- Fixing by clipping onto 35mm DIN rail EN 50022-35 or by screws
- Screws protected against accidental contact in accordance with VDE 0106 T.100, VBG4.
- Ring terminal version
- Three coil terminals
- Mounting possibilities of front/side instantaneous auxiliary contact blocks, timed auxiliary contact blocks, mechanical latch, transient suppressor block and interface modules.
- Degree of protection: IP20 to CL00 ... CL02
  IP10 to CL25 ... CL10
- Maximum number of auxiliary contacts: 4 for CL00 ... CL25
  6 for CL04 ... CL45
  8 for CL06 ... CL10

Standards

IEC/EN 60947-1
IEC/EN 60947-4-1
IEC/EN 60947-5-1
EN 50005
UL 508
NEMA ICS 1
BS 5424 & 775
CSA 22.2/14
NFC 63-110
ASE 1025
VDE 0660/102
CENELEC HD 419

Approvals

cULus
IMQ (up to Ith=32A)
RINA
Lloyd's Register
Bureau Veritas
CE
(Contact GE for details)

Standard voltages

To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit.

Alternating current (V). Dual-frequency coil

♦	1	2	9	3	4	5	6	7	13	8	15
AC 50/60Hz	24	42	48	110 115	120	220	230	240	400	440	480

Alternating current (V).

♦	E	K	L	N	T	U	W	Y	Z
AC 50Hz	32	127		220 230		380 400	415	500	660 690
AC 60Hz			208	277	380	480	460	600	

Direct current (V)

For contactors type CL...D / Operating limits: 0.80 ... 1.10 x Us

♦	B	D	E	F	G	H	I	J	K	N	P	R	T	X
Voltage	12	24	36	42	48	60	72	110	120 125	220	230	240	250	440

Coil with electronic module for contactors CL...E (can also be used with alternating current)

♦	D	F	H	J	N	Y
Voltage	24 28	42 48	60 72	110 125	220 250	440

Direct current (V). Coil with wide voltage range (0.70 ... 1.30 x Us)

For contactors type CL...D

♦	WB	WD	WE	WF	WG	WH	WI	WJ	WK	WN	WP	WR	WT	WX
DC	12	24	33	42	48	60	72	110	125	220	230	240	250	440

Coil with electronic module for contactors CL...E

♦	WD	WE	WF	WH	WJ	WN
Voltage	24	33	48	72	110	220

Maximun number of add-on auxiliary contact blocks:

CL00D...CL02D : 2NO or 1NC
CL03D...CL45D : 1NO and 1NC
CL05D...CL10D : 4NO or 2NC
CL05E...CL10E : 4 cont. aux.

Different auxiliary contact configurations, contact us.

Order codes ● pg. A.53
Auxiliary contact blocks ● pg. A.57
Accessories ● pg. A.58
Technical data ● pg. A.91
Terminal numbering ● pg. A.99
Dimensions ● pg. A.112

Three pole contactors. Screw terminal

Max.oper.current		Admissible power AC3				Electrical endurance	Aux. contacts		Control circuit: Alternating current		Control circuit: Direct current		Control circuit: Coil with electronic module (AC/DC)	
Non-inductive load	Motors <440V, 3 ~ 50/60Hz AC3	220V 230V	380V 400V	415V 440V	500V				Cat. no. [1]	Pack [3]	Cat. no. [1]	Pack [3]	Cat. no. [1]	Pack [3]
AC1 A	A	kW HP	kW HP	kW HP	kW HP	Cat. AC3 Operations	3 4	1 2	Ref. no. see bottom		Ref. no. see bottom		Ref. no. see bottom	
25	9	2.2 *3*	4 *5.5*	4 *5.5*	5.5 *7.5*	2x10⁶	1 0	0 0	**CL00A310T♦** **CL00A301T♦**	5 5	**CL00D310T♦** **CL00D301T♦**	10 10	- -	
25	12	3 *4*	5.5 *7.5*	5.5 *7.5*	7.5 *10*	2x10⁶	1 0	0 1	**CL01A310T♦** **CL01A301T♦**	5 5	**CL01D310T♦** **CL01D301T♦**	10 10	- -	
32	18	4 *5.5*	7.5 *10*	7.5 *10*	10 *13.5*	1.7x10⁶	1 0	0 1	**CL02A310T♦** **CL02A301T♦**	5 5	**CL02D310T♦** **CL02D301T♦**	10 10	- -	
45	25	7.5 *10*	11 *15*	11 *15*	15 *20*	1.2x10⁶	0	0	**CL25A300T♦**	5	**CL25D300T♦**	10	-	
45	25	7.5 *10*	12 *16*	12 *16*	15 *20*	2x10⁶	1 0	0 1	**CL03A310M♦** **CL03A301M♦**	10 10	**CL03D310M♦** **CL03D301M♦**	10 10	- -	
60	32	9 *12*	16 *22*	16 *22*	18.5 *25*	2x10⁶	1 0	0 1	**CL04A310M♦** **CL04A301M♦**	10 10	**CL04D310M♦** **CL04D301M♦**	10 10	- -	
60	40	11 *15*	18.5 *25*	22 *30*	25 *34*	2x10⁶	0	0	**CL45A300M♦**	10	**CL45D300M♦**	10	-	
90	50	15 *20*	22 *30*	25 *34*	30 *40*	1.8x10⁶	0	0	**CL06A300M♦**	1	**CL06D300M♦**	1	**CL06E300M♦**	1
110	65	18.5 *25*	30 *40*	37 *50*	40 *55*	1.7x10⁶	0	0	**CL07A300M♦**	1	**CL07D300M♦**	1	**CL07E300M♦**	1
110	80	22 *30*	37 *50*	45 *60*	45 *60*	1.5x10⁶	0	0	**CL08A300M♦**	1	**CL08D300M♦**	1	**CL08E300M♦**	1
140	95	25 *34*	45 *60*	50 *68*	55 *75*	1.7x10⁶	0	0	**CL09A300M♦**	1	**CL09D300M♦**	1	**CL09E300M♦**	1
140	105	30 *40*	55 *75*	55 *75*	65 *88*	1.5x10⁶	0	0	**CL10A300M♦**	1	**CL10D300M♦**	1	**CL10E300M♦**	1

Spare coils

CL00 - CL25	**LB1A ♦**	5	**LB1D ♦**	5	-
CL03 - CL45	**LB3A ♦**	5	**LB3D ♦**	5	-
CL06 - CL10	**LB4A ♦**	5	**LB4D ♦**	1	-
coil + electronic module CL06E - CL10E					**LB4E ♦** 1

(1) To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit (see A.52).
(2) Equipped with two blocks BCLF
(3) Multipack, see below

Multipack. Series M and Series CL

To reduce the amount of waste packaging material and to save time during installation, we offer the opportunity to order contactors in a multipack without the individual packaging.

Product	Type	Standard pack	Multipack (1)
Contactors	CL00A...CL25A...	20	**40**
	CL03...CL45...	10	**20**

(1) The quantity ordered must be a multiple of the quantity in each multipack (with the same frame/size and coil voltage)

How to order

For reference numbers, see chapter X, pg. X.4

To order a multipack, add the suffix **MP** to the standard catalogue number

Example	Standard pack	Multipack
	CL03A400MJ	CL03A400MJ **MP** (20 pieces)

Three pole contactors. Ring terminal

Max.oper.current		Admissible power AC3				Electrical endurance	Aux. contacts		Control circuit: Alternating current		Control circuit: Direct current	
Non-inductive load	Motors <440V, 3 ~ 50/60Hz	220V 230V	380V 400V	415V 440V	500V							
AC1	AC3	kW HP	kW HP	kW HP	kW HP	Cat. AC3 Operations	•3 | •4	•1 | •2	Cat. no. (1)	Pack (2)	Cat. no. (1)	Pack (2)
A	A								Ref. no. see bottom		Ref. no. see bottom	
25	9	2.2 *3*	4 *5.5*	4 *5.5*	5.5 *7.5*	$2x10^6$	1 0	0 1	**CL00A310R♦** **CL00A301R♦**	5 5	**CL00D310R♦** **CL00D301R♦**	10 10
25	12	3 *4*	5.5 *7.5*	5.5 *7.5*	7.5 *10*	$2x10^6$	1 0	0 1	**CL01A310R♦** **CL01A301R♦**	5 5	**CL01D310R♦** **CL01D301R♦**	10 10
32	18	4 *5.5*	7.5 *10*	7.5 *10*	10 *13.5*	$1.7x10^6$	1 0	0 1	**CL02A310R♦** **CL02A301R♦**	5 5	**CL02D310R♦** **CL02D301R♦**	10 10
45	25	7.5 *10*	11 *15*	11 *15*	15 *20*	$1.2x10^6$	0 0	0 0	**CL25A300R♦**	5	**CL25D300R♦**	10
45	25	7.5 *10*	12 *16*	12 *16*	15 *20*	$2x10^6$	1 0	0 1	**CL03A310R♦** **CL03A301R♦**	10 10	**CL03D310R♦** **CL03D301R♦**	10 10
60	32	9 *12*	16 *22*	16 *22*	18.5 *25*	$2x10^6$	1 0	0 1	**CL04A310R♦** **CL04A301R♦**	10 10	**CL04D310R♦** **CL04D301R♦**	10 10
60	40	11 *15*	18.5 *25*	22 *30*	25 *34*	$2x10^6$	0 0	0 0	**CL45A300R♦**	10	**CL45D300R♦**	10
90	50	15 *20*	22 *30*	25 *34*	30 *40*	$1.8x10^6$	0 0	0 0	**CL06A300R♦**	1	**CL06D300R♦**	1
110	65	18.5 *25*	30 *40*	37 *50*	40 *55*	$1.7x10^6$	0 0	0 0	**CL07A300R♦**	1	**CL07D300R♦**	1
110	80	22 *30*	37 *50*	45 *60*	45 *60*	$1.5x10^6$	0 0	0 0	**CL08A300R♦**	1	**CL08D300R♦**	1
140	95	25 *34*	45 *60*	50 *68*	55 *75*	$1.7x10^6$	0 0	0 0	**CL09A300R♦**	1	**CL09D300R♦**	1
140	105	30 *40*	55 *75*	55 *75*	65 *88*	$1.5x10^6$	0 0	0 0	**CL10A300R♦**	1	**CL10D300R♦**	1

Spare coils

CL00 - CL25	**LB1A ♦**	5	**LB1D ♦** 5
CL03 - CL45	**LB3A ♦**	5	**LB3D ♦** 5
CL06 - CL10	**LB4A ♦**	5	**LB4D ♦** 1

(1) To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit (see A.52).
(2) Multipack, see A.53

For reference numbers, see chapter X, pg. X.4

Four pole contactors. Screw terminal

Max.oper.current Non-inductive loads AC1 A	AC3 A	Admissible power AC1 220V 230V kW	380V 400V kW	415V 440V kW	500V kW	Electrical endurance Cat. AC1 Operations	Power contacts		Control circuit: Alternating current Cat. no. (1) Ref. no. see bottom	Pack (2)	Control circuit: Direct current Cat. no. (1) Ref. no. see bottom	Pack (2)	Control circuit: Coil with electronic module (AC/DC) Cat. no. (1) Ref. no. see bottom	Pack (2)
25	12	9.5	16.5	18	21.5	$1.5x10^6$	4	0	**CL01A400T♦**	5	**CL01D400T♦**	10	-	
32	18	12	22	23	27.5	$1.5x10^6$	4	0	**CL02A400T♦**	5	**CL02D400T♦**	10	-	
45	25	17	29	32	39	$2x10^6$	4	0	**CL03A400M♦**	10	**CL03D400M♦**	10	-	
60	32	22.5	39.5	43	52	$1.5x10^6$	4	0	**CL04A400M♦**	10	**CL04D400M♦**	10	-	
													CL05E400M♦	1
90	50	34	59	64	78	$1.5x10^6$	4	0	**CL05A400M♦**	1	**CL05D400M♦**	1		
													CL07E400M♦	1
110	65	42	72.5	79	95	$1.8x10^6$	4	0	**CL07A400M♦**	1	**CL07D400M♦**	1		
													CL09E400M♦	1
140	95	53	92	100	121	$1.8x10^6$	4	0	**CL09A400M♦**	1	**CL09D400M♦**	1	-	

Max.oper.current Non-inductive loads AC1	Motors <440V, 3~ 50/60Hz AC3 A	Admissible power AC3 220V 230V kW HP	380V 400V kW HP	415V 440V kW HP	500V kW HP	Power contacts		Control circuit: Alternating current Cat. no. (1) Ref. no. see bottom	Pack (2)	Control circuit: Direct current Cat. no. (1) Ref. no. see bottom	Pack (2)	Control circuit: Coil with electronic module (AC/DC) Cat. no. (1) Ref. no. see bottom	Pack (2)
25	12	3 4	5.5 7.5	5.5 7.5	7.5 10	2	2	**CL01AB00T♦**	5	**CL01DB00T♦**	5	-	
32	18	4 5.5	7.5 10	7.5 10	10 13.5	2	2	**CL02AB00T♦**	5	**CL02DB00T♦**	5	-	
45	25	7.5 10	12 16	12 16	15 20	2	2	**CL03AB00M♦**	10	**CL03DB00M♦**	10	-	
60	32	9 12	16 22	16 22	18.5 25	2	2	**CL04AB00M♦**	10	**CL04DB00M♦**	10	-	
90	40	11 15	18.5 25	22 30	25 34	2	2	**CL05AB00M♦**	1	**CL05DB00M♦**	1	**CL05EB00M♦**	1
110	65	18.5 25	30 40	37 50	40 55	2	2	**CL07AB00M♦**	1	**CL07DB00M♦**	1	**CL07EB00M♦**	1
110	80	22 30	37 50	45 60	45 60	2	2	**CL08AB00M♦**	1	**CL08DB00M♦**	1	**CL08EB00M♦**	1

Spare coils

		Alternating current Cat. no. (1)	Pack (2)	Direct current Cat. no. (1)	Pack (2)	Coil with electronic module (AC/DC) Cat. no. (1)	Pack (2)
CL00 - CL25		**LB1A ♦**	5	**LB1D ♦**	5	-	
CL03 - CL45		**LB3A ♦**	5	**LB3D ♦**	5	-	
CL05A - CL08A		**LB4A ♦**	5	**LB4D ♦**	1	-	
Coil + Electronic module	CL05E - CL08E	**LB4E ♦**	1	-		**LB4E ♦**	1

(1) To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit (see A.52).
(2) Multipack, see A.53

For reference numbers, see chapter X, pg. X.4

Four poles. Ring terminal

Max.oper.current Non-inductive load AC1 A	AC3 A	Admissible power AC1 220V 230V kW	380V 400V kW	415V 440V kW	500V kW	Electrical endurance Cat. AC1 Operations	Power contacts		Control circuit: Alternating current Cat. no. (1) Ref. no. see bottom	Pack (2)	Control circuit: Direct current Cat. no. (1) Ref. no. see bottom	Pack (2)
25	12	9.5	16.5	18	21.5	$1.5x10^6$	4	0	**CL01A400R♦**	5	**CL01D400R♦**	10
32	18	12	22	23	27.5	$1.5x10^6$	4	0	**CL02A400R♦**	5	**CL02D400R♦**	10
45	25	17	29	32	39	$2x10^6$	4	0	**CL03A400R♦**	10	**CL03D400R♦**	10
60	32	22.5	39.5	43	52	$1.5x10^6$	4	0	**CL04A400R♦**	10	**CL04D400R♦**	10
90	50	34	59	64	78	$1.5x10^6$	4	0	**CL05A400R♦**	1	**CL05D400R♦**	1
110	65	42	72.5	79	95	$1.8x10^6$	4	0	**CL07A400R♦**	1	**CL07D400R♦**	1
140	95	53	92	100	121	$1.8x10^6$	4	0	**CL09A400R♦**	1	**CL09D400R♦**	1

Max.oper.current Non-inductive load AC1 A	Motors <440V, 3~ 50/60Hz AC3 A	Admissible power AC3 220V 230V kW *HP*	380V 400V kW *HP*	415V 440V kW *HP*	500V kW *HP*	Power contacts		Control circuit: Alternating current Cat. no. (1) Ref. no. see bottom	Pack (2)	Control circuit: Direct current Cat. no. (1) Ref. no. see bottom	Pack (2)
25	12	3 *4*	5.5 *7.5*	5.5 *7.5*	7.5 *10*	2	2	**CL01AB00R♦**	5	**CL01DB00R♦**	5
32	18	4 *5.5*	7.5 *10*	7.5 *10*	10 *13.5*	2	2	**CL02AB00R♦**	5	**CL02DB00R♦**	5
45	25	7.5 *10*	12 *16*	12 *16*	15 *20*	2	2	**CL03AB00R♦**	10	**CL03DB00R♦**	10
60	32	9 *12*	16 *22*	16 *22*	18.5 *25*	2	2	**CL04AB00R♦**	10	**CL04DB00R♦**	10

Spare coils

		Control circuit: Alternating current		Control circuit: Direct current	
CL00 - CL25		**LR1A ♦**	5	**LR1D ♦**	5
CL03 - CL45		**LR3A ♦**	5	**LR3D ♦**	5
CL05A - CL08A		**LR4A ♦**	5	**LR4D ♦**	1

(1) To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit (see A.52).
(2) Multipack, see A.53

For reference numbers, see chapter X, pg. X.4

Auxiliary contact blocks

Instantaneous

Frontal mounting

Number of contacts	Contacts				Type	Time	Cat. no.	Ref. no.	Pack
Terminal: screw									
1	1	0	0	0			**BCLF10**	104700	10
1	0	1	0	0			**BCLF01**	104701	10
1	0	0	1	0			**BCLF10G**	104702	10
1	0	0	0	1			**BCLF01G**	104703	10
Terminal: ring terminal									
1	1	0	0	0			**BCRF10**	108901	10
1	0	1	0	0			**BCRF01**	108902	10

Side mounting

Terminal: screw									
2	2	0	0	0			**BCLL20**	104706	10
2	1	1	0	0			**BCLL11**	104707	10
For combinations of more than 4 front-mounted and 2 side-mounted auxiliary contact blocks									
2	2	0	0	0			**BRLL20**	104704	10
2	1	1	0	0			**BRLL11**	104705	10
2	0	2	0	0			**BRLL02**	106622	10

Pneumatic timer

Front mounting

Terminal: screw									
2	0	0	1	1	Delay ON	0.1 - 30 sec.	**BTLF30C**	104709	10
2	0	0	1	1	Delay ON	1 - 60 sec.	**BTLF60C**	104710	10
2	0	0	1	1	Delay OFF	0.1 - 30 sec.	**BTLF30D**	104711	10
2	0	0	1	1	Delay OFF	1 - 60 sec.	**BTLF60D**	104712	10
Terminal: ring terminal									
2	0	0	1	1	Delay ON	0.1 - 30 sec.	**BTRF30C**	108903	10
2	0	0	1	1	Delay ON	1 - 60 sec.	**BTRF60C**	108904	10
2	0	0	1	1	Delay OFF	0.1 - 30 sec.	**BTRF30D**	108905	10
2	0	0	1	1	Delay OFF	1 - 60 sec.	**BTRF60D**	108906	10
Seaking cover protection for pneumatic timer							**BTLFX**	113001	5

Accessories

Interlock

Number of contacts	Contacts				For use with:	Cat. no. [1]	Ref. no.	Pack
Mechanical								
-	-	-	-	-	CL00 ... CL10	**BELA**	104723	5
Mech./ electrical								
2	0	2	-	-	CL00 ... CL10	**BELA02**	104724	5
Support interlock								
Only for direct current contactors					CL00D..CL10D	**SBELA**	101017	5

Mechanical latch blocks

Frontal mounted to the contactor								
					CL00 ... CL10	**RMLF ♦**	*see bottom*	10

♦	D	G	HC	J	N	U	Y
50Hz	24, 32	42, 48		110, 115, 120, 127	220, 230, 240	380, 400, 415, 440, 480	500, 660/690
60HZ	24, 32	48, 60		110, 115, 120, 127	208, 220, 240, 277	380, 400, 415, 440, 480	600
DC	24, 32, 36	42, 48	60, 72	110, 120, 125	220, 230, 240, 250	440	

1) To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit (see A.52).

For reference numbers, see chapter X, pg. X.4

Accessories

Transient voltage suppressor block

For use with:	Type	Control circuit	Ue	Cat. no.	Ref. no.	Pack
Fixation to the coil terminals, that allows simultaneous use with the auxiliary contact blocks.						
CL00 ... CL45	R/C	AC	12V ... 48V	**BSLR2G**	104713	10
CL00 ... CL45	R/C	AC	50V ... 127V	**BSLR2K**	104714	10
CL00 ... CL45	R/C	AC	130V ... 250V	**BSLR2R**	104715	10
CL05A ... CL10A	R/C	AC	12V ... 48V	**BSLR3G**	104716	10
CL05A ... CL10A	R/C	AC	50V ... 127V	**BSLR3K**	104717	10
CL05A ... CL10A	R/C	AC	130V ... 250V	**BSLR3R**	104718	10
CL__ D	Diode	DC	12V ... 600V	**BSLDZ**	104719	10
CL00 ... CL10	Varistor	AC / DC	24V ... 48V	**BSLV3G**	104720	10
CL00 ... CL10	Varistor	AC / DC	50V ... 127V	**BSLV3K**	104721	10
CL00 ... CL10	Varistor	AC / DC	130V ... 250V	**BSLV3R**	104722	10
CL00 ... CL10	Varistor	AC / DC	277V ... 500V	**BSLV3U**	110836	10

Electronic timer module

For use with:	Control circ.	Type	Time	Cat. no.	Ref. no.	Pack
Fixation to the coil terminals, that allows simultaneous use with the auxiliary contact blocks.						
CL00 ... CL10	24-250V AC/DC	delay ON	0.1 - 2 sec.	**BETL02C**	113602	5
CL00 ... CL10	24-250V AC/DC	delay ON	1.5 - 45 sec.	**BETL45C**	113603	5
CL00 ... CL10	24-250V AC/DC	delay OFF	0.1 - 2 sec.	**BETL02D**	113604	5
CL00 ... CL10	24-250V AC/DC	delay OFF	1.5 - 45 sec.	**BETL45D**	113605	5

Accessories

Identification

For use with:				Cat. no.	Ref. no.	Pack
CL00 ... CL10	Sheets of labels (sheets of 260 labels each)			**EAT 260**	100548	1
CL00 ... CL10	Labelling plate base (50 pieces in one pack)			**SPR**	100549	1

Pole terminal protector IPXXB

CL03 ... CL04				**PTP04**	113850	8
CL45				**PTP45**	113851	6
CL05 ... CL08				**PTP08**	113852	8
CL09 ... CL10				**PTP10**	113853	8

Spares

Contact kits

For use with:	Number of sets	Type		Cat. no.	Ref. no.	Pack
CL03_3_/CL03_4_	3	NO		**V31203B**	104743	1
CL03_B_	4	2NAO-2NC		**VB1203B**	133170	1
CL04_3_/CL04_4_	3	NO		**V31204B**	104745	1
CL04_B_	4	2NO-2NC		**VB1204B**	133885	1
CL45_3_	3	NO		**V31245B**	104758	1
CL05_4_	4	NO		**V31205B**	104747	1
CL05_B_	4	2NO-2NC		**VB1205B**	104748	1
CL06_ _ _	3	NO		**V31206B**	104749	1
CL07_3_/CL07_4_	3	NO		**V31207B**	104750	1
CL07_B_	4	2NO-2NC		**VB1207B**	104751	1
CL08_3_/CL08_4_	3	NO		**V31208B**	104752	1
CL08_B_	4	2NO-2NC		**VB1208B**	104753	1
CL09_ _ _	3	NO		**V31209B**	104754	1
CL10_ _ _	3	NO		**V31210B**	104755	1

Direct-on-line starters

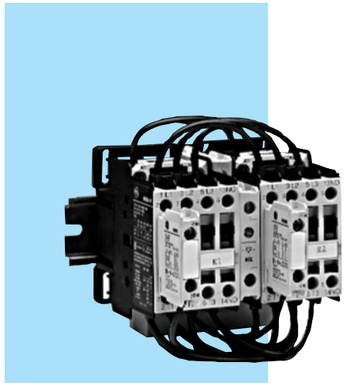
Series CL
9 to 105A (AC-3)

- Power circuit: up to 690V AC
- Control circuit: up to 690V AC
- Protection degree IP00

Series CL - Direct-on-line starters

	For use with	Push-buttons	Protection degree	Cat. no.	Ref. no	Pack
Empty boxes	CL00, CL01,CL02	Start/Stop + Reset	IP40	**LG0004P1B0**	209344	1
			IP65	**LG0006P1B0**	200004	1
		Without push-buttons	IP40	**LG0004S1B0**	209347	1
			IP65	**LG0006S1B0**	116011	1
		Only Reset	IP40	**LG0004R1B0**	116651	1
			IP65	**LG0006R1B0**	116652	1
	CL25	Start/Stop + Reset	IP40	**LG2504P1B0**	100885	1
			IP65	**LG2506P1B0**	101095	1
		Only Reset	IP40	**LG2504R1B0**	116226	1
			IP65	**LG2506R1B0**	133611	1
	CL04	Start/Stop + Reset	IP40	**LG0404P1B0**	116653	1
			IP65	**LG0406P1B0**	116656	1
		Only Reset	IP40	**LG0404R1B0**	133264	1
			IP65	**LG0406R1B0**	133265	1
	CL25, CL04	Without push-buttons	IP40	**LG0404S1B0**	116996	1
			IP65	**LG0406S1B0**	116997	1
Neutral terminal				**BNL**	104797	10
Conversion to permanent control		Pressure-fixed between push-buttons in direct-on-line enclosures for mechanical interlocking into permanent control.		**EPL**	104798	10
Start contact block		Pressure-fixed onto the front of direct-on-line starters allowing electrical operation using the start push-button on the enclosure		**BMLF**	104800	10

Wiring diagrams ● page A.132
Dimensions ● page A.137



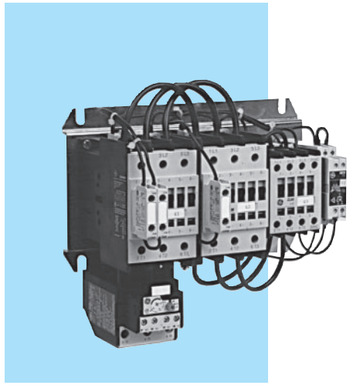
Reversing starters

9 to 40A (AC-3)

- Power circuit: up to 690V AC
- Control circuit: up to 690V AC
- IP00 version
- Polycarbonate enclosure (IP40 - IP65)
  - Shock resistance
  - Total insulation ⧈
  - 4 knock-out input holes
- Empty enclosures version
- Start contact block

Series CL - Reversing starters

	Description	For use with contactor	ac/dc	Cat. no.	Ref. no.	Pack.
Wiring kits for reversing starters	Suitable to be usd with link modules Upper and lower connections without overload relays	CL00., CL01., CL02..	ac/dc	**WKLI02P**	101422	1
Plate	Metallic plate	CL06, CL07, CL08		**WKI0910**	241751	1
		CL08, CL09, CL10		**WKI0608**	241752	1



Star-delta starters

Series CL

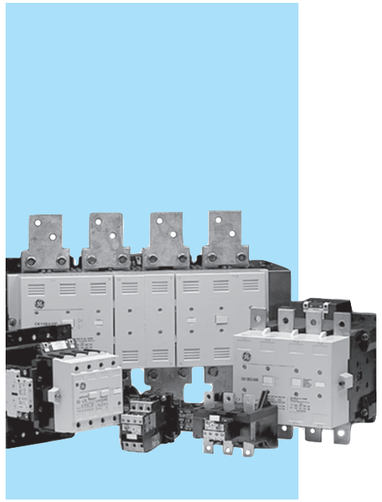
- Power circuit: up to 690V AC
- Control circuit: up to 690V AC
- Protection degree IP00
- Use delay setting by electronic relay NMET
- Terminals protected against accidental contact

Series CL - Star-delta starters

		Line-delta contactor		Cat. no.	Ref. no.	Pack
Busbar sets for power circuit		CL00		**WKLE00**	103238	1
		CL01, CL02		**WKLE02**	103241	1
Plate	Metallic plate	CL06, CL07, CL08		**WLSD**	103247	1
		CL09, CL10		**WLSD1**	241750	1

Order codes ● page A.60
Wiring diagrams ● page A.132
Dimensions ● page A.137

Notes



Three and four pole contactors
150 to 825A (AC3)
200 to 1250A (AC1)

- Control circuit: Alternating current up to 690V
  Direct current up to 500V
- Degree of protection IP00 (IPxxB with accessories)
- CK07...CK13: auxiliary and coil terminals originally protected against accidental contacts.
  Protection for power contacts on request (see accessories)
- Terminals protected against accidental contacts according to VDE 0106 T.100, VBG4.
- CK_ _E_with electronic module suitable for DC and AC. (50/60Hz)
- CK contactors always provided with one auxiliary contact block BCLL11 (1NO+1NC)

Standards

IEC/EN 60947-1
IEC/EN 60947-4-1
IEC/EN 60947-5-1
EN 50005
UL 508
NEMA ICS 1
BS 5424 & 775
CSA 22.2/14
CENELEC HD 419
NFC 63-110
ASE 1025
UNE 20109
VDE 0660/102

Approvals/Marking

(1) cULus — CE

Lloyd's Register — Bureau Veritas — RINA

(Contact GE for details)

Standard voltages

To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit.

Alternating current (V)

Three-pole contactors: CK75CA3..., CK08CA3..., CK85BA3...
Four-pole contactors: CK07BA4..., CK08BA4...

♦	C	D	F	G	H	I	J	K	M	N	R	S	T	U	V	W	X	Y	Z
50Hz		24	42	48			110	127	220 230	240		380 400		415	440	500 690	660		
60Hz	24		48		110	120			220	277	240	380	480	440			600		

Alternating current (V). Dual-frequency coil

Three-pole contactors: CK75CA3..., CK08CA3..., CK85BA3...
Four-pole contactors: CK07BA4..., CK08BA4...

♦	1	2	3	6	13
50/60Hz	24	48	110	230	400

Alternating current (V)

Three-pole contactors: CK13BA3...
Four-pole contactors: CK13BA4...

♦	J	N	U	Y	Z
50/60Hz	110	220	380	480	600
		240	440	500	660

Control circuit with rectifier bridge

♦	J	N	U
50Hz	110 230	220 400	380
60Hz	120	240	480

Direct current (V). With electronic module (0.7 ... 1.3 x Us)

Three-pole contactors: CK75CE3...., CK08CE3.....

♦	WD	WE	WF	WH	WJ	WN
Voltage	24	33	48	72	110	220

Alternating c. / Direct c. (V). With electronic module (0.8 ... 1.10 x Us)

Three-pole & four-pole contactors: CK ..... **E**.....

♦	D	F	J	N	U	Y
Voltage	24 28	42 48	110 127	220 250	380 415	440 500

(1) CK13 not UL

Order codes ● pg. A.63
Aux. contact blocks ● pg. A.64
Accessories & Spares ● pg. A.65
Technical data ● pg. A.102
Dimensions ● pg. A.118

Three pole contactors

Max.oper.current		Admissible power AC3					Electrical endurance	Control circuit: Alternating current		Control circuit: A.C. / D.C.	
Non-inductive loads	Motors <440V, 3 ~ 50/60Hz	220V 230V	380V 400V	415V 440V	440V	500V					
AC1 A	AC3 A	kW HP	kW HP	kW HP	kW HP	kW HP	Cat. AC3 Operations	Cat. no. (1)	Pack	Cat. no. (1)	Pack
								Ref. no. see bottom		*Ref. no. see bottom*	
250	150	45 *60*	75 *100*	80 *108*	80 *108*	100 *135*	$1.7x10^6$	**CK75CA311 ♦**	1	**CK75CE311 ♦**	1
250	185	55 *75*	90 *125*	100 *135*	100 *135*	110 *150*	$1.2x10^6$	**CK08CA311 ♦**	1	**CK08CE311 ♦**	1
315	205	65 *88*	110 *150*	125 *170*	125 *170*	132 *180*	$1.7x10^6$	**CK85BA311 ♦**	1	**CK85BE311 ♦**	1
315	250	75 *100*	132 *180*	132 *180*	132 *180*	160 *220*	$1.5x10^6$	-		**CK09BE311 ♦**	1
450	309	90 *125*	160 *220*	160 *220*	185 *250*	200 *270*	$1,1x10^6$	-		**CK95BE311 ♦**	1
600	420	125 *170*	220 *300*	230 *312*	230 *312*	300 *405*	$1x10^6$	-		**CK10CE311 ♦**	1
700	550	160 *220*	280 *380*	315 *425*	315 *425*	400 *540*	$0.8x10^6$	-		**CK11CE311 ♦**	1
1000	700	220 *300*	375 *510*	400 *540*	425	480 *650*	$0.7x10^6$	-		**CK12BE311 ♦**	1
1250	825	250 *340*	450 *610*	450 *610*	450 *610*	500 *680*	$0.7x10^6$ (2)	**CK13BA311 ♦**	1	-	

Spare coil	CK75CA3 ... CK08CA3	**C12168 ♦**	1	-	
	CK85BA3	**C04255 ♦**	1	-	
	CK13BA3	**C08998 ♦**	1	-	
	Control circuit with incorporated rectifier bridge CK13BA3	**C09120 ♦**	1	-	
Coil	CK75CE3 ... CK08CE3	-		**KB4E ♦**	1
	CK85BE3 ... CK95BE3	-		**KB5E ♦**	1
	CK12BE3	-		**KB6E ♦**	1
	CK10CE3 ... CK11CE3	-		**KB7E ♦**	1
Electronic module	CK75CE3 ... CK08CE3	-		**KM4E ♦**	1
	CK85BE3 ... CK95BE3	-		**KM5E ♦**	1
	CK12BE3	-		**KM6E ♦**	1
	CK10CE3 ... CK11CE3	-		**KM7E ♦**	1

(1) To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit (see A.62).
(2) CK13 non alow the aux. block in right side.

For reference numbers, see chapter X, pg. X.5

Four pole contactors

Max.oper. current	Admissible power AC3		AC1					Electrical endurance	Control circuit: Alternating current		Control circuit: A.C. / D.C.	
Non-inductive loads AC1	380V 400V		220V 230V	380V 400V	415V	440V	500V	Cat. AC3	Cat. no. [1]	Pack	Cat. no. [1]	Pack
A	kW	A	kW	kW	kW	kW	kW	Operations	*Ref. no. see bottom*		*Ref. no. see bottom*	
200	55	105	76	131	143	151	173	$1x10^6$	**CK07BA41 ♦** CK07BA411	1	**CK07BE411 ♦**	1
325	100	185	123	214	233	247	281	$0.6x10^6$	**CK08BA411 ♦**	1	**CK08BE411 ♦**	1
400	132	250	152	263	287	304	346	$0.6x10^6$	-		**CK09BE411 ♦**	1
500	160	309	191	329	359	380	415	$0.6x10^6$	-		**CK95BE411 ♦**	1
600	220	408	228	395	431	456	519	$0.5x10^6$	-		**CK10CE411 ♦**	1
700	280	530	266	460	503	533	606	$0.4x10^6$	-		**CK11CE411 ♦**	1
1000	375	680	381	658	719	762	866	$0.4x10^6$	-		**CK12BE411 ♦**	1
1250	450	800	476	822	898	952	1082	$0.6x10^6$ (2)	**CK13BA411 ♦**	1		

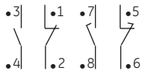
Spare coil

	CK07BA4	**C04255 ♦**	1	-
	CK08BA4	**C04787 ♦**	1	-
	CK13BA4	**C08998 ♦**	1	-
Control circuit with incorporated rectifier bridge	CK13BA4	**C09120 ♦**	1	-
Coil	CK07BE4	-		**KB5E ♦**	1
	CK08BE4 ... CK95BE4, CK12BE4	-		**KB6E ♦**	1
	CK10CE4 ... CK11CE4	-		**KB7E ♦**	1
Electronic module	CK07BE4	-		**KM5E ♦**	1
	CK08BE4 ... CK95BE4, CK12BE4	-		**KM6E ♦**	1
	CK10CE4 ... CK11CE4	-		**KM7E ♦**	1

(1) To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit (see A.62).
(2) CK13 non alow the aux. block in right side.

Auxiliary instantaneous contact block

Side mounting

Number of contacts	Contacts				Cat. no.	Ref. no.	Pack
							
2	2	0	0	0	**BCLL20**	104706	10
2	1	1	0	0	**BCLL11**	104707	10
2	1	1	0	0	**BCLL11-K**[1]	248083	10
combinations of more than 2 blocks							
2	2	0	0	0	**BRLL20**	104704	10
2	1	1	0	0	**BRLL11**	104705	10
2	0	2	0	0	**BRLL02**	106622	10

(1) For high shock/vibrations environments

For reference numbers, see chapter X, pg. X.5

Accessories

Transient voltage suppressor

For use with:	Mounting	Voltage	Ue	Cat. no.	Ref. no.	Pack
Fixation to the coil terminals, that allows simultaneous use with the auxiliary contact blocks.						
CK75 ... CK08		AC	24V - 48V	**BSLR3G**	104716	10
CK75 ... CK08		AC	50V - 127V	**BSLR3K**	104717	10
CK75 ... CK08		AC	130V - 240V	**BSLR3R**	104718	10
CK75 ... CK08		AC	227V - 500V	**BSLV3U**	110836	10
CK85 ... CK13		AC	24V	**KRC24**	104760	10
CK85 ... CK13		AC	260V	**KRC48/260**	104761	10
CK85 ... CK13		AC	415V	**KRC380/415**	104762	10

Mechanical interlock

CK07B ... CK12	Horizontal			**BEKH**	104763	1
CK07B ... CK95	Vertical			**BEKVS 1**	104786	1
CK10C ... CK12B	Vertical			**BEKVA 1**	104785	1
CK13	Vertical			**BEKV**	104764	1

Pole terminal protection

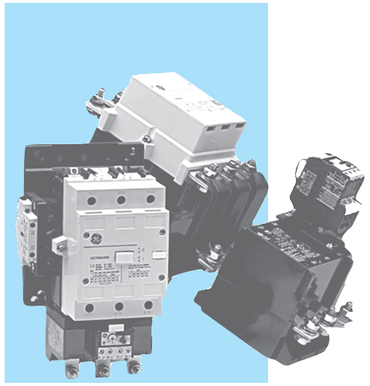
CK75C ... CK08C	1 pole. VDE0106			**CM1CA5F**	105200	1
CK85B ... CK12B	1 pole. VDE0106	Contactors 3P		**C09476**	104766	6
CK08B ... CK12B	1 pole. VDE0106	Contactors 4P		**C09479**	204800	8
CK75C ... CK08C	1 pole IPXXB			**PTPCK75**	103747	1[1]
CK85B ... CK95B	1 pole IPXXB			**PTPCK95**	103748	3[2]
CK10C ... CK12B	1 pole IPXXB			**PTPCK11**	103749	1[1]

(1) One phase
(2) Three pole

Spares

Contact kits

For use with:	Type			Cat. no.	Ref. no.	Pack
One set consists of two fixed contacts, one moving contact and accessory parts. When contact replacement is needed, it is recommended to replace all the contacts at the same time.						
CK07B	NA			**V1107BA**	113612	1
CK75C	NA			**V1175CA**	113613	1
CK08C	NA			**V1108CA**	113614	1
CK08B	NA	Contactors 4P		**V1108B4**	113505	1
CK85B	NA			**V1185BA**	113615	1
CK09B	NA			**V1109BA**	113616	1
CK09B	NA	Contactors 4P		**V1109B4**	113899	1
CK95B	NA			**V1195BA**	113617	1
CK10C	NA			**V1110CE**	113618	1
CK11C	NA			**V1111CE**	113619	1
CK12B	NA			**V1112BA**	113620	1
CK13B	NA			**V1113BA**	113621	1



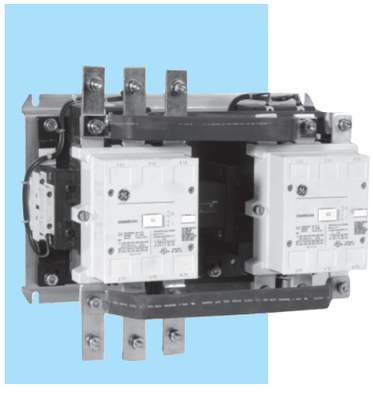
Direct-on-line starters

150 to 825A (AC-3)

- Power circuit: up to 1000V AC
- Control circuit: up to 690V AC
- Protection degree IP00
- Terminals protected against accidental contact: IP20
  - KG75 to KG12: Coil and auxiliary terminals with built-in protection
    Main terminals protector on request
  - KG13: Coil and auxiliary terminals with built-in protection

Series CK - Direct-on-line starters. IP00

			Cat. no.	Ref. no.	Pack
Connection sets	Busbar set for power circuit	CK85,CK09,CK95	**KVP85G**	104770	1
		CK10,CK11	**KVP10G**	104771	1
		CK12	**KVP12G**	104767	1
Plate	Metallic plate	CK85, CK09, CK95	**PVP85G**	241747	1
		CK10, CK11	**PVP10G**	241748	1
		CK12	**PCP12G**	241749	1



Reversing starters

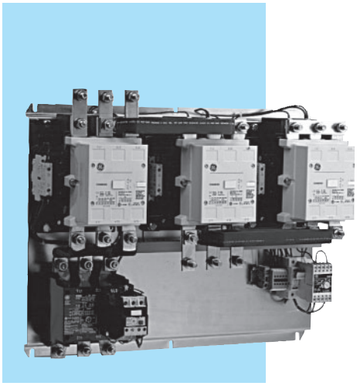
150 to 825A (AC-3)

- Power circuit: up to 1000V AC
- Control circuit: up to 690V AC
- Protection degree IP00

Series CK - Reversing starters. IP00

	Description	For use with contactor	Cat. no.	Ref. no.	Pack.
Connection sets	Busbar set for power circuit	CK75, CK08	**KVP75U**	113627	1
		CK85, CK09, CK95	**KVP85U**	113628	1
		CK10, CK11	**KVP10U**	133374	1
		CK12	**KVP12U**	113630	1
	Busbar set for power circuit For assembly with thermal overload relay.	CK75, CK08	**KVP75I**	133370	1
		CK85, CK09, CK95	**KVP85I**	113631	1
		CK10, CK11	**KVP10I**	133371	1
		CK12	**KVP12I**	113633	1
Plate	Metallic plate	CK75, CK08	**KVB75I**	104690	1
		CK85, CK95	**KVB95I**	104691	1
		CK10, CK11	**KVB10I**	104692	1
		CK12	**KVB12I**	104693	1

Order codes ● page A.66-67
Wiring diagrams ● page A.135
Dimensions ● page A.138



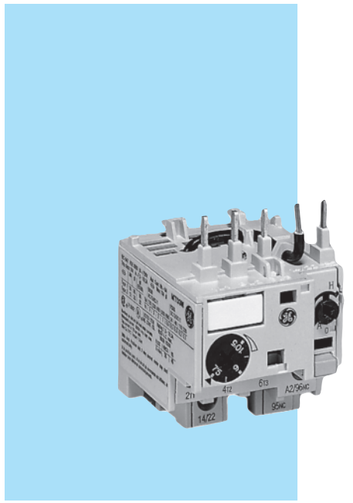
Star-delta starters

Series CK

- Power circuit: up to 1000V AC
- Control circuit: up to 690V AC
- Protection degree IP00
- Protection against accidental contacts: IP20
  - KE75: Built-in protection
  - KE08 - KE12: Coil and auxiliary terminals with built-in protection
    Main terminals protector on request
  - KE13: Coil and auxiliary terminals with built-in protection

Series CK - Star-delta starters. IP00

		Line-delta contactor	Star contactor	Cat. no.	Ref. no.	Pack
Busbar sets for power circuit		CK75, CK08	CK75, CK08	**KVP75E**	133378	1
		CK85, CK09, CK95	CK75, CK08	**KVP08E**	116212	1
		CK95	CK85, CK09, CK95	**KVP85E**	133379	1
		CK10, CK11	CK85, CK09, CK95	**KVP95E**	113637	1
		CK10, CK11	CK10, CK11	**KVP10E**	133380	1
		CK12	CK10, CK11	**KVP12E**	116235	1
Plate	Metallic plate	CK75, CK08		**KVB75E**	104694	1
		CK85, CK95		**KVB95E**	104695	1
		CK10, CK11		**KVB10E**	104597	1
		CK12		**KVB12E**	104587	1



Thermal overload relays for contactors from 0.11 to 14A

- Control circuit up to 690V
- Power circuit up to 690V
- Three-pole differential (phase unbalance protection)
- Automatic ambient temperature compensation between – 25ºC and + 60ºC
- Choice of manual or automatic reset
- Direct connection to contactor or independent mounting using accessories.
- Screw and Ring terminal versions
- Terminals protected against accidental contact in accordance with VDE 0106 T.100 and VBG4.
- Terminal numbering in accordance with EN 50005
- Degree of protection IP20 (EN 60529)
- Additional auxiliary contact block 1NO (with manual reset only)

Standards

IEC/EN 60947-4-1
IEC/EN 60947-5-1
UNE 115
NFC 63-650
CSA 22.2/14
NI C 63-650
VDE 0660
UL 508

Approvals/Marking

cULus NEMKO CE

SEMKO SETI

General characteristics

- Thermal protection against balanced overload.
- Three-pole differential (phase unbalance protection).
- Automatic ambient temperature compensation.
- Front mounted selector for choosing utilisation current.
- Reset button, 2 positions : Manual(H) and Automatic(A) by turning the blue selector.
- Stop push button, independent of reset (red).
- Manual trip lever (tripping test).
- Tripping indicator (0-1).
- To facilitate wiring arrangements terminal 96 fits directly onto coil terminal (A2) and terminal 14/22 fits directly onto the feedback auxiliary contact.

Order codes ● pg. A.69
Technical data ● pg. A.120
Dimensions ● pg. A.121

Thermal overload relays for contactors

For use with:	Setting range (regulation)		Fuse				Terminal: screw		Terminal: ring terminal		Pack
			aM		gL						
	min. A	max. A	Type 2 A	Type 1 A	Type 2 A	Type 1 A	Cat. no.	Ref. no.	Cat. no.	Ref. no.	
MC0...	0.11	0.17	0.5	0.5	0.5	0.5	**MT03A**	101000	**MT03RA**	103540	10
MC1...	0.17	0.26	0.85	1	1	1	**MT03B**	101001	**MT03RB**	103541	10
MC2...	0.26	0.43	1	2	2	4	**MT03C**	101002	**MT03RC**	103542	10
	0.43	0.65	1	4	2	8	**MT03D**	101003	**MT03RD**	103543	10
	0.65	1	2	6	4	12	**MT03E**	101004	**MT03RE**	103544	10
	0.85	1,3	2	6	4	12	**MT03F**	101005	**MT03RF**	103545	10
	1.1	1.6	2	10	4	16	**MT03G**	101006	**MT03RG**	103546	10
	1.35	2	4	10	6	16	**MT03H**	101007	**MT03RH**	103547	10
	1.7	2.4	4	16	6	25	**MT03I**	101008	**MT03RI**	103548	10
	2.2	3.2	4	20	6	32	**MT03J**	101009	**MT03RJ**	103549	10
	2.5	4	4	20	6	32	**MT03R**	101015			10
	3	4.7	6	20	10	32	**MT03K**	101010	**MT03RK**	103550	10
	4	6.3	10	32	16	50	**MT03L**	101011	**MT03RL**	103551	10
	5.5	8	12	50	20	63	**MT03M**	101012	**MT03RM**	103552	10
	7.5	10.5	16	50	25	80	**MT03N**	101013	**MT03RN**	103553	10
	10	14	20	32	32	100	**MT03P**	101014	**MT03RP**	103554	10

Accessories

Input terminals

	Terminal	Cat. no.	Ref. no.	Pack
	Screw	**MVE0T**	101020	5
	Ring terminal	**MVE0R**	103562	5

Base

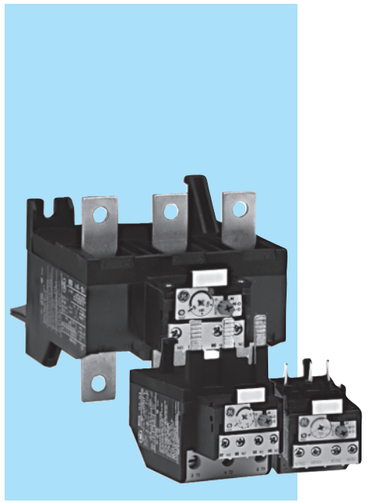
For separate mounting onto standard EN 50022-35 profile	**MVB0T**	101021	5

Auxiliary contact block

Frontal fixing to the relay With trip indicator (0-I) One block per relay and only for manual reset	Screw	**MATV10AT**	101022	10
	Ring terminal	**MATV10AR**	103563	10

Identification

Sheets of labels (sheets of 260 labels each)	**EAT 260**	100548	1
Labeling plate base (50 pieces in one pack)	**SPR**	100549	1



Thermal overload relays for contactors from 0.16 to 850A

- Control circuit up to 690V AC
- Power circuit:
  - RT1, RT12: up to 690V
  - RT2, RT22, RT3, RT32, RT4/4L, RT5/5L & RT6/6L: up to 1000V
- Thermal protection against normal overloads.
- Three pole differential (phase unbalance protection).
- Protection against long starting times.
- Automatic ambient temperature compensation between – 25°C + 60°C.
- Front mounted test button.
- Trip indication.
- Independent auxiliary contacts with double rupture (1NO + 1NC).
- Function selector:
  - Manual RESET
  - Manual RESET and STOP
  - Automatic RESET with STOP
  - Automatic RESET without STOP

Standards

IEC/EN 60947-4-1
IEC/EN 60947-5-1
UNE 115
NFC 63-650
CEI 17-50

CSA 22.2/14
NI C 63-650
VDE 0660
UL 508

Approvals/Marking

cULus

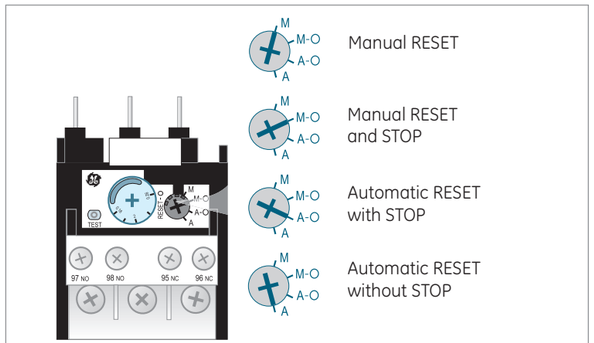
CE

Lloyd's Register

Bureau Veritas

RINA

(Contact GE for details)



Order codes ● pg. A.71
Technical data ● pg. A.122
Dimensions ● pg. A.123

Thermal overload relays for contactors

	For use with:	Setting range (regulation)		Fuses [1]		Srew terminal		Ring terminal		Pack
				aM	gL - gG					
		min. A	max. A	A	A	Cat. no.	Ref. no.	Cat. no.	Ref. no.	
Class 10A	CL00	0.16	0.26	2	2	**RT1B**	113700	**RT1RB**	114087	5
	CL01	0.25	0.41	2	2	**RT1C**	113701	**RT1RC**	114088	5
	CL02	0.4	0.65	2	2	**RT1D**	113702	**RT1RD**	114089	5
	CL25	0.65	1.1	2	4	**RT1F**	113703	**RT1RF**	114090	5
	CL03	1.0	1.5	4	6	**RT1G**	113704	**RT1RG**	114091	5
	CL04	1.3	1.9	4	6	**RT1H**	113705	**RT1RH**	114092	5
	CL45	1.8	2.7	6	10	**RT1J**	113706	**RT1RJ**	114093	5
		2.5	4.0	8	16	**RT1K**	113707	**RT1RK**	114094	5
		4.0	6.3	12	20	**RT1L**	113708	**RT1RL**	114095	5
		5.5	8.5	16	20	**RT1M**	113709	**RT1RM**	114096	5
		8.0	12.0	20	25	**RT1N**	113710	**RT1RN**	114097	5
		10.0	16.0	25	35	**RT1P**	113711	**RT1RP**	114098	5
		14.5	18.0	32	50	**RT1S**	113712	**RT1RS**	114099	5
		17.5	22.0	40	50	**RT1T**	113713	**RT1RT**	114100	5
		21.0	26.0	40	63	**RT1U**	113714	**RT1RU**	114101	5
		25.0	32.0	50	80	**RT1V**	113715	**RT1RV**	114102	5
		30.0	40.0	63	100	**RT1W**	113716	**RT1RW**	114103	5
Class 10	CL05	11.5	15.0	32	35	**RT2A**	113717	**RT2RA**	114104	1
	CL06	14.5	19.0	40	50	**RT2B**	113718	**RT2RB**	114132	1
	CL07	18.5	25.0	50	63	**RT2C**	113719	**RT2RC**	114106	1
	CL08	24.0	32.0	63	100	**RT2D**	113720	**RT2RD**	114133	1
	CL09	30.0	43.0	80	125	**RT2E**	113721	**RT2RE**	114134	1
	CL10	42.0	55.0	100	160	**RT2G**	113722	**RT2RG**	114109	1
		54.0	65.0	125	160	**RT2H**	113723	**RT2RH**	114146	1
		64.0	82.0	125	200	**RT2J**	113724	**RT2RJ**	114136	1
		78.0	97.0	125	200	**RT2L**	113725	**RT2RL**	114235	1
		90.0	110	160	250	**RT2M**	113726	**RT2RM**	114113	1
Class 20	CL00	0.4	0.65	2	2	**RT12D**	139138	**RT12RD**	114060	5
	CL01	0.65	1.1	2	4	**RT12F**	139139	**RT12RF**	114061	5
	CL02	1	1.5	4	6	**RT12G**	139140	**RT12RG**	114062	5
	CL25	1.3	1.9	4	6	**RT12H**	139141	**RT12RH**	114063	5
	CL03	1.8	2.7	8	10	**RT12J**	139142	**RT12RJ**	114159	5
	CL04	2.5	4.1	8	16	**RT12K**	113640	**RT12RK**	114114	5
	CL45	4	6.3	12	20	**RT12L**	113641	**RT12RL**	114115	5
		5.5	8.5	16	20	**RT12M**	113642	**RT12RM**	114116	5
		8	12	20	35	**RT12N**	113643	**RT12RN**	114117	5
		10	16	25	35	**RT12P**	113644	**RT12RP**	114118	5
		14.5	18	32	50	**RT12S**	113645	**RT12RS**	114119	5
		17.5	22	40	50	**RT12T**	113646	**RT12RT**	114120	5
		21	26	40	63	**RT12U**	113647	**RT12RU**	114121	5
		25	32	50	80	**RT12V**	113648	**RT12RV**	114122	5
		30	40	63	100	**RT12W**	113649	**RT12RW**	114123	5
	CL05	24	32	63	80	**RT22D**	113650	**RT22RD**	114124	1
	CL06	30	43	80	100	**RT22E**	113651	**RT22RE**	114141	1
	CL07	42	55	100	160	**RT22G**	113652	**RT22RG**	114126	1
	CL08	54	65	125	160	**RT22H**	113653	**RT22RH**	114127	1
	CL09	64	82	125	200	**RT22J**	113654	**RT22RJ**	114128	1
	CL10	78	97	125	200	**RT22L**	113655	**RT22RL**	114143	1
		90	110	160	250	**RT22M**	113656	**RT22RM**	114130	1

(1) Most suitable fuse in accordance with IEC 60947-4-1.

(continued on page A.72)

Thermal overload relays for contactors (continued)

	For use with:	Setting range (regulation) min. A	Setting range (regulation) max. A	Fuses [1] aM A	Fuses [1] gL - gG A	Cat.no. (Screw terminal)	Ref. no.	Pack
Class 10	CK75 CK08 Direct mounting	55	80	125	200	**RT3B**	113727	1
		63	90	125	200	**RT3C**	113728	1
		90	120	160	250	**RT3D**	113729	1
		110	140	200	315	**RT3E**	113730	1
		140	190	250	355	**RT3F**	113731	1
	CK85 CK09 CK95 [2]	120	190	250	315	**RT4N**	113732	1
		175	280	315	400	**RT4P**	113733	1
		200	310	400	500	**RT4R**	113734	1
	CK10 CK11 CK12 [3]	120	190	250	315	**RT5A**	113750	1
		175	280	315	400	**RT5B**	113751	1
		250	400	500	630	**RT5C**	113752	1
		315	500	630	800	**RT5D**	113753	1
		430	700	800	1000	**RT5E**	113754	1
	CK13 [4]	500	850	100	1250	**RT6A**	113760	1
Class 20	CK75 CK08 Direct ounting	63	90	125	200	**RT32C**	113657	1
		90	120	160	250	**RT32D**	113658	1
		110	140	200	315	**RT32E**	113659	1
		140	190	250	355	**RT32F**	113660	1
Class 30	CL... CK... Mounting with screws	2.5	4	10	16	**RT4LA**	113735	1
		4	6.5	12	20	**RT4LB**	113736	1
		5.5	8.5	16	25	**RT4LC**	113737	1
		7.5	11	20	32	**RT4LD**	113738	1
		10	16	25	40	**RT4LE**	113739	1
		12.5	20	32	50	**RT4LF**	113740	1
		17	27	50	80	**RT4LG**	113741	1
		26	40	80	125	**RT4LH**	113742	1
		32	52	100	160	**RT4LJ**	113743	1
		45	70	125	160	**RT4LK**	113744	1
		60	90	160	200	**RT4LL**	113745	1
		80	125	200	250	**RT4LM**	113746	1
	CK85 CK09 CK95 [2]	120	190	250	315	**RT4LN**	113747	1
		175	280	315	400	**RT4LP**	113748	1
		200	310	400	500	**RT4LR**	113749	1
	CK10 CK11 CK12 [3]	120	190	250	315	**RT5LA**	113755	1
		175	280	315	400	**RT5LB**	113756	1
		250	400	500	630	**RT5LC**	113757	1
		315	500	630	800	**RT5LD**	113758	1
		430	700	800	1000	**RT5LE**	113759	1
	CK13 [4]	500	850	1000	1250	**RT6LA**	113761	1

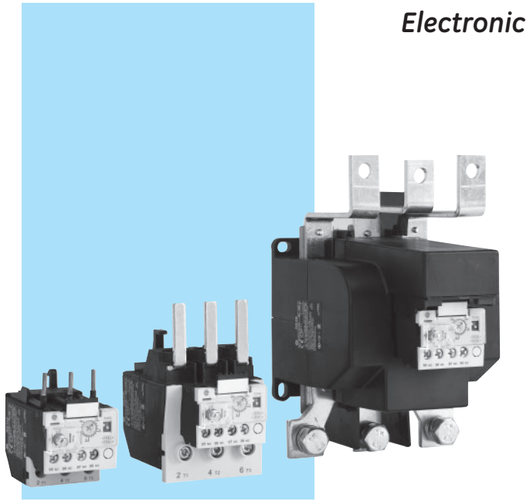
(1) Most suitable fuse in accordance with IEC 60947-4-1.
(2) Fitting direct to the contactor.
(3) Fitting direct to the contactor: by means of a coupling and connection set.
Separate mounting:with screws on DIN rail / with cable connection.
(4) RT6A = RT1 with right setting range plus RTXP, independent mounting base adaptor, to be utilisied with current transformer connected by passing cable chosen by customer. Current transformer data on request.

Accessories

			Cat. no.	Ref. no.	Pack
Base for separate mounting	DIN EN50022-35				
	RT1		**RTXP**	105170	1
	RT2		**RT2XP**	113764	1
Setting range cover protection	RT...		**RTX3**	113762	1
Push-button with flexible cable	for distance RESET				
	RT1... - RT6.... (front)	0.5 meters	**RTXS**	113855	1
	RT1... - RT6.... (front)	1 meters	**RTXSL**	113856	1
	RT1..., RT2..., RT4..., RT5..., RT6... (back)		**RTXBS**	108864	1
Terminal protection	for RT3 or CK75C/CK08C				
	Thermal overload relay	1 pole IPxxB	**PTPCK75**	103747	1
	Connection contactor-relay	3 poles	**RT3PXX3P**	110565	1
Remote electrical reset	RT1... - RT6...		**RTXRR ◆**		1

Available coil voltages (V)

♦	B	D	G	J	N	U	X
AC/DC	12	24	48	110 240	220 415	380 480	440



Electronic overload relays

Approvals/Marking

cULus CE

Product features ➢ *Your benefits*

Lower power consumption	➢ Saving space into cabinet
Great accuracy	➢ Better motor protection
Full reliability	➢ Low risk to burn motor
Phase unbalance protection	➢ Better motor protection and current control
Direct fitting to contactors Series CL	➢ Compact starter
Interchangeable with thermal overload relay	➢ No need to redesign existing cabinet
Multiple trip class selection	➢ One device cover for start time motor
Manual / Auto reset	➢ One device for two solutions

Main characteristics

- Setting range from 0.1 up to 150A
- Self powered
- Thermal memory
- Phase loss protection
- Phase unbalance protection
- Direct fitting to contactors Series CL
- Interchangeable with thermal overload relay
- Multiple trip class selection
- Manual / Auto reset
- Increased flexibility, less order codes, less stock
- Tripp class: 5 - 10 - 20 - 30

Order codes ● pg. A.75
Technical data ● pg. A.128
Dimensions ● pg. A.130

Electronic overload relays for contactors

		Suitable for	Setting range (A) Min.	Setting range (A) Max.	Fuses (A) [1] gL - gG	Cat. no.	Ref. no.	Pack.
	Frame 1	CL00...CL45	0,1	0,5	2	**RE1D**	101866	5
			0,4	2	4	**RE1H**	101867	5
			1,0	5	10	**RE1K**	101868	5
			1,6	8	20	**RE1M**	101869	5
			6,4	32	63	**RE1S**	101870	5
			9,0	45	80	**RE1W**	101871	5
	Frame 2	CL05...CL10	15	75	125	**RE2H**	101872	1
			22	110	125	**RE2M**	101873	1
	Frame 3	CK75-CK08	30	150	250	**RE3E**	101874	1

Accessories

		Cat. no.	Ref. no.	Pack.
Transparent cover for pushbutton reset	For frames 1, 2 and 3	**RETC**	247795	10
pendent mounting base adaptor	Frame 1	**RE1XP**	247302	1
pendent mounting base adaptor	Frame 2	**RE2XP**	247303	1

(1) Most suitable fuse in accordance with IEC 60947-4-1, see coordination table on pg. A.128.

Approvals/Marking

SIL certified

ATEX certified

CE

Intelligent motor management relay EntelliPro ES3 / ES5

- Motor protection and motor control
- Pre-programmed motor typicals
- Communication Interface to Profibus-DP and Modbus RTU system
- Status information from motor and switchgear
- Maintenance information,
- Management of settings and configuration
- Predefined control logic
- Internal event recording with time stamping
- Local control and display devices

Protection
- Overload (Class 5 to 40)
- Earth fault (Residual current))
- Phase loss
- Thermistor (PTC)
- Start current
- Blocked rotor
- Under load
- Maximum starts per time
- Self monitoring
- External device monitoring

Diagnostic
- Time to overload trip, release
- Number of operations
- Number of motor starts
- Motor ON-time, OFF-time
- Number of overload trips
- Number of thermistor trips
- Maximum currents
- Trip currents

Drive typicals
- Direct-on-line
- Reverse
- Star delta
- Star delta reverse
- Softstarter
- Softstarter reverse
- Dahlander
- Pole changing starter
- Solenoid valve
- Actuator

Order information *(see page A.77)*

EntelliPro ES3 DP 2 2

ES3 = Standard device
ES5 = Medium device

2 = Power supply and 7 digital inputs, voltage 24V DC
3 = Power supply and 7 digital inputs, voltage 110-240V AC

0 = no additional 9 digital inputs available
2 = additional 9 digital input, voltage 24V DC
3 = additional 9 digital input, voltage 110-240V AC

Order codes ● pg. A.77
Technical data ● pg. A.78
Dimensions ● pg. A.80

New

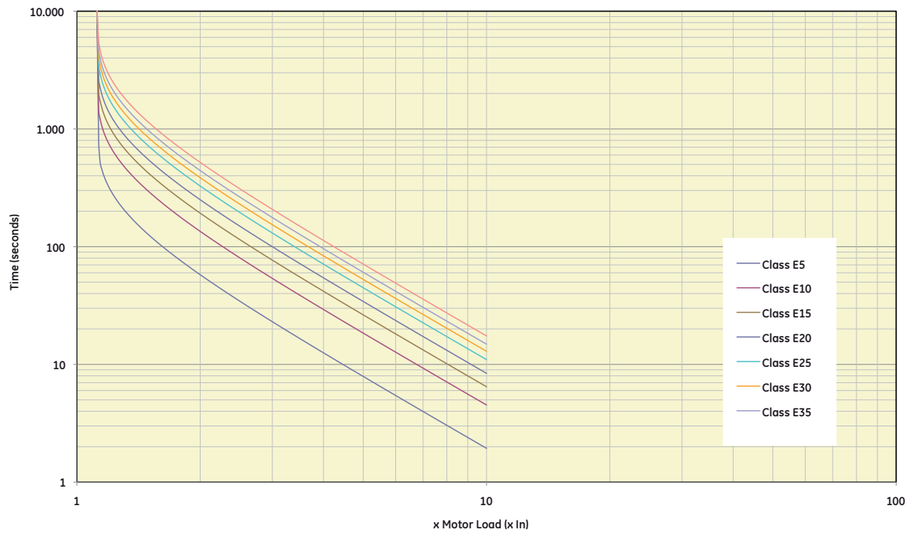
Intelligent motor management relay

Type	Voltage	Ref. No.
Standard device (I/O 7 digital inputs / 3 digital outputs)		
EntelliPro ES3 DP 2 0	24V DC	**720003**
EntelliPro ES3 DP 3 0	240V AC	**720004**
Mid device (I/O 16 digital inputs / 8 digital outputs + 4–20 mA output)		
EntelliPro ES5 DP 2 2	24V DC / 24V DC	**720005**
EntelliPro ES5 DP 2 3	24V DC / 240V AC	**720006**
EntelliPro ES5 DP 3 3	240V AC / 240V AC	**720007**
Transformer		
EntelliPro CT8	1,4A – 8A	**720022**
EntelliPro CT32	5,4A - 32A	**720023**
EntelliPro CT64	10,7A – 64A	**720024**
EntelliPro CT630	105A - 630A	**720025**
HMI Control panel		
EntelliPro CP3	HMI 3,3" LCD	**720028**
EntelliPro CP5	HMI 7" color TFT-LCD	**720029**
Parameterizing user software		
WinESG V3	EntelliPro software tool for Windows	**720020**
Demonstration KIT		
Demo-case	Demonstration KIT for EntelliPro	**720030**

New

Intelligent motor management relay

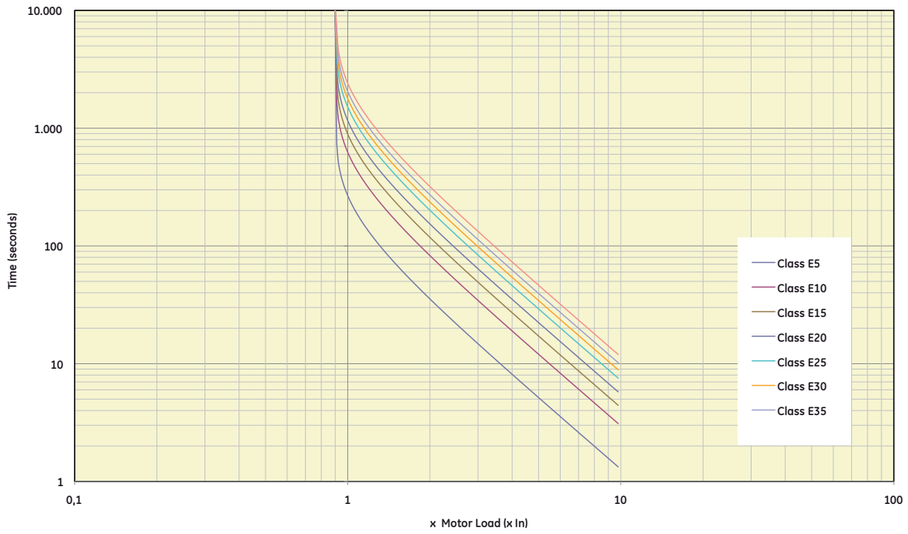
Overload tripping curves IEC 60947-4-1 (3-Pole / 3-Wire)



Current (x In)	Class E5 (sec)	Class E10 (sec)	Class E15 (sec)	Class E20 (sec)	Class E25 (sec)	Class E30 (sec)	Class E35 (sec)	Class E40 (sec)	Tolerance (%)
1.2	314.70	734.29	1048.99	1363.68	1783.28	2097.98	2412.67	2832.27	10
1.4	156.93	366.16	523.09	680.01	889.25	1046.17	1203.10	1412.83	10
1.6	103.43	241.33	344.75	448.18	586.08	689.50	792.93	930.83	10
1.8	75.21	175.49	250.70	325.91	426.19	501.40	576.61	676.90	10
2	57.80	134.86	192.66	250.46	327.53	385.33	443.12	520.19	10
2.5	34.41	80.29	114.70	149.11	194.99	229.40	263.81	309.69	10
3	23.26	54.10	77.85	101.91	133.65	155.70	178.76	209.50	10
3.5	16.79	39.02	56.31	73.91	97.03	112.62	129.22	151.34	10
4	12.74	29.56	42.80	56.34	74.06	85.60	98.14	114.86	10
4.5	10.02	23.22	33.74	44.56	58.66	67.48	77.30	90.40	10
5	8.11	18.75	27.36	36.26	47.81	54.71	62.62	73.16	10
5.5	6.71	15.48	22.68	30.19	39.86	45.37	51.87	60.55	10
6	5.65	13.01	19.10	24.31	31.97	37.52	43.16	50.43	10
6.5	4.83	11.10	16.43	20.76	27.33	32.06	36.89	43.06	10
7	4.18	9.59	13.40	17.96	23.67	27.76	31.94	37.25	10
7.2	3.90	9.08	12.78	17.00	22.42	26.28	30.25	35.26	10
8	3.20	7.39	10.40	13.88	18.33	21.47	24.71	28.76	20
9	2.60	5.89	8.40	11.09	14.68	17.18	18.90	22.98	20
10	2.30	5.20	7.40	9.10	12.19	14.13	16.27	18.85	20

New

Overload tripping curves IEC 60947-4-1 (2-Pole / 2-Wire)

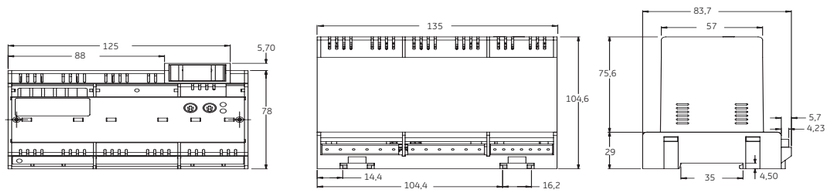


Current (x In)	Class E5 (sec)	Class E10 (sec)	Class E15 (sec)	Class E20 (sec)	Class E25 (sec)	Class E30 (sec)	Class E35 (sec)	Class E40 (sec)	Tolerance (%)
1	267.42	623.99	891.41	1158.83	1515.39	1782.81	2050.24	2406.80	10
1.2	130.59	304.72	435.31	565.91	740.03	870.63	1001.22	1175.35	10
1.4	83.87	195.69	279.56	263.43	475.25	559.12	642.98	754.81	10
1.6	59.72	139.35	199.07	258.79	338.42	398.14	457.88	537.48	10
1.8	45.12	105.27	150.39	195.51	255.67	300.78	345.90	406.06	10
2	35.46	82.75	118.21	153.67	200.96	236.42	271.88	319.17	10
2.5	21.73	50.71	72.45	94.18	123.16	144.90	166.63	195.61	10
3	14.76	34.44	49.20	63.97	83.65	98.41	113.17	132.85	10
3.5	10.70	24.98	35.68	46.39	60.66	71.36	82.07	96.34	10
4	8.13	18.97	27.09	35.22	46.06	54.19	62.32	73.15	10
4.5	6.39	14.90	21.29	27.67	36.19	42.57	48.96	57.48	10
5	5.15	12.02	17.17	22.33	29.20	34.35	39.50	46.37	10
5.5	4.25	9.91	14.15	18.40	24.06	28.30	32.55	38.21	10
6	3.56	8.31	11.86	15.42	20.17	23.73	27.29	32.04	10
6.5	3.03	7.06	10.09	13.12	17.16	20.18	23.21	27.25	10
7	2.80	6.30	8.79	11.70	15.47	17.88	20.94	24.36	10
7.2	2.60	6.05	8.42	11.09	14.66	16.92	19.83	23.07	10
8	2.20	4.90	6.80	9.14	12.09	13.78	16.22	19.04	20
9	1.75	3.80	5.66	7.21	9.61	10.98	13.00	15.05	20
10	1.66	3.50	5.30	6.39	7.87	8.98	12.19	14.01	20

New

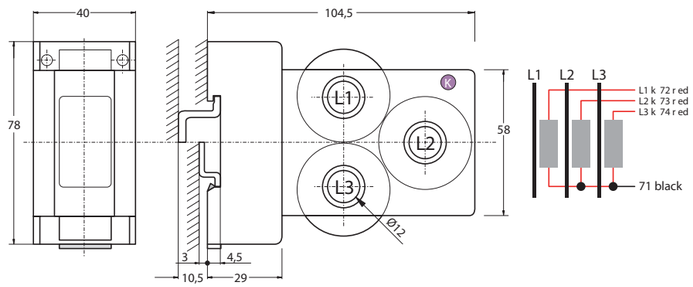
Dimensional drawings

EntelliPro ES3/ES5

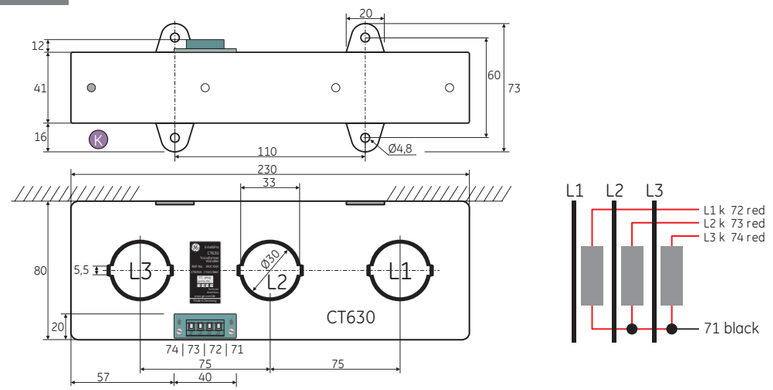


Transformers

CT 8 - CT 32 - CT 64



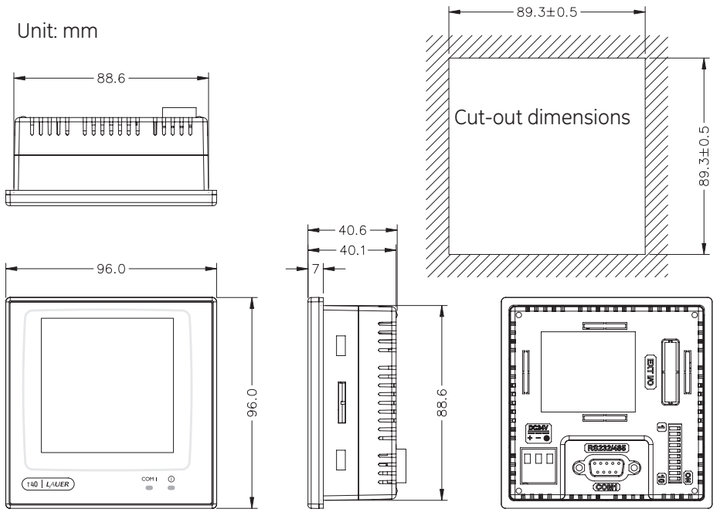
CT 630



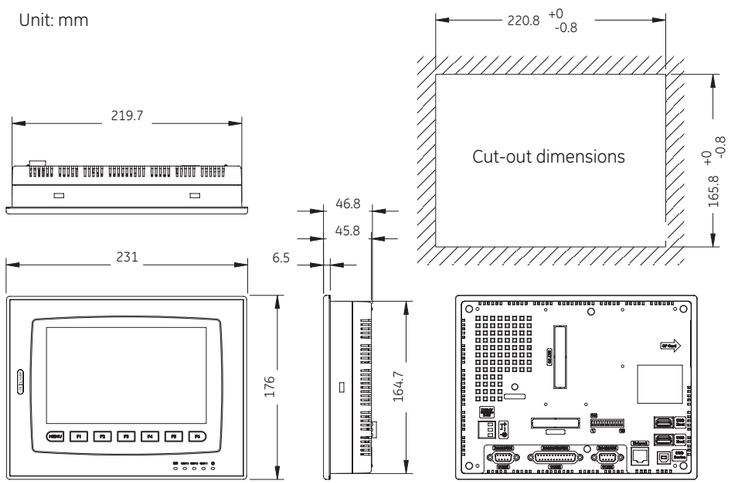
New

Control panel

CP3



CP5



New

Notes

Technical data

General

		MC1...	MC2...
Rated thermal current Ith θ ≤ 60º(1)	(A)	20	20
Rated operational current Ie(2)	(A)	9	12
(3 x 440V, 50/60Hz, AC-3)			
Maximum number of poles		4	4
Rated insulation current Ui	(V)	750	750
Rated operational current Ue	(V)	690	690

(1) Insulated terminal type B 2.8 x 0.8 with wire 1 mm²: Ie = 8A, design DIN 46 247
(2) Max.operational current AC3, 3 -phase≤ 440V, according to IEC 947-4-1

Conformity to standards

IEC/EN 60947-1	CSA C22.2/14	SEV 10254
IEC/EN 60947-4-1	CENELEC HD 419	JIS C8325
IEC/EN 60947-5-1	VDE 0660	JEM 1038
EN 50003	NFC 63110	NEMA ICS-1
EN 50005	BS 4794	UL 508
EN 50012		

Approvals

cULus	NEMKO	SEMKO
SETI	DEMKO	RINA
IMQ		
Lloyd's Register	Bureau Veritas	CE

Ambient conditions

Storage temperature		-55ºC to +80ºC
Operation temperature		-40ºC to +55ºC
Altitude	up to 3000m	Nominal values
	from 3000 up to 4000m	90%Ie 80%Ue
	from 4000 up to 5000m	80%Ie 75%Ue

Climatic resistance

Continuous tests 40 / 125 / 56		
Cold (72h)		
	Temperature	-40ºC
Dry heat (96h)		
	Temperature	+125ºC
	Relative humidity	< 50%
Humid heat (56h)		
	Temperature	+40ºC
	Relative humidity	95%
Cyclic tests		
First half-cycle (12h)		
	Low temperature	+25ºC
	Relative humidity	93%
Second half-cycle (12h)		
	Low temperature	+55ºC
	Relative humidity	95%
Number of consecutive cycles		6

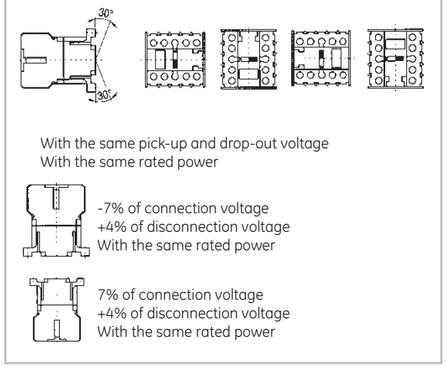
Shock resistance (IEC 68-2-27)

Continuously closed (at 0.8Us)	
Admissible acceleration	25 g
Impulse duration	11 ms
Continuously opened (no voltage)	
Admissible acceleration	20 g
Impulse duration	11 ms

Vibration resistance (IEC 68-2-6)

Continuously closed (at 0.8Us)	
Admissible acceleration	15 g
Sweep between	10 - 200 Hz
Continuously opened (no voltage)	
Admissible acceleration	5g (AC) - 35g (DC)
Sweep between	10 - 200 Hz

Mounting positions



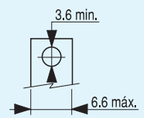
With the same pick-up and drop-out voltage
With the same rated power

-7% of connection voltage
+4% of disconnection voltage
With the same rated power

7% of connection voltage
+4% of disconnection voltage
With the same rated power

Terminal capacity

Terminal with M3.5 screw		Tightening torque
(with pozidrive head and safety flange)		0.8 Nm - 7 Lb/in
Solid wire	mm²	0.75 to 2 x 2 w.
Flexible wire without terminal	mm²	0.75 to 2.5 x 2 w.
Flexible wire without terminal with cap	mm²	0.75 to 2.5 x 1 w.
	mm²	0.75 to 1 x 2 w.
Ring terminal		0.8 Nm - 7 Lb/in



Faston terminal 2.8 - 2 insulated terminals	mm²	1 x 2 w.
Terminal for printed circuit (Ø of PCB hole)		1.8 mm
Ring terminal cap		7.8 mm
Fork terminal cap		6.5 mm

Control circuit

		MC _ A...	MC _ C...	MC _ I...	MC _ K...	MC _ C...W
Rated insulation voltage (Ui)	(V)	750	750	750	750	750
Standard voltages (Us)						
50Hz(V)		24 ... 690	–	–	–	–
60Hz(V)		6 ... 600	–	–	–	–
DC	(V)	–	6 ... 440	24	24	12 ... 440
Operating voltages limits						
Operating [1]	xUs	0.8 ... 1.1	0.8 ... 1.1	0.8 ... 1.25	0.7 ... 1.25	0.7 ... 1.3
Drop-out	xUs	0.35 ... 0.55	0.15 ... 0.4	0.15 ... 0.3	0.15 ... 0.35	0.15 ... 0.3
Operating voltages limits with coil 50/60 Hz						
Operating	xUs	0.8 ... 1.1	–	–	–	–
Drop-out	xUs	0.35 ... 0.55	–	–	–	–
Consumption						
50 or 60Hz - monofrequency coil						
Pick-up	(VA)	26	–	–	–	–
Seal	(VA)	4	–	–	–	–
50/60Hz - bifrequency coil						
Pick-up	(VA)	32	–	–	–	–
Seal	(VA)	6	–	–	–	–
DC	(W)	–	3	1.2	2	4
Power factor						
Magnetic circuit open	(cos φ)	0.8	–	–	–	–
Magnetic circuit closed	(cos φ)	0.35	–	–	–	–
Power dissipation	(W)	1.4	3	1.2	2	4
Opening and closing times						
Values between ± %Us	%	+10 ... -20	+10 ... -20	+25 ... -30	+25 ... -30	+30 ... -30
Time on energisation NO	(ms)	6 ... 13	22 ... 36	30 ... 70	20 ... 50	17 ... 28
Time on de-energisation NC	(ms)	8 ... 16	9 ... 12	9 ... 16	9 ... 16	9 ... 12
Time on energisation NC	(ms)	5 ... 11	18 ... 27	20 ... 45	18 ... 35	12 ... 25
Time on de-energisation NO	(ms)	6 ... 13	5 ... 7	5 ... 9	5 ... 9	5 ... 7
Values at Us						
Time on excitation NO	(ms)	7 ... 12	24 ... 27	25 ... 45	25 ... 40	11 ... 23
Time on desexcitation NC	(ms)	8 ... 16	9 ... 11	9 ... 16	9 ... 16	9 ... 11
Time on excitation NC	(ms)	6 ... 10	20 ... 26	25 ... 35	20 ... 30	15 ... 21
Time on desexcitation NO	(ms)	6 ... 13	5 ... 8	5 ... 9	5 ... 8	5 ... 8
Maximum time without voltage	(ms)	3	3	3	3	3
Mechanical endurance						
Monofrequency coil	10^6 ops.	>15	–	–	–	–
Bifrequency coil	10^6 ops.	>10	–	–	–	–
DC	10^6 ops.	–	10	10	10	10
Maximum rate						
No load Monofrequency coil	ops./h	9000	–	–	–	–
No load Bifrequency coil	ops./h	3600	–	–	–	–
No load DC	ops./h	–	9000	9000	9000	9000
AC1 and AC3 (at rated power)	ops./h	1200	1200	1200	1200	1200
AC4 (at rated power)	ops./h	300	300	300	300	300

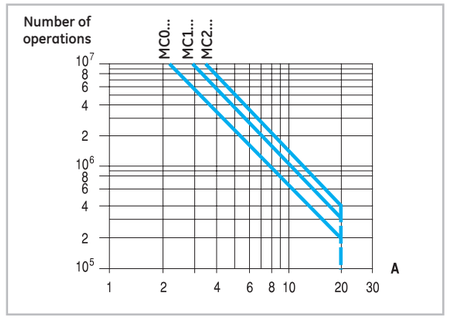
Main circuit (poles)

		MC1...	MC2...
Rated insulation voltage (Ui)	(V)	750	750
(acc. IEC 947-4)			
Rated thermal current (Ith) θ ≤ 60° (1)	(A)	20	20
Frequency limits	(Hz)	0...400	0...400
Making capacity (r.m.s.) Ue ≤ 690V 50/60Hz	(A)	160	160
Breaking capacity (r.m.s.) Ue ≤ 440V	(A)	106	106
Ue = 500V	(A)	90	90
Ue = 690V	(A)	80	90
Short-time current			
0.3 sec.	(A)	470	470
1 sec.	(A)	250	250
5 sec.	(A)	125	125
10 sec.	(A)	95	95
30 sec.	(A)	70	70
1 min.	(A)	50	50
3 min.	(A)	40	40
Recovery time	min.	10	10
Protec. against short-circuits (IEC 947-4). w/o TOR			
Coordination type "1" gL/gG	(A)	32	32
Coordination type "2" gL/gG	(A)	20	20
w/o welding contacts gL/gG	(A)	16	16
Circuit breaker rating (curve G CEE 19.1)		20	20
Impedance per pole	(mΩ)	1.5	1.5
Power dissipation per pole			
AC1	(W)	0.6	0.6
AC3	(W)	0.128	0.228
Insulation resistance			
Between adjacent poles	(mΩ)	> 10	> 10
Between pole and earth	(mΩ)	> 10	> 10
Between input and output	(mΩ)	> 10	> 10
Guaranteed no overlap between NO and NC contacts			
Space	(mm)	1	1
Time	(ms)	> 2	> 2

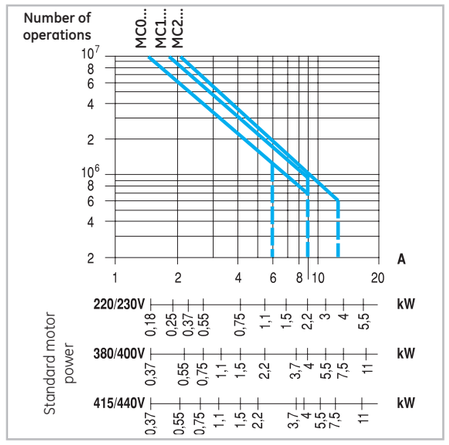
(1) Insulated terminal type B 2.8 x 0.8 with wire 1 mm² Ie = 8A acc. to DIN 46247

Electrical endurance

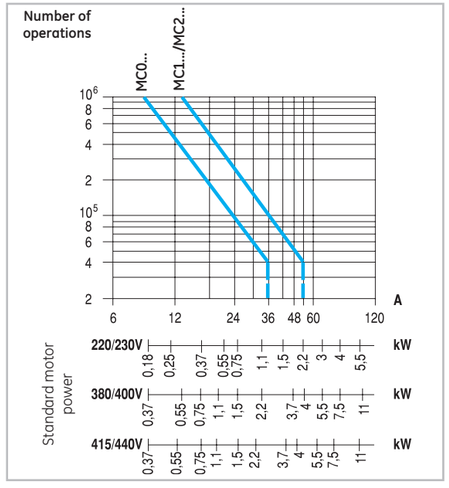
Category AC1



Category AC3



Category AC4



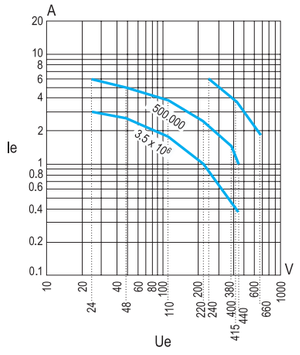
Internal auxiliary contacts

			MC1 / MC2
Rated insulation voltage (Ui) IEC 60947-5		(V)	750
Rated thermal current (Ith) θ ≤ 60°C (1)		(A)	16
Making capacity according with IEC 60947-5-1			
	Ue ≤ 690 50-60 Hz	(A)	160
	Ue ≤ 440V DC	(A)	160
Breaking capacity (r.m.s.) IEC 60947-5-1			
	AC-15		
	Ue ≤ 440V / 50-60 Hz	(A)	106
	DC-13		
	Ue ≤ 110V DC	(A)	3
	Ue = 220V DC	(A)	1.2
	Ue = 48V DC	(A)	10
Minimum operational power (operational safety.)			5mA, 17V
Short-circuit protection (max.class gl fuse) w/o welding		(A)	10
Insulation resistance			
	Between adjacent contacts	(mΩ)	> 10
	Between contacts and earth	(mΩ)	> 10
	Between input and output	(mΩ)	> 10
Guaranteed no overlap between NO and NC contacts			
	Space	(mm)	0,5
	Minimal time	(ms)	> 2
Impedance		(mΩ)	2.3
Terminal capacity			Same as main circuit

(1) Insulated terminal type B 2.8 x 0.8 with wire 1 mm² Ie = 8A acc. with DIN 46247

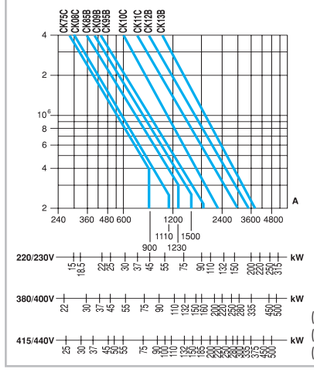
Tripping characteristics (AC)

AC Operation AC-15
Electrical endurance



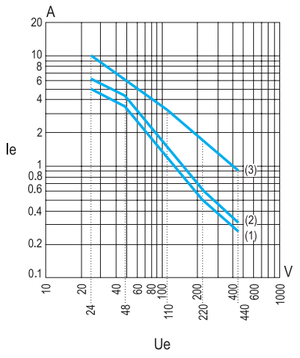
Tripping characteristics (DC)

DC Inductive circuit. DC-13 L/R ≤ 100 ms
Electrical endurance 10^6 ops.



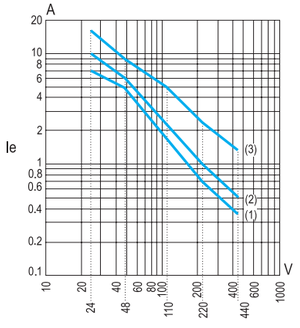
(1) 1 pole in series
(2) 2 poles in series
(3) 3 poles in series

DC Inductive circuit. DC-13 L/R ≤ 15 ms
Electrical endurance 10^6 ops.



(1) 1 pole in series
(2) 2 poles in series
(3) 3 poles in series

DC Inductive circuit. DC-13 L/R ≤ 1 ms
Electrical endurance 10^6 ops.



(1) 1 pole in series
(2) 2 poles in series
(3) 3 poles in series

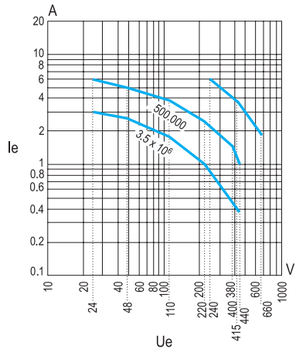
Instantaneous auxiliary contact blocks

			MACN..., MACL...
Rated insulation voltage (Ui) acc. IEC 60947-1		(V)	750
Rated thermal current (Ith) θ ≤ 60°C (1)		(A)	10
Making capacity (r.m.s.) according with IEC/EN 60947-5-1			
AC-15	Ue ≤ 220V 50/60 Hz	(A)	73
	Ue = 380V 50/60 Hz	(A)	38
	Ue = 690V 50/60 Hz	(A)	22
DC-13	Ue ≤ 100V DC	(A)	2.6
L/R=100ms	Ue = 220V DC	(A)	1
	Ue = 440V DC	(A)	0.6
Breaking capacity (r.m.s.) acc. IEC/EN 60947-5-1			
AC-15	Ue ≤ 220V 50/60 Hz	(A)	73
	Ue = 380V 50/60 Hz	(A)	38
	Ue = 690V 50/60 Hz	(A)	22
DC-13	Ue ≤ 100V DC	(A)	2
LR=100ms	Ue = 220V DC	(A)	0,8
	Ue = 440V DC	(A)	0.4
Rated voltage and rated current Ue-Ie			
AC-15	according to IEC 60947		120V - 6A
			230V - 6A
			400V - 4A
			500V - 1A
			600V - 1A
	according to UL, CSA		A600
DC-13	according to IEC 60947		24V - 4A
			48V - 2A
			110V - 0.7A
			220V - 0.3A
			440V - 0.1A
	according to UL, CSA		Q600
Minimum operational power (operational safety)			5 mA, 17V
Short-circuit protection (max. class gl fuse) w/o welding		(A)	10
Insulation resistance			
	Between adjacent contacts	(mΩ)	> 10
	Between contacts an earth	(mΩ)	> 10
	Between input and output	(mΩ)	> 10
Guaranteed no overlap between NO and NC contacts			
	Space	(mm)	0,5
	Minimal time	(ms)	> 2
Impedance		(mΩ)	2.4
Terminal capacity			Same as main circuit

(1) Insulated terminal type B 2.8 x 0.8 with wire 1 mm² Ie = 8A acc. with DIN 46247

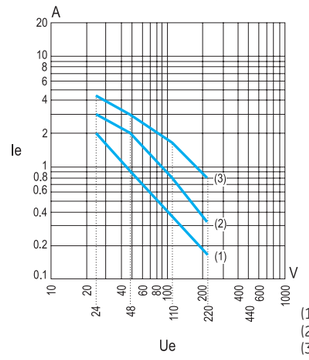
Tripping characteristics (AC)

AC Operation AC-15
Electrical endurance



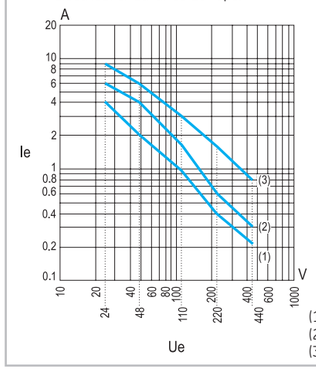
Tripping characteristics (DC)

DC Inductive circuit. DC-13 L/R ≤ 100 ms
Electrical endurance 10^6 ops.



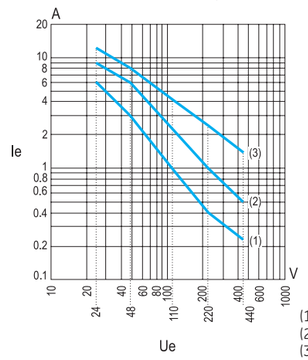
(1) 1 pole in series
(2) 2 poles in series
(3) 3 poles in series

DC Inductive circuit. DC-13 L/R ≤ 15 ms
Electrical endurance 10^6 ops.



(1) 1 pole in series
(2) 2 poles in series
(3) 3 poles in series

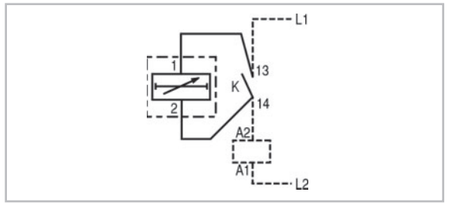
DC Inductive circuit. DC-13 L/R ≤ 1 ms
Electrical endurance 10^6 ops.



(1) 1 pole in series
(2) 2 poles in series
(3) 3 poles in series

Electronic timer block

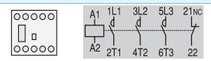
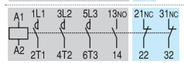
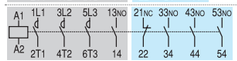
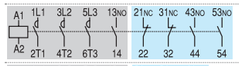
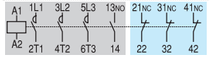
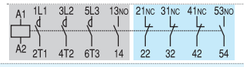
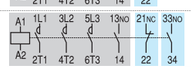
			MREBC...
Rated insulation voltage (Ui)		(V)	750
Rated thermal current (Ith) θ ≤ 60°C [1]		(V)	0.55
Supply voltage (AC and DC)		(V)	24 to 250
Operating limits			0.80 to 1.1 Us (0.85 to 1.1 Us to 12V)
Voltage drop		(V)	< 3
Maximum load current at :			
	20°C	(A)	0.9
	40°C	(A)	0.72
	60°C	(A)	0.55
Minimum load for safe operation		(A)	> 10
Maximum current		(A)	10A per 40 ms
Leakage current at 220V		(mA)	< 5
Operational current			
	AC-15	(A)	0.7
	DC-13	(A)	0.9
Timing range (delay ON)		(s)	0.5 to 60 (± 6 s)
Rearrangement time		(ms)	< 100
Repeatibility (accuracy) (%)		± 1	
Ambient temperature			
	storage	(°C)	–55 to + 80
	operation	(°C)	–5 to + 60
Degree of protection			IP20
Mounting positions			Any
Terminals : 2 free cables			1 mm² (AWG 17) 250 mm



Contact sequence

	Main contact (NO)	Main contact (NC)	Auxiliary contact (NO)	Auxiliary contact (NC)
Three-pole minicontactor				
MC...310...	0 2 3.5		0 2.3 3.5	
MC...301...	0 2 3.5			0 1.2 3.5
Four-pole minicontactor				
MC...400...	0 2 3.5			
MC...B00...	0 2 3.5	0 1.2 3.5		
MC...A00...		0 1.2 3.5		
Auxiliary contact block				
MAC...			0 2.1 3.5	0 1 3.5
MAR...			0 2.1 3.5	0 1 3.5

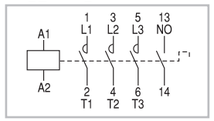
Terminal numbering in accordance with EN 50012

Final structure of the contactor	Auxiliary contactors Combination Description	NO	NC	Possible basic contactors + Auxiliary contact blocks to be added
Without auxiliary contact blocks				
	01E	0	1	MC_A301A...
	10E	1	0	MC_A310A...
Auxiliary contact blocks front mounted with two or four contacts				
	11E	1	1	MC_A310A... + MACN211A
	21E	2	1	MC_A310A... + MACN211A
	12E	1	2	MC_A310A... + MACN202A
	31E	3	1	MC_A310A... + MACN431A
	41E	4	1	MC_A310A... + MACN431A
	22E	2	2	MC_A310A... + MACN422A
	32E	3	2	MC_A310A... + MACN422A
	13E	1	3	MC_A310A... + MACN413A
	23E	2	3	MC_A310A... + MACN413A
Auxiliary contact blocks lateral mounted with one contact				
	11E	1	1	MC_A310A... + MACL101A
	21E	2	1	MC_A310A... + MACL101A + MACL110A
	12E	1	2	MC_A310A... + MACL101A + MACL101A

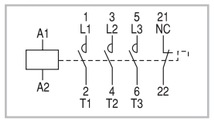
Terminal numbering

Basic three-pole contactors. *(EN 50012)*

MC _ _ 310A _

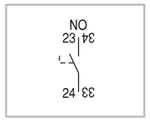


MC _ _ 301A _

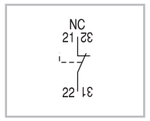


Instantaneous auxiliary contact blocks. *(EN 50012)*

MACL110A _



MACL101A _



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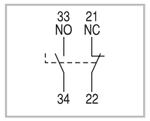

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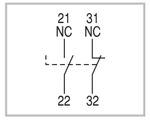
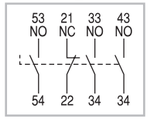
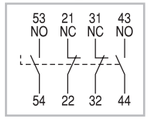


MACN431A_



MACN422A_



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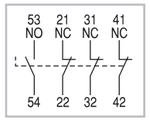
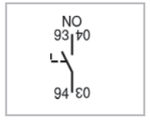
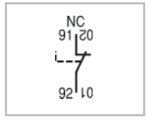


Instantaneous auxiliary contact blocks. *(EN 50005)*

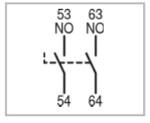
MARL110A_S



MARL101A_S



MARN220A_



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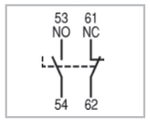

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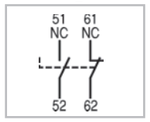
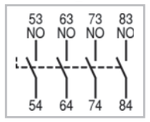


MARN440A_



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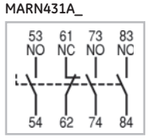

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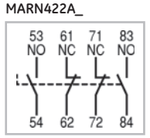

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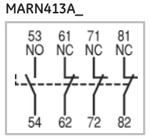
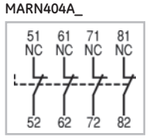
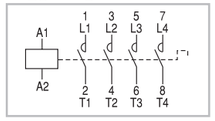


MARN404A_

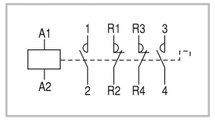


Base four-pole contactors. *(EN 50005)*

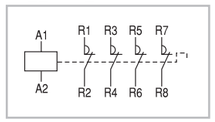
MC _ _ 400A _



MC _ _ B00A _



MC _ _ A00A _



Instantaneous auxiliary contact blocks. *(EN 50005)*

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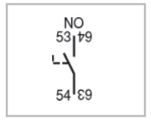

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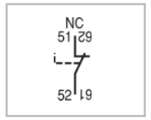

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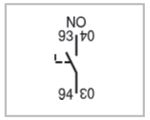

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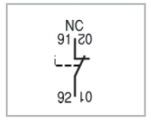

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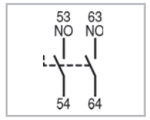

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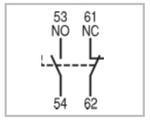

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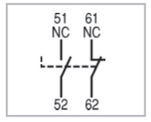

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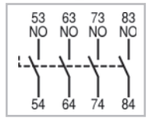

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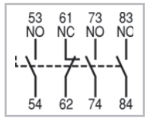

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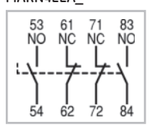
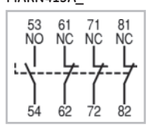
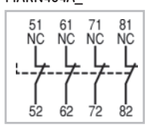


MARN413A_

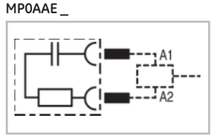


MARN404A_

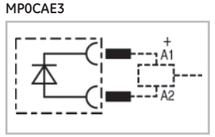


Voltage suppressor block

MP0AAE _



MP0CAE3



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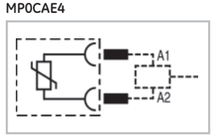


Conformity to standards

IEC/EN 60947-1	EN 50005	UNE 20109
IEC/EN 60947-4-1	CENELEC HD419	BS 5424 & 775
IEC/EN 60947-5-1	NF C63-110	NEMA ICS 1
UL 508	ASE 1025	VDE 0660/102
CSA 22.2/14		

Approvals

cULus	RINA	CE
SETI	IMQ (up to Ith:32A)	
Lloyd's Register	Bureau Veritas	

Ambient conditions

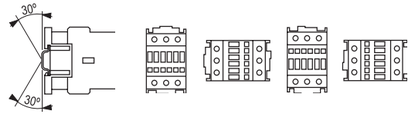
Storage temperature		-55°C to +80°C
Operation temperature		-40°C to +55°C
Altitude	up to 3000m	Nominal values
	from 3000 up to 4000m	90%Ie 80%Ue
	from 4000 up to 5000m	80%Ie 75%Ue

Climatic resistance (IEC 68-2)

Continuous tests 40 / 125 / 56	
Cold (72h)	
Temperature	-40°C
Dry heat (96h)	
Temperature	+125°C
Relative humidity	< 50%
Humid heat (56h)	
Temperature	+40°C
Relative humidity	95%

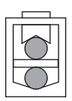
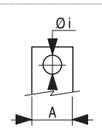
Cyclic test (6 cycles)	
Humid heat	
First half-cycle (12h))	
Low temperature	+25°C
Relative humidity	93%
Second half-cycle (12h)	
Low temperature	+55°C
Relative humidity	95%

Mounting positions



With the same pick-up and drop-out voltage
With the same rated power

Terminal capacity and tightening torque

			CL00 ... CL02	CL25	CL03 ...CL04	CL45	CL05 ... CL08	CL09 ... CL10
	Solid, stranded and finely stranded		2 x 0.5 ... 2.5	2 x 0.5 .. 2.5	–	–	–	–
	without end sleeve	(mm^2)	2 x 2.5 ... 6	2 x 2.5 ... 10	–	–	–	–
	Finely stranded with or		2 x 1 ... 2,5	2 x 1 ... 2,5	–	–	–	–
	without end sleeve	(mm^2)	2 x 2.5 ... 6	2 x 2.5 ... 10	–	–	–	–
	AWG wires		2 x 20 ... 12	2 x 20 ... 8	–	–	–	–
	Tightening torque	(Nm)	1.6	2.2	–	–	–	–
		(Lb x in.)	15	20	–	–	–	–
	Solid, stranded and finely stranded		–	–	0.75 ... 16	0.75 ... 16	1 ... 35	1.5 ... 50
	without end sleeve	(mm^2)	–	–	0.75 ... 16	0.75 ... 16	1 ... 35	1.5 ... 50
	Finely stranded with end sleeve	(mm^2)	–	–	1 ... 16	1 ... 16	1 ... 35	1.5 ... 50
	Finely stranded w/o end sleeve	(mm^2)	–	–	18 ... 6	18 ... 6	16 ... 2	16 ... 2
	AWG wires		–	–	1,4	1,8	4	5,6
	Tightening torque	(Nm)	–	–	12	16	35	50
		(Lb x in.)						
	Solid	(mm^2)	–	–	0.75 ... 16	0.75 ... 16	1 ... 16	4 ... 35
	Stranded	(mm^2)	–	–	0.75 ... 16	0.75 ... 16	1 ... 25	4 ... 35
	Finely stranded w/o end sleeve	(mm^2)	–	–	0.75 ... 16	0.75 ... 16	1 ... 25	4 ... 35
	Finely stranded with end sleeve	(mm^2)	–	–	1 ... 16	1 ... 16	1 ... 25	4 ... 35
	AWG wires		–	–	18 ... 6	18 ... 6	16 ... 4	10 ... 1
	Tightening torque	(Nm)	–	–	1.4	1.8	4	5.6
		(Lb x in.)	–	–	12	16	35	50
	Solid, stranded and finely stranded		–	–	Max. 16	Max. 16	Max. 50 ... 4	Max. 50 ... 35
	without end sleeve	(mm^2)	–	–			Max. 25 ... 16	
	Finely stranded w/o end sleeve	(mm^2)	–	–			Max. 25 ... 16	
	Finely stranded with end sleeve	(mm^2)	–	–			Max. 25 ... 25	
	AWG wires		–	–	Max. 6	Max. 6	Max. 2 ... 12	Max. 1
			–	–			Max 4 ... 4	
	Tightening torque	(Nm)	–	–	1.4	1.8	4	5.6
		(Lb x in.)	–	–	12	16	35	50
	Ring terminals	(Ø i)	3,6	4,2	4.2	4.2	6.2	6.2
	(acc. with IEC/EN 60947-1)	(A)	8	10	10	10	12.5	12.5
	Tightening torque	(Nm)	1,6	1,4	1.4	1.4	3	3
		(Lb x in.)	15	12	12	12	26	26

Power circuit

		CL00	CL01	CL02	CL25	CL03	CL04	CL45	CL05	CL06	CL07	CL08	CL09	CL10
Three pole version														
Rated thermal current Ith at θ ≤ 55°C	(A)	25	25	32	45	45	60	60	-	90	110	110	140	140
Rated operational current Ie AC-3	(A)	9	12	18	25	25	32	40	-	50	65	80	95	105
Rated operational voltage Ue	(V)	690	690	690	690	690	690	690	-	690	690	690	690	690
Four pole version (4NO and 2NO+2NC)														
Rated thermal current Ith at θ ≤ 55°C	(A)	-	25	32	-	45	60	-	90	-	110	110	140	-
Rated operational voltage Ue	(V)	-	690	690	-	690	690	-	690	-	690	690	690	-
Three and four pole version														
Rated insulation voltage Ui	(V)	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Maximum continuous current AC-1	(A)	25	25	32	45	45	60	60	90	90	110	110	140	140
Frequency limits	(Hz)	25..400	25..400	25..400	25..400	25..400	25..400	25..400	25..400	25..400	25..400	25..400	25..400	25..400
Making capacity (RMS) (IEC 947)	(A)	450	450	450	450	550	550	550	1000	1000	1000	1000	1280	1280
Breaking capacity (RMS) (IEC 947)														
Ue ≤ 400V	(A)	250	250	250	350	450	450	450	920	920	920	920	1050	1050
Ue = 500V	(A)	250	250	250	320	450	450	450	920	920	920	920	1050	1050
Ue = 690V	(A)	130	130	130	170	205	205	205	780	780	780	780	950	950
Short-time current														
1 sec.	(A)	455	455	570	630	1010	1010	1265	1580	1580	2530	2530	3300	3300
5 sec.	(A)	205	205	254	280	450	450	450	565	710	1130	1130	1485	1485
10 sec.	(A)	144	144	180	200	320	320	400	500	500	800	800	1050	1050
30 sec.	(A)	85	85	104	115	185	185	230	290	290	460	460	600	600
1 min.	(A)	60	60	74	80	130	130	165	205	205	325	325	430	430
3 min.	(A)	35	35	46	50	90	90	100	120	120	185	185	250	250
Recovery time	(min.)	10	10	10	10	10	10	10	10	10	10	10	10	10
Protec. against short-circuit with fuses without TOR														
Coordination type "1"														
gL/gG	(A)	50	50	63	63	100	100	125	200	200	200	200	250	250
Coordination type "2"														
gL-gG	(A)	25	35	35	50	63	63	80	100	100	125	125	160	200
Without welding														
gL-gG	(A)	10	10	25	35	35	35	50	80	80	100	100	140	160
Impedance per pole	(mΩ)	2.35	2.35	2.41	1.65	1.28	1.28	0.95	0.85	0.85	0.86	0.86	0.76	0.76
Power dissipation per pole														
AC-1	(W)	1.47	1.47	2.46	3.34	2.59	4.6	3.42	6.89	6.86	10.40	10.40	14.89	14.89
AC-3	(W)	0.19	0.34	0.78	1.03	0.80	1.31	1.52	1.36	2.12	3.63	5.5	6.86	8.37
Insulation resistance														
Between adjacent poles	(mΩ)	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10
Between poles and earth	(mΩ)	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10
Between input and output	(mΩ)	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10

Control circuit

		CL00 ... CL25	CL03 ... CL45	CL05 ... CL08	CL09 ... CL10
Alternating current					
Rated insulation voltage Ui	(V)	1000	1000	1000	1000
Standard voltages Us 50 Hz	(V)	24...690	24...690	24...690	24...690
Standard voltages Us 60 Hz	(V)	24...600	24...600	24...600	24...600
Voltage operating limits monofrequency coils					
Operating	xUs	0.8...1.1	0.8...1.1	0.8...1.1	0.8...1.1
Pick-up	xUs	0.6...0.8	0.65...0.8	0.65...0.8	0.65...0.8
Seal	xUs	0.35...0.55	0.4...0.6	0.4...0.6	0.4...0.6
Voltage operating limits 50/60 Hz coils					
Operating 50 Hz	xUs	0,8...1,1	0.8...1.1	0.8...1.1	0.8...1.1
Operating 60 Hz	xUs	0,85...1,1	0.85...1.1	0.85...1.1	0.85...1.1
Pick-up 50 Hz	xUs	0,5...0,8	0.6...0.8	0.6...0.8	0.6...0.8
Pick-up 60 Hz	xUs	0,65...0,85	0.7...0.85	0.7...0.85	0.7...0.85
Seal 50 Hz	xUs	0,3...0,55	0.35...0.60	0.35...0.60	0.35...0.60
Seal 60 Hz	xUs	0,35...0,65	0.4...0.6	0.4...0.6	0.4...0.6
Consumption monofrequency coils					
Magnetic circuit closed	(VA)	6	9	15.5	15.5
Magnetic circuit opened (VA)		48	88	190	190
Consumption bifrequency coils					
Magnetic circuit closed (50 Hz/60 Hz)	(VA)	6.8 / 5.6	11.4 / 9.5	20 / 16.6	20 / 16,6
Magnetic circuit opened (50 Hz/60 Hz)	(VA)	53 / 44	120 / 100	245 / 204	245 / 204
Thermal power dissipation (50 Hz/60 Hz)	(W)	2.2 / 1.8	3.2 / 2.6	5.2 / 4.3	5.2 / 4.3
Power factor					
Magnetic circuit closed	cos φ	0.33	0.28	0.26	0.26
Magnetic circuit opened	cos φ	0.84	0.73	0.54	0.54
Opening and closing times					
Values between + 10 % Us and – 20 % Us					
Time on energisation (NO)	(ms)	6...20	7...25	9...35	9...35
Time on de-energisation (NO)	(ms)	6...13	5...25	9...15	9...15
Values at Us					
Time on energisation (NO)	(ms)	8...20	10...19	15...30	15...30
Time on de-energisation (NO)	(ms)	6...13	5...25	9...15	9...15
Mechanical endurance					
Monofrequency coils	10^6 ops.	15	15	15	15
Bifrequency coils (at 50 Hz)	10^6 ops.	10	10	8	8
Maximum rate					
Monofrequency coils. No load	ops./h	9000	9000	9000	5000
AC-1 at rated power	ops./h	1200	1200	1200	1200
AC-2 at rated power	ops./h	1000	1000	1000	750
AC-3 at rated power	ops./h	1200	1200	1200	600
AC-4 at rated power	ops./h	360	360	200	200
Bifrequency coils. No load	ops./h	3600	3600	3600	3600

				Coils with electronic module		Coils with wide voltage range		
		CL00D ... CL25D	CL03D ... CL45D	CL05E ... CL08E	CL09E ... CL10E	CL00D..W ... CL25D..W	CL03D..W ... CL45D..W	CL05D..W ... CL10D..W
Direct current								
Rated insulation voltage Ui	(V)	1000	1000	1000	1000	1000	1000	1000
Standard voltages Us	(V)	12...440	12...440	24...440	24...440	12...440	12...440	12...440
Operating limits								
Operating	xUs	0.8...1.1	0.8...1.1	0.8...1.1	0.8...1.1	0.7...1.3	0.7...1.3	0.7...1.3
Pick-up	xUs	0.45...0.65	0.45...0.65	0.70...0.80	0.70...0.80	0.45...0.55	0.45...0.55	0.45...0.55
Drop-out	xUs	0.15...0.3	0.15...0.3	0.4...0.6	0.4...0.6	0.15...0.3	0.15...0.3	0.15...0.3
Consumption								
Magnetic circuit closed	(W)	5.5	8	10	10	6.5	10.4	20
Magnetic circuit opened (W)		5.5	8	170	170	6.5	10.4	20
Opening and closing times								
Values between + 10 % Us and – 20 % Us								
Time on energisation (NO)	(ms)	35...65	35...70	60...80	60...80	26...55	30...65	64...133
Time on de-energisation (NO)	(ms)	6...15	40...65	40...50	40...50	6...15	5...10	20...23
Values at Us								
Time on energisation (NO)	(ms)	35...45	40...55	50...60	50...60	35...45	40...55	75...95
Time on de-energisation (NO)	(ms)	7...12	30...65	55...60	55...60	7...12	6...8	20...22
Mechanical endurance	10^6 ops.	15	15	12	12	15	15	12
Maximum rate								
No load	ops./h	3600	3600	2500	2500	3600	3600	3600
AC1 and AC3 at rated power	ops./h	1200	1200	1200	600	1200	1200	1200
AC4 at rated power	ops./h	360	360	200	200	360	360	200

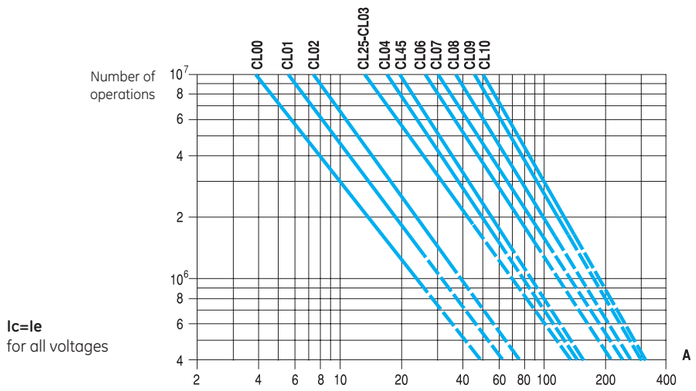
Electrical endurance

Mixed category AC4 / AC3

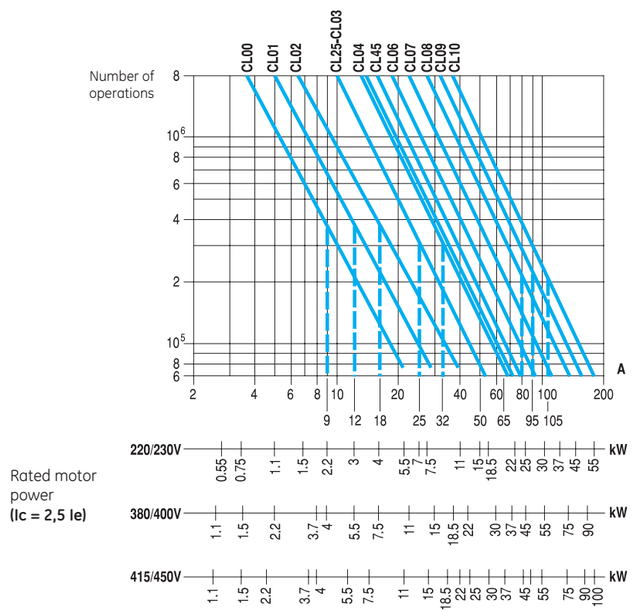
Electrical endurance for mixed category (AC-3/AC-4) is calculated with the following formula:

$$\text{Electrical endurance (AC-3/AC-4)} = \frac{\text{Electrical endurance (AC-3)}}{1 + \frac{\text{\% oper AC-4}}{100} \times \left(\frac{\text{Elec.endur. (AC-3)}}{\text{Elec.endur.(AC-4)}} - 1 \right)}$$

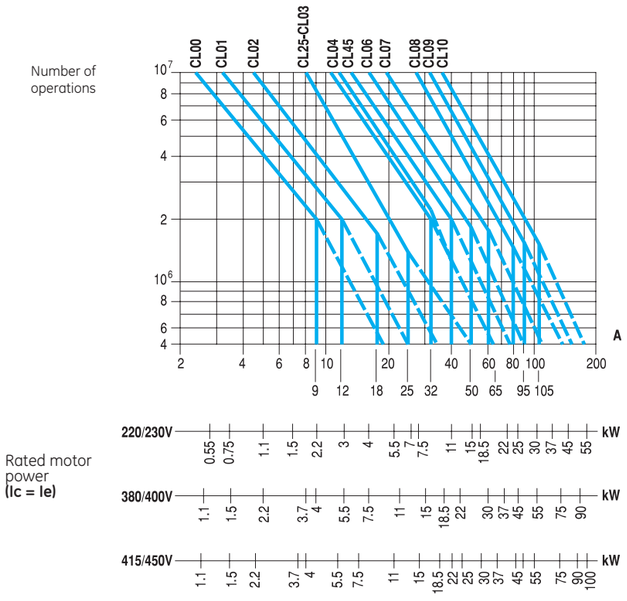
Category AC1



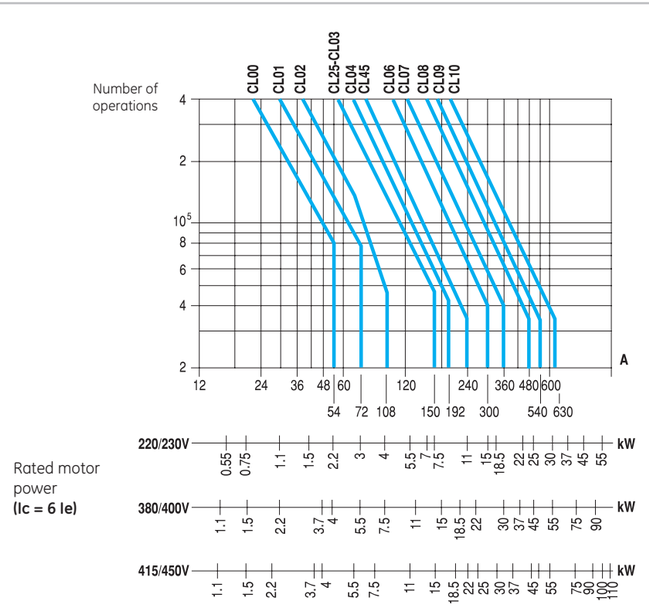
Category AC2



Category AC3



Category AC4



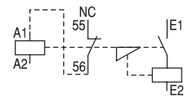
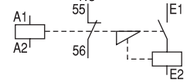
Internal auxiliary contacts

				CL00 ... CL02		CL03 ... CL04	
Rated insulation voltage Ui according to IEC 60947			(V)	1000		1000	
Rated thermal current Ith a θ ≤ 55°C			(A)	20		20	
Making capacity (r.m.s.) acc. to IEC 60947							
AC-15	Ue ≤ 400V, 50/60 Hz		(A)	250		250	
DC-13	Ue ≤ 220V DC		(A)	250		250	
Breaking capacity (r.m.s.) acc.to IEC 60947							
AC-15	Ue ≤ 400V, 50/60 Hz		(A)	250		250	
DC-13	Ue ≤ 220V DC		(A)	2		2	
AC-15	Rated voltage and current Ue-Ie	according to IEC		110/120V-10A 400/380V-6A 500V-4A	220/230V-10A 415/450V-5A 690/660V-2A	110/120V-10A 400/380V-6A 500V-4A	230/220V-10A 415/450V-5A 690/660V-2A
		according to UL, CSA		A600		A600	
DC-13	Rated voltage and current Ue-Ie	according to IEC		24V-6A 110V-2A 440V-0.35A	48V-4A 220V-0.7A	24V-6A 110V-2A 440V-0.35A	48V-4A 220V-0.7A
		according to CSA		P600		P600	
Electrical endurance			ops.	10^6		10^6	
Minimum operational power (operational safety)				17V - 5mA		17V - 5mA	
Short-circuit protect.	Max.fuse class gl-gG without welding		(A)	10		10	
Insulation resistance	Between contacts		(mΩ)	> 10		> 10	
	Between contacts and earth		(mΩ)	> 10		> 10	
	Between input and output		(mΩ)	> 10		> 10	
Guaranteed no overlap between NO and NC contacts							
	Space		(mm)	1.3		2.6	
	Time		(ms)	1.5		1.5	
Impedance of the contacts			(mΩ)	1.28		1.28	

Auxiliary contact blocks

				Instantaneous BCLF..., BCRF..., BCLL..., BRLL...		Timed blocks BTLF..., BTRF...	
Rated insulation voltage Ui according to IEC 60947			(V)	1000		1000	
Rated thermal current Ith at θ ≤ 55°C			(A)	10		10	
Making capacity (Ieff) according to IEC 60947							
AC-15	Ue ≤ 400V, 50/60 Hz		(A)	90		90	
DC-13	Ue ≤ 220V DC		(A)	90		90	
Breaking capacity (Ieff) according to IEC 60947							
AC-15	Ue ≤ 400V, 50/60 Hz		(A)	60		60	
DC-13	Ue ≤ 220V, DC		(A)	0.95		0.95	
AC-15	Rated voltage and current Ue-Ie	according to IEC		120/110V-6A 400/380V-4A 500V-2.5A	230/220V-6A 440/415V-3.5A 690/660V-1.5A	120/110V-6A 400/380V-4A 500V-2.5A	230/220V-6A 440/415V-3.5A 690/660V-1.5A
		according to UL, CSA		A600		A600	
DC-13	Rated voltage and current Ue-Ie	according to IEC		24V-4A 110V-0.7A 440V-0.15A	48V-2A 220V-0.3A	24V-4A 110V-0.7A 440V-0.15A	48V-2A 220V-0.3A
		according to UL, CSA		Q600		Q600	
Electrical endurance			10^6 ops.	1		1	
Mechanical endurance			10^6 ops.	10		5	
Minimum operational current (operational safety)				17V - 5mA		17V - 5mA	
Short-circuit protect.	Max.fuse class gl-gG without welding		(A)	10		10	
Insulation resistance	Between contacts		(mΩ)	> 10		> 10	
	Between contacts and earth		(mΩ)	> 10		> 10	
	Between input and output		(mΩ)	> 10		> 10	
Guaranted no overlap between NO and NC contacts							
	Space		(mm)	1.3		1.3	
	Time		(ms)	1.5		5	
Impedance of the contacts			(mΩ)	1.28		1.28	
Timing (ambient temperature between – 25°C and + 55°C)							
	Accuracy			–		± 5%	
	Loss of accuracy 0.5 x 10^6 ops.			–		+ 20%	
	Loss of accuracy per rise °C (0 - 55°C)			–		+ 0.75% per °C	

Mechanical latch blocks

		RMLF...
Rated insulation voltage Ui		1000 V
Standard voltages Us : 50 to 60 Hz and DC		24...690 V
Operating limits		0.75...1.1 xUs
Consumption for unlatching (auto cut-out)		
24 to 72 V		210 W / VA
110 to 440 V		130 W / VA
Electrical unlatching control [1]		
Minimum impulse		10 ms
Maintained		auto cut-out by integral contact
Manual unlatching control		by local push-button
Electrical making control		
Minimum pulse		40 ms auto cut-out by integral contact
Manual making control		by local push-button
Auxiliary contact NC		
Utilisation AC-15	according to IEC	120V - 6A 500V - 1.5A 230V/220V - 4A 690V/660V - 1A 400V/380V - 2.5A
	according to UL/CSA	A600
Utilisation DC-13	according to IEC	24V - 3A 220V - 0.3A 48V - 1.5A 400V - 0.15A 110V - 0.6A
	according to UL/CSA	Q600
Mechanical endurance		
CL00...CL45		3 million (1200 ops./h)
CL05...CL10		0.1 million (300 ops./h)
Wiring diagram Alternating current		
Alternating current / Direct current		

(1) The contactor coil and the unlatch control must not be energised simultaneously

Terminal capacity

		Terminal: screw BCLF, BCLL, BTLF y RMLF	Terminal: ring terminal BCRF, BTRF
Solid		2 x 0.5 to 2.5 or 1 x 4	
Stranded and finely stranded without end sleeve		2 x 0.5 to 2.5 or 1 x 4	
Finely stranded with end sleeve		2 x 0.5 to 2.5 or 1 x 4	
AWG wires, solid and stranded		12 - 22 AWG 75ºC	
Tightening torque		1.1 Nm / 10 Lb x in.	
	Ø i		3.6 min.
	A		6.5 max.
Ring terminal	Tightening torque		0.8 Nm / 7 Lb x in.

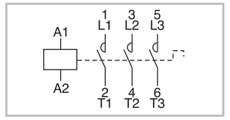
Contact sequence

		Basic contactor	Auxiliary contact blocks Front mounted		Auxiliary contact blocks Lateral mounted	
			BCLF 10 BCRF 10	BCLF 01 BCRF 01	BCLL 20 BRLL 20	BCLL 11 BRLL 11
Three pole contactors 3 NO	**CL00...** **CL01...** **CL02...**	0 3.3 4.7	0 3.2 4.7	0 1.4 4.7	0 3.2 4.7	0 3.2 4.7 1.4
	CL25...	0 3 5.1	0 3.7 5.1	0 1.6 5.1	0 3.7 5.1	0 3.7 5.1 1.6
	CL03... **CL04...**	0 4 5.6	0 3.7 5.6	0 1.6 5.6	0 3.7 5.6	0 3.7 5.6 1.6
	CL45...	0 4.3 6.5	0 3.7 6.5	0 1.6 6.5	0 3.7 6.5	0 3.7 6.5 1.6
	CL06...	0 5.4 8	0 3.7 8	0 1.6 8	0 3.7 8	0 3.7 8 1.6
	CL07... **CL08...**	0 4.8 8	0 3.7 8	0 1.6 8	0 3.7 8	0 3.7 8 1.6
	CL09...	0 5.6 8	0 3.7 8	0 1.6 8	0 3.7 8	0 3.7 8 1.6
	CL10...	0 5.6 8	0 3.7 8	0 1.6 8	0 3.7 8	0 3.7 8 1.6
Four pole contactors 4 NO	**CL01...** **CL02...**	0 3.3 4.7	0 3.2 4.7	0 1.4 4.7	0 3.2 4.7	0 3.2 4.7 1.4
	CL03... **CL04...**	0 4 5.6	0 3.7 5.6	0 1.6 5.1	0 3.7 5.6	0 3.7 5.6 1.6
	CL05...	0 5.4 8	0 3.7 8	0 1.6 8	0 3.7 8	0 3.7 8 1.6
	CL07...	0 4.8 8	0 3.7 8	0 1.6 8	0 3.7 8	0 3.7 8 1.6
	CL09...	0 5.6 8	0 3.7 8	0 1.6 8	0 3.7 8	0 3.7 8 1.6
Four pole contactors 2 NO + 2 NC	**CL01...** **CL02...**	0 3.3 4.7 1.6	0 3.2 4.7	0 1.4 4.7	0 3.2 4.7	0 3.2 4.7 1.4
	CL03... **CL04...**	0 4 5.6 1.5	0 3.7 5.6	0 1.6 5.1	0 3.7 5.6	0 3.7 5.6 1,6
	CL05...	0 5.4 8 3.7	0 3.7 8	0 1.6 8	0 3.7 8	0 3.7 8 1.6
	CL07... **CL08...**	0 4.8 8 4.3	0 3.7 8	0 1.6 8	0 3.7 8	0 3.7 8 1.6

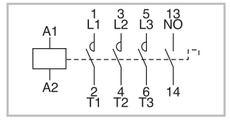
Terminal numbering

Three-pole and four-pole AC contactors

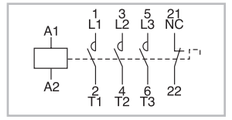
CL00A310__ ... CL10A300__
CL25D300__ ... CL45D300__
CL06E300__ ... CL10E300__



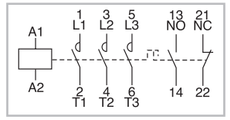
CL00_310__ ... CL02_310__
CL03_310__ ... CL04_310__



CL00_301__ ... CL02_301__
CL03_301__ ... CL04_301__



CL45A311__ ... CL10A311__



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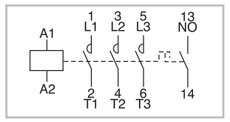

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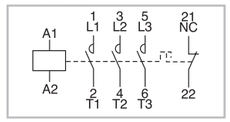
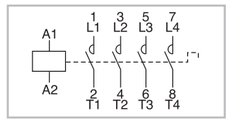
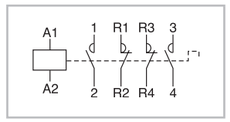


CL00A400__ ... CL08A400__
CL01D400__ ... CL04D400__
CL05E400__ ... CL09E400__



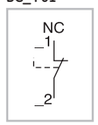
CL01AB00__ ... CL08AB00__
CL01DB00__ ... CL04DB00__
CL05EB00__ ... CL08EB00__



Auxiliary contact blocks. Front mounting

BC_ F10

BC_ F01



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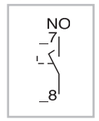
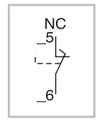
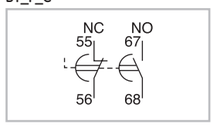


BCLF01G

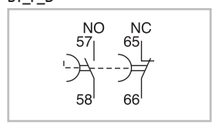


Pneumatic timer blocks

BT_F_C



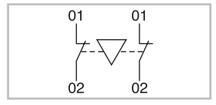
BT_F_D



Mechanical and mechanical/electrical interlock

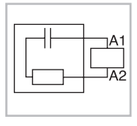
BELA

BELA02

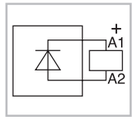


Voltage suppressor blocks

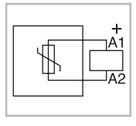
BSLR2, BSLR3



BSLDZ

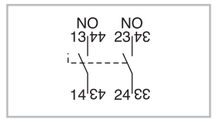


BSLV3

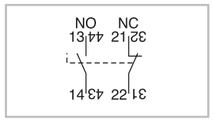


Auxiliary contact blocks. Lateral mounting

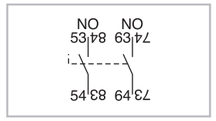
BCLL20



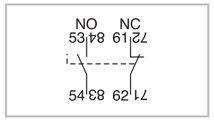
BCLL11



BRLL20

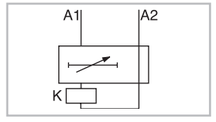


BRLL11

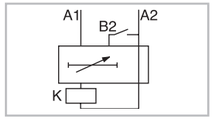


Electronic timer blocks

BETL__C

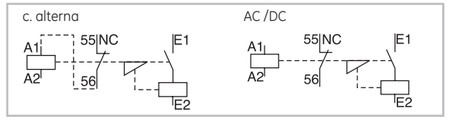


BETL__D

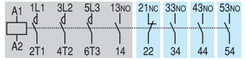
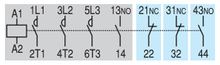
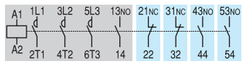
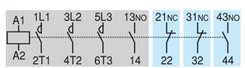


Mechanical latch block

RMLF

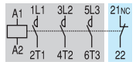
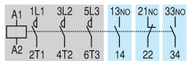
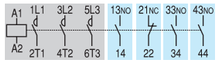
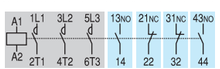
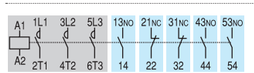
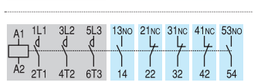
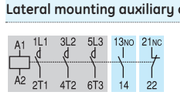
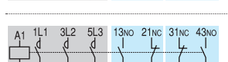


Terminal numbering according to EN 50012

	Auxiliary contacts			Possible basic contactors + Auxiliary contacts blocks to be added
	Combination	NO	NC	
	Description			
Without auxiliary contact blocks				
	10E	1	0	CL00_310_... - CL04_310_...
	01E	0	1	CL00_301_... - CL04_301_...
Front mounting auxiliary contact blocks with one contact each				
	11E	1	1	CL00_310_... - CL04_310_... + BC_F01
	21E	2	1	CL00_310_... - CL04_310_... + BC_F01 + BC_F10
	12E	1	2	CL00_310_... - CL04_310_... + BC_F01 + BC_F01
	31E	3	1	CL00_310_... - CL04_310_... + BC_F01 + BC_F10 + BC_F10
	41E	4	1	CL00_310_... - CL04_310_... + BC_F01 + BC_F10 + BC_F10 + BC_F10
	22E	2	2	CL00_310_... - CL04_310_... + BC_F01 + BC_F01 + BC_F10
	32E	3	2	CL00_310_... - CL04_310_... + BC_F01 + BC_F01 + BC_F10 + BC_F10
	13E	1	3	CL00_310_... - CL04_310_... + BC_F01 + BC_F01 + BC_F01
	23E	2	3	CL00_310_... - CL04_310_... + BC_F01 + BC_F01 + BC_F01 + BC_F10
Lateral mounting auxiliary contact blocks with two contacts each				
	11E	1	1	CL25_300_... - CL45_300_... + BCLL11
	31E	3	1	CL25_300_... - CL45_300_... + BCLL11 + BCLL20
	22E	2	2	CL00_310_... - CL45_310_... + BCLL11 + BCLL11

The maximum number of auxiliary contacts is 4 for CL00 to CL25, 6 for CL03 -CL04 and 8 for CL45, CL06 to CL10.When using the pneumatic BTLF-block, these-numbers are reduced to two, resp .four.(2 for CL00 to CL25, 4 for CL03 and CL04, etc.)

Terminal numbering according to EN 50012 (continued)

	Auxiliary contacts Combination / Description	NO	NC	Possible basic contactors + Auxiliary contacts blocks to be added	
Without auxiliary contact blocks					
				CL25_300_... - CL45_300_...	CL06_300_... - CL10_300_...
Front mounting auxiliary contact blocks with one contact each					
	10E	1	0	CL25_300_... - CL45_300_... + BC_F10	CL06_300_... - CL10_300_... + BC_F10
	01E	0	1	CL25_300_... - CL45_300_... + BC_F01	CL06_300_... - CL10_300_... + BC_F01
	11E	1	1	CL25_300_... - CL45_300_... + BC_F10 + BC_F01	CL06_300_... - CL10_300_... + BC_F10 + BC_F01
	21E	2	1	CL25_300_... - CL45_300_... + BC_F10 + BC_F01 + BC_F10	CL06_300_... - CL10_300_... + BC_F10 + BC_F01 + BC_F10
	12E	1	2	CL25_300_... - CL45_300_... + BC_F10 + BC_F01 + BC_F01	CL06_300_... - CL10_300_... + BC_F10 + BC_F01 + BC_F01
	31E	3	1	CL25_300_... - CL45_300_... + BC_F10 + BC_F01 + BC_F10 + BC_F10	CL06_300_... - CL10_300_... + BC_F10 + BC_F01 + BC_F10 + BC_F10
	41E	4	1	CL06_300_... - CL10_300_... + BC_F10 + BC_F01 + BC_F10 + BC_F10 + BC_F10	
	22E	2	2	CL25_300_... - CL45_300_... + BC_F10 + BC_F01 + BC_F01 + BC_F10	CL06_300_... - CL10_300_... + BC_F10 + BC_F01 + BC_F01 + BC_F10
	32E	3	2	CL06_300_... - CL10_300_... + BC_F10 + BC_F01 + BC_F01 + BC_F01 + BC_F10	
	13E	1	3	CL25_300_... - CL45_300_... + BC_F10 + BC_F01 + BC_F01 + BC_F01	CL06_300_... - CL10_300_... + BC_F10 + BC_F01 + BC_F01 + BC_F01
	23E	2	3	CL06_300_... - CL10_300_... + BC_F10 + BC_F01 + BC_F01 + BC_F01 + BC_F10	
Lateral mounting auxiliary contact blocks with two contacts each					
	11E	1	1	CL25_300_... - CL45_300_... + BCLL11	CL06_300_... - CL10_300_... + BCLL11
	31E	3	1	CL25_300_... - CL45_300_... + BCLL11 + BCLL20	CL06_300_... - CL10_300_... + BCLL11 + BCLL20
	22E	2	2	CL25_300_... - CL45_300_... + BCLL11 + BCLL11	CL06_300_... - CL10_300_... + BCLL11 + BCLL11

Conformity to standards

IEC/EN 60947-1	NF C 63-110	BS 5424 & 775
IEC/EN 60947-4-1	ASE 1025	NEMA ICS 1
CENELEC HD 419	CSA 22.2/14	VDE 0660/102
UL 508	UNE 20109	
EN 50005		

Approvals

cULus	RINA	CE
NOM	FI	
Lloyd's Register	Bureau Veritas	

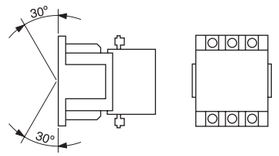
Ambient conditions

Storage temperature		-55°C to +80°C
Operation temperature	-40°C to +60°C	
Altitude	up to 3000m	Nominal values
	from 3000 up to 4000m	90%Ie 80%Ue
	from 4000 up to 5000m	80%Ie 75%Ue

Climatic resistance (IEC 68-2)

Continuous tests 40 / 125 / 56		
Cold (72h)		
	Temperature	-40°C
Dry heat (96h)		
	Temperature	+125°C
	Relative humidity	< 50%
Humid heat (56 days)		
	Temperature	+40°C
	Relative humidity	95%
Cyclical test		
First half-cycle (12h)		
	Low temperature	+25°C
	Relative humidity	93%
Second half-cycle (12h)		
	Low temperature	+55°C
	Relative humidity	95%
Number of consecutive cycles		6

Mounting positions



With the same pick-up and drop-out voltage
With the same rated power

Terminal capacity and tightening torque

			CK07B	CK75C CK08C	CK08B CK95B	CK10C	CK11C	CK12B	CK13B
	Solid	(mm^2)	1.5...95						
	Finely stranded w/end sleeve	(mm^2)	2...35						
	Finely stranded w/o end sleeve	(mm^2)	2...50						
	Stranded	(mm^2)	1.5...95						
	AWG wires	(mm^2)	16...00						
	Tightening torque	(Nm)	8						
		(Lb x in)	70						
	Finely stranded w/end sleeve	(mm^2)		1 x 120 2 x 95	1 x 240 2 x 150	2 x 185	2 x 240	–	–
	AWG wires with end sleeve	(mm^2)		1 x 300 2 x 107	1 x 500 2 x 300	2 x 350	2 x 500	–	–
	Busbars			2 (25 x 5)	2 (25 x 5)	2 (35 x 10)	2 (35 x 10)	2 (35 x 10)	2 (60 x 10)
	Tightening torque	(Nm)		8	23	31.5	31.5	31.5	31.5
		(Lb x in)		70	200	275	275	275	275

Power circuit

Three pole contactors

			CK75C	CK08C	CK85B	CK09B	CK95B	CK10C	CK11C	CK12B	CK13B
Rated thermal current Ith at θ ≤ 40°C		(A)	250	250	315	315	450	600	700	1000	1250
Rated operational current Ie AC-3		(A)	150	185	205	250	309	420	550	700	825
Rated operational voltage Ue		(V)	1000	1000	1000	1000	1000	1000	1000	1000	1000
Rated insulation voltage Ui		(V)	1000	1000	1000	1000	1000	1000	1000	1000	1000
Maximum continuous current AC-1		(A)	250	250	315	315	450	600	700	1000	1250
Frequency limits		(Hz)	25...400	25...400	25...400	25...400	25...400	25...400	25...400	25...400	25...400
Making capacity (RMS) (IEC 947)		(A)	1850	2200	2500	2500	3700	6500	6500	8400	8250
Breaking capacity (RMS) (IEC 947)											
Ue ≤ 400V		(A)	1600	1850	2000	3500	3500	5600	5600	7300	6600
Ue = 500V		(A)	1600	1850	2000	3500	3500	5600	5600	7000	6600
Ue = 690V		(A)	1000	1200	1660	2200	2200	5000	5000	6700	6000
Ue = 1000V		(A)	350	350	850	1100	1100	3000	3000	3500	3500
Short-time current	1 sec.	(A)	2500	2500	4000	5500	5500	7500	7500	9700	11600
	5 sec.	(A)	2500	2500	3200	3500	3500	5200	5200	7700	8800
	10 sec.	(A)	2300	2300	2400	2500	2500	4000	4000	6100	7350
	30 sec.	(A)	1250	1250	1400	1600	1600	2800	2800	4400	5300
	1 min.	(A)	900	900	1000	1200	1200	1800	1800	3500	4500
	3 min.	(A)	600	600	750	900	900	1200	1200	2300	2800
Short-time current		(min.)	10	10	10	10	10	10	10	10	10
Protec. against short-circuit with fuses without TOR											
Coord. type "1"	gL/gG	(A)	355	355	500	500	630	1250	1250	1250	2x800
Coord. type "2"	gL/gG	(A)	250	250	315	400	500	630	800	1000	1250
Without welding	gL/gG	(A)	200	200	250	315	425	500	630	800	1000
Impedance per pole		(mΩ)	0.30	0.30	0.28	0.28	0.28	0.15	0.13	0.14	0.11
Power dissipation	AC-1	(W)	19	19	27.7	27.7	56.7	54.3	63.7	140	171.8
per pole	AC-3	(W)	6.8	10.3	11.7	17.5	26.7	26.5	45.3	68.6	74.8
Insulation resistance											
Between adjacent poles		(mΩ)	> 10	> 10	> 10	> 10	> 10	> 10	> 10	> 10	> 10
Between poles and earth		(mΩ)	> 10	> 10	> 10	> 10	> 10	> 10	> 10	> 10	> 10
Between input and output		(mΩ)	> 10	> 10	> 10	> 10	> 10	> 10	> 10	> 10	> 10

Four pole contactors

			CK07B	CK08B		CK09B	CK95B	CK10C	CK11C	CK12B	CK13B
Rated thermal current Ith at θ ≤ 40°C		(A)	200	325		400	500	600	700	1000	1250
Rated operational voltage Ue		(V)	690	1000		1000	1000	1000	1000	1000	1000
Rated insulation voltage Ui		(V)	1000	1000		1000	1000	1000	1000	1000	1000
Maximum continuous current AC-1		(A)	200	325		400	500	600	700	1000	1250
Frequency limits		(Hz)	25...400	25...4000		25...400	25...400	25...400	25...400	25...400	25...400
Making capacity (RMS) (IEC 947)		(A)	1150	1850		2500	3700	6500	6500	6700	8250
Breaking capacity (RMS) (IEC 947)											
Ue ≤ 400V		(A)	950	1600		3500	3500	5600	5600	6700	6600
Ue = 500V		(A)	950	1600		3500	3500	5600	5600	6700	6600
Ue = 690V		(A)	800	1000		2200	2200	3500	3500	6000	6000
Ue = 1000V		(A)	–	350		1100	1100	2000	2000	3500	3500
Short-time current	1 sec.	(A)	2100	2500		5500	5500	7500	7500	9700	11600
	5 sec.	(A)	1500	2500		3500	3500	5200	5200	7700	8800
	10 sec.	(A)	1150	2300		2500	2500	4000	4000	6100	7350
	30 sec.	(A)	750	1250		1600	1600	2800	2800	4400	5300
	1 min.	(A)	550	900		1200	1200	1800	1800	3500	4500
	3 min.	(A)	350	600		900	900	1200	1200	2300	2800
Recovery time		min.	10	10		10	10	10	10	10	10
Short-circuit protection with fuse without TOR											
Coord. type "1"	gL/gG	(A)	315	500		500	630	1250	1250	1250	2x800
Coord. type "2"	gL/gG	(A)	250	400		400	500	630	800	1000	1250
Without welding	gL/gG	(A)	200	315		315	425	500	630	800	1000
Impedance per pole		(mΩ)	0.45	0.32		0.28	0.28	0.15	0.13	0.14	0.11
Power dissipation per pole											
AC-1		(W)	18	33.8		44.8	56.7	61.2	68.6	140	171.8
Insulation resistance											
Between adjacent poles		(mΩ)	> 10	> 10		> 10	> 10	> 10	> 10	> 10	> 10
Between poles and earth		(mΩ)	> 10	> 10		> 10	> 10	> 10	> 10	> 10	> 10
Between input and output		(mΩ)	> 10	> 10		> 10	> 10	> 10	> 10	> 10	> 10

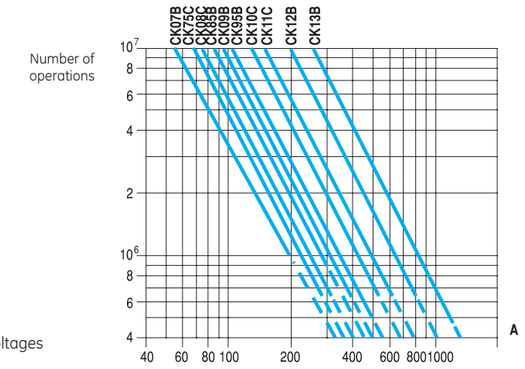
Electrical endurance

Mixed category AC4 / AC3

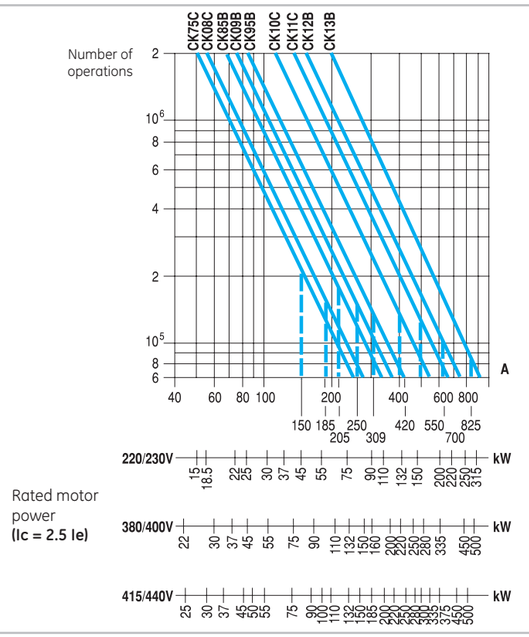
Electrical endurance for mixed category (AC-3/AC-4) is calculated with the following formula:

$$\text{Electrical endurance (AC-3/AC-4)} = \frac{\text{Electrical endurance (AC-3)}}{1 + \frac{\%\ \text{oper AC-4}}{100} \times \left(\frac{\text{Elec.endur. (AC-3)}}{\text{Elec.endur.(AC-4)}} - 1 \right)}$$

Category AC1

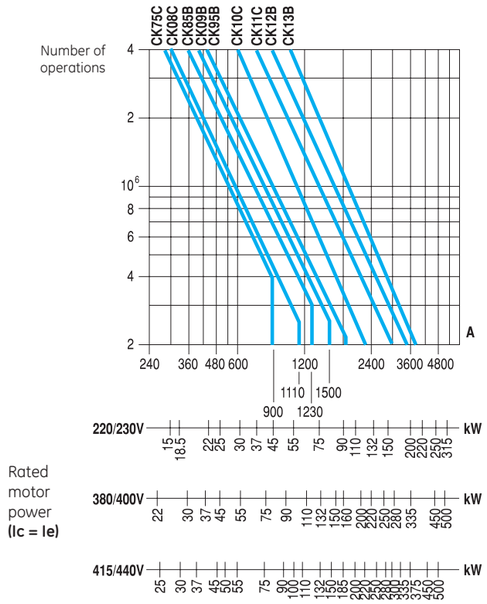


Category AC2

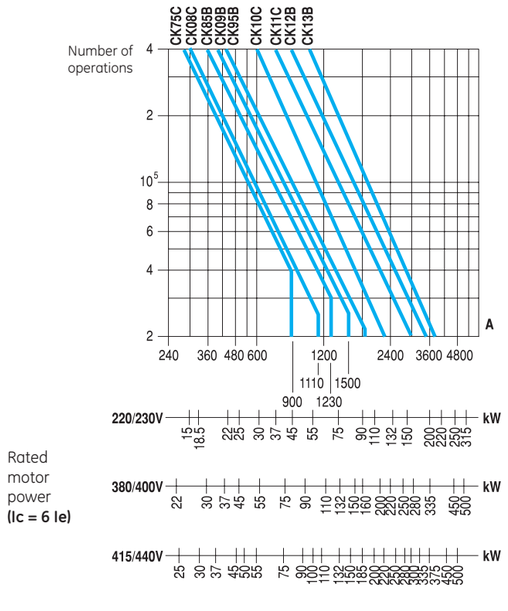


Electrical endurance (continued)

Category AC3



Category AC4



Three pole contactors. Control circuit

Alternating current

			CK75CA	CK08CA	CK85BA CK85BE	CK09BE	CK95BE	CK10CE	CK11CE	CK12BE	CK12BE	CK13BA
Rated insulation voltage Ui		(V)	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Standard voltages Us (50/60 Hz)		(V)	24...690	24...690	24...690	24...690	24...690	24...690	24...690	24...72	100...690	24...440
Operating limits												
Switch-on		xUs	0.8...1.1	0.8...1,1	0.85...1.1	0.85...1,1	0.85...1.1	0.85...1.1	0.85...1.1	0.85...1.1	0.85...1.1	0.8...1.1
Switch-off		xUs	0.2...0.75	0.2...0.75	0.2...0.75	0.2...0.75	0.2...0.75	0.2...0.75	0.2...0.75	0.2...0.75	0.2...0.75	0.25...0.55
Consumption. Monofrequency coils												
Magnetic circuit	CK....A	(VA)	42	42	46	-	-	-	-	-	-	6
closed	CK....E	(VA)	-	-	20	20	20	23	23	25	25	-
Magnetic circuit	CK....A	(VA)	500	500	830	-	-	-	-	-	-	2760
open	CK....E	(VA)	-	-	425	425	425	680	680	750	750	-
Power	CK....A	(W)	21	21	17	-	-	-	-	-	-	5
dissipation	CK....E	(W)	-	-	3.5	3.5	3.5	4	4	4.5	4.5	-
Consumption. Bifrequency coils												
Magnetic circuit	50Hz	(VA)	46	46	60	-	-	-	-	-	-	-
closed (CK....A)	60Hz	(VA	38.3	38.3	50	-	-	-	-	-	-	-
Magnetic circuit	50Hz	(VA)	568	568	1082	-	-	-	-	-	-	-
open (CK....A)	60Hz	(VA)	473	473	901	-	-	-	-	-	-	-
Power 50Hz		(W)	23	23	22.2	-	-	-	-	-	-	-
dissipation (CK....A)	60Hz	(W	19.1	19.1	18.5	-	-	-	-	-	-	-
Power factor												
Magnetic circuit	CK....A	(cos φ)	0.4	0.4	0.37	-	-	-	-	-	-	approx. 1
closed	CK....E	(cos φ)	-	-	-	-	-	-	-	-	-	-
Magnetic circuit	CK....A	(cos φ)	0.6	0.6	0.6	-	-	-	-	-	-	approx. 1
open	CK....E	(cos φ)	-	-	-	-	-	-	-	-	-	-
Opening and closing times at Us												
Making time		(ms)	20...25	20...25	36...40	60...70	60...80	80...90	80...90	150...170	70...80	50...55
at excitation (NO)												
Breaking time		(ms)	10...13	10...13	60...80	60...80	60...80	60...80	60...90	60...90	60...90	115...130
at de-energisation (NO)												
Mechanical endurance [1]		10^6 ops	10	10	6.5	6.5	6.5	7.5	7.5	3.5	3.5	3
Maximum rate												
No load		ops./h	2400	2400	2400	1200	1200	900	900	900	900	600
AC-1/AC-3 at rated power		ops./h	600	600	600	600	600	300	300	300	300	120
AC-2 at rated power		ops./h	150	150	150	150	150	120	120	120	120	120
AC-4 at rated power		ops./h	150	150	150	150	150	120	120	120	120	120

(1) Mechanical endurance for e-module is 1 Million operations

Direct current

		CK75CE	CK08CE	CK85BE	CK09BE	CK95BE	CK10CE	CK11CE	CK12BE	CK12BE	
Rated insulation voltage Ui	(V)	1000	1000	1000	1000	1000	1000	1000	1000	1000	
Standard voltages Us (50/60 Hz)	(V)	24...500	24...500	24...500	24...500	24...500	24...500	24...500	24...72	110...500	
Operating limits											
Switch-on	xUs	0.8...1.1	0.8...1.1	0.8...1.1	0.8...1.1	0.8...1.1	0.8...1.1	0.8...1,1	0.8...1.1	0.8...1.1	
Switch-off	xUs	0.2...0.75	0.2...0.75	0.2...0.75	0.2...0.75	0.2...0.75	0.2...0.75	0.2...0.75	0.2...0.75	0.2...0.75	
Consumption											
Magnetic circuit closed	(W)	10	10	10	10	10	10	10	10	10	
Magnetic circuit open	(W)	225	225	350	350	350	500	500	650	650	
Opening and closing times at Us											
Making time	(ms)	60...70	60...70	60...70	60...70	60...70	80...90	80...90	150...170	70...80	
at excitation (NO contacts)											
Breaking time	(ms)	40...50	40...50	60...80	60...80	60...80	60...80	60...80	60...90	60...90	
at de-energisation (NO contacts)											
Mechanical endurance	10^6 ops.	10	10	6.5	6.5	6.5	7.5	7.5	3.5	3.5	
Maximum rate											
No load	ops./h	1200	1200	1200	1200	1200	900	900	900	900	
AC-3 at rated power	ops./h	600	600	600	600	600	300	300	300	300	
AC-4 at rated power	ops./h	150	150	150	150	150	120	120	120	120	

(1) Mechanical endurance for e-module is 1 Million operations

Four pole contactors. Control circuit

Alternating current

			CK07BA CK07BE	CK08BA CK08BE	CK09BE	CK95BE	CK10CE	CK11CE	CK12BE	CK12BE	CK13BA
Rated insulation voltage Ui		(V)	1000	1000	1000	1000	1000	1000	1000	1000	1000
Standard voltages Us (50/60 Hz)		(V)	24...690	24...690	24...690	24...690	24...690	24...690	24...72	100...690	110...440
Operating limits											
Switch-on		xUs	0.85...1.1	0.85...1.1	0.85...1.1	0.85...1.1	0.85...1.1	0.85...1.1	0.85...1.1	0.85...1.1	0.85...1.1
Switch-off		xUs	0.2...0.75	0.2...0.75	0.2...0.75	0.2...0.75	0.2...0.75	0.2...0.6	0.2...0.75	0.2...0.75	0.2...0.75
Consumption. Monofrequency coils											
Magnetic circuit	CK....A	(VA)	46	130	-	-	-	-	-	-	6
closed	CK....E	(VA)	20	25	25	25	23	23	25	25	-
Magnetic circuit	CK....A	(VA)	830	2860	-	-	-	-	-	-	2760
open	CK....E	(VA)	425	750	750	750	680	680	750	750	-
Power	CK....A	(W)	17	53	-	-	-	-	-	-	5
dissipation	CK....E	(W)	3.5	4.5	4.5	4.5	4	4	4.5	4.5	-
Consumption. Bifrequency coils											
Magnetic circuit	50Hz	(VA)	60	159.3	-	-	-	-	-	-	-
closed (CK....A)	60Hz	(VA)	50	132.7	-	-	-	-	-	-	-
Magnetic circuit	50Hz	(VA)	1082	3509	-	-	-	-	-	-	-
open (CK....A)	60Hz	(VA)	901	2924	-	-	-	-	-	-	-
Power	50Hz	(W)	22.2	65.3	-	-	-	-	-	-	-
dissipation (CK....A)	60Hz	(W)	18.5	54.4	-	-	-	-	-	-	-
Power factor											
Magnetic circuit	CK....A	(cos φ)	0.37	0.37	-	-	-	-	-	-	approx. 1
closed	CK....E	(cos φ)	-	-	-	-	-	-	-	-	-
Magnetic circuit	CK....A	(cos φ)	0.6	0.6	-	-	-	-	-	-	approx. 1
open	CK....E	(cos φ)	-	-	-	-	-	-	-	-	-
Opening and closing times at Us											
Making time		(ms)	36...40	60...70	70...80	70...80	110...115	80...90	150...170	110...115	50...55
at excitation (NO)											
Breaking time		(ms)	10...15	13...17	70...80	70...80	70...80	70...80	70...80	70...80	70...80
at de-energisation (NO)											
Mechanical endurance		10^6 ops.	10	6.5	6.5	6.5	6.5	6.5	3.5	3.5	3
Maximum rate											
No load		ops./h	2400	900	900	900	900	900	900	900	600
AC-1/AC-3 at rated power		ops./h	600	600	600	600	300	300	300	300	120

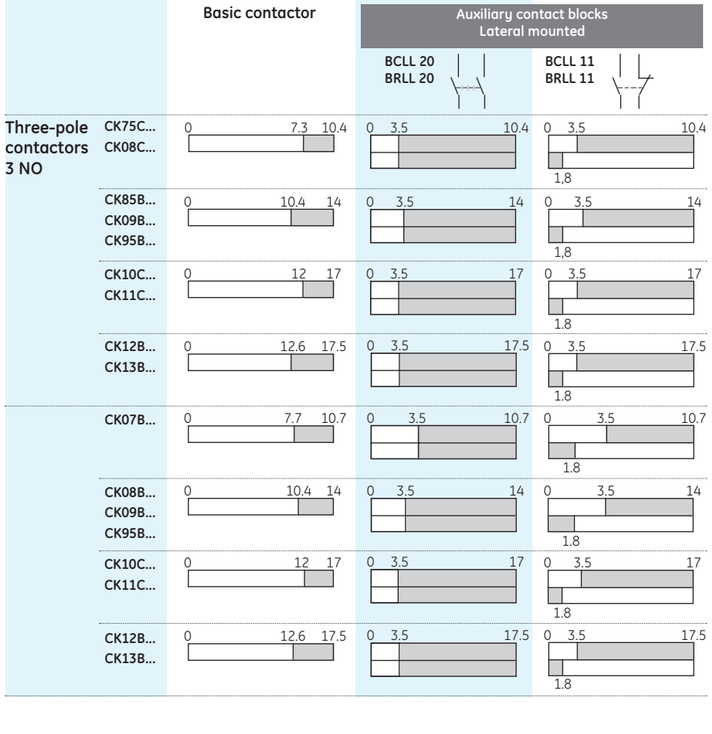
(1) Mechanical endurance for e-module is 1 Million operations

Direct current - Electronic module

		CK07BE	CK08BE		CK08BE	CK95BE	CK10CE	CK11CE	CK12BE	CK12BE
Rated insulation voltage Ui	(V)	1000	1000		1000	1000	1000	1000	1000	1000
Standard voltages Us	(V)	24...500	24...500		24...500	24...500	24...500	24...500	24...72	110...500
Operating limits										
Switch-on	xUs	0.75...1.1	0.8...1.1		0.8...1.1	0.8...1.1	0.8...1.1	0.8...1.1	0.8...1.1	0.8...1.1
Switch-off	xUs	0.2...0.75	0.2...0.75		0.2...0.75	0.2...0.75	0.2...0.75	0.2...0.75	0.2...0.75	0.2...0.75
Consumption										
Magnetic circuit closed	(W)	10	10		10	10	10	10	10	10
Magnetic circuit open	(W)	350	650		650	650	650	650	650	650
Opening and closing times at Us										
Making time	(ms)	60...70	70...80		70...80	70...80	80...90	80...90	150...170	110...115
at excitation (NO contacts)										
Breaking time	(ms)	40...50	70...80		70...80	70...80	60...80	60...80	60...90	60...90
at de-energisation (NO contacts)										
Mechanical endurance	10^6 ops.	10	6.5		6.5	6.5	6.5	6.5	3.5	3.5
Maximum rate										
No load	ops./h	1200	900		900	900	900	900	900	900
AC-3 at rated power	ops./h	600	600		600	600	600	300	300	300

(1) Mechanical endurance for e-module is 1 Million operations

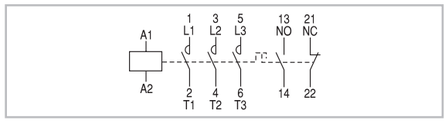
Contact sequence



Numbering of the terminals

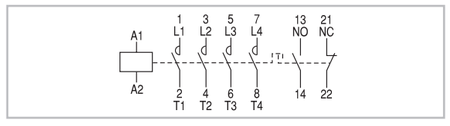
Three pole contactors

CK75C_ _3_ ... CK13B _ _3_



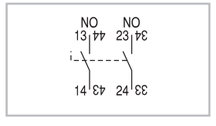
Four pole contactors

CK07B_ _4_ ... CK13B _ _4_

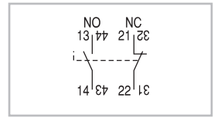


Auxiliary contact blocks. *Lateral mounting*

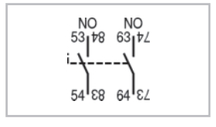
BCLL20



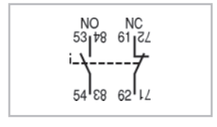
BCLL11



BRLL20

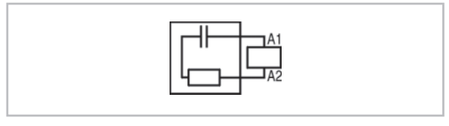


BRLL11



Voltage suppressor block

K/RC...



Mechanical interlock

BEKV, BEKVA1, BEKVS1, BEKVH

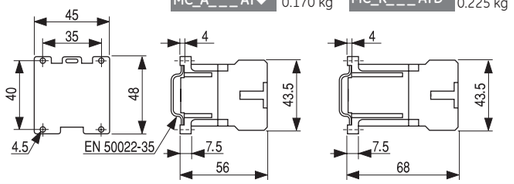
Notes

Dimensional drawings

Three and four pole contactors

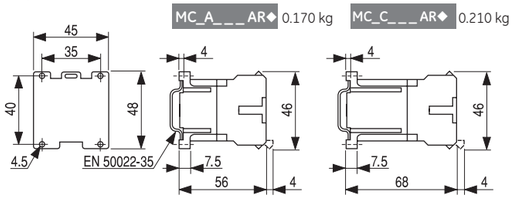
Screw terminal

MC_A_ _ _ AT◆	0.170 kg
MC_C_ _ _ AT◆	0.210 kg
MC_I_ _ _ ATD	0.225 kg
MC_K_ _ _ ATD	0.225 kg



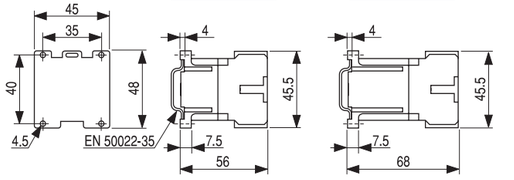
Ring terminal

MC_A_ _ _ AR◆	0.170 kg
MC_C_ _ _ AR◆	0.210 kg



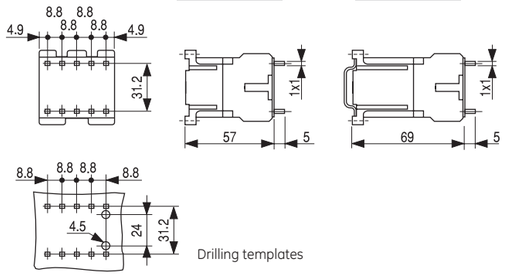
Terminal: faston 2x2,8 insulated

MC_A_ _ _ AF◆	0.165 kg
MC_C_ _ _ AF◆	0.210 kg



Terminal: printed circuit

MC_A_ _ _ AI◆	0.165 kg
MC_C_ _ _ AI◆	0.210 kg

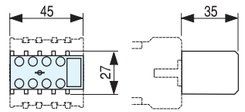


Drilling templates

Auxiliary contact block. *Lateral mounting*

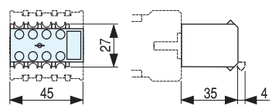
Screw terminal

MACN2 _ _AT - MARN2 _ _AT	0.025 kg
MACN4 _ _AT - MARN4 _ _AT	0.040 kg



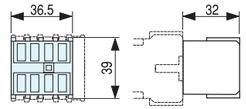
Ring terminal

MACN2 _ _AR - MARN2 _ _AR	0.025 kg
MACN4 _ _AR - MARN4 _ _AR	0.040 kg



Terminal: faston 2x2.8 insulated

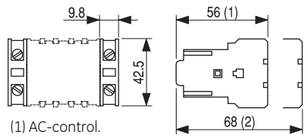
MACF4 _ _AF	0.035 kg
MARF4 _ _AF	0.035 kg



Auxiliary contact blocks. Lateral mounting

Screw terminal

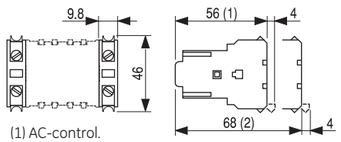
MACL_ _ _AT	0.013 kg
MARL_ _ _ATS	0.013 kg



(1) AC-control.
(2) DC-control.

Ring terminal

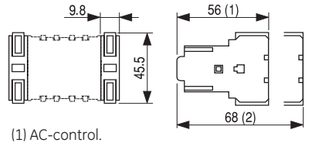
MACL_ _ _AR	0.013 kg
MARL_ _ _ARS	0.013 kg



(1) AC-control.
(2) DC-control.

Terminal: faston 2x2.8 insulated

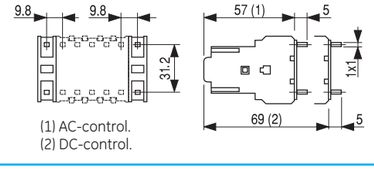
MACL _ _AF	0.009 kg
MARL _ _AFS	0.009 kg



(1) AC-control.
(2) DC-control.

Terminal: printed circuit

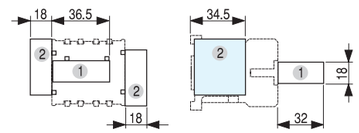
MACL _ _AI	0.009 kg
MARL _ _AIS	0.009 kg



(1) AC-control.
(2) DC-control.

Electronic timer block

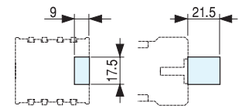
MREBC _0AC2	0.040 kg



(1) Frontal mounting
(2) Lateral mounting

Voltage suppressor block

MP0A_AE_	0.010 kg
MP0C_AE3	0.010 kg

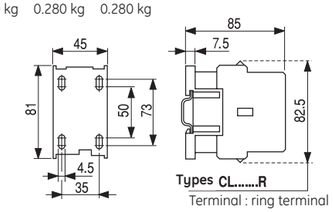


Dimensional drawings. Three pole contactors

Alternating current

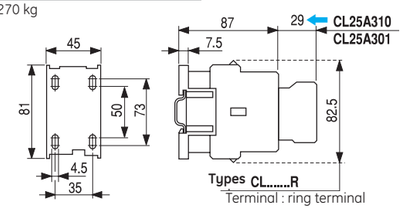
CL00A...., CL01A...., CL02A....

0.280 kg 0.280 kg 0.280 kg



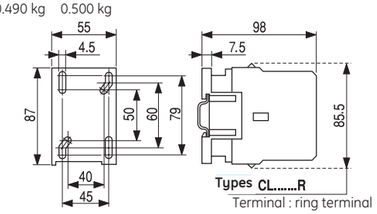
CL25A....

0.270 kg



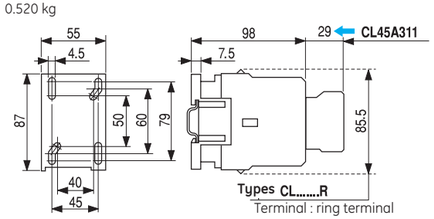
CL03A...., CL04A....

0.490 kg 0.500 kg



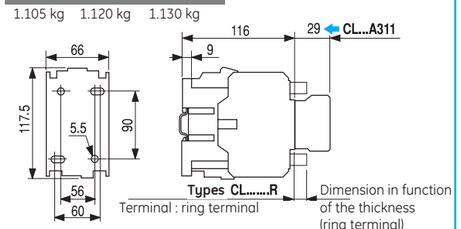
CL45A....

0.520 kg



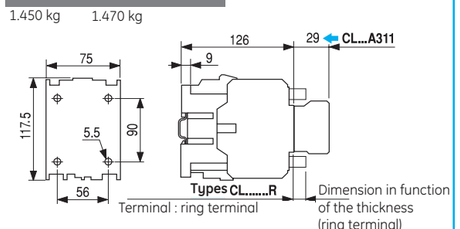
CL06A...., CL07A...., CL08A....

1.105 kg 1.120 kg 1.130 kg



CL09A...., CL10A....

1.450 kg 1.470 kg

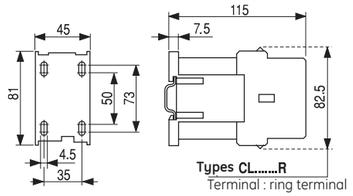


Three pole contactors

Direct current

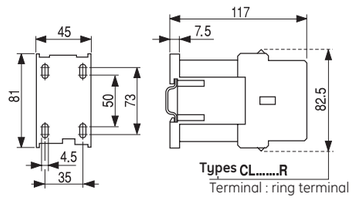
CL00D3...., CL01D3...., CL02D3....

0.490 kg 0.490 kg 0.490 kg



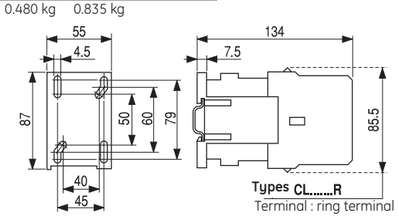
CL25D3....

0.480 kg



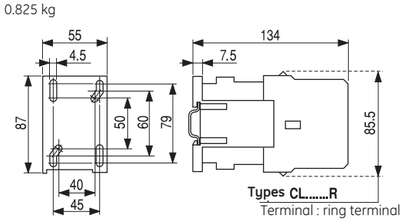
CL03D3...., CL04D3....

0.480 kg 0.835 kg



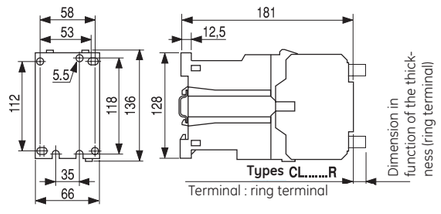
CL45D3....

0.825 kg



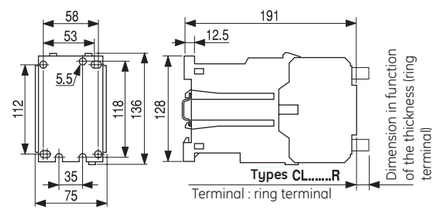
CL06D3...., CL07D3...., CL08D3....

1.110 kg 1.110 kg 1.110 kg



CL09D3...., CL10D3....

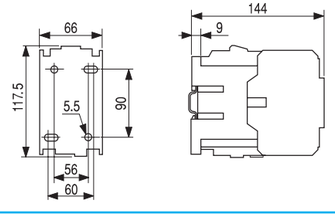
1.440 kg 1.440 kg



Coil with electronic module

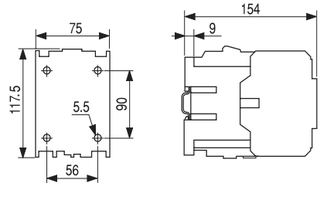
CL06E3...., CL07E3...., CL08E3....

1.095 kg 1.110 kg 1.120 kg



CL09E3...., CL10E3....

1.440 kg 1.460 kg

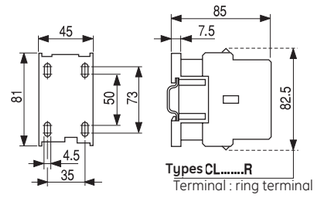


Dimensional drawings. Four pole contactors

Alternating current

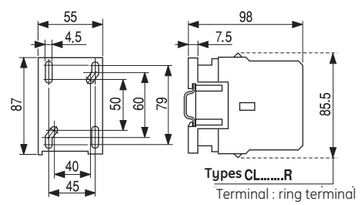
CL01A4...., CL02A4...., CL01AB...., CL02AB....

0.280 kg 0.280 kg 0.280 kg 0.280 kg



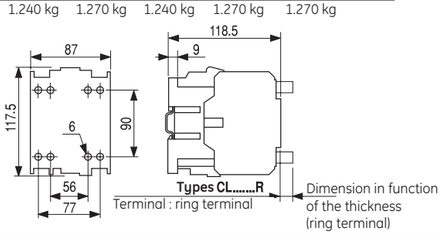
CL03A4...., CL04A4...., CL03AB...., CL04AB....

0.490 kg 0.500 kg 0.490 kg 0.500 kg



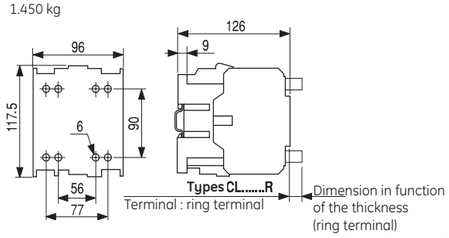
CL05A4...., CL07A4...., CL05AB...., CL07AB...., CL08AB...

1.240 kg 1.270 kg 1.240 kg 1.270 kg 1.270 kg



CL09A4....

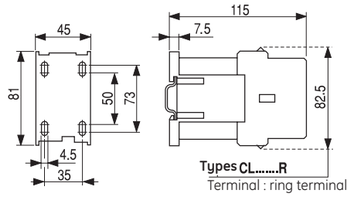
1.450 kg



Direct current

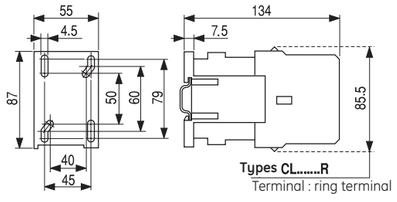
CL01D4...., CL02D4...., CL01DB...., CL02DB....

0.490 kg 0.490 kg 0.490 kg 0.490 kg



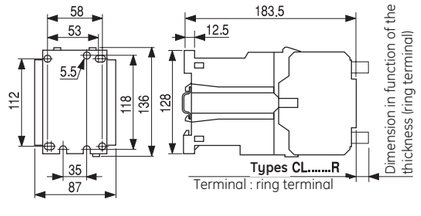
CL03D4...., CL04D4...., CL03DB...., CL04DB....

0.825 kg 0.835 kg 0.825 kg 0.835 kg

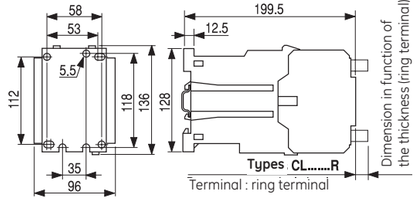


CL05D4...., CL07D4...., CL05DB...., CL07DB...., CL08DB...

1.290 kg 1.290 kg 1.290 kg 1.290 kg



CL09D4....

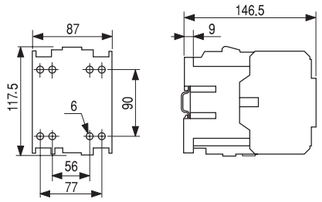


Four pole contactors

Coil with electronic module

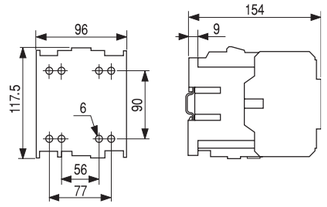
CL05E4...., CL07E4...., CL05EB...., CL07EB...., CL08EB...

1.290 kg 1.290 kg 1.290 kg 1.320 kg 1.320 kg



CL09E4....

