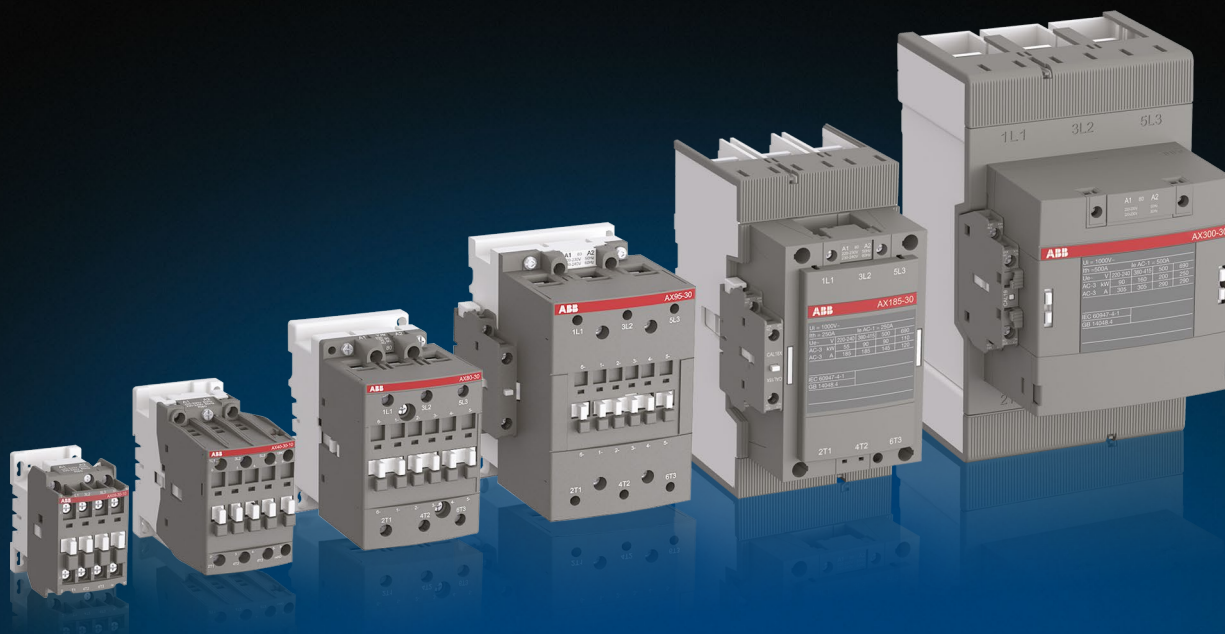




Main catalog

AX contactor range

Control made simple

The performance you need

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

AX contactor range

Control made simple - The performance you need

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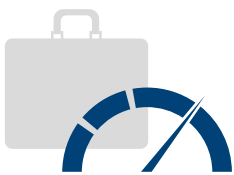
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AX contactors

The simplest way to get the control and performance you need

The AX contactor range offers exceptional reliability and performance in a brilliant, space-saving design. Use it for motor starting applications up to 370 A / 200 kW 400 V AC-3.

1



Speed-up your projects

Simpler selection process

Speed up your projects with ABB's simpler order codes, faster identification, easier connection, and a complete and flexible range of accessories.

Compliance process is faster too as AX contactors use environmentally friendly materials that comply with energy label.



Easy to install

Faster fitting by design

ABB's smart design saves time with every detail. AX contactors are smaller and easier to handle. All terminals are delivered in open position so wiring is faster.

ABB's broad range provides the best configuration for the job. Single or multiple pole blocks are no problem. Front or side mounted auxiliary contact blocks are available as well.



Continuous operation

Proven, secure, trusted

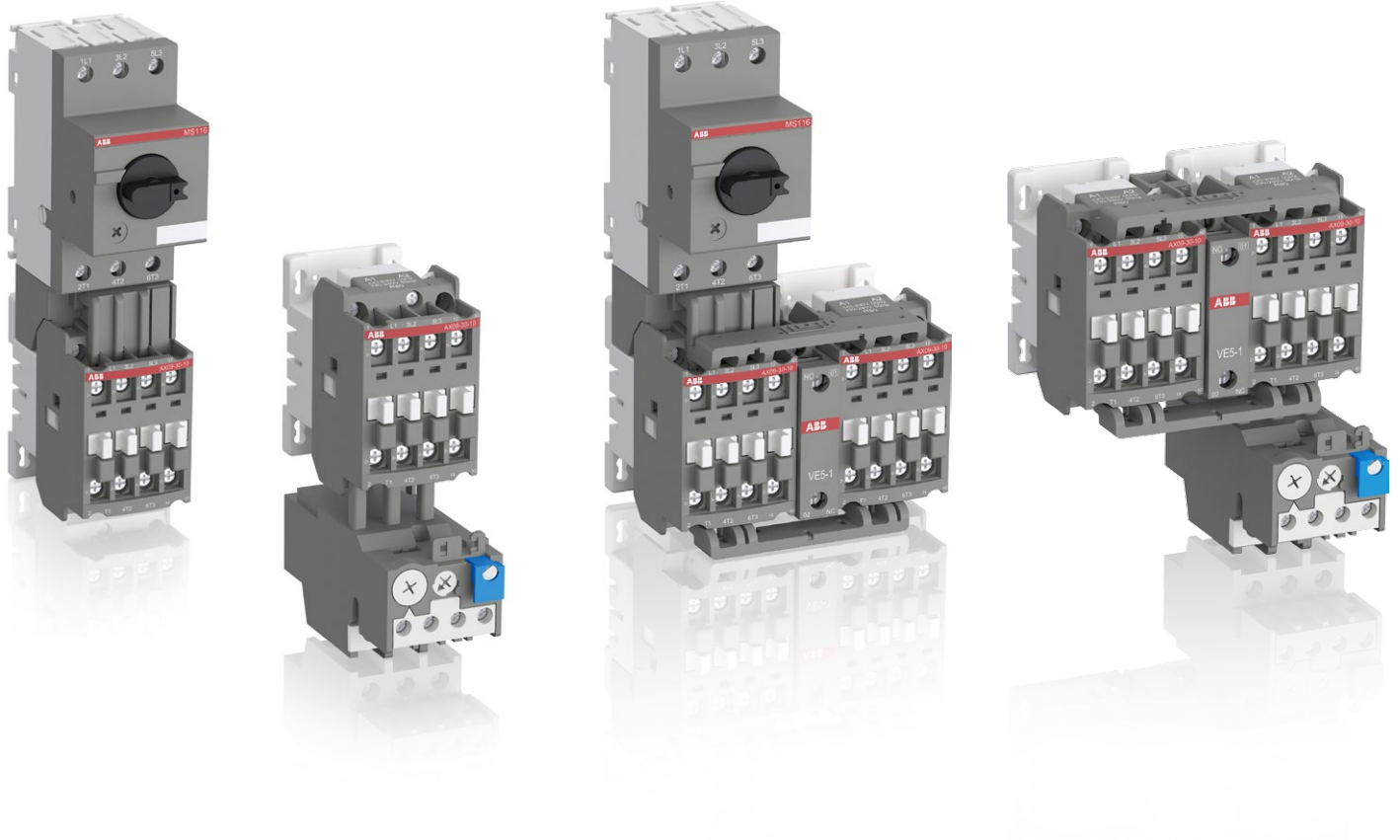
Trust a proven solution from a brand with 100 years of experience in contactors design and manufacture. ABB's AX range makes starting solutions that are more reliable – with type 2 coordination between contactors and short-circuit protection devices guaranteed.

ABB's mechanically linked contacts and mirror contact functions make control circuits safe and reliable.

Save time when building motor starting solution with AX contactors

Complete range compatible with ABB low voltage solutions

1



Tested component combinations

Using ABB's coordination tables gives users a choice of fully tested assemblies and product combinations. It's quicker and easier to build DOL starters, reversing starters or star delta starters using ABB's range of AX contactors, manual motor starters, molded case breakers, fuses and overload relays.

Create smart starters

AX contactors look more professional and, together with connection kits, they provide a better finish than cables or bus bars.

Save time

ABB starters come with connection kits to make assembly simpler and faster. The kits save time on cable preparation and eliminate fitment and wiring error risks.

AX contactors

Features and benefits

Every detail designed for you

Smart packaging design makes it simpler to identify the product you need – the product type, coil voltage, order code and bar code are all clearly displayed. The same goes when the product is unboxed. A quick glance at the front tells you what product, contactor type and coil voltage you have. Terminal markings are also plainly visible. The rated values and main approvals are ready to read on the side.



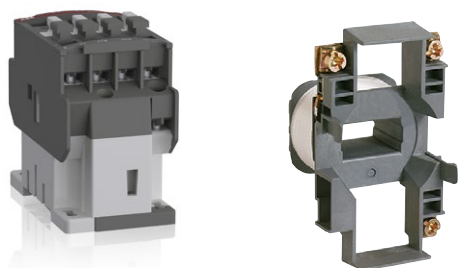
Certified, trusted contactors

ABB's AX contactors are designed in compliance with IEC 60947-4-1 and GB 14048-4 requirements. These trusted safety products have CB certification, CE marking as well as CCC and CCS approval.



Easier to connect

ABB designed its AX contactors so that all screw-heads are accessible from the front. One Pozidriv #2 screwdriver fits every contactor terminal and the complete accessory range. All main and auxiliary terminals can take one or two cables and contactors up to AX150 have three coil terminals for connection from the top or the bottom. Right out of the box, all terminals are ready in the open position for wiring.



Environmentally sound

The design and production of ABB's AX contactor range follows ISO 14000 processes. The raw materials are free of red phosphorous, cadmium, mercury, brominated substances (PBB, PBPE) and other pollutants. AX contactors and main accessories also comply with the European directive ROHS 2006. The same goes for the packaging design. The box is fully recyclable and clearly marked to aid correct disposal.



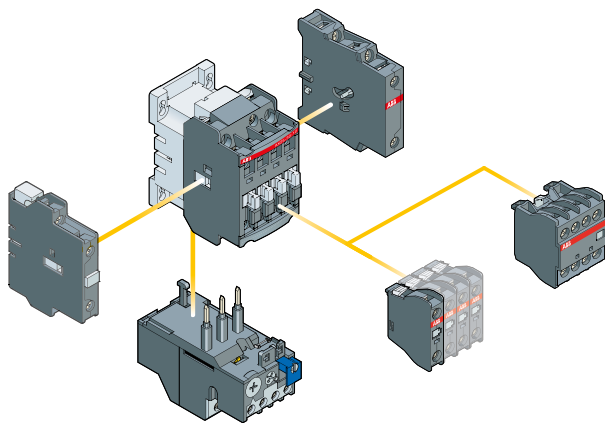
AX contactors

Features and benefits

1

Auxiliaries made simple, secure and flexible

Common interfaces that are clip-on and self-locking make mounting ABB contactors simpler. Its AX contactor range uses the same front-mounted auxiliary for contact blocks up to AX150 and the same side-mounted auxiliary contact blocks up to AX80. To maximize flexibility, users can front-mount any single- or four-pole auxiliary contact block. Two-pole auxiliary contact block can be side-mounted.



Protect control circuits and save space

ABB's AX range makes surge suppressors easy to snap on and connect. Designing contactor coils to them fit within their overall dimensions without additional space requirements. The smart design and proven technologies provide safe protection for circuits against over-voltages when the contactor opens.

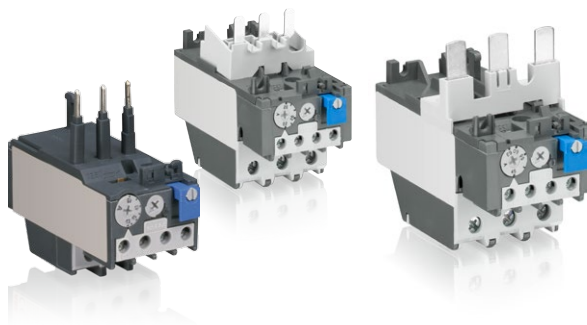


Complete range of multi-function overload relays

ABB's complete range of thermal overload relays provides class 10 protection and key functions including:

- Motor protection against overload and phase failure
- Automatic and manual reset both included
- Test and stop functions

ABB's thermal overload relays are suitable for three-phase or single-phase motor applications with temperature compensation between -25 °C and +55 °C.



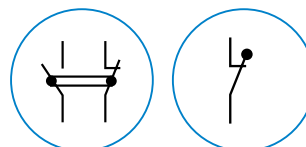
Safe and reliable control circuits

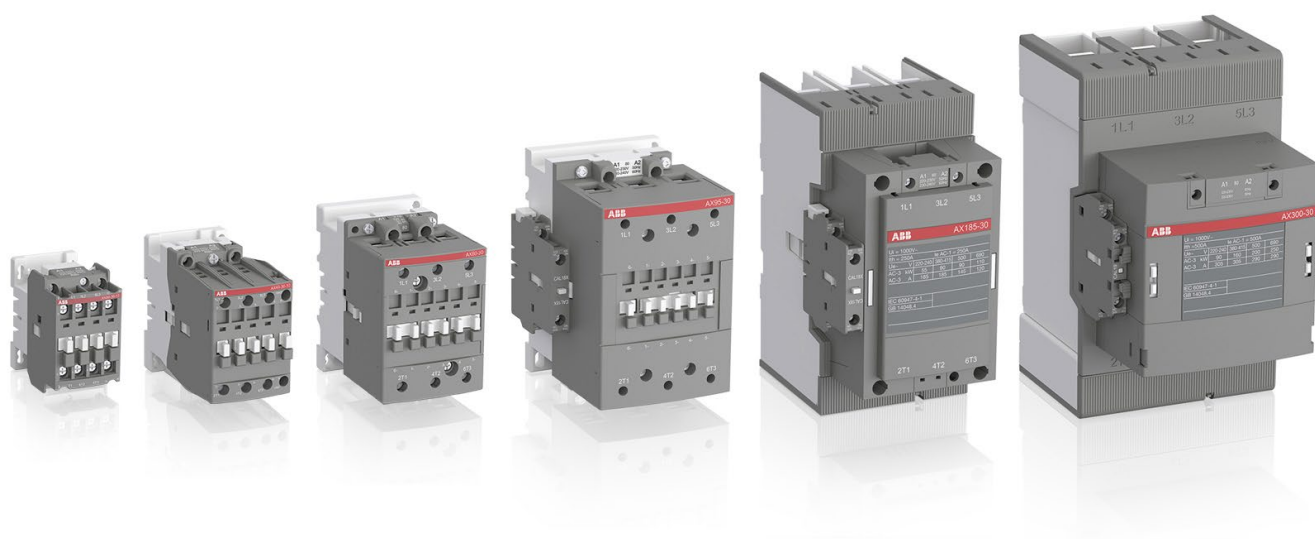
A white contact carrier ensures the contactor state is visible at all times, even with accessories mounted.

Built-in and add-on auxiliary contacts provide reliable low signal contacts for 12 V 3 mA. Failure rates are less than 10⁻⁶ according to IEC 60947-5-1.

Mechanically linked functions are available with 4-pole blocks CA5X. Mirror contacts are available with built-in NC contacts for AX06.

AX40 and side-mounted blocks CAL5-11X and 4-pole blocks CA5X for AX06 ... AX80.





3-pole contactors for motor control and power switching

1



IEC	AC-3 Rated operational power	$\theta \leq 55^\circ\text{C}$, 400 V	kW
AC Control supply			Type
IEC	AC-3 Rated operational current	$\theta \leq 55^\circ\text{C}$, 400 V	A
	AC-1 Rated operational current	$\theta \leq 40^\circ\text{C}$, 690 V	A

3	4	5.5	7.5	11	15	18.5
AX06	AX09	AX12	AX18	AX25	AX32	AX40
7	9	12	18	25	32	40
20	22	25	27	32	55	60

Main accessories

Auxiliary contact blocks	Front mounting	CA5X-10 (1 x N.O.) CA5X-01 (1 x N.C.) CA5X-4 pole (add on block with 4 contacts N.O. or N.C. combination)
	Side mounting	CAL5X-11 (1 x N.O. + 1 x N.C.)
Timers	Electronic	TEF5-ON TEF5-OFF
		VM5-1 VE5-1
Interlocking units	Mechanical Mechanical / Electrical	RV5 (24...440 V) RC5-1 (24...440 V)
Surge suppressors	Varistor (AC / DC)	
	RC type (AC)	

Overload relays

Thermal relays



Class 10A

TA25DU-M (0.10...32 A) (1)

TA42DU-M (18...42 A)

Electronic relays



Class 10E, 20E, 30E

- (1) The max. AC-3 operational current is 23 A for AX25 with TA25DU-25M
 (2) The max. AC-3 operational current is 74 A for AX80 with TA75DU-80M
 (3) The max. AC-3 operational current is 182 A for AX205 with TA200DU-200.

Manual motor starters

	Thermal / magnetic protection
	Class 10
	Magnetic types only

MS116 (0.10...32 A) lcs up to 50 kA for class 10A	MS165 (10...65 A) lcs up to 100 kA
MS132 (0.10...32 A) lcs up to 100 kA	MS497 (22...100 A) lcs up to 100 kA
MO132 (0.16...32 A) lcs up to 100 kA	MO165 (16...65 A) lcs up to 100 kA
	MO496 (32...100 A) lcs up to 100 kA

Accessories

For contactor mounting

BEA16/116 (4)	BEA25/116 (4)
	BEA25/132 (5)

- (4) AX.. with MS116-0.16 ... MS116-16 or MS132-0.16 ... MS132-10
 (5) AX25 with MS116-20 ... MS116-32 or MS132-12 ... MS132-32.

