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Our focus is on delivering the right solution for the application. But, decision makers demand more than just innovative products. They turn to Eaton for an unwavering commitment to personal support that makes customer success a top priority. For more information, visit www.eaton.eu.

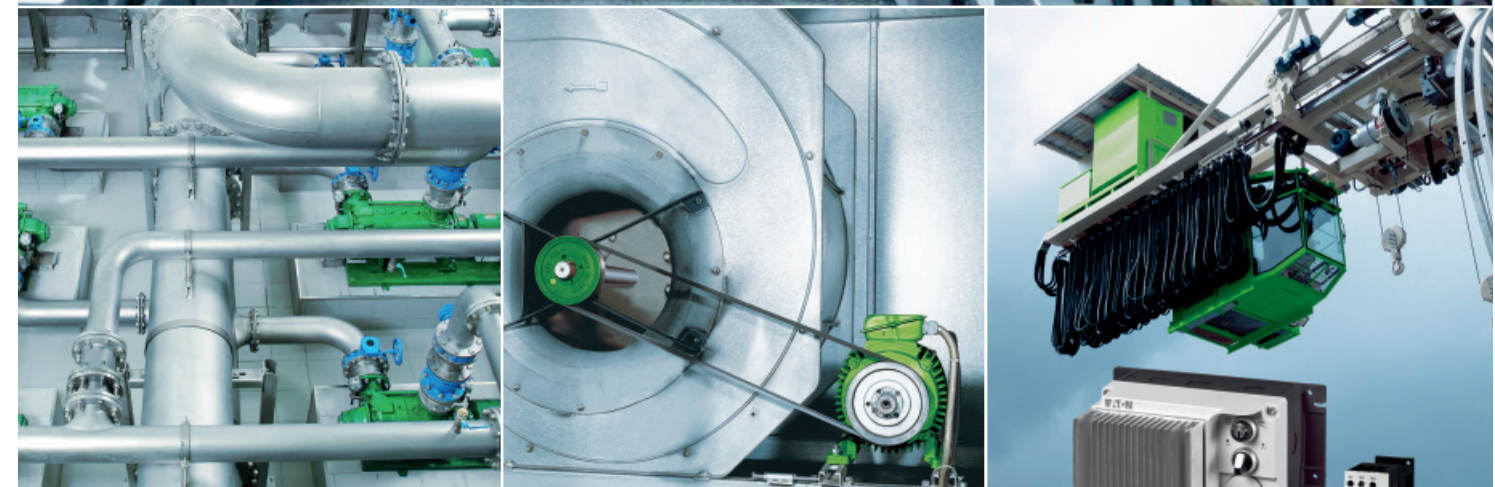
To contact an Eaton salesperson or local distributor/agent, please visit www.eaton.eu/electrical/customersupport

Product range catalog for variable frequency drives, soft starters, Rapid Link

DC1/DA1 and **SVX/SPX** variable frequency drives
DS7 and **S801+/S811+** soft starters
Rapid Link 4.0 distributed, electronic drive system

Product range catalog

Efficient Engineering for starting and controlling motors.



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Eaton Online Catalog – find product details quickly and efficiently!

You can find comprehensive up-to-date product information at <http://ecat.moeller.net>

Lookup

You can search by keywords, product names, article numbers, technical data: The search understands everything and takes you straight to the product you're looking for.

Graphical navigation

Graphical representation of the fields of application and product groups.

Selection aids

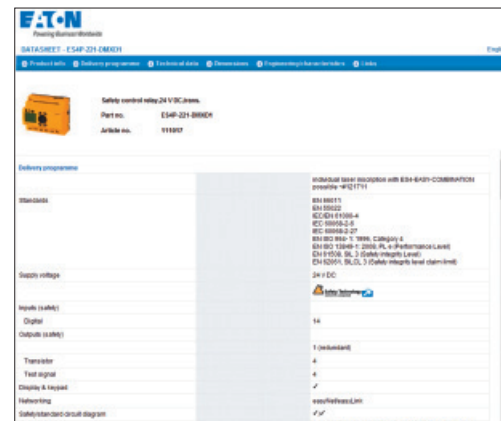
Tailored to the typical expert's approach, this search aid helps you quickly find the product you need.

Data sheets

For every article the catalog can generate a technical data sheet, which you can convert to a PDF file for printing or saving with a single click.

Parts lists

From your search results you can create a parts list that you can then send to your Eaton sales partner as a query.



HTML data sheet; can be saved as PDF file.

Item	Qty.	Photo	Article no.	Part no.	Short Text
1	1		111017	ESAP-221-08021	Safety control relay, 24 V DC, 12 A
2	1		229758	FAK-COMBI-AT-24	Complete unit
3	1		284031	M225-DOL-M-GR-3-10/2	Double act. 3-wire, set-off button ext.
4	1		290090	DALM15-01 (110V/50Hz, 120V/60Hz)	Contactors, 7, 5A/10A/20A, AC-operated
5	1		130016	PNEG5X70-05	PNSE - Trip block Standard S-65A

Parts list, e.g. for queries to Eaton Sales.

You can find comprehensive up-to-date information about Eaton's automation products and switchgear in our Online Catalog.



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The power of fusion.

1833

1874

1886

1893

1897

1899

1906

1908

1911

1914

1934

1961

1962

1963

1967

1977

1983

1984

1989

EATON
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There's a certain energy at Eaton. It's the power of uniting some of the world's most respected names to build a brand you can trust to meet your every power management need.

Eaton is dedicated to ensuring that reliable, efficient and safe power is available when it's needed most. Building on over 100 years of experience in electrical power management, the experts at Eaton deliver customized, integrated solutions to solve your most critical challenges. To learn more visit www.eaton.eu/electrical.

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DC1, DA1 variable frequency drives

SVX, SPX variable frequency drives

DS7 soft starters

S801+, S811+ soft starters

Rapid Link

SmartWire-DT™

Appendix



Energizing a world that demands more.

Discover today's Eaton.

Powering business worldwide

As a global diversified power management company, we help customers worldwide manage the power needed for buildings, aircraft, trucks, cars, machinery and businesses.

Eaton's innovative technologies help customers manage electrical, hydraulic and mechanical power more reliably, efficiently, safely and sustainably.

EATON

Powering Business Worldwide



We deliver:

- **Electrical solutions** that use less energy, improve power reliability and make the places we live and work safer and more comfortable
- **Hydraulic and electrical solutions** that enable machines to deliver more productivity without wasting power
- **Aerospace solutions** that make aircraft lighter, safer and less costly to operate, and help airports operate more efficiently
- **Vehicle drivetrain and powertrain solutions** that deliver more power to cars, trucks and buses, while reducing fuel consumption and emissions

We provide integrated solutions that help make energy, in all its forms, more practical and accessible.

With 2012 sales of \$16.3 billion, Eaton has approximately 103,000 employees around the world and sells products in more than 175 countries.



Eaton's electrical business

Eaton is a global leader with expertise in:

- Power distribution and circuit protection
- Backup power protection
- Solutions for harsh and hazardous environments
- Lighting and security
- Structural solutions and wiring devices
- Control and automation
- Engineering services

Eaton is positioned through its global solutions to answer today's most critical electrical power management challenges. With 100 years of electrical experience behind us, we're energized by the challenge of powering up a world that demands twice as much energy as today. We're anticipating needs, engineering products, and creating solutions to energize our markets today and in the future.

We are dedicated to ensuring that reliable, efficient and safe power is available when it's needed most.

www.eaton.eu



PowerXL™ DC1, DA1 variable frequency drives

Variable frequency drives make it possible to use infinitely variable speed control with three-phase asynchronous motors and AC motors. To do so, they convert a single-phase or three-phase alternating voltage with a specific frequency and amplitudes into a single-phase or three-phase alternating voltage with a variable frequency and a variable amplitude. With its DC1 and DA1 device series, Eaton has just the right variable frequency drive for any machine building application or standard electric drive system application, regardless of whether your needs are extremely simple or extremely complex.

DC1 variable frequency drives

Output voltage with sinusoidal pulse-width modulation (PWM) when using Volts-per-Hertz control (V/Hz control) with slip compensation and start voltage boost.

DC1-12...: U_{IN} 1~230 V/ U_{OUT} 3~230 V, allocated motor output 0.37 – 4 kW

DC1-32...: U_{IN} 3~230 V/ U_{OUT} 3~230 V, allocated motor output 0.37 – 4 kW

DC1-34...: U_{IN} 3~400 V/ U_{OUT} 3~400 V, allocated motor output 0.75 – 11 kW

DC1-S2...: U_{IN} 1~230 V/ U_{OUT} 1~230 V, allocated motor output 0.37 – 1.1 kW (Single-phase motor)

DC1-S1...: U_{IN} 1~115 V/ U_{OUT} 1~115 V, allocated motor output 0.37 – 0.55 kW

DC1-1D...: U_{IN} 1~115 V/ U_{OUT} 3~230 V, allocated motor output 0.37 – 1.1 kW (voltage doubler)

DA1 variable frequency drives

Output voltage with sinusoidal pulse-width modulation (PWM) when using Volts-per-Hertz control (V/Hz control), sensorless (SLVC) and sensed vector control

DA1-12...: U_{IN} 1~230 V/ U_{OUT} 3~230 V, allocated motor output 0.75 – 2.2 kW

DA1-32...: U_{IN} 3~230 V/ U_{OUT} 3~230 V, allocated motor output 0.75 – 75 kW

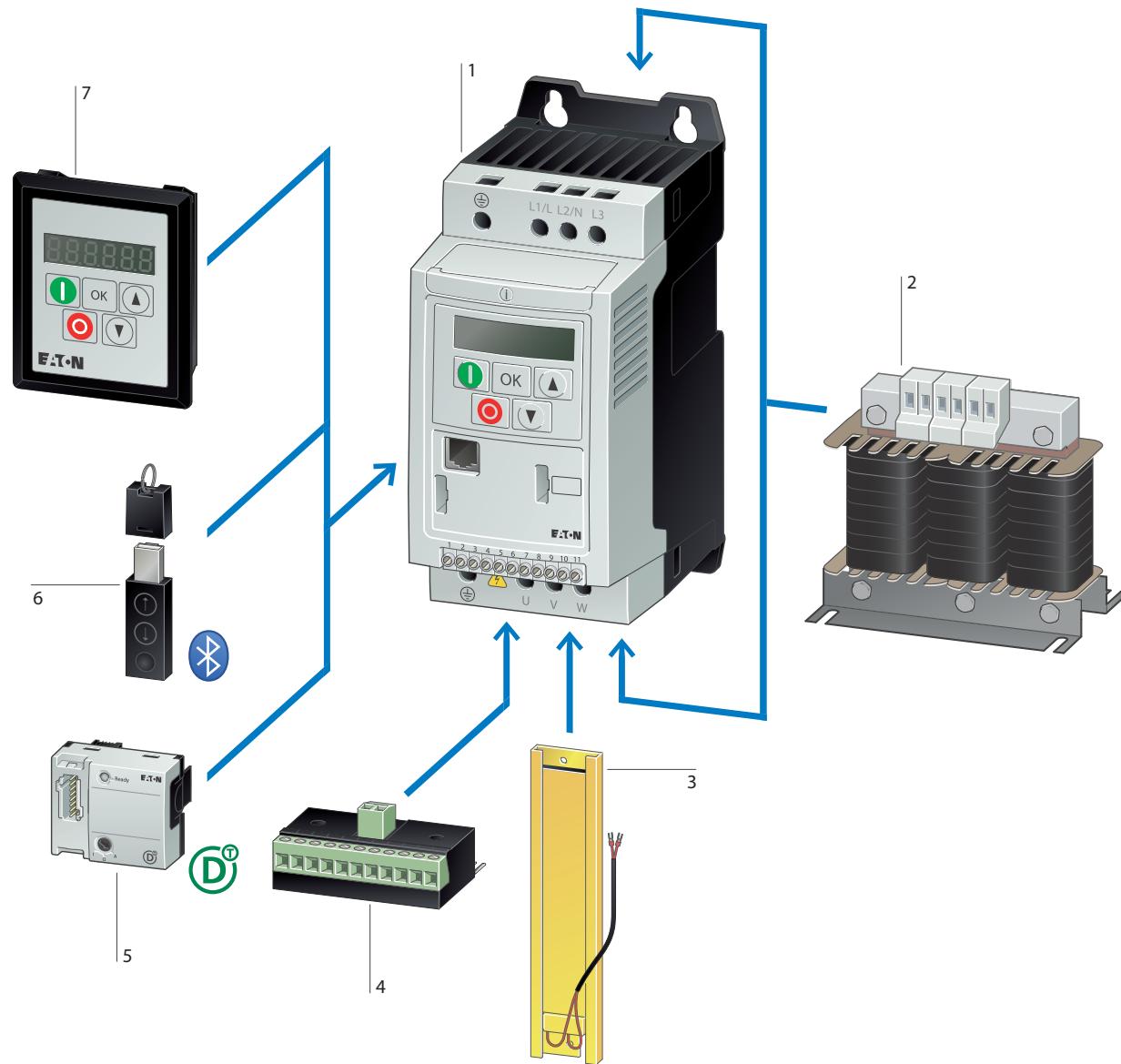
DA1-34...: U_{IN} 3~400 V/ U_{OUT} 3~400 V, allocated motor output 0.75 – 250 kW



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System overview

DC1 with IP20 degree of protection



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Description



The DC1 is Eaton's compact variable frequency drive. It has been specifically designed for simple applications. With only 14 basic parameters and outstanding ease of mounting and installation, the DC1 is perfect for quick commissioning. This makes these compact variable frequency drive ideal for series production applications in the field of machine building.

Typical applications for this series include fans, pumps, and conveyor systems. In addition, additional parameters and functionalities can be flexibly enabled in order to allow the DC1 to handle more demanding applications as well.

When configured with an IP66 degree of protection, DC1 variable frequency drives can be installed in humid and wet locations as well.

In addition, these variable frequency drives can also be used as stand-alone units directly on site if they are equipped with a setpoint potentiometer, a selector switch, and a mains transfer switch and are configured with an IP66 degree of protection.

Essential features

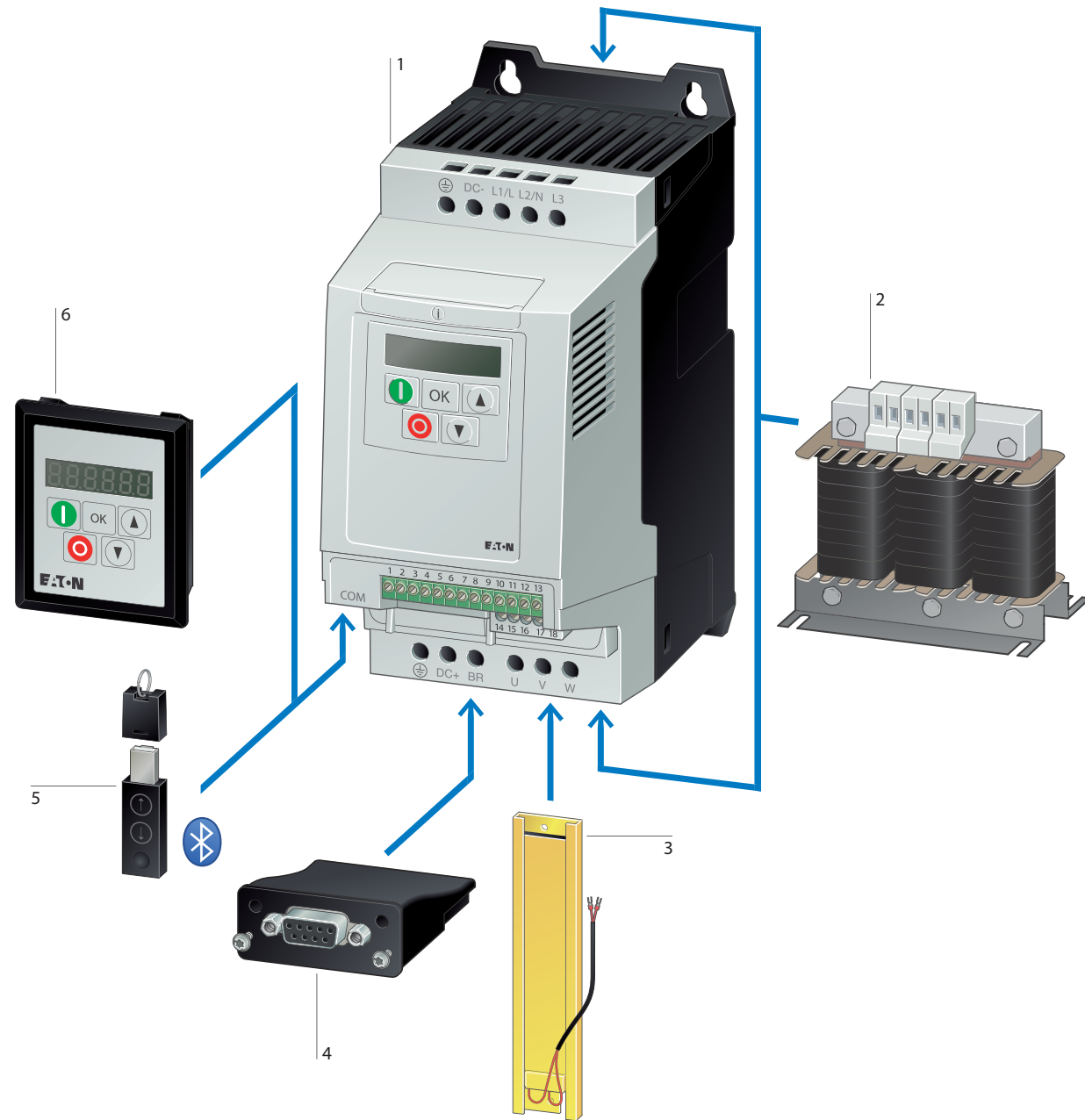
- Fast commissioning with 14 basic parameters
- Performance range (allocated motor output)
 - 0.37 - 4 kW (U_{IN} : 1~230 V / U_{OUT} : 3~230 V)
 - 0.37 - 4 kW (U_{IN} : 3~230 V / U_{OUT} : 3~230 V)
 - 0.75 - 11 kW (U_{IN} : 3~400 V / U_{OUT} : 3~400 V), up to 7.5 kW at IP66
 - 0.37 - 1.1 kW (U_{IN} : 1~230 V / U_{OUT} : 1~230 V), single-phase motor
 - 0.37 - 0.55 kW (U_{IN} : 1~115 V / U_{OUT} : 1~115 V), single-phase motor
 - 0.37 - 1.1 kW (U_{IN} : 1~115 V / U_{OUT} : 3~230 V) with voltage doubler
- Large overload capability: 150% for 60 seconds, 175% for 2 seconds
- Maximum ambient temperature:
 - 50 °C without derating (IP20) / 40 °C (IP66)
- Integrated® CANopen and Modbus
- Degree of protection to IP20 and IP66
- EMC filter
- Optional internal braking transistor for IP20 degree of protection
- Integrated PI controller
- V/Hz control with start voltage boost and slip compensation
- International standards (CE, UL, cUL, C-Tick, UkrSEPRO, RoHS)
- Side-by-side mounting

Accessory consideration

- SmartWire-DT field bus module
- I/O expansion with plug-in modules
- External keypad for control panel door
- Mains choke
- Motor choke
- sine filter
- braking resistances

System overview

DA1 with IP20 degree of protection



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Description



DA1 frequency inverters are ideal for demanding, speed-dependent applications. Their wide performance range of up to 250 kW, together with their compact dimensions and high level of functionality, are sure to leave a lasting impression. Accordingly, DA1 units come with an integrated EMC filter and braking transistor. Moreover, the Modbus RTU and CANopen protocols are integrated as standard. With sensorless vector control, DA1 variable frequency drives are able to provide 200% torque at zero rpm. This makes them the perfect choice for applications that involve lifting or tractive forces. Comprehensive expansions such as additional inputs and outputs (analog, digital) and various field bus modules round off this variable frequency drive's flexibility.

When configured with an IP66 degree of protection, DA1 variable frequency drives can be installed in humid and wet locations as well.

In addition, these variable frequency drives can also be used as stand-alone units directly on site if they are equipped with a setpoint potentiometer, a selector switch, and a mains transfer switch.

Essential features

- Performance range:
 - 0.75 - 2.2 kW (U_{IN} : 1~ 230 V / U_{OUT} : 3~ 230 V)
 - 0.75 - 75 kW (U_{IN} : 3~ 230 V / U_{OUT} : 3~ 230 V)
 - 0.75 - 250 kW (U_{IN} : 3~ 400 V / U_{OUT} : 3~ 400 V)
- Large overload capability: 150% for 60 seconds, 200% for 4 seconds
- Degrees of protection
 - IP20 to 11 kW at 400 V
 - IP40 at 200/250 kW at 400 V
 - IP55 for 11 to 160 kW with 400 V
 - IP66 up to 7.5 kW with 400 V; 0.75–4 kW with 230 V
- The maximum allocated motor output is 7.5 kW with degree of protection IP66.
- Integrated CANopen and Modbus
- EMC filter, integrated
- Braking transistor, integrated
- Control method: V/Hz control, sensorless vector control, vector control with encoder
- Safe Torque Off (STO)
- Can be used to drive high-efficiency PM motors
- International standards (CE, UL, cUL, C-Tick, UkrSEPRO, RoHS)
- Side-by-side mounting
- Ambient air temperature 50 °C without derating (IP20), max. 40 °C (IP66)
- Master/Slave functionality

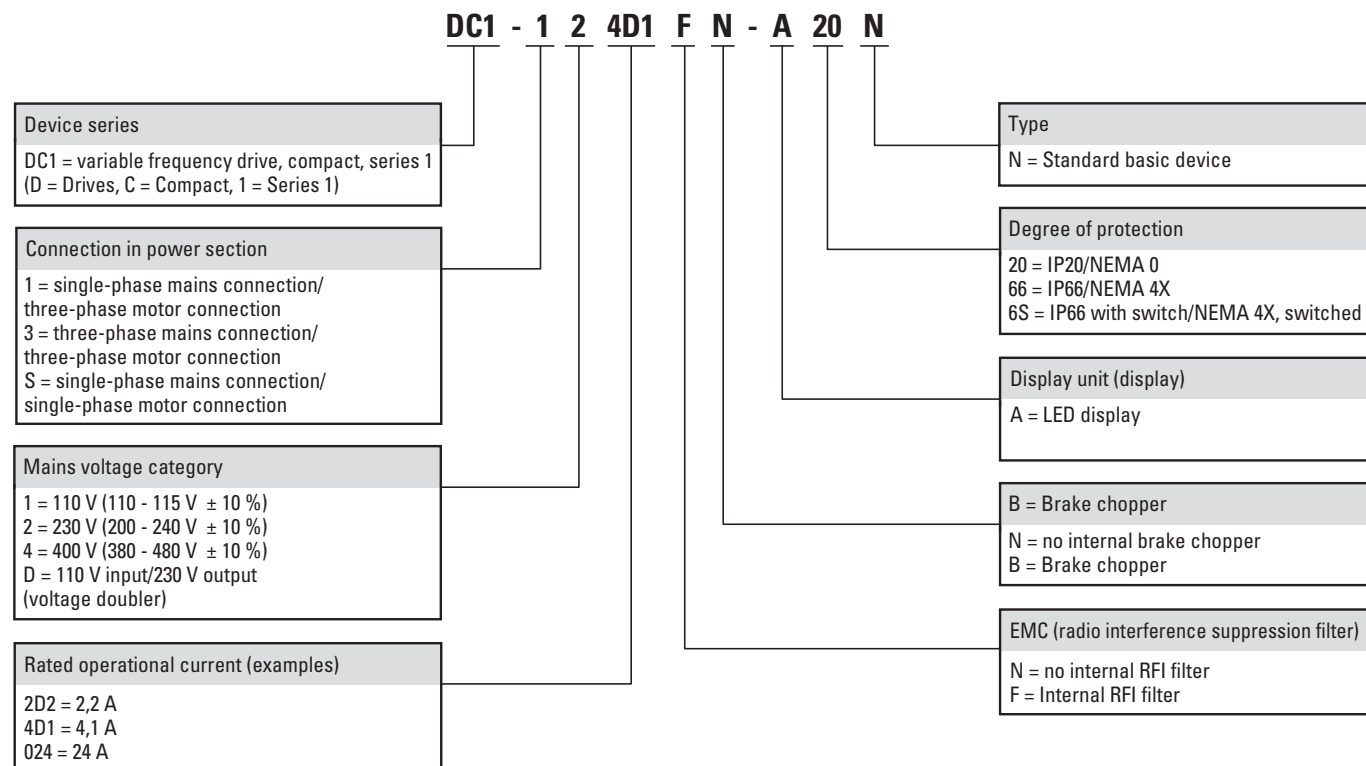
Accessory consideration

- SmartWire-DT field bus module
- Field bus modules (PROFIBUS, PROFINET, Ethernet/IP, EtherCat, Modbus TCP, BACnet, and DeviceNet)
- I/O expansion with plug-in modules
- External keypad for control panel door
- High-resolution OLED display
- Mains choke
- Motor chokes
- sine filter
- braking resistances

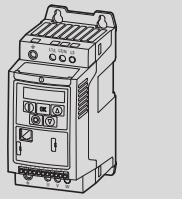
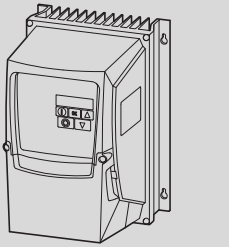
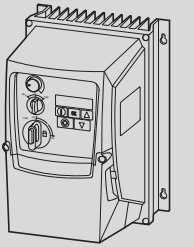
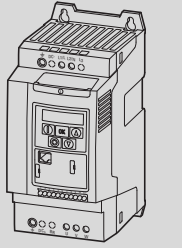
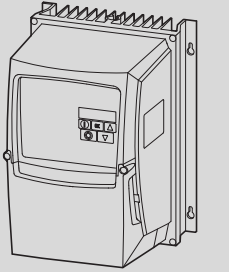
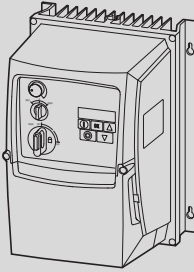
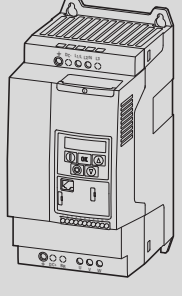
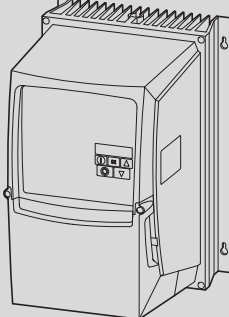
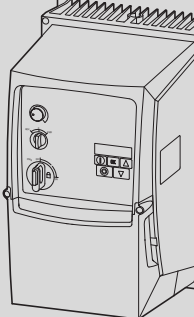
Technical overview

			DC1...	DA1...
Rated operational voltage	U _e			
115 V AC, single-phase			✓	-
230 V AC, 1-phase			✓	✓
230 V AC, 3-phase			✓	✓
400 V AC, 3-phase			✓	✓
Supply frequency	f _{LN}	Hz	50/60	50/60
Rated operational current	I _e	A	2.3 - 24	2.2 - 450
Overload current for 60 s every 600 s	I _L	%	150	150
Starting current for 2 s	I _L	%	175	-
Starting current for 4 s	I _L	%	-	200
Assigned motor rating				
at 115 V, 50 Hz	P	kW	0.37 - 0.55 (Single-phase motors)	-
at 230 V, 50 Hz	P	kW	0.37 - 4 (0.37 - 4 for single-phase motors)	0.75 - 75
at 400 V, 50 Hz	P	kW	0.75 - 11	0.75 - 250
Ambient temperature				
Operation		°C		
IP20/NEMA 0			-10 - +50	-10 - +50
IP40			-	-10 - +30
IP55/NEMA 3			-	-10 - +40 / -10 - +30 (I _e > 180 A)
IP66/NEMA 4X			-10 - +40	-10 - +40
Storage		°C	-40 - +60	-40 - +60
Operation Mode				
U/f control			✓	✓
Slip compensation			✓	✓
sensorless vector control (SLV)			-	✓
Vector control with feedback (CLV)			-	✓
Switching frequency	f _{PWM}	kHz	4 - 32	4 - 32
Output voltage with V _e	U ₂			
115 V AC, single-phase			✓	-
230 V AC, single-phase			✓	-
230 V AC, 3-phase			✓	✓
400 V AC, 3-phase			✓	✓
Output Frequency	f ₂	Hz	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)
Protection type				
IP20/NEMA 0			✓	✓
IP40			-	✓
IP55/NEMA 3			-	✓
IP66/NEMA 4X			✓	✓
Fitted with				
Radio interference suppression filter			✓	✓
Brake chopper			✓	✓
Additional PCB protection			-	✓
7-digital display assembly			✓	✓
OLED display			-	✓
Interface			OP-Bus (RS485)/Modbus RTU, CANopen®	OP-Bus (RS485)/Modbus RTU, CANopen®
Fieldbus connection			SmartWire-DT	Ethernet IP DeviceNet PROFIBUS PROFINET Modbus-TCP EtherCAT BACnet/IP SmartWire-DT
Analog inputs			parameterizable, max. 2 x (0 - 10 V, 0/4 - 20 mA)	parameterizable, max. 2 x (0 - 10 V, 0/4 - 20 mA)
Analog outputs			parameterizable, max. 1 x (0 - 10 V)	parameterizable, max. 2 x (0 - 10 V, 0/4 - 20 mA)
Digital inputs			parameterizable, max. 4 x (max. 30 V DC)	parameterizable, 3 x (max. 30 V DC)
Digital outputs			parameterizable, max. 1 x (24 V DC)	parameterizable, max. 2 x (24 V DC)
Relay outputs			parameterizable, 1 x N/O, 6 A (250 V AC) / 5 A (30 V DC)	parameterizable, 1 x N/O and 1 x changeover contact, 6 A (250 V AC) / 5 A (30 V DC)
Production quality			RoHS, ISO 9001	RoHS, ISO 9001
Safety functions			-	STO (Safe Torque Off)
Standards			EMC: EN 61800-3:2004+A1-2012	EMC: EN 61800-3:2004+A1-2012
Certifications			CE, cUL, UL, c-Tick, Ukr Sepro	CE, cUL, UL, c-Tick, Ukr Sepro

Key to type references



Sizes and degree of protection

Frame size	Protection type		
	IP20/NEMA 0	IP66/NEMA 4X	IP66/NEMA 4X Local controls
FS1			
FS2			
FS3			

UL/CSA

Information relevant for export to North America



Product Standards UL 508C; CSA-C22.2 No. 14; IEC/EN61800-3; IEC/EN61800-5; CE marking

UL File No. E172143

UL Category Control No. NMMS, NMMS7

CSA File No. UL report applies to both US and Canada

CSA Class No. 3211-06

North America Certification UL listed, certified by UL for use in Canada

Suitable for Branch circuits





Max. Voltage Rating 1~ 120 V AC IEC: TN-S UL/CSA: "Y" (Solidly Grounded Wey)
1~ 240 V AC IEC: TN-S UL/CSA: "Y" (Solidly Grounded Wey)
3~ 240 V AC IEC: TN-S UL/CSA: "Y" (Solidly Grounded Wey)
3~ 480 V AC IEC: TN-S UL/CSA: "Y" (Solidly Grounded Wey)

Ordering



Rated operational current ¹⁾	Assigned motor rating ²⁾	Rated motor current	Fitted with	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack
I _e A	P kW	I _e A	Radio interference suppression filter Brake chopper 7-digital display assembly Local controls					
<p>U_e 115 V AC, single-phase / U₂ 115 V AC, single-phase Mains voltage (50/60Hz) U_{LN} 110 (-10%) - 115 (+10%) V Interface OP-Bus (RS485)/Modbus RTU, CANopen®</p>								
7	0.37	7	- - ✓ - - - ✓ - - - ✓ ✓	FS1	IP20/NEMA 0 IP66/NEMA 4X	DC1-S17D0NN-A20N 169497 DC1-S17D0NN-A66N 169498 DC1-S17D0NN-A6SN 169499		1 off
10.5	0.55	10.5	- ✓ ✓ - - ✓ ✓ - - ✓ ✓ ✓	FS2	IP20/NEMA 0 IP66/NEMA 4X	DC1-S1011NB-A20N 169500 DC1-S1011NB-A66N 169501 DC1-S1011NB-A6SN 169502		
<p>U_e 230 V AC, 1-phase / U₂ 230 V AC, single-phase Mains voltage (50/60Hz) U_{LN} 200 (-10%) - 240 (+10%) V Interface OP-Bus (RS485)/Modbus RTU, CANopen®</p>								
4.3	0.37	4.3	- - ✓ - ✓ - ✓ - - - ✓ - - - ✓ ✓ ✓ - ✓ - ✓ - ✓ ✓	FS1	IP20/NEMA 0 IP66/NEMA 4X	DC1-S24D3NN-A20N 169512 DC1-S24D3FN-A20N 169521 DC1-S24D3NN-A66N 169513 DC1-S24D3NN-A6SN 169514 DC1-S24D3FN-A66N 169522 DC1-S24D3FN-A6SN 169523		1 off
7	0.75	7	- - ✓ - ✓ - ✓ - - - ✓ - - - ✓ ✓ ✓ - ✓ - ✓ - ✓ ✓	FS1	IP20/NEMA 0 IP66/NEMA 4X	DC1-S27D0NN-A20N 169515 DC1-S27D0FN-A20N 169524 DC1-S27D0NN-A66N 169516 DC1-S27D0NN-A6SN 169517 DC1-S27D0FN-A66N 169525 DC1-S27D0FN-A6SN 169526		
10.5	1.1	10.5	- ✓ ✓ - ✓ ✓ ✓ - - ✓ ✓ - - ✓ ✓ ✓ ✓ ✓ ✓ - ✓ ✓ ✓ ✓	FS2	IP20/NEMA 0 IP66/NEMA 4X	DC1-S2011NB-A20N 169518 DC1-S2011FB-A20N 169527 DC1-S2011NB-A66N 169519 DC1-S2011NB-A6SN 169520 DC1-S2011FB-A66N 169528 DC1-S2011FB-A6SN 169529		

Notes
¹⁾ Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C
²⁾ Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

Information relevant for export to North America → page 11

Rated operational current ¹⁾ I _e A	Assigned motor rating ²⁾ P kW	Rated motor current I _e A	Fitted with	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack
			Radio interference suppression filter Brake chopper 7-digital display assembly Local controls					
U₁ 115 V AC, single-phase / U₂ 230 V AC, 3-phase								
Mains voltage (50/60Hz) U _{LN} 110 (-10%) - 115 (+10%) V Interface OP-Bus (RS485)/Modbus RTU, CANopen®								
2.3	0.37	2	- - ✓ - - - ✓ - - - ✓ ✓	FS1	IP20/NEMA 0 IP66/NEMA 4X	DC1-1D2D3NN-A20N 169503 DC1-1D2D3NN-A66N 169504 DC1-1D2D3NN-A6SN 169505		1 off  
4.3	0.75	3.2	- - ✓ - - - ✓ - - - ✓ ✓		IP20/NEMA 0 IP66/NEMA 4X	DC1-1D4D3NN-A20N 169506 DC1-1D4D3NN-A66N 169507 DC1-1D4D3NN-A6SN 169508		
5.8	1.1	4.6	- ✓ ✓ - - ✓ ✓ - - ✓ ✓ ✓	FS2	IP20/NEMA 0 IP66/NEMA 4X	DC1-1D5D8NB-A20N 169509 DC1-1D5D8NB-A66N 169510 DC1-1D5D8NB-A6SN 169511		
U₁ 230 V AC, 1-phase / U₂ 230 V AC, 3-phase								
Mains voltage (50/60Hz) U _{LN} 200 (-10%) - 240 (+10%) V Interface OP-Bus (RS485)/Modbus RTU, CANopen®								
2.3	0.37	2	- - ✓ - ✓ - ✓ - - - ✓ - - - ✓ ✓ ✓ - ✓ - ✓ - ✓ ✓	FS1	IP20/NEMA 0 IP66/NEMA 4X	DC1-122D3NN-A20N 169222 DC1-122D3FN-A20N 169240 DC1-122D3NN-A66N 169223 DC1-122D3NN-A6SN 169224 DC1-122D3FN-A66N 169241 DC1-122D3FN-A6SN 169242		1 off  
4.3	0.75	3.2	- - ✓ - ✓ - ✓ - - - ✓ - - - ✓ ✓ ✓ - ✓ - ✓ - ✓ ✓	FS1	IP20/NEMA 0 IP66/NEMA 4X	DC1-124D3NN-A20N 169225 DC1-124D3FN-A20N 169243 DC1-124D3NN-A66N 169226 DC1-124D3NN-A6SN 169227 DC1-124D3FN-A66N 169244 DC1-124D3FN-A6SN 169245		

Notes
¹⁾ Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C
²⁾ Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

  Information relevant for export to North America → page 11

Rated operational current ¹⁾ I _e A	Assigned motor rating ²⁾ P kW	Rated motor current I _e A	Fitted with Radio interference suppression filter Brake chopper 7-digital display assembly Local controls	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack	
U _e 230 V AC, 1-phase / U ₂ 230 V AC, 3-phase Mains voltage (50/60Hz) U _{LN} 200 (-10%) - 240 (+10%) V Interface OP-Bus (RS485)/Modbus RTU, CANopen®									
7	1.5	6.3	- - ✓ -	FS1	IP20/NEMA 0	DC1-127D0NN-A20N 169228		1 off	
			✓ - ✓ -			DC1-127D0FN-A20N 169246			
			- ✓ ✓ -	FS2	IP20/NEMA 0	DC1-127D0NB-A20N 169231			
			✓ ✓ ✓ -			DC1-127D0FB-A20N 169249			
			- - ✓ -	FS1	IP66/NEMA 4X	DC1-127D0NN-A66N 169229			
			- - ✓ ✓			DC1-127D0NN-A6SN 169230			
			✓ - ✓ -			DC1-127D0FN-A66N 169247			
			✓ - ✓ ✓			DC1-127D0FN-A6SN 169248			
			- ✓ ✓ -		FS2	IP66/NEMA 4X			DC1-127D0NB-A66N 169232
			- ✓ ✓ ✓						DC1-127D0NB-A6SN 169233
			✓ ✓ ✓ -						DC1-127D0FB-A66N 169250
			✓ ✓ ✓ ✓						DC1-127D0FB-A6SN 169251
10.5	2.2	8.7	- ✓ ✓ -	FS2	IP20/NEMA 0	DC1-12011NB-A20N 169234			
			✓ ✓ ✓ -			DC1-12011FB-A20N 169252			
			- ✓ ✓ ✓	FS1	IP66/NEMA 4X	DC1-12011NB-A66N 169235			
			- ✓ ✓ ✓			DC1-12011NB-A6SN 169236			
			✓ ✓ ✓ -			DC1-12011FB-A66N 169253			
			✓ ✓ ✓ ✓			DC1-12011FB-A6SN 169254			
15	4	14.8	- ✓ ✓ -	FS3	IP20/NEMA 0	DC1-12015NB-A20N 169237			
			- ✓ ✓ -			DC1-12015NB-A66N 169238			
			- ✓ ✓ ✓	IP66/NEMA 4X	DC1-12015NB-A6SN 169239				

Notes

¹⁾ Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C
²⁾ Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

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Rated operational current ¹⁾ I _e A	Assigned motor rating ²⁾ P kW	Rated motor current I _e A	Fitted with Radio interference suppression filter Brake chopper 7-digital display assembly Local controls	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack					
U ₁ 230 V AC, 3-phase / U ₂ 230 V AC, 3-phase Mains voltage (50/60Hz) U _{LN} 200 (-10%) - 240 (+10%) V Interface OP-Bus (RS485)/Modbus RTU, CANopen®													
2.3	0.37	2	- - ✓ -	FS1	IP20/NEMA 0	DC1-322D3NN-A20N 169255		1 off 					
			- - ✓ -			IP66/NEMA 4X			DC1-322D3NN-A66N 169256				
			- - ✓ ✓						DC1-322D3NN-A6SN 169257				
4.3	0.75	3.2	- - ✓ -	FS1	IP20/NEMA 0	DC1-324D3NN-A20N 169258							
			- - ✓ -			IP66/NEMA 4X			DC1-324D3NN-A66N 169259				
			- - ✓ ✓						DC1-324D3NN-A6SN 169260				
7	1.5	6.3	- - ✓ -	FS1	IP20/NEMA 0	DC1-327D0NN-A20N 169261							
			- ✓ ✓ -			FS2			DC1-327D0NB-A20N 169264				
			✓ ✓ ✓ -	FS1	IP66/NEMA 4X	DC1-327D0FB-A20N 169444							
			- - ✓ -			DC1-327D0NN-A66N 169262							
			- - ✓ ✓	FS2	IP66/NEMA 4X	DC1-327D0NN-A6SN 169263							
			- ✓ ✓ -			DC1-327D0NB-A66N 169436							
			- ✓ ✓ ✓	FS2	IP66/NEMA 4X	DC1-327D0NB-A6SN 169437							
			✓ ✓ ✓ -			DC1-327D0FB-A66N 169445							
			✓ ✓ ✓ ✓			DC1-327D0FB-A6SN 169446							
			10.5	2.2	8.7	- ✓ ✓ -			FS2	IP20/NEMA 0	DC1-32011NB-A20N 169438		
						✓ ✓ ✓ -							
						- ✓ ✓ -			IP66/NEMA 4X	DC1-32011NB-A66N 169439			
- ✓ ✓ ✓	DC1-32011NB-A6SN 169440												
✓ ✓ ✓ -	DC1-32011FB-A66N 169448												
✓ ✓ ✓ ✓	DC1-32011FB-A6SN 169449												
18	4	14.8	- ✓ ✓ -	FS3	IP20/NEMA 0	DC1-32018NB-A20N 169441							
			✓ ✓ ✓ -						DC1-32018FB-A20N 169450				
			- ✓ ✓ -	IP66/NEMA 4X	DC1-32018NB-A66N 169442								
			- ✓ ✓ ✓		DC1-32018NB-A6SN 169443								
			✓ ✓ ✓ -		DC1-32018FB-A66N 169451								
			✓ ✓ ✓ ✓		DC1-32018FB-A6SN 169452								

Notes
¹⁾ Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C
²⁾ Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

Rated operational current ¹⁾ I _e A	Assigned motor rating ²⁾ P kW	Rated motor current I _e A	Fitted with				Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack						
			Radio interference suppression filter	Brake chopper	7-digital display assembly	Local controls											
U _g 400 V AC, 3-phase / U ₂ 400 V AC, 3-phase Mains voltage (50/60Hz) U _{LN} 380 (-10%) - 480 (+10%) V Interface OP-Bus (RS485)/Modbus RTU, CANopen®																	
2.2	0.75	1.9	-	-	✓	-	FS1	IP20/NEMA 0	DC1-342D2NN-A20N 169453		1 off						
			✓	-	✓	-							IP66/NEMA 4X	DC1-342D2FN-A20N 169475			
			-	-	✓	-									DC1-342D2NN-A66N 169454		
			-	-	✓	✓										DC1-342D2NN-A6SN 169455	
			✓	-	✓	-											DC1-342D2FN-A66N 169476
			✓	-	✓	✓											
4.1	1.5	3.6	-	-	✓	-	FS1	IP20/NEMA 0	DC1-344D1NN-A20N 169456	1 off							
			✓	-	✓	-						IP66/NEMA 4X	DC1-344D1FN-A20N 169478				
			-	✓	✓	-								DC1-344D1NB-A20N 169459			
			✓	✓	✓	-									DC1-344D1FB-A20N 169481		
			-	-	✓	-	FS1	IP66/NEMA 4X	DC1-344D1NN-A66N 169457								
			-	-	✓	✓						DC1-344D1NN-A6SN 169458					
			✓	-	✓	-							DC1-344D1FN-A66N 169479				
			-	✓	✓	-								FS2	DC1-344D1NB-A66N 169460		
			-	✓	✓	✓	DC1-344D1NB-A6SN 169461										
			✓	-	✓	✓		FS1	IP20/NEMA 0			DC1-345D8NB-A20N 169462					
			✓	✓	✓	-							IP66/NEMA 4X			DC1-345D8FB-A20N 169484	
			✓	✓	✓	✓								DC1-345D8NB-A66N 169463			
-	✓	✓	-	DC1-345D8NB-A6SN 169464													
✓	✓	✓	-		DC1-345D8FB-A66N 169485												
✓	✓	✓	✓			DC1-345D8FB-A6SN 169486											

Notes
¹⁾ Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C
²⁾ Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

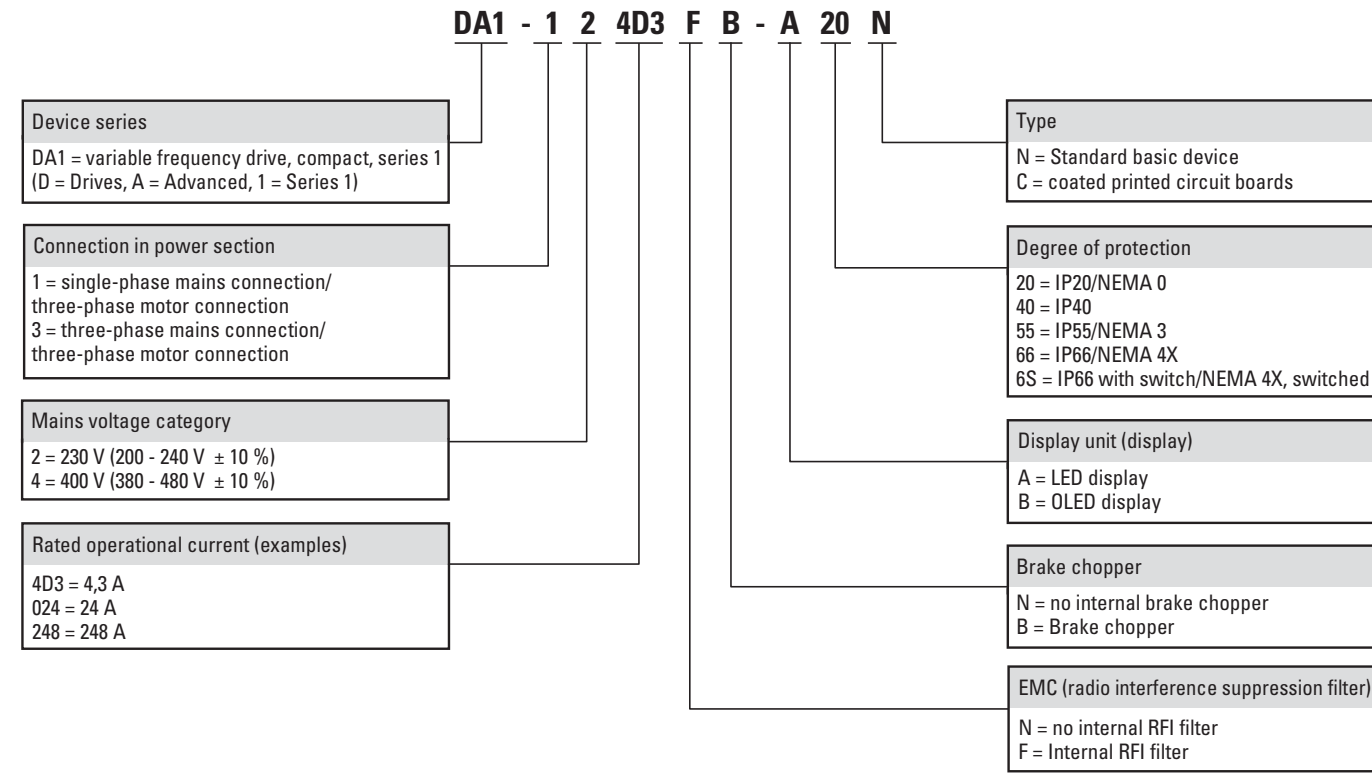
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Rated operational current ¹⁾ I _e A	Assigned motor rating ²⁾ P kW	Rated motor current I _e A	Fitted with				Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack						
			Radio interference suppression filter	Brake chopper	7-digital display assembly	Local controls											
U₁ 400 V AC, 3-phase / U₂ 400 V AC, 3-phase Mains voltage (50/60Hz) U _{LN} 380 (-10%) - 480 (+10%) V Interface OP-Bus (RS485)/Modbus RTU, CANopen®																	
9.5	4	8.5	-	✓	✓	-	FS2	IP20/NEMA 0	DC1-349D5NB-A20N 169465		1 off						
			✓	✓	✓	-							IP66/NEMA 4X	DC1-349D5FB-A20N 169487			
			-	✓	✓	-									DC1-349D5NB-A66N 169466		
			✓	✓	✓	-										DC1-349D5NB-A6SN 169467	
			✓	✓	✓	-											DC1-349D5FB-A66N 169488
			✓	✓	✓	✓											
14	5.5	11.3	-	✓	✓	-	FS3	IP20/NEMA 0	DC1-34014NB-A20N 169468		1 off						
			✓	✓	✓	-							IP66/NEMA 4X	DC1-34014FB-A20N 169490			
			-	✓	✓	-									DC1-34014NB-A66N 169469		
			✓	✓	✓	-										DC1-34014NB-A6SN 169470	
			✓	✓	✓	-											DC1-34014FB-A66N 169491
			✓	✓	✓	✓											
18	7.5	15.2	-	✓	✓	-		IP20/NEMA 0	DC1-34018NB-A20N 169471		1 off						
			✓	✓	✓	-							IP66/NEMA 4X	DC1-34018FB-A20N 169493			
			-	✓	✓	-									DC1-34018NB-A66N 169472		
			✓	✓	✓	-										DC1-34018NB-A6SN 169473	
			✓	✓	✓	-											DC1-34018FB-A66N 169494
			✓	✓	✓	✓											
24	11	21.7	-	✓	✓	-		IP20/NEMA 0	DC1-34024NB-A20N 169474		1 off						
			✓	✓	✓	-							IP20/NEMA 0	DC1-34024FB-A20N 169496			

Notes
¹⁾ Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C
²⁾ Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

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Key to type references

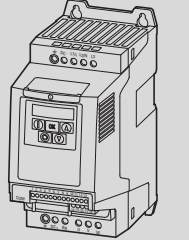
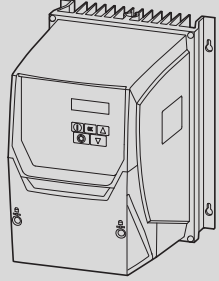
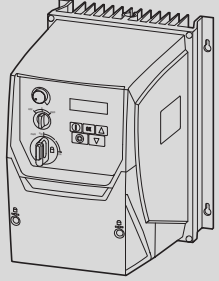
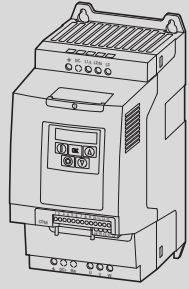
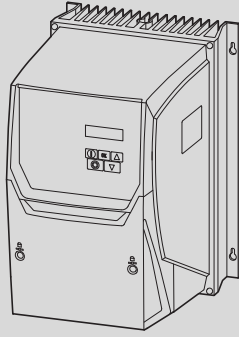
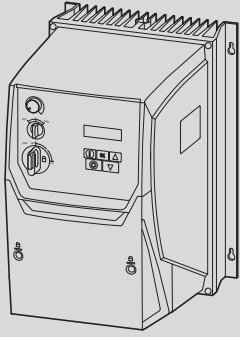


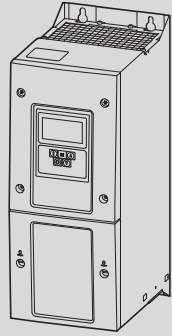
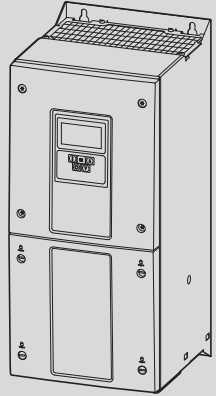
UL/CSA

Information relevant for export to North America

Product Standards	UL 508C; CSA-C22.2 No. 14; IEC/EN61800-3; IEC/EN61800-5; CE marking
UL File No.	E172143
UL Category Control No.	NMMS, NMMS7
CSA File No.	UL report applies to both US and Canada
CSA Class No.	3211-06
North America Certification	UL listed, certified by UL for use in Canada
Suitable for	Branch circuits
Max. Voltage Rating	1~ 240 V AC IEC: TN-S UL/CSA: "Y" (Solidly Grounded Wey) 3~ 240 V AC IEC: TN-S UL/CSA: "Y" (Solidly Grounded Wey) 3~ 480 V AC IEC: TN-S UL/CSA: "Y" (Solidly Grounded Wey)

Sizes and degree of protection

Frame size	Protection type IP20/NEMA 0	IP66/NEMA 4X	IP66/NEMA 4X Local controls
FS2			
FS3			

Frame size	Protection type IP55/NEMA 3	IP40	
FS4		-	-
FS5	 FS5	-	-
FS8	-	Panel version	-

Rated operational current ¹⁾ I _e A	Assigned motor rating ²⁾ P kW	Rated motor current I _e A	Fitted with Radio interference suppression filter Brake chopper 7-digital display assembly OLED display Local controls Additional PCB protection	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack	
U _e 230 V AC, 1-phase / U ₂ 230 V AC, 3-phase Mains voltage (50/60Hz) U _{LN} 200 (-10%) - 240 (+10%) V Interface OP-Bus (RS485)/Modbus RTU, CANopen®									
4.3	0.75	3.2	✓ ✓ ✓ - - -	FS2	IP20/NEMA 0	DA1-124D3FB-A20N 169152		1 off 	
			✓ ✓ ✓ - - ✓			DA1-124D3FB-A20C 169078			
			✓ ✓ ✓ - - -			IP66/NEMA 4X			DA1-124D3FB-A66N 169153
			✓ ✓ - ✓ - -			DA1-124D3FB-B66N 169280			
			✓ ✓ - ✓ - ✓			DA1-124D3FB-B66C 169347			
			✓ ✓ ✓ - ✓ -			DA1-124D3FB-A6SN 169154			
			✓ ✓ - ✓ ✓ -			DA1-124D3FB-B6SN 169281			
			✓ ✓ ✓ - - ✓			DA1-124D3FB-A66C 169079			
			✓ ✓ ✓ - ✓ ✓			DA1-124D3FB-A6SC 169080			
			✓ ✓ - ✓ ✓ ✓			DA1-124D3FB-B6SC 169348			
7	1.5	6.3	✓ ✓ ✓ - - -	FS2	IP20/NEMA 0	DA1-127D0FB-A20N 169155			
			✓ ✓ ✓ - ✓ ✓			DA1-127D0FB-A20C 169081			
			✓ ✓ ✓ - - -			IP66/NEMA 4X			DA1-127D0FB-A66N 169156
			✓ ✓ - ✓ - -			DA1-127D0FB-B66N 169282			
			✓ ✓ ✓ - - ✓			DA1-127D0FB-A66C 169082			
			✓ ✓ - ✓ ✓ -			DA1-127D0FB-B6SN 169283			
			✓ ✓ - ✓ - ✓			DA1-127D0FB-B66C 169349			
			✓ ✓ ✓ - ✓ -			DA1-127D0FB-A6SN 169157			
			✓ ✓ - ✓ ✓ ✓			DA1-127D0FB-B6SC 169350			
			✓ ✓ ✓ - ✓ ✓			DA1-127D0FB-A6SC 169083			
10.5	2.2	8.7	✓ ✓ ✓ - - -	FS2	IP20/NEMA 0	DA1-12011FB-A20N 169158			
			✓ ✓ ✓ - - ✓			DA1-12011FB-A20C 169084			
			✓ ✓ ✓ - - -			IP66/NEMA 4X			DA1-12011FB-A66N 169159
			✓ ✓ - ✓ - -			DA1-12011FB-B66N 169284			
			✓ ✓ ✓ - ✓ -			DA1-12011FB-A6SN 169160			
			✓ ✓ - ✓ ✓ -			DA1-12011FB-B6SN 169285			
			✓ ✓ - ✓ - ✓			DA1-12011FB-B66C 169351			
			✓ ✓ ✓ - - ✓			DA1-12011FB-A66C 169085			
			✓ ✓ - ✓ ✓ ✓			DA1-12011FB-B6SC 169352			
			✓ ✓ ✓ - ✓ ✓			DA1-12011FB-A6SC 169086			

Notes
¹⁾ Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C
²⁾ Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

Rated operational current ¹⁾ I _e A	Assigned motor rating ²⁾ P kW	Rated motor current I _e A	Fitted with Radio interference suppression filter Brake chopper 7-digital display assembly OLED display Local controls Additional PCB protection	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack	
U _e 230 V AC, 3-phase / U ₂ 230 V AC, 3-phase Mains voltage (50/60Hz) U _{LN} 200 (-10%) - 240 (+10%) V Interface OP-Bus (RS485)/Modbus RTU, CANopen®									
4.3	0.75	3.2	✓ ✓ ✓ - - -	FS2	IP20/NEMA 0	DA1-324D3FB-A20N 169161		1 off 	
			✓ ✓ ✓ - ✓ ✓			DA1-324D3FB-A20C 169087			
			✓ ✓ ✓ - - -			IP66/NEMA 4X			DA1-324D3FB-A66N 169162
			✓ ✓ - ✓ - -			DA1-324D3FB-B66N 169286			
			✓ ✓ - ✓ ✓ -			DA1-324D3FB-B6SN 169287			
			✓ ✓ - ✓ - ✓			DA1-324D3FB-B66C 169353			
			✓ ✓ ✓ - ✓ -			DA1-324D3FB-A6SN 169163			
			✓ ✓ ✓ - - ✓			DA1-324D3FB-A66C 169088			
			✓ ✓ - ✓ ✓ ✓			DA1-324D3FB-B6SC 169354			
			✓ ✓ ✓ - ✓ ✓			DA1-324D3FB-A6SC 169089			
7	1.5	6.3	✓ ✓ ✓ - - -	FS2	IP20/NEMA 0	DA1-327D0FB-A20N 169164			
			✓ ✓ ✓ - - ✓			DA1-327D0FB-A20C 169090			
			✓ ✓ ✓ - - -			IP66/NEMA 4X			DA1-327D0FB-A66N 169165
			✓ ✓ - ✓ - -			DA1-327D0FB-B66N 169288			
			✓ ✓ ✓ - - ✓			DA1-327D0FB-A66C 169091			
			✓ ✓ - ✓ - ✓			DA1-327D0FB-B66C 169355			
			✓ ✓ ✓ - ✓ -			DA1-327D0FB-A6SN 169166			
			✓ ✓ - ✓ ✓ -			DA1-327D0FB-B6SN 169289			
			✓ ✓ - ✓ ✓ ✓			DA1-327D0FB-B6SC 169356			
			✓ ✓ ✓ - ✓ ✓			DA1-327D0FB-A6SC 169092			
10.5	2.2	8.7	✓ ✓ ✓ - - -	FS2	IP20/NEMA 0	DA1-32011FB-A20N 169167			
			✓ ✓ ✓ - - ✓			DA1-32011FB-A20C 169093			
			✓ ✓ ✓ - - -			IP66/NEMA 4X			DA1-32011FB-A66N 169168
			✓ ✓ - ✓ - -			DA1-32011FB-B66N 169290			
			✓ ✓ ✓ - ✓ -			DA1-32011FB-A6SN 169169			
			✓ ✓ - ✓ - ✓			DA1-32011FB-B66C 169357			
			✓ ✓ - ✓ ✓ -			DA1-32011FB-B6SN 169291			
			✓ ✓ ✓ - - ✓			DA1-32011FB-A66C 169094			
			✓ ✓ ✓ - ✓ ✓			DA1-32011FB-A6SC 169095			
			✓ ✓ - ✓ ✓ ✓			DA1-32011FB-B6SC 169358			

Notes
¹⁾ Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C
²⁾ Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

Rated operational current ¹⁾ I _e A	Assigned motor rating ²⁾ P kW	Rated motor current I _e A	Fitted with Radio interference suppression filter Brake chopper 7-digital display assembly OLED display Local controls Additional PCB protection	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack
18	4	14.8	✓ ✓ ✓ - - -	FS3	IP20/NEMA 0	DA1-32018FB-A20N 169170		1 off
			✓ ✓ ✓ - - ✓			DA1-32018FB-A20C 169096		
			✓ ✓ - ✓ - -		IP66/NEMA 4X	DA1-32018FB-B66N 169292		
			✓ ✓ ✓ - - -			DA1-32018FB-A66N 169171		
			✓ ✓ ✓ - ✓ -			DA1-32018FB-A6SN 169172		
			✓ ✓ - ✓ ✓ -			DA1-32018FB-B6SN 169293		
			✓ ✓ ✓ - - ✓			DA1-32018FB-A66C 169097		
			✓ ✓ - ✓ - ✓			DA1-32018FB-B66C 169359		
			✓ ✓ ✓ - - ✓			DA1-32018FB-A6SC 169098		
			✓ ✓ - ✓ ✓ ✓			DA1-32018FB-B6SC 169360		
24	5.5	19.6	✓ ✓ ✓ - - -	FS3	IP20/NEMA 0	DA1-32024FB-A20N 169173		
			✓ ✓ ✓ - - ✓			DA1-32024FB-A20C 169099		
			✓ ✓ ✓ - - -	FS4	IP55	DA1-32024FB-A55N 169174		
			✓ ✓ - ✓ - -			DA1-32024FB-B55N 169294		
			✓ ✓ - ✓ - ✓			DA1-32024FB-B55C 169361		
			✓ ✓ ✓ - - ✓			DA1-32024FB-A55C 169100		
39	7.5	26.5	✓ ✓ ✓ - - -	FS4	IP55/NEMA 3	DA1-32039FB-A55N 169175		
			✓ ✓ - ✓ - -			DA1-32039FB-B55N 169295		
			✓ ✓ - ✓ - ✓			DA1-32039FB-B55C 169362		
			✓ ✓ ✓ - - ✓			DA1-32039FB-A55C 169101		
46	11	38	✓ ✓ ✓ - - -			DA1-32046FB-A55N 169176		
			✓ ✓ - ✓ - -			DA1-32046FB-B55N 169296		
			✓ ✓ - ✓ - ✓			DA1-32046FB-B55C 169363		
			✓ ✓ ✓ - - ✓			DA1-32046FB-A55C 169102		
61	15	51	✓ ✓ ✓ - - -			DA1-32061FB-A55N 169177		
			✓ ✓ - ✓ - -			DA1-32061FB-B55N 169297		
			✓ ✓ - ✓ - ✓			DA1-32061FB-B55C 169364		
			✓ ✓ ✓ - - ✓			DA1-32061FB-A55C 169103		

Notes
¹⁾ Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C
²⁾ Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

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Rated operational current ¹⁾ I _e A	Assigned motor rating ²⁾ P kW	Rated motor current I _e A	Fitted with Radio interference suppression filter Brake chopper 7-digital display assembly OLED display Local controls Additional PCB protection	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack
72	18.5	63	✓ ✓ ✓ - - -	FS5	IP55/NEMA 3	DA1-32072FB-A55N 169178		1 off
			✓ ✓ - ✓ - -			DA1-32072FB-B55N 169298		
			✓ ✓ ✓ - - ✓			DA1-32072FB-A55C 169104		
			✓ ✓ - ✓ - ✓			DA1-32072FB-B55C 169365		
90	22	71	✓ - - ✓ - -	FS6	IP55/NEMA 3	DA1-32090FN-B55N 169299		
			✓ - ✓ - - -			DA1-32090FN-A55N 169179		
			✓ - ✓ - - ✓			DA1-32090FN-A55C 169105		
			✓ ✓ - ✓ - -			DA1-32090FB-B55N 169300		
			✓ ✓ ✓ - - -			DA1-32090FB-A55N 169180		
			✓ - - ✓ - ✓			DA1-32090FN-B55C 169366		
			✓ ✓ ✓ - - ✓			DA1-32090FB-A55C 169106		
			✓ ✓ - ✓ - ✓			DA1-32090FB-B55C 169367		
110	30	96	✓ - - ✓ - -	FS6	IP55/NEMA 3	DA1-32110FN-B55N 169301		
			✓ - ✓ - - -			DA1-32110FN-A55N 169181		
			✓ ✓ ✓ - - -			DA1-32110FB-A55N 169182		
			✓ ✓ - ✓ - -			DA1-32110FB-B55N 169302		
			✓ - - ✓ - ✓			DA1-32110FN-B55C 169368		
			✓ - ✓ - - ✓			DA1-32110FN-A55C 169107		
			✓ ✓ ✓ - - ✓			DA1-32110FB-A55C 169108		
			✓ ✓ - ✓ - ✓			DA1-32110FB-B55C 169369		
150	45 ³⁾	141	✓ - - ✓ - -	FS6	IP55/NEMA 3	DA1-32150FN-B55N 169303		
			✓ - ✓ - - -			DA1-32150FN-A55N 169183		
			✓ ✓ ✓ - - -			DA1-32150FB-A55N 169184		
			✓ ✓ - ✓ - -			DA1-32150FB-B55N 169304		
			✓ - - ✓ - ✓			DA1-32150FN-B55C 169370		
			✓ - ✓ - - ✓			DA1-32150FN-A55C 169109		
			✓ ✓ - ✓ - ✓			DA1-32150FB-B55C 169371		
			✓ ✓ ✓ - - ✓			DA1-32150FB-A55C 169110		

Notes
¹⁾ Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C
²⁾ Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)
³⁾ Alternatively: allocated motor output of 37 kW (230 V) with 117-A rated motor current
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Rated operational current ¹⁾ I _e A	Assigned motor rating ²⁾ P kW	Rated motor current I _e A	Fitted with	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack
			Radio interference suppression filter Brake chopper 7-digital display assembly OLED display Local controls Additional PCB protection					
<p>U₁ 230 V AC, 3-phase / U₂ 230 V AC, 3-phase Mains voltage (50/60Hz) U_{LN} 200 (-10%) - 240 (+10%) V Interface OP-Bus (RS485)/Modbus RTU, CANopen®</p>								
180	55 ³⁾	173	✓ - - ✓ - - ✓ - ✓ - - - ✓ ✓ ✓ - - - ✓ - ✓ - - ✓ ✓ - - ✓ - ✓ ✓ ✓ - ✓ - - ✓ ✓ - ✓ - ✓ ✓ ✓ ✓ - - ✓	FS6	IP55	DA1-32180FN-B55N 169305 DA1-32180FN-A55N 169185 DA1-32180FB-A55N 169186 DA1-32180FN-A55C 169111 DA1-32180FN-B55C 169372 DA1-32180FB-B55N 169306 DA1-32180FB-B55C 169373 DA1-32180FB-A55C 169112		1 off
202	55	173	✓ - - ✓ - - ✓ - ✓ - - - ✓ ✓ ✓ - - - ✓ - ✓ - - ✓ ✓ ✓ - ✓ - - ✓ - - ✓ - ✓ ✓ ✓ - ✓ - ✓ ✓ ✓ ✓ - - ✓	FS7		DA1-32202FN-B55N 169307 DA1-32202FN-A55N 169187 DA1-32202FB-A55N 169188 DA1-32202FN-A55C 169113 DA1-32202FB-B55N 169308 DA1-32202FN-B55C 169374 DA1-32202FB-B55C 169375 DA1-32202FB-A55C 169114		
248	75	233	✓ - - ✓ - - ✓ - ✓ - - - ✓ ✓ ✓ - - - ✓ ✓ - ✓ - - ✓ - - ✓ - ✓ ✓ - ✓ - - ✓ ✓ ✓ ✓ - - ✓ ✓ ✓ - ✓ - ✓			DA1-32248FN-B55N 169309 DA1-32248FN-A55N 169189 DA1-32248FB-A55N 169190 DA1-32248FB-B55N 169310 DA1-32248FN-B55C 169376 DA1-32248FN-A55C 169115 DA1-32248FB-A55C 169116 DA1-32248FB-B55C 169377		

Notes

- ¹⁾ Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C
- ²⁾ Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)
- ³⁾ Alternatively: allocated motor output of 45 kW (230 V) with 141-A rated motor current

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Rated operational current ¹⁾ I _e A	Assigned motor rating ²⁾ P kW	Rated motor current I _e A	Fitted with Radio interference suppression filter Brake chopper 7-digital display assembly OLED display Local controls Additional PCB protection	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack	
U _e 400 V AC, 3-phase / U ₂ 400 V AC, 3-phase Mains voltage (50/60Hz) U _{LN} 380 (-10%) - 480 (+10%) V Interface OP-Bus (RS485)/Modbus RTU, CANopen®									
2.2	0.75	1.9	✓ ✓ ✓ - - -	FS2	IP20/NEMA 0	DA1-342D2FB-A20N 169191		1 off 	
			✓ ✓ ✓ - - ✓			DA1-342D2FB-A20C 169117			
			✓ ✓ ✓ - - -			IP66/NEMA 4X			DA1-342D2FB-A66N 169192
			✓ ✓ - ✓ - -			DA1-342D2FB-B66N 169311			
			✓ ✓ ✓ - ✓ -			DA1-342D2FB-A6SN 169193			
			✓ ✓ ✓ - - ✓			DA1-342D2FB-A66C 169118			
			✓ ✓ - ✓ ✓ -			DA1-342D2FB-B6SN 169312			
			✓ ✓ - ✓ - ✓			DA1-342D2FB-B66C 169378			
			✓ ✓ - ✓ ✓ ✓			DA1-342D2FB-B6SC 169379			
			✓ ✓ ✓ - ✓ ✓			DA1-342D2FB-A6SC 169119			
4.1	1.5	3.6	✓ ✓ ✓ - - -	FS2	IP20/NEMA 0	DA1-344D1FB-A20N 169194			
			✓ ✓ ✓ - - ✓			DA1-344D1FB-A20C 169120			
			✓ ✓ ✓ - - -			IP66/NEMA 4X			DA1-344D1FB-A66N 169195
			✓ ✓ - ✓ - -			DA1-344D1FB-B66N 169313			
			✓ ✓ ✓ - ✓ -			DA1-344D1FB-A6SN 169196			
			✓ ✓ - ✓ ✓ -			DA1-344D1FB-B6SN 169314			
			✓ ✓ ✓ - - ✓			DA1-344D1FB-A66C 169049			
			✓ ✓ - ✓ - ✓			DA1-344D1FB-B66C 169380			
			✓ ✓ - ✓ ✓ ✓			DA1-344D1FB-B6SC 169381			
			✓ ✓ ✓ - ✓ ✓			DA1-344D1FB-A6SC 169050			
5.8	2.2	5	✓ ✓ ✓ - - -	FS2	IP20/NEMA 0	DA1-345D8FB-A20N 169197			
			✓ ✓ ✓ - - ✓			DA1-345D8FB-A20C 169051			
			✓ ✓ ✓ - - -			IP66/NEMA 4X			DA1-345D8FB-A66N 169198
			✓ ✓ - ✓ - -			DA1-345D8FB-B66N 169315			
			✓ ✓ ✓ - ✓ -			DA1-345D8FB-A6SN 169199			
			✓ ✓ - ✓ - ✓			DA1-345D8FB-B66C 169382			
			✓ ✓ - ✓ ✓ -			DA1-345D8FB-B6SN 169316			
			✓ ✓ ✓ - - ✓			DA1-345D8FB-A66C 169052			
			✓ ✓ - ✓ ✓ ✓			DA1-345D8FB-B6SC 169383			
			✓ ✓ ✓ - ✓ ✓			DA1-345D8FB-A6SC 169053			

Notes
¹⁾ Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C
²⁾ Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

Rated operational current ¹⁾ I _e A	Assigned motor rating ²⁾ P kW	Rated motor current I _e A	Fitted with Radio interference suppression filter Brake chopper 7-digital display assembly OLED display Local controls Additional PCB protection	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack	
U_e 400 V AC, 3-phase / U₂ 400 V AC, 3-phase Mains voltage (50/60Hz) U _{LN} 380 (-10%) - 480 (+10%) V Interface OP-Bus (RS485)/Modbus RTU, CANopen®									
9.5	4	8.5	✓ ✓ ✓ - - -	FS2	IP20/NEMA 0	DA1-349D5FB-A20N 169200		1 off 	
			✓ ✓ ✓ - ✓ ✓			DA1-349D5FB-A20C 169054			
			✓ ✓ ✓ - - -			IP66/NEMA 4X			DA1-349D5FB-A66N 169201
			✓ ✓ - ✓ - -			DA1-349D5FB-B66N 169317			
			✓ ✓ ✓ - - ✓			DA1-349D5FB-A66C 169055			
			✓ ✓ - ✓ ✓ -			DA1-349D5FB-B66SN 169318			
			✓ ✓ ✓ - ✓ -			DA1-349D5FB-A6SN 169202			
			✓ ✓ - ✓ - ✓			DA1-349D5FB-B66C 169384			
			✓ ✓ ✓ - ✓ ✓			DA1-349D5FB-A6SC 169056			
			✓ ✓ - ✓ ✓ ✓			DA1-349D5FB-B6SC 169385			
14	5.5	11.3	✓ ✓ ✓ - - -	FS3	IP20/NEMA 0	DA1-34014FB-A20N 169203			
			✓ ✓ ✓ - - ✓			DA1-34014FB-A20C 169057			
			✓ ✓ ✓ - - -			IP66/NEMA 4X			DA1-34014FB-A66N 169204
			✓ ✓ - ✓ - -			DA1-34014FB-B66N 169319			
			✓ ✓ ✓ - ✓ -			DA1-34014FB-A6SN 169205			
			✓ ✓ - ✓ ✓ -			DA1-34014FB-B6SN 169320			
			✓ ✓ - ✓ - ✓			DA1-34014FB-B66C 169386			
			✓ ✓ ✓ - - ✓			DA1-34014FB-A66C 169058			
			✓ ✓ ✓ - ✓ ✓			DA1-34014FB-A6SC 169059			
			✓ ✓ - ✓ ✓ ✓			DA1-34014FB-B6SC 169387			
18	7.5	15.2	✓ ✓ ✓ - - -	FS3	IP20/NEMA 0	DA1-34018FB-A20N 169206			
			✓ ✓ ✓ - ✓ ✓			DA1-34018FB-A20C 169060			
			✓ ✓ - ✓ - -			IP66/NEMA 4X			DA1-34018FB-B66N 169321
			✓ ✓ ✓ - - -			DA1-34018FB-A66N 169207			
			✓ ✓ - ✓ - ✓			DA1-34018FB-B66C 169388			
			✓ ✓ ✓ - ✓ -			DA1-34018FB-A6SN 169208			
			✓ ✓ - ✓ ✓ -			DA1-34018FB-B6SN 169322			
			✓ ✓ ✓ - - ✓			DA1-34018FB-A66C 169061			
			✓ ✓ ✓ - ✓ ✓			DA1-34018FB-A6SC 169062			
			✓ ✓ - ✓ ✓ ✓			DA1-34018FB-B6SC 169389			

Notes
¹⁾ Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C
²⁾ Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

Rated operational current ¹⁾ I _e A	Assigned motor rating ²⁾ P kW	Rated motor current I _e A	Fitted with Radio interference suppression filter Brake chopper 7-digital display assembly OLED display Local controls Additional PCB protection	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack					
24	11	21.7	✓ ✓ ✓ - - -	FS3	IP20/NEMA 0	DA1-34024FB-A20N 169209		1 off					
			✓ ✓ ✓ - - ✓			DA1-34024FB-A20C 169063							
			✓ ✓ ✓ - - -	FS4	IP55	DA1-34024FB-A55N 169210							
			✓ ✓ - ✓ - -			DA1-34024FB-B55N 169323							
			✓ ✓ - ✓ - ✓			DA1-34024FB-B55C 169390							
			✓ ✓ ✓ - - ✓			DA1-34024FB-A55C 169064							
			✓ ✓ - ✓ - -			DA1-34030FB-B55N 169324							
			✓ ✓ ✓ - - -			DA1-34030FB-A55N 169211							
			✓ ✓ ✓ - - ✓	DA1-34030FB-A55C 169065									
			✓ ✓ - ✓ - ✓	DA1-34030FB-B55C 169391									
			39	18.5	36	✓ ✓ - ✓ - -					DA1-34039FB-B55N 169325		
						✓ ✓ ✓ - - -					DA1-34039FB-A55N 169212		
✓ ✓ ✓ - - ✓	DA1-34039FB-A55C 169066												
✓ ✓ - ✓ - ✓	DA1-34039FB-B55C 169392												
46	22	41	✓ ✓ ✓ - - -			DA1-34046FB-A55N 169213							
			✓ ✓ - ✓ - -			DA1-34046FB-B55N 169326							
			✓ ✓ - ✓ - ✓			DA1-34046FB-B55C 169393							
			✓ ✓ ✓ - - ✓			DA1-34046FB-A55C 169067							
61	30	55	✓ ✓ ✓ - - -	FS5		DA1-34061FB-A55N 169214							
			✓ ✓ - ✓ - -			DA1-34061FB-B55N 169327							
			✓ ✓ ✓ - - ✓			DA1-34061FB-A55C 169068							
			✓ ✓ - ✓ - ✓			DA1-34061FB-B55C 169394							
72	37	68	✓ ✓ ✓ - - -			DA1-34072FB-A55N 169215							
			✓ ✓ - ✓ - -			DA1-34072FB-B55N 169328							
			✓ ✓ ✓ - - ✓			DA1-34072FB-A55C 169069							
			✓ ✓ - ✓ - ✓			DA1-34072FB-B55C 169395							

Notes
¹⁾ Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C
²⁾ Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