1.500 kg

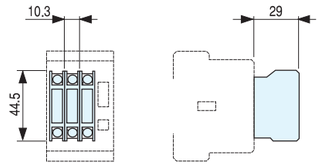


Dimensional drawings

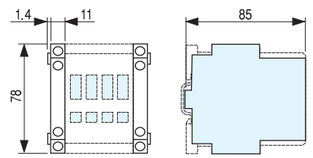
Auxiliary contact blocks

Screw terminal

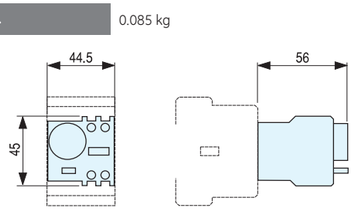
BCLF... 0.015 kg



BCLL..., BRLL.... 0.048 kg

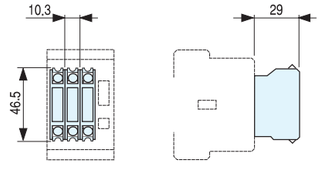


BTLF... 0.085 kg

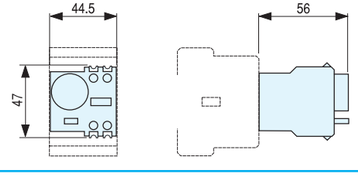


Ring terminal

BCRF... 0.015 kg



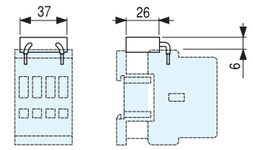
BTRF... 0.085 kg



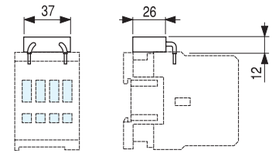
Accessories

Voltage suppressor block

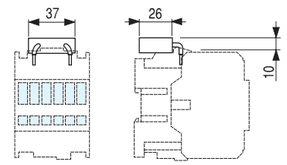
BSLR, BSLDZ, BSLV 0.020 kg



CL00 ... CL25



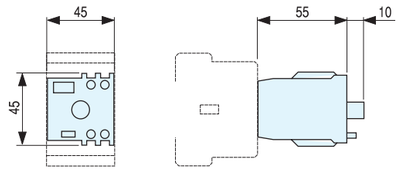
CL03 ... CL45



CL05 ... CL10

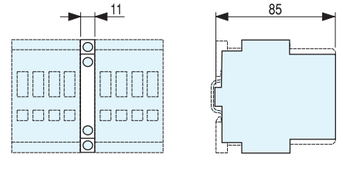
Mechanical latch block

RMLF 0.082 kg



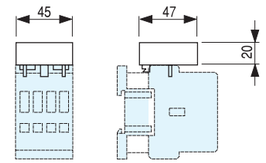
Mechanical / mechanical-electrical interlock

BEL, BELA, BEL02, BELA02 0.025 kg

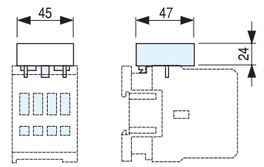


Electronic timer block

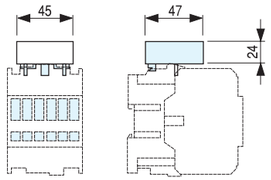
BETL02, BETL45 0.040 kg



CL00 ... CL25



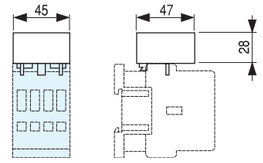
CL03 ... CL45



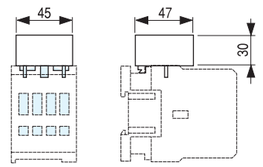
CL05 ... CL10

Interface modules

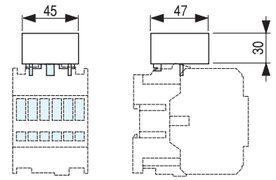
IMR..., IMRF..., IMSSD, IMAMS 0.020 kg



CL00 ... CL25



CL03 ... CL45

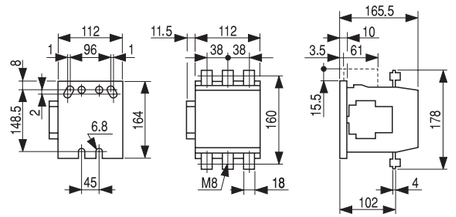


CL05 ... CL10

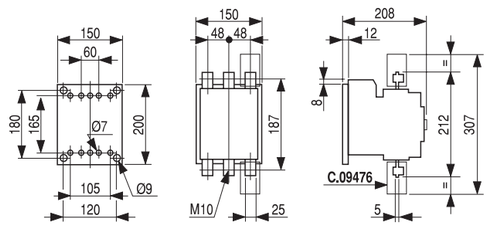
Dimensional drawings

Three pole contactors

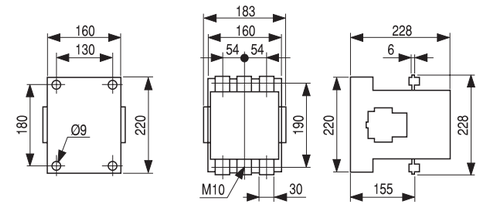
CK75C	3.500 kg
CK08C	3.500 kg



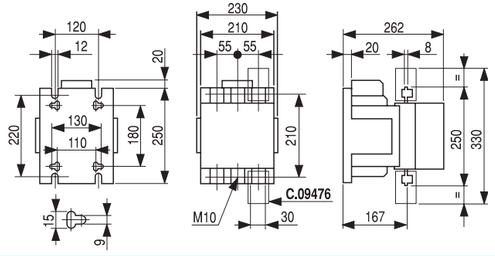
CK85B	6.100 kg
CK09B	6.200 kg
CK95B	6.300 kg



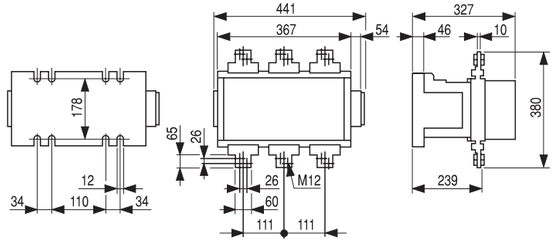
CK10C	11.00 kg
CK11C	11.00 kg



CK12B	18.00 kg

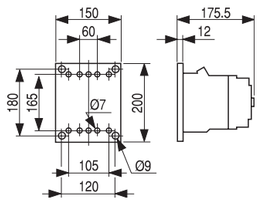


CK13B	35.00 kg

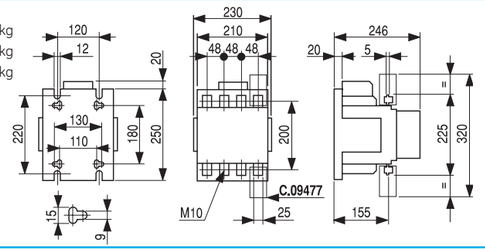


Four pole contactors

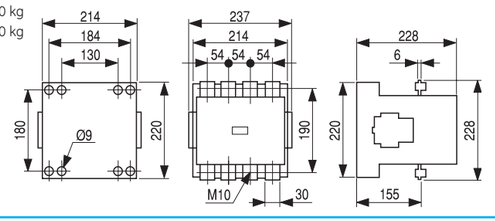
CK07B 4.700 kg



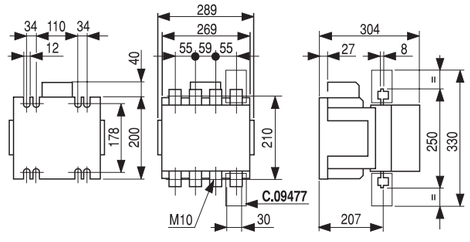
CK08B 14.90 kg
CK09B 15.10 kg
CK95B 15.30 kg



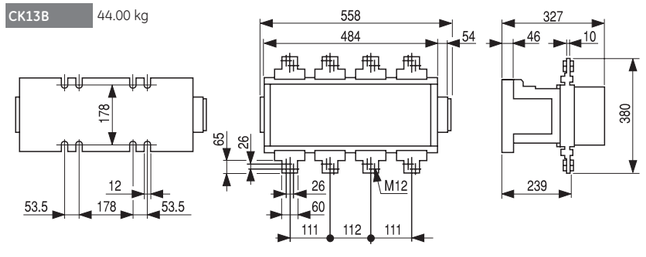
CK10C 22.30 kg
CK11C 22.80 kg



CK12B 23.30 kg



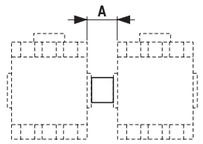
CK13B 44.00 kg



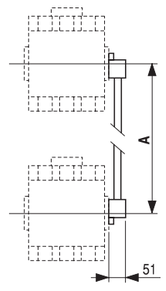
Mechanical interlock

BEKH 0.350 kg

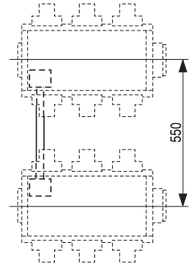
	A
CK75C3... - CK08C3...	55
CK85B3... - CK95B3...	55
CK10C3... - CK11C3...	33
CK12B3...	75



	A	
BEKVA1	550	0.900 kg
BEKVS1	350	0.800 kg



BEKV 1.200 kg



Technical data

General

- Thermal protection against balanced overload.
- Three-pole differential (phase unbalance protection).
- Automatic ambient temperature compensation.
- Front mounted selector for choosing utilisation current.
- Reset button, 2 positions :
  Manual(H) and Automatic(A) by turning the blue selector.
- Stop push button, independent of reset (red).
- Manual trip lever (tripping test).
- Tripping indicator (0-1).
- To facilitate wiring arragements terminal 96 fits directly onto coil terminal (A2) and terminal 14/22 fits directly onto the feedback auxiliary contact.

Conformity to standards

IEC 60947-4	CEI 17-50	VDE660
UNE 115	NI C63-650	UL508
NFC63-650		

Approvals

UL	CSA	SEMKO
SETI	NEMKO	CE

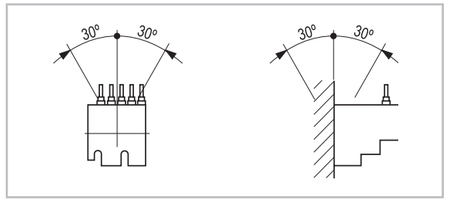
Ambient conditions

Storage temperature		-55°C to +80°C
Operation temperature		-25°C to +60°C
Altitude	up to 3000m	Nominal values
	from 3000 to 4000m	90%Ie 80%Ue
	from 4000 to 5000m	80%Ie 75%Ue
Degree of protection		IP20
Protection treatment		Tropical finish

Climatic resistance

Continuous tests 40 / 125 / 56		
Cold (72h)		
	Temperature	-40°C
Dry heat (96h)		
	Temperature	+125°C
	Relative humidity	< 50%
Humid heat (56 days)		
	Temperature	+40°C
	Relative humidity	95%
Cyclical tests		
First half-cycle (12h)		
	Low temperature	+25°C
	Relative humidity	93%
Second half-cycle (12h)		
	Low temperature	+55°C
	Relative humidity	95%
Number of consecutive cycles		6

Mounting positions

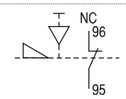


Main circuit *(poles)*

			MT0...
Rated insulation voltage (Ui) according to IEC 947		(V)	750
Frequency		(Hz)	0...400
Power dissipation per pole		(W)	min. 1 / max. 2.5
Terminal capacity			
Screw M 3.5 (pozidrive head) safety flange			
Maximum capacity :			
Solid		(Ø mm)	2 x 2 wires
Stranded without end sleeve		(mm^2)	2 wires Ø 2.5
Stranded with end sleeve			
pen (2 end sleeves)		(mm^2)	2 wires Ø 0.75
pen (1 end sleeve)		(mm^2)	2 wires Ø 1 1 wires Ø 2.5
Tightening torque		(Nm)	0.8

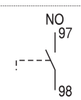
Control circuit *(incorporated auxiliary contact)*

			MT0...
Rated insulation voltage (Ui) according to IEC 947		(V)	750
Rated thermal current (Ith) θ ≤ 60°C		(A)	10
Tripping currents			
AC-15	Ue-Ie	(V-A)	223-3, 380-2, 500-1
DC-13	Ue-Ie	(V-A)	60-0.5, 110-0.2, 220-0.1
Short-circuit protection (max.glass gL fuse - w/h welding)		(A)	6
Number and type of contacts			

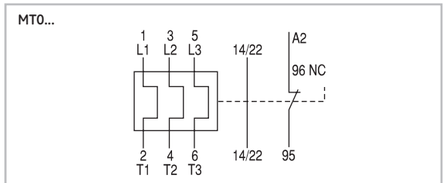


Control circuit *(auxiliary contact block)*

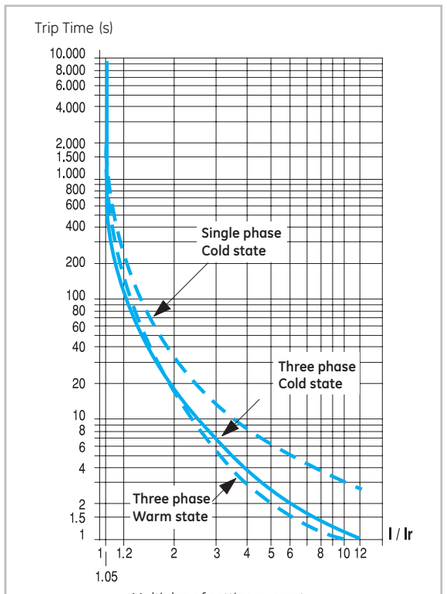
			MATV10AT
Rated insulation voltage (Ui) according to IEC 947		(V)	750
Rated thermal current (Ith) θ ≤ 60°C		(A)	10
Tripping currents			
AC-15	Ue-Ie	(V-A)	223-1, 380-0.5
DC-13	Ue-Ie	(V-A)	60-0.1, 110-0.5
Short-circuit protection (max.glass gL fuse - w/h welding)		(A)	6
Number and type of contacts			



Numbering of the terminals

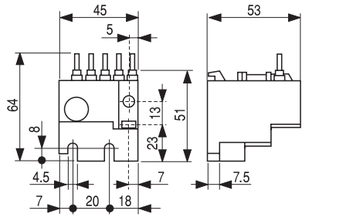


Tripping curves

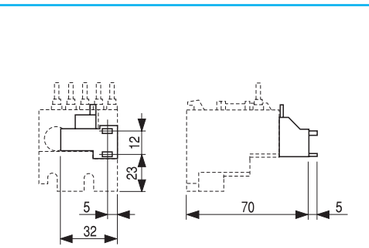


Dimensional drawings

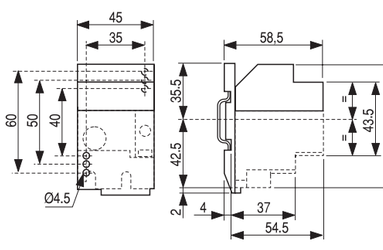
Thermal overload relay



Thermal overload relay + aux. contact block (front mounting)



Independent mounting of the thermal overload relay



Technical data

		RT1...	RT2...	RT3...	RT4.../ 4L...	RT5.../ 5L...	RT6.../ 6L...
General							
Class		10A / 20	10 / 20	10 / 20	10 / 30	10 / 30	10 / 30
Setting range	(A)	0.16 ... 40	11.5 ... 110	55 ... 190	2.5 ... 310	120 ... 700	500 ... 850
Suitable for		CL00...CL45	CL05...CL10	CK75...CK08	CL,CK	CK10...CK12	CK13
Main circuit							
Rated insulation voltage	(V)	690	1000	1000	1000	1000	1000
(IEC947-4) Ui							
Frequency limits	(Hz)	0...400	0...400	0...400	50...60	50...60	50...60
Terminal capacity							
Clamp terminal - solid	(mm^2)	16	50	120	-	-	-
Clamp terminal - flexible	(mm^2)	10	50	120	-	-	-
Flat terminal	(mm)	-	-	25 x 5	-	-	80 x 10
Passing by hole (wire) through C.T. core	(mm^2)	-	-	-	-	400	-
Passing by hole (bar) through C.T. core	(mm)	-	-	-	30 x 10	30 x 10	-
Tightening torque	(Nm)	2.5	4.5	6.5	23	31.5	-
Control circuit							
Rated insulation voltage	(V)	690					
(IEC60947-4) Ui							
Rated thermal current Ith	(A)	10					
Operation current							
AC-15 - Ue-Ie	(V - A)	110/120 - 3 ; 220/240 - 2 ; 380/415 - 1 ; 480/500 - 0,8 ; 660/690 - 0,3					
DC-13 - Ue-Ie	(V - A)	24 - 2 ; 48 - 1.4 ; 110 - 0.6 ; 250 - 0.3 ; 440 - 0.1					
Utilisation according UL and CSA		B600 - Q600					
Protective fuse type gL	(A)	10					
Terminal capacity	(mm^2)	2.5					
Tightening capacity	(Nm)	0.8					

Conformity to standards

IEC/EN 60947-4-1	NFC 63-650	NI C 63-650
IEC/EN 60947-5-1	CEI 17-50	VDE 0660
UNE 115	CSA 22.2/14	UL 508

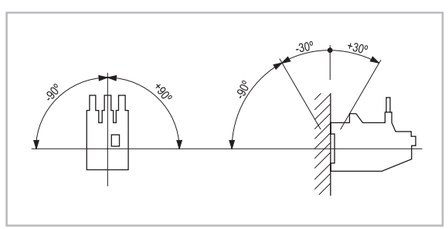
Approvals

cULus	RINA	CE
LLoyd's Register	Bureau Veritas	

Ambient conditions

Storage temperature		-40°C to +70°C
Operation temperature (compensated)		-25°C to +60°C
Altitude	up to 3000m	w/o any changes in characteristics
Relative humidity		98%
Protection treatment		Tropical finish

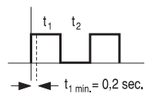
Mounting positions



Remote electrical reset

Power consumption			
	AC	(VA)	100
	DC	(W)	100

Coils not suitable for continuous operating duty

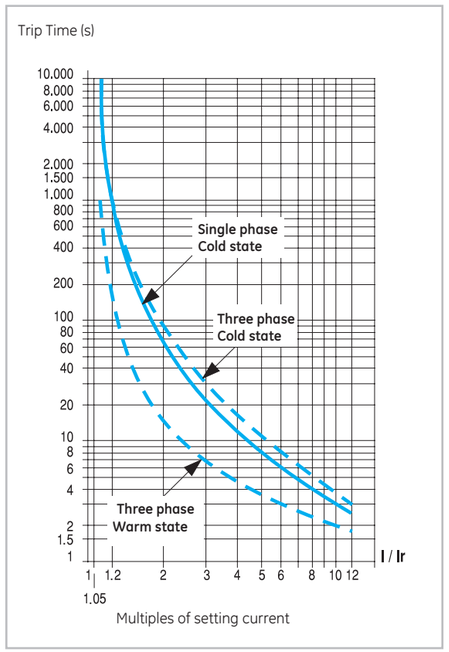


t_1 = 1 sec. ◆ t_2 = 30 sec.
t_1 = 5 sec. ◆ t_2 = 90 sec.
t_1 = 10 sec. ◆ t_2 = 180 sec.

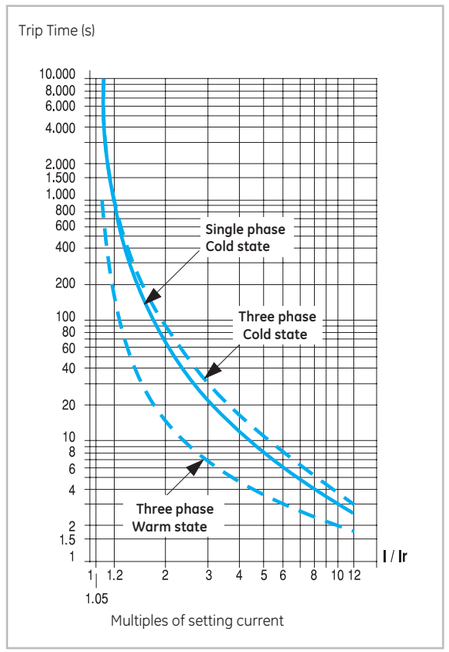
(t_1 = ON time t_2 = OFF time)

Tripping curves

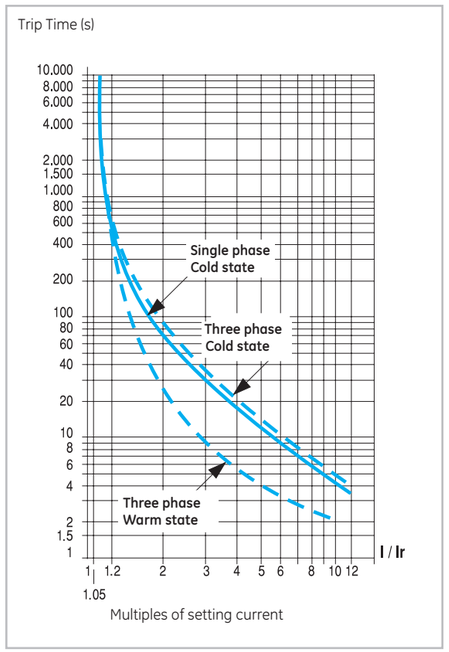
RT1 Class 10A



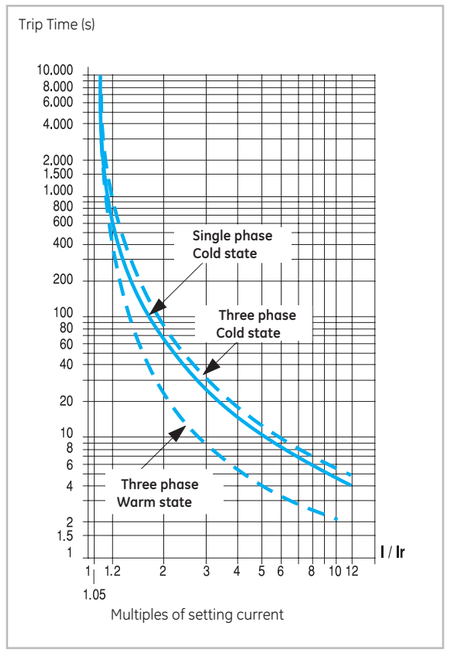
RT2 Class 10



RT12 Class 20

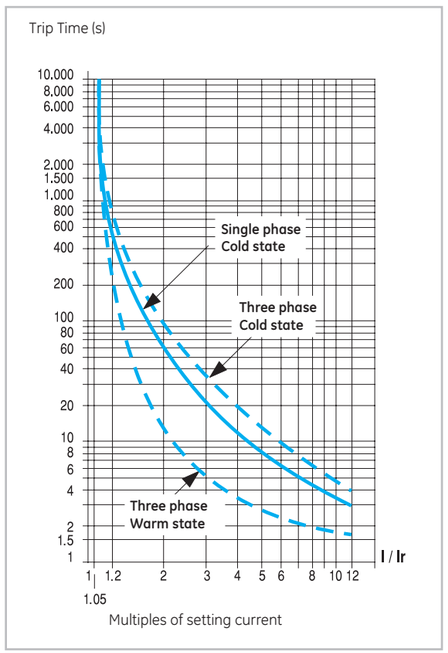


RT22 Class 20

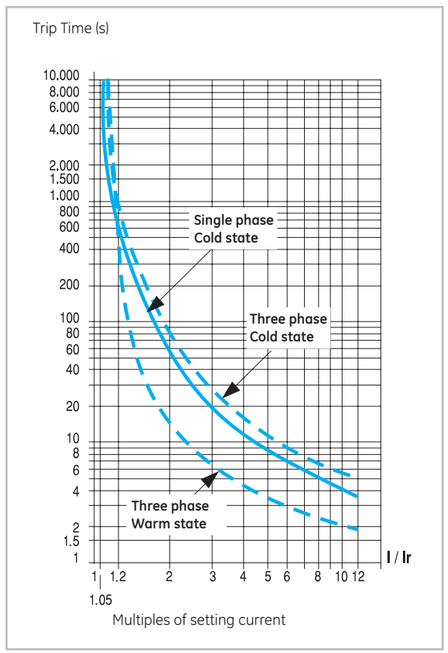


Tripping curves

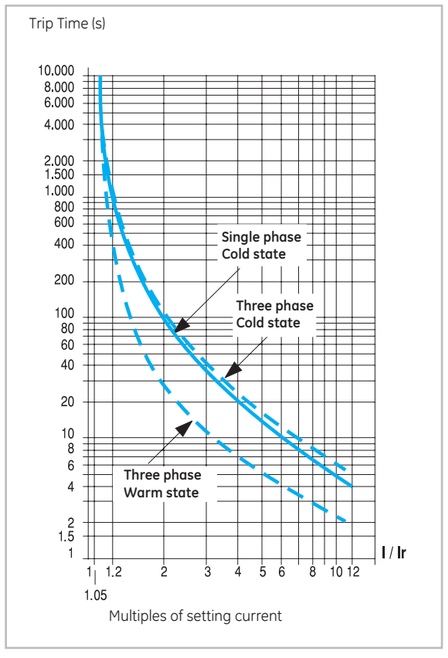
RT3 Class 10



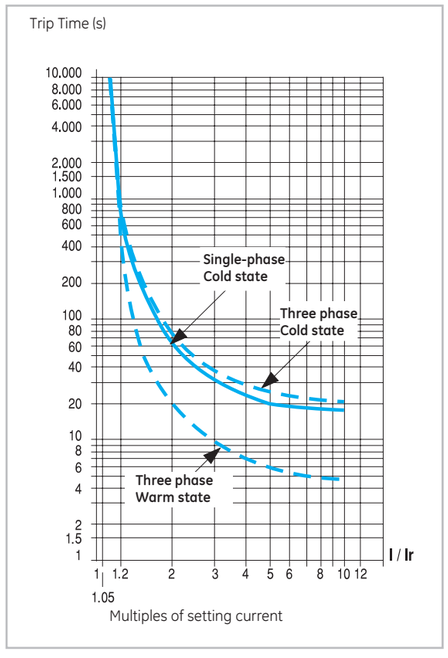
RT4 Class 10



RT32 Class 20

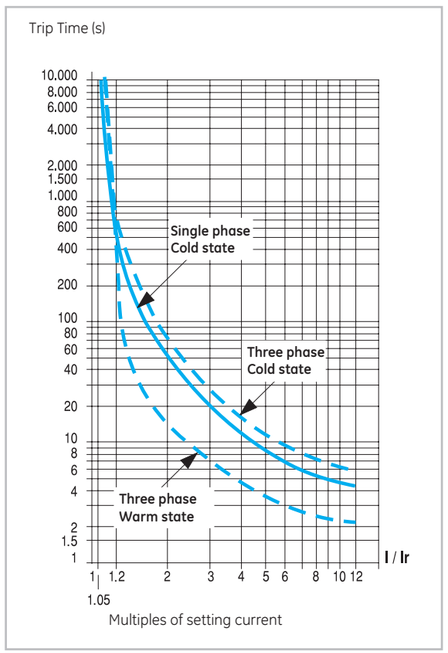


RT4L Class 30

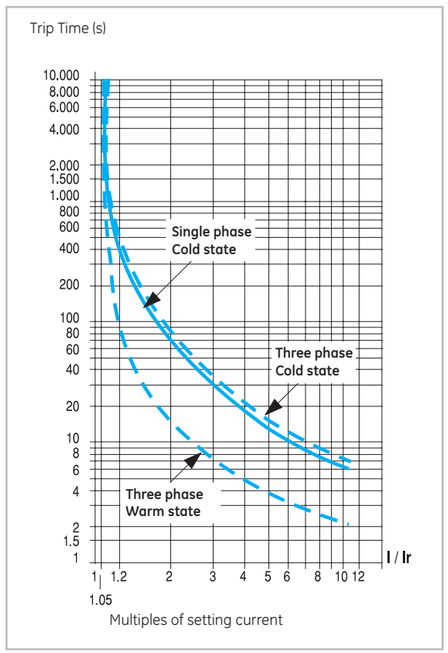


Tripping curves

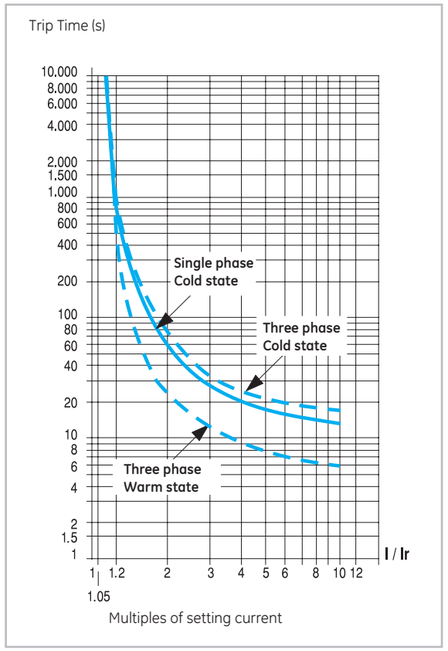
RT5 Class 10



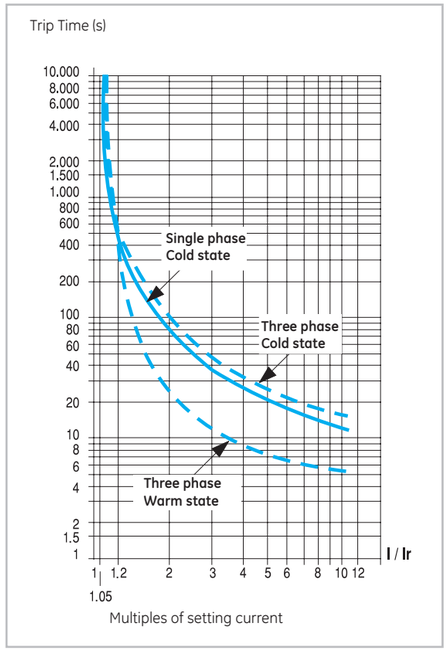
RT6 Class 10



RT5L Class 30



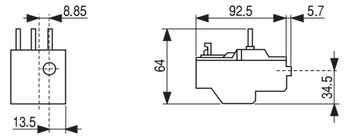
RT6L Class 30



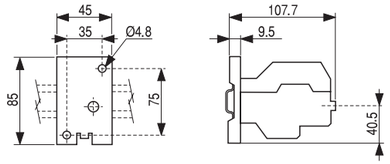
Dimensional drawings

Thermal overload relay for contactors

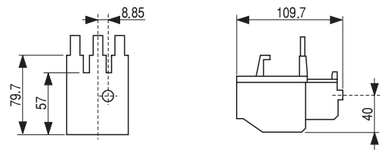
RT1 - RT12
0.190 kg



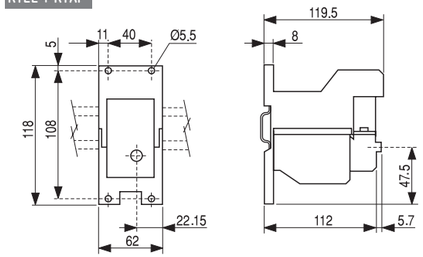
RT1 + RT XP
RT12 + RTXP



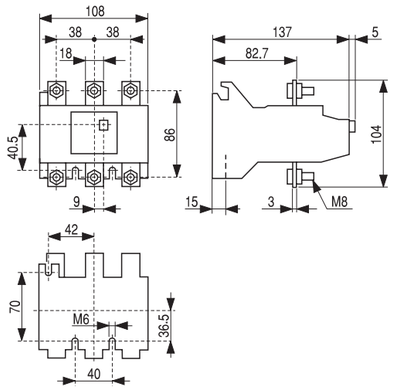
RT2 - RT22
0.400 kg



RT2 + RT XP
RT22 + RTXP

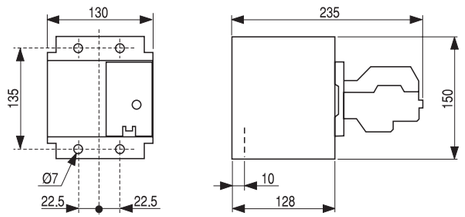


RT3 - RT32
0.900 kg

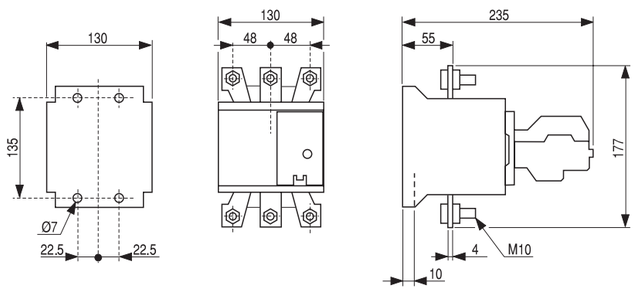


Thermal overload relay for contactors

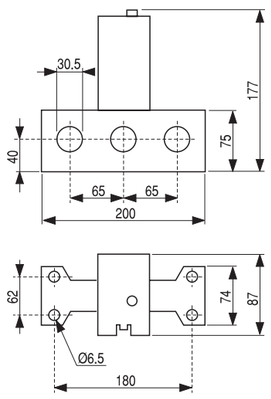
RT4LA...RT4LM
2.400 kg



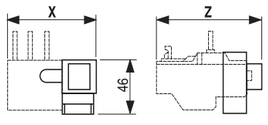
RT4/4LN...RT4/4LR
2.400 kg



RT5 / 5L
0.875 kg



Remote electrical reset



RTXRR + ...	X	Z
RT1	75	110
RT2	84	121
RT3	108	153
RT4	150	240
RT5	200	196

Coordination tables

Coordination Type 2 - 65kA at 380/400V and 415V - 50/60Hz

MOTOR[1]			BREAKER				CONTACTOR	OVERLOAD RELAY		WIRE	
Rated power	Rated current		Cat. no.	Rated current In	Magnetic setting 1m Pick-up ±20% Im	Magnetic current	Series	Series	Setting range	Smallest wire Cu (PVC)[2]	Min frontal safety
(kW)	380/400V (A)	415V	#	(A)	(A)	(A)			(A)	(mm^2)	(mm)
0.06	0.23	0.21	GPS1MHAB	0.25	-	3.3	CLOO	RE1D	0.1-0.5	1	20
0.09	0.34	0.31	GPS1MHAC	0.4	-	5.2	CLOO	RE1D	0.1-0.5	1	20
0.12	0.44	0.4	GPS1MHAD	0.63	-	8.2	CLOO	RE1D	0.1-0.5	1	20
0.18	0.65	0.63	GPS1MHAE	1	-	13	CLOO	RE1H	0.4-2.0	1	20
0.25	0.9	0.8	GPS1MHAE	1	-	13	CLOO	RE1H	0.4-2.0	1	20
0.37	1.25	1.1	GPS1MHAF	1.6	-	20.8	CLOO	RE1H	0.4-2.0	1	20
0.55	1.6	1.5	GPS1MHAF	1.6	-	20.8	CLOO	RE1H	0.4-2.0	1	20
0.75	2	1.9	GPS1MHAG	2.5	-	32.5	CLOO	RE1K	1.5-5.0	1	20
1.1	2.6	2.5	GPS1MHAH	4	-	52	CL25	RE1K	1.5-5.0	1	20
1.5	3.5	3.4	GPS1MHAH	4	-	52	CL25	RE1K	1.5-5.0	1	20
2.2	5	4.5	GPS1MHAJ	6.3	-	81.9	CL25	RE1K	1.5-5.0	1	20
3	7	6.5	GPS1MHAK	10	-	130	CL25	RE1M	1.6-8.0	1.5	20
4	9	8	GPS1MHAK	10	-	130	CL25	RE1S	6.4-32.0	1.5	20
5.5	12	11	GPS1MHAL	13	-	169	CL25	RE1S	6.4-32.0	2.5	20
7.5	-	14	GPS1MHAM	16	-	208	CL25	RE1S	6.4-32.0	2.5	20
8.8	16	-	GPS1MHAM	16	-	208	CL25	RE1S	6.4-32.0	2.5	20
11	22.5	21	GPS1MHAP	25	-	325	CL25	RE1S	6.4-32.0	4	20
15	30	28	GPS1MHAR	32	-	416	CL04	RE1S	6.4-32.0	6	20
11	22.5	21	GPS2MHAR	25	-	325	CL04	RE1S	6.4-32.0	4	20
15	30	28	GPS2MHAP	32	-	416	CL04	RE1S	6.4-32.0	6	20
18.5	37	35	GPS2MHAS	40	-	520	CL45	RE1W	9.0-45.0	10	20
22	-	40	GPS2MHAT	50	-	650	CL06	RE2H	15.0-75.0	10	25
	44	--	GPS2MHAT	50	-	650	CL06	RE2H	15.0-75.0	10	25
30	60	55	GPS2MHAU	63	-	819	CL07	RE2H	15.0-75.0	16	25
35	65	60	FDH36MC080GD	80	900-1300	1100	CL08	RE2H	15.0-75.0	25	25
45	85	80	FDH36MC1 OOGD	100	1000-1500	1400	CL09	RE2M	22.0-110.0	25	30
55	-	100	FDH36MC1 OOGD	100	1000-1500	1400	CL10	RE2M	22.0-110.0	25	30
55	105	-	FEH36MC125JF	125	1250-1875	1250	CL10	RE2M	22.0-110.0	25	30
75	138	135	FEH36MC200KF	200	2250-3350	2800	CK75	RE3E	30.0-150.0	50	40

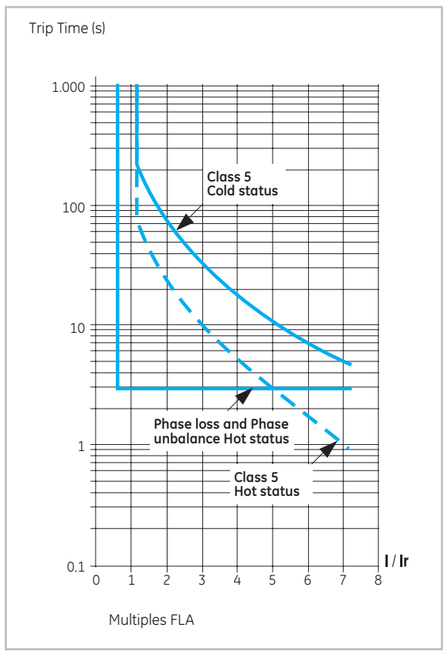
Coordination Type 2 - 100kA at 500 - 525V - 50/60Hz

MOTOR[1]			gL/gG Fuses		EOL			CONTACTOR		WIRE	
Rated power	Rated current			Size	Series	Type	Setting range	Series	PAC3	Seco min	Safety clearance
kW	500V (A)	525V	In (A)				(A)		(kW)		(mm)
0.06	0.17	0.16	2	000	RE1	D	0.1-0.5	CLOO	5.5	1	20
0.03	0.24	0.22	2	000	RE1	D	0.1-0.5	CLOO	5.5	1	20
0.12	0.33	0.3	2	000	RE1	D	0.1-0.5	CLOO	5.5	1	20
0.18	0.48	0.46	2	000	RE1	D	0.1-0.5	CLOO	5.5	1	20
0.25	0.66	0.64	2	000	RE1	H	0.4-2.0	CLOO	5.5	1	20
0.37	0.3	0.85	4	000	RE1	H	0.4-2.0	CLOO	5.5	1	20
0.55	1.2	1.15	4	000	RE1	H	0.4-2.0	CLOO	5.5	1	20
0.75	1.5	1.45	4	000	RE1	H	0.4-2.0	CLOO	5.5	1	20
1.1	2.1	1.3	6	000	RE1	K	1.5-5.0	CLOO	5.5	1	20
1.5	2.8	2.6	10	000	RE1	K	1.5-5.0	CLOO	5.5	1	20
1.1	2.1	1.3	6	000	RE1	K	1.5-5.0	CL01	7.5	1	20
1.5	2.8	2.6	10	000	RE1	K	1.5-5.0	CL01	7.5	1	20
2.2	3.3	3.6	10	000	RE1	K	1.5-5.0	CL01	7.5	1	20
1.5	2.8	2.6	10	000	RE1	K	1.5-5.0	CL25	15	1	20
2.2	3.3	3.6	10	000	RE1	K	1.5-5.0	CL25	15	1	20
3	5.3	5	16	000	RE1	M	1.6-8.0	CL25	15	1	20
4	6.8	6.5	20	000	RE1	M	1.6-8.0	CL25	15	1	20
5.5	3.1	8.6	25	000	RE1	S	6.4-32.0	CL25	15	1.5	20
7.5	12	11.4	32	000	RE1	S	6.4-32.0	CL25	15	2.5	20
10	15.5	14.8	40	000	RE1	S	6.4-32.0	CL25	15	2.5	20
11	17.6	17	40	000	RE1	S	6.4-32.0	CL25	15	2.5	20
15	23	22	50	000	RE1	S	6.4-32.0	CL04	18.5	4	20
18.5	28.5	27	63	000	RE1	S	6.4-32.0	CL04	18.5	6	20
4	6.8	6.5	20	000	RE1	M	1.6-8.0	CL45	25	1.5	20
5.5	3.1	8.6	25	000	RE1	S	6.4-32.0	CL45	25	2.5	20
7.5	12	11.4	32	000	RE1	S	6.4-32.0	CL45	25	2.5	20
11	17.6	17	40	000	RE1	S	6.4-32.0	CL45	25	2.5	20
15	23	22	50	000	RE1	S	6.4-32.0	CL45	25	4	20
18.5	28.5	27	63	000	RE1	W	3.0-45.0	CL45	25	5	20
22	33	31.5	80	000	RE1	H	15.0-75.0	CL45	25	5	20
18.5	28.5	27	63	000	RE2	H	15.0-75.0	CL06	30	5	25
22	33	31.5	80	000	RE2	H	15.0-75.0	CL06	30	5	25
30	45	43	80	000	RE2	H	15.0-75.0	CL06	30	10	25
37	53	52	100	000	RE2	H	15.0-75.0	CL07	40	10	25
40	53	56	100	000	RE2	H	15.0-75.0	CL08	45	16	25
45	65	62	125	00	RE2	H	15.0-75.0	CL09	55	16	30
55	80	76	125	00	RE2	M	22.0-110.0	CL10	65	25	30
75	105	100	160	01/1	RE3	E	30.0-150.0	CK75	100	35/25	40
30	130	124	250	01/1	RE3	E	30.0-150.0	CK08	110	50	40

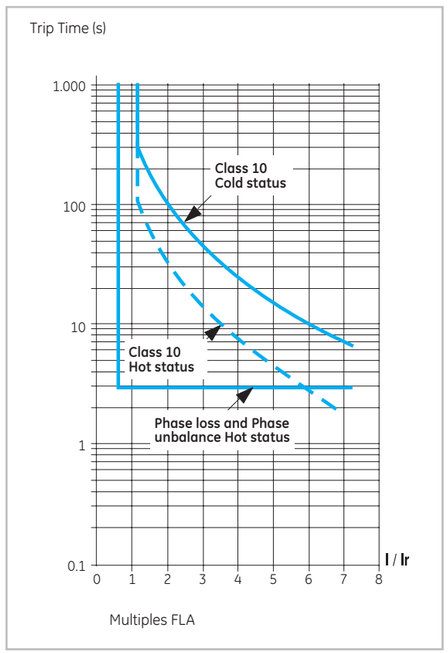
(1) Current are relevant to four pole motors not having special characteristics of torque.
(2) The minimum cycle cross-sections are referred to an ambient temperature of 30°C max. in free air and are selected to withstand the maximum let-through energy and the motor rated current. Besides the user has to consider the drop voltage, the type of laying and ambient temperature if it is different.

Tripping curves

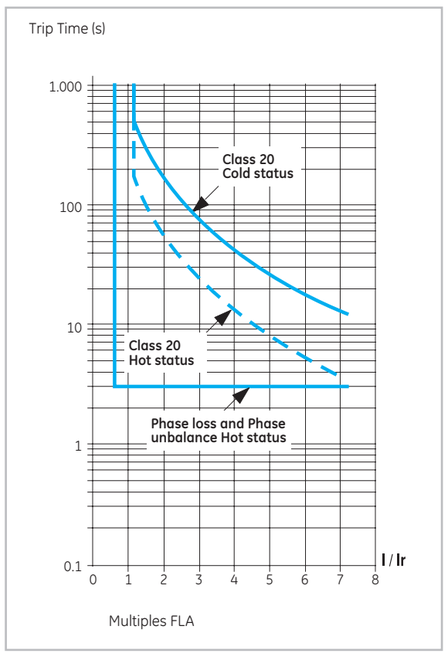
Class 5



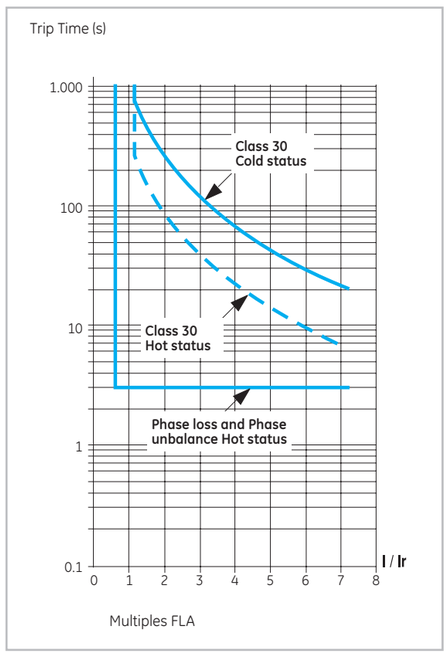
Class 10



Class 20

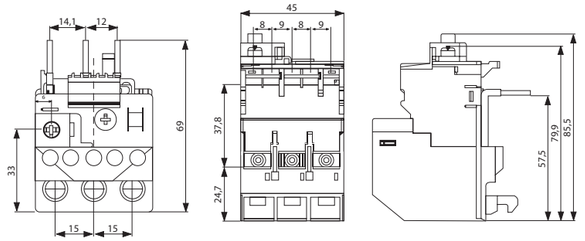


Class 30

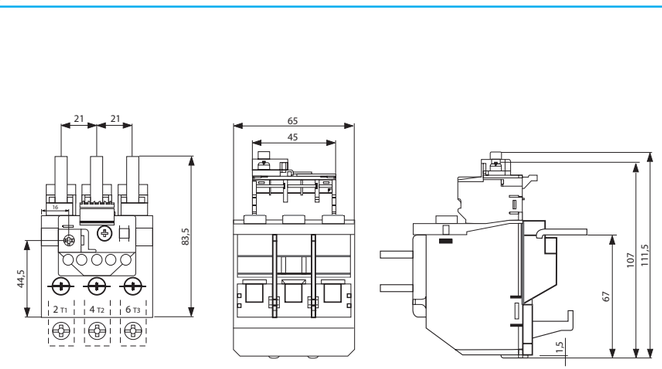


Dimensional drawings

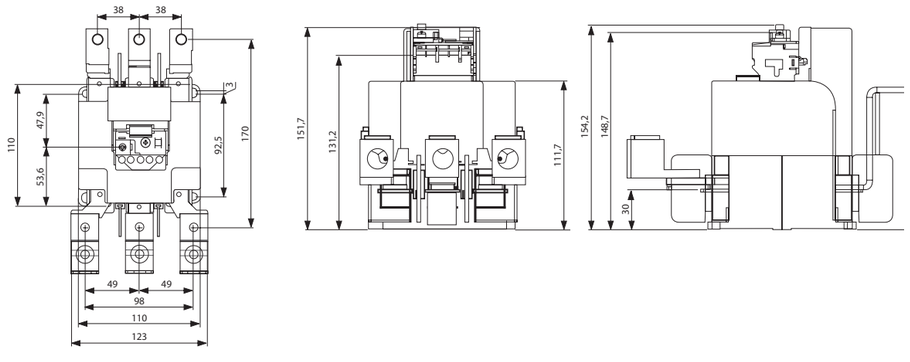
Frame 1



Frame 2



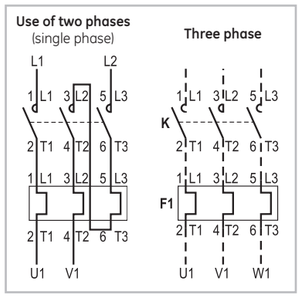
Frame 3



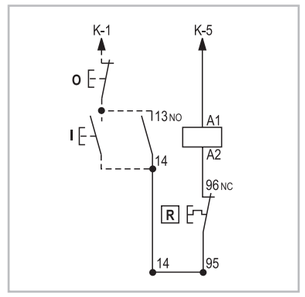
Wiring diagrams

Series M. Direct-on-line starter with reset

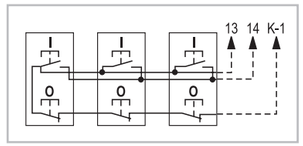
Power circuit



Control circuit

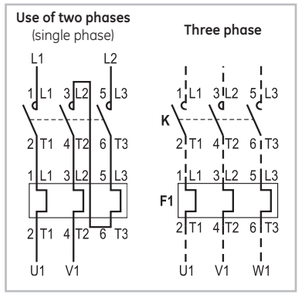


Control by two or more push-buttons

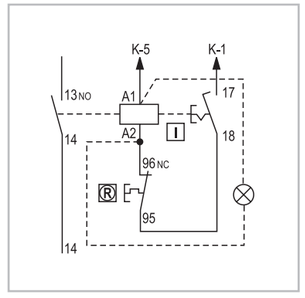


Series M. Direct-on-line starter with start/emergency stop push-button

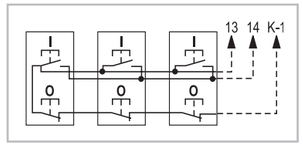
Power circuit



Control circuit



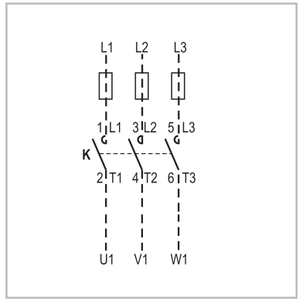
Control by two or more push-buttons



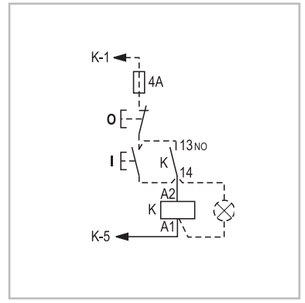
Wiring diagrams

Series CL. Direct-on-line starter

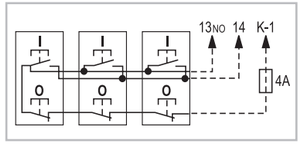
Power circuit



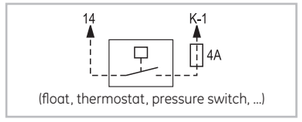
Control circuit



Control by two or more push-buttons

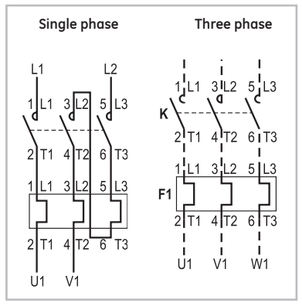


Control by permanent contact

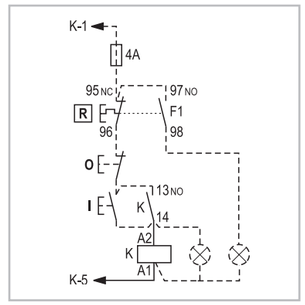


Series CL. Direct-on-line starter with reset push-button

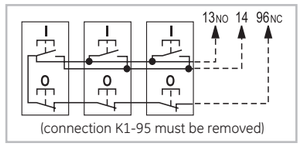
Power circuit



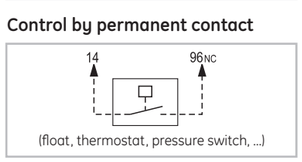
Control circuit



Control by two or more push-buttons

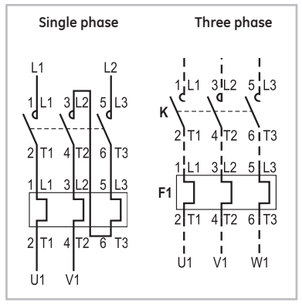


Control by permanent contact

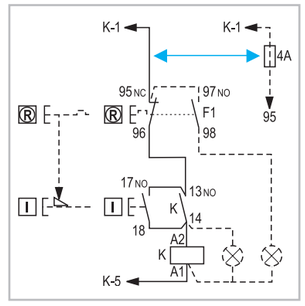


Series CL. Direct-on-line starter with start/stop/reset push-button

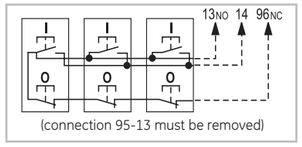
Power circuit



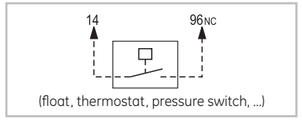
Control circuit



Control by two or more push-buttons

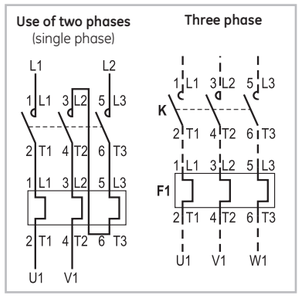


Control by permanent contact

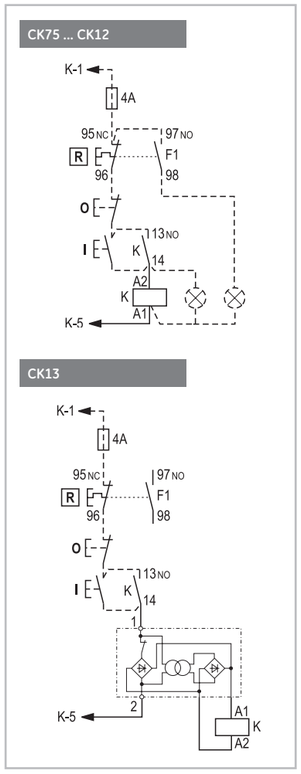


Series CK. Direct-on-line starter

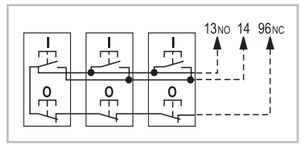
Power circuit



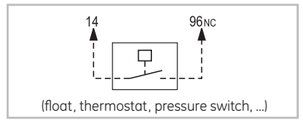
Control circuit



Control by two or more push-buttons



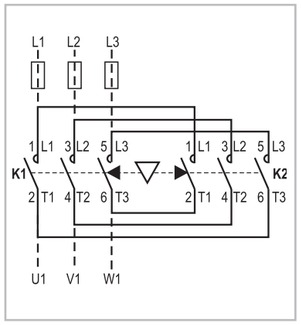
Control by permanent contact



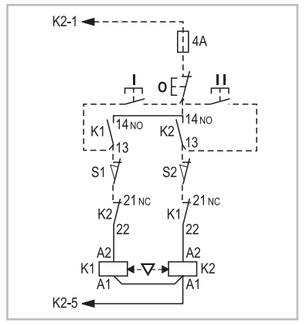
Wiring diagrams

Series M. Reversing starter without thermal overload relay

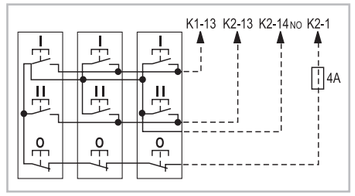
Power circuit



Control circuit

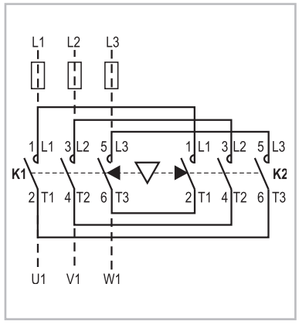


Control by two or more push-buttons

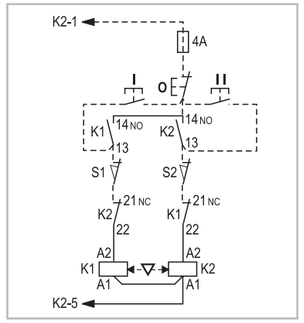


Series CL. Reversing starter without thermal overload relay

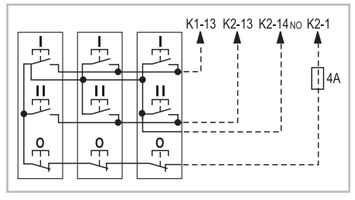
Power circuit



Control circuit

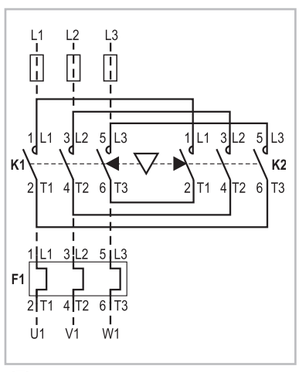


Control by two or more push-buttons

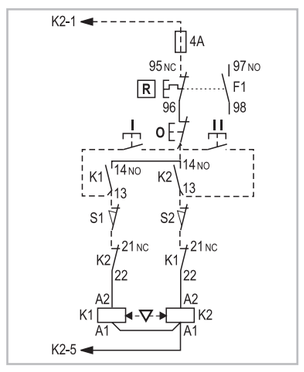


Series CL. Reversing starter with thermal overload relay

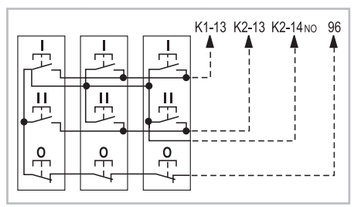
Power circuit



Control circuit

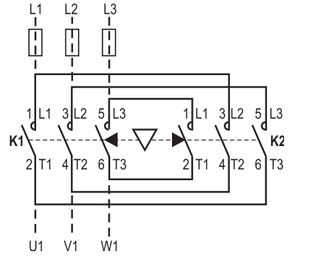


Control by two or more push-buttons

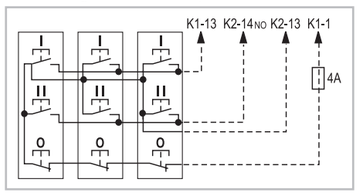


Series CK. Reversing starter without thermal overload relay

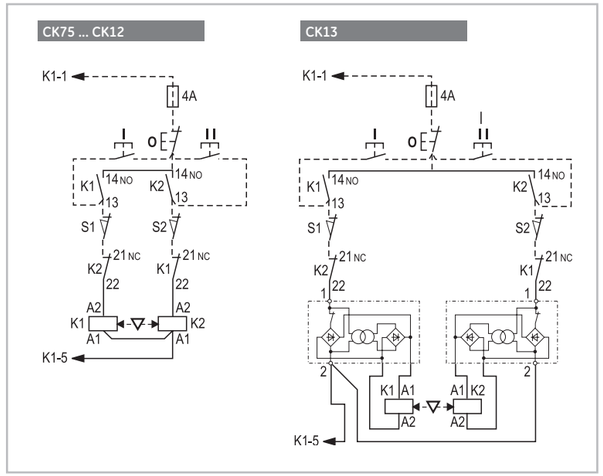
Power circuit



Control by two or more push-buttons

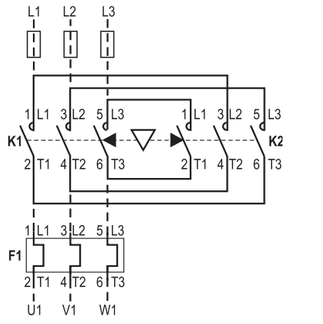


Control circuit

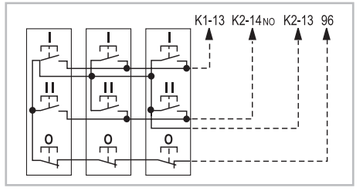


Series CK. Direct-on-line starters with thermal overload relay

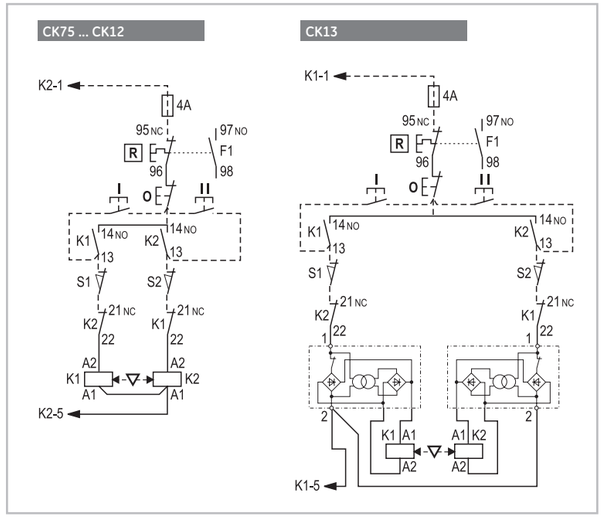
Power circuit



Control by two or more push-buttons



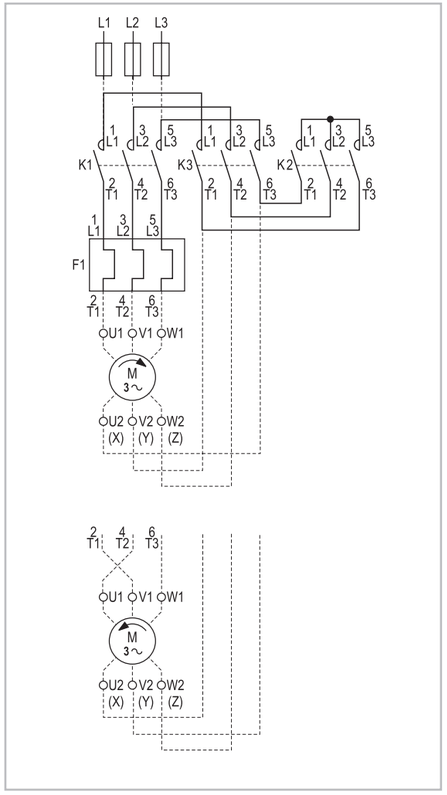
Control circuit



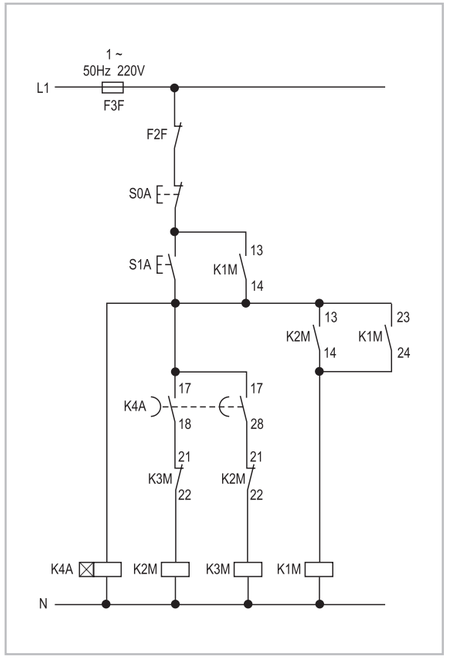
Wiring diagrams

Series CL and CK. Star-delta starters

Power circuit



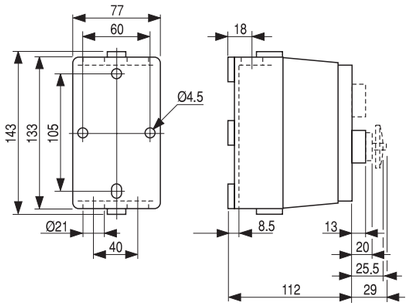
Control circuit



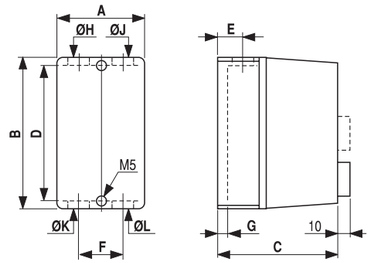
Dimensional drawings

Direct-on-line starters. IP40 / IP65

Series M



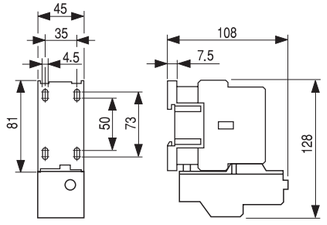
Series CL



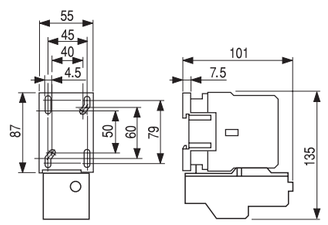
	LG00... - LG02...	LG25... - LG04...
A	87	101
B	180	195
C	124.5	136
D	162	177
E	20	23
F	49	57
G	8	8
Ø H	21	23
Ø J	21	21
Ø K	21	23
Ø L	21	23

Series CL - Direct-on-line starters

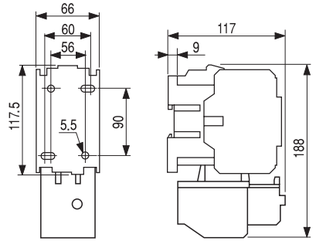
CL00 ... CL25



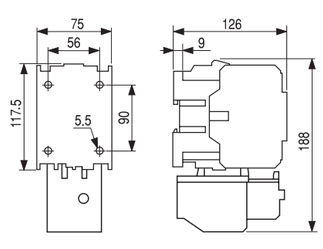
CL04



CL45 ... CL08



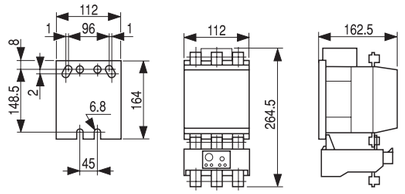
CL09 ... CL10



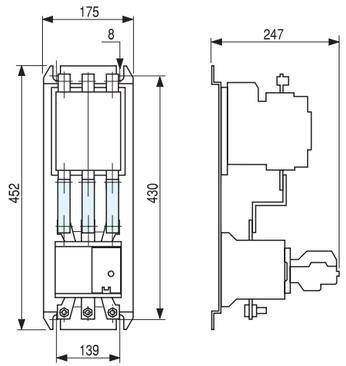
Dimensional drawings

Series CK - Direct-on-line starters

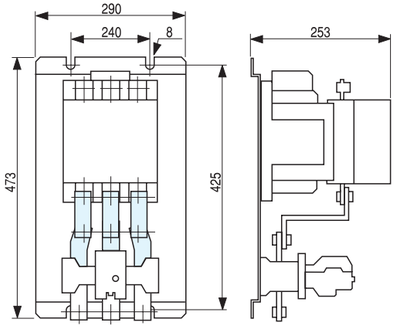
CK75 ... CK08



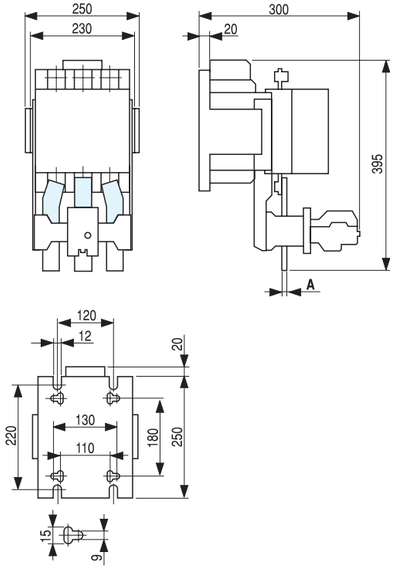
CK85 ... CK95



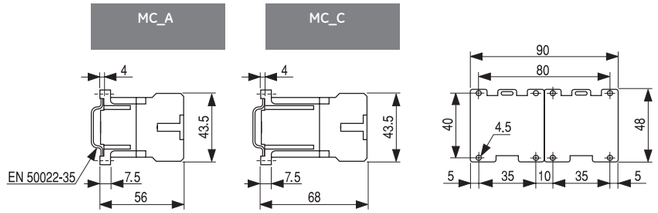
CK10 ... CK11

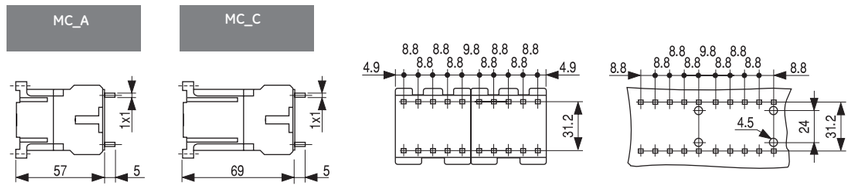


CK12



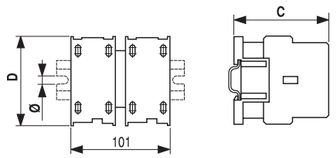
Series M. Direct-on-line reversing starters



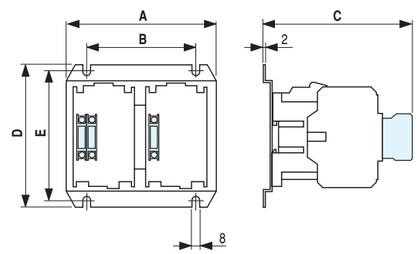


Series CL. Direct-on-line reversing starters without thermal overload relay

	A	B	C	D	Ø
CL00... - CL25...	130	116	87.5	81	5.5
CL03... - CL45...	150	136	100.5	87	5.5

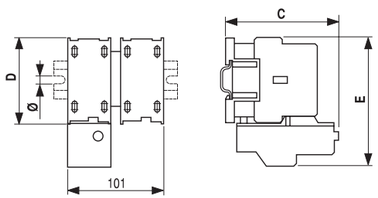


	A	B	C	D	E
CL06... - CL08...	171	135	160	155	133
CL09... - CL10...	186	150	167	155	133

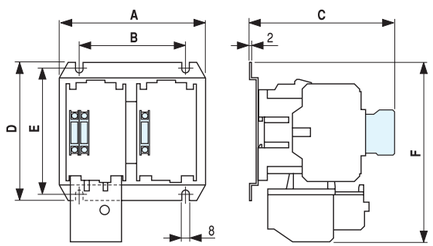


Series CL. Direct-on-line reversing starters with thermal overload relay

	A	B	C	D	E	Ø
CL00... - CL25...	130	116	110.5	81	135	5.5
CL03... - CL45...	150	136	103.5	87	145	5.5



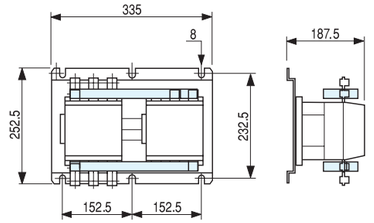
	A	B	C	D	E	F
CL06... - CL08...	171	135	160	155	133	205
CL09... - CL10...	186	150	167	155	133	258



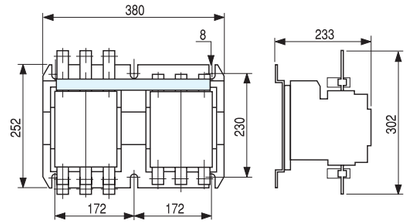
Dimensional drawings

Series CK. Direct-on-line reversing starters without thermal overload relay

CK75 .... CK08

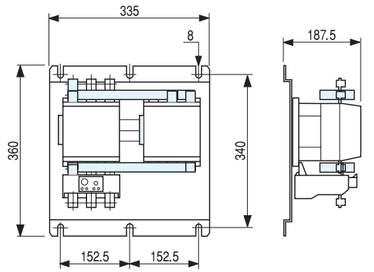


CK85 .... CK95

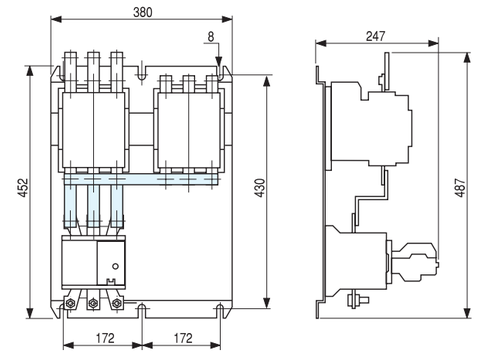


Series CK. Direct-on-line reversing starters with thermal overload relay

CK75 .... CK08

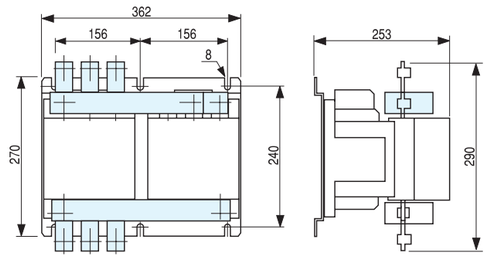


CK85 .... CK95

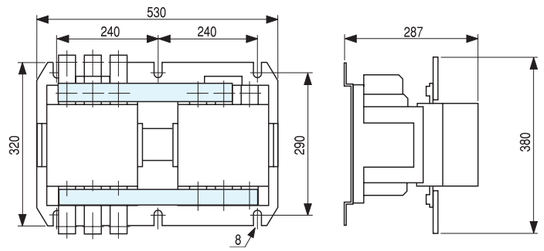


Series CK - Direct-on-line reversing starters without thermal overload relay

CK10 .... CK11

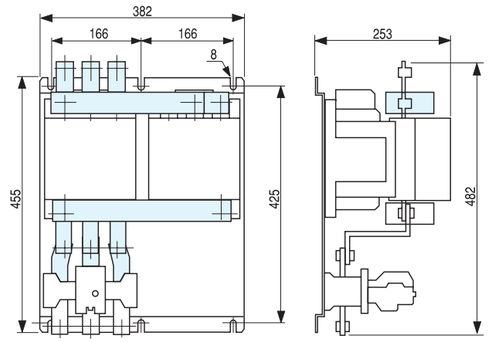


CK12

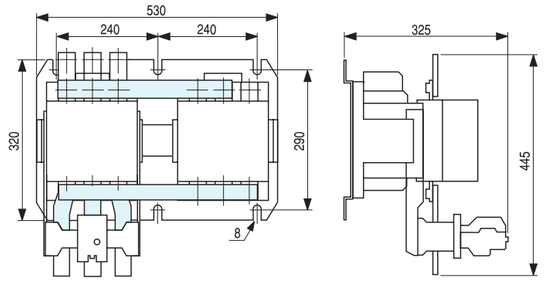


Series CK - Direct-on-line reversing starters with thermal overload relay

CK10 .... CK11

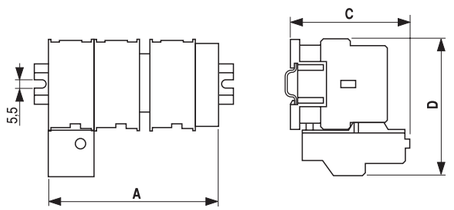


CK12

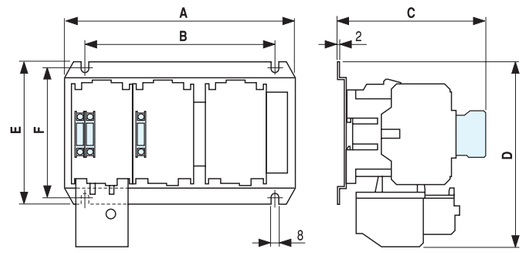


Dimensional drawings

Series CL - Star-delta starters



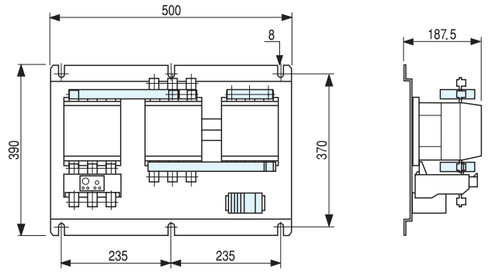
	A	B	C	D
CL00... - CL25...	190	180	110.5	135
CL03... - CL04...	220	210	103.5	145



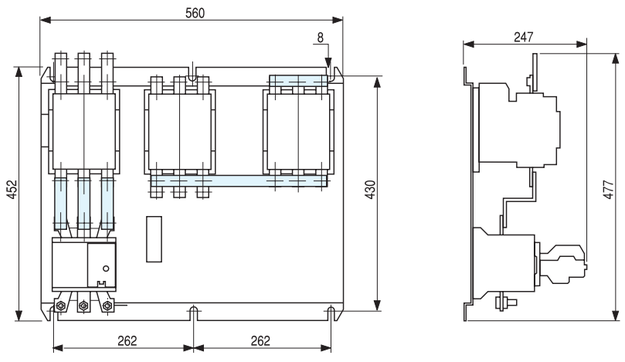
	A	B	C	D	E	F
CL06... - CL08...	253	217	129	205	155	133
CL09...	263	247	138	247	155	133
CL10...	283	247	151	247	155	133

Series CK - Star-delta starters

CK75 ... CK08

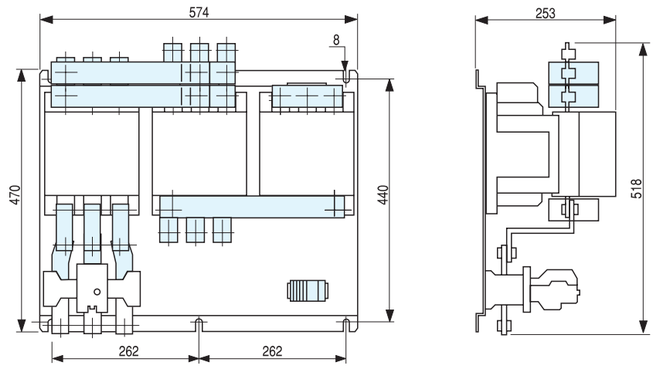


CK85 ... CK95

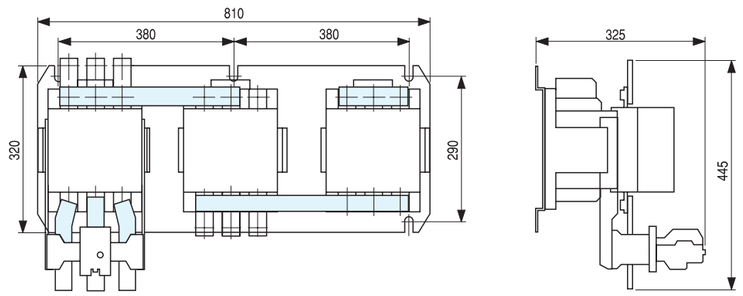


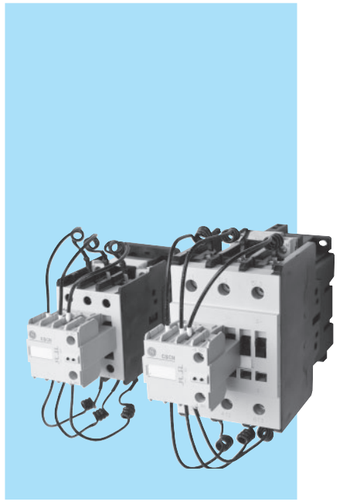
Series CK - Star-delta starters

CK10 ... CK11



CK12





Contactors for capacitors switching

With built-in resistance to switch three phase capacitor banks

"CSCN" contactors incorporate a front block with three early-make auxiliary contacts together with 6 quick discharge resistors (two per phase) through which the capacitors are switched to the network, reducing the current peak. Once the resistors have damped the current peak, the main contacts short-circuit the resistors, carrying the uninterrupted current.
A few miliseconds later the early-make auxiliary contact closes to guarantee that all current flows through the main contacts.

Standards

IEC/EN 60947-1
IEC/EN 60947-4-1
IEC/EN 60947-5-1
EN 50005
UL 508
CSA C22.2/14
CENELEC HD 419
VDE 0660/102
NFC 63-110
ASE 1025
UNE 20109

Approvals/Marking

cULus CE

Standard voltages

To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit, other voltages on request.

Alternating current (V). Dual-frequency

♦	1	2	3	4	5	6	7	8	9
50/60Hz	24	42	110 115	120	220	230	240	440	48

Alternating current (V)

♦	E	K	L	N	T	U	W	Y	Z
50Hz	32	127		220 230		380 400	415	500	660 690
60Hz			208	277	380	480	460	600	

Order codes ● pg. A.145
Technical data ● pg. A.146
Dimensional drawings ● pg. A.148

Contactors for capacitors switching

Ith	Ambient temperature										Fuse	Contacts		Cat. no. (1)	Ref. no. see bottom	Pack
	θ ≤ 55°C					θ ≤ 70°C						•3 \ •1				
	230V 240V	400V	415V	500V	660V 690V	230V 240V	400V	415V	500V	660V 690V						
A	kvar	kvar	kvar	kvar	kvar	kvar	kvar	kvar	kvar	kvar	gl - gG	•4	•2			
25	7.5	12.5	13	16	15	3.7	7.5	8	9.5	10	25	2	0	**CSCN12A320 ♦**		1
												1	1	**CSCN12A311 ♦**		1
												0	2	**CSCN12A302 ♦**		1
32	10	16.7	17	21	20	5	10	11	12.5	12.5	35	2	0	**CSCN16A320 ♦**		1
												1	1	**CSCN16A311 ♦**		1
												0	2	**CSCN16A302 ♦**		1
45	12.5	20	21	25	25	7.5	12.5	13	16	15	40	1	0	**CSCN20A310 ♦**		1
												0	1	**CSCN20A301 ♦**		1
												2	1	**CSCN20A321 ♦**		1
												1	2	**CSCN20A312 ♦**		1
45	15	25	26	31	30	10	15	16	18	20	50	1	0	**CSCN25A310 ♦**		1
												0	1	**CSCN25A301 ♦**		1
												2	1	**CSCN25A321 ♦**		1
												1	2	**CSCN25A312 ♦**		1
60	20	30	31	38	35	16	22	23	27	25	63	1	0	**CSCN30A310 ♦**		1
												0	1	**CSCN30A301 ♦**		1
												2	1	**CSCN30A321 ♦**		1
												1	2	**CSCN30A312 ♦**		1
90	25	45	47	56	55	20	35	36	44	40	80	1	0	**CSCN45A310 ♦**		1
												0	1	**CSCN45A301 ♦**		1
												2	0	**CSCN45A320 ♦**		1
												1	1	**CSCN45A311 ♦**		1
												1	2	**CSCN45A312 ♦**		1
110	35	55	57	69	65	30	45	47	56	50	125	1	0	**CSCN55A310 ♦**		1
												0	1	**CSCN55A301 ♦**		1
												2	0	**CSCN55A320 ♦**		1
												1	1	**CSCN55A311 ♦**		1
												1	2	**CSCN55A312 ♦**		1
140	45	70	73	88	85	35	60	62	75	70	160	1	0	**CSCN70A310 ♦**		1
												0	1	**CSCN70A301 ♦**		1
												2	0	**CSCN70A320 ♦**		1
												1	1	**CSCN70A311 ♦**		1
												1	2	**CSCN70A312 ♦**		1

Spare coils

For series CSCN12 ... CSCN25	**LB1A ♦**	5
For series CSCN30	**LB3A ♦**	5
For series CSCN45 ... CSCN70	**LB4A ♦**	5

(1) To complete the reference, replace ♦ by the code corresponding to the voltage and frequency of the control circuit.
(see pg. A.144)

Technical data

Technical characteristics

Main circuit (poles)

			CSCN12	CSCN16	CSCN20	CSCN25	CSCN30	CSCN45	CSCN55	CSCN70
Rated operational voltage		(V)	690	690	690	690	690	690	690	690
Rated insulation voltage according to IEC947		(V)	1000	1000	1000	1000	1000	1000	1000	1000
Rated thermal current		(A)	25	32	45	45	60	90	110	140
Max. power utilization	230/240V	(kvar)	7,5	10	12,5	15	20	25	35	45
at 55°C	380/400V	(kvar)	12.5	16,7	20	25	30	45	55	70
	660/690V	(kvar)	15	20	25	30	35	55	65	85
Electrical endurance		(ops.)	280.000	280.000	280.000	250.000	200.000	150.000	120.000	90.000
Max. ops./hour		(ops./hour)	350	350	350	240	240	150	150	150

Control circuit

				CSCN12	CSCN16	CSCN20	CSCN25	CSCN30	CSCN45	CSCN55	CSCN70
Standard voltages		50Hz	(V)	24-690	24-690	24-690	24-690	24-690	24-690	24-690	24-690
		60Hz	(V)	24-600	24-600	24-600	24-600	24-600	24-600	24-600	24-600
Consumption											
Single frequency	Mar. circuit open		(VA)	45	45	48	48	88	191	191	198
	Mar. circuit closed		(VA)	6	6	7	7	9	15,5	15,5	17
Dual frequency	Mar. circuit open		(VA)	54	54	58	58	125	245	245	250
50Hz	Mar. circuit closed		(VA)	7	7	8	8	11.5	20	20	23
Dual frequency	Mar. circuit open		(VA)	35	35	39	39	110	215	215	220
60Hz	Mar. circuit closed		(VA)	5	5	6	6	11	15	15	19

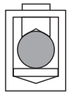
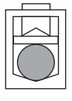
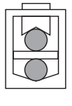
Instantaneous auxiliary contact blocks

Rated insulation voltage Ui	(V)	1000
Rated thermal current Ith	(A)	10

Ambient conditions

Storage temperature	(°C)	-50 ... +80
Operating temperature	(°C)	-25 to +55 (without derating)
Altitude up to 3000m		Nominal values
Mounting positions		Vertical mounting +/- 30°

Terminal capacity and tightening torque

			CSCN12	CSCN16	CSCN20	CSCN25	CSCN30	CSCN45	CSCN55	CSCN70
	Solid, stranded and finely stranded		1 x 0.5 ... 2,5		1 x 0.5 .. 2,5		–	–		–
	without end sleeve	(mm²)	1 x 2.5 ... 6		1 x 2.5 ... 10		–	–		–
	Finely stranded with or		1 x 1 ... 2,5		1 x 1 ... 2,5		–	–		–
	without end sleeve	(mm²)	1 x 2.5 ... 6		1 x 2.5 ... 10		–	–		–
	AWG wires		1 x 20 ... 12		1 x 20 ... 8		–	–		–
	Tightening torque	(Nm)	1.6		2.2		–	–		–
		(Lb x in.)	15		20		–	–		–
	Solid, stranded and finely stranded									
	without end sleeve	(mm²)	–		–		0.75 ... 16	1 ... 35		1.5 ... 50
	Finely stranded with end sleeve	(mm²)	–		–		0.75 ... 16	1 ... 35		1.5 ... 50
	Finely stranded without end sleeve	(mm²)	–		–		1 ... 16	1 ... 35		1.5 ... 50
	AWG wires		–		–		18 ... 6	16 ... 2		16 ... 2
	Tightening torque	(Nm)	–		–		1.8	4		5.6
		(Lb x in.)	–		–		16	35		50
	Solid	(mm²)	–		–		0.75 ... 16	1 ... 16		4 ... 35
	Stranded	(mm²)	–		–		0.75 ... 16	1 ... 25		4 ... 35
	Finely stranded without end sleeve	(mm²)	–		–		0.75 ... 16	1 ... 25		4 ... 35
	Finely stranded with end sleeve	(mm²)	–		–		1 ... 16	1 ... 25		4 ... 35
	AWG wires		–		–		18 ... 6	16 ... 4		10 ... 1
	Tightening torque	(Nm	–		–		1.8	4		5.6
		(Lb x in.)	–		–		16	35		50
	Solid, stranded and finely stranded		–		–		Max. 16	Max. 50 ... 4		Max.
	without end sleeve	(mm²)	–		–			Max. 25 ... 16		50 ... 35
	Finely stranded without end sleeve	(mm²)	–		–		Max. 16	Max. 35 ... 2,5		Max. 35
								Max. 25 ... 16		
	Finely stranded with end sleeve	(mm²)	–		–		Max. 16	Max. 35 ... 16		Max. 35
								Max. 25 ... 25		
	AWG wires		–		–		Max. 6	Max. 2 ... 12		Max. 1
			–		–			Max 4 ... 4		
	Tightening torque	(Nm)	–		–		1.8	4		5.6
		(Lb x in.)	–		–		16	35		50

Standard contactors

Series "CL" and "CK" contactors, to switch three phase capacitor banks

Electrical endurance: >100,000 operations

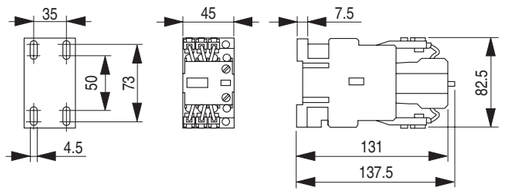
Contactor		θ ≤ 55°C					θ ≤ 70°C					Fuse gI - gG	I max. (peak)
Type [1]	Ith	220V 230V 240V	400V	415V	500V	690V 660V	220V 230V 240V	400V	415V	500V	690V 660V		
	A	kvar	kvar	kvar	kvar	kvar	kvar	kvar	kvar	kvar	kvar	A	A
CL00A	25	3	5	5.5	6.5	5.7	2.4	4	4.5	5.2	4.5	10	1000
CL01A	25	4.5	9.5	10.5	12.5	11	3.6	6	6.5	10	7	16	1000
CL02A	32	6.5	11	12	14.5	12.5	5.2	8.5	9	11.5	10	25	1000
CL25A	45	7.5	12.5	14	16	15	6.5	10	11	13	12	25	1000
CL03A	45	9	15	16.5	20	17.5	7.2	12	13	16	14	35	2500
CL04A	60	12.5	21	23	27.5	24	10	17	18	22	19.5	40	2500
CL45A	60	16.5	25	27	32	30	13	20	22	25	22	50	2500
CL06A	90	22	40	43	52	50	17	30	33	41	35	80	3500
CL07A	110	25	45	48	58	65	19	35	37	46	40	125	3500
CL08A	110	30	50	54	65	70	22	40	43	52	50	125	3500
CL09A	140	40	65	70	85	95	35	58	62	75	85	160	3500
CL10A	140	50	80	85	105	120	43	70	75	90	105	160	3500
CK75C	250	60	110	118	145	150	48	88	94	116	120	250	5000
CK08C	250	70	125	135	162	170	56	100	107	130	136	250	5000
CK85B	315	80	150	160	195	200	64	120	130	156	160	315	5000
CK09B	315	95	165	177	215	230	85	148	160	192	205	315	5000
CK95B	450	105	190	205	250	288	95	175	188	230	265	450	5500
CK10C	600	135	260	280	340	370	120	235	252	375	330	630	10000
CK11C	700	190	325	350	425	450	152	260	280	340	360	800	10000
CK12B	1000	250	400	430	520	600	200	320	344	416	480	1000	12000
CK13B	1250	315	525	565	685	650	252	420	452	548	520	1250	15000

(1) To complete contactor reference, see A.52 for CL and A.62 for CK

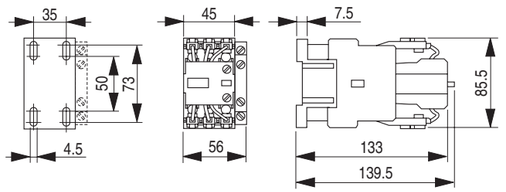
Dimensional drawings

Contactors for capacitors switching

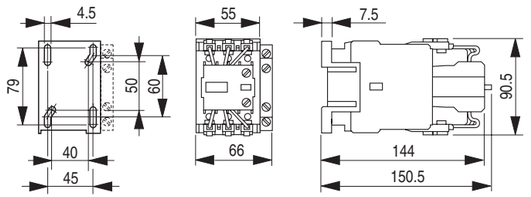
CSCN12..., CSCN16...



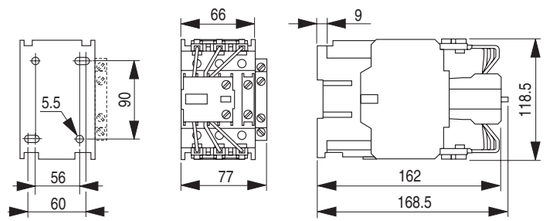
CSCN20..., CSCN25...



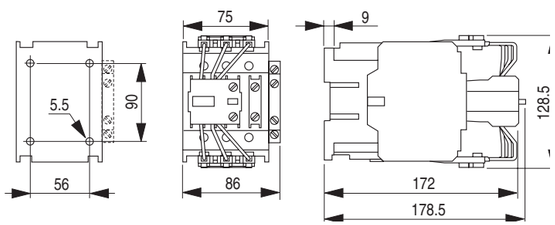
CSCN30...



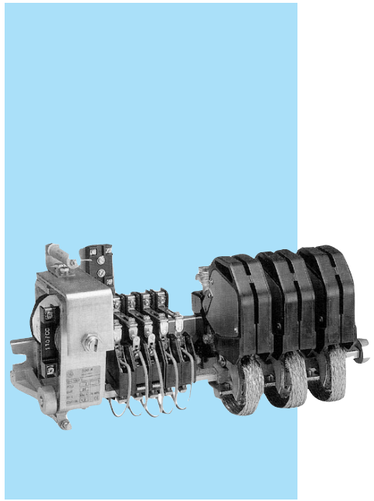
CSCN45..., CSCN55...



CSCN70...



Notes



Clapper contactors 40A to 800A (AC-3) / 45A to 1200A (AC-1)

AC and DC control using a bridge rectifier, designed to meet the most recent stringent requirements in terms of reliability, service life and performance.

Main characteristics

- Sliding contact holder, set on self-centering and self-lubricating bronze bushings
- Minitubes made of high-strength, high electrical resistance material
- Individual auxiliary contacts

Construction

Variable composition contactors (the number of main poles and auxiliary contacts may vary), preferably secured on mounts

Control circuit

Solid iron magnetic circuit with coil powered by direct or rectified current, particularly for heavy-duty applications (e.g., cranes, roll mills, reversing winches, etc.). The coils are sized for intermittent operation. For continuous operation, insert an economy resistor in series with the coil using the respective auxiliary contact.

Main contacts

The sintered main contacts are classified as Type 4/2 for intermittent operation and Type 5/2 for continuous operation.
The 4/2 sintered contact may be used only for heavy-duty operation when the number of switching operations per hour is above 60 and the operating intermittence is equal or less than 60% (cranes, roll mills, etc.).
If used for continuous operation, the contact will overheat.
The 5/2 sintered contact may be used only for normal duty when the number of switching operations per hour is equal to or less than 60% and the operating intermittence is above 60%.

Auxiliary contacts

Individual NO or NC single-breake contacts
Possibility to advance or delay contact making or breaking

Special versions

The following items may be supplied upon request:
- Contactors with coils having an operating limit that exceeds the limits required by the standards
- Contactors with an operating voltage up to 3000V (rotary disconnect switches, induction furnaces, etc.)
- Vertical mechanical interlocks ideal for interlocking 3 contactors.

Control voltage and normal combinations

Normal rated voltages, shaft spacing and combinations (main and auxiliary poles) have been defined for each switchgear unit, thereby allowing the contactor to be rapidly selected.
AC rated voltages: 24V - 48V - 110V - 220/230V
DC rated voltages: 24V - 48V - 110V - 220/230V

Spacing between standarised shafts and combinations:
See pages A.160 to A.162
Standard center-to-center spacing (mm): 150, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000

Standard voltages

Alternating current (V) Dual-frequency coils

	AP	CP	EP	GP
50/60Hz	24	48	110	220

Direct current (V)

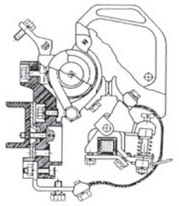
	A	B	C	D	E	F	G	H	M	R
Voltage	20	24	40	48	97	110	197	220	230	125

Spare parts and additional components

Spare parts and additional components for the contactors are listed on page A.155.

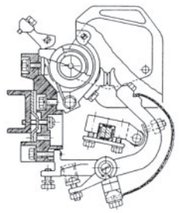
Order codes ● pg. A.151
Coils ● pg. A.154
Spare parts ● pg. A.155
Technical data ● pg. A.158
Dimensional drawings ● pg. A.160

Main poles



The poles can be constructed as follows, depending on the operating conditions:

Z design (NO)
- For load breaking, with high breaking capacity
- For AC or DC use
- Equipped with magnetic arc-quenching coil. In the case of AC, the poles are normally supplied with an appropriate arc-quenching coil for the maximum rated current of the pole.
- Arc-quenching coils for medium rated currents with respect to the expected peak current are available for DC use upon request, for more effective pole performance (see table on page A.154).



RN design (NC)
- Based on the use of break poles, which are open when the coil is energized and closed when the coil is de-energised.
- For AC or DC use in special circuits where high interrupting capacities are not required.
- This design is intended to be used with contactors R1, R2, R3, R4, R5, R7.

Poles	R1	R2	R3	R4	R5	R6	R7	R8	R9
Z	■	■	■	■	■	■	■	■	■
RN	■	■	■	■	■		■		

Order codes - Clapper contactors

Peak operating current		AC-3 admissible rated powers				Electric endur.		AC or DC	Pack.
Resistive loads	Motors	220V 230V	380V 400V	415V 440V	500V				
AC1 A	**<440V, 3 ~ 50/60Hz AC3** A	kW HP	kW HP	kW HP	kW HP	**Cat. AC3** Switching operations		See the following pages A.152 and A.153 on how to complete the catalogue number	
45	40	11,5	20	20	20	1×10^6		**R1 . . .**	1
90	90	26	45	45	45	1×10^6		**R2 . . .**	1
125	120	36.5	62	62	73.5	1×10^6		**R3 . . .**	1
250	200	72.5	100	100	120	1×10^6		**R4 . . .**	1
320	320	93	160	160	165	1.2×10^6		**R5 . . .**	1
450	450	130	225	225	300	1.5×10^6		**R6 . . .**	1
630	630	184	315	315	400	1×10^6		**R7 . . .**	1
800	800	232	400	400	500	0.9×10^6		**R8 . . .**	1
1500	-	-	-	-	-	-		**R9 . . .**	1

Catalogue number structure

1	2	3	4	5	6	7	8	9
Product line	Size	Coil voltage		Resistor	No. NO aux. contacts	No. NC aux. contacts	No. "Z" poles	"Z" poles

1 2 Size

	Ith		
Max.	45	R	1
500V AC	90	R	2
250V DC	125	R	3
	250	R	4
	320	R	5
	450	R	6
	630	R	7
	800	R	8
	1200	R	9

3 4 Coil voltage

AC	DC	3	4
Types R1 ... R7			
24V		A	P
48V		C	P
110V		E	P
220V		G	P
	20V	A	-
	24V	B	-
	40V	C	-
	48V	D	-
	97V	E	-
	110V	F	-
	197V	G	-
	220V	H	-
	230V	M	-
	125V	R	-
Types R8 and R9			
110V		E	P
220V	97V	G	P
	110V	E	-
	197V	F	-
	220V	G	-
	230V	H	-
	125V	M	-

5 Economy resistor

	5
If required (5/2 contacts)	R
If not required	-

6 7 Auxiliary contacts

NO	NC	6	7
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
	1		1
	2		2
	3		3
	4		4

8 "Z" poles (N)

"Z" poles	8
0	-
1	1
2	2
3	3
4	4

9 "Z" poles

Type of pole	9
Z	Z
No "Z" poles	-

10 Arc-quenching coil "Z" poles

Type	A	B	C
R1	45A	14A	25A
R2	90A	45A	-
R3	125A	75A	-
R4	200A	50A	130A
R5	320A	150A	-
R6	450A	270A	-
R7	630A	320A	-
R8	800A	320A	400A
R9	1200A	-	-

Standard | Upon request

11 "RN" poles (NC)

"RN" poles	"RN" poles	11
0	0	-
1	1	1
2	2	2
3	3	3
4	4	4

Note: The "RN" poles are not available for the R6, R8 and R9 types.

12 "RN" poles

Type of pole	12
RN	V
No "RN" poles	-

Note: The "RN" poles are not available for the R6, R8 and R9 types.

13 Arc-quenching coil «RN» poles

Type	A	B	C
R1	45A	14A	25A
R2	90A	45A	-
R3	125A	75A	-
R4	200A	50A	130A
R5	320A	150A	-
R6	-	-	-
R7	630A	320A	-
R8	-	-	-
R9	-	-	-

Note: The "RN" poles are not available for the R6, R8 and R9 types.

14 Type of contacts

Type		14
4/2	Intermittent op.	4
5/2	Continuous op.	5

10	11	12	13	14	15	16	17	18
Arc-quenching coil "Z" poles	No. "RN" poles	"RN" poles	Arc-quenching coil "RN" poles	Type of contacts	Stationary support	Space	Shaft	Isolation

15 *Stationary support*

Length (mm)	Contactor type R1 R2 R3	R4 R5	R6 R7 R8	R9
150	A	-	-	-
200	B	-	-	-
250	C	C	-	-
300	D	D	-	-
350	E	E	E	-
400	F	F	F	F
450	G	G	G	G
500	H	H	H	H
600	I	I	I	I
700	L	L	L	L
800	M	M	M	M
900	N	N	N	N
1000	O	O	O	O

17 *Schaft (≤stat. sup.)*

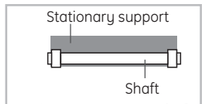
Length (mm)	Contactor type R1 R2 R3	R4 R5	R6 R7 R8	R9
150	A	-	-	-
200	B	-	-	-
250	C	C	-	-
300	D	D	-	-
350	E	E	E	-
400	F	F	F	F
450	G	G	G	G
500	H	H	H	H
600	I	I	I	I
700	L	L	L	L
800	M	M	M	M
900	N	N	N	N
1000	O	O	O	O

18 *Isolation*

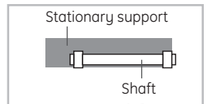
		18
	For more isolation	M
	Not required	-

16 *Space*

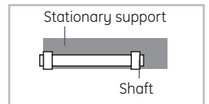
		16
No space	Station. sup.=Shaft	-
Space	Left	S
	Right	-



Stationary support = Shaft



Space to left



Space to right

Standard DC or rectified coils

The DC coils are suitable for intermittent operation; for continuous operation, an economy resistor must be used.
The coils for rectified rated voltages 20-40-97-197V obtained from AC power supplies. (before the rectifier). 24-48-110-220V are available upon request. For the contactor of "RN" break poles, contact GE.

Contactor	Voltage VDC	Coil		Economy resistor for continuous operation ± 5%				Single-phase bridge rectifier for AC power		
		Cat. no.	Ref. no.	W	Ω	Cat. no.	Ref. no.	V 50/60Hz	Cat. no.	Ref. no.
R1 **R2**	20	**39012Y20D**	244107	4	8.2	**RSS13/64TA8,2**	204177	24	**MSK-B250/220-1,5**	209997
	24	**39012Y24D**	202327		18	**RSS13/64TA18**	211727	-		
	40	**39012Y40D**	244106		33	**RSS13/64TA33**	211728	48	**MSK-B250/220-1,5**	209997
	48	**39012Y48D**	244734		68	**RSS13/64TA6,8**	214869	-		
	97	**39012Y97D**	202328		220	**RSS13/64TA220**	212702	110	**MSK-B250/220-1,5**	209997
	110	**39012Y110D**	202323		330	**RSS13/64TA330**	211745	-		
	197	**39012Y197D**	202325		680	**RSS13/64TA680**	214580	220	**MSK-B250/220-1,5**	209997
	220	**39012Y220D**	202326		1200	**RSS13/64TA1200**	213034	-		
	230	**39012Y230D**	211706		1200	**RSS13/64TA1200**	213034			
	125	**39012Y125D**	202324		330	**RSS13/64TA300**	211714			
R3	20	**3903Y20D**	215278	4	8.2	**RSS13/64TA8,2**	204177	24	**MSK-B250/220-1,5**	209997
	24	**3903Y24D**	244735		18	**RSS13/64TA18**	211727	-		
	40	**3903Y40D**	244088		39	**RSS13/64TA39**	211730	48	**MSK-B250/220-1,5**	209997
	48	**3903Y48D**	212705		47	**RSS13/64TA47**	211731	-		
	97	**3903Y97D**	213691		270	**RSS13/64TA270**	214399	110	**MSK-B250/220-1,5**	209997
	110	**3903Y110D**	202437		330	**RSS13/64TA330**	211745	-		
	197	**3903Y197D**	214442		820	**RSS13/64TA820**	214400	220	**MSK-B250/220-1,5**	209997
	220	**3903Y220D**	202438		1200	**RSS13/64TA1200**	213034	-		
	230	**3903Y230D**	211107		1200	**RSS13/64TA1200**	213034			
	125	**3903Y125D**	216100		330	**RSS13/64TA300**	211714			
R4	20	**3904Y20D**	244084	6	8.2	**RSS13/64TA8,2**	204177	24	**MSK-B250/220-1,5**	209997
	24	**3904Y24D**	202483		18	**RSS13/64TA18**	211727	-		
	40	**3904Y40D**	244083		33	**RSS13/64TA33**	211728	48	**MSK-B250/220-1,5**	209997
	48	**3904Y48D**	213814		33	**RSS13/64TA33**	211728	-		
	97	**3904Y97D**	213601		180	**RSS13/64TA180**	211744	110	**MSK-B250/220-1,5**	209997
	110	**3904Y110D**	202479		180	**RSS13/64TA180**	211744	-		
	197	**3904Y197D**	202481		680	**RSS13/64TA680**	214580	220	**MSK-B250/220-1,5**	209997
	220	**3904Y220D**	202482		680	**RSS13/64TA680**	214580	-		
	230	**3904Y230D**	211708		680	**RSS13/64TA680**	214580			
	125	**3904Y125D**	202480		180	**RSS13/64TA180**	211744			
R5	20	**3905Y20D**	244073	10	6.8	**RSS13/64TA6,8**	214869	24	**SKB-B80/70-4**	211716
	24	**3905Y24D**	244072		10	**RSS13/64TA10**	211742	-		
	40	**3905Y40D**	244071		27	**RSS13/64TA27**	244192	48	**MSK-B250/220-1,5**	209997
	48	**3905Y48D**	244736		27	**RSS13/64TA27**	244192	-		
	97	**3905Y97D**	202513		120	**RSS13/64TA120**	243281	110	**MSK-B250/220-1,5**	209997
	110	**3905Y110D**	202512		180	**RSS13/64TA180**	211744	-		
	197	**3905Y197D**	244074		470	**RSS13/64TA470**	244191	220	**MSK-B250/220-1,5**	209997
	220	**3905Y220D**	212706		680	**RSS13/64TA680**	214580	-		
	230	**3905Y230D**	211709		680	**RSS13/64TA680**	214580			
	125	**3905Y125D**	242260		180	**RSS13/64TA180**	211744			
R6	20	**3906Y20D**	244065	10	6.8	**RSS13/64TA6,8**	214869	24	**SKB-B80/70-4**	211716
	24	**3906Y24D**	244064		8.2	**RSS13/64TA8,2**	204177	-		
	40	**3906Y40D**	244063		27	**RSS13/64TA27**	244192	48	**MSK-B250/220-1,5**	209997
	48	**3906Y48D**	212707		27	**RSS13/64TA27**	244192	-		
	97	**3906Y97D**	202533		100	**RSS13/64TA100**	211744	110	**MSK-B250/220-1,5**	209997
	110	**3906Y110D**	202532		180	**RSS13/64TA180**	211744	-		
	197	**3906Y197D**	244066		470	**RSS13/64TA470**	244191	220	**MSK-B250/220-1,5**	209997
	220	**3906Y220D**	213612		680	**RSS13/64TA680**	214580	-		
	230	**3906Y230D**	211770		680	**RSS13/64TA680**	214580			
	125	**3906Y125D**	211711		180	**RSS13/64TA180**	211744			
R7	20	**3907Y20D**	244058	16	5.6	**RSS13/64TA5,6**	211735	24	**SKB-B80/70-4**	211716
	24	**3907Y24D**	244057		5.6	**RSS13/64TA5,6**	211735	-		
	40	**3907Y40D**	244056		15	**RSS13/64TA15**	211737	48	**SKB-B80/70-4**	211716
	48	**3907Y48D**	244737		18	**RSS13/64TA18**	211727	-		
	97	**3907Y97D**	244738		82	**RSS13/64TA82**	204177	110	**MSK-B250/220-1,5**	209997
	110	**3907Y110D**	202547		100	**RSS13/64TA100**	211743	-		
	197	**3907Y197D**	244059		330	**RSS13/64TA330**	211745	220	**MSK-B250/220-1,5**	209997
	220	**3907Y220D**	202548		390	**RSS13/64TA390**	211746	-		
	230	**3907Y230D**	211712		1200	**RSS13/64TA1200**	213034			
	125	**3907Y125D**	211713		330	**RSS13/64TA330**	211745			
R8	97	**3908Y97D**	212959	16	82	**RSS20/165TA82**	214081	110	**SKB-B250/220-4**	212165
	110	**3908Y110D**	202565		120	**RSS20/165TA120**	213664	-		
	197	**3908Y197D**	214066		390	**RSS20/165TA390**	211748	220	**MSK-B250/220-1,5**	209997
	220	**3908Y220D**	202566		470	**RSS20/165TA470**	211739	-		
R9	97	**3909Y97D**	214146	140	100	**RSS20/165TA100**	213663	110	**SKB-B30/08**	211720
	110	**3909Y110D**	202572		150	**RSS20/165TA150**	215004	-		
	197	**3909Y197D**	204181		390	**RSS20/165TA390**	211748	220	**SKB-B500/445-4**	214501
	220	**3909Y220D**	244739		560	**RSS20/165TA560**	244987	-		

(1) To insert the resistors, use NC auxiliary contacts in series.
(2) Two 20x165 resistors connected in parallel, each with a resistive value listed in the table.

Spare parts

Contactor	Description	Cat. no.	Ref. no.	Pack (units)
R1	"Z" stationary part with 14A arc-quenching coil and spark suppressor	**390/3921PFZCS14**	202273	1
	"Z" stationary part with 25A arc-quenching coil and spark suppressor	**390/3921PFZCS25**	244172	1
	"Z" stationary part with 45A arc-quenching coil and spark suppressor	**390/3921PFZCS45**	202274	1
	"RN" stationary part with spark suppressor	**390/3921PFRN**	244173	1
	"Z" moving part (with pressure spring and strap)	**390/3921PMZI**	202276	1
	"RN" moving part (with pressure spring and strap)	**390/3921PMRN**	202275	1
	Stationary and moving main contact, type 4/2 (intermittent operation)	**390/3921/2FOM4/2**	214120	1
	Stationary and moving main contact, type 5/2 (continuous operation)	**390/3922FOM5/2**	214121	1
	Spark suppressor for "Z" and "RN" poles	**390/3921PZ**	202277	1
R2	"Z" stationary part with 45A arc-quenching coil and spark suppressor	**390/3922PFZCS45**	244744	1
	"Z" stationary part with 90A arc-quenching coil and spark suppressor	**390/3922PFZCS90**	202278	1
	"RN" stationary part with spark suppressor	**390/3922PFRN**	212709	1
	"Z" moving part (with pressure spring and strap)	**390/3922PMZI**	202279	1
	"RN" moving part (with pressure spring and strap)	**390/3922PMRN**	213014	1
	Stationary and moving main contact, type 4/2 (intermittent operation)	**390/3921/2FOM4/2**	214120	1
	Stationary and moving main contact, type 5/2 (continuous operation)	**390/3922FOM5/2**	214121	1
	Spark suppressor for "Z" and "RN" poles	**390/3922PZ**	202280	1
R3	"Z" stationary part with 75A arc-quenching coil and spark suppressor	**390/3923PFZCS75**	244745	1
	"Z" stationary part with 125A arc-quenching coil and spark suppressor	**390/3923PFZCS125**	202281	1
	"RN" stationary part with spark suppressor	**390/3923PFRN**	213986	1
	"Z" moving part (with pressure spring and strap)	**390/3923PMZI**	202283	1
	"RN" moving part (with pressure spring and strap)	**390/3923PMRN**	202282	1
	Stationary and moving main contact, type 4/2 (intermittent operation)	**390/3923/2FOM4/2**	214122	1
	Stationary and moving main contact, type 5/2 (continuous operation)	**390/3923FOM5/2**	214123	1
	Spark suppressor for "Z" and "RN" poles	**390/3923PZ**	202284	1
R4	"Z" stationary part with 125A arc-quenching coil and spark suppressor	**390/3924PFZCS125**	202288	1
	"Z" stationary part with 200A arc-quenching coil and spark suppressor	**390/3924PFZCS200**	202289	1
	"RN" stationary part with spark suppressor	**390/3924PFRN**	202287	1
	"Z" moving part (with pressure spring and strap)	**390/3924PMZI**	202291	1
	"RN" moving part (with pressure spring and strap)	**390/3924PMRN**	202290	1
	Stationary main contact, type 4/2 (intermittent operation)	**390/3924F4**	214124	1
	Moving main contact, type 4/2 (intermittent operation)	**390/3924M4/2**	214126	1
	Stationary main contact, 5/2 type (continuous operation)	**390/3924F5/2**	204178	1
	Moving main contact, type 5/2 (continuous operation)	**390/3924M5/2**	214127	1
	Spark suppressor for "Z" and "RN" poles	**390/3924PZ**	202292	1
R5	"Z" stationary part with 125A arc-quenching coil and spark suppressor	**390/3925PFZCS150**	213573	1
	"Z" stationary part with 320A arc-quenching coil and spark suppressor	**390/3925PFZCS320**	202295	1
	"RN" stationary part with spark suppressor	**390/3925PFRN**	244746	1
	"Z" moving part (with pressure spring and strap)	**390/3925PMZI**	202298	1
	"RN" moving part (with pressure spring and strap)	**390/3925PMRN**	202297	1
	Stationary main contact, type 4/2 (intermittent operation)	**390/3925F4/2**	214128	1
	Moving main contact, type 4/2 (intermittent operation)	**390/3925M4/2**	214130	1
	Stationary main contact, 5/2 type (continuous operation)	**390/3925F5/2**	214129	1
	Moving main contact, type 5/2 (continuous operation)	**390/3925M5/2**	214131	1
	Spark suppressor for "Z" and "RN" poles	**390/3925PZ**	202299	1
R5	"Z" stationary part with 270A arc-quenching coil and spark suppressor	**390/3926PFZCS270**	202303	1
	"Z" stationary part with 450A arc-quenching coil and spark suppressor	**390/3926PFZCS450**	213574	1
	"Z" moving part (with pressure spring and strap)	**390/3926PMZI**	202304	1
	Stationary main contact, type 4/2 (intermittent operation)	**390/3926F4/2**	214133	1
	Moving main contact, type 4/2 (intermittent operation)	**390/3926M4/2**	214135	1
	Stationary main contact, 5/2 type (continuous operation)	**390/3926F5/2**	214134	1
	Moving main contact, type 5/2 (continuous operation)	**390/3926M5/2**	214136	1
	Spark suppressor for "Z" and "RN" poles	**390/3926PZ**	202654	1

Spare parts (continued)

Contactor	Description	Cat. no.	Ref. no.	Pack (units)
R7	"Z" stationary part with 320A arc-quenching coil and spark suppressor	**390/3927PFZCS320**	202307	1
	"Z" stationary part with 630A arc-quenching coil and spark suppressor	**390/3927PFZCS630**	202308	1
	"RN" stationary part with spark suppressor	**390/3927PFRN**	202306	1
	"Z" moving part (with pressure spring and strap)	**390/392PMZI**	202310	1
	"RN" moving part (with pressure spring and strap)	**390/3927PMRN**	202309	1
	Stationary main contact, type 4/2 (intermittent operation)	**390/3927F4/2**	214137	1
	Moving main contact, type 4/2 (intermittent operation)	**390/3927M4/2**	214139	1
	Stationary main contact, 5/2 type (continuous operation)	**390/3927F5/2**	214138	1
	Moving main contact, type 5/2 (continuous operation)	**390/3927M5/2**	214140	1
	Spark suppressor for "Z" and "RN" poles	**390/3927PZ**	202311	1
R8	"Z" stationary part with 400A arc-quenching coil and spark suppressor	**3908PFZCS400**	202555	1
	"Z" stationary part with 800A arc-quenching coil and spark suppressor	**3908PFZCS800**	202562	1
	"Z" moving part (with pressure spring and strap)	**3908PMZ**	202563	1
	Stationary main contact, type 4/2 (intermittent operation)	**3908F4/2**	214144	1
	Moving main contact, type 4/2 (intermittent operation)	**3908/9M4/2**	214141	1
	Stationary main contact, 5/2 type (continuous operation)	**3908F5/2**	214145	1
	Moving main contact, type 5/2 (continuous operation)	**3908/9M5/2**	214142	1
	Spark suppressor for "Z" and "RN" poles	**3908PZ**	202564	1
R9	"Z" stationary part with 1200A arc-quenching coil and spark suppr.	**3909PFZCS120**	244983	1
	"Z" moving part (with pressure spring and strap)	**3909PMZ**	212962	1
	Stationary main contact, type 4/2 (intermittent operation)	**3909F4/2**	204179	1
	Moving main contact, type 4/2 (intermittent operation)	**3908/9M4/2**	214141	1
	Stationary main contact, 5/2 type (continuous operation)	**3909F5/2**	204180	1
	Moving main contact, type 5/2 (continuous operation)	**3908/9M5/2**	214142	1

Operating categories

				R1...	R2...	R3...	R4...	R5...	R6...	R7...	R8...	R9...
AC-1	Peak operating current	40ºC	(A)	45	90	125	250	320	450	630	800	1200
	at ambient temp. of:	55ºC	(A)	45	90	125	250	320	450	600	750	1200
	(for all rated voltages)	70ºC	(A)	30	70	100	200	280	360	500	700	950
	Max. operating power	230/220V	(kW)	17	30	45	90	114	170	195	240	450
	Resistor III	400/380V	(kW)	29	55	75	155	196	310	330	410	750
		440/415V	(kW)	32	57	85	180	227	340	330	500	900
		500V	(kW)	39	69	102	200	250	390	420	550	1030
	Conductor		(mm^2)	10	35	50	120	185	2 x (30x5)	2 x (40x5)	2 x (60x5)	4 x (50x5)
	Operation in % of peak	120 ops./h	(%)	100	100	100	100	100	100	100	100	50
	operating current	300 ops./h	(%)	50	50	50	50	30	30	20	10	10
AC-3	Peak operating current	Ue = 400V	(A)	40	90	110	200	320	450	630	800	-
	Max. operating power	230/220V	(kW)	11.5	26	36.5	72.5	93	130	184	232	-
		400/380V	(kW)	20	45	62	100	160	225	315	400	-
		440/415V	(kW)	20	45	68	100	160	225	315	400	-
		500V	(kW)	20	45	72,5	120	165	280	400	500	-
	Use in % of peak	120 ops./h	(%)	100	100	100	100	100	100	100	100	-
	operating current	300 ops./h	(%)	50	50	50	50	50	50	30	30	-
AC-4	Peak operating current	Ue = 500V	(A)	18.5	44	55	110	125	150	165	250	-
	Operating power	230/220V	(kW)	4	11	15	33	37	45	50	80	-
	(200,000 switching		(HP)	5.3	14.6	19.9	43.9	49.2	59.8	66.5	106	-
		400/380V	(kW)	9	22	28	55	63	80	90	132	-
			(HP)	11.9	29.2	37.2	73.1	83.8	106	119.7	175.5	-
		500V	(kW)	11	25	33	75	90	100	110	225	-
			(HP)	14.6	33.2	43.9	99.7	119.7	133	146	299	-
	Peak operating current	≤ 400V	(A)	40	90	110	185	280	420	590	700	-
	Max. operating power	400/380V	(kW)	18.5	38	55	90	150	220	300	375	-

	Ue	Series poles	R1...	R2...	R3...	R4...	R5...	R6...	R7...	R8...	R9...
DC1 L/R ≤ 1ms	125V	1	40	85	115	180	300	400	600	700	900
		2	60	90	125	200	320	450	630	750	1000
		3	60	90	125	200	320	450	630	800	1250
		4	60	90	125	200	320	450	630	800	1250
	220V	1	20	75	110	160	275	350	500	600	800
		2	30	90	115	200	300	370	560	650	900
		3	40	90	125	250	320	400	630	750	1000
		4	40	90	125	250	320	450	630	800	1250
	440V	1	-	-	-	-	-	-	-	-	-
		2	-	75	100	200	275	350	500	600	800
		3	20	90	125	250	320	400	600	700	900
		4	20	90	125	250	320	450	630	800	1000
DC3 L/R ≤ 2.5ms	125V	1	30	75	100	170	280	380	550	650	-
		2	40	80	110	200	320	450	630	800	-
		3	45	90	110	200	320	450	630	800	-
		4	45	100	120	220	340	480	-	-	-
	220V	1	-	-	-	-	-	-	-	-	-
		2	15	65	90	155	245	340	460	550	-
		3	20	90	110	200	320	450	630	800	-
		4	25	90	110	200	320	450	630	800	-
	440V	1	-	-	-	-	-	-	-	-	-
		2	-	-	-	-	-	-	-	-	-
		3	10	55	75	120	200	300	400	500	-
		4	13	70	100	160	260	400	550	660	-
DC5 L/R ≤ 15ms	125V	1	27	50	70	90	240	320	400	500	-
		2	35	70	90	150	280	380	450	550	-
		3	40	90	100	200	320	420	500	600	-
		4	40	90	110	200	320	450	500	650	-
	220V	1	-	-	-	-	-	-	-	-	-
		2	13	55	80	140	220	300	410	490	-
		3	18	80	100	180	290	400	560	700	-
		4	22	80	100	180	290	400	560	700	-
	440V	1	-	-	-	-	-	-	-	-	-
		2	-	-	-	-	-	-	-	-	-
		3	9	50	67	100	180	270	360	450	-
		4	11	60	90	130	224	360	480	600	-

Technical data

Standards

IEC/EN 60947-1
IEC/EN 60947-4-1
IEC/EN 60947-5-1

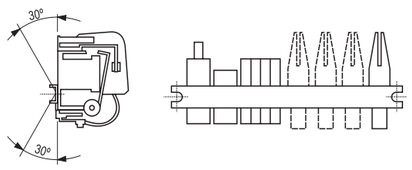
Ambient conditions

Storage temperature		-55°C to +80°C
Operating temperature	-40°C to +60°C	
Altitude	up to 2500m	Rated values
	3000 to 4000m	90%Ie 80%Ue
	4000 to 5000m	80%Ie 75%Ue

Climatic withstand capacity (IEC 68-2)

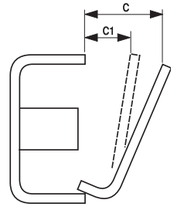
Continuous testing 40/125/56			
	Cold (72h)	Temperature	-40°C
	Dry heat (96h)	Temperature	+125°C
		Relative humidity	< 50%
	Moist heat (56 days)	Temperature	+40°C
		Relative humidity	95%
Cyclic testing			
	First half-cycle (12h)	Low temperature	+25°C
		Relative humidity	93%
	Second half-cycle (12h)	Low temperature	+55°C
		Relative humidity	95%
	No. consecutive cycles		6

Mounting positions



No variation in on and off voltage.
No variation in rated power

Maintenance



C = Opening of the moving core
C1 = Opening of moving core when the contacts start to touch. The data listed in the table refers to contactors in a normal three-pole design and may vary in the case of special designs.

DC power supply		Pressure of closed contact in kg
C (mm) ±1	**C1** (mm) ±1	(+10% / -30%)
18	5	0.750
18	5	0.750
20	6	0.750
22	6	1.300
24	7	2.000
28	8	3.500
28	8	5.500
34	10	8.000
34	10	15.000

Replacement of main contact

The replacement (due to wear) of the main contacts requires an adjustment to ensure proper distance between the moving and the stationary contacts. The respective adjustment screws should be turned until the main contacts start to touch simultaneously when the gap indicated by A1 or C1 exists between the stationary and the moving magnetic circuit.
Make sure that all contactor poles have the same stroke by manually closing the magnetic circuit; if the poles are properly adjusted, they should come into contact at the same time.
If contact wear is abnormal, please contact the manufacturer since the apparatus has been improperly chosen for the application conditions.
To replace the contacts, loosen the screw securing the contacts to the respective contact holder, making sure that the screws are well-tightened when installing the new contacts.
GE Power Controls warrants proper operation of the contactors only if the contacts are replaced with OEM contacts.

Capacity of terminals and torque

			R1... R2...	R3...	R4...	R5...	R6...	R7...	R8...	R9...
	Single-core conductor	(mm²)	2.5...25	2.5...50						
	Multi-strand conductor with terminal sheath	(mm²)	2.5...25	2.5...50						
	Multi-strand conductor without terminal sheath	(mm²)	2.5...25	2.5...50						
	Multi-strand	(mm²)	4...25	4...50						
	Single- and multi-strand AWG	(mm²)	16...4	16...2						
	Torque	(Nm)	4	5,6						
		(Lb x in)	35	50						
	Multi-strand with terminal	(mm²)			1 x 120 2 x 95	1 x 185 2 x 150	-	-	-	
	Clappers				-	-	2 x (30x5)	2 x (40x5)	2 x (60x5)	
	Torque	(Nm)			7	23	31	31	31	
		(Lb x in)			60	200	275	275	275	

Power circuit

		R1...	R2...	R3...	R4...	R5...	R6...	R7...	R8...	R9...
Thermal rated current Ith at θ ≤ 55ºC	(A)	45	90	125	250	320	450	630	800	1500
Rated operating current Ie AC-3	(A)	40	90	110	200	320	450	630	800	-
Rated operating voltage Ue (1)	(V)	500	500	500	500	500	500	500	500	500

3-pole contactors

Rated isolation voltage Ui	(V)	1000	1000	1000	1000	1000	1000	1000	1000	1000
Maximum continuous current AC-1	(A)	45	90	125	250	320	450	630	800	1200
Frequency limits (Hz)	(Hz)									
Making capacity (RMS) (IEC947)	(A)	540	1200	1250	2400	3800	5400	7500	9600	4000
Breaking capacity (RMS) (IEC 947) Ue ≤ 400V	(A)	450	960	1250	1900	3050	4350	6000	7700	4000
Ue = 500V	(A)	-	650	1050	1900	3050	4350	6000	7700	4000
Short-time current 1 s.	(A)	1200	1500	2000	2500	3000	4250	5000	6000	10000
5 s.	(A)	800	900	1500	2200	2800	4000	4800	5700	9000
10 s.	(A)	500	650	1200	1600	2500	3900	4600	5500	8800
30 s.	(A)	250	300	750	1100	2000	3700	4400	5200	8500
1 min.	(A)	180	200	450	800	1500	2500	3000	4000	5000
3 min.	(A)	100	150	250	500	600	900	1500	2300	3000
Recovery time	(min.)	10	10	10	10	10	10	10	10	10
Fused short-circuit protection aM	(A)	50	125	160	250	400	630	800	1000	-
gL-gG	(A)	80	160	200	315	425	630	800	1000	-
Impedance per pole	(mΩ)	1	1	0.5	0.4	0.2	0.3	0.2	0.25	0.10
Power dissipated per pole AC-1	(W)	2.1	8.1	7.8	25	20	60	79	160	144
AC-3	(W)	1.6	8.1	6	16	20	60	79	160	-
Isolation resistance										
Pole-to-pole	(mΩ)	>10	>10	>10	>10	>10	>10	>10	>10	>10
Pole-to-ground	(mΩ)	>10	>10	>10	>10	>10	>10	>10	>10	>10
Input-to-output	(mΩ)	>10	>10	>10	>10	>10	>10	>10	>10	>10

(1) For rated voltages above 500V, contact the manufacturer.

Control circuit

Alternating current

		R1...	R2...	R3...	R4...	R5...	R6...	R7...	R8...	R9...
Rated isolation voltage Ui	(V)	1000	1000	1000	1000	1000	1000	1000	1000	1000
Standardized voltages Us at 50/60 Hz	(V)	24...220	24...220	24...220	24...220	24...220	24...220	24...220	24...220	24...220
Single-frequency coil voltage limits										
Operation	xUs	0.85...1.1	0.85...1.1	0.85...1.1	0.85...1.1	0.85...1.1	0.85...1.1	0.85...1.1	0.85...1.1	0.85...1.1
Off	xUs	0.22...0.55	0.22...0.55	0.22...0.55	0.22...0.55	0.22...0.55	0.22...0.55	0.22...0.55	0.22...0.55	0.22...0.55
Consumption of dual-frequency coils (1)										
Closed magnetic circuit (50 Hz/60 Hz)	(VA)	19	19	20	25	35	38	53	100	190
Open magnetic circuit (50 Hz/60Hz)	(VA)	27	27	38	41	57	60	90	440	1400
Dissipated thermal power (50 Hz/60 Hz)	(W)	19	19	20	25	35	38	53	100	190
On and off times. Values at Us										
Making time at de-energisation (NA)	(ms)	60/70	60/70	60/70	110/120	150/160	180/200	200/210	150/160	-
Making time at de-energisation (NA)	(ms)	80/95	80/95	80/95	160/170	200/210	350/450	240/250	150/160	-
Mechanical endurance										
Dual-frequency coils (at 50 Hz)	10^6 ops.	10	10	10	10	10	10	10	8	8
Maximum rate										
Dual-frequency coils. No-load	ops./h	1200	1200	600	400	400	400	400	300	300
AC-1 with rated power	ops./h	600	600	300	120	120	120	120	90	60
AC-2 with rated power	ops./h	250	250	200	120	120	120	120	90	-
AC-3 with rated power	ops./h	600	600	300	120	120	120	120	90	-
AC-4 with rated power	ops./h	150	150	100	60	60	60	60	30	-

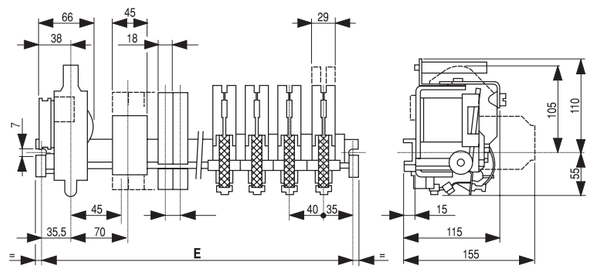
Direct current

Rated isolation voltage Ui	(V)	1000	1000	1000	1000	1000	1000	1000	1000	1000
Standardized voltages Us	(V)	24...230	24...230	24...230	24...230	24...230	24...230	24...230	24...230	24...230
Voltage limits										
Operating	xUs	0.8...1.1	0.8...1.1	0.8...1.1	0.8...1.1	0.8...1.1	0.8...1.1	0.8...1.1	0.8...1.1	0.8...1.1
Off	xUs	0.15...0.5	0.15...0.5	0.15...0.5	0.15...0.5	0.15...0.5	0.15...0.5	0.15...0.5	0.15...0.5	0.15...0.5
Power consumption										
Closed magnetic circuit	(W)	14	14	16	22	28	30	42	80	140
Open magnetic circuit	(W)	21	21	25	31	45	46	65	400	1000
On and off time										
Values at Us										
Making time at energization (NA)	(ms)	60/70	60/70	60/70	110/120	150/160	180/200	200/210	150/160	-
Breaking time at de-energization (NA)	(ms)	19/20	19/20	19/20	28/30	40/45	59/60	30/35	25/30	-
Mechanical endurance	10^6 ops.	10	10	10	10	10	10	10	8	8
Maximum rate										
No-load	ops./h	1200	1200	600	400	400	400	400	300	300
AC1 and AC3 with rated power	ops./h	600	600	300	120	120	120	120	90	-
AC4 with rated power	ops./h	150	150	100	60	60	60	60	30	-

(1) With 5/2 contact

Dimensional drawings

R1..., R2...

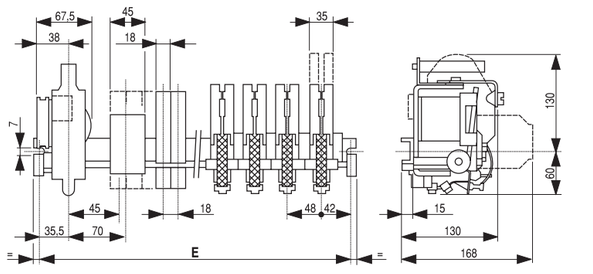


Contact combination

"Z" main pole (1)	Max. no. of aux. contacts	Max. NO	Max. NC	Center-to-center spacing
1	1	1	1	150
	3	3	3	200
	6	6	4	250
	9	6	4	300
	10	6	4	350
	10	6	4	400
2	1	1	1	200
	4	4	4	250
	7	6	4	300
	9	6	4	350
	9	6	4	400
3	2	2	2	250
	5	5	4	300
	7	6	4	350
	7	6	4	400
4	2	2	2	300
	5	5	4	350
	5	5	4	400

(1) A "RN" pole can be used to replace one of the "Z" poles. To use a higher number of "RN" poles, contact the manufacturer.

R3...

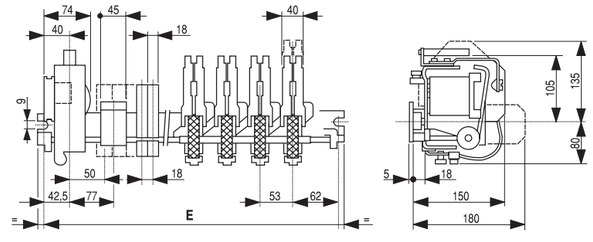


Contact combination

"Z" main pole (1)	Max. no. of aux. contacts	Max. NO	Max. NC	Center-to-center spacing
1	-	-	-	150
	3	3	3	200
	6	6	4	250
	9	6	4	300
	10	6	4	350
	10	6	4	400
2	-	-	-	200
	3	3	3	250
	6	6	4	300
	8	6	4	350
	9	6	4	400
3	-	-	-	250
	3	3	3	300
	6	6	4	350
	7	6	4	400
4	-	-	-	300
	3	3	3	350
	4	4	4	400

(1) A "RN" pole can be used to replace one of the "Z" poles. To use a higher number of "RN" poles, contact the manufacturer.

R4...

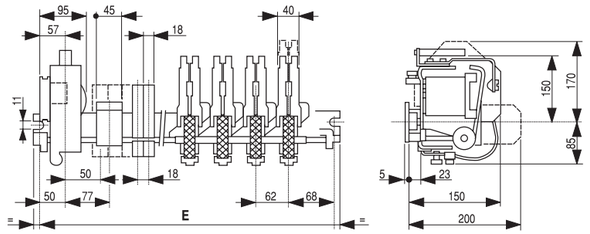


Contact combination

"Z" main pole (1)	Max. no. of aux. contacts	Max. NO	Max. NC	Center-to-center spacing
1	3	3	3	250
	6	6	4	300
	9	6	4	350
	10	6	4	400
	10	6	4	450
2	-	-	-	250
	3	3	3	300
	6	6	4	350
	9	6	4	400
	10	6	4	450
3	-	-	-	300
	3	3	3	350
	6	6	4	400
	9	6	4	450
4	3	3	3	400
	4	4	3	450

(1) A "RN" pole can be used to replace one of the "Z" poles. To use a higher number of "RN" poles, contact the manufacturer.

R5...

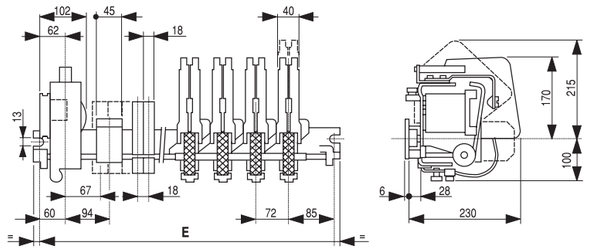


Contact combination

"Z" main pole (1)	Max. no. of aux. contacts	Max. NO	Max. NC	Center-to-center spacing
1	2	2	2	250
	5	5	4	300
	8	6	4	350
	10	6	4	400
	10	6	4	450
	10	6	4	500
2	2	2	2	300
	4	4	4	350
	7	6	4	400
	10	6	4	450
	10	6	4	500
3	1	-	-	350
	4	4	4	400
	6	6	4	450
	7	6	4	500
4	-	-	-	400
	3	3	3	450
	3	3	3	500

(1) A "RN" pole can be used to replace one of the "Z" poles. To use a higher number of "RN" poles, contact the manufacturer.

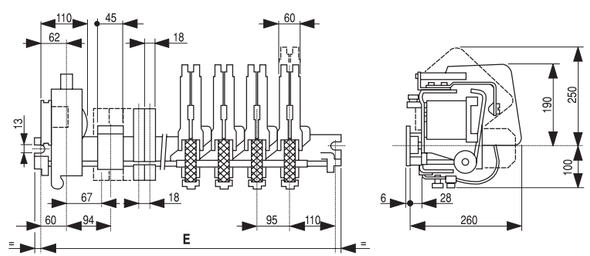
R6...



Contact combination

"Z" main pole	Max. no. of aux. contacts	Max. NO	Max. NC	Center-to-center spacing
1	5	2	4	350
	8	6	4	400
	10	6	4	450
	10	6	4	500
	10	6	4	600
	10	6	4	700
2	1	1	1	350
	4	4	4	400
	7	6	4	450
	9	6	4	500
	10	6	4	600
3	10	6	4	700
	2	2	2	450
	5	5	4	500
	7	6	4	600
	7	6	4	700
4	1	1	1	500
	2	2	2	600
	2	2	2	700

R7...



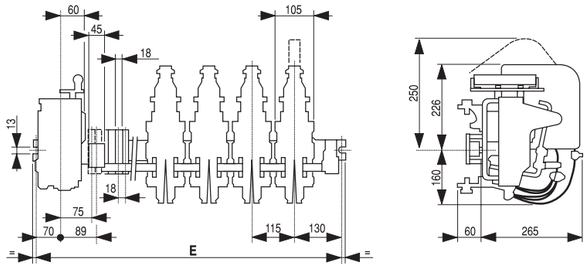
Contact combination

"Z" main pole (1)	Max. no. of aux. contacts	Max. NO	Max. NC	Center-to-center spacing
1	4	4	4	350
	6	6	4	400
	9	6	4	450
	10	6	4	500
	10	6	4	600
	10	6	4	700
2	1	1	1	400
	4	4	4	450
	7	6	4	500
	10	6	4	600
	10	6	4	700
3	1	1	1	500
	7	6	4	600
	8	6	4	700
4	2	2	2	600
	5	5	3	700

(1) A "RN" pole can be used to replace one of the "Z" poles. To use a higher number of "RN" poles, contact the manufacturer.

Dimensional drawings

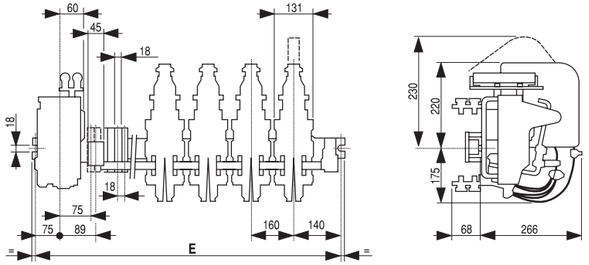
R8...



Contact combination

"Z" main pole	Max. no. of aux. contacts	Max. NO	Max. NC	Center-to-center spacing
1	1	1	1	350
	4	4	4	400
	6	6	4	450
	9	6	4	500
	10	6	4	600
	10	6	4	700
	10	6	4	800
2	-	-	-	450
	3	3	3	500
	8	6	4	600
	10	6	4	700
	10	6	4	800
3	2	2	2	600
	8	6	4	700
	8	6	4	800
4	1	1	1	700
	4	3	3	800

R9...



Contact combination

"Z" main pole	Max. no. of aux. contacts	Max. NO	Max. NC	Center-to-center spacing
1	2	2	2	400
	4	4	4	450
	7	6	4	500
	10	6	4	600
	10	6	4	700
	10	6	4	800
	10	6	4	900
	10	6	4	1000
2	4	4	4	600
	9	6	4	700
	10	6	4	800
	10	6	4	900
	10	6	4	1000
3	-	-	-	700
	6	6	4	800
	8	6	4	900
	8	6	4	1000
4	3	3	3	900
	4	3	3	1000

Plug-in Relays and Auxiliary Contactors

Order codes

B.2 Series PRC - Plug-in relays

B.8 Series M - Auxiliary contactors

B.14 Series RL - Auxiliary contactors

Series PRC - Plug-in relays

B.17 Technical data

B.24 Dimensions

Series M - Auxiliary contactors

B.26 Technical data

B.31 Terminal numbering

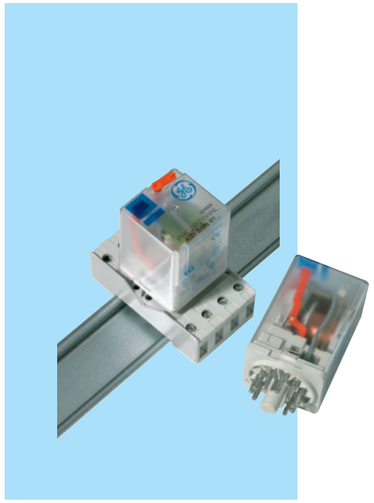
B.34 Dimensions

Series RL - Auxiliary contactors

B.36 Technical data

B.39 Terminal numbering

B.42 Dimensions



Approvals

According to types:

Plug-in relays	Sockets
CE	CE
cUL	cUL
VDE	

Plug-in auxiliary relays

- AC or DC coils
- Lockable test button with mechanical flag indicator.
- Sockets with rear 35 mm rail (EN 50022) mounting.
- With LED indicator incorporated.

Miniature relays

Types	Poles	AC ratings
PRC4M2...	2 CO	12A/250V
PRC4M3...	3 CO	10A/250V
PRC4M4...	4 CO	6A/250V

Sockets

Types
PRCG-ES15/2N
PRCG-ES15/3N
PRCG-ES15/4N

Standard 8-11 pin relays

Types	Poles	AC ratings
PRC2P2...	2 CO	10A/250V
PRC3P3...	3 CO	10A/250V

Sockets

Types
PRZ8
PRZ11

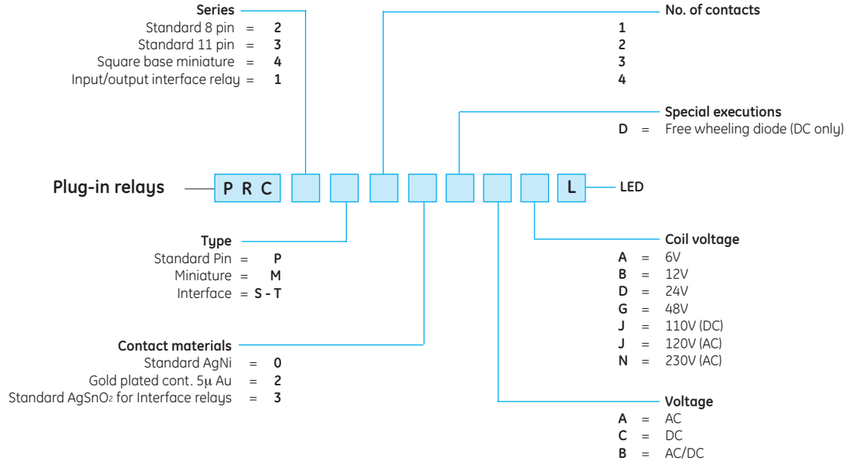
Interface relay module

Types	Poles	AC ratings
PRC1S1...	1 CO	6A/250V
For use with PLC systems		
PRC1T1...	1 CO	16A/250V
PRC1T2...	2 CO	8A/250V

Sockets

Types
-
PRCGZT80

Catalogue number structure



Order codes ● pg. B.3
Modules for sockets ● pg. B.6
Technical characteristics ● pg. B.17
Dimensions ● pg. B.24

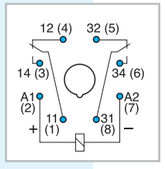
Miniature plug-in relays

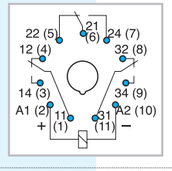
	Ratings AC	Contacts Standard material		Voltage		With LED Cat. no.	With LED Ref. no.	Pack
2 changeover contacts	12A/250V	0 AgNi	AC 50/60 Hz	12V	**PRC4M20ABL**	220710	10
				24V	**PRC4M20ADL**	220711	10
				48V	**PRC4M20AGL**	220712	10
				120V	**PRC4M20AJL**	220715	10
				230V	**PRC4M20ANL**	220717	10
			DC	12V	**PRC4M20CBL**	220713	10
				24V	**PRC4M20CDL**	220714	10
				48V	**PRC4M20CGL**	220716	10
				110V	**PRC4M20CJL**	220718	10
			DC Diode	12V	**PRC4M20DCBL**	220754	10
				24V	**PRC4M20DCDL**	220755	10
				48V	**PRC4M20DCGL**	220756	10
				110V	**PRC4M20DCJL**	220757	10
3 changeover contacts	10A/250V	0 AgNi	AC 50/60 Hz	12V	**PRC4M30ABL**	221051	10
				24V	**PRC4M30ADL**	221052	10
				48V	**PRC4M30AGL**	221053	10
				120V	**PRC4M30AJL**	221056	10
				230V	**PRC4M30ANL**	221058	10
			DC	12V	**PRC4M30CBL**	221054	10
				24V	**PRC4M30CDL**	221055	10
				48V	**PRC4M30CGL**	221057	10
				110V	**PRC4M30CJL**	221059	10
			DC Diode	12V	**PRC4M30DCBL**	221074	10
				24V	**PRC4M30DCDL**	221075	10
				48V	**PRC4M30DCGL**	221076	10
				110V	**PRC4M30DCJL**	221077	10
4 changeover contacts	6A/250V	0 AgNi	AC 50/60 Hz	12V	**PRC4M40ABL**	221809	10
				24V	**PRC4M40ADL**	221810	10
				48V	**PRC4M40AGL**	221811	10
				120V	**PRC4M40AJL**	221814	10
				230V	**PRC4M40ANL**	221816	10
			DC	12V	**PRC4M40CBL**	221812	10
				24V	**PRC4M40CDL**	221813	10
				48V	**PRC4M40CGL**	221815	10
				110V	**PRC4M40CJL**	221817	10
			DC Diode	12V	**PRC4M40DCBL**	221851	10
				24V	**PRC4M40DCDL**	221852	10
				48V	**PRC4M40DCGL**	221853	10
				110V	**PRC4M40DCJL**	221854	10

Sockets

	Screw terminals Two levels				Cat. no.	Ref. no.	Pack
For PRC4M2... 2 changeover contacts		Socket			**PRCG-ES15/2N**	220912	10
		Fixing clip	Metal		**PRCG1052**	220914	10
		Retainer/Extractor	White plastic		**PRCMS35**	220915	10
		Identification plate			**PRCTR1**	220916	10
For PRC4M3... 3 changeover contacts	Screw terminals Two levels	Socket			**PRCG-ES15/3N**	221442	10
		Fixing clip	Metal		**PRCG1052**	220914	10
		Retainer/Extractor	White plastic		**PRCMS35**	220915	10
		Identification plate			**PRCTR1**	220916	10
For PRC4M4... 4 changeover contacts	Screw terminals Two levels	Socket			**PRCG-ES15/4N**	221934	10
		Fixing clip	Metal		**PRCG1052**	220914	10
		Retainer/Extractor	White plastic		**PRCMS35**	220915	10
		Identification plate			**PRCTR1**	220916	10

Standard 8-11 pin plug-in relays





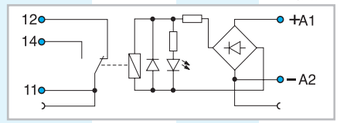
	Ratings AC	Contacts Standard material	Voltage		With LED Cat. no.	Ref. no.	Pack
Standard 8 pin	**2 changeover contacts**						
	10A/250V	0 AgNi	AC 50/60 Hz	12V	**PRC2P20ABL**	220019	10
				24V	**PRC2P20ADL**	220020	10
				48V	**PRC2P20AGL**	220021	10
				120V	**PRC2P20AJL**	220024	10
				230V	**PRC2P20ANL**	220026	10
			DC	12V	**PRC2P20CBL**	220022	10
				24V	**PRC2P20CDL**	220023	10
				48V	**PRC2P20CGL**	220025	10
				110V	**PRC2P20CJL**	220027	10
			DC diode	12V	**PRC2P20DCBL**	220041	10
				24V	**PRC2P20DCDL**	220042	10
				48V	**PRC2P20DCGL**	220043	10
				110V	**PRC2P20DCJL**	220044	10
Standard 11 pin	**3 changeover contacts**						
	10A/250V	0 AgNi	AC 50/60 Hz	12V	**PRC3P30ABL**	220310	10
				24V	**PRC3P30ADL**	220311	10
				48V	**PRC3P30AGL**	220312	10
				120V	**PRC3P30AJL**	220315	10
				230V	**PRC3P30ANL**	220317	10
			DC	12V	**PRC3P30CBL**	220313	10
				24V	**PRC3P30CDL**	220314	10
				48V	**PRC3P30CGL**	220316	10
				110V	**PRC3P30CJL**	220318	10
			DC diode	12V	**PRC3P30DCBL**	220335	10
				24V	**PRC3P30DCDL**	220336	10
				48V	**PRC3P30DCGL**	220337	10
				110V	**PRC3P30DCJL**	220338	10

Sockets

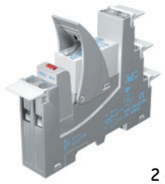
			Cat. no.	Ref. no.	Pack
For PRC2P20... Standard 8 pin	Screw terminals One level	Socket	**PRCZ8**	220216	10
		Fixing clip	**PRCPZ11**	220218	10
	Solder terminal	Socket	**PRCG8**	220217	10
		Fixing clip	**PRCR159**	220219	10
For PRC3P30... Standard 11 pin	Screw terminals One level	Socket	**PRCZ11**	220647	10
		Fixing clip	**PRCPZ11**	220218	10
	Solder terminal	Socket	**PRCG11**	220648	10
		Fixing clip	**PRCR159**	220219	10

Interface relay

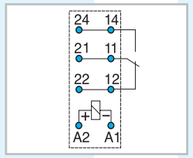
	Ratings AC1	Ratings DC1	Contacts material	Voltage		With LED Cat. no.	Ref. no.	Pack
6,2mm wide								
1 single pole	6A/250V	-	3 $AgSnO_2$	AC/DC	230V	**PRC1S13BNL**	222013	10
1 changeover contact	6A/250V	-	3 AgSnO2	DC	12V	**PRC1S13CBL**	222007	10
					24V	**PRC1S13CDL**	222008	10
				AC/DC	24V	**PRC1S13BDL**	222004	10

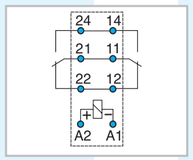


Interface relay for PLC systems



	Ratings AC1	Ratings DC1	Contacts material	Voltage		With LED Cat. no.	Ref. no.	Pack
1 changeover contact	16A/250V	16A/24V	0 AgNi	AC	24V	**PRC1T10ADL**	221868	10
					120V	**PRC1T10AJL**	221869	10
					230V	**PRC1T10ANL**	221870	10
				DC	12V	**PRC1T10CBL**	221860	10
					24V	**PRC1T10CDL**	221861	10
					110V	**PRC1T10CJL**	221862	10
2 changeover contacts	8A/250V	8A/24V	0 AgNi	AC	24V	**PRC1T20ADL**	221883	10
					120V	**PRC1T20AJL**	221884	10
					230V	**PRC1T20ANL**	221885	10
				DC	12V	**PRC1T20CBL**	221875	10
					24V	**PRC1T20CDL**	221876	10
					110V	**PRC1T20CJL**	221877	10

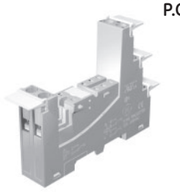


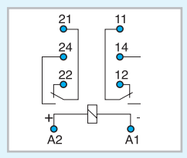


Complete set of relay, socket, module (diode+Led for DC-Varistor + Led for AC) and retaining clip + marking plate.
16mm width

Spare parts

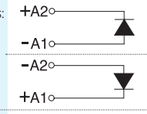
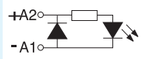
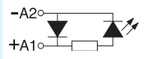
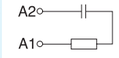
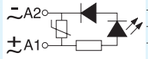
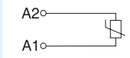
		Voltage		Cat. no.	Ref. no.	Pack
Miniature P.C.B. relays. 16A 1 changeover contact	AC 50/60 Hz	24V		**PRCT1AD**	221896	20
		120V		**PRCT1AJ**	221897	20
		230V		**PRCT1AN**	221898	20
	DC	12V		**PRCT1CB**	221890	20
		24V		**PRCT1CD**	221891	20
		110V		**PRCT1CJ**	221892	20
Miniature P.C.B. relays. 8A 2 changeover contacts	AC 50/60 Hz	24V		**PRCT2AD**	221913	20
		120V		**PRCT2AJ**	221914	20
		230V		**PRCT2AN**	221915	20
	DC	12V		**PRCT2CB**	221905	20
		24V		**PRCT2CD**	221906	20
		110V		**PRCT2CJ**	221907	20
Socket for miniature P.C.B. relays	Three level screws			**PRCGZT80**	221918	10
	Retainer/Retractor			**PRCMS16**	221920	10
	Plate			**PRCTR**	221921	10



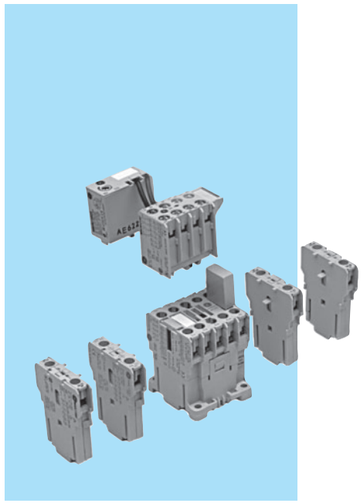


NOTE: If more than 12A are applied to the relay contact, twin wiring is required.
See the connection diagram of the relay

Modules for sockets

				Color Led	Cat. no.	Ref. no.	Pack
Diode	Protection against polarity inversion						
For use with sockets: **PRCG-ES15/2N PRCG-ES15/3N PRCG-ES15/4N**		6 / 230V DC		**PRCM21P**	222100	10
		6 / 230V DC		**PRCM21N**	222101	10
Diode and Led	Protection against polarity inversion Coil energizing indication						
For use with sockets: **PRCG-ES15/2N PRCG-ES15/3N PRCG-ES15/4N PRCGZT80**		6 / 24V DC	Red	**PRCM31R**	222102	10
			Green	**PRCM31G**	222104	10
		24 / 60V DC	Red	**PRCM32R**	222103	10
			Green	**PRCM32G**	222105	10
		110 / 230V DC	Red	**PRCM33R**	222109	10
			Green	**PRCM33G**	222106	10
		6 / 24V DC	Red	**PRCM41R**	222110	10
			Green	**PRCM41G**	222107	10
		24 / 60V DC	Red	**PRCM42R**	222111	10
			Green	**PRCM42G**	222124	10
		110 / 230V DC	Red	**PRCM43R**	222112	10
			Green	**PRCM43G**	222125	10
RC group	Arc suppression circuit						
For use with sockets: **PRCG-ES15/2N PRCG-ES15/3N PRCG-ES15/4N**		6 / 24V AC		**PRCM51**	222113	10
		24 / 60V AC		**PRCM52**	222114	10
		110 / 240V AC		**PRCM53**	222115	10
Led and varistor	No protection against polarity inversion Coil energizing indication AC/DC voltage allowed						
For use with sockets: **PRCG-ES15/2N PRCG-ES15/3N PRCG-ES15/4N PRCGZT80**		6 / 24V AC	Red	**PRCM91R**	222116	10
			Green	**PRCM91G**	222126	10
		110 / 230V AC	Green	**PRCM93G**	222120	10
Varistor group	No indication Protection against overvoltage						
For use with sockets: **PRCG-ES15/2N PRCG-ES15/3N PRCG-ES15/4N**		24V AC		**PRCM71**	222121	10
		230V AC		**PRCM73**	222122	10

Notes



Auxiliary contactors Ith = 16A

- Control circuit: Alternating current up to 600V
  Direct current up to 250V
- Terminal numbering in accordance with EN 50011
- Fixing system for rapid and simple mounting by clamping onto standard 35 mm DIN rail (EN 50022).
- Screw and push-on terminals protected against accidental contacts in accordance with VDE 0106 T.100 and VBG4.
- Printed circuit version.
- Ring terminal version.
- Facility to mount instant or timed auxiliary contact blocks and voltage supressor blocks.
- Maximum number of auxiliary contacts to add: 6
- Degree of protection IP20 (EN 60529).
- According to IEC/EN 60947-1.

Standards

IEC/EN 60947-5-1	BS 4794
IEC/EN 60947-1	CENELEC HD 420
EN 50002	NFC 63-110
EN 50005	NFC 63-140
EN 50011	CSA C22.2/14
UL 508	VDE 0660

Approvals

cULus CE

Lloyd's Register · Bureau Veritas · RINA

General data

Maximum number of contacts (MCR...)		4
Rated thermal current (Ith) θ ≤ 60°	(A)	16
Rated operational voltage (Ue) acc. IEC 60947-1	(V)	690
Insulation voltage (Ui) acc. IEC 60947-1	(V)	750

Utilisation category:

AC-15	**V**	110	220/240	380/400	415	440	500	660/690
	A	6	6	4	4	3	2.5	1.5

DC-13	**V**	24	48	110	220
	A	5	3.5	1.2	0.6

Standard voltages

To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit.

Alternating current (V). Bifrequency coil

♦	10	1	2	9	3	4	5	6	7	8	12	13
AC 50/60Hz	12	24	42	48	110 115	120	220	230	240	440	380	400

Voltage operating limits of dual-frequency coil:
at 60Hz = 0.85 a 1.1 x Us
at 50Hz = 0.8 a 1.1 x Us for uninterrupted duty (ED=100%), temperature = 40°C

Alternating current (V)

♦	A	E	G	K	M	N	S	U	W	Y
AC 50Hz			48	115 127		220 240	260	380 400	415 440	500
AC 60Hz	6	32	60		208 220	240 277		440	480	600

Direct current (V)

♦	A	B	C	D	E	F	G	H	I	J	K	L	N	17	R	S	16
DC	6	12	32	24	36	42	48	60	72	110	120	125	220	230	240	250	440

Direct current (V) - Wide voltage range

♦	WD	WE	WG	WI	WJ	WN
DC	24	33	48	72	110	220

Order codes ● pg. B.9
Auxiliary contacts blocks ● pg. B.10
Accessories ● pg. B.12
Technical data ● pg. B.26
Dimensions ● pg. B.34

Auxiliary contactors

	Contacts acc. EN 50011			Control circuit: alternating current			Control circuit: direct current		
				Cat. no. [1]	Ref. no. see bottom	Pack	Cat. no. [1]	Ref. no. see bottom	Pack
	•3 •1 •4 •2								
Screw terminal									
	40E	4	0	**MCRA040AT ♦**		5	**MCRC040AT ♦**		10
	31E	3	1	**MCRA031AT ♦**		5	**MCRC031AT ♦**		10
	22E	2	2	**MCRA022AT ♦**		5	**MCRC022AT ♦**		10
	13E	1	3	**MCRA013AT ♦**		5			
	04E	0	4	**MCRA004AT ♦**		5			
Ring terminal									
	40E	4	0	**MCRA040AR ♦**		5	**MCRC040AR ♦**		10
	31E	3	1	**MCRA031AR ♦**		5	**MCRC031AR ♦**		10
	22E	2	2	**MCRA022AR ♦**		5	**MCRC022AR ♦**		10
	13E	1	3	**MCRA013AR ♦**		5			
	04E	0	4	**MCRA004AR ♦**		5			
Terminal: faston 2x2,8 insulated (2)									
	40E	4	0	**MCRA040AF ♦**		5	**MCRC040AF ♦**		10
	31E	3	1	**MCRA031AF ♦**		5	**MCRC031AF ♦**		10
	22E	2	2	**MCRA022AF ♦**		5	**MCRC022AF ♦**		10
	13E	1	3	**MCRA013AF ♦**		5			
	04E	0	4	**MCRA004AF ♦**		5			
Terminal: printed circuit									
	40E	4	0	**MCRA040AI ♦**		5	**MCRC040AI ♦**		10
	31E	3	1	**MCRA031AI ♦**		5	**MCRC031AI ♦**		10
	22E	2	2	**MCRA022AI ♦**		5	**MCRC022AI ♦**		10
	13E	1	3	**MCRA013AI ♦**		5			
	04E	0	4	**MCRA004AI ♦**		5			
Spare coil				**MB0A ♦**		10	**MB0C ♦**		10

(1) To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit. (see pg.A.16).
(2) Terminal: - with wire 1.5 mm²: Ie = 16A - with wire 1 mm²: Ie = 10A
Insulated terminal type B2.8x0.8 with wire 1 mm²: Ie = 8A to DIN 46247
Faston terminal 1 x 6.3 on request, replace the letter **F** by **H** in the catalogue number

Auxiliary contactors interface

	Contacts acc. to EN 50011			Control circuit: direct current 24V / 1.2W [3]			Control circuit: direct current 24V / 2W [4]		
				Operating limits from 19 to 30V (0.8-1.25xUs)			Operating limits from 17 to 30V (0.7-1.25xUs)		
				Cat. no.	Ref. no.	Pack	Cat. no.	Ref. no.	Pack
	•3 •1 •4 •2								
Screw terminal	40E	4	0	**MCRI040ATD**	100530	10	**MCRK040ATD**	100533	10
	31E	3	1	**MCRI031ATD**	100531	10	**MCRK031ATD**	100534	10
	22E	2	2	**MCRI022ATD**	100532	10	**MCRK022ATD**	100535	10
Spare coil				**MB0ID**	100470	10	**MB0KD**	100471	10

(3) No possibility of adding instantaneous auxiliary blocks.
(4) Facility to mount instantaneous auxiliary contact block of two contacts (MARN2...) or two instantaneous auxiliary contact blocks of one contact (MARL1...).

For reference numbers, see chapter X, pg. X.6

Instantaneous auxiliary contacts blocks

Front mounting

Number of contacts	Combination with MCRA040AT♦ (40E) according to EN 50011	Contacts acc. to EN 50005 Designation (block marking)	3 4	1 2	Cat. no.	Ref. no.	Pack
Screw terminal							
2	60E	20	2	0	**MARN220AT**	100994	10
2	51E	11	1	1	**MARN211AT**	100993	10
2	42E	02	0	2	**MARN202AT**	100992	10
Ring terminal							
2	60E	20	2	0	**MARN220AR**	103349	10
2	51E	11	1	1	**MARN211AR**	103350	10
2	42E	02	0	2	**MARN202AR**	103351	10
Screw terminal							
4	80E	40	4	0	**MARN440AT**	100991	10
4	71E	31	3	1	**MARN431AT**	100990	10
4	62E	22	2	2	**MARN422AT**	100989	10
4	53E	13	1	3	**MARN413AT**	100988	10
4	44E	04	0	4	**MARN404AT**	100987	10
Terminal : Ring terminal							
4	80E	40	4	0	**MARN440AR**	103352	10
4	71E	31	3	1	**MARN431AR**	103353	10
4	62E	22	2	2	**MARN422AR**	103354	10
4	53E	13	1	3	**MARN413AR**	103355	10
4	44E	04	0	4	**MARN404AR**	103300	10

Instantaneous auxiliary contacts blocks

Lateral mounting

Number of contacts	Combination with MCRA040AT♦ (40E) according to EN 50011	Contacts acc. to EN 50005 Designation (Block marking)	•3 •4	•1 •2	Cat. no.	Ref. no.	Pack
• One or two blocks to cover combinations of 5 or 6 contacts without increasing the height of the basic unit.							
Screw terminal							
1	50E	10	1	0	**MARL110AT**	100513	10
1	–	01	0	1	**MARL101AT**	100514	10
Ring terminal							
1	50E	10	1	0	**MARL110AR**	103556	10
1	–	01	0	1	**MARL101AR**	103557	10
Terminal : Faston 2x2,8 insulated (1)							
1	50E	10	1	0	**MARL110AF**	100515	10
1	–	01	0	1	**MARL101AF**	100516	10
Terminal : Printed circuit							
1	50E	10	1	0	**MARL110AI**	100517	10
1	–	01	0	1	**MARL101AI**	100518	10
• One or two additional blocks, when 9 or 10 contacts are required (combination possible with the front mounting block) • One or two additional blocks on both sides, to cover up to 8 contacts (combination only possible with lateral blocks)							
Screw terminal							
1	50E	10	1	0	**MARL110ATS**	100519	10
1	–	01	0	1	**MARL101ATS**	100520	10
Ring terminal							
1	50E	10	1	0	**MARL110ARS**	103299	10
1	–	01	0	1	**MARL101ARS**	103298	10
Terminal : Faston 2x2,8 insulated (1)							
1	50E	10	1	0	**MARL110AFS**	100521	10
1	–	01	0	1	**MARL101AFS**	100522	10
Terminal : Printed circuit							
1	50E	10	1	0	**MARL110AIS**	100523	10
1	–	01	0	1	**MARL101AIS**	100524	10

(1) Terminal with wire 1 mm²: Ie = 10A
Insulated terminal type B2.8x0.8 with wire 1 mm²: Ie = 8A

Accessories

Electronic timer block

For use with:	Time	Function	Ue	Cat. no.	Ref. no.	Pack
Lateral or front fixing on the contactor						
MCR..MC_ ...	0.5 - 60 sec.	Delay ON	24 to 250V AC/DC	**MREBC10AC2**	100541	10
MCR..MC_ ...	0.2 - 24 sec.	Delay ON	24 to 250V AC/DC	**MREBC20AC2**	100542	10

Timer fitment

For use with:		Cat. no.	Ref. no.	Pack
For fixing onto 35mm DIN-rail (EN 5022)				
MREBC...		**MVB0R**	100543	10

Voltage suppresor block

For use with:	Type	Control	Ue	Cat. no.	Ref. no.	Pack
Connection and (plug-in) fixing onto front of the contactor						
MCRA,MC_ ...	RC	AC	12 to 60V 50/60Hz	**MP0AAE1**	100544	10
MCRA,MC_ ...	RC	AC	72 to 250V 50/60Hz	**MP0AAE2**	100545	10
MCRC,MC_ ...	Diode	DC	6 to 250V DC	**MP0CAE3**	100546	10
MCRC, MC_...	Varistor	AC/DC	24-48V	**MP0DAE4**	100536	10

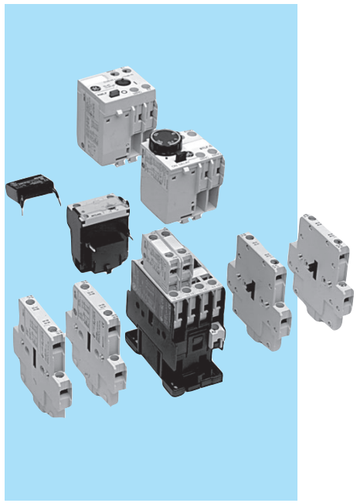
Mechanical interlock

For use with:	Cat. no.	Ref. no.	Pack
Kit comprising mechanical interlock and contactor jointing parts			
MCR, MC_ ...	**MMH0**	100547	10

Identification

For use with:		Cat. no.	Ref. no.	Pack
MCR, MC_ ...	Sheets of labels (10 sheets of 260 labels each)	**EAT 260**	100548	1
MCR, MC_ ...	Labelling plate base. Plug-in labelling plate bases (50 pieces in one pack)	**SPR**	100549	1

Notes



Auxiliary contactors Ith = 20A

- Control circuit: Alternating current up to 690V
  Direct current up to 440V
- Terminal numbering in accordance with EN 50005 and EN 50011
- Fixing system for rapid and simple mounting onto standard 35mm DIN-rail (EN 50022-35)
- Terminals protected against accidental contact in accordance with VDE 0106 T.100, VBG4
- Ring terminal versions
- Three coil terminals
- Facility to mount side and/or front instantaneous contact blocks, timed auxilary contacts, mechanical latch, voltage supressor blocks and interface modules.
- Degree of protection IP20 (EN 60529)

Standards

IEC/EN 60947-5-1
IEC/EN 60947-1
EN 90947
EN 60947
EN 50005
EN 50011
UL 508
NEMA ICS 1
BS 4794
CENELEC HD410
CENELEC HD420
NFC 63-110
NFC 63-140
CSA C22.2/14
VDE 0660/102

Approvals

cULus
CE
Lloyd's Register
Bureau Veritas
RINA

Order codes ● pg. B.15
Accessories ● pg. B.16
Technical data ● pg. B.36
Dimensions ● pg. B.42

General data

Maximum number of contacts (RL...)						4	
Rated thermal current (Ith) θ ≤ 55°						(A)	20
Rated operational voltage (Ue)						(V)	690
Insulation voltage (Ui)						(V)	1000
Utilisation category:							
AC-15	**V**	120	230/220	400/380	440/415	500	690/660
	A	10	10	6	5	4	2
DC-13	**V**	24	48	110	220	440	
	A	6	4	2	0.7	0.35	

Standard voltages

To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit.

Alternating current (V). Dual-frequency coil

♦	1	2	9	3	4	5	6	7	13	8	15
AC 50/60Hz	24	42	48	110 115	120	220	230	240	400	440	480

Alternating current (V)

♦	A	B	E	K	L	N	T	U	W	Y	Z
AC 50Hz			32	127		220 230		380 400	415	500	660 690
AC 60Hz	6	12			208	277	380	480	460	600	

Direct current (V)

♦	B	D	E	F	G	H	I	J	K	N	P	R	T
DC	12	24	36	42	48	60	72	110	120	220	230	240	250

Direct current (V) - Wide voltage range

♦	WB	WD	WE	WF	WG	WH	WI	WJ	WK	WN	WP	WR	WT
DC	12	24	33	42	48	60	72	110	125	220	230	240	250

Auxiliary contactors

Contacts				Control circuit: Alternating current up to 690V			Control circuit: Direct current up to 440V		
•3 •1 •7 •5 / •4 •2 •8 •6				Cat. no. [1]	Ref. no. see bottom	Pack	Cat. no. [1]	Ref. no. see bottom	Pack
Screw terminal									
4	0	0	0	**RL4RA040T ♦**		5	**RL4RD040T ♦**		10
3	1	0	0	**RL4RA031T ♦**		5	**RL4RD031T ♦**		10
2	2	0	0	**RL4RA022T ♦**		5	**RL4RD022T ♦**		10
0	4	0	0	**RL4RA004T ♦**		5	**RL4RD004T ♦**		10
1	1	1	1	**RL4RA022G ♦**		5	**RL4RD022G ♦**		10
Ring terminal									
4	0	0	0	**RL4RA040R ♦**		5	**RL4RD040R ♦**		10
3	1	0	0	**RL4RA031R ♦**		5	**RL4RD031R ♦**		10
2	2	0	0	**RL4RA022R ♦**		5	**RL4RD022R ♦**		10
0	4	0	0	**RL4RA004R ♦**		5	**RL4RD004R ♦**		10

Spare coil

Screw terminal				
LB1A ♦	5	**LB1D ♦**		5
Ring terminal				
LR1A ♦	5	**LR1D ♦**		5

(1) To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit. (see pg. B.14).

Auxiliary contacts

Instantaneous	Number of contacts	Contacts				Function	Time	Cat. no.	Ref. no.	Pack
		•3 •1 •7 •5 / •4 •2 •8 •6								
Frontal mounting	**Screw terminal**									
	1	1	0	0	0			**BCLF10**	104700	10
	1	0	1	0	0			**BCLF01**	104701	10
	1	0	0	1	0			**BCLF10G**	104702	10
	1	0	0	0	1			**BCLF01G**	104703	10
	Ring terminal									
	1	1	0	0	0			**BCRF10**	108901	10
	1	0	1	0	0			**BCRF01**	108902	10
Side mounting	**Screw terminal**									
	2	2	0	0	0			**BRLL20**	104704	10
	2	1	1	0	0			**BRLL11**	104705	10
	2	0	2	0	0			**BRLL02**	106622	10
Pneumatic timer blocks										
Frontal mounting	**Screw terminal**									
	2	0	0	1	1	Delayed ON	0.1 - 30 sec.	**BTLF30C**	104709	10
	2	0	0	1	1	Delayed ON	1 - 60 sec.	**BTLF60C**	104710	10
	2	0	0	1	1	Delayed OFF	0.1 - 30 sec.	**BTLF30D**	104711	10
	2	0	0	1	1	Delayed OFF	1 - 60 sec.	**BTLF60D**	104712	10
	Ring terminal									
	2	0	0	1	1	Delayed ON	0.1 - 30 sec.	**BTRF30C**	108903	10
	2	0	0	1	1	Delayed ON	1 - 60 sec.	**BTRF60C**	108904	10
	2	0	0	1	1	Delayed OFF	0.1 - 30 sec.	**BTRF30D**	108905	10
	2	0	0	1	1	Delayed OFF	1 - 60 sec.	**BTRF60D**	108906	10
	Sealing cover protection for pneumatic timer							**BTLFX**	113001	5

For reference numbers, see chapter X, pg. X.7

Accessories

Mechanical interlock

Number of contacts	Contacts					Cat. no.	Ref. no.	Pack
	•3 •4	•1 •2	•7 •8	•5 •6				
Mechanical								
-	-	-	-	-		**BELA**	104723	5
Mechanical / electrical								
2	0	2	-	-		**BELA02**	104724	5

Mechanical latch blocks

Frontal mounted to the contactor								
				RL4RA..., RL4RD...		**RMLF ♦** [1]	see bottom	20

(1) To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit.