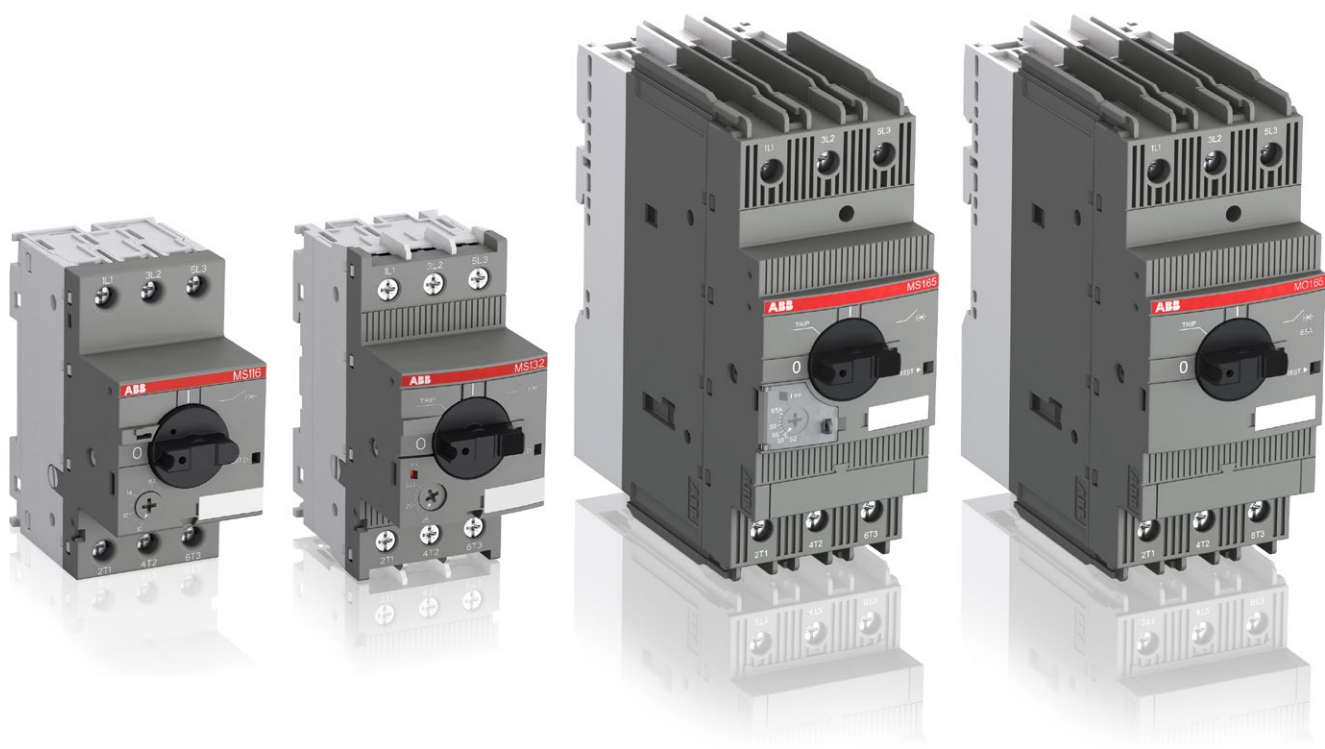
	TA75DU-M (18...80 A) (2)	TA80DU (29...80 A)	TA200DU (66...200 A) (3)	
		TA110DU (66...110 A)		
		E140DU (50...140 A)	EF205 (63...210 A)	EF370 (115...380 A)

Short-circuit protection devices

MCCB and switch fuses

	MS495 (45...100 A) Ics up to 50 kA	
	MO495 (63...100 A) Ics up to 50 kA	
BEA75/495 For MS495		BEA110/495 For MS495





Manual motor starters

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

MS116 manual motor starters	16
MS132 manual motor starters	17
MS165 manual motor starters	18

Ordering details – 0.16 to 65 A – with electromagnetic protection

MO132 manual motor starters magnetic only	19
MO165 manual motor starters magnetic only	20

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

MS132-T circuit breakers for transformer protection	21
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Ordering details – 22 to 100 A – with thermal and electromagnetic protection

MS495, MS497 manual motor starters	42
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Ordering details – 32 to 100 A – with electromagnetic protection

MO495, MO496 manual motor starters magnetic only	46
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Manual motor starters

Benefits

2

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. 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.

Safe, compact, and cost-saving solution

Various motor protection functions in one device

- Overload
- Short-circuit
- Phase loss sensitivity

Efficient planning and installation perfectly matching the ABB contactor family, leads to high flexibility and increased exchangeability. Simple connecting links ensure the electrical and mechanical connection.

Products range for different applications available

- Short-circuit breaking capacity up to 100 kA
- Magnetic-only devices (only short-circuit protection)
- Selected types are certified according to ATEX
- Special version for transformer protection

The manual motor starter range is compatible with all major national and international standards.



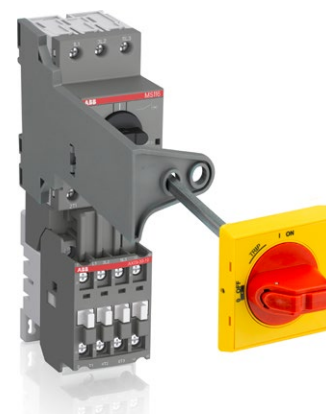
Product range



Manual motor starters with busbar connection



Accessory range



Door mounting kits

Manual motor starters

Features

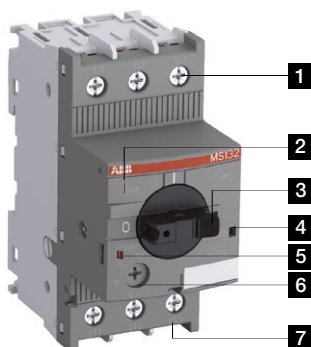
Features

- Manual control
- Disconnect function
- Handle can be locked in the off position
- Remote control via undervoltage release or shunt trip
- Trip indication
- Temperature compensation
- Adjustable current setting

- Magnetic trip indication for several types available (MS132, MS165, and MS132-T)
- One product family in 45 mm width (MS116, MS132, MO132, and MS132-T)
- Variants from 0.1 up to 100 A available
- Short-circuit service breaking capacity I_{CS} up to 100 kA

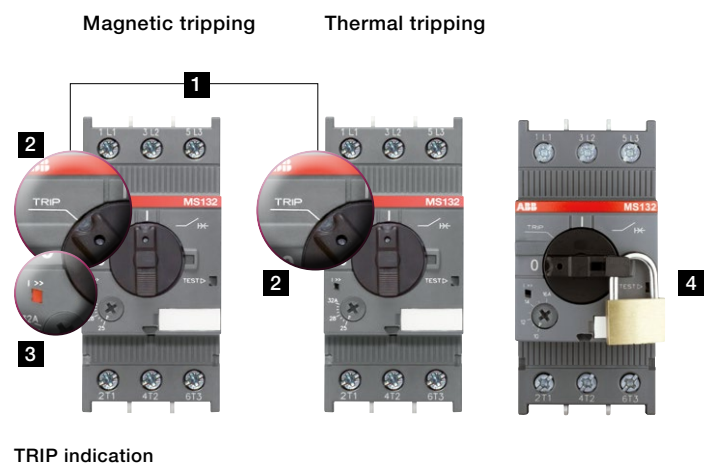
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- 1 Terminals (1L1, 3L2, 5L3)
- 2 Switch position TRIP
- 3 Lockable handle
- 4 Test function
- 5 Status indication for short-circuit
- 6 Current setting range
- 7 Terminals 2T1, 4T2, 6T3



Features of type MS132

- 1 Clear trip indication
- 2 Handle in TRIP position
- 3 Optical indication for short-circuit
- 4 Easy locking



2CDC131102C0201

Manual motor starters

Overview



2

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

¹⁾ Compensated

²⁾ For motor loads only up to 80 A

Accessories

Auxiliary contact	HKF1, HK1
Signalling contact for tripped alarm	SK1
Signalling contact for short-circuit alarm	-
Shunt trip	AA1
Undervoltage release	UA1

Table for short-circuit ratings for 400/415 V

	Standard range	Performance range
	MS116	MS132, MS165

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}
-	0.1 ... 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
30 kW	52 ... 65 A				MS165-65	50 kA	30 kA



MO132	MO165	MS132-T
-	-	Yes
Yes	Yes	-
-	-	Yes
ON/OFF/TRIP	ON/OFF/TRIP	ON/OFF/TRIP
-	-	Yes
Yes	Yes	Yes
Yes	Yes	Yes
45 mm	55 mm	45 mm
0.16 ... 32 A	16 ... 65 A	0.16 ... 32 A
-	-	0.1 ... 25 A
-25 ... +60 °C	-25 ... +60 °C	-25 ... +60 °C ¹⁾

HKF1, HK1	HKF1
SK1	SK1
-	CK1
AA1	AA1
UA1	UA1

Standard range MO132	Performance range MO132, MO165	Transformer protection MS132-T
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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		
			MO165-65	50 kA	30 kA		

MS116 manual motor starters

0.10 to 32 A – with thermal and electromagnetic protection

2



MS116-16



MS116-25



MS116-0.16-HKF1-11



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.

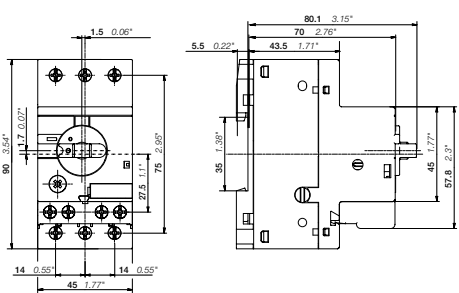
Ordering details

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
-	0.10 ... 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
-	0.10 ... 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

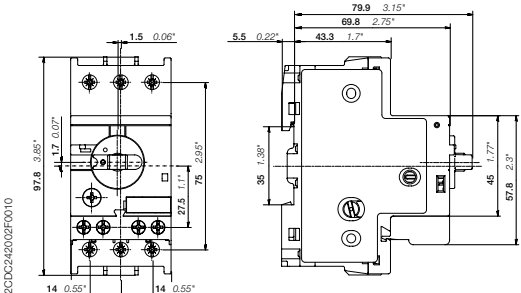
Note: Manual motor starters should always be selected so that the actual motor current is within the setting range.

¹⁾ The data is valid for products, produced after week 34, 2014.

Main dimensions mm, inches



MS116 ≤ 16 A & MS116-HKF1-11 ≤ 16 A



MS116 ≥ 20 A & MS116-HKF1-11 ≥ 20 A

MS132 manual motor starters

0.10 to 32 A – with thermal and electromagnetic protection



MS132-10

1SBC101232F010



MS132-32

2CDC241001F0011



MS132-0.16-HKF1-11

2CDC241014F0011



MS132-32-HKF1-11

2CDC241015F0011

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.

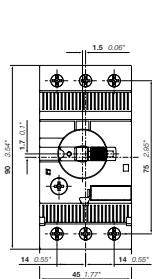
Ordering details

Rated operational power 400 V AC-3 kW	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	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
-	0.10 ... 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

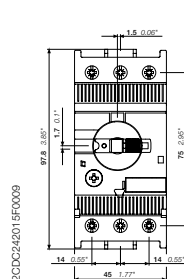
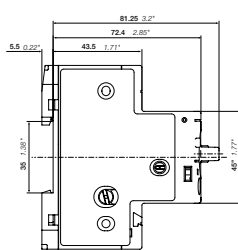
Note: Manual motor starters should always be selected so that the actual motor current is within the setting range.

¹⁾ The data is valid for products, produced after week 34, 2014.

Main dimensions mm, inches



MS132 ≤ 10 A



MS132 ≥ 12 A

MS165 manual motor starters

10 to 65 A – with thermal and electromagnetic protection

2



MS165-65

Description

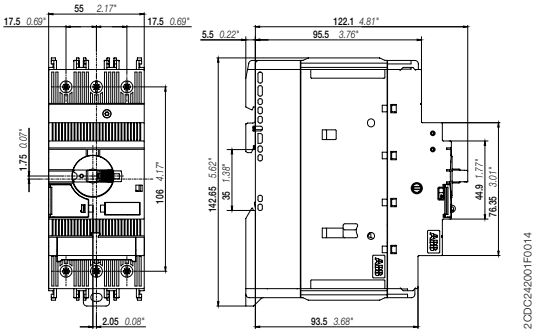
MS165 is a compact and powerful range for motor protection up to 30 kW (400 V) / 65 A in width of 55 mm. This type has also a clear and reliable indication of fault in a separate window in the event of short-circuit tripping. Further features are the build-in disconnect function, temperature compensation, 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

MO132 manual motor starters magnetic only

0.16 to 32 A – with electromagnetic protection



MO132-6.3



MO132-32

2CDC241008F0011

2CDC241008F0011

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.

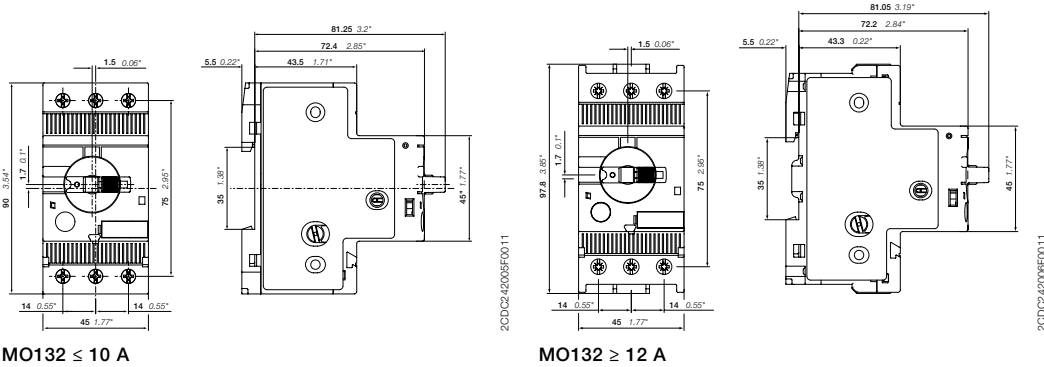
Ordering details

Rated operational power 400 V AC-3 ¹⁾ kW	Rated operational current 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
-	0.16	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.

Main dimensions mm, inches



MO165 manual motor starters magnetic only

16 to 65 A – with electromagnetic protection

2



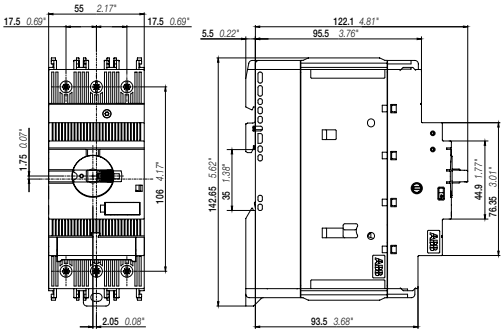
Description

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

2CDC242002F014

2CDC13110C0201

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.

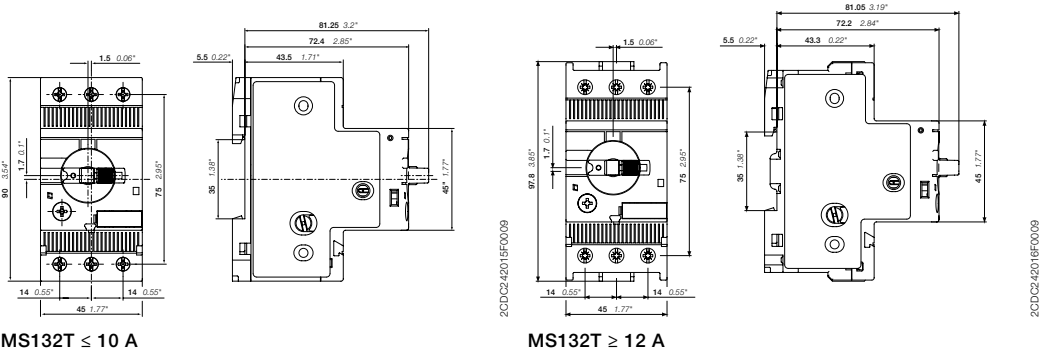
MS132-T is a 45 mm (width) compact and powerful range for transformer protection up to 12.5 kW (400 V) / 25 A. This type has also a clear and reliable indication of fault in a separate window in the event of short-circuit tripping. Further features are the build-in disconnect function, temperature compensation, 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	Short-circuit breaking capacity I_{cs} at 400 V AC	Rated instantaneous short-circuit current setting I_i	Type	Order code	Weight (1 pce)
A	kA	A			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



Technical data

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

Main circuit – Utilization characteristics according to IEC/EN

Type	MS116	MS132	MS165	MO132	MO165	MS132-T
Standards	IEC/EN 60947-2, IEC/EN 60947-4-1, IEC/EN 60947-1					
Rated operational voltage U_e	690 V AC	690 V AC / 250 V DC	690 V AC	690 V AC	690 V AC	690 V AC
Rated frequency	50/60 Hz	DC, 50/60 Hz	DC, 50/60 Hz	50/60 Hz	DC, 50/60 Hz	50/60 Hz
Trip class	10A	10	10	-	-	10
Number of poles	3					
Duty time	100 %					
Mechanical durability	100000 cycles	100000 cycles	50000 cycles	100000 cycles	50000 cycles	100000 cycles
Electrical durability	up to 16 A	100000 cycles	50000 cycles	25000 cycles	50000 cycles	50000 cycles
	20 ... 65 A	50000 cycles	50000 cycles	25000 cycles	50000 cycles	50000 cycles
Rated impulse withstand voltage U_{imp}	6 kV	6 kV	8 kV	6 kV	8 kV	6 kV
Rated insulation voltage U_i	690 V	690 V	1000 V	690 V	1000 V	690 V
Rated operational current I_e	See ordering details					
Rated operational current DC-5 $I_{e,DC-5}$ 3 conducting paths in series up to 250 V	-	See "Rated operational current I_e "	See "Rated operational current I_e "	-	See "Rated operational current I_e "	-
Rated instantaneous short-circuit current setting I_{cs}	See ordering details					
Rated service short-circuit breaking capacity I_{cs}	See table "Short-circuit breaking capacity and back-up fuses"					
Rated ultimate short-circuit breaking capacity I_{cu}	See table "Short-circuit breaking capacity and back-up fuses"					
Rated service short-circuit breaking capacity DC $I_{cs,DC}$ 3 conducting paths in series up to 250 V	-	10 kA	100 kA	-	100 kA	-

Short-circuit breaking capacity and back-up fuses

I_{cs} Rated service short-circuit breaking capacity

I_{cu} Rated ultimate short-circuit breaking capacity

I_{cc} Prospective short-circuit current at installation location

Note: Maximum rated current of the back-up fuses if $I_{cc} > I_{cs}$

Type	230 V AC			400 V AC			440 V AC			500 V AC			690 V AC		
	I_{cs}	I_{cu}	gG, aM	I_{cs}	I_{cu}	gG, aM	I_{cs}	I_{cu}	gG, aM	I_{cs}	I_{cu}	gG, aM	I_{cs}	I_{cu}	gG, aM
	kA	kA	A	kA	kA	A	kA	kA	A	kA	kA	A	kA	kA	A
MS116-0.16	50	50	- ¹⁾	50	50	- ¹⁾	30	30	- ¹⁾	30	30	- ¹⁾	30	30	- ¹⁾
MS116-0.25	50	50	- ¹⁾	50	50	- ¹⁾	30	30	- ¹⁾	30	30	- ¹⁾	30	30	- ¹⁾
MS116-0.4	50	50	- ¹⁾	50	50	- ¹⁾	30	30	- ¹⁾	30	30	- ¹⁾	30	30	- ¹⁾
MS116-0.63	50	50	- ¹⁾	50	50	- ¹⁾	30	30	- ¹⁾	30	30	- ¹⁾	30	30	- ¹⁾
MS116-1.0	50	50	- ¹⁾	50	50	- ¹⁾	30	30	- ¹⁾	30	30	- ¹⁾	30	30	- ¹⁾
MS116-1.6	50	50	- ¹⁾	50	50	- ¹⁾	30	30	- ¹⁾	30	30	- ¹⁾	30	30	- ¹⁾
MS116-2.5	50	50	- ¹⁾	50	50	- ¹⁾	10	10	25 ²⁾	10	10	25 ²⁾	5	5	25 ²⁾
MS116-4.0	50	50	- ¹⁾	50	50	- ¹⁾	6	6	25 ²⁾	6	6	25 ²⁾	2	2	25 ²⁾
MS116-6.3	50	50	- ¹⁾	50	50	- ¹⁾	6	6	63 ²⁾	6	6	63 ²⁾	2	2	40 ²⁾
MS116-10	50	50	- ¹⁾	50	50	- ¹⁾	6	6	63 ²⁾	6	6	63 ²⁾	2	2	50 ²⁾
MS116-12	25	25	80 ²⁾	25	25	80 ²⁾	6	6	63 ²⁾	6	6	63 ²⁾	2	2	50 ²⁾
MS116-16	16	16	80 ²⁾	16	16	80 ²⁾	4	4	63 ²⁾	4	4	63 ²⁾	2	2	63 ²⁾
MS116-20	10	15	125 ²⁾	10	15	125 ²⁾	3	6	125 ²⁾	3	4	125 ²⁾	2	2	80 ²⁾
MS116-25	10	15	125 ²⁾	10	15	125 ²⁾	3	6	125 ²⁾	3	4	125 ²⁾	2	2	100 ²⁾
MS116-32	10	10	125 ²⁾	10	10	125 ²⁾	3	6	125 ²⁾	3	4	125 ²⁾	2	2	100 ²⁾

