Short form catalog | November 2016

Motor protection and control
Manual motor starters, contactors and overload relays

Motor rated operational powers and currents

The currents given below concern standard three-phase four-pole cage motors (1500 r.p.m. at 50 Hz 1800 r.p.m. at 60 Hz). These values are given for guidance and may vary according to the motor manufacturer and depending on the number of poles.

IEC	Motor nominal current: standardized values in blue colour (according to IEC 60947-4-1 Annex G)									
Motor power	220 V	230 V	240 V	380 V	400 V	415 V	440 V	500 V	660 V	690 V
kW	A	A	A	A	A	A	A	A	A	A
0.06	0.37	0.35	0.34	0.21	0.2	0.19	0.18	0.16	0.13	0.12
0.09	0.54	0.52	0.50	0.32	0.3	0.29	0.26	0.24	0.18	0.17
0.12	0.73	0.7	0.67	0.46	0.44	0.42	0.39	0.32	0.24	0.23
0.18	1	1	1	0.63	0.6	0.58	0.53	0.48	0.37	0.35
0.25	1.6	1.5	1.4	0.9	0.85	0.82	0.74	0.68	0.51	0.49
0.37	2.0	1.9	1.8	1.2	1.1	1.1	1	0.88	0.67	0.64
0.55	2.7	2.6	2.5	1.6	1.5	1.4	1.3	1.2	0.91	0.87
0.75	3.5	3.3	3.2	2.0	1.9	1.8	1.7	1.5	1.15	1.1
1.1	4.9	4.7	4.5	2.8	2.7	2.6	2.4	2.2	1.7	1.6
1.5	6.6	6.3	6	3.8	3.6	3.5	3.2	2.9	2.2	2.1
2.2	8.9	8.5	8.1	5.2	4.9	4.7	4.3	3.9	2.9	2.8
3	11.8	11.3	10.8	6.8	6.5	6.3	5.7	5.2	4	3.8
4	15.7	15	14.4	8.9	8.5	8.2	7.4	6.8	5.1	4.9
5.5	20.9	20	19.2	12.1	11.5	11.1	10.1	9.2	7	6.7
7.5	28.2	27	25.9	16.3	15.5	14.9	13.6	12.4	9.3	8.9
11	39.7	38	36.4	23.2	22	21.2	19.3	17.6	13.4	12.8
15	53.3	51	48.9	30.5	29	28	25.4	23	17.8	17
18.5	63.8	61	58.5	36.8	35	33.7	30.7	28	22	21
22	75.3	72	69	43.2	41	39.5	35.9	33	25.1	24
30	100	96	92	57.9	55	53	48.2	44	33.5	32
37	120	115	110	69	66	64	58	53	40.8	39
45	146	140	134	84	80	77	70	64	49.1	47
55	177	169	162	102	97	93	85	78	59.6	57
75	240	230	220	139	132	127	116	106	81	77
90	291	278	266	168	160	154	140	128	97	93
110	355	340	326	205	195	188	171	156	118	113
132	418	400	383	242	230	222	202	184	140	134
160	509	487	467	295	280	270	245	224	169	162
200	637	609	584	368	350	337	307	280	212	203
250	782	748	717	453	430	414	377	344	261	250
315	983	940	901	568	540	520	473	432	327	313
355	1109	1061	1017	642	610	588	535	488	370	354
400	1255	1200	1150	726	690	665	605	552	418	400
500	1545	1478	1416	895	850	819	745	680	515	493
560	1727	1652	1583	1000	950	916	832	760	576	551
630	1928	1844	1767	1116	1060	1022	929	848	643	615
710	2164	2070	1984	1253	1190	1147	1043	952	721	690
800	2446	2340	2243	1417	1346	1297	1179	1076	815	780
900	2760	2640	2530	1598	1518	1463	1330	1214	920	880
1000	3042	2910	2789	1761	1673	1613	1466	1339	1014	970

UL/CSA	Motor nominal current: single and three phase (according to UL 60947-4-1A)								
Motor power	120 V 1-ph	200 V 1-ph	200 V 3-ph	208 V 1-ph	208 V 3-ph	220-240 V 1-ph	220-240 V 3-ph	380-415 V 3-ph	440-480 V 3-ph	550-600 V 3-ph
hp	A	A	A	A	A	A	A	A	A	A
1/10	3	–	–	–	–	1.5	–	–	–	–
1/8	3.8	–	–	–	–	1.9	–	–	–	–
1/6	4.4	2.5	–	2.4	–	2.2	–	–	–	–
1/4	5.8	3.3	–	3.2	–	2.9	–	–	–	–
1/3	7.2	4.1	–	4	–	3.6	–	–	–	–
1/2	9.8	5.6	2.5	5.4	2.4	4.9	2.2	1.3	1.1	0.9
3/4	13.8	7.9	3.7	7.6	3.5	6.9	3.2	1.8	1.6	1.3
1	16	9.2	4.8	8.8	4.6	8	4.2	2.3	2.1	1.7
1-1/2	20	11.5	6.9	11	6.6	10	6	3.3	3	2.4
2	24	13.8	7.8	13.2	7.5	12	6.8	4.3	3.4	2.7
3	34	19.6	11	18.7	10.6	17	9.6	6.1	4.8	3.9
5	56	32.2	17.5	30.8	16.7	28	15.2	9.7	7.6	6.1
7-1/2	80	46	25.3	44	24.2	40	22	14	11	9
10	100	57.5	32.2	55	30.8	50	28	18	14	11
15	135	–	48.3	–	46.2	68	42	27	21	17
20	–	–	62.1	–	59.4	88	54	34	27	22
25	–	–	78.2	–	74.8	110	68	44	34	27
30	–	–	92	–	88	136	80	51	40	32
40	–	–	120	–	114	176	104	66	52	41
50	–	–	150	–	143	216	130	83	65	52
60	–	–	177	–	169	–	154	103	77	62
75	–	–	221	–	211	–	192	128	96	77
100	–	–	285	–	273	–	248	165	124	99
125	–	–	359	–	343	–	312	208	156	125
150	–	–	414	–	396	–	360	240	180	144
200	–	–	552	–	528	–	480	320	240	192
250	–	–	–	–	–	–	604	403	302	242
300	–	–	–	–	–	–	722	482	361	289
350	–	–	–	–	–	–	828	560	414	336
400	–	–	–	–	–	–	954	636	477	382
450	–	–	–	–	–	–	1030	–	515	412
500	–	–	–	–	–	–	1180	786	590	472

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Motor protection and control
Manual motor starters, contactors and overload relays

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More product information and technical data available in main catalog 1SBC100192C0205

For direct product details information, use product type or order code, ex:
www.abb.com/productdetails/AF09-30-10-13 or www.abb.com/productdetails/1SBL137001R1310

3-pole contactors

Mini contactors

Contactors for motor control and

1

IEC (1)	**AC-3 Rated operational power**	θ ≤ 60 °C (2), 400 V	**kW**	**4**	**5.5**	**4**	**5.5**	**7.5**	**4**	**5.5**	**7.5**	**11**	**15**	**18.5**
UL/CSA	**3-phase motor rating**	480 V	**hp**	**3**	**5**	**5**	**7.5**	**10**	**5**	**7.5**	**10**	**15**	**20**	**25**
AC / DC Control supply			Type	—	—	—	—	—	AF09	AF12	AF16	AF26	AF30	AF38
AC Control supply			Type	B6	B7	AS09	AS12	AS16	AF09	AF12	AF16	AF26	AF30	AF38
DC Control supply			Type	BC6	BC7	ASL09	ASL12	ASL16	AF09	AF12	AF16	AF26	AF30	AF38
IEC	**AC-3 Rated operational current**	θ ≤ 60 °C (2), 400 V	**A**	**8.5**	**11.5**	**9**	**12**	**15.5**	**9**	**12**	**18**	**26**	**32**	**38**
	AC-1 Rated operational current	θ ≤ 40 °C, 690 V	**A**	**20** (400 V)	**20** (400 V)	**22**	**24**	**24**	**25**	**28**	**30**	**45**	**50**	**50**
UL/CSA	**General use rating**	600 V	**A**	**12** (300 V)	**16**	**20**	**20**	**20**	**25**	**28**	**30**	**45**	**50**	**50**
NEMA	**NEMA Size**			—	—	**00**	**00**	**0**	**00**	**0**	—	**1**	—	—

(1) 1000 V IEC ratings available for AF80, AF96 and AF146 ... AF2650 contactors.
(2) θ ≤ 55 °C for mini contactors and AF400 ... AF2650 contactors.

Main accessories

Auxiliary contact blocks	Front mounting	**CAF6**	**CA3-10** (1 x N.O.) **CA3-01** (1 x N.C.)	**CA4-10** (1 x N.O.) **CA4-01** (1 x N.C.)	
	Side mounting	**CA6**		**CAL4-11** (1 x N.O. + 1 x N.C.)	
Timers	Electronic		**TEF3-ON** **TEF3-OFF**	**TEF4-ON** **TEF4-OFF**	
Interlocking units (3)	Mechanical		**VM3**	**VM4**	
	Mechanical / Electrical			**VEM4**	
Connection sets	For reversing contactors	**BSM6-30**	**BER16C-3**	**BER16-4**	**BER38-4**
Surge suppressors	Varistor (AC/DC)	**RV-BC6**	**RV5** (24...440 V)	Built-in surge protection	
	RC type (AC)		**RC5-1** (24...440 V)		
	Transil diode (DC)	**RD7**	**RT5** (12...264 V)		

(3) See available reversing contactors VB6, VB7 and VAS09 ... VAS16.

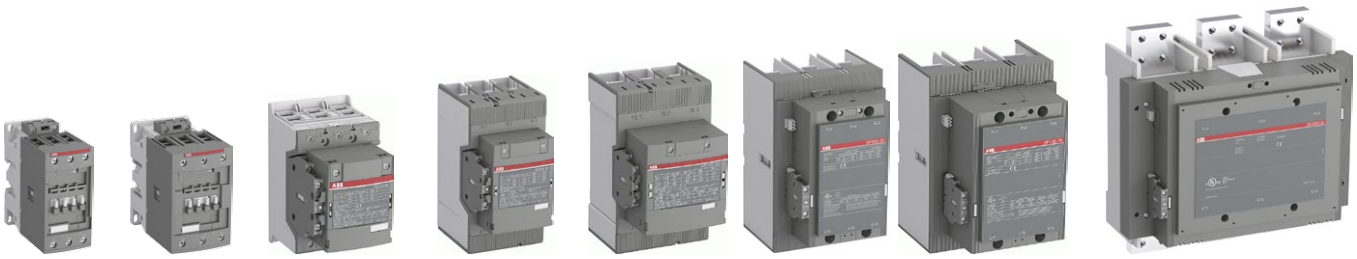
Overload relays

Thermal relays	Class 10 (Class 10A for TF140, TA200DU)	**T16** (0.10...16 A)	**T16** (0.10...16 A)	**TF42** (0.10...38 A)	
Electronic relays	Class 10E, 20E, 30E	**E16DU** (0.10...18.9 A)		**EF19** (0.10...18.9 A)	**EF19** (0.10...18.9 A) **EF45** (9...45 A)

Manual motor starters

Thermal / magnetic protection Class 10	**MS116** (0.10...32 A) Ics up to 50 kA for class 10A	**MS116** (0.10...32 A) Ics up to 50 kA for class 10A		**MS165** (4) (10...65 A) Ics up to 100 kA
	MS132 (0.10...32 A) Ics up to 100 kA	**MS132** (0.10...32 A) Ics up to 100 kA		
				MS497 (22...100 A) Ics up to 100 kA
Magnetic only types	**MO132** (0.16...32A)	**MO132** (0.16...32 A) Ics up to 100 kA		**MO165** (4) (16...65 A) Ics up to 100 kA
Accessories	For contactor mounting	**BEA7/132**	**BEA16-3**	**BEA16-4**	**BEA38-4**

(4) MS165/MO165 are suitable for use with AF09 ... AF30 for North american applications.
(5) BEA65-4 suitable for MS165 and MO165 only.



	18.5	22	30	37	45	55	75	75	90	110	132	160	200	200	250	315	400	—	475	560	—	—
	30	40	50	60	60	75	100	100	125	150	200	250	300	350	400	500	600	—	800	900	—	—
	AF40	AF52	AF65	AF80	AF96	AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370	AF400	AF460	AF580	AF750	AF1250	AF1350	AF1650	AF2050	AF2650
	AF40	AF52	AF65	AF80	AF96	AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370	AF400	AF460	AF580	AF750	AF1250	AF1350	AF1650	AF2050	AF2650
	AF40	AF52	AF65	AF80	AF96	AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370	AF400	AF460	AF580	AF750	AF1250	AF1350	AF1650	AF2050	AF2650
	40	53	65	80	96	116	140	146	190	205	265	305	370	400	460	580	750	—	860	1060	—	—
	70	100	105	125	130	160	200	225	275	350	400	500	600	600	700	800	1050	1260	1350	1650	2050	2650
	60	80	90	105	115	160	200	200	250	300	350	400	520	550	650	750	900	1210	1350	1650	2100	2700
	2	—	—	3	—	—	4	—	—	—	5	—	—	—	6	—	7	—	—	8	—	—

						CAL19-11 (1 x N.O. + 1 x N.C.)								**CAL18-11** (1 x N.O. + 1 x N.C.)										
	VM96-4					**VM19** (for same size contactors)								**VM750H** **VM750V**					**VM1650H**					
	BER65-4			**BER96-4**		**BER140-4**			**BER205-4**		**BER370-4**			**BEM460-30**		**BEM750-30**								

	TF65 (22...67 A)			**TF96** (40...96 A)		**TF140DU** (66...142 A) $\theta \leq 55$ °C			**TA200DU** (66...200 A) $\theta \leq 55$ °C															
	EF65 (20...70 A)			**EF96** (36...100 A)		**EF146** (54...150 A)			**EF205** (63...210 A)		**EF370** (115...380 A)			**EF460** (150...500 A)		**EF750** (250...800 A)			**E1250DU** (375...1250 A)					

Short-circuit protection devices

MCCB and switch-fuses

MS5100
(40...100 A)
Ics up to 50 kA

MS495 (45...100 A)
Ics up to 50 kA

MO5100
(70...100 A)
Ics up to 36 kA

MO496 (32...100 A)
Ics up to 100 kA

MO495
(63...100 A)
Ics up to 50 kA

BEA65-4 (5)

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4-pole contactors

Mini contactors

IEC	**AC-1 Rated operational current**	θ ≤ 40 °C, 690 V	**A**	**16**	**20**
UL/CSA	**General use rating**	600 V	**A**	**12** (300 V)	**16**
AC / DC Control supply			Type	–	–
AC Control supply			Type	**B6**	**B7**
DC Control supply			Type	**BC6**	**BC7**

Contactor relays

Mini contactor relays

IEC	**AC-15 Rated operational current**	400 V	**A**	**3**		
UL/CSA	**Pilot duty**			**A600**		
				2 2	3 1	4 0
AC Control supply			Type	**K6-22Z**	**K6-31Z**	**K6-40E**
DC Control supply			Type	**KC6-22Z**	**KC6-31Z**	**KC6-40E**
AC / DC Control supply			Type	–	–	–

R contactors

DC Circuit switching

DC-1 Rated current up to 5000 A
DC-3/DC-5 Rated current up to 2000 A
1500 V with poles in series

IOR.. 63-..-CC to **IOR.. 5100-..-CC**

Specific contactors

DC Circuit switching

100 A, 440 V, DC-1
GA75, **GAE75** types

275 to 2050 A, 1000 V, DC-1
GAF185 to **GAF2050** types

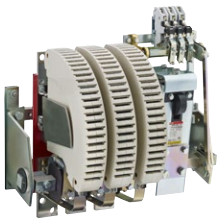
Contactors

25	30	45	55	70	100	125	160	200	275	350	400	500	525	800	1000
25	30	45	55	60	80	105	160	175	230	250	300	350	420	540	—
AF09	AF16	AF26	AF38	AF40	AF52	AF80	AF116	AF140	AF190	AF205	AF265	AF305	AF370	—	—
AF09	AF16	AF26	AF38	AF40	AF52	AF80	AF116	AF140	AF190	AF205	AF265	AF305	AF370	EK550	EK1000
AF09	AF16	AF26	AF38	AF40	AF52	AF80	AF116	AF140	AF190	AF205	AF265	AF305	AF370	EK550	EK1000

Contactor relays

3			3		
A600, Q300			A600, Q600		
2 2	3 1	4 0	2 2	3 1	4 0
NS22E	NS31E	NS40E	NF22E	NF31E	NF40E
NSL22E	NSL31E	NSL40E	NF22E	NF31E	NF40E
—	—	—	NF22E	NF31E	NF40E

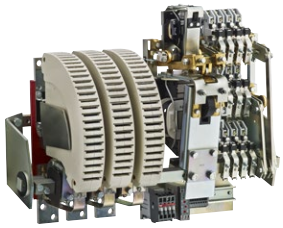
AC Circuit switching



AC-1 Rated current up to 5000 A
AC-3 Rated power up to 1500 kW
(1520 A - 440 V)

IOR.. 63-..-MT to **IOR.. 5100-..-MT**

Special versions



AC/DC Coupling: LOR.. contactors

Slip ring motor control: FOR .. contactors

Field discharge: AM(F)-CC-JORE contactors

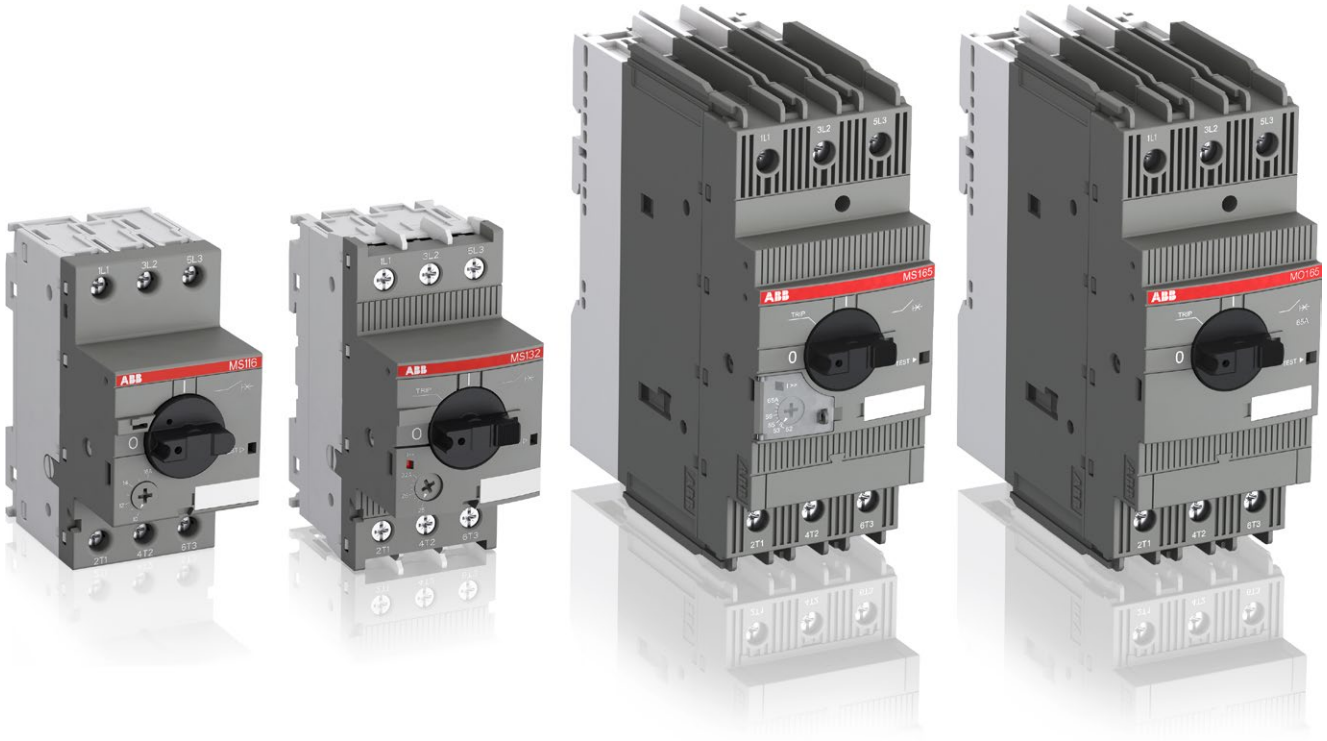
AC/DC Switching (N.C./N.O. main poles):
NOR & JOR contactors

Latching contactors for energy saving
and safety requirements: AMA or AME contactors

Capacitor switching

12.5 to 80 kvar

UA16..RA to **UA110..RA** types
UA16 to **UA110** types


MS116
MS132
MS165
MO165
ABB

Manual motor starters

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Overview 2/8

Ordering details – 0.10 to 65 A – with thermal and electromagnetic protection

MS116 manual motor starters **2**/10

MS132 manual motor starters **2**/11

MS165 manual motor starters **2**/12

Ordering details – 0.16 to 65 A – with electromagnetic protection

MO132 manual motor starters magnetic only **2**/13

MO165 manual motor starters magnetic only **2**/14

Ordering details – 0.10 to 25 A – with thermal and electromagnetic protection

MS132-T circuit breakers for transformer protection **2**/15

Main accessories 2/16

Ordering details – 22 to 100 A – with thermal and electromagnetic protection

MS5100, MS495, MS497 manual motor starters **2**/23

Ordering details – 32 to 100 A – with electromagnetic protection

MO5100, MO495, MO496 manual motor starters magnetic only **2**/24

Main accessories 2/25

General accessories 2/28

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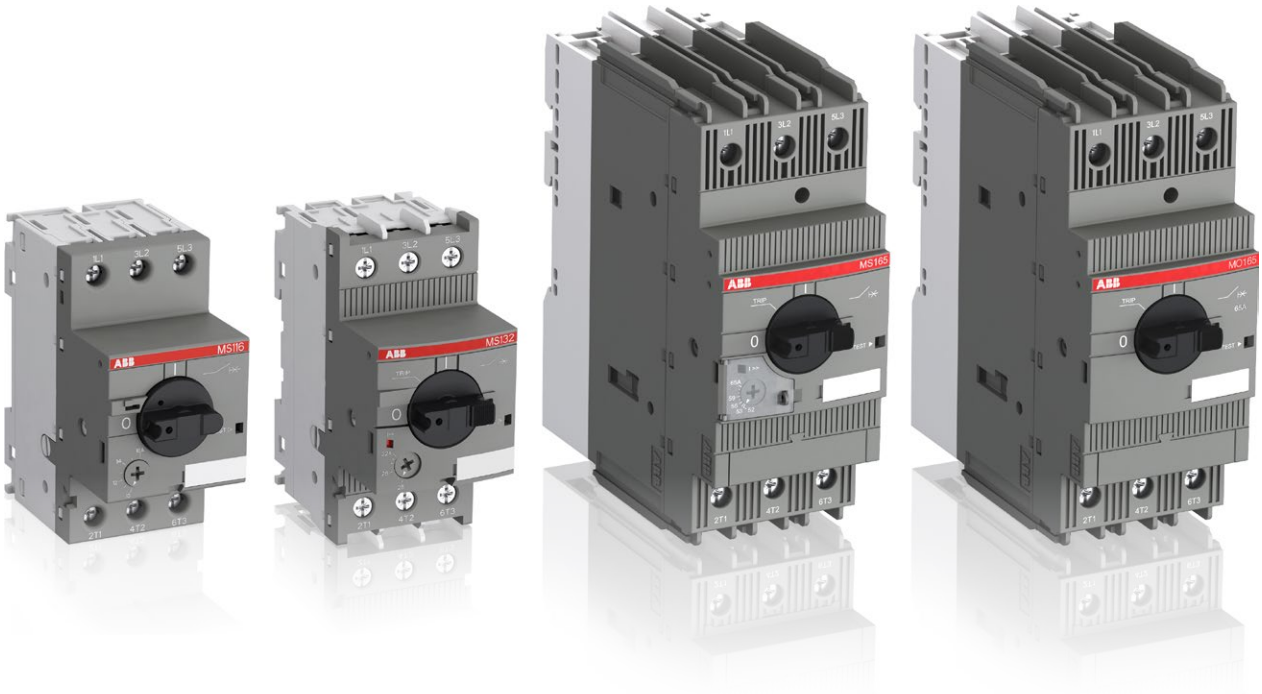
MS and MO manual motor starters
A complete motor protection concept

Fuseless protection saves costs, space and ensures a quick reaction under overload and short-circuit condition by switching off the motor within milliseconds. The full range of motor starters offers protection from 0.1 A to up to 100 A. The new family range has a harmonized range of accessories and offers the same features up to 65 A.



Safety and protection

Protect equipment and people

With its broad range of manual motor starters, ABB offers protection and safety in almost every situation including hazardous areas. Save people from electrical shocks and the installation from short-circuits, overloads and phase failures while also controlling the current flow through a simple and handy ON/OFF switch.

Continuous operation

Secure uptime

Fuseless motor protection reduces maintenance costs and downtimes by avoiding fuse replacement after faults. Furthermore, MS132 and MS165 feature a magnetic trip indicator making troubleshooting easier.

Speed up your projects

Simplified design

This range can be connected easily with ABB contactors or soft starters using the respective accessory. Additionally, the main range of accessories is shared across multiple starters, making planning simpler. At the same time, you can rely on ABB´s global technical support.

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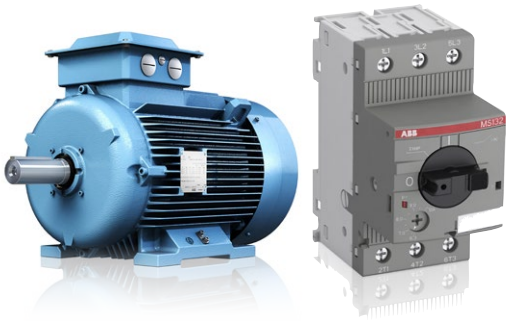
Protection and control
A full motor protection solution



MS116 MS132/ MO132 MS165/ MO165

An all-in-one solution
ABB offers protection against short-circuits, phase failures and overload together with disconnecting functionality – all in one single compact product.

High performance in compact size
The main range of motor starters can cover short-circuit breaking capacities up to 100 kA. Also, every motor starter is temperature compensated up to 60 °C, making them more reliable.

Troubleshooting made easy
MS132 and MS165 feature a magnetic trip indicator. This way, every tripping event will be distinguished, making troubleshooting a lot easier and faster.

Always an option
The MS116 and MS132 offer protection up to 32 A and a short-circuit breaking capacity of 50 kA and 100 kA, respectively – all in a 45 mm housing. They are designed for high performance in addition to their compact size.

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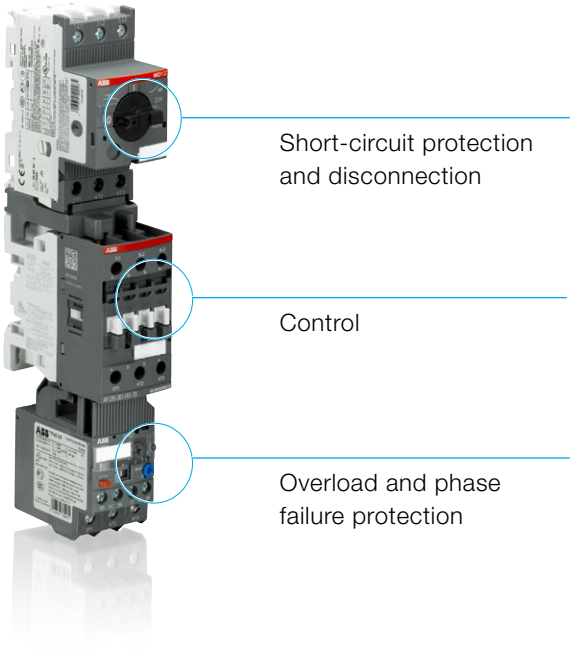
Control everywhere and anytime
Tuned for your application

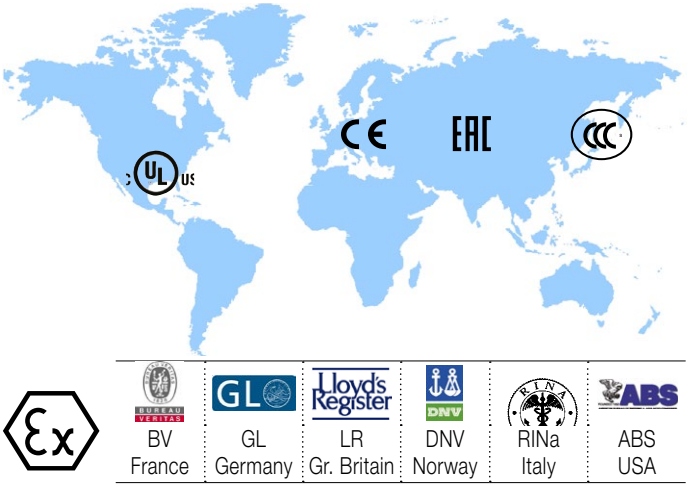


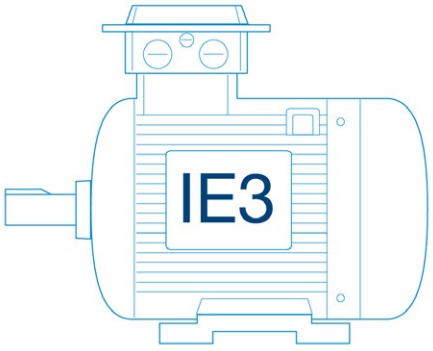
Dedicated for short-circuit protection

MO motor starters offer magnetic-only protection for the same range of operational currents as MS family and shared the same accessories range. These starters can be combined with a contactor and an overload relay in order to create a full motor protection solution.

Transformer protection

MS132-T is an inrush compensated circuit breaker for control transformer protection. With the right selection, it provides overcurrent protection on the primary side of the transformer. This avoids expensive protection on the secondary side.





Protection wherever you are

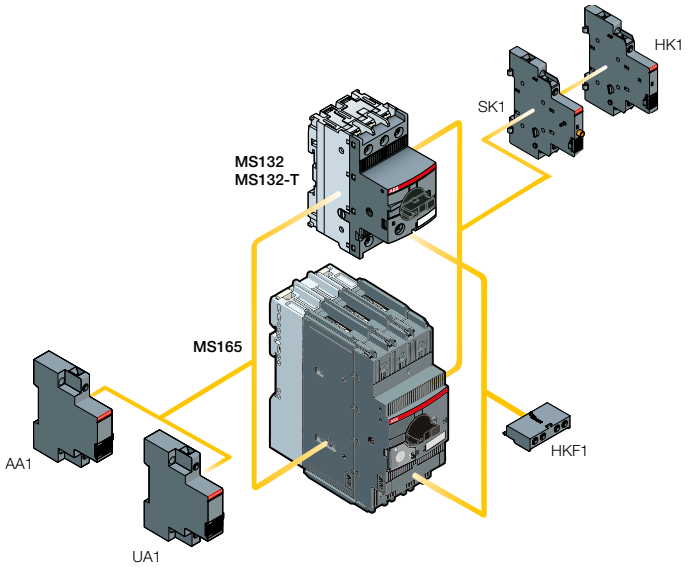
The manual motor starter range is worldwide applicable. With its wide range of certifications, it covers standards like IEC, cU-Lus, CCC, EAC and ship approvals. All manual motor starters also apply to ATEX standards and will protect your motors in hazardous areas.

Ready for IE3 motors

MS116/MS132/MO132 and MS/MO165 comply with the latest standards. They are "IE3 ready" and will protect the new generation of high efficiency motors.

2CDC131067C0202

Accessories
Easy add-ons, easier control



Busbar connectors and enclosures
With busbar connectors, up to 5 manual motor starters can be fitted next to each other with optional spacing for auxiliary contacts. For easier access, enclosures or door handle kits are also available.

Harmonized range of accessories
All types up to 65 A share the same main accessories like auxiliary contacts, signal contacts, shunt trips and under-voltage releases. This significantly slims the part list and makes selection of the right accessories easy.

Safety at work
With a lockable handle maintenance will be safe for every technician. For MS132 and MS165 a lock can seal the handle without the use of an additional accessory.

Easy to connect
Save time wiring and avoid mistakes by using a connecting link between ABB manual motor starters and soft starters or contactors. This creates harmonious and compact starter combination that is easy to mount.

2CDC131067C0202

Notes

Manual motor starters
Overview

Type	MS116	MS132	MS165	MS5100
Thermal and electromagnetic protection	Yes	Yes	Yes	Yes
Electromagnetic protection	-	-	-	-
Phase loss sensitivity	Yes	Yes	Yes	Yes
Switch position	ON/OFF	ON/OFF/TRIP	ON/OFF/TRIP	ON/OFF/TRIP
Magnetic trip indication	-	Yes	Yes	Yes
Lockable handle without accessories	-	Yes	Yes	Yes
Disconnecting feature	Yes	Yes	Yes	Yes
Width	45 mm	45 mm	55 mm	90 mm
Rated operational current I_e	0.16 ... 32 A	0.16 ... 32 A	16 ... 65 A	100 A
Setting range	0.1 ... 32 A	0.1 ... 32 A	10 ... 65 A	40 ... 100 A [2]
Ambient air temperature	-25 ... +55 °C [1]	-25 ... +60 °C [1]	-20 ... +60 °C [1]	-25 ... +70 °C

[1] Compensated
[2] For motor loads only up to 80 A

Accessories

Auxiliary contact		HKF1, HK1		AUX
Signalling contact	for tripped alarm	SK1		AUX SA
	for short-circuit alarm	-	CK1	-
Shunt trip		AA1		SOR-C
Undervoltage release		UA1		UVR-C

Table for short-circuit ratings for 400/415 V

		Standard range MS116			Performance range MS132, MS165, MS5100		
Selection parameters							
Rated operational power	**Setting range for thermal release**	**Type**	**Short-circuit breaking capacity**		**Type**	**Short-circuit breaking capacity**	
			I_{cu}	I_{cs}		I_{cu}	I_{cs}
0.03 kW[1]	0.1 ... 0.16 A	MS116-0.16	50 kA	50 kA	MS132-0.16	100 kA	100 kA
0.06 kW	0.16 ... 0.25 A	MS116-0.25	50 kA	50 kA	MS132-0.25	100 kA	100 kA
0.09 kW	0.25 ... 0.4 A	MS116-0.4	50 kA	50 kA	MS132-0.4	100 kA	100 kA
0.18 kW	0.4 ... 0.63 A	MS116-0.63	50 kA	50 kA	MS132-0.63	100 kA	100 kA
0.25 kW	0.63 ... 1.0 A	MS116-1.0	50 kA	50 kA	MS132-1.0	100 kA	100 kA
0.55 kW	1.0...1.6 A	MS116-1.6	50 kA	50 kA	MS132-1.6	100 kA	100 kA
0.75 kW	1.6...2.5 A	MS116-2.5	50 kA	50 kA	MS132-2.5	100 kA	100 kA
1.5 kW	2.5...4.0 A	MS116-4.0	50 kA	50 kA	MS132-4.0	100 kA	100 kA
2.2 kW	4.0...6.3 A	MS116-6.3	50 kA	50 kA	MS132-6.3	100 kA	100 kA
4.0 kW	6.3...10 A	MS116-10	50 kA	50 kA	MS132-10	100 kA	100 kA
5.5 kW	8...12 A	MS116-12	25 kA	25 kA	MS132-12	100 kA	100 kA
7.5 kW	10...16 A	MS116-16	16 kA	16 kA	MS132-16 / MS165-16	100 kA	100 kA
7.5 kW	14 ... 20 A				MS165-20	100 kA	100 kA
7.5 kW	16...20 A	MS116-20	15 kA	10 kA	MS132-20	100 kA	100 kA
11 kW	18 ... 25 A				MS165-25	100 kA	100 kA
11 kW	20...25 A	MS116-25	15 kA	10 kA	MS132-25	50 kA	50 kA
15 kW	25...32 A	MS116-32	10 kA	10 kA	MS132-32	50 kA	25 kA
15 kW	23 ... 32 A				MS165-32	100 kA	100 kA
22 kW	30 ... 42 A				MS165-42	50 kA	50 kA
22 kW	40 ... 54 A				MS165-54	50 kA	30 kA
25 kW	-						
30 kW	52 ... 65 A				MS165-65	50 kA	30 kA
37 kW	40 ... 100 A				MS5100-100	70 kA	70 kA
45 kW	40 ... 100 A				MS5100-100	70 kA	70 kA

[1] 690 V

	MO132	MO165	MO5100	MS132-T
	-	-	-	Yes
	Yes	Yes	Yes	-
	-	-	-	Yes
	ON/OFF/TRIP	ON/OFF/TRIP	ON/OFF/TRIP	ON/OFF/TRIP
	-	-	-	Yes
	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes
	45 mm	55 mm	76.2 mm	45 mm
	0.16 ... 32 A	16 ... 65 A	70 ... 100 A	0.16 ... 32 A
	-	-	-	0.1 ... 25 A
	-25 ... +60 °C	-25 ... +60 °C	-25 ... +70 °C	-25 ... +60 °C [1]

	HKF1, HK1	AUX	HKF1
	SK1	-	SK1
	-	-	CK1
	AA1	SOR-C	AA1
	UA1	UVR-C	UA1

	Standard range MO132		Performance range MO132, MO165, MO5100			Transformer protection MS132-T	
	Type	Short-circuit breaking capacity		Type	Short-circuit breaking capacity		Type	Short-circuit breaking capacity
		I_{cu}	I_{cs}		I_{cu}	I_{cs}		I_{cu} / I_{cs}
	MO132-0.16	100 kA	100 kA	MO132-0.16	100 kA	100 kA	MS132-0.16T	100 kA
	MO132-0.25	100 kA	100 kA	MO132-0.25	100 kA	100 kA	MS132-0.25T	100 kA
	MO132-0.4	100 kA	100 kA	MO132-0.4	100 kA	100 kA	MS132-0.4T	100 kA
	MO132-0.63	100 kA	100 kA	MO132-0.63	100 kA	100 kA	MS132-0.63T	100 kA
	MO132-1.0	100 kA	100 kA	MO132-1.0	100 kA	100 kA	MS132-1.0T	100 kA
	MO132-1.6	100 kA	100 kA	MO132-1.6	100 kA	100 kA	MS132-1.6T	100 kA
	MO132-2.5	100 kA	100 kA	MO132-2.5	100 kA	100 kA	MS132-2.5T	100 kA
	MO132-4.0	100 kA	100 kA	MO132-4.0	100 kA	100 kA	MS132-4.0T	100 kA
	MO132-6.3	100 kA	100 kA	MO132-6.3	100 kA	100 kA	MS132-6.3T	100 kA
	MO132-10	100 kA	100 kA	MO132-10	100 kA	100 kA	MS132-10T	100 kA
	MO132-12	100 kA	100 kA	MO132-12	100 kA	100 kA	MS132-12T	100 kA
	MO132-16	100 kA	100 kA	MO132-16 / MO165-16	100 kA	100 kA	MS132-16T	100 kA
				MO165-20	100 kA	100 kA		
	MO132-20	100 kA	100 kA	MO132-20	100 kA	100 kA	MS132-20T	100 kA
	MO132-25	50 kA	50 kA	MO132-25 / MO165-25	50 kA / 100 kA	50 kA / 100 kA	MS132-25T	50 kA
	MO132-32	50 kA	25 kA	MO132-32	50 kA	25 kA	Transformer protection: The instantaneous short-circuit current setting is 20 times the rated operational current.	
				MO165-32	100 kA	100 kA		
				MO165-42	50 kA	50 kA		
				MO165-54	50 kA	30 kA		
				MO5100-70	36 kA	36 kA		
				MO165-65	50 kA	30 kA		
				MO5100-80	36 kA	36 kA		
				MO5100-100	36 kA	36 kA		

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MS116 manual motor starters
0.10 to 32 A – with thermal and electromagnetic protection

2CDC241010F0011

MS116-16

2CDC241001F0011

MS116-25

2CDC241013F0011

MS116-0.16-HKF1-11

2CDC241012F0011

MS116-32-HKF1-11

Description

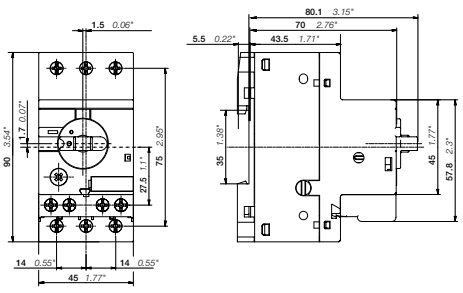
MS116 is a compact and economic range for motor protection up to 15 kW (400 V) / 32 A in width of 45 mm. Further features are the build-in disconnect function, temperature compensation, trip-free mechanism and a rotary handle with a clear switch position indication. The manual motor starter is suitable for three- and single phase applications. Auxiliary contacts, signaling contacts, undervoltage releases, shunt trips, power in-feed blocks and locking devices for protection against unauthorized changes are available as accessory. These are suitable throughout the MS116/MS132/MS165-range.

Ordering details

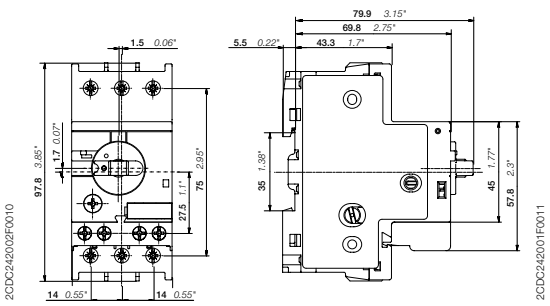
Rated operational power 400 V AC-3	Setting range	Short-circuit breaking capacity I_{cs} at 400 V AC	Rated instantaneous short-circuit current setting I_i	Type	Order code		Weight (1 pce)
kW	A	kA	A				kg
0.03 [2]	0.10 ... 0.16	50	2.00 [1]	MS116-0.16	1SAM250000R1001		0.225
0.06	0.16 ... 0.25	50	3.10 [1]	MS116-0.25	1SAM250000R1002		0.225
0.09	0.25 ... 0.40	50	5.00 [1]	MS116-0.4	1SAM250000R1003		0.225
0.18	0.40 ... 0.63	50	7.90 [1]	MS116-0.63	1SAM250000R1004		0.225
0.25	0.63 ... 1.00	50	12.5 [1]	MS116-1.0	1SAM250000R1005		0.225
0.55	1.00 ... 1.60	50	20.0 [1]	MS116-1.6	1SAM250000R1006		0.265
0.75	1.60 ... 2.50	50	31.3 [1]	MS116-2.5	1SAM250000R1007		0.265
1.50	2.50 ... 4.00	50	50.0	MS116-4.0	1SAM250000R1008		0.265
2.20	4.00 ... 6.30	50	78.8	MS116-6.3	1SAM250000R1009		0.265
4.00	6.30 ... 10.0	50	150	MS116-10	1SAM250000R1010		0.265
5.50	8.00 ... 12.0	25	180	MS116-12	1SAM250000R1012		0.265
7.50	10.0 ... 16.0	16	240	MS116-16	1SAM250000R1011		0.265
7.50	16.0 ... 20.0	10	300	MS116-20	1SAM250000R1013		0.310
11.0	20.0 ... 25.0	10	375	MS116-25	1SAM250000R1014		0.310
15.0	25.0 ... 32.0	10	480	MS116-32	1SAM250000R1015		0.310
0.03 [2]	0.10 ... 0.16	50	2.00 [1]	MS116-0.16-HKF1-11	1SAM250005R1001		0.240
0.06	0.16 ... 0.25	50	3.10 [1]	MS116-0.25-HKF1-11	1SAM250005R1002		0.240
0.09	0.25 ... 0.40	50	5.00 [1]	MS116-0.4-HKF1-11	1SAM250005R1003		0.240
0.18	0.40 ... 0.63	50	7.90 [1]	MS116-0.63-HKF1-11	1SAM250005R1004		0.240
0.25	0.63 ... 1.00	50	12.5 [1]	MS116-1.0-HKF1-11	1SAM250005R1005		0.240
0.55	1.00 ... 1.60	50	20.0 [1]	MS116-1.6-HKF1-11	1SAM250005R1006		0.280
0.75	1.60 ... 2.50	50	31.3 [1]	MS116-2.5-HKF1-11	1SAM250005R1007		0.280
1.50	2.50 ... 4.00	50	50.0	MS116-4.0-HKF1-11	1SAM250005R1008		0.280
2.20	4.00 ... 6.30	50	78.8	MS116-6.3-HKF1-11	1SAM250005R1009		0.280
4.00	6.30 ... 10.0	50	150	MS116-10.0-HKF1-11	1SAM250005R1010		0.280
5.50	8.00 ... 12.0	25	180	MS116-12.0-HKF1-11	1SAM250005R1012		0.280
7.50	10.0 ... 16.0	16	240	MS116-16.0-HKF1-11	1SAM250005R1011		0.280
7.50	16.0 ... 20.0	10	300	MS116-20-HKF1-11	1SAM250005R1013		0.326
11.0	20.0 ... 25.0	10	375	MS116-25-HKF1-11	1SAM250005R1014		0.326
15.0	25.0 ... 32.0	10	480	MS116-32-HKF1-11	1SAM250005R1015		0.326

Note: Manual motor starters should always be selected so that the actual motor current is within the setting range.
[1] The data is valid for products, produced after week 34, 2014.
[2] 690 V

Main dimensions mm, *inches*



MS116 ≤ 16 A & MS116-HKF1-11 ≤ 16 A



MS116 ≥ 20 A & MS116-HKF1-11 ≥ 20 A

2CDC131062C0201a

MS132 manual motor starters
0.10 to 32 A – with thermal and electromagnetic protection

MS132-10

MS132-32

MS132-0.16-HKF1-11

MS132-32-HKF1-11

Description

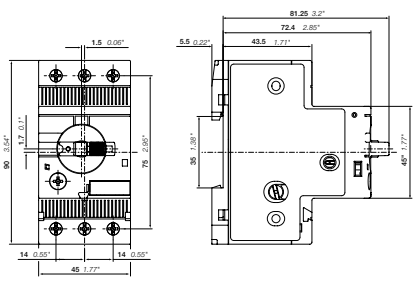
MS132 is a compact and powerful range for motor protection up to 15 kW (400 V) / 32 A in width of 45 mm. This type has also a clear and reliable indication of fault in a separate window in the event of short-circuit tripping. Further features are the build-in disconnect function, temperature compensation, trip-free mechanism and a rotary handle with a clear switch position indication. The manual motor starter is suitable for three- and single phase applications. The handle is lockable to protect against unauthorized changes. Auxiliary contacts, signaling contacts, undervoltage releases, shunt trips, power in-feed blocks are available as accessory. These are suitable throughout the MS116/MS132/MS165-range.

Ordering details

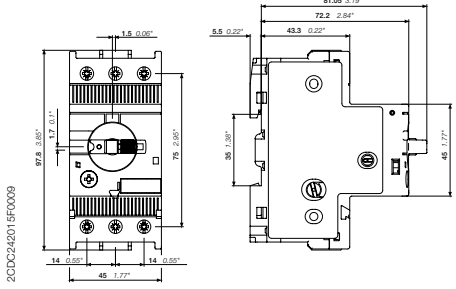
Rated operational power 400 V AC-3	Setting range	Short-circuit breaking capacity I_{cs} at 400 V AC	Rated instantaneous short-circuit current setting I_i	Type	Order code		Weight (1 pce)
kW	A	kA	A				kg
0.03 [2]	0.10 ... 0.16	100	2.00 [1]	MS132-0.16	1SAM350000R1001		0.215
0.06	0.16 ... 0.25	100	3.10 [1]	MS132-0.25	1SAM350000R1002		0.215
0.09	0.25 ... 0.40	100	5.00 [1]	MS132-0.4	1SAM350000R1003		0.215
0.18	0.40 ... 0.63	100	7.90 [1]	MS132-0.63	1SAM350000R1004		0.215
0.25	0.63 ... 1.00	100	12.5 [1]	MS132-1.0	1SAM350000R1005		0.215
0.55	1.00 ... 1.60	100	20.0 [1]	MS132-1.6	1SAM350000R1006		0.265
0.75	1.60 ... 2.50	100	31.3 [1]	MS132-2.5	1SAM350000R1007		0.265
1.50	2.50 ... 4.00	100	50.0	MS132-4.0	1SAM350000R1008		0.265
2.20	4.00 ... 6.30	100	78.8	MS132-6.3	1SAM350000R1009		0.265
4.00	6.30 ... 10.0	100	150	MS132-10	1SAM350000R1010		0.265
5.50	8.00 ... 12.0	100	180	MS132-12	1SAM350000R1012		0.310
7.50	10.0 ... 16.0	100	240	MS132-16	1SAM350000R1011		0.310
7.50	16.0 ... 20.0	100	300	MS132-20	1SAM350000R1013		0.310
11.0	20.0 ... 25.0	50	375	MS132-25	1SAM350000R1014		0.310
15.0	25.0 ... 32.0	25	480	MS132-32	1SAM350000R1015		0.310
0.03 [2]	0.10 ... 0.16	100	2.00 [1]	MS132-0.16-HKF1-11	1SAM350005R1001		0.231
0.06	0.16 ... 0.25	100	3.10 [1]	MS132-0.25-HKF1-11	1SAM350005R1002		0.231
0.09	0.25 ... 0.40	100	5.00 [1]	MS132-0.4-HKF1-11	1SAM350005R1003		0.231
0.18	0.40 ... 0.63	100	7.90 [1]	MS132-0.63-HKF1-11	1SAM350005R1004		0.231
0.25	0.63 ... 1.00	100	12.5 [1]	MS132-1.0-HKF1-11	1SAM350005R1005		0.231
0.55	1.00 ... 1.60	100	20.0 [1]	MS132-1.6-HKF1-11	1SAM350005R1006		0.281
0.75	1.60 ... 2.50	100	31.3 [1]	MS132-2.5-HKF1-11	1SAM350005R1007		0.281
1.50	2.50 ... 4.00	100	50.0	MS132-4.0-HKF1-11	1SAM350005R1008		0.281
2.20	4.00 ... 6.30	100	78.8	MS132-6.3-HKF1-11	1SAM350005R1009		0.281
4.00	6.30 ... 10.0	100	150	MS132-10.0-HKF1-11	1SAM350005R1010		0.281
5.50	8.00 ... 12.0	100	180	MS132-12.0-HKF1-11	1SAM350005R1012		0.326
7.50	10.0 ... 16.0	100	240	MS132-16.0-HKF1-11	1SAM350005R1011		0.326
7.50	16.0 ... 20.0	100	300	MS132-20-HKF1-11	1SAM350005R1013		0.326
11.0	20.0 ... 25.0	50	375	MS132-25-HKF1-11	1SAM350005R1014		0.326
15.0	25.0 ... 32.0	25	480	MS132-32-HKF1-11	1SAM350005R1015		0.326

Note: Manual motor starters should always be selected so that the actual motor current is within the setting range.
[1] The data is valid for products, produced after week 34, 2014.
[2] 690 V

Main dimensions mm, *inches*



MS132 ≤ 10 A



MS132 ≥ 12 A

2CDC242016F0009

2CDC131062C0201a

MS165 manual motor starters
10 to 65 A – with thermal and electromagnetic protection

MS165-65

Description

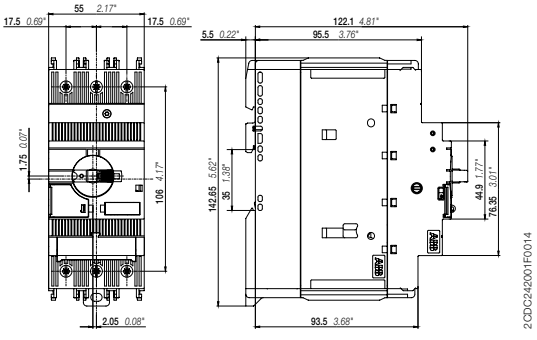
MS165 is a compact and powerful range for motor protection up to 30 kW (400 V) / 65 A in width of 55 mm. This type has also a clear and reliable indication of fault in a separate window in the event of short-circuit tripping. Further features are the build-in disconnect function, temperature compensation, trip-free mechanism and a rotary handle with a clear switch position indication. The manual motor starter is suitable for three- and single phase applications. The handle is lockable to protect against unauthorized changes. Auxiliary contacts, signaling contacts, undervoltage releases, shunt trips, power in-feed blocks are available as accessory. These are suitable throughout the MS116/MS132/MS165-range.

Ordering details

Rated operational power 400 V AC-3	Setting range	Short-circuit breaking capacity I_{cs} at 400 V AC	Rated instantaneous short-circuit current setting I_i	Type	Order code		Weight (1 pce)
kW	A	kA	A				kg
7.5	10 ... 16	100	240	MS165-16	1SAM451000R1011		0.950
7.5	14 ... 20	100	300	MS165-20	1SAM451000R1012		0.950
11	18 ... 25	100	375	MS165-25	1SAM451000R1013		0.960
15	23 ... 32	100	480	MS165-32	1SAM451000R1014		0.970
22	30 ... 42	50	630	MS165-42	1SAM451000R1015		0.970
22	40 ... 54	30	810	MS165-54	1SAM451000R1016		0.970
30	52 ... 65	30	975	MS165-65	1SAM451000R1017		0.980

Note: Manual motor starters should always be selected so that the actual motor current is within the setting range.

Main dimensions mm, *inches*



MS165

2CDC131062C0201a

MO132 manual motor starters magnetic only
0.16 to 32 A – with electromagnetic protection

MO132-6.3

MO132-32

Description

Manual motor starters magnetic only are electromechanical protection devices for the main circuit. They are used mainly to switch motors manually ON/OFF and protect them fuse-less against short-circuit.

Fuse-less protection with a manual motor starter saves costs, space and ensures a quick reaction under short-circuit condition, by switching off the motor within milliseconds. Fuse-less starter combinations are setup together with contactors and overload relays.

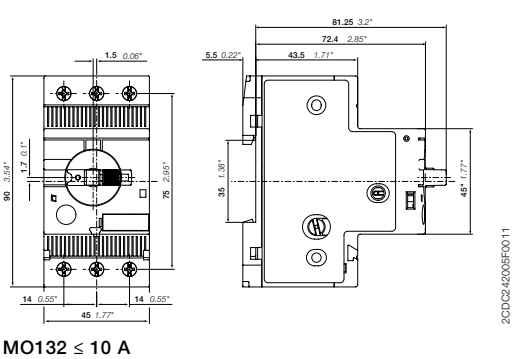
2

Ordering details

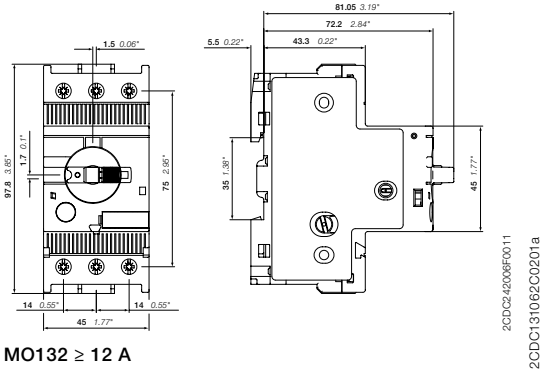
Rated operational power 400 V AC-3[1]	Rated operational current	Short-circuit breaking capacity I_{cs} at 400 V AC	Rated instantaneous short-circuit current setting I_i	Type	Order code		Weight (1 pce)
kW	A	kA	A				kg
0.03 [3]	0.16	100	2.00 [2]	MO132-0.16	1SAM360000R1001		0.215
0.06	0.25	100	3.10 [2]	MO132-0.25	1SAM360000R1002		0.215
0.09	0.40	100	5.00 [2]	MO132-0.4	1SAM360000R1003		0.215
0.12	0.63	100	7.90 [2]	MO132-0.63	1SAM360000R1004		0.215
0.25	1.0	100	12.5 [2]	MO132-1.0	1SAM360000R1005		0.215
0.55	1.6	100	20.0 [2]	MO132-1.6	1SAM360000R1006		0.265
0.75	2.5	100	31.3 [2]	MO132-2.5	1SAM360000R1007		0.265
1.5	4.0	100	50.0	MO132-4.0	1SAM360000R1008		0.265
2.2	6.3	100	78.8	MO132-6.3	1SAM360000R1009		0.265
4.0	10	100	125	MO132-10	1SAM360000R1010		0.265
5.5	12	100	150	MO132-12	1SAM360000R1012		0.310
7.5	16	100	200	MO132-16	1SAM360000R1011		0.310
7.5	20	100	250	MO132-20	1SAM360000R1013		0.310
11	25	50	313	MO132-25	1SAM360000R1014		0.310
15	32	25	400	MO132-32	1SAM360000R1015		0.310

[1] For overload protection of motors, an appropriate thermal or electronic overload relay must be used
[2] The data is valid for products, produced after week 34, 2014.
[3] 690 V

Main dimensions mm, *inches*



MO132 ≤ 10 A



MO132 ≥ 12 A

2CDC131062C0201a

MO165 manual motor starters magnetic only
16 to 65 A – with electromagnetic protection

MO165-65

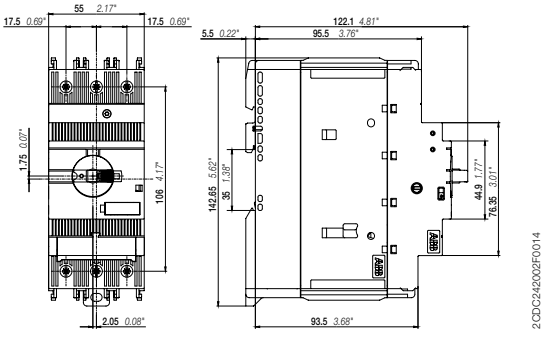
Description

Manual motor starters magnetic only are electromechanical protection devices for the main circuit. They are used mainly to switch motors manually ON/OFF and protect them fuse-less against short-circuit. Fuse-less protection with a manual motor starter saves costs, space and ensures a quick reaction under short-circuit condition, by switching off the motor within milliseconds. Fuse-less starter combinations are setup together with contactors and overload relays.

Ordering details

Rated operational power 400 V AC-3	Rated operational current	Short-circuit breaking capacity I_{cs} at 400 V AC	Rated instantaneous short-circuit current setting I_i	Type	Order code		Weight (1 pce)
kW	A	kA	A				kg
7.5	16	100	240	MO165-16	1SAM461000R1011		0.950
7.5	20	100	300	MO165-20	1SAM461000R1012		0.950
11	25	100	375	MO165-25	1SAM461000R1013		0.960
15	32	100	480	MO165-32	1SAM461000R1014		0.970
22	42	50	630	MO165-42	1SAM461000R1015		0.970
22	54	30	810	MO165-54	1SAM461000R1016		0.970
30	65	30	975	MO165-65	1SAM461000R1017		0.980

Main dimensions mm, *inches*



MO165

MS132-T circuit breakers for transformer protection
0.10 to 25 A – with thermal and electromagnetic protection

MS132-10T

MS132-25T

Description

Circuit breakers for transformer protection are electro mechanical protection devices specially designed to protect control transformers on the primary side. They allow fuse-less protection against overload and short-circuit, saving space and cost and ensuring a quick reaction under short-circuit condition by switching off the transformer within milliseconds. The short-circuit current setting is fixed to 20 times the operating current to handle the high inrush current generated by transformers. The device allows manual connection and disconnection of the transformer from the mains.

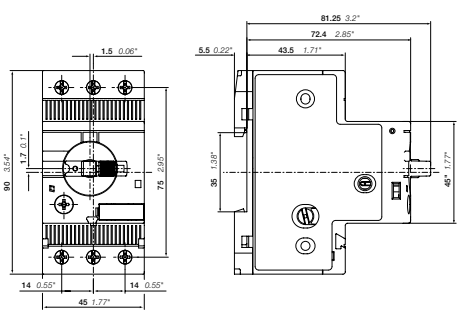
MS132-T is a 45 mm (width) compact and powerful range for transformer protection up to 12.5 kW (400 V) / 25 A. This type has also a clear and reliable indication of fault in a separate window in the event of short-circuit tripping. Further features are the build-in disconnect function, temperature compensation, trip-free mechanism and a rotary handle with a clear switch position indication. The handle is lockable to protect against unauthorized changes. Auxiliary contacts, signaling contacts, undervoltage releases, shunt trips, power in-feed blocks are available as accessory. These are suitable throughout the MS116/MS132/MS165-range. Moreover ABB offers special accessories for fast single phase setup.

Ordering details

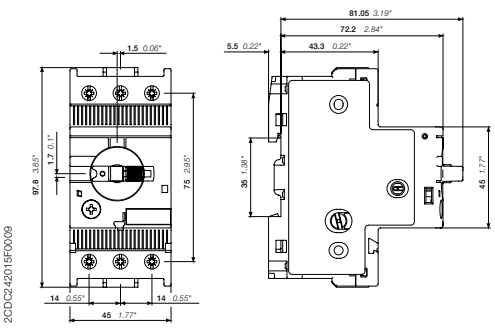
Setting range A	Short-circuit breaking capacity I_{cs} at 400 V AC kA	Rated instantaneous short-circuit current setting I_i A	Type	Order code		Weight (1 pce) kg
0.10 ... 0.16	100	3.2	MS132-0.16T	1SAM340000R1001		0.215
0.16 ... 0.25	100	5	MS132-0.25T	1SAM340000R1002		0.215
0.25 ... 0.40	100	8	MS132-0.4T	1SAM340000R1003		0.215
0.40 ... 0.63	100	12.6	MS132-0.63T	1SAM340000R1004		0.215
0.63 ... 1.00	100	20	MS132-1.0T	1SAM340000R1005		0.215
1.00 ... 1.60	100	32	MS132-1.6T	1SAM340000R1006		0.265
1.60 ... 2.50	100	50	MS132-2.5T	1SAM340000R1007		0.265
2.50 ... 4.00	100	80	MS132-4.0T	1SAM340000R1008		0.265
4.00 ... 6.30	100	126	MS132-6.3T	1SAM340000R1009		0.265
6.30 ... 10.0	100	200	MS132-10T	1SAM340000R1010		0.265
8.00 ... 12.0	100	240	MS132-12T	1SAM340000R1012		0.310
10.0 ... 16.0	100	320	MS132-16T	1SAM340000R1011		0.310
16.0 ... 20.0	100	400	MS132-20T	1SAM340000R1013		0.310
20.0 ... 25.0	50	500	MS132-25T	1SAM340000R1014		0.310

Please check for single phase equipment chapter Main accessories.

Main dimensions mm, *inches*



MS132T ≤ 10 A

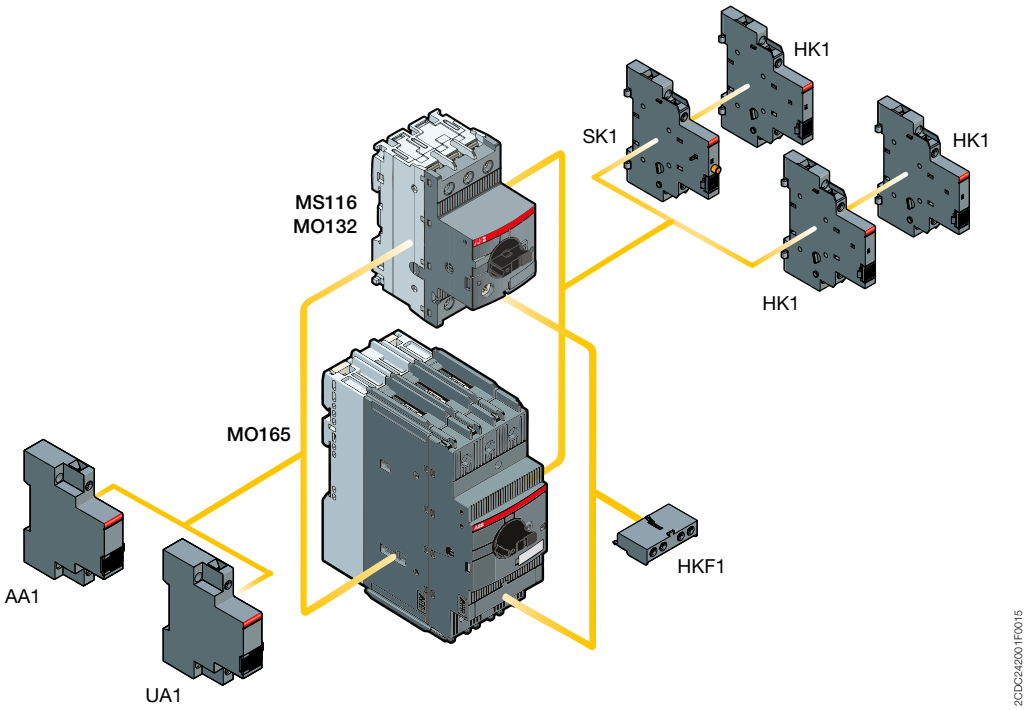


MS132T ≥ 12 A

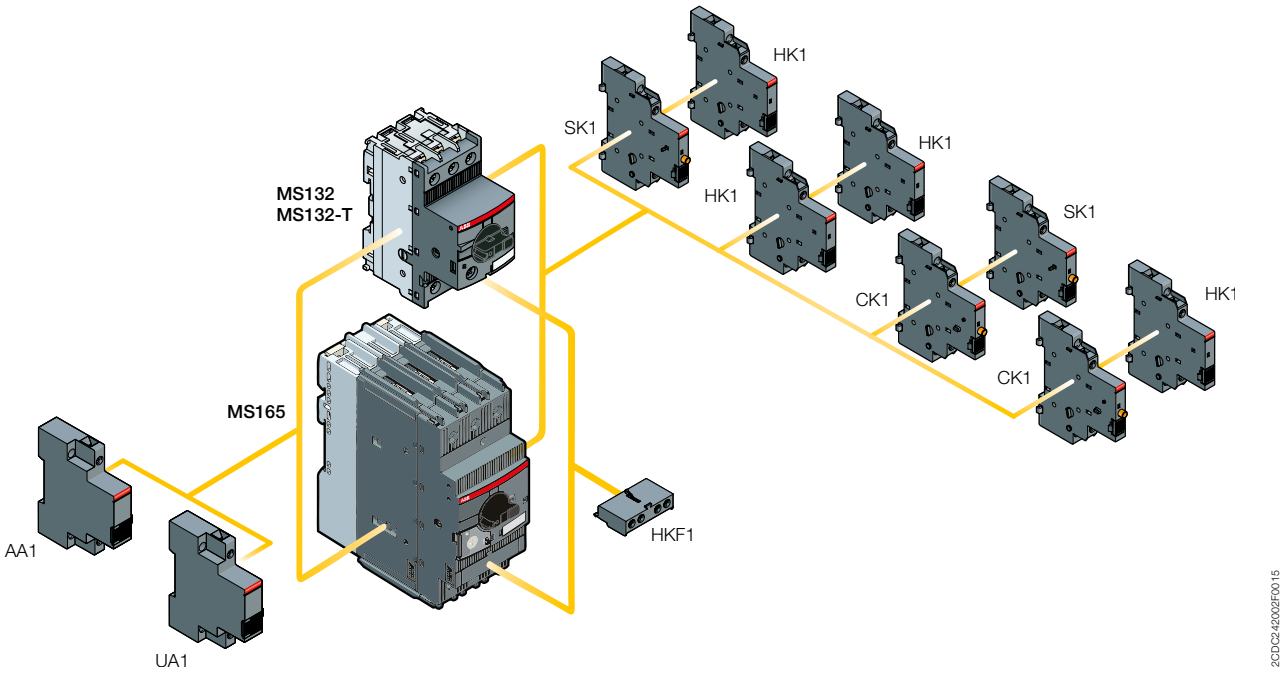
2CDC131062C0201a

MS116, MS132, MS165, MO132, MO165, MS132-T
Main accessories

Manual motor starters with accessories (MS116, MO132, MO165)



Manual motor starters with accessories (MS132, MS165) and circuit breaker for transformer protection (MS132-T)



2CDC131050C0201a

MS116, MS132, MS165, MO132, MO165, MS132-T
Main accessories

1SBC101208F0014

HKF1-11

1SBC101209F0014

HK1-11

1SBC101210F0014

SK1-11

1SBC101286F0014

CK1-11

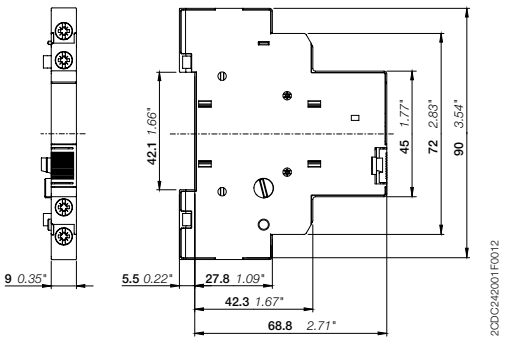
Description

MMS and MS132-T can be equipped with auxiliary contacts for lateral/front mounting, signaling contacts for lateral mounting, undervoltage releases and shunt trips. Two different signaling contacts are available. The accessories can be fitted wiring free and without tools. A variety of combinations is possible as required for the application. The auxiliary contacts change position with the main contacts. The signaling contact SK signals tripping regardless if it was caused by short-circuit or overload. The signaling contact CK signals tripping in case it was caused by short-circuit. Undervoltage releases are used for remote tripping of the manual motor starters especially for emergency stop circuits. Shunt trips release the MMS used for remote tripping. These main accessories are suitable throughout the MS116/MS132/MS165-range.