	D	G	HC	J	N	U	Y
50Hz	24, 32	42, 48		110, 115, 120, 127	220, 230, 240	380, 400, 415, 440, 480	500, 660/690
60HZ	24, 32	48, 60		110, 115, 120, 127	208, 220, 240, 277	380, 400, 415, 440, 480	600
DC	24, 32, 36	42, 48	60, 72	110, 120, 125	220, 230, 240, 250	440	

Transient voltage supressor block

For use with:	Type	Control circ.	Ue	Cat. no.	Ref. no.	Pack
Directly connected parallel to the coil terminals, allows simultaneous use with auxiliary contact blocks.						
RL4RA...	R/C	AC	12V ... 48V	**BSLR2G**	104713	10
RL4RA...	R/C	AC	50V ... 127V	**BSLR2K**	104714	10
RL4RA...	R/C	AC	130V ... 250V	**BSLR2R**	104715	10
RL4RD...	Diode	DC	12V ... 600V	**BSLDZ**	104719	10
RL4RA..., RL4RD...	Varistor	AC / DC	24V ... 48V	**BSLV3G**	104720	10
RL4RA..., RL4RD...	Varistor	AC / DC	50V ... 127V	**BSLV3K**	104721	10
RL4RA..., RL4RD...	Varistor	AC / DC	130V ... 250V	**BSLV3R**	104722	10
RL4RA..., RL4RD...	Varistor	AC / DC	277V ... 500V	**BSLV3U**	110836	10

Identification

For use with:		Cat. no.	Ref. no.	Pack
RL4RA..., RL4RD...	Sheets of labels (10 sheets of 260 labels each)	**EAT 260**	100548	1
RL4RA..., RL4RD...	Labelling plate base. Plug-in labeling plate bases (50 pieces in one pack)	**SPR**	100549	1

Electronic timer module

For use with:	Control circuit	Function	Time	Cat. no.	Ref. no.	Pack
Directly connected parallel to the coil terminals, allows simultaneous use with auxiliary contact blocks.						
RL4...	24-250V AC/DC	Delayed ON	0,1 - 2 sec.	**BETL02C**	113602	5
RL4...	24-250V AC/DC	Delayed ON	1,5 - 45 sec.	**BETL45C**	113603	5
RL4...	24-250V AC/DC	Delayed OFF	0,1 - 2 sec.	**BETL02D**	113604	5
RL4...	24-250V AC/DC	Delayed OFF	1,5 - 45 sec.	**BETL45D**	113605	5

For reference numbers, see chapter X, pg. X.7

Technical data

Sockets for miniature plug-in relays

			PRCG-ES15/2N	PRCG-ES15/3N	PRCG-ES15/4N
			Screw terminals two levels	**Screw terminals two levels**	**Screw terminals two levels**
Specifications					
Nominal load		(A)	12 (300V)	10 (300V)	10 (300V)
Dielectric strength					
	Adjacent screws	(kV)	3	3	3
	Screws - rail	(kV)	3	3	3
Terminals	Type		Screw M4, Pozidriv	Screw M4, Pozidriv	Screw M3, Pozidriv
	Max. torque	(Nm)	0,7	0,7	0,7
	Protection category		IP20	IP20	IP20
	Capacity Solid wire	(mm^2)	2x2.5	2x2.5	2x2.5
	Flexible wire		22-14 AWG	22-14 AWG	22-14 AWG
Ambient temperature		(°C)	-40 ... +70	-40 ... +70	-40 ... +70

Sockets for 8-11 pin standard plug-in relays

			PRCZ8	PRCG08	PRCZ11	PRCG11
			Screw terminals One level	**8 pin Solder terminal socket**	**Screw terminals One level**	**11 pin Solder terminal socket**
Specifications						
Nominal load		(A)	10 (250V)	10 (250V)	10 (250V)	10 (250V)
Dielectric strength		(kV)		2.5		2.5
	Adjacent screws	(kV)	2.5		2.5	
	Screws - rail	(kV)	3		3	
Terminals	Type		Screw M3, Pozidriv	Hard brass tin-plated terminals	Screw M3, Pozidriv	Hard brass tin-plated terminals
	Max. torque	(Nm)	0,7		0.7	
	Protection category		IP20		IP20	
	Capacity Solid wire	(mm^2)	2x2.5		2x2.5	
	Flexible wire		22-14 AWG		22-14 AWG	
Ambient temperature		(°C)	-40 ... +70		-40 ... +70	

Sockets for miniature P.C.B. relays

			PRCGZ80
			Screw terminals Two levels
Specifications			
Nominal load		(A)	12 (300V)
Dielectric strength			
	Adjacent screws	(kV)	3
	Screws - rail	(kV)	3
Terminals	Type		Screw M4, Pozidriv
	Max. torque	(Nm)	0,7
	Protection category		IP20
	Capacity Solid wire	(mm^2)	2x2.5
	Flexible wire		22-14 AWG
Ambient temperature		(°C)	-40 ... +70

Miniature plug-in relays

				PRC4M20...	PRC4M30...	PRC4M40...
				2 pole	**3 pole**	**4 pole**
Contacts						
Number of contacts				2 changeover	3 changeover	4 changeover
Standard material				AgNi	AgNi	AgNi
Optional material				AgNi/Au 5µ	AgNi/Au 5µ	AgNi/Au 5µ
Voltage						
Max. switching voltage	AC/DC (poll. 3)			250V	250V	250V
	AC (poll. 2)			400V	400V	400V
Min. switching voltage AC/DC				5V	5V	5V
Current						
Rated load	AC1		(A)	12 (250V AC)	10 (250V AC)	6 (250V AC)
	AC15		(A)	4 (250V AC)	4 (250V AC)	2,5 (250V AC)
	DC1		(A)	12 (24V DC)	10 (24V DC)	6 (24V DC)
Min. switching current			(mA)	5	5	5
Max. inrush current			(A)	24	20	12
Rated current			(A)	12	10	6
Max. breaking capacity			(VA)	3000	2500	1500
Resistance			(mΩ)	≤100 (100mA, 24V)	≤100 (100mA, 24V)	≤100 (100mA, 24V)
Max. operating frequency						
At rated load			cycles/hour	1200	1200	1200
No load			cycles/hour	18000	18000	18000
Coil						
Rated voltage	AC 50/60Hz		(V)	6 ... 240	6 ... 240	6 ... 240
	DC		(V)	5 ... 220	5 ... 220	5 ... 220
Must release time voltage	AC			≥0.2 Un	≥0.2 Un	≥0.2 Un
	DC			≥0.1 Un	≥0.1 Un	≥0.1 Un
Operating range of supply voltage				Table 1, 2	Table 1, 2	Table 1, 2
Rated power consumption	AC	50Hz	(VA)	1.5	1.6	1.6
		60Hz	(VA)	1.3	1.3	1.3
	DC		(W)	0.9	0.9	0.9
	AC/DC		(W)	-	-	-
Insulation						
Insulation category				C250	C250	B250
Insulation rated voltage			(VAC)	250	250	250
Dielectric strength	Coil-Contact		(VAC)	2500	2500	2500
	Contact-Contact		(VAC)	1500	1500	1500
	Pole-Pole		(VAC)	2500	2500	2000
Contact coil distance	Clearance		mm	≥ 2.5	≥ 2.5	≥ 1.6
	Creepage		mm	≥ 4	≥ 4	≥ 3.2
General data						
Operating time (typical value)	AC		(ms)	10	10	10
	DC		(ms)	13	13	13
Release time (typical value)	AC		(ms)	8	8	8
	DC		(ms)	3	3	3
Electrical life	Resistive			≥ 10^5 (12A, 250V AC)	≥ 10^5 (10A, 250V AC)	≥ 10^5 (6A, 250V AC)
	Cos φ			See curves	See curves	See curves
Mechanical life (cycles)				≥ 10^7	≥ 10^7	≥ x10^7
Ambient temperature	Storage		(ºC)	-40 ... +85	-40 ... +85	-40 ... +85
	Operating	AC	(ºC)	-40 ... +55	-40 ... +55	-40 ... +55
		DC	(ºC)	-40 ... +70	-40 ... +70	-40 ... +70
Cover protection category				IP40	IP40	IP40
Shock resistance			(G)	10	10	10
Vibration resistance			(G)	5 (for 10..150Hz)	5 (for 10..150Hz)	5 (for 10..150Hz)

Table 1. Coil data DC version

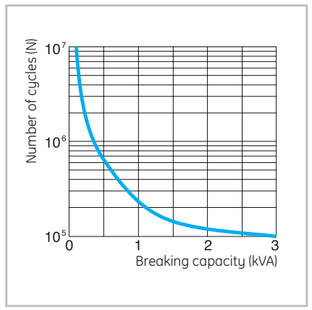
Rated voltage V DC	**Coil resistance** Ω	Coil operating range V DC Min. (at 20ºC)	Max. (at 55ºC)
12	160	9.6	13.2
24	640	19.2	26.4
48	2600	38.4	52.8
110	13600	88	121
220	54000	176	242

Table 2. Coil data AC 50/60Hz version

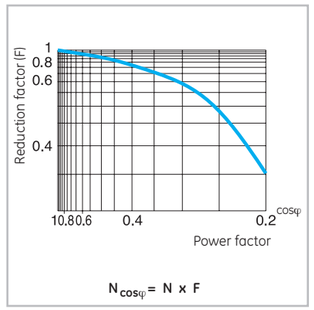
Rated voltage V AC	**Coil resistance** Ω	Coil operating range V AC Min. (at 20ºC)	Max. (at 55ºC)
12	39	9.6	13.2
24	158	19.2	26.4
48	640	38.4	52.8
132	3770	96	120
230	16100	184	253

Miniature 2 pole plug-in relays

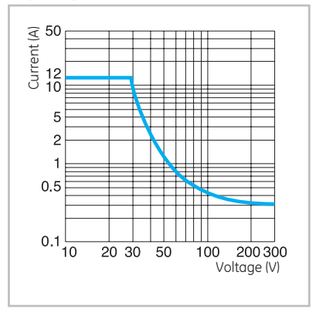
Electrical life at AC resistive load



Electrical life reduction factor at AC inductive load

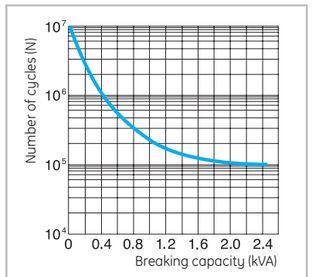


Max. DC resistive load breaking capacity

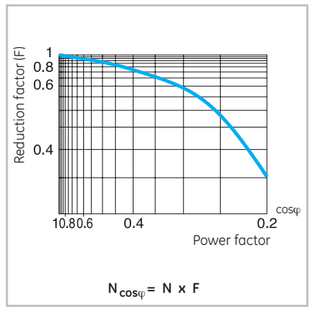


Miniature 3 pole plug-in relays

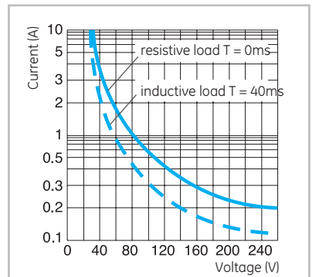
Electrical life at AC resistive load



Electrical life reduction factor at AC inductive load

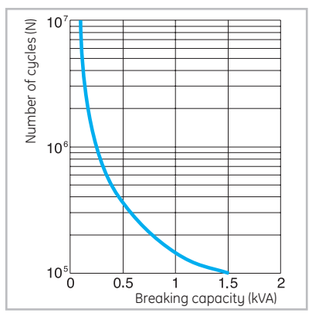


Max. DC load breaking capacity

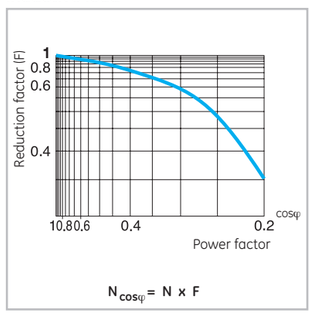


Miniature 4 pole plug-in relays

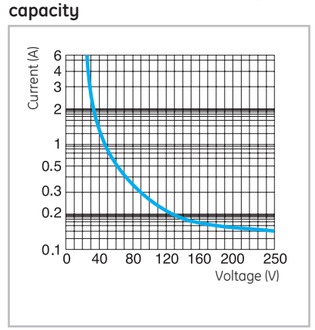
Electrical life at AC resistive load



Electrical life reduction factor at AC inductive load



Max. DC resistive load breaking capacity



Standard 8-11 pin plug-in relays

				PRC2P20...	PRC3P30...
				Standard 8-pin	**Standard 11-pin**
Contacts					
Number of contacts				2 changeover	3 changeover
Standard material				AgNi	AgNi
Optional material				AgNi/Au 5µ	AgNi/Au 5µ
Voltage					
Max switching	AC/DC (poll. 3)			250V	250V
voltage	AC (poll. 2)			400V	400V
Min switching voltage AC/DC				10V (AgNi) 5V (AgNi/Au 5µ)	10V (AgNi) 5V (AgNi/Au 5µ)
Current					
Rated load	AC1		(A)	10 (250V AC)	10 (250V AC)
	AC15		(A)	4 (250V AC)	4 (250V AC)
	DC1		(A)	10 (24V DC)	10 (24V DC)
Min. switching current			(mA)	5	5
Max. inrush current			(A)	30	30
Rated current			(A)	10	10
Max. breaking capacity			(VA)	2500	2500
Resistance			(mΩ)	H100 (100mA, 24V)	H100 (100mA, 24V)
Max. operating frequency					
At rated load			cycles/hour	1200	1200
No load			cycles/hour	12000	12000
Coil					
Rated voltage	AC 50/60Hz		(V)	6 ... 240	6 ... 240
	DC		(V)	6 ... 220	6 ... 220
Must release time	AC			≥0.15 Un	≥0.15 Un
voltage	DC			≥0.1 Un	≥0.1 Un
Operating range of supply voltage				Table 1, 2	Table 1, 2
Rated power	AC	50Hz	(VA)	2,7	2,7
consumption		60Hz	(VA)	2,5	2,5
	DC		(W)	1,5	1,5
	AC/DC		(W)	-	-
Insulation					
Insulation category				C250	C250
Insulation rated voltage			(VAC)	250	250
Dielectric strength	Coil-Contact		(VAC)	2500	2500
	Contact-Contact		(VAC)	1500	1500
	Pole-Pole		(VAC)	2000	2000
Distance	Clearance		mm	≥ 3	≥ 3
contact coil	Creepage		mm	≥ 4.2	≥ 4.2
General					
Operating time	AC		(ms)	12	12
(typical value)	DC		(ms)	12	12
Release time	AC		(ms)	10	10
(typical value)	DC		(ms)	7	7
Electrical life	Resistive			≥ $2x10^5$ (10A, 250V AC)	≥ $2x10^5$ (10A, 250V AC)
	Cos φ			See curves	See curves
Mechanical life (cycles)				≥ $2x10^7$	≥ $2x10^7$
Ambient	Storage		(°C)	-40 ... +85	-40 ... +85
temperature	Operating	AC	(°C)	-40 ... +55	-40 ... +55
		DC	(°C)	-40 ... +70	-40 ... +70
Cover protection category				IP40	IP40
Shock resistance			(G)	10	10
Vibration resistance			(G)	5	5

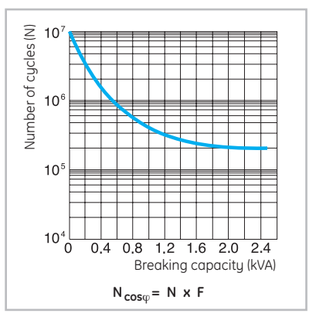
Table 1. Coil data DC version

Rated voltage V DC	**Coil resistance** Ω	Coil operating range V DC Min. (at 20°C)	Max. (at 55°C)
12	110	9.6	13.2
24	430	19.2	26.4
48	1750	38.4	52.8
110	9200	88	121
220	37000	176	242

Table 2. Coil data AC 50/60Hz version

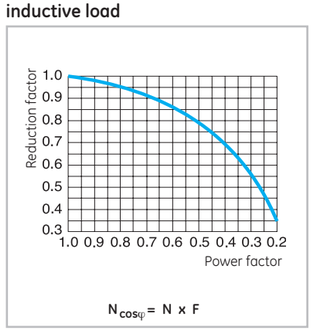
Rated voltage V AC	**Coil resistance** Ω	Coil operating range V AC Min. (at 20°C)	Max. (at 55°C)
12	18.5	9.6	13.2
24	75	19.2	26.4
48	305	38.4	52.8
120	1910	96	132
230	7080	184	253

Electrical life at AC resistive load



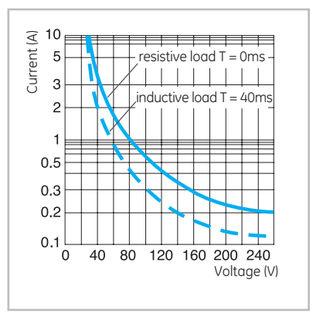
$N_{cos\varphi} = N \times F$

Electrical life reduction factor at AC inductive load



$N_{cos\varphi} = N \times F$

Max. DC load breaking capacity



Interface plug-in relays

			PRC1S13...
Contacts			
Number of contacts			1 changeover
Standard material			$AgSnO_2$
Optional material			
Voltage			
Max switching voltage	AC/DC (poll. 3)		AC 250V / DC 150V
	AC (poll. 2)		AC 400V / DC 300V
Min switching voltage	AC/DC		12V
Current			
Rated load	AC1	(A)	6 (250V AC)
	AC15	(A)	
	DC1	(A)	6 (24V DC)
Min. switching current		(mA)	10
Max. inrush current	(A)		15
Rated current		(A)	6
Max. breaking capacity		(VA)	1500V
Resistance		(mΩ)	≤100 (100mA, 24V)
Max. operating frequency			
At rated load			360 cycles/hour
No load			72000 cycles/hour
Coil			
Rated voltage	AC/DC	(V)	24, 230
	AC 50/60Hz	(V)	230
	DC	(V)	12, 24
Must release time voltage	AC		≥0,2 Un
	DC		≥0,1 Un
Operating range of supply voltage			See Table 1
Rated power consumption	AC 50Hz	(VA)	0.6...1.9
	60Hz	(VA)	-
	DC	(W)	0.33
	AC/DC	(W)	0.48 (at 24V), 1.8 (at 230V)
Insulation			
Insulation category			C250
Insulation rated voltage		(VAC)	400
Dielectric strength	Coil-Contact	(VAC)	4000
	Contact-Contact	(VAC)	1000
	Pole-Pole	(VAC)	-
Distance contact coil	Clearance	mm	≥ 8
	Creepage	mm	≥ 8
General			
Operating time (typical value)	AC	(ms)	8
	DC	(ms)	6
Release time (typical value)	AC	(ms)	15
	DC	(ms)	8
Electrical life	Resistive		
	Cos φ		
Mechanical life (cycles)			$20x10^6$
Ambient temperature	Storage	(°C)	-40 ... +70
	Operating AC	(°C)	-20 ... +55
	DC	(°C)	-20 ... +55
Cover protection category			IP20
Shock resistance		(G)	10
Vibration resistance		(G)	0.062" DA (10 ... 55Hz)

Table 1. Interface relay

Rated voltage V		Coil operating range V DC Min.	Max.
12	DC	9	17
24	DC	17	30
24	AC/DC	18	30
230	AC	80	250
230	AC/DC	185	250

Interface relay for PLC systems

			PRC1T10...
Contacts			
Number of contacts			1 changeover
Standard material			AgNi
Optional material			
Voltage			
Max. switching voltage		AC/DC	AC 400V / DC 300V
Min. switching voltage		AC/DC	5V
Current			
Rated load	AC1	(A)	16 (250V AC)
	DC1	(A)	16 (24V DC)
Min. switching current		(mA)	5
Max. inrush current		(A)	30
Rated current		(A)	16
Max. breaking capacity		(VA)	4000
Min. breaking capacity		(W)	0,3
Resistance		(mΩ)	≤100 (at 1A, 24V)
Max. operating frequency			
At rated load			600 cycles/hour
No load			72000 cycles/hour
Coil			
Rated voltage	AC 50/60Hz	(V)	24,120, 230
	DC	(V)	12, 24, 110
Must release time	AC		≥0.15 Un
voltage	DC		≥0.1 Un
Operating range of supply voltage			See Table 1, 2
Rated power	AC	(VA)	0.75
consumption	DC	(W)	0.4
Insulation			
Insulation category			C250
Insulation rated voltage		(VAC)	400
Dielectric strength	Coil-Contact	(VAC)	5000
	Contact-Contact	(VAC)	1000
	Pole-Pole	(VAC)	-
Distance	Clearance	mm	≥ 10
contact coil	Creepage	mm	≥ 10
General			
Operating time	AC	(ms)	7
(typical value)	DC	(ms)	7
Release time	AC	(ms)	5
(typical value)	DC	(ms)	3
Electrical life	Resistive	(s)	≥ 0.7 x 10^5 (at 16A, 250VAC)
	Cos φ		See curves
	L/R = 40ms		≥ 10^5 (at 0.12A, 220VDC)
Mechanical life (cycles)			$3x10^7$
Ambient	Storage	(°C)	-40 ... +70
temperature	Operating	(°C)	-40 ... +70
Cover protection category			IP40
Shock resistance		(G)	30
Vibration resistance		(G)	10 (for 10 ... 150Hz)

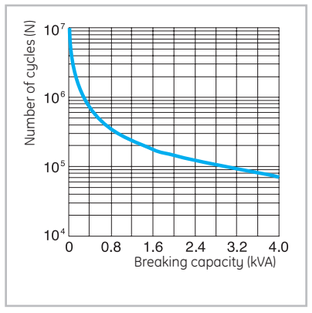
Table 1. Coil data DC version

Rated voltage V DC	Coil resistance (±10%) at20°C Ω	Coil operating range V DC U Min.	U Max.
12	360	8.4	30.6
24	1440	16.8	61.2
110	25200	77	280

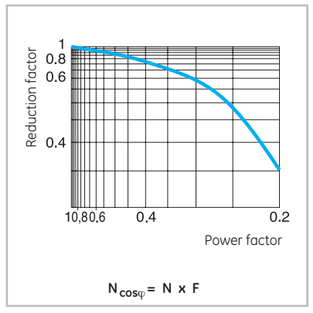
Table 2. Coil data AC 50/60Hz version

Rated voltage V AC	Coil resistance (±10%) at20°C Ω	Coil operating range V AC U Min.	U Max.
24	400	19.2	28.8
120	10200	96	144
230	38500	184	276

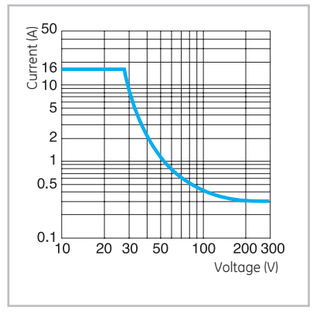
Electrical life at AC resistive load



Electrical life reduction factor at AC inductive load



Max. DC load breaking capacity



Interface relay for PLC systems

			PRC1T20...
Contacts			
Number of contacts			2 changeover
Standard material			AgNi
Optional material			
Voltage			
Max. switching voltage		AC/DC	AC 400V / DC 300V
Min. switching voltage		AC/DC	5V
Current			
Rated load	AC1	(A)	8 (250V AC)
	DC1	(A)	8 (24V DC)
Min. switching current		(mA)	5
Max. inrush current		(A)	15
Rated current		(A)	8
Max. breaking capacity		(VA)	2000
Min. breaking capacity		(W)	0,3
Resistance		(mΩ)	≤100 (at 1A, 24V)
Max. operating frequency			
At rated load			600 cycles/hour
No load			72000 cycles/hour
Coil			
Rated voltage	AC 50/60Hz	(V)	24, 230
	DC	(V)	12, 24
Must release time	AC		≥0.15 Un
voltage	DC		≥0.1 Un
Operating range of	supply voltage		See Table 1, 2
Rated power	AC	(VA)	0.75
consumption	DC	(W)	0.4
Insulation			
Insulation category			C250
Insulation rated voltage		(VAC)	400
Dielectric strength	Coil-Contact	(VAC)	5000
	Contact-Contact	(VAC)	1000
	Pole-Pole	(VAC)	-
Distance	Clearance	mm	≥ 10
contact coil	Creepage	mm	≥ 10
General			
Operating time	AC	(ms)	7
(typical value)	DC	(ms)	7
Release time	AC	(ms)	5
(typical value)	DC	(ms)	3
Electrical life	Resistive	(s)	≥ 0.7 x 10^5 (at 8A, 250VAC)
	Cos φ		See curves
	L/R = 40ms		≥ 10^5 (at 0,12A, 220VDC)
Mechanical life (cycles)			$3x10^7$
Ambient	Storage	(°C)	-40 ... +70
temperature	Operating	(°C)	-40 ... +70
Cover protection category			IP40
Shock resistance		(G)	20
Vibration resistance		(G)	10 (for 10 ... 150Hz)

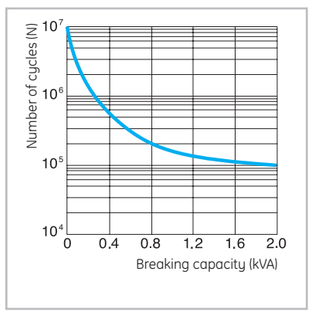
Table 1. Coil data DC version

Rated voltage V DC	Coil resistance (±10%) at 20°C Ω	Coil operating range V DC U Min.	U Max.
12	360	8.4	30.6
24	1440	16.8	61.2
110	25200	77	280

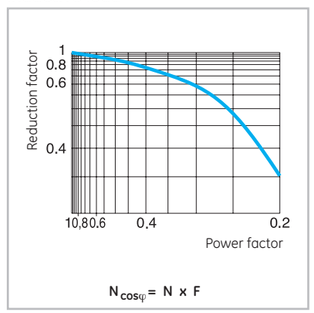
Table 2. Coil data AC 50/60 Hz version

Rated voltage V AC	Coil resistance (±10%) at 20°C Ω	Coil operating range V AC U Min.	U Max.
24	400	19.2	28.8
120	10200	96	144
230	38500	184	276

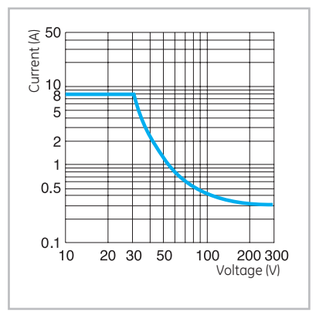
Electrical life at AC resistive load



Electrical life reduction factor at AC inductive load



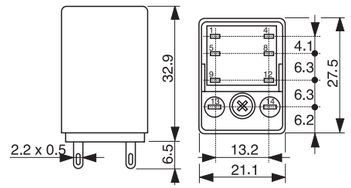
Max. DC load breaking capacity



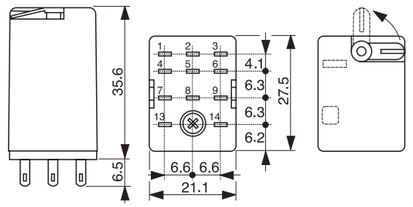
Dimensional drawings

Miniature

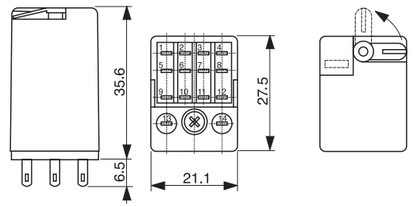
2 poles



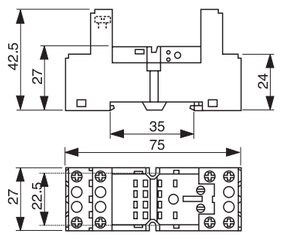
3 poles



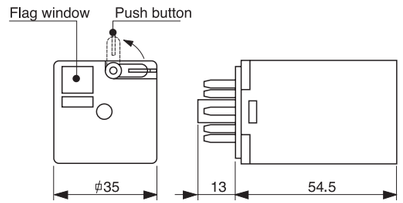
4 poles



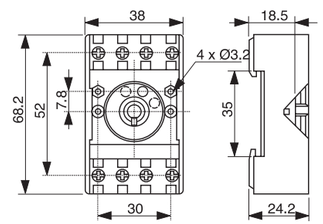
Socket. Screw terminals. Two levels



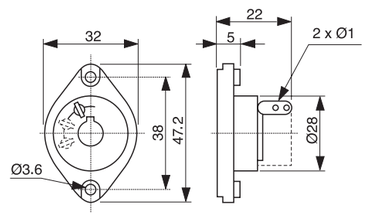
Standard 8-11 pin



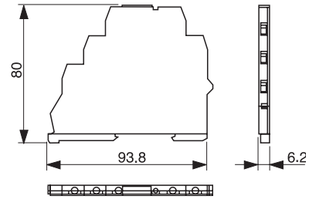
Socket. Screw terminals. One level



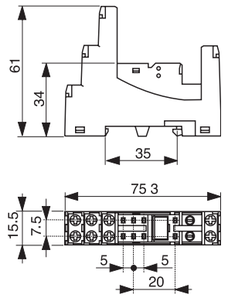
Socket. Solder terminals



Interface relay



Socket for miniature P.C.B. relays



Technical data

General

Maximum number of contacts (MCR...)	4
Rated thermal current (Ith) θ ≤ 60°	16A
Rated operational voltage (Ue) acc. IEC 60947.1	690V
Insulation voltage (Ui) acc. IEC 60947.1	750V

Conformity to standards

IEC / EN 60947-5-1	IEC / EN 60947-1	BS 4794
EN 50002	EN 50005	EN 50011
NFC 63-110	NFC 63-140	CENELEC HD 420
CSA C22.2/14	VDE 0660	UL 508

Approvals

cULus	DEMKO	NEMKO
SEMKO	SETI	RINA
Lloyd's Register	Bureau Veritas	CE

Ambient conditions

Storage temperature		-55°C to +80°C
Operation temperature		-40°C to +60°C
Altitude	up to 3000m	Nominal values
	from 3000 to 4000m	90%Ie 80%Ue
	from 4000 to 5000m	80%Ie 75%Ue

Climatic resistance (IEC 68-2)

Continuous tests		40 / 125 / 56
Cold (72h)		
	Temperature	-40°C
Dry heat (96h)		
	Temperature	+125°C
	Relative humidity	< 50%
Humid heat (56 days)		
	Temperature	+40°C
	Relative humidity	95%
Cyclical tests (6 cycles)		
Humid heat		
First half-cycle (12h)		
	Low temperature	+25°C
	Relative humidity	93%
Second half-cycle (12h)		
	Low temperature	+55°C
	Relative humidity	95%

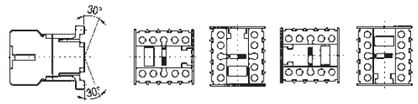
Shock resistance (IEC 68-2-27)

Continously closed (at 0,8Us)		
	Admissible acceleration	25 g
	Impulse duration	11 ms
Continously opened (no voltage)		
	Admissible acceleration	20 g
	Impulse duration	11 ms

Vibration resistance (IEC 68-2-6)

Continously closed (at 0,8Us)		
	Admissible acceleration	15 g
	Sweep between	10 - 200 Hz
Continously opened (no voltage)		
	Admissible acceleration	5 g AC - 3.5 g DC
	Sweep between	10 - 200 Hz

Mounting positions



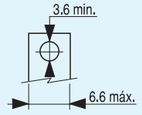
With the same pick-up and drop-out voltage
With the same rated power

-7% of connection voltage
+4% of disconnection voltage
With the same rated power

-7% of connection voltage
+4% of disconnection voltage
With the same rated power

Terminal capacity

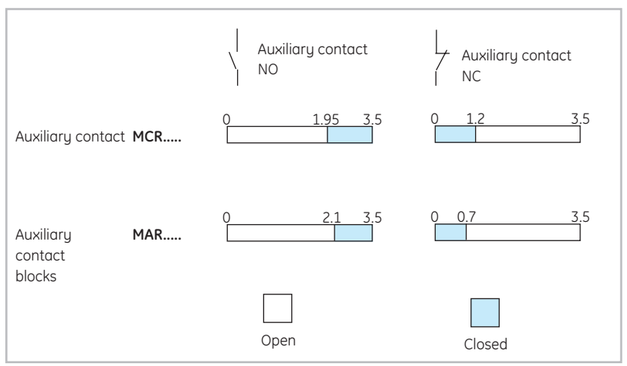
Terminal with screw M3.5 Tightening torque		
(with pozidrive head and safety flange)		0.8 Nm - 7 Lb-in
Solid wire	mm^2	0.75 to 2x2 w.
Flexible wire without terminal	mm^2	0.75 to 2.5x2 w.
Flexible wire with terminal with cap	mm^2	0.75 to 2.5x1 w
	mm^2	0.75 to 1x2 w
Ring terminal cap		0.8 Nm - 7 Lb/in
Fast-on 2.8 - 2 insulated terminals	mm^2	1 x 2 w.
Terminal for printed circuit (Ø of PCB hole)		1.8mm
Ring terminal cap		7.8mm
Fork terminal cap		6.5mm



Control circuit

		MCRA...	MCRC...	MCRC...	MCRI...	MCRK...
Rated insulation voltage (Ui)	(V)	750	750	750	750	750
Standard voltages (Us)						
50Hz	(V)	24...690	–	–	–	–
60Hz	(V)	6...600	–	–	–	–
DC	(V)	–	6...440	12...440	24	24
Voltage [1]						
Operating limits	xUs	0.8...1.1	0.8...1.1	0.7...1.3	0.8...1.25	0.7...1.25
Drop-out	xUs	0.35...0.55	0.15...0.3	0.15...0.3	0.15...0.3	0.13...0.35
Consumption						
Pick-up	(VA)	26	–	–	–	–
Seal	(VA)	4	–	–	–	–
DC	(W)	–	3	4	1.2	2
Power factor						
Pick-up	(cos φ)	0.8	–	–	–	–
Seal	(cos φ)	0.35	–	–	–	–
Power dissipation	(W)	1.4	3	4	1.2	2
Opening and closing times						
Values between ± %Us	%	+10...-20	+10...-20	+30...-30	+25...-20	+25...-20
Time at energisation NO	(ms)	6...13	22...36	17...28	30...70	20...50
Time at de-energisation NC	(ms)	8...16	9...12	9...12	9...16	9...16
Time at energisation NC	(ms)	5...11	18...27	12...25	20...45	18...35
Time at de-energisation NO	(ms)	6...13	5...7	5...7	5...9	5...9
Values at Us						
Time at energisation NO	(ms)	7...12	24...27	19...23	25...45	25...40
Time at de-energisation NC	(ms)	8...16	9...11	9...11	9...16	9...16
Time at energisation NC	(ms)	6...10	20...26	15...21	25...35	20...30
Time at de-energisation NO	(ms)	6...13	5...8	5...8	5...9	5...9
Maximum time without voltage	(ms)	3	3	3	3	3
(without effecting the closed magnetic circuit)						
Mechanical endurance						
Monofrequency	x10^6 ops.	15	–	–	–	–
Dual-frequency	x10^6 ops.	10	–	–	–	–
DC	x10^6 ops.	–	10	10	10	10
Maximum rate (no load)						
Monofrequency	n° ops./h	9000	–	–	–	–
Dual-frequency	n° ops./h	3600	–	–	–	–
DC	n° ops./h	–	9000	9000	9000	9000

Contact sequence (distance in mm)

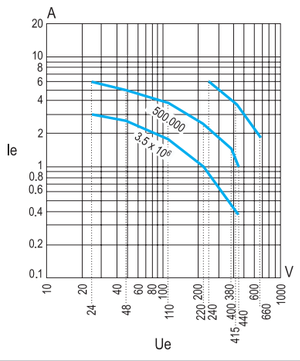


Internal auxiliary contacts

		MCR.....
Rated insulation voltage (Ui) acc. IEC 60947-1		750V
Rated thermal current (Ith) θ ≤ 60°C (1)		16A
Making capacity (r.m.s.) acc. IEC 60947-5		
AC-15	Ue ≤ 440V 50/60 Hz	160A
DC-13	Ue ≤ 220V DC	3A
Breaking capacity (r.m.s.) acc. IEC 60947-5		
AC-15	Ue ≤ 440V 50/60 Hz	106A
DC-13 (L/R = 100 ms)	Ue ≤ 220V DC	1.2A
	Ue = 110V DC	3A
	Ue = 48V DC	10A
Rated voltage and rated current Ue-Ie		
AC-15	according to IEC 947	110/120V - 6A
		220/240V - 6A
		380/400V - 4A
		415/440V - 4A
		500V - 2.5A
		660/690V - 1.5A
	according to UL, CSA	A600
DC-13	according to IEC	24V - 5A
		48V - 3.5 A
		110V - 1.2A
		220V - 0.6A
		440V - 0.25A
	according to UL, CSA	P600
Minimum operational power (operational safety)		5 mA, 17V
Short-circuit protection (max.class gl fuse without welding)		10A
Insulation resistance		
	between contacts	> 10 mΩ
	between contacts and earth	> 10 mΩ
	between input and output	> 10 mΩ
Guaranted no overlap of the contacts		
	Space	1,1 mm
	minimum time	> 2 ms
Impedance		2.3 mΩ
Terminal capacity		Same as main circuit

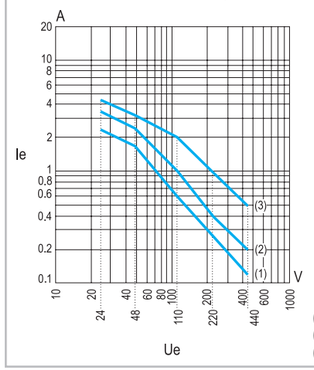
Tripping characteristics (AC)

AC AC-15
Electrical endurance



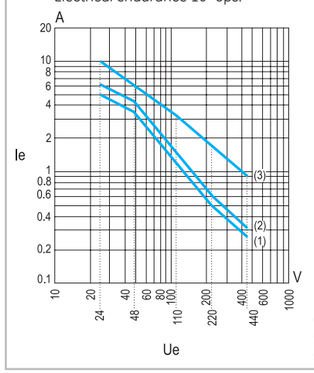
Tripping characteristics Ie/ue

DC Inductive circuit. DC-13 L/R ≤ 100 ms
Electrical endurance 10^6 ops.



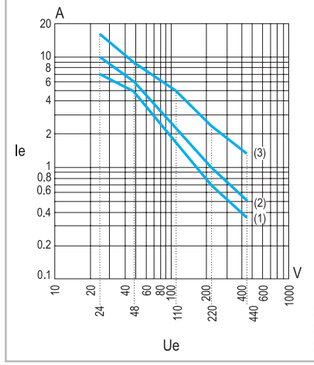
(1) 1 pole in series
(2) 2 poles in series
(3) 3 poles in series

DC Inductive circuit. DC-13 L/R ≤ 15 ms
Electrical endurance 10^6 ops.



(1) 1 pole in series
(2) 2 poles in series
(3) 3 poles in series

DC Inductive circuit DC-13 L/R ≤ 1 ms
Electrical endurance 10^6 ops.



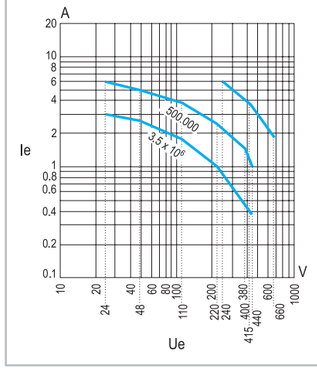
(1) 1 pole in series
(2) 2 poles in series
(3) 3 poles in series

External auxilary contact blocks

		MARN..., MARL...
Rated insulation voltage (Ui) acc. IEC 60947-1		750V
Rated thermal current (Ith) θ ≤ 60°C (1)		10A
Making capacity (r.m.s.) acc. IEC 60947-5		
AC-15	Ue ≤ 220V 50/60 Hz	73A
	Ue = 380V 50/60 Hz	38A
	Ue = 690V 50/60 Hz	22A
DC-13 L/R = 100 ms	Ue ≤ 100V DC	2.6A
	Ue = 220V DC	1A
	Ue = 440V DC	0.6A
Breaking capacity (r.m.s.) acc. IEC 60947-5		
AC-15	Ue ≤ 220V 50/60 Hz	73A
	Ue = 380V 50/60 Hz	38A
	Ue = 690V 50/60 Hz	22A
DC-13 L/R = 100 ms	Ue ≤ 100V DC	2A
	Ue = 220V DC	0.8A
	Ue = 440V DC	0.4A
Rated voltage and rated current Ue-Ie		
AC-15	according to IEC 60947	110/120V - 6A
		220/240V - 6A
		380/400V - 3A
		415/440V - 3A
		500V - 1A
		660/680V - 1A
	according to UL, CSA	A600
DC-13	according to IEC 60947	24V - 4A
		48V - 2A
		110V - 0.7A
		220V - 0.3A
		440V - 0.1A
	according to UL, CSA	Q600
Minimum operational power (operational safety)		5 mA, 17V
Short-circuit protection (max.class gl fuse without welding)		10A
Insulation resistance		
	between contacts	> 10 mΩ
	between contacts and earth	> 10 mΩ
	between input and output	> 10 mΩ
Guaranteed no overlap of the contacts		
	Space	0.5 mm
	minimum time	> 2 ms
Impedance		2.4 mΩ
Terminal capacity		Same as main circuit

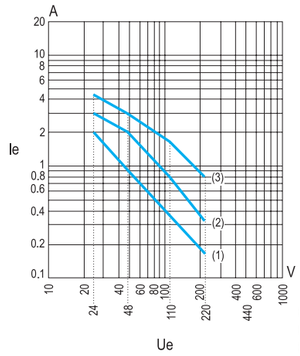
Tripping characteristics (AC)

AC AC-15
Electrical endurance



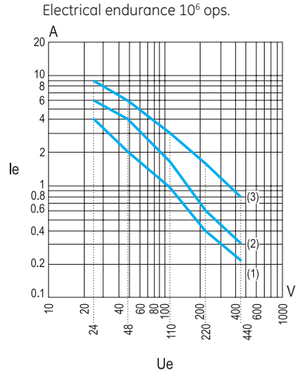
Tripping characteristics Ie/ue

DC Inductive circuit. DC-13 L/R ≤ 100 ms
Electrical endurance 10^6 ops.



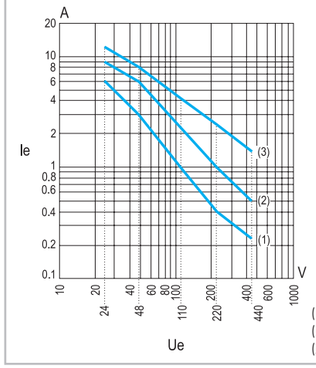
(1) 1 pole in series
(2) 2 poles in series
(3) 3 poles in series

DC Inductive circuit. DC-13 L/R ≤ 15 ms
Electrical endurance 10^6 ops.



(1) 1 pole in series
(2) 2 poles in series
(3) 3 poles in series

DC Inductive circuit. DC-13 L/R ≤ 1 ms
Electrical endurance 10^6 ops.

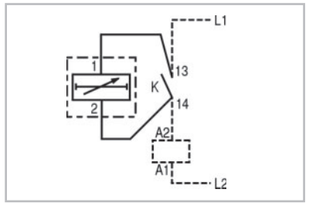


(1) 1 pole in series
(2) 2 poles in series
(3) 3 poles in series

Electronic timer block

		MREBC...
Rated insulation voltage (Ui)		750V
Rated thermal current (Ith) θ ≤ 60°C [1]		0.55V
Standard voltages (AC y DC)		24 to 250V
Operation limits		0.80 to 1.1 Us (0.85 to 1.1 Us at 12V)
Voltage drop		< 3V
Maximum load current at		
	20°C	0.9A
	40°C	0.72A
	60°C	0.55A
Minimum load for safe operation		> 10 mA
Maximum current (peak)		10A for 40 ms
Leakage current at 220V		< 5 mA
Operational current		
	AC-15	0.7A
	DC-13	0.9A
Timing range (delay ON)		0.5 to 60 s (± 6 s)
Rearragement time		< 100 ms
Repeatibility (accuracy)		± 1 %
Ambient temperature		
	Storage	from –55 up to + 80°C
	Operation	from –5 up to + 60°C
Degree of protection		IP20
Mounting position		any
Terminals : 2 free cables		1 mm^2 (AWG 17) 250 mm

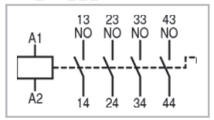
MREBC _ 0AC2



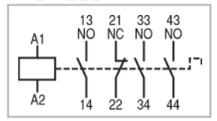
Terminal numbering

Auxiliary contactors. *According to EN 50011*

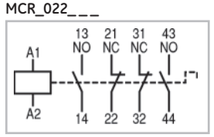
MCR_040_ _ _



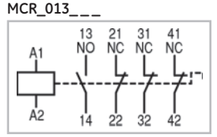
MCR_031_ _ _



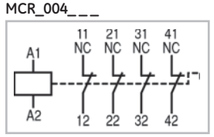
MCR_022_ _ _



MCR_013_ _ _



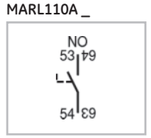
MCR_004_ _ _



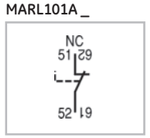
Auxiliary contact blocks

According to EN 50005 & EN 50011

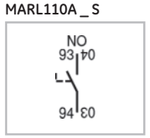
MARL110A _



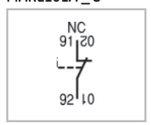
MARL101A _



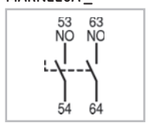
MARL110A _ S



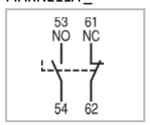
MARL101A _ S



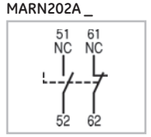
MARN220A _



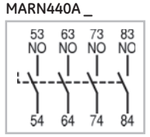
MARN211A _



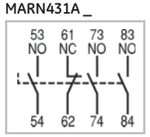
MARN202A _



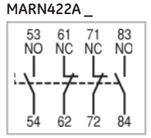
MARN440A _



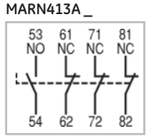
MARN431A _



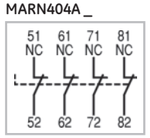
MARN422A _



MARN413A _

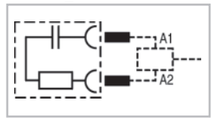


MARN404A _

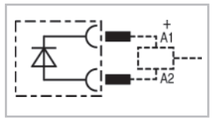


Transient voltage suppressor block

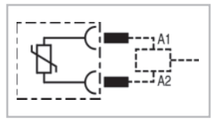
MP0AAE _



MP0CAE3



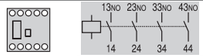
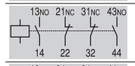
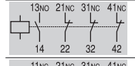
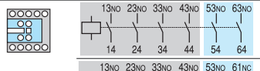
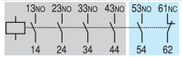
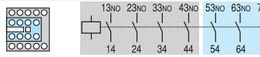
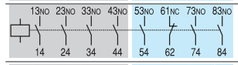
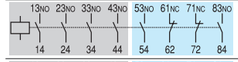
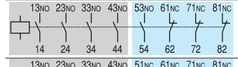
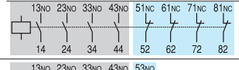
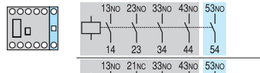
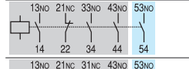
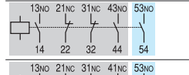
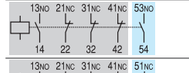
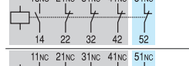
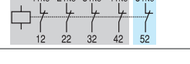
MP0DAE4



Terminal numbering in accordance with EN 50011

By combining other basic auxiliary contactors with auxiliary contact blocks MAR..., it is possible to obtain other combinations, and positions of contacts which are not covered by the table. But in all cases the maximum number of auxiliary contacts should be ten.

Type E
Standard contact combination in which the interchangeability of the devices does not affect the cabling or the diagram. Specifies a particular contact numbering and positioning.

	Final structure of the combination	Auxiliary contacts Combination Description	NO	NC	Auxiliary contactor + Auxiliary contact blocks to be added
Type E		40E	4	0	**MCRA040A..**
		31E	3	1	**MCRA031A..**
		22E	2	2	**MCRA022A..**
		13E	1	3	**MCRA013A..**
		04E	0	4	**MCRA004A..**
		60E	6	0	**MCRA040A..** + MARN220A..
		51E	5	1	**MCRA040A..** + MARN211A..
		42E	4	2	**MCRA040A..** + MARN202A..
		80E	8	0	**MCRA040A..** + MARN440A..
		71E	7	1	**MCRA040A..** + MARN431A..
		62E	6	2	**MCRA040A..** + MARN422A..
		53E	5	3	**MCRA040A..** + MARN413A..
		44E	4	4	**MCRA040A..** + MARN404A..
		50E	5	0	**MCRA040A..** + MARL110A..
		41E	4	1	**MCRA031A..** + MARL110A..
		32E	3	2	**MCRA022A..** + MARL110A..
		23E	2	3	**MCRA013A..** + MARL110A..
		14E	1	4	**MCRA013A..** + MARL101A..
		05E	0	5	**MCRA004A..** + MARL101A..

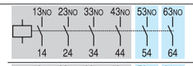
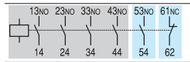
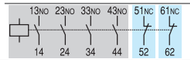
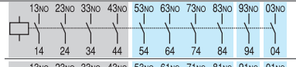
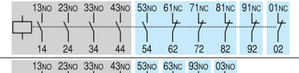
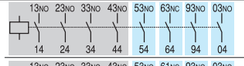
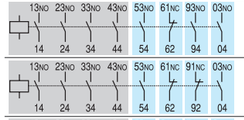
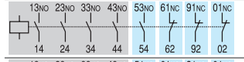
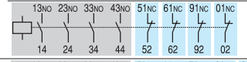
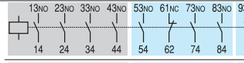
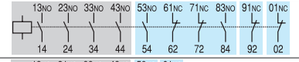
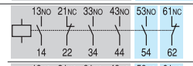
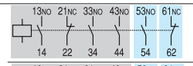
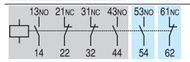
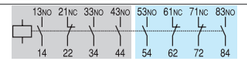
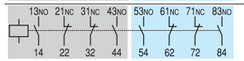
Terminal numbering in accordance with EN 50011 (continued)

By combining other basic auxiliary contactors with auxiliary contact blocks MAR..., it is possible to obtain other combinations, and positions of contacts which are not covered by the table. But in all cases the maximum number of auxiliary contacts should be ten.

Type Z
Contact combination the same as Type E. Interchangeability of the devices may affect the cabling and the diagram. Neither contact numbering nor positioning are retained.

Type X
Contact combination the same as Type E. Interchangeability of the devices may affect the cabling but not the diagram.The contact numbering is maintained but not their position.

Type Y
Contact combination which differs from Type E, although it is obtained by a combination of devices provided for this Type E.

	Final structure of the combination	Auxiliary contacts Combination / Description	NO	NC	Auxiliary contactor + Auxiliary contact blocks to be added
Type Z		60Z	6	0	**MCRA040A..** + MARL110A.. + MARL110A..
		51Z	5	1	**MCRA040A..** + MARL110A.. + MARL101A..
		42Z	4	2	**MCRA040A..** + MARL101A.. + MARL101A..
		100Z	10	0	**MCRA040A..** + MARN440A.. + MARL110A..S + MARL110A..S
		55Z	5	5	**MCRA040A..** + MARN413A.. + MARL101A..S + MARL101A..S
Type X		80X	8	0	**MCRA040A..** + MARL110A.. + MARL110A.. + MARL110A..S + MARL110A..S
		71X	7	1	**MCRA040A..** + MARL110A.. + MARL101A.. + MARL101A..S + MARL110A..S
		62X	6	2	**MCRA040A..** + MARL110A.. + MARL101A.. + MARL101A..S + MARL110A..S
		53X	5	3	**MCRA040A..** + MARL110A.. + MARL101A.. + MARL101A..S + MARL101A..S
		44X	4	4	**MCRA040A..** + MARL101A.. + MARL101A.. + MARL101A..S + MARL101A..S
		91X	9	1	**MCRA040A..** + MARN431A.. + MARL110A..S + MARL110A..S
		82X	8	2	**MCRA040A..** + MARN431A.. + MARL101A..S + MARL110A..S
		73X	7	3	**MCRA040A..** + MARN422A.. + MARL101A..S + MARL110A..S
		64X	6	4	**MCRA040A..** + MARN422A.. + MARL101A..S + MARL101A..S
Type Y		42Y	4	2	**MCRA031A..** + MARL110A.. + MARL101A..
		33Y	3	3	**MCRA022A..** + MARL110A.. + MARL101A..
		42Y	4	2	**MCRA031A..** + MARN211A..
		33Y	3	3	**MCRA022A..** + MARN211A..
		53Y	5	3	**MCRA031A..** + MARN422A..
		44Y	4	4	**MCRA022A..** + MARN422A..

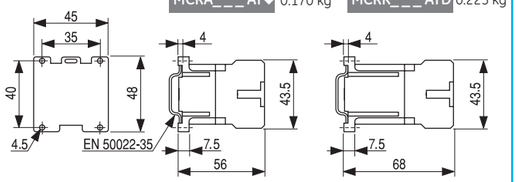
Dimensional drawings

Auxiliary minicontactors

Slotted screw

MCRA_ _ _ AT◆ 0.170 kg

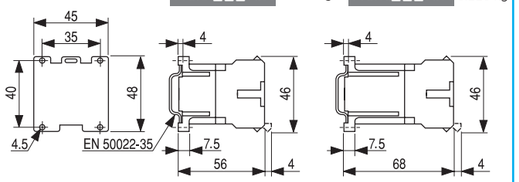
MCRC_ _ _ AT◆ 0.210 kg
MCRI _ _ _ ATD 0.225 kg
MCRK_ _ _ ATD 0.225 kg



Ring terminal

MCRA_ _ _ AR◆ 0.170 kg

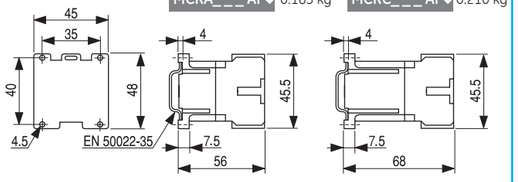
MCRC_ _ _ AR◆ 0.210 kg



Terminal: Faston 2x2.8 insulated

MCRA_ _ _ AF◆ 0.165 kg

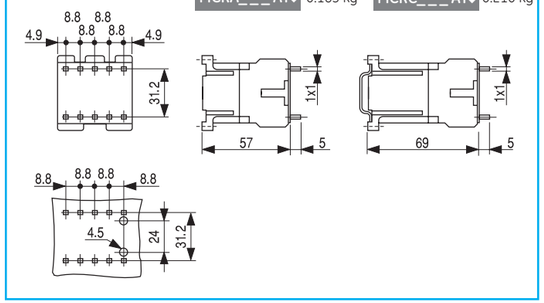
MCRC_ _ _ AF◆ 0.210 kg



Terminal: Printed circuit

MCRA_ _ _ AI◆ 0.165 kg

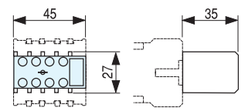
MCRC_ _ _ AI◆ 0.210 kg



Auxiliary contact blocks. *Front mounting*

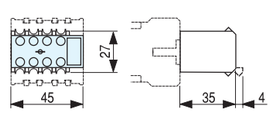
Slotted screw

MARN2 _ _AT 0.025 kg
MARN4 _ _AT 0.040 kg



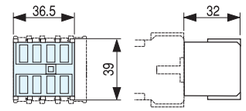
Ring terminal

MARN2 _ _AR 0.025 kg
MARN4 _ _AR 0.040 kg



Terminal: Faston 2x2.8 insulated

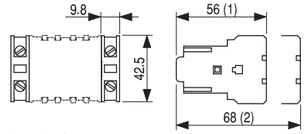
MARF4 _ _AF 0.035 kg



Auxiliary contact blocks. *Lateral mounting*

Slotted screw

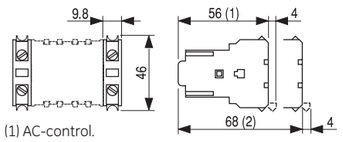
MARL_ _ _AT, ATS 0.013 kg



(1) AC-control.
(2) DC-control

Ring terminal

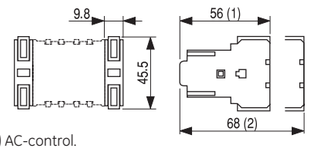
MARL_ _ _AR, ARS 0.013 kg



(1) AC-control.
(2) DC-control

Terminal: Faston 2x2.8 insulated

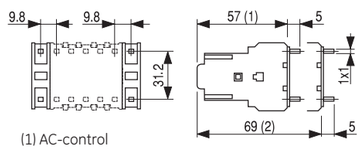
MARL _ _AF, AFS 0.009 kg



(1) AC-control.
(2) DC-control

Terminal: Printed circuit

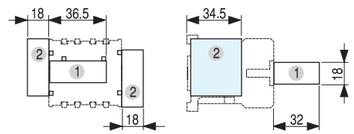
MARL _ _AI, AIS 0.009 kg



(1) AC-control
(2) DC-control

Electronic timer block

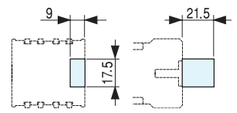
MREBC _0AC2 0.040 kg



(1) Frontal mounting
(2) Lateral mounting

Voltage suppressor block

MP0A_AE_ 0.010 kg
MP0C_AE3 0.010 kg



General

Maximum number of contacts	4
Rated thermal current (Ith) θ < 55°C	20A
Rated operational voltage (Ue)	690V
Insulation voltage (Ui)	1000V

Conformity to standards

IEC / EN 60947-1	IEC / EN 60947-5-1	ASE 1025
EN 50005	EN 50011	VDE 0660 / 102
NFC 63-110	NFC 63-140	
CENELEC HD 410	CENELEC HD 420	
NEMA ICS 1	CSA C22.2/14	
UL 508	BS 4794	

Approvals

cULus	DEMKO	NEMKO
SEMKO	FI	CE
Lloyd's Register	Bureau Veritas	

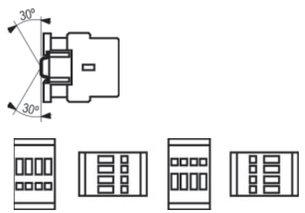
Ambient conditions

Storage temperature		-55°C to +80°C
Operation temperature		-40°C to +60°C
Altitude	up to 3000m	Nominal values
	from 3000 to 4000m	90%Ie 80%Ue
	from 4000 to 5000m	80%Ie 75%Ue

Climatic resistance (IEC 68-2)

Continuous tests	40 / 125 / 56	
Cold (72h)		
	Temperature	-40°C
Dry heat (96h)		
	Temperature	+125°C
	Relative humidity	< 50%
Humid heat (56 days)		
	Temperature	+40°C
	Relative humidity	95%
Cyclical tests (6 cycles)		
Humid heat		
First half-cycle (12h)		
	Low temperature	+25°C
	Relative humidity	93%
Second half-cycle (12h)		
	Low temperature	+55°C
	Relative humidity	95%

Mounting positions

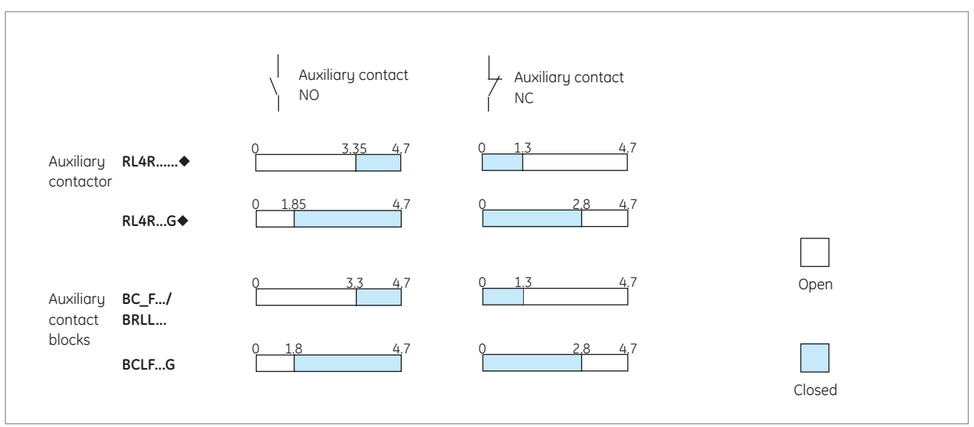


With the same pick-up and drop-out voltage
With the same rated power

Control circuit

			RL4RA...	RL4RD...	RL4RD...W
Rated insulation voltage Ui		(V)	1000	1000	1000
Standard voltages Us					
50Hz (V)			24 ... 690	–	–
60Hz (V)			24 ... 600	–	–
DC		(V)	–	12 ... 440	12 ... 440
Voltage [1]					
Operating limits		xUs	0.8 ... 1.1	0.8 ... 1.1	0.7 ... 1.3
Pick-up		xUs	0.65 ... 0.75	0.45 ... 0.65	0.45 ... 0.55
Seal		xUs	0.4 ... 0.55	0.15 ... 0.3	0.15 ... 0.3
Consumption					
AC	Magnetic circuit closed	(VA)	6	–	–
	Magnetic circuit open	(VA)	45	–	–
DC	Magnetic circuit closed	(W)	–	5.5	6.5
	Magnetic circuit open	(W)	–	5.5	6.5
Power dissipation		(W)	2.4	5.5	6.5
Power factor					
Magnetic circuit closed		cos φ	0.34	–	–
Magnetic circuit open		cos φ	0.82	–	–
Opening and closing times					
at 0,8 to 1,1 Us					
Closing time NO		(ms)	6 ... 25	35 ... 65	25 ... 65
Opening time NO		(ms)	6 ... 13	6 ... 13	6 ... 13
at Us					
Closing time NO		(ms)	8 ... 20	35 ... 45	25 ... 55
Opening time NO		(ms)	6 ... 13	7 ... 12	6 ... 13
Mechanical endurance		10^6 ops	15	15	15
Maximum rate no load		ops./h	9000	3600	3600

Contact sequence (distance in mm)

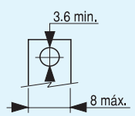


Internal auxiliary contacts

		RL4.....
Rated insulation voltage (Ui) acc. IEC 60947-5		1000V
Rated thermal current (Ith) < 55ºC		20A
Making capacity (r.m.s.) acc. IEC 60947-5		
AC-15	Ue ≤ 400V, 50/60 Hz	250A
DC-13	Ue ≤ 220V DC	250A
Breaking capacity (r.m.s.) acc. IEC 60947-5		
AC-15	Ue ≤ 400V, 50/60 Hz	250A
DC-13	Ue ≤ 220V DC	2A (4A with 2 contacts in series
	Ue ≤ 110V DC	7A (12A with 2 contacts in series)
	Ue ≤ 48V DC	10A (18A with 2 contacts in series)
Rated voltage and rated current Ue-Ie		
AC-15	according to IEC	110/120V - 10A 220/240V - 10A 380/400V - 6A 415/440V - 5A 500V - 4A 660/690V - 2A
	according to UL, CSA	A600
DC-13	according to IEC	24V - 6A 48V - 4 A 110V - 2A 220V - 0,7A 440V - 0,35A
	according to UL, CSA	P600
Electrical endurance		1 x 10^6 ops.
Minimum operational voltage (operational safety)		17V
Minimun operational current		5mA
Short-circuit protection		
max. fus. class gL fuse		20A
without welding		10A
Insulation resistance		
between contacts		> 10 mΩ
between contacts and earth		> 10 mΩ
between input and output		> 10 mΩ
Guaranteed no overlap between NO and NC contacts		
space		1.3 mm
minimum time		1.5 ms
Impedance		1.28 mΩ

Terminal capacity

Solid, stranded and finely stranded without end sleeve	mm²	2 x 0.5 to 6
Finely stranded with end sleeve	mm²	2 x 1 to 6
AWG wires, solid and stranded	mm²	2 x 20 to 12
Tightening torque		1.1 Nm / 10 Lb.in
Ring terminals		1.6 Nm / 15 Lb.in

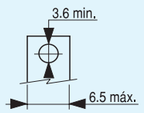


Instantaneous auxiliary contact blocks

		BCLF../BCRF../BRLL..
Rated insulation voltage (Ui) acc. IEC 60947-5		1000V
Rated thermal current (Ith) θ < 55ºC		10A
Making capacity (r.m.s.) acc. IEC 60947-5		
AC-15	Ue ≤ 440V, 50/60 Hz	90A
DC-13	Ue ≤ 220V DC	90A
Breaking capacity (r.m.s.) acc. IEC 60947-5		
AC-15	Ue ≤ 400V, 50/60 Hz	60A
DC-13	Ue ≤ 220V DC	0,95A
Rated voltage and rated current Ue-Ie		
AC-15	according to IEC	110/120V - 6A 220/240V - 6A 380/400V - 4A 415/440V - 3.5A 500V - 2.5A 660/690V - 1.5A
	according to UL, CSA	A600
DC-13		24V - 4A 48V - 2A 110V - 0.7A 220V - 0.3A 415/440V - 0.15A
	according to UL, CSA	Q600
Electrical endurance		1 x 10^6 ops.
Minimum operational voltage (operational safety)		17V
Minimun operational current		5mA
Short-circuit protection (without welding) gL		10A
Insulation resistance		
between contacts		> 10 mΩ
between contacts and earth		> 10 mΩ
between input and output		> 10 mΩ
Guaranteed no overlap between NO and NC contacts		
Space		1.3 mm
minimum time		1.5 ms
Impedance of the contacts		1.28 mΩ

Terminal capacity

Solid, stranded and finely stranded without end sleeve	mm²	2 x 0.5 to 2.5 2 x 2.5 to 4
Finely stranded with end sleeve	mm²	2 x 0.5 to 2.5 2 x 2.5 to 4
AWG wires, solid and stranded	mm²	2 x 20 to 10
Tightening torque		0.8 Nm / 7 Lb.in
Ring terminals		0.8 Nm / 7 Lb.in

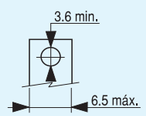


Timed auxiliary contact blocks

		BTLF... / BTRF...
Rated insulation voltage (Ui) acc. IEC 60947-5		1000V
Rated thermal current (Ith) θ < 55ºC		10A
Making capacity (r.m.s.) acc. IEC 60947-5		
AC-15	Ue ≤ 440V, 50/60 Hz	90A
DC-13	Ue ≤ 220V DC	90A
Breaking capacity (r.m.s.) acc. IEC 60947-5		
AC-15	Ue ≤ 400V, 50/60 Hz	60A
DC-13	Ue ≤ 220V DC	0.95A
Rated voltage and rated current Ue-Ie		
AC-15	according to IEC	110/120V - 6A 220/240V - 6A 380/400V - 4A 415/440V - 3.5A 500V - 2.5A 660/690V - 1.5A
	according to UL, CSA	A600
DC-13	according to IEC	24V - 4A 48V - 2A 110V - 0.7A 220V - 0.3A 415/440V - 0.15A
	according to UL, CSA	Q600
Electrical endurance		1 x 10^6 ops.
Minimum operational voltage (operational safety)		17V
Minimum operational current		5mA
Short-circuit protection (without welding) gL		10A
Insulation resistance		
between contacts		> 10 MΩ
between contacts and earth		> 10 MΩ
between input and output		> 10 MΩ
Guaranteed no overlap between NO and NC contacts		
space		1.3 mm
minimum time	1.5 ms	
Timing (Ambient temperature between – 25 and + 55ºC)		
Accuracy		± 5 %
Loss of accuracy after 0.5 x 10^6 ops.		+ 20 %
Loss of accuracy per rise ºC (0 - 55ºC)		+ 0.75 % per ºC
Impedance of the contacts		1.28 mΩ
Mechanical endurance		5 x 10^6 ops.
Peak current		
during 1 s.		50A
during 0.1 s.		100A

Terminal capacity

Solid, stranded and finely stranded without end sleeve	(mm^2)	2 x 0.5 to 2.5 2 x 2.5 to 4
Finely stranded with end sleeve	(mm^2)	2 x 0.5 to 2.5 2 x 2.5 to 4
AWG wires, solid and stranded	(mm^2)	2 x 20 to 10
Tightening torque		0.8 Nm / 7 Lb.in
Ring terminals		0.8 Nm / 7 Lb.in



Mechanical latch blocks

		RMLF.....
Rated insulation voltage(Ui)		1000V
Standard voltages (Us); 50-60Hz and direct current		24 ... 690V
Operating limits		0.75 to 1.1 xUs
Consumption for unlatching (auto cut-out)		210W /VA (24-72V) 130W /VA (110-440V)
Unlatching control [1]		
Electrical	Min.impuls	10 ms Maintained auto cut-out by integral contact 55-56 (only AC slots)
Manual		By local (0) push-button
Contactor control		
Electrical	Min.impuls	40 ms
Manual		By local (I) push-button
Mechanical endurance	CL00 ... CL45	3 x 10^6 (1200ops./h)
	CL05 ... CL10	0.1 x 10^6 (300 ops./h)

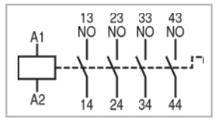
Terminal capacity

Solid, stranded and finely stranded without end sleeve	mm^2	2 x 0.5 to 2.5 2 x 2.5 to 4
Finely stranded with end sleeve	mm^2	2 x 0.5 to 2.5 2 x 2.5 to 4
AWG wires, solid and stranded	mm^2	2 x 20 to 10
Tightening torque		0.8 Nm / 7 Lb.in

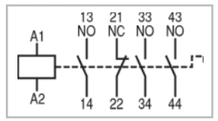
Terminal numbering

Auxiliary contactors

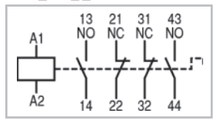
RL4R_040__



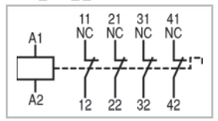
RL4R_031__



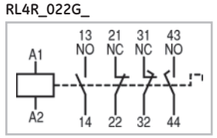
RL4R_022__



RL4R_004__



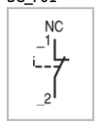
RL4R_022G_



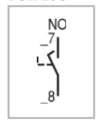
Auxiliary contact blocks. *Front mounting*

BC_F10

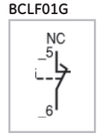
BC_F01



BCLF10G



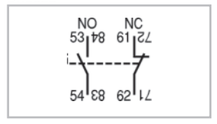
BCLF01G



Auxiliary contact blocks. *Lateral mounting*

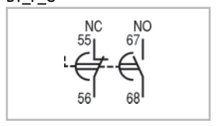
BRLL20

BRLL11

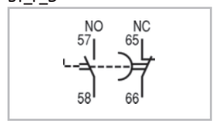


Pneumatic timer blocks

BT_F_C

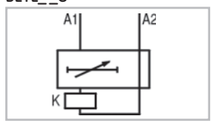


BT_F_D

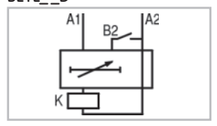


Electronic timer blocks

BETL__C

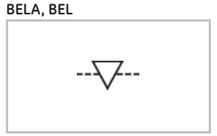


BETL__D

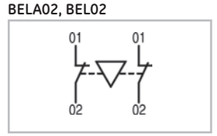


Mechanical (-/electrical) interlock

BELA, BEL

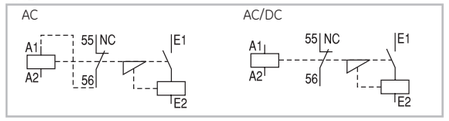


BELA02, BEL02



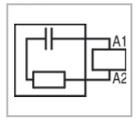
Mechanical latch block

RMLF

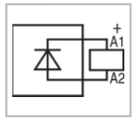


Voltage suppressor blocks

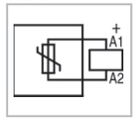
BSLR2



BSLDZ



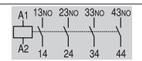
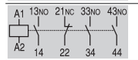
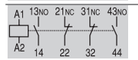
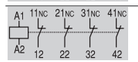
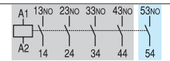
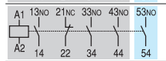
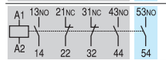
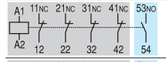
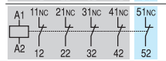
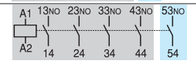
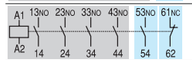
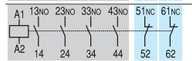
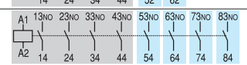
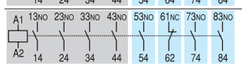
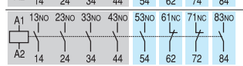
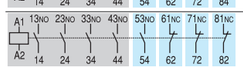
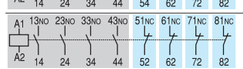
BSLV3



Terminal numbering in accordance with EN 50011

By combining other basic auxiliary contactors with auxiliary contact blocks BLC..., it is possible to obtain other combinations, and positions of contacts which are not covered by the table. But in all cases the maximum number of additional auxiliary contacts should be four.

Type E
Standard contact combination in which the interchangeability of the devices does not affect the cabling or the diagram. Specifies a particular contact numbering and positioning.

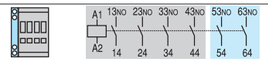
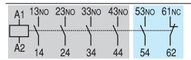
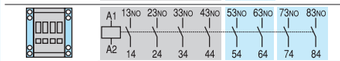
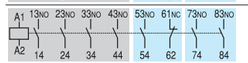
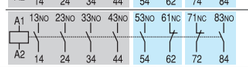
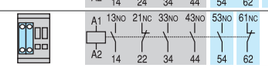
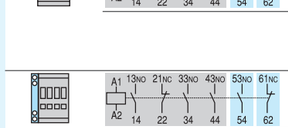
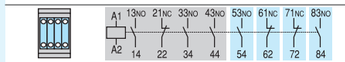
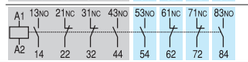
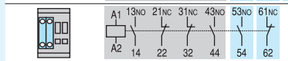
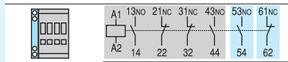
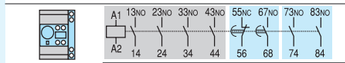
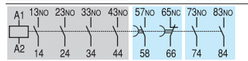
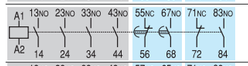
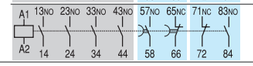
	Final structure of the combination	Auxiliary contacts Combination Description	NO	NC	Auxiliary contactor +Auxiliary contact blocks to be added
Type E		40E	4	0	**RL4RA040...**
		31E	3	1	**RL4RA031...**
		22E	2	2	**RL4RA022...**
		04E	0	4	**RL4RA004...**
		50E	5	0	**RL4RA040...** + BC_F10
		41E	4	1	**RL4RA031...** + BC_F10
		32E	3	2	**RL4RA022...** + BC_F10
		23E	2	3	**RL4RA022...** + BC_F01
		14E	1	4	**RL4RA004...** + BC_F10
		05E	0	5	**RL4RA004...** + BC_F01
		60E	6	0	**RL4RA040...** + BC_F10 + BC_F10
		51E	5	1	**RL4RA040...** + BC_F10 + BC_F01
		42E	4	2	**RL4RA040...** + BC_F01 + BC_F01
		80E	8	0	**RL4RA040...** + BC_F10 + BC_F10 + BC_F10 + BC_F10
		71E	7	1	**RL4RA040...** + BC_F10 + BC_F01 + BC_F10 + BC_F10
		62E	6	2	**RL4RA040...** + BC_F10 + BC_F01 + BC_F01 + BC_F10
		53E	5	3	**RL4RA040...** + BC_F10 + BC_F01 + BC_F01 + BC_F01
		44E	4	4	**RL4RA040...** + BC_F01 + BC_F01 + BC_F01 + BC_F01

Terminal numbering in accordance with EN 50011 *(continued)*

By combining other basic auxiliary contactors with auxiliary contact blocks BLC..., it is possible to obtain other combinations, and positions of contacts which are not covered by the table. But in all cases the maximum number of additional auxiliary contacts should be four.

Type Z
Contact combination the same as Type E.
Interchangeability of the devices may affect the cabling and the diagram. Neither contact numbering nor positioning are retained.

Type Y
Contact combination which differs from Type E, although it is obtained by a combination of devices provided for this Type E.

	Final structure of the combination	Auxiliary contacts Combination Description	NO	NC	Auxiliary contactor +Auxiliary contact blocks to be added
Type Z		60Z	6	0	RL4RA040... + BRLL20
		51Z	5	1	RL4RA040... + BRLL11
		80Z	8	0	RL4RA040... + BRLL20 + BRLL20
		71Z	7	1	RL4RA040... + BRLL11 + BRLL20
		62Z	6	2	RL4RA040... + BRLL11 + BRLL11
Type Y		42Y	4	2	RL4RA031... + BC_F10 + BC_F01
		42Y	4	2	RL4RA031... + BRLL11
		53Y	5	3	RL4RA031... + BC_F10 + BC_F01 + BC_F01 + BC_F10
		44Y	4	4	RL4RA022... + BC_F10 + BC_F01 + BC_F01 + BC_F10
		33Y	3	3	RL4RA022... + BC_F10 + BC_F01
		33Y	3	3	RL4RA022... + BRLL11
					RL4RA040... + BTLF...C + BRLL20
					RL4RA040... + BTLF...D + BRLL20
					RL4RA040... + BTLF...C + BRLL11
					RL4RA040... + BTLF...D + BRLL11

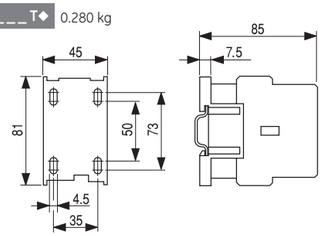
Dimensional drawings

Auxiliary contactors

Screw terminal

AC

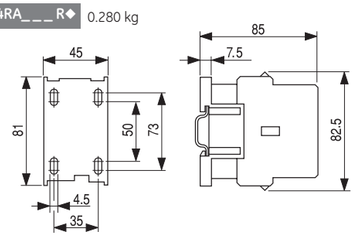
RL4RA___T◆ 0.280 kg



Ring terminal

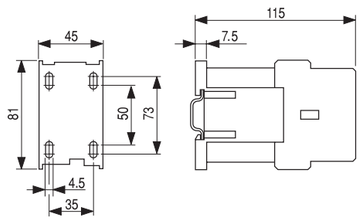
AC

RL4RA___R◆ 0.280 kg



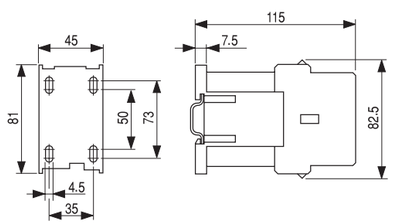
DC

RL4RD___T◆ 0.490 kg



DC

RL4RD___R◆ 0.490 kg

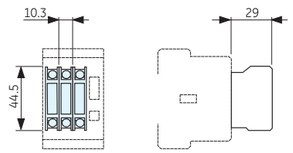


Instantaneous auxiliary contact blocks

Screw terminal

Instantaneous, frontal mounting

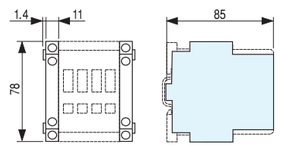
BCLF___ 0.015 kg



Screw terminal

Instantaneous, lateral mounting

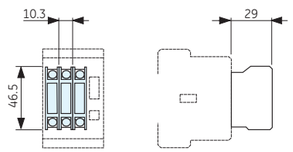
BRLL___ 0.048 kg



Ring terminal

Frontal mounting

BCRF___ 0.015 kg

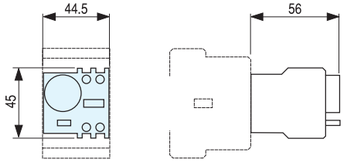


Timed auxiliary contact blocks

Screw terminal

Front mounting

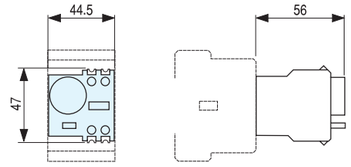
BTLF_ _ _ 0.085 kg



Ring terminal

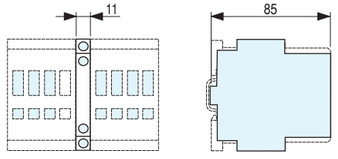
Front mounting

BTRF_ _ _ 0.085 kg



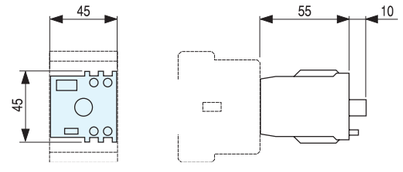
Mechanical (-/electrical) interlock

BELA 0.025 kg
BELA02 0.025 kg



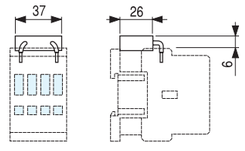
Mechanical latch block

RMLF_ _ 0.082 kg



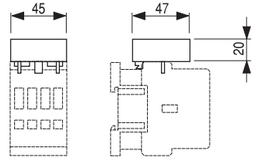
Voltage suppressor blocks

BSLR2_ 0.020 kg
BSLDZ_ 0.020 kg
BSLV3_ 0.020 kg



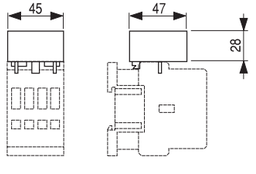
Electronic timer block

BETL_ _ C 0.040 kg
BETL_ _ D 0.040 kg



Interface

IMR_ 0.060 kg
IMRF_ 0.050 kg
IMSSD 0.045 kg
IMAMS 0.045 kg



Notes

SURION - Manual motor starter

Order codes

C.2 **GPS1B** - Thermal and magnetic protection

C.4 **GPS2B** - Thermal and magnetic protection

C.6 **GPS1M** - Magnetic protection

C.8 **GPS2M** - Magnetic protection

C.10 Auxiliaries

C.12 Accessories

C.14 Fuseless starters and busbar adapter plates

C.16 Enclosures

Technical data

C.18 Technical performance

C.22 Mounting possibilities of the auxiliaries

C.24 Dimensions

SURION

Manual Motor Starters and Coordination tables

see chapter D pages D.11-D.17

SFK - Motor protection circuit breaker

C.32 Order codes

C.35 Terminal numbering

C.36 Technical data

C.37 Dimensions

Thermal and magnetic protection

GPS1B

Standards/Approvals

IEC 60947-1, 60947-2, 60947-4-1
DIN VDE 0660T 100/101/102
UL508/CSA - UL508/cULus
Shipping approvals:

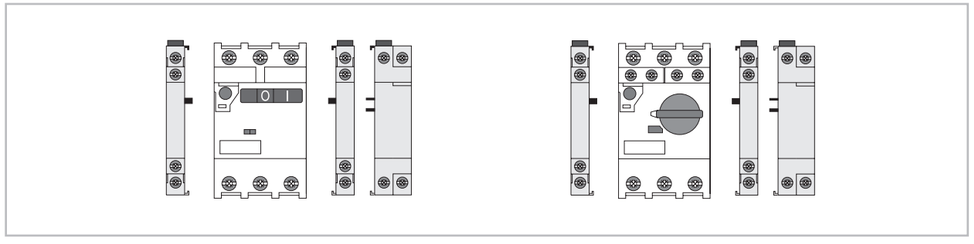
RINA Bureau Veritas Lloyd's Register Germanischer Lloyd

cULus CE

Characteristics

- Rocker and rotary handle operator
- Thermal and magnetic protection
- Standard and high breaking capacity
  Icu = 100kA ≥ Ics = 100% Icu
  Icu < 100kA ≥ Ics min. 75% Icu
- Clear identification of the operation state (ON-OFF-tripped)
- Ambient temperature compensation
- Phase failure protection

Auxiliaries



Technical performances

Rated current In	(A)	0.1-32
Rated operational current Ie (A)		0.1-32
Rated power at 400Vac	(kW)	0.02-15
Utilisation category		
IEC 60947-2 (circuit breaker)		A
IEC 60947-4-1 (MMS)		AC-3
Tripping class IEC 60947-4-1		10
Magnetic release Ie max.	(A)	x13
Mechanical/electrical endurance		100,000

Accessories

Auxiliaries ● pg. C.10
Busbar system ● pg. C.13

Technical data ● pg. C.18
Dimensions ● pg. C.24
Fuseless starters ● pg. C.14
Coordination tables ● pg. D.11

GPS1B - Standard breaking capacity

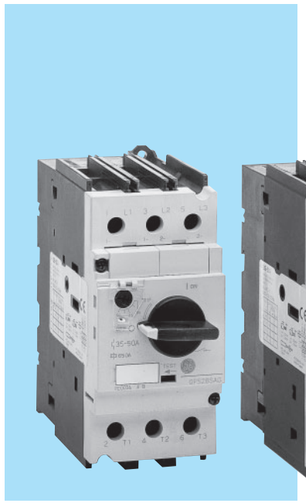
CLASS 10	Rated power 3 phase motors at 400Vac Pn (kW)	Rated current In (1) (A)	Thermal current setting range (A)	Instantaneous short-circuit release (A)	Rated ultimate short-circuit breaking capacity at 400V Icu (kA)	Rated service short-circuit breaking capacity at 400V Ics (kA)	Cat. no.	Ref. no.	Pack.
	0.02	0.16	0.10 - 0.16	2.1	100	100	**GPS1BSAA**	101211	5
	0.06	0.25	0.16 - 0.25	3.3	100	100	**GPS1BSAB**	101212	5
	0.09	0.4	0.25 - 0.40	5.2	100	100	**GPS1BSAC**	101213	5
	0.12/0.18	0.63	0.40 - 0.63	8.2	100	100	**GPS1BSAD**	101214	5
	0.25	1	0.63 - 1.00	13	100	100	**GPS1BSAE**	101215	5
	0.37/0.55	1.6	1.0 - 1.6	20.8	100	100	**GPS1BSAF**	101216	5
	0.75	2.5	1.6 - 2.5	32.5	100	100	**GPS1BSAG**	101217	5
	1.5	4	2.5 - 4.0	52	100	100	**GPS1BSAH**	101218	5
	2.2	6.3	4.0 - 6.3	81.9	100	100	**GPS1BSAJ**	101219	5
	3/4	10	6.3 - 10	130	100	100	**GPS1BSAK**	101220	5
	5.5	13	9 - 13	169	50	38	**GPS1BSAL**	101221	5
	7.5	16	11 - 16	208	25	19	**GPS1BSAM**	101222	5
	10	20	14 - 20	260	25	19	**GPS1BSAN**	101223	5
	11	25	19 - 25	325	25	19	**GPS1BSAP**	101224	5
	15	32	24 - 32	416	25	19	**GPS1BSAR**	101225	5

(1) Rated current: highest thermal current setting range value.

GPS1B - High breaking capacity.

CLASS 10	Rated power 3 phase motors at 400Vac Pn (kW)	Rated current In (1) (A)	Thermal current setting range (A)	Instantaneous short-circuit release (A)	Rated ultimate short-circuit breaking capacity at 400V Icu (kA)	Rated service short-circuit breaking capacity at 400V Ics (kA)	Cat. no.	Ref. no.	Pack.
	0.02	0.16	0.10 - 0.16	2.1	100	100	**GPS1BHAA**	101234	5
	0.06	0.25	0.16 - 0.25	3.3	100	100	**GPS1BHAB**	101235	5
	0.09	0.4	0.25 - 0.40	5.2	100	100	**GPS1BHAC**	101236	5
	0.12/0.18	0.63	0.40 - 0.63	8.2	100	100	**GPS1BHAD**	101237	5
	0.25	1	0.63 - 1.00	13	100	100	**GPS1BHAE**	101238	5
	0.37/0.55	1.6	1 - 1.6	20.8	100	100	**GPS1BHAF**	101239	5
	0.75	2.5	1.6 - 2.5	32.5	100	100	**GPS1BHAG**	101240	5
	1.5	4	2.5 - 4.0	52	100	100	**GPS1BHAH**	101241	5
	2.2	6.3	4.0 - 6.3	81.9	100	100	**GPS1BHAJ**	101242	5
	3/4	10	6.3 - 10	130	100	100	**GPS1BHAK**	101243	5
	5.5	13	9 - 13	169	100	100	**GPS1BHAL**	101244	5
	7.5	16	11 - 16	208	50	38	**GPS1BHAM**	101245	5
	10	20	14 - 20	260	50	38	**GPS1BHAN**	101246	5
	11	25	19 - 25	325	50	38	**GPS1BHAP**	101247	5
	15	32	24 - 32	416	50	38	**GPS1BHAR**	101248	5

(1) Rated current: highest thermal current setting range value.



Thermal and magnetic protection

GPS2B

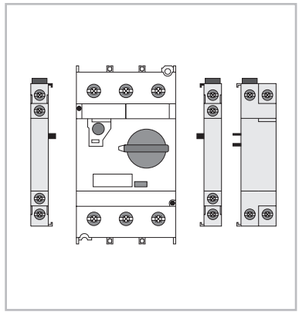
Standards/Approvals

IEC 60947-1, 60947-2, 60947-4-1
DIN VDE 0660T 100/101/102
UL508/CSA - UL508/cULus
Shipping approvals:

RINA | Bureau Veritas | Lloyd's Register | Germanischer Lloyd

cULus | CE

Auxiliaries



Accessories

Auxiliaries ● pg. C.10
Busbar system ● pg. C.13

Technical data ● pg. C.18
Dimensions ● pg. C.24
Fuseless starters ● pg. C.14
Coordination tables ● pg. D.11

Characteristics

- Rotary handle operator
- Thermal and magnetic protection
- Standard and high breaking capacity
  Icu = 100kA ≥ Ics = 100% Icu
  Icu < 100kA ≥ Ics min. 75% Icu
- Clear identification of the operation state (ON-OFF-tripped)
- Ambient temperature compensation
- Phase failure protection

Technical performances

Rated current In	(A)	10-63
Rated operational current Ie	(A)	10-63
Rated power at 400Vac	(kW)	4-30
Utilisation category		
IEC 60947-2 (circuit breaker)		A
IEC 60947-4-1 (MMS)		AC-3
Tripping class IEC 60947-4-1		10
Magnetic release Ie max.	(A)	x13
Mechanical/electrical endurance		50,000/25,000

GPS2B - Standard breaking capacity

CLASS 10	Rated power 3 phase motors at 400Vac Pn (kW)	Rated current In (1) (A)	Thermal current setting range (A)	Instantaneous short-circuit release (A)	Rated ultimate short-circuit breaking capacity at 400V Icu (kA)	Rated service short-circuit breaking capacity at 400V Ics (kA)	Cat. no.	Ref. no.	Pack.
	3/4	10	6.3 - 10	130	100	100	**GPS2BSAK**	101226	1
	5.5	13	9 - 13	169	50	38	**GPS2BSAL**	107119	1
	7.5	16	11 -16	208	25	19	**GPS2BSAM**	101227	1
	10	20	14 - 20	260	25	19	**GPS2BSAN**	101228	1
	11	25	19 - 25	325	25	19	**GPS2BSAP**	101229	1
	15	32	24 - 32	416	25	19	**GPS2BSAR**	101230	1
	18.5	40	28 - 40	520	25	19	**GPS2BSAS**	101231	1
	22	50	35 - 50	650	25	19	**GPS2BSAT**	101232	1
	30	63	45 - 63	819	25	19	**GPS2BSAU**	101233	1

(1) Rated current: highest thermal current setting range value.

GPS2B - High breaking capacity

CLASS 10	Rated power 3 phase motors at 400Vac Pn (kW)	Rated current In (1) (A)	Thermal current setting range (A)	Instantaneous short-circuit release (A)	Short-circuit breaking capacity at 400V Icu (kA)	Short-circuit breaking capacity at 400V Ics (kA)	Cat. no.	Ref. no.	Pack.
	3/4	10	6.3 - 10	130	100	100	**GPS2BHAK**	101249	1
	5.5	13	9 - 13	169	100	100	**GPS2BHAL**	107120	1
	7.5	16	11 -16	208	50	38	**GPS2BHAM**	101250	1
	10	20	14 - 20	260	50	38	**GPS2BHAN**	101251	1
	11	25	19 - 25	325	50	38	**GPS2BHAP**	101252	1
	15	32	24 - 32	416	50	38	**GPS2BHAR**	101253	1
	18.5	40	28 - 40	520	50	38	**GPS2BHAS**	101254	1
	22	50	35 - 50	650	50	38	**GPS2BHAT**	101255	1
	30	63	45 - 63	819	50	38	**GPS2BHAU**	101256	1

(1) Rated current: highest thermal current setting range value.

Magnetic protection

GPS1M

Standards/Approvals

IEC 60947-1, 60947-2, 60947-4-1
DIN VDE 0660T 100/101/102
UL508/CSA - UL508/cULus
Shipping approvals:

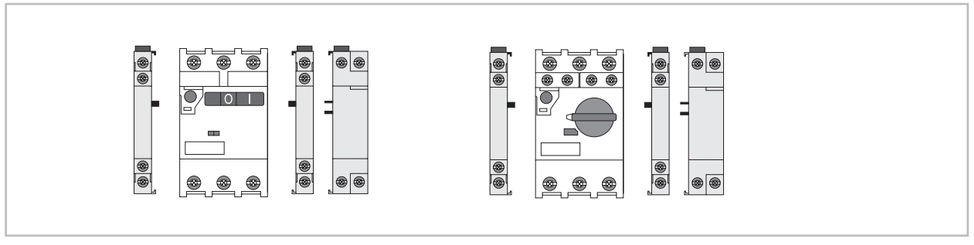
RINA
Bureau Veritas
Lloyd's Register Germanischer Lloyd

cULus
CE

Characteristics

- Short-circuit protection for starters
- Rocker and rotary handle operator
- Magnetic protection
- Standard and high breaking capacity
  Icu = 100kA ≥ Ics = 100% Icu
  Icu < 100kA ≥ Ics min. 75% Icu
- Clear identification of the operation state (ON-OFF-tripped)

Auxiliaries



Accessories

Auxiliaries ● pg. C.10
Busbar system ● pg. C.13

Technical data ● pg. C.18
Dimensions ● pg. C.24
Fuseless starters ● pg. C.14
Coordination tables ● pg. D.11

Technical performances

Rated current In	(A)	0.1-32
Rated operational current Ie	(A)	0.1-32
Utilisation category		
IEC 60947-2 (circuit breaker)		A
Magnetic release Ie max.	(A)	x13
Mechanical/electrical endurance		100.000

GPS1M - Standard breaking capacity

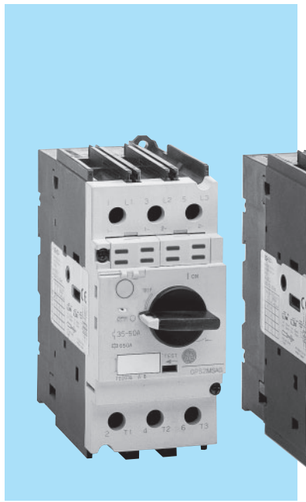
Rated power 3 phase motors at 400Vac Pn (kW)	Rated current In (A)	Thermal current setting range (1) (A)	Instantaneous short-circuit release (A)	Rated ultimate short-circuit breaking capacity at 400V Icu (kA)	Rated service short-circuit breaking capacity at 400V Ics (kA)	Cat. no.	Ref. no.	Pack.
0.02	0.16	-	2.1	100	100	**GPS1MSAA**	101257	5
0.06	0.25	-	3.3	100	100	**GPS1MSAB**	101258	5
0.09	0.4	-	5.2	100	100	**GPS1MSAC**	101259	5
0.12/0.18	0.63	-	8.2	100	100	**GPS1MSAD**	101260	5
0.25	1	-	13	100	100	**GPS1MSAE**	101261	5
0.37/0.55	1.6	-	20.8	100	100	**GPS1MSAF**	101262	5
0.75	2.5	-	32.5	100	100	**GPS1MSAG**	101263	5
1.5	4	-	52	100	100	**GPS1MSAH**	101264	5
2.2	6.3	-	81.9	100	100	**GPS1MSAJ**	101265	5
3/4	10	-	130	100	100	**GPS1MSAK**	101266	5
5.5	13	-	169	50	38	**GPS1MSAL**	101267	5
7.5	16	-	208	25	19	**GPS1MSAM**	101268	5
10	20	-	260	25	19	**GPS1MSAN**	101269	5
11	25	-	325	25	19	**GPS1MSAP**	101270	5
15	32	-	416	25	19	**GPS1MSAR**	101271	5

(1) Select appropriate thermal overload relay for the starter. See chapter A pages A.70 - A.75.

GPS1M - High breaking capacity

Rated power 3 phase motors at 400Vac Pn (kW)	Rated current In (A)	Thermal current setting range (1) (A)	Instantaneous short-circuit release (A)	Rated ultimate short-circuit breaking capacity at 400V Icu (kA)	Rated service short-circuit breaking capacity at 400V Ics (kA)	Cat. no.	Ref. no.	Pack.
0.02	0.16	-	2.1	100	100	**GPS1MHAA**	101280	5
0.06	0.25	-	3.3	100	100	**GPS1MHAB**	101281	5
0.09	0.4	-	5.2	100	100	**GPS1MHAC**	101282	5
0.12/0.18	0.63	-	8.2	100	100	**GPS1MHAD**	101283	5
0.25	1	-	13	100	100	**GPS1MHAE**	101284	5
0.37/0.55	1.6	-	20.8	100	100	**GPS1MHAF**	101285	5
0.75	2.5	-	32.5	100	100	**GPS1MHAG**	101286	5
1.5	4	-	52	100	100	**GPS1MHAH**	101287	5
2.2	6.3	-	81.9	100	100	**GPS1MHAJ**	101288	5
3/4	10	-	130	100	100	**GPS1MHAK**	101289	5
5.5	13	-	169	100	100	**GPS1MHAL**	101290	5
7.5	16	-	208	50	38	**GPS1MHAM**	101291	5
10	20	-	260	50	38	**GPS1MHAN**	101292	5
11	25	-	325	50	38	**GPS1MHAP**	101293	5
15	32	-	416	50	38	**GPS1MHAR**	101294	5

(1) Select appropriate thermal overload relay for the starter. See chapter A pages A.70 - A.75.



Magnetic protection

GPS2M

Standards/Approvals

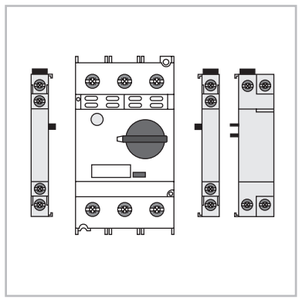
IEC 60947-1, 60947-2, 60947-4-1
DIN VDE 0660T 100/101/102
UL508/CSA - UL508/cULus
Shipping approvals:

RINA | Bureau Veritas | Lloyd's Register Germanischer Lloyd

CE

CE

Auxiliaries



Accessories

Auxiliaries ● pg. C.10
Busbar system ● pg. C.13

Technical data ● pg. C.18
Dimensions ● pg. C.24
Fuseless starters ● pg. C.14
Coordination tables ● pg. D.11

Characteristics

- Short-circuit protection for starters
- Rotary handle operator
- Magnetic protection
- Standard and high breaking capacity
  Icu = 100kA ≥ Ics = 100% Icu
  Icu < 100kA ≥ Ics min. 75% Icu
- Clear identification of the operation state (ON-OFF-tripped)

Technical performances

Rated current In	(A)	10-63
Rated operational current Ie	(A)	10-63
Utilisation category		
IEC 60947-2 (circuit breaker)		A
Magnetic release Ie max.	(A)	x13
Mechanical/electrical endurance		50,000/25,000

GPS2M - Standard breaking capacity

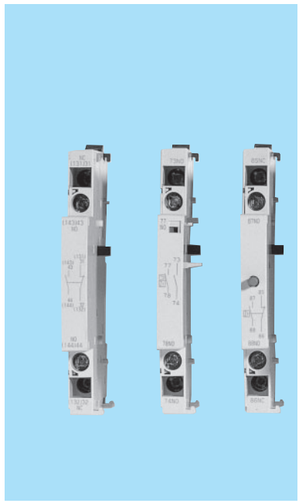
Rated power 3 phase motors at 400Vac Pn (kW)	Rated current In (A)	Thermal current setting range (1) (A)	Instantaneous short-circuit release (A)	Rated ultimate short-circuit breaking capacity at 400V Icu (kA)	Rated service short-circuit breaking capacity at 400V Ics (kA)	Cat. no.	Ref. no.	Pack.
4	10	-	130	100	100	**GPS2MSAK**	101272	1
5.5	13	-	169	50	38	**GPS2MSAL**	107121	1
7.5	16	-	208	25	19	**GPS2MSAM**	101273	1
10	20	-	260	25	19	**GPS2MSAN**	101274	1
11	25	-	325	25	19	**GPS2MSAP**	101275	1
15	32	-	416	25	19	**GPS2MSAR**	101276	1
18.5	40	-	520	25	19	**GPS2MSAS**	101277	1
22	50	-	650	25	19	**GPS2MSAT**	101278	1
30	63	-	819	25	19	**GPS2MSAU**	101279	1

(1) Select appropriate thermal overload relay for the starter. See chapter A pages A.72 - A.75.

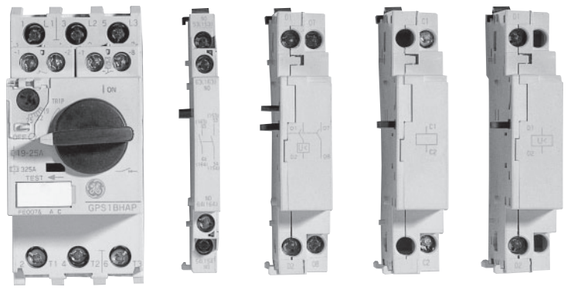
GPS2M - High breaking capacity

Rated power 3 phase motors at 400Vac Pn (kW)	Rated current In (A)	Thermal current setting range (1) (A)	Instantaneous short-circuit release (A)	Rated ultimate short-circuit breaking capacity at 400V Icu (kA)	Rated service short-circuit breaking capacity at 400V Ics (kA)	Cat. no.	Ref. no.	Pack.
4	10	-	130	100	100	**GPS2MHAK**	101295	1
5.5	13	-	169	100	100	**GPS2MHAL**	107122	1
7.5	16	-	208	50	38	**GPS2MHAM**	101296	1
10	20	-	260	50	38	**GPS2MHAN**	101297	1
11	25	-	325	50	38	**GPS2MHAP**	101298	1
15	32	-	416	50	38	**GPS2MHAR**	101299	1
18.5	40	-	520	50	38	**GPS2MHAS**	101300	1
22	50	-	650	50	38	**GPS2MHAT**	101301	1
30	63	-	819	50	38	**GPS2MHAU**	101302	1

(1) Select appropriate thermal overload relay for the starter. See chapter A pages A.71 - A.75.



Auxiliaries



Standards/Approvals

IEC 60947-1, 60947-2, 60947-4-1
DIN VDE 0660T 100/101/102
UL508/CSA - UL508/cULus
Shipping approvals:

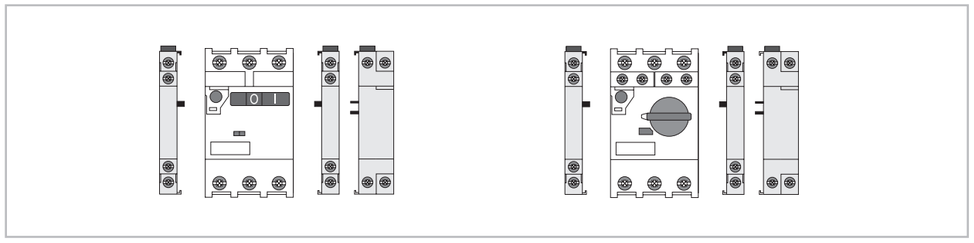
RINA
Bureau Veritas
Lloyd's Register
Germanischer Lloyd

cULus
CE

Product range

- Auxiliary contacts (frontal & lateral)
- Alarm contact block
- Auxiliary and alarm contact block
- Short-circuit alarm contact block
- Shunt trip
- Undervoltage release
- Undervoltage release with 2NO early make contacts
- External handle operator
- Terminal protector
- Busbar system

Auxiliaries

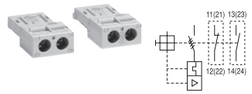
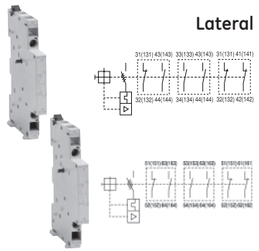


Technical performances

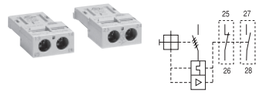
- **All auxiliaries can be mounted and changed easily, without any tools**
- **Both frames GPS1 and GPS2 uses same auxiliaries**
- **All terminals are capable for 2 cables (0.5mm² - 2.5mm²)**
- **Side auxiliary contacts are rated to A600, P300 duty**
- **Frontal auxiliary contacts are rated to B300, Q300 duty**
- **Minimum operational contact 5mA, 17Vdc**
- **All terminal screwhead are Pozidriv 2 and slotted combination**

Technical data ● pg. C.18
Dimensions ● pg. C.24
Fuseless starters ● pg. C.14
Coordination tables ● pg. D.11

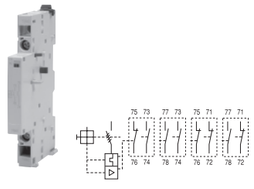
Auxiliary contact blocks

	Description	For use with	Type	Cat. no.	Ref. no.	Pack.
Frontal	Maximum 2 auxiliary contact blocks per manual motor starter	GPS1... and GPS2...	1 NO	**GPAC10FBA**	101303	10
		GPS1... and GPS2...	1 NC	**GPAC01FBA**	101304	10
						
Lateral	Two contacts Side mounting on the **left**	GPS1... and GPS2...	1 NO + 1 NC	**GPAC11LLA**	101305	10
		GPS1... and GPS2...	2 NO	**GPAC20LLA**	101306	10
		GPS1... and GPS2...	2 NC	**GPAC02LLA**	101307	10
	Two contacts Side mounting on the **right**	GPS1... and GPS2...	1 NO + 1 NC	**GPAC11LRA**	101308	10
		GPS1... and GPS2...	2 NO	**GPAC20LRA**	101309	10
		GPS1... and GPS2...	2 NC	**GPAC02LRA**	101310	10
						

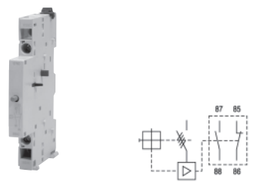
Alarm contact block

	Description	For use with	Type	Cat. no.	Ref. no.	Pack.
	Frontal mounting on the **right**	GPS1... and GPS2...	1 NO	**GPAL10FRA**	101311	10
	Single contact	GPS1... and GPS2...	1 NC	**GPAL01FRA**	101312	10
						

Auxiliary / alarm contact block

	Description	For use with	Type	Cat. no.	Ref. no.	Pack.
	Side mounting on the **left** (front alarm contact block can not be used at the same time) Two contacts	GPS1... and GPS2...	1 NO(Alarm)+1 NO(Aux.)	**GPAD1010LLA**	101313	10
		GPS1... and GPS2...	1 NO(Alarm)+1 NC(Aux.)	**GPAD1001LLA**	101314	10
		GPS1... and GPS2...	1 NC(Alarm)+1 NO(Aux.)	**GPAD0110LLA**	101315	10
		GPS1... and GPS2...	1 NC(Alarm)+1 NC(Aux.)	**GPAD0101LLA**	101316	10
						

Short-circuit alarm contact block

	Description	For use with	Type	Cat. no.	Ref. no.	Pack.
	Side mounting on the **left** Two contacts NO + NC Mechanical indication marking	GPS1... and GPS2...	1 NO + 1 NC	**GPAE11LLA**	101317	10
						

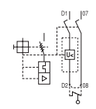
Shunt trip device

Description	For use with	Coil voltage	Cat. no.	Ref. no.	Pack.
Side mounting on the **right** Can not be used together with the undervoltage trip device	GPS1... and GPS2...	24V 50/60Hz	**GPASLRAA1**	101318	5
	GPS1... and GPS2...	48V 60Hz	**GPASLRAAF**	101319	5
	GPS1... and GPS2...	48V 50Hz / 60V 60Hz	**GPASLRAAG**	101320	5
	GPS1... and GPS2...	110/127V 50Hz / 120V 60Hz	**GPASLRAAJ**	101321	5
	GPS1... and GPS2...	208V 60Hz	**GPASLRAAM**	101322	5
	GPS1... and GPS2...	220/230V 50Hz / 240/260V 60Hz	**GPASLRAAN**	101323	5
	GPS1... and GPS2...	240V 50Hz / 277V 60Hz	**GPASLRAAR**	101324	5
	GPS1... and GPS2...	380/400V 50Hz	**GPASLRAAU**	101325	5
	GPS1... and GPS2...	415/440V 50Hz / 460/480V 60Hz	**GPASLRAAW**	101326	5
	GPS1... and GPS2...	500V 50Hz / 600V 60Hz	**GPASLRAAY**	101327	5
	GPS1... and GPS2...	24 to 60Vdc	**GPASLRADD**	101328	5
	GPS1... and GPS2...	110 to 240Vdc	**GPASLRADJ**	101329	5
	GPS1... and GPS2...	100V 50/60Hz	**GPASLRAA11**	101194	5

Undervoltage trip device

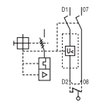
Description	For use with	Coil voltage	Cat. no.	Ref. no.	Pack.
Side mounting on the **right** Can not be used together with the shunt trip device	GPS1... and GPS2...	24V 50Hz	**GPAULRAAD**	101330	10
	GPS1... and GPS2...	24V 60Hz	**GPAULRAAC**	101331	10
	GPS1... and GPS2...	48V 50Hz	**GPAULRAAG**	101332	10
	GPS1... and GPS2...	48V 60Hz	**GPAULRAAF**	101333	10
	GPS1... and GPS2...	110/127V 50Hz / 120V 60Hz	**GPAULRAAJ**	101334	10
	GPS1... and GPS2...	208V 60Hz	**GPAULRAAM**	101335	10
	GPS1... and GPS2...	220/230V 50Hz / 240/260V 60Hz	**GPAULRAAN**	101336	10
	GPS1... and GPS2...	240V 50Hz / 277V 60Hz	**GPAULRAAR**	101337	10
	GPS1... and GPS2...	380/400V 50Hz	**GPAULRAAU**	101338	10
	GPS1... and GPS2...	415/440V 50Hz / 460/480V 60Hz	**GPAULRAAW**	101339	10
	GPS1... and GPS2...	500V 50Hz / 600V 60Hz	**GPAULRAAY**	101340	10
	GPS1... and GPS2...	100V 50/60Hz	**GPAULRAA11**	102625	10

With 2NO early make auxiliary contacts



Description	For use with	Coil voltage	Cat. no.	Ref. no.	Pack.
Side mounting on the **right** Can not be used together with the shunt trip device	GPS1*S...	24V 50Hz	**GPAU20LTAAD**	101341	10
	GPS1*S...	24V 60Hz	**GPAU20LTAAC**	101342	10
	GPS1*S...	48V 50Hz	**GPAU20LTAAG**	101343	10
	GPS1*S...	48V 60Hz	**GPAU20LTAAF**	101344	10
	GPS1*S...	110/127V 50Hz / 120V 60Hz	**GPAU20LTAAJ**	101345	10
	GPS1*S...	208V 60Hz	**GPAU20LTAAM**	101346	10
	GPS1*S...	220/230V 50Hz / 240/260V 60Hz	**GPAU20LTAAN**	101347	10
	GPS1*S...	240V 50Hz / 277V 60Hz	**GPAU20LTAAR**	101348	10
	GPS1*S...	380/400V 50Hz	**GPAU20LTAAU**	101349	10
	GPS1*S...	415/440V 50Hz / 460/480V 60Hz	**GPAU20LTAAW**	101350	10
	GPS1*S...	500V 50Hz / 600V 60Hz	**GPAU20LTAAY**	101351	10
	GPS1*S...	100V 50/60Hz	**GPAU20LTAA11**	110360	10

With 2NO early make auxiliary contacts



Description	For use with	Coil voltage	Cat. no.	Ref. no.	Pack.
Side mounting on the **right** Can not be used together with the shunt trip device	GPS1*H and GPS2...	24V 50Hz	**GPAU20LCAAD**	101352	10
	GPS1*H and GPS2...	24V 60Hz	**GPAU20LCAAC**	101353	10
	GPS1*H and GPS2...	48V 50Hz	**GPAU20LCAAG**	101354	10
	GPS1*H and GPS2...	48V 60Hz	**GPAU20LCAAF**	101355	10
	GPS1*H and GPS2...	110/127V 50Hz / 120V 60Hz	**GPAU20LCAAJ**	101356	10
	GPS1*H and GPS2...	208V 60Hz	**GPAU20LCAAM**	101357	10
	GPS1*H and GPS2...	220/230V 50Hz / 240/260V 60Hz	**GPAU20LCAAN**	101358	10
	GPS1*H and GPS2...	240V 50Hz / 277V 60Hz	**GPAU20LCAAR**	101359	10
	GPS1*H and GPS2...	380/400V 50Hz	**GPAU20LCAAU**	101360	10
	GPS1*H and GPS2...	415/440V 50Hz / 460/480V 60Hz	**GPAU20LCAAW**	101361	10
	GPS1*H and GPS2...	500V 50Hz / 600V 60Hz	**GPAU20LCAAY**	101362	10
	GPS1*H and GPS2...	100V 50/60Hz	**GPAU20LCAA11**	112185	10

Terminal protector

101509

107182

Description	For use with	Cat. no.	Ref. no.	Pack.
Snap-in tabs for screw mounting (set of 10)	GPS1*	**GPAKS1A**	101509	1
IP20 terminal covers	GPS2*	**GPAPTP2A**	107182	50
DIN rail vibration clamps	GPS1* / GPS2*	**GPVDA**	101514	2
Panel vibration clamps	GPS1* / GPS2*	**GPVPA**	101515	2

Increases vibration resistance of GPS1* from 5G to 8G (5-150 Hz) in all directions. One clamp must be mounted on each side which increases total mounting width by 22 mm (0.87").
For vibration resistance of GPS2*, contact customers service.

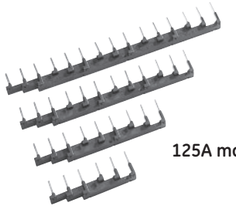
External handle operator

Description	For use with	Type	Cat. no.	Ref. no.	Pack.
Used for distance mounting on a panel	GPS1*H...	Standard (black)	**GPA1HAB**	101363	5
	GPS1*H ...	Emergency (red/yellow)	**GPA1HAR**	101364	5
Lockable with 1, 2 or 3 padlocks diameter 4 to 8 mm	GPS2...	Standard (black)	**GPA2HAB**	101502	5
Two types: standard and emergency applications	GPS2 ...	Emergency (red/yellow)	**GPA2HAR**	101503	5
ON/OFF/TRIPPING position marking					
Protection degree: IP54					
Shaft mounting depths:					
139.8 - 289.8 mm for GPA1HAB, GPA1HAR					
161 - 311.1 mm for GPA2HAB, GPA2HAR					
Package parts and quantities:					
1 handle unit					
1 shaft					
1 shaft guide					
1 latch (screws)					
4 mounting screws					

Busbar system

3-phase feed-in terminals

Main busbar 63A max.



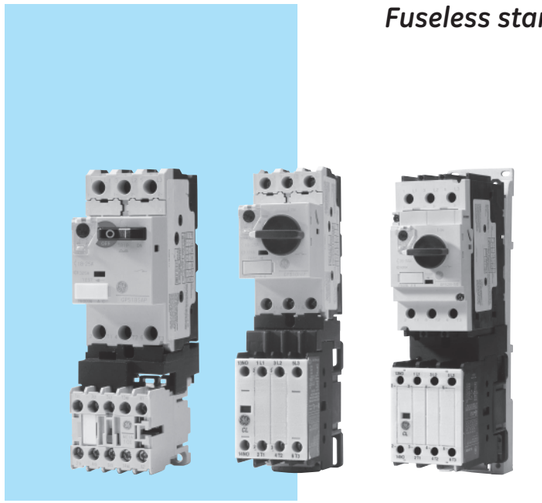
125A max.

Busbar cover

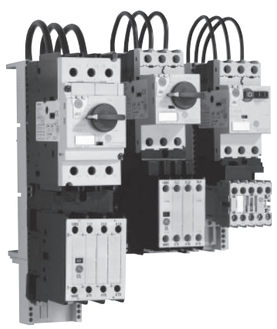
Terminal cover type E

Description	For use with	Connection	Cat. no.	Ref. no.	Pack.
Main feeding terminal Upper connection	GPS1...	Terminal capacity: 25 mm² Pin	**GPB1FA**	107186	10
	GPS2...	Terminal capacity: 50 mm² Pin	**GPB2FA**	107187	10
	GPS1...	Terminal capacity: 25mm² Fork	**SFVB8**	254537	1
Modular spacing 45 mm	for 2 GPS1... + frontal auxiliaries	Pin	**GPB1B02A**	101390	5
	for 3 GPS1... + frontal auxiliaries	Pin	**GPB1B03A**	101391	5
	for 4 GPS1... + frontal auxiliaries	Pin	**GPB1B04A**	101392	5
	for 5 GPS1... + frontal auxiliaries	Pin	**GPB1B05A**	101393	5
Modular spacing 54 mm	for 2 GPS1... + 9mm lateral aux.	Pin	**GPB1B12A**	101394	5
	for 3 GPS1... + 9mm lateral aux.	Pin	**GPB1B13A**	101395	5
	for 4 GPS1... + 9mm lateral aux.	Pin	**GPB1B14A**	101396	5
	for 5 GPS1... + 9mm lateral aux.	Pin	**GPB1B15A**	101397	5
Modular spacing 63 mm	for 2 GPS1... + 18mm lateral aux. or 2 x 9mm lateral auxiliary	Fork	**GPB1B22A**	101398	10
	for 4 GPS1... + 18mm lateral aux. or 2 x 9mm lateral auxiliary	Fork	**GPB1B24A**	101399	10
Modular spacing 55 mm	for 2 GPS2... + frontal auxiliaries	Pin	**GPB2B02A**	101400	1
	for 3 GPS2... + frontal auxiliaries	Pin	**GPB2B03A**	101401	1
	for 4 GPS2... + frontal auxiliaries	Pin	**GPB2B04A**	101402	1
Modular spacing 64 mm	for 2 GPS2... + 9mm lateral aux.	Pin	**GPB2B12A**	101403	1
	for 3 GPS2... + 9mm lateral aux.	Pin	**GPB2B13A**	101404	1
	for 4 GPS2... + 9mm lateral aux.	Pin	**GPB2B14A**	101405	1
Modular spacing 73 mm	for 2 GPS2... + 18mm lateral aux. or 2 x 9mm lateral auxiliary	Pin	**GPB2B22A**	101406	1
	for 4 GPS2... + 18mm lateral aux. or 2 x 9mm lateral auxiliary	Pin	**GPB2B24A**	101407	1
Touch guard for non used space	GPS1...	Pin	**GPB1GA**	101408	10
	GPS1...	Fork	**GPB1GAF**	101511	1
	GPS2...	Pin	**GPB2GA**	101409	10
For compliance UL508E	GPS1...H	-	**GPAPT1E**	107315	1

When using a Surion GPS1*BH as a manual self-protected combination motor starter (Type E).
Cover enables compliance with NEC Section 430-52, 1" over air creepage and over surface clearance, phase to phase on the line side.



Fuseless starters and busbar adapter plates



Product range

- Link modules for mechanical and electrical connection of the manual motor starter and the M / CL contactor range
- Base plates for Din rail and busbar adapters
- Wiring kits for reversing applications
- Link connection for two base plates for three phase busbar system with 40 and 60mm center line spacing and 5 to 10mm thickness
- Accessories

Technical performances

- Compact and high performance solution
- Easy accessibility to the contactor coil terminal A1-A2
- Save spacing only using 45 and 55mm width base plates for busbar adapters
- Quick “clip on” and secure connections
- Minimum 50kA short-circuit breaking capacity applies throughout

For fuseless starter application turn the contactor 180° to have direct accessibility to the A1-A2 coil terminals when contactor is assembled to the manual motor starter. Then fit the contactor plastic cover into the contactor front to have the terminal numbering in the correct position.
Note: when turning the contactor 180° the built-in auxiliary contact (in case) will be located on the first left side terminal.

Thermal and magnetic protection
GPS1B ● pg. C.2
GPS2B ● pg. C.4
GPS1M ● pg. C.6
GPS2M ● pg. C.8

Contactors
Serie M ● pg. A.44
Serie CL ● pg. A.52

Coordination tables ● pg. D.11
Dimensions ● pg. D.40

Fuseless starters

	Description	For use with contactor	ac/dc	Frame size	Cat. no.	Ref. no.	Pack.
Link modules	For mechanical and electrical connection between contactors and manual motor starters	MC0.., MC1..	ac/dc	GPS1	**GPF1LMCBA**	101410	5
		CL00A.., CL01A.., CL02A..	ac	GPS1	**GPF1L02AA**	101411	5
		CL00D.., CL01D.., CL02D..	dc	GPS1	**GPF1L02DA**	101412	5
		CL25A..	ac	GPS1	**GPF1L25AA**	101413	5
		CL25D..	dc	GPS1	**GPF1L25DA**	101414	5
		CL03A.., CL04A	ac	GPS1	**GPF1L04AA**	107165	5
		CL03D.., CL04D	dc	GPS1	**GPF1L04DA**	107166	5
		CL03A.., CL04A..	ac	GPS2	**GPF2L04AA**	107190	5
		CL45A..	ac	GPS2	**GPF2L45AA**	101415	5
		CL03D.., CL04D..	dc	GPS2	**GPF2L04DA**	107191	5
		CL45D..	dc	GPS2	**GPF2L45DA**	101416	5
		CL06A.., CL07A..	ac	GPS2	**GPF2L07AA**	101417	5
	Record Plus withCL09/10A						
	For mechanical and electrical connection between contactor and thermal overload relays RT1	CL00.. - CL25	ac/dc	GPS1	**GPF1L25CT1**	101512	5
		CL03.. - CL45	ac/dc	GPS2	**GPF1L45CT1**	101513	5
Base plates	Plastic plates for mounting the fuseless starter in panels or in 35 mm DIN rail	CL00.., CL01..,CL02..,CL25..	ac/dc	GPS1	**GPF1B1A**	101418	5
		CL03..,CL04.. and CL45..	ac/dc	GPS2	**GPF2B2A**	101419	5
		CL06..,CL07..	ac/dc	GPS2	**GPF2B3A**	101420	5
		CL03.., CL04..	ac/dc	GP	**GPF1B4A**	107163	5
Base plates	For use with MCCB Record Plus	-	-	-	**GPF3B5A**	107253	1
Link connector	For two base plates for reversing applications	-	-	-	**GPF1CBA**	101427	10

	Description	For use with contactor	Cat. no.	Ref. no.	Pack.
Plastic cover	Fit the plastic cover into the front of the correspondent contactor to allow a clear identification of the terminal numbering	CL00.., CL01.. and CL02 without built-in auxiliary contact	**GPF00C02**	107098	5
		CL00.., CL01.. and CL02 with built-in 1NO auxiliary contact	**GPF10C02**	107099	5
		CL00.., CL01.. and CL02 with built-in 1NC auxiliary contact	**GPF01C02**	107100	5
		CL25..	**GPF00C25**	107101	2
		CL03.., CL04.. without built-in auxiliary contact	**GPF00C04**	107102	5
		CL03.., CL04.. with built-in 1NO auxiliary contact	**GPF10C04**	107103	5
		CL03.., CL04.. with built-in 1NC auxiliary contact	**GPF01C04**	107105	5
		CL45..	**GPF00C45**	107106	5
		CL06.., CL07..	**GPF00C08**	107107	5

Enclosures for manual motor starters

Product range

- Surface and flush mounting plastic enclosures (IP41 and IP55)
- Neutral and ground connection
- Three different types of push-buttons
  - Mushroom with impulse function
  - Mushroom self latching, unlatching by turning
  - Mushroom self latching, unlatching with a key
- Indicator lamps
- Padlocking device for three padlocks
- Conversion kit IP41 to IP55

Technical performances

- **Used with GPS1*S manual motor starters**
- **Protection degree IP41 or IP55**
- **Possibility to mount frontal/lateral auxiliary contact blocks with an undervoltage release (without or with 2NO early make auxiliary contacts) inside the enclosures**

Manual motor starter

GPS1B ● pg. C.2
GPS2B ● pg. C.4
GPS1M ● pg. C.6
GPS2M ● pg. C.8

*Enclosures for only GPS 1*S*

Plastic enclosures

Description	Cat. no.	Ref. no.	Pack.
Surface mounting IP41	**GPES41A**	101365	1
Surface mounting IP55	**GPES55A**	101366	1
Flush mounting IP41	**GPEF41A**	101367	1
Flush mounting IP55	**GPEF55A**	101368	1

Mounting accessories for all enclosures

Neutral connection

Description	Cat. no.	Ref. no.	Pack.
To be used inside the enclosure	**GPENA**	101369	1

Adaptor set

Description	Cat. no.	Ref. no.	Pack.
For enclosures used with GPS1*S and undervoltage release with 2 NO auxiliary contacts	**GPEUTA**	107097	1

Padlocking device

Description	Cat. no.	Ref. no.	Pack.
For three padlocks with max. 8 mm shackle diameter Not to be used with emergency stop handle	**GPEPA**	101370	1

Conversion kit IP41 to IP55

Description	Cat. no.	Ref. no.	Pack.
	GPECA	101371	1

Mushroom push-button

Description	Cat. no.	Ref. no.	Pack.
Mushroom spring return	**GPEPMA**	101372	1
Mushroom self latching, turn to release	**GPEPLA**	101373	1
Mushroom self latching, release with a key	**GPEPKA**	101374	1

Indicator lamps

Description	Cat. no.	Ref. no.	Pack.
Green 110/120V	**GPELGAJ**	101375	1
Green 220/240V	**GPELGAN**	101376	1
Green 380/440V	**GPELGAU**	101377	1
Green 480/500V	**GPELGAX**	101378	1
Green 600V	**GPELGAY**	101379	1
Red 110/120V	**GPELRAJ**	101380	1
Red 220/240V	**GPELRAN**	101381	1
Red 380/440V	**GPELRAU**	101382	1
Red 480/500V	**GPELRAX**	101383	1
Red 600V	**GPELRAY**	101384	1
Transparent 110/120V	**GPELCAJ**	101385	1
Transparent 220/240V	**GPELCAN**	101386	1
Transparent 380/440V	**GPELCAU**	101387	1
Transparent 480/500V	**GPELCAX**	101388	1
Transparent 600V	**GPELCAY**	101389	1

Technical data

General data

Frame size	GPS1	GPS2
Rated insolation voltage Ui	690V	1000V
Rated operating voltage Ue	690V ac	690V ac
Rated impulse withstand strength Uimp	6kV	8kV
Rated frequency	50/60Hz	50/60Hz
Total power loss P (W)	0.16 to 25A 7W	up to 32A 11W
	32A 8.5W	40A to 50A 15W
Utilisation category:		63A 17W
IEC 947-2 (Circuit breaker)	Cat. A	Cat. A
IEC 947-4-1 (Motor starter)	AC3	AC3
Mechanical operational performance	100,000 (70,000 for 32A)	50,000
Electrical operational performance	100,000 (70,000 for 32A)	25,000
Max.operations per hour (motor start-up)	25	25
Ambient conditions:		
Storage temperature	-40°C to +80°C	-40°C to +80°C
Operation temperature	-25°C to +60°C	-25°C to +60°C
Temperature compensation	-20°C to +60°C	-20°C to +60°C
Ambient temperature compensation	yes	yes
Operational altitude	up to 2000m	up to 2000m
Shock resistance (IEC 68)	30g (width 20ms)	30g (width 20ms)
Vibration resistance	8g (5 to 150Hz)	8g (5 to 150Hz)
Shock -hazard prot. (acc.DIN VDE 0106)	fingerproof	fingerproof
Protection degree (acc.to IEC529)	IP20	IP10 (IP20 with acc GPAPTP2A)
Rated current Ie	up to 32A	up to 63A
Overload protection	IEC 947-4-1	IEC 947-4-1
Phase failure protection	yes	yes
Tripping class	10	10
Magnetic release (factory set)	13 x Iemax	13 x Iemax
Test trip button	yes	yes
Standards & Approvals		
IEC 947-1 / -2 / -4-1	yes	yes
DIN VDE 0660T 100 / 101 / 102	yes	yes
UL508	yes	yes
UL508 type E	Only GPS1*H	yes
CE	yes	yes
cULus	yes	yes
D / S / N / Fi	In process	-
Shipping approvals	yes	yes

Mounting data

Terminal capacity:		
Solid or stranded without end sleeve	1 x 1...10 mm^2	1 or 2 x 1...25 mm^2
	2 x 1...6 mm^2	
Stranded with end sleeve	1 or 2 x 1...6 mm^2	1 x 1...25 mm^2 / 2 x 1...16 mm^2
AWG	1 x 18...8 / 2 x 18...10	1 x 18...2 / 2 x 18...4
Operating mechanism lockable in OFF position diameter (mm)	3.5 to 4.5	3.5 to 4.5
Terminal type	screw	box
Tightening torque	2 Nm / 18Lb.in	5 Nm / 45 Lb.in
Screwdriver	Pz2 / slotted combination	Pz2 / slotted combination
Mounting:		
DIN-rail	yes	yes
Screws	no	yes
Operating position:		
turning to the front	30°	30°
turning to the back	90°	90°
turning to both sides	180°	180°
Handle operation	Rocker level / Rotary	Rotary
Dimensions		
width (mm)	45	55
height (mm)	90	120
depth (mm)	(GPS1*S) 75 / 92.5 (GPS1*H)	107.5

Ultimate short-circuit breaking capacity (Icu) in kA

Rated current (A)	A 1.6	B 0.25	C 0.4	D 0.63	E 1	F 1.6	G 2.5	H 4	J 6.3	K 10	L 13	M 16	N 20	P 25	R 32	S 40	T 50	U 63
For ranges GPS1BSA* / GPS1MSA*																		
220/230V	100	100	100	100	100	100	100	100	100	100	100	100	50	50	50	-	-	-
400/415V	100	100	100	100	100	100	100	100	100	100	50	25	25	25	25	-	-	-
440V	100	100	100	100	100	100	100	100	50	15	10	10	10	10	10	-	-	-
500/525V	100	100	100	100	100	100	100	100	50	10	6	6	6	6	6	-	-	-
600V	100	100	100	100	100	100	3	3	3	3	3	3	3	3	3	-	-	-
690V	100	100	100	100	100	100	3	3	3	3	3	3	3	3	3	-	-	-
For ranges GPS1BHA* / GPS1MHA*																		
220/230V	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	-	-	-
400/415V	100	100	100	100	100	100	100	100	100	100	100	50	50	50	50	-	-	-
440V	100	100	100	100	100	100	100	100	100	50	50	35	35	35	35	-	-	-
500/525V	100	100	100	100	100	100	100	100	100	50	42	10	10	10	10	-	-	-
600V	100	100	100	100	100	100	8	8	6	6	6	4	4	4	4	-	-	-
690V	100	100	100	100	100	100	8	8	6	6	6	4	4	4	4	-	-	-
For ranges GPS2BSA* / GPS2MSA*																		
220/230V	-	-	-	-	-	-	-	-	-	100	100	100	50	50	50	50	50	50
400/415V	-	-	-	-	-	-	-	-	-	100	50	25	25	25	25	25	25	25
440V	-	-	-	-	-	-	-	-	-	15	10	10	10	10	10	10	10	10
500/525V	-	-	-	-	-	-	-	-	-	10	6	6	6	6	6	5	5	5
600V	-	-	-	-	-	-	-	-	-	4	4	4	4	4	4	4	4	4
690V	-	-	-	-	-	-	-	-	-	4	4	4	4	4	4	4	4	4
For ranges GPS2BHA* / GPS2MHA*																		
220/230V	-	-	-	-	-	-	-	-	-	100	100	100	100	100	100	100	100	100
400/415V	-	-	-	-	-	-	-	-	-	100	100	50	50	50	50	50	50	50
440V	-	-	-	-	-	-	-	-	-	50	50	50	50	35	35	35	35	35
500/525V	-	-	-	-	-	-	-	-	-	50	42	12	12	12	10	10	10	10
600V	-	-	-	-	-	-	-	-	-	6	6	5	5	5	5	5	5	5
690V	-	-	-	-	-	-	-	-	-	6	6	5	5	5	5	5	5	5

Short-circuit proof with an Icu = 100kA or 50kA

Rated service short-circuit breaking capacity (Ics) in kA

Rated current (A)	A 1.6	B 0.25	C 0.4	D 0.63	E 1	F 1.6	G 2.5	H 4	J 6.3	K 10	L 13	M 16	N 20	P 25	R 32	S 40	T 50	U 63
For ranges GPS1BSA* / GPS1MSA*																		
220/230V	100	100	100	100	100	100	100	100	100	100	100	100	38	38	38	-	-	-
400/415V	100	100	100	100	100	100	100	100	100	100	38	19	19	19	19	-	-	-
440V	100	100	100	100	100	100	100	100	38	11	8	8	8	8	8	-	-	-
500/525V	100	100	100	100	100	100	100	100	38	8	5	5	5	5	5	-	-	-
600V	100	100	100	100	100	100	3	3	3	3	3	3	3	3	3	-	-	-
690V	100	100	100	100	100	100	3	3	3	3	3	3	3	3	3	-	-	-
For ranges GPS1BHA* / GPS1MHA*																		
220/230V	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	-	-	-
400/415V	100	100	100	100	100	100	100	100	100	100	100	38	38	38	38	-	-	-
440V	100	100	100	100	100	100	100	100	100	38	38	25	25	25	25	-	-	-
500/525V	100	100	100	100	100	100	100	100	100	38	32	8	8	8	8	-	-	-
600V	100	100	100	100	100	100	6	6	5	5	5	3	3	3	3	-	-	-
690V	100	100	100	100	100	100	6	6	5	5	5	3	3	3	3	-	-	-
For ranges GPS2BSA* / GPS2MSA*																		
220/230V	-	-	-	-	-	-	-	-	-	100	100	100	38	38	38	38	38	38
400/415V	-	-	-	-	-	-	-	-	-	100	32	19	19	19	19	19	19	19
440V	-	-	-	-	-	-	-	-	-	12	8	8	8	8	8	8	8	8
500/525V	-	-	-	-	-	-	-	-	-	8	5	5	5	5	5	4	4	4
600V	-	-	-	-	-	-	-	-	-	3	3	3	3	3	3	3	3	3
690V	-	-	-	-	-	-	-	-	-	3	3	3	3	3	3	3	3	3
For ranges GPS2BHA* / GPS2MHA*																		
220/230V	-	-	-	-	-	-	-	-	-	100	100	100	100	100	100	100	100	100
400/415V	-	-	-	-	-	-	-	-	-	100	100	38	38	38	38	38	38	38
440V	-	-	-	-	-	-	-	-	-	38	38	38	38	25	25	25	25	25
500/525V	-	-	-	-	-	-	-	-	-	38	32	9	9	9	8	8	8	8
600V	-	-	-	-	-	-	-	-	-	5	5	4	4	4	4	4	4	4
690V	-	-	-	-	-	-	-	-	-	5	5	4	4	4	4	4	4	4

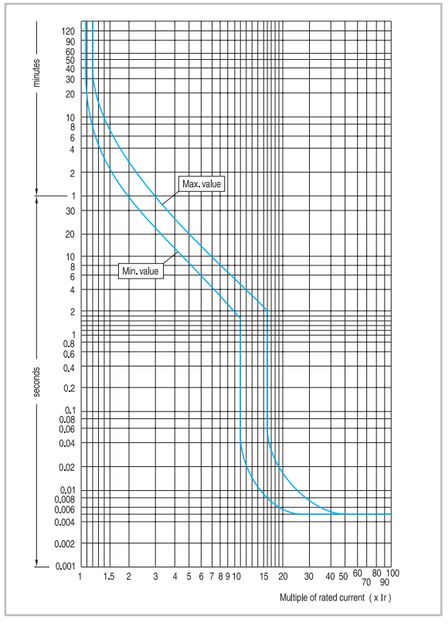
Back-up fuses are necessary in case of possibility of a short-circuit current higher than 100kA or 50kA at the installation point of the device (on request)
Ics = 100%Icu when Icu = 100kA
Ics = 75%Icu when Icu < 100kA

Back-up gI/gG fuses only if Ics > Icu (kA)

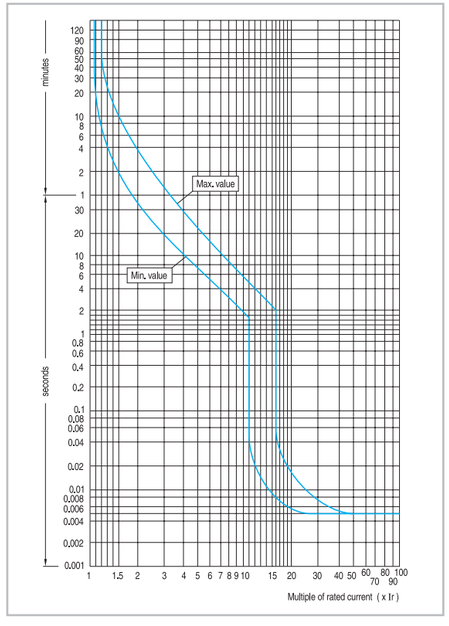
	For ranges GPS1BSA* / GPS1MSA*																	
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U
gI/gG fuses (A)	1.6	0.25	0.4	0.63	1	1.6	2.5	4	6.3	10	13	16	20	25	32	40	50	63
230V	#	#	#	#	#	#	#	#	#	#	#	#	100	100	100	-	-	-
400V	#	#	#	#	#	#	#	#	#	#	80	100	100	100	100	-	-	-
440V	#	#	#	#	#	#	#	#	50	63	63	80	80	80	80	-	-	-
500V	#	#	#	#	#	#	#	#	50	50	63	63	63	80	80	-	-	-
600V	#	#	#	#	#	#	20	32	40	50	63	63	63	80	80	-	-	-
690V	#	#	#	#	#	#	20	32	40	50	50	63	63	63	63	-	-	-
	For ranges GPS1BHA* / GPS1MHA*																	
230V	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	-	-	-
400V	#	#	#	#	#	#	#	#	#	#	#	100	125	125	125	-	-	-
440V	#	#	#	#	#	#	#	#	#	63	63	80	80	100	100	-	-	-
500V	#	#	#	#	#	#	#	#	#	50	63	80	80	80	80	-	-	-
600V	#	#	#	#	#	#	25	40	50	50	63	63	63	80	80	-	-	-
690V	#	#	#	#	#	#	25	40	50	50	63	63	63	63	63	-	-	-
	For ranges GPS2BSA* / GPS2MSA*																	
230V	-	-	-	-	-	-	-	-	-	#	#	#	125	125	125	125	125	160
400V	-	-	-	-	-	-	-	-	-	#	80	100	125	125	125	125	125	160
440V	-	-	-	-	-	-	-	-	-	63	63	80	80	100	100	125	125	125
500V	-	-	-	-	-	-	-	-	-	63	63	80	80	80	80	100	100	125
600V	-	-	-	-	-	-	-	-	-	63	63	63	63	80	80	100	100	100
690V	-	-	-	-	-	-	-	-	-	63	63	63	63	63	63	63	80	100
	For ranges GPS2BHA* / GPS2MHA*																	
230V	-	-	-	-	-	-	-	-	-	#	#	#	#	#	#	#	#	#
400V	-	-	-	-	-	-	-	-	-	#	#	100	125	125	125	125	125	160
440V	-	-	-	-	-	-	-	-	-	63	63	80	80	100	100	125	125	125
500V	-	-	-	-	-	-	-	-	-	63	63	80	80	80	80	100	100	125
600V	-	-	-	-	-	-	-	-	-	80	63	63	63	80	80	100	100	100
690V	-	-	-	-	-	-	-	-	-	80	63	63	63	63	63	63	80	100

Back-up gI/gG fuses only if Ics > Icu (kA)

Manual motor starter: GPS1...

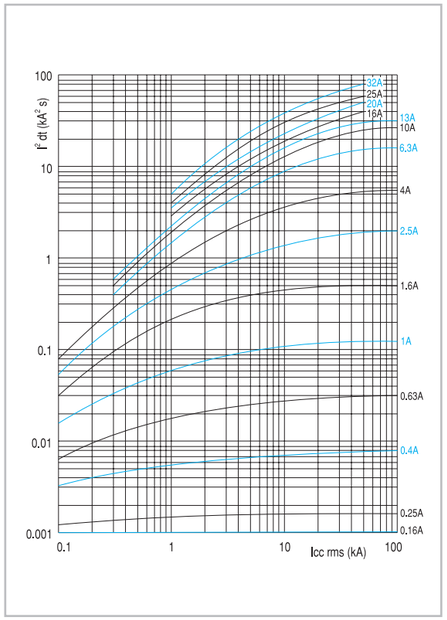


Manual motor starter: GPS2...

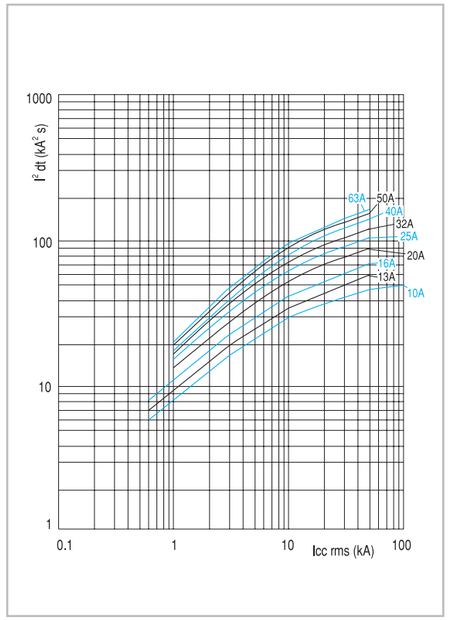


Specific let-through energy at Ue = 400/415 V

Manual motor starter: GPS1...

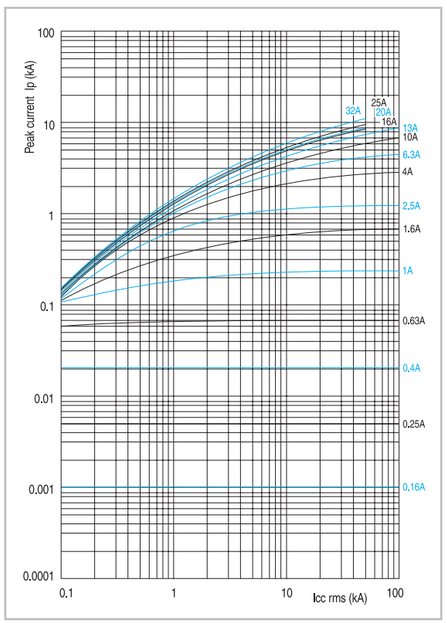


Manual motor starter: GPS2...

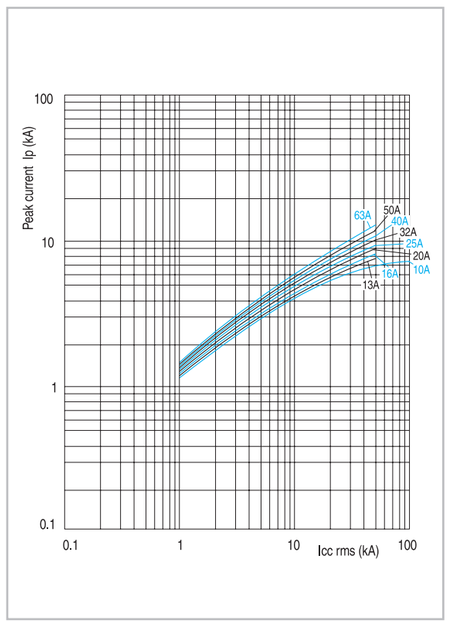


Peak current limitation at Ue = 400/415 V

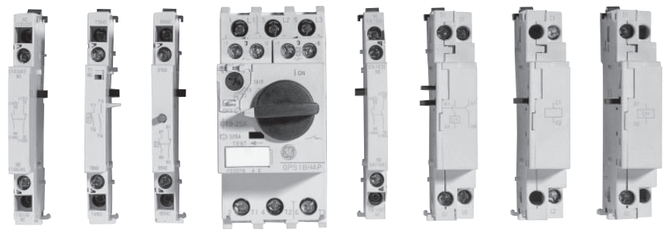
Manual motor starter: GPS1...

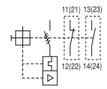
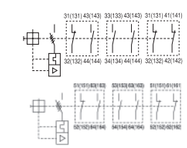
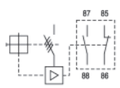
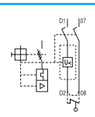


Manual motor starter: GPS2...



Mounting possibilities of the auxiliaries



Wiring diagram		Type	Description
Frontal auxiliaries	**Auxiliary contact block**	1NO or 1NC	Two frontal auxiliary contact blocks can be installed at the same time maintaining the overall width of the manual motor starter.
	**Alarm contact block**	1NO or 1NC	Installed on the frontal right side. Can be mounted in combination with the frontal auxiliary block. The overall width of the manual motor starter is maintained.
Lateral auxiliaries	**Auxiliary contact block**	2NO 1NO + 1NC 2NC	Different catalogue numbers for left or right mounting. Maximum number of auxiliary contact blocks mounted on each side: 2. Total number of auxiliary contacts in combination frontal and lateral: 8. Width of each lateral auxiliary contact block: 9 mm. GPS1 rated at 32A allows maximum 2 auxiliary contact blocks (4 contacts).
	**Auxiliary/alarm contact block**	1NO (alarm) + 1NO (auxiliary) 1NO (alarm) + 1NC (auxiliary) 1NC (alarm) + 1NO (auxiliary) 1NC (alarm) + 1NC (auxiliary)	Installed on the left side. Maximum number of blocks per manual motor starter: 1. Can be fitted together with one lateral auxiliary contact block or one short-circuit alarm block mounted on the left side. Width of each lateral alarm/auxiliary contact block: 9 mm.
	**Short-circuit alarm contact block**	1NO + 1NC	Installed on the left side. Tripping in case of short-circuit only. Can be fitted together with one lateral auxiliary contact block or one auxiliary/alarm block mounted on the left side. Width of each short-circuit alarm contact block: 9 mm.
	Shunt trip		Installed on the right side. Can not be mounted together with the undervoltage release or any lateral block mounted on the same side. Width of each shunt trip: 18 mm.
	Undervoltage trip		Installed on the right side. Can not be mounted together with a shunt trip device or any lateral block mounted on the same side. Width of each undervoltage trip: 18 mm
	**Undervoltage trip with 2NO early make auxiliary contacts**		Installed on the right side. Two different types, one for the GPS1*S.. and another for the GPS1*H..and GPS2.. Can not be mounted together with a shunt trip device or any lateral block mounted on the same side. Width of each undervoltage trip: 18 mm.

Shunt trip, undervoltage trip and undervoltage with 2NO contacts can be mounted together with any frontal block or left lateral block with above mentioned restrictions

Auxiliaries

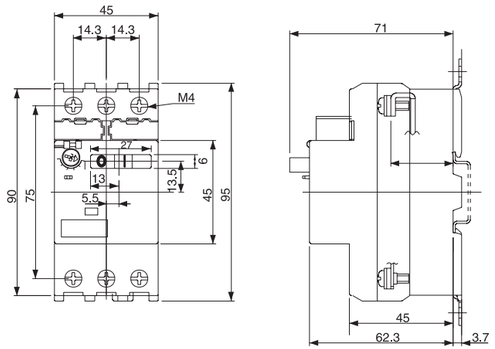
Catalogue reference	GPAC*F..	GPAC*L..	GPAL..	GPAD..	GPAE..
	Aux. frontal block	Aux. lateral block	Alarm frontal block	Alarm/aux. lateral block	Short-circuit alarm block
Cont. cap. contacts class (UL508)	B300 / Q300	A600 / P300	B300 / Q300	A600 / P300	A600 / P300
Back-up fuses gG, gl	6A	10A	6A	10A	10A
Utilization category AC-15					
Rated operating voltage Ue (Vac)	48 125 230	48 125 230 400 500 690	48 125 230	48 125 230 400 500 690	48 125 230 400 500 690
Rated operational current (A)	5 3 1.5	6 4 4 2.2 1.5 0.6	5 3 1.5	6 4 4 2.2 1.5 0.6	6 4 4 2.2 1.5 0.6
Utilization category DC-13					
Rated operating voltage Ue (Vdc)	48 110 220	48 110 220	48 110 220	48 110 220	48 110 220
Rated operational current (A)	1.38 0.55 0.27	5 1.3 0.5	1.38 0.55 0.27	5 1.3 0.5	5 1.3 0.5
Mounting data					
Mounting side	Front	Left or right	Frontal right	Left	Left
Terminals capacity:					
Solid or stranded without end sleeve	2x0.5...2.5 mm^2	2x0.5...2.5 mm^2	2x0.5...2.5 mm^2	2x0.5...2.5 mm^2	2x0.5...2.5 mm^2
AWG	2x18...14	2x18...14	2x18...14	2x18...14	2x18...14
Terminal type	screw	screw	screw	screw	screw
Tightening torque	0.8Nm	0.8Nm	0.8Nm	0.8Nm	0.8Nm
Screwdriver	Pz2/Slotted	Pz2/Slotted	Pz2/Slotted	Pz2/Slotted	Pz2/Slotted
Dimensions width (mm)	Maintain same width	Increase width 9 mm	Maintain same width	Increase width 9 mm	Increase width 9 mm

Catalogue reference	GPAU	GPAS
	Undervoltage trip	Shunt trip
Power consuption:		
Pick-up (VA/W)	21/12	21/12
Hold (VA/W)	8/1.2	-
Operating voltage		
Tripping (V)	0.35Ve-0.7Ve	0.7Ve-1.1Ve
Pick-up (V)	0.85Ve-1.1Ve	-
Max. operation supply (ms)	-	5[DC]
Rated operating voltage Ue	24V 50Hz	24V 50/60Hz
	24V 60Hz	48V 60Hz
	48V 50Hz	48V 50Hz / 60V 60Hz
	48V 60Hz	110/127V 50Hz / 120V 60Hz
	110/127V 50Hz / 120V 60Hz	208V 60Hz
	208V 60Hz	220/230V 50Hz / 240/260V 60Hz
	220/230V 50Hz / 240/260V 60Hz	240V 50Hz / 277V 60Hz
	240V 50Hz / 277V 60Hz	380/400V 50Hz
	380/400V 50Hz	415/440V 50Hz / 460/480V 60Hz
	415/440V 50Hz / 460/480V 60Hz	500V 50Hz / 600V 60Hz
	500V 50Hz / 600V 60Hz	24 to 60Vdc
		110 to 240Vdc
Contacts class (UL508)	-	-
Back-up fuses (gG,gl)	10A	10A
Mounting data		
Mounting side	Right	Right
Terminals capacity:		
Solid or stranded without end sleeve	2x0.5...2.5 mm^2	2x0.5...2.5 mm^2
AWG	2x18...14	2x18...14
Terminal type	Screw	Screw
Tightening torque	0.8Nm	0.8Nm
Screwdriver	Pz2/Slotted	Pz2/Slotted
Dimensions width (mm)	Increase width 18 mm	Increase width 18 mm

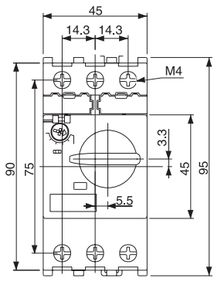
Detailed dimensions see page C.25

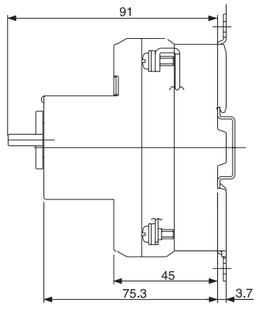
Dimensional drawings

Manual Motor Starter - GPS1 rocker

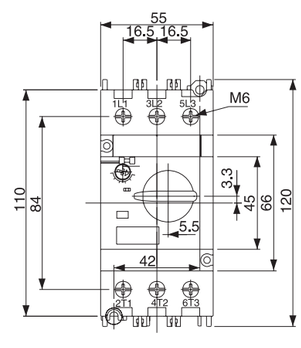


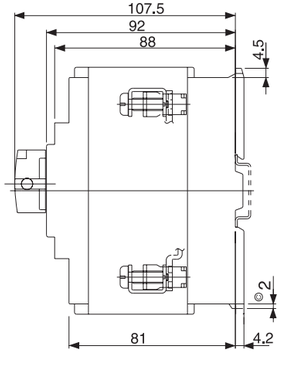
Manual Motor Starter - GPS1 rotary





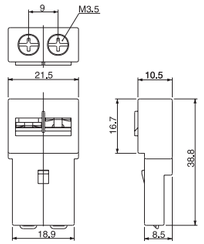
Manual Motor Starter - GPS2





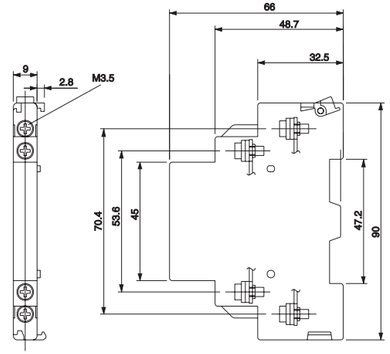
Auxiliary contact blocks

Frontal



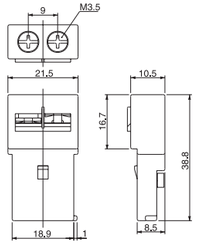
Auxiliary contact blocks

Lateral



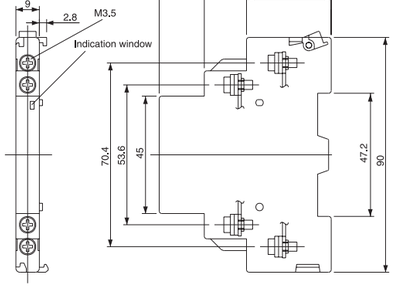
Alarm contact blocks

Frontal

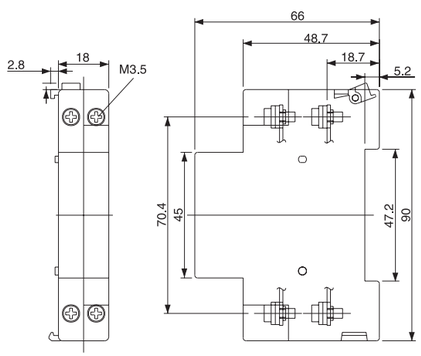


Alarm contact blocks

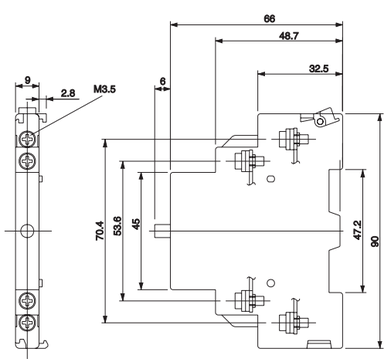
Lateral



Shunt and undervoltage trip devices

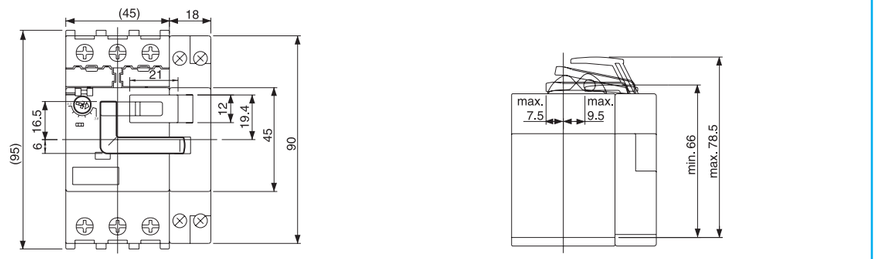


Short-circuit contact block

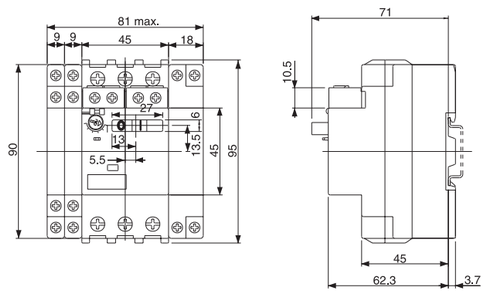


Dimensional drawings

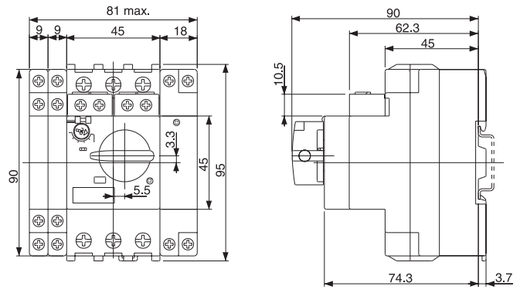
GPS1 rocker + Undervoltage trip device with 2NO contacts



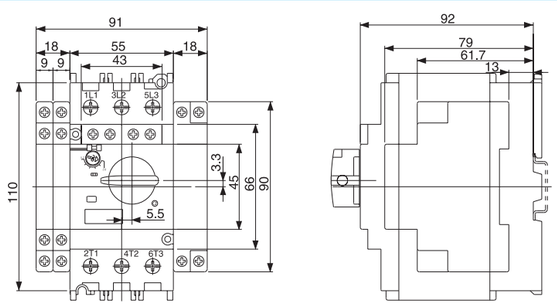
GPS1 rocker + Auxiliaries



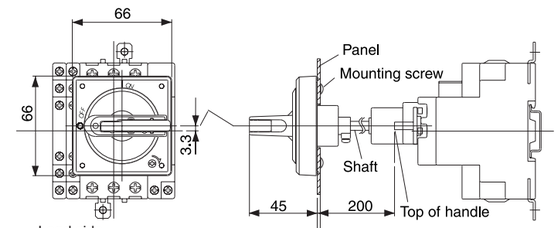
GPS1 rotary + Auxiliaries

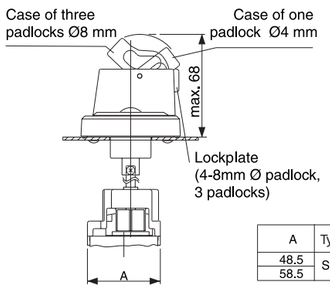


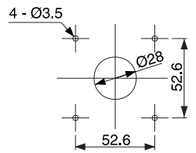
GPS2 + Auxiliaries



External handle operator



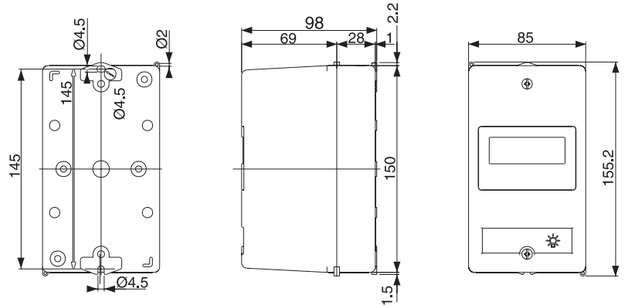




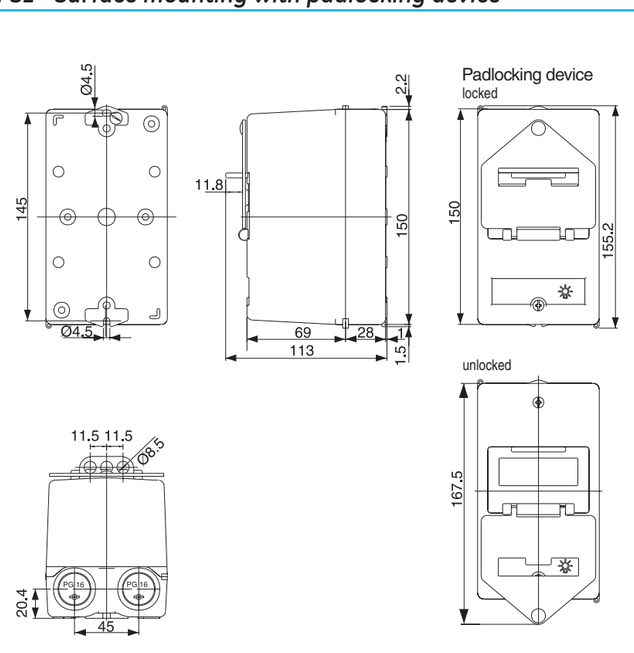
A	Type	Applicable frame
48.5	Standard / emergency stop	GPS1*H
58.5		GPS2

Dimensional drawings

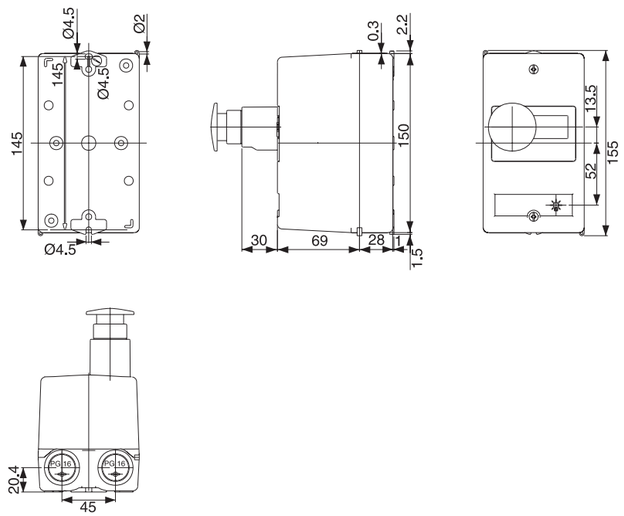
Enclosure for GPS1 - Surface mounting



Enclosure for GPS1 - Surface mounting with padlocking device

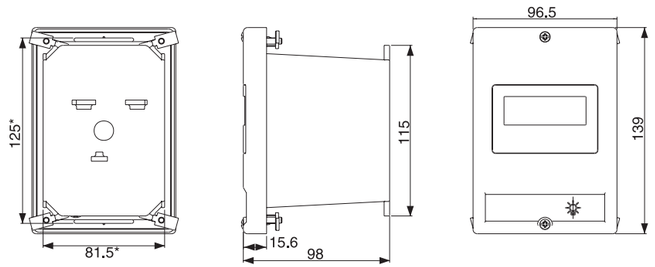


Enclosure for GPS1 - Surface mounting with emergency push-button



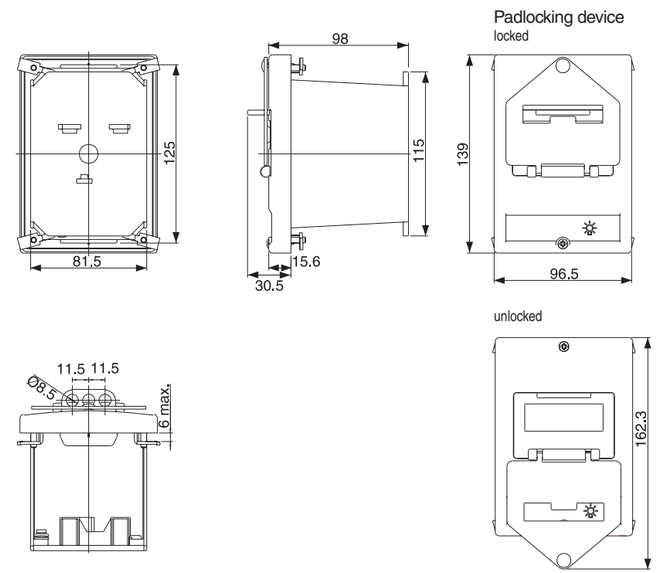
Dimensional drawings

Enclosure for GPS1 - Flush mounting

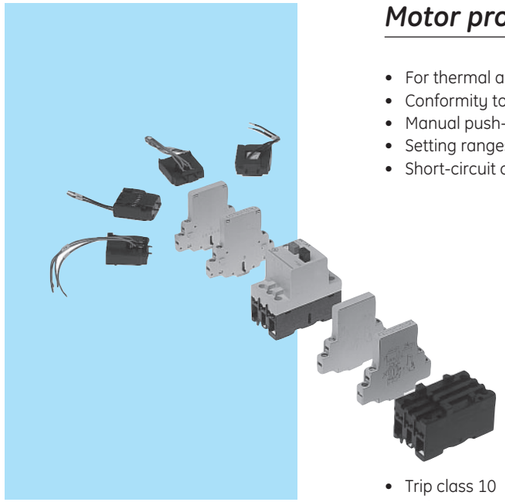


* The minimum dimensions of the window in the panel to allow flush mounting will be 126-128 x 82-84 mm

Enclosure for GPS1 - Flush mounting with padlocking device



Notes



Motor protection circuit breaker

- For thermal and magnetic protection of AC and DC motors
- Conformity to standards IEC 947-2, IEC 947-4-1 and VDE 0660
- Manual push-button operation
- Setting ranges from 0.1 to 25A at 690V AC and 220V DC
- Short-circuit capacity of 65kA up to setting range of 1.6-2.5A/400V
- Trip class 10
- Instant magnetic tripping (12 times the maximum operating current Ie)
- Single phase protection
- Ambient temperature compensation between – 5° C and + 40° C
- Internal and external accessories easy to mount
- Quick fixing on DIN rail EN 50022-35 and, with two screws, on plate or wall
- Terminals protected against accidental contacts (IP20)
- Suitable for isolation (⎍) and positive padlocking in open position (IEC 947-1 § 7-1-6)

Standards

IEC 947-2
IEC 947-4-1
VDE 0660

Approvals

UL cULus CE

Motor protection circuit breakers

3-phase motor AC3 380/415V kW	Magnetical tripping current A	Thermal tripping current (setting range) Min. A	Max. A	Cat. no.	Ref. no.	Pack
0.02	1.9	0.1	0.16	**SFK0A**	120001	1/5
0.06	3.0	0.16	0.25	**SFK0B**	120002	1/5
0.06 / 0.09	4.8	0.25	0.4	**SFK0C**	120003	1/5
0.12 / 0.18	7.5	0.4	0.63	**SFK0D**	120004	1/5
0.25	12	0.63	1	**SFK0E**	120005	1/5
0.37 / 0.55	19	1	1.6	**SFK0F**	120006	1/5
0.75	30	1.6	2.5	**SFK0G**	120007	1/5
1.1 / 1.5	48	2.5	4	**SFK0H**	120008	5
2.2	75	4	6.3	**SFK0I**	120009	5
3.7 / 4.0	120	6.3	10	**SFK0J**	120010	5
5.5 / 7.5	190	10	16	**SFK0K**	120011	5
9.0	240	16	20	**SFK0L**	120012	1/5
11 / 12.5	300	20	25	**SFK0M**	120013	1/5

Circuit breaker to protect transformers on request

Auxiliary contact blocks

					Cat. no.	Ref. no.	Pack
Side mounting		1NO	1NC		**SFAL11N**	120020	5
		2NO			**SFAL20N**	120021	5
		1NO	1NC		**SFAL11D**	120022	5
		(advanced on closing)					
		2NO			**SFAL20D**	120023	5
		(advanced on closing)					
For lower energy levels (≥ 4V, ≥ 4mA)	1change-over				**SFAL11S**	120027	1
	PE + N conductor				**SFALPEN**	264826	1
Internal mounting		1NO	1NC		**SFAI11**	120024	5
Switch trip indicator-alarm		1NO			**SFAK10**	120025	5
		1NC			**SFAK01**	120026	5

Coils for internal mounting

				Cat. no.	Ref. no.	Pack
Minimum power	Functioning range: 0.35Ue < U < 0.7Ue Manual reset Dissipated power 2.2VA / 1W					
	110V / 50Hz	120V / 60Hz		**SFB0RJ**	120034	5
	220V / 50Hz	240V / 60Hz		**SFB0RN**	120035	5
	380V / 50Hz	440V / 60Hz		**SFB0RU**	120036	5
Undervoltage release special for machinary	According to IEC204-1, DIN VDE 0113, INRS Art. L233-5 A combination of a special undervoltage release and auxiliary contact block SFAL20D					
	110V / 50Hz	120V / 60Hz		**SFB0RJM**	107256	1
	220V / 50Hz	240V / 60Hz		**SFB0RNM**	120114	1
	380V / 50Hz	440V / 60Hz		**SFB0RUM**	120115	1
Shunt trip	Functioning range: 0.7Ue < U < 1.2Ue Manual reset					
	110V / 50Hz	120V / 60Hz		**SFB0AJ**	120030	5
	220V / 50Hz	240V / 60Hz		**SFB0AN**	120031	5
	380V / 50Hz	440V / 60Hz		**SFB0AU**	120032	5

Current limiter

		Cat. no.	Ref. no.	Pack
Current limiter	Combined with SFK. Upgrades breaking capacity to 50kA/3~400V Not available UL, CSA.			
	In = 32A	**SFVH03**	120050	1

Enclosures

			Cat. no.	Ref. no.	Pack
Surface mounting					
	IP41-PG16		**SFS04**	120040	1
	Conversion kit IP55		**SFS0K2**	120046	1
	IP55-PG16		**SFS05**	120041	1
	IP41-M25		**SFS04M**	212558	1
	IP65-M25		**SFS05M**	212559	1
Flush mounting					
	IP41		**SFE04**	120042	1
	Conversion kit IP55		**SFE0K2**	120047	1
	IP55		**SFE05**	120043	1

Accessories for enclosures

			Cat. no.	Ref. no.	Pack
Neutral connection					
	For use with surface and flush mounting enclosures		**SFVN0**	101369	1
Padlocking device					
	Up to 3 padlocks 6 - 8 mm		**SFVCD**	120054	1
Emergency mushroom push-buttons IP55					
	Impulse function		**SFPS0**	120051	1
	Latched, pull to release		**SFPR0**	120052	1
	Key locked, turn to release		**SFPE0**	120053	5
	Conversion kit IP55 for SFS04		**SFS04K1**	245217	1
	Conversion kit IP55 for SFE04		**SFE04K1**	216604	1
Indicator lamps for AC and DC					
	Green 110/120V		**GPELGAJ**	101375	1
	Green 220/240V		**GPELGAN**	101376	1
	Green 380/440V		**GPELGAU**	101377	1
	Green 480/500V		**GPELGAX**	101378	1
	Green 600V		**GPELGAY**	101379	1
	Red 110/120V		**GPELRAJ**	101380	1
	Red 220/240V		**GPELRAN**	101381	1
	Red 380/440V		**GPELRAU**	101382	1
	Red 480/500V		**GPELRAX**	101383	1
	Red 600V		**GPELRAY**	101384	1
	Transparent 110/120V		**GPELCAJ**	101385	1
	Transparent 220/240V		**GPELCAN**	101386	1
	Transparent 380/440V		**GPELCAU**	101387	1
	Transparent 480/500V		**GPELCAX**	101388	1
	Transparent 600V		**GPELCAY**	101389	1

Continued on page C.35

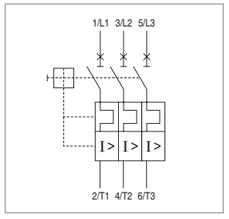
Accessories for enclosures (continued)

					Cat. no.	Ref. no.	Pack
Three phase busbar block	4 units	Ui 690V / Ie 63A	L = 207mm		**GPB104A**	101392	2
	5 units	Ui 690V / Ie 63A	L = 261mm		**GPB105A**	101393	2
	Plastic cover for 3 unused terminals				**GPB1GA**	101408	2
Supply block	Ie = 63A Fully insulated				**SFVB8**	254537	5

Terminal numbering

Motor protection circuit breaker

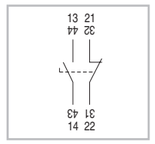
SFK...