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Rated operational current ¹⁾ I _e A	Assigned motor rating ²⁾ P kW	Rated motor current I _e A	Fitted with Radio interference suppression filter Brake chopper 7-digital display assembly OLED display Local controls Additional PCB protection	Frame size FS6	Protection type IP55/NEMA 3	Part no. Article no.	Price see price list	Std. pack
90	45	81	✓ - ✓ - - -	FS6	IP55/NEMA 3	DA1-34090FN-A55N 169216		1 off
			✓ - - ✓ - -			DA1-34090FN-B55N 169329		
			✓ ✓ ✓ - - -			DA1-34090FB-A55N 169037		
			✓ - ✓ - - ✓			DA1-34090FN-A55C 169070		
			✓ ✓ - ✓ - -			DA1-34090FB-B55N 169330		
			✓ - - ✓ - ✓			DA1-34090FN-B55C 169396		
			✓ ✓ - ✓ - ✓			DA1-34090FB-B55C 169397		
			✓ ✓ ✓ - - ✓			DA1-34090FB-A55C 169071		
110	55	99	✓ - ✓ - - -	FS6	IP55/NEMA 3	DA1-34110FN-A55N 169038		1 off
			✓ - - ✓ - -			DA1-34110FN-B55N 169331		
			✓ ✓ ✓ - - -			DA1-34110FB-A55N 169039		
			✓ - ✓ - - ✓			DA1-34110FN-A55C 169072		
			✓ - - ✓ - ✓			DA1-34110FN-B55C 169398		
			✓ ✓ - ✓ - -			DA1-34110FB-B55N 169332		
			✓ ✓ - ✓ - ✓			DA1-34110FB-B55C 169399		
			✓ ✓ ✓ - - ✓			DA1-34110FB-A55C 169265		
150	75	134	✓ - - ✓ - -	FS6	IP55/NEMA 3	DA1-34150FN-B55N 169333		1 off
			✓ - ✓ - - -			DA1-34150FN-A55N 169040		
			✓ ✓ ✓ - - -			DA1-34150FB-A55N 169041		
			✓ ✓ - ✓ - -			DA1-34150FB-B55N 169334		
			✓ - - ✓ - ✓			DA1-34150FN-B55C 169400		
			✓ - ✓ - - ✓			DA1-34150FN-A55C 169266		
			✓ ✓ - ✓ - ✓			DA1-34150FB-B55C 169401		
			✓ ✓ ✓ - - ✓			DA1-34150FB-A55C 169267		

Notes

¹⁾ Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C
²⁾ Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

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Rated operational current ¹⁾ I _e A	Assigned motor rating ²⁾ P kW	Rated motor current I _e A	Fitted with Radio interference suppression filter Brake chopper 7-digital display assembly OLED display Local controls Additional PCB protection	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack
180	90	161	✓ - ✓ - - -	FS6	IP55	DA1-34180FN-A55N 169042		1 off
			✓ - - ✓ - -			DA1-34180FN-B55N 169335		
			✓ - ✓ - - ✓			DA1-34180FN-A55C 169268		
			✓ ✓ ✓ - - -			DA1-34180FB-A55N 169043		
			✓ ✓ - ✓ - -			DA1-34180FB-B55N 169336		
			✓ - - ✓ - ✓			DA1-34180FN-B55C 169402		
			✓ ✓ ✓ - - ✓			DA1-34180FB-A55C 169269		
			✓ ✓ - ✓ - ✓			DA1-34180FB-B55C 169403		
202	110	196	✓ - ✓ - - -	FS7		DA1-34202FN-A55N 169044		
			✓ - - ✓ - -			DA1-34202FN-B55N 169337		
			✓ ✓ ✓ - - -			DA1-34202FB-A55N 169045		
			✓ - - ✓ - ✓			DA1-34202FN-B55C 169404		
			✓ - ✓ - - ✓			DA1-34202FN-A55C 169270		
			✓ ✓ - ✓ - -			DA1-34202FB-B55N 169338		
			✓ ✓ - ✓ - ✓			DA1-34202FB-B55C 169405		
			✓ ✓ ✓ - - ✓			DA1-34202FB-A55C 169271		
240	132	231	✓ - - ✓ - -			DA1-34240FN-B55N 169339		
			✓ - ✓ - - -			DA1-34240FN-A55N 169046		
			✓ - ✓ - - ✓			DA1-34240FN-A55C 169272		
			✓ - - ✓ - ✓			DA1-34240FN-B55C 169406		
			✓ ✓ - ✓ - -			DA1-34240FB-B55N 169340		
			✓ ✓ ✓ - - -			DA1-34240FB-A55N 169047		
			✓ ✓ ✓ - - ✓			DA1-34240FB-A55C 169273		
			✓ ✓ - ✓ - ✓			DA1-34240FB-B55C 169407		

Notes
¹⁾ Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C
²⁾ Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)






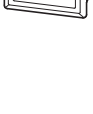






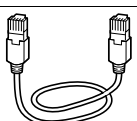


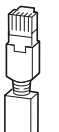


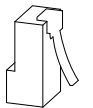




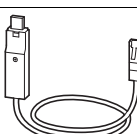


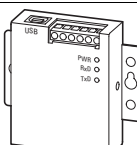


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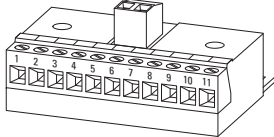
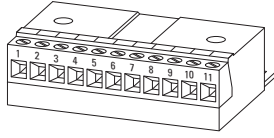
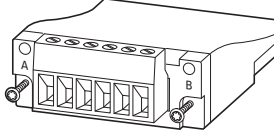
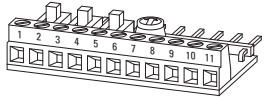

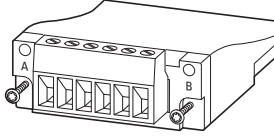

Rated operational current ¹⁾ I _e A	Assigned motor rating ²⁾ P kW	Rated motor current I _e A	Fitted with Radio interference suppression filter Brake chopper 7-digital display assembly OLED display Local controls Additional PCB protection	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack							
302	160	279	- - - ✓ - ✓	FS7	IP55	DA1-34302FN-B55C 169408		1 off							
			✓ - - ✓ - -			DA1-34302FN-B55N 169341									
			✓ - ✓ - - ✓			DA1-34302FN-A55C 169274									
			✓ ✓ - ✓ - ✓			DA1-34302FB-B55C 169217									
			✓ ✓ ✓ - - -			DA1-34302FB-A55N 169073									
			✓ ✓ - ✓ - -			DA1-34302FB-B55N 169342									
			✓ ✓ ✓ - ✓ -			DA1-34302FN-A55N 169048									
			✓ ✓ ✓ - - ✓			DA1-34302FB-A55C 169275									
			370			200			349	✓ - - ✓ - -	FS8	IP40	DA1-34370FN-B40N 169343		1 off
										✓ - ✓ - - -			DA1-34370FN-A40N 169074		
✓ - - ✓ - ✓	DA1-34370FN-B40C 169218														
✓ ✓ ✓ - - -	DA1-34370FB-A40N 169075														
✓ - ✓ - - ✓	DA1-34370FN-A40C 169276														
✓ ✓ - ✓ - -	DA1-34370FB-B40N 169344														
✓ ✓ - ✓ - ✓	DA1-34370FB-B40C 169219														
✓ ✓ ✓ - - ✓	DA1-34370FB-A40C 169277														
450	250	437		✓ - - ✓ - -				DA1-34450FN-B40N 169345							
				✓ - ✓ - - -				DA1-34450FN-A40N 169076							
			✓ ✓ - ✓ - -	DA1-34450FB-B40N 169346											
			✓ ✓ ✓ - - -	DA1-34450FB-A40N 169077											
			✓ - - ✓ - ✓	DA1-34450FN-B40C 169220											
			✓ - ✓ - - ✓	DA1-34450FN-A40C 169278											
			✓ ✓ - ✓ - ✓	DA1-34450FB-B40C 169221											
			✓ ✓ ✓ - - ✓	DA1-34450FB-A40C 169279											


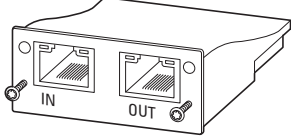

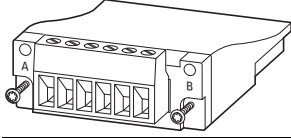
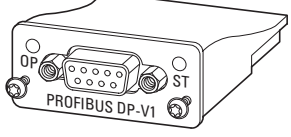
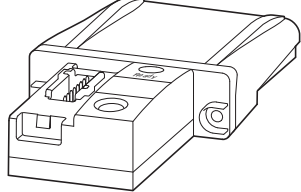

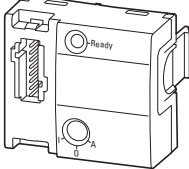
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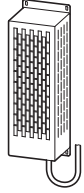

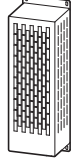

¹⁾ Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C
²⁾ Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)


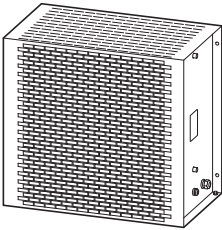

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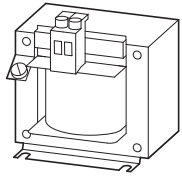
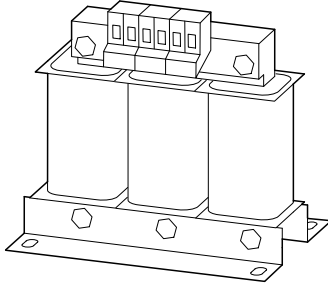


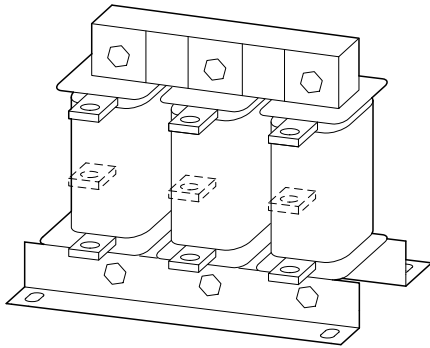
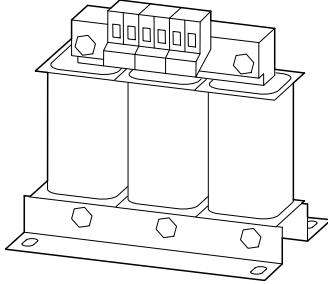


Description	For use with	Part no. Article no.	Price see price list	Std. pack	Information relevant for export to North America  
External keypad					
 with LED display Front IP54 With approx. 3 m-long, plug-in connection cable (RJ45, 8-pin)	DC1, DA1	DX-KEY-LED 169132		1 off  	UL/CSA certification not required
 with OLED display Front IP54 Multilingual With approx. 3 m-long, plug-in connection cable (RJ45, 8-pin)	DC1, DA1	DX-KEY-OLED 169133			
Bluetooth communications stick					
For transferring parameters to a computer with drivesConnect software via Bluetooth					
 With 2 function keys for uploading and downloading parameters with configuration memory	DC1, DA1	DX-COM-STICK 169134		1 off  	UL/CSA certification not required
License Keys					
 For enabling the drivesConnect program's PLC function	DA1	DX-COM-SOFT 169136		1 off  	UL/CSA certification not required
Connection cable					
Connection cable with RJ45 plugs, 8 pole					
 Length 0.5 m	DC1, DA1	DX-CBL-RJ45-0M5 169137		1 off  	UL/CSA certification not required
Length 1 m	DC1, DA1	DX-CBL-RJ45-1M0 169138			
Length 3 m	DC1, DA1	DX-CBL-RJ45-3M0 169139			
Bus termination resistor					
 With 2 resistors, 120 Ω RJ45 plug, 8-pin for CANopen® and Modbus RTU	DX-SPL-RJ45-2SL-1PLT	DX-CBL-TERM 169140		1 off  	UL/CSA certification not required
 8 pole RJ45 124 Ω Connection to PIN 1 and PIN 2 für CANopen®	easyNet easyNet	EASY-NT-R 256281		2 off  	
Cable and splitter					
RJ45, 8-pin, 2 sockets/1 plug	DC1, DA1	DX-SPL-RJ45-2SL1PL 169142		1 off  	UL/CSA certification not required
Interface converter					
For directly connecting the variable-frequency drive to a computer with drivesConnect software					
 Interface converter USB/RS485 with connection cable, RJ45, 8 pole electrically isolated	DC1, DA1	DX-CBL-PC-1M5 171018		1 off  	UL/CSA certification not required
 Interface converter USB/RS485 with connection cable, RJ45, 8 pole electrically isolated 1 × SUB-D plug, 9-pole Terminal strip, 5-terminal LED indicators	DC1, DA1	DX-COM-PCKIT 169135		1 off  	UL/CSA certification not required

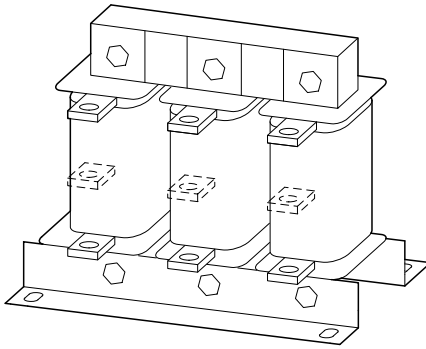


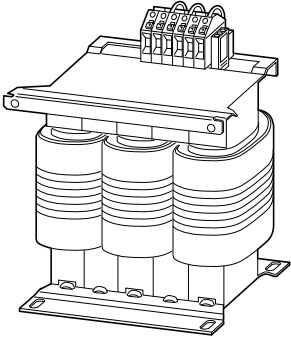


	Description	For use with	Part no. Article no.	Price see price list	Std. pack	Information relevant for export to North America 
Expansion modules						
	110-V-input (electrically isolated)	DC1	DXC-EXT-IO110 169032		1 off	
	230-V-input (electrically isolated)	DC1	DXC-EXT-IO230 169033			
	2 relay outputs 1 analog output	DC1	DXC-EXT-2R01A0 169030			
	2 relay outputs	DC1	DXC-EXT-2R0 169031			
	3 digital inputs 1 Relay output	DA1	DXA-EXT-3DI1R0 169036			
	3 relay outputs	DA1	DXA-EXT-3R0 169121			
Simulator						
	3 digital inputs 1 Relay output 1 Potentiometer	DC1	DXC-EXT-LOCSIM 169034		1 off 	UL/CSA certification not required
Encoder module						
	2-channel max. 500 kHz 5 V TTL, A & B, /A & /B, 5 V DC, max. 200 mA 24 V HTL, A & B, /A & /B, 24 V DC, external power supply required, max. 30 V DC	DA1	DXA-EXT-ENCOD 169035		1 off 	UL/CSA certification not required

	Fieldbus connection	For use with	Part no. Article no.	Price see price list	Std. pack	Information relevant for export to North America 
Fieldbus modules						
2 x RJ45, 8 pole 	Ethernet IP	DA1	DX-NET-ETHERNET-2 169122		1 off 	UL/CSA certification not required
	Modbus-TCP	DA1	DX-NET-MOVBUSTCP-2 169126			
	EtherCAT	DA1	DX-NET-ETHERCAT-2 169127			
	BACnet/IP	DA1	DX-NET-BACNETIP-2 169128			
	PROFINET	DA1	DX-NET-PROFINET-2 169125			
Terminal strip, plug-in, 6-terminal 	DeviceNet	DA1	DX-NET-DEVICENET 169123			
SUB-D socket, 9-pole 	PROFIBUS-DP	DA1	DX-NET-PROFIBUS 169124			
SmartWire-DT Modules						
with slot for SWD4-8SF2-5 	SmartWire-DT	DA1 (IP20)	DX-NET-SWD1 169129		1 off 	UL/CSA certification not required
	SmartWire-DT	DC1/DA1 (IP55/IP66)	DX-NET-SWD2 169130			
with slot for SWD4-8SF2-5 	SmartWire-DT	DC1 (IP20)	DX-NET-SWD3 169131			



	Resistance value	Continuous braking rating	Protection type	For use with	Part no. Article no.	Price see price list	Std. pack	Information relevant for export to North America 
	R Ω	P _{DB} kW						
Braking resistances								
Braking resistance in anodized aluminium enclosure for direct installation in frequency inverter enclosure of frame sizes FS2 und FS3								
	100	0.2	IP54	DC1, DA1	DX-BR3-100 169150		1 off	
Braking resistance in aluminum housing for direct installation in frequency inverter enclosure of frame sizes FS4 und FS5								
	33	0.5	IP54	DA1	DX-BR5-033 169151		1 off	
Braking resistance in aluminum housing Installed in a housing designed to prevent accidental contact and featuring a temperature monitoring switch and a 1-meter connection cable								
	75	1.4	IP20	DC1, DA1	DX-BR075-1K4 171917		1 off 	Product Standards UL508; C22.2 UL File No. E300773 UL Category Control No. NMTR2, NMTR8 CSA File No. E300773 CSA Class No. 14-M05 North America Certification UL listed, certified by UL for use in Canada Branch circuits Suitable for Max. Voltage Rating 600 Degree of Protection IEC: IP00
	100	1.4	IP20	DC1, DA1	DX-BR100-1K4 171896			
	100	0.8	IP20	DC1, DA1	DX-BR100-0K8 171907			
	100	1.6	IP20	DC1, DA1	DX-BR100-1K6 171924			
	150	0.5	IP20	DC1, DA1	DX-BR150-0K5 171916			
	150	1.4	IP20	DC1, DA1	DX-BR150-1K4 171895			
	200	0.8	IP20	DC1, DA1	DX-BR200-0K8 171894			
	200	0.4	IP20	DC1, DA1	DX-BR200-0K4 171915			
	400	0.4	IP20	DC1, DA1	DX-BR400-0K4 171914			
Braking resistance in aluminum housing Installed in a housing designed to prevent accidental contact and featuring a temperature monitoring switch and internal connecting terminals								
	35	1.1	IP20	DA1	DX-BR035-1K1 171927		1 off 	Product Standards UL508; C22.2 UL File No. E300773 UL Category Control No. NMTR2, NMTR8 CSA File No. E300773 CSA Class No. 14-M05 North America Certification UL listed, certified by UL for use in Canada Branch circuits Suitable for Max. Voltage Rating 600 Degree of Protection IEC: IP00
	50	0.4	IP20	DC1, DA1	DX-BR050-0K4 171906			
	50	9.8	IP20	DC1, DA1	DX-BR050-0K8 171910			
	100	0.2	IP20	DC1, DA1	DX-BR100-0K2 171909			
	100	0.4	IP20	DC1, DA1	DX-BR100-0K4 171926			

Resistance value	Continuous braking rating	Protection type	For use with	Part no. Article no.	Price see price list	Std. pack	Information relevant for export to North America
R Ω	P _{DB} kW						
Braking resistance with steel wire mesh elements Installed in a housing designed to prevent accidental contact and featuring a temperature monitoring switch and internal connecting terminals							
	2	54.3	IP20	DA1	DX-BR002-54K3 171923	1 off 	Product Standards UL508; C22.2 UL File No. E300773
	2	102.4	IP20	DA1	DX-BR002-102K4 171903		UL Category Control No. NMTR2, NMTR8
	6	5.1	IP20	DA1	DX-BR006-5K1 171913		CSA File No. E300773 CSA Class No. 14-M91
	6	9.2	IP20	DA1	DX-BR006-9K2 171893		North America Certification
	6	18.1	IP20	DA1	DX-BR006-18K1 171922		UL listed, certified by UL for use in Canada
	6	33.3	IP20	DA1	DX-BR006-33K3 171902		Branch circuits
	12	3.1	IP20	DA1	DX-BR012-3K1 171912		Suitable for
	12	5.1	IP20	DA1	DX-BR012-5K1 171929		Max. Voltage Rating 1000
	12	9.2	IP20	DA1	DX-BR012-9K2 171921		Degree of Protection IEC: IP00
	12	18.1	IP20	DA1	DX-BR012-18K1 171901		
	22	1.4	IP20	DA1	DX-BR022-1K4 171911		
	22	3.1	IP20	DA1	DX-BR022-3K1 171928		
	22	5.1	IP20	DA1	DX-BR022-5K1 171920		
	22	9.2	IP20	DA1	DX-BR022-9K2 171900		
	40	3.1	IP20	DA1	DX-BR040-3K1 171919		
	40	5.1	IP20	DA1	DX-BR040-5K1 171899		
	47	3.1	IP20	DC1, DA1	DX-BR047-3K1 171908		
	47	5.1	IP20	DC1, DA1	DX-BR047-5K1 171925		
	47	9.2	IP20	DC1, DA1	DX-BR047-9K2 171905		
	50	3.1	IP20	DC1, DA1	DX-BR050-3K1 171918		
	50	5.1	IP20	DC1, DA1	DX-BR050-5K1 171898		
	75	5.1	IP20	DC1, DA1	DX-BR075-5K1 171897		
	100	6.2	IP20	DC1, DA1	DX-BR100-6K2 171904		

	Rated operational current I_e A	Inductance L mH	Maximum heat dissipation P_v W	Part no. Article no.	Price see price list	Std. pack
Mains chokes						
Single-phase max. permitted mains supply voltage V AC: 260 V + 0% (50/60 Hz)						
	5.8	5.05	9	DX-LN1-006 269490		1 off
	8.6	3.41	11	DX-LN1-009 269495		
	13	2.25	12	DX-LN1-013 269496		
	18	1.63	17	DX-LN1-018 269497		
	24	1.22	20	DX-LN1-024 269498		
	32	0.92	24	DX-LN1-032 169791		
three-phase max. permitted mains supply voltage V AC: 550 V + 0% (50/60 Hz)						
	3.9	7.51	17	DX-LN3-004 269500		1 off  
	6	4.9	19	DX-LN3-006 269501		
	10	2.94	33	DX-LN3-010 269502		
	16	1.84	44	DX-LN3-016 269503		
	25	1.18	57	DX-LN3-025 269504		
	40	0.64	59	DX-LN3-040 269505		
	50	0.37	58	DX-LN3-050 269506		
	60	0.31	60	DX-LN3-060 269507		
	80	0.23	86	DX-LN3-080 269508		
	100	0.18	101	DX-LN3-100 269509		
	120	0.15	100	DX-LN3-120 269510		
	160	0.11	140	DX-LN3-160 269511		
	200	0.09	154	DX-LN3-200 269512		
	250	0.07	155	DX-LN3-250 269513		
	300	0.06	196	DX-LN3-300 269514		
	303	0.06	230	DX-LN3-303 169143		
	370	0.05	290	DX-LN3-370 169144		
450	0.04	300	DX-LN3-450 169145			
Motor chokes						
three-phase max. permitted mains supply voltage V AC: 750 V + 0% (50/60 Hz)						
	5	2	24	DX-LM3-005 269538		1 off  
	8	4.1	54	DX-LM3-008 269539		
	11	3	71	DX-LM3-011 269541		
	16	1.5	78	DX-LM3-016 269542		
	35	1	116	DX-LM3-035 269543		
	50	0.6	168	DX-LM3-050 269544		

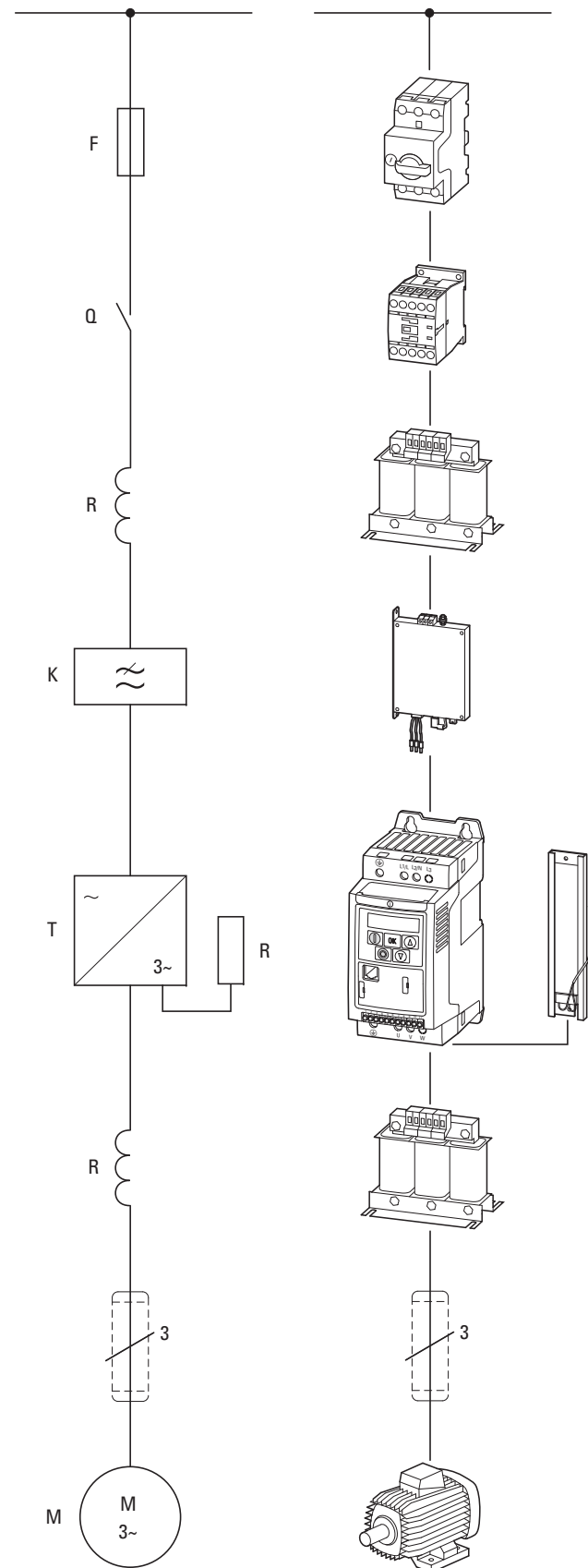
	Rated operational current I_e A	Inductance L mH	Maximum heat dissipation P_v W	Part no. Article no.	Price see price list	Std. pack
			max. heat dissipation (pulse frequency) (12 kHz)			
Motor chokes						
three-phase max. permitted mains supply voltage V AC: 750 V + 0% (50/60 Hz)						
	63	0.5	193	DX-LM3-063 269545		1 off  
	80	0.5	206	DX-LM3-080 269546		
	100	0.45	294	DX-LM3-100 269547		
	150	0.35	424	DX-LM3-150 269548		
	180	0.3	439	DX-LM3-180 269549		
	220	0.2	517	DX-LM3-220 269560		
	260	0.15	520	DX-LM3-260 269561		
	303	0.15	-	DX-LM3-303 169146		
	370	0.12	-	DX-LM3-370 169147		
	450	0.1	-	DX-LM3-450 169148		
Sine filter						
three-phase						
	4	11	50	DX-SIN3-004 271538		1 off  
	10	5.1	100	DX-SIN3-010 271590		
	16.5	3.07	70	DX-SIN3-016 271591		
	23.5	2.5	125	DX-SIN3-023 271593		
	32	2	100	DX-SIN3-032 271594		
	37	1.7	100	DX-SIN3-037 271595		
	48	1.2	240	DX-SIN3-048 271597		
	61	1	280	DX-SIN3-061 271599		
	72	0.95	300	DX-SIN3-072 271600		
	90	0.8	290	DX-SIN3-090 271601		
	115	0	460	DX-SIN3-115 271602		
	150	0.5	530	DX-SIN3-150 271603		
	180	0.4	500	DX-SIN3-180 271604		
	250	0.35	550	DX-SIN3-250 271605		
	440	0.14	650	DX-SIN3-440 271606		
480	0.14	1550	DX-SIN3-480 169149		1 off	

Instructions

 	Information relevant for export to North America
Product Standards	UL 508C; CSA-C22.2 No. 14; IEC/EN61800-3; IEC/EN61800-5; CE marking
UL File No.	E167225
UL Category Control No.	XPTQ2, XPTQ8
CSA File No.	UL report applies to both US and Canada
CSA Class No.	3211-06
North America Certification	UL listed, certified by UL for use in Canada
Suitable for	Branch circuits
Max. Voltage Rating	1~ 240 V AC IEC: TN-S UL/CSA: "Y" (Solidly Grounded Wey)
Degree of Protection	IEC: IP00

Input current I_{LN} T	For use with	Part no. Article no.	Price see price list	Std. pack
Radio interference suppression filters				
Single-phase Mains voltage (50/60Hz) U_{LN} [V] max. 240 + 10% Base-mounted filter				
8	DC1-12 DA1-12...	DX-EMC12-008 172273		1 off
12		DX-EMC12-012 172274		
16		DX-EMC12-016 172275		
20		DX-EMC12-020 172276		
30		DX-EMC12-030 172277		
three-phase Mains voltage (50/60Hz) U_{LN} [V] max. 480 + 10% Base-mounted filter				
8	DC1-32... DC1-34... DA1-32... DA1-34...	DX-EMC34-008 172278		1 off
12		DX-EMC34-012 172279		
16		DX-EMC34-016 172280		
30		DX-EMC34-030 172281		
Mounting to the side, next to the variable frequency drive				
42	DA1-32... DA1-34...	DX-EMC34-042 172282		
55		DX-EMC34-055 172283		
75		DX-EMC34-075 172284		
100		DX-EMC34-100 172285		
130		DX-EMC34-130 172286		
180		DX-EMC34-180 172287		
250		DX-EMC34-250 172288		
400		DX-EMC34-400 172289		

Engineering



AC supply system: Variable-frequency drives can be connected without restriction to AC supply systems with a grounded star point (TN/TT grounding systems). Directly connecting them to and running them on unbalanced or B phase-grounded systems (e.g., USA) is not permissible.

Fuses (circuit-breakers) allow the protection of lines and electrical devices. For the protection of persons, AC/DC-sensitive residual current circuit-breakers (RCD Type B) are required in addition.

Contactors are used to switch the mains voltage on and off.

Mains choke damp harmonic distortion (THD) and current peaks and limit inrush currents (the DC link capacitors' charging current). In addition, they protect the mains rectifier from voltage peaks coming from the mains.

Radio interference suppression filter attenuate high-frequency electromagnetic emissions from devices. They ensure that the EMC limit values for conducted interference specified in the applicable product standards are complied with (variable-frequency drives).

Note: External radio interference suppression filters (optional) make it possible to use longer motor cables and have low leakage currents. Normally, they should only be used with variable-frequency drives that do not feature an internal radio interference suppression filter.
Exception: directly assigned variable-frequency drives with internal filters (calibrated combination)

variable frequency drive allow the continuously variable speed control of three-phase motors. To do this, the variable-frequency drive converts the voltage of the AC supply system with a constant voltage and a constant frequency to a new AC voltage with a variable amplitude and a variable frequency.

On **brake resistor** converts the variable frequency drive's regenerative braking energy into heat. The variable frequency drive must be equipped with a brake chopper, which connects the braking resistance parallel to the internal DC link.

Motor choke

- Compensate the capacitive currents,
- Reduce current ripple and the motor's current change noise,
- Attenuate the retroaction on parallel connection of several motors.

sine filter

- Smoothen the output voltage sinusoidally,
- reduce motor noise through du/dt reduction, and thereby increase the motor insulation's lifespan,
- Reduce the leakage currents to allow better motor performance at improved EMC values.

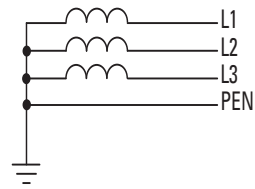
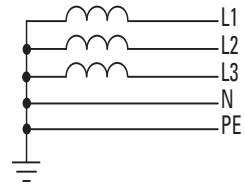
Screened motor cables attenuate radiated and conducted high-frequency emissions within the limits defined in the applicable product standard (EMC). They must be connected to the earth potential on both sides across a large area (PES).

Three-phase asynchronous motor (standard motor) converts electric power ($P \sim U \times I$) into mechanical power ($P \sim M \times n$).

Equipment code
 F = fuses and circuit-breakers
 Q = controlled switching within energy flow (contactors, circuit-breakers)
 R = limitation (reactors, resistors)
 K = radio interference suppression filters
 T = variable-frequency drives
 M = motors

Electrical mains connection

Frequency inverters can be connected to and operated on star point-earthed AC supply systems (as per IEC 60364) without restrictions.



Connecting them to and operating them on asymmetrically earthed networks, such as phase-earthed delta networks (grounded delta, USA) or non-earthed or high-resistance earthed (> 30 Ω) IT networks is permitted with limitations. In these

networks, only frequency inverters without internal radio interference suppression filters (EMC) may be used. In the case of devices with an integrated radio interference suppression filter, the filter's protective earth connection must be disconnected.

The standardized rated operating voltages of the utility companies fulfil the following conditions at the point of transfer to the consumer:

- maximum deviation from the rated voltage (U_{LN}): ±10 %
- Maximum deviation in the voltage symmetry: ±3 %
- Maximum deviation from the rated frequency: ±4 %

A further voltage drop of up to 4% in the consumer networks is permissible relative to the lower voltage value (U_{LN} -10%) of the mains voltage. In ring-operated mesh networks (such as in the EU) the standardized consumer voltages (230/400/690 V) are identical to the utility company's supply voltages. In star networks (for example in North America/USA), the stated consumer voltages take the voltage drop from the utility company's infeed point to the last consumer into account.

Table: North American voltage level

Supply voltage U_{LN} of the EVU	Motor voltage according to UL 508 C	Consumer voltage, rated value for the motors
120 V	110 - 120 V	115 V
240 V	220 - 240 V	230 V
480 V	440 - 480 V	460 V
600 V	550 - 600 V	575V

Safety and switching

For frequency inverters, the components placed on the mains-side are assigned as per the input-side rated operational current I_{LN} and the AC-1 utilization category. Fuses, circuit-breakers and conductor cross-sections must meet the national and regional requirements and the required approvals at the point of operation.

For fire prevention and the protection of persons and domestic animals from excessive contact voltages residual current devices (RCD) must be used. Only AC/DC sensitive residual current devices (RCD, type B) may be used in connection with a frequency inverter.

Marking on residual current devices for AC/DC sensitive RCDs, type B:



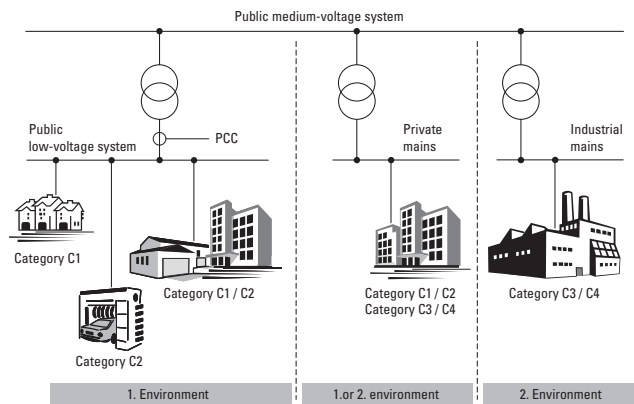
Earth leakage currents will be produced when using frequency-controlled drives due to the nature of the system. The main reasons for this consist of external capacitances between the phases of the motor cable, the motor cable's screening, Y capacitors in the frequency inverter, and radio interference suppression filters, as well as earthing measures at the motor's site of operation. These leakage currents can exceed 3.5 mA and require improved PDS earthing as per EN 50178 (earth conductor cross-section ≥ 10 mm²).

EMC compliance

Frequency inverters work with fast electronic switches (IGBT) in the inverter. This can cause radio interference in a drive system, which, in turn, can adversely affect nearby electronic equipment. To provide protection from this high-frequency interference, these should be spatially separated and screened from frequency-controlled drives.

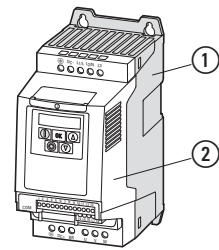
In Europe, adherence to the EMC Directive is mandatory. The EMC product standard for power drive systems (PDS) is IEC/EN 61800-3. This standard covers the complete drive system, from mains infeed to the motor.

Both versions of DC1 and DA1 series frequency inverters (with internal/external radio interference suppression filter) meet the requirements of the EMC product standard for residential areas (first environment) and therefore the higher limits for industrial environment (second environment) as well.



Frequency inverters

A frequency inverter is an electronic apparatus used for the variable-speed control of three-phase motors. It is intended for installation in a machine or for assembly with other components to a machine or plant. The main components of a modern compact frequency inverter are a power section (1) and a control section (2).



1 Power section with:

- A = Rectifier
- B = Internal DC link
- C = inverter (IGBT)

2 Control section with:

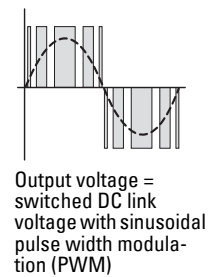
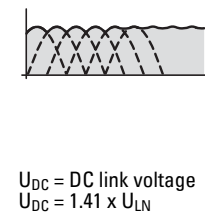
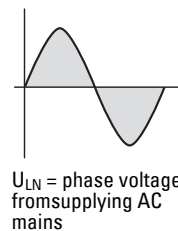
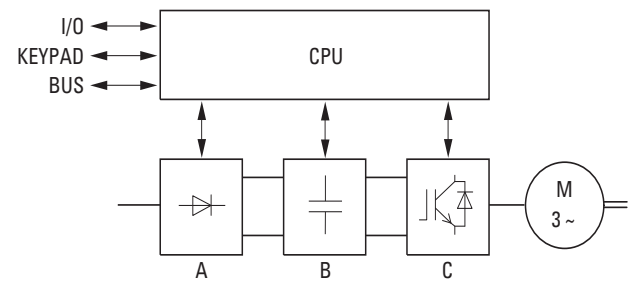
- I/O = Analog and binary inputs and outputs
- KEYPAD = Operating unit with display unit
- BUS = Serial ports/interfaces (RS485, field bus, PC interface)

The functional control of the frequency inverter and the output values in the power section (such as frequency, voltage and current) can be adjusted through:

- Control terminals (I/O) with analog and digital (binary) inputs,
- A keypad with function keys and display units,
- Serial interfaces (BUS) with RS485 (Modbus RTU) and optional fieldbus connections (CANopen, PROFIBUS-DP etc.) and an optional PC connection.

Internal open and closed-loop control circuits monitor all variable values in the frequency inverter and automatically switch the process off if a value reaches a dangerous level. The power section of a static compact frequency generally consists of three subgroups:

- Rectifier (A),
- Internal DC link (B),
- Inverter module (C).



Block diagram with main components of a frequency inverter

Control methods

The IGBTs in the variable frequency series' inverter are controlled with sinusoidal pulse-width modulation (PWM). In real-life applications, the industry draws a distinction between the following control methods:

- Voltage frequency control (U/f control),
- V/Hz control with slip compensation
- Sensorless vector control (speed control)
- Vector control (closed-loop)

The **Voltage frequency control** is the best known and most commonly used method. A simple characteristic curve (linear or quadratic) defines the motor's rotating field frequency and the corresponding three-phase line-to-line motor voltage is selected such that the motor is neither over nor under-magnetized.

Main applications of U/f control:

- pump and fan drives,
- horizontal conveying and transportation systems,
- multiple motor drives (parallel operation of several motors at the variable frequency drive's output).

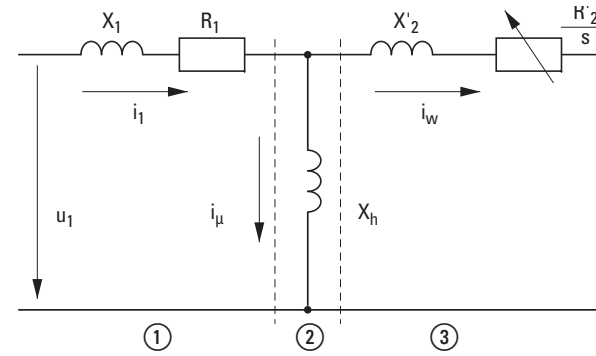
Bei der **V/Hz control with slip compensation** can compensate for the load-dependent speed change in individual drives (sensorless).

Bei der **In sensorless vector control** the magnetic fields of the stator and rotor windings are aligned so as to oppose each other. With asynchronous motors the magnetic flux in the rotor must be mapped in an electronic model of the motor. This requires the physical parameters on the motor's rating plate to be entered. In vector operation the frequency inverter can control only one motor. A parallel operation of several motors is not possible here. The exact calculation of the phase voltages at the variable frequency drive's output, however, improves the motor's operational behavior. The motor also heats up less in the lower speed range. The field-oriented vector control results in a significant improvement in the drive dynamics as well as optimizing performance; it also increases the range of possible applications.

The main applications of sensorless vector control are:

- Material machining and processing equipment
- Condensers (compressor),
- Heavy starting duty (extruder, agitators, mixer),
- Horizontal conveying equipment (cranes, elevators).

Bei der **Vector control** uses the variable frequency drive's output current as a controlled variable. This makes it possible to perfectly adjust the three-phase motor in line with the corresponding torque boost. The motor speed can be controlled in connection with an rpm sensor (tachometer, pulse generator) (closed loop).



- ① Stator winding
- ② Air gap
- ③ Transformed rotor winding

Simplified equivalent circuit diagram for a three-phase motor

Motor model

Regardless of the control method used, a variable frequency drive uses the measured voltage and current values on the stator winding (u_1, i_1) to calculate the required manipulated variable for flux-generating component i_μ and torque-generating component in the rotor i_w . The motor's load dependent slip is represented as resistor $R'2/s$. During no-load operation, this value approaches infinity ($i_w \rightarrow 0$). On the other hand, the value approaches zero as the load increases. The current in the rotor grows at this point.

Explanation:

- EMC = Electromagnetic compatibility
- EVU = Utility company
- IGBT = Insulated-gate bipolar transistor
- PDS = Magnet system
- RCD = Residual current device

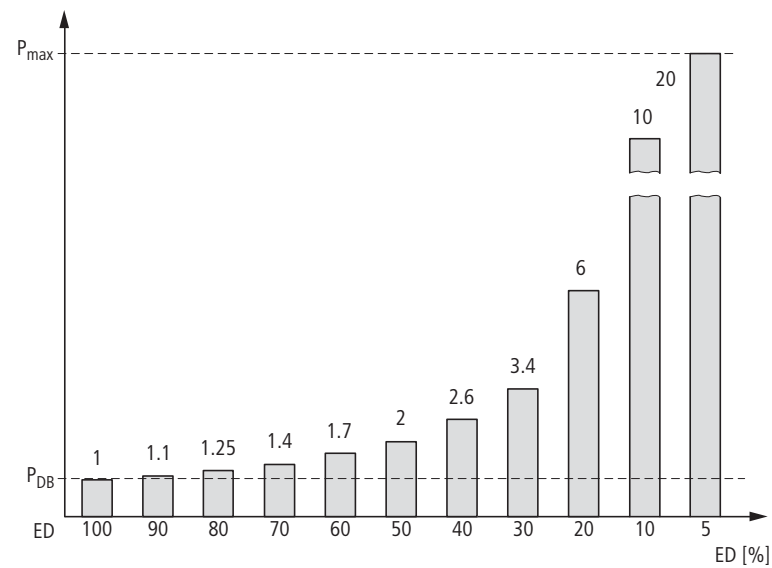
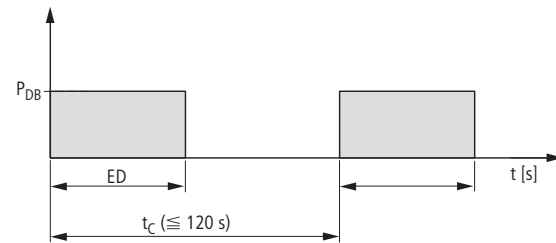
Technical information concerning braking resistances:

The braking resistors' specified P_{DB} power dissipation applies to continuous operation. In short-time operation these values can be increased by multiplying them with the type-specific power factor using the following formula:

$$P_{max} \leq (P_{DB} \times 100\%) \div ED [\%]$$

- P_{max} = maximum pulse rating
- P_{DB} = continuous rating at a duty factor of 100 %
- ED = duty factor
- t_c = Cycle time (max. 120 seconds)

The duty factor is stated as a percentage (%) and is calculated with the formula:
 $ED [\%] = (ED \times 100\%) \div t_c$

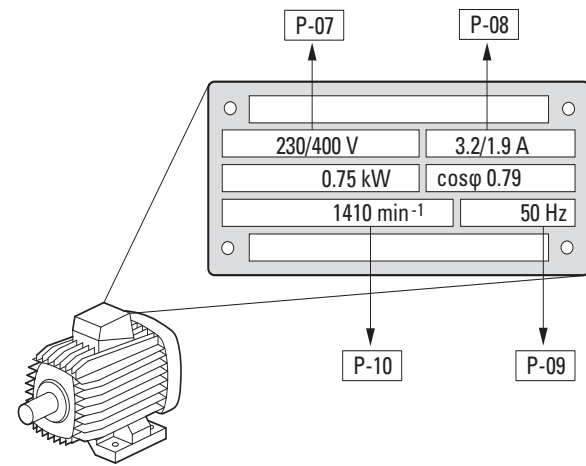


Connecting example for a 0.75 kW motor with the rating plate illustrated here.

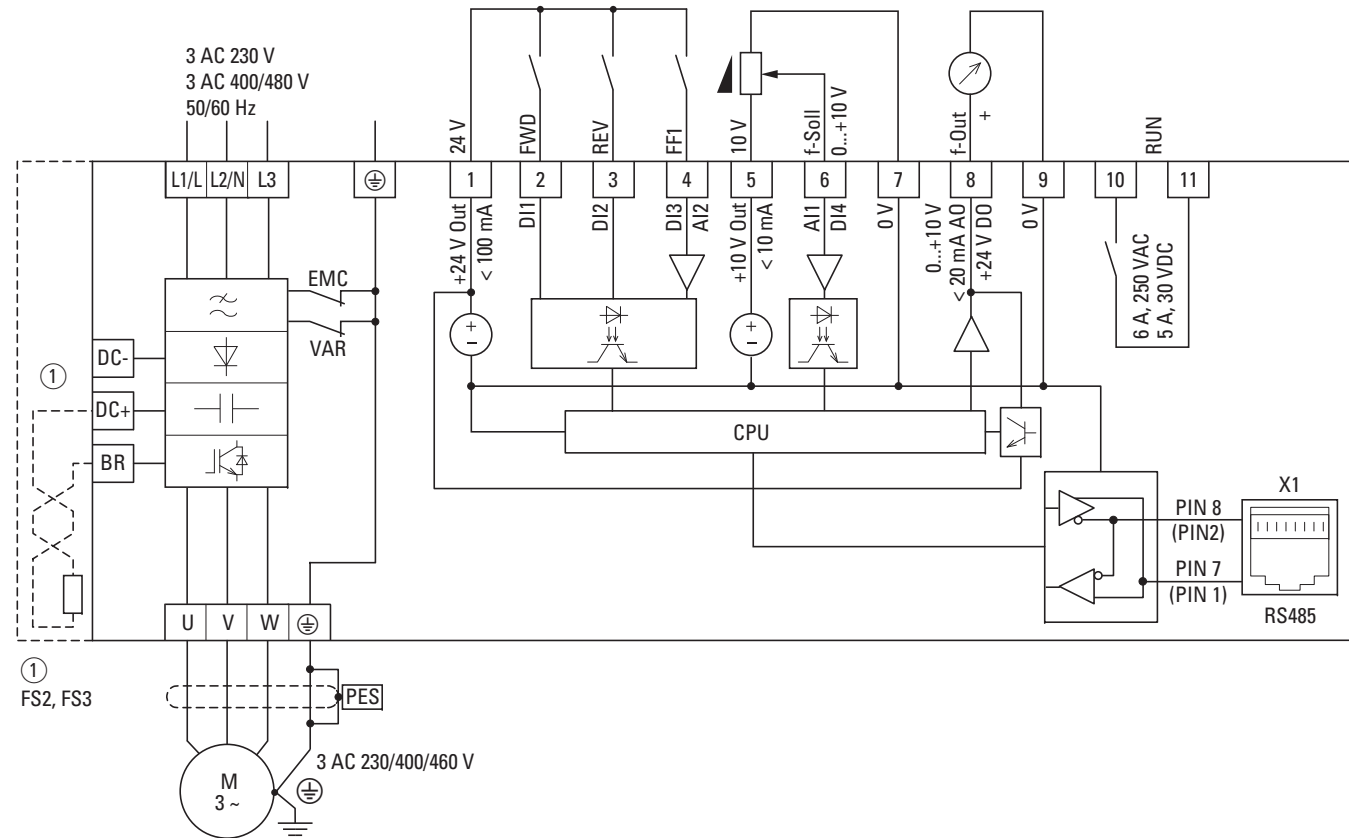
The variable frequency drives are configured by default in such a way that they can be operated immediately with V/Hz control when connected to the assigned motor rating without having to configure any additional parameters.

To ensure ideal operational behavior (e.g., slip compensation, vector control, etc.), the data on the motor's rating plate should be entered into the variable frequency drive (electric motor map).

The following example shows the necessary parameter settings for a variable frequency drive (a DC1 in this example)



and connection examples for single-phase and three-phase mains voltages:



Block diagram for DC1-32... and DC1-34... with internal radio interference suppression filter

① Only sizes FS2 and FS3 have connection terminals DC+ and BR- for an external braking resistance (optional).

- | | |
|--|---|
| <p>The control signal terminals are factory set as follows:</p> <p>1: 24 V: +24 V control voltage, max. 100 mA</p> <p>2: DI1: FWD = Clockwise rotating field enable (Forward)</p> <p>3: DI2: REV = Anticlockwise rotating field enable (Reverse)</p> <p>4: DI3: FF1 = Fixed frequency 1 or AI2</p> <p>5: 10 V: +10 V reference voltage, max. 10 mA</p> <p>6: AI1: f-setpoint = Frequency setpoint value (0 - +10 V)</p> <p>7: 0 V, reference potential</p> <p>8: AO: f-Out = Output frequency to motor (0 - +10 V)</p> | <p>9: 0 V, reference potential</p> <p>10/11: Relay: RUN = Operating signal (N/O)</p> <p>DI: Digital input = +24 VDC digital input</p> <p>AI: Analog input = 0 - 10 V, 0/4 - 20 mA analog input</p> <p>DO: Digital output = +24 VDC, max. 20 mA digital output</p> <p>AO: Analog output = 0 - +10 V, max. 20 mA analog output</p> <p>Parameters are used to define the function and mode of operation for the digital and analog inputs/outputs. These parameters are described in manual MN04020003Z.</p> |
|--|---|

Connection example for a 0.75 kW motor

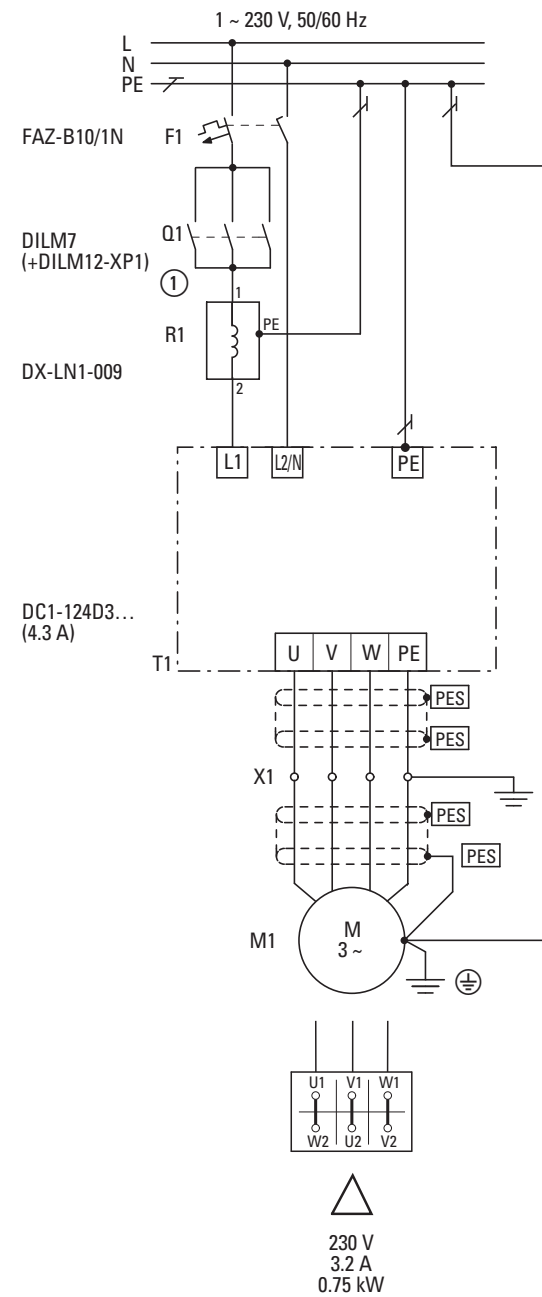
Motor: P = 0.75 kW
 Mains: 3/N/PE 400 V 50/60 Hz
 Connection examples meeting EMC requirements: Power section (see figure below)

The previously indicated 0.75 kW motor can be connected in a delta configuration for a single-phase 230-V supply system (version A) or in a star configuration for a 400-V supply system (version B).
 The frequency inverter and the type-specific accessories are selected for 1 AC 230 V (DC1-124D3...) or for 3 AC 400 V (MMX34AA2D4) depending on the mains voltage selected.

Variant A:

Motor in delta configuration

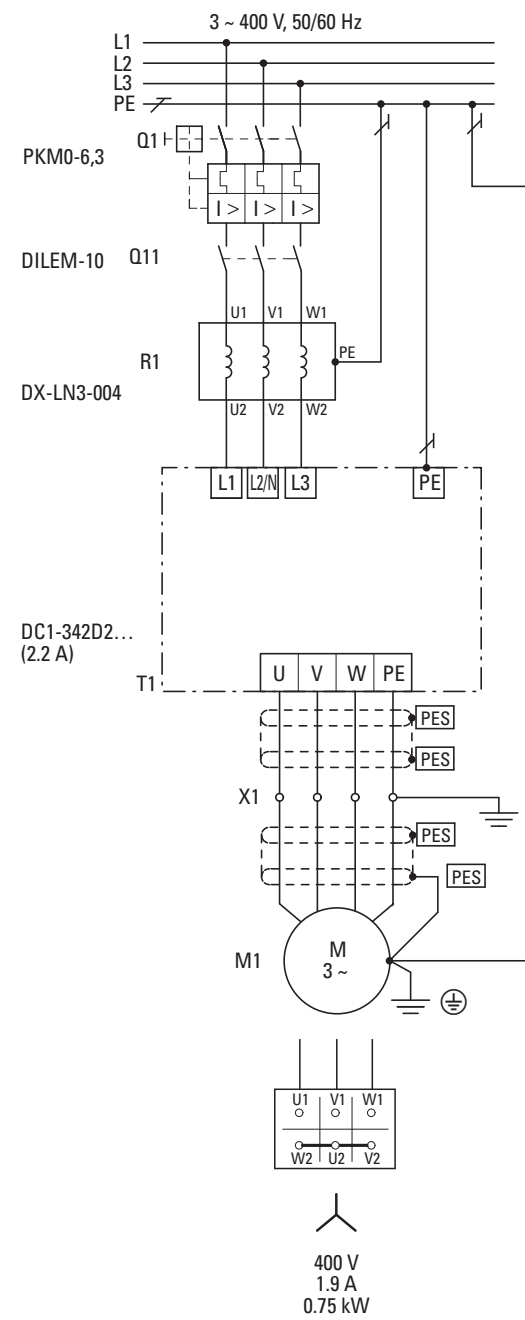
DC1... frequency inverter with single-phase mains supply (230 V)



Variant B:

Motor in star configuration

DC1... frequency inverter with three-phase mains supply (400 V)



① Optional connection option for single-phase connections

Engineering

Part no.	Motor		Frequency inverters			Power Wiring			
	Assigned motor rating ¹⁾		Rated motor current	Rated operational current ²⁾	Input current	Protection device	Protection device	Contactor	Mains choke
	P kW	P HP	I _e A	I _e A	I _{LN} T				
U_e230 V AC, 1-phase/U_e230 V AC, 3-phase									
DC1-122D3	0.37	0.5	2	2.3	5	FAZ-B10/1N	-	DILM7	DX-LN1-006
DC1-124D3	0.75	1	3.2	4.3	8.5	FAZ-B10/1N	-	DILM7	DX-LN1-013
DC1-127D0	1.5	2	6.3	7	13.9	FAZ-B16/1N	-	DILM7	DX-LN1-018
DC1-12011	2.2	3	8.7	10.5	19.5	FAZ-B25/1N	-	DILM7	DX-LN1-024
DC1-12015	4	5	14.8	15	30.5	FAZ-B40/1N	-	DILM7	DX-LN1-032
U_e230 V AC, 3-phase/U_e230 V AC, 3-phase									
DC1-322D3	0.37	0.5	2	2.3	3	FAZ-B6/3	PKM0-6,3	DILM7	DX-LN3-004
DC1-324D3	0.75	1	3.2	4.3	4.5	FAZ-B6/3	PKM0-6,3	DILM7	DX-LN3-006
DC1-327D0	1.5	2	6.3	7	7.3	FAZ-B10/3	PKM0-10	DILM7	DX-LN3-010
DC1-32011	2.2	3	8.7	10.5	11	FAZ-B16/3	PKM0-16	DILM7	DX-LN3-016
DC1-32018	4	5	14.8	18	18.8	FAZ-B20/3	PKM0-20	DILM7	DX-LN3-025
U_e400 V AC, 3-phase/U_e400 V AC, 3-phase									
DC1-342D2	0.75	1	1.9	2.2	2.4	FAZ-B6/3	PKM0-6,3	DILM7	DX-LN3-004
DC1-344D1	1.5	2	3.6	4.1	4.3	FAZ-B6/3	PKM0-6,3	DILM7	DX-LN3-006
DC1-345D8	2.2	3	5	5.8	6.1	FAZ-B10/3	PKM0-10	DILM7	DX-LN3-010
DC1-349D5	4	5	8.5	9.5	9.8	FAZ-B16/3	PKM0-16	DILM7	DX-LN3-010
DC1-34014	5.5	7.5	11.3	14	14.6	FAZ-B20/3	PKM0-20	DILM7	DX-LN3-016
DC1-34018	7.5	10	15.2	18	18.1	FAZ-B25/3	PKM0-25	DILM7	DX-LN3-025
DC1-34024	11	15	21.7	24	24.7	FAZ-B32/3	PKM0-32	DILM17	DX-LN3-025
U_e230 V AC, 1-phase/U_e230 V AC, 3-phase									
DA1-124D3	0.75	1	3.2	4.3	8.5	FAZ-B10/1N	-	DILM7	DX-LN1-013
DA1-127D0	1.5	2	6.3	7	13.9	FAZ-B16/1N	-	DILM7	DX-LN1-018
DA1-12011	2.2	3	8.7	10.5	19.5	FAZ-B25/1N	-	DILM7	DX-LN1-024
U_e230 V AC, 3-phase/U_e230 V AC, 3-phase									
DA1-324D3	0.75	1	3.2	4.3	4.5	FAZ-B6/3	PKM0-6,3	DILM7	DX-LN3-006
DA1-327D0	1.5	2	6.3	7	7.3	FAZ-B10/3	PKM0-10	DILM7	DX-LN3-010
DA1-32011	2.2	3	8.7	10.5	11	FAZ-B16/3	PKM0-16	DILM7	DX-LN3-016
DA1-32018	4	5	14.8	18	18.8	FAZ-B20/3	PKM0-20	DILM7	DX-LN3-025
DA1-32024	5.5	7.5	19.6	24	24.8	FAZ-B32/3	PKM0-32	DILM17	DX-LN3-025
DA1-32039	7.5	10	26.4	39	40	FAZ-B50/3	-	DILM25	DX-LN3-040
DA1-32046	11	15	38	46	47.1	FAZ-B63/3	-	DILM40	DX-LN3-050
DA1-32061	15	20	51	61	62.4	NZMC1-S80	-	DILM50	DX-LN3-080
DA1-32072	18.5	25	63	72	74.1	NZMC1-S80	-	DILM65	DX-LN3-080
DA1-32090	22	30	71	90	92.3	NZMC2-S100	-	DILM80	DX-LN3-100
DA1-32110	30	40	96	110	112.7	NZMC2-S125	-	DILM95	DX-LN3-120
DA1-32150	45	50	141	150	153.5	NZMC2-S160	-	DILM150	DX-LN3-160
DA1-32180	55	60	173	180	183.8	NZMC2-S200	-	DILM170	DX-LN3-200
DA1-32202	55	75	173	202	206.2	NZMC3-S250	-	DILM185A	DX-LN3-250
DA1-32248	75	100	233	248	252.8	NZMC3-S320	-	DILM185A	DX-LN3-300

¹⁾ Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)
²⁾ With a switching frequency of 4 kHz and an ambient air temperature of +40°C or +50°C for IP20/NEMA 0
³⁾ Only for devices with an internal braking chopper

Motor connection		Braking resistances for duty factors (DF) as a % ³⁾		
Motor choke	Sine filter	10%	20%	40%
DX-LM3-005	DX-SIN3-004	-	-	-
DX-LM3-005	DX-SIN3-010	-	-	-
DX-LM3-008	DX-SIN3-010	DX-BR050-0K4	DX-BR050-0K8	DX-BR047-3K1
DX-LM3-011	DX-SIN3-016	DX-BR050-0K4	DX-BR050-0K8	DX-BR047-3K1
DX-LM3-016	DX-SIN3-016	DX-BR050-0K4	DX-BR050-0K8	DX-BR047-3K1
DX-LM3-005	DX-SIN3-004	-	-	-
DX-LM3-005	DX-SIN3-010	-	-	-
DX-LM3-008	DX-SIN3-010	DX-BR050-0K4	DX-BR050-0K8	DX-BR047-3K1
DX-LM3-011	DX-SIN3-016	DX-BR050-0K4	DX-BR050-0K8	DX-BR047-3K1
DX-LM3-035	DX-SIN3-023	DX-BR050-0K4	DX-BR050-0K8	DX-BR047-3K1
DX-LM3-005	DX-SIN3-004	-	-	-
DX-LM3-005	DX-SIN3-010	DX-BR100-0K8	DX-BR100-1K6	DX-BR100-6K2
DX-LM3-008	DX-SIN3-010	DX-BR100-0K8	DX-BR100-1K6	DX-BR100-6K2
DX-LM3-011	DX-SIN3-010	DX-BR100-0K8	DX-BR100-1K6	DX-BR100-6K2
DX-LM3-016	DX-SIN3-016	DX-BR047-3K1	DX-BR047-5K1	DX-BR047-9K2
DX-LM3-035	DX-SIN3-023	DX-BR047-3K1	DX-BR047-5K1	DX-BR047-9K2
DX-LM3-035	DX-SIN3-023	DX-BR047-3K1	DX-BR047-5K1	DX-BR047-9K2
DX-LM3-005	DX-SIN3-010	DX-BR100-0K2	DX-BR100-0K4	-
DX-LM3-008	DX-SIN3-010	DX-BR050-0K4	DX-BR050-0K8	-
DX-LM3-011	DX-SIN3-016	DX-BR050-0K8	DX-BR035-1K1	-
DX-LM3-005	DX-SIN3-010	DX-BR100-0K2	DX-BR100-0K4	-
DX-LM3-008	DX-SIN3-010	DX-BR050-0K4	DX-BR050-0K8	-
DX-LM3-011	DX-SIN3-016	DX-BR050-0K8	DX-BR035-1K1	-
DX-LM3-035	DX-SIN3-023	DX-BR022-1K4	DX-BR022-3K1	-
DX-LM3-035	DX-SIN3-032	DX-BR022-1K4	DX-BR022-3K1	-
DX-LM3-050	DX-SIN3-048	DX-BR022-1K4	DX-BR022-3K1	-
DX-LM3-050	DX-SIN3-048	DX-BR022-1K4	DX-BR022-3K1	-
DX-LM3-063	DX-SIN3-061	DX-BR012-3K1	DX-BR012-5K1	-
DX-LM3-080	DX-SIN3-072	DX-BR012-3K1	DX-BR012-5K1	-
DX-LM3-100	DX-SIN3-090	DX-BR006-5K1	DX-BR006-9K2	-
DX-LM3-150	DX-SIN3-115	DX-BR006-5K1	DX-BR006-9K2	-
DX-LM3-150	DX-SIN3-150	DX-BR006-5K1	DX-BR006-9K2	-
DX-LM3-180	DX-SIN3-180	DX-BR006-5K1	DX-BR006-9K2	-
DX-LM3-220	DX-SIN3-250	DX-BR006-5K1	DX-BR006-9K2	-
DX-LM3-260	DX-SIN3-250	DX-BR006-5K1	DX-BR006-9K2	-

Part no.	Motor		Frequency inverters			Power Wiring			
	Assigned motor rating ¹⁾		Rated motor current	Rated operational current ²⁾	Input current	Protection device	Protection device	Contactor	Mains choke
	P kW	P HP	I _e A	I _e A	I _{LN} T				
U_e400 V AC, 3-phase/U_e400 V AC, 3-phase									
DA1-342D2	0.75	1	1.9	2.2	2.4	FAZ-B6/3	PKM0-6,3	DILM7	DX-LN3-004
DA1-344D1	1.5	2	3.6	4.1	4.3	FAZ-B6/3	PKM0-6,3	DILM7	DX-LN3-006
DA1-345D8	2.2	3	5	5.8	6.1	FAZ-B10/3	PKM0-10	DILM7	DX-LN3-010
DA1-349D5	4	5	8.5	9.5	9.8	FAZ-B16/3	PKM0-16	DILM7	DX-LN3-010
DA1-34014	5.5	7.5	11.3	14	14.6	FAZ-B20/3	PKM0-20	DILM7	DX-LN3-016
DA1-34018	7.5	10	15.2	18	18.1	FAZ-B25/3	PKM0-25	DILM7	DX-LN3-025
DA1-34024	11	15	21.7	24	24.7	FAZ-B32/3	PKM0-32	DILM17	DX-LN3-025
DA1-34030	15	20	29.3	30	30.8	FAZ-B40/3	-	DILM17	DX-LN3-040
DA1-34039	18.5	25	36	39	40	FAZ-B50/3	-	DILM25	DX-LN3-040
DA1-34046	22	30	41	46	47.1	FAZ-B63/3	-	DILM40	DX-LN3-050
DA1-34061	30	40	55	61	62.8	NZMC1-S80	-	DILM50	DX-LN3-080
DA1-34072	37	50	68	72	73.8	NZMC1-S80	-	DILM65	DX-LN3-080
DA1-34090	45	60	81	90	92.2	NZMC1-S100	-	DILM80	DX-LN3-100
DA1-34110	55	75	99	110	112.5	NZMC2-S125	-	DILM95	DX-LN3-120
DA1-34150	75	100	134	150	153.2	NZMC2-S160	-	DILM150	DX-LN3-160
DA1-34180	90	150	161	180	183.7	NZMC2-S200	-	DILM170	DX-LN3-200
DA1-34202	110	175	196	202	205.9	NZMC3-S250	-	DILM185A	DX-LN3-250
DA1-34240	132	200	231	240	244.5	NZMC3-S320	-	DILM185A	DX-LN3-250
DA1-34302	160	250	279	302	307.8	NZMC3-S400	-	DILM225A	DX-LN3-370
DA1-34370	200	300	349	370	-	NZMC3-S400	-	-	-
DA1-34450	250	350	437	450	-	NZMC3-S500	-	-	-

¹⁾ Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)
²⁾ With a switching frequency of 4 kHz and an ambient air temperature of +40°C or +50°C for IP20/NEMA 0
³⁾ Only for devices with an internal braking chopper

Motor connection		Braking resistances for duty factors (DF) as a % ³⁾		
Motor choke	Sine filter	10%	20%	40%
DX-LM3-005	DX-SIN3-004	DX-BR400-0K4	DX-BR400-0K4	-
DX-LM3-005	DX-SIN3-010	DX-BR200-0K4	DX-BR200-0K8	-
DX-LM3-008	DX-SIN3-010	DX-BR150-0K5	DX-BR150-1K4	-
DX-LM3-011	DX-SIN3-010	DX-BR100-0K8	DX-BR100-1K4	-
DX-LM3-016	DX-SIN3-016	DX-BR075-1K4	DX-BR075-5K1	-
DX-LM3-035	DX-SIN3-023	DX-BR050-3K1	DX-BR050-5K1	-
DX-LM3-035	DX-SIN3-023	DX-BR040-3K1	DX-BR040-5K1	-
DX-LM3-035	DX-SIN3-032	DX-BR022-5K1	DX-BR022-9K2	-
DX-LM3-050	DX-SIN3-048	DX-BR022-5K1	DX-BR022-9K2	-
DX-LM3-050	DX-SIN3-048	DX-BR022-5K1	DX-BR022-9K2	-
DX-LM3-063	DX-SIN3-061	DX-BR012-9K2	DX-BR012-18K1	-
DX-LM3-080	DX-SIN3-090	DX-BR012-9K2	DX-BR012-18K1	-
DX-LM3-100	DX-SIN3-115	DX-BR006-18K1	DX-BR006-33K3	-
DX-LM3-150	DX-SIN3-115	DX-BR006-18K1	DX-BR006-33K3	-
DX-LM3-150	DX-SIN3-150	DX-BR006-18K1	DX-BR006-33K3	-
DX-LM3-180	DX-SIN3-180	DX-BR006-18K1	DX-BR006-33K3	-
DX-LM3-220	DX-SIN3-250	DX-BR006-18K1	DX-BR006-33K3	-
DX-LM3-260	DX-SIN3-250	DX-BR006-18K1	DX-BR006-33K3	-
DX-LM3-303	DX-SIN3-440	DX-BR006-18K1	DX-BR006-33K3	-
-	-	DX-BR002-54K3	DX-BR002-102K4	-
-	-	DX-BR002-54K3	DX-BR002-102K4	-

			DC1-S17D0...	DC1-S1011...	DC1-1D2D3...	DC1-1D4D3...	DC1-1D5D3...
General							
Climatic proofing	ρ_w	%	< 95 %, average relative humidity (RH), non-condensing (EN 50178)				
Mounting position			Vertical				
Altitude		m	0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 4000 m				
Protection against direct contact			BGV A3 (VBG4, finger- and back-of-hand proof)				
Radio interference level							
Radio interference class (EMC)			C1, C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.				
Environment (EMC)							
longest permissible length of motor cable	l	m	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)
Main circuit							
Supply							
Rated operational voltage	U _e		115 V AC, single-phase				
Notes			- - The mains voltage of 115 V is raised to 230 V (output voltage) through an internal voltage double connection.				
Mains voltage (50/60Hz)	U _{LN}	V	110 (-10%) - 115 (+10%)				
Input current	I _{LN}	T	8.5	12.5	11	19	25
Supply frequency	f _{LN}	Hz	50/60	50/60	50/60	50/60	50/60
Frequency range	f _{LN}	Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz
Mains switch-on frequency			Maximum of one time every 30 seconds		Maximum of one time every 30 seconds		
Power section							
Overload current for 60 s every 600 s	I _L	A	10.5	15.75	3.45	6.45	8.7
Starting current for 2 s	I _L	A	12.25	18.38	4.03	7.53	10.15
Output voltage with V _e	U ₂		115 V AC, single-phase		230 V AC, 3-phase		
Output Frequency	f ₂	Hz	0 - 50 Hz (max. 120 Hz)		0 - 50 Hz (max. 500 Hz)		
Switching frequency	f _{PWM}	kHz	16 (adjustable 4 - 32)				
Operation Mode							
Frequency resolution (setpoint value)	Δf	Hz	0.1	0.1	0.1	0.1	0.1
Rated operational current	I _e	A	7	10.5	2.3	4.3	5.8
Power loss							
Heat dissipation at rated operational current	P _V	W	18.5	22	18.5	37.5	44
Efficiency	η	%	95	96	95	95	96
Maximum leakage current to ground (PE) without motor	I _{PE}	mA	2.49	2.49	< 1	< 1	< 1
Frame size			FS1	FS2	FS1	FS1	FS2
Motor feeder							
Assigned motor rating							
at 115 V, 50 Hz	P	kW	0.37	0.55	-	-	-
at 230 V, 50 Hz	P	kW	-	-	0.37	0.75	1.1
110 - 120 V, 60 Hz	P	HP	0.5	0.75	-	-	-
at 220 - 240 V, 60 Hz	P	HP	-	-	0.5	1	1.5
Apparent power							
Apparent power at rated operation 230 V	S	kVA	0	0	-	-	-
Apparent power at rated operation 240 V	S	kVA	0	0	-	-	-
Braking function							
Standard braking torque			-	-	max. 30% M _N	max. 30% M _N	max. 30% M _N
DC braking torque			max. 100% of rated operational current I _e , variable				
Braking torque with external braking resistance			-	max. 100% rated operational current I _e , with external braking resistance	-	-	max. 100% rated operational current I _e , with external braking resistance
minimum external braking resistance	R _{min}	Ω	-	47	-	-	47
Switch-on threshold for the braking transistor	U _{DC}	V	-	-	-	-	390 V DC
DC braking	%	I/I _e	-	-	-	-	-
Braking torque	%	I/I _e	-	-	-	-	-
Control section							
External control voltage	U _c	V	24 V DC (max. 100 mA)				
Reference voltage	U _s	V	10 V DC (max. 10 mA)				

Note ¹⁾With a switching frequency of 4 kHz and an ambient air temperature of +40°C or +50°C for IP20/NEMA 0

DC1-S24D3...	DC1-S27D0...	
< 95 %, average relative humidity (RH), non-condensing (EN 50178)		
Vertical		
0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 4000 m		
BGV A3 (VBG4, finger- and back-of-hand proof)		
C1, C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.		
1st and 2nd environments		
25 (200)	25 (200)	25 (200)
230 V AC, 1-phase		
-	-	-
200 (-10%) - 240 (+10%)		
6	9.3	14
50/60	50/60	50/60
48 - 62 Hz	48 - 62 Hz	48 - 62 Hz
Maximum of one time every 30 seconds		
6.45	10.5	15.75
7.53	12.25	18.38
230 V AC, single-phase	230 V AC, single-phase	230 V AC, single-phase
0 - 50 Hz (max. 120 Hz)	0 - 50 Hz (max. 120 Hz)	0 - 50 Hz (max. 120 Hz)
16 (adjustable 4 - 32)	16 (adjustable 4 - 32)	16 (adjustable 4 - 32)
U/f control Slip compensation		
0.1	0.1	0.1
4.3	7	10.5
18.5	37.5	44
95	95	96
2.49	2.49	2.49
FS1	FS1	FS2
-	-	-
-	-	-
-	-	-
-	-	-
0.99	1.61	2.42
1.03	1.68	2.52
-	-	-
max. 100% of rated operational current I _e , variable		
-	-	max. 100% rated operational current I _e , with external braking resistance
-	-	47
-	-	390 V DC
-	-	-
-	-	-
24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)
10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)

Part no.			DC1-342D2...	DC1-344D1...	DC1-345D8...	DC1-349D5...
General						
Climatic proofing	P _w	%	< 95 %, average relative humidity (RH), non-condensing (EN 50178)			
Mounting position			Vertical			
Altitude		m	0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 4000 m			
Protection against direct contact			BGV A3 (VBG4, finger- and back-of-hand proof)			
Radio interference level						
Radio interference class (EMC)			C1, C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.			
Environment (EMC)			1st and 2nd environments			
longest permissible length of motor cable	l	m	25 (200)	25 (200)	25 (200)	25 (200)
Main circuit						
Supply						
Rated operational voltage	U _e		400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase
Mains voltage (50/60Hz)	U _{LN}	V	380 (-10%) - 480 (+10%)	380 (-10%) - 480 (+10%)	380 (-10%) - 480 (+10%)	380 (-10%) - 480 (+10%)
Input current	I _{LN}	T	2.4	4.3	6.1	9.8
Supply frequency	f _{LN}	Hz	50/60	50/60	50/60	50/60
Frequency range	f _{LN}	Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz
Mains switch-on frequency			Maximum of one time every 30 seconds			
Power section						
Overload current for 60 s every 600 s	I _L	A	3.3	6.15	8.7	14.25
Starting current for 2 s	I _L	A	3.85	7.18	10.15	16.63
Output voltage with V _e	U ₂		400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase
Output Frequency	f ₂	Hz	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)
Switching frequency	f _{PWM}	kHz	16 (adjustable 4 - 32)	16 (adjustable 4 - 32)	16 (adjustable 4 - 32)	16 (adjustable 4 - 32)
Operation Mode						
U/f control Slip compensation						
Frequency resolution (setpoint value)	Δf	Hz	0.1	0.1	0.1	0.1
Rated operational current	I _e	A	2.2	4.1	5.8	9.5
Power loss						
Heat dissipation at rated operational current	P _V	W	63.75	76.5	101.2	136
Efficiency	η	%	91.5	94.9	95.4	96.6
Maximum leakage current to ground (PE) without motor	I _{PE}	mA	< 1	< 1	< 1	< 1
Frame size			FS1	FS2	FS2	FS2
Motor feeder						
Assigned motor rating						
at 400 V, 50 Hz	P	kW	0.75	1.5	2.2	4
at 440 - 480 V, 60 Hz	P	HP	1	2	3	5
Apparent power						
Apparent power at rated operation 400 V	S	kVA	1.52	2.84	4.02	6.58
Apparent power at rated operation 480 V	S	kVA	1.83	3.41	4.82	7.9
Braking function						
Standard braking torque			max. 30% M _N	max. 30% M _N	max. 30% M _N	max. 30% M _N
DC braking torque			max. 100% of rated operational current I _e , variable			
Braking torque with external braking resistance			max. 100% rated operational current I _e , with external braking resistance			
minimum external braking resistance	R _{min}	Ω	-	200	200	100
Switch-on threshold for the braking transistor	U _{DC}	V	-	780 V DC	780 V DC	780 V DC
DC braking	%	I/I _e	-	-	-	-
Braking torque	%	I/I _e	-	-	-	-
Control section						
External control voltage	U _c	V	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)
Reference voltage	U _s	V	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)