Ordering details

Suitable for	Auxiliary contacts N.O.	Auxiliary contacts N.C.	Description	Type	Order code		Pkg qty pcs	Weight (1 pce) kg
Auxiliary contacts – mountable on the front								
MS116, MS132, MS165 MO132, MO165 MS132-T	1	1		HKF1-11	1SAM201901R1001		10	0.015
	1	0		HKF1-10	1SAM201901R1003		10	0.013
	0	1		HKF1-01	1SAM201901R1004		10	0.013
	2	0		HKF1-20	1SAM201901R1002		10	0.015
Auxiliary contacts – mountable on the right								
MS116, MS132, MS165 MO132, MO165 MS132-T	1	1	max. 2 pieces	HK1-11	1SAM201902R1001		2	0.035
	2	0	max. 2 pieces	HK1-20	1SAM201902R1002		2	0.035
	0	2	max. 2 pieces	HK1-02	1SAM201902R1003		2	0.035
	2	0	with lead contacts	HK1-20L	1SAM201902R1004		2	0.035
Signaling contacts – mountable on the right								
MS116, MS132, MS165 MO132, MO165 MS132-T	1	1	for tripped alarm, max. 2 pieces	SK1-11	1SAM201903R1001		2	0.035
	2	0	for tripped alarm, max. 2 pieces	SK1-20	1SAM201903R1002		2	0.035
	0	2	for tripped alarm, max. 2 pieces	SK1-02	1SAM201903R1003		2	0.035
MS132, MS165, MS132-T	1	1	for short-circuit alarm, max. 2 pieces	CK1-11	1SAM301901R1001		2	0.035
	2	0	for short-circuit alarm, max. 2 pieces	CK1-20	1SAM301901R1002		2	0.035
	0	2	for short-circuit alarm, max. 2 pieces	CK1-02	1SAM301901R1003		2	0.035

Main dimensions mm, *inches*



2CDC242001F0012

HK1

2CDC131050C0201a

MS116, MS132, MS165, MO132, MO165, MS132-T
Main accessories

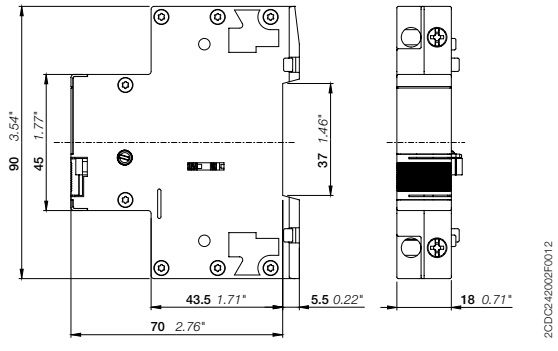
AA1-24

UA1-24

Ordering details

Suitable for	Rated control supply voltage 50 Hz V AC	Rated control supply voltage 60 Hz V AC	Type	Order code		Pkg qty pcs	Weight (1 pce) kg
Shunt trips – mountable on the left							
MS116, MS132, MS165, MO132, MO165, MS132-T	20 ... 24	20 ... 24	AA1-24	1SAM201910R1001		1	0.100
	110	110	AA1-110	1SAM201910R1002		1	0.100
	200 ... 240	200 ... 240	AA1-230	1SAM201910R1003		1	0.100
	350 ... 415	350 ... 415	AA1-400	1SAM201910R1004		1	0.100
Undervoltage releases – mountable on the left							
MS116, MS132, MS165, MO132, MO165, MS132-T	20	24	UA1-20	1SAM201904R1010		1	0.100
	24	-	UA1-24	1SAM201904R1001		1	0.100
	48	-	UA1-48	1SAM201904R1002		1	0.100
	60	-	UA1-60	1SAM201904R1003		1	0.100
	110	120	UA1-110	1SAM201904R1004		1	0.100
	-	208	UA1-208	1SAM201904R1008		1	0.100
	230	240	UA1-230	1SAM201904R1005		1	0.100
	400	-	UA1-400	1SAM201904R1006		1	0.100
	415	480	UA1-415	1SAM201904R1007		1	0.100
	-	575	UA1-575	1SAM201904R1009		1	0.100

Main dimensions mm, *inches*

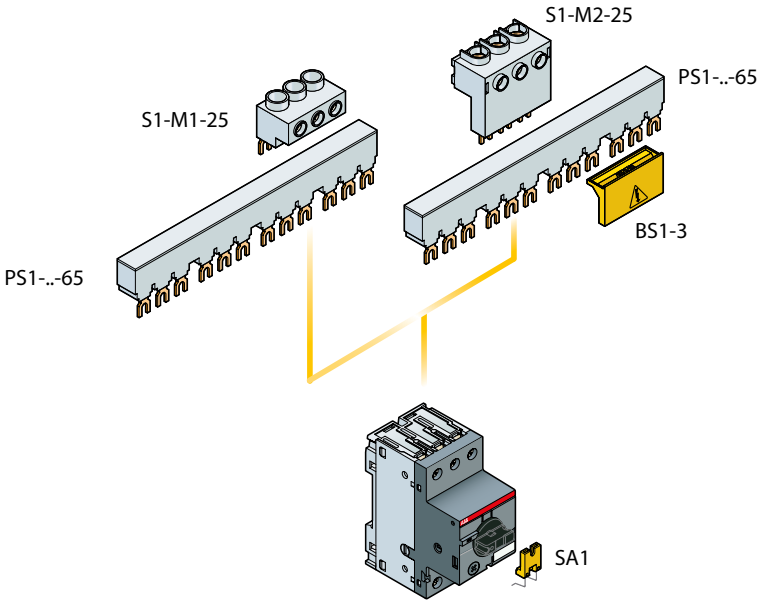


AA1, UA1

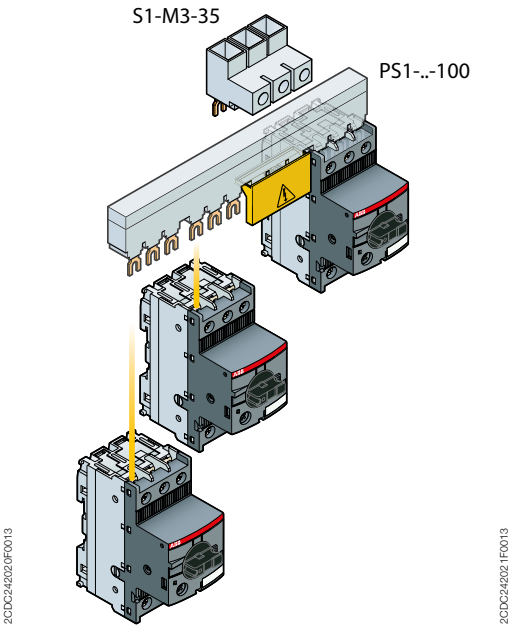
2CDC131050C0201a

MS116, MS132, MS165, MO132, MO165
Main accessories

Manual motor starter with three-phase busbar systems (MS116, MS132, MO132)

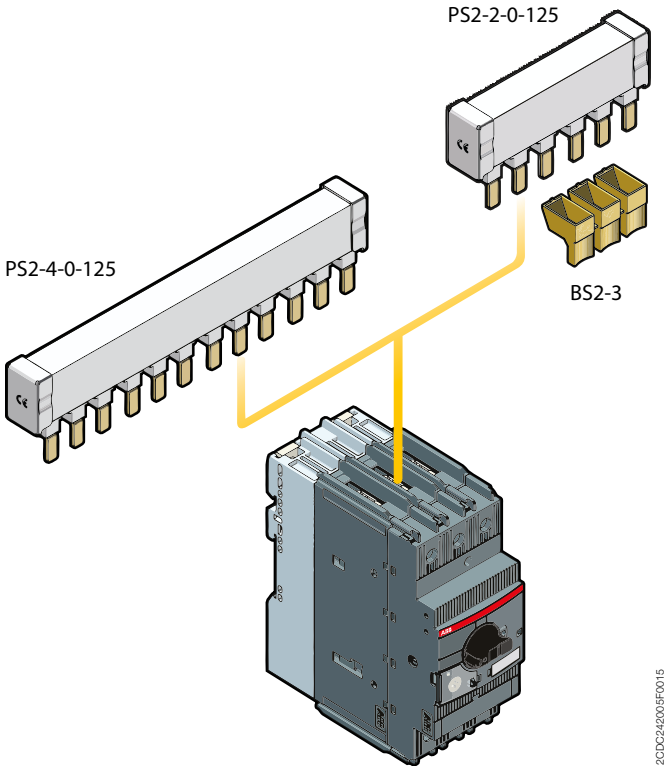


Three-phase busbar up to 65 A

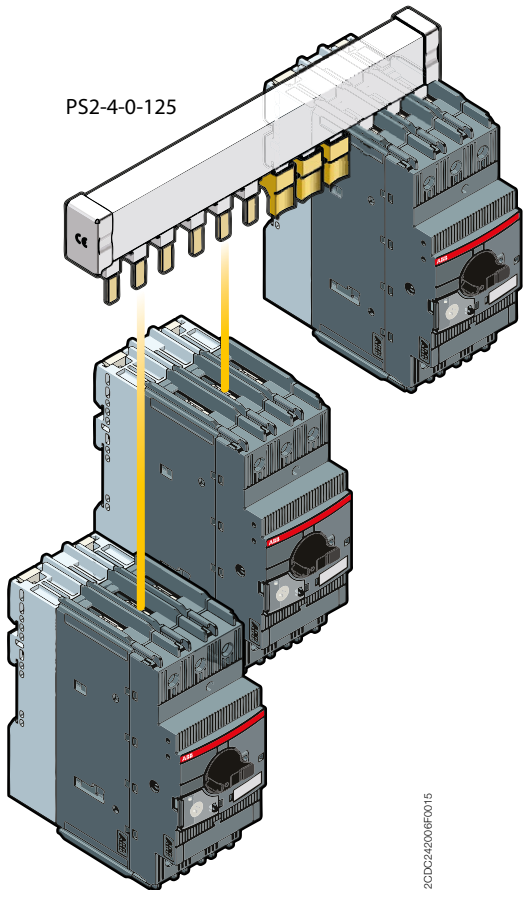


Three-phase busbar up to 100 A

Manual motor starter with three-phase busbar systems (MS165, MO165)



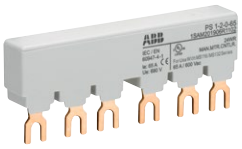
Three-phase busbar up to 125 A



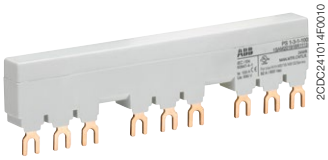
Three-phase busbar up to 125 A

2CDC131050C0201a

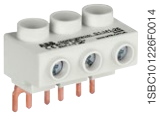
MS116, MS132, MO132, MS132-T
Main accessories



PS1-2-0-65



PS1-3-1-100

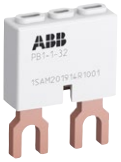


S1-M1-25

S1-M2-25

SA2

SA1



PB1-1-32

S1-PB1-25

Description

Three-phase busbars ensure a quick and safe connection and are therefore a cost effective solution. A variety of different three-phase busbars up to 100 A are in the assortment. Between 2 and 5 manual motor starters with none, one or two lateral auxiliary contacts can be connected. Different three-phase feeder terminals are available according to the application.

Phase connecting links and phase power infeed blocks are also available for single-phase applications.

Ordering details

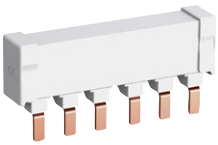
Suitable for	Rated operational current A	Number of MMS	Number of lateral aux.	Type	Order code		Pkg qty pcs	Weight (1 pce) kg
Three-phase busbars								
MS116, MS132, MO132	65	2	0	PS1-2-0-65	1SAM201906R1102		10	0.034
	65	3	0	PS1-3-0-65	1SAM201906R1103		10	0.055
	65	4	0	PS1-4-0-65	1SAM201906R1104		10	0.077
	65	5	0	PS1-5-0-65	1SAM201906R1105		10	0.098
	65	2	1	PS1-2-1-65	1SAM201906R1112		10	0.036
	65	3	1	PS1-3-1-65	1SAM201906R1113		10	0.060
	65	4	1	PS1-4-1-65	1SAM201906R1114		10	0.087
	65	5	1	PS1-5-1-65	1SAM201906R1115		10	0.108
	65	2	2	PS1-2-2-65	1SAM201906R1122		10	0.040
	65	3	2	PS1-3-2-65	1SAM201906R1123		10	0.067
	65	4	2	PS1-4-2-65	1SAM201906R1124		10	0.095
	65	5	2	PS1-5-2-65	1SAM201906R1125		10	0.122
MS116, MS132, MO132	100	3	0	PS1-3-0-100	1SAM201916R1103		10	0.084
	100	4	0	PS1-4-0-100	1SAM201916R1104		10	0.117
	100	5	0	PS1-5-0-100	1SAM201916R1105		10	0.154
	100	3	1	PS1-3-1-100	1SAM201916R1113		10	0.094
	100	4	1	PS1-4-1-100	1SAM201916R1114		10	0.134
	100	5	1	PS1-5-1-100	1SAM201916R1115		10	0.172
	100	3	2	PS1-3-2-100	1SAM201916R1123		10	0.105

Suitable for	Rated operational current A	Rated cross section mm²	Mounting form	Type	Order code		Pkg qty pcs	Weight (1 pce) kg
Three-phase feeder terminals								
MS116, MS132, MO132	65	25	Flat	S1-M1-25	1SAM201907R1101		10	0.038
	65	25	High	S1-M2-25	1SAM201907R1102		10	0.051
	65	25	UL/CSA Type E/F and IEC	S1-M3-25	1SAM201907R1103		10	0.042
	100	35	UL/CSA Type E/F and IEC	S1-M3-35	1SAM201913R1103		10	0.060

Suitable for	Description	Type	Order code		Pkg qty pcs	Weight (1 pce) kg
MS116, MS132, MO132	Protection cover for busbars	BS1-3	1SAM201908R1001		50	0.003
MS116, MS132, MO132, MS132-T	Screw fixing kit	FS116	1SAM201909R1001		1	0.020
	Padlock + two keys	SA2	GJF1101903R0002		10	0.020
MS116	Lock handle	SA1	GJF1101903R0001		10	0.003
	Lock handle box SA1/SA2	SA3	GJF1101903R0003		10	0.050
Accessories for single-phase connection (IEC only)						
MS116, MS132, MO132, MS132-T	Phase connecting link	PB1-1-32	1SAM201914R1001		1	0.009
	Phase power infeed block	S1-PB1-25	1SAM201914R1002		1	0.013

2CDC131050C0201a

MS165, MO165
Main accessories



PS2-2-0-125

PS2-3-0-125

KA165

BS2-3

SA2

Description

Three-phase busbars ensure a quick and safe connection and are therefore a cost effective solution. A variety of different three-phase busbars up to 125 A are in the assortment. Between 2 and 5 manual motor starters with none, one or two lateral auxiliary contacts can be connected.

Ordering details

Suitable for	Rated operational current A	Number of MMS	Number of lateral aux.	Type	Order code		Pkg qty pcs	Weight (1 pce) kg
Three-phase busbars								
MS165, MO165	125	2	0	PS2-2-0-125	1SAM401920R1002		10	0.100
	125	3	0	PS2-3-0-125	1SAM401920R1003		10	0.162
	125	4	0	PS2-4-0-125	1SAM401920R1004		10	0.226
	125	2	2	PS2-2-2-125	1SAM401920R1022		10	0.117
	125	3	2	PS2-3-2-125	1SAM401920R1023		10	0.197
	125	4	2	PS2-4-2-125	1SAM401920R1024		10	0.277

Other busbar types on request.

Suitable for	Description	Type	Order code		Pkg qty pcs	Weight (1 pce) kg
MS165, MO165	Terminal shroud	KA165	1SAM401922R1001		10	0.025
	Protection cover for busbars	BS2-3	1SAM401921R1001		10	0.005
	Padlock + two keys	SA2	GJF1101903R0002		10	0.020

2CDC131050C0201a

MS116, MS132, MO132
Main accessories

2CDC241004F0010

IB132-Y

2CDC241003F0010

IB132-G

2CDC241002F0010

DMS132-Y

2CDC241001F0010

DMS132-G

Description

IB132 are IP65 (UL/CSA Type 12) enclosures for single MMS installation. Additional mounting of auxiliary and signaling contacts, shunt trips and undervoltage release is possible. The handle is lockable in OFF position. For detailed specification see installation instruction.

DMS132 are IP65 (UL/CSA Type 12) door mounting kits for MMS installation in any enclosure. Additional mounting of auxiliary, signaling, shunt trips and undervoltage release is possible. The handle is lockable in OFF position. For detailed specification see installation instruction.

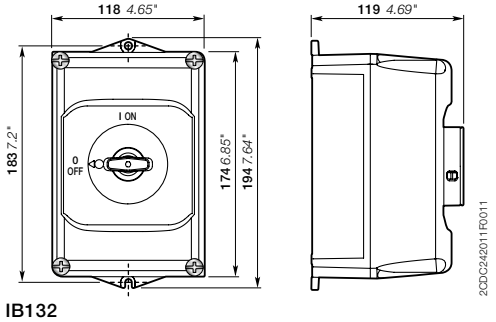
Ordering details

Suitable for	Description	Color	Type	Order code		Pkg qty pcs	Weight (1 pce) kg
IP65 enclosures (UL/CSA Type 12)							
MS116, MS132, MO132	Padlockable max. 3 padlocks with bail diameter 4 ... 6.5 mm	Yellow/red	IB132-Y	1SAM201911R1011		1	0.370
		Grey/black	IB132-G	1SAM201911R1010		1	0.370
IP65 door mounting kits (UL/CSA Type 12)							
MS116, MS132, MO132	Padlockable max. 3 padlocks with bail diameter 4 ... 6.5 mm	Yellow/red	DMS132-Y	1SAM201912R1011		1	0.170
		Grey/black	DMS132-G	1SAM201912R1010		1	0.170

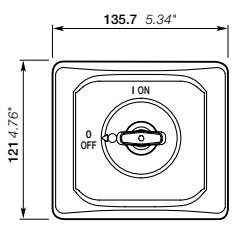
Indication I-O-T and ON-OFF-T

Please check for further equipment chapter General accessories.

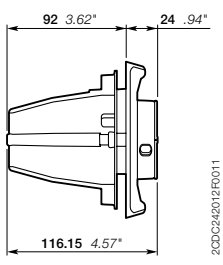
Main dimensions mm, *inches*



IB132



DMS132



2CDC131050C0201a

MS5100, MS495, MS497 manual motor starters
22 to 100 A – with thermal and electromagnetic protection

MS5100-100

MS495-40

MS497-100

Description

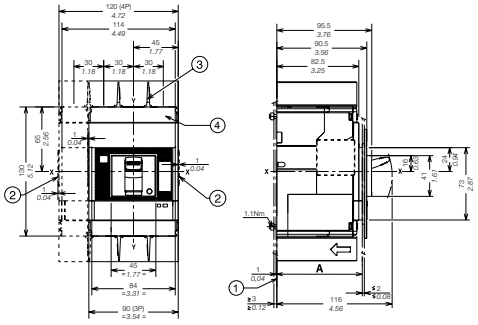
Manual motor starters (MMS) are protection devices for the main circuit. They combine motor control and protection in a single device. MMS are used mainly to switch motors manually ON/OFF and protect them and the installation fuse-less against short-circuit, overload and phase failures [1]. Fuse-less protection with a manual motor starter saves costs, space and ensures a quick reaction under short-circuit condition, by switching off the motor within milliseconds.

Ordering details

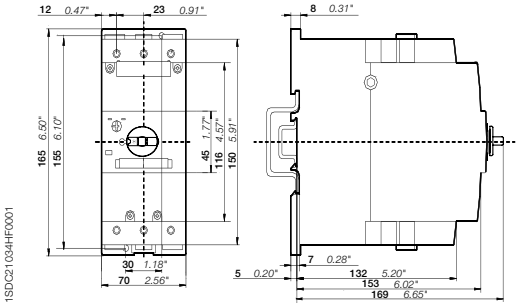
Rated operational power 400 V AC-3	Setting range	Short-circuit breaking capacity I_{cs} at 400 V AC	Rated instantaneous short-circuit current setting I_i	Type	Order code		Weight (1 pce)
kW	A	kA	A				kg
MS5100 manual motor starters							
45	40 ... 100 [2]	70	240 ... 1300	MS5100-100	1SDA082034R1		1.200
MS495 manual motor starters							
30	45. ... 63	25	819	MS495-63	1SAM550000R1007		2.247
37	57 ... 75	25	975	MS495-75	1SAM550000R1008		2.253
45	70 ... 90	25	1170	MS495-90	1SAM550000R1009		2.280
55	80 ... 100	25	1235	MS495-100	1SAM550000R1010		2.295
MS497 manual motor starters							
15	22 ... 32	50	416	MS497-32	1SAM580000R1004		2.222
18.5	28 ... 40	50	520	MS497-40	1SAM580000R1005		2.203
22	36 ... 50	50	650	MS497-50	1SAM580000R1006		2.230
30	45 ... 63	50	819	MS497-63	1SAM580000R1007		2.255
37	57 ... 75	50	975	MS497-75	1SAM580000R1008		2.266
45	70 ... 90	50	1170	MS497-90	1SAM580000R1009		2.268
55	80 ... 100	50	1235	MS497-100	1SAM580000R1010		2.275

[1] The MS49x range offers phase loss sensitivity
[2] For motor loads only up to 80 A

Main dimensions mm, *inches*



MS5100



MS495, MS497

MO5100, MO495, MO496 manual motor starters magnetic only
32 to 100 A – with electromagnetic protection

MO5100-100

MO495-75

MO496-100

Description

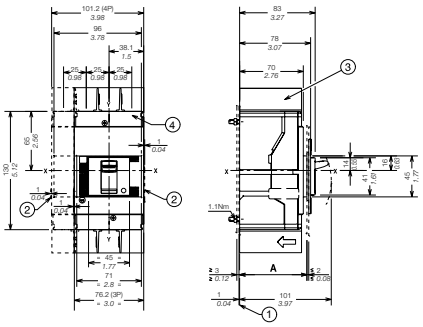
The manual motor starter magnetic only is used to manually switch on and off motors and to protect them reliably and without the need for a fuse from short-circuits.

Ordering details

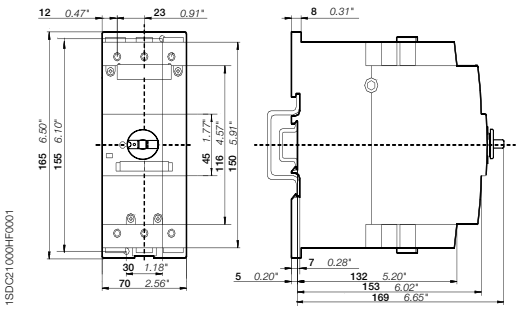
Rated operational power 400 V AC-3 [1]	Rated operational current	Short-circuit breaking capacity I_{cs} at 400 V AC	Rated instantaneous short-circuit current setting I_i	Type	Order code		Weight (1 pce)
kW	A	kA	A				kg
MO5100 manual motor starter magnetic only							
25	70	36 [2]	210 ... 770	MO5100-70	1SDA082031R1		1.100
30	80	36 [2]	240 ... 880	MO5100-80	1SDA082032R1		1.100
45	100	36 [2]	300 ... 1100	MO5100-100	1SDA082033R1		1.100
MO495 manual motor starter magnetic only							
30	63	25	819	MO495-63	1SAM560000R1007		2.244
37	75	25	975	MO495-75	1SAM560000R1008		2.247
45	90	25	1170	MO495-90	1SAM560000R1009		2.269
55	100	25	1235	MO495-100	1SAM560000R1010		2.292
MO496 manual motor starter magnetic only							
15	32	50	416	MO496-32	1SAM590000R1004		2.208
18.5	40	50	520	MO496-40	1SAM590000R1005		2.218
22	50	50	650	MO496-50	1SAM590000R1006		2.218
30	63	50	819	MO496-63	1SAM590000R1007		2.248
37	75	50	975	MO496-75	1SAM590000R1008		2.278
45	90	50	1170	MO496-90	1SAM590000R1009		2.266
55	100	50	1235	MO496-100	1SAM590000R1010		2.293

[1] For overload protection of motors, an appropriate thermal or electronic overload relay must be used
[2] I_{cs} at 415 V AC

Main dimensions mm, *inches*



MO5100



MO495, MO496

2CDC131038C0201a

Main accessories
MS5100, MO5100 manual motor starters

AUX-C

SOR-C

KLC Ronis

Description

Manual motor starters can be equipped with auxiliary contacts, undervoltage release and shunt trips. Undervoltage release are used for remote tripping of the manual motor starter especially for emergency stop circuits. Shunt trips release the MMS used for remote tripping.

For this manual motor starter range we also offer key lock solutions for customer applications.

Ordering details

Suitable for	Auxiliary con-tacts N.O.	Auxiliary con-tacts N.C.	Description	Type	Order code		Pkg qty pcs	Weight (1 pce) kg
Auxiliary contacts - mountable inside the breaker on the left slot (cabled version)								
MS5100, MO5100			Changeover	AUX-C 1Q+1SY 250V AC	1SDA066431R1		2	0.06
			Changeover	AUX-C 2Q+1SY 250V AC	1SDA066433R1		3	0.09
MS5100			Changeover	AUX-C 2Q+2SY+1SA 250V AC	1SDA066438R1		5	0.15
			Changeover	AUX-C 3Q+1SY 250V AC	1SDA066434R1		4	0.12
			Changeover	AUX-C 3Q+2SY 250V AC	1SDA066436R1		5	0.15
MO5100			Changeover	AUX-C 1Q+1SY 24V DC	1SDA066446R1		2	0.06

Suitable for	Rated control supply voltage V	Description	Type	Order code		Pkg qty pcs	Weight (1 pce) kg
Shunt trips units - mountable inside the breaker on the left slot (cabled version)							
MS5100, MO5100		Normally NON energized	SOR-C 12V DC	1SDA066321R1		1	0.14
		Normally NON energized	SOR-C 24-30V AC/DC	1SDA066322R1		1	0.14
		Normally NON energized	SOR-C 48-60V AC/DC	1SDA066323R1		1	0.14
		Normally NON energized	SOR-C 110-127V AC / 110-125V DC	1SDA066324R1		1	0.14
		Normally NON energized	SOR-C 220-240V AC / 220-250V DC	1SDA066325R1		1	0.14
		Normally NON energized	SOR-C 380-440V AC	1SDA066326R1		1	0.14
		Normally NON energized	SOR-C 480-525V AC	1SDA066327R1		1	0.14
Undervoltages releases - mountable inside the breaker on the left slot (cabled version)							
MS5100, MO5100		Normally energized	UVR-C 24-30V AC/DC	1SDA066396R1		1	0.14
		Normally energized	UVR-C 48V AC/DC	1SDA060965R1		1	0.14
		Normally energized	UVR-C 60V AC/DC	1SDA066397R1		1	0.14
		Normally energized	UVR-C 110-127V AC / 110-125V DC	1SDA066398R1		1	0.14
		Normally energized	UVR-C 220-240V AC / 220-250V DC	1SDA066399R1		1	0.14
		Normally energized	UVR-C 380-440V AC	1SDA066400R1		1	0.14
		Normally energized	UVR-C 480-525V AC	1SDA066401R1		1	0.14

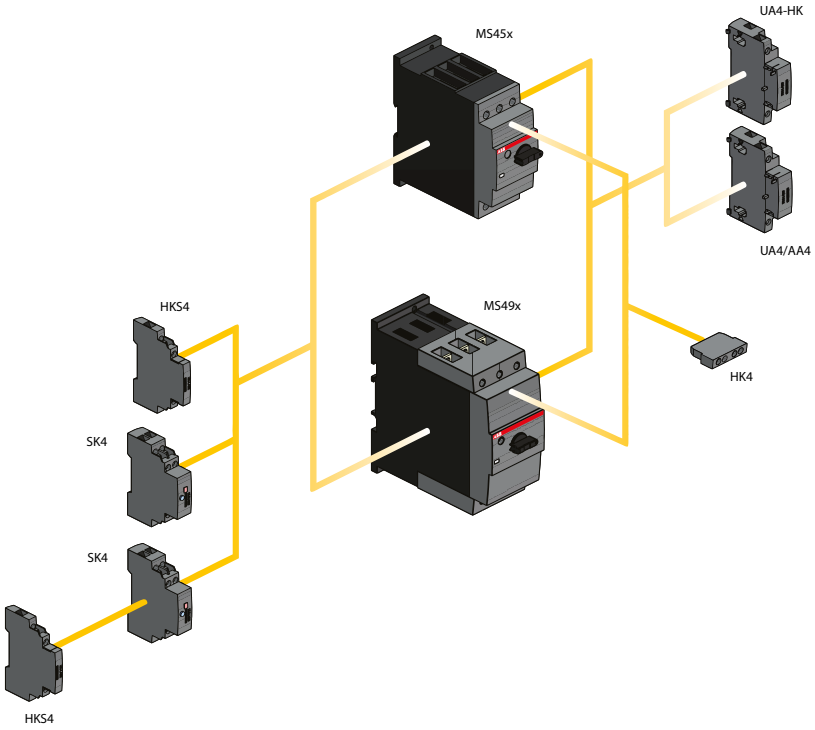
Suitable for	Description	Type	Order code		Pkg qty pcs	Weight (1 pce) kg
Key locks						
MS5100	Key lock on the circuit breaker, different keys, removable in open position	KLC Ronis [1]	1SDA066599R1		1	NA
MO5100	Key lock on the circuit breaker, different keys, removable in open position	KLC Ronis [1]	1SDA066593R1		1	NA

[1] UL Listed

2CDC131051C0201a

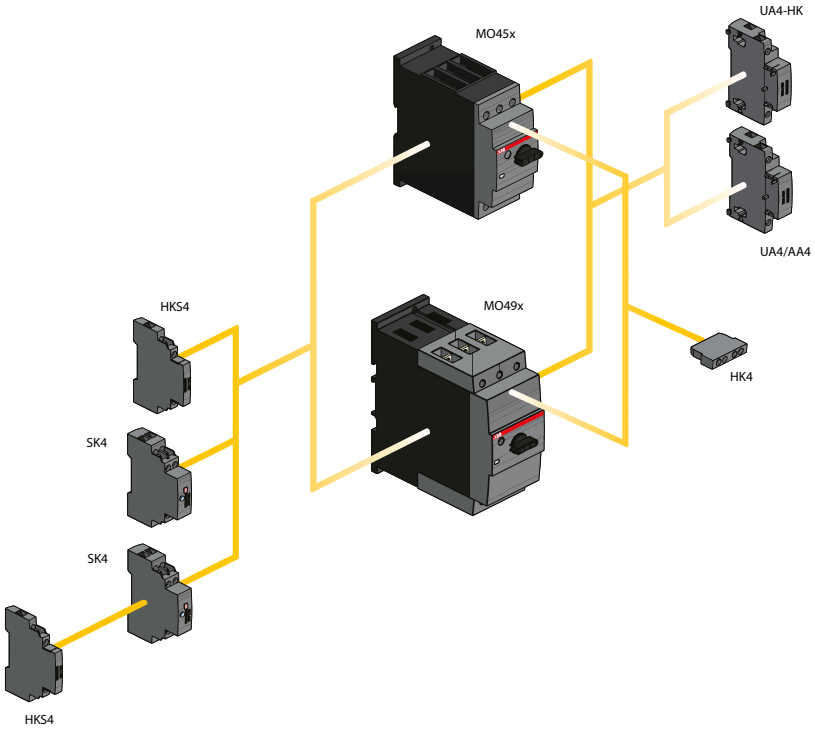
Main accessories
MS49x, MO49x manual motor starters

Manual motor starter MS49x with accessories



2CDC242025F0011

Manual motor starter MO49x with accessories



2CDC242007F0013

2CDC131051C0201a

Main accessories
MS49x, MO49x manual motor starters

2CDC241026F0011

HK4-11

2CDC241022F0011

HKS4-20

2CDC241024F0011

SK4-11

2CDC241023F0011

AA4-24

2CDC241025F0011

UA4-110

2CDC241023F0013

SA2

Description

Manual motor starters can be equipped with auxiliary contacts for lateral/front mounting, signalling contact for lateral mounting, undervoltage release and shunt trips. The accessories can be fitted wiring free and without tools. A variety of combinations is possible as required for the application. The auxiliary contacts change position with the main contacts. Undervoltage release are used for remote tripping of the manual motor starter especially for emergency stop circuits. Shunt trips release the MMS used for remote tripping.

For this manual motor starter range we offer terminal shrouds, terminal insulation barriers and different lock/key solutions for customer solutions.

Ordering details

Suitable for	Auxiliary contacts N.O.	Auxiliary contacts N.C.	Description	Type	Order code		Pkg qty pcs	Weight (1 pce) kg
Auxiliary contacts – mountable on the front								
MS49x, MO49x	1	1		HK4-11	1SAM401901R1001		10	0.017
			Changeover	HK4-W	1SAM401901R1002		10	0.015
Auxiliary contacts – mountable on the left								
MS49x, MO49x	1	1	Max. 1 piece	HKS4-11	1SAM401902R1001		2	0.045
	2	0	Max. 1 piece	HKS4-20	1SAM401902R1002		2	0.045
	0	2	Max. 1 piece	HKS4-02	1SAM401902R1003		2	0.045
Signalling contacts – mountable on the left								
MS49x, MO49x	2	2	Separate signalling acc. UL508E 1 N.O. + 1 N.C. for short circuit alarm and 1 N.O. + 1 N.C. for tripped alarm, max. 1x SK4-11 + 1 x HKS4-xx	SK4-11	1SAM401904R1001		1	0.093

Suitable for	Rated control supply voltage V	Frequency Hz	Type	Order code		Pkg qty pcs	Weight (1 pce) kg
Shunt trip units – mountable on the right							
MS49x, MO49x	20 ... 24	50/60	AA4-24	1SAM401907R1001		1	0.135
	90 ... 110	50/60	AA4-110	1SAM401907R1002		1	0.135
	200 ... 240	50/60	AA4-230	1SAM401907R1003		1	0.128
	350 ... 415	50/60	AA4-400	1SAM401907R1004		1	0.125
Undervoltage releases – mountable on the right							
MS49x, MO49x	24	50/60	UA4-24	1SAM401905R1004		1	0.134
	110/120	50/60	UA4-110	1SAM401905R1001		1	0.134
	230/240	50/60	UA4-230	1SAM401905R1002		1	0.131
	400/440	50/60	UA4-400	1SAM401905R1003		1	0.129
	230/240	50/60	UA4-HK-230	1SAM401906R1001		1	0.140
	400/440	50/60	UA4-HK-400	1SAM401906R1002		1	0.137

Suitable for	Description	Type	Order code		Pkg qty pcs	Weight (1 pce) kg
MS495, MS497, MO495, MO496	Terminal shroud	KA495	1SAM501901R1001		10	0.018
	Terminal shroud	KA495C [1)]	1SAM501902R1001		10	0.038
	Terminal insulation barrier for UL508E	DX495	1SAM401912R1001		1	0.154
MS495, MS497, MO495, MO496	Padlock + two keys	SA2	GJF1101903R0002		10	0.020

[1)] Is plugged onto the housing after removing the box terminals, if using cable lugs.

2CDC131051C0201a

General accessories
MS1xx, MO1xx, MS5100, MO5100, MS49x, MO49x

2CDC241003F0011

MSHD-LB

2CDC241002S0011

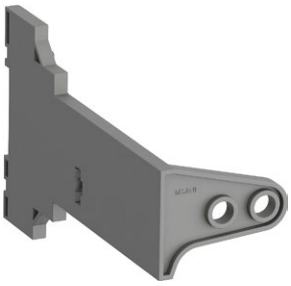
MSHD-LY

2CDC241004F0011

MSMN

2CDC241001F0012

MSH-AR


2CDC241017V0013

MSAH1

RHD-01

RHD Normal Direct Handle

Description

With this solution of door coupling rotary mechanism it is possible to operate a manual motor starter in the back of a switch cabinet from outside. The door coupling mechanism prevents opening of the door of a switch cabinet with the manual motor starter in ON position.

The complete mechanism includes handle, shaft, driver, shaft alignment ring and shaft supporter.

Most accessories fit for 6 mm shafts with a maximum length of 180 mm. The degree of protection for handles MSHD is IP64 (UL/CSA Type 1, 3R, 12).

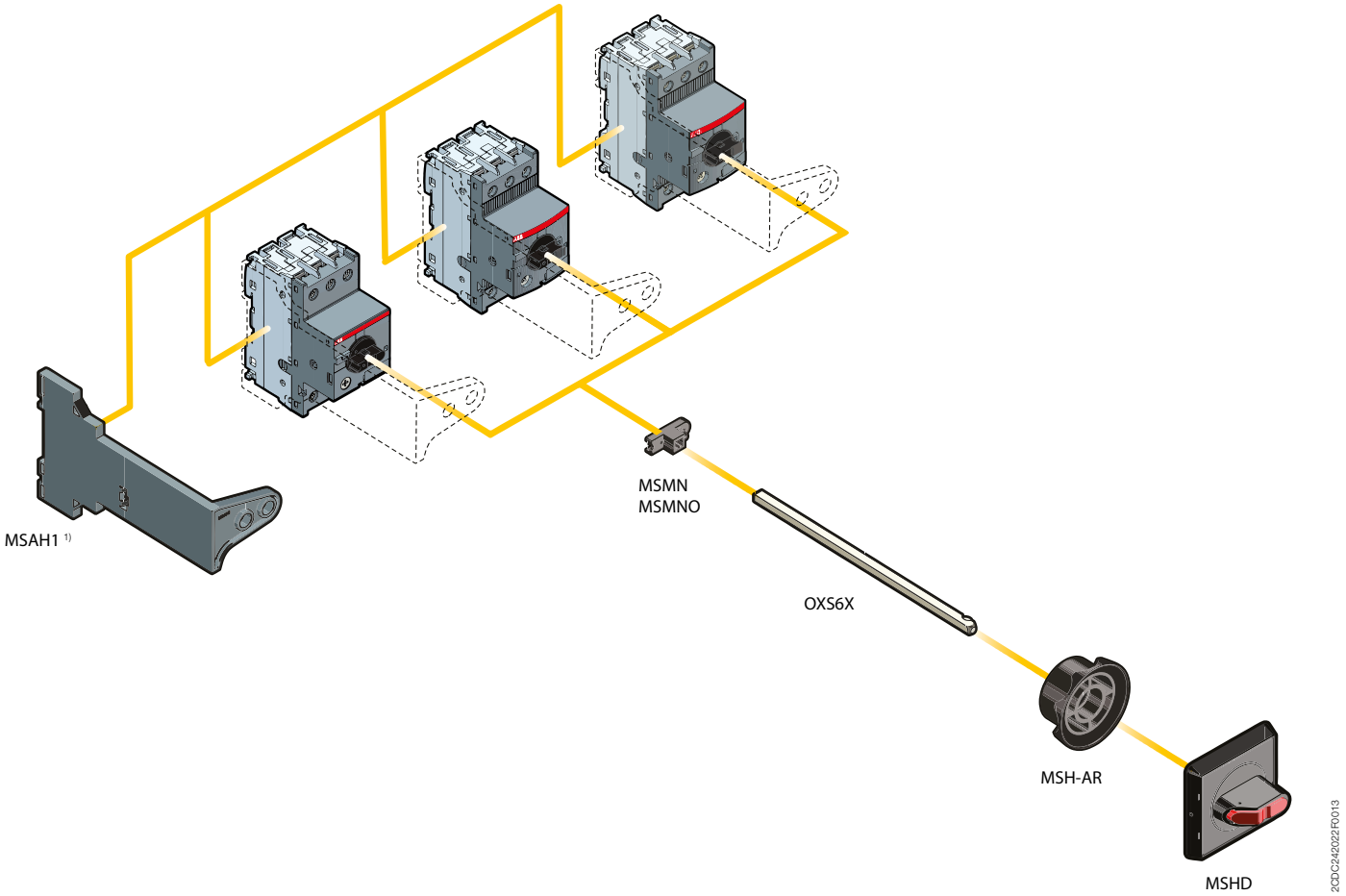
Ordering details

Suitable for	Description	Shaft length mm	Color	Type	Order code		Pkg qty pcs	Weight (1 pce) kg
Shafts								
MS116, MS132, MO132, MS165, MO165, MS4xx, MO4xx	For MSHD handles. Shaft diameter 6 mm. Shaft extension for door coupling driver.	85		OXS6X85	1SCA101647R1001		1	0.020
		105		OXS6X105	1SCA108043R1001		1	0.020
		130		OXS6X130	1SCA101655R1001		1	0.030
		180		OXS6X180	1SCA101659R1001		1	0.040
IP64 handles (UL/CSA Type 1, 3R, 12)								
MS116, MS132, MO132, MS165, MO165, MS4xx, MO4xx	Padlockable max. 3 padlocks with bail diameter 5 ... 8 mm, door interlock in ON position defeatable, for use with 6 mm OXS6...types up to 180 mm or driver shafts MSOX.		Black	MSHD-LB [1]	1SAM201920R1001		1	0.065
			Yellow	MSHD-LY [1]	1SAM201920R1002		1	0.065
			Black	MSHD-LTB [2]	1SAM201920R1011		1	0.065
			Yellow	MSHD-LTY [2]	1SAM201920R1012		1	0.065
Driver								
MS116, MS132, MO132, MS165, MO165, MS4xx, MO4xx	Coupling driver for use with 6 mm OXS6... types up to 180 mm.			MSMN [3]	1SAM101923R0002		1	0.002
				MSMNO [4]	1SAM101923R0012		1	0.002
Shaft alignment ring								
MS116, MS132, MO132, MS165, MO165, MS4xx, MO4xx	The MSH-AR supports the long shafts for alignment to the handle inlet. It makes closing panel doors more easy. Use for OXS6X > 105 mm.			MSH-AR	1SAM201920R1000		1	0.010
Shaft supporter								
MS116, MS132, MO132	With the MSAH it is possible to support the shaft in the extension of handle (MSHD). It is mandatory for the usage of shafts >130 mm.			MSAH1	1SAM201909R1021		1	0.035
Rotary handle operating mechanism								
MS5100	Rotary handle operating mechanism			RHD Normal Direct Handle [5]	1SDA069053R1		1	0.4
MO5100	Rotary handle operating mechanism			RHD Normal Direct Handle [5]	1SDA066475R1		1	0.4

[1] Indication I-O and ON-OFF (recommended for MS116, MS4xx, MO4xx)
[2] Indication I-O and ON-OFF + Trip indication
[3] Coded - Positioning of ON indication dependent from mounting orientation of the MMS
[4] Uncoded - Positioning of ON indication independent from mounting orientation of the MMS
[5] UL Listed

2CDC131053C0201

General accessories
MS1xx, MO1xx, MS4xx, MO4xx



1) MSAH1 fits to MS116,MS132 and MO132

2CDC131053C0201

1L1
3L2
5L3
13NO
A1
ABB
0
A2
B6-30-10
2T1
4T2
6T3
14NO

13NO
1L1
3L2
5L3
A1
ABB
0
A2
VBC6-30-10
2T1
4T2
6T3
14NO

B mini contactors
K mini contactor relays

Overview 3/2

3-pole mini contactors

B6, B7	AC operated	**3**/4
BC6, BC7, B7D	DC operated	**3**/5

3-pole mini reversing contactors

VB6, VB7	AC operated	**3**/6
VBC6, VBC7	DC operated	**3**/7

3-pole interface mini contactors

BC6, BC7	DC operated	**3**/8

3-pole contactors - large coil voltage range

TBC7	DC operated	**3**/9

4-pole mini contactors

B6, B7	AC operated	**3**/10
BC6, B7D	DC operated	**3**/11

4-pole contactors - large coil voltage range

TBC7	DC operated	**3**/12

4-pole mini contactor relays

K6	AC operated	**3**/13
KC6	DC operated	**3**/14

4-pole interface mini contactor relays

KC6	DC operated	**3**/15

4-pole mini contactor relays - large coil voltage range

TKC6	DC operated	**3**/16

Accessories 3/17

3

For direct product details information, use product type or order code, ex:
www.abb.com/productdetails/AF09-30-10-13 or www.abb.com/productdetails/1SBL137001R1310

Mini contactors

				Screw terminals			
AC Control supply							
3-pole contactors	Coil consumption 3.5 W		Type	B6	B7	-	-
3-pole reversing contactors	Coil consumption 3.5 W		Type	-	-	VB6 VB6A[2]	VB7 VB7A[2]
4-pole contactors	Coil consumption 3.5 W		Type	B6	B7	-	-
DC Control supply							
3-pole contactors	Coil consumption 3.5 W		Type	BC6	BC7 B7D[1]	-	-
3-pole interface contactors	Coil consumption 1.4 ... 2.4 W		Type	BC6	BC7	-	-
3-pole reversing contactors	Coil consumption 3.5 W		Type	-	-	VBC6 VBC6A[2]	VBC7 VBC7A[2]
4-pole contactors	Coil consumption 3.5 W		Type	BC6	B7D		
Wide range types	Extended coil voltage and temperature		Type	-	TBC7		
PLC types	Coil consumption 1.7 W		Type	B6S[1]	B7S[1]		
IEC	**Rated operational power AC-3**	220-230-240 V	kW	2.2	3	2.2	3
		380-400 V	kW	4	5.5	4	5.5
	Rated operational current AC-1	400 V, $\theta \leq 40$ °C	A	20	20	20	20
UL/ CSA	**3-phase motor rating**	220-240 V AC	hp	2	3	2	3
		440-480 V AC	hp	3	5	3	5
	General use rating		A	12 (300 V)	16 (600 V)	12 (300 V)	16 (600 V)

[1] With integrated surge suppressor
[2] With safety blocking function

Main accessories

Auxiliary contact blocks	Front mounting		CAF6
	Side mounting		CA6
Connection sets	For reversing contactors		BSM6-30
Surge suppressors	Varistor (AC/DC)		RV-BC6

Overload relays

Thermal overload relays Thermal and phase failure protection, with single setup possible	Class 10	T16
Electronic overload relays With single setup possible	Class 10E, 20E, 30E	E16DU

Manual motor starters

Thermal / magnetic protection	Class 10	MS116, MS132
Magnetic only types		MO132
Connecting link to manual motor starters		BEA7/132

Mini contactor relays

				Screw terminals
AC Control supply				
4-pole contactor relays	Coil consumption 3.5 W		Type	K6
DC Control supply				
4-pole contactor relays	Coil consumption 3.5 W		Type	KC6
4-pole interface contactor relays	Coil consumption 1.4 ... 2.4 W		Type	KC6
Wide range types	Extended coil voltage and temperature		Type	TKC6
IEC	**Rated operational current AC-15**	220-230-240 V	A	4
		380-400 V	A	3
	Rated operational current DC-13	24 V	A	2.5

Main accessories

Auxiliary contact blocks	Front mounting		CAF6
	Side mounting		CA6-11K

	Soldering pins				Flat pins			
	B6...P	B7...P	-	-	B6...F	B7...F	-	-
	-	-	VB6...P VB6A...P[2]	VB7...P VB7A...P[2]	-	-	VB6...F VB6A...F[2]	VB7...F VB7A...F[2]
	-	-	-	-	-	-		
	BC6...P	BC7...P B7D...P[1]	-	-	BC6...F	BC7...F B7D...F[1]	-	-
	BC6...P	BC7...P	-	-	BC6...F	BC7...F	-	-
	-	-	VBC6...P VBC6A...P[2]	VBC7...P VBC7A...P[2]	-	-	VBC6...F VBC6A...F[2]	VBC7...F VBC7A...F[2]
	-	-			-	-		
	2.2	3	2.2	3	2.2	3	2.2	3
	4	5.5	4	5.5	4	5.5	4	5.5
	12	12	12	12	20	20	20	20
	2	3	2	3	2	3	2	3
	3	5	3	5	3	5	3	5
	12 (300 V)	16 (600 V)	12 (300 V)	16 (600 V)	12 (300 V)	16 (600 V)	12 (300 V)	16 (600 V)

	-	-
	CA6-11K-P	CA6-11K-F
	-	-
	-	-

	-	-
	-	-

	MS116, MS132	MS116, MS132
	MO132	MO132
	-	-

	Soldering pins	Flat pins
	K6...P	K6...F
	KC6...P	KC6...F
	KC6...P	KC6...F
	4	4
	3	3
	2.5	2.5

	-	-
	CA6-11K-P	CA6-11K-F

2CDC102050C0201

B6, B7 3-pole mini contactors – with screw terminals
4 to 5.5 kW
AC operated

B6-30-10

B7-30-10

Description

B6, B7 3-pole mini contactors are compact control products mainly used for switching resistive or motor loads up to 690 V AC.

These contactors are designed with:

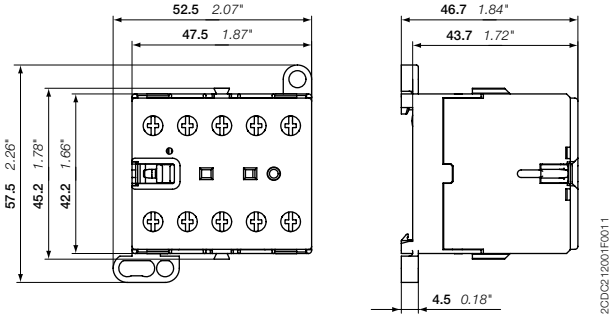
- 3 main poles and one built-in auxiliary contact
- control circuit: AC operated
  - low coil consumption (3.5 VA at pull-in and at holding)
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories
- hum-free coil
- designed for rail or wall mounting

Ordering details

IEC		UL/CSA		Rated control circuit voltage U_c		Auxiliary contacts fitted		Type	Order code		Pkg qty	Weight (1 pce)
Rated operational power	current θ ≤ 40 °C	3-phase motor rating	General use rating	50 Hz	60 Hz							
400 V AC-3	AC-1	480 V										
kW	A	hp		V AC	V AC							kg
B6 mini contactors												
4	20	3	300 V / 12 A	24	24	1	0	B6-30-10-01	GJL1211001R0101		10	0.175
						0	1	B6-30-01-01	GJL1211001R0011		10	0.175
				42	42	1	0	B6-30-10-02	GJL1211001R0102		10	0.175
						0	1	B6-30-01-02	GJL1211001R0012		10	0.175
				48	48	1	0	B6-30-10-03	GJL1211001R0103		10	0.175
						0	1	B6-30-01-03	GJL1211001R0013		10	0.175
				110 ... 127	110 ... 127	1	0	B6-30-10-84	GJL1211001R8104		10	0.175
						0	1	B6-30-01-84	GJL1211001R8014		10	0.175
				220 ... 240	220 ... 240	1	0	B6-30-10-80	GJL1211001R8100		10	0.175
						0	1	B6-30-01-80	GJL1211001R8010		10	0.175
				380 ... 415	380 ... 415	1	0	B6-30-10-85	GJL1211001R8105		10	0.175
						0	1	B6-30-01-85	GJL1211001R8015		10	0.175
B7 mini contactors												
5.5	20	5	600 V / 16 A	24	24	1	0	B7-30-10-01	GJL1311001R0101		10	0.175
						0	1	B7-30-01-01	GJL1311001R0011		10	0.175
				42	42	1	0	B7-30-10-02	GJL1311001R0102		10	0.175
						0	1	B7-30-01-02	GJL1311001R0012		10	0.175
				48	48	1	0	B7-30-10-03	GJL1311001R0103		10	0.175
						0	1	B7-30-01-03	GJL1311001R0013		10	0.175
				110 ... 127	110 ... 127	1	0	B7-30-10-84	GJL1311001R8104		10	0.175
						0	1	B7-30-01-84	GJL1311001R8014		10	0.175
				220 ... 240	220 ... 240	1	0	B7-30-10-80	GJL1311001R8100		10	0.175
						0	1	B7-30-01-80	GJL1311001R8010		10	0.175
				380 ... 415	380 ... 415	1	0	B7-30-10-85	GJL1311001R8105		10	0.175
						0	1	B7-30-01-85	GJL1311001R8015		10	0.175

Other types on request

Main dimensions mm, *inches*



B6, B7

2CDC102008C0201

BC6, BC7, B7D 3-pole mini contactors – with screw terminals
4 to 5.5 kW
DC operated

2CDC211040F0011

BC6-30-10

2CDC211013F0011

BC7-30-10

Description

BC6, BC7, B7D 3-pole mini contactors are compact control products mainly used for switching resistive or motor loads up to 690 V AC.

These contactors are designed with:

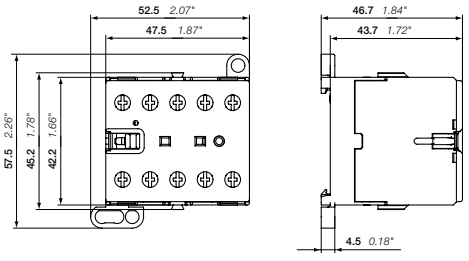
- 3 main poles and one built-in auxiliary contact
- control circuit: DC operated, low consumption (3.5 W at pull-in and at holding)
- hum-free coil
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories
- designed for rail or wall mounting

Ordering details

IEC		UL/CSA								
Rated operational power 400 V AC-3 kW	current θ ≤ 40 °C AC-1 A	3-phase motor rating 480 V hp	General use rating	Rated control circuit voltage U_c V DC	Auxiliary contacts fitted	Type	Order code		Pkg qty	Weight (1 pce) kg
BC6 mini contactors										
4	20	3	300 V / 12 A	12	1 0	BC6-30-10-07	GJL1213001R0107		10	0.175
					0 1	BC6-30-01-07	GJL1213001R0017		10	0.175
				24	1 0	BC6-30-10-01	GJL1213001R0101		10	0.175
					0 1	BC6-30-01-01	GJL1213001R0011		10	0.175
				48	1 0	BC6-30-10-16	GJL1213001R1106		10	0.175
					0 1	BC6-30-01-16	GJL1213001R1016		10	0.175
				60	1 0	BC6-30-10-03	GJL1213001R0103		10	0.175
					0 1	BC6-30-01-03	GJL1213001R0013		10	0.175
				110 ... 125	1 0	BC6-30-10-04	GJL1213001R0104		10	0.175
					0 1	BC6-30-01-04	GJL1213001R0014		10	0.175
				220 ... 240	1 0	BC6-30-10-05	GJL1213001R0105		10	0.175
					0 1	BC6-30-01-05	GJL1213001R0015		10	0.175
BC7 mini contactors										
5.5	20	5	600 V / 16 A	12	1 0	BC7-30-10-07	GJL1313001R0107		10	0.175
					0 1	BC7-30-01-07	GJL1313001R0017		10	0.175
				24	1 0	BC7-30-10-01	GJL1313001R0101		10	0.175
					0 1	BC7-30-01-01	GJL1313001R0011		10	0.175
				48	1 0	BC7-30-10-16	GJL1313001R1106		10	0.175
					0 1	BC7-30-01-16	GJL1313001R1016		10	0.175
				60	1 0	BC7-30-10-03	GJL1313001R1103		10	0.175
					0 1	BC7-30-01-03	GJL1313001R0013		10	0.175
				110 ... 125	1 0	BC7-30-10-04	GJL1313001R0104		10	0.175
					0 1	BC7-30-01-04	GJL1313001R0014		10	0.175
				220 ... 240	1 0	BC7-30-10-05	GJL1313001R0105		10	0.175
					0 1	BC7-30-01-05	GJL1313001R0015		10	0.175
B7D mini contactors with integrated suppressor diode										
5.5	20	5	600 V / 16 A	24	1 0	B7D-30-10-01	GJL1317001R0101		10	0.175
					0 1	B7D-30-01-01	GJL1317001R0011		10	0.175
				220	1 0	B7D-30-10-05	GJL1317001R0105		10	0.175
					0 1	B7D-30-01-05	GJL1317001R0015		10	0.175

Other types on request

Main dimensions mm, *inches*



BC6, BC7, B7D

2CDC212001F0011

2CDC102015C0201

VB6, VB7 3-pole mini reversing contactors – with screw terminals
4 to 5.5 kW
AC operated

2CDC211006F0011

VB7-30-10

Description

VB6, VB7 3-pole compact design reversing contactors are space optimized control products mainly used for switching resistive or motor loads up to 690 V AC.

These reversing contactors are designed with:

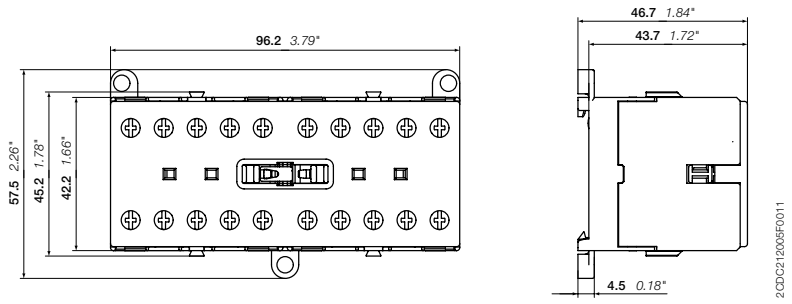
- built-in mechanical interlock. The coils must be mutually interlocked electrically and coils must be de-energised for 50 ms at least to prevent phase to phase short circuit on the arc.
- control circuit: AC operated
  - low coil consumption (3.5 VA at pull-in and at holding)
- hum-free coil
- add-on auxiliary contact blocks for front mounting
- designed for rail or wall mounting

Ordering details

IEC		UL/CSA		Rated control circuit voltage U_c		Auxiliary contacts fitted	Type	Order code		Pkg qty	Weight (1 pce)
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating	50 Hz	60 Hz						
kW	A	hp		V AC	V AC						kg
VB6 mini reversing contactors											
4	20	3	300 V / 12 A	24	24	1 0	VB6-30-10-01	GJL1211901R0101		5	0.355
						0 1	VB6-30-01-01	GJL1211901R0011		5	0.355
				42	42	1 0	VB6-30-10-02	GJL1211901R0102		5	0.355
						0 1	VB6-30-01-02	GJL1211901R0012		5	0.355
				48	48	1 0	VB6-30-10-03	GJL1211901R0103		5	0.355
						0 1	VB6-30-01-03	GJL1211901R0013		5	0.355
				110 ... 127	110 ... 127	1 0	VB6-30-10-84	GJL1211901R8104		5	0.355
						0 1	VB6-30-01-84	GJL1211901R8014		5	0.355
				220 ... 240	220 ... 240	1 0	VB6-30-10-80	GJL1211901R8100		5	0.355
						0 1	VB6-30-01-80	GJL1211901R8010		5	0.355
				380 ... 415	380 ... 415	1 0	VB6-30-10-85	GJL1211901R8105		5	0.355
						0 1	VB6-30-01-85	GJL1211901R8015		5	0.355
VB7 mini reversing contactors											
5.5	20	5	600 V / 16 A	24	24	1 0	VB7-30-10-01	GJL1311901R0101		5	0.355
						0 1	VB7-30-01-01	GJL1311901R0011		5	0.355
				42	42	1 0	VB7-30-10-02	GJL1311901R0102		5	0.355
						0 1	VB7-30-01-02	GJL1311901R0012		5	0.355
				48	48	1 0	VB7-30-10-03	GJL1311901R0103		5	0.355
						0 1	VB7-30-01-03	GJL1311901R0013		5	0.355
				110 ... 127	110 ... 127	1 0	VB7-30-10-84	GJL1311901R8104		5	0.355
						0 1	VB7-30-01-84	GJL1311901R8014		5	0.355
				220 ... 240	220 ... 240	1 0	VB7-30-10-80	GJL1311901R8100		5	0.355
						0 1	VB7-30-01-80	GJL1311901R8010		5	0.355
				380 ... 415	380 ... 415	1 0	VB7-30-10-85	GJL1311901R8105		5	0.355
						0 1	VB7-30-01-85	GJL1311901R8015		5	0.355

Other types on request

Main dimensions mm, *inches*



VB6, VB7

2CDC102016C0201

VBC6, VBC7 3-pole mini reversing contactors – with screw terminals
4 to 5.5 kW
DC operated

VBC6-30-10

VBC7-30-10

Description

VBC6, VBC7 3-pole compact design reversing contactors are space optimized control products mainly used for switching resistive or motor loads up to 690 V AC.

These reversing contactors are designed with:

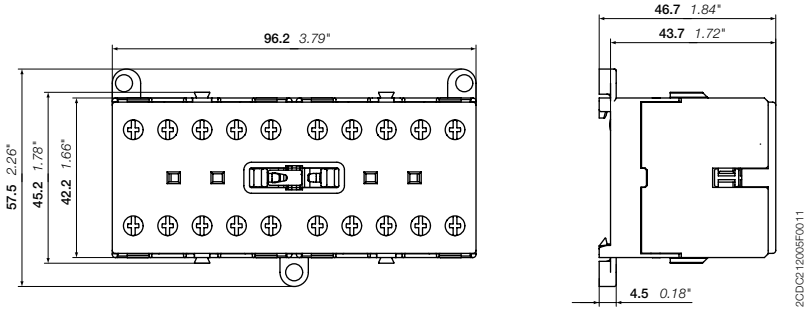
- built-in mechanical interlock. The coils must be mutually interlocked electrically and coils must be de-energised for 50 ms at least to prevent phase to phase short circuit on the arc.
- control circuit: DC operated
  - low coil consumption (3.5 W at pull-in and at holding)
- hum-free coil
- add-on auxiliary contact blocks for front mounting
- designed for rail or wall mounting

Ordering details

IEC		UL/CSA		Rated control circuit voltage U_c	Auxiliary contacts fitted	Type	Order code		Pkg qty	Weight (1 pce)
Rated operational power 400 V AC-3	current $\theta \le 40$ °C AC-1	3-phase motor rating 480 V	General use rating							
kW	A	hp		V DC						kg
VBC6 mini reversing contactors										
4	20	3	300 V / 12 A	12	1 0	VBC6-30-10-07	GJL1213901R0107		5	0.355
					0 1	VBC6-30-01-07	GJL1213901R0017		5	0.355
				24	1 0	VBC6-30-10-01	GJL1213901R0101		5	0.355
					0 1	VBC6-30-01-01	GJL1213901R0011		5	0.355
				48	1 0	VBC6-30-10-16	GJL1213901R1106		5	0.355
					0 1	VBC6-30-01-16	GJL1213901R1016		5	0.355
				60	1 0	VBC6-30-10-03	GJL1213901R0103		5	0.355
					0 1	VBC6-30-01-03	GJL1213901R0013		5	0.355
				110 ... 125	1 0	VBC6-30-10-04	GJL1213901R0104		5	0.355
					0 1	VBC6-30-01-04	GJL1213901R0014		5	0.355
				220 ... 240	1 0	VBC6-30-10-05	GJL1213901R0105		5	0.355
					0 1	VBC6-30-01-05	GJL1213901R0015		5	0.355
VBC7 mini reversing contactors										
5.5	20	5	600 V / 16 A	12	1 0	VBC7-30-10-07	GJL1313901R0107		5	0.355
					0 1	VBC7-30-01-07	GJL1313901R0017		5	0.355
				24	1 0	VBC7-30-10-01	GJL1313901R0101		5	0.355
					0 1	VBC7-30-01-01	GJL1313901R0011		5	0.355
				48	1 0	VBC7-30-10-16	GJL1313901R1106		5	0.355
					0 1	VBC7-30-01-16	GJL1313901R1016		5	0.355
				60	1 0	VBC7-30-10-03	GJL1313901R0103		5	0.355
					0 1	VBC7-30-01-03	GJL1313901R0013		5	0.355
				110 ... 125	1 0	VBC7-30-10-04	GJL1313901R0104		5	0.355
					0 1	VBC7-30-01-04	GJL1313901R0014		5	0.355
				220 ... 240	1 0	VBC7-30-10-05	GJL1313901R0105		5	0.355
					0 1	VBC7-30-01-05	GJL1313901R0015		5	0.355

Other types on request

Main dimensions mm, *inches*



VBC6, VBC7

2CDC102017C0201

BC6, BC7 3-pole interface mini contactors – with screw terminals
4 to 5.5 kW
DC operated

BC6-30-10

BC7-30-10

Description

BC6, BC7 3-pole interface mini contactors are compact control products mainly used for switching resistive or motor loads up to 690 V AC.

These contactors are designed with:

- 3 main poles and one built-in auxiliary contact
- control circuit: DC operated, very low coil consumption. Suitable for direct control by PLC outputs
- hum-free coil
- no auxiliary contact block permitted for mounting
- designed for rail or wall mounting

Ordering details

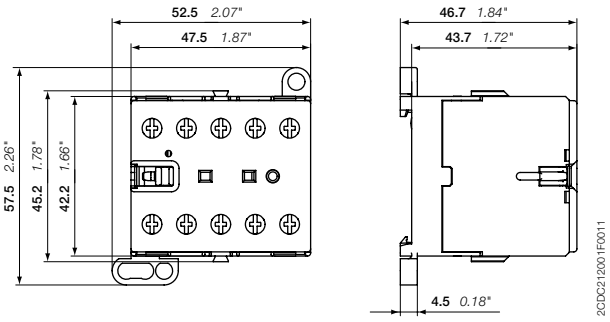
IEC		UL/CSA		Rated control circuit voltage U_c	Auxiliary contacts fitted	Type	Order code		Pkg qty	Weight (1 pce)
Rated operational power 400 V AC-3 kW	current θ ≤ 40 °C AC-1 A	3-phase motor rating 480 V hp	General use rating	V DC						kg
DC operation 24 V / 1.4 W										
4	20	3	300 V / 12 A	24	1 0	BC6-30-10-1.4-81	GJL1213001R8101		10	0.175
					0 1	BC6-30-01-1.4-81	GJL1213001R8011		10	0.175
5.5	20	5	600 V / 16 A	24	1 0	BC7-30-10-1.4-81	GJL1313001R8101		10	0.175
					0 1	BC7-30-01-1.4-81	GJL1313001R8011		10	0.175
DC operation 17 ... 32 V / 2.4 W										
4	20	3	300 V / 12 A	17 ... 32	1 0	BC6-30-10-2.4-51	GJL1213001R5101		10	0.175
					0 1	BC6-30-01-2.4-51	GJL1213001R5011		10	0.175
5.5	20	5	600 V / 16 A	17 ... 32	1 0	BC7-30-10-2.4-51	GJL1313001R5101		10	0.175
					0 1	BC7-30-01-2.4-51	GJL1313001R5011		10	0.175

Connection to PLCs with integrated protective circuit

DC operation 24 V / 1.7 W										
4	20	3	300 V / 12 A	24	1 0	B6S-30-10-1.7-71	GJL1213001R7101		10	0.175
					0 1	B6S-30-01-1.7-71	GJL1213001R7011		10	0.175
5.5	20	5	600 V / 16 A	24	1 0	B7S-30-10-1.7-71	GJL1313001R7101		10	0.175
					0 1	B7S-30-01-1.7-71	GJL1313001R7011		10	0.175
DC operation 17 ... 32 V / 2.8 W										
4	20	3	300 V / 12 A	17 ... 32	1 0	B6S-30-10-2.8-72	GJL1213001R7102		10	0.175
					0 1	B6S-30-01-2.8-72	GJL1213001R7012		10	0.175
5.5	20	5	600 V / 16 A	17 ... 32	1 0	B7S-30-10-2.8-72	GJL1313001R7102		10	0.175
					0 1	B7S-30-01-2.8-72	GJL1313001R7012		10	0.175

Other types on request

Main dimensions mm, *inches*



BC6, BC7

2CDC102010C0201

TBC7 3-pole mini contactors – with screw terminals
4 to 5.5 kW
DC operated – large coil voltage range

2CDC211015F0011

TBC7-30-10

Description

TBC7 3-pole mini contactors are compact control products mainly used for switching resistive or motor loads up to 690 V AC.

These contactors are designed with:

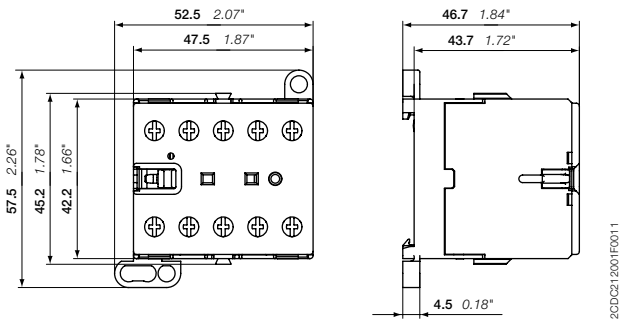
- 3 main poles and one built-in auxiliary contact
- control circuit: DC operated
  - low coil consumption (5 W at pull-in and at holding)
- hum-free coil
- expanded ambient temperature range -30 … +70 °C and wide range voltage supply
- no auxiliary contact block permitted for mounting
- designed for rail or wall mounting
- material is approved for railway applications

Ordering details

IEC		UL/CSA		Rated control circuit voltage U_{Cmin} ... U_{Cmax}	Auxiliary contacts fitted	Type	Order code		Pkg qty	Weight (1 pce)
Rated operational power 400 V AC-3	current $\theta \leq 40$ °C AC-1	3-phase motor rating 480 V	General use rating							
kW	A	hp		V DC						kg
TBC7 mini contactors										
5.5	20	5	600 V / 16 A	17 ... 32	1 0	TBC7-30-10-51	GJL1313061R5101		10	0.185
					0 1	TBC7-30-01-51	GJL1313061R5011		10	0.185
				50 ... 90	1 0	TBC7-30-10-55	GJL1313061R5105		10	0.185
					0 1	TBC7-30-01-55	GJL1313061R5015		10	0.185
				77 ... 143	1 0	TBC7-30-10-62	GJL1313061R6102		10	0.185
					0 1	TBC7-30-01-62	GJL1313061R6012		10	0.185
				140 ... 260	1 0	TBC7-30-10-68	GJL1313061R6108		10	0.185
					0 1	TBC7-30-01-68	GJL1313061R6018		10	0.185

Other types on request

Main dimensions mm, *inches*



2CDC212001F0011

TBC7

2CDC102020C0201

B6, B7 4-pole mini contactors – with screw terminals
4 to 5.5 kW
AC operated

B6-22-00

3

Description

B6, B7 4-pole mini contactors are compact control products mainly used for switching resistive loads up to 690 V AC.

These contactors are designed with:

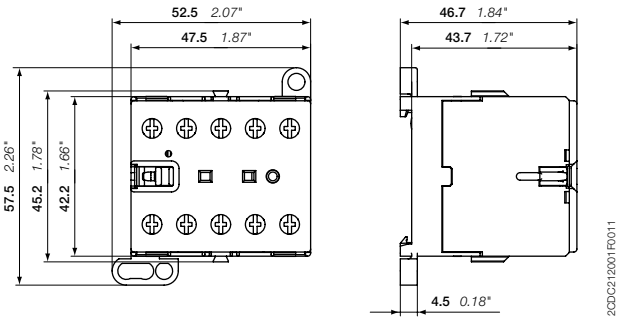
- 4 main poles
- control circuit: AC operated
  - low coil consumption (3.5 VA at pull-in and at holding)
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories
- hum-free coil
- designed for rail or wall mounting

Ordering details

IEC Rated operational current $\theta \leq 40$ °C AC-1 A	UL/CSA General use rating	Rated control circuit voltage U_c 50/60 Hz V AC	Auxiliary contacts fitted	Type	Order code		Pkg qty	Weight (1 pce) kg
4 N.O. main poles								
20	300 V / 12 A	24	0 0	B6-40-00-01	GJL1211201R0001		10	0.175
		42	0 0	B6-40-00-02	GJL1211201R0002		10	0.175
		48	0 0	B6-40-00-03	GJL1211201R0003		10	0.175
		110 ... 127	0 0	B6-40-00-84	GJL1211201R8004		10	0.175
		220 ... 240	0 0	B6-40-00-80	GJL1211201R8000		10	0.175
20	600 V / 16 A	24	0 0	B7-40-00-01	GJL1311201R0001		10	0.175
		42	0 0	B7-40-00-02	GJL1311201R0002		10	0.175
		48	0 0	B7-40-00-03	GJL1311201R0003		10	0.175
		110 ... 127	0 0	B7-40-00-84	GJL1311201R8004		10	0.175
		220 ... 240	0 0	B7-40-00-80	GJL1311201R8000		10	0.175
2 N.O. + 2 N.C. main poles								
20	300 V / 12 A	24	0 0	B6-22-00-01	GJL1211501R0001		10	0.175
		42	0 0	B6-22-00-02	GJL1211501R0002		10	0.175
		48	0 0	B6-22-00-03	GJL1211501R0003		10	0.175
		110 ... 127	0 0	B6-22-00-84	GJL1211501R8004		10	0.175
		220 ... 240	0 0	B6-22-00-80	GJL1211501R8000		10	0.175
20	600 V / 16 A	24	0 0	B7-22-00-01	GJL1311501R0001		10	0.175
		42	0 0	B7-22-00-02	GJL1311501R0002		10	0.175
		48	0 0	B7-22-00-03	GJL1311501R0003		10	0.175
		110 ... 127	0 0	B7-22-00-84	GJL1311501R8004		10	0.175
		220 ... 240	0 0	B7-22-00-80	GJL1311501R8000		10	0.175

Other types on request

Main dimensions mm, *inches*



B6, B7

2CDC102009C0201

BC6, B7D 4-pole mini contactors – with screw terminals
4 to 5.5 kW
DC operated

2CDC211032F0011

BC6-22-00

Description

BC6, B7D 4-pole mini contactors are compact control products mainly used for switching resistive loads up to 690 V AC.

These contactors are designed with:

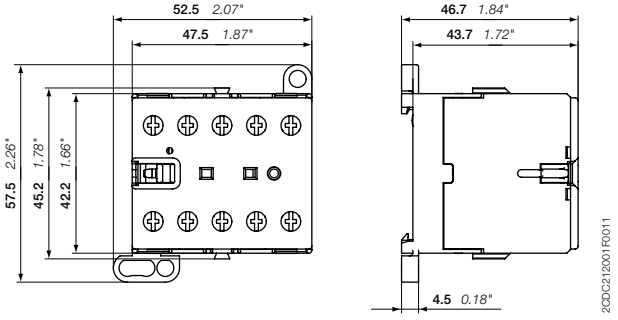
- 4 main poles
- control circuit: DC operated
  - low coil consumption (3.5 W at pull-in and at holding)
- hum-free coil
- add-on auxiliary contact blocks for front or side mounting
- designed for rail or wall mounting

Ordering details

IEC Rated operational current $\theta \leq 40$ °C AC-1 A	UL/CSA General use rating	Rated control circuit voltage U_c V DC	Auxiliary contacts fitted	Type	Order code		Pkg qty	Weight (1 pce) kg
4 N.O. main poles								
20	600 V / 16 A	24	0 0	B7D-40-00-01	GJL1317201R0001		10	0.175
		220	0 0	B7D-40-00-05	GJL1317201R0005		10	0.175
2 N.O. + 2 N.C. main poles								
20	300 V / 12 A	12	0 0	BC6-22-00-07	GJL1213501R0007		10	0.175
		24	0 0	BC6-22-00-01	GJL1213501R0001		10	0.175
		42	0 0	BC6-22-00-02	GJL1213501R0002		10	0.175
		48	0 0	BC6-22-00-16	GJL1213501R1006		10	0.175
		60	0 0	BC6-22-00-03	GJL1213501R0003		10	0.175
		110 ... 125	0 0	BC6-22-00-04	GJL1213501R0004		10	0.175
		220 ... 240	0 0	BC6-22-00-05	GJL1213501R0005		10	0.175

Other types on request

Main dimensions mm, *inches*



2CDC212001F0011

BC6, B7D

TBC7 4-pole mini contactors – with screw terminals
4 to 5.5 kW
DC operated – large coil voltage range

TBC7-31-00

Description

TBC7 4-pole mini contactors are compact control products mainly used for switching resistive or motor loads up to 690 V AC.