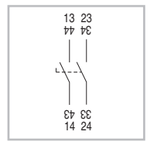
Auxiliary contact blocks

Side mounting

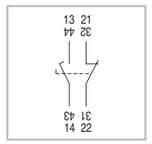
SFAL11N



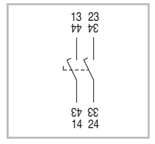
SFAL20N



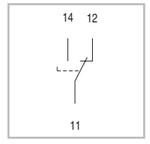
SFAL11D



SFAL20D

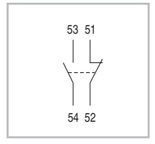


SFAL11S

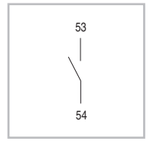


Internal mounting

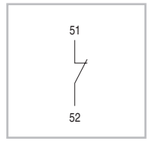
SFAI11



SFAK10



SFAK01



Technical data

General

Rated thermal current (Ith) at 40°C		25A
Rated insulation voltage (Ui)		690V
Rated operational voltage (Ue)	AC	690V, 40/60Hz
(see application diagram)	DC	220V, with or without earth

Standards

IEC 947-2 IEC 947-4-1 VDE 0660

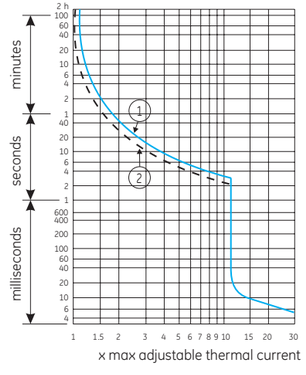
Approvals

UL CSA

Main circuit

Category		AC3, DC4
Operational frequency limits		40 to 60 Hz
Opening time		aprox. 7 ms
Mechanical endurance		10^5 operations
Electrical endurance category AC3		10^5 operations
Maximum operating rate		40 operations/hour
Total dissipated power at rated thermal current and hot state		6 W
Tripping characteristics		
Thermal		
Symmetrical overloads		Class 10 (see curve 1, tripping curves)
Asymmetrical overloads (phase failure)		To IEC 947-4-1 (see curve 2, tripping curves)
Temperature compensation		– 5 to + 40°C
Magnetic		12 x Ie (Ie = max. thermal setting value)
Shunt release		0.7 - 1.2 Ue 100% ED
Operating voltage limits		2.2 VA
Consumption	AC	1 W
	DC	0.85 - 1.1 Ue 100% ED
Undervoltage release		
Operating voltage limits		0.75 - 0.35 Ue
Breaking voltage limits		2.2 VA
Consumption		1 W
Wiring capacity		
Rigid wire	min.	2 wires of 0,75mm²
	max.	2 wires of 6mm²
Flexible wire	min.	2 wires of 0,75mm²
	max.	2 wires of 4mm²

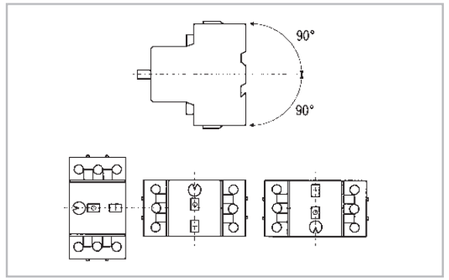
Tripping curve



(1) Thermal trip, operating with 3-phases

(2) Thermal differential trip (from cold) operating with 2-phases

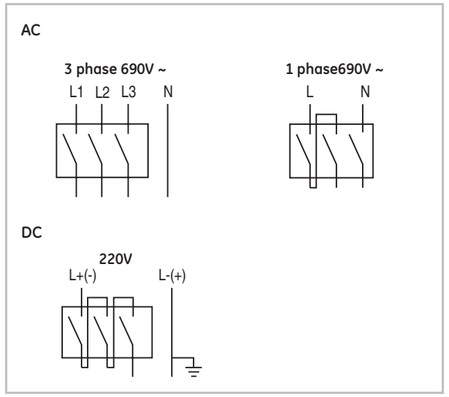
Mounting positions



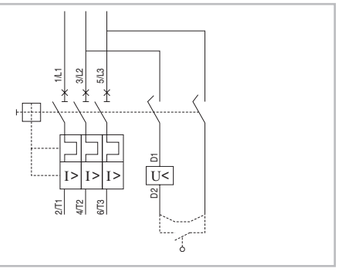
Auxiliary contact blocks

			SFAL			SFAI - SFAK		
Rated insulation voltage (Ui)			500V			500V		
according VDE 0110								
Rated thermal current (Ith)			6A			6A		
AC-15	Ue		230V	400V	500V	230V	400V	500V
	Ie		3,5A	2A	1A	2A	1A	0,5A
DC-13	Ue		60V	110V	220V	60V	110V	220V
	Ie		1,5A	1A	0,5A	0,7A	0,55A	0,25A
Protective fuse gl			6A			6A		
Wiring capacity,								
Flexible wire		min.	2 x 0.75mm²			2 x 0.75mm²		
		max.	2 x 2.5mm²			2 x 2.5mm²		
Terminal type			M3,5, Pozidriv, safety flange screws					

Wiring diagram



Application diagram for tooling machines



Short-circuit breaking capacity Icu/Ics according to IEC 947-2

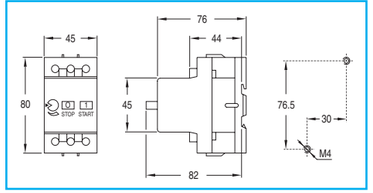
Thermal adjustment	230V AC / 220V DC (1)				400V AC				415V AC				500V AC				690V AC			
	3ph motor AC3	Icu	Ics	Fuse (2)	3ph motor AC3	Icu	Ics	Fuse (2)	3ph motor AC3	Icu	Ics	Fuse (2)	3ph motor AC3	Icu	Ics	Fuse (2)	3ph motor AC3	Icu	Ics	Fuse (2)
(A)	(kW)	(kA)	(kA)	(A)	(kW)	(kA)	(kA)		(kW)	(kA)	(kA)	(A)	(kW)	(kA)	(kA)	(A)	(kW)	(kA)	(kA)	(A)
0.1 - 0.16	–	65	65	(3)	0.02	65	65	(3)	0.02	65	65	(3)	0.04	65	65	(3)	0.06	42	42	(3)
0.16 - 0.25	–	65	65	(3)	0.06	65	65	(3)	0.06	65	65	(3)	0.06	65	65	(3)	0.12	42	42	(3)
0.25 - 0.4	0.06	65	65	(3)	0.09	65	65	(3)	0.12	65	65	(3)	0.12	65	65	(3)	0.18	42	42	(3)
0.4 - 0.63	0.09	65	65	(3)	0.12	65	65	(3)	0.18	65	65	(3)	0.25	65	65	(3)	0.37	42	42	(3)
0.63 - 1	0.12	65	65	(3)	0.25	65	65	(3)	0.25	65	65	(3)	0.37	65	65	(3)	0.75	1	1	20
1 - 1.6	0.25	65	65	(3)	0.55	65	65	(3)	0.55	65	65	(3)	0.75	65	65	(3)	1.1	1	1	20
1.6 - 2.5	0.37	65	65	(3)	0.75	65	65	(3)	0.75	10	5	25	1.1	3	1.5	25	1.5	1	0.5	20
2.5 - 4	0.75	65	65	(3)	1.5	10 (4)	5 (4)	35	1.5	10	5	35	2.2	3	1.5	35	3	1	0.5	25
4 - 6.3	1.1	65	37,5(4)	(3)	2.2	10 (4)	5 (4)	50	2.2	10	5	50	3	3	1.5	50	4	1	0.5	35
6.3 - 10	2.2	10 (4)	5 (4)	80	4	4 (4)	2 (4)	80	4	4	2	80	5.5	3	1.5	50	7.5	1	0.5	35
10 - 16	4	6 (4)	3 (4)	80	7.5	4 (4)	2 (4)	80	7.5	3.5	1.75	80	9	3	1.5	63	11	1	0.5	35
16 - 20	5	6 (4)	3 (4)	80	9	4 (4)	2 (4)	80	9	2.5	1.25	80	11	1.5	0.75	63	15	1	0.5	50
20 - 25	5.5	6 (4)	3 (4)	80	11	4 (4)	2 (4)	80	12.5	2.5	1.25	80	15	1.5	0.75	63	22	1	0.5	50

Icu = Ultimate short-circuit breaking capacity
Ics = Service short-circuit breaking capacity

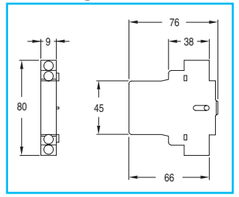
(1) At 220V, t = 15 ms
(2) Maximum value of the fuses when the presumed short circuit current is higher than the breaking capacity of the device. Type D, slow or NH type gG/gL.
(3) No back-up fuse required to the Icu value
(4) 50 kA in combination with current limiter

Dimensional drawings

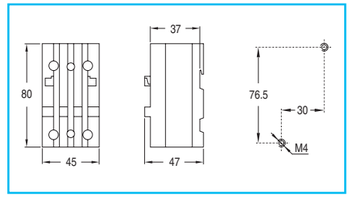
Motor protection circuit breaker



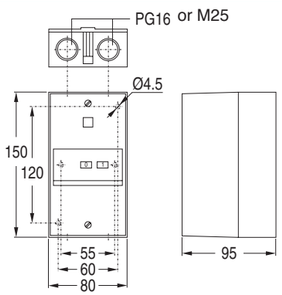
Auxiliary contact block



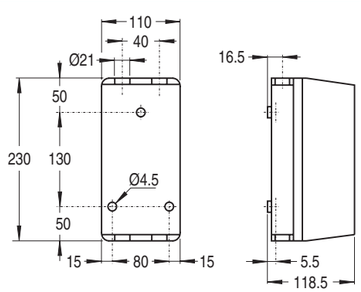
Current limiter



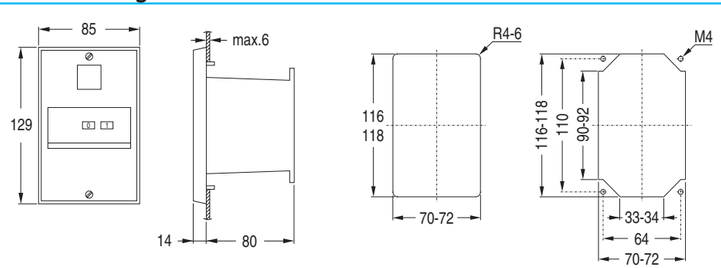
Enclosures: surface mounting



Enclosure to combine with contactor



Enclosures: flush mounting



Notes

Applications

D.3 Utilization categories

D.7 Electrical endurance

D.8 Machine directive - B10d value for contactors

Selection tables

D.9 Coordination tables

D.18 Direct-on-line starters

D.22 Star-delta starters

D.26 Autotransformer starters

D.28 Contactors for rotor starters

D.30 Contactors for rotor speed drives

D.32 Contactors for connection of power transformers

D.33 Contactors for capacitors (category AC6b)

D.34 Contactors for control lighting circuits

D.36 Contactors for DC utilization

D.38 Dimensional drawings - Fuseless starters

D.42 Wiring diagrams

D.42 Direc-on-line starters

D.45 Star-delta starters

D.46 Reversing starters

D.48 Dimensional drawings starters

Notes

Utilization categories according to IEC 60947-4-1

Standard utilization categories AC

Category	Typical applications
AC-1	Non-inductive or slightly loads. Resistance furnaces
AC-2	Slip-ring motors: starting, plugging
AC-3	Squirrel-cage motors (1): starting, switching off motors during running.
AC-4	Squirrel-cage motors: starting, plugging, inching.
AC-5 a	Discharge lamps
AC-5 b	Incandescent lamps
AC-6 a	Transformers
AC-6 b	Cos φ capacitors
AC-7 a	Slightly inductive loads for domestic applications
AC-7 b	Motors in domestic applications
AC-8 a	Drive motors for cooling compressors (2) with manual reset and thermal overload relay
AC-8 b	Drive motors for cooling compressors (2) with manual reset and automatic reset

Standard utilization categories DC

Category	Typical applications
DC-1	Non-inductive or slightly inductive loads. Resistance furnaces
DC-3	Shunt motors: starting, plugging, inching
DC-5	Series motors: starting, plugging, inching
DC-6	Incandescent lamps

(1) Category AC-3 can be used for accidental not continuous short period service, while mounting and testing machines. The number of operations shall not be greater than 5 per minute or 10 per 10 minutes.
(2) The drive motor of a hermetic cooling compressor is an assembly of a motor and compressor in the same housing, without any axle; the motor is working in the cooling liquid.
(3) Making conditions in alternating current are expressed by effective value. Moreover the asymmetrical current high value, referred to cos φ, can assume a higher value.
(4) Tolerance for cos φ = ± 0.05
(5) Tolerance for L/R = ± 15%

Making and breaking capacity

IEC 60947-4-1

Values given for closing and opening by intermittent use

Cat.	Rated current	Closing (3) Ic/Ie	Ur/Ue	cosφ(4)	Opening Ic/Ie	Ur/Ue	cosφ (4)
AC-1	All values	1.5	1.05	0.80	1.5	1.05	0.80
AC-2	All values	4	1.05	0.65	4	1.05	0.65
AC-3	Ie ≤ 100A	10	1.05	0.45	8	1.05	0.45
	Ie > 100A	10	1.05	0.35	8	1.05	0.35
AC-4	Ie ≤ 100A	12	1.05	0.45	10	1.05	0.45
	Ie > 100A	12	1.05	0.35	10	1.05	0.35

Cat.	Rated current	Closing Ic/Ie	Ur/Ue	L/R(5) (ms)	Opening Ic/Ie	Ur/Ue	L/R(5) (ms)
DC-1	All values	1.5	1.05	1	1.5	1.05	1
DC-3	All values	4	1.05	2.5	4	1.05	2.5
DC-5	All values	4	1.05	15	4	1.05	15

Electrical endurance

IEC 60947-4-1

Values given for closing and opening intermittent use

Cat.	Rated current	Closing (3) Ic/Ie	Ur/Ue	cosφ(4)	Opening Ic/Ie	Ur/Ue	cosφ(4)
AC-1	All values	1	1	0.95	1	1	0.95
AC-2	All values	2.5	1	0.65	2.5	1	0.65
AC-3	Ie ≤ 17A	6	1	0.65	1	0.17	0.65
	Ie > 17A	6	1	0.35	1	0.17	0.35
AC-4	Ie ≤ 17A	6	1	0.65	6	1	0.65
	Ie > 17A	6	1	0.35	6	1	0.35

Cat.	Rated current	Closing Ic/Ie	Ur/Ue (ms)	L/R(5)	Opening Ic/Ie	Ur/Ue (ms)	L/R(5)
DC-1	All values	1	1	1	1	1	1
DC-3	All values	2.5	1	2	2.5	1	2
DC-5	All values	2.5	1	7.5	2.5	1	7.5

Ue	Rated voltage
Ie	Rated current
Ur	Recovery voltage
Ic	Breaking current

Utilization category AC-1

Three pole contactors

Type			MC0	MC1	MC2	CL00	CL01	CL02	CL25	CL03	CL04	CL45	CL06	CL07	CL08	CL09	CL10
Max. operat. current	40°C	(A)	20	20	20	25	25	32	45	45	60	60	90	110	110	140	140
at ambient temp. of	55°C	(A)	20	20	20	25	25	32	45	45	60	60	90	110	110	140	140
(for all voltages)	70°C	(A)	16	16	16	20	20	25	32	32	48	48	72	88	88	110	110
Max. operat. power	230/220V	(kW)	7.5	7.5	7.5	9.5	9.5	12	17	17	22.5	22.5	30	42	42	53	53
Three-phase	400/380V	(kW)	13	13	13	16.5	16.5	22	29	29	39.5	39.5	55	72.5	72.5	92	92
resistors	440/415V	(kW)	15	15	13	18	18	23	32	32	43	43	57	79	79	100	100
	500V	(kW)	17	17	17	21.5	21.5	27.5	39	39	52	52	69	95	95	121	121
	690/660V	(kW)	22.5	22.5	22.5	28.5	28.5	38	51	51	68.5	68.5	95	125	125	160	160
Cable size		(mm^2)	2.5	2.5	2.5	4	4	6	10	10	16	16	35	35	35	50	50
Percentage of the max.	120 ops./h	(%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
operational current at	300 ops./h	(%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	600 ops./h	(%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	1200 ops./h	(%)	100	100	100	100	100	100	100	100	100	100	100	100	100	80	80
	3000 ops./h	(%)	50	50	50	50	50	50	50	50	50	50	50	50	50	40	40

Type			CK75C	CK08C	CK85B	CK09B	CK95B	CK10C	CK11C	CK12B	CK13B
Max. operat. current	40°C	(A)	250	250	315	315	450	600	700	1000	1250
at ambient temp. of:	55°C	(A)	200	200	252	252	382	510	546	736	1125
(for all voltages)	70°C	(A)	155	155	195	195	300	402	468	680	1060
Max. operat. power	230/220V	(kW)	90	90	114	114	170	191	234	289	450
Three-phase	400/380V	(kW)	155	155	196	196	310	329	406	500	780
resistors	440/415V	(kW)	180	180	227	227	343	329	470	578	904
	500V	(kW)	200	200	259	259	389	415	533	657	1027
	690/660V	(kW)	270	270	341	341	537	572	705	867	1354
	1000V	(kW)	400	400	517	517	780	866	1060	1314	2054
Cable size		(mm^2)	120	120	185	185	2x (30X5)	2x (30X8)	2x (30X8)	2x (30X10)	2x (30X10)
Percentage of the max.	120 ops./h	(%)	100	100	100	100	100	100	100	100	100
operational current at	300 ops./h	(%)	100	100	100	100	100	100	100	100	90
	600 ops./h	(%)	100	100	100	100	100	80	80	80	70
	1200 ops./h	(%)	80	80	80	80	80	–	–	–	–
	3000 ops./h	(%)	40	40	40	40	–	–	–	–	–

Four pole contactors

Type			MC0	MC1	MC2	CL01	CL02	CL03	CL04	CL05	CL07	CL08(1)	CL09(2)
Max. operat. current	40°C	(A)	20	20	20	25	32	45	60	90	110	110	140
at ambient temp. of:	55°C	(A)	20	20	20	25	32	45	60	90	110	110	140
(for all voltages)	70°C	(A)	16	16	16	20	25	32	48	72	88	88	110
Max. operat. power	230/220V	(kW)	7.5	7.5	7.5	9.5	12	17	22.5	30	42	42	53
Three-phase	400/380V	(kW)	13	13	13	16.5	22	29	39.5	55	72.5	72.5	92
resistors	440/415V	(kW)	15	15	15	18	23	32	43	57	79	79	100
	500V	(kW)	17	17	17	21.5	27.5	39	52	69	95	95	121
	690/660V	(kW)	22.5	22.5	22.5	28.5	38	51	68.5	95	125	25	160
Cable size		(mm^2)	2.5	2.5	2.5	4	6	10	16	35	35	35	50
Percentage of the max.	120 ops./h	(%)	100	100	100	100	100	100	100	100	100	100	100
operational current at	300 ops./h	(%)	100	100	100	100	100	100	100	100	100	100	100
	600 ops./h	(%)	100	100	100	100	100	100	100	100	100	100	100
	1200 ops./h	(%)	100	100	100	100	100	100	100	100	100	100	80
	3000 ops./h	(%)	50	50	50	50	50	50	50	50	50	50	40

Type			CK07B	CK08B	CK09B	CK95B	CK10C	CK11C	CK12B	CK13B
Max. operat. current	40°C	(A)	200	325	400	500	600	700	1000	1250
at ambient temp. of:	55°C	(A)	170	260	320	425	510	546	736	1125
(for all voltages)	70°C	(A)	140	201	272	335	402	468	680	1060
Max. operat. power	230/220V	(kW)	76	123	152	191	228	266	381	476
Three-phase	400/380V	(kW)	131	214	263	329	395	460	658	822
resistors	440/415V	(kW)	143	233	287	359	431	503	719	898
	500V	(kW)	173	281	346	415	519	606	866	1082
	690/660V	(kW)	228	371	457	572	686	800	1143	1428
	1000V	(kW)	–	562	692	866	1039	1212	1732	2165
Cable size		(mm^2)	95	185	2x (25X5)	2x (30X5)	2x (30X8)	2x (30X8)	2x (30X10)	2x (40X10)
Percentage of the max.	120 ops./h	(%)	100	100	100	100	100	100	100	100
operational current at	300 ops./h	(%)	100	100	100	100	100	100	100	90
	600 ops./h	(%)	100	100	100	100	80	80	80	70
	1200 ops./h	(%)	80	80	80	80	–	–	–	–
	3000 ops./h	(%)	40	40	40	40	–	–	–	–

Increase in maximum operational current through connection poles in parallel:
- 2 poles in parallel: Ie x 1.8
- 3 poles in parallel: Ie x 2.4
- 4 poles in parallel: Ie x 3.2

(1) Only types (2NO + 2NC)
(2) Only types (4NO)

Utilization category AC-3

Three pole contactors

Types			MC0	MC1	MC2	CL00	CL01	CL02	CL25	CL03	CL04	CL45	CL06	CL07	CL08	CL09	CL10
Operational current Ie for Ue ≤ 400V		(A)	6	9	12	9	12	18	25	25	32	40	50	65	80	95	105
Max. operat. power	230/220V	(kW)	1.5	3	3	2.2	3	4	7.5	7.5	9	11	15	18.5	22	25	30
Three-phase motors		(HP)	2	4	4	3	4	5.5	10	10	12	15	20	25	30	34	40
50/60Hz	400/380V	(kW)	2.2	4	5.5	4	5.5	7.5	12	12	16	18.5	22	30	37	45	55
		(HP)	3	5.5	7.3	5.5	7.5	10	16	16	22	25	30	40	50	60	75
	440/415V	(kW)	2.2	4	5.5	4	5.5	7.5	12	12	16	22	25	37	45	50	55
		(HP)	3	5.5	7.3	5.5	7.5	10	16	16	22	30	34	50	60	68	75
	500V	(kW)	3	4	5.5	5.5	7.5	10	15	15	18.5	25	30	40	45	55	65
		(HP)	4	5.5	7.3	7.5	10	13.5	20	20	25	34	40	55	60	75	88
	690/660V	(kW)	3	4	5.5	5.5	7.5	10	15	15	18.5	30	35	45	45	55	65
		(HP)	4	5.5	7.3	7.5	10	13.5	20	20	25	40	48	60	60	75	88
Percentage of the max.	120 ops./h	(%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
operational current at	300 ops./h	(%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	600 ops./h	(%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	1200 ops./h	(%)	100	100	100	100	100	100	100	100	100	100	100	100	100	75	75
	3000 ops./h	(%)	35	35	35	35	35	35	35	35	35	35	35	35	35	25	25

Type			CK75C	CK08C	CK85B	CK09B	CK95B	CK10C	CK11C	CK12B	CK13B						
Operational current Ie for Ue ≤ 400V		(A)	150	185	205	250	309	420	550	700	825						
Max. operat. power	230/220V	(kW)	45	55	65	75	90	125	160	220	250						
Three-phase motors		(HP)	60	75	88	100	125	170	220	300	340						
50/60Hz	400/380V	(kW)	75	90	110	132	160	220	280	375	450						
		(HP)	100	125	150	180	220	300	380	510	610						
	440/415V	(kW)	80	100	125	132	185	230	315	400	450						
		(HP)	108	135	170	180	250	312	425	540	610						
	500V	(kW)	100	110	132	160	200	300	400	480	500						
		(HP)	135	150	180	220	270	405	540	650	680						
	690/660V	(kW)	100	132	155	200	250	375	450	500	550						
		(HP)	135	180	205	270	335	510	610	680	750						
	1000V	(kW)	65	100	110	150	200	300	375	450	500						
		(HP)	88	135	150	205	270	405	510	610	680						
Percentage of the max.	120 ops./h	(%)	100	100	100	100	100	100	100	100	100						
operational current	300 ops./h	(%)	100	100	100	100	100	100	100	100	80						
	600 ops./h	(%)	100	100	100	100	100	75	75	75	65						
	1200 ops./h	(%)	75	75	75	75	75	–	–	–	–						
	3000 ops./h	(%)	25	25	25	25	–	–	–	–	–						

Utilization category AC-4

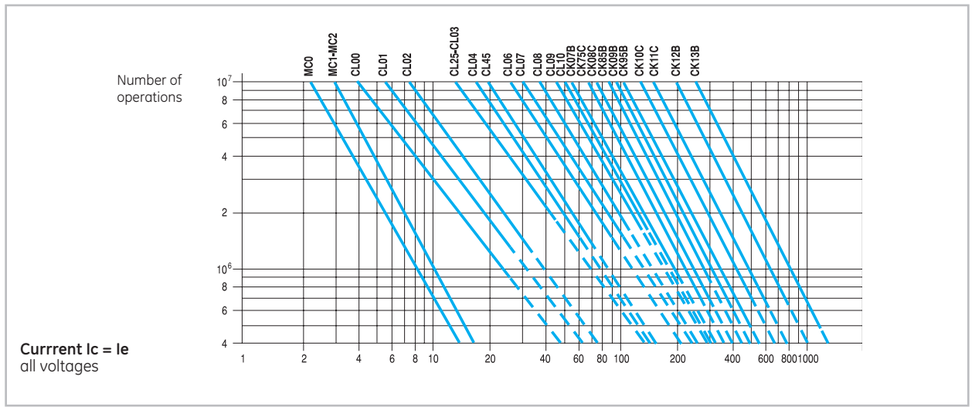
Three pole contactors

Type			MC0	MC1	MC2	CL00	CL01	CL02	CL25	CL03	CL04	CL45	CL06	CL07	CL08	CL09	CL10
Operational current Ue ≤ 690V		(A)	2.75	3.5	3.5	5	7	8	12	12	16	18.5	23	30	37	44	50
Operational power	230/220V	(kW)	0.55	0.75	0.75	1.1	1.5	1.8	3	3	3.7	4	5.5	7.5	10	11	13
(200.000 operations)		(HP)	0.73	1	1	1.5	2	2.4	4	4	5	5.3	7.3	9.7	13	14.6	17.3
	400/380V	(kW)	1.1	1.5	1.5	2.2	3	3.7	5.5	5.5	7.5	9	11	15	18.5	22	25
		(HP)	1.5	2	2	3	4	5	7.3	7.3	9.7	12	14.6	20	24.6	29.2	33
	500V	(kW)	1.5	2.2	2.2	3	4	5.5	7.5	7.5	10	11	15	18.5	22	25	30
		(HP)	2	3	3	4	5.3	7.3	9.7	9.7	13	14.6	20	24.6	29.2	33	40
	690/660V	(kW)	2.2	3	3	4	5.5	7.5	10	10	11	15	18.5	22	25	30	37
		(HP)	3	4	4	5.3	7.3	9.7	13	13	14.6	20	24.6	29.2	33	40	49
Max. operational current ≤ 400V		(A)	6	9	9	9	12	18	25	25	32	40	50	65	80	95	105
(35.000 operations)																	
Max. operational power	400/380V	(kW)	2.2	4	4	4	5.5	7.5	11	12	16	18.5	22	30	37	45	55

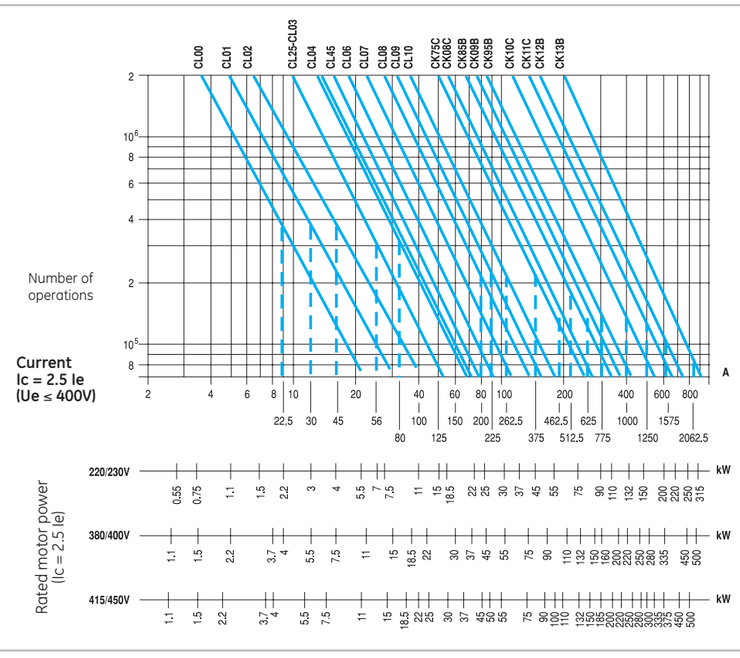
Type			CK75C	CK08C	CK85B	CK09B	CK95B	CK10C	CK11C	CK12B	CK13B						
Operational current Ue ≤ 400V		(A)	65	75	90	110	125	150	165	250	350						
Operational power	230/220V	(kW)	18.5	22	25	33	37	45	50	80	110						
Three-phase motors		(HP)	24.6	29.2	33	44	49	60	66.5	106	146						
50/60Hz	400/380V	(kW)	33	40	45	55	63	80	90	132	165						
(200.000 operations)		(HP)	44	53	60	73	83.8	106	119	175	219						
	500V	(kW)	45	50	63	75	90	100	110	225	250						
		(HP)	60	66.5	83.8	100	119	133	146	300	332						
	690/660V	(kW)	55	63	80	100	110	132	150	250	315						
		(HP)	73	83.8	106	133	146	175	200	332	419						
Max. operational current ≤ 400V		(A)	150	185	205	250	309	420	550	700	825						
(35.000 operations)																	
Max. operational power	400/380V	(kW)	75	90	110	132	160	220	280	375	450						

Electrical endurance

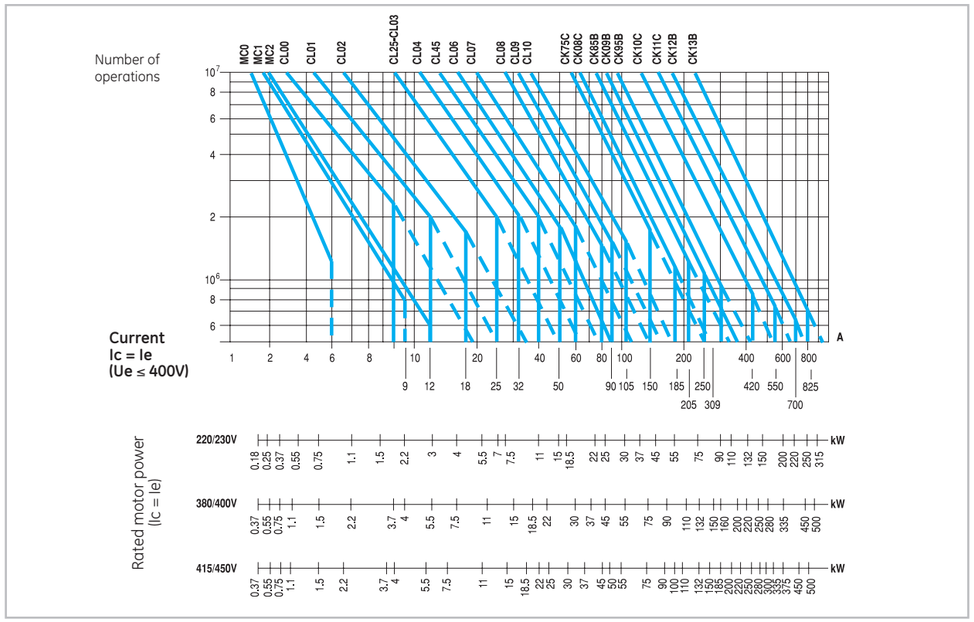
Category AC1



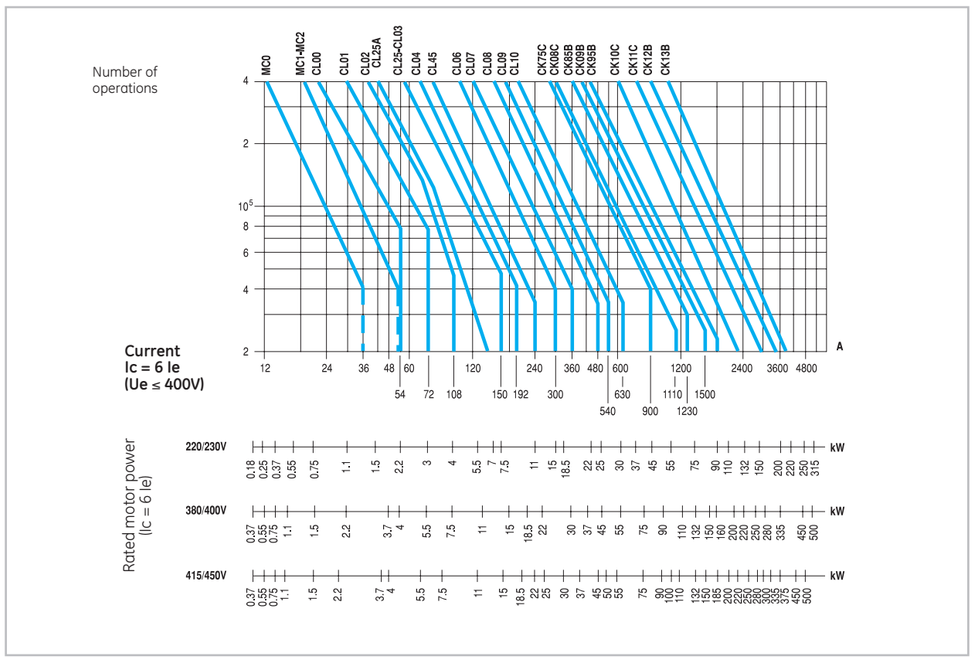
Category AC2



Category AC3



Category AC4



B10d value for contactors

According to ISO 13849-1

This part of ISO 13849 provides safety requirements and guidance on the principles for the design and integration of safety-related parts of control systems (SRP/CS), including the design of software. For these parts of SRP/CS, it specifies characteristics that include the performance level required for carrying out safety functions. It applies to SRP/CS, regardless of the type of technology and energy used (electrical, hydraulic, pneumatic, mechanical, etc.), for all kinds of machinery.

Terms and definitions

Fault: State of an item characterized by the inability to perform a required function, excluding the inability during preventive maintenance or other planned actions, or due to lack of external resources.

Failure: Termination of the ability of an item to perform a required function.

Dangerous failure: Failure which has the potential to put the SRP/CS in a hazardous or fail-to-function state

B10d: Number of cycles until 10 % of the components fails dangerously (for pneumatic and electromechanical components).

Confidence level: Statistical measure of the number of times out of 100 that test results can be expected to be within a specified range.

Calculations

Standard B10 values at a high demand rate. With the help of the B10 value and a simplified formula (see section 6.7.8.2.1 of EN 62061), the user can then calculate the total failure rate of an electromechanical component:

λ = 0.1 x C/B10
With C = operating cycles per hour. C is specified by the user. The failure rate is made up of safe (λ S) and dangerous (λ D) failures:
λ = λ S+ λ D or:
λ D = (share of dangerous failures in %) x λ
The failure rate of the dangerous failures λ D of the components used is needed for further calculations.
λ D = 50% (value recommended by ISO 13849-1)
λ S = (share of safe failures in %) x λ
The failure rate of the safe failures λ S of the components used is needed for further calculations.
λ S = 10%
CL = Confidence Level used for statistical calculations
Confidence Level used is needed for further calculations
CL = 60%
Listed in the following table are the standard B10 and B10d values and the share of dangerous failures for products groups, where B10d is determinate as:

$$B10_d = \frac{B10}{\text{Share of dangerous failures}}$$

Test

Electrical endurance (AC3) test has been conducted to collect data which have been taken to calculate B10d value for MC, Efficor (EC) and CL contactors series.
For contactors dangerous failures rate has been calculated according to IEC 60947-5-1. (λ D = 73%).

Results

	Contactor type	AC3 Current (A)	B10d ($x10^6$)
MC1	MC Series	9	1.4
EC09	Efficor	9	2.0
EC12	Efficor	12	2.0
EC18	Efficor	18	1.7
EC25	Efficor	25	1.7
EC32	Efficor	32	1.37
EC40	Efficor	40	1.37
CL06	CL Series	50	1.5
CL07	CL Series	65	1.5
CL08	CL Series	80	1.5
CL09	CL Series	95	1.5
CL10	CL Series	105	1.5

Technical data

Surion GPS-B: Coordination Type 1 65kA at 380/400V and 415V

MOTOR (1)			MANUAL MOTOR STARTER				CONTACTOR			LINKS
Rated power (kW)	Rated current 380/400V (A)	Rated current 415V	Cat. no.	Rated current In (A)	Thermal current Setting range (A)	Magnetic current (A)	Series	Smallest wire Cu (PVC)(2) 380/415V (mm^2)	Minimum frontal electrical safety clearance (mm)	Cat. no. (3)
0.06	0.23	0.21	GPS1BSAB	0.25	0.16 - 0.25	3.2	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02*
0.09	0.34	0.31	GPS1BSAC	0.4	0.25 - 0.4	5.2	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02*
0.12	0.44	0.4	GPS1BSAD	0.63	0.4 - 0.63	8.2	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02*
0.18	0.65	0.63	GPS1BSAE	1	0.63 - 1	13	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02*
0.25	0.9	0.8	GPS1BSAE	1	0.63 - 1	13	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02*
0.37	1.25	1.1	GPS1BSAF	1.6	1 - 1.6	20.5	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02*
0.55	1.6	1.5	GPS1BSAF	1.6	1 - 1.6	20.5	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02*
0.75	2	1.9	GPS1BSAG	2.5	1.6 - 2.5	32.5	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02*
1.1	2.6	2.5	GPS1BSAH	4	2.5 - 4	52	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02*
1.5	3.5	3.4	GPS1BSAH	4	2.5 - 4	52	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02*
2.2	5	4.5	GPS1BSAJ	6.3	4 - 6.3	82	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02*
3	7	6.5	GPS1BSAK	10	6.3 - 10	130	MC1 / CL00	1.5	20	GPF1LMCBA / GPF1L02*
4	9	8	GPS1BSAK	10	6.3 - 10	130	MC1 / CL00	1.5	20	GPF1LMCBA / GPF1L02*
5.5	12	11	GPS1BHAL	13	9 - 13	169	CL01	2.5	20	GPF1L02*
7.5	16	14	GPS1BHAM	16	11 - 16	208	CL02	2.5	20	GPF1L02*
11	22.5	21	GPS1BHAP	25	19 - 25	325	CL25	4	20	GPF1L25*
15	30	28	GPS1BHAR	32	24 - 32	416	CL04	6	20	GPF1L04*
11	22.5	21	GPS2BHAP	25	19 - 25	325	CL04	4	20	GPF2L04*
15	30	28	GPS2BHAR	32	24 - 32	416	CL04	6	20	GPF2L04*
18.5	37	35	GPS2BHAS	40	28 - 40	520	CL45	10	20	GPF2L45*
22	44	41	GPS2BHAT	50	35 - 50	650	CL06	10	25	GPF2L07AA
30	60	55	GPS2BHAU	63	45 - 63	820	CL07	16	25	GPF2L07AA

Surion GPS-B: Coordination Type 2 65kA at 380/400V and 415V

MOTOR (1)			MANUAL MOTOR STARTER				CONTACTOR			LINKS
Rated power (kW)	Rated current 380/400V (A)	Rated current 415V	Cat. no.	Rated current In (A)	Thermal current Setting range (A)	Magnetic current (A)	Series	Smallest wire Cu (PVC)(2) 380/415V (mm^2)	Minimum frontal electrical safety clearance (mm)	Cat. no. (3)
0.06	0.23	0.21	GPS1BHAB	0.25	0.16 - 0.25	3.2	CL00	1	20	GPF1L02*
0.09	0.34	0.31	GPS1BHAC	0.4	0.25 - 0.4	5.2	CL00	1	20	GPF1L02*
0.12	0.44	0.4	GPS1BHAD	0.63	0.4 - 0.63	8.2	CL00	1	20	GPF1L02*
0.18	0.65	0.63	GPS1BHAE	1	0.63 - 1	13	CL00	1	20	GPF1L02*
0.25	0.9	0.8	GPS1BHAE	1	0.63 - 1	13	CL00	1	20	GPF1L02*
0.37	1.25	1.1	GPS1BHAF	1.6	1 - 1.6	20.5	CL00	1	20	GPF1L02*
0.55	1.6	1.5	GPS1BHAF	1.6	1 - 1.6	20.5	CL00	1	20	GPF1L02*
0.75	2	1.9	GPS1BHAG	2.5	1.6 - 2.5	32.5	CL00	1	20	GPF1L02*
1.1	2.6	2.5	GPS1BHAH	4	2.5 - 4	52	CL25	1	20	GPF1L25*
1.5	3.5	3.4	GPS1BHAH	4	2.5 - 4	52	CL25	1	20	GPF1L25*
2.2	5	4.5	GPS1BHAJ	6.3	4 - 6.3	82	CL25	1	20	GPF1L25*
3	7	6.5	GPS1BHAK	10	6.3 - 10	130	CL25	1.5	20	GPF1L25*
4	9	8	GPS1BHAK	10	6.3 - 10	130	CL25	1.5	20	GPF1L25*
5.5	12	11	GPS1BHAL	13	9 - 13	169	CL25	2.5	20	GPF1L25*
7.5	16	14	GPS1BHAM	16	11 - 16	208	CL25	2.5	20	GPF1L25*
11	22.5	21	GPS1BHAP	25	19 - 25	325	CL25	4	20	GPF1L25*
15	30	28	GPS1BHAR	32	24 - 32	416	CL04	6	20	GPF1L04*
11	22.5	21	GPS2BHAP (4)	25	19 - 25	325	CL04	4	20	GPF2L04*
15	30	28	GPS2BHAR (4)	32	24 - 32	416	CL04	6	20	GPF2L04*
18.5	37	35	GPS2BHAS (4)	40	28 - 40	520	CL45	10	20	GPF2L45*
22	44	41	GPS2BHAT (4)	50	35 - 50	650	CL06	10	25	GPF2L07*
30	60	55	GPS2BHAU (4)	63	45 - 63	820	CL07	16	25	GPF2L07*

(1) Currents are relevant to four pole motors not having special characteristics of torque.
Inrush currents: 8 time rated current for 1s.
(2) The minimum cycle cross-sections are referred to an ambient temperature of 30°C max. in free air.
Cables are to withstand the maximum let-through energy and the motor rated current. Besides the user should consider the drop voltage on the cables, the type of laying and the ambient temperature.
(3) Complete cat. nrs., see page D.3
(4) Test running.

Surion GPS-B: Coordination Type 1 50kA at 500V and 525V

MOTOR (1)			MANUAL MOTOR STARTER				CONTACTOR			LINKS
Rated power (kW)	Rated current 500V (A)	Rated current 525V (A)	Cat. no.	Rated current In (A)	Thermal current Setting range (A)	Magnetic current (A)	Series	Smallest wire Cu (PVC)(2) 380/415V (mm^2)	Minimum frontal electrical safety clearance (mm)	Cat. no. (3)
0.06	0.17	0.16	GPS1BSAB	0.25	0.16 - 0.25	3.2	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02*
0.09	0.24	0.22	GPS1BSAB	0.25	0.16 - 0.25	3.2	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02*
0.12	0.33	0.3	GPS1BSAC	0.4	0.25 - 0.4	5.2	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02*
0.18	0.48	0.46	GPS1BSAD	0.63	0.4 - 0.63	8.2	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02*
0.25	0.66	0.64	GPS1BSAE	1	0.63 - 1	13	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02*
0.37	0.9	0.85	GPS1BSAE	1	0.63 - 1	13	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02*
0.55	1.2	1.15	GPS1BSAF	1.6	1 - 1.6	20.5	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02*
0.75	1.5	1.45	GPS1BSAF	1.6	1 - 1.6	20.5	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02*
1.1	2.1	1.9	GPS1BSAG	2.5	1.6 - 2.5	32.5	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02*
1.5	2.8	2.6	GPS1BSAH	4	2.5 - 4	52	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02*
2.2	3.9	3.6	GPS1BSAH	4	2.5 - 4	52	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02*
3	5.3	5	GPS1BSAJ	6.3	4 - 6.3	82	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02*
4	6.8	6.5	GPS1BHAK	10	6.3 - 10	130	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02*
5.5	9.1	8.6	GPS1BHAK	10	6.3 - 10	130	CL00	1.5	20	GPF1L02*
7.5	12	11.4	GPS1BHAL	13	9 - 13	169	CL01	2.5	20	GPF1L02*
10	15.5	14.8	GPS1BHAM	16	11 - 16	208	CL02	2.5	20	GPF1L02*
11	17.6	17	GPS1BHAN	20	14 - 20	260	CL25	2.5	20	GPF1L25*
15	23	22	GPS1BHAP	25	19 - 25	325	CL25	4	20	GPF2L25*
18.5	28.5	27	GPS1BHAR	32	24 - 32	416	CL04	6	20	GPF1L04*
11	17.6	17	GPS2BHAN	20	14 - 20	260	CL04	2.5	20	GPF2L04*
15	23	22	GPS2BHAP	25	19 - 25	325	CL04	4	20	GPF2L04*
18.5	28.5	27	GPS2BHAR	32	24 - 32	416	CL04	6	20	GPF2L04*
22	33	31.5	GPS2BHAS	40	28 - 40	520	CL45	6/10	20	GPF2L45*
30	45	43	GPS2BHAT	50	35 - 50	650	CL06	10	25	GPF2L07*
37	53	52	GPS2BHAU	63	45 - 63	820	CL07	16	25	GPF2L07*

Surion GPS-B: Coordination Type 2 50kA at 500V and 525V

MOTOR (1)			MANUAL MOTOR STARTER				CONTACTOR			LINKS
Rated power (kW)	Rated current 500V (A)	Rated current 525V (A)	Cat. no.	Rated current In (A)	Thermal current Setting range (A)	Magnetic current (A)	Series	Smallest wire Cu (PVC)(2) 380/415V (mm^2)	Minimum frontal electrical safety clearance (mm)	Cat. no. (3)
0.06	0.17	0.16	GPS1BS/HAB	0.25	0.16- 0.25	3.2	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02*
0.09	0.24	0.22	GPS1BS/HAB	0.25	0.16 - 0.25	3.2	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02*
0.12	0.33	0.3	GPS1BS/HAC	0.4	0.25 - 0.4	5.2	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02*
0.18	0.48	0.46	GPS1BS/HAD	0.63	0.4– 0.63	8.2	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02*
0.25	0.66	0.64	GPS1BS/HAE	1	0.63 - 1	13	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02*
0.37	0.9	0.85	GPS1BS/HAE	1	0.63 - 1	13	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02*
0.55	1.2	1.15	GPS1BS/HAF	1.6	1 - 1.6	20.5	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02*
0.75	1.5	1.45	GPS1BS/HAF	1.6	1 - 1.6	20.5	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02*
1.1	2.1	1.9	GPS1BS/HAG	2.5	1.6 – 2.5	32.5	CL00	1	20	GPF1L02*
1.5	2.8	2.6	GPS1BS/HAH	4	2.5 - 4	52	CL25	1	20	GPF1L25*
2.2	3.9	3.6	GPS1BS/HAH	4	2.5 - 4	52	CL25	1	20	GPF1L25*
3	5.3	5	GPS1BS/HAJ	6.3	4 - 6.3	82	CL25	1	20	GPF1L25*
4	6.8	6.5	GPS1BHAK	10	6.3 – 10	130	CL25	1	20	GPF1L25*
5.5	9.1	8.6	GPS1BHAK	10	6.3 – 10	130	CL25	1.5	20	GPF1L25*
7.5	12	11.4	GPS1BHAL	13	9 – 13	169	CL25	2.5	20	GPF1L25*
10	15.5	14.8	GPS1BHAM	16	11 – 16	208	CL25	2.5	20	GPF1L25*
11	17.6	17	GPS1BHAN	20	14 - 20	260	CL25	2.5	20	GPF1L25*
15	23	22	GPS1BHAP	25	19 - 25	325	CL04	4	20	GPF1L04*
18.5	28.5	27	GPS1BHAR	32	24 - 32	416	CL04	6	20	GPF1L04*
11	17.6	17	GPS2BHAN	20	14 - 20	260	CL04	2.5	20	GPF2L04*
15	23	22	GPS2BHAP	25	19 - 25	325	CL04	4	20	GPF2L04*
18.5	28.5	27	GPS2BHAR	32	24 - 32	416	CL45	6	20	GPF2L45*
22	33	31.5	GPS2BHAS	40	28 – 40	520	CL06	6/10	25	GPF2L07*
30	45	43	GPS2BHAT	50	35– 50	650	CL06	10	25	GPF2L07*
37	53	52	GPS2BHAU	63	45 - 63	820	CL07	16	25	GPF2L07*

(1) Currents are relevant to four pole motors not having special characteristics of torque. Inrush currents: 8 time rated current for 1s.
(2) The minimum cycle cross-sections are referred to an ambient temperature of 30°C max. in free air. Cables are to withstand the maximum let-through energy and the motor rated current. Besides the user should consider the drop voltage on the cables, the type of laying and the ambient temperature.
(3) Complete cat. nrs., see page D.3

Surion GPS-M and Record Plus: Coordination Type 1 65kA at 380/400V and 415V

MOTOR (1)			BREAKER				CONTACTOR	OVERLOAD RELAY			
Rated power (kW)	Rated current 380/400V (A)	Rated current 415V (A)	Cat. no.	Rated current In (A)	Magnetic setting Im Pick-up band ± 20% Im (A)	Magnetic current (A)	Series	Series	Setting range	Smallest wire Cu (PVC) (2) 380/415V (mm^2)	Min frontal safety clearance (mm)
0.06	0.23	0.21	GPS1MSAB	0.25	-	3.3	CL00	RT1B	0.16-0.26	1	20
0.09	0.34	0.31	GPS1MSAC	0.4	-	5.2	CL00	RT1C	0.25-0.41	1	20
0.12	0.44	0.4	GPS1MSAD	0.63	-	8.2	CL00	RT1D	0.4-0.65	1	20
0.18	0.65	0.63	GPS1MSAE	1	-	13	CL00	RT1D	0.4-0.65	1	20
0.25	0.9	0.8	GPS1MSAE	1	-	13	CL00	RT1F	0.65-1.1	1	20
0.37	1.25	1.1	GPS1MSAF	1.6	-	20.8	CL00	RT1G	1-1.5	1	20
0.55	1.6	1.5	GPS1MSAF	1.6	-	20.8	CL00	RT1H	1.3-1.9	1	20
0.75	2	1.9	GPS1MSAG	2.5	-	32.5	CL00	RT1J	1.8-2.7	1	20
1.1	2.6	2.5	GPS1MSAH	4	-	52	CL00	RT1K	2.5-4	1	20
1.5	3.5	3.4	GPS1MSAH	4	-	52	CL00	RT1K	2.5-4	1	20
2.2	5	4.5	GPS1MSAJ	6.3	-	81.9	CL00	RT1L	4-6.3	1	20
3	7	6.5	GPS1MSAK	10	-	130	CL00	RT1M	5.5-8.5	1.5	20
4	9	8	GPS1MSAK	10	-	130	CL00	RT1N	8-12	1.5	20
5.5	12	11	GPS1MHAL	13	-	169	CL01	RT1P	10-16	2.5	20
7.5	-	14	GPS1MHAM	16	-	208	CL02	RT1P	10-16	2.5	20
7.5	16	-	GPS1MHAM	16	-	208	CL02	RT1S	14.5-18	2.5	20
11	22.5	21	GPS1MHAP	25	-	325	CL25	RT1U	21-26	4	20
15	30	28	GPS1MHAR	32	-	416	CL04	RT1V	25-32	6	20
11	22.5	21	GPS2MHAP	25	-	325	CL04	RT1U	21-26	4	20
15	30	28	GPS2MHAR	32	-	416	CL04	RT1V	25-32	6	20
18.5	37	35	GPS2MHAS	40	-	520	CL45	RT1W	30-40	10	20
22	-	40	GPS2MHAT	50	-	650	CL06	RT2E	30-43	10	25
22	44	-	GPS2MHAT	50	-	650	CL06	RT2G	42-55	10	25
30	60	55	GPS2MHAU	63	-	819	CL07	RT2H	54-65	16	25
45	85	80	FDH36MC100GD	100	1000 - 1500	1140	CL09	RT2L	78 – 97	35	30
55	-	100	FDH36MC160JF	160	1600 - 2400	1400	CL10	RT2M	90 - 110	35	30
55	105	-	FDH36MC160JF	160	1600 - 240	1400	CL10	RT2M	90 - 110	35	30

Surion GPS-M and Record Plus: Coordination Type 2 65kA at 380/400V and 415V

MOTOR (1)			BREAKER				CONTACTOR	OVERLOAD RELAY			
Rated power (kW)	Rated current 380/400V (A)	Rated current 415V (A)	Cat. no.	Rated current In (A)	Magnetic setting Im Pick-up band ± 20% Im (A)	Magnetic current (A)	Series	Series	Setting range	Smallest wire Cu (PVC) (2) 380/415V (mm^2)	Min frontal safety clearance (mm)
0.06	0.23	0.21	GPS1MHAB	0.25	-	3.3	CL00	RT1B	0.16-0.26	1	20
0.09	0.34	0.31	GPS1MHAC	0.4	-	5.2	CL00	RT1C	0.25-0.41	1	20
0.12	0.44	0.4	GPS1MHAD	0.63	-	8.2	CL00	RT1D	0.4-0.65	1	20
0.18	0.65	0.63	GPS1MHAE	1	-	13	CL00	RT1D	0.4-0.65	1	20
0.25	0.9	0.8	GPS1MHAE	1	-	13	CL00	RT1F	0.65-1.1	1	20
0.37	1.25	1.1	GPS1MHAF	1.6	-	20.8	CL00	RT1G	1-1.5	1	20
0.55	1.6	1.5	GPS1MHAF	1.6	-	20.8	CL00	RT1H	1.3-1.9	1	20
0.75	2	1.9	GPS1MHAG	2.5	-	32.5	CL00	RT1J	1.8-2.7	1	20
1.1	2.6	2.5	GPS1MHAH	4	-	52	CL25	RT1K	2.5-4	1	20
1.5	3.5	3.4	GPS1MHAH	4	-	52	CL25	RT1K	2.5-4	1	20
2.2	5	4.5	GPS1MHAJ	6.3	-	81.9	CL25	RT1L	4-6.3	1	20
3	7	6.5	GPS1MHAK	10	-	130	CL25	RT1M	5.5-8.5	1.5	20
4	9	8	GPS1MHAK	10	-	130	CL25	RT1N	8-12	1.5	20
5.5	12	11	GPS1MHAL	13	-	169	CL25	RT1P	10-16	2.5	20
7.5	-	14	GPS1MHAM	16	-	208	CL25	RT1P	10-16	2.5	20
7.5	16	-	GPS1MHAM	16	-	208	CL25	RT1S	14.5-18	2.5	20
11	22.5	21	GPS2MHAP	25	-	325	CL25	RT1U	21-26	4	20
15	30	28	GPS2MHAR	32	-	416	CL04	RT1V	25-32	6	20
11	22.5	21	GPS2MHAP	25	-	325	CL04	RT1U	21-26	4	20
15	30	28	GPS2MHAR	32	-	416	CL04	RT1V	25-32	6	20
18.5	37	35	GPS2MHAS	40	-	520	CL45	RT1W	30-40	10	20
22	-	40	GPS2MHAT	50	-	650	CL06	RT2E	30-43	10	25
22	44	-	GPS2MHAT	50	-	650	CL06	RT2G	42-55	10	25
30	60	55	GPS2MHAU	63	-	819	CL07	RT2H	54-65	16	25
45	85	80	FDH36MC100GD	100	1000 - 1500	1140	CL09	RT2L	78 – 97	35	30
55	-	100	FDH36MC100GD	100	1000 - 1500	1400	CL10	RT2M	90 - 110	35	30
55	105	-	FDH36MC160JF	160	1600 - 2400	1400	CL10	RT2M	90 - 110	35	30

(1) Current are relevant to four pole motors not having special characteristics of torque. Inrush currents: ≤ 8 time rated current for ≤ 1s.
(2) The minimum cycle cross-sections are referred to an ambient temperature of 30°C max. in free air and are selected to withstand the maximum let-through energy and the motor rated current. Besides the user has to consider the drop voltage, the type of laying and ambient temperature.

Surion GPS-B: Coordination Type 2 50kA at 380/400V and 415V

MOTOR (1)			MANUAL MOTOR STARTER				CONTACTOR			LINKS
Rated power	Rated current		Cat. no.	Rated current In	Thermal current Setting range	Magnetic current	Series	Smallest wire Cu (PVC)(2) 380/415V	Minimum frontal electrical safety clearance	Cat. no. (3)
(kW)	380/400V (A)	415V (A)		(A)	(A)	(A)		(mm^2)	(mm)	
0.06	0.23	0.21	GPS1BS/HAB	0.25	0.16 - 0.25	3.2	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02*
0.09	0.34	0.31	GPS1BS/HAC	0.4	0.25 - 0.4	5.2	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02*
0.12	0.44	0.4	GPS1BS/HAD	0.63	0.4 - 0.63	8.2	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02*
0.18	0.65	0.63	GPS1BS/HAE	1	0.63 - 1	13	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02*
0.25	0.9	0.8	GPS1BS/HAE	1	0.63 - 1	13	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02*
0.37	1.25	1.1	GPS1BS/HAF	1.6	1 - 1.6	20.5	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02*
0.55	1.6	1.5	GPS1BS/HAF	1.6	1 - 1.6	20.5	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02*
0.75	2	1.9	GPS1BS/HAG	2.5	1.6 - 2.5	32.5	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02*
1.1	2.6	2.5	GPS1BS/HAH	4	2.5 - 4	52	CL01	1	20	GPF1L02*
1.5	3.5	3.4	GPS1BS/HAH	4	2.5 - 4	52	CL01	1	20	GPF1L02*
2.2	5	4.5	GPS1BS/HAJ	6.3	4 - 6.3	82	CL02	1	20	GPF1L02*
3	7	6.5	GPS1BS/HAK	10	6.3 - 10	130	CL25	1.5	20	GPF1L25*
4	9	8	GPS1BS/HAK	10	6.3 - 10	130	CL25	1.5	20	GPF1L25*
5.5	12	11	GPS1BHAL	13	9 - 13	169	CL25	2.5	20	GPF1L25*
7.5	16	14	GPS1BHAM	16	11 - 16	208	CL25	2.5	20	GPF1L25*
11	22.5	21	GPS1BHAP	25	19 - 25	325	CL25	4	20	GPF1L25*
15	30	28	GPS1BHAR	32	24 - 32	416	CL04	6	20	GPF1L04*
11	22.5	21	GPS2BHAP	25	19 - 25	325	CL04	4	20	GPF2L04*
15	30	28	GPS2BHAR	32	24 - 32	416	CL04	6	20	GPF2L04*
18.5	37	35	GPS2BHAS	40	28 - 40	520	CL45	10	20	GPF2L45*
22	44	41	GPS2BHAT	50	35 - 50	650	CL06	10	25	GPF2L07*
30	60	55	GPS2BHAU	63	45 - 63	820	CL07	16	25	GPF2L07*

(1) Currents are relevant to four pole motors not having special characteristics of torque.
Inrush currents: ≤ 8 time rated current for ≤ 1s.

(2) The minimum cycle cross-sections are referred to an ambient temperature of 30°C max. in free air. Cables are to withstand the maximum let-through energy and the motor rated current. Besides the user should consider the drop voltage on the cables, the type of laying and the ambient temperature.

(3) Complete cat. nrs., see page D.3

Surion GPS-M and Record Plus MCCBs: Coordination Type 1 65kA at 380/400V and 415V

MOTOR (1)			BREAKER				CONTACTOR	OVERLOAD RELAY			
Rated power (kW)	Rated current 380/400V (A)	Rated current 415V (A)	Cat. no.	Rated current In (A)	Thermal current (A)	Magnetic current (A)	Series	Series	Setting range	Smallest wire Cu (PVC) (2) 380/415V (mm^2)	Min frontal safety clearance (mm)
0.06	0.23	0.21	GPS1MS/HAB	0.25	-	3.3	CL00	RT1B	0.16-0.26	1	20
0.09	0.34	0.31	GPS1MS/HAC	0.4	-	5.2	CL00	RT1C	0.25-0.41	1	20
0.12	0.44	0.4	GPS1MS/HAD	0.63	-	8.2	CL00	RT1D	0.4-0.65	1	20
0.18	0.65	0.63	GPS1MS/HAE	1	-	13	CL00	RT1D	0.4-0.65	1	20
0.25	0.9	0.8	GPS1MS/HAE	1	-	13	CL00	RT1F	0.65-1.1	1	20
0.37	1.25	1.1	GPS1MS/HAF	1.6	-	20.8	CL00	RT1G	1-1.5	1	20
0.55	1.6	1.5	GPS1MS/HAF	1.6	-	20.8	CL00	RT1H	1.3-1.9	1	20
0.75	2	1.9	GPS1MS/HAG	2.5	-	32.5	CL00	RT1J	1.8-2.7	1	20
1.1	2.6	2.5	GPS1MS/HAH	4	-	52	CL00	RT1K	2.5-4	1	20
1.5	3.5	3.4	GPS1MS/HAH	4	-	52	CL00	RT1K	2.5-4	1	20
2.2	5	4.5	GPS1MS/HAJ	6.3	-	81.9	CL00	RT1L	4-6.3	1	20
3	7	6.5	GPS1MS/HAK	10	-	130	CL00	RT1M	5.5-8.5	1.5	20
4	9	8	GPS1MS/HAK	10	-	130	CL00	RT1N	8-12	1.5	20
5.5	12	11	GPS1MHAL	13	-	169	CL01	RT1P	10-16	2.5	20
7.5	-	14	GPS1MHAM	16	-	208	CL02	RT1P	10-16	2.5	20
7.5	16	-	GPS1MHAM	16	-	208	CL02	RT1S	14.5-18	2.5	20
11	22.5	21	GPS1MHAP	25	-	325	CL25	RT1U	21-26	4	20
15	30	28	GPS1MHAR	32	-	416	CL04	RT1V	25-32	6	20
11	22.5	21	GPS2MHAP	25	-	325	CL25	RT1U	21-26	4	20
15	30	28	GPS2MHAR	32	-	416	CL04	RT1V	25-32	6	20
18.5	37	35	GPS2MHAS	40	-	520	CL45	RT1W	30-40	10	20
22	-	40	GPS2MHAT	50	-	650	CL06	RT2E	30-43	10	25
22	44	-	GPS2MHAT	50	-	650	CL06	RT2G	42-55	10	25
30	60	55	GPS2MHAU	63	-	819	CL07	RT2H	54-65	16	25
37	72	68	FDN36MC080GD	80	-	950	CL08	RT2J	64-82	25	25
45	85	80	FDN36MC100GD	100	-	1140	CL09	RT2L	78-97	35	30
55	105	100	FDN36MC100GD	100	-	1400	CL10	RT2M	90-110	35	30

Surion GPS-M and Record Plus MCCBs: Coordination Type 2 50kA at 380/400V and 415V

MOTOR (1)			BREAKER				CONTACTOR	OVERLOAD RELAY			
Rated power (kW)	Rated current 380/400V (A)	Rated current 415V (A)	Cat. no.	Rated current In (A)	Thermal current (A)	Magnetic current (A)	Series	Series	Setting range	Smallest wire Cu (PVC) (2) 380/415V (mm^2)	Min frontal safety clearance (mm)
0.06	0.23	0.21	GPS1MS/HAB	0.25	-	3.3	CL00	RT1B	0.16-0.26	1	20
0.09	0.34	0.31	GPS1MS/HAC	0.4	-	5.2	CL00	RT1C	0.25-0.41	1	20
0.12	0.44	0.4	GPS1MS/HAD	0.63	-	8.2	CL00	RT1D	0.4-0.65	1	20
0.18	0.65	0.63	GPS1MS/HAE	1	-	13	CL00	RT1D	0.4-0.65	1	20
0.25	0.9	0.8	GPS1MS/HAE	1	-	13	CL00	RT1F	0.65-1.1	1	20
0.37	1.25	1.1	GPS1MS/HAF	1.6	-	20.8	CL00	RT1G	1-1.5	1	20
0.55	1.6	1.5	GPS1MS/HAF	1.6	-	20.8	CL00	RT1H	1.3-1.9	1	20
0.75	2	1.9	GPS1MS/HAG	2.5	-	32.5	CL00	RT1J	1.8-2.7	1	20
1.1	2.6	2.5	GPS1MS/HAH	4	-	52	CL01	RT1K	2.5-4	1	20
1.5	3.5	3.4	GPS1MS/HAH	4	-	52	CL01	RT1K	2.5-4	1	20
2.2	5	4.5	GPS1MS/HAJ	6.3	-	81.9	CL02	RT1L	4-6.3	1	20
3	7	6.5	GPS1MS/HAK	10	-	130	CL25	RT1M	5.5-8.5	1.5	20
4	9	8	GPS1MS/HAK	10	-	130	CL25	RT1N	8-12	1.5	20
5.5	12	11	GPS1MHAL	13	-	169	CL25	RT1P	10-16	1.5	20
7.5	-	14	GPS1MHAM	16	-	208	CL25	RT1P	10-16	2.5	20
7.5	16	-	GPS1MHAM	16	-	208	CL25	RT1S	14.5-18	2.5	20
11	22.5	21	GPS1MHAP	25	-	325	CL25	RT1U	21-26	4	20
15	30	28	GPS1MHAR	32	-	416	CL04	RT1V	25-32	6	20
11	22.5	21	GPS2MHAP	25	-	325	CL04	RT1U	21-26	4	20
15	30	28	GPS2MHAR	32	-	416	CL04	RT1V	25-32	6	20
18.5	37	35	GPS2MHAS	40	-	520	CL45	RT1W	30-40	6	20
22	-	40	GPS2MHAT	50	-	650	CL06	RT2E	30-43	10	25
22	44	-	GPS2MHAT	50	-	650	CL06	RT2G	42-55	10	25
30	60	55	GPS2MHAU	63	-	819	CL07	RT2H	54-65	16	25
37	72	68	FDN36MC080GD	80	-	950	CL08	RT2J	64-82	25	25
45	85	80	FDN36MC100GD	100	-	1140	CL09	RT2L	78-97	35	30
55	105	100	FDN36MC100GD	100	-	1400	CL10	RT2M	90-110	35	30

(1) Current are relevant to four pole motors not having special characteristics of torque. Inrush currents: ≤ 8 time rated current for ≤ 1s.
(2) The minimum cycle cross-sections are referred to an ambient temperature of 30°C max. in free air and are selected to withstand the maximum let-through energy and the motor rated current. Besides the user has to consider the drop voltage, the type of laying and ambient temperature.

Surion GPS-M and Record Plus MCCBs: Coordination Type 1 50kA at 500 and 525V

MOTOR (1)			BREAKER				CONTACTOR	OVERLOAD RELAY			
Rated power	Rated current		Cat. no.	Rated current In	Magnetic setting Im Pick-up band ± 20% Im	Magnetic current	Series	Series	Setting range	Smallest wire Cu (PVC) (2) 380/415V	Min frontal safety clearance
(kW)	500V (A)	525V (A)		(A)	(A)	(A)				(mm^2)	(mm)
0.06	0.17	0.16	GPS1MSAB	0.25	-	3.2	CL00	RT1B	0.16-0.26	1	20
0.09	0.24	0.22	GPS1MSAB	0.25	-	3.2	CL00	RT1B	0.16-0.26	1	20
0.12	0.33	0.3	GPS1MSAC	0.4	-	5.2	CL00	RT1C	0.25-0.41	1	20
0.18	0.48	0.46	GPS1MSAD	0.63	-	8.2	CL00	RT1D	0.4-0.65	1	20
0.25	-	0.64	GPS1MSAE	1	-	13	CL00	RT1D	0.4-0.65	1	20
0.25	0.66	-	GPS1MSAE	1	-	13	CL00	RT1F	0.65-1.1	1	20
0.37	0.9	0.85	GPS1MSAE	1	-	13	CL00	RT1F	0.65-1.1	1	20
0.55	1.2	1.15	GPS1MSAF	1.6	-	20.5	CL00	RT1G	1.0-1.5	1	20
0.75	1.5	1.45	GPS1MSAF	1.6	-	20.5	CL00	RT1H	1.3-1.9	1	20
1.1	2.1	1.9	GPS1MSAG	2.5	-	32.5	CL00	RT1J	1.8-2.7	1	20
1.5	2.8	2.6	GPS1MSAH	4	-	52	CL00	RT1K	2.5-4	1	20
2.2	3.9	3.6	GPS1MSAH	4	-	52	CL00	RT1K	2.5-4	1	20
3	5.3	5	GPS1MSAJ	6.3	-	82	CL00	RT1L	4.0-6.3	1	20
4	6.8	6.5	GPS1MHAK	10	-	130	CL00	RT1M	5.5-8.5	1	20
5.5	9.1	8.6	GPS1MHAK	10	-	130	CL00	RT1N	8.0-12.0	1.5	20
7.5	12	11.4	GPS1MHAL	13	-	169	CL01	RT1P	10-16	2.5	20
10	15.5	14.8	GPS1MHAM	16	-	208	CL02	RT1S	14.5-18	2.5	20
11	17.6	17	GPS1MHAN	20	-	260	CL25	RT1S	14.5-18	2.5	20
15	23	22	GPS1MHAP	25	-	325	CL25	RT1U	21-26	4	20
18.5	28.5	27	GPS1MHAR	32	-	416	CL04	RT1V	25-32	6	20
11	17.6	17	GPS2MHAN	20	-	260	CL04	RT1S	14.5-18	2.5	20
15	23	22	GPS2MHAP	25	-	325	CL04	RT1U	21-26	4	20
18.5	28.5	27	GPS2MHAR	32	-	416	CL04	RT1V	25-32	6	20
22	33	31.5	GPS2MHAS	40	-	520	CL45	RT2E	30-43	6/10	20
30	45	43	GPS2MHAT	50	-	650	CL06	RT2G	42-55	10	25
37	53	52	GPS2MHAU	63	-	820	CL07	RT2G	42-55	16	25
45	-	62	FDN36MC080GD	80	800 - 1200	1000	CL08	RT2H	54 – 65	16	30
45	65	-	FDN36MC080GD	80	800 - 1200	1000	CL08	RT2J	64 – 82	25	30
55	80	76	FDN36MC100GD	100	1000 - 150	1200	CL09	RT2J	64 – 82	25	30

Surion GPS-M and Record Plus MCCBs: Coordination Type 2 50kA at 500 and 525V

MOTOR (1)			BREAKER				CONTACTOR	OVERLOAD RELAY			
Rated power	Rated current		Cat. no.	Rated current In	Magnetic setting Im Pick-up band ± 20% Im	Magnetic current	Series	Series	Setting range	Smallest wire Cu (PVC) (2) 380/415V	Min frontal safety clearance
(kW)	500V (A)	525V (A)		(A)	(A)	(A)				(mm^2)	(mm)
0.06	0.17	0.16	GPS1MS/HAB	0.25	-	3.2	CL00	RT1B	0.16-0.26	1	20
0.09	0.24	0.22	GPS1MS/HAB	0.25	-	3.2	CL00	RT1B	0.16-0.26	1	20
0.12	0.33	0.3	GPS1MS/HAC	0.4	-	5.2	CL00	RT1C	0.25-0.41	1	20
0.18	0.48	0.46	GPS1MS/HAD	0.63	-	8.2	CL00	RT1D	0.4-0.65	1	20
0.25	-	0.64	GPS1MS/HAE	1	-	13	CL00	RT1D	0.4-0.65	1	20
0.25	0.66	-	GPS1MS/HAE	1	-	13	CL00	RT1F	0.65-1.1	1	20
0.37	0.9	0.85	GPS1MS/HAE	1	-	13	CL00	RT1F	0.65-1.1	1	20
0.55	1.2	1.15	GPS1MS/HAF	1.6	-	20.5	CL00	RT1G	1.0-1.5	1	20
0.75	1.5	1.45	GPS1MS/HAF	1.6	-	20.5	CL00	RT1H	1.3-1.9	1	20
1.1	2.1	1.9	GPS1MS/HAG	2.5	-	32.5	CL01	RT1J	1.8-2.7	1	20
1.5	2.8	2.6	GPS1MS/HAH	4	-	52	CL25	RT1K	2.5-4	1	20
2.2	3.9	3.6	GPS1MS/HAH	4	-	52	CL25	RT1K	2.5-4	1	20
3	5.3	5	GPS1MS/HAJ	6.3	-	82	CL25	RT1L	4.0-6.3	1	20
4	6.8	6.5	GPS1MHAK	10	-	130	CL25	RT1M	5.5-8.5	1	20
5.5	9.1	8.6	GPS1MHAK	10	-	130	CL25	RT1N	8.0-12	1.5	20
7.5	12	11.4	GPS1MHAL	13	-	169	CL25	RT1P	10-16	2.5	20
10	15.5	14.8	GPS1MHAM	16	-	208	CL25	RT1S	14.5-18	2.5	20
11	17.6	17	GPS1MHAN	20	-	260	CL25	RT1S	14.5-18	2.5	20
15	23	22	GPS1MHAP	25	-	325	CL04	RT1U	21-26	4	20
18.5	28.5	27	GPS1MHAR	32	-	416	CL04	RT1V	25-32	6	20
11	17.6	17	GPS2MHAN	20	-	260	CL04	RT1S	14.5-18	2.5	20
15	23	22	GPS2MHAP	25	-	325	CL04	RT1U	21-26	4	20
18.5	28.5	27	GPS2MHAR	32	-	416	CL45	RT1V	25-32	6	20
22	33	31.5	GPS2MHAS	40	-	520	CL06	RT2E	30-43	6/10	25
30	45	43	GPS2MHAT	50	-	650	CL06	RT2G	42-55	10	25
37	53	52	GPS2MHAU	63	-	820	CL07	RT2G	42-55	16	25
45	-	62	FDN36MC080GD	80	800 - 1200	1000	CL09	RT2H	54 – 65	16	30
45	65	-	FDN36MC080GD	80	800 - 1200	1000	CL09	RT2J	64 – 82	25	30
55	80	76	FDN36MC100GD	100	1000 - 1500	1200	CL10	RT2J	64 – 82	25	30

Surion GPS-B and Record Plus MCCBs: Coordination Type 2 65kA at 380/400V and 415V

MOTOR			MOTOR PROTECTION CIRCUITBREAKER			CONTACTOR	THERMAL RELAY
Rated power (kW)	Ie 380/400V (A)	Ie 415V	Cat. no.	Setting range In (A)	Magnetic setting Im (A)	Series (A)	Class 10
0.25	0.9	0.8	GPS1BHAE	0.63-1	13	CL00	Integrated into the motor protection circuit breaker
0.37	1.25	1.1	GPS1BHAF	1-1.6	20.5	CL00	Integrated into the motor protection circuit breaker
0.55	1.6	1.5	GPS1BHAF	1-1.6	20.5	CL00	Integrated into the motor protection circuit breaker
0.75	2	1.9	GPS1BHAG	1.6-2.5	32.5	CL00	Integrated into the motor protection circuit breaker
1.1	2.6	2.5	GPS1BHAH	2.5-4	52	CL25	Integrated into the motor protection circuit breaker
1.5	3.5	3.45	GPS1BHAH	2.5-4	52	CL25	Integrated into the motor protection circuit breaker
2.2	5	4.7	GPS1BHAJ	4-6.3	82	CL25	Integrated into the motor protection circuit breaker
3	7	6.5	GPS1BHAK	6.3-10	130	CL25	Integrated into the motor protection circuit breaker
4	9	8	GPS1BHAK	6.3-10	130	CL25	Integrated into the motor protection circuit breaker
5.5	12	11	GPS1BHAL	9.0-13	169	CL25	Integrated into the motor protection circuit breaker
7.5	16	14	GPS1BHAM	11.0-16	208	CL25	Integrated into the motor protection circuit breaker
11	22.5	21	GPS1BHAP	19-25	325	CL25	Integrated into the motor protection circuit breaker
15	30	28	GPS1BHAR	24-32	416	CL04	Integrated into the motor protection circuit breaker
18.5	37	35	GPS2BHAS	28-40	520	CL45	Integrated into the motor protection circuit breaker
22	44	41	GPS2BHAT	25-50	650	CL06	Integrated into the motor protection circuit breaker
30	60	55	GPS2BHAU	45-63	820	CL07	Integrated into the motor protection circuit breaker
37	72.5	65	FDH36MC080	80	950	CL08	RT2J (64-82A)
45	85	79	FDH36MC100	100	1140	CL09	RT2L (78-97A)

Surion GPS-B and Record Plus MCCBs: Coordination Type 2 80kA at 380/400V and 415V

MOTOR			MOTOR PROTECTION CIRCUITBREAKER			CONTACTOR	THERMAL RELAY
Rated power (kW)	Ie 380/400V (A)	Ie 415V	Cat. no.	Setting range In (A)	Magnetic setting Im (A)	Series (A)	Class 10
0.25	0.9	0.8	GPS1BHAE	0.63-1	13	CL00	Integrated into the motor protection circuit breaker
0.37	1.25	1.1	GPS1BHAF	1-1.6	20.5	CL00	Integrated into the motor protection circuit breaker
0.55	1.6	1.5	GPS1BHAF	1-1.6	20.5	CL00	Integrated into the motor protection circuit breaker
0.75	2	1.9	GPS1BHAG	1.6-2.5	32.5	CL00	Integrated into the motor protection circuit breaker
1.1	2.6	2.5	GPS1BHAH	2.5-4	52	CL25	Integrated into the motor protection circuit breaker
1.5	3.5	3.45	GPS1BHAH	2.5-4	52	CL25	Integrated into the motor protection circuit breaker
2.2	5	4.7	GPS1BHAJ	4-6.3	82	CL25	Integrated into the motor protection circuit breaker
3	7	6.5	GPS1BHAK	6.3-10	130	CL25	Integrated into the motor protection circuit breaker
4	9	8	GPS1BHAK	6.3-10	130	CL25	Integrated into the motor protection circuit breaker
5.5	12	11	GPS1BHAL	9.0-13	169	CL05	Integrated into the motor protection circuit breaker
7.5	16	14	FDH36MC020	20	210	CL04	RT1S (14.5-18A)
11	22.5	21	FDH36MC030	30	300	CL45	RT1U (21-26A)
15	30	28	FDH36MC030	30	450	CL45	RT1V (25-32A)
18.5	37	35	FDH36MC050	50	500	CL45	RT1W (30-40A)
22	44	41	FDH36MC050	50	580	CL06	RT2G (42-55A)
30	66	55	FDH36MC080	80	800	CL07	RT2H (54-65A)
37	72.5	65	FDH36MC080	80	950	CL08	RT2J (64-82A)
45	85	79	FDH36MC100	100	1140	CL09	RT2L (78-97A)

(1) Current are relevant to four pole motors not having special characteristics of torque. Inrush currents: ≤ 8 time rated current for ≤ 1s.
(2) The minimum cycle cross-sections are referred to an ambient temperature of 30°C max. in free air and are selected to withstand the maximum let-through energy and the motor rated current. Besides the user has to consider the drop voltage, the type of laying and ambient temperature.

Record Plus MCCBs: Coordination Type 2 150kA at 380/400V and 415V (Class 10 protection)

MOTOR (1)			THERMAL-MAGNETIC CIRCUIT BREAKER					CONTACTOR		
Rated power	Rated current		Cat. no. (3)	Magnetic setting Im pick-up band ± 20% Im	Magnetic current Setpoint	Thermal setting range	Thermal setpoint (400V)	Series	Smallest wire Cu (PVC) (2) 380/415V	Min frontal safety clearance
(kW)	380/400V (A)	415V		(A)	(A)	(A)	(A)		(mm^2)	(mm)
7.5	16	14	FD*36TD016ED	160	160	12.8 - 16	16	CL45	2.5	20
11	22.5	21	FD*36TD025ED	250	250	20 – 25	22.5	CL45	4	20
15	30	28	FD*36TD032ED	320	320	26 – 32	30	CL45	6	20
18.5	37	35	FD*36TD040ED	400	400	32 – 40	37	CL45	10	20
22	44	40	FD*36TD050ED	500	500	40 – 50	40	CL06	10	25
30	60	55	FD*36TD063ED	630	630	50 – 63	55	CL07	16	25
37	72	68	FD*36TD080GD	800	800	64 – 80	68	CL08	25	25
45	85	80	FD*36TD100GD	1000	1000	80 – 100	80	CL09	35	30
55	105	100	FD*36TD125GD	1250	1250	100 – 125	100	CL10	35	30
75	138	135	FD*36TD160GD	1280	1280	128 – 160	135	CK75	50	40
90	170	165	FE*36TD200KF	1000 – 2000	1700	160 – 200	165	CK08	70	40
110	211	200	FE*36TD250KF	1250 – 2500	2100	200 – 250	200	CK85	95	40
132	245	240	FE*36TD250KF	1250 – 2500	2500	200 - 250	240	CK09	120	40

(*) Max Iq rating in kA: type N = 50 kA, type H = 80 kA, type L = 150 kA.

(1) Current are relevant to four pole motors not having special characteristics of torque.
Inrush currents: ≤ 8 times rated current for ≤ 1s (Normal starting) or H 5s (Heavy starting).

(2) The minimum cycle cross-sections are referred to an ambient temperature of 30°C max. in free air and are selected to withstand the maximum let-through energy and the motor rated current. Besides the user has to consider the drop voltage, the type of laying and ambient temperature.

(3) Foreseen values for E-frame.

Record Plus MCCBs: Coordination Type 2 Up to 150kA at 380/400V and 415V (Class 10 protection)

MOTOR (1)			ONLY MAGNETIC CIRCUIT BREAKER			CONTACTOR	OVERLOAD RELAY			
Rated power	Rated current		Cat. no. (3)	Magnetic setting Im pick-up band ± 20% Im	Magnetic current Setpoint	Series	Series	Setting range	Smallest wire Cu (PVC) (2) 380/415V	Min frontal safety clearance
(kW)	380/400V (A)	415V		(A)	(A)			(A)	(mm^2)	(mm)
4	9	8	FD*36MC012ED	125 - 188	120	CL04	RT1N	8 - 12	1.5	20
5.5	12	11	FD*36MC012ED	125 - 188	150	CL04	RT1P	10 - 16	2.5	20
7.5	-	14	FD*36MC020ED	200 - 300	200	CL04	RT1P	10 - 16	2.5	20
7.5	16	-	FD*36MC020ED	200 - 300	210	CL04	RT1S	14.5 - 18	2.5	20
11	22.5	21	FD*36MC030ED	300 - 450	450	CL45	RT1U	21 - 26	4	20
15	30	28	FD*36MC030ED	300 - 450	500	CL45	RT1V	25 - 32	6	20
18.5	37	35	FD*36MC050ED	500 - 750	500	CL45	RT1W	30 - 40	10	20
22	-	40	FD*36MC050ED	500 - 750	540	CL06	RT2E	30 - 43	10	25
22	44	-	FD*36MC050ED	500 - 750	580	CL06	RT2G	42 - 55	10	25
30	60	55	FD*36MC080GD	800 - 1200	800	CL07	RT2H	54 - 65	16	25
37	72	68	FD*36MC080GD	800 - 1200	950	CL08	RT2J	64 - 82	25	25
45	85	80	FD*36MC100GD	1000 - 1500	1140	CL09	RT2L	78 - 97	35	30
55	-	100	FD*36MC100GD	1000 - 1500	1400	CL10	RT2M	90 - 110	35	30
55	105	-	FE*36MC160JF	1600 - 2400	1400	CL10	RT2M	90 - 110	35	30
75	138	135	FE*36MC160JF	1600 - 2400	1900	CK75	RT3E	110 - 140	50	40
90	170	165	FE*36MC250KF	2500 - 3750	2500	CK08	RT3F	140 - 190	70	40
110	211	200	FE*36MC250KF	2500 - 3750	2800	CK85	RT4P	175 - 280	95	40
132	245	240	FE*36MC250KF	2500 - 3750	3150	CK09	RT4P	175 - 280	120	40

Record Plus MCCBs: Coordination Type 2 Up to 150kA at 380/400V and 415V (Class 30 protection)

MOTOR (1)			ONLY MAGNETIC CIRCUIT BREAKER			CONTACTOR	OVERLOAD RELAY			
Rated power	Rated current		Cat. no. (3)	Magnetic setting Im pick-up band ± 20% Im	Magnetic current Setpoint	Series	Series	Setting range	Smallest wire Cu (PVC) (2) 380/415V	Min frontal safety clearance
(kW)	380/400V (A)	415V		(A)	(A)			(A)	(mm^2)	(mm)
2.2	5	4.5	FD*36MC008ED	80 - 120	80	CL25	RT4LB	4 - 6.5	1.5	20
3	7	6.5	FD*36MC008ED	80 - 120	90	CL04	RT4LC	5.5 - 8.5	1.5	20
4	9	8	FD*36MC012ED	125 - 188	120	CL04	RT4aLD	7.5 - 11	1.5	20
5.5	12	11	FD*36MCa012ED	125 - 188	150	CL45	RT4LE	10 - 16	2.5	20
7.5	-	14	FD*36MC020EaD	200 - 300	200	CL45	RT4LE	10 - 16	2.5	20
7.5	16	-	FD*36MC020ED	200 - 300	210	CL45	RT4LF	12.5 - 20	2.5	20
11	22.5	21	FD*36MC030ED	300 - 450	450	CL45	RT4LG	17 - 27	4	20
15	30	28	FD*36MC030ED	300 - 450	500	CL45	RT4LH	26 - 40	6	20
18.5	37	35	FD*36MC050ED	500 - 750	500	CL06	RT4LH	26 - 40	10	25
22	-	40	FD*36MC050ED	500 - 750	540	CL06	RT4LJ	32 - 52	10	25
22	44	-	FD*36MC050ED	500 - 750	580	CL06	RT4LJ	32 - 52	10	25
30	60	55	FD*36MC080GD	800 - 1200	800	CL07	RT4LK	45 - 70	16	25
37	72	68	FD*36MC080GD	800 - 1200	950	CL08	RT4LL	60 - 90	25	25
45	85	80	FD*36MC100GD	1000 - 1500	1140	CL09	RT4LL	60 - 90	35	30
55	-	100	FD*36MC100GD	1000 - 1500	1400	CL10	RT4LM	80 - 125	35	30
55	105	-	FE*36MC160JF	1600 - 2400	1400	CL10	RT4LM	80 - 125	35	30
75	138	135	FE*36MC160JF	1600 - 2400	1900	CK75	RT4LN	120 - 190	50	40a
90	170	165	FE*36MC250KF	2500 - 3750	2500	CK08	RT4LN	120 - 190	70	40
110	211	200	FE*36MC250KF	2500 - 3750	2800	CK85	RT4LR	200 - 310	95	40
132	245	240	FE*36MC250KF	2500 - 3750	3150	CK09	RT4LR	200 - 310	120	40

(*) Max Iq rating in kA: type N = 50 kA, type H = 80 kA, type L = 150 kA.

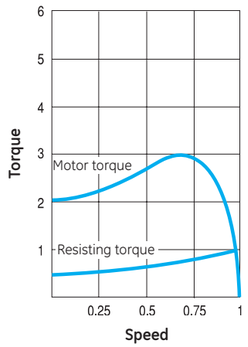
(1) Current are relevant to four pole motors not having special characteristics of torque.
Inrush currents: ≤ 8 times rated current for ≤ 1s (Normal starting) or H 5s (Heavy starting).
(2) The minimum cycle cross-sections are referred to an ambient temperature of 30°C max. in free air and are selected to withstand the maximum let-through energy and the motor rated current. Besides the user has to consider the drop voltage, the type of laying and ambient temperature.
(3) Foreseen values for E-frame.

Direct-on-line starters

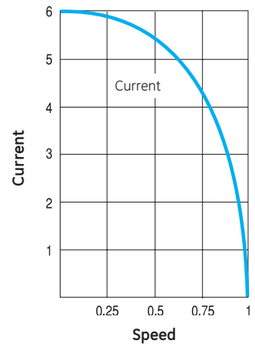
- Motors connected directly on-line with a contactor and a thermal overload relay.
- Symple installation with high starting torque and current.
- For use with motors of medium power that do not need a progressive star

AC-3	Switching off motors during running	Ic = Ie
AC-4	Switching off motors during starting	Ic = 6 Ie

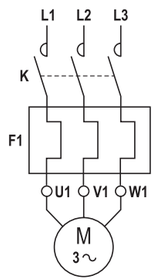
Torque-speed curve



Current-speed curve



Diagram



Selection table

Motor												Contactor	Thermal relay	Fuse	
230/200V		400/380V		440/415V		500V		690/660V		1000V				aM	gG-gL
kW	A	kW	A	kW	A	kW	A	kW	A	kW	A			A	A
–	–	–	–	–	–	–	–	0.06	0.13	–	–	**MC0**	**MT03A**	0.5	1
–	–	0.06	0.23	0.06	0.21	0.06	0.17	0.09	0.2	–	–		**MT03B**	0.5	1
–	–	–	–	–	–	–	–	0.12	0.25	–	–		**MT03B**	0.5	1
0.06	0.39	0.09	0.34	0.09	0.31	0.09	0.26	0.18	0.35	–	–		**MT03C**	1	2
–	–	–	–	0.12	0.4	0.12	0.33	–	–	–	–		**MT03C**	1	2
0.09	0.58	0.12	0.44	–	–	0.18	0.46	0.25	0.46	–	–		**MT03D**	1	2
–	–	0.18	0.61	0.18	0.56	0.25	0.6	–	–	–	–		**MT03D**	1	2
–	–	–	–	–	–	–	–	0.37	0.7	–	–		**MT03E**	2	4
0.12	0.76	0.25	0.78	0.25	0.7	0.37	0.9	0.55	0.9	–	–		**MT03E**	2	4
0.18	1.05	0.37	1.13	0.37	1.1	0.55	1.2	0.75	1.1	–	–		**MT03F**	2	4
0.25	1.4	–	–	–	–	–	–	–	–	–	–		**MT03G**	2	4
–	–	0.55	1.6	0.55	1.5	0.75	1.5	1.1	1.5	–	–		**MT03H**	4	6
0.37	2	0.75	2	0.75	2	1.1	2	1.5	2	–	–		**MT03I**	4	6
–	–	1.1	2.6	1.1	2.5	1.5	2.6	–	–	–	–		**MT03J**	4	6
0.56	2.75	–	–	–	–	–	–	2.2	2.9	–	–		**MT03J**	4	6
0.75	3.5	1.5	3.5	1.5	3.4	2.2	3.8	3	3.5	–	–		**MT03K**	6	10
1.1	5	2.2	5	2.2	4.5	3	5	–	–	–	–		**MT03L**	10	16
1.5	7	–	–	–	–	–	–	–	–	–	–		**MT03M**	10	16
–	–	–	–	–	–	–	–	3.7	4.6	–	–	**MC1**	**MT03L**	10	16
–	–	–	–	–	–	–	–	4	5	–	–		**MT03L**	10	16
–	–	3	7	3	6.5	3.7	6	–	–	–	–		**MT03M**	10	16
–	–	–	–	3.7	7.3	4	6.5	–	–	–	–		**MT03M**	10	16
–	–	3.7	8	4	8	–	–	–	–	–	–		**MT03N**	12	20
2.2	9	4	9	–	–	–	–	–	–	–	–		**MT03N**	12	20
–	–	–	–	–	–	–	–	5.5	6.7	–	–	**MC2**	**MT03M**	12	20
–	–	–	–	–	–	5.5	9	–	–	–	–		**MT03N**	16	20
3	12	5.5	12	5.5	11	–	–	–	–	–	–		**MT03P**	16	20
–	–	0.06	0.23	0.06	0.21	0.06	0.17	0.09	0.2	–	–	**CL00**	**RT1B**	2	4
–	–	–	–	–	–	0.09	0.26	0.12	0.25	–	–		**RT1C**	2	4
0.06	0.39	0.09	0.34	0.09	0.31	0.12	0.33	0.18	0.35	–	–		**RT1C**	2	4
0.09	0.58	0.12	0.44	0.12	0.4	0.18	0.46	0.25	0.46	–	–		**RT1D**	2	4
–	–	0.18	0.61	0.18	0.56	0.25	0.6	–	–	–	–		**RT1D**	2	4
–	–	–	–	–	–	–	–	0.37	0.7	–	–		**RT1F**	2	4
0.12	0.76	0.25	0.78	0.25	0.7	0.37	0.9	0.55	0.9	–	–		**RT1F**	2	4
0.18	1.05	0.37	1.13	0.37	1.1	0.55	1.2	0.75	1.1	–	–		**RT1G**	2	4
0.25	1.4	0.55	1.6	0.55	1.5	0.75	1.5	1.1	1.5	–	–		**RT1H**	2	6
0.37	2	0.75	2	0.75	2	1.1	2	1.5	2	–	–		**RT1J**	4	6
0.55	2.75	1.1	2.6	1.1	2.5	1.5	2.6	2.2	2.9	–	–		**RT1K**	4	6
0.75	3.5	1.5	3.5	1.5	3.4	2.2	3.8	–	–	–	–		**RT1K**	6	10
–	–	–	–	–	–	–	–	3.7	4.6	–	–		**RT1L**	6	16
1.1	5	2.2	5	2.2	4.5	–	–	–	–	–	–		**RT1L**	6	16
1.5	7	–	–	3.7	7.3	3.7	6	5.5	7	–	–		**RT1M**	10	20
–	–	3.7	8	–	–	–	–	–	–	–	–		**RT1M**	12	25
2.2	9	4	9	4	9	5.5	9	–	–	–	–		**RT1N**	16	25
–	–	–	–	–	–	–	–	7.5	9	–	–	**CL01**	**RT1N**	16	25
3	12	5.5	12	5.5	11	7.5	12	–	–	–	–		**RT1P**	16	35
3.7	14	–	–	7.5	14	–	–	–	–	–	–	**CL02**	**RT1P**	20	40
4	16	7.5	16	–	–	10	15.5	–	–	–	–		**RT1S**	20	40
–	–	–	–	–	–	–	–	11	13	–	–	**CL25**	**RT1P**	20	40
–	–	–	–	–	–	11	17	13	16	–	–		**RT1S**	20	40
5.5	21	–	–	11	21	13	20	–	–	–	–		**RT1T**	32	50
–	–	11	22.5	–	–	15	23	–	–	–	–		**RT1U**	32	50

(continued on page D.22)

Direct-on-line starters

Selection table *(continued 1)*

Motor												Contactor	Thermal relay	Fuse	
230/200V		400/380V		440/415V		500V		690/660V		1000V				aM	gG-gL
kW	A	kW	A	kW	A	kW	A	kW	A	kW	A			A	A
–	–	–	–	–	–	–	–	17	20	–	–	**CL04**	**RT1T**	32	50
7.5	27	15	30	15	28	17.5	26.5	–	–	–	–		**RT1V**	40	63
–	–	–	–	–	–	–	–	18.5	23	–	–		**RT1U**	32	50
–	–	–	–	–	–	–	–	22	25	–	–	**CL45**	**RT1V**	40	63
–	–	–	–	–	–	18.5	28.5	–	–	–	–		**RT1V**	40	63
–	–	18.5	37	18.5	35	22	33	–	–	–	–		**RT1W**	50	80
–	–	–	–	–	–	25	37.5	30	35	–	–		**RT1W**	50	80
11	40	–	–	22	40	–	–	–	–	–	–		**RT2E** (1)	50	80
–	–	–	–	–	–	–	–	33	38	–	–	**CL06**	**RT2E**	50	80
–	–	22	44	25	45	–	–	–	–	–	–		**RT2G**	63	80
15	50	–	–	–	–	–	–	–	–	–	–		**RT2G**	63	80
–	–	–	–	–	–	–	–	37	41	–	–	**CL07**	**RT2E**	63	80
–	–	–	–	–	–	30	45	40	43	–	–		**RT2G**	63	80
–	–	30	60	30	55	37	55	–	–	–	–		**RT2H**	80	125
18.5	65	–	–	37	66	–	–	–	–	–	–		**RT2J**	80	125
–	–	–	–	–	–	–	–	45	49	–	–	**CL08**	**RT2G**	80	125
–	–	37	72	–	–	45	65	–	–	–	–		**RT2J**	100	125
22	75	–	–	–	–	–	–	–	–	–	–		**RT2J**	100	125
–	–	–	–	45	80	–	–	–	–	–	–		**RT2L**	100	160
–	–	–	–	–	–	–	–	55	60	–	–	**CL09**	**RT2H**	80	125
–	–	–	–	–	–	50	73	–	–	–	–		**RT2J**	100	125
25	84	45	85	50	88	55	80	–	–	–	–		**RT2L**	100	160
30	105	55	105	55	100	–	–	–	–	–	–	**CL10**	**RT2M**	125	200
–	–	–	–	–	–	–	–	–	–	55	40	**CK75**	**RT4J**	63	80
–	–	–	–	–	–	–	–	75	80	–	–		**RT3C**	125	160
–	–	–	–	–	–	–	–	90	97	–	–		**RT3D**	125	160
–	–	–	–	–	–	75	105	–	–	–	–		**RT3D**	160	200
37	126	–	–	–	–	–	–	–	–	–	–		**RT3E**	160	200
–	–	75	138	75	135	90	129	–	–	–	–		**RT3E**	200	224
45	150	–	–	–	–	–	–	–	–	–	–		**RT3F**	200	224
–	–	–	–	–	–	–	–	–	–	75	54	**CK08**	**RT4 K**	80	125
–	–	–	–	–	–	–	–	–	–	90	64		**RT3B**	100	160
–	–	–	–	–	–	–	–	110	118	–	–		**RT3E**	160	200
–	–	–	–	–	–	–	–	132	141	–	–		**RT3F**	200	250
–	–	90	170	90	165	110	156	–	–	–	–		**RT3F**	200	250
55	182	–	–	100	182	–	–	–	–	–	–		**RT3F**	200	250
–	–	–	–	–	–	–	–	–	–	110	78	**CK85**	**RT4L** (1)	100	160
–	–	–	–	–	–	–	–	150	166	–	–		**RT4N** (1)	250	315
–	–	–	–	110	200	132	188	–	–	–	–		**RT4P** (1)	250	315
–	–	110	211	–	–	–	–	–	–	–	–		**RT4P** (1)	250	315
–	–	–	–	–	–	–	–	–	–	132	94	**CK09**	**RT4M** (1)	125	160
–	–	–	–	–	–	–	–	–	–	150	105		**RT4M** (1)	160	200
–	–	–	–	–	–	–	–	160	170	–	–		**RT4N** (1)	200	250
–	–	–	–	–	–	–	–	185	193	–	–		**RT4P** (1)	250	315
–	–	–	–	–	–	–	–	–	–	160	113	**CK95**	**RT4M** (1)	160	200
–	–	–	–	–	–	–	–	–	–	185	130		**RT4N** (1)	160	200
–	–	–	–	–	–	–	–	–	–	200	141		**RT4N** (1)	200	250
–	–	–	–	–	–	–	–	–	–	220	155	**CK10**	**RT5A** (1)	200	250
–	–	–	–	–	–	–	–	–	–	250	175		**RT5A** (1)	250	315
–	–	–	–	–	–	–	–	220	230	–	–	**CK95**	**RT4P** (1)	315	400
–	–	–	–	150	269	185	261	250	262	–	–		**RT4R** (1)	355	400
–	–	150	283	160	285	–	–	–	–	–	–		**RT4R** (1)	400	425
90	309	160	309	–	–	200	281	–	–	–	–		**RT4R** (1)	400	425

(1) Separate mounting: type RT2XP.

(continued on page D.23)

Selection table (continued 2)

Motor												Contactor	Thermal relay	Fuse	
230/200V		400/380V		440/415V		500V		690/660V		1000V				aM	gG-gL
kW	A	kW	A	kW	A	kW	A	kW	A	kW	A			A	A
–	–	–	–	–	–	220	310	280	292	–	–	**CK10**	**RT5C**	400	425
–	–	–	–	185	325	–	–	300	307	–	–		**RT5C**	425	500
–	–	–	–	–	–	–	–	315	322	–	–		**RT5C**	425	500
110	356	185	355	200	350	250	348	335	344	–	–		**RT5D**	425	500
–	–	220	370	220	385	–	–	355	366	–	–		**RT5D**	500	500
–	–	–	–	–	–	280	385	375	390	–	–		**RT5D**	500	500
–	–	220	408	–	–	300	409	–	–	–	–		**RT5D**	500	500
–	–	–	–	–	–	–	–	–	–	280	197	**CK11**	**RT5B**	250	315
–	–	–	–	–	–	–	–	–	–	300	211		**RT5B**	315	355
–	–	–	–	–	–	–	–	–	–	315	221		**RT5B**	315	355
–	–	–	–	–	–	–	–	–	–	335	234		**RT5B**	315	355
–	–	–	–	–	–	–	–	–	–	355	245		**RT5B**	315	355
–	–	–	–	–	–	–	–	400	412	–	–		**RT5D**	500	500
132	425	–	–	250	437	315	426	–	–	–	–		**RT5D**	630	630
–	–	–	–	–	–	335	456	425	442	–	–		**RT5D**	630	630
–	–	250	475	280	480	355	485	450	462	–	–		**RT5E**	630	630
150	500	–	–	300	508	375	513	–	–	–	–		**RT5E**	630	630
160	520	280	530	315	530	400	543	–	–	–	–		**RT5E**	630	630
–	–	–	–	–	–	–	–	–	–	375	256	**CK12**	**RT5B**	315	355
–	–	–	–	–	–	–	–	–	–	400	273		**RT5C**	400	425
–	–	–	–	–	–	–	–	–	–	425	290		**RT5C**	400	425
–	–	–	–	–	–	–	–	–	–	450	307		**RT5C**	400	425
–	–	–	–	–	–	–	–	475	488	–	–		**RT5E**	630	630
–	–	–	–	–	–	–	–	500	514	–	–		**RT5E**	630	630
–	–	300	563	335	565	–	–	–	–	–	–		**RT5E**	630	630
185	609	315	580	355	600	–	–	–	–	–	–		**RT5E**	630	630
200	630	335	630	375	630	450	613	–	–	–	–		**RT5E**	800	800
220	710	355	650	–	–	475	647	–	–	–	–		**RT5E**	800	800
–	–	375	680	400	673	–	–	–	–	–	–		**RT5E**	800	800
–	–	–	–	–	–	–	–	–	–	475	324	**CK13**	**RT5C**	500	630
–	–	–	–	–	–	–	–	–	–	500	341		**RT5C**	500	630
–	–	–	–	–	–	500	680	–	–	–	–		**RT6A**	1000	1000
–	–	400	720	425	714	–	–	–	–	–	–		**RT6A**	1000	1000
–	–	425	763	450	756	–	–	–	–	–	–		**RT6A**	1000	1000
250	823	450	800	–		–	–	–	–	–	–		**RT6A**	1000	1000

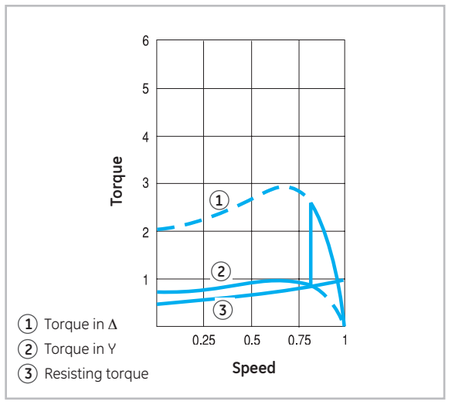
Star-delta starters

For AC squirrel cage motors

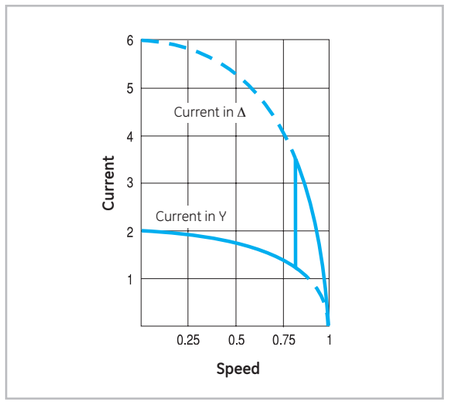
In order to use this type of starting, the following conditions must be met:
The ends of the three stator windings should terminate in a terminal box (6 terminals, see diagram).
The line voltage should be the same as the motor delta connection voltage.

This starting system is suitable for machines where the resisting torque during starting is less than 1/3 of the motor torque (see torque speed curves).
The target of this type of starting is to reduce the current during starting to 1/3, there by reducing the linedrop (see current speed curves).
Reduce the motor torque to 1/3 to smooth out mechanical stress on the machine and on the load (see torque speed curves).

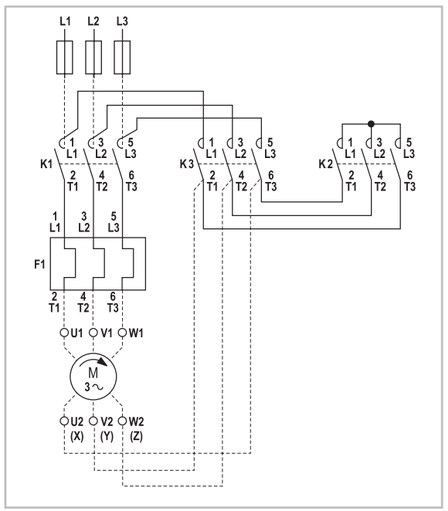
Torque-speed curve



Current-speed curve



Diagram



Selection table

Motor												Contactors		Thermal	Fuse	
230/200V		400/380V		440/415V		500V		690/660V		1000V		Line and	Star	relay	aM	gG-gL
kW	A	kW	A	kW	A	kW	A	kW	A	kW	A	Delta			A	A
2.2	9	4	9	–	–	5.5	9	7.5	9	–	–	CL00	CL00	RT1L	16	25
3	12	5.5	12	5.5	11	7.5	12	–	–	–	–	CL00	CL00	RT1M	16	35
3.7	14	–	–	–	–	–	–	–	–	–	–	CL00	CL00	RT1N	20	40
4	16	7.5	16	7.5	14	–	–	–	–	–	–	CL01	CL00	RT1N	20	40
–	–	–	–	–	–	–	–	11	13	–	–	CL01	CL00	RT1M	20	40
–	–	–	–	–	–	11	17	–	–	–	–	CL01	CL00	RT1N	20	40
5.5	21	11	22.5	11	21	–	–	–	–	–	–	CL02	CL01	RT1P	32	50
–	–	–	–	–	–	–	–	15	18	–	–	CL02	CL01	RT1P	32	50
–	–	–	–	–	–	15	23	–	–	–	–	CL02	CL01	RT1P	32	50
–	–	–	–	–	–	–	–	18.5	23	–	–	CL25	CL02	RT1P	32	50
7.5	27	15	30	15	28	–	–	–	–	–	–	CL25	CL02	RT1S	40	63
–	–	–	–	–	–	18.5	28.5	22	26	–	–	CL25	CL02	RT1S	40	63
–	–	–	–	18.5	35	22	33	–	–	–	–	CL25	CL02	RT1T	50	80
11	40	18.5	37	–	–	–	–	–	–	–	–	CL25	CL25	RT1U	50	63
–	–	–	–	–	–	–	–	30	35	–	–	CL03	CL25	RT1T	50	63
–	–	22	44	22	40	30	45	–	–	–	–	CL03	CL25	RT1U	63	80
15	50	25	50	–	–	–	–	–	–	–	–	CL04	CL03	RT1V	63	80
–	–	–	–	–	–	–	–	37	41	–	–	CL45	CL03	RT1U	50	80
–	–	30	60	30	55	–	–	–	–	–	–	CL45	CL03	RT1W	63	80
18.5	65	–	–	–	–	–	–	–	–	–	–	CL45	CL03	RT1W	80	125
–	–	–	–	–	–	37	55	45	49	–	–	CL45	CL03	RT1V	63	80
22	75	–	–	–	–	–	–	–	–	–	–	CL06	CL04	RT2G	100	160
–	–	33	65	37	66	–	–	–	–	–	–	CL06	CL04	RT1W	80	100
–	–	–	–	–	–	45	65	55	60	–	–	CL06	CL04	RT2E	100	160
–	–	37	72	–	–	–	–	–	–	–	–	CL06	CL04	RT2E	100	160
–	–	45	85	45	80	55	80	–	–	–	–	CL06	CL04	RT2G	100	160
–	–	–	–	–	–	–	–	75	80	–	–	CL07	CL06	RT2G	100	160
30	105	55	105	55	100	–	–	–	–	–	–	CL07	CL06	RT2H	125	160
–	–	–	–	–	–	75	105	–	–	–	–	CL08	CL06	RT2H	125	160
37	126	–	–	–	–	–	–	–	–	–	–	CL08	CL06	RT2J	160	200
–	–	–	–	75	135	–	–	–	–	–	–	CL08	CL06	RT2J	160	200
–	–	–	–	–	–	–	–	90	97	–	–	CL09	CL06	RT2H	125	160
40	138	–	–	–	–	–	–	–	–	–	–	CL09	CL07	RT2L	160	250
–	–	–	–	–	–	90	129	–	–	–	–	CL09	CL07	RT2J	160	250
–	–	75	138	–	–	–	–	–	–	–	–	CL09	CL07	RT2L	160	250
–	–	–	–	–	–	–	–	110	118	–	–	CL10	CL07	RT2J	160	250
45	150	–	–	–	–	–	–	–	–	–	–	CL10	CL07	RT2L	160	250
–	–	–	–	–	–	110	156	–	–	–	–	CL10	CL08	RT2L	200	250
–	–	90	170	90	165	–	–	–	–	–	–	CL10	CL08	RT2M	200	250
–	–	–	–	–	–	–	–	132	141	–	–	CK75C	CL08	RT3C	160	200
55	182	–	–	–	–	132	188	–	–	–	–	CK75C	CL08	RT3D	200	250
–	–	–	–	110	200	–	–	–	–	–	–	CK75C	CL08	RT3D	250	315
–	–	–	–	–	–	–	–	150	166	–	–	CK75C	CL09	RT3D	200	250
–	–	–	–	–	–	–	–	160	170	–	–	CK75C	CL10	RT3D	200	250
–	–	110	211	–	–	150	218	–	–	–	–	CK75C	CL10	RT3E	250	315
–	–	–	–	132	240	160	228	–	–	–	–	CK75C	CL10	RT3E	250	315
75	239	–	–	–	–	–	–	–	–	–	–	CK75C	CL10	RT3E	250	315
–	–	–	–	–	–	–	–	–	–	90	64	CK75C	CK75C	RT4LJ	80	125
–	–	–	–	–	–	–	–	–	–	110	78	CK75C	CK75C	RT4LJ	108	160
–	–	132	245	–	–	–	–	–	–	–	–	CK75C	CL10	RT3F	315	355
–	–	–	–	–	–	–	–	185	193	–	–	CK75C	CK75C	RT3E	250	315
–	–	150	288	150	269	185	261	–	–	–	–	CK08C	CK75C	RT3F	315	355
–	–	–	–	160	285	–	–	–	–	–	–	CK08C	CK75C	RT3F	315	355
–	–	–	–	–	–	–	–	200	207	–	–	CK08C	CK75C	RT3E	250	315
–	–	–	–	–	–	–	–	220	230	–	–	CK08C	CK75C	RT3E	250	315
90	309	–	–	–	–	–	–	–	–	–	–	CK08C	CK75C	RT3F	315	355

For electrical endurance see page A.94-A.104, but first divide the rated power and current values shown in the table by 1.73.
The thermal overload relay should be set at 0.58 In of the motor.

Star-delta starters

Selection table *(continued 1)*

Motor												Contactors		Thermal	Fuse	
230/200V		400/380V		440/415V		500V		690/660V		1000V		Line and	Star	relay	aM	gG-gL
kW	A	kW	A	kW	A	kW	A	kW	A	kW	A	Delta			A	A
–	–	–	–	–	–	–	–	–	–	132	94	**CK08C**	**CK75C**	**RT4LK**	125	160
–	–	–	–	–	–	–	–	–	–	150	105	**CK08C**	**CK75C**	**RT3B**	125	160
–	–	–	–	–	–	–	–	–	–	160	113	**CK08C**	**CK75C**	**RT3B**	125	160
–	–	–	–	–	–	–	–	–	–	185	130	**CK85B**	**CK75C**	**RT4LL**	160	200
–	–	160	309	–	–	200	281	250	262	–	–	**CK85B**	**CK75C**	**RT4N**	355	400
–	–	–	–	–	–	220	310	–	–	–	–	**CK85B**	**CK75C**	**RT4N**	355	400
–	–	–	–	185	325	–	–	–	–	–	–	**CK85B**	**CK75C**	**RT4P**	400	425
110	356	185	355	200	350	–	–	–	–	–	–	**CK85B**	**CK75C**	**RT4P**	400	425
–	–	–	–	–	–	–	–	280	262	–	–	**CK09B**	**CK75C**	**RT4N**	315	355
132	425	200	370	220	385	250	348	–	–	–	–	**CK09B**	**CK75C**	**RT4P**	500	500
–	–	220	408	–	–	280	385	–	–	–	–	**CK09B**	**CK08C**	**RT4P**	500	500
–	–	–	–	–	–	–	–	–	–	200	141	**CK09B**	**CK08C**	**RT4LL**	200	250
–	–	–	–	–	–	–	–	–	–	220	155	**CK09B**	**CK08C**	**RT4LM**	200	250
–	–	–	–	–	–	–	–	–	–	250	175	**CK09B**	**CK08C**	**RT4LM**	200	250
–	–	–	–	–	–	–	–	300	307	–	–	**CK09B**	**CK08C**	**RT4N**	355	400
–	–	–	–	–	–	–	–	315	322	–	–	**CK09B**	**CK08C**	**RT4N**	355	400
–	–	–	–	–	–	–	–	335	349	–	–	**CK09B**	**CK08C**	**RT4P**	500	500
–	–	–	–	–	–	–	–	–	–	280	197	**CK95B**	**CK09B**	**RT4LM**	250	315
–	–	–	–	250	437	–	–	–	–	–	–	**CK95B**	**CK08C**	**RT4P**	500	500
–	–	–	–	–	–	–	–	355	366	–	–	**CK95B**	**CK85B**	**RT4P**	425	500
–	–	–	–	–	–	300	409	375	390	–	–	**CK95B**	**CK85B**	**RT4P**	500	500
–	–	–	–	–	–	315	426	–	–	–	–	**CK95B**	**CK85B**	**RT4P**	500	500
150	500	250	475	280	480	–	–	–	–	–	–	**CK95B**	**CK85B**	**RT4R**	630	630
–	–	–	–	–	–	–	–	–	–	300	211	**CK95B**	**CK85B**	**RT4LM**	250	315
–	–	–	–	–	–	–	–	–	–	315	221	**CK95B**	**CK85B**	**RT4LM**	250	315
–	–	–	–	–	–	–	–	400	412	–	–	**CK95B**	**CK85B**	**RT4R**	500	500
–	–	–	–	–	–	–	–	425	442	–	–	**CK95B**	**CK85B**	**RT4R**	500	500
–	–	–	–	300	508	335	456	450	462	–	–	**CK10C**	**CK85B**	**RT5C**	630	630
160	520	–	–	–	–	355	485	–	–	–	–	**CK10C**	**CK85B**	**RT4C**	630	630
–	–	–	–	–	–	375	513	–	–	–	–	**CK10C**	**CK85B**	**RT5C**	630	630
–	–	280	530	315	530	–	–	–	–	–	–	**CK10C**	**CK85B**	**RT5C**	630	630
–	–	300	563	355	561	–	–	–	–	–	–	**CK10C**	**CK85B**	**RT5C**	630	630
–	–	315	580	–	–	–	–	–	–	–	–	**CK10C**	**CK85B**	**RT5C**	630	630
185	609	–	–	355	600	–	–	–	–	–	–	**CK10C**	**CK85B**	**RT5C**	800	800
–	–	–	–	–	–	–	–	–	–	335	234	**CK10C**	**CK09B**	**RT5A**	315	355
–	–	–	–	–	–	–	–	–	–	355	245	**CK10C**	**CK09B**	**RT5A**	315	355
–	–	–	–	–	–	–	–	–	–	375	256	**CK10C**	**CK09B**	**RT5A**	315	355
–	–	–	–	–	–	–	–	–	–	400	273	**CK10C**	**CK09B**	**RT5A**	355	400
–	–	–	–	–	–	–	–	–	–	425	290	**CK10C**	**CK09B**	**RT5A**	355	400
–	–	–	–	–	–	–	–	–	–	450	307	**CK10C**	**CK09B**	**RT5A**	355	400
–	–	–	–	–	–	–	–	475	488	–	–	**CK10C**	**CK09B**	**RT5C**	630	630
–	–	–	–	–	–	–	–	500	514	–	–	**CK10C**	**CK09B**	**RT5C**	630	630
–	–	–	–	–	–	400	543	530	545	–	–	**CK10C**	**CK09B**	**RT5C**	630	630
–	–	–	–	375	587	425	580	560	575	–	–	**CK10C**	**CK09B**	**RT5C**	630	630
200	630	335	630	375	630	450	613	–	–	–	–	**CK10C**	**CK09B**	**RT5D**	800	800
–	–	355	650	–	–	–	–	–	–	–	–	**CK10C**	**CK09B**	**RT5D**	800	800
–	–	–	–	–	–	–	–	600	616	–	–	**CK10C**	**CK95B**	**RT5D**	800	800
–	–	–	–	400	622	475	647	630	646	–	–	**CK10C**	**CK95B**	**RT5D**	800	800
–	–	–	–	–	–	–	–	–	–	475	324	**CK10C**	**CK95B**	**RT5B**	355	400
–	–	–	–	–	–	–	–	–	–	500	341	**CK10C**	**CK95B**	**RT5B**	400	425
–	–	–	–	–	–	–	–	–	–	600	407	**CK10C**	**CK95B**	**RT5B**	500	500
–	–	–	–	400	673	425	659	–	–	–	–	**CK10C**	**CK10C**	**RT5D**	800	800
–	–	375	680	–	–	500	680	670	688	–	–	**CK11C**	**CK10C**	**RT5D**	800	800
220	710	400	720	425	714	530	725	710	729	–	–	**CK11C**	**CK10C**	**RT5D**	800	800
–	–	–	–	450	756	560	762	750	770	–	–	**CK11C**	**CK10C**	**RT5E**	1000	1000
–	–	425	763	475	798	–	–	–	–	–	–	**CK11C**	**CK10C**	**RT5E**	1000	1000
–	–	–	–	–	–	600	817	–	–	–	–	**CK11C**	**CK10C**	**RT5E**	1000	1000

For electrical endurance see page A.94-A.104, but first divide the rated power and current values shown in the table by 1.73.
The thermal overload relay should be set at 0.58 In of the motor.

Selection table (continued 2)

Motor												Contactors		Thermal	Fuse	
230/200V		400/380V		440/415V		500V		690/660V		1000V		Line and	Star	relay	aM	gG-gL
kW	A	kW	A	kW	A	kW	A	kW	A	kW	A	Delta			A	A
250	823	–	–	–	–	–	–	–	–	–	–	**CK11C**	**CK10C**	**RT5E**	1000	1000
–	–	–	–	–	–	–	–	–	–	630	428	**CK11C**	**CK10C**	**RT5B**	500	630
–	–	–	–	–	–	–	–	–	–	670	455	**CK11C**	**CK10C**	**RT5C**	500	630
–	–	450	800	–	–	–	–	–	–	–	–	**CK11C**	**CK10C**	**RT5E**	1000	1000
–	–	475	846	500	840	–	–	–	–	–	–	**CK11C**	**CK10C**	**RT5E**	1000	1000
–	–	–	–	–	–	–	–	800	821	–	–	**CK11C**	**CK10C**	**RT5E**	1000	1000
–	–	500	892	530	890	630	857	850	873	–	–	**CK11C**	**CK10C**	**RT5E**	1000	1000
280	910	530	943	560	941	670	912	–	–	–	–	**CK11C**	**CK10C**	**RT5E**	2x630	2x630
300	975	–	–	–	–	710	965	–	–	–	–	**CK12C**	**CK10C**	**RT5E**	2x630	2x630
315	1023	560	996	600	1010	750	1020	–	–	–	–	**CK12C**	**CK10C**	**RT5E**	2x630	2x630
335	1083	–	–	630	1058	–	–	–	–	–	–	**CK12C**	**CK10C**	**RT5E**	2x630	2x630
–	–	–	–	–	–	–	–	–	–	750	510	**CK12C**	**CK11C**	**RT5C**	630	630
–	–	–	–	–	–	–	–	900	924	–	–	**CK13B**	**CK11C**	**RT6A**	2x630	2x630
–	–	–	–	–	–	800	1088	950	975	–	–	**CK13B**	**CK11C**	**RT6A**	2x630	2x630
–	–	600	1074	–	–	–	–	–	–	–	–	**CK12B**	**CK11C**	**RT5E**	2x630	2x630
355	1142	–	–	710	1097	–	–	–	–	–	–	**CK12B**	**CK11C**	**RT5E**	2x630	2x630
–	–	–	–	–	–	–	–	–	–	800	543	**CK13B**	**CK11C**	**RT5C**	630	800
–	–	630	1128	670	1125	–	–	–	–	–	–	**CK12B**	**CK11C**	**RT5E**	2x630	2x630
375	1206	670	1200	710	1190	850	1156	–	–	–	–	**CK13B**	**CK11C**	**RT6A**	2x800	2x800
400	1286	710	1270	750	1255	–	–	–	–	–	–	**CK13B**	**CK11C**	**RT6A**	2x800	2x800
425	1364	–	–	–	–	–	–	–	–	–	–	**CK13B**	**CK12C**	**RT6A**	2x800	2x800
–	–	750	1342	–	–	–	–	–	–	–	–	**CK13B**	**CK12C**	**RT6A**	2x800	2x800

For electrical endurance see page A.94-A.104, but first divide the rated power and current values shown in the table by 1.73.
The thermal overload relay should be set at 0.58 In of the motor.

Autotransformer starters

For AC squirrel cage motors

This type of starting is used for machines where the resisting torque during starting is less than the motor torque (see torque speed curves):

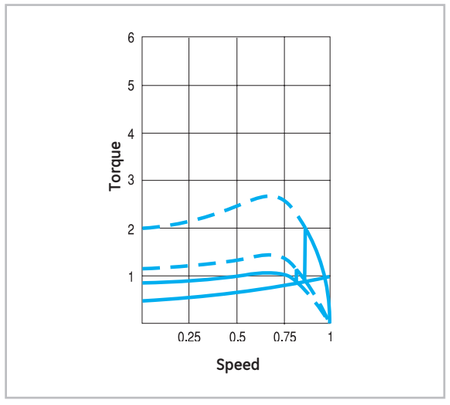
- Reduce current during starting to the required value (this will depend on the autotransformer voltage ratio selected).
- Reduce motor torque to smooth out mechanical stress on the machine and on the load (see torque speed curves). Reduction of the motor will depend on the autotransformer voltage ratio.

The two requirements for star-delta starting do not apply here. That is to say both end of the three windings do not have to be accessible and the line voltage does not have to be the same as the delta connection voltage.

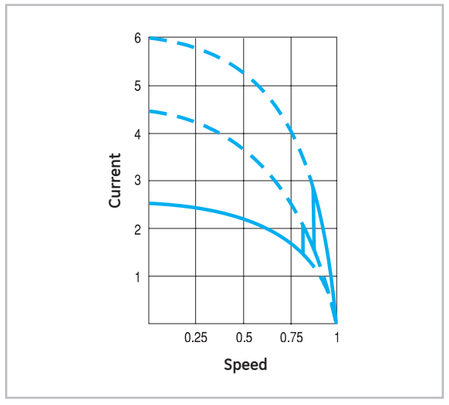
This system also has the following advantages over star-delta starting:

- required current and starting torque can be selected.
- starting can be effected at various points.
- motor voltage continuity during network switching.

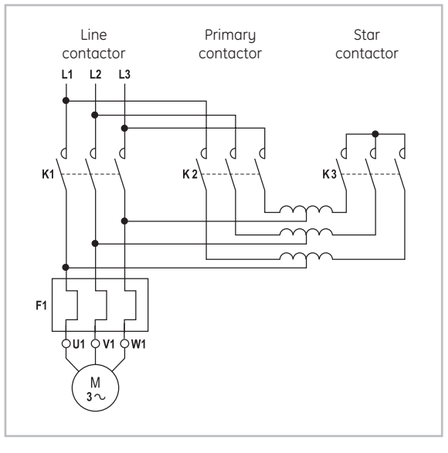
Torque-speed curve



Current-speed curve



Diagram



Selection table

Motor												Contactors		Thermal	Fuse	
230/200V		400/380V		440/415V		500V		690/660V		1000V		Line	Pr. trafo + Star	relay	aM	gG-gL
kW	A	kW	A	kW	A	kW	A	kW	A	kW	A				A	A
2.2	9	4	9	4	8	5.5	9	–	–	–	–	**CL00**	**CL00**	**RT1N**	16	25
–	–	–	–	–	–	–	–	7.5	9	–	–	**CL01**	**CL00**	**RT1N**	16	25
3	12	5.5	12	5.5	11	7.5	12	–	–	–	–	**CL01**	**CL00**	**RT1P**	16	35
3.7	14	–	–	7.5	14	–	–	–	–	–	–	**CL02**	**CL00**	**RT1P**	20	40
–	–	7.5	16	–	–	10	15,5	–	–	–	–	**CL02**	**CL00**	**RT1S**	20	40
–	–	–	–	–	–	–	–	11	13	–	–	**CL25**	**CL01**	**RT1P**	20	40
–	–	–	–	–	–	11	17	–	–	–	–	**CL25**	**CL01**	**RT1S**	20	40
5.5	21	11	22.5	11	21	13	20	–	–	–	–	**CL25**	**CL01**	**RT1T**	32	50
–	–	–	–	–	–	–	–	15	18	–	–	**CL03**	**CL01**	**RT1T**	32	50
–	–	–	–	–	–	15	23	–	–	–	–	**CL04**	**CL01**	**RT1U**	32	50
7.5	27	15	30	15	28	–	–	–	–	–	–	**CL04**	**CL02**	**RT1V**	40	63
–	–	–	–	–	–	–	–	18.5	23	–	–	**CL45**	**CL02**	**RT1U**	32	50
–	–	–	–	–	–	18.5	22.5	22	25	–	–	**CL45**	**CL02**	**RT1U**	40	63
–	–	–	–	18.5	35	22	33	–	–	–	–	**CL45**	**CL02**	**RT1W**	50	80
11	40	18.5	37	22	40	–	–	–	–	–	–	**CL06**	**CL03**	**RT2E**	50	80
–	–	–	–	–	–	–	–	30	35	–	–	**CL06**	**CL03**	**RT2E**	50	80
–	–	22	44	–	–	–	–	–	–	–	–	**CL06**	**CL03**	**RT2G**	63	80
15	50	–	–	–	–	–	–	–	–	–	–	**CL06**	**CL03**	**RT2G**	63	80
–	–	–	–	–	–	30	45	–	–	–	–	**CL07**	**CL03**	**RT2G**	63	80
–	–	–	–	–	–	–	–	37	41	–	–	**CL07**	**CL04**	**RT2E**	63	80
–	–	30	60	30	55	37	55	–	–	–	–	**CL07**	**CL04**	**RT2H**	80	125
18.5	65	–	–	37	66	–	–	–	–	–	–	**CL07**	**CL04**	**RT2J**	80	125
–	–	–	–	–	–	–	–	45	49	–	–	**CL08**	**CL04**	**RT2G**	80	125
–	–	–	–	–	–	–	–	55	60	–	–	**CL08**	**CL04**	**RT2H**	80	125
–	–	–	–	–	–	45	65	–	–	–	–	**CL08**	**CL06**	**RT2J**	80	125
22	75	37	72	–	–	–	–	–	–	–	–	**CL08**	**CL06**	**RT2J**	80	125
–	–	–	–	45	80	55	80	–	–	–	–	**CL08**	**CL06**	**RT2L**	100	160
25	84	45	85	50	88	–	–	–	–	–	–	**CL09**	**CL06**	**RT2L**	100	160
–	–	–	–	–	–	–	–	75	80	–	–	**CL09**	**CL06**	**RT2L**	125	160
30	105	55	105	55	100	75	105	–	–	–	–	**CL10**	**CL06**	**RT2M**	160	200
–	–	–	–	–	–	–	–	90	97	–	–	**CL10**	**CL07**	**RT2M**	125	200
37	126	75	138	75	135	90	129	–	–	–	–	**CK75C**	**CL07**	**RT3E**	200	224
–	–	–	–	–	–	–	–	110	118	–	–	**CK08C**	**CL08**	**RT3E**	160	200
–	–	–	–	–	–	–	–	132	141	–	–	**CK08C**	**CL08**	**RT3F**	200	250
45	150	90	170	90	165	110	156	–	–	–	–	**CK08C**	**CL08**	**RT3F**	200	250
55	182	–	–	–	–	–	–	–	–	–	–	**CK08C**	**CL08**	**RT3F**	200	250
–	–	–	–	–	–	–	–	–	–	90	64	**CK08C**	**CL08**	**RT3B**	100	160
–	–	–	–	–	–	–	–	150	166	–	–	**CK85B**	**CL09A**	**RT4N**	250	315
–	–	110	211	110	200	132	188	–	–	–	–	**CK85B**	**CL09A**	**RT4P**	250	315
–	–	–	–	–	–	–	–	–	–	110	78	**CK85B**	**CK75C**	**RT4N**	100	160
–	–	–	–	–	–	–	–	160	170	–	–	**CK09B**	**CK75C**	**RT4N**	200	250
–	–	–	–	–	–	150	218	185	193	–	–	**CK09B**	**CK75C**	**RT4P**	250	315
75	239	132	245	132	240	160	228	200	207	–	–	**CK09B**	**CK75C**	**RT4R**	315	355
–	–	–	–	–	–	–	–	–	–	150	105	**CK09B**	**CK75C**	**RT4M**	160	200
–	–	–	–	–	–	–	–	–	–	160	113	**CK95B**	**CK08C**	**RT4M**	160	200
–	–	–	–	–	–	–	–	–	–	220	155	**CK10C**	**CK08C**	**RT5A**	200	250
–	–	–	–	–	–	–	–	–	–	250	175	**CK10C**	**CK85B**	**RT5A**	250	315
–	–	–	–	–	–	–	–	220	230	–	–	**CK95B**	**CK08C**	**RT4P**	315	355
90	309	160	309	–	–	220	310	–	–	–	–	**CK10C**	**CK08C**	**RT5C**	400	425
–	–	–	–	185	325	–	–	300	307	–	–	**CK10C**	**CK08C**	**RT5C**	425	500
110	356	220	408	220	385	280	285	335	344	–	–	**CK10C**	**CK85B**	**RT5D**	425	500
132	425	–	–	250	437	–	–	–	–	–	–	**CK11C**	**CK85B**	**RT5D**	630	630
–	–	–	–	–	–	–	–	–	–	280	197	**CK10C**	**CK09B**	**RT5B**	250	315
–	–	–	–	–	–	–	–	–	–	335	234	**CK11C**	**CK09B**	**RT5B**	315	355
–	–	–	–	–	–	–	–	–	–	355	245	**CK11C**	**CK09B**	**RT5B**	315	355
–	–	–	–	–	–	300	409	400	412	–	–	**CK11C**	**CK09B**	**RT5D**	500	500
–	–	–	–	–	–	315	426	–	–	–	–	**CK11C**	**CK09B**	**RT5D**	630	630
150	500	250	475	280	480	335	456	–	–	–	–	**CK11C**	**CK09B**	**RT5E**	630	630
–	–	–	–	–	–	–	–	–	–	375	256	**CK12B**	**CK95B**	**RT5B**	315	355
–	–	–	–	300	508	375	513	450	462	–	–	**CK12B**	**CK95B**	**RT5E**	630	630
160	520	315	580	335	565	–	–	–	–	–	–	**CK12B**	**CK95B**	**RT5E**	630	630
–	–	–	–	–	–	–	–	–	–	450	307	**CK12B**	**CK10C**	**RT5C**	400	425
–	–	–	–	–	–	–	–	475	488	–	–	**CK12B**	**CK10C**	**RT5D**	630	630
200	630	335	630	375	630	450	613	–	–	–	–	**CK12B**	**CK10C**	**RT5E**	800	800
–	–	–	–	–	–	–	–	–	–	500	341	**CK13B**	**CK10C**	**RT5C**	500	630
–	–	–	–	–	–	–	–	500	514	–	–	**CK13B**	**CK10C**	**RT6A**	800	800
220	710	425	762	450	756	500	800	–	–	–	–	**CK13B**	**CK10C**	**RT6A**	1000	1000
250	823	450	800	–	–	–	–	–	–	–	–	**CK13B**	**CK10C**	**RT6A**	1000	1000

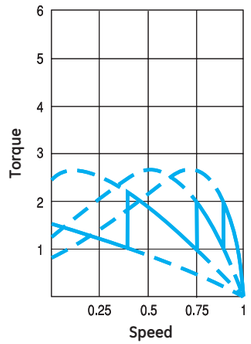
Contactors for rotor starters

For AC slip-ring motors

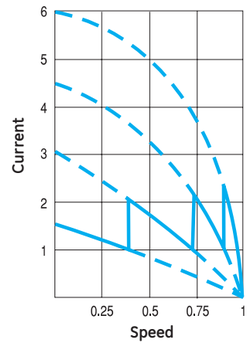
This type of starter is used in machines with resisting torque of any value where it is required to:
- Start with reduced peak currents without consequent motor torque reduction, as is the case with high resisting torques and when starting with reduced peak currents is required.
- Control speed for different load or resisting torque values, with reduced peak currents: lifting and transport gear, flow volume control, etc.

Whatever the application, a distinction should be made between the two electrical circuits which are used in this type of starters:
- Stator circuit, present in two categories and ahving a different breaking current in each:
  Category AC'2: switching-off motors during running, Ic = Ie
  Category AC 2: switching-off motors during starting, Ic = 2.5 Ie
- Rotor circuit, with similar characteristics to those in category AC1.

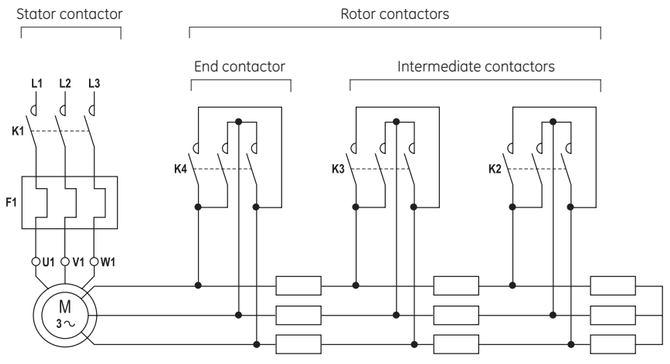
Torque-speed curve



Current-speed curve



Diagram



Stator circuit

Motor power						Contactor	Thermal relay	Fuse	
230V 220V kW	400V 380V kW	440V 415V kW	500V kW	690V 660V kW	1000V kW			aM A	gG-gL A
–	–	11	13	–	–	**CL25**	**RT1T**	32	50
5.5	11	–	–	–	–	**CL25**	**RT1U**	32	50
–	–	–	–	15	–	**CL03**	**RT1T**	25	40
–	–	–	–	17	–	**CL04**	**RT1T**	32	50
–	–	–	15	–	–	**CL04**	**RT1U**	32	50
7.5	15	15	17	–	–	**CL04**	**RT1V**	40	63
–	–	–	–	18.5	–	**CL45**	**RT1U**	32	50
–	–	18.5	22	33	–	**CL45**	**RT1W**	50	80
11	18.5	22	–	–	–	**CL06**	**RT2E**	50	80
–	22	25	25	33	–	**CL06**	**RT2G**	63	80
15	–	–	–	–	–	**CL06**	**RT2G**	63	80
–	–	–	30	40	–	**CL07**	**RT2G**	63	80
–	30	30	37	–	–	**CL07**	**RT2H**	80	125
18.5	–	37	–	–	–	**CL07**	**RT2J**	80	125
–	–	–	–	45	–	**CL08**	**RT2G**	63	80
–	–	–	–	55	–	**CL09**	**RT2H**	80	125
–	–	–	45	–	–	**CL08**	**RT2J**	80	125
22	37	45	–	–	–	**CL08**	**RT2J**	100	160
–	–	–	55	75	–	**CL10**	**RT2J**	100	160
25	45	50	63	–	–	**CL10**	**RT2L**	125	160
–	–	–	–	90	–	**CK75C**	**RT3D**	125	160
30	55	55	75	–	–	**CK75C**	**RT3D**	160	200
37	75	75	90	–	–	**CK75C**	**RT3E**	200	250
–	–	–	–	–	90	**CK08C**	**RT3B**	100	125
–	–	–	–	110	–	**CK08C**	**RT3E**	160	200
–	–	–	–	132	–	**CK08C**	**RT3F**	200	250
45	90	90	110	–	–	**CK08C**	**RT3F**	200	250
55	–	100	–	–	–	**CK08C**	**RT4N**	250	315
–	–	110	132	–	–	**CK85B**	**RT4P**	250	315
–	–	–	–	–	150	**CK09B**	**RT4M**	125	160
–	–	–	–	160	–	**CK09B**	**RT4N**	200	250
–	–	–	–	200	–	**CK09B**	**RT4P**	250	315
75	132	132	160	–	–	**CK09B**	**RT4P**	315	355
–	–	–	–	–	185	**CK95B**	**RT4N**	160	200
–	–	–	–	–	250	**CK10C**	**RT4N**	200	250
–	–	–	–	220	–	**CK10C**	**RT4P**	315	355
90	160	160	220	300	–	**CK10C**	**RT5C**	355	400
–	–	185	–	315	–	**CK10C**	**RT5C**	400	425
110	200	220	250	335	–	**CK10C**	**RT5C**	500	630
–	–	–	–	–	280	**CK10C**	**RT5B**	250	315
–	–	–	–	–	335	**CK11C**	**RT5B**	315	355
–	–	–	–	–	355	**CK11C**	**RT5B**	315	355
–	220	–	300	400	–	**CK11C**	**RT5D**	500	600
132	–	250	315	–	–	**CK11C**	**RT5D**	630	630
150	250	250	335	–	–	**CK11C**	**RT5E**	630	630
–	–	–	–	–	375	**CK12B**	**RT5B**	355	400
–	–	–	–	–	450	**CK12B**	**RT5C**	400	425
–	–	300	375	475	–	**CK12B**	**RT5E**	630	800
220	335	375	–	–	–	**CK12B**	**RT5E**	800	800
–	–	–	–	–	500	**CK13B**	**RT5C**	400	500
–	–	–	–	500	–	**CK13B**	**RT6A**	630	800
220	425	–	450	–	–	**CK13B**	**RT6A**	1000	1000
250	450	450	500	–	–	**CK13B**	**RT6A**	1000	1000

Rotor circuit

Rotor		Contactor	
Current (1) A	Max. voltage V	Intermediate	End
28	1000	**CL00**	**CL00**
37	1000	**CL00**	**CL01**
42	1000	**CL00**	**CL01**
48	1000	**CL01**	**CL02**
55	1000	**CL02**	**CL25**
60	1000	**CL02**	**CL03**
75	1000	**CL25**	**CL04**
90	1000	**CL25**	**CL45**
98	1000	**CL03**	**CL45**
112	1000	**CL04**	**CL06**
120	1000	**CL45**	**CL06**
135	1000	**CL45**	**CL06**
147	1000	**CL06**	**CL06**
165	1000	**CL06**	**CL07**
180	1000	**CL06**	**CL07**
187	1000	**CL07**	**CL08**
202	1000	**CL07**	**CL09**
240	1000	**CL08**	**CL10**
247	1000	**CL08**	**CK75C**
280	1000	**CL09**	**CK75C**
315	1000	**CL09**	**CK08C**
360	1000	**CL10**	**CK85C**
390	1500	**CK75C**	**CK09B**
472	1500	**CK08C**	**CK95B**
525	1500	**CK85B**	**CK95B**
585	1500	**CK09B**	**CK10C**
660	1500	**CK95B**	**CK10C**
825	1500	**CK10C**	**CK11C**
945	1500	**CK10C**	**CK12B**
1087	1500	**CK11C**	**CK12B**
1188	1500	**CK11C**	**CK12B**
1485	1500	**CK12B**	**CK13B**
1956	1500	**CK13B**	–

(1) The currents shown relate to the delta connection of the contactors poles. If the poles are star-connected, divide the values given in the column by 1.5.

Electrical endurance

- Stator circuit (see graph AC-2)
- Rotor circuit (see graph AC-1)

Contactors for rotor speed drives

Stator circuit

Rotor circuit

	Motor power (1)							Contactor	Rotor current (2)	Rotor voltage without counter-current	Rotor voltage with counter-current	Contactor
	230V 220V kW	400V 380V kW	415V kW	440V kW	500V kW	690V kW	1000V kW					
Jogging 10% AC-2	2.4	4.5	5	5.5	5.5	6.3	–	**CL00**	22	690	500	**CL00**
	3.7	6.5	7.5	7.5	8	9	–	**CL01**	30	690	500	**CL01**
	5	8	10	10	10	11	–	**CL02**	39	690	500	**CL02**
	7	13	15	15	15	15	–	**CL25**	60	690	500	**CL25**
	9	16.5	19	19	19	19	–	**CL04**	72	690	500	**CL04**
	10.5	19.5	24	24	24	27	–	**CL45**	87	750	600	**CL45**
	13.5	23	27	27	27	30	–	**CL06**	105	750	600	**CL06**
	18.5	28	32	32	32	35	–	**CL07**	127	750	600	**CL07**
	21	34	40	40	40	45	–	**CL08**	147	750	600	**CL08**
	22.5	39	47	47	47	50	–	**CL09**	177	750	600	**CL09**
	27.5	49	55	55	55	60	–	**CL10**	195	750	600	**CL10**
	38	65	70	70	75	75	–	**CK75C**	220	1000	750	**CK75C**
	40	75	85	85	85	95	80	**CK08C**	240	1000	750	**CK08C**
	50	85	90	90	100	100	95	**CK85B**	280	1000	750	**CK85B**
	55	96	110	110	110	120	110	**CK09B**	315	1000	750	**CK09B**
	70	110	115	115	125	125	120	**CK95B**	360	1000	750	**CK95B**
	85	147	175	175	175	195	165	**CK10C**	405	1000	750	**CK10C**
	105	181	220	220	220	233	220	**CK11C**	525	1000	750	**CK11C**
	124	215	235	235	257	270	250	**CK12B**	780	1000	750	**CK12B**
	140	250	260	260	300	280	276	**CK13B**	885	1000	750	**CK13B**
Jogging 20% AC-2	2.1	3.7	4.4	4.4	4.4	5	–	**CL00**	18	690	500	**CL00**
	2.6	4.5	6.1	6.1	6.1	7	–	**CL01**	25	690	500	**CL01**
	3.6	6.5	8.2	8.2	8.2	9	–	**CL02**	37	690	500	**CL02**
	6.3	11	12.7	12.7	12.7	11	–	**CL25**	48	690	500	**CL25**
	8	13.8	15.9	15.9	15.9	17	–	**CL04**	60	690	500	**CL04**
	9.2	16	18.5	18.5	18.5	20	–	**CL45**	72	750	600	**CL45**
	10.5	18.5	22	22	22	25	–	**CL06**	85	750	600	**CL06**
	13	23	27	27	27	31	–	**CL07**	106	750	600	**CL07**
	17.3	30	34.6	34.6	34.6	43	–	**CL08**	123	750	600	**CL08**
	19.6	34	39	39	39	47	–	**CL09**	147	750	600	**CL09**
	22	38	46	46	46	55	–	**CL10**	165	750	600	**CL10**
	32	60	65	65	65	70	65	**CK75C**	190	1000	750	**CK75C**
	36	75	75	75	75	90	75	**CK08C**	210	1000	750	**CK08C**
	42	78	85	85	85	100	85	**CK85B**	240	1000	750	**CK85B**
	47.8	82.5	90	96	96	115	100	**CK09B**	273	1000	750	**CK09B**
	60	96	110	110	110	135	125	**CK95B**	305	1000	750	**CK95B**
	77	132	140	150	150	190	160	**CK10C**	348	1000	750	**CK10C**
	89	153	178	178	185	220	185	**CK11C**	453	1000	750	**CK11C**
	110	190	218	218	220	258	220	**CK12B**	570	1000	750	**CK12B**
	132	228	230	230	258	240	230	**CK13B**	750	1000	750	**CK13B**

Electrical endurance 10^6 x 1.3 operations

continued on D.33

(1) Power values shown are not standard as they refer to intermittent service.
(2) The current shown relates to the delta connection of the contactor poles.
If the poles are star-connected, divide the values given in the column by 1.5.

Stator circuit (continued)

Jogging 35% AC-2

Motor power (1)							Contactor
230V 220V kW	400V 380V kW	415V kW	440V kW	500V kW	690V kW	1000V kW	
1.4	2.8	3.4	3.4	3.4	4	–	**CL00**
2.2	3.8	4.5	4.5	4.5	5.5	–	**CL01**
3	5.5	7.5	7.5	7.5	7.5	–	**CL02**
4.9	9	10	10	10	11	–	**CL25**
6.7	12.8	14.8	14.8	14.8	13		**CL04**
7	13	15	15	15	17	–	**CL45**
9	15	18	18	18	20	–	**CL06**
10.5	18.5	22	22	22	25	–	**CL07**
13.5	24	28	28	28	33	–	**CL08**
18.5	29	33	33	33	40	–	**CL09**
19.6	34	39	39	39	45	–	**CL10**
25	45	47	47	47	55	60	**CK75C**
30	55	63	63	63	77	63	**CK08C**
35	78	80	80	80	90	75	**CK85B**
40	75	85	85	85	100	80	**CK09B**
46	83	100	100	100	135	117	**CK95B**
63	110	132	132	132	150	132	**CK10C**
79	136	157	157	160	190	160	**CK11C**
91	157	165	176	188	220	185	**CK12B**
115	200	200	200	220	205	202	**CK13B**

Electrical endurance 10^6 x 1.3 operations

(1) Power values shown are not standard as they refer to intermittent service.
(2) The current shown relates to the delta connection of the contactor poles.
If the poles are star-connected, divide the values given in the column by 1.5.

Rotor circuit (continued)

Rotor current (2)	Rotor voltage without counter-current	Rotor voltage with counter-current	Contactor
14	660	500	**CL00**
20	660	500	**CL01**
26	660	500	**CL02**
42	660	500	**CL25**
50	660	500	**CL04**
57	750	600	**CL45**
70	750	600	**CL06**
85	750	600	**CL07**
100	750	600	**CL08**
120	750	600	**CL09**
138	750	600	**CL10**
155	1000	750	**CK75C**
172	1000	750	**CK08C**
200	1000	750	**CK85B**
225	1000	750	**CK09B**
250	1000	750	**CK95B**
285	1000	750	**CK10C**
385	1000	750	**CK11C**
495	1000	750	**CK12B**
637	1000	750	**CK13B**

Contactors for connection of power transformers

In this application it is essential to ascertain the no-load inrush current of the transformer I_{μ}, (magnetisation current) which in the majority of cases determines the size of the contactor.

Two cases are illustrated in the table:
- No-loap inrush current up to 20 times the rated transformer current
- No-loap inrush current up to 40 times the rated transformer current.

The contactor should not cut out the short-circuit current; if the protective devices used are fuses, this condition will be intrinsically complied with.
In the case however of devices with tripping contacts the general line circuit breaker will be driven rather than the contactor coil.

Selection table

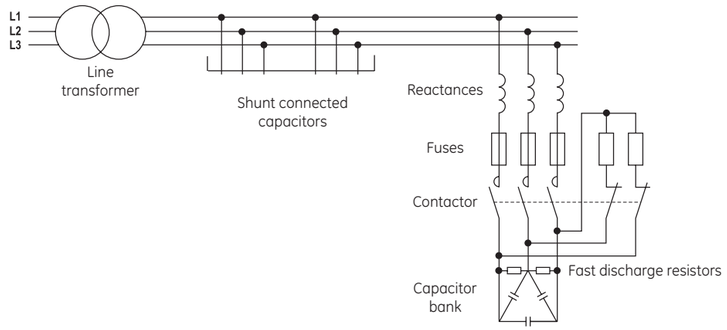
$\frac{I_{\mu}}{Ie} = 20$		$\frac{I_{\mu}}{Ie} = 40$		Contactor
230V 240V kVA	**380V 400V** kVA	**230V 240V** kVA	**380V 400V** kVA	
2	3.5	1	1.75	**CL00A**
2.75	5	1.37	2.5	**CL01A**
4	7	2	3.5	**CL02A**
5.75	10	2.85	5	**CL25A**
5.75	10	2.85	5	**CL03A**
7.25	12.5	3.65	6.25	**CL04A**
9	15.5	4.50	7.75	**CL45A**
10	17	5	8.5	**CL05A**
12	21	6	10.5	**CL06A**
15	25	7.5	12.5	**CL07A**
20	35	10	16	**CL08A**
25	40	12.5	20	**CL09A**
30	50	15	25	**CL10A**
35	55	17	27	**CK75C**
40	60	20	30	**CK08C**
45	75	22	35	**CK85B**
50	85	25	42.5	**CK09B**
80	150	40	75	**CK10C**
100	170	50	85	**CK11C**
127	215	64	107	**CK12B**
160	280	80	140	**CK13B**

Contactors for capacitors (category AC6b)

The most usual application of capacitors is for centralised automatic power factor (cos φ) correction. A characteristic of capacitors is the high overcurrent which appears as they are connected.
Such overcurrents are due to:
- Harmonic currents produced by saturated transformers, rectifiers, etc.
- Transient currents, the frequency and amplitude of which depend on the network inductance and the capacitor size.
- Additional transient currents arising where a capacitor is connected when others have already been connected, and caused by discharging of the latter.

GE Power Controls contactors are fitted with specially treated hardened alloy contacts which are highly resistent to welding and are therefore capable of withstanding high current peaks on connection.
The operation conditions taken as a basis for usage are:
- Near presence of other previously connected capacitors with a total power of up to eight times that of the capacitor to be connected.
- Shock coils reactances with a minimum inductance of 4µH. These can be obtained by making 4 or 6 turns of 15cm windings on the conductor of each phase.
- Fast discharge resistor for reconnection within 60 seconds.

Diagram



Selection table

Contactor		θ ≤ 55°C					θ ≤ 70°C						
Type	**Ith**	**220V 230V 240V**	**400V**	**415V**	**500V**	**690V 660V**	**220V 230V 240V**	**400V**	**415V**	**500V**	**690V 660V**	**Fuse gl - gG**	**I max. (peak)**
	A	kvar	kvar	kvar	kvar	kvar	kvar	kvar	kvar	kvar	kvar	A	A
CL00A	25	3	5	5.5	6.5	5.7	2.4	4	4.5	5.2	4.5	10	1000
CL01A	25	4.5	9.5	10.5	12.5	11	3.6	6	6.5	10	7	16	1000
CL02A	32	6.5	11	12	14.5	12.5	5.2	8.5	9	11.5	10	25	1000
CL25A	45	7.5	12.5	14	16	15	6.5	10	11	13	12	25	1000
CL03A	45	9	15	16.5	20	17.5	7.2	12	13	16	14	35	2500
CL04A	60	12.5	21	23	27.5	24	10	17	18	22	19.5	40	2500
CL45A	60	16.5	25	27	32	30	13	20	22	25	22	50	2500
CL06A	90	22	40	43	52	50	17	30	33	41	35	80	3500
CL07A	110	25	45	48	58	65	19	35	37	46	40	125	3500
CL08A	110	30	50	54	65	70	22	40	43	52	50	125	3500
CL09A	140	40	65	70	85	95	35	58	62	75	85	160	3500
CL10A	140	45	70	80	90	105	40	60	64	65	75	160	3500
CK75C	250	60	110	118	145	150	48	88	94	116	120	250	5000
CK08C	250	70	125	135	162	170	56	100	107	130	136	250	5000
CK85B	315	80	150	160	195	200	64	120	130	156	160	315	5000
CK09B	315	95	165	177	215	230	85	148	160	192	205	315	5000
CK95B	450	105	190	205	250	288	95	175	188	230	265	450	5500
CK10C	600	135	260	280	340	370	120	235	252	375	330	630	10000
CK11C	700	190	325	350	425	450	152	260	280	340	360	800	10000
CK12B	1000	250	400	430	520	600	200	320	344	416	480	1000	12000
CK13B	1250	315	525	565	685	650	252	420	452	548	520	1250	15000

Electrical endurance: 100.000 operations

Contactors for control lighting circuits

The characteristics of the most usual lighting systems are as follows:

Incandescent lamps
The connection current in very high -of the order of 15 times- rated current. Although this is a very short duration, it is only taken into account in order for the contactor connection current not to be exceeded. The power factor is always maintained at 1.

Fluorescent lamps
The connection current is slightly higher than rated current. The power factor is about 0.5. To improve up to 0.9, compensating capacitors can be used. In such cases, the connection power of the capacitor must be taken into account, the effect of which is appreciably greater on the smaller contactors.

High pressure mercury vapour lamps
The connection current varies, depending on type, between 1.6 and 2 times the rated current and will hold for between 3 and 5 minutes.
The power factor is of the order of 0.6 and this can be improved up to approximately unit value by means of compensating capacitors. In such cases, the connection power of the capacitor must be taken into account, the effect of which is appreciably greater on the smaller contactors.

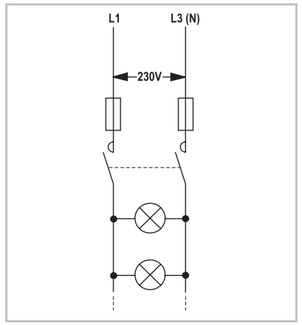
High pressure sodium vapour lamps
The connection current values varies, depending on type, between 1.3 and 1.6 times the rated current and will hold between 3 and 5 minutes.
The power factor is of the order of 0.45 and this can be improved up to apporximately unit value by means of compensating capacitors. In such cases, the connection power of the capacitor must be taken into account, the effect of which is appreciably greater on the smaller contactors.

Selection table

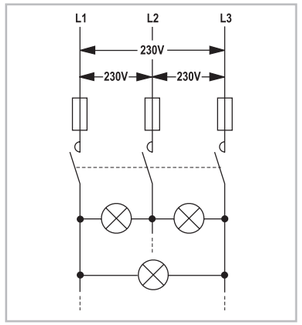
Types	W	A	µF		MCR	MC0	MC1	MC2		RL	CL00	CL01	CL02	CL25
Incandescent	60	0.27			27	37	59	59		59	62	62	70	77
	100	0.45			16	22	35	35		35	40	40	50	60
	200	0.91			8	11	17	17		17	20	20	25	30
	300	1.36			5	7	11	11		11	13	13	17	20
	500	2.27			3	4	7	7		7	8	8	10	12
	1000	4.5			1	2	3	3		3	4	4	5	6
	2000	9.1			0	1	1	1		1	1	1	2	3
Fluorescent	15	0.23			51	61	79	79		79	88	98	126	155
Single arrangement	20	0.37			32	38	49	49		49	57	61	78	110
Without compensation	40	0.44			28	33	41	41		41	48	51	66	93
	65	0.7			18	21	26	26		26	30	32	41	58
	100	1.5			8	10	12	12		12	14	16	19	27
Fluorescent	15	0.23	3.5		26	32	49	49		49	61	77	94	111
Single arrangement	20	0.25	4.5		20	25	38	38		38	48	61	74	87
With compensation	40	0.3	4.5		20	25	38	38		38	48	61	74	87
	65	0.45	7		13	14	25	25		25	31	39	47	56
	100	0.7	18		5	6	9	9		9	11	14	17	21
High pressure mercury	250	2.13			5	5	5	6		6	6	8	10	12
vapour	400	3.25			3	3	4	4		4	4	5	6	8
Without compensation	700	5.4			2	2	2	2		2	2	3	4	5
	1000	7.5			1	1	2	2		2	2	2	3	3
High pressure mercury	250	1.3	20		9	9	9	9		11	11	14	18	22
vapour	400	2.1	25		7	7	7	7		7	7	9	11	14
With compensation	700	3.6	40		5	5	5	5		4	4	5	6	8
	1000	5.3	60		3	3	3	3		3	3	3	4	5
High pressure sodium	250	3			3	3	4	4		4	4	5	7	9
vapour	400	4.4			2	2	3	3		3	3	4	5	6
Without compensation	1000	10.3			1	1	1	1		1	1	2	2	2
High pressure sodium	250	1.45	40		5	5	5	5		10	10	12	16	20
vapour	400	2.5	45		4	4	4	4		6	6	7	9	11
With compensation	1000	5.5	100		2	2	2	2		3	3	3	4	5
Metal iodide	250	2,17	-		3	3	4	4		4	4	5	7	9
Without compensation	400	3,48	-		2	2	2	3		3	3	3	4	6
	700	6,09	-		1	1	1	1		1	1	2	2	3
	1000	8,7	-		1	1	1	1		1	1	1	2	2
	2000	17,39	-		0	0	0	1		1	1	1	1	1
Metal iodide	250	1,4	32		0	6	6	7		7	7	9	11	16
With compensation	400	2,0	45		0	4	5	5		5	5	6	8	11
	700	3,6	65		0	2	3	3		3	3	3	4	6
	1000	5,3	85		0	2	2	2		2	2	2	3	4
	2000	10,6	100		0	0	0	0		0	1	1	2	2

Diagrams

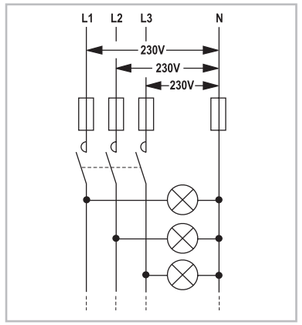
Single-phase circuit
The total number of lamps will be as shown in the table.



3-phase circuit, lamps delta-connected
The total number of lamps will be as shown in the table, multiplied by 1.73 and distributed in three equal quantities.



3-phase circuit, lamps star-connected
The total number of lamps will be as shown in the table, multiplied by 3 and distributed in three equal quantities.



Maximum number of lamps per phase at 230V															
CL03	**CL04**	**CL45**	**CL06**	**CL07**	**CL08**	**CL09**	**CL10**	**CK75C**	**CK08C**	**CK09**	**CK95**	**CK10**	**CK11**	**CK12**	**CK13**
77	85	122	156	191	222	264	284	333	410	555	820	1320	1550	1860	1860
60	66	73	95	116	133	160	170	200	246	333	490	790	930	1120	1120
30	33	36	47	58	66	79	84	99	122	165	240	390	460	550	550
20	22	24	31	38	44	53	56	66	81	110	165	260	300	370	370
12	12	14	19	23	26	31	33	39	48	66	95	155	185	220	220
6	6	7	9	11	13	16	17	20	24	33	50	80	90	110	110
3	3	3	4	5	7	8	8	10	12	16	25	40	45	55	55
177	224	237	355	390	434	496	553	790	988	1245	1770	2340	2740	3910	4890
125	139	147	221	243	270	309	344	490	614	774	1090	1460	1700	2430	3040
105	118	124	186	204	227	260	289	413	516	650	920	1220	1430	2045	2550
66	74	78	116	127	142	163	181	259	324	409	570	770	900	1280	1600
30	34	36	54	59	66	76	85	121	151	190	270	360	420	600	750
119	134	149	191	232	273	312	347	496	621	786	900	1240	1450	1740	1740
92	103	115	148	180	212	243	270	385	482	610	700	960	1120	1350	1350
92	103	115	148	180	212	243	270	385	482	610	700	960	1120	1350	1350
59	66	74	95	115	136	155	173	248	310	393	440	610	720	860	860
23	23	29	37	45	53	60	67	96	120	152	170	240	280	330	330
14	15	18	27	30	33	36	42	60	75	95	136	181	211	302	377
9	10	12	18	20	22	24	28	40	49	62	89	119	138	198	247
5	6	7	11	12	13	14	17	24	30	38	54	71	83	119	149
4	4	5	8	9	9	10	12	17	21	27	39	51	60	86	107
31	27	33	49	55	60	66	77	109	156	156	171	311	311	374	467
25	17	20	31	34	37	41	48	87	125	125	137	249	249	299	374
16	10	12	18	20	22	24	28	54	78	78	86	156	156	187	234
10	7	8	12	13	15	16	19	36	52	52	57	104	104	125	156
10	11	13	19	21	24	26	30	43	54	68	96	129	150	214	268
7	7	9	13	15	16	18	20	29	37	46	66	88	102	146	183
3	3	4	6	6	7	7	9	12	16	20	28	37	44	62	78
16	25	30	44	49	54	59	69	57	81	81	90	163	163	195	244
14	14	17	26	29	31	34	40	51	72	72	80	145	145	174	217
7	6	8	12	13	14	16	18	23	33	33	36	65	65	78	98
12	12	12	19	21	23	25	29	41	52	65	93	124	145	207	259
8	8	8	12	13	14	16	18	26	32	41	58	78	91	129	162
4	4	4	7	7	8	9	10	15	18	23	33	44	52	74	92
3	3	3	5	5	6	6	7	10	13	16	23	31	36	52	65
2	2	2	2	3	3	3	4	5	6	8	12	16	18	26	32
21	21	21	32	36	39	43	50	68	97	97	107	195	195	234	292
15	15	15	23	25	28	30	35	48	69	69	76	138	138	166	208
8	8	8	13	14	15	17	19	34	48	48	53	96	96	115	144
6	6	6	8	9	10	11	13	26	37	37	40	73	73	88	110
3	3	3	4	5	5	6	7	22	31	31	34	62	62	75	93

Contactors for DC - Max. operational current Ie (A) - DC utilization categories

Category DC1. L/R ≤ 1ms

Ue	Poles in serie	MC0	MC1	MC2	CL00	CL01	CL02	CL25	CL03	CL04	CL45	CL05	CL06	CL07	CL08	CL09	CL10
24V	1	6	9	9	18	18	18	25	25	32	40	50	50	65	65	80	80
	2	8	12	12	25	25	32	45	45	60	60	90	90	110	110	140	140
	3	15	20	20	25	25	32	45	45	60	60	90	90	110	110	140	140
	4	15	20	20	-	25	32	-	45	60	-	90	-	110	-	140	-
48V	1	5	7.5	7.5	15	15	15	20	20	25	35	45	45	55	55	70	70
	2	8	12	12	25	25	32	45	45	60	60	90	90	110	110	140	140
	3	12	16	16	25	25	32	45	45	60	60	90	90	110	110	140	140
	4	15	20	20	-	25	32	-	45	60	-	90	-	110	-	140	-
60V	1	4	6	6	12	12	12	18	18	18	32	40	40	50	50	65	65
	2	6	9	9	25	25	32	45	45	60	60	90	90	110	110	140	140
	3	12	16	16	25	25	32	45	45	60	60	90	90	110	110	140	140
	4	15	20	20	-	25	32	-	45	60	-	90	-	110	-	140	-
125V	1	1.6	2.5	2.5	6	6	6	8	8	8	8	16	16	16	16	16	16
	2	4	6	6	18	18	18	25	25	45	45	80	80	90	90	110	110
	3	5	10	10	25	25	25	32	45	60	60	90	90	110	110	140	140
	4	5	10	10	-	25	32	-	45	60	-	90	-	110	-	140	-
220V	1	0.2	0.36	0.36	0.8	0.8	0.8	0.8	1	1	1	2	2	2	2	2	2
	2	1.7	2.6	2.6	7.5	7.5	7.5	7.5	8	8	8	20	20	20	20	20	20
	3	4	8	8	25	25	25	32	45	50	50	90	90	110	110	140	140
	4	4	8	8	-	25	32	-	45	60	-	90	-	110	-	140	-
440V	1	0.09	0.13	0.13	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.8	0.8	0.8	0.8	0.8	0.8
	2	0.26	0.4	0.4	0.8	0.8	0.8	0.8	1	1	1	2	2	2	2	2	2
	3	0.5	1	1	8	8	8	10	10	10	10	15	15	15	15	15	15
	4	0.5	1	1	-	15	15	-	20	25	-	80	-	90	-	110	-
600V	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	0.4	0.4	0.4	0.4	0.5	0.5	0.5	1	1	1	1	1	1
	3	-	-	-	4	4	4	5	5	5	5	7.5	7.5	7.5	7.5	7.5	7.5
	4	-	-	-	-	8	10	-	12	12	-	50	-	65	-	75	-

Category DC3. L/R ≤ 2.5ms

Ue	Poles in serie	MC0	MC1	MC2	CL00	CL01	CL02	CL25	CL03	CL04	CL45	CL05	CL06	CL07	CL08	CL09	CL10
24V	1	-	-	-	12	12	12	18	18	25	32	40	40	50	50	65	65
	2	4	9	9	18	18	18	25	25	40	40	65	65	80	80	105	105
	3	8	12	12	18	18	18	25	25	40	40	65	65	80	80	105	105
	4	-	-	-	-	18	18	-	25	40	-	65	-	80	-	105	-
48V	1	-	-	-	9	9	9	12	12	18	20	30	30	35	35	45	45
	2	3	6	6	18	18	18	25	25	40	40	65	65	80	80	105	105
	3	6	9	9	18	18	18	25	25	40	40	65	65	80	80	105	105
	4	-	-	-	-	18	18	-	25	40	-	65	-	80	-	105	-
60V	1	-	-	-	7.5	7.5	7.5	10	10	15	15	25	25	30	30	35	35
	2	2	3	3	18	18	18	25	25	40	40	65	65	80	80	105	105
	3	5	7	7	18	18	18	25	25	40	40	65	65	80	80	105	105
	4	-	-	-	-	18	18	-	25	40	-	65	-	80	-	105	-
125V	1	-	-	-	0.8	0.8	0.8	0.8	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	2	0.65	1.5	1.5	5	5	5	5	5	5	5	50	50	60	60	85	85
	3	1.3	2	2	15	15	15	20	20	25	32	60	60	70	70	95	95
	4	-	-	-	-	15	18	-	25	32	-	65	-	80	-	105	-
220V	1	-	-	-	-	-	-	-	-	-	-	0.5	0.5	0.5	0.5	0.5	0.5
	2	0.16	0.26	0.26	0.8	0.8	0.8	0.8	0.8	0.8	0.8	3	3	3	3	4	4
	3	0.5	0.8	0.8	3	3	3	3	3	3	3	7	7	7	7	7	7
	4	-	-	-	-	10	10	-	15	15	-	65	-	75	-	95	-
440V	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	0.4	0.1	1.1	0.5	0.5	0.5	0.5	0.7	0.7	0.7	1	1	1	1	1	1
	4	-	-	-	-	2	2	-	4	4	-	40	-	50	-	60	-
600V	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	4	-	-	-	-	0.75	0.75	-	2.5	2.5	-	20	-	25	-	30	-

Category DC5. L/R ≤ 15ms

Ue	Poles in serie	MC0	MC1	MC2	CL00	CL01	CL02	CL25	CL03	CL04	CL45	CL05	CL06	CL07	CL08	CL09	CL10
24V	1	-	-	-	12	12	12	18	18	25	32	40	40	50	50	65	65
	2	3	4.5	4.5	18	18	18	25	25	40	40	65	65	80	80	105	105
	3	6	9	9	18	18	18	25	25	40	40	65	65	80	80	105	105
	4	-	-	-	-	18	18	-	25	40	-	65	-	80	-	105	-
48V	1	-	-	-	9	9	9	12	12	18	20	30	30	35	35	45	45
	2	2.5	4	4	18	18	18	25	25	40	40	65	65	80	80	105	105
	3	6.5	8	8	18	18	18	25	25	40	40	65	65	80	80	105	105
	4	-	-	-	-	18	18	-	25	40	-	65	-	80	-	105	-
60V	1	-	-	-	7.5	7.5	7.5	10	10	15	15	25	25	30	30	35	35
	2	2	3	3	18	18	18	25	25	40	40	65	65	80	80	105	105
	3	5	7	7	18	18	18	25	25	40	40	65	65	80	80	105	105
	4	-	-	-	-	18	18	-	25	40	-	65	-	80	-	105	-
125V	1	-	-	-	0.8	0.8	0.8	0.8	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	2	0.65	1.5	1.5	5	5	5	5	5	5	5	50	50	60	60	85	85
	3	1.3	2	2	15	15	15	20	20	25	32	60	60	70	70	95	95
	4	-	-	-	-	15	18	-	25	32	-	65	-	80	-	105	-
220V	1	-	-	-	-	-	-	-	-	-	-	0.5	0.5	0.5	0.5	0.5	0.5
	2	0.16	0.26	0.26	0.8	0.8	0.8	0.8	0.8	0.8	0.8	3	3	3	3	4	4
	3	0.5	0.8	0.8	3	3	3	3	3	3	3	7	7	7	7	7	7
	4	-	-	-	-	10	10	-	15	15	-	65	-	75	-	95	-
440V	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	0.4	0.1	1.1	0.5	0.5	0.5	0.5	0.7	0.7	0.7	1	1	1	1	1	1
	4	-	-	-	-	2	2	-	4	4	-	40	-	50	-	60	-
600V	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	4	-	-	-	-	0.75	0.75	-	2.5	2.5	-	20	-	25	-	30	-

Max. operational current Ie (A) - DC utilization categories (continued)

Category DC1. L/R ≤ 1ms

Ue	Poles in serie	CK07	CK75	CK08	CK85	CK09	CK95	CK10	CK11	CK12	CK13
24V	1	150	200	200	250	250	350	500	600	800	1000
	2	200	250	250	315	315	450	600	700	1000	1250
	3	200	250	250	315	315	450	600	700	1000	1250
	4	200	-	250	-	315	450	600	700	1000	1250
48V	1	125	170	170	200	200	295	425	500	600	850
	2	140	175	175	220	220	315	425	480	700	850
	3	200	250	250	315	315	500	600	700	1000	1250
	4	200	-	250	-	315	500	600	700	1000	1250
60V	1	100	140	140	175	175	245	350	420	560	700
	2	140	175	175	220	220	315	425	480	700	850
	3	200	250	250	315	315	500	600	700	1000	1250
	4	200	-	250	-	315	500	600	700	1000	1250
125V	1	20	25	25	30	30	50	60	70	100	125
	2	110	200	200	250	250	300	400	500	600	1000
	3	200	250	250	315	315	500	600	700	1000	1250
	4	200	-	250	-	315	500	600	700	1000	1250
220V	1	-	-	-	-	-	-	-	-	-	-
	2	65	110	110	150	150	200	250	250	300	400
	3	200	250	250	315	315	500	600	700	1000	1250
	4	200	-	250	-	315	500	600	700	1000	1250
440V	1	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-
	3	60	120	120	150	150	180	240	300	400	480
	4	110	-	200	-	250	315	400	500	700	800
600V	1	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-
	3	32	65	65	80	80	95	130	160	215	250
	4	85	-	100	-	130	170	215	265	375	430

Category DC3. L/R ≤ 2.5ms

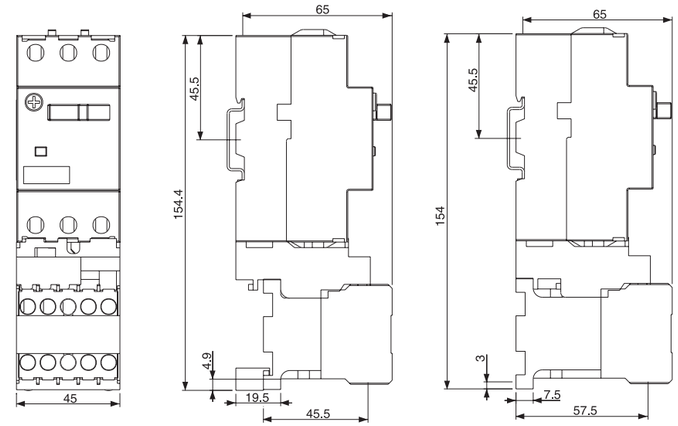
Ue	Poles in serie	CK07	CK75	CK08	CK85	CK09	CK95	CK10	CK11	CK12	CK13
24V	1	105	150	185	205	250	309	420	550	700	825
	2	105	150	185	205	250	309	420	550	700	825
	3	105	150	185	205	250	309	420	550	700	825
	4	105	-	185	-	250	309	420	550	700	825
48V	1	70	105	130	140	175	215	290	385	490	575
	2	105	150	185	205	250	309	420	550	700	825
	3	105	150	185	205	250	309	420	550	700	825
	4	105	-	185	-	250	309	420	550	700	825
60V	1	55	85	105	110	140	175	230	300	390	460
	2	105	150	185	205	250	309	420	550	700	825
	3	105	150	185	205	250	309	420	550	700	825
	4	105	-	185	-	250	309	420	550	700	825
125V	1	20	25	25	30	30	50	60	70	100	125
	2	105	150	185	205	250	309	420	550	700	825
	3	105	150	185	205	250	309	420	550	700	825
	4	105	-	185	-	250	309	420	550	700	825
220V	1	-	-	-	-	-	-	-	-	-	-
	2	10	60	70	80	85	95	140	185	225	400
	3	105	150	185	205	250	309	420	550	700	825
	4	105	-	185	-	250	309	420	550	700	825
440V	1	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-
	3	8	50	55	65	70	80	120	150	180	320
	4	80	-	105	-	185	205	250	300	400	700
600V	1	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-
	3	4	25	25	30	35	40	60	75	90	165
	4	40	-	50	-	90	100	125	150	200	350

Category DC5. L/R ≤ 15ms

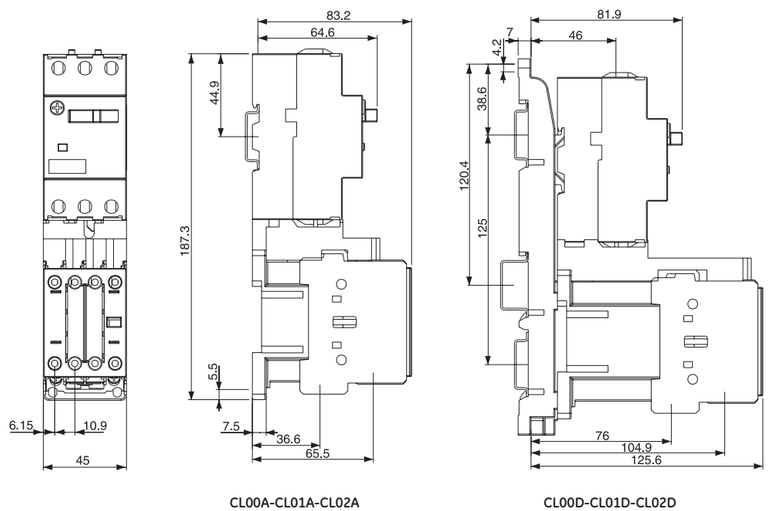
Ue	Poles in serie	CK07	CK75	CK08	CK85	CK09	CK95	CK10	CK11	CK12	CK13
24V	1	105	150	185	205	250	309	420	550	700	825
	2	105	150	185	205	250	309	420	550	700	825
	3	105	150	185	205	250	309	420	550	700	825
	4	105	-	185	-	250	309	420	550	700	825
48V	1	60	90	110	120	150	185	250	330	420	495
	2	105	150	185	205	250	309	420	550	700	825
	3	105	150	185	205	250	309	420	550	700	825
	4	105	-	185	-	250	309	420	550	700	825
60V	1	55	85	105	110	140	175	230	300	390	460
	2	105	150	185	205	250	309	420	550	700	825
	3	105	150	185	205	250	309	420	550	700	825
	4	105	-	185	-	250	309	420	550	700	825
125V	1	15	20	20	25	25	40	50	60	80	100
	2	80	95	105	150	185	205	250	300	400	700
	3	105	150	185	205	250	309	420	550	700	825
	4	105	-	185	-	250	309	420	550	700	825
220V	1	-	-	-	-	-	-	-	-	-	-
	2	8	50	55	65	70	80	120	150	180	320
	3	80	95	105	150	185	205	250	300	400	700
	4	105	-	185	-	250	309	420	550	700	825
440V	1	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-
	3	5	40	40	50	50	60	90	100	100	200
	4	65	-	95	-	150	185	205	250	300	400
600V	1	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-
	3	40	45	50	75	90	100	125	150	200	350
	4	35	-	45	-	75	90	100	125	150	200

Dimensional drawings

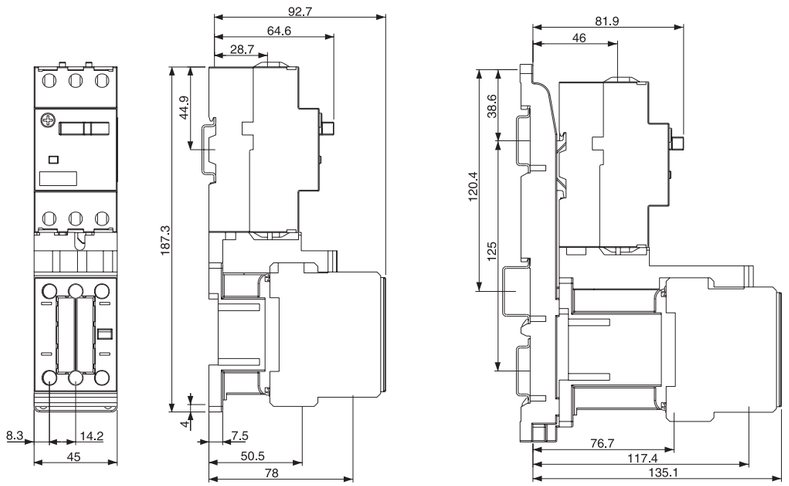
Fuseless starter - GPS1 rocker + Minicontactor MC



Fuseless starter - GPS1 rocker + Contactor CL00-CL01-CL02

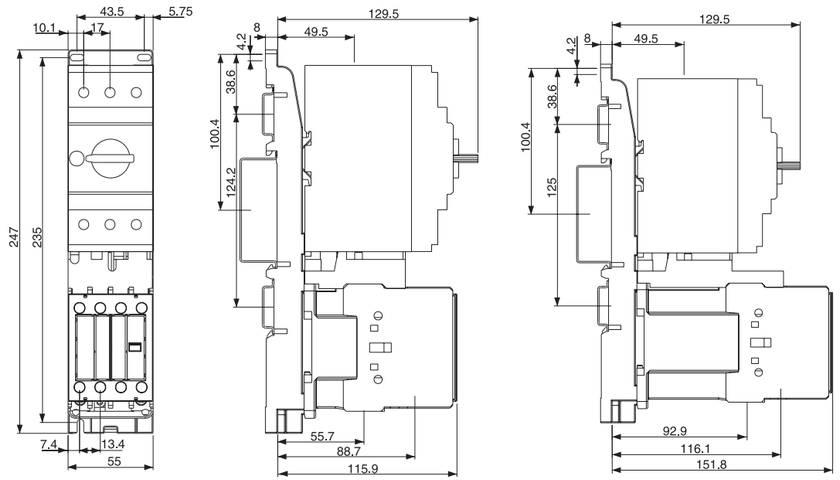


Fuseless starter - GPS1 rocker + Contactor CL25



CL25A CL25D

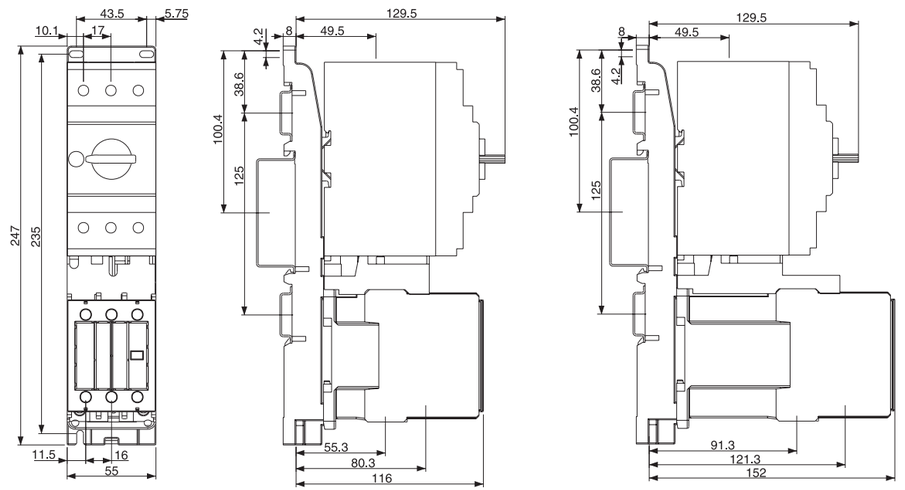
Fuseless starter - GPS2 + Contactor CL03-CL04



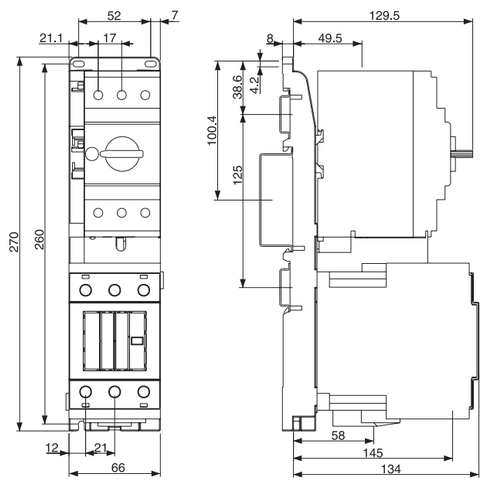
CL03A-CL04A CL03D-CL04D

Dimensional drawings

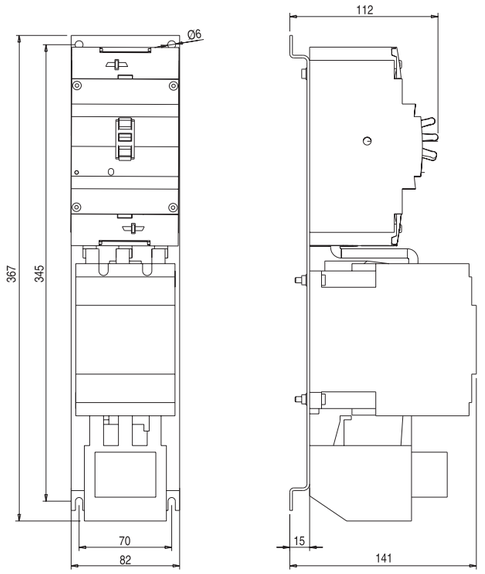
Fuseless starter - GPS2 + Contactor CL45



Fuseless starter - GPS2 + Contactor CL06-CL08



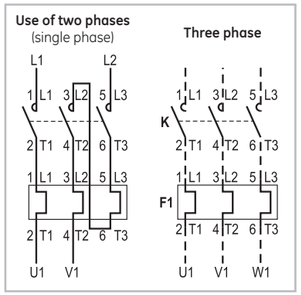
Fuseless starter - Record Plus + Contactor CL09 + Thermal overload relay RT2



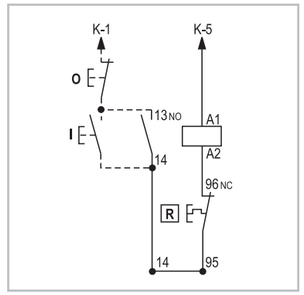
Wiring diagrams

Series M. Direct-on-line starter with reset

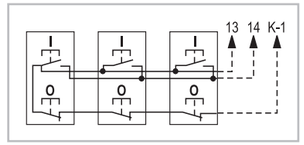
Power circuit



Control circuit



Control by two or more push-buttons



Series M. Direct-on-line starter with start/emergency stop push-button

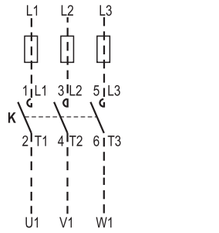
Power circuit

Control circuit

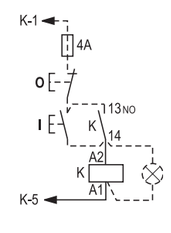
Control by two or more push-buttons

Series CL. Direct-on-line starter

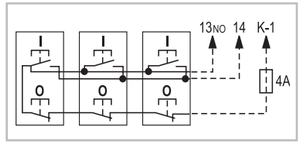
Power circuit



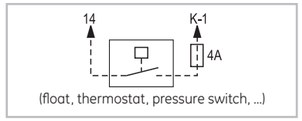
Control circuit



Control by two or more push-buttons

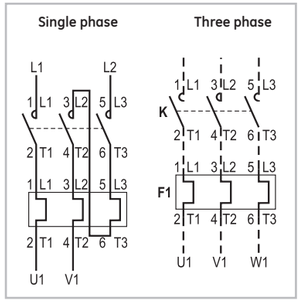


Control by permanent contact

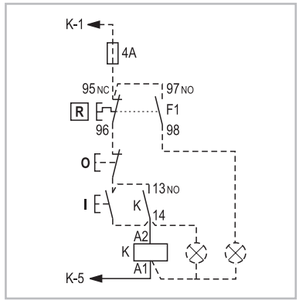


Series CL. Direct-on-line starter with reset push-button

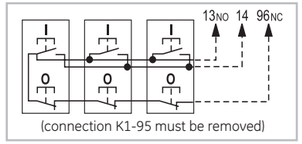
Power circuit



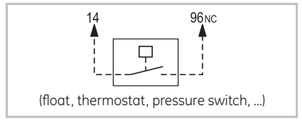
Control circuit



Control by two or more push-buttons

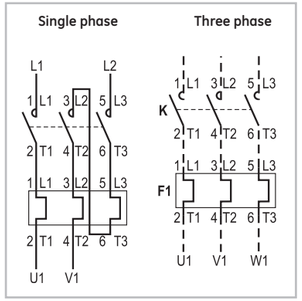


Control by permanent contact

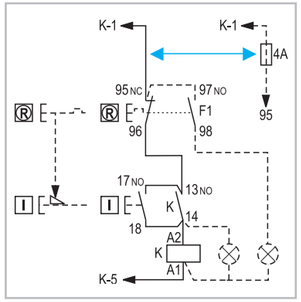


Series CL. Direct-on-line starter with start/stop/reset push-button

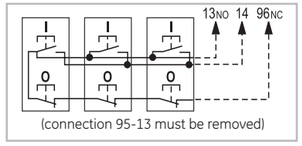
Power circuit



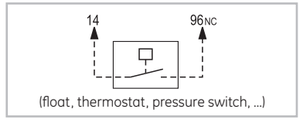
Control circuit



Control by two or more push-buttons



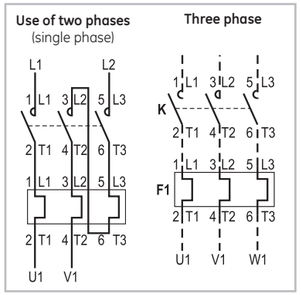
Control by permanent contact



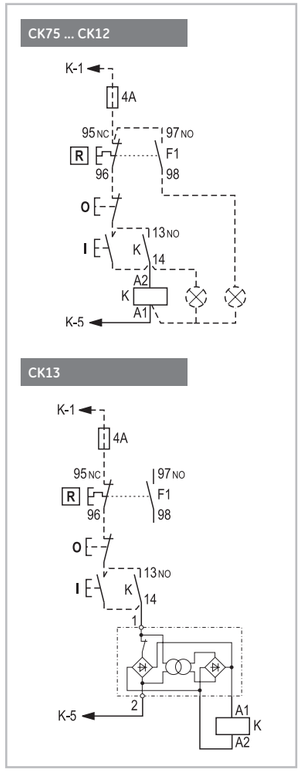
Wiring diagrams

Series CK. Direct-on-line starter

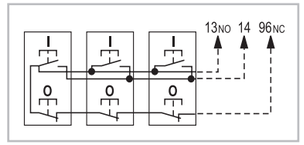
Power circuit



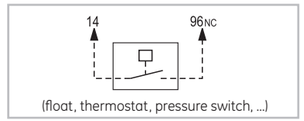
Control circuit



Control by two or more push-buttons



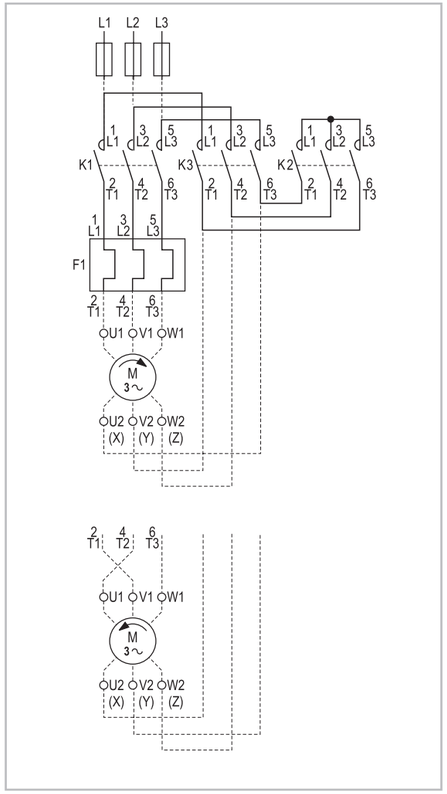
Control by permanent contact



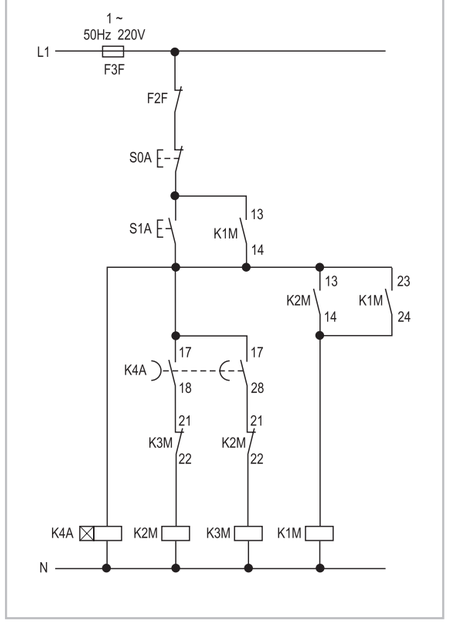
Wiring diagrams

Series CL and CK. Star-delta starters

Power circuit



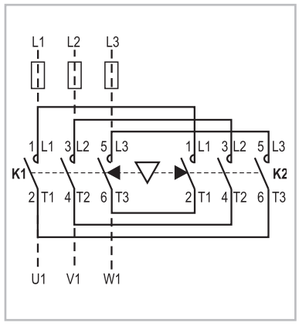
Control circuit



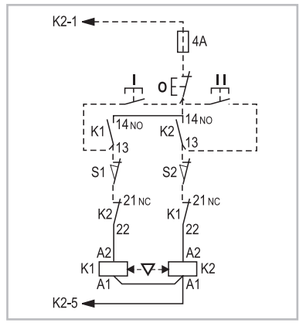
Wiring diagrams

Series M. Reversing starter without thermal overload relay

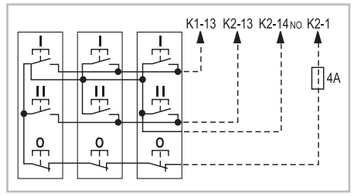
Power circuit



Control circuit

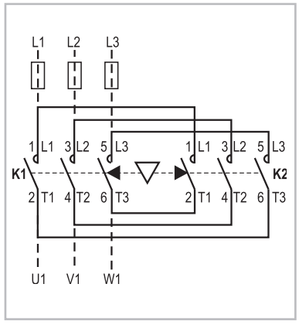


Control by two or more push-buttons

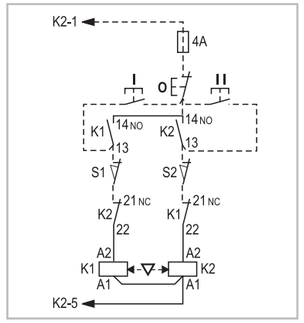


Series CL. Reversing starter without thermal overload relay

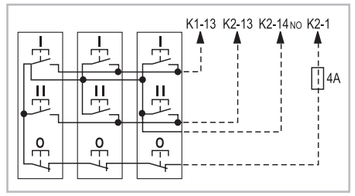
Power circuit



Control circuit

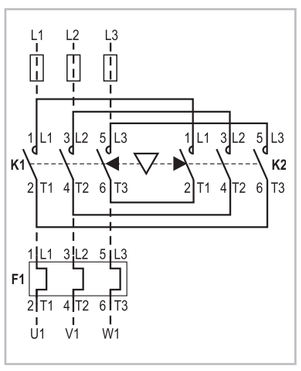


Control by two or more push-buttons

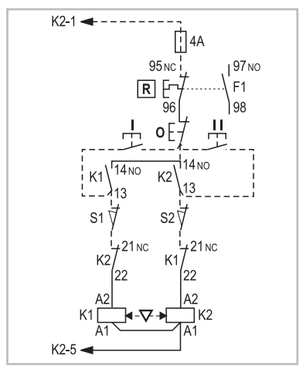


Series CL. Reversing starter with thermal overload relay

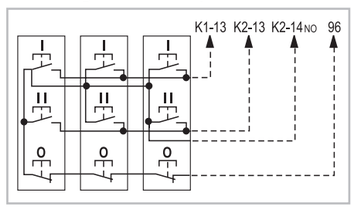
Power circuit



Control circuit

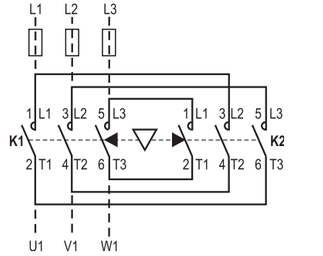


Control by two or more push-buttons

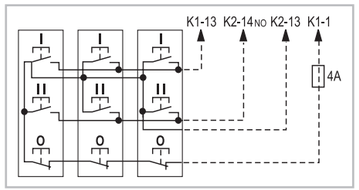


Series CK. Reversing starter without thermal overload relay

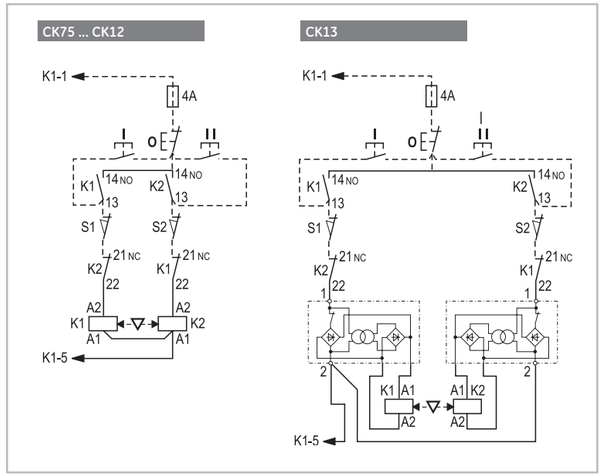
Power circuit



Control by two or more push-buttons

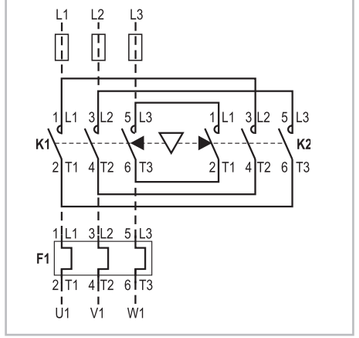


Control circuit

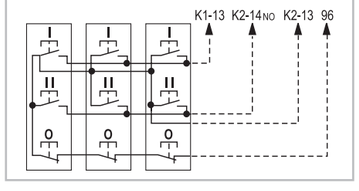


Series CK. Direct-on-line starters with thermal overload relay

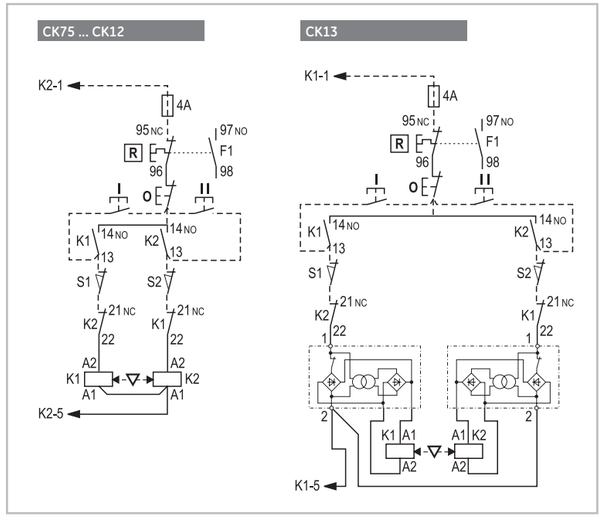
Power circuit



Control by two or more push-buttons



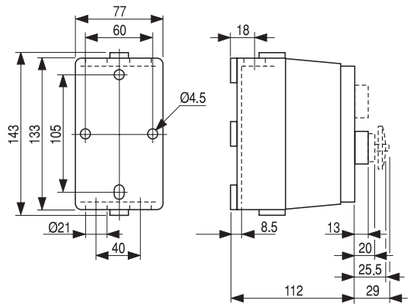
Control circuit



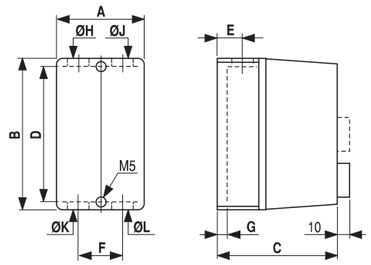
Dimensional drawings

Direct-on-line starters. IP40 / IP65

Series M



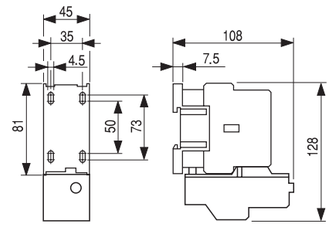
Series CL



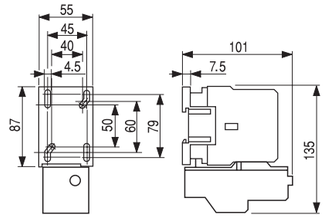
	LG00... - LG02...	LG25... - LG04...
A	87	101
B	180	195
C	124.5	136
D	162	177
E	20	23
F	49	57
G	8	8
Ø H	21	23
Ø J	21	21
Ø K	21	23
Ø L	21	23

Series CL - Direct-on-line starters

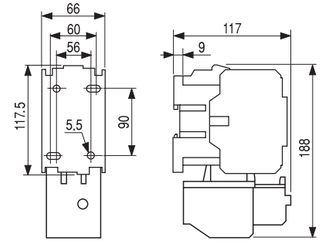
CL00 ... CL25



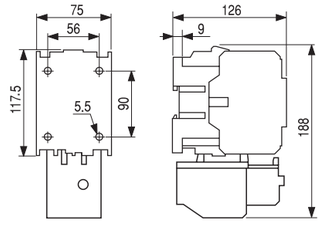
CL04



CL45 ... CL08

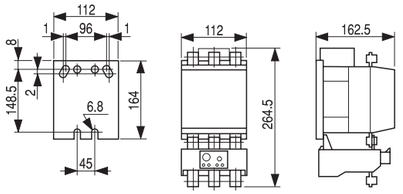


CL09 ... CL10

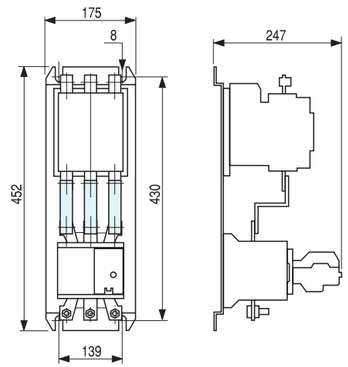


Series CK - Direct-on-line starters

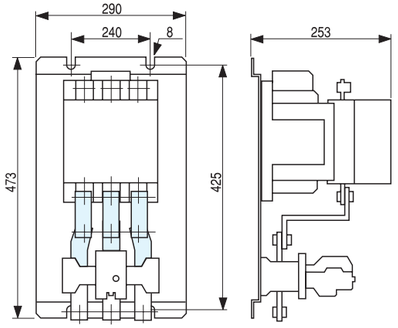
CK75 ... CK08



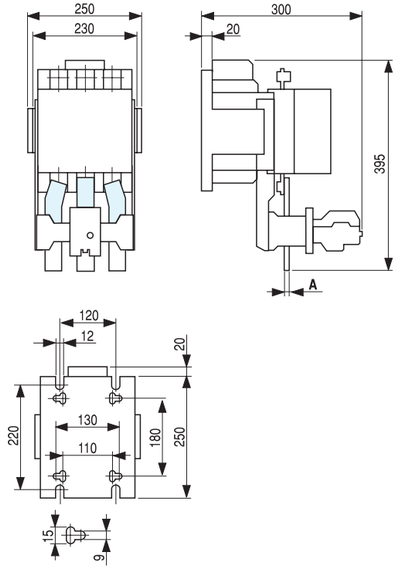
CK85 ... CK95



CK10 ... CK11

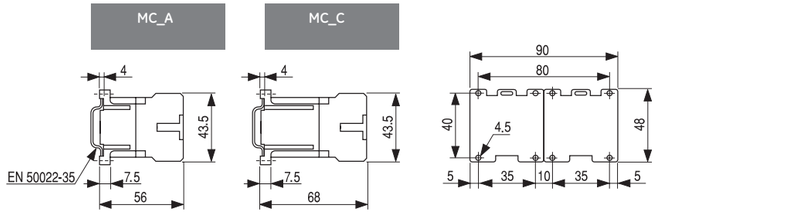


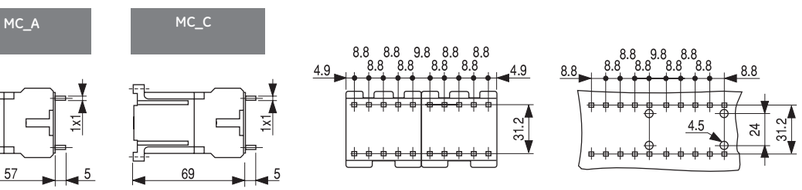
CK12



Dimensional drawings

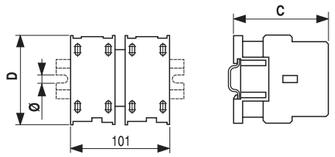
Series M. Direct-on-line reversing starters



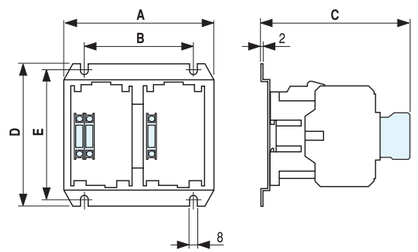


Series CL. Direct-on-line reversing starters without thermal overload relay

	A	B	C	D	Ø
CL00... - CL25...	130	116	87.5	81	5.5
CL03... - CL45...	150	136	100.5	87	5.5

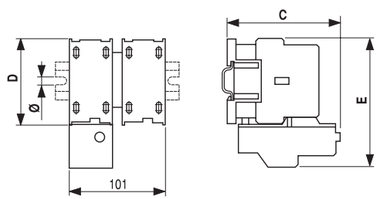


	A	B	C	D	E
CL06... - CL08...	171	135	160	155	133
CL09... - CL10...	186	150	167	155	133

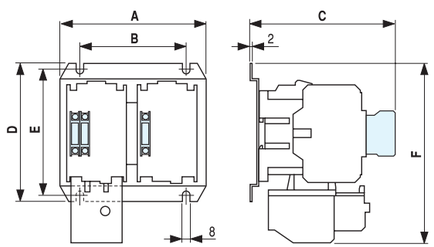


Series CL. Direct-on-line reversing starters with thermal overload relay

	A	B	C	D	E	Ø
CL00... - CL25...	130	116	110.5	81	135	5.5
CL03... - CL45...	150	136	103.5	87	145	5.5

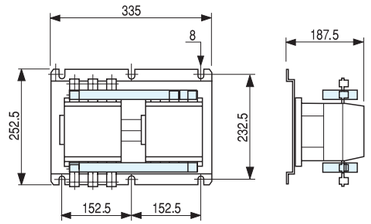


	A	B	C	D	E	F
CL06... - CL08...	171	135	160	155	133	205
CL09... - CL10...	186	150	167	155	133	258

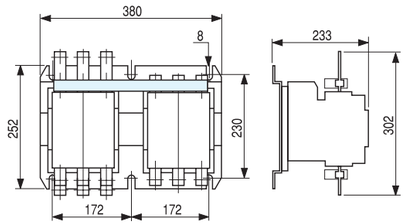


Series CK. Direct-on-line reversing starters without thermal overload relay

CK75 .... CK08

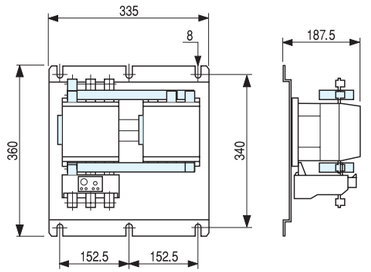


CK85 .... CK95

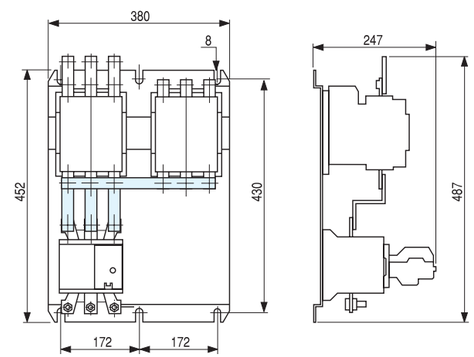


Series CK. Direct-on-line reversing starters with thermal overload relay

CK75 .... CK08



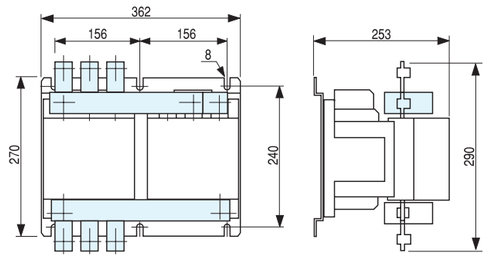
CK85 .... CK95



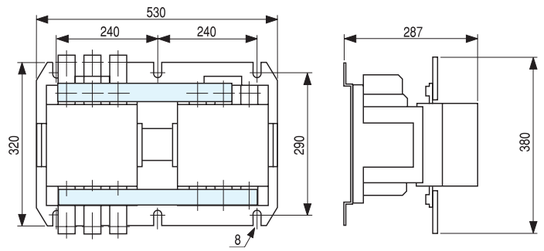
Dimensional drawings

Series CK - Direct-on-line reversing starters without thermal overload relay

CK10 .... CK11

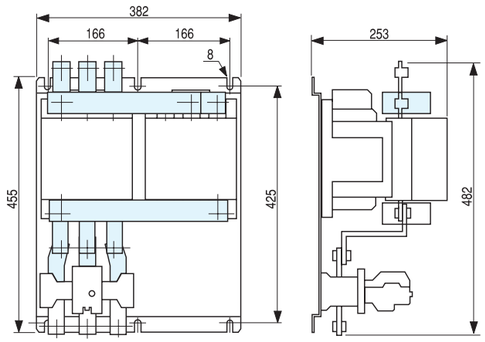


CK12

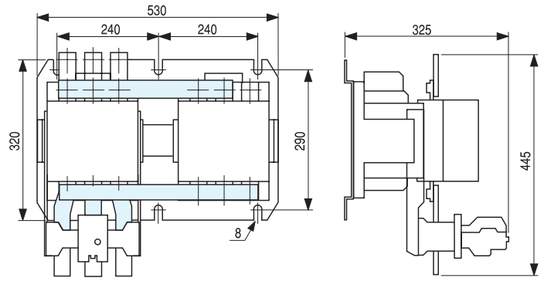


Series CK - Direct-on-line reversing starters with thermal overload relay

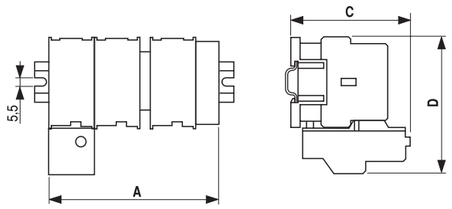
CK10 .... CK11



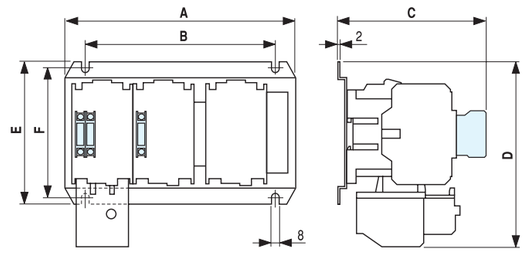
CK12



Series CL - Star-delta starters



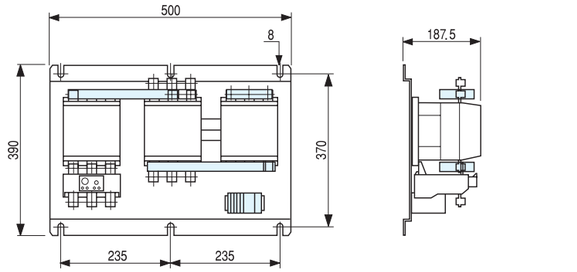
	A	B	C	D
CL00... - CL25...	190	180	110.5	135
CL03... - CL04...	220	210	103.5	145



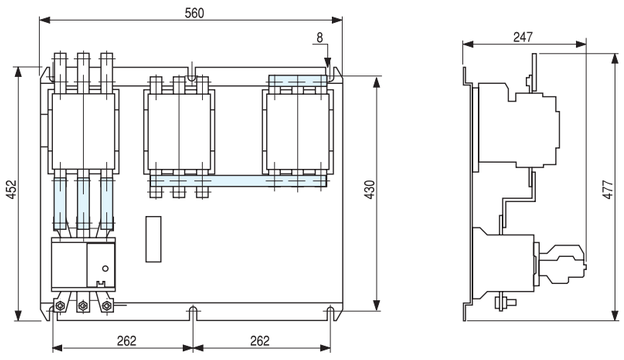
	A	B	C	D	E	F
CL06... - CL08...	253	217	129	205	155	133
CL09...	263	247	138	247	155	133
CL10...	283	247	151	247	155	133

Series CK - Star-delta starters

CK75 ... CK08



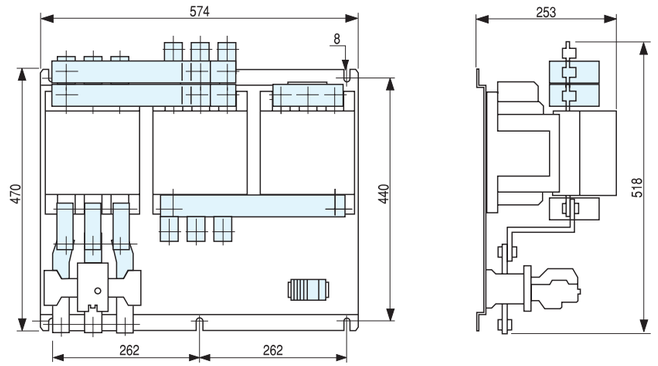
CK85 ... CK95



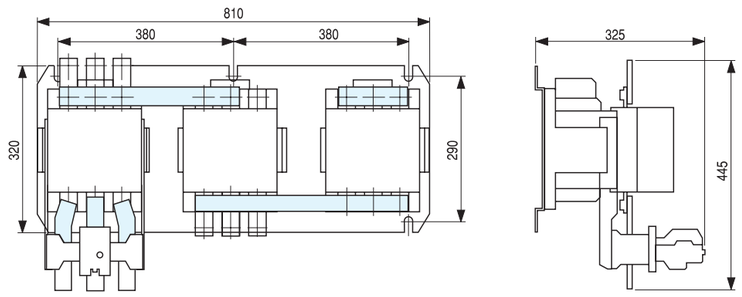
Dimensional drawings

Series CK - Star-delta starters

CK10 ... CK11



CK12



Main switches & Emergency-stop switches for machinery - Series ML

E.3 Mounting possibilities

E.4 Standard programme

E.6 Accessories

E.7 Enclosed switches

E.8 Technical data

E.9 Dimensions

Switches for fotovoltaic application

E.13 **Order codes**

E.13 **Technical data**

Main switches

A manual operated main switch must be provided for every mains circuit.
It must be a switch-disconnector corresponding to utilization category AC23 (IEC 947-3) fulfils the following requirements:

- Disconnecting the electrical equipment from the main.
- Visible contact indication or a disconnection function by construction (the handle is in the "OFF" position when all contacts are open).
- If the main switch does not serve simultaneously as an emergency-stop switch, its handle should not be red.
  Black or grey handles are recommended.
- It should be lockable in the off-position (e.g. by padlock).
- All active conductors are to be disconnected from the main.
- The breaking capacity should be sufficient. In order to break the current of the largest motor in a blocked state together with the sum of the operating currents of the remaining motors/loads.
- The handle of the main switch must be easily accessible and must lie between 0.6 and 1.9 m above the incomer level.