Note ¹⁾ With a switching frequency of 4 kHz and an ambient air temperature of +40°C or +50°C for IP20/NEMA 0

DC1-34014...	DC1-34018...	DC1-34024...
< 95 %, average relative humidity (RH), non-condensing (EN 50178)		
Vertical		
0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 4000 m		
BGV A3 (VBG4, finger- and back-of-hand proof)		
C1, C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.		
1st and 2nd environments		
25 (200)	25 (200)	25 (200)
400 V AC, 3-phase		
380 (-10%) - 480 (+10%)	380 (-10%) - 480 (+10%)	380 (-10%) - 480 (+10%)
14.6	18.1	24.7
50/60	50/60	50/60
48 - 62 Hz	48 - 62 Hz	48 - 62 Hz
Maximum of one time every 30 seconds		
21	27	36
24.5	31.5	42
400 V AC, 3-phase		
0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)
8 (adjustable 4 - 24)	8 (adjustable 4 - 24)	8 (adjustable 4 - 24)
U/f control Slip compensation		
0.1	0.1	0.1
14	18	24
209	300	297
96.2	97	97.3
< 1	< 1	2.49
FS3	FS3	FS3
5.5	7.5	11
7.5	10	15
9.67	12.47	16.63
11.64	14.96	19.95
max. 30% M _N		
max. 100% of rated operational current I _e , variable		
max. 100% rated operational current I _e , with external braking resistance		
100	47	47
780 V DC	780 V DC	780 V DC
-	-	-
-	-	-
24 V DC (max. 100 mA)		
24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)
10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)

Typ			DA1-124D3...	DA1-127D0...	DA1-12011...
General					
Climatic proofing	P _w	%	< 95 %, average relative humidity (RH), non-condensing (EN 50178)		
Mounting position			Vertical		
Altitude		m	0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 4000 m		
Protection against direct contact			BGV A3 (VBG4, finger- and back-of-hand proof)		
Radio interference level					
Radio interference class (EMC)			C1, C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.		
Environment (EMC)			1st and 2nd environments		
longest permissible length of motor cable	l	m	25 (200)	25 (200)	25 (200)
Main circuit					
Supply					
Rated operational voltage	U _e		230 V AC, 1-phase	230 V AC, 1-phase	230 V AC, 1-phase
Mains voltage (50/60Hz)	U _{LN}	V	200 (-10%) - 240 (+10%)		
Input current	I _{LN}	T	8.5	13.9	19.5
Supply frequency	f _{LN}	Hz	50/60	50/60	50/60
Frequency range	f _{LN}	Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz
Mains switch-on frequency			Maximum of one time every 30 seconds		
Power section					
Overload current for 60 s every 600 s	I _L	A	6.45	10.5	15.75
Starting current for 4 s	I _L	A	8.6	14	21
Output voltage with V _e	U ₂		230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase
Output Frequency	f ₂	Hz	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)
Switching frequency	f _{PWM}	kHz	16 (adjustable 4 - 32)	16 (adjustable 4 - 32)	16 (adjustable 4 - 32)
Operation Mode					
			U/f control Slip compensation sensorless vector control (SLV) Vector control with feedback (CLV)		
Frequency resolution (setpoint value)	Δf	Hz	0.1	0.1	0.1
Rated operational current	I _e	A	4.3	7	10.5
Power loss					
Heat dissipation at rated operational current	P _v	W	45.75	63	103.4
Efficiency	η	%	93.9	95.8	95.3
Maximum leakage current to ground (PE) without motor	I _{PE}	mA	2.49	2.49	2.49
Frame size			FS2	FS2	FS2
Motor feeder					
Assigned motor rating					
at 230 V, 50 Hz	P	kW	0.75	1.5	2.2
at 220 - 240 V, 60 Hz	P	HP	1	2	3
Apparent power					
Apparent power at rated operation 230 V	S	kVA	1.71	2.79	4.18
Apparent power at rated operation 240 V	S	kVA	1.79	2.91	4.36
Braking function					
Standard braking torque			max. 30% M _N	max. 30% M _N	max. 30% M _N
DC braking torque			max. 100% of rated operational current I _e , variable		
Braking torque with external braking resistance			max. 100% rated operational current I _e , with external braking resistance		
minimum external braking resistance	R _{min}	Ω	100	50	35
Switch-on threshold for the braking transistor	U _{DC}	V	390 V DC	390 V DC	390 V DC
Control section					
External control voltage	U _c	V	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)
Reference voltage	U _s	V	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)

Note ¹⁾ With a switching frequency of 4 kHz and an ambient air temperature of +40°C or +50°C for IP20/NEMA 0

DA1-324D3...	DA1-327D0...	DA1-32011...	DA1-32018...	DA1-32024...
< 95 %, average relative humidity (RH), non-condensing (EN 50178)				
Vertical				
0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 4000 m				
BGV A3 (VBG4, finger- and back-of-hand proof)				
C1, C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.				
1st and 2nd environments				
25 (200)	25 (200)	25 (200)	25 (200)	25 (200)
230 V AC, 3-phase				
230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase
200 (-10%) - 240 (+10%)				
4.5	7.3	11	18.8	24.8
50/60	50/60	50/60	50/60	50/60
48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz
Maximum of one time every 30 seconds				
6.45	10.5	15.75	27	36
8.6	14	21	36	48
230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase
0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)
16 (adjustable 4 - 32)	16 (adjustable 4 - 32)	16 (adjustable 4 - 32)	16 (adjustable 4 - 24)	16 (adjustable 4 - 16)
U/f control Slip compensation sensorless vector control (SLV) Vector control with feedback (CLV)				
0.1	0.1	0.1	0.1	0.1
4.3	7	10.5	18	24
39.75	61.5	90.2	160	170.5
94.7	95.9	95.9	96	96.9
1.73	1.73	1.73	0.93	0.93
FS2	FS2	FS2	FS3	FS3
0.75	1.5	2.2	4	5.5
1	2	3	5	7.5
1.71	2.79	4.18	7.17	9.56
1.79	2.91	4.36	7.48	9.98
max. 30% M _N	max. 30% M _N	max. 30% M _N	max. 30% M _N	max. 30% M _N
max. 100% of rated operational current I _e , variable				
max. 100% rated operational current I _e , with external braking resistance				
100	50	35	20	20
390 V DC	390 V DC	390 V DC	390 V DC	390 V DC
24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)
10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)

Part no.			DA1-342D2...	DA1-344D1FB...	DA1-345D8...	DA1-349D5...
General						
Climatic proofing	ρ_w	%	< 95 %, average relative humidity (RH), non-condensing (EN 50178)			
Mounting position			Vertical			
Altitude		m	0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 4000 m			
Protection against direct contact			BGV A3 (VBG4, finger- and back-of-hand proof)			
Radio interference level						
Radio interference class (EMC)			C1, C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.			
Environment (EMC)			1st and 2nd environments			
longest permissible length of motor cable	l	m	25 (200)	25 (200)	25 (200)	25 (200)
Main circuit						
Supply						
Rated operational voltage	U _e		400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase
Mains voltage (50/60Hz)	U _{LN}	V	380 (-10%) - 480 (+10%)			
Input current	I _{LN}	T	2.4	4.3	6.1	9.8
Supply frequency	f _{LN}	Hz	50/60	50/60	50/60	50/60
Frequency range	f _{LN}	Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz
Mains switch-on frequency			Maximum of one time every 30 seconds			
Power section						
Overload current for 60 s every 600 s	I _L	A	3.3	6.15	8.7	14.25
Starting current for 4 s	I _L	A	4.4	8.2	11.6	19
Output voltage with U _e	U ₂		400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase
Output Frequency	f ₂	Hz	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)
Switching frequency	f _{PWM}	kHz	8 (adjustable 4 - 24)	8 (adjustable 4 - 24)	8 (adjustable 4 - 32)	8 (adjustable 4 - 32)
Operation Mode			U/f control Slip compensation sensorless vector control (SLV) Vector control with feedback (CLV)			
Frequency resolution (setpoint value)	Δf	Hz	0.1	0.1	0.1	0.1
Rated operational current	I _e	A	2.2	4.1	5.8	9.5
Power loss						
Heat dissipation at rated operational current	P _V	W	63.75	76.5	101.2	136
Efficiency	η	%	91.5	94.9	95.4	96.6
Maximum leakage current to ground (PE) without motor	I _{PE}	mA	4.65	4.65	4.65	4.65
Frame size			FS2	FS2	FS2	FS2
Motor feeder						
Assigned motor rating						
at 400 V, 50 Hz	P	kW	0.75	1.5	2.2	4
at 440 - 480 V, 60 Hz	P	HP	1	2	3	5
Apparent power						
Apparent power at rated operation 400 V	S	kVA	1.52	2.84	4.02	6.58
Apparent power at rated operation 480 V	S	kVA	1.83	3.41	4.82	7.9
Braking function						
Standard braking torque			max. 30% M _N	max. 30% M _N	max. 30% M _N	max. 30% M _N
DC braking torque			max. 100% of rated operational current I _e , variable			
Braking torque with external braking resistance			max. 100% rated operational current I _e , with external braking resistance			
minimum external braking resistance	R _{min}	Ω	400	200	150	100
Switch-on threshold for the braking transistor	U _{DC}	V	780 V DC	780 V DC	780 V DC	780 V DC
Control section						
External control voltage	U _c	V	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)
Reference voltage	U _s	V	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)

Note ¹⁾ With a switching frequency of 4 kHz and an ambient air temperature of +40°C or +50°C for IP20/NEMA 0

DA1-34014...	DA1-34018...	DA1-34024...	DA1-34030...	DA1-34039...	DA1-34046...
< 95 %, average relative humidity (RH), non-condensing (EN 50178)					
Vertical					
0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 4000 m					
BGV A3 (VBG4, finger- and back-of-hand proof)					
C1, C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.					
1st and 2nd environments					
25 (200)	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)
Supply					
400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase
380 (-10%) - 480 (+10%)					
14.6	18.1	24.7	30.8	40	47.1
50/60	50/60	50/60	50/60	50/60	50/60
48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz
Maximum of one time every 30 seconds					
21	27	36	45	58.5	69
28	36	48	60	78	92
400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase
0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)
8 (adjustable 4 - 24)	8 (adjustable 4 - 24)	8 (adjustable 4 - 24)	8 (adjustable 4 - 24)	8 (adjustable 4 - 24)	8 (adjustable 4 - 24)
U/f control Slip compensation sensorless vector control (SLV) Vector control with feedback (CLV)					
0.1	0.1	0.1	0.1	0.1	0.1
14	18	24	30	39	46
Power loss					
209	300	297	375	444	506
96.2	97	97.3	97.5	97.6	97.7
1.55	1.55	2.47	2.47	2.47	2.47
FS3	FS3	FS4	FS4	FS4	FS4
Assigned motor rating					
5.5	7.5	11	15	18.5	22
7.5	10	15	20	25	30
Apparent power					
9.67	12.47	16.63	20.78	27.02	31.87
11.64	14.96	19.95	24.94	32.42	38.24
Braking function					
max. 30% M _N	max. 30% M _N	max. 30% M _N	max. 30% M _N	max. 30% M _N	max. 30% M _N
max. 100% of rated operational current I _e , variable					
max. 100% rated operational current I _e , with external braking resistance					
75	50	40	22	22	22
780 V DC	780 V DC	780 V DC	780 V DC	780 V DC	780 V DC
Control section					
24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)
10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)

Part no.			DA1-34090...			
General						
Climatic proofing	ρ_w	%	< 95 %, average relative humidity (RH), non-condensing (EN 50178)			
Mounting position			Vertical			
Altitude		m	0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 4000 m			
Protection against direct contact			BGV A3 (VBG4, finger- and back-of-hand proof)			
Radio interference level						
Radio interference class (EMC)			C1, C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.			
Environment (EMC)			1st and 2nd environments			
longest permissible length of motor cable	l	m	25 (200)	25 (200)	25 (200)	25 (200)
Main circuit						
Supply						
Rated operational voltage	U _e		400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase
Mains voltage (50/60Hz)	U _{LN}	V	380 (-10%) - 480 (+10%)			
Input current	I _{LN}	T	62.8	73.8	92.2	112.5
Supply frequency	f _{LN}	Hz	50/60	50/60	50/60	50/60
Frequency range	f _{LN}	Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz
Mains switch-on frequency			Maximum of one time every 30 seconds			
Power section						
Overload current for 60 s every 600 s	I _L	A	91.5	105	135	165
Starting current for 4 s	I _L	A	122	140	180	220
Output voltage with U _e	U ₂		400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase
Output Frequency	f ₂	Hz	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)
Switching frequency	f _{PWM}	kHz	8 (adjustable 4 - 24)	8 (adjustable 4 - 24)	4 (adjustable 4 - 16)	4 (adjustable 4 - 16)
Operation Mode			U/f control Slip compensation sensorless vector control (SLV) Vector control with feedback (CLV)			
Frequency resolution (setpoint value)	Δf	Hz	0.1	0.1	0.1	0.1
Rated operational current	I _e	A	61	72	90	110
Power loss						
Heat dissipation at rated operational current	P _V	W	840	925	1080	1210
Efficiency	η	%	97.2	97.5	97.6	97.8
Maximum leakage current to ground (PE) without motor	I _{PE}	mA	0.49	0.49	2.68	2.68
Frame size			FS5	FS5	FS6	FS6
Motor feeder						
Assigned motor rating						
at 400 V, 50 Hz	P	kW	30	37	45	55
at 440 - 480 V, 60 Hz	P	HP	40	50	60	75
Apparent power						
Apparent power at rated operation 400 V	S	kVA	42.26	48.5	62.35	76.21
Apparent power at rated operation 480 V	S	kVA	50.71	58.2	74.82	91.45
Braking function						
Standard braking torque			max. 30% M _N	max. 30% M _N	max. 30% M _N	max. 30% M _N
DC braking torque			max. 100% of rated operational current I _e , variable			
Braking torque with external braking resistance			max. 100% rated operational current I _e , with external braking resistance			
minimum external braking resistance	R _{min}	Ω	12	12	6	6
Switch-on threshold for the braking transistor	U _{DC}	V	780 V DC	780 V DC	780 V DC	780 V DC
Control section						
External control voltage	U _c	V	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)
Reference voltage	U _s	V	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)

Note ¹⁾ With a switching frequency of 4 kHz and an ambient air temperature of +40°C or +50°C for IP20/NEMA 0

< 95 %, average relative humidity (RH), non-condensing (EN 50178)						
Vertical						
0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 4000 m						
BGV A3 (VBG4, finger- and back-of-hand proof)						
C1, C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.						
1st and 2nd environments						
25 (200)	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)
Supply						
400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase
380 (-10%) - 480 (+10%)						
153.2	183.7	205.9	244.5	307.8		
50/60	50/60	50/60	50/60	50/60	50/60	50/60
48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz
Maximum of one time every 30 seconds						
225	270	303	360	453		
300	360	404	480	604		
400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase
0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)
4	4	4	4	4	4	4
(adjustable 4 - 12)	(adjustable 4 - 8)	(adjustable 4 - 16)	(adjustable 4 - 12)	(adjustable 4 - 8)		
U/f control Slip compensation sensorless vector control (SLV) Vector control with feedback (CLV)						
0.1	0.1	0.1	0.1	0.1	0.1	0.1
150	180	202	240	302		
1575	1800	2090	2376	3040		
97.9	98	98.1	98.2	98.1		
2.68	2.68	4.75	4.75	4.75		
FS6	FS6	FS7	FS7	FS7		
75	90	110	132	160		
100	150	175	200	250		
103.92	124.71	139.95	166.28	209.23		
124.71	149.65	167.94	199.53	251.08		
max. 30% M _N	max. 30% M _N	max. 30% M _N	max. 30% M _N	max. 30% M _N		
max. 100% of rated operational current I _e , variable						
max. 100% rated operational current I _e , with external braking resistance						
6	6	6	6	6		
780 V DC	780 V DC	780 V DC	780 V DC	780 V DC	780 V DC	780 V DC
24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)
10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)

Typ			DA1-32039...	DA1-32046...	DA1-32061...	DA1-32072...	DA1-32090...
General							
Climatic proofing	ρ_w	%	< 95 %, average relative humidity (RH), non-condensing (EN 50178)				
Mounting position			Vertical				
Altitude		m	0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 4000 m				
Protection against direct contact			BGV A3 (VBG4, finger- and back-of-hand proof)				
Radio interference level							
Radio interference class (EMC)			C1, C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.				
Environment (EMC)			1st and 2nd environments				
longest permissible length of motor cable	l	m	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)
Main circuit							
Supply							
Rated operational voltage	U _e		230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase
Mains voltage (50/60Hz)	U _{LN}	V	200 (-10%) - 240 (+10%)				
Input current	I _{LN}	T	40	47.1	62.4	74.1	92.3
Supply frequency	f _{LN}	Hz	50/60	50/60	50/60	50/60	50/60
Frequency range	f _{LN}	Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz
Mains switch-on frequency			Maximum of one time every 30 seconds				
Power section							
Overload current for 60 s every 600 s	I _L	A	45	69	91.5	108	135
Starting current for 4 s	I _L	A	60	92	122	144	180
Output voltage with V _e	U ₂		230 V AC, 3-phase				
Output Frequency	f ₂	Hz	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)
Switching frequency	f _{PWM}	kHz	8 (adjustable 4 - 24)				4 (adjustable 4 - 16)
Operation Mode							
			U/f control Slip compensation sensorless vector control (SLV) Vector control with feedback (CLV)				
Frequency resolution (setpoint value)	Δf	Hz	0.1	0.1	0.1	0.1	0.1
Rated operational current	I _e	A	39	46	61	72	90
Power loss							
Heat dissipation at rated operational current	P _V	W	187.5	264	345	518	550
Efficiency	η	%	97.5	97.6	97.7	97.2	97.5
Maximum leakage current to ground (PE) without motor	I _{PE}	mA	1.42	1.42	0.28	0.28	1.54
Frame size			FS4	FS4	FS5	FS5	FS6
Motor feeder							
Assigned motor rating							
at 230 V, 50 Hz	P	kW	7.5	11	15	18.5	22
at 220 - 240 V, 60 Hz	P	HP	10	15	20	25	30
Apparent power							
Apparent power at rated operation 230 V	S	kVA	11.95	18.33	24.3	28.68	35.85
Apparent power at rated operation 240 V	S	kVA	12.47	19.12	25.36	29.93	37.41
Braking function							
Standard braking torque			max. 30% M _N				
DC braking torque			max. 100% of rated operational current I _e , variable				
Braking torque with external braking resistance			max. 100% rated operational current I _e , with external braking resistance				
minimum external braking resistance	R _{min}	Ω	22	12	12	6	6
Switch-on threshold for the braking transistor	U _{DC}	V	390 V DC	390 V DC	390 V DC	390 V DC	390 V DC
Control section							
External control voltage	U _c	V	24 V DC (max. 100 mA)				
Reference voltage	U _s	V	10 V DC (max. 10 mA)				

Note ¹⁾ With a switching frequency of 4 kHz and an ambient air temperature of +40°C or +50°C for IP20/NEMA 0

	DA1-32110...	DA1-32150...	DA1-32180...	DA1-32202...	DA1-32248...
General					
Climatic proofing	< 95 %, average relative humidity (RH), non-condensing (EN 50178)				
Mounting position	Vertical				
Altitude	0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 4000 m				
Protection against direct contact	BGV A3 (VBG4, finger- and back-of-hand proof)				
Radio interference level					
Radio interference class (EMC)	C1, C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.				
Environment (EMC)	1st and 2nd environments				
longest permissible length of motor cable	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)
Main circuit					
Supply					
Rated operational voltage	230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase
Mains voltage (50/60Hz)	200 (-10%) - 240 (+10%)				
Input current	112.7	153.5	183.8	206.2	252.8
Supply frequency	50/60	50/60	50/60	50/60	50/60
Frequency range	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz
Mains switch-on frequency	Maximum of one time every 30 seconds				
Overload current for 60 s every 600 s	165	225	270	303	372
Starting current for 4 s	220	300	360	404	496
Output voltage with V _e	230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase
Output Frequency	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)
Switching frequency	4 (adjustable 4 - 16)	4 (adjustable 4 - 12)	4 (adjustable 4 - 8)	4 (adjustable 4 - 16)	4 (adjustable 4 - 12)
Operation Mode					
	U/f control Slip compensation sensorless vector control (SLV) Vector control with feedback (CLV)				
Frequency resolution (setpoint value)	0.1	0.1	0.1	0.1	0.1
Rated operational current	110	150	180	202	248
Power loss					
Heat dissipation at rated operational current	720	814	945	1100	1425
Efficiency	97.6	97.8	97.9	98	98.1
Maximum leakage current to ground (PE) without motor	1.54	1.54	1.54	2.74	2.74
Frame size	FS6	FS6	FS6	FS7	FS7
Motor feeder					
Assigned motor rating					
at 230 V, 50 Hz	30	45	55	55	75
at 220 - 240 V, 60 Hz	40	50	60	75	100
Apparent power					
Apparent power at rated operation 230 V	43.82	59.76	71.71	80.47	98.8
Apparent power at rated operation 240 V	45.73	62.35	74.82	83.97	103.09
Braking function					
Standard braking torque	max. 30% M _N				
DC braking torque	max. 100% of rated operational current I _e , variable				
Braking torque with external braking resistance	max. 100% rated operational current I _e , with external braking resistance				
minimum external braking resistance	6	6	6	6	6
Switch-on threshold for the braking transistor	390 V DC	390 V DC	390 V DC	390 V DC	390 V DC
Control section					
External control voltage	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)
Reference voltage	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)

Technical data

			DX-LN1...	DX-LN3...	DX-LM3...
General					
Standards			IEC/EN 61558-2-20-2000, VDE 0570 Part 2-20/2001-04, UL, CSA	IEC/EN 61558-2-20-2000, VDE 0570 Part 2-20/2001-04, UL, CSA	IEC/EN 61558-2-20-2000, VDE 0570 Part 2-20/2001-04, UL, CSA
Operating temperature		°C	-25 to +40, up to 70 with current derating (see the note)	-25 to +40, up to 70 with current derating (see the note)	-25 to +40, up to 70 with current derating (see the note)
Storage temperature	θ	°C	-25 - +85	-25 - +85	-25 - +85
Mechanical shock resistance		g	11 ms ² /15 3 shocks	11 ms ² /15 3 shocks	11 ms ² /15 3 shocks
Vibration resistance		g	1 (0 - 150 Hz)	1 (0 - 150 Hz)	1 (0 - 150 Hz)
Vibration			0.35 mm at 10 - 55 Hz	0.35 mm at 10 - 55 Hz	0.35 mm at 10 - 55 Hz
Altitude		m	0 – 1000 above sea level, up to 5000 with current reduction (see notes)	0 – 1000 above sea level, up to 5000 with current reduction (see notes)	0 – 1000 above sea level, up to 5000 with current reduction (see notes)
Mounting position			Standing vertically, suspended horizontally	Standing vertically, suspended horizontally	Standing vertically, suspended horizontally
Free surrounding areas		MM	< 50	< 50	< 50
Protection type			IP20 (terminal)	IP20 (terminal)	IP20 (terminal)
Rated duty factor		% DF	100	100	100
Weight		kg	0.7	1.5	1.5
Electrical data					
Rated operational voltage			1 AC 230 V	3 AC 400 V	3 AC 400 V
Max. supply voltage		V AC	260 V + 0% (50/60 Hz)	550 V + 0% (50/60 Hz)	750 V + 0% (50/60 Hz)
Operating frequency	f	Hz	50/60	50/60	0...200
Insulation class			B	B	B
Connection					
Terminations			✓	✓	✓
Connection lugs			-	✓ (≥ 50 A)	✓ (≥ 63 A)
PE stud			✓	✓	✓

Part no.	Rated operational current	Inductance	Maximum heat dissipation	Cu factor	Voltage sag	Connection			Drilling	Tightening torque	Weight
	I_e					L	P_v	Terminal			
	A	mH	W	kg	%	mm ²	AWG	mm ²	mm	Nm	kg

Mains choke

Rated operational voltage 1 AC 230 V

DX-LN1-006	5.8	5.05	9	0,09	4	4	20 - 10	-	-	0.8	0.7
DX-LN1-009	8.6	3.41	11	0,11	4	4	20 - 10	-	-	0.8	0.7
DX-LN1-013	13	2.25	12	0,18	4	4	20 - 10	-	-	0.8	1.5
DX-LN1-018	18	1.63	17	0,27	4	4	20 - 10	-	-	0.8	1.5
DX-LN1-024	24	1.22	20	0,33	4	4	20 - 10	-	-	0.8	2
DX-LN1-032	32	0.92	24	0,00	4	4	20 - 10	-	0	0.8	3

Rated operational voltage 3 AC 400 V

DX-LN3-004	3.9	7.51	17	0,25	4	4	20 - 10	-	-	0.8	1.5
DX-LN3-006	6	4.9	19	0,34	4	4	20 - 10	-	-	0.8	1.5
DX-LN3-010	10	2.94	33	0,45	4	4	20 - 10	-	-	0.8	2.2
DX-LN3-016	16	1.84	44	0,53	4	4	20 - 10	-	-	0.8	2.9
DX-LN3-025	25	1.18	57	0,90	4	4	20 - 10	-	-	0.8	4.8
DX-LN3-040	40	0.64	59	0,91	2.5	10	20 - 6	-	-	1.5	4.8
DX-LN3-050	50	0.37	58	1,08	2.5	-	-	Cu 15 x 2	7	3	5.9
DX-LN3-060	60	0.31	60	1,51	2.5	-	-	Cu 15 x 2	7	3	5.9
DX-LN3-080	80	0.23	86	1,67	2.5	-	-	Cu 20 x 3	9	6	7.3
DX-LN3-100	100	0.18	101	1,68	2.5	-	-	Cu 20 x 3	9	6	10.2
DX-LN3-120	120	0.15	100	2,26	2.5	-	-	Cu 25 x 5	11	10	10.2
DX-LN3-160	160	0.11	140	2,35	2.5	-	-	Cu 25 x 5	11	10	12.3
DX-LN3-200	200	0.09	154	3,81	2.5	-	-	Cu 25 x 5	11	10	14.9
DX-LN3-250	250	0.07	155	4,26	2.5	-	-	Cu 40 x 5	14	15.5	20.6
DX-LN3-300	300	0.06	196	4,28	2.5	-	-	Cu 40 x 5	14	15.5	20.6
DX-LN3-303	303	0.06	230	0,00	2.5	-	-	Cu 40 x 5	14	15.5	20.6
DX-LN3-370	370	0.05	290	0,00	2.5	-	-	Cu 40 x 5	14	15.5	24.3
DX-LN3-450	450	0.04	300	0,00	2.5	-	-	Cu 40 x 10	14	15.5	23.8

Part no.	Rated operational current	Inductance	max. heat dissipation (pulse frequency)			Cu factor	Connection			Drilling	Tightening torque	Weight
			(3 kHz)	(5 kHz)	(12 kHz)		Terminal	Terminal	Connection lug			
	I_e	L	P_v	P_v	P_v	kg	mm ²	AWG	mm ²	mm	Nm	kg

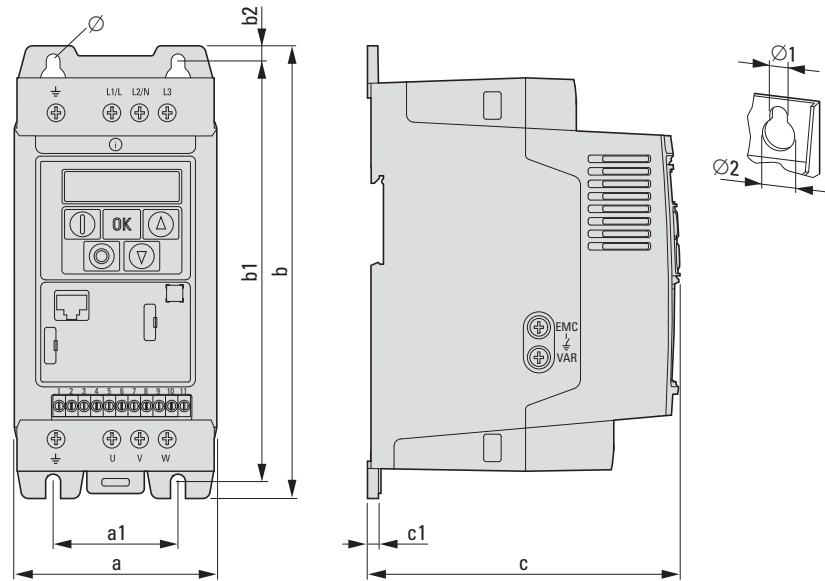
Motor chokes

Rated operational voltage 3 AC 400 V

DX-LM3-005	5	2	12	14	24	0,29	4	20 - 10	-	-	0.8	1.5
DX-LM3-008	8	4.1	32	46	54	1,09	4	20 - 10	-	-	0.8	4.8
DX-LM3-011	11	3	45	66	71	1,23	4	20 - 10	-	-	0.8	4.8
DX-LM3-016	16	1.5	50	75	78	0,88	4	20 - 10	-	-	0.8	4.8
DX-LM3-035	35	1	75	114	116	2,30	4	20 - 10	-	-	0.8	7.3
DX-LM3-050	50	0.6	110	157	168	3,60	10	20 - 6	-	-	1.5	12.3
DX-LM3-063	63	0.5	130	190	193	3,01	-	-	Cu 15 x 2	7	3	14.9
DX-LM3-080	80	0.5	132	206	206	5,88	-	-	Cu 20 x 2	9	6	20.6
DX-LM3-100	100	0.45	177	279	294	10,10	-	-	Cu 20 x 2	9	6	31
DX-LM3-150	150	0.35	293	418	424	8,22	-	-	Cu 25 x 5	11	10	45
DX-LM3-180	180	0.3	418	298	439	14,75	-	-	Cu 25 x 5	11	10	45
DX-LM3-220	220	0.2	344	512	517	11,37	-	-	Cu 40 x 5	14	15.5	45
DX-LM3-260	260	0.15	358	526	520	11,10	-	-	Cu 40 x 5	14	15.5	45
DX-LM3-303	303	0.15	685	-	-	0,00	-	-	Cu 40 x 5	14	15.5	48.7
DX-LM3-370	370	0.12	685	-	-	0,00	-	-	Cu 40 x 5	14	15.5	61.7
DX-LM3-450	450	0.1	730	-	-	0,00	-	-	Cu 40 x 10	14	15.5	81.7

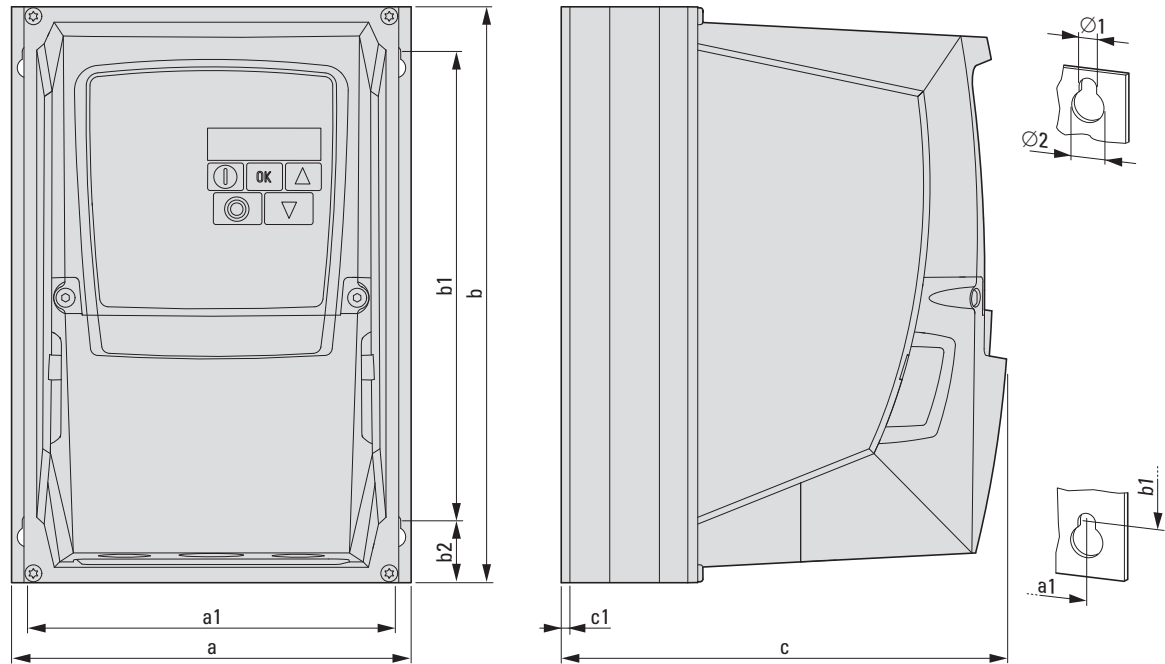
Dimensions

DC1, sizes FS1 - FS3, degree of protection IP20/NEMA 0



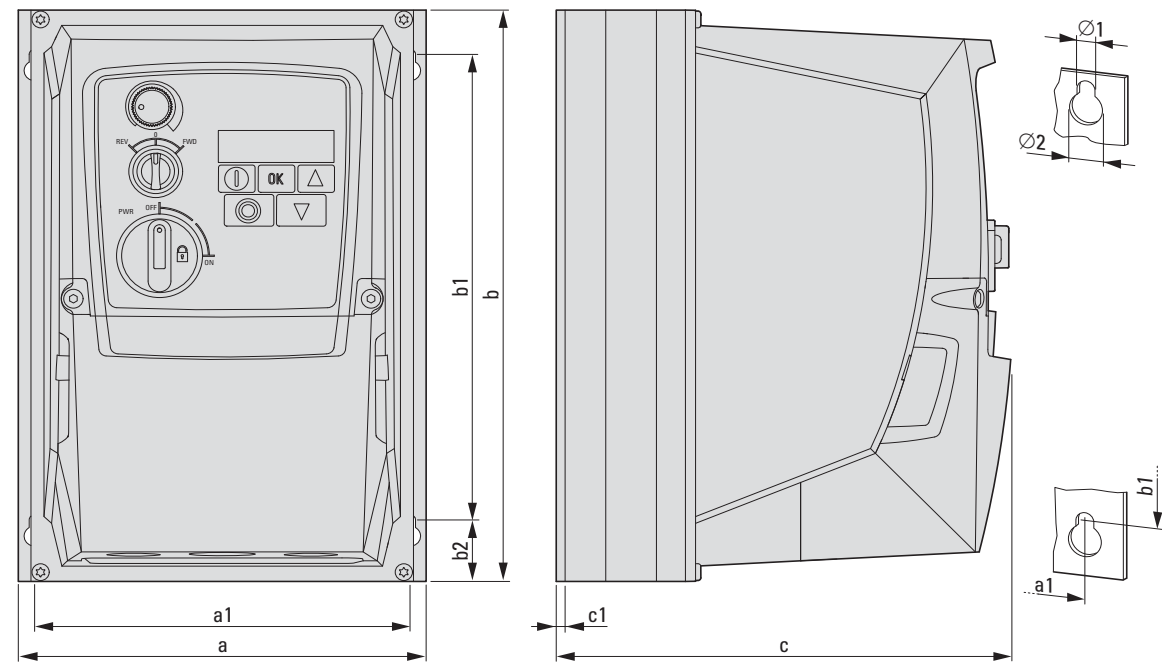
a	a1	b	b1	b2	c	c1	Ø1	Ø2	Weight	Size
mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	kg	
81 (3.19)	50 (1.97)	184 (7.24)	170 (6.69)	7 (0.28)	124 (4.88)	4 (0.16)	6 (0.24)	12 (0.47)	1.1	FS1
107 (4.21)	75 (2.95)	231 (9.09)	215 (8.46)	8 (0.31)	152 (5.98)	5 (0.2)	6 (0.24)	12 (0.47)	2.6	FS2
131 (5.16)	100 (3.94)	273 (10.75)	255 (10.04)	8.5 (0.33)	175 (6.89)	5 (0.2)	6 (0.24)	12 (0.47)	4	FS3

DC1, sizes FS1 - FS3, degree of protection IP66/NEMA 4X



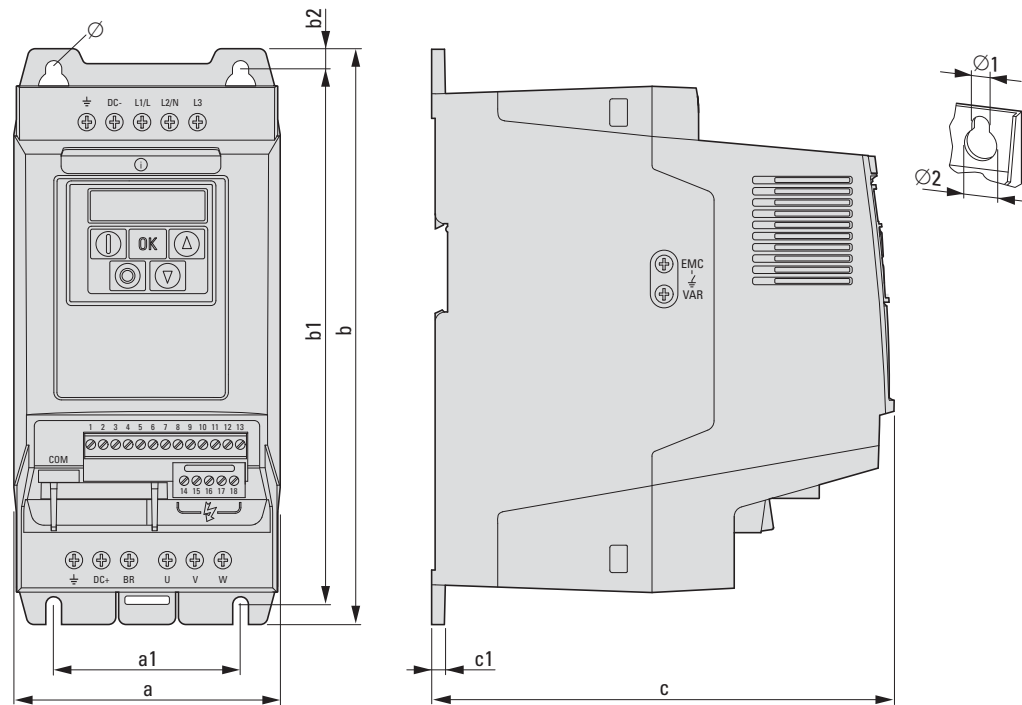
a	a1	b	b1	b2	c	c1	Ø1	Ø2	Weight	Size
mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	kg (lbs)	
161 (6.34)	148.5 (5.85)	232 (9.13)	189 (7.44)	25 (0.98)	184 (7.24)	3.5 (0.14)	4 (0.15)	8 (0.31)	2.5 (5.51)	FS1
188 (7.4)	176 (6.93)	257 (10.12)	200 (7.87)	28.5 (1.12)	192 (7.56)	3.5 (0.14)	4.2 (0.16)	8.5 (0.33)	4.7 (10.36)	FS2
210.5 (8.29)	197.5 (7.78)	310 (12.2)	251.5 (9.9)	33.4 (1.31)	234 (9.21)	3.5 (0.14)	4.2 (0.16)	8.5 (0.33)	7.9 (17.42)	FS3

DC1, sizes FS1 - FS3, degree of protection IP66/NEMA 4X, with local controls



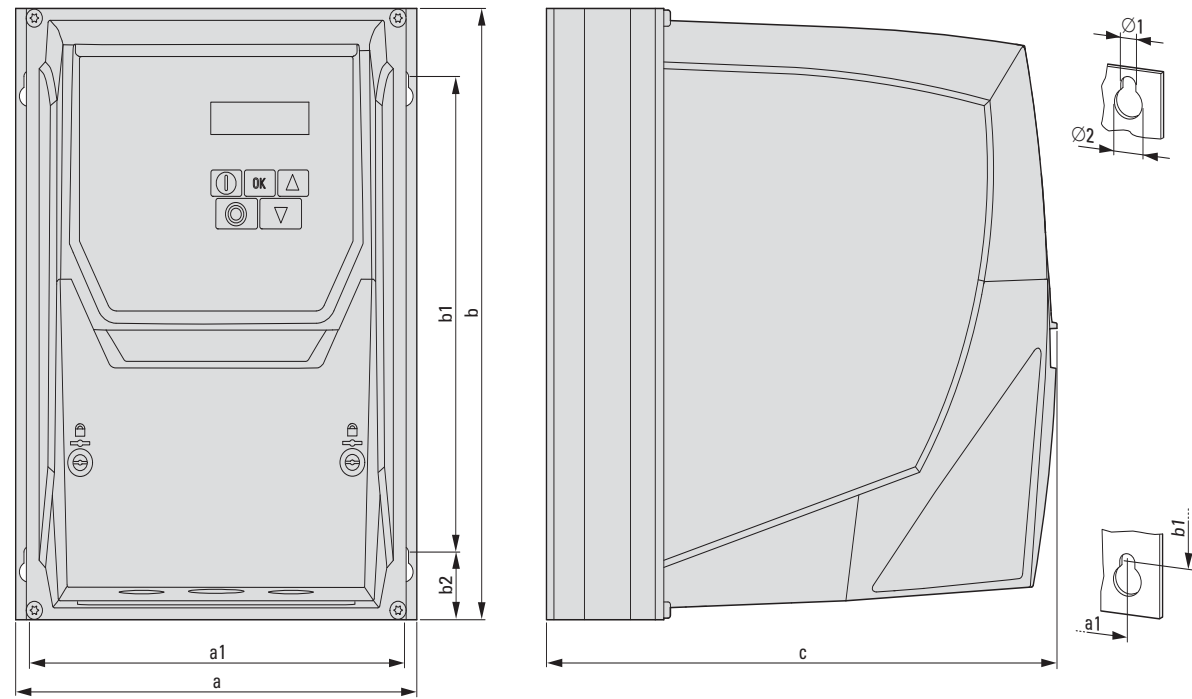
a	a1	b	b1	b2	c	c1	Ø1	Ø2	Weight	Size
mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	kg (lbs)	
161 (6.34)	148.5 (5.85)	232 (9.13)	189 (7.44)	25 (0.98)	184 (7.24)	3.5 (0.14)	4 (0.15)	8 (0.31)	2.8 (6.17)	FS1
188 (7.4)	176 (6.93)	257 (10.12)	200 (7.87)	28.5 (1.12)	192 (7.56)	3.5 (0.14)	4.2 (0.16)	8.5 (0.33)	5 (11.02)	FS2
210.5 (8.29)	197.5 (7.78)	310 (12.2)	251.5 (9.9)	33.4 (1.31)	234 (9.21)	3.5 (0.14)	4.2 (0.16)	8.5 (0.33)	8.2 (18.08)	FS3

DA1, sizes FS2 - FS3, degree of protection IP20/NEMA 0



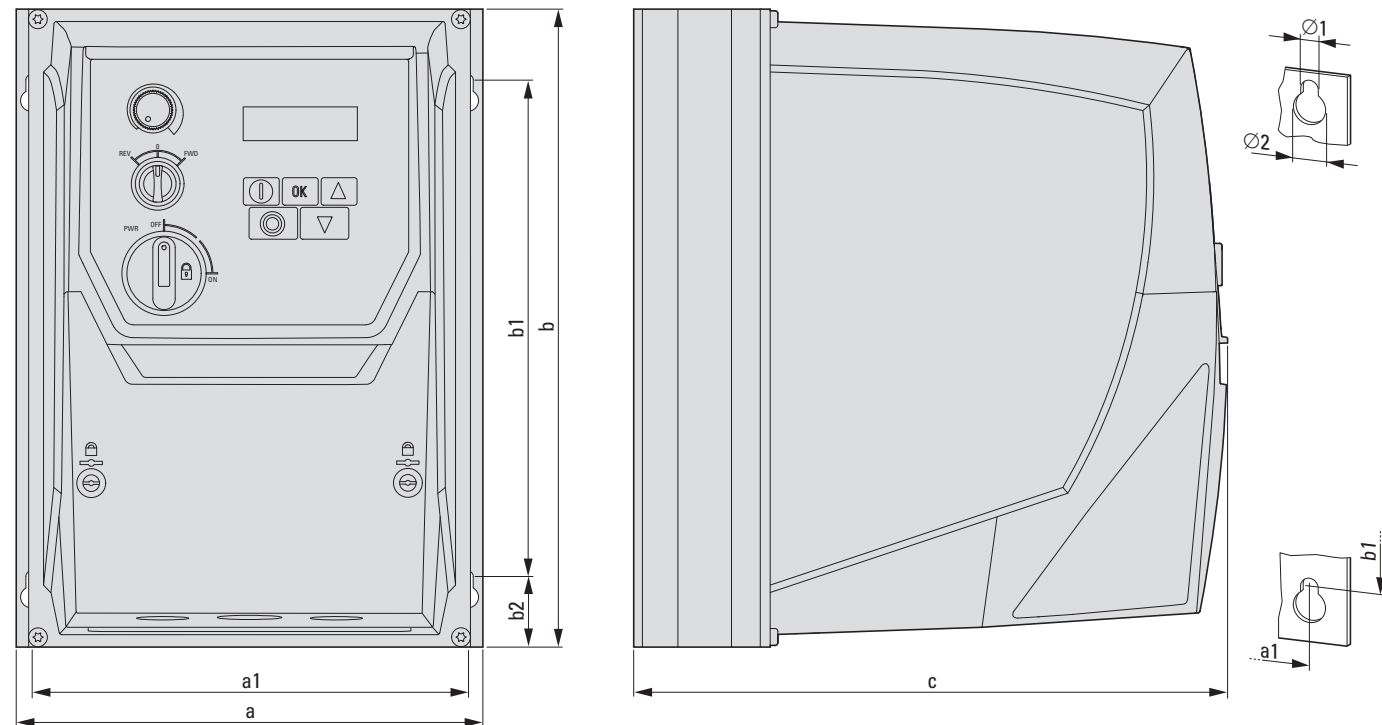
a	a1	b	b1	b2	c	c1	Ø1	Ø2	Weight	Size
mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	kg	
107 (4.21)	75 (2.95)	231 (9.09)	215 (8.46)	8 (0.31)	186 (7.32)	5 (0.2)	6 (0.24)	12 (0.47)	1.8	FS2
131 (5.16)	100 (3.94)	273 (10.75)	255 (10.04)	8.5 (0.33)	204 (8.03)	5 (0.2)	6 (0.24)	12 (0.47)	3.5	FS3

DA1, sizes FS2 - FS3, degree of protection IP66/NEMA 4X



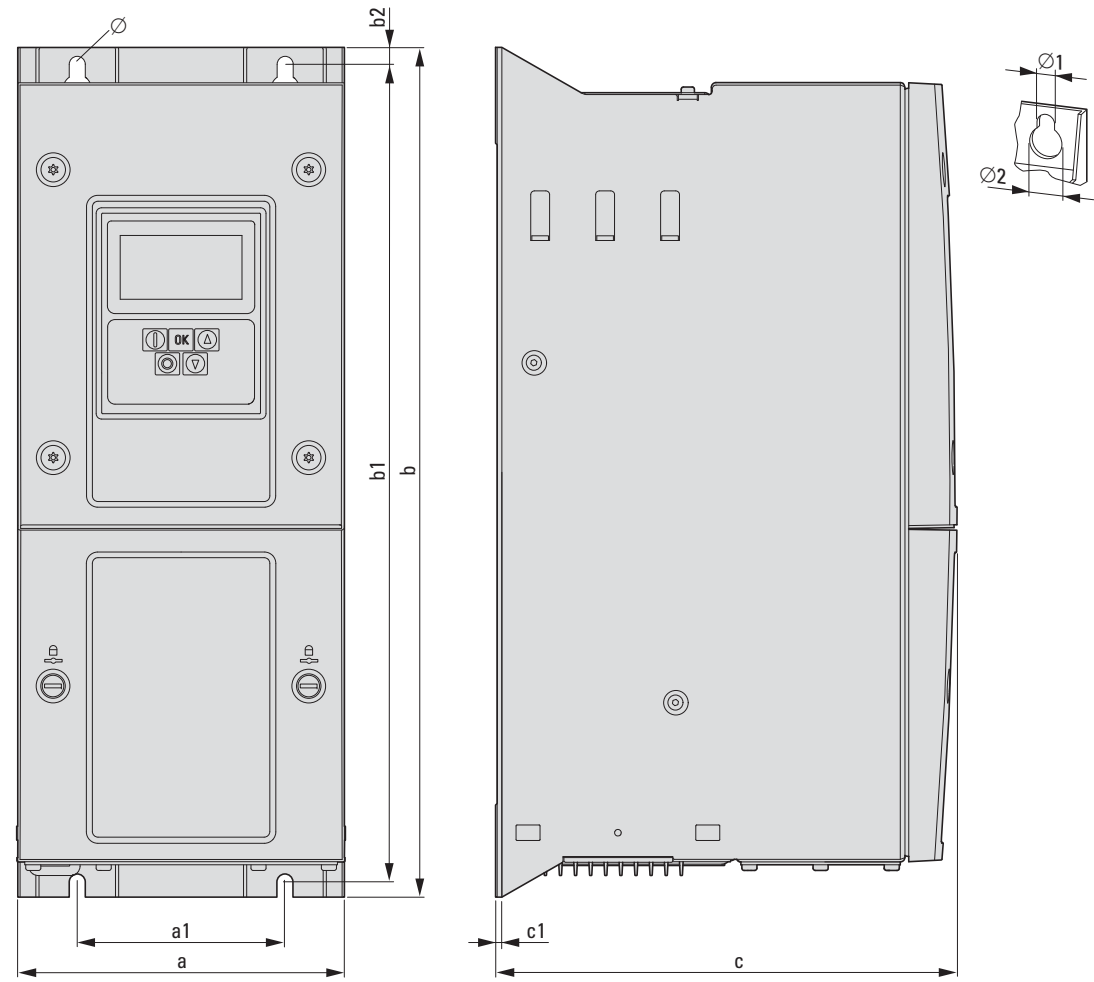
a	a1	b	b1	b2	c	Ø1	Ø2	Weight	Size
mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	kg (lbs)	
188 (7.4)	176 (6.93)	200 (7.87)	20 (0.79)	239.3 (9.42)	4.2 (0.16)	8.5 (0.33)	4.5 (10.4)	FS2	
211 (8.29)	198 (7.78)	310 (12.2)	25 (0.98)	266.3 (10.48)	4.2 (0.16)	8.5 (0.33)	7 (15.9)	FS3	

DA1, sizes FS2 - FS3, degree of protection IP66/NEMA 4X, with local controls



a	a1	b	b1	b2	c	Ø1	Ø2	Weight	Size
mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	kg (lbs)	
188 (7.4)	176 (6.93)	257 (10.12)	200 (7.87)	20 (0.79)	239.3 (9.42)	4.2 (0.16)	8.5 (0.33)	4.8 (10.6)	FS2
211 (8.29)	198 (7.78)	310 (12.2)	252 (9.9)	25 (0.98)	266.3 (10.48)	4.2 (0.16)	8.5 (0.33)	7.3 (16.1)	FS3

DA1, sizes FS4 - FS7, degree of protection IP55



a	a1	b	b1	b2	c	c1	Ø1	Ø2	Weight	Size
mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	kg	
171 (6.73)	110 (4.33)	450 (17.72)	428 (16.85)	9 (0.35)	240 (9.45)	2 (0.08)	8 (0.31)	15 (0.59)	11.5	FS4
235 (9.25)	175 (6.89)	540 (20.28)	515 (20.28)	12 (0.47)	270 (10.63)	2 (0.08)	8 (0.31)	15 (0.59)	22.5	FS5
330 (12.99)	200 (7.87)	865 (34.06)	840 (33.07)	15 (0.59)	330 (12.99)	2 (0.08)	11 (0.43)	22 (0.87)	50	FS6
330 (12.99)	200 (7.87)	1280 (50.39)	1255 (44.41)	15 (0.59)	360 (14.17)	2 (0.08)	11 (0.43)	22 (0.87)	80	FS7

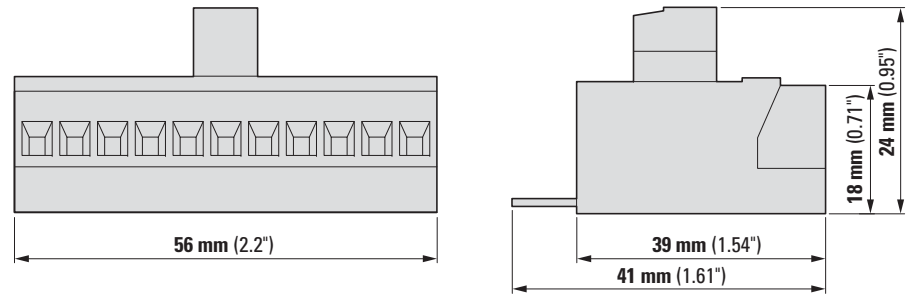
DA1, size FS8, degree of protection IP40

Control panel version

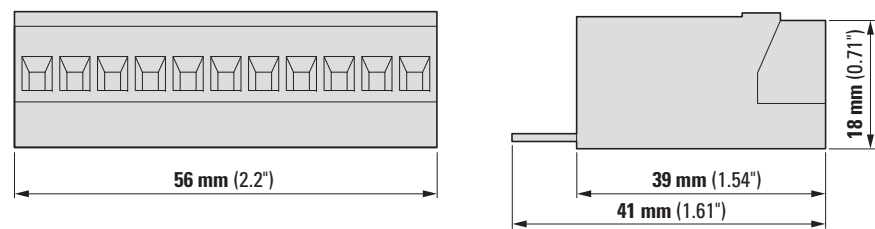
a	a1	b	b1	b2	c	c1	Ø1	Ø2	Weight	Size
mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	kg	
500 (19.69)	350 (13.78)	2000 (78.74)	1950 (76.77)	33 (1.3)	516 (20.31)	2 (0.08)	18 (0.71)	35 (1.38)	270	FS8

Expansion modules for DC1

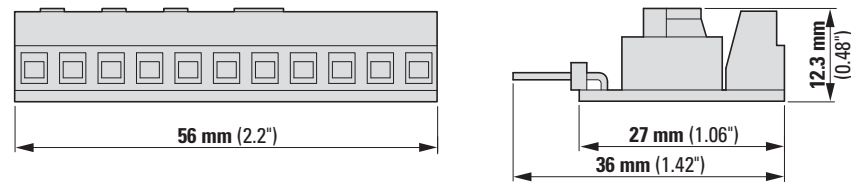
DXC-EXT-I0110
DXC-EXT-I0230
DXC-EXT-2R01A0



DXC-EXT-2R0

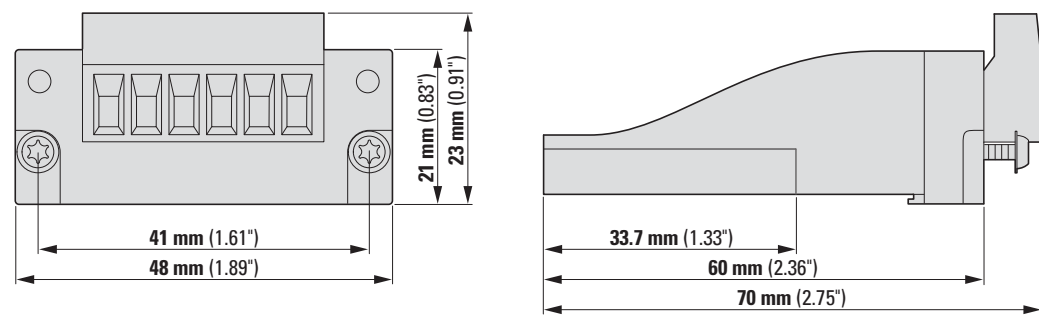


DXC-EXT-LOCSIM



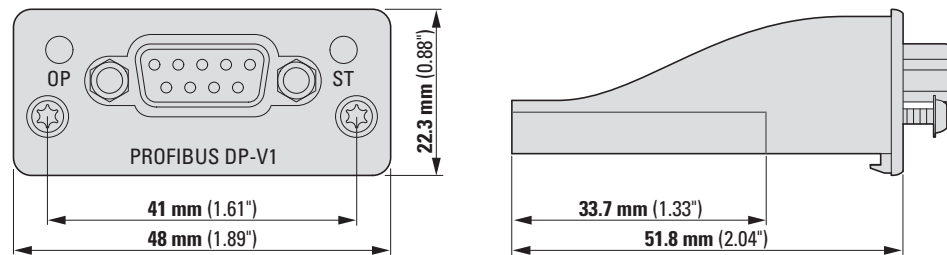
Expansion modules for DA1

DXA-EXT-3D11R0
DXA-EXT-3R0
DXA-EXT-ENCOD



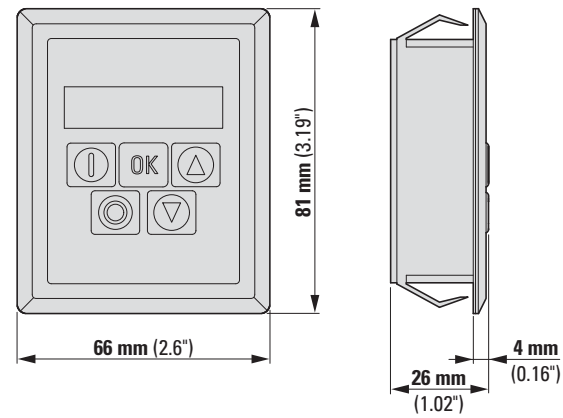
Fieldbus module for DA1

DX-NET-PROFIBUS

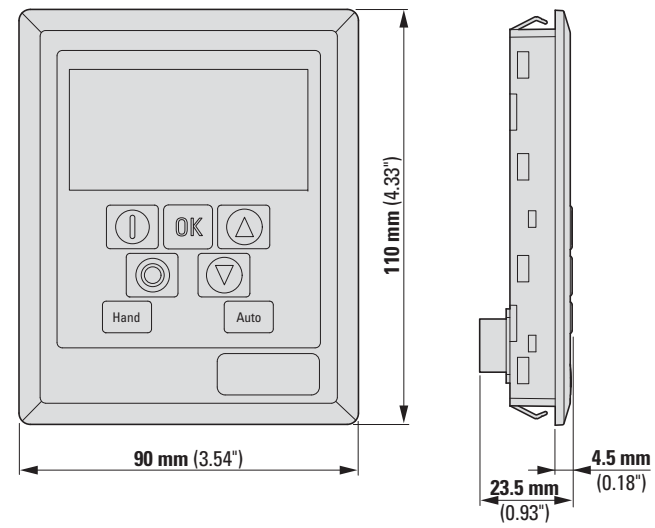


External keypad

DX-KEY-LED

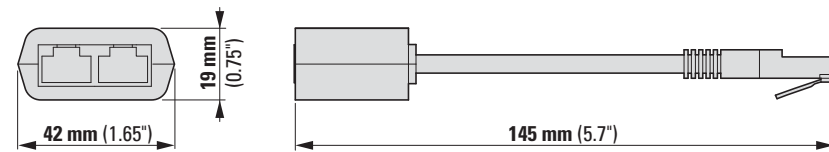


DX-KEY-OLED



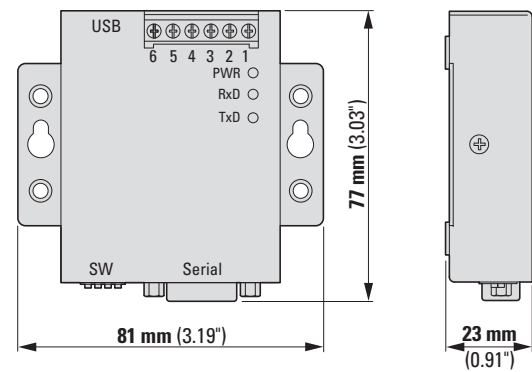
Cable and splitter

DX-SPL-RJ45-2SL1PL



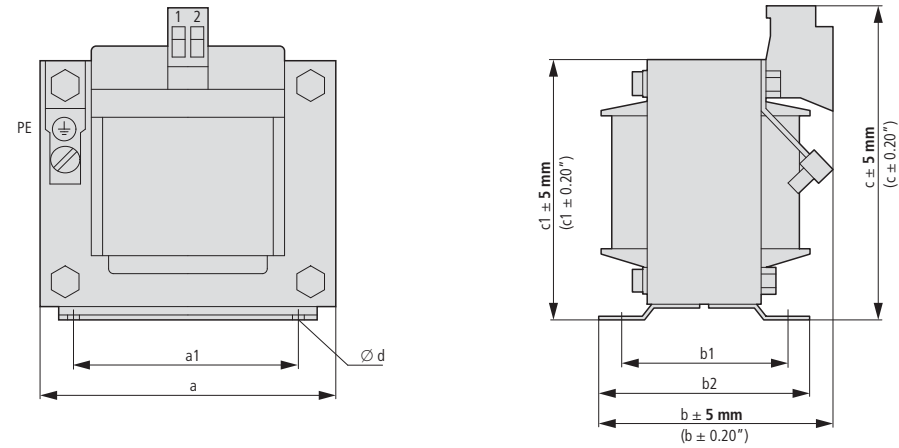
Interface converter

DX-COM-PCKIT



Mains chokes

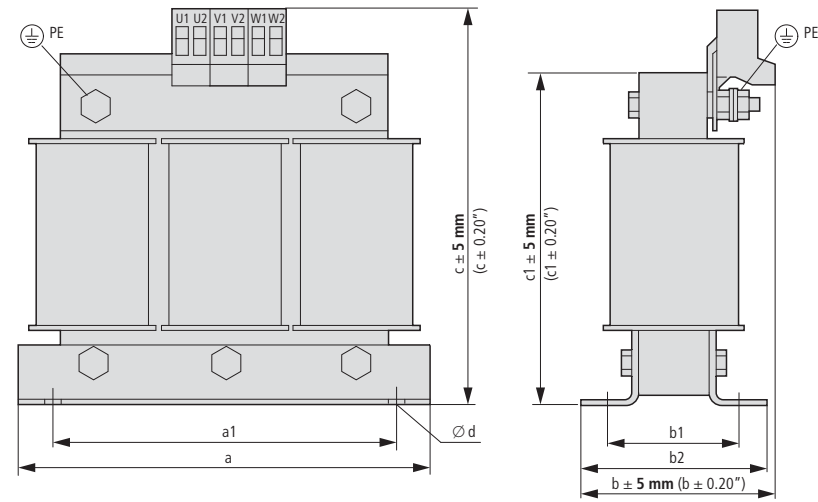
DX-LN1-...



	a	a1	b	b1	b2	c	c1	d	Weight
	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	kg
DX-LN1-006	66 (2.6)	50 (1.97)	71 (2.8)	44 (1.73)	55 (2.17)	80 (3.15)	61 (2.36)	4.5 x 8 (0.18 x 0.31)	0.7
DX-LN1-009	66 (2.6)	50 (1.97)	71 (2.8)	44 (1.73)	55 (2.17)	80 (3.15)	61 (2.36)	4.5 x 8 (0.18 x 0.31)	0.7
DX-LN1-013	84 (3.31)	64 (2.52)	67 (2.64)	47 (1.85)	60 (2.36)	90 (3.54)	75 (2.95)	4.8 x 8 (0.18 x 0.31)	1.5
DX-LN1-018	84 (3.31)	64 (2.52)	67 (2.64)	47 (1.85)	60 (2.36)	90 (3.54)	75 (2.95)	4.8 x 8 (0.18 x 0.31)	1.5
DX-LN1-024	84 (3.31)	64 (2.52)	81 (3.19)	61 (2.4)	74 (2.91)	90 (3.54)	75 (2.95)	4.8 x 8 (0.18 x 0.31)	2
DX-LN1-032	105 (4.13)	84 (3.31)	102 (4.02)	65 (2.56)	81 (3.19)	121 (4.76)	94 (3.7)	5.8 x 11 (0.23 x 0.43)	3

Mains chokes, motor chokes

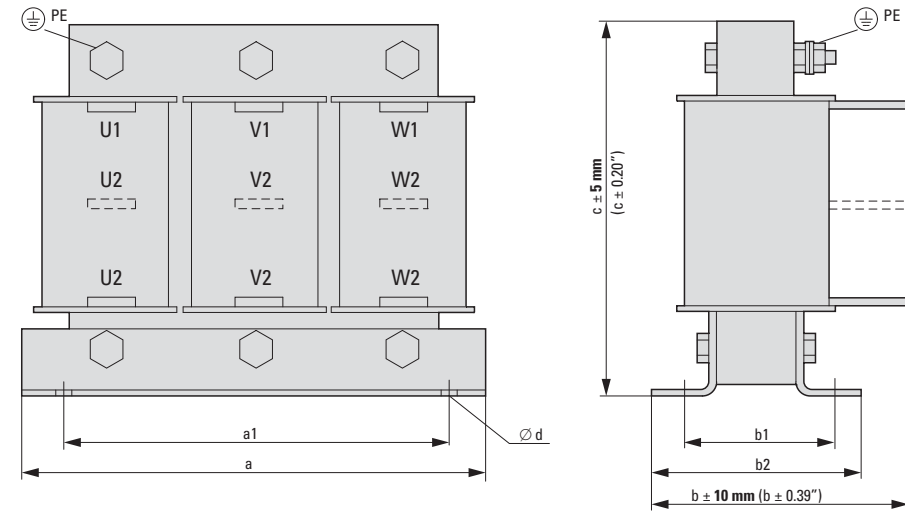
DX-LN3-004...DX-LN3-040
DX-LM3-005...DX-LM3-050



	a	a1	b	b1	b2	c	c1	d	Weight
	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	kg
DX-LN3-004	115 (4.53)	100 (3.94)	66 (2.6)	50 (1.97)	66 (2.6)	118 (4.65)	84 (3.31)	5 x 10 (0.2 x 0.39)	1.5
DX-LN3-006	115 (4.53)	100 (3.94)	66 (2.6)	50 (1.97)	66 (2.6)	118 (4.65)	84 (3.31)	5 x 10 (0.2 x 0.39)	1.5
DX-LN3-010	140 (5.51)	125 (4.92)	61 (2.4)	50 (1.97)	61 (2.4)	138 (5.43)	105 (4.13)	5 x 10 (0.2 x 0.39)	2.2
DX-LN3-016	140 (5.51)	125 (4.92)	71 (2.8)	50 (1.97)	71 (2.8)	138 (5.43)	105 (4.13)	5 x 10 (0.2 x 0.39)	2.9
DX-LN3-025	195 (7.68)	175 (6.89)	104 (4.09)	50 (1.97)	76.5 (3.01)	175 (6.89)	134 (5.28)	8 x 13 (0.31 x 0.51)	4.8
DX-LN3-040	195 (7.68)	175 (6.89)	104 (4.09)	50 (1.97)	76.5 (3.01)	188 (7.4)	134 (5.28)	8 x 13 (0.31 x 0.51)	4.8
DX-LM3-005	115 (4.53)	100 (3.94)	66 (2.6)	50 (1.97)	66 (2.6)	118 (4.65)	84 (3.31)	5 x 10 (0.2 x 0.39)	1.5
DX-LM3-008	195 (7.68)	175 (6.89)	104 (4.09)	50 (1.97)	76.5 (3.01)	175 (6.89)	134 (5.28)	8 x 13 (0.31 x 0.51)	4.8
DX-LM3-011	195 (7.68)	175 (6.89)	104 (4.09)	50 (1.97)	76.5 (3.01)	175 (6.89)	134 (5.28)	8 x 13 (0.31 x 0.51)	4.8
DX-LM3-016	195 (7.68)	175 (6.89)	104 (4.09)	50 (1.97)	76.5 (3.01)	175 (6.89)	134 (5.28)	8 x 13 (0.31 x 0.51)	4.8
DX-LM3-035	220 (8.66)	200 (7.87)	132 (5.2)	75 (2.95)	101.5 (4)	195 (7.68)	160 (6.3)	8 x 13 (0.31 x 0.51)	7.3
DX-LM3-050	270 (10.63)	250 (9.84)	106 (4.17)	75 (2.95)	96 (3.78)	228 (8.98)	198 (7.8)	8 x 13 (0.31 x 0.51)	12.3

Mains chokes, motor chokes

DX-LN3-050...-DX-LN3-450
DX-LM3-063...-DX-LM3-450

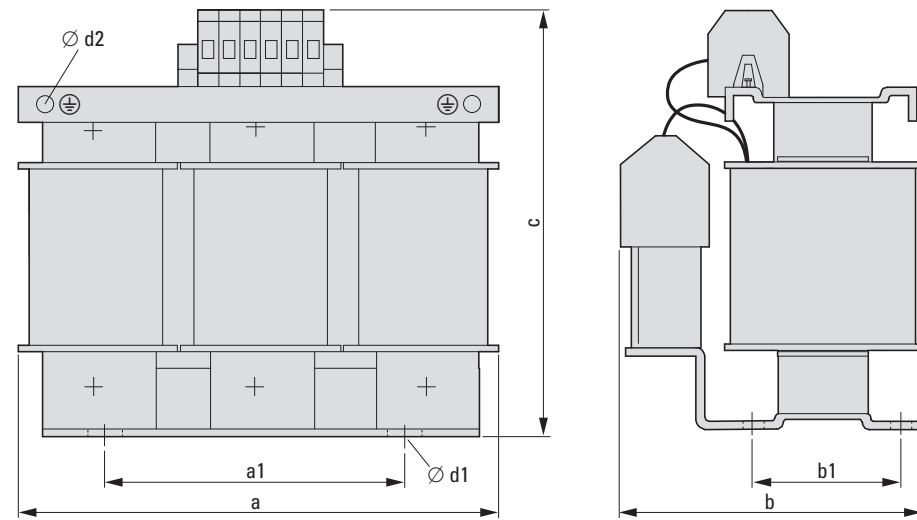


Height tolerance depends on gap
The position of connection lugs U2-V2-W2 depends on the coil material and can deviate from the position illustrated here.

	a	a1	b	b1	b2	c	d	Weight
	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	kg
DX-LN3-050	195 (7.68)	175 (6.89)	105 (4.13)	75 (2.95)	91.5 (3.6)	132 ±5 (5.2 ±0.2)	8 x 13 (0.31 x 0.51)	5.9
DX-LN3-060	195 (7.68)	175 (6.89)	105 (4.13)	75 (2.95)	91.5 (3.6)	132 ±5 (5.2 ±0.2)	8 x 13 (0.31 x 0.51)	5.9
DX-LN3-080	220 (8.66)	200 (7.87)	110 (4.33)	50 (1.97)	81.5 (3.21)	160 ±5 (6.3 ±0.2)	8 x 13 (0.31 x 0.51)	7.3
DX-LN3-100	220 (8.66)	200 (7.87)	130 (5.12)	75 (2.95)	101.5 (4)	160 ±5 (6.3 ±0.2)	8 x 13 (0.31 x 0.51)	10.2
DX-LN3-120	220 (8.66)	200 (7.87)	130 (5.12)	75 (2.95)	101.5 (4)	160 ±5 (6.3 ±0.2)	8 x 13 (0.31 x 0.51)	10.2
DX-LN3-160	270 (10.63)	250 (9.84)	125 (4.92)	75 (2.95)	96 (3.75)	200 ±5 (7.87 ±0.2)	8 x 13 (0.31 x 0.51)	12.3
DX-LN3-200	270 (10.63)	250 (9.84)	155 (6.1)	100 (3.94)	120 (4.72)	202 ±5 (7.95 ±0.2)	8 x 13 (0.31 x 0.51)	14.9
DX-LN3-250	270 (10.63)	250 (9.84)	155 (6.1)	100 (3.94)	125 (4.92)	210 ±5 (8.27 ±0.2)	10 x 18 (0.39 x 0.71)	20.6
DX-LN3-300	270 (10.63)	250 (9.84)	155 (6.1)	100 (3.94)	125 (4.92)	210 ±5 (8.27 ±0.2)	10 x 18 (0.39 x 0.71)	20.6
DX-LN3-303	270 (10.63)	250 (9.84)	155 (6.1)	100 (3.94)	125 (4.92)	210 ±5 (8.27 ±0.2)	10 x 18 (0.39 x 0.71)	20.6
DX-LN3-370	384 (15.12)	350 (13.78)	215 (8.46)	100 (3.94)	130 (5.12)	258 ±5 (10.16 ±0.2)	12 x 20 (0.47 x 0.79)	24.3
DX-LN3-450	384 (15.12)	350 (13.78)	215 (8.46)	100 (3.94)	130 (5.12)	258 ±5 (10.16 ±0.2)	12 x 20 (0.47 x 0.79)	23.8
DX-LM3-063	270 (10.63)	250 (9.84)	155 (6.1)	100 (3.94)	120 (4.72)	202 ±10 (7.95 ±0.39)	8 x 13 (0.31 x 0.51)	14.9
DX-LM3-080	270 (10.63)	250 (9.84)	155 (6.1)	100 (3.94)	125 (4.92)	210 ±10 (8.27 ±0.39)	10 x 18 (0.39 x 0.71)	20.6
DX-LM3-100	384 (15.12)	350 (13.78)	215 (8.46)	100 (3.94)	130 (5.12)	258 ±30 (10.16 ±1.18)	12 x 20 (0.47 x 0.79)	31
DX-LM3-150	384 (15.12)	350 (13.78)	260 (10.24)	150 (5.91)	180 (7.09)	258 ±30 (10.16 ±1.18)	12 x 20 (0.47 x 0.79)	45
DX-LM3-180	384 (15.12)	350 (13.78)	260 (10.24)	150 (5.91)	180 (7.09)	258 ±30 (10.16 ±1.18)	12 x 20 (0.47 x 0.79)	45
DX-LM3-220	384 (15.12)	350 (13.78)	260 (10.24)	150 (5.91)	180 (7.09)	258 ±30 (10.16 ±1.18)	12 x 20 (0.47 x 0.79)	45
DX-LM3-260	384 (15.12)	350 (13.78)	260 (10.24)	150 (5.91)	180 (7.09)	258 ±30 (10.16 ±1.18)	12 x 20 (0.47 x 0.79)	45
DX-LM3-303	454 (17.87)	425 (16.73)	270 (10.63)	100 (3.94)	150 (5.9)	313 ±5 (12.32 ±0.2)	12 x 20 (0.47 x 0.79)	48.7
DX-LM3-370	454 (17.87)	425 (16.73)	285 (11.22)	125 (4.92)	165 (6.5)	313 ±5 (12.32 ±0.2)	12 x 20 (0.47 x 0.79)	61.7
DX-LM3-450	454 (17.87)	425 (16.73)	300 (11.81)	150 (5.9)	180 (7.09)	313 ±5 (12.32 ±0.2)	12 x 20 (0.47 x 0.79)	81.7