These contactors are designed with:

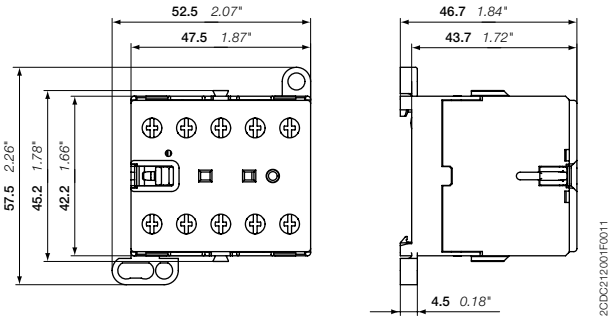
- 4 main poles
- control circuit: DC operated
  - low coil consumption (5 W at pull-in and at holding)
- hum-free coil
- expanded ambient temperature range -30 … +70 °C and wide range voltage supply
- no auxiliary contact block permitted for mounting
- designed for rail or wall mounting
- material is approved for railway applications

Ordering details

IEC Rated operational current $\theta \leq 40$ °C AC-1 A	UL/CSA General use rating	Rated control circuit voltage $U_{C\,min}$ ... $U_{C\,max}$ V DC	Auxiliary contacts fitted	Type	Order code		Pkg qty	Weight (1 pce) kg
3 N.O. + 1 N.C. main poles								
20	600 V / 16 A	50 ... 90	0 0	TBC7-31-00-55	GJL1313461R5005		10	0.185
		77 ... 143	0 0	TBC7-31-00-62	GJL1313461R6002		10	0.185
		140 ... 260	0 0	TBC7-31-00-68	GJL1313461R6008		10	0.185
2 N.O. + 2 N.C. main poles								
20	600 V / 16 A	50 ... 90	0 0	TBC7-22-00-55	GJL1313561R5005		10	0.185
		77 ... 143	0 0	TBC7-22-00-62	GJL1313561R6002		10	0.185
		140 ... 260	0 0	TBC7-22-00-68	GJL1313561R6008		10	0.185

Other types on request

Main dimensions mm, *inches*



TBC7

2CDC102022C0201

K6 4-pole mini contactor relays – with screw terminals
AC operated

K6-22Z

K6-31Z

Description

K6 4-pole mini-contactor relays are space optimized control products mainly used for control functions or for small loads up to 4 A.

These contactors are designed with:

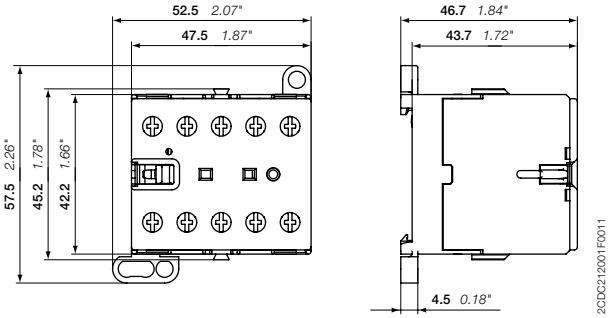
- 4-poles with various contact combinations
- control circuit: AC operated
  - low coil consumption (3.5 VA at pull-in and at holding)
- hum-free coil
- add-on auxiliary contact blocks for front or side mounting
- designed for rail or wall mounting

Ordering details

Rated control circuit voltage U_c		Type	Order code		Pkg qty	Weight (1 pce)
50 Hz	60 Hz					
V AC	V AC					kg
K6 4-pole mini contactor relays						
24	24	K6-22Z-01	GJH1211001R0221		10	0.175
42	42	K6-22Z-02	GJH1211001R0222		10	0.175
48	48	K6-22Z-03	GJH1211001R0223		10	0.175
110 ...127	110 ...127	K6-22Z-84	GJH1211001R8224		10	0.175
220 ... 240	220 ... 240	K6-22Z-80	GJH1211001R8220		10	0.175
380 ... 415	380 ... 415	K6-22Z-85	GJH1211001R8225		10	0.175
24	24	K6-31Z-01	GJH1211001R0311		10	0.175
42	42	K6-31Z-02	GJH1211001R0312		10	0.175
48	48	K6-31Z-03	GJH1211001R0313		10	0.175
110 ...127	110 ...127	K6-31Z-84	GJH1211001R8314		10	0.175
220 ... 240	220 ... 240	K6-31Z-80	GJH1211001R8310		10	0.175
380 ... 415	380 ... 415	K6-31Z-85	GJH1211001R8315		10	0.175
24	24	K6-40E-01	GJH1211001R0401		10	0.175
42	42	K6-40E-02	GJH1211001R0402		10	0.175
48	48	K6-40E-03	GJH1211001R0403		10	0.175
110 ...127	110 ...127	K6-40E-84	GJH1211001R8404		10	0.175
220 ... 240	220 ... 240	K6-40E-80	GJH1211001R8400		10	0.175
380 ... 415	380 ... 415	K6-40E-85	GJH1211001R8405		10	0.175

Other types on request

Main dimensions mm, *inches*



K6

2CDC102011C0201

KC6 4-pole mini contactor relays – with screw terminals
DC operated

KC6-22Z

Description

KC6 4-pole mini-contactor relays are space optimized control products mainly used for control functions or for small loads up to 4 A.

These contactors are designed with:

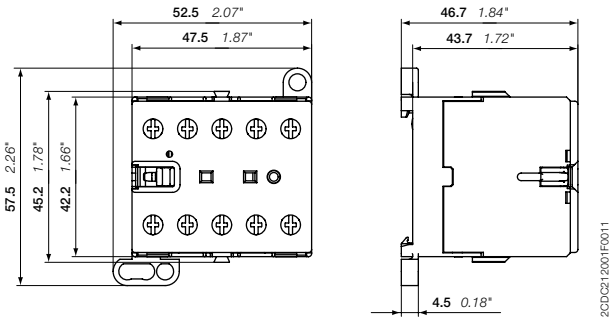
- 4-poles with various contact combinations
- control circuit: DC operated
  - low coil consumption (3.5 W at pull-in and at holding)
- hum-free coil
- add-on auxiliary contact blocks for front or side mounting
- designed for rail or wall mounting

Ordering details

Rated control circuit voltage U_c V DC	Type	Order code		Pkg qty	Weight (1 pce) kg
KC6 4-pole mini contactor relays					
12	KC6-22Z-07	GJH1213001R0227		10	0.175
24	KC6-22Z-01	GJH1213001R0221		10	0.175
48	KC6-22Z-16	GJH1213001R1226		10	0.175
60	KC6-22Z-03	GJH1213001R0223		10	0.175
110 ... 125	KC6-22Z-04	GJH1213001R0224		10	0.175
220 ... 240	KC6-22Z-05	GJH1213001R0225		10	0.175
12	KC6-31Z-07	GJH1213001R0317		10	0.175
24	KC6-31Z-01	GJH1213001R0311		10	0.175
48	KC6-31Z-16	GJH1213001R1316		10	0.175
60	KC6-31Z-03	GJH1213001R0313		10	0.175
110 ... 125	KC6-31Z-04	GJH1213001R0314		10	0.175
220 ... 240	KC6-31Z-05	GJH1213001R0315		10	0.175
12	KC6-40E-07	GJH1213001R0407		10	0.175
24	KC6-40E-01	GJH1213001R0401		10	0.175
48	KC6-40E-16	GJH1213001R1406		10	0.175
60	KC6-40E-03	GJH1213001R0403		10	0.175
110 ... 125	KC6-40E-04	GJH1213001R0404		10	0.175
220 ... 240	KC6-40E-05	GJH1213001R0405		10	0.175

Other types on request

Main dimensions mm, *inches*



KC6

2CDC102012C0201

KC6 4-pole interface mini contactor relays – with screw terminals
DC operated

KC6-31Z

Description

KC6 4-pole interface mini-contactor relays are space optimized control products mainly used for control functions or for small loads up to 4 A.

These contactors are designed with:

- 4-poles with various contact combinations
- control circuit: DC operated
  - low coil consumption (1.4 ... 2.8 W at pull-in and at holding)
- hum-free coil
- no auxiliary contact block permitted for mounting
- designed for rail or wall mounting

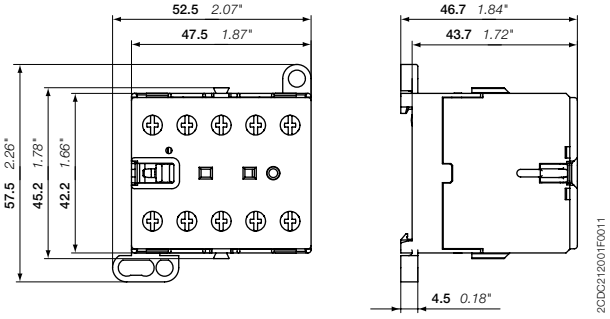
3

Ordering details

Rated control circuit voltage U_c V DC	Type	Order code		Pkg qty	Weight (1 pce) kg
DC operation 24 V / 1.4 W					
24	KC6-31Z-1.4-81	GJH1213001R8311		10	0.175
24	KC6-40E-1.4-81	GJH1213001R8401		10	0.175
DC operation 17 ... 32 V / 2.4 W					
17 ... 32	KC6-31Z-2.4-51	GJH1213001R5311		10	0.175
17 ... 32	KC6-40E-2.4-51	GJH1213001R5401		10	0.175
DC operation 24 V / 1.7 W					
24	K6S-22Z-1.7-71	GJH1213001R7221		10	0.175
24	K6S-31Z-1.7-71	GJH1213001R7311		10	0.175
24	K6S-40E-1.7-71	GJH1213001R7401		10	0.175
DC operation 17 ... 32 V / 2.8 W					
17 ... 32	K6S-22Z-2.8-72	GJH1213001R7222		10	0.175
17 ... 32	K6S-31Z-2.8-72	GJH1213001R7312		10	0.175
17 ... 32	K6S-40E-2.8-72	GJH1213001R7402		10	0.175

Other types on request

Main dimensions mm, *inches*



KC6

2CDC102013C0201

TKC6 4-pole mini contactor relays – with screw terminals
DC operated – large coil voltage range

TKC6-31Z

Description

TKC6 4-pole mini contactors are space optimized control products mainly used for control functions or for small loads up to 4 A.

These contactors are designed with:

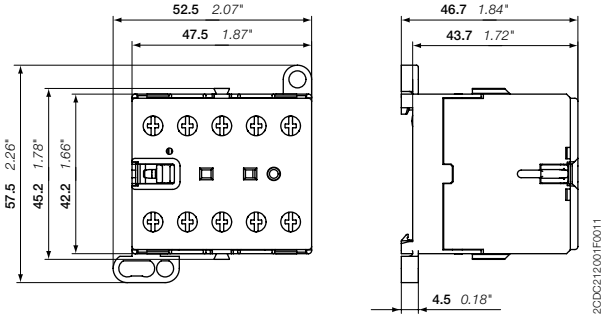
- 4-poles with various contact combinations
- control circuit: DC operated, hum free, low consumption (5 W at pull-in and at holding)
- expanded ambient temperature range -30 … +70 °C and wide range voltage supply
- material is suitable for railway applications
- humfree operating DC coil
- no auxiliary contact block permitted for mounting
- designed for rail or wall mounting

Ordering details

Rated control circuit voltage $U_{C\,min}$ ... $U_{C\,max}$ V DC	Type	Order code		Pkg qty	Weight (1 pce) kg
17 ... 32	TKC6-22Z-51	GJH1213061R5221		10	0.180
50 ... 90	TKC6-22Z-55	GJH1213061R5225		10	0.180
77 ... 143	TKC6-22Z-62	GJH1213061R6222		10	0.180
140 ... 260	TKC6-22Z-68	GJH1213061R6228		10	0.180
17 ... 32	TKC6-31Z-51	GJH1213061R5311		10	0.180
50 ... 90	TKC6-31Z-55	GJH1213061R5315		10	0.180
77 ... 143	TKC6-31Z-62	GJH1213061R6312		10	0.180
140 ... 260	TKC6-31Z-68	GJH1213061R6318		10	0.180
17 ... 32	TKC6-40E-51	GJH1213061R5401		10	0.180
50 ... 90	TKC6-40E-55	GJH1213061R5405		10	0.180
77 ... 143	TKC6-40E-62	GJH1213061R6402		10	0.180
140 ... 260	TKC6-40E-68	GJH1213061R6408		10	0.180

Other types on request

Main dimensions mm, *inches*



TKC6

2CDC102014C0201

B6, B7, BC6, BC7 3 and 4-pole mini contactors
VB6, VB7, VBC6, VBC7 3-pole mini reversing contactors
Accessories

2CDC211012S0010

CAF6-11N

2CDC211007S0010

RV-BC6/250

2CDC211009S0010

CA6-11E-P

2CDC211018S0011

CA6-11E

SST27792R

BSM6-30

2CDC231012F0011

T16

Odering details

For contactors	Auxiliary contacts	Type	Order code		Pkg qty	Weight (1 pce) kg
Front-mounted instantaneous auxiliary contact blocks (not allowed for mounting on TBC, B6S, B7S, interface contactors) (1)						
B6-, B7-40-00, BC6-, BC7-40-00 VB6, VB7, VBC6, VBC7, VB6A, VB7A VBC6A, VBC7A	1 1	CAF6-11E	GJL1201330R0002		10	0.020
	2 0	CAF6-20E	GJL1201330R0006		10	0.020
	0 2	CAF6-02E	GJL1201330R0010		10	0.020
B6-, B7-30-10, BC6-, BC7-30-10 VB6, VB7, VBC6, VBC7, VB6A, VB7A VBC6A, VBC7A	1 1	CAF6-11M	GJL1201330R0003		10	0.020
	2 0	CAF6-20M	GJL1201330R0007		10	0.020
	0 2	CAF6-02M	GJL1201330R0011		10	0.020
B6-, B7-30-01, BC6-, BC7-30-01 VB6, VB7, VBC6, VBC7, VB6A, VB7A VBC6A, VBC7A	1 1	CAF6-11N	GJL1201330R0004		10	0.020
	2 0	CAF6-20N	GJL1201330R0008		10	0.020
	0 2	CAF6-02N	GJL1201330R0012		10	0.020
Side-mounted instantaneous auxiliary contact block (1)						
B6-, B7-40-00, BC6-, BC7-40-00	1 1	CA6-11E	GJL1201317R0002		10	0.030
B6-, B7-30-10, BC6-, BC7-30-10	1 1	CA6-11M	GJL1201317R0003		10	0.030
B6-, B7-30-01, BC6-, BC7-30-01	1 1	CA6-11N	GJL1201317R0004		10	0.030

(1) CA6 and CAF6 must not be fitted simultaneously.

For contactors	Rated control circuit voltage Uc V DC	Connection type	Type	Order code		Pkg qty	Weight (1 pce) kg
Surge suppressors for contactor coils							
BC6, BC7	24...60	Cable lug	RV-BC6/60	GHV2501902R0002		10	0.005
		Flat pin, 2.8 mm	RV-BC6-F/60	GHV2501902R0003		10	0.005
	50...250	Cable lug	RV-BC6/250	GHV2501903R0002		10	0.005
		Flat pin, 2.8 mm	RV-BC6-F/250	GHV2501903R0003		10	0.010
	380	Cable lug	RV-BC6/380	GHV2501904R0002		10	0.005
		Flat pin, 2.8 mm	RV-BC6-F/380	GHV2501904R0003		10	0.010

Note: Mini contactors for AC operation have an integrated protective circuit.

Connecting links with manual motor starters					
To connect B..VB.. mini contactor to MS116, MS132	BEA7/132	1SBN080906R1002		10	0.013
To connect B..VB.. mini contactors to MS325	BEA7/325	1SBN080906R1001		10	0.021
Connection sets for reversing contactors					
VB6, VB7, VBC6, VBC7, VB6A, VB7A, VBC6A, VBC7A, cross-section 1.8 mm²	BSM6-30	GJL1201908R0001		10	0.010
Parallel connecting link					
B6, B7, BC6, BC7	LP6	GJL1201907R0001		100	0.009
Cover cap, transparent fitting to DIN rail design, sealable					
B6, B7, BC6, BC7	LT6-B	GJL1201906R0001		10	0.015

Overload relays fitting details (2)

Contactor types	Thermal overload relays	Electronic overload relays
B6, B7, BC6, BC7	T16 (0.10...16 A)	E16DU (0.10...18.9 A)

(2) Direct mounting - No kit required. Ordering details, see overload relays section.

1SBC101635S0201

K6, KC6 4-pole mini contactor relays
Accessories

CAF6-11K

CA6-11K

CA6-11K-P

LT6-B

RV-BC6/250

Ordering details

For contactors	Auxiliary contacts	Type	Order code		Pkg qty	Weight (1 pce) kg
Front-mounted instantaneous auxiliary contact blocks (1)						
K6, KC6	1 1	CAF6-11K	GJL1201330R0001		10	0.020
	2 0	CAF6-20K	GJL1201330R0005		10	0.020
	0 2	CAF6-02K	GJL1201330R0009		10	0.020
Side-mounted instantaneous auxiliary contact block (1)						
K6, KC6	1 1	CA6-11K	GJL1201317R0001		10	0.030

(1) CA6 and CAF6 must not be fitted simultaneously.

For contactors	Rated control circuit voltage Uc V DC	Connection type	Type	Order code		Pkg qty	Weight (1 pce) kg
Surge suppressors for contactor coils							
KC6	24...60	Cable lug	RV-BC6/60	GHV2501902R0002		10	0.005
		Flat pin, 2.8 mm	RV-BC6-F/60	GHV2501902R0003		10	0.005
	50...250	Cable lug	RV-BC6/250	GHV2501903R0002		10	0.005
		Flat pin, 2.8 mm	RV-BC6-F/250	GHV2501903R0003		10	0.010
	380	Cable lug	RV-BC6/380	GHV2501904R0002		10	0.005
		Flat pin, 2.8 mm	RV-BC6-F/380	GHV2501904R0003		10	0.010

Note: Mini contactors for AC operation have an integrated protective circuit.

Cover cap, transparent fitting to DIN rail design, sealable						
K6, KC6	LT6-B	GJL1201906R0001		10	0.015

1SBC101635S0201

Notes

1L1
3L2
5L3
13NO
A1
ABB
230 V 50/60 Hz
2T1
4T2
6T3
14NO
A2
1L1
3L2
5L3
21NC
A1
ABB
230 V 50/60 Hz
2T1
4T2
6T3
22NC
A2

AS 3-pole contactors and NS contactor relays with screw terminals

Presentation 4/3

3-pole contactors

AS09 ... AS16	AC operated	**4**/8
ASL09 ... ASL16	DC operated	**4**/9
AS09 ... AS16	AC operated - 2-stack	**4**/10
ASL09 ... ASL16	DC operated - 2-stack	**4**/11
Main accessories		**4**/12

Contactor relays

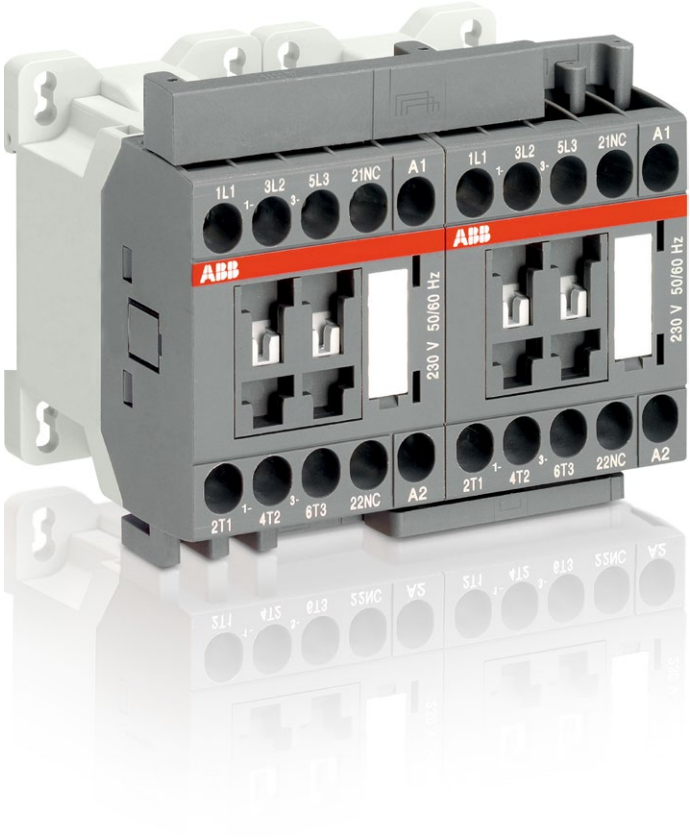
NS	AC operated	**4**/14
NSL	DC operated	**4**/15
Main accessories		**4**/16

Voltage code table 4/18

For direct product details information, use product type or order code, ex:
www.abb.com/productdetails/AF09-30-10-13 or www.abb.com/productdetails/1SBL137001R1310

AS contactors
Efficient and space saving

The compact AS contactor range allows you to optimize equipment design and is a reliable, time and cost saving solution.



Speed up your projects

Simpler by design

AS contactors come in one single size and are designed to make life easy for engineering, handling and wiring purposes. These products follow a simple marking pattern, which enables a quick identification of their individual features.

Easy to install

Easy to use

Make engineering a simple process with AS contactors. Every product is delivered with opened terminals, located directly on the front for easy access. Every terminal is screwdriver guided. Spring terminal versions are also available for a time-saving and reliable connection alternative.

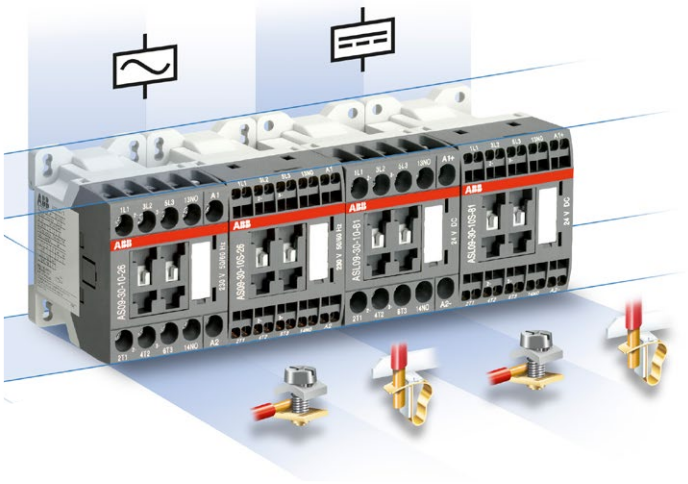
Space saving

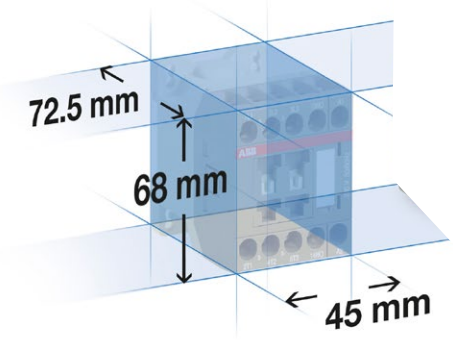
Space optimization

The addition of accessories keeps the panel smart and compact, while providing additional features. Interlocking kits and surge suppression are clipped into the housing without adding width to the small frame of the contactor.

1SBC100208S0201

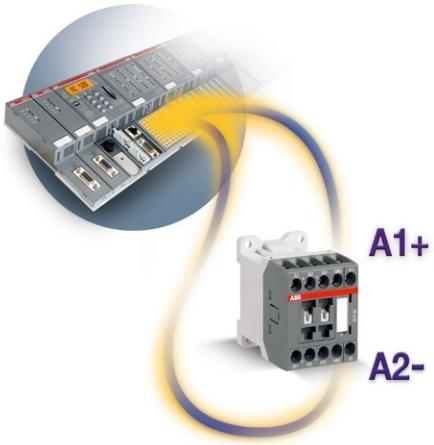
Compact and efficient
Optimize your equipment dimensions!

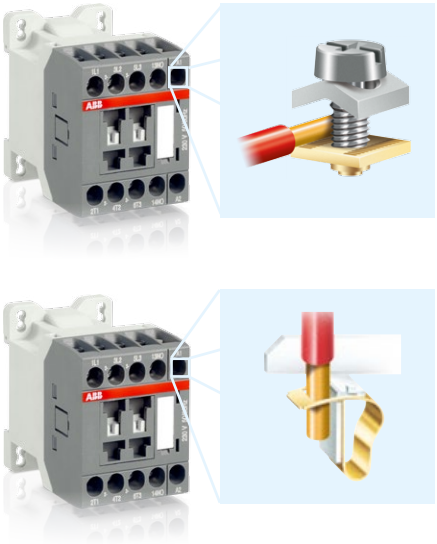




More choices, for more comfort
AS contactors feature products for AC and DC control circuits. On top of that, they are available with screw or spring terminals.

Easy to engineer with just one size
For motor starting solutions up to 7.5 kW at 400 V and 3 hp at 440 V, contactors are in one frame size for both AC and DC coils.



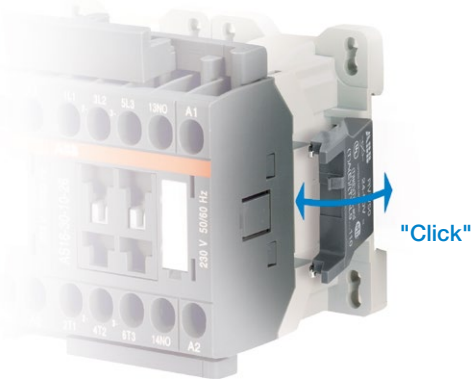


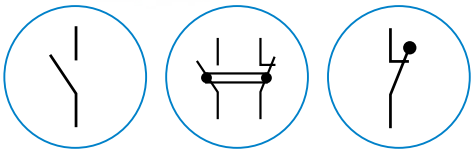
Direct control by PLC
With their low consumption coil of only 3 W, AS contactors can be controlled directly by most PLC's. For 24 V control circuits, this is only 125 mA.

Two types of terminals, for even more choices
As an alternative to the conventional screw terminals, spring terminals are often used in applications with vibrations. Both types are able to accommodate two cables. This way, AS offers the right type of terminal depending on the installation.

1SBC100209S0201

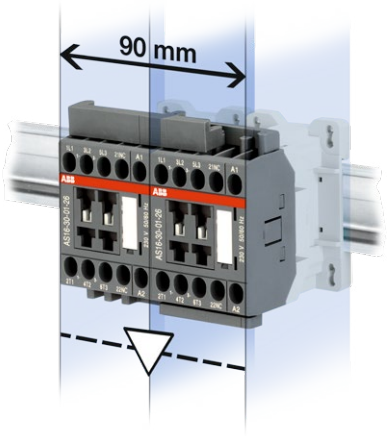
Easy to use
Space-saving and intuitive

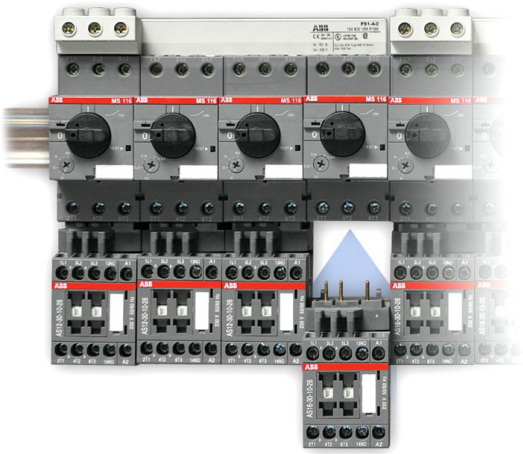




Make your control circuits reliable
Built-in and add-on auxiliary contacts offer high reliability for low signals and meet the requirements for mechanically linked and mirror contacts according to IEC standards.

Side clip-on surge suppressors
This add-on snaps and connects to the side of the housing and does not add width to the frame. The coil terminals remain accessible this way.





Compact reversing contactors
Using mechanical interlock units does not increase the width of the reversing contactor pair.

Choose reliable and time-saving solutions
AS contactors can easily be connected to manual motor starters or overload relays. The connecting accessories prevent mistakes and save time when assembling starter combinations.

1SBC100209S0201

AS09 ... AS16 3-pole contactors
4 to 7.5 kW
AC operated

AS09-30-10

4

Description

AS09 ... AS16 contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220 V DC.

These contactors are of the block type design with:

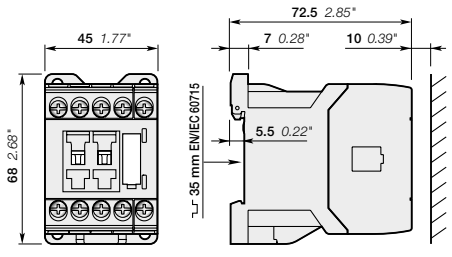
– 3 main poles and 1 built-in auxiliary contact
– control circuit: AC operated
– add-on auxiliary contact blocks for front mounting and a comprehensive range of accessories.

Ordering details

IEC		UL/CSA		Rated control circuit voltage Uc (1)		Auxiliary contacts fitted		Type	Order code		Weight
Rated operational power 400 V AC-3	current θ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC								Pkg (1 pce)
kW	A	hp	A	V 50 Hz	V 60 Hz						kg
4	22	5	20	24	24	1	0	AS09-30-10-20	1SBL101001R2010		0.220
						0	1	AS09-30-01-20	1SBL101001R2001		0.220
				230	230	1	0	AS09-30-10-26	1SBL101001R2610		0.220
						0	1	AS09-30-01-26	1SBL101001R2601		0.220
5.5	24	7.5	20	24	24	1	0	AS12-30-10-20	1SBL111001R2010		0.220
						0	1	AS12-30-01-20	1SBL111001R2001		0.220
				230	230	1	0	AS12-30-10-26	1SBL111001R2610		0.220
						0	1	AS12-30-01-26	1SBL111001R2601		0.220
7.5	24	10	20	24	24	1	0	AS16-30-10-20	1SBL121001R2010		0.220
						0	1	AS16-30-01-20	1SBL121001R2001		0.220
				230	230	1	0	AS16-30-10-26	1SBL121001R2610		0.220
						0	1	AS16-30-01-26	1SBL121001R2601		0.220

Note: for multiple packaging, please contact your ABB local sales organization.
(1) Other control voltages see voltage code table.

Main dimensions mm, *inches*



AS09, AS12, AS16

1SBC101301S0201 - Rev. A

ASL09 ... ASL16 3-pole contactors
4 to 7.5 kW
DC operated

ASL09-30-10

Description

ASL09 ... ASL16 contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220 V DC.

These contactors are of the block type design with:

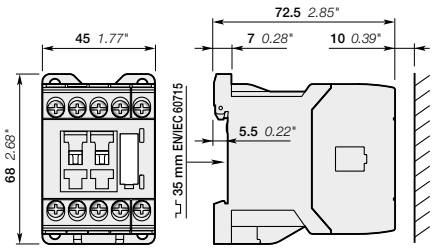
– 3 main poles and 1 built-in auxiliary contact
– control circuit: low consumption (3 W at pull-in and holding) DC operated with solid core magnet. Suitable for direct control by PLC outputs (the polarity on the coil terminals A1+ and A2- must be respected)
– add-on auxiliary contact blocks for front mounting and a comprehensive range of accessories.

Ordering details

IEC		UL/CSA		Rated control circuit voltage Uc (1)	Auxiliary contacts fitted		Type	Order code		Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC							Pkg (1 pce)
kW	A	hp	A	V DC						kg
4	22	5	20	24	1	0	ASL09-30-10-81	1SBL103001R8110		0.280
					0	1	ASL09-30-01-81	1SBL103001R8101		0.280
5.5	24	7.5	20	24	1	0	ASL12-30-10-81	1SBL113001R8110		0.280
					0	1	ASL12-30-01-81	1SBL113001R8101		0.280
7.5	24	10	20	24	1	0	ASL16-30-10-81	1SBL123001R8110		0.280
					0	1	ASL16-30-01-81	1SBL123001R8101		0.280

Note: for multiple packaging, please contact your ABB local sales organization.
(1) Other control voltages see voltage code table.

Main dimensions mm, *inches*



ASL09, ASL12, ASL16

AS09 ... AS16 2-stack 3-pole contactors
4 to 7.5 kW
AC operated

AS09-30-32

4

Description

AS09 ... AS16 contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220 V DC.

These contactors are of the block type design with:

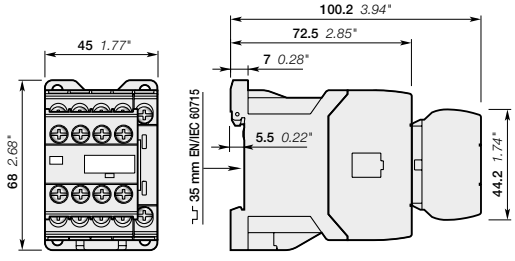
– 1st stack with 3 main poles and 1 N.O. built-in auxiliary contact
– 2nd stack with permanently fixed 2 N.O. + 2 N.C. auxiliary contact block. The auxiliary contact elements are mechanically linked (side-marked symbol) and the N.C. auxiliary contacts are mirror contacts
– control circuit: AC operated
– a comprehensive range of accessories.

Ordering details

IEC		UL/CSA		Rated control circuit voltage Uc (1)		Auxiliary contacts fitted		Type	Order code		Weight
Rated operational power 400 V AC-3	current θ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC								Pkg (1 pce)
kW	A	hp	A	V 50 Hz	V 60 Hz						kg
4	22	5	20	24	24	3	2	AS09-30-32-20	1SBL101001R2032		0.260
				230	230	3	2	AS09-30-32-26	1SBL101001R2632		0.260
5.5	24	7.5	20	24	24	3	2	AS12-30-32-20	1SBL111001R2032		0.260
				230	230	3	2	AS12-30-32-26	1SBL111001R2632		0.260
7.5	24	10	20	24	24	3	2	AS16-30-32-20	1SBL121001R2032		0.260
				230	230	3	2	AS16-30-32-26	1SBL121001R2632		0.260

Note: for multiple packaging, please contact your ABB local sales organization.
(1) Other control voltages see voltage code table.

Main dimensions mm, *inches*



AS09, AS12, AS16

1SBC101303S0201 - Rev. A

ASL09 ... ASL16 2-stack 3-pole contactors
4 to 7.5 kW
DC operated

ASL09-30-32

Description

ASL09 ... ASL16 contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220 V DC.

These contactors are of the block type design with:

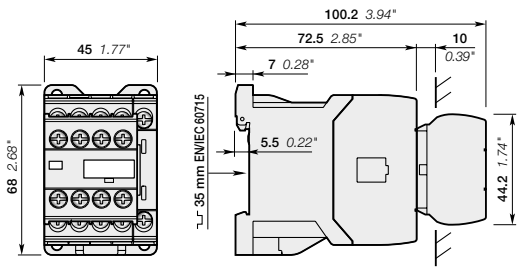
– 1st stack with 3 main poles and 1 N.O. built-in auxiliary contact
– 2nd stack with permanently fixed 2 N.O. + 2 N.C. auxiliary contact block. The auxiliary contact elements are mechanically linked (side-marked symbol) and the N.C. auxiliary contacts are mirror contacts
– control circuit: low consumption (3 W at pull-in and holding) DC operated with solid core magnet. Suitable for direct control by PLC outputs (the polarity on the coil terminals A1+ and A2- must be respected)
– a comprehensive range of accessories.

Ordering details

IEC		UL/CSA		Rated control circuit voltage Uc (1)	Auxiliary contacts fitted		Type	Order code		Weight Pkg (1 pce)
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC							
kW	A	hp	A	V DC						kg
4	22	5	20	24	3	2	ASL09-30-32-81	1SBL103001R8132		0.320
5.5	24	7.5	20	24	3	2	ASL12-30-32-81	1SBL113001R8132		0.320
7.5	24	10	20	24	3	2	ASL16-30-32-81	1SBL123001R8132		0.320

Note: for multiple packaging, please contact your ABB local sales organization.
(1) Other control voltages see voltage code table.

Main dimensions mm, *inches*

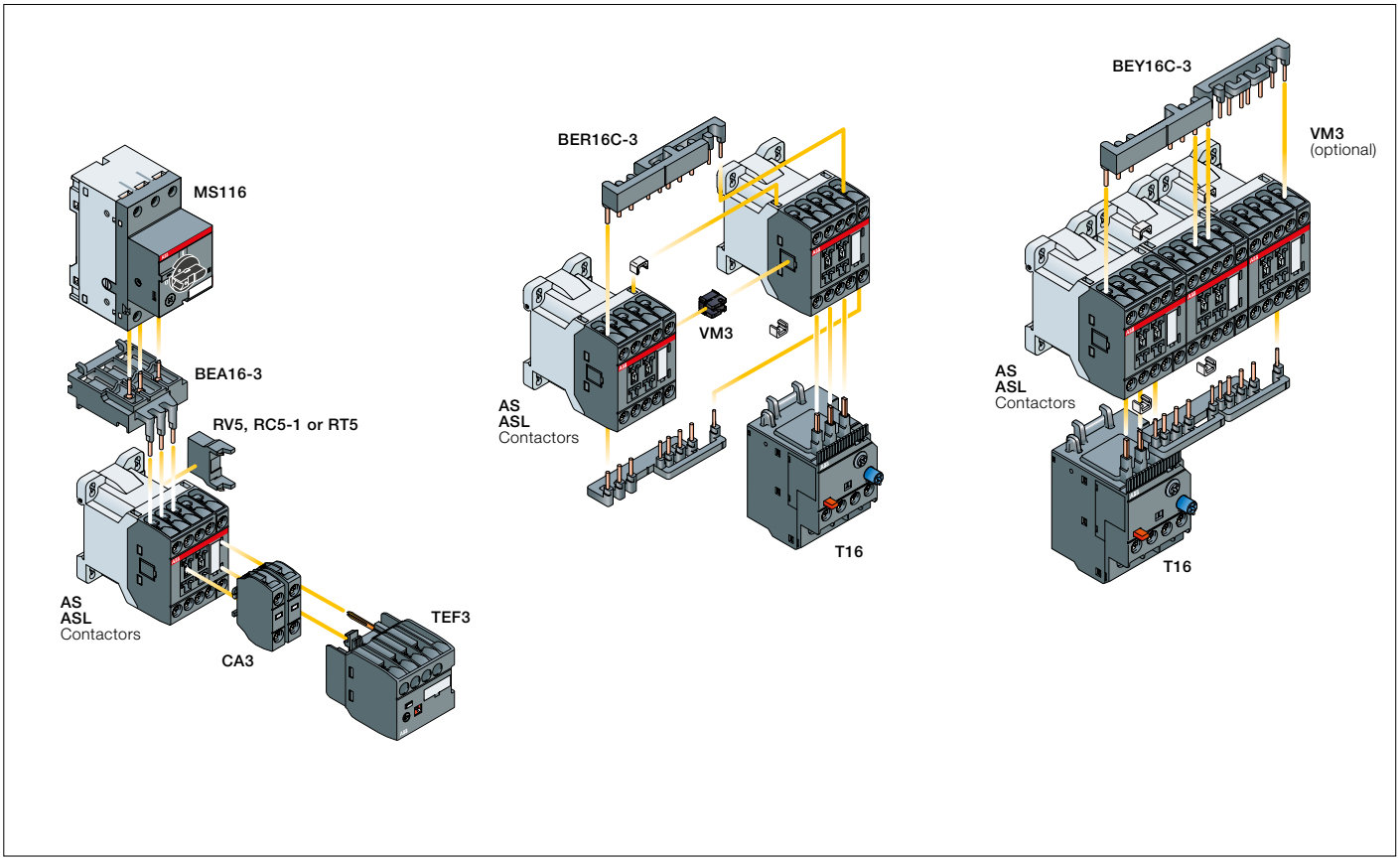


ASL09, ASL12, ASL16

1SBC101453S0201 - Rev. A

AS09 ... AS16 and
ASL09 ... ASL16 3-pole contactors
Main accessories

Contactor and main accessories (other accessories available)



4

Main accessory fitting details

Many configurations of accessories are possible depending on whether these are front-mounted or side-mounted.

Contactor types	Main poles	Built-in auxiliary contacts	Front-mounted accessories						Side-mounted accessories		
			Auxiliary contact blocks		Electronic timer		Mechanical interlock unit (between 2 contactors)				
			1-pole CA3		TEF3		VM3		Surge suppressors		
AS09 ... AS16	3 0 3 0	1 0 0 1	2 max.	or	1	+	1	+	RV5	or	RC5-1
AS09 ... AS16	3 0	3 2	–		–		1	+	RV5	or	RC5-1
ASL09 ... ASL16	3 0 3 0	1 0 0 1	2 max.	or	1	+	1	+	RV5	or	RT5
ASL09 ... ASL16	3 0	3 2	–		–		1	+	RV5	or	RT5

Overload relays fitting details (1)

Contactor types	Thermal overload relays
AS09 ... AS16 ASL09 ... ASL16	T16 (0.10...16 A)

The addition of an overload relay on the contactor does not prevent fitting of many other accessories as shown above.
(1) Direct mounting - No kit required.

1SBC101297S0201

AS09 ... AS16 and
ASL09 ... ASL16 3-pole contactors
Main accessories

CA3-10

Front-mounted instantaneous auxiliary contact blocks

For contactors	Auxiliary contacts		Type	Order code	Pkg qty	Weight (1 pce) kg
AS09 ... AS16	1	0	CA3-10	1SBN011010T1010	10	0.011
ASL09 ... ASL16	0	1	CA3-01	1SBN011010T1001	10	0.011

TEF3-ON

Front-mounted electronic timer

For contactors	Rated control circuit voltage - Uc V	Type	Order code	Pkg qty	Weight (1 pce) kg
ON-delay					
AS09 ... AS16, ASL09 ... ASL16	24...240 V AC/DC	TEF3-ON	1SBN021012R1000	1	0.065
OFF-delay					
AS09 ... AS16, ASL09 ... ASL16	24...240 V AC/DC	TEF3-OFF	1SBN021014R1000	1	0.065

VM3

Mechanical interlock unit

For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
AS09 ... AS16, ASL09 ... ASL16	VM3	1SBN031005T1000	10	0.002

RV5

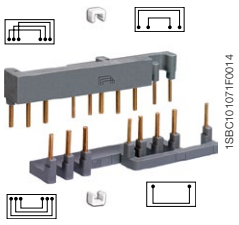
Surge suppressors

For contactors	Rated control circuit voltage - Uc V	AC	DC	Type	Order code	Pkg qty	Weight (1 pce) kg
AS09 ... AS16, ASL09 ... ASL16	24...50	●	●	RV5/50	1SBN050010R1000	2	0.015
	50...133	●	●	RV5/133	1SBN050010R1001	2	0.015
	110...250	●	●	RV5/250	1SBN050010R1002	2	0.015
	250...440	●	●	RV5/440	1SBN050010R1003	2	0.015
AS09 ... AS16	24...50	●	–	RC5-1/50	1SBN050100R1000	2	0.012
	50...133	●	–	RC5-1/133	1SBN050100R1001	2	0.012
	110...250	●	–	RC5-1/250	1SBN050100R1002	2	0.012
	250...440	●	–	RC5-1/440	1SBN050100R1003	2	0.012
ASL09 ... ASL16	12...32	–	●	RT5/32	1SBN050020R1000	2	0.015
	25...65	–	●	RT5/65	1SBN050020R1001	2	0.015
	50...90	–	●	RT5/90	1SBN050020R1002	2	0.015
	77...150	–	●	RT5/150	1SBN050020R1003	2	0.015
	150...264	–	●	RT5/264	1SBN050020R1004	2	0.015

BEA16-3

Connecting links with manual motor starters

For contactors	Manual motor starter	Type	Order code	Pkg qty	Weight (1 pce) kg
AS09 ... AS16 ASL09 ... ASL16	MS116-0.16 ... MS116-16 MS132-0.16 ... MS132-16	BEA16-3	1SBN081006T1000	10	0.019

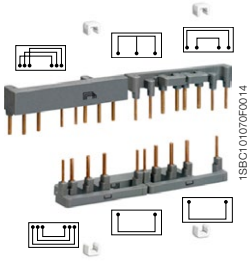


BER16C-3

Connection sets for reversing contactors

For contactors	Mechanical interlock unit	Type	Order code	Pkg qty	Weight (1 pce) kg
AS09 ... AS16, ASL09 ... ASL16	with or without VM3	BER16C-3	1SBN081012R1000	1	0.035

Note: BER16C-3 connection set includes two BB3 fixing clips, and an electrical interlocking when fitted on contactors with built-in N.C. auxiliary contacts. BER16C-3 can be used with or without VM3 mechanical interlock unit.



BEY16C-3

Connection sets for star-delta starting

For contactors	Mech. interlock unit between Star & Delta contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
AS09 ... AS12, ASL09 ... ASL12	with or without VM3	BEY16C-3	1SBN081018R2000	1	0.041

Note: BEY16C-3 connection set includes two BB3 fixing clips, and an electrical interlocking when fitted on Star and Delta contactors with built-in N.C. auxiliary contacts. BEY16C-3 can be used with or without VM3 mechanical interlock unit.

1SBC101297S0201

NS contactor relays
AC operated

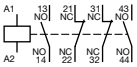
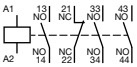
NS22E

4

Description

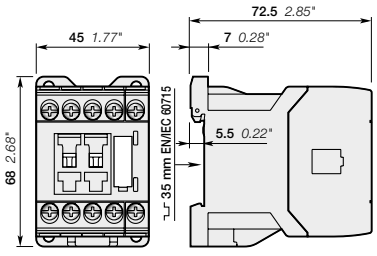
NS contactor relays are used for switching auxiliary and control circuits.
These contactor relays are designed with:
– 4 poles or 8 poles. Contactor relays have mechanically linked auxiliary contact elements (side-marked symbol)
– control circuit: AC operated
– add-on auxiliary contact blocks for front mounting and a comprehensive range of accessories.

Ordering details

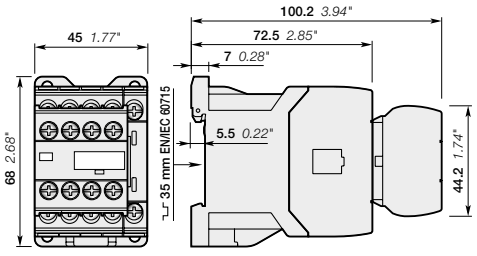
Number of contacts 1st stack	2nd stack	Rated control circuit voltage Uc (1) V 50 Hz	V 60 Hz	Type	Order code		Weight Pkg (1 pce) kg
		24	24	NS22E-20	1SBH101001R2022		0.220
		230	230	NS22E-26	1SBH101001R2622		0.220
		24	24	NS31E-20	1SBH101001R2031		0.220
		230	230	NS31E-26	1SBH101001R2631		0.220
		24	24	NS40E-20	1SBH101001R2040		0.220
		230	230	NS40E-26	1SBH101001R2640		0.220
		24	24	NS44E-20	1SBH101001R2044		0.260
		230	230	NS44E-26	1SBH101001R2644		0.260
		24	24	NS53E-20	1SBH101001R2053		0.260
		230	230	NS53E-26	1SBH101001R2653		0.260
		24	24	NS62E-20	1SBH101001R2062		0.260
		230	230	NS62E-26	1SBH101001R2662		0.260
		24	24	NS71E-20	1SBH101001R2071		0.260
		230	230	NS71E-26	1SBH101001R2671		0.260
		24	24	NS80E-20	1SBH101001R2080		0.260
		230	230	NS80E-26	1SBH101001R2680		0.260

Note: for multiple packaging, please contact your ABB local sales organization.
(1) Other control voltages see voltage code table.

Main dimensions mm, *inches*



NS22E, NS31E, NS40E



NS44E, NS53E, NS62E, NS71E, NS80E

1SBC101475S0201 - Rev. A

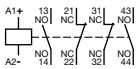
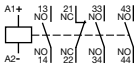
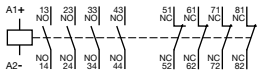
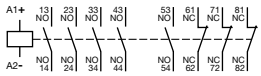
NSL contactor relays
DC operated

NSL22E

Description

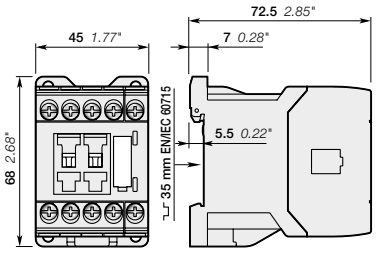
NSL contactor relays are used for switching auxiliary and control circuits.
These contactor relays are designed with:
– 4 poles or 8 poles. Contactor relays have mechanically linked auxiliary contact elements (side-marked symbol)
– control circuit: low coil consumption (3 W at pull-in and holding) DC operated with solid core magnet. Suitable for direct control by PLC outputs (the polarity on the coil terminals A1+ and A2- must be respected)
– add-on auxiliary contact blocks for front mounting and a comprehensive range of accessories.

Ordering details

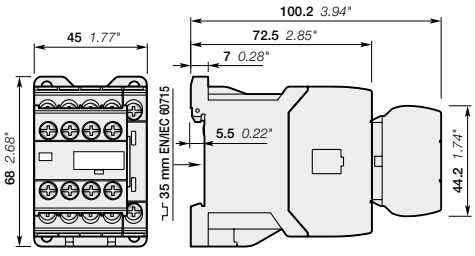
Number of contacts 1st stack	2nd stack	Rated control circuit voltage Uc (1) V DC	Type	Order code	Weight Pkg (1 pce) kg
		24	NSL22E-81	1SBH103001R8122	0.280
		24	NSL31E-81	1SBH103001R8131	0.280
		24	NSL40E-81	1SBH103001R8140	0.280
		24	NSL44E-81	1SBH103001R8144	0.320
		24	NSL53E-81	1SBH103001R8153	0.320
		24	NSL62E-81	1SBH103001R8162	0.320
		24	NSL71E-81	1SBH103001R8171	0.320
		24	NSL80E-81	1SBH103001R8180	0.320

Note: for multiple packaging, please contact your ABB local sales organization.
(1) Other control voltages see voltage code table.

Main dimensions mm, *inches*



NSL22E, NSL31E, NSL40E

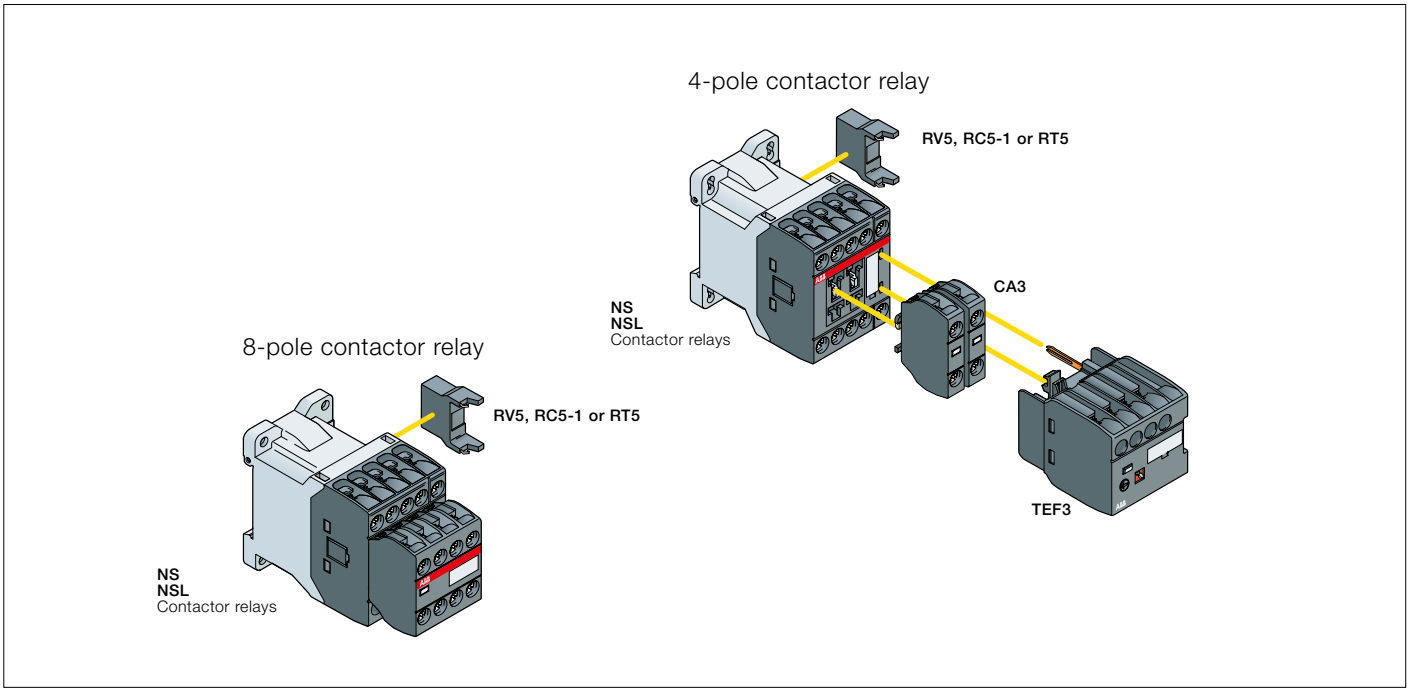


NSL44E, NSL53E, NSL62E, NSL71E, NSL80E

1SBC101479S0201 - Rev. A

NS and NSL contactor relays
Main accessories

Contactor relays and main accessories (other accessories available)



Main accessory fitting details

Contactor types	Main poles			Front-mounted accessories: Auxiliary contact blocks 1-pole CA3		Electronic timer TEF3		Side-mounted accessories: Surge suppressors		
NS..	2	2	E	2 max.	or	1	+	RV5	or	RC5-1
NS..	3	1	E							
NS..	4	0	E							
NS..	4	4	E	–		–		RV5	or	RC5-1
NS..	5	3	E							
NS..	6	2	E							
NS..	7	1	E							
NS..	8	0	E							
NSL..	2	2	E	2 max.	or	1	+	RV5	or	RT5
NSL..	3	1	E							
NSL..	4	0	E							
NSL..	4	4	E	–		–		RV5	or	RT5
NSL..	5	3	E							
NSL..	6	2	E							
NSL..	7	1	E							
NSL..	8	0	E							

1SBC101298S0201

NS and NSL contactor relays
Main accessories

CA3-10

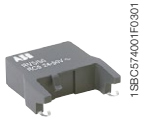
Front-mounted instantaneous auxiliary contact blocks

For contactor relays	Auxiliary contacts		Type	Order code		Pkg qty	Weight (1 pce) kg
NS, NSL	1	0	CA3-10	1SBN011010T1010		10	0.011
	0	1	CA3-01	1SBN011010T1001		10	0.011

TEF3-ON

Front-mounted electronic timer

For contactors	Rated control circuit voltage - Uc V	Type	Order code		Pkg qty	Weight (1 pce) kg
ON-delay						
NS, NSL	24...240 V AC/DC	TEF3-ON	1SBN021012R1000		1	0.065
OFF-delay						
NS, NSL	24...240 V AC/DC	TEF3-OFF	1SBN021014R1000		1	0.065



RV5

Surge suppressors

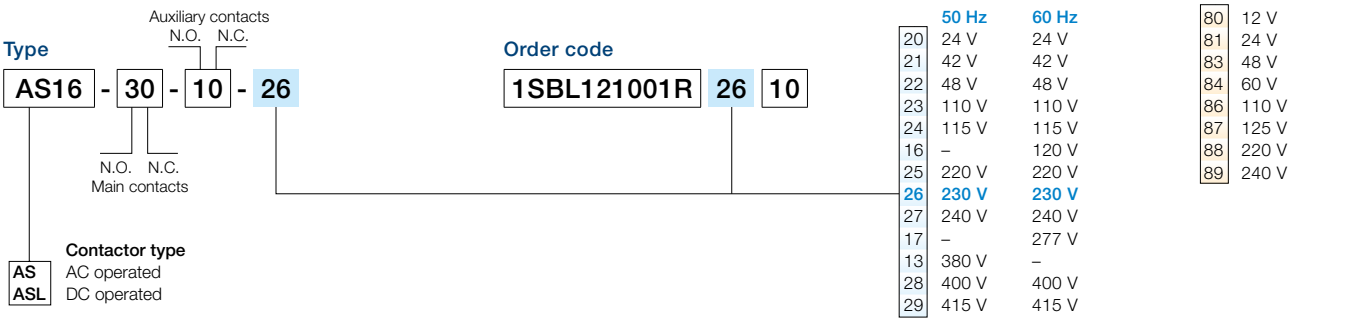
For contactor relays	Rated control circuit voltage - Uc V	AC	DC	Type	Order code		Pkg qty	Weight (1 pce) kg
NS, NSL	24...50	●	●	RV5/50	1SBN050010R1000		2	0.015
	50...133	●	●	RV5/133	1SBN050010R1001		2	0.015
	110...250	●	●	RV5/250	1SBN050010R1002		2	0.015
	250...440	●	●	RV5/440	1SBN050010R1003		2	0.015
NS	24...50	●	–	RC5-1/50	1SBN050100R1000		2	0.012
	50...133	●	–	RC5-1/133	1SBN050100R1001		2	0.012
	110...250	●	–	RC5-1/250	1SBN050100R1002		2	0.012
	250...440	●	–	RC5-1/440	1SBN050100R1003		2	0.012
NSL	12...32	–	●	RT5/32	1SBN050020R1000		2	0.015
	25...65	–	●	RT5/65	1SBN050020R1001		2	0.015
	50...90	–	●	RT5/90	1SBN050020R1002		2	0.015
	77...150	–	●	RT5/150	1SBN050020R1003		2	0.015
	150...264	–	●	RT5/264	1SBN050020R1004		2	0.015

1SBC101298S0201

Voltage code table

The below tables indicate the available coil voltages and corresponding digits for order codes. When placing an order, please give either type or order code. Select a standard contactor from ordering detail pages. Change the **coil voltage code** in the type or in the order code according to the table below. Example: for contactor AS09-30-10 and coil 42 V 50/60 Hz, type is AS09-30-10-**21** and order code is 1SBL101001R**21**10.

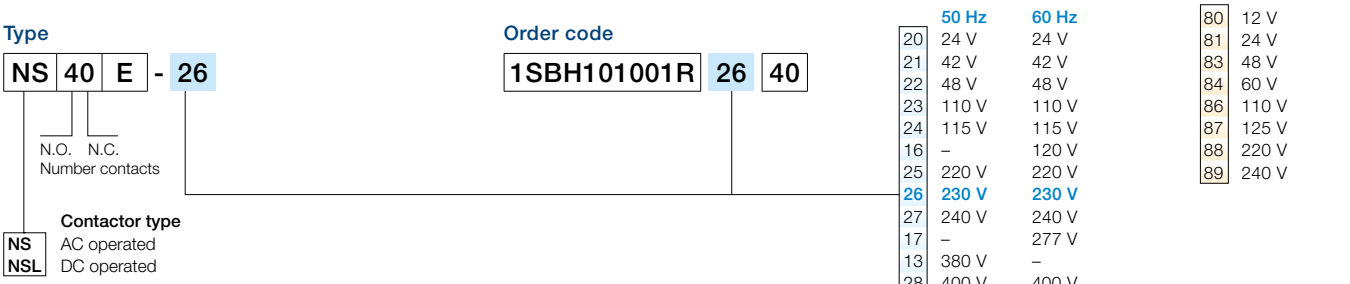
3-pole contactors



AC coil code	50 Hz	60 Hz
20	24 V	24 V
21	42 V	42 V
22	48 V	48 V
23	110 V	110 V
24	115 V	115 V
16	–	120 V
25	220 V	220 V
26	**230 V**	**230 V**
27	240 V	240 V
17	–	277 V
13	380 V	–
28	400 V	400 V
29	415 V	415 V

DC coil code	
80	12 V
81	24 V
83	48 V
84	60 V
86	110 V
87	125 V
88	220 V
89	240 V

Contactor relays



AC coil code	50 Hz	60 Hz
20	24 V	24 V
21	42 V	42 V
22	48 V	48 V
23	110 V	110 V
24	115 V	115 V
16	–	120 V
25	220 V	220 V
26	**230 V**	**230 V**
27	240 V	240 V
17	–	277 V
13	380 V	–
28	400 V	400 V
29	415 V	415 V

DC coil code	
80	12 V
81	24 V
83	48 V
84	60 V
86	110 V
87	125 V
88	220 V
89	240 V

1SBC101600S0201

Notes

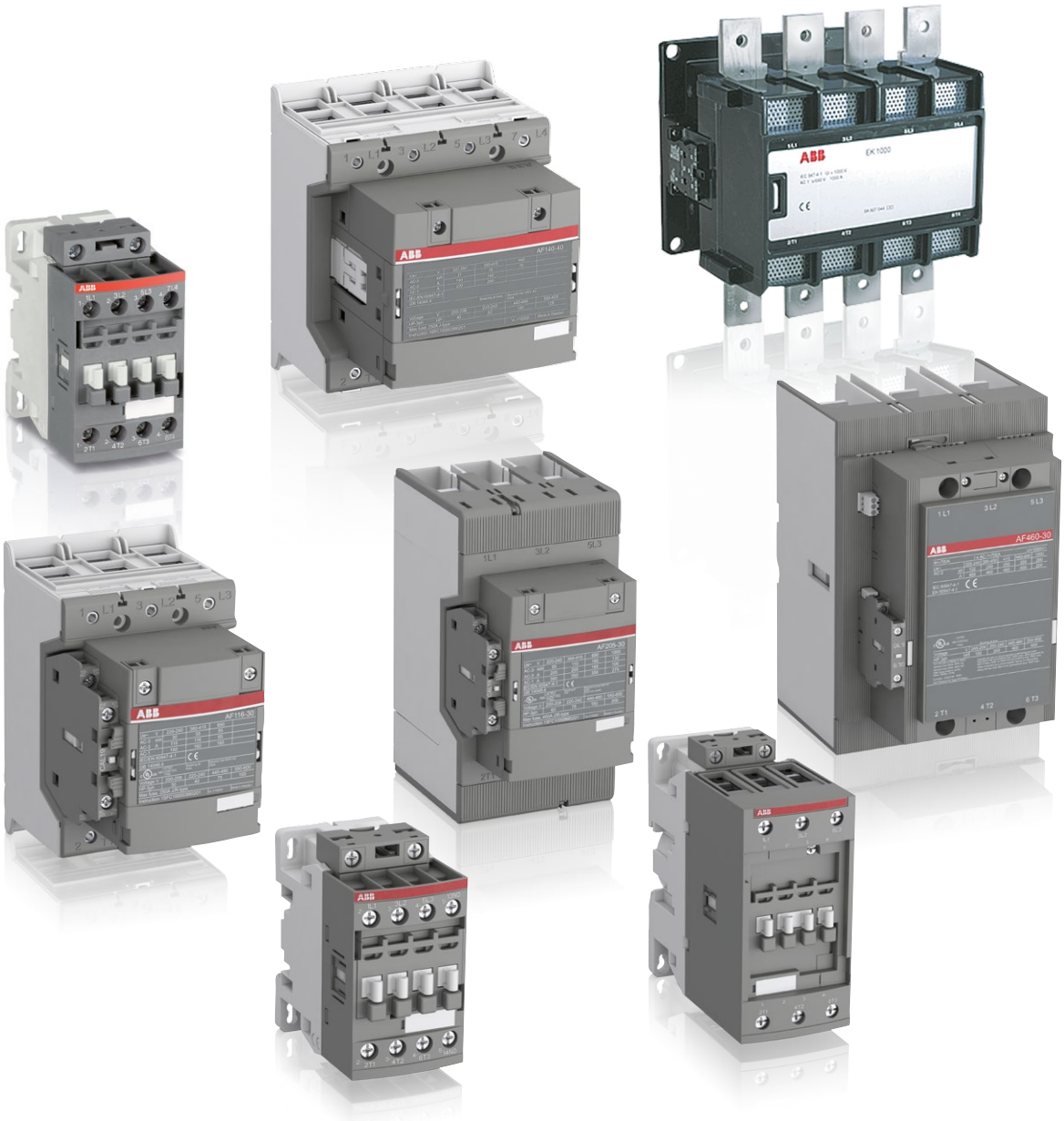


ABB
AF140-40
EK 1000
AF116-30
AF205-30
AF460-30

AF, EK contactors and NF contactor relays with screw terminals

Presentation 5/3

Motor starting solution, in kit form

DOL and reversing starters protected by manual motor starters **5**/8
DOL starters protected by moulded-case circuit-breakers **5**/14
DOL and reversing starters protected by overload relays **5**/20
Star-delta starters protected by overload relays **5**/26

AF 3-pole contactors - Overview 5/32

4 to 45 kW / 5 to 60 hp

AF09 ... AF38 AC / DC operated **5**/34
AF09Z ... AF38Z AC / DC operated - low consumption **5**/35
AF40 ... AF96 AC / DC operated **5**/36
Main accessories **5**/38

55 to 200 kW / 75 to 350 hp

AF116 ... AF146 AC / DC operated **5**/40
AF190 ... AF370 AC / DC operated **5**/42
Main accessories **5**/44

200 to 560 kW / 350 to 900 hp

AF400 ... AF750 AC / DC operated **5**/46
AF1250 ... AF2650 AC / DC operated **5**/47
AF1350T ... AF2650T AC operated **5**/49
Main accessories **5**/50

AF and EK 4-pole contactors - Overview 5/52

25 to 125 A AC-1

AF09 ... AF38 AC / DC operated **5**/54
AF09Z ... AF38Z AC / DC operated - low consumption **5**/55
AF40 ... AF80 AC / DC operated **5**/56
Main accessories **5**/58

160 to 525 A AC-1

AF116 ... AF140 AC / DC operated **5**/60
AF190 ... AF370 AC / DC operated **5**/61
Main accessories **5**/62

800 to 1000 A AC-1

EK550, EK1000 AC operated **5**/64
EK550, EK1000 DC operated **5**/65
Main accessories **5**/66

NF contactor relays

NF AC / DC operated **5**/68
NFZ AC / DC operated - low consumption **5**/69
Main accessories **5**/70

Voltage code table 5/72

For direct product details information, use product type or order code, ex:
www.abb.com/productdetails/AF09-30-10-13 or www.abb.com/productdetails/1SBL137001R1310

AF contactors for motor starting and power switching up to 2650 A

The latest technology of electronically controlled coil is our standard. It offers multiple benefits over conventional alternatives, and together with ABB's wide product offering, it is an optimal configuration, every time.

Optimized logistics

Cut your costs

With its contactor and motor protection range, ABB has managed to reduce the number of contactor coils to just four.
Total number of product variants has been reduced by up to 90%. This simplifies the customers' logistics while cutting storage and administration costs.

Continuous operation

Secure uptime

Prevent stoppages caused by voltage fluctuations. The AF contactor ensures distinct operation in unstable networks and signifies a major advance in motor control and power switching.
Voltage sags, dips and surges pose no threat. The AF contactor secures your uptime.

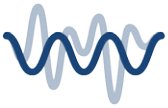
Speed up your projects

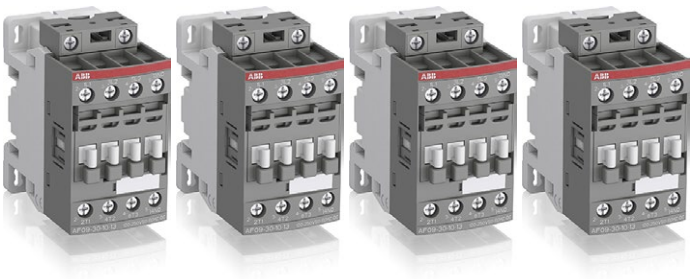
Simplify design

Use the same part number in Europe, Asia and North America as one contactor coil now handles 100 V – 250 V AC / DC, 50 / 60 Hz.
By reducing contactor coil energy consumption by up to 80%, panels can be built smaller and transformers more compact.

1SBC100200S0201

AF technology
Benefits

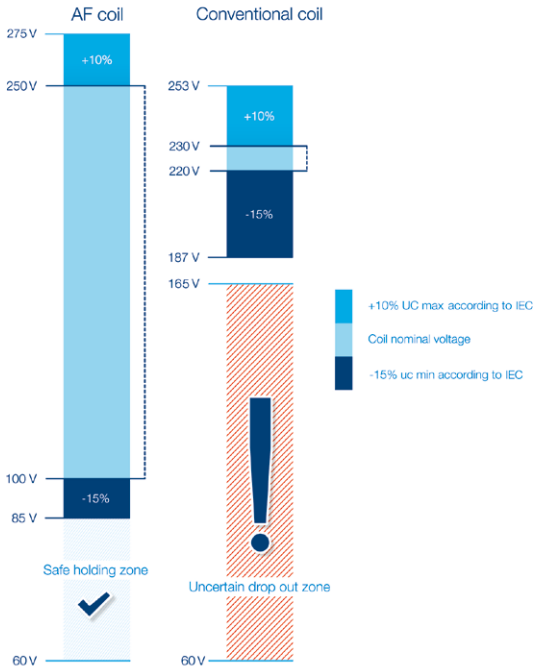


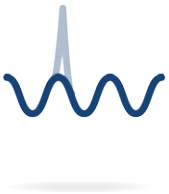


5

Reliable in all networks
The electronic system within the AF contactor continuously monitor the current and voltage apply to the coil. The contactor is safely operated in an always optimized condition and hum free.

Four coils for the entire voltage range
AF contactors feature both AC and DC control in the same product. Still, the total number of product variants compared to a conventional range is reduced by 90%. Only four coils are required to cover 24 V AC, 20 V DC - 500 V AC / DC.



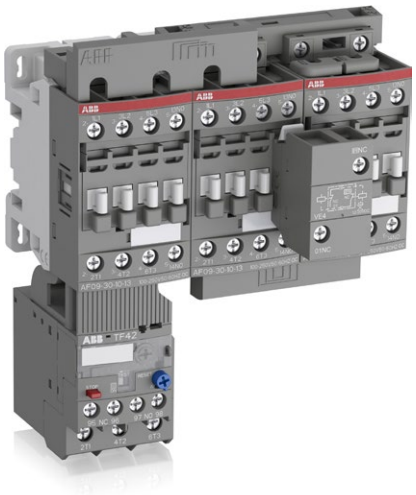


Wide control voltage range
With conventional contactor technology, different contactors are needed for different network voltages. Thanks to the wide operating range of the AF contactor, it can operate just as well in Europe as in Asia or North America. The core coil of the AF contactor range covers 100-250 V AC / DC, 50 / 60 Hz.

Built-in surge suppression
With conventional contactor technology, it is recommended to use an external surge suppressor, an accessory that could cost as much as half of the contactor. With the AF technology, the surges are handled by the contactor and never reach the control circuit. One less product and one less complication to worry about.

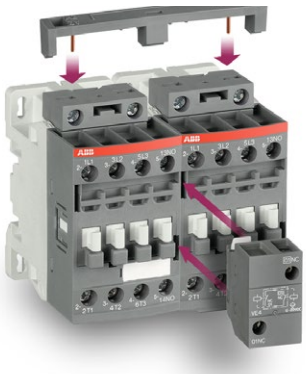
1SBC100202S0201

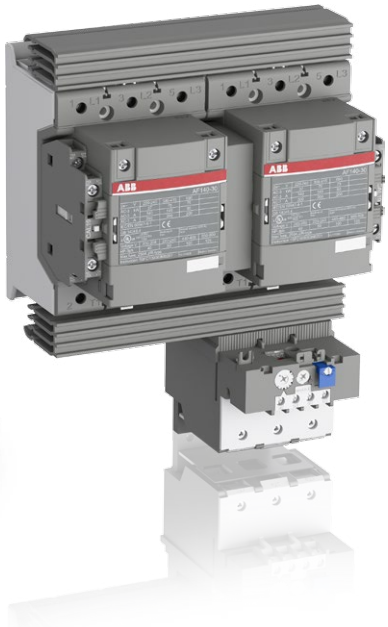
Contactors and motor protection
Advanced but simple



Easy, fast and secure starters assembly
The AF contactor range is perfect for motor starting applications and for solutions where space is limited. You can create any motor starting type and save assembly time with a complete range of accessories and connection sets.

Compact size
The AF contactor is compact in size and has had its width reduced by up to 30% thanks to an 80% coil consumption reduction.





Save space
Interlocking reversing pairs require no spacing between contactors, meaning you can fit more functionality into cabinets or other enclosures.

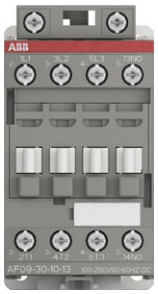
Protect from overload in all conditions
Select thermal overload relays (trip class 10) or electronic overload relays (trip class 10E, 20E, 30E in the same product) to protect your motors against overload and phase failure.