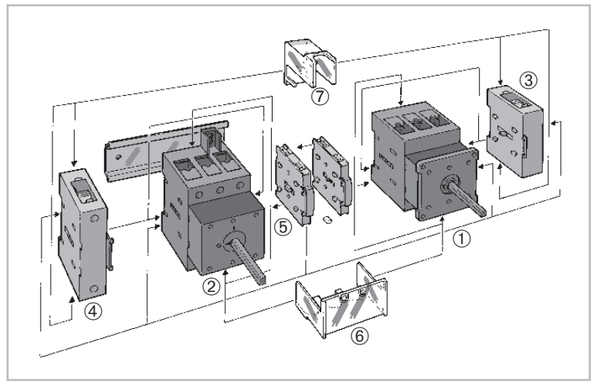
Standards

Complying with:
- IEC 60947-3
- EN 60947-3
- DIN VDE 0660 Teil 107
- low voltage directive 73/73 EEC
- low voltage directive EMC 89/336 EEC

Approvals/Marking

Emergency-stop switches

The main switch may fulfil the function of an emergency-stop switch on certain machines.
The handles must be red on a yellow background.
The contacts of manual operated emergency-stop switch has to be opened by force.



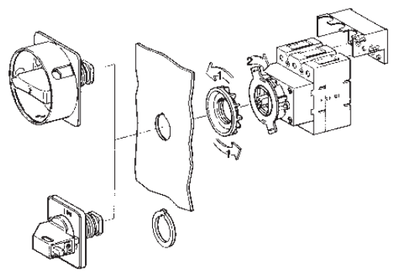
① Front mounting (flush mounting)
② Rear mounting
③ Main contact and PE-or N-terminals for ①
④ Main contact and PE-or N-terminals for ②
⑤ Auxiliary switch 1NO/1NG for ① and ②
⑥ Terminal cover triple for ① and ②
⑦ Terminal cover single for ③ and ④

Mounting possibilities ● pg. E.3
Accessories ● pg. E.6
Technical data ● pg. E.8
Dimensions ● pg. E.9

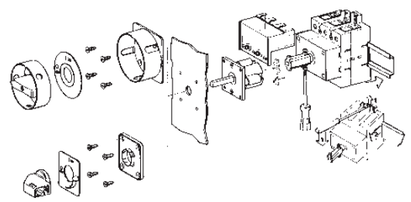
Mounting possibilities

	Ith	25A	40A	63A	80A	125A
	Series	ML 1	ML 1	ML 2	ML 2	ML 3
Front mounting (flush mounting)	Colour					
Central fixing						
Ø 22.5 mm for 3 padlocks	red/yellow	789178	789179			
Ø 22.5 mm for 3 padlocks	black	789180	789181			
Ø 22.5 mm for 1 or 2 padlocks	red/yellow	789174	789175			
Ø 22.5 mm for 1 or 2 padlocks	black	789176	789177			
4-hole fixing						
With standard handle	black	789239	789240	789241	789242	789243
For 3 padlocks	red/yellow	789186	789187	789188	789189	789190
For 3 padlocks	black	789191	789192	789193	789194	789195
For 1 or 2 padlocks	red/yellow	789182	789183			
For 1 or 2 padlocks	black	789184	789185			
Rear mounting						
With cover coupling						
For 3 padlocks	red/yellow	789200	789201	789202	789203	789204
For 3 padlocks	black	789205	789206	789207	789208	789209
For 1 or 2 padlocks	red/yellow	789196	789197			
For 1 or 2 padlocks	black	789198	789199			
With door coupling						
For 3 padlocks	red/yellow	789214	789215	789216	789217	789218
For 3 padlocks	black	789219	789220	789221	789122	789223
For 1 or 2 padlocks	red/yellow	789210	789211			
For 1 or 2 padlocks	black	789212	789213			
DIN-rail mounting						
With standard handle	black	789234	789235	789236	789237	789238
For 1 or 2 padlocks	red/yellow	789224	789225	789226	789227	789228
For 1 or 2 padlocks	black	789229	789230	789231	789232	789233

Front mounting

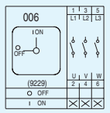
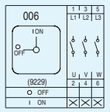
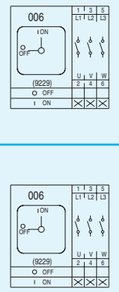


Rear mounting



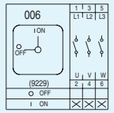
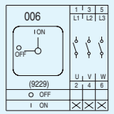
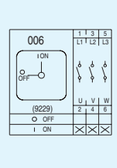
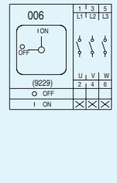
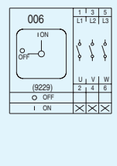
Attention: the padlocks are not included.

Standard programme

Central fixing Ø 22.5 mm	Diagram	Terminal cover	Protection	Ithe	Red/yellow Ref. no.	Black/gray Ref. no.	Pack
Locking handle by 1 or 2 padlocks		✔	IP65	25A	**789174**	**789176**	1
		✔	IP65	40A	**789175**	**789177**	1
Locking handle by 3 padlocks		✔	IP65	25A	**789178**	**789180**	1
		✔	IP65	40A	**789179**	**789181**	1
4-hole fixing							
Locking handle by 1 or 2 padlocks		✔	IP55	25A	**789182**	**789184**	1
		✔	IP55	40A	**789183**	**789185**	1
Locking handle by 3 padlocks		✔	IP55	25A	**789186**	**789191**	1
		✔	IP55	40A	**789187**	**789192**	1
		✔	IP55	63A	**789188**	**789193**	1
		✔	IP55	80A	**789189**	**789194**	1
		✔	IP55	125A	**789190**	**789195**	1
With standard black handle		-	IP55	25A	-	**789239**	1
		-	IP55	40A	-	**789240**	1
		-	IP55	63A	-	**789241**	1
		-	IP55	80A	-	**789242**	1
		-	IP55	125A	-	**789243**	1

Accessories see E.6

Standard programme

		Terminal cover	Protection	Ithe	Red/yellow Ref. no.	Black/gray Ref. no.	Pack
DIN-rail mounting							
Locking handle by 1 or 2 padlocks		✔	IP30	25A	**789224**	**789229**	1
		✔	IP30	40A	**789225**	**789230**	1
		✔	IP30	63A	**789226**	**789231**	1
		✔	IP30	80A	**789227**	**789232**	1
		✔	IP30	125A	**789228**	**789233**	1
With standard black handle		-	IP30	25A		**789234**	1
		-	IP30	40A		**789235**	1
		-	IP30	63A		**789236**	1
		-	IP30	80A		**789237**	1
		-	IP30	125A		**789238**	1
With door coupling							
Locking handle by 1 or 2 padlocks		✔	IP55	25A	**789210**	**789212**	1
		✔	IP55	40A	**789211**	**789213**	1
Locking handle by 3 padlocks		✔	IP55	25A	**789214**	**789219**	1
		✔	IP55	40A	**789215**	**789220**	1
		✔	IP55	63A	**789216**	**789221**	1
		✔	IP55	80A	**789217**	**789222**	1
		✔	IP55	125A	**789218**	**789223**	1
With cover coupling							
Locking handle by 1 or 2 padlocks		✔	IP65	25A	**789196**	**789198**	1
		✔	IP65	40A	**789197**	**789199**	1
Locking handle by 3 padlocks		✔	IP65	25A	**789200**	**789205**	1
		✔	IP65	40A	**789201**	**789206**	1
		✔	IP65	63A	**789202**	**789207**	1
		✔	IP65	80A	**789203**	**789208**	1
		✔	IP65	125A	**789204**	**789209**	1

Accessories see E.6

Accessories - Contact blocks(1)

Neutral switched

Front	Rear	
789244	**789245**	1
Series ML1		
789246	**789247**	1
Series ML2		
789248	**789249**	1
Series ML3		

Fixed neutral module

Front	Rear	
789262	**789263**	1
Series ML1		
789264	**789265**	1
Series ML2		
789266	**789267**	3
Series ML3		

Switching contact

Front	Rear	
789250	**789251**	1
Series ML1		
789252	**789253**	1
Series ML2		
789254	**789255**	1
Series ML3		

Auxiliary contact NO+NC Ith = 16A

Front	Rear	
789268	**789269**	1
Series ML1		
789268	**789269**	1
Series ML2		
789268	**789269**	1
Series ML3		

PE-terminal (Fixed)

Front	Rear	
789256	**789257**	1
Series ML1		
789258	**789259**	1
Series ML2		
789260	**789261**	1
Series ML3		

Accessories - Terminal cover

Single terminal cover (HS1)

Series ML1	**789270**	1
Series ML2	**789271**	1
Series ML3	**789271**	1

Triple terminal cover (HS3)

Series ML1	**789272**	1
Series ML2	**789273**	1
Series ML3	**789274**	1

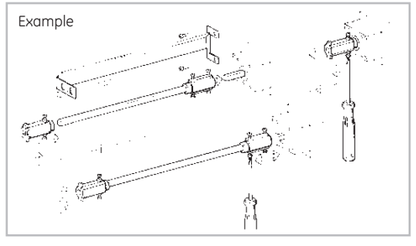
Same cover for front or rear mounting

Extension shafts for door coupling

Shaft length	Depth range between door and base (mm) ML1	ML2, ML3	Cat. no.
AL-65	170-215 mm	185-320 mm	**789275**
AL-165	265-335 mm	280-350 mm	**789276**
AL-265 (2)	365-435 mm	380-450 mm	**789277**
AL-365 (2)	465-535 mm	480-550 mm	**789278**
Shaft support for 265 and 365 mm			**789279**

An extension shaft is necessary when the depth is higher than the length of the standard shaft.
ML1: 105-135 mm
ML2 and ML3: 120-150 mm

Example

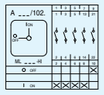
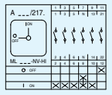
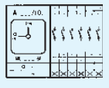
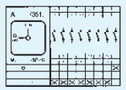


(1) ML1: max. 2 units
ML2 and ML3: max 3 units
(2) Shaft support included.

Enclosed switches

The maintenance switch is an enclosed main switch with locking handle by 3 padlocks.
With red handle and yellow front plate, if it should be used as an emergency-stop switch, otherwise black/grey.
There are six sizes of standard enclosures for the series ML. Each is equipped with a cover coupling and a double PE-terminal.
All enclosures have a degree of protection IP65 and are of solid impact and flame resistant polyester.

Enclosed switches

	Diagram	Ithe	Type of enclosure	Black/grey 3 padlocks Ref. no.	Red/yellow 3 padlocks Ref. no.	Pack.
Three poles		25A	E2	**789285**	**789280**	1
		32A	E3	**789286**	**789281**	1
		50A	E4	**789287**	**789282**	1
		63A	E5	**789288**	**789283**	1
		100A	E7	**789289**	**789284**	1
Four poles		25A	E2	**789295**	**789290**	1
		32A	E3	**789296**	**789291**	1
		50A	E4	**789297**	**789292**	1
		63A	E5	**789298**	**789293**	1
		100A	E7	**789299**	**789294**	1
Three poles + (1 NO + 1 NC)		25A	E2	**789305**	**789300**	1
		32A	E3	**789306**	**789301**	1
		50A	E4	**789307**	**789302**	1
		63A	E5	**789308**	**789303**	1
		100A	E7	**789309**	**789304**	1
Four poles + (1 NO + 1 NC)		25A	E2	**789315**	**789310**	1
		32A	E3	**789316**	**789311**	1
		50A	E4	**789317**	**789312**	1
		63A	E5	**789318**	**789313**	1
		100A	E7	**789319**	**789314**	1
Six poles		25A	E2	**789325**	**789320**	1
		32A	E3	**789326**	**789321**	1
		50A	E4	**789327**	**789322**	1
		63A	E5	**789328**	**789323**	1
		100A	E7	**789329**	**789324**	1
Six poles + (1 NO + 1 NC)		25A	E2	**789335**	**789330**	1
		32A	E3	**789336**	**789331**	1
		50A	E4	**789337**	**789332**	1
		63A	E5	**789338**	**789333**	1
		100A	E7	**789339**	**789334**	1

Technical data

Main switches - According to IEC 60947-3, EN 60947-3, DIN VDE 0660 part 107, UL and CSA

Series				ML 1	ML 1	ML 2	ML 2	ML 3
Rated uninterrupted current	Iu open = Ith		(A)	25	40	63	80	125
	Ithe enclosed		(A)	25	32	50	63	100
Rated insulation voltage Ui (III/3)			(V)	690	690	690	690	690
Rated impulse withstand voltage Uimp (III/3)			(kV)	6	6	6	6	6
Rated operational current Ie AC21 A[3]			(A)	25	40	63	80	125
Rated operational voltage Ue			(V)	690	690	690	690	690
Frequence			(Hz)	50/60	50/60	50/60	50/60	50/60
Making/breaking capacity								
Utilization category AC3:		3 x 230V	(kW)	5.5	7.5	15	18.5	22
Motor switches for		3 x 400V	(kW)	7.5	11	22	30	37
operational switching		3 x 690V	(kW)	7.5	11	22	30	45
Utilization category AC23A[3]		3 x 230V	(kW)	7.5	11	18.5	22	25
Motor switches		3 x 400V	(kW)	11	15	30[1]	37[2]	45
(Main switches for machinery)		3 x 690V	(kW)	11	15	30[1]	37[2]	45
Rated breaking category AC23 A[3]		3 x 230V	(A)	260	390	630	750	870
		3 x 400V	(A)	220	300	570	700	850
		3 x 690V	(A)	130	170	330	400	490
Short-circuit capacity								
Max. fuse rating gG			(A)	50	50	80	80	125
Rated conditional short-circuit current			(kAeff)	10	10	–	–	–
Rated short-circuit making capacity Icm			(kA)	–	–	2.1	2.1	3.4
Rated short-time withstand Icw (1s-current)			(Aeff)	300	480	765	960	1500
Disconnect function up to			(V)	690	690	690	690	690
Terminal screws (Pozidriv)				M4	M4	M5	M5	M6
Torque terminal screws			(Nm)	2.5	2.5	4	4	6
Cable cross section								
Solid or multi-stranded (Cu)			min. - max. (mm²)	1.5-10	1.5-10	2.5-35	2.5-35	6-70
Flexible with ferrule (DIN 46228)			min. - max. (mm²)	1.5-6	1.5-6	1.5-25	1.5-25	6-50
General purpose 3-phase			(A)	25	40	63	80	125
			(V)	600	600	600	600	600
Motor 3-phase		240V	(HP)	7.5	10	15	20	25
		480V	(HP)	10	20	30	40	50
		600V	(HP)	10	20	30	40	50
Motor 1-phase (2 pole)		120V	(HP)	1	1,5	3	4	6
		240V	(HP)	2	3	7,5	10	15
Cable cross section			AWG-No	14-7	14-3	14-2	14-2	8-1/0

(1) 22 kW in enclosure
(2) 30 kW in enclosure
(3) ML2/ML3 according to EN 60947-3 category B

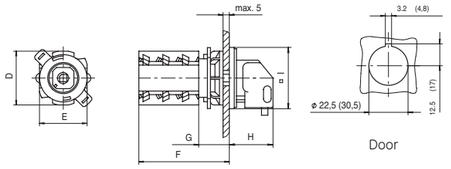
Auxiliary contact for main switches - According to IEC 60947-5-1

Series			ML 1/2/3
Rated uninterrupted current	Iu open = Ith	(A)	16
	Ithe enclosed	(A)	16
Rated insulation voltage Ui (III/3)		(V)	690
Rated impulse withstand voltage Uimp		(kV)	6
Rated operational current	Ie (AC15)		
	230V	(A)	6
	400V	(A)	4
	690V	(A)	2
Max. fuse rating gG		(A)	16
Rated conditional short-circuit current		(kAeff)	3
Cable cross section, solid or multi-stranded		min. - max. (mm²)	1-4
Flexible with ferrule (DIN 46228)		min. - max. (mm²)	1-2.5
Terminal screws (Pozidriv)			M3
Torque terminal screws		(Nm)	0.6

Dimensional drawings

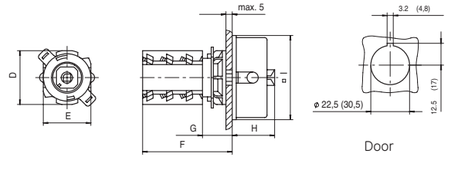
Front mounting - Central fixing Ø 22.5 mm

For 1 or 2 padlocks, Ø max. 5 mm



Series	D	E	F	G	H	I
ML1	55	45	75	25	35	48

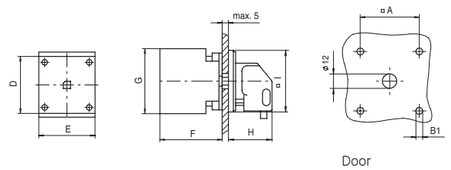
For 3 padlocks, Ø max. 9 mm



Series	D	E	F	G	H	I
ML1	55	45	75	25	35	66

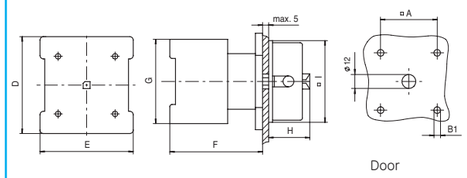
Front mounting - 4-hole fixing

For 1 or 2 padlocks, Ø max. 5 mm



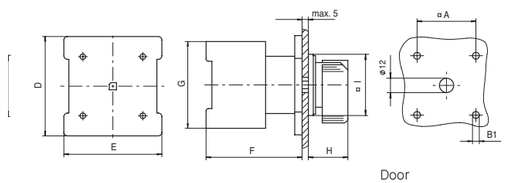
Series	A	B1	D	E	F	G	H	I
ML1	36	4.5	44	44	50	55	35	48

For 3 padlocks, Ø max. 5 mm



Series	A	B1	D	E	F	G	H	I
ML1	36	4.5	44	44	50	55	32	66
ML2	48	5.5	58	58	72	75	37	86
ML3	48	5.5	78	78	72	80	37	86

Front mounting - 4-hole fixing, with standard black handle

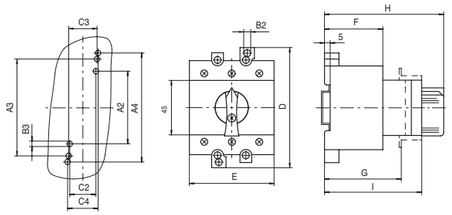


Series	A	B1	D	E	F	G	H	I
ML1	36	4.5	44	44	50	55	29	48
ML2	48	5.5	58	58	72	75	33	64
ML3	69	5.5	78	78	72	80	35	88

Dimensional drawings

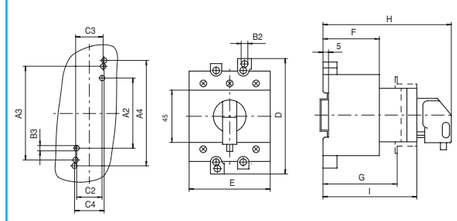
Rear mounting - DIN-rail mounting

With standard black handle



Series	A2	A3	A4	B2	B3	C2	C3
ML1	60	65	70	4.2	3.8	22	30
ML2	–	80	90	5.5	5.2	–	23.5
ML3	–	80	90	5.5	5.2	–	23.5
Series	**C4**	**D**	**E**	**F**	**G**	**H**	**I**
ML1	25	78	52.5	42	48.5	87.5	67.5
ML2	25	100	53.5	49	–	100	79
ML3	25	100	70	49	–	100	79

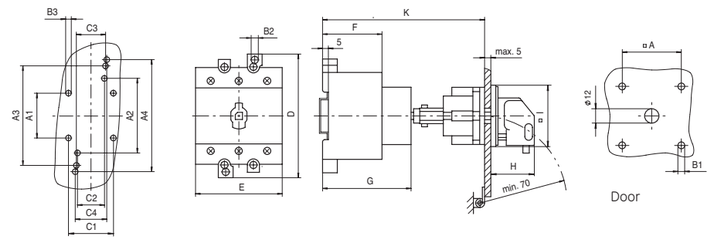
For 1 or 2 padlocks, Ø max. 5 mm



Series	A2	A3	A4	B2	B3	C2	C3
ML1	60	65	70	4.2	3.8	22	30
ML2	–	80	90	5.5	5.2	–	23.5
ML3	–	80	90	5.5	5.2	–	23.5
Series	**C4**	**D**	**E**	**F**	**G**	**H**	**I**
ML1	25	78	52.5	42	48.5	91.5	67.5
ML2	25	100	53.5	49	–	104	79
ML3	25	100	70	79	–	104	79

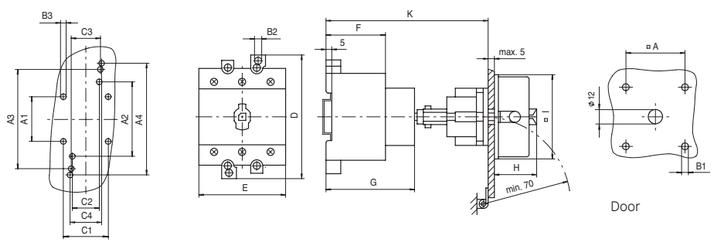
Rear mounting - With door coupling

For 1 or 2 padlocks, Ø max. 5 mm



Series	A	A2	A3	A4	B1	B2	B3	C2	C3	C4	D	E	F	G	H	I	K
ML1	36	60	65	70	4.5	4.2	3.8	22	30	25	78	45	42	55	35	48	105-135

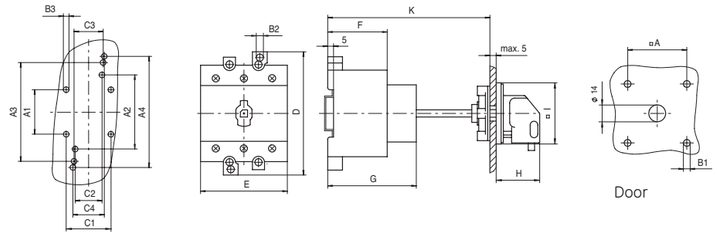
For 3 padlocks, Ø max. 5 mm



Series	A	A2	A3	A4	B1	B2	B3	C2	C3	C4	D	E	F	G	H	I	K
ML1	36	60	65	70	4.5	4.2	3.8	22	30	25	78	45	42	55	32	66	105-135
ML2	36	–	80	90	5.5	5.5	5.2	–	23.5	25	100	53.5	49	72	37	86	120-150
ML3	36	–	80	90	5.5	5.5	5.2	–	23.5	25	100	70	49	72	37	86	120-150

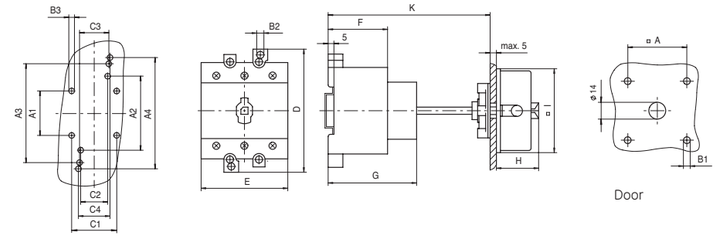
Rear mounting - With cover coupling

For 1 or 2 padlocks, Ø max. 9 mm



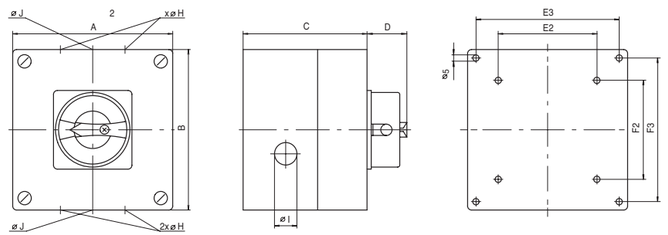
Series	A	A2	A3	A4	B1	B2	B3	C2	C3	C4	D	E	F	G	H	I	K
ML1	36	60	65	70	4.5	4.2	3.8	22	30	25	78	45	42	55	35	48	105-135

For 3 padlocks, Ø max. 9 mm



Series	A	A2	A3	A4	B1	B2	B3	C2	C3	C4	D	E	F	G	H	I	K
ML1	36	60	65	70	4.5	4.2	3.8	22	30	25	78	45	42	55	32	66	88-98
ML2	36	–	80	90	5.5	5.5	5.2	–	23.5	25	100	53.5	49	72	37	86	103-113
ML3	36	–	80	90	5.5	5.5	5.2	–	23.5	25	100	70	49	72	37	86	103-113

Enclosed switches



Enclosure								
Type	A	B	C	D	E2	E3	F2	F3
E2	94	130	81	32	–	79	–	115
E3	130	130	99	32	–	115	–	115
E4	110	180	11	32	50	95	120	165
E5	180	182	111	37	120	165	120	167
E6	180	254	111	37	120	165	190	239
E7	265	265	140	37	194	–	230	–

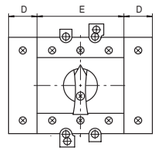
Cable entry					
Type	H (1)	I (1)	H (2)	I (2)	J (2)
E2	PG 16/11	PG 11	–	–	–
E3	PG 21/16	PG 16	–	–	–
E4	–	–	PG 21	PG 11	–
E5	–	–	PG 29	–	PG 11
E6	–	–	PG 29	PG 11	–
E7	PG 36/29	PG 29	–	–	–

(1) Knock-out entry
(2) Cable entry

Dimensional drawings

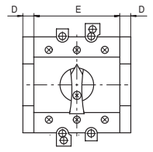
Accessories

N-module and PE-terminal



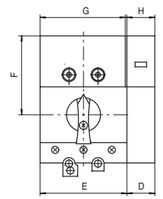
Series	D	E
ML1	14.5	45
ML2	23	53.5
ML3	23	70

Auxiliary contacts (NO + NC)



Series	D	E
ML1	9.5	45
ML2	9.5	53.5
ML3	9.5	70

Terminal covers



Series	D	E	F	G	H
ML1	14.5	45	53	41	14
ML2	23	53.5	61	52	22.5
ML3	23	70	65	68	22.5

Switches for photovoltaic applications up to 1000Vdc

To isolate the solar panels from the inverter, from 16 to 100Adc

- Available in 600 and 1000Vdc
- Easy installation, ready to install
- Pre-wired for DC applications
- Compact size
- DIN rail mounting as standard, other configurations possible
- Clear identification of inputs and outputs
- Padlockable

Approvals/Marking

Technical data/Order codes

According IEC 60947-3	Ref. no.	247532	247533	247534	817600	247536	247537	247538
Rated operational voltage Ue (+10%)	(Vdc)	600	600	600	1000	1000	1000	1000
Rated impulse withstand voltage Uimp	(kV)	6	6	6	6	6	6	6
Rated thermal current, DC-20 Ith	(Adc)	16	25	40	40	63	80	100
In open air, normal conditions(1)								
Minimum cable or bar cross section - Cu	(mm^2)	2.5	6	10	10	35	35	35
Rated operational current								
600Vdc	(Adc)	16	25	40	-	-	-	-
1000Vdc	(Adc)	-	10	25	40	63	80	100
Power loss / Pole	(W)	1.5	1.5	1.5	1.5	4.5	5.5	3
Number of poles		2	3	3	6	8	8	8
Mechanical service life	(Ops)	30,000	30,000	30,000	30,000	30,000	30,000	30,000
Dimensions (HxWxD)	(mm)	78x46x55	78x46x55	78x46x55	78x97x55	100x90x73	100x105x73	100x105x73
Frontcover	-	included	included	included	included	not available	not available	not available

Enclosed DC switch without surge protection

Description	Ref. no.	Pack.
Enclosure to protect DC entry at PV inverter level (1 for each inverter) Enclosure IP65 (130 x 130 x 100 mm) DC switch 40A under 600Vdc Clear identification of inputs/outputs DC connectors, type MC-4	**817590**	1

Notes

Series P9

F.2 Control and signalling units **Ø 22 mm**

Series 077

F.40 Control and signalling units **Ø 30 mm**

Series 105

F.57 Signalling devices

Series NLT

F.62 Light towers

Series IP

F.68 Foot switches

Series P9

F.3 **Main features**

F.4 **Range overview**

F.6 **Technical data**

F.8 **Order codes - Panel mounting devices**
F.8 Complete devices
F.9 Toggle switches - Joysticks
F.11 Standard push-buttons
F.11 Mushroom head push-buttons
F.11 Push buttons with key
F.12 Selector switches with knob
F.13 Selector switches with lever
F.14 Selector switches with key
F.16 Illuminated push-buttons
F.16 Illuminated selector switches
F.17 Selector push-buttons
F.18 Emergency lever
F.18 Reset push buttons
F.18 Potentiometer operators
F.18 Buzzers - Pilot lights
F.19 Double function push-buttons
F.20 Contact blocks
F.21 Power supplies
F.22 Electrical diagrams
F.23 **Order codes - Base mounting devices**
F.23 Contact blocks and power supplies

F.24 **Order codes - Push-button stations in thermoplastic**
F.25 **Order codes - Equipped boxes**
F.27 **Order codes - Push-button stations in aluminium**

F.28 **Order codes - Common accessories**

F.34 **Overall dimensions**
F.34 Panel mounting
F.39 Enclosures for push-button stations

Main features

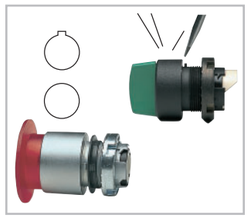
Shape, material and colours

The P9 line offers three types of operators:
- **round in satin chrome**
- **round in engineering thermoplastic**
- **square in engineering thermoplastic**

Modern ergonomic P9 actuators are available in a wide variety of colours and styles, and are the result of superior industrial design experience.

Series P9 satisfies any sophisticated industrial applications.

Fitting and positioning



All the P9 operators are fitted with seal to ensure IP66 degree of protection.

A locating tab on the operator allows the correct positioning on panels with holes drilled
according to CENELEC EN 50007 standards (with notch).
The tab also ensures panel stability and prevents urwanted rotations.

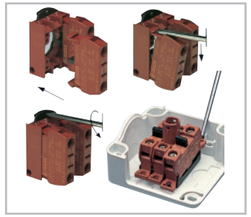
The tab can be removed with a screwdriver for applications in holes without notch.

Rear locking and back mounting procedure

P9 operators are back mounted to the panel by a patented locking ring. The units can be assembled using a standard screwdriver.

As an option, an assembly wrench is available.

Fast mounting



All the P9 rear panel devices are snap-on.

Mounting between panel and operator is accomplished by means of a patented snap-on flange which ensures a fast fitting.

For base mounting, the fitting is done directly on the adaptor inside the enclosures base.

Each single block can be mounted or removed individually.

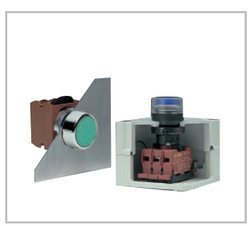
In panel mounting, it is also possible to install or remove the snap-on mounting flange with the contact block group;

Blocks and/or flange can be disassembled by a standard screwdriver, to simplify operations.

Safety and reliability

The P9 contact blocks are designed to ensure maximum reliability in every condition and to monitor control circuits at low energy levels (12V-5mA) minimum), thanks to advanced solution such as:
- four contact points
- high efficiency self-cleaning operation
- silver contacts properly shaped
- high contact pressure

Mounting system



The P9 line offers a wide variety of operators, contact blocks and power supplies for panel mounting.

Furthermore a range of contact blocks and power supplies are available for base mounting.

The base mounting option is simple thanks to plastic enclosures fitted with a standard mounting adaptor, which allows a snap-on and secure fastening.

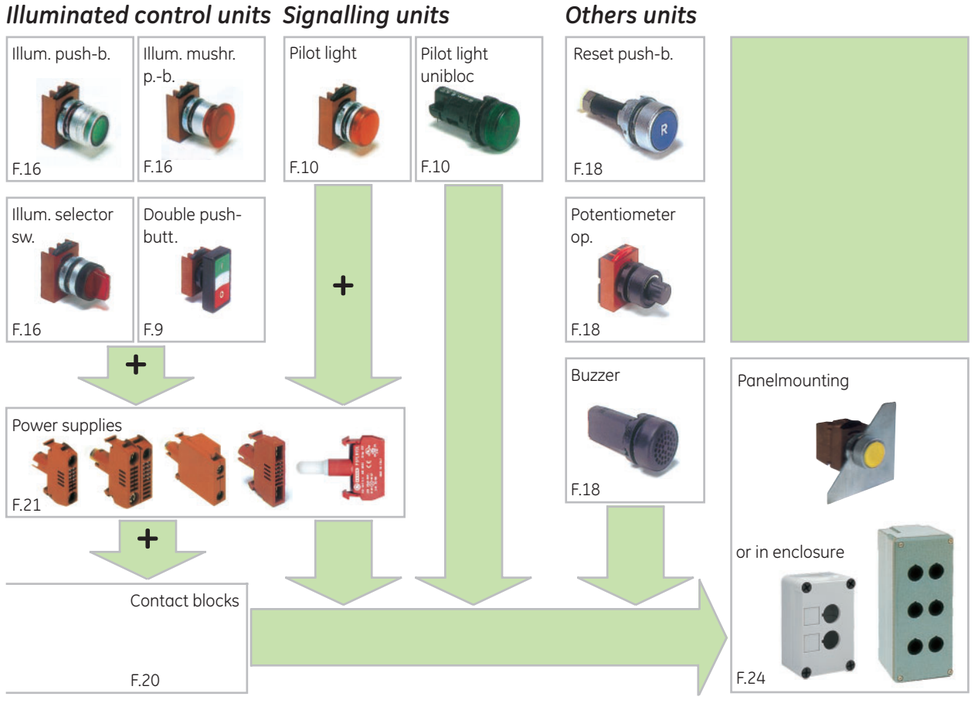
Panel mounting devices

Control units

Standard push-b. F.11	Mushroom push-button F.11	Emergency push-button F.11	Key push-button F.11	Knob selector sw. F.12	Lever selector sw. F.13
Key selector sw. F.14	Selector push-b. F.17	Toggle switch F.17	Joystick F.19	Emergency lever F.18	Double push-b. F.9

+

Contact blocks F.20



Accessories

General	Push-buttons	Mushroom push-buttons	Illuminated push-buttons	Illuminated mushroom push-buttons	Illuminated selector switches	Pilot lights
Nameplates F.51	Rubber caps F.28	Name plates F.32	Diffusers F.29	Collar F.30	Padlock F.30	Diffusers F.29
Plugs F.30	Padlock F.30	Collar Ø 40 F.30	Padlock F.30			
Flanges F.30	Push-on/ push-off device F.30		Push-on/ push-off device F.30			
Ring wrench F.30			Bulbs BA9S F.31			
Neutral plate F.32	Keys F.31			Bulb extractor F.30		

Technical data

Compliance with standards

IEC 947.5.1 - VDE 0660 - NFC 63140
IEC/EN 60947.5.1 - UTE - BSI - NEMA
CENELEC EN 50007

Approvals

cUL U.S. - RINA - CE - GOST R - Lloyd's Register of Shipping - Bureau Veritas - Germanischer Lloyd

Climatic protections

The standard versions are suitable for use in the following climates:

Temperate climate	cat. 23/50 (DIN 50014)
Wet climate	cat. 23/83 (DIN 50015)
Hot wet climate	cat. 40/92 (DIN 50015)
Variable wet climate	FW24 (DIN 50016)

Temperature ranges

Operation	-30 °C to + 70 °C
Storage	-40 °C to + 70 °C

Protection degree of the operators

IP66 according to CENELEC EN 60529 when they are mounted into enclosures with the same or a higher degree of protection.
Suitable for using into enclosures type NEMA 1-3-3R-3S-4-4X-12-13 according to UL 508.

Protection degree of the terminals

IP2x according to CENELEC EN 60529.

Shock resistance *(acc. to MIL 202 B method 202 A)*

1/2 sinusoid 11 ms:
No damage or disassembling at 100 g for all devices, except for the illuminated operators with transformer 38 g.

Vibration resistance *(according to IEC 68-2-6)*

16 g with frequency range from 40 to 500 Hz and maximum shifting 0.75 mm (peak-to-peak).

Rated insulation voltage

690V according to EN 60947.1

Impulse withstand voltage

4 kV according to EN 60947.1

Insulation class

Groep C according VDE 0110

Electrical shocks protection *(acc. IEC 536)*

Metal operators	Class I
Plastic operators	Class II (double insulation)

Short-circuit protection

With fuses 16A gG according to IEC 269.1 and 269.3.

Performances of the contacts

- Slow acting
- Self-cleaning sliding
- NC forced breaking
- Double movable bridge
- Four switching points
- Double break

Electrical resistance of the contact

≤25 m Ω according to IEC 255, cat. 3

Identification of the terminals

According CENELEC EN 50013

Electrical performances

Rated thermal current Ith = 10 A

Performances according IEC 947.5.1

Categorie AC 15										
Voltage	Ue	(V)	24	48	60	110	220	380	500	600
Current	Ie	(A)	10	10	10	6	3	2	1.5	1.2
Categorie DC 13										
Voltage	Ue	(V)	24	48	60	110	220	300		
Current	Ie	(A)	2.5	1.4	1	0.55	0.27	0.2		

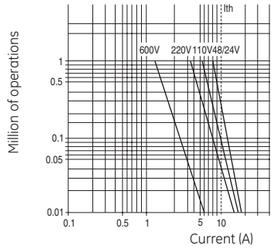
Performances according to CSA and UL

AC Heavy Duty	(A600)
DC Standard Duty	(Q300)

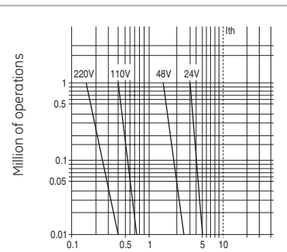
Operating range

Electrical endurance

Alternative current 50/60 Hz cat. AC 15



Direct current cat. DC 13



Mechanical endurance

Locking emergency Mushroom head push-buttons 3 positions Illuminated mushroom head push-buttons 3 pos.	0.3 Mil./op.
Joysticks Key push-buttons Toggle switches Illuminated selector switches Push-on push-off device	0.5 Mil./op.
Standard selector switches Key selector switches Illuminated push-buttons Selector push-buttons Emergency lever	1 Mil./op
Standard push-buttons Mushroom head push-buttons	3 Mil./op.

Rear panel modularity

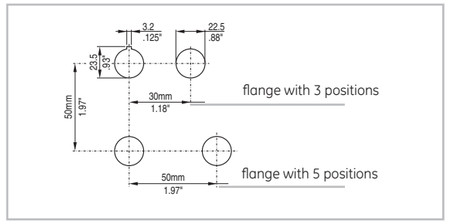
The P9 series is composed with 10 mm or a multiple of 10 mm modular units, fitted side by side on a proper mounting flange. The standard operators are supplied with a three position flange with a capacity of 3 units of 10 mm or 1 of 10 mm and 1 of 20 mm or 1 of 30 mm.
When the three position flange is not enough to satisfy the applications needs, the five position flange is required to add two more units of 10 mm mounted side by side.
Using the five position flange take into account the bigger with (50 mm instead of 30 mm).

Number of electrical contacts

	Flange	
	standard 3 positions	optional 5 positions
Standard push-buttons Mushroom head push-buttons Emergency lever	max 6	max 8
Standard selectors Key selector switches	max 4	max 8
Joysticks Key push-buttons Selector push-buttons Toggle switches	max 4	-
Mushroom head with lock Mushroom head push-buttons 3 pos.	max 4 max 2	-
Illuminated push-buttons Illuminated mushroom head push-buttons Illuminated selector switches	max 4	max 4
Illuminated mush. push-buttons with lock Illuminated mush. push-buttons 3 pos.	max 2	max 2

Mounting

Fitted for panels 1 to 6 mm. thick with holes drilled according to CENELEC EN 50007 standards.



Complete devices

	Description	Contact-block	Power supply	Cap colour	Cat. no. Metal	Ref. no. Metal	Cat. no. Plastic	Ref. no. Plastic
Momentary push-buttons (head + contact block)	Standard flush	1 NO	13 14	Black	**P9MPN53007**	153007	**P9XPN52007**	152007
				Green	**P9MPN53006**	153006	**P9XPN52002**	152002
	Standard raised	1 NC	21 22	Red	**P9MPN53061**	153061	**P9XPN52061**	152061
Mushroom push-buttons (head + contact block)	Mushroom head momentary	1 NC	21 22	Red Ø 40	**P9MEM53111**	153111	**P9XEM52111**	152111
	Mush.with latch pull to release Twist to release	1 NC	21 22	Red Ø 40	**P9MET53121**	153121	**P9XET52121**	152121
Emergency push-buttons[1] (head + contact block)	Twist to release VISION						**P9XER50775**	150775
	Key (3095) to release						**P9XERW50776**	150776
							P9XEC50777	150777[2]
	(1) Emergency stop as per EN 418 (2) Includes 2 keys							
Knob selector switch (knob head + contact block)	2 fixed positions I 90° II	1 NO	13 14	Black	**P9MSM53293**	153293	**P9XSM52293**	152293
	3 fixed positions I 45° 0 45° II	2 NO	13 23 14 24	Black	**P9MSM53391**	153391	**P9XSM52391**	152321
Knob selector switch (knob head + contact block)	2 fixed positions	1 NO	13 14	Key 3095	**P9MSC53435**	153435	**P9XSC52435**	152435
	2 fixed positions (includes plate I-0) I 90° II						**P9XSC52434**	152434
	3 fixed positions	2 NO	13 23 14 24	Key 3095	**P9MSC53497**	153497	**P9XSC52497**	152497
	3 fixed positions (includes plate I-0-II) I 45° 0 45° II						**P9XSC52496**	152496

The catalogue numbers **in bold** are available from stock.

Complete devices

	Description	Contact-block	Power supply	Cap colour	Cat. no. (Metal)	Ref. no. (Metal)	Cat. no. (Plastic)	Ref. no. (Plastic)
Illuminated push-buttons (Head + Standard full voltage power supply+ contact blocks)	Momentary flush (bulb not included)	1NO		Green	**P9MPL53502**	153502	**P9XPL52502**	152502
		1 NC		Red	**P9MPL53511**	153511	**P9XPL52511**	152511
		1NO + 1NC		Green	**P9MPL53514**	153514	**P9XPL52514**	152514
				Red	**P9MPL53515**	153515	**P9XPL52515**	152515
				White	**P9MPL53513**	153513	**P9XPL52513**	152513
Pilot lights	Standard diffused lens- Full voltage Power supply			Green	**P9MLD53610**	153610	**P9XLD52610**	152610
				Red	**P9MLD53611**	153611	**P9XLD52611**	152611
	Standard diffused lens- Integrated LED 24VAC/DC			Green	**P9MLD53620**	153623	**P9XLD52620**	152620
				Red	**P9MLD53621**	153621	**P9XLD52621**	152621
Double functions push-buttons (Head + contact block & power supply when indicated)	Flush both caps	1 NO + 1NC		Green-red			**P9DPL54700**	154700
	Flush both caps - Full voltage power supply	1 NO + 1NC		Green-red			**P9DPL54720**	154720
	Flush both caps with ISO I/O Full voltage power supply	1 NO + 1NC		Green-red			**P9DPL54701**	154701
	Flush both caps with ISO I/O	1 NO + 1NC		Green-red			**P9DPL54721**	154721

The catalogue numbers **in bold** are available from stock.

Pilot lights

Description	Cat. no.	Ref. no. see bottom	Cat. no.	Ref. no. see bottom	Cat. no.	Ref. no. see bottom
	Metal		Plastic		Plastic	
	○		●		■	
Standard						
Diffused lens (for filament bulb)	**P9ML●D**	*see bottom*	**P9XL●D**	*see bottom*	**P9SL●D**	*see bottom*
Refracted lens (for neon bulb)	**P9ML●R**	*see bottom*				
Glass lens	P9ML●V	*see bottom*				
Unibloc (complete pilot light)						
Full voltage AC/DC						
BA9S max 382 V - 2 W not included						
Diffused lens			P9XU●DD0	*see bottom*		
Refracted lens						
With resistor 220 V						
BA9S 110 V - 2 W included						
Diffused lens			P9XU●DRN	*see bottom*		
Refracted lens						

The catalogue numbers **in bold** are available from stock.

Colours		red	green	yellow	orange	blue	white	clear
Lens	●	R	V	G	A	L	B	I

Double function push-buttons (1)

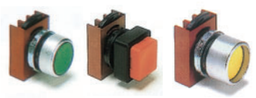
	Colours (2)	Cat. no.	Ref. no.	Cat. no.	Ref. no.
		Plastic caps without symbols		Plastic caps with symbols	
IP40 protection (acc. to IEC 529)					
With white lens assembled for indicator light. Black insert for not illuminated function included in the packaging.					
A-flush, lens, B-flush	A - Black B - Red	P9DPLNRG00	186880	P9DPLNRG01	186890
	A - Green B - Red	**P9DPLVRG00**	186881	**P9DPLVRG01**	186891
	A - Black B - Red	P9DPLNRS00	186882	P9DPLNRS01	186892
A-flush, lens, B-raised	A - Green B - Red	P9DPLVRS00	186883	P9DPLVRS01	186893
Clear cap (silicon rubber)					
IP66 protection (acc. to IEC 529)					
	A - flush B - flush	080CPDT	173208	080CPDT	173208
	A - flush B - raised	P9ADCST	187796	P9ADCST	187796

The catalogue numbers **in bold** are available from stock.

(1) With white lens assembled.
Black insert for not illuminated function included in the packaging.

(2) Integral caps, colours not replacable.

Push-buttons

	Description	Cat. no.	Ref. no. see bottom	Cat. no.	Ref. no. see bottom	Cat. no.	Ref. no. see bottom
		Metal		Plastic		Plastic	
		○		●		■	
Standard / Momentary							
	With flush cap	**P9MPN●G**		**P9XPN●G**		**P9SPN●G**	
	With raised cap	**P9MPN●S**		**P9XPN●S**		**P9SPN●S**	
	Recessed	P9MPN●E					
Mushroom head / Momentary							
	Mushroom head Ø 28 mm	P9MEM3●N		P9XEM3●N*			
	Mushroom head Ø 40 mm	**P9MEM4●N**		**P9XEM4●N***			
	Mushroom head Ø 60 mm	P9MEM6●N					
	Mushroom head ◰ 30 mm					**P9SEM3RN**	186031
				* Color N or R			
Mushroom head with latch							
Standard **Push-pull to release**	Mushroom head Ø40 mm	**P9MET4●N1**		**P9XET4●N1**		**P9SET4R**	186061
Push-twist to release	Red mushroom head Ø28 mm	P9MER3RN	184070	P9XER3RN	185070		
	Red mushroom head Ø40 mm	**P9MER4RN**	184071	**P9XER4RN**	185071		
Push-key to release	Red mushroom head Ø40 mm	P9MEC4RN▲		P9XEC4RN▲			
Emergency with latch							
Positive break in accordance with EN 418 **Push-twist to release**	Red mushroom head Ø40 mm			**P9XER4RAN**	185077	**P9SER4RA**	186072
Push-twist to release	Red mushroom head Ø40 mm **with status indication**			**P9XER4RAW**	185078		
Push-key to release	Red mushroom head Ø40 mm with key code 3095			**P9XEC4RA95N**	185079	**P9SEC4RA95**	186073
Mushroom head / 3 positions							
	Ø40 mm 1-0 fixed. 2 transient	P9MET4●N2					
	Ø40 mm 0 fixed. 1-2 transient	P9MET4●N3					
With keylock [1]							
Key withdrawable in position I & II	normal	**P9MPCN1K▲**					
	depressed	P9MPCN2K▲					
	normal & depressed	P9MPCN3K▲					
Key withdrawable position III **Lockable position**	normal	P9MPCN1E▲					
	depressed	P9MPCN2E▲					
	normal & depressed	P9MPCN3E▲					

(1) Keys on F.14

The catalogue numbers **in bold** are available from stock.

Colours		black	red	green	yellow	brown	blue	white	grey	without cap
Caps	●	**N**	**R**	**V**	G	M	L	B	H	0
Mushroom heads	●	**N**	**R**	V	G	-	L	-	-	-

Remark: To complete the catalogue number, substitute the symbol ● by a letterfor the choise of the colour and the symbol ▲ by a number for the type of key.

For reference numbers, see chapter X, pg. X.8

Selector switches with knob

		Function (1)	Cat. no.	Ref. no. *see bottom*	Cat. no.	Ref. no. *see bottom*	Cat. no.	Ref. no. *see bottom*
			Metal		Plastic		Plastic	
			○		●		■	
2 positions								
	Fixed	D	**P9MSMD0●**		**P9XSMD0N**	185110	**P9SSMD0N**	186110
		I	P9MSMI0●		P9XSMI0N	185120	P9SSMI0N	186120
	With spring return	H	P9MSMH0●					
		D	P9MSMD5●		P9XSMD5N	185150	P9SSMD5N	186140
		I	P9MSMI5●				P9SSMI5N	186150
		H	P9MSMH1●					
3 positions								
	Fixed	E	P9MSME0●				P9SSME0N	186170
		L	P9MSML0●					
		U	P9MSMU0●		P9XSMU0N	185190	P9SSMU0N	186190
		Z, B	P9MSMZ0●		P9XSMZ0N	185200	P9SSMZ0N	186200
	With spring return	E	P9MSME1●				P9SSME1N	186210
		L	P9MSML1●					
		U	P9MSMU●				P9SSMU1N	186230
		Z;B	P9MSMZ1●		P9XSMZ1N	185240	P9SSMZ1N	186240
		E	P9MSME5●					
		L	P9MSML5●					
		U	P9MSMU5●					
		Z, B	P9MSMZ5●		P9XSMZ5N	185280	P9SSMZ5N	186280
		E	P9MSME3●					
		L	P9MSML3●					
		U	P9MSMU3●					
		Z, B	**P9MSMZ3●**		**P9XSMZ3N**	185320	**P9SSMZ3N**	186320
4 positions								
	Fixed	X	P9MSMX0●		P9XSMX0N	185330	P9SSMX0N	186330
	With spring return	X	P9MSMX5●					
5 positions								
	Fixed	X	P9MSMY0●					
		W	P9MSMW0●					

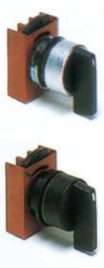
(1) Electrical diagrams, see F.22

The catalogue numbers **in bold** are available from stock.

Colours round shape		black	red	green	yellow	blue
Knobs	●	**N**	R	V	G	L

For reference numbers, see chapter X, pg. X.8

Selector switches with lever

		Function (1)	Cat. no.	Ref. no. *see bottom*	Cat. no.	Ref. no. *see bottom*
			Metal		Plastic	
2 positions						
Fixed		D	**P9MSVD0●**		**P9XSVD0N**	185370
		I	P9MSVI0●		P9XaSVI0N	185371
		H	P9MSVH0●			
With spring return		D	P9MSVD5●		P9XSVD5N	185373
		I	P9MSVI5●			
		H	P9MSVH1●			
3 positions						
Fixed		E	P9MSVE0●			
		L	P9MSVL0●			
		U	P9MSVU0●			
		Z, B	**P9MSVZ0●**		**P9XSVZ0N**	185379
With spring return		E	P9MSVE1●			
		L	P9MSVL1●			
		U	P9MSVU1●			
		Z;B	P9MSVZ1●			
		E	P9MSVE5●			
		L	P9MSVL5●			
		U	P9MSVU5●			
		Z, B	P9MSVZ5●			
		E	P9MSVE3●			
		L	P9MSVL3●			
		U	P9MSVU3●			
		Z, B	**P9MSVZ3●**		**P9XSVZ3N**	185391
4 positions						
Fixed		X	P9MSVX0●		P9XSVX0N	185392
With spring return		X	P9MSVX5●			
5 positions						
Fixed		X	P9MSVY0●			
		W	P9MSVW0●			

(1) Electrical diagrams, see F.22

The catalogue numbers **in bold** are available from stock.

Colours		black	red	green	yellow	blue
Levers	●	**N**	R	V	G	L

For reference numbers, see chapter X, pg. X.8

Selector switches with key

2 positions		Function (1)	Key removal	Cat. no.	Ref. no. see bottom	Cat. no.	Ref. no. see bottom	Cat. no.	Ref. no. see bottom
				Metal		Plastic		Plastic (1)	
Fixed		D	I	**P9MSCD0A▲**		**P9XSCD0A95**	185400	**P9SSCD0A95**	186400
			II	P9MSCD0E▲		P9XSCD0E95	185401		
			I-II	**P9MSCD0K▲**		**P9XSCD0K95**	185402		
		I	0	P9MSCI0C▲					
			I	P9MSCI0E▲					
			0-I	P9MSCI0N▲					
		H	I	P9MSCH0A▲					
			0	P9MSCH0C▲					
			I-0	P9MSCH0H▲					
With spring return		D	I	P9MSCD5A▲		P9XSCD5A95	185409	P9SSCD5A95	186409
		I	0	P9MSCI5C▲		P9XSCI5C95	185410	P9SSCI5C95	186410
		H	0	P9MSCH1C▲					
3 positions									
Fixed		E	I	P9MSCE0A▲					
			0	P9MSCE0C▲					
			II	P9MSCE0E▲					
			I-0	P9MSCE0H▲					
			I-II	P9MSCE0K▲					
			0-II	P9MSCE0N▲					
			I-0-II	P9MSCE0T▲					
		L	I	P9MSCL0A▲					
			0	P9MSCL0C▲					
			II	P9MSCL0E▲					
			I-0	P9MSCL0H▲					
			I-II	P9MSCL0K▲					
			0-II	P9MSCL0N▲					
			I-0-II	P9MSCL0T▲					
		U	I	P9MSCU0A▲					
			0	P9MSCU0C▲					
			II	P9MSCU0E▲					
			I-0	P9MSCU0H▲					
			I-II	P9MSCU0K▲					
			0-II	P9MSCU0N▲					
			I-0-II	P9MSCU0T▲		P9XSCU0T95	185432		
		Z, B	I	P9MSCZ0A▲		P9XSCZ0A95	185433		
			0	P9MSCZ0C▲		P9XSCZ0C95	185434		
			II	P9MSCZ0E▲		P9XSCZ0E95	185435		
			I-0	P9MSCZ0H▲					
			I-II	P9MSCZ0K▲					
			0-II	P9MSCZ0N▲					
			I-0-II	**P9MSCZ0T▲**		**P9XSCZ0T95**	185439	**P9SSCZ0T95**	186439

(1) Electrical diagrams, see F.22

The catalogue numbers **in bold** are available from stock.

Keys for round metal shape

Standard version number	▲	95								
Standard version with specific number	▲	01	02	03	04	05	10	16	19	55 (Ronis)
FIAT version number	▲	33	34	37	38	40				
Colour		yellow	black	red	blue	orange				

(1) Key for square shape and round plastic shape, only standard version 95

For reference numbers, see chapter X, pg. X.8

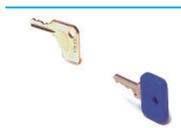
Selector switches with key

		Function (1)	Key removal	Cat. no.	Ref. no. see bottom	Cat. no.	Ref. no. see bottom	Cat. no.	Ref. no. see bottom
				Metal		Plastic		Plastic (1)	
3 positions				○		●		■	
With spring return		E	0	P9MSCE1C▲					
			II	P9MSCE1E▲					
			0-II	P9MSCE1N▲					
		L	0	P9MSCL1C▲					
			II	P9MSCL1E▲					
			0-II	P9MSCL1N▲					
		U	0	P9MSCU1C▲					
			II	P9MSCU1E▲					
			0-II	P9MSCU1N▲					
		Z; B	0	P9MSCZ1C▲					
			II	P9MSCZ1E▲					
			0-II	P9MSCZ1N▲					
		E	I	P9MSCE5A▲					
			0	P9MSCE5C▲					
			I-0	P9MSCE5H▲					
		L	I	P9MSCL5A▲					
			0	P9MSCL5C▲					
			I-0	P9MSCL5H▲					
		U	I	P9MSCU5A▲					
			0	P9MSCU5C▲					
			I-0	P9MSCU5H▲					
		Z, B	I	P9MSCZ5A▲		P9XSCZ5A95	185461	P9SSCZ5A95	186461
			0	P9MSCZ5C▲		P9XSCZ5C95	185462		
			I-0	P9MSCZ5H▲		P9XSCZ5H95	185463		
		E	0	P9MSCE3C▲					
		L	0	P9MSCL3C▲					
		U	0	P9MSCU3C▲					
		Z, B	0	**P9MSCZ3C▲**		**P9XSCZ3C95**	185467	**P9SSCZ3C95**	186467
4 positions									
Fixed		X	I	P9MSCX0A▲					
			II	P9MSCX0B▲					
			III	P9MSCX0D▲					
			IV	P9MSCX0E▲					
			I-II	P9MSCX0F▲					
			I-III	P9MSCX0J▲					
			I-IV	P9MSCX0K▲					
			II-III	P9MSCX0L▲					
			II-IV	P9MSCX0M▲					
			III-IV	P9MSCX0P▲					
			I-II-III	P9MSCX0R▲					
			I-II-IV	P9MSCX0S▲					
			I-III-IV	P9MSCX0U▲					
			II-III-IV	P9MSCX0V▲					
			I-II-III-IV	P9MSCX0Z▲					
With spring return		X	I	P9MSCX5A▲					
			II	P9MSCX5B▲					
			III	P9MSCX5D▲					
			I-II	P9MSCX5F▲					
			I-III	P9MSCX5J▲					
			II-III	P9MSCX5L▲					
			I-II-III	P9MSCX5R▲					

(1) Electrical diagrams, see F.22

The catalogue numbers **in bold** are available from stock.

Keys for round metal shape

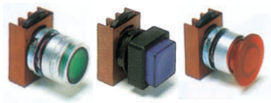


Standard version number	▲	95									
Standard version with specific number	▲	01	02	03	04	05	10	16	19	55 (Ronis)	
FIAT version number	▲	33	34	37	38	40					
Colour		yellow	black	red	blue	orange					

(1) Key for square shape and round plastic shape, only standard version 95

For reference numbers, see chapter X, pg. X.8

Illuminated push-buttons

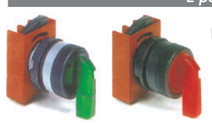


		Cat. no.	Ref. no. see bottom	Cat. no.	Ref. no. see bottom	Cat. no.	Ref. no. see bottom
		Metal		Plastic		Plastic	
Standard / Momentary							
With diffused lens:	Flush	**P9MPL●GD**		**P9XPL●GD**		**P9SPL●GD**	
	Raised	**P9MPL●SD**		**P9XPL●SD**		**P9SPL●SD**	
	Recessed	P9MPL●ED					
Mushroom head / Momentary							
Mushroom head Ø40 mm		**P9MEM4●L**		**P9XEM4●L***			
Mushroom head ☐ 30 mm						P9SEM3RL	186551
Mushroom head / With latch							
Push-pull to release							
Mushroom head Ø40 mm		P9MET4●L1		P9XET4●L1*		P9SET4RL1	186561
				* Color R, V or G			
Mushroom head / 3 positions							
With mushroom Ø40 mm							
1-0 fixed, 2 transient		P9MET4●L2		P9XET4RL2	185571		
0 transient, 1-2 fixed		P9MET4●L3					

Illuminated selector switches with knob

		Function (1)						
2 positions								
Fixed		D	**P9MSLD0●**		**P9XSLD0●**		**P9SSLD0●**	
3 positions								
Fixed		Z, B	**P9MSLZ0●**		**P9XSLZ0●**		**P9SSLZ0●**	
With spring return		Z, B	P9MSLZ1●					
		Z, B	P9MSLZ5●					
		Z, B	**P9MSLZ3●**					

Illuminated selector switches with lever

		Function (1)						
2 positions								
Fixed		D	P9MSAD0●					
3 positions								
Fixed		Z, B	P9MSAZ0●					
With spring return		Z, B	P9MSAZ1●					
		Z, B	P9MSAZ5●					
		Z, B	P9MSAZ3●					

(1) Electrical diagrams, see F.22

The catalogue numbers **in bold** are available from stock.

Colours		red	green	yellow	orange	blue	white	clear
Lens	●	**R**	**V**	**G**	A	L	B	I
Mushroomheads	●	**R**	V	G	A	L	B	I
Knob/lever	●	**R**	**V**	G	A	L	B	I

For reference numbers, see chapter X, pg. X.8

Selector push-buttons (black coloured)

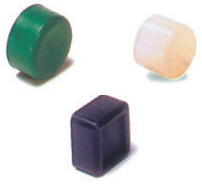
	Function (1)	Cat. no.	Ref. no.	Cat. no.	Ref. no.	Cat. no.	Ref. no.
		Metal		Plastic		Plastic	
		○		●		■	
2 positions							
Fixed	201	P9MPS21G	184690				
	231	**P9MPS22G**	184691				
	235	P9MPS23G	184692				
3 positions							
Fixed	301	P9MPS34G	184693				
	323	P9MPS35G	184694				

Toggle switches (black coloured)

	Function (1)	Cat. no.	Ref. no.	Cat. no.	Ref. no.	Cat. no.	Ref. no.
		Metal		Plastic		Plastic	
		○		●		■	
2 positions							
Fixed position	D	**P9MCD**	184695	**P9XCD**	185695	**P9SCD**	186695
3 positions							
Fixed position	B	P9MCB	184696				
Transient to zero from one position	B	P9MCC	184697				

The catalogue numbers **in bold** are available from stock.

Rubber protective caps (IP66)



Description		Cat. no.	Ref. no. *see bottom*	Cat. no.	Ref. no. *see bottom*
		Plastic		Plastic	
		○ ●		■	
Standard flush push-buttons	coloured (nitrilic rubber)	080CP●		P9ASCG●	
	clear (silicon rubber)	080CPT	170198	P9ASCGT	170790
Raised push buttons	clear (silicon rubber)	P9ARCST	187490	P9ASCST	187791

Emergency lever

	Cat. no.	Ref. no.	Cat. no.	Ref. no.	Cat. no.	Ref. no.
	Metal		Plastic		Plastic	
	○		●		■	
Red lever	P9MWR	184770				

Reset push-button

White symbol on blue background	P9MRG	184771	P9XRG	185771		

Potentiometer operator (potentiometer not included)

Black knob	**P9MZ**	184772	**P9XZ**	185772	**P9SZ**	186772

Buzzer

Black coloured Bitonal sound Full voltage AC/DC Frequency: 2kHz Sound intensity: 80dB at 1 m Consumption: 3 to 9 mA						
24 V			P9XBD	185773	P9SBD	186773
110-240 V			P9XBM	185774	P9SBM	186774

The catalogue numbers **in bold** are available from stock.

For reference numbers, see chapter X, pg. X.8

Joysticks (black coloured)

		Cat. no.	Ref. no.	Cat. no.	Ref. no.	Cat. no.	Ref. no.
		Metal		Plastic		Plastic	
		○		●		■	
2 positions + central zero position [1]							
Without interlock	fixed postions	P9MMN2F	184700	P9XMN2F	185700		
	transient positions	**P9MMN2T**	184701	**P9XMN2T**	185701		
	1 transient - 3 fixed positions	P9MMN2A	184702				
	1 fixed - 3 transient positions	P9MMN2B	184703				
With interlock	fixed postions	P9MMB2F	184710	P9XMB2F	185710		
	transient positions	**P9MMB2T**	184711	**P9XMB2T**	185711		
	1 transient - 3 fixed positions	P9MMB2A	184712	P9XMB2A	185712		
	1 fixed - 1 transient positions	P9MMB2B	184713	P9XMB2B	185713		
4 positions + central zero position [1]							
Without interlock	fixed postions	P9MMN4F	184720	P9XMN4F	185720		
	transient positions	**P9MMN4T**	184721	**P9XMN4T**	185721		
With interlock	fixed postions	P9MMB4F	184740	P9XMB4F	185740		
	transient positions	P9MMB4T	184741	P9XMB4T	185741		

Spare boots for joysticks

(a) (b)

Standard rubber boot for joystick	(a)	P9ARSCMN	188043
Standard rubber boot for joystick with interlock	(a)	P9ARSCMB	188044
Silicone boot for joystick	(b)	P9ARSGMN	187495
Silicone boot for joystick with interlock	(b)	P9ARSGMB	187496

(1) Electrical diagrams, see F.22

The catalogue numbers **in bold** are available from stock.

For reference numbers, see chapter X, pg. X.8

Contact blocks

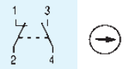
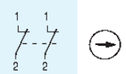
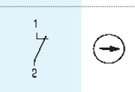
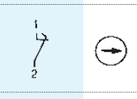
Logic Reed

A new range of LOGIC REED contact blocks with faston terminals for use with power lower than 12V - 5mA.

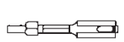
		Cat. no.	Ref. no.
Contact type	NC	**P9B01FH**	187014
	NO	**P9B10FH**	187015
Rated voltage	AC2 to 120V max.		
	DC2 to 30V max.		
Rated current	AC/DC - 0.001 to 0.15A max.		
Rated power	AC - 8VA max.		
	DC - 4.5W max.		
Minimum centerline distance	30x32 mm.		
Mounting on operators	through specific bayonet flange adaptor.	**P9ACFSM**	187846
Full voltage power supply		**P9PDHF**	187056

With screw

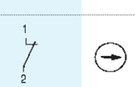
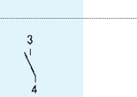
min. 1 of 22 AWG (0.32 mm²)
max. 2 of 12 AWG (3.3 mm²)

	Contact type	Cat. no.	Ref. no.
	NC+NO	**P9B11VN**	187000
	NC+NC	**P9B02VN**	187008
	NO+NO	**P9B20VN**	187009
	NC	**P9B01VN**	187001
	NO	**P9B10VN**	187002
	NC late opening	P9B01VR	187003
	NO early closing	P9B10VA	187004

Faston



1 x (6.35 x 0.8 mm)
2 x (2.8 x 0.8 mm)

	NC	P9B01FN	187012
	NO	P9B10FN	187013

Terminal adapter

printed circuit board adapter

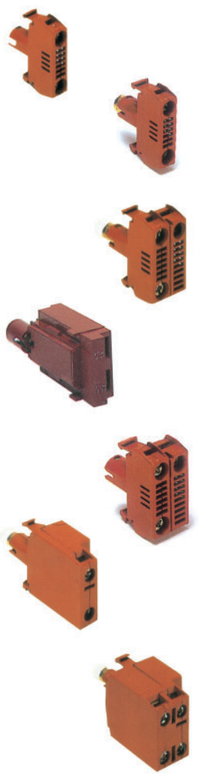
	P9ACA6	188804

The catalogue numbers **in bold** are available from stock.

Power supplies

With screw

min. 1 of 22 AWG (0.32 mm²)
max. 2 of 12 AWG (3.3 mm²)



Position on flange	2 3 1	Contact type	Cat. no.	Ref. no.
X1 X2	□ ■ □	Full voltage ≌ IEC: BA9S max 380V-2W not included UL-CSA: BA9S max 250V-2W not included	**P9PDNV0**	187020
		Logic Reed fullvoltage for low power	P9PDHF	187056
X1 X2	□ ■ □	Long life 110/120V ≌ BA9S 130V-2W included	P9PRLVJ	187021
X1 X2	□ ■ □	Resistor + Diode 220/240 V ~ BA9S 130V-2W included	P9PRDVN	187022
X1 X2	▬ □	Resistor 110/120V ≌ BA9S 60V-1.2W included	**P9PRNVJ**	187023
		220/240V ≌ BA9S 130V-2W included	**P9PRNVN**	187024
X1 X2	▬ □	Resistor ENEL version BA9S 48V-2W included 110V ≌	P9PREVJ	187025
		125/127V ≌	P9PREVL	187026
X5 X1 X2	▬ □	UL-CSA: BA9S max 250V-2W not included Test full voltage (1) ≌ IEC: BA9S max 380V-2W not included	P9PDTV0	187027
X5 X1 X2	▬ □	Test resistor (1) 220/240 V ≌ BA9S 130V-2W included	P9PRTVN	187028
X1 X2	▬ □	Transformer 50/60 Hz BA9S 6V-1.5W included	**P9PTNV♦**	*see bottom*
Y1 X1 Y2 X2	▬	Multifunction (2) full voltage 24V ≌ BA9S 24V-2W included	**P9PDMVD**	187040
		Multifunction (2) full voltage 110V ≌ BA9S 130V-2W included	P9PDMVJ	187041
Y1 X1 Y2 X2	▬	Multifunction (2) Transformer 50/60 Hz BA9S 6V-0.6W included	**P9PTMV:**	*see bottom*

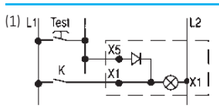
Faston

1 x (6.35 x 0.8 mm)
2 x (2.8 x 0.8 mm)

X1 X2	□ ■ □	Full voltage IEC:BA9S max 380V-2W not included UL-CSA: BA9S max 250V-2W not included	P9PDNF0	187055

Integrated LED

x1 x2	□ ■ □	Standard light		
		24V AC/DC	**P9PLNVD•**	*see bottom*
		120V AC	**P9PLNVJ•**	*see bottom*
		230V AC	**P9PLNVN•**	*see bottom*
		Flashing light		
		24V AC/DC	**P9PLFVD•**	*see bottom*
		120V AC	**P9PLFVJ•**	*see bottom*
		230V AC	**P9PLFVN•**	*see bottom*



(1) L1 Test L2 X5 K X1 X1

(2) Y1 Y2 Y1 Y2 C

Do not connect for flashing light
Link to external contact in order to have steady or flashing light
C closed = Steady light
C open = Flashing light

LED colour•	orange	white	yellow	blue	red	green
	A	B	G	L	R	V

The catalogue numbers **in bold** are available from stock.

Voltage	110-120	220-250	380	415-440	480-500
♦	J	N	U	W	Y
:	J	N	U	-	-

For reference numbers, see chapter X, pg. X.8

Diagrams

Selector switches

Positions	Function	Contacts	Position on flange 2 3 1
I 90° II	D	B10	□ □ ■
	D	B10 B01	■ □ ■
	D	B11	□ □ ■
0 45° I	I	B11	□ □ ■
I 45° 0	H	B11 B11	□ □ ■
I 45° 0 45° II	B	B10 B10	■ □ ■
I 45° 45° II	E	B11	□ □ ■
I 45° 0 45° II	L	B11	□ □ ■
I 45° 0 45° II	U	B11 B11	■ □ ■
I 45° 0 45° II	Z	B11 B11	■ □ ■
	Z	B10 B01	■ □ ■
I 45° 45° 45° II III IV	X	B11 B11	■ □ ■
I 40° 40° 40° 40° II III IV V	Y	B11 B11	■ □ ■
I 40° 40° 40° 40° II III IV V	W	B11 B11	■ □ ■

Selector push-buttons

Positions	Function	Contacts	Normal	Depressed	Position on flange 2 3 1
I 90° II	201	B11 B11	I II	I II	■ □ ■
I 90° II	231	B11 B11	I II	I II	■ □ ■
I 90° II	235	B11 B11	I II	I II (✕)	■ □ ■
II 45° 45° III	301	B11 B11	I II III	I II III	■ □ ■
II 45° 45° III	323	B11 B11	I II III	I II III (✕)	■ □ ■

✕ Can not be depressed

Joysticks

Positions	Contacts	Position on flange 2 3 1
1 0 3	B11 B11	■ □ ■
1 4 0 2 3	B11 B11	■ □ ■

Toggle switches

Positions	Function	Contacts	Position on flange 2 3 1
1 2	D	B11	□ □ ■
1 0 2	B	B11	□ □ ■

Mushroom head push-buttons 3 pos.

Function	Contacts	Position on flange 2 3 1
2	B01R B01	■ □ ■
3	B11	□ □ ■

Base mounting - Contact blocks

With screw

min. 1 of 22 AWG (0.32 mm²)
max. 2 of 12 AWG (3.3 mm²)

Contact type	Cat. no.	Ref. no.
NC	**P9B01BN**	187017
NO	**P9B10BN**	187018

Base mounting - Power supplies

With screw

min. 1 of 22 AWG (0.32 mm²)
max. 2 of 12 AWG (3.3 mm²)

Position on flange 2 3 1	Bulb power supply	Cat. no.	Ref. no.
X1 / X2	Full voltage ≅ IEC: BA9S max 380V-2W not included UL-CSA: BA9S max 250V-2W not included	**P9PDNB0**	187070

Integrated LED

Standard light			
24V AC/DC	**P9PLNBD•**	*see bottom*	
120V AC	**P9PLNBJ•**	*see bottom*	
230V AC	**P9PLNBN•**	*see bottom*	

The catalogue numbers **in bold** are available from stock.

LED colour•	orange	white	yellow	blue	red	green
	A	B	G	L	R	V

For reference numbers, see chapter X, pg. X.8

Empty box for DIN Rail application (Light grey coloured RAL 7035)

		Cat. no.	Ref. no.
1		**P9EPEM**	189200

- Up to 3 base mounting contact blocks and power supplies
- 1hole P9EPEM 189200
- Can be used in modular cabinet
- 36mm width
- Double protection

Push-button stations in thermoplastic (Light grey coloured RAL 7035)

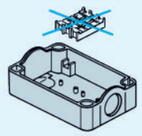
For panel and base mounting

- IP66 according to IEC529, EN 60529
- Engineered thermoplastic covers, bases and screws
- Self extinguishing Class V0, according to UL 94
- Rust resistant (4X according to UL 508)
- Total insulation with all thermoplastic operators
- Contact blocks and power supplies for both base and front mounting

Empty versions

Cover with holes
Knockouts conduit entry

Number of holes		Cat. no.	Ref. no.
1 (yellow cover)		**P9EPEG1**	189000
1		**P9EPE01**	189001
2		**P9EPE02**	189002
2 (yellow cover)		**P9EPEG2**	189006
3		**P9EPE03**	189003
4		**P9EPE04**	189004
6		**P9EPE06**	189005

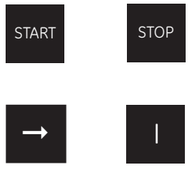


For panel mounting

Accessories

Write-on plates

Bilaminated, self adhesive, 20 x 20 mm
Black background
engravable for white texts



Description	Symbols	Cat. no.	Ref. no.
Without text		**P9AELN**	**189030**
Text in English (1) START		P9AELN202	189031
STOP		P9AELN201	189032
FORWARD		P9AELN214	189033
REVERSE		P9AELN215	189034
CLOSE		P9AELN205	189035
OPEN		P9AELN206	189036
UP		P9AELN204	189037
DOWN		P9AELN203	189038
LEFT		P9AELN222	189152
RIGHT		P9AELN224	189154
	→	P9AELN006	189041
	I	P9AELN028	189042
	0	P9AELN029	189043
	II	P9AELN035	189044
	III	P9AELN038	189045
	0-I	P9AELN039	189046
	I-0-II	P9AELN042	189047
		P9AEMT	189029

Earth terminal clamp

The catalogue numbers **in bold** are available from stock.

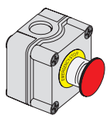
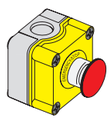
Push-button stations in thermoplastic (continued)

Equipped versions	Operators		Colour	Diagram	Name-plate	Cat. no.	Ref. no.
One unit	Flush push-button		green	13 / 4	I	**P9EPA01Y02**	189010
	Flush push-button		white	13 / 4	I	**P9EPA01Y03**	189011
	Emergency push-button with latch according to EN418 (yellow cover)		red	1 / 2	0	**P9EPAG1Y0N**	189007
	Emergency push-button with latch & **status indicator** according to EN418 (yellow cover)		red	1 / 2	0	**P9EPAG1Y01W**	189008
	Emergency push-button with latch according to EN418 - key to release (yellow cover)		red	1 / 2	0	**P9EPAG1Y06N**	189009

Equipped versions	Operators		Colour	Diagram	Name-plate	Cat. no.	Ref. no.
Two units	Flush push-buttons		green	13 / 4	I	**P9EPA02Y01**	189016
			red	1 / 2	0		
Three units	Full voltage pilot light max 380V-2W not included	BA9S	white	x1 / x2	blank	**P9EPA03Y01**	189018
	Flush push-buttons		green	13 / 4	I		
			red	1 / 2	0		
	Flush push-buttons		black	13 / 4	↑	**P9EPA03Y05**	189022
			red	1 / 2	0		
			black	13 / 4	↓		

Equipped boxes

Specially enclosures to use for shaft lifts (other versions, please contact us)

	Composition	Individual operators	Cat. no.	Ref. no.	Pack
One operator	Thermoplastic box. 1 element	P9EPE01	**P9EPC01X00**	215432	1
	Emergency push button mushroom head Ø40, push-pull to release	P9XET4RN1			
	1NC contact block	P9B01VN			
	1NO contact block	P9B10VN			
	Nameplate with inscription "EMERGENCY-STOP"	080XTGR02			
	PG16 packing gland				
	Thermoplastic box. Yellow cover. 1 element	P9EPEG1	**P9EPC01X01**	215433	1
	Emergency push-button mushroom head Ø40, push-twist to release	P9XER4RN			
	1NC contact block	P9B01VN			
	Nameplate with inscription "EMERGENCY-STOP"	080XTGR02			

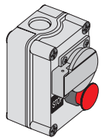
(1) Other languages on request

The catalogue numbers **in bold** are available from stock.

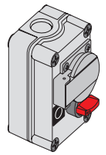
Equipped boxes (continued)

Specially enclosures to use for shaft lifts
(other versions, please contact us)

Two operators

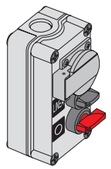


Composition	Individual operators	Cat. no.	Ref. no.	Pack
Thermoplastic box. 2 elements	P9EPE02	**P9EPL02X01**	189136	1
Emergency push-button mushroom head Ø28, push-twist to release	P9XER3RN			
1NC contact block	P9B01VN			
Nameplate with inscription "STOP"	P9AELN201			
16A Schuko socket-outlet with cover				

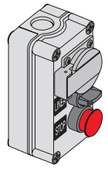


Thermoplastic box. 2 elements	P9EPE02	**P9EPL02X02**	189137	1
Selector switch, 2 positions, with red knob	P9XSMD0R			
1NC contact block	P9B01VN			
Nameplate with inscription "O-I"	P9AELN039			
16A Schuko socket-outlet with cover				

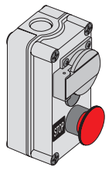
Three operators



Thermoplastic box. 3 elements	P9EPE03	**P9EPL03X01**	189138	1
Selector switch, 2 positions, with black knob	P9XSMD0N			
1NC contact block	P9B01VN			
1NO contact block	P9B10VN			
Nameplate with inscription "LINEA"	P9AELN523			
Selector switch, 2 positions, with red lever	P9XSVD0R			
1NO contact block	P9B10VN			
Nameplate with inscription "O-I"	P9AELN039			
16A Schuko socket-outlet with cover				

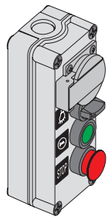


Thermoplastic box. 3 elements	P9EPE03	**P9EPL03X02**	189139	1
Selector switch, 2 positions, with black knob	P9XSMD0N			
1NC contact block	P9B01VN			
1NO contact block	P8B10VN			
Nameplate with inscription "LINEA"	P9AELN523			
Emergency push-button mushroom head Ø28, push-twist to release	P9XER3RN			
1NC contact block	P9B01VN			
Nameplate with inscription "STOP"	P9AELN201			
16A Schuko socket-outlet with cover				



Thermoplastic box. 3 elements	P9EPE03	**P9EPL03X03**	189140	1
Emergency push-button mushroom head Ø40, push-twist to release	P9XER4RN			
1NC contact block	P9B01VN			
Nameplate with inscription "STOP"	P9AELN201			
Round plug	P9ARHPR			
16A Schuko socket-outlet with cover				

Four operators



Thermoplastic box. 4 elements	P9EPE04	**P9EPL04X01**	189141	1
Selector switch, 2 positions, with black knob	P9XSMD0N			
1NC contact block	P9B01VN			
1NO contact block	P9B10VN			
Nameplate with "Light" symbol	P9AELN100			
Standard/momentary push button with flush cap, green	P9XPNVG			
1NO contact block	P9B10VN			
Nameplate with "Bell" symbol	P9AELN099			
Emergency push-button mushroom head Ø28, push-twist to release	P9XER3RN			
1NC contact block	P9B01VN			
Nameplate with inscription "STOP"	P9AELN201			
16A Schuko socket-outlet with cover				

The catalogue numbers **in bold** are available from stock.

Push-button stations in aluminium (Grey coloured RAL 7012)

For panel mounting	Protection	Number of holes	Type	Cat. no.	Ref. no.
Cover with holes with conduit entry	IP66 (according to IEC 529, EN 60529)	1	1	**080SP1**	170801
		1	1M (1)	**080SP1M**	170831
		2	2	**080SP2**	170802
		2	2M (1)	**080SP2M**	170832
		3	3	**080SP3**	170803
		4	4	**080SP4**	170804
		4	4M (1)	**080SP4M**	170834
		6	6	**080SP6**	170806
		8	8	**080SP8**	170807
		12	12	**080SP12**	170808
		18	18	**080SP18**	170809
		24	24	**080SP24**	170810
		35	35	**080SP35**	170811
Cover with holes without conduit entry	IP66 (according to IEC 529, EN 60529)	1	1	080SP1SFE	170836
		1	1M (1)	080SP1MSFE	170839
		2	2	080SP2SFE	170842
		2	2M (1)	080SP2MSFE	170845
		3	3	080SP3SFE	170848
		4	4	080SP4SFE	170850
		4	4M (1)	080SP4MSFE	170851
		6	6	080SP6SFE	170852
		8	8	080SP8SFE	170854
		12	12	080SP12SFE	170857
		18	18	080SP18SFE	170860
		24	24	080SP24SFE	170862
		35	35	080SP35SFE	170864
Cover without holes with conduit entry	IP66 (according to IEC 529, EN 60529)		1	080SP1SFC	170835
			1M (1)	080SP1MSFC	170838
			2	080SP2SFC	170841
			2M (1)	080SP2MSFC	170844
			3	080SP3SFC	170847
			4	080SP2SFC	170841
			4M (1)	080SP2MSFC	170844
			6	080SP3SFC	170847
			8	080SP8SFC	170853
			12	080SP12SFC	170856
			18	080SP18SFC	170859
			24	080SP18SFC	170859
			35	080SP35SFC	170863
Cover without holes without conduit entry	IP66 (according to IEC 529, EN 60529)		1	080SP1SF	170837
			1M (1)	080SP1MSF	170840
			2	080SP2SF	170843
			2M (1)	080SP2MSF	170846
			3	080SP3SF	170849
			4	080SP2SF	170843
			4M (1)	080SP2MSF	170846
			6	080SP3SF	170849
			8	080SP8SF	170855
			12	080SP12SF	170858
			18	080SP18SF	170861
			24	080SP18SF	170861
			35	080SP35SF	170865

(1) With deep socle

Accessories

Description	Cat. no.	Ref. no.
Kit of two hinges for types 18, 24, 35 with holes	**080KCSP**	170883

Overall dimensions, see F.41

The catalogue numbers **in bold** are available from stock.

Caps for standard push-buttons

		Colour	Cat. no.	Ref. no.	Cat. no.	Ref. no.	Cat. no.	Ref. no.	Cat. no.	Ref. no.
			Flush and recessed		Raised		Flush		Raised	
Neutral			**P9ARBG** ●	18710 ■	**P9ARBS** ●	18720 ■	**P9ASBG** ●	18750 ■	**P9ASBS** ●	18760 ■
With symbols[1]										
Stop		Black	**P9ARBGN 029**	187150	**P9ARBSN 029**	187250	**P9ASBGN 029**	187550	**P9ASBSN 029**	187650
		Red	**P9ARBGR 029**	187110	**P9ARBSR 029**	187210	**P9ASBGR 029**	187510	**P9ASBSR 029**	187610
Start		Black	**P9ARBGN 028**	187111	**P9ARBSN 028**	187211	**P9ASBGN 028**	187511	**P9ASBSN 028**	187611
		Green	**P9ARBGV 028**	187112	**P9ARBSV 028**	187212	**P9ASBGV 028**	187512	**P9ASBSV 028**	187612
		White	**P9ARBGB 028**	187151	**P9ARBSB 028**	187251	**P9ASBGB 028**	187551	**P9ASBSB 028**	187651
Continuous rectilinear motion		Black	**P9ARBGN 006**	187117	**P9ARBSN 006**	187217	**P9ASBGN 006**	187517	**P9ASBSN 006**	187617
		Green	**P9ARBGV 006**	187118	**P9ARBSV 006**	187218	**P9ASBGV 006**	187518	**P9ASBSV 006**	187618
		White	**P9ARBGB 006**	187152	**P9ARBSB 006**	187252	**P9ASBGB 006**	187552	**P9ASBSB 006**	187652
Increase		Black	P9ARBGN 017	187125						
Decrease		Black	P9ARBGN 018	187127						
Reset		Blue	P9ARBGL 037	187143			P9ASBGL 037	187543	P9ASBSL 037	187643
Stop/Reset		Red	P9ARBGR 036	187144						
Test		Black	P9ARBGN 030	187145	P9ARBSN 030	187245	P9ASBGN 030	187545	P9ASBSN 030	187645
		Green	P9ARBGV 030	187146	P9ARBSV 030	187246	P9ASBGV 030	187546	P9ASBSV 030	187646
Stop	STOP	Red	**P9ARBGR 201**	187147	**P9ARBSR 201**	187247	**P9ASBGR 201**	187547	**P9ASBSR 201**	187647
Start	START	Black	**P9ARBGN 202**	187148	**P9ARBSN 202**	187248	**P9ASBGN 202**	187548	**P9ASBSN 202**	187648
		Green	**P9ARBGV 202**	187149	**P9ARBSV 202**	187249	**P9ASBGV 202**	187549	**P9ASBSV 202**	187649
		White	**P9ARBGB 202**	188909	**P9ARBSB 202**	188978	**P9ASBGB 202**	189859	**P9ASBSB 202**	189928

(1) Other symbols on request

The catalogue numbers **in bold** are available from stock.

Colours		black	red	green	yellow	brown	blue	white	grey
Caps	●	**N**	**R**	**V**	**G**	**M**	**L**	**B**	H

Diffusers/insert for illuminated units

		Cat. no.	Ref. no.	Cat. no.	Ref. no.	Cat. no.	Ref. no.
		For pilot lights		For illuminated push buttons		For pilot lights and illuminated push buttons	
Neutral		P9ARDLS	187300	P9ARDPL	187350	080QDF	173220
With symbols[1]	on white background						
Stop		**P9ARDLS029**	187301	**P9ARDPL029**	187351	**080QDF029**	187701
Start		**P9ARDLS028**	187302	**P9ARDPL028**	187352	**080QDF028**	187702
Continuous rectilinear motion		**P9ARDLS006**	187305	**P9ARDPL006**	187355	**080QDF006**	187705
Increase		P9ARDLS017	187309	P9ARDPL017	187359	080QDF017	187709
Decrease		P9ARDLS018	187310	P9ARDPL018	187360	080QDF018	187710
Auto cycle		P9ARDLS026	187311	P9ARDPL026	187361	080QDF026	187711
Manual		P9ARDLS027	187312	P9ARDPL027	187362	080QDF027	185788
Locking		P9ARDLS031	187313	P9ARDPL031	187363	080QDF031	187713
Releasing		P9ARDLS032	187314	P9ARDPL032	187364	080QDF032	187714
Coolant		P9ARDLS001	187315	P9ARDPL001	187365	080QDF001	187715
Light		P9ARDLS002	187316	P9ARDPL002	187366	080QDF002	187716
Test		P9ARDLS030	187318	P9ARDPL030	187368	080QDF030	185789
Stop		**P9ARDLS201**	187319	**P9ARDPL201**	187369	**080QDF201**	187719
Start		**P9ARDLS202**	187320	P9ARDPL202	187370	**080QDF202**	187720

(1) Other symbols on request

The catalogue numbers **in bold** are available from stock.

Common accessories

	Description	Cat. no.	Ref. no.	Cat. no.	Ref. no.
		Plastic		Plastic	
		○	●	■	
Plugs					
	Round	**P9ARHPR**	187491		
	Square 30 x 30 mm			**P9ASHP3**	187792
	Rectangular 30 x 50 mm			**P9ASHP5**	187793
Protections					
	Collar for mushroom head push-buttons Ø40 mm.	P9ARRE4	187492		
	Protection cover padlockable for standard push-buttons, illuminated push-buttons, selector switches, illuminated selector switches with knob.	P9ACRCL	187840	P9ACRCL	187840
Flanges					
	With three positions Centre distances 30 x 50 mm	P9ACFS3	187841	P9ACFS3	187841
	With five positons Centre distances 50 x 50 mm	**P9ACFS5**	187842	**P9ACFS5**	187842
	With two positons For Logic Reed contact blocks	**P9ACFSM**	187846	**P9ACFSM**	187846
Adapter screw plug-in terminal					
	Only for Logic Reed contact blocks and power supplies	**P9ACAFV**	187847	**P9ACAFV**	187847
Adapter					
	Gives round control and signalling units a square appearance. Made in black thermoplastic. Can be used with nameplate for square operators P9ASTBS (see P.30). Excluded for mushroom flush buttons with positive break and types with 3 positions.	**P9ARSN1**	188805		
Push-on/push off					
	Device for standard push-buttons and illuminated push-buttons. To be added only to single pole contact blocks. The NO-contacts must be early closing types.	**P9ACDPP**	187843	**P9ACDPP**	187843
Extended srew					
	For reset push-buttons (setting min. 80, max. 170 mm)	P9ACVLR	187844	P9ACVLR	187844
Central contact driving plug					
	For standard momentary push-buttons and momentary mushroom head push-buttons.			P9ASHAC	187794
Tools					
	Locking ring wrench	**P9ACWAF**	187845	**P9ACWAF**	187845
	Bulb extractor	**080ESL**	170212	**080ESL**	170212
	Extractor for caps and lenses			**P9ASEBG**	187795

The catalogue numbers **in bold** are available from stock.

Spare keys

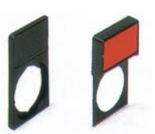
Description		Cat. no.	Ref. no.
		Plastic	
		○ ● ■	
Standard version	**Code**		
	3095	**077C3095**	173095
	9901	077C9901	173901
	9902	077C9902	173902
	9903	077C9903	173903
	9904	077C9904	173904
	9905	077C9905	173905
	9910	077C9910	173910
	9916	077C9916	173916
	9919	077C9919	173919
	3353	077C3353	173353
	(Ronis) 455	077CR455	173455
FIAT version	**Colour / Code**		
yellow	73033	077CF73033	173033
black	73034	077CF73034	173034
red	73037	077CF73037	173037
blue	73038	077CF73038	173038
orange	73040	077CF73040	173040

Bulbs BA9s

Description		Cat. no.	Ref. no.
		Plastic	
		○ ● ■	
Filament type	**Vn / W**		
6	0.6	**BA9S606**	187850
6	1.5	**BA9S615**	187851
12	2.0	BA9S122	187852
24	2.0	**BA9S242**	187853
30	2.1	**BA9S30**	187854
48	2.0	BA9S48	187855
60	1.2	BA9S6012	187856
130	2.0	**BA9S130**	187857
220	2.0	BA9S220	187868
Neon type			
110	0.11	BA9SN110	187860
220	0.33	**BA9SN220**	187861
MultiLED	**VN AC/DC ± 10%**		
	6	BA9S6LED•	
	12	BA9S12LED•	
	24	BA9S24LED•	
	48	BA9S48LED•	
	60	BA9S60LED	187191
	110	BA9S110LED•	
	130	BA9S130LED	187190
	(AC) 230	BA9S230LED•	

Colours	red	green	yellow	blue	white
●	R	V	G	L	B

Insert holders



Description		Cat. no.	Ref. no.	Cat. no.	Ref. no.
		Plastic		Plastic	
		○ ●		■	
Supplied with neutral insert engravable on both sides or transparent.					
Standard 30 x 50 mm	Background black/red, white text	**P9ARTBS**	188000	**P9ASTBS**	188010
	Background white, black text	**P9ARTWS**	188005	**P9ASTWS**	188011
	Transparent	**P9ARTTS**	188012	**P9ASTTS**	188014
Extended 45 x 50 mm	Background black/red, white text	**P9ARTBM**	188001		
	Background white, black text	**P9ARTWM**	188008		
	Transparent	**P9ARTTM**	188019		

The catalogue numbers **in bold** are available from stock.

For reference numbers, see chapter X, pg. X.8

Rectangular inserts

For insert holders 30 x 50 mm

Neutral

Description	Cat. no.	Ref. no.
black/red background	**P9ACPBS**	188015
white background	**P9ACPWS**	188017
transparent	**P9ACPTS**	188018

English (1)

	Description	Cat. no.	Ref. no.
black background	START	P9ACPBS202	188202
	STOP	P9ACPBS201	188201
	REVERSE	P9ACPBS215	188215
	CLOSE	P9ACPBS205	188205
	OPEN	P9ACPBS206	188206
	UP	P9ACPBS204	188204
	DOWN	P9ACPBS203	188203
	LEFT	P9ACPBS222	188222
	RIGHT	P9ACPBS224	188224
	FAST	P9ACPBS208	188208
	SLOW	P9ACPBS207	188207
	OPEN-CLOSE	P9ACPBS234	188234
	HAND-AUTO	P9ACPBS243	188243
	STOP-START	P9ACPBS232	188232
	FORWARD-REVERSE	P9ACPBS231	188231
	OFF-ON	P9ACPBS233	188233
	AUTO-OFF-HAND	P9ACPBS258	188258
	FORWARD-0-REVERSE	P9ACPBS239	188239
	O - I	**P9ACPBS039**	188030

Aluminium English (1)

Description	Cat. no.	Ref. no.
Without inscription	P9ARTAPN	116099
O - I	P9ARTAPN039	116140
I O II	P9ARTAPN042	116141
ON	P9ARTAPN212	116147
RESET	P9ARTAPN291	116150
I II	P9ARTAPN040	116991
I	P9ARTAPN028	118846
STOP	P9ARTAPN201	116143
START	P9ARTAPN202	116144
OPEN	P9ARTAPN206	116145
OFF	P9ARTAPN213	116148

START

MARCHE

For insert holders 45 x 50 mm

Neutral

Description	Cat. no.	Ref. no.
black/red background, white text	**P9ARPBM**	188002
white background, black text	**P9ARPWM**	188028
transparent	**P9ARPTM**	188019

Round plates for emergency

	Diameter 59 mm			Diameter 78 mm		
	Description	Cat. no.	Ref. no.	Description	Cat. no.	Ref. no.
Without text	**yellow background**	**080XTGR**	179514	**black background**	**080XTG8**	**179515**
With text	**yellow background**			**black background**		
	EMERGENZA	080XTGR01	179525	EMERGENZA	080XTG801	179535
	EMERGENCY STOP	**080XTGR02**	179526	EMERGENCY STOP	**080XTG802**	179536
	ARRET D'URGENCE	**080XTGR03**	179510	ARRET D'URGENCE	**080XTG803**	179511
	NOT - AUS	**080XTGR04**	179527	NOT - AUS	**080XTG804**	179537
	NOODSTOP	080XTGR05	179528	NOODSTOP	080XTG805	179538
	PARO EMERGENCIA	**080XTGR06**	179529	PARO EMERGENCIA	**080XTG806**	179539
	NOTSTOP	080XTGR07	179530	EMERGENZA GENERALE	080XTG807	179540
	PARAGEM EMERGÊNCIA	080XTGR08	179531	PARAGEM EMERGÊNCIA	080XTG808	179541

59 mm

78 mm

Neutral plate

Snap-on system

Description	Cat. no.	Ref. no.
For identification of contact blocks and power supplies	P9ACPIU	188016

Adapter ring

Description	Cat. no.	Ref. no.
Adapter ring for 30mm hole to mount P9 22mm in a 30mm hole	P9ARAM32	188801

(1) Other languages on request.

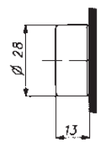
The catalogue numbers **in bold** are available from stock.

Notes

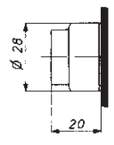
Dimensional drawings

Round operators - Push-buttons

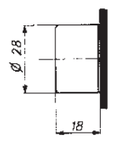
P9MPN-G
P9XPN-G



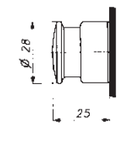
P9MPN-S
P9XPN-S



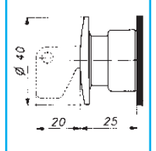
P9MPN-E



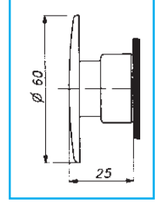
P9MEM3-N
P9XEM3-N
P9MER3RN
P9XER3RN



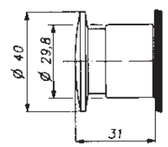
P9MEM4-N
P9XEM4-N
P9MER4RN
P9XER4RN
P9MEC4RN-



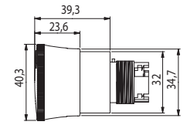
P9MEM6-N
P9XEM6-N



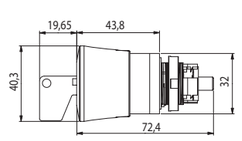
P9MET4-N-
P9XET4-N-



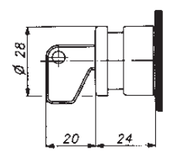
P9XER4RAN/W



P9XEC4RA-95N

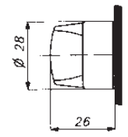


P9MPCN- - -
P9XPCN- - -

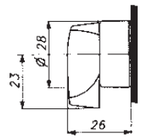


Round operators - Selector switches

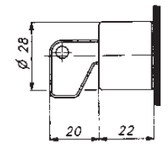
P9MSM- - -
P9XSM- - -



P9MSV- - -
P9XSV- - -

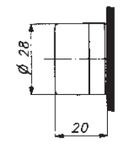


P9MSC- - - -
P9XSC- - - -

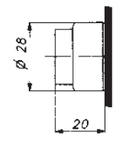


Round operators - Illuminated push-buttons and selector switches

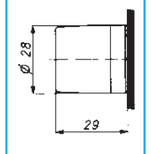
P9MPL- G -
P9XPL- G -



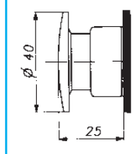
P9MPL- S -
P9XPL- S -



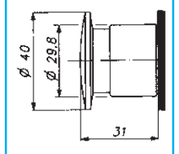
P9MPL- E -
P9XPL- E -



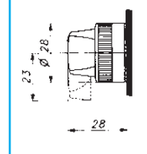
P9MEM4-L
P9XEM4-L



P9MET4-L-
P9XET4-L-

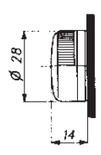


P9MSL- - -
P9XSL- - -
P9MSA - - -
P9XSA - - -

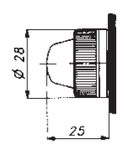


Round operators - Pilot lights

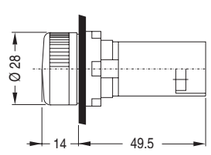
P9ML- -
P9XL- -



P9ML-V

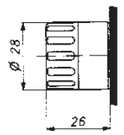


P9XU- -

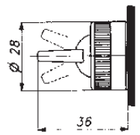


Round operators - Other devices

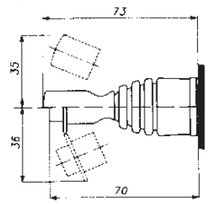
P9MPS- - -



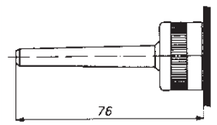
P9MC-
P9XC-
P9MPN-E



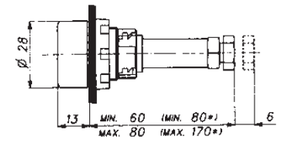
P9MMN- -
P9XMN- -



P9MMB- -
P9XMB- -

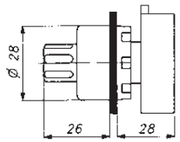


P9MRG
P9XRG

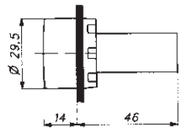


* with accessory P9ACVLR

P9MZ
P9XZ

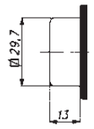


P9MPS- - -

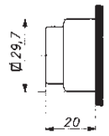


Square operators - Push-buttons

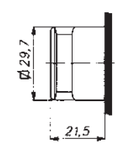
P9SPN-G



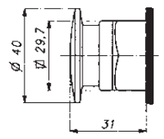
P9SPN-S



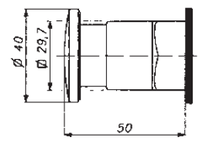
P9SEM3-N



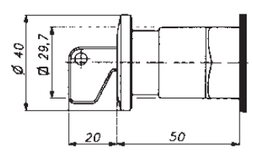
P9SET4-N-



P9SER4RA

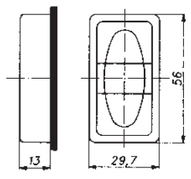


P9SEC4RA-95

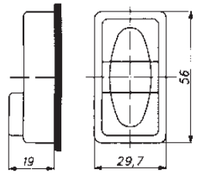


Square operators - Double function push-buttons

P9DPL- -G- -



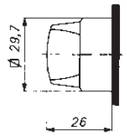
P9DPL- -S- -



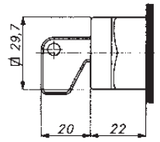
Dimensional drawings

Square operators - Selector switches

P9SSM– – –

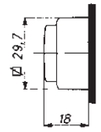


P9SSC– – – –



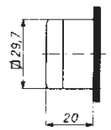
Square operators - Pilot lights

P9SL–D

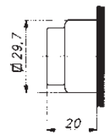


Square operators - Illuminated push-buttons and selector switches

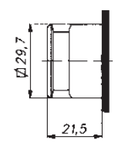
P9SPL–GD



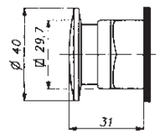
P9SPL–SD



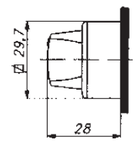
P9SEM3–L



P9SET4–L–



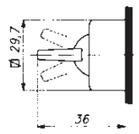
P9SSL– – –



Square operators - Other devices

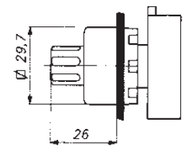
Toggle switch

P9SC–



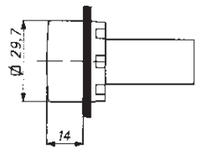
Potentiometer operator

P9SZ



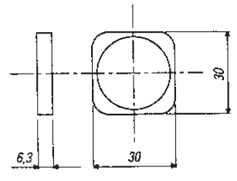
Buzzer

P9SB–



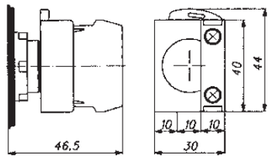
Adaptor

P9ARSN1

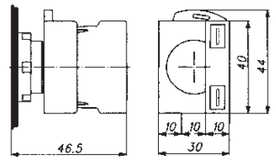


Contact blocks

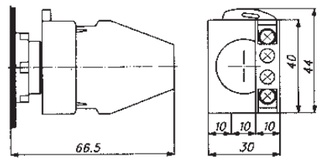
P9B01V– / P9B10V–



P9B01FN / P9B10FN

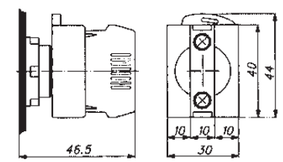


P9B011VN / P9B02VN / P9B20VN

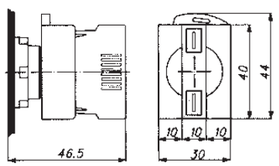


Power supplies

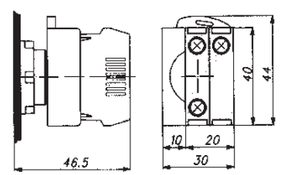
P9PDNV0 / P9PRLV– / P9PRDV–



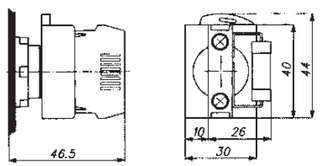
P9PDNF0



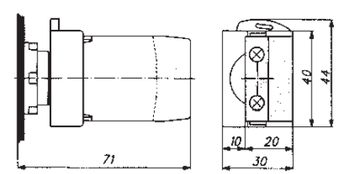
P9PRNV– / P9PDTV0 / P9PRTV–



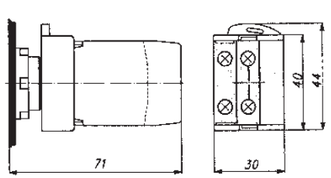
P9PREV–



P9PTNV–



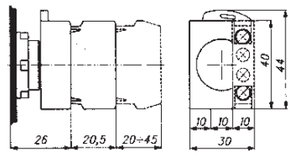
P9PDMV– / P9PTMV–



Dimensional drawings

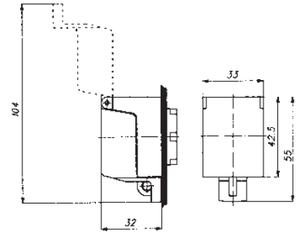
Push-on / push-off devices

P9ACDPP



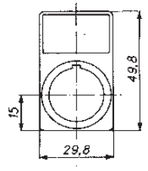
Protection cover

P9ACRCL

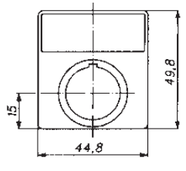


Insert holders and plates

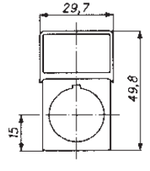
P9ARTBS
P9ARTWS
P9ARTTS



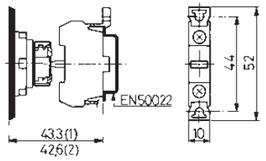
P9ARTBM
P9ARTWM
P9ARTTM



P9ASTBS
P9ASTWS
P9ASTTS

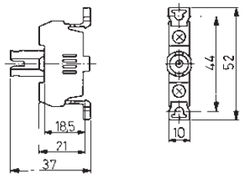


P9B01BN
P9B10BN

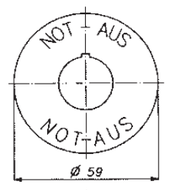


(1) With insert holder
(2) Without insert holder

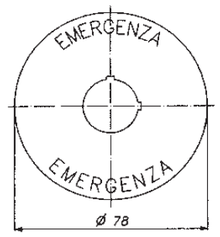
P9PDNBO



080XTGR- -

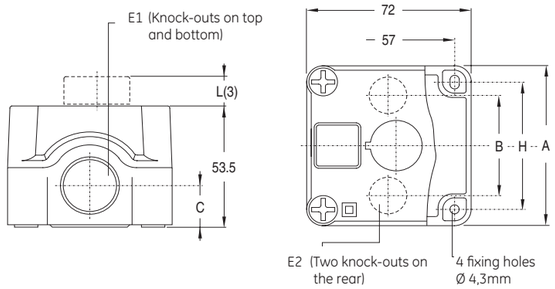


080XTG8- -



Overall dimensions

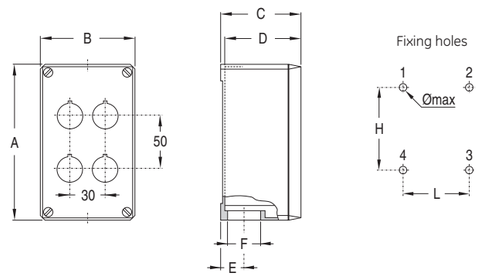
Enclosures for push-button stations in thermoplastic



Holes	A	B	C	E1	E2	H
1	72	46	16.5	23(1)	15.5	57
2	110	78	16.5	23(1)	21.5	95
3	140	108	16.5	23(1)	21.5	125
4	175	143	16.5	23(1)	21.5	160
6	235	200	19.5	29(2)	23	220

(1) Suitable for cable gland, with locknut, PG16 or 1/2" NPT
(2) Suitable for cable gland, with locknut, PG21 or 3/4" NPT
(3) Flush push-button: 13
Pilot light: 14
Emergency push-button: 50
Key selector switch: 22
For customized versions see operator dimensions.

Enclosures for push-button stations in aluminium



Type	Holes Ø 22		Dimensions						Fixing templates	
	vertic.	horizont.	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F	HxLxØmax (mm)	position of the holes
1	1	–	87	87	75	72	21.5	PG 21	74x55x4	1-3
1M	1	–	87	87	100	97	21.5	PG 21	68x55x4	1-3
2	2	–	145	87	75	72	21.5	PG 21	132x55x4	1-3
2M	2	–	145	87	100	97	21.5	PG 21	126x55x4	1-3
3	3	–	195	87	100	97	21.5	PG 21	176x55x4	1-3
4	2	2	145	87	75	72	21.5	PG 21	132x55x4	1-3
4M	2	2	145	87	100	97	21.5	PG 21	126x55x4	1-3
6	3	2	195	87	100	97	21.5	PG 21	176x55x4	1-3
8	2	4	152	152	101.5	98.5	27	PG 29	136x119x6	1-3
12	3	4	205	230	101.5	98.5	27	PG 29	172x214x6	1-2-3-4
18	3	6	257	300	101.5	98.5	35	PG 36	221x282x6	1-2-3-4
24	4	6	257	300	101.5	98.5	35	PG 36	221x282x6	1-2-3-4
35	5	7	350	350	123	106.5	41	PG 36	180x180x10	1-2-3-4

Technical data

Compliance with standards

IEC 947.5.1 - VDE 0660 - NFC 63140
CEI EN 60947.5.1 - UTE - BSI - NEMA
CENELEC EN 50007

Approvals

UL (U.S.A.) - CSA (Canada) - RINA - CE

Climatic protections

The standard versions are suitable for use in the following climates:

Temperate climate	cat. 23/50 (DIN 50014)
Wet climate	cat. 23/83 (DIN 50015)
Hot wet climate	cat. 40/92 (DIN 50015)
Variable wet climate	FW24 (DIN 50016)

Temperature ranges

Operation	-25 °C to + 70 °C
Storage	-40 °C to + 70 °C

Protection degree of the operators

IP65 according to IEC 529 when they are mounted into enclosures with the same or a higher degree of protection.
IP66 with appropriate protective caps.

Protection degree of the terminals

IP2x according to IEC 529.
Fully integrated on signalling units, illuminated push-buttons and illuminated selector switches. With accessory on contact blocks for control units.

Rated insulation voltage

690V according to EN 60947.1

Impulse withstand voltage

4 kV according to EN 60947.1

Insulation class

Group C according to VDE 0110

Electric shocks protection

Class I according to IEC 536

Short-circuit protection

With fuses type gl of 10A according to IEC 947.5.1

Connection terminals

Connection terminals
Screw type with retractable clamp.
Clamping capacity of rigid and/or flexible conductors:
- minimum 22 AWG (0.32 mm^2)
- maximum 12 AWG (3.3 mm^2)

Performances of the contacts

- Slow acting
- Self-cleaning
- NC forced breaking
- Double break

Electrical performances

Rated thermal current Ith = 10 A

Performances according IEC 947.5.1

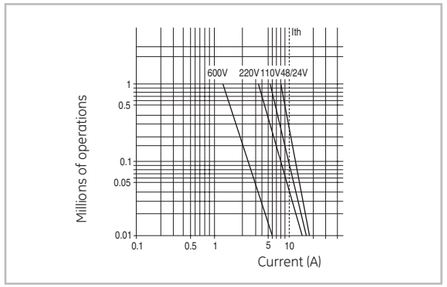
Categorie AC 15 (A600)										
Voltage	Ue	(V)	24	48	60	110	220	380	500	600
Current	Ie	(A)	10	10	10	6	3	2	1.5	1.2
Categorie DC 13 (P600)										
Voltage	Ue	(V)	24	48	60	110	220	300	500	600
Currente	Ie	(A)	5	2.7	2	1.1	0.55	0.3	0.22	0.2
Categorie DC 13 (Q300)			for illuminated push-buttons and illuminated selector switch							
Voltage	Ue	(V)	24	48	60	110	220	300		
Currente	Ie	(A)	2.5	1.1	1	0.55	0.27	0.2		

Performances according to CSA and UL

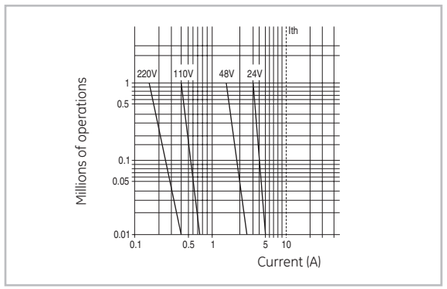
AC Heavy Duty (A600)	
DC Standard Duty (Q300)	for illuminated push-buttons and illuminated selector switch

Electrical endurance

Alternative current 50/60 Hz cat. AC 15



Direct current cat. DC 13



Mechanical endurance

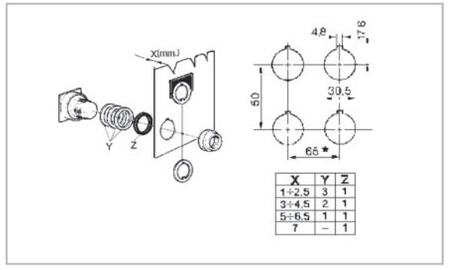
Joysticks Key push-buttons Locking mushroom push button	0.5 x 10^6 op.
Knob selector switches Lever selector switches Key selector switches Illuminated selector switches Selector push-buttons Timed push-buttons Illuminated push-buttons	1 x 10^6 op.
Momentary std push-buttons Momentary mush. push-buttons	3 x 10^6 op.

Number of contact blocks

Momentary standard push-buttons Momentary mush. push-buttons	4 double pole (8 single pole)
Key push-buttons Locking emergency	4 double pole (4 single pole)
Selector switches (4 pos. types excl)	6 double pole (6 single pole)
4 pos. selector switches	2 double pole
Selector push-buttons	6 double pole (6 single pole)
Joysticks 2 and 4 positions	4 double pole (4 single pole)
Illuminated push-buttons Illuminated selector switches	For different contacts configuration, contact our sales office

Fitting of units

The units of Series 077 are designed for fitting onto panels with a thickness between 1 and
7 mm., with holes of 30.5 mm. diameter, according to rules established by EN 60947.5.1.
A special metal ring supplied with each unit or one of the name plates included among the fittings, enables the unit to be exactly positioned.
All equipment is supplied with a set of spacing rings to adjust variations in the thickness of the panel thus ensuring a uniform front protrusion.
For a correct fitting, it needs to observe the diagram below and tables indications.



X	Y	Z
1÷2.5	3	1
3÷4.5	2	1
5÷6.5	1	1
7	–	1

Push-buttons

Standard/Momentary	Description	Contacts	Cat. no.	Ref. no.
		NC+NO	**077P11**	180019
		NC	**077P01**	180039
		NO	**077P10**	180029
Standard/Time delayed [1]				
	Contacts delayed at the release of the push button. Accuracy ± 5% Setting range: 0,1 - 30 sec.	NC+NO	077P11T30	180120
	10 - 180 sec.	NC+NO	077P11T180	180121
To complete by	**Fixing kits** With 4 coloured caps: black, red, green, yellow	Ring type		
		with guard	**077GGBCN**	**180020**
		without guard	**077GSBCN**	**180010**
	With 4 coloured caps: brown, orange, blue, white	Ring type		
		with guard	**077GGBCS**	180050
		without guard	077GSBCS	180040
	With 1 clear and 4 marking etched on both sides 	Ring type		
		with guard	077GGBCF	180137
		without guard	077GSBCF	180136

(1) Not approved by RINA and Lloyd's Register

The catalogue numbers **in bold** are available from stock.

For reference numbers, see chapter X, pg. X.8

Push-buttons

Mushroom head/Momentary	Description	Contacts	Cat. no.	Ref. no.
		NC+NO	**077E11**	180049
		NC	**077E01**	180069
		NO	**077E10**	180059
Mushroom head with latch				
	Push-twist to release	NC+NO	**077RE11**	**180079**
		NC	**077RE01**	**180099**
		NO	**077RE10**	180089
With keylock [1]				
	Key withdrawable in positions I & II			
Locking I II (type G unlock)	Lockable in position: normal & depressed	NC+NO	**077PC11C**	180100
	depressed without pre-setting[2]	NC+NO	**077PC11G**	180104

To complete by	Description	Diameter	Cat. no.	Ref. no.
	Mushroom head caps			
	For momentary push-buttonl	Ø 35 mm	**077E●**	*see bottom*
		Ø 60 mm	**077EE●**	*see bottom*
	For push-twist to release push-button	Red Ø 35 mm	**077RER**	180090
		Red Ø 60 mm	**077RER60**	180091
	For keylock push-button	Red Ø 60 mm	**077ECR**	181602

The catalogue numbers **in bold** are available from stock.

Colours	black	red	yellow
●	**N**	**R**	G

(1) Supplied with two standard keys 3095.
(2) Combined with mushroom head 077ECR makes an mushroom head with latch push-key to release.

For reference numbers, see chapter X, pg. X.8

Selector switches with knob

			Function (1)	Contacts	Cat. no.	Ref. no. see bottom
2 positions						
	Fixed		D	NC+NO	**077SDN11**	180170
			H	NC+NO	077SHN11	180180
3 positions						
	Fixed		B U Z	NC+NO 2NC+2NO 2NC+2NO	**077SBN11** **077SUN22** **077SZN22**	180230 180440 180480
	With spring return		B	NC+NO	077SBN11SC	180240
			B	NC+NO	077SBN11DC	180250
			B	NC+NO 2NC + 2NO	**077SBN11RC** **077SN22RC**	180260 180510

Selector switches with lever

			Function (1)	Contacts	Cat. no.	Ref. no. see bottom
					Metal	
2 positions						
	Fixed		D	NC+NO	**077SLD11**	180601
3 positions						
	Fixed		B Z	NC+NO 2NC+2NO	**077SLB11** 077SLZ22	180607 180623
	With spring return		Z	2NC+2NO	077SLZ22DC	180625
			Z	2NC+2NO	**077SLZ22RC**	180626
4 positions						
	Fixed		X	2NC+2NO	**077SLX22**	180606

The catalogue numbers **in bold** are available from stock.

(1) Electrical diagrams, see F.55

For reference numbers, see chapter X, pg. X.8

Selector switches with key [1]

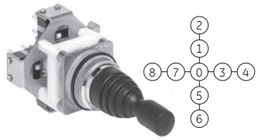
		Function (2)	Contacts	Key removal	Cat. no.	Ref. no.
2 positions						
Fixed		D	NC+NO	I	**077SCD1101**	180630
			NC+NO	II	077SCD1105	180631
			NC+NO	I-II	**077SCD1109**	180632
With pring return		I	NC+NO	0	**077SCI11DC03**	180640
		H	NC+NO	0	077SCH11SC03	180636
3 positions						
Fixed		B	NC+NO	I-0-II	**077SCB1120**	180843
With spring return		B	NC+NO	I-0	**077SCB11DC07**	180852
		Z	2NC+2NO	I	077SCZ22DC01	180906
		B	NC+NO	0	**077SCB11RC03**	180853

The catalogue numbers **in bold** are available from stock.

(1) Supplied with two standard keys 3095.
(2) Electrical diagrams, see F.55

For reference numbers, see chapter X, pg. X.8

Joysticks

		Function [1]	Contacts	Cat. no.	Ref. no.	Cat. no.	Ref. no.
				Without interlock		With interlock	
2 positions + central zero position							
	Fixed position	N	2NC+2NO	**077MTS2422**	180910	077MTS2422B	181000
		R	2NC+2NO	**077MTS2422R**	180912	077MTS2422RB	181002
	Transient position	N	2NC+2NO	**077MT24S22**	180911	**077MT24S22B**	181001
		R	2NC+2NO	**077MT24S22R**	180913	077MT24S22RB	181003
4 positions + central zero position							
	Fixed positions	N	2NC+2NO	**077MTS123422**	180914	077MTS123422B	181004
	Transient positions		2NC+2NO	**077MT1234S22**	180915	**077MT1234S22B**	181005
2+2 positions + central zero position							
	Fixed positions	X	4NC+4NO	077M2S2SX44	180918	077M2S2SX44B	181008
	Transient positions		4NC+4NO	077M2T2TX44	180919	077M2T2TX44B	181009
	4,8 transient -3,7 fixed		4NC+4NO	077M2S2TX44	180921		
	Transient positions	Y	4NC+4NO	077M2T2TY44	180923		
4+4 positions + central zero position							
	Transient positions	X	8NC+8NO	077M4T4TX88	180927		
	2,4,6,8 transient -1,3,5,7 fixed		8NC+8NO	077M4S4TX88	180929	077M4S4TX88B	181019
	Transient positions	Y	8NC+8NO	077M4T4TY88	180931	077M4T4TY88B	181021

The catalogue numbers **in bold** are available from stock.

(1) Electrical diagrams, see F.55

Illuminated push-buttons

Momentary	Description	Contacts	Cat. no.	Ref. no.
	Full voltage ~ / ⎓ BA9s max 380V - 2 W not included	NC+NO NO+NO NO	**077PLM11D0** 077PLM20D0 **077PLM10D0**	181040 181041 181043
	With transformer 50/60Hz BA9s6V-1.5W included	NC+NO	**077PLM11T♦**	
To complete by:				
	Lenses			
	Standard		**077GPL●**	*see bottom*
	Mushroom head Ø 35 mm (to use with the fixing ring 077GG03)		**077GELR**	180971
	Locking rings			
	Without guard		**077GG03**	180980
	With metal guard		**077GGM**	180981
	With transparent guard		**077GGT**	180982

The catalogue numbers **in bold** are available from stock.

Suffix	110-120V	220-250V
♦	**J**	**N**

Colours	red	green	yellow	orange	blue	white	clear
Standard lenses	**R**	**V**	**G**	A	**BL**	**B**	I

For reference numbers, see chapter X, pg. X.8

Illuminated selector switches

2 positions			Function (1)	Contacts	Cat. no.	Ref. no.
Fixed		Full voltage ~ / ⎓ BA9s max. 380V-2W not included	D	NC+NO	**077ISD11D0**	181060

3 positions			Function (1)	Contacts	Cat. no.	Ref. no.
Fixed		Full voltage ~ / ⎓ BA9s max. 380V-2W not included	B	NC+NO	**077ISB11D0**	181170
				NC+NO	**077ISB11T♦**	
With spring return		Full voltage ~ / ⎓ BA9s max. 380V-2W not included	B Z	NC+NO NC+NO	077ISB11D0RC 077ISZ11D0RC	181174 181176

To complete by:			
Lenses			
	Knob	**077MIS●**	*see bottom*

(1) Electrical diagrams, see F.55

The catalogue numbers **in bold** are available from stock.

Suffix	110-120V	220-250V
♦	**J**	**N**

Colours	red	green	yellow
●	**R**	**V**	**G**

For reference numbers, see chapter X, pg. X.8

Pilot lights

	Description	Cat. no.	Ref. no.
	Full voltage ~ / ⎓ BA9s max. 380V-2W not included	**077LDNV0**	181300
	With resistor ~ / ⎓ 110-120V, BA9s60V-1.2W included	**077LRNVJ**	181301
	220-240V, BA9s130V-2W included	**077LRNVN**	181302
	With transformer 50/60Hz BA9s6v-1.5w included	**077LTNV♦**	
	Multifunction (1) full voltage 24V ~ / ⎓ BA9s24V-2W included	**077LDMVD**	181305
	Multifunction (1) with transformer 50/60 Hz BA9s6V-0.6W included	**077LTMV♦**	

To complete by:

Lenses

	plastic version	**077GL●**	*see bottom*

	Full voltage ~ / ⎓ For bulb E14 base max 660V(1)-6W not included	**077DLE14**	181260

To complete by:

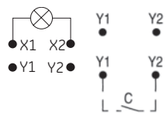
Lenses

	For pilot lights 077DLE14 plastic version	**099GW1●**	*see bottom*

The catalogue numbers **in bold** are available from stock.

Suffix	110-120V	220-250V
♦	**J**	**N**

Colours	red	green	yellow	orange	blue	white	clear
●	**R**	**V**	**G**	A	**BL**	**B**	I

(1) 

Do not connect for flashing light

Link to external contact in order to have steady or flashing light:
Steady light = C closed
Flashing light = C open

For reference numbers, see chapter X, pg. X.8

Accessories

	Description		Cat. no.	Ref. no.
	Push-on/ push-off device	**For momentary standard push-buttons** Converts momentary push-button to push-on/push-off. This device can only be used with 077-01 (NC) and/or 077-10A (NO early make) contact blocks.	**077DPP**	181550
	Push-pull to release device	**For momentary mushroom push-buttons** Converts momentary mushroom push-button to push to latch/pull to release.	**077DAE**	181554
	Handles	Knob for selector switches	**077M●**	*see bottom*
	Protection	Guard-ring for mushroom head push-button dia 35 mm.	**077GE35**	181620
	Plug	For unused mounting hole.	**077TPF**	181601
	Potentiometer operator	Suitable for potentiometers with shaft 50 mm long and 6 mm diameter. Potentiometer not included.	**077OPZ**	181570
	Rubber protective caps	For standard push-buttons – coloured – clear	**077CP●** **077CPT**	*see bottom* 181588
		For illuminated standard push-buttons – clear	**077CPLT**	181600
		For knob selector switches – black colour with clear knob	**077CST**	181603
	Spare keys	**Standard version** Code 3095	**077C3095**	173095

	Filament type	Vn	Wn		
	Bulbs BA9s	6	0.6	**BA9S606**	187850
		6	1.5	**BA9S615**	187851
		12	2	BA9S122	187852
		24	2	**BA9S242**	187853
		30	2.1	**BA9S30**	187854
		48	2	BA9S48	187855
		60	1.2	BA9S6012	187856
		130	2	**BA9S130**	187857
	Neon type	110	0.11	BA9SN110	187860
		220	0.33	**BA9SN220**	187861

The catalogue numbers **in bold** are available from stock.

Colours ●	black	red	green	yellow	blue	white
Knobs	N	R	V	G	BL	-
Protective caps	**N**	**R**	**V**	G	–	-
Mono LED	-	R	V	G	BL	B

For reference numbers, see chapter X, pg. X.8

Nameplates

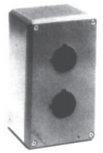
	Description		Cat. no.	Ref. no.
For push-button and pilot lights	Without text (black background)		077TNA	181650
	With text in English (black background)	STOP	077TNA40	181840
For 2 position selector switch and selector push-button	Without text (black background)		077TNA2	181660
	With text (black background)	ON - OFF	077TNA230	181930
For 3 position selector switch and selector push-button	Without text (black background)		077TNA3	181670
	With text (black background)			
		MANUAL CYCLE-O-AUTOMATIC	077TNA301	181951
		OPEN - OFF - CLOSE	077TNA312	181962
		UP - OFF - DOWN	077TNA313	181963
Diameter 62 mm for emergency push-buttons	Without text (yellow background)		**077TGR**	181720
	With text (yellow background): EMERGENCY STOP		**077TGRO2**	181722

Contact blocks

2 positions		Contacts	Cat. no.	Ref. no.
	For all the applications Illuminated push-buttons and illuminated selector switches excluded			
Standard		NC+NO	**077-11**	180001
		NC	**077-01**	180003
		NO	**077-10**	180002
		NC late opening	**077-01R**	180008
		NO early closing	**077-10A**	180007
	Accessories for contact blocks 077-... IP2X protection	for use with NO	**077PTB10**	181608
		for use with NC	**077PTB01**	181609
		for use with NO+NC	**077PTB11**	181615
	For 2 + 2 and 4 + 4 positions joysticks Snap action		099SPDTDB	180009
	For illuminated push-buttons and illuminated selector switches			
		NC+NO	P9B11VN	187000
		NC	P9B01VN	187001
		NO	P9B10VN	187002

The catalogue numbers **in bold** are available from stock.

Enclosures for push-button stations in aluminium alloy (Grey RAL 7012)



Cover with holes with conduit entry

No. of holes	Type	Cat. no.	Ref. no.
1	1	**077SP1**	180521
1	1M	**077SP1M**	180522
2	2	**077SP2**	180523
2	2M	**077SP2M**	180524
3	3	**077SP3**	180525
4	4V	**077SP4V**	180526
4	4	**077SP4**	180527
6	6	**077SP6**	180528
9	9	**077SP9**	180529
12	12	**077SP12**	180530
16	16	**077SP16**	180531
20	20	**077SP20**	180532
25	25	**077SP25**	180533
30	30	**077SP30**	180534
36	36	077SP36	180535

Cover with holes without conduit entry

No. of holes	Type		
1	1	077SP1SFE	180536
1	1M	077SP1MSFE	180537
2	2	077SP2SFE	180538
2	2M	077SP2MSFE	180539
3	3	077SP3SFE	180540
4	4V	077SP4VSFE	180541
4	4	077SP4SFE	180542
6	6	077SP6SFE	180543
9	9	077SP9SFE	180544
12	12	077SP12SFE	180545
16	16	077SP16SFE	180546
20	20	077SP20SFE	180547
25	25	077SP25SFE	180548
30	30	077SP30SFE	180549
36	36	077SP36SFE	180550

Cover without holes with conduit entry

Type		
1	080SP1SFC	170835
1M	080SP1MSFC	170838
2	080SP2SFC	170841
2M	080SP2MSFC	170844
3	080SP3SFC	170847
4V	077SP4VSFC	180551
4	080SP8SFC	170853
6	080SP12SFC	170856
9	080SP12SFC	170856
12	080SP18SFC	170859
16	080SP18SFC	170859
20	080SP35SFC	170863
25	080SP35SFC	170863
30	**077SP36SFC**	180552
36	077SP36SFC	180552

Cover without holes without conduit entry

Type		
1	080SP1SF	170837
1M	080SP1MSF	170840
2	080SP2SF	170843
2M	080SP2MSF	170846
3	080SP3SF	170849
4V	077SP4VSF	180553
4	080SP8SF	170855
6	080SP12SF	170858
9	080SP12SF	170858
12	080SP18SF	170861
16	080SP18SF	170861
20	080SP35SF	170865
25	080SP35SF	170865
30	**077SP36SF**	180554
36	077SP36SF	180554

Accessories		
Kit of two hinges for types from 12 to 36 holes.	**080KCSP**	170883

The catalogue numbers **in bold** are available from stock.

Diagrams

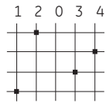
Selector switches

	Function		Contacts	Diagram
120	D	077 11...		
60	I	077 11...		
60	H	077 11...		
60 60	B	077 11...		
60 60	Z	077 11...		
		077 11...		

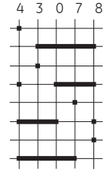
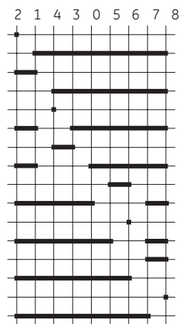
Illuminated selector switches

Full voltage type		Function	Contacts	Diagram
120	D	077 10... 077 01...		
60 60	B	077 10... 077 01...		
60 60	Z	077 10... 077 01...		

Joysticks

Positions		Function	Contacts	Diagram
4 0 2	N	077 11...		
		077 11...		
	R	077 11...		
		077 11...		
1 4 0 2 3	N	077 11...		
		077 11...		

Joysticks

Positions		Function	Contacts	Diagram
	X	077 11...		
		077 11...		
		077 11...		
		077 11...		
8 7 0 3 4	Y	077 11...		
		077 11...		
		077 11...		
		077 11...		
2 1 8 7 0 3 4 5 6	X	077 11...		
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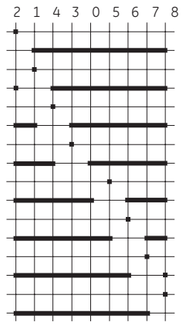
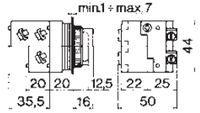
		077 11...		
		077 11...		
		077 11...		
		077 11...		
		077 11...		
	Y	077 11...		
		077 11...		
		077 11...		
		077 11...		
		077 11...		
		077 11...		
		077 11...		
		077 11...		

■ = closed contact

Dimensional drawings

Push-buttons

077P__



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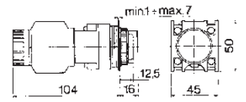

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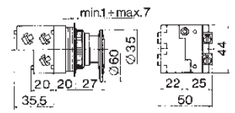

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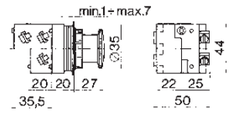

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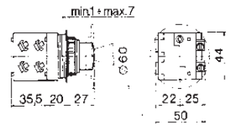
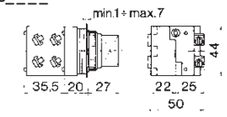


Selector switches

077S____



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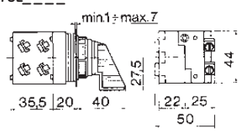

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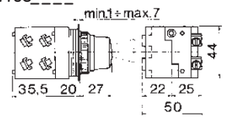
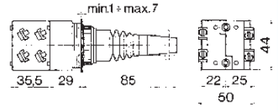


Joysticks

077MT____



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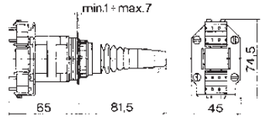

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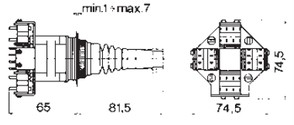
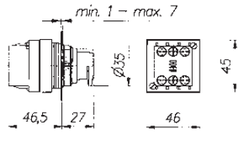
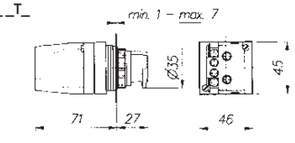


Illuminated push-buttons

077PLM__D_
077PLM__R_

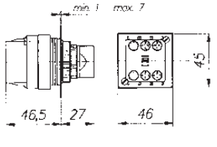


077PLM__T_

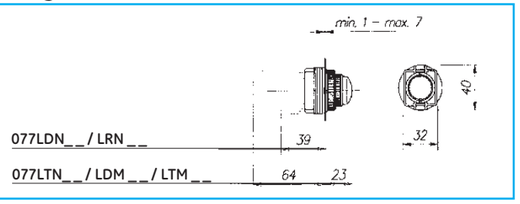


Illuminated selector switches

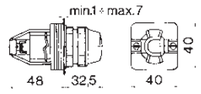
077IS___D_



Pilot lights

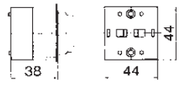


077DLE14

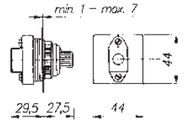


Kits

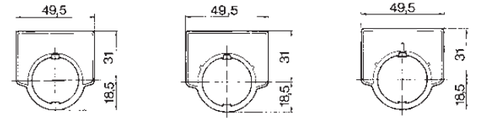
077DPP
077DAE

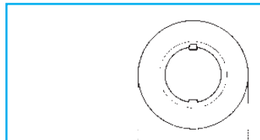


077OPZ



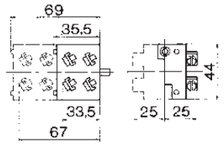
Nameplates



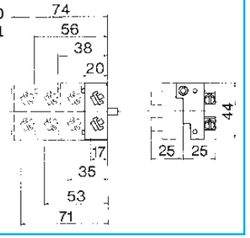


Contact blocks

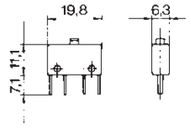
077-11



077-10
077-01

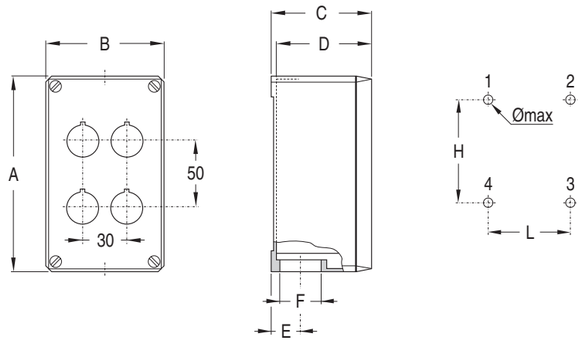


099SPDT-DB

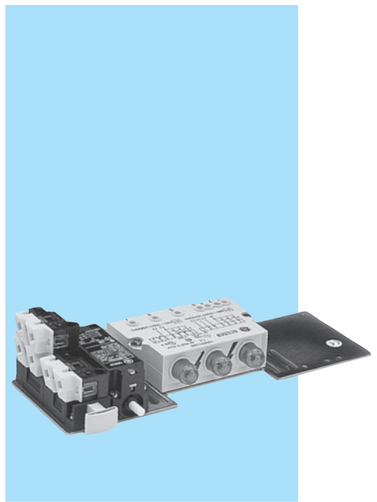


Dimensional drawings

Aluminium enclosures



Type	Number of holes Ø 30		Dimensions						Fixing templates	
	Vertic.	Horizont.	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F	HxLxØmax (mm)	position of the holes
1	-	-	87	87	75	72	21.5	PG 21	74x55x4	1 - 3
1M	-	-	87	87	100	97	21.5	PG 21	68x55x4	1 - 3
2	2	-	145	87	75	72	21.5	PG 21	132x55x4	1 - 3
2M	2	-	145	87	100	97	21.5	PG 21	126x55x4	1 - 3
3	3	-	195	87	100	97	21.5	PG 21	176x55x4	1 - 3
4V	4	-	257	92	86.5	83.5	23	PG 21	224x76x6	1 - 3
4	2	2	152	152	101.5	98.5	27	PG 29	136x119x6	1 - 3
6	2	3	205	230	101.5	98.5	27	PG 29	172x214x6	1-2-3-4
9	3	3	205	230	101.5	98.5	27	PG 29	172x214x6	1-2-3-4
12	3	4	257	300	101.5	98.5	35	PG 36	221x282x6	1-2-3-4
16	4	4	257	300	101.5	98.5	35	PG 36	221x282x6	1-2-3-4
20	5	4	350	350	123.5	106.5	41	PG 36	180x180x10	1-2-3-4
25	5	5	350	350	123.5	106.5	41	PG 36	180x180x10	1-2-3-4
30	6	5	410	410	144.5	127.5	53	PG 48	180x180x10	1-2-3-4
36	6	6	410	410	144.5	127.5	53	PG 48	180x180x10	1-2-3-4



Signalling devices

General

Series 105 signalling units are used to indicate the electric equipment power supply conditions.
For this purpose the devices shall be wired after the main disconnecting switch and clearly in view when the cabinet's doors are opened.
Series 105 DTL devices can be used on three-phase lines with or without the neutral wire or single-phase power lines, indicating the hazardous condition due to the applied voltage.
Three luminous red lamps are used. The flashing devices are normally used in combination with limit switches contacts NC type 114FCT03 that provides insertion when the cabinet door are open only.

Climatic protection

The standard versions are suitable for use in the following climates:

- Temperate climate cat. 23/50 (DIN 50014)
- Wet climate cat. 23/83 (DIN 50015)
- Hot wet climate cat. 40/92 (DIN 50015)
- Variable wet climate cat. FW 24 (DIN 50016)

Standards

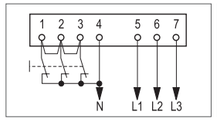
CEI, IEC, VDE, BSI and UTE

Approvals

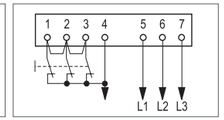
CE, UL, CSA

Suggested connections

Indicates the presence of 3, 2 or 1 phase only by means of the relative lamp.

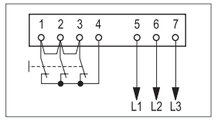


3-phase line with insulated neutral



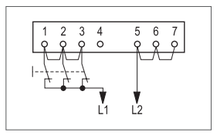
3-phase line with grounded neutral

Indicates the presence of 3 or 2 phases by means of the relative lamp. One phase only is not indicated (all lamps OFF)

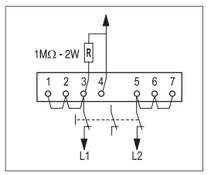


3-phase line without neutral

Indicates both phases with 3 lamps ON at same time. One phase only is not indicated (all lamps OFF)



Single-phase line (general diagram)



Single phase-line (alternative diagram)

1. Phase to phase connection on a 3 phase line with grounded neutral. Indicates the presence of 2-phases or 1 only with the 3 lamps ON at the same time.
2. Phase to neutral connection on a 3 phase line with grounded neutral or phase to phase by a matching transformer with one phase grounded. Indicates the presence of the ungrounded phase with the 3 lamps ON at the same time. No indication occur if the ungrounded phase is missing (all lamps OFF).

Specifications

Temperature ranges	Operation	from -25°C up to +70°C
	Storage	from -40°C up to +70°C
Degree of protection (according to IEC 529)		IP 20
Electrical		
Rated insulation voltage according to EN 60947.1		690V
Impulse withstand voltage according to EN 60947.1		4kV
Electrical input		2mA max.
Connections		Terminal strip with numbered terminals, accessible from outside
		protected against accidental contacts according to DIN 57106 and IP 20 according to IEC 529
Clamping capacity		Maximum one flexible conductor 12 AWG (3.3mm²)

Order codes ● pg. F.58
Dimensional drawings ● pg. F.60

Flashing devices

Supply voltage				Cat. no	Ref. no.	Pack
Three-phase (50-60Hz)	Single-phase (50/60Hz)					
220V	110-127V			**105DTL220**	132230	1
380-600V	220-350V			**105DTL500**	132231	1
690V				**105DTL690**	132232	1

3 pole limit switch for device control

Protection degree	Cables entry	Operation force	Contacts	Cat. no	Ref. no.	Pack
IP40	PG11	8.5 N min.	3NC	**114FCT03**	130320	25
IP65	PG11	8.5 N min.	3NC	**114FCT03T**	130321	25

Paralell bridge for 3 poles limit switches

Cat. no	Ref. no.	Pack
105 PT	132234	50x5

Single door protection unit

The unit includes the following components:

- one flashing device105DTL220 or 105DTL500.
- one 3-pole limit switch 114FCT03 for connection of the flashing device
- one electrical interlock device and panel light 105GIL or 105GIL10.
- one mounting plate 105PM on which are fitted on the above devices.

If two doors have to be protected (as double enclosure closing on the middle) the mounting plate shall be fitted also one limit switch114FCT03 and one device 105GIL or 105GIL10.

Approvals:
UL (USA) - CSA (Canada)

Supply voltage				Cat. no	Ref. no.	Pack
Three-phase (50-60Hz)	Single-phase (50/60Hz)	Tripping coil				
220V	110-127V	Shunt trip		**105GP1P220**	132250	1
220V	110-127V	Undervoltage trip		**105GP1P220M**	132251	1
380-600V	220-350V	Shunt trip		**105GP1P500**	132252	1
380-600V	220-350V	Undervoltage trip		**105GP1P500M**	132253	1

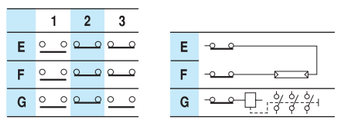
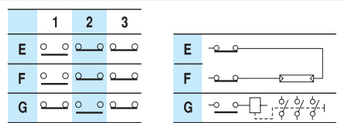
Electrical interlock device and cubicle lighting (1)

The switch can be directly driven by the enclosure door.
If several doors are employed, one switch per door shall be used.
When properly connected, the following functions are provided:

- Position 1 (pushed) door closed: light OFF, tripping coil of main switch unpowered (normal equipment operation)
- Position 2. (free) door opening: light ON, tripping coil of main switch powered (equipment shall cut-out automatically).
- Position 3 (pulled) door open: light ON, tripping coil of main switch unpowered (adjustment on the equipment of dry checks). When door is closed again, the switch revert automatically from position 2 or 3 to position 1.

Terminals have IP2X protection degree according to IEC/EN 60529

Approvals: UL (U.S.A.) - CSA (Canada)

Tripping coil		Cat. no	Ref. no.	Pack
Shunt trip		**105 GIL**	132240	1
Undervoltage trip		**105 GIL 10**	132241	1

Electrical interlock device (1)

The switch is directly driven by the enclosure door.
If several doors are employed, one switch per door is needed.
When properly connected, the same functions of devices above shall be provided but without enclosure control light.
Terminals have IP2X protection degree according to IEC 529

Tripping coil		Cat. no	Ref. no.	Pack
Shunt trip		**105 CI**	132242	1
Undervoltage trip		**105 CI 10**	132243	1

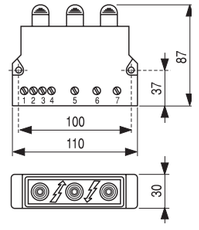
Mounting plate

	Cat. no	Ref. no.	Pack
	105 PM	132244	1

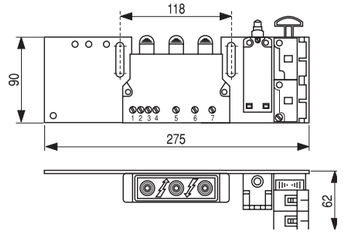
(1) For electrical performance and features of contact blocks please see F.42

Dimensional drawings

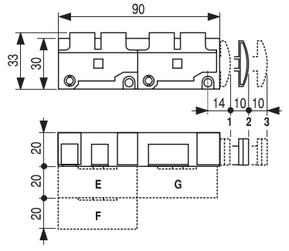
Series 105 - Flashing devices



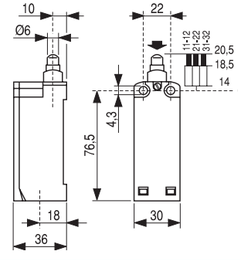
Series 105 - Single door protection unit



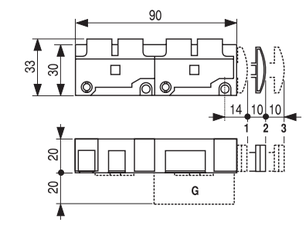
Series 105 - Electrical interlock and cubicle lighting



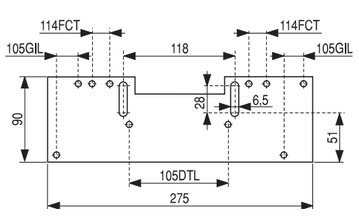
Series 105 - 3 pole limit switch for device control



Series 105 - Electrical interlock device



Series 105 - Mounting plate



Notes

Light towers

- Outstanding modular concept.
  One terminal unit can be combined with **up to seven modular signal units.**
- Steady light units, flashing light units, strobe light units, LED light units.
- The buzzer elements emit a clearly audible dual-tone signal for maximum safety.
- A bayonet mounting, through a simple manual operation, allows a quick and simultaneous method of joining the signal units together and the electrical connection of them.
- Compact dimension Ø70mm.
- IP65 for use in extreme conditions.
- Captive screw cable connectors, located with terminal unit are **easy** to reach and guarantee a quick and neat electrical connection.
- The special design makes maintenance quick, easy and carried out in complete safety and without tools.
- The high quality of materials used to manufacture the lenses ensures the light output is at the **highest luminous** intensity, combined with a sturdy construction and a good resistance to aging.

Marking

CE

Meaning of optical signals

	Colour	Meaning	Operating state
	Red	Extreme danger Hazardous conditions	Immediate action necessary
	Yellow / Amber	Beware Warning conditions imminent	Abnormal state Monitor or action as necessary
	Green	Normal conditions	No actions required
	Blue	Conditions requiring defined action	Discontinuity Intervention mandatory
	White / Clear	No particular meaning	Other state Can be used as required

Meaning of audible signals (EN 981, IEC 73)

	Signal tone	Meaning	Operating state
	Intermittent modulated tone	Danger	Immediate action necessary
	Linear tone	Safety	No actions required

Light units

NLT1... Steady light unit

- With socket BA15D for filament bulbs (7W max.) and LEDs
- Supply voltage: 240V AC/DC
- Current consumption (with 5W lamps):

24V	115V	240V
210mA	43mA	22mA

NLT2... Flashing light unit

- With socket BA15D for filament bulbs (7W max.) and LEDs
- Supply voltage: 24V AC/DC, 115V AC, 240V AC
- Current consumption (with 5W lamps):

24V DC	24V AC	115V AC	240V AC
130mA	145mA	25mA	15mA

NLT3... Strobe light unit

- Lamp type: 4 Joule xenon lamp
- Supply voltage: 24V AC/DC, 115V AC, 240V AC
- Current consumption:

24V DC	24V AC	115V AC	240V AC
75mA	135mA	20mA	15mA

- Flash frequency: 1,4Hz (84 flashes per min.) according with EN 60073

Audio units

NLT73BD Pulsating tone

- **Protection degree IP54**
- Tone: pulsating
- Audio frequency: 2900Hz
- Pulsating tone frequency: 0,5Hz according to EN 457
- Sound level at 1 m.: 90 dB (A)
- Supply voltage: 24V AC/DC
- Current consumption: 20mA

NLT75AJ - NLT75AN Pulsating or constant tone

Pulsating or constant tone, adjustable by removing or inserting bridge JP1 in the printed circuit.

- **Protection degree IP54**
- Tone: pulsating or constant
- Audio frequency: 2600Hz according to EN 457
- Pulsating tone frequency: 1Hz according to EN 457
- Sound level at 1 m.: pulsating tone: 95 dB (A) constant tone: 93 dB (A)
- Supply voltage: 115VAC (NLT75AJ) / 240VAC (NLT75AN)
- Current consumption:

115VAC	240VAC
40mA	30mA

NLT75BD Modulated tone

- **Protection degree IP54**
- Audio frequency: 2500 - 2800Hz according to EN 457
- Sound level at 1 m.: max. 90 dB (A)
- Supply voltage: 24V AC/DC
- Current consumption: 40mA

16 sounds can be selected by means of the dip switch

NLT77BD Pulsating tone

- **Protection degree IP65**
- Audio frequency: 1200 - 2600Hz according to EN 457
- Sound level at 1 m.: max. 84 dB (A)
- Supply voltage: 24V AC/DC
- Current consumption: 40mA

NLT77AJ - NLT77AN Pulsating or constant tone

Pulsating or constant tone, adjustable by removing or inserting bridge JP1 in the printed circuit.

- **Protection degree IP65**
- Tone: pulsating or constant
- Audio frequency: 2600Hz according to EN 457
- Pulsating tone frequency: 1Hz according to EN 457
- Sound level at 1 m.: pulsating tone: 78 dB (A) constant tone: 75 dB (A)
- Supply voltage: 115VAC (NLT77AJ) / 240VAC (NLT77AN)
- Current consumption:

115VAC	240VAC
40mA	30mA

Light units

	Supply voltage	Red		Amber		Yellow		Green		Blue		Clear		
		Cat. no.	Ref. no.	Cat. no.	Ref. no.	Cat. no.	Ref. no.	Cat. no.	Ref. no.	Cat. no.	Ref. no.	Cat. no.	Ref. no.	Pack
Steady light units (bulb not included)	12...240V	**NLT1R**	222230	**NLT1A**	222231	**NLT1G**	222232	**NLT1V**	222233	**NLT1L**	222234	**NLT1I**	222235	1
Flashing light units (bulb BA15D filament) (bulb included)	24V AC/DC	**NLT2BDR**	222236	**NLT2BDA**	222237	**NLT2BDG**	222238	**NLT2BDV**	222239	**NLT2BDL**	222240	**NLT2BDI**	222241	1
	115V AC	**NLT2AJR**	222242	**NLT2AJA**	222243	**NLT2AJG**	222244	**NLT2AJV**	222245	**NLT2AJL**	222246	**NLT2AJI**	222247	1
	240V AC	**NLT2ANR**	222248	**NLT2ANA**	222249	**NLT2ANG**	222250	**NLT2ANV**	222251	**NLT2ANL**	222252	**NLT2ANI**	222253	1
Flashing light units (bulb LED) (bulb included)	24V AC/DC	**NLT2BDLR**	222289	**NLT2BDLA**	222290	**NLT2BDLG**	222291	**NLT2BDLV**	222292	**NLT2BDLL**	222293	**NLT2BDLI**	222294	1
	115V AC	**NLT2AJLR**	222295	**NLT2AJLA**	222296	**NLT2AJLG**	222297	**NLT2AJLV**	222298	**NLT2AJLL**	222299	**NLT2AJLI**	242464	1
	240V AC	**NLT2ANLR**	222301	**NLT2ANLA**	222302	**NLT2ANLG**	222303	**NLT2ANLV**	222304	**NLT2ANLL**	222305	**NLT2ANLI**	222306	1
Strobe light units (bulb included)	24V AC/DC	**NLT3BDR**	222254	**NLT3BDA**	222255	**NLT3BDG**	222256	**NLT3BDV**	222257	**NLT3BDL**	222258	**NLT3BDI**	222259	1
	115V AC	**NLT3AJR**	222260	**NLT3AJA**	222261	**NLT3AJG**	222262	**NLT3AJV**	222263	**NLT3AJL**	222264	**NLT3AJI**	222265	1
	240V AC	**NLT3ANR**	222266	**NLT3ANA**	222267	**NLT3ANG**	222268	**NLT3ANV**	222269	**NLT3ANL**	222270	**NLT3ANI**	222271	1

Audio units

	Protection degree	Supply voltage	Cat. no.	Ref. no.	Pack
Pulsating tone	IP54	24V AC/DC	**NLT73BD**	222278	1
	IP65	24V AC/DC	**NLT77BD**	222279	1

Pulsating or constant tone Adjustable by removing or inserting bridge JP1 in the printed circuit	IP54	115V AC	**NLT75AJ**	222287	1
		240V AC	**NLT75AN**	222288	1
	IP65	115V AC	**NLT77AJ**	222280	1
		240V AC	**NLT77AN**	222281	1

Modulated tone 16 sounds can be selected by means of dip switch	IP54	24V AC/DC	**NLT75BD**	222286	1

The audio units can only be mounted as final top unit (top cover included)

Bulbs

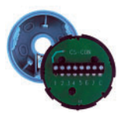
LED - BA15D

Supply voltage	Red Cat. no.	Red Ref. no.	Amber Cat. no.	Amber Ref. no.	Yellow Cat. no.	Yellow Ref. no.	Green Cat. no.	Green Ref. no.	Blue Cat. no.	Blue Ref. no.	White Cat. no.	White Ref. no.	Pack
24V AC/DC	**BA15D24LR**	222330	**BA15D24LA**	222331	**BA15D24LG**	222332	**BA15D24LV**	222333	**BA15D24LL**	222334	**BA15D24LB**	222335	1
115V AC	**BA15D115LR**	222336	**BA15D115LA**	222337	**BA15D115LG**	222338	**BA15D115LV**	222339	**BA15D115LL**	222340	**BA15D115LB**	222341	1
240V AC	**BA15D230LR**	222342	**BA15D230LA**	222343	**BA15D230LG**	222344	**BA15D230LV**	222345	**BA15D230LL**	222346	**BA15D230LB**	222347	1

Incandescent BA15D

Supply voltage	Clear Cat. no.	Clear Ref. no.	Pack
12V	**BA15D125**	222348	5
24V	**BA15D245**	222349	5
30V	**BA15D305**	222350	5
115V	**BA15D1155**	222351	5
240V	**BA15D2305**	222352	5

Terminal



	Cat. no.	Ref. no.	Pack
Terminal unit with top cover	**NLT9TC**	222282	1

Base with tube

	Cat. no.	Ref. no.	Pack
Base + tube height 100mm	**NLT5BT**	222284	1
Base + tube height 100mm, 90° fixing	**NLT90BT**	222307	1
Tube height extension 100mm	**NLT5ET**	222285	1

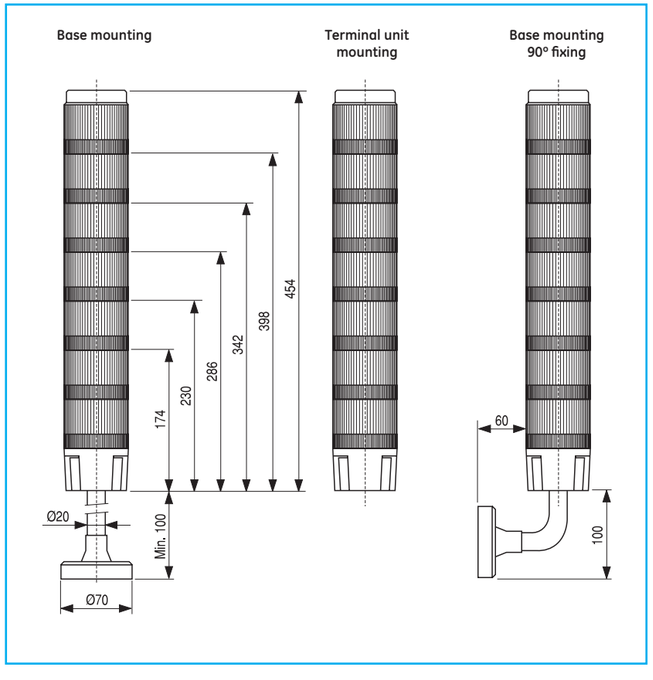
Technical data

Conformity to standards	EEC regulation 89/336 electromagnetic compatibility EEC regulation 73/23 low voltage, including amendment EEC 93/68 All NLT range are made and tested in full compliance with: EN 60947-5-14 (VDE 0470, IEC 60947) CE, cUL US
Materials	Polycarbonate Visual and audio signal units, terminal unit, top cover, base and extension tubes
Rated insulated voltage	250V max.
Operating temperature	-20°C ... +60°C (except version with bulb 12V = 40°C)
Protection degree (according to EN 60529)	IP65 (IP54 for audio units types NLT73xx and NLT75xx) (indicators must be correctly assembled with top cover, gasket or PG conduit fitting)
Colours (according to EN 60073)	Amber, Blue, Yellow, Clear, Red and Green
Lamp type	
Steady/flashing units	Bayonet type BA15D socket: filament (7W max.) or LED
Strobe units	Xenon lamps
Nr. of combined units	Up to 7 modular units
Connection	Captive screw cable connectors (max. cable size 1.5mm²) inside terminal sleeve «C» is common to allsignal units.
Connection identification code	They are numbered 1/7 from base to top

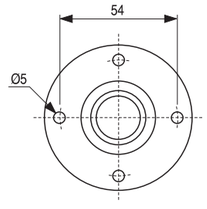
Mechanical characteristics

Mounting of the units	
Average torque	2.4Nm
Unfastening of the units	
Average torque	2.3Nm
Vibration resistance	2g min. (10-150Hz) according to IEC 68-2-6
Mounting	Direct through terminal unit or with base and tube

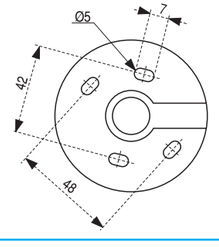
Dimensions



Drilling and mounting
Dimensions with base Ø70

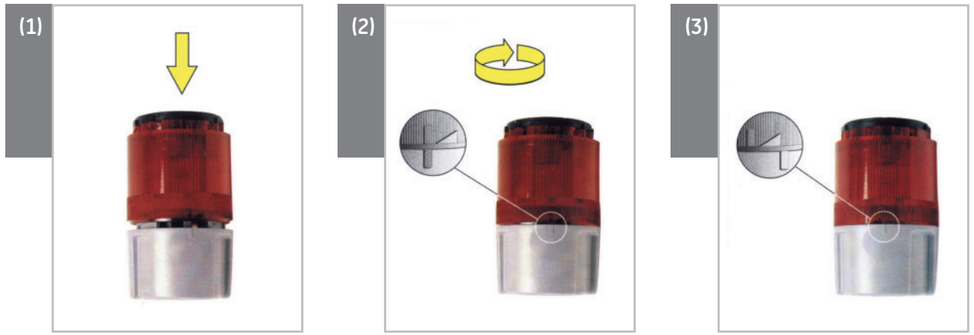


Drilling and fixing dimensions with terminal unit.
Two separate hole spacings.