Sine filter

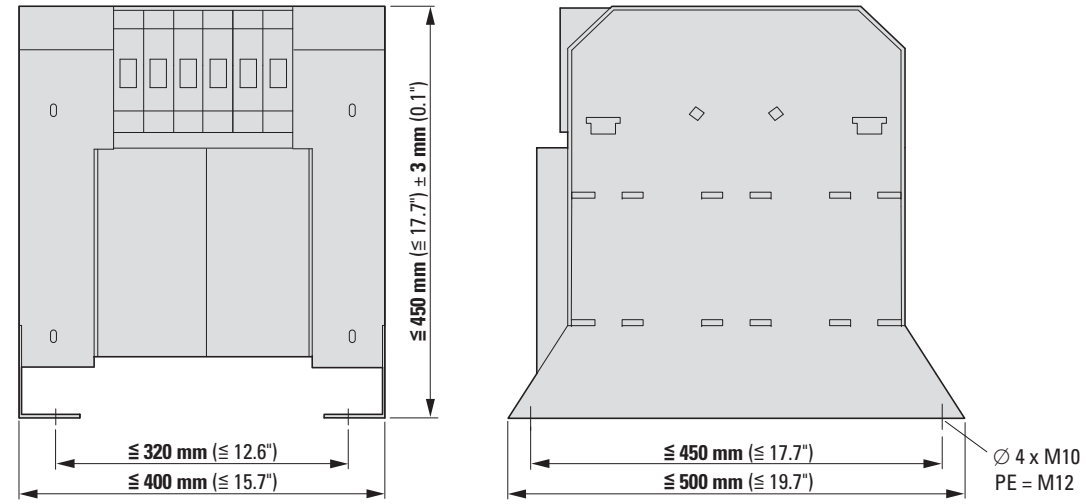
DX-SIN3-004 - DX-SIN3-180



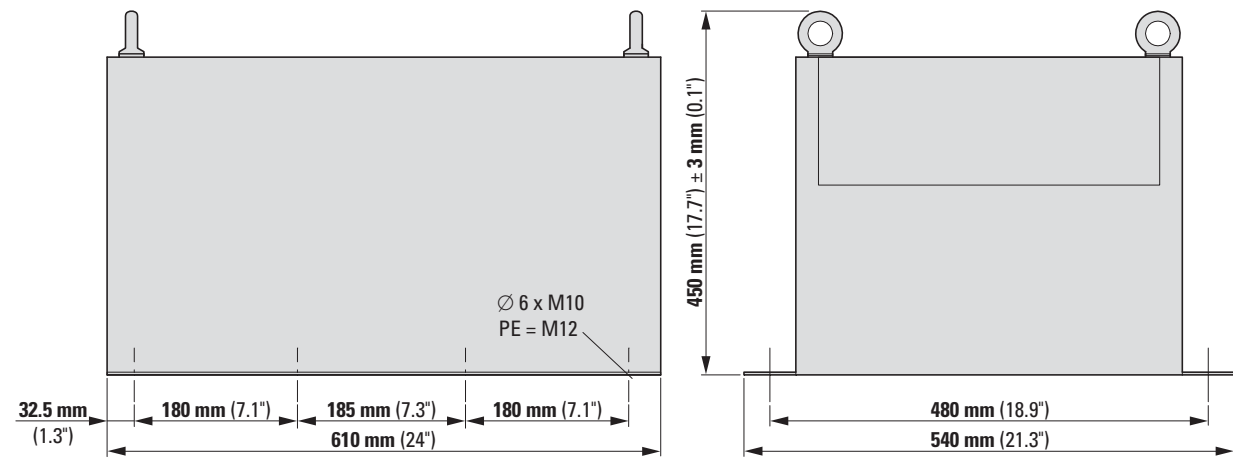
	a mm (inch)	a1 mm (inch)	b mm (inch)	b1 mm (inch)	c mm (inch)	d1	d2	Weight kg
DX-SIN3-004	155 (6.1)	130 (5.12)	105 (4.13)	56 (2.2)	160 (6.3)	4 x M5	M4	4.2
DX-SIN3-010	155 (6.1)	130 (5.12)	120 (4.72)	71 (2.8)	160 (6.3)	4 x M5	M4	6.1
DX-SIN3-016	190 (7.48)	170 (6.69)	160 (6.3)	67 (2.64)	185 (7.28)	4 x M5	M4	9.4
DX-SIN3-023	240 (9.45)	190 (7.48)	190 (7.48)	105 (4.13)	280 (11.02)	4 x M6	M6	14.5
DX-SIN3-032	240 (9.45)	190 (7.48)	200 (7.87)	105 (4.13)	280 (11.02)	4 x M6	M6	19.7
DX-SIN3-037	240 (9.45)	190 (7.48)	210 (8.27)	115 (4.53)	280 (11.02)	4 x M6	M6	21.3
DX-SIN3-048	240 (9.45)	190 (7.48)	220 (8.66)	125 (4.92)	280 (11.02)	4 x M6	M6	26.2
DX-SIN3-061	300 (11.81)	240 (9.45)	228 (8.97)	133 (5.24)	315 (12.4)	4 x M8	M8	35
DX-SIN3-072	300 (11.81)	240 (9.45)	240 (9.45)	145 (5.71)	315 (12.4)	4 x M8	M8	39
DX-SIN3-090	300 (11.81)	240 (9.45)	270 (10.63)	171 (6.73)	320 (12.6)	4 x M8	M8	53.3
DX-SIN3-115	360 (14.17)	264 (10.39)	210 (8.27)	125 (4.92)	415 (16.34)	4 x M8	M8	66
DX-SIN3-150	360 (14.17)	264 (10.39)	225 (8.86)	140 (5.51)	415 (16.34)	4 x M10	M8	69
DX-SIN3-180	360 (14.17)	264 (10.39)	240 (9.45)	154 (6.06)	415 (16.34)	4 x M10	M8	88.7

Sine filter

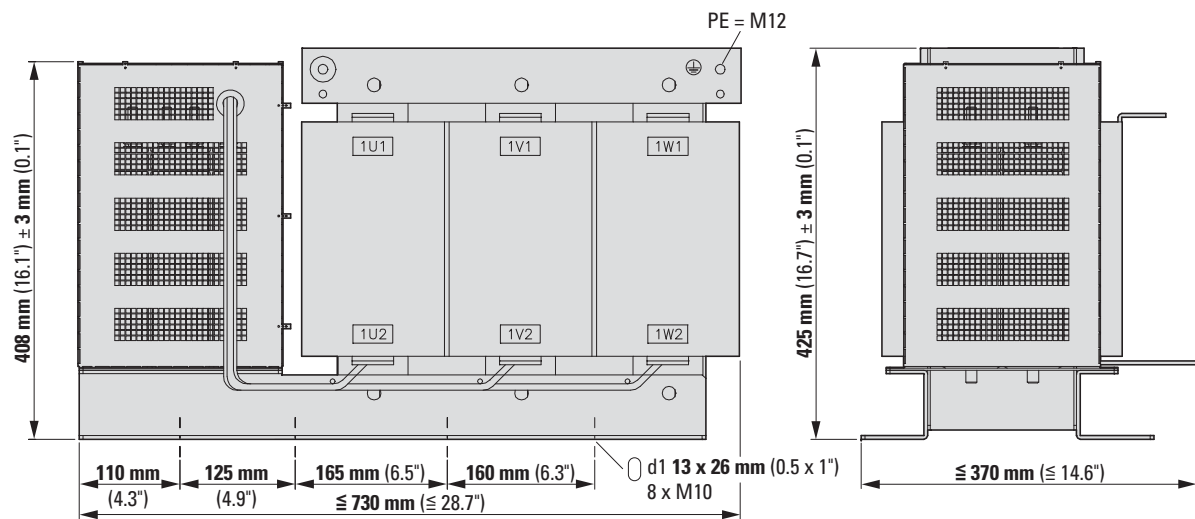
DX-SIN3-250



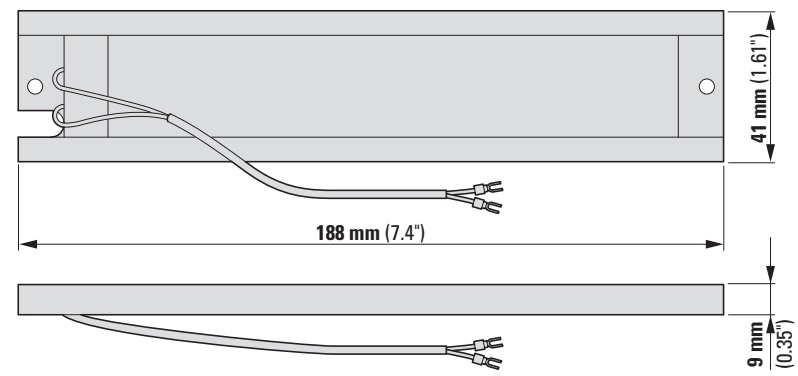
DX-SIN3-440



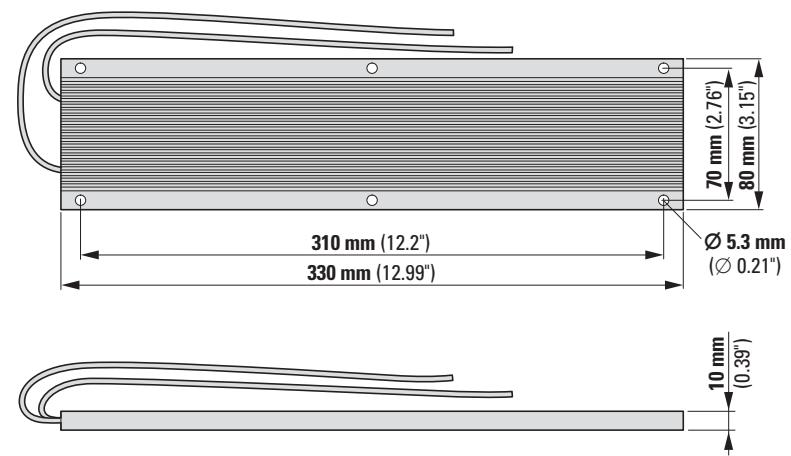
DX-SIN3-480



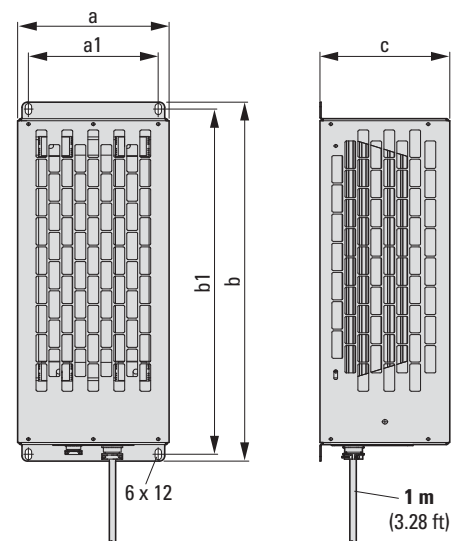
DX-BR3-100



DX-BR5-033

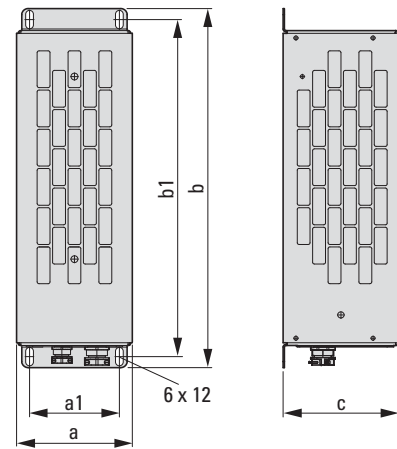


DX-BR... with connection cable



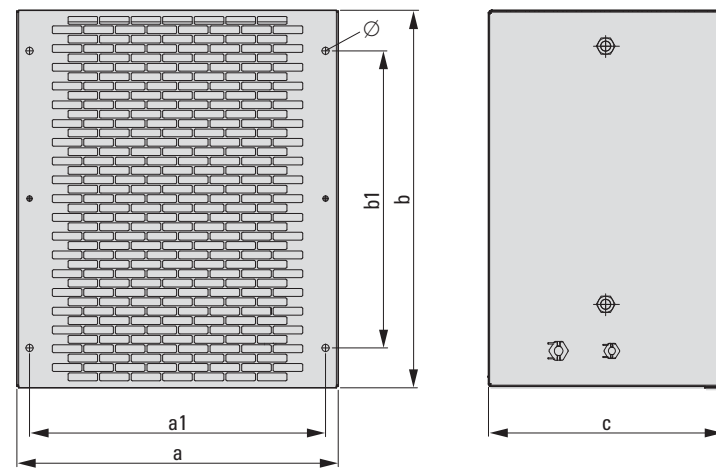
	a mm (inch)	a1 mm (inch)	b mm (inch)	b1 mm (inch)	c mm (inch)	Weight kg (lbs)
DX-BR200-0K4 DX-BR400-0K4	95 (3.07)	70 (2.76)	445 (17.52)	425 (16.73)	95 (3.07)	2.4 (5.29)
DX-BR150-0K5	140 (5.51)	120 (4.72)	395 (15.55)	375 (14.76)	120 (4.72)	3.7 (8.16)
DX-BR100-0K8 DX-BR200-0K8	140 (5.51)	120 (4.72)	445 (17.52)	425 (16.73)	120 (4.72)	4 (8.82)
DX-BR075-1K4 DX-BR100-1K4 DX-BR150-1K4	230 (9.06)	210 (8.27)	445 (17.52)	425 (16.73)	120 (4.72)	5.7 (12.57)
DX-BR100-1K6	2 x 140 (5.51)	2 x 120 (4.72)	445 (17.52)	425 (16.73)	120 (4.72)	2 x 4 (8.82)

DX-BR... with connection cable



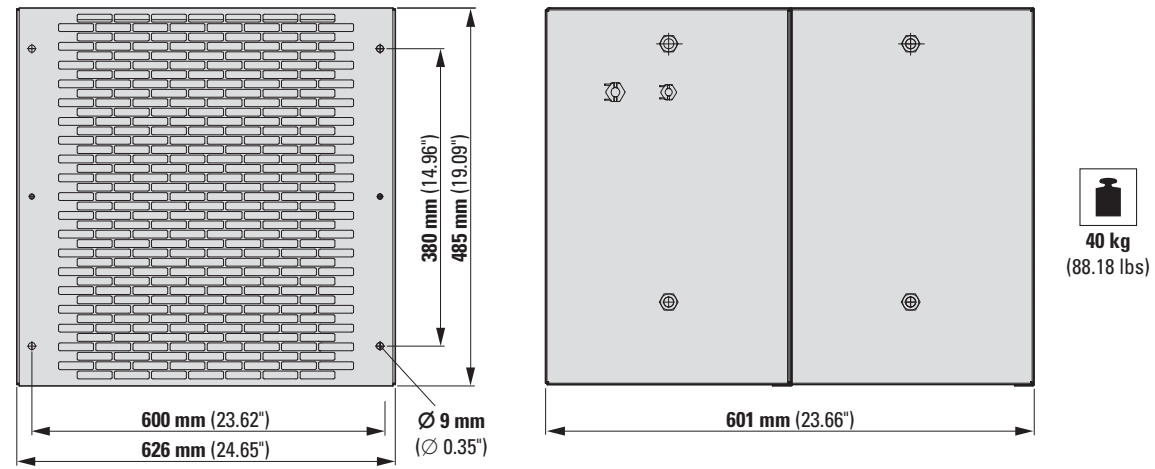
	a mm (inch)	a1 mm (inch)	b mm (inch)	b1 mm (inch)	c mm (inch)	Weight kg (lbs)
DX-BR050-0K4 DX-BR100-0K4	95 (3.07)	70 (2.76)	445 (17.52)	425 (16.73)	95 (3.07)	2.1 (4.63)
DX-BR100-0K2	95 (3.07)	70 (2.76)	345 (13.58)	325 (12.8)	95 (3.07)	1.7 (3.75)
DX-BR050-0K8	140 (5.51)	120 (4.72)	445 (17.52)	425 (16.73)	120 (4.72)	4 (8.82)
DX-BR035-1K1	230 (9.06)	210 (8.27)	445 (17.52)	425 (16.73)	120 (4.72)	5.5 (12.13)

DX-BR... with connection cable

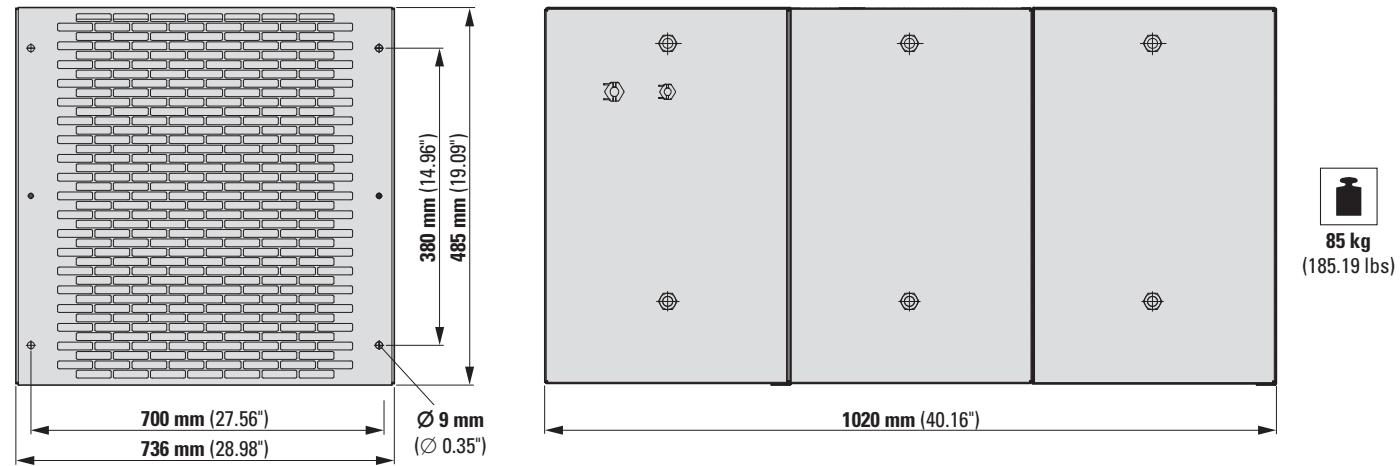


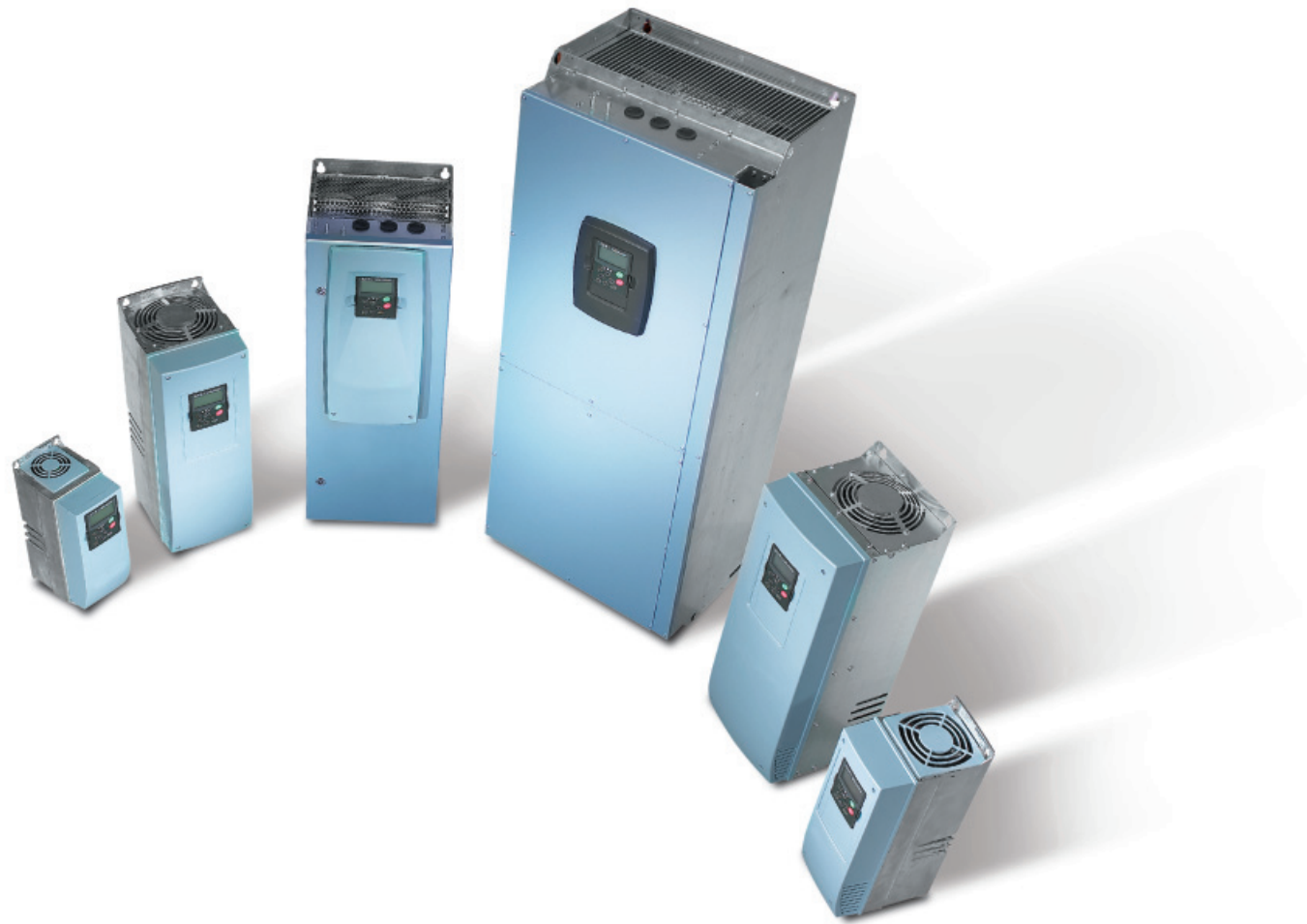
	a mm (inch)	a1 mm (inch)	b mm (inch)	b1 mm (inch)	c mm (inch)	Ø1 mm (inch)	Weight kg (lbs)
DX-BR022-1K4	226 (8.9)	200 (7.87)	485 (19.09)	380 (14.96)	301 (11.85)	9 (0.35)	8.6 (18.96)
DX-BR012-3K1 DX-BR022-3K1 DX-BR040-3K1 DX-BR047-3K1 DX-BR050-3K1	326 (12.83)	300 (11.81)	485 (19.09)	380 (14.96)	301 (11.85)	9 (0.35)	12 (26.46)
DX-BR006-5K1 DX-BR012-5K1 DX-BR022-5K1 DX-BR040-5K1 DX-BR047-5K1 DX-BR050-5K1 DX-BR075-5K1	426 (16.77)	400 (15.75)	485 (19.09)	380 (14.96)	301 (11.85)	9 (0.35)	15.5 (34.17)
DX-BR100-6K2	526 (20.71)	500 (19.69)	485 (19.09)	380 (14.96)	301 (11.85)	9 (0.35)	18 (39.68)
DX-BR006-9K2 DX-BR012-9K2 DX-BR022-9K2 DX-BR047-9K2	626 (24.65)	600 (23.62)	485 (19.09)	380 (14.96)	301 (11.85)	9 (0.35)	20.5 (45.19)

DX-BR002-54K3, DX-BR006-18K1, DX-BR012-18K1



DX-BR002-102K4, DX-BR006-33K3





9000X SVX, SPX variable frequency drive

9000X variable frequency drives are ideal for sophisticated applications. With two different device series, they make a compelling case in a variety of scenarios: SVX standard variable frequency drives when it comes to simple and complex motor control systems in industrial machine building environments, and SPX application frequency drives when it comes to sophisticated, high-performance requirements. In both open-loop and closed-loop modes, their vector control guarantees reliable, dynamic, and sophisticated motor control performance when working with three-phase induction or permanent magnet motors.

SVX variable frequency drive

Variable frequency drives for operation with two overload options: 150% or 110%. The compact enclosures are rated IP21 (NEMA 1) and IP54 (NEMA 12) and come with an integrated radio interference suppression filter. A braking chopper is integrated into all units up to size FR6, and, in addition, there are two different models.

SVX...-4A...: U_{IN} 3~400 V/ U_{OUT} 3~400 V, allocated motor outputs 0.75 – 132 kW

SVX...-5A...: U_{IN} 3~690 V/ U_{OUT} 3~690 V, allocated motor outputs 2.2 – 160 kW

SPX variable frequency drive

Variable frequency drives for operation with two overload options: 150% or 110%. The enclosures for the compact devices are rated IP21 (NEMA 1) and IP54 (NEMA 12) and come with an integrated radio interference suppression filter. A braking chopper is integrated into all units up to size FR6, and, in addition, there are two different models.

SPX...-4A...: U_{IN} 3~400 V/ U_{OUT} 3~400 V, allocated motor outputs 0.75 – 132 kW¹⁾

SPX...-5A...: U_{IN} 3~690 V/ U_{OUT} 3~690 V, allocated motor outputs 2.2 – 160 kW¹⁾

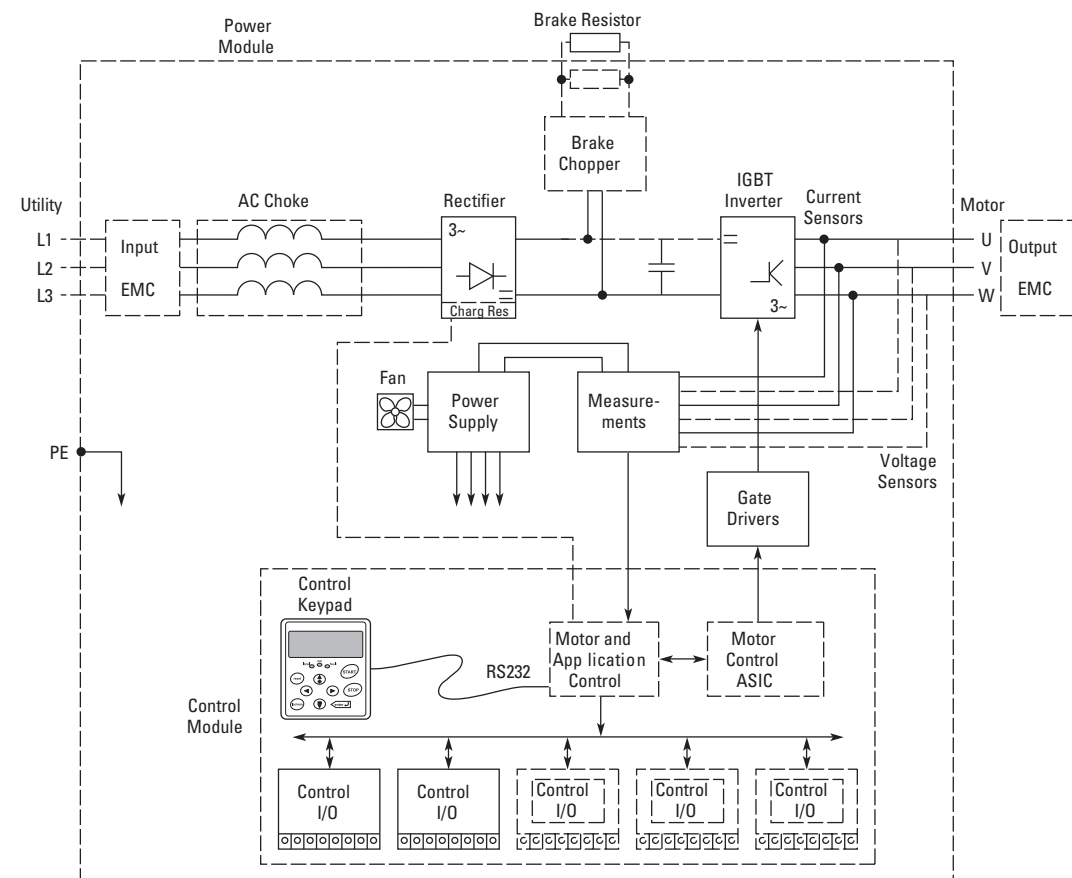
¹⁾ Higher outputs of up to 1,100 kW (400 V) and 2,000 kW (690 V) are covered by variable frequency drives with sizes FR10 to FR14. These devices are available upon request from your sales office.



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SVX, SPX

Description



SVX variable frequency drive

SVX units are heavy-duty, all-purpose standard variable frequency drives. Featuring a variety of application settings, they can be configured to meet virtually any challenge that arises when used to control induction motors, including applications involving multiple motors or multiple pumps run in parallel. SVX variable frequency drives are suitable for all standard applications in machines, buildings, and industrial projects. One of the factors contributing to this is their sturdy design, which features integrated chokes and EMC filters and provides effective protection against interference from the grid. In addition, their sophisticated motor control design and effective protection features for both motor and variable frequency drive guarantee reliable operation.

Essential features

- Performance range:
 - 0.75 - 132 kW (U_{IN} : 3~ 400 V / U_{OUT} : 3~ 400 V)
 - 2.2 - 160 kW (U_{IN} : 3~ 690 V / U_{OUT} : 3~ 690 V)
- High load capacity:
 - H = 2x rated operational current (2 seconds/20 seconds) and 150% overload (60 seconds/600 seconds)
 - L = 2x rated operational current (2 seconds/20 seconds) and 110% overload (60 seconds/600 seconds)
- Ambient air temperature: -10 °C up to +50 °C without derating
- Degree of protection with compact design: IP21 (NEMA1) and IP54 (NEMA12)
- I/O expansion with plug-in modules (5 slots)
- Optional fieldbus connection (CANopen, PROFIBUS-DP, DeviceNet), LonWorks
- PID control and power factor correction (PFC) for 1 to 5 pumps
- Programmable start and application wizard for an easy parameter configuration process
- Multiple display (multi-monitoring) for monitoring up to 3 different readings at the same time
- V/Hz control with boost and slip compensation
- Dynamic open-loop and closed-loop vector control
- Internal braking chopper available in sizes of up to FR9 (compact design)

SPX variable frequency drive

SPX variable frequency drives are the perfect choice when it comes to demanding applications in which reliability, a highly dynamic response, precision, and power are a must. Popular applications include lifting equipment and conveyances (cranes, winches, elevators, lifts), compressors and oil pumps, chippers, crushers, mixers, extruders, take-up and pay-off units, and tunnel boring machines. Multi-purpose SPX variable frequency drives are designed to cover a wide variety of applications while keeping things simple. In fact, with their excellent flexibility, they make it easy to adapt to additional process requirements for custom and complex applications used to control induction and permanent magnet motors. On top of this, their sturdy design, which features integrated chokes and EMC filters, provides effective protection against interference from the grid. Finally, their sophisticated motor control design and effective protection features for both motor and variable frequency drive guarantee reliable operation.

Essential features

- Performance range:
 - 0.75 - 132 kW (U_{IN} : 3~ 400 V / U_{OUT} : 3~ 400 V)
 - 2.2 - 160 kW (U_{IN} : 3~ 690 V / U_{OUT} : 3~ 690 V)
- Expanded performance range with distributed design (IP00). Please enquire:
 - up to 1100 kW (U_{IN} : 3~ 400 V / U_{OUT} : 3~ 400 V)
 - up to 2000 kW (U_{IN} : 3~ 690 V / U_{OUT} : 3~ 690 V)
- High load capacity:
 - H = 2x rated operational current (2 seconds/20 seconds) and 150% overload (60 seconds/600 seconds)
 - L = 2x rated operational current (2 seconds/20 seconds) and 110% overload (60 seconds/600 seconds)
- Ambient air temperature: -10 °C up to +50 °C without derating
- Degree of protection with compact design: Up to IP21 (NEMA1) and IP54 (NEMA12)
- I/O expansion with plug-in modules (5 slots)
- Optional fieldbus connection (CANopen, PROFIBUS-DP, DeviceNet), LonWorks
- PID control and power factor correction (PFC)
- Direct and parallel circuit solutions, even for PM motors with high outputs
- Programmable start and application wizard for an easy parameter configuration process
- Multiple display (multi-monitoring) for monitoring up to 3 different readings at the same time
- V/Hz control with boost and slip compensation
- Dynamic open-loop and closed-loop vector control
- Internal braking chopper available in sizes up to FR9

Technical overview

			SVX	SPX
Rated operational voltage	U _e			
400 V AC, 3-phase			✓	✓
690 V AC, 3-phase			✓	✓
Mains voltage (50/60Hz)	U _{LN}	V		
380 (-15%) - 500 (+10%)			✓	✓
525 (-15%) - 690 (±10%)			✓	✓
Supply frequency	f _{LN}	Hz	50/60	50/60
Rated operational current ¹⁾				
At 110% overload	I _e	A	3.3 - 300	3.3 - 300 (2250) ²⁾
At 150% overload	I _e	A	2.2 - 245	2.2 - 245 (1940) ²⁾
Assigned motor rating ¹⁾				
With 400 V, 50 Hz (110% overload)	P	kW	1.1 - 160	1.1 - 160 (1200) ²⁾
With 400 V, 50 Hz (150% overload)	P	kW	0.75 - 132	0.75 - 132 (1100) ²⁾
With 690 V, 60 Hz (110% overload)	P	kW	3 - 200	3 - 200 (2000) ²⁾
With 690 V, 60 Hz (150% overload)	P	kW	2.2 - 160	2.2 - 160 (1800) ²⁾
Ambient temperature				
Operation	θ	°C	-10 - +40	-10 - +40
Storage	θ	°C	-40 - +70	-40 - +70
Operation Mode				
U/f control			-	✓
sensorless vector control (SLV)			✓	✓
Vector control with feedback (CLV)			✓	✓
Switching frequency	f _{PWM}	kHz	1 - 16	1 - 16
Output voltage with V _e	U ₂			
400 V AC, 3-phase			✓	✓
690 V AC, 3-phase			✓	✓
Output Frequency	f ₂	Hz	0 - 320 Hz	0 - 320 Hz
Protection type				
IP00			-	(✓) ²⁾
IP21			✓	✓
IP54			✓	✓
Fitted with				
Radio interference suppression filter			✓	✓
Brake chopper			✓	✓
Analog inputs			parameterizable, 2 x (0 - 10 V, 0/4 - 20 mA)	parameterizable, 2 x (0 - 10 V, 0/4 - 20 mA)
Analog outputs			parameterizable, 1 x (0/4 - 20 mA)	parameterizable, 1 x (0/4 - 20 mA)
Digital inputs			parameterizable, 6 x (max. 30 V DC)	parameterizable, 6 x (max. 30 V DC)
Digital outputs			parameterizable, 1 x (48 V DC / 50mA)	parameterizable, 1 x (48 V DC / 50mA)
Relay outputs			Parameterizable, two N/Os, 8 A (24 VDC) / 8 A (250 VAC) / 0.4 A (125 VDC)	Parameterizable, two N/Os, 8 A (24 VDC) / 8 A (250 VAC) / 0.4 A (125 VDC)
Production quality			RoHS, ISO 9001	RoHS, ISO 9001
Standards			EMC: EN 61800-3:2004+A1-2012 Safety: EN 61800-5-1: 2003	EMC: EN 61800-3:2004+A1-2012 Safety: EN 61800-5-1: 2003
EMC: EN 61800-3:2004+A1-2012			✓	✓
Safety: EN 61800-5-1: 2003			✓	✓
Certifications			CE, cUL, c-Tick	CE, cUL, c-Tick

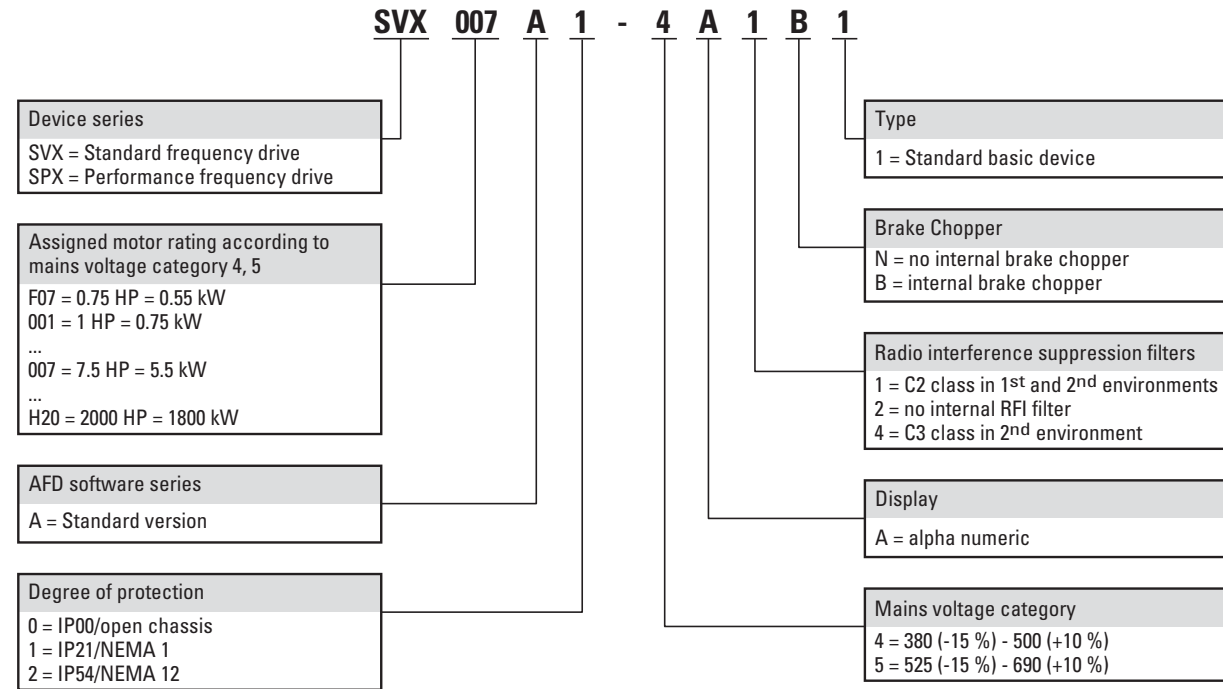
SVX, SPX

Notes

¹⁾ L = 110% overload for 60 s every 10 min.
H = 150% overload for 60 s every 10 min.

²⁾ Higher outputs are covered by variable frequency drives with sizes FR10 to FR14. These devices are available as modules with protection class IP 00 upon request from your sales office.

Key to type references



UL/CSA

Information relevant for export to North America



Product Standards	UL 508C; CSA-C22.2 No. 14; IEC/EN61800-3; IEC/EN61800-5; CE marking
UL File No.	E134360
UL Category Control No.	NMMS, NMMS2, NMMS7, NMMS8
CSA File No.	UL report applies to both US and Canada
CSA Class No.	3211-06
North America Certification	UL listed, certified by UL for use in Canada
Specially designed for North America	No
Suitable for	Branch circuits
Max. Voltage Rating	
SVX/SPX...-4...	3~ 480 V AC IEC: TN-S UL/CSA: "Y" (Solidly Grounded Wey)
SVX/SPX...-5...	3~ 690 V AC IEC: TN-S UL/CSA: "Y" (Solidly Grounded Wey)
Degree of Protection	
SPX...A0...	IEC: IP00
SVX/SPX...A1...	IEC: IP21
SVX/SPX...A2...	IEC: IP54

Variable frequency drive 9000X

SVX, for three-phase motors 400 V AC

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Ordering



Rated operational current ¹⁾		Assigned motor rating ^{1),2)}		Rated motor current ^{1),2)}		Fitted with	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack
L = 110 %	H = 150 %	L = 110 %	H = 150 %	L = 110 %	H = 150 %	Radio interference suppression filter Brake chopper					
I _e A	I _e A	P kW	P kW	I _e A	I _e A						
U_g 400 V AC, 3-phase / U₂ 400 V AC, 3-phase Mains voltage (50/60Hz) U _{LN} : 380 (-15%) - 500 (+10%) V											
3.3	2.2	1.1	0.75	2.6	1.9	✓ ✓	FR4	IP21	SVX001A1-4A1B1 125676		1 off
						✓ ✓		IP54	SVX001A2-4A1B1 125677		
4.3	3.3	1.5	1.1	3.6	2.6	✓ ✓		IP21	SVXF15A1-4A1B1 125707		
						✓ ✓		IP54	SVXF15A2-4A1B1 125708		
5.6	4.3	2.2	1.5	5	3.6	✓ ✓		IP21	SVX002A1-4A1B1 125748		
						✓ ✓		IP54	SVX002A2-4A1B1 125678		
7.6	5.6	3	2.2	6.6	5	✓ ✓		IP21	SVX003A1-4A1B1 125679		
						✓ ✓		IP54	SVX003A2-4A1B1 125680		
9	7.6	4	3	8.5	6.6	✓ ✓		IP21	SVX005A1-4A1B1 125749		
						✓ ✓		IP54	SVX005A2-4A1B1 125753		
12	9	5.5	4	11.3	8.5	✓ ✓		IP21	SVX006A1-4A1B1 125682		
						✓ ✓		IP54	SVX006A2-4A1B1 125683		
16	12	7.5	5.5	15.2	11.3	✓ ✓	FR5	IP21	SVX007A1-4A1B1 125684		
						✓ ✓		IP54	SVX007A2-4A1B1 125685		
23	16	11	7.5	21.7	15.2	✓ ✓		IP21	SVX010A1-4A1B1 125686		
						✓ ✓		IP54	SVX010A2-4A1B1 125687		
31	23	15	11	29.3	21.7	✓ ✓		IP21	SVX015A1-4A1B1 125688		
						✓ ✓		IP54	SVX015A2-4A1B1 125689		
38	31	18.5	15	36	29.3	✓ ✓	FR6	IP21	SVX020A1-4A1B1 125690		
						✓ ✓		IP54	SVX020A2-4A1B1 125754		
46	38	22	18.5	41	36	✓ ✓		IP21	SVX025A1-4A1B1 125691		
						✓ ✓		IP54	SVX025A2-4A1B1 125692		
61	46	30	22	55	41	✓ ✓		IP21	SVX030A1-4A1B1 125693		
						✓ ✓		IP54	SVX030A2-4A1B1 125694		
72	61	37	30	68	55	✓ -	FR7	IP21	SVX040A1-4A1N1 125695		
						✓ -		IP54	SVX040A2-4A1N1 125696		
						✓ ✓		IP21	SVX040A1-4A1B1 132656		
						✓ ✓		IP54	SVX040A2-4A1B1 138452		

SVX, SPX

Notes



¹⁾ L = 110% overload for 60 s every 10 min.
H = 150% overload for 60 s every 10 min.

²⁾ Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

Rated operational current ¹⁾		Assigned motor rating ^{1),2)}		Rated motor current ^{1),2)}		Fitted with Radio interference suppression filter Brake chopper	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack
L = 110 % I _e A	H = 150 % I _e A	L = 110 % P kW	H = 150 % P kW	L = 110 % I _e A	H = 150 % I _e A						
U _e 400 V AC, 3-phase / U ₂ 400 V AC, 3-phase Mains voltage (50/60Hz) U _{LN} : 380 (-15%) - 500 (+10%) V											
87	72	45	37	81	68	✓ ✓ ✓ - ✓ - ✓ ✓	FR7	IP21 IP54 IP21 IP54	SVX050A1-4A1B1 138430 SVX050A2-4A1N1 125697 SVX050A1-4A1N1 125750 SVX050A2-4A1B1 138453		1 off  
105	87	55	45	99	81	✓ - ✓ ✓ ✓ ✓ ✓ -	FR8	IP54 IP54 IP21 IP21	SVX060A2-4A1N1 125698 SVX060A2-4A1B1 138454 SVX060A1-4A1B1 138431 SVX060A1-4A1N1 125751		
140	105	75	55	134	99	✓ - ✓ - ✓ ✓ ✓ ✓	FR8	IP21 IP54 IP21 IP54	SVX075A1-4A1N1 125699 SVX075A2-4A1N1 125700 SVX075A1-4A1B1 132657 SVX075A2-4A1B1 138455		
170	140	90	75	161	134	✓ - ✓ - ✓ ✓ ✓ ✓	FR8	IP21 IP54 IP21 IP54	SVX100A1-4A1N1 125701 SVX100A2-4A1N1 125755 SVX100A1-4A1B1 132658 SVX100A2-4A1B1 138456		
205	170	110	90	196	161	✓ - ✓ - ✓ ✓ ✓ ✓	FR8	IP21 IP54 IP21 IP54	SVX125A1-4A1N1 125702 SVX125A2-4A1N1 125703 SVX125A1-4A1B1 135242 SVX125A2-4A1B1 138457		
261	205	132	110	231	196	✓ - ✓ - ✓ ✓ ✓ ✓	FR9	IP21 IP54 IP54 IP21	SVX150A1-4A1N1 125704 SVX150A2-4A1N1 125705 SVX150A2-4A1B1 138458 SVX150A1-4A1B1 138432		
300	245	160	132	279	231	✓ - ✓ - ✓ ✓ ✓ ✓	FR9	IP21 IP54 IP54 IP21	SVX200A1-4A1N1 125752 SVX200A2-4A1N1 125706 SVX200A2-4A1B1 138459 SVX200A1-4A1B1 132900		

Notes

¹⁾ L = 110% overload for 60 s every 10 min.
H = 150% overload for 60 s every 10 min.
²⁾ Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

  Information relevant for export to North America → Page 82

Variable frequency drive 9000X

SVX, for three-phase motors 690 V AC



Rated operational current ¹⁾		Assigned motor rating ^{1),2)}		Rated motor current ^{1),2)}		Fitted with	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack
L = 110 %	H = 150 %	L = 110 %	H = 150 %	L = 110 %	H = 150 %	Radio interference suppression filter Brake chopper					
I _e	I _e	P	P	I _e	I _e						
A	A	kW	kW	A	A						
U_g 690 V AC, 3-phase / U₂ 690 V AC, 3-phase Mains voltage (50/60Hz) U _{LN} : 525 (-15%) - 690 (±10%) V											
4.5	3.2	3	2.2	3.8	2.9	✓ -	FR6	IP21	SVX002A1-5A4N1 125756		1 off
						✓ -		IP54	SVX002A2-5A4N1 125774		
						✓ ✓		IP54	SVX002A2-5A4B1 138498		
						✓ ✓		IP21	SVX002A1-5A4B1 138480		
5.5	4.5	4	3	4.9	3.8	✓ -		IP21	SVX003A1-5A4N1 125757		
						✓ -		IP54	SVX003A2-5A4N1 125775		
						✓ ✓		IP21	SVX003A1-5A4B1 138481		
						✓ ✓		IP54	SVX003A2-5A4B1 138499		
7.5	5.5	5.5	4	6.5	4.9	✓ -		IP21	SVX004A1-5A4N1 125758		
						✓ -		IP54	SVX004A2-5A4N1 125776		
						✓ ✓		IP21	SVX004A1-5A4B1 138482		
						✓ ✓		IP54	SVX004A2-5A4B1 138500		
10	7.5	7.5	5.5	8.8	6.5	✓ -		IP21	SVX005A1-5A4N1 125759		
						✓ -		IP54	SVX005A2-5A4N1 125777		
						✓ ✓		IP21	SVX005A1-5A4B1 138483		
						✓ ✓		IP54	SVX005A2-5A4B1 138501		
13.5	10	11	7.5	12.6	8.8	✓ -		IP21	SVX007A1-5A4N1 125760		
						✓ -		IP54	SVX007A2-5A4N1 125778		
						✓ ✓		IP21	SVX007A1-5A4B1 138484		
						✓ ✓		IP54	SVX007A2-5A4B1 138502		
18	13.5	15	11	17	12.6	✓ -		IP21	SVX010A1-5A4N1 125761		
						✓ -		IP54	SVX010A2-5A4N1 125779		
						✓ ✓		IP21	SVX010A1-5A4B1 138485		
						✓ ✓		IP54	SVX010A2-5A4B1 138503		
22	18	18.5	15	20.9	17	✓ -		IP21	SVX015A1-5A4N1 125762		
						✓ -		IP54	SVX015A2-5A4N1 125780		
						✓ ✓		IP21	SVX015A1-5A4B1 138486		
						✓ ✓		IP54	SVX015A2-5A4B1 138504		

SVX, SPX

Notes



¹⁾ L = 110% overload for 60 s every 10 min.
 H = 150% overload for 60 s every 10 min.
²⁾ Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

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Rated operational current ¹⁾		Assigned motor rating ^{1),2)}		Rated motor current ^{1),2)}		Fitted with Radio interference suppression filter Brake chopper	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack
L = 110 % I _e A	H = 150 % I _e A	L = 110 % P kW	H = 150 % P kW	L = 110 % I _e A	H = 150 % I _e A						
U ₁ 690 V AC, 3-phase / U ₂ 690 V AC, 3-phase Mains voltage (50/60Hz) U _{LN} : 525 (-15%) - 690 (±10%) V											
27	22	22	18.5	23.8	20.9	✓ - ✓ - ✓ ✓ ✓ ✓	FR6	IP21	SVX020A1-5A4N1 125763		1 off  
								IP54	SVX020A2-5A4N1 125781		
								IP21	SVX020A1-5A4B1 138487		
								IP54	SVX020A2-5A4B1 138505		
34	27	30	22	32	23.8	✓ - ✓ - ✓ ✓ ✓ ✓	FR6	IP21	SVX025A1-5A4N1 125764		
								IP54	SVX025A2-5A4N1 125782		
								IP21	SVX025A1-5A4B1 138488		
								IP54	SVX025A2-5A4B1 138506		
41	34	37	30	39	32	✓ - ✓ - ✓ ✓ ✓ ✓	FR7	IP21	SVX030A1-5A4N1 125765		
								IP54	SVX030A2-5A4N1 125783		
								IP21	SVX030A1-5A4B1 138489		
								IP54	SVX030A2-5A4B1 138507		
52	41	45	37	47	39	✓ - ✓ - ✓ ✓ ✓ ✓	FR7	IP54	SVX040A2-5A4N1 125784		
								IP21	SVX040A1-5A4N1 125766		
								IP21	SVX040A1-5A4B1 138490		
								IP54	SVX040A2-5A4B1 138508		
62	52	55	45	58	47	✓ - ✓ - ✓ ✓ ✓ ✓	FR8	IP21	SVX050A1-5A4N1 125767		
								IP54	SVX050A2-5A4N1 125785		
								IP54	SVX050A2-5A4B1 138509		
								IP21	SVX050A1-5A4B1 138491		
80	62	75	55	78	58	✓ - ✓ - ✓ ✓ ✓ ✓	FR8	IP21	SVX060A1-5A4N1 125768		
								IP54	SVX060A2-5A4N1 125786		
								IP21	SVX060A1-5A4B1 138492		
								IP54	SVX060A2-5A4B1 138510		
100	80	90	75	93	78	✓ - ✓ - ✓ ✓ ✓ ✓	FR8	IP21	SVX075A1-5A4N1 125769		
								IP54	SVX075A2-5A4N1 125787		
								IP21	SVX075A1-5A4B1 138493		
								IP54	SVX075A2-5A4B1 138511		

Notes

¹⁾ L = 110% overload for 60 s every 10 min.
 H = 150% overload for 60 s every 10 min.
²⁾ Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

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Variable frequency drive 9000X

SVX, for three-phase motors 690 V AC

Rated operational current ¹⁾		Assigned motor rating ^{1),2)}		Rated motor current ^{1),2)}		Fitted with	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack
L = 110 %	H = 150 %	L = 110 %	H = 150 %	L = 110 %	H = 150 %	Radio interference suppression filter Brake chopper					
I _e	I _e	P	P	I _e	I _e						
A	A	kW	kW	A	A						
U_e 690 V AC, 3-phase / U₂ 690 V AC, 3-phase Mains voltage (50/60Hz) U _{LN} : 525 (-15%) - 690 (±10%) V											
125	100	110	90	114	93	✓ -	FR9	IP21	SVX100A1-5A4N1 125770		1 off
						✓ -		IP54	SVX100A2-5A4N1 125788		
						✓ ✓		IP21	SVX100A1-5A4B1 138494		
						✓ ✓		IP54	SVX100A2-5A4B1 138512		
144	125	132	110	134	114	✓ -		IP21	SVX125A1-5A4N1 125771		
						✓ -		IP54	SVX125A2-5A4N1 125789		
						✓ ✓		IP54	SVX125A2-5A4B1 138513		
						✓ ✓		IP21	SVX125A1-5A4B1 138495		
170	144	160	132	162	134	✓ -		IP21	SVX150A1-5A4N1 125772		
						✓ -		IP54	SVX150A2-5A4N1 125790		
						✓ ✓		IP21	SVX150A1-5A4B1 138496		
						✓ ✓		IP54	SVX150A2-5A4B1 138514		
208	170	200	160	202	162	✓ -		IP21	SVX175A1-5A4N1 125773		
						✓ -		IP54	SVX175A2-5A4N1 125791		
						✓ ✓		IP21	SVX175A1-5A4B1 138497		
						✓ ✓		IP54	SVX175A2-5A4B1 138515		

SVX, SPX

Notes
¹⁾ L = 110% overload for 60 s every 10 min.
 H = 150% overload for 60 s every 10 min.
²⁾ Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

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Rated operational current ¹⁾		Assigned motor rating ^{1),2)}		Rated motor current ^{1),2)}		Fitted with	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack
L = 110 %	H = 150 %	L = 110 %	H = 150 %	L = 110 %	H = 150 %	Radio interference suppression filter Brake chopper					
I _e	I _e	P	P	I _e	I _e						
A	A	kW	kW	A	A						
U _e 400 V AC, 3-phase / U ₂ 400 V AC, 3-phase Mains voltage (50/60Hz) U _{LN} : 380 (-15%) - 500 (+10%) V											
3.3	2.2	1.1	0.75	2.6	1.9	✓ ✓	FR4	IP21	SPX001A1-4A1B1 125203		1 off
						✓ ✓		IP54	SPX001A2-4A1B1 125207		
4.3	3.3	1.5	1.1	3.6	2.6	✓ ✓		IP21	SPXF15A1-4A1B1 125675		
						✓ ✓		IP54	SPXF15A2-4A1B1 125480		
5.6	4.3	2.2	1.5	5	3.6	✓ ✓		IP21	SPX002A1-4A1B1 125657		
						✓ ✓		IP54	SPX002A2-4A1B1 125216		
7.6	5.6	3	2.2	6.6	5	✓ ✓		IP21	SPX003A1-4A1B1 125658		
						✓ ✓		IP54	SPX003A2-4A1B1 125226		
9	7.6	4	3	8.5	6.6	✓ ✓		IP21	SPX005A1-4A1B1 125659		
						✓ ✓		IP54	SPX005A2-4A1B1 125245		
12	9	5.5	4	11.3	8.5	✓ ✓		IP21	SPX006A1-4A1B1 125249		
						✓ ✓		IP54	SPX006A2-4A1B1 125251		
16	12	7.5	5.5	15.2	11.3	✓ ✓	FR5	IP21	SPX007A1-4A1B1 125660		
						✓ ✓		IP54	SPX007A2-4A1B1 125260		
23	16	11	7.5	21.7	15.2	✓ ✓		IP21	SPX010A1-4A1B1 125661		
						✓ ✓		IP54	SPX010A2-4A1B1 125662		
31	23	15	11	29.3	21.7	✓ ✓		IP21	SPX015A1-4A1B1 125663		
						✓ ✓		IP54	SPX015A2-4A1B1 125664		
38	31	18.5	15	36	29.3	✓ ✓	FR6	IP21	SPX020A1-4A1B1 125665		
						✓ ✓		IP54	SPX020A2-4A1B1 125291		
46	38	22	18.5	41	36	✓ ✓		IP21	SPX025A1-4A1B1 125666		
						✓ ✓		IP54	SPX025A2-4A1B1 125302		
61	46	30	22	55	41	✓ ✓		IP21	SPX030A1-4A1B1 125667		
						✓ ✓		IP54	SPX030A2-4A1B1 125313		
72	61	37	30	68	55	✓ -	FR7	IP21	SPX040A1-4A1N1 125319		
						✓ -		IP54	SPX040A2-4A1N1 125325		
						✓ ✓		IP21	SPX040A1-4A1B1 134844		
						✓ ✓		IP54	SPX040A2-4A1B1 138609		

Notes

¹⁾ L = 110% overload for 60 s every 10 min.
 H = 150% overload for 60 s every 10 min.



²⁾ Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

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Variable frequency drive 9000X

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SPX, for three-phase motors 400 V AC

Rated operational current ¹⁾		Assigned motor rating ^{1),2)}		Rated motor current ^{1),2)}		Fitted with	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack
L = 110 %	H = 150 %	L = 110 %	H = 150 %	L = 110 %	H = 150 %	Radio interference suppression filter Brake chopper					
I _e	I _e	P	P	I _e	I _e						
A	A	kW	kW	A	A						
U_e 400 V AC, 3-phase / U₂ 400 V AC, 3-phase Mains voltage (50/60Hz) U _{LN} : 380 (-15%) - 500 (+10%) V											
87	72	45	37	81	68	✓ - ✓ - ✓ ✓ ✓ ✓	FR7	IP21 IP54 IP21 IP54	SPX050A1-4A1N1 125331 SPX050A2-4A1N1 125337 SPX050A1-4A1B1 138606 SPX050A2-4A1B1 138610		1 off  
105	87	55	45	99	81	✓ - ✓ - ✓ ✓ ✓ ✓		IP21 IP54 IP21 IP54	SPX060A1-4A1N1 125668 SPX060A2-4A1N1 125348 SPX060A1-4A1B1 138607 SPX060A2-4A1B1 138611		
140	105	75	55	134	99	✓ - ✓ - ✓ ✓ ✓ ✓	FR8	IP21 IP54 IP21 IP54	SPX075A1-4A1N1 125354 SPX075A2-4A1N1 125359 SPX075A1-4A1B1 138608 SPX075A2-4A1B1 138612		
170	140	90	75	161	134	✓ - ✓ - ✓ ✓ ✓ ✓		IP21 IP54 IP21 IP54	SPX100A1-4A1N1 125365 SPX100A2-4A1N1 125370 SPX100A1-4A1B1 131744 SPX100A2-4A1B1 138613		
205	170	110	90	196	161	✓ - ✓ - ✓ ✓ ✓ ✓		IP21 IP54 IP21 IP54	SPX125A1-4A1N1 125669 SPX125A2-4A1N1 125377 SPX125A1-4A1B1 134489 SPX125A2-4A1B1 138614		
261	205	132	110	231	196	✓ - ✓ - ✓ ✓ ✓ ✓	FR9	IP21 IP54 IP21 IP54	SPX150A1-4A1N1 125381 SPX150A2-4A1N1 125385 SPX150A1-4A1B1 129701 SPX150A2-4A1B1 138615		
300	245	160	132	279	231	✓ - ✓ - ✓ ✓ ✓ ✓		IP21 IP54 IP21 IP54	SPX200A1-4A1N1 125670 SPX200A2-4A1N1 125398 SPX200A1-4A1B1 134845 SPX200A2-4A1B1 138616		

SVX, SPX

Notes

¹⁾ L = 110% overload for 60 s every 10 min.
 H = 150% overload for 60 s every 10 min.
²⁾ Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

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Variable frequency drive 9000X

SPX, for three-phase motors 690 V AC

Rated operational current ¹⁾		Assigned motor rating ^{1),2)}		Rated motor current ^{1),2)}		Fitted with	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack
L = 110 %	H = 150 %	L = 110 %	H = 150 %	L = 110 %	H = 150 %	Radio interference suppression filter Brake chopper					
I _e A	I _e A	P kW	P kW	I _e A	I _e A						
U _s 690 V AC, 3-phase / U ₂ 690 V AC, 3-phase Mains voltage (50/60Hz) U _{LN} : 525 (-15%) - 690 (±10%) V											
4.5	3.2	3	2.2	3.8	2.9	✓ -	FR6	IP21	SPX002A1-5A4N1 125212		1 off
						✓ -		IP54	SPX002A2-5A4N1 125218		
						✓ ✓		IP21	SPX002A1-5A4B1 138638		
						✓ ✓		IP54	SPX002A2-5A4B1 129582		
5.5	4.5	4	3	4.9	3.8	✓ -		IP54	SPX003A2-5A4N1 125228		
						✓ -		IP21	SPX003A1-5A4N1 125222		
						✓ ✓		IP21	SPX003A1-5A4B1 138639		
						✓ ✓		IP54	SPX003A2-5A4B1 129583		
7.5	5.5	5.5	4	6.5	4.9	✓ -		IP21	SPX004A1-5A4N1 125232		
						✓ ✓		IP54	SPX004A2-5A4B1 129584		
						✓ ✓		IP21	SPX004A1-5A4B1 138640		
						✓ -		IP54	SPX004A2-5A4N1 125236		
10	7.5	7.5	5.5	8.8	6.5	✓ -		IP21	SPX005A1-5A4N1 125241		
						✓ -		IP54	SPX005A2-5A4N1 125247		
						✓ ✓		IP21	SPX005A1-5A4B1 138641		
						✓ ✓		IP54	SPX005A2-5A4B1 129585		
13.5	10	11	7.5	12.6	8.8	✓ -		IP21	SPX007A1-5A4N1 125256		
						✓ -		IP54	SPX007A2-5A4N1 125262		
						✓ ✓		IP21	SPX007A1-5A4B1 138642		
						✓ ✓		IP54	SPX007A2-5A4B1 129586		
18	13.5	15	11	17	12.6	✓ -		IP21	SPX010A1-5A4N1 125267		
						✓ -		IP54	SPX010A2-5A4N1 125272		
						✓ ✓		IP21	SPX010A1-5A4B1 138643		
						✓ ✓		IP54	SPX010A2-5A4B1 129587		
22	18	18.5	15	20.9	17	✓ -		IP21	SPX015A1-5A4N1 125277		
						✓ -		IP54	SPX015A2-5A4N1 125282		
						✓ ✓		IP21	SPX015A1-5A4B1 138644		
						✓ ✓		IP54	SPX015A2-5A4B1 129588		

Notes

¹⁾ L = 110% overload for 60 s every 10 min.
 H = 150% overload for 60 s every 10 min.
²⁾ Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

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Variable frequency drive 9000X

SPX, for three-phase motors 690 V AC



Rated operational current ¹⁾		Assigned motor rating ^{1),2)}		Rated motor current ^{1),2)}		Fitted with Radio interference suppression filter Brake chopper	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack
L = 110 % I _e A	H = 150 % I _e A	L = 110 % P kW	H = 150 % P kW	L = 110 % I _e A	H = 150 % I _e A						
U_e 690 V AC, 3-phase / U₂ 690 V AC, 3-phase Mains voltage (50/60Hz) U _{LN} : 525 (-15%) - 690 (±10%) V											
27	22	22	18.5	23.8	20.9	✓ - ✓ - ✓ ✓ ✓ ✓	FR6	IP21	SPX020A1-5A4N1 125287		1 off
								IP54	SPX020A2-5A4N1 125293		
								IP21	SPX020A1-5A4B1 138645		
								IP54	SPX020A2-5A4B1 129589		
34	27	30	22	32	23.8	✓ - ✓ - ✓ ✓ ✓ ✓	FR6	IP21	SPX025A1-5A4N1 125298		
								IP54	SPX025A2-5A4N1 125304		
								IP54	SPX025A2-5A4B1 129590		
								IP21	SPX025A1-5A4B1 138646		
41	34	37	30	39	32	✓ - ✓ - ✓ ✓ ✓ ✓	FR7	IP21	SPX030A1-5A4N1 125309		
								IP54	SPX030A2-5A4N1 125315		
								IP21	SPX030A1-5A4B1 138647		
								IP54	SPX030A2-5A4B1 129591		
52	41	45	37	47	39	✓ - ✓ - ✓ ✓ ✓ ✓	FR7	IP21	SPX040A1-5A4N1 125321		
								IP54	SPX040A2-5A4N1 125327		
								IP21	SPX040A1-5A4B1 138648		
								IP54	SPX040A2-5A4B1 129592		
62	52	55	45	58	47	✓ - ✓ - ✓ ✓ ✓ ✓	FR8	IP21	SPX050A1-5A4N1 125333		
								IP54	SPX050A2-5A4N1 125339		
								IP21	SPX050A1-5A4B1 138649		
								IP54	SPX050A2-5A4B1 129593		
80	62	75	55	78	58	✓ - ✓ - ✓ ✓ ✓ ✓	FR8	IP21	SPX060A1-5A4N1 125344		
								IP54	SPX060A2-5A4N1 125350		
								IP21	SPX060A1-5A4B1 138650		
								IP54	SPX060A2-5A4B1 129594		
100	80	90	75	93	78	✓ - ✓ - ✓ ✓ ✓ ✓	FR8	IP21	SPX075A1-5A4N1 125356		
								IP54	SPX075A2-5A4N1 125361		
								IP54	SPX075A2-5A4B1 129595		
								IP21	SPX075A1-5A4B1 138651		

SVX, SPX









Notes
¹⁾ L = 110% overload for 60 s every 10 min.
 H = 150% overload for 60 s every 10 min.
²⁾ Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)


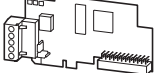

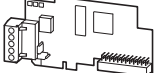





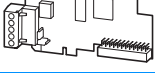

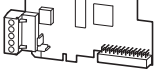

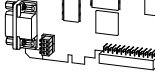
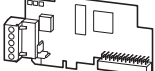
Rated operational current ¹⁾		Assigned motor rating ^{1),2)}		Rated motor current ^{1),2)}		Fitted with Radio interference suppression filter Brake chopper	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack
L = 110 % I _e A	H = 150 % I _e A	L = 110 % P kW	H = 150 % P kW	L = 110 % I _e A	H = 150 % I _e A						
U_e 690 V AC, 3-phase / U₂ 690 V AC, 3-phase Mains voltage (50/60Hz) U _{LN} : 525 (-15%) - 690 (±10%) V											
125	100	110	90	114	93	✓ - ✓ - ✓ ✓ ✓ ✓	FR9	IP21 IP54 IP21 IP54	SPX100A1-5A4N1 125367 SPX100A2-5A4N1 125372 SPX100A1-5A4B1 138652 SPX100A2-5A4B1 129596		1 off  
144	125	132	110	134	114	✓ - ✓ - ✓ ✓ ✓ ✓		IP21 IP54 IP21 IP54	SPX125A1-5A4N1 125375 SPX125A2-5A4N1 125379 SPX125A1-5A4B1 138653 SPX125A2-5A4B1 129597		
170	144	160	132	162	134	✓ - ✓ - ✓ ✓ ✓ ✓	FR9	IP21 IP54 IP21 IP54	SPX150A1-5A4N1 125383 SPX150A2-5A4N1 125387 SPX150A1-5A4B1 138654 SPX150A2-5A4B1 129598		1 off  
208	170	200	160	202	162	✓ - ✓ - ✓ ✓ ✓ ✓		IP21 IP54 IP21 IP54	SPX175A1-5A4N1 125389 SPX175A2-5A4N1 125391 SPX175A1-5A4B1 138655 SPX175A2-5A4B1 129599		

Notes ¹⁾ L = 110% overload for 60 s every 10 min.
²⁾ H = 150% overload for 60 s every 10 min.
²⁾ Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

  Information relevant for export to North America → Page 82

Accessories

Description	For use with	Part no. Article no.	Price see price list	Std. pack	Information relevant for export to North America  
External keypad					
With illuminated LCD display Plain text, multi-line With control buttons and function keys Front IP54	SVX, SPX	KEYPAD-LOC/REM 139787		1 off  	Product Standards UL 508C; CSA-C22.2 No. 14; IEC/EN61800-3; IEC/EN61800-5; CE marking E134360 UL File No. UL Category Control No. NMMS, NMMS2, NMMS7, NMMS8 CSA File No. UL report applies to both US and Canada 3211-06
Mounting unit					
Mounting frame for control panel door 3 m	KEYPAD- LOC/REM	OPTRMT-KIT 126868		1 off  	
Connection cable					
Connection between variable frequency drive and PC 1.5 m	SVX, SPX	SVDRIVECABLE 129001		1 off  	CSA Class No. North America Certification Suitable for UL listed, certified by UL for use in Canada Branch circuits

Description	For use with	Part no. Article no.	Price see price list	Std. pack	Information relevant for export to North America 
Expansion modules					
The expansion module is plugged into the variable-frequency drive.					
Adapters					
	System bus adapter	SPX	OPTD1 125077	1 off 	Product Standards UL 508C; CSA-C22.2 No. 14; IEC/EN61800-3; IEC/EN61800-5; CE marking E134360 UL File No. UL Category Control No. CSA File No. CSA Class No. North America Certification Suitable for
	System bus adapter with CANopen® interface	SPX	OPTD2 125078		
	RS232 adapter	SPX	OPTD3 125079		
Output expansion					
	1 relay output (NO/NC) 1 relay output (NC) 1 Thermistor input	SPX	OPTA3 125050	1 off 	UL report applies to both US and Canada 3211-06 UL listed, certified by UL for use in Canada Branch circuits
	2 relay outputs (NO/NC)	SVX, SPX	OPTA2 125049		
	1 relay output (NO) 5 digital inputs (42 - 240 V AC)	SVX, SPX	OPTB9 125064		
	3 relay outputs (NO)	SVX, SPX	OPTB5 125062		
	1 relay output (NO/NC) 1 relay output (NO) 1 Thermistor input	SVX, SPX	OPTB2 125060		
I/O expansion					
	6 digital inputs External 24 V supply	SVX, SPX	OPTB1 125059	1 off 	
	6 digital inputs 1 digital output 2 analog inputs (mA/V) 1 analog output	SVX, SPX	OPTA9 125055		
	3 digital inputs 1 relay output (NO/NC) 1 digital output	SVX, SPX	OPTAA 125056		
	6 digital inputs 1 digital output 2 analog inputs (mA/V) 1 analog output	SPX	OPTA8 125054		
	1 analog input (mA, isolated) 2 analog outputs (mA, isolated)	SVX, SPX	OPTB4 125061		
Encoder module					
	HTL (+15 V/24 V) Master / Slave capability	SPX	OPTA7 125053	1 off 	
Temperature sensor expansion					
	3 Pt100 External 24 V supply	SVX, SPX	OPTB8 125063	1 off 	
Fieldbus modules					
The field bus module is plugged into the variable-frequency drive.					
	Modbus RS485 Screw terminals	SVX, SPX	OPTC2 125067	1 off 	
	PROFIBUS-DP Screw terminals	SVX, SPX	OPTC3 125068		
	LonWorks Screw terminals	SVX, SPX	OPTC4 125069		
	CANopen® Screw terminals	SVX, SPX	OPTC6 125710		
	PROFIBUS-DP SUB-D 9 pole, socket	SVX, SPX	OPTC5 125070		
	DeviceNet SUB-D 9 pole, socket	SVX, SPX	OPTC7 125071		
	Modbus RS485 SUB-D 9 pole, socket	SVX, SPX	OPTC8 125072		
	Modbus-TCP RJ45, 8-pole	SVX, SPX	OPTC1 125075		
	BACnet/IP RJ45, 8-pole	SVX, SPX	OPTCJ 125076		

SVX, SPX

Technical data

			SVX001... SPX001...	SVXF15... SPXF15...	SVX002... SPX002...	SVX003... SPX003...
General						
Standards			EMC: EN 61800-3:2004+A1-2012 Safety: EN 61800-5-1: 2003			
Certifications			CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick
Production quality			RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001
Climatic proofing			ρ _w % < 95% relative humidity, no condensation, no corrosion, no dripping water			
Ambient temperature						
Operation			θ °C -10 - +40	-10 - +40	-10 - +40	-10 - +40
Storage			θ °C -40 - +70	-40 - +70	-40 - +70	-40 - +70
Radio interference level						
Radio interference class (EMC)			C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.			
Environment (EMC)			1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments
Mounting position			Vertical	Vertical	Vertical	Vertical
Altitude			m 0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 3000 m			
Protection against direct contact			BGV A3 (VBG4, finger- and back-of-hand proof)			
Weight			kg 5	5	5	5
Main circuit						
Supply						
Rated operational voltage			U _e V 400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase
Mains voltage (50/60Hz)			U _{LN} V 380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)
Supply frequency			f _{LN} Hz 50/60	50/60	50/60	50/60
Frequency range			f _{LN} Hz 45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz
Power section						
Function			Frequency inverter with internal DC link and IGBT inverter			
Output voltage with V _e			U ₂ V 400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase
Output Frequency			f ₂ Hz 0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz
Switching frequency			f _{PWM} kHz 10 (adjustable 1 - 16)	10 (adjustable 1 - 16)	10 (adjustable 1 - 16)	10 (adjustable 1 - 16)
Operation Mode						
SVX...			U/f control sensorless vector control (SLV)			
SPX...			U/f control sensorless vector control (SLV) Vector control with feedback (CLV)			
Frequency resolution (setpoint value)			Δf Hz 0.01	0.01	0.01	0.01
Rated operational current						
At 110% overload			I _e A 3.3	4.3	5.6	7.6
At 150% overload			I _e A 2.2	3.3	4.3	5.6
Motor feeder						
Assigned motor rating						
Note			For AC motors with internal and external ventilation with 50 Hz / 60 Hz			
With 400 V, 50 Hz (110% overload)			P kW 1.1	1.5	2.2	3
With 400 V, 50 Hz (150% overload)			P kW 0.75	1.1	1.5	2.2
With 440 - 480 V, 60 Hz (110% overload)			P HP 1.5	2	3	5
With 440 - 480 V, 60 Hz (150% overload)			P HP 1	1.5	2	3
Control section						
External control voltage			U _c V 24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)
Reference voltage			U _s V 10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)

SVX005... SPX005...	SVX006... SPX006...	SVX007... SPX007...	SVX010... SPX010...	SVX015... SPX015...	SVX020... SPX020...
EMC: EN 61800-3:2004+A1-2012 Safety: EN 61800-5-1: 2003					
CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick
RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001
< 95% relative humidity, no condensation, no corrosion, no dripping water					
-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40
-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70
C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.					
1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments
Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 3000 m					
BGV A3 (VBG4, finger- and back-of-hand proof)					
5	5	8.1	8.1	8.1	18.5
Frequency inverter with internal DC link and IGBT inverter					
400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase
380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)
50/60	50/60	50/60	50/60	50/60	50/60
45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz
400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase
0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz
10 (adjustable 1 - 16)	10 (adjustable 1 - 16)	10 (adjustable 1 - 16)	10 (adjustable 1 - 16)	10 (adjustable 1 - 16)	10 (adjustable 1 - 16)
U/f control sensorless vector control (SLV)					
U/f control sensorless vector control (SLV) Vector control with feedback (CLV)					
0.01	0.01	0.01	0.01	0.01	0.01
9	12	16	23	31	38
7.6	9	12	16	23	31
For AC motors with internal and external ventilation with 50 Hz / 60 Hz					
4	5.5	7.5	11	15	18.5
3	4	5.5	7.5	11	15
6	7.5	10	15	20	25
5	6	7.5	10	15	20
24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)
10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)

			SVX025... SPX025...	SVX030... SPX030...	SVX040... SPX040...	SVX050... SPX050...
General						
Standards			EMC: EN 61800-3:2004+A1-2012 Safety: EN 61800-5-1: 2003			
Certifications			CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick
Production quality			RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001
Climatic proofing			ρ _w % < 95% relative humidity, no condensation, no corrosion, no dripping water			
Ambient temperature						
Operation			θ °C -10 - +40	-10 - +40	-10 - +40	-10 - +40
Storage			θ °C -40 - +70	-40 - +70	-40 - +70	-40 - +70
Radio interference level						
Radio interference class (EMC)			C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.			
Environment (EMC)			1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments
Mounting position			Vertical	Vertical	Vertical	Vertical
Altitude			m 0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 3000 m			
Protection against direct contact			BGV A3 (VBG4, finger- and back-of-hand proof)			
Weight			kg 18.5	18.5	35	35
Main circuit						
Supply						
Rated operational voltage			U _e V 400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase
Mains voltage (50/60Hz)			U _{LN} V 380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)
Supply frequency			f _{LN} Hz 50/60	50/60	50/60	50/60
Frequency range			f _{LN} Hz 45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz
Power section						
Function			Frequency inverter with internal DC link and IGBT inverter			
Output voltage with V _e			U ₂ V 400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase
Output Frequency			f ₂ Hz 0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz
Switching frequency			f _{PWM} kHz 10 (adjustable 1 - 16)	10 (adjustable 1 - 16)	3.6 (adjustable 1 - 10)	3.6 (adjustable 1 - 10)
Operation Mode						
SVX...			U/f control sensorless vector control (SLV)			
SPX...			U/f control sensorless vector control (SLV) Vector control with feedback (CLV)			
Frequency resolution (setpoint value)			Δf Hz 0.01	0.01	0.01	0.01
Rated operational current						
At 110% overload			I _e A 46	61	72	87
At 150% overload			I _e A 38	46	61	72
Motor feeder						
Assigned motor rating						
Note			For AC motors with internal and external ventilation with 50 Hz / 60 Hz			
With 400 V, 50 Hz (110% overload)			P kW 22	30	37	45
With 400 V, 50 Hz (150% overload)			P kW 18.5	22	30	37
With 440 - 480 V, 60 Hz (110% overload)			P HP 30	40	50	60
With 440 - 480 V, 60 Hz (150% overload)			P HP 25	30	40	50
Control section						
External control voltage			U _c V 24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)
Reference voltage			U _s V 10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)

SVX060... SPX060...	SVX075... SPX075...	SVX100... SPX100...	SVX125... SPX125...	SVX150... SPX150...	SVX200... SPX200...
EMC: EN 61800-3:2004+A1-2012 Safety: EN 61800-5-1: 2003					
CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick
RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001
< 95% relative humidity, no condensation, no corrosion, no dripping water					
-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40
-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70
C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.					
1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments
Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 3000 m					
BGV A3 (VBG4, finger- and back-of-hand proof)					
35	58	58	58	146	146
Frequency inverter with internal DC link and IGBT inverter					
400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase
380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)
50/60	50/60	50/60	50/60	50/60	50/60
45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz
400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase
0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz
3.6 (adjustable 1 - 10)	3.6 (adjustable 1 - 10)	3.6 (adjustable 1 - 10)	3.6 (adjustable 1 - 10)	3.6 (adjustable 1 - 10)	3.6 (adjustable 1 - 10)
U/f control sensorless vector control (SLV)					
U/f control sensorless vector control (SLV) Vector control with feedback (CLV)					
0.01	0.01	0.01	0.01	0.01	0.01
105	140	170	205	261	300
87	105	140	170	205	245
For AC motors with internal and external ventilation with 50 Hz / 60 Hz					
55	75	90	110	132	160
45	55	75	90	110	132
75	100	125	150	200	250
60	75	100	125	150	200
24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)
10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)

			SVX002... SPX002...	SVX003... SPX003...	SVX004... SPX004...	SVX005... SPX005...
General						
Standards			EMC: EN 61800-3:2004+A1-2012 Safety: EN 61800-5-1: 2003			
Certifications			CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick
Production quality			RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001
Climatic proofing			ρ _w % < 95% relative humidity, no condensation, no corrosion, no dripping water			
Ambient temperature						
Operation			θ °C -10 - +40	-10 - +40	-10 - +40	-10 - +40
Storage			θ °C -40 - +70	-40 - +70	-40 - +70	-40 - +70
Radio interference level						
Radio interference class (EMC)			C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.			
Environment (EMC)			1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments
Mounting position			Vertical	Vertical	Vertical	Vertical
Altitude			m 0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 3000 m			
Protection against direct contact			BGV A3 (VBG4, finger- and back-of-hand proof)			
Weight			kg 18.5	18.5	18.5	18.5
Main circuit						
Supply						
Rated operational voltage			U _e V 690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase
Mains voltage (50/60Hz)			U _{LN} V 525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)
Supply frequency			f _{LN} Hz 50/60	50/60	50/60	50/60
Frequency range			f _{LN} Hz 45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz
Power section						
Function			Frequency inverter with internal DC link and IGBT inverter			
Output voltage with V _e			U ₂ V 690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase
Output Frequency			f ₂ Hz 0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz
Switching frequency			f _{PWM} kHz 1.5 (adjustable 1 - 6)	1.5 (adjustable 1 - 6)	1.5 (adjustable 1 - 6)	1.5 (adjustable 1 - 6)
Operation Mode						
SVX...			U/f control sensorless vector control (SLV)			
SPX...			U/f control sensorless vector control (SLV) Vector control with feedback (CLV)			
Frequency resolution (setpoint value)			Δf Hz 0.01	0.01	0.01	0.01
Rated operational current						
At 110% overload			I _e A 4.5	5.5	7.5	10
At 150% overload			I _e A 3.2	4.5	5.5	7.5
Motor feeder						
Assigned motor rating						
Note			For AC motors with internal and external ventilation with 50 Hz / 60 Hz			
With 690 V, 60 Hz (110% overload)			P kW 3	4	5.5	7.5
With 690 V, 60 Hz (150% overload)			P kW 2.2	3	4	5.5
With 550 - 600 V, 60 Hz (110% overload)			P HP 3	4	5	7.5
With 550 - 600 V, 60 Hz (150% overload)			P HP 2	3	4	5
Control section						
External control voltage			U _c V 24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)
Reference voltage			U _s V 10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)