1SBC100202S0201

Contactors and motor protection
Flexible and safe

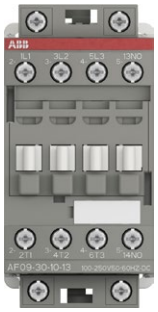
Easy to use accessories

1-pole, 2-pole and 4-pole auxiliary contact blocks, front or side mounted, are available for a great flexibility up to 96 A. Furthermore, 116 to 2650 A contactors can take up to 2 side mounted auxiliary contact blocks without adding to its width. Coil connection terminals, mechanical and electrical interlocks and electronic timers are easily connected through he snap-to-connect function.



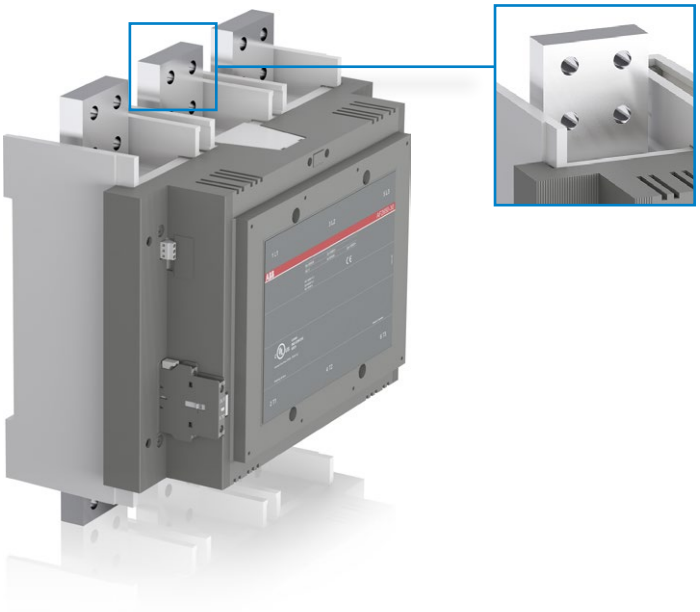
Top-mounted

Bottom-mounted



Additional coil terminal block

Front-mounted



Great flexibility for coil terminal access

Contactors up to 96 A offer free choice of coil terminal access from top, bottom, both top and bottom or front.

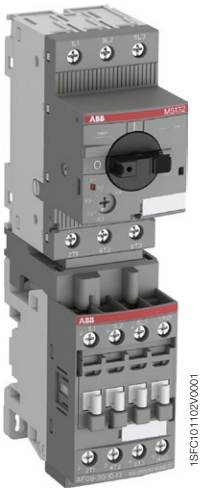
Simple connection and maintenance

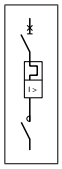
The main terminals of AF116 … AF2650 contactors are at the contactors's back to facilitate your bus bars connections. It also allows easy contact inspection and maintenance from AF400 and above.

1SBC100202S0201

Notes

DOL and reversing starters protected by manual motor starters
With AF contactors - open type version in kit form

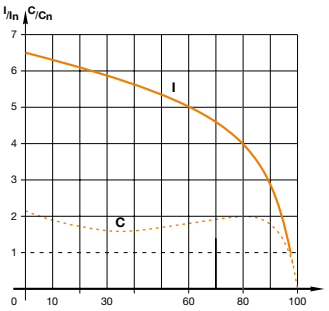




DOL starter
MS132-10 + BEA16-4 + AF09-30-10

Application

Full voltage direct-on-line (DOL) starting and reversing starting for controlling three-phase asynchronous motors is a simple and economic solution characterised by a high starting torque (1.9 to 2.1 times full-speed torque) and a starting current 5.5 to 7 times nominal current.



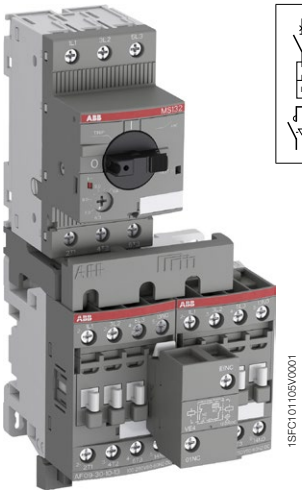
I = current
C = torque
In = nominal current
Cn = nominal torque

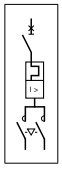
Coordination types

The contactor and the manual motor starter control and protect motors against overload and short-circuits according to coordination types 1 and 2 (IEC 60947-4-1 / EN 60947-4-1) defining the anticipated level of service continuity as follow:

Type 1: In short-circuit conditions, the contactor or starter does not endanger persons or installations and will not be able to then operate without being repaired or having parts replaced.

Type 2: In short-circuit conditions, the contactor or starter does not endanger persons or installations and will be able to operate afterwards. The risk of contacts light welding is acceptable.



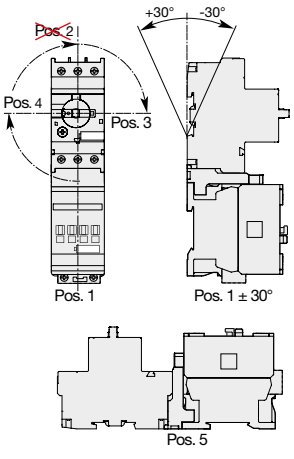


Reversing starter
MS132-10 + BEA16-4 + BER16-4 + VEM4 + AF09-30-10

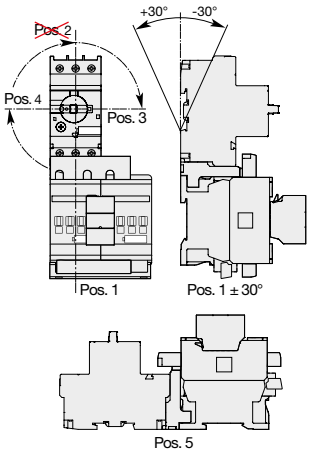
Main Technical Data

Standards		IEC 60947-4-1 / EN 60947-4-1
Rated operational voltage Ue max.		690 V - 50/60 Hz
Rated insulation voltage Ui		
acc. to IEC 60947-4-1		690 V
acc. to UL / CSA		600 V
Switching frequency		≤ 15 starts/hour - 80 % max. load factor - with max. 1.5 s starting time ≤ 30 starts/hour - 50 % max. load factor - with max. 1.5 s starting time
Ambient air temperature		
Close to the device	**use with MS116**	≤ 55 °C
	use with MS132, MS165, MS495	≤ 60 °C
Degree of protection		IP20

Mounting positions



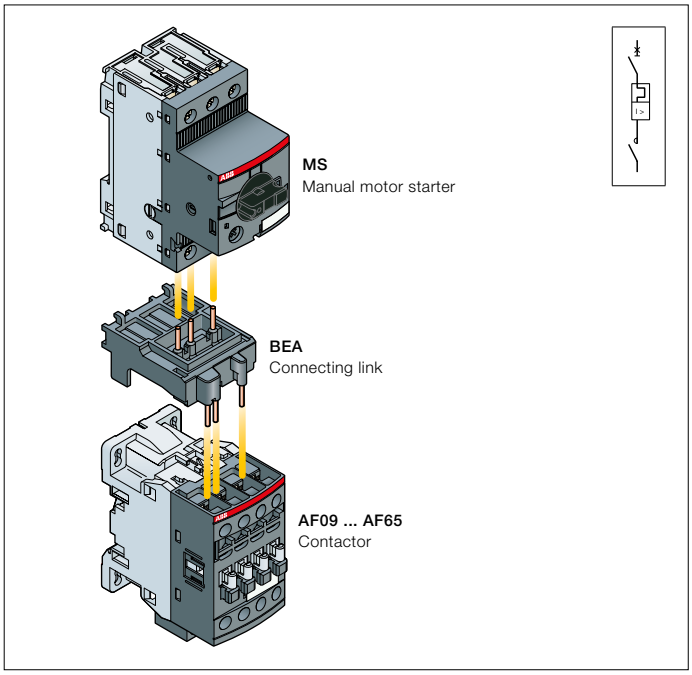
DOL starters



Reversing starters

1SBC101917S0201 - Rev. A

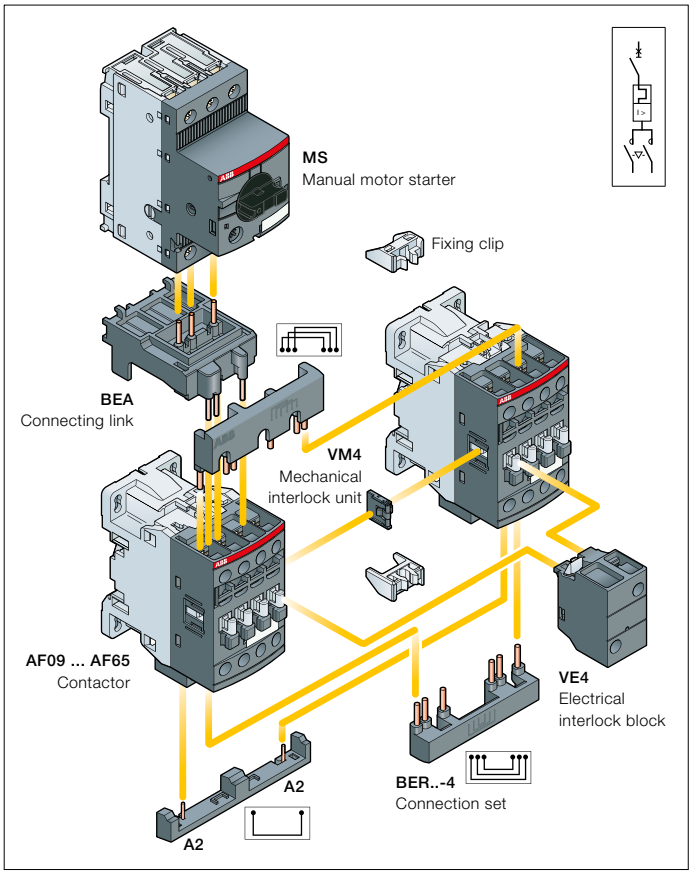
DOL and reversing starters protected by manual motor starters
With AF contactors - open type version in kit form



Direct-on-line starters

Description

You can easily assemble a direct-on-line starter by using the BEA..-4 connecting link 3-pole insulated. It is used to electrically and mechanically connect MS116, MS132 or MS165 manual motor starter and AF09 ... AF65 contactor, AC or DC operated.



Reversing starters

Description

You can easily assemble reversing starter thanks to our complete range of accessories:

- BEA..-4 connecting link 3-pole insulated: it is used to electrically and mechanically connect MS116, MS132 or MS165 manual motor starter and AF09 ... AF65 contactor, AC or DC operated
- For AF09 ... AF38, use VEM4 mechanical and electrical interlock set for reversing starter in 90 mm width. It includes:
  - VM4 mechanical interlock unit including 2 fixing clips
  - VE4 electrical interlock block with A2-A2 connection.
- For AF40 ... AF96, use VM96-4 mechanical interlock unit and additional auxiliary contact blocks for electrical interlocking
- BER..-4 connection set: it assures a safe and simple reversing connection between both contactor main terminals.

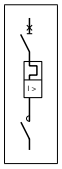
Select now easily and quickly your starter in the following pages for coordination type 1 or 2 at 400 V, 50/60 Hz, Iq = 16 kA up to 18.5 kW and Iq = 50 kA up to 45 kW.

For the full coordination tables:
www.abb.com/lowvoltage then go to the right menu: "Support", select: "Online Product Selection Tools" then select "Coordination Tables for motor protection"

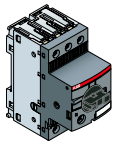
1SBC101917S0201 - Rev. A

DOL starters protected by MS manual motor starters
Coordination type 1

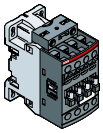
Coordination type 1, AC-3, 16 kA or 50 kA, 400 V, 50/60 Hz



Manual motor starters



Contactors



Accessories

BEA..-4

CA4-10

IEC AC-3, 400 V Rated operational power kW	current A	Manual motor starters Type (1)	Order code	Current setting range A	Magnetic tripping current A	Contactors Rated control circuit voltage Uc min. ... Uc max. (2) V 50/60 Hz	V DC	Type (3)	Order code	Allowed setting current A	Accessories Type	Order code
0.06	0.2	MS132-0.25	1SAM350000R1002	0.16...0.25	2.44	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	0.25	BEA16-4	1SBN081306T1000
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
0.09	0.3	MS132-0.4	1SAM350000R1003	0.25...0.40	3.9	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	0.4		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
0.12	0.44	MS132-0.63	1SAM350000R1004	0.40...0.63	6.14	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	0.63		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
0.18	0.6	MS132-0.63	1SAM350000R1004	0.40...0.63	6.14	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	0.63		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
0.25	0.85	MS132-1.0	1SAM350000R1005	0.63...1.00	11.5	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	1		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
0.37	1.1	MS132-1.6	1SAM350000R1006	1.00...1.60	18.4	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	1.6		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
0.55	1.5	MS132-1.6	1SAM350000R1006	1.00...1.60	18.4	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	1.6		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
0.75	1.9	MS132-2.5	1SAM350000R1007	1.60...2.50	28.75	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	2.5		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
1.1	2.7	MS132-4.0	1SAM350000R1008	2.50...4.00	50	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	4		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
1.5	3.6	MS132-4.0	1SAM350000R1008	2.50...4.00	50	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	4		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
2.2	4.9	MS132-6.3	1SAM350000R1009	4.00...6.30	78.75	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	6.3		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
3	6.5	MS132-10	1SAM350000R1010	6.30...10.0	150	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	9		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
4	8.5	MS132-10	1SAM350000R1010	6.30...10.0	150	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	9		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
5.5	11.5	MS132-12	1SAM350000R1012	8.00...12.0	180	24...60	20...60	AF12Z-30-10-21	1SBL156001R2110	12		
						100...250	100...250	AF12-30-10-13	1SBL157001R1310			
7.5	15.5	MS132-16	1SAM350000R1011	10.0...16.0	240	24...60	20...60	AF16Z-30-10-21	1SBL176001R2110	16		
						100...250	100...250	AF16-30-10-13	1SBL177001R1310			
11	22	MS132-25	1SAM350000R1014	20.0...25.0	375	24...60	20...60	AF26Z-30-00-21	1SBL236001R2100	25	BEA38-4	1SBN082306T2000
						100...250	100...250	AF26-30-00-13	1SBL237001R1300		+ CA4-10	1SBN010110R1010
15	29	MS132-32	1SAM350000R1015	25.0...32.0	480	24...60	20...60	AF30Z-30-00-21	1SBL276001R2100	32		
						100...250	100...250	AF30-30-00-13	1SBL277001R1300			
18.5	35	MS165-42	1SAM451000R1015	30.0...42.0	630	24...60	20...60	AF40-30-00-11	1SBL347001R1100	40	BEA65-4	1SBN083406R1000
						100...250	100...250	AF40-30-00-13	1SBL347001R1300		CA4-10	1SBN010110R1010
22	41	MS165-54	1SAM451000R1016	40.0...54.0	810	24...60	20...60	AF52-30-00-11	1SBL367001R1100	53		
						100...250	100...250	AF52-30-00-13	1SBL367001R1300			
30	55	MS165-65	1SAM451000R1017	52.0...65.0	975	24...60	20...60	AF65-30-00-11	1SBL387001R1100	65		
						100...250	100...250	AF65-30-00-13	1SBL387001R1300			
37	66	MS495-75	1SAM550000R1008	57.0...75.0	975	24...60	20...60	AF80-30-00-11	1SBL397001R1100	75		
						100...250	100...250	AF80-30-00-13	1SBL397001R1300			
45	80	MS495-90	1SAM550000R1009	70.0...90.0	1170	24...60	20...60	AF96-30-00-11	1SBL407001R1100	90		
						100...250	100...250	AF96-30-00-13	1SBL407001R1300			

(1) MS116 manual motor starter can be selected according to the current setting range indicated on the coordination line, up to:
- 15 kW, 400 V - AC-3 at 16 kA
- 4 kW, 400 V - AC-3 at 50 kA.

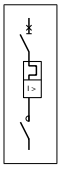
(2) For other control voltages, see "Voltage code table".

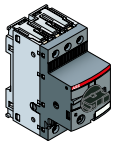
(3) AF38 3-pole contactor can be selected for coordination type 1, 16 kA and 50 kA, 18.5 kW, 400 V - AC-3 (BEA65-4 available for AF40 ... AF65 only).

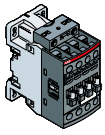
1SBC101913S0201 - Rev. C

DOL starters protected by MS manual motor starters
Coordination type 2

Coordination type 2, AC-3, 16 kA or 50 kA, 400 V, 50/60 Hz







BEA..-4

CA4-10

Manual motor starters						Contactors					Accessories	
IEC AC-3, 400 V Rated operational power	current	Type (1)	Order code	Current setting range	Magnetic tripping current	Rated control circuit voltage Uc min. ... Uc max. (2)		Type (3)	Order code	Allowed setting current	Type (4)	Order code
kW	A			A	A	V 50/60 Hz	V DC			A		
0.06	0.2	MS132-0.25	1SAM350000R1002	0.16...0.25	2.44	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	0.25	BEA16-4	1SBN081306T1000
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
0.09	0.3	MS132-0.4	1SAM350000R1003	0.25...0.40	3.9	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	0.4		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
0.12	0.44	MS132-0.63	1SAM350000R1004	0.40...0.63	6.14	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	0.63		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
0.18	0.6	MS132-0.63	1SAM350000R1004	0.40...0.63	6.14	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	0.63		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
0.25	0.85	MS132-1.0	1SAM350000R1005	0.63...1.00	11.5	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	1		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
0.37	1.1	MS132-1.6	1SAM350000R1006	1.00...1.60	18.4	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	1.6		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
0.55	1.5	MS132-1.6	1SAM350000R1006	1.00...1.60	18.4	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	1.6		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
0.75	1.9	MS132-2.5	1SAM350000R1007	1.60...2.50	28.75	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	2.5		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
1.1	2.7	MS132-4.0	1SAM350000R1008	2.50...4.00	50	24...60	20...60	AF26Z-30-00-21	1SBL236001R2100	4	BEA26-4	1SBN082306T1000
						100...250	100...250	AF26-30-00-13	1SBL237001R1300		+ CA4-10	1SBN010110R1010
1.5	3.6	MS132-4.0	1SAM350000R1008	2.50...4.00	50	24...60	20...60	AF26Z-30-00-21	1SBL236001R2100	4		
						100...250	100...250	AF26-30-00-13	1SBL237001R1300			
2.2	4.9	MS132-6.3	1SAM350000R1009	4.00...6.30	78.75	24...60	20...60	AF26Z-30-00-21	1SBL236001R2100	6.3		
						100...250	100...250	AF26-30-00-13	1SBL237001R1300			
3	6.5	MS132-10	1SAM350000R1010	6.30...10.0	150	24...60	20...60	AF26Z-30-00-21	1SBL236001R2100	10		
						100...250	100...250	AF26-30-00-13	1SBL237001R1300			
4	8.5	MS132-10	1SAM350000R1010	6.30...10.0	150	24...60	20...60	AF26Z-30-00-21	1SBL236001R2100	10		
						100...250	100...250	AF26-30-00-13	1SBL237001R1300			
5.5	11.5	MS132-12	1SAM350000R1012	8.00...12.0	180	24...60	20...60	AF26Z-30-00-21	1SBL236001R2100	12	BEA38-4	1SBN082306T2000
						100...250	100...250	AF26-30-00-13	1SBL237001R1300		+ CA4-10	1SBN010110R1010
7.5	15.5	MS132-16	1SAM350000R1011	10.0...16.0	240	24...60	20...60	AF30Z-30-00-21	1SBL276001R2100	16		
						100...250	100...250	AF30-30-00-13	1SBL277001R1300			
11	22	MS132-25	1SAM350000R1014	20.0...25.0	375	24...60	20...60	AF30Z-30-00-21	1SBL276001R2100	25		
						100...250	100...250	AF30-30-00-13	1SBL277001R1300			
15	29	MS132-32	1SAM350000R1015	25.0...32.0	480	24...60	20...60	AF30Z-30-00-21	1SBL276001R2100	32		
						100...250	100...250	AF30-30-00-13	1SBL277001R1300			
18.5	35	MS165-42	1SAM451000R1015	30.0...42.0	630	24...60	20...60	AF40-30-00-11	1SBL347001R1100	40	BEA65-4	1SBN083406R1000
						100...250	100...250	AF40-30-00-13	1SBL347001R1300		CA4-10	1SBN010110R1010
22	41	MS165-54	1SAM451000R1016	40.0...54.0	810	24...60	20...60	AF52-30-00-11	1SBL367001R1100	53		
						100...250	100...250	AF52-30-00-13	1SBL367001R1300			
30	55	MS165-65	1SAM451000R1017	52.0...65.0	975	24...60	20...60	AF65-30-00-11	1SBL387001R1100	65		
						100...250	100...250	AF65-30-00-13	1SBL387001R1300			
37	66	MS495-75	1SAM550000R1008	57.0...75.0	975	24...60	20...60	AF80-30-00-11	1SBL397001R1100	75		
						100...250	100...250	AF80-30-00-13	1SBL397001R1300			
45	80	MS495-90	1SAM550000R1009	70.0...90.0	1170	24...60	20...60	AF96-30-00-11	1SBL407001R1100	90		
						100...250	100...250	AF96-30-00-13	1SBL407001R1300			

(1) MS116 manual motor starter can be selected according to the current setting range indicated on the coordination line, up to
- 15 kW 400V - AC-3 at 16 kA
- 4 kW, 400 V - AC-3 at 50 kA.

(2) For other control voltages, see "Voltage code table".

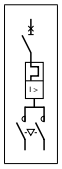
(3) AF26 3-pole contactor can be selected for coordination type 2, 16 kA, 7.5 kW, 400 V - AC-3.
AF38 3-pole contactor can be selected for coordination type 2, 16 kA and 50 kA, 18.5 kW, 400 V - AC-3 (BEA65-4 available for AF40 ... AF65 only).

(4) BEA26-4 should be selected with MS116-12 … MS116-16 and AF26 … AF38.
BEA38-4 can only be selected with MS116-20 … MS116-32.

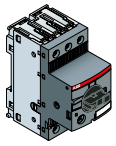
1SBC101914S0201 - Rev. C

Reversing starters protected by MS manual motor starters
Coordination type 1

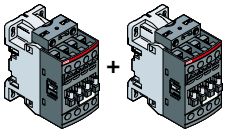
Coordination type 1, AC-3, 16 kA or 50 kA, 400 V, 50/60 Hz



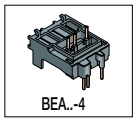
Manual motor starters

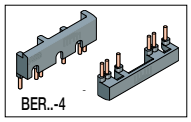


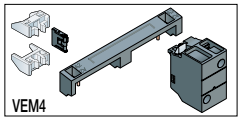
Contactors



Accessories







IEC AC-3, 400 V Rated operational power kW	current A	Type (1)	Order code	Current setting range A	Magnetic tripping current A	Rated control circuit voltage Uc min. ... Uc max. (2) V 50/60 Hz	V DC	Type (3)	Order code	Allowed setting current A	Type	Order code
0.06	0.2	MS132-0.25	1SAM350000R1002	0.16...0.25	2.44	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	0.25	BEA16-4	1SBN081306T1000
						100...250	100...250	AF09-30-10-13	1SBL137001R1310		+ BER16-4	1SBN081311R1000
0.09	0.3	MS132-0.4	1SAM350000R1003	0.25...0.40	3.9	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	0.4	+ VEM4	1SBN030111R1000
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
0.12	0.44	MS132-0.63	1SAM350000R1004	0.40...0.63	6.14	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	0.63		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
0.18	0.6	MS132-0.63	1SAM350000R1004	0.40...0.63	6.14	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	0.63		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
0.25	0.85	MS132-1.0	1SAM350000R1005	0.63...1.00	11.5	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	1		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
0.37	1.1	MS132-1.6	1SAM350000R1006	1.00...1.60	18.4	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	1.6		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
0.55	1.5	MS132-1.6	1SAM350000R1006	1.00...1.60	18.4	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	1.6		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
0.75	1.9	MS132-2.5	1SAM350000R1007	1.60...2.50	28.75	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	2.5		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
1.1	2.7	MS132-4.0	1SAM350000R1008	2.50...4.00	50	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	4		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
1.5	3.6	MS132-4.0	1SAM350000R1008	2.50...4.00	50	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	4		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
2.2	4.9	MS132-6.3	1SAM350000R1009	4.00...6.30	78.75	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	6.3		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
3	6.5	MS132-10	1SAM350000R1010	6.30...10.0	150	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	9		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
4	8.5	MS132-10	1SAM350000R1010	6.30...10.0	150	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	9		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
5.5	11.5	MS132-12	1SAM350000R1012	8.00...12.0	180	24...60	20...60	AF12Z-30-10-21	1SBL156001R2110	12		
						100...250	100...250	AF12-30-10-13	1SBL157001R1310			
7.5	15.5	MS132-16	1SAM350000R1011	10.0...16.0	240	24...60	20...60	AF16Z-30-10-21	1SBL176001R2110	16		
						100...250	100...250	AF16-30-10-13	1SBL177001R1310			
11	22	MS132-25	1SAM350000R1014	20.0...25.0	375	24...60	20...60	AF26Z-30-00-21	1SBL236001R2100	25	BEA38-4	1SBN082306T2000
						100...250	100...250	AF26-30-00-13	1SBL237001R1300		+ BER38-4	1SBN082311R1000
15	29	MS132-32	1SAM350000R1015	25.0...32.0	480	24...60	20...60	AF30Z-30-00-21	1SBL276001R2100	32	+ VEM4	1SBN030111R1000
						100...250	100...250	AF30-30-00-13	1SBL277001R1300		+ 2x CA4-10	1SBN010110R1010
18.5	35	MS165-42	1SAM451000R1015	30.0...42.0	630	24...60	20...60	AF40-30-00-11	1SBL347001R1100	40	BEA65-4	1SBN083406R1000
						100...250	100...250	AF40-30-00-13	1SBL347001R1300		+ BER65-4	1SBN083411R1000
22	41	MS165-54	1SAM451000R1016	40.0...54.0	810	24...60	20...60	AF52-30-00-11	1SBL367001R1100	53	+ VM96-4	1SBN033405T1000
						100...250	100...250	AF52-30-00-13	1SBL367001R1300		+ 2x CA4-10	1SBN010110R1010
30	55	MS165-65	1SAM451000R1017	52.0...65.0	975	24...60	20...60	AF65-30-00-11	1SBL387001R1100	65	+ 2x CA4-01	1SBN010110R1001
						100...250	100...250	AF65-30-00-13	1SBL387001R1300			
37	66	MS495-75	1SAM550000R1008	57.0...75.0	975	24...60	20...60	AF80-30-00-11	1SBL397001R1100	75	BER96-4	1SBN083911R1000
						100...250	100...250	AF80-30-00-13	1SBL397001R1300		+ VM96-4	1SBN033405T1000
45	80	MS495-90	1SAM550000R1009	70.0...90.0	1170	24...60	20...60	AF96-30-00-11	1SBL407001R1100	90	+ 2x CA4-10	1SBN010110R1010
						100...250	100...250	AF96-30-00-13	1SBL407001R1300		+ 2x CA4-01	1SBN010110R1001

(1) MS116 manual motor starter can be selected according to the current setting range indicated on the coordination line, up to:
- 15 kW, 400 V - AC-3 at 16 kA
- 4 kW, 400 V - AC-3 at 50 kA.

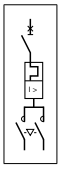
(2) For other control voltages, see "Voltage code table".

(3) AF38 3-pole contactor can be selected for coordination type 1, 16 kA and 50 kA, 18.5 kW, 400 V - AC-3 (BEA65-4 available for AF40 ... AF65 only).

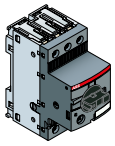
1SBC101915S0201 - Rev. C

Reversing starters protected by MS manual motor starters
Coordination type 2

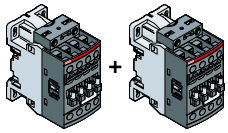
Coordination type 2, AC-3, 16 kA or 50 kA, 400 V, 50/60 Hz



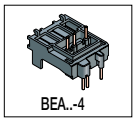
Manual motor starters

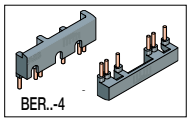


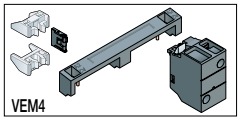
Contactors



Accessories







IEC AC-3, 400 V Rated operational power kW	current A	Manual motor starters Type (1)	Order code	Current setting range A	Magnetic tripping current A	Contactors Rated control circuit voltage Uc min. ... Uc max. (2) V 50/60 Hz	V DC	Type (3)	Order code	Allowed setting current A	Accessories Type (4)	Order code
0.06	0.2	MS132-0.25	1SAM350000R1002	0.16...0.25	2.44	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	0.25	BEA16-4	1SBN081306T1000
						100...250	100...250	AF09-30-10-13	1SBL137001R1310		+ BER16-4	1SBN081311R1000
0.09	0.3	MS132-0.4	1SAM350000R1003	0.25...0.40	3.9	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	0.4	+ VEM4	1SBN030111R1000
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
0.12	0.44	MS132-0.63	1SAM350000R1004	0.40...0.63	6.14	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	0.63		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
0.18	0.6	MS132-0.63	1SAM350000R1004	0.40...0.63	6.14	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	0.63		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
0.25	0.85	MS132-1.0	1SAM350000R1005	0.63...1.00	11.5	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	1		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
0.37	1.1	MS132-1.6	1SAM350000R1006	1.00...1.60	18.4	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	1.6		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
0.55	1.5	MS132-1.6	1SAM350000R1006	1.00...1.60	18.4	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	1.6		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
0.75	1.9	MS132-2.5	1SAM350000R1007	1.60...2.50	28.75	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	2.5		
						100...250	100...250	AF09-30-10-13	1SBL137001R1310			
1.1	2.7	MS132-4.0	1SAM350000R1008	2.50...4.00	50	24...60	20...60	AF26Z-30-00-21	1SBL236001R2100	4	BEA26-4	1SBN082306T1000
						100...250	100...250	AF26-30-00-13	1SBL237001R1300		+ BER38-4	1SBN082311R1000
1.5	3.6	MS132-4.0	1SAM350000R1008	2.50...4.00	50	24...60	20...60	AF26Z-30-00-21	1SBL236001R2100	4	+ VEM4	1SBN030111R1000
						100...250	100...250	AF26-30-00-13	1SBL237001R1300		+ 2x CA4-10	1SBN010110R1010
2.2	4.9	MS132-6.3	1SAM350000R1009	4.00...6.30	78.75	24...60	20...60	AF26Z-30-00-21	1SBL236001R2100	6.3		
						100...250	100...250	AF26-30-00-13	1SBL237001R1300			
3	6.5	MS132-10	1SAM350000R1010	6.30...10.0	150	24...60	20...60	AF26Z-30-00-21	1SBL236001R2100	10		
						100...250	100...250	AF26-30-00-13	1SBL237001R1300			
4	8.5	MS132-10	1SAM350000R1010	6.30...10.0	150	24...60	20...60	AF26Z-30-00-21	1SBL236001R2100	10		
						100...250	100...250	AF26-30-00-13	1SBL237001R1300			
5.5	11.5	MS132-12	1SAM350000R1012	8.00...12.0	180	24...60	20...60	AF26Z-30-00-21	1SBL236001R2100	12	BEA38-4	1SBN082306T2000
						100...250	100...250	AF26-30-00-13	1SBL237001R1300		+ BER38-4	1SBN082311R1000
7.5	15.5	MS132-16	1SAM350000R1011	10.0...16.0	240	24...60	20...60	AF30Z-30-00-21	1SBL276001R2100	16	+ VEM4	1SBN030111R1000
						100...250	100...250	AF30-30-00-13	1SBL277001R1300		+ 2x CA4-10	1SBN010110R1010
11	22	MS132-25	1SAM350000R1014	20.0...25.0	375	24...60	20...60	AF30Z-30-00-21	1SBL276001R2100	25		
						100...250	100...250	AF30-30-00-13	1SBL277001R1300			
15	29	MS132-32	1SAM350000R1015	25.0...32.0	480	24...60	20...60	AF30Z-30-00-21	1SBL276001R2100	32		
						100...250	100...250	AF30-30-00-13	1SBL277001R1300			
18.5	35	MS165-42	1SAM451000R1015	30.0...42.0	630	24...60	20...60	AF40-30-00-11	1SBL347001R1100	40	BEA65-4	1SBN083406R1000
						100...250	100...250	AF40-30-00-13	1SBL347001R1300		+ BER65-4	1SBN083411R1000
22	41	MS165-54	1SAM451000R1016	40.0...54.0	810	24...60	20...60	AF52-30-00-11	1SBL367001R1100	53	+ VM96-4	1SBN033405T1000
						100...250	100...250	AF52-30-00-13	1SBL367001R1300		+ 2x CA4-10	1SBN010110R1010
30	55	MS165-65	1SAM451000R1017	52.0...65.0	975	24...60	20...60	AF65-30-00-11	1SBL387001R1100	65	+ 2x CA4-01	1SBN010110R1001
						100...250	100...250	AF65-30-00-13	1SBL387001R1300			
37	66	MS495-75	1SAM550000R1008	57.0...75.0	975	24...60	20...60	AF80-30-00-11	1SBL397001R1100	75	BER96-4	1SBN083911R1000
						100...250	100...250	AF80-30-00-13	1SBL397001R1300		+ VM96-4	1SBN033405T1000
45	80	MS495-90	1SAM550000R1009	70.0...90.0	1170	24...60	20...60	AF96-30-00-11	1SBL407001R1100	90	+ 2x CA4-10	1SBN010110R1010
						100...250	100...250	AF96-30-00-13	1SBL407001R1300		+ 2x CA4-01	1SBN010110R1001

(1) MS116 manual motor starter can be selected according to the current setting range indicated on the coordination line, up to
- 15 kW 400V - AC-3 at 16 kA
- 4 kW, 400 V - AC-3 at 50 kA.

(2) For other control voltages, see "Voltage code table".

(3) AF26 3-pole contactor can be selected for coordination type 2, 16 kA, 7.5 kW, 400 V - AC-3.
AF38 3-pole contactor can be selected for coordination type 2, 16 kA and 50 kA, 18.5 kW, 400 V - AC-3 (BEA65-4 available for AF40 ... AF65 only).

(4) BEA26-4 should be selected with MS116-12 ... MS116-16 and AF26 ... AF38.
BEA38-4 can only be selected with MS116-20 ... MS116-32.

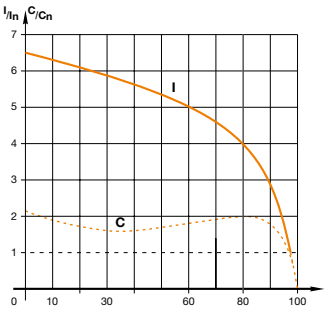
1SBC101916S0201 - Rev. C

DOL starters protected by moulded-case circuit-breakers and overload relays
With AF contactors - Open type version in kit form

XT2S 160 + BEA140/XT2 + AF140-30-11

Application

Full voltage direct-on-line (DOL) starting for controlling three-phase asynchronous motors is a simple and economic solution characterised by a high starting torque (1.9 to 2.1 times full-speed torque) and a starting current 5.5 to 7 times nominal current.



I = current
C = torque
In = nominal current
Cn = nominal torque

Coordination types

The contactor and the moulded-case circuit-breaker control and protect motors against overload and short-circuits according to coordination types 1 and 2 (IEC 60947-4-1/EN 60947-4-1) defining the anticipated level of service continuity as follow:

Type 1: In short-circuit conditions, the contactor or starter does not endanger persons or installations and will not be able to then operate without being repaired or having parts replaced.

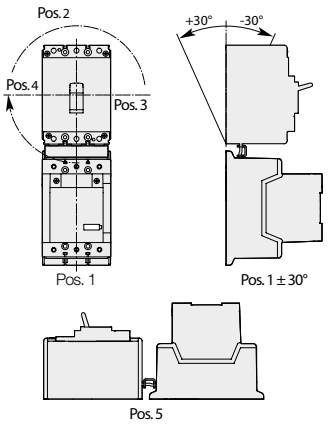
Type 2: In short-circuit conditions, the contactor or starter does not endanger persons or installations and will be able to operate afterwards. The risk of contacts light welding is acceptable.

XT2S 160 + BEA140/XT2 + AF140-30-11 + EF146

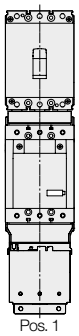
Main Technical Data

Standards	IEC 60947-4-1 / EN 60947-4-1
Rated operational voltage Ue max.	400 V - 50/60 Hz
Rated insulation voltage Ui	
acc. to IEC 60947-4-1	690 V
acc. to UL / CSA	600 V
Switching frequency	≤ 15 starts/hour - 80 % max. load factor - with max. 1.5 s starting time ≤ 30 starts/hour - 50 % max. load factor - with max. 1.5 s starting time
Ambient air temperature	
Close to the device	< 55 °C
Degree of protection	IP20

Mounting positions



Direct-on-line
MCCB + AF

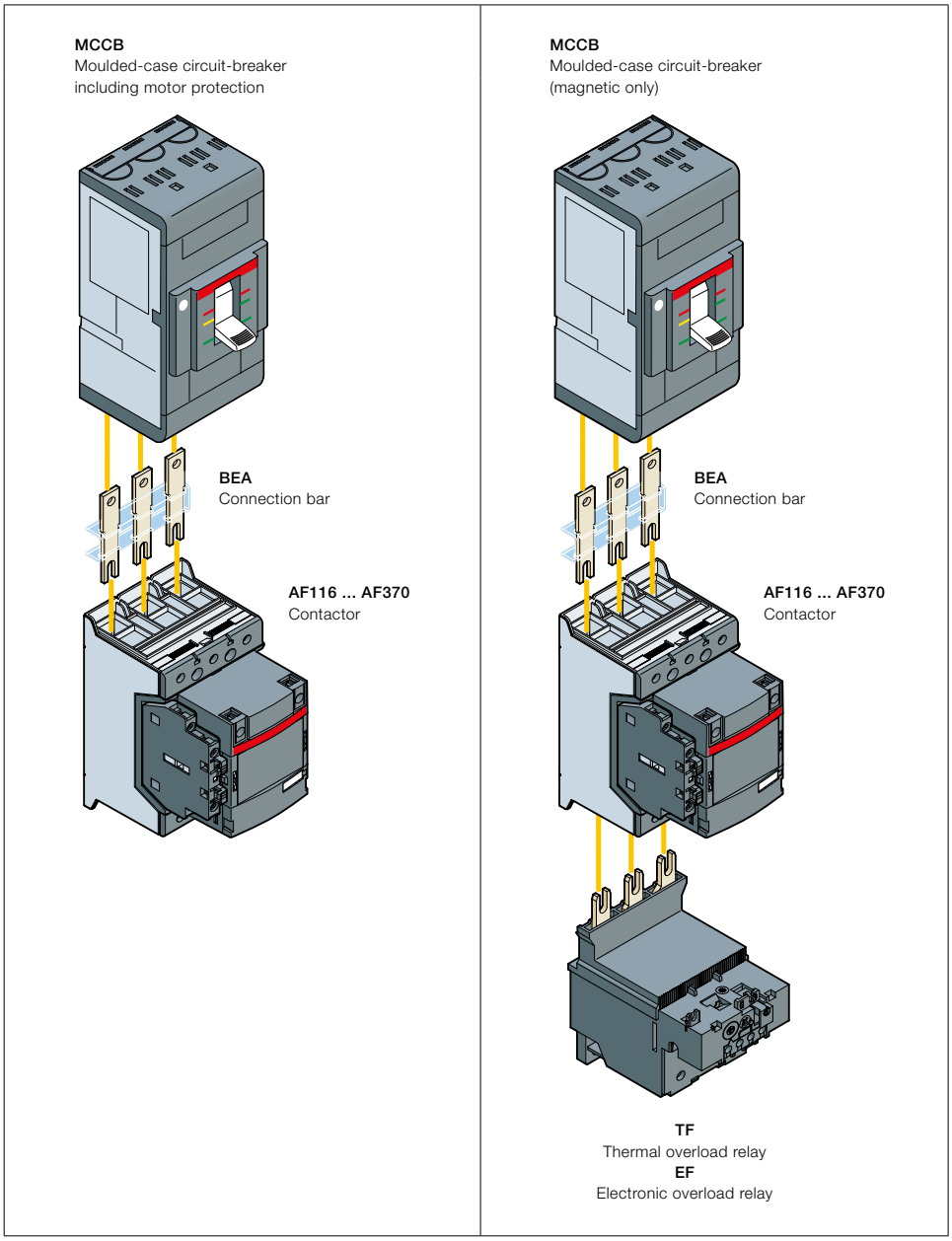


Direct-on-line
MCCB + AF + OL

1SBC101973S0201

DOL starters protected by moulded-case circuit-breakers and overload relays

With AF contactors - Open type version in kit form



Description

You can easily assemble a direct-on-line starter by using the BEA connection bars. It is used to electrically connect MCCB moulded-case circuit-breaker and AF116 ... AF370 contactor, AC or DC operated.

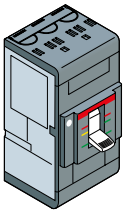
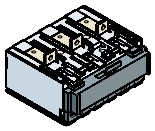
Select now easily and quickly your starter in the following pages for coordination type 1 or 2 at 400 V, 50/60 Hz, Iq = 50 kA up to 200 kW.

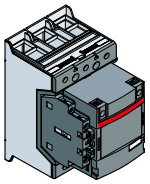
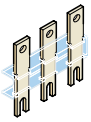
For the full coordination tables:
www.abb.com/lowvoltage then go to the right menu: "Support", select: "Online Product Selection Tools" then select "Coordination Tables for motor protection"

1SBC101973S0201

DOL starters protected by MCCB including motor protection
Coordination type 1 or 2

Coordination type 1 or 2, AC-3, 50 kA, 400 V, 50/60 Hz

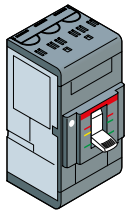
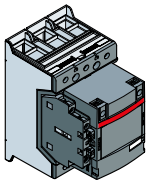
		MCCB							
									
IEC		Magnetic triping current setting	Max. allowed thermal setting	Base			Trip unit		
AC-3, 400 V				Type	Order code		Type	Order code	
Rated power kW	Rated current A	A							
55	97	1440	116	XT2S 160	1SDA068164R1	+	Ekip M-LIU In160	1SDA067355R1	
75	132	1920	140	XT2S 160	1SDA068164R1	+	Ekip M-LIU In160	1SDA067355R1	
90	160	2400	190	T4S 250 PR222MP In200	1SDA054527R1		Included	-	
110	195	2880	205	T5S 400 PR222MP In320	1SDA054553R1		Included	-	
132	230	3600	265	T5S 400 PR222MP In400	1SDA054554R1		Included	-	
160	280	4400	305	T5S 400 PR222MP In400	1SDA054554R1		Included	-	

	Contactors					Connection bars		
								
	Control voltage Uc min. ... Uc max.		Type	Order code		Type	Order code	
	V 50/60 Hz	V DC						
	24...60	20...60	AF116-30-11-11	1SFL427001R1111		BEA140/XT2	1SFN084206R1000	
	100...250	100...250	AF116-30-11-13	1SFL427001R1311				
	24...60	20...60	AF140-30-11-11	1SFL447001R1111				
	100...250	100...250	AF140-30-11-13	1SFL447001R1311				
	24...60	20...60	AF190-30-11-11	1SFL487002R1111		BEA205/T4	1SFN084806R1001	
	100...250	100...250	AF190-30-11-13	1SFL487002R1311				
	24...60	20...60	AF205-30-11-11	1SFL527002R1111				
	100...250	100...250	AF205-30-11-13	1SFL527002R1311				
	24...60	20...60	AF265-30-11-11	1SFL547002R1111		BEA370/T5	1SFN085406R1000	
	100...250	100...250	AF265-30-11-13	1SFL547002R1311				
	24...60	20...60	AF305-30-11-11	1SFL587002R1111				
	100...250	100...250	AF305-30-11-13	1SFL587002R1311				

1SBC101975S0201

DOL starters protected by MCCB (magnetic only) and overload relays
Coordination type 1 or 2

Coordination type 1 or 2, AC-3, 50 kA, 400 V, 50/60 Hz

	MCCB	Contactors
		

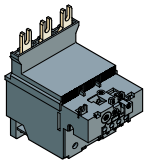
Thermal overload relays

IEC AC-3, 400 V Rated power kW	Rated current A	Magnetic triping current A	Type	Order code	Control voltage Uc min. ... Uc max. V 50/60 Hz	V DC	Type	Order code
55	97	1600	XT2S 160 MA 160	1SDA076530R1	24...60	20...60	AF116-30-11-11	1SFL427001R1111
					100...250	100...250	AF116-30-11-13	1SFL427001R1311
75	132	1920	XT2S 160 MA 160	1SDA076530R1	24...60	20...60	AF140-30-11-11	1SFL447001R1111
					100...250	100...250	AF140-30-11-13	1SFL447001R1311
90	160	2250	XT4S 250 Ekip I In250	1SDA068480R1	24...60	20...60	AF190-30-11-11	1SFL487002R1111
					100...250	100...250	AF190-30-11-13	1SFL487002R1311
110	195	2720	T4S 320 PR221-I In320	1SDA054126R1	24...60	20...60	AF205-30-11-11	1SFL527002R1111
					100...250	100...250	AF205-30-11-13	1SFL527002R1311

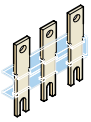
Electronic overload relays

55	97	1600	XT2S 160 MA 160	1SDA076530R1	24...60	20...60	AF116-30-11-11	1SFL427001R1111
					100...250	100...250	AF116-30-11-13	1SFL427001R1311
75	132	1920	XT2S 160 MA 160	1SDA076530R1	24...60	20...60	AF140-30-11-11	1SFL447001R1111
					100...250	100...250	AF140-30-11-13	1SFL447001R1311
90	160	2250	XT4S 250 Ekip I In250	1SDA068480R1	24...60	20...60	AF190-30-11-11	1SFL487002R1111
					100...250	100...250	AF190-30-11-13	1SFL487002R1311
110	195	2720	T4S 320 PR221-I In320	1SDA054126R1	24...60	20...60	AF205-30-11-11	1SFL527002R1111
					100...250	100...250	AF205-30-11-13	1SFL527002R1311
132	230	3200	T5S 400 PR221-I In400	1SDA054335R1	24...60	20...60	AF265-30-11-11	1SFL547002R1111
					100...250	100...250	AF265-30-11-13	1SFL547002R1311
160	280	4000	T5S 400 PR221-I In400	1SDA054335R1	24...60	20...60	AF305-30-11-11	1SFL587002R1111
					100...250	100...250	AF305-30-11-13	1SFL587002R1311
200	350	5040	T5S 630 PR221-I In630	1SDA054405R1	24...60	20...60	AF370-30-11-11	1SFL607002R1111
					100...250	100...250	AF370-30-11-13	1SFL607002R1311

Overload relays



Connection bars



Setting ranges A	Max. allowed setting current A	Type	Order code	Type	Order code
80...110	110	TF140DU-110	1SAZ431201R1002	BEA140/XT2	1SFN084206R1000
110...142	140	TF140DU-142	1SAZ431201R1004		
130...175	175	TA200DU-175	1SAZ421201R1005	BEA205/XT4	1SFN084806R1000
155...200	200	TA200DU-200	1SAZ421201R1006	BEA205/T4	1SFN084806R1001
54...150	116	EF146-150	1SAX351001R1101	BEA140/XT2	1SFN084206R1000
54...150	140	EF146-150	1SAX351001R1101		
63...210	190	EF205-210	1SAX531001R1101	BEA205/XT4	1SFN084806R1000
63...210	205	EF205-210	1SAX531001R1101	BEA205/T4	1SFN084806R1001
115...380	265	EF370-380	1SAX611001R1101	BEA370/T5	1SFN085406R1000
115...380	305	EF370-380	1SAX611001R1101		
115...380	350	EF370-380	1SAX611001R1101		

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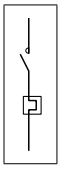
DOL and reversing starters protected by overload relays
With AF contactors - Open type version in kit form

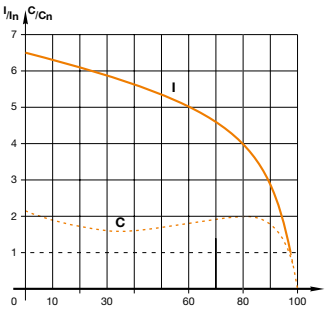
AF09-30-10 + TF42



AF140-30-11 + TF140DU

Application

Full voltage direct-on-line and reversing starting for controlling three-phase asynchronous motors is a simple and economic solution characterised by a high starting torque (1.9 to 2.1 times full-speed torque) and a starting current 5.5 to 7 times nominal current.



I = current
C = torque
In = nominal current
Cn = nominal torque

Coordination Types

The contactor, the short-circuit protection device and the thermal overload relay control and protect motors against overload and short-circuits according to coordination types 1 and 2 (IEC 60947-4-1 / EN 60947-4-1) defining the anticipated level of service continuity as follow:

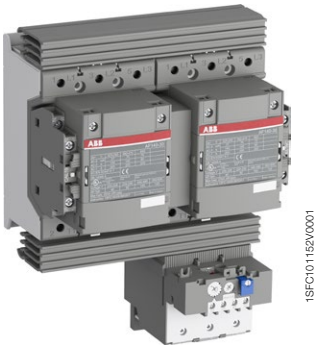
Type 1: In short-circuit conditions, the contactor or starter does not endanger persons or installations and will not be able to then operate without being repaired or having parts replaced.

Type 2: In short-circuit conditions, the contactor or starter does not endanger persons or installations and will be able to operate afterwards. The risk of contacts light welding is acceptable.

AF09-30-10 + BER16-4 + VEM4 + TF42

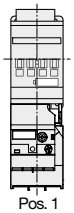
Main Technical Data

Standards	IEC 60947-4-1 / EN 60947-4-1
Rated operational voltage Ue max.	690 V - 50/60 Hz
Rated insulation voltage Ui	
acc. to IEC 60947-4-1	690 V
acc. to UL / CSA	600 V
Ambient air temperature	
Close to the device	≤ 60 °C (TF42: 38 A above ≤ 50 °C)
Degree of protection	IP20
Switching frequency	Refer to "Switching frequency diagrams" page

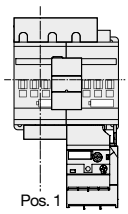


AF140-30-11 + BER140-4 + VM19 + TF140DU

Mounting positions



Direct-on-line



Reversing

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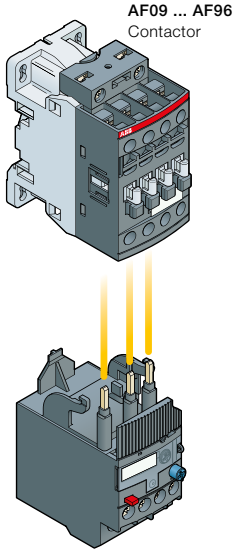
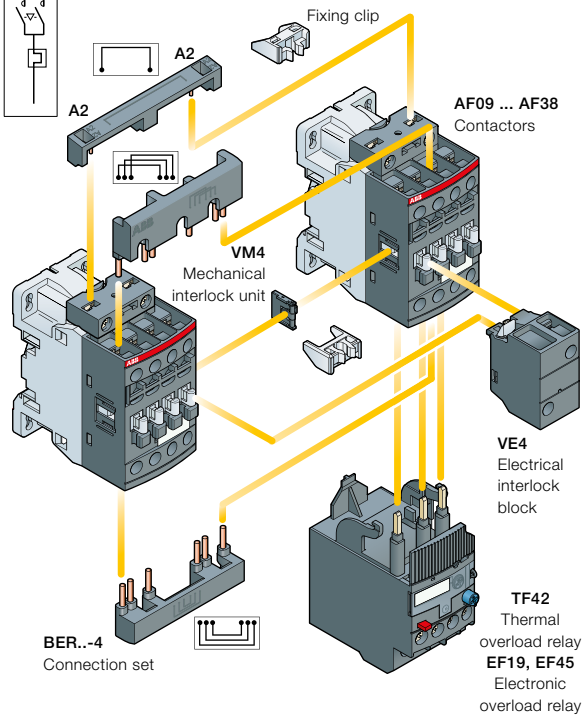
DOL and reversing starters protected by overload relays
With AF contactors - Open type version in kit form

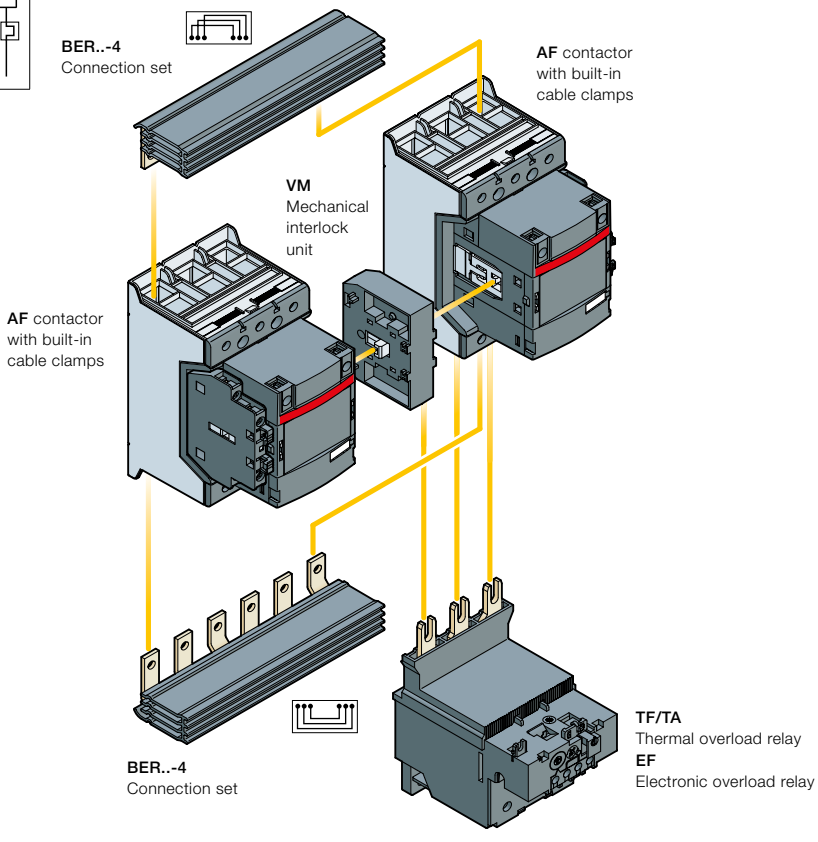
Direct-On-Line starters



Reversing starters for AF09 ... AF38



Reversing starters for AF116 ... AF370



Description

You can easily assemble a direct-on-line starter by connecting AF contactor and TF thermal overload relay or EF electronic overload relay.

You can also easily assemble reversing starter thanks to our complete range of accessories:

- For AF09 ... AF38, use VEM4 mechanical and electrical interlock set for reversing starter in 90 mm width.
  It includes:
  - VM4 mechanical interlock unit including 2 fixing clips
  - VE4 electrical interlock block with A2-A2 connection.
- For AF40 ... AF370, use VM mechanical interlock unit and additional auxiliary contact blocks for electrical interlocking.
- BER..-4 connection set: it assures a safe and simple reversing connection between both contactor main terminals.

Select now easily and quickly your starter in the following pages at 400 V, up to 200 kW.

For the full coordination tables:
www.abb.com/lowvoltage then go to the right menu: "Support", select: "Online Product Selection Tools" then select "Coordination Tables for motor protection"

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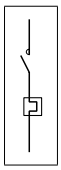
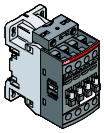
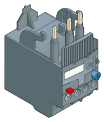
Direct-on-line starters protected by thermal overload relays
With AF contactors - Open type version in kit form



Contactors



Thermal overload relays



Accessories

IEC AC-3, 400 V Rated power	Rated current	Control voltage Uc min. ... Uc max. (1)		Type	Order code	Setting ranges	Type	Order code
kW	A	V 50/60 Hz	V DC			A		
4	8.5	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	7.60...10.0	TF42-10	1SAZ721201R1043
		100...250	100...250	AF09-30-10-13	1SBL137001R1310			
5.5	11.5	24...60	20...60	AF12Z-30-10-21	1SBL156001R2110	10.0...13.0	TF42-13	1SAZ721201R1045
		100...250	100...250	AF12-30-10-13	1SBL157001R1310			
7.5	15.5	24...60	20...60	AF16Z-30-10-21	1SBL176001R2110	13.0...16.0	TF42-16	1SAZ721201R1047
		100...250	100...250	AF16-30-10-13	1SBL177001R1310			
11	22	24...60	20...60	AF26Z-30-00-21	1SBL236001R2100	20.0...24.0	TF42-24	1SAZ721201R1051
		100...250	100...250	AF26-30-00-13	1SBL237001R1300			
15	29	24...60	20...60	AF30Z-30-00-21	1SBL276001R2100	29.0...35.0	TF42-35	1SAZ721201R1053
		100...250	100...250	AF30-30-00-13	1SBL277001R1300			
18.5	35	24...60	20...60	AF38Z-30-00-21	1SBL296001R2100	35.0...38.0/40.0	TF42-38	1SAZ721201R1055
		100...250	100...250	AF38-30-00-13	1SBL297001R1300			
18.5	35	24...60	20...60	AF40-30-00-11	1SBL347001R1100	30.0...40.0	TF65-40	1SAZ811201R1003
		100...250	100...250	AF40-30-00-13	1SBL347001R1300			
22	41	24...60	20...60	AF52-30-00-11	1SBL367001R1100	36.00...47.0	TF65-47	1SAZ811201R1004
		100-250	100-250	AF52-30-00-13	1SBL367001R1300			
30	55	24...60	20...60	AF65-30-00-11	1SBL387001R1100	50.0...60.0	TF65-60	1SAZ811201R1006
		100-250	100-250	AF65-30-00-13	1SBL387001R1300			
37	66	24...60	20...60	AF80-30-00-11	1SBL397001R1100	57.0...68.0	TF96-68	1SAZ911201R1003
		100-250	100-250	AF80-30-00-13	1SBL397001R1300			
45	80	24...60	20...60	AF96-30-00-11	1SBL407001R1100	75.0..87.0	TF96-87	1SAZ911201R1005
		100-250	100-250	AF96-30-00-13	1SBL407001R1300			
55	97	24...60	20...60	AF116-30-11-11	1SFL427001R1111	80...110	TF140DU-110	1SAZ431201R1002
		100-250	100-250	AF116-30-11-13	1SFL427001R1311			
75	132	24...60	20...60	AF140-30-11-11	1SFL447001R1111	100...135	TF140DU-135	1SAZ431201R1003
		100-250	100-250	AF140-30-11-13	1SFL447001R1311			
90	160	24...60	20...60	AF190-30-11-11	1SFL487002R1111	130...175	TA200DU-175	1SAZ421201R1005
		100-250	100-250	AF190-30-11-13	1SFL487002R1311			
110	195	24...60	20...60	AF205-30-11-11	1SFL527002R1111	150...200	TA200DU-200	1SAZ421201R1006
		100-250	100-250	AF205-30-11-13	1SFL527002R1311			

(1) For other control voltages, see "Voltage code table".
Note : for rated power above 110 kW, refer to "Starters protected by electronic overload relays".

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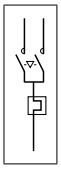
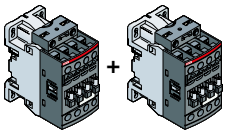
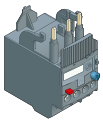
Reversing starters protected by thermal overload relays
With AF contactors - Open type version in kit form



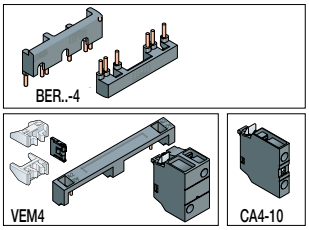
Contactors



Thermal overload relays



Accessories



IEC AC-3, 400 V Rated power kW	Rated current A	Control voltage Uc min. ... Uc max. (1) V 50/60 Hz	V DC	Type	Order code	Setting ranges A	Type	Order code	Type	Order code
4	8.5	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	7.60...10.0	TF42-10	1SAZ721201R1043	BER16-4	1SBN081311R1000
		100...250	100...250	AF09-30-10-13	1SBL137001R1310				+ VEM4	1SBN030111R1000
5.5	11.5	24...60	20...60	AF12Z-30-10-21	1SBL156001R2110	10.0...13.0	TF42-13	1SAZ721201R1045		
		100...250	100...250	AF12-30-10-13	1SBL157001R1310					
7.5	15.5	24...60	20...60	AF16Z-30-10-21	1SBL176001R2110	13.0...16.0	TF42-16	1SAZ721201R1047		
		100...250	100...250	AF16-30-10-13	1SBL177001R1310					
11	22	24...60	20...60	AF26Z-30-00-21	1SBL236001R2100	20.0...24.0	TF42-24	1SAZ721201R1051	BER38-4	1SBN082311R1000
		100...250	100...250	AF26-30-00-13	1SBL237001R1300				+ VEM4	1SBN030111R1000
15	29	24...60	20...60	AF30Z-30-00-21	1SBL276001R2100	29.0...35.0	TF42-35	1SAZ721201R1053	+ 2x CA4-10	1SBN010110R1010
		100...250	100...250	AF30-30-00-13	1SBL277001R1300					
18.5	35	24...60	20...60	AF38Z-30-00-21	1SBL296001R2100	35.0...38.0/40.0	TF42-38	1SAZ721201R1055		
		100...250	100...250	AF38-30-00-13	1SBL297001R1300					
18.5	35	24...60	20...60	AF40-30-00-11	1SBL347001R1100	30.0...40.0	TF65-40	1SAZ811201R1003	BER65-4	1SBN083411R1000
		100...250	100...250	AF40-30-00-13	1SBL347001R1300				+ VM96-4	1SBN033405T1000
22	41	24...60	20...60	AF52-30-00-11	1SBL367001R1100	36.00...47.0	TF65-47	1SAZ811201R1004	+ 2x CA4-10	1SBN010110R1010
		100...250	100...250	AF52-30-00-13	1SBL367001R1300				+ 2x CA4-01	1SBN010110R1001
30	55	24...60	20...60	AF65-30-00-11	1SBL387001R1100	50.0...60.0	TF65-60	1SAZ811201R1006		
		100...250	100...250	AF65-30-00-13	1SBL387001R1300					
37	66	24...60	20...60	AF80-30-00-11	1SBL397001R1100	57.0...68.0	TF96-68	1SAZ911201R1003	BER96-4	1SBN083911R1000
		100...250	100...250	AF80-30-00-13	1SBL397001R1300				+ VM96-4	1SBN033405T1000
45	80	24...60	20...60	AF96-30-00-11	1SBL407001R1100	75.0..87.0	TF96-87	1SAZ911201R1005	+ 2x CA4-10	1SBN010110R1010
		100...250	100...250	AF96-30-00-13	1SBL407001R1300				+ 2x CA4-01	1SBN010110R1001
55	97	24...60	20...60	AF116-30-11-11	1SFL427001R1111	80...110	TF140DU-110	1SAZ431201R1002	BER140-4	1SFN084211R1000
		100...250	100...250	AF116-30-11-13	1SFL427001R1311				+ VM19	1SFN030300R1000
75	132	24...60	20...60	AF140-30-11-11	1SFL447001R1111	100...135	TF140DU-135	1SAZ431201R1003		
		100...250	100...250	AF140-30-11-13	1SFL447001R1311					
90	160	24...60	20...60	AF190-30-11-11	1SFL487002R1111	130...175	TA200DU-175	1SAZ421201R1005	BER205-4	1SFN084811R1000
		100...250	100...250	AF190-30-11-13	1SFL487002R1311				+ VM19	1SFN030300R1000
110	195	24...60	20...60	AF205-30-11-11	1SFL527002R1111	150...200	TA200DU-200	1SAZ421201R1006		
		100...250	100...250	AF205-30-11-13	1SFL527002R1311					

(1) For other control voltages, see "Voltage code table".

Note : for rated power above 110 kW, refer to "Starters protected by electronic overload relays".

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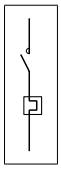
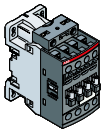
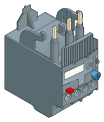
Direct-on-line starters protected by electronic overload relays
With AF contactors - Open type version in kit form



Contactors



Electronic overload relays



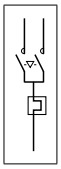
Accessories

IEC AC-3, 400 V Rated power	Rated current	Control voltage Uc min. ... Uc max. (1)		Type	Order code	Setting ranges	Type	Order code
kW	A	V 50/60 Hz	V DC			A		
4	8.5	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	5.70...18.9	EF19-18.9	1SAX121001R1105
		100...250	100...250	AF09-30-10-13	1SBL137001R1310			
5.5	11.5	24...60	20...60	AF12Z-30-10-21	1SBL156001R2110	5.70...18.9	EF19-18.9	1SAX121001R1105
		100...250	100...250	AF12-30-10-13	1SBL157001R1310			
7.5	15.5	24...60	20...60	AF16Z-30-10-21	1SBL176001R2110	5.70...18.9	EF19-18.9	1SAX121001R1105
		100...250	100...250	AF16-30-10-13	1SBL177001R1310			
11	22	24...60	20...60	AF26Z-30-00-21	1SBL236001R2100	9.00...30.0	EF45-30	1SAX221001R1101
		100...250	100...250	AF26-30-00-13	1SBL237001R1300			
15	29	24...60	20...60	AF30Z-30-00-21	1SBL276001R2100	9.00...30.0	EF45-30	1SAX221001R1101
		100...250	100...250	AF30-30-00-13	1SBL277001R1300			
18.5	35	24...60	20...60	AF38Z-30-00-21	1SBL296001R2100	15.0...45.0	EF45-45	1SAX221001R1102
		100...250	100...250	AF38-30-00-13	1SBL297001R1300			
18.5	35	24...60	20...60	AF40-30-00-11	1SBL347001R1100	25.0...70.0	EF65-70	1SAX331001R1101
		100...250	100...250	AF40-30-00-13	1SBL347001R1300			
22	41	24...60	20...60	AF52-30-00-11	1SBL367001R1100	25.0...70.0	EF65-70	1SAX331001R1101
		100-250	100-250	AF52-30-00-13	1SBL367001R1300			
30	55	24...60	20...60	AF65-30-00-11	1SBL387001R1100	25.0...70.0	EF65-70	1SAX331001R1101
		100-250	100-250	AF65-30-00-13	1SBL387001R1300			
37	66	24...60	20...60	AF80-30-00-11	1SBL397001R1100	36...100	EF96-100	1SAX341001R1101
		100-250	100-250	AF80-30-00-13	1SBL397001R1300			
45	80	24...60	20...60	AF96-30-00-11	1SBL407001R1100	36...100	EF96-100	1SAX341001R1101
		100-250	100-250	AF96-30-00-13	1SBL407001R1300			
55	97	24...60	20...60	AF116-30-11-11	1SFL427001R1111	54...150	EF146-150	1SAX351001R1101
		100-250	100-250	AF116-30-11-13	1SFL427001R1311			
75	132	24...60	20...60	AF140-30-11-11	1SFL447001R1111	54...150	EF146-150	1SAX351001R1101
		100-250	100-250	AF140-30-11-13	1SFL447001R1311			
90	160	24...60	20...60	AF190-30-11-11	1SFL487002R1111	63...210	EF205-210	1SAX531001R1101
		100-250	100-250	AF190-30-11-13	1SFL487002R1311			
110	195	24...60	20...60	AF205-30-11-11	1SFL527002R1111	63...210	EF205-210	1SAX531001R1101
		100-250	100-250	AF205-30-11-13	1SFL527002R1311			
132	230	24...60	20...60	AF265-30-11-11	1SFL547002R1111	115...380	EF370-380	1SAX611001R1101
		100-250	100-250	AF265-30-11-13	1SFL547002R1311			
160	280	24...60	20...60	AF305-30-11-11	1SFL587002R1111	115...380	EF370-380	1SAX611001R1101
		100-250	100-250	AF305-30-11-13	1SFL587002R1311			
200	350	24...60	20...60	AF370-30-11-11	1SFL607002R1111	115...380	EF370-380	1SAX611001R1101
		100-250	100-250	AF370-30-11-13	1SFL607002R1311			

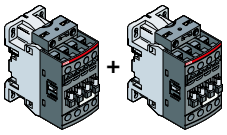
(1) For other control voltages, see "Voltage code table".

1SBC101948S0201

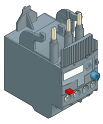
Reversing starters protected by electronic overload relays
With AF contactors - Open type version in kit form



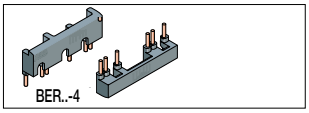
Contactors

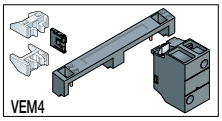


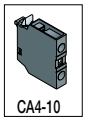
Electronic overload relays



Accessories





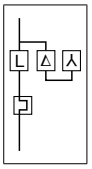


IEC AC-3, 400 V Rated power kW	Rated current A	Control voltage Uc min. ... Uc max. (1) V 50/60 Hz	V DC	Type	Order code	Setting ranges A	Type	Order code	Type	Order code
4	8.5	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	5.70...18.9	EF19-18.9	1SAX121001R1105	BER16-4	1SBN081311R1000
		100...250	100...250	AF09-30-10-13	1SBL137001R1310				+ VEM4	1SBN030111R1000
5.5	11.5	24...60	20...60	AF12Z-30-10-21	1SBL156001R2110	5.70...18.9	EF19-18.9	1SAX121001R1105		
		100...250	100...250	AF12-30-10-13	1SBL157001R1310					
7.5	15.5	24...60	20...60	AF16Z-30-10-21	1SBL176001R2110	5.70...18.9	EF19-18.9	1SAX121001R1105		
		100...250	100...250	AF16-30-10-13	1SBL177001R1310					
11	22	24...60	20...60	AF26Z-30-00-21	1SBL236001R2100	9.00...30.0	EF45-30	1SAX221001R1101	BER38-4	1SBN082311R1000
		100...250	100...250	AF26-30-00-13	1SBL237001R1300				+ VEM4	1SBN030111R1000
15	29	24...60	20...60	AF30Z-30-00-21	1SBL276001R2100	9.00...30.0	EF45-30	1SAX221001R1101	+ 2x CA4-10	1SBN010110R1010
		100...250	100...250	AF30-30-00-13	1SBL277001R1300					
18.5	35	24...60	20...60	AF38Z-30-00-21	1SBL296001R2100	15.0...45.0	EF45-45	1SAX221001R1102		
		100...250	100...250	AF38-30-00-13	1SBL297001R1300					
18.5	35	24...60	20...60	AF40-30-00-11	1SBL347001R1100	25.0...70.0	EF65-70	1SAX331001R1101	BER65-4	1SBN083411R1000
		100...250	100...250	AF40-30-00-13	1SBL347001R1300				+ VM96-4	1SBN033405T1000
22	41	24...60	20...60	AF52-30-00-11	1SBL367001R1100	25.0...70.0	EF65-70	1SAX331001R1101	+ 2x CA4-10	1SBN010110R1010
		100...250	100...250	AF52-30-00-13	1SBL367001R1300				+ 2x CA4-01	1SBN010110R1001
30	55	24...60	20...60	AF65-30-00-11	1SBL387001R1100	25.0...70.0	EF65-70	1SAX331001R1101		
		100...250	100...250	AF65-30-00-13	1SBL387001R1300					
37	66	24...60	20...60	AF80-30-00-11	1SBL397001R1100	36...100	EF96-100	1SAX341001R1101	BER96-4	1SBN083911R1000
		100...250	100...250	AF80-30-00-13	1SBL397001R1300				+ VM96-4	1SBN033405T1000
45	80	24...60	20...60	AF96-30-00-11	1SBL407001R1100	36...100	EF96-100	1SAX341001R1101	+ 2x CA4-10	1SBN010110R1010
		100...250	100...250	AF96-30-00-13	1SBL407001R1300				+ 2x CA4-01	1SBN010110R1001
55	97	24...60	20...60	AF116-30-11-11	1SFL427001R1111	54...150	EF146-150	1SAX351001R1101	BER140-4	1SFN084211R1000
		100...250	100...250	AF116-30-11-13	1SFL427001R1311				+ VM19	1SFN030300R1000
75	132	24...60	20...60	AF140-30-11-11	1SFL447001R1111	54...150	EF146-150	1SAX351001R1101		
		100...250	100...250	AF140-30-11-13	1SFL447001R1311					
90	160	24...60	20...60	AF190-30-11-11	1SFL487002R1111	63...210	EF205-210	1SAX531001R1101	BER205-4	1SFN084811R1000
		100...250	100...250	AF190-30-11-13	1SFL487002R1311				+ VM19	1SFN030300R1000
110	195	24...60	20...60	AF205-30-11-11	1SFL527002R1111	63...210	EF205-210	1SAX531001R1101		
		100...250	100...250	AF205-30-11-13	1SFL527002R1311					
132	230	24...60	20...60	AF265-30-11-11	1SFL547002R1111	115...380	EF370-380	1SAX611001R1101	BER370-4	1SFN085411R1000
		100...250	100...250	AF265-30-11-13	1SFL547002R1311				+ VM19	1SFN030300R1000
160	280	24...60	20...60	AF305-30-11-11	1SFL587002R1111	115...380	EF370-380	1SAX611001R1101		
		100...250	100...250	AF305-30-11-13	1SFL587002R1311					
200	350	24...60	20...60	AF370-30-11-11	1SFL607002R1111	115...380	EF370-380	1SAX611001R1101		
		100...250	100...250	AF370-30-11-13	1SFL607002R1311					

(1) For other control voltages, see "Voltage code table".