¹⁾ No back-up fuse required, because short-circuit proof up to 50 kA

²⁾ Rated back-up fuse for short-circuit up to 50 kA

Technical data

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

2

Type	230 V AC			400 V AC			440 V AC			500 V AC			690 V AC		
	I _{CS} kA	I _{CU} kA	gG, aM A	I _{CS} kA	I _{CU} kA	gG, aM A	I _{CS} kA	I _{CU} kA	gG, aM A	I _{CS} kA	I _{CU} kA	gG, aM A	I _{CS} kA	I _{CU} kA	gG, aM A
MS132-0.16	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾
MS132-0.25	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾
MS132-0.4	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾
MS132-0.63	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾
MS132-1.0	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾
MS132-1.6	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾
MS132-2.5	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾
MS132-4.0	100	100	- ¹⁾	100	100	- ¹⁾	20	20	35 ²⁾	20	20	35 ²⁾	3	3	32 ²⁾
MS132-6.3	100	100	- ¹⁾	100	100	- ¹⁾	20	20	63 ²⁾	20	20	63 ²⁾	3	3	50 ²⁾
MS132-10	100	100	- ¹⁾	100	100	- ¹⁾	20	20	100 ²⁾	20	20	100 ²⁾	3	3	50 ²⁾
MS132-12	100	100	- ¹⁾	100	100	- ¹⁾	20	20	100 ²⁾	20	20	100 ²⁾	3	3	63 ²⁾
MS132-16	100	100	- ¹⁾	100	100	- ¹⁾	20	20	125 ²⁾	20	20	125 ²⁾	3	3	63 ²⁾
MS132-20	100	100	- ¹⁾	100	100	- ¹⁾	20	20	125 ²⁾	20	20	125 ²⁾	3	3	80 ²⁾
MS132-25	50	50	125 ²⁾	50	50	125 ²⁾	20	20	125 ²⁾	10	10	125 ²⁾	3	3	100 ²⁾
MS132-32	25	50	125 ²⁾	25	50	125 ²⁾	20	20	125 ²⁾	10	10	125 ²⁾	3	3	100 ²⁾

¹⁾ No back-up fuse required, because short-circuit proof up to 100 kA

²⁾ Rated back-up fuse for short-circuit up to 100 kA

Type	230 V AC			400 V AC			440 V AC			500 V AC			690 V AC			250 V DC ³⁾		
	I _{CS} kA	I _{CU} kA	gG A	I _{CS} kA	I _{CU} kA	gG A	I _{CS} kA	I _{CU} kA	gG A	I _{CS} kA	I _{CU} kA	gG A	I _{CS} kA	I _{CU} kA	gG A	I _{CS} kA	I _{CU} kA	gG A
MS165-16	100	100	- ¹⁾	100	100	- ¹⁾	75	75	125 ²⁾	20	20	125 ²⁾	8	8	63 ²⁾	100	100	- ¹⁾
MS165-20	100	100	- ¹⁾	100	100	- ¹⁾	75	75	125 ²⁾	20	20	125 ²⁾	8	8	63 ²⁾	100	100	- ¹⁾
MS165-25	100	100	- ¹⁾	100	100	- ¹⁾	50	50	125 ²⁾	20	20	125 ²⁾	8	8	80 ²⁾	100	100	- ¹⁾
MS165-32	100	100	- ¹⁾	100	100	- ¹⁾	50	50	125 ²⁾	20	20	125 ²⁾	5	5	100 ²⁾	100	100	- ¹⁾
MS165-42	50	50	125 ²⁾	50	50	125 ²⁾	50	50	125 ²⁾	20	20	125 ²⁾	5	5	100 ²⁾	100	100	- ¹⁾
MS165-54	30	50	125 ²⁾	30	50	125 ²⁾	30	45	125 ²⁾	20	20	125 ²⁾	5	5	100 ²⁾	100	100	- ¹⁾
MS165-65	30	50	125 ²⁾	30	50	125 ²⁾	30	45	125 ²⁾	20	20	125 ²⁾	5	5	100 ²⁾	100	100	- ¹⁾

¹⁾ No back-up fuse required, short-circuit proof up to 100 kA

²⁾ Rated back-up fuse for short-circuit up to 100 kA

³⁾ 3 poles in series

Type	230 V AC			400 V AC			440 V AC			500 V AC			690 V AC		
	I _{CS} kA	I _{CU} kA	gG, aM A	I _{CS} kA	I _{CU} kA	gG, aM A	I _{CS} kA	I _{CU} kA	gG, aM A	I _{CS} kA	I _{CU} kA	gG, aM A	I _{CS} kA	I _{CU} kA	gG, aM A
MO132-0.16	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾
MO132-0.25	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾
MO132-0.4	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾
MO132-0.63	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾
MO132-1.0	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾
MO132-1.6	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾
MO132-2.5	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾
MO132-4.0	100	100	- ¹⁾	100	100	- ¹⁾	20	20	35 ²⁾	20	20	35 ²⁾	3	3	32 ²⁾
MO132-6.3	100	100	- ¹⁾	100	100	- ¹⁾	20	20	63 ²⁾	20	20	63 ²⁾	3	3	50 ²⁾
MO132-10	100	100	- ¹⁾	100	100	- ¹⁾	20	20	100 ²⁾	20	20	100 ²⁾	3	3	50 ²⁾
MO132-12	100	100	- ¹⁾	100	100	- ¹⁾	20	20	100 ²⁾	20	20	100 ²⁾	3	3	63 ²⁾
MO132-16	100	100	- ¹⁾	100	100	- ¹⁾	20	20	125 ²⁾	20	20	125 ²⁾	3	3	63 ²⁾
MO132-20	100	100	- ¹⁾	100	100	- ¹⁾	20	20	125 ²⁾	20	20	125 ²⁾	3	3	80 ²⁾
MO132-25	50	50	125 ²⁾	50	50	125 ²⁾	10	10	125 ²⁾	10	10	125 ²⁾	3	3	100 ²⁾
MO132-32	25	50	125 ²⁾	25	50	125 ²⁾	10	10	125 ²⁾	10	10	125 ²⁾	3	3	100 ²⁾

¹⁾ No back-up fuse required, because short-circuit proof up to 100 kA

²⁾ Rated back-up fuse for short-circuit up to 100 kA

Technical data

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

kA

Type	230 V AC			400 V AC			440 V AC			500 V AC			690 V AC			250 V DC ³⁾		
	I_{CS}	I_{CU}	gG	I_{CS}	I_{CU}	gG	I_{CS}	I_{CU}	gG	I_{CS}	I_{CU}	gG	I_{CS}	I_{CU}	gG	I_{CS}	I_{CU}	gG
	kA	kA	A	kA	kA	A	kA	kA	A	kA	kA	A	kA	kA	A	kA	kA	A
MO165-16	100	100	- ¹⁾	100	100	- ¹⁾	75	75	125 ²⁾	20	20	125 ²⁾	8	8	63 ²⁾	100	100	- ¹⁾
MO165-20	100	100	- ¹⁾	100	100	- ¹⁾	75	75	125 ²⁾	20	20	125 ²⁾	8	8	63 ²⁾	100	100	- ¹⁾
MO165-25	100	100	- ¹⁾	100	100	- ¹⁾	50	50	125 ²⁾	20	20	125 ²⁾	8	8	80 ²⁾	100	100	- ¹⁾
MO165-32	100	100	- ¹⁾	100	100	- ¹⁾	50	50	125 ²⁾	20	20	125 ²⁾	5	5	100 ²⁾	100	100	- ¹⁾
MO165-42	50	50	125 ²⁾	50	50	125 ²⁾	50	50	125 ²⁾	20	20	125 ²⁾	5	5	100 ²⁾	100	100	- ¹⁾
MO165-54	30	50	125 ²⁾	30	50	125 ²⁾	30	45	125 ²⁾	20	20	125 ²⁾	5	5	100 ²⁾	100	100	- ¹⁾
MO165-65	30	50	125 ²⁾	30	50	125 ²⁾	30	45	125 ²⁾	20	20	125 ²⁾	5	5	100 ²⁾	100	100	- ¹⁾

¹⁾ No back-up fuse required, short-circuit proof up to 100 kA

²⁾ Rated back-up fuse for short-circuit up to 100 kA

³⁾ 3 poles in series

Type	230 V AC			400 V AC			440 V AC			500 V AC			690 V AC		
	I_{CS}	I_{CU}	gG, aM	I_{CS}	I_{CU}	gG, aM	I_{CS}	I_{CU}	gG, aM	I_{CS}	I_{CU}	gG, aM	I_{CS}	I_{CU}	gG, aM
	kA	kA	A	kA	kA	A	kA	kA	A	kA	kA	A	kA	kA	A
MS132-0.16T	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾
MS132-0.25T	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾
MS132-0.4T	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾
MS132-0.63T	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾
MS132-1.0T	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾
MS132-1.6T	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾
MS132-2.5T	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾	100	100	- ¹⁾
MS132-4.0T	100	100	- ¹⁾	100	100	- ¹⁾	30	30	35 ²⁾	20	20	35 ²⁾	3	3	32 ²⁾
MS132-6.3T	100	100	- ¹⁾	100	100	- ¹⁾	30	30	63 ²⁾	20	20	63 ²⁾	3	3	50 ²⁾
MS132-10T	100	100	- ¹⁾	100	100	- ¹⁾	30	30	100 ²⁾	20	20	100 ²⁾	3	3	50 ²⁾
MS132-12T	100	100	- ¹⁾	100	100	- ¹⁾	30	30	100 ²⁾	20	20	100 ²⁾	3	3	63 ²⁾
MS132-16T	100	100	- ¹⁾	100	100	- ¹⁾	30	30	125 ²⁾	20	20	125 ²⁾	3	3	63 ²⁾
MS132-20T	100	100	- ¹⁾	100	100	- ¹⁾	30	30	125 ²⁾	20	20	125 ²⁾	3	3	80 ²⁾
MS132-25T	50	50	125 ²⁾	50	50	125 ²⁾	30	30	125 ²⁾	10	10	125 ²⁾	3	3	100 ²⁾

¹⁾ No back-up fuse required, short-circuit proof up to 100 kA

²⁾ Rated back-up fuse for short-circuit up to 100 kA

Main circuit – Utilization characteristics according to UL/CSA

Type	MS116	MS132	MS165	MO132	MO165	MS132-T
Standards	UL 60947-1, UL 60947-4-1 (UL 508), CSA C22.2 No.60947-4-1 (CSA C22.2 No.14)					-
Rated operational voltage U_n acc. to UL/CSA	600 V AC	600 V AC	1000 V AC	600 V AC	1000 V AC	-
Trip class	10A	10	-	-	-	-
Motor ratings ¹⁾	See table "Motor ratings, three phase"					-
Horsepower	See table "Motor ratings, three phase"					-
Full Load Amps (FLA)	See table "Motor ratings, three phase"					-
Locked Rotor Amps (LRA)	See table "Motor ratings, three phase"					-

¹⁾ See product data sheets for UL/CSA single phase motor and general use (AC-1) ratings.

UL/CSA ratings overview

Type	MS116	MS132	MS165	MO132	MO165	MS132-T
Manual Motor Controller	X	X	X	X	X	-
Manual Motor Controller, Suitable as Motor Disconnect	X	X	X	X	X	-
Manual Motor Controller, Suitable for use in Group Installations	X	X	X	X	X	-
Manual Motor Controller, Suitable for Tap Conductor Protection in Group Installations	-	X	X	X	X	-
Manual self-protected Combination Motor Controller (Type E)	-	X	X	-	-	-

Technical data

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

UL/CSA Motor ratings, three phase – MS116

Type	200 V AC			208 V AC			220 ... 240 V AC			440 ... 480 V AC			550 ... 600 V AC		
	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA
MS116-0.16	-	0.16	0.96	-	0.16	0.96	-	0.16	0.96	-	0.16	0.96	-	0.16	0.96
MS116-0.25	-	0.25	1.5	-	0.25	1.5	-	0.25	1.5	-	0.25	1.5	-	0.25	1.5
MS116-0.40	-	0.4	2.4	-	0.4	2.4	-	0.4	2.4	-	0.4	2.4	-	0.4	2.4
MS116-0.63	-	0.63	3.78	-	0.63	3.78	-	0.63	3.78	-	0.63	3.78	-	0.63	3.78
MS116-1.0	-	1	6	-	1	6	-	1	6	-	1	6	1/2	1	6
MS116-1.6	-	1.6	9.6	-	1.6	9.6	-	1.6	9.6	3/4	1.6	9.6	3/4	1.6	9.6
MS116-2.5	1/2	2.5	15	1/2	2.5	15	1/2	2.5	15	1	2.5	15	1 1/2	2.5	15
MS116-4.0	3/4	4	24	3/4	4	24	1	4	24	2	4	24	3	3.9	25.6
MS116-6.3	1	6.3	37.8	1	6.3	37.8	1 1/2	6.3	37.8	3	4.8	32	5	6.1	36.8
MS116-10	2	7.8	57.5	2	7.5	55	3	9.6	64	5	7.6	46	7 1/2	9	50.8
MS116-12	3	11	73.6	3	10.6	71	3	9.6	64	7 1/2	11	63.5	10	11	64.8
MS116-16	3	11	73.6	3	10.6	71	5	15.2	92	10	14	81	10	11	64.8
MS116-20	5	17.5	105.8	5	16.7	102	5	15.2	92	10	14	81	15	17	93
MS116-25	5	17.5	105.8	7 1/2	24.2	140	7 1/2	22	127	15	21	116	20	22	116
MS116-32	7 1/2	25.3	146	10	30.8	179	10	28	162	20	27	145	25	27	146

UL/CSA Motor ratings, three phase – MS132

Type	200 V AC			208 V AC			220 ... 240 V AC			440 ... 480 V AC			550 ... 600 V AC		
	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA
MS132-0.16	-	0.16	0.96	-	0.16	0.96	-	0.16	0.96	-	0.16	0.96	-	0.16	0.96
MS132-0.25	-	0.25	1.5	-	0.25	1.5	-	0.25	1.5	-	0.25	1.5	-	0.25	1.5
MS132-0.40	-	0.4	2.4	-	0.4	2.4	-	0.4	2.4	-	0.4	2.4	-	0.4	2.4
MS132-0.63	-	0.63	3.78	-	0.63	3.78	-	0.63	3.78	-	0.63	3.78	-	0.63	3.78
MS132-1.0	-	1	6	-	1	6	-	1	6	-	1	6	1/2	1	6
MS132-1.6	-	1.6	9.6	-	1.6	9.6	-	1.6	9.6	3/4	1.6	9.6	3/4	1.6	9.6
MS132-2.5	1/2	2.5	15	1/2	2.5	15	1/2	2.5	15	1	2.5	15	1-1/2	2.5	15
MS132-4.0	3/4	4	24	3/4	4	24	1	4	24	2	4	24	3	3.9	25.6
MS132-6.3	1	6.3	37.8	1	6.3	37.8	1 1/2	6.3	37.8	3	4.8	32	5	6.1	36.8
MS132-10	2	7.8	57.5	2	7.5	55	3	9.6	64	5	7.6	46	7 1/2	9	50.8
MS132-12	3	11	73.6	3	10.6	71	3	9.6	64	7 1/2	11	63.5	10	11	64.8
MS132-16	3	11	73.6	3	10.6	71	5	15.2	92	10	14	81	10	11	64.8
MS132-20	5	17.5	105.8	5	16.7	102	5	15.2	92	10	14	81	15	17	93
MS132-25	5	17.5	105.8	7 1/2	24.2	140	7 1/2	22	127	15	21	116	20	22	116
MS132-32	7 1/2	25.3	146	10	30.8	179	10	28	162	20	27	145	25	27	146

UL/CSA Motor ratings, three phase – MS165

Type	200 V AC			208 V AC			220 ... 240 V AC			440 ... 480 V AC			550 ... 600 V AC		
	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA
MS165-16	3	11	73.6	3	10.6	71	5	15.2	92	10	14	81	10	11	64.8
MS165-20	5	17.5	105.8	5	16.7	102	5	15.2	92	10	14	81	15	17	93
MS165-25	5	17.5	105.8	7 1/2	24.2	140	7 1/2	22	127	15	21	116	20	22	116
MS165-32	7 1/2	25.3	146	10	30.8	179	10	28	162	20	27	145	30	32	174
MS165-42	10	32.2	186.3	10	30.8	179	15	42	232	30	40	218	40	41	232
MS165-54	15	48.3	267	15	46.2	257	20	54	290	40	52	290	50	52	290
MS165-65	20	62.1	334	20	59.4	321	20	54	290	50	65	363	60	62	348

hp Horsepower
FLA Full Load Amps
LRA Locked Rotor Amps

Note: Manual motor starters should always be selected so that the actual motor current is within the setting range; see ordering detail pages. Horsepower (hp) ratings are for reference only.