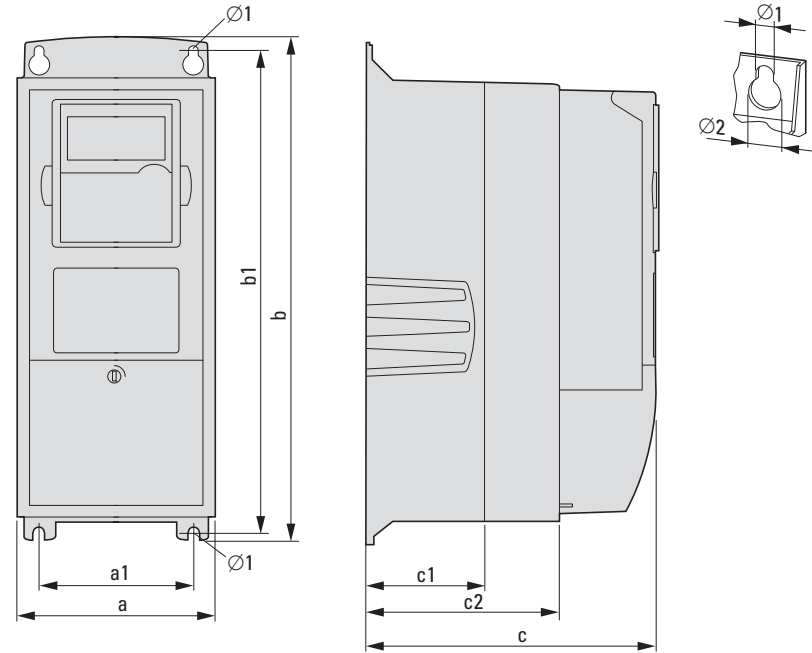
SVX007... SPX007...	SVX010... SPX010...	SVX015... SPX015...	SVX020... SPX020...	SVX025... SPX025...	SVX030... SPX030...
EMC: EN 61800-3:2004+A1-2012 Safety: EN 61800-5-1: 2003					
CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick
RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001
< 95% relative humidity, no condensation, no corrosion, no dripping water					
-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40
-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70
C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.					
1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments
Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 3000 m					
BGV A3 (VBG4, finger- and back-of-hand proof)					
18.5	18.5	18.5	18.5	18.5	35
690 V AC, 3-phase					
525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)
50/60	50/60	50/60	50/60	50/60	50/60
45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz
Frequency inverter with internal DC link and IGBT inverter					
690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase
0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz
1.5 (adjustable 1 - 6)	1.5 (adjustable 1 - 6)	1.5 (adjustable 1 - 6)	1.5 (adjustable 1 - 6)	1.5 (adjustable 1 - 6)	1.5 (adjustable 1 - 6)
U/f control sensorless vector control (SLV)					
U/f control sensorless vector control (SLV) Vector control with feedback (CLV)					
0.01	0.01	0.01	0.01	0.01	0.01
13.5	18	22	27	34	41
10	13.5	18	22	27	34
For AC motors with internal and external ventilation with 50 Hz / 60 Hz					
11	15	18.5	22	30	37
7.5	11	15	18.5	22	30
10	15	20	25	30	40
7.5	10	15	20	25	30
24 V DC (max. 250 mA)					
10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)

			SVX040... SPX040...	SVX050... SPX050...	SVX060... SPX060...	SVX075... SPX075...
General						
Standards			EMC: EN 61800-3:2004+A1-2012 Safety: EN 61800-5-1: 2003			
Certifications			CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick
Production quality			RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001
Climatic proofing			ρ _w % < 95% relative humidity, no condensation, no corrosion, no dripping water			
Ambient temperature						
Operation			θ °C -10 - +40	-10 - +40	-10 - +40	-10 - +40
Storage			θ °C -40 - +70	-40 - +70	-40 - +70	-40 - +70
Radio interference level						
Radio interference class (EMC)			C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.			
Environment (EMC)			1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments
Mounting position			Vertical	Vertical	Vertical	Vertical
Altitude			m 0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 3000 m			
Protection against direct contact			BGV A3 (VBG4, finger- and back-of-hand proof)			
Weight			kg 35	58	58	58
Main circuit						
Supply						
Rated operational voltage			U _e V 690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase
Mains voltage (50/60Hz)			U _{LN} V 525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)
Supply frequency			f _{LN} Hz 50/60	50/60	50/60	50/60
Frequency range			f _{LN} Hz 45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz
Power section						
Function			Frequency inverter with internal DC link and IGBT inverter			
Output voltage with V _e			U ₂ V 690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase
Output Frequency			f ₂ Hz 0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz
Switching frequency			f _{PWM} kHz 1.5 (adjustable 1 - 6)	1.5 (adjustable 1 - 6)	1.5 (adjustable 1 - 6)	1.5 (adjustable 1 - 6)
Operation Mode						
SVX...			U/f control sensorless vector control (SLV)			
SPX...			U/f control sensorless vector control (SLV) Vector control with feedback (CLV)			
Frequency resolution (setpoint value)			Δf Hz 0.01	0.01	0.01	0.01
Rated operational current						
At 110% overload			I _e A 52	62	80	100
At 150% overload			I _e A 41	52	62	80
Motor feeder						
Assigned motor rating						
Note			For AC motors with internal and external ventilation with 50 Hz / 60 Hz			
With 690 V, 60 Hz (110% overload)			P kW 45	55	75	90
With 690 V, 60 Hz (150% overload)			P kW 37	45	55	75
With 550 - 600 V, 60 Hz (110% overload)			P HP 50	60	75	100
With 550 - 600 V, 60 Hz (150% overload)			P HP 40	50	60	75
Control section						
External control voltage			U _c V 24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)
Reference voltage			U _s V 10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)

SVX100... SPX100...	SVX125... SPX125...	SVX150... SPX150...	SVX175... SPX175...	SVX200... SPX200...
EMC: EN 61800-3:2004+A1-2012 Safety: EN 61800-5-1: 2003				
CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick
RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001
< 95% relative humidity, no condensation, no corrosion, no dripping water				
-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40
-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70
C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.				
1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments
Vertical	Vertical	Vertical	Vertical	Vertical
0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 3000 m				
BGV A3 (VBG4, finger- and back-of-hand proof)				
146	146	146	146	176
690 V AC, 3-phase				
525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)
50/60	50/60	50/60	50/60	50/60
45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz
Frequency inverter with internal DC link and IGBT inverter				
690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase
0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz
1.5 (adjustable 1 - 6)	1.5 (adjustable 1 - 6)	1.5 (adjustable 1 - 6)	1.5 (adjustable 1 - 6)	1.5 (adjustable 1 - 6)
U/f control sensorless vector control (SLV)				
U/f control sensorless vector control (SLV) Vector control with feedback (CLV)				
0.01	0.01	0.01	0.01	0.01
125	144	170	208	261
100	125	144	170	208
For AC motors with internal and external ventilation with 50 Hz / 60 Hz				
110	132	160	200	250
90	110	132	160	200
125	150	175	200	250
100	125	150	175	200
24 V DC (max. 250 mA)				
10 V DC (max. 10 mA)				

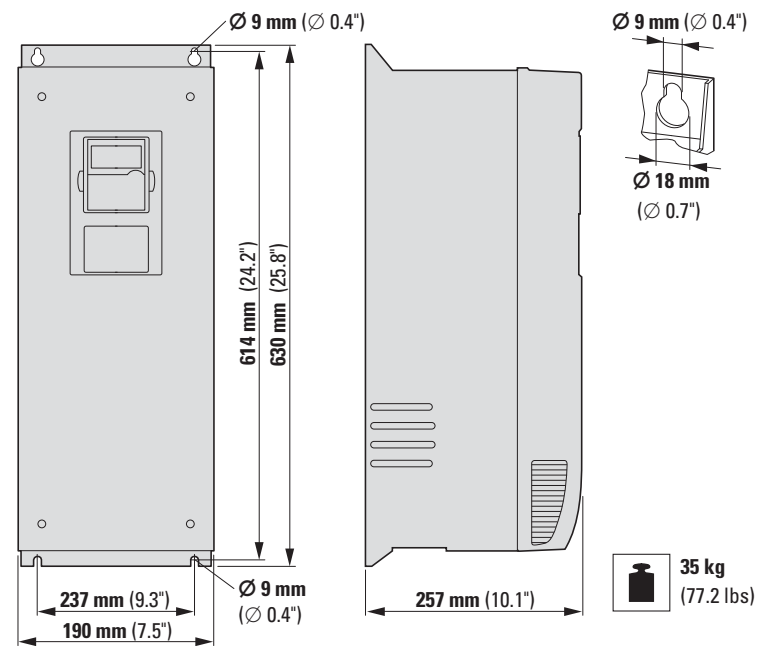
Dimensions

Sizes FR4 - FR6
Protection type IP20/NEMA 0 and IP20/NEMA 0



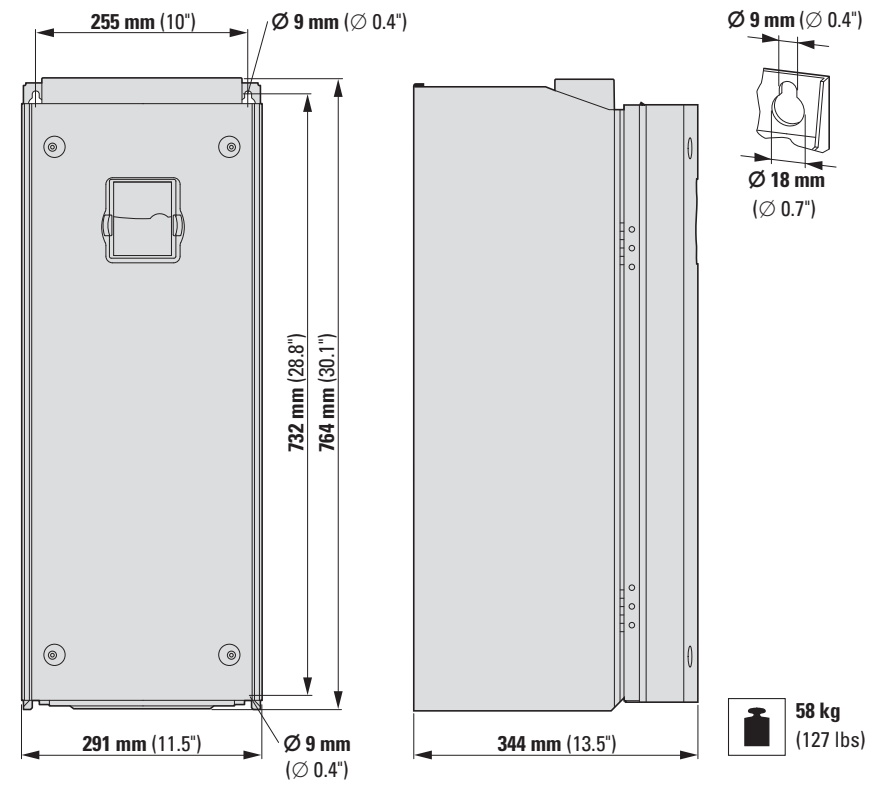
a	a1	b	b1	b2	c	c1	c2	Ø1	Ø2	Weight	Size
mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	kg (lbs)	
128 (5)	100 (3.9)	327 (12.9)	313 (12.3)	292 (11.5)	190 (7.5)	77 (3)	126 (4.9)	7 (0.3)	13 (0.5)	5 (11)	FR4
143 (5.6)	100 (3.9)	419 (16.5)	406 (16)	389 (15.3)	214 (8.4)	100 (3.9)	148 (5.9)	7 (0.3)	13 (0.5)	8 (17.9)	FR5
195 (7.6)	148 (5.8)	558 (22)	541 (21.3)	519 (20.4)	237 (9.3)	105 (4.2)	165 (6.5)	9 (0.4)	15.5 (0.6)	19 (40.8)	FR6

Sizes FR7
Protection type IP20/NEMA 0 and IP20/NEMA 0



Sizes FR8

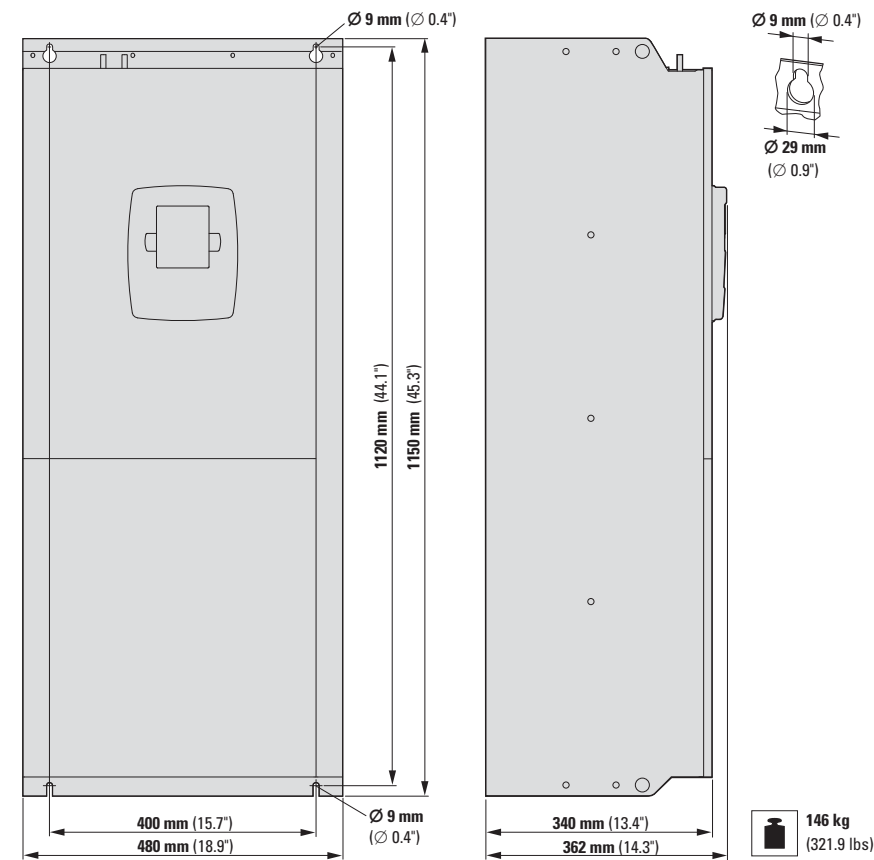
Protection type IP20/NEMA 0 and IP20/NEMA 0



SVX, SPX

Sizes FR9

Protection type IP20/NEMA 0 and IP20/NEMA 0





DS7 soft starters in xStart system – Soft to start, powerful in torque

The soft starters have become increasingly established as an alternative to the star-delta starter. The DS7 replaces the mechanical contactor and extends the function “Motor soft start”. Motor run-up is soft but still at a higher torque than other available solutions using the patented method. Extended service intervals and reduced operating costs are welcomed side effects.

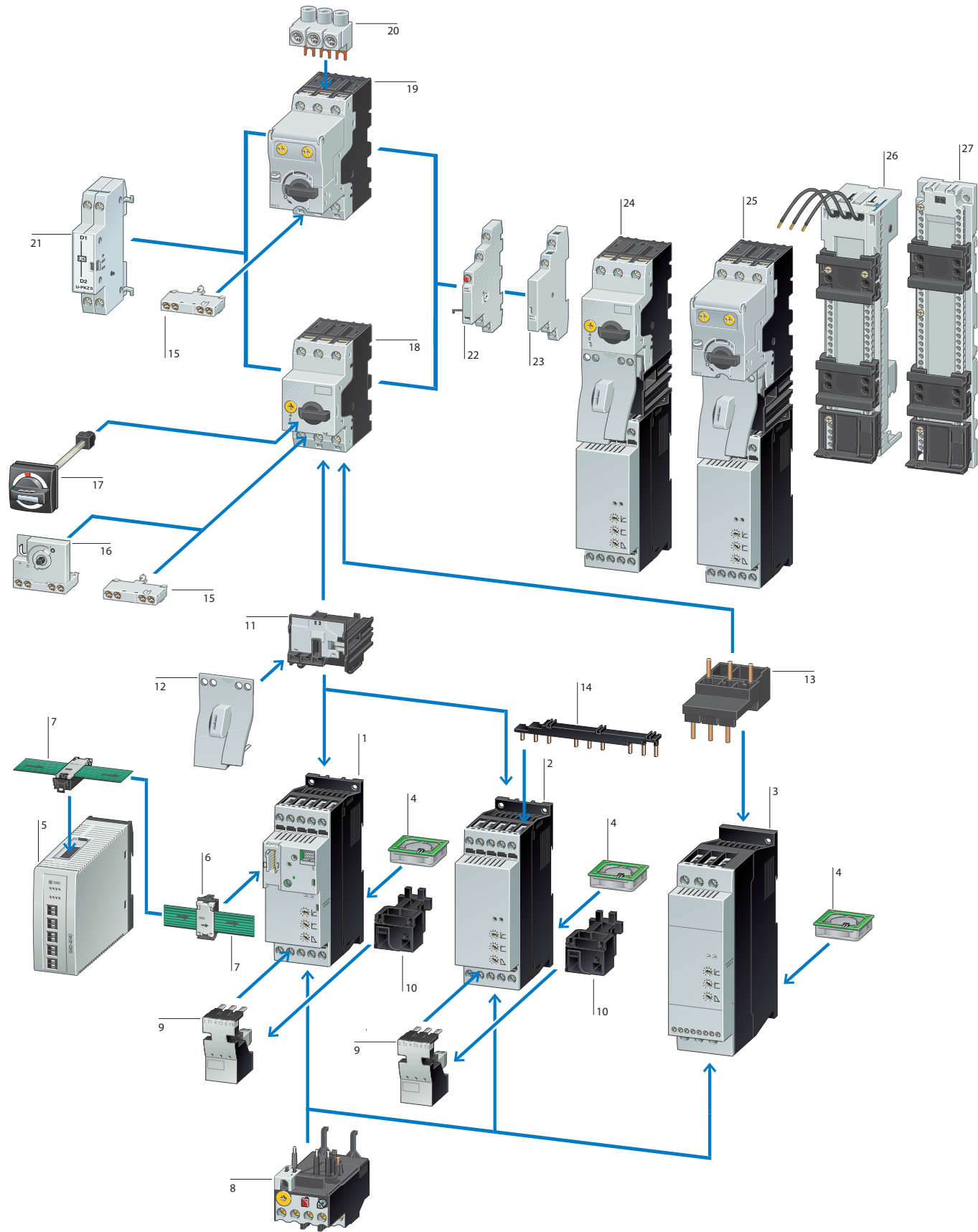
Designed for normal applications such as pumps, fans and small conveyors, the compact DS7 is ideal. The DS7 is also available with a SmartWire-DT connection to simplify wiring and enhance functionality as an automation solution.



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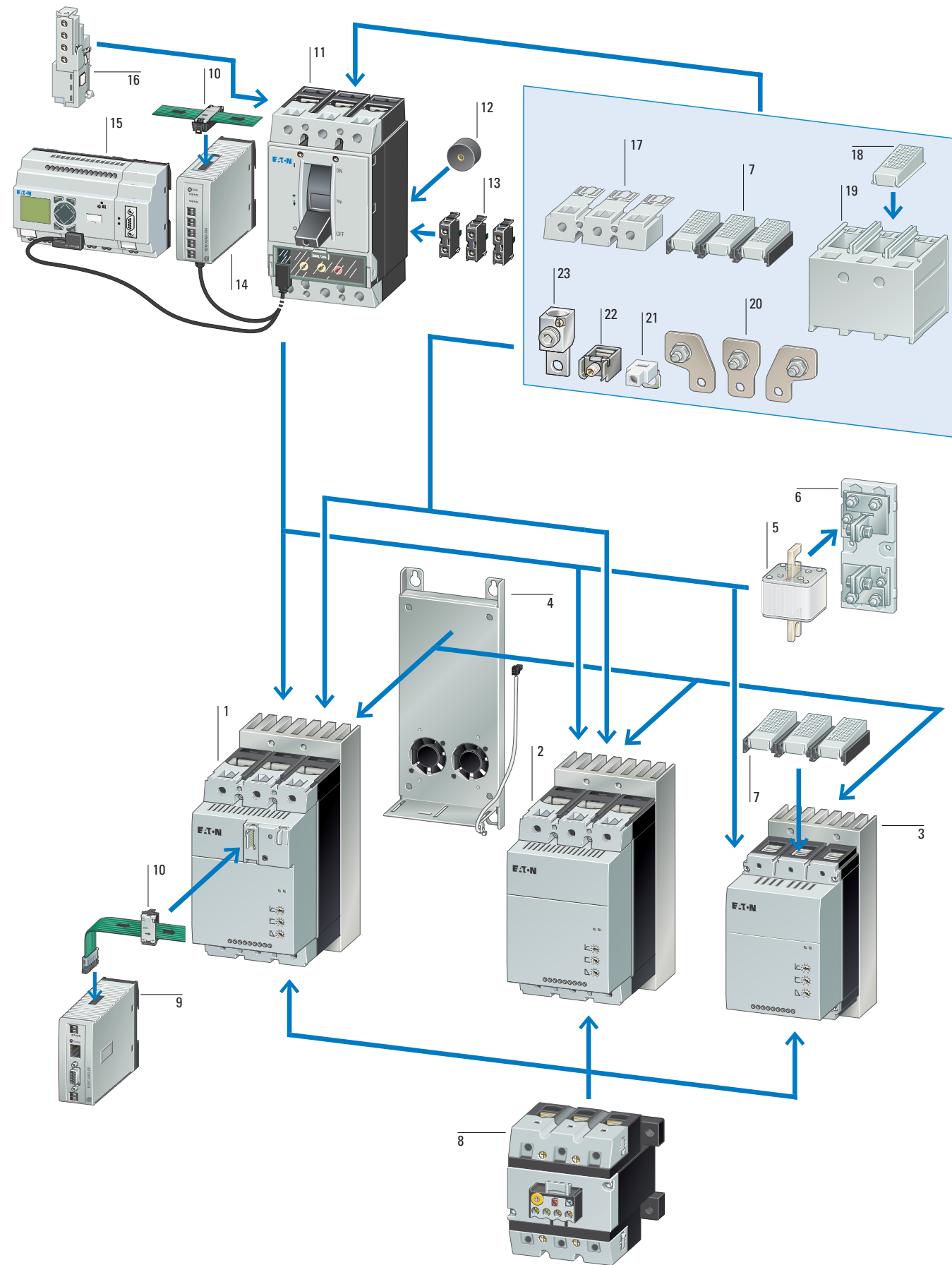
DS7

System overview



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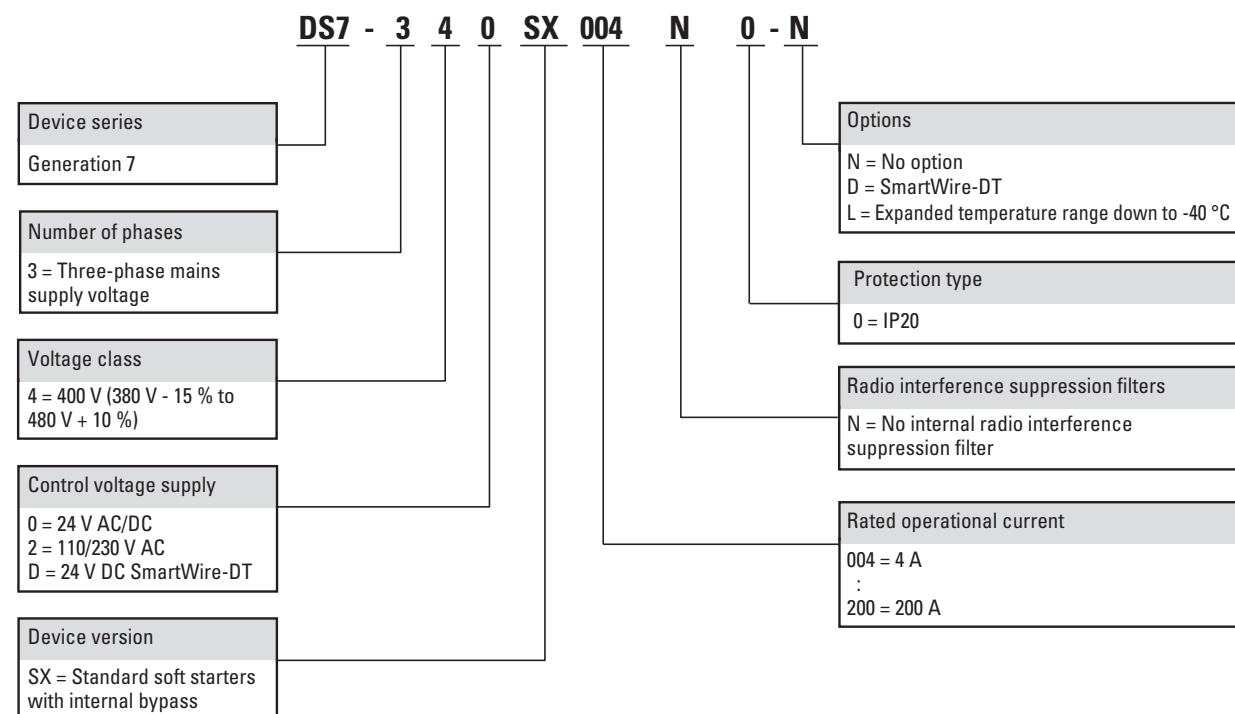
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overload relay → Industrial Switchgear 2011 catalog, chapter 6	8	connection width extension → Industrial Switchgear 2011 catalog, chapter 17	20
Gateways for SmartWire-DT → page 182	9	Control circuit terminal → Industrial Switchgear 2011 catalog, chapter 17	21
SmartWire-DT external device plug → page 182	10	Box terminals → Industrial Switchgear 2011 catalog, chapter 17	22
NZM circuit-breaker → Industrial Switchgear 2011 catalog, chapter 17	11	Tunnel terminals for Al and Cu cable → Industrial Switchgear 2011 catalog, chapter 17	23
spacer → Industrial Switchgear 2011 catalog, chapter 17	12		

DS7

Key to type references



Description



Application

The DS7 series soft starters are two-phased controlled soft starters used for soft starting three-phase AC motors for applications with a normal operating frequency and a performance range of 3 to 200 A (1.1 to 110 kW with a 400 V mains voltage). Closing transients and DC components during startup are effectively suppressed and guarantee even motor starting.

The special actuation method (asymmetrical trigger phase control) for the soft starter function avoids the DC components (Eaton patent) that would normally occur in two-phase-controlled soft starters. This suppresses the generation of an elliptical rotating field, which would cause uneven motor starting and increase the motor's acceleration. The true run behavior of the DS7 is therefore comparable with that of a three-phase controlled soft starter.

Functions

Typical fields of application for Series DS7 soft starters are:

- Pump drives: pressure surges are prevented through soft starting. The mechanical load on the whole plant is reduced and its service life increases.
- Fan drives: soft starting keeps fan belts from slipping, preventing premature wear. This lowers operating costs and extends the system's lifespan.
- Conveyor belts: conveyor belts start running smoothly, instead of starting with a jolt. This ensures that any goods being conveyed do not topple over. Mechanical damage to the belt itself is avoided, making it more durable.

Features

- The ramp time can be adjusted by potentiometer within a range of 1 to 30 s (for starting) or 0 to 30 s (for stopping) with a potentiometer
- The start voltage (or start torque) can be adjusted within a range of 30 to 100 percent of the mains voltage with a potentiometer
- Significant reduction in switch-on current, achieved with a short soft start ramp time (min. 1 s) for lamp and heating loads
- Internal bypass relay: switches on automatically after the end of the ramp, bypassing the internal thyristors.
- This makes it possible to comply with radio interference level B without any additional measures.
- The motor's thermal load is smaller than it would be without asymmetric ignition control.
- Designed specifically for long cables

Documentation

Surface mounting and standard mounting procedures are described in the corresponding mounting instructions and in the manual.

Instructional leaflets:
 IL03902003Z: for size 1 devices (up to 12 A motor output)
 IL03902004Z: for size 2 devices (up to 32 A motor output)
 IL03902005Z: for size 3, 4 devices (up to 200 A motor output)

Manual:
 MN03901001Z

You can download the documentation for the DS7 soft starters from the Internet at: www.moeller.net/support

Communication interface SmartWire-DT

Our SmartWire-DT interface completely eliminates the need for conventional control wiring. This has several advantages:

- No incorrect wiring
- Faster wiring
- Cost saving

The interface can be used to send control commands to the DS7-SWD and change and diagnose its parameter configuration; in addition, the control electronics can be powered via the SmartWire-DT cable. The device is controlled with one of three selectable profiles:

- A "start/stop" profile, which should already be familiar from the PKE motor-protective circuit-breaker and contactor combination
- An 8 bit-wide profile for the soft starter, which is provided the same way for the variable frequency drive and features more options
- A control profile comparable to a PROFIdrive profile, just like the one available for the variable frequency drive.

Regardless of the profile chosen, the DS7-SWD's parameters can be read and written to at any time by using acyclic services.

DS7-SWD makes it possible to read and write to all device parameters. The mechanisms of the parameter channel that is described for the drives in the PROFIdrive profile are used for this purpose. This profile provides a standardized parameter access method for variable frequency drives and soft starters.

It is also possible to overwrite the potentiometer settings on the DS7-SWD, which can come in handy, for instance, when a change made to the machine needs to be undone.

The DS7-SWD comes with a detailed diagnostic system with options that extend far beyond those of wired devices. In addition to having an error log, the DS7-SWD can detect and report nine different device faults. A warning parameter reports any present alarm messages. Moreover, the response to each individual fault can be customized. Finally, there are 35 additional messages for communication errors. Using the DS7 in connection with the PKE opens up new functionalities that were previously thought impossible to implement with a low-cost soft starter and that were reserved to significantly more expensive devices. Combining a PKE unit and a DS7-SWD makes it possible to completely protect the DS7-SWD device against overloads. In addition, it provides a current limiting function and can report thermal capacity utilization levels to higher level controllers.

Expanded temperature range

DS7-340SX...-L soft starters can operate at temperatures as low as -40 °C.

Ordering

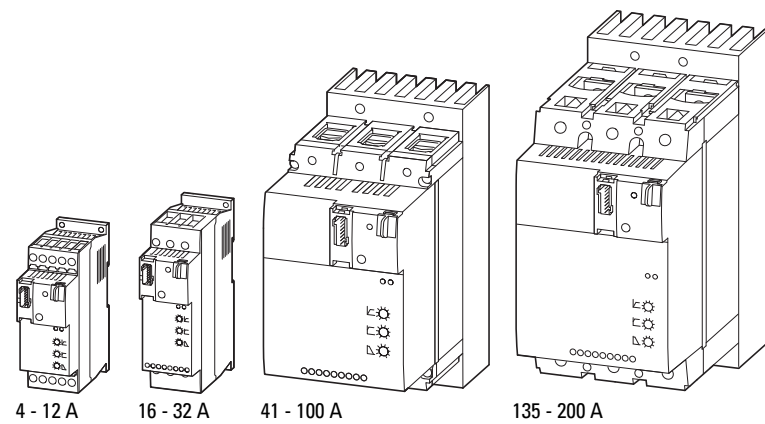
Rated operational current Device (AC-53) I_e A	Assigned motor rating		Part no.	Article no.	Price see price list	Part no.	Article no.	Price see price list	Std. pack
	at 400 V, 50 Hz P kW	at 480 V, 60 Hz P HP							
			U_c 24 V AC/DC U_s 24 V AC/DC Standard temperature range			U_c 24 V AC/DC U_s 24 V AC/DC Expanded temperature range down to -40 °C			
Soft starters									
Soft starters for three-phase loads Mains supply voltage (50/60 Hz) U _{LN} 200 - 480 V AC									
4	1.5	2	DS7-340SX004N0-N	134847		DS7-340SX004N0-L	171740		1 off USA Canada
7	3	5	DS7-340SX007N0-N	134849		DS7-340SX007N0-L	171741		
9	4	5	DS7-340SX009N0-N	134910		DS7-340SX009N0-L	171742		
12	5.5	10	DS7-340SX012N0-N	134911		DS7-340SX012N0-L	171743		
16	7.5	10	DS7-340SX016N0-N	134912		DS7-340SX016N0-L	171744		
24	11	15	DS7-340SX024N0-N	134913		DS7-340SX024N0-L	171745		
32	15	25	DS7-340SX032N0-N	134914		DS7-340SX032N0-L	171746		
41	22	30	DS7-340SX041N0-N	134916		DS7-340SX041N0-L	171747		
55	30	40	DS7-340SX055N0-N	134917		DS7-340SX055N0-L	171748		
70	37	50	DS7-340SX070N0-N	134918		DS7-340SX070N0-L	171749		
81	45	60	DS7-340SX081N0-N	134919		DS7-340SX081N0-L	171750		
100	55	75	DS7-340SX100N0-N	134920		DS7-340SX100N0-L	171751		
135	75	100	DS7-340SX135N0-N	134921		DS7-340SX135N0-L	171752		
160	90	125	DS7-340SX160N0-N	134922		DS7-340SX160N0-L	171753		
200	110	150	DS7-340SX200N0-N	134923		DS7-340SX200N0-L	171754		
			U_c 110 - 230 V AC U_s 110/230 V AC			U_c 24 V DC U_s 24 V DC			
4	1.5	2	DS7-342SX004N0-N	134925		DS7-34DSX004N0-D	134943		1 off USA Canada
7	3	5	DS7-342SX007N0-N	134927		DS7-34DSX007N0-D	134945		
9	4	5	DS7-342SX009N0-N	134928		DS7-34DSX009N0-D	134946		
12	5.5	10	DS7-342SX012N0-N	134929		DS7-34DSX012N0-D	134947		
16	7.5	10	DS7-342SX016N0-N	134930		DS7-34DSX016N0-D	134948		
24	11	15	DS7-342SX024N0-N	134931		DS7-34DSX024N0-D	134949		
32	15	25	DS7-342SX032N0-N	134932		DS7-34DSX032N0-D	134950		
41	22	30	DS7-342SX041N0-N	134934		DS7-34DSX041N0-D	134952		
55	30	40	DS7-342SX055N0-N	134935		DS7-34DSX055N0-D	134953		
70	37	50	DS7-342SX070N0-N	134936		DS7-34DSX070N0-D	134954		
81	45	60	DS7-342SX081N0-N	134937		DS7-34DSX081N0-D	134955		
100	55	75	DS7-342SX100N0-N	134938		DS7-34DSX100N0-D	134956		
135	75	100	DS7-342SX135N0-N	134939		DS7-34DSX135N0-D	134957		
160	90	125	DS7-342SX160N0-N	134940		DS7-34DSX160N0-D	134958		
200	110	150	DS7-342SX200N0-N	134941		DS7-34DSX200N0-D	134959		


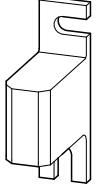

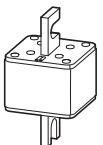
DS7


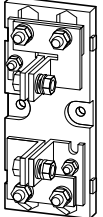

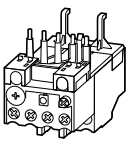

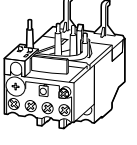
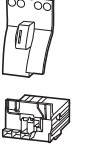

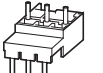

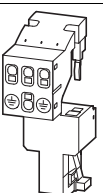

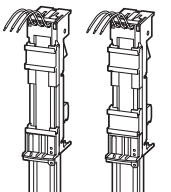
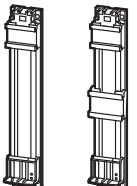
Notes

Information relevant for export to North America
UL/CSA applies only for DS7...-N






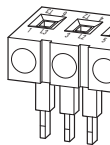



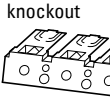
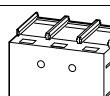
Product Standards IEC/EN 60947-4-2; GB 14048.6; UL 508;
CSA-C22.2 No 0-M91; CSA-C22.2 No 14-05 CE
UL File No. E251034
CSA File No. 2511305
CSA Class No. 321106
Suitable for Branch circuits
Max. Voltage Rating 480 V
Degree of Protection IP20; UL/CSA Type 1








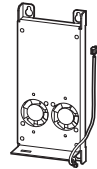
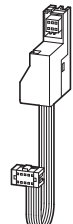


Rated device current	Maximum power loss P _v W	Frame size	For use with	Part no. Article no.	Price see price list	Std. pack	Information relevant for export to North America 	
Superfast semiconductor fuses								
DIN 43653, 690/700 V (IEC/UL) Inside micrometer 80 mm								
	16	5.5	000	DS7-34...SX004N0-...	170M1359 171968	1 off 	Product Standards IEC/EN 60269-4; UL 248-1; CSA-C22.2 No. 248.14; CE marking E125085 UL File No. UL Category Control No. JFHR2 CSA File No. 053787_C_000 CSA Class No. 1422-30 North America Certification UL recognized, CSA certified semiconductor protection Suitable for	
	25	9	000	DS7-34...SX007N0-...	170M1361 171969			
	32	10	000	DS7-34...SX009N0-... DS7-34...SX012N0-...	170M1362 171970			
	40	12	000	DM4-340-7K5	170M1363 171971			
	50	15	000	DS4-340-2K2-M DS4-340-2K2-MR DS4-340-2K2-M-DC DS7-34...SX016N0-...	170M1364 171972			
	63	16	000	DS4-340-4K0-M DS4-340-4K0-MR DS4-340-7K5-MX DS4-340-7K5-MXR DS7-34...SX024N0-...	170M1365 171973			
	80	19	000	DS4-340-5K5-M DS4-340-5K5-MR DS4-340-11K-MX DS4-340-11K-MXR DS7-34...SX032N0-...	170M1366 171974			
	100	21	S1*	DS6-340-22K-MX	170M3012 171976			
	125	25	000	DM4-340-22K DM4-340-30K	170M2615 171975			Product Standards IEC/EN 60269-4; UL 248-1; CE marking E125085 UL File No. UL Category Control No. JFHR2 North America Certification UL recognized Semiconductor protection Suitable for
	160	30	S1*	DS4-340-11K-M DS4-340-11K-MR	170M3014 171977			Product Standards IEC/EN 60269-4; UL 248-1; CSA-C22.2 No. 248.14; CE marking E125085 UL File No. UL Category Control No. JFHR2 CSA File No. 053787_C_000 CSA Class No. 1422-30 North America Certification UL recognized, CSA certified semiconductor protection Suitable for
	200	45	S1	DM4-340-37K DM4-340-45K DS6-340-37K-MX DS6-340-45K-MX DS6-340-55K-MX DS7-34...SX070N0-... DS7-34...SX081N0-... DS7-34...SX100N0-...	170M4008 171978			
	315	58	S1	DS6-340-75K-MX DS7-34...SX135N0-...	170M4010 171979			
	350	60	S1	DM4-340-55K DM4-340-75K	170M4011 171980			
	400	65	S2	DS6-340-90K-MX DS7-34...SX160N0-...	170M5008 171984			
	450	70	S1	DM4-340-90K DM4-340-110K	170M4013 171981			
	500	72	S1	DM4-340-132K DM4-340-160K	170M4014 171982			
	500	95	S3	DS6-340-110K-MX DS7-34...SX200N0-... DM4-340-132K DM4-340-160K	170M6008 171985			
	630	80	S1	DM4-340-200K	170M4016 171983			
	900	120	S3	DM4-340-250K DM4-340-315K	170M6013 171986			
	1250	140	S3	DM4-340-400K DM4-340-500K	170M6016 171987			

	For use with	Part no. Article no.	Price see price list	Std. pack	Information relevant for export to North America 
Fuse Bases					
	Dimensions (W x H x D) mm 145 x 43 x 50	000, 00	170H1007 171988	1 off 	Product Standards IEC/EN 60269-1; UL 512; CE marking UL File No. E14853 UL Category Control No. IZLT2 North America Certification UL listed Suitable for DIN 43653 fuses
	205 x 88 x 80	S1*, S1, S2, S3	170H3004 171989		
Overload relays					
	DS7-34...SX004...	ZB12-4 278438		1 off 	Product Standards UL 508; CSA-C22.2 No. 14; IEC/EN 60947-4-1; IEC/EN 60947-5-1; CE marking E29184 UL File No. UL Category Control No. NKCR CSA File No. 12528 CSA Class No. 3211-03 North America Certification UL listed, CSA certified Suitable for Branch circuits Max. Voltage Rating 600 V AC Degree of Protection IEC: IP20, UL/CSA Type: -
	DS7-34...SX007...	ZB12-10 278440			
	DS7-34...SX009...	ZB12-12 278441			
	DS7-34...SX012...	ZB12-12 278441			
	DS7-34...SX016...	ZB32-16 278452			
	DS7-34...SX024...	ZB32-24 278453			
	DS7-34...SX032...	ZB32-32 278454			
Wiring set					
For DOL Starter					
	DS7-34...SX004...	PKZM0-XDM12 283149		1 off 	Product Standards UL 508; CSA-C22.2 No. 14; IEC60947-4-1; CE marking E36332 UL File No. UL Category Control No. NLRV CSA File No. 165628 CSA Class No. 3211-05 North America Certification UL listed, CSA certified
	DS7-34...SX007...				
	DS7-34...SX009...				
	DS7-34...SX012...				
Electric contact module					
	DS7-34...SX016...	PKZM0-XM32DE 239349		5 off 	Product Standards UL 508; CSA-C22.2 No. 14; IEC60947-4-1; CE marking E36332 UL File No. UL Category Control No. NLRV CSA File No. 165628 CSA Class No. 3211-05 North America Certification UL listed, CSA certified
	DS7-34...SX024...				
	DS7-34...SX032...				
Motor feeder plug					
	DS7-34...SX004...	DILM12-XMCP/T 121770		1 off 	Product Standards IEC/EN 60947-4-1; UL 508; CSA-C22.2 No. 14-05; CE marking North America Certification Request filed for UL and CSA
	DS7-34...SX007...				
	DS7-34...SX009...				
	DS7-34...SX012...				
Busbar adapters					
	PKZM0, PKE + DS7...004N...	BBA0L-25 142526		1 off	
	PKZM0, PKE + DS7...007N...				
PKZM0, PKE + DS7...009N...					
PKZM0, PKE + DS7...012N...					
	PKZM0, PKE + DS7...016N...	BBA0L-32 142527		1 off	
PKZM0, PKE + DS7...024N...					
PKZM0, PKE + DS7...032N...					
Top-hat rail adapter					
45 mm wide adapter plate					
	PKZM0, PKE + DS7...004N...	PKZM0-XC45L 142529		1 off	
	PKZM0, PKE + DS7...007N...				
PKZM0, PKE + DS7...009N...					
PKZM0, PKE + DS7...012N...					
	PKZM0, PKE + DS7...016N...	PKZM0-XC45L/2 142570		1 off	
PKZM0, PKE + DS7...024N...					
PKZM0, PKE + DS7...032N...					

DS7

For use with	Part no. Article no.	Price see price list	Std. pack	Notes	Information relevant for export to North America 
Three-phase commoning links					
For the primary side of DS7 Suitable for 3 DS7 soft starters Length 112 mm protected against accidental contact, short-circuit proof, $U_e = 690\text{ V}$, $I_n = 35\text{ A}$ can be extended by rotating by mounting					
	DS7-34...SX004... DS7-34...SX007... DS7-34...SX009... DS7-34...SX012...	DILM12-XDSB0/3 240084	5 off 	For the primary side of DS7 Suitable for 3 DS7 soft starters Length 112 mm	Product Standards IEC/EN 60947-4-1; UL 508; CSA-C22.2 No. 14-05; CE marking UL File No. UL Category Control No. NLRV E36332
		DILM12-XDSB0/4 240085		For the primary side of DS7 Suitable for 4 DS7 soft starters Length 157 mm	UL File No. UL Category Control No. NLRV E36332
		DILM12-XDSB0/5 240086		For the primary side of DS7 Suitable for 5 DS7 soft starters Length 202 mm	CSA File No. 012528 CSA Class No. 2411-03 North America Certification UL listed, CSA certified
Incoming connection block					
	DS7-34...SX004... DS7-34...SX007... DS7-34...SX009... DS7-34...SX012...	DILM12-XEK 240083	5 off 	For three-phase commoning link, protected against accidental contact, $U_e = 690\text{ V}$, $I_n = 35\text{ A}$. Connection cross section: Stranded 2.5...16 mm ² Flexible with ferrule 2.5...16 mm ² AWG14...8	Product Standards IEC/EN 60947-4-1; UL 508; CSA-C22.2 No. 14-05; CE marking E36332 UL File No. UL Category Control No. NLRV CSA File No. 012528 CSA Class No. 2411-03 North America Certification UL listed, CSA certified
Terminal cover					
Type contains parts for a terminal located at top or bottom for 3 pole circuit-breakers. Enhancement of the busbar tag shroud (simple protection against contact with a finger). Cannot be combined with NZM-XSTK control circuit terminal.					
knockout For box terminal 	DS7-34...SX041... DS7-34...SX055... DS7-34...SX070... DS7-34...SX081... DS7-34...SX100...	NZM1-XKSFA 100780	1 off 	Type contains parts for a terminal located at top or bottom for 3 pole circuit- breakers. Enhancement of the busbar tag shroud (simple protection against contact with a finger). Cannot be combined with NZM- XSTK control circuit terminal.	
knockout 	DS7-34...SX135... DS7-34...SX160... DS7-34...SX200...	NZM2-XKSFA 104640	1 off	Type contains parts for a terminal located at top or bottom for 3 pole circuit- breakers. Enhancement of the busbar tag shroud (simple protection against contact with a finger). Protection when reaching into the cable connection area with the connection of cables in the box terminal. With 2 conductors max cross section 22 mm ² or AWG4. Cannot be combined with NZM- XSTK control circuit terminal.	
	DS7-34...SX135... DS7-34...SX160... DS7-34...SX200...	NZM2-XKSA 260038	1 off	Type contains parts for a terminal located at top or bottom for 3 pole circuit- breakers. Busbar tag shroud where cable lugs, busbars or tunnel terminals are used. When using insulated conductor material to IP1X.	Product Standards UL489; CSA- C22.2 No. 5-09; IEC60947, CE marking E31593 UL File No. UL Category Control No. DIHS 22086 CSA File No. CSA Class No. 1432-01 North America Certification UL listed, CSA certified Refer to main component information Suitable for

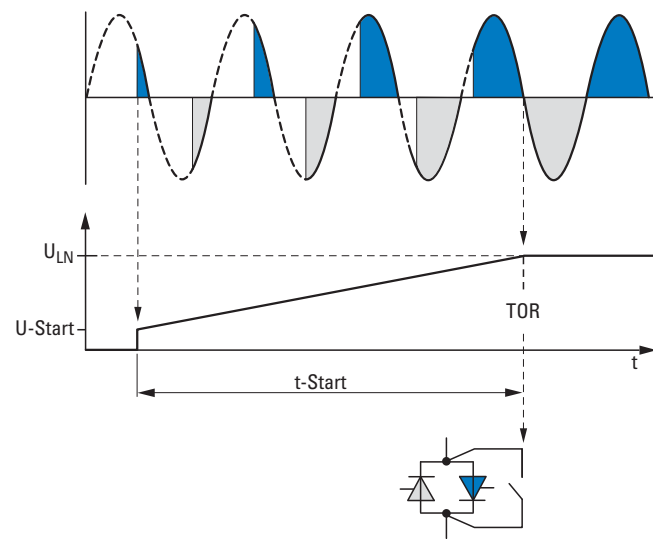
For use with	Part no. Article no.	Price see price list	Std. pack	Notes	Information relevant for export to North America 
IP2X protection against contact with a finger					
Typ enthält Teile für eine Schalterseite oben oder unten für 3-polige Schalter. Erhöhung des Berührungsschutzes auf IP2X.					
For box terminal 	NZM2, PN2, N(S)2	NZM2-XIPK 266773	1 off 	Type contains parts for a terminal located at top or bottom for 3 pole circuit-breakers. Enhancement of the busbar tag shroud to IP2X. Protection when reaching into the cable connection area with the connection of cables in the box terminal. With 2 conductors max cross section 25 mm ² or AWG4. Cannot be combined with NZM-XSTK control circuit terminal.	
for cover NZM2-XKSA or NZM2 or NZM2...(C)NA und N(S)2...NA 	NZM2, PN2, N(S)2	NZM2-XIPA 266777	1 off 	Type contains parts for a terminal located at top or bottom for 3 pole circuit-breakers. Enhancement of the busbar tag shroud to IP2X. When mounting NZM2...-(C)NA or NZM...-NA the following applies: with 2 conductors max cross section 25 mm ² or AWG4.	
Mounting kit					
when using covers NZM1-XKSFA and NZM2-XKSA					
	DS7-34xSX041N0-x DS7-34xSX055N0-x DS7-34xSX070N0-x DS7-34xSX081N0-x DS7-34xSX100N0-x DS7-34xSX135N0-x DS7-34xSX160N0-x DS7-34xSX200N0-x	DE6-MNT-NZM 107323	1 off	-	
Device fans					
Device fan for increasing the load cycle (more starts per hour higher or longer-lasting starting current)					
	DS7-34...SX004... DS7-34...SX007... DS7-34...SX009... DS7-34...SX012... DS7-34...SX016... DS7-34...SX024... DS7-34...SX032...	DS7-FAN-032 135553	1 off 		North America Certification Request filed for UL and CSA
	DS7-34...SX041... DS7-34...SX055... DS7-34...SX070... DS7-34...SX081... DS7-34...SX100...	DS7-FAN-100 169021	1 off		
	DS7-34...SX135... DS7-34...SX160... DS7-34...SX200...	DS7-FAN-200 169022	1 off		
PKE communications cable					
6-Pole Prefabricated with two plugs For connecting the PKE to DS7-SWD					
	DS7...SWD	PKE32-COM 168970	1 off		

DS7

Engineering

Generalized phase control of motor voltage

By means of generalized phase control, the soft starter adjusts the grid's voltage (U_{LN}) smoothly from an adjustable start value to 100 % of the rated value U_{LN} .



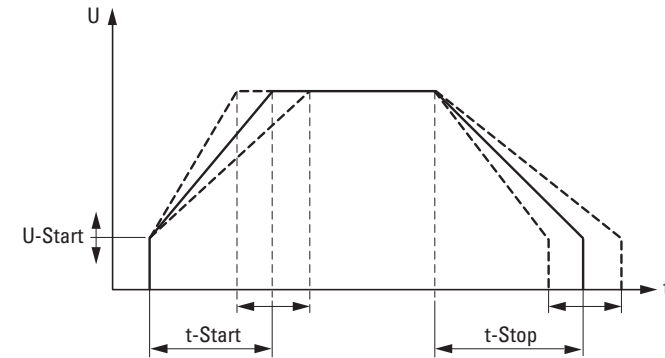
U_{LN} : Mains supply voltage
 U-Start: start voltage
 t-Start: Ramp time of the voltage change at start
 TOR (Top of Ramp): Signals the end of the set "t-Start" ramp time (output voltage $U_2 =$ Mains supply voltage U_{LN}). The internal bypass contacts are closed after this.

This voltage control enables the inrush current of a three-phase asynchronous motor to be limited and its starting torque to be reduced. This enables a smooth and jerk-free increase in torque, adjusted in line with the machine's load behavior. This has a positive effect on the lifespan, operating behavior, and operating processes of the mechanical equipment and prevents negative effects such as:

- Impacting of cog edges in the gearbox
- Pressure surge in pipe systems (water impact),
- Slipping of V belts or
- Jitter with conveyor systems.

In DS7 and S801+/S811+ series soft starters, generalized phase control is achieved with anti-parallel thyristors that are bypassed for continuous operation by using bypass contacts (TOR = Top Of Ramp) after the time for a time-triggered voltage change (t-Start) has elapsed. The transition resistance of these bypass contacts is considerably lower than the transition resistance of the power semiconductors. This reduces the heat dissipation in the soft starter and extends the lifespan of the power semiconductors.

As well as the time-controlled startup of a motor, the soft starter also enables a time-controlled reduction of the motor voltage and thus a controlled stopping of the motor.



The output voltage of a soft starter determines the torque of the motor ($M \sim U^2$). Because of this, it is necessary to make sure that, when a machine starts up, the selected U-Start start voltage is not too low and the t-Start ramp time for the linear voltage change is set to be as short as possible.

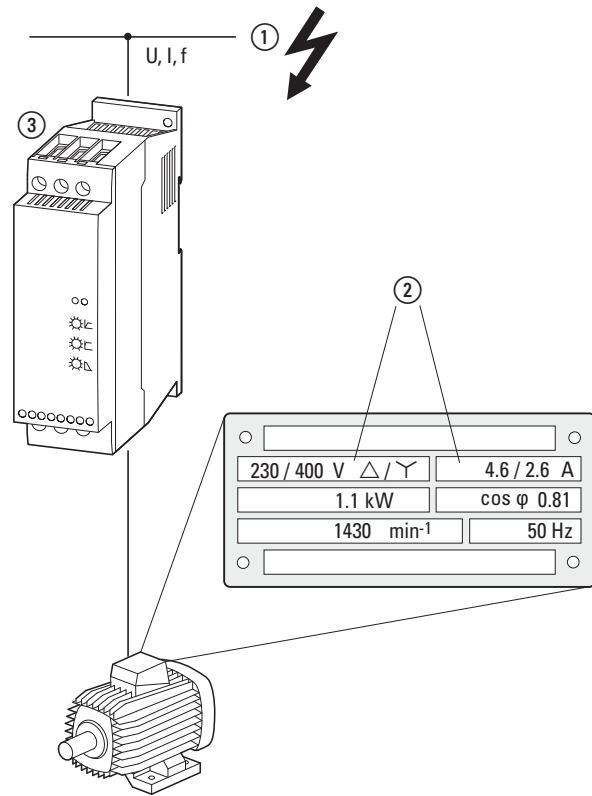
Please note:

- Long ramp times (t-Start) will produce a soft startup behavior, but will also result in a higher thermal load on the thyristors
- A high start voltage (U-Start) will produce a higher torque and a high starting current
- Set the lowest possible start voltage and the shortest possible start ramps.

The following pages include application and setting configuration examples for DS7 soft starters.

If controlled deceleration is required, t-Stop must be set to a longer time than would be necessary for the machine to coast freely based on the load. For the thyristors, the controlled deceleration constitutes a load comparable to that produced during startup. If, for example, the deceleration ramp is activated on a soft starter with a maximum of 10 permissible starts per hour, the number of permissible starts will be reduced to five per hour (plus five stops within that hour).

Selection criteria



Soft starters (3) are selected based on the supply voltage of the corresponding grid (1) (ULN) and the rated operational current of the assigned motor (2). The motor's circuit configuration (Δ/Y) must be selected in such a way that it matches the supply voltage. In addition, the soft starter's rated operational current (I_e) must be at least equal to that of the motor.

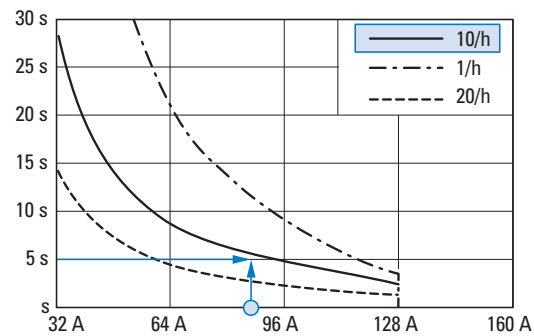
- Additional selection criteria include:
- Ambient air temperature (rated value +40 °C)
 - The number of starts per hour (< 10 starts, take stops into account)
 - Load torque (quadratic, linear)
 - Starting torque

Centrifugal pumps, centrifugal fans, simple and smooth-running conveyor belts and traction drives, and circular saws and ribbon saws are some of the typical applications for which soft starters are used. Reciprocating compressors, mixers, mills, crushers, and lifting gear are instead categorized as heavy starting duty machines. In this case, the soft starter must be oversized in terms of its overload capacity.

In the case of applications that are typical for a soft starter, such as water pumps (centrifugal pumps), and that feature comparable operational data (operating frequency, run-up time, and/or inrush currents) a soft starter can be assigned directly to the motor on the basis of the rated operational current.

- Example:
- 15 kW Pump motor
 - 400 V
 - Rated operational current 29 A
 - About three times the starting current (I_{LRP} = 87 A),
 - A maximum of 10 starts per hour
 - 5-second start-up time
 - ambient air temperature 40 °C.

=> DS7-34...032... (I_e = 32 A)



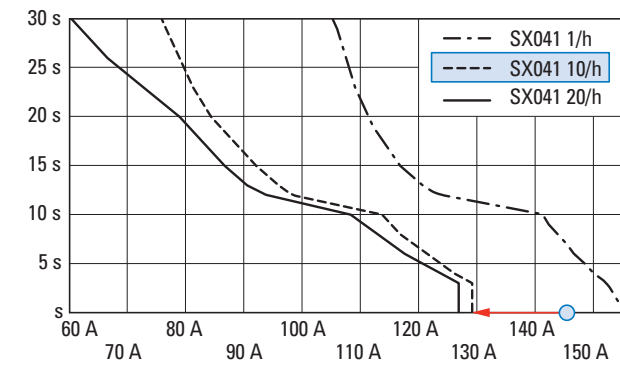
When different operating frequencies, run-up times and/or starting currents are involved, the thermal capacity of the DS7 soft starter must be taken into account in the design. This can be done by using the following diagrams or by calculating the I²t values. These I²t values define the corresponding load capacity and overload cycle and are defined in product standard IEC/EN 60947-4-2.

- DS7-34...SX032... soft starter:
- 32A: AC-53a: 3-5: 75-10
 - Rated operational current (I_e) 32 A
 - Load cycle AC-53a
 - 300% overcurrent for 5 seconds
 - 75% duty factor with 10 starts per hour

The resulting I²t value is: (3 x 32 A)² x 5 s = 46.080 A²s
The maximum I²t value of the connected motor load must be smaller:
(3 x 29 A)² x 5 s = 37.845 A²s
Soft starter DS7-34...SX032... is the right choice for this application.

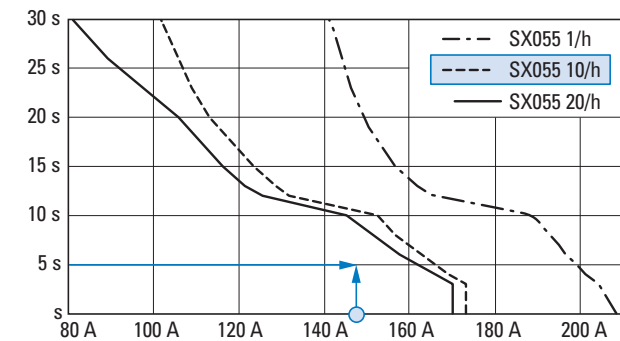
- If the motor had a higher inrush current, e.g., 5 times the starting current, a more powerful soft starter would have to be selected:
- Motor inrush current: I_{LRP} = 5 x 29 = 145 A, I²t value = (5 x 29 A)² x 5 s = 105.125 A²s
 - DS7-34...SX041...: 41A: AC-53a: 3-5: 75-10 => (3 x 41 A)² x 5 s = 75.645 A²s

Soft starter DS7-34...SX041... cannot meet the required startup and load conditions required in this case.



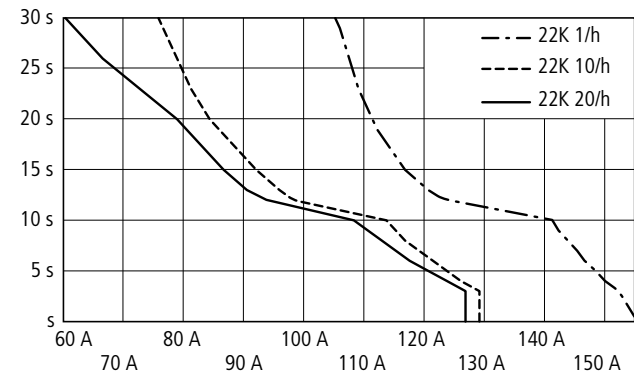
- DS7-34...SX055...:
55A: AC-53a: 3-5: 75-10
=> (3 x 55 A)² x 5 s = 136.125 A²s
Soft starter DS7-34...SX055... however, does meet the required startup and load conditions.

Note: As the following diagram shows, the DS7-34...SX055... unit can handle even more demanding startup and load requirements, e.g., up to 20 starts per hour and longer start-up times (up to 10 seconds).

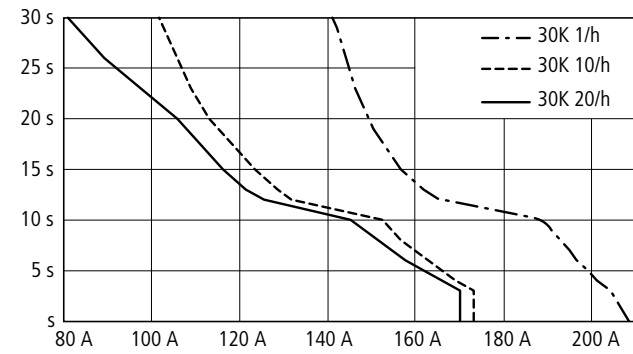


DS7

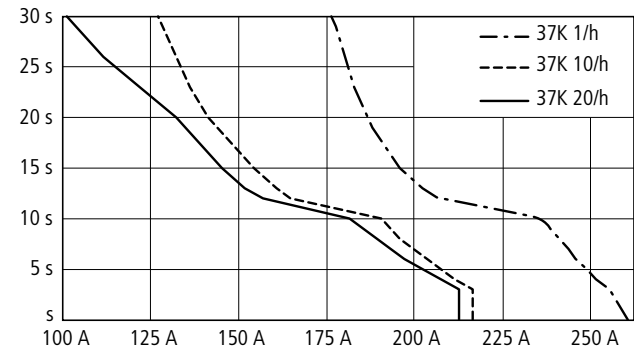
DS7-34...SX041N0-...



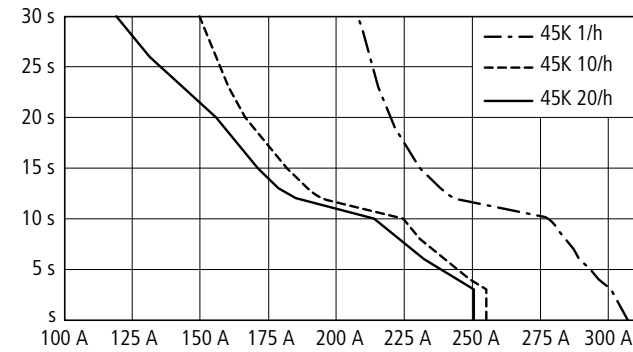
DS7-34...SX055N0-...



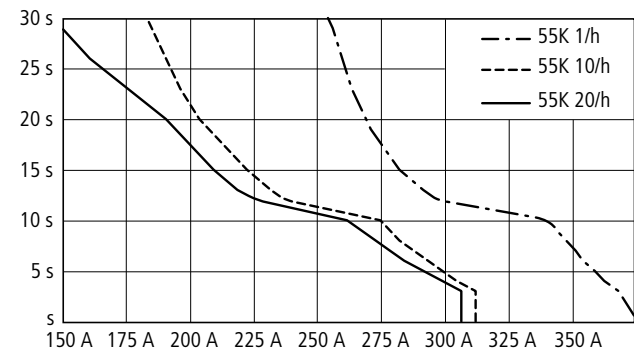
DS7-34...SX070N0-...



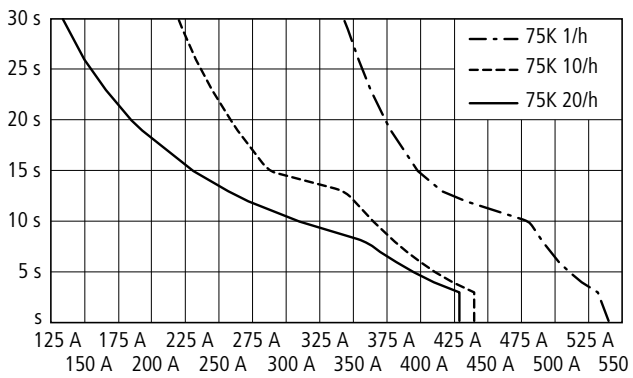
DS7-34...SX081N0-...



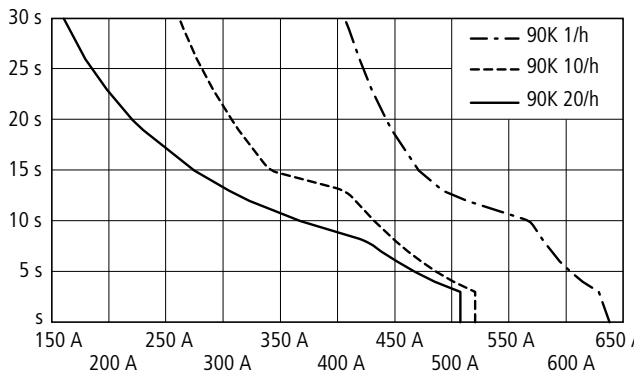
DS7-34...SX100N0-...



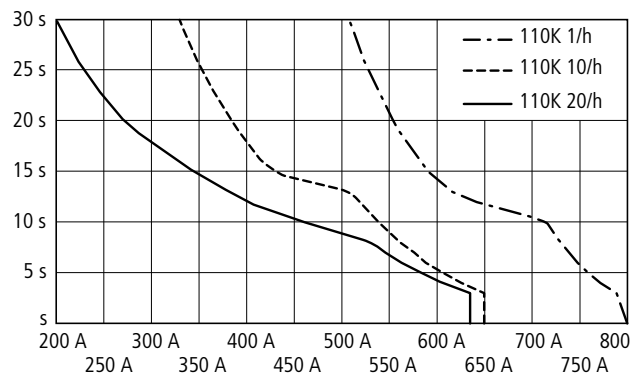
DS7-34...SX135N0-...



DS7-34...SX160N0-...



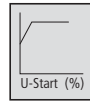
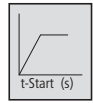
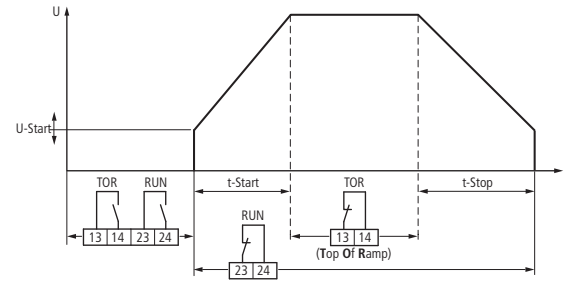
DS7-34...SX200N0-...



Note: Additional diagrams for 4-32 A soft starters can be found in the manual for DS7 soft starters (MN03901001Z).

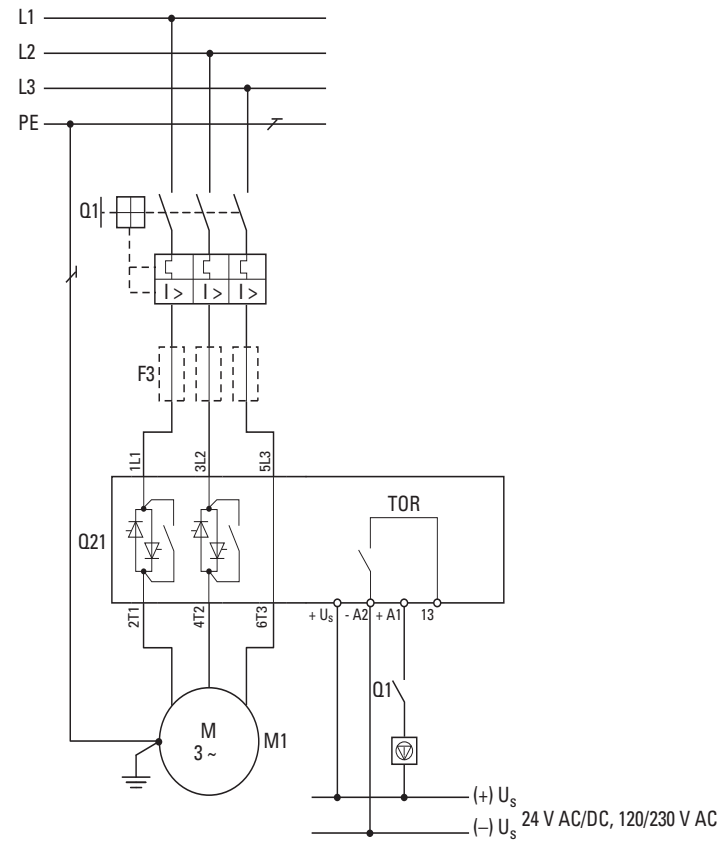
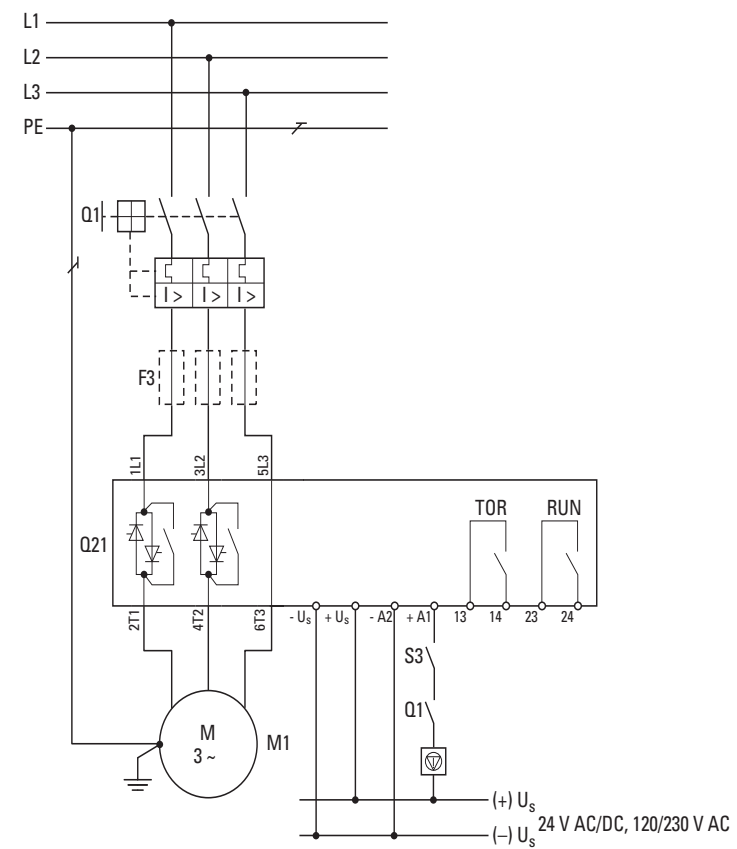
Setting of potentiometer

U	I	(R)	I_{min}	U_{min}
250 V ~	0.2 A	1 A	10 mA	250 V ~
30 V H	0.7 A	0.5 A	100 mA	5 V H



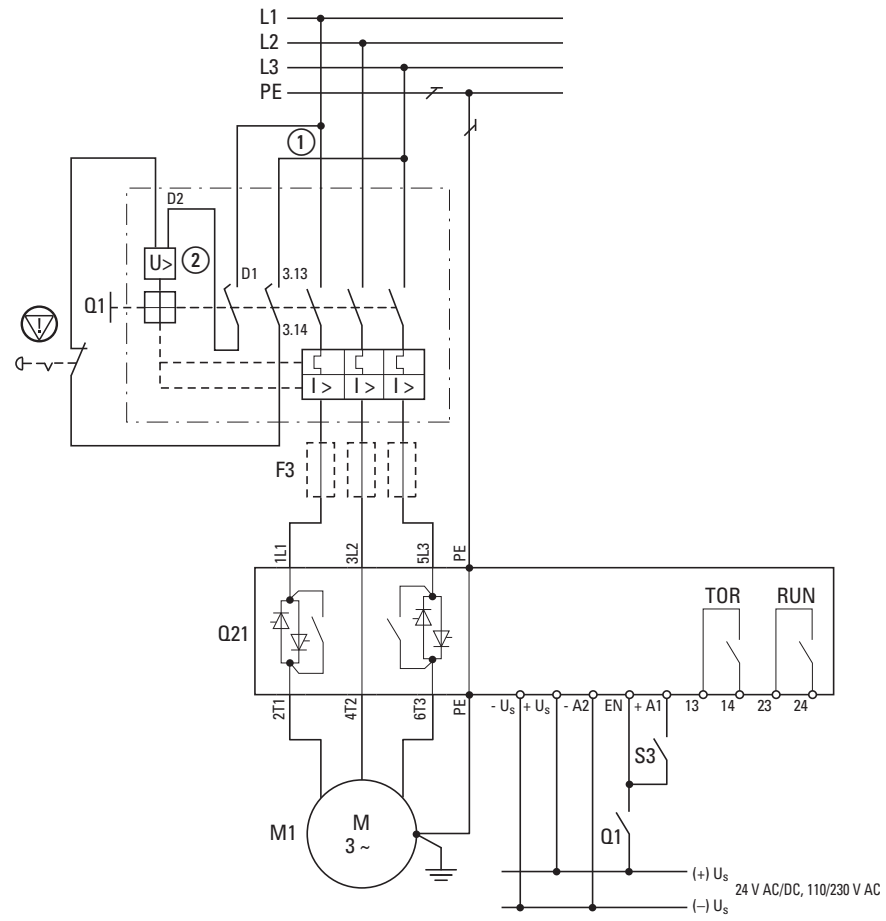
t-Start (s)	U-Start %	t-Stop (s)	Application
~10	~30	0	J → 0 Low flywheel mass
~25	~30	~30	Conveyor belt with loose belt
~20	~40	0	Roller conveyers
~10	~30	~20	Centrifugal pump
~15	~40	0	Fan general (building) with belt drive
~18	~40	0	J → ∞ Large gyrating mass → The DS7 soft starter's rating should be higher than the assigned motor output.
~15	~50	0	Tunnel fan Axial fan → a Soft starter DS7 should have a higher rating than the assigned motor.
~10	~60	0	Bulk conveyor Escalator
~10	~60	0	Mixers Agitators → a Soft starter DS7 should have a higher rating than the assigned motor.

DS7

Standard connection
up to 12 AStandard connection
up to 32 A

Standard connection
 41 - 200 A

With Emergency switching off function according to IEC/EN 60 204-1 and VDE 0113 Part 1



- Ⓜ = EMERGENCY SWITCHING OFF
- Q 1 = Cable and motor protection (NZM (NZM1, NZM2))
- Q21 = Soft starter DS7
- M1 = Motor
- F3 = superfast semiconductor fuse, optional for type 2 coordination (in addition to Q1)
- ① Control circuit terminal
- ② Undervoltage release with early-make auxiliary contact

DS7

assigned Motor output at		Rated operational current ¹⁾		Part no. Soft starters (device to be selected)	Soft starter function Cable protection ²⁾ Type "1" coordination
400 V P kW	480 V P HP	Motor I _e A _x	Soft starters I _e A _x		
Soft starters for three-phase mains connection, low operating frequency (5 s, 3 x I_e, 10 starts/h)					
1.5	2	3.6	4	DS7-34xSX004N0-x	PKZM0-4 (+ CL-PKZ0)
3	3	6.6	7	DS7-34xSX007N0-x	PKZM0-10 (+ CL-PKZ0)
4	5	8.5	9	DS7-34xSX009N0-x	PKZM0-10 (+ CL-PKZ0)
5.5	7.5	11.3	12	DS7-34xSX012N0-x	PKZM0-12 (+ CL-PKZ0)
7.5	10	15.2	16	DS7-34xSX016N0-x	PKZM0-16 (+ CL-PKZ0)
11	15	21.7	24	DS7-34xSX024N0-x	PKZM0-25 (+ CL-PKZ0)
15	20	29.3	32	DS7-34xSX032N0-x	PKZM0-32 (+ CL-PKZ0)
22	25	41	41	DS7-34xSX041N0-x	NZMN1-M50 / PKZM4-50
30	30	55	55	DS7-34xSX055N0-x	NZMN1-M63 / PKZM4-58
37	40	68	70	DS7-34xSX070N0-x	NZMN1-M80
45	50	81	81	DS7-34xSX081N0-x	NZMN1-M100
55	60	99	100	DS7-34xSX100N0-x	NZMN1-M100
75	75	134	135	DS7-34xSX135N0-x	NZMN2-M160
90	100	160	160	DS7-34xSX160N0-x	NZMN2-M200
110	125	196	200	DS7-34xSX200N0-x	NZMN2-M200

Notes

¹⁾ Rated operational current based on the load cycle specified here.