1SBC101949S0201

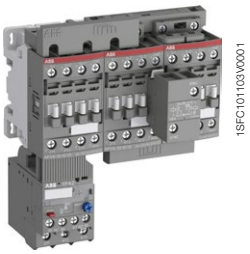
Star-delta starters protected by overload relays
With AF contactors - Open type version in kit form



Application

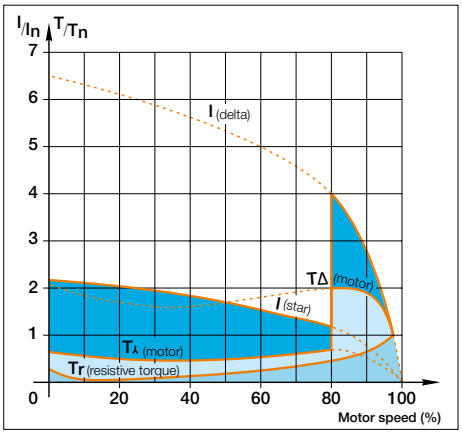
Star-delta starting is the most common method to reduce the starting current of a motor.

This system can be used on all the squirrel cage motors, which are normally used in delta connection. In this type of starting, it is recommended to choose motors having high starting torque i.e. much higher than the resistive torque in order to reach sufficient high speed when the motor is connected in star.



1SFC101103V0001

AF16-30-10 + AF16-30-10 + AF09-30-10 + BEY16-4 + VEM4 + TF42



I = current
T = torque

In = nominal current
Tn = nominal torque

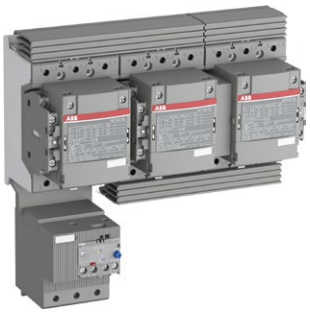
When starting:

- Inrush current is reduced to a third of direct starting current
- Motor torque is reduced to a third or even less of direct starting torque.

Transient current is generated when switching from star to delta connection.

During the initial starting phase ("star" connection), the resistive torque of the driven load must remain, irrespective of speed, less than the "star" motor torque until "star-delta" switching occurs.

This starting mode is therefore ideal for machines having low starting torque such as pumps, centrifugal compressors, wood-working machines...



1SFC101104V0001

AF140-30-11 + AF140-30-11 + AF140-30-11 + BEY140-4 + VM19 + EF146

Precaution

- Motor nominal voltage in delta connection must be equal to that of the mains. Example: a motor for 400 V star-delta starting must be designed for 400 V in "delta" connection. Its usual designation is "400 V / 690 V motor". The motor must be constructed with 6 terminal windings
- In order to prevent a high current peak, at least 85 % of nominal speed must be reached before switching from star to delta

Sequence

Starting is a three-stage process:

1st stage: "Star" connection - Press the "On" button on the control circuit to close the KM2 "Star" contactor. The KM1 "line" contactor then closes and the motor starts. Countdown of programmed starting time (6 to 10 s) then begins.

2nd stage: "Star" to "Delta" switching - when programmed starting time is over, the KM2 "Star" contactor opens.

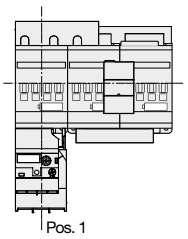
3rd stage: "Delta" connection - Thanks to AF contactors, a transition time (or dwelling time) of 50 ms is already integrated between the opening of the "star" contactor and closing of the "delta" contactor.

Conclusion: An on-delay timer without dwelling time (e.g.: CT-ERS.21S or TEF4-ON) is enough to count-down the programmed starting time (6 to 10 s) during "Star connection". The use of a star-delta timer including a dwelling time is not permitted.

Main Technical Data

Standards	IEC 60947-4-1 / EN 60947-4-1
Rated operational voltage Ue max.	690 V - 50/60 Hz
Rated insulation voltage Ui	
acc. to IEC 60947-4-1	690 V
acc. to UL / CSA	600 V
Ambient air temperature	
Close to the device	≤ 60 °C (TF42: 38 A above ≤ 50 °C)
Degree of protection	IP20
Switching frequency	Refer to "Switching frequency diagrams" page

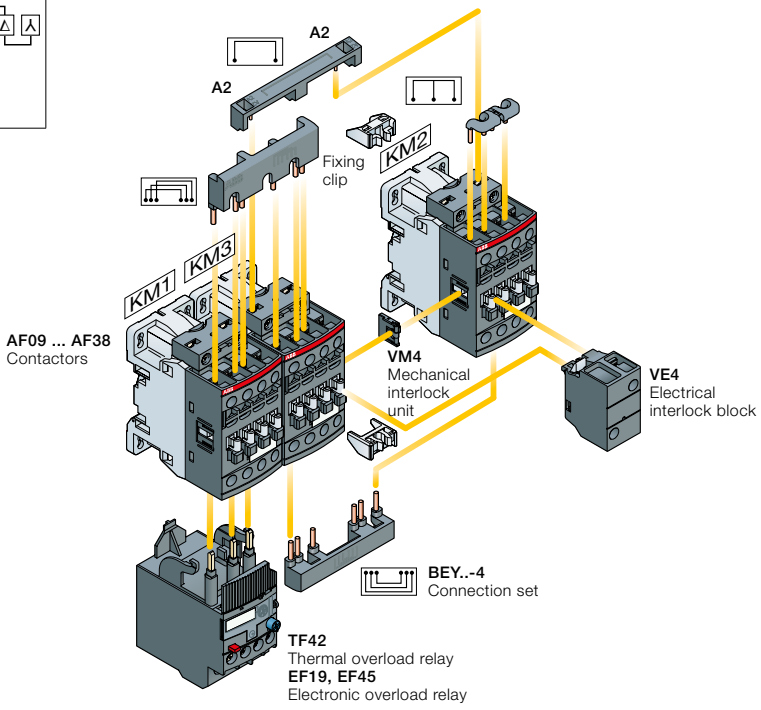
Mounting positions



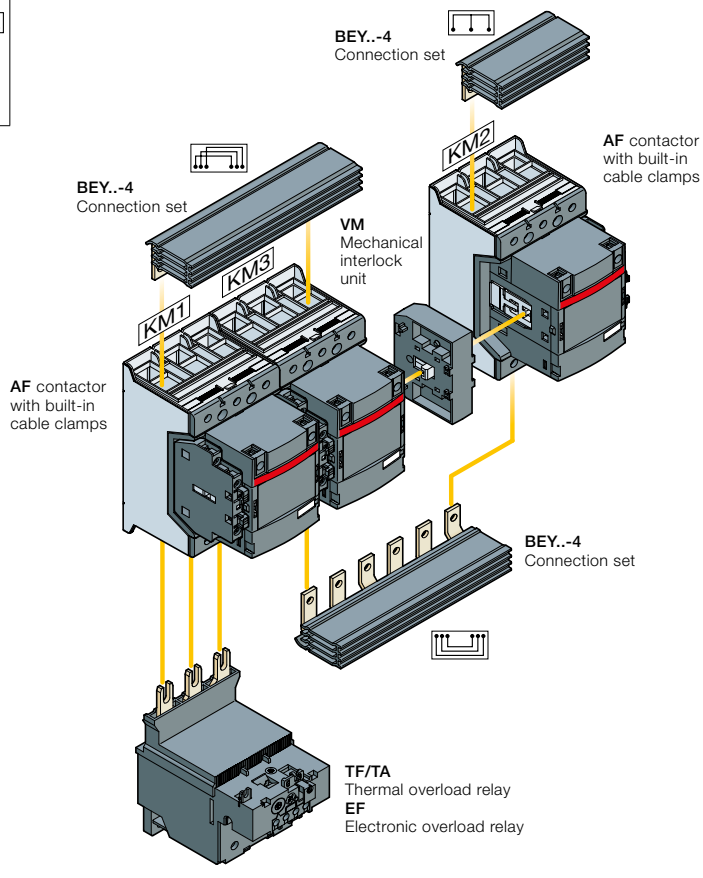
1SBC101956S0201

Star-delta starters protected by overload relays
With AF contactors - Open type version in kit form

Star-delta starters for AF09 ... AF38



Star-delta starters for AF116 ... AF370



Description

You can easily assemble star-delta starter thanks to our complete range of accessories:

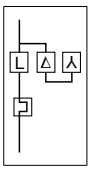
- For AF09 ... AF38, use VEM4 mechanical and electrical interlock set without increasing starter width. It includes:
  - VM4 mechanical interlock unit and 2 fixing clips
  - VE4 electrical interlock block with A2-A2 connection.
- For AF40 ... AF370, use VM mechanical interlock unit and additional auxiliary contact blocks for electrical interlocking.
- BEY..-4 connection set: it assures a safe and simple connection between both contactor main terminals.

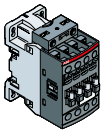
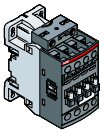
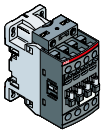
Select now easily and quickly your starter in the following pages at 400 V, up to 200 kW.

For the full coordination tables:
www.abb.com/lowvoltage then go to the right menu: "**Support**", select: "**Online Product Selection Tools**" then select "**Coordination Tables for motor protection**"

1SBC101956S0201

Star-delta starters protected by thermal overload relays
With AF contactors - Open type version in kit form

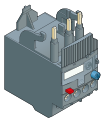


	Line contactor KM1	Delta contactor KM3	Star contactor KM2
			

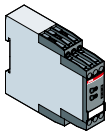
IEC AC-3 Rated power 220 V kW	230/240 V kW	380 V kW	400 V kW	415 V kW	440 V kW	500 V kW	690 V kW	Rated current 400 V A	Control voltage Uc min. ... Uc max. (1) V 50/60 Hz	V DC	Type	Order code	Type	Order code	Type	Order code
4	4	7.5	7.5	7.5	7.5	9	9	15.5	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	AF09Z-30-10-21	1SBL136001R2110	AF09Z-30-10-21	1SBL136001R2110
									100...250	100...250	AF09-30-10-13	1SBL137001R1310	AF09-30-10-13	1SBL137001R1310	AF09-30-10-13	1SBL137001R1310
5.5	5.5	9	11	11	11	11	11	22	24...60	20...60	AF12Z-30-10-21	1SBL156001R2110	AF12Z-30-10-21	1SBL156001R2110	AF09Z-30-10-21	1SBL136001R2110
									100...250	100...250	AF12-30-10-13	1SBL157001R1310	AF12-30-10-13	1SBL157001R1310	AF09-30-10-13	1SBL137001R1310
7.5	9	15	15	15	15	15	15	29	24...60	20...60	AF16Z-30-10-21	1SBL176001R2110	AF16Z-30-10-21	1SBL176001R2110	AF09Z-30-10-21	1SBL136001R2110
									100...250	100...250	AF16-30-10-13	1SBL177001R1310	AF16-30-10-13	1SBL177001R1310	AF09-30-10-13	1SBL137001R1310
11	11	18.5	18.5	25	25	25	25	35	24...60	20...60	AF26Z-30-00-21	1SBL236001R2100	AF26Z-30-00-21	1SBL236001R2100	AF26Z-30-00-21	1SBL236001R2100
									100...250	100...250	AF26-30-00-13	1SBL237001R1300	AF26-30-00-13	1SBL237001R1300	AF26-30-00-13	1SBL237001R1300
11	11	22	22	25	25	25	25	41	24...60	20...60	AF26Z-30-00-21	1SBL236001R2100	AF26Z-30-00-21	1SBL236001R2100	AF26Z-30-00-21	1SBL236001R2100
									100...250	100...250	AF26-30-00-13	1SBL237001R1300	AF26-30-00-13	1SBL237001R1300	AF26-30-00-13	1SBL237001R1300
11	15	25	25	25	25	30	30	47	24...60	20...60	AF30Z-30-00-21	1SBL276001R2100	AF30Z-30-00-21	1SBL276001R2100	AF26Z-30-00-21	1SBL236001R2100
									100...250	100...250	AF30-30-00-13	1SBL277001R1300	AF30-30-00-13	1SBL277001R1300	AF26-30-00-13	1SBL237001R1300
18.5	18.5	37	37	37	37	37	37	66	24...60	20...60	AF40-30-00-11	1SBL347001R1100	AF40-30-00-11	1SBL347001R1100	AF40-30-00-11	1SBL347001R1100
									100...250	100...250	AF40-30-00-13	1SBL347001R1300	AF40-30-00-13	1SBL347001R1300	AF40-30-00-13	1SBL347001R1300
25	25	45	45	45	45	45	45	80	24...60	20...60	AF52-30-00-11	1SBL367001R1100	AF52-30-00-11	1SBL367001R1100	AF40-30-00-11	1SBL347001R1100
									100...250	100...250	AF52-30-00-13	1SBL367001R1300	AF52-30-00-13	1SBL367001R1300	AF40-30-00-13	1SBL347001R1300
30	30	55	55	55	55	55	55	97	24...60	20...60	AF65-30-00-11	1SBL387001R1100	AF65-30-00-11	1SBL387001R1100	AF40-30-00-11	1SBL347001R1100
									100...250	100...250	AF65-30-00-13	1SBL387001R1300	AF65-30-00-13	1SBL387001R1300	AF40-30-00-13	1SBL347001R1300
37	37	75	75	75	75	75	75	132	24...60	20...60	AF80-30-00-11	1SBL397001R1100	AF80-30-00-11	1SBL397001R1100	AF52-30-00-11	1SBL367001R1100
									100...250	100...250	AF80-30-00-13	1SBL397001R1300	AF80-30-00-13	1SBL397001R1300	AF52-30-00-13	1SBL367001R1300
45	45	90	90	90	90	90	90	160	24...60	20...60	AF96-30-00-11	1SBL407001R1100	AF96-30-00-11	1SBL407001R1100	AF65-30-00-11	1SBL387001R1100
									100...250	100...250	AF96-30-00-13	1SBL407001R1300	AF96-30-00-13	1SBL407001R1300	AF65-30-00-13	1SBL387001R1300
55	55	90	110	110	132	132	110	195	24...60	20...60	AF116-30-11-11	1SFL427001R1111	AF116-30-11-11	1SFL427001R1111	AF116-30-11-11 (4)	1SFL427001R1111
									100...250	100...250	AF116-30-11-13	1SFL427001R1311	AF116-30-11-13	1SFL427001R1311	AF116-30-11-13	1SFL427001R1311
75	75	132	132	132	132	160	132	230	24...60	20...60	AF140-30-11-11	1SFL447001R1111	AF140-30-11-11	1SFL447001R1111	AF116-30-11-11	1SFL427001R1111
									100...250	100...250	AF140-30-11-13	1SFL447001R1311	AF140-30-11-13	1SFL447001R1311	AF116-30-11-13	1SFL427001R1311
90	90	160	160	160	160	200	200	280	24...60	20...60	AF190-30-11-11	1SFL487002R1111	AF190-30-11-11	1SFL487002R1111	AF140-30-11-11	1SFL447001R1111
									100...250	100...250	AF190-30-11-13	1SFL487002R1311	AF190-30-11-13	1SFL487002R1311	AF140-30-11-13	1SFL447001R1311

(1) AF09 ... AF190: ambient temperature ≤ 60 °C.
(2) The setting current value is: nominal motor current x 0.58. Overload relay type given for 400 V - AC-3.
For other voltage, select overload relay type according to required nominal motor current x 0.58.
(3) On-delay timer without dwelling-time (e.g.: side-mounted CT-ERS.21S or front-mounted TEF4-ON) is enough to countdown the programmed starting time during "Star connection".
In case of use of front-mounted TEF4-ON on-delay timer, mount on KM1 contactor AF26 ... AF96 a side-mounted CAL4-11 auxiliary contact block instead of CA4-10 auxiliary contact block.
(4) AF80 can also be used, but no connection set and mechanical interlock is available for this combination.

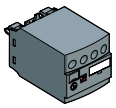
Thermal overload relays (2)



Electronic timers (3)



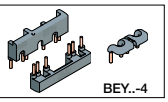
CT-ERS



TEF4-ON
Uc = 24...240 V
50/60 Hz or DC

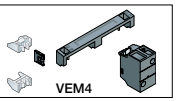
Accessories

Connection sets



BEY..-4

Mechanical and electrical interlock sets



VEM4

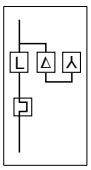
Auxiliary contact blocks

CA4

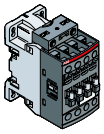
Setting ranges A	Type	Order code		Type	Order code		Type	Order code		Type	Order code
7.60...10.0	TF42-10	1SAZ721201R1043		CT-ERS.21S or TEF4-ON	1SVR730100R0300 1SBN020112R1000		BEY16-4 + VEM4	1SBN081313R2000 1SBN030111R1000		-	-
10.0...13.0	TF42-13	1SAZ721201R1045		CT-ERS.21S or TEF4-ON	1SVR730100R0300 1SBN020112R1000		BEY16-4 + VEM4	1SBN081313R2000 1SBN030111R1000		-	-
16.0...20.0	TF42-20	1SAZ721201R1049		CT-ERS.21S or TEF4-ON	1SVR730100R0300 1SBN020112R1000		BEY16-4 + VEM4	1SBN081313R2000 1SBN030111R1000		-	-
20.0...24.0	TF42-24	1SAZ721201R1051		CT-ERS.21S or TEF4-ON	1SVR730100R0300 1SBN020112R1000		BEY38-4 + VEM4	1SBN082713R2000 1SBN030111R1000		KM1 : 1 x CA4-10 KM2 : 1 x CA4-10	1SBN010110R1010 1SBN010110R1010
20.0...24.0	TF42-24	1SAZ721201R1051		CT-ERS.21S or TEF4-ON	1SVR730100R0300 1SBN020112R1000		BEY38-4 + VEM4	1SBN082713R2000 1SBN030111R1000		KM1 : 1 x CA4-10 KM2 : 1 x CA4-10	1SBN010110R1010 1SBN010110R1010
24.0...29.0	TF42-29	1SAZ721201R1052		CT-ERS.21S or TEF4-ON	1SVR730100R0300 1SBN020112R1000		BEY38-4 + VEM4	1SBN082713R2000 1SBN030111R1000		KM1 : 1 x CA4-10 KM2 : 1 x CA4-10	1SBN010110R1010 1SBN010110R1010
30.0...40.0	TF65-40	1SAZ811201R1003		CT-ERS.21S or TEF4-ON	1SVR730100R0300 1SBN020112R1000		BEY65-4 + VM96-4	1SBN083413R2000 1SBN033405T1000		KM1 : 1 x CA4-10 (3) KM2 : 1 x CA4-10 1 x CA4-01 KM3 : 1 x CA4-01	1SBN010110R1010 1SBN010110R1010 1SBN010110R1001 1SBN010110R1001
36.0...47.0	TF65-47	1SAZ811201R1004		CT-ERS.21S or TEF4-ON	1SVR730100R0300 1SBN020112R1000		BEY65-4 + VM96-4	1SBN083413R2000 1SBN033405T1000		KM1 : 1 x CA4-10 (3) KM2 : 1 x CA4-10 1 x CA4-01 KM3 : 1 x CA4-01	1SBN010110R1010 1SBN010110R1010 1SBN010110R1001 1SBN010110R1001
50.0...60.0	TF65-60	1SAZ811201R1006		CT-ERS.21S or TEF4-ON	1SVR730100R0300 1SBN020112R1000		BEY65-4 + VM96-4	1SBN083413R2000 1SBN033405T1000		KM1 : 1 x CA4-10 (3) KM2 : 1 x CA4-10 1 x CA4-01 KM3 : 1 x CA4-01	1SBN010110R1010 1SBN010110R1010 1SBN010110R1001 1SBN010110R1001
65.0...78.0	TF96-78	1SAZ911201R1004		CT-ERS.21S or TEF4-ON	1SVR730100R0300 1SBN020112R1000		BEY96-4 + VM96-4	1SBN083913R2000 1SBN033405T1000		KM1 : 1 x CA4-10 (3) KM2 : 1 x CA4-10 1 x CA4-01 KM3 : 1 x CA4-01	1SBN010110R1010 1SBN010110R1010 1SBN010110R1001 1SBN010110R1001
84.0...96.0	TF96-96	1SAZ911201R1006		CT-ERS.21S or TEF4-ON	1SVR730100R0300 1SBN020112R1000		BEY96-4 + VM96-4	1SBN083913R2000 1SBN033405T1000		KM1 : 1 x CA4-10 (3) KM2 : 1 x CA4-10 1 x CA4-01 KM3 : 1 x CA4-01	1SBN010110R1010 1SBN010110R1010 1SBN010110R1001 1SBN010110R1001
100...135	TF140DU-135	1SAZ431201R1003		CT-ERS.21S	1SVR730100R0300		BEY140-4 + VM19	1SFN084413R1000 1SFN030300R1000		-	-
100...135	TF140DU-135	1SAZ431201R1003		CT-ERS.21S	1SVR730100R0300		BEY140-4 + VM19	1SFN084413R1000 1SFN030300R1000		-	-
130...175	TA200DU-175	1SAZ421201R1005		CT-ERS.21S	1SVR730100R0300		BEY190-4 + VM140/190	1SFN084813R1000 1SFN034403R1000		-	-

1SBC101959S0201

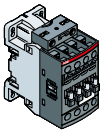
Star-delta starters protected by electronic overload relays
With AF contactors - Open type version in kit form



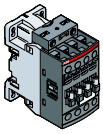
Line contactor KM1



Delta contactor KM3



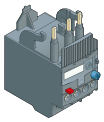
Star contactor KM2



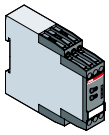
IEC AC-3 Rated power								Rated current	Control voltage Uc min. ... Uc max. (1)		Line contactor KM1		Delta contactor KM3		Star contactor KM2	
220 V kW	230/240 V kW	380 V kW	400 V kW	415 V kW	440 V kW	500 V kW	690 V kW	400 V A	V 50/60 Hz	V DC	Type	Order code	Type	Order code	Type	Order code
4	4	7.5	7.5	7.5	7.5	9	9	15.5	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110	AF09Z-30-10-21	1SBL136001R2110	AF09Z-30-10-21	1SBL136001R2110
									100...250	100...250	AF09-30-10-13	1SBL137001R1310	AF09-30-10-13	1SBL137001R1310	AF09-30-10-13	1SBL137001R1310
5.5	5.5	9	11	11	11	11	11	22	24...60	20...60	AF12Z-30-10-21	1SBL156001R2110	AF12Z-30-10-21	1SBL156001R2110	AF09Z-30-10-21	1SBL136001R2110
									100...250	100...250	AF12-30-10-13	1SBL157001R1310	AF12-30-10-13	1SBL157001R1310	AF09-30-10-13	1SBL137001R1310
7.5	9	15	15	15	15	15	15	29	24...60	20...60	AF16Z-30-10-21	1SBL176001R2110	AF16Z-30-10-21	1SBL176001R2110	AF09Z-30-10-21	1SBL136001R2110
									100...250	100...250	AF16-30-10-13	1SBL177001R1310	AF16-30-10-13	1SBL177001R1310	AF09-30-10-13	1SBL137001R1310
11	11	18.5	18.5	25	25	25	25	35	24...60	20...60	AF26Z-30-00-21	1SBL236001R2100	AF26Z-30-00-21	1SBL236001R2100	AF26Z-30-00-21	1SBL236001R2100
									100...250	100...250	AF26-30-00-13	1SBL237001R1300	AF26-30-00-13	1SBL237001R1300	AF26-30-00-13	1SBL237001R1300
11	11	22	22	25	25	25	25	41	24...60	20...60	AF26Z-30-00-21	1SBL236001R2100	AF26Z-30-00-21	1SBL236001R2100	AF26Z-30-00-21	1SBL236001R2100
									100...250	100...250	AF26-30-00-13	1SBL237001R1300	AF26-30-00-13	1SBL237001R1300	AF26-30-00-13	1SBL237001R1300
11	15	25	25	25	25	30	30	47	24...60	20...60	AF30Z-30-00-21	1SBL276001R2100	AF30Z-30-00-21	1SBL276001R2100	AF26Z-30-00-21	1SBL236001R2100
									100...250	100...250	AF30-30-00-13	1SBL277001R1300	AF30-30-00-13	1SBL277001R1300	AF26-30-00-13	1SBL237001R1300
18.5	18.5	37	37	37	37	37	37	66	24...60	20...60	AF40-30-00-11	1SBL347001R1100	AF40-30-00-11	1SBL347001R1100	AF40-30-00-11	1SBL347001R1100
									100...250	100...250	AF40-30-00-13	1SBL347001R1300	AF40-30-00-13	1SBL347001R1300	AF40-30-00-13	1SBL347001R1300
25	25	45	45	45	45	45	45	80	24...60	20...60	AF52-30-00-11	1SBL367001R1100	AF52-30-00-11	1SBL367001R1100	AF40-30-00-11	1SBL347001R1100
									100...250	100...250	AF52-30-00-13	1SBL367001R1300	AF52-30-00-13	1SBL367001R1300	AF40-30-00-13	1SBL347001R1300
30	30	55	55	55	55	55	55	97	24...60	20...60	AF65-30-00-11	1SBL387001R1100	AF65-30-00-11	1SBL387001R1100	AF40-30-00-11	1SBL347001R1100
									100...250	100...250	AF65-30-00-13	1SBL387001R1300	AF65-30-00-13	1SBL387001R1300	AF40-30-00-13	1SBL347001R1300
37	37	75	75	75	75	75	75	132	24...60	20...60	AF80-30-00-11	1SBL397001R1100	AF80-30-00-11	1SBL397001R1100	AF52-30-00-11	1SBL367001R1100
									100...250	100...250	AF80-30-00-13	1SBL397001R1300	AF80-30-00-13	1SBL397001R1300	AF52-30-00-13	1SBL367001R1300
45	45	90	90	90	90	90	90	160	24...60	20...60	AF96-30-00-11	1SBL407001R1100	AF96-30-00-11	1SBL407001R1100	AF65-30-00-11	1SBL387001R1100
									100...250	100...250	AF96-30-00-13	1SBL407001R1300	AF96-30-00-13	1SBL407001R1300	AF65-30-00-13	1SBL387001R1300
55	55	90	110	110	132	132	110	195	24...60	20...60	AF116-30-11-11	1SFL427001R1111	AF116-30-11-11	1SFL427001R1111	AF116-30-11-11 (4)	1SFL427001R1111
									100...250	100...250	AF116-30-11-13	1SFL427001R1311	AF116-30-11-13	1SFL427001R1311	AF116-30-11-13	1SFL427001R1311
75	75	132	132	132	132	160	132	230	24...60	20...60	AF140-30-11-11	1SFL447001R1111	AF140-30-11-11	1SFL447001R1111	AF116-30-11-11	1SFL427001R1111
									100...250	100...250	AF140-30-11-13	1SFL447001R1311	AF140-30-11-13	1SFL447001R1311	AF116-30-11-13	1SFL427001R1311
90	90	160	160	160	160	200	200	280	24...60	20...60	AF190-30-11-11	1SFL487002R1111	AF190-30-11-11	1SFL487002R1111	AF140-30-11-11	1SFL447001R1111
									100...250	100...250	AF190-30-11-13	1SFL487002R1311	AF190-30-11-13	1SFL487002R1311	AF140-30-11-13	1SFL447001R1311
110	110	160	200	200	200	250	250	350	24...60	20...60	AF205-30-11-11	1SFL527002R1111	AF205-30-11-11	1SFL527002R1111	AF190-30-11-11	1SFL487002R1111
									100...250	100...250	AF205-30-11-13	1SFL527002R1311	AF205-30-11-13	1SFL527002R1311	AF190-30-11-13	1SFL487002R1311
132	132	250	250	250	250	315	355	430	24...60	20...60	AF265-30-11-11	1SFL547002R1111	AF265-30-11-11	1SFL547002R1111	AF205-30-11-11	1SFL527002R1111
									100...250	100...250	AF265-30-11-13	1SFL547002R1311	AF265-30-11-13	1SFL547002R1311	AF205-30-11-13	1SFL527002R1311
160	160	315	315	315	355	400	400	540	24...60	20...60	AF370-30-11-11	1SFL607002R1111	AF370-30-11-11	1SFL607002R1111	AF265-30-11-11	1SFL547002R1111
									100...250	100...250	AF370-30-11-13	1SFL607002R1311	AF370-30-11-13	1SFL607002R1311	AF265-30-11-13	1SFL547002R1311
200	200	315	355	355	400	400	500	610	24...60	20...60	AF370-30-11-11	1SFL607002R1111	AF370-30-11-11	1SFL607002R1111	AF305-30-11-11	1SFL587002R1111
									100...250	100...250	AF370-30-11-13	1SFL607002R1311	AF370-30-11-13	1SFL607002R1311	AF305-30-11-13	1SFL587002R1311

(1) AF09 ... AF370: ambient temperature ≤ 60 °C.
(2) The setting current value is: nominal motor current x 0.58. Overload relay type given for 400 V - AC-3.
For other voltage, select overload relay type according to required nominal motor current x 0.58.
(3) On-delay timer without dwelling-time (e.g.: side-mounted CT-ERS.21S or front-mounted TEF4-ON) is enough to countdown the programmed starting time during "Star connection".
In case of use of front-mounted TEF4-ON on-delay timer, mount on KM1 contactor AF26 ... AF96 a side-mounted CAL4-11 auxiliary contact block instead of CA4-10 auxiliary contact block.
(4) AF80 can also be used, but no connection set and mechanical interlock is available for this combination.

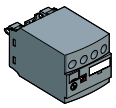
Electronic overload relays (2)



Electronic timers (3)



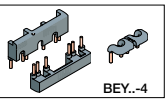
CT-ERS



TEF4-ON
Uc = 24...240 V
50/60 Hz or DC

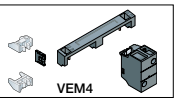
Accessories

Connection sets



BEY..-4

Mechanical and electrical interlock sets



VEM4

Auxiliary contact blocks

CA4

Setting ranges A	Type	Order code		Type	Order code		Type	Order code		Type	Order code
5.70...18.9	EF19-18.9	1SAX121001R1105		CT-ERS.21S or TEF4-ON	1SVR730100R0300 1SBN020112R1000		BEY16-4 + VEM4	1SBN081313R2000 1SBN030111R1000		-	-
5.70...18.9	EF19-18.9	1SAX121001R1105		CT-ERS.21S or TEF4-ON	1SVR730100R0300 1SBN020112R1000		BEY16-4 + VEM4	1SBN081313R2000 1SBN030111R1000		-	-
5.70...18.9	EF19-18.9	1SAX121001R1105		CT-ERS.21S or TEF4-ON	1SVR730100R0300 1SBN020112R1000		BEY16-4 + VEM4	1SBN081313R2000 1SBN030111R1000		-	-
9.00...30.0	EF45-30	1SAX221001R1101		CT-ERS.21S or TEF4-ON	1SVR730100R0300 1SBN020112R1000		BEY38-4 + VEM4	1SBN082713R2000 1SBN030111R1000		KM1 : 1 x CA4-10 KM2 : 1 x CA4-10	1SBN010110R1010 1SBN010110R1010
9.00...30.0	EF45-30	1SAX221001R1101		CT-ERS.21S or TEF4-ON	1SVR730100R0300 1SBN020112R1000		BEY38-4 + VEM4	1SBN082713R2000 1SBN030111R1000		KM1 : 1 x CA4-10 KM2 : 1 x CA4-10	1SBN010110R1010 1SBN010110R1010
9.00...30.0	EF45-30	1SAX221001R1101		CT-ERS.21S or TEF4-ON	1SVR730100R0300 1SBN020112R1000		BEY38-4 + VEM4	1SBN082713R2000 1SBN030111R1000		KM1 : 1 x CA4-10 KM2 : 1 x CA4-10	1SBN010110R1010 1SBN010110R1010
25...70	EF65-70	1SAX331001R1101		CT-ERS.21S or TEF4-ON	1SVR730100R0300 1SBN020112R1000		BEY65-4 + VM96-4	1SBN083413R2000 1SBN033405T1000		KM1 : 1 x CA4-10 (3) KM2 : 1 x CA4-10 1 x CA4-01 KM3 : 1 x CA4-01	1SBN010110R1010 1SBN010110R1010 1SBN010110R1001 1SBN010110R1001
25...70	EF65-70	1SAX331001R1101		CT-ERS.21S or TEF4-ON	1SVR730100R0300 1SBN020112R1000		BEY65-4 + VM96-4	1SBN083413R2000 1SBN033405T1000		KM1 : 1 x CA4-10 (3) KM2 : 1 x CA4-10 1 x CA4-01 KM3 : 1 x CA4-01	1SBN010110R1010 1SBN010110R1010 1SBN010110R1001 1SBN010110R1001
25...70	EF65-70	1SAX331001R1101		CT-ERS.21S or TEF4-ON	1SVR730100R0300 1SBN020112R1000		BEY65-4 + VM96-4	1SBN083413R2000 1SBN033405T1000		KM1 : 1 x CA4-10 (3) KM2 : 1 x CA4-10 1 x CA4-01 KM3 : 1 x CA4-01	1SBN010110R1010 1SBN010110R1010 1SBN010110R1001 1SBN010110R1001
36...100	EF96-100	1SAX341001R1101		CT-ERS.21S or TEF4-ON	1SVR730100R0300 1SBN020112R1000		BEY96-4 + VM96-4	1SBN083913R2000 1SBN033405T1000		KM1 : 1 x CA4-10 (3) KM2 : 1 x CA4-10 1 x CA4-01 KM3 : 1 x CA4-01	1SBN010110R1010 1SBN010110R1010 1SBN010110R1001 1SBN010110R1001
36...100	EF96-100	1SAX341001R1101		CT-ERS.21S or TEF4-ON	1SVR730100R0300 1SBN020112R1000		BEY96-4 + VM96-4	1SBN083913R2000 1SBN033405T1000		KM1 : 1 x CA4-10 (3) KM2 : 1 x CA4-10 1 x CA4-01 KM3 : 1 x CA4-01	1SBN010110R1010 1SBN010110R1010 1SBN010110R1001 1SBN010110R1001
54...150	EF146-150	1SAX351001R1101		CT-ERS.21S	1SVR730100R0300		BEY140-4 + VM19	1SFN084413R1000 1SFN030300R1000		-	-
54...150	EF146-150	1SAX351001R1101		CT-ERS.21S	1SVR730100R0300		BEY140-4 + VM19	1SFN084413R1000 1SFN030300R1000		-	-
63...210	EF205-210	1SAX531001R1101		CT-ERS.21S	1SVR730100R0300		BEY190-4 + VM140/190	1SFN084813R1000 1SFN034403R1000		-	-
63...210	EF205-210	1SAX531001R1101		CT-ERS.21S	1SVR730100R0300		BEY205-4 + VM19	1SFN085213R1000 1SFN030300R1000		-	-
115...380	EF370-380	1SAX611001R1101		CT-ERS.21S	1SVR730100R0300		BEY265-4 + VM205/265	1SFN085413R1000 1SFN035203R1000		-	-
115...380	EF370-380	1SAX611001R1101		CT-ERS.21S	1SVR730100R0300		BEY370-4 + VM19	1SFN085813R1000 1SFN030300R1000		-	-
115...380	EF370-380	1SAX611001R1101		CT-ERS.21S	1SVR730100R0300		BEY370-4 + VM19	1SFN085813R1000 1SFN030300R1000		-	-

1SBC101960S0201

3-pole contactors, for motor control and power switching

AC / DC Control supply				Type	AF09	AF12	AF16	AF26	AF30	AF38	AF40	AF52	AF65	AF80	AF96
IEC	**AC-3**	Rated operational power θ ≤ 60 °C for AF09 ... AF370 θ ≤ 55 °C for AF400 ... AF2650	220 - 230 - 240 V	kW	2.2	3	4	6.5	9	11	11	15	18.5	22	25
			380 - 400 V	**kW**	**4**	**5.5**	**7.5**	**11**	**15**	**18.5**	**18.5**	**22**	**30**	**37**	**45**
			415 V	kW	4	5.5	9	11	15	18.5	22	30	37	45	55
			440 V	kW	4	5.5	9	15	18.5	22	22	30	37	45	55
			500 V	kW	5.5	7.5	9	15	18.5	22	22	30	37	45	55
			690 V	kW	5.5	7.5	9	15	18.5	22	22	30	37	45	55
			1000 V	kW	—	—	—	—	—	—	—	—	—	35	40
		Rated operational current	**380 - 400 V**	**A**	**9**	**12**	**18**	**26**	**32**	**38**	**40**	**53**	**65**	**80**	**96**
	AC-1	Rated operational current	**θ ≤ 40 °C, 690 V**	**A**	**25**	**28**	**30**	**45**	**50**	**50**	**70**	**100**	**105**	**125**	**130**

UL / CSA	**1-phase motor rating**	120 V	hp	0.75	1	1.5	2	2	2	3	3	5	7.5	7.5
		240 V	hp	1.5	2	3	3	5	5	7.5	10	15	15	20
	3-phase motor rating	200 - 208 V	hp	2	3	5	7.5	10	10	10	15	20	25	30
		220 - 240 V	hp	2	3	5	7.5	10	10	15	20	25	30	30
		440 - 480 V	**hp**	**5**	**7.5**	**10**	**15**	**20**	**25**	**30**	**40**	**50**	**60**	**60**
		550 - 600 V	hp	7.5	10	15	20	25	30	40	50	60	75	75
	General use rating	**600 V**	**A**	**25**	**28**	**30**	**45**	**50**	**50**	**60**	**80**	**90**	**105**	**115**
NEMA	**NEMA Size**			**00**	**0**	—	**1**	—	—	**2**	—	—	**3**	—

Main accessories

Auxiliary contact blocks	Front mounting	**CA4-10** (1 x N.O.) **CA4-01** (1 x N.C.)			
	Side mounting	**CAL4-11** (1 x N.O. + 1 x N.C.)			
Timers	Electronic	**TEF4-ON** **TEF4-OFF**			
Interlocking units	Mechanical	**VM4**		**VM96-4**	
	Mechanical / Electrical	**VEM4**			
Connection sets	For reversing contactors	**BER16-4**	**BER38-4**	**BER65-4**	**BER96-4**
Surge suppressors		Built-in surge protection			

Overload relays

Thermal relays	Class 10 (Class 10A for TF140, TA200DU)	**TF42** (0.10...38 A)		**TF65** (22...67 A)	**TF96** (40...96 A)
Electronic relays	Class 10E, 20E, 30E	**EF19** (0.10...18.9 A)	**EF19** (0.10...18.9 A) **EF45** (9...45 A)	**EF65** (20...70 A)	**EF96** (36...100 A)

Manual motor starters

	Thermal / magnetic protection Class 10	**MS116** (0.10...32 A) Ics up to 50 kA for class 10 A		**MS165** (10...65 A) Ics up to 100 kA (1)	**MS5100** (40...100 A) Ics up to 50 kA
		MS132 (0.10...32 A) Ics up to 100 kA			**MS495** (45...100 A) Ics up to 50 kA
				MS497 (22...100 A) Ics up to 100 kA	
	Magnetic only types	**MO132** (0.16...32 A) Ics up to 100 kA		**MO165** (16...65 A) Ics up to 100 kA (1)	**MO5100** (70...100 A) Ics up to 36 kA
				MO496 (32...100 A) Ics up to 100 kA	
					MO495 (63...100 A) Ics up to 50 kA
Accessories	For contactor mounting	**BEA16-4**	**BEA38-4**	**BEA65-4** (2)	

(1) MS165/MO165 are suitable for use with AF09 ... AF30 for North american applications.
(2) BEA65-4 suitable for MS165 and MO165 only.

	AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370	AF400	AF460	AF580	AF750	AF1250	AF1350	AF1650	AF2050	AF2650
	30	37	45	55	55	75	90	110	110	132	160	220	—	257	315	—	—
	55	**75**	**75**	**90**	**110**	**132**	**160**	**200**	**200**	**250**	**315**	**400**	—	**475**	**560**	—	—
	55	75	75	90	110	132	160	200	220	250	355	425	—	500	630	—	—
	75	90	90	110	132	160	160	200	220	250	355	450	—	560	710	—	—
	75	90	90	110	132	160	200	250	250	315	400	520	—	560	710	—	—
	55	75	90	132	160	200	250	315	315	355	500	600	—	800	1000	—	—
	—	—	75	110	132	132	132	132	220	280	355	400	—	—	—	—	—
	116	**140**	**146**	**190**	**205**	**265**	**305**	**370**	**400**	**460**	**580**	**750**	—	**860**	**1060**	—	—
	160	**200**	**225**	**275**	**350**	**400**	**500**	**600**	**600**	**700**	**800**	**1050**	**1260**	**1350**	**1650**	**2050**	**2650**
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	30	40	40	50	60	75	100	125	125	150	200	250	—	—	—	—	—
	40	50	50	60	75	100	125	150	150	200	250	300	—	400	450	—	—
	75	**100**	**100**	**125**	**150**	**200**	**250**	**300**	**350**	**400**	**500**	**600**	—	**800**	**900**	—	—
	100	125	125	150	200	250	300	350	400	500	600	700	—	1000	1150	—	—
	160	**200**	**200**	**250**	**300**	**350**	**400**	**520**	**550**	**650**	**750**	**900**	**1210**	**1350**	**1650**	**2100**	**2700**
	—	**4**	—	—	—	**5**	—	—	—	**6**	—	**7**	—	—	**8**	—	—

	CAL19-11 (1 x N.O. + 1 x N.C.)								**CAL18-11** (1 x N.O. + 1 x N.C.)								
	VM19 (for same size contactors)								**VM750H** **VM750V**					**VM1650H**			
	BER140-4			**BER205-4**		**BER370-4**			**BEM460-30**		**BEM750-30**						

	TF140DU (66...142 A) $\theta \leq 55$ °C			**TA200DU** (66...200 A) $\theta \leq 55$ °C													
	EF146 (54...150 A)			**EF205** (63...210 A)		**EF370** (115...380 A)			**EF460** (150...500 A)		**EF750** (250...800 A)			**E1250DU** (375...1250 A)			

Short-circuit protection devices

MCCB and switch-fuses

1SBC101908S0201 - Rev. C

AF09 ... AF38 3-pole contactors
4 to 18.5 kW
AC / DC operated

AF09-30-10

AF26-30-00

5

Description

AF09 ... AF38 contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220 V DC. These contactors are of the block type design with 3 main poles.

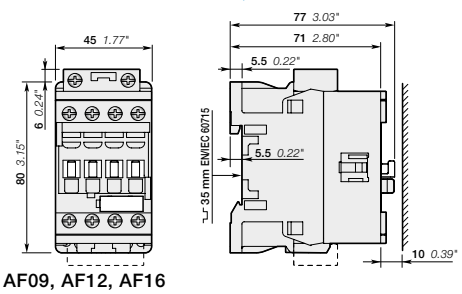
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...500V 50/60 Hz and 20...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening.
- built-in surge suppression
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Ordering details

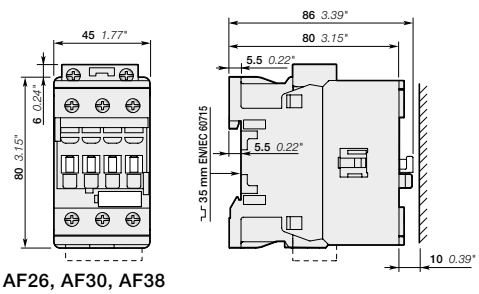
IEC		UL/CSA		Rated control circuit voltage Uc min. ... Uc max.			Auxiliary contacts fitted		Type (1)	Order code		Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC									Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz	V DC							kg
4	25	5	25	24...60	-	(2)	1	0	AF09-30-10-41	1SBL137001R4110		0.270
							0	1	AF09-30-01-41	1SBL137001R4101		0.270
				48...130	48...130		1	0	AF09-30-10-12	1SBL137001R1210		0.270
							0	1	AF09-30-01-12	1SBL137001R1201		0.270
				100...250	100...250		1	0	AF09-30-10-13	1SBL137001R1310		0.270
							0	1	AF09-30-01-13	1SBL137001R1301		0.270
				250...500	250...500		1	0	AF09-30-10-14	1SBL137001R1410		0.310
							0	1	AF09-30-01-14	1SBL137001R1401		0.310
5.5	28	7.5	28	24...60	-	(2)	1	0	AF12-30-10-41	1SBL157001R4110		0.270
							0	1	AF12-30-01-41	1SBL157001R4101		0.270
				48...130	48...130		1	0	AF12-30-10-12	1SBL157001R1210		0.270
							0	1	AF12-30-01-12	1SBL157001R1201		0.270
				100...250	100...250		1	0	AF12-30-10-13	1SBL157001R1310		0.270
							0	1	AF12-30-01-13	1SBL157001R1301		0.270
				250...500	250...500		1	0	AF12-30-10-14	1SBL157001R1410		0.310
							0	1	AF12-30-01-14	1SBL157001R1401		0.310
7.5	30	10	30	24...60	-	(2)	1	0	AF16-30-10-41	1SBL177001R4110		0.270
							0	1	AF16-30-01-41	1SBL177001R4101		0.270
				48...130	48...130		1	0	AF16-30-10-12	1SBL177001R1210		0.270
							0	1	AF16-30-01-12	1SBL177001R1201		0.270
				100...250	100...250		1	0	AF16-30-10-13	1SBL177001R1310		0.270
							0	1	AF16-30-01-13	1SBL177001R1301		0.270
				250...500	250...500		1	0	AF16-30-10-14	1SBL177001R1410		0.310
							0	1	AF16-30-01-14	1SBL177001R1401		0.310
11	45	15	45	24...60	-	(2)	0	0	AF26-30-00-41	1SBL237001R4100		0.310
				48...130	48...130		0	0	AF26-30-00-12	1SBL237001R1200		0.310
				100...250	100...250		0	0	AF26-30-00-13	1SBL237001R1300		0.310
				250...500	250...500		0	0	AF26-30-00-14	1SBL237001R1400		0.350
15	50	20	50	24...60	-	(2)	0	0	AF30-30-00-41	1SBL277001R4100		0.310
				48...130	48...130		0	0	AF30-30-00-12	1SBL277001R1200		0.310
				100...250	100...250		0	0	AF30-30-00-13	1SBL277001R1300		0.310
				250...500	250...500		0	0	AF30-30-00-14	1SBL277001R1400		0.350
18.5	50	25	50	24...60	-	(2)	0	0	AF38-30-00-41	1SBL297001R4100		0.310
				48...130	48...130		0	0	AF38-30-00-12	1SBL297001R1200		0.310
				100...250	100...250		0	0	AF38-30-00-13	1SBL297001R1300		0.310
				250...500	250...500		0	0	AF38-30-00-14	1SBL297001R1400		0.350

(1) For other auxiliary contacts arrangements, please contact your ABB local sales organization.
(2) For 24...60 V 50/60 Hz - 20...60 V DC, use AF..Z-30-..-21.

Main dimensions mm, *inches*



AF09, AF12, AF16



AF26, AF30, AF38

1SBC101371S0201 - Rev. C

AF09Z ... AF38Z 3-pole contactors
4 to 18.5 kW
AC / DC operated - low consumption

AF09Z-30-10

AF26Z-30-00

Description

AF09Z ... AF38Z contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220 V DC. These contactors are of the block type design with 3 main poles.

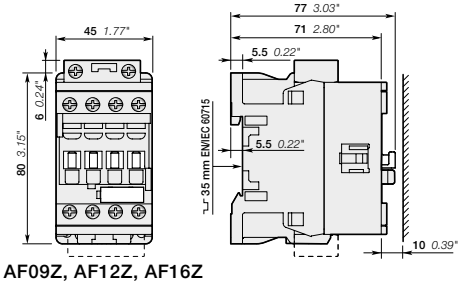
– control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...250 V 50/60 Hz and 12...250 V DC
  - can manage large control voltage variations
  - allow direct control by PLC-output ≥ 24 V DC 500 mA
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47-0706 conditions of use on request).
– built-in surge suppression
– add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Ordering details

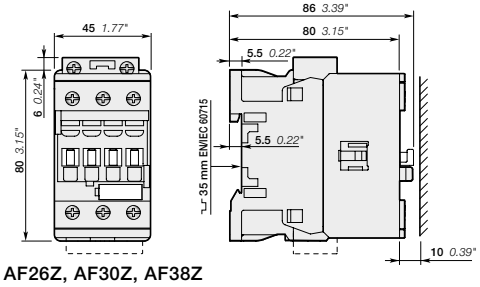
IEC		UL/CSA		Rated control circuit voltage Uc min. ... Uc max.		Auxiliary contacts fitted		Type (1)	Order code		Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC								Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz	V DC						kg
4	25	5	25	-	12...20	1	0	AF09Z-30-10-20	1SBL136001R2010		0.310
						0	1	AF09Z-30-01-20	1SBL136001R2001		0.310
				24...60	20...60	1	0	AF09Z-30-10-21	1SBL136001R2110		0.310
						0	1	AF09Z-30-01-21	1SBL136001R2101		0.310
				48...130	48...130	1	0	AF09Z-30-10-22	1SBL136001R2210		0.310
						0	1	AF09Z-30-01-22	1SBL136001R2201		0.310
				100...250	100...250	1	0	AF09Z-30-10-23	1SBL136001R2310		0.310
						0	1	AF09Z-30-01-23	1SBL136001R2301		0.310
5.5	28	7.5	28	-	12...20	1	0	AF12Z-30-10-20	1SBL156001R2010		0.310
						0	1	AF12Z-30-01-20	1SBL156001R2001		0.310
				24...60	20...60	1	0	AF12Z-30-10-21	1SBL156001R2110		0.310
						0	1	AF12Z-30-01-21	1SBL156001R2101		0.310
				48...130	48...130	1	0	AF12Z-30-10-22	1SBL156001R2210		0.310
						0	1	AF12Z-30-01-22	1SBL156001R2201		0.310
				100...250	100...250	1	0	AF12Z-30-10-23	1SBL156001R2310		0.310
						0	1	AF12Z-30-01-23	1SBL156001R2301		0.310
7.5	30	10	30	-	12...20	1	0	AF16Z-30-10-20	1SBL176001R2010		0.310
						0	1	AF16Z-30-01-20	1SBL176001R2001		0.310
				24...60	20...60	1	0	AF16Z-30-10-21	1SBL176001R2110		0.310
						0	1	AF16Z-30-01-21	1SBL176001R2101		0.310
				48...130	48...130	1	0	AF16Z-30-10-22	1SBL176001R2210		0.310
						0	1	AF16Z-30-01-22	1SBL176001R2201		0.310
				100...250	100...250	1	0	AF16Z-30-10-23	1SBL176001R2310		0.310
						0	1	AF16Z-30-01-23	1SBL176001R2301		0.310
11	45	15	45	-	12...20	0	0	AF26Z-30-00-20	1SBL236001R2000		0.350
				24...60	20...60	0	0	AF26Z-30-00-21	1SBL236001R2100		0.350
				48...130	48...130	0	0	AF26Z-30-00-22	1SBL236001R2200		0.350
				100...250	100...250	0	0	AF26Z-30-00-23	1SBL236001R2300		0.350
15	50	20	50	-	12...20	0	0	AF30Z-30-00-20	1SBL276001R2000		0.350
				24...60	20...60	0	0	AF30Z-30-00-21	1SBL276001R2100		0.350
				48...130	48...130	0	0	AF30Z-30-00-22	1SBL276001R2200		0.350
				100...250	100...250	0	0	AF30Z-30-00-23	1SBL276001R2300		0.350
18.5	50	25	50	-	12...20	0	0	AF38Z-30-00-20	1SBL296001R2000		0.350
				24...60	20...60	0	0	AF38Z-30-00-21	1SBL296001R2100		0.350
				48...130	48...130	0	0	AF38Z-30-00-22	1SBL296001R2200		0.350
				100...250	100...250	0	0	AF38Z-30-00-23	1SBL296001R2300		0.350

(1) For other auxiliary contacts arrangements, please contact your ABB local sales organization.
Note: Only AF..Z contactors with DC control voltage 12...20 V DC need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole.

Main dimensions mm, *inches*



AF09Z, AF12Z, AF16Z



AF26Z, AF30Z, AF38Z

1SBC101372S0201 - Rev. B

AF40 ... AF96 3-pole contactors
18.5 to 45 kW
AC / DC operated

AF40-30-00

AF80-30-00

5

Description

AF40 ... AF96 contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220 V DC. These contactors are of the block type design with 3 main poles.

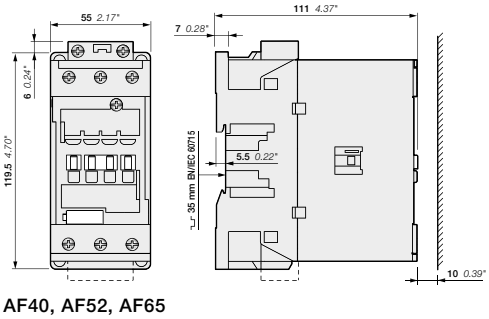
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...500 V 50/60 Hz and 20...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening.
- built-in surge suppression
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Ordering details

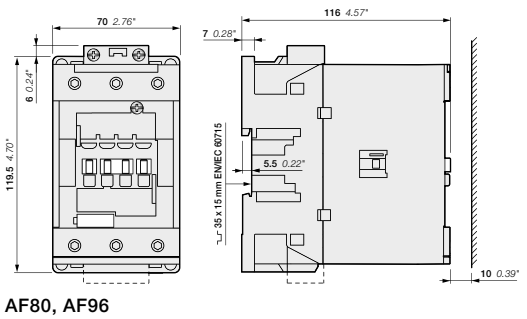
IEC		UL / CSA		Rated control circuit voltage Uc min. ... Uc max.		Auxiliary contacts fitted	Type (1)	Order code		Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC							Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz	V DC					kg
18.5	70	30	60	24...60	-	0 0	AF40-30-00-41	1SBL347001R4100		0.970
				24...60	20...60 (2)	0 0	AF40-30-00-11	1SBL347001R1100		0.970
				48...130	48...130	0 0	AF40-30-00-12	1SBL347001R1200		0.970
				100...250	100...250	0 0	AF40-30-00-13	1SBL347001R1300		0.950
				250...500	250...500	0 0	AF40-30-00-14	1SBL347001R1400		0.950
22	100	40	80	24...60	-	0 0	AF52-30-00-41	1SBL367001R4100		0.970
				24...60	20...60 (2)	0 0	AF52-30-00-11	1SBL367001R1100		0.970
				48...130	48...130	0 0	AF52-30-00-12	1SBL367001R1200		0.970
				100...250	100...250	0 0	AF52-30-00-13	1SBL367001R1300		0.950
				250...500	250...500	0 0	AF52-30-00-14	1SBL367001R1400		0.950
30	105	50	90	24...60	-	0 0	AF65-30-00-41	1SBL387001R4100		0.970
				24...60	20...60 (2)	0 0	AF65-30-00-11	1SBL387001R1100		0.970
				48...130	48...130	0 0	AF65-30-00-12	1SBL387001R1200		0.970
				100...250	100...250	0 0	AF65-30-00-13	1SBL387001R1300		0.950
				250...500	250...500	0 0	AF65-30-00-14	1SBL387001R1400		0.950
37	125	60	105	24...60	-	0 0	AF80-30-00-41	1SBL397001R4100		1.220
				24...60	20...60 (2)	0 0	AF80-30-00-11	1SBL397001R1100		1.220
				48...130	48...130	0 0	AF80-30-00-12	1SBL397001R1200		1.220
				100...250	100...250	0 0	AF80-30-00-13	1SBL397001R1300		1.170
				250...500	250...500	0 0	AF80-30-00-14	1SBL397001R1400		1.170
45	130	60	115	24...60	-	0 0	AF96-30-00-41	1SBL407001R4100		1.220
				24...60	20...60 (2)	0 0	AF96-30-00-11	1SBL407001R1100		1.220
				48...130	48...130	0 0	AF96-30-00-12	1SBL407001R1200		1.220
				100...250	100...250	0 0	AF96-30-00-13	1SBL407001R1300		1.170
				250...500	250...500	0 0	AF96-30-00-14	1SBL407001R1400		1.170

(1) For other auxiliary contacts arrangements, please contact your ABB local sales organization.
(2) AF..-30-..-11 not suitable for direct control by PLC-output.

Main dimensions mm, *inches*

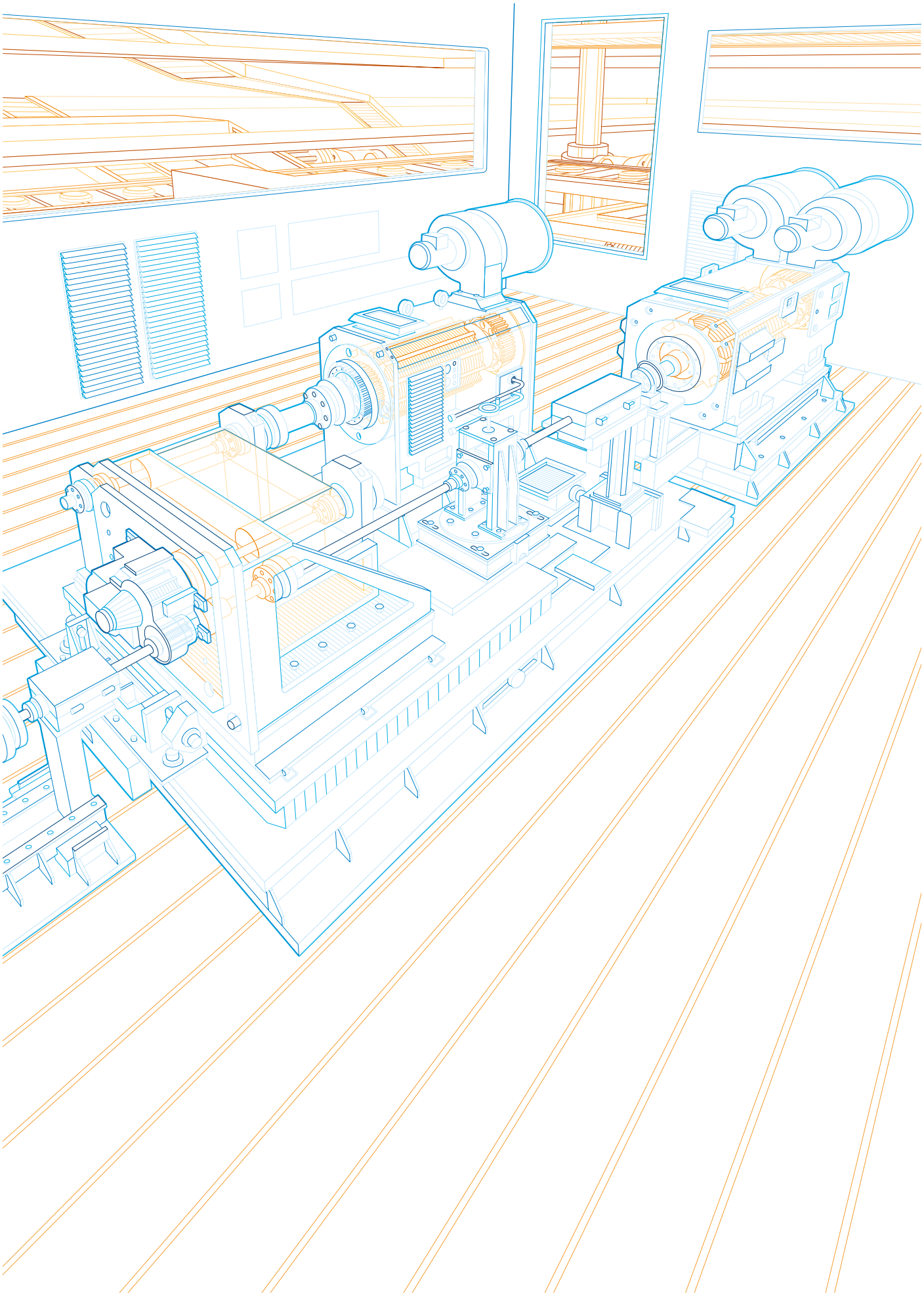


AF40, AF52, AF65



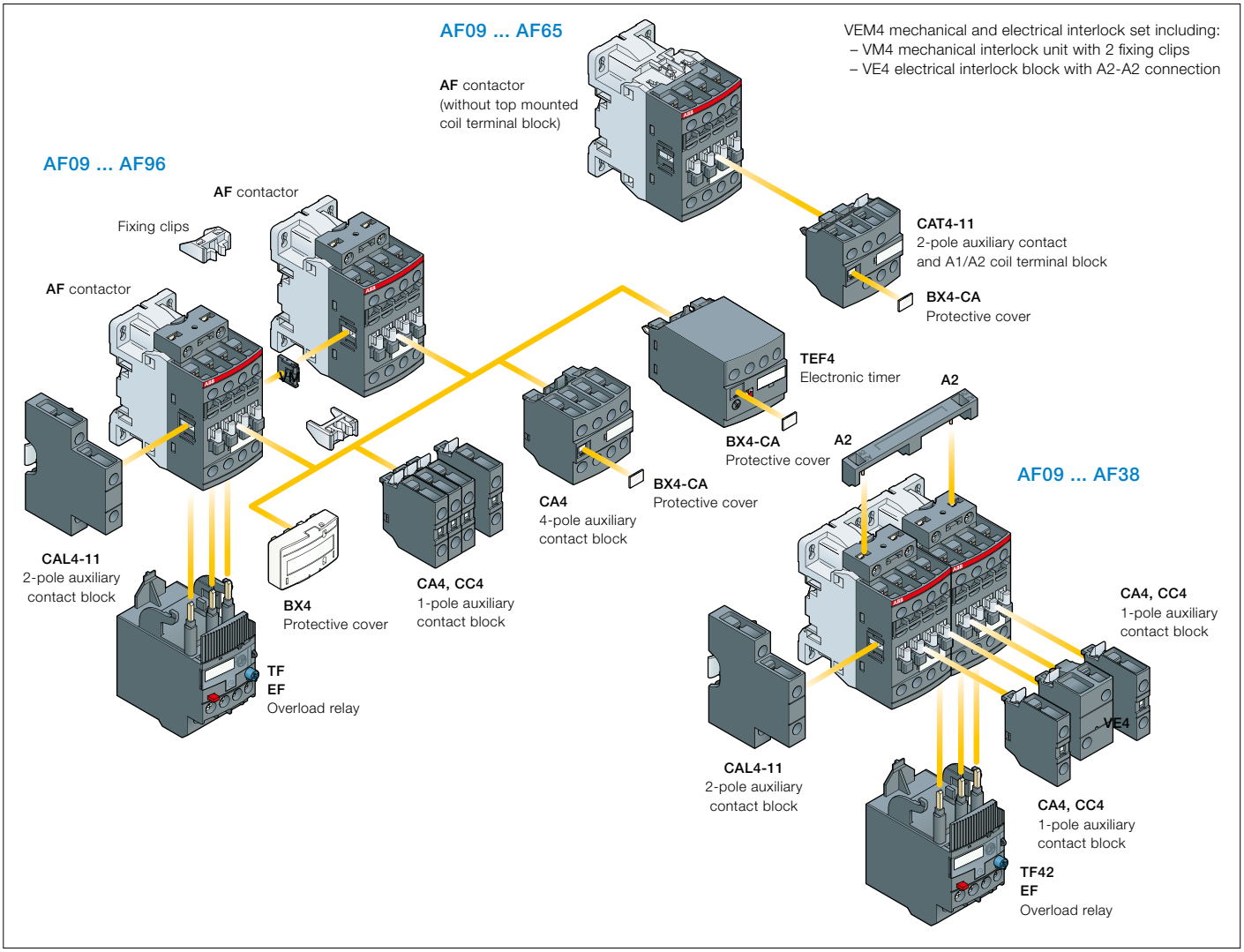
AF80, AF96

1SBC101740S0201 - Rev. A



AF09 ... AF96 3-pole contactors
Main accessories

Contactor and main accessories (other accessories available)



Main accessory fitting details

Many configurations of accessories are possible depending on whether these are front-mounted or side-mounted.

Contactor types	Main poles		Built-in auxiliary contacts		Front-mounted accessories: Auxiliary contact blocks 1-pole CA4 / 1-pole CC4		2-pole CAT4-11		4-pole CA4		Electronic timer TEF4		Electrical and mechanical interlock set (between 2 contactors) VEM4		Side-mounted accessories: Auxiliary contact blocks Left side / 2-pole CAL4-11		Right side
					Max. N.C. built-in and add-on N.C. auxiliary contacts: 4 N.C. max. on positions 1, 2, 3, 4 and 3 N.C. max. on positions 1 ±30°, 5												
AF09 ... AF16	3	0	0	1	4 max.	or	1	or	1	or	1		–	+	1		–
AF09 ... AF16	3	0	1	0	2 max.	or	1		–	or	1		–	+	1	+	1
AF26 ... AF38	3	0	0	0	3 max.		–		–		–	+	1	+	1	or	1
					Max. add-on N.C. auxiliary contacts: 6 N.C. max. on positions 1, 1 ±30°, 2, 3, 4, 5												
AF40 ... AF65	3	0	0	0	4 max.	or	1	or	1	or	1		–	+	1	+	1
AF80, AF96	3	0	0	0	4 max.		–	or	1	or	1		–	+	1	+	1

Overload relays fitting details (1)

Contactor types	Thermal overload relays	Electronic overload relays
AF09 ... AF38	TF42 (0.10...38 A)	EF19 (0.10...19 A)
AF26 ... AF38	TF42 (0.10...38 A)	EF45 (9...45 A)
AF40 ... AF65	TF65 (22...67 A)	EF65 (20...70 A)
AF80, AF96	TF96 (40...96 A)	EF96 (36...100 A)

The addition of an overload relay on the contactor does not prevent fitting of many other accessories as shown above.
(1) Direct mounting - No kit required.

1SBC101748S0201 - Rev. A

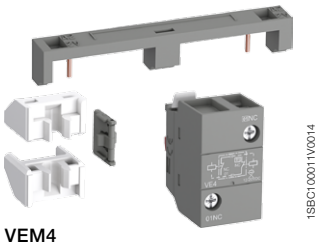
AF09 ... AF96 3-pole contactors
Main accessories

CA4-10

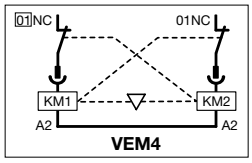
CAL4-11

CA4-22E

CAT4-11E

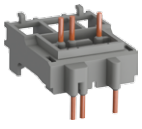


VEM4

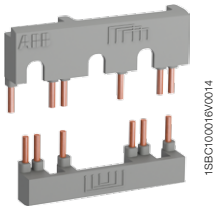


VEM4

TEF4-ON



BEA16-4



BER16-4

Ordering details (1)

For contactors	Auxiliary contacts				Type	Order code		Pkg qty	Weight (1 pce) kg
Front-mounted instantaneous auxiliary contact blocks									
AF09 ... AF96	1	0	–	–	CA4-10	1SBN010110R1010		1	0.014
	1	0	–	–	CA4-10-T	1SBN010110T1010		10	0.014
	0	1	–	–	CA4-01	1SBN010110R1001		1	0.014
	0	1	–	–	CA4-01-T	1SBN010110T1001		10	0.014
AF09 ... AF16..-30-10	2	2	–	–	CA4-22M	1SBN010140R1122		1	0.055
AF26 ... AF96..-30-00	2	2	–	–	CA4-22E	1SBN010140R1022		1	0.055
AF09 ... AF16..-30-01	2	2	–	–	CA4-22U	1SBN010140R1322		1	0.055
Front-mounted auxiliary contact blocks with N.O. leading contact and N.C. lagging contact									
AF09 ... AF96	–	–	1	0	CC4-10	1SBN010111R1010		1	0.014
	–	–	0	1	CC4-01	1SBN010111R1001		1	0.014
Side-mounted instantaneous auxiliary contact blocks									
AF09 ... AF96	1	1	–	–	CAL4-11	1SBN010120R1011		1	0.040
	1	1	–	–	CAL4-11-T	1SBN010120T1011		10	0.040
Front-mounted instantaneous auxiliary contact and A1/A2 coil terminal blocks									
AF09 ... AF16..-30-10	1	1	–	–	CAT4-11M	1SBN010151R1111		1	0.040
AF26 ... AF65..-30-00	1	1	–	–	CAT4-11E	1SBN010151R1011		1	0.040
AF09 ... AF16..-30-01	1	1	–	–	CAT4-11U	1SBN010151R1311		1	0.040

Note: CAT4 not suitable for AF..Z contactors with DC control voltage 12...20 V DC.

Mechanical interlock unit									
AF09 ... AF38					VM4	1SBN030105T1000		10	0.005
AF40 ... AF96					VM96-4	1SBN033405T1000		10	0.006

Note: VM4 and VM96-4 include 2 fixing clips (BB4) to maintain together both contactors.

Mechanical and electrical interlock set									
AF09 ... AF16 AF26 ... AF38	0	2	–	–	VEM4	1SBN030111R1000		1	0.035

Note: - VEM4 includes a VM4 mechanical interlock unit with 2 fixing clips (BB4), a VE4 electrical interlock block. VE4 block must be used with A2-A2 connection to respect the electrical connection diagram.
- VEM4 not suitable for AF..Z contactors with DC control voltage 12...20 V DC.

For contactors	Time delay range selected by switch	Delay type	Auxiliary contacts	Type	Order code		Pkg qty	Weight (1 pce) kg
Electronic timers								
AF09 ... AF96	0.1...1 s 1...10 s 10...100 s	ON-delay	1 1	TEF4-ON	1SBN020112R1000		1	0.065
		OFF-delay	1 1	TEF4-OFF	1SBN020114R1000		1	0.065

Note: Rated control circuit voltage Uc 24...240 V 50/60 Hz or DC.

Connecting links with manual motor starters							
AF09 ... AF16	with	MS116-0.16 ... MS116-25, MS132-0.16 ... MS132-25	BEA16-4	1SBN081306T1000		10	0.025
AF26 ... AF38	with	MS116-0.16 ... MS116-16, MS132-0.16 ... MS132-10	BEA26-4	1SBN082306T1000		10	0.025
	with	MS116-20 ... MS116-32, MS132-12 ... MS132-32	BEA38-4	1SBN082306T2000		10	0.030
AF40 ... AF65	with	MS165-16 ... MS165-65	BEA65-4	1SBN083406R1000		1	0.090
Connection sets for reversing contactors							
AF09 ... AF16			BER16-4	1SBN081311R1000		1	0.045
AF26 ... AF38			BER38-4	1SBN082311R1000		1	0.100
AF40 ... AF65			BER65-4	1SBN083411R1000		1	0.175
AF80 ... AF96			BER96-4	1SBN083911R1000		1	0.250
Connection sets for star-delta starting							
AF09 ... AF16	With or without VM4		BEY16-4	1SBN081313R2000		1	0.050
AF26 ... AF38	With or without VM4		BEY38-4	1SBN082713R2000		1	0.110
AF40 ... AF65	With or without VM96-4		BEY65-4	1SBN083413R2000		1	0.200
AF80 ... AF96	With or without VM96-4		BEY96-4	1SBN083913R2000		1	0.250

(1) For more information, refer to main catalog "Accessories" section.