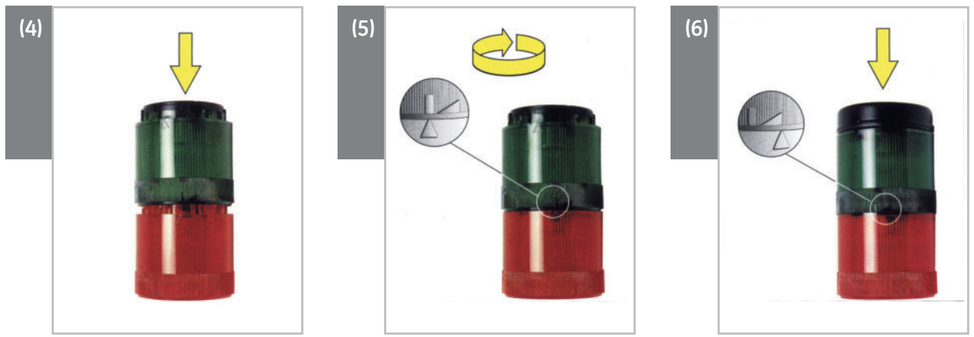


Modular system

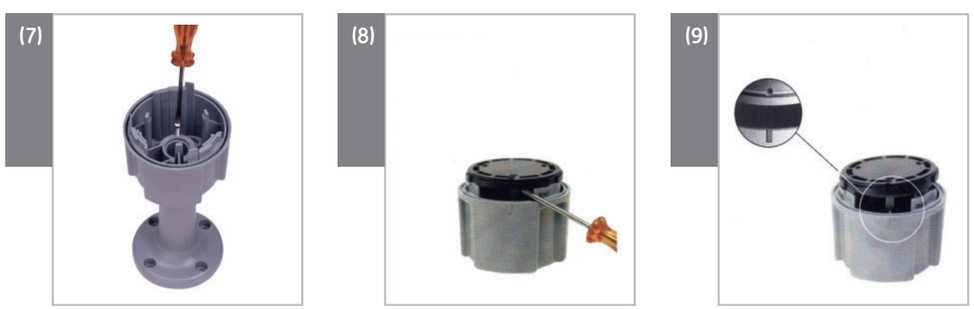
Place signal beacon unit onto terminal unit **(1)** align guide marks and twist clockwise till they are locked **(2)** + **(3)**



Follow the same steps to add more signal units **(4)** + **(5)** + **(6)**
The audible element can be mounted as final top unit, as it is complete with a top cover.



To fix extension tube (base always included), insert it into opening on the underside of the terminal unit and tighten screw on the side **(7)**. To reach the screw cable clamp terminals, remove black disc first, prising with a small screwdriver **(8)**. Connect to terminals (coloured units are numbered from base to top). To place terminal back into position, align the guiding marks **(9)** and press inwards.



Foot switches

General

Foot switches , for intensive services suitable for controlling and monitoring of low voltage AC and DC electrical circuits.

Climatic protections

The standard versions are suitable for use in the following climates:

- Temperate climate cat. 23/50 (DIN 50014)
- Wet climate cat. 23/83 (DIN 50015)
- Hot wet climate cat. 40/92 (DIN 50015)
- Variable wet climate cat. FW 24 (DIN 50016)

Standards

IEC 947-5-1, CEI EN 60947.5.1
VDE 0660

Approvals

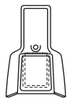
CSA, UL

Specifications

Temperature ranges	Operation	from -30°C up to +80°C							
	Storage	from -30°C up to +80°C							
Degree of protection (according to IEC 529)		IP 65							
Vibration resistance		20g (10 up to 55Hz)							
Mechanical endurance		2 x 10^7 for all the types							
Electrical									
Rated insulation voltage according to EN 60947.1		500V							
Insulation class according to VDE 0110		Group C							
Electric shock protection according to IEC 536		Class I							
Short-circuit prot. according to IEC 269.1 and 269.3		10A gL fuses							
Electrical performances of the contact blocks									
Rated thernal current (Ith)		10A							
Performances according to EN 60947.5.1									
	Slow motion contacts	Voltage	Ue	(V)	24	48	110	220	380
	Category AC 15	Current	Ie	(A)	6	6	6	6	4
	Snap action contacts	Voltage	Ue	(V)	24	48	110	220	380
	Category AC 15	Current	Ie	(A)	6	6	6	5	4
	Category DC 13	Voltage	Ue	(V)	24	48	110	220	
		Current	Ie	(A)	1	0,8	0,7	0,3	
Connection		Same polarity for both slow motion and snap action contacts							
Cables entries	IPA1, IPA2, IPB1, IPB2	1 x M20							
	IPA1-P	2 x M20							

Order codes ● pg. F.69
Dimensional drawings ● pg. F.69

Foot switches - order codes

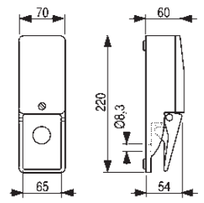
		Slow break				Snap action				
		11 23 NC NO 12 24		11 23 31 43 NC NO NC NO 12 24 32 44		13 21 NO NC 14 22		13 21 33 41 NO NC NO NC 14 22 34 42		
	Function (1)	Cat. no	Ref. no.	Cat. no	Ref. no.	Cat. no	Ref. no.	Cat. no	Ref. no.	Pack
ONE pedal Without guard	N	**IPA1-N211B**	132170	**–**	–	**IPA1-N411B**	132198	**IPA1-N422B**	132213	1
 **ONE pedal With guard**	N	**IPB1-N211B**	132172	**IPB1-N222B**	132186	**IPB1-N411B**	132201	**IPB1-N422B**	132215	1
	D	**–**		**–**	–	**–**	–	**IPB1-D422B**	132216	1
	R	**–**		**–**	–	**IPB1-R411B**	132203	**–**		1
Spare microswitches		**N211B**	116113	**N222B**	116664	**N411B**	116663	**N422B**	116665	1

(1) **Function N**
Normal operation. When the pedal is pressed the contacts change position. When released they return to their position.
Function D
Two-stage operation. Used with two contacts blocks. When the pedal is pressed to the first point, the contacts of the first block switch; when pressed as far as the second point the contacts of the second block switch and the first block stays in the same position.
Function R
Normal operation with potentiometer. When the pedal is pressed, the contacts change position at the same time as the potentiometer is operated. When released, the contacts and potentiometer return to their initial position.
Positive opening.

Dimensional drawings

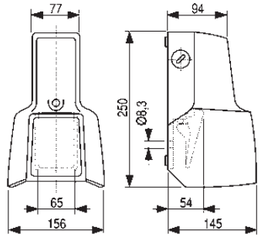
Foot switches without protective guard

One pole



Foot switches with protective guard

One pole



Approvals

Standards

EN 60947-1 / IEC 60947-5-1

Features

Enclosed in metal with aluminium protection cover, safety latch function "OFF-ON-OFF" with manual reset.

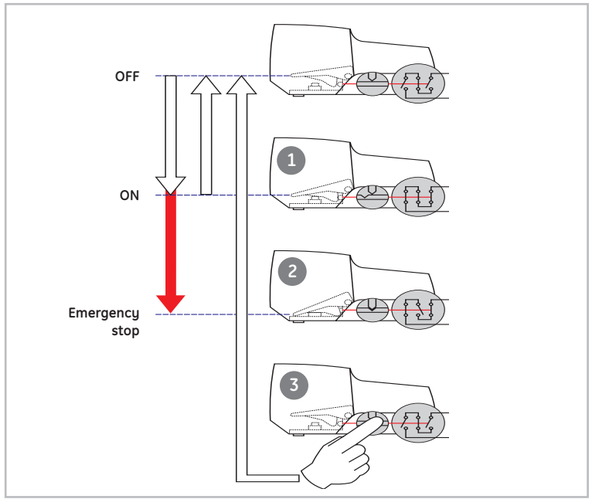
Safety foot switches

Operation

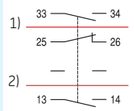
1 **Pedal operation up to the trigger point**
The operating contact is closed, the operating process is started

2 **Operation past the trigger point in emergency cases**
The operating contact is opened and latched and the process is stopped. Also if the device is unused, the latch remains in the off-position in this phase.
Uncontrolled restart is prevented

3 **Reset function**
Only after the danger has passed can the contacts be manually un-latched (push-button on the side). The operating process can now be restarted by pushing the pedal up to the triggering point.



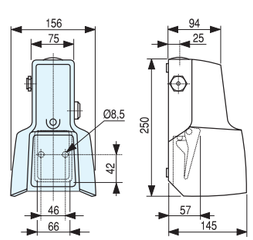
Technical data

Switching diagram 1) Trigger point 2) Latched position	
Rated insulation voltage Ui	max. 400VAC
Thermal continuous current Ithe	max. 10A
Switching frequency	max. 50/min.
Mechanical operational life number of switching cycles	10 x 10^6
Ambient temperature	-30°C to +80°C
Cable conduits	(3x) M20x1.5
Protection degree	IP65
Actuating force (approx.)	10N
Trigger point	200N
Weight	1.5 kg

Order codes

	Cat. no.	Ref. no.	Pack
- Slow-action contact - Snap-action contact - Trigger point - Latch function - Making current according to: EN/IEC 60947-5-1 AC15/240V/3A	**IPSF1**	223000	1

Dimensional drawings



Electronic relays and Limit Switches

Electronic relays

Series NMV - Order codes

G.2 Multivoltage electronic timers - 22.5mm module

Series D - Order codes

G.3 Single voltage electronic timers - 45mm module

G.3 Earth leakage relays

G.4 Protection relays

G.5 Liquid level detectors relay

G.5 Detection relays

G.5 Control and protection relays

Technical data

G.6 Series NMV

G.10 Series D

Dimensions

G.20 Series NMV and D

Limit switches

G.22 **Series IS and IM** - Metal and thermoplastic limit switches

G.24 **Series IUG** - Thermoplastic limit switches

G.26 **Series IZ** - Miniature thermoplastic limit switches

G.27 **Series IP** - Stainless steel limit switches - Heavy duty - IP40

G.28 **Series 114FCT** - Three pole limit switches

G.30 Technical data

G.31 Dimensions

G.36 **Series 115** - Pressure switches

Series NMV Multivoltage timers 22.5mm module

- Timers: 22,5mm multivoltage 24-240V AC/DC relay
- Functions: delayed ON, OFF, star-delta, intermittence and multifunction
- 2 LED indication:
  Green flashing during timer function and stable after relay energized.
  Red when output contact is ON

Standards

VDE 0106	CSA C 22.2 Nr.14	UNE 20-119
VDE 0110	UL 94	IEC/EN 60947-5-1
EN 50002	UL 508	IEC/EN 61812-1
EN 50042	IEC 255.5	CE
		cUL

Multivoltage electronic timers - 22.5mm module

	Supply voltage	Time range	Available contacts		Cat. no.	Ref. no.	Pack.
Delayed ON relay	Direct 24-240V AC/DC	0.06 sec - 100 h	2 changeover		NMTCV 2	**124901**	1
	Technical data: see G.6						
Star-delta starter relay	Direct 24-240V AC/DC	1 - 10 sec. 6 - 60 sec	1 changeover		NMETV	**124908**	1
	With transformer[2]	1 - 10 sec. 6 - 60 sec	1 changeover		NMETV t AU[1]	**124911**	1
	Technical data: see G.7						
Delayed OFF timer	Direct	0.5 - 6 sec	2 changeover		NMRDV 2-6	**124915**	1
	24-240V AC/DC	5 - 60 sec.	2 changeover		NMRDV 2-60	**124916**	1
	24-240V AC/DC	50 - 600 sec.	2 changeover		NMRDV 2-600	**124917**	1
	Technical data: see G.7						
Asymmetric intermittence, started by connection or pause (choice)	Direct 24-240V AC/DC	0.06 sec - 100 h	1 changeover		NMIVV	**124929**	1
	Technical data: see G.8						
Multifunction	- Delayed ON timer - Delayed ON through contact timer - Delayed OFF thro ugh contact timer - Delayed ON and OFF through contact timer			- Impulse ON timer - Impulse ON through contact timer - Impulse OFF through contact timer - Impulse ON and OFF through contact timer			
	Module 22,5mm						
	Direct 24-240V AC/DC	0.6 sec - 100 h	1 changeover		NMMFV	**124930**	1
	Technical data: see G.9						

Dimensions ● pg. G.20

(1) AU = coil 380V 50/60 Hz
(2)Transformator inside the timerhousing

Series D *Single voltage relays 45mm module*

- Line protection and detection relays.
- Detection functions: motor re-start, thermistor, earth-leakage, voltage, current, frequency ...
- Line protection: unbalance, maximum and minimum voltage, phase sequence ...

Standards

VDE 0106	CSA C 22.2 Nr.14	UNE 20-119
VDE 0110	UL 94	IEC/EN 60947-5-1
EN 50002	UL 508	IEC/EN 61812-1
EN 50042	IEC 255.5	CE
		cUL

Single voltage electronic relays - 45mm module

Motor re-start control relay (plug in)

Supply voltage	Voltage	Available contacts	Time range	Cat. no.	Ref. no.	Pack
Direct[1]	220-230V 50/60Hz	RCRT 1 changeover	0.2 - 6 sec. (memory time)	RCRT 6 - 60AN	**123624**	1
	110-125V 50/60Hz		0.2 - 60 sec. (delayed time)	RCRT 6 - 60AJ	**123623**	1
11 pins socket for RCRT for panel fixing. Front terminals				PRCZ11	**220647**	1

Technical data: see G.10

Earth leakage relays - 45 mm module

Differential earth leakage relay with hand reset (with test)

Differential earth leakage relay with automatic reset (with test)

Voltage (V)	Contacts	Sensiv. (A)	Ø (mm)	Differential transformers Cat. no.	Ref. no.	Pack	Earth leakage relays Cat. no.	Ref. no.	Pack
220-230V 50/60Hz	RDHT **1**-... **With test** 1 changeover	0.2 - 1.2	35	**WKAT 35-1,2A/2V**	204165	1	RDHT 1-1,2AEN	**123744**	1
			70	**WKAT 70-1,2A/2V**	204166	1			
220-230V 50/60Hz		1 - 10	35	**WKAT 35-10A/2V**	204169	1	RDHT 1-10AEN	**123754**	1
			70	**WKAT 70-10A/2V**	204170	1			
Technical data: see G.12									
380-400V 50/60Hz Direct and with transformer[2]	RDHA **1**-... **With test** 1 changeover	0.2 - 1.2	35	**WKAT 35-1,2A/2V**	204165	1	RDHA 1-1,2AEU	**123965**	1
			70	**WKAT 70-1,2A/2V**	204166	1			
220-230V 50/60Hz		1 - 10	35	**WKAT 35-10A/2V**	204169	1	RDHA 1-10AEN	**123964**	1
			70	**WKAT 70-10A/2V**	204170	1			
Technical data: see G.12									

(1) Possibility of fitting a remote potentiometer.
(2) Transformer inside the relay

Dimensions ● pg. G.20

Liquid level detector relay

	Voltage (V)	Contacts	No. of circuits		Cat. no.	Ref. no.	Pack
	220-230V 50/60Hz	DINIL ...E 1 changeover	2		DINIL 02E ENU	**123656**	1
	11 pins socket for DINIL-02E, -03E. for panel fixing. Front terminals				PRCZ11	**220647**	1
	Technical data: G.11						
Probes	Without cable. Waterproof and protected with a thermoplastic housing. Stainless steel probe.				SON-3	**123700**	1

Detection relays

	Supply voltage	Contacts	Operating range	Voltage drop	Input impedance	Max. input voltage	Cat. no.	Ref. no.	Pack
Voltage detector relay	Direct and with transformer	RDT **2-...** 2 changeover	40 - 400V	-	800 kΩ	600V	RDT2400VEN[1]	**124184**	1
	Technical data: see G.17								
Current detector with delay (0.5 - 15 sec.)	Direct and with transformer	RDIT **2-...** 2 changeover	0.5 - 5A 20 - 200mV	0.25V	0.05Ω 1 kΩ	10A 15V	RDIT2-5AEN[1] RDIT2-02VEN[1]	**124754** **124354**	1 1
	Technical data: see G.17								

Control and protection relays

	Supply voltage	Contacts	Thermal probe [5] When cold - When hot				Cat. no.	Ref. no.	Pack
Thermistor relay	Direct and with transformer[4]	RS01N 1 changeover	1.5 kΩ	2.5 kΩ			RS01NEN[1] RS01NAJ[2]	**212759** **124373**	1 1
	Technical data: see G.18								

	Supply voltage	Contacts		Jumper terminals	Setting range	Cat. no.	Ref. no.	Pack
Frequency control relay	With transformer[4]	RCF **1-...** 1 changeover		Without	5 - 15Hz	RCF-1 AJ[2]	**124433**	1
				Y1 - Y2	15 - 45Hz	RCF-1 EN[1]	**124434**	1
				Y1 - Y3	45 - 135Hz	RCF-1 AU[3]	**124435**	1
	Technical data: see G.19							

(1) EN = coil 220/230V 50/60Hz
(2) AJ = coil 110V 50/60Hz
(3) AU = coil 380/400V 50/60Hz
(4) Transformator inside the timerhousing
(5) Thermal probe resistance not included
(6) ENU = coil 220-230V 380-400V 50/60Hz

Dimensions ● pg. G.20

Protection relays

	Supply voltage contact	Contacts	Operating range Umin.	Operating range Umax.	Unbalance	Mains frequency	Cat. no.	Ref. no.	Pack
Integral protection relay for three-phase lines	400V 50Hz With transformer[1]	RDFF **1-...** 1 changeover	5 - 20%	5 - 15%	2.5 - 10%	50 Hz	RDFF1-50AU	**123985**	1
	Technical data: see G.13								
Unbalance and phase failure protection relay for three-phase lines	400V 50Hz Direct and with transformer[1]	RPDF **2-...** 2 changeover	-	-	2.5 - 10%	50 Hz	RPDF2-50AU	**124025**	1
	Technical data: see G.14								
Phase sequence and phase failure protection relay for three-phase lines	400V 50Hz With transformer[1]	RSFF **1-...** 1 changeover	-	-	-	50 Hz	RSFF1-50AU	**124622**	1
	Technical data: see G.15								
Phase sequence protection relay for three-phase lines	220-230V 380-400V 50/60Hz With transformer[1]	RSF **1-...** 1 changeover	-	-	-	50 Hz	RSF1-50ENU[6]	**124051**	1
	Technical data: see G.15								
Maximum and minimum voltage protection relay for three-phase lines	380/400V 220/230V 50/60Hz With transformer[1]	RTMM **2-...** 2 changeover	5 - 20%	5 - 15%	-		RTMM 2 AU RTMM 2 EN	**124085** **124084**	1 1
	Technical data: see G.16								
Maximum and minimum voltage protection relay for a single-phase lines	220/230V 50/60Hz With transformer[1]	RMM **2-...** 2 changeover	5 - 20%	5 - 15%	-		RMM 2 EN	**124104**	1
	Technical data: see G.16								

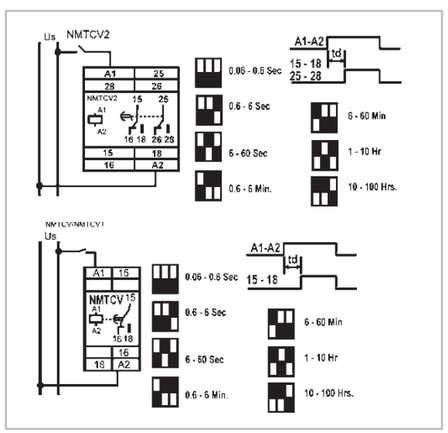
(1) Transformer inside the relay

Dimensions ● pg. G.19

NMTCV2 Delayed ON timer

Function

Electronic relay whose output contact connects with a certain adjustable delay from the moment voltage is applied to supply terminals **A1-A2.**
It has seven timing ranges : see drawing.
Range selection is made by dipswitches located on the front of the relay. Times are set by front potentiometer controlling an Application Specific Integrated Circuit (ASIC) specially designed for this group of relays. This allows for excellent precision and repeatability features.



0.06 - 0.6s, 0.6 - 6s, 6 - 60s, 0.6 - 6 min, 6 - 60 min, 1 - 10h, 10 - 100h

Technical characteristics

			NMTCV2
Nr. of changeover contacts			2
Output contacts:			
Rated insulation voltage Ui	AC	(V)	250
	DC	(V)	250
Thermal current Ith		(A)	6
Utilisation AC-15			
Rated voltage Ue		(V)	120/230
Rated current Ie		(A)	2.5/1.3
Utilisation DC-13			
Rated voltage Ue		(V)	110/230
Rated current Ie		(A)	0.2/0.1
Supply voltages		(Un)	
AC/DC (direct)		(V)	24-240
AC(with transformer)		(V)	-
Frequency		(Hz)	50/60
Supply voltagetolerance		(%)	+10 / -20
Consumption		(mA)	60 (24V)
		(mA)	15 (240V)
		(VA)	-
Input circuit test voltage (between input, output and group circuits)		(kV)	4
Switch ON response time			0.06s - 100 h.
Switch OFF response time		(ms)	150
Reset time between 2 cycles (1)		(ms)	100
Repeat accuracy with 0.85 - 1.1 Un		(%)	1

Ambient conditions

Storage temperature	-40°C to +80°C
Operating temperature	-25°C to +60°C
Relative humidity	95% (without condensation)
Max. operating altitude	2.000 m
Degree of protection	IP40; terminals IP20
Operating positions	Any position

Conformity to standards

VDE 0106	CSA C 22.2 No 14
VDE 0110	IEC/EN 60255-5
EN 50002	UL 94
EN 50042	UL 508
IEC/EN 60947-5-1	UNE 20-119
CE	

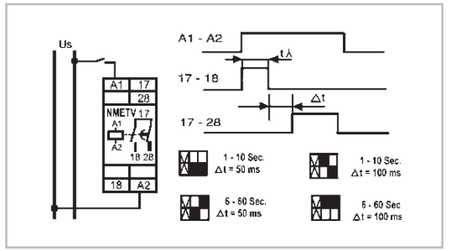
(1) Reset time: Time that must go by from the relay ends an operation until it is able to initiate the next one without error.

Remark
The relay has a green LED that lights when the relay is energised (flashing during the timing) and a red LED that lights when output contact is made.

NMETV... Star-delta starter timer

Function

Electronic relay timed in steps whose purpose is to control star-delta starting. When supply voltage is applied to the **A1-A2** terminals, the star contact (17-18) closes for an adjustable time between up to 100 h (selectable)
When this time is up, it opens, there is a pause and then the delta contact connects (17-18). The standard pause time is about 100ms.
Times are set by front potentiometer controlling an ASIC specially designed for this group of relays. This allows for excellent precision and repeatability features.



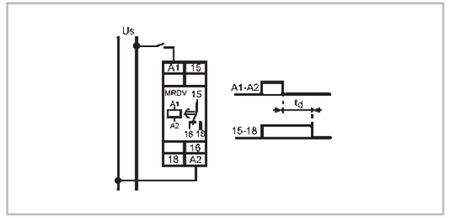
Technical characteristics

			NMETV	NMETV t
Nr. of changeover contacts			2	
Output contacts:				
Rated insulation	AC	(V)	250	
voltage Ui	DC	(V)	250	
Thermal current Ith		(A)	6	
Utilisation AC-15				
Rated voltage Ue		(V)	125/230	
Rated current Ie		(A)	2.5/1.3	
Utilisation DC-13				
Rated voltage Ue		(V)	110/230	
Rated current Ie		(A)	0.2/0.1	
Supply voltages (Un)				
AC/DC (direct)		(V)	24-240	-
AC(with transformer)		(V)	-	110-125
				200-240
				380-440
Frequency		(Hz)	50/60	
Supply voltage tolerance		(%)	+10 / -20	+10 / -15
Consumption		(mA)	50 (at 24V)	-
		(mA)	12 (at 240V)	-
		(VA)	-	3.5
Test voltage (between input, output and ground)		(kV)	4	
Switch ON response time		(ms)	100	
Reset time between 2 cycles [1]		(ms)	100	
Repeat accuracy with 0.85 - 1.1 Un		(%)	2	

NMRDV... Delayed OFF timer

Function

Electronic relay whose output contact instantly connects when supply voltage is applied to terminals **A1-A2.** It disconnects with an adjsutable delay as from the moment the relay loses supply voltage. There are several types depending on the range of timers.



Technical characteristics

			NMRDV2
Nr. of changeover contacts			2
Output contacts:			
Rated insulation	AC	(V)	250
voltage Ui	DC	(V)	250
Thermal current Ith		(A)	6
Utilisation AC-15			
Rated voltage Ue		(V)	125/230
Rated current Ie		(A)	2.5/1.3
Utilisation DC-13			
Rated voltage Ue		(V)	110/230
Rated current Ie		(A)	0.2/0.1
Supply voltages (Un)			
AC/DC (direct)		(V)	24-240
AC(with transformer)		(V)	-
			200-240
			380-440
Frequency		(Hz)	50/60
Supply voltage tolerance		(%)	+10 / -20
Consumption		(mA)	1,5 (at 24V)
		(mA)	5 (at 240V)
		(VA)	-
Test voltage (between input, output and ground)		(kV)	4
Switch ON response time		(ms)	250 [2]
Switch OFF response time			0.5 - 600
Reset time between 2 cycles [1]		(ms)	250
Repeat accuracy with 0.85 - 1.1 Un		(%)	5

Ambient conditions

Storage temperature	-40°C to +80°C
Operating temperature	-25°C to +60°C
Relative humidity	95% (without condensation)
Max. operating altitude	2.000 m
Degree of protection	IP40; terminals IP20
Operating positions	Any position

Conformity to standards

VDE 0106	CSA C 22.2 No 14
VDE 0110	IEC/EN 60255-5
EN 50001 (NMETV)	UL 94
EN 50002	UL 508
EN 50042 (NMRDV)	UNE 20-119 (NMRDV)
IEC/EN 60947-5-1 (NMRDV)	CE

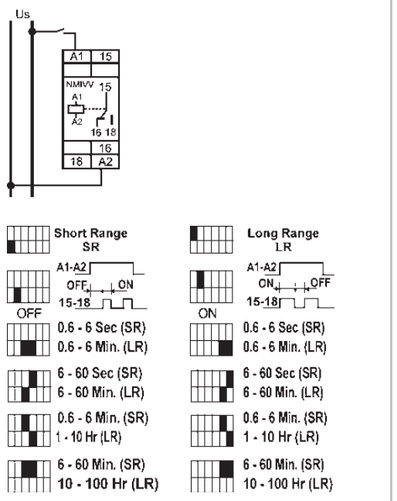
(1) Reset time: Time that must go by from the relay ends an operation until it is able to initiate the next one without error.
(2) For 24V c.c. = 300ms

Remark
NMETV relays have a green LED that lights up when the relays is energised (flashing during the timing) and a red LED that lights up when the star contact 17-18 is closed.

NMIVV Asymmetric intermittence, started by connection or pause (choice)

Function

Electronic relay whose output contact connects and disconnects intermittently. Connection and pause times may be separately. The intermittency cycle begins a connection or disconnection selected by a dip-switches and start the instant connection is made from supply voltage to the **A1-A2** terminals. A new step is begun if voltage supply is interrumped during operation.
It has seven timing ranges ;
NMIVV : 0,6 sec - 100 h
Range selection is made by dip-switches located on the front of the relay. Times are set by front potentiometer an ASIC specially designed for this group of relays. This allows for excellent precision and repeatability features.



Technical characteristics

			NMIVV
Nr. of changeover contacts			1
Output contacts:			
Rated insulation voltage Ui	AC	(V)	250
	DC	(V)	50
Thermal current Ith		(A)	6
Utilisation AC-15			
Rated voltage Ue		(V)	125/230
Rated current Ie		(A)	2,5/1,3
Utilisation DC-13			
Rated voltage Ue		(V)	110/230
Rated current Ie		(A)	0,2/0,1
Supply voltages		(Un)	
AC/DC (direct)		(V)	24-240
Frequency		(Hz)	50/60
Supply voltage tolerance		(%)	+10 / -20
Consumption		(mA)	60 (at 24V)
		(mA)	15 (at 240V)
		(VA)	-
Test voltage (between input, output and ground circuits)		(kV)	2
Switch ON response time		(ms)	150
Intermittent switch ON times (2)			0,6 s - 100 h.
Reset time between 2 cycles (1)		(ms)	150
Repeat accuracy with 0.85 - 1.1 Un		(%)	1

Ambient conditions

Storage temperature	-40°C to +80°C
Operating temperature	-25°C to +60°C
Relative humidity	95% (without condensation)
Max. operating altitude	2.000 m
Degree of protection	IP40; terminals IP20
Operating positions	Any position

Conformity to standards

VDE 0106	CSA C 22.2 No 14
VDE 0110	IEC/EN 60255-5
EN 50002	UL 94
EN 50005	UL 508
EN 50042	UNE 20-119
IEC/EN 60947-5-1	CE

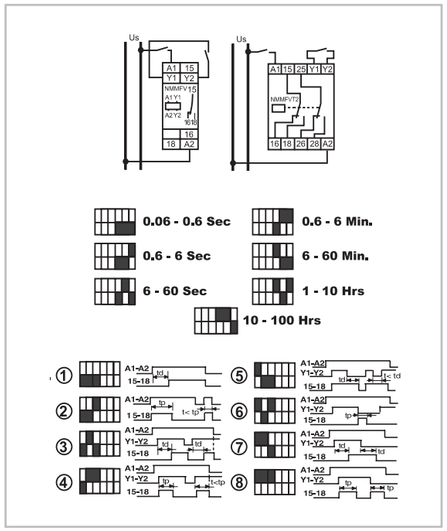
(1) Reset time: Time that must go by from the relay ends an operation until it is able to initiate the next one without error.
(2) Connection and pause times be set within different ranges.

Remark
These relays has a green LED that lights up when the relays is energised (flashing during the timing) and a red LED that lights up when output contact is made.

NMMFV Multifunction relay

Function

The functions of this multifunction and multirange electronic relay are selected by 3 dip-switches located on the front of the relay. It has eight functions: delayed ON timer, delayed ON through contact timer, delayed OFF through contact timer, delayed ON and OFF through contact timer, impulse ON timer, impulse ON through contact timer, impulse OFF through contact timer, impulse ON and OFF through contact timer. If the relay loses current during timing, it disconnects and is ready for a new cycle.
It has seven timing ranges: see drawing.
Range selection is made by dip-switches located on front of the relay.
Times are set by front potentiometer controlling an ASIC specially designed for this group of relays. This allows for excellent precision and repeatability features.



Technical characteristics

			NMMFV
Nr. of changeover contacts			1
Output contacts:			
Rated insulation voltage Ui	AC	(V)	250
	DC	(V)	250
Thermal current Ith		(A)	6
Utilisation AC-15			
Rated voltage Ue		(V)	110/230
Rated current Ie		(A)	2.5/1.3
Utilisation DC-13			
Rated voltage Ue		(V)	110/230
Rated current Ie		(A)	0.2/0.1
Supply voltages		(Un)	
AC/DC (direct)		(V)	24-240
Frequency		(Hz)	50/60
Supply voltage tolerance		(%)	+10 / -20
Consumption		(mA)	60 (at 24V)
		(mA)	15 (at 240V)
		(VA)	-
Test voltage (between input, output and ground circuit)		(kV)	2
Switch ON response time			0.065 s - 100 h.
Switch OFF response time			0.065 s - 100 h.
Reset time between 2 cycles [1]		(ms)	150
Repeat accuracy with 0.85 - 1.1 Un		(%)	1
Voltage open Y1-Y2 control contact terminals		(V DC)	5
Current through control contact			
Initial		(mA)	15
Permanent		(mA)	1

Ambient conditions

Storage temperature	-40°C to +80°C
Operating temperature	-25°C to +60°C
Relative humidity	95% (without condensation)
Max. operating altitude	2.000 m
Degree of protection	IP40; terminals IP20
Operating positions	Any position

Conformity to standards

VDE 0106
VDE 0110
EN 50002
EN 50042
IEC/EN 60947-5-1
CE
CSA C 22.2 No 14
IEC/EN 60255-5
UL 94
UL 508
UNE 20-119

(1) Reset time: Time that must go by from the relay ends an operation until it is able to initiate the next one without error.

Remark
The relays have a green LED that lights up when the relays is energised (flashing during the timing) and a red LED that lights up when output contact is made.

RCRT... Motor re-start control relay

(plug-in)

Function

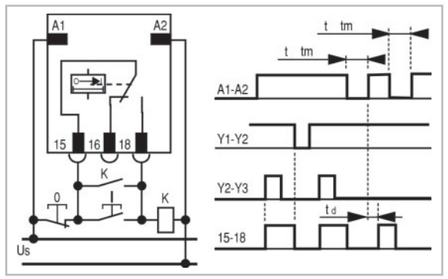
RCRT...

Correlation table between relay and 11pins socket.

RCRT	Socket
A1	8
A2	2
15	5
16	11
18	6

RCRT...

The relay is used for instantaneous or delayed motor startup after a short-time power failure (max. 6 sec). The start ocurrs immediately if power supply is disrupted for less than 0.2 sec. If the power failure lasts longer, the relay activates its memory for a time that can be set to 0.2 to 6 sec, after which no automatic restart is possible. If power supply is restored while the memory period is elapsing, the relay commands a motor restart with a delay time from power supply restoration that can be set to 0.2 to 60 sec. A system stop cancels the memory function after 50 ms, and therefore the stop signal should be on for at least this time. The relay is non-sensitive to any control voltage fluctuation or disruption during or after the motor stop.



Technical characteristics

			RCRT 6-60
Nr. of changeover contacts			1
Output contacts:			
Rated insulation voltage Ui	AC	(V)	400
	DC	(V)	250
Thermal current Ith		(A)	6
Utilisation AC-15			
Rated voltage Ue		(V)	120/240
Rated current Ie		(A)	2.5/1.3
Utilisation DC-13			
Rated voltage Ue		(V)	110/220
Rated current Ie		(A)	0.2/0.1
Supply voltages		(Un)	
AC		(V)	110, 220-230, 125
Frequency		(Hz)	50/60
Permissible supply voltage variation		(%)	+10 / -15
Repeat accuracy with 0.85 - 1.1 Un		(%)	2
Consumption		(VA)	3
Input circuit test voltage (between input, output circuit and earth)		(kV)	4
Switch ON response time		(ms)	100
Power failure detection level			0.8 Us
Reset time (stop)		(ms)	50 - 75
Memory reset time		(ms)	100
Max. restart delay time		(s)	0.2 - 60
Max. memory time		(s)	0.2 - 6

Ambient conditions

Storage temperature	-10°C to +85°C
Operating temperature	-5°C to +50°C
Relative humidity	95% (without condensation)
Max. operating altitude	2.000 m
Degree of protection	IP40; terminals IP20
Operating positions	Any position

Conformity to standards

VDE 0106
EN 50001
EN 50005
EN 50011
DIN 46199
IEC/EN 60947-5-1
UNE 20-119
CE

Remark

The relay has one LED that lights up when the contact is made.

DINIL 02E Liquid level detector relay for simultaneous control of well and tank

Functions

Plug-in devices for control of level of conductive liquids which can perform the following functions:
Filling control: The contact between **1** and **3** sloses when the tank to be cheked drops below a minimum, fixed by the position of probe **6,** which starts up the pumping system. When the maximum filling level is reached, fixed by the position of probe **7**, the contact between **1** and **3**, opens and the pumping system stops. For the filling control the two well probes must be connected externally to the common one (condition of full well).
Draining control: The contact **1-3** closes if the level liquid goes above a maximum, fixed by the position of probe **9**, which starts up the drain pumping system. When the level drops below a minimum, fixed by the position of probe **8** the contact **1-3** opens and stop the pumping system, which prevents the pumpo from losing its prime.
Simultaneous filling and draining control: The system starts up whenever the tank requires liquid and the well has sufficient level to supply it, and it stops when the liquid reaches its maximum level in the tank or, as the case may be, the well reaches its minimum level.

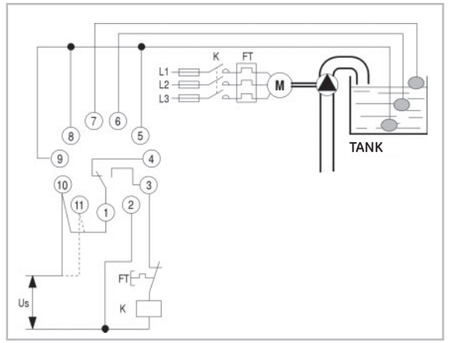
Remark: In all the above applications, the contact between **1-3** is used as a permanent contact for starting and stopping the pump starter, whether this is DOL, star-delta or any other type of starter.

Control voltage: **Two voltages:**
terminals 2-10 (220 VAC)
terminals 2-11 (380 VAC)

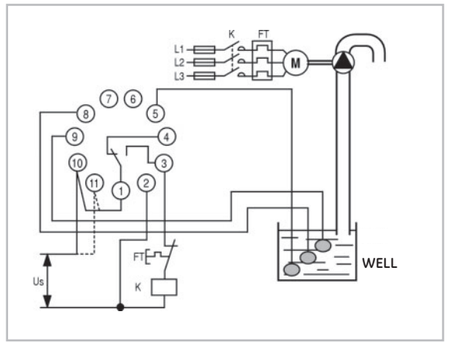
Technical characteristics

			DINIL-02E
Nr. of changeover contacts			1
Output contacts:			
Rated insulation voltage Ui	AC	(V)	400
	DC	(V)	250
Thermal current Ith		(A)	6
Utilisation AC-15			
Rated voltage Ue		(V)	120/240
Rated current Ie		(A)	2.5/1.3
Utilisation DC-13			
Rated voltage Ue		(V)	110/220
Rated current Ie		(A)	0.2/0.1
Supply voltages		(Un)	
AC (with transformer)		(V)	380-400/220-230 (two voltages)
Frequency		(Hz)	50/60
Permissible supply voltage variation		(%)	+10 / -15
Repeat accuracy with 0.85-1.1 Un		(%)	2
Consumption		(VA)	3
Input circuit test voltage (between input, output circuit and earth)		(kV)	4
Voltage between probes and common		(V ef.)	6 - 18
Max. consumption of probes		(mA ef.)	0.18
Max.resistance between probes (resistance of controlled liquid)		(kOhms)	200
Switch ON response time		(s)	1
Switch OFF response time		(s)	1

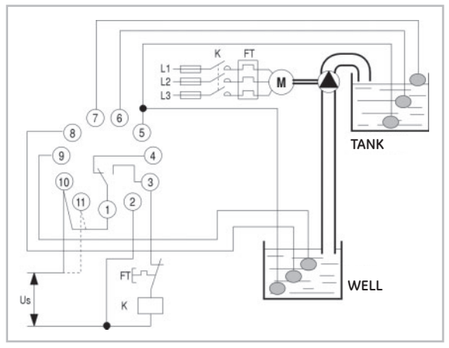
DINIL-02E - Filling control



DINIL-02E - Draining control



DINIL-02E - Simultaneous filling and draining control



Ambient conditions

Storage temperature	-10°C to +85°C
Operating temperature	-5°C to +50°C
Relative humidity	95% (without condensation)
Maximum operating altitude	2.000 m
Degree of protection	IP40; terminals IP20
Operating positions	Any

Conformity to standards

VDE 0106 IEC/EN 60947-5-1 CE UNE 20119

Remark
The relays has one LED that lights up when the output contact is made.

RDHT... RDHA... Earth leakage relays

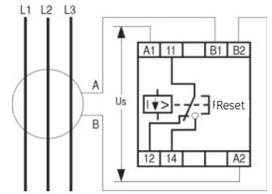
RDHT... *Earth leakage relay with manual reset, with test*
RDHA... *Earth leakage relay with automatic reset, with test*

Function

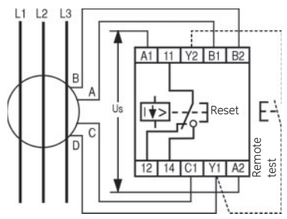
RDH, RDHT and RDHA are earth leakage detectors for industrial networks with neutral connected to earth, used with WKA (without test) and WKAT (with test) differential transformers. Tripping is produced when leakage current exceeds a threshold which is adjustable by means of a front mounted potentiometer. Tripping ranges are shown in the table below.
RDH and RDHT keep memory of tripping even in the absence of voltage in **A1** and **A2** and resetting is obtained from a push-button. RDHA is self resetting in the absence of control voltage in **A1** and **A2** or when leakage dissappears. RDHT and RDHA have in addition a test push-button for control from cubicle door, and therefore those relays should always be use with WKAT transformers with test winding. All types have included a timer, with external adjustement in RDHA and internal ajustement in RDH and RDHT that allows to delay the trip to achieve trip selectivity.

RDHT1-... RDHA1-...	Sensitivity	Transformers		Ø
... 1,2	0.2 - 1.2A	**WKAT-35**	1.2A/2V	35
		WKAT-70	1.2A/2V	70
... 10	1 - 10A	**WKAT-35**	10A/2V	35
		WKAT-70	10A/2V	70

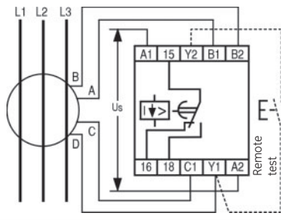
RDH



RDHT



RDHA



Ambient conditions

Storage temperature	-10°C to+85°C
Operating temperature	0°C to +50°C
Relative humidity	95% (without condensation)
Altitude	2.000 m
Degree of protection	IP40; terminals IP20
Operating positions	Any

Conformity to standards

VDE 0106	IEC/EN 60947-5-1
EN 50001	UNE 20-119
EN 50005	CE
EN 50011	
DIN 46199	

Technical characteristics

		RDHT1-...	RDHA1-...
Nr. of changeover contacts		1	
Output contacts:			
Rated insulation voltage Ui	AC (V)	400	
	DC (V)	250	
Thermal current Ith	(A)	6	
Utilisation AC-15			
Rated voltage Ue	(V)	120/240	
Rated current Ie	(A)	2.5/1.3	
Utilisation DC-13			
Rated voltage Ue	(V)	110/220	
Rated current Ie	(A)	0.2/0.1	
Supply voltages	(Un)		
AC (with transformer)	(V)		380-400
		220-230	220-230
DC/AC (direct)	(V)	-	
Frequency	(Hz)	50/60	
Permissible supply voltage variation	(%)	+10 / -15	
Repeat accuracy with 0.85-1.1 Un	(%)	2	
Consumption	(VA)	3	
Input circuit test voltage (between input, output circuit and earth)	(kV)	4	
Switch ON response time (can be delayed up to 5 sec)	(s)	150-200	100

RDFF1... Integral protection relay for three-phase lines

Function

Protection against:
a) Phase failure
b) Phase sequence
c) Phase unbalance
d) Low line voltage
e) High line voltage

Relay operates by phase angle detection between voltages and not by voltage levels and therefore will drive satisfactorly even with feedback from other motors.

Relays will connect only when all conditions are normal (contact **15-18** closes) and disconnects on any fault including supply, protecting network even with supply failure. It will not connect if phase sequence is incorrect, preventing motors starting in wrong direction.

Unbalance adjustement
Phase, unbalance, and therefore single phase is very dangerous for the life of a motor. The graph belows shows temperature rise in a three-phase motor with a phase unbalance (NEMA MG 1-1433 and 34). The per cent unbalance is obtained as follow:

$$\% \text{ unbalance} = \frac{\text{Max. voltage deviation from average voltage}}{\text{average voltage}} \times 100$$

Tripping is adjustable between 2.5 and 10 %.
Consequently protection is provided for motors working closely adjusted to rated power, to others more generously sized, and even power lines.
In any case adjustements should be made so that on failure of one phase realy will disconnect.

Voltage adjustement
Voltage tripping is adjustable form -5 to - 20 % and +5 to +15 % maximum by which it is possible to adjust to values recommended by IEC 34.1 (1969) and IEC 158 respectively. Tripping for these causes is delayed 1 second approximately.

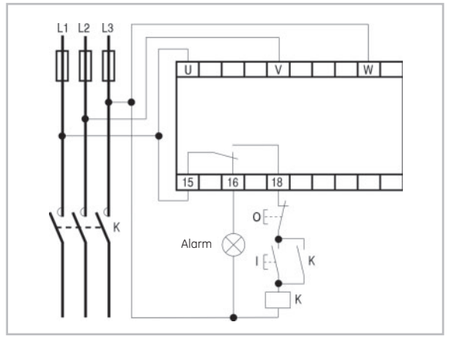
Tripping indication
Relays incorporate LED diode tripping indication. When phase sequence is incorrect, both phase sequence and unbalance light up. When unbalance lights up only indicates unbalance or single phasing with feedback.

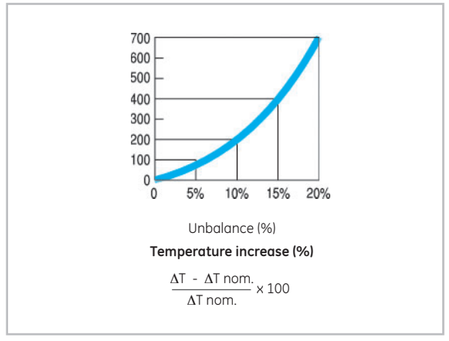
Ambient conditions

Storage temperature	-10°C to+85°C
Operating temperature	-5°C to +50°C
Relative humidity	95% (without condensation)
Altitude	2.000 m
Degree of protection	IP40; terminals IP20
Operating positions	Any

Conformity to standards

VDE 0106	EN 50011	IEC/EN 60947-5-1
EN 50001	DIN 46199	CE
EN 50005	UNE 20-119	





Technical characteristics

			RDFF1-5
Nr. of changeover contacts			1
Output contacts:			
Rated insulation voltage Ui	AC	(V)	400
	DC	(V)	250
Thermal current Ith		(A)	6
Utilisation AC-15			
Rated voltage Ue		(V)	120/240
Rated current Ie		(A)	2.5/1.3
Utilisation DC-13			
Rated voltage Ue		(V)	110/220
Rated current Ie		(A)	0,2/0,1
Supply voltages		(Un)	
AC (with transformer)		(V)	380
Frequency		(Hz)	50
Permissible supply voltage variation		(%)	+15 / -20
Repeat accuracy with 0.85 - 1.1 Un		(%)	2
Consumption		(VA)	3
Input circuit test voltage (between input, output circuit and earth)		(kV)	4
Unbalance tripping (adjustable)		(%)	2.5 to 10
Low voltage tripping (adjustable)		(%)	5 to 20
Overvoltage tripping (adjustable)		(%)	5 to 15
Switch ON response time		(ms)	200
Reset hysteresis		(%)	5 approx.

RPDF... Unbalance and phase failure protection relay for three-phase lines

Function

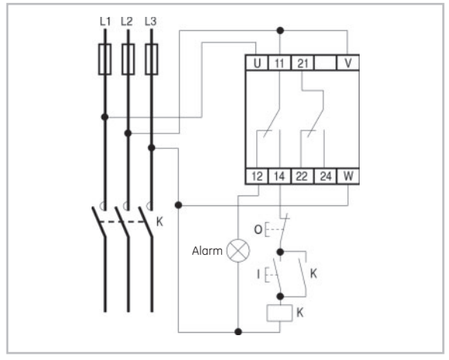
The RPDF-electronic relay is intended for the protection of lines or electronic motors against unbalance between phases or failure of one or more phases. Detection of unbalance or phase failure is done by measuring phase change and not by voltage levels. This guarantees correct working even when there are return paths due to motors running which are connected to the mains networks to be protected.The relay is made when all conditions are normal (contact **11-14** closed); the contacts open in the event of a failure. In this way, any failure, including that of the relay supply, will cause disconnection and so avoid the supply being left unprotected.

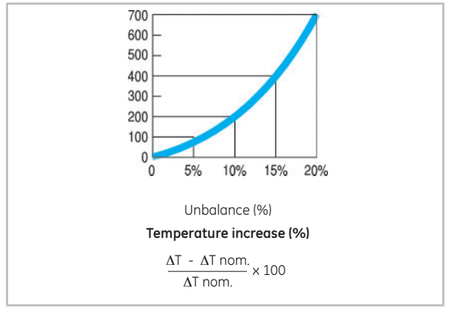
Setting unbalance

The unbalance in phases and, consequently, the failure of one of these, is a limiting factor in the life of an electric motor. The graph below shows the percentage temperature increase in a three-phase motor as a function of the degree of unbalance (see standards NEMA MG 1-1433 and 34). The per cent unbalance is calculated as follows :

$$\% \text{ unbalance} = \frac{\text{Max. voltage deviation from average voltage}}{\text{average voltage}} \times 100$$

The trip is adjustable between about 2.5% and 10%. Consequently protection is provided for motors working closely adjusted to rated power, to others more generously sized, and even power lines. In any case, the adjustement must be such that the loss of a phase produces the opening of the relay.





$$\frac{\Delta T - \Delta T \text{ nom.}}{\Delta T \text{ nom.}} \times 100$$

Technical characteristics

			RPDF 2-50
Nr. of changeover contacts			2
Output contacts:			
Rated insulation	AC	(V)	400
voltage Ui	DC	(V)	250
Thermal current Ith		(A)	6
Utilisation AC-15			
Rated voltage Ue		(V)	120/240
Rated current Ie		(A)	2.5/1.3
Utilisation DC-13			
Rated voltage Ue		(V)	110/220
Rated current Ie		(A)	0,2/0,1
Supply voltages		(Un)	
AC (with transformer)		(V)	380
Frequency		(Hz)	50
Permissible supply voltage variation		(%)	+10 / -20
Repeat accuracy		(%)	2
Consumption		(VA)	3
Input circuit test voltage (between input, output circuit and earth)		(kV)	4
Unbalance tripping (adjustable)		(%)	2.5 to 10
Switch ON response time		(ms)	100
Reset hysteresis		(%)	2

Ambient conditions

Storage temperature	-10°C to+85°C
Operating temperature	-5°C to +50°C
Relative humidity	95%(without condensation)
Altitude	2.000 m
Degree of protection	IP40; terminals IP20
Operating positions	Any

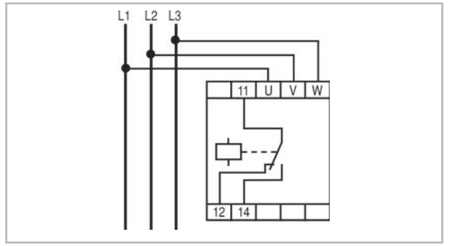
Conformity to standards

VDE 0106	IEC/EN 60947-5-1
EN 50001	UNE 20-119
EN 50005	CE
EN 50011	
DIN 46199	

RSFF... Phase sequence and phase failure protection relay for three-phase lines

Function

The RSFF relay is designed to detect phase sequence errors and/or phase failures in three phase lines. Three terminals **U, V, W** are connected to each of the three phases of the mains. Controlling vectors of voltage between lines (amplitude and phase) is detected the direct sequence (phase **V** with 120° in respect of **U** and phase **W** with 240° lag in respect and phase **U**) as well as balance of voltages and angles of phases, for detecting a phase failure even with returns (motor working).
By means of an external potentiometer can be adjusted the network unbalance, level, between 2,5 % and 105 % to adapt the relays sensibility for phase failure function. This unbalance is measured according to NEMA MG1-1433 and 34, and corresponds to a fall of simple tension of phase in amplitude of 7.3 and 28%, respectively. The relay precives either increases or drops of voltage and angle, then it detect the failures even in motors working as breaking devices (loads going down in lifting devices). When relay is powered, it connects instantaneously (max. 200ms) if the power system is correct. Once the switched on relay is switch-on, it switches-off with 1 sec. delay in case of a failure, to avoid false disconnections due to transient unbalances. (Start of other motors, transformers, etc.).



Technical characteristics

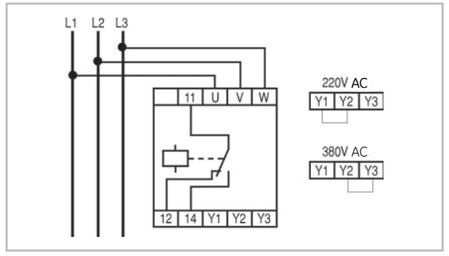
			RSFF1-50
Nr. of changeover contacts			1
Output contacts:			
Rated insulation	AC	(V)	400
voltage Ui	DC	(V)	250
Thermal current Ith		(A)	6
Utilisation AC-15			
Rated voltage Ue		(V)	120/240
Rated current Ie		(A)	2.5/1.3
Utilisation DC-13			
Rated voltage Ue		(V)	110/220
Rated current Ie		(A)	0.2/0.1
Supply voltages		(Un)	
AC (with transformer)		(V)	380-400
Frequency		(Hz)	50/60
Permissible supply voltage variation		(%)	+15 / -20
Repeat accuracy		(%)	2
Consumption		(VA)	3
Input circuit test voltage (between input, output circuit and earth)		(kV)	4
Switch ON response time		(ms)	200
Switch OFF response time		(s)	1

$$\% \text{ unbalance} = \frac{\text{max. voltage derivation from average voltage}}{\text{average voltage}} \times 100$$

RSF... Phase sequence relay for three-phase lines

Function

The RSF1 is designed to detect phase sequence in three phase power system. Three supplies **U, V, W**, take voltage from each of the phases of the network. When phase sequence supplying relay is direct (Phase **V** with 120° lag in respect of **U** and phase **W** with 120° lag in respect of **V**) the relays connects with supply (closes contact between **11**-**14**) and if no it remains OFF. For correct operation, relay must have supplying each of the three phases.
A phase failure, when there is a return current (the motor is rotating), is not detected by the relay and may lead to a relay malfunction.



Technical characteristics

			RSF1-50
Nr. of changeover contacts			1
Output contacts:			
Rated insulation	AC	(V)	400
voltage Ui	DC	(V)	250
Thermal current Ith		(A)	6
Utilisation AC-15			
Rated voltage Ue		(V)	120/240
Rated current Ie		(A)	2.5/1.3
Utilisation DC-13			
Rated voltage Ue		(V)	110/220
Rated current Ie		(A)	0.2/0.1
Supply voltages		(Un)	
AC (with transformer)		(V)	380-400 / 220-230 (two voltages)
Frequency		(Hz)	50/60
Permissible supply voltage variation		(%)	+10 / -15
Repeat accuracy		(%)	2
Consumption		(VA)	3
Input circuit test voltage (between input, output circuit and earth)		(kV)	4
Switch ON response time		(ms)	500
Switch OFF response time		(ms)	200

Ambient conditions

Storage temperature	-10°C to+85°C
Operating temperature	-5°C to +50°C
Relative humidity	95% (without condensation)
Altitude	2.000 m
Degree of protection	IP40; terminals IP20
Operating positions	Any

Conformity to standards

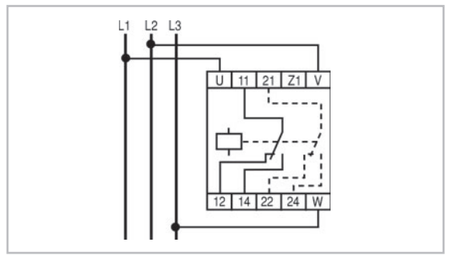
VDE 0106	IEC/EN 60947-5-1	EN 50001	UNE 20-119
EN 50005	EN 50011	DIN 46199	CE

Remark
The relay has one LED that lights when the output contact is made.

RTMM2 Maximum and minimum voltage protection relay for three-phase lines

Function

The RTMM electronic relay is voltage sensitive and has one or two changeover output contacts. The relay mantains operated (contact between **11-14** or between **21-24** closed) while the voltage is within the tolerance limits and opens when these limits are surpassed in plus or minus. The relay can be used for low voltage or over-voltage detection in three-phase lines.
The trip value, for maximum and minimum voltage, are set by means of two independent potentiometer mounted on the relay front cover. The limits for the trip are adjustable between +5 and +15% for maximum voltage and between -5 and -20% for minimum voltage.



Technical characteristics

			RTMM2
Nr. of changeover contacts			2
Output contacts:			
Rated insulation voltage Ui	AC	(V)	400
	DC	(V)	250
Thermal current Ith		(A)	6
Utilisation AC-15			
Rated voltage Ue		(V)	120/240
Rated current Ie		(A)	2.5/1.3
Utilisation DC-13			
Rated voltage Ue		(V)	110/220
Rated current Ie		(A)	0.2/0.1
Supply voltages		(Un)	
AC (with transformer)		(V)	400,380,240,220
Frequency		(Hz)	50/60
Permissible supply voltage variation		(%)	+20 / -20
Repeat accuracy		(%)	2
Consumption		(VA)	3
Input circuit test voltage (between input, output circuit and earth)		(kV)	4
Low voltage tripping (adjustable)		(%)	-5 to -20
Over voltage tripping (adjustable)		(%)	+5 to +15
Switch ON response time		(ms)	100
Reset hysteresis		(%)	2

Ambient conditions

Storage temperature	-10°C to+85°C
Operating temperature	-5°C to +50°C
Relative humidity	95% (without condensation)
Altitude	2.000 m
Degree of protection	IP40; terminals IP20
Operating positions	Any

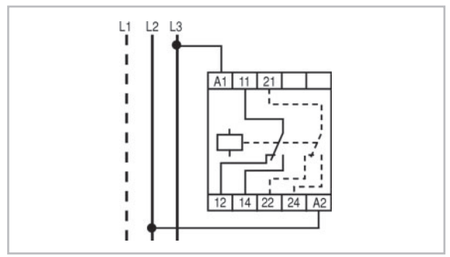
Conformity to standard

VDE 0106
EN 50001
EN 50005
EN 50011
DIN 46199
IEC/EN 60947-5-1
UNE 20-119
CE

RMM2 Maximum and minimum voltage relay for single-phase lines

Function

These voltage-sensitive relays with one or two changeover output contacts remain connected (contact between 11-14 or between 21-24 closed) when voltage is within tolerance limits, and opens when voltage surpasses these limits in plus or minus. Relays can be used to detect low or lover voltage in balanced single or three-phase systems, and maximum and minimum tripping values are adjsutable by means of two frontal potentiometers. The limits for the trip are adjustable between 5 and 15% for maximum voltage and between 5 and 20% for minimum voltage.



Technical characteristics

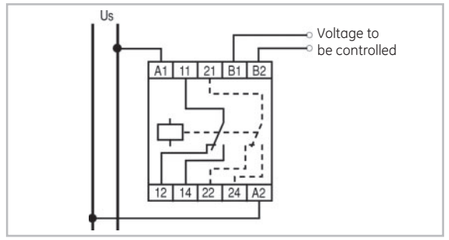
			RMM 2
Nr. of changeover contacts			2
Output contacts:			
Rated insulation voltage Ui	AC	(V)	400
	DC	(V)	250
Thermal current Ith		(A)	6
Utilisation AC-15			
Rated voltage Ue		(V)	120/240
Rated current Ie		(A)	2.5/1.3
Utilisation DC-13			
Rated voltage Ue		(V)	110/220
Rated current Ie		(A)	0.2/0.1
Supply voltages		(Un)	
AC		(V)	240,220
Frequency		(Hz)	50/60
Permissible supply voltage variation		(%)	+15 / -20
Repeat accuracy		(%)	2
Consumption		(VA)	3
Input circuit test voltage (between input, output circuit and earth)		(kV)	4
Low voltage tripping (adjustable)		(%)	-5 to -20
Over voltage tripping (adjustable)		(%)	+5 to +15
Reset hysteresis		(%)	5 approx.
Switch ON response time		(ms)	100

Remark
The relay has one LED that lights when the output contact is made.

RDT2 Voltage detector relay [1]

Function

The output contact in this voltage detector will connect when controlled voltage between terminals B1-B2 exceeds a certain adjustable threshold by means of the front potentiometer and will disconnect with a voltage 10% below the setting value.
The relay requires voltages supply between A1-A2. Controlled voltage can be either direct (DC) or alternating (AC). The output contact function can be set to NO by means of an internal jumper (contact 11-14 is normally closed and opens when control power supply or removal is detected at A1-A2).
When the distance between the measurement point and the relay is greater than 1m, in order to avoid any noise problems, connection to the B1-B2 terminals should be made by using a shielded cable, with its screen joined to the B2 terminal and isolated at the other cable end or by using a twisted-pair cable.



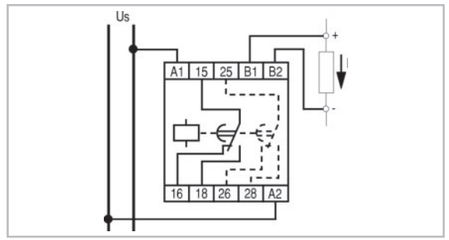
Technical characteristics

			RDT2-...
Nr. of changeover contacts			2
Output contacts:			
Rated insulation voltage Ui	AC	(V)	400
	DC	(V)	250
Thermal current Ith		(A)	6
Utilisation AC-15			
Rated voltage Ue		(V)	120/240
Rated current Ie		(A)	2.5/1.3
Utilisation DC-13			
Rated voltage Ue		(V)	110/220
Rated current Ie		(A)	0.2/0.1
Supply voltages		(Un)	
AC		(V)	220-230
Frequency		(Hz)	50/60
Permissible supply voltage variation		(%)	+10 / -15
Consumption		(VA)	3,7
Input circuit test voltage (between input, output circuit and earth)		(kV)	2,5
Reset hysteresis		(%)	10
Switch ON response time		(ms)	100

RDIT2 Current detector relay with delay [2] *(0.5-15 seconds)*

Function

This relay is similar to the RDI except that it will connect with a certain adjustable delay of **0.5 to 15 secs**. If current falls below threshold before timeout, relay will reset inmediately to recount delay from zero. For higher currents, current transformers or shunts of suitable ratios can be used. The realy requires voltages supply between A1-A2. Controlled voltage can be either direct (DC) or alternating (AC). The output contact function can be set to NO (the **15-18** contact closes when the delay time has elapsed) or to NC (the 15-18 contact is normally closed and opens when the delay time has elapsed or when the control power supply is removed from **A1-A2**) by means of an internal jumper. The **0.2 V** version has been designed to be used with an external shunt and if the distance between the shunt and the relay is greater than 1 m, a connection to the **B1-B2** terminals should be made by using a shielded cable, with its screen joined to the **B2** terminal and isolated on the shunt side or by using a twisted-pair cable.



Technical characteristics

			RDIT2-...
Nr. of changeover contacts			2
Output contacts:			
Rated insulation voltage Ui	AC	(V)	400
	DC	(V)	250
Thermal current Ith		(A)	6
Utilisation AC-15			
Rated voltage Ue		(V)	120/240
Rated current Ie		(A)	2.5/1.3
Utilisation DC-13			
Rated voltage Ue		(V)	110/220
Rated current Ie		(A)	0.2/0.1
Supply voltages		(Un)	
AC (with transformer)		(V)	220-230
Frequency		(Hz)	50/60
Permissible supply voltage variation		(%)	+10 / -15
Repeat accuracy with 0.8 -1.1 Un		(%)	2
Consumption		(VA)	3
Input circuit test voltage (between input, output circuit and earth)		(kV)	4
Switch OFF response time		(s)	0.5 to 15
Reset time between 2 cycles[3]		(ms)	100

Ambient conditions

Storage temperature	-10°C to +85°C
Operating temperature	-5°C to +50°C
Relative humidity	95% (without condensation)
Altitude	2.000 m
Degree of protection	IP40; terminals IP20
Operating positions	Any

Conformity to standards

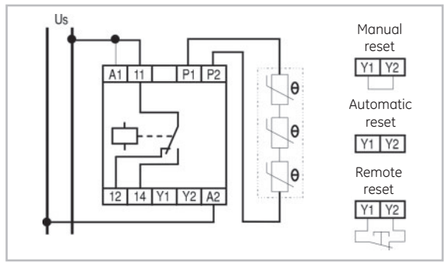
VDE 0106
EN 50001
EN 50005
EN 50011
DIN 46199
IEC/EN 60947-5-1
UNE 20-119
CE

(1) **Remark**
The relay has a green LED which lights up when the supply is between A1 and A2, and a red LED when the contact is made (11-14).
(2) **Remark**
The relay has a yelow LED which lights up when the supply is between A1 and A2, and a red LED when the contact is made **15-18**.
(3) Reset time: Time that must go by from the relay ends an operation until it is able to initiate the next one without error.

RS01N Thermistor relay

Function

This thermal probe relay is sensitive to resistance of several thermal probes (thermistors, PTC) connected to **P1** and **P2** and detect overheating in motor windings transformers, etc. where these PTC are connected.
The relays disconnects when probe resistance exceeds 2500 ohms and cannot reset until resistance is lower than 1500 ohms. Control voltage should be applied to **A1** and **A2**, the absence of this will cause relay to trip and prevent any possibility remaining without protection. In this case resetting is automatic, but if the relay trips through probe heating, resetting may be automatic, hand or remote (distance NC contact).
RS01N detect those cases of probe cables short-circuited (resistance lower than 20 Ohms) or probe cables cut (resistance higher than 2.5k Ohms). The resistance at 25 °C of the probe circuit must be within 40 to 600 ohms range.



Technical characteristics

			RS01N
Nr. of changeover contacts			1
Output contacts:			
Rated insulation voltage Ui	AC	(V)	400
	DC	(V)	250
Thermal current Ith		(A)	6
Utilisation AC-15			
Rated voltage Ue		(V)	120/240
Rated current Ie		(A)	2.5/1.3
Utilisation DC-13			
Rated voltage Ue		(V)	110/220
Rated current Ie		(A)	0.2/0.1
Supply voltages		(Un)	
AC (with transformer)		(V)	220-230,125,110
Frequency		(Hz)	50/60
Permissible supply voltage variation		(%)	+10 / -15
Repeat accuracy with 0.85-1.1 Un		(%)	2
Consumption		(VA)	3
Input circuit test voltage (between input, output circuit and earth)		(kV)	4
Switch OFF response time		(s)	100
Hysteresis		(kOhms)	1
Probe resistance min. (at 25°C)		(Ohms)	40
Probe resistancemax. (at 25°C)		(Ohms)	600
Max. voltage in terminals P1-P2 (R=2.5kV)		(V)	< 1,6

Ambient conditions

Storage temperature	-10°C to +85°C
Operating temperature	-5°C to +50°C
Relative humidity	95% (without condensation)
Altitude	2.000 m
Degree of protection	IP40; terminals IP20
Operating positions	Any

Conformity to standards

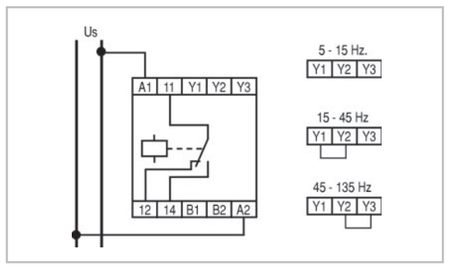
VDE 0106
EN 50001
EN 50005
EN 50011
DIN VDE 0660-303 (RS01N)
DIN 46199 (RSR)
IEC/EN 60947-5-1
IEC 34-11-2 (RS01N)
UNE 20-119
CE

Remark
The relay has one LED that lights when the output contact is made.

RCF 1 Frequency control relay

Function

This frequency control relay is sensitive to frequency of the signal applied to terminals **B1** and **B2** and output contact connects when frequency fails below a threshold adjsutable by the front potentiometer. Supply voltage should also be applied to relay between terminals **A1** and **A2** to produce connection. Possibility of three settings ranges (by cross-connection): 5-15Hz, 15-45Hz, 45-135Hz.
Switching is independent of input signal level at **B1-B2**, whitin a wide range of values, and response is not changed by the input signal wave form (sinusoidal, square, triangular, etc).
Relay is suitable for suppression of rotor resistance in slipring asynchronous motors starters, speed reversal detector in motor wound motors and frequency control in generating sets.



Technical characteristics

			RCF-1
Nr. of changeover contacts			1
Output contacts:			
Rated insulation voltage Ui	AC	(V)	400
	DC	(V)	250
Thermal current Ith		(A)	6
Utilisation AC-15			
Rated voltage Ue		(V)	120/240
Rated current Ie		(A)	2.5/1.3
Utilisation DC-13			
Rated voltage Ue		(V)	110/220
Rated current Ie		(A)	0.2/0.1
Supply voltages		(Un)	
AC (with transformer)		(V)	380-400,220,230,110
Frequency		(Hz)	50/60
Permissible supply voltage variation		(%)	+10 / -15
Voltage between B1-B2 terminals		(V c.a.)	15 to 500
Repeat accuracy with 0.85-1.1 Un		(%)	2
Consumption		(VA)	3
Input circuit test voltage (between input, output circuit and earth)		(kV)	4
Switch ON response time		(ms)	100
Switch OFF response time		(ms)	800
Reset hysteresis		(Hz)	1.5 approx.

Ambient conditions

Storage temperature	-10°C to +85°C
Operating temperature	-5°C to +50°C
Relative humidity	95% (without condensation)
Altitude	2.000 m
Degree of protection	IP40; terminals IP20
Operating positions	Any

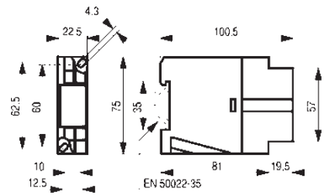
Conformity to standards

VDE 0106	EN 50042 (MRI)
VDE 0110 (MRI)	DIN 46199 (RCF)
EN 50001 (RCF)	IEC/EN 60947-5-1
EN 50002 (MRI)	UNE 20-119 (RCF)
EN 50005	UL 94 (MRI)
EN 50011	UL 508 (MRI)
CE	

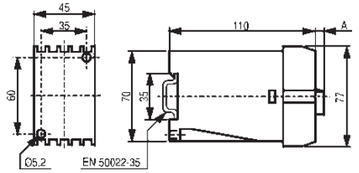
Remark
The relay has one LED that lights when the output contact is closed.

Dimensional drawings

Series NMV

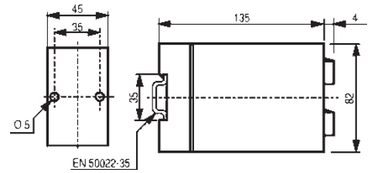


Series D

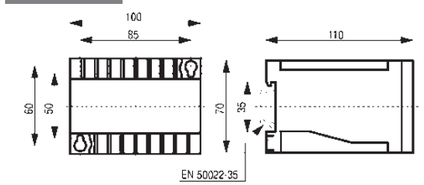


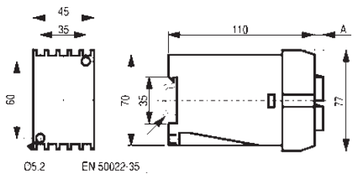
	A
RET, RTC, RTCI, RRD, RTD, RIC, RCR, DINIL-02, DINIL-03, RTMM, RDI, RDIA RSR, RCF	4
RS01N	8

RCRT 6 - 60



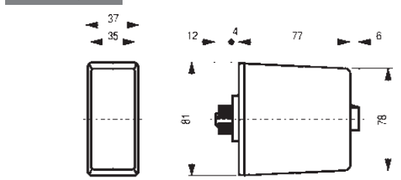
RDFF



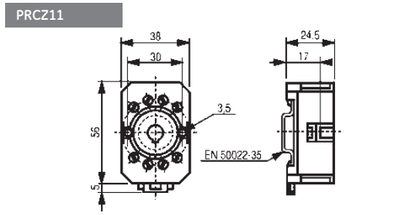


	A
RDMT, RPDF, RMM, RDT,RDTA, RDIT, RDITA	4
RDH, RDHT, RDHA	12

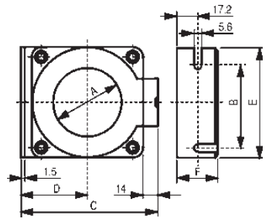
DINIL-02E, -03E



PRCZ11

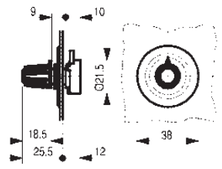


Differential transformers



TYPE	A	B	C	D	E	F
WKA-35	35	75	99	42	92	33.5
WKA-70	70	98	132	60.5	115	33.5
WKA-105	105	141	175	82	158	33.5
WKA-140	140	183	218	103.5	200	33.5
WKA-210	210	270	309	150	290	43
WKAT-35	35	75	99	42	92	33.5
WKAT-70	70	98	132	60.5	115	33.5
WKAT-105	105	141	175	82	158	33.5
WKAT-140	140	183	218	103.5	200	33.5
WKAT-210	210	270	309	150	290	43

Remote potentiometer



Metal and thermoplastic limit switches. Positive opening. Conformity with EN 50041.

- Fixing center lines and operation points in accordance with EN 50041
- NC contacts with positive opening to IEC/EN 60947-5-1
- IP65 protection
- Terminal numbering according to IEC/EN 50013
- Cable entry M20 x 1.5
- Safety switches according to cat. 1 of IEC/EN 60947-5-1 (depends on actuating system)
- CSA and UL certified

Standards

IEC/EN 60947-5-1
IEC/EN 60204-1

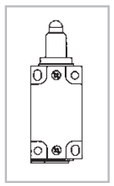
Specifications

Degree of protection		IP65
Ambient conditions		
Storage temperature	°C	-40 to +80
Operating temperature	°C	-25 to +80
Resistance to shocks (10 ms)	G	30
Resistance to vibrations (10-55 Hz)	G	25
Mechanical endurance	ops.	10×10^6
Cable entry		M20 x 1.5
Fixing screws		4 x M5

Approvals

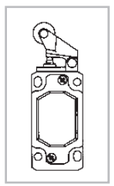
Mounted versions

Series IS...



- Double-insulated bodies, in **thermoplastic material, according to UL-94 VO**
- Clip-fixing and opening of terminal acces cover, no screws.

Series IM...



- Metal bodies constructed from injected **aluminium**.
- Cover fastening by screws.

Order codes ● pg. G.3
Technical data ● pg. G.10
Dimensions ● pg. G.11

Limit switches according to EN 50041

	Heads Standard position	Head position	Form to EN 50041	Slow break Cat.no	Ref. no.	Snap action Cat.no	Ref. no.	Pack
	Plunger	I I I	B	**ISGA-B211**	130000	**ISGA-B411**	130018	5
		I I I	B			**IMGA-B411**	130019	5
	Roller plunger	I I I	C			**ISGR-B411**	130020	5
		I I I	C			**IMGR-B411**	130021	5
	Roller level	I I I	(1)			**ISGH-B411**	130022	5
		I I I	(1)			**IMGH-B411**	130023	5
	Roller crank	I I I	A			**ISGL-B411**	130028	5
		I I I	A			**IMGL-B411**(4)	130029	5
	Adjustable roller crank[2]	I I	(1)			**ISGT-B311**	130030	5
		I I	(1)			**IMGT-B311**	130031	5
	Rod lever[2]	I I	D			**IMGP-B311**	130035	5
	Cross rod	I I	(1)			**IMGC-B411**	130037	5
	Spring rod lever[2]	I I I	(1)			**IMGQ-B311**	130039	5
	Omnidirectional spring rod[2]	I I I	(1)			**ISGM-B311**	130040	5
		I I I	(1)			**IMGM-B311**	130041	5

Positive break

(1) Fixing center lines and operation points in accordance with EN 50041.
(2) Heads for these limit switches have no positive opening, as they are adjustable or flexible.
(3) Supplied in standard mounting position. Positions II and III must be set by user.
(4) Available with metal roller lever: IMGL-B411M (130107).

Series IUG

Thermoplastic limit switches.
Positive opening. Conformity with EN 50047.

- Fixing center and operation points in accordance with EN 50047
- NC contacts with positive opening according to IEC/EN 60947-5-1
- IP65 protection
- Terminal numbering according to EN 50013
- Thermoplastic material according to UL-94 V0
- One bottom cable entry M20x1.5 on Series IUG
- Two fixing possibilities for series IUGA...
- Clip fixing and opening of terminals access cover, no screws.
- CSA and UL certified

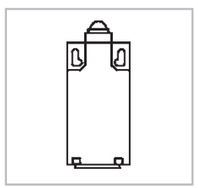
Standards

IEC/EN 60947-5-1
IEC/EN 60204-1

Approvals

Mounted versions

Series IUG...



Specifications

Degree of protection			IP 65
Ambient conditions			
	Storage temperature	°C	-40 to +80
	Operating temperature	°C	-25 to +80
Resistance to shocks (10 ms)		G	30
Resistance to vibrations (10-55 Hz)		G	25
Mechanical endurance		ops.	10×10^6
Cable entry		IUG...	1 x (M20x1.5)
Fixing screws			2 of M5

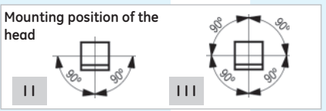
Switch function

Contact type		Switch function	Switch contacts	Voltage	Current
IUG	Slow make & break	Changeover	1NC/1NO	250V	10A
	Snap action	Changeover	1NC/1NO	250V	10A

Order codes ● pg. G.5
Technical data ● pg. G.10
Dimensions ● pg. G.13

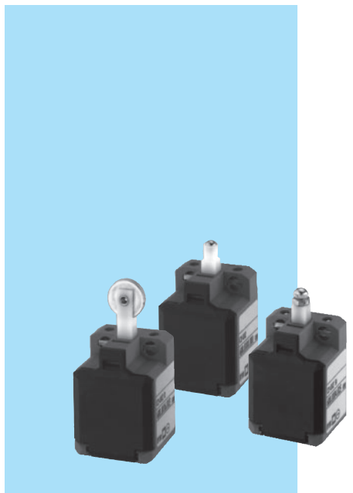
Limit switches according to EN 50047

Mounting position of the head



	Heads Standard position	Head position	Form to EN 50047	Slow break 11 23 NC NO 12 24 Cat. no.	Slow break Ref. no.	Snap action 13 21 NO NC 14 22 Cat. no.	Snap action Ref. no.	Pack
	Plunger	III	B	**IUGA-B211**[3]	130060	**IUGA-B411**	130082	5
		III	B	**IUGA-B211 S**[3]	209140			5
	Low roller	III	[2]			**IUGU-B411**	130084	5
	plunger	III	[2]	**IUGU-B211 S**[3]	130057			5
	Low roller plunger [1]	III	[2]			**IUGR-B411**	130086	5
	Roller lever	III	E			**IUGH-B411**	130088	5
	Adjustable roller lever	III	[2]			**IUGI-B411**	130090	5
	Retractable returning roller lever	III	[2]			**IUGE-B411**	130094	5
	Roller crank (28mm between centres)	III	A			**IUGL-B411**	130096	5
	Adjustable roller crank [1]	II	[2]			**IUGT-B311**	130098	5
	Rod lever [1]	II	[2]			**IUGP-B311**	130100	5
	Spring rod lever [1]	III	[2]			**IUGQ-B311**	130102	5
	Omnidirectional spring rod [1]	III	[2]			**IUGM-B311**	130104	5

(1) Heads for these limit switches have no positive opening.
(2) Fixing centre lines and operating points according to EN 50047.
(3) with latch
⊖→ Positive break



Miniature thermoplastic limit switches

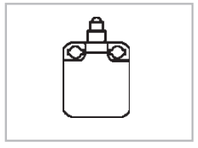
- The small sizes makes these ideal for use in reduced spaces
- With slow break, NC contacts with positive opening according to IEC/EN 60947-5-1
- 2 mm contact opening of slow-action system according to EN 81-1 for lift application
- IP30 protection
- Terminal numbering according to EN 50013
- Thermoplastic material in accordance with UL-94 V0
- Clip fixing and opening of the contact access cover, no screws
- Two fixing possibilities: 2 x M3 from the top
  2 x M4 for mounting from the front

Approvals

Switch function

Contact type	Switch function	Switch contacts	Voltage	Current
Slow make & break	Changeover	1NC/1NO	250V	10A
Snap action	Changeover	1NC/1NO	250V	10A

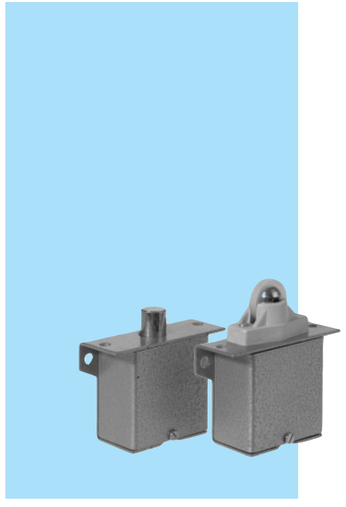
Mounted versions



Order codes ● pg. G.6
Technical data ● pg. G.10
Dimensions ● pg. G.15

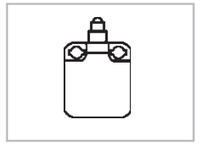
Miniature limit switches

	Heads		Slow break (11 23 NC NO / 12 24) Cat. no.	Ref. no.	Snap - action (13 21 NO NC / 14 22) Cat. no.	Ref. no.	Pack
	Plunger				**IZMA-B311**	130144	10
	Push-button (adjustable)		**IZMS-B211**	130141	**IZMS-B311**	130145	10
	Roller plunger				**IZMR-B311**	130146	10



Stainless steel limit switches - Heavy duty - IP40

Mounted versions



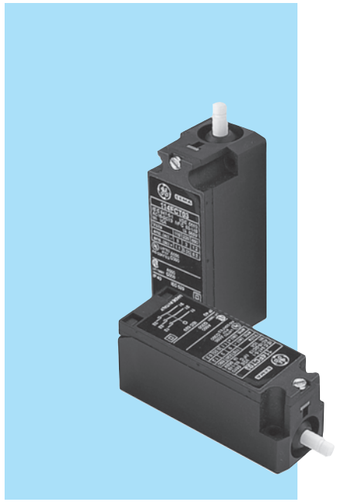
Dimensions ● pg. G.35

Approvals

CE

Stainless steel limit switches

	Heads	Slow break 13 21 NO NC 14 22 Cat. no.	Ref. no.
	Plunger	**IP**	201942
	Ball	**IB**	201943
	Roller plunger	**IR**	201944



Three pole limit switches

- Switch-box, cover and operation plunger by thermoplastic resin.
- Silver contacts.
- Lockable cover with one screw only.
- Two basic versions:
  Without seal — Protection IP40 according to IEC 529
  With seal — Protection IP65 according to IEC 529
  (Types NEMA 1, 12 and 13 according to UL, ENCL. 3 according to CSA)
- Four electrical functions for both versions.
- Slow operation contacts, double-break and positive break of NC contacts.
- With screws, retractable and captive clamp type. Protection against accidental contact with live parts, degree of protection IP2x according to IEC 529.

Standards

IEC/EN 60947-5-1
VDE 0660
BSI 4794
NFC 63140

Approvals

Actuating force

Minimum actuating force	
114FCT03, ...03T	7.5N
114FCT12, ...12T	10N
114FCT21, ...21T	12N
114FCT30, ...30T	13N
Positive opening force	
114FCT03, ...03T	8.5N
114FCT12, ...12T	8.5N
114FCT21, ...21T	8.5N
114FCT30, ...30T	-
Maximum force	
114FCT03, ...03T	12N
114FCT12, ...12T	13.5N
114FCT21, ...21T	15.5N
114FCT30, ...30T	17N

Specifications

Mechanical performances											
Climatic protections											
	Temperate climate (DIN 50014)					23 / 50					
	Wet climate (DIN 50015)					23 / 83					
	Hot wet climate (DIN 50015)					40 / 92					
	Variable wet climate (DIN 50016)					FW 24					
Temperature ranges											
	Operation					-25°C to +70°C					
	Storage					-40°C to +70°C					
Vibrations resistance						10G					
(according to IEC 68-2-6)						with frequency range from 1 to 100Hz					
Mechanical endurance						10×10^6 operations					
Operation speed											
	Min.					0.25 m/sec.					
	Max.					1 m/sec.					
Electrical performances											
Rated insulation voltage (Ui) EN 60947.1						690V					
Impulse withstand voltage (Uimp) EN 60947.1						4kV					
Insulation class according to VDE 0660						Group C					
Electrical shocks protection IEC 536						Class II (double insulation)					
Short-circuit protection according to IEC 269.1 and 269.3						10A					
Rated thermal current: Ith						10A					
Performances according to IEC 947.5.1											
Cat. AC15	Voltage Ue	(V)	24	48	60	110	220	380	500	600	
	Current Ie	(A)	10	10	10	6	3	2	1.5	1.2	
Cat. DC13	Voltage Ue	(V)	24	48	60	110	220	300			
	Current Ie	(A)	2.5	1.4	1	0.55	0.27	0.2			
Performances according to UL and CSA						AC / Heavy duty (A600)					
						DC / Standard duty (Q300)					
Terminals											
Capacity					min.	22 AWG (0.32mm²)					
Rigid and/or flexible conductors					max.	12 AWG (3.3mm²)					
Cable entry						1 x PG11					

Order codes ● pg. G.9
Dimensions ● pg. G.15

Three pole limit switches

	Contacts	Diagrams	Protection	Cat. no.	Ref. no.	Pack.
	11 NC 21 NC 31 NC 12 22 32	0 2 6,5mm 11-12 21-22 31-32 3,3 Positive opening travel	IP40	**114FCT03**	130320	1
			IP65	**114FCT03T**	130321	1
	13 NO 21 NC 31 NC 14 22 32	0 2 3,5 6,5mm 11-12 21-22 31-32 3,3 Positive opening travel	IP40	**114FCT12**	200909	1
	13 NO 23 NO 31 NC 14 24 32	0 2 3,5 6,5mm 11-12 21-22 31-32 3,3 Positive opening travel	IP40	**114FCT21**	200910	1
Three pole insulated jumper				**105PT**	132234	1

Technical data

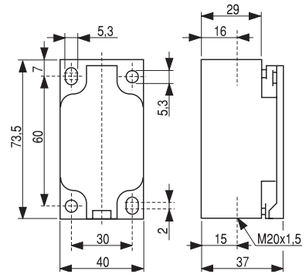
Limit switches

				ISG..-B211 IMG..-B211	**ISG..-B311 IMG..-B311 ISG..-B411 IMG..-411**	**IUG..-B111 IUG..-B211**	**IUG..-B311 IUG..-B411**	**IZM..-B211**	**IZM..-B311**
Type of break				Slow break	Snap action	Slow break	Snap action	Slow break	Snap action
Number of contacts				2	2	2	2	2	2
Function				1NO-1NC	1NO-1NC	1NO-1NC	1NO-1NC	1NO-1NC	1NO-1NC
Polarity				Same	Same	Same	Same	Same	Same
Rated thermal current (Ithe)			(A)	10	10	10	10	10	10
Auxiliary contacts									
Rated insulation voltage (Ui)V				400	400	250	250	380	250
Protection against electrical shocks				Class II (ISG)	Class II (ISG)	Class II	Class II	-	-
				CLASS I (IMG)	CLASS I (IMG)				
Protection against electrical shocks (fuse)			(A)	10	2	10	2	6	6
Rated current (DIN EN60947-5-1)									
A300	AC-15	12/24V	(A)	-	-	-	-	-	-
		48/60V	(A)	-	-	-	-	-	-
		(110V) 120V	(A)	6	6	6	6	6	6
		127V	(A)	-	-	-	-	-	-
		(220V) 240V	(A)	3	3	3	3	3	3
		380V	(A)	-	-	-	-	-	-
Q300	DC-13	24V	(A)	-	-	-	-	-	-
		48V	(A)	-	-	-	-	-	-
		(110V) 125V	(A)	0.55	0.55	-	-	0.55	0.55
		(220V) 250V	(A)	0.27	0.27	-	-	0.27	0.27
		300V	(A)	-	-	-	-	-	-
Operating rate			ops./h	6000	6000	6000	6000	6000	6000
Switching time			(ms)	-	10	-	10	-	10
Repetition assurance			(mm)	± 0.1	± 0.1	± 0.1	± 0.1	± 0.1	± 0.1
Clamping capacity			(mm^2)	0.5 - 1.5	1.5	1.5	1.5	1.5	1.5
Terminal screw				M3.5	M3.5	M3.5	M3.5	M3.5	M3.5
Protection				IP65	IP65	IP65	IP65	IP30	IP30

Dimensional drawings

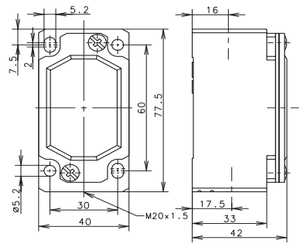
Contact block Series IS

Common for all limit switches Series IS



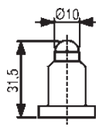
Contact block Series IM

Common for all limit switches Series IM

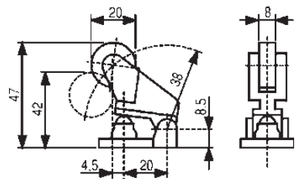


Operating heads

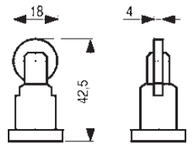
ISGA B..., IMGA B...



ISGH B..., IMGH B...



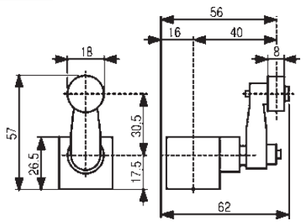
ISGR B..., IMGR B...



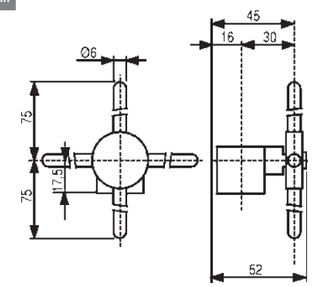
Dimensional drawings

Operating heads (continued)

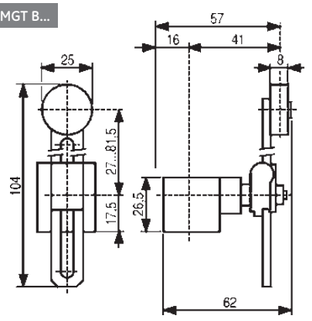
ISGL B..., IMGL B...



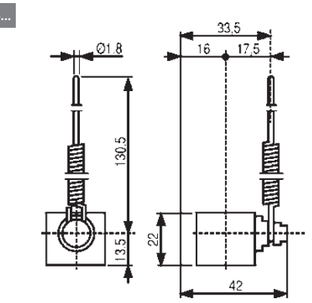
IMGC B...



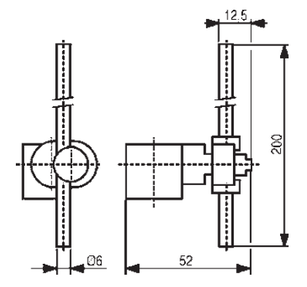
ISGT B..., IMGT B...



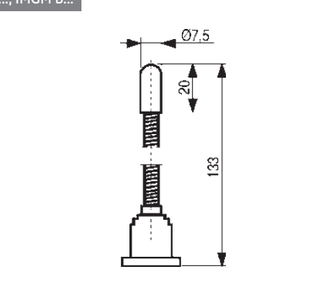
IMGQ B...



IMGP B...

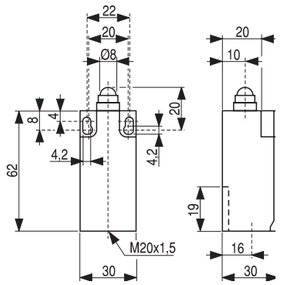


ISGM B..., IMGM B...

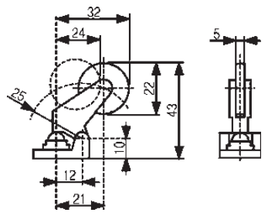


Contact block Series IUG

Common for all limit switches Series IUGA B...

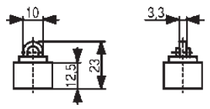


IUGK B...

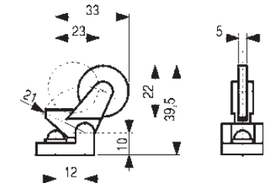


Operating heads

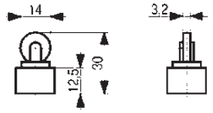
IUGU B...



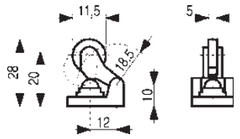
IUGJ B...



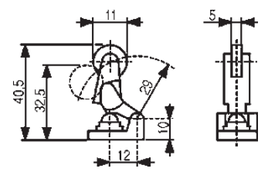
IUGR B...



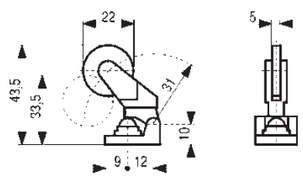
IUGH B...



IUGE B...



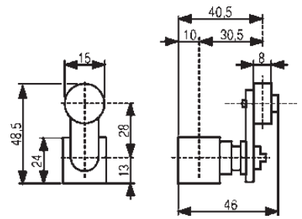
IUGI B...



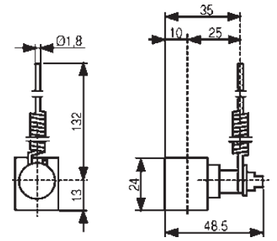
Dimensional drawings

Operating heads (continued)

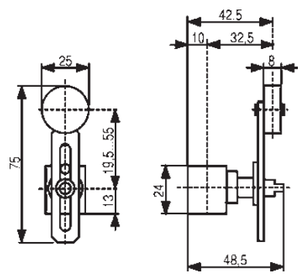
IUGL B...



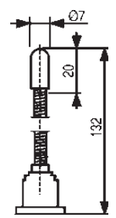
IUGQ B...



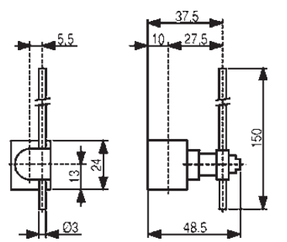
IUGT B...



IUGM B...

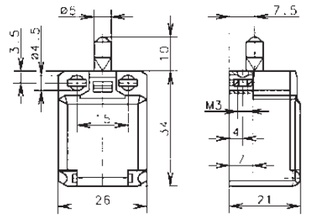


IUGP B...

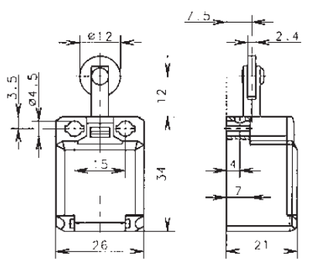


Series IZ

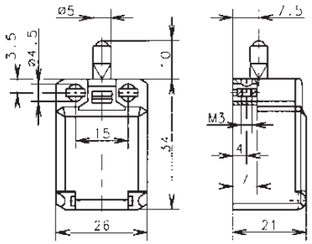
IZMA



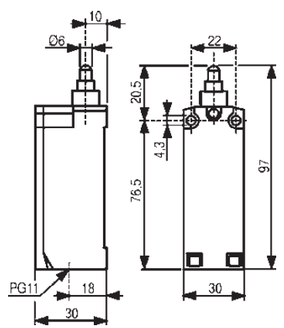
IZMR



IZMS

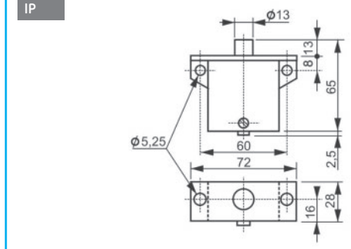


Three pole limit-switches Series 114FCT

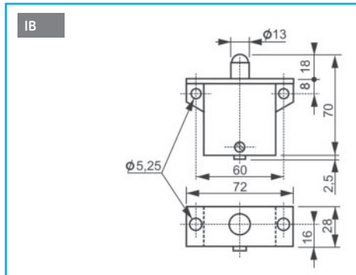


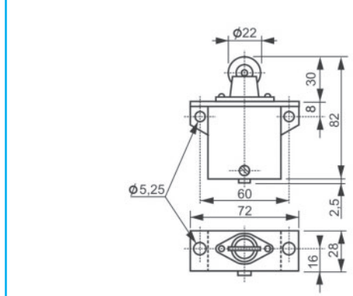
Serie IP

IP

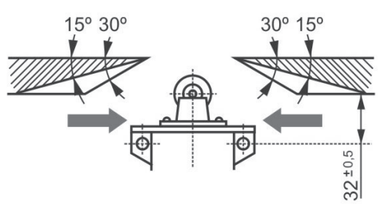


IB

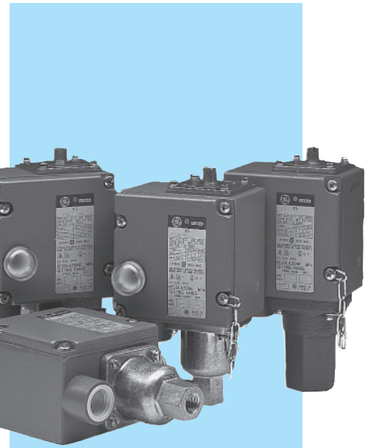




Angle



15° for 1m/s
30° for 0,5m/s



Standards

IEC/EN 60947-5-1 BSI
CEI UTE
VDE 0660

Approvals

(Canada)

ASE/SEV (Switzerland)

Pressure switches

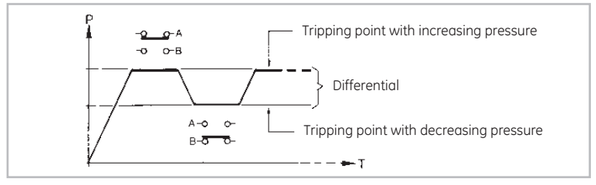
- Controlled fluid temperature: 120°C
- Fluids that can be controlled by bellows pressure switches: air and rare gases, freon, water (sea-water not included), fuel oils, mineral oils, hydraulic oils and other kinds of fluids that do not corrode steel, tin and other kinds of fluids that do not corrode steel, tin and copper alloys. To avoid absolutely and solvents and acids.
- Fluids that can be controlled by piston pressure switches: mineral oils and hydraulic oils that do not corrode steel and cast iron.
- Synthetic oils with base of phosphates, gas and all the other fluids have to be excluded.

Setting range choice

On the following pages are shown the values within which it is possible to make setting of our pressures switches.
For a correct interpretation, consider that:
– The main setting range defines the values within which it is possible to set the tripping of the pressure switch, when the pressure is decreasing.
– The differential setting range defines the values that, added to those ones of the main range, determine the tripping when pressure is increasing.
– The maximum admissible pressure defines the limit that the devices can stand without consequences. Indicated values have never to exceed also in the case of occasional overpressure of temporary type.
When choosing the most suitable type, consider that the device reaches its excellent efficiency when the tripping point, with decreasing pressure, is set between 25% and 75% of the main setting range.

Setting

– To completely loose the external screw of the main range and the internal pawl of the differential range.
– By a manometer, to set pressure at the value on which the tripping is wanted, when pressure is decreasing. To screw the external screw of the main range until the tripping of the microswitch (A contact shall result open and B closed).
– To completely screw the pawl of the differential range, until its maximum value.
– To set pressure at the value on which the tripping is wanted, when pressure is increasing.
– To loosen the pawl of the differential range until the tripping of the microswitch (A contact shall result closed and B open).

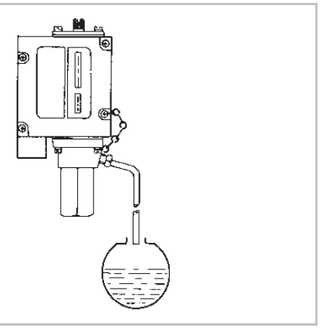


Order codes ● pg. G.18
Dimensional drawings ● pg.G.15

Location

Generally the location of our pressure switches can be effected as wanted.
Nevertheless, as to the piston types whitout seal ring, location have to be made in such a way as to allow the discharge, through the drainage hole, of the blow-by oil between cylinder and piston (a few drops per hour).
The going-out oil can be collected by a proper drainage pipe that conveys it, free falling, into the tank of the hydraulic central, as shown in the below figure.

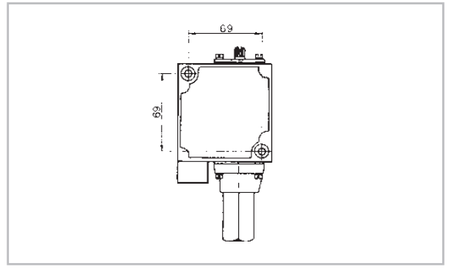
Caution



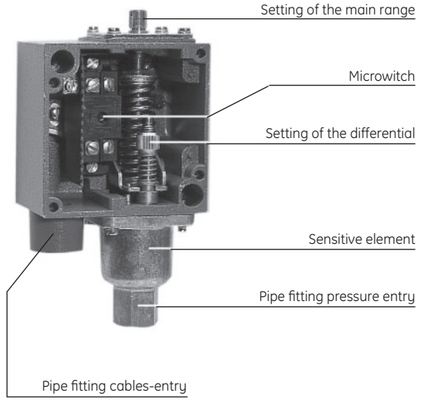
- Do not connect the drainage hole to a return pipe of the line...
- The drainage pipe must not cover a way different from that one indicated (e.g. towards the top).
- Do not plug the drainage holes.

If the above cautions are not met, inside the sensitive group there will be a counter pressure that could damage the sealing washer between actuator and frame of the pressure switch.

Fixing



To fix the pressure switch on a proper support, use the two pierceable holes Ø 6.8 mm. located under the cover.
To absolutely avoid to fix it directly on the pipe containing the fluid to be controlled, use the threaded pipe fitting for pressure entry.



Pressure switches - Bellows type

Without lighting signalisation	Setting Range		Maximum admissible pressure	Weight (kg)	1NO - 1NC		2NO - 2NC		Pack
	Main	Differential			Cat. no.	Ref. no.	Cat. no.	Ref. no.	
	Mpa Bar	Mpa Bar	Mpa Bar						
0.002 - 0.15	0.02 - 0.1	0.4	0.950	**115PC002**	132500			1
0.02 - 1.5	0.2 - 1	4		**115PC002A**	215253			1
0.01 - 0.5	0.04 - 0.1	0.6	0.950	**115PC015**	132501	**115PC2015**	132505	1
0.1 - 5	0.4 - 1	6		**115PC015A**	215252	**115PC2015A**	132517	1
0.01 - 0.8	0.07 - 0.2	1.55	0.950	**115PC018**	132502	**115PC2018**	132515	1
0.1 - 8	0.7 - 2	15.5		**115PC018A**	241311	**115PC2018A**	247788	1
0.1 - 1.9	0.12 - 0.2	2.45	0.950	**115PC119**	132503			1
1 - 19	1.2 - 2	24.5		115PC119A	215329			1

Accessories

Microswitch

Contacts	Weight	Cat. no.	Ref. no.	Pack
1NO - 1NF	0.060	090MI1	130310	25
2NO - 2NF	0.100	090MI2	130311	25

Bellows type

Sensitive group

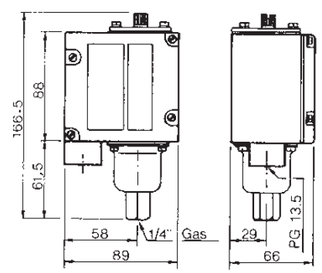
Basic pressure switch	Weight	Bellow type				Piston type				Pack
		Standard		Stainless steel		Without seal ring		With seal ring		
		Cat. no.	Ref. no.	Cat. no.	Ref. no.	Cat. no.	Ref. no.	Cat. no.	Ref. no.	
115PC002	0.045	**115807SP**	132562	**1158065SPA**	215320	-	-	-	-	1
115PC015	0.045	**115803SP**	132563	**1158067SPA**	215321	-	-	-	-	1
115PC018	0.045	**115805SP**	132564	**1158067SPA**	215321	-	-	-	-	1
115PC119	0.045	**115804SP**	132565	**1158067SPA**	215321	-	-	-	-	1

Protective cap of main range screws

Weight	Cat. no.	Ref. no.	Pack
0.078	**115CA**	132571	100

Dimensions

Pressure switches - Bellows type



Technical data

General

The pressure switches Series 115 are designed for transforming a pressure variation into an electrical signal when a pre-arranged pressure value is reached.
Pressure switches are utilized in the field of the industry machines, installations and transports.

Climatic protections

Temperature climate	cat. 23/50 (DIN 50014)
Wet climate	cat. 23/83 (DIN 50015)
Hot wet climate	cat. 40/92 (DIN 50015)
Variable wet climate	cat. FW24 (DIN 50016)

Temperature ranges

Operation	–25°C to +70° C
Storage	–40°C to +70°C

Insulation class

IP65	IEC/EN 60529
ENCL. 4, 5	CSA

Vibration resistance

5g at a sinusoidal frequency ranging from to 100 Hz according to IEC 68-2-6	IEC 68-2-6

Mechanical endurance

Bellows type

1 million operations. It can be considerably reduced when the pressure jump reachs the maximum value foreseen for every type of device and the operations number is high.
The bellows endurance can be also negatively influenced by the temperature and the kind of controlled fluid.

Rated insulation voltage

600V AC/DC

Insulation class

Group C according to VDE 0110

Short-circuit protection

10 A gL fuses according to IEC 947-5-1

Electrical performances

090MI1 (1NO + 1NC)
090MI2 (2NO + 2NC)
Rated thermal current: Ith = 10 A

Performances according IEC 947.5.1

Category AC15 (A600)									
Voltage Ue	V	24	48	60	110	220	380	500	600
Current Ie	A	10	10	10	6	3	2	1.5	1.2
Category DC 13 (P600)									
Voltage Ue	V	24	48	60	110	220	300		
Current Ie	A	2.5	1.4	1	0.55	0.27	0.2		

Performances according to CSA

AC/Heavy Duty (A/600)
DC/Standard Duty (Q300)
Connections at same polarity

Connection terminals

Screw type without clamping screw.
Suitable for eye, fork and hook terminals.

Cable entry

One PG 13.5 threaded cable entry.

Range

The pressure switches series 115 are available in two basic versions:
– With bellows sensitive element for pressures ranging between 0.002 Mpa (0.02 bar) minimum and 2.1 Mpa (21 bar) maximum.
– With piston sensitive element for pressures ranging between 0.95 Mpa (9.5 bar) minimum and 37.25 Mpa (372.5 bar) maximum.

Both versions can be supplied:
- Without lighting signaling
- With lighting signaling

Construction

Snap-action 1NO-1NC or 2NO+2NC microswitches with double-break contacts without positive-break of the NC contact.
Bellows sensitive element, hermetic sealing, made by Tombacco (or stainless steel) material enclosed into a die-cast zamac case complete with a 1 mm. damper.
Piston sensitive element, with or without seal ring, with steel piston enclosed into a cast-iron cylinder complete with 1 mm. damper.
Enclosure and cover are made of die-cast aluminium and painted with anaphoresis process grey RAL 7012..

H.2 VAT20 - Micro AC variable speed drives
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H.5 I/O wiring
H.6 Dimensions and weights

H.8 VAT200 - Mini AC variable speed drives
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H.12 I/O Control terminal description
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H.14 EMC compliance
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H.18 Introduction
H.24 AF-60 LP - Micro Drives
H.32 AF-650 GP - General Purpose Drives
H.52 AF-600 FP - Fan and Pump Drives

Micro AC variable speed drives

- Single-phase or three-phase digital inverters for controlling the speed of three-phase induction AC motors from 0.2 to 2.2kW
- Built-in keypad and display
- IP20 or IP65 protection degree
- Built-in EMC filter for industrial environment (class A)
- DIN rail mountable by optional kit
- Global standards CE and cUL

Technical data

Control specifications

Control system	Sinusoidal wave PWM inverter
Output frequency	0 - 200Hz
Voltage / Frequency	Constant torque, Constant power, Torque boost
	Six selectable pre-set patterns
Overload capacity	150%, 60 sec.
Carrier frequency	Selectable 4 - 16kHz
Frequency setting resolution	
Digital	0.1Hz(0-99.9Hz), 1Hz(100-200Hz)
Analogic	0.1Hz/ 60Hz
Acceleration/deceleration	0.1 - 999 sec.
	Acceleration and deceleration set individually
Operating system	Two mode selection: forward run by FWD input, Reverse run by REV
	input Run by FWD input, forward/reverse command by REV input
Stopping system	Selectable either ramp down or coast to stop
DC braking	DC brake starting frequency 1-10Hz
	DC braking level 0-20%, DC braking time 0-25.5s
Frequency limit	Upper limit (1-200Hz), lower limit (0-200Hz)
Other functions	Auto re-start, Auto reset, Flying start, Jog Slow speeds

I/O configuration

Operation panel	3 digits, 7 segment display with 5 operation keys
Sequence input	Four digital inputs (2 are programmable)
Sequence output	One programmable relay output
Frequency setting input	One analogue either 0-10V, 4-20mA or 0-20mA configurable
Source for potentiometer	10 VDC source for 2-10kΩ potentiometer
Analogue outputs	0-10 VDC for frequency output display

Protection features

Prevention	Overcurrent limitation, Overvoltage limitation, Stall prevention
Trip	Overload, Overvoltage, Undervoltage, Overcurrent, Powerloss,
	Output short-circuit, Grounding fault, Overtemperature
Fault history	The last three faults are recorded

Operating environment

Installation	Indoor, with atmosphere free from corrosive or explosive gases, dust, steam or oil mist.
Protection degree	IP20 and IP65
Temperature range	from -10 to 50 °C
Relative humidity	0-95% without condensation
Vibrations	Under 1G (9.8 m/s^2)
Standards	cUL, CE

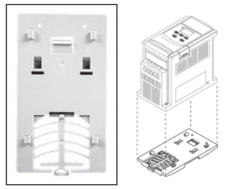
1 and 3 phase speed drives

Input voltage + 10%, -15%, 50/60 Hz (± 5%)	Input power kVA	Output current A	Max. motor power kW (1)	Cooling convection	Losses W	Protection degree	Cat. no.	Ref. no.	Pack
1ph 200V - 240V	0.53	1.4	0.2	natural	21	IP20	**U20N0K2S**	167075	1
	0.88	2.3	0.4	forced	38	IP20	**U20N0K4S**	167076	1
	1.6	4.2	0.75	forced	60	IP20	**U20N0K7S**	167077	1
1ph / 3ph 200V - 240V	2.9	7.5	1.5	forced	103	IP20	**U20N1K5S** (2)	167078	1
	4.0	10.5	2.2	forced	149	IP20	**U20N2K2S** (2)	167079	1
3ph 380V - 480V	1.6	2.3	0.75	forced	61	IP20	**U20X0K7S** (2)	167080	1
	2.9	3.8	1.5	forced	79	IP20	**U20X1K5S** (2)	167081	1
	4.0	5.2	2.2	forced	94	IP20	**U20X2K2S** (2)	167082	1
1ph 200V - 240V	0.53	1.4	0.2	natural	21	IP65	**U20N0K2P** (3)	167088	1
	0.88	2.3	0.4	natural	38	IP65	**U20N0K4P** (3)	167089	1
	1.6	4.2	0.75	natural	60	IP65	**U20N0K7P** (3)	167090	1
	0.53	1.4	0.2	natural	21	IP65	**U20N0K2PS** (4)	167132	1
	0.88	2.3	0.4	natural	38	IP65	**U20N0K4PS** (4)	167133	1
	1.6	4.2	0.75	natural	60	IP65	**U20N0K7PS** (4)	167134	1
1ph / 3ph 200V - 240V	2.9	7.5	1.5	natural	103	IP65	**U20N1K5P** (3)	167091	1
	4.0	10.5	2.2	natural	149	IP65	**U20N2K2P** (3)	167092	1
	2.9	7.5	1.5	natural	103	IP65	**U20N1K5PS** (4)	167135	1
	4.0	10.5	2.2	natural	149	IP65	**U20N2K2PS** (4)	167136	1
3ph 380V - 480V	1.6	2.3	0.75	natural	61	IP65	**U20X0K7P** (3)	167093	1
	2.9	3.8	1.5	natural	79	IP65	**U20X1K5P** (3)	167094	1
	4.0	5.2	2.2	natural	94	IP65	**U20X2K2P** (3)	167095	1
	1.6	2.3	0.75	natural	61	IP65	**U20X0K7PS** (4)	167137	1
	2.9	3.8	1.5	natural	79	IP65	**U20X1K5PS** (4)	167138	1
	4.0	5.2	2.2	natural	94	IP65	**U20X2K2PS** (4)	167139	1

(1) Ratings for standard tree-pole induction motors with four poles.
(2) Units including dynamic braking function. An external braking resistor is needed to perform operation.
(3) IP65 models type U20_ _ P include only keypad in the front cover.
(4) IP65 models type U20_ _ PS include power switch, forward/reverse switch and potentiometer in the front cover.

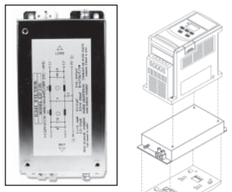
Options and accessories

DIN rail kit



	Applicable to drive	Cat. no.	Ref. no.	Pack
	All drives	**U20AR0K7** (pack of 10 pieces)	167087	1

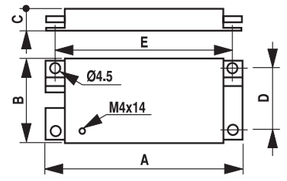
EMC filters



	Applicable to drive	Cat. no.	Ref. no.	Pack
	U20N0K2S U20N0K4S U20N0K7S	**U20AF0K7**	167085	1
	U20N1K5S U20N2K2S	**U20AF2K2**	167086	1
	U20X0K7S U20X1K5S U20X2K2S	**U20AF2K2X**	167084	1

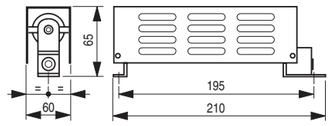
VAT 20 includes as standard a Class A EMC filter, for industrial environment.
For residential environment, the use of external Class B EMC foot print filter is recommended.

Cat. No.	A	B	C	D	E
U20AF0K7	156	76	25	60	145
U20AF2K2	170	221	38	108	156
U20AF2K2X	170	221	38	108	156



Braking resistors
100% braking torque, 10% ED

	Motor (kW)	Applicable to drive	Cat. no.	Ref. no.	Pack
	1.5	U20N1K5	**TLR100P200**	108223	1
	2.2	U20N2K2	**TLR75P200**	116300	1
	0.75	U20X0K7	**TLR750P200**	116301	1
	1.5	U20X1K5	**TLR400P200**	116302	1
	2.2	U20X2K2	**TLR250P200**	108227	1



Reactors

	Losses (W)	Applicable to drive	Cat. no.	Ref. no.	Pack
Input reactors for single phase drives	2.5	U20N0K2S	**ACRP3A7H0**	168490	1
	5	U20N0K4S	**ACRP8A2H5**	168491	1
	7	U20N0K7S	**ACRP12A2H5**	168492	1
	7.5	U20N1K5S	**ACRP18A1H3**	168493	1
	8	U20N2K2S	**ACRP22A0H84**	168494	1
Input reactors for three phase drives	11	U20N1K5S	**ACRP6A2H5**	168496	1
	14	U20N2K2S	**ACRP9A1H3**	168497	1
	8	U20X0K7S	**ACRP3A8H1**	168509	1
	9	U20X1K5S	**ACRP4A5H1**	168510	1
	11	U20X2K2S	**ACRP6A3H4**	168511	1

Cat.No.	Losses W	Fig.	A	B	C	D	E	Ø	Weight (kg)
ACRP3A7H0	2.4	4	75	96	85	80	56	6	1.3
ACRP8A2H5	5.2	4	75	96	100	80	56	6	1.8
ACRP12A2H5	6.8	4	84	102	110	86	65	6	2.7
ACRP18A1H3	7.3	4	96	112	106	96	77	6	3.2
ACRP22A0H84	8	4	96	112	116	96	77	6	3.7
ACRP6A2H5	17	1	120	80	152	41	100	6	1.5
ACRP9A1H3	18	1	120	80	152	41	100	6	1.6
ACRP3A8H1	17	1	120	80	152	41	100	6	1.4
ACRP4A5H1	16	1	120	80	152	41	100	6	1.5
ACRP6A3H4	19	1	120	80	152	41	100	6	1.7

Fig. 4

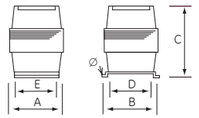
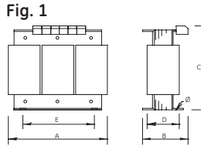


Fig. 1



Dimensions in mm

I/O terminal board specifications

Digital inputs

Symbol	Description	Function
12V	Common digital inputs	12V DC supply for all digital inputs
FWD	Forward run	Used for forward run command
REV	Reverse run	Used for reverse run command
SP1	Multifunction input	This is a programmable digital input Either jog, slow speed, emergency stop, output shut off or reset function are allowed
RST	Fault reset	This is a programmable input set to reset function as default Either jog, slow speed, emergency and output shut off are allowed as well

Digital outputs

Trip relay	Multifunction output	This is a programmable output relay set to fault function as default
1 , 2		Run status and frequency reached are allowed as well

Analogue inputs

MVI	Frequency setting	Programmable analogue frequency signal input 0-10V, 4-20mA or 0-20mA allowed
0V	Common analogue I/O	

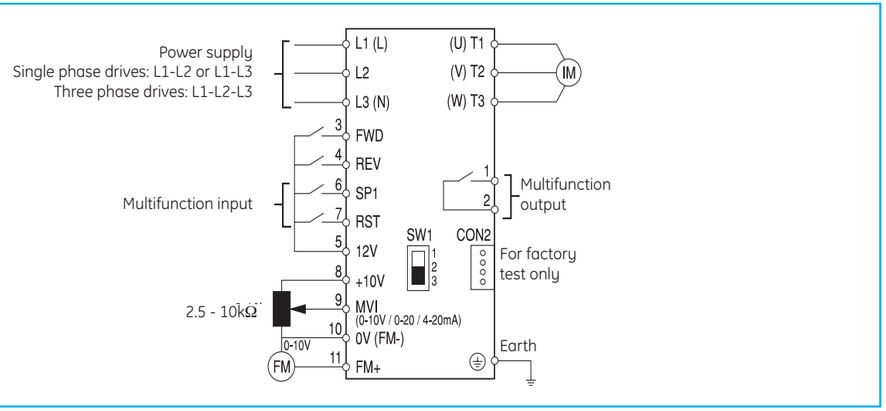
Analogue outputs

FM	Frequency output	Analogue output 0-10V. May be used as speed meter
0V	Common analogue I/O	

Other

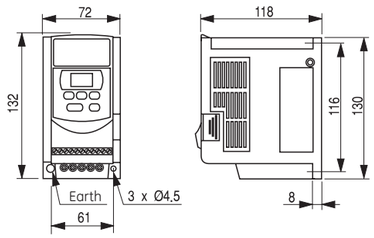
+10V	10V DC source	10V DC power supply for potentiometer 2-10KΩ (2W)

I/O wiring



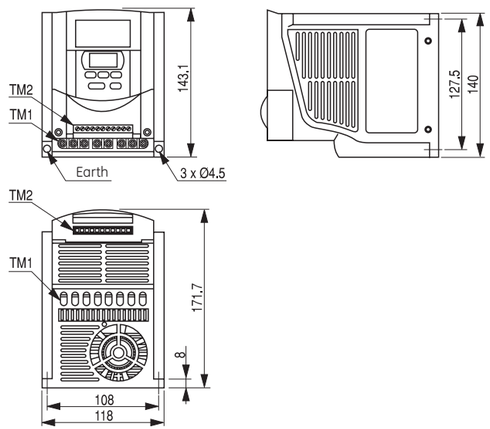
Dimensional drawings

Protection IP20



Cat. no.	Ref. no.	Weight (kg)
U20N0K2S	167075	0.76
U20N0K4S	167076	0.77
U20N0K7S	167077	0.8

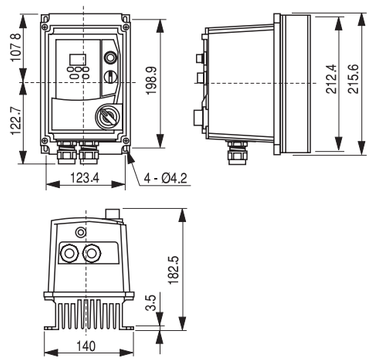
Dimensions in mm



Cat. no.	Ref. no.	Weight (kg)
U20N1K5S	167078	1.66
U20N2K2S	167079	1.76
U20X0K7S	167080	1.60
U20X1K5S	167081	1.60
U20X2K2S	167082	1.63

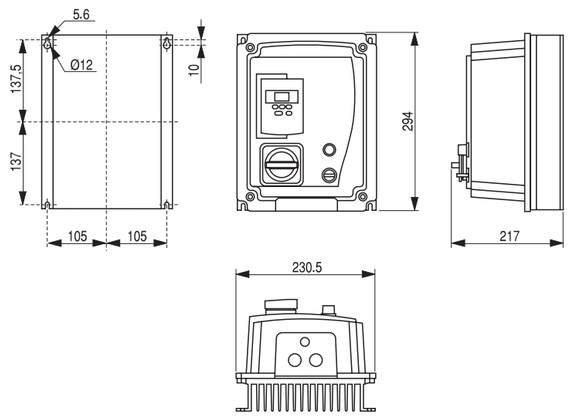
Dimensions in mm

Protection IP65



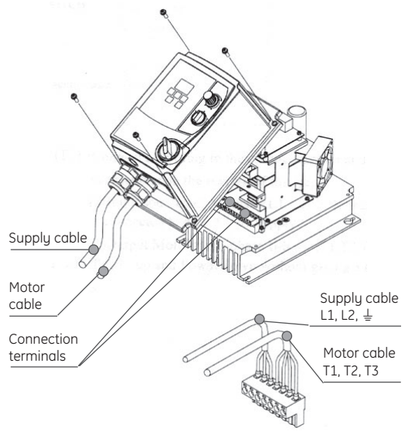
Cat. no.	Ref. no.	Weight (kg)
U20N0K2P	167088	2.9
U20N0K4P	167089	2.9
U20N0K7P	167090	2.9
U20N0K2PS	167132	2.9
U20N0K4PS	167133	2.9
U20N0K7PS	167134	2.9

Dimensions in mm



Cat. no.	Ref. no.	Weight (kg)
U20N1K5P	167091	4.8
U20N2K2P	167092	4.9
U20X0K7P	167093	4.9
U20X1K5P	167094	4.9
U20X2K2P	167095	4.9
U20N1K5PS	167135	5.2
U20N2K2PS	167136	5.3
U20X0K7PS	167137	5.2
U20X1K5PS	167138	5.2
U20X2K2PS	167139	5.2

Dimensions in mm



Approvals

CE cULus UL

Mini AC variable speed drives

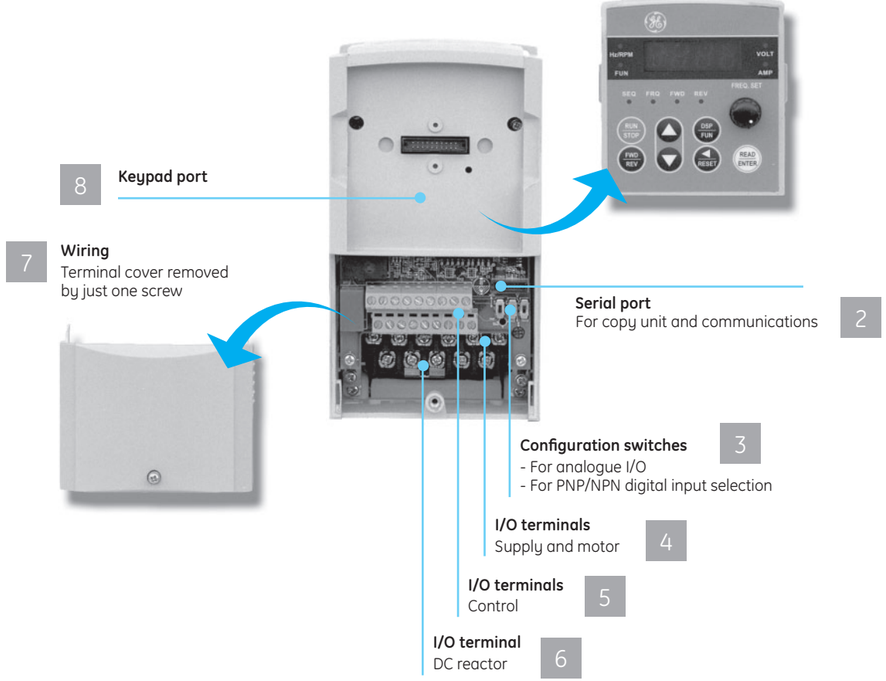
The VAT200 is a well performed, sensorless vector VSD for AC standard motors available in the following ranges:
- From 0.4 to 2.2 kW at 200V, single phase power supply
- From 0.4 to 7.5 kW at 200V, three phase power supply
- From 0.75 to 55 kW at 400V, three phase power supply

Advantages

- Compact size
- Built-in removable LED keypad
- Optional multilanguage LCD keypad
- Sensorless vector control or V/f control, selectable
- Built-in with ModBus RTU communications
- Optional Field bus communication DeviceNet, ProfibusDP
- Integrated EMC filters for U20...FS series
- Built-in with dynamic braking up to 15kW
- Performed with simple PLC and PID functions
- Easy start-up & tunning by PC or keypad
- Advanced programming and drive control by built-in PLC function
- Easy maintenance

Simple and reliable

Removable keypad 1
- LED keypad as standard
- LCD keypad as option



1 and 3 phase speed drives

Input voltage + 10%, -15%, 50/60 Hz (± 5%)	Suitable motor capacity (kW)	Rated output de current (A)	Rated capacity (KVA)	Frame	Cat. no.	Ref. no.	Pack.
 Frame 1							
With EMC filter							
1ph 200V - 240V	0.4	3.1	1.2	1	**U201N00K4FS**	167400	1
	0.75	4.5	1.7	1	**U201N00K7FS**	167401	1
	1.5	7.5	2.9	2	**U201N01K5FS**	167402	1
	2.2	10.5	4.0	2	**U201N02K2FS**	167403	1
Without EMC filter							
1ph 200V - 240V	0.4	3.1	1.2	1	**U201N00K4SS**	167411	1
	0.75	4.5	1.7	1	**U201N00K7SS**	167412	1
	1.5	7.5	2.9	2	**U201N01K5SS**	167413	1
	2.2	10.5	4.0	2	**U201N02K2SS**	167414	1
 Frame 2							
Without EMC filter							
3ph 200V - 240V	0.4	3.1	1.2	1	**U203N00K4SS**	167415	1
	0.75	4.5	1.7	1	**U203N00K7SS**	167416	1
	1.5	7.5	2.9	1	**U203N01K5SS**	167417	1
	2.2	10.5	4	2	**U203N02K2SS**	167418	1
	3.7	17.5	6.7	2	**U203N04K0SS**	167419	1
	5.5	26	9.9	3	**U203N05K5SS**	167420	1
	7.5	35	13.3	3	**U203N07K5SS**	167422	1
 Frame 3							
With EMC filter							
3ph 380V - 480V	0.75	2.3	1.7	1	**U203X00K7FS**	167404	1
	1.5	3.8	2.9	1	**U203X01K5FS**	167405	1
	2.2	5.2	4	2	**U203X02K2FS**	167406	1
	3.7	8.8	6.7	2	**U203X04K0FS**	167407	1
	5.5	13	9.9	3	**U203X05K5FS**	167408	1
	7.5	17.5	13.3	3	**U203X07K5FS**	167409	1
	11	25	19.1	3	**U203X11K0FS**	167410	1
Without EMC filter							
3ph 380V - 480V	0.75	2.3	1.7	1	**U203X00K7SS**	167424	1
	1.5	3.8	2.9	1	**U203X01K5SS**	167425	1
	2.2	5.2	4	2	**U203X02K2SS**	167426	1
	3.7	8.8	6.7	2	**U203X04K0SS**	167427	1
	5.5	13	9.9	3	**U203X05K5SS**	167428	1
	7.5	17.5	13.3	3	**U203X07K5SS**	167429	1
	11	25	19.1	3	**U203X11K0SS**	167430	1
	15	32	27.4	4	**U203X15K0SS**	167481	1
	18.5	40	34	4	**U203X18K5SS**	167482	1
	22	48	41	4	**U203X22K0SS**	167483	1
	30	64	54	5	**U203X30K0SS**	167484	1
	37	80	68	5	**U203X37K0SS**	167485	1
	45	96	82	6	**U203X45K0SS**	167486	1
 Frame 4	55	128	110	6	**U203X55K0SS**	167487	1

Accessories

	Description	Details	Cat. no.	Ref. no.	Pack.
 U200ARS485 / 167435	External dynamic braking unit		**U200ABU430**	167468	1
	Communication interface	Profibus-DP	**U200APB**	167433	1
		DeviceNet	**U200ADN**	167434	1
		RS485	**U200ARS485**	167435	1
		RS232 for PC to drive	**U200ARS232**	167436	1
 U200ARS232 / 167436	NEMA1 boxes	For frame 1 drives	**U200AN101**	167446	1
		For frame 2 drives	**U200AN102**	167447	1
		For frame 3 drives	**U200AN103**	167448	1
	Memory pack	Program copy	**U200AMP**	167437	1
 U200AMP / 167437	Keypad	LED [1]	**U200ALEDK**	167438	1
		LCD multilanguage	**U200ALCDK**	167439	1
		Blank cover	**U200ABK**	167440	1
	Remote wire for keypad	0.5m	**U200AW05**	167441	1
		1.0m	**U200AW10**	167442	1
		2.0m	**U200AW20**	167443	1
		3.0m	**U200AW30**	167444	1
		5.0m	**U200AW50**	167445	1

(1) All VAT200 include a LED keypad U200ALEDK as standard.

Technical data

General specifications

		1ph 200-240V (with / without EMC filter)				3ph 200-240V (without EMC filter)						
		U201N_____S				U203N____SS						
		00K4	00K7	01K5	02K2	00K4	00K7	01K5	02K2	04K0	05K5	07K5
Motor ratings	(HP)	0.5	1	2	3	0.5	1	2	3	5.5	7.5	10
	(kW)	0.4	0.75	1.5	2.2	0.4	0.75	1.5	2.2	3.7	5.5	7.5
Rated output current	(A)	3.1	4.5	7.5	10.5	3.1	4.5	7.5	10.5	17.5	26	35
Rated capacity	(kVA)	1.2	1.7	2.9	4	1.2	1.7	2.9	4	6.7	9.9	13.3
Max. input voltage		Single phase: 200-240V +10 -15%, 50/60Hz ±5%				Three phase: 380-480V, +10 -15%, 50/60Hz ±5%						
Max. output voltage		Three phase: 0 - 240V				Three phase: 0 - 240V						
Input current	(A)	8.5	12	19	27	4.5	6.5	11	15.4	20	29	40

		3ph 380-480V (with / without EMC filter)							3ph 380-480V (without EMC filter)						
		U203X_____S							U203X_____SS						
		00K7	01K5	02K2	04K0	05K5	07K5	11K0	15K0	18K5	22K0	30K0	37K0	45K0	55K0
Motor ratings	(HP)	1	2	3	5.5	7.5	10	15	20	25	30	40	50	60	75
	(kW)	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55
Rated output current	(A)	2.3	3.8	5.2	8.8	13	17.5	25	32	40	48	64	80	96	128
Rated capacity	(kVA)	1.7	2.9	4	6.7	9.9	13.3	19.1	27.4	34	41	54	68	82	110
Max. input voltage		Three phase: 380-480V, +10 -15%, 50/60Hz ±5%							Three phase: 380-480V, +10 -15%, 50/60Hz ±5%						
Max. output voltage		Three phase: 0 - 480V							Three phase: 0 - 480V						
Input current	(A)	4.2	5.6	7.3	11.6	17	23	31	38	48	56	75	92	112	142

Frequency control

Control mode	V /f or sensorless vector control
Range	0.1 to 650.0Hz
Starting torque	150% / 1Hz (sensorless vector)
Speed control range	1 : 50 (sensorless vector)
Speed control accuracy	±0.5% (sensorless vector)
Setting resolution	Digital: 0.01 Hz Analogue: 0.06Hz / 60Hz (10 bits)
Keypad setting	Set directly by △ ▽ keys or by potentiometer on the keypad
Display function	Four digital LED (or 2x16 LCD) and status indicator; display frequency / speed / line speed / DC voltage / output voltage / current / rotation direction / inverter parameter / trouble log / program version
Frequency setting	1. External potentiometer 0-5V / 0-10V / 4-20mA / 5-0V / 10-0V / 20-4mA 2. Performs up/down controls, speed control or automatic procedure control with multifunctional contacts on the terminal block (TM2)
Frequency limit function	Respectively setting upper/lower frequency limits and three-stage skip frequencies

Control

Carrier frequency	2 to 16kHz
V / F pattern	18 fixable patterns, 1 programmable pattern
Acc./Dec. control	Two-stage Acc./Dec. time (0.1 to 3,600 seconds) and two-stage S curve
Multifunctional analog output	5 different functions
Multifunctional input	Assigned to 28 different functions
Multifunctional output	Assigned to 15 different functions
Digital input signal	NPN / PNP toggle
Other functions	Momentary power loss restart, Speed search, Overload detection, Torque detection, 8 preset speeds, Acc./Dec. switch (2 stages), S curve, 3-wire control, PID control, Torque boost, Slip compensation, Frequency upper/lower limit, Auto energy saving, Modbus slave and control link, Abnormal restart, Sequence control, Built-in simple PLC function

Technical data (continued)

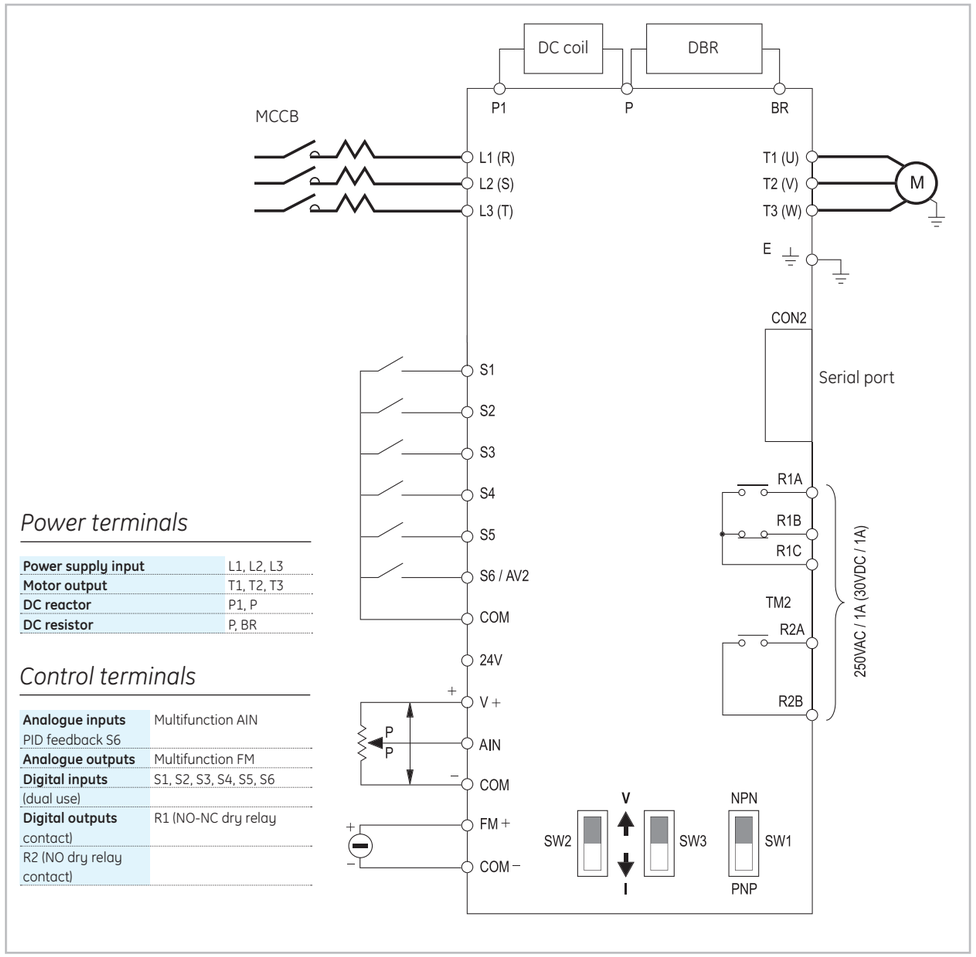
Others

Communication control	Control by RS232 or RS485
	One to one or multilink up to 254 stations (RS485 only)
	Can be set Baud rate, Stop bit and Parity bit
Braking torque	About 100% with braking resistor (20% without braking resistor)
Operation temperature	-10 to +50°C
Storage temperature	-20 to +60°C
Humidity	0 to 95% relative humidity (without condensation)
Vibration	1G (9.8m/S²)
EMC	Comply with requirement EN 61800-3 with optional filter
LVD	Comply with requirement EN 50178
Enclosure	IP20 (NEMA 1 by external box attached)
Safety level	UL 508C

Protective functions

Overload protection	Inverse characteristic overload protection. Max. 150% inverter current rating / 60 sec.	
Fuse protection	The motor stops after FUSE melt	
Overvoltage	**200V class:** DC voltage > 410V	**400V class:** DC voltage > 820V
Undervoltage	**200V class:** DC voltage < 190V	**400V class:** DC voltage < 380V
Momentary power loss restart	Restart after more than 15ms-power loss possible. Programmed up to 2 sec.	
Stall prevention	Stall prevention for Acceleration / Deceleration / Operation	
Short-circuit output terminal	Electronic circuit protection	
Grounding fault	Electronic circuit protection	
Other protections	Heatsink overtemperature, overtorque detection, error contact control, reverse run restriction, restrictions for direct start after power up, error recovery and parameter lock out	

I/O power and control layout



Power terminals

Power supply input	L1, L2, L3
Motor output	T1, T2, T3
DC reactor	P1, P
DC resistor	P, BR

Control terminals

Analogue inputs PID feedback S6	Multifunction AIN
Analogue outputs	Multifunction FM
Digital inputs (dual use)	S1, S2, S3, S4, S5, S6
Digital outputs contact)	R1 (NO-NC dry relay
R2 (NO dry relay contact)	

I/O control terminal description

Symbol	Description		
R2A	Multifunctional terminals - Normally Open		
R2B			Contact rated capacity 250 VAC/1A or 30 VDC/1A
R1C	Common contact	Multifunctional terminals Normally Open	
R1B	Normally Closed contact		
R1A	Normally Open contact		
10V	Frequency knob (VR) power source terminal		
AIN	Analogue frequency signal input terminal		
24V	Common source for S1 to S5 in PNP input.		
	Selectable by switch on main PCB		
COM	Common terminal for S1 to S5 in NPN input.		
	Selectable by switch on main PCB		
FM +	Multifunction analog output, 0-10V DC		
S1	Multifunction input terminals		
S2			
S3			
S4			
S5			
S6 / AV2	Digital input or PID input terminal (selectable)		

External accessories

	VAT200		Losses W	AC reactors		DC reactors		Tubular resistors	
1ph 200-240V									
With EMC filter	**U201N00K4FS**	167400	32	**ACRP8A2H5**	168491	**DCR4A5H7**	168387	**TLR200P200**	129165
	U201N00K7FS	167401	50	**ACRP12A2H5**	168492	**DCR6A3H9**	168388	**TLR200P200**	129165
	U201N01K5FS	167402	85	**ACRP18A1H3**	168493	**DCR9A2H4**	168389	**TLR100P200**	108223
	U201N02K2FS	167403	157	**ACRP22A0H84**	168494	**DCR12A1H7**	168390	**TLR75P200**	116300
Without EMC filter	**U201N00K4SS**	167411	28	**ACRP8A2H5**	168491	**DCR4A5H7**	168387	**TLR200P200**	129165
	U201N00K7SS	167412	45	**ACRP12A2H5**	168492	**DCR6A3H9**	168388	**TLR200P200**	129165
	U201N01K5SS	167413	77	**ACRP18A1H3**	168493	**DCR9A2H4**	168389	**TLR100P200**	108223
	U201N02K2SS	167414	142	**ACRP22A0H84**	168494	**DCR12A1H7**	168390	**TLR75P200**	116300
3ph 200-240V									
Without EMC filter	**U203N00K4SS**	167415	28	**ACRP4A2H5**	168495	**DCR4A5H7**	168387	**TLR200P200**	129165
	U203N00K7SS	167416	44	**ACRP6A2H5**	168496	**DCR6A3H9**	168388	**TLR200P200**	129165
	U203N01K5SS	167417	74	**ACRP9A1H3**	168497	**DCR9A2H4**	168389	**TLR100P200**	108223
	U203N02K2SS	167418	140	**ACRP12A0H84**	168498	**DCR12A1H7**	168390	**TLR75P200**	116300
	U203N04K0SS	167419	247	**ACRP18A0H56**	168499	**DCR18A1H0**	168391	**TLR44P600**	129166
	U203N05K5SS	167420	274	**ACRP27A0H37**	168500	**DCRP32A0H78**	168542	**TLR29P600**	129167
	U203N07K5SS	167422	372	**ACRP35A0H27**	168501	**DCRP45A0H55**	168543	**TLR22P600**	129168
3ph 380-480V									
With EMC filter	**U203X00K7FS**	167404	45	**ACRP3A8H1**	168509	**DCR3A15H2**	168392	**TLR750P200**	116301
	U203X01K5FS	167405	69	**ACRP4A5H1**	168510	**DCR4A9H2**	168393	**TLR400P200**	116302
	U203X02K2FS	167406	137	**ACRP6A3H4**	168511	**DCR6A6H8**	168394	**TLR240P200**	108227
	U203X04K0FS	167407	231	**ACRP10A2H**	168512	**DCR9A4H0**	168395	**TLR175P600**	129173
	U203X05K5FS	167408	361	**ACRP14A1H4**	168513	**DCRP18A2H9**	168555	**TLR118P600**	129174
	U203X07K5FS	167409	446	**ACRP18A1H1**	168514	**DCRP25A2H1**	168556	**TLR86P600**	129175
	U203X11K0FS	167410	656	**ACRP27A0H75**	168515	**DCRP32A1H6**	168557	**TLR43P1000**	129177
Without EMC filter	**U203X00K7SS**	167424	40	**ACRP3A8H1**	168509	**DCR3A15H2**	168392	**TLR750P200**	116301
	U203X01K5SS	167425	62	**ACRP4A5H1**	168510	**DCR4A9H2**	168393	**TLR400P200**	116302
	U203X02K2SS	167426	123	**ACRP6A3H4**	168511	**DCR6A6H8**	168394	**TLR240P200**	108227
	U203X04K0SS	167427	208	**ACRP10A2H**	168512	**DCR9A4H0**	168395	**TLR175P600**	129173
	U203X05K5SS	167428	325	**ACRP14A1H4**	168513	**DCRP18A2H9**	168555	**TLR118P600**	129174
	U203X07K5SS	167429	402	**ACRP18A1H1**	168514	**DCRP25A2H1**	168556	**TLR86P600**	129175
	U203X11K0SS	167430	591	**ACRP27A0H75**	168515	**DCRP32A1H6**	168557	**TLR43P1000**	129177
	U203X15K0SS	167481	1051	**ACRP35A0H58**	168516	-	-	**TLR43P1000**	129177
	U203X18K0SS(1)	167482	1218	**ACRP38A0H58**	168517	-	-	**TLR35P1500**	129877
	U203X22K0SS(1)	167483	1449	**ACRP45A0H45**	168518	-	-	**TLR29P1800**	129878
	U203X30K0SS(1)	167484	1608	**ACRP70A0H29**	168519	included	-	**TLR22P2500**	129879
	U203X37K0SS(2)	167485	1993	**ACRP90A0H22**	168520	included	-	**TLR35P1500**(3)	129877
	U203X45K0SS(2)	167486	2270	**ACRP115A0H18**	168521	included	-	**TLR29P1800**(3)	129878
	U203X55K0SS(2)	167487	2957	**ACRP160A0H14**	168522	included	-	**TLR22P2500**(3)	129879

(1) (2) Drives 18.5kW and above do not built dynamic braking. In case this is needed, use external braking unit U200ABU430.
(2) (3) Dynamic braking for drives 45kW, 55kW may need the use of two sets of braking units U200ABU430 in parallel with two sets of braking resistors (one resistor per breaking unit).

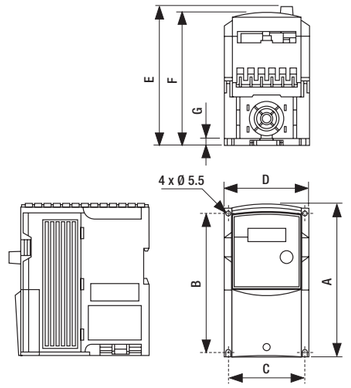
EMC compliance

Drives with built-in filter type U20....FS, comply with EN 618000-3 second environment.
To comply with first environment restricted sector, or to allow EMC compliance to U20....SS drives, an external filter has to be used according following table

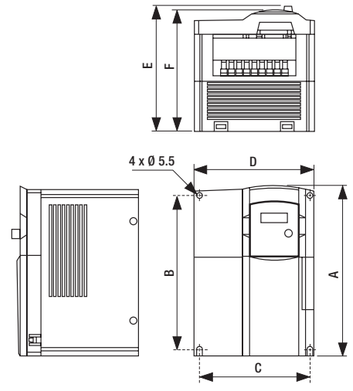
	VAT200		Second environment		First environment	
1ph 200-240V With EMC filter	**U201N00K4FS**	167400	Not needed		**U200F611TA1**	167453
	U201N00K7FS	167401	Not needed		**U200F611TA1**	167453
	U201N01K5FS	167402	Not needed		**U200F627TA2**	167454
	U201N02K2FS	167403	Not needed		**U200F627TA2**	167454
Without EMC filter	**U201N00K4SS**	167411	**U200F611TA1**	167453		
	U201N00K7SS	167412	**U200F611TA1**	167453		
	U201N01K5SS	167413	**U200F627TA2**	167454		
	U201N02K2SS	167414	**U200F627TA2**	167454		
3ph 200-240V Without EMC filter	**U203N00K4SS**	167415	**U200F709TA1**	167456		
	U203N00K7SS	167416	**U200F709TA1**	167456		
	U203N01K5SS	167417	**U200F709TA1**	167456		
	U203N02K2SS	167418	**U200F719TA2**	167457		
	U203N04K0SS	167419	**U200F719TA2**	167457		
	U203N05K5SS	167420	**U200F739TA3**	167458		
	U203N07K5SS	167422	**U200F739TA3**	167458		
3ph 380-480V With EMC filter	**U203X00K7FS**	167404	Not needed		**U200F905TA1**	167459
	U203X01K5FS	167405	Not needed		**U200F905TA1**	167459
	U203X02K2FS	167406	Not needed		**U200F910TA2**	167460
	U203X04K0FS	167407	Not needed		**U200F910TA2**	167460
	U203X05K5FS	167408	Not needed		**U200F928TA3**	167461
	U203X07K5FS	167409	Not needed		**U200F928TA3**	167461
	U203X11K0FS	167410	Not needed		**U200F928TA3**	167461
Without EMC filter	**U203X00K7SS**	167424	**U200F905TA1**	167459		
	U203X01K5SS	167425	**U200F905TA1**	167459		
	U203X02K2SS	167426	**U200F910TA2**	167460		
	U203X04K0SS	167427	**U200F910TA2**	167460		
	U203X05K5SS	167428	**U200F928TA3**	167461		
	U203X07K5SS	167429	**U200F928TA3**	167461		
	U203X11K0SS	167430	**U200F928TA3**	167461		
	U203X15K0SS	167481	**U200F34048SMA**	167474		
	U203X18K0SS	167482	**U200F370A**	167475		
	U203X22K0SS	167483	**U200F370A**	167475		
	U203X30K0SS	167484	**U200F3100A**	167476		
	U203X37K0SS	167485	**U200F3100A**	167476		
	U203X45K0SS	167486	**U200F3150A**	167477		
	U203X55K0SS	167487	**U200F3180A**	167478		

Dimensions

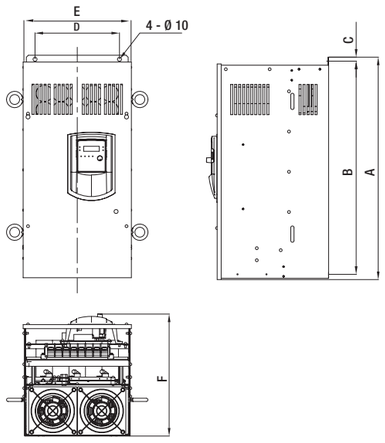
Speed drive



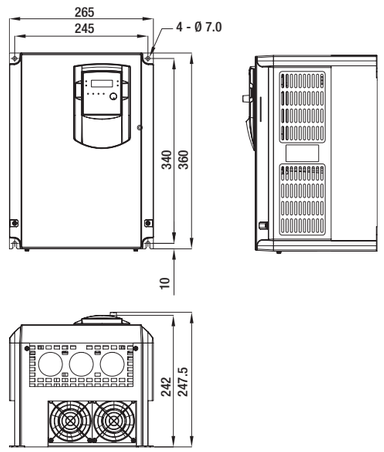
	Weight (kg)		Dimensions (mm)						
	Series								
	SS	FS	A	B	C	D	E	F	G
U201N00K4..	1.2	1.3	163	150	78	90	147	141	7
U201N00K7..	1.2	1.3							
U203N00K4..	1.2	-							
U203N00K7..	1.2	-							
U203N01K5..	1.2	-							
U203X00K7..	1.2	1.3							
U203X01K5..	1.2	1.3							
U201N01K5..	1.5	1.8	187	170.5	114.5	128	148	142	7
U201N02K2..	1.9	2.3							
U203N02K2..	1.75	-							
U203N04K0..	1.9	-							
U203X02K2..	1.8	2.2							
U203X04K0..	1.9	2.3							



	Weight (kg)		Dimensions (mm)					
	Series							
	SS	FS	A	B	C	D	E	F
U203N05K5..	5.6	-	260	244	173	186	195	188
U203N07K5..	5.6	-						
U203X05K5..	5.6	6.6						
U203X07K5..	5.6	6.6						
U203X11K0..	5.6	6.6						



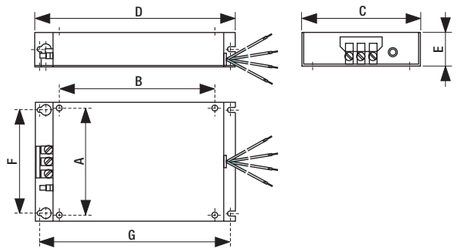
	Weight (kg)	Dimensions (mm)					
		A	B	C	D	E	F
U203X30K0SS	33	553	530	10	210	269	303
U203X37K0SS	33	553	530	10	210	269	303
U203X45K0SS	50	653	630	10	250	308	308
U203X55K0SS	50	653	630	10	250	308	308



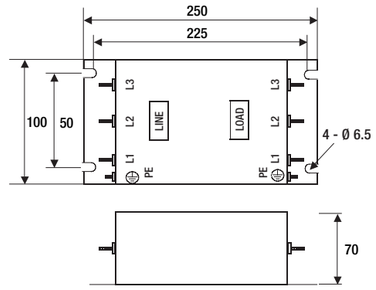
	Weight (kg)
U203X15K0SS	15
U203X18K5SS	15
U203X22K0SS	15

Dimensions (continued)

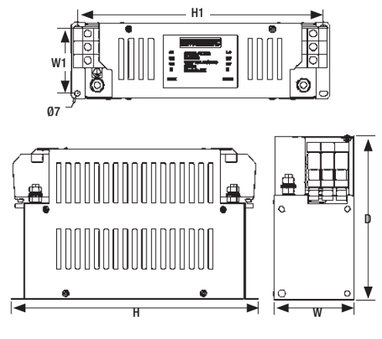
EMC external filter



		Inverter mounting		External filter size			External filter mount.	
		A	B	C	D	E	F	G
U200F611TA1	167453	78	150	91	192	28	74	181
U200F709TA1	167456							
U200F905TA1	167459							
U200F627TA2	167454	114.5	170.5	128	215	37	111	204
U200F719TA2	167457							
U200F910TA2	167460							
U200F739TA3	167458	173	244	188	289	42	165	278
U200F928TA3	167461							

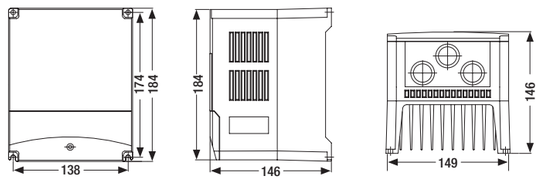


U200F34048SMA 167474



		Dimensions (mm)						
		W	W1	H	H1	D	d	M
U200F370A	167475	93	79	312	298	190	7	M6
U200F3100A	167476	93	79	312	298	190	7	M6
U200F3150A	167477	126	112	312	298	224	7	M6
U200F3180A	167478	126	112	312	298	224	7	M6

External dynamic braking unit



		Weight (kg)
U200ABU430	167468	2.3

Dimensions (continued)

AC input reactors

Fig. 1

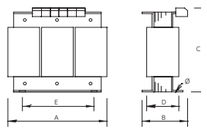


Fig. 3

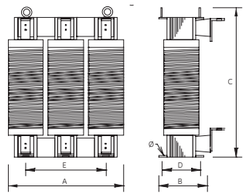
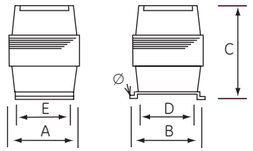


Fig. 4



Cat. No.	Ref.No.	Losses W	Fig.	Dimensions (mm)						Weight (kg)
				A	B	C	D	E	Ø	
ACRP8A2H5	168491	5.2	4	75	96	100	80	56	6	1.8
ACRP12A2H5	168492	6.8	4	84	102	110	86	65	6	2.7
ACRP18A1H3	168493	7.3	4	96	112	106	96	77	6	3.2
ACRP22A0H84	168494	8	4	96	112	116	96	77	6	3.7
ACRP4A2H5	168495	16	1	120	80	152	41	100	6	1.3
ACRP6A2H5	168496	18	1	120	80	152	41	100	6	1.5
ACRP9A1H3	168497	17	1	120	80	152	41	100	6	1.6
ACRP12A0H84	168498	18	1	120	80	152	41	100	6	1.7
ACRP18A0H56	168499	21	1	120	90	152	51	100	6	2.4
ACRP27A0H37	168500	32	1	150	95	183	46	125	6	3.3
ACRP35A0H27	168501	35	1	150	95	183	46	125	6	3.7
ACRP3A8H1	168509	17	1	120	80	152	41	100	6	1.4
ACRP4A5H1	168510	16	1	120	80	152	41	100	6	1.5
ACRP6A3H4	168511	19	1	120	80	152	41	100	6	1.7
ACRP10A2H	168512	23	1	120	90	152	51	100	6	2.5
ACRP14A1H4	168513	29	1	150	95	178	46	125	6	3.2
ACRP18A1H1	168514	35	1	150	95	178	46	125	6	4
ACRP27A0H75	168515	77	1	150	106	233	72	100	9	4.8
ACRP35A0H58	168516	98	1	150	111	233	77	100	9	5.5
ACRP38A0H58	168517	96	1	150	116	233	82	100	9	6.4
ACRP45A0H45	168518	102	1	150	121	233	87	100	9	7.1
ACRP70A0H29	168519	147	1	150	151	250	117	100	9	11
ACRP90A0H22	168520	158	1	180	136	286	102	120	9	13.1
ACRP115A0H18	168521	186	1	180	156	301	122	120	9	16.9
ACRP160A0H14	168522	268	3	240	181	288	107	160	9	25.7

DC reactors

Fig. 2

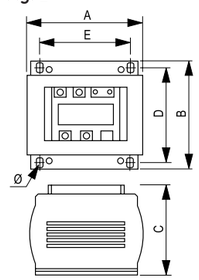
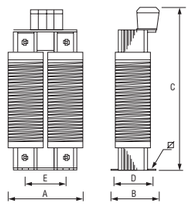


Fig. 5



Cat. No.	Ref.No.	Losses W	Fig.	Dimensions (mm)						Weight (kg)
				A	B	C	D	E	Ø	
DCR4A5H7	168387	4	2	50	97	84	80	34	6	0.78
DCR6A3H9	168388	6	2	50	97	94	80	34	6	0.94
DCR9A2H4	168389	9	2	75	96	95	80	56	6	1.3
DCR12A1H7	168390	15	2	75	96	95	80	56	6	1.3
DCR18A1H0	168391	22	2	75	96	110	80	56	6	1.8
DCR3A15H2	168392	4	2	50	97	94	80	34	6	0.94
DCR4A9H2	168393	4	2	75	96	95	80	56	6	1.3
DCR6A6H8	168394	6	2	75	96	95	80	56	6	1.3
DCR9A4H0	168395	9	2	75	96	95	80	56	6	1.3
DCRP32A0H78	168542	37	5	100	110	173	91	75	6	3.9
DCRP45A0H55	168543	33	5	120	110	203	86	90	6	6.1
DCRP18A2H9	168555	42	5	100	95	178	76	75	6	3.5
DCRP25A2H1	168556	54	5	100	95	183	76	75	6	3.5
DCRP32A1H6	168557	59	5	100	110	183	91	75	6	3.9

Highlight of benefits

One family
- Designed for general purpose applications
- For both constant and variable torque applications
- Just one drive series to run an entire production line
- Broad range: 180W to 1.4 MW, 230 V – 690 V

Designed for lifetime
- Built-in DC chokes increase the lifetime of the capacitors
- Conformal coating available

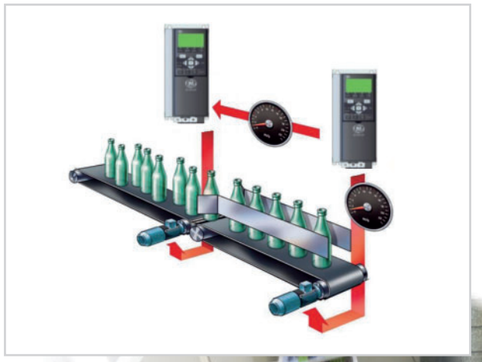
Low operating costs
- Low energy consumption – up to 98% efficiency
- Less energy needed for cooling
- Automatic Energy Optimizer (AEO) potentially saves up to 5% energy compared to standard drives
- Low cost of ownership – no periodic maintenance/ replacement cost
- Energy saving up to 40% depending on the application

Constant torque applications Heavy Duty

Constant torque applications include those where the load does not change significantly with the speed as conveyors, lifting gear and mixers.

A motor block on a conveyor will always weight the same, regardless of whether the conveyor is running at low or high speed.
The torque required to move this motor block is always the same. Although friction and acceleration torques will vary depending on the operating state, the torque requirement for the load remains constant.

The power required by a system of this type is proportional to the torque required and to the speed of the motor.
Savings can be achieved directly if the speed can be reduced at constant load. Adapting the speed of the belt to the quantity of goods to be transported not only enables those goods to be processed without interruption but also leads to a reduction on the energy required.
Even if it is not possible or desirable to adapt the speed, most speed drives will still bring about reductions in energy consumption, since they regulate the motor's output voltage depending on load and as the load rises, it will increase the voltage.



New

Variable torque applications Light Duty

Often involve pumps and fans. However, a distinction has to be made in the case of pumps. Although the most popular types of centrifugal pump have a quadratic torque characteristic but eccentric, vacuum or positive displacement pumps have a constant torque characteristic. Pumps and fans have a significant share of all power consumed by industrial applications, with consumption levels approximately at 40%. Speed control is a simple yet very effective way of saving energy where fans and pumps with variable load torques are concerned.

Reducing the speed generates a cubic reduction in energy requirements. This significant potential for savings makes all applications with variable torque ideal candidates for the implementation of energy saving. Operators need to take into account that changes in speed alter the operating point and affect the efficiency. If the difference between the maximum power required and average part-load operation is too great, systems should be cascaded. It is often the case that investments pay for themselves relatively quickly when existing systems are converted.

Built-in class A2 RFI filter

- Drive is ready to use and faults due to incorrect installation or wrong filter selection are avoided
- No over sizing of drive necessary – with motor cables of up to 300m
- Immunity from electrical interference and minimal emission
- Saves panel space and installation costs
- A1 and B1 Filter available as factory option
- Facilitates meeting CE EMC directives (requirement for EU markets)

Built-in DC link reactor

- Low harmonic emission: THDi < 48%
- No voltage drop => full output voltage
- Reduces installation cost
- Fulfils EN 61000-3-2/3-12
- True power factor 0.9

Reliable operation in harsh environment

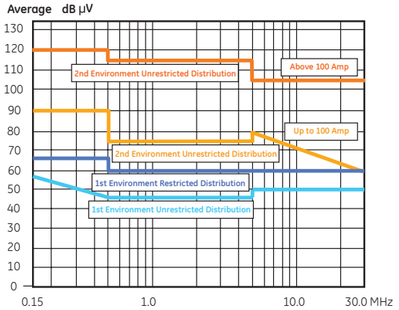
- Protection against environmental pollution, aggressive gasses, moisture and dust
- Reduces the probability of failure resulting in less down-time
- Increases the lifetime of the drive
- High protection Class 3C2 **as standard** and increased protection in harsh environments with Class 3C3 **as optional**
- Optional conformal coating is tested to ANSI/ISA S71.04-1985 Class G3 (airborne gasses - harsh) and Class GX (airborne gasses - severe)

Intelligent heat management

- Cooling fans are easily cleaned without touching the electronics
- 100% cooling air via segregated rear heat-sink– protects the electronic against aggressive environments
- Temperature controlled fan

High immunity

- Immunity to fluctuating supply voltage (+/- 10%)
- Efficient overvoltage protection
- Fully short-circuit- and earth-leakage proof
- 100kA prospective short-circuit current capability
- No voltage drop and unnecessary de-rating of motor – no external line chokes needed



Domestic - 1st Environment	EN55011 cl. B EN55011 cl. A1
Industrial - 2nd Environment	EN55011 cl. A2 EN55011 cl. A2

New

AF-600 FP - Special pump functions

No flow detection

- No flow detection is based on speed and power
- Two sets of data must be programmed into the drive
- Manual or auto set up
- Used to enable sleep mode in closed loop systems for energy savings

End-of-curve protection

- If there is a water leak in the pipe, it will not produce pressure
- The pump is delivering a large volume of water but cannot maintain the static head
- Drive will go to full flow to try producing pressure (set point)
- The drive running at high speed with a feedback signal less than 97.5% of the set point pressure causes End of Curve action

Dry pump protection

- Special no-flow condition, where pressure can not be produced, if there is no water
- Drive will go to full speed to try producing full pressure
- Low power consumption at high speed causes Dry Pump action

New

PC software tool DCT-10

One PC tool for all tasks
- Explorer-like view
- On and offline commission
- Help description for each drive parameter
- Oscilloscope function
- Option programming
- Logging of alarms and warnings for improved system performance and documentation

Interacts with process management
Communicates through USB, RS485 or Network

Plug-in option modules

- Tailored for specific application needs
- Low handling cost
- Easy service/ upgrade with a wide range of options
- Field installable Plug n' Play and self configuring

1 A slot : Network option modules
2 B slot : I/O option modules
3 24 Vdc External supply option module

Control wiring and PC connections

- Reduced installation time - Pluggable terminal block for easy installation
- Improved installation quality
- Spring terminals provide better contact than screw terminals
- Thin or thick wires (1.5mm² solid/1.0mm² stranded wire)

Built-in control card I/O

Inputs / Outputs
- 6 digital I/O (0-24 Vdc)
  - 2 configurable as Digital Outputs
  - 2 configurable as Pulse I/O
  - Configurable as PNP or NPN
- 2 form C relay outputs with on/off delays
- 2 analogue Input (10V or 0/4-20mA)
- 1 analogue Output (0/4-20mA)

Serial ports
- RS 485 Port
  - Supports multi-drop connections
  - Supports 1.2 km cables
  - Switchable network termination
  - Modbus RTU
- USB Port
  - Simple USB direct cable connection ~3m max.
  - Point - to - point

Network option modules

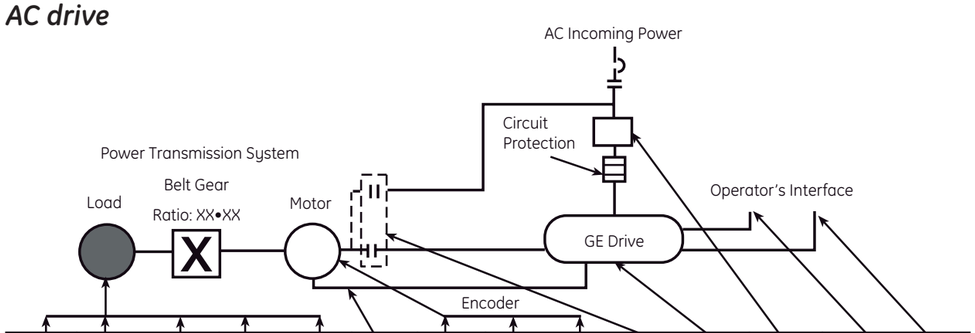
- Support for all leading protocols
- Easy installation and commissioning
  - Top cable entry -or-
  - Bottom cable entry (if used you cannot add I/O option modules)
- Built-in Networks: Modbus RTU
- Network option modules: Profibus DP, DeviceNet, Ethernet IP, Modbus TCP, Profinet RT
- Additional Option Modules for AF-600 FP: BACnet and LonWorks

New

Inquiry customer data for dimensioning of variable speed drives

Nominal Motor Data (Type Plate)			
Motor Type :	Manufacturer:		
Nominal Power Pn:	kW		
Nominal Voltage Un (Y/Δ):	V	Nominal Current I_N (Y/Δ):	A
Nominal Speed:	min^{-1}	cos φ	
Specifications:			
Grid Voltage:		Grid Type (IT/TT/TN):	
Length of Motorcable:		Degree of EMC :	
Application Area (Industry / Residential) :			
Special Exigencies:			
Application Description:			
Torque characteristics (Constant/Quadratic):			
Overload (110/160%):			
Speed Range:			
Braking Torque:			
Desired Functionalities:			
Specification:			
Communication System:			
Protection Degree:	IP	Special Ambient Conditions	

AC drive



Machine Name/No.	Load Type CT, VT, CH	Starting Torque	Max. Torque	Reversing/ Non- Rev.	Encoder Y/N	Hp and Base Speed	Speed Range ex.: 10:1	Speed Regulation	Bypass Req'd. (Y/N)	Inverter Hp/FLA	Reactor Req'd. (Y/N)	Operator's Device & Sys. Controls	RS-485/ Genius/LAN
1													
2													
3													
4													
5													
6													

General information: Circuit protection guidelines

For some products, incoming line fuses are required to meet the basic UL listing requirements.
Consult AF-6 Series individual drive design guides for fuse recommendations.
The NEC defines several types of control circuits and the overcurrent protection required for each type.

Type enclosures: IP00, IP20, IP21, IP54, IP55 and IP66 - IEC 60529 - ingress protection (IP) codes

First digit	Protection against foreign objects	Second digit	Protection against moisture
0	Not protected	0	Not protected
1	Protected against objects greater than 50 mm	1	Protected against dripping water
2	Protected against objects greater than 12 mm	2	Protected against dripping water when tilted up to 15°
3	Protected against objects greater than 2.5 mm	3	Protected against spraying water
4	Protected against objects greater than 1.0 mm	4	Protected against splashing water
5	Dust protected	5	Protected against water jets
6	Dust tight	6	Protected against heavy seas
-		7	Protection against the effects of immersion
-		8	Protection against submersion

Type enclosures: NEMA 1, NEMA 4, NEMA 12 - UL50 and CSAC22.2 no. 94-M91

NEMA 1	Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment and to provide a degree of protection against falling dirt.
NEMA 4	Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt, rain, sleet, snow, wind-blown dust, splashing water, hose-directed water, and corrosion; and that will be undamaged by external formation of ice on the enclosure.
NEMA 12	Enclosures constructed (without knockouts) for indoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt; against circulating dust, lint, fibers, and flyings; and against dripping and light splashing of liquids.

AF-60 LP - Micro Drives

The Micro Drive AF-60 LP is a compact but powerful and easy to use AC variable frequency drive.
The drive is available in its standard configuration that includes built-in Brake chopper for 1.5kW/2HP and above, single-turn potentiometer for speed reference and LCD keypad display that can be remotely mounted.

Following models are available:
- Single-phase, 230Vac, from 0.18 to 2.2kW, 1/4 to 3HP
- Three-phase, 230Vac, from 0.25 to 3.7kW, 1/3 to 5HP
- Three-phase, 400Vac, from 0.37 to 22kW, 1/2 to 30HP

Approvals / Marking

UL, cUL, C-Tick

Applications

- Fans
- Pumps
- Mixers
- Conveyors
- Material handling
- Industrial machinery, including: agitators, lathes, spinning machines, machine tools, packaging equipment, plastics and woodworking

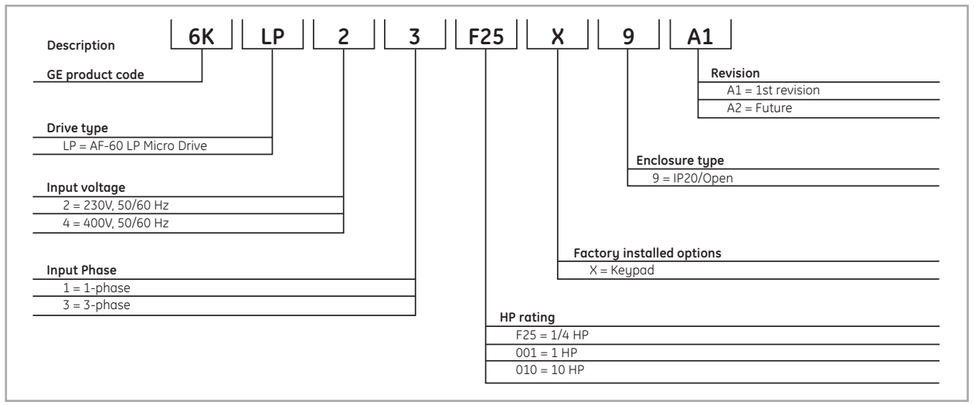
Features

Ready to start from the beginning
- Self-protecting features
- 150% current overload up to 1 minute
- "Pick up" start (catch a spinning motor)
- Potentiometer on keypad
- Keypad is hot pluggable and can be password protected
- RS485 communication, Modbus protocol
- RFI class A1 filter built-in
- Dynamic brake incorporated from 1.5kW
- High level functions, PI for feedback systems, mechanical brake control for lifts
- Easy to use PC software
- Integrated logic control, PLC

Built-in durability
- Robust housing (IP20) protects the drive and allows side-by-side mounting
- Conformal coated circuit boards and high quality capacitors maximize uptime
- Intelligent heat management leads to long life

Built-in simplicity speeds installation and set-up
- Installation and set-up immediate
- Wiring diagram, template and quick guide
- DIN-rail kit optional, to 2.2kW

Product numbering system diagram



Product number for illustrative purposes only

New

IP20

230 Vac, 1-phase, 50/60 Hz input

Nominal motor ratings									
Power kW	Power HP	Current A	Cat. No.	Ref. No.	Unit Size	Efficiency (%) [1]	Losses (W) [1]	NEMA 1 kit	DIN-rail mounting kit
0.18	1/4	1.2	6KLP21F25X9A1	**404774**	M1	94.5	15.5	NEMA1ACLP1	RMACLP1
0.37	1/2	2.2	6KLP21F50X9A1	**404775**	M1	95.6	25.0	NEMA1ACLP1	RMACLP1
0.75	1	4.2	6KLP21001X9A1	**404776**	M1	96.0	44.0	NEMA1ACLP1	RMACLP1
1.5	2	6.8	6KLP21002X9A1	**404777**	M2	96.7	67.0	NEMA1ACLP2	RMACLP1
2.2	3	9.6	6KLP21003X9A1	**404778**	M3	97.1	85.1	NEMA1ACLP3	N/A

230 Vac, 3-phase, 50/60 Hz input

0.25	1/3	1.5	6KLP23F33X9A1	**404779**	M1	94.9	20.0	NEMA1ACLP1	RMACLP1
0.37	1/2	2.2	6KLP23F50X9A1	**404780**	M1	95.8	24.0	NEMA1ACLP1	RMACLP1
0.75	1	4.2	6KLP23001X9A1	**404781**	M1	96.3	39.5	NEMA1ACLP1	RMACLP1
1.5	2	6.8	6KLP23002X9A1	**404782**	M2	97.2	57.0	NEMA1ACLP2	RMACLP1
2.2	3	9.6	6KLP23003X9A1	**404783**	M3	97.4	77.1	NEMA1ACLP3	N/A
3.7	5	15.2	6KLP23005X9A1	**404784**	M3	97.4	122.8	NEMA1ACLP3	N/A

400 Vac, 3-phase, 50/60 Hz input

0.37	1/2	1.2	6KLP43F50X9A1	**404785**	M1	95.5	25.5	NEMA1ACLP1	RMACLP1
0.75	1	2.2	6KLP43001X9A1	**404786**	M1	96.0	43.5	NEMA1ACLP1	RMACLP1
1.5	2	3.7	6KLP43002X9A1	**404787**	M2	97.2	56.5	NEMA1ACLP2	RMACLP1
2.2	3	5.3	6KLP43003X9A1	**404788**	M2	97.1	81.5	NEMA1ACLP2	RMACLP1
4	5	9	6KLP43005X9A1	**404789**	M3	98.0	133.5	NEMA1ACLP3	N/A
5.5	7.5	12	6KLP43007X9A1	**404790**	M3	98.0	166.8	NEMA1ACLP3	N/A
7.5	10	15.5	6KLP43010X9A1	**404791**	M3	98.0	217.5	NEMA1ACLP3	N/A
11	15	23	6KLP43015X9A1	**404792**	M4	97.4	342	NEMA1ACLP4	N/A
15	20	31	6KLP43020X9A1	**404793**	M4	97.4	454	NEMA1ACLP4	N/A
18.5	25	37	6KLP43025X9A1	**404794**	M5	98.0	428	NEMA1ACLP5	N/A
22	30	43	6KLP43030X9A1	**404795**	M5	97.9	520	NEMA1ACLP5	N/A

Brake chopper is included with 2HP / 1.5kW drives and above
(1) At rated load conditions

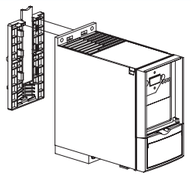
Options, accessories and replacement parts

Remote mounting kit for keypad

Remote mounting kit for mounting keypad on enclosure doors.
Kit includes gasket, mounting brackets, and cable. Keypad is rated IP21.

Description	Cat. No.	Ref. No.
Remote mounting kit for keypad	RMKYPDACLP1	**404797**

DIN-rail mounting kit

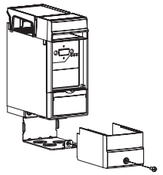


This adapter can be used to mount AF-60 LP Micro Drives at 0.75kW/1HP and below to 35mm DIN-rail.

Description	Cat. No.	Ref. No.
DIN-rail mounting kit for unit size M1 or M2[1]	RMACLP1	**404806**

(2) Please note that these DIN-rail mounting kits only include bottom cover.

NEMA 1 kit

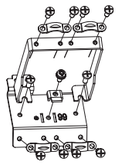


This kit can be mounted to the IP20 protected AF-60 LP Micro Drives to provide NEMA type 1 protection.

Description	Cat. No.	Ref. No.
For 0.75kW/1HP and below drives	NEMA1ACLP1	**404798**
For 1.5kW/2HP at 230V, 2.2kW/3HP at 400V and below drives	NEMA1ACLP2	**404799**
For 2.2kW/3HP at 230V, 3.7kW/5HP at 400V and above drives	NEMA1ACLP3	**404800**
For 11kW/15HP and 15kW/20HP at 400V drives	NEMA1ACLP4[2]	**404801**
For 18.5kW/25HP and 22kW/30HP at 400V drives	NEMA1ACLP5[2]	**404802**

(2) Please note that these NEMA 1 kits only include bottom cover.

De-coupling plate kit



For EMC applications and strain relief for drive wiring.