²⁾ Used to specify the circuit-breaker required for the specified load cycle. At different duty cycles (operating frequency, overcurrent, overcurrent time, duty factor), this value changes and must then be adapted accordingly.

³⁾ An external overload relay is required if the main contacts should not be disconnected in the event of an overload and a controlled soft stop is desired instead.

⁴⁾ A mains contactor is not required. Disconnection characteristics in accordance with VDE can only be ensured with the specified circuit-breaker.

⁵⁾ The superfast semiconductor fuses protect the soft starter from short circuits on the motor side. This can not, however, prevent damage caused by voltage peaks, for example through lightning strike.

Soft starter function with soft stop in case of overload		Mains contactor	Semiconductor contactor (optional, in addition to the protective devices for type 1 coordination, required for type 2 coordination) ⁵⁾	
Cable protection ²⁾ Type "1" coordination	overload relay ³⁾	optional ⁴⁾	Fuses Number x Part no.	Fuse holders Number x Part no.
PKM0-4 (+ CL-PKZ0)	ZB12-4	DILM7	3 x 170M1359	3 x 170H1007
PKM0-10 (+ CL-PKZ0)	ZB12-10	DILM9	3 x 170M1361	3 x 170H1007
PKM0-10 (+ CL-PKZ0)	ZB12-10	DILM9	3 x 170M1362	3 x 170H1007
PKM0-12 (+ CL-PKZ0)	ZB12-12	DILM12	3 x 170M1362	3 x 170H1007
PZM0-16 (+ CL-PKZ0)	ZB32-16	DILM17	3 x 170M1364	3 x 170H1007
PZM0-25 (+ CL-PKZ0)	ZB32-24	DILM25	3 x 170M1365	3 x 170H1007
PZM0-32 (+ CL-PKZ0)	ZB32-32	DILM32	3 x 170M1366	3 x 170H1007
NZMN1-M50 / PKZM4-50	ZB65-40+ZB65-XEZ	DILM50	3 x 170M1366	3 x 170H1007
NZMN1-M63 / PKZM4-58	ZB65-57+ZB65-XEZ	DILM65	3 x 170M2615	3 x 170H1007
NZMN1-M80	ZB150-70/KK	DILM80	3 x 170M4008	3 x 170H3004
NZMN1-M100	ZB150-100/KK	DILM95	3 x 170M4008	3 x 170H3004
NZMN1-M100	ZB150-100/KK	DILM115	3 x 170M4008	3 x 170H3004
NZMN2-M160	ZB150-150/KK	DILM150	3 x 170M4011	3 x 170H3004
NZMN2-M200	Z5-160/FF250	DILM185	3 x 170M5008	3 x 170H3004
NZMN2-M200	Z5-220/FF250	DILM225	3 x 170M6008	3 x 170H3004

Technical data

		DS7...004...	DS7...007...	DS7...009...	DS7...012...	DS7...016...	DS7...024...	DS7...032...
General								
Standards		IEC/EN 60947-4-2 UL 508 CSA22.2-14						
Approvals		CE						
Approvals		UL CSA C-Tick UkrSEPRO						
Climatic proofing		Damp heat, constant, to IEC 60068-2-3 Damp heat, cyclic, to IEC 60068-2-10						
DS7...-L		Damp heat, constant, to IEC 60068-2-3 Damp heat, cyclic, to IEC 60068-2-10 Cold test as per EN 60068-2-4						
Ambient temperature								
Operation	θ °C	-5 - +40 up to 60 at 2% derating per Kelvin temperature rise						
DS7...-L		-40 - +40 up to 60 at 2% derating per Kelvin temperature rise						
Storage	θ °C	-25 - +60						
DS7...-L		-40 - +40 up to 60 at 2% derating per Kelvin temperature rise						
Altitude	m	0 - 1000 m, above that 1 % derating per 100 m , up to 2000 m						
Mounting position		Vertical						
Degree of protection								
Protection type		IP20						
Integrated		-						
Protection against direct contact		Finger- and back-of-hand proof						
Rated insulation voltage	U _i V AC	500						
Overvoltage category/ pollution degree		II/2						
Shock resistance		8 g/11 ms						
Vibration resistance to EN 60721-3-2		2M2						
Radio interference level (IEC/EN 55011)		B						
...342SX...		A						
Heat dissipation	W	0.2	0.35	0.45	0.6	0.8	1.1	1.5
Weight	kg							
...340SX...-N		0.35		0.4		1.8		
...340SX...-L		0.44		0.49		0.44		
...342SX...		0.4		0.45		0.4		
...34DSX...		0.41		0.46		0.41		
Main conducting paths								
Rated operating voltage	U _e V AC	200 - 480						
Supply frequency	f _{LN} Hz	50/60						
Rated operational current								
Device (AC-53)	I _e A	4	7	9	12	16	24	24
Assigned motor rating (Standard connection, In-Line)								
at 230 V, 50 Hz	P kW	0.75	1.5	2.2	3	4	5.5	5.5
at 400 V, 50 Hz	P kW	1.5	3	4	5.5	7.5	11	11
at 200 V, 60 Hz	P HP	0.75	2	2	3	5	7.5	7.5
at 230 V, 60 Hz	P HP	1	2	3	3	5	7.5	7.5
at 480 V, 60 Hz	P HP	2	5	5	10	10	15	15
Overload cycle to IEC/EN 60947-4-2								
AC-53a (without bypass)		4 A: AC-53a: 3 - 5: 75 - 10	7 A: AC-53a: 3 - 5: 75 - 10	9 A: AC-53a: 3 - 5: 75 - 10	12 A: AC-53a: 3 - 5: 75 - 10	16 A: AC-53a: 3 - 5: 75 - 10	24 A: AC-53a: 3 - 5: 75 - 10	32 A: AC-53a: 3 - 5: 75 - 10
Internal bypass contacts		✓	✓	✓	✓	✓	✓	✓

DS7...041...	DS7...055...	DS7...070...	DS7...081...	DS7...100...	DS7...135...	DS7...160...	DS7...200...
IEC/EN 60947-4-2 UL 508 CSA22.2-14							
CE							
UL CSA C-Tick UkrSEPRO							
Damp heat, constant, to IEC 60068-2-3 Damp heat, cyclic, to IEC 60068-2-10							
Damp heat, constant, to IEC 60068-2-3 Damp heat, cyclic, to IEC 60068-2-10 Cold test as per EN 60068-2-4							
-5 - +40 up to 60 at 2% derating per Kelvin temperature rise							
-40 - +40 up to 60 at 2% derating per Kelvin temperature rise							
-25 - +60							
-40 - +60							
0 - 1000 m, above that 1 % derating per 100 m , up to 2000 m							
Vertical							
IP20 (terminals IP00)							
Protection type IP40 can be achieved on all sides with covers from the NZM range. Finger- and back-of-hand proof							
500							
II/2							
8 g/11 ms							
2M2							
B							
A							
7	10	13	18	25	24	30	42
1.8				3.7			
1.8				3.7			
1.8				3.7			
1.8				3.7			
200 - 480							
50/60							
41	55	70	81	100	135	160	200
11	15	15	22	30	30	45	55
22	30	37	45	55	75	90	110
10	15	20	25	30	40	50	60
15	20	25	30	30	50	60	75
30	40	50	60	75	100	125	150
41 A: AC-53a: 3 - 5: 75 - 10	55 A: AC-53a: 3 - 5: 75 - 10	70 A: AC-53a: 3 - 5: 75 - 10	81 A: AC-53a: 3 - 5: 75 - 10	100 A: AC-53a: 3 - 5: 75 - 10	135 A: AC-53a: 3 - 5: 75 - 10	160 A: AC-53a: 3 - 5: 75 - 10	200 A: AC-53a: 3 - 5: 75 - 10
✓	✓	✓	✓	✓	✓	✓	✓



	DS7...004...	DS7...007...	DS7...009...	DS7...012...	DS7...016...	DS7...024...	DS7...032...
Short-circuit rating							
Type "1" coordination							
Type "1" coordination	PKM0-4 (+ CL-PKZ0)	PKM0-10 (+ CL-PKZ0)	PKM0-10 (+ CL-PKZ0)	PKM0-12 (+ CL-PKZ0)	PKM0-16 (+ CL-PKZ0)	PKM0-25 (+ CL-PKZ0)	PKM0-32 (+ CL-PKZ0)
Type „2“ coordination short-circuit rating (additional with the fuses for coordination type „1“)	3 x 170M1359	3 x 170M1361	3 x 170M1362	3 x 170M1362	3 x 170M1364	3 x 170M1365	3 x 170M1366
Fuse base (number x part no.)	3 x 170H1007	3 x 170H1007	3 x 170H1007	3 x 170H1007	3 x 170H1007	3 x 170H1007	3 x 170H1007
Terminal capacities							
Cable lengths							
Solid	mm ²	1 x (0.75 - 4) 2 x (0.75 - 2.5)			1 x (0.75 - 16) 2 x (0.75 - 10)		
Flexible with ferrule	mm ²	1 x (0.75 - 2.5) 2 x (0.75 - 2.5)			1 x (0.75 - 16) 2 x (0.75 - 10)		
Stranded	mm ²	-			1 x 16		
Solid or stranded	AWG	18 - 10			18 - 6		
Copper band	MM	-			-		
Tightening torque	Nm	1.2			3.2		
Screwdriver (PZ: Pozidriv)	mm	PZ2; 1 x 6 mm			PZ2; 1 x 6 mm		
Control cables							
Solid	mm ²	1 x (0.75 - 4) 2 x (0.75 - 2.5)			1 x (0.5 - 2.5) 2 x (0.5 - 1.0)		
Flexible with ferrule	mm ²	1 x (0.75 - 2.5) 2 x (0.75 - 2.5)			1 x (0.5 - 1.5) 2 x (0.5 - 0.75)		
Stranded	mm ²	-			1 x (0.5 - 1.5) 2 x (0.5 - 1.0)		
Solid or stranded	AWG	18 - 10			1 x (21 - 14) 2 x (21 - 18)		
Tightening torque	Nm	1.2			1.2		
Screwdriver	mm	0,8 x 5,5 1 x 6			0,6 x 3,5		
Control circuit							
Regulator supply							
Notes							
External supply voltage							
Voltage	U _s	V					
...340SX...			24 V AC/DC +10 %/- 15 %				
...342SX...			110 V AC -15 % - 230 V AC +10 %				
...34DSX...			24 V DC +10 %/- 15 %				
Current consumption	I _e	mA	50				
Current consumption at peak performance (close bypass) at 24 V DC	I _{Peak}	mA/ms	-				
Digital inputs							
Control voltage							
DC-operated							
DC-operated		V DC					
...340SX...-N			24 V DC +10 %/- 15 %				
...340SX...-L			24 V DC +10 %/- 15 %				
...34DSX...			24 V DC +10 %/- 15 % oder über SWD				
AC operated							
AC operated		V AC					
...340SX...-N			24 V AC +10 %/- 15 %				
...342SX...-N			110 V AC - 15 % - 230 V AC +10 %				
Current consumption 24 V							
External 24 V		mA	1.6				
Current consumption 230 V							
230 V AC		mA					
...342SX...			4				
Pick-up voltage							
DC-operated							
DC-operated		V DC	17.3 - 27				
AC operated							
AC operated		V AC	17.3 - 27				
...340SX...			17.3 - 27				
...342SX...			108 - 253				

DS7...041...	DS7...055...	DS7...070...	DS7...081...	DS7...100...	DS7...135...	DS7...160...	DS7...200...
NZMN1-M50/PKZM4-49	NZMN1-M63/PKZM4-57	NZMN1-M80	NZMN1-M100	NZMN1-M100	NZMN2-M160	NZMN2-M200	NZMN2-M200
3 x 170M3012	3 x 170M2615	3 x 170M4008	3 x 170M4008	3 x 170M4008	3 x 170M4010	3 x 170M5008	3 x 170M6008
3 x 170H3004	3 x 170H1007	3 x 170H3004	3 x 170H3004	3 x 170H3004	3 x 170H3004	3 x 170H3004	3 x 170H3004
Cable lengths							
1 x (25 - 70) 2 x (6 - 25)						1 x (4 - 185) 2 x (4 - 70)	
-						-	
1 x (25 - 70) 2 x (6 - 25)						1 x (4 - 185) 2 x (4 - 70)	
1 x (12 - 2/0)						1 x (12 - 350 kcmil) 2 x (12 - 00)	
2 x 9 x 0.89 x 9 x 0.8						5 (≤ 10 mm ²); 14 (> 10 mm ²)	
6 (≤ 10 mm ²); 9 (> 10 mm ²)						PZ2; 1 x 6 mm	
PZ2; 1 x 6 mm						PZ2; 1 x 6 mm	
1 x (0.5 - 2.5) 2 x (0.5 - 1.0)						1 x (0.5 - 2.5) 2 x (0.5 - 1.0)	
1 x (0.5 - 1.5) 2 x (0.5 - 0.75)						1 x (0.5 - 1.5) 2 x (0.5 - 0.75)	
1 x (0.5 - 1.5) 2 x (0.5 - 1.0)						1 x (0.5 - 1.5) 2 x (0.5 - 1.0)	
1 x (21 - 14) 2 x (21 - 18)						1 x (21 - 14) 2 x (21 - 18)	
0.4						0.4	
0,6 x 3,5						0,6 x 3,5	
External supply voltage							
24 V AC/DC +10 %/- 15 %							
110 V AC -15 % - 230 V AC +10 %							
24 V DC +10 %/- 15 %							
50							
600/50							
Digital inputs							
Control voltage							
DC-operated							
24 V DC +10 %/- 15 %							
24 V DC +10 %/- 15 %							
24 V DC +10 %/- 15 % oder über SWD							
AC operated							
24 V AC +10 %/- 15 %							
110 V AC - 15 % - 230 V AC +10 %							
Current consumption 24 V							
1.6							
Current consumption 230 V							
4							
Pick-up voltage							
DC-operated							
17.3 - 27							
AC operated							
17.3 - 27							
108 - 253							

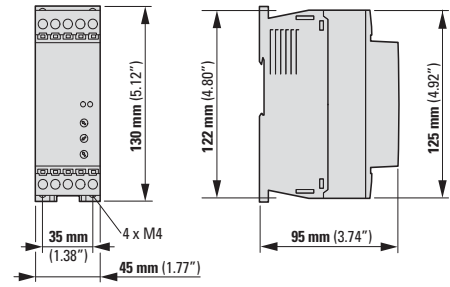
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Drop-out voltage							
DC operated	V DC	0 - 3					
AC operated	V AC						
...340SX...		0 - 3					
...342SX...		0 - 15					
Pick-up time							
DC operated	ms	250					
AC operated	ms	250					
Drop-out time							
DC operated	ms	350					
AC operated	ms	350					
Relay outputs							
Number		1 (TOR)			2 (TOR, Ready)		
Voltage range	V AC	= U_n			250		
AC-11 current range	A	1 A, AC-11			1 A, AC-11		
Soft start function							
Ramp times							
Acceleration	s	1 - 30					
Deceleration	s	0 - 30					
Start pedestal	%	30 - 100					
Current limitation							
...34DSX...(PKE)		(0 - 8) x I_n					
Fields of application							
Fields of application		Soft starting of three-phase asynchronous motors					
3-phase motors		✓					
Functions							
Fast switching (semiconductor contactor)		- (minimum ramp time 1s)					
Soft start function		✓					
Reversing starter		External solution required					
Suppression of closing transients		✓					
Current limitation							
...34DSX...		✓, with PKE					
Overload monitoring		-	-	-	-	-	-
Underload monitoring		-	-	-	-	-	-
Thermistor input		-	-	-	-	-	-
Fault memory	Faults						
...34DSX...		8					
Pre-programmed parameter sets		-	-	-	-	-	-
Suppression of DC components for motors		✓					
Potential isolation between power and control sections		✓					
Built-in interfaces							
...34DSX...		SmartWire-DT					

	DS7...041...	DS7...055...	DS7...070...	DS7...081...	DS7...100...	DS7...135...	DS7...160...	DS7...200...
Drop-out voltage								
DC operated	V DC	0 - 3						
AC operated	V AC							
...340SX...		0 - 3						
...342SX...		0 - 15						
Pick-up time								
DC operated	ms	250						
AC operated	ms	250						
Drop-out time								
DC operated	ms	350						
AC operated	ms	350						
Relay outputs								
Number		1 (TOR)		2 (TOR, Ready)				
Voltage range	V AC	= U_n		250				
AC-11 current range	A	1 A, AC-11		1 A, AC-11				
Soft start function								
Ramp times								
Acceleration	s	1 - 30						
Deceleration	s	0 - 30						
Start pedestal	%	30 - 100						
Current limitation								
...34DSX...(PKE)		(0 - 8) x I_n						
Fields of application								
Fields of application		Soft starting of three-phase asynchronous motors						
3-phase motors		✓						
Functions								
Fast switching (semiconductor contactor)		- (minimum ramp time 1s)						
Soft start function		✓						
Reversing starter		External solution required						
Suppression of closing transients		✓						
Current limitation								
...34DSX...		✓, with PKE						
Overload monitoring		-	-	-	-	-	-	-
Underload monitoring		-	-	-	-	-	-	-
Thermistor input		-	-	-	-	-	-	-
Fault memory	Faults							
...34DSX...		8						
Pre-programmed parameter sets		-	-	-	-	-	-	-
Suppression of DC components for motors		✓						
Potential isolation between power and control sections		✓						
Built-in interfaces								
...34DSX...		SmartWire-DT						

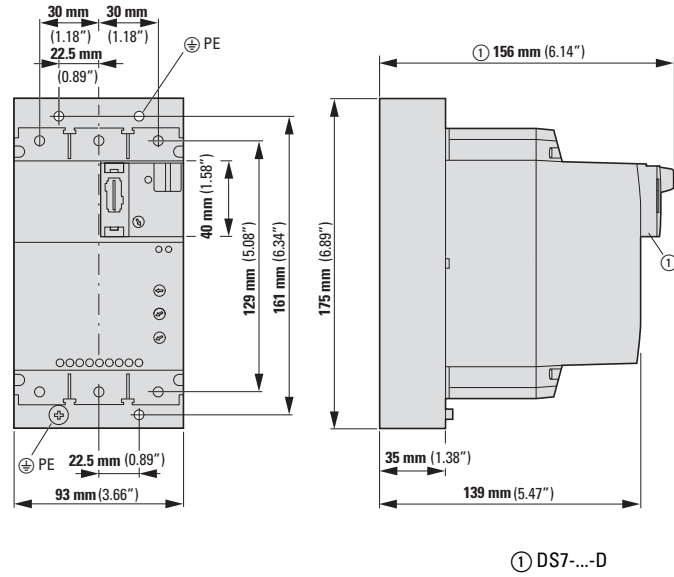
DS7

Dimensions

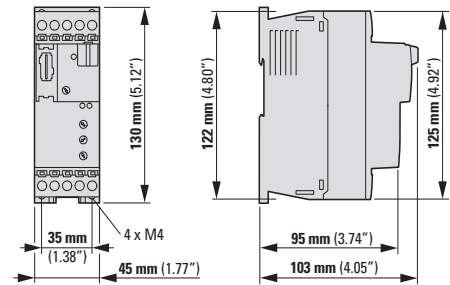
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DS7-340SX007N0-N DS7-342SX007N0-N
DS7-340SX009N0-N DS7-342SX009N0-N
DS7-340SX012N0-N DS7-342SX012N0-N



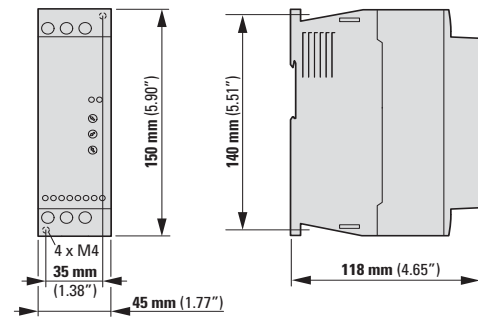
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DS7-340SX055N0-N DS7-342SX055N0-N DS7-34DSX055N0-D
DS7-340SX070N0-N DS7-342SX070N0-N DS7-34DSX070N0-D
DS7-340SX081N0-N DS7-342SX081N0-N DS7-34DSX081N0-D
DS7-340SX100N0-N DS7-342SX100N0-N DS7-34DSX100N0-D



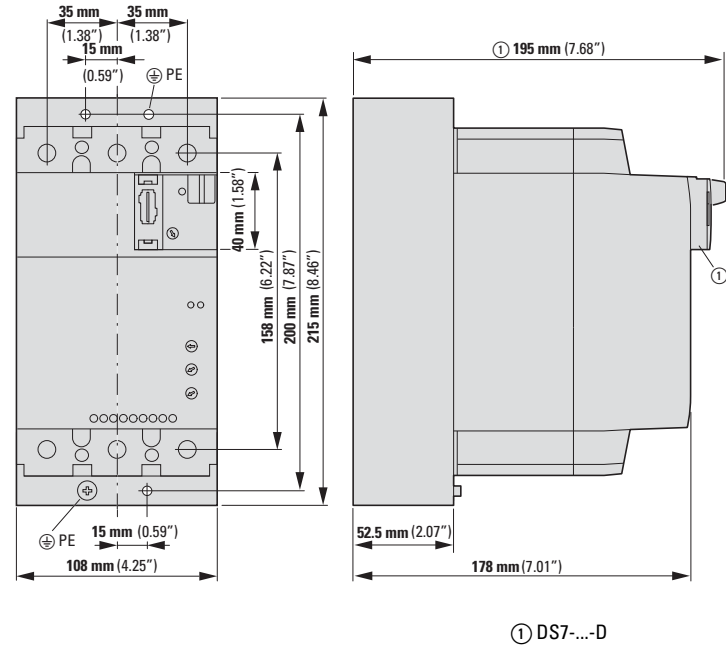
DS7-34DSX004N0-D DS7-34DSX009N0-D
DS7-34DSX007N0-D DS7-34DSX012N0-D



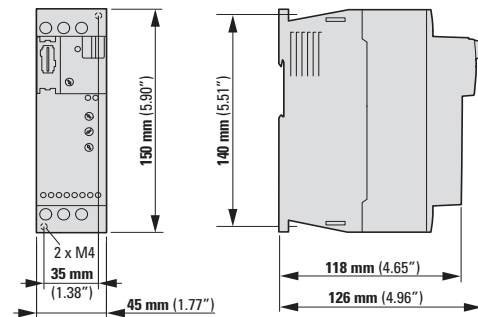
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DS7-340SX024N0-N DS7-342SX024N0-N
DS7-340SX032N0-N DS7-342SX032N0-N



DS7-340SX135N0-N DS7-342SX135N0-N DS7-34DSX135N0-D
DS7-340SX160N0-N DS7-342SX160N0-N DS7-34DSX160N0-D
DS7-340SX200N0-N DS7-342SX200N0-N DS7-34DSX200N0-D

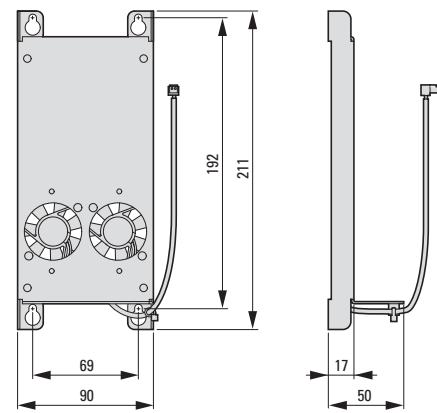


DS7-34DSX016N0-D
DS7-34DSX024N0-D
DS7-34DSX032N0-D

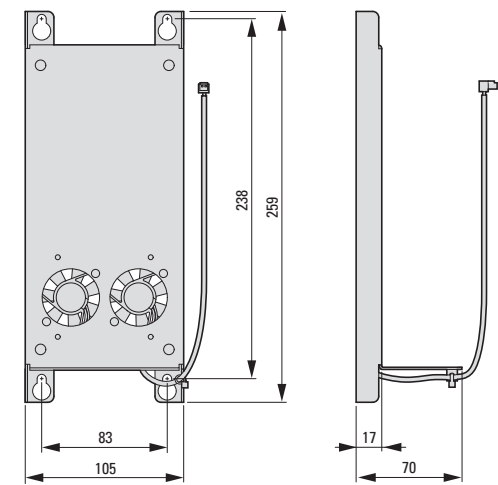


Device fans

DS7-FAN-100

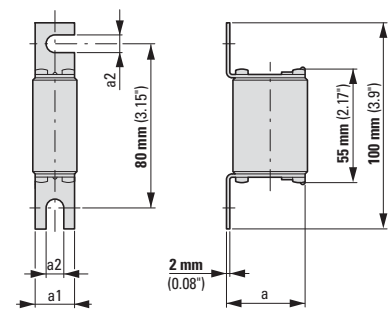


DS7-FAN-200



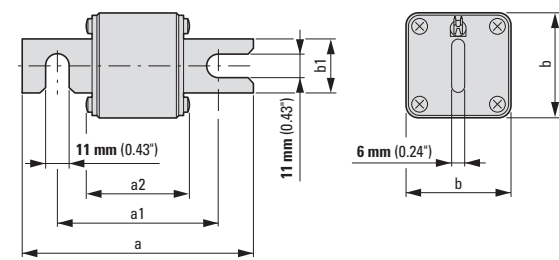
Superfast semiconductor fuses

Sizes 000, 00



a	a1	a2	Size
mm (inch)	mm (inch)	mm (inch)	(size)
40 (1.57)	20 (0.79)	8 (0.31)	000
51 (2.01)	28 (1.1)	10 (0.39)	00

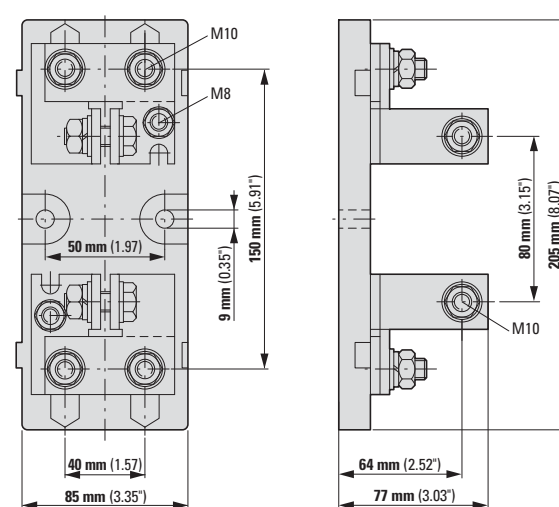
Sizes S1*, S1, S2, S3



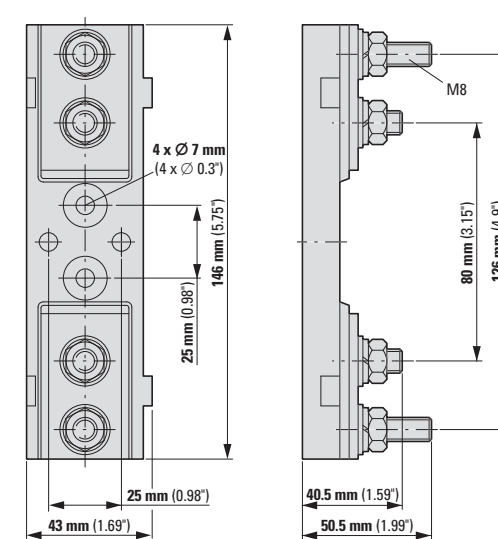
a	a1	a2	b	b1	Size
mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	(size)
104 (4.09)	78 (3.07)	50 (1.97)	45 (1.77)	22 (0.87)	S1*
108 (4.25)	78 (3.07)	50 (1.97)	53 (2.09)	25 (0.98)	S1
108 (4.25)	78 (3.07)	50 (1.97)	61 (2.40)	25 (0.98)	S2
109 (4.29)	78 (3.07)	51 (2.01)	76 (2.99)	30 (1.18)	S3

Fuse Bases

170H3004



170H1007



DS7



S801+/S811+ Soft Starters – Powerful Performance in a Small Package

The incredible performance of our two new S801+ and S811+ soft starter series is shaped by the expanded functionality that we have integrated into our tried-and-true series of soft starters. With only five sizes and rated operational currents of 37 A to 1,000 A for line voltages of 200 V to 690 V, the S801+ and S811+ are two of the smallest, most compact soft starters in the world.

These three-phase controlled soft starters, which feature an internal bypass and extensive monitoring and protection mechanisms, guarantee not only soft motor start-ups, but also the safe and reliable continuous operation of three-phase motors even in applications involving high load torques. In addition, these soft starters can be connected with a standard in-line configuration or with an inside-the-delta (also called "six wire connection") configuration as needed.

S801+ soft starters were designed with standard applications in mind and owe an important part of their appeal to their ease of use, while the devices in the S811+ series are characterized by a digital control and display unit that provides access to extended functions for sophisticated applications.



System overview

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Description

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Key to type references, UL/CSA

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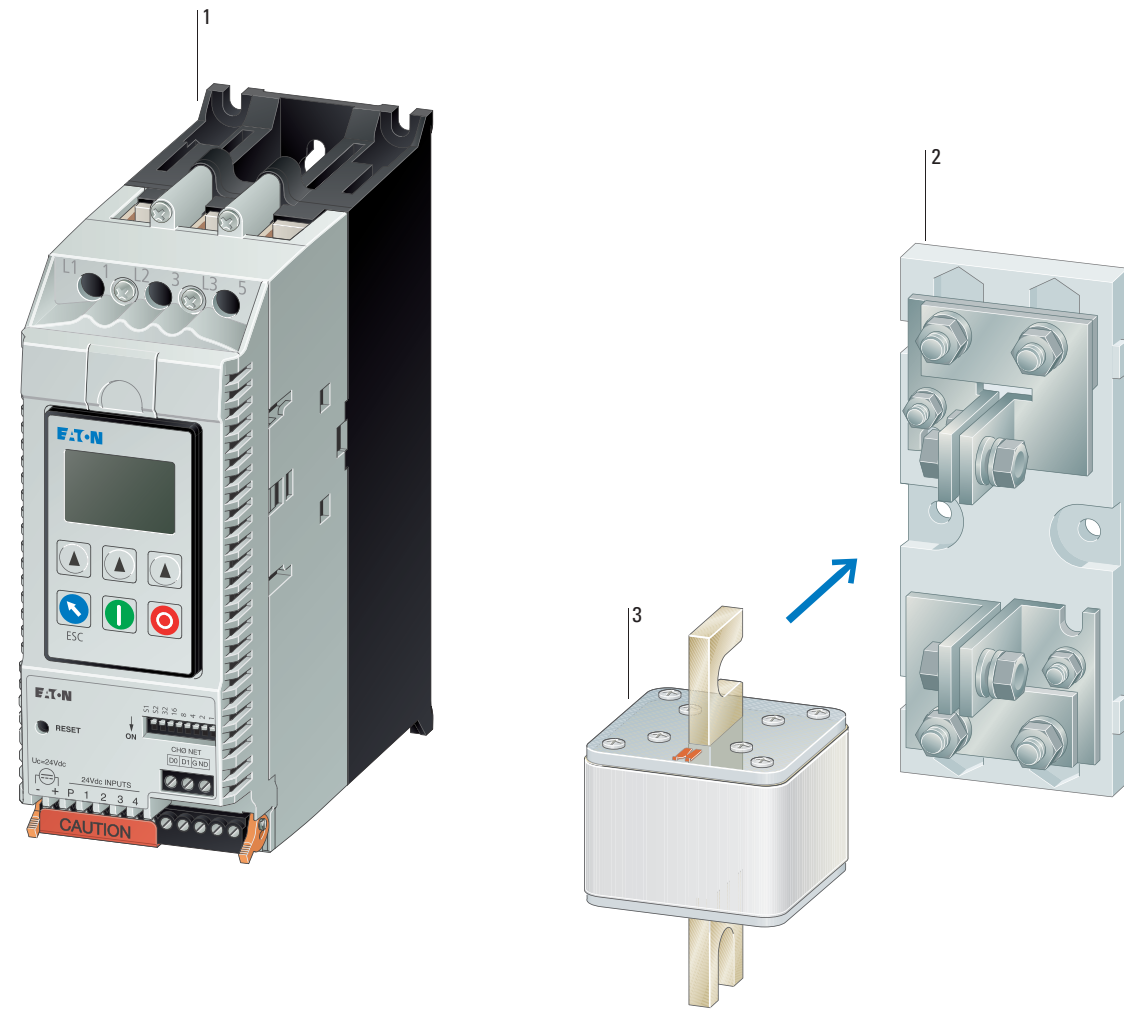
Dimensions

Soft starter S801+, S811+	150
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S801+, S811+

System overview



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Description



S801+ series soft starters are an innovative addition that further enhances their tried-and-true predecessors. They are designed to guarantee reliable operation even under harsh and challenging ambient conditions. In addition, the series makes a compelling case as a result of its ease of use and is the perfect choice for standard applications such as pumps, fans, compressors, and conveyor belts.

S801+ soft starters are three-phase controlled and come with internal bypass contacts for continuous operation. With them, motors can be connected with a standard in-line circuit or inside the delta circuit (inside-the-delta circuit, $\sqrt{3}$ circuit). Using an inside-the-delta circuit will reduce the current flowing through the soft starter by approximately 42%. This makes it possible, for example, to start and run a motor with a rated operational current of 100 A using a 58-A soft starter. In addition, their comprehensive protection and monitoring features enable S801+ soft starters to ensure that three-phase motors with rated operational currents of 11 A to 1000 A will have soft startups and safe and reliable continuous operation at mains voltages of 200 V to 600 V – up to 690 V in the case of S811+ soft starters. Accordingly, for instance, their controlled coasting (soft stop control) and torque monitoring features can be used to prevent water impact in pumps and to reduce the mechanical loads on pump systems significantly.

Essential features S801+ / S811+

- Rated operational current: 37 - 1000 A
- Parameterizable overload settings: 31–100%
- Adjustable overload classes: class 5, 10, 20, 30
- Base setting: 15 s start ramp, 4 starts per hour, 300% starting current at 40 °C ambient temperature
- Allocated motor outputs for in-line connection:
 - 7.5 - 277 kW (3~ 230 V)
 - 18.5 - 525 kW (3~ 400 V)
 - 30 - 900 kW (3~ 690 V)
- Ambient air temperature: -30 °C to +50 °C
- any required mounting position
- Degree of protection with compact design (IP20 optional)
- 5 compact designs
- Adjustable torque control
- Adjustable kick start
- Efficient use of power achieved with internal bypass contacts during continuous operation
- 24-V control voltage:
 - External supply required
 - 1 A continuous current
 - 10 A starting current (peak value for 15 ms)

S801+ specific characteristics

- Microswitches and potentiometers make it easy to configure these soft starters

S811+ series soft starters provide all the features and characteristics of S801+ soft starters, plus expanded functionality and an operating unit (DIM = digital interface module).



Important operating unit characteristics (S811+)

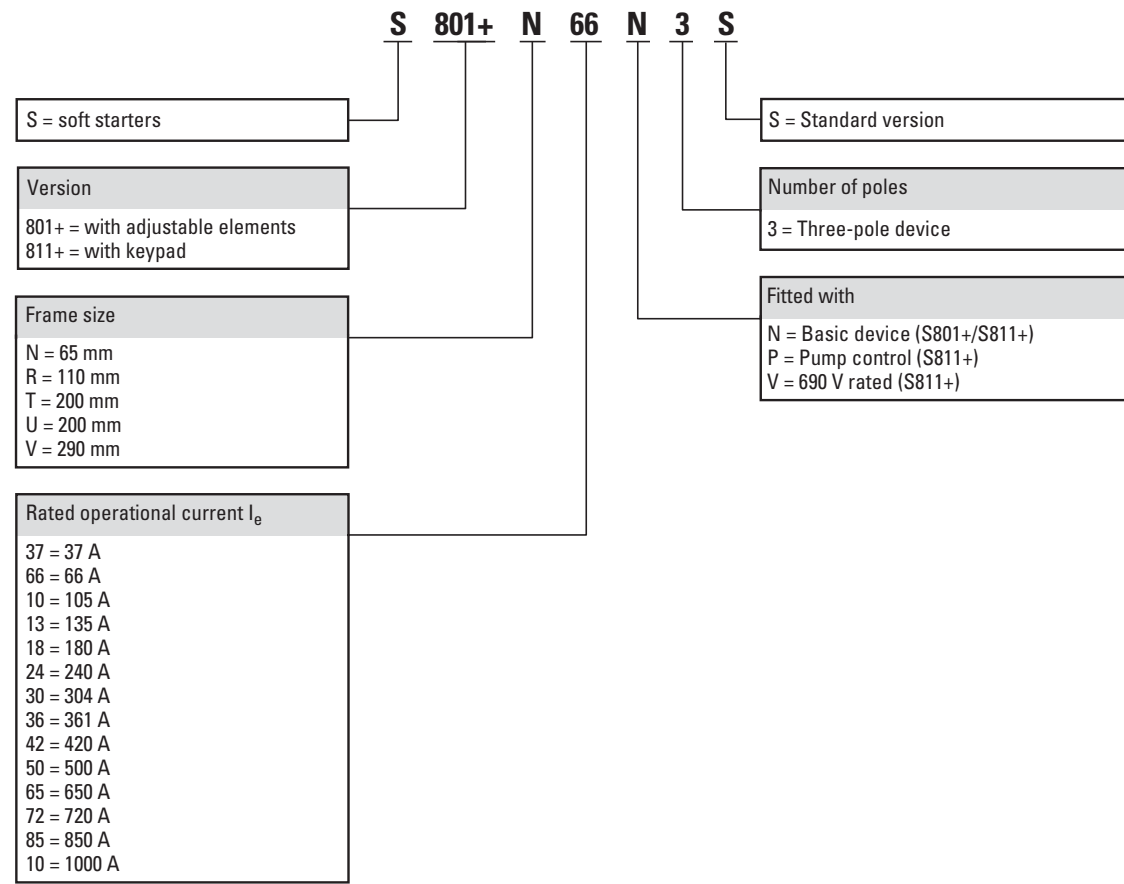
- Language-neutral LCD display with backlight
- Easy to use and configure with function keys
- System parameter configuration
- Diagnostic and monitoring options
- Reading display (e.g., L1, L2, L3 phase currents)
- Error display
- Offset placement (mounted on door), connection via plug-in patch cord with RJ45 plug
- Front IP54

S811+ specific characteristics

- Mains voltage up to 690 V?
- Special pump control algorithm with prolonged soft stop ramp

S801+, S811+

Key to type references



UL/CSA

Information relevant for export to North America

	S801+N..., S801+R..., S801+T... (600 V) S811+N..., S811+R..., S811+T... (600 V)
Product Standards	IEC/EN 60947-4-2; UL 508; CSA C22.2 No. 14; CE marking
UL File No.	E202571
UL CCN	NMFT
CSA File No.	LR 353
CSA Class No.	3211-06, 2411-01
NA Certification	UL Listed, CSA Certified
Conditions of Acceptability	None
Suitable for	Branch Circuits, not as BCPD
Max. Voltage Rating	600 Vac
Degree of Protection	IP20 with kit

	S801+U..., S801+V... bis 850 A (600 V) S811+U..., S811+V... bis 850 A (600 V)
Product Standards	IEC/EN 60947-4-2; UL 508; CSA C22.2 No. 14; CE marking
UL File No.	E202571
UL CCN	NMFT
CSA File No.	LR 353
CSA Class No.	3211-06
NA Certification	UL Listed, CSA Certified
Conditions of Acceptability	None
Suitable for	Branch Circuits, not as BCPD
Max. Voltage Rating	600 Vac
Degree of Protection	IP20 with kit


	S801+V..., 1000 A (600 V) S811+V..., 1000 A (600 V)
Product Standards	IEC/EN 60947-4-2; UL 508; CSA C22.2 No. 14; CE marking
UL File No.	E202571
UL CCN	NMFT2
CSA File No.	LR 353
CSA Class No.	3211-06
NA Certification	UL Recognized, CSA Certified
Conditions of Acceptability	98-115 CFM fan and 4" x 4" vent req'd
Suitable for	Branch Circuits, not as BCPD
Max. Voltage Rating	600 Vac
Degree of Protection	IP20 with kit

	S811+...V3S (690 V)
Product Standards	IEC/EN 60947-4-2; UL 508; CE marking
UL File No.	E202571
UL CCN	NMFT
CSA File No.	
CSA Class No.	
NA Certification	UL Listed
Conditions of Acceptability	None
Suitable for	Branch Circuits, not as BCPD
Max. Voltage Rating	690 Vac
Degree of Protection	IP20 with kit

Ordering

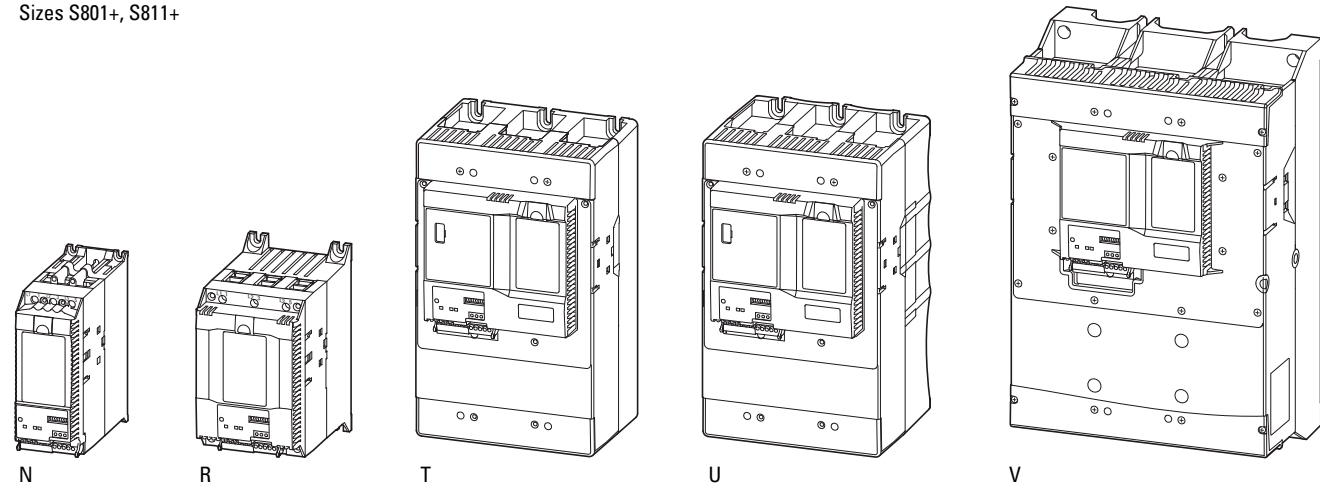
Frame size	Rated operational current Device (AC-53)		Assigned motor rating		Part no.	Article no.	Price see price list	Std. pack
	I _e A	P kW	at 400 V, 50 Hz P kW	at 480 V, 60 Hz P HP				
Soft starters								
Mains supply voltage (50/60 Hz) U _{LN} : 200 - 600 V AC								
Supply voltage U _s : 24 V DC								
Control voltage U _c : 24 V DC, With internal bypass contacts								
Soft starters for three-phase loads								
N	37	18.5	25	S801+N37N3S	169852		1 off 	
	66	30	50	S801+N66N3S	169853			
R	105	55	75	S801+R10N3S	169854			
	135	75	100	S801+R13N3S	169855			
T	180	90	150	S801+T18N3S	169856			
	240	132	200	S801+T24N3S	169857			
	304	160	250	S801+T30N3S	169858			
U	361	200	300	S801+U36N3S	169859			
	420	200	350	S801+U42N3S	169860			
V	361	200	300	S801+V36N3S	169863			
	420	200	350	S801+V42N3S	169864			
	500	250	400	S801+V50N3S	169865			
	650	315	500	S801+V65N3S	169866			
	720	400	600	S801+V72N3S	169867			
	850	450	600	S801+V85N3S	169868			
	1000	560	750	S801+V10N3S	169862			
Soft starter for three-phase loads, with control unit								
N	37	18.5	25	S811+N37N3S	168976		1 off 	
	66	30	50	S811+N66N3S	168978			
R	105	55	75	S811+R10N3S	168980			
	135	75	100	S811+R13N3S	168982			
T	180	90	150	S811+T18N3S	168984			
	240	132	200	S811+T24N3S	168987			
	304	160	250	S811+T30N3S	168990			
U	361	200	300	S811+U36N3S	169869			
	420	200	350	S811+U42N3S	169870			
V	361	200	300	S811+V36N3S	168993			
	420	200	350	S811+V42N3S	168996			
	500	250	400	S811+V50N3S	168999			
	650	315	500	S811+V65N3S	169002			
	720	400	600	S811+V72N3S	169005			
	850	450	600	S811+V85N3S	169008			
	1000	560	750	S811+V10N3S	169011			
Soft starter for three-phase loads, with control unit and pump algorithm								
N	37	18.5	25	S811+N37P3S	168977		1 off 	
	66	30	50	S811+N66P3S	168979			
R	105	55	75	S811+R10P3S	168981			
	135	75	100	S811+R13P3S	168983			
T	180	90	150	S811+T18P3S	168985			
	240	132	200	S811+T24P3S	168988			
	304	160	250	S811+T30P3S	168991			
U	361	200	300	S811+U36P3S	169872			
	420	200	350	S811+U42P3S	169873			
V	361	200	300	S811+V36P3S	168994			
	420	200	350	S811+V42P3S	168997			
	500	250	400	S811+V50P3S	169000			
	650	315	500	S811+V65P3S	169003			
	720	400	600	S811+V72P3S	169006			
	850	450	600	S811+V85P3S	169009			
	1000	560	750	S811+V10P3S	169012			

S801+, S811+

Frame size	Rated operational current Device (AC-53) I_e A	Assigned motor rating			Part no.	Article no.	Price see price list	Std. pack
		at 400 V, 50 Hz P kW	at 690 V, 50 Hz P kW	at 480 V, 60 Hz P HP				
Soft starters								
Mains supply voltage (50/60 Hz) U_{LN} : 200 - 690 V AC Supply voltage U_s : 24 V DC Control voltage U_c : 24 V DC With internal bypass contacts								
Soft starter for three-phase loads, with control unit and pump algorithm, for 690-V grids								
T	180	90	160	150	S811+T18V3S	168986		1 off 
	240	132	200	200	S811+T24V3S	168989		
	304	160	250	250	S811+T30V3S	168992		
V	361	200	315	300	S811+V36V3S	168995		
	420	200	400	350	S811+V42V3S	168998		
	500	250	500	400	S811+V50V3S	169001		
	650	315	630	500	S811+V65V3S	169004		
	720	400	630	600	S811+V72V3S	169007		
	850	450	710	600	S811+V85V3S	169010		

Notes




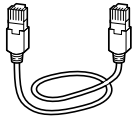

Sizes S801+, S811+







 Information relevant for export to North America → Page 136

Soft starter S801+, S811+ 139

Accessories

Description	For use with	Part no. Article no.	Price see price list	Std. pack	Information relevant for export to North America 
Control unit					
With adjusting elements (potentiometer, microswitch)	S801+	EMA71 144346		1 off 	Product Standards IEC/EN 60947-4-2; UL 508; CSA C22.2 No. 14; CE marking UL File No. E202571 CSA File No. LR 353 Conditions of Acceptability UL unlisted component, CSA Investigated Component
With illuminated LCD display With control buttons and function keys Front IP54 RJ45 plug, 8-pin	S811+	EMA91 144570			
Cover					
Protection for installation space in S811+ if the control unit is set up externally.	S811+	EMA68 144556		1 off	
Mounting frame					
For mounting the EMA91 control unit externally with surface mounting (e.g., installation in control panel door).	EMA91	EMA69A 144557		1 off 	Product Standards IEC/EN 60947-4-2; UL 508; CSA C22.2 No. 14; CE marking UL File No. E202571 UL Category Control No. NMFT2 CSA File No. LR 353 CSA Class No. 3211-06 North America Certification UL listed, CSA certified
Connection cable					
Connection cable with RJ45 plugs, 8 pole 	EMA91	EMA69B 144558		1 off 	Product Standards IEC/EN 60947-4-2; UL 508; CSA C22.2 No. 14; CE marking UL File No. E202571 UL Category Control No. NMFT2 CSA File No. LR 353 CSA Class No. 3211-06 North America Certification UL listed, CSA certified
	EMA91	EMA69C 144559			
	EMA91	EMA69D 144560			
Control terminal strip					
-	S801+, S811+	EMA75 144561		1 off	
IP20 Kits					
-	S801+, S811+, Baugröße N	SS-IP20-N 171990		1 off	
-	S801+, S811+, Baugröße R	SS-IP20-R 171991			
-	S801+, S811+, Baugrößen T und U	SS-IP20-TU 171992			
-	S801+, S811+, Baugröße V	SS-IP20-V 158650			

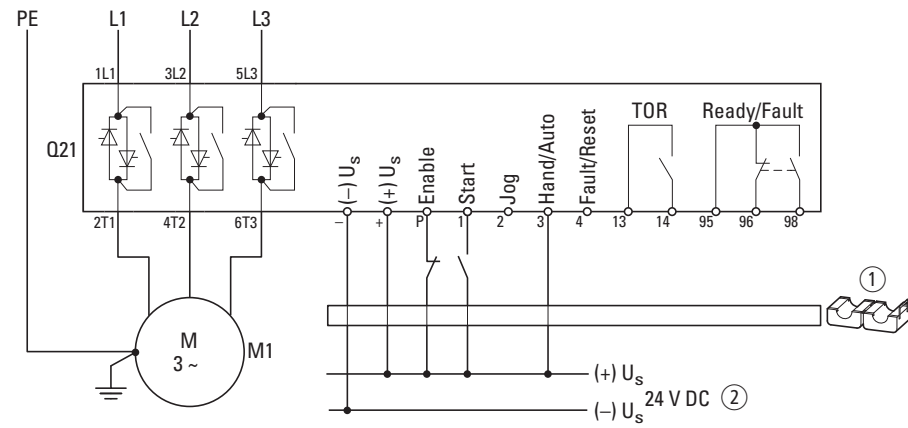
S801+, S811+

Description	For use with	Part no. Article no.	Price see price list	Std. pack	Information relevant for export to North America 
Terminal blocks					
Tools with dimensions in inches required					
Terminal capacities					
2 x 4-1/0MCM, 2 x 25-50 mm ²	S801+, S811+, Baugrößen T und U	EML22 127661		1 off 	Product Standards UL 1059 UL File No. E60693 UL Category Control No. NMFT CSA File No. LR 353 CSA Class No. 6223-02 North America Certification UL listed, CSA certified Conditions of Acceptability 10A min, Use group C or D, 30 to 12 AWG solid/stranded Max. Voltage Rating 300 V _{ac}
4/0-500 MCM, 120-150 mm ²		EML23 127662			Product Standards UL508, CSA C22.2 No. 65 UL File No. E202571 UL Category Control No. NMFT CSA File No. LR 353 CSA Class No. 6223-02 North America Certification UL listed, CSA certified
2 x 4/0-500 MCM, 2 x 120-150 mm ²		EML24 127663			
2 x 2/0-300 MCM, 2 x 70-150 mm ²		EML25 127664			
2/0-300 MCM, 70-150 mm ²		EML26 127665			
4/0-500 MCM, 120-150 mm ²	S801+, S811+, Baugröße V	EML27 144549			
2 x 4/0-500 MCM, 2 x 120-150 mm ²		EML28 127666			
4 x 4/0-500 MCM, 4 x 120-150 mm ²		EML30 127667			
6 x 4/0-500 MCM, 6 x 120-150 mm ²		EML32 127668			
4 x 2/0-300 MCM, 4 x 70-150 mm ²		EML33 127669			
TVSS					
SMD metal-oxide varistors (MOVs) with connection cables for the grid and motor connection sides	S801+, S811+, bis 600 V	EMS39 127671		1 off 	Product Standards UL 508; CSA C22.2 No. 14 UL File No. E202571 CSA File No. LR 353 Conditions of Acceptability UL and CSA Investigated Component Max. Voltage Rating 1000 V _{ac} 3 ph
	S811+, bis 690 V	EMS41 127672		1 off	
EtherNet/IP - Modbus/TCP adapter					
-	S801+, S811+	C441V 172306		1 off 	Product Standards IEC/EN 60947-4-1; UL 508; CSA C22.2 No. 14; CE marking UL File No. E1230 UL Category Control No. NKCR CSA File No. LR 353 CSA Class No. 3211-03 Max. Voltage Rating 240 Vac (auxiliary contacts)

Engineering

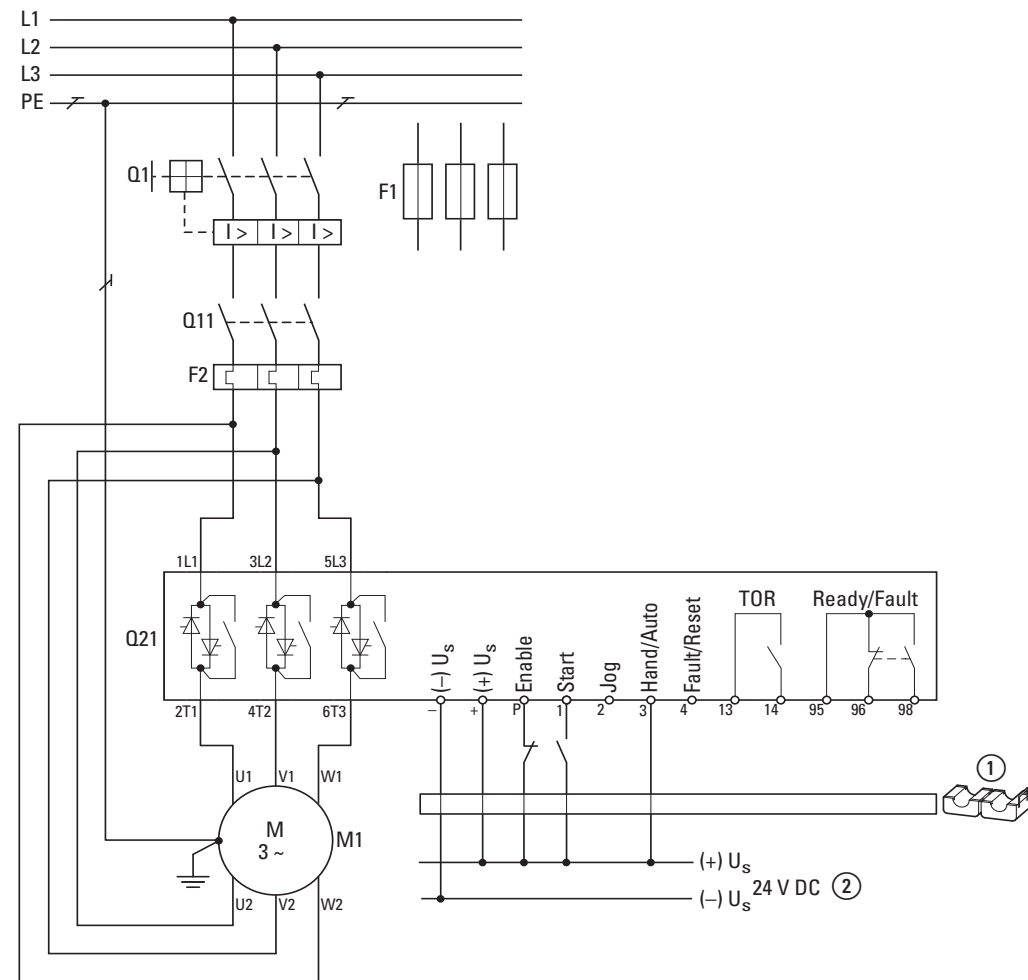
Connection examples for S811+...N3S

Standard connection (in-line connection)



- ① Snap-on ferrite core, included as standard
- ② External control voltage (24 VDC) required, IS 100 mA, I_{Peak} = 10 A for 15 ms when bypass contacts are switched

Delta circuit (inside-the-delta circuit)



- ① Snap-on ferrite core, included as standard
 - ② External control voltage (24 VDC) required, IS 100 mA, I_{Peak} = 10 A for 15 ms when bypass contacts are switched
- Short-circuit and cable protection: Q1 circuit-breakers or F1 fuses.

S801+, S811+

Technical data

			S8x1+N37...	S8x1+N66...	S8x1+R10...	S8x1+R13...
General						
Standards	IEC/EN 60947-4-2 UL 508 CSA22.2-14-1995 GB14048					
Approvals	CE					
Approvals	UL CSA C-Tick CCC					
Climatic proofing	Damp heat, constant, to IEC 60068-2-3 Damp heat, cyclic, to IEC 60068-2-10					
Ambient temperature						
Operation	θ	°C	-30 - +50	-30 - +50	-30 - +50	-30 - +50
Storage	θ	°C	-50 - +70	-50 - +70	-50 - +70	-50 - +70
Altitude	m		0 - 2000 m, above that each 100 m 0.5% Derating			
Mounting position			As required	As required	As required	As required
Degree of protection						
Protection type			IP20 (terminals IP00)	IP20 (terminals IP00)	IP20 (terminals IP00)	IP20 (terminals IP00)
Integrated	Protection type IP40 can be achieved on all sides with covers SS-IP20-N.					
Protection against direct contact	Finger- and back-of-hand proof					
Overvoltage category/pollution degree			II/3	II/3	II/3	II/3
Shock resistance			15 g	15 g	15 g	15 g
Radio interference level (IEC/EN 55011)			A	A	A	A
Heat dissipation	W		25	25	25	25
Weight	kg		2.6	2.6	4.8	4.8
Main conducting paths						
Rated operating voltage	U _e	V AC	200 - 600	200 - 600	200 - 600	200 - 600
...V3S						
Supply frequency	f _{LN}	Hz	50/60	50/60	50/60	50/60
Rated operational current						
Device (AC-53)	I _e	A	37	66	105	135
Assigned motor rating (Standard connection, In-Line)						
at 230 V, 50 Hz	P	kW	7.5	18.5	30	37
at 400 V, 50 Hz	P	kW	18.5	30	55	75
at 500 V, 50 Hz	P	kW	22	45	55	90
at 690 V, 50 Hz	P	kW	-	-	-	-
at 200 V, 60 Hz	P	HP	10	20	30	40
at 230 V, 60 Hz	P	HP	10	20	40	50
at 480 V, 60 Hz	P	HP	25	50	75	100
at 600 V, 60 Hz	P	HP	30	60	100	125
Internal bypass contacts			✓	✓	✓	✓
Terminal capacities						
Cable lengths						
Solid	mm ²		1 x (2.5 - 35)	1 x (2.5 - 35)	1 x (2.5 - 95)	1 x (2.5 - 95)
Flexible with ferrule	mm ²		1 x (2.5 - 35)	1 x (2.5 - 35)	1 x (2.5 - 95)	1 x (2.5 - 95)
Stranded	mm ²		1 x (2.5 - 35)	1 x (2.5 - 35)	1 x (2.5 - 95)	1 x (2.5 - 95)
Solid or stranded	AWG		1 x (14 - 2)	1 x (14 - 2)	1 x (14 - 4/0)	1 x (14 - 4/0)
Tightening torque	Nm		4 (≤ 6 mm ²); 4.5 (≤ 10 mm ²); 5 (≤ 25 mm ²); 5.6 (> 25 mm ²)			11.3
Screwdriver (PZ: Pozidriv)	mm		1,5 x 6 mm		4 mm Hexagon socket-head screw	

S8x1+T18...	S8x1+T24...	S8x1+T30...	S8x1+U36...	S8x1+U42...
IEC/EN 60947-4-2 UL 508 CSA22.2-14-1995 GB14048				
CE	CE	CE	CE	CE
UL CSA C-Tick CCC				
Damp heat, constant, to IEC 60068-2-3 Damp heat, cyclic, to IEC 60068-2-10				
Ambient temperature				
-30 - +50	-30 - +50	-30 - +50	-30 - +50	-30 - +50
-50 - +70	-50 - +70	-50 - +70	-50 - +70	-50 - +70
0 - 2000 m, above that each 100 m 0.5% Derating				
As required	As required	As required	As required	As required
Degree of protection				
IP20 (terminals IP00)				
An IP20 degree of protection can be achieved on all sides by using optional terminal covers SS-IP20-TU.				
Finger- and back-of-hand proof				
II/3	II/3	II/3	II/3	II/3
15 g	15 g	15 g	15 g	15 g
A	A	A	A	A
25	25	25	25	25
18.6	18.6	18.6	18.6	18.6
Rated operating voltage				
200 - 600	200 - 600	200 - 600	200 - 600	200 - 600
200 - 690	200 - 690	200 - 690	-	-
50/60	50/60	50/60	50/60	50/60
Rated operational current				
180	240	304	361	420
Assigned motor rating (Standard connection, In-Line)				
55	75	90	110	132
90	132	160	200	200
110	160	200	250	250
160	200	250	-	-
60	75	100	125	125
60	75	100	150	150
150	200	250	300	350
150	200	300	350	450
✓	✓	✓	✓	✓
Terminal capacities				
Cable lengths				
1 x (70 - 240) 2 x (25 - 240)	1 x (70 - 240) 2 x (25 - 240)	1 x (70 - 240) 2 x (25 - 240)	1 x (70 - 240) 2 x (25 - 240)	1 x (70 - 240) 2 x (25 - 240)
1 x (70 - 240) 2 x (25 - 240)	1 x (70 - 240) 2 x (25 - 240)	1 x (70 - 240) 2 x (25 - 240)	1 x (70 - 240) 2 x (25 - 240)	1 x (70 - 240) 2 x (25 - 240)
1 x (70 - 240) 2 x (25 - 240)	1 x (70 - 240) 2 x (25 - 240)	1 x (70 - 240) 2 x (25 - 240)	1 x (70 - 150) 2 x (25 - 240)	1 x (70 - 150) 2 x (25 - 240)
1 x (4 - 500 kcmil) 2 x (4 - 500 kcmil)	1 x (4 - 500 kcmil) 2 x (4 - 500 kcmil)	1 x (4 - 500 kcmil) 2 x (4 - 500 kcmil)	1 x (4 - 500 kcmil) 2 x (4 - 500 kcmil)	1 x (4 - 500 kcmil) 2 x (4 - 500 kcmil)
25.5 (≤ 150 mm ²); 28.3 (> 150 mm ²)	25.5 (≤ 150 mm ²); 28.3 (> 150 mm ²)	25.5 (≤ 150 mm ²); 28.3 (> 150 mm ²)	-	-
4 mm Hexagon socket-head screw			-	-

			S8x1+N37...	S8x1+N66...	S8x1+R10...	S8x1+R13...
Control cables						
Solid	mm ²		1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)
Flexible with ferrule	mm ²		1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)
Stranded	mm ²		1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)
Solid or stranded	AWG		1 x (12 - 14) 2 x (12 - 14)	3 x (12 - 14) 2 x (12 - 14)	5 x (12 - 14) 2 x (12 - 14)	7 x (12 - 14) 2 x (12 - 14)
Tightening torque	Nm		0.4	0.4	0.4	0.4
Screwdriver	mm		0,6 x 3,5	0,6 x 3,5	0,6 x 3,5	0,6 x 3,5
Control circuit						
Regulator supply						
Notes						
External supply voltage						
Voltage	U _s	V	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %
Current consumption	I _e	mA	1000	1000	1000	1000
Current consumption at peak performance (close bypass) at 24 V DC	I _{peak}	mA/ms	10.000 / 15	10.000 / 15	10.000 / 15	10.000 / 15
Digital inputs						
Control voltage						
DC-operated	V DC		24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %
Current consumption 24 V						
External 24 V (no-load)	mA		100	100	100	100
Pick-up voltage						
DC-operated	V DC		21.6 - 26.4	21.6 - 26.4	21.6 - 26.4	21.6 - 26.4
Drop-out voltage						
DC operated	V DC		3	3	3	3
Pick-up time						
DC operated	ms		100	100	100	100
Drop-out time						
DC operated	ms		100	100	100	100
Relay outputs						
Number			2	2	2	2
Voltage range	V AC		120 V AC/DC	120 V AC/DC	120 V AC/DC	120 V AC/DC
AC-11 current range	A		3 A, AC-11	3 A, AC-11	3 A, AC-11	3 A, AC-11
Soft start function						
Ramp times						
Acceleration	s		180	180	180	180
Deceleration	s		0 - 60	0 - 60	0 - 60	0 - 60
Start pedestal	%		85	85	85	85
Kickstart						
Voltage	%		100	100	100	100
Duration						
50 Hz	ms		2000	2000	2000	2000
60 Hz	ms		2000	2000	2000	2000
Fields of application						
Fields of application			Soft starting of three-phase asynchronous motors			
3-phase motors			✓	✓	✓	✓
Functions						
Fast switching (semiconductor contactor)			- (minimum ramp time 1s)			
Soft start function			✓	✓	✓	✓
Reversing starter			External solution required (reversing contactor)			
Suppression of closing transients			✓	✓	✓	✓
Current limitation			✓	✓	✓	✓
Overload monitoring			✓	✓	✓	✓
Underload monitoring			✓	✓	✓	✓
Fault memory	Faults		10	10	10	10
Suppression of DC components for motors			✓	✓	✓	✓
Potential isolation between power and control sections			✓	✓	✓	✓
Built-in interfaces			Modbus RTU	Modbus RTU	Modbus RTU	Modbus RTU

S8x1+T18...	S8x1+T24...	S8x1+T30...	S8x1+U36...	S8x1+U42...
1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)
1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)
1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)
9 x (12 - 14) 2 x (12 - 14)	12 x (12 - 14) 2 x (12 - 14)	15 x (12 - 14) 2 x (12 - 14)	18 x (12 - 14) 2 x (12 - 14)	21 x (12 - 14) 2 x (12 - 14)
0.4	0.4	0.4	0.4	0.4
0,6 x 3,5	0,6 x 3,5	0,6 x 3,5	0,6 x 3,5	0,6 x 3,5
24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %
1000	1000	1000	1000	1000
10.000 / 15	10.000 / 15	10.000 / 15	10.000 / 15	10.000 / 15
24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %
100	100	100	100	100
21.6 - 26.4	21.6 - 26.4	21.6 - 26.4	21.6 - 26.4	21.6 - 26.4
3	3	3	3	3
100	100	100	100	100
100	100	100	100	100
2	2	2	2	2
120 V AC/DC	120 V AC/DC	120 V AC/DC	120 V AC/DC	120 V AC/DC
3 A, AC-11	3 A, AC-11	3 A, AC-11	3 A, AC-11	3 A, AC-11
180	180	180	180	180
0 - 60	0 - 60	0 - 60	0 - 60	0 - 60
85	85	85	85	85
100	100	100	100	100
2000	2000	2000	2000	2000
2000	2000	2000	2000	2000
Soft starting of three-phase asynchronous motors				
✓	✓	✓	✓	✓
- (minimum ramp time 1s)				
✓	✓	✓	✓	✓
External solution required (reversing contactor)				
✓	✓	✓	✓	✓
✓	✓	✓	✓	✓
✓	✓	✓	✓	✓
✓	✓	✓	✓	✓
10	10	10	10	10
✓	✓	✓	✓	✓
✓	✓	✓	✓	✓
Modbus RTU	Modbus RTU	Modbus RTU	Modbus RTU	Modbus RTU

			S8x1+V36...	S8x1+V42...	S8x1+V50...	S8x1+V65...
General						
Standards			IEC/EN 60947-4-2 UL 508 CSA22.2-14-1995 GB14048	IEC/EN 60947-4-2 UL 508 CSA22.2-14-1995 GB14048	IEC/EN 60947-4-2 UL 508 CSA22.2-14-1995 GB14048	IEC/EN 60947-4-2 UL 508 CSA22.2-14-1995 GB14048
Approvals			CE	CE	CE	CE
Approvals			UL CSA C-Tick CCC	UL CSA C-Tick CCC	UL CSA C-Tick CCC	UL CSA C-Tick CCC
Climatic proofing			Damp heat, constant, to IEC 60068-2-3 Damp heat, cyclic, to IEC 60068-2-10			
Ambient temperature						
Operation	θ	°C	-30 - +50	-30 - +50	-30 - +50	-30 - +50
Storage	θ	°C	-50 - +70	-50 - +70	-50 - +70	-50 - +70
Altitude		m	0 - 2000 m, above that each 100 m 0.5% Derating			
Mounting position			As required	As required	As required	As required
Degree of protection						
Protection type			IP20 (terminals IP00)	IP20 (terminals IP00)	IP20 (terminals IP00)	IP20 (terminals IP00)
Integrated			Protection type IP40 can be achieved on all sides with covers SS-IP20-N.			
Protection against direct contact			Finger- and back-of-hand proof			
Overvoltage category/pollution degree			II/3	II/3	II/3	II/3
Shock resistance			15 g	15 g	15 g	15 g
Radio interference level (IEC/EN 55011)			A	A	A	A
Heat dissipation		W	25	25	25	25
Weight		kg	41.4	41.4	41.4	41.4
Main conducting paths						
Rated operating voltage	U _e	V AC	200 - 600	200 - 600	200 - 600	200 - 600
...V3S			200 - 690	200 - 690	200 - 690	200 - 690
Supply frequency	f _{LN}	Hz	50/60	50/60	50/60	50/60
Rated operational current						
Device (AC-53)	I _e	A	361	420	500	650
Assigned motor rating (Standard connection, In-Line)						
at 230 V, 50 Hz	P	kW	110	132	160	200
at 400 V, 50 Hz	P	kW	200	200	250	315
at 500 V, 50 Hz	P	kW	250	250	315	450
at 690 V, 50 Hz	P	kW	315	400	500	630
at 200 V, 60 Hz	P	HP	125	150	150	200
at 230 V, 60 Hz	P	HP	150	150	200	250
at 480 V, 60 Hz	P	HP	300	350	400	500
at 600 V, 60 Hz	P	HP	350	450	500	600
Internal bypass contacts			✓	✓	✓	✓
Terminal capacities						
Cable lengths						
Solid		mm ²	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)
Flexible with ferrule		mm ²	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)
Stranded		mm ²	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)
Solid or stranded		AWG	2 x (4 - 500 kcmil) 4 x (4 - 500 kcmil) 6 x (4 - 500 kcmil)	2 x (4 - 500 kcmil) 4 x (4 - 500 kcmil) 6 x (4 - 500 kcmil)	2 x (4 - 500 kcmil) 4 x (4 - 500 kcmil) 6 x (4 - 500 kcmil)	2 x (4 - 500 kcmil) 4 x (4 - 500 kcmil) 6 x (4 - 500 kcmil)
Tightening torque		Nm	-	-	-	-
Screwdriver (PZ: Pozidriv)		mm	-	-	-	-

S8x1+V72...	S8x1+V85...	S8x1+V10...
IEC/EN 60947-4-2 UL 508 CSA22.2-14-1995 GB14048	IEC/EN 60947-4-2 UL 508 CSA22.2-14-1995 GB14048	IEC/EN 60947-4-2 UL 508 CSA22.2-14-1995 GB14048
CE	CE	CE
UL CSA C-Tick CCC	UL CSA C-Tick CCC	UL CSA C-Tick CCC
Damp heat, constant, to IEC 60068-2-3 Damp heat, cyclic, to IEC 60068-2-10		
-30 - +50	-30 - +50	-30 - +50
-50 - +70	-50 - +70	-50 - +70
0 - 2000 m, above that each 100 m 0.5% Derating		
As required	As required	As required
IP20 (terminals IP00)	IP20 (terminals IP00)	IP20 (terminals IP00)
Protection type IP40 can be achieved on all sides with covers SS-IP20-N.		
Finger- and back-of-hand proof		
II/3	II/3	II/3
15 g	15 g	15 g
A	A	A
25	25	25
41.4	41.4	41.4
200 - 600	200 - 600	200 - 600
200 - 690	200 - 690	-
50/60	50/60	50/60
720	850	1000
200	200	200
400	450	560
500	560	630
630	710	-
200	200	200
250	350	400
600	600	750
750	850	850
✓	✓	✓
2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)
2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)
2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)
2 x (4 - 500 kcmil) 4 x (4 - 500 kcmil) 6 x (4 - 500 kcmil)	2 x (4 - 500 kcmil) 4 x (4 - 500 kcmil) 6 x (4 - 500 kcmil)	2 x (4 - 500 kcmil) 4 x (4 - 500 kcmil) 6 x (4 - 500 kcmil)
-	-	-
-	-	-

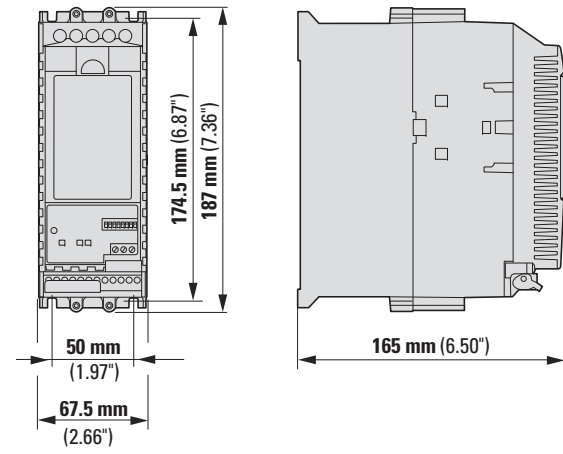
S801+, S811+

			S8x1+V36...	S8x1+V42...	S8x1+V50...	S8x1+V65...
Control cables						
Solid	mm ²		1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)
Flexible with ferrule	mm ²		1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)
Stranded	mm ²		1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)
Solid or stranded	AWG		27 x (12 - 14) 2 x (12 - 14)	30 x (12 - 14) 2 x (12 - 14)	33 x (12 - 14) 2 x (12 - 14)	36 x (12 - 14) 2 x (12 - 14)
Tightening torque	Nm		0.4	0.4	0.4	0.4
Screwdriver	mm		0,6 x 3,5	0,6 x 3,5	0,6 x 3,5	0,6 x 3,5
Control circuit						
Regulator supply						
Notes						
External supply voltage						
Voltage	U _s	V	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %
Current consumption	I _e	mA	1400	1400	1400	1400
Current consumption at peak performance (close bypass) at 24 V DC	I _{peak}	mA/ms	10.000 / 15	10.000 / 15	10.000 / 15	10.000 / 15
Digital inputs						
Control voltage						
DC-operated	V DC		24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %
Current consumption 24 V						
External 24 V (no-load)	mA		100	100	100	100
Pick-up voltage						
DC-operated	V DC		21.6 - 26.4	21.6 - 26.4	21.6 - 26.4	21.6 - 26.4
Drop-out voltage						
DC operated	V DC		3	3	3	3
Pick-up time						
DC operated	ms		100	100	100	100
Drop-out time						
DC operated	ms		100	100	100	100
Relay outputs						
Number			2	2	2	2
Voltage range			120 V AC/DC	120 V AC/DC	120 V AC/DC	120 V AC/DC
AC-11 current range			3 A, AC-11	3 A, AC-11	3 A, AC-11	3 A, AC-11
Soft start function						
Ramp times						
Acceleration	s		180	180	180	180
Deceleration	s		0 - 60	0 - 60	0 - 60	0 - 60
Start pedestal	%		85	85	85	85
Kickstart						
Voltage			100	100	100	100
Duration						
50 Hz	ms		2000	2000	2000	2000
60 Hz	ms		2000	2000	2000	2000
Fields of application						
Fields of application			Soft starting of three-phase asynchronous motors			
3-phase motors			✓	✓	✓	✓
Functions						
Fast switching (semiconductor contactor)			- (minimum ramp time 1s)			
Soft start function			✓	✓	✓	✓
Reversing starter			External solution required (reversing contactor)			
Suppression of closing transients			✓	✓	✓	✓
Current limitation			✓	✓	✓	✓
Overload monitoring			✓	✓	✓	✓
Underload monitoring			✓	✓	✓	✓
Fault memory			10	10	10	10
Suppression of DC components for motors			✓	✓	✓	✓
Potential isolation between power and control sections			✓	✓	✓	✓
Built-in interfaces			Modbus RTU	Modbus RTU	Modbus RTU	Modbus RTU

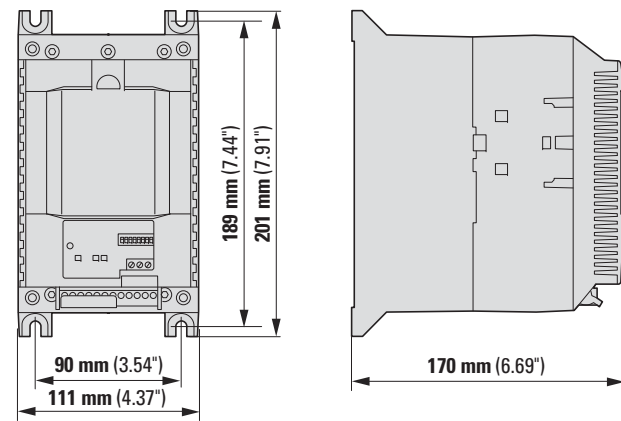
S8x1+V72...	S8x1+V85...	S8x1+V10...
1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)
1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)
1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)
27 x (12 - 14) 2 x (12 - 14)	39 x (12 - 14) 2 x (12 - 14)	42 x (12 - 14) 2 x (12 - 14)
0.4	0.4	0.4
0,6 x 3,5	0,6 x 3,5	0,6 x 3,5
24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %
1400	1400	1400
10.000 / 15	10.000 / 15	10.000 / 15
24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %
100	100	100
21.6 - 26.4	21.6 - 26.4	21.6 - 26.4
3	3	3
100	100	100
100	100	100
2	2	2
120 V AC/DC	120 V AC/DC	120 V AC/DC
3 A, AC-11	3 A, AC-11	3 A, AC-11
180	180	180
0 - 60	0 - 60	0 - 60
85	85	85
100	100	100
2000	2000	2000
2000	2000	2000
Soft starting of three-phase asynchronous motors		
✓	✓	✓
- (minimum ramp time 1s)		
✓	✓	✓
External solution required (reversing contactor)		
✓	✓	✓
✓	✓	✓
✓	✓	✓
✓	✓	✓
10	10	10
✓	✓	✓
✓	✓	✓
Modbus RTU	Modbus RTU	Modbus RTU

Dimensions

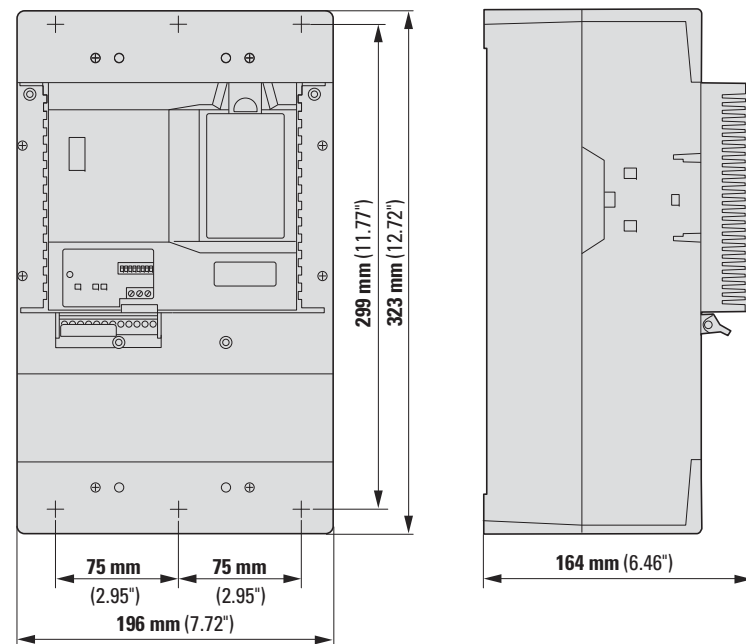
S8x1+N...