1SBC101749S0201 - Rev. A

AF116 ... AF146 3-pole contactors
55 to 75 kW
AC / DC operated with 1 N.O. + 1 N.C. auxiliary contacts

AF146-30-11

AF146-30-11B

5

Description

AF116 ... AF140 contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC, AF146 up to 1000 V AC and AF116 ... AF146 up to 260 V DC. These contactors are of the block type design with 3 main poles.

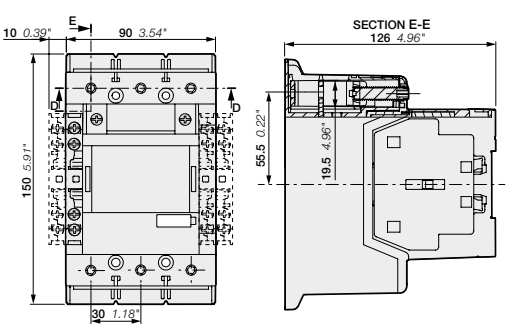
– control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 coils to cover control voltages between 24...500 V 50/60 Hz and 20...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47 conditions of use on request).
– built-in surge suppression
– add-on auxiliary contact blocks for side mounting and a wide range of accessories.

Ordering details

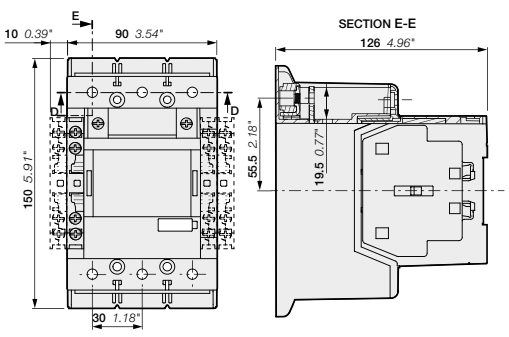
IEC		UL / CSA		Rated control ircuit voltage Uc min. ... Uc max.		Auxiliary contacts fitted	Type (1)	Order code		Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC							Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz	V DC					kg
For connection with built-in cable clamps										
55	160	75	160	24...60	20...60	1 1	AF116-30-11-11	1SFL427001R1111		1.750
				48...130	48...130	1 1	AF116-30-11-12	1SFL427001R1211		1.750
				100...250	100...250	1 1	AF116-30-11-13	1SFL427001R1311		1.750
				250...500	250...500	1 1	AF116-30-11-14	1SFL427001R1411		1.750
75	200	100	200	24...60	20...60	1 1	AF140-30-11-11	1SFL447001R1111		1.750
				48...130	48...130	1 1	AF140-30-11-12	1SFL447001R1211		1.750
				100...250	100...250	1 1	AF140-30-11-13	1SFL447001R1311		1.750
				250...500	250...500	1 1	AF140-30-11-14	1SFL447001R1411		1.750
75	225	100	200	24...60	20...60	1 1	AF146-30-11-11	1SFL467001R1111		1.750
				48...130	48...130	1 1	AF146-30-11-12	1SFL467001R1211		1.750
				100...250	100...250	1 1	AF146-30-11-13	1SFL467001R1311		1.750
				250...500	250...500	1 1	AF146-30-11-14	1SFL467001R1411		1.750
With bar connections										
55	160	75	160	24...60	20...60	1 1	AF116-30-11B-11	1SFL427002R1111		1.500
				48...130	48...130	1 1	AF116-30-11B-12	1SFL427002R1211		1.500
				100...250	100...250	1 1	AF116-30-11B-13	1SFL427002R1311		1.500
				250...500	250...500	1 1	AF116-30-11B-14	1SFL427002R1411		1.500
75	200	100	200	24...60	20...60	1 1	AF140-30-11B-11	1SFL447002R1111		1.500
				48...130	48...130	1 1	AF140-30-11B-12	1SFL447002R1211		1.500
				100...250	100...250	1 1	AF140-30-11B-13	1SFL447002R1311		1.500
				250...500	250...500	1 1	AF140-30-11B-14	1SFL447002R1411		1.500
75	225	100	200	24...60	20...60	1 1	AF146-30-11B-11	1SFL467002R1111		1.500
				48...130	48...130	1 1	AF146-30-11B-12	1SFL467002R1211		1.500
				100...250	100...250	1 1	AF146-30-11B-13	1SFL467002R1311		1.500
				250...500	250...500	1 1	AF146-30-11B-14	1SFL467002R1411		1.500

(1) For other auxiliary contacts arrangements, please contact your ABB local sales organization.

Main dimensions mm, *inches*



AF116, AF140, AF146-30-11

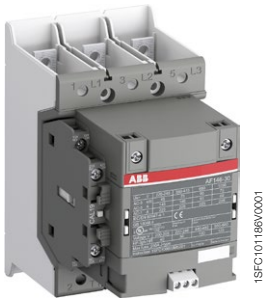


AF116, AF140, AF146-30-11B

1SFC101090C0201 - Rev. D

AF116 ... AF146 3-pole contactors with built-in PLC interface
55 to 75 kW
AC / DC operated with 1 N.O. + 1 N.C. auxiliary contacts

AF146-30-11



AF146-30-11B

Description

AF116 ... AF140 contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC, AF146 up to 1000 V AC and AF116 ... AF146 up to 260 V DC. These contactors are of the block type design with 3 main poles.

– control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 2 coils to cover control voltages between 100...500 V 50/60 Hz and 100...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47 conditions of use on request).
– built-in surge suppression
– add-on auxiliary contact blocks for side mounting and a wide range of accessories.

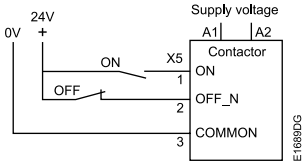
Ordering details

IEC		UL / CSA		Rated control circuit voltage Uc min. ... Uc max.		Auxiliary contacts fitted	Type (1)	Order code		Weight Pkg (1 pce)
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC							
kW	A	hp	A	V 50/60 Hz	V DC					kg
For connection with built-in cable clamps										
55	160	75	160	100...250	100...250	1 1	AF116-30-11-33	1SFL427001R3311		1.750
				250...500	250...500	1 1	AF116-30-11-34	1SFL427001R3411		1.750
75	200	100	200	100...250	100...250	1 1	AF140-30-11-33	1SFL447001R3311		1.750
				250...500	250...500	1 1	AF140-30-11-34	1SFL447001R3411		1.750
75	225	100	200	100...250	100...250	1 1	AF146-30-11-33	1SFL467001R3311		1.750
				250...500	250...500	1 1	AF146-30-11-34	1SFL467001R3411		1.750
With bar connections										
55	160	75	160	100...250	100...250	1 1	AF116-30-11B-33	1SFL427002R3311		1.500
				250...500	250...500	1 1	AF116-30-11B-34	1SFL427002R3411		1.500
75	200	100	200	100...250	100...250	1 1	AF140-30-11B-33	1SFL447002R3311		1.500
				250...500	250...500	1 1	AF140-30-11B-34	1SFL447002R3411		1.500
75	225	100	200	100...250	100...250	1 1	AF146-30-11B-33	1SFL467002R3311		1.500
				250...500	250...500	1 1	AF146-30-11B-34	1SFL467002R3411		1.500

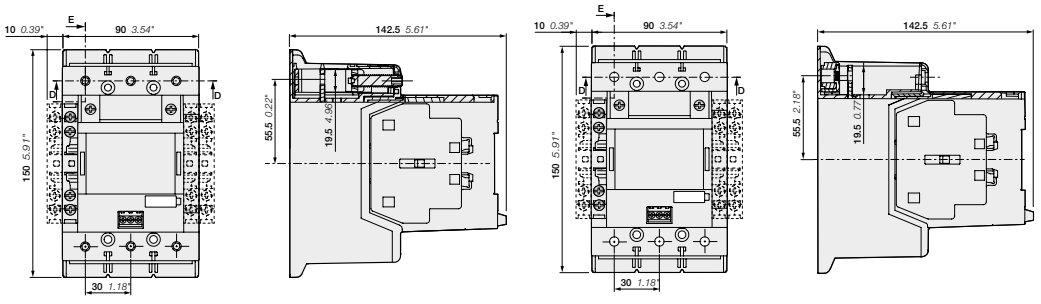
(1) For other auxiliary contacts arrangements, please contact your ABB local sales organization.

AF116 ... AF146 are equipped with low voltage inputs for control, for example by a PLC.

Control inputs



Main dimensions mm, *inches*

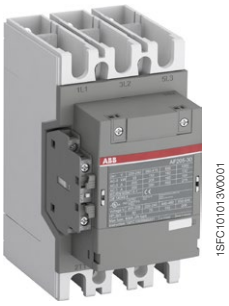


AF116, AF140, AF146-30-11

AF116, AF140, AF146-30-11B

1SFC101166C0201 - Rev. A

AF190 ... AF370 3-pole contactors
90 to 200 kW
AC / DC operated with 1 N.O. + 1 N.C. auxiliary contacts



AF205-30-11

AF370-30-11

5

Description

AF190 ... AF370 contactors are mainly used for controlling 3-phase motors and power circuits up to 1000 V AC and up to 340 V DC. These contactors are of the block type design with 3 main poles.

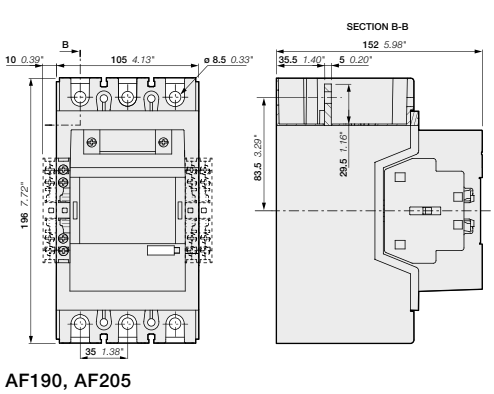
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 coils to cover control voltages between 24...500 V 50/60 Hz and 20...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47 conditions of use on request).
- built-in surge suppression
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

Ordering details

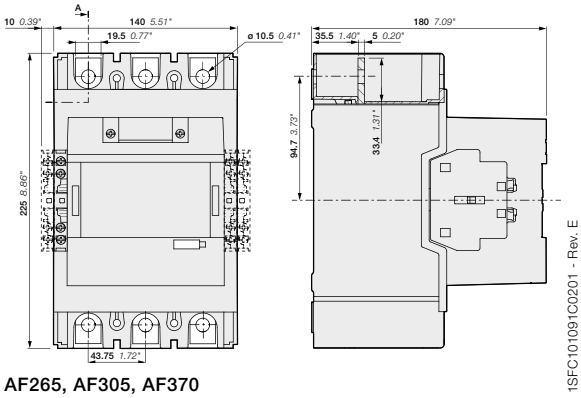
IEC		UL / CSA		Rated control circuit voltage Uc min. ... Uc max.		Auxiliary contacts fitted	Type (1)	Order code		Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC							Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz	V DC					kg
90	275	125	250	24...60	20...60	1 1	AF190-30-11-11	1SFL487002R1111		3.000
				48...130	48...130	1 1	AF190-30-11-12	1SFL487002R1211		3.000
				100...250	100...250	1 1	AF190-30-11-13	1SFL487002R1311		3.000
				250...500	250...500	1 1	AF190-30-11-14	1SFL487002R1411		3.000
110	350	150	300	24...60	20...60	1 1	AF205-30-11-11	1SFL527002R1111		3.000
				48...130	48...130	1 1	AF205-30-11-12	1SFL527002R1211		3.000
				100...250	100...250	1 1	AF205-30-11-13	1SFL527002R1311		3.000
				250...500	250...500	1 1	AF205-30-11-14	1SFL527002R1411		3.000
132	400	200	350	24...60	20...60	1 1	AF265-30-11-11	1SFL547002R1111		4.640
				48...130	48...130	1 1	AF265-30-11-12	1SFL547002R1211		4.640
				100...250	100...250	1 1	AF265-30-11-13	1SFL547002R1311		4.640
				250...500	250...500	1 1	AF265-30-11-14	1SFL547002R1411		4.640
160	500	250	400	24...60	20...60	1 1	AF305-30-11-11	1SFL587002R1111		4.640
				48...130	48...130	1 1	AF305-30-11-12	1SFL587002R1211		4.640
				100...250	100...250	1 1	AF305-30-11-13	1SFL587002R1311		4.640
				250...500	250...500	1 1	AF305-30-11-14	1SFL587002R1411		4.640
200	600	300	520	24...60	20...60	1 1	AF370-30-11-11	1SFL607002R1111		4.640
				48...130	48...130	1 1	AF370-30-11-12	1SFL607002R1211		4.640
				100...250	100...250	1 1	AF370-30-11-13	1SFL607002R1311		4.640
				250...500	250...500	1 1	AF370-30-11-14	1SFL607002R1411		4.640

(1) For other auxiliary contacts arrangements, please contact your ABB local sales organization.

Main dimensions mm, *inches*



AF190, AF205

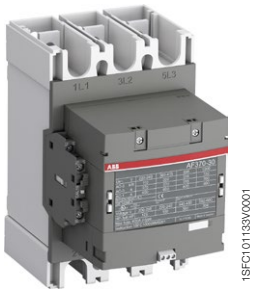


AF265, AF305, AF370

1SFC101091C0201 - Rev. E

AF190 ... AF370 3-pole contactors with built-in PLC interface
90 to 200 kW
AC / DC operated with 1 N.O. + 1 N.C. auxiliary contacts

AF205-30-11



AF370-30-11

Description

AF190 ... AF370 contactors are mainly used for controlling 3-phase motors and power circuits up to 1000 V AC and up to 340 V DC. These contactors are of the block type design with 3 main poles.

- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 2 coils to cover control voltages between 100...500 V 50/60 Hz and 100...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47 conditions of use on request).
- built-in surge suppression
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

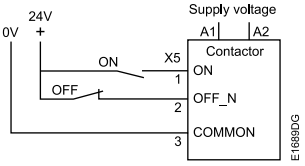
Ordering details

IEC		UL / CSA		Rated control circuit voltage Uc min. ... Uc max.		Auxiliary contacts fitted	Type (1)	Order code		Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC							Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz	V DC					kg
90	275	125	250	100...250	100...250	1 1	AF190-30-11-33	1SFL487002R3311		3.000
				250...500	250...500	1 1	AF190-30-11-34	1SFL487002R3411		3.000
110	350	150	300	100...250	100...250	1 1	AF205-30-11-33	1SFL527002R3311		3.000
				250...500	250...500	1 1	AF205-30-11-34	1SFL527002R3411		3.000
132	400	200	350	100...250	100...250	1 1	AF265-30-11-33	1SFL547002R3311		4.640
				250...500	250...500	1 1	AF265-30-11-34	1SFL547002R3411		4.640
160	500	250	400	100...250	100...250	1 1	AF305-30-11-33	1SFL587002R3311		4.640
				250...500	250...500	1 1	AF305-30-11-34	1SFL587002R3411		4.640
200	600	300	520	100...250	100...250	1 1	AF370-30-11-33	1SFL607002R3311		4.640
				250...500	250...500	1 1	AF370-30-11-34	1SFL607002R3411		4.640

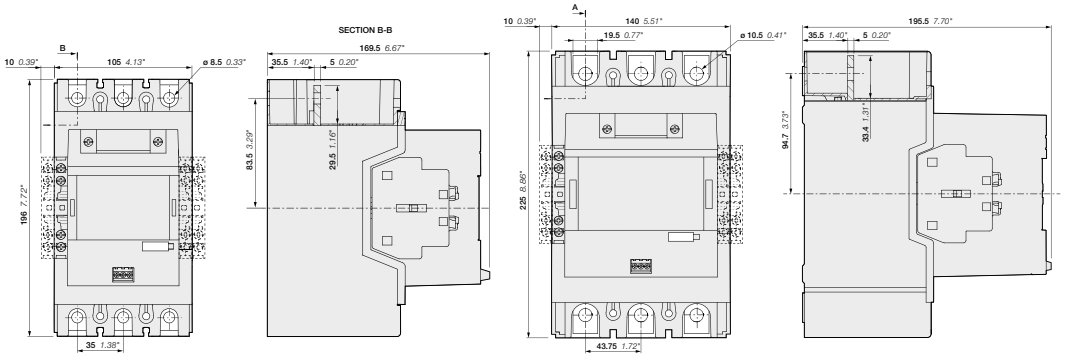
(1) For other auxiliary contacts arrangements, please contact your ABB local sales organization.

AF190 ... AF370 are equipped with low voltage inputs for control, for example by a PLC.

Control inputs



Main dimensions mm, *inches*



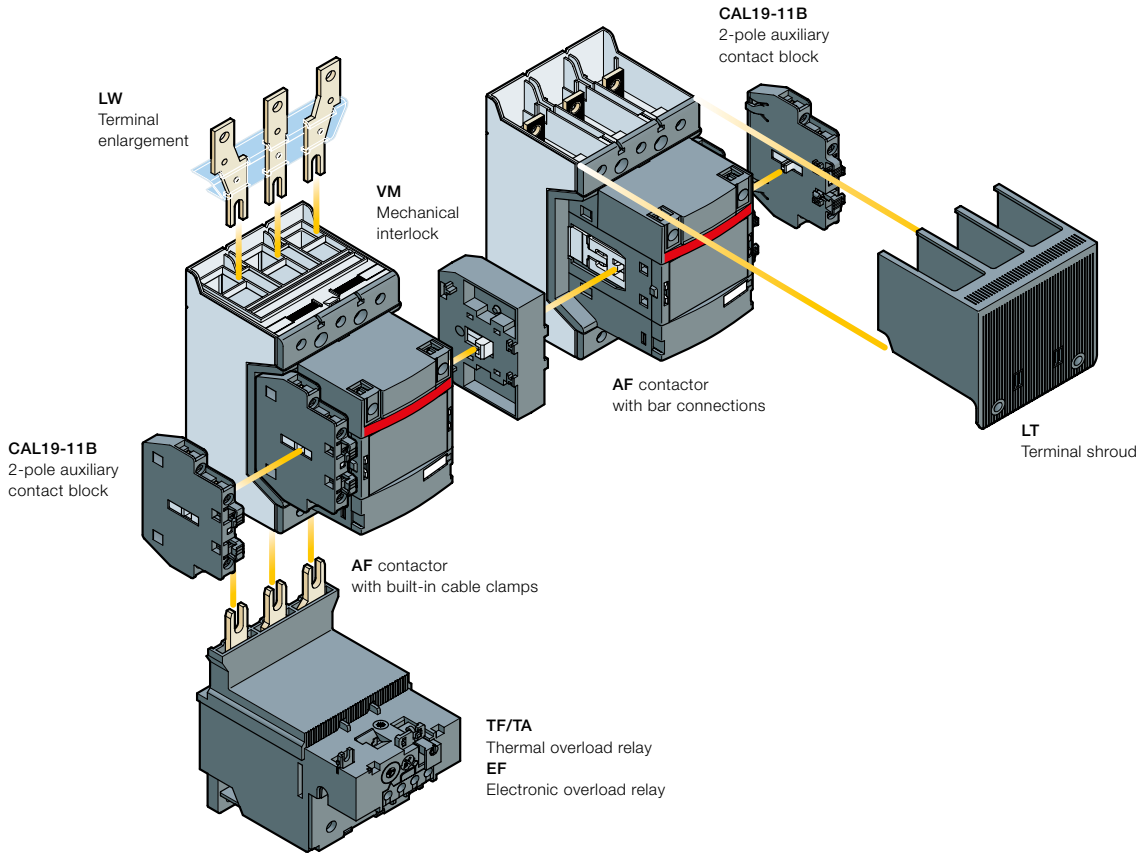
AF190, AF205

AF265, AF305, AF370

1SFC101167C0201 - Rev. A

AF116 ... AF370 3-pole contactors
with 1 N.O. + 1 N.C. auxiliary contacts
Main accessories

Main accessories (other accessories available)



Main accessory fitting details

Contactor types	Main poles	Available auxiliary contacts	Side-mounted accessories Auxiliary contact blocks CAL19-11 (3)		CAL19-11B (3)		Mechanical interlock units (between two contactors)
AF116 ... AF370	3 0	1 1	1 x CAL19-11	+	2 x CAL19-11B		–
AF116 ... AF370	3 0	1 1	–	+	2 x CAL19-11B (1)	+	VM... (2)

(1) Total number of auxiliary contact blocks for the two contactors. (2) Interlock type, according to the contactor ratings (see "Accessories").
(3) The CEL19 auxiliary contact blocks can replace the CAL19-11 and CAL19-11B. Though, no auxiliary contact block can be mounted outside the CEL19.

Overload relays fitting details (1)

Contactor types	Thermal overload relays	Electronic overload relays
AF116 ... AF140	TF140DU (66...142 A)	EF146 (54...150 A)
AF146	–	EF146 (54...150 A)
AF190, AF205	TA200DU (66...200 A)	EF205 (63...210 A)
AF265 ... AF370	–	EF370 (115...380 A)

The addition of a thermal or electronic overload relay on the contactor does not prevent fitting of many other accessories as shown in "Main accessory fitting details" table.
(1) Direct mounting - No kit required.

1SFC101132C0201 - Rev. A

AF116 ... AF370 3-pole contactors
with 1 N.O. + 1 N.C. auxiliary contacts
Main accessories

1SFC101071V0001

CAL19-11

1SFC101035V0001

VM19

1SFC101041V0001

LT370-30C

1SFC101049V0001

LX140

Ordering details (1)

For contactors	Auxiliary contacts	Type	Order code		Pkg qty	Weight (1 pce) kg
Side-mounted instantaneous auxiliary contact blocks						
AF116 ... AF370	1 1	CAL19-11	1SFN010820R1011		2	0.050
	1 1	CAL19-11B	1SFN010820R3311		2	0.050
Mechanical interlock unit						
AF116 ... AF370		VM19	1SFN030300R1000		1	0.054
AF116 ... AF146 and AF190, AF205		VM140/190	1SFN034403R1000		1	0.088
AF190, AF205 and AF265 ... AF370		VM205/265	1SFN035203R1000		1	0.090
Terminal shrouds						
AF116 ... AF146, with compression lugs		LT140-30L	1SFN124203R1000		2	0.070
AF190, AF205, with cable clamps		LT205-30C	1SFN124801R1000		2	0.050
AF190, AF205, with compression lugs		LT205-30L	1SFN124803R1000		2	0.220
AF190, AF205, with shorting bar or between contactor and TOL/EOL in DOL-starters		LT205-30Y	1SFN124804R1000		1	0.050
AF265 ... AF370, with cable clamps		LT370-30C	1SFN125401R1000		2	0.035
AF265 ... AF370, with compression lugs		LT370-30L	1SFN125403R1000		2	0.280
AF265 ... AF370, with shorting bar or between contactor and TOL/EOL in DOL-starters		LT370-30Y	1SFN125404R1000		1	0.075
AF265 ... AF370, for use with extending cable clamps, ATK300/2 and OZXB4		LT370-30D	1SFN125406R1000		1	0.150

For contactors	Dimensions hole Ø mm	bar mm	Type	Order code		Pkg qty	Weight (1 pce) kg
Terminal enlargements							
AF116...AF146	6.5	13 x 3	LW140	1SFN074207R1000		1	0.115
AF190...AF205	10.5	17.5 x 5	LW205	1SFN074807R1000		1	0.260
AF265...AF370	10.5	20 x 5	LW370	1SFN075407R1000		1	0.340
Terminal extension							
AF116...AF146	6.5	13 x 3	LX140	1SFN074210R1000		1	0.072
AF190...AF250	8.5	17.5 x 5	LX205	1SFN074810R1000		1	0.180
AF265...AF370	10.5	20 x 5	LX370	1SFN075410R1000		1	0.234

(1) For more information, refer to main catalog "Accessories" section.

AF400 ... AF750 3-pole contactors
200 to 400 kW
AC / DC operated with 1 N.O. + 1 N.C. auxiliary contacts

AF460-30-11

AF750-30-11

5

Description

AF400 ... AF750 contactors are mainly used for controlling 3-phase motors and power circuits up to 1000 V AC or 600 V DC (2). These contactors are of the block type design with 3 main poles.

- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 coils to cover control voltages between 48...500 V 50/60 Hz and 24...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltages sags (SEMI F47 conditions of use on request).
- built-in surge suppression
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

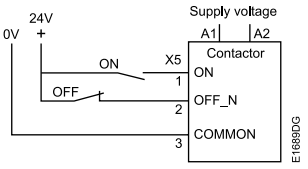
Ordering details

IEC		UL/CSA		Rated control circuit voltage Uc min. ... Uc max.		Auxiliary contacts fitted		Type	Order code		Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C 690 V AC-1	3-phase motor rating 480 V	General use rating 600 V AC								Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz	V DC						kg
200	600	350	550	-	24...60	1	1	AF400-30-11	1SFL577001R6811 (1)		12.000
				48...130	48...130	1	1	AF400-30-11	1SFL577001R6911		12.000
				100...250	100...250	1	1	AF400-30-11	1SFL577001R7011		12.000
				250...500	250...500	1	1	AF400-30-11	1SFL577001R7111		12.000
250	700	400	650	-	24...60	1	1	AF460-30-11	1SFL597001R6811 (1)		12.000
				48...130	48...130	1	1	AF460-30-11	1SFL597001R6911		12.000
				100...250	100...250	1	1	AF460-30-11	1SFL597001R7011		12.000
				250...500	250...500	1	1	AF460-30-11	1SFL597001R7111		12.000
315	800	500	750	-	24...60	1	1	AF580-30-11	1SFL617001R6811 (1)		15.000
				48...130	48...130	1	1	AF580-30-11	1SFL617001R6911		15.000
				100...250	100...250	1	1	AF580-30-11	1SFL617001R7011		15.000
				250...500	250...500	1	1	AF580-30-11	1SFL617001R7111		15.000
400	1050	600	900	-	24...60	1	1	AF750-30-11	1SFL637001R6811 (1)		15.000
				48...130	48...130	1	1	AF750-30-11	1SFL637001R6911		15.000
				100...250	100...250	1	1	AF750-30-11	1SFL637001R7011		15.000
				250...500	250...500	1	1	AF750-30-11	1SFL637001R7111		15.000

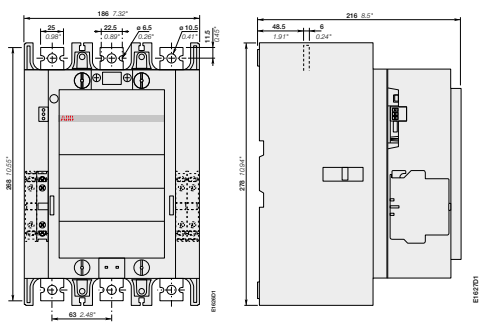
(1) The connection polarities indicated close to the coil terminals must be respected: A1 for the positive pole and A2 for the negative pole.
(2) Up to 850 V DC for AF580, AF750.

AF400 ... AF750 are equipped with low voltage inputs for control, for example by a PLC.

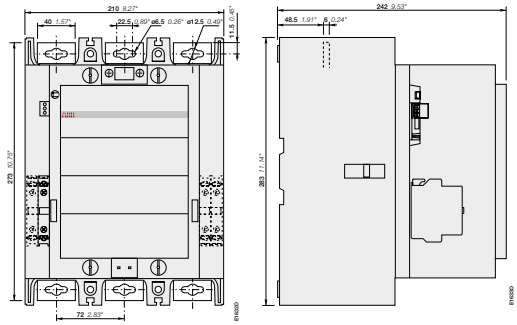
Control inputs



Main dimensions mm, *inches*



AF400, AF460



AF580, AF750

1SFC101013C0201 - Rev. A

AF1250 ... AF2650 3-pole contactors
475 to 560 kW and 1260 to 2650 A AC-1
AC / DC operated with 1 N.O. + 1 N.C. auxiliary contacts

AF1250-30-11

AF2650-30-11

Description

AF1250 ... AF2050 contactors are mainly used for controlling power circuits up to 1000 V AC or 850 V DC, AF2650 for controlling power up to 1000 V AC. These contactors are of the block type design with 3 main poles.

– control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC)
  - only 4 coils for AF1250 to cover control voltages between 48...500 V 50/60 Hz and 24...500 V DC
  - only 1 coil for AF1350 ... AF2650 to cover control voltages between 100...250 V 50/60 Hz and 100...250 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltages sags (SEMI F47 conditions of use on request).
– built-in surge suppression
– add-on auxiliary contact blocks for side mounting and a wide range of accessories.

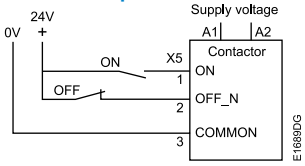
Ordering details

IEC		UL/CSA		Rated control circuit voltage Uc (1)		Auxiliary contacts fitted		Type	Order code		Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C 690 V AC-1	3-phase motor rating 480 V	General use rating 600 V AC (2)								Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz	V DC						kg
-	1260	-	1210	-	24...60	1	1	AF1250-30-11	1SFL647001R6811 (1)		16.000
				48...130	48...130	1	1	AF1250-30-11	1SFL647001R6911		16.000
				100...250	100...250	1	1	AF1250-30-11	1SFL647001R7011		16.000
				250...500	250...500	1	1	AF1250-30-11	1SFL647001R7111		16.000
475	1350	800	1350	100...250	100...250	1	1	AF1350-30-11	1SFL657001R7011		34.000
560	1650	900	1650	100...250	100...250	1	1	AF1650-30-11	1SFL677001R7011		35.000
-	2050	-	2100	100...250	100...250	1	1	AF2050-30-11	1SFL707001R7011		35.000
-	2650	-	2700	100...250	100...250	1	1	AF2650-30-11	1SFL667001R7011		45.000

(1) The connection polarities indicated close to the coil terminals must be respected: A1 for the positive pole and A2 for the negative pole.
(2) AF2650: Maximum operational voltage = 1000 V according to UL / CSA.

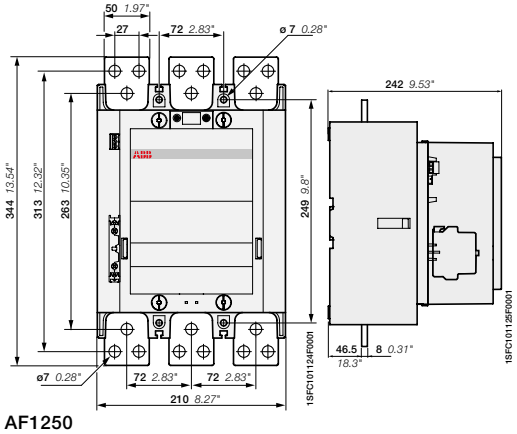
AF1250 ... AF2650 are equipped with low voltage inputs for control, for example by a PLC

Control inputs

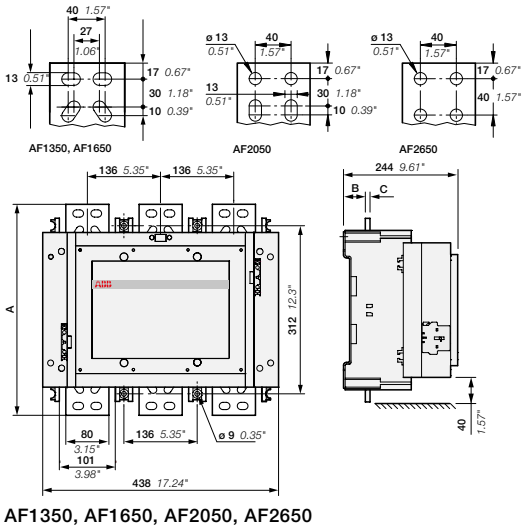


	AF1350, AF1650, AF2050	AF2650
A	392 mm / *15.43"*	422 mm / *16.61"*
B	47 mm / *1.85"*	53 mm / *2.09"*
C	10 mm / *0.39"*	25 mm / *0.98"*

Main dimensions mm, *inches*

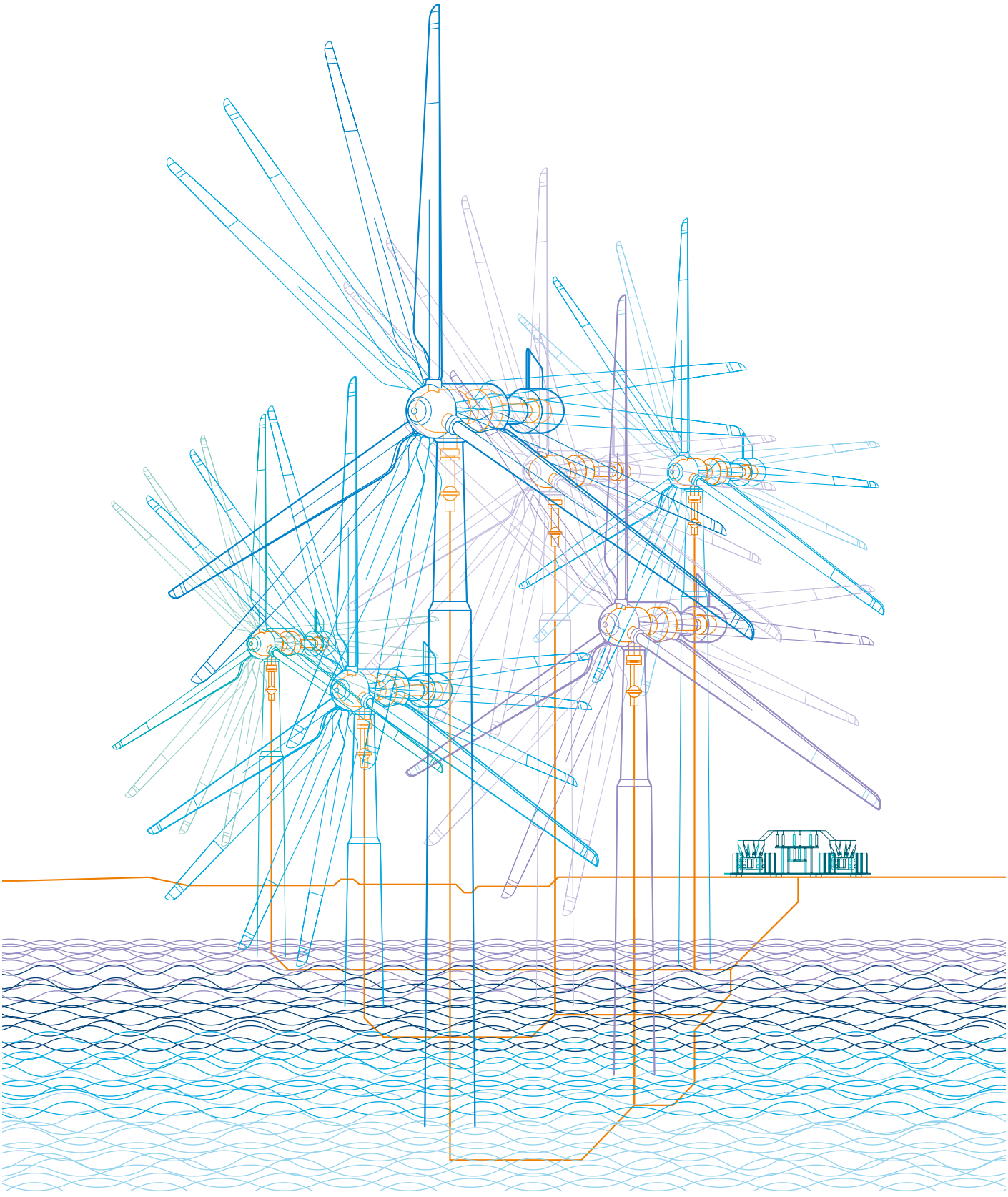


AF1250



AF1350, AF1650, AF2050, AF2650

1SFC101094C0201 - Rev. A



AF1350T ... AF2650T 3-pole contactors with built-in LVRT
475 to 560 kW and 1350 to 2650 A AC-1
AC operated with 1 N.O. + 1 N.C. auxiliary contacts

AF2650-30T-11

Description

AF1350T .. AF2050T contactors are designed to meet the Low Voltage Ride Through requirements for grid connections withstand voltage drop-outs up to 1 sec without opening. These contactors are often used in grid connected applications where the demand of non interrupted power is required. When controlled through built-in PLC connection the contactor is operated directly without delay function.

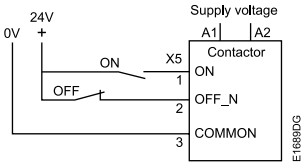
– Control circuit: AC or DC operated with electronic coil interface
  - can withstand voltage drop-outs according to Low Voltage Ride Through requirements
  - equipped with low voltage inputs for direct control by a PLC
  - distinct closing and opening
  - add-on auxiliary contact blocks for side mounting and a wide range of accessories.

Ordering details

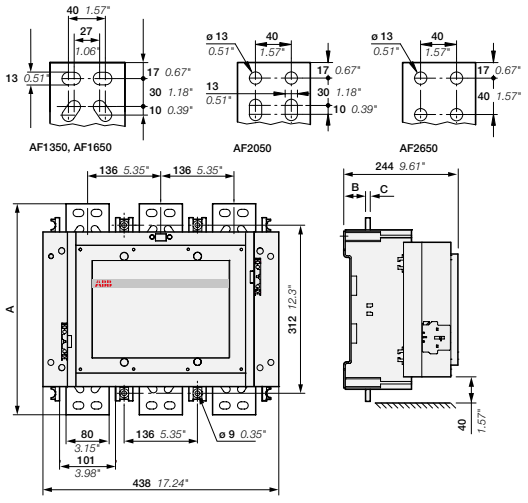
IEC		UL/CSA		Rated control circuit voltage Uc	Auxiliary contacts fitted		Type	Order code		Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C 690 V AC-1	3-phase motor rating 480 V	General use rating 600 V AC							Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz						kg
475	1350	800	1350	220 ... 240	1	1	AF1350T-30-11 (1)	1SFL657001R9101		34.000
560	1650	900	1650	220 ... 240	1	1	AF1650T-30-11 (1)	1SFL677001R9101		35.000
-	2050	-	2100	220 ... 240	1	1	AF2050T-30-11 (1)	1SFL707001R9101		35.000
-	2650	-	2700	220 ... 240	1	1	AF2650T-30-11 (1)	1SFL667001R9101		45.000

(1) Types -00 and -22 on request.

Control inputs



Main dimensions *mm, inches*



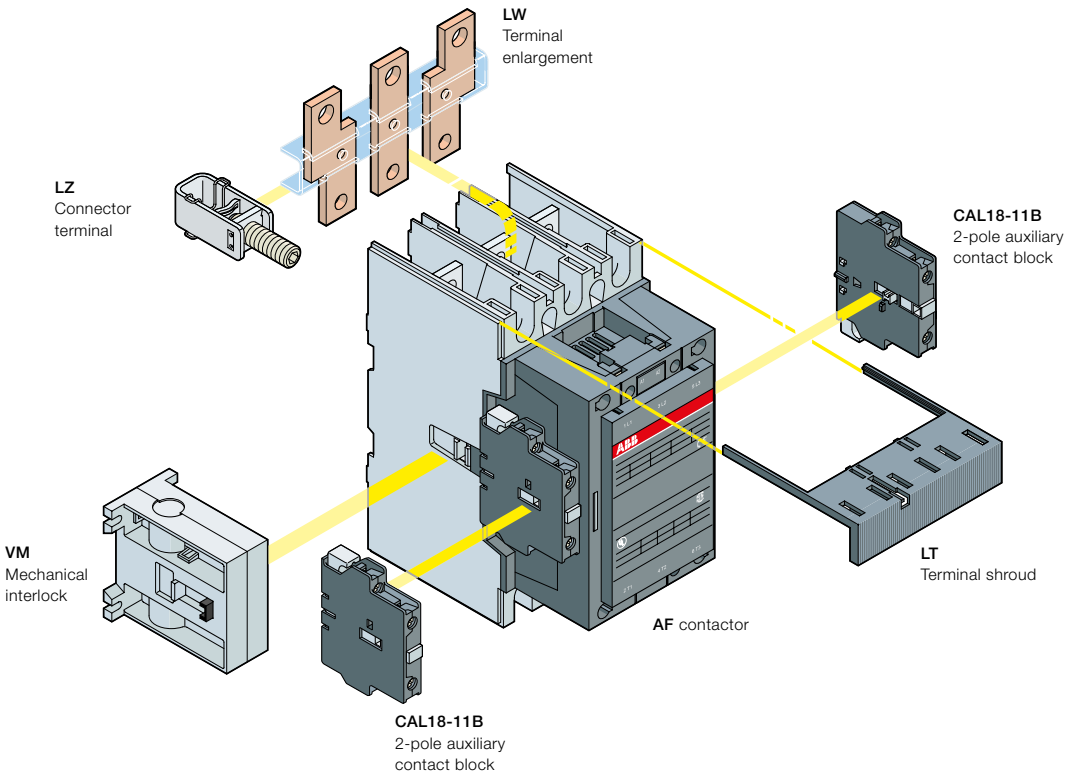
AF1350T-30-11, AF1650T-30-11, AF2050T-30-11, AF2650T-30-11

	AF1350, AF1650, AF2050	AF2650
A	392 mm / *15.43*"	422 mm / *16.61*"
B	47 mm / *1.85*"	53 mm / *2.09*"
C	10 mm / *0.39*"	25 mm / *0.98*"

1SFC101076D0201

AF400 ... AF2650 3-pole contactors
with 1 N.O. + 1 N.C. auxiliary contacts
Main accessories

Main accessories (other accessories available)



Main accessory fitting details

Contactor types	Main poles	Available auxiliary contacts	Side-mounted accessories Auxiliary contact blocks CAL18-11		CAL18-11B (3)		Mechanical interlock units (between two contactors)
Contactors + auxiliary contact blocks							
AF400 ... AF2650	3 0	1 1	1 x CAL18-11	+	2 x CAL18-11B		–
Contactors with mechanical interlocking + auxiliary contact blocks							
AF400 ... AF2650	3 0	1 1	2 x CAL18-11 (1)	+	4 x CAL18-11B (1)	+	VM...H (2)

(1) Total number of auxiliary contact blocks for the two contactors. (2) Interlock type, according to the contactor ratings (see "Accessories").
(3) The CEL18-.. auxiliary contact blocks can replace the CAL18-11 and CAL18-11B. Though, no auxiliary contact block can be mounted outside the CEL18-..

Overload relays fitting details

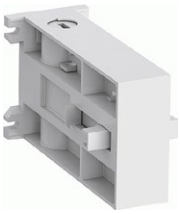
Contactor types	Thermal overload relays	Electronic overload relays
AF400, AF460	–	EF460 (150...500 A) (1)
AF580, AF750	–	EF750 (250...800 A) (1)
AF1350, AF1650	–	E1250DU (375...1250 A) (1)

The addition of a thermal or electronic overload relay on the contactor does not prevent fitting of many other accessories as shown in "Main accessory fitting details" table.
(1) Mounting kit required (see "Motor protection").

1SFC101126C0201 - Rev. A

AF400 ... AF2650 3-pole contactors
with 1 N.O. + 1 N.C. auxiliary contacts
Main accessories

CAL18-11



VM750H

LT460-AC

Ordering details (1)

For contactors	Auxiliary contacts		Type	Order code		Pkg qty	Weight (1 pce) kg
Side-mounted instantaneous auxiliary contact blocks							
AF400 ... AF2650	1	1	CAL18-11	1SFN010720R1011		2	0.050
	1	1	CAL18-11B	1SFN010720R3311		2	0.050
Mechanical interlock unit							
AF400 ... AF1250			VM750H	1SFN035700R1000		1	0.200
AF1350 ... AF2650			VM1650H	1SFN036503R1001		1	6.000
Terminal shrouds							
AF400, AF460 with connectors			LT460-AC	1SFN125701R1000		2	0.100
AF400, AF460 with lugs			LT460-AL	1SFN125703R1000		2	0.800
AF580 ... AF750 with connectors			LT750-AC	1SFN126101R1000		2	0.120
AF580 ... AF750 with lugs			LT750-AL	1SFN126103R1000		2	0.825

For contactors	Dimensions hole Ø mm	bar mm	Type	Order code		Pkg qty	Weight (1 pce) kg
Terminal enlargements							
AF400, AF460	10.5	25 x 5	LW460	1SFN075707R1000		1	0.730
AF580, AF750	13	40 x 6	LW750	1SFN076107R1000		1	1.230
AF1250	13	50 x 10	LW1250	1SFN076407R1000		1	2.000
Terminal extension							
AF400, AF460	10.5	25 x 5	LX460	1SFN075710R1000		1	0.500
AF580, AF750	13	40 x 6	LX750	1SFN076110R1000		1	0.850

(1) For more information, refer to main catalog "Accessories" section.

4-pole contactors

IEC	**AC-1 Rated operational current**	θ ≤ 40 °C, 690 V	**A**	**25**	**30**	**45**	**55**	**70**	**100**	**125**
UL/CSA	**General use rating**	600 V	**A**	**25**	**30**	**45**	**55**	**60**	**80**	**105**
AC / DC Control supply			Type	**AF09**	**AF16**	**AF26**	**AF38**	**AF40**	**AF52**	**AF80**
AC Control supply			Type	**AF09**	**AF16**	**AF26**	**AF38**	**AF40**	**AF52**	**AF80**
DC Control supply			Type	**AF09**	**AF16**	**AF26**	**AF38**	**AF40**	**AF52**	**AF80**
IEC	**AC-1 Rated operational current** 690 V	θ ≤ 40 °C	**A**	**25**	**30**	**45**	**55**	**70**	**100**	**125**
		θ ≤ 60 °C (1)	**A**	**25**	**30**	**40**	**45**	**60**	**80**	**105**
		θ ≤ 70 °C	**A**	**22**	**26**	**32**	**37**	**50**	**70**	**90**
	With conductor cross sectional area		**mm²**	**4**	**6**	**10**	**16**	**35**	**35**	**50**
	Rated operational voltage Ue max.		**V**	**690**	**690**	**690**	**690**	**690**	**690**	**690**

(1) θ ≤ 55 °C for EK550, EK1000 contactors

Main accessories

Auxiliary contact blocks	Front mounting	**CA4-10** (1 x N.O.), **CA4-01** (1 x N.C.)	
	Side mounting	**CAL4-11** (1 x N.O. + 1 x N.C.)	
Timers	Electronic	**TEF4-ON** **TEF4-OFF**	
Interlocking units	Mechanical	**VM4**	**VM96-4**
	Mechanical / Electrical	**VEM4**	
Surge suppressors	Varistor + RC (AC / DC)	Built-in surge protection	

	160	200	275	350	400	500	525	800	1000
	160	175	230	250	300	350	420	540	—
	AF116	AF140	AF190	AF205	AF265	AF305	AF370	—	—
	AF116	AF140	AF190	AF205	AF265	AF305	AF370	EK550	EK1000
	AF116	AF140	AF190	AF205	AF265	AF305	AF370	EK550	EK1000
	160	200	275	350	400	500	525	800	1000
	145	175	250	300	350	400	425	650	800
	130	160	200	240	290	325	350	575	720
	70	95	150	240	240	300	2 x 185	2 x 240	2 x 300
	690	690	1000	1000	1000	1000	1000	1000	1000

	CAL19-11 (1 x N.O. + 1 x N.C.)	**CAL16-11** (1 x N.O. + 1 x N.C.)
	VM19 (for same size contactors)	**VH800**
		RC-EH800

1SBC101569S0201 - Rev. E

AF09 ... AF38 4-pole contactors
25 to 55 A AC-1
AC / DC operated

AF09-40-00

AF26-40-00

5

Description

AF09 ... AF38 4-pole contactors are mainly used for controlling non-inductive or slightly inductive loads (i.e. resistance furnaces...) and generally for controlling power circuits up to 690 V AC and 440 V DC. These contactors are of the block type design with 4 main poles.

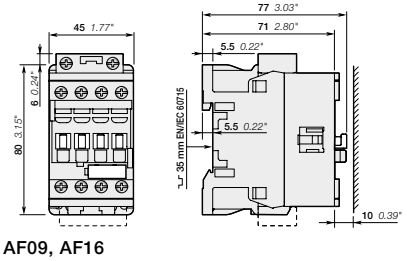
– control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...500 V 50/60 Hz and 20...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening.
– built-in surge suppression
– add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Ordering details

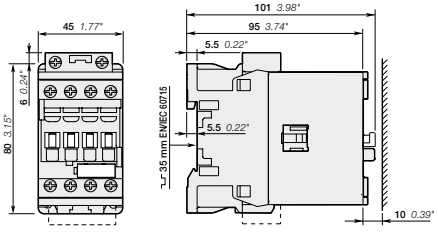
IEC Rated operational current $\theta \leq 40$ °C AC-1 A	UL/CSA General use rating 600 V AC A	Rated control circuit voltage Uc min. ... Uc max. V 50/60 Hz	 V DC	Auxiliary contacts fitted NO	 NC	Type	Order code		Weight Pkg (1 pce) kg
4 N.O. main poles									
25	25	24...60	- (1)	0	0	AF09-40-00-41	1SBL137201R4100		0.270
		48...130	48...130	0	0	AF09-40-00-12	1SBL137201R1200		0.270
		100...250	100...250	0	0	AF09-40-00-13	1SBL137201R1300		0.270
		250...500	250...500	0	0	AF09-40-00-14	1SBL137201R1400		0.310
30	30	24...60	- (1)	0	0	AF16-40-00-41	1SBL177201R4100		0.270
		48...130	48...130	0	0	AF16-40-00-12	1SBL177201R1200		0.270
		100...250	100...250	0	0	AF16-40-00-13	1SBL177201R1300		0.270
		250...500	250...500	0	0	AF16-40-00-14	1SBL177201R1400		0.310
45	45	24...60	- (1)	0	0	AF26-40-00-41	1SBL237201R4100		0.360
		48...130	48...130	0	0	AF26-40-00-12	1SBL237201R1200		0.360
		100...250	100...250	0	0	AF26-40-00-13	1SBL237201R1300		0.360
		250...500	250...500	0	0	AF26-40-00-14	1SBL237201R1400		0.400
55	55	24...60	- (1)	0	0	AF38-40-00-41	1SBL297201R4100		0.360
		48...130	48...130	0	0	AF38-40-00-12	1SBL297201R1200		0.360
		100...250	100...250	0	0	AF38-40-00-13	1SBL297201R1300		0.360
		250...500	250...500	0	0	AF38-40-00-14	1SBL297201R1400		0.400
2 N.O. + 2 N.C. main poles									
25	25	24...60	- (1)	0	0	AF09-22-00-41	1SBL137501R4100		0.270
		48...130	48...130	0	0	AF09-22-00-12	1SBL137501R1200		0.270
		100...250	100...250	0	0	AF09-22-00-13	1SBL137501R1300		0.270
		250...500	250...500	0	0	AF09-22-00-14	1SBL137501R1400		0.310
30	30	24...60	- (1)	0	0	AF16-22-00-41	1SBL177501R4100		0.270
		48...130	48...130	0	0	AF16-22-00-12	1SBL177501R1200		0.270
		100...250	100...250	0	0	AF16-22-00-13	1SBL177501R1300		0.270
		250...500	250...500	0	0	AF16-22-00-14	1SBL177501R1400		0.310
45	45	24...60	- (1)	0	0	AF26-22-00-41	1SBL237501R4100		0.360
		48...130	48...130	0	0	AF26-22-00-12	1SBL237501R1200		0.360
		100...250	100...250	0	0	AF26-22-00-13	1SBL237501R1300		0.360
		250...500	250...500	0	0	AF26-22-00-14	1SBL237501R1400		0.400
55	55	24...60	- (1)	0	0	AF38-22-00-41	1SBL297501R4100		0.360
		48...130	48...130	0	0	AF38-22-00-12	1SBL297501R1200		0.360
		100...250	100...250	0	0	AF38-22-00-13	1SBL297501R1300		0.360
		250...500	250...500	0	0	AF38-22-00-14	1SBL297501R1400		0.400

(1) For 24...60 V 50/60 Hz - 20...60 V DC, use AF..Z-..-00-21.

Main dimensions mm, *inches*



AF09, AF16



AF26, AF38

1SBC101375S0201 - Rev. B

AF09Z ... AF38Z 4-pole contactors
25 to 55 A AC-1
AC / DC operated - low consumption

AF09Z-40-00

AF26Z-40-00

Description

AF09Z ... AF38Z 4-pole contactors are mainly used for controlling non-inductive or slightly inductive loads (i.e. resistance furnaces...) and generally for controlling power circuits up to 690 V AC and 440 V DC. These contactors are of the block type design with 4 main poles.

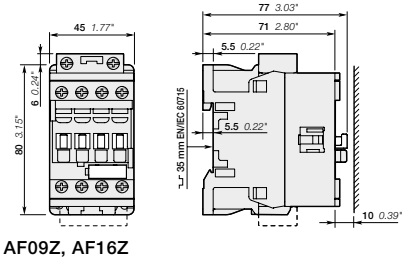
– control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...250 V 50/60 Hz and 12...250 V DC
  - can manage large control voltage variations
  - allow direct control by PLC-output ≥ 24 V DC 500 mA
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47-0706 conditions of use on request).
– built-in surge suppression
– add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Ordering details

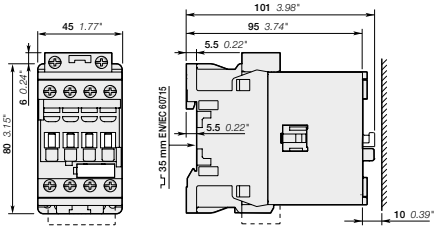
IEC Rated operational current θ ≤ 40 °C AC-1 A	UL/CSA General use rating 600 V AC A	Rated control circuit voltage Uc min. ... Uc max. V 50/60 Hz	 V DC	Auxiliary contacts fitted		Type	Order code		Weight Pkg (1 pce) kg
4 N.O. main poles									
25	25	-	12...20	0	0	AF09Z-40-00-20	1SBL136201R2000		0.310
		24...60	20...60	0	0	AF09Z-40-00-21	1SBL136201R2100		0.310
		48...130	48...130	0	0	AF09Z-40-00-22	1SBL136201R2200		0.310
		100...250	100...250	0	0	AF09Z-40-00-23	1SBL136201R2300		0.310
30	30	-	12...20	0	0	AF16Z-40-00-20	1SBL176201R2000		0.310
		24...60	20...60	0	0	AF16Z-40-00-21	1SBL176201R2100		0.310
		48...130	48...130	0	0	AF16Z-40-00-22	1SBL176201R2200		0.310
		100...250	100...250	0	0	AF16Z-40-00-23	1SBL176201R2300		0.310
45	45	-	12...20	0	0	AF26Z-40-00-20	1SBL236201R2000		0.400
		24...60	20...60	0	0	AF26Z-40-00-21	1SBL236201R2100		0.400
		48...130	48...130	0	0	AF26Z-40-00-22	1SBL236201R2200		0.400
		100...250	100...250	0	0	AF26Z-40-00-23	1SBL236201R2300		0.400
55	55	-	12...20	0	0	AF38Z-40-00-20	1SBL296201R2000		0.400
		24...60	20...60	0	0	AF38Z-40-00-21	1SBL296201R2100		0.400
		48...130	48...130	0	0	AF38Z-40-00-22	1SBL296201R2200		0.400
		100...250	100...250	0	0	AF38Z-40-00-23	1SBL296201R2300		0.400
2 N.O. + 2 N.C. main poles									
25	25	-	12...20	0	0	AF09Z-22-00-20	1SBL136501R2000		0.310
		24...60	20...60	0	0	AF09Z-22-00-21	1SBL136501R2100		0.310
		48...130	48...130	0	0	AF09Z-22-00-22	1SBL136501R2200		0.310
		100...250	100...250	0	0	AF09Z-22-00-23	1SBL136501R2300		0.310
30	30	-	12...20	0	0	AF16Z-22-00-20	1SBL176501R2000		0.310
		24...60	20...60	0	0	AF16Z-22-00-21	1SBL176501R2100		0.310
		48...130	48...130	0	0	AF16Z-22-00-22	1SBL176501R2200		0.310
		100...250	100...250	0	0	AF16Z-22-00-23	1SBL176501R2300		0.310
45	45	-	12...20	0	0	AF26Z-22-00-20	1SBL236501R2000		0.400
		24...60	20...60	0	0	AF26Z-22-00-21	1SBL236501R2100		0.400
		48...130	48...130	0	0	AF26Z-22-00-22	1SBL236501R2200		0.400
		100...250	100...250	0	0	AF26Z-22-00-23	1SBL236501R2300		0.400
55	55	-	12...20	0	0	AF38Z-22-00-20	1SBL296501R2000		0.400
		24...60	20...60	0	0	AF38Z-22-00-21	1SBL296501R2100		0.400
		48...130	48...130	0	0	AF38Z-22-00-22	1SBL296501R2200		0.400
		100...250	100...250	0	0	AF38Z-22-00-23	1SBL296501R2300		0.400

Note: Only AF..Z contactors with DC control voltage 12...20 V DC need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole.

Main dimensions mm, *inches*



AF09Z, AF16Z

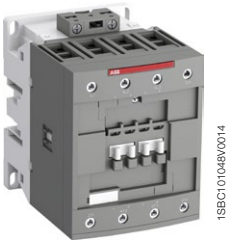


AF26Z, AF38Z

1SBC101376S0201 - Rev. A

AF40 ... AF80 4-pole contactors
70 to 125 A AC-1
AC / DC operated

AF40-40-00



AF80-40-00

5

Description

AF40 ... AF80 4-pole contactors are mainly used for controlling non-inductive or slightly inductive loads (i.e. resistance furnaces...) and generally for controlling power circuits up to 690 V AC and 440 V DC. These contactors are of the block type design with 4 main poles.

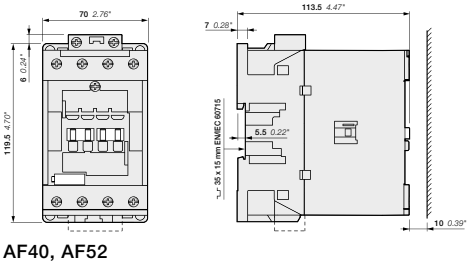
– control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltages ranges covering 24...500 V 50/60 Hz and 20...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening.
– built-in surge suppression
– add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Ordering details

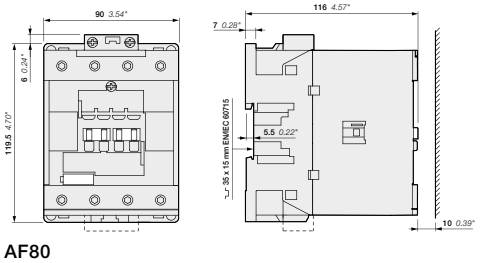
IEC Rated operational current θ ≤ 40 °C AC-1 A	UL/CSA General use rating 600 V AC A	Rated control circuit voltage Uc min. ... Uc max. V 50/60 Hz	 V DC	Auxiliary contacts fitted	Type (1)	Order code		Weight Pkg (1 pce) kg
4 N.O. Main Poles								
70	60	24...60	-	0 0	AF40-40-00-41	1SBL347201R4100		1.210
		24...60	20...60 (1)	0 0	AF40-40-00-11	1SBL347201R1100		1.210
		48...130	48...130	0 0	AF40-40-00-12	1SBL347201R1200		1.210
		100...250	100...250	0 0	AF40-40-00-13	1SBL347201R1300		1.160
		250...500	250...500	0 0	AF40-40-00-14	1SBL347201R1400		1.160
100	80	24...60	-	0 0	AF52-40-00-41	1SBL367201R4100		1.210
		24...60	20...60 (1)	0 0	AF52-40-00-11	1SBL367201R1100		1.210
		48...130	48...130	0 0	AF52-40-00-12	1SBL367201R1200		1.210
		100...250	100...250	0 0	AF52-40-00-13	1SBL367201R1300		1.160
		250...500	250...500	0 0	AF52-40-00-14	1SBL367201R1400		1.160
125	105	24...60	-	0 0	AF80-40-00-41	1SBL397201R4100		1.490
		24...60	20...60 (1)	0 0	AF80-40-00-11	1SBL397201R1100		1.490
		48...130	48...130	0 0	AF80-40-00-12	1SBL397201R1200		1.490
		100...250	100...250	0 0	AF80-40-00-13	1SBL397201R1300		1.440
		250...500	250...500	0 0	AF80-40-00-14	1SBL397201R1400		1.440
2 N.O. + 2 N.C. Main Poles								
70	60	24...60	-	0 0	AF40-22-00-41	1SBL347501R4100		1.210
		24...60	20...60 (1)	0 0	AF40-22-00-11	1SBL347501R1100		1.210
		48...130	48...130	0 0	AF40-22-00-12	1SBL347501R1200		1.210
		100...250	100...250	0 0	AF40-22-00-13	1SBL347501R1300		1.160
		250...500	250...500	0 0	AF40-22-00-14	1SBL347501R1400		1.160
125	105	24...60	-	0 0	AF80-22-00-41	1SBL397501R4100		1.490
		24...60	20...60 (1)	0 0	AF80-22-00-11	1SBL397501R1100		1.490
		48...130	48...130	0 0	AF80-22-00-12	1SBL397501R1200		1.490
		100...250	100...250	0 0	AF80-22-00-13	1SBL397501R1300		1.440
		250...500	250...500	0 0	AF80-22-00-14	1SBL397501R1400		1.440

(1) AF..-..-..-11 not suitable for direct control by PLC-output.

Main dimensions mm, *inches*



AF40, AF52



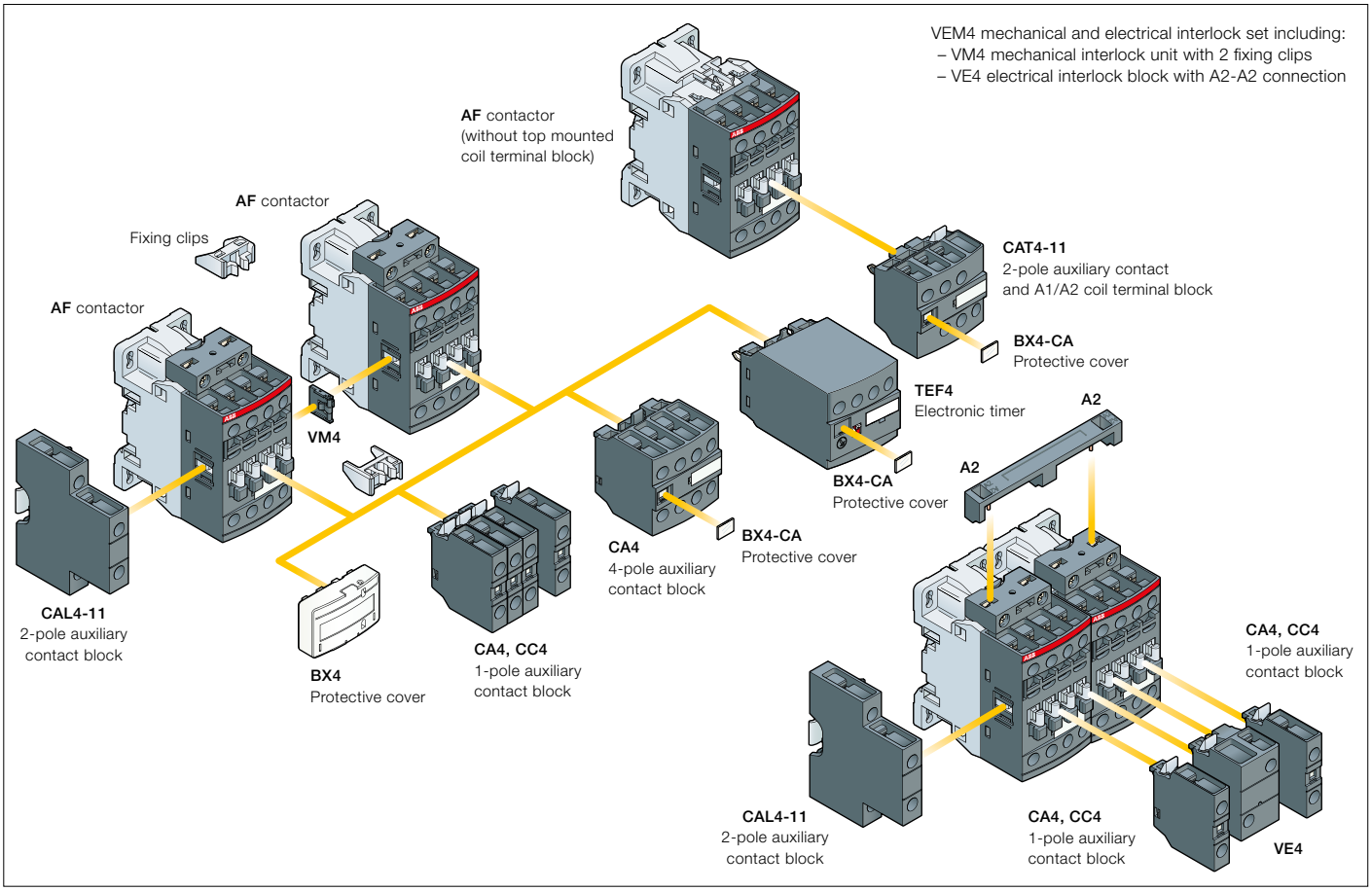
AF80

1SBC101987S0201 - Rev. B

Notes

AF09 ... AF80 4-pole contactors
Main accessories

Contactor and main accessories (other accessories available)



Main accessory fitting details

Many configurations of accessories are possible depending on whether these are front-mounted or side-mounted.

Contactor types	Main poles		Built-in auxiliary contacts		Front-mounted accessories											Side-mounted accessories		
					Auxiliary contact blocks						Electronic timer		Electrical and mechanical interlock set (between 2 contactors)			Auxiliary contact blocks		
					1-pole CA4											Left side		Right side
					1-pole CC4		2-pole CAT4-11		4-pole CA4		TEF4		VEM4			2-pole CAL4-11		
	Max. add-on N.C. auxiliary contacts: 4 N.C. max. on positions 1, 2, 3, 4 and 3 N.C. max. on positions 1 ±30°, 5																	
AF09 ... AF16	4	0	0	0	4 max.	or	1	or	1	or	1		–	+		1		–
					2 max.	or	1		–	or	1		–	+		1	+	1
					3 max.		–		–		–	+	1	+		1	or	1
	Max. add-on N.C. auxiliary contacts: 3 N.C. max. on positions 1, 2, 3, 4 and 2 N.C. max. on positions 1 ±30°, 5																	
AF26 ... AF38	4	0	0	0	4 max.	or	1	or	1	or	1		–	+		1		–
					2 max.	or	1		–	or	1		–	+		1	+	1
					3 max.		–		–		–	+	1	+		1	or	1
	Max. add-on N.C. auxiliary contacts: 6 N.C. max. on positions 1, 1 ±30°, 2, 3, 4, 5																	
AF40 ... AF52	4	0	0	0	4 max.	or	1	or	1	or	1		–	+		1	+	1
AF80	4	0	0	0	4 max.		–	or	1	or	1		–	+		1	+	1
	Max. add-on N.C. auxiliary contacts: 3 N.C. max. on positions 1, 2, 3, 4 and 2 N.C. max. on positions 1 ±30°, 5																	
AF09 ... AF16 AF26 ... AF38	2 2	2 2	0 0	0 0	4 max. 2 max.	or or	1 1	or	1 –	or or	1 1		– –	+ +		1 1		– 1
	Max. add-on N.C. auxiliary contacts: 2 N.C. max. on positions 1, 1 ±30°, 2, 3, 4, 5																	
AF40	2 2	2 2	0 0	0 0	4 max. 4 max.	or	1 –	or	1 1	or	1 1		– –	+ +		1 1	+ +	– 1
AF80	2	2	0	0	4 max.		–	or	1	or	1		–	+		1	+	1

1SBC101392S0201 - Rev. B

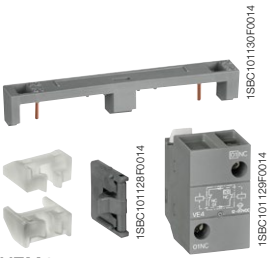
AF09 ... AF80 4-pole contactors
Main accessories

CA4-10

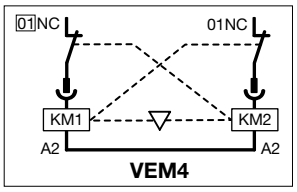
CAL4-11

CA4-22E

CAT4-11E



VEM4



TEF4-ON

Ordering details (1)

For contactors	Auxiliary contacts		Type	Order code		Pkg qty	Weight (1 pce) kg
Front-mounted instantaneous auxiliary contact blocks							
AF09 ... AF80-40-00 AF09 ... AF80-22-00	1 0	– –	CA4-10	1SBN010110R1010		1	0.014
	1 0	– –	CA4-10-T	1SBN010110T1010		10	0.014
	0 1	– –	CA4-01	1SBN010110R1001		1	0.014
	0 1	– –	CA4-01-T	1SBN010110T1001		10	0.014
	2 2	– –	CA4-22E	1SBN010140R1022		1	0.055
	3 1	– –	CA4-31E	1SBN010140R1031		1	0.055
	4 0	– –	CA4-40E	1SBN010140R1040		1	0.055
AF09 ... AF16..-40-00 AF40 ... AF80-40-00	0 4	– –	CA4-04E	1SBN010140R1004		1	0.055
Front-mounted auxiliary contact blocks with N.O. leading contact and N.C. lagging contact							
AF09 ... AF80-40-00	– –	1 0	CC4-10	1SBN010111R1010		1	0.014
AF09 ... AF80-22-00	– –	0 1	CC4-01	1SBN010111R1001		1	0.014
Side-mounted instantaneous auxiliary contact blocks							
AF09 ... AF80-40-00	1 1	– –	CAL4-11	1SBN010120R1011		1	0.040
AF09 ... AF80-22-00	1 1	– –	CAL4-11-T	1SBN010120T1011		10	0.040
Front-mounted instantaneous auxiliary contact and A1/A2 coil terminal blocks							
AF09 ... AF52..-40-00 AF09 ... AF40..-22-00	1 1	– –	CAT4-11E	1SBN010151R1011		1	0.040

Note: CAT4 not suitable for AF..Z contactors with DC control voltage 12...20 V DC.

Mechanical interlock unit							
AF09 ... AF38..-40-00			VM4	1SBN030105T1000		10	0.005
AF40 ... AF80..-40-00			VM96-4	1SBN033405T1000		10	0.006

Note: VM4 includes 2 fixing clips (BB4) to maintain together both contactors.

Mechanical and electrical interlock set							
AF09, AF16..-40-00 AF26, AF38..-40-00	0 2	– –	VEM4	1SBN030111R1000		1	0.035

Note: – VEM4 includes a VM4 mechanical interlock unit with 2 fixing clips (BB4), a VE4 electrical interlock block. VE4 block must be used with A2-A2 connection to respect the electrical connection diagram.
– VEM4 not suitable for AF..Z contactors with DC control voltage 12...20 V DC.

For contactors	Time delay range selected by switch	Delay type	Auxiliary contacts	Type	Order code		Pkg qty	Weight (1 pce) kg
Electronic timers								
AF09 ... AF80	0.1...1 s 1...10 s 10...100 s	ON-delay	1 1	TEF4-ON	1SBN020112R1000		1	0.065
		OFF-delay	1 1	TEF4-OFF	1SBN020114R1000		1	0.065

Note: Rated control circuit voltage Uc 24...240 V 50/60 Hz or DC.
(1) For more information, refer to main catalog "Accessories" section.

5

1SBC101393S0201 - Rev. B

AF116 ... AF140 4-pole contactors
160 to 200 A AC-1
AC / DC operated with 1 N.O. + 1 N.C. auxiliary contacts

AF140-40-11

AF140-40-11B

5

Description

AF116 ... AF140 4-pole contactors are mainly used for controlling non-inductive or slightly inductive loads (i.e. resistance furnaces...) and generally for controlling power circuits up to 690 V AC and 350 V DC. These contactors are of the block type design with 4 main poles.

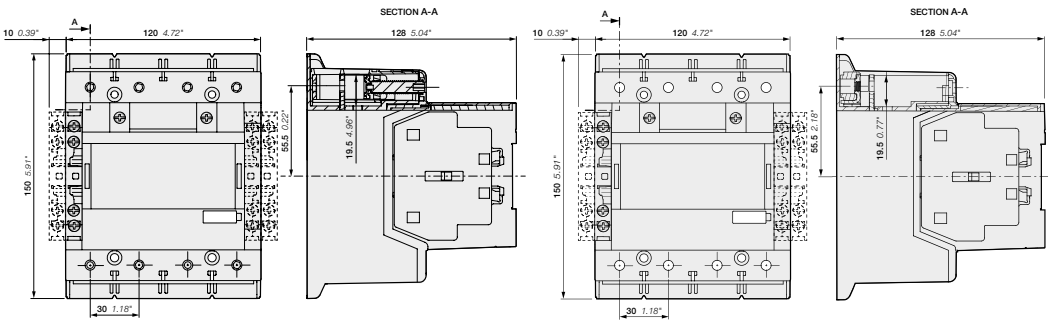
– control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 coils to cover control voltages between 24...500 V 50/60 Hz and 20...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47 conditions of use on request).
– built-in surge suppression
– add-on auxiliary contact blocks for side mounting and a wide range of accessories.