Technical data

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

UL/CSA Motor ratings, three phase – MO132

Type	200 V AC			208 V AC			220 ... 240 V AC			440 ... 480 V AC			550 ... 600 V AC		
	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA
MO132-0.16	-	0.16	0.96	-	0.16	0.96	-	0.16	0.96	-	0.16	0.96	-	0.16	0.96
MO132-0.25	-	0.25	1.5	-	0.25	1.5	-	0.25	1.5	-	0.25	1.5	-	0.25	1.5
MO132-0.40	-	0.4	2.4	-	0.4	2.4	-	0.4	2.4	-	0.4	2.4	-	0.4	2.4
MO132-0.63	-	0.63	3.78	-	0.63	3.78	-	0.63	3.78	-	0.63	3.78	-	0.63	3.78
MO132-1.0	-	1	6	-	1	6	-	1	6	-	1	6	1/2	1	6
MO132-1.6	-	1.6	9.6	-	1.6	9.6	-	1.6	9.6	3/4	1.6	9.6	3/4	1.6	9.6
MO132-2.5	1/2	2.5	15	1/2	2.5	15	1/2	2.5	15	1	2.5	15	1 1/2	2.5	15
MO132-4.0	3/4	4	24	3/4	4	24	1	4	24	2	4	24	3	3.9	25.6
MO132-6.3	1	6.3	37.8	1	6.3	37.8	1 1/2	6.3	37.8	3	4.8	32	5	6.1	36.8
MO132-10	2	7.8	57.5	2	7.5	55	3	9.6	64	5	7.6	46	7 1/2	9	50.8
MO132-12	3	11	73.6	3	10.6	71	3	9.6	64	7 1/2	11	63.5	10	11	64.8
MO132-16	3	11	73.6	3	10.6	71	5	15.2	92	10	14	81	10	11	64.8
MO132-20	5	17.5	105.8	5	16.7	102	5	15.2	92	10	14	81	15	17	93
MO132-25	5	17.5	105.8	7 1/2	24.2	140	7 1/2	22	127	15	21	116	20	22	116
MO132-32	7 1/2	25.3	146	10	30.8	179	10	28	162	20	27	145	25	27	146

UL/CSA Motor ratings, three phase – MO165

Type	200 V AC			208 V AC			220 ... 240 V AC			440 ... 480 V AC			550 ... 600 V AC		
	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA
MO165-16	3	11	73.6	3	10.6	71	5	15.2	92	10	14	81	10	11	64.8
MO165-20	5	17.5	105.8	5	16.7	102	5	15.2	92	10	14	81	15	17	93
MO165-25	5	17.5	105.8	7 1/2	24.2	140	7 1/2	22	127	15	21	116	20	22	116
MO165-32	7 1/2	25.3	146	10	30.8	179	10	28	162	20	27	145	30	32	174
MO165-42	10	32.2	186.3	10	30.8	179	15	42	232	30	40	218	40	41	232
MO165-54	15	48.3	267	15	46.2	257	20	54	290	40	52	290	50	52	290
MO165-65	20	62.1	334	20	59.4	321	20	54	290	50	65	363	60	62	348

UL/CSA Motor ratings, single phase – MS132-T

Type	120 V AC			220 ... 240 V AC		
	hp	FLA	LRA	hp	FLA	LRA
MS132-0.16T	-	0.16	0.96	-	0.16	0.96
MS132-0.25T	-	0.25	1.5	-	0.25	1.5
MS132-0.4T	-	0.4	2.4	-	0.4	2.4
MS132-0.63T	-	0.63	3.78	-	0.63	3.78
MS132-1.0T	-	1	6	-	1	6
MS132-1.6T	-	1.6	9.6	1/10	1.6	9.6
MS132-2.5T	-	2.5	15	1/6	2.5	15
MS132-4.0T	1/8	4	24	1/3	4	24
MS132-6.3T	1/4	6.3	37.8	1/2	6.3	37.8
MS132-10T	1/2	9.8	58.8	1-1/2	10	60
MS132-12T	1/2	9.8	58.8	2	12	72
MS132-16T	1	16	96	2	12	72
MS132-20T	1-1/2	20	120	3	17	92
MS132-25T	2	24	144	3	17	127

hp Horsepower
FLA Full Load Amps
LRA Locked Rotor Amps

Technical data

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

UL/CSA Maximum short-circuit current ratings – MS116

Type	Manual Motor Controllers					
	Branch circuit protection, max. size per NEC/CEC ¹⁾		for motor disconnect ²⁾		for group installations	
	Fuses	Circuit breaker	480 V	600 V	480 V	600 V
	A	A	kA	kA	kA	kA
MS116-0.16	100	-	30	5	30	5
MS116-0.25	100	-	30	5	30	5
MS116-0.40	100	-	30	5	30	5
MS116-0.63	100	-	30	5	30	5
MS116-1.0	100	-	30	5	30	5
MS116-1.6	100	-	30	5	30	5
MS116-2.5	100	-	30	5	30	5
MS116-4.0	100	-	18	5	18	5
MS116-6.3	100	-	18	5	18	5
MS116-10	100	-	18	5	18	5
MS116-12	100	-	18	5	18	5
MS116-16	100	-	18	5	18	5
MS116-20	100	-	18	5	18	5
MS116-25	100	-	18	5	18	5
MS116-32	100	-	18	5	18	5

¹⁾ NEC: NFPA®70 National Electrical Code®; CEC: CSA C22.1 Canadian Electrical Code.

²⁾ Suitable as motor disconnect only when provide with padlock adaptor SA1 or SA3.

UL/CSA Maximum short-circuit current ratings – MS132

Type	Manual Motor Controllers		for motor disconnect		for group installations		for tap conductor protection in group installations		Manual self-protected Combination Motor Controllers (Type E) ²⁾	
	Branch circuit protection, max. size per NEC/CEC ¹⁾									
	Fuses	Circuit breaker	480 V	600 V	480 V	600 V	480 V	600 V	480Y / 277 V	600Y / 347 V
	A	A	kA	kA	kA	kA	kA	kA	kA	kA
MS132-0.16	Any Listed fuses. Size per NEC/CEC	Any Listed UL489 / CSA C22.2 No.5 circuit breaker. Size per NEC/CEC	65	47	65	47	65	47	65	47
MS132-0.25			65	47	65	47	65	47	65	47
MS132-0.40			65	47	65	47	65	47	65	47
MS132-0.63			65	47	65	47	65	47	65	47
MS132-1.0			65	47	65	47	65	47	65	47
MS132-1.6			65	47	65	47	65	47	65	47
MS132-2.5			65	47	65	47	65	47	65	47
MS132-4.0			65	47	65	47	65	47	65	47
MS132-6.3			65	18	65	35	65	18	65	18
MS132-10			65	18	65	35	65	18	65	18
MS132-12			30	18	35	35	30	18	30	-
MS132-16			30	18	35	35	30	18	30	-
MS132-20			30	18	35	35	30	18	30	-
MS132-25			30	18	35	35	30	18	30	-
MS132-32			30	18	35	35	30	18	30	-

¹⁾ NEC: NFPA®70 National Electrical Code®; CEC: CSA C22.1 Canadian Electrical Code.

²⁾ Requires the use of S1-M3-xx line-side terminal feeder block.

Technical data

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

UL/CSA Maximum short-circuit current ratings – MS165

Type	Manual Motor Controllers		for motor disconnect		for group installations		for tap conductor protection in group installations		Manual self-protected Combination Motor Controllers (Type E)	
	Branch circuit protection, max. size per NEC/CEC ¹⁾									
	Fuses	Circuit breaker	480 V	600 V	480 V	600 V	480 V	600 V	480Y / 277 V	600Y / 347 V
	A	A	kA	kA	kA	kA	kA	kA	kA	kA
MS165-16	Any Listed fuses. Size per NEC/CEC	Any Listed UL489 / CSA C22.2 No.5 circuit breaker. Size per NEC/CEC	65	30	65	30	65	30	65	30
MS165-20			65	30	65	30	65	30	65	30
MS165-25			65	30	65	30	65	30	65	30
MS165-32			65	30	65	30	65	30	65	30
MS165-42			65	30	65	30	65	30	65	-
MS165-54			65	30	65	30	65	30	65	-
MS165-65			65	30	65	30	65	30	65	-

¹⁾ NEC: NFPA®70 National Electrical Code®; CEC: CSA C22.1 Canadian Electrical Code.

UL/CSA Maximum short-circuit current ratings – MO132

Type	Manual Motor Controllers		for motor disconnect		for group installations		for tap conductor protection in group installations	
	Branch circuit protection, max. size per NEC/CEC ¹⁾							
	Fuses	Circuit breaker	480 V	600 V	480 V	600 V	480 V	600 V
	A	A	kA	kA	kA	kA	kA	kA
MS132-0.16	Any Listed fuses. Size per NEC/CEC	Any Listed UL489 / CSA C22.2 No.5 circuit breaker. Size per NEC/CEC	65	47	65	47	65	47
MS132-0.25			65	47	65	47	65	47
MS132-0.40			65	47	65	47	65	47
MS132-0.63			65	47	65	47	65	47
MS132-1.0			65	47	65	47	65	47
MS132-1.6			65	47	65	47	65	47
MS132-2.5			65	47	65	47	65	47
MS132-4.0			65	47	65	47	65	47
MS132-6.3			65	18	65	35	65	18
MS132-10			65	18	65	35	65	18
MS132-12			30	18	35	35	30	18
MS132-16			30	18	35	35	30	18
MS132-20			30	18	35	35	30	18
MS132-25			30	18	35	35	30	18
MS132-32			30	18	35	35	30	18

¹⁾ NEC: NFPA®70 National Electrical Code®; CEC: CSA C22.1 Canadian Electrical Code.

UL/CSA Maximum short-circuit current ratings – MO165

Type	Manual Motor Controllers		for motor disconnect		for group installations		for tap conductor protection in group installations	
	Branch circuit protection, max. size per NEC/CEC ¹⁾							
	Fuses	Circuit breaker	480 V	600 V	480 V	600 V	480 V	600 V
	A	A	kA	kA	kA	kA	kA	kA
MO165-16	Any Listed fuses. Size per NEC/CEC	Any Listed UL489 / CSA C22.2 No.5 circuit breaker. Size per NEC/CEC	65	30	65	30	65	30
MO165-20			65	30	65	30	65	30
MO165-25			65	30	65	30	65	30
MO165-32			65	30	65	30	65	30
MO165-42			65	30	65	30	65	30
MO165-54			65	30	65	30	65	30
MO165-65			65	30	65	30	65	30

¹⁾ NEC: NFPA®70 National Electrical Code®; CEC: CSA C22.1 Canadian Electrical Code.

Technical data

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

UL 508 — Manual controller for tap conductor protection and for control transformer

Type	Max. short-circuit current rating when used with upstream protection device	
	480 V	600 V
	kA	kA
MS132-0.16T	65	47
MS132-0.25T	65	47
MS132-0.4T	65	47
MS132-0.63T	65	47
MS132-1.0T	65	47
MS132-1.6T	65	47
MS132-2.5T	65	47
MS132-4.0T	65	47
MS132-6.3T	65	18
MS132-10T	65	18
MS132-12T	30	18
MS132-16T	30	18
MS132-20T	30	18
MS132-25T	30	18

Technical data

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

General technical data

Type	MS116	MS132	MS165	MO132	MO165	MS132-T
Pollution degree	3	3	3	3	3	3
Phase loss sensitivity	Yes	Yes	Yes	No	No	Yes
Disconnect function acc. to IEC/EN 60947-2	Yes	Yes	Yes	Yes	Yes	Yes
Ambient air temperature						
Operation						
Open - compensated	-25 ... +55 °C	-25 ... +60 °C	-25 ... +60 °C	-	-	-25 ... +60 °C
Open	-25 ... +70 °C	-25 ... +70 °C	-25 ... +60 °C	-25 ... +60 °C	-25 ... +60 °C	-25 ... +70 °C
Enclosed (IB132 ¹⁾)	0 ... +40 °C	0 ... +40 °C	-	-	-	0 ... +40 °C
Storage	-50 ... +80 °C	-50 ... +80 °C	-50 ... +80 °C	-50 ... +80 °C	-50 ... +80 °C	-50 ... +80 °C
Ambient air temperature compensation	Acc. to IEC/EN60947-4-1	Acc. to IEC/EN60947-4-1	Acc. to IEC/EN60947-4-1	-	-	Acc. to IEC/EN60947-4-1
Maximum operating altitude permissible	2000 m	2000 m	2000 m	2000 m	2000 m	2000 m
Resistance to shock acc. to IEC 60068-2-27	25g / 11 ms	25g / 11 ms	25g / 11 ms	25g / 11 ms	25g / 11 ms	25g / 11 ms
Resistance to vibrations acc. to IEC 60068-2-6	5g / 3 ... 150 Hz	5g / 3 ... 150 Hz	5g / 3 ... 150 Hz	5g / 3 ... 150 Hz	5g / 3 ... 150 Hz	5g / 3 ... 150 Hz
Mounting position	Position 1-6 (optional for single mounting)	Position 1-6 (optional for single mounting)	Position 1-6 (optional for single mounting)	Position 1-6 (optional for single mounting)	Position 1-6 (optional for single mounting)	Position 1-6 (optional for single mounting)
Mounting	DIN-rail (EN 60715)	DIN-rail (EN 60715)	DIN-rail (EN 60715)	DIN-rail (EN 60715)	DIN-rail (EN 60715)	DIN-rail (EN 60715)
Group mounting	On request	On request	On request	On request	On request	-
Recommended screw for mounting plate	-	-	M4	-	M4	-
Screw torque for mounting plate	-	-	2 Nm	-	2 Nm	-
Minimum distance to other units same type						
Horizontal	0 mm	0 mm	0 mm	0 mm	0 mm	0 mm
Vertical	150 mm	150 mm	150 mm	150 mm	150 mm	150 mm
Minimum distance to electrical conductive board						
Horizontal, up to 400 V	0 mm	0 mm	0 mm	0 mm	0 mm	0 mm
Horizontal, up to 690 V	> 1.5 mm	> 1.5 mm	> 1.5 mm	> 1.5 mm	> 1.5 mm	> 1.5 mm
Vertical	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm
Degree of protection						
Housing	IP20	IP20	IP20	IP20	IP20	IP20
Main circuit terminals	IP10	IP10	IP10	IP10	IP10	IP10

¹⁾ not suitable for MS165 and MO165

Connecting characteristics

Main circuit

Type	MS116 ≤ 16 A	MS116 ≥ 20 A
Connecting capacity		
 Rigid	1 or 2 x 1 ... 4 mm ²	2.5 ... 6 mm ²
 Flexible with ferrule	1 or 2 x 0.75 ... 2.5 mm ²	1 ... 6 mm ²
 Flexible with insulated ferrule	1 or 2 x 0.75 ... 2.5 mm ²	1 ... 6 mm ²
 Flexible	1 or 2 x 0.75 ... 2.5 mm ²	1 ... 6 mm ²
Stranded acc. to UL/CSA	1 or 2 x AWG 16-12	AWG 16-8
Stripping length	9 mm	10 mm
Tightening torque	0.8 ... 1.2 Nm / 10 ... 12 lb.in	2.0 Nm / 18 lb.in
Recommended screw driver	Pozidriv 2	Pozidriv 2

Main circuit

Type	MS132 ≤ 10 A	MS132 ≥ 12 A
Connecting capacity		
 Rigid	1 or 2 x 1 ... 4 mm ²	1 ... 2.5 mm ² 2.5 ... 6 mm ²
 Flexible with ferrule	1 or 2 x 0.75 ... 2.5 mm ²	0.75 ... 6 mm ²
 Flexible with insulated ferrule	1 or 2 x 0.75 ... 2.5 mm ²	0.75 ... 6 mm ²
 Flexible	1 or 2 x 0.75 ... 2.5 mm ²	1 ... 2.5 mm ² 2.5 ... 6 mm ²
Stranded acc. to UL/CSA	1 or 2 x AWG 16-12	AWG 16-8
Stripping length	9 mm	10 mm
Tightening torque	0.8 ... 1.2 Nm / 10 ... 12 lb.in	2.0 Nm / 18 lb.in
Recommended screw driver	Pozidriv 2	Pozidriv 2

Technical data

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

Connecting characteristics

Main circuit		
Type	MS165	
Connecting capacity		
 Rigid	1 or 2 x	1 ... 50 mm ²
 Flexible with ferrule	1 or 2 x	1 ... 35 mm ²
 Flexible with insulated ferrule	1 or 2 x	1 ... 35 mm ²
 Flexible	1 or 2 x	1 ... 35 mm ²
Stranded acc. to UL/CSA	1 or 2 x	AWG 16-0
Stripping length	16 mm	
Tightening torque	4.0 Nm / 35 lb.in	
Recommended screw driver	Pozidriv 2	

Main circuit		
Type	MO132 ≤ 10 A	MO132 ≥ 12 A
Connecting capacity		
 Rigid	1 or 2 x	1 ... 4 mm ²
 Flexible with ferrule	1 or 2 x	0.75 ... 2.5 mm ²
 Flexible with insulated ferrule	1 or 2 x	0.75 ... 2.5 mm ²
 Flexible	1 or 2 x	0.75 ... 2.5 mm ²
Stranded acc. to UL/CSA	1 or 2 x	AWG 16-12
Stripping length	9 mm	10 mm
Tightening torque	0.8 ... 1.2 Nm / 10 ... 12 lb.in	2.0 Nm / 18 lb.in
Recommended screw driver	Pozidriv 2	Pozidriv 2

Main circuit		
Type	MO165	
Connecting capacity		
 Rigid	1 or 2 x	1 ... 50 mm ²
 Flexible with ferrule	1 or 2 x	1 ... 35 mm ²
 Flexible with insulated ferrule	1 or 2 x	1 ... 35 mm ²
 Flexible	1 or 2 x	1 ... 35 mm ²
Stranded acc. to UL/CSA	1 or 2 x	AWG 16-0
Stripping length	16 mm	
Tightening torque	4.0 Nm / 35 lb.in	
Recommended screw driver	Pozidriv 2	

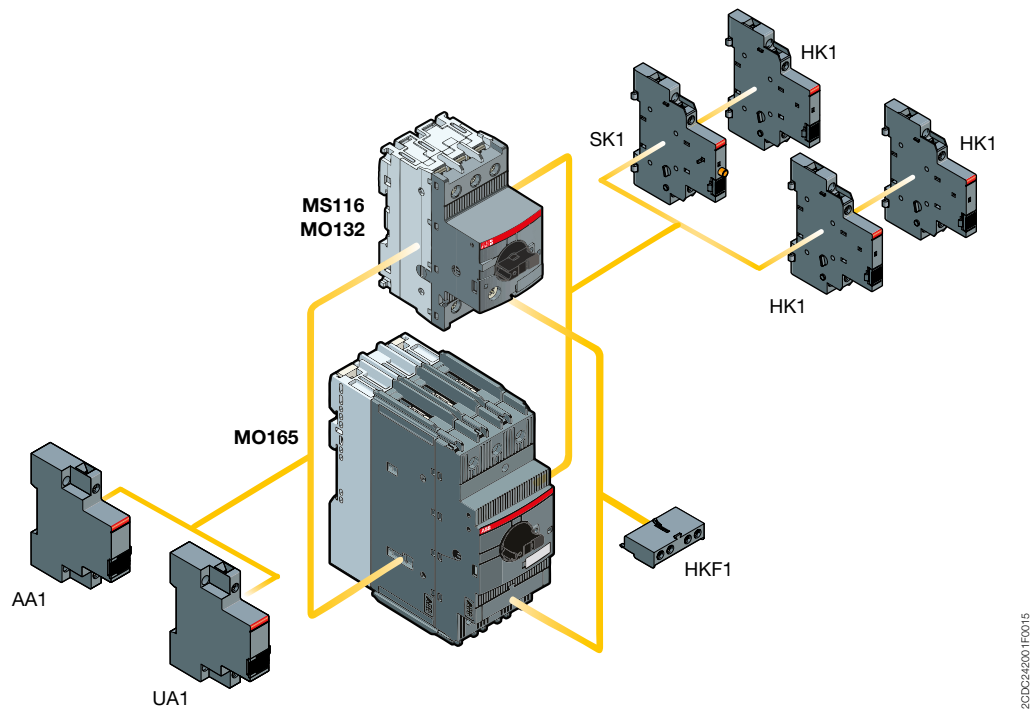
Main circuit		
Type	MS132-T ≤ 10 A	MS132-T ≥ 12 A
Connecting capacity		
 Rigid	1 or 2 x	1 ... 4 mm ²
 Flexible with ferrule	1 or 2 x	0.75 ... 2.5 mm ²
 Flexible with insulated ferrule	1 or 2 x	0.75 ... 2.5 mm ²
 Flexible	1 or 2 x	0.75 ... 2.5 mm ²
Stranded acc. to UL/CSA	1 or 2 x	AWG 16-12
Stripping length	9 mm	10 mm
Tightening torque	0.8 ... 1.2 Nm / 10 ... 12 lb.in	2.0 Nm / 18 lb.in
Recommended screw driver	Pozidriv 2	Pozidriv 2