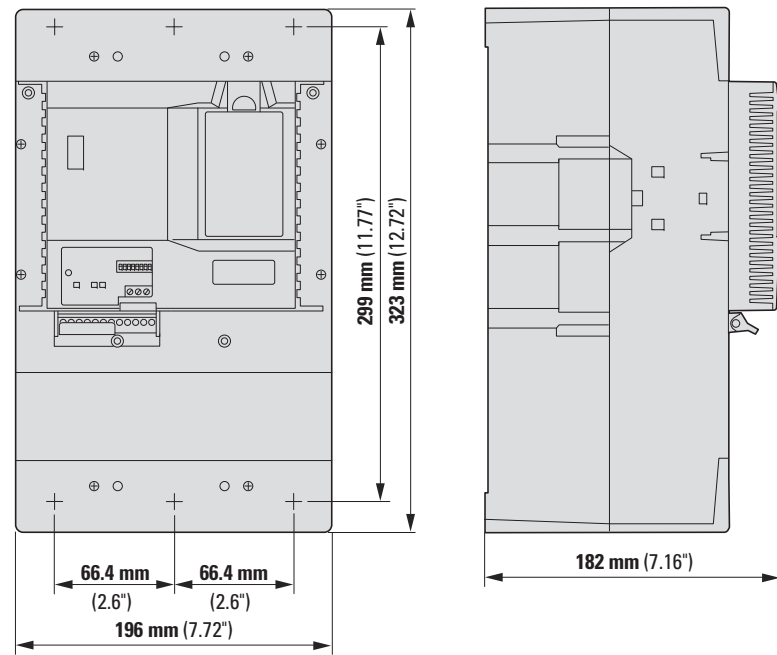
S8x1+R...



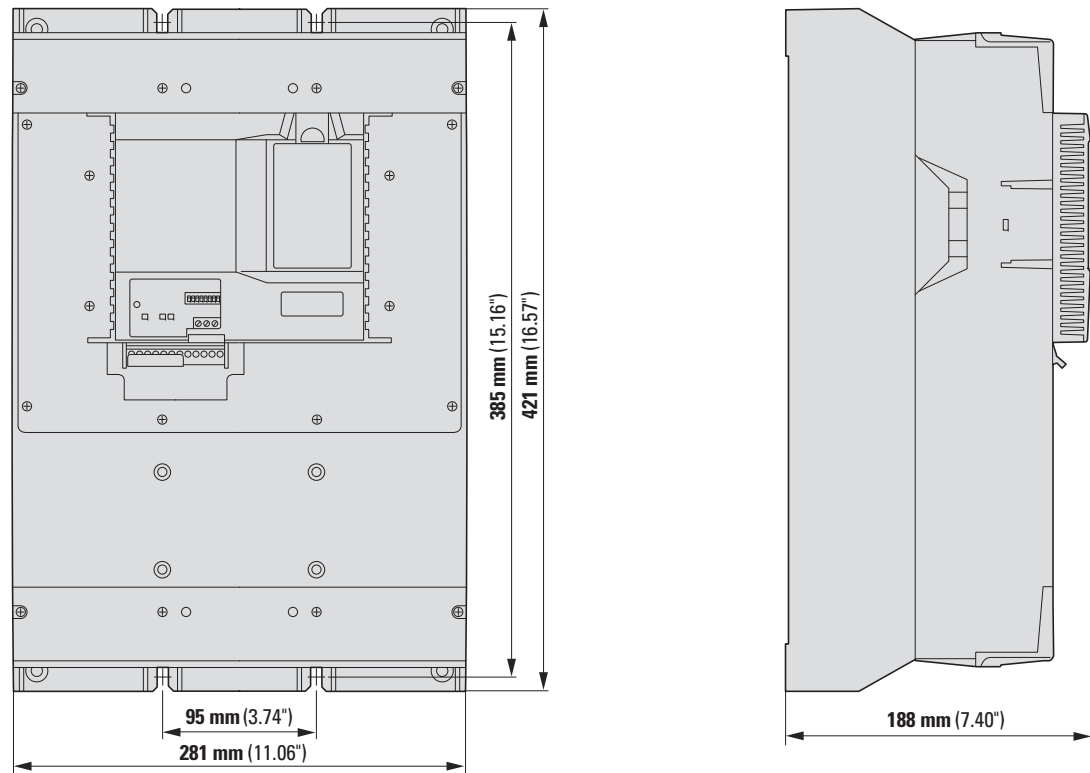
S8x1+T...



S8x1+U...



S8x1+V...



S801+, S811+



Rapid Link 4.0 distributed, electronic drive system

Standardized installation procedures, the ability to directly and locally configure parameters with a plug and play configuration, and networked communications – these are the needs of material handling system applications today when it comes to state-of-the-art drive engineering and the systems it produces.

Eaton delivers a modern answer with the Rapid Link 4.0 distributed electronic drive system. With its flexible power spectrum, its simple handling and its intelligent programming options, this new motor starter and variable frequency drives generation is the first choice for all kinds of conveying engineering applications.

RAMO electronic motor starters

Electronic DOL and reversing starters with a lifespan of more than 10 million switching operations, IP 65 degree of protection. Rated adjustable operational current of 0.3 – 6.6 A with three-phase mains connection of 400 V; allocated motor output of 0.09 – 3.0 kW

RAMO-D...: DOL starter

RAMO-W...: reversing starter

RASP speed controllers

Frequency-controlled motor starters with Volts-per-Hertz control (V/Hz control) and slip compensation or voltage-controlled vector control, as well as an integrated radio interference suppression filter (EMC), IP65 degree of protection.

RASP-2...: Rated operational current of 0.48 – 2.4 A with three-phase mains connection of 400 V; assigned motor output of up to 0.75 kW

RASP-3...: Rated operational current of 0.66 – 3.3 A with three-phase mains connection of 400 V; assigned motor output of up to 1.1 kW

RASP-4...: Rated operational current of 0.86 – 4.3 A with three-phase mains connection of 400 V; assigned motor output of up to 1.5 kW

RASP-5...: Rated operational current of 1.12 – 5.6 A with three-phase mains connection of 400 V; allocated motor output of up to 2.2 kW



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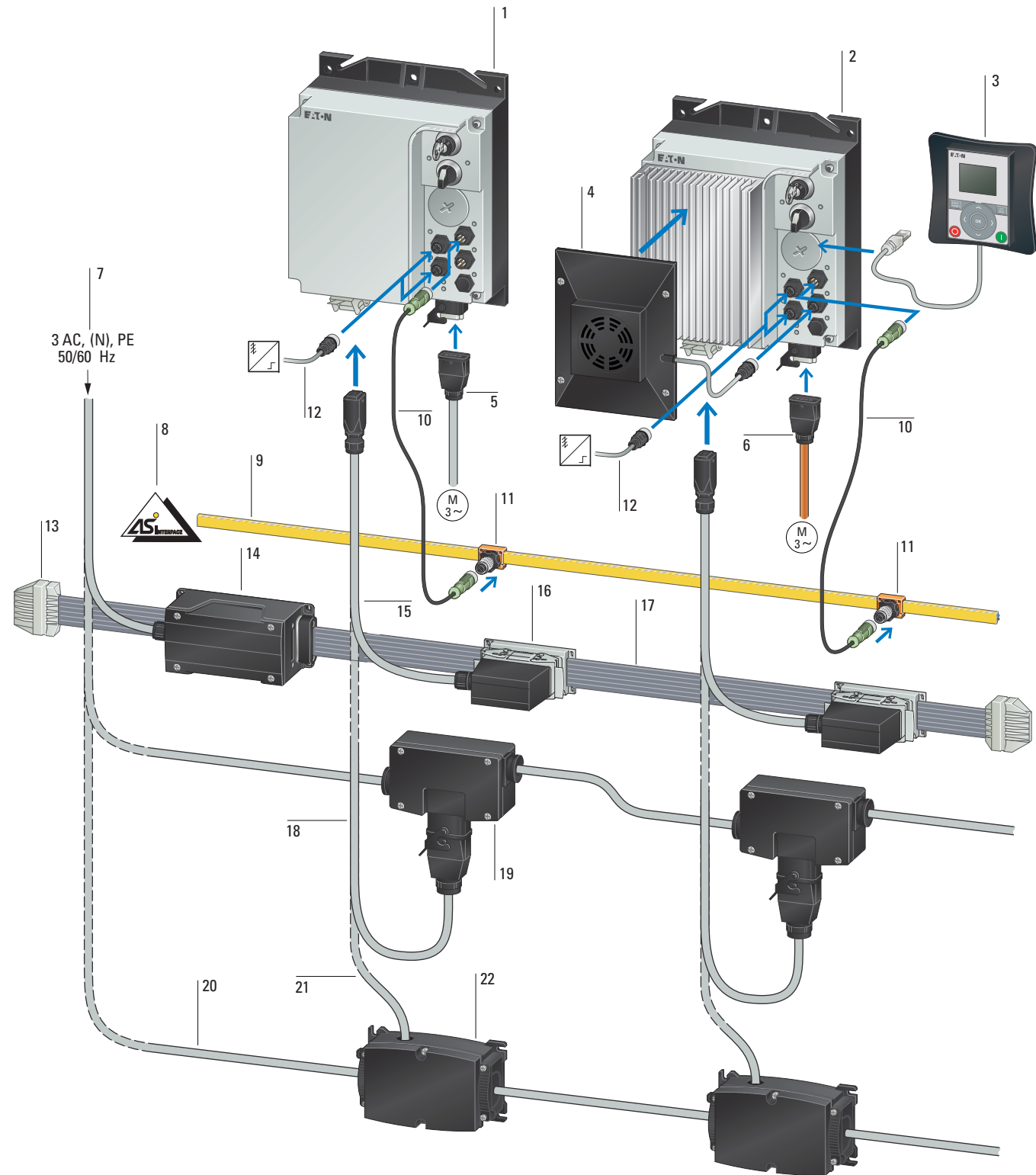


Dimensions

Motor starter RAMO	175
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System overview



Function modules

Motor feeder

Power and data bus

Motor starter (Motor Control Unit) 1 Three-phase electronic DOL starter or reversing starter → page 158	Unscreened motor cable 5 → page 160	Energy supply (3 AC 400 V) via circuit-breaker for overload and short-circuit protection 7 for protection against short-circuit and overload
Speed controller RASP (Speed Control Unit) 2 Three phase frequency-controlled motor starter (fixed speeds, two rotational directions, adjustable acceleration and deceleration ramps) → page 159	Screened motor supply cable (EMC) 6 → page 160	AS-Interface® feeder unit 8
operating unit 3 for parameter setting → page 160		AS-Interface® flat cable 9
Fan 4 for operation at high temperatures without derating → page 160		AS-Interface® connection cable 10 → page 163
		AS-Interface® junction 11 → page 163
		Sensor connection 12 → page 163
		End-piece for flat cable 13 → page 162
		distributor module 14 for 400-V-AC incoming unit of the flat cable → page 161
		Power connection cable 15 to flexible busbar junction → page 160
		flexible busbar junction 16 → page 161
		Ribbon cable for 400 V AC 17 → page 160
		Power connection cable 18 to round cable junction → page 162
		Round cable junction 19 → page 162
		Round cable for 400 V AC 20
		Power connection cable 21 to round cable junction → page 162
		Round cable junction 22 → page 162

Rapid Link 4.0 is a modern, efficient drive and PLC. It is the competent further development of the Rapid Link 2.1/3.0 device series, suitable for simple and complex tasks in all aspects of material handling. For example in airports, industrial production and logistics centers. The Rapid Link system consists of the RAMO electronic motor starters and the RASP frequency controlled motor starters.

The RAMO and RASP motor starters are designed with IP65 protection and can be installed in direct proximity to the drive. Their versions and mounting depend on the required specifications and the local conditions. The RAMO and RASP are connected with standard plug connectors to the energy and databus systems predominantly used in material handling systems (AS-Interface). Connection can be implemented without interrupting the required location. This simplifies installation and reduces the wiring requirement.



Overview of features

RAMO 4.0 electronic motor starters

Application and function

The RAMO motor starters enable the electronic DOL or reversing starting of three-phase motors in automatic or manual mode. The electronic overload protection for motor ratings from 90 W to 3 kW at 400 V (50/60 Hz) is configured with DIP switches. Full motor protection is ensured when used in connection with temperature sensors.

The operating mode is set via the AUTO - OFF/RESET - MANUAL key switch and can be combined with the 'Quick stop' and 'Interlocked manual operation' via the two sensor inputs (M12 sockets). Operating states are diagnosed and error messages (Reset) acknowledged on the device or via the AS-Interface. RAMO is available in different versions:

- with actuator output (24 V DC) for a direct actuation of external switching devices, e.g. solenoid valves.
- with electronic actuation for mechanical motor brakes.
- with lockable repair switch for diagnostic and maintenance work, making it possible to safely de-energize the device locally.

Essential features

- Standard size in square enclosure. The bottom section with the two power terminals (power plug, motor feeder socket) and the repair and maintenance switch can be turned 90° clockwise and counterclockwise.
- Long lifespan up to 10 million switching operations and up to 3,000 switch cycles per hour at 2.2 kW.
- Rated operational current 6.6 A.
- Operating and ambient temperature from -10 to +55 °C, without derating.
- Monitoring of thermistor and motor cable.
- Maximum motor cable length: 10 m.

Frequency controlled motor starter RASP 4.0

Application and function

The RASP motor starter enables the infinitely variable speed control of three-phase motors in the range from zero to 320 Hz. The standard size for 400 V (50/60 Hz) is assigned four motor ratings: 0.75 kW, 1.1 kW, 1.5 kW and 2.2 kW. Full motor protection is ensured by the adjustable current limitation (I²t controller).

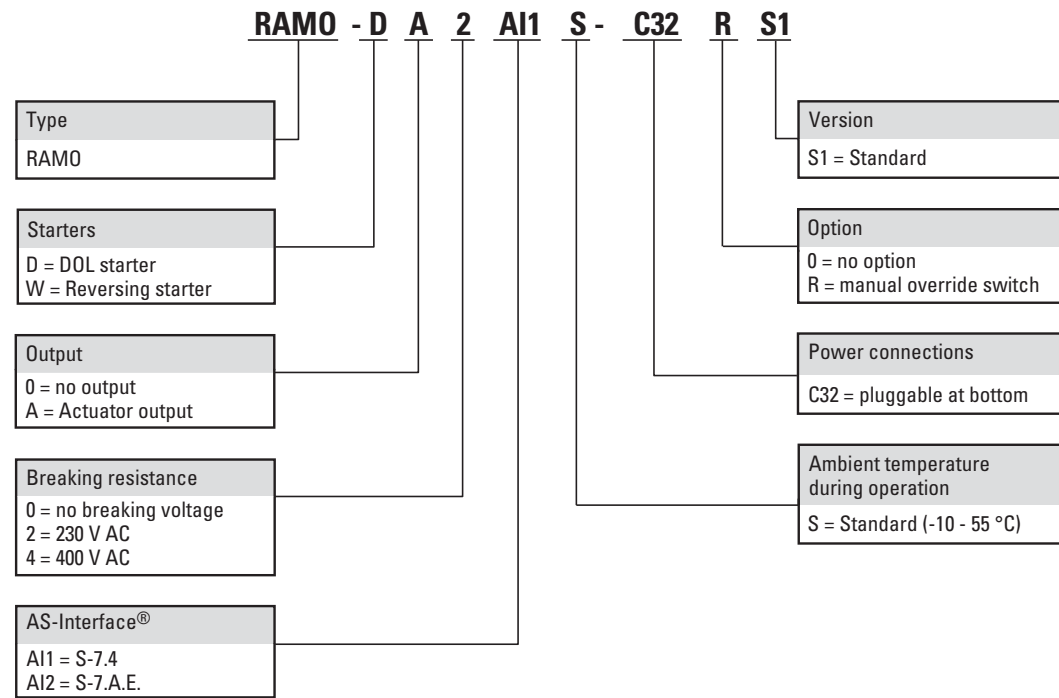
The operating mode is set via the AUTO - OFF/RESET - MANUAL key switch and can be combined with the 'Quick stop' and 'Interlocked manual operation' via the two sensor inputs (M12 sockets). Settable fixed frequencies and cyclical program sequences extend the application range and relieve the load on the higher-level head-end controller (PLC). Operating states are diagnosed and error messages (Reset) acknowledged on the device or via the AS-Interface. A hand-held programmer and a PC interface are available for the parameterization of the variable frequency drive module. RASP is available in different versions:

- with integrated brake chopper with braking resistance for dynamic braking.
- with electronic actuation for mechanical motor brakes.
- with lockable repair switch for diagnostic and maintenance work, making it possible to safely de-energize the device locally.

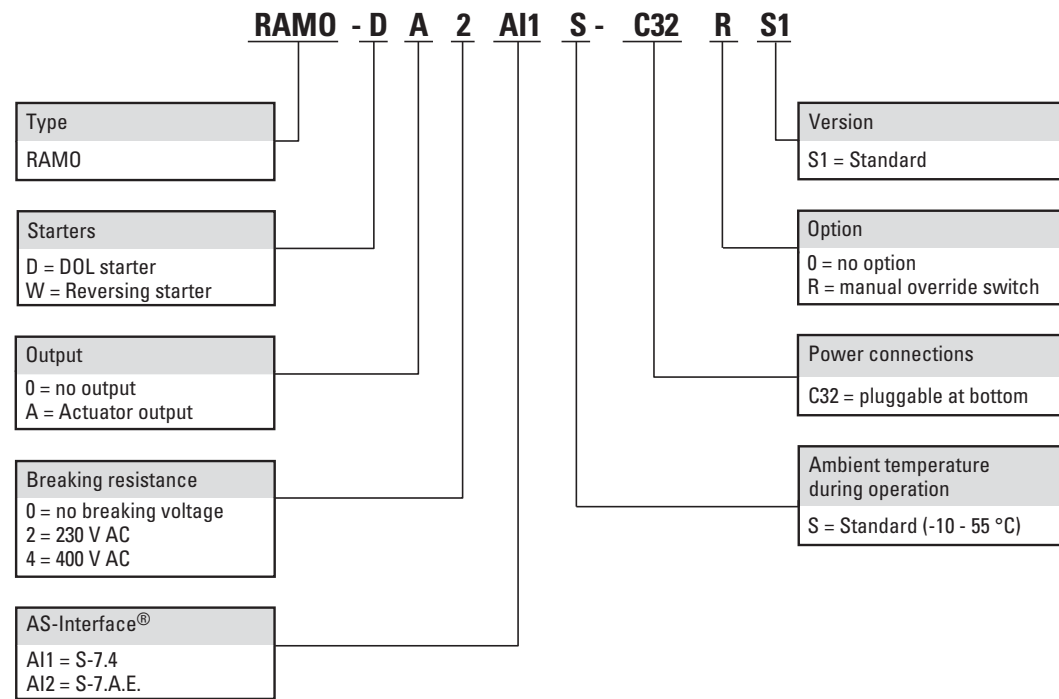
Essential features

- Standard size in square enclosure. The bottom section with the two power terminals (power plug, motor feeder socket) and the repair and maintenance switch can be turned 90° clockwise and counterclockwise.
- Monitoring of thermistor and motor cable.
- Operating and ambient temperatures from 0 to +40 °C without derating, with optional fan in the performance range up to 1.5 kW max. +55 °C.
- Rated operational current: 2.4 A, 3.3 A, 4.3 A, 5.6 A
- EMC class C3 in 2nd environment
- Maximum motor cable length: 5 m.

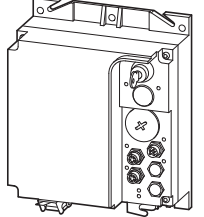
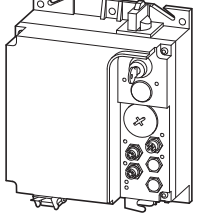
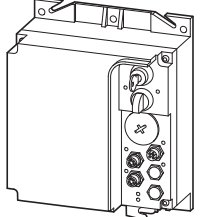
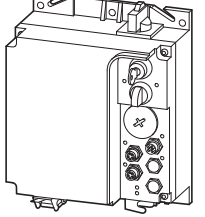
Electronic motor starters RAMO



Frequency controlled motor starter RASP

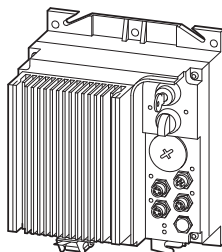
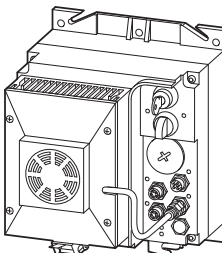
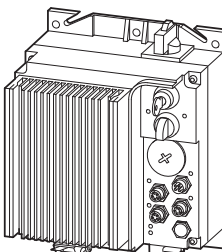
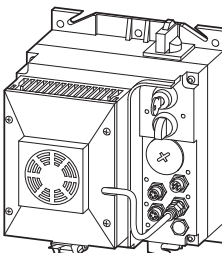


Ordering

	Rated operational current I_e A	Control voltage external brake (50/60 Hz) ¹⁾ V AC	Actuator output ²⁾ Number	AS-Interface profile cable S-7.4 for 31 modules S-7.A.E. for 62 modules	Part no. Article no.	Price see price list	Std. pack
Motor starter RAMO							
Rated operational voltage 400 V AC							
DOL starters							
	6.6	-	-	✓ -	RAMO-D00A1S-C320S1 150150		1 off
	6.6	230	-	✓ -	RAMO-D02A1S-C320S1 150152		
	6.6	230	-	- ✓	RAMO-D02A2S-C320S1 171776		
	6.6	230	1	✓ -	RAMO-DA2A1S-C320S1 164321		
	6.6	400	-	✓ -	RAMO-D04A1S-C320S1 169799		
	6.6	400	-	- ✓	RAMO-D04A2S-C320S1 171778		
	6.6	400	1	✓ -	RAMO-DA4A1S-C320S1 169800		
with manual override switch							
	6.6	-	-	✓ -	RAMO-D00A1S-C32RS1 150158		1 off
	6.6	230	-	✓ -	RAMO-D02A1S-C32RS1 150160		
	6.6	230	-	- ✓	RAMO-D02A2S-C32RS1 171782		
	6.6	400	-	✓ -	RAMO-D04A1S-C32RS1 169801		
	6.6	400	-	- ✓	RAMO-D04A2S-C32RS1 171784		
Reversing starter with selector switch REV - OFF - FWD							
	6.6	-	-	✓ -	RAMO-W00A1S-C320S1 150151		1 off
	6.6	230	-	✓ -	RAMO-W02A1S-C320S1 150153		
	6.6	230	-	- ✓	RAMO-W02A2S-C320S1 171777		
	6.6	230	1	✓ -	RAMO-WA2A1S-C320S1 164322		
	6.6	400	-	✓ -	RAMO-W04A1S-C320S1 169802		
	6.6	400	-	- ✓	RAMO-W04A2S-C320S1 171779		
	6.6	400	1	✓ -	RAMO-WA4A1S-C320S1 169803		
with manual override switch							
	6.6	-	-	✓ -	RAMO-W00A1S-C32RS1 150159		1 off
	6.6	230	-	✓ -	RAMO-W02A1S-C32RS1 150161		
	6.6	230	-	- ✓	RAMO-W02A2S-C32RS1 171783		
	6.6	400	-	✓ -	RAMO-W04A1S-C32RS1 169804		
	6.6	400	-	- ✓	RAMO-W04A2S-C32RS1 171785		

Instructions



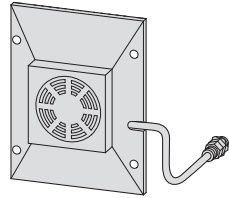

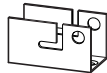
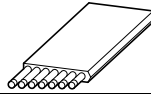
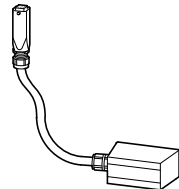
- ¹⁾ for actuation of motors with mechanical brake
²⁾ Operation with external 24V DC supply

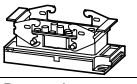
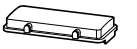
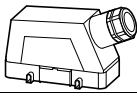
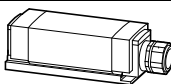
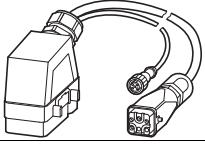
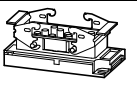
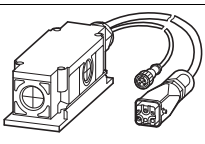
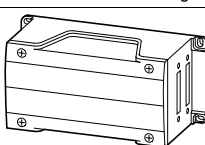

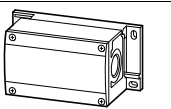

	Rated operational current ¹⁾	assigned motor rating P ²⁾	Control voltage external brake (50/60 Hz) ³⁾	Part no. Article no.	Price see price list	with braking resistance ⁴⁾		Std. pack		
						Part no. Article no.	Price see price list			
	I _e A	at 400 V, 50 Hz P A	V AC							
RASP speed controllers										
Rated operational voltage 400 V AC AS-Interface profile cable S-7.4 for 31 modules										
	2.4	-	-	RASP-200AI1S0-C320S1 150168		RASP-210AI1S0-C320S1 150172		1 off		
	2.4	-	230	RASP-202AI1S0-C320S1 150176		RASP-212AI1S0-C320S1 150180				
	2.4	-	400	RASP-204AI1S0-C320S1 169805		RASP-214AI1S0-C320S1 169809				
	3.3	-	-	RASP-300AI1S0-C320S1 150169		RASP-310AI1S0-C320S1 150173				
	3.3	-	230	RASP-302AI1S0-C320S1 150177		RASP-312AI1S0-C320S1 150181				
	3.3	-	400	RASP-304AI1S0-C320S1 169806		RASP-314AI1S0-C320S1 169810				
	4.3	-	-	RASP-400AI1S0-C320S1 150170		RASP-410AI1S0-C320S1 150174				
	4.3	-	230	RASP-402AI1S0-C320S1 150178		RASP-412AI1S0-C320S1 150182				
	4.3	-	400	RASP-404AI1S0-C320S1 169807		RASP-414AI1S0-C320S1 169811				
	5.6	-	-	RASP-500AI1SL-C320S1 150171		RASP-510AI1SL-C320S1 150175				
	5.6	-	230	RASP-502AI1SL-C320S1 150179		RASP-512AI1SL-C320S1 150183				
	5.6	-	400	RASP-504AI1SL-C320S1 169808		RASP-514AI1SL-C320S1 169812				
	with manual override switch									
		2.4	-	-	RASP-200AI1S0-C32RS1 150200		RASP-210AI1S0-C32RS1 150204			1 off
		2.4	-	230	RASP-202AI1S0-C32RS1 150208		RASP-212AI1S0-C32RS1 150212			
2.4		-	400	RASP-204AI1S0-C32RS1 169813		RASP-214AI1S0-C32RS1 169817				
3.3		-	-	RASP-300AI1S0-C32RS1 150201		RASP-310AI1S0-C32RS1 150205				
3.3		-	230	RASP-302AI1S0-C32RS1 150209		RASP-312AI1S0-C32RS1 150213				
3.3		-	400	RASP-304AI1S0-C32RS1 169814		RASP-314AI1S0-C32RS1 169818				
4.3		-	-	RASP-400AI1S0-C32RS1 150202		RASP-410AI1S0-C32RS1 150206				
4.3		-	230	RASP-402AI1S0-C32RS1 150210		RASP-412AI1S0-C32RS1 150214				
4.3		-	400	RASP-404AI1S0-C32RS1 169815		RASP-414AI1S0-C32RS1 169819				
	5.6	-	-	RASP-500AI1SL-C32RS1 150203		RASP-510AI1SL-C32RS1 150207				
	5.6	-	230	RASP-502AI1SL-C32RS1 150211		RASP-512AI1SL-C32RS1 150215				
	5.6	-	400	RASP-504AI1SL-C32RS1 169816		RASP-514AI1SL-C32RS1 169820				

Rapid Link




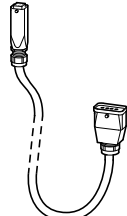
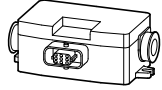

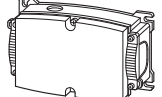
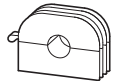

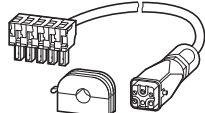
Instructions

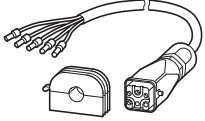
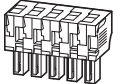
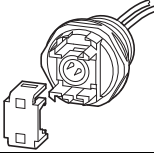
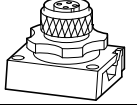

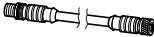
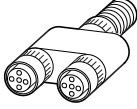

¹⁾ for normal internally and externally ventilated 4 pole, three-phase asynchronous motors with 1500 rpm⁻¹ at 50 Hz or 1800 min⁻¹ at 60 Hz
²⁾ Rated operational current at an operating frequency of 6 kHz and an ambient air temperature of +40 °C
³⁾ for actuation of motors with mechanical brake
⁴⁾ integrated brake chopper with braking resistance for dynamic braking

Description	For use with	Part no. Article no.	Price see price list	Std. pack	Instructions	
Communications						
Operating unit for setting the device parameters						
 with non-volatile parameter memory for copying parameter sets Equipment supplied: including 1 m connection cable with RJ45 connectors	RASP	RASP-KEY-S1 156644		1 off	-	
Programming cable for connecting the device to the PC						
 For configuring the device's parameters with the MaxConnect computer program with RJ 45 plug and USB plug	Length 3.4 m RASP	XXM-CBL-3M4-USB 153448		1 off	-	
Device fans						
RASP device fan for operation at high temperatures without derating						
 Power supply and control via RASP through M12 plug connector Enhanced cooling for ambient temperatures of up to +55 °C for RASP-2..., RASP-3..., and RASP-4... Spare part for RASP-5...	RASP	RASP-FAN-S1 156643		1 off	-	
Motor feeder						
Motor cable for connecting the motor starter to the motor						
	halogen free, 8 x 1.5 mm ² , plastic plug	Length m				
		2	RAMO	RAMO-CM1-2M0 164282	1 off	-
		5	RAMO	RAMO-CM1-5M0 164283	1 off	-
		10	RAMO	RAMO-CM1-10M 164284	1 off	-
	halogen free, screened, 4 x 1.5 mm ² + 2 x (2 x 0.75 mm ²), plastic plug	2	RASP	RASP-CM1-2M0 164285	1 off	-
	5	RASP	RASP-CM1-5M0 164286	1 off	-	
Locking brackets for the safe isolation of the motor cables from power						
 For motor cables and motor plugs, disconnection device to EN 60204-1	RAMO-CM1... RASP-CM1...	SET-M-LOCK 272085		1 off	For padlocks with hasp thickness up to 8 mm	
Power supply at flat cable RA-C1						
Flat cable for 400 V AC/24 V DC decentralized power supply or AS-Interface						
 halogen free, 7 x 4 mm ²	RA-C1...	RA-C1-7X4HF 230860		100 runn. m	Paint film contaminant/ silicon-free	
Power connection cable for connecting the device with the 400 V AC flexible busbar junction						
 with power plug and plug for flexible busbar junction, halogen-free, 5 x 1.5 mm ²	RAMO RASP RA-C1-PLF	RA-C3/C1-1,5HF 290210		1 off	-	

Description	For use with	Part no. Article no.	Price see price list	Std. pack	Instructions
Power supply at flat cable RA-C1					
Flexible busbar junction 400 V AC/24 V DC Connection socket for power connection cable					
 Insulation piercing terminals, terminal socket with lock mechanism	RA-C1-7X4HF RA-C3/C1-1,5HF	RA-C1-PLF 290188		5 off	-
 Protection cover for protecting the 400 V AC/24 V DC flexible busbar junction	RA-C1-PLF	RA-C1-COV 254693		10 off	-
 Plug connector for 400 V AC/24 V DC flexible busbar junction Plug insert with hood	RA-C1-PLF	RA-C1-VP-PLM 231574		5 off	Order cable gland V-M25 separately.
 Distributor module for feeding the 400-V-AC/24-V-DC of the ribbon cable with a round cable Termination with piercing screws, 2 x V-M25 and 2 x V-M20 knockout plates, connection module with spring-loaded terminals, connection of round cables up to 4 mm ² .	RA-C1-7X4HF	RA-C1-AM-7 290214		5 off	Order cable gland V-M25 or V-M20 separately.
 Power/AS-Interface connection cable for connecting the device with the 400 V AC AS-Interface flexible busbar junction Double cable with outgoer plug (flexible busbar end) and M12 plug and power plug (device end)	RAMO RASP RA-C1-PLF1	RA-C1-PLM/C3-1M5 112624		1 off	Can be used when AS-Interface implemented in flat cable.
 400 V AC/AS-Interface flexible busbar junction Connection socket for power/AS-Interface cable Insulation piercing terminals, terminal socket with lock mechanism	RA-C1-7X4HF RA-C1-PLM/C3-1M5	RA-C1-PLF1 116904		1 off	Can be used when AS-Interface implemented in flat cable.
 Power/AS-Interface connection cable for connecting the device with 400 V AC/24 V DC/AS-Interface flexible busbar Double cable with connection module (flexible busbar end) and M12 plug as well as power plug (device end), termination with piercing screws, knockouts Length 1.5 m	RAMO RASP RA-C1-7X4HF	RA-C1-AM/C3-1M5 112625		1 off	Can be used when AS-Interface implemented in flat cable.
 Distributor module for the 400V AC feeding to the ribbon cable with a round cable With 3 flexible busbar inputs and 2 round cable inputs Connection of round cables 4 mm ²	RA-C1-7X4HF	RA-C1-VM-7 264244		2 off	Order V-M25/V-M20 cable gland and RA-C1-DF bushing separately.
 Flexible busbar bushing for bushing for flat cable in distributor module or control cabinet	RA-C1-VM-7	RA-C1-DF 264243		10 off	-
 Distributor module 24 V DC control voltage is taken from the ribbon cable Termination with piercing screws, connection sockets with screw contacts	RA-C1-7X4HF	RA-C1-VP-AM-2 264315		5 off	Order cable gland V-M20 separately
 Flexible busbars for fastening the ribbon cable	RA-C1-7X4HF	RA-C1-FIX 272086		100 off	One set with 100 clips.

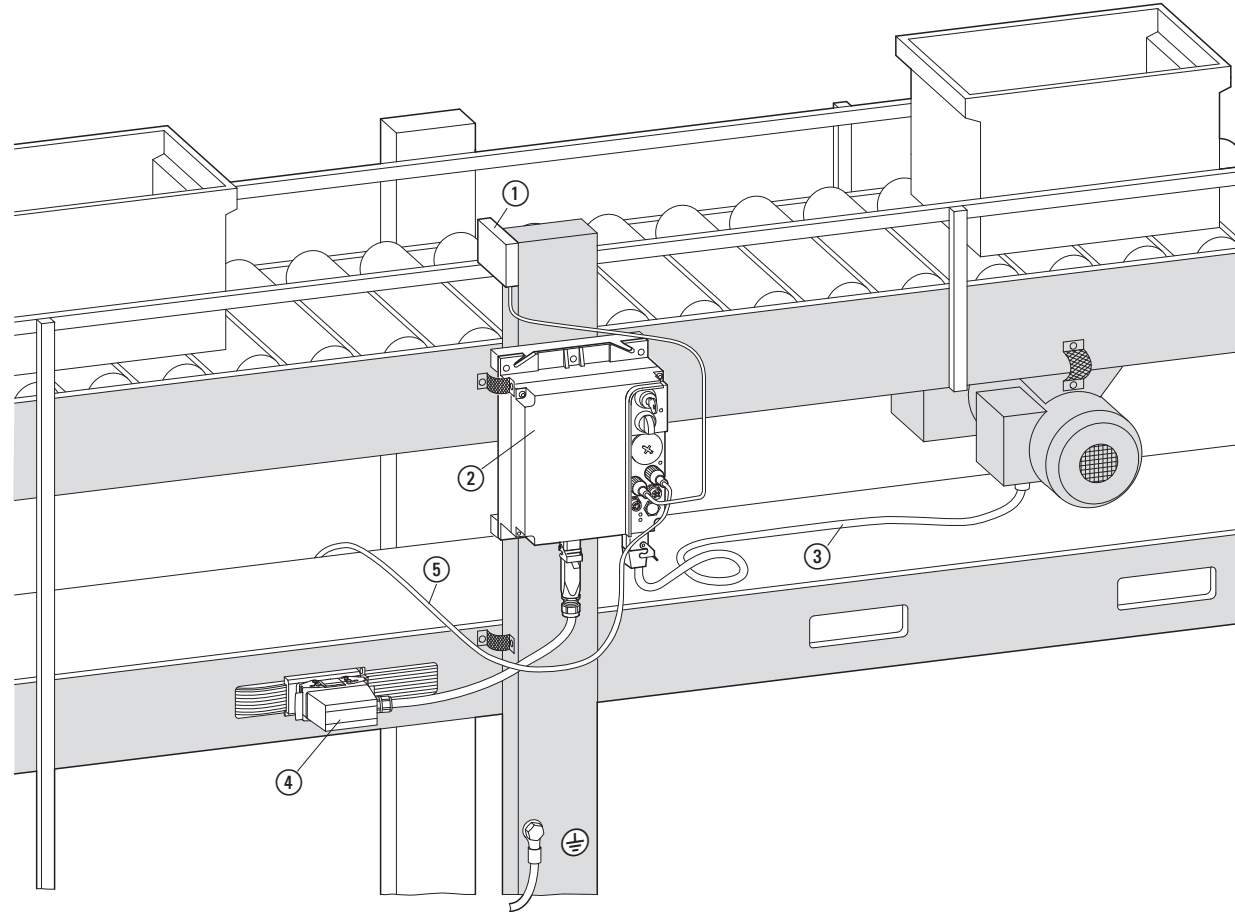
Rapid Link

Description	Length m	For use with	Part no. Article no.	Price see price list	Std. pack	Instructions
Power supply at flat cable RA-C1						
End-piece for terminating the ribbon cable		RA-C1-7X4HF	RA-C1-END1 290189		10 off	-
						
Tools						
 For cutting flat cable		RA-C1-7X4HF	RA-C1-CUT 254690		1 off	-
 for removing casing at the ends of the flat cable		RA-C1-7X4HF	RA-C1-AZ-4 272087		1 off	A standard engineer's pliers is required.
Power supply at round cable RA-C2						
Power connection cable for connecting the device with the round cable junction						
 with power plug and plug for round cable junction, halogen-free, 5 x 1.5 mm ²	1.5	RAMO RASP RA-C2-S1-4	RA-C3/C2-1.5HF 290211		1 off	-
Round cable junction Connection socket for power connection cable						
 for 7 x 2.5/4 mm ² , 400 V AC and 24 V DC, termination with insulation piercing technology, cable fixing with metal screws, pre-wired socket insert, suitable for cable outer diameters 10 - 13 mm.		RA-C3/C2-1.5HF	RA-C2-S1-4 257830		1 off	Equipment supplied: 1 pairs of gaskets for these cable diameters, 1 lock mechanism.
Blanking plug for closing the last round cable junction in the power line		RA-C2-S1-4	RA-C2-SBL 265357		10 off	One set with 10 blanking plugs.
						
Power supply at round cable RA-C4						
Round cable junction Connection socket for power cables from 2.5 - 6 mm ²						
 T junction via spring-cage terminal, 1.5 to 6 mm ² and/or plug connection of 0.5 - 4 mm ² , Enclosure IP65		RA-C4-PPB/ C3-1M5 RA-C4-X/ C3-1M5	RA-C4-PB65 116905		1 off	Tools required: Stripping tool AM16 from Weidmüller or similar. Enclosure continuous seals must be ordered separately.
Gasket Slotted enclosure bushing seal						
 for Ø 11 - 13 mm EPDM round cable, silicon free and halogen free, IP65		RA-C4-PB65	RA-C4-D13 116907		10 off	-
for Ø 13 - 15 mm EPDM round cable, silicon free and halogen free, IP65		RA-C4-PB65	RA-C4-D15 116908		10 off	-
for Ø 15 - 17 mm EPDM round cable, silicon free and halogen free, IP65		RA-C4-PB65	RA-C4-D17 116909		10 off	-
Blanking plug for closing off unused housing openings		RA-C4-PB65	RA-C4-D0 116960		10 off	One set with 10 blanking plugs.
						
Power connection cable for connecting the device with the round cable junction						
 Cable 5 x 1.5 mm ² , halogen-free, with RA-C4-PPB plug for round cable junction, power plug and gasket IP65	1.5	RAMO RASP RA-C4-PB65	RA-C4-PPB/C3-1M5 116962		1 off	-

Description	Length m	For use with	Part no. Article no.	Price see price list	Std. pack	Instructions
 <p>Power connection cable for user assembly for connecting the device with the round cable junction</p> <p>Cable 5 x 1.5 mm² halogen free, with ferrules, power plug and IP65 gasket</p>	1.5	RAMO RASP RA-C4-PB65	RA-C4-X/C3-1M5 116961		1 off	-
 <p>Plug connectors for wiring the power connection cable for user assembly</p> <p>Plug with spring-cage terminal 0.5 - 4 mm², printed with 1; N; 2; PE; 3.</p>		RA-C4-PB65	RA-C4-PPB 116906		10 off	-
AS-Interface connection and sensors						
 <p>Connection clip for AS-Interface flat cable to AS-Interface incomer/outgoer for connection modules</p> <p>with integrated AS-Interface overvoltage protection, protection against interference on switch operations or short-circuit, cable termination with insulation displacement</p>		RA-C1-AM-7 RA-C1-AM/C3-1M5 RA-C1-VP-AM-2	RA-C1-AZPG 112978		1 off	-
 <p>AS-Interface link M12 connection socket for AS-Interface connection cable</p> <p>IDC termination</p>		RAMO RASP	ZB2-100-AZ1 082667		1 off	-
 <p>24V/AS-Interface connection cable for supplying the device with 24 V/AS-Interface</p> <p>with M12 socket and double outgoer for AS-Interface and 24 V, cable termination with insulation displacement</p>	1	RASP RASP	RA-XAZ2-1M 292253		1 off	-
 <p>AS-Interface connection cable for connecting the device with AS-Interface junction</p> <p>with M12 socket and M12 plug, 3-pole</p>	1	RAMO RASP	RA-XM12-1M 272057		1 off	Pins 1, 3, 4 are assigned
 <p>Y connector For connecting up to 2 sensors per M12 socket</p>		RASP	RA-XM12-Y 290424		1 off	-
AS-Interface connection and sensors						
 <p>Spare keys for AUTO - OFF/RESET - HAND key-switches</p> <p>Lock mechanism MS1</p>		RAMO RASP	M22-ES-MS1 216416		5 off	-

Rapid Link

The Rapid Link 4.0 electronic drive system enables remote and flexible installation in the direct proximity of the drive unit. The entire system is designed with protection to IP65. All electrical connections (mains voltage, motor feeder, sensors) are implemented simply with the standard connectors that are primarily used in materials handling applications.



- ① Sensor (light barriers)
- ② RAMO
- ③ Motor connection cable
- ④ Mains connection on power bus
- ⑤ AS-Interface

Motor starter selection

All motor starters (RAMO, RASP) can provide electronic motor protection and the additional connection of temperature sensors (thermistor, ThermoClick, PTC). The motor starters are available in the following variants, with or without a lockable repair switch (mains transfer switch):

- RAMO-D, electronic DOL starter for one operating direction.
- RAMO-W, electronic reversing starter (two operating directions).
- RASP, frequency-controlled motor starter with several speeds for two operating direction in assigned ratings.

Electrical mains connection

The motor starters can be connected to and operated on 400 V three-phase, star point-earthed AC supply systems (in accordance with IEC 60364) without any restriction. The neutral conductor must be connected for motor starter variants that actuate a 230 V motor brake.

Safety and protective device

The power bus must have short-circuit protection. The length of the power bus depends on the upstream group protection. Calculations for design examples are provided in the Rapid Link manual (MN03406003Z):

- PKZM0-25 motor-protective circuit-breaker, max. approx. 40 m.
- FAZ C25/3 miniature circuit-breaker, max. approx. 60 m.
- PKE32/XTU-32 system protective circuit-breaker, 50 m to 220 m.

The group protective devices listed here protect:

- the power bus from overloads and short-circuits.
- the spur lines to the motor starter (RAMO, RASP) from overloads and short-circuits.
- the motor feeder of the RAMO

On the RASP frequency-controlled motor starter, the motor feeder is protected by the internal variable frequency drive.

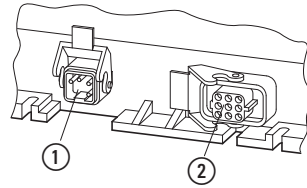
When using residual current devices, a Type B AC/DC sensitive residual current circuit-breaker must be used with the RASP frequency-controlled motor starter.

EMC compliance

All motor starters observe the required EMC limit values when connected as specified. The RASP frequency-controlled motor starter must be provided with a shielded motor cable (RASP-CM1-...) and installed with the specified EMC measures. The internal RFI filter then allows operation in accordance with category C3 in the second environment.

Terminal Models

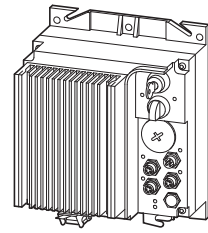
The electrical connection in the power section (mains voltage, motor feeder) is implemented with plug-in terminals in the base.



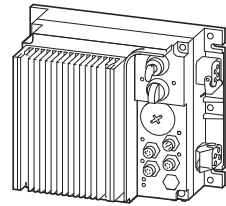
- ① 5-pole power connector for connecting the 3 AC 400 V mains voltage, (N), PE.
- ② 8-pole motor feeder socket as per DESINA specification.

By rotating the base 90 degrees, connection is also possible from the right or left. This makes it possible to keep the operating and connection area and the heat sink on the RASP in the preferred vertical position.

Example RASP:

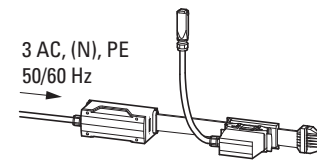


Connection from below (standard)

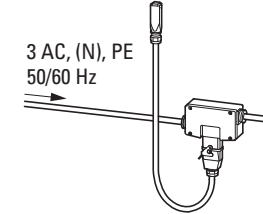


Connection from the right (90 degree rotation of the base to the left)

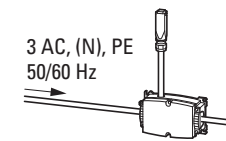
Three installation systems are available for connecting the power plug to the mains:



RA-C1, flat cable system



RA-C2, round cable system with plug connectors

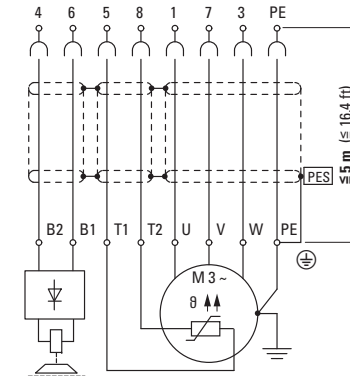


RA-C4, round cable system with contact connectors

Device variants with a repair switch (RAMO-...-C32R..., RASP-...-C32R...) ensure that the drive can be isolated locally from the power supply for repair or maintenance work, even when it is still connected. A padlock can be used to secure the repair switch.

The 8-pole motor feeder can be used to connect:

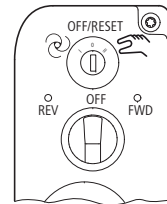
- a three-phase AC motor (U1, V1, W1, PE),
- a motor brake (B1, B2) with a control voltage of 230 V AC or 400 V AC,
- a thermistor or temperature switch (ThermoClick). These connection cables (T1, T2) can at the same time be used to monitor the motor cable and the connection of the motor feeder plug.



Example: Motor feeder with shielded motor cable on the RASP

Control level

The control level features a selector switch (key switch) for selecting automatic mode and manual mode locally. The RAMO-W and RASP motor starters are also provided with a selector switch for reversing the motor direction in manual mode.



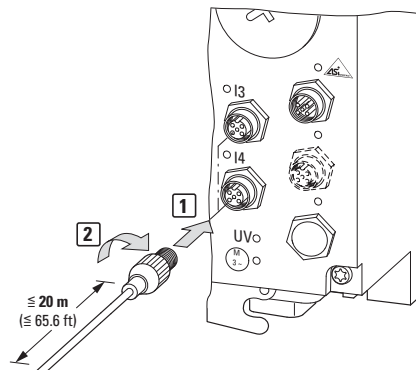
The automatic mode and the control voltage power supply are implemented via the AS-Interface. All connections in the control level (AS-i, sensors etc.) are implemented with M12 plug connectors. For this the M12 connectors just have to be fitted on [1] and rotated to secure them [2] (see illustration below).

The sensor inputs (I3, I4) enable the Rapid Link motor starters to execute sensor-controlled functions immediately and independently of PLC and bus cycle times:

- Interlocked manual operation,
- Quick Stop,
- Rotation direction change (on RAMO-W and RASP),
- Controlled speeds (only RASP)

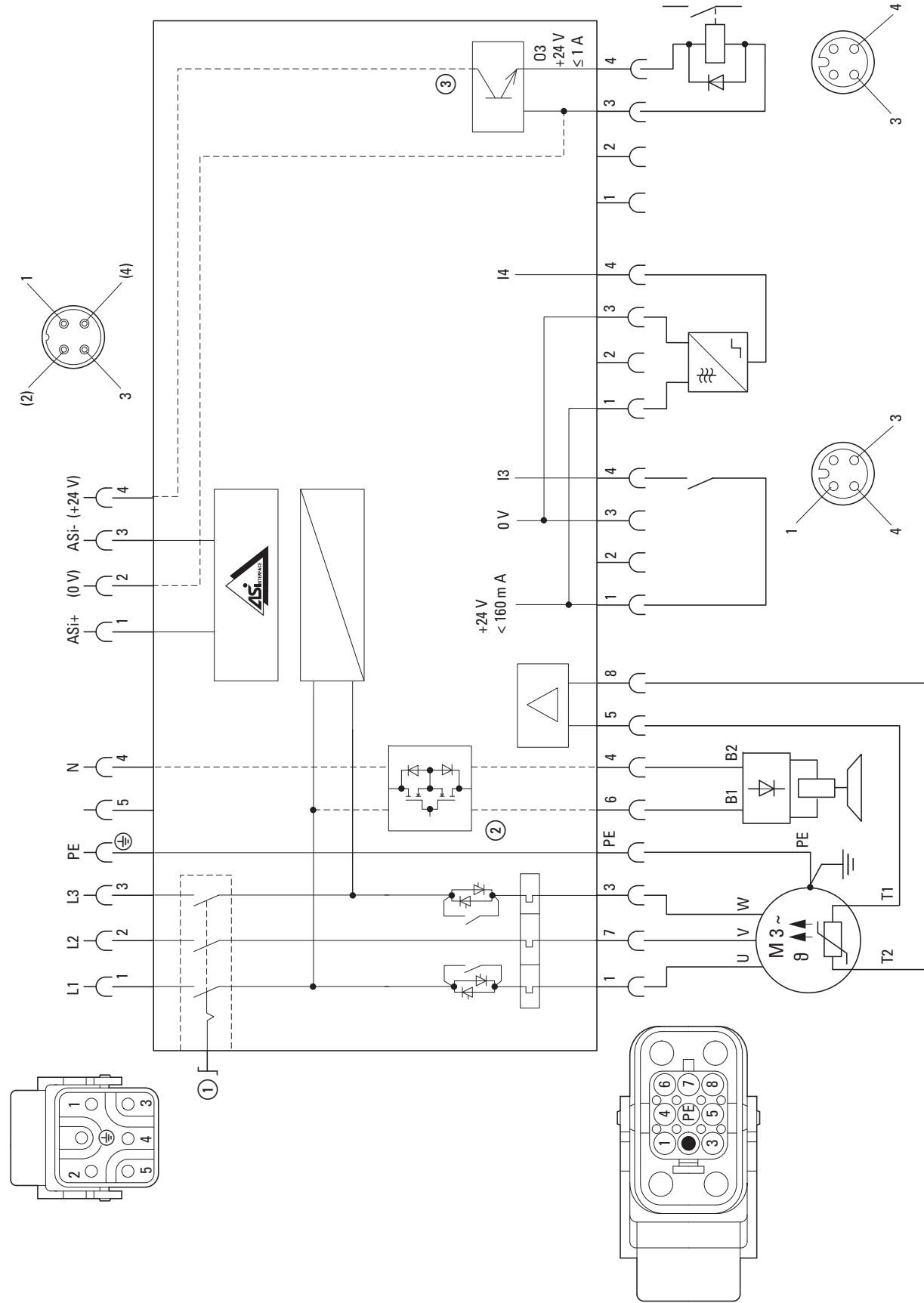
On the RAMO-DA... and RAMO-WA... a 24 V DC output (max. 1 A, O3) also makes it possible to control external actuators (valves, couplings, indicator lights) directly.

The functions are selected directly on the motor starter via microswitches. On the RASP additional settings (variable frequency drives) can be made from a hand-held terminal or from the parameter software.



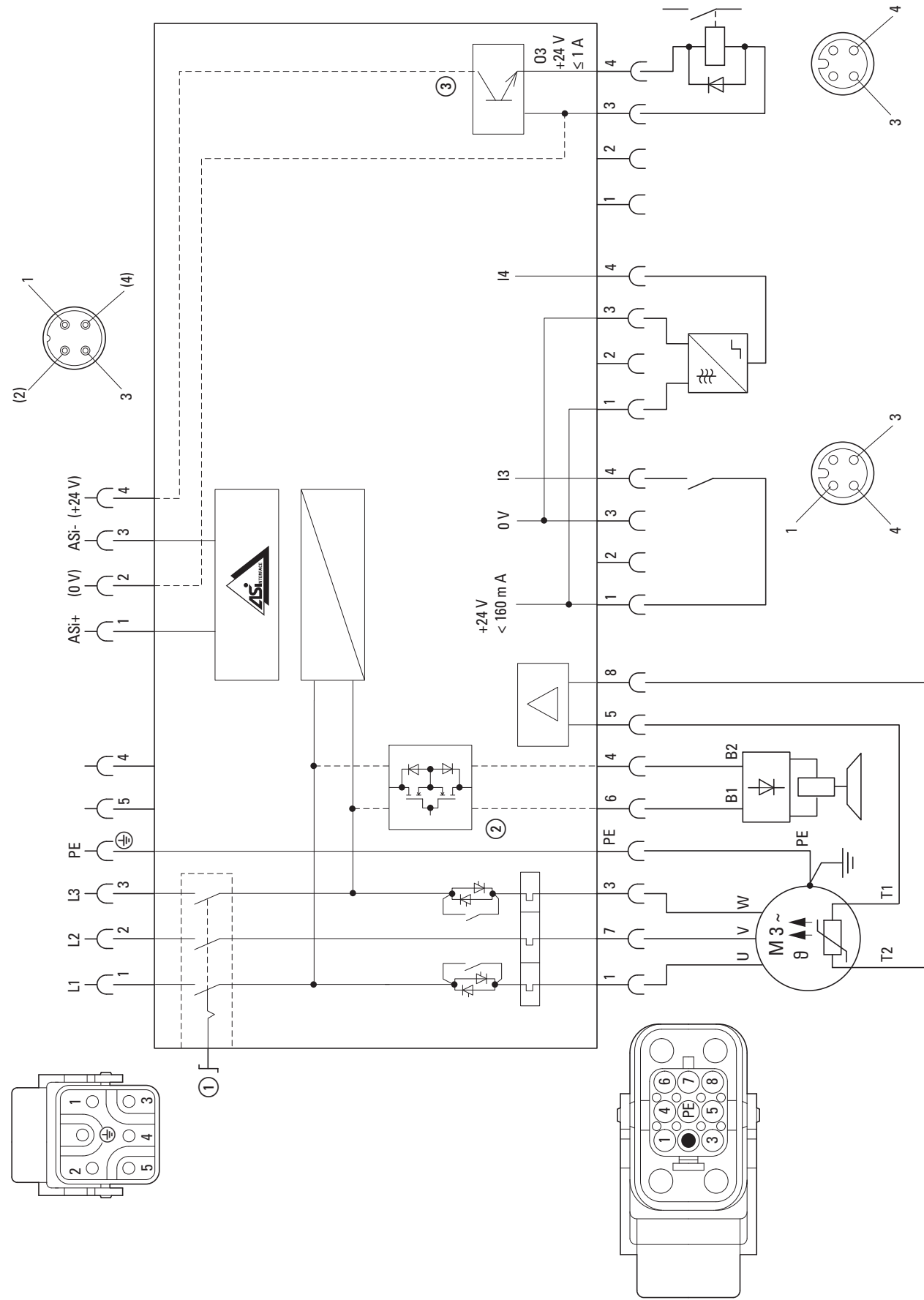
Engineering

Block diagram RAMO-D DOL starter



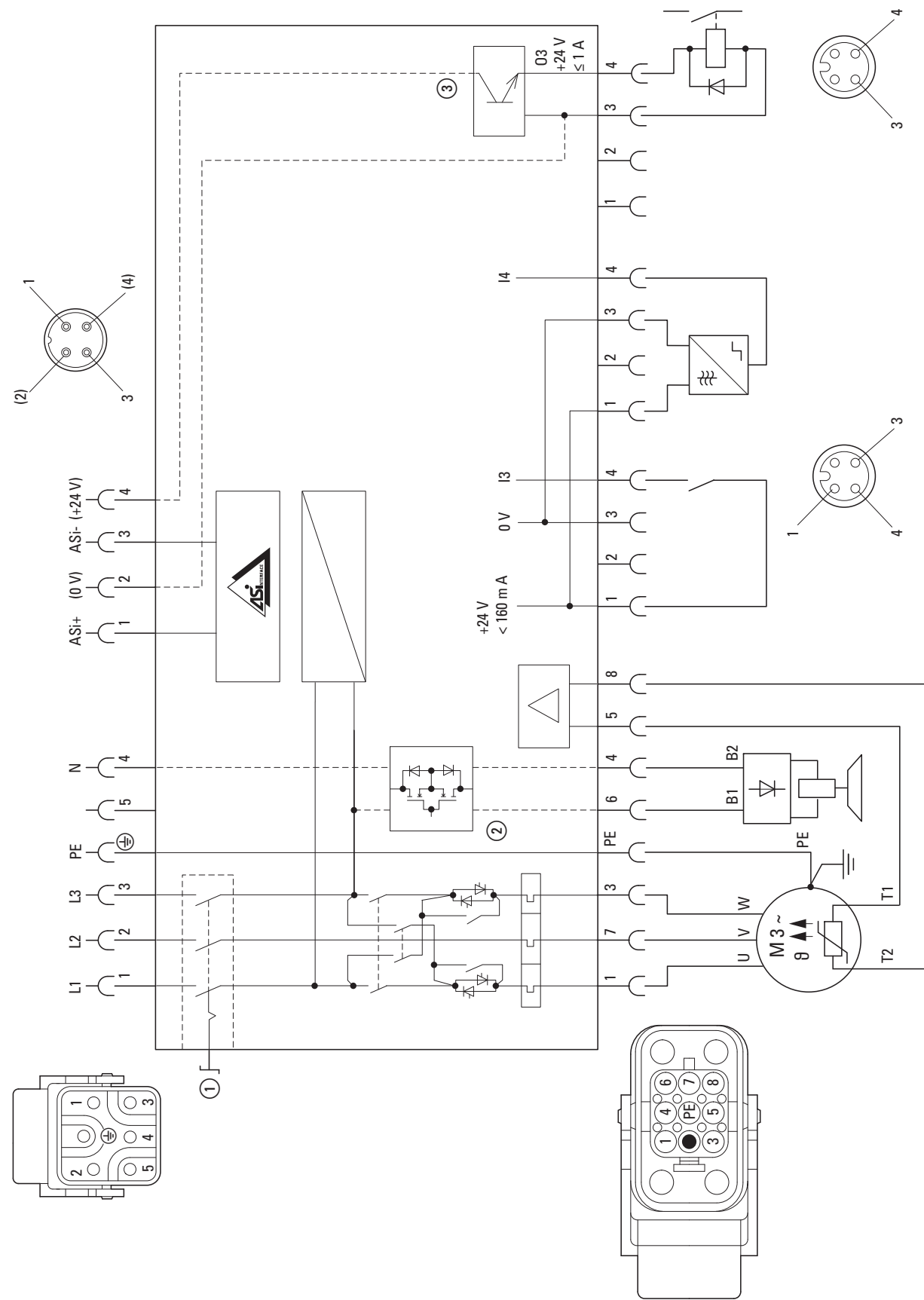
- Optional features:
- ① RAMO-D...-C32R... Repair and maintenance switch
 - ② Actuation of external brake (230 V), RAMO-Dx2...
 - ③ Actuator output, RAMO-DA...

Block diagram DOL starter RAMO-D



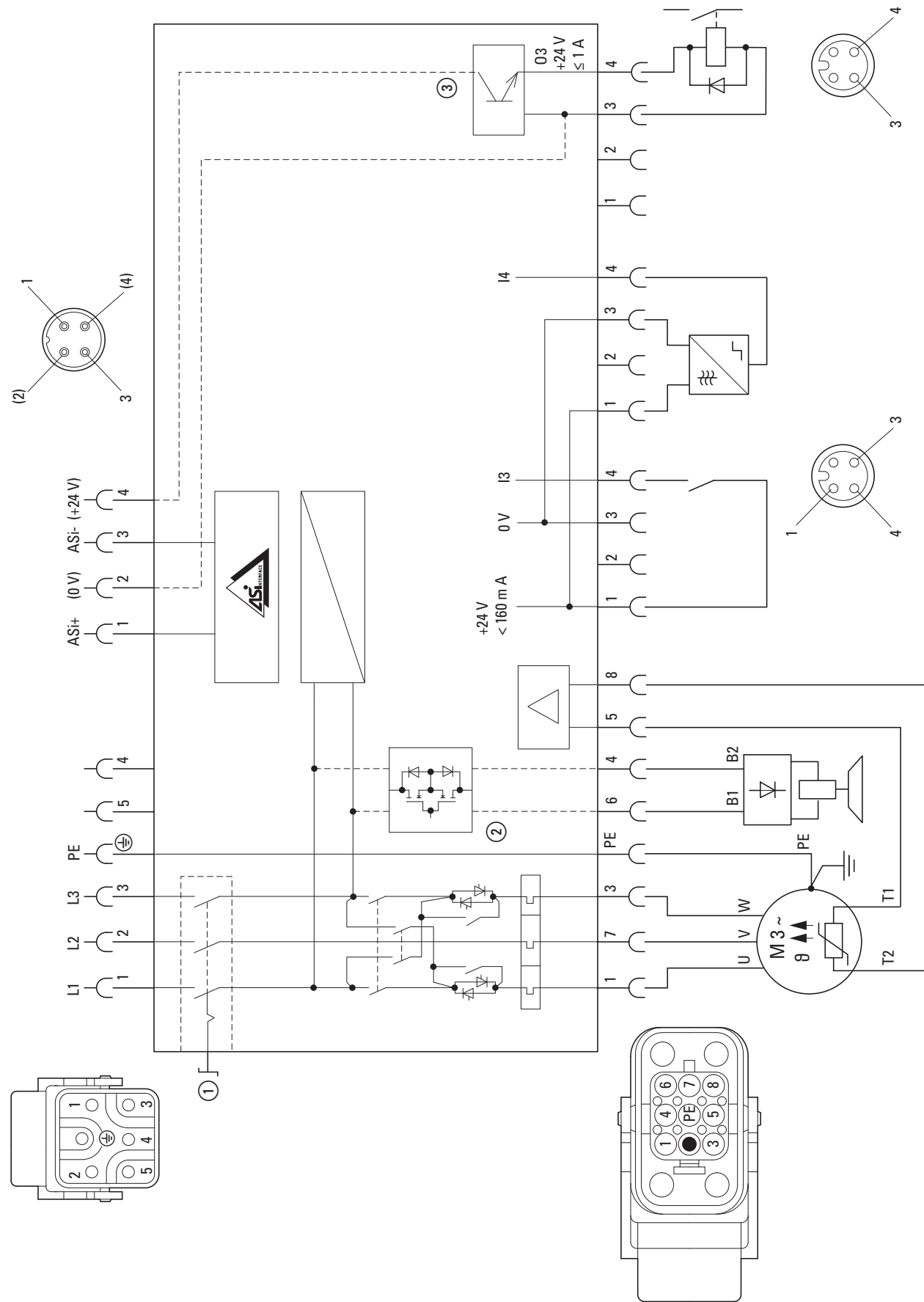
- ① RAMO-D...-C32R... Repair and maintenance switch
- ② Actuation of external brake (400 V), RAMO-Dx4...
- ③ Actuator output, RAMO-DA...

Block diagram RAMO-W reversing starter



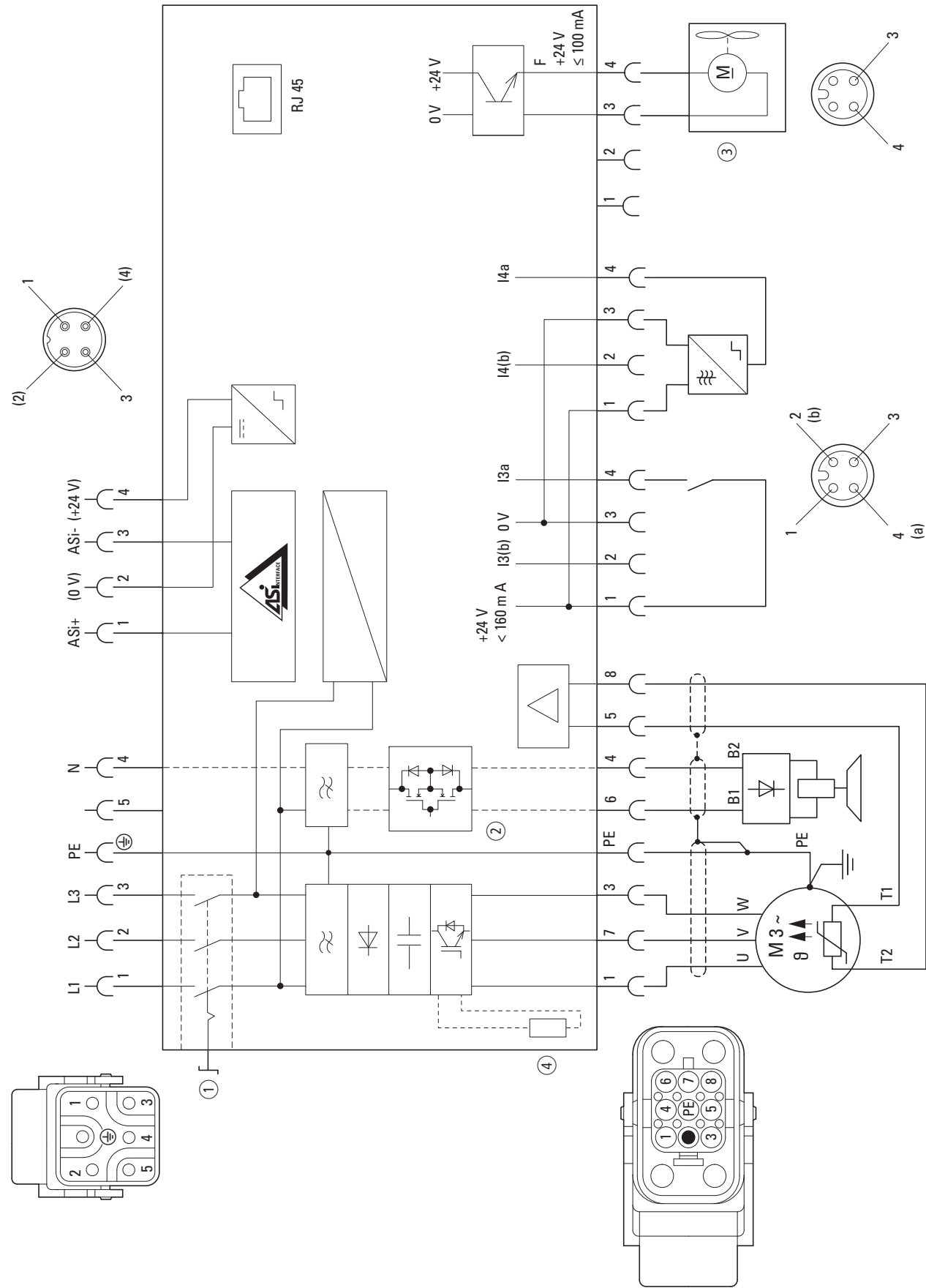
- Optional features:
 ① Repair and maintenance switch RAMO-W...C32R...
 ② Actuation of external brake (230 V), RAMO-Wx2...
 ③ Actuator output, RAMO-WA...

Block diagram RAMO-W reversing starter



- Optional features:
 ① Repair and maintenance switch RAMO-W...-C32R...
 ② Actuation of external brake (400 V), RAMO-Wx4...
 ③ Actuator output, RAMO-WA...

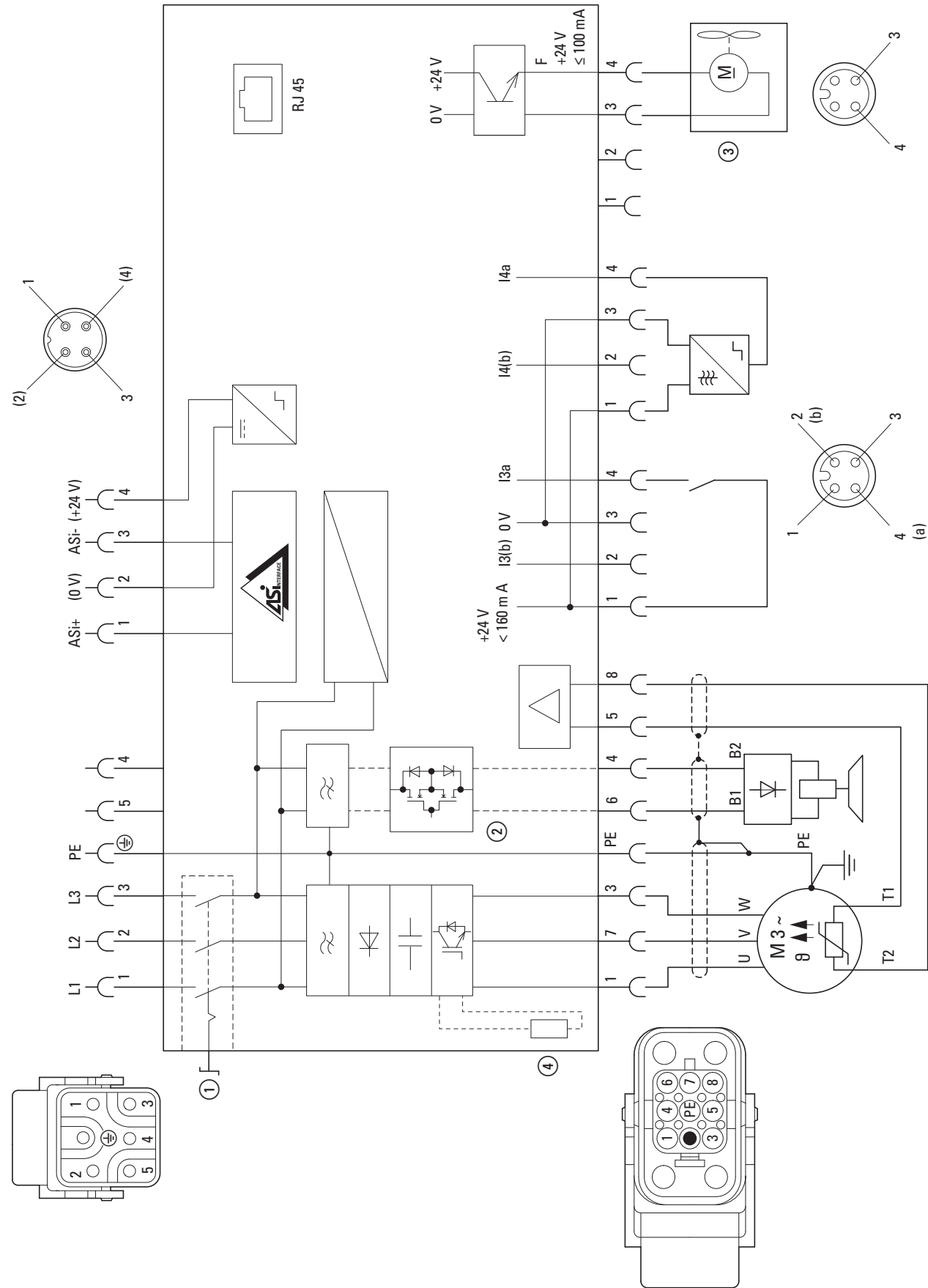
Block diagram RASP



- Optional features:
- ① Repair and maintenance switch, RASP-...-C32R...
 - ② Actuation of external brake (230 V), RASP-...x2...
 - ③ Device fan, RASP-...L-C32...
 - ④ internal braking resistance, RASP-x1...

Note:
Y connector RA-XM12-Y is required in order to connect 4 sensors (I3a, I3b/I4a, I4b) (→ accessory)

Block diagram RASP



- Optional features:
- ① Repair and maintenance switch, RASP-...-C32R...
 - ② Actuation of external brake (400 V), RASP-...xx4...
 - ③ Device fan, RASP-...L-C32...
 - ④ internal braking resistance, RASP-x1...