Ordering details

IEC Rated operational current $\theta \leq 40$ °C AC-1 A	UL / CSA General use rating 600 V AC A	Rated control circuit voltage Uc min. ... Uc max. V 50/60 Hz	 V DC	Auxiliary contacts fitted	Type (1)	Order code		Weight Pkg (1 pce) kg
4 N.O. main poles								
For connection with built-in cable clamps								
160	160	24...60	20...60	1 1	AF116-40-11-11	1SFL427101R1111		2.270
		48...130	48...130	1 1	AF116-40-11-12	1SFL427101R1211		2.270
		100...250	100...250	1 1	AF116-40-11-13	1SFL427101R1311		2.270
		250...500	250...500	1 1	AF116-40-11-14	1SFL427101R1411		2.270
200	175	24...60	20...60	1 1	AF140-40-11-11	1SFL447101R1111		2.270
		48...130	48...130	1 1	AF140-40-11-12	1SFL447101R1211		2.270
		100...250	100...250	1 1	AF140-40-11-13	1SFL447101R1311		2.270
		250...500	250...500	1 1	AF140-40-11-14	1SFL447101R1411		2.270
With bar connections								
160	160	24...60	20...60	1 1	AF116-40-11B-11	1SFL427102R1111		2.170
		48...130	48...130	1 1	AF116-40-11B-12	1SFL427102R1211		2.170
		100...250	100...250	1 1	AF116-40-11B-13	1SFL427102R1311		2.170
		250...500	250...500	1 1	AF116-40-11B-14	1SFL427102R1411		2.170
200	175	24...60	20...60	1 1	AF140-40-11B-11	1SFL447102R1111		2.170
		48...130	48...130	1 1	AF140-40-11B-12	1SFL447102R1211		2.170
		100...250	100...250	1 1	AF140-40-11B-13	1SFL447102R1311		2.170
		250...500	250...500	1 1	AF140-40-11B-14	1SFL447102R1411		2.170

(1) For other auxiliary contacts arrangements, please contact your ABB local organization.

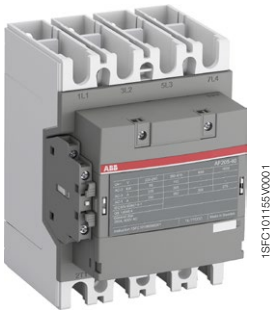
Main dimensions mm, *inches*



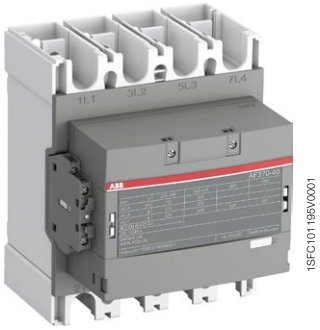
AF116, AF140-40-11 **AF116, AF140-40-11B**

1SFC101199C0201 - Rev. B

AF190 … AF370 4-pole contactors
275 to 525 A AC-1
AC / DC operated with 1 N.O. + 1 N.C. auxiliary contacts



AF205-40-11



AF370-40-11

Description

AF190 ... AF370 4-pole contactors are mainly used for controlling non-inductive or slightly inductive loads (i.e. resistance furnaces...) and generally for controlling power circuits up to 1000 V AC and 440 V DC. These contactors are of the block type design with 4 main poles.

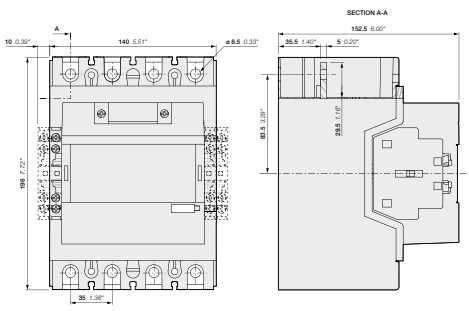
– control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 coils to cover control voltages between 24...500 V 50/60 Hz and 20...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47 conditions of use on request).
– built-in surge suppression
– add-on auxiliary contact blocks for side mounting and a wide range of accessories.

Ordering details

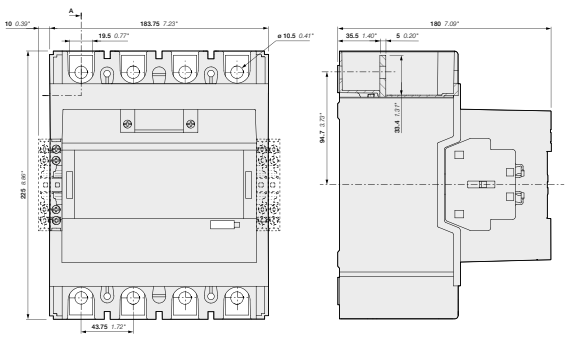
IEC Rated operational current θ ≤ 40 °C AC-1 A	UL / CSA General use rating 600 V AC A	Rated control circuit voltage Uc min. ... Uc max. V 50/60 Hz	 V DC	Auxiliary contacts fitted		Type (1)	Order code		Weight Pkg (1 pce) kg
4 N.O. main poles									
275	230	24...60	20...60	1	1	AF190-40-11-11	1SFL487102R1111		3.920
		48...130	48...130	1	1	AF190-40-11-12	1SFL487102R1211		3.920
		100...250	100...250	1	1	AF190-40-11-13	1SFL487102R1311		3.920
		250...500	250...500	1	1	AF190-40-11-14	1SFL487102R1411		3.920
350	250	24...60	20...60	1	1	AF205-40-11-11	1SFL527102R1111		3.920
		48...130	48...130	1	1	AF205-40-11-12	1SFL527102R1211		3.920
		100...250	100...250	1	1	AF205-40-11-13	1SFL527102R1311		3.920
		250...500	250...500	1	1	AF205-40-11-14	1SFL527102R1411		3.920
400	300	24...60	20...60	1	1	AF265-40-11-11	1SFL547102R1111		6.380
		48...130	48...130	1	1	AF265-40-11-12	1SFL547102R1211		6.380
		100...250	100...250	1	1	AF265-40-11-13	1SFL547102R1311		6.380
		250...500	250...500	1	1	AF265-40-11-14	1SFL547102R1411		6.380
500	350	24...60	20...60	1	1	AF305-40-11-11	1SFL587102R1111		6.380
		48...130	48...130	1	1	AF305-40-11-12	1SFL587102R1211		6.380
		100...250	100...250	1	1	AF305-40-11-13	1SFL587102R1311		6.380
		250...500	250...500	1	1	AF305-40-11-14	1SFL587102R1411		6.380
525	420	24...60	20...60	1	1	AF370-40-11-11	1SFL607102R1111		6.380
		48...130	48...130	1	1	AF370-40-11-12	1SFL607102R1211		6.380
		100...250	100...250	1	1	AF370-40-11-13	1SFL607102R1311		6.380
		250...500	250...500	1	1	AF370-40-11-14	1SFL607102R1411		6.380

(1) For other auxiliary contacts arrangements, please contact your ABB local organization.

Main dimensions mm, *inches*



AF190, AF205

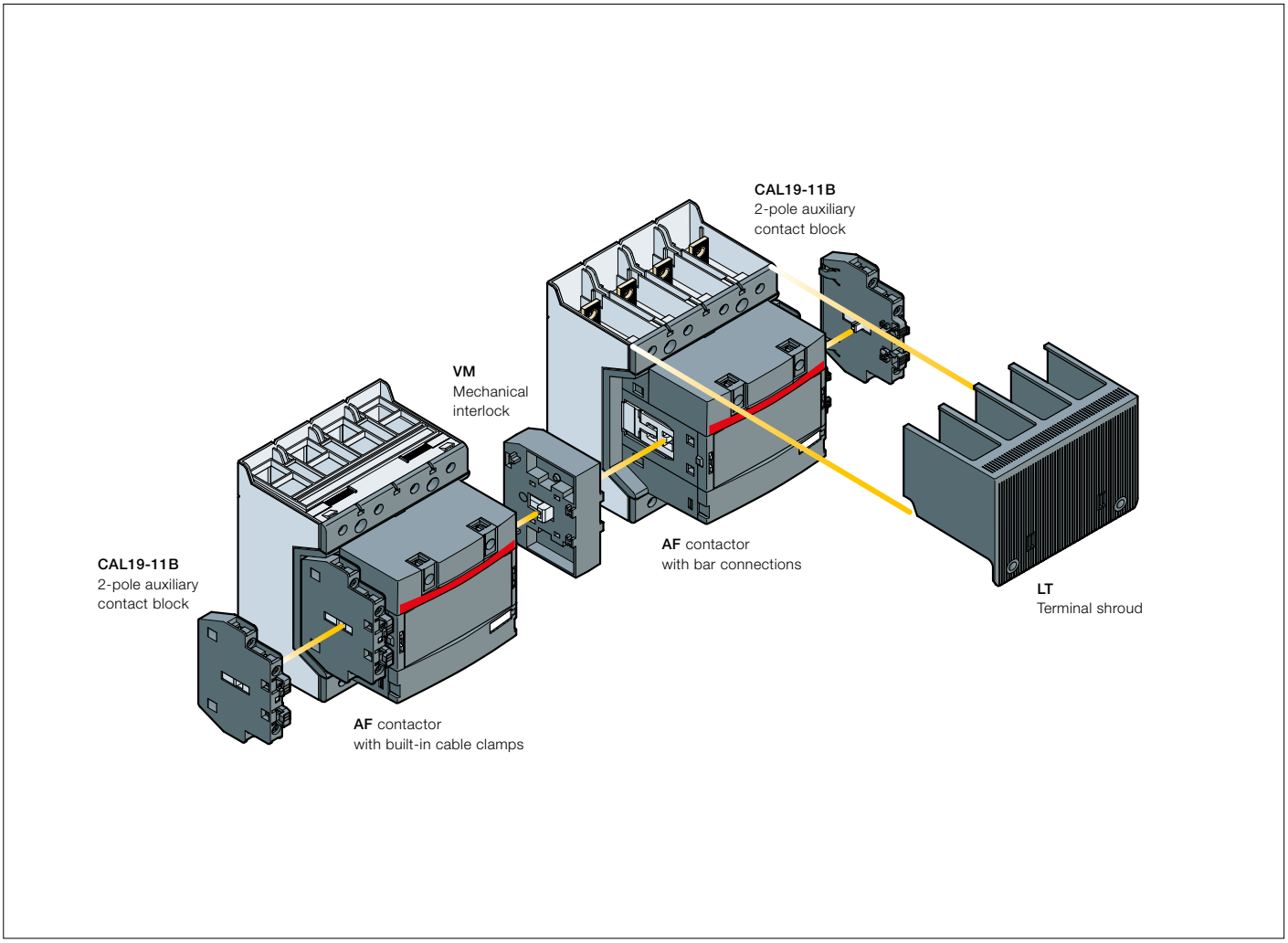


AF265, AF305, AF370

1SFC101200C0201 - Rev. A

AF116 ... AF370 4-pole contactors
with 1 N.O. + 1 N.C. auxiliary contacts
Main accessories

Main accessories (other accessories available)



Main accessory fitting details

Contactor types	Main poles	Available auxiliary contacts	Side-mounted accessories Auxiliary contact blocks CAL19-11		CAL19-11B		Mechanical interlock units (between two contactors)
AF116 ... AF370	4 0	1 1	1 x CAL19-11	+	2 x CAL19-11B		–
AF116 ... AF370	4 0	1 1	–	+	2 x CAL19-11B (1)	+	VM... (2)

(1) Total number of auxiliary contact blocks for the two contactors.

(2) Interlock type, according to the contactor ratings (see "Accessories").

1SFC101205C0201

AF116 ... AF370 4-pole contactors
with 1 N.O. + 1 N.C. auxiliary contacts
Main accessories

CAL19-11

VM19

Ordering details (1)

For contacts	Auxiliary contacts		Type	Order code		Pkg qty	Weight (1 pce) kg
Side-mounted instantaneous auxiliary contact blocks							
AF116 ... AF370	1	1	CAL19-11	1SFN010820R1011		2	0.050
	1	1	CAL19-11B	1SFN010820R3311		2	0.050
Mechanical interlock unit							
AF116 ... AF370			VM19	1SFN030300R1000		1	0.054
AF116 ... AF146 and AF190, AF205			VM140/190	1SFN034403R1000		1	0.088
AF190, AF205 and AF265 ... AF370			VM205/265	1SFN035203R1000		1	0.090
Terminal shrouds							
AF116 ... AF140, with compression lugs			LT140-40L	1SFN124203R2000		2	0.090
AF190 ... AF205, with cable clamps			LT205-40C	1SFN124801R2000		2	0.060
AF190 ... AF205, with compression lugs			LT205-40L	1SFN124803R2000		2	0.290
AF265 ... AF370, with cable clamps			LT370-40C	1SFN125401R2000		2	0.040
AF265 ... AF370, with compression lugs			LT370-40L	1SFN125403R2000		2	0.370

For contacts	Dimensions hole Ø mm	bar mm	Type	Order code		Pkg qty	Weight (1 pce) kg
Terminal enlargements							
AF190 ... AF205	10.5	20 x 5	LW205-40	1SFN074807R2000		1	0.306
AF265 ... AF370	10.5	25 x 5	LW370-40	1SFN075407R2000		1	0.540

(1) For more information, refer to "Accessories" section.

1SFC101206C0201

EK550, EK1000 4-pole contactors
800 to 1000 A AC-1
AC operated - with 1 N.O. + 1 N.C. auxiliary contacts

EK1000-40-11

Description

EK550 4-pole contactors are mainly used for controlling non-inductive or slightly inductive loads (i.e. resistance furnaces...) and generally for controlling power circuits up to 1000 V AC and 600 V DC, EK1000 up to 1000 V AC.

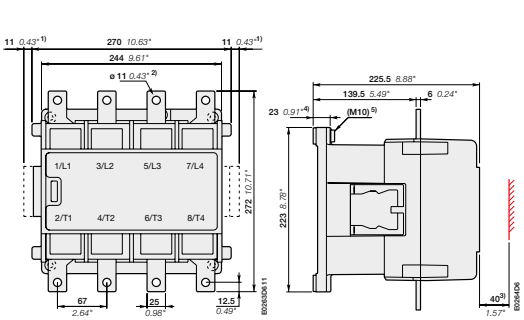
These contactors are of the block type design with:
- 4 main poles
- control circuit: AC operated
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

Ordering details

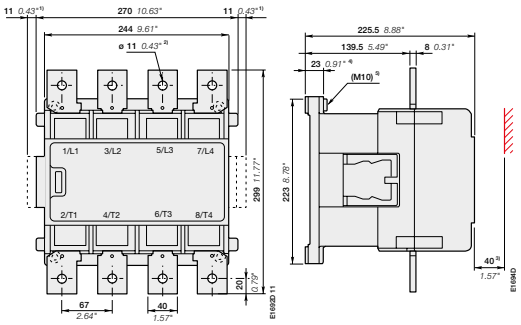
IEC Rated operational current θ ≤ 40 °C AC-1 A	UL/CSA General use rating 600 V AC A	Rated control circuit voltage Uc (1) V 50 Hz	 V 60 Hz	Auxiliary contacts fitted NO	 NC	Type	Order code		Weight Pkg (1 pce) kg
800	540	48	-	1	1	EK550-40-11	SK827041-AD		17.200
		110	110...120	1	1	EK550-40-11	SK827041-EF		17.200
		110...115	115...127	1	1	EK550-40-11	SK827041-EG		17.200
		220	220...240	1	1	EK550-40-11	SK827041-EL		17.200
		220...230	230...255	1	1	EK550-40-11	SK827041-EM		17.200
		400...415	-	1	1	EK550-40-11	SK827041-AR		17.200
1000	-	48	-	1	1	EK1000-40-11	SK827044-AD		17.500
		110	110...120	1	1	EK1000-40-11	SK827044-EF		17.500
		110...115	115...127	1	1	EK1000-40-11	SK827044-EG		17.500
		220	220...240	1	1	EK1000-40-11	SK827044-EL		17.500
		220...230	230...255	1	1	EK1000-40-11	SK827044-EM		17.500
		400...415	-	1	1	EK1000-40-11	SK827044-AR		17.500

(1) Other control voltages see voltage code table.

Main dimensions mm, *inches*



EK550



EK1000

1) Dimension for extra auxiliary contact block.
2) Screw, nut and washer by-packed.
3) Min. distance to uninsulated wall.
4) Damping elements are included.
5) Earthing screw.

1SFC101217C0201

EK550, EK1000 4-pole contactors
800 to 1000 A AC-1
DC operated - with 2 N.O. + 1 N.C. auxiliary contacts

1SFC98099-069

EK1000-40-21

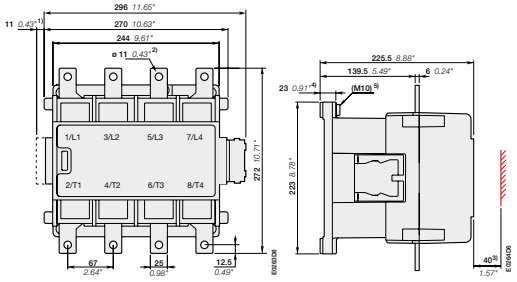
Description

EK550 4-pole contactors are mainly used for controlling non-inductive or slightly inductive loads (i.e. resistance furnaces...) and generally for controlling power circuits up to 1000 V AC and 600 V DC, EK1000 up to 1000 V AC.
These contactors are of the block type design with:
– 4 main poles
– control circuit: DC operated
– add-on auxiliary contact blocks for side mounting and a wide range of accessories.

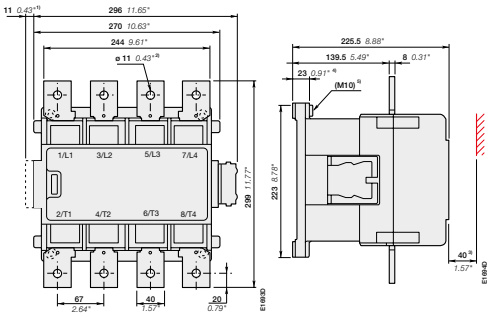
Ordering details

IEC Rated operational current $\theta \leq 40$ °C AC-1 A	UL / CSA General use rating 600 V AC A	Rated control circuit voltage Uc V DC	Auxiliary contacts fitted		Type	Order code		Weight Pkg (1 pce) kg
800	540	24	2	1	EK550-40-21	SK827041-DB		17.200
		48	2	1	EK550-40-21	SK827041-DD		17.200
		75	2	1	EK550-40-21	SK827041-DG		17.200
		110	2	1	EK550-40-21	SK827041-DE		17.200
		125	2	1	EK550-40-21	SK827041-DU		17.200
		220	2	1	EK550-40-21	SK827041-DF		17.200
1000	-	24	2	1	EK1000-40-21	SK827044-DB		17.500
		36	2	1	EK1000-40-21	SK827044-DC		17.500
		48	2	1	EK1000-40-21	SK827044-DD		17.500
		60	2	1	EK1000-40-21	SK827044-DT		17.500
		75	2	1	EK1000-40-21	SK827044-DG		17.500
		110	2	1	EK1000-40-21	SK827044-DE		17.500
		125	2	1	EK1000-40-21	SK827044-DU		17.500
		220	2	1	EK1000-40-21	SK827044-DF		17.500

Main dimensions mm, *inches*



EK550



EK1000

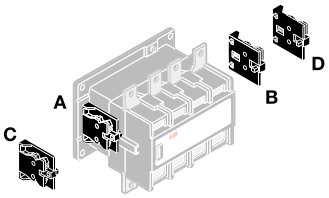
1) Dimension for extra auxiliary contact block.
2) Screw, nut and washer by-packed.
3) Min. distance to uninsulated wall.
4) Damping elements are included.
5) Earthing screw.

1SFC101218C0201

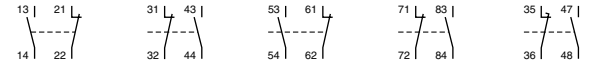
EK550, EK1000 4-pole contactors
with 1 N.O. + 1 N.C. auxiliary contacts
and 2 N.O. + 1 N.C. auxiliary contacts

Main accessory fitting details

Mounting positions of the auxiliary contact



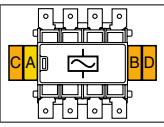
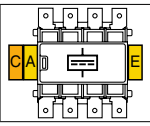
Auxiliary contact types and connecting diagrams



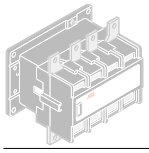
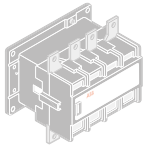
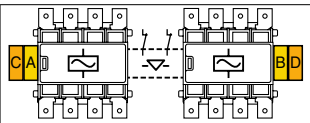
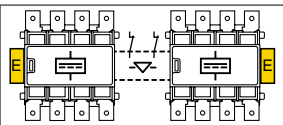
CAL16-11 A | CAL16-11 B | CAL16-11 C | CAL16-11 D | CCL16-11 E (1)

(1) Contact 35-36 used for some types of EK... contactors

EK 4-pole contactors

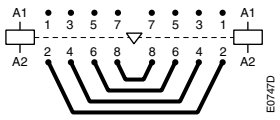
Contactor types	Main poles	Available auxiliary contacts	Add-on auxiliary contact blocks 2-pole CAL16-11 ...	Mounting and positioning (Factory mounted auxiliary contacts / Add-on CAL16-11 auxiliary contacts)
AC operated, 50 Hz, 60 Hz or 50/60 Hz				
EK550, EK1000	4 0	1 1	+ 1 x CAL16-11B + 1 x CAL16-11C + 1 x CAL16-11D	
DC operated				
EK550, EK1000	4 0	2 1	+ 1 x CAL16-11C	

EK 4-pole reversing contactors with VH800 mechanical and electrical interlock units

"Left hand" contactors	Interlocking	"Right hand" contactors	Add-on auxiliary contact blocks 2-pole CAL16-11 ...	Mounting and positioning (Factory mounted auxiliary contacts / Add-on CAL16-11 auxiliary contacts)
				
AC operated, 50 Hz, 60 Hz or 50/60 Hz				
EK550, EK1000	VH800	EK550, EK1000	+ 1 x CAL16-11C 1 x CAL16-11D	
DC operated				
EK550, EK1000	VH800	EK550, EK1000	–	

1SFC101220C0201

EK550, EK1000 4-pole contactors
with 1 N.O. + 1 N.C. auxiliary contacts and 2 N.O. + 1 N.C. auxiliary contacts



BSS550 ... BSS1000

RC-EH

Ordering details (1)

For contactors	Auxiliary contacts		Type	Order code		Pkg qty	Weight (1 pce) kg
Side-mounted auxiliary contact blocks							
EK	1	1	CAL16-11B	SK829002-B		1	0.050
	1	1	CAL16-11C	SK829002-C		1	0.050
	1	1	CAL16-11D	SK829002-D		1	0.050
	1	1	CCL16-11E (2)	SK829002-E		1	0.050
Mechanical interlock unit for two horizontal mounted contactors							
EK550, EK1000			VH800	SK829070-F		1	6.000
Connecting sets							
EK550			BSS550	SK829090-E		1	3.300
EK1000			BSS1000	SK829090-H		1	5.500

Surge suppressors

For contactors	Rated control circuit voltage Uc V	AC	DC	Type	Order code		Pkg qty	Weight (1 pce) kg
EK550, EK1000	48...110	●	–	RC-EH800/110	SK829007-C		1	0.015
EK550, EK1000	24...125	–	●	RC-EH800/110	SK829007-C		1	0.015
EK550, EK1000	220...600	●	–	RC-EH800/600	SK829007-D		1	0.015

(1) See "Main accessory fitting details" table.
(2) Mounting of CCL16-11E blocks does not allow an additional second block to be added on top of it.
All DC operated EK contactors are equipped with one CCL16-11E on the right side.

1SFC101220C0201

NF 4-pole contactor relays
AC / DC operated

NF22E

Description

NF contactor relays are used for switching auxiliary and control circuits.

These contactor relays are of the block type design with:

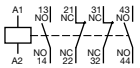
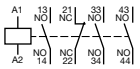
– 4 poles. Contactor relays have mechanically linked auxiliary contact elements (side-marked symbol)

– control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC)
- can manage large control voltage variations
- only 4 control voltage ranges covering 24...500 V 50/60 Hz and 20...500 V DC
- reduced panel energy consumption
- very distinct closing and opening.

– built-in surge suppression

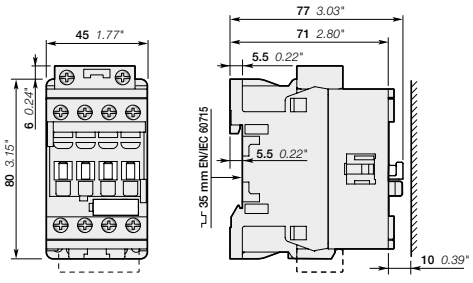
– add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Ordering details

Number of contacts	Rated control circuit voltage Uc min. ... Uc max.			Type	Order code		Weight Pkg (1 pce)
	V 50/60 Hz	V DC					kg
	24...60	-	(1)	NF22E-41	1SBH137001R4122		0.270
	48...130	48...130		NF22E-12	1SBH137001R1222		0.270
	100...250	100...250		NF22E-13	1SBH137001R1322		0.270
	250...500	250...500		NF22E-14	1SBH137001R1422		0.310
	24...60	-	(1)	NF31E-41	1SBH137001R4131		0.270
	48...130	48...130		NF31E-12	1SBH137001R1231		0.270
	100...250	100...250		NF31E-13	1SBH137001R1331		0.270
	250...500	250...500		NF31E-14	1SBH137001R1431		0.310
	24...60	-	(1)	NF40E-41	1SBH137001R4140		0.270
	48...130	48...130		NF40E-12	1SBH137001R1240		0.270
	100...250	100...250		NF40E-13	1SBH137001R1340		0.270
	250...500	250...500		NF40E-14	1SBH137001R1440		0.310

(1) For 24...60 V 50/60 Hz - 20...60 V DC, use NF..E-21.

Main dimensions mm, *inches*



NF22E, NF31E, NF40E

1SBC101558S0201 - Rev. B

NFZ 4-pole contactor relays
AC / DC operated - low consumption

NFZ22E

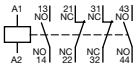
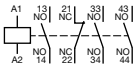
Description

NFZ contactor relays are used for switching auxiliary and control circuits.

These contactor relays are of the block type design with:

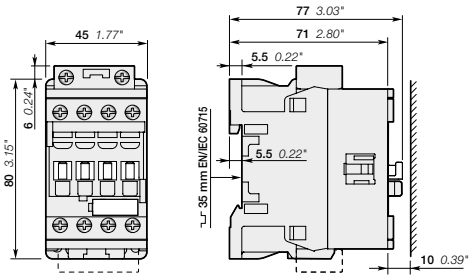
– 4 poles. Contactor relays have mechanically linked auxiliary contact elements (side-marked symbol)
– control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC)
  - can manage large control voltage variations
  - only 4 control voltage ranges covering 24...250 V 50/60 Hz and 12...250 V DC
  - allow direct control by PLC-output ≥ 24 V DC 500 mA
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47-0706 conditions of use on request).
– built-in surge suppression
– add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Ordering details

Number of contacts	Rated control circuit voltage Uc min. ... Uc max.		Type	Order code		Weight Pkg (1 pce)
	V 50/60 Hz	V DC				kg
	–	12...20	NFZ22E-20	1SBH136001R2022		0.310
	24...60	20...60	NFZ22E-21	1SBH136001R2122		0.310
	48...130	48...130	NFZ22E-22	1SBH136001R2222		0.310
	100...250	100...250	NFZ22E-23	1SBH136001R2322		0.310
	–	12...20	NFZ31E-20	1SBH136001R2031		0.310
	24...60	20...60	NFZ31E-21	1SBH136001R2131		0.310
	48...130	48...130	NFZ31E-22	1SBH136001R2231		0.310
	100...250	100...250	NFZ31E-23	1SBH136001R2331		0.310
	–	12...20	NFZ40E-20	1SBH136001R2040		0.310
	24...60	20...60	NFZ40E-21	1SBH136001R2140		0.310
	48...130	48...130	NFZ40E-22	1SBH136001R2240		0.310
	100...250	100...250	NFZ40E-23	1SBH136001R2340		0.310

Note: Only NFZ contactor relays with DC control voltage 12...20 V DC need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole.

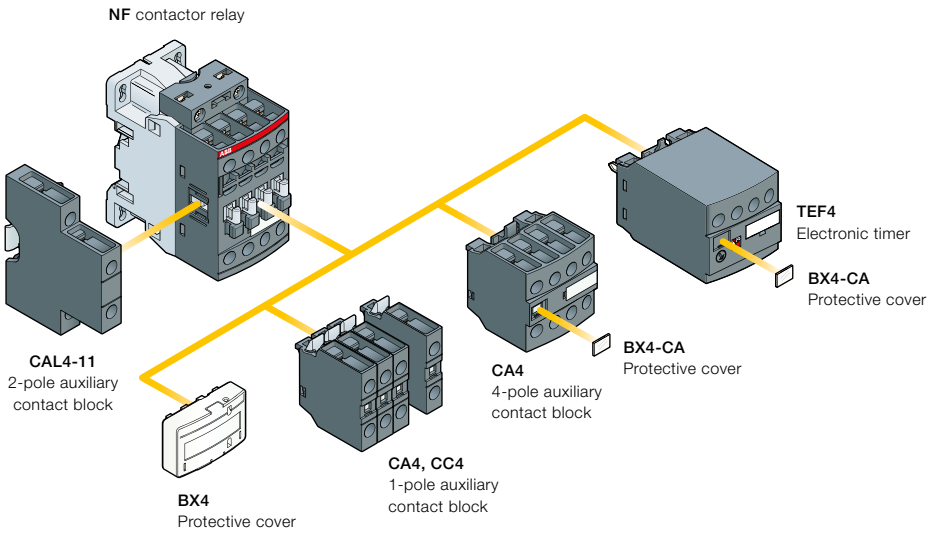
Main dimensions mm, *inches*



NFZ22E, NFZ31E, NFZ40E

NF 4-pole contactor relays
Main accessories

Contactor relays and main accessories (other accessories available)



Main accessory fitting details

Many configurations of accessories are possible depending on whether these are front-mounted or side-mounted.

Contactor relay types	Main poles			Front-mounted accessories							Side-mounted accessories		
				Auxiliary contact blocks				Electronic timer			Auxiliary contact blocks		
				1-pole CA4							Left side		Right side
				1-pole CC4		4-pole CA4		TEF4			2-pole CAL4-11		
				Max. add-on N.C. auxiliary contacts: 3 N.C. max. on positions 1, 2, 3, 4 and 2 N.C. max. on positions 1 ±30°, 5									
NF	2	2	E	4 max.	or	1	or	1	+		1		–
	3	1	E	2 max.		–	or	1	+		1	+	1
				Max. add-on N.C. auxiliary contacts: 4 N.C. max. on positions 1, 2, 3, 4 and 3 N.C. max. on positions 1 ±30°, 5									
NF	4	0	E	4 max.	or	1	or	1	+		1		–
				2 max.		–	or	1	+		1	+	1

1SBC101518S0201 - Rev. A

NF 4-pole contactor relays
Main accessories

CA4-10

CA4-22N

CAL4-11

TEF4-ON

LDC4

BX4

BX4-CA

Ordering details (1)

For contactor relays	Auxiliary contacts				Type	Order code		Pkg qty	Weight (1 pce) kg
Front-mounted instantaneous auxiliary contact blocks									
4-pole NF	1	0	–	–	CA4-10	1SBN010110R1010		1	0.014
	1	0	–	–	CA4-10-T	1SBN010110T1010		10	0.014
	0	1	–	–	CA4-01	1SBN010110R1001		1	0.014
	0	1	–	–	CA4-01-T	1SBN010110T1001		10	0.014
	4	0	–	–	CA4-40N	1SBN010140R1240		1	0.055
	3	1	–	–	CA4-31N	1SBN010140R1231		1	0.055
	2	2	–	–	CA4-22N	1SBN010140R1222		1	0.055
	1	3	–	–	CA4-13N	1SBN010140R1213		1	0.055
NF..40E	0	4	–	–	CA4-04N	1SBN010140R1204		1	0.055
Front-mounted auxiliary contact blocks with N.O. leading contact and N.C. lagging contact									
4-pole NF	–	–	1	0	CC4-10	1SBN010111R1010		1	0.014
	–	–	0	1	CC4-01	1SBN010111R1001		1	0.014
Side-mounted instantaneous auxiliary contact blocks									
NF	1	1	–	–	CAL4-11	1SBN010120R1011		1	0.040
	1	1	–	–	CAL4-11-T	1SBN010120T1011		10	0.040

For contactors	Time delay range selected by switch	Delay type	Auxiliary contacts		Type	Order code		Pkg qty	Weight (1 pce) kg
Electronic timers									
NF	0.1...1 s 1...10 s 10...100 s	ON-delay	1	1	TEF4-ON	1SBN020112R1000		1	0.065
		OFF-delay	1	1	TEF4-OFF	1SBN020114R1000		1	0.065

Note: Rated control circuit voltage Uc 24...240 V 50/60 Hz or DC.

Additional coil terminal block					
NF	LDC4	1SBN070156T1000		10	0.010
Protective covers					
All 1-stack contactor relays	BX4	1SBN110108T1000		10	0.006
4-pole CA4 auxiliary contact blocks and TEF4 electronic timer	BX4-CA	1SBN110109W1000		50	0.001

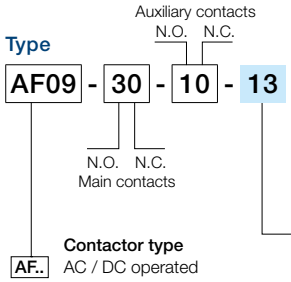
(1) For more information, refer to main catalog "Accessories" section.

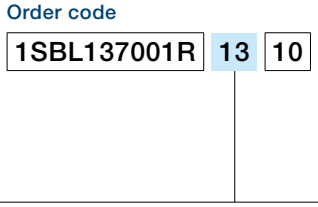
1SBC101519S0201 - Rev. A

Voltage code table

The below tables indicate the available coil voltages and corresponding digits for order codes. When placing an order, please give the order code. Select a standard contactor from ordering detail pages. Change the **coil voltage code** in the order code according to the table below. Example: for contactor AF400-30-11 and coil 100...250 V 50/60 Hz, the order code is 1SFL577001R**70**11.

AF09 ... AF370 3-pole contactors
AF09 ... AF370 4-pole contactors





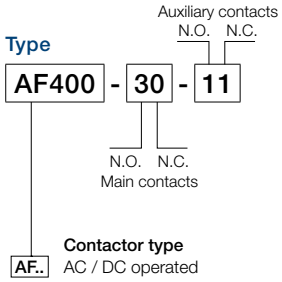
	AC coil code 50/60 Hz	DC coil code
41	24...60 V	-
11	24...60 V	20...60 V
12	48...130 V	48...130 V
13	**100...250 V**	**100...250 V**
14	250...500 V	250...500 V

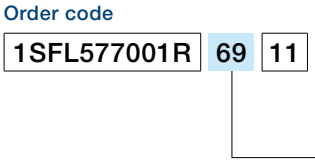
Coil 41: not available for AF116 ... AF370

AF116 ... AF370 3-pole contactors with built-in PLC interface

	AC coil code 50/60 Hz	DC coil code
33	100...250 V	100...250 V
34	250...500 V	250...500 V

AF400 ... AF2650 3-pole contactors

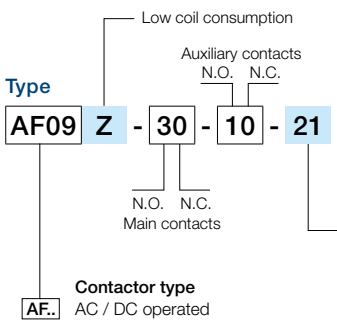


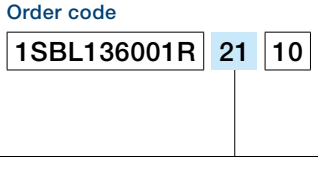


	AC coil code 50/60 Hz	DC coil code
68	-	24...60 V
69	**48...130 V**	**48...130 V**
70	100...250 V	100...250 V
71	250...500 V	250...500 V

Coil 68, 69, 71: not available for AF1350 ... AF2650

AF09 ... AF38 3- and 4-pole contactors - low consumption





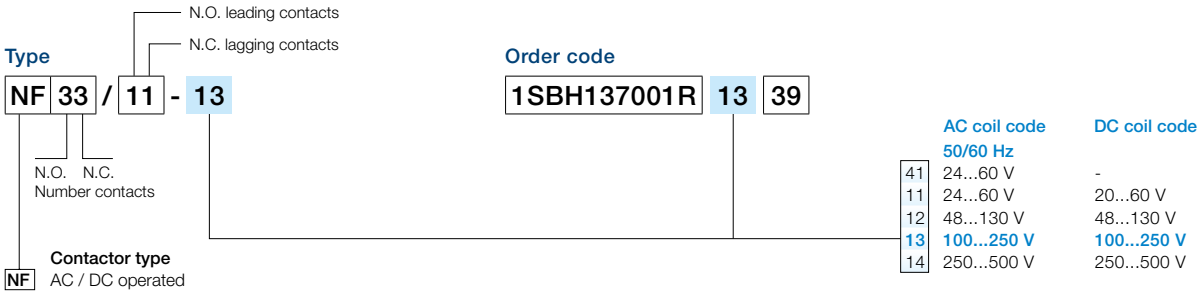
	AC coil code 50/60 Hz	DC coil code
20	-	12...20 V
21	**24...60 V**	**20...60 V**
22	48...130 V	48...130 V
23	100...250 V	100...250 V

1SBC101601S0201 - Rev. D

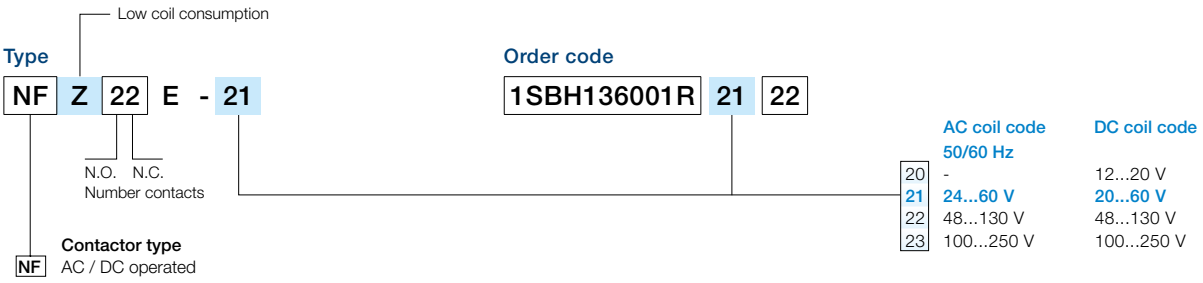
Voltage code table

NF contactor relays

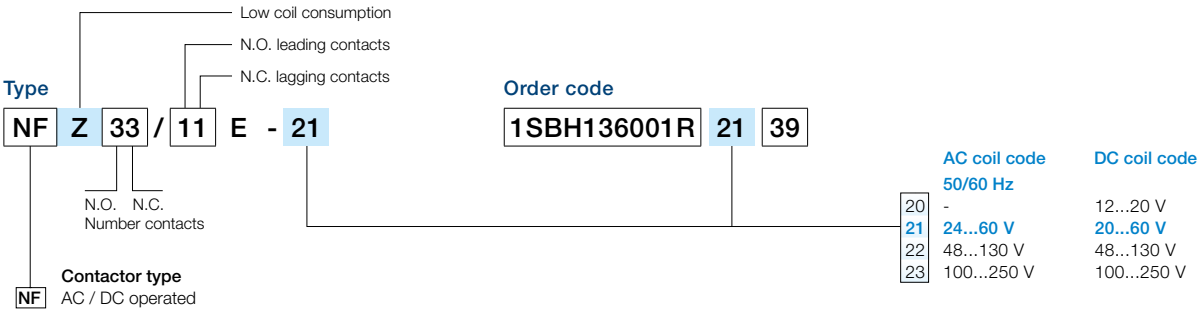
NF contactor relays with overlapping of lagging / leading contacts



NF contactor relays - low consumption



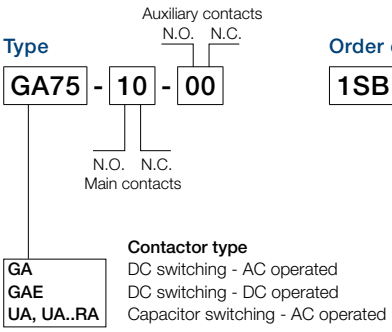
NF contactor relays with overlapping of lagging / leading contacts - low consumption



1SBC101601S0201 - Rev. D

Voltage code table

UA, UA..RA contactors
GA contactors



Contactors: UA, UA..RA, GA

AC coil code

	50 Hz	60 Hz
81	**24 V**	**24 V**
16	26 V	28 V
17	28 V	32 V
82	**42 V**	**42 V**
20	42 V	48 V
83	**48 V**	**48 V**
73	**60 V**	**60 V**
74	**100 V**	**100**...110 V
26	105 V	110...127 V
84	**110 V**	**110**...120 V
89	110...**115 V**	**115**...127 V
29	120 V	140 V
30	125...127 V	150 V
34	175 V	208 V
36	190 V	220 V
40	210 V	240 V
80	220...**230 V**	**230**...240 V
88	230...**240 V**	**240**...260 V
42	230...240 V	277 V
85	380...**400 V**	**400**...415 V
86	400...**415 V**	**415**...440 V
50	400 V	440 V
51	400...415 V	480 V
87	415...**440 V**	**440**...460 V
53	440 V	500 V
55	500 V	600 V
56	550 V	-
58	660...690 V	-
59	-	690 V

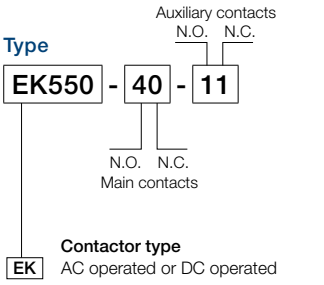
Codes in bold for dual frequency coils.

Contactors: GAE

DC coil code

80	12 V
81	24 V
82	42 V
83	48 V
21	50 V
84	60 V
85	75 V
86	110 V
87	125 V
88	220 V
89	240 V
38	250 V

EK550, EK1000 contactors



AC coil code

	50 Hz	60 Hz
AD	48 V	-
AE	-	110 V
AF	110 V	120 V
AG	127 V	-
AZ	-	208 V
AH	190 V	220 V
AK	-	240 V
AL	220...230 V	240 V
AM	230...240 V	-
AN	-	380 V
AP	380...400 V	440 V
AR	400...415 V	-
AS	-	480 V
AT	440 V	-
AU	500 V	-
AV	-	600 V

Dual frequency coil code

	50 Hz	60 Hz
EF	110 V	110...120 V
EG	110...115 V	115...127 V
EL	220 V	220...240 V
EM	220...230 V	230...255 V
EP	380 V	380...415 V
ER	380...400 V	400...440 V

2 auxiliary contact blocks maximum per contactor, ambient temperature ≤ 55 °C and mounting positions 2 and 6 excluded.

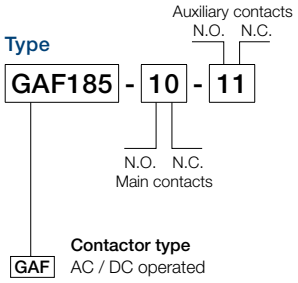
DC coil code

DB	24 V
DC	36 V
DD	48 V
DT	60 V
DG	75 V
DE	110 V
DU	125 V
DF	220 V

1SBC101601S0201 - Rev. D

Voltage code table

GAF185 ... GAF300 contactors

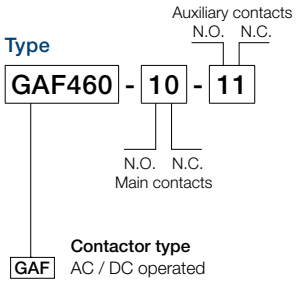


Order code

1SFL497025R **69** **11**

	AC coil code 50/60 Hz	DC coil code
72	-	20...60 V
69	**48...130 V**	**48...130 V**
70	100...250 V	100...250 V

GAF460 ... GAF1250 contactors

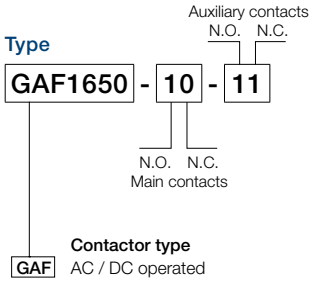


Order code

1SFL597025R **69** **11**

	AC coil code 50/60 Hz	DC coil code
68	-	24...60 V
69	**48...130 V**	**48...130 V**
70	100...250 V	100...250 V
71	250...500 V	250...500 V

GAF1650, GAF2050 contactors



Order code

1SFL677025R **70** **11**

	AC coil code 50/60 Hz	DC coil code
70	**100...250 V**	**100...250 V**

1SBC101601S0201 - Rev. D

ABB
T16
TRIP CLASS 10
STOP
TEST
RESET
95 NC 96
97 NO 98
2T1
4T2
6T3
ABB
TF42
STOP
TEST
RESET
95 NC 96
97 NO 98
2T1
4T2
6T3
ABB
EF19
TRIP CLASS
STOP
TEST
RESET
95 NC 96
97 NO 98
ABB
EF45
TRIP CLASS
STOP
TEST
RESET
95 NC 96
97 NO 98

Overload relays

Overview 6/2

Thermal overload relays

T16 – 0.10 to 16.0 A **6**/4

TF42 – 0.10 to 38.0 A **6**/5

TF65 – 22.0 to 67.0 A **6**/6

TF96 – 40.0 to 96.0 A **6**/7

TF140DU – 66 to 142 A **6**/8

TA200DU – 66 to 200 A **6**/9

Electronic overload relays

E16DU, EF19, EF45 – 0.10 to 45.0 A **6**/10

EF65, EF96, EF146 – 20 to 150 A **6**/11

EF205, EF370 – 63 to 380 A **6**/12

EF460, EF750 – 150 to 800 A **6**/13

E1250DU – 375 to 1250 A **6**/14

General accessories 6/15

For direct product details information, use product type or order code, ex:
www.abb.com/productdetails/AF09-30-10-13 or www.abb.com/productdetails/1SBL137001R1310

Thermal and electronic overload relays

Thermal overload relays

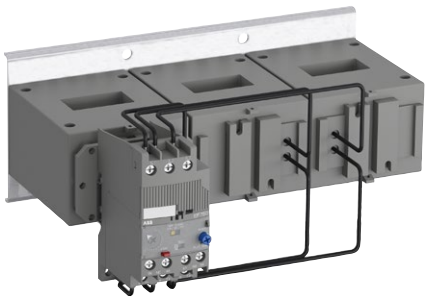
IEC: rated operational power AC-3	**400 V**	0.06 ... 7.5 kW	0.06 ... 7.5 kW	0.06 ... 18.5 kW	11 ... 37 kW
UL/CSA: 3-phase hp-ratings	**480 V**	1/2 ... 10 hp	1/2 ... 10 hp	1/2 ... 25 hp	15 ... 50 hp
Fitting to contactors		B6, B7	AS09 ... AS16	AF09 ... AF38	AF40, AF52, AF65
Type		**T16**	**T16**	**TF42**	**TF65**
Current range		0.10 ... 16 A	0.10 ... 16 A	0.10 ... 38 A	22 ... 67 A
Trip class		10	10	10	10
Single mounting kit		DB16	DB16	DB42	DB65

6

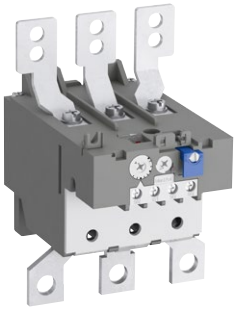
Electronic overload relays
with integrated CT

IEC: rated operational power AC-3	**400 V**	0.06 ... 7.5 kW	0.06 ... 7.5 kW	4 ... 22 kW	7.5 ... 37 kW
UL/CSA: 3-phase hp-ratings	**480 V**	1/2 ... 10 hp	1/2 ... 10 hp	5 ... 30 hp	15 ... 50 hp
Fitting to contactors		B6, B7, BC6, BC7, VB6, VB7, VBC6, VBC7	AF09 ... AF16	AF26 ... AF38	AF40, AF52, AF65
Type		**E16DU**	**EF19**	**EF45**	**EF65**
Current range		0.10 ... 18.9 A	0.10 ... 18.9 A	9 ... 45 A	20 ... 70 A
Trip class		10E, 20E, 30E selectable			
Single mounting kit		DB16E	DB19EF	DB45EF	-

Electronic overload relays
with external separate CT

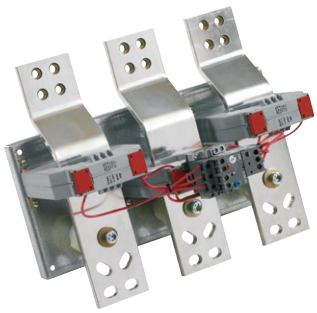


IEC: rated operational power AC-3	**400 V**	75 ... 250 kW	132 ... 400 kW
UL/CSA: 3-phase hp-ratings	**480 V**	100 ... 400 hp	200 ... 500 hp
Fitting to contactors		AF400, AF460	AF580, AF750, AF1250
Type		**EF460**	**EF750**
Current range		150 ... 500 A	250 ... 800 A
Trip class		10E, 20E, 30E selectable	



18.5 … 45 kW	37 … 75 kW	37 … 110 kW	
30 … 75 hp	50 … 100 hp	50 … 150 hp	
AF80, AF96	AF116, AF140	AF190, AF205	
TF96	**TF140DU**	**TA200DU**	
40 … 96 A	66 … 142 A	66 … 200 A	
10	10A	10A	
DB96	-	DB200	

22 … 55 kW	30 … 75 kW	37 … 110 kW	75 … 200 kW
30 … 75 hp	50 … 100 hp	50 … 150 hp	100 … 300 hp
AF80, AF96	AF116, AF140, AF146	AF190, AF205	AF265, AF305, AF370
EF96	**EF146**	**EF205**	**EF370**
36 … 100 A	54 … 150 A	63 … 210 A	115 … 380 A
10E, 20E, 30E selectable			
DB96	-	-	-

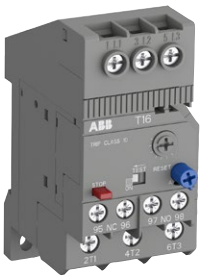


250 … 710 kW
350 … 500 hp
AF1350, AF1650
E1250DU
375 … 1250 A
10E, 20E, 30E selectable

T16 thermal overload relays – 0.10 to 16.0 A
Ordering details

2CDC231009F0013

T16



2CDC231025F0013

T16 + DB16

1SFC151224F0002

KPR-101L

2CDC231002F0011

DB16

Description

The T16 thermal overload relays are economic electromechanical protection devices for the main circuit. They offer reliable protection for motors in the event of overload or phase failure. The devices have trip class 10.

The thermal overload relays are three pole relays with bimetal tripping elements. The motor current flows through the bimetal tripping elements and heats them directly and indirectly. In case of an overload (over current), the bimetal elements bent as a result of the heating. This leads to a release of the relay and a change of the contacts switching position (95-96 / 97-98).

- Manual or automatic reset selectable
- Phase loss sensitive acc. to IEC/EN 60947-4-1
- TEST and STOP function – Trip indication on the front
- Temperature compensation
- Suitable for three- and single-phase applications

Ordering details

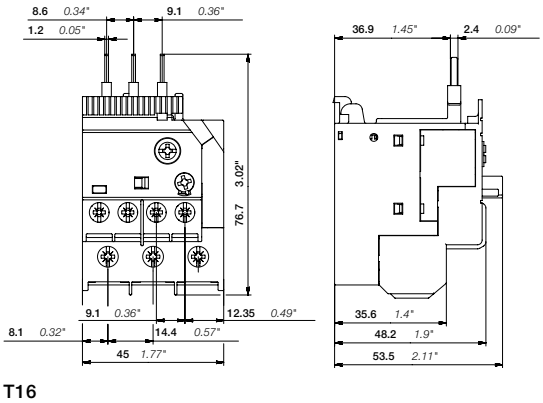
Setting range A	Short-circuit protective device	Trip class	Type	Order code		Weight (1 pce) kg
0.10 ... 0.13	0.5 A, fuse type T	10	T16-0.13	1SAZ711201R1005		0.100
0.13 ... 0.17	1.0 A, fuse type T	10	T16-0.17	1SAZ711201R1008		0.100
0.17 ... 0.23	1.0 A, fuse type T	10	T16-0.23	1SAZ711201R1009		0.100
0.23 ... 0.31	1.0 A, fuse type T	10	T16-0.31	1SAZ711201R1013		0.100
0.31 ... 0.41	2.0 A, fuse type gG	10	T16-0.41	1SAZ711201R1014		0.100
0.41 ... 0.55	2.0 A, fuse type gG	10	T16-0.55	1SAZ711201R1017		0.100
0.55 ... 0.74	4.0 A, fuse type gG	10	T16-0.74	1SAZ711201R1021		0.100
0.74 ... 1.00	6.0 A, fuse type gG	10	T16-1.0	1SAZ711201R1023		0.100
1.00 ... 1.30	6.0 A, fuse type gG	10	T16-1.3	1SAZ711201R1025		0.100
1.30 ... 1.70	10.0 A, fuse type gG	10	T16-1.7	1SAZ711201R1028		0.100
1.70 ... 2.30	10.0 A, fuse type gG	10	T16-2.3	1SAZ711201R1031		0.100
2.30 ... 3.10	10.0 A, fuse type gG	10	T16-3.1	1SAZ711201R1033		0.100
3.10 ... 4.20	20.0 A, fuse type gG	10	T16-4.2	1SAZ711201R1035		0.100
4.20 ... 5.70	20.0 A, fuse type gG	10	T16-5.7	1SAZ711201R1038		0.100
5.70 ... 7.60	35.0 A, fuse type gG	10	T16-7.6	1SAZ711201R1040		0.100
7.60 ... 10.0	35.0 A, fuse type gG	10	T16-10	1SAZ711201R1043		0.104
10.0 ... 13.0	40.0 A, fuse type gG	10	T16-13	1SAZ711201R1045		0.104
13.0 ... 16.0	40.0 A, fuse type gG	10	T16-16	1SAZ711201R1047		0.104

Ordering details accessories

Suitable for	Description	Type	Order code		Weight (1 pce) kg
T16	Single mounting kit	DB16	1SAZ701901R0001		0.032
T16	Reset push button*	KPR-101L	1SFA616162R1014		0.027

*Note: for more information see catalog 1SFC151004C0201

Main dimensions mm, *inches*

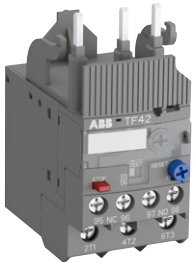


T16

2CDC232009F0008

2CDC106036C0201a

TF42 thermal overload relays – 0.10 to 38.0 A
Ordering details



TF42

TF42 + DB42

Description

The TF42 thermal overload relays are economic electromechanical protection devices for the main circuit. They offer reliable protection for motors in the event of overload or phase failure. The devices have trip class 10.

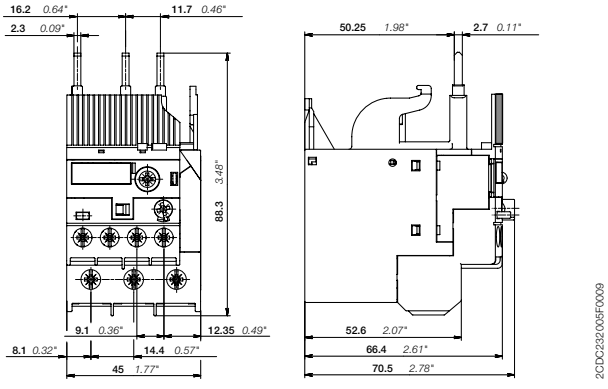
The thermal overload relays are three pole relays with bimetal tripping elements. The motor current flows through the bimetal tripping elements and heats them directly and indirectly. In case of an overload (over current), the bimetal elements bent as a result of the heating. This leads to a release of the relay and a change of the contacts switching position (95-96 / 97-98).

- Manual or automatic reset selectable
- Phase loss sensitive acc. to IEC/EN 60947-4-1
- TEST and STOP function – Trip indication on the front
- Temperature compensation
- Suitable for three- and single-phase applications
- With ATEX certification

Ordering details

Setting range A	Short-circuit protective device	Trip class	Type	Order code		Weight (1 pce) kg
0.10 ... 0.13	0.5 A, fuse type T	10	TF42-0.13	1SAZ721201R1005		0.130
0.13 ... 0.17	1.0 A, fuse type T	10	TF42-0.17	1SAZ721201R1008		0.130
0.17 ... 0.23	1.0 A, fuse type T	10	TF42-0.23	1SAZ721201R1009		0.130
0.23 ... 0.31	1.0 A, fuse type T	10	TF42-0.31	1SAZ721201R1013		0.130
0.31 ... 0.41	2.0 A, fuse type gG	10	TF42-0.41	1SAZ721201R1014		0.130
0.41 ... 0.55	2.0 A, fuse type gG	10	TF42-0.55	1SAZ721201R1017		0.130
0.55 ... 0.74	4.0 A, fuse type gG	10	TF42-0.74	1SAZ721201R1021		0.130
0.74 ... 1.00	6.0 A, fuse type gG	10	TF42-1.0	1SAZ721201R1023		0.130
1.00 ... 1.30	6.0 A, fuse type gG	10	TF42-1.3	1SAZ721201R1025		0.130
1.30 ... 1.70	10.0 A, fuse type gG	10	TF42-1.7	1SAZ721201R1028		0.130
1.70 ... 2.30	10.0 A, fuse type gG	10	TF42-2.3	1SAZ721201R1031		0.130
2.30 ... 3.10	10.0 A, fuse type gG	10	TF42-3.1	1SAZ721201R1033		0.130
3.10 ... 4.20	20.0 A, fuse type gG	10	TF42-4.2	1SAZ721201R1035		0.130
4.20 ... 5.70	20.0 A, fuse type gG	10	TF42-5.7	1SAZ721201R1038		0.130
5.70 ... 7.60	35.0 A, fuse type gG	10	TF42-7.6	1SAZ721201R1040		0.130
7.60 ... 10.0	35.0 A, fuse type gG	10	TF42-10	1SAZ721201R1043		0.130
10.0 ... 13.0	40.0 A, fuse type gG	10	TF42-13	1SAZ721201R1045		0.130
13.0 ... 16.0	40.0 A, fuse type gG	10	TF42-16	1SAZ721201R1047		0.130
16.0 ... 20.0	63.0 A, fuse type gG	10	TF42-20	1SAZ721201R1049		0.145
20.0 ... 24.0	63.0 A, fuse type gG	10	TF42-24	1SAZ721201R1051		0.145
24.0 ... 29.0	63.0 A, fuse type gG	10	TF42-29	1SAZ721201R1052		0.145
29.0 ... 35.0	80.0 A, fuse type gG	10	TF42-35	1SAZ721201R1053		0.145
35.0 ... 38.0/40.0	80.0 A, fuse type gG	10	TF42-38	1SAZ721201R1055		0.145

Main dimensions mm, *inches*



TF42

TF65 thermal overload relays – 22.0 to 67.0 A
Ordering details

2CDC231004F0013

TF65

2CDC231003V0015

DB65

2CDC231004V0015

DB65 + TF65

1SFC151224R0002

KPR-101L

Description

The TF65 thermal overload relays are economic electromechanical protection devices for the main circuit. They offer reliable protection for motors in the event of overload or phase failure. The devices have trip class 10.

The thermal overload relays are three pole relays with bimetal tripping elements. The motor current flows through the bimetal tripping elements and heats them directly and indirectly. In case of an overload (over current), the bimetal elements bent as a result of the heating. This leads to a release of the relay and a change of the contacts switching position (95-96 / 97-98).

- Manual or automatic reset selectable
- Phase loss sensitive acc. to IEC/EN 60947-4-1
- TEST and STOP function – Trip indication on the front
- Temperature compensation
- Suitable for three- and single-phase applications
- With ATEX certification [1)]

Ordering details

Setting range A	Short-circuit protective device	Trip class	Type	Order code		Weight (1 pce) kg
22.0 ... 28.0	80 A, gG Type Fuses	10	TF65-28	1SAZ811201R1001		0.456
25.0 ... 33.0	80 A, gG Type Fuses	10	TF65-33	1SAZ811201R1002		0.456
30.0 ... 40.0	100 A, gG Type Fuses	10	TF65-40	1SAZ811201R1003		0.456
36.0 ... 47.0	125 A, gG Type Fuses	10	TF65-47	1SAZ811201R1004		0.456
44.0 ... 53.0	125 A, gG Type Fuses	10	TF65-53	1SAZ811201R1005		0.456
50.0 ... 60.0	125 A, gG Type Fuses	10	TF65-60	1SAZ811201R1006		0.466
57.0 ... 67.0	160 A, gG Type Fuses	10	TF65-67	1SAZ811201R1007		0.466

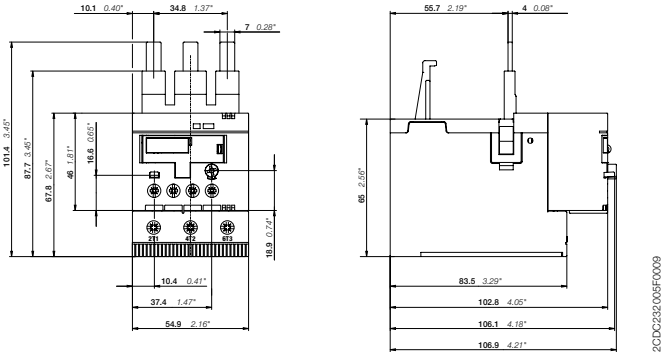
Ordering details accessories

Suitable for	Description	Type	Order code		Weight (1 pce) kg
TF65	Single mounting kit	DB65	1SAZ801901R1001		0.132
TF65	Reset push button [2)]	KPR-101L	1SFA616162R1014		0.027

[1)] ATEX is valid for products, produced from week 26, 2015

[2)] Note: for more information see catalog 1SFC151004C0201

Main dimensions mm, *inches*



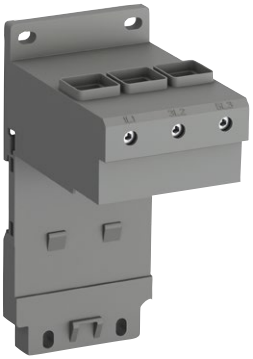
2CDC232005F0009

TF65

2CDC106063C0201a

TF96 thermal overload relays – 40.0 to 96.0 A
Ordering details

TF96



DB96

DB96 + TF96

KPR-101L

Description

The TF96 thermal overload relays are economic electromechanical protection devices for the main circuit. They offer reliable protection for motors in the event of overload or phase failure. The devices have trip class 10.

The thermal overload relays are three pole relays with bimetal tripping elements. The motor current flows through the bimetal tripping elements and heats them directly and indirectly. In case of an overload (over current), the bimetal elements bent as a result of the heating. This leads to a release of the relay and a change of the contacts switching position (95-96 / 97-98).

- Manual or automatic reset selectable
- Phase loss sensitive acc. to IEC/EN 60947-4-1
- TEST and STOP function – Trip indication on the front
- Temperature compensation
- Suitable for three- and single-phase applications
- With ATEX certification [1)]

Ordering details

Setting range A	Short-circuit protective device	Trip class	Type	Order code		Weight (1 pce) kg
40.0 ... 51.0	125 A, gG Type Fuses	10	TF96-51	1SAZ911201R1001		0.620
48.0 ... 60.0	160 A, gG Type Fuses	10	TF96-60	1SAZ911201R1002		0.620
57.0 ... 68.0	160 A, gG Type Fuses	10	TF96-68	1SAZ911201R1003		0.620
65.0 ... 78.0	200 A, gG Type Fuses	10	TF96-78	1SAZ911201R1004		0.620
75.0 ... 87.0	200 A, gG Type Fuses	10	TF96-87	1SAZ911201R1005		0.620
84.0 ... 96.0	250 A, gG Type Fuses	10	TF96-96	1SAZ911201R1006		0.630

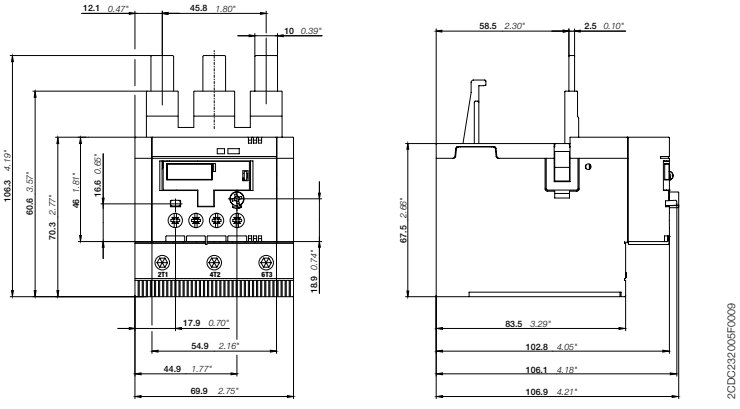
Ordering details accessories

Suitable for	Description	Type	Order code		Weight (1 pce) kg
TF96, EF96	Single mounting kit	DB96	1SAZ901901R1001		0.190
TF96	Reset push button [2)]	KPR-101L	1SFA616162R1014		0.027

[1)] ATEX is valid for products, produced from week 26, 2015

[2)] Note: for more information see catalog 1SFC151004C0201

Main dimensions mm, *inches*



TF96

TF140DU thermal overload relays – 66 to 142 A
Ordering details

TF140DU

KPR-101L

6

Description

The TF140DU thermal overload relays are economic electromechanical protection devices for the main circuit. They offer reliable protection for motors in the event of overload or phase failure. The devices have trip class 10A.

The thermal overload relays are three pole relays with bimetal tripping elements. The motor current flows through the bimetal tripping elements and heats them directly and indirectly. In case of an overload (over current), the bimetal elements bent as a result of the heating. This leads to a release of the relay and a change of the contacts switching position (95-96 / 97-98).

- Manual or automatic reset selectable
- Phase loss sensitive acc. to IEC/EN 60947-4-1
- TEST and STOP function – Trip indication on the front
- Temperature compensation
- Suitable for three- and single-phase applications
- ATEX variants available

Ordering details

Setting range A	Short-circuit protective device	Trip class	Type	Order code		Weight (1 pce) kg
66 ... 90	200 A, fuse type gG	10A	TF140DU-90	1SAZ431201R1001		0.820
80 ... 110	224 A, fuse type gG	10A	TF140DU-110	1SAZ431201R1002		0.820
100 ... 135	224 A, fuse type gG	10A	TF140DU-135	1SAZ431201R1003		0.820
110 ... 142	250 A, fuse type gG	10A	TF140DU-142	1SAZ431201R1004		0.820
66 ... 90	200 A, fuse type gG	10A	TF140DU-90-V1000*	1SAZ431301R1001		0.820
80 ... 110	224 A, fuse type gG	10A	TF140DU-110-V1000*	1SAZ431301R1002		0.820
100 ... 135	224 A, fuse type gG	10A	TF140DU-135-V1000*	1SAZ431301R1003		0.820
110 ... 142	250 A, fuse type gG	10A	TF140DU-142-V1000*	1SAZ431301R1004		0.820

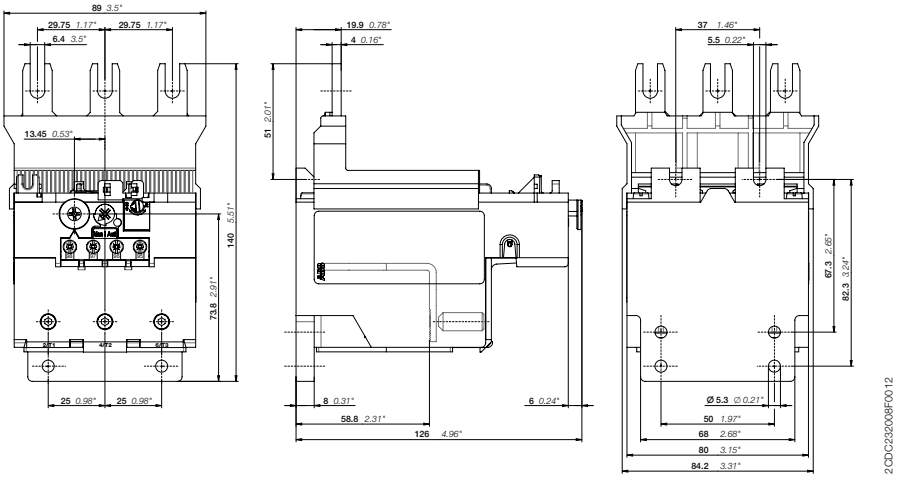
*Note: ATEX variant

Ordering details accessories

Suitable for	Description	Type	Order code		Weight (1 pce) kg
TF140DU	Reset push button*	KPR-101L	1SFA616162R1014		0.027

*Note: for more information see catalog 1SFC151004C0201

Main dimensions mm, *inches*



TF140DU

2CDC106054C0201a

TA200DU thermal overload relays – 66 to 200 A
Ordering details

TA200DU

KPR-101L

Description

The TA200DU thermal overload relays are economic electromechanical protection devices for the main circuit. They offer reliable protection for motors in the event of overload or phase failure. The devices have trip class 10A.

The thermal overload relays are three pole relays with bimetal tripping elements. The motor current flows through the bimetal tripping elements and heats them directly and indirectly. In case of an overload (over current), the bimetal elements bent as a result of the heating. This leads to a release of the relay and a change of the contacts switching position (95-96 / 97-98).

- Manual or automatic reset selectable
- Phase loss sensitive acc. to IEC/EN 60947-4-1
- TEST and STOP function – Trip indication on the front
- Temperature compensation
- Suitable for three- and single-phase applications
- ATEX variants available

Ordering details

Setting range A	Short-circuit protective device	Trip class	Type	Order code		Weight (1 pce) kg
66 ... 90	200 A, fuse type gG / 125 A aM	10A	TA200DU-90	1SAZ421201R1001		0.755
80 ... 110	224 A, fuse type gG / 160 A aM	10A	TA200DU-110	1SAZ421201R1002		0.760
100 ... 135	224 A, fuse type gG / 200 A aM	10A	TA200DU-135	1SAZ421201R1003		0.760
110 ... 150	250 A, fuse type gG / 200 A aM	10A	TA200DU-150	1SAZ421201R1004		0.760
130 ... 175	315 A, fuse type gG / 250 A aM	10A	TA200DU-175	1SAZ421201R1005		0.770
150 ... 200	315 A, fuse type gG / 250 A aM	10A	TA200DU-200	1SAZ421201R1006		0.785
66 ... 90	200 A, fuse type gG / 125 A aM	10A	TA200DU-90-V1000 1)	1SAZ421301R1001		0.755
80 ... 110	224 A, fuse type gG / 160 A aM	10A	TA200DU-110-V1000 1)	1SAZ421301R1002		0.760
100 ... 135	224 A, fuse type gG / 200 A aM	10A	TA200DU-135-V1000 1)	1SAZ421301R1003		0.760
110 ... 150	250 A, fuse type gG / 200 A aM	10A	TA200DU-150-V1000 1)	1SAZ421301R1004		0.760
130 ... 175	315 A, fuse type gG / 250 A aM	10A	TA200DU-175-V1000 1)	1SAZ421301R1005		0.770
150 ... 200	315 A, fuse type gG / 250 A aM	10A	TA200DU-200-V1000 1)	1SAZ421301R1006		0.785

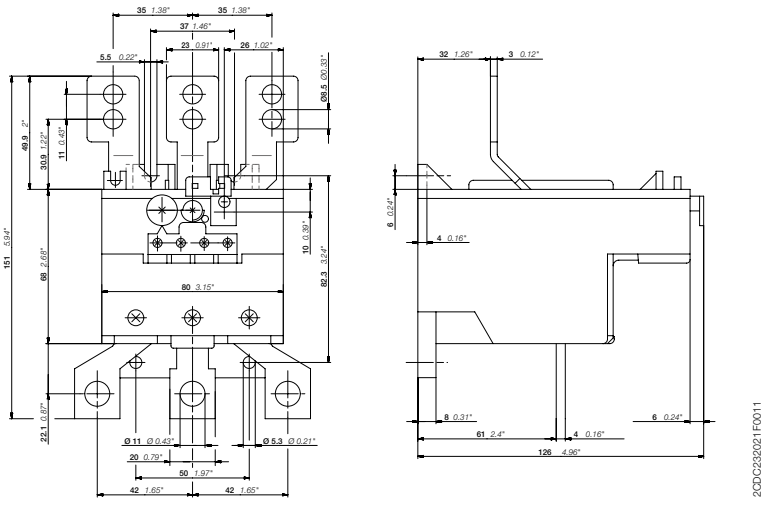
1) ATEX variant

Ordering details accessories

Suitable for	Description	Type	Order code		Weight (1 pce) kg
TA200DU	Terminal shroud	LT200/A	1SAZ401901R1001		0.090
TA200DU	Single mounting kit	DB200	1SAZ401110R0001		0.225
TA200DU	Reset push button*	KPR-101L	1SFA616162R1014		0.027

*Note: for more information see catalog 1SFC151004C0201

Main dimensions mm, *inches*



TA200DU

2CDC106038C0201a

E16DU, EF19, EF45 electronic overload relays – 0.10 to 45.0 A
Ordering details

2CDC231001R0007

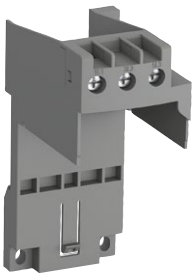
E16DU-1.0

1SBC101147F0010

EF19-18.9

1SBC101148F0010

EF45-30


2CDC231024V0013

DB19EF

2CDC231032V0014

DB45EF

1SFC151224F0002

KPR-101L

Description

The E16DU, EF19 and EF45 are self-supplied electronic overload relays, which means no extra external supply is needed. It offers reliable protection for motors in the event of overload or phase failure. Easy to use like a thermal overload relay and compatible with standard motor applications, the electronic overload relay is convincing, above all, due to its wide setting range, high accuracy, high operational temperature range and the possibility to select a trip class (10E, 20E, 30E). Further features are the temperature compensation, trip contact (N.C.), signal contact (N.O.), automatic or manual reset selectable, trip-free mechanism, STOP and TEST function and a trip indication. The overload relays are connected directly to the contactors. The EF19 and EF45 have ATEX certification [1].