Main accessories

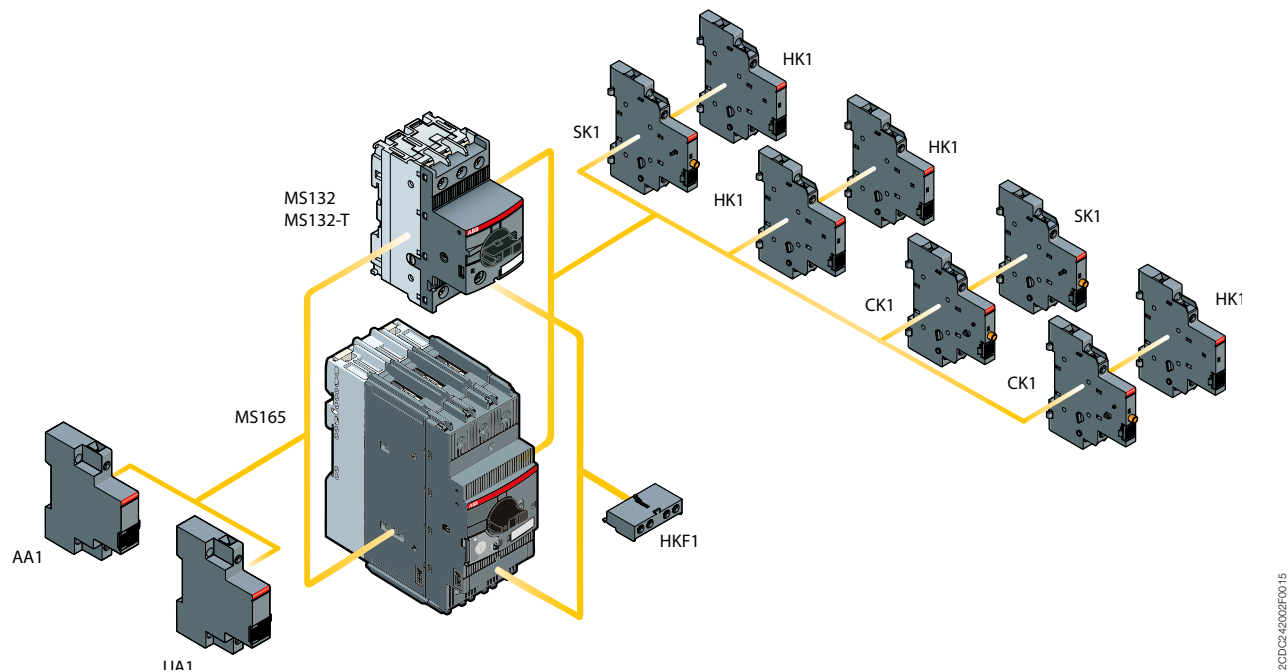
MS116, MS132, MS165, MO132, MO165, MS132-T

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

2



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



Main accessories

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



HKF1-11



HK1-11



SK1-11



CK1-11

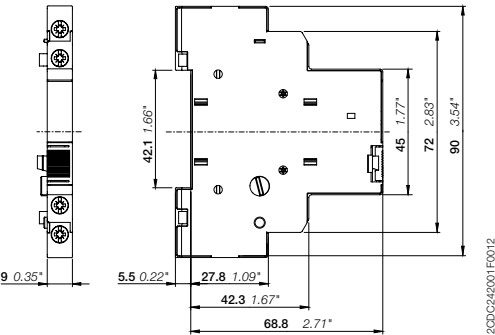
Description

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



HK1

Main accessories

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

2



AA1-24

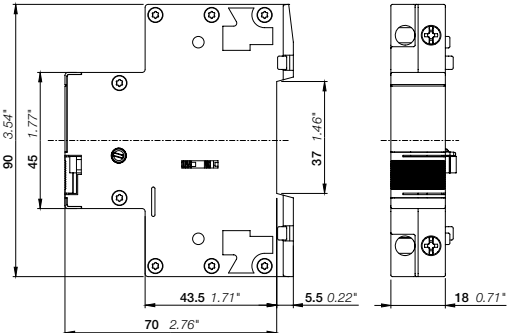


UA1-24

Ordering details

Suitable for	Rated control supply voltage		Type	Order code	Pkg qty	Weight (1 pce) kg
	50 Hz V AC	60 Hz V AC				
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

2CDC24202F0012

2CDC131050C0201

Main accessories

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

General technical data

Type	HK1, SK1, CK1		HKF1
Standards	IEC/EN 60947-2, IEC/EN 60947-4-1, IEC/EN 60947-1		
Rated operational voltage U_e	690 V AC / 600 DC		250 V AC / 250 V DC
Conventional free-air thermal current I_{th}	6 A		5 A
Rated frequency	50/60 Hz		
Rated impulse withstand voltage U_{imp}	6 kV		
Rated insulation voltage U_i	690 V AC		250 V AC
Pollution degree	3		
Ambient air temperature	Operation	-25 ... +70 °C	
	Storage	-50 ... +80 °C	
Resistance to shock acc. to IEC 60068-2-27	25g / 11 ms		
Resistance to vibrations acc. to IEC 60068-2-6	5g / 3 ... 150 Hz		
I_e / Rated operational current AC-15 acc. to IEC/EN 60947-5-1 for utilization category			
	24 V, 120 V	6 A	3 A
	240 V	4 A	1.5 A
	400 V	3 A	-
	440 V, 690 V	1 A	-
I_e / Rated operational current DC-13 acc. to IEC/EN 60947-5-1 for utilization category			
	24 V	2 A	1 A
	125 V	0.55 A	0.27 A
	250 V	0.27 A	0.11 A
	440 V, 600 V	0.15 A	-
Minimum switching capacity	17 V / 5 mA		
Short-circuit protective device	N.C., 95-96	10 A Type gG	
	N.O., 97-98	10 A Type gG	
Duty time	100 %		
Mounting	Right side of MMS / MS132-T		Front of MMS / MS132-T
Mounting positions	1-6		
Mechanical durability	50000 cycles		-
Electrical durability	50000 cycles		-

Contact utilization characteristics according to UL/CSA

Type	HK1, SK1, CK1	HKF1
Standards	UL 60947-1, UL 60947-4-1 (UL 508), CSA C22.2 No.60947-4-1 (CSA C22.2 No.14)	
Rated operational voltage U_n acc. to UL/CSA	600 V AC / 600 V DC	250 V AC / 250 V DC
Pilot duty	A600, Q600	B300, Q300
AC thermal rated current	10 A	5 A
AC maximum volt-ampere making	7200 VA	3600 VA
AC maximum volt-ampere breaking	720 VA	360 VA
DC thermal rated current	2.5 A	2.5 A
DC maximum volt-ampere making-breaking	69 VA	69 VA

Connecting characteristics

Auxiliary circuit

Type	HK1, SK1, CK1	HKF1
Connecting capacity		
 Rigid	1 or 2 x	1 ... 1.5 mm ²
 Flexible with ferrule	1 or 2 x	0.75 ... 1.5 mm ²
 Flexible with insulated ferrule	1 or 2 x	0.75 ... 1.5 mm ²
 Flexible	1 or 2 x	0.75 ... 1.5 mm ²
Stranded acc. to UL/CSA		
	1 or 2 x	AWG 16-14
Stripping length	8 mm	
Tightening torque	0.8 ... 1.2 Nm / 7 lb.in	
Recommended screw driver	Pozidriv 2	

Main accessories

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

General technical data

Type	UA1	AA1
Standards	IEC/EN 60947-1, IEC/EN 60947-4-1, UL 60947-1, UL 60947-4-1 (UL 508), CSA C22.2 No.60947-4-1 (CSA C22.2 No.14)	
Rated control supply voltage	see ordering details	AA1-24: 20-24 V 50/60 Hz; 20-70 V 50/60 Hz KB = 5 s, 20-70 V DC KB = 5 s AA1-100: 110 V 50/60 Hz; 110-200 V 50/60 Hz KB = 5 s, 110-200 V DC KB = 5 s AA1-230: 200-240 V 50/60 Hz, 200-350 V 50/60 Hz KB = 5 s, 200-350 V DC KB = 5 s AA1-400: 350-415 V 50/60 Hz, 350-500 V 50/60 Hz KB = 5 s, 350-500 V DC KB = 5 s
Rated frequency	see ordering details	50/60 Hz, DC
Operating voltage	Tripping 0.35 ... 0.7 x U _s Coil operating voltage 0.85 ... 1.1 x U _s	0.7 ... 1.1 x U _s -
Power consumption	Pull-in AC on request DC on request Holding AC on request DC on request	on request on request - -
Rated impulse withstand voltage U _{imp}	6 kV	6 kV
Rated insulation voltage U _i	690 V	690 V
Pollution degree	3	3
Ambient air temperature	Operation -25 ... +60 °C Storage -50 ... +80 °C	-25 ... +60 °C -50 ... +80 °C
Resistance to shock acc. to IEC 60068-2-27	25g / 11 ms	25g / 11 ms
Resistance to vibrations acc. to IEC 60068-2-6	5g / 3 ... 150 Hz	5g / 3 ... 150 Hz
Mounting	left side of MMS / MS132-T	left side of MMS / MS132-T
Mounting positions	-	-

Connecting characteristics

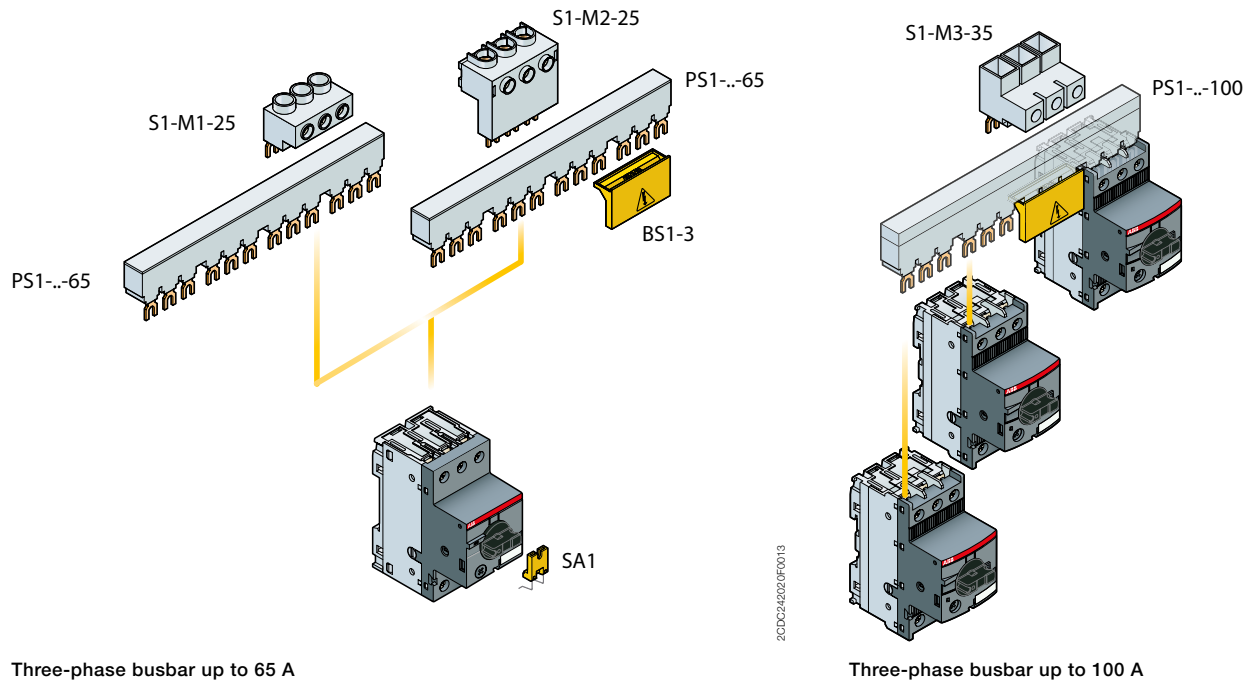
Auxiliary circuit

Type	UA1	AA1
Connecting capacity		
 Rigid	1 or 2 x 1 ... 4 mm ²	
 Flexible with ferrule	1 or 2 x 0.75 ... 2.5 mm ²	
 Flexible with insulated ferrule	1 x 0.75 ... 2.5 mm ² 2 x 0.75 ... 1.5 mm ²	
 Flexible	1 or 2 x 0.75 ... 2.5 mm ²	
Stranded acc. to UL/CSA	1 or 2 x AWG 16-12	
Stripping length	10 mm	
Tightening torque	0.8 ... 1.2 Nm / 7 lb.in	
Recommended screw driver	Pozidriv 2	

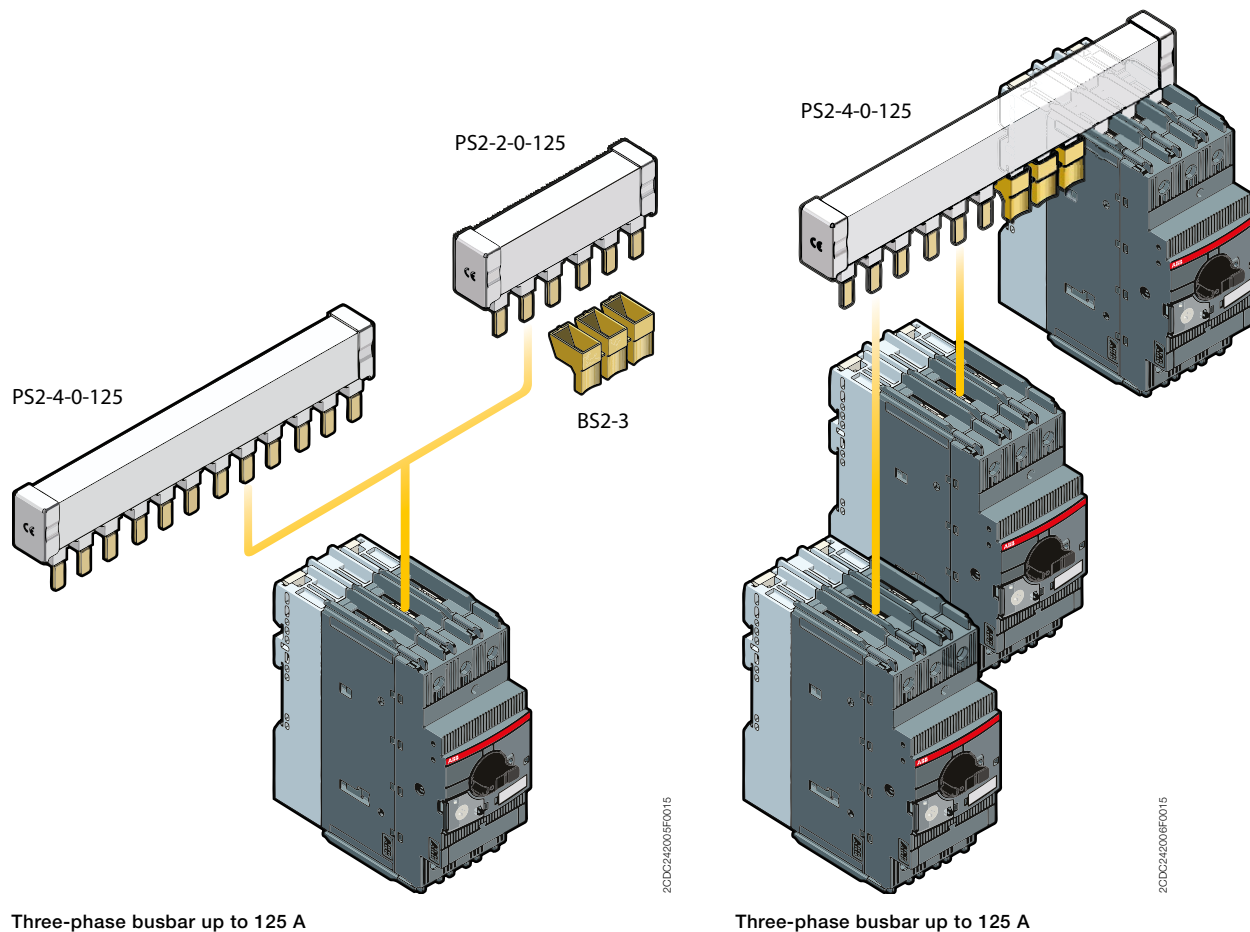
Main accessories

MS116, MS132, MS165, MO132, MO165

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



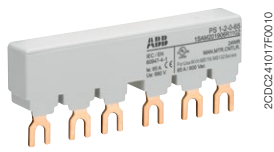
Manual motor starter with three-phase busbar systems (MS165, MO165)



Main accessories

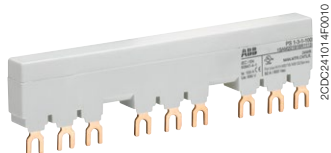
MS116, MS132, MO132, MS132-T

2



PS1-2-0-65

2CDC241017F0010



PS1-3-1-100

2CDC241014F0010



S1-M1-25

1SBC101226F0014



S1-M2-25

1SBC101266F0014



SA2



2CDC241023F0013



SA1

SK0108B91



PB1-1-32

2CDC241004F0014



S1-PB1-25

2CDC241005S0014

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	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
MS116, MS132, MO132	65	4	2	PS1-4-2-65	1SAM201906R1124	10	0.095
	65	5	2	PS1-5-2-65	1SAM201906R1125	10	0.122
	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 mm ²	Mounting form	Type	Order code	Pkg qty	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

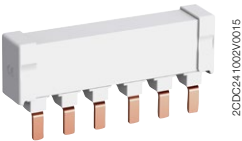
Suitable for	Description	Type	Order code	Pkg qty	Weight (1 pce) kg
MS116, MS132, MO132	Protection cover for busbars	BS1-3	1SAM201908R1001	50	0.003
MS116, MS132, MO132, MS132-T	Screw fixing kit	FS116	1SAM201909R1001	1	0.020
	Padlock + two keys	SA2	GJF1101903R0002	10	0.020
MS116	Lock handle	SA1	GJF1101903R0001	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

Main accessories

MS165, MO165



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	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	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

Main accessories

MS116, MS132, MS165, MO132, MO165

General technical data

Type	PS1-xxx-65	PS1-xxx-100	S1-Mx-25	S1-Mx-35
Standards	IEC/EN 60947-4-1, IEC/EN 60947-1, UL 60947-1, UL 60947-4-1 (UL 508), CSA C22.2 No.60947-4-1 (CSA C22.2 No.14)			
Rated operational voltage U_e	690 V			
Rated operational voltage U_e acc. to UL/CSA	600 V AC			
Rated operational current I_e	65 A	100 A	65 A	100 A
Rated operational current I_e acc. to UL/CSA	65 A	92 A	65 A	92 A
Rated frequency	50/60 Hz			
Rated impulse withstand voltage U_{imp}	6 kV			
Rated insulation voltage U_i	690 V AC			
Pollution degree	3			
Cross-section	10 mm ²	16 mm ²	25 mm ²	35 mm ²
Ambient air temperature	Operation	-25 ... +70 °C		
	Storage	-50 ... +80 °C		
Resistance to shock acc. to IEC 60068-2-27	25g / 11 ms			
Resistance to vibrations acc. to IEC 60068-2-6	5g / 3 ... 150 Hz			

Electrical connection

Main circuit

Type	S1-Mx-25	S1-Mx-35
Connecting capacity		
 Rigid	1 x 6 ... 25 mm ²	10 ... 35 mm ²
 Flexible with ferrule	1 x 6 ... 16 mm ²	10 ... 35 mm ²
 Flexible with insulated ferrule	1 x 6 ... 16 mm ²	10 ... 35 mm ²
 Flexible	1 x 6 ... 16 mm ²	10 ... 35 mm ²
Stranded acc. to UL/CSA	1 x AWG 10-4	AWG 8-2
Stripping length	10 mm	12 mm
Tightening torque	2.5 Nm / 22 lb.in	4.5 Nm / 40 lb.in
Recommended screw driver	Pozidriv 2	Hexagon SW4

Technical data for PS2-xxx on request.

Main accessories

MS116, MS132, MO132



IB132-Y



IB132-G



DMS132-Y



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.