Note:
 Y connector RA-XM12-Y is required in order to connect 4 sensors (I3a, I3b/I4a, I4b) (→ accessory)

Technical data

			RAMO-D...	RAMO-W...	RASP-2...	RASP-3...	RASP-4...	RASP-5...
General								
Standards			IEC/EN 60947-4-2 IEC/EN 60947-5-1 IEC/EN 61000-6-2 IEC/EN 61000-6-4 Directive 2002/95/EG (RoHS) CE approval		EN 61800-5-1 EN 61800-3 Directive 2002/95/EG (RoHS) CE approval			
Climatic proofing	ρ_w	%	< 95%, non-condensing IEC/EN 50178					
Ambient temperature								
Operation	θ	°C	-10 - +55	-10 - +55	0 - +40 0 - +55 (with fan RASP-FAN-1)			0 - +45
Storage	θ	°C	-30 - +70	-30 - +70	-30 - +70	-30 - +70	-30 - +70	-30 - +70
Overvoltage category								
Rated impulse withstand voltage	U_{imp}	kV	4	4	2	2	2	2
Radio interference level								
Environment (EMC)			Device class A	Device class A	2. Environment, Class C3	2. Environment, Class C3	2. Environment, Class C3	2. Environment, Class C3
longest permissible length of motor cable	l	m	10	10	5	5	5	5
Mechanical shock resistance			1000 shocks per shaft, semi-sinusoidal 15 g/11 ms IEC/EN 60068-2-27					
Vibration								
Oscillation frequency: 10 - 150 Hz Amplitude 0.15 mm: 6 Hz Amplitude transition frequency on acceleration: 57 Hz IEC/EN 60068-2-6								
Mounting position								
Altitude			Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 2000 m								
Protection type								
			IP65 IEC/EN 60529	IP65 IEC/EN 60529	IP65 IEC/EN 60529	IP65 IEC/EN 60529	IP65 IEC/EN 60529	IP65 IEC/EN 60529
Weight								
without manual override switch			1.6	1.7	4.2	4.2	4.2	4.4
with manual override switch			1.9	1.9	4.4	4.4	4.4	4.6
Main circuit								
Supply								
Rated operational voltage	U_o		400 V AC		400 V AC			
Mains voltage (50/60Hz)	U_{LN}	V	400 (-15%) - 415 (+10%)		380 (-15%) - 400 (+10%)			
Input current	I_{LN}	T	≤ 6.6	≤ 6.6	3.2	4	5.6	7.3
System configuration								
AC voltage Center-point earthed star network (TN-S network) Phase-earthed AC supply systems are not permitted.								
Supply frequency	f_{LN}	Hz	50/60	50/60	50/60	50/60	50/60	50/60
Frequency range	f_{LN}	Hz	47 - 63 Hz (± 0%)	47 - 63 Hz (± 0%)	47 - 66 Hz (± 0%)	47 - 66 Hz (± 0%)	47 - 66 Hz (± 0%)	47 - 66 Hz (± 0%)
Mains switch-on frequency								
max. one time per minute								
Mains current distortion	THD	%	-	-	> 120	> 120	> 120	> 120
Rated conditional short-circuit current	I_q	kA	< 10	< 10	< 5	< 5	< 5	< 5
Short-circuit protective device								
Type 1 coordination via the power bus' feeder unit								

			RAMO-D...	RAMO-W...	RASP-2...	RASP-3...	RASP-4...	RASP-5...
Power section								
Function			DOL starter with thyristors and bypass contacts, 2-phase	Reversing starter with relays, thyristors and bypass contacts, 2-phase controlled	Frequency inverter with internal DC link and IGBT inverter			
On-delay	t _{ON}	ms	20 - 35	20 - 35	30 - 50	30 - 50	30 - 50	30 - 50
Off-delay	t _{OFF}	ms	20 - 35	20 - 35	15 - 35	15 - 35	15 - 35	15 - 35
Lifespan, mechanical	Operations		AC3: > 10.000.000	AC3: > 10.000.000	-	-	-	-
Lifespan, electrical	Operations		AC3: > 10.000.000	AC3: > 10.000.000	-	-	-	-
Overload cycle			AC-53a	AC-53a	-	-	-	-
Overload current for 60 s every 600 s	I _L	A	-	-	3.6 (at 40 °C)	5 (at 40 °C)	6.5 (at 40 °C)	8.4 (at 40 °C)
Starting current for 2 s	I _L	A	-	-	4.8 (at 40 °C)	6.6 (at 40 °C)	8.6 (at 40 °C)	11.2 (at 40 °C)
Output voltage with V _e	U ₂		= U _{LN}	= U _{LN}	0 - U _{LN}	0 - U _{LN}	0 - U _{LN}	0 - U _{LN}
Output Frequency	f ₂	Hz	= f _{LN}	= f _{LN}	0 - 50 Hz (max. 320 Hz)			
Switching frequency	f _{PWM}	kHz	-	-	6 (adjustable 1.5 - 16)			
Operation Mode			-	-	linear, parameterizable			
Frequency resolution (setpoint value)	Δf	Hz	-	-	0.01	0.01	0.01	0.01
Rated operational current	I _e	A	6.6	6.6	2.4	3.3	4.3	5.6
Note			-	-	Rated operational current at an operating frequency of 6 kHz and an ambient air temperature of +40 °C			
Motor current limit	I	A	0.3 - 6.6 adjustable	0.3 - 6.6 adjustable	0.48 - 4.8 adjustable	0.66 - 6.6 adjustable	0.86 - 8.6 adjustable	1.12 - 11.2 adjustable
Efficiency	η	%	-	-	0.95	0.95	0.96	0.96
Maximum leakage current to ground (PE) without motor	I _{PE}	mA	-	-	3.5	3.5	3.5	3.5
Fan			-	-	internal, temperature controlled optional RASP-FAN-S1 on heat sink, temperature-controlled			internal and on heat sink, temperature-controlled
Motor feeder								
Assigned motor rating								
Note			for normal internally and externally ventilated 4 pole, three-phase asynchronous motors with 1500 rpm ⁻¹ at 50 Hz or 1800 min ⁻¹ at 60 Hz					
at 400 V, 50 Hz	P	A	-	-	-	-	-	-
Actuator for external motor brake								
Breaking voltage	U	V	230 V AC -15% / +10% 400 V AC -15% / +10%		230 V AC -15% / +10% 400 V AC -15% / +10%			
Braking current	I	A	≤ 0.6 A (max. 6 A for 120 ms)	≤ 0.6 A (max. 6 A for 120 ms)	≤ 0.6 A (max. 6 A for 120 ms)	≤ 0.6 A (max. 6 A for 120 ms)	≤ 0.6 A (max. 6 A for 120 ms)	≤ 0.6 A (max. 6 A for 120 ms)
Braking function								
Braking torque	%	I/I _e	-	-	≤ 30	≤ 30	≤ 30	≤ 30
Switch-on threshold for the braking transistor	U _{DC}	V	-	-	765 V DC	765 V DC	765 V DC	765 V DC
DC braking	%	I/I _e	-	-	≤ 100, adjustable			
Control section								
External control voltage	U _c	V	24 V DC - 15% / + 20% via AS-Interface® plug					
AS-Interface®			max. total power consumption from AS-Interface® power supply unit (30 V): 250 mA					
RAMO-...AI1... RASP...			Specification: S-7.4 Number of slave addresses: 31		Specification: S-7.4 Number of slave addresses: 31			
RAMO-...AI2...			Specification: S-7.A.E. Number of slave addresses: 62		-			

Rapid Link

	Flat cable		Distributor module	
	RA-C1-7X4HF		RA-C1-AM-7	
General				
Standards	IEC 60332-1 DIN VDE 0295 Class 6 DIN VDE 0281 Part 404		DIN/EN 60664-1 DIN/EN 60529 DIN/EN 60999 DIN VDE 0470 Part 1	
Protection type	IP65 IEC/EN 60529		IP65 IEC/EN 60529	
Mounting position	As required		As required	
Ambient temperature				
Operation	θ	°C	-15 - +50	-15 - +40
Storage	θ	°C	-5 - +70	-5 - +50
Flame retardance, fire propagation	Self-extinguishing to IEC 60332-1		-	
Resistance to oils and acids	To VDE 0473, Part 811-2-1		-	
Sheathing	Material according to DIN VDE 0282, EVA mixture EM4, black		-	
Minimum bending radius		mm	18	-
Cable weight		kg/km	440	-
Outer dimensions L x W x H		mm	L x 34.8 x 6.0	160 x 60.2 x 59.5
Overvoltage category	-		III	
Pollution degree	-		3	
Termination	-		Springloaded terminals 1.5 to 4 mm ²	
Outer cable diameter		mm	-	V-M25: 9 - 17 V-M20: 6 - 13
Main circuit				
Rated operational voltage	U _e		500 V AC	500 V AC
Rated operational current	I _e	A	25	25
Line protection		Type	PKE32/XTU-32 PKZM0-25 FAZ-C25/3	PKE32/XTU-32 PKZM0-25 FAZ-C25/3
Control circuit				
Rated operational voltage	U _e	V	24 V DC	24 V DC
Rated operational current	I _e	A	25	10

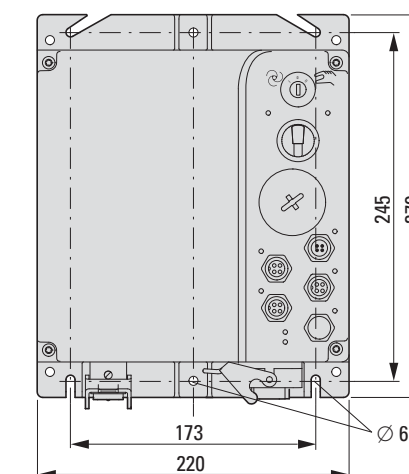
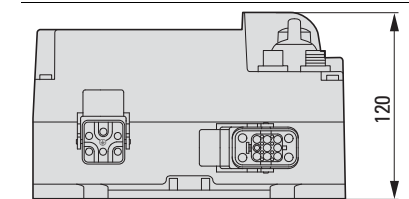
	Motor cable and motor feeder plug		Motor cable and motor feeder plug	
	RAMO-CM1-2M0 /-5M0 /-10M0		RASP-CM1-2M0 /-5M0	
General				
Standards	EN 61684 DIN VDE 0110		EN 61684 DIN VDE 0110	
Protection type	IP65 IEC/EN 60529		IP65 IEC/EN 60529	
Ambient temperature				
Operation	θ	°C	-30 - +70	-30 - +70
Connection cable				
Terminal capacities		mm ²	8 x 1.5	4 x 1.5 + 2 x (2 x 0.75) screened
Outer cable diameter		mm	9 - 13	9 - 13
Minimum bending radius		mm	6 x outer cable diameter	10 x outer cable diameter
Conductor material	-		-	
Material	Outer casing halogen free Cable: Cu flexible to VDE 0295 Class 5 Silver grey (RAL 7001)		Outer casing halogen free Cable: Cu flexible to VDE 0295 Class 6 Orange (RAL 2003)	
Colour	-		-	
Resistance to oils and acids	VDE 0472 Part 803 B		VDE 0472 Part 803 A/B	
Flame retardance, fire propagation	EN 50265-2-1		IEC 60332-2	
Metal housing with plug-in connection				
Conductor cross-section		mm ²	Contact pins: 8 x 1.5	Contact pins: 4 x 1.5 + 4 x 0.75
Material				
Contacts	Polycarbonate		Polycarbonate	
Contact material	Cu silver-plated		Cu silver-plated	
Housing	Polycarbonate		Polycarbonate	
Locking facility	Polyamide		Polyamide	

Distributor module	Flexible busbar junction 400 V AC/24 V DC	Round cable junction	Round cable junction
RA-C1-VM-7	RA-C1-PLF	RA-C2-S1-4	RA-C4-PB65
IEC/EN 60047-7-1 DIN VDE 0470 Part 1	IEC/EN 68000-2-27 IEC/EN 60998-3 DIN VDE 0660 Part 1535	EN 61684 DIN VDE 0110 DESINA	-
IP65 IEC/EN 60529	IP65 IEC/EN 60529	IP65 IEC/EN 60529	IP65 IEC/EN 60529
As required	As required	As required	As required
-15 - +50	-15 - +50	-15 - +50	-40 - +55
-5 - +50	-5 - +50	-5 - +50	-10 - +40
-	-	-	-
-	-	-	-
-	-	-	-
175 x 83 x 78	119 x 57.5 x H	158 x 112.5 x 55	181 x 104 x 67
III	III	III	III
3	3	3	3
Twin-level terminal block, 1.5 to 4 mm ²	IDC termination	Piercing/screw terminals	Insulation piercing terminals
9 - 17	-	10 - 13 13 - 16	11 - 13 13 - 15 15 - 17
500 V AC	500 V AC	500 V AC	690 V AC
25	-	20/25 (2.5 mm ² /4 mm ²)	25 (4 mm ²)
PKE32/XTU-32 PKZM0-25 FAZ-C25/3	PKE32/XTU-32 PKZM0-25 FAZ-C25/3	PKE32/XTU-32 PKZM0-25 FAZ-C25/3	PKE32/XTU-32 PKZM0-25 FAZ-C25/3
24 V DC	24 V DC	24 V DC	-
25	-	20/25 (2.5 mm ² /4 mm ²)	-

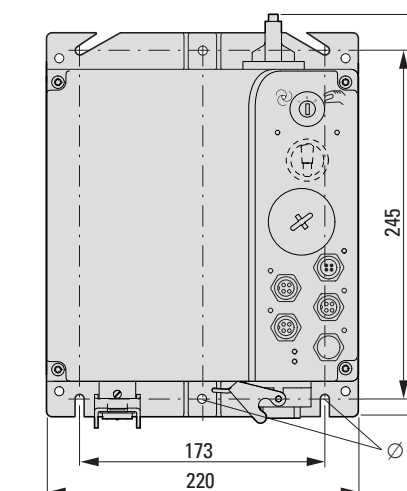
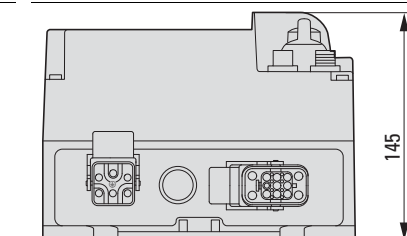
Dimensions

Motor starter RAMO

without manual override switch



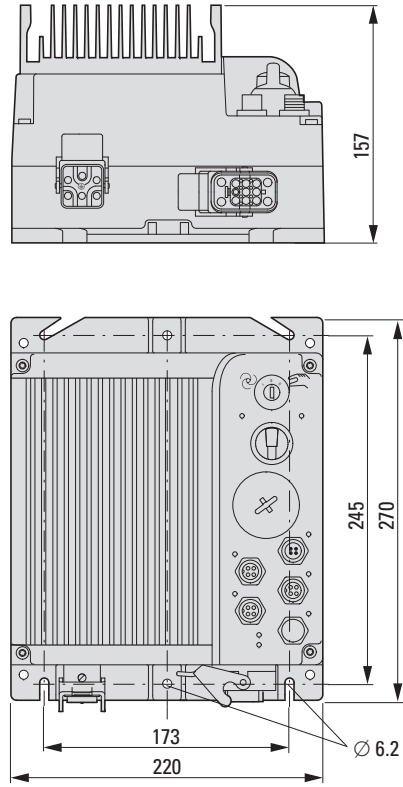
with manual override switch



RASP speed controllers

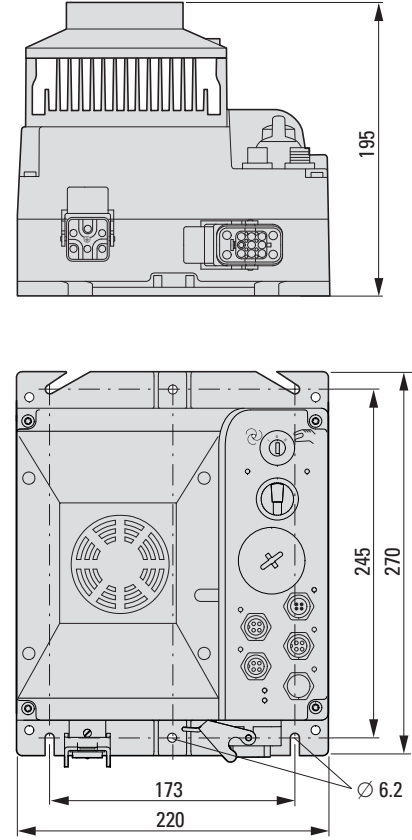
without fan

without manual override switch

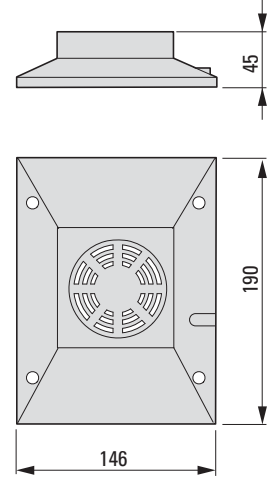


with fan

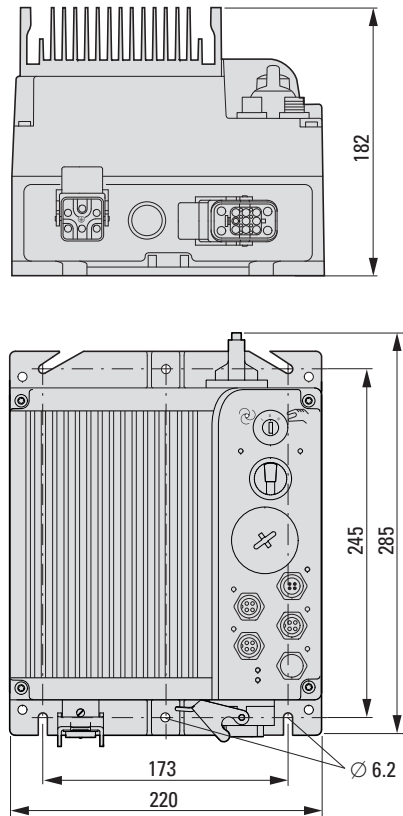
without manual override switch



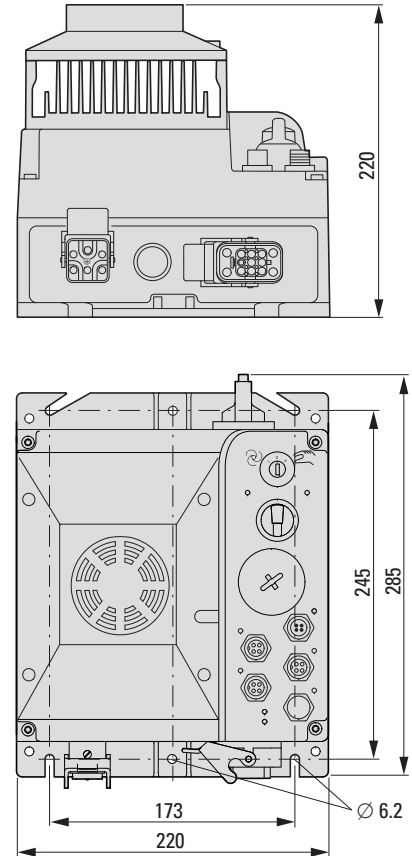
Device fans RASP-FAN-S1



with manual override switch



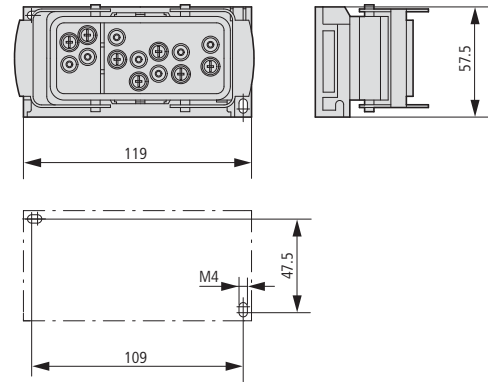
with manual override switch



Accessories

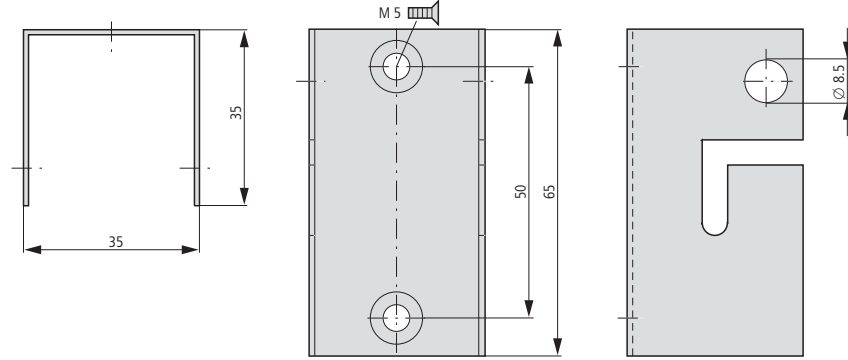
flexible busbar junction

RA-C1-PLF
RA-C1-PLF1



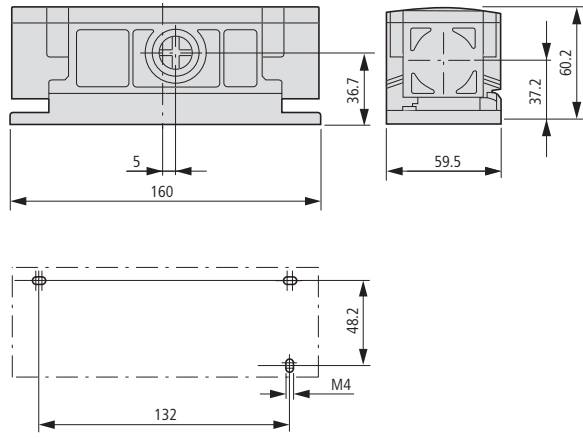
Locking brackets

SET-M-LOCK

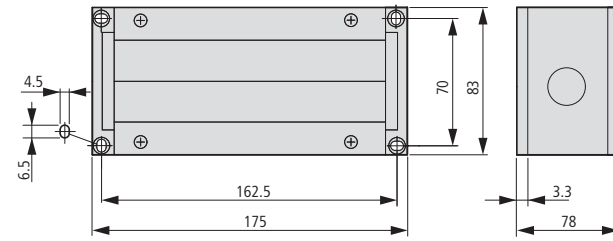


Distributor module

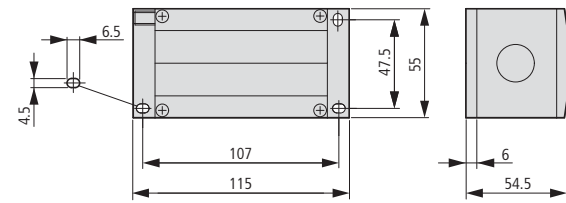
RA-C1-AM-7



RA-C1-VM-7

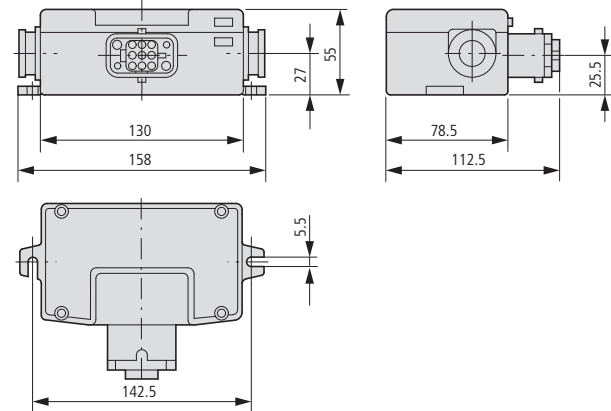


RA-C1-VP-AM-2



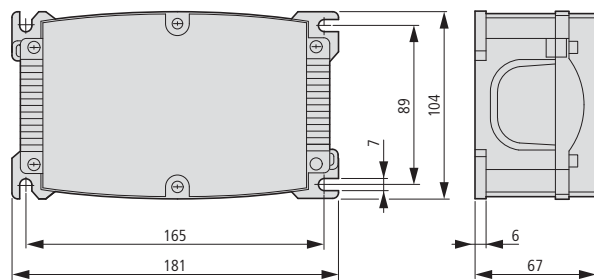
Round cable junction

RA-C2-S1-4



Locking brackets

RA-C4-PB65

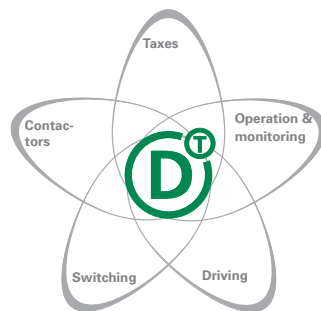


Rapid Link



SmartWire-DT™ – Cost-optimized communication for switchgear

Manufacturers of machines and systems strive to achieve a balance between the maximum level of functionality and cost optimization. Designed for further development, SmartWire-DT is a communication system for industrial switchgear in control panels and the periphery: from control, protection and switching to actuation, operation and monitoring. One technology from which you will profit, now and in the future.



PowerXL variable frequency drives and DS7 soft starters – Communicate with SmartWire-DT

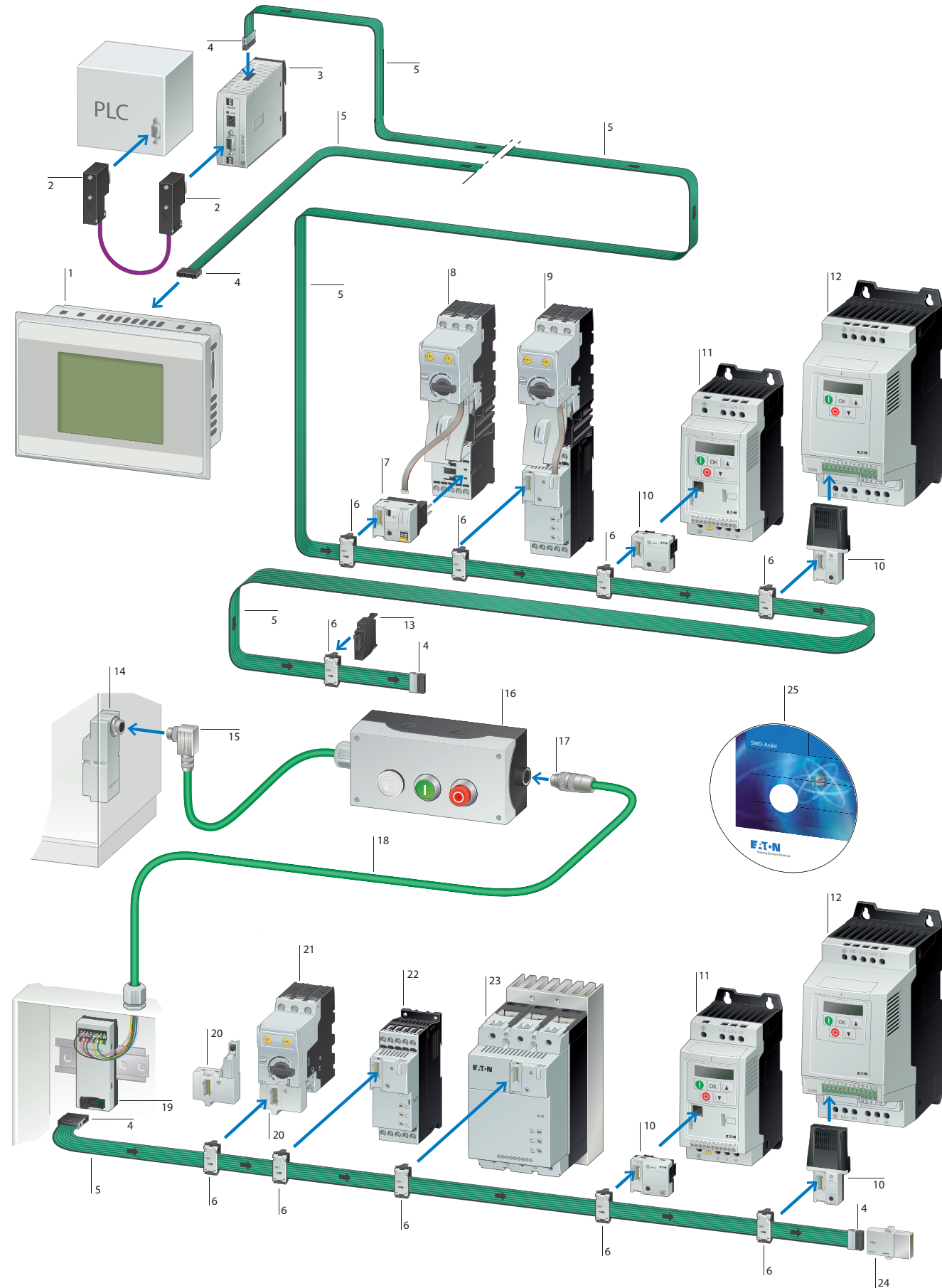
Being able to use a controller to directly access all of a soft starter's and/or variable frequency drive's parameters via SmartWire-DT is the epitome of ease of operation. Users can read and overwrite potentiometer settings. Extended status, error, and diagnostic messages can be retrieved directly. The result: absolute data transparency. The plug-in units make installation fast and foolproof, and the resulting connection includes the soft starter's control current supply. SmartWire-DT modules for expanding the functionality of the variable frequency drives in the DC1 and DA1 series are scheduled to hit the market soon. This will enable users to communicate with their variable frequency drives via SmartWire-DT on the basis of the relevant Profidrive profile. Other profiles will also be available for simple applications. Another important function that will complement the ability to change parameters in variable frequency drives will be the ability to use extended diagnostic functions. Within this context, function blocks will make it easy to connect to Eaton PLCs and HMIs.



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System overview



SmartWire-DT HMI-PLC → Industrial Switchgear 2011 catalog	1	SmartWire-DT module for variable frequency drives → page 33	10	SmartWire-DT adapter for flat/round cable for top-hat rail mounting → page 183	19
Data plug Sub-D 9 pole	2	DC1 variable frequency drive → page 12	11	SmartWire-DT PKE (motor-protective circuit-breaker) → Industrial Switchgear 2011 catalog	20
SmartWire-DT Gateways → page 182	3	DA1 variable frequency drives → page 20	12	Motor-protective circuit-breaker PKE12, PKE32 → Industrial Switchgear 2011 catalog	21
SmartWire-DT blade terminal 8 pole → page 182	4	SmartWire-DT universal module, front mount → page 183	13	Soft starter DS7 < 32 A → page 111	22
SmartWire-DT flat ribbon cable 8 pole → page 182	5	SmartWire-DT control panel cable entry for flat to round cable → page 183	14	Soft starter DS7 > 32 A → page 111	23
SmartWire-DT external device plug 8 pole → page 182	6	SmartWire-DT plug connector → page 183	15	SmartWire-DT bus termination resistor for 8-pole flat band conductor → page 183	24
SmartWire-DT PKE module (motor starter) → Industrial Switchgear 2011 catalog	7	RMQ-Titan surface-mounting enclosure with RMQ-Titan elements → Industrial Switchgear 2011 catalog	16	SmartWire-DT planning and ordering aid, SWD-Assist	25
Motor starter with PKE electronic motor protection → Industrial Switchgear 2011 catalog	8	SmartWire-DT plug connector → page 183	17		
Soft starter DS7 with electronic motor protection from PKE → Industrial Switchgear 2011 catalog	9	SmartWire-DT round cable, 8-pole → page 183	18		





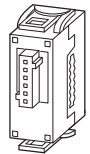

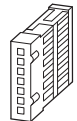
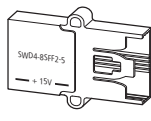
Note: You can find the entire SmartWire-DT range of products by consulting our industrial main catalog or our online catalog at <http://ecat.moeller.net>


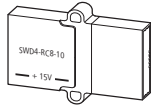
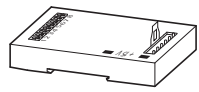
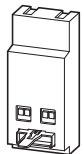


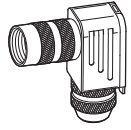
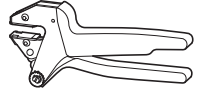
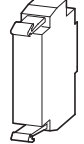
Features

- | | | | |
|---|--|---|---|
| <p>SmartWire-DT HMI-PLC</p> <ul style="list-style-type: none"> • with SmartWire-DT master interface and PLC function • Compact design with light plastic enclosures • Wide selection of onboard interfaces • 3.5", 5.7" or 7" TFT-LCD screen | <p>SmartWire-DT Gateways</p> <ul style="list-style-type: none"> • Connection of SmartWire-DT to field bus. • Field bus address setting with dip switches • Automatic baud rate detection • Feeding the supply voltage for the SmartWire-DT modules • Supplies the control voltage for the motor starter or contactor • Configuration button for automatic addressing of the SmartWire-DT module. • Support of up to 99 SmartWire-DT modules. | <p>SmartWire-DT module</p> <ul style="list-style-type: none"> • Function element for connecting to RMQ-Titan pilot devices. • Function element for connecting to DLM contactors • Function element for connecting to PKZ/PKE motor-protective circuit-breakers • Function module for connecting to NZM2,3,4 circuit-breakers • Connection of digital and analog input/output modules • DS7 Soft starter connection • Function element for connecting to PowerXL™ DC1, DA1 variable frequency drives | <p>SmartWire-DT Assist (SWD-Assist)</p> <ul style="list-style-type: none"> • Easy creation of SmartWire-DT networks • Integrated validity check • Generation of ordering lists. • Online-Functionality <ul style="list-style-type: none"> – Simple pre-commissioning – Configuration check and comparison – Display of parameters and diagnostics – Easy diagnostics of SmartWire-DT module • Free download under: http://downloadcenter.moeller.net |
|---|--|---|---|



Ordering

Description	Baud Rates	Number of SmartWire-DT slaves	Part no. Article no.	Price see price list	Std. pack	Information relevant for export to North America 
SmartWire-DT Gateways						
supply of the SmartWire-DT modules and switchgear						
	For connection to PROFIBUS-DP field bus field bus connection through 9-pin SUB-D socket Separate RS232 diagnostics interface (RJ45)	up to 12 MBit/s	Max. 58	EU5C-SWD-DP 116308	1 off	UL File No. E29184 UL Category Control No. NKCR CSA File No. 2324643 CSA Class No. 3211-07 North America Certification UL listed, CSA certified
	For connection to CANopen® field bus Field bus connection through 9-pin SUB-D plug Separate RS232 diagnostics interface (RJ45)	up to 1 MBit/s	Max. 99	EU5C-SWD-CAN 116307		
	For connection to the Ethernet-IP/MODBUS-TCP field bus Field bus connection via Ethernet Switch Separate RS232 diagnostics interface (RJ45)	10/100 MBit/s	Max. 99	EU5C-SWD-EIP-MODTCP 153163		
	for connection to field bus PROFINET as PROFINET IO-Device Field bus connection via Ethernet Switch Separate USB diagnostics interface (Mini-USB)	100 MBit/s	Max. 99	EU5C-SWD-PROFINET 170124	1 off 	UL File No. E221530 UL Category Control No. NRQA CSA File No. UL report applies to both US and Canada North America Certification UL listed, CSA certified
Flat band conductor, 8 pole						
For connecting the SmartWire-DT modules within the control panel 8 pole						
	not ready-assembled	Length 100 m	SWD4-100LF8-24 116026		1 off	UL File No. E29184 UL Category Control No. NKCR CSA File No. 2324643 CSA Class No. 3211-07 North America Certification UL listed, CSA certified
	not ready-assembled	Length 3 m	SWD4-3LF8-24-2S 116027			
		Length 5 m	SWD4-5LF8-24-2S 116028			
		Length 10 m	SWD4-10LF8-24-2S 116029			
External device plugs						
	For connecting the ribbon cable to SmartWire-DT modules		SWD4-8SF2-5 116022		10 off	UL File No. E29184 UL Category Control No. NKCR CSA File No. 2324643 CSA Class No. 3211-07 North America Certification UL listed, CSA certified
Link						
	For bridging open mounting locations for external device plugs Front fixing		SWD4-SEL8-10 116021		5 off	UL File No. E29184 UL Category Control No. NKCR CSA File No. 2324643 CSA Class No. 3211-07 North America Certification UL listed, CSA certified
Blade terminal						
	For connecting the ribbon cable to the gateway, power feeder module, coupling, bus termination resistor		SWD4-8MF2 116023		10 off	UL File No. E29184 UL Category Control No. NKCR CSA File No. 2324643 CSA Class No. 3211-07 North America Certification UL listed, CSA certified
Coupling						
	Coupling blade terminal 8-pole		SWD4-8SFF2-5 116024		1 off	UL File No. E29184 UL Category Control No. NKCR CSA File No. 2324643 CSA Class No. 3211-07 North America Certification UL listed, CSA certified

Description	Part no. Article no.	Price see price list	Std. pack	Information relevant for export to North America 						
Network terminator										
 <p>For connecting each SmartWire-DT line</p>	SWD4-RC8-10 116020		1 off	UL File No. E29184 UL Category Control No. NKCR CSA File No. 2324643 CSA Class No. 3211-07 North America Certification UL listed, CSA certified						
Cable adapters										
 <p>for connection flat cable (plug) on round cable (terminal)</p>	SWD4-8FRF-10 121377		1 off	UL File No. E29184 UL Category Control No. NKCR CSA File No. 2324643 CSA Class No. 3211-07 North America Certification UL listed, CSA certified						
Switch cabinet bushing										
<p>for transition from SmartWire-DT ribbon cable to round cable Connection of ribbon cable with blade terminal SWD4-8MF2 8 pole double conductor run pluggable Additional control voltage feeder for the motor starter and contactors.</p>										
 <p>Connection round cable via socket</p>	SWD4-SFL8-20 121380		1 off	UL File No. E29184 UL Category Control No. NKCR CSA File No. 2324643 CSA Class No. 3211-07 North America Certification UL listed, CSA certified						
<p>Connection round cable via plug</p>	SWD4-SML8-20 121381		1 off	UL File No. E29184 UL Category Control No. NKCR CSA File No. 2324643 CSA Class No. 3211-07 North America Certification UL listed, CSA certified						
Round conductor										
<p>For laying the SmartWire-DT network outside of the control panel.</p>										
 <p>For connecting the SmartWire-DT module outside the control panel 8 pole HK-S0-Li2YY, 8 mm diameter Length 50 m</p>	SWD4-50LR8-24 116030		1 off	UL File No. E29184 UL Category Control No. NKCR CSA File No. 2324643 CSA Class No. 3211-07 North America Certification UL listed, CSA certified						
Connectors for SWD round conductors										
 <p>8 pole socket Straight</p>	SWD4-SF8-67 116033		1 off	UL File No. E29184 UL Category Control No. NKCR CSA File No. 2324643 CSA Class No. 3211-07 North America Certification UL listed, CSA certified						
 <p>8-pinplug connector Straight</p>	SWD4-SM8-67 116034									
<p>8 pole socket 90° angled</p>	SWD4-SF8-67W 116035									
<p>8-pinplug connector 90° angled</p>	SWD4-SM8-67W 116036									
Tools for plugs										
 <p>Pliers for connecting external device plug and ribbon cable</p>	SWD4-CRP-1 116025		1 off	UL/CSA certification not required						
<p>Pliers for making contacts with blade terminals and ribbon cables</p>	SWD4-CRP-2 116699									
Universal slave										
<p>for configured but not yet installed SmartWire-DT slaves Front mount</p>										
 <p>Configuration</p> <table border="1" data-bbox="290 1730 391 1793"> <tr> <td>1</td> <td>3</td> <td>2</td> </tr> <tr> <td>4</td> <td>6</td> <td>5</td> </tr> </table>	1	3	2	4	6	5	M22-SWD-NOP 147637		20 off	North America Certification Request filed for UL and CSA
1	3	2								
4	6	5								



Technical data

			EU5C-SWD-DP	EU5C-SWD-CAN	EU5C-SWD-EIP-MODTCP
General					
Standards			IEC/EN 61131-2 EN 50178		
Dimensions (W x H x D)	mm		35 x 90 x 127		35 x 90 x 124
Weight	kg		0.16	0.16	0.17
Mounting			Top-hat rail IEC/EN 60715, 35 mm		
Mounting position			As required		
Ambient conditions, mechanical					
Protection type (IEC/EN 60529, EN50178, VBG 4)			IP20	IP20	IP20
Vibrations (IEC/EN 61131-2:2008)					
Constant amplitude 3,5 mm	Hz		5 - 8.4	5 - 8.4	5 - 8.4
Constant acceleration 1 g	Hz		8.4 - 150	8.4 - 150	8.4 - 150
Mechanical shock resistance (IEC/EN 60068-2-27) semi-sinusoidal 15 g/11 ms	Impacts		9	9	9
Drop to IEC/EN 60068-2-31	Fallhöhe	mm	50	50	50
Free fall, packaged (IEC/EN 60068-2-32)	m		0.3	0.3	0.3
Electromagnetic compatibility (EMC)					
Overvoltage category			II	II	II
Pollution degree			2	2	2
Electrostatic discharge (IEC/EN 61131-2:2008)					
Air discharge (Level 3)	kV		8	8	8
Contact discharge (Level 2)	kV		4	4	4
Electromagnetic fields (IEC/EN 61131-2:2008)					
80 - 1000 MHz	V/m		10	10	10
1.4 - 2 GHz	V/m		3	3	3
2 - 2.7 GHz	V/m		1	1	1
Radio interference suppression (SmartWire-DT)			EN 55011 Class A		
Burst (IEC/EN 61131-2:2008, Level 3)					
Supply cables	kV		2	2	2
CAN/DP bus cable	kV		1	1	1
SmartWire-DT cables	kV		1	1	1
Surge (IEC/EN 61131-2:2008, Level 1)					
Supply cables/CAN/DP bus cable			Supply cables 0.5 kV, CAN/DP bus cable 1 kV		
Radiated RFI (IEC/EN 61131-2:2008, Level 3)	V		10	10	10
Climatic environmental conditions					
Operating ambient temperature (IEC 60068-2)	°C		- 25 - + 55	- 25 - + 55	- 25 - + 55
Condensation			Take appropriate measures to prevent condensation		
Storage	°C		- 40 - + 70	- 40 - + 70	- 40 - + 70
relative humidity, non-condensing (IEC/EN 60068-2-30)	%		5 - 95	5 - 95	5 - 95
Supply voltage U_{Aux}					
Rated operational voltage	V		24 V DC (-15/+20%)		
Residual ripple on the input voltage	%		≤ 5	≤ 5	≤ 5
Protection against polarity reversal			Yes	Yes	Yes
Max. current	I _{max}	A	3	3	3
Short-circuit rating			If contactors with a total power consumption > 3 A are connected, a power feeder module EU5C-SWD-PF1/2 has to be used. no, external fuse FAZ Z3		
Power loss	W		Normally 1	Normally 1	Normally 1
Potential isolation			No	No	No
Rated operating voltage of 24-V-DC slaves	V		typ. U _{Aux} - 0.2	typ. U _{Aux} - 0.2	typ. U _{Aux} - 0.2

			EU5C-SWD-DP	EU5C-SWD-CAN	EU5C-SWD-EIP-MODTCP
Supply voltage U_{Pow}					
Supply voltage		V	24 DC -15 % + 20 %	24 DC -15 % + 20 %	24 DC -15 % + 20 %
Input voltage ripple		%	≤ 5	≤ 5	≤ 5
Siemens MPI, (optional)			yes	yes	yes
Rated current	I	A	0.7	0.7	0.7
Overload proof			yes	yes	yes
Inrush current and duration		A	12.5 A/6 ms	12.5 A/6 ms	12.5 A/6 ms
Heat dissipation at 24 V DC		W	3.8	3.8	3.8
Potential isolation between U _{Pow} and 15 V SmartWire-DT supply voltage			No	No	No
Bridging voltage dips		ms	10	10	10
Repetition rate		s	1	1	1
Status indication		LED	yes	yes	yes
SmartWire-DT supply voltage					
Rated operating voltage	U _e	V	14,5 ± 3 %	14,5 ± 3 %	14,5 ± 3 %
max. current	I _{max}	A	0.7	0.7	0.7
			If SmartWire-DT modules with a total power consumption > 0.7 A are connected, a power feeder module EU5C-SWD-PF2 has to be used.		
Short-circuit rating			Yes	Yes	Yes
Connection supply and inputs/outputs					
Connection type			Push in terminals		
Solid		mm ²	0.2 - 1.5	0.2 - 1.5	0.2 - 1.5
Flexible with ferrule		mm ²	0.25 - 1.5	0.25 - 1.5	0.25 - 1.5
UL/CSA solid or stranded		AWG	24 - 16	24 - 16	24 - 16
SmartWire-DT network					
Station type			SmartWire-DT master		
Number of SmartWire-DT slaves			58	99	99
Baud Rates		kBd	125 250	125 250	125 250
Address allocation			automatic	automatic	automatic
Status indication		LED	SmartWire-DT master LED: green Configurations LED: red		
Connection SmartWire-DT			Plug, 8-pole		
Plug connectors			Blade terminal SWD4-8MF2		
Fieldbus interface					
Function			PROFIBUS DP slave	CANopen® slave	Ethernet IP/MODBUS-TCP Slave
Protocol			PROFIBUS-DP	CANopen®	Ethernet IP/MODBUS-TCP
Input data, max.		Byte	240	128	Ethernet-IP: 546 MODBUS-TCP: 800
Output data, max.		Byte	240	128	Ethernet-IP: 496 MODBUS-TCP: 642
Baud Rates			up to 12 MBit/s	up to 1 MBit/s	10/100 MBit/s
Baud rates switching			automatic	automatic	automatic
Address			2 ... 125	2 ... 32	-
Address allocation			DIP switch	DIP switch	Dip switch/DHCP/BOOTP Selection via DIP switch
Status display interface		LED	Two-coloured red/green	Two-coloured red/green	Link status: yellow (10 MBit), green (100 MBit) flashing
Terminating resistor			switchable via plug	DIP switches	-
Terminal type			1 x D-SUB socket, 9-pin	1 x D-SUB socket, 9-pin	2 x RJ45 (2-channel switch)
Potential isolation			Yes	Yes	Yes

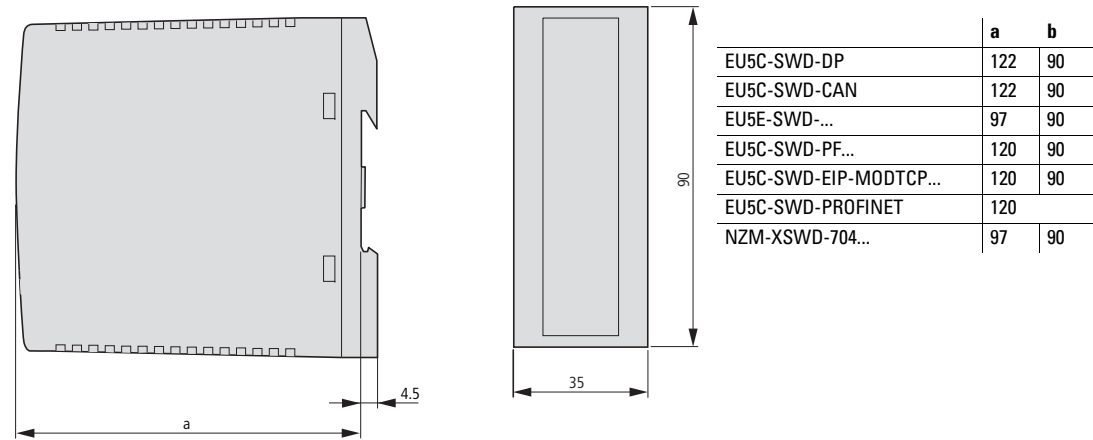
SmartWire-DT®

Part no.		M22-SWD-NOP...	SWD4-RC8-10	SWD4-8SF2-5
General				
Standards		IEC/EN 61131-2 EN 50178	IEC/EN 61131-2 EN 50178	IEC/EN 61131-2 EN 50178
Dimensions (W x H x D)	mm	12 x 42 x 39	48.5 x 34.5 x 10	15 x 36.5 x 17.5
Weight	kg	-	-	-
Weight	g	10	10	5.5
Mounting position		As required	As required	As required
Ambient conditions, mechanical				
Protection type (IEC/EN 60529, EN50178, VBG 4)		IP20	IP20	IP20
Vibrations (IEC/EN 61131-2:2008)				
Constant amplitude 3,5 mm	Hz	5 - 8.4	5 - 8.4	5 - 8.4
Constant acceleration 1 g	Hz	8.4 - 150	8.4 - 150	8.4 - 150
Mechanical shock resistance (IEC/EN 60068-2-27) semi-sinusoidal 15 g/11 ms	Impacts	9	9	9
Drop to IEC/EN 60068-2-31	Fallhöhe mm	50	50	-
Free fall, packaged (IEC/EN 60068-2-32)	m	0.3	0.3	-
Electromagnetic compatibility (EMC)				
Overvoltage category		Not applicable	II	-
Pollution degree		2	2	-
Electrostatic discharge (IEC/EN 61131-2:2008)				
Air discharge (Level 3)	kV	8	8	-
Contact discharge (Level 2)	kV	4	4	-
Electromagnetic fields (IEC/EN 61131-2:2008)				
80 - 1000 MHz	V/m	10	10	-
1.4 - 2 GHz	V/m	3	3	-
2 - 2.7 GHz	V/m	1	1	-
Radio interference suppression (SmartWire-DT)		EN 55011 Class A	EN 55011 Class A	-
Burst (IEC/EN 61131-2:2008, Level 3)				
Supply cables	kV	2	-	-
SmartWire-DT cables	kV	1	1	-
Radiated RFI (IEC/EN 61131-2:2008, Level 3)	V	10	10	-
Climatic environmental conditions				
Operating ambient temperature (IEC 60068-2)	°C	- 30 - + 55	- 25 - + 55	- 25 - + 55
Condensation				
		Take appropriate measures to prevent condensation	Take appropriate measures to prevent condensation	Take appropriate measures to prevent condensation
Storage	°C	- 40 - 80	- 40 - 70	- 40 - 70
relative humidity, non-condensing (IEC/EN 60068-2-30)	%	5 - 95	5 - 95	5 - 95
SmartWire-DT network				
Station type		SmartWire-DT slave	-	-
Number		-	-	-
Baud rate setting		automatic	-	-
SmartWire-DT status LED	LED	Green	-	-
Connections		Plug, 8-pole	-	-
Plug connectors		SWD4-8SF2-5	-	-
Number of insertion cycles		≥ 50	-	-
Function element				
Contacts		-	-	-
Lifespan mechanical/electrical	Operations	-	-	-
LED display	LED	No	-	-
Diagnostics		Yes	-	-
Fixing		Front fixing	-	-
Connection options				
SWD-In			Plug, 8-pole	Plug connector
Number of insertion cycles			≥ 200	≥ 1
SWD-Out			-	Socket, 8-pole
Number of insertion cycles			-	≥ 200

SWD4-8SFF2-5	SWD4-8FRF-10	SWD4-SFL8-20	SWD4-SML8-20
IEC/EN 61131-2 EN 50178	IEC/EN 61131-2 EN 50178	IEC/EN 61131-2 EN 50178	IEC/EN 61131-2 EN 50178
48.5 x 34.5 x 10	35 x 90 x 35	35 x 83 x 40	35 x 83 x 46
-	-	-	-
4.5	42	50	50
As required	As required	As required	As required
IP20	IP20	IP67	IP67
5 - 8.4	5 - 8.4	5 - 8.4	5 - 8.4
8.4 - 150	8.4 - 150	8.4 - 150	8.4 - 150
9	9	9	9
-	-	-	-
-	-	-	-
-	-	-	-
8	8	8	8
4	4	4	4
-	-	10	10
-	-	3	3
-	-	1	1
-	-	-	-
-	-	-	-
-	-	10	10
- 25 - + 55	- 25 - + 55	- 25 - + 55	- 25 - + 55
Take appropriate measures to prevent condensation	Take appropriate measures to prevent condensation	Take appropriate measures to prevent condensation	Take appropriate measures to prevent condensation
- 40 - 70	- 40 - 70	- 40 - 70	- 40 - 70
5 - 95	5 - 95	5 - 95	5 - 95
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
Plug, 8-pole	Plug, 8-pole	Plug, 8-pole	Plug, 8-pole
≥ 200	≥ 200	≥ 200	≥ 500
Plug, 8-pole	Push in terminals	Socket, 8-pole	Plug, 8-pole
≥ 200	-	≥ 500	≥ 200

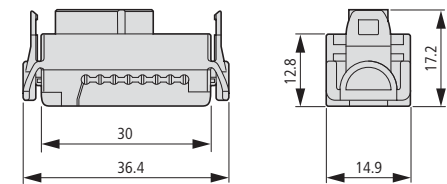
Dimensions

SmartWire-DT Gateways



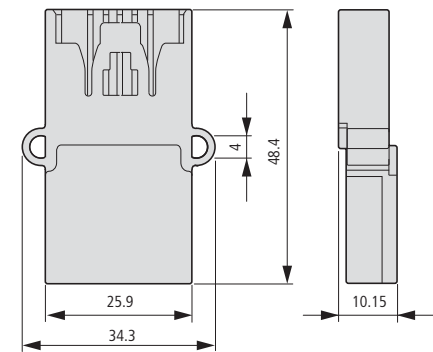
External device plugs

SWD4-8SF2-5



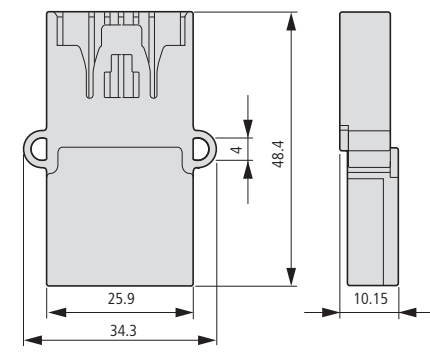
Network terminator

SWD4-RC8-10



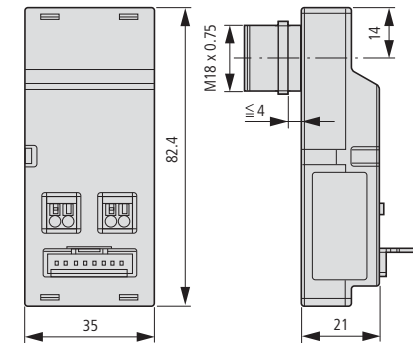
Coupling

SWD4-8SFF2-5



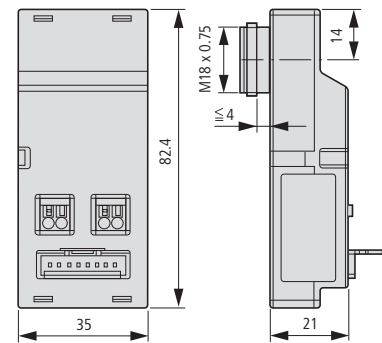
Switch cabinet bushing plug

SWD4-SM8-20



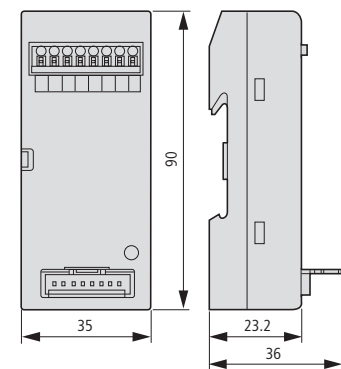
Switch cabinet bushing socket

SWD4-SFL8-20



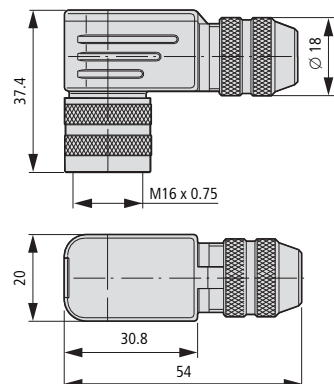
Adapter flat cable on round cable

SWD4-8FRF-10

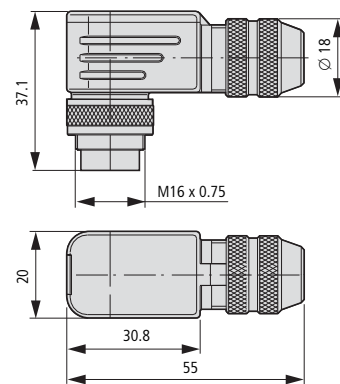


Connectors for SmartWire-DT round cables, angled

SWD4-SF8-67W

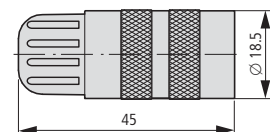


SWD4-SM8-67W

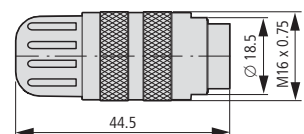


Plug connectors for SmartWire-DT round cables, flat

SWD4-SF8-67



SWD4-SM8-67





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URL

www.moeller.net/cad



Worldwide export of machines and plants

European machine and system building and worldwide exports are closely related. Even if you don't export your machines at present, you should be prepared for it in the future. Eaton provides switchgear and protective devices with all the essential approvals and certificates for machine and system building. In most countries around the world, conformity with international standards is the sole requirement for successful exports. This is because components in these locations are governed by compliance with well known and established IEC standards. In this respect, the European CE mark is not only the passport for exports within Europe but also far beyond its borders.



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Nearly all the switchgear and protective devices of Eaton's Moeller® series are world market devices. Each product line thus carries all the approvals and certification marks required for worldwide use.

These product lines include those for

- Pilot devices, limit switches
- Contactors and various timing and special relays
- Motor-protective circuit-breakers and relays
- Electronic components and systems.

With circuit-breakers and switch-disconnectors, Eaton offers IEC devices for use in most countries in the world and NA devices with virtually the same dimensions and the same accessories for the North American market. This considerably simplifies device selection since the North American standards often involve the need for considerably different technical specifications.

Electrical engineering products and their applications are not harmonized internationally.

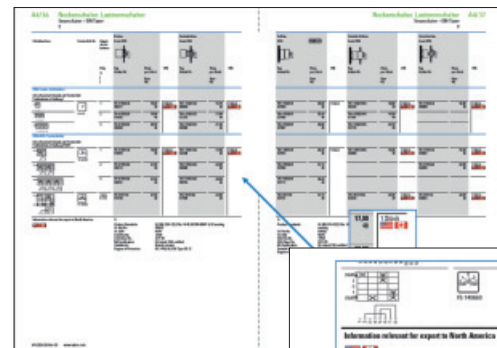


The greatest differences to the IEC world are in North America, i.e. the USA and Canada. For many newcomers to the export business, it is initially surprising to experience the very different approaches and solutions.

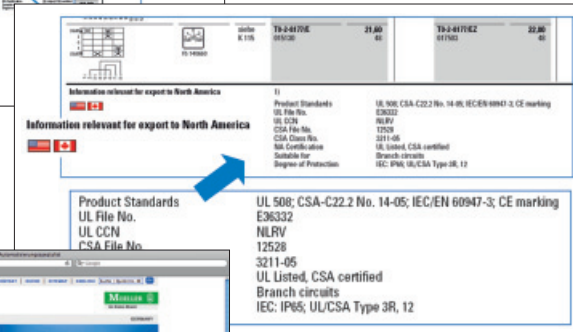
Special components, such as handles for main switches that can only be operated by the intentional switching of an

additional handle when the control panel door is opened, may sometimes be required for export to North America. Likewise, the European motor-protective circuit-breaker is only accepted with an upstream protective device or with larger air and creepage distances at the incoming terminals. Eaton is the competent partner of choice for export-related issues here.

Qualified information is a critical key to success



The Eaton Main Catalogue for Moeller® series products provides reliable information for machine and panel builders on the approval of components deployed for North American market. Each selection page provides information such as the relevant product standard, the E-File Number, the Category Control Number or the CSA Class Number. Many customers incorporate this information in their parts lists in order to be well prepared for the acceptance procedures.



Up to 13 data items are listed here for each product, such as the suitability for use in feeders or branch circuits, the maximum operating voltage, or the North American degree of protection, such as UL / CSA Type 4X. The Main Catalogue also contains a glossary with explanations of the American terms.



The link <http://www.moeller.net/eaton-approbationen/en/index.jsp> shows the relevant approvals or permits for each component type. This therefore enables you to view the certificates provided or, depending on the test authority, also the product report. The information given is the same as what is provided in the databases of the authorities.

Anyone wishing to avoid unfortunate experiences, should make use beforehand of the large number of publications that Eaton is offering on the issue of exports to North America. They contain the implementation of the codes & standards and a description of different practices.

These technical articles can be accessed via <http://www.moeller.net/en/company/news/publications/index.jsp>
They can be downloaded or ordered free of charge.





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servicegermany@eaton.com

or contact us by phone at:

Tel.: +49 (0)7841 604 - 334

We can be contacted here between

Monday – Thursday from 08.00 – 17.00 CET
and Friday from 08.00 – 16.00 CET.

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Our customer service:

Eaton Hydraulics Group

Dr.-Reckeweg-Straße 1

D-76532 Baden-Baden

Tel.: +49 (0)7221 682 - 0

Fax: +49 (0)7221 682 - 788

Email: customersupportemea@eaton.com

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Full-load motor-running currents in amperes corresponding to various AC horsepower ratings

HP	110 - 120 V			220 - 240 V ^{a,b}			360 - 380 V		440 - 480 V			550 - 600 V		
	Single phase	Two phase	Three phase	Single phase	Two phase	Three phase	Single phase	Three phase	Single phase	Two phase	Three phase	Single phase	Two phase	Three phase
1/10	3.0	-	-	1.5	-	-	1.0	-	-	-	-	-	-	-
1/8	3.8	-	-	1.9	-	-	1.2	-	-	-	-	-	-	-
1/6	4.4	-	-	2.2	-	-	1.4	-	-	-	-	-	-	-
1/4	5.8	-	-	2.9	-	-	1.8	-	-	-	-	-	-	-
1/3	7.2	-	-	3.6	-	-	2.3	-	-	-	-	-	-	-
1/2	9.8	4.0	4.4	4.9	2.0	2.2	3.2	1.3	2.5	1.0	1.1	2.0	0.8	0.9
3/4	13.8	4.8	6.4	6.9	2.4	3.2	4.5	1.8	3.5	1.2	1.6	2.8	1.0	1.3
1	16.0	6.4	8.4	8.0	3.2	4.2	5.1	2.3	4.0	1.6	2.1	3.2	1.3	1.7
1-1/2	20.0	9.0	12.0	10.0	4.5	6.0	6.4	3.3	5.0	2.3	3.0	4.0	1.8	2.4
2	24.0	11.8	13.6	12.0	5.9	6.8	7.7	4.3	6.0	3.0	3.4	4.8	2.4	2.7
3	34.0	16.6	19.2	17.0	8.3	9.6	10.9	6.1	8.5	4.2	4.8	6.8	3.3	3.9
5	56.0	26.4	30.4	28.0	13.2	15.2	17.9	9.7	14.0	6.6	7.6	11.2	5.3	6.1
7-1/2	80.0	38.0	44.0	40.0	19.0	22.0	27.0	14.0	21.0	9.0	11.0	16.0	8.0	9.0
10	100	48.0	56.0	50.0	24.0	28.0	33.0	18.0	26.0	12.0	14.0	20.0	10.0	11.0
15	135	72.0	84.0	68.0	36.0	42.0	44.0	27.0	34.0	18.0	21.0	27.0	14.0	17.0
20	-	94.0	108	88.0	47.0	54.0	56.0	34.0	44.0	23.0	27.0	35.0	19.0	22.0
25	-	118	136	110	59.0	68.0	70.0	44.0	55.0	29.0	34.0	44.0	24.0	27.0
30	-	138	160	136	69.0	80.0	87.0	51.0	68.0	35.0	40.0	54.0	28.0	32.0
40	-	180	208	176	90.0	104	112	66.0	88.0	45.0	52.0	70.0	36.0	41.0
50	-	226	260	216	113	130	139	83.0	108	56.0	65.0	86.0	45.0	52.0
60	-	-	-	-	133	154	-	103	-	67.0	77.0	-	53.0	62.0
75	-	-	-	-	166	192	-	128	-	83.0	96.0	-	66.0	77.0
100	-	-	-	-	218	248	-	165	-	109	124	-	87.0	99.0
125	-	-	-	-	-	312	-	208	-	135	156	-	108	125
150	-	-	-	-	-	360	-	240	-	156	180	-	125	144
200	-	-	-	-	-	480	-	320	-	208	240	-	167	192
250	-	-	-	-	-	602	-	403	-	-	302	-	-	242
300	-	-	-	-	-	-	-	482	-	-	361	-	-	289
350	-	-	-	-	-	-	-	560	-	-	414	-	-	336
400	-	-	-	-	-	-	-	636	-	-	477	-	-	382
500	-	-	-	-	-	-	-	786	-	-	590	-	-	472

^aTo obtain full-load currents for 200 and 208 V motors, increase corresponding 220 - 240 V ratings by 15 and 10 percent, respectively.

^bTo obtain full-load currents for 265 and 277 V motors, decrease corresponding 220 - 240 V ratings by 13 and 17 percent, respectively.

Quote from "Power Conversion Equipment - UL 508C, May 3, 2002".

Reproduced from UL 508 C, Power Conversion Equipment, 3rd edition (May 2, 2002) with permission of Underwriters Laboratories Inc.

Full-load motor-running currents in amperes corresponding to various AC horsepower ratings

Minimum fuse sizes for short-circuit protection of three-phase motors
The maximum value depends on the switching device or the overload relay.

Motor power			230 V			400 V			440 V			500 V			690 V		
			Motor rated operational current	Fuse Starting DOL	Fuse Starting Y/Δ	Motor rated operational current	Fuse Starting DOL	Fuse Starting Y/Δ	Motor rated operational current	Fuse Starting DOL	Fuse Starting Y/Δ	Motor rated operational current	Fuse Starting DOL	Fuse Starting Y/Δ	Motor rated operational current	Fuse Starting DOL	Fuse Starting Y/Δ
kWh	p.f.	η (%)	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
0.06	0.7	58	0.37	2	–	0.21	2	–	0.19	2	–	0.17	2	–	0.12	2	–
0.09	0.7	60	0.54	2	–	0.31	2	–	0.28	2	–	0.25	2	–	0.18	2	–
0.12	0.7	60	0.72	4	2	0.41	2	–	0.37	2	–	0.33	2	–	0.24	2	–
0.18	0.7	62	1.04	4	2	0.6	2	–	0.54	2	–	0.48	2	–	0.35	2	–
0.25	0.7	62	1.4	4	2	0.8	4	2	0.76	2	–	0.7	2	–	0.5	2	–
0.37	0.72	66	2	6	4	1.1	4	2	1	4	2	0.9	2	2	0.7	2	–
0.55	0.75	69	2.7	10	4	1.5	4	2	1.4	4	2	1.2	4	2	0.9	4	2
0.75	0.79	74	3.2	10	4	1.9	6	4	1.7	4	2	1.5	4	2	1.1	4	2
1.1	0.81	74	4.6	10	6	2.6	6	4	2.4	4	2	2.1	6	4	1.5	4	2
1.5	0.81	74	6.3	16	10	3.6	6	4	3.3	6	4	2.9	6	4	2.1	6	4
2.2	0.81	78	8.7	20	10	5	10	6	4.6	10	6	4	10	4	2.9	10	4
3	0.82	80	11.5	25	16	6.6	16	10	6	16	10	5.3	16	6	3.8	10	4
4	0.82	83	14.8	32	16	8.5	20	10	7.7	16	10	6.8	16	10	4.9	16	6
5.5	0.82	86	19.6	32	25	11.3	25	16	10.2	20	10	9	20	16	6.5	16	10
7.5	0.82	87	26.4	50	32	15.2	32	16	13.8	25	16	12.1	25	16	8.8	20	10
11	0.84	87	38	80	40	21.7	40	25	19.8	32	25	17.4	32	20	12.6	25	16
15	0.84	88	51	100	63	29.3	63	32	26.6	50	32	23.4	50	25	17	32	20
18.5	0.84	88	63	125	80	36	63	40	32.8	63	32	28.9	50	32	20.9	32	25
22	0.84	92	71	125	80	41	80	50	37	80	40	33	63	32	23.8	50	25
30	0.85	92	96	200	100	55	100	63	50	100	63	44	80	50	32	63	32
37	0.86	92	117	200	125	68	125	80	61	125	80	54	100	63	39	80	50
45	0.86	93	141	250	160	81	160	100	74	125	100	65	125	80	47	80	63
55	0.86	93	173	250	200	99	200	125	90	125	100	79	160	80	58	100	63
75	0.86	94	233	315	250	134	200	160	122	160	125	107	200	125	78	160	100
90	0.86	94	279	400	315	161	250	200	146	200	160	129	200	160	93	160	100
110	0.86	94	342	500	400	196	315	200	179	250	200	157	250	160	114	200	125
132	0.87	95	401	630	500	231	400	250	210	250	250	184	250	200	134	250	160
160	0.87	95	486	630	630	279	400	315	254	315	250	224	315	250	162	250	200
200	0.87	95	607	800	630	349	500	400	318	400	315	279	400	315	202	315	250
250	0.87	95	–	–	–	437	630	500	397	630	400	349	500	400	253	400	315
315	0.87	96	–	–	–	544	800	630	495	630	630	436	630	500	316	500	400
400	0.88	96	–	–	–	683	1000	800	621	800	800	547	800	630	396	630	400
450	0.88	96	–	–	–	769	1000	800	699	800	800	615	800	630	446	630	630
500	0.88	97	–	–	–	–	–	–	–	–	–	–	–	–	491	630	630
560	0.88	97	–	–	–	–	–	–	–	–	–	–	–	–	550	800	630
630	0.88	97	–	–	–	–	–	–	–	–	–	–	–	–	618	800	630

Instructions

The rated motor currents apply to normal internally and surface-cooled three-phase motors with 1500 rpm.
DOL starting: Starting current max. 6 × rated motor current.
Starting time max. 5 s.
Y/Δ-start: Starting current max. 2 × motor rated current.
Starting time max. 15 s.
Set overload relay in line to 0.58 × motor rated current.

Fuse ratings at Y/Δ starting apply also to three-phase slipring motors.
For higher rated currents, starting currents and/or longer starting times, larger fuses will be required. Table applies for time delay and gL fuses (VDE 0636)

For LV h.b.c. fuse with aM characteristics the fuse should be equal to the rated operational current.

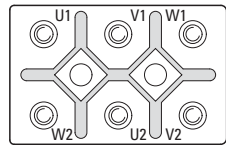
Drives engineering selection criteria

Each drive task requires a drive motor. The speed, torque and controllability of each motor must fulfill the requirements of the task. The following generally applies:
 the application determines the drive. The drive motor most frequently used worldwide in industrial plants and large buildings is the 3-phase asynchronous motor. Its robust and simple construction as well as its high degrees of protection and standard types are the main features of this inexpensive electric motor.

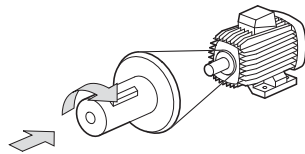
Motor connection

When connecting a 3-phase motor to the mains supply, the data on the rating plate of the motor must correspond to the mains voltage and frequency.

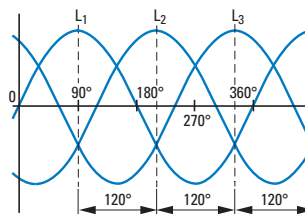
The standard connection is implemented via six screw terminals in the terminal box of the motor and with two types of circuit, the star connection and the delta circuit, depending on the mains voltage.



The rotation direction of a motor is always determined by directly looking at the drive shaft of the motor (from the drive end). On motors with two shaft ends, the driving end is denoted with D (= Drive), the non-driving end with N (= No drive).

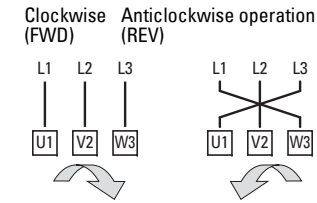


Regardless of the circuit type and the type of three-phase asynchronous motor, the connections must be labeled, so that their alphabetical sequence (e.g. U1, V1, W1) corresponds with the order of the mains voltage phase sequence (L1, L2, L3) and causes the motor to rotate clockwise.



On the three-phase asynchronous motor, three windings are arranged offset from each other by $120^\circ/p$ (p = number of pole pairs). To generate a rotating field in the motor, an alternating voltage is applied to each phase in turn at a time delay of 120° .

The effect of inductance causes the rotation field and torque to be formed in the rotor winding. The speed of the motor thus depends on the number of pole pairs and the frequency of the supply voltage. The operating direction can be reversed by swapping over two of the supply phases.



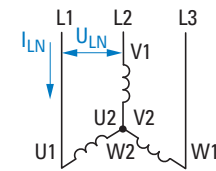
FWD = forward run (clockwise rotation field)
 REV = reverse run (anticlockwise rotation field)

Information on the rating plate

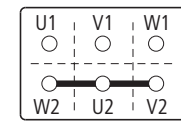
The electrical and mechanical rating data of the motor must be stated on its rating plate (IEC 34-1, VDE 0530). The data on the rating plate describes the stationary operation of the motor in the area of its operating point (MN, e.g. at 400 V and 50 Hz). The operational data is unstable in the motor start phase. The following examples show the rating plates for two motors with a motor shaft output of 4 kW and the respective connection circuits on a 3-phase AC network with 400 V and 50 Hz.

Star circuit

230 / 400 V	Δ / Y	14.5 / 8.5 A
S1	4.0 kW	cos ϕ 0.82
1410 min ⁻¹		50 Hz
IP 54 Iso. KI F		



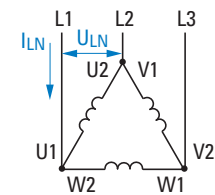
$$U_{LN} = \sqrt{3} \times U_W \cdot I_{LN} = I_W$$



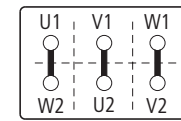
- With the specified 230/400 V voltage, this motor must be connected to the 3-phase system ($U_{LN} = 400$ V) in a star-connected circuit.
- The voltage of each motor winding is designed for 230 V. The windings must therefore be connected in sequence to the phase voltage (400 V).
- The three winding phases (W2-U2-V2) are configured in the terminal box to the so-called star point. The voltage of the individual phases to the star point is 230 V ($= U_W$).

Delta circuit

400 / 690 V	Δ / Y	8.5 / 4.9 A
S1	4.0 kW	cos ϕ 0.82
1410 min ⁻¹		50 Hz
IP 54 Iso. KI F		



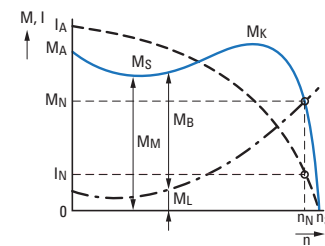
$$U_{LN} = U_W \cdot I_{LN} = \sqrt{3} \times I_W$$



- With the specified 400/690 V voltage, this motor must be connected to the 3-phase system ($U_{LN} = 400$ V) in a delta circuit.
- Each motor winding is designed here for the maximum phase voltage of 400 V and can be connected directly.
- The three winding phases (U1 – W2, V1 – U2, W1 – V2) are combined in the terminal box and connected directly to the individual phases.

Startup characteristics

The following figure shows the characteristic startup curves of a 3-phase asynchronous motor.



- I_A : Starting current
- I_N : Rated operational current at the operating point
- M_A : Starting torque
- M_B : Accelerating torque ($M_M > M_L$)
- M_K : Breakdown torque
- M_L : Load torque
- M_M : Motor torque
- M_N : Rated load torque, (stable operating point, intersection point of the 3-phase speed torque characteristic with the load characteristic)
- M_S : Pull-up torque
- n : Speed (actual value)
- n_N : Rated speed at the operating point
- n_S : Synchronous speed ($n_S - n_N =$ slip speed s)

Synchronous speed:

$$n_s = \frac{f}{p}$$

Slip speed in %:

$$s = \frac{n_s - n}{n_s} \cdot 100\%$$

3-phase asynchronous motor speed:

$$n = \frac{f}{p} \cdot (1 - s)$$

- f : Frequency of voltage in Hz ($= s^{-1}$)
- n : Speed in r.p.m.
- p : Number of pole pairs
- s : Slip speed in r.p.m.

Electric power:

$$P_1 = U \times I \times \sqrt{3} \times \cos \phi$$

- P_1 : Electrical power in W
- U : Rated operating voltage in V
- I : Rated operational current in A
- $\cos \phi$: Power factor

Motor output (power equation):

$$P_2 = \frac{M_N \times n}{9550}$$

- P_2 : Mechanical shaft output power in kW
- M_N : Rated torque in Nm
- n : Speed in r.p.m.

Efficiency:

$$\eta = \frac{P_2}{P_1}$$

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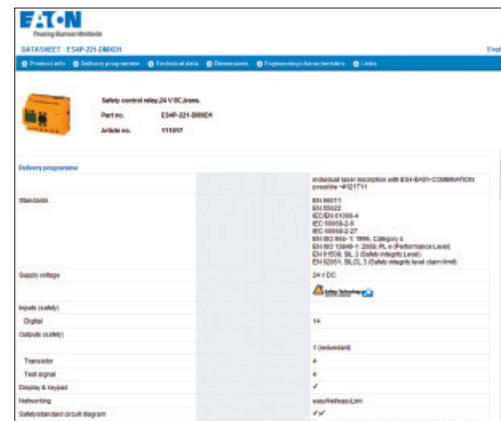
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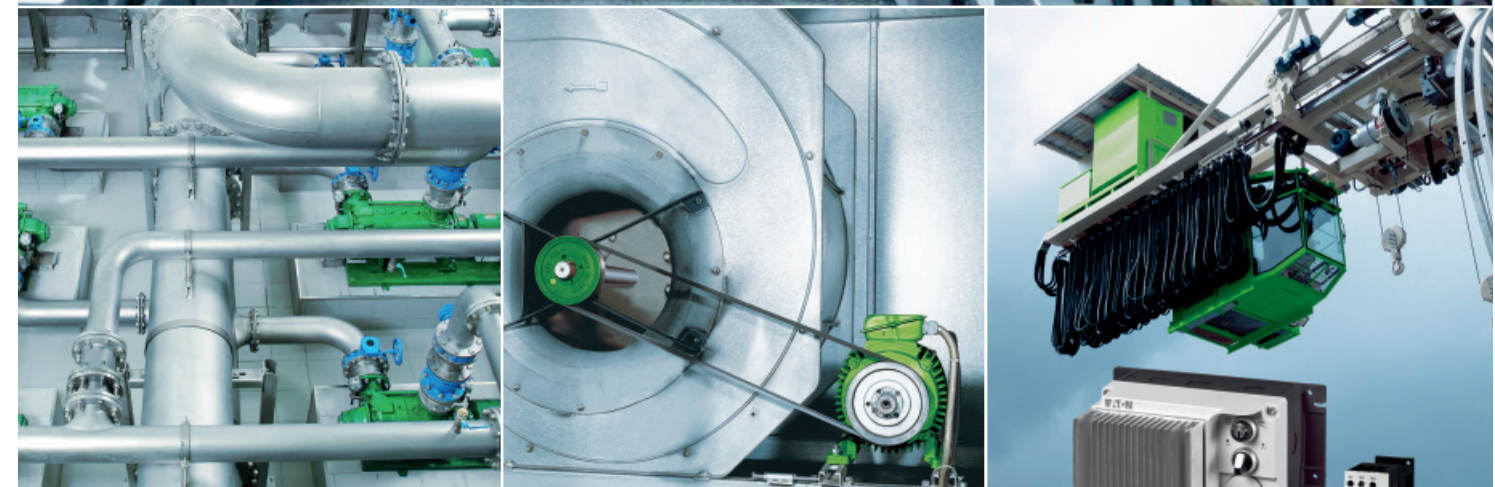
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