Ordering details

Setting range A	Short-circuit protective device	Trip class	Type	Order code		Weight (1 pce) kg
E16DU electronic overload relays						
0.10 ... 0.32	1 A, fuse type gG	10E, 20E, 30E	E16DU-0.32	1SAX111001R1101		0.150
0.30 ... 1.00	4 A, fuse type gG	10E, 20E, 30E	E16DU-1.0	1SAX111001R1102		0.150
0.80 ... 2.70	10 A, fuse type gG	10E, 20E, 30E	E16DU-2.7	1SAX111001R1103		0.150
2.00 ... 6.30	20 A, fuse type gG	10E, 20E, 30E	E16DU-6.3	1SAX111001R1104		0.150
5.70 ... 18.9	50 A, fuse type gG	10E, 20E, 30E	E16DU-18.9	1SAX111001R1105		0.150
EF19 electronic overload relays [1]						
0.10 ... 0.32	1 A, fuse type gG	10E, 20E, 30E	EF19-0.32	1SAX121001R1101		0.158
0.30 ... 1.00	4 A, fuse type gG	10E, 20E, 30E	EF19-1.0	1SAX121001R1102		0.158
0.80 ... 2.70	10 A, fuse type gG	10E, 20E, 30E	EF19-2.7	1SAX121001R1103		0.158
1.90 ... 6.30	20 A, fuse type gG	10E, 20E, 30E	EF19-6.3	1SAX121001R1104		0.158
5.70 ... 18.9	50 A, fuse type gG	10E, 20E, 30E	EF19-18.9	1SAX121001R1105		0.158
EF45 electronic overload relays [1]						
9.00 ... 30.0	160 A, fuse type gG	10E, 20E, 30E	EF45-30	1SAX221001R1101		0.362
15.0 ... 45.0	160 A, fuse type gG	10E, 20E, 30E	EF45-45	1SAX221001R1102		0.362

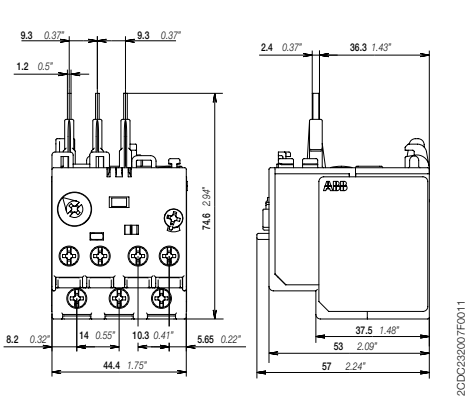
[1] ATEX is valid for products, produced from week 42, 2014.

Ordering details accessories

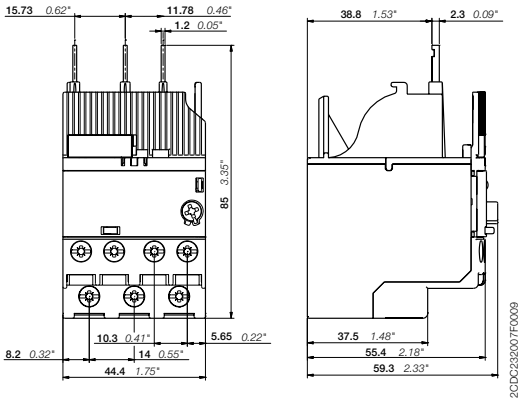
Suitable for	Description	Type	Order code		Weight (1 pce) kg
E16DU	Single mounting kit	DB16E	1SAX101110R0001		0.035
EF19	Single mounting kit	DB19EF	1SAX101910R1001		0.046
EF45	Single mounting kit	DB45EF	1SAX201910R0001		0.100
E16DU, EF19, EF45	Reset push button [2]	KPR-101L	1SFA616162R1014		0.019

[2] Note: for more information see catalog 1SFC151004C0201

Main dimensions mm, *inches*



E16DU



EF19

2CDC107032C0201a

EF65, EF96, EF146 electronic overload relays – 20 to 150 A
Ordering details

2CDC231001F0012

EF65-70

2CDC231002F0012

EF96-100

2CDC231003F0012

EF146-150

2CDC231001V0015

DB96

2CDC231002V0015

DB96 + EF96

1SFC151224F0002

KPR-101L

Description

The EF65, EF96 and EF146 are self-supplied electronic overload relays, which means no extra external supply is needed. It offers reliable protection for motors in the event of overload or phase failure. Easy to use like a thermal overload relay and compatible with standard motor applications, the electronic overload relay is convincing, above all, due to its wide setting range, high accuracy, high operational temperature range and the possibility to select a trip class (10E, 20E, 30E). Further features are the temperature compensation, trip contact (N.C.), signal contact (N.O.), automatic or manual reset selectable, trip-free mechanism, STOP and TEST function and a trip indication. The overload relays are connected directly to the contactors. The EF65, EF96 and EF146 have ATEX certification [1].

Ordering details

Setting range A	Short-circuit protective device	Trip class	Type	Order code		Weight (1 pce) kg
20 ... 56	160 A, fuse type gG	10E, 20E, 30E	EF65-56	1SAX331001R1102		0.821
25 ... 70	160 A, fuse type gG	10E, 20E, 30E	EF65-70	1SAX331001R1101		0.821
36 ... 100	200 A, fuse type gG	10E, 20E, 30E	EF96-100	1SAX341001R1101		0.802
54 ... 150	315 A, fuse type gG	10E, 20E, 30E	EF146-150	1SAX351001R1101		0.879

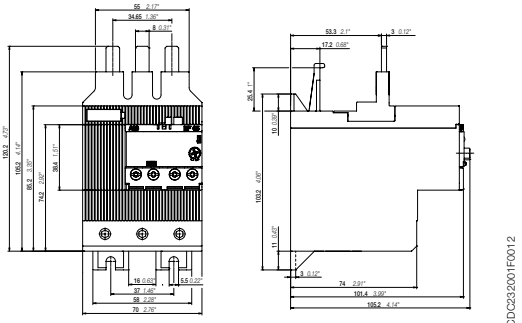
[1] ATEX is valid for products, produced from week 42, 2014. ATEX certification is valid for EF65-56, produced from week 47, 2015.

Ordering details accessories

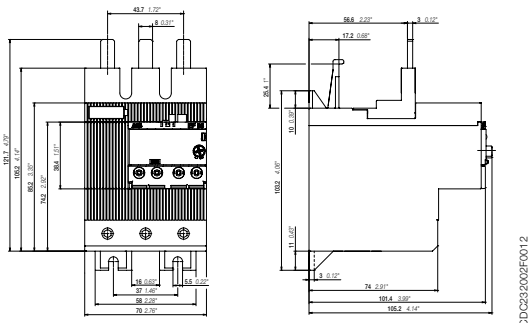
Suitable for	Description	Type	Order code		Weight (1 pce) kg
EF96, TF96	Single mounting kit	DB96	1SAZ901901R1001		0.190
EF65, EF96, EF146	Reset push button [2]	KPR-101L	1SFA616162R1014		0.019

[2] Note: for more information see catalog 1SFC151004C0201

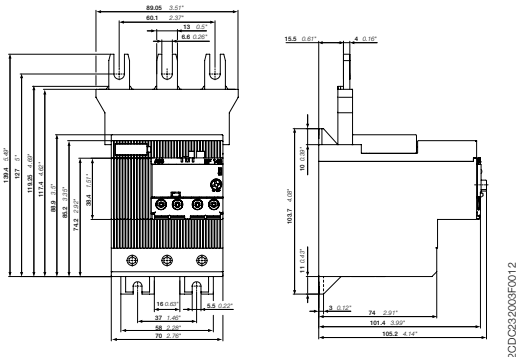
Main dimensions mm, *inches*


2CDC232001F0012

EF65-56 / EF65-70


2CDC232002F0012

EF96-100


2CDC232003F0012

EF146-150

2CDC107038C0201a

6

EF205, EF370 electronic overload relays – 63 to 380 A
Ordering details

EF205-210

EF370-380

KPR-101L

Description

The EF205 and EF370 are self-supplied electronic overload relays, which means no extra external supply is needed. It offers reliable protection for motors in the event of overload or phase failure. Easy to use like a thermal overload relay and compatible with standard motor applications, the electronic overload relay is convincing, above all, due to its wide setting range, high accuracy, high operational temperature range and the possibility to select a trip class (10E, 20E, 30E). Further features are the temperature compensation, trip contact (N.C.), signal contact (N.O.), automatic or manual reset selectable, trip-free mechanism, STOP and TEST function and a trip indication. The overload relays are connected directly to the contactors. The EF205 and EF370 have ATEX certification [1].

Ordering details

Setting range A	Short-circuit protective device	Trip class	Type	Order code		Weight (1 pce) kg
63 ... 210	1250 A, fuse type gG	10E, 20E, 30E	EF205-210	1SAX531001R1101		1.210
115 ... 380	1600 A, fuse type gG	10E, 20E, 30E	EF370-380	1SAX611001R1101		1.430

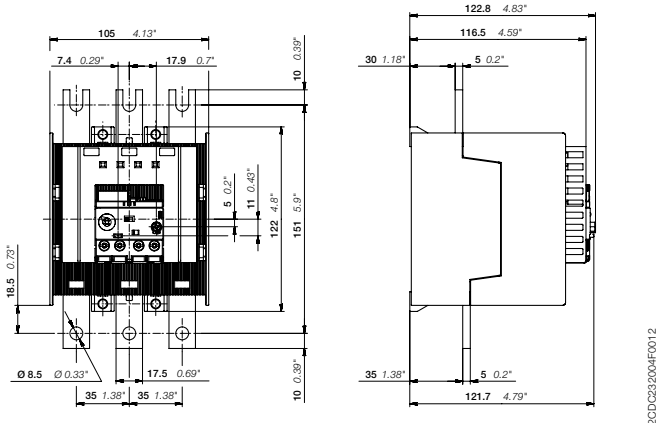
[1] ATEX is valid for products, produced from week 42, 2014.

Ordering details accessories

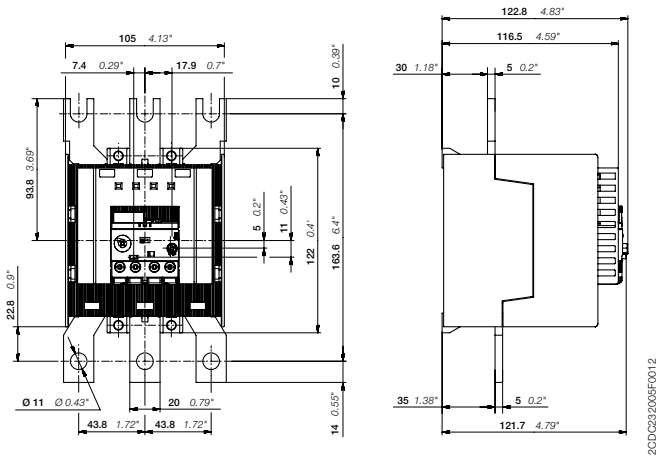
Suitable for	Description	Type	Order code		Weight (1 pce) kg
EF205, EF370	Reset push button [2]	KPR-101L	1SFA616162R1014		0.027
EF205	Terminal shroud	LT200E	1SAX501904R0001		0.085
EF370	Terminal shroud	LT320E	1SAX601904R0001		0.105

[2] Note: for more information see catalog 1SFC151004C0201

Main dimensions mm, *inches*



EF205-210



EF370-380

2CDC107040C0201a

EF460, EF750 electronic overload relays – 150 to 800 A
Ordering details

2CDC231013F0013

EF460-500

2CDC231014F0013

EF750-800

1SFC151224F0002

KPR-101L

Description

The EF460 and EF750 are self-supplied electronic overload relays, which means no extra external supply is needed. It offers reliable protection for motors in the event of overload or phase failure. Easy to use like a thermal overload relay and compatible with standard motor applications, the electronic overload relay is convincing, above all, due to its wide setting range, high accuracy, high operational temperature range and the possibility to select a trip class (10E, 20E, 30E). Further features are the temperature compensation, trip contact (N.C.), signal contact (N.O.), automatic or manual reset selectable, trip-free mechanism, STOP and TEST function and a trip indication. Busbar kits are available as accessory for contactor mounting. The EF460 and EF750 have ATEX certification [1].

Ordering details

Setting range A	Short-circuit protective device	Trip class	Type	Order code		Masse (1 pce) kg
EF460 electronic overload relay [1]						
150 ... 500	690 V: 630 A, Type gG 1000 V: 1600 A, Type gG	10E, 20E, 30E	EF460-500	1SAX721001R1101		1.170
EF750 electronic overload relay [1]						
250 ... 800	690 V: 800 A, Type gG 1000 V: 1600 A, Type gG	10E, 20E, 30E	EF750-800	1SAX821001R1101		3.905

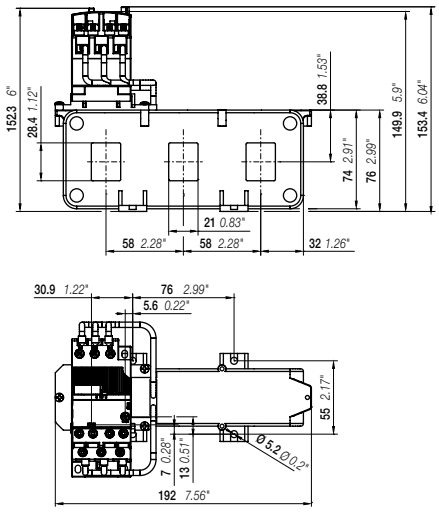
[1] ATEX is valid for products, produced from week 42, 2014.

Ordering details accessories

Suitable for	Description	Type	Order code		Weight (1 pce) kg
EF460, EF750	Reset push button [2]	KPR-101L	1SFA616162R1014		0.027
EF460	Terminal shroud	LT460EF	1SAX701904R0002		0.320
EF750	Terminal shroud	LT750EF	1SAX801904R0002		0.440
EF460	DT500/AF460-S Mounting Kit short for mounting of EF460DU on AF460	DT500/AF460-S	1SAX701902R1011		0.635
EF460	DT500/AF460-L Mounting Kit long for mounting of EF460DU on AF460	DT500/AF460-L	1SAX701902R1001		0.740
EF750	DT800/AF750-S Mounting Kit short for mounting of EF750DU on AF750	DT800/AF750-S	1SAX801902R1011		1.000
EF750	DT800/AF750-L Mounting Kit long for mounting of EF750DU on AF750	DT800/AF750-L	1SAX801902R1001		1.475

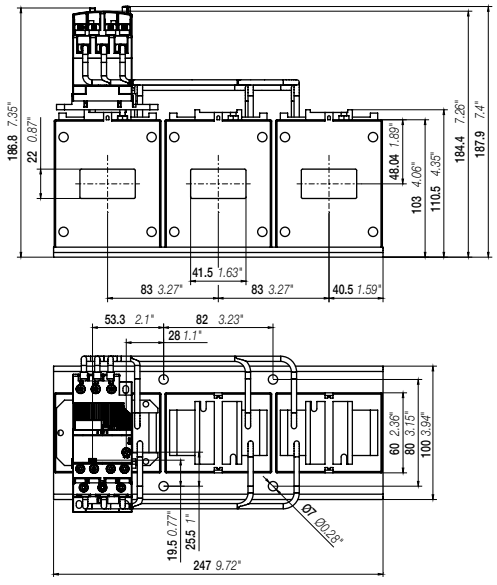
[2] Note: for more information, see catalog 1SFC151004C0201.

Main dimensions mm, *inches*



2CDC232008F0013

EF460-500

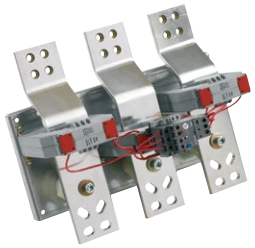


2CDC232009F0013

EF750-800

2CDC1070450201a

E1250DU electronic overload relays – 375 to 1250 A
Ordering details



E1250DU-1250

Description

The E1250DU are self-supplied electronic overload relays, which means no extra external supply is needed. It offers reliable protection for motors in the event of overload or phase failure. Easy to use like a thermal overload relay and compatible with standard motor applications, the electronic overload relay is convincing, above all, due to its wide setting range, high accuracy, high operational temperature range and the possibility to select a trip class (10E, 20E, 30E). Further features are the temperature compensation, trip contact (N.C.), signal contact (N.O.), automatic or manual reset selectable, trip-free mechanism, STOP and TEST function and a trip indication. Busbar kits are available as accessory for contactor mounting.

Ordering details

Setting range A	Short-circuit protective device	Trip class	Type	Order code		Weight (1 pce) kg
E1250DU electronic overload relay						
375 ... 1250	-	10E, 20E, 30E	E1250DU-1250	1SFA739001R1000		12.181

6

2CDC107031C0201a

Thermal and electronic overload relays
General accessories

WRB-400

WRH-F

Description

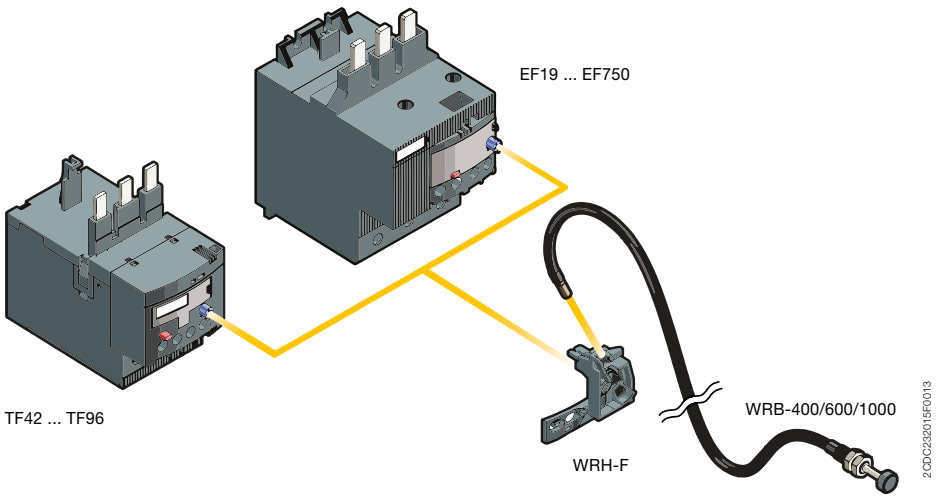
The wire reset is a general accessory for thermal and electronic overloads relays. In installations which are difficult to access, like a motor control centre or compact cubical, the accessory allows the user to remotely reset the overload relays.

The wire reset consists of two parts, the bowden wire with actuator and the holder. The actuator should be mounted into a door of a panel. The holder will be mounted on the overload relay. The actuator and holder are connected via the bowden wire.

Ordering details

Suitable for	Description	Length mm	Type	Order code		Weight (1 pce) kg
Holder						
TF42, TF65, TF96, EF19, EF45, EF65, EF96, EF146, EF205, EF370, EF460, EF750	Holder for tool less direct mounting		WRH-F	1SAZ701903R1001		0.006
Bowden wire with actuator						
WRH-F	Bowden wire with actuator, hole diameter: 7.3 mm, maximum panel thickness: 12 mm	400	WRB-400	1SAZ701903R1011		0.030
		600	WRB-600	1SAZ701903R1012		0.040
		1000	WRB-1000	1SAZ701903R1013		0.060
IP54 gasket						
WRB-400 WRB-600 WRB-1000	IP54 Panel seal gasket		WRBG	1SAZ701903R1030		0.037

Overload relays with accessory wire reset (WRH, WRB)



2CDC131059C0201

RESET
STOP
START

ABB

DRAS and DRAF enclosed starters

DRAS enclosed starter

Ordering details 7/2

Voltage code table 7/3

DRAF enclosed starter

Presentation 7/4

Ordering details 7/6

For direct product details information, use product type or order code, ex:
www.abb.com/productdetails/AF09-30-10-13 or www.abb.com/productdetails/1SBL137001R1310

DRAS09 ... DRAS16 enclosed direct-on-line starters
4 to 7.5 kW, protected by thermal overload relays
AC or DC operated

DRAS
+ T16 to be ordered separately

Description

Enclosed direct-on-line (DOL) starters are used for controlling 3-phase asynchronous motors up to 690 V AC.

Each starter is delivered assembled and wired. It contains:

– IP65 compact plastic enclosure with double insulation, equipped with:
  - 1 green flush "I" ON button and 1 red protruding "O" OFF/RESET button
  - 2 quarter-turn, quick fastening screws and a base with 6 cable inlets and outlets via knockouts.
– 1 AS or ASL 3-pole contactor with holding contact
– 1 PE and 1 neutral terminal.

3 versions of control supply wiring are available: phase-to-phase, separate supply or phase-to-neutral.

T16 thermal overload relay has to be ordered separately and choses according to motor's nominal current (see table below).

DRAS, DRASL enclosed DOL starters

IEC - AC-3				Rated control circuit voltage Uc Other control voltages see AS voltage code table		Control supply wiring	Type	Order code		Weight Pkg (1 pce)
Rated operational power 220 V 230 V 240 V	400 V	500 V	max. current θ ≤ 40 °C Ue=400 V							
kW	kW	kW	A	V 50/60 Hz	V DC					kg
AC operated with AS 3-pole contactors										
2.2	4	4	9	24	-	Separate supply	DRAS09-20S	1SBK104235R2000		0.650
				230	-	Phase-to-neutral	DRAS09-26N	1SBK104135R2600		0.650
				240	-	Phase-to-neutral	DRAS09-27N	1SBK104135R2700		0.650
				400	-	Phase-to-phase	DRAS09-28P	1SBK104035R2800		0.650
				415	-	Phase-to-phase	DRAS09-29P	1SBK104035R2900		0.650
3	5.5	5.5	12	24	-	Separate supply	DRAS12-20S	1SBK114235R2000		0.650
				230	-	Phase-to-neutral	DRAS12-26N	1SBK114135R2600		0.650
				240	-	Phase-to-neutral	DRAS12-27N	1SBK114135R2700		0.650
				400	-	Phase-to-phase	DRAS12-28P	1SBK114035R2800		0.650
				415	-	Phase-to-phase	DRAS12-29P	1SBK114035R2900		0.650
4	7.5	7.5	15.5	24	-	Separate supply	DRAS16-20S	1SBK124235R2000		0.650
				230	-	Phase-to-neutral	DRAS16-26N	1SBK124135R2600		0.650
				240	-	Phase-to-neutral	DRAS16-27N	1SBK124135R2700		0.650
				400	-	Phase-to-phase	DRAS16-28P	1SBK124035R2800		0.650
				415	-	Phase-to-phase	DRAS16-29P	1SBK124035R2900		0.650
DC operated with ASL 3-pole contactors										
2.2	4	4	9	-	24	Separate supply	DRASL09-81S	1SBK104335R8100		0.700
				-	48		DRASL09-83S	1SBK104335R8300		0.700
3	5.5	5.5	12	-	24	Separate supply	DRASL12-81S	1SBK114335R8100		0.700
				-	48		DRASL12-83S	1SBK114335R8300		0.700
4	7.5	7.5	15.5	-	24	Separate supply	DRASL16-81S	1SBK124335R8100		0.700
				-	48		DRASL16-83S	1SBK124335R8300		0.700

T16

T16 thermal overload relays to be ordered separately

Setting range A	Short-circuit protective device	Trip class	Type	Order code		Weight (1 pce) kg
0.10...0.13	0.5 A, Fuse type T	10	T16-0.13	1SAZ711201R1005		0.100
0.13...0.17	1.0 A, Fuse type T		T16-0.17	1SAZ711201R1008		0.100
0.17...0.23			T16-0.23	1SAZ711201R1009		0.100
0.23...0.31			T16-0.31	1SAZ711201R1013		0.100
0.31...0.41	2.0 A, Fuse type gG		T16-0.41	1SAZ711201R1014		0.100
0.41...0.55			T16-0.55	1SAZ711201R1017		0.100
0.55...0.74	4.0 A, Fuse type gG		T16-0.74	1SAZ711201R1021		0.100
0.74...1.00	6.0 A, Fuse type gG		T16-1.0	1SAZ711201R1023		0.100
1.00...1.30			T16-1.3	1SAZ711201R1025		0.100
1.30...1.70	10.0 A, Fuse type gG		T16-1.7	1SAZ711201R1028		0.100
1.70...2.30			T16-2.3	1SAZ711201R1031		0.100
2.30...3.10			T16-3.1	1SAZ711201R1033		0.100
3.10...4.20	20.0 A, Fuse type gG		T16-4.2	1SAZ711201R1035		0.100
4.20...5.70			T16-5.7	1SAZ711201R1038		0.100
5.70...7.60	35.0 A, Fuse type gG		T16-7.6	1SAZ711201R1040		0.100
7.60...10.0			T16-10	1SAZ711201R1043		0.104
10.0...13.0	40.0 A, Fuse type gG		T16-13	1SAZ711201R1045		0.104
13.0...16.0			T16-16	1SAZ711201R1047		0.104

Empty enclosure with push-button

Empty enclosure with push-button

-	-	-	FR16AS-12VARS	1SBN101035R1000		0.394

To be completed with AS or ASL contactor, T16 thermal overload relay and MCB-10B (1SFA611610R2001) contact block.

1SBC133001S0201

Voltage code table

DRAS09 ... DRAS16 and DRASL09 ... DRASL16 enclosed DOL starters

Type

DR **AS16** - **26N**

Contactor type

AS	AC operated
ASL	DC operated

AS contactors AC coil code	50 Hz	60 Hz
20 S	24 V	24 V
21 S	42 V	42 V
22 S	48 V	48 V
16 N	-	120 V
23 N	110 V	110 V
24 N	115 V	115 V
25 N	220 V	220 V
26 N	**230 V**	**230 V**
27 N	240 V	240 V
13 P	380 V	380 V
17 P	-	277 V
28 P	400 V	400 V
29 P	415 V	415 V

ASL contactors DC coil code	
81 S	24 V
83 S	48 V

Control supply wiring	
S	Separate supply
N	Phase-to-neutral
P	Phase-to-phase

1SBC133003S0201

DRAF enclosed direct-on-line starters
Experience reliable and easy to install motor starting

Improve installation efficiency

- Easy to connect and to operate
- Pre-wired control circuit and easy to follow wiring instructions
- Coil energy consumption down by 80%.

Reliable in harsh condition

- High number of electrical and mechanical operations
- Robust IP66 and type 4X enclosure
- Double electrical insulation.

Continuous operation

- AF contactors manage voltage fluctuation, chattering free
- Protected motor with thermal overload relay
- Safety through coordinated product.

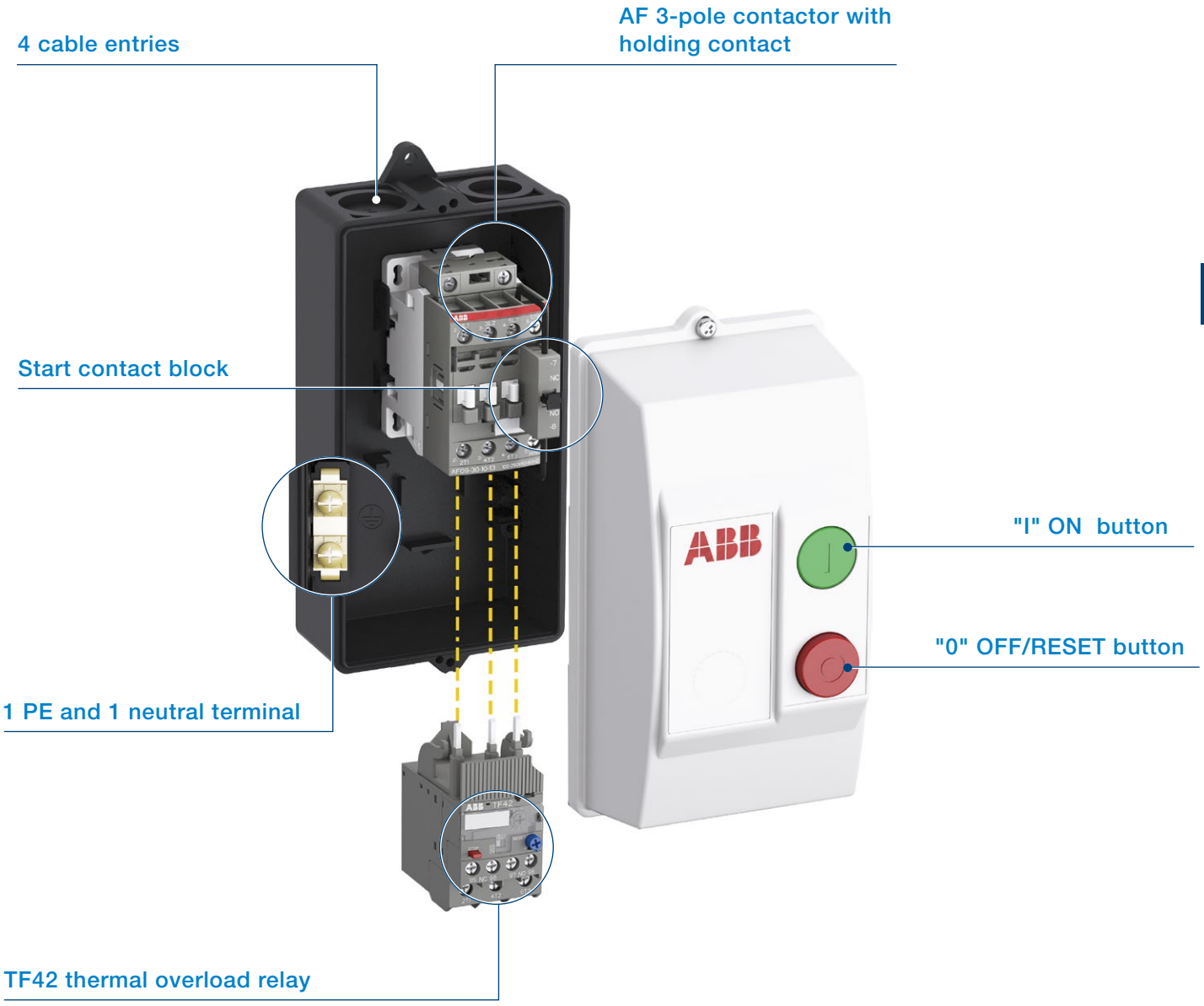
For machine or wall mounting

Main applications

Control of stand alone motors like for heat pumps, air conditioning units, small machine tools, compressors, pumping, irrigation...

1SBC133007S0201

Motor starting solutions up to 7.5 kW and 10 hp



1SBC133008S0201

DRAF09 … DRAF16 enclosed direct-on-line starters
Up to 7.5 kW and 10 hp, protected by thermal overload relays AC operated

1SBC133005W0014

DRAF
+ TF42 to be ordered separately

Description

Enclosed direct-on-line (DOL) starters are used for controlling 3-phase asynchronous motors up to 690 V AC.

Each starter is delivered assembled and wired. It contains:

– IP66 and type 4X plastic enclosure with double insulation, equiped with:
  - 1 green flush "I" ON button and 1 red protruding "O" OFF/RESET button
  - 4 cable inlets and outlets via knockouts.
– 1 AF 3-pole contactor with holding contact
– 1 CB5-10 start contact block
– 1 PE and 1 neutral terminal.

Control supply wiring:
IEC starters type: phase-to-phase, separate supply or phase-to-neutral.
UL starters type: separate supply.

TF42 thermal overload relay to be ordered separately and choses according to motor's nominal current (see table in the next page).

DRAF enclosed DOL starters

IEC - AC-3					Control supply wiring	Rated control circuit voltage Uc min ... Uc max (1)	Type	Order code		Weight Pkg (1 pce)
Rated operational power				max. current θ ≤ 40 °C Ue=400 V						
220 V 230 V 240 V	380 V 400 V	500 V	690 V							
kW	kW	kW	kW	A		V 50/60 Hz				kg
IEC starters type										
2.2	4	5.5	5.5	9	Separate supply	24…60	DRAF09-11S	1SBK134237R1100		0.820
					Phase-to-neutral	100…250	DRAF09-13N	1SBK134137R1300		0.820
					Phase-to-phase	250…500	DRAF09-14P	1SBK134037R1400		0.820
3	5.5	7.5	7.5	12	Separate supply	24…60	DRAF12-11S	1SBK154237R1100		0.820
					Phase-to-neutral	100…250	DRAF12-13N	1SBK154137R1300		0.820
					Phase-to-phase	250…500	DRAF12-14P	1SBK154037R1400		0.820
4	7.5	9	9	18	Separate supply	24…60	DRAF16-11S	1SBK174237R1100		0.820
					Phase-to-neutral	100…250	DRAF16-13N	1SBK174137R1300		0.820
					Phase-to-phase	250…500	DRAF16-14P	1SBK174037R1400		0.820

(1) Select DRAF..S with separate supply for 24…60 V DC control circuit voltage (change A2 - Us wire to blue color acc. to IEC 60947-4-1).

UL starter type with separate control supply wiring

UL / CSA						Rated control circuit voltage Uc min ... Uc max	Type	Order code		Weight Pkg (1 pce)
Horse power ratings										
Single phase motor		Three phase motor								
120 V	240 V	200 V 208 V	220 V 240 V	440 V 480 V	550 V 600 V					
hp	hp	hp	hp	hp	hp	V 50/60 Hz				kg
UL starters type										
0.75	1.5	2	2	5	7.5	24…60	DRAF09-11U	1SBK134238R1100		0.820
						100…250	DRAF09-13U	1SBK134238R1300		0.820
						250…500	DRAF09-14U	1SBK134238R1400		0.820
1	2	3	3	7.5	10	24…60	DRAF12-11U	1SBK154238R1100		0.820
						100…250	DRAF12-13U	1SBK154238R1300		0.820
						250…500	DRAF12-14U	1SBK154238R1400		0.820
1.5	3	5	5	10	15	24…60	DRAF16-11U	1SBK174238R1100		0.820
						100…250	DRAF16-13U	1SBK174238R1300		0.820
						250…500	DRAF16-14U	1SBK174238R1400		0.820

1SBC133006S0201

DRAF09 … DRAF16 enclosed direct-on-line starters
Up to 7.5 kW and 10 hp, protected by thermal overload relays
AC operated

TF42

TF42 thermal overload relays to be ordered separately

Setting range A	Short-circuit protective device	Trip class	Type	Order code		Weight (1 pce) kg
0.10 ... 0.13	0.5 A, Fuse type T	10	TF42-0.13	1SAZ721201R1005		0.130
0.13 ... 0.17	1.0 A, Fuse type T	10	TF42-0.17	1SAZ721201R1008		0.130
0.17 ... 0.23	1.0 A, Fuse type T	10	TF42-0.23	1SAZ721201R1009		0.130
0.23 ... 0.31	1.0 A, Fuse type T	10	TF42-0.31	1SAZ721201R1013		0.130
0.31 ... 0.41	2.0 A, Fuse type gG	10	TF42-0.41	1SAZ721201R1014		0.130
0.41 ... 0.55	2.0 A, Fuse type gG	10	TF42-0.55	1SAZ721201R1017		0.130
0.55 ... 0.74	4.0 A, Fuse type gG	10	TF42-0.74	1SAZ721201R1021		0.130
0.74 ... 1.00	6.0 A, Fuse type gG	10	TF42-1.0	1SAZ721201R1023		0.130
1.00 ... 1.30	6.0 A, Fuse type gG	10	TF42-1.3	1SAZ721201R1025		0.130
1.30 ... 1.70	10.0 A, Fuse type gG	10	TF42-1.7	1SAZ721201R1028		0.130
1.70 ... 2.30	10.0 A, Fuse type gG	10	TF42-2.3	1SAZ721201R1031		0.130
2.30 ... 3.10	10.0 A, Fuse type gG	10	TF42-3.1	1SAZ721201R1033		0.130
3.10 ... 4.20	20.0 A, Fuse type gG	10	TF42-4.2	1SAZ721201R1035		0.130
4.20 ... 5.70	20.0 A, Fuse type gG	10	TF42-5.7	1SAZ721201R1038		0.130
5.70 ... 7.60	35.0 A, Fuse type gG	10	TF42-7.6	1SAZ721201R1040		0.130
7.60 ... 10.0	35.0 A, Fuse type gG	10	TF42-10	1SAZ721201R1043		0.130
10.0 ... 13.0	40.0 A, Fuse type gG	10	TF42-13	1SAZ721201R1045		0.130
13.0 ... 16.0	40.0 A, Fuse type gG	10	TF42-16	1SAZ721201R1047		0.130
16.0 ... 20.0	63.0 A, Fuse type gG	10	TF42-20	1SAZ721201R1049		0.145

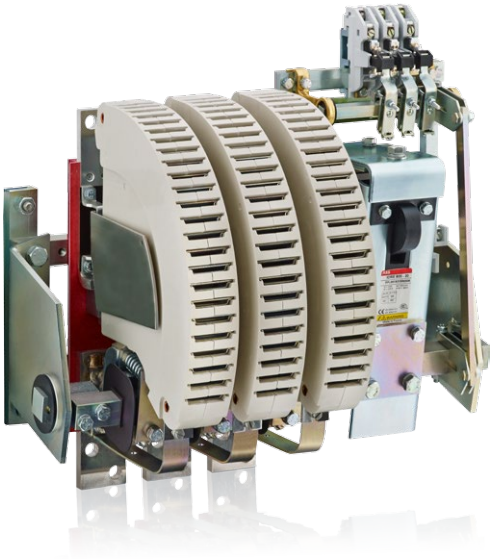
Empty enclosure with push-button

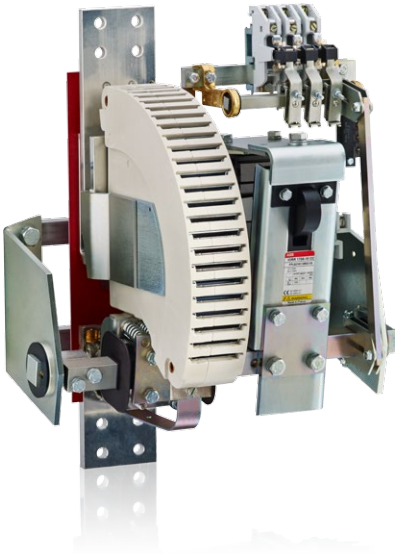
Empty enclosure with push-button

mm cable inlet/outlet suitable for IEC starter types	–	FR16AF-12	1SBN101337R1000		0.53
Inch cable inlet/outlet suitable for UL starter types	–	FR16AF-12U	1SBN101338R1000		0.53

To be completed with AF contactor, TF42 thermal overload relay and CB5-10 (1SBN010013R1010) start contact block.

1SBC133004S0201





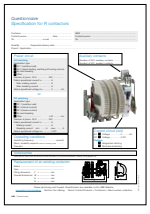
R contactors

Presentation 8/2

Download

For additional information refer to our main catalog.

Download main catalog



Submit your request with the dedicated form. Our expert will define the right contactor for your application.

Download the form

R contactors
Tailored to your needs

With over 100 years of experience in control, ABB has designed its R contactors to meet the particular requirements of power applications from 63 A up to 5000 A in AC and DC.

With a variable number of poles and advanced features, these tailor-made bar mounted contactors remain the most flexible solution. Robustness and reliability bring our technology far beyond the limits of standard contactors. Our know-how enables us to offer R contactors perfectly suited to your applications whatever the environment.

Performance
- High making and breaking capacity
- Current up to 5000 A
- Voltage up to 1000 V AC or 1500 V DC.

Flexibility
- Variable number of poles
- Combination of N.O. and N.C. poles
- Adjustable number of auxiliary contacts.

Reliability
- Robust construction
- Durability up to 5 millions of operating cycles
- Experienced and proven for years.

... you can trust

Easy maintenance
- Direct access to all the contactor parts for inspection or replacement
- Complete and didactic instruction manual for installation, inspection or maintenance
- Dedicated R contactors service support available by ABB.

From standard to tailor-made solution
- Pre-sales support to identify and define customer requirements
- Customized support with development of solutions from specifications
- Specialists available to optimize your configuration.

Sustainability of control for a wide variety of applications
- Iron and steel industries
- Mining
- Cranes
- Induction furnaces
- Hydroelectric power stations
- Photovoltaic power plants
- Power distribution
- Energy storage
- Railway substation
- Lighting equipment
- Pump stations.

1SBC104005S0201

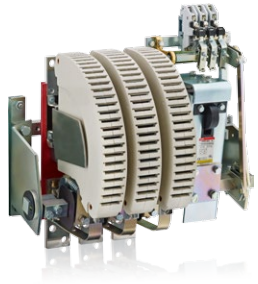
R contactors
Get the right product

Conventional applications

AC circuit switching

Up to 500 V AC
IOR contactors

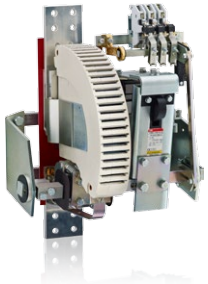
From 500 up to 1000 V AC
IOR..MT contactors



AC-1 Rated operational current up to 5000 A
AC-3 Rated power up to 1500 kW (1520 A - 440 V)

DC circuit switching

Up to 1500 V DC with poles in series
IOR..CC contactors



DC-1 Rated operational current up to 5000 A
DC-3 / DC-5 operational current up to 2000 A

Advanced applications

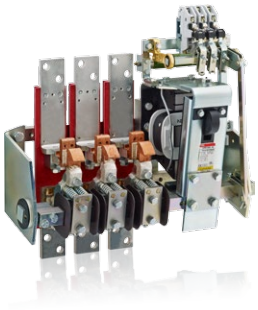
N.O./N.C. main poles combination

AC circuit switching
NOR..MT contactors

DC circuit switching
NOR..CC contactors

Power circuit coupling

Up to 1000 V AC / 1500 V DC
LOR couplers

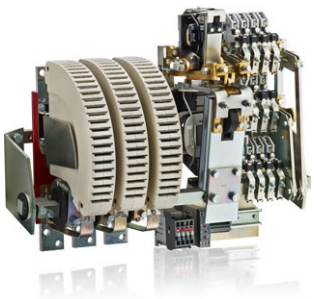


Slip-ring motor control

Uer up to 5000 V AC
FOR contactors

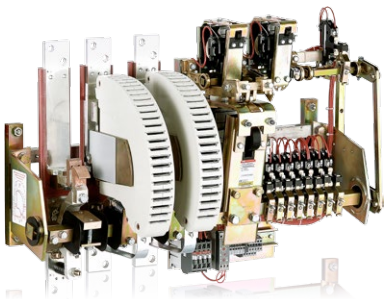
Energy saving and safety requirements

Equipped with latching
..AMA, ..AME contactor types



Alternator field discharge

Umax 2250 V DC
AM-CC-JORE contactors



1SBC104006S0201

Certifications and approvals

Certifications and approvals 9/2

Coordination with short-circuit protection devices 9/8

Certifications and approvals

Designed according to the appropriate specifications, the devices in this catalogue have been built and tested. They can be used in most countries without any further certifications.
Some countries, however, require certification according to their own national standards. In other cases, the Marine for example, approvals ratifying that particular specifications have been met are necessary.
The table below shows the approvals and certifications for different devices.
The following documents may be obtained on request:
– Certificates of conformity
– Certificates of certification or approval.
The use of certified devices does not exonerate the equipment supplier from complying with the legal specifications of the country concerned.

Explanation of symbols:

■ **Standard design approved**, the company labels bear the certification mark when this is required.

	Certifications						Approvals: ship classification societies							
Mark														
Abbreviation	CSA	UL	cULus	CCC	GOST or EAC	KC	BV	GL	LR	DNV	RINa	ABS	RMRS	CCS
Approved in	Canada	USA	North America	China	Russia	Korea	France	Germany	Gr.Britain	Norway	Italy	USA	Russia	China shipping
3-pole contactors														
4 to 7.5 KW														
AC operated AS09, AS12, AS16			■ E312527	■	■									
DC operated ASL09, ASL12, ASL16			■ E312527	■	■									
4 to 45 kW														
AC / DC operated AF09, AF12, AF16, AF26, AF30, AF38			■ E312527	■	■	■	■	■ (3)	■	■ (3)	■	■	■	
AC / DC operated AF40, AF52, AF65, AF80, AF96			■ E312527	■	■	■	■	■ (3)	■	■ (3)	■	■	■	
55 to 200 kW														
AC / DC operated (2) AF116, AF140, AF146			■ E36588	■	■		■	■	■	■	■	■		■
AC / DC operated (2) AF190, AF205, AF265, AF305, AF370			■ E36588	■	■		■	■	■	■	■	■		■
200 to 560 kW														
AC / DC operated AF400, AF460, AF580, AF750			■ E36588	■	■		■	■	■	■	■	■		■
AC / DC operated AF1250			■ E73397	■	■						■	■		■
AC / DC operated AF1350, AF1650			■ E36588	■	■		■	■	■		■	■		■
AC / DC operated AF2050			■ E73397	■	■						■	■		■
AC / DC operated AF2650			■ E73397	■	■						■			■
4-pole contactors														
25 to 125 A, AC-1														
AC / DC operated AF09, AF16, AF26, AF38			■ E312527	■	■	■	■	■ (3)	■	■ (3)	■	■	■	
AC / DC operated AF40, AF52, AF80			■ E312527	■	■	■						■		
160 to 525 A, AC-1														
AC / DC operated AF116, AF140, AF190, AF205, AF265, AF305, AF370			■ E73397		■	■ (1)	■	■	■	■				
800 to 1000 A AC-1														
AC operated EK550			■ E36588	■	■									
AC operated EK1000				■	■									
DC operated EK550			■ E36588	■	■									
DC operated EK1000				■	■									

(1) AF116 ... AF265 only. KC only applicable to devices up to 300 A. (2) Marine approvals for AF116 ... AF370 with built-in PLC interface: only DNV is available. (3) DNV-GL certificate.
All AF contactors are (RCM) marked.

1SBC100059S0201 - Rev. C

Certifications and approvals

	Certifications						Approvals: ship classification societies							
Mark														
Abbreviation	CSA	UL	cULus	CCC	GOST or EAC	KC	BV	GL	LR	DNV	RINa	ABS	RMRS	CCS
Approved in	Canada	USA	North America	China	Russia	Korea	France	Germany	Gr.Britain	Norway	Italy	USA	Russia	China shipping
DC switching contactors														
AC operated GA75	■	■ E319322		■										
DC operated GAE75	■	■ E319322		■										
AC / DC operated GAF185 ... GAF300			■ E73397	■										
AC / DC operated GAF460, GAF750, GAF1250, GAF1650, GAF2050			■ E73397	■										
Capacitor switching contactors														
AC operated UA16		■ E312527		■	■									
AC operated UA26 ... UA75	■	■ E312527		■	■									
AC operated UA95, UA110			■ E36588	■	■									
AC operated UA16..RA		■ E312527		■	■									
AC operated UA26..RA ... UA75..RA	■	■ E312527		■	■									
AC operated UA95..RA, UA110..RA			■ E36588	■	■									
Contactor relays														
AC operated 4-pole, 8-pole - NS..			■ E252354	■	■									
DC operated 4-pole, 8- pole - NSL..			■ E252354	■	■									
AC / DC operated 4-pole, 8-pole - NF..			■ E252354	■	■		■	■	■	■	■	(1)	■	

(1) in progress.
All GAF and NF contactors are (RCM) marked.

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Certifications and approvals

	Certifications					Approvals: ship classification societies							
Mark	CSA	UL	cULus	CCC	GOST or EAC	BV	GL	LR	DNV	RINa	ABS	RMRS	CCS
Abbreviation	CSA	UL	cULus	CCC	GOST or EAC	BV	GL	LR	DNV	RINa	ABS	RMRS	CCS
Approved in	Canada	USA	North America	China	Russia	France	Germany	Gr.Britain	Norway	Italy	USA	Russia	China shipping
Accessories for AS09 ... AS16 contactors													
Auxiliary contacts													
CA3			■ E252354	■	■								
Mechanical interlock unit													
VM3			■ E312527		■	□	□	□	□	□	□	□	□
Connecting links													
BEA16-3			■ E312527		■	□	□	□	□	□	□	□	□
BEA16-3U			■ E312527			□	□	□	□	□	□	□	□
BER16C-3			■ E312527		■	□	□	□	□	□	□	□	□
BEY16C-3			■ E312527		■	□	□	□	□	□	□	□	□
Electronic timer													
TEF3			■ E252354		■								
Surge suppressors													
RT5			■ E312527		■								
RC5-1			■ E312527		■								
RV5			■ E312527		■								
Accessories for AF09 ... AF2650 and EK contactors and NF contactor relays													
Auxiliary contacts													
CA4, CC4			■ E252354	■	■	■ (CA4)	■ (CA4)	■	■ (CA4)	■	■	■	
CAT4			■ E252354	■	■	■	■	■		■	■	■	
CAL4			■ E252354	■	■	■	■	■		■	■	■	
CAL19			■ E76003	■	■	■	■	■	■	■	■		■
CAL18			■ E76003	■	■	■	■	■	■	■	■		■
CAL16			■ E76003	■	■								
CE5...D0.1		■ E319322		■	■								
CE5...D2		■ E319322		■	■								
CE5...W0.1		■ E319322		■	■								
CE5...W2		■ E319322			■								
CEL18			■ E76003		■								
Electronic timer													
TEF4			■ E252354		■								
Mechanical / electrical interlock unit													
VEM4			■ E312527	■	■								
Mechanical interlock units													
VM4, VM96-4			■ E312527		■	□	□	□	□	□	□	□	□
VM19			■ E36588		■	□	□	□	□	□	□	□	□
VM140/190			■ E36588		■	□	□	□	□	□	□	□	□
VM205/265			■ E36588		■	□	□	□	□	□	□	□	□
VM 750			■ E36588		■	□	□	□	□	□	□	□	□
VM1650H			■ E36588		■	□	□	□	□	□	□	□	□
Interface relay													
RA4			■ E252354		■								

□ Marine approvals not needed for this accessory.

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Certifications and approvals

	Certifications					Approvals: ship classification societies							
Mark	CSA	UL	cULus	CCC	GOST or EAC	BV	GL	LR	DNV	RINa	ABS	RMRS	CCS
Abbreviation	CSA	UL	cULus	CCC	GOST or EAC	BV	GL	LR	DNV	RINa	ABS	RMRS	CCS
Approved in	Canada	USA	North America	China	Russia	France	Germany	Gr.Britain	Norway	Italy	USA	Russia	China shipping
Latching unit													
WB75-A		■ E252354			■								
WA4		(1)											
Connecting links with manual motor starters													
BEA16-4, BEA26-4, BEA38-4, BEA65-4			■ E312527		■	□	□	□	□	□	□	□	□
Connection sets for reversing contactors													
BER16-4, BER38-4			■ E312527		■	□	□	□	□	□	□	□	□
BER65-4, BER96-4			■ E312527		■	□	□	□	□	□	□	□	□
BER140-4, BER205-4, BER370-4			■ E36588		■	□	□	□	□	□	□	□	□
BEM460-30, BEM750-30			■ E36588		■	□	□	□	□	□	□	□	□
Connection sets for star-delta starters													
BEY16-4, BEY38-4			■ E312527		■	□	□	□	□	□	□	□	□
BEY65-4, BEY96-4			■ E312527		■	□	□	□	□	□	□	□	□
BEY190-4, BEY205-4, BEY265-4, BEY370-4			■ E36588		■	□	□	□	□	□	□	□	□
BED460, BED580, BED750			■ E36588		■	□	□	□	□	□	□	□	□
Phase to phase connections													
BEP140-30, BEP205-30, BEP370-30			■ E36588		■	□	□	□	□	□	□	□	□
BEP140-40, BEP205-40, BEP370-40						□	□	□	□	□	□	□	□
BES460, BES750			■ E36588		■	□	□	□	□	□	□	□	□
Connection bars between contactors and MCCB													
BEA140/XT2			■ E36588			□	□	□	□	□	□	□	□
BEA205/XT4			■ E36588			□	□	□	□	□	□	□	□
BEA370/T5			■ E36588			□	□	□	□	□	□	□	□
Terminal connecting strips and shorting bars													
LY16-4, LY38-4			■ E312527		■	□	□	□	□	□	□	□	□
LY110, LY185, LY300, LY460, LY750			■ E36588		■	□	□	□	□	□	□	□	□
LP185, LP300, LP460, LP750			■ E36588		■	□	□	□	□	□	□	□	□
LH38-4			■ E312527		■	□	□	□	□	□	□	□	□
LF16-4, LF38-4			■ E312527		■	□	□	□	□	□	□	□	□
LG16-4			■ E312527		■	□	□	□	□	□	□	□	□
LK96-4			■ E312527			□	□	□	□	□	□	□	□
Additional coil terminal blocks													
LD38-4			■ E312527			□	□	□	□	□	□	□	□
Additional terminal blocks													
LDC4			■ E312527			□	□	□	□	□	□	□	□
Protective covers													
BX4, BX4-CA			■ E252354			□	□	□	□	□	□	□	□
Terminal shrouds													
LT65-30 ... LT96-30			□			□	□	□	□	□	□	□	□
LT52-40 ... LT80-40			□			□	□	□	□	□	□	□	□
LT140 ... LT750			■ E36588		■	□	□	□	□	□	□	□	□
LT140-40 ... LT370-40			■ E73397		■	□	□	□	□	□	□	□	□
Terminal enlargement													
LW			■ E36588		■	□	□	□	□	□	□	□	□

(1) In progress. □ Marine approvals not needed for this accessory.

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Certifications and approvals

	Certifications							Approvals: ship classification societies						
Mark	CSA	UL	cULus	CCC	GOST or EAC	ATEX	KC	BV	GL	LR	DNV	RINa	ABS	RMRS
Abbreviation	CSA	UL	cULus	CCC	GOST or EAC	ATEX	KC	BV	GL	LR	DNV	RINa	ABS	RMRS
Approved in	Canada	USA	North America	China	Russia		Korea	France	Germany	Gr.Britain	Norway	Italy	USA	Russia
Teminal extension														
LX			■ E36588		■	□		□	□	□	□	□	□	□
Connection socket														
LL			■ E36588		■	□		□	□	□	□	□	□	□
Connection modules														
LD146-30, LD146-40			■ E36588		■	□		□	□	□	□	□	□	□
Function marker														
BA4			■ E252354			□		□	□	□	□	□	□	□
Fixing clip														
BB4			■ E312527			□		□	□	□	□	□	□	□
Manual motor starters														
MS116			■ E137861	■	■		■ (4)	■ (1)	■	■	■		■	■
MS132			■ E137861 E345003	■	■	■	■ (4)	■	■	■	■	■	■	■
MS165			■ E137861 E345003	■	■	■ (2)	■ (3)			■			■	
MS495	■	■ E167205 E195536		■	■	■		■	■	■	■			■
MS497	■	■ E167205 E195536		■	■	■		■	■	■	■			■
Manual motor starters magnetic only														
MO132			■ E137861 E345003	■	■		■ (4)	■	■	■	■	■	■	■
MO165			■ E137861 E345003	■	■		■ (3)			■			■	
MO495	■	■ E167205			■						■			
MO496	■	■ E167205			■						■			
Circuit breaker for transformer protection														
MS132-T	■			■			■ (4)							
Mini contactors														
3-pole contactors														
AC operated B6, B7			■ E191658	■	■			■	■	■	■			■
DC operated BC6, BC7, B7D			■ E191658	■	■			■	■	■	■			■
DC operated B6S, B7S			■ E191658	■	■			■	■	■	■			■
3-pole reversing contactors														
AC operated VB6, VB7			■ E191658	■	■				■					■
DC operated VBC6, VBC7			■ E191658	■	■				■					■
AC operated VB6A, VB7A			■ E191658	■	■				■					■
DC operated VBC6A, VBC7A			■ E191658	■	■				■					■
3-pole interface contactors														
DC operated BC6, BC7			■ E191658	■	■			■	■	■	■			■
3-pole contactor - large coil voltage range														
DC operated TBC7														

(1) MS116 up to 16 A only. (2) ATEX certification for MS165 is valid for production from week 49, 2015. (3) KC certification for MS165/MO165 is valid for production from week 2, 2016. (4) KC certification for MS116/MS132/MO132/MS132-T is valid for production from week 6, 2016. □ Marine approvals not needed for this accessory.

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Certifications and approvals

	Certifications							Approvals: ship classification societies						
Mark														
Abbreviation	CSA	UL	cULus	CCC	GOST or EAC	ATEX	KC	BV	GL	LR	DNV	RINa	ABS	RMRS
Approved in	Canada	USA	North America	China	Russia		Korea	France	Germany	Gr.Britain	Norway	Italy	USA	Russia
4-pole contactors														
AC operated B6, B7			■ E191658	■	■			■	■	■	■			■
DC operated BC6, B7D			■ E191658	■	■			■	■	■	■			■
4-pole contactor - large coil voltage range														
DC operated TBC7														
Contactor relays														
AC operated K6			■ E48139	■	■									■
DC operated KC6			■ E48139	■	■									■
Interface contactor relays														
DC operated KC6			■ E48139	■	■									■
DC operated K6S			■ E48139	■	■									■
Contactor relays - large coil voltage range														
DC operated TKC6														
Thermal overload relays														
T16			■ E48139	■	■			■	■	■	■	■	■	■
TF42			■ E48139	■	■	■		■	■	■	■	■	■	■
TF65			■ E48139	■	■	■ (3)		■		■	■	■	■	■
TF96			■ E48139	■	■	■ (3)		■		■	■	■	■	■
TF140DU			■ E48139	■	■			■		■	■	■	■	■
TF140DU-V1000			■ E48139	■	■	■		■		■	■	■	■	■
TA200DU			■ E48139	■	■			■	■	■	■		■	■
TA200DU-V1000			■ E48139	■	■	■		■	■	■	■		■	■
Electronic overload relays														
0.10...45 A														
E16DU			■ E48139	■	■									■
EF19			■ E48139	■	■	■		■		■	■	■	■	■
EF45			■ E48139	■	■	■		■		■	■	■	■	■
20...150 A														
EF65			■ E48139	■	■	■ (2)		■		■	■	■ (2)	■	■
EF96			■ E48139	■	■	■		■		■	■	■	■	■
EF146			■ E48139	■	■	■		■		■	■	■	■	■
63...380 A														
EF205			■ E48139	■	■	■		■		■	■	■	■	■
EF370			■ E48139	■	■	■		■		■	■	■	■	■
150...800 A														
EF460			■ E48139	■	■	■		■		■	■	■	■	■
EF750			■ E48139	■	■	■		■		■	■	■	■	■
150...1250 A														
E1250DU			■ E76003											■

(2) EF65-56 has no RINa approval and ATEX certification is valid for EF65-56 produced from week 47, 2015. (3) ATEX is valid for products produced from week 26, 2015.
All electronic overload relays are (RCM) marked : EF produced from week 47, 2015; E produced from week 14, 2016.

9

Coordination with short-circuit protection devices

In compliance with standards IEC 60947-4-1 and EN 60947-4-1, we define for the contactors and starters the type, rating and characteristics of the short-circuit protection devices SCPD which allow selective protection against overloads and ensure protection against short circuits.

Basic functions

Any starter is designed to:
– start motors,
– ensure continuous functioning of motors,
– disconnect motors from the supply line,
– guarantee protection of motors against overloads.

The starter is typically made up of a switching device (contactor) and an overload protection device (thermal overload relay or electronic overload relay).

These two devices MUST be coordinated with equipment capable of providing protection against short circuit (SCPD: short circuit protective device): typically a circuit breaker with magnetic release only or a switch fuse. These are not necessarily part of the starter.

Applicable standards

IEC 60947-4-1 (EN 60947-4-1) precisely defines the different points to be considered in order to carry out correct coordination.

Complete coordination for a combination includes the following points:
– Selectivity test between the overload relay and the short-circuit protection device SCPD.
– Short-circuit condition tests:
  - at prospective "r" currents - These currents depend on the rated operational current of the starter (**Ie** AC-3) and are given by the standard (Table 13). For example:
    r = 1kA for **Ie** AC-3 < 16 A
    r = 3 kA for 16 A < **Ie** AC-3 < 63 A
    r = 5 kA for 63 A < **Ie** AC-3 < 125 A etc.
  - at the rated conditional short-circuit current "**Iq**" - This is the maximum prospective current that the combination can withstand, for example 50 kA.

Types of coordination

IEC 60947-4-1 (EN 60947-4-1) defines two types of coordination according to the expected level of service continuity. Acceptable extreme damage for the switchgear is divided into two types.

Type 1: In short-circuit conditions, the contactor or starter does not endanger persons or installations and will not be able to then operate without being repaired or having parts replaced.

Type 2: In short-circuit conditions, the contactor or starter does not endanger persons or installations and will be able to operate afterwards. The risk of contacts light welding is acceptable. In this case, the manufacturer must stipulate the measures to be taken with respect to maintenance of the equipment.

The complete ABB offer

ABB has acquired years of experience with respect to problems of coordination and is able to make a complete offer based on tests performed in its qualified laboratories. This offer includes 400 V, 500 V, 690 V networks.

A complete data base of coordination tables, according to IEC 60947-4-1 (EN 60947-4-1), is available on the ABB Website.

In the coordination tables the following short-circuit protection devices are recommended:
– Moulded case circuit-breakers (MCCBs)
– Miniature circuit-breakers (MCBs)
– Switch-disconnector-fuses (aM, gG and BS)
– Manual Motor Starters (MMS).

General remarks applicable to all tables

– Each table is defined for a maximum ambient temperature of 40 °C. For higher temperatures, apply a derating factor according to the following rules:
  - Fuses: factor of 0.8 applied to **In** for an ambient temperature of 70 °C
  - MCCBs and MCBs: factor of 0.8 applied to **In** for an ambient temperature of 60 °C
  - The starter derating factor depends on the operating conditions of thermal overload relays:
    Factor of 0.9 applied to **In** for an ambient temperature of 70 °C.
– Each table is defined for motor currents: 3-phase motors, 4-pole
– **Normal starting** means a starting time < 2 s. - **Difficult starting** means an accelerating time 10 s < **ts** < 30 s
  Tripping classes of thermal overload relays according to IEC 60947-4-1 (EN 60947-4-1): 10A and 10
  Tripping classes of electronic overload relays according to IEC 60947-4-1 (EN 60947-4-1): 10E, 20E, 30E selectable
– In the tables with MCCBs, these are fitted with the magnetic relay alone. Setting is always carried out at > 12.3 **Ie** AC-3 so that the transient current peak occurring during starting does not lead to tripping.

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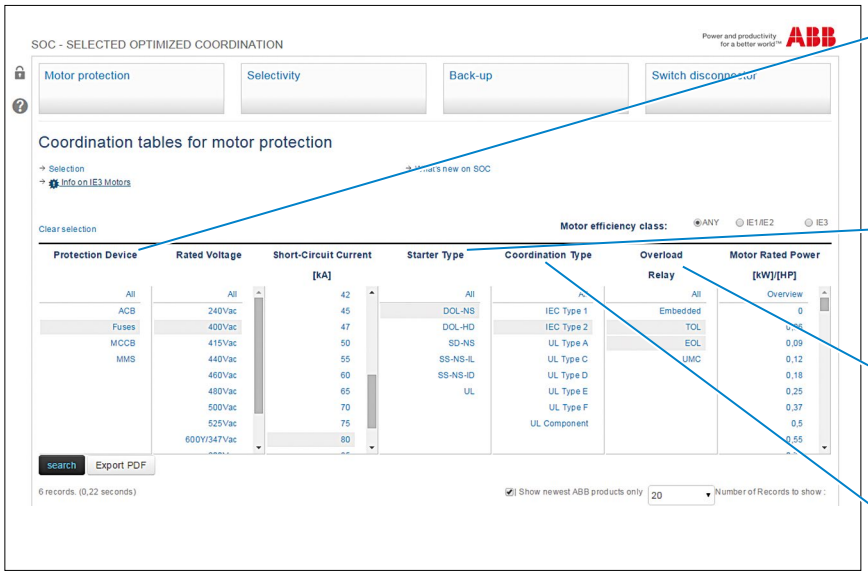
Coordination with short-circuit protection devices

A complete data base of coordination tables, according to **IEC 60947-4-1** (EN 60947-4-1) **or UL 508 / UL 60947-4-1**, is available on the ABB Website: see below.

Selection

Simple or multiple selections all from the same screen.



Short-circuit protection devices
- Air circuit breakers
- Fuses "gG" or "aM"
- Miniature circuit breaker
- Moulded case circuit breaker
- Manual motor starter

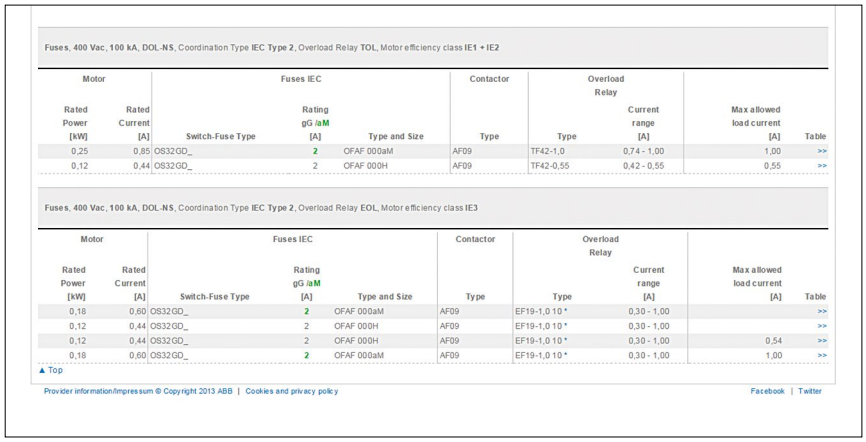
Starter type
- Direct-on-line normal start
- Direct-on-line heavy duty
- Star-delta normal start
- Soft starter normal start

Overload relay
- TOL : thermal overload relay
- EOL : electronic overload relay
- UMC : Universal motor controller

Coordination
- IEC type 1 or type 2
- UL type A to Type F

Results

- Search results displayed at the bottom of the selection page.
- Only the most appropriate solutions to your application, will be displayed at the bottom of the page.
  "Enable Smart Current Search" function featured for the short-circuit current where "near to" selected values also are included in the result.
- Possible to print the page to a pdf file or from your printer.
- "Clear selection" function to deselect all selected.



Access

To find the coordination tables for motor protection, please see:
http://applications.it.abb.com/SOC/Page/Selection.aspx

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Index

Order code classification

Order code	Type	Page
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1SAM101923R0012	MSMNO	2/28
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1SAM201901R1002	HKF1-20	2/17
1SAM201901R1003	HKF1-10	2/17
1SAM201901R1004	HKF1-01	2/17
1SAM201902R1001	HK1-11	2/17
1SAM201902R1002	HK1-20	2/17
1SAM201902R1003	HK1-02	2/17
1SAM201902R1004	HK1-20L	2/17
1SAM201903R1001	SK1-11	2/17
1SAM201903R1002	SK1-20	2/17
1SAM201903R1003	SK1-02	2/17
1SAM201904R1001	UA1-24	2/18
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1SAM201904R1005	UA1-230	2/18
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1SAM201906R1115	PS1-5-1-65	2/20
1SAM201906R1122	PS1-2-2-65	2/20
1SAM201906R1123	PS1-3-2-65	2/20
1SAM201906R1124	PS1-4-2-65	2/20
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1SAM201907R1101	S1-M1-25	2/20
1SAM201907R1102	S1-M2-25	2/20
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1SAM201910R1002	AA1-110	2/18
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1SAM201910R1004	AA1-400	2/18
1SAM201911R1010	IB132-G	2/22
1SAM201911R1011	IB132-Y	2/22
1SAM201912R1010	DMS132-G	2/22
1SAM201912R1011	DMS132-Y	2/22
1SAM201913R1103	S1-M3-35	2/20
1SAM201914R1001	PB1-1-32	2/20
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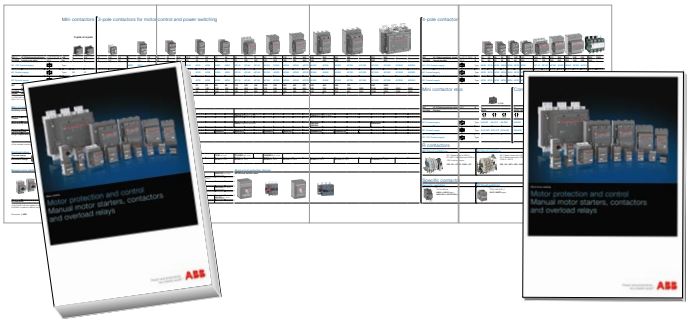

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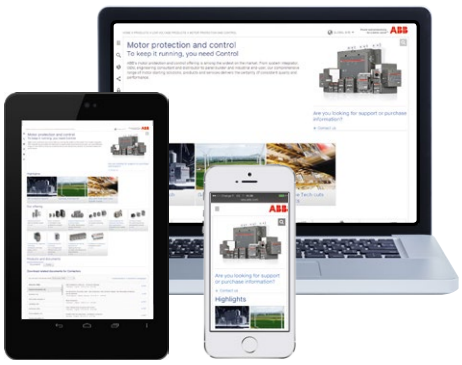

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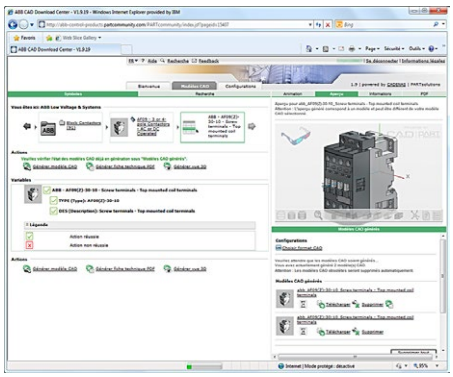

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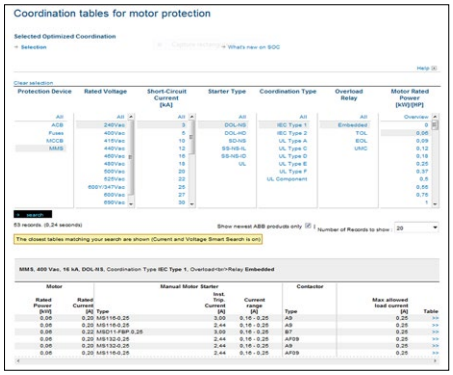

SOC II: Select the Optimized Coordination tables for your starter according to IEC or UL standard

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