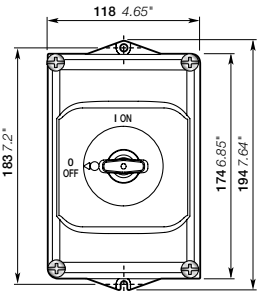
Ordering details

Suitable for	Description	Color	Type	Order code		Pkg qty	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

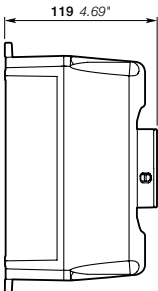
Indication I-O-T and ON-OFF-T

Please check for further equipment chapter General accessories.

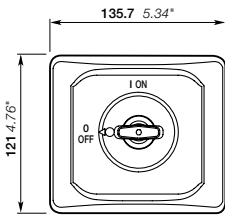
Main dimensions mm, inches



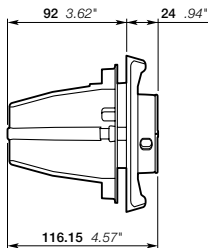
IB132



2CDC242011R0011



DMS132



2CDC242012R0011

2CDC131050C00201

MS495, MS497 manual motor starters

22 to 100 A – with thermal and electromagnetic protection

2



19BC101194F0014

MS495-40



2CDC241020F0011

MS497-100

Description

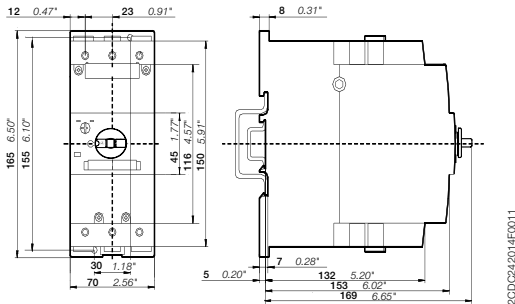
Manual motor starters (MMS) are protection devices for the main circuit. They combine motor control and protection in a single device. MMS are used mainly to switch motors manually ON/OFF and protect them and the installation fuse-less against short-circuit, overload and phase failures ¹⁾. Fuse-less 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 kW	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
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	660	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

Main dimensions mm, inches



MS495, MS497

2CDC242014F0011

2CDC131042C0201

MS495, MS497 manual motor starters

Technical data

2

Main circuit – Utilization characteristics according to IEC/EN

Type	MS495, MS497
Standards	IEC/EN 60947-2, IEC/EN 60947-4-1, IEC/EN 60947-1
Rated operational voltage U_e	690 V AC / 450 V DC
Rated frequency	50/60 Hz
Trip class	10
Number of poles	3
Duty time	100 %
Mechanical durability	50000 cycles
Electrical durability	25000 cycles
Rated impulse withstand voltage U_{imp}	6 kV
Rated insulation voltage U_i	690 V AC
Rated operational current I_e	
Rated instantaneous short-circuit current setting I_i	
Rated service short-circuit breaking capacity I_{cs}	
Rated ultimate short-circuit breaking capacity I_{cu}	

Short-circuit breaking capacity and back-up fuses

I_{cs} Rated service short-circuit breaking capacity

I_{cu} Rated ultimate short-circuit breaking capacity

I_{cc} Prospective short-circuit current at installation location

Note: Maximum rated current of the back-up fuses if $I_{cc} > I_{cs}$

Type	240 V AC			400 V AC			440 V AC			500 V AC			690 V AC		
	I_{cs} kA	I_{cu} kA	gG, aM A	I_{cs} kA	I_{cu} kA	gG, aM A	I_{cs} kA	I_{cu} kA	gG, aM A	I_{cs} kA	I_{cu} kA	gG, aM A	I_{cs} kA	I_{cu} kA	gG, aM A
Short-circuit protection MS495															
MS495-63				25	50	160	20	50	160	6	12	160	3	6	80
MS495-75				25	50	160	20	50	160	6	8	160	3	5	100
MS495-90				25	50	160	20	50	160	6	8	160	3	5	125
MS495-100				25	50	160	20	50	160	6	8	160	3	5	125

MS495-40: No need for back-up fuse in networks with a prospective current of up to 50 kA at 400 V.

With an appropriate 125 A type gG fuse the device can be used in a network with a prospective current of up to 100 kA.

MS495-100: No need for back-up fuse in networks with a prospective current of up to 50 kA at 400 V.

With an appropriate 160 A type gG fuse the device can be used in a network with a prospective current of up to 100 kA.

Short-circuit protection MS497

MS497-32	No back-up fuse required up to $I_{cc} = 100$ kA	50	100	No back-up fuse required up to $I_{cc} = 100$ kA	50	100	No back-up fuse required up to $I_{cc} = 100$ kA	11	22	100	7	12	63
MS497-40		50	100		50	100		9	18	160	6	12	80
MS497-50		50	100		50	100		7.5	15	160	5	10	100
MS497-63		50	100		50	70		7.5	15	160	4	7.5	100
MS497-75		50	100		50	70		5	10	160	3	6	125
MS497-90		50	100		50	70		5	10	160	3	6	160
MS497-100		50	100		50	70		5	10	160	3	6	160

MS497-32: No need for back-up fuse in networks with a prospective current of up to 100 kA at 440 V.

MS497-90: No need for back-up fuse in networks with a prospective current of up to 70 kA at 440 V.

With an appropriate 200 A type gG fuse the device can be used in a network with a prospective current of up to 100 kA.

MS495, MS497 manual motor starters

Technical data

2

Main circuit – Utilization characteristics according to UL/CSA

Type	MS495, MS497	
Standards	UL 508, CSA 22.2 No. 14	
Maximum operational voltage	600 V AC	
Manual motor controller ratings	See table "UL 508 – Manual motor controller"	
Trip rating	125 % FLA	
Motor ratings	Horsepower	See table "Motor ratings, three-phase"
	Full Load Amps (FLA)	See table "Motor ratings, three-phase"

Motor ratings, three-phase

hp Horsepower

FLA Full Load Amps

Type	General purpose rating at max. 600 V AC	Full Load Amps	200 - 208 V AC	230 V AC	460 V AC	575 V AC
	A	FLA	hp	hp	hp	hp
MS495-63	63	63	20	25	50	60
MS495-75	75	75	25	25	60	75
MS495-90	90	90	30	30	75	100
MS495-100	100	100	40	40	75	100
MS497-32	32	32	10	10	25	30
MS497-40	40	40	15	15	30	40
MS497-50	50	50	15	20	40	50
MS497-63	63	63	20	25	50	60
MS497-75	75	75	25	25	60	75
MS497-90	90	90	30	30	75	100
MS497-100	100	100	30	40	75	100

UL 508 – Manual motor controller

Type	Circuit breaker or class R fuse per UL/NEC	Max. circuit breaker or fuse per UL/ NEC	Maximum short-circuit current for motor disconnect		for group installation		for tap conductor	for protection	UL 508	
	480/600 V A	480/600 V A	480 V kA	600 V kA	480 V kA	600 V kA	480Y/277V kA	600Y/347V kA	Type E ¹⁾ 480Y/277V kA	Type E 600Y/347V kA
MS495-63	250	500	65	30	65	30	65	30	65	30
MS495-75	300	500	65	30	65	30	65	30	65	30
MS495-90	350	500	65	10	65	10	65	-	65	-
MS495-100	400	500	65	10	65	10	65	-	65	-
MS497-32	120	500	65	30	65	30	65	30	65	30
MS497-40	160	500	65	30	65	30	65	30	65	30
MS497-50	200	500	65	30	65	30	65	30	65	30
MS497-63	250	500	65	30	65	30	65	30	65	30
MS497-75	300	500	65	30	65	30	65	30	65	30
MS497-90	350	500	65	10	65	10	-	-	65	-
MS497-100	400	500	65	10	65	10	-	-	65	-

¹⁾ only with use DX495

MS495, MS497 manual motor starters

Technical data

General technical data

Type	MS495	MS497
Pollution degree	3	
Phase loss sensitivity	Yes	
Disconnect function acc. to IEC/EN 60947-2	Yes	
Ambient air temperature		
Operation		
Open - compensated	-20 ... +60 °C	
Open	-20 ... +70 °C	
Enclosed	-20 ... +35 °C	
Storage	-50 ... +80 °C	
Ambient air temperature compensation	Acc. to IEC/EN60947-4-1	
Maximum operating altitude permissible	2000 m	
Resistance to shock acc. to IEC 60068-2-27	-	
Resistance to vibrations acc. to IEC 60068-2-6	2g / 5-150 Hz	
Mounting position	Position 1-6 (optional for single mounting)	
Mounting	DIN-rail 15 mm / 75 mm (EN 60715)	
Minimum distance to other units same type		
Horizontal	0 mm	
Vertical - up to 240 V	50 mm	
Vertical - up to 440 V	70 mm	
Vertical - up to 500 V	110 mm	
Vertical - up to 690 V	150 mm	
Vertical	-	
Minimum distance to electrical conductive board		
Horizontal	-	
Horizontal - up to 500 V	10 mm	
Horizontal - up to 690 V	30 mm	
Vertical - up to 240 V	50 mm	
Vertical - up to 440 V	70 mm	
Vertical - up to 500 V	110 mm	
Vertical - up to 690 V	150 mm	
Vertical	-	
Degree of protection		
Housing	IP20	
Main circuit terminals	IP00	

Connecting characteristics

Main circuit			
Type	MS495	MS497	
Connecting capacity			
 Rigid	1 or 2 x	2.5 ... 16 mm ²	2.5 ... 16 mm ²
 Flexible with ferrule	1 x	10 ... 70 mm ²	10 ... 70 mm ²
	2 x	10 ... 50 mm ²	10 ... 50 mm ²
 Flexible	1 x	10 ... 70 mm ²	10 ... 70 mm ²
	2 x	10 ... 50 mm ²	10 ... 50 mm ²
Stranded acc. to UL/CSA	1 x	AWG 10-2/0	AWG 10-2/0
	2 x	AWG 10-1/0	AWG 10-1/0
Flexible acc. to UL/CSA	1 x	AWG 10-2/0	AWG 10-2/0
	2 x	AWG 10-1/0	AWG 10-1/0
Stripping length	17 mm	17 mm	
Tightening torque	4 - 6 Nm / 35 - 53 lb.in	4 - 6 Nm / 35 - 53 lb.in	
Recommended screw driver	Hexagon 4	Hexagon 4	

MO495, MO496 manual motor starters magnetic only

32 to 100 A – with electromagnetic protection

2



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.

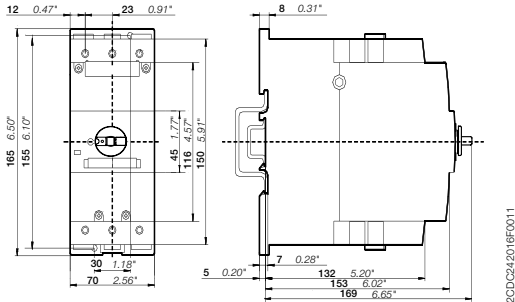
Ordering details

Rated operational power 400 V AC-3 ¹⁾ kW	Rated operational current 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
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



MO495, MO496

2CDC242016F0011

2CDC131038C0201

MO495, MO496 manual motor starters magnetic only

Technical data

Main circuit – Utilization characteristics according to IEC/EN

Type	MO495, MO496
Standards	IEC/EN 60947-2, IEC/EN 60947-4-1, IEC/EN 60947-1
Rated operational voltage U_e	690 V AC / 450 V DC
Rated frequency	50/60 Hz
Number of poles	3
Duty time	100 %
Mechanical durability	50000 cycles
Electrical durability	25000 cycles
Rated impulse withstand voltage U_{imp}	6 kV
Rated insulation voltage U_i	690 V AC
Rated operational current I_e	
Rated instantaneous short-circuit current setting I_i	
Rated service short-circuit breaking capacity I_{cs}	
Rated ultimate short-circuit breaking capacity I_{cu}	

Short-circuit breaking capacity and back-up fuses

I_{cs} Rated service short-circuit breaking capacity

I_{cu} Rated ultimate short-circuit breaking capacity

I_{cc} Prospective short-circuit current at installation location

Note: Maximum rated current of the back-up fuses if $I_{cc} > I_{cs}$

Type	240 V AC			400 V AC			440 V AC			500 V AC			690 V AC		
	I_{cs} kA	I_{cu} kA	gG, aM A	I_{cs} kA	I_{cu} kA	gG, aM A	I_{cs} kA	I_{cu} kA	gG, aM A	I_{cs} kA	I_{cu} kA	gG, aM A	I_{cs} kA	I_{cu} kA	gG, aM A
Short-circuit protection MO495															
MO495-63	No back-up fuse required up to $I_{cc} = 100$ kA			25	50	160	20	50	160	6	12	160	3	6	80
MO495-75				25	50	160	20	50	160	6	8	160	3	5	100
MO495-90				25	50	160	20	50	160	6	8	160	3	5	125
MO495-100				25	50	160	20	50	160	6	8	160	3	5	125

MO495-100: No need for back-up fuse in networks with a prospective current of up to 50 kA at 400 V.

With an appropriate 160 A type gG fuse the device can be used in a network with a prospective current of up to 100 kA.

Short-circuit protection MO496

MO496-32	No back-up fuse required up to $I_{cc} = 100$ kA	50	100	No back-up fuse required up to $I_{cc} = 100$ kA	50	100	No back-up fuse required up to $I_{cc} = 100$ kA	11	22	100	7	12	63
MO496-40		50	100		50	100		9	18	160	6	12	80
MO496-50		50	100		50	100		7.5	15	160	5	10	100
MO496-63		50	100		50	70		7.5	15	160	4	7.5	100
MO496-75		50	100		50	70		5	10	160	3	6	125
MO496-90		50	100		50	70		5	10	160	3	6	160
MO496-100		50	100		50	70		5	10	160	3	6	160

MO496-32: No need for back-up fuse in networks with a prospective current of up to 100 kA at 440 V.

MO496-90: No need for back-up fuse in networks with a prospective current of up to 70 kA at 440 V.

With an appropriate 200 A type gG fuse the device can be used in a network with a prospective current of up to 100 kA.

MO495, MO496 manual motor starters magnetic only

Technical data

2

Main circuit – Utilization characteristics according to UL/CSA

Type	MO495, MO496	
Standards	UL 508, CSA 22.2 No. 14	
Maximum operational voltage	600 V AC	
Manual motor controller ratings	See table "UL 508 – Manual motor controller"	
Trip rating	125 % FLA	
Motor ratings	Horsepower	See table "Motor ratings, three-phase"
	Full Load Amps (FLA)	See table "Motor ratings, three-phase"

Motor ratings, three-phase

hp Horsepower

FLA Full Load Amps

Type	General purpose rating at max. 600 V AC	Full Load Amps	200 - 208 V AC	230 V AC	460 V AC	575 V AC
	A	FLA	hp	hp	hp	hp
MO495-63	63	63	20	25	50	60
MO495-75	75	75	25	25	60	75
MO495-90	90	90	30	30	75	100
MO495-100	100	100	40	40	75	100
MO496-32	32	32	10	10	25	30
MO496-40	40	40	15	15	30	40
MO496-50	50	50	15	20	40	50
MO496-63	63	63	20	25	50	60
MO496-75	75	75	25	25	60	75
MO496-90	90	90	30	30	75	100
MO496-100	100	100	30	40	75	100

UL 508 – Manual motor controller

Type	Circuit breaker or class R fuse per UL/NEC	Max. circuit breaker or fuse per UL/NEC	Maximum short-circuit current for motor disconnect		for group installation	
	480/600 V	480/600 V	480 V	600 V	480 V	600 V
	A	A	kA	kA	kA	kA
MO495-63	60	500	65	30	65	30
MO495-75	250	500	65	30	65	30
MO495-90	300	500	65	30	65	30
MO495-100	350	500	65	10	65	10
MO496-32	120	500	65	30	65	30
MO496-40	160	500	65	30	65	30
MO496-50	200	500	65	30	65	30
MO496-63	250	500	65	30	65	30
MO496-75	300	500	65	30	65	30
MO496-90	350	500	65	10	65	10
MO496-100	400	500	65	10	65	10

MO495, MO496 manual motor starters magnetic only

Technical data

General technical data

Type	MO495	MO496
Pollution degree	3	
Phase loss sensitivity	-	
Disconnect function acc. to IEC/EN 60947-2	Yes	
Ambient air temperature		
Operation		
Open - compensated	-20 ... +60 °C	
Open	-20 ... +70 °C (above 60° C, current derating)	
Enclosed	-20 ... +35 °C	
Storage	-50 ... +80 °C	
Ambient air temperature compensation	-	
Maximum operating altitude permissible	2000 m	
Resistance to shock acc. to IEC 60068-2-27	25g / 11 ms	
Resistance to vibrations acc. to IEC 60068-2-6	-	
Mounting position	Position 1-6 (optional for single mounting)	
Mounting	DIN-rail 15 mm / 75 mm (EN 60715)	
Minimum distance to other units same type		
Horizontal	0 mm	
Vertical - up to 240 V	50 mm	
Vertical - up to 440 V	70 mm	
Vertical - up to 500 V	110 mm	
Vertical - up to 690 V	150 mm	
Vertical	-	
Minimum distance to electrical conductive board		
Horizontal	-	
Horizontal - up to 500 V	10 mm	
Horizontal - up to 690 V	30 mm	
Vertical - up to 240 V	50 mm	
Vertical - up to 440 V	70 mm	
Vertical - up to 500 V	110 mm	
Vertical - up to 690 V	150 mm	
Vertical	-	
Degree of protection		
Housing	IP20	
Main circuit terminals	IP20	

Connecting characteristics

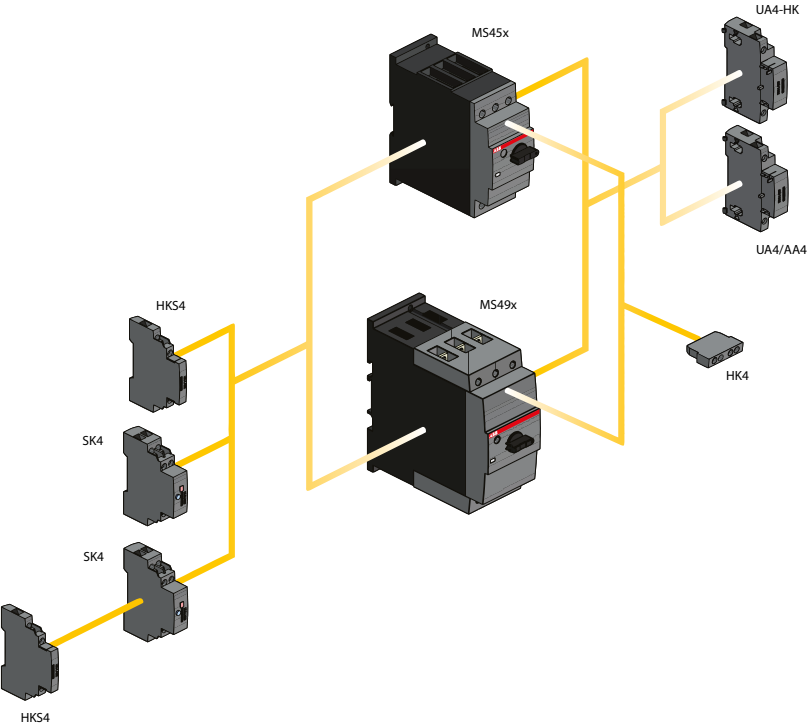
Main circuit		
Type	MO495	MO496
Connecting capacity		
 Rigid	1 or 2 x 2.5 ... 16 mm ²	2.5 ... 16 mm ²
 Flexible with ferrule	1 x 10 ... 70 mm ²	10 ... 70 mm ²
	2 x 10 ... 50 mm ²	10 ... 50 mm ²
 Flexible	1 x 10 ... 70 mm ²	10 ... 70 mm ²
	2 x 10 ... 50 mm ²	10 ... 50 mm ²
Stranded acc. to UL/CSA	1 x AWG 10-2/0	AWG 10-2/0
	2 x AWG 10-1/0	AWG 10-1/0
Flexible acc. to UL/CSA	1 x AWG 10-2/0	AWG 10-2/0
	2 x AWG 10-1/0	AWG 10-1/0
Stripping length	17 mm	17 mm
Tightening torque	4 - 6 Nm / 35 - 53 lb.in	4 - 6 Nm / 35 - 53 lb.in
Recommended screw driver	Hexagon 4	Hexagon 4