Description	Cat. No.	Ref. No.
For 1.5kW/2HP at 230V, 2.2kW/3HP at 400V and below drives	DEPLTACLP1	**404804**
For 2.2kW/3HP at 230V, 3.7kW/5HP at 400V and above drives	DEPLTACLP2	**404805**
For 11kW/15HP at 400V and above drives	DEPLTACLP3	**404803**

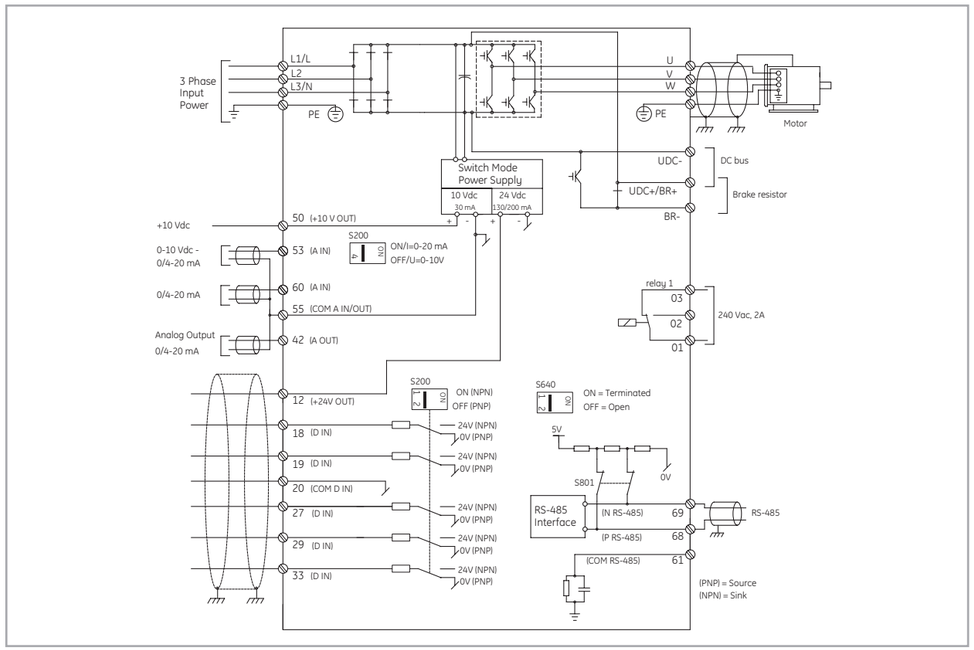
Replacement keypad with potentiometer

LCD keypad with potentiometer for the AF-60 LP Micro Drive. Keypad is removable under power and includes copycat feature to program multiple drives. Includes hand-off-auto keys for local control of drive and large parameter and operational data display. Menu key selects between drive status, quick menu, and main menu. LED indicators for alarms, warnings, and power are also included on each keypad. Keypad dimensions are: 85 H x 65 W x 28 D (with potentiometer) in mm.

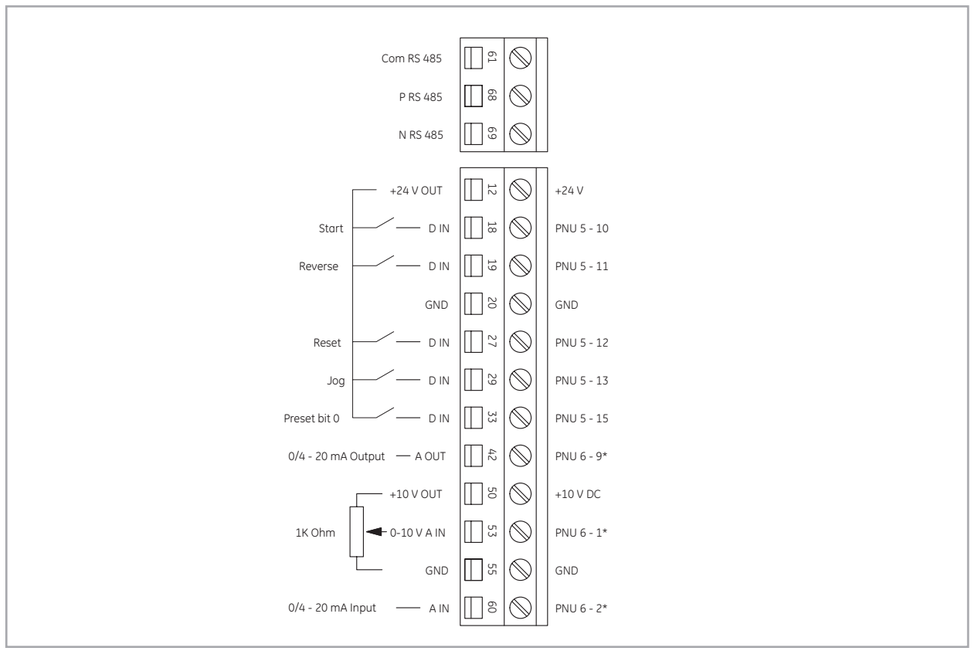
Description	Cat. No.	Ref. No.
Replacement AF-60 LP keypad with potentiometer:	KYPDACLP1	**404796**

New

Basic wiring diagrams



Basic control terminal (PNP configuration and drive factory default settings)



New

Specifications

Environmental conditions

Enclosure	IP20 (NEMA 1 with optional NEMA 1 kit)
Installation location	Do not install in locations where product could be exposed to dust, corrosive gas, inflammable gas, oil mist, vapor, water drops or direct sun-light. There must be no salt in the atmosphere. Condensation must not be caused by sudden changes in temperature. For use at altitudes of 3280 ft. (1000 m) or less without derating.
Ambient temperature	-10° to +50° C
Ambient humidity	5 to 95% RH (non-condensing)
Vibration	1.0 G
Storage temperature	-25° to 65° C

Standards

Approvals	CE, UL, cUL, and C-Tick Suitable for use on a circuit capable of deliver-ing not more than 100,000 rms symmetrical amperes for 230V and 400V. WEEE and RoHS Compliant

Input power supply

Rated Input AC voltage	200-240 Vac, 1-phase, 50-60 Hz, +/- 10% V 200-240 Vac, 3-phase, 50-60 Hz, +/- 10% V 380-480 Vac, 3-phase, 50-60 Hz, +/- 10% V
Maximum voltage imbalance	3% of rated supply voltage
True power factor	> 0.4 nominal at rated load
Displacement power factor	> 0.98
Switching on input power supply	Maximum twice/minute
Environment according to EN60664-1	Overvoltage category III/pollution degree 2

Output

Rated output voltage	0-100 % of supply voltage
Output frequency	0-200 Hz (Adv. Vector Control Plus Mode), 0-400 Hz (Volts/Hertz Mode)
Switching on output	Unlimited
Accel/decel times	0.05-3600 seconds
Overload current rating	150 % of drive rated current for 1 minute

Control

Control method	Sinusoidal PWM Control (V/Hz with torque vector control)
Switching frequency select	2, 4, 8, 12, 16 kHz
Operation method	Keypad operation: Hand, Off, Auto Digital Input: Programmable for Start/Stop, Forward/Reverse, Jog Timer operation: Stop after predetermined time frame Link operation: RS-485 Modbus RTU
Frequency reference setting	Up or Down buttons on keypad or external reference
Analogue input	Built in potentiometer 0-10 Vdc analogue input 4-20 mA analogue input
Preset speeds	8 presets via digital inputs
Link operation	Drive RS-485 or Modbus RTU
Second reference setting	Switch from speed reference 1 to reference 2 via digital input
Trim reference setting	Available for speed reference offset via potentiometer, voltage input, or current input
Acceleration/deceleration time	0.05-3600 seconds (two acceleration and deceleration rates are selectable via digital inputs. Acceleration and deceleration patterns can be selected from linear or S-curve
DC injection braking	Starting frequency: 0.0-400 Hz Braking time: 0.0-60.0 seconds
	Braking level: 0-150 % of rated current Braking time: 0.0-60.0 seconds
	Braking level: 0-150 % of rated current
Frequency limit	0-400 Hz
Jump frequency control	Two jump (or skip) frequencies via parameter set to avoid mechanical vibration
Jogging operation	Operation via On key or digital input (Fwd or Rev)
Auto-restart after power failure	Restarts the drive without stopping after instantaneous power failure
Slip compensation	Maintains motor at constant speed with load fluctuations
Energy savings	Controls output voltage to minimize motor loss during constant speed operation
Start mode function	This functionality smoothly catches a spinning motor

Logic controler (LC)

Logic controller events	Over 23 types of programmable events
Comparators	Array of 4 comparators
Timers	Array of 3 timers, adjustable from 0.0 to 3600 sec
Logic rules	Array of 4 boolean logic rules
Logic controller states	Array of 20 logic controller action states

Process controler (PI)

Process CL feedback select	No function, analogue input 1, analogue input 2, pulse input, local bus reference
Process PI control	Normal or inverse
Process PI anti windup	Disabled or enabled
Process PI start speed	0.0-200 Hz
Process PI proportional gain	0.00-10.00
Process PI integral gain	0.10-9999 seconds
Process PI feed forward factor	0-400 %
On reference bandwidth	0-200 %

Indication

LEDs	Green - drive is on Yellow - indicates a warning Red - indicates an alarm
Monitor Units Available	Frequency, current, voltage, power, horsepower, % load, speed, or time

Trip codes

2	Live zero error
4	Line phase loss
7	DC overvoltage
8	DC undervoltage
9	Drive overload
10	Motor overtemperature
11	Motor thermistor overtemperature
12	Torque limit
13	Overcurrent
14	Ground fault
16	Short circuit
17	Control word timeout
25	Brake resistor short-circuited
27	Brake chopper short-circuited
28	Brake check
29	Power board overtemperature
30	Missing U phase
31	Missing V phase
32	Missing W phase
38	Internal fault
47	Control voltage fault
51	Auto tune check - wrong motor parameters
52	Auto tune low inom - motor current is too low
59	Current limit
63	Mechanical brake low
80	Drive restored to factory settings

Monitoring parameters available

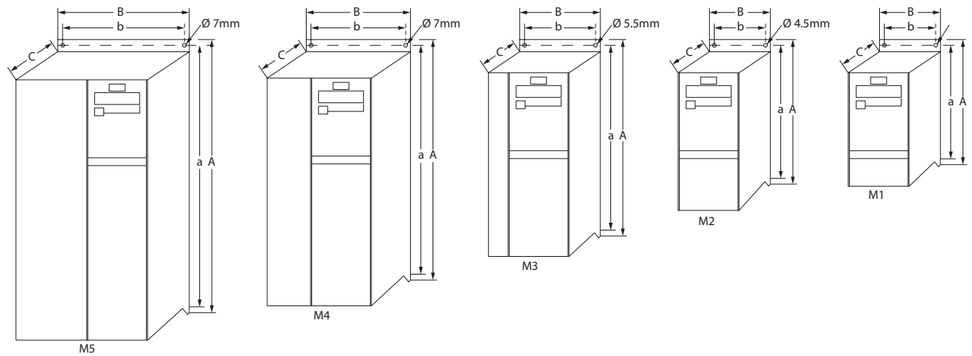
Power	kW
Power	HP
Motor voltage	V
Frequency	Hz
Motor current	A
Frequency	%
Motor thermal	%
DC link voltage	V
Drive current	A
Drive max current	A
Logic controller state	ON/OFF

New

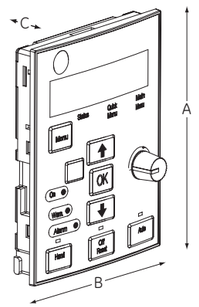
Dimensional drawings

Micro drives

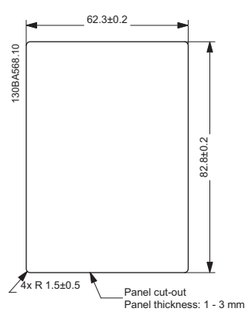
Unit size	Nominal motor power ratings (kW) 230 V 1ph	230 V 3ph	400 V 3ph	Nominal motor power ratings (HP) 230 V 1ph	230 V 3ph	400 V 3ph	Height (mm) A	A (including decoupling plate)	a	Width (mm) B	b	Depth (mm) C	Weight kg
M1	0.18 - 0.75	0.25 - 0.75	0.37 - 0.75	1/4 - 1	1/3 - 1	1/2 - 1	150	205	140.4	70	55	148	1.1
M2	1.5	1.5	1.5 - 2.2	2	2	2 - 3	176	230	166.4	75	59	168	1.6
M3	2.2	2.2 - 3.7	4 - 7.5	3	3 - 5	5 - 10	239	294	226	90	69	194	3.0
M4	-	-	11 - 15	-	-	15 - 20	292	347.5	272.4	125	97	249	6.0
M5	-	-	18.5 - 22	-	-	25 - 30	335	387.5	315	165	140	256	9.5



Micro drive keypad



Micro drive keypad



Micro drive keypad cut-out

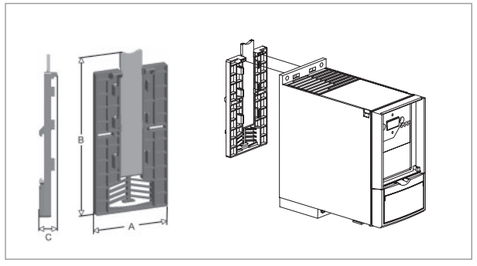
Height (mm) A	Width (mm) B	Depth (mm) C	Weight kg
85	65	28	0.08

Note: Please allow 5 cm between drives with field installed IP21/NEMA 1 kits. Also, please consult the relevant AF-6 Series drives Operating Instructions for recommended clearance above and below each drive rating.

Dimensional drawings

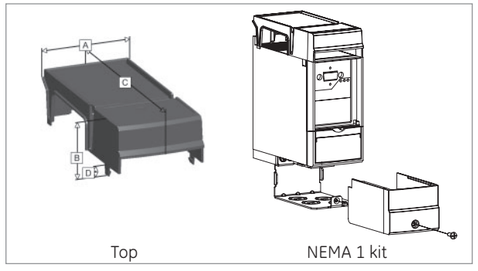
DIN-rail mounting kit for 0.75kW / 1HP and below drives

Cat. No.	Ref. No.	A (mm)	B (mm)	C (mm)
RMACLP1	**404806**	60	129	13.5



NEMA 1 field installed kit – top

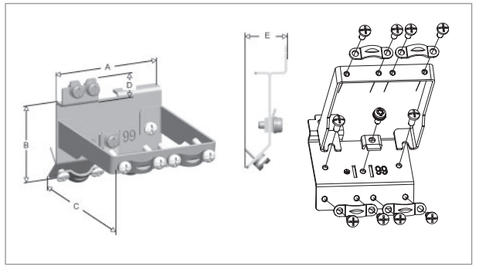
Cat. No.	Ref. No.	A (mm)	B (mm)	C (mm)	D (mm)
NEMA1ACLP1	**404798**	72	43	151	8
NEMA1ACLP2	**404799**	77	43	172	8
NEMA1ACLP3	**404800**	92	43	199	8



Top NEMA 1 kit

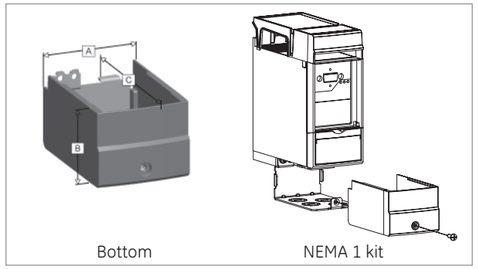
De-coupling plate kit

Cat. No.	Ref. No.	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
DEPLTACLP1	**404804**	70	52	100	14	22.6
DEPLTACLP2	**404805**	70	52	N/A	14	22.6



NEMA 1 field installed kit – bottom

Cat. No.	Ref. No.	A (mm)	B (mm)	C (mm)	D (mm)
NEMA1ACLP1	**404798**	70	55	107	8
NEMA1ACLP2	**404799**	75	55	114	8
NEMA1ACLP3	**404800**	90	55	121	8



Bottom NEMA 1 kit

Notes

Approvals / Marking

UL, cUL, C-Tick

Applications

Conveyors, mixers, agitators, lathes, spinning machines, machine tool, grinder, extruders, plastic injection molding machines, constant displacement pumps, woodworking machines.

AF-650 GP - General Purpose Drives

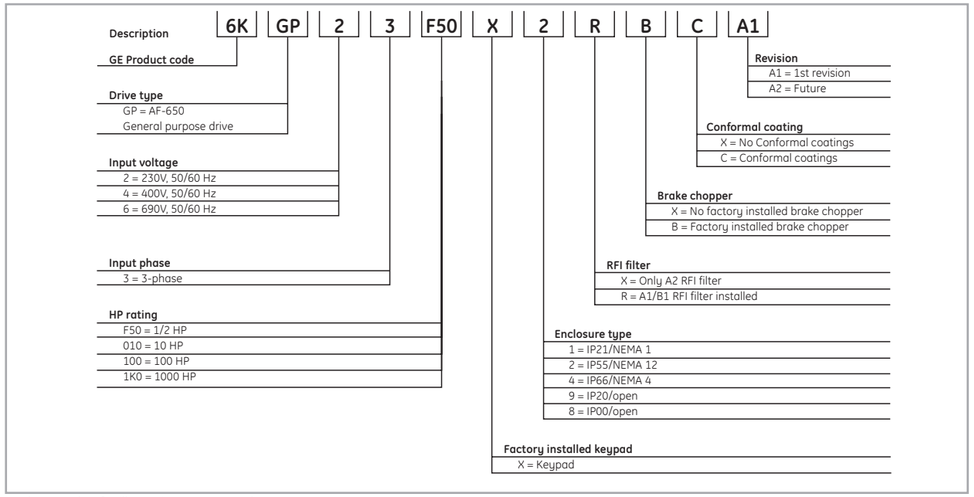
The AF-650 GP general purpose drive is a powerful, flexible and easy to use drive with many standard features. It is ideally suited for both heavy duty and light duty applications.
The drive is available in its standard configuration that includes IP20 or IP00 chassis, LCD keypad display that can be remote mounted, DC link reactors, built-in Modbus RTU and RFI class A2 filter. Available in IP 55 and IP 66 enclosures.

Following models are available:
- Three-phase, 230Vac, from 0.25 to 45kW, 1/3 to 60HP
- Three-phase, 400Vac, from 0.37 to 1000kW, 1/2 to 1350HP
- Three-phase, 690Vac, from 11 to 1200kW, 15 to 1600HP

Features

- Self-protecting features
- Other available configurations: RFI class A1/B1 filter, braking chopper and conformal coating.
- Configurations are available in IP55 and IP66
- RFI class A2 filter and DC link reactor as standard configuration
- Duality of power, Heavy or Light Duty
- 150% current overload for 1 minute (Heavy Duty)
- 110% current overload for 1 minute (Light Duty)
- Hot pluggable, illuminated LCD display, unit indications, rotation direction indication, trended charts display speed, torque, current, full alarm messages & descriptions
- Speed and process PID controls
- Integrated logic control, PLC
- "Pick up" start (catch a spinning motor)
- Precise stop function
- Advanced brake control
- 24V encoder feedback built-in
- Easy to use PC software
- Built-in communication networks for ModBus RTU
- Optional protocols: Profibus DP, Profinet, ModBus TPC/IP, Ethernet/IP and DeviceNet
- High standard protection class 3C2, optional class 3C3

Product numbering system diagram



Product number for illustrative purposes only

New

IP00 / IP20 / IP21, with EMC filter Class A2, WITH braking chopper

230V, 3-phase, 50/60Hz input

Heavy Duty rating				Light Duty rating							
Nominal motor ratings			Overload	Nominal motor ratings			Overload				
Power kW	Power HP	Current A	current during 60s (A)	Power kW	Power HP	Current A	current during 60s (A)	Enclosure type[1]:	Cat. No.	Ref. No.	Unit size
0.25	1/3	1.8	2.88	0.25	1/3	1.8	2.88	IP20	6KGP23F33X9XBXA1	On request	12
0.37	1/2	2.4	3.84	0.37	1/2	2.4	3.84		6KGP23F50X9XBXA1		12
0.75	1	4.6	7.36	0.75	1	4.6	7.36		6KGP23001X9XBXA1		12
1.5	2	7.5	12	1.5	2	7.5	12		6KGP23002X9XBXA1		12
2.2	3	10.6	16.96	2.2	3	10.6	16.96		6KGP23003X9XBXA1		12
3.7	5	16.7	26.72	3.7	5	16.7	26.72		6KGP23005X9XBXA1		13
5.5	7.5	24.2	38.72	5.5/7.5	7.5/10	30.8	33.88		6KGP23007X9XBXA1		23
7.5	10	30.8	49.28	11	15	46.2	50.82		6KGP23010X9XBXA1		23
11	15	46.2	73.92	15	20	59.4	65.34		6KGP23015X9XBXA1		24
15	20	59.4	89.1	18.5	25	74.8	82.28		6KGP23020X9XBXA1		24
18.5	25	74.8	112.2	22	30	88	96.8		6KGP23025X9XBXA1		33
22	30	88	132	30	40	115	126.5		6KGP23030X9XBXA1		33
30	40	115	172.5	37	50	143	157.3		6KGP23040X9XBXA1		34
37	50	143	214.5	45	60	170	187		6KGP23050X9XBXA1		34

400V, 3-phase, 50/60Hz input

Heavy Duty rating				Light Duty rating							
Nominal motor ratings			Overload	Nominal motor ratings			Overload				
Power kW	Power HP	Current A	current during 60s (A)	Power kW	Power HP	Current A	current during 60s (A)	Enclosure type[1]:	Cat. No.	Ref. No.	Unit size
0.37	1/2	1.3	2.08	0.37	1/2	1.3	1.43	IP20	6KGP43F50X9XBXA1	**403116**	12
0.75	1	2.4	3.84	0.75	1	2.4	2.64		6KGP43001X9XBXA1	**403117**	12
1.5	2	4.1	6.56	1.5	2	4.1	4.51		6KGP43002X9XBXA1	**403118**	12
2.2	3	5.6	8.96	2.2	3	5.6	6.16		6KGP43003X9XBXA1	**403119**	12
4	5	10	16	4	5	10	11		6KGP43005X9XBXA1	**403120**	12
5.5	7.5	13	20.8	5.5	7.5	13	14.3		6KGP43007X9XBXA1	**403121**	13
7.5	10	16	25.6	7.5	10	16	17.6		6KGP43010X9XBXA1	**403122**	13
11	15	24	38.4	11/15	15/20	32	35.2		6KGP43015X9XBXA1	**403123**	23
15	20	32	51.2	18.5	25	37.5	41.25		6KGP43020X9XBXA1	**403124**	23
18.5	25	37.5	60	22	30	44	48.4		6KGP43025X9XBXA1	**403125**	24
22	30	44	70.4	30	40	61	67.1		6KGP43030X9XBXA1	**403126**	24
30	40	61	97.6	37	50	73	80.3		6KGP43040X9XBXA1	**403127**	24
37	50	73	116.8	45	60	90	99		6KGP43050X9XBXA1	**403128**	33
45	60	90	144	55	75	106	116.6		6KGP43060X9XBXA1	**403129**	33
55	75	105	168	75	100	147	161.7		6KGP43075X9XBXA1	**403130**	34
75	100	147	235.2	90	125	177	194.7		6KGP43100X9XBXA1	**403131**	34
90	125	177	265.5	110	150	212	233.2	IP00	6KGP43125X8XBXA1	**403132**	43
110	150	212	318	132	200	260	286		6KGP43150X8XBXA1	**403133**	43
132	200	260	390	160	250	315	346.5		6KGP43200X8XBXA1	**403134**	44
160	250	315	472.5	200	300	395	434.5		6KGP43250X8XBXA1	**403135**	44
200	300	395	592.5	250	350	480	528		6KGP43300X8XBXA1	**403136**	44
250	350	480	720	315	450	600	660	IP00 conformal coated	6KGP43350X8XBCA1	**403137**	52
315	450	600	900	355	500	658	723.8		6KGP43450X8XBCA1	**403138**	52
355	500	658	987	400	550	745	819.5		6KGP43500X8XBCA1	**403139**	52
400	550	745	1117.5	450	600	800	880		6KGP43550X8XBCA1	**403140**	52
450	600	800	1200	500	650	880	968	IP21/NEMA 1 conformal coated	6KGP43600X1XBCA1	**403141**	61
500	650	880	1320	560	750	990	1089		6KGP43650X1XBCA1	**403142**	61
560	750	990	1485	630	900	1120	1232		6KGP43750X1XBCA1	**403143**	61
630	900	1120	1680	710	1000	1260	1386		6KGP43900X1XBCA1	**403144**	61
710	1000	1260	1890	800	1200	1460	1606		6KGP431K0X1XBCA1	**403145**	62
800	1200	1460	2190	1000	1350	1700	1870		6KGP431K2X1XBCA1	**403146**	62

690V[2], 3-phase, 50/60Hz input

Heavy Duty rating				Light Duty rating							
Nominal motor ratings			Overload	Nominal motor ratings			Overload				
Power kW	Power HP	Current A	current during 60s (A)	Power kW	Power HP	Current A	current during 60s (A)	Enclosure type:	Cat. No.	Ref. No.	Unit size
11	15	13	20.8	15	20	18	20	IP21/NEMA 1	6KGP63015X1XBXA1	**403642**	22
15	20	18	28.8	18.5	25	22	24		6KGP63020X1XBXA1	**403643**	22
18.5	25	22	35.2	22	30	27	30		6KGP63025X1XBXA1	**403644**	22
22	30	27	43.2	30	40	34	37		6KGP63030X1XBXA1	**403645**	22
30	40	34	51	37	50	41	45		6KGP63040X1XBXA1	**403646**	32
37	50	41	61.5	45	60	52	56		6KGP63050X1XBXA1	**403647**	32
45	60	52	76.5	55	75	62	68		6KGP63060X1XBXA1	**403648**	32
55	75	62	93	75	100	83	91		6KGP63075X1XBXA1	**403649**	32
75	100	83	124.5	90	125	100	110		6KGP63100X1XBXA1	**403650**	32
90	125	108	162	110	150	131	144	IP00 conformal coated	6KGP63125X8XBCA1	**403651**	43
110	150	131	196.5	132	200	155	171		6KGP63150X8XBCA1	**403652**	43
132	200	155	232.5	160	250	192	211		6KGP63200X8XBCA1	**403653**	43
160	250	192	288	200	300	242	266		6KGP63250X8XBCA1	**403654**	44
200	300	242	363	250	350	290	319		6KGP63300X8XBCA1	**403655**	44
250	350	290	435	315	400	344	378		6KGP63350X8XBCA1	**403656**	44
315	400	344	516	400	500	400	440		6KGP63400X8XBCA1	**403657**	44
355	500	380	570	450	600	450	495		6KGP63500X8XBCA1	**403658**	52
400	550	410	615	500	650	500	550		6KGP63550X8XBCA1	**403659**	52
500	650	500	750	560	750	570	627		6KGP63650X8XBCA1	**403660**	52
560	750	570	855	630	800	630	693		6KGP63750X8XBCA1	**403661**	52
630	900	630	945	710	1000	730	803	IP21/NEMA 1 conformal coated	6KGP63900X1XBCA1	**403662**	61
710	1000	730	1095	800	1200	850	935		6KGP631K0X1XBCA1	**403663**	61
800	1150	850	1275	900	1300	945	1040		6KGP631K1X1XBCA1	**403664**	61
900	1250	945	1417.5	1000	1400	1060	1166		6KGP631K2X1XBCA1	**403665**	62
1000	1350	1060	1590	1200	1600	1260	1386		6KGP631K3X1XBCA1	**403666**	62
1200	1600	1260	1890	1400	1900	1415	1557		6KGP631K6X1XBCA1	**404738**	62

(1) IP21/NEMA 1 kits are available as field installed options for all 230V drives from 0.25 to 37kW / 1/3 to 50HP for all 400V drives from 0.37 to 75kW / 1/2 to 100HP. See Page H.33.
(2) 690V horsepower ratings.

IP00 / IP20 / IP21, with EMC filter Class A2, WITHOUT braking chopper

230V, 3-phase, 50/60Hz input

Heavy Duty rating				Light Duty rating							
Nominal motor ratings			Overload	Nominal motor ratings			Overload				
Power kW	Power HP	Current A	current during 60s (A)	Power kW	Power HP	Current A	current during 60s (A)	Enclosure type[1]:	Cat. No.	Ref. No.	Unit size
0.25	1/3	1.8	2.88	0.25	1/3	1.8	2.88	IP20	6KGP23F33X9XXXA1	**404670**	12
0.37	1/2	2.4	3.84	0.37	1/2	2.4	3.84		6KGP23F50X9XXXA1	**404671**	12
0.75	1	4.6	7.36	0.75	1	4.6	7.36		6KGP23001X9XXXA1	**404672**	12
1.5	2	7.5	12	1.5	2	7.5	12		6KGP23002X9XXXA1	**404673**	12
2.2	3	10.6	16.96	2.2	3	10.6	16.96		6KGP23003X9XXXA1	**404674**	12
3.7	5	16.7	26.72	3.7	5	16.7	26.72		6KGP23005X9XXXA1	**404675**	13
5.5	7.5	24.2	38.72	5.5/7.5	7.5/10	30.8	33.88		6KGP23007X9XXXA1	**404676**	23
7.5	10	30.8	49.28	11	15	46.2	50.82		6KGP23010X9XXXA1	**404677**	23
11	15	46.2	73.92	15	20	59.4	65.34		6KGP23015X9XXXA1	**404678**	24
15	20	59.4	89.1	18.5	25	74.8	82.28		6KGP23020X9XXXA1	**404679**	24
18.5	25	74.8	112.2	22	30	88	96.8		6KGP23025X9XXXA1	**404680**	33
22	30	88	132	30	40	115	126.5		6KGP23030X9XXXA1	**404681**	33
30	40	115	172.5	37	50	143	157.3		6KGP23040X9XXXA1	**404682**	34
37	50	143	214.5	45	60	170	187		6KGP23050X9XXXA1	**404683**	34

400V, 3-phase, 50/60Hz input

Heavy Duty rating				Light Duty rating							
Nominal motor ratings			Overload	Nominal motor ratings			Overload				
Power kW	Power HP	Current A	current during 60s (A)	Power kW	Power HP	Current A	current during 60s (A)	Enclosure type[1]:	Cat. No.	Ref. No.	
0.37	1/2	1.3	2.08	0.37	1/2	1.3	1.43	IP20	6KGP43F50X9XXXA1	**400412**	12
0.75	1	2.4	3.84	0.75	1	2.4	2.64		6KGP43001X9XXXA1	**400451**	12
1.5	2	4.1	6.56	1.5	2	4.1	4.51		6KGP43002X9XXXA1	**401212**	12
2.2	3	5.6	8.96	2.2	3	5.6	6.16		6KGP43003X9XXXA1	**401362**	12
4	5	10	16	4	5	10	11		6KGP43005X9XXXA1	**402735**	12
5.5	7.5	13	20.8	5.5	7.5	13	14.3		6KGP43007X9XXXA1	**402738**	13
7.5	10	16	25.6	7.5	10	16	17.6		6KGP43010X9XXXA1	**402746**	13
11	15	24	38.4	11/15	15/20	32	35.2		6KGP43015X9XXXA1	**402747**	23
15	20	32	51.2	18.5	25	37.5	41.25		6KGP43020X9XXXA1	**402748**	23
18.5	25	37.5	60	22	30	44	48.4		6KGP43025X9XXXA1	**402765**	24
22	30	44	70.4	30	40	61	67.1		6KGP43030X9XXXA1	**402766**	24
30	40	61	97.6	37	50	73	80.3		6KGP43040X9XXXA1	**402767**	24
37	50	73	116.8	45	60	90	99		6KGP43050X9XXXA1	**402768**	33
45	60	90	144	55	75	106	116.6		6KGP43060X9XXXA1	**402769**	33
55	75	105	168	75	100	147	161.7		6KGP43075X9XXXA1	**402857**	34
75	100	147	235.2	90	125	177	194.7		6KGP43100X9XXXA1	**402863**	34
90	125	177	265.5	110	150	212	233.2		6KGP43125X8XXXA1	**402864**	43
110	150	212	318	132	200	260	286	IP00	6KGP43150X8XXXA1	**402865**	43
132	200	260	390	160	250	315	346.5		6KGP43200X8XXXA1	**402866**	44
160	250	315	472.5	200	300	395	434.5		6KGP43250X8XXXA1	**402867**	44
200	300	395	592.5	250	350	480	528		6KGP43300X8XXXA1	**402868**	44
250	350	480	720	315	450	600	660	IP00 conformal coated	6KGP43350X8XXCA1	**402869**	52
315	450	600	900	355	500	658	723.8		6KGP43450X8XXCA1	**402870**	52
355	500	658	987	400	550	745	819.5		6KGP43500X8XXCA1	**402871**	52
400	550	745	1117.5	450	600	800	880		6KGP43550X8XXCA1	**402872**	52
450	600	800	1200	500	650	880	968		6KGP43600X1XXCA1	**402873**	61
500	650	880	1320	560	750	990	1089	IP21/NEMA 1 conformal coated	6KGP43650X1XXCA1	**402874**	61
560	750	990	1485	630	900	1120	1232		6KGP43750X1XXCA1	**402875**	61
630	900	1120	1680	710	1000	1260	1386		6KGP43900X1XXCA1	**402876**	61
710	1000	1260	1890	800	1200	1460	1606		6KGP431K0X1XXCA1	**402877**	62
800	1200	1460	2190	1000	1350	1700	1870		6KGP431K2X1XXCA1	**402878**	62

690V[2], 3-phase, 50/60Hz input

Heavy Duty rating				Light Duty rating							
Nominal motor ratings			Overload	Nominal motor ratings			Overload				
Power kW	Power HP	Current A	current during 60s (A)	Power kW	Power HP	Current A	current during 60s (A)	Enclosure type:	Cat. No.	Ref. No.	Unit size
11	15	13	20.8	15	20	18	20	IP21/NEMA 1	6KGP63015X1XXXA1	**403545**	22
15	20	18	28.8	18.5	25	22	24		6KGP63020X1XXXA1	**403546**	22
18.5	25	22	35.2	22	30	27	30		6KGP63025X1XXXA1	**403547**	22
22	30	27	43.2	30	40	34	37		6KGP63030X1XXXA1	**403548**	22
30	40	34	51	37	50	41	45		6KGP63040X1XXXA1	**403549**	32
37	50	41	61.5	45	60	52	56		6KGP63050X1XXXA1	**403550**	32
45	60	52	76.5	55	75	62	68		6KGP63060X1XXXA1	**403551**	32
55	75	62	93	75	100	83	91		6KGP63075X1XXXA1	**403552**	32
75	100	83	124.5	90	125	100	110		6KGP63100X1XXXA1	**403553**	32
90	125	108	162	110	150	131	144	IP00 conformal coated	6KGP63125X8XXCA1	**403554**	43
110	150	131	196.5	132	200	155	171		6KGP63150X8XXCA1	**403555**	43
132	200	155	232.5	160	250	192	211		6KGP63200X8XXCA1	**403556**	43
160	250	192	288	200	300	242	266		6KGP63250X8XXCA1	**403557**	44
200	300	242	363	250	350	290	319		6KGP63300X8XXCA1	**403558**	44
250	350	290	435	315	400	344	378		6KGP63350X8XXCA1	**403559**	44
315	400	344	516	400	500	400	440		6KGP63400X8XXCA1	**403560**	44
355	500	380	570	450	600	450	495		6KGP63500X8XXCA1	**403561**	52
400	550	410	615	500	650	500	550		6KGP63550X8XXCA1	**403562**	52
500	650	500	750	560	750	570	627		6KGP63650X8XXCA1	**403563**	52
560	750	570	855	630	800	630	693		6KGP63750X8XXCA1	**403564**	52
630	900	630	945	710	1000	730	803	IP21/NEMA 1 conformal coated	6KGP63900X1XXCA1	**403565**	61
710	1000	730	1095	800	1200	850	935		6KGP631K0X1XXCA1	**403566**	61
800	1150	850	1275	900	1300	945	1040		6KGP631K1X1XXCA1	**403567**	61
900	1250	945	1417.5	1000	1400	1060	1166		6KGP631K2X1XXCA1	**403568**	62
1000	1350	1060	1590	1200	1600	1260	1386		6KGP631K3X1XXCA1	**403569**	62
1200	1600	1260	1890	1400	1900	1415	1557		6KGP631K6X1XXCA1	**404739**	62

(1) IP21/NEMA 1 kits are available as field installed options for all 230V drives from 0.25 to 37kW / 1/3 to 50HP for all 400V drives from 0.37 to 75kW / 1/2 to 100HP. See Page H.33.
(2) 690V horsepower ratings.

New

IP54 / IP55, with EMC filter Class A2, WITH braking chopper

230V, 3-phase, 50/60Hz input

Heavy duty rating				Light duty rating							
Nominal motor ratings			Overload	Nominal motor ratings			Overload				
Power kW	Power HP	Current A	current during 60s (A)	Power kW	Power HP	Current A	current during 60s (A)	Enclosure type:	Cat. No.	Ref. No.	Unit size
0.25	1/3	1.8	2.88	0.25	1/3	1.8	2.88	IP55/NEMA 12	6KGP23F33X2XBXA1	on request	12
0.37	1/2	2.4	3.84	0.37	1/2	2.4	3.84		6KGP23F50X2XBXA1		12
0.75	1	4.6	7.36	0.75	1	4.6	7.36		6KGP23001X2XBXA1		12
1.5	2	7.5	12	1.5	2	7.5	12		6KGP23002X2XBXA1		12
2.2	3	10.6	16.96	2.2	3	10.6	16.96		6KGP23003X2XBXA1		12
3.7	5	16.7	26.72	3.7	5	16.7	26.72		6KGP23005X2XBXA1		13
5.5	7.5	24.2	38.72	5.5/7.5	7.5/10	30.8	33.88		6KGP23007X2XBXA1		23
7.5	10	30.8	49.28	11	15	46.2	50.82		6KGP23010X2XBXA1		23
11	15	46.2	73.92	15	20	59.4	65.34		6KGP23015X2XBXA1		24
15	20	59.4	89.1	18.5	25	74.8	82.28		6KGP23020X2XBXA1		24
18.5	25	74.8	112.2	22	30	88	96.8		6KGP23025X2XBXA1		33
22	30	88	132	30	40	115	126.5		6KGP23030X2XBXA1		33
30	40	115	172.5	37	50	143	157.3		6KGP23040X2XBXA1		34
37	50	143	214.5	45	60	170	187		6KGP23050X2XBXA1		34

400V, 3-phase, 50/60Hz input

Heavy Duty rating				Light Duty rating							
Nominal motor ratings			Overload	Nominal motor ratings			Overload				
Power kW	Power HP	Current A	current during 60s (A)	Power kW	Power HP	Current A	current during 60s (A)	Enclosure type:	Cat. No.	Ref. No.	Unit size
0.37	1/2	1.3	2.08	0.37	1/2	1.3	1.43	IP55/NEMA 12	6KGP43F50X2XBXA1	**403156**	12
0.75	1	2.4	3.84	0.75	1	2.4	2.64		6KGP43001X2XBXA1	**403157**	12
1.5	2	4.1	6.56	1.5	2	4.1	4.51		6KGP43002X2XBXA1	**403158**	12
2.2	3	5.6	8.96	2.2	3	5.6	6.16		6KGP43003X2XBXA1	**403159**	12
4	5	10	16	4	5	10	11		6KGP43005X2XBXA1	**403160**	12
5.5	7.5	13	20.8	5.5	7.5	13	14.3		6KGP43007X2XBXA1	**403161**	13
7.5	10	16	25.6	7.5	10	16	17.6		6KGP43010X2XBXA1	**403162**	13
11	15	24	38.4	11/15	15/20	32	35.2		6KGP43015X2XBXA1	**403163**	23
15	20	32	51.2	18.5	25	37.5	41.25		6KGP43020X2XBXA1	**403164**	23
18.5	25	37.5	60	22	30	44	48.4		6KGP43025X2XBXA1	**403165**	24
22	30	44	70.4	30	40	61	67.1		6KGP43030X2XBXA1	**403166**	24
30	40	61	97.6	37	50	73	80.3		6KGP43040X2XBXA1	**403167**	24
37	50	73	116.8	45	60	90	99		6KGP43050X2XBXA1	**403168**	33
45	60	90	144	55	75	106	116.6		6KGP43060X2XBXA1	**403169**	33
55	75	105	168	75	100	147	161.7		6KGP43075X2XBXA1	**403170**	34
75	100	147	235.2	90	125	177	194.7		6KGP43100X2XBXA1	**403171**	34
90	125	177	265.5	110	150	212	233.2	IP54/NEMA 12 conformal coated	6KGP43125X2XBXA1	**403172**	43
110	150	212	318	132	200	260	286		6KGP43150X2XBXA1	**403173**	43
132	200	260	390	160	250	315	346.5		6KGP43200X2XBXA1	**403174**	44
160	250	315	472.5	200	300	395	434.5		6KGP43250X2XBXA1	**403175**	44
200	300	395	592.5	250	350	480	528		6KGP43300X2XBXA1	**403176**	44
250	350	480	720	315	450	600	660		6KGP43350X2XBCA1	**403177**	52
315	450	600	900	355	500	658	723.8		6KGP43450X2XBCA1	**403178**	52
355	500	658	987	400	550	745	819.5		6KGP43500X2XBCA1	**403179**	52
400	550	745	1117.5	450	600	800	880		6KGP43550X2XBCA1	**403180**	52
450	600	800	1200	500	650	880	968		6KGP43600X2XBCA1	**403181**	61
500	650	880	1320	560	750	990	1089		6KGP43650X2XBCA1	**403182**	61
560	750	990	1485	630	900	1120	1232		6KGP43750X2XBCA1	**403183**	61
630	900	1120	1680	710	1000	1260	1386		6KGP43900X2XBCA1	**403184**	61
710	1000	1260	1890	800	1200	1460	1606		6KGP431K0X2XBCA1	**403185**	62
800	1200	1460	2190	1000	1350	1700	1870		6KGP431K2X2XBCA1	**403186**	62

690V, 3-phase, 50/60Hz input

Heavy Duty rating				Light Duty rating							
Nominal motor ratings			Overload	Nominal motor ratings			Overload				
Power kW	Power HP	Current A	current during 60s (A)	Power kW	Power HP	Current A	current during 60s (A)	Enclosure type:	Cat. No.	Ref. No.	Unit size
11	15	13	20.8	15	20	18	20	IP55/NEMA 12	6KGP63015X2XBXA1	**403678**	22
15	20	18	28.8	18.5	25	22	24		6KGP63020X2XBXA1	**403679**	22
18.5	25	22	35.2	22	30	27	30		6KGP63025X2XBXA1	**403682**	22
22	30	27	43.2	30	40	34	37		6KGP63030X2XBXA1	**403683**	22
30	40	34	51	37	50	41	45		6KGP63040X2XBXA1	**403684**	32
37	50	41	61.5	45	60	52	56		6KGP63050X2XBXA1	**403685**	32
45	60	52	76.5	55	75	62	68		6KGP63060X2XBXA1	**403686**	32
55	75	62	93	75	100	83	91		6KGP63075X2XBXA1	**403687**	32
75	100	83	124.5	90	125	100	110		6KGP63100X2XBXA1	**403688**	32
90	125	108	162	110	150	131	144	IP54/NEMA 12 conformal Coated	6KGP63125X2XBCA1	**403689**	43
110	150	131	196.5	132	200	155	171		6KGP63150X2XBCA1	**403690**	43
132	200	155	232.5	160	250	192	211		6KGP63200X2XBCA1	**403691**	43
160	250	192	288	200	300	242	266		6KGP63250X2XBCA1	**403692**	44
200	300	242	363	250	350	290	319		6KGP63300X2XBCA1	**403693**	44
250	350	290	435	315	400	344	378		6KGP63350X2XBCA1	**403694**	44
315	450	344	516	400	500	400	440		6KGP63400X2XBCA1	**403695**	44
355	500	380	570	450	600	450	495		6KGP63500X2XBCA1	**403696**	52
400	550	410	615	500	650	500	550		6KGP63550X2XBCA1	**403697**	52
500	650	500	750	560	750	570	627		6KGP63650X2XBCA1	**403698**	52
560	750	570	855	630	800	630	693		6KGP63750X2XBCA1	**403699**	52
630	900	630	945	710	1000	730	803		6KGP63900X2XBCA1	**403700**	61
710	1000	730	1095	800	1200	850	935		6KGP631K0X2XBCA1	**403701**	61
800	1150	850	1275	900	1300	945	1040		6KGP631K1X2XBCA1	**403702**	61
900	1250	945	1417.5	1000	1400	1060	1166		6KGP631K2X2XBCA1	**403703**	62
1000	1350	1060	1590	1200	1600	1260	1386		6KGP631K3X2XBCA1	**403704**	62
1200	1600	1260	1890	1400	1900	1415	1557		6KGP631K6X2XBCA1	**404740**	62

IP54 / IP55, with EMC filter Class A2, WITHOUT braking chopper

230V, 3-phase, 50/60Hz input

Heavy duty rating				Light duty rating							
Nominal motor ratings			Overload	Nominal motor ratings			Overload				
Power kW	Power HP	Current A	current during 60s (A)	Power kW	Power HP	Current A	current during 60s (A)	Enclosure type:	Cat. No.	Ref. No.	Unit size
0.25	1/3	1.8	2.88	0.25	1/3	1.8	2.88	IP55/NEMA 12	6KGP23F33X2XXXA1	**404710**	12
0.37	1/2	2.4	3.84	0.37	1/2	2.4	3.84		6KGP23F50X2XXXA1	**404711**	12
0.75	1	4.6	7.36	0.75	1	4.6	7.36		6KGP23001X2XXXA1	**404712**	12
1.5	2	7.5	12	1.5	2	7.5	12		6KGP23002X2XXXA1	**404713**	12
2.2	3	10.6	16.96	2.2	3	10.6	16.96		6KGP23003X2XXXA1	**404714**	12
3.7	5	16.7	26.72	3.7	5	16.7	26.72		6KGP23005X2XXXA1	**404715**	13
5.5	7.5	24.2	38.72	5.5/7.5	7.5/10	30.8	33.88		6KGP23007X2XXXA1	**404716**	23
7.5	10	30.8	49.28	11	15	46.2	50.82		6KGP23010X2XXXA1	**404717**	23
11	15	46.2	73.92	15	20	59.4	65.34		6KGP23015X2XXXA1	**404718**	24
15	20	59.4	89.1	18.5	25	74.8	82.28		6KGP23020X2XXXA1	**404719**	24
18.5	25	74.8	112.2	22	30	88	96.8		6KGP23025X2XXXA1	**404720**	33
22	30	88	132	30	40	115	126.5		6KGP23030X2XXXA1	**404721**	33
30	40	115	172.5	37	50	143	157.3		6KGP23040X2XXXA1	**404722**	34
37	50	143	214.5	45	60	170	187		6KGP23050X2XXXA1	**404723**	34

400V, 3-phase, 50/60Hz input

Heavy Duty rating				Light Duty rating							
Nominal motor ratings			Overload	Nominal motor ratings			Overload				
Power kW	Power HP	Current A	current during 60s (A)	Power kW	Power HP	Current A	current during 60s (A)	Enclosure type:	Cat. No.	Ref. No.	Unit size
0.37	1/2	1.3	2.08	0.37	1/2	1.3	1.43	IP55/NEMA 12	6KGP43F50X2XXXA1	**402888**	12
0.75	1	2.4	3.84	0.75	1	2.4	2.64		6KGP43001X2XXXA1	**402889**	12
1.5	2	4.1	6.56	1.5	2	4.1	4.51		6KGP43002X2XXXA1	**402890**	12
2.2	3	5.6	8.96	2.2	3	5.6	6.16		6KGP43003X2XXXA1	**402891**	12
4	5	10	16	4	5	10	11		6KGP43005X2XXXA1	**402892**	12
5.5	7.5	13	20.8	5.5	7.5	13	14.3		6KGP43007X2XXXA1	**402893**	13
7.5	10	16	25.6	7.5	10	16	17.6		6KGP43010X2XXXA1	**402894**	13
11	15	24	38.4	11/15	15/20	32	35.2		6KGP43015X2XXXA1	**402895**	23
15	20	32	51.2	18.5	25	37.5	41.25		6KGP43020X2XXXA1	**402896**	23
18.5	25	37.5	60	22	30	44	48.4		6KGP43025X2XXXA1	**402897**	24
22	30	44	70.4	30	40	61	67.1		6KGP43030X2XXXA1	**402898**	24
30	40	61	97.6	37	50	73	80.3		6KGP43040X2XXXA1	**402899**	24
37	50	73	116.8	45	60	90	99		6KGP43050X2XXXA1	**402900**	33
45	60	90	144	55	75	106	116.6		6KGP43060X2XXXA1	**402901**	33
55	75	105	168	75	100	147	161.7		6KGP43075X2XXXA1	**402902**	34
75	100	147	235.2	90	125	177	194.7		6KGP43100X2XXXA1	**402903**	34
90	125	177	265.5	110	150	212	233.2	IP54/NEMA 12 conformal coated	6KGP43125X2XXCA1	**403332**	43
110	150	212	318	132	200	260	286		6KGP43150X2XXCA1	**403333**	43
132	200	260	390	160	250	315	346.5		6KGP43200X2XXCA1	**403334**	44
160	250	315	472.5	200	300	395	434.5		6KGP43250X2XXCA1	**403335**	44
200	300	395	592.5	250	350	480	528		6KGP43300X2XXCA1	**403336**	44
250	350	480	720	315	450	600	660		6KGP43350X2XXCA1	**402909**	52
315	450	600	900	355	500	658	723.8		6KGP43450X2XXCA1	**402910**	52
355	500	658	987	400	550	745	819.5		6KGP43500X2XXCA1	**402911**	52
400	550	745	1117.5	450	600	800	880		6KGP43550X2XXCA1	**402912**	52
450	600	800	1200	500	650	880	968		6KGP43600X2XXCA1	**402913**	61
500	650	880	1320	560	750	990	1089		6KGP43650X2XXCA1	**402914**	61
560	750	990	1485	630	900	1120	1232		6KGP43750X2XXCA1	**402915**	61
630	900	1120	1680	710	1000	1260	1386		6KGP43900X2XXCA1	**402916**	61
710	1000	1260	1890	800	1200	1460	1606		6KGP431K0X2XXCA1	**402917**	62
800	1200	1460	2190	1000	1350	1700	1870		6KGP431K2X2XXCA1	**402918**	62

690V, 3-phase, 50/60Hz input

Heavy Duty rating				Light Duty rating							
Nominal motor ratings			Overload	Nominal motor ratings			Overload				
Power kW	Power HP	Current A	current during 60s (A)	Power kW	Power HP	Current A	current during 60s (A)	Enclosure type:	Cat. No.	Ref. No.	Unit size
11	15	13	20.8	15	20	18	20	IP55/NEMA 12	6KGP63015X2XXXA1	**403581**	22
15	20	18	28.8	18.5	25	22	24		6KGP63020X2XXXA1	**403582**	22
18.5	25	22	35.2	22	30	27	30		6KGP63025X2XXXA1	**403583**	22
22	30	27	43.2	30	40	34	37		6KGP63030X2XXXA1	**403584**	22
30	40	34	51	37	50	41	45		6KGP63040X2XXXA1	**403585**	32
37	50	41	61.5	45	60	52	56		6KGP63050X2XXXA1	**403586**	32
45	60	52	76.5	55	75	62	68		6KGP63060X2XXXA1	**403587**	32
55	75	62	93	75	100	83	91		6KGP63075X2XXXA1	**403588**	32
75	100	83	124.5	90	125	100	110		6KGP63100X2XXXA1	**403589**	32
90	125	108	162	110	150	131	144	IP54/NEMA 12 conformal Coated	6KGP63125X2XXCA1	**403590**	43
110	150	131	196.5	132	200	155	171		6KGP63150X2XXCA1	**403591**	43
132	200	155	232.5	160	250	192	211		6KGP63200X2XXCA1	**403592**	43
160	250	192	288	200	300	242	266		6KGP63250X2XXCA1	**403593**	44
200	300	242	363	250	350	290	319		6KGP63300X2XXCA1	**403594**	44
250	350	290	435	315	400	344	378		6KGP63350X2XXCA1	**403595**	44
315	450	344	516	400	500	400	440		6KGP63400X2XXCA1	**403596**	44
355	500	380	570	450	600	450	495		6KGP63500X2XXCA1	**403597**	52
400	550	410	615	500	650	500	550		6KGP63550X2XXCA1	**403598**	52
500	650	500	750	560	750	570	627		6KGP63650X2XXCA1	**403599**	52
560	750	570	855	630	800	630	693		6KGP63750X2XXCA1	**403600**	52
630	900	630	945	710	1000	730	803		6KGP63900X2XXCA1	**403601**	61
710	1000	730	1095	800	1200	850	935		6KGP631K0X2XXCA1	**403602**	61
800	1150	850	1275	900	1300	945	1040		6KGP631K1X2XXCA1	**403603**	61
900	1250	945	1417.5	1000	1400	1060	1166		6KGP631K2X2XXCA1	**403604**	62
1000	1350	1060	1590	1200	1600	1260	1386		6KGP631K3X2XXCA1	**403605**	62
1200	1600	1260	1890	1400	1900	1415	1557		6KGP631K6X1XXCA1	**404741**	62

New

IP66, with EMC filter Class A2, WITH braking chopper

230V, 3-phase, 50/60Hz input

Heavy Duty rating				Light Duty rating						
Nominal motor ratings			Overload current during 60s (A)	Nominal motor ratings			Overload current during 60s (A)	Cat. No.	Ref. No.	Unit size
Power kW	Power HP	Current A		Power kW	Power HP	Current A				
0.25	1/3	1.8	2.88	0.25	1/3	1.8	2.88	6KGP23F33X4XBXA1	on request	12
0.37	1/2	2.4	3.84	0.37	1/2	2.4	3.84	6KGP23F50X4XBXA1		12
0.75	1	4.6	7.36	0.75	1	4.6	7.36	6KGP23001X4XBXA1		12
1.5	2	7.5	12	1.5	2	7.5	12	6KGP23002X4XBXA1		12
2.2	3	10.6	16.96	2.2	3	10.6	16.96	6KGP23003X4XBXA1		12
3.7	5	16.7	26.72	3.7	5	16.7	26.72	6KGP23005X4XBXA1		13
5.5	7.5	24.2	38.72	5.5/7.5	7.5/10	30.8	33.88	6KGP23007X4XBXA1		23
7.5	10	30.8	49.28	11	15	46.2	50.82	6KGP23010X4XBXA1		23
11	15	46.2	73.92	15	20	59.4	65.34	6KGP23015X4XBXA1		24
15	20	59.4	89.1	18.5	25	74.8	82.28	6KGP23020X4XBXA1		24
18.5	25	74.8	112.2	22	30	88	96.8	6KGP23025X4XBXA1		33
22	30	88	132	30	40	115	126.5	6KGP23030X4XBXA1		33
30	40	115	172.5	37	50	143	157.3	6KGP23040X4XBXA1		34
37	50	143	214.5	45	60	170	187	6KGP23050X4XBXA1		34

400V, 3-phase, 50/60Hz input

Heavy Duty rating				Light Duty rating						
Nominal motor ratings			Overload current during 60s (A)	Nominal motor ratings			Overload current during 60s (A)	Cat. No.	Ref. No.	Unit size
Power kW	Power HP	Current A		Power kW	Power HP	Current A				
0.37	1/2	1.3	2.08	0.37	1/2	1.3	1.43	6KGP43F50X4XBXA1	**403187**	12
0.75	1	2.4	3.84	0.75	1	2.4	2.64	6KGP43001X4XBXA1	**403188**	12
1.5	2	4.1	6.56	1.5	2	4.1	4.51	6KGP43002X4XBXA1	**403189**	12
2.2	3	5.6	8.96	2.2	3	5.6	6.16	6KGP43003X4XBXA1	**403190**	12
4	5	10	16	4	5	10	11	6KGP43005X4XBXA1	**403191**	12
5.5	7.5	13	20.8	5.5	7.5	13	14.3	6KGP43007X4XBXA1	**403192**	13
7.5	10	16	25.6	7.5	10	16	17.6	6KGP43010X4XBXA1	**403193**	13
11	15	24	38.4	11/15	15/20	32	35.2	6KGP43015X4XBXA1	**403194**	23
15	20	32	51.2	18.5	25	37.5	41.25	6KGP43020X4XBXA1	**403195**	23
18.5	25	37.5	60	22	30	44	48.4	6KGP43025X4XBXA1	**403196**	24
22	30	44	70.4	30	40	61	67.1	6KGP43030X4XBXA1	**403197**	24
30	40	61	97.6	37	50	73	80.3	6KGP43040X4XBXA1	**403198**	24
37	50	73	116.8	45	60	90	99	6KGP43050X4XBXA1	**403199**	33
45	60	90	144	55	75	106	116.6	6KGP43060X4XBXA1	**403200**	33
55	75	106	169.6	75	100	147	161.7	6KGP43075X4XBXA1	**403201**	34
75	100	147	235.2	90	125	177	194.7	6KGP43100X4XBXA1	**403202**	34

New

IP66, with EMC filter Class A2, WITHOUT braking chopper

230V, 3-phase, 50/60Hz input

Heavy Duty rating				Light Duty rating						
Nominal motor ratings			Overload current during 60s (A)	Nominal motor ratings			Overload current during 60s (A)	Cat. No.	Ref. No.	Unit size
Power kW	Power HP	Current A		Power kW	Power HP	Current A				
0.25	1/3	1.8	2.88	0.25	1/3	1.8	2.88	6KGP23F33X4XXXA1	**404724**	12
0.37	1/2	2.4	3.84	0.37	1/2	2.4	3.84	6KGP23F50X4XXXA1	**404725**	12
0.75	1	4.6	7.36	0.75	1	4.6	7.36	6KGP23001X4XXXA1	**404726**	12
1.5	2	7.5	12	1.5	2	7.5	12	6KGP23002X4XXXA1	**404727**	12
2.2	3	10.6	16.96	2.2	3	10.6	16.96	6KGP23003X4XXXA1	**404728**	12
3.7	5	16.7	26.72	3.7	5	16.7	26.72	6KGP23005X4XXXA1	**404729**	13
5.5	7.5	24.2	38.72	5.5/7.5	7.5/10	30.8	33.88	6KGP23007X4XXXA1	**404730**	23
7.5	10	30.8	49.28	11	15	46.2	50.82	6KGP23010X4XXXA1	**404731**	23
11	15	46.2	73.92	15	20	59.4	65.34	6KGP23015X4XXXA1	**404732**	24
15	20	59.4	89.1	18.5	25	74.8	82.28	6KGP23020X4XXXA1	**404733**	24
18.5	25	74.8	112.2	22	30	88	96.8	6KGP23025X4XXXA1	**404734**	33
22	30	88	132	30	40	115	126.5	6KGP23030X4XXXA1	**404735**	33
30	40	115	172.5	37	50	143	157.3	6KGP23040X4XXXA1	**404736**	34
37	50	143	214.5	45	60	170	187	6KGP23050X4XXXA1	**404737**	34

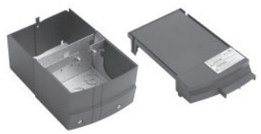
400V, 3-phase, 50/60Hz input

Heavy Duty rating				Light Duty rating						
Nominal motor ratings			Overload current during 60s (A)	Nominal motor ratings			Overload current during 60s (A)	Cat. No.	Ref. No.	Unit size
Power kW	Power HP	Current A		Power kW	Power HP	Current A				
0.37	1/2	1.3	2.08	0.37	1/2	1.3	1.43	6KGP43F50X4XXXA1	**402919**	12
0.75	1	2.4	3.84	0.75	1	2.4	2.64	6KGP43001X4XXXA1	**402920**	12
1.5	2	4.1	6.56	1.5	2	4.1	4.51	6KGP43002X4XXXA1	**402921**	12
2.2	3	5.6	8.96	2.2	3	5.6	6.16	6KGP43003X4XXXA1	**402922**	12
4	5	10	16	4	5	10	11	6KGP43005X4XXXA1	**402923**	12
5.5	7.5	13	20.8	5.5	7.5	13	14.3	6KGP43007X4XXXA1	**402924**	13
7.5	10	16	25.6	7.5	10	16	17.6	6KGP43010X4XXXA1	**402925**	13
11	15	24	38.4	11/15	15/20	32	35.2	6KGP43015X4XXXA1	**402926**	23
15	20	32	51.2	18.5	25	37.5	41.25	6KGP43020X4XXXA1	**402927**	23
18.5	25	37.5	60	22	30	44	48.4	6KGP43025X4XXXA1	**402928**	24
22	30	44	70.4	30	40	61	67.1	6KGP43030X4XXXA1	**402929**	24
30	40	61	97.6	37	50	73	80.3	6KGP43040X4XXXA1	**402930**	24
37	50	73	116.8	45	60	90	99	6KGP43050X4XXXA1	**402931**	33
45	60	90	144	55	75	106	116.6	6KGP43060X4XXXA1	**402932**	33
55	75	106	169.6	75	100	147	161.7	6KGP43075X4XXXA1	**402933**	34
75	100	147	235.2	90	125	177	194.7	6KGP43100X4XXXA1	**402934**	34

New

Options and accessories

Field installed IP21/NEMA 1 add-on option kits



Voltage	Rating kW	Rating HP	IP21/NEMA 1 Kit Cat. No.	Ref. No.
230	0.25	1/3	NEMA1ACA2	**404831**
	0.37	1/2	NEMA1ACA2	**404831**
	0.75	1	NEMA1ACA2	**404831**
	1.5	2	NEMA1ACA2	**404831**
	2.2	3	NEMA1ACA2	**404831**
	3.7	5	NEMA1ACA3	**404832**
	5.5	7.5	NEMA1ACB3	**404833**
	7.5	10	NEMA1ACB3	**404833**
	11	15	NEMA1ACB4	**404834**
	15	20	NEMA1ACB4	**404834**
	18.5	25	NEMA1ACC3	**404835**
	22	30	NEMA1ACC3	**404835**
	30	40	NEMA1ACC4	**404836**
	37	50	NEMA1ACC4	**404836**
400	0.37	1/2	NEMA1ACA2	**404831**
	0.75	1	NEMA1ACA2	**404831**
	1.5	2	NEMA1ACA2	**404831**
	2.2	3	NEMA1ACA2	**404831**
	3.7	5	NEMA1ACA2	**404831**
	5.5	7.5	NEMA1ACA3	**404832**
	7.5	10	NEMA1ACA3	**404832**
	11	15	NEMA1ACB3	**404833**
	15	20	NEMA1ACB3	**404833**
	18.5	25	NEMA1ACB4	**404834**
	22	30	NEMA1ACB4	**404834**
	30	40	NEMA1ACB4	**404834**
	37	50	NEMA1ACC3	**404835**
	45	60	NEMA1ACC3	**404835**
	55	75	NEMA1ACC4	**404836**
	75	100	NEMA1ACC4	**404836**

Remote mounting kit for graphical LCD keypad

Remote mounting kit for mounting graphical LCD Keypad on enclosure door. kit includes gasket, mounting brackets, and cable. Keypad is rated IP65.

Description	Cat. No.	Ref. No.
Remote mounting kit for graphical LCD keypad	RMKYPDAC	**404797**
Remote mounting kit without cable	OPCRMKNC	**404850**

Communications modules

Profibus DP communications module Profibus DP internal drive mounted module for use on AF-650 GP and AF-600 FP drives. Supports Profibus DP V1 communications networks.	OPCPDP	**404848**
DeviceNet communications module DeviceNet internal drive mounted module for use on AF-650 GP and AF-600 FP drives. ODVA certified device.	OPCDEV	**404818**
Ethernet IP communications module(1) Ethernet IP internal drive mounted module for use on AF-650 GP and AF-600 FP drives. ODVA certified device. Features 2-port built-in switch. Also includes webserver and e-mail notification.	OPCEIP	**404820**
Modbus TCP communications module Modbus TCP internal drive mounted module for use on AF-650 GP and AF-600 FP drives.	OPCMBTCP	**404824**
ProfiNet RT communications module ProfiNet RT internal drive mounted module for use on AF-650 GP and AF-600 FP drives.	OPCPRT	**404825**

(1) Requires I/O and network slots and cannot be used with any other network or I/O modules.

New

Options and accessories (continued)

General purpose I/O module

General purpose I/O internal drive mounted module for use on AF-650 GP and AF-600 FP drives.
Module includes: 3x digital inputs 24V
2x digital outputs PNP/NPN
2x analogue inputs 0-10V
1x analogue output 0/4-20mA

Description	Cat. No.	Ref. No.
General purpose I/O module	OPCGPIO	**404821**

Encoder module

Encoder internal drive mounted module for use on the AF-650 GP drive. Module supports all 5V incremental encoders. Also supports hyperface sincos encoders.

Encoder input module	OPCENC	**404819**

Resolver module

Resolver internal drive mounted module for use on the AF-650 GP drive.
Module supports 4-8Vrms, 2.5kHz - 15kHz, 50mA resolvers. Resolution is 10bit at 4Vrms.

Resolver input module	OPCRES	**404852**

Relay output module

Relay output internal drive mounted module for use on the AF-650 GP.
Module adds (3) Form C relay outputs to the drive. Relays are rated at 2A at 240V resistive load.

Relay output module	OPCRLY	**404849**

24V DC External supply module

24V DC external supply internal drive mounted module for use on the AF-650 GP drives. This module accepts an external 24V DC supply which is used to keep the control board of the drive and other option modules powered in the event of a Line side power outage. Can be used with Communications and I/O Modules.

24V DC External supply module	OPC24VPS	**404815**

Safe PLC I/O module

Safe PLC I/O internal drive mounted module for use on the AF-650 GP drive. This module provides a safety input based on a single pole 24V DC input.

Safe PLC I/O Module	OPCSAFE	**404853**

New

Options and accessories (continued)

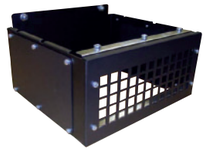
Screw terminal accessory

Screw terminal accessory is available for field installation on AF-650 GP drives. These screw terminals can replace the cage clamp terminals which ship with each drive. This set of three terminals are for the digital inputs, analog I/O, and RS485 connection.

Description	Cat. No.	Ref. No.
Screw terminal accessory	OPCSTERM	**404822**

Pedestal kit

Pedestal kit allows unit size 41 and 42 drives to be floor mounted (IP21/NEMA 1 and IP55/ NEMA 12, 90 to 200/315kW / 125 to 300/400HP at 400/690V for AF-650 GP).



Description	Cat. No.	Ref. No.
Pedestal kit	OPC4XPED	**404845**

USB kit

This kit allows for the USB programming terminal to be brought out to the front cover of the drive. Works with all drive types.

For all drives up to unit size 5X	OPCUSB	**404861**
For all unit size 6X drives	OPCUSB6X	**404860**

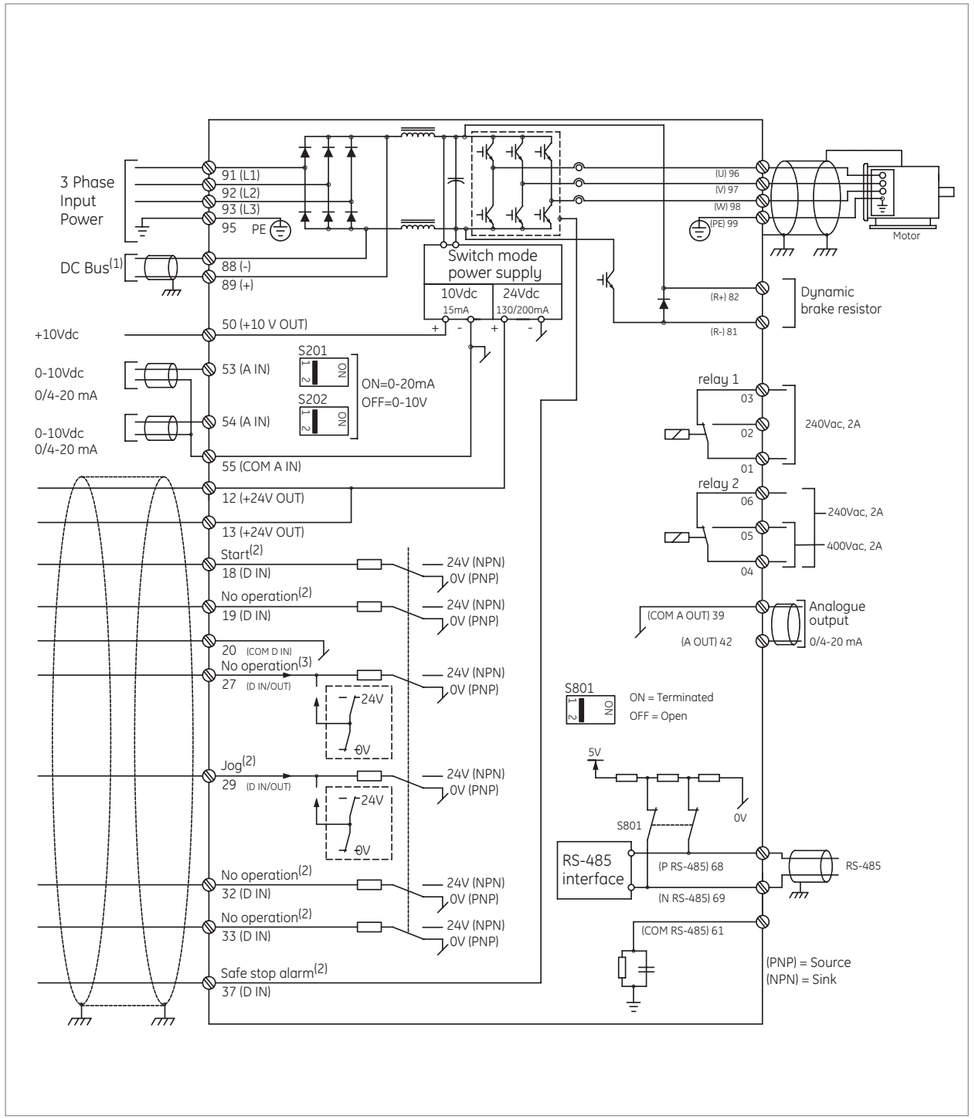
Power shields

These shields are used to cover the drive power terminals on NEMA 1 and NEMA 12 drive types.

For Unit size 41 and 42 drives	OPCCOVER4142	**404846**
For Unit size 51 drives	OPCCOVER51	**404847**

New

Basic wiring diagrams



(1) These terminals are only available with optional factory installed brake chopper.
(2) Indicates default setting; see parameter group E-## to re-program.
(3) Indicates default setting for version 1.10 drives or higher. Prior versions are set to coast inverse, indicating that terminal #27 must be logic "high" to enable the drive to run. See parameter E-03 terminal 27 digital input to re-program.

Specifications

Environmental conditions

Enclosures	IP20 chassis, IP00 chassis, IP21/NEMA 1, IP55/ NEMA 12, IP54/NEMA 12, IP66/NEMA 4
Installation location	Do not install in locations where product could be exposed to dust, corrosive gas, inflammable gas, oil mist, vapor, water drops or direct sun-light. There must be no salt in the atmosphere. Condensation must not be caused by sudden changes in temperature. For use at altitudes of 3280 ft. (1000 m) or less without derating.
Storage temperature	-25° to 65° C
Ambient temperature	-10° to +50° C (24 hour average max of 45°C)
Ambient humidity	5 to 95 % RH (non-condensing)
Vibration	1.0 G
Cooling method	Fan cooled all ratings. Fan control auto, 50 % level, 75 % level, 100 % level adjustable

Standards

Approvals	CE, UL, cUL, and C-Tick Suitable for use on a circuit capable of delivering not more than 100,000 rms symmetrical amperes for 230 V and 400 V.

Input power supply

Rated Input AC voltage	200-240 Vac, 3-phase, 50-60 Hz, +/- 10% V 380-500 Vac, 3-phase, 50-60 Hz, +/- 10% V 525-690 Vac, 3-phase, 50-60 Hz, +/- 10% V
Maximum voltage imbalance	3% of rated supply voltage
True power factor	> 0.9 at rated load
Displacement power factor	> 0.98
Switching on input power supply	Maximum twice/minute up to 7.5kW/10HP, maximum once/minute above 7.5kW/10HP
Environment according to EN60664-1	Overvoltage category III/pollution degree 2

Output

Rated output voltage	0-100% of supply voltage
Output frequency	0-1000 Hz; 0-800Hz for 400V above 710kW/ 100HP and 690V above 710kW/100HP
Switching on output	Unlimited
Accel/decel times	0.01-3600 seconds
Overload current rating	Sinusoidal PWM control (V/Hz, Avd. vector control, sensorless vector, and flux vector with motor feedback)

Control

Starting torque	160% starting torque for 1 minute (constant torque), 110% starting torque for 1 minute (variable torque)
Carrier frequency (motor noise)	Selectable - 1, 1.5, 2, 2.5, 3, 3.5, 4, 5, 6, 7, 8, 10, 12, 14, 16 kHz
Torque boost	Selectable by up to 5 individual V/Hz settings in V/Hz Mode or by 0 - 300% setting of torque boost parameter in Adv. vector mode
Acceleration/deceleration time	0.01-3600 seconds (4 acceleration and deceleration times are selectable via digital inputs. Acceleration and deceleration patterns can be selected from linear or deceleration patterns can be selected from linear or S-curve)
Data protection	Passw protection for quick menu or main menu, 0-9999.
Pattern operation	Settings via built-in logic controller sequencer
Jump frequency control	4 jump (or skip) frequencies via parameter set to avoid mechanical vibration
Slip compensation	Maintains motor at constant speed with load fluctuations
Torque limit control	Output torque can be controlled within a range of 0.0 to 160% (0.1 and steps)
8 preset speeds	8 programmable preset speeds selectable by 3 digital inputs
Trim reference setting	Available for speed reference offset via potentiometer, voltage input, or current input
DC injection braking	Starting frequency: 0.0-1000 Hz, 0-800Hz for 400V above 710kW/100HP and 690V above 37kW/50HP Braking time: 0.0-60.0 seconds Braking level: 0-100% of rated current
Jogging operation	Operation via on key or digital input (Fwd or Rev)
Auto-restart after power failure	Restarts the drive without stopping after instantaneous power failure
Energy savings	Controls output voltage to minimize motor loss during constant speed operation
Start mode function	This functionality smoothly catches a spinning motor

Logic controler (LC)

Logic controller events	Up to 37 types of programmable events
Comparators	Array of 6 comparators
Timers	Array of 8 timers, adjustable from 0.0 to 3600 sec
Logic rules	Array of 6 boolean logic rules
Logic controller states	Array of 20 logic controller action states

Process controler (PI)

Process CL feedback select	Up to 2 references. Selectable - no function, motor feedback, separate encoder, encoder option module, or resolver option module
Process PID control	Normal or inverse
Process PID anti windup	Disabled or enabled
Process PID start speed	0.0-200 Hz
Process PID proportional gain	0.00-10.00
Process PID integral time	0.1 - 10000.0 ms
Process PID differential time	0.0 - 10 s
Process PID differential gain	1.0-50.00
Process PID feed forward factor	0-500%
On reference bandwidth	0-200%

Operation

Operation method	Keypad operation: hand, off, auto digital input: programmable for start/stop, forward/reverse, jog timer operation: stop after predetermined time frame Built-in RS-485 Modbus USB port for programming drive with optional PC software
Frequency reference signal	Left or right arrow buttons on keypad in manual mode Speed potentiometer: 0 to +10 Vdc, 10 to 0 Vdc 0-10 Vdc analog input 0/4-20mA analog input
References	Up to 3 input references can be selected from analog input #1 or #2, frequency input #1 or #2, network, or potentiometer
Input signals	6x digital inputs, 24 Vdc PNP or NPN 1x safe stop digital input suitable for category 3 installations to meet EN-954-1 2x pulse inputs rated to 110kHz or 1x pulse input and 1 - encoder Input 24 Vdc rated to 4096 PPR 2x analog inputs -10 to +10V scalable or 0/4 to 20 mA scalable Digital input settings: No operation Reset after drive trip or alarm Reset after drive trip or alarm Drive at stop with no holding current Quick stop according to quick stop decel time 1 Stop on input going low Start Maintained start arfter signal applied for Minimum of 2ms Reversing Start reverse Enable start forward only Jog Multi-step frequency selection (1 to 8 Steps) Hold drive frequency Hold reference Speed up; activated by hold drive frequency or Hold reference Slow down; activated by hold drive frequency or hold reference Drive parameter setup select 1-4 Precise start or stop; activated when drive parameter precise start or stop function is selected Catch up or slow down; activated by signal to add to or subtract from input reference to control speed Pulse input selectable from 100 - 110000Hz Accel / decel time select. Set input to accel / decel times 1 to 4 Digital potentiometer Input Increase or Decrease Mechanical Brake Feedback

Continued on next page

New

Specifications

Operation *(continued)*

Output signals	2x digital outputs 24 Vdc (digital outputs are used in place of 2 of the digital inputs) 2x form C relays rated to 2A at 230 Vac 1x analog output 0/4 to 20mA Relay output settings: No operation Control ready Drive ready Drive ready in remote Standby no drive warnings Drive running Drive running no drive warnings Drive running on remote Alarm Alarm or warning At torque limit Out of current range Below current Above current Out of speed range Below speed Above speed Out of feedback range Below feedback Above feedback Thermal overload warning Reverse Bus OK Torque limit and stopped Brake and no warning Brake ready and no faults Brake chopper fault External interlock Out of external reference range Below external reference Above external reference Fieldbus controlling drive No alarm Running in reverse Local mode active Remote mode active Start command active Hand mode active Auto mode active
Protective functions	Line phase loss DC overvoltage DC undervoltage Drive overload Motor overtemperature Motor thermistor overtemperature Torque limit Overcurrent Ground fault Short circuit Control word timeout Brake resistor short-circuited Brake chopper short-circuited Brake check DC Link voltage high DC Link voltage low Internal fan fault External fan fault Power board overtemperature Missing U phase Missing V phase Missing W phase Internal fault Control voltage fault Auto tune check - wrong motor parameters Auto Tune low inom - motor current is too low Current limit Mechanical brake low Drive initialized to default value Keypad error No motor Soft charge fault Auto tuning fault Serial comms bus fault Hardware mismatch Speed limit

Keypad

Keypad features	LCD display with 6 alpha-numeric lines. multi-language support Hot pluggable, remote mount option, and copy-cat feature, IP65 rating when remote mounted on enclosure LED's - green - drive is on, yellow - indicates a warning, red - indicates an alarm, amber - indicates active menu keys and h-o-a keys
Keypad keys	Status - shows status of drive Quick Menu - enters quick start, parameter data check, or trending modes Alarm log - used to display alarm list Back - reverts to previous step or layer in parameter structure Cancel - used to cancel last change or command Info - displays information about a command, parameter, or function in any display. Hand/off/auto - used to control drive locally or put drive in remote mode Reset - used to reset warnings or alarms
Password	2 level password protection
Alternate motor parameters	Up to 4 separate complete parameter set-ups are available
Graphical trending	Trend speed, power, frequency or any value programmed in status display

RS485 modbus RTU serial communications

Physical level	EIA/RS485
Transmission distance	1640 ft (500m)
Node address	32
Transmission speed	2400, 4800, 9600, 19200, 38400,or 115200 (bits/s)
Transmission mode	Half duplex
Transmission protocol	Modbus RTU
Character code	Binary
Character length	8 bits
Error check	CRC

Mounting clearance

Starting torque	All AF-650 GP drives can be mounted side-by-side without spacing. For all drives rated 75kW/100HP or below allow 3.4 inches (100 mm) free space above and below. For all drives rated 90kW/125HP and above allow 8.9 inches (225 mm) free space above and below.

New

Heavy Duty efficiency, Watt loss, unit size, dimensions and weights

230 Vac

Nominal motor ratings			Efficiency									
Power kW	Power HP	Current A	at 5 kHz (%)	at 4 kHz (%)	at 3 kHz (%)	Watt loss (W)	Unit size	Drive type	Height (mm)	Width (mm)	Depth (mm)	Weight (kg)
0.25	1/3	1.8	94			21	12	IP20 chassis	375	90	220	5
0.37	1/2	2.4	94			29	12	IP20 chassis	375	90	220	5
0.75	1	4.6	95			54	12	IP20 chassis	375	90	220	5
1.5	2	7.5	96			82	12	IP20 chassis	375	90	220	5
2.2	3	10.6	96			115	12	IP20 chassis	374	130	220	7
3.7	5	16.7	96			185	13	IP20 chassis	420	165	262	12
5.5	7.5	24.2		96.4		239	23	IP20 chassis	420	165	262	12
7.5	10	30.8		95.9		371	23	IP20 chassis	595	230	242	24
11	15	46.2		96.4		463	24	IP20 chassis	595	230	242	24
15	20	59.4		96		621	24	IP20 chassis	630	308	334	35
18.5	25	74.8			97	740	33	IP20 chassis	630	308	334	35
22	30	88			97	874	33	IP20 chassis	800	370	334	50
30	40	115			97	1143	34	IP20 chassis	800	370	334	50
37	50	143			97	1400	34	IP20 chassis	31.5	14.57	13.15	110.2

400 Vac

Nominal motor ratings			Efficiency				Watt	Unit		Height	Width	Depth	Weight
Power kW	Power HP	Current A	at 5 kHz (%)	at 4 kHz (%)	at 3 kHz (%)	at 2 kHz (%)	loss (W)	size	Drive type	(mm)	(mm)	(mm)	(kg)
0.37	1/2	1.3	93				35	12	IP20 chassis	375	90	220	5
0.75	1	2.4	96				46	12	IP20 chassis	375	90	220	5
1.5	2	4.1	97				62	12	IP20 chassis	375	90	220	5
2.2	3	5.6	97				88	12	IP20 chassis	375	90	220	5
3.7	5	10	97				124	12	IP20 chassis	375	90	220	5
5.5	7.5	13	97				187	13	IP20 chassis	375	130	220	7
7.5	10	16	97				255	13	IP20 chassis	375	130	220	7
11	15	24		98			291	23	IP20 chassis	420	165	262	12
15	20	32		98			379	23	IP20 chassis	420	165	262	12
18.5	25	37.5		98			444	24	IP20 chassis	595	230	242	24
22	30	44		98			547	24	IP20 chassis	595	230	242	24
30	40	61			98		570	24	IP20 chassis	595	230	242	24
37	50	73			98		697	33	IP20 chassis	630	308	334	35
45	60	90			98		891	33	IP20 chassis	630	308	334	35
55	75	106			98		1022	34	IP20 chassis	800	370	334	50
75	100	147			99		1232	34	IP20 chassis	800	370	334	50
90	125	177			98		2641	43	IP00 chassis	1046	407.9	374.9	91
110	150	212			98		2995	43	IP00 chassis	1046	407.9	374.9	91
132	200	260			98		3425	44	IP00 chassis	1327	407.9	374.9	138
160	250	315			98		3910	44	IP00 chassis	1327	407.9	374.9	138
200	300	395			98		4625	44	IP00 chassis	1327	407.9	374.9	138
250	350	480				98	5165	52	IP00 chassis	1547	585	497.8	313
315	450	600				98	6960	52	IP00 chassis	1547	585	497.8	313
355	500	658				98	7691	52	IP00 chassis	1547	585	497.8	313
400	550	745				98	8636	52	IP00 chassis	1547	585	497.8	313
450	600	800				98	9492	61	IP21/NEMA 1	2282	1400	606	1004
500	650	80				98	10631	61	IP21/NEMA 1	2282	1400	606	1004
560	750	990				98	11263	61	IP21/NEMA 1	2282	1400	606	1004
630	900	1120				98	13172	61	IP21/NEMA 1	2282	1400	606	1004
710	1000	1260				98	14967	62	IP21/NEMA 1	2282	1800	606	1262
800	1200	1460				98	16392	62	IP21/NEMA 1	2282	1800	606	1262

Continued on next page

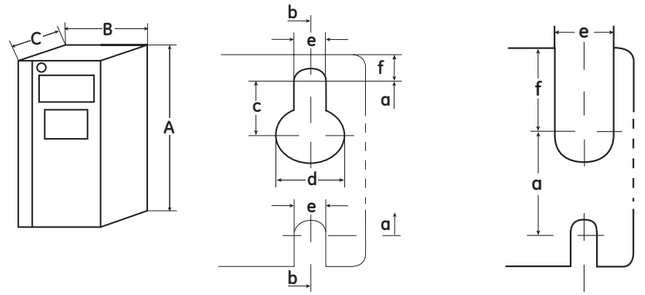
New

Heavy Duty efficiency, Watt loss, unit size, dimensions and weights

690 Vac

Nominal motor ratings			Efficiency									
Power kW	Power HP	Current A	at 3 kHz (%)	at 2 kHz (%)	at 1.5 kHz (%)	Watt Loss (W)	Unit size	Type	Height (mm)	Width (mm)	Depth (mm)	Weight (kg)
11	15	13	98			228	22	IP21/NEMA 1	650	242	260	27
15	20	18	98			285	22	IP21/NEMA 1	650	242	260	27
18.5	25	22	98			335	22	IP21/NEMA 1	650	242	260	27
22	30	27	98			375	22	IP21/NEMA 1	650	242	260	27
30	40	34	98			480	32	IP21/NEMA 1	770	370	335	65
37	50	41	98			592	32	IP21/NEMA 1	770	370	335	65
45	60	51	98			720	32	IP21/NEMA 1	770	370	335	65
55	75	62	98			880	32	IP21/NEMA 1	770	370	335	65
75	100	83	98			1800	32	IP21/NEMA 1	770	370	335	65
90	125	108		98		2264	43	IP00 chassis	1046	407.9	374.9	91
110	150	131		98		2664	43	IP00 chassis	1046	407.9	374.9	91
132	200	155		98		2953	43	IP00 chassis	1046	407.9	374.9	91
160	250	192		98		3451	44	IP00 chassis	1327	407.9	374.9	138
200	300	242		98		4275	44	IP00 chassis	1327	407.9	374.9	138
250	350	290		98		4875	44	IP00 chassis	1327	407.9	374.9	138
315	400	344			98	5185	44	IP00 chassis	1327	407.9	374.9	138
355	500	380			98	5385	52	IP00 chassis	1547	585	497.8	313
400	600	410			98	5818	52	IP00 chassis	1547	585	497.8	313
500	650	500			98	7671	52	IP00 chassis	1547	585	497.8	313
560	750	570			98	8715	52	IP00 chassis	1547	585	497.8	313
630	900	630	98			9674	61	IP21/NEMA 1	2282	1400	606	1004
710	1000	730	98			10965	61	IP21/NEMA 1	2282	1400	606	1004
800	1150	850	98			12890	61	IP21/NEMA 1	2282	1400	606	1004
900	1250	945	98			14457	62	IP21/NEMA 1	2282	1800	606	1262
1000	1350	1060	98			15899	62	IP21/NEMA 1	2282	1800	606	1262

Dimensional drawings



Dimensions, 1X unit sizes (mm)

	Unit size	Dimensions	12	13	15
Enclosure type			IP20 Open chassis	IP20 Open chassis	IP55/IP66 NEMA 12/NEMA 4
Voltage	230V		0.25 to 2.2kW 1/3 to 3HP	3.7kW 5HP	0.25 to 3.7kW 1/3 to 5HP
	400V		0.37 to 3.7kW 1/2 to 5HP	5.5 to 7.5kW 7.5 to 10HP	0.37 to 7.5kW 1/2 to 10HP
Height	Height of backplate	**A**	268	268	420
	Height with de-coupling plate	**A**	375	375	
	Distance between mounting holes	**a**	257	257	402
Width	Width of backplate	**B**	90	130	242
	Distance between mounting holes	**b**	70	110	215
Depth	Depth without I/O and/or network option	**C**	205	205	195
	Depth with I/O and/or network option	**C**	220	220	195
Screw holes		**c**	8.0	8.0	8.3
		d	11.0	11.0	12.0
		e	5.5	5.5	6.5
		f	9.0	9.0	9.0
Weight (kg)			4.9	6.6	13.5 / 14.2

Dimensions, 2X unit sizes (mm)

	Unit size	Dimensions	21	22	23	24
Enclosure type			IP55/IP66 NEMA 12/NEMA 4	IP55/IP66 NEMA 12/NEMA 4	IP20 Open chassis	IP20 Open chassis
Voltage	230V		5.5 to 7.5kW 7.5 to 10HP	11kW 15HP	5.5 to 7.5kW 7.5 to 10HP	11 to 15kW 15 to 20HP
	400V		11 to 15kW 15 to 20HP	18.5 to 22kW 25 to 30HP	11 to 15kW 15 to 20HP	18.5 to 30kW 25 to 40HP
Height	Height of backplate	**A**	480	650	399	521
	Height with de-coupling plate	**A**	-	-	420	595
	Distance between mounting holes	**a**	455	625	380	495
Width	Width of backplate	**B**	242	242	165	230
	Distance between mounting holes	**b**	210	210	140	200
Depth	Depth without I/O and/or network option	**C**	260	260	249	242
	Depth with I/O and/or network option	**C**	260	260	262	242
Screw holes		**c**	12.0	12.0	8.0	-
		d	19.0	19.0	12.0	-
		e	9.0	9.0	6.8	8.5
		f	9.0	9.0	7.9	15.0
Weight (kg)			23.0	27.0	12.0	23.5

Dimensional drawings

Dimensions, 3X unit sizes (mm)

	Unit size	Dimensions	31	32	33	34
Enclosure type			IP55/IP66 NEMA 12/NEMA 4	IP55/IP66 NEMA 12/NEMA 4	IP20 Open chassis	IP20 Open chassis
Voltage	230V		15 to 22kW 20 to 30HP	30 to 37kW 40 to 50HP	18.5 to 22kW 25 to 30HP	30 to 37kW 40 to 50HP
	400V		30 to 45kW 40 to 60HP	55 to 75kW 75 to 100HP	37 to 45kW 50 to 60HP	55 to 75kW 75 to 100HP
Height	Height of backplate	A	680	770	550	660
	Height with de-coupling plate	A	-	-	630	800
	Distance between mounting holes	a	648	739	521	631
Width	Width of backplate	B	308	370	308	370
	Distance between mounting holes	b	272	334	270	330
Depth	Depth without I/O and/or network option	C	310	335	333	333
	Depth with I/O and/or network option	C	310	335	333	333
Screw holes		c	12.5	12.5	-	-
		d	19.0	19.0	-	-
		e	9.0	9.0	8.5	8.5
		f	9.8	9.8	17.0	17.0
Weight (kg)			45	65	35	50

Dimensions IP20 open chassis drives with field installed IP21/NEMA 1 kits(1) (mm)

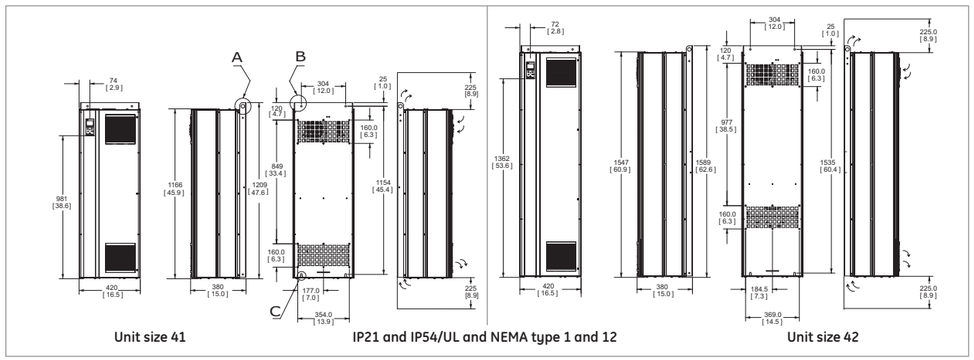
Unit Size	12	13	23	24	33	34
Enclosure type	IP20 open chassis with IP21/NEMA 1 kit					
Voltage						
230V	0.25 to 2.2kW 1/3 to 3HP	3.7kW 5HP	5.5 to 7.5kW 7.5 to 10HP	11 to 15kW 15 to 20HP	18.5 to 22kW 25 to 30HP	30 to 37kW 40 to 50HP
400V	0.25 to 2.2kW 1/2 to 5HP	5.5 to 7.5kW 7.5 to 10HP	11 to 15kW 15 to 20HP	18.5 to 30kW 25 to 40HP	37 to 45kW 50 to 60HP	55 to 75kW 75 to 100HP
Height						
Height with kit	375	375	475	671	754	950
Width						
Width of backplate	94	130	165	231	397	371
Distance between mounting holes	70	110	140	201	269	330
Depth						
Depth without I/O and/or network option	205	205	249	242	338	338
Depth with I/O and/or network option	220	220	262	242	338	338

(1) Please consult IP21/NEMA 1 kit Instructions for further mounting details and dimensions.

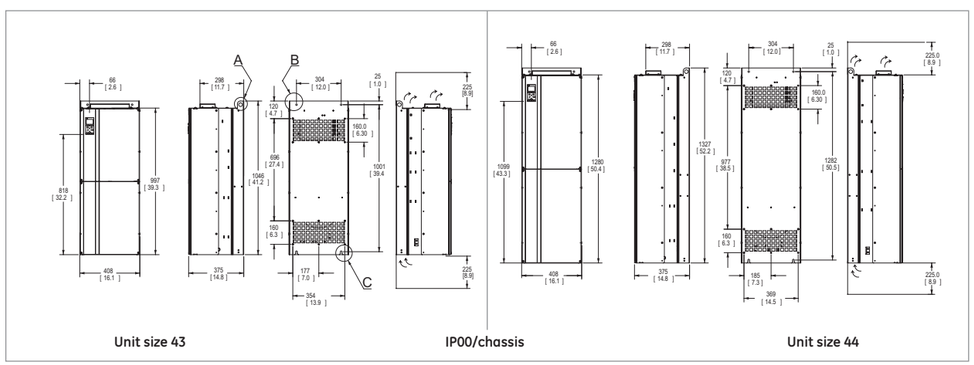
Note: please allow 5cm /2" between drives with field installed IP21/NEMA 1 kits. Also, please consult the relevant AF-6 Series drives operating instructions for recommended clearance above and below each drive rating.

New

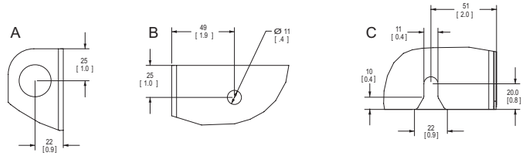
Dimensional drawings in mm (inches)



Unit size 41 — IP21 and IP54/UL and NEMA type 1 and 12 — Unit size 42



Unit size 43 — IP00/chassis — Unit size 44

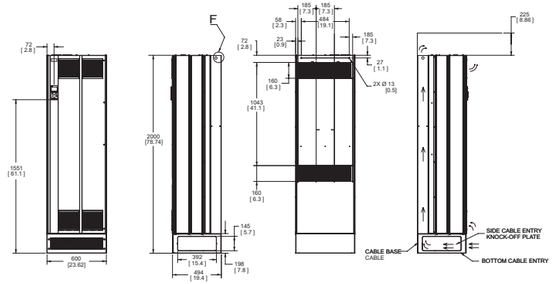


IP00/IP21/IP54 - All sizes

Unit size		41	42	43	44
Enclosure type		IP21/IP54 NEMA 1/NEMA 12	IP21/IP54 NEMA 1/NEMA 12	IP00 Open chassis	IP00 Open chassis
Voltage	400V	90 to 110kW 125 to 150HP	132 to 200kW 200 to 300HP	90 to 110kW 125 to 150HP	132 to 200kW 200 to 300HP
	690V	90 to 132kW 125 to 200HP	160 to 315kW 250 to 400HP	15 to 22kW 125 to 200HP	160 to 315kW 250 to 400HP
Shipping dimensions	Height	650	650	650	650
	Width	1730	1730	1220	1490
	Depth	570	570	570	570
Drive dimensions	Height	1209	1589	1046	1327
	Width	420	420	408	408
	Depth	380	380	375	375
Weight (kg)		104	106	91	138

New

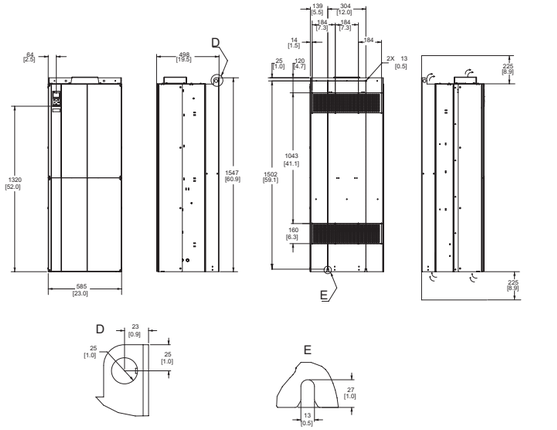
Dimensional drawings in mm (inches)



Unit size 51, IP21 and IP54/UL and NEMA type 1 and 12

Unit size 51

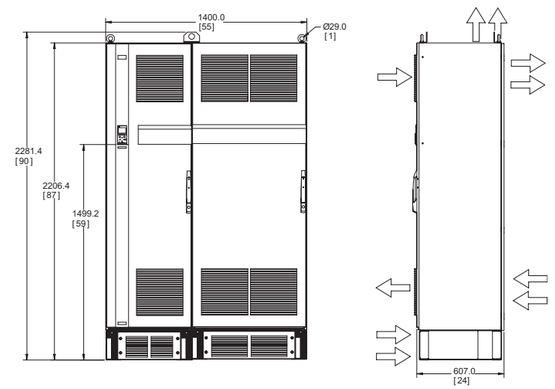
Enclosure type	IP21/IP54
	NEMA 1/NEMA 12
Voltage 400V	250 to 400kW
	350 to 550HP
690V	355 to 560kW
	500 to 750HP
Shipping dimensions	
Height	841
Width	2197
Depth	734
Drive dimensions	
Height	2000
Width	600
Depth	494
Weight (kg)	313



Unit size 52, IP00/Chassis

Unit size 52

Enclosure type	IP00
	Open chassis
Voltage 400V	250 to 400kW
	350 to 550HP
690V	355 to 560kW
	500 to 750HP
Shipping dimensions	
Height	831
Width	1704
Depth	734
Drive dimensions	
Height	1547
Width	585
Depth	498
Weight (kg)	313



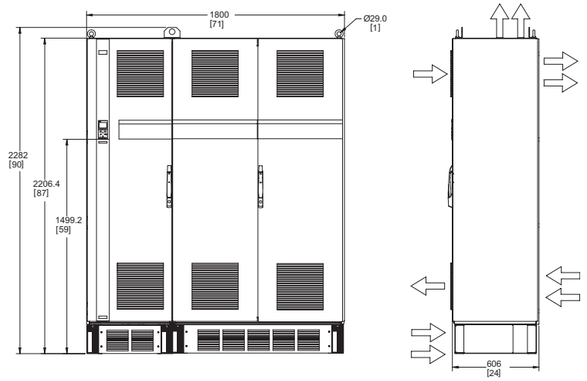
Unit Size 61

Unit size 61

Enclosure type	IP21/IP54
	NEMA 1/NEMA 12
Voltage 400V	450 to 630kW
	600 to 900HP
690V	630 to 800kW
	900 to 1150HP
Shipping dimensions	
Height	2324
Width	1570
Depth	927
Drive dimensions	
Height	2282
Width	1400
Depth	606
Weight (kg)	1004

New

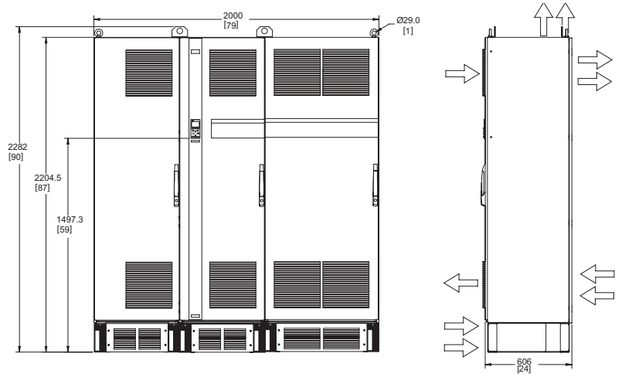
Dimensional drawings in mm (inches)



Unit size 62

Unit size 62

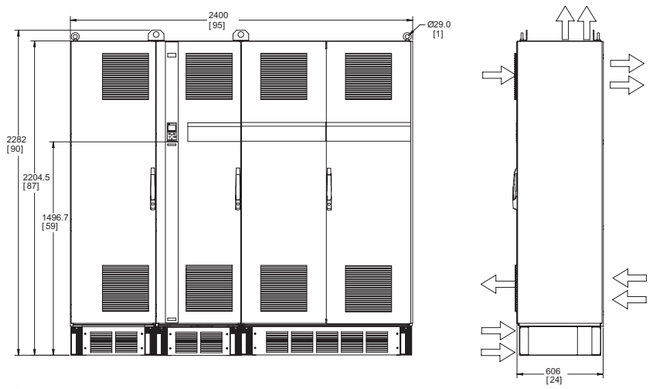
Enclosure type	IP21/IP55
	NEMA 1/NEMA 12
Voltage 400V	710 to 800kW
	1000 to 1200HP
690V	900 to 1000kW
	1250 to 1350HP
Shipping dimensions	
Height	2324
Width	1961
Depth	419
Drive dimensions	
Height	2282
Width	1800
Depth	606
Weight (kg)	1262



Unit size 63

Unit size 63

Enclosure type	IP21/IP55
	NEMA 1/NEMA 12
Voltage 400V	450 to 630kW
	600 to 900HP
690V	630 to 800kW
	900 to 1150HP
Shipping dimensions	
Height	2324
Width	2159
Depth	927
Drive dimensions	
Height	2282
Width	2000
Depth	606
Weight (kg)	1300



Unit size 64

Unit size 64

Enclosure type	IP21/IP55
	NEMA 1/NEMA 12
Voltage 400V	710 to 800kW
	1000 to 1200HP
690V	900 to 1000kW
	1250 to 1350HP
Shipping dimensions	
Height	2324
Width	2543
Depth	927
Drive dimensions	
Height	2282
Width	2400
Depth	606
Weight (kg)	1541

New

Approvals / Marking

UL, cUL, C-Tick

Applications

Fan
HVAC, cooling towers, VAV, supply and return, exhaust, fume hood, make-up air, induced and forced draft, furnace temperature control.

Pump
Chilled water, pressure boosting, cooling tower, wastewater, chiller, irrigation, hydro-storage.

AF-600 FP - Fan and Pump Drives

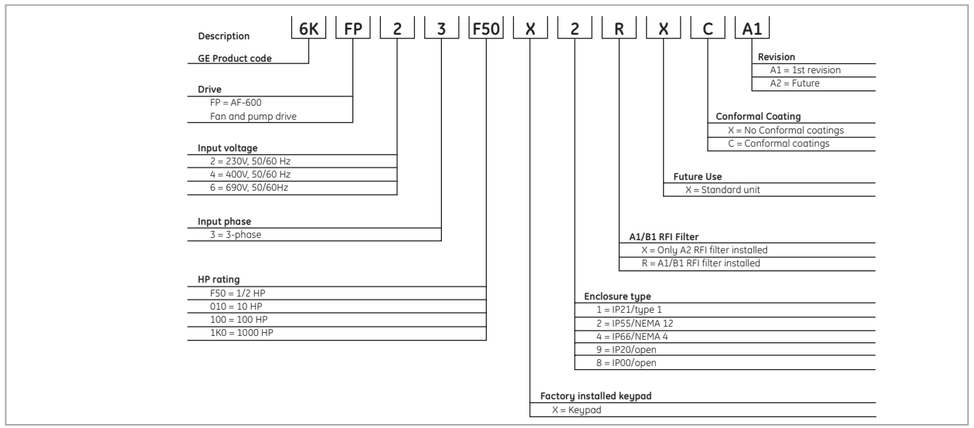
The AF-600 FP Fan and Pump Drive is a powerful, flexible and easy to use AC variable torque drive.
The drive is available in its standard configuration that includes LCD keypad display that can be remote mounted, DC link reactors, built-in Modbus RTU, Metasys N2, Apogee FLN P1 and RFI Class A2 filter. Available in IP55 enclosure.

Following models are available:
- Three-phase, 230Vac, from 1.1 to 45kW, 1 to 60HP
- Three-phase, 400Vac, from 1.1 to 1000kW, 1 to 1350HP
- Three-phase, 690Vac, from 1.1 to 1000kW, 1 to 1350HP

Features

All features HVAC needs
- RFI class A2 filter and DC link reactor as standard configuration.
- Built-in communication networks for ModBus RTU, Metasys N2 and Apogee FLN P1
- Field installed network options: BACnet, LonWorks, Profibus DP, Profinet, Modbus TCP/IP, Ethernet/IP and DeviceNet
- 110% current overload for 1 minute (Light Duty)
- Hot pluggable, illuminated LCD display, unit indications, rotation direction indication, trended charts display speed, torque, current, full alarm messages & descriptions
- 4 auto-tuning PID controllers
- Integrated logic control, PLC
- “Pick up” start (catch a spinning motor)
- Easy to use PC software
- Energy monitoring feature
- Flow compensation
- Pump cascade controller
- Sleep mode
- Fan belt monitoring
- Stairwell pressurization
- Fire override mode
- High standard protection Class 3C2, optional class 3C3

Product numbering system diagram



Product number for illustrative purposes only

IP00 / IP20 / IP21, with EMC filter Class A2, without braking chopper

230V, 3-phase, 50/60Hz input

Nominal motor ratings							
Power kW	Power HP	Current A	Overload current (A) (110% 1 Min)	Enclosure type[2]:	Cat. No.	Ref. No.	Unit size
0.75	1	4.6	5.1	IP20	6KFP23001X9XXXA1	**404684**	12
1.5	2	7.5	8.3		6KFP23002X9XXXA1	**404685**	12
2.2	3	10.6	11.7		6KFP23003X9XXXA1	**404686**	12
3.7	5	16.7	18.4		6KFP23005X9XXXA1	**404687**	13
5.5	7.5	24.2	26.6		6KFP23007X9XXXA1	**404688**	23
7.5	10	30.8	33.9		6KFP23010X9XXXA1	**404689**	23
11	15	46.2	50.8		6KFP23015X9XXXA1	**404690**	23
15	20	59.4	65.3		6KFP23020X9XXXA1	**404691**	24
18.5	25	74.8	82.3		6KFP23025X9XXXA1	**404692**	24
22	30	88	96.8		6KFP23030X9XXXA1	**404693**	33
30	40	115	126.5		6KFP23040X9XXXA1	**404694**	33
37	50	143	157		6KFP23050X9XXXA1	**404695**	34
45	60	170	187		6KFP23060X9XXXA1	**404696**	34

400V, 3-phase, 50/60Hz input

Nominal motor ratings							
Power kW	Power HP	Current A	Overload current (A) (110% 1 Min)	Enclosure type[2]:	Cat. No.	Ref. No.	Unit size
0.75	1	1.3	1.43	IP20	6KFP43001X9XXXA1	**403855**	12
1.5	2	2.4	2.64		6KFP43002X9XXXA1	**403856**	12
2.2	3	4.1	4.51		6KFP43003X9XXXA1	**403857**	12
4	5	5.6	6.16		6KFP43005X9XXXA1	**403858**	12
5.5	7.5	10	11		6KFP43007X9XXXA1	**403859**	13
7.5	10	13	14.3		6KFP43010X9XXXA1	**403860**	13
11	15	16	17.6		6KFP43015X9XXXA1	**403861**	23
15	20	32	35.2		6KFP43020X9XXXA1	**403862**	23
18.5	25	37.5	41.25		6KFP43025X9XXXA1	**403863**	23
22	30	44	48.4		6KFP43030X9XXXA1	**403864**	24
30	40	61	67.1		6KFP43040X9XXXA1	**403865**	24
37	50	73	80.3		6KFP43050X9XXXA1	**403866**	24
45	60	90	99		6KFP43060X9XXXA1	**403867**	33
55	75	106	116.6		6KFP43075X9XXXA1	**403868**	33
75	100	147	161.7		6KFP43100X9XXXA1	**403869**	34
90	125	177	194.7		6KFP43125X9XXXA1	**403870**	34
110	150	212	233.2	IP00 conformal coated	6KFP43150X8XXXA1	**403871**	43
132	200	260	286		6KFP43200X8XXXA1	**403872**	43
160	250	315	346.5		6KFP43250X8XXXA1	**403873**	44
200	300	395	434.5		6KFP43300X8XXXA1	**403874**	44
250	350	480	528		6KFP43350X8XXXA1	**403875**	44
315	450	600	660	IP00 conformal coated	6KFP43450X8XXCA1	**403876**	52
355	500	658	723.8		6KFP43500X8XXCA1	**403877**	52
400	550	745	819.5		6KFP43550X8XXCA1	**403878**	52
450	600	800	880		6KFP43600X8XXCA1	**403879**	52
500	650	880	968	IP21/NEMA 1 conformal coated	6KFP43650X1XXCA1	**403880**	61
560	750	990	1089		6KFP43750X1XXCA1	**403881**	61
630	900	1120	1232		6KFP43900X1XXCA1	**403882**	61
710	1000	1260	1386		6KFP431K0X1XXCA1	**403883**	61
800	1200	1460	1606		6KFP431K2X1XXCA1	**403884**	62
1000	1350	1700	1870		6KFP431K3X1XXCA1	**403885**	62

690V, 3-phase, 50/60Hz input

Nominal motor ratings							
Power kW	Power HP	Current A	Overload current (A) (110% 1 Min)	Enclosure type[2]:	Cat. No.	Ref. No.	Unit size
11	15	13	14	IP21/NEMA 1	6KFP63015X1XXCA1	on request	
15	20	18	20		6KFP63020X1XXCA1		
18.5	25	22	24		6KFP63025X1XXCA1		
22	30	27	30		6KFP63030X1XXCA1		
30	40	34	37		6KFP63040X1XXCA1		
37	50	41	45		6KFP63050X1XXCA1		
45	60	52	57		6KFP63060X1XXCA1		
55	75	62	68		6KFP63075X1XXCA1		
75	100	83	91		6KFP63100X1XXCA1		
90	125	100	110		6KFP63125X1XXCA1		
110	150	131	144	IP00 conformal coated	6KFP63150X8XXCA1		
132	200	155	171		6KFP63200X8XXCA1		
160	250	192	211		6KFP63250X8XXCA1		
200	300	242	266		6KFP63300X8XXCA1		
250	350	290	319		6KFP63350X8XXCA1		
315	400	344	378		6KFP63450X8XXCA1		
355	500	400	440		6KFP63550X8XXCA1		
400	550	450	495		6KFP63600X8XXCA1		
500	650	500	550		6KFP63650X8XXCA1		
560	750	570	627		6KFP63750X8XXCA1		
630	900	630	693		6KFP63900X8XXCA1		
710	1000	730	803	IP21/NEMA 1 conformal coated	6KFP631K0x1XXCA1		
800	1150	850	935		6KFP631K1X1XXCA1		
900	1250	945	1040		6KFP631K2x1XXCA1		
1000	1350	1060	1166		6KFP631K3X1XXCA1		
1200	1600	1260	1386		6KFP631K6X1XXCA1		
1400	1900	1415	1557		6KFP631K9X1XXCA1		

(1) Drives are rated NEMA 1 without the need for a separate kit.
(2) IP21/NEMA 1 kits are available as field installed options for all 230V drives from 1.1 to 45kW / 1 to 60HP and for all 400V drives from 1.1 to 90kW / 1 to 125HP. See page H.51.

IP54 / IP55, with EMC filter Class A2, without Braking Chopper

230V, 3-phase, 50/60Hz input

Nominal motor ratings							
Power kW	Power HP	Current A	Overload current (A) (110% 1 Min)	Enclosure type[2]:	Cat. No.	Ref. No.	Unit size
0.75	1	4.6	5.1	IP55/NEMA 12	6KFP23001X2XXXA1	**404697**	12
1.5	2	7.5	8.3		6KFP23002X2XXXA1	**404698**	12
2.2	3	10.6	11.7		6KFP23003X2XXXA1	**404699**	12
3.7	5	16.7	18.4		6KFP23005X2XXXA1	**404700**	13
5.5	7.5	24.2	26.6		6KFP23007X2XXXA1	**404701**	23
7.5	10	30.8	33.9		6KFP23010X2XXXA1	**404702**	23
11	15	46.2	50.8		6KFP23015X2XXXA1	**404703**	23
15	20	59.4	65.3		6KFP23020X2XXXA1	**404704**	24
18.5	25	74.8	82.3		6KFP23025X2XXXA1	**404705**	24
22	30	88	96.8		6KFP23030X2XXXA1	**404706**	33
30	40	115	126.5		6KFP23040X2XXXA1	**404707**	33
37	50	143	157		6KFP23050X2XXXA1	**404708**	34
45	60	170	187		6KFP23060X2XXXA1	**404709**	34

400V, 3-phase, 50/60Hz input

Nominal motor ratings							
Power kW	Power HP	Current A	Overload current (A) (110% 1 Min)	Enclosure type[2]:	Cat. No.	Ref. No.	Unit size
0.75	1	1.3	1.43	IP55/NEMA 12	6KFP43001X2XXXA1	**403886**	12
1.5	2	2.4	2.64		6KFP43002X2XXXA1	**403887**	12
2.2	3	4.1	4.51		6KFP43003X2XXXA1	**403888**	12
4	5	5.6	6.16		6KFP43005X2XXXA1	**403889**	12
5.5	7.5	10	11		6KFP43007X2XXXA1	**403890**	13
7.5	10	13	14.3		6KFP43010X2XXXA1	**403891**	13
11	15	16	17.6		6KFP43015X2XXXA1	**403892**	23
15	20	32	35.2		6KFP43020X2XXXA1	**403893**	23
18.5	25	37.5	41.25		6KFP43025X2XXXA1	**403894**	23
22	30	44	48.4		6KFP43030X2XXXA1	**403895**	24
30	40	61	67.1		6KFP43040X2XXXA1	**403896**	24
37	50	73	80.3		6KFP43050X2XXXA1	**403897**	24
45	60	90	99		6KFP43060X2XXXA1	**403898**	33
55	75	106	116.6		6KFP43075X2XXXA1	**403899**	33
75	100	147	161.7		6KFP43100X2XXXA1	**403900**	34
90	125	177	194.7		6KFP43125X2XXXA1	**403901**	34
110	150	212	233.2	IP54/NEMA 12 conformal coated	6KFP43150X2XXXA1	**403902**	43
132	200	260	286		6KFP43200X2XXXA1	**403903**	43
160	250	315	346.5		6KFP43250X2XXXA1	**403904**	44
200	300	395	434.5		6KFP43300X2XXXA1	**403905**	44
250	350	480	528		6KFP43350X2XXXA1	**403906**	44
315	450	600	660	IP54/NEMA 12 conformal coated	6KFP43450X2XXCA1	**403907**	52
355	500	658	723.8		6KFP43500X2XXCA1	**403908**	52
400	550	745	819.5		6KFP43550X2XXCA1	**403909**	52
450	600	800	880		6KFP43600X2XXCA1	**403910**	52
500	650	880	968		6KFP43650X2XXCA1	**403911**	61
560	750	990	1089		6KFP43750X2XXCA1	**403912**	61
630	900	1120	1232		6KFP43900X2XXCA1	**403913**	61
710	1000	1260	1386		6KFP431K0X2XXCA1	**403914**	61
800	1200	1460	1606		6KFP431K2X2XXCA1	**403915**	62
1000	1350	1700	1870		6KFP431K3X2XXCA1	**403916**	62

690V, 3-phase, 50/60Hz input

Nominal motor ratings							
Power kW	Power HP	Current A	Overload current (A) (110% 1 Min)	Enclosure type[2]:	Cat. No.	Ref. No.	Unit size
15	20	18	20	IP55/NEMA 12 conformal coated	6KFP63015X2XXCA1	**on request**	
18.5	25	22	24		6KFP63020X2XXCA1		
22	30	27	30		6KFP63025X2XXCA1		
30	40	34	37		6KFP63030X2XXCA1		
37	50	41	45		6KFP63040X2XXCA1		
45	60	52	57		6KFP63050X2XXCA1		
55	75	62	68		6KFP63060X2XXCA1		
75	100	83	91		6KFP63075X2XXCA1		
90	125	100	110		6KFP63100X2XXCA1		
110	150	131	144		6KFP63125X2XXCA1		
132	200	155	171		6KFP63150X2XXCA1		
160	250	192	211		6KFP63200X2XXCA1		
200	300	242	266		6KFP63250X2XXCA1		
250	350	290	319		6KFP63300X2XXCA1		
315	400	344	378		6KFP63350X2XXCA1		
355	500	400	440		6KFP63400X2XXCA1		
400	550	450	495	IP54/NEMA 12 conformal coated	6KFP63500X2XXCA1		
500	650	500	550		6KFP63550X2XXCA1		
560	750	570	627		6KFP63650X2XXCA1		
630	900	630	693		6KFP63750X2XXCA1		
710	1000	730	803		6KFP63900X2XXCA1		
800	1150	850	935		6KFP631K0X2XXCA1		
900	1250	945	1040		6KFP631K1X2XXCA1		
1000	1350	1060	1166		6KFP631K2X2XXCA1		
1200	1600	1260	1386		6KFP631K3X2XXCA1		
1400	1900	1415	1557		6KFP631K6X2XXCA1		

(1) Drives are rated NEMA 1 without the need for a separate kit.
(2) IP21/NEMA 1 kits are available as field installed options for all 230V drives from 1.1 to 45kW / 1 to 60HP and for all 400V drives from 1.1 to 90kW / 1 to 125HP. See page H.51.

New

IP66, with EMC filter Class A2, without braking chopper

230V, 3-phase, 50/60Hz input

Nominal motor ratings							
Power kW	Power HP	Current A	Overload current (A) (110% 1 Min)	Enclosure type[2]:	Cat. No.	Ref. No.	Unit size
0.75	1	4.6	5.1	IP66/NEMA 12	6KFP23001X4XXXA1	on request	
1.5	2	7.5	8.3		6KFP23002X4XXXA1		
2.2	3	10.6	11.7		6KFP23003X4XXXA1		
3.7	5	16.7	18.4		6KFP23005X4XXXA1		
5.5	7.5	24.2	26.6		6KFP23007X4XXXA1		
7.5	10	30.8	33.9		6KFP23010X4XXXA1		
11	15	46.2	50.8		6KFP23015X4XXXA1		
15	20	59.4	65.3		6KFP23020X4XXXA1		
18.5	25	74.8	82.3		6KFP23025X4XXXA1		
22	30	88	96.8		6KFP23030X4XXXA1		
30	40	115	126.5		6KFP23040X4XXXA1		
37	50	143	157		6KFP23050X4XXXA1		
45	60	170	187		6KFP23060X4XXXA1		

400V, 3-phase, 50/60Hz input

Nominal motor ratings							
Power kW	Power HP	Current A	Overload current (A) (110% 1 Min)	Enclosure type[2]:	Cat. No.	Ref. No.	Unit size
0.75	1	1.3	1.43	IP66/NEMA 12	6KFP43001X4XXXA1	on request	
1.5	2	2.4	2.64		6KFP43002X4XXXA1		
2.2	3	4.1	4.51		6KFP43003X4XXXA1		
4	5	5.6	6.16		6KFP43005X4XXXA1		
5.5	7.5	10	11		6KFP43007X4XXXA1		
7.5	10	13	14.3		6KFP43010X4XXXA1		
11	15	16	17.6		6KFP43015X4XXXA1		
15	20	32	35.2		6KFP43020X4XXXA1		
18.5	25	37.5	41.25		6KFP43025X4XXXA1		
22	30	44	48.4		6KFP43030X4XXXA1		
30	40	61	67.1		6KFP43040X4XXXA1		
37	50	73	80.3		6KFP43050X4XXXA1		
45	60	90	99		6KFP43060X4XXXA1		
55	75	106	116.6		6KFP43075X4XXXA1		
75	100	147	161.7		6KFP43100X4XXXA1		
90	125	177	194.7		6KFP43125X4XXXA1		
110	150	212	233.2	IP66/NEMA 12	6KFP43150X4XXXA1		
132	200	260	286		6KFP43200X4XXXA1		
160	250	315	346.5		6KFP43250X4XXXA1		
200	300	395	434.5		6KFP43300X4XXXA1		
250	350	480	528		6KFP43350X4XXXA1		
315	450	600	660	IP66/NEMA 12 conformal coated	6KFP43450X4XXCA1		
355	500	658	723.8		6KFP43500X4XXCA1		
400	550	745	819.5		6KFP43550X4XXCA1		
450	600	800	880		6KFP43600X4XXCA1		
500	650	880	968		6KFP43650X4XXCA1		
560	750	990	1089		6KFP43750X4XXCA1		
630	900	1120	1232		6KFP43900X4XXCA1		
710	1000	1260	1386		6KFP431K0X4XXCA1		
800	1200	1460	1606		6KFP431K2X4XXCA1		
1000	1350	1700	1870		6KFP431K3X4XXCA1		

(1) Drives are rated NEMA 1 without the need for a separate kit.
(2) IP21/NEMA 1 kits are available as field installed options for all 230V drives from 1.1 to 45kW / 1 to 60HP and for all 400V drives from 1.1 to 90kW / 1 to 125HP. See page H.51.

New

Options and accessories

Field installed IP21/NEMA 1 add-on option kits

Voltage	Power kW	Power HP	IP21/NEMA 1 kit Cat. No.	Ref. No.
230	0,75	1	NEMA1ACA2	**404831**
	1.5	2	NEMA1ACA2	**404831**
	2.2	3	NEMA1ACA2	**404831**
	3.7	5	NEMA1ACA3	**404832**
	5.5	7.5	NEMA1ACB3	**404833**
	7.5	10	NEMA1ACB3	**404833**
	11	15	NEMA1ACB3	**404833**
	15	20	NEMA1ACB4	**404834**
	18.5	25	NEMA1ACB4	**404834**
	22	30	NEMA1ACC3	**404835**
	30	40	NEMA1ACC3	**404835**
	37	50	NEMA1ACC4	**404836**
	45	60	NEMA1ACC4	**404836**
400	0,75	1	NEMA1ACA2	**404831**
	1.5	2	NEMA1ACA2	**404831**
	2.2	3	NEMA1ACA2	**404831**
	3.7	5	NEMA1ACA2	**404831**
	5.5	7.5	NEMA1ACA3	**404832**
	7.5	10	NEMA1ACA3	**404832**
	11	15	NEMA1ACB3	**404833**
	15	20	NEMA1ACB3	**404833**
	18.5	25	NEMA1ACB3	**404833**
	22	30	NEMA1ACB4	**404834**
	30	40	NEMA1ACB4	**404834**
	37	50	NEMA1ACB4	**404834**
	45	60	NEMA1ACC3	**404835**
	55	75	NEMA1ACC3	**404835**
	75	100	NEMA1ACC4	**404836**
	90	125	NEMA1ACC4	**404836**

Remote mounting kit for graphical LCD keypad

Remote mounting Kit for mounting graphical LCD Keypad on enclosure door. Kit includes gasket, mounting brackets, and cable. Keypad is rated IP65.

Description	Cat. No.	Ref. No.
Remote mounting kit for graphical LCD keypad	RMKYPDAC	**404851**
Remote mounting kit without cable	OPCRMKNC	**404850**

Communications modules

Profibus DP communications module Profibus DP internal drive mounted module for use on AF-650 GP and AF-600 FP drives. Supports Profibus DP V1 communications networks.	OPCPDP	**404848**
DeviceNet communications module DeviceNet internal drive mounted module for use on AF-650 GP and AF-600 FP drives. ODVA certified device.	OPCDEV	**404818**
Ethernet IP communications module(1) Ethernet IP internal drive mounted module for use on AF-650 GP and AF-600 FP drives. ODVA certified device. Features 2-port built-in switch. Also includes webserver and e-mail notification.	OPCEIP	**404820**
Modbus TCP communications module Modbus TCP internal drive mounted module for use on AF-650 GP and AF-600 FP drives.	OPCMBTCP	**404824**
ProfiNet RT communications module ProfiNet RT internal drive mounted module for use on AF-650 GP and AF-600 FP drives.	OPCPRT	**404825**
LonWorks communications module LonWorks internal drive mounted module for use on AF-600 FP drives only. Supports LonWorks building automation communications networks.	OPCLON	**404823**
BacNet communications module BacNet internal drive mounted module for use on AF-60 FP drives only. Supports BacNet MSTP building automation communications networks.	OPCBAC	**404817**

(1) Requires I/O and network slots and cannot be used with any other network or I/O modules.

New

Options and accessories (continued)

Relay output module

Relay output internal drive mounted module for use on AF-600 drives.
Module adds (3) Form C relay outputs to the drive. Relays are rated at 2A at 240V resistive load.

Description	Cat. No.	Ref. No.
Relay output module	OPCRLY	**404849**

Analog I/O module

Analog I/O internal drive mounted module for us on the AF-600 FP drive only.
Module includes: 3) Analogue inputs 0-10V, 0/4-20mA
3) Analogue outputs 0-10V
Battery back-up power for AF-600 FP's internal real time clock

Analog I/O module	OPCAIO	**404816**

24V DC external supply module

24V DC external supply internal drive mounted module for use on AF-600 FP drives. This module accepts an external 24V DC supply which is used to keep the control board of the drive and other option modules powered in the event of a line side power outage.
Can be used with communications and I/O modules.

24V DC external supply module	OPC24VPS	**404815**

General purpose I/O module

General purpose I/O internal drive mounted module for use on AF-600 FP drives.
Module includes: 3x digital inputs 24V
2x digital outputs PNP/NPN
2x analogue inputs 0-10V
1x analogue output 0/4-20mA

General purpose I/O module	OPCGPIO	**404821**

Screw terminal accessory

Screw terminal accessory is available for field installation on AF-600 FP drives. These screw terminals can replace the cage clamp terminals which ship with each drive. This set of three terminals are for the digital inputs, analog I/O, and RS485 connection.

Screw terminal accessory	OPCSTERM	**404822**

New

Options and accessories (continued)

Pedestal kit

Pedestal kit allows Unit Size 41 and 42 drives to be floor mounted (IP21/54/55, NEMA 1 and 12, 110 to 250/315kW / 150 to 350/400HP at 400V for AF-600 FP).

Description	Cat. No.	Ref. No.
Pedestal kit	OPC4XPED	**404845**

USB kit

This kit allows for the USB programming terminal to be brought out to the front cover of the drive. Works with all drive types.

Description	Cat. No.	Ref. No.
For all drives up to unit size 5X	OPCUSB	**404861**
For all unit size 6X drives	OPCUSB6X	**404860**

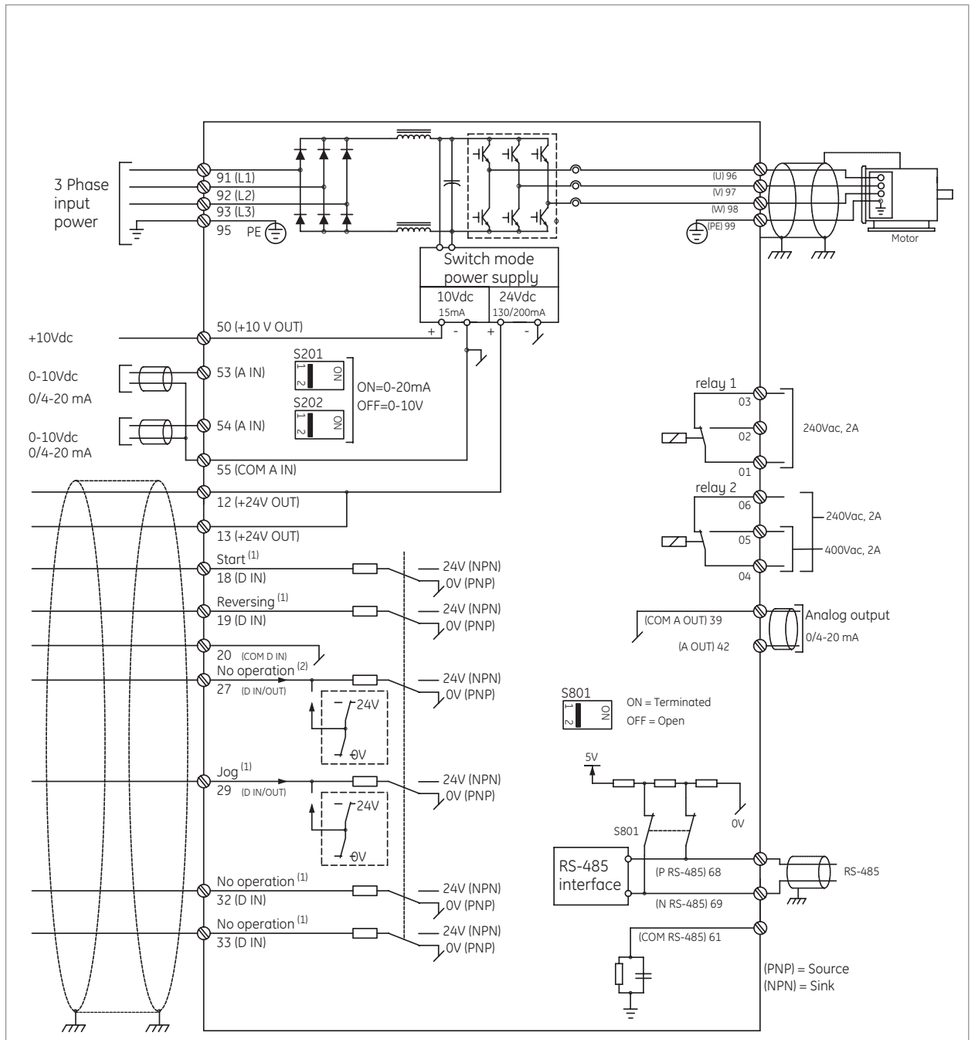
Power shields

These shields are used to cover the drive power terminals on NEMA 1 and NEMA 12 drive types.

For unit size 41 and 42 drives	OPCCOVER4142	**404846**
For unit size 51 drives	OPCCOVER51	**404847**

New

Basic wiring diagrams



(1) Indicates default setting; see parameter group E-## to re-program.
(2) Indicates default setting for version 1.10 drives or higher. Prior versions are set to coast inverse, indicating that terminal #27 must be Logic "high" to enable the drive to run. See parameter E-03 terminal 27 digital input to re-program.

Specifications

Environmental conditions

Enclosures	IP20 chassis, IP00 chassis, IP21/NEMA 1, IP55/ NEMA 12, IP54/NEMA 12
Plenum ratings	Drives and options are UL rated for installation inside air handling ducts and plenums
Installation location	Do not install in locations where product could be exposed to dust, corrosive gas, inflammable gas, oil mist, vapor, water drops or direct sunlight. There must be no salt in the atmosphere. Condensation must not be caused by sudden changes in temperature. For use at altitudes of 3280 ft. (1000 m) or less without derating.
Storage temperature	-25° to 65° C
Ambient temperature	-10° to +50° C (24 hour average max of 45° C)
Ambient humidity	5 to 95 % RH (non-condensing)
Vibration	1.0 G
Cooling method	Fan cooled all ratings. Fan control auto, 50 % level, 75 % level, 100 % level adjustable

Standards

Approvals	CE, UL, cUL, and C-Tick Suitable for use on a circuit capable of delivering not more than 100,000 rms symmetrical amperes for 230V and 400V.

Input power supply

Rated input AC voltage	200-240 Vac, 3-phase, 50-60 Hz, +/- 10% V 380-480 Vac, 3-phase, 50-60 Hz, +/- 10% V
Maximum voltage imbalance	3% of rated supply voltage
True power factor	> 0.9 nominal at rated load
Displacement power factor	> 0.98
Switching on input power supply	Maximum twice/minute up to 7.5kW/10HP, maximum once/minute above 7.5kW/10HP
Environment according to EN60664-1	Overvoltage category III/pollution degree 2
DC link reactors	Built-In DC Link Reactors on all ratings
RFI filters	Built-In RFI Filters to reduce noise generated by the drive. Meets industrial standards.

Output

Rated output voltage	0-100% of supply voltage
Output frequency	0-1000 Hz; 0-800Hz for 400V above 90kW/ 125HP
Switching on output	Unlimited
Accel/decel times	1-3600 seconds
Control method	Sinusoidal PWM control (V/Hz, Avd. vector control)

Control

Starting torque	110% starting torque for 1 minute (variable torque)
Carrier frequency (motor noise)	Selectable - 1, 1.5, 2, 2.5, 3, 3.5, 4, 5, 6, 7, 8, 10, 12, 14, 16 kHz
Torque boost	0 - 300% setting to compensate voltage in relation to the load at low speed
Acceleration/deceleration time	0.01-3600 seconds (4 acceleration and deceleration times are selectable via digital inputs. Acceleration and deceleration patterns can be selected from linear or S-curve)
Data protection	Password protection for quick menu or main menu, 0-9999.
Pattern operation	Settings via built-in logic controller sequencer
Jump frequency control	4 jump (or skip) frequencies via parameter set to avoid mechanical vibration
Slip compensation	Maintains motor at constant speed with load fluctuations
Torque limit control	Output torque can be controlled within a range of 0.0 to 110% (0.1 and steps)
8 preset speeds	8 programmable preset speeds selectable by 3 digital inputs
Preset speeds	8 presets via digital inputs
Built-in communications	Drive RS-485, Modbus RTU, Metasys N2, or Apogee FLN P1
Trim reference setting	Available for speed reference offset via potentiometer, voltage input, or current input
DC injection braking	Starting frequency: 0.0-1000 Hz, 0-800Hz for 400V above 90kW/125HP Braking time: 0.0-60.0 seconds Braking level: 0-100% of rated current
Jogging operation	Operation via on key or digital input (fwd or rev)
Auto-restart after power failure	Restarts the drive without stopping after instantaneous power failure
Energy savings	Controls output voltage to minimize motor loss during constant speed operation
Start mode function	This functionality smoothly catches a spinning motor
Fire override mode	Overrides drive's protective features and keeps motor running
Pump cascade controller	Distributes running hours evenly over up to 4 pumps
Sleep mode	Drive detects low or no flow conditions and adjusts output
Dry pump detection	Detects pump operation and can set off alarm, shuts off, or other programmed actions
Belt monitoring	Drive can detect relationship between current and speed to recognize a broken belt
Real time clock	With programmable timed actions

Logic controller (LC) sequencer

Logic controller events	Up to 38 programmable events
Comparators	Array of 6 comparators
Timers	Array of 8 timers, adjustable from 0.0 to 3600 sec
Logic rules	Array of 6 boolean logic rules
Logic controller states	Array of 20 logic controller action states

Process controller (PID)

Process PID controller	4 auto tune PID controllers built-in
Process CL feedback select	Up to 2 references. Selectable - no function, motor feedback, separate encoder, encoder option module, or resolver option module
Process PID control	Normal or inverse
Process PID anti windup	Disabled or enabled
Process PID start speed	0.0-200 Hz
Process PID proportional gain	0.00-10.00
Process PID integral time	0.1 - 10000.0 ms
Process PID differential time	0.0 - 10 s
Process PID differential gain	1.0-50.00
Process PID feed forward factor	0-500%
On reference bandwidth	0-200%

New

Specifications

Operation

Operation method	Keypad operation: hand, off, auto digital input: programmable for start/stop, forward/reverse, jog timer operation: stop after predetermined time frame Communications: RS-485 Modbus RTU, Metasys N2, and Apogee FLN P1 USB port for programming drive with optional PC software
Frequency reference signal	Left or right arrow buttons on keypad in manual mode Speed potentiometer: 0 to +10 Vdc, 10 to 0 Vdc 0-10 Vdc analog input 0/4-20 ma analog input
References	Up to 3 Input references can be selected from analogue input #1 or #2, frequency input #1 or #2, network, or potentiometer
Input signals	No operation Reset after drive trip or alarm Drive at stop with no holding current Quick stop according to quick stop decel time 1 Stop on input going low Start Maintained start arfter signal applied for minimum of 2ms Reversing Start reverse Enable start forward only Enable start reverse only Jog Multi-step frequency selection (1 to 8 Steps) Hold drive frequency Hold reference Speed up; activated by hold drive frequency or hold reference Slow down; activated by hold drive frequency or hold reference Drive parameter setup select 1-4 Precise start or stop; activated when drive parameter precise start or stop function is selected catch up or slow down; activated by signal to add to or subtract from input reference to control speed Pulse input selectable from 100 - 110kHz Accel / decel time select. Set input to Accel / decel times 1 to 4 Digital potentiometer input increase or decrease Mechanical brake feedback

Keypad

Keypad features	LCD display with 6 alpha-numeric lines. Multi-language support Hot pluggable, remote mount option, and copy-cat Feature, IP65 rating when remote mounted on enclosure LED's - green - drive is on, yellow - indicates a warning, red - indicates an alarm, amber - indicates active menu keys and H-O-A keys
Keypad keys	Status - shows status of drive Quick menu - enters quick start, parameter data check, or trending modes Main menu - used for programming all drive parameters Alarm log - used to display alarm list Back - reverts to previous step or layer in parameter structure Cancel - used to cancel last change or command Info - displays information about a command, parameter, or function in any display. Hand/off/auto - used to control drive locally or put drive in remote mode Reset - used to reset warnings or alarms
Password	2 level password protection
Alternate motor parameters	Up to 4 separate complete parameter set-ups are available
Graphical trending	Trend speed, power, frequency

RS485 Modbus RTU serial communications

Physical level	EIA/RS485
Transmission distance	1640 ft (500m)
Node address	32
Transmission speed	2400, 4800, 9600, 19200, 38400, or 115200 (bits/s)
Transmission mode	Half Duplex
Transmission protocol	Modbus RTU
Character code	Binary
Character length	8 bits
Error check	CRC

Mounting clearance

	All AF-600 FP drives can be mounted side-by-side without spacing. For all drives rated 90kW /125HP or below allow 3.4 inches (100mm) free space above and below. For all drives rated 110kW/150HP and above allow 8.9 inches (225mm) free space above and below.

New

Efficiency, Watt loss, unit size, dimensions and weights

230 Vac, 3-phase, 50/60Hz

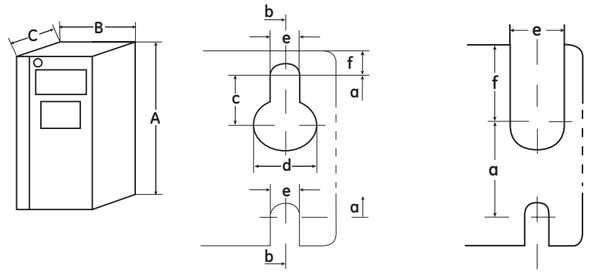
Nominal motor ratings			Efficiency								
Power kW	Power HP	Current A	at 5 kHz (%)	at 4 kHz (%)	at 3 kHz (%)	Watt loss (W)	Unit size	Drive type	Height (mm)	Width (mm)	Depth (mm)	Weight (kg)
0.75	1	6.6	96			63	12	IP20 Chassis	375	90	220	5
1.5	2	7.5	96			82	12	IP20 Chassis	375	90	220	5
2.2	3	10.6	96			116	12	IP20 Chassis	375	90	220	5
4	5	16.7	96			185	13	IP20 Chassis	375	90	220	5
5.5	7.5	24.2		96		269	23	IP20 Chassis	375	130	220	7
7.5	10	30.8		96		310	23	IP20 Chassis	375	130	220	7
11	15	46.2		96		447	23	IP20 Chassis	420	165	262	12
15	20	59.4		96		602	24	IP20 Chassis	420	165	262	12
18.5	25	74.8		96		737	24	IP20 Chassis	595	230	242	24
22	30	88			97	845	33	IP20 Chassis	595	230	242	24
30	40	115			97	1140	33	IP20 Chassis	595	230	242	24
37	50	143			97	1353	34	IP20 Chassis	630	308	334	35
45	60	170			97	1636	34	IP20 Chassis	630	308	334	35

400 Vac, 3-phase, 50/60Hz

Nominal motor ratings			Efficiency				Watt	Unit		Height	Width	Depth	Weight
Power kW	Power HP	Current A	at 5 kHz (%)	at 4 kHz (%)	at 3 kHz (%)	at 2 kHz (%)	Loss (W)	size	Drive type	(mm)	(mm)	(mm)	(kg)
0.75	1	2.4	96				58	12	IP20 Chassis	375	90	220	5
1.5	2	4.1	97				62	12	IP20 Chassis	375	90	220	5
2.2	3	5.6	97				88	12	IP20 Chassis	375	90	220	5
4	5	10	97				124	12	IP20 Chassis	375	90	220	5
5.5	7.5	13	97				187	13	IP20 Chassis	375	90	220	5
7.5	10	16	97				255	13	IP20 Chassis	375	130	220	7
11	15	24		98			278	23	IP20 Chassis	375	130	220	7
15	20	32		98			392	23	IP20 Chassis	420	165	262	12
18.5	25	37.5		98			465	23	IP20 Chassis	420	165	262	12
22	30	44		98			525	24	IP20 Chassis	595	230	242	24
30	40	61		98			698	24	IP20 Chassis	595	230	242	24
37	50	73		98			739	24	IP20 Chassis	595	230	242	24
45	60	90			98		843	33	IP20 Chassis	630	308	334	35
55	75	106			98		1083	33	IP20 Chassis	630	308	334	35
75	100	147			98		1384	34	IP20 Chassis	800	370	334	50
90	125	177			99		1474	34	IP20 Chassis	800	370	334	50
110	150	212			98		3234	43	IP00 Chassis	1046	407.9	374.9	91
132	200	260			98		3782	43	IP00 Chassis	1046	407.9	374.9	91
160	250	315			98		4213	44	IP00 Chassis	1327	407.9	374.9	138
200	300	395			98		5119	44	IP00 Chassis	1327	407.9	374.9	138
250	350	480			98		5893	44	IP00 Chassis	1327	407.9	374.9	138
315	450	600				98	7630	52	IP00 Chassis	1547	585	497.8	313
355	500	658				98	7701	52	IP00 Chassis	1547	585	497.8	313
400	550	745				98	8879	52	IP00 Chassis	1547	585	497.8	313
450	600	800				98	9428	52	IP00 Chassis	1547	585	497.8	313
500	650	80				98	10647	61	IP21/NEMA 1	2282	1400	606	1004
560	750	990				98	12338	61	IP21/NEMA 1	2282	1400	606	1004
630	900	1120				98	13201	61	IP21/NEMA 1	2282	1400	606	1004
710	1000	1260				98	15436	61	IP21/NEMA 1	2282	1400	606	1004
800	1200	1460				98	18084	62	IP21/NEMA 1	2282	1800	606	1262
1000	1350	1720				98	20358	62	IP21/NEMA 1	2282	1800	606	1262

New

Dimensional drawings



Dimensions, 1X unit sizes (mm)

	Unit size	Dimensions	12	13	15
Enclosure type			IP20 Open chassis	IP20 Open chassis	IP55 NEMA 12
Voltage	230V		0.75 to 2.2kW 1 to 3HP	3.7kW 5HP	0.75 to 3.7kW 1 to 5HP
	400V		0.75 to 2.2kW 1 to 5HP	5.5 to 7.5kW 7.5 to 10HP	0.75 to 7.5kW 1 to 10HP
Height	Height of backplate	**A**	268	268	420
	Height with de-coupling plate	**A**	375	375	
	Distance between mounting holes	**a**	257	257	402
Width	Width of backplate	**B**	90	130	242
	Distance between mounting holes	**b**	70	110	215
Depth	Depth without I/O and/or network option	**C**	205	205	195
	Depth with I/O and/or network option	**C**	220	220	195
Screw holes		**c**	8.0	8.0	8.3
		d	11.0	11.0	12.0
		e	5.5	5.5	6.5
		f	9.0	9.0	9.0
Weight (kg)			4.9	6.6	13.5 / 14.2

Dimensions, 2X unit sizes (mm)

	Unit size	Dimensions	21	22	23	24
Enclosure type			IP55 NEMA 12	IP55 NEMA 12	IP20 Open chassis	IP20 Open chassis
Voltage	230V		5.5 to 11kW 7.5 to 15HP	15kW 20HP	5.5 to 11kW 7.5 to 15HP	15 to 18.5kW 20 to 25HP
	400V		11 to 15kW 15 to 25HP	22 to 30kW 30 to 40HP	11 to 18.5kW 15 to 25HP	22 to 37kW 30 to 50HP
Height	Height of backplate	**A**	480	650	399	521
	Height with de-coupling plate	**A**	-	-	420	595
	Distance between mounting holes	**a**	455	625	380	495
Width	Width of backplate	**B**	242	242	165	230
	Distance between mounting holes	**b**	210	210	140	200
Depth	Depth without I/O and/or network option	**C**	260	260	249	242
	Depth with I/O and/or network option	**C**	260	260	262	242
Screw holes		**c**	12.0	12.0	8.0	-
		d	19.0	19.0	12.0	-
		e	9.0	9.0	6.8	8.5
		f	9.0	9.0	7.9	15.0
Weight (kg)			23.0	27.0	12.0	23.5

New

Dimensional drawings

Dimensions, 3X unit sizes (mm)

	Unit size	Dimensions	31	32	33	34
Enclosure type			IP55 NEMA 12	IP55 NEMA 12	IP20 Open chassis	IP20 Open chassis
Voltage	230V		18.5 to 30kW 25 to 40HP	37 to 45kW 50 to 60HP	22 to 30kW 30 to 40HP	37 to 45kW 50 to 60HP
	400V		37 to 55kW 50 to 75HP	75 to 90kW 100 to 125HP	45 to 55kW 60 to 75HP	75 to 90kW 100 to 125HP
Height	Height of backplate	**A**	680	770	550	660
	Height with de-coupling plate	**A**	-	-	630	800
	Distance between mounting holes	**a**	648	739	521	631
Width	Width of backplate	**B**	308	370	308	370
	Distance between mounting holes	**b**	272	334	270	330
Depth	Depth without I/O and/or network option	**C**	310	335	333	333
	Depth with I/O and/or network option	**C**	310	335	333	333
Screw holes		**c**	12.5	12.5	-	-
		d	19.0	19.0	-	-
		e	9.0	9.0	8.5	8.5
		f	9.8	9.8	17.0	17.0
Weight (kg)			45	65	35	50

Dimensions IP20 open chassis drives with field installed IP21/NEMA 1 kits[1] (mm)

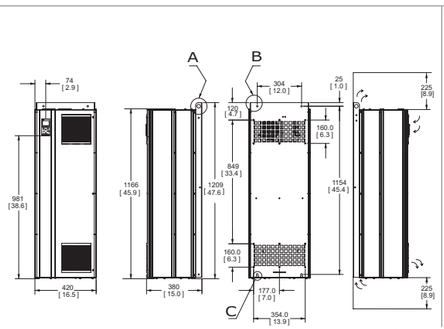
Unit size		12	13	23	24	33	34
Enclosure type		IP20 open chassis with IP21/NEMA 1 Kit					
Voltage	230V	0.75 to 2.2kW 1 to 3HP	3.7kW 5HP	5.5 to 11kW 7.5 to 15HP	15 to 18.5kW 20 to 25HP	22 to 30kW 30 to 40HP	37 to 45kW 50 to 60HP
	400V	0.75 to 2.2kW 1 to 5HP	5.5 to 7.5kW 7.5 to 10HP	11 to 18.5kW 15 to 25HP	22 to 37kW 30 to 50HP	45 to 55kW 60 to 75HP	75 to 90kW 100 to 125HP
Height							
Height with kit		375	375	475	671	754	950
Width							
Width of backplate		94	130	165	231	397	371
Distance between mounting holes		70	110	140	201	269	330
Depth							
Depth without I/O and/or network option		205	205	249	242	338	338
Depth with I/O and/or network option		220	220	262	242	338	338

(1) Please consult IP21/NEMA 1 kit instructions for further mounting details and dimensions.

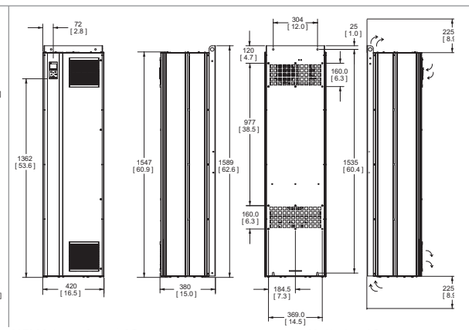
Note: Please allow 5cm / 2" between drives with field installed IP21/NEMA 1 Kits. Also, please consult the relevant AF-6 Series drives operating Instructions for recommended clearance above and below each drive rating.

New

Dimensional drawings in mm (inches)

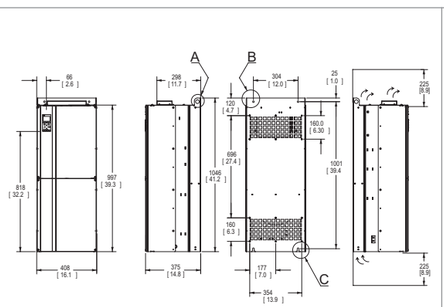


Unit size 41

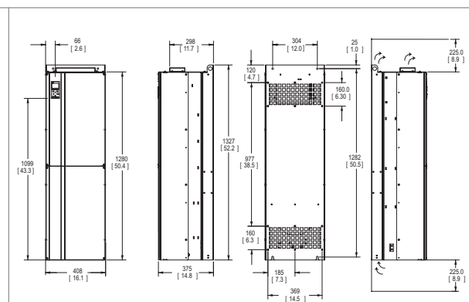


Unit size 42

IP21 and IP54/UL and NEMA type 1 and 12

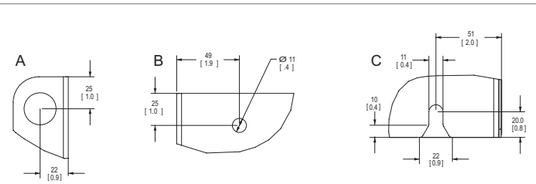


Unit size 43



IP00/chassis

Unit size 44

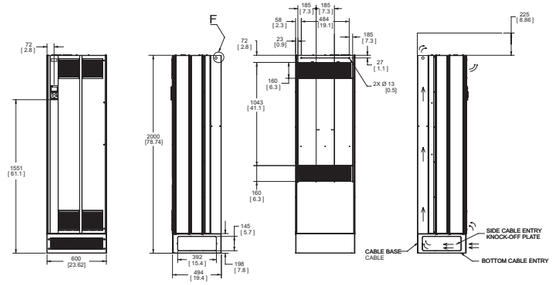


IP00/IP21/IP54 - all sizes

Unit size		41	42	43	44
Enclosure type		IP21/IP54 NEMA 1/NEMA 12	IP21/IP54 NEMA 1/NEMA 12	IP00 Open chassis	IP00 Open chassis
Voltage	400V	110 to 132kW 150 to 200HP	160 to 250kW 250 to 350HP	110 to 132kW 150 to 200HP	160 to 250kW 250 to 350HP
Shipping dimensions	Height	650	650	650	650
	Width	1730	1730	1220	1490
	Depth	570	570	570	570
Drive dimensions	Height	1209	1589	1046	1327
	Width	420	420	408	408
	Depth	380	380	375	375
Weight (kg)		104	106	91	138

New

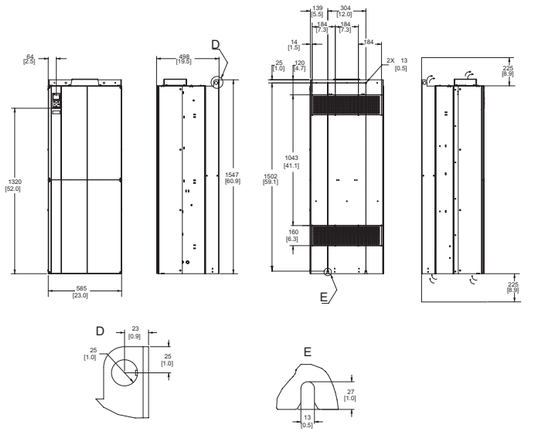
Dimensional drawings in mm (inches)



Unit size 51, IP21 and IP54/UL and NEMA type 1 and 12

Unit size 51

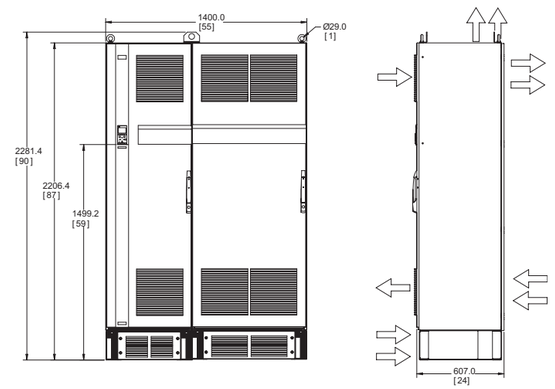
Enclosure type	IP21/IP55
	NEMA 1/NEMA 12
Voltage 400V	315 to 450kW
	450 to 600HP
Shipping dimensions	
Height	841
Width	2197
Depth	734
Drive dimensions	
Height	2000
Width	600
Depth	494
Weight (kg)	313



Unit size 52, IP00/chassis

Unit size 52

Enclosure type	IP00
	Open chassis
Voltage 400V	315 to 450kW
	450 to 600HP
Shipping dimensions	
Height	831
Width	1704
Depth	734
Drive dimensions	
Height	1547
Width	585
Depth	498
Weight (kg)	313



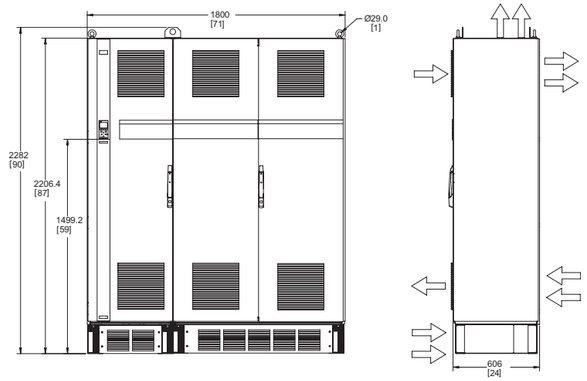
Unit size 61

Unit size 61

Enclosure type	IP21/IP55
	NEMA 1/NEMA 12
Voltage 400V	500 to 710kW
	650 to 1000HP
Shipping dimensions	
Height	2324
Width	1570
Depth	927
Drive dimensions	
Height	2282
Width	1400
Depth	607
Weight (kg)	1004

New

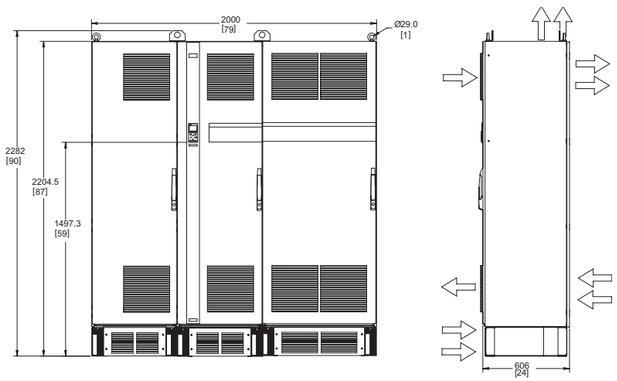
Dimensional drawings in mm (inches)



Unit size 62

Unit size 62

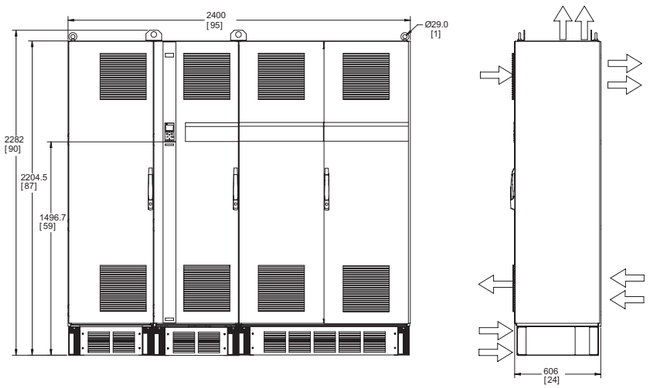
Enclosure type	IP21/IP55
	NEMA 1/NEMA 12
Voltage 400V	800 to 1000kW
	1200 to 1350HP
Shipping dimensions	
Height	2324
Width	1961
Depth	419
Drive dimensions	
Height	2282
Width	1800
Depth	606
Weight (kg)	1262



Unit size 63

Unit size 63

Enclosure type	IP21/IP55
	NEMA 1/NEMA 12
Voltage 400V	500 to 710kW
	650 to 1000HP
Shipping Dimensions	
Height	2324
Width	2159
Depth	927
Drive Dimensions	
Height	2282
Width	2000
Depth	606
Weight (kg)	1300



Unit size 64

Unit size 64

Enclosure type	IP21/IP55
	NEMA 1/NEMA 12
Voltage 400V	800 to 1000kW
	1200 to 1350HP
Shipping dimensions	
Height	2324
Width	2543
Depth	927
Drive dimensions	
Height	2282
Width	2400
Depth	606
Weight (kg)	1541

Dynamic Braking Resistors

dynamic braking allows for faster deceleration rates then could be achieved via a coast to stop. Dynamic braking consists of the internal drive brake chopper and separate add-on dynamic braking resistors.
Important application notes:

- The AF-60 LP Micro Drive dynamic braking can be used for stopping a load with an inertia equal to or less than the applied motor's rotor inertia.
- High inertia or overhauling loads may cause extended deceleration times which could cause overheating and tripping of the drive.
- The dynamic braking is not a holding brake. It does not prevent a motor at rest from rotating.

Note: refer to the drives' Operating Instruction for installation and connection details.

Dynamic braking resistors- AF-60 LP drives

230 Vac

Nominal applied motor kW	Nominal applied motor HP	Max. braking torque (%)	Brake chopper	Recommanded dynamic braking resistor				Total Ohms	Total kW	
				10% duty cycle		40% duty cycle				
				Cat. No.	Ref. No.	Cat. No.	Ref. No.		10% duty cycle	40% duty cycle
0.18	1/4	-	N/A	-	-	-	-	-	-	-
0.37	1/2	-	N/A	-	-	-	-	-	-	-
0.75	1	-	N/A	-	-	-	-	-	-	-
1.5	2	150	Built-in	TLR74P200	**129870**	4 x TLR74P200	**4 x 129870**	74	0.2	0.8
2.2	3	150	Built-in	TLR44P600	**129166**	TLR43P1000	**129177**	44	0.6	1
3.7	5	150	Built-in	TLR29P600	**129167**	TLR22P2500	**129879**	29	0.6	2.5

400 Vac

Nominal applied motor kW	Nominal applied motor HP	Max. braking torque (%)	Brake chopper	Recommanded dynamic braking resistor				Total Ohms	Total kW	
				10% duty cycle		40% duty cycle				
				Cat. No.	Ref. No.	Cat. No.	Ref. No.		10% duty cycle	40% duty cycle
0.37	1/2	-	N/A	-	-	-	-	-	-	-
0.75	1	-	N/A	-	-	-	-	-	-	-
1.5	2	150	Built-in	TLR295P200	**129876**	4 x TLR295P200	**4 x 129876**	295	0.2	0.8
2.2	3	150	Built-in	TLR216P200	**129868**	4 x TLR216P200	**4 x 129868**	216	0.2	0.8
4	5	150	Built-in	TLR118P600	**129174**	4 x TLR118P600	**4 x 129174**	118	0.6	2.4
5.5	8	150	Built-in	TLR86P600	**129175**	4 x TLR86P600	**4 x 129175**	86	0.6	2.4
7.5	10	150	Built-in	TLR59P1000	**129176**	4 x TLR59P1000	**4 x 129176**	59	1	4
11	15	150	Built-in	TLR43P1000	**129177**	On request		43	1	-
15	20	150	Built-in	TLR35P1500	**129877**			35	1.5	-
18.5	25	150	Built-in	TLR29P1800	**129878**			29	1.8	-
22	30	150	Built-in	TLR22P2500	**129879**			22	2.5	-

New

Dynamic braking resistors - AF-650 GP drives

230 Vac

Nominal applied motor kW	Nominal applied motor HP	Max. braking torque (%)	Repetitive braking torque duty – 10% (kW)	Ohms	Cont. max breaking time(s)	Cat. No.	Ref. No.	Repetitive braking torque duty – 40% (kW)	Ohms	Cont. max breaking time(s)	Cat. No.	Ref. No.
0.25	1/3	160	0.2	405	12	TLR405P200	**129867**	0.43	425	120	TLR405P200	**129867**
0.37	1/2	160	0.2	295	12	TLR295P200	**129876**	0.80	310	120	4 x TLR295P200	**4 x 129876**
0.75	1	160	0.6	118	12	TLR118P600	**129174**	0.26	145	120	TLR118P600	**129174**
1.5	2	160	1	59	12	TLR59P1000	**129176**	0.80	65	120	TLR59P1000	**129176**
2.2	3	160	1	43	12	TLR43P1000	**129177**	1.00	50	120	TLR43P1000	**129177**
3.7	5	160	1.8	29	12	TLR29P1800	**129878**	3.00	25	120	TLR22P2500	**129879**
5.5	7.5	158	2.5	22	12	TLR22P2500	**129879**	-	-	-	-	-
7.5	10	153	3	17.6	12	2 x TLR8,8P1500	**2 x 129171**	-	-	-	-	-
11	15	154	5	10	12	2 x TLR5P2500	**2 x 129871**	-	-	-	-	-
15	20	150	6	8	12	2 x TLR4P3000	**2 x 129872**	-	-	-	-	-
18.5	25	150	6	8	12	2 x TLR4P3000	**2 x 129872**	-	-	-	-	-
22	30	150	6	4.7	30	On request		-	-	-	-	-
30	40	150	8	3.3	30			-	-	-	-	-
37	50	150	10	2.7	30			-	-	-	-	-

400 Vac

Nominal applied motor kW	Nominal applied motor HP	Max. braking torque (%)	Repetitive braking torque duty – 10% (kW)	Ohms	Cont. max breaking time(s)	Cat. No.	Ref. No.	Repetitive braking torque duty – 40% (kW)	Ohms	Cont. max breaking time(s)	Cat. No.	Ref. No.
0.37	0.5	160	0.2	750	12	TLR750P200	**116301**	0.2	620	120	TLR750P200	**116301**
0.75	1	160	0.2	750	12	TLR750P200	**116301**	0.2	620	120	TLR750P200	**116301**
1.5	2	160	0.2	295	12	TLR295P200	**129876**	0.4	310	120	2 x TLR750P200	**2 x 116301**
2.2	3	160	0.2	216	12	TLR216P200	**129868**	0.4	210	120	2 x TLR432P200	**2 x 129875**
4	5	160	0.6	118	12	TLR118P600	**129174**	2	110	120	2 x TLR59P1000	**2 x 129176**
5.5	7.5	160	0.6	86	12	TLR86P600	**129175**	3	80	120	2 x TLR35P1500	**2 x 129877**
7.5	10	160	1	59	12	TLR59P1000	**129176**	6	65	120	2 x TLR35P3000	**2 x 129888**
11	15	160	1	43	12	TLR43P1000	**129177**	5	40	120	2 x TLR22P2500	**2 x 129879**
15	20	160	1.5	35	12	TLR35P1500	**129877**	7.4	30	120	2 x TLR15P3700	**2 x 129881**
18.5	25	160	1.8	29	12	TLR29P1800	**129878**	10	25	120	4 x TLR22P2500	**4 x 129879**
22	30	160	2.5	22	12	TLR22P2500	**129879**	10	20	120	4 x TLR22P2500	**4 x 129879**
30	40	150	3.7	15	12	TLR15P3700	**129881**	14.8	15	120	4 x TLR15P3700	**4 x 129881**
37	50	150	4.7	12.5	12	On request						
45	60	150	6.4	9.2	12							
55	75	150	7.7	4.3	12							
75	100	150	13.6	4.3	12							
90	125	150	17	3.4	30							
110	150	150	17	3.4	30							
132	200	150	22.5	10.4	30							
160	250	150	27.2	8.6	30							
200	300	150	17	3.3	30							
250	350	150	22.4	10.4	30							
355	450	150	27.2	8.6	30							
400	550	150	144	1.3	30							
450	600	150	144	1.3	30							
500	650	150	144	1.3	30							
560	750	150	144	1.3	30							
630	900	150	144	1.3	30							
710	1000	150	144	1.3	30							
800	1200	150	144	1.3	30							

690 Vac

Nominal applied motor kW	Nominal applied motor HP	Max. braking torque (%)	Repetitive braking torque duty – 10% (kW)	Ohms	Cont. max breaking time(s)	Cat. No.	Ref. No.	Repetitive braking torque duty – 40% (kW)	Ohms	Cont. max breaking time(s)	Cat. No.	Ref. No.
90	125	160	126	9.8	60	DB6101TBNC	On request	77	9.8	120	DB6401TBNC	On request
110	150	160	153	7.3	60	DB6102TBNC		93	7.3	120	DB6402TBNC	
132	200	160	185	4.7	60	DB6103TBNC		113	4.7	120	DB6403TBNC	
160	250	160	224	4.7	60	DB6104TBNC		137	4.7	120	DB6404TBNC	
200	300	160	147	3.8	60	DB6105TBNC		90	3.8	120	DB6405TBNC	
250	350	160	173	2.6	60	DB6106TBNC		106	2.6	120	DB6406TBNC	
315	400	160	212	2.6	60	DB6107TBNC		130	2.6	120	DB6407TBNC	

For higher motor power please contact GE

New

Notes

ASTAT S - Small soft starters

I.3 Order codes

I.4 Diagrams

I.5 Performance

I.6 Dimensions

I.7 **ASTAT XT - Digital soft starters**

I.8 Order codes

I.10 Unit configuration

I.11 Technical Data

I.12 Functions

I.13 Overload protections

I.14 I/O Wiring

I.15 I/O terminal board specifications

I.18 Wiring diagrams

I.20 Coordination tables

I.22 Dimensions and weights

POWER DEVICES

AUXILIARY DEVICES

POWER ELECTRONICS

Intro

Contactors and overload relays A

Auxiliary relays and contactors B

Motor protection devices C

Applications D

Main switches E

Control and signalling units F

Electronic relays and limit switches G

Speed drive units H

Soft starters I

Lighting dimmer-stabilizer/Numerical index J/X

Small soft starters with integral by-pass

ASTAT S is compact, easy to operate soft starter, designed for use with standard 3-phase squirrel cage motors. It provides an advanced method of reducing current during motor starting and stopping.
ASTAT S will start supplying a reduced voltage to the motor, increasing up to the rated voltage, so avoiding, high currents and generating soft starting and stopping.
The motor has to be able to start in a reduced voltage.

- Solid soft starter for standard 3ph AC motors up to 30kW at 400V AC
- Voltage ratings up to 600V
- Two phase control with integral by-pass
- Compact, small case
- DIN rail mounting. Optional from 31A
- Start and soft stop features

Marking

cULus

The cUL, is achieved for all range of ASTAT S, except for 58A models, items QA02P058S, QA12P058S, QA22P058S, QA32P058S.

Technical data

Ratings

Voltage ratings	3ph AC systems 220/230V (+10%, -15%) for units QA02P___S 380/415V (+10%, -15%) for units QA12P___S 480/500V (+10%, -15%) for units QA22P___S 575/600V (+10%, -15%) for units QA32P___S
Frequency range	50/60Hz (±5%)
Load	3ph, AC standard motors

Control specifications

Ramp up	0,5 - 10 s
Ramp down	0,5 - 10 s
Initial voltage	0 - 80% Un
Starting torque	0 - 64% Tn

I/O control

Inputs	one input for Start/Stop
Outputs	one output for «End of Ramp» signal for ratings 31, 44, 58A

Ambient conditions

Operating temperature	0 to 40ºC. Up to 60ºC derating by 1,2% per ºC
Storage temperature	-20 to 70ºC
Relative humidity	up to 80%, without condensation
Max. altitude	up to 1000m. Above this derate by 5% each 100m
Protection degree	IP20

Order codes ● page I.3
Diagrams ● page I.4
Performances ● page I.5
Dimensions ● page I.6

Small soft starters with integral by-pass

Input voltage V CA	Current rating (2) A	Maximum current A	Maximum motor power (1) 220/230V kW / Hp	380/415V kW / Hp	480/500V kW / Hp	575/600V kW / Hp	Cat. No.	Ref. no.	Pack
220	8	28	1.5 / 2	-	-	-	**QA02P008S**	120881	1
	17	60	4 / 5.5	-	-	-	**QA02P017S**	120882	1
	22	77	5.5 / 7.5	-	-	-	**QA02P022S**	120883	1
	31	110	7.5 / 10	-	-	-	**QA02P031S**	120884	1
	44	150	11 / 15	-	-	-	**QA02P044S**	120885	1
	58	200	15 / 20	-	-	-	**QA02P058S**	120886	1
400	8	28	-	4 / 5.5	-	-	**QA12P008S**	120892	1
	17	60	-	7.5 / 10	-	-	**QA12P017S**	120893	1
	22	77	-	11 / 15	-	-	**QA12P022S**	120894	1
	31	110	-	15 / 20	-	-	**QA12P031S**	120895	1
	44	150	-	22 / 30	-	-	**QA12P044S**	120896	1
	58	200	-	30 / 40	-	-	**QA12P058S**	120897	1
500	8	28	-	-	5.5 / 7.5	-	**QA22P008S**	120898	1
	17	60	-	-	11 / 15	-	**QA22P017S**	120899	1
	22	77	-	-	15 / 20	-	**QA22P022S**	120900	1
	31	110	-	-	22 / 30	-	**QA22P031S**	120901	1
	44	150	-	-	30 / 40	-	**QA22P044S**	120902	1
	58	200	-	-	45 / 60	-	**QA22P058S**	120903	1
600	8	28	-	-	-	7.5 / 10	**QA32P008S**	120904	1
	17	60	-	-	-	15 / 20	**QA32P017S**	120905	1
	22	77	-	-	-	22 / 30	**QA32P022S**	120906	1
	31	110	-	-	-	30 / 40	**QA32P031S**	120907	1
	44	150	-	-	-	37 / 50	**QA32P044S**	120908	1
	58	200	-	-	-	55 / 75	**QA32P058S**	120909	1
Accessory	DIN rail mounting kit for types 31A, 44A and 58A						**QAOPTDIN**	120910	1

(1) Ratings for standard 4-poles AC motors
(2) See Operations/hour in table below
Cycles/hour includes both soft start and soft stop

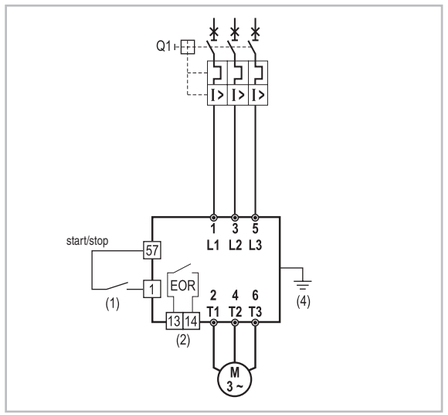
Times between rampings Start/Stop

	Starting current	Ramp 1 sec.	Ramp 2 sec.	Ramp 5 sec.	Ramp 10 sec.
QA_2P008S	8	7	15	35	70
	16	16	33	77	155
	24	26	51	125	250
	28 (*)	32	62	155	-
QA_2P017S	17	7	15	35	70
	34	16	33	77	155
	51	26	51	125	250
	60 (*)	32	62	155	-
QA_2P022S	22	7	15	35	70
	44	16	33	77	155
	66	26	51	125	250
	77 (*)	32	62	155	-
QA_2P031S	31	4	8	20	40
	62	8	15	38	76
	93	12	24	62	124
	110 (*)	15	31	80	-
QA_2P044S	44	4	8	20	40
	88	8	15	38	76
	132	12	24	62	124
	155(*)	15	31	80	-
QA_2P058S	58	4	8	20	40
	116	8	15	38	76
	174	12	24	62	124
	200 (*)	15	31	80	-

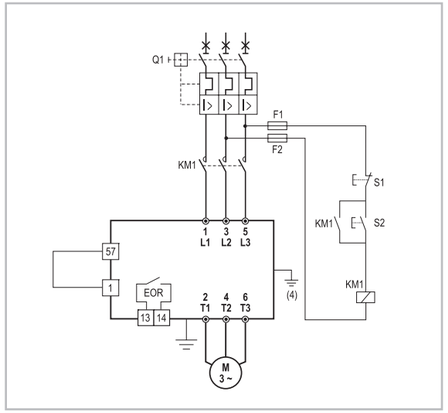
(*) Maximum starting current at all

Diagrams

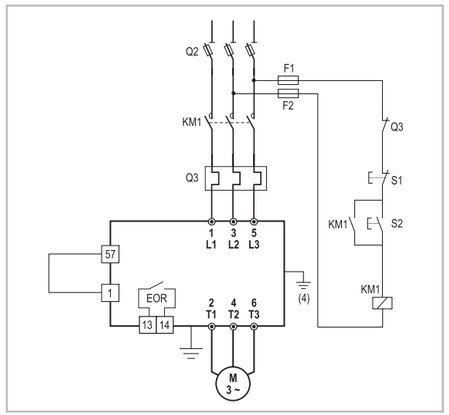
Control by permanent command (soft start and stop)



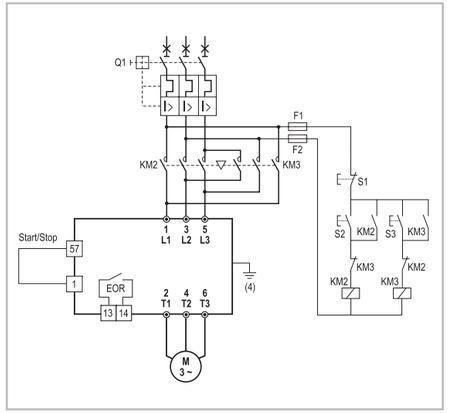
Control by push-buttons and line contactor (soft start)



Control by push-buttons, line contactor and thermal overload relay (soft start)



Forward/reverse control by push-buttons (3)



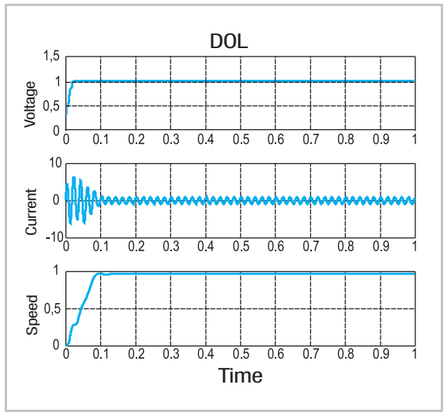
Motor power 380/415V kW	Hp	ASTAT S	Q1	Q2 Am fuses	KM1 Contactor	Q3 Thermal overload relay	F1-F2	S1-S2-S3
4	5.5	**QA12P008**	GPS1B*AK	10	CL25A	RT A 1N	-	P9-P3
7.5	10	**QA12P017**	GPS1B*AN	25	CL25A	RT A 1S	-	P9-P3
11	15	**QA12P022**	GPS1B*AP	32	CL25A	RT A 1T	-	P9-P3
15	20	**QA12P031**	GPS1B*AR	40	CL04A	RT A 1V	-	P9-P3
22	30	**QA12P044**	GPS2B*AT	63	CL06A	RT A 2F	-	P9-P3
30	40	**QA12P058**	GPS2B*AU	80	CL07A	RT A 2H	-	P9-P3

Coordination type 1

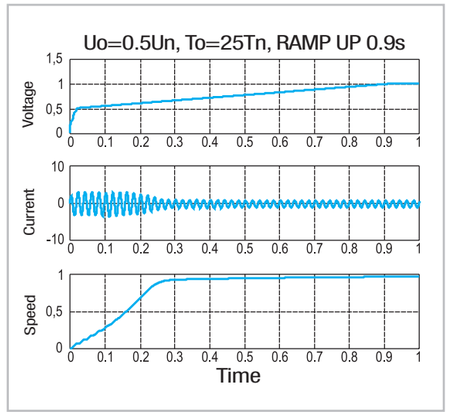
(1) Use dry contact only.
(2) End of Ramp output relay (only types 31A, 44A and 58A.
(3) Forward/Reverse operation must be done when motor is not rotating.
(4) Ground terminal only for types 31A, 44A and 58A.

Performances

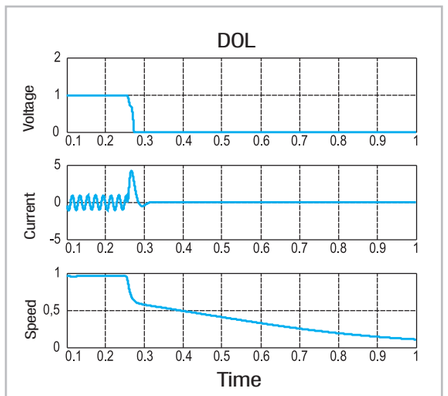
Direct-on-line start



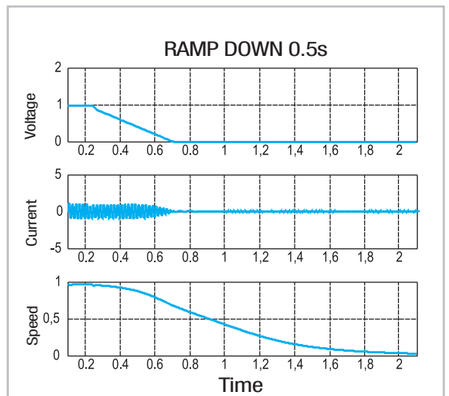
ASTAT S soft start



Direct-on-line stop



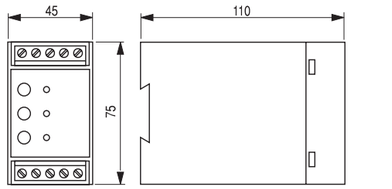
ASTAT S soft stop



Dimensional drawings

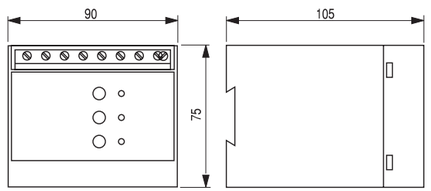
Small soft starter with integral by-pass

TYPE	Weight (kg)
QA12P008S	0.470
QA22P008S	0.470



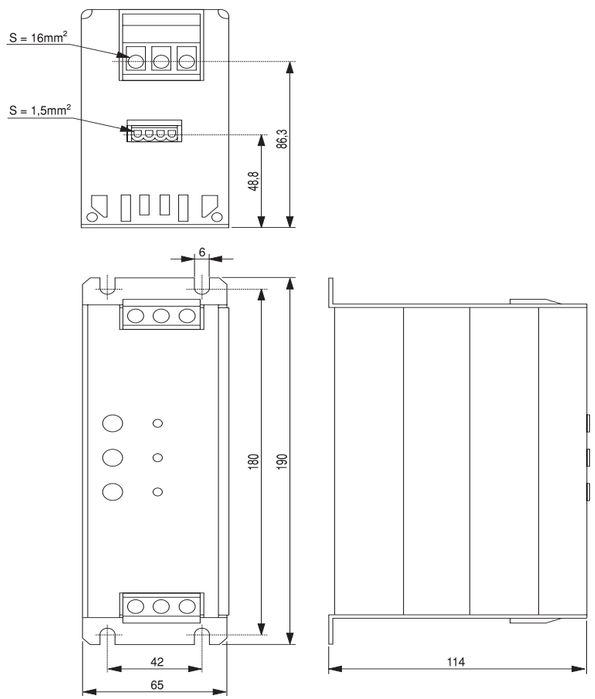
Dimensions in mm

TYPE	Weight (kg)
QA_2P017S	0.610
QA_2P022S	0.650
QA32P008S	0.650



Dimensions in mm

TYPE	Weight (kg)
QA_2P031S	1.370
QA_2P044S	1.400
QA_2P058S	1.400



Dimensions in mm

Approvals / Marking

c UL US LISTED

UL

For units up to 820A. "U" type

CE CCC (Contact GE for details)

Control panel

Order codes ● pg. I.8
Technical data ● pg. I.11
Functions ● pg. I.12
Overload protections ● pg. I.13
I/O wiring ● pg. I.14
Wiring diagrams ● pg. I.16
Coordination types ● pg. I.20
Dimensions ● pg. I.22

ASTAT XT

Digital soft starters for 3ph standard induction motors

GE´s new ASTAT XT solid state soft starter features microprocessor control digital technology. Setup and adjustment is performed through a six-buttom keypad and parameters or messages are displayed out trough a friendly LCD multilanguage interface with two rows, sixteen alphanumeric characters each. The design includes isolated I/O and high level of protection in their circuits to minimize the disturbance effects while working in the hardest industrial environment.