Main accessories

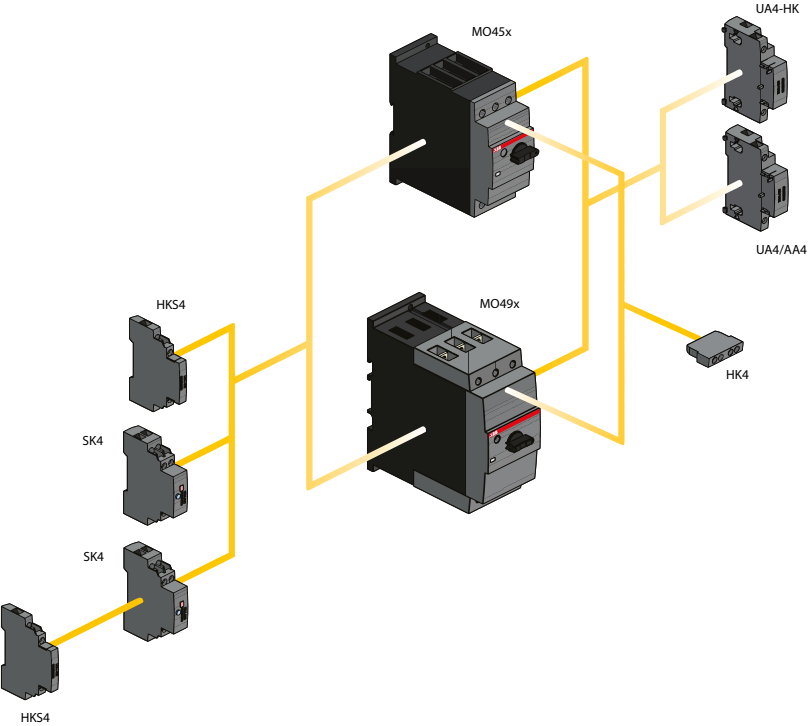
MS49x, MO49x manual motor starters

Manual motor starter MS49x with accessories

2



Manual motor starter MO49x with accessories



Main accessories

MS49x, MO49x manual motor starters



HK4-11

2CDC24102BF0011



HKS4-20

2CDC24102FF0011



SK4-11

2CDC24102AF0011



AA4-24

2CDC24102BF0011



UA4-110

2CDC24102BF0011



SA2

2CDC24102BF0013

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	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
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Suitable for	Rated control supply voltage	Frequency	Type	Order code	Pkg qty	Weight (1 pce)
	V	Hz				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	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.

Main accessories

MS49x, MO49x manual motor starters

General technical data

Type		HK4-11	HK4-W	HKS4	SK4
Standards		IEC/EN 60947–1, IEC/EN 60947-5-1, UL 508, CSA22.2 No. 14			
Rated operational voltage U_e		230 V AC / 220 V DC	690 V AC / 220 V DC	690 V AC	690 V AC
Conventional free-air thermal current I_{th}		2.5 A	5 A	10 A	10 A
Rated frequency		DC, 50/60 Hz			
Rated impulse withstand voltage U_{imp}		6 kV			
Rated insulation voltage U_i		300 V	300 V	690 V	690 V
Pollution degree		3			
Ambient air temperature	Operation	-20 ... +70 °C			
	Storage	-50 ... +80 °C			
Resistance to shock acc. to IEC 60068-2-27		25g / 11 ms			
Resistance to vibrations acc. to IEC 60068-2-6		2g / 5 ... 150 Hz			
Number of poles		1 N.C. + 1 N.O.	Changeover	1 N.C. + 1 N.O. / 2 N.O. / 2 N.C.	2 N.C. + 2 N.O.
I_e / Rated operational current AC-15 acc. to IEC/EN 60947-5-1 for utilization category					
	24 V	2 A	4 A	6 A	6 A
	230 V	0.5 A	3 A	4 A	4 A
	400 V	-	1.5 A	3 A	3 A
	690 V	-	0.5 A	1 A	1 A
I_e / Rated operational current DC-13 acc. to IEC/EN 60947-5-1 for utilization category					
	24 V	1 A	1 A	2 A	2 A
	48 V	0.3 A	-	-	-
	60 V	0.15 A	-	-	-
	110 V	-	0.22 A	0.5 A	0.5 A
	230 V	-	0.1 A	0.25 A	0.25 A
Minimum switching capacity		17 V / 1 mA		-	-
Short-circuit protective device		10 A Type gG			
Duty time		100 %			
Mounting		Front of MMS	Front of MMS	Left side of MMS	Left side of MMS
Mounting positions		1-6			
Mechanical durability		100000 cycles			
Electrical durability		100000 cycles			

Type	UA4-xxx	AA4-xxx
Power consumption		
Pull-in	AC 20.2/13 VA/W	20.2/13 VA/W
	DC 20 W	13 ... 80 W
Holding	AC 7.2/2.4 VA/W	-
	DC 2.1 W	-
Operating voltage		
Tripping	0.35 ... 0.7 V x U_s	0.7 ... 1.1 V x U_s
Coil operating voltage	0.85 ... 1.1 V x U_s	-

Main accessories

MS49x, MO49x manual motor starters

Connecting characteristics

Auxiliary circuit

Type		HK4-11	HK4-W	HKS4	SK4
Connecting capacity					
 Rigid	1 x	0.5... 2.5 mm²			
	2 x	0.5 ... 1.5 mm² or 0.75 ... 2.5 mm			
 Flexible with ferrule	1 x	0.5 ... 2.5 mm²			
	2 x	0.5 ... 1.5 mm² or 0.75 ... 2.5 mm			
 Flexible	1 x	0.5 ... 2.5 mm²			
	2 x	0.5 ... 1.5 mm² or 0.75 ... 2.5 mm			
	Stranded acc. to UL/CSA	1 or 2 x	AWG 18-14		
	Flexible acc. to UL/CSA	1 or 2 x	AWG 18-14		
Stripping length					
10 mm					
Tightening torque					
0.8 ... 1.2 Nm / 7 ... 10.3 lb.in					
Recommended screw driver					
Pozidriv 2					

2

General accessories

MS1xx, MO1xx, MS49x, MO49x

2



MSHD-LB

2CDC241003F0011



MSHD-LY

2CDC241002S0011



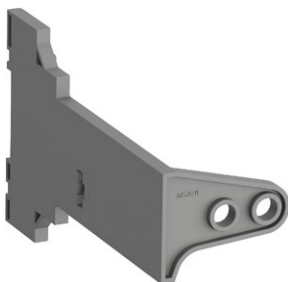
MSMN

2CDC241004F0011



MSH-AR

2CDC241001F0012



MSAH1

2CDC241017V0013

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	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.	85 105 130 180		OXS6X85 OXS6X105 OXS6X130 OXS6X180	1SCA101647R1001 1SCA108043R1001 1SCA101655R1001 1SCA101659R1001	1 1 1 1	0.020 0.020 0.030 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 Yellow Black Yellow	MSHD-LB ¹⁾ MSHD-LY ¹⁾ MSHD-LTB ²⁾ MSHD-LTY ²⁾	1SAM201920R1001 1SAM201920R1002 1SAM201920R1011 1SAM201920R1012	1 1 1 1	0.065 0.065 0.065 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⁾ MSMNO ⁴⁾	1SAM101923R0002 1SAM101923R0012	1 1	0.002 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 MSAH1 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

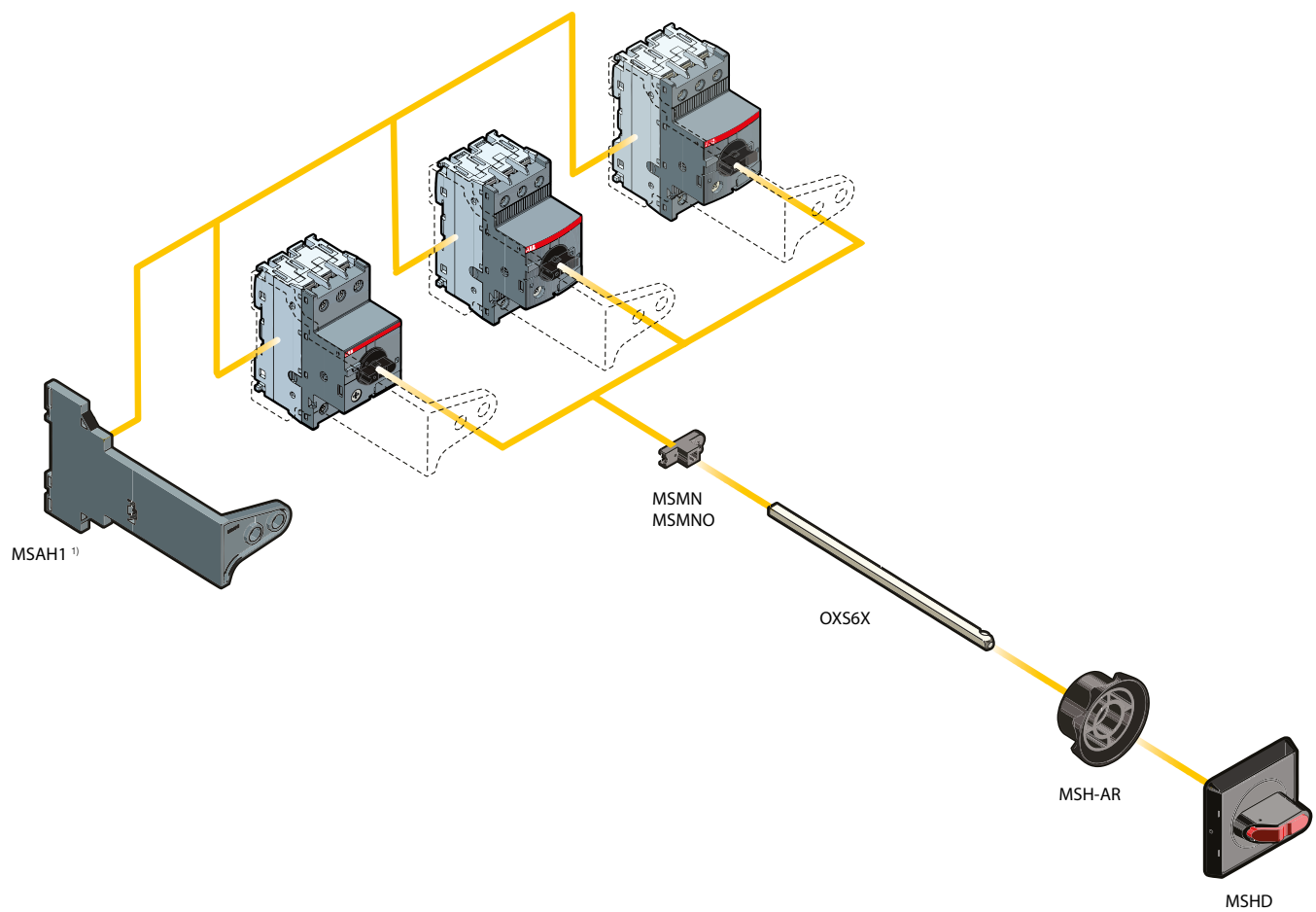
¹⁾ Indication I-O and ON-OFF (recommended for MS116, MS4xx, MO4xx)

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

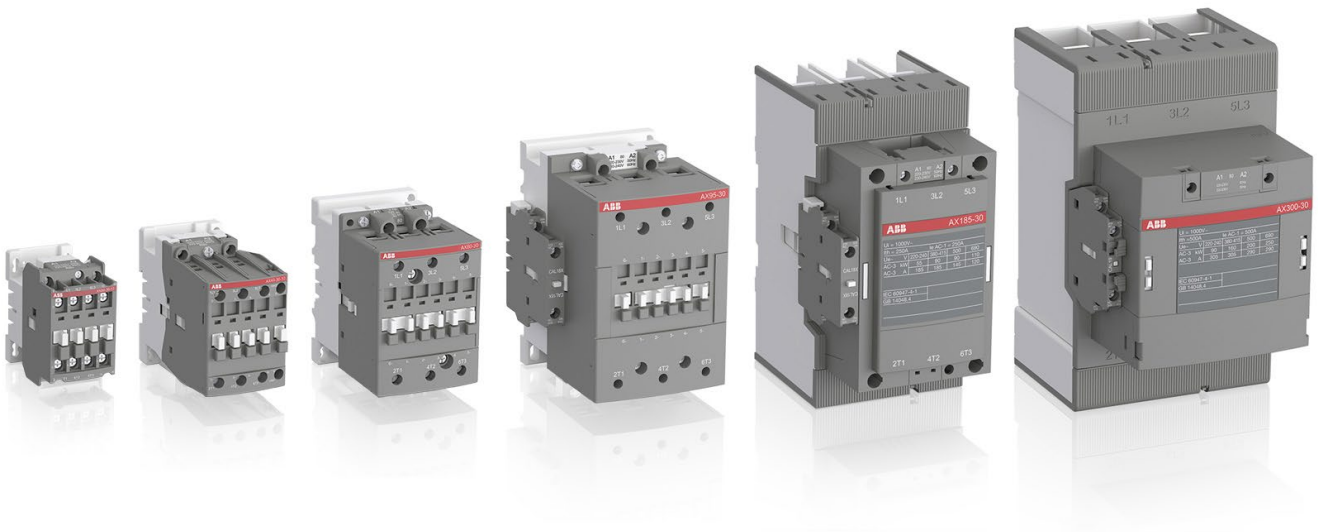
General accessories MS1xx, MO1xx, MS49x, MO49x



¹⁾ MSAH1 fits to MS116, MS132 and MO132

2CDC240022 F0013

2CDC131053C0201



AX contactors and NX contactor relays

AX 3-pole contactors

AX06 ... AX12	AC operated	58
AX18 ... AX25	AC operated	59
AX32, AX40	AC operated	60
AX50 ... AX80	AC operated	61
AX50 ... AX80	AC operated with 1 N.O. + 1 N.C.	62
AX95 ... AX150	AC operated with 1 N.O. + 1 N.C.	63
Main accessories		64
AX185 ... AX205	AC operated with 1 N.O. + 1 N.C.	67
AX260 ... AX370	AC operated with 1 N.O. + 1 N.C.	68
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NX contactor relays

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Terminal marking and positioning		102

Accessories for AX06 ... AX80 3-pole contactors and NX contactor relays	103
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Voltage code table	126
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AX06 ... AX12 3-pole contactors

3 to 5.5 kW

AC operated



AX06 ... AX12

Description

AX06 ... AX12 contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC. These contactors are of the block type design with:

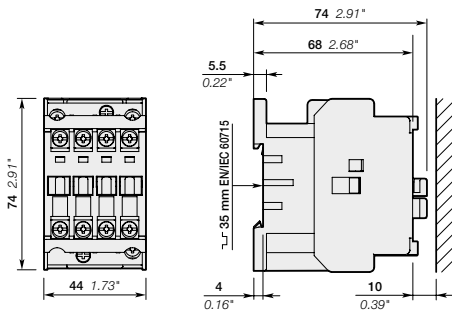
- 3 main poles and 1 built-in auxiliary contact
- control circuit: AC operated
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Ordering details

IEC		Rated control circuit voltage U _c (1)		Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce)
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	V 50 Hz	V 60 Hz				
3 kW	20 A	24	24	1 0	AX06-30-10-81	1SBL891074R8110	0.340
				0 1	AX06-30-01-81	1SBL891074R8101	0.340
		110	110...120	1 0	AX06-30-10-84	1SBL891074R8410	0.340
				0 1	AX06-30-01-84	1SBL891074R8401	0.340
		220...230	230...240	1 0	AX06-30-10-80	1SBL891074R8010	0.340
				0 1	AX06-30-01-80	1SBL891074R8001	0.340
		230...240	240...260	1 0	AX06-30-10-88	1SBL891074R8810	0.340
				0 1	AX06-30-01-88	1SBL891074R8801	0.340
		400...415	415...440	1 0	AX06-30-10-86	1SBL891074R8610	0.340
				0 1	AX06-30-01-86	1SBL891074R8601	0.340
4	22	24	24	1 0	AX09-30-10-81	1SBL901074R8110	0.340
				0 1	AX09-30-01-81	1SBL901074R8101	0.340
		110	110...120	1 0	AX09-30-10-84	1SBL901074R8410	0.340
				0 1	AX09-30-01-84	1SBL901074R8401	0.340
		220...230	230...240	1 0	AX09-30-10-80	1SBL901074R8010	0.340
				0 1	AX09-30-01-80	1SBL901074R8001	0.340
		230...240	240...260	1 0	AX09-30-10-88	1SBL901074R8810	0.340
				0 1	AX09-30-01-88	1SBL901074R8801	0.340
		400...415	415...440	1 0	AX09-30-10-86	1SBL901074R8610	0.340
				0 1	AX09-30-01-86	1SBL901074R8601	0.340
5.5	25	24	24	1 0	AX12-30-10-81	1SBL911074R8110	0.340
				0 1	AX12-30-01-81	1SBL911074R8101	0.340
		110	110...120	1 0	AX12-30-10-84	1SBL911074R8410	0.340
				0 1	AX12-30-01-84	1SBL911074R8401	0.340
		220...230	230...240	1 0	AX12-30-10-80	1SBL911074R8010	0.340
				0 1	AX12-30-01-80	1SBL911074R8001	0.340
		230...240	240...260	1 0	AX12-30-10-88	1SBL911074R8810	0.340
				0 1	AX12-30-01-88	1SBL911074R8801	0.340
		400...415	415...440	1 0	AX12-30-10-86	1SBL911074R8610	0.340
				0 1	AX12-30-01-86	1SBL911074R8601	0.340

(1) For other voltage version see voltage code table.