ASTAT XT Soft Starter offers reliable performance and smooth acceleration for a variety of standard AC motors up to 1400A and up to 690V, reducing mechanical shock to the driving system, resulting in extended component and motor life.

ASTAT XT offers many traditional features such a motor overload function, adjustable ramps, current limit, kick start, but also other high end features like inside-delta operation, torque control, pump control and a reliable motor and unit set of protections.

Key Features

- Ratings up to 1400Amps and up to 690VAC
- Friendly multilanguage interface with two rows, sixteen characters each
- Built-in with three extra power terminals for external bypass
- In-line or inside-delta operation modes
- Torque control and pump control advanced features
- Motor protection according IEC 10, 20 and NEMA 10, 20, 30, even if ASTAT XT is in by-pass
- Built in communications RS485 port, and ModBus protocol as standard
- ProfibusDP and DeviceNet optional interfaces for communications

IEC ratings. Recommended motor and type unit ratings

	Light Duty	NORMAL DUTY (IEC Class 10)					HEAVY DUTY (IEC Class 20)						
	Max Current Rating	Rated Current	230V	400V-415V	480V-500V	690V	Rated Current	230V	400V-415V	480V-500V	690V	Cat. No.	Ref. No.
	A	A	kW	kW	kW	kW	A	kW	kW	kW	kW		
Mains voltage 230-500VAC	8	8	1.5	3	4	-	8	1.5	3	4	-	QT10008U21MS	**169075**
	17	17	4	7.5	7.5	-	12	3	5.5	5.5	-	QT10017U21MS	**169076**
	34	31	7.5	15	18.5	-	31	7.5	15	18.5	-	QT10031U21MS	**169077**
	54	44	11	22	30	-	44	11	22	30	-	QT10044U21MS	**169078**
	65	58	15	30	37	-	55	15	30	37	-	QT10058U21MS	**169079**
	72	72	22	37	45	-	66	18.5	37	45	-	QT10072U21MS	**169080**
	104	85	22	45	55	-	80	22	45	55	-	QT10085U21MS	**169081**
	130	105	30	55	55	-	99	30	55	55	-	QT10105U21MS	**169082**
	156	145	45	75	90	-	130	37	55	90	-	QT10145U21MS	**169083**
	170	170	55	90	110	-	134	37	75	90	-	QT10170U21MS	**169084**
	248	210	55	110	132	-	203	55	110	132	-	QT10210N21MS	**169091**
	361	310	90	160	200	-	310	75	160	200	-	QT10310N21MS	**169092**
	390	390	110	200	250	-	344	110	160	250	-	QT10390N21MS	**169093**
	480	460	132	250	315	-	432	132	250	315	-	QT10460N21MS	**169094**
	610	580	160	315	400	-	488	160	250	355	-	QT10580N21MS	**169095**
	610	580	160	315	400	-	552	160	315	400	-	QT10580U21MS	**169089**
	820	650	200	355	400	-	552	160	315	400	-	QT10650N21MS	**169096**
	820	820	250	400	560	-	690	200	400	500	-	QT10820U21MS	**169090**
	1180	950	315	560	630	-	950	315	560	630	-	QT10950N21MS	**169097**
	1375	1100	355	630	800	-	1076	355	630	800	-	QT11100N21MS	**169098**
	1750	1400	400	800	1000	-	1400	400	800	1000	-	QT11400N21MS	**169099**
Mains voltage 690VAC	8	8	-	-	-	5.5	8	-	-	-	5.5	QT30008N21MS	**169119**
	17	17	-	-	-	15	12	-	-	-	7.5	QT30017N21MS	**169120**
	34	31	-	-	-	22	31	-	-	-	22	QT30031N21MS	**169121**
	54	44	-	-	-	37	44	-	-	-	37	QT30044N21MS	**169122**
	65	58	-	-	-	55	55	-	-	-	45	QT30058N21MS	**169123**
	72	72	-	-	-	55	66	-	-	-	55	QT30072N21MS	**169124**
	104	85	-	-	-	75	80	-	-	-	75	QT30085N21MS	**169125**
	130	105	-	-	-	90	99	-	-	-	90	QT30105N21MS	**169126**
	156	145	-	-	-	132	130	-	-	-	90	QT30145N21MS	**169127**
	170	170	-	-	-	160	134	-	-	-	132	QT30170N21MS	**169128**
	248	210	-	-	-	200	203	-	-	-	200	QT30210N21MS	**169129**
	361	310	-	-	-	250	310	-	-	-	250	QT30310N21MS	**169130**
	390	390	-	-	-	355	344	-	-	-	315	QT30390N21MS	**169131**
	480	460	-	-	-	400	432	-	-	-	400	QT30460N21MS	**169132**
	610	580	-	-	-	560	488	-	-	-	400	QT30580N21MS	**169133**
	820	650	-	-	-	630	552	-	-	-	560	QT30650N21MS	**169134**
	1180	950	-	-	-	900	950	-	-	-	900	QT30950N21MS	**169135**
	1375	1100	-	-	-	1000	1076	-	-	-	1000	QT31100N21MS	**169136**
	1750	1400	-	-	-	-	1400	-	-	-	-	QT31400N21MS	**169137**

Remark
Motor kW ratings given in above table are for IEC, standard AC four poles motors.
Always check that motor rated current is less than the specified rated current of the starter, for the specific application (Normal Duty or Heavy Duty)

QT10008U21MS
ASTAT XT 8A-72A

QT10105U21MS
ASTAT XT 105A-170A

QT10210N21MS
ASTAT XT 210A-390A

QT10460N21MS
ASTAT XT 460A-650A

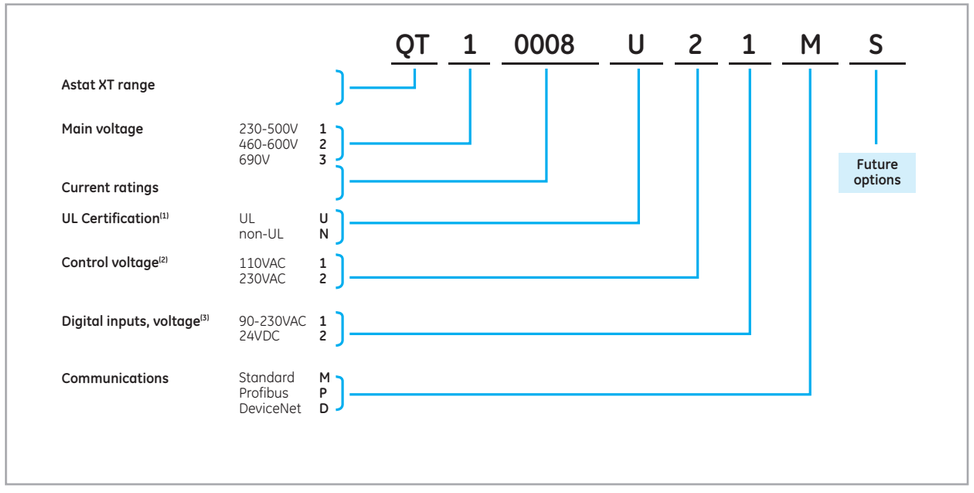
NEMA ratings. Recommended unit type and motor ratings

	LIGHT DUTY Nema 10				NORMAL DUTY Nema 20				HEAVY DUTY Nema 30					
	Current Rating	230V	460V	575V	Current Rating	230V	460V	575V	Current Rating	230V	460V	575V	Cat. No.	Ref. No.
	A	HP	HP	HP	A	HP	HP	HP	A	HP	HP	HP		
Mains voltage 230-500VAC	8	2	5	-	8	2	5	-	8	2	5	-	QT10008U21MS	**169075**
	17	5	10	-	17	5	10	-	12	3	7.5	-	QT10017U21MS	**169076**
	34	10	25	-	31	10	20	-	31	10	20	-	QT10031U21MS	**169077**
	54	20	40	-	44	15	30	-	44	15	30	-	QT10044U21MS	**169078**
	65	20	50	-	58	20	40	-	55	20	40	-	QT10058U21MS	**169079**
	72	25	50	-	72	25	50	-	66	20	50	-	QT10072U21MS	**169080**
	104	40	75	-	85	30	60	-	80	30	60	-	QT10085U21MS	**169081**
	130	50	100	-	105	40	75	-	99	40	75	-	QT10105U21MS	**169082**
	156	60	125	-	145	50	100	-	130	50	100	-	QT10145U21MS	**169083**
	170	60	125	-	170	60	125	-	134	50	100	-	QT10170U21MS	**169084**
	262	100	200	-	210	75	150	-	203	75	150	-	QT10210U21MS	**169085**
	387	150	300	-	310	100	250	-	310	100	250	-	QT10310U21MS	**169086**
	414	150	350	-	390	150	300	-	361	150	300	-	QT10390U21MS	**169087**
	480	200	400	-	460	150	350	-	432	150	350	-	QT10460U21MS	**169088**
	610	250	500	-	580	200	400	-	552	200	400	-	QT10580U21MS	**169089**
	820	-	-	-	820	250	500	-	690	250	500	-	QT10820U21MS	**169090**
Mains voltage 460-600VAC	8	-	5	5	8	-	5	5	8	-	5	5	QT20008U21MS	**169100**
	17	-	10	15	17	-	10	15	12	-	7.5	10	QT20017U21MS	**169101**
	34	-	25	30	31	-	20	25	31	-	20	25	QT20031U21MS	**169102**
	54	-	40	50	44	-	30	40	44	-	30	40	QT20044U21MS	**169103**
	65	-	50	60	58	-	40	50	55	-	40	50	QT20058U21MS	**169104**
	72	-	50	60	72	-	50	60	66	-	50	60	QT20072U21MS	**169105**
	104	-	75	100	85	-	60	75	80	-	60	75	QT20085U21MS	**169106**
	130	-	100	125	105	-	75	100	99	-	75	100	QT20105U21MS	**169107**
	156	-	125	150	145	-	100	150	130	-	100	125	QT20145U21MS	**169108**
	170	-	125	150	170	-	125	150	134	-	100	125	QT20170U21MS	**169109**
	262	-	200	250	210	-	150	200	203	-	150	200	QT20210U21MS	**169110**
	387	-	300	400	310	-	250	300	310	-	250	300	QT20310U21MS	**169111**
	414	-	350	400	390	-	300	400	361	-	300	300	QT20390U21MS	**169112**
	480	-	400	500	460	-	350	400	432	-	350	400	QT20460U21MS	**169113**
	610	-	500	-	580	-	400	400	552	-	400	500	QT20580U21MS	**169114**
	820	-	-	-	820	-	500	500	690	-	500	-	QT20820U21MS	**169115**

Remark

Motor HP ratings given in above table are for NEMA, standard AC four poles motors.
Always check that motor rated current is less than the specified rated current of the starter, for the specific application (Light duty, Normal duty or Heavy duty)

Unit configuration



(1) - ASTAT XT up to 600V, and up to 170A (Cat Numbers up to QT10170_ or up to QT20170) are always cUL certified. Option "N" not available
- Units QT2, from QT20008_, up to QT20820_ are always cUL certified. Option "N" not available.
- Units QT1, or QT2 from QTx0950_ up to QTx1400 are not UL certified. Option "U" not available.
- Units QT3__, rated to 690V, are not UL certified. Option "U" not available

(2) ASTAT XT standard Control Voltage configuration is option 2, Voltage 230VAC, +10%, -15%

(3) ASTAT XT standard configuration for Inputs is option 1, Voltage 90-230VAC, +10%, -15%

Technical data

Ratings

Main voltage	3Ph AC supply	230 to 500VAC +10%, -15% for QT1xxx units 460 to 600VAC +10%, -15% for QT2xxx units 690VAC +10%, -15% for QT3xxx units
Starter current rating	for 3Ph AC motors	From 8A up to 1400A.
Motor current rating	3 phases Induction motors	Motor rated current from 50% to 100% of starter current
Control voltage	1ph AC supply	230VAC, +10, -15%, 50/60Hz, or 110VAC, +10, -15%, 50/60Hz (optional)
Frequency range	50/60Hz systems	Wide from 45Hz to 65Hz. Auto-tracking frequency range

Control specifications

Control system	Digital control with microcontroller.
	Starting ramp, with progressive increase in voltage and current limitation
Operation mode	In-Line (three wires) or Inside-Delta (six wires) of the motor
Run operation	Soft Start and Soft stop by multiple choices, including torque control both at start or Stop phases
Operator interface	By LCD display, keypad and Indication LEDs Display: LCD with two rows, 16 characters each Type: Multilanguage, dip-switch selectable for English, Italian, Spanish and German Keys: Six keys, Mode, reset, Set, Select and Up / Down LEDs: ON, Start, Run, Soft Stop, Stop, Save / Slow Speed, Dual Set / Reverse and Fault
Initial voltage	10-50% Un. Up to 80% with expanded settings function
Starting current	100-400% In. Can be extended up to 500%, by using extended settings
Acceleration ramp time	1-30 sec. Can be extended up to 90sec, by using extended settings
Deceleration ramp time	1-30 sec. Can be extended up to 90sec, by using extended settings
Current limitation	100-400% of motor rated current. Can be extended up to 500% by using extended settings
Bypass	By external contactor while motor is full protected by ASTAT XT.
Monitoring	Motor Current, Line Voltage, motor thermistor resistance, Test & Maintenance and Statistics

Environmental conditions

Operating temperature	-10 up to 50ºC, with current derating by 2.5% per ºC, from 40ºC
Storage temperature	-20ºC up to 70ºC
Maximum altitude	Up to 1000 mts. Ask your dealed for installation at higher altitude
Humidity	95% at 50ºC or 98% at 45ºC
Protection degree	IP20 for units up to 72A, IP00 for units from 85A up to 1400A
Pollution degree	Class 3

Standards

Global standards	CE for the full trange. UL, cUL for specified units up to 820A	
EMC emissions	EN 61000-6-4	CISPR 11 Class A
Immunity	EN 61000-6-2	ESD 8KV air, IEC 801-2; Electric RF field 10 V/m, 20-1000Mhz, IEC 801-3 Fast transients 2KV, IEC 801-4
Safety	EN 600947-1	Related to safety requirements. UL508C

Functions

Available standard functions

Soft start and soft stop	ASTAT XT is provided with a soft start and soft stop features, including five independent acceleration and decel-ertaion curve models. The factory default curve is used for general purpose, other three are used for pump control and the last one for torque control.
Pump control	Specific function for pump control, that avoids overpressure in the system at the end of acceleration phase and suppresses the hammering at stopping phase.
Torque control	Provides a smoth time controlled torque ramp acelleration and deceleration, with linear deceleration of the torque resulting in a close to linear speed deceleration, thus eliminating stall conditions
In line / Inside delta	ASTAT XT allows either traditional Line operation or Inside Delta operation. When the ASTAT XT is installed to operate Inside Delta, the individual phases of the starter are connected in series with the individual motor windings (six wiring connections like the Start-Delta starters), thus reducing the current x1.73, and allowing the use of a much smaller starter (x1.5 less than motor rated current).
Bypass	ASTAT XT allows bypass operation using an external contactor, controlled ON/OFF by starter function EOR (End Of Ramp). The starter is provided with three dedicated power terminals to facilitate wirings to the bypass contactor. ASTAT XT protections to motor are enabled, even in bypass.
Kick start	This function allows to start high friction loadsthat require high starting torque for a short period of time. When this function is enabled, a pulse of 80% Un during an adjustable time from 0 to 1sec is given to the motor. After this pulse the output voltage is ramping down to Starting Voltage setting, before ramping up again to full voltage.
End of ramp	Detects end of acceleration and outputs a signal by an dry relay contact. This signal can be delayed by an adjustable timer from 0-120 sec.
Lock-Out	Allows to control the number of startings into a period of time, then protecting both motor and ASTAT.
Dual settings	By this function, ASTAT XT is able to control a secondary motor Dual setting of Starting Voltage, Starting Current, Current Limit, Ramp Up, Ramp Down and Motor current parameters can be selected by using one of the program-mable ASTAT XT's inputs
Energy saving	Activated when the motor has a light load for extended periods of time, then reducing the output voltage level and decreasing the reactive current and motor copper/Iron losses. This function can be enabled or disabled by dedicated parameters in ASTAT XT.
Slow speed	Function that allows the motor to run at 1/6 constant rated speed, for a short period of time of maximum 30sec. This function supports forward and reverse operation.
Auto reset	This function allows the ASTAT XT automatic recover after a fault caused by Undervoltage, Undercurrent or Phase lost. Auto-Reset can be programed up to maximum 10 attempts.
Cooling fan control	Allows thre method of control for the ASTAT's built-in cooling fans. - Continuous Operation - Controlled by an external Input - Automatically OFF controlled, after five minutes ASTAT XT is stopped
Generator supply	This is a specific function useful when the Starter is powered from a diesel generator rather than from commercial power supply. The function is enabled by an internal Dip Switch, and helps to minimize the negative effects caused by the generator's voltage fluctuations during starting.
Keypad lock	This function is enabled by means of starter's internal dipswitch, then locking the keypad. This is usefull to prevent undesired parameter modifications.
Built-in communications	ASTAT XT includes a ModBus RTU communications protocol. Communications are carried out through a half duplex RS485 port, with maximum baudrate of 9600, supporting up to 247 stations.
Statistic data	ASTAT XT records useful data for maintenance and start up - Last 10 trip events - Statistical data like number of starts, number of trip events and elapsed RUN time. - Last trip data information of Motor current, Starting current and acceleration time.

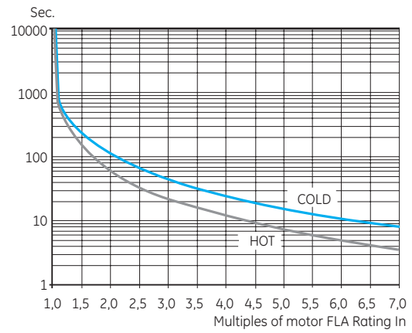
Motor and starter protection

Overload	Trips the ASTAT-XT when current exceeds the Overload Trip level according IEC Class 10, 20 or NEMA 10, 20, 30
Motor thermistor	Trips when motor thermistor resinstance decreases below trip level set ASTAT XT allows both PTC or NTC sensors, with adjustable trip level
Too many starts	Trips if the number of starts, during Duty Cycle Time exceeds the preset number
Long start time	Trips if output voltage does not reach rated voltage at the preset Max. Start time
O/C JAM fault	Trips under the following conditions: - Instantaneously when current exceeds 8.5 x ASTAT-XT Current - During starting when current exceeds 8.5 x Motor Current - During running when current exceeds 200-850% of Motor Current O/C JAM has a programmable triping delay of 0-5 seconds
Undercurrent	Trips when line current drops below the preset level for the preset time.
Undervoltage	Trips when line voltage drops below the preset level for the preset time.
Overvoltage	Trips when line voltage increases above a preset level for a preset time
Phase loss	Trips if 1 or 2 phases are lost
Frequency loss	Trips if frequency is not in the range of 40-66.6Hz
Phase sequence	Trips if line phase sequence is wrong
Slow speed time	Trips when operating at slow speed for extended periods
Wrong connection	Trips the ASTAT-XT when one or more motor phases is not properly connected to ASTAT-XT's load terminals or if there is an internal disconnection in the motor winding
Shorted SCR	Trips and prevents starting if any SCR is short-circuited or when motor windings are shorted
Over temperature	Heat-sink over-temperature. Trips the ASTAT-XT when the heat-sink temperature rises above 85°C
External fault	Trips the ASTAT-XT when a N.O. contact between terminals 19-21 closes for over two seconds
Wrong parameters	Parameters not transferred from RAM to EEPROM or vice versa
OC or wrong CON	Trips when the ASTAT-XT is connected Inside Delta and Wrong connection or overcurrent is detected

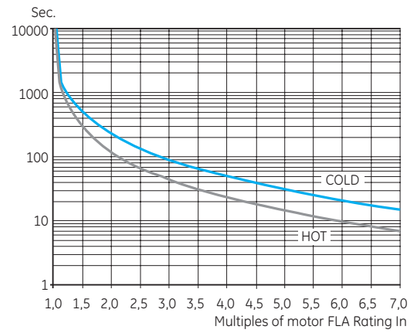
Overload protections - Thermal characteristics

The ASTAT XT allows motor protection according IEC Class 10 or Class 20 and NEMA 10, 20 or 30, user free selectable by ASTAT internal dedicated parameter.

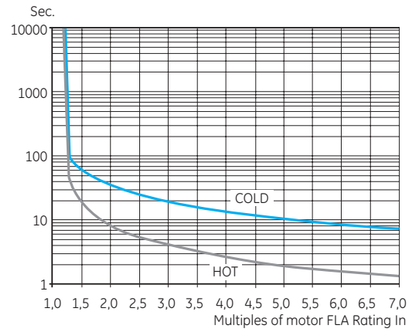
IEC Class 10



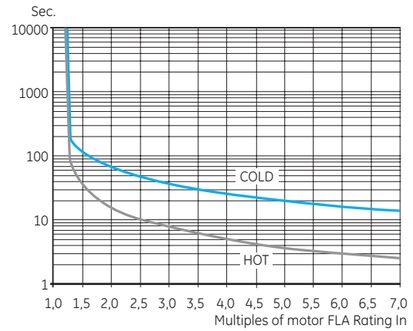
IEC Class 20



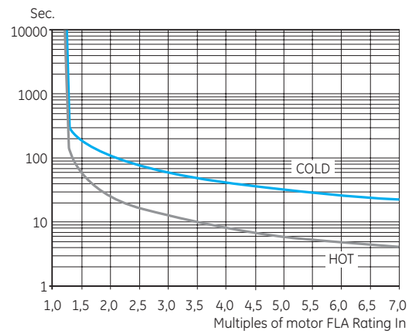
NEMA 10 Light duty



NEMA 20



NEMA 30

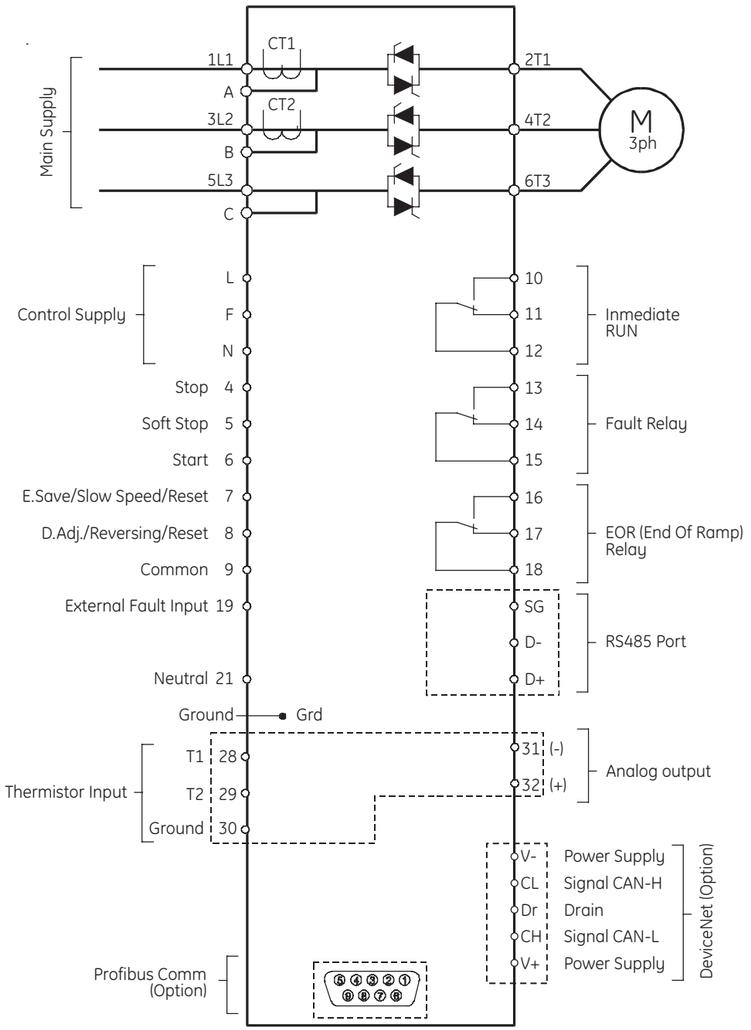


Maximum number starting /hour

		Ramp time		
		10s	**20s**	**30s**
Starting current I/In [1]	2	24	12	8
	3	16	8	5
	4	12	6	4

(1) In= rated current of ASTAT XT in the specified class IEC/Nema

I/O Wiring, Basic scheme



I/O terminal board specifications

Power I/O terminals

Terminals	Function	Description
1L1, 3L2, 5L3	Mains Input	3ph Input voltage according Astat XT Main Voltage Option rating (Option 1, QT1_) 230-500VAC, +10%/-15% 50/60Hz (Option 2, QT2_) 460-600VAC, +10%/-15% 50/60Hz (Option 3, QT3_) 690VAC, +10%/-15% 50/60Hz
2T1, 4T2, 6T3	Output to motor	Power Output terminals to 3ph AC motor
A, B, C	By-pass	Bypass terminals for external by-pass contactor
G	Ground	ASTAT XT, ground connection

Control power supply

L, N	Control. Supply	a110VAC or 220VAC, according ASTAT XT Control Voltage rating
F	Fan control	Cooling fan external control, together with jumper J1
		Control Voltage & Fan consumption VA: QTx0008 to QTx0031: No fan. Total consumption: 150VA QTx0044 to QTx0072: Fan 35 VA. Total consumption 185VA QTx0085 to QTx0170: Fan 60 VA. Total consumption 210VA QTx0210 to QTx0390: Fans 105VA. Total consumption 255VA QTx0390 to QTx 1400A : Fans 150VA.Total consumption 300VA

Digital inputs

4	Stop	Dedicated input to Stop
5	Soft Stop	Dedicated input to Soft Stop
6	Start	Dedicated input to Start
7	Progammable Inputs	Programmable to functions Energy Saving, Slow Speed and Reset
8	Progammable Inputs	Programmable to functions Dual Set, Reverse and Reset
9	Common	Common terminal for digital inputs from 4, 5, 6, 7 and 8
		Operating Voltage of digital inputs from 4 to 9 Digital Input hardware is operated according either of below ordered voltage ratings (Option 1, standard) From 90 to 230VAC +10%, 50/60Hz (Option 2, Optional) 24VDC +10%/ -15%

Other inputs

19, 21	External fault	Requires a free voltage relay contact, to detect external fault
21	Neutral	This terminal may be connected to Mains Neutral when available
28, 29	Motor thermistor	PTC or NTC programable input for motor thermistor protection The input can be enabled or disabled, and programmed at desired trip level resistance

Digital outputs

10, 11, 12	RUN	Run Relay with NO & NC dry contact. Programmable ON delay
13, 14, 15	FAULT	Fault to ON or Fault to OFF programmable function
16, 17, 18	EOR	End Of Ramp relay. Programmable ON delay
		Relay Outputs Ratings Max rating: 8A, 250VAC, 2000VA max

Analogue output

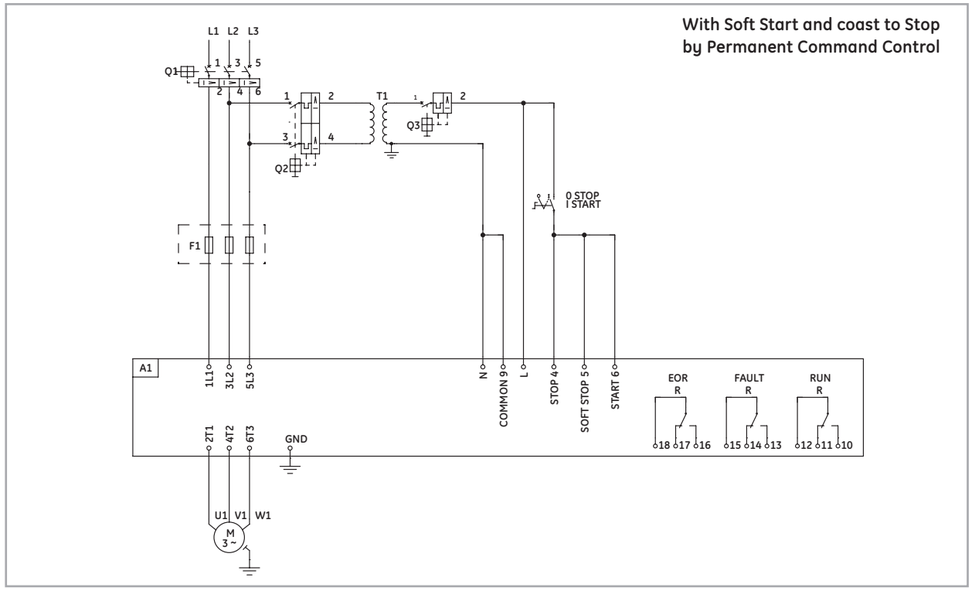
31, 32	Current output	Range 0 to 2xIn. Programmable 0-10VDC, 0-20mA or 4-20mA.
30	Ground	Ground terminal for Analog Output

Communications

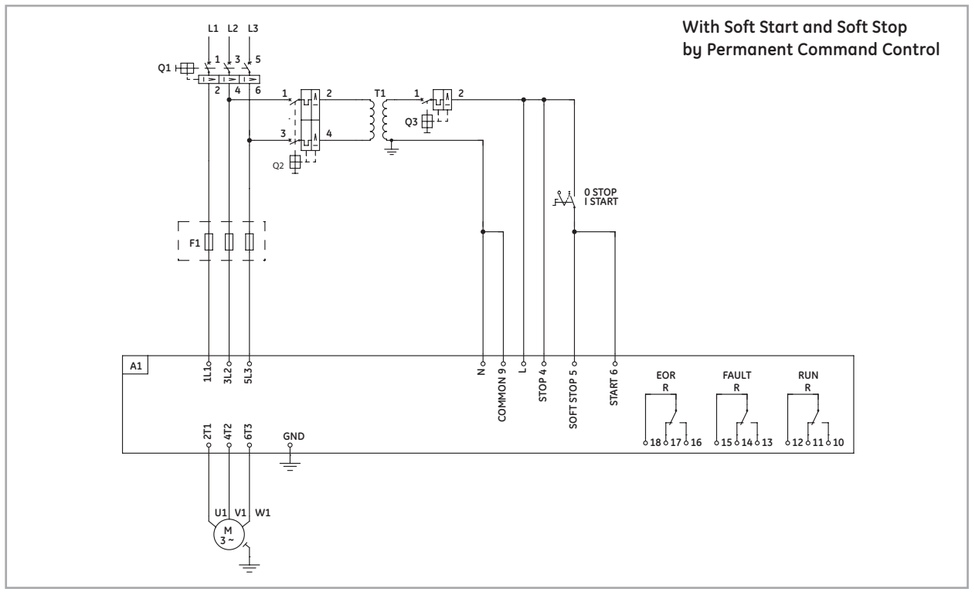
D+, D-, SG	RS485 terminals	RS485 Communication port, half duplex for ModBus protocol Baudrate 1200, 2400, 4800, 9600 BPS
D-9 connector	Profibus port	Optional Profibus Communications port
V+, CL, Dr, CH, V-	DeviceNet terminals	Optional Devicenet Communications port

Application wiring diagrams

Basic diagram without line contactor(1)



Basic diagram without line contactor(1)



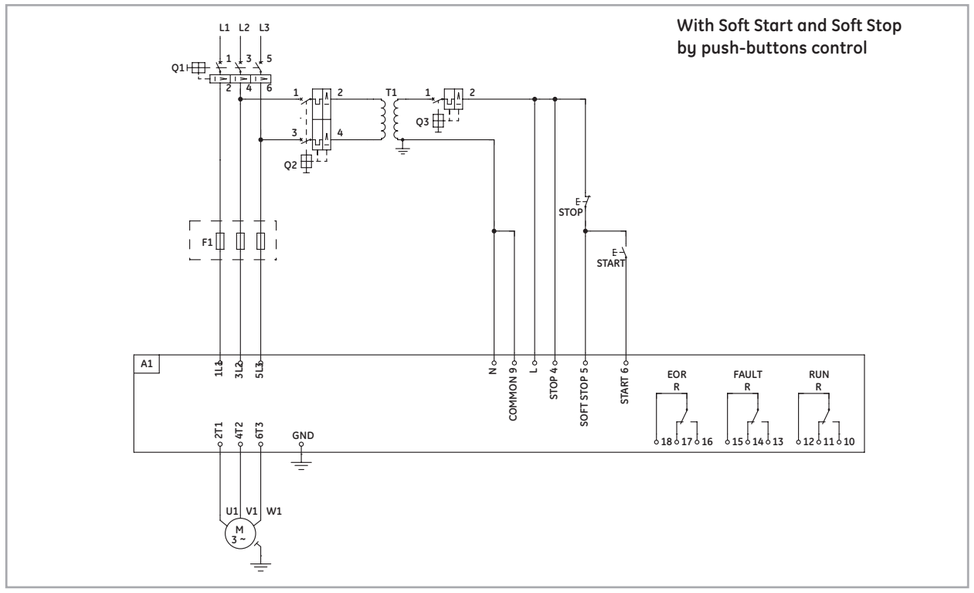
(1) Schemes are given for information purposes. Add additional emergency safety stop, if it is required for your application.

Remarks

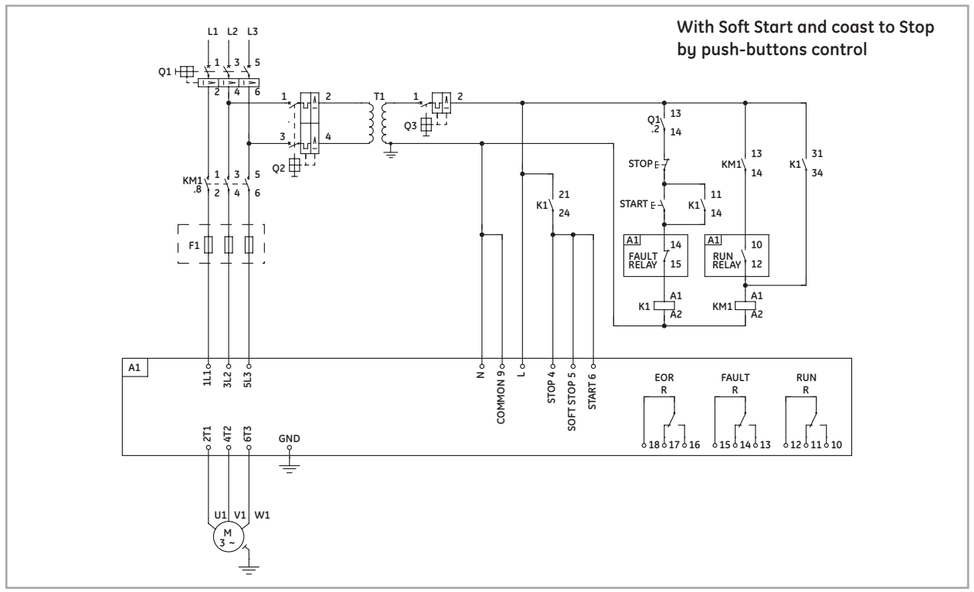
1. Check coordination tables for proper selection of Breaker and Line contactor.
2. Control Voltage and Control Input voltage are from same source in above example. Please check manuals if you have different sources for Control Voltage and Control input Voltage.
3. Semiconductor Fuses "F" are only required for Type 2 coordination. Please check coordination tables
4. In spite of ASTAT XT can operate without line contactor, the use of a line contactor will increase the operation safety. Anyway provide a way to switch off the Breaker in case of an emergency.

Application wiring diagrams

Basic diagram without line contactor(1)



Basic diagram with line contactor(1)



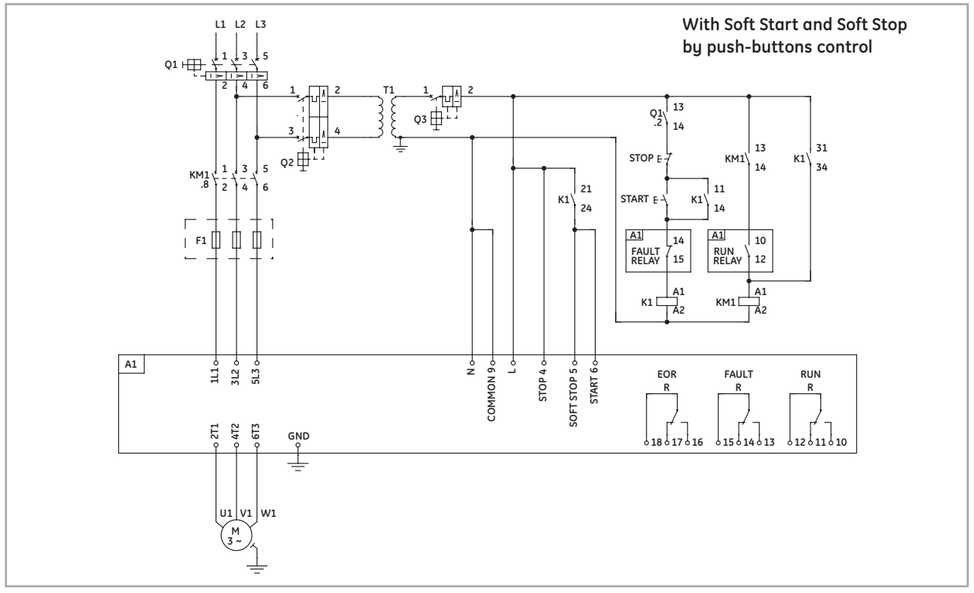
(1) Schemes are given for information purposes. Add additional emergency safety stop, if it is required for your application.

Remarks

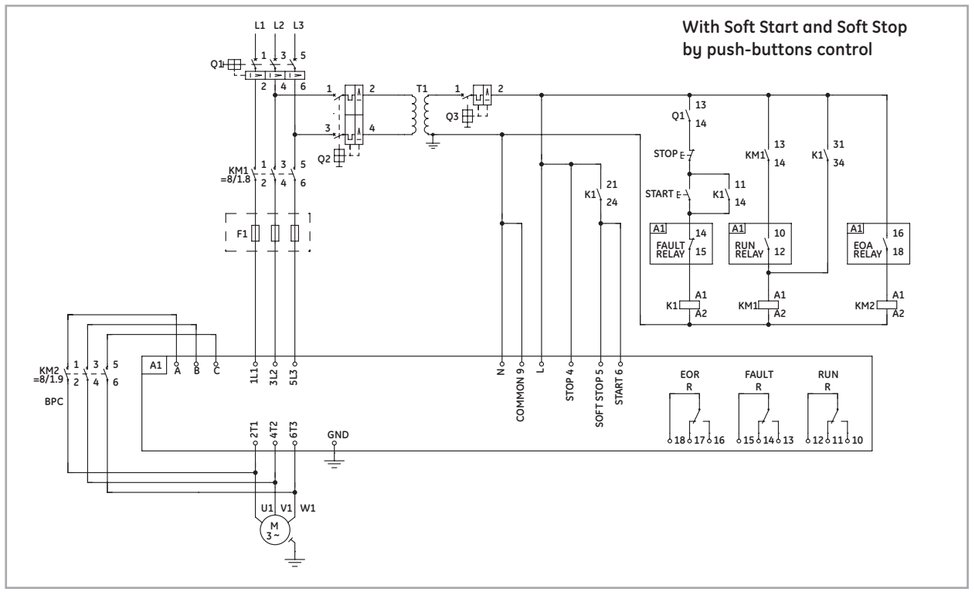
1. Check coordination tables for proper selection of Breaker and Line contactor.
2. Control Voltage and Control Input voltage are from same source in above example. Please check manuals if you have different sources for Control Voltage and Control input Voltage.
3. Semiconductor Fuses "F" are only required for Type 2 coordination. Please check coordination tables
4. In spite of ASTAT XT can operate without line contactor, the use of a line contactor will increase the operation safety. Anyway provide a way to switch off the Breaker in case of an emergency.

Application wiring diagrams

Basic diagram with line contactor(1)



Basic diagram with line and bypass contactors(1)



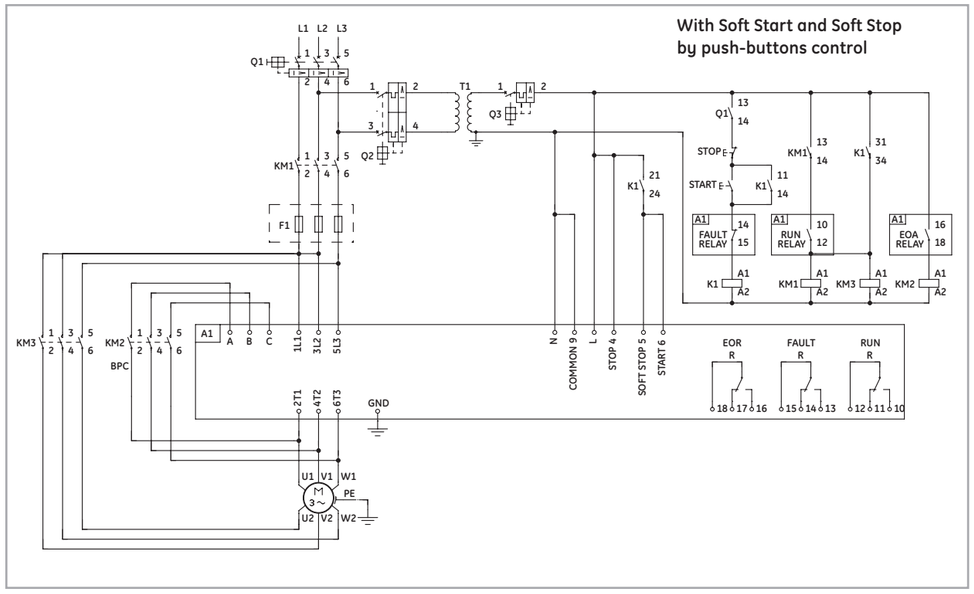
(1) Above schemes are given for information purposes. Add additional emergency safety stop, if it is required for your application.

Remarks

1. Check coordination tables for proper selection of Breaker and Line contactor.
2. Control Voltage and Control Input voltage are from same source in above example. Please check manuals if you have different sources for Control Voltage and Control input Voltage.
3. Semiconductor Fuses "F" are only required for Type 2 coordination. Please check coordination tables

Application wiring diagrams

Basic diagram in "Inside Delta" configuration with line and bypass contactors(1)



(1) Above schemes are given for information purposes. Add additional emergency safety stop, if it is required for your application.

Remarks

1. Check coordination tables for proper selection of Breaker and Line contactor.
2. Control Voltage and Control Input voltage are from same source in above example. Please check manuals if you have different sources for Control Voltage and Control input Voltage.
3. Semiconductor Fuses "F" are only required for Type 2 coordination. Please check coordination tables
4. Wrong connection of the motor, or the ASTAT-XT when it is Inside-delta connected may seriously damage the motor or the ASTAT-XT. Please check additional details given in the ASTAT XT's instruction manual.

Coordination Type 1

Combination with aM fuses - 415V

	ASTAT-XT type		aM fuses		Contactor Type	Short-circuit current
	Rating (A)	Cat. No.		Rating (A)	CL/CK series	Iq (kA)
Main Voltage Up to 415VAC	8	- QT10008_	-	16	CL00	80
	17	- QT10017_	-	20	CL02	80
	31	- QT10031_	-	35	CL04	80
	44	- QT10044_	-	50	CL06	80
	58	- QT10058_	-	80	CL07	80
	72	- QT10072_	-	100	CL08	80
	85	- QT10085_	-	125	CL09	80
	105	- QT10105_	-	160	CL10	80
	145	- QT10145_	-	200	CK75C	80
	170	- QT10170_	-	200	CK08C	80
	210	- QT10210_	-	250	CK09B	80
	310	- QT10310_	-	400	CK95B	80
	390	- QT10390_	-	500	CK10C	80
	460	- QT10460_	-	630	CK11C	80
	580	- QT10580_	-	800	CK12B	80
	650	- QT10650_	-	1000	CK13B	80
	950	- QT10950_	-	2x630	-	80
	1100	- QT11100_	-	2x800	-	80
	1400	- QT11400_	-	2x800	-	80

Combination with Record Plus MCCB'S - 415V

	ASTAT-XT type		Circuit Breaker		Contactor Type	Short-circuit current
	Rating (A)	Cat. No.	Record Plus	Rating (A)	CL/CK series	Iq (kA)
Main Voltage Up to 415VAC	8	- QT10008_	FD63	16	CL45	65
	17	- QT10017_	FD63	40	CL06	65
	31	- QT10031_	FD63	50	CL06	65
	44	- QT10044_	FD160	63	CL06	65
	58	- QT10058_	FD160	80	CL07	65
	72	- QT10072_	FD160	80	CL08	65
	85	- QT10085_	FE160	125	CL10	65
	105	- QT10105_	FE160	160	CL10	65
	145	- QT10145_	FE160	160	CK85B	65
	170	- QT10170_	FE250	160	CK08	65
	210	- QT10210_	FE250	160	CK85	65
	310	- QT10310_	FG400	400	CK10C	65
	390	- QT10390_	FG400	400	CK12B	65
	460	- QT10460_	FG630	630	CK12B	65
	580	- QT10580_	FG630	630	CK13B	65
	650	- QT10650_	FK1250	1000	CK13B	50
	950	- QT10950_	FK1250	1000	-	50
	1100	- QT11100_	FK1250	1250	-	50
	1400	- QT11400_	FK1600	1600	-	50

Combination with aM fuses - 500V

	ASTAT-XT type		aM fuses		Contactor Type	Short-circuit current
	Rating (A)	Cat. No.		Rating (A)	CL/CK series	Iq (kA)
Main Voltage 500 VAC	8	QT10008_	QT20008_	- 16	CL00	80
	17	QT10017_	QT20017_	- 20	CL02	80
	31	QT10031_	QT20031_	- 35	CL04	80
	44	QT10044_	QT20044_	- 50	CL06	80
	58	QT10058_	QT20058_	- 80	CL07	80
	72	QT10072_	QT20072_	- 100	CL08	80
	85	QT10085_	QT20085_	- 125	CL09	80
	105	QT10105_	QT20105_	- 160	CL10	80
	145	QT10145_	QT20145_	- 200	CK75C	80
	170	QT10170_	QT20170_	- 200	CK08C	80
	210	QT10210_	QT20210_	- 250	CK09B	80
	310	QT10310_	QT20310_	- 400	CK95B	80
	390	QT10390_	QT20390_	- 500	CK10C	80
	460	QT10460_	QT20460_	- 630	CK11C	80
	580	QT10580_	QT20580_	- 800	CK12B	80
	650/820	QT10650_	QT20820_	- 1000	CK13B	80
	950	QT10950_	QT20950_	- 2x630	-	80
	1100	QT11100_	QT21100_	- 2x800	-	80
	1400	QT11400_	QT21400_	- 2x800	-	80

Coordination Type 2

Combination with semiconductor fuses - 415V

	ASTAT-XT type		Semiconductor fuses[1]	Contactor Type	Short-circuit current
	Rating (A)	Cat. No.	Bussmann type	CL/CK series	Iq (kA)
Main Voltage Up to 415VAC	8	-	QT10008_	170M3808D	CL25	80
	17	-	QT10017_	170M3810D	CL25	80
	31	-	QT10031_	170M3813D	CL04	80
	44	-	QT10044_	170M3814D	CL45	80
	58	-	QT10058_	170M3814D	CL07	80
	72	-	QT10072_	170M3815D	CL08	80
	85	-	QT10085_	170M3816D	CL09	80
	105	-	QT10105_	170M3817D	CL10	80
	145	-	QT10145_	170M3817D	CK75C	80
	170	-	QT10170_	170M3819D	CK08C	80
	210	-	QT10210_	170M4864D	CK09B	80
	310	-	QT10310_	170M4864D	CK95B	80
	390	-	QT10390_	170M5814D	CK10C	80
	460	-	QT10460_	170M5820D	CK11C	80
	580	-	QT10580_	170M5816D	CK12B	50
	650	-	QT10650_	2x170M5814D	CK13B	80
	950	-	QT10950_	2x170M5816D	-	80
	1100	-	QT11100_	2x170M6892D	-	80
	1400	-	QT11400_	2x170M8555D	-	80

Combination with semiconductor fuses - 500V

	ASTAT-XT type		Semiconductor fuses[1]	Contactor Type	Short-circuit current
	Rating (A)	Cat. No.	Bussmann type	CL/CK series	Iq (kA)
Main Voltage 500 VAC	8	QT10008_	QT20008_	170M3808D	CL25	80
	17	QT10017_	QT20017_	170M3810D	CL25	80
	31	QT10031_	QT20031_	170M3813D	CL04	80
	44	QT10044_	QT20044_	170M3814D	CL06	80
	58	QT10058_	QT20058_	170M3814D	CL07	80
	72	QT10072_	QT20072_	170M3815D	CL08	80
	85	QT10085_	QT20085_	170M3816D	CL09	80
	105	QT10105_	QT20105_	170M3817D	CL10	80
	145	QT10145_	QT20145_	170M3817D	CK75C	80
	170	QT10170_	QT20170_	170M3819D	CK08C	80
	210	QT10210_	QT20210_	170M4864D	CK09B	80
	310	QT10310_	QT20310_	170M4864D	CK10C	80
	390	QT10390_	QT20390_	170M5814D	CK10C	80
	460	QT10460_	QT20460_	170M5820D	CK11C	80
	580	QT10580_	QT20580_	170M5816D	CK12B	50
	650/820	QT10650_	QT20820_	2x170M5814D	CK13B	80
	950	QT10950_	QT20950_	2x170M5816D	-	80
	1100	QT11100_	QT21100_	2x170M6892D	-	80
	1400	QT11400_	QT21400_	2x170M8555D	-	80

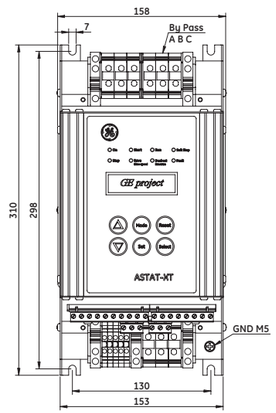
Combination with semiconductor fuses - 690V

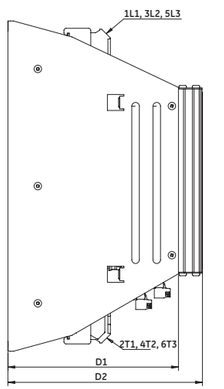
	ASTAT-XT type		Semiconductor fuses[1]	Contactor Type	Short-circuit current
	Rating (A)	Cat. No.	Bussmann type	CL/CK series	Iq (kA)
Main Voltage 690 VAC	8	-	QT30008_	170M3808D	CL25	50
	17	-	QT30017_	170M3810D	CL25	50
	31	-	QT30031_	170M3813D	CL06	50
	44	-	QT30044_	170M3814D	CL06	50
	58	-	QT30058_	170M3814D	CL07	50
	72	-	QT30072_	170M3815D	CL08	50
	85	-	QT30085_	170M3816D	CK75C	50
	105	-	QT30105_	170M3817D	CK75C	50
	145	-	QT30145_	170M3817D	CK08B	50
	170	-	QT30170_	170M3819D	CK08B	50
	210	-	QT30210_	170M4864D	CK08B	50
	310	-	QT30310_	170M4864D	CK10C	50
	390	-	QT30390_	170M5814D	CK10C	50
	460	-	QT30460_	170M5820D	CK12B	50
	580	-	QT30580_	170M5816D	CK12B	30
	650	-	QT30650_	2x170M5814D	-	50
	950	-	QT30950_	2x170M5816D	-	50
	1100	-	QT31100_	2x170M6892D	-	50
	1400	-	QT31400_	2x170M8555D	-	50

(1) Semiconductor Fuses must be always used for Type 2 coordination

Dimensions and weights

*Cat. No.: QTx0008U_ , QTx0017U_ , QTx0031U_ , QTx0044U_ , QTx0058U_ , QTx0072U_*

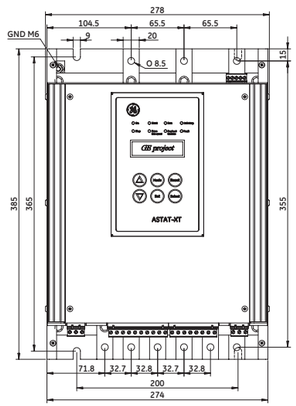


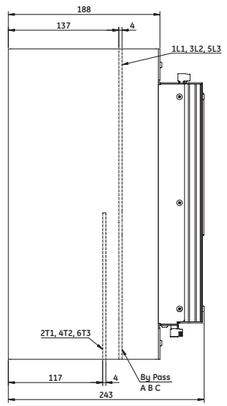


Cat. No	Dimensions		Power terminal size (mm²) Input	Bypass	Output	Weight Kg
	D1	D2	1L1, 3L2, 5L3	A, B, C	2T1, 4T2, 6T3	
QTx0008U__	**160**	182.5	16	16	16	4.2
QTx0017U__	**160**	182.5	16	16	16	4.2
QTx0031U__	**160**	182.5	16	16	16	5.3
QTx0044U__	**207**	229.5	16	16	35	6.7
QTx0058U__	**207**	229.5	16	16	35	6.7
QTx0072U__	**207**	229.5	35	35	35	6.7

UL Certified units

*Cat. No.: QTx0085U_ , QTx0105U_*



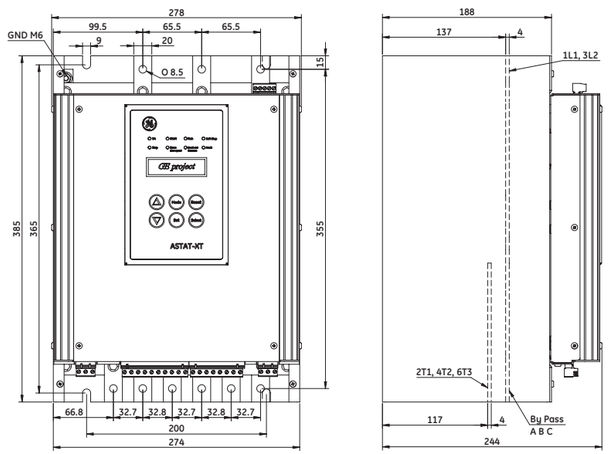


Cat. No.	Weight
QTx0085U__	15.2
QTx0105U__	15.2

UL Certified units

Dimensions and weights

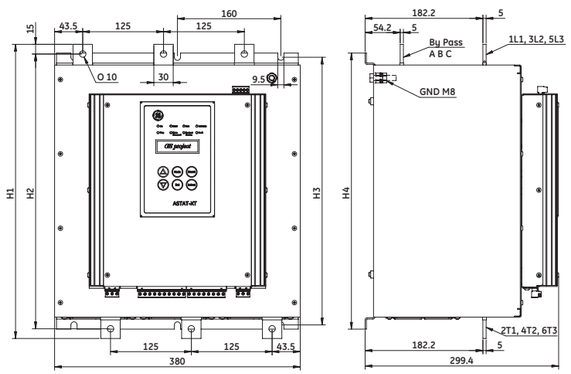
*Cat. No.: QTx0145U_ , QTx0170U_*



Cat. No.	Weight
QTx0145U__	15.2
QTx0170U__	15.2

UL Certified units

*Cat. No.: QTx0210N_ , QTx0310N_ , QTx0390N_ , QTx0460N_*

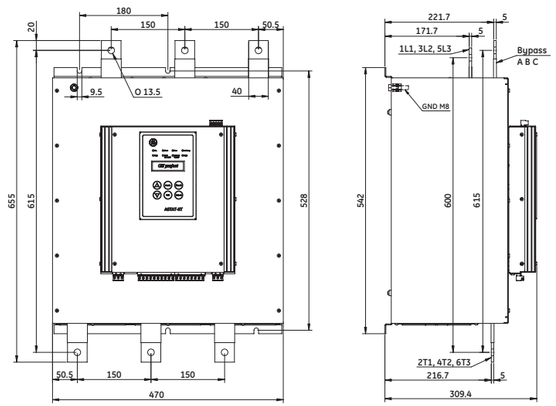


Cat. No.	Dimensions				Weight
	H1	H2	H3	H4	
QTx0210N__	455	425	414	427	32.7
QTx0310N__	455	425	414	427	32.7
QTx0390N__	455	425	414	427	32.7
QTx0460N__	555	525	528.5	527	58.4

Non-UL Certified units

Dimensions and weights

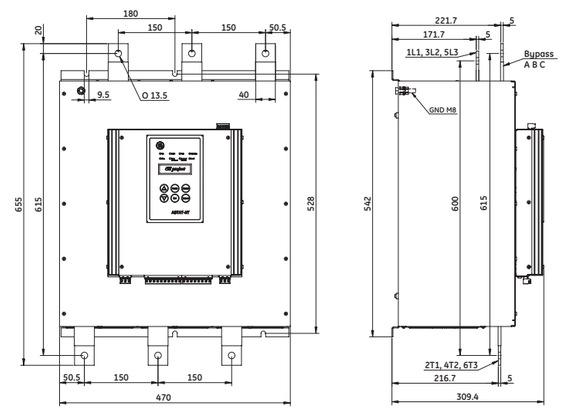
*Cat. No.: QTx0580N_*



Cat. No.	Weight
QTx0580U__	63.2

Non-UL Certified unit

*Cat. No.: QTx0650N_*

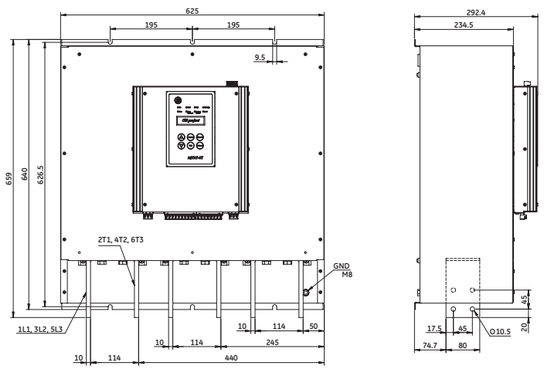


Cat. No.	Weight
QTx0650N__	64.8

Non-UL Certified units

Dimensions and weights

*Cat. No.: QTx0950N_*



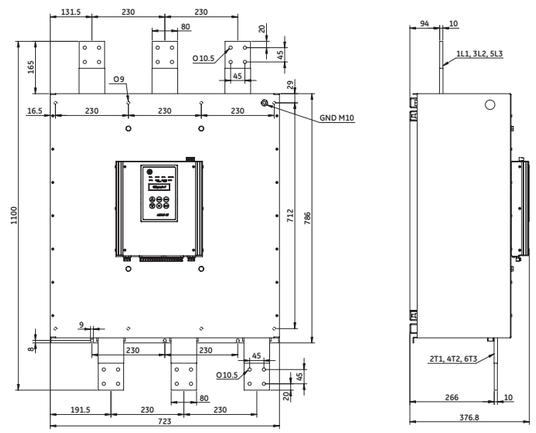
Remarks
1. This unit must be operated with a bypass contactor
2. Add space for current transformers (supplied separately from the main unit) and bus bars for preparation for bypass

Approximate current transformers dimensions: W=240mm, H=130mm, D=90mm

Non-UL Certified unit

Cat. No.	Weight
QTx0950N__	86.7

Cat. No.: QTx1100N_ , QTx1400N



Remarks
1. Units must be operated with a bypass contactor
2. Add space for current transformers (Supplied separately from main unit) and bus bars for preparation for bypass

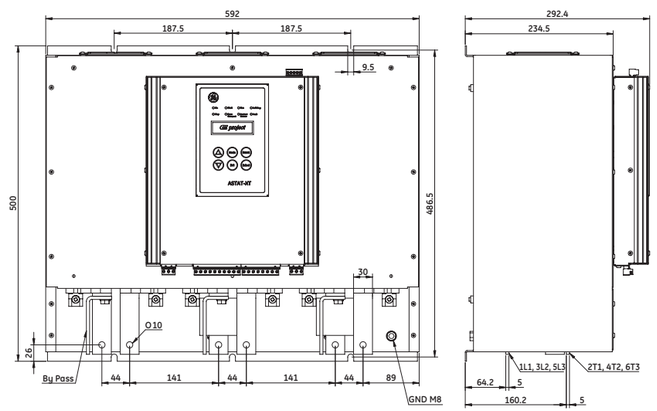
Approximate current transformers dimensions:
W=240mm, H=130mm, D=90mm. (for 1100A unit, Cat Numbers QTx1100N__
W=270mm, H=155mm, D=90mm. (for 1400A unit, Cat Numbers QTx1400N__

Non-UL Certified unit

Cat. No.	Weight
QTx1100N__	169.8
QTx1400N__	175.5

Dimensions and weights

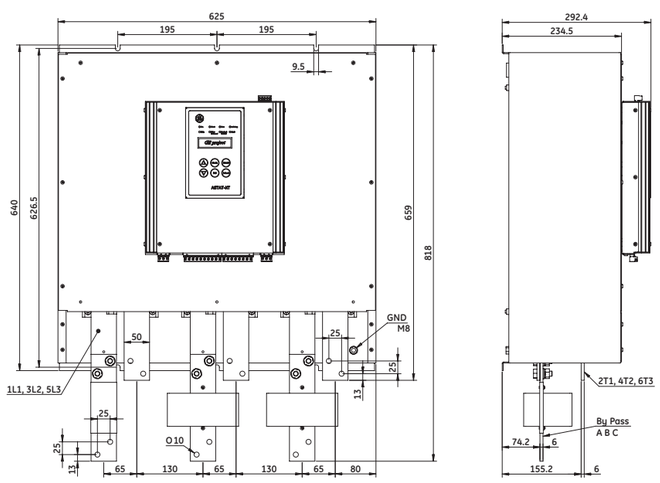
*Cat. No.: QTx0210U_ , QTx0315U_ , QTx0390U_*



Cat. No.	Weight
QTx0210U__	32.7
QTx0310U__	32.7
QTx0390U__	32.7

UL Certified unit

*Cat. No.: QTx0460U_*

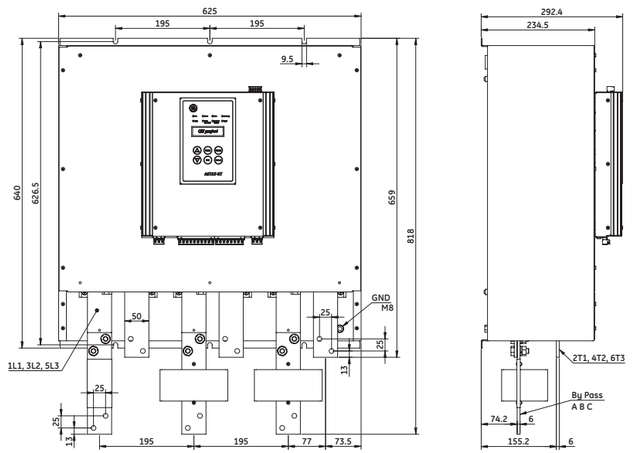


Cat. No.	Weight
QTx0460U__	61.8

UL Certified unit

Dimensions and weights

*Cat. No.: QTx0580U_ , QTx0820U_*



Cat. No.	Weight
QTx0580U__	69.5
QTx0820U__	69.5

UL Certified unit

Notes

Lighting dimmer-stabilizer

GradiLux™ - Lighting dimmer-stabilizer

J.3 Advantages

J.4 Communication

J.5 Selection guide

J.6 Order codes

J.8 Technical data

J.9 Cross cable sections

J.10 Installation diagrams

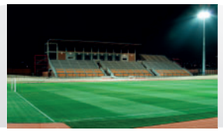
J.13 Dimensions

Notes

GradiLux™, reducing excessive power consumption

- ☑ Minimize lighting expenses
- ☑ Maximize efficiency of lighting
- ☑ Save up to 40% on energy bill
- ☑ Reduce carbon emissions
- ☑ Achieve fast payback

Harbour industry



Sports arena

Tunnel

Airport

Railway station

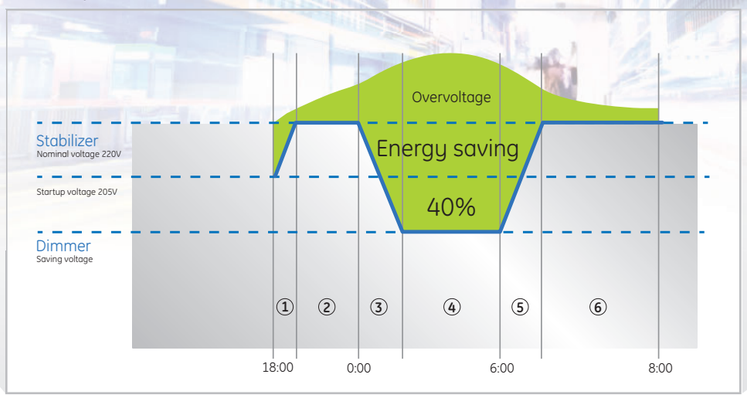
Park

Car park

Fountain

Public lighting installations operate at approximately 4000 annual hours, accounting for a major part of the municipal energy bill. These lighting installations experience considerable voltage variations throughout the night, increasing power consumption and reducing lamp lifetime. Moreover, lighting levels are rarely adapted to vehicular traffic and pedestrians on public roads, even if the need to operate lighting at full power decreases considerably after midnight.

Principle



① **Progressive soft startup**, adapted to the warmup cycle of the lamps and avoiding initial overload.

② **Stabilization at nominal voltage**, with an accuracy of 1%, until the equipment initiates the saving mode of operation.

③ **Soft ramp down from nominal to saving voltage.** The maximum ramp speed is 6V per minute.

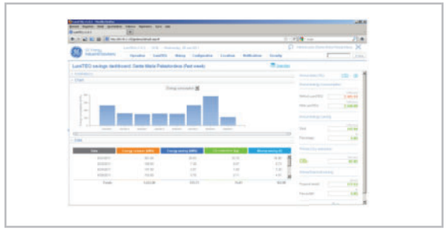
④ **Stabilization at saving voltage**, with an accuracy of 1%. The type of lamp determines the minimum saving voltage.

⑤ **Soft ramp up from saving to nominal voltage.** The maximum ramp speed is 6V per minute.

⑥ **Stabilization at nominal voltage,** with an accuracy of 1%, until the equipment is turned off.

Communication - Remote control

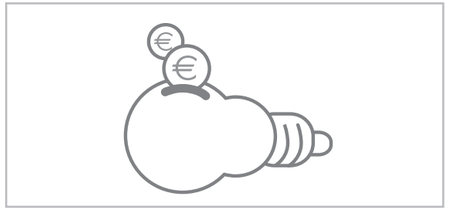
Dashboard



- Summary based on different data
- Reports about GradiLux community (different installations and cities)
- Visualise each GradiLux on detailed map or inside device tree
- Wide range of analysis options (daily/monthly/annual graphs, energy and CO_2 savings...)

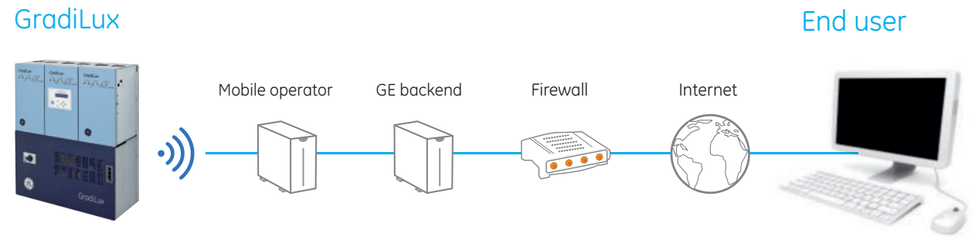
Savings

- Reduce maintenance costs by receiving alarms notifications
- Allows quick diagnostic on real time data from each GradiLux with status and measurement information



Safety

- Secured webserver
- Control in safe environment via VPN
- Configuration of GradiLux community, define other users with monitoring and control access



New

Selection guide

On communication

1. Display version
Controller with display for local configuration and control.
- Display: local control and configuration.
- Including calendar and timer scheduling an astronomical clock and alarm log.
- Access to input and output voltages, active and apparent power, power factor, load and savings measurements.
- Communications port: RS232 with RJ45 connector for local MODBUS communication.

2. Web version
Includes additional communication features for remote configuration and control.
- ComiTEQ card or box: communication device, providing an Ethernet communication interface supporting TCP/IP & SNMP protocols for remote access from the web portal.
- Optional GPRS modem: communication device for wireless remote access from the web portal.
- Data logger function with 6000 data values, programmable from 1 second to 1 hour.
- Alarm log for 200 events.

3. I/O version
Includes additional digital communication features for local configuration and control.
- 5 digital inputs and 5 relay outputs
- RS232 and RS485 communication port for local MODBUS communication
- 2 analogue ports

On implementation

1. Stand-alone unit
Three modules mounted on a vertical or horizontal frame for fast and easy installation.

2. Modular unit
One or three modules with fixing and interconnection kit for user specific installation.

Order codes

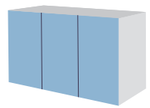
Stand-alone units

	Power (kVA)	HORIZONTAL				VERTICAL			
		Without manual bypass		With manual bypass		Without manual bypass		With manual bypass	
		Cat. no.	Ref. no.	Cat. no.	Ref. no.	Cat. no.	Ref. no.	Cat. no.	Ref. no.
Standard	7.5	GLIX07HS	**817718**	GLIX07HS-B	**817732**	GLIX07VS	**817711**	GLIX07VS-B	**817725**
With communication card		GLIX07HCC	**817818**	GLIX07HCC-B	**817832**	GLIX07VCC	**817811**	GLIX07VCC-B	**817825**
With I/O card		GLIX07HIC	**817218**	GLIX07HIC-B	**817232**	GLIX07VIC	**817211**	GLIX07VIC-B	**817225**
With Com & I/O cards		GLIX07HCIC	**817318**	GLIX07HCIC-B	**817332**	GLIX07VCIC	**817311**	GLIX07VCIC-B	**817325**
Standard	10.5	GLIX10HS	**817719**	GLIX10HS-B	**817733**	GLIX10VS	**817712**	GLIX10VS-B	**817726**
With communication card		GLIX10HCC	**817819**	GLIX10HCC-B	**817833**	GLIX10VCC	**817812**	GLIX10VCC-B	**817826**
With I/O card		GLIX10HIC	**817219**	GLIX10HIC-B	**817233**	GLIX10VIC	**817212**	GLIX10VIC-B	**817226**
With Com & I/O cards		GLIX10HCIC	**817319**	GLIX10HCIC-B	**817333**	GLIX10VCIC	**817312**	GLIX10VCIC-B	**817326**
Standard	15	GLIX15HS	**817720**	GLIX15HS-B	**817734**	GLIX15VS	**817713**	GLIX15VS-B	**817727**
With communication card		GLIX15HCC	**817820**	GLIX15HCC-B	**817834**	GLIX15VCC	**817813**	GLIX15VCC-B	**817827**
With I/O card		GLIX15HIC	**817220**	GLIX15HIC-B	**817234**	GLIX15VIC	**817213**	GLIX15VIC-B	**817227**
With Com & I/O cards		GLIX15HCIC	**817320**	GLIX15HCIC-B	**817334**	GLIX15VCIC	**817313**	GLIX15VCIC-B	**817327**
Standard	20	GLIX20HS	**817721**	GLIX20HS-B	**817735**	GLIX20VS	**817714**	GLIX20VS-B	**817728**
With communication card		GLIX20HCC	**817821**	GLIX20HCC-B	**817835**	GLIX20VCC	**817814**	GLIX20VCC-B	**817828**
With I/O card		GLIX20HIC	**817221**	GLIX20HIC-B	**817235**	GLIX20VIC	**817214**	GLIX20VIC-B	**817228**
With Com & I/O cards		GLIX20HCIC	**817321**	GLIX20HCIC-B	**817335**	GLIX20VCIC	**817314**	GLIX20VCIC-B	**817328**
Standard	25	GLIX25HS	**817722**	GLIX25HS-B	**817736**	GLIX25VS	**817715**	GLIX25VS-B	**817729**
With communication card		GLIX25HCC	**817822**	GLIX25HCC-B	**817836**	GLIX25VCC	**817815**	GLIX25VCC-B	**817829**
With I/O card		GLIX25HIC	**817222**	GLIX25HIC-B	**817236**	GLIX25VIC	**817215**	GLIX25VIC-B	**817229**
With Com & I/O cards		GLIX25HCIC	**817322**	GLIX25HCIC-B	**817336**	GLIX25VCIC	**817315**	GLIX25VCIC-B	**817329**
Standard	30	GLIX30HS	**817723**	GLIX30HS-B	**817737**	GLIX30VS	**817716**	GLIX30VS-B	**817730**
With communication card		GLIX30HCC	**817823**	GLIX30HCC-B	**817837**	GLIX30VCC	**817816**	GLIX30VCC-B	**817830**
With I/O card		GLIX30HIC	**817223**	GLIX30HIC-B	**817237**	GLIX30VIC	**817216**	GLIX30VIC-B	**817230**
With Com & I/O cards		GLIX30HCIC	**817323**	GLIX30HCIC-B	**817337**	GLIX30VCIC	**817316**	GLIX30VCIC-B	**817330**
Standard	45	GLIX45HS	**817724**	GLIX45HS-B	**817738**	GLIX45VS	**817717**	GLIX45VS-B	**817731**
With communication card		GLIX45HCC	**817824**	GLIX45HCC-B	**817838**	GLIX45VCC	**817817**	GLIX45VCC-B	**817831**
With I/O card		GLIX45HIC	**817224**	GLIX45HIC-B	**817238**	GLIX45VIC	**817217**	GLIX45VIC-B	**817231**
With Com & I/O cards		GLIX45HCIC	**817324**	GLIX45HCIC-B	**817338**	GLIX45VCIC	**817317**	GLIX45VCIC-B	**817331**

New

Modular units

Power (kVA)	SINGLE PHASE Without manual bypass Cat. no.	Ref. no.
3.5	GLIN03KS	**817700**
6.7	GLIN06KS	**817701**
10	GLIN10KS	**817702**
15	GLIN15KS	**817703**



Power (kVA)	THREE PHASE Without manual bypass Cat. no.	Ref. no.
7.5	GLIX07KS	**817704**
10.5	GLIX10KS	**817705**
15	GLIX15KS	**817706**
20	GLIX20KS	**817707**
25	GLIX25KS	**817708**
30	GLIX30KS	**817709**
45	GLIX45KS	**817710**

Options

Description	Power (kVA)	Input	Cat. No.	Ref. No.
ComiTEQ box	3.5 - 45kVA	Single and three phase	GLCB	**817801**
I/O digital box	3.5 - 45kVA	Single and three phase	GLIOB	**817803**
Modem GSM/GPRS	3.5 - 45kVA	Single and three phase	GLCMDM	**817806**
Demonstration case	3.5 kVA	Single phase/ 230Vac	GLCMDM	**817000**

Technical data

TECHNOLOGY		Bidirectional "Buck" IGBT converter, electronic, static without transformer
INPUT	**Voltage**	Single phase: 230V / Three phase: 3 x 400V
	Regulation range	+25% / -7% nominal voltage
		+25% / -17% reduced voltage HPSV (High Pressure Sodium Vapor)
		+25% / -10% reduced voltage MV (Mercury Vapor)
	Frequency	48 - 65 Hz
	Module protection	Input and output fuses and varistors for fault and surge protection
	Protection per phase of equipment	Disconnector
OUTPUT	**Voltage**	Configurable from 215V to 230V (standard 220V)
	Regulation accuracy	Better than ±1% for input voltage range 230V +20% -3% Better than ±2.5% ±2V for input voltage range 230V -3% -7%
	Soft start voltage	Preset at 205V and configurable
	Saving level	Configurable from 180V to 210V
	Transition speed setting	From 1 to 6V/min
	Response time	< 40ms
	Regulation	Linear and independent for each phase
	Efficiency	> 96%
	Imbalance between phases	100% permissible
	Reduced voltage adjustment	Using LCD panel or RS232 communication
	Permissible surge	Nominally 110%, 120% & 150% (duration limits apply)
BYPASS	**Type**	Without zero crossing
	Features	Automatic, reversible, independent of each phase, independent operation, input for manual activation
	Activation criteria	Overheating, surge, fault, output fault, manual activation
	Reactivation	Automatic due to alarm cancellation. Number of retries: 5 - Time between retries: 2 minutes
COMMUNICATION	**Ports**	RS232 and RS485
	Remote monitoring	ComiTEQ TCP/IP communication card required
GENERAL	**Operating temperature**	-20°C up to +55°C (Derating applies at 4%/°C at 40°C or 45°C depending on the module power and working voltage)
	Protection degree	IP20 (not suitable for unprotected outdoor use)
	Relative humidity	Up to 95%, without condensation
	Maximum altitude	2000m
	Mean time between failures (MTBF)	24000 hours (5kVA & 6.7kVA) 21682 hours (10kVA & 15kVA)
	Noise level at 1 metre	<48dBA (with typical load)
FORMATS	**Stand-alone unit**	Modules assembled on a mounting base (chassis made of col-rolled carbon steel) with drill holes for fixing to wall
	Modular kit	3 modules + fixing supports + controls interconnection kit
STANDARD	**Safety**	EA0032:2007
	Electromagnetic compatibility (EMC)	IEC 62041:2003
OPTIONS	**Surge arrester**	Protection against destructive overvoltage surges
	Manual bypass	Interrupts the regulator for maintenance without switching off the light
	GPRS modem	Communication module for access to web portal
	ComiTEQ communication card or box	Module enabling TCP/IP communication for internet access
	Digital I/O card or box	General purpose digital I/O

Note: GradiLux cannot work with LED and lamps equipped with electronic ballast

New

Recommended cross cable sections

Recommended protections, cross cable sections and connection terminals, for single phase mains of 220/230/240 V or three phase of 3x380/3x400/3x415 V at maximum power (100% load)

Single phase formats

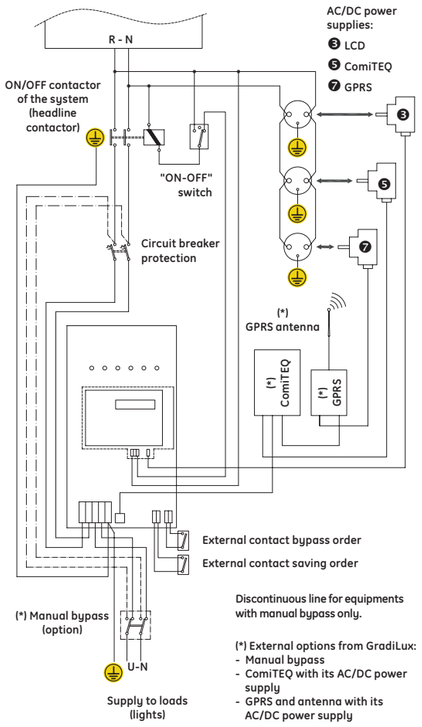
Description	Characteristics	GLIN03KS	GLIN06KS	GLIN10KS	GLIN15KS
Input earth leakage breaker	Sensitivity of 300mA; type A	16 A	32 A	50 A	80 A
Input circuit breaker	2 poles K charact.	16 A	32 A	50 A	80 A
Headline contactor	2 poles (AC1/AC3) 400 V - coil 230 V ac	16 A	32 A	50 A	80 A
Minimum cross cable section of input mains	RZ1-K	4 mm^2	10 mm^2	16 mm^2	25 mm^2
Maximum cross cable section of input mains	RZ1-K	35 mm^2	35 mm^2	35 mm^2	70 mm^2
Terminals for input cables	Ring terminal DIN 46234	D 6-4 to D 6-35	D 6-10 to D 6-35	D 6-16 to D 6-35	D 8-25 to D 8-70
	For screw	M6	M6	M6	M8
Minimum cross cable section of output mains	RZ1-K	4 mm^2	10 mm^2	16 mm^2	25 mm^2
Maximum cross cable section of output mains	RZ1-K	35 mm^2	35 mm^2	35 mm^2	70 mm^2
Terminals for output cables	Ring terminal DIN 46234	D 6-4 to D 6-35	D 6-10 to D 6-35	D 6-16 to D 6-35	D 8-25 to D 8-70
	For screw	M6	M6	M6	M8
Minimum cross cable section of control line	RZ1-K	2.5 mm^2	2.5 mm^2	2.5 mm^2	2.5 mm^2

Three phase formats

Description	Characteristics	GLIX07KS	GLIX10KS	GLIX15KS	GLIX20KS	GLIX25KS	GLIX30KS	GLIX45KS
Input earth leakage breaker	Sensitivity of 300mA; type A	16 A	16 A	25 A	32 A	40 A	50 A	80 A
Input circuit breaker	2 poles K charact.	16 A	16 A	25 A	32 A	40 A	50 A	80 A
Headline contactor	2 poles (AC1/AC3) 400 V - coil 230 V ac	16 A	16 A	25 A	32 A	40 A	50 A	80 A
Minimum cross cable section of input mains	RZ1-K	4 mm^2	4 mm^2	6 mm^2	10 mm^2	10 mm^2	16 mm^2	25 mm^2
Maximum cross cable section of input mains	RZ1-K	35 mm^2	35 mm^2	35 mm^2	35 mm^2	35 mm^2	35 mm^2	70 mm^2
Terminals for input cables	Ring terminal DIN 46234	D 6-4 to D 6-35	D 6-4 to D 6-35	D 6-6 to D 6-35	D 6-10 to D 6-35	D 6-10 to D 6-35	D 6-16 to D 6-35	D 8-25 to D 8-70
	For screw	M6	M6	M6	M6	M6	M6	M8
Minimum cross cable section of output mains	RZ1-K	4 mm^2	4 mm^2	6 mm^2	10 mm^2	10 mm^2	16 mm^2	25 mm^2
Maximum cross cable section of output mains	RZ1-K	35 mm^2	35 mm^2	35 mm^2	35 mm^2	35 mm^2	35 mm^2	70 mm^2
Terminals for output cables	Ring terminal DIN 46234	D 6-4 to D 6-35	D 6-4 to D 6-35	D 6-6 to D 6-35	D 6-10 to D 6-35	D 6-10 to D 6-35	D 6-16 to D 6-35	D 8-25 to D 8-70
	For screw	M6	M6	M6	M6	M6	M6	M8
Minimum cross cable section of control line	RZ1-K	2.5 mm^2	2.5 mm^2	2.5 mm^2	2.5 mm^2	2.5 mm^2	2.5 mm^2	2.5 mm^2

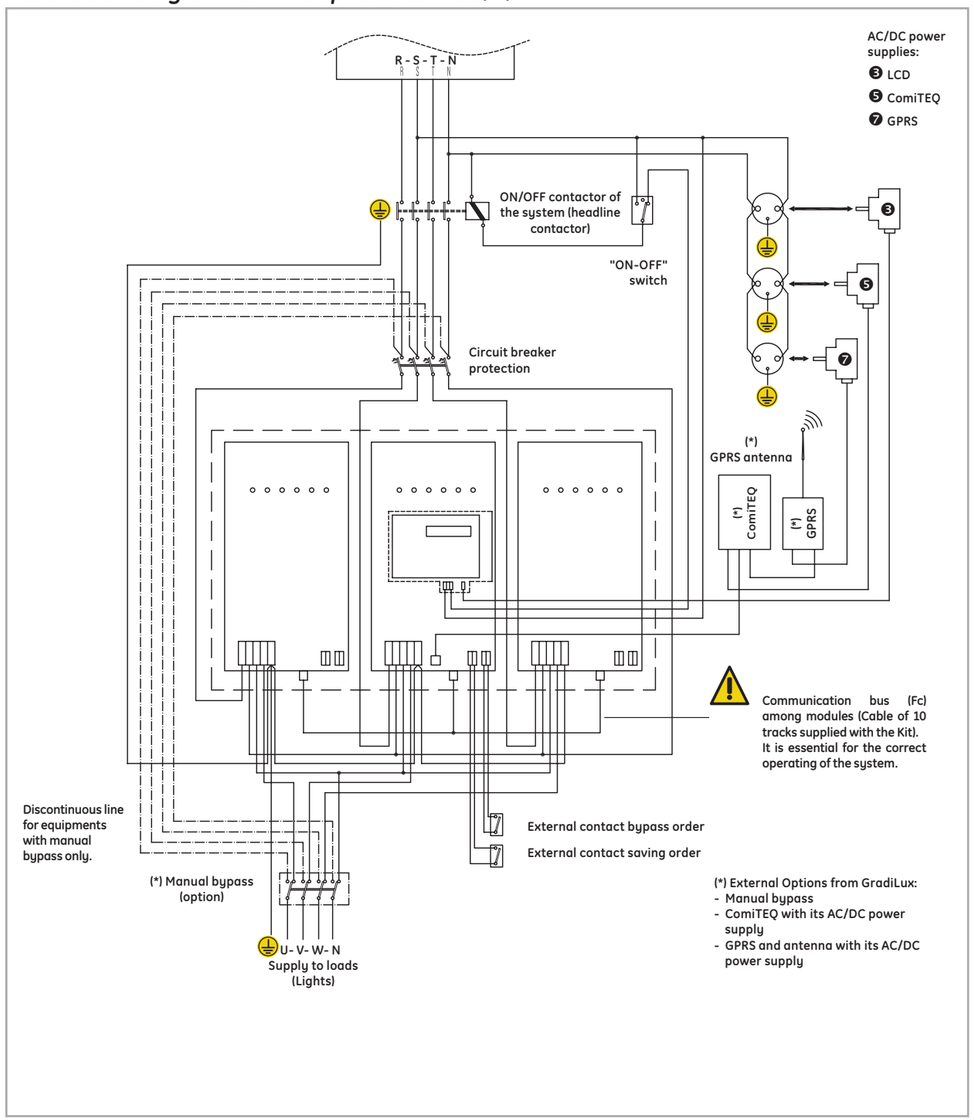
Installation diagrams

Installation diagram for single phase format (M)



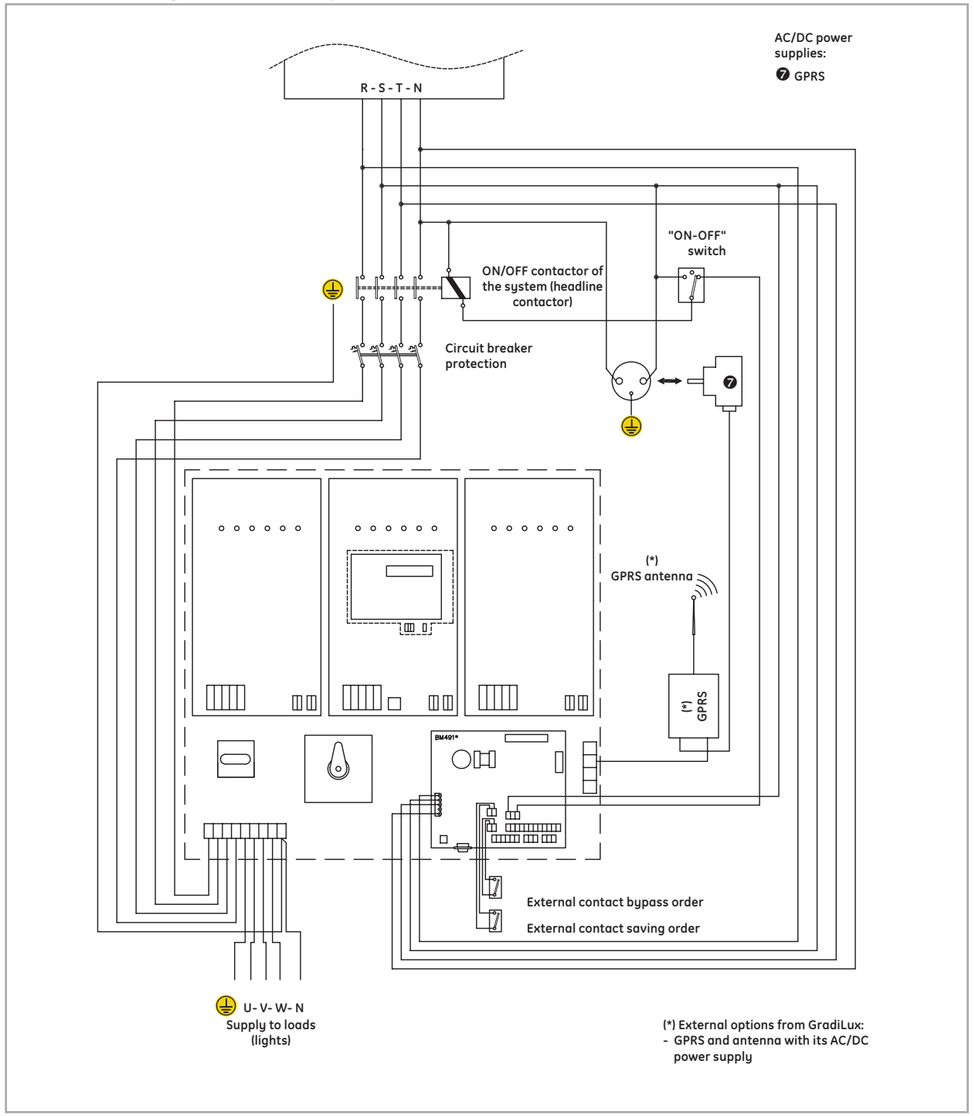
Installation diagrams

Installation diagram for three phase format (M)



Installation diagrams

Installation diagram for three phase formats (H) or (V)

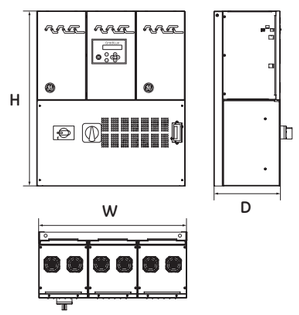


New

Dimensions

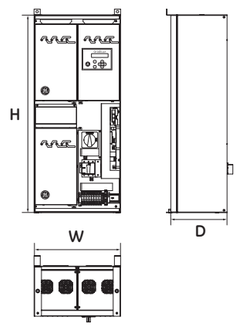
Stand-alone unit - Horizontal

Power (kVa)	Dimensions (mm) (H × W × D)	Weight (kg)
7.5	610 × 520 × 231+35	35
10		35
15		35
20		38
25	770 × 520 × 231+35	50
30		50
45		53



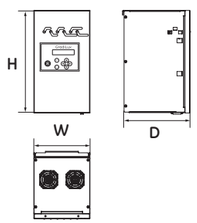
Stand-alone unit - Vertical

Power (kVa)	Dimensions (mm) (H × W × D)	Weight (kg)
7.5	823 × 350 × 245	35
10		35
15		35
20		38
25	1142 × 350 × 245	50
30		50
45		53



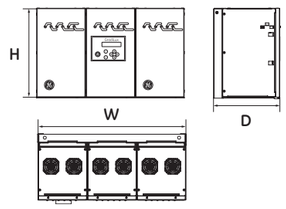
Modular unit - Single phase

Power (kVa)	Dimensions (mm) (H × W × D)	Weight (kg)
3.5	346 × 172 × 200	8
6.7		9
10	470 × 172 × 200	13
15		14



Modular unit - Three phase

Power (kVa)	Dimensions (mm) (H × W × D)	Weight (kg)
7.5	346 × 516 × 2400	24
10		24
15		24
20		27
25	470 × 516 × 200	39
30		39
45		42



Notes

X.2 **Completed catalogue numbers**

X.2 Chap. A - Series M - Contactors
X.4 Chap. A - Series CL - Contactors
X.5 Chap. A - Series CK - Contactors
X.6 Chap. B - Series M - Auxiliary contactors
X.7 Chap. B - Series RL - Auxiliary contactors
X.8 Chap. F - Series P9 - Control and signalling units Ø 22 mm
X.8 Chap. F - Series 077 - Control and signalling units Ø 30 mm

X.9 **General index by catalogue number**

X.20 **General index by reference number**

This list shows the catalogue and reference numbers for the **minicontactors** with the most usual voltages. For other voltages/types, please consult us.

Cat. no.	Ref. no.	
50Hz	pg. A.45-A.47	
MB0AG	100452	48V
MB0AK	102400	115/127V
MB0AN	100454	220/240V
MB0AS	102403	260V
MB0AU	213532	380/400V
MB0AW	102405	415/440V
MC0A301AFN	100184	220/240V
MC0A301AIG	100202	48V
MC0A301AIN	100204	220/240V
MC0A301AIU	100205	380/400V
MC0A301ARN	103377	220/240V
MC0A301ARU	103378	380/400V
MC0A301ATG	100162	48V
MC0A301ATK	102451	115/127V
MC0A301ATN	100164	220/240V
MC0A301ATS	102454	260V
MC0A301ATU	100165	380/400V
MC0A301ATW	102456	415/440V
MC0A310AFG	100172	48V
MC0A310AFN	100174	220/240V
MC0A310AIG	100192	48V
MC0A310AIN	100194	220/240V
MC0A310AIU	100195	380/400V
MC0A310ARN	103364	220/240V
MC0A310ARU	103365	380/400V
MC0A310ATG	100152	48V
MC0A310ATK	102430	115/127V
MC0A310ATN	100154	220/240V
MC0A310ATS	102433	260V
MC0A310ATU	100155	380/400V
MC0A310ATW	102435	415/440V
MC0A400AFN	100304	220/240V
MC0A400AIN	100334	220/240V
MC0A400AIU	100335	380/400V
MC0A400ATG	100272	48V
MC0A400ATK	102790	115/127V
MC0A400ATN	100274	220/240V
MC0A400ATS	102793	260V
MC0A400ATU	100275	380/400V
MC0A400ATW	102795	415/440V
MC0AA00AIN	100354	220/240V
MC0AA00ATG	100292	48V
MC0AA00ATK	102832	115/127V
MC0AA00ATN	100294	220/240V
MC0AA00ATS	102835	260V
MC0AA00ATU	100295	380/400V
MC0AA00ATW	102837	415/440V
MC0AB00AFN	100314	220/240V
MC0AB00AIN	100344	220/240V
MC0AB00ATG	100282	48V
MC0AB00ATK	102811	115/127V
MC0AB00ATN	100284	220/240V
MC0AB00ATS	102814	260V
MC0AB00ATU	100285	380/400V
MC0AB00ATW	102816	415/440V
MC1A301AFG	100242	48V
MC1A301AFK	102673	115/127V
MC1A301AFN	100244	220/240V
MC1A301AFS	102676	260V
MC1A301AFU	100245	380/400V
MC1A301AFW	102678	415/440V
MC1A301AIG	100262	48V
MC1A301AIN	100264	220/240V
MC1A301AIU	100265	380/400V
MC1A301ARN	103403	220/240V
MC1A301ARU	103404	380/400V
MC1A301ATG	100222	48V
MC1A301ATK	102631	115/127V
MC1A301ATN	100224	220/240V
MC1A301ATS	102634	260V
MC1A301ATU	100225	380/400V
MC1A301ATW	102636	415/440V
MC1A310AFG	100232	48V
MC1A310AFK	102652	115/127V
MC1A310AFN	100234	220/240V
MC1A310AFS	102655	260V
MC1A310AFU	100235	380/400V
MC1A310AFW	102657	415/440V
MC1A310AIG	100252	48V
MC1A310AIN	100254	220/240V
MC1A310AIU	100255	380/400V
MC1A310AIW	102699	415/440V
MC1A310ARN	103390	220/240V
MC1A310ARU	103391	380/400V

Cat. no.	Ref. no.	
MC1A310ATG	100212	48V
MC1A310ATK	102610	115/127V
MC1A310ATN	100214	220/240V
MC1A310ATS	102613	260V
MC1A310ATU	100215	380/400V
MC1A310ATW	102615	415/440V
MC1A400AFG	100392	48V
MC1A400AFK	103042	115/127V
MC1A400AFN	100394	220/240V
MC1A400AFS	103045	260V
MC1A400AFU	100395	380/400V
MC1A400AFW	103047	415/440V
MC1A400AIG	100422	48V
MC1A400AIN	100424	220/240V
MC1A400AIU	100425	380/400V
MC1A400AIW	103110	415/440V
MC1A400ATG	100362	48V
MC1A400ATK	102979	115/127V
MC1A400ATN	100364	220/240V
MC1A400ATS	102982	260V
MC1A400ATU	100365	380/400V
MC1A400ATW	102984	415/440V
MC1AA00AFG	100412	48V
MC1AA00AFK	103084	115/127V
MC1AA00AFN	100414	220/240V
MC1AA00AFS	103087	260V
MC1AA00AFU	100415	380/400V
MC1AA00AFW	103089	415/440V
MC1AA00AIN	100444	220/240V
MC1AA00ATG	100382	48V
MC1AA00ATK	103021	115/127V
MC1AA00ATN	100384	220/240V
MC1AA00ATS	103024	260V
MC1AA00ATU	100385	380/400V
MC1AA00ATW	103026	415/440V
MC1AB00AFG	100402	48V
MC1AB00AFK	103063	115/127V
MC1AB00AFN	100404	220/240V
MC1AB00AFS	103066	260V
MC1AB00AFU	100405	380/400V
MC1AB00AFW	103068	415/440V
MC1AB00AIN	100434	220/240V
MC1AB00ATG	100372	48V
MC1AB00ATK	103000	115/127V
MC1AB00ATN	100374	220/240V
MC1AB00ATS	103003	260V
MC1AB00ATU	100375	380/400V
MC1AB00ATW	103005	415/440V
MC2A301AIN	101019	220/240V
MC2A301AIU	103289	380/400V
MC2A301ARN	103429	220/240V
MC2A301ARU	103430	380/400V
MC2A301ATG	103564	48V
MC2A301ATN	103566	220/240V
MC2A301ATU	103567	380/400V
MC2A310AIN	101018	220/240V
MC2A310AIU	103290	380/400V
MC2A310ARN	103416	220/240V
MC2A310ARU	103417	380/400V
MC2A310ATG	103572	48V
MC2A310ATN	103574	220/240V
MC2A310ATU	103575	380/400V
60Hz	pg. A.45-A.47	
MB0AE	102397	32V
MB0AF	102398	48V
MB0AM	102401	208/220V
MB0AU	213532	440V
MB0AY	102406	600V
MC0A301AIU	100205	440V
MC0A301ARU	103378	440V
MC0A301ATE	102448	32V
MC0A301ATM	102452	208/220V
MC0A301ATU	100165	440V
MC0A301ATY	102457	600V
MC0A310AIM	100147	208/220V
MC0A310AIU	100195	440V
MC0A310ARU	103365	440V
MC0A310ATE	102427	32V
MC0A310ATM	102431	208/220V
MC0A310ATU	100155	440V
MC0A310ATY	102436	600V
MC0A400AIM	102917	208/220V
MC0A400AIU	100335	440V
MC0A400ATE	102787	32V
MC0A400ATM	102791	208/220V
MC0A400ATU	100275	440V
MC0A400ATY	102796	600V
MC0AA00ATE	102829	32V
MC0AA00ATM	102833	208/220V
MC0AA00ATU	100295	440V
MC0AA00ATY	102838	600V
MC0AB00ATE	102808	32V
MC0AB00ATM	102812	208/220V
MC0AB00ATU	100285	440V
MC0AB00ATY	102817	600V
MC1A301AFE	102670	32V
MC1A301AFM	102674	208/220V
MC1A301AFU	100245	440V

Cat. no.	Ref. no.	
MC1A301AFY	102679	600V
MC1A301AIM	102716	208/220V
MC1A301AIU	100265	440V
MC1A301ARU	103404	440V
MC1A301ATE	102628	32V
MC1A301ATM	102632	208/220V
MC1A301ATU	100225	440V
MC1A301ATY	102637	600V
MC1A310AFE	102649	32V
MC1A310AFM	102653	208/220V
MC1A310AFU	100235	440V
MC1A310AFY	102658	600V
MC1A310AIU	100255	440V
MC1A310ARU	103391	440V
MC1A310ATE	102607	32V
MC1A310ATM	102611	208/220V
MC1A310ATU	100215	440V
MC1A310ATY	102616	600V
MC1A400AFE	103039	32V
MC1A400AFM	103043	208/220V
MC1A400AFU	100395	440V
MC1A400AFY	103048	600V
MC1A400AIY	113267	600V
MC1A400ATE	102976	32V
MC1A400ATM	102980	208/220V
MC1A400ATU	100365	440V
MC1A400ATY	102985	600V
MC1AA00AFE	103081	32V
MC1AA00AFM	103085	208/220V
MC1AA00AFU	100415	440V
MC1AA00AFY	103090	600V
MC1AA00ATE	103018	32V
MC1AA00ATM	103022	208/220V
MC1AA00ATU	100385	440V
MC1AA00ATY	103027	600V
MC1AB00AFE	103060	32V
MC1AB00AFM	103064	208/220V
MC1AB00AFU	100405	440V
MC1AB00AFY	103069	600V
MC1AB00ATE	102997	32V
MC1AB00ATM	103001	208/220V
MC1AB00ATU	100375	440V
MC1AB00ATY	103006	600V
MC2A301ARU	103430	440V
MC2A301ATU	103567	440V
MC2A310ARU	103417	440V
MC2A310ATU	103575	440V
MC2A400ATU	103292	440V
50/60Hz	pg. A.45-A.47	
MB0A1	102407	24V
MB0A2	102408	42V
MB0A3	102409	110/115V
MB0A4	102410	120V
MB0A5	102411	220V
MB0A6	102412	230V
MB0A7	102413	240V
MB0A8	102414	440V
MB0A9	133717	48V
MC0A301AI1	102542	24V
MC0A301AI3	102544	110/115V
MC0A301AI5	102546	220V
MC0A301AI6	102547	230V
MC0A301AR1	103373	24V
MC0A301AR9	103374	48V
MC0A301AT1	102458	24V
MC0A301AT2	102459	42V
MC0A301AT3	102471	110/115V
MC0A301AT4	102461	120V
MC0A301AT5	102462	220V
MC0A301AT6	102463	230V
MC0A301AT7	102464	240V
MC0A301AT8	102465	440V
MC0A301AT9	100299	48V
MC0A310AF1	102479	24V
MC0A310AF5	102483	220V
MC0A310AI1	102521	24V
MC0A310AI3	102523	110/115V
MC0A310AI5	102525	220V
MC0A310AI6	102526	230V
MC0A310AI8	107492	440V
MC0A310AR1	103360	24V
MC0A310AR9	103361	48V
MC0A310AT1	102437	24V
MC0A310AT2	102438	42V
MC0A310AT3	102439	110/115V
MC0A310AT4	102440	120V
MC0A310AT5	102441	220V
MC0A310AT6	102442	230V
MC0A310AT7	102443	240V
MC0A310AT8	102444	440V
MC0A310AT9	100297	48V
MC0A400AF1	113318	24V
MC0A400AF5	100260	220V
MC0A400AI1	100408	24V
MC0A400AT1	102797	24V
MC0A400AT2	102798	42V
MC0A400AT3	102799	110/115V
MC0A400AT4	102800	120V

Cat. no.	Ref. no.	
MC0A400AT5	102801	220V
MC0A400AT6	102802	230V
MC0A400AT7	102803	240V
MC0A400AT8	102804	440V
MC0A400AT9	100290	48V
MC0AA00AT1	102839	24V
MC0AA00AT2	102840	42V
MC0AA00AT3	102841	110/115V
MC0AA00AT4	102842	120V
MC0AA00AT5	102843	220V
MC0AA00AT6	102844	230V
MC0AA00AT7	102845	240V
MC0AA00AT8	102846	440V
MC0AB00AT1	102818	24V
MC0AB00AT2	102819	42V
MC0AB00AT3	102820	110/115V
MC0AB00AT4	102821	120V
MC0AB00AT5	102822	220V
MC0AB00AT6	102823	230V
MC0AB00AT7	102824	240V
MC0AB00AT8	102825	440V
MC1A301AF1	102680	24V
MC1A301AF2	102681	42V
MC1A301AF3	102682	110/115V
MC1A301AF4	102683	120V
MC1A301AF5	102684	220V
MC1A301AF6	102685	230V
MC1A301AF7	102686	240V
MC1A301AF8	102687	440V
MC1A301AI1	102722	24V
MC1A301AI3	102724	110/115V
MC1A301AI5	102726	220V
MC1A301AI6	107167	230V
MC1A301AR1	103399	24V
MC1A301AR9	103400	48V
MC1A301AT1	102638	24V
MC1A301AT2	102639	42V
MC1A301AT3	102640	110/115V
MC1A301AT4	102641	120V
MC1A301AT5	102642	220V
MC1A301AT6	102643	230V
MC1A301AT7	102644	240V
MC1A301AT8	102645	440V
MC1A301AT9	100320	48V
MC1A310AF1	102659	24V
MC1A310AF2	102660	42V
MC1A310AF3	102661	110/115V
MC1A310AF4	102662	120V
MC1A310AF5	102663	220V
MC1A310AF6	102664	230V
MC1A310AF7	102665	240V
MC1A310AF8	102666	440V
MC1A310AI1	102701	24V
MC1A310AI3	102703	110/115V
MC1A310AI5	102705	220V
MC1A310AI9	102706	48V
MC1A310AR1	103386	24V
MC1A310AR9	103387	48V
MC1A310AT1	102617	24V
MC1A310AT2	102618	42V
MC1A310AT3	102619	110/115V
MC1A310AT4	102620	120V
MC1A310AT5	102621	220V
MC1A310AT6	102622	230V
MC1A310AT7	102623	240V
MC1A310AT8	102624	440V
MC1A310AT9	100298	48V
MC1A400AF1	103049	24V
MC1A400AF2	103050	42V
MC1A400AF3	103051	110/115V
MC1A400AF4	103052	120V
MC1A400AF5	103053	220V
MC1A400AF6	103054	230V
MC1A400AF7	103055	240V
MC1A400AF8	103056	440V
MC1A400AI1	103112	24V
MC1A400AT1	102986	24V
MC1A400AT2	102987	42V
MC1A400AT3	102988	110/115V
MC1A400AT4	102989	120V
MC1A400AT5	102990	220V
MC1A400AT6	102991	230V
MC1A400AT7	102992	240V
MC1A400AT8	102993	440V
MC1A400AT9	100296	48V
MC1AA00AF1	103091	24V
MC1AA00AF2	103092	42V
MC1AA00AF3	103093	110/115V
MC1AA00AF4	103094	120V
MC1AA00AF5	103095	220V
MC1AA00AF6	103096	230V
MC1AA00AF7	103097	240V
MC1AA00AF8	103098	440V
MC1AA00AT1	103028	24V
MC1AA00AT2	103029	42V
MC1AA00AT3	103030	110/115V
MC1AA00AT4	103031	120V
MC1AA00AT5	103032	220V
MC1AA00AT6	103033	230V

Cat. no.	Ref. no.	
MC1AA00AT7	103034	240V
MC1AA00AT8	103035	440V
MC1AB00AF1	103070	24V
MC1AB00AF2	103071	42V
MC1AB00AF3	103072	110/115V
MC1AB00AF4	103073	120V
MC1AB00AF5	103074	220V
MC1AB00AF6	103075	230V
MC1AB00AF7	103076	240V
MC1AB00AF8	103077	440V
MC1AB00AI9	100427	48V
MC1AB00AT1	103007	24V
MC1AB00AT2	103008	42V
MC1AB00AT3	103009	110/115V
MC1AB00AT4	103010	120V
MC1AB00AT5	103011	220V
MC1AB00AT6	103012	230V
MC1AB00AT7	103013	240V
MC1AB00AT8	103014	440V
MC1AB00AT9	100400	48V
MC2A301AI1	103273	24V
MC2A301AI9	103272	48V
MC2A301AR1	103425	24V
MC2A301AR9	103426	48V
MC2A301AT1	103569	24V
MC2A301AT3	103358	110/115V
MC2A301AT5	103570	220V
MC2A301AT6	103571	230V
MC2A310AI1	103271	24V
MC2A310AI9	103270	48V
MC2A310AR1	103412	24V
MC2A310AR9	103413	48V
MC2A310AT1	103577	24V
MC2A310AT5	103578	220V
MC2A310AT6	103579	230V
MC2A400AT6	103595	230V
Direct current	pg. A.45-A.47	
MB0CA	102415	6V
MB0CB	100460	12V
MB0CC	102416	32V
MB0CD	100466	24V
MB0CE	102417	36V
MB0CF	102418	42V
MB0CG	100467	48V
MB0CH	102419	60V
MB0CI	102420	72V
MB0CJ	100468	110V
MB0CK	102421	120V
MB0CL	102422	125V
MB0CN	100469	220V
MB0CR	102423	240V
MB0CS	100449	250V
MC0C301AFD	100186	24V
MC0C301AID	100206	24V
MC0C301ARB	103379	12V
MC0C301ARD	103380	24V
MC0C301ARG	103381	48V
MC0C301ARH	103382	60V
MC0C301ARJ	103383	110V
MC0C301ARK	103384	120V
MC0C301ARN	103385	220V
MC0C301ATB	100160	12V
MC0C301ATD	100166	24V
MC0C301ATE	102561	36V
MC0C301ATF	102562	42V
MC0C301ATG	100167	48V
MC0C301ATH	102563	60V
MC0C301ATI	102564	72V
MC0C301ATJ	100168	110V
MC0C301ATK	102565	120V
MC0C301ATN	100169	220V
MC0C301ATR	102567	240V
MC0C310AFB	100170	12V
MC0C310AFD	100176	24V
MC0C310AFG	100258	48V
MC0C310AID	100196	24V
MC0C310AIG	100259	48V
MC0C310AIJ	100198	110V
MC0C310ARB	103366	12V
MC0C310ARD	103367	24V
MC0C310ARG	103368	48V
MC0C310ARH	103369	60V
MC0C310ARJ	103370	110V
MC0C310ARK	103371	120V
MC0C310ARN	103372	220V
MC0C310ATB	100150	12V
MC0C310ATC	102551	32V
MC0C310ATD	100156	24V
MC0C310ATE	102552	36V
MC0C310ATF	102553	42V
MC0C310ATG	100157	48V
MC0C310ATH	102554	60V
MC0C310ATI	102555	72V
MC0C310ATJ	100158	110V
MC0C310ATK	102556	120V
MC0C310ATL	102557	125V
MC0C310ATN	100159	220V
MC0C310ATR	102558	60V

Completed catalogue numbers

Cat. no.	Ref. no.	
MC0C400AFD	100306	24V
MC0C400AFG	100267	48V
MC0C400AID	100336	24V
MC0C400AIH	103202	60V
MC0C400ATB	100270	12V
MC0C400ATD	100276	24V
MC0C400ATE	103164	36V
MC0C400ATF	103165	42V
MC0C400ATG	100277	48V
MC0C400ATH	103166	60V
MC0C400ATI	103167	72V
MC0C400ATJ	100278	110V
MC0C400ATK	103168	120V
MC0C400ATL	103169	125V
MC0C400ATN	100279	220V
MC0C400ATR	103170	240V
MC0CB00ATB	100280	12V
MC0CB00ATD	100286	24V
MC0CB00ATE	103173	36V
MC0CB00ATF	103174	42V
MC0CB00ATG	100287	48V
MC0CB00ATH	103175	60V
MC0CB00ATI	103176	72V
MC0CB00ATJ	100288	110V
MC0CB00ATK	103177	120V
MC0CB00ATL	103178	125V
MC0CB00ATN	100289	220V
MC0CB00ATR	103179	240V
MC1C301AFD	100246	24V
MC1C301AFJ	100248	110V
MC1C301AID	100266	24V
MC1C301ARB	103405	12V
MC1C301ARD	103406	24V
MC1C301ARG	103407	48V
MC1C301ARH	103408	60V
MC1C301ARJ	103409	110V
MC1C301ARK	103410	120V
MC1C301ARN	103411	220V
MC1C301ATB	100220	12V
MC1C301ATC	102740	32V
MC1C301ATD	100226	24V
MC1C301ATE	102741	36V
MC1C301ATF	102742	42V
MC1C301ATG	100227	48V
MC1C301ATH	102743	60V
MC1C301ATI	102744	72V
MC1C301ATJ	100228	110V
MC1C301ATK	102745	120V
MC1C301ATL	102746	125V
MC1C301ATN	100229	220V
MC1C301ATR	102747	240V
MC1C310AFB	100230	12V
MC1C310AFD	100236	24V
MC1C310AID	100256	24V
MC1C310AIG	100257	48V
MC1C310ARB	103392	12V
MC1C310ARD	103393	24V
MC1C310ARG	103394	48V
MC1C310ARH	103395	60V
MC1C310ARJ	103396	110V
MC1C310ARK	103397	120V
MC1C310ARN	103398	220V
MC1C310ATB	100210	12V
MC1C310ATD	100216	24V
MC1C310ATE	102732	36V
MC1C310ATF	102733	42V
MC1C310ATG	100217	48V
MC1C310ATH	102734	60V
MC1C310ATI	102735	72V
MC1C310ATJ	100218	110V
MC1C310ATK	102736	120V
MC1C310ATL	102737	125V
MC1C310ATN	100219	220V
MC1C310ATR	102738	240V
MC1C400AIB	100420	12V
MC1C400AID	100426	24V
MC1C400ATB	100360	12V
MC1C400ATD	100366	24V
MC1C400ATE	103218	36V
MC1C400ATF	103219	42V
MC1C400ATG	100367	48V
MC1C400ATH	103220	60V
MC1C400ATI	103221	72V
MC1C400ATJ	100368	110V
MC1C400ATK	103222	120V
MC1C400ATL	103223	125V
MC1C400ATN	100369	220V
MC1C400ATR	103224	240V
MC1CB00AFD	100406	24V
MC1CB00AFG	100407	48V
MC1CB00AHD	103232	24V
MC1CB00AID	100436	24V
MC1CB00ATB	100370	12V
MC1CB00ATC	103226	32V
MC1CB00ATD	100376	24V
MC1CB00ATE	103227	36V
MC1CB00ATF	103228	42V
MC1CB00ATG	100377	48V
MC1CB00ATH	103229	60V

Cat. no.	Ref. no.	
MC1CB00ATI	103230	72V
MC1CB00ATJ	100378	110V
MC1CB00ATK	103231	120V
MC1CB00ATN	100379	220V
MC1CB00ATR	103233	240V
MC1I301ARD	103441	24V
MC1I301ATD	100573	24V
MC1I310ARD	103440	24V
MC1I310ATD	100572	24V
MC2C301AIB	103287	12V
MC2C301AID	103286	24V
MC2C301AIG	103285	48V
MC2C301AIH	103284	60V
MC2C301AIJ	103283	110V
MC2C301AIK	103282	120V
MC2C301AIN	103281	220V
MC2C301ARB	103431	12V
MC2C301ARD	103432	24V
MC2C301ARG	103433	48V
MC2C301ARH	103434	60V
MC2C301ARJ	103435	110V
MC2C301ARK	103436	120V
MC2C301ARN	103437	220V
MC2C301ATB	103589	12V
MC2C301ATD	103580	24V
MC2C301ATG	103581	48V
MC2C301ATJ	103582	110V
MC2C301ATN	103583	220V
MC2C310AIB	103280	12V
MC2C310AID	103279	24V
MC2C310AIG	103278	48V
MC2C310AIH	103277	60V
MC2C310AIJ	103276	110V
MC2C310AIK	103275	120V
MC2C310AIN	103274	220V
MC2C310ARB	103418	12V
MC2C310ARD	103419	24V
MC2C310ARG	103420	48V
MC2C310ARH	103421	60V
MC2C310ARJ	103422	110V
MC2C310ARK	103423	120V
MC2C310ARN	103424	220V
MC2C310ATB	103588	12V
MC2C310ATD	103584	24V
MC2C310ATG	103585	48V
MC2C310ATJ	103586	110V
MC2C310ATN	103587	220V

This list shows the catalogue and reference numbers for the **contactors** with the most usual voltages. For other voltages/types, please consult us.

Cat. no.	Ref. no.	
50Hz		pg. A.53-A.55
CL00A300TN	104044	220/230V
CL00A300TU	104045	380/400V
CL00A301TN	104064	220/230V
CL00A301TU	104065	380/400V
CL00A310TN	104054	220/230V
CL00A310TU	104055	380/400V
CL01A300TN	104074	220/230V
CL01A300TU	104075	380/400V
CL01A301TN	104094	220/230V
CL01A301TU	104095	380/400V
CL01A310TN	104084	220/230V
CL01A310TU	104085	380/400V
CL01A400TN	104314	220/230V
CL01A400TU	104315	380/400V
CL01AB00TN	104384	220/230V
CL01AB00TU	104385	380/400V
CL02A300TN	104104	220/230V
CL02A300TU	104105	380/400V
CL02A301RN	108894	220/230V
CL02A301TN	104124	220/230V
CL02A301TU	104125	380/400V
CL02A310TN	104114	220/230V
CL02A310TU	104115	380/400V
CL02A400TN	104324	220/230V
CL02A400TU	104325	380/400V
CL02AB00TN	104394	220/230V
CL02AB00TU	104395	380/400V
CL03A300MN	104134	220/230V
CL03A300MU	104135	380/400V
CL03A301MN	104154	220/230V
CL03A301MU	104155	380/400V
CL03A310MN	104144	220/230V
CL03A310MU	104145	380/400V
CL03A400MN	104334	220/230V
CL03A400MU	104335	380/400V
CL03AB00MN	104404	220/230V
CL03AB00MU	104405	380/400V
CL04A300MN	104164	220/230V
CL04A300MU	104165	380/400V
CL04A301MN	104184	220/230V
CL04A301MU	104185	380/400V
CL04A310MN	104174	220/230V
CL04A310MU	104175	380/400V
CL04A400MN	104344	220/230V
CL04A400MU	104345	380/400V
CL04AB00MN	104414	220/230V
CL04AB00MU	104415	380/400V
CL05A400MN	104354	220/230V
CL05A400MU	104355	380/400V
CL05AB00MN	104424	220/230V
CL05AB00MU	104425	380/400V
CL06A300MN	104214	220/230V
CL06A300MU	104215	380/400V
CL06A311MN	104224	220/230V
CL06A311MU	104225	380/400V
CL07A300MN	104234	220/230V
CL07A300MU	104235	380/400V
CL07A311MN	104244	220/230V
CL07A311MU	104245	380/400V
CL07A400MN	104364	220/230V
CL07A400MU	104365	380/400V
CL07AB00MN	104434	220/230V
CL07AB00MU	104435	380/400V
CL08A300MN	104254	220/230V
CL08A300MU	104255	380/400V
CL08A311MN	104264	220/230V
CL08A311MU	104265	380/400V
CL08AB00MN	104444	220/230V
CL08AB00MU	104445	380/400V
CL09A300MN	104274	220/230V
CL09A300MU	104275	380/400V
CL09A311MN	104284	220/230V
CL09A311MU	104285	380/400V
CL09A400MN	104374	220/230V
CL09A400MU	104375	380/400V
CL10A300MN	104294	220/230V
CL10A300MU	104295	380/400V
CL10A311MN	104304	220/230V
CL10A311MU	104305	380/400V
CL25A300TN	110804	220/230V
CL25A300TU	110805	380/400V
CL25A301TN	112354	220/230V
CL25A301TU	112355	380/400V
CL25A310TN	112344	220/230V
CL25A310TU	112345	380/400V
CL45A300MN	110814	220/230V
CL45A300MU	110815	380/400V
CL45A311MN	112804	220/230V
CL45A311MU	112805	380/400V

Cat. no.	Ref. no.	
LB1AN	104634	220/230V
LB1AU	104635	380/400V
LB3AN	104644	220/230V
LB3AU	104645	380/400V
LB4AN	104654	220/230V
LB4AU	104655	380/400V
60Hz		pg. A.53-A.55
CL00A300TT	109143	380V
CL00A301TT	109191	380V
CL00A310TT	109167	380V
CL01A300TT	109214	380V
CL01A301TT	109262	380V
CL01A310TT	109238	380V
CL01A400TT	109889	380V
CL01AB00TT	110064	380V
CL02A300TT	109287	380V
CL02A301TT	109335	380V
CL02A310TT	109311	380V
CL02A400TT	109905	380V
CL02AB00TT	110080	380V
CL03A300MT	109359	380V
CL03A301MT	109407	380V
CL03A310MT	109383	380V
CL03A400MT	109921	380V
CL03AB00MT	110096	380V
CL04A300MT	109431	380V
CL04A301MT	109479	380V
CL04A310MT	109455	380V
CL04A400MT	109937	380V
CL04AB00MT	110112	380V
CL05A400MT	109953	380V
CL05AB00MT	110127	380V
CL06A300MT	109550	380V
CL06A311MT	109574	380V
CL07A300MT	109598	380V
CL07A311MT	109622	380V
CL07A400MT	109969	380V
CL07AB00MT	110143	380V
CL08A300MT	109646	380V
CL08A311MT	109670	380V
CL08AB00MT	110159	380V
CL09A300MT	109694	380V
CL09A311MT	109718	380V
CL09A400MT	109985	380V
CL10A300MT	109742	380V
CL10A311MT	109766	380V
CL25A300TT	110722	380V
CL45A300MT	110746	380V
LB1AT	110410	380V
LB3AT	110443	380V
LB4AT	110476	380V
50/60Hz		pg. A.53-A.55
CL00A300T1	109149	24V
CL00A300T3	109151	110/115V
CL00A300T5	109153	220V
CL00A300T7	109155	240V
CL00A301T1	109197	24V
CL00A301T3	109199	110/115V
CL00A301T5	109201	220V
CL00A301T7	109203	240V
CL00A310T1	109173	24V
CL00A310T3	109175	110/115V
CL00A310T5	109177	220V
CL00A310T7	109179	240V
CL01A300T1	109220	24V
CL01A300T3	109222	110/115V
CL01A300T5	109224	220V
CL01A300T7	109226	240V
CL01A301T1	109268	24V
CL01A301T3	109270	110/115V
CL01A301T5	109272	220V
CL01A301T7	109275	240V
CL01A310T1	109244	24V
CL01A310T3	109246	110/115V
CL01A310T5	109248	220V
CL01A310T7	109250	240V
CL01A400T1	110600	24V
CL01A400T3	207282	110/115V
CL01A400T5	110604	220V
CL01A400T7	110606	240V
CL01AB00T1	110656	24V
CL01AB00T3	110658	110/115V
CL01AB00T5	110660	220V
CL01AB00T7	110662	240V
CL02A300T1	109293	24V
CL02A300T3	109295	110/115V
CL02A300T5	109297	220V
CL02A300T7	109299	240V
CL02A301T1	109341	24V
CL02A301T3	109343	110/115V
CL02A301T5	109345	220V
CL02A301T7	109347	240V
CL02A310T1	109317	24V
CL02A310T3	109319	110/115V
CL02A310T5	109321	220V
CL02A310T7	109323	240V
CL02A400T1	110608	24V
CL02A400T3	110610	110/115V
CL02A400T5	110612	220V
CL02A400T7	110614	240V
CL02AB00T1	110664	24V
CL02AB00T3	110666	110/115V
CL02AB00T5	110668	220V

Cat. no.	Ref. no.	
CL02AB00T7	110670	240V
CL03A300M1	109365	24V
CL03A300M3	109367	110/115V
CL03A300M5	109369	220V
CL03A300M7	109371	240V
CL03A301M1	109413	24V
CL03A301M3	109415	110/115V
CL03A301M5	109417	220V
CL03A301M7	109419	240V
CL03A310M1	109389	24V
CL03A310M3	109391	110/115V
CL03A310M5	109393	220V
CL03A310M7	109395	240V
CL03A400M1	110616	24V
CL03A400M3	110618	110/115V
CL03A400M5	110620	220V
CL03A400M7	110622	240V
CL03AB00M1	110672	24V
CL03AB00M3	110674	110/115V
CL03AB00M5	110676	220V
CL03AB00M7	110678	240V
CL04A300M1	109437	24V
CL04A300M3	109439	110/115V
CL04A300M5	109441	220V
CL04A300M7	109443	240V
CL04A301M1	109485	24V
CL04A301M3	109487	110/115V
CL04A301M5	109489	220V
CL04A301M7	109491	240V
CL04A310M1	109461	24V
CL04A310M3	109463	110/115V
CL04A310M5	109465	220V
CL04A310M7	109467	240V
CL04A400M1	110624	24V
CL04A400M3	110626	110/115V
CL04A400M5	110628	220V
CL04A400M7	110630	240V
CL04AB00M1	110680	24V
CL04AB00M3	110682	110/115V
CL04AB00M5	110684	220V
CL04AB00M7	110686	240V
CL05A400M1	110632	24V
CL05A400M3	110634	110/115V
CL05A400M5	110636	220V
CL05A400M7	110638	240V
CL05AB00M1	110688	24V
CL05AB00M3	110690	110/115V
CL05AB00M5	110692	220V
CL05AB00M7	110694	240V
CL06A300M1	109556	24V
CL06A300M3	109558	110/115V
CL06A300M5	109560	220V
CL06A300M7	109562	240V
CL06A311M1	109580	24V
CL06A311M3	109582	110/115V
CL06A311M5	109584	220V
CL06A311M7	109586	240V
CL07A300M1	109604	24V
CL07A300M3	110243	110/115V
CL07A300M5	109608	220V
CL07A300M7	109610	240V
CL07A311M1	109628	24V
CL07A311M3	109630	110/115V
CL07A311M5	109632	220V
CL07A311M7	109634	240V
CL07A400M1	110762	24V
CL07A400M3	110642	110/115V
CL07A400M5	110644	220V
CL07A400M7	110646	240V
CL07AB00M1	110696	24V
CL07AB00M3	110698	110/115V
CL07AB00M5	110700	220V
CL07AB00M7	110702	240V
CL08A300M1	109652	24V
CL08A300M3	109654	110/115V
CL08A300M5	109656	220V
CL08A300M7	109658	240V
CL08A311M1	109676	24V
CL08A311M3	109678	110/115V
CL08A311M5	109680	220V
CL08A311M7	109682	240V
CL08AB00M1	110704	24V
CL08AB00M3	110706	110/115V
CL08AB00M5	110708	220V
CL08AB00M7	110710	240V
CL09A300M1	109700	24V
CL09A300M3	109702	110/115V
CL09A300M5	109704	220V
CL09A300M7	109706	240V
CL09A311M1	109724	24V
CL09A311M3	109726	110/115V
CL09A311M5	109728	220V
CL09A311M7	109730	240V
CL09A400M1	110648	24V
CL09A400M3	110650	110/115V
CL09A400M5	110652	220V
CL09A400M7	110654	240V
CL10A300M1	109748	24V
CL10A300M3	109750	110/115V
CL10A300M5	109752	220V
CL10A300M7	109754	240V
CL10A311M1	109772	24V
CL10A311M3	109774	110/115V
CL10A311M5	109776	220V
CL10A311M7	109778	240V

Cat. no.	Ref. no.	
CL25A300T1	110728	24V
CL25A300T3	110730	110/115V
CL25A300T5	110732	220V
CL25A300T7	110734	240V
CL45A300M1	110752	24V
CL45A300M3	110754	110/115V
CL45A300M5	110756	220V
CL45A300M7	110758	240V
CL45A311M1	112821	24V
CL45A311M3	112823	110/115V
CL45A311M5	112825	220V
CL45A311M7	112827	240V
LB1A1	110416	24V
LB1A3	110418	110/115V
LB1A5	110420	220V
LB1A7	110422	240V
LB3A1	110449	24V
LB3A3	110451	110/115V
LB3A5	110453	220V
LB3A7	110455	240V
LB4A1	110482	24V
LB4A3	110484	110/115V
LB4A5	110486	220V
LB4A7	110488	240V
Direct current		pg. A.53-A.55
CL00D301TD	112016	24V
CL00D301TJ	112018	110V
CL00D301TN	112019	220V
CL00D310TB	112000	12V
CL00D310TD	112006	24V
CL00D310TJ	112008	110V
CL00D310TN	112009	220V
CL00D310TWD	113510	24V (WR)
CL00D310TWG	113447	48V (WR)
CL00D310TWN	113486	220V (WR)
CL01D301TD	112036	24V
CL01D301TJ	112038	110V
CL01D301TN	112039	220V
CL01D310TB	112020	12V
CL01D310TD	112026	24V
CL01D310TJ	112028	110V
CL01D310TN	112029	220V
CL01D310TWD	113511	24V (WR)
CL01D310TWG	113448	48V (WR)
CL01D310TWN	113487	220V (WR)
CL01D400TD	112176	24V
CL01D400TJ	112178	110V
CL01D400TN	112179	220V
CL01DB00TB	112240	12V
CL01DB00TD	112246	24V
CL01DB00TN	112249	220V
CL02D301TB	112050	12V
CL02D301TD	112056	24V
CL02D301TJ	112058	110V
CL02D301TN	112059	220V
CL02D310TB	112040	12V
CL02D310TD	112046	24V
CL02D310TJ	112048	110V
CL02D310TN	112049	220V
CL02D310TWD	113512	24V (WR)
CL02D310TWG	113449	48V (WR)
CL02D310TWN	113488	220V (WR)
CL02D400TB	112180	12V
CL02D400TD	112186	24V
CL02D400TJ	112188	110V
CL02D400TN	112189	220V
CL02D400TWG	112045	48V (WR)
CL02DB00TB	112250	12V
CL02DB00TD	112256	24V
CL02DB00TJ	112258	110V
CL02DB00TN	112259	220V
CL03D301MB	112080	12V
CL03D301MD	112086	24V
CL03D301MJ	112088	110V
CL03D301MN	112089	220V
CL03D310MB	112070	12V
CL03D310MD	112076	24V
CL03D310MJ	112078	110V
CL03D310MN	112079	220V
CL03D310MWD	113153	24V (WR)
CL03D310MWG	113513	48V (WR)
CL03D310MWN	113489	220V (WR)
CL03D400MB	112190	12V
CL03D400MD	112196	24V
CL03D400MJ	112198	110V
CL03D400MN	112199	220V
CL03DB00MD	112266	24V
CL03DB00MJ	112268	110V
CL03DB00MN	112269	220V
CL04D301MB	112100	12V
CL04D301MD	112106	24V
CL04D301MJ	112108	110V
CL04D301MN	112109	220V
CL04D301MWG	107009	48V (WR)
CL04D301MWN	113257	220V (WR)
CL04D310MB	112090	12V
CL04D310MD	112096	24V
CL04D310MJ	112098	110V
CL04D310MN	112099	220V
CL04D310MWG	113451	48V (WR)
CL04D310MWN	113490	220V (WR)
CL04D400MB	112202	12V
CL04D400MD	112201	24V
CL04D400MJ	112208	110V

Cat. no.	Ref. no.	
CL04D400MN	112209	220V
CL04DB00MB	112270	12V
CL04DB00MD	112276	24V
CL04DB00MJ	112278	110V
CL04DB00MN	112279	220V
CL25D300TB	112060	12V
CL25D300TD	112066	24V
CL25D300TJ	112068	110V
CL25D300TN	112069	220V
CL45D300MB	112110	12V
CL45D300MD	112116	24V
CL45D300MJ	112118	110V
CL45D300MN	112119	220V
CL45D300MWD	113515	24V (WR)
CL45D300MWG	113452	48V (WR)
CL45D300MWN	113491	220V (WR)
LB1DB	112310	12V
LB1DD	112316	24V
LB1DJ	112318	110V
LB1DN	112319	220V
LB1DWD	113524	24V (WR)
LB1DWG	113526	48V (WR)
LB1DWN	113529	220V (WR)
LB3DB	112320	12V
LB3DD	112326	24V
LB3DJ	112328	110V
LB3DN	112329	220V
LB3DWD	113531	24V (WR)
LB3DWG	113533	48V (WR)
LB3DWN	113536	220V (WR)
With electronic module		pg. A.53-A.55
CL05E400MD	112216	24/28V
CL05E400MF	112550	42/48V
CL05E400MJ	112218	110/125V
CL05E400MN	112219	220/250V
CL05E400MY	113971	440V
CL05EB00MD	112286	24/28V
CL05EB00MF	112619	42/48V
CL05EB00MJ	112288	110/125V
CL05EB00MN	112289	220/250V
CL05EB00MY	113968	440V
CL06E300MD	112126	24/28V
CL06E300MF	112839	42/48V
CL06E300MJ	112128	110/125V
CL06E300MN	112129	220/250V
CL06E300MY	113977	440V
CL07E300MD	112136	24/28V
CL07E300MF	112850	42/48V
CL07E300MJ	112138	110/125V
CL07E300MN	112139	220/250V
CL07E300MY	113976	440V
CL07E400MD	112226	24/28V
CL07E400MF	112561	42/48V
CL07E400MJ	112228	110/125V
CL07E400MN	112229	220/250V
CL07E400MY	113970	440V
CL07EB00MD	112296	24/28V
CL07EB00MF	112630	42/48V
CL07EB00MJ	112298	110/125V
CL07EB00MN	112299	220/250V
CL07EB00MY	113967	440V
CL08E300MD	112146	24/28V
CL08E300MF	112861	42/48V
CL08E300MJ	112148	110/125V
CL08E300MN	112149	220/250V
CL08E300MY	113975	440V
CL08EB00MD	112306	24/28V
CL08EB00MF	112641	42/48V
CL08EB00MJ	112308	110/125V
CL08EB00MN	112309	220/250V
CL08EB00MY	113966	440V
CL09E300MD	112156	24/28V
CL09E300MF	112872	42/48V
CL09E300MJ	112158	110/125V
CL09E300MN	112159	220/250V
CL09E300MY	113974	440V
CL09E400MD	112236	24/28V
CL09E400MF	112572	42/48V
CL09E400MJ	112238	110/125V
CL09E400MN	112239	220/250V
CL09E400MY	113969	440V
CL10E300MD	112166	24/28V
CL10E300MF	112503	42/48V
CL10E300MJ	112168	110/125V
CL10E300MN	112169	220/250V
CL10E300MY	113973	440V
LB4ED	112336	24/28V
LB4EF	112670	42/48V
LB4EJ	112338	110/125V
LB4EN	112339	220/250V
LB4EY	113972	440V
Mechanical latch blocks		pg. A.57
RMLFD	112992	
RMLFG	112993	
RMLFJ	112994	
RMLFN	112995	
RMLFU	112996	
RMLFY	112997	

This list shows the catalogue and reference numbers for the **contactors** with the most usual voltages. For other voltages/types, please consult us.

Cat. no.	Ref. no.	
50Hz		pg. A.63/64
C04255D	104811	24V
C04255G	104812	48V
C04255J	104813	110V
C04255K	110504	127V
C04255N	104814	220/230V
C04255R	110508	240V
C04255U	104815	380/400V
C04255W	110511	415V
C04255X	110512	440V
C04255Z	110514	660/690V
C04787D	104821	24V
C04787G	104822	48V
C04787J	104823	110V
C04787K	110520	127V
C04787N	104824	220/230V
C04787R	110524	240V
C04787U	104825	380/400V
C04787W	110527	415V
C04787X	110528	440V
C04787Z	110530	660/690V
C12168D	104895	24V
C12168G	104892	48V
C12168J	104893	110V
C12168K	105306	127V
C12168N	104894	220/230V
C12168R	105310	240V
C12168U	113888	380/400V
C12168W	105313	415V
C12168X	105314	440V
C12168Z	105316	660/690V
CK07BA411D	104531	24V
CK07BA411G	104532	48V
CK07BA411J	104533	110V
CK07BA411K	110327	127V
CK07BA411N	104534	220/230V
CK07BA411R	110332	240V
CK07BA411U	104535	380/400V
CK07BA411W	110335	415V
CK07BA411X	110336	440V
CK07BA411Z	110338	660/690V
CK08BA411D	104541	24V
CK08BA411G	104542	48V
CK08BA411J	104543	110V
CK08BA411K	110346	127V
CK08BA411N	104544	220/230V
CK08BA411R	110350	240V
CK08BA411U	104545	380/400V
CK08BA411W	110353	415V
CK08CA311D	113131	24V
CK08CA311G	113132	48V
CK08CA311J	113133	110V
CK08CA311K	113140	127V
CK08CA311N	133187	220/230V
CK08CA311R	113889	240V
CK08CA311U	113135	380/400V
CK08CA311W	113147	415V
CK75CA311D	113101	24V
CK75CA311G	113892	48V
CK75CA311J	113103	110V
CK75CA311K	113113	127V
CK75CA311N	133188	220/230V
CK75CA311R	113893	240V
CK75CA311U	113105	380/400V
CK75CA311W	113120	415V
CK85BA311D	104471	24V
CK85BA311G	110266	48V
CK85BA311J	104473	110V
CK85BA311K	110269	127V
CK85BA311N	104474	220/230V
CK85BA311R	110273	240V
CK85BA311U	104475	380/400V
CK85BA311W	110276	415V
CK85BA311X	110277	440V
CK85BA311Z	110278	660/690V
60Hz		pg. A.63/64
C04255C	110499	24V
C04255F	110501	48V
C04255H	110502	110V
C04255I	110503	120V
C04255M	110506	220V
C04255S	110507	240V
C04255T	110509	380V
C04255V	110510	440V
C04255Y	110513	600V
C04787C	110515	24V
C04787F	119517	48V
C04787H	110518	110V
C04787I	110519	120V
C04787M	110522	220V
C04787S	110523	240V
C04787T	110525	380V
C04787V	110526	440V
C04787Y	110529	600V
C12168C	105302	24V
C12168F	105304	48V
C12168H	133886	110V
C12168I	104891	120V
C12168M	105308	220V
C12168S	105309	240V
C12168T	101060	380V
C12168V	105312	440V
C12168Y	133838	600V
CK07BA411C	110322	24V
CK07BA411F	110760	48V
CK07BA411H	110325	110V
CK07BA411I	133798	120V
CK07BA411M	110330	220V
CK07BA411S	110331	240V
CK07BA411T	110333	380V
CK07BA411V	110334	440V
CK07BA411Y	110337	600V
CK08BA411M	110348	220V
CK08CA311F	113272	48V
CK08CA311H	113130	110V
CK08CA311M	111581	220V
CK08CA311S	113890	240V
CK08CA311V	113891	440V
CK08CA311Y	101047	600V
CK75CA311C	113100	24V
CK75CA311F	113102	48V
CK75CA311H	113111	110V
CK75CA311I	113112	120V
CK75CA311M	133219	220V
CK75CA311S	113894	240V
CK75CA311V	113895	440V
CK75CA311Y	113122	600V
CK85BA311H	110267	110V
CK85BA311I	110268	120V
CK85BA311M	110271	220V
CK85BA311S	110272	240V
CK85BA311V	110275	440V
CK85BA311Y	101048	600V
50/60Hz		pg. A.63/64
C08998J	104833	110V
C08998N	104834	220/240V
C08998U	104835	380/440V
C0912OJ	212822	110V
C0912ON	204790	220/240V
C0912OU	204792	380/440V
CK13BA311J	104523	110V
CK13BA311N	104524	220/240V
CK13BA311U	104525	380/440V
CK13BA411J	104603	110V
CK13BA411N	104604	220/240V
CK13BA411U	104605	380/440V
With electronic module		pg. A.63/64
CK07BE411D	104536	24/28V
CK07BE411F	110339	42/48V
CK07BE411J	104538	110/127V
CK07BE411N	104539	220/250V
CK07BE411U	110340	380/415V
CK08BE411D	104546	24/28V
CK08BE411J	104548	110/127V
CK08BE411N	104549	220/250V
CK08BE411U	110358	380/415V
CK08CE311D	113136	24/28V
CK08CE311F	113151	42/48V
CK08CE311J	113138	110/127V
CK08CE311N	113139	220/250V
CK08CE311U	113152	380/415V
CK08CE311WD	113522	24V (WR)
CK08CE311WE	113446	33V (WR)
CK08CE311WF	113459	48V (WR)
CK08CE311WH	113472	72V (WR)
CK08CE311WJ	113485	110V (WR)
CK08CE311WN	113498	220V (WR)
CK08CE311Y	113374	440/500V
CK09BE311D	104486	24/28V
CK09BE311F	104480	42/48V
CK09BE311J	104488	110/127V
CK09BE311N	104489	220/250V
CK09BE311U	110299	380/415V
CK09BE311Y	104493	440/500V
CK09BE411D	104556	24/28V
CK09BE411F	110375	42/48V
CK09BE411J	104558	110/127V
CK09BE411N	104559	220/250V
CK09BE411U	110376	380/415V
CK09BE411Y	113224	440/500V
CK10CE311D	133783	24/28V
CK10CE311F	113692	42/48V
CK10CE311J	133784	110/127V
CK10CE311N	133286	220/250V
CK10CE311U	133785	380/415V
CK10CE311Y	113694	440/500V
CK10CE411D	133786	24/28V
CK10CE411J	133787	110/127V
CK10CE411N	133287	220/250V
CK10CE411U	133788	380/415V
CK11CE311D	133789	24/28V
CK11CE311F	113691	42/48V
CK11CE311J	133790	110/127V
CK11CE311N	133288	220/250V
CK11CE311U	133791	380/415V
CK11CE311Y	113688	440/500V
CK11CE411D	133792	24/28V
CK11CE411F	113680	42/48V
CK11CE411J	133793	110/127V
CK11CE411N	133289	220/250V
CK11CE411U	133794	380/415V
CK12BE311D	104516	24/28V
CK12BE311F	110304	42/48V
CK12BE311J	104518	110/127V
CK12BE311N	104519	220/250V
CK12BE311U	110305	380/415V
CK12BE311Y	110823	440/500V
CK12BE411D	104596	24/28V
CK12BE411F	110383	42/48V
CK12BE411J	104598	110/127V
CK12BE411N	104599	220/250V
CK12BE411U	110384	380/415V
CK75CE311D	113106	24/28V
CK75CE311F	108972	42/48V
CK75CE311J	113108	110/127V
CK75CE311N	113109	220/250V
CK75CE311U	113125	380/415V
CK75CE311WD	113521	24V (WR)
CK75CE311WE	113445	33V (WR)
CK75CE311WF	113458	48V (WR)
CK75CE311WH	113471	72V (WR)
CK75CE311WJ	113484	110V (WR)
CK75CE311WN	113497	220V (WR)
CK75CE311Y	113126	440/500V
CK85BE311D	104476	24/28V
CK85BE311F	110280	42/48V
CK85BE311J	104478	110/127V
CK85BE311N	104479	220/250V
CK85BE311U	110281	380/415V
CK95BE311D	104616	24/28V
CK95BE311F	104610	42/48V
CK95BE311J	104618	110/127V
CK95BE311N	104614	220/250V
CK95BE311U	104611	380/415V
CK95BE311WH	104617	72V (WR)
CK95BE311Y	113375	440/500V
CK95BE411D	104560	24/28V
CK95BE411F	110377	42/48V
CK95BE411J	104572	110/127V
CK95BE411N	104569	220/250V
CK95BE411U	110378	380/415V
KB4ED	104956	24/28V
KB4EF	133913	42/48V
KB4EJ	104957	110/127V
KB4EN	104958	220/250V
KB4EU	104959	380/415V
KB4EWD	113543	24V (WR)
KB4EWE	113544	33V (WR)
KB4EWF	113545	48V (WR)
KB4EWH	113546	72V (WR)
KB4EWJ	113547	110V (WR)
KB4EWN	113548	220V (WR)
KB4EY	105317	440/500V
KB5ED	104850	24/28V
KB5EF	104856	42/48V
KB5EJ	104857	110/127V
KB5EN	104858	220/250V
KB5EU	104859	380/415V
KB5EWH	104855	72V (WR)
KB5EY	110831	440/500V
KB6ED	104860	24/28V
KB6EF	104866	42/48V
KB6EJ	104867	110/127V
KB6EN	104868	220/250V
KB6EU	104869	380/415V
KB6EY	110832	440/500V
KB7ED	113675	24/28V
KB7EF	133911	42/48V
KB7EJ	113673	110/127V
KB7EN	113672	220/250V
KB7EU	113671	380/415V
KB7EY	113670	440/500V
KM4ED	104960	24/28V
KM4EF	104966	42/48V
KM4EJ	104967	110/127V
KM4EN	104968	220/250V
KM4EU	104969	380/415V
KM4EWD	113549	24V (WR)
KM4EWE	113550	33V (WR)
KM4EWF	113551	48V (WR)
KM4EWH	113552	72V (WR)
KM4EWJ	113553	110V (WR)
KM4EWN	113554	220V (WR)
KM4EY	105318	440/500V
KM5ED	104870	24/28V
KM5EF	104876	42/48V
KM5EJ	104877	110/127V
KM5EN	104878	220/250V
KM5EU	104879	380/415V
KM5EWH	104871	72V (WR)
KM5EY	110833	440/500V
KM6ED	104880	24/28V
KM6EF	104886	42/48V
KM6EJ	104887	110/127V
KM6EN	104888	220/250V
KM6EU	104889	380/415V
KM6EY	110834	440/500V
KM7ED	113427	24/28V
KM7EF	113428	42/48V
KM7EJ	113429	110/127V
KM7EN	113430	220/250V
KM7EU	113431	380/415V
KM7EY	113432	440/500V

This list shows the catalogue and reference numbers for the **auxiliary minicontactors** with the most usual voltages. For other voltages/ types, please consult us.

Cat. no.	Ref. no.	
50Hz		pg. B.9
MB0AG	100452	48V
MB0AK	102400	115/127V
MB0AN	100454	220/240V
MB0AS	102403	260V
MB0AU	213532	380/400V
MB0AW	102405	415/440V
MCRA004AFN	100094	220/240V
MCRA004AIN	100144	220/240V
MCRA004ATG	100042	48V
MCRA004ATK	102090	115/127V
MCRA004ATN	100044	220/240V
MCRA004ATS	102093	260V
MCRA004ATU	100045	380/400V
MCRA004ATW	102095	415/440V
MCRA013AFN	100084	220/240V
MCRA013AIN	100134	220/240V
MCRA013ATG	100032	48V
MCRA013ATK	102069	115/127V
MCRA013ATN	100034	220/240V
MCRA013ATS	102072	260V
MCRA013ATU	100035	380/400V
MCRA013ATW	102074	415/440V
MCRA022AFG	100072	48V
MCRA022AFN	100074	220/240V
MCRA022AIN	100124	220/240V
MCRA022AIU	100125	380/400V
MCRA022ATG	100022	48V
MCRA022ATK	102048	115/127V
MCRA022ATN	100024	220/240V
MCRA022ATS	102051	260V
MCRA022ATU	100025	380/400V
MCRA022ATW	102053	415/440V
MCRA031AFG	100062	48V
MCRA031AFN	100064	220/240V
MCRA031AFU	100065	380/400V
MCRA031AIG	100112	48V
MCRA031AIN	100114	220/240V
MCRA031AIU	100115	380/400V
MCRA031ATG	100012	48V
MCRA031ATK	102027	115/127V
MCRA031ATN	100014	220/240V
MCRA031ATS	102030	260V
MCRA031ATU	100015	380/400V
MCRA031ATW	102032	415/440V
MCRA040AFN	100054	220/240V
MCRA040AFU	100055	380/400V
MCRA040AIN	100104	220/240V
MCRA040ATG	100002	48V
MCRA040ATK	102006	115/127V
MCRA040ATN	100004	220/240V
MCRA040ATS	102009	260V
MCRA040ATU	100005	380/400V
MCRA040ATW	102011	415/440V

60Hz		pg. B.9
MB0AE	102397	32V
MB0AF	102398	48V
MB0AM	102401	208/220V
MB0AU	213532	440V
MB0AY	102406	600V
MCRA004ATE	102087	32V
MCRA004ATM	102091	208/220V
MCRA004ATU	100045	440V
MCRA004ATY	102096	600V
MCRA013ATE	102066	32V
MCRA013ATM	102070	208/220V
MCRA013ATU	100035	440V
MCRA013ATY	102075	600V
MCRA022AIU	100125	440V
MCRA022ATE	102045	32V
MCRA022ATH	102047	110V
MCRA022ATM	102049	208/220V
MCRA022ATU	100025	440V
MCRA022ATY	102054	600V
MCRA031AFU	100065	440V
MCRA031AIU	100115	440V
MCRA031ATE	102024	32V
MCRA031ATM	102028	208/220V
MCRA031ATU	100015	440V
MCRA031ATY	102033	600V
MCRA040ATE	102003	32V
MCRA040ATM	102007	208/220V
MCRA040ATU	100005	440V
MCRA040ATY	102012	600V

Cat. no.	Ref. no.	
50/60Hz		pg. B.9
MB0A1	102407	24V
MB0A2	102408	42V
MB0A3	102409	110/115V
MB0A4	102410	120V
MB0A5	102411	220V
MB0A6	102412	230V
MB0A7	102413	240V
MB0A8	102414	440V
MB0A9	133717	48V
MCRA004AT1	102097	24V
MCRA004AT2	102098	42V
MCRA004AT3	102099	110/115V
MCRA004AT4	102100	120V
MCRA004AT5	102101	220V
MCRA004AT6	102102	230V
MCRA004AT7	102103	240V
MCRA004AT8	102104	440V
MCRA004AT9	108859	48V
MCRA013AT1	102076	24V
MCRA013AT2	102077	42V
MCRA013AT3	102078	110/115V
MCRA013AT4	102079	120V
MCRA013AT5	102080	220V
MCRA013AT6	102081	230V
MCRA013AT7	102082	240V
MCRA013AT8	102083	440V
MCRA022AF8	107493	440V
MCRA022AI5	100129	220V
MCRA022AT1	102055	24V
MCRA022AT2	102056	42V
MCRA022AT3	102057	110/115V
MCRA022AT4	102058	120V
MCRA022AT5	102059	220V
MCRA022AT6	102060	230V
MCRA022AT7	102061	240V
MCRA022AT8	102062	440V
MCRA022AT9	108236	48V
MCRA031AT1	102034	24V
MCRA031AT2	102035	42V
MCRA031AT3	102036	110/115V
MCRA031AT4	102037	120V
MCRA031AT5	102038	220V
MCRA031AT6	102039	230V
MCRA031AT7	102040	240V
MCRA031AT8	102041	440V
MCRA031AT9	108238	48V
MCRA040AT1	102013	24V
MCRA040AT2	102014	42V
MCRA040AT3	102015	110/115V
MCRA040AT4	102016	120V
MCRA040AT5	102017	220V
MCRA040AT6	102018	230V
MCRA040AT7	102019	240V
MCRA040AT8	102020	440V
MCRA040AT9	108237	48V

Direct current		pg. B.9
MB0CA	102415	6V
MB0CB	100460	12V
MB0CC	102416	32V
MB0CD	100466	24V
MB0CE	102417	36V
MB0CF	102418	42V
MB0CG	100467	48V
MB0CI	102420	72V
MB0CJ	100468	110V
MB0CK	102421	120V
MB0CL	102422	125V
MB0CN	100469	220V
MB0CR	102423	240V
MB0CS	100449	250V
MB0CH	102419	60V
MCRC022AFG	100077	48V
MCRC022AFL	102366	125V
MCRC022AFN	100079	220V
MCRC022AID	100126	24V
MCRC022AIJ	100128	110V
MCRC022ATB	100020	12V
MCRC022ATC	102333	32V
MCRC022ATD	100026	24V
MCRC022ATE	102334	36V
MCRC022ATF	102335	42V
MCRC022ATG	100027	48V
MCRC022ATH	102336	60V
MCRC022ATI	102337	72V
MCRC022ATJ	100028	110V
MCRC022ATK	102338	120V
MCRC022ATL	102339	125V
MCRC022ATN	100029	220V
MCRC022ATR	102340	240V
MCRC022ATS	108953	250V
MCRC031AFD	100066	24V
MCRC031AID	100116	24V
MCRC031ATA	102323	6V
MCRC031ATB	100010	12V
MCRC031ATD	100016	24V
MCRC031ATE	102325	36V
MCRC031ATF	102326	42V
MCRC031ATG	100017	48V
MCRC031ATH	102327	60V
MCRC031ATI	102328	72V
MCRC031ATJ	100018	110V
MCRC031ATK	102329	120V
MCRC031ATL	102330	125V
MCRC031ATN	100019	220V
MCRC031ATR	102331	240V
MCRC031ATS	102324	250V
MCRC040AFD	100056	24V
MCRC040AFG	100057	48V
MCRC040AID	102332	24V
MCRC040ATB	100000	12V
MCRC040ATC	102315	32V
MCRC040ATD	100006	24V
MCRC040ATE	102316	36V
MCRC040ATF	102317	42V
MCRC040ATG	100007	48V
MCRC040ATH	102318	60V
MCRC040ATI	102319	72V
MCRC040ATJ	100008	110V
MCRC040ATK	102320	120V
MCRC040ATL	102321	125V
MCRC040ATN	100009	220V
MCRC040ATR	102322	240V
MCRC040ATS	100040	250V

This list shows the catalogue and reference numbers for the **auxiliary contactors** with the most usual voltages.
For other voltages/ types, please consult us.

Cat. no.	Ref. no.	
50Hz		pg. B.15
LB1AE	110401	32V
LB1AK	110405	127V
LB1AN	104634	220/230V
LB1AU	104635	380/400V
LB1AW	110412	415V
LB1AZ	110415	660/690V
RL4RA004TE	109073	32V
RL4RA004TK	109077	127V
RL4RA004TN	104034	220/230V
RL4RA004TU	104035	380/400V
RL4RA004TW	109084	415V
RL4RA004TZ	109087	660/690V
RL4RA022TE	109049	32V
RL4RA022TK	109053	127V
RL4RA022TN	104024	220/230V
RL4RA022TU	104025	380/400V
RL4RA022TW	109060	415V
RL4RA022TZ	109063	660/690V
RL4RA031TE	109025	32V
RL4RA031TK	109029	127V
RL4RA031TN	104014	220/230V
RL4RA031TU	104015	380/400V
RL4RA031TW	109036	415V
RL4RA031TZ	109039	660/690V
RL4RA040TE	109001	32V
RL4RA040TK	109005	127V
RL4RA040TN	104004	220/230V
RL4RA040TU	104005	380/400V
RL4RA040TW	109012	415V
RL4RA040TZ	109015	660/690V
60Hz		pg. B.15
LB1AL	110406	208V
LB1AT	110410	380V
LB1AY	110414	600V
RL4RA004TL	109078	208V
RL4RA004TT	109082	380V
RL4RA004TY	109086	600V
RL4RA022TL	109054	208V
RL4RA022TT	109058	380V
RL4RA022TY	109062	600V
RL4RA031TL	109030	208V
RL4RA031TT	109034	380V
RL4RA031TY	109038	600V
RL4RA040TL	109006	208V
RL4RA040TT	109010	380V
RL4RA040TY	109014	600V
50/60Hz		pg. B.15
LB1A1	110416	24V
LB1A2	110417	42V
LB1A3	110418	110/115V
LB1A4	110419	120V
LB1A5	110420	220V
LB1A6	110421	230V
LB1A7	110422	240V
LB1A8	110423	440V
LB1A9	113979	48V
RL4RA004T1	109088	24V
RL4RA004T2	109089	42V
RL4RA004T3	109090	110/115V
RL4RA004T4	109091	120V
RL4RA004T5	109092	220V
RL4RA004T6	109093	230V
RL4RA004T7	109094	240V
RL4RA004T8	109095	440V
RL4RA022T1	109064	24V
RL4RA022T2	109065	42V
RL4RA022T3	109066	110/115V
RL4RA022T4	109067	120V
RL4RA022T5	109068	220V
RL4RA022T6	109069	230V
RL4RA022T7	109070	240V
RL4RA022T8	109071	440V
RL4RA031T1	109040	24V
RL4RA031T2	109041	42V
RL4RA031T3	109042	110/115V
RL4RA031T4	109043	120V
RL4RA031T5	109044	220V
RL4RA031T6	109045	230V
RL4RA031T7	109046	240V
RL4RA031T8	109047	440V
RL4RA040T1	109016	24V
RL4RA040T2	109017	42V

Cat. no.	Ref. no.	
RL4RA040T3	109018	110/115V
RL4RA040T4	109019	120V
RL4RA040T5	109020	220V
RL4RA040T6	109021	230V
RL4RA040T7	109022	240V
RL4RA040T8	109023	440V
Direct current		pg. B.15
LB1DB	112310	12V
LB1DD	112316	24V
LB1DE	112650	36V
LB1DF	112651	42V
LB1DG	112317	48V
LB1DH	112652	60V
LB1DI	112653	72V
LB1DJ	112318	110V
LB1DK	112654	120/125V
LB1DN	112319	220V
LB1DP	112655	230V
LB1DR	112656	240V
LB1DT	112657	250V
LB1DWB	113523	12V (WR)
LB1DWD	113524	24V (WR)
LB1DWE	113525	33V (WR)
LB1DWG	113526	48V (WR)
LB1DWI	113527	72V (WR)
LB1DWJ	113528	110V (WR)
LB1DWN	113529	220V (WR)
LB1DX	112658	440V
RL4RD004TB	113030	12V
RL4RD004TD	113036	24V
RL4RD004TE	113077	36V
RL4RD004TG	113037	48V
RL4RD004TJ	113038	110V
RL4RD004TK	113081	120/125V
RL4RD004TN	113039	220V
RL4RD004TT	113084	250V
RL4RD022GD	113046	24V
RL4RD022GJ	113048	110V
RL4RD022TB	113020	12V
RL4RD022TD	113026	24V
RL4RD022TE	113068	36V
RL4RD022TG	113027	48V
RL4RD022TJ	113028	110V
RL4RD022TK	113072	120/125V
RL4RD022TN	113029	220V
RL4RD022TP	113073	230V
RL4RD022TT	113075	250V
RL4RD031TB	113010	12V
RL4RD031TD	113016	24V
RL4RD031TE	113059	36V
RL4RD031TG	113017	48V
RL4RD031TH	113061	60V
RL4RD031TJ	113018	110V
RL4RD031TK	113063	120/125V
RL4RD031TN	113019	220V
RL4RD031TT	113066	250V
RL4RD031TX	113067	440V
RL4RD040TB	113000	12V
RL4RD040TD	113006	24V
RL4RD040TE	113050	36V
RL4RD040TG	113007	48V
RL4RD040TJ	113008	110V
RL4RD040TK	113054	120/125V
RL4RD040TN	113009	220V
RL4RD040TT	113057	250V

Mechanical latch blocks		pg. B.16
RMLFD	112992	
RMLFG	112993	
RMLFJ	112994	
RMLFN	112995	
RMLFU	112996	
RMLFY	112997	

Series P9

This list shows the catalogue and reference numbers for the **control and signalling units Ø 22 mm** with the most usual colours.
For other types, please consult us.

Cat. no.	Ref. no.	
Push-buttons standard		pg. F.11
P9XPNVG	185002	green
P9XPNRG	185001	red
P9XPNGG	185003	yellow
P9XPNLG	185006	bleu
P9XPNBG	185007	white
P9XPNNG	185000	black
P9XPNHG	185008	grey
P9XPNMG	185004	brown
P9XPN0G	185009	w/o button
P9XPNVS	185012	green
P9XPNRS	185011	red
P9XPNGS	185013	yellow
P9XPNLS	185016	bleu
P9XPNBS	185017	white
P9XPNNS	185010	black
P9XPNHS	185018	grey
P9XPNMS	185014	brown
P9XPN0S	185019	w/o button
P9MPNVE	184022	green
P9MPNRE	184021	red
P9MPNGE	184023	yellow
P9MPNLE	184026	bleu
P9MPNBE	184027	white
P9MPNNE	184020	black
P9MPNHE	184028	grey
P9MPNME	184024	brown
P9MPN0E	184029	w/o button
Illuminated push-buttons		pg. F.16
P9XPLVGD	185492	green
P9XPLRGD	185491	red
P9XPLGGD	185493	yellow
P9XPLLGD	185496	bleu
P9XPLBGD	185497	white
P9XPLAGD	185495	amber
P9XPLIGD	185498	clear
P9XPLVSD	185502	green
P9XPLRSD	185501	red
P9XPLGSD	185503	yellow
P9XPLLSD	185506	bleu
P9XPLBSD	185507	white
P9XPLASD	185505	amber
P9XPLISD	185508	clear
P9MPLVED	184512	green
P9MPLRED	184511	red
P9MPLGED	184513	yellow
P9MPLLED	184516	bleu
P9MPLBED	184517	white
P9MPLAED	184515	amber
P9MPLIED	184518	clear
Pilot lights		pg. F.18
P9XLVD	185792	green
P9XLRD	185791	red
P9XLGD	185793	yellow
P9XLLD	185796	bleu
P9XLBD	185797	white
P9XLAD	185795	amber
P9XLID	185798	clear
Pilot lights unibloc		pg. F.18
P9XUVDD0	185822	green
P9XURDD0	185821	red
P9XUGDD0	185823	yellow
P9XULDD0	185826	bleu
P9XUBDD0	185827	white
P9XUADD0	185825	amber
P9XUIDD0	185828	clear
P9XUVDRN	185842	green
P9XURDRN	185841	red
P9XUGDRN	185843	yellow
P9XULDRN	185846	bleu
P9XUBDRN	185847	white
P9XUADRN	185845	amber
P9XUIDRN	185848	clear
Emergency push-buttons		pg. F.11
P9XEM3VN	185032	green
P9XEM3RN	185031	red
P9XEM3GN	185033	yellow

Cat. no.	Ref. no.	
P9XEM3LN	185036	bleu
P9XEM3NN	185030	black
P9XEM4VN	185042	green
P9XEM4RN	185041	red
P9XEM4GN	185043	yellow
P9XEM4LN	185046	bleu
P9XEM4NN	185040	black
P9XET4VN1	185062	green
P9XET4RN1	185061	red
P9XET4GN1	185063	yellow
P9XET4LN1	185066	bleu
P9XET4NN1	185057	black
Emergency illuminated push-buttons		pg. F.16
P9XEM4VL	185552	green
P9XEM4RL	185551	red
P9XEM4GL	185553	yellow
P9XEM4LL	185556	bleu
P9XEM4BL	185557	white
P9XEM4AL	185555	amber
P9XEM4IL	185558	clear
P9XET4VL1	185562	green
P9XET4RL1	185561	red
P9XET4GL1	185563	yellow
P9XET4LL1	185566	bleu
P9XET4BL1	185567	white
P9XET4AL1	185565	amber
P9XET4IL1	185568	clear
Selector switches not illuminated		pg. F.12/13
P9XSMD5V	185142	green
P9XSMD5R	185141	red
P9XSMD5G	185143	yellow
P9XSMD5L	185146	bleu
P9XSMD5N	185140	black
Illuminated selector switches		pg. F.16
P9XSLD0V	185592	green
P9XSLD0R	185591	red
P9XSLD0G	185593	yellow
P9XSLD0L	185596	bleu
P9XSLD0B	185597	white
P9XSLD0A	185595	amber
P9XSLD0I	185598	clear
P9XSLZ0V	185602	green
P9XSLZ0R	185601	red
P9XSLZ0G	185603	yellow
P9XSLZ0L	185606	bleu
P9XSLZ0B	185607	white
P9XSLZ0A	185605	amber
P9XSLZ0I	185608	clear
Selector switches with key, 3 positions		pg. F.14/15
P9XSCE0T95	185418	Func. E
P9XSCL0T95	185425	Func. L
P9XSCU0T95	185432	Func. U
P9XSCE3C95	185464	Func. E
P9XSCL3C95	185465	Func. L
P9XSCU3C95	185466	Func. U
P9XSCE1N95	185442	Func. E
P9XSCL1N95	185445	Func. L
P9XSCU1N95	185448	Func. U
P9XSCE5H95	185454	Func. E
P9XSCL5H95	185457	Func. L
P9XSCU5H95	185460	Func. U
Not illuminated selector switches, 5 positions		pg. F.12/13
P9TSMV0N	191350	black
P9TSMW0N	191360	black
P9XSVV0V	183897	green
P9XSVV0R	183896	red
Power supplies, integrated LED		pg. F.23
P9PLNBDA	197036	amber
P9PLNBDB	197037	white
P9PLNBDG	197038	yellow
P9PLNBDL	197039	bleu
P9PLNBDR	197040	red
P9PLNBDV	197041	green

Series 077

This list shows the catalogue and reference numbers for the **control and signalling units Ø 30 mm** with the most usual colours.
For other types, please consult us.

Cat. no.	Ref. no.	
Mushroom head caps		pg. F.43
077EN	180070	black
077ER	180071	red
077EG	180073	yellow
Selector switches with knob - 2 positions		pg. F.44
077SHN11	180180	black
077SHR11	180181	red
077SHV11	180182	green
Illuminated push-buttons - Lenses		pg. F.47
077GPLR	180961	red
077GPLV	180962	green
077GPLG	180963	yellow
077GPLA	180965	orange
077GPLBL	180966	blue
077GPLB	180967	white
077GPLI	180968	clear
Illuminated selector switches Lenses		pg. F.48
077MISR	181151	red
077MISV	181152	green
077MISG	181153	yellow
Illuminated selector switches - 3 positions		pg. F.48
077ISB11TJRC	181225	110-120V
Pilot lights - Lenses		pg. F.48/49
077GLR	181401	red
077GLV	181402	green
077GLG	181403	yellow
077GLA	181405	orange
077GLBL	181406	blue
077GLB	181407	white
077GLI	181408	clear
099GW1R	181271	red
099GW1V	181272	green
099GW1A	181275	orange
099GW1BL	181276	blue
099GW1B	181277	white
099GW1I	181278	clear
Accessories		pg. F.50
077MN	181590	black
077MR	181591	red
077MV	181592	green
077MG	181593	yellow
077MBL	181596	blue
077CPN	181580	black
077CPR	181581	red
077CPV	181582	green
077CPG	181583	yellow
BA9S6LR	187871	red
BA9S6LV	187872	green
BA9S6LG	187873	yellow
BA9S6LB	187875	white
BA9S12LR	187881	black
BA9S12LV	187882	green
BA9S12LG	187883	yellow
BA9S24LR	187891	black
BA9S24LV	187892	green
BA9S24LG	187893	yellow
BA9S24LB	187895	White
BA9S48LR	187901	black
BA9S48LV	187902	green
BA9S48LG	187903	yellow
BA9S110LR	187911	black
BA9S110LV	187912	green
BA9S110LG	187913	yellow
BA9S110LB	187915	white
BA9S230LR	187921	red
BA9S230LG	187922	yellow
BA9S230LB	187926	white

Cat. no	Ref. no.	Page
077...		
077-01	180003	F.51
077-01R	180008	F.51
077-10	180002	F.51
077-10A	180007	F.51
077-11	180001	F.51
077C3095	173095	F.31
077C3353	173353	F.31
077C9901	173901	F.31
077C9902	173902	F.31
077C9903	173903	F.31
077C9904	173904	F.31
077C9905	173905	F.31
077C9910	173910	F.31
077C9916	173916	F.31
077C9919	173919	F.31
077CF73033	173033	F.31
077CF73034	173034	F.31
077CF73037	173037	F.31
077CF73038	173038	F.31
077CF73040	173040	F.31
077CPLT	181600	F.50
077CPT	181588	F.50
077CR455	173455	F.31
077CST	181603	F.50
077DAE	181554	F.50
077DLE14	181260	F.49
077DPP	181550	F.50
077E01	180069	F.43
077E10	180059	F.43
077E11	180049	F.43
077ECR	181602	F.43
077GE35	181620	F.50
077GELR	180971	F.47
077GG03	180980	F.47
077GGBCF	180137	F.42
077GGBCN	180020	F.42
077GGBCS	180050	F.42
077GGM	180981	F.47
077GGT	180982	F.47
077GSBCF	180136	F.42
077GSBCN	180010	F.42
077GSBCS	180040	F.42
077ISB11D0	181170	F.48
077ISB11D0RC	181174	F.48
077ISD11D0	181060	F.48
077ISZ11D0RC	181176	F.48
077LDMVD	181305	F.49
077LDNV0	181300	F.49
077LRNVJ	181301	F.49
077LRNVN	181302	F.49
077M2S2SX44	180914	F.46
077M2S2SX44B	181004	F.46
077M2S2TX44	180918	F.46
077M2T2TX44	180915	F.46
077M2T2TX44B	181005	F.46
077M2T2TY44	180919	F.46
077M4S4TX88	180923	F.46
077M4S4TX88B	181008	F.46
077M4T4TX88	180921	F.46
077M4T4TY88	180927	F.46
077M4T4TY88B	181009	F.46
077MT1234S22	180931	F.46
077MT1234S22B	181021	F.46
077MT24S22	180911	F.46
077MT24S22B	181001	F.46
077MT24S22R	180913	F.46
077MT24S22RB	181003	F.46
077MTS123422	180929	F.46
077MTS123422B	181019	F.46
077MTS2422	180910	F.46
077MTS2422B	181000	F.46
077MTS2422R	180912	F.46
077MTS2422RB	181002	F.46
077OPZ	181570	F.50
077P01	180039	F.42
077P10	180029	F.42
077P11	180019	F.42
077P11T180	180121	F.42
077P11T30	180120	F.42
077PC11C	180100	F.43
077PC11G	180104	F.43
077PLM10D0	181043	F.47
077PLM11D0	181040	F.47
077PLM20D0	181041	F.47
077PTB01	181609	F.51
077PTB10	181608	F.51
077PTB11	181615	F.51
077RE01	180099	F.43
077RE10	180089	F.43
077RE11	180079	F.43
077RER	180090	F.43
077RER60	180091	F.43
077SBN11	180230	F.44
077SBN11DC	180250	F.44
077SBN11RC	180260	F.44
077SBN11SC	180240	F.44
077SCB1120	180843	F.45
077SCB11DC07	180852	F.45
077SCB11RC03	180853	F.45
077SCD1101	180630	F.45
077SCD1105	180631	F.45
077SCD1109	180632	F.45
077SCH11SC03	180636	F.45
077SCI11DC03	180640	F.45
077SCZ22DC01	180906	F.45
077SDN11	180170	F.44
077SHN11	180180	F.44
077SLB11	180607	F.44
077SLD11	180601	F.44
077SLX22	180606	F.44
077SLZ22	180623	F.44
077SLZ22DC	180625	F.44
077SLZ22RC	180626	F.44
077SN22RC	180510	F.44
077SP1	180521	F.52
077SP12	180530	F.52
077SP12SFE	180545	F.52
077SP16	180531	F.52
077SP16SFE	180546	F.52
077SP1M	180522	F.52
077SP1MSFE	180537	F.52
077SP1SFE	180536	F.52
077SP2	180523	F.52
077SP20	180532	F.52
077SP20SFE	180547	F.52
077SP25	180533	F.52
077SP25SFE	180548	F.52
077SP2M	180524	F.52
077SP2MSFE	180539	F.52
077SP2SFE	180538	F.52
077SP3	180525	F.52
077SP30	180534	F.52
077SP30SFE	180549	F.52
077SP36	180535	F.52
077SP36SF	180554	F.52
077SP36SFC	180552	F.52
077SP36SFE	180550	F.52
077SP3SFE	180540	F.52
077SP4	180527	F.52
077SP4SFE	180542	F.52
077SP4V	180526	F.52
077SP4VSF	180553	F.52
077SP4VSFC	180551	F.52
077SP4VSFE	180541	F.52
077SP6	180528	F.52
077SP6SFE	180543	F.52
077SP9	180529	F.52
077SP9SFE	180544	F.52
077SUN22	180440	F.44
077SZN22	180480	F.44
077TGR	181650	F.51
077TGRO2	181840	F.51
077TNA	181660	F.51
077TNA2	181670	F.51
077TNA230	181951	F.51
077TNA3	181962	F.51
077TNA301	181963	F.51
077TNA312	181720	F.51
077TNA313	181722	F.51
077TNA40	181930	F.51
077TPF	181601	F.50
080...		
080CPDT	173208	F.10
080ESL	170212	F.30
080KCSP	170883	F.27
080QDF	173220	F.29
080QDF001	187715	F.29
080QDF002	187716	F.29
080QDF006	187705	F.29
080QDF017	187709	F.29
080QDF018	187710	F.29
080QDF026	187711	F.29
080QDF027	185788	F.29
080QDF028	187702	F.29
080QDF029	187701	F.29
080QDF030	185789	F.29
080QDF031	187713	F.29
080QDF032	187714	F.29
080QDF201	187719	F.29
080QDF202	187720	F.29
080SP1	170801	F.27
080SP12	170808	F.27
080SP12SF	170858	F.27
080SP12SFC	170856	F.27
080SP12SFE	170857	F.27
080SP18	170809	F.27
080SP18SF	170861	F.27
080SP18SFC	170859	F.27
080SP18SFE	170860	F.27
080SP1M	170831	F.27
080SP1MSF	170840	F.27
080SP1MSFC	170838	F.27
080SP1MSFE	170839	F.27
080SP1SF	170837	F.27
080SP1SFC	170835	F.27
080SP1SFE	170836	F.27
080SP2	170802	F.27
080SP24	170810	F.27
080SP24SFE	170862	F.27
080SP2M	170832	F.27
080SP2MSF	170846	F.27
080SP2MSFC	170844	F.27
080SP2MSFE	170845	F.27
080SP2SF	170843	F.27
080SP2SFC	170841	F.27
080SP2SFE	170842	F.27
080SP3	170803	F.27
080SP35	170811	F.27
080SP35SF	170865	F.27
080SP35SFC	170863	F.27
080SP35SFE	170864	F.27
080SP3SF	170849	F.27
080SP3SFC	170847	F.27
080SP3SFE	170848	F.27
080SP4	170804	F.27
080SP4M	170834	F.27
080SP4MSFE	170851	F.27
080SP4SFE	170850	F.27
080SP6	170806	F.27
080SP6SFE	170852	F.27
080SP8	170807	F.27
080SP8SF	170855	F.27
080SP8SFC	170853	F.27
080SP8SFE	170854	F.27
080XTG8	179515	F.32
080XTG801	179535	F.32
080XTG802	179536	F.32
080XTG803	179511	F.32
080XTG804	179537	F.32
080XTG805	179538	F.32
080XTG806	179539	F.32
080XTG807	179540	F.32
080XTG808	179541	F.32
080XTGR	179514	F.32
080XTGR01	179525	F.32
080XTGR02	179526	F.32
080XTGR03	179510	F.32
080XTGR04	179527	F.32
080XTGR05	179528	F.32
080XTGR06	179529	F.32
080XTGR07	179530	F.32
080XTGR08	179531	F.32
090...		
090MI1	130310	G.38
090MI2	130311	G.38
099...		
099SPDTDB	180009	F.51
105...		
105 CI	132242	F.59
105 CI 10	132243	F.59
105 GIL	132240	F.59
105 GIL 10	132241	F.59
105 PM	132244	F.59
105 PT	132234	F.58
105DTL220	132230	F.58
105DTL500	132231	F.58
105DTL690	132232	F.58
105GP1P220	132250	F.58
105GP1P220M	132251	F.58
105GP1P500	132252	F.58
105GP1P500M	132253	F.58
105PT	132234	G.29
114...		
114FCT03	130320	G.29
114FCT03T	130321	G.29
114FCT12	200909	G.29
114FCT21	200910	G.29
115...		
115803SP	132563	G.38
115804SP	132565	G.38
115805SP	132564	G.38
1158065SPA	215320	G.38
1158067SPA	215321	G.38
115807SP	132562	G.38
115CA	132571	G.38
115PC002	132500	G.38
115PC002A	215253	G.38
115PC015	132501	G.38
115PC015A	215252	G.38
115PC018	132502	G.38
115PC018A	241311	G.38
115PC119	132503	G.38
115PC119A	215329	G.38
115PC2015	132505	G.38
115PC2015A	132517	G.38
115PC2018	132515	G.38
115PC2018A	247788	G.38
390...		
390/3921/2FOM4/	214120	A.155
390/3921PFRN	244173	A.155
390/3921PFZCS14	202273	A.155
390/3921PFZCS25	244172	A.155
390/3921PFZCS45	202274	A.155
390/3921PMRN	202275	A.155
390/3921PMZI	202276	A.155
390/3921PZ	202277	A.155
390/3922FOM5/2	214121	A.155
390/3922PFRN	212709	A.155
390/3922PFZCS45	244744	A.155
390/3922PFZCS90	202278	A.155
390/3922PMRN	213014	A.155
390/3922PMZI	202279	A.155
390/3922PZ	202280	A.155
390/3923/2FOM4/	214122	A.155
390/3923FOM5/2	214123	A.155
390/3923PFRN	213986	A.155
390/3923PFZCS125	202281	A.155
390/3923PFZCS75	244745	A.155
390/3923PMRN	202282	A.155
390/3923PMZI	202283	A.155
390/3923PZ	202284	A.155
390/3924F4	214124	A.155
390/3924F5/2	204178	A.155
390/3924M4/2	214126	A.155
390/3924M5/2	214127	A.155
390/3924PFRN	202287	A.155
390/3924PFZCS125	202288	A.155
390/3924PFZCS200	202289	A.155
390/3924PMRN	202290	A.155
390/3924PMZI	202291	A.155
390/3924PZ	202292	A.155
390/3925F4/2	214128	A.155
390/3925F5/2	214129	A.155
390/3925M4/2	214130	A.155
390/3925M5/2	214131	A.155
390/3925PFRN	244746	A.155
390/3925PFZCS150	213573	A.155
390/3925PFZCS320	202295	A.155
390/3925PMRN	202297	A.155
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