Main dimensions mm, inches



AX06, AX09, AX12

AX18, AX25 3-pole contactors

7.5 to 11 kW

AC operated



AX18

Description

AX18, AX25 contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC. These contactors are of the block type design with:

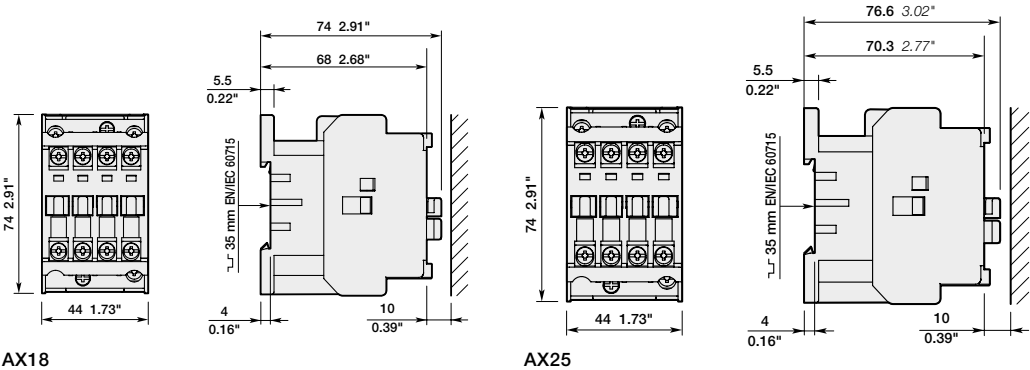
- 3 main poles and 1 built-in auxiliary contact
- control circuit: AC operated
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Ordering details

IEC		Rated control circuit voltage U _c (1)		Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce)
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	V 50 Hz	V 60 Hz				
kW	A						kg
7.5	27	24	24	1 0	AX18-30-10-81	1SBL921074R8110	0.340
				0 1	AX18-30-01-81	1SBL921074R8101	0.340
		110	110...120	1 0	AX18-30-10-84	1SBL921074R8410	0.340
				0 1	AX18-30-01-84	1SBL921074R8401	0.340
		220...230	230...240	1 0	AX18-30-10-80	1SBL921074R8010	0.340
				0 1	AX18-30-01-80	1SBL921074R8001	0.340
		230...240	240...260	1 0	AX18-30-10-88	1SBL921074R8810	0.340
				0 1	AX18-30-01-88	1SBL921074R8801	0.340
		400...415	415...440	1 0	AX18-30-10-86	1SBL921074R8610	0.340
				0 1	AX18-30-01-86	1SBL921074R8601	0.340
		24	24	1 0	AX25-30-10-81	1SBL931074R8110	0.340
				0 1	AX25-30-01-81	1SBL931074R8101	0.340
11	32	110	110...120	1 0	AX25-30-10-84	1SBL931074R8410	0.340
				0 1	AX25-30-01-84	1SBL931074R8401	0.340
		220...230	230...240	1 0	AX25-30-10-80	1SBL931074R8010	0.340
				0 1	AX25-30-01-80	1SBL931074R8001	0.340
		230...240	240...260	1 0	AX25-30-10-88	1SBL931074R8810	0.340
				0 1	AX25-30-01-88	1SBL931074R8801	0.340
		400...415	415...440	1 0	AX25-30-10-86	1SBL931074R8610	0.340
				0 1	AX25-30-01-86	1SBL931074R8601	0.340

(1) For other voltage version see voltage code table.

Main dimensions mm, inches



1SBC100212S0201

AX32, AX40 3-pole contactors

15 to 18.5 kW

AC operated



AX32, AX40

Description

AX32, AX40 contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC. These contactors are of the block type design with:

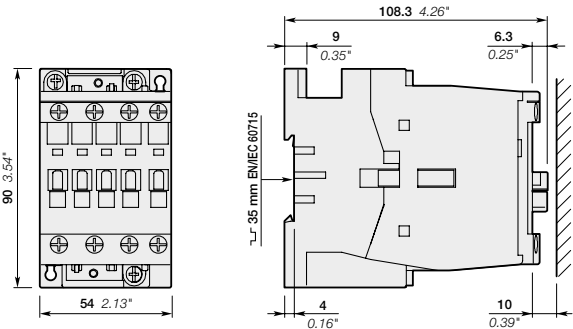
- 3 main poles and 1 built-in auxiliary contact
- control circuit: AC operated
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Ordering details

IEC Rated operational power 400 V AC-3		Rated control circuit voltage Uc (1)		Auxiliary contacts fitted	Type	Order code	Weight (1 pce)
kW	current θ ≤ 40 °C AC-1	V 50 Hz	V 60 Hz				
15	55	24	24	1 0	AX32-30-10-81	1SBL281074R8110	0.71
				0 1	AX32-30-01-81	1SBL281074R8101	0.71
				1 0	AX32-30-10-84	1SBL281074R8410	0.71
				0 1	AX32-30-01-84	1SBL281074R8401	0.71
				1 0	AX32-30-10-80	1SBL281074R8010	0.71
				0 1	AX32-30-01-80	1SBL281074R8001	0.71
		110	110...120	1 0	AX32-30-10-88	1SBL281074R8810	0.71
				0 1	AX32-30-01-88	1SBL281074R8801	0.71
				1 0	AX32-30-10-86	1SBL281074R8610	0.71
				0 1	AX32-30-01-86	1SBL281074R8601	0.71
		220...230	230...240	1 0	AX32-30-10-80	1SBL281074R8010	0.71
				0 1	AX32-30-01-80	1SBL281074R8001	0.71
18.5	60	24	24	1 0	AX40-30-10-81	1SBL321074R8110	0.71
				0 1	AX40-30-01-81	1SBL321074R8101	0.71
				1 0	AX40-30-10-84	1SBL321074R8410	0.71
				0 1	AX40-30-01-84	1SBL321074R8401	0.71
				1 0	AX40-30-10-80	1SBL321074R8010	0.71
				0 1	AX40-30-01-80	1SBL321074R8001	0.71
		110	110...120	1 0	AX40-30-10-88	1SBL321074R8810	0.71
				0 1	AX40-30-01-88	1SBL321074R8801	0.71
				1 0	AX40-30-10-86	1SBL321074R8610	0.71
				0 1	AX40-30-01-86	1SBL321074R8601	0.71
		220...230	230...240	1 0	AX40-30-10-80	1SBL321074R8010	0.71
				0 1	AX40-30-01-80	1SBL321074R8001	0.71

(1) For other voltage version see voltage code table.

Main dimensions mm, inches



AX32, AX40

AX50 ... AX80 3-pole contactors

22 to 37 kW

AC operated



AX50 ... AX80

Description

AX50 ... AX80 contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC. These contactors are of the block type design with:

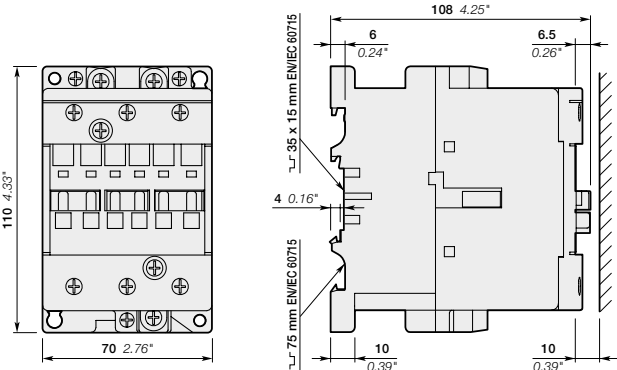
- 3 main poles
- control circuit: AC operated
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Ordering details (without auxiliary block)

IEC		Rated control circuit voltage U _c (1)		Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce)
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	V 50 Hz	V 60 Hz				
kW	A						kg
22	100	24	24	0 0	AX50-30-00-81	1SBL351074R8100	1.12
		110	110...120	0 0	AX50-30-00-84	1SBL351074R8400	1.12
		220...230	230...240	0 0	AX50-30-00-80	1SBL351074R8000	1.12
		230...240	240...260	0 0	AX50-30-00-88	1SBL351074R8800	1.12
		400...415	415...440	0 0	AX50-30-00-86	1SBL351074R8600	1.12
30	115	24	24	0 0	AX65-30-00-81	1SBL371074R8100	1.12
		110	110...120	0 0	AX65-30-00-84	1SBL371074R8400	1.12
		220...230	230...240	0 0	AX65-30-00-80	1SBL371074R8000	1.12
		230...240	240...260	0 0	AX65-30-00-88	1SBL371074R8800	1.12
		400...415	415...440	0 0	AX65-30-00-86	1SBL371074R8600	1.12
37	125	24	24	0 0	AX80-30-00-81	1SBL411074R8100	1.12
		110	110...120	0 0	AX80-30-00-84	1SBL411074R8400	1.12
		220...230	230...240	0 0	AX80-30-00-80	1SBL411074R8000	1.12
		230...240	240...260	0 0	AX80-30-00-88	1SBL411074R8800	1.12
		400...415	415...440	0 0	AX80-30-00-86	1SBL411074R8600	1.12

(1) For other voltage version see voltage code table.

Main dimensions mm, inches



AX50, AX65, AX80

AX50 ... AX80 3-pole contactors

22 to 37 kW

AC operated with 1 N.O. + 1 N.C. auxiliary contacts



AX50 ... AX80

Description

AX50 ... AX80 contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC. These contactors are of the block type design with:

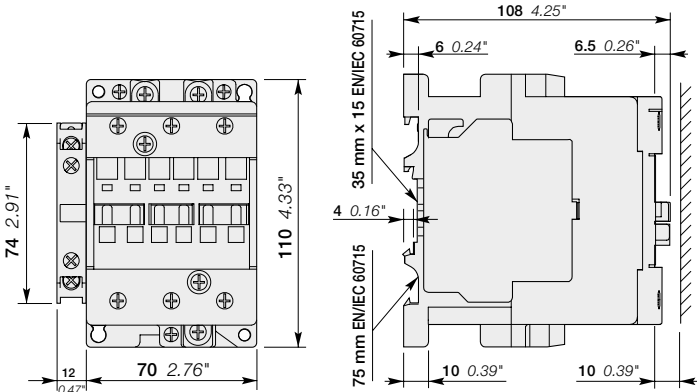
- 3 main poles and 1 side-mounted auxiliary contact block
- control circuit: AC operated
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Ordering details

IEC		Rated control circuit voltage Uc (1)		Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce)
Rated operational power	current						
400 V	$\theta \leq 40\text{ }^{\circ}\text{C}$						
AC-3	AC-1						
kW	A	V 50 Hz	V 60 Hz				kg
22	100	24	24	1 1	AX50-30-11-81	1SBL351074R8111	1.16
		110	110...120	1 1	AX50-30-11-84	1SBL351074R8411	1.16
		220...230	230...240	1 1	AX50-30-11-80	1SBL351074R8011	1.16
		230...240	240...260	1 1	AX50-30-11-88	1SBL351074R8811	1.16
		400...415	415...440	1 1	AX50-30-11-86	1SBL351074R8611	1.16
30	115	24	24	1 1	AX65-30-11-81	1SBL371074R8111	1.16
		110	110...120	1 1	AX65-30-11-84	1SBL371074R8411	1.16
		220...230	230...240	1 1	AX65-30-11-80	1SBL371074R8011	1.16
		230...240	240...260	1 1	AX65-30-11-88	1SBL371074R8811	1.16
		400...415	415...440	1 1	AX65-30-11-86	1SBL371074R8611	1.16
37	125	24	24	1 1	AX80-30-11-81	1SBL411074R8111	1.16
		110	110...120	1 1	AX80-30-11-84	1SBL411074R8411	1.16
		220...230	230...240	1 1	AX80-30-11-80	1SBL411074R8011	1.16
		230...240	240...260	1 1	AX80-30-11-88	1SBL411074R8811	1.16
		400...415	415...440	1 1	AX80-30-11-86	1SBL411074R8611	1.16

(1) For other voltage version see voltage code table.

Main dimensions mm, inches



AX50, AX65, AX80

AX95 ... AX150 3-pole contactors

45 to 75 kW

AC operated with 1 N.O. + 1 N.C. auxiliary contacts



AX95 ... AX150

Description

AX95 ... AX150 contactors are mainly used for controlling 3-phase motors and power circuits up to 1 000 V AC. These contactors are of the block type design with:

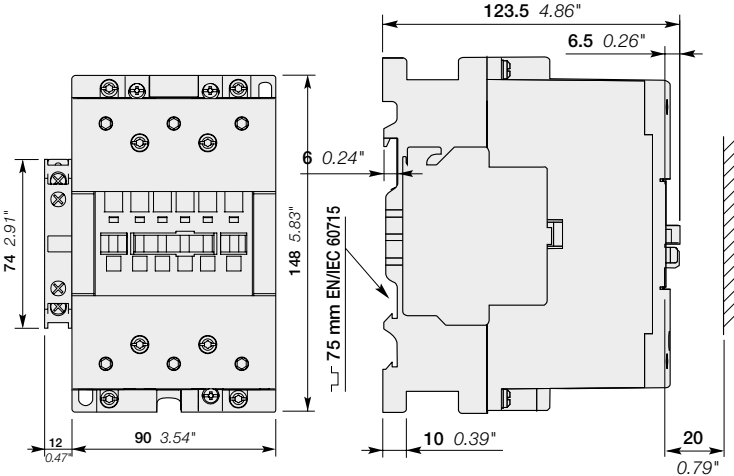
- 3 main poles and side mounted auxiliary contact block
- control circuit: AC operated
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Ordering details

IEC		Rated control circuit voltage Uc (1)		Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce)
Rated operational power 400 V AC-3	current $\theta \leq 40\text{ }^{\circ}\text{C}$ AC-1	V 50 Hz	V 60 Hz				
kW	A						kg
45	145	24	24	1 1	AX95-30-11-81	1SFL431074R8111	2.08
		110	110...120	1 1	AX95-30-11-84	1SFL431074R8411	2.08
		220...230	230...240	1 1	AX95-30-11-80	1SFL431074R8011	2.08
		230...240	240...260	1 1	AX95-30-11-88	1SFL431074R8811	2.08
		400...415	415...440	1 1	AX95-30-11-86	1SFL431074R8611	2.08
55	160	24	24	1 1	AX115-30-11-81	1SFL981074R8111	2.08
		110	110...120	1 1	AX115-30-11-84	1SFL981074R8411	2.08
		220...230	230...240	1 1	AX115-30-11-80	1SFL981074R8011	2.08
		230...240	240...260	1 1	AX115-30-11-88	1SFL981074R8811	2.08
		400...415	415...440	1 1	AX115-30-11-86	1SFL981074R8611	2.08
75	190	24	24	1 1	AX150-30-11-81	1SFL991074R8111	2.08
		110	110...120	1 1	AX150-30-11-84	1SFL991074R8411	2.08
		220...230	230...240	1 1	AX150-30-11-80	1SFL991074R8011	2.08
		230...240	240...260	1 1	AX150-30-11-88	1SFL991074R8811	2.08
		400...415	415...440	1 1	AX150-30-11-86	1SFL991074R8611	2.08

(1) For other voltage version see voltage code page.

Main dimensions mm, inches

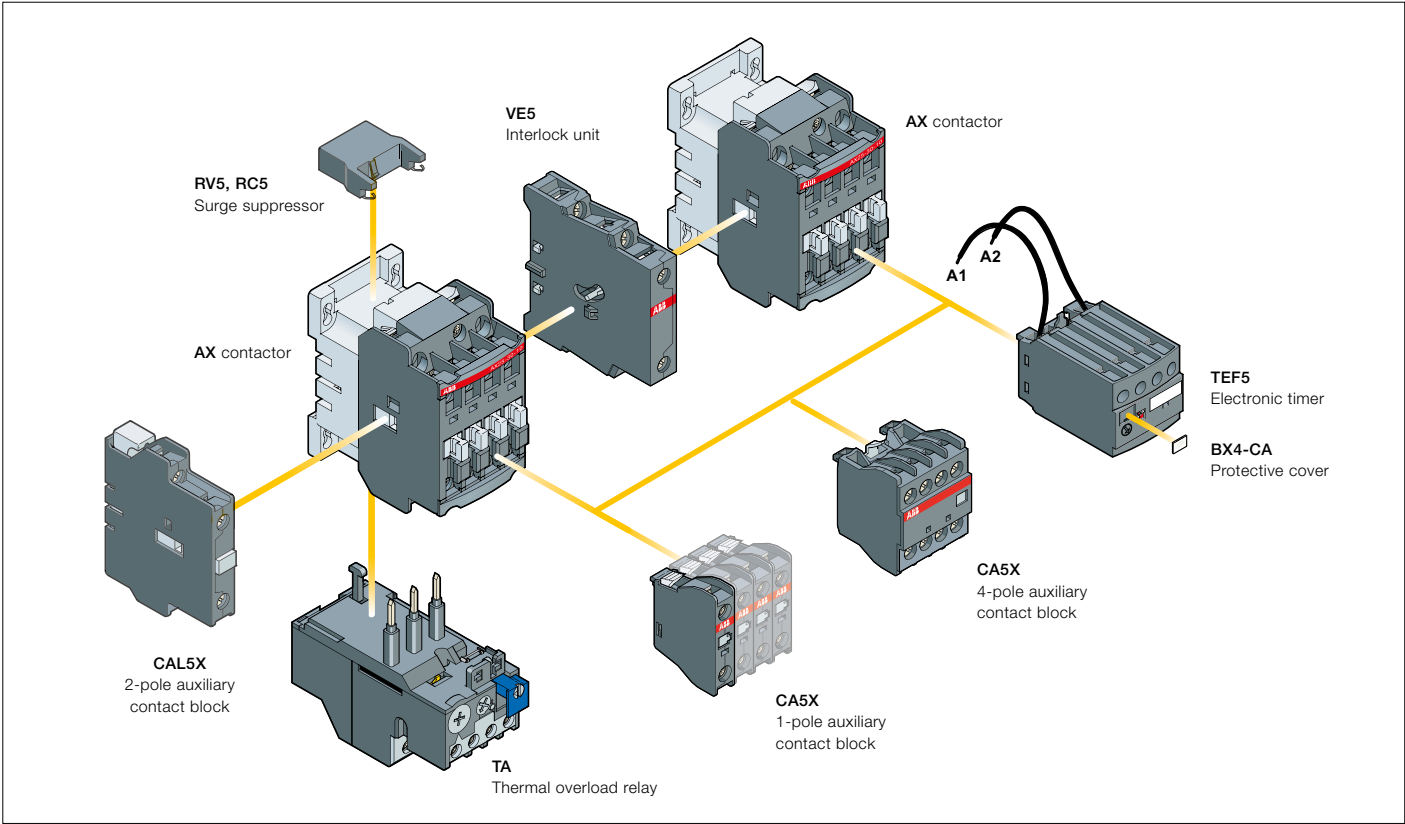


AX95, AX115, AX150

AX06 ... AX150 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				Side-mounted accessories	
			Auxiliary contact blocks		Electronic timer		Auxiliary contact blocks	Interlock unit
			1-pole CA5X	4-pole CA5X	TEF5	2-pole CAL	VM5 or VE5	
AX06 ... AX25	3 0 	1 0 	1 to 4 x CA5X 1 to 2 x CE5 max (2)	or 1 x CA5X (4-pole)	or 1 x TEF5	+	1 to 2 x CAL5X-11 or 1 x VM5-1 or VE5-1 +1 x CAL5X-11	
AX32, AX40	3 0 	1 0 	1 to 5 x CA5X 1 to 3 x CE5 max (3)	or 1 x CA5X (4-pole) + 1 x 1-pole CA5X or CE5 (3)	or 1 x TEF5 + 1 x CA5X (1-pole)	+	1 to 2 x CAL5X-11 or 1 x VM5-1 or VE5-1 +1 x CAL5X-11	
AX50 ... AX80	3 0 	0 0 	1 to 6 x CA5X 1 to 5 x CE5 max (4)	or 1 x CA5X (4-pole) + 2 x 1-pole CA5X or CE5 (4)	or 1 x TEF5 + 2 x CA5X (1-pole)	+	2 x CAL5X-11 or 1 x VE5-2	
AX50 ... AX80	3 0 	1 1 	1 to 6 x CA5X 1 to 5 x CE5 max (4)	or 1 x CA5X (4-pole) + 2 x 1-pole CA5X or CE5 (4)	or 1 x TEF5 + 2 x CA5X (1-pole)	+	1 x CAL5X-11 or 1 x VE5-2	
AX95 ... AX150	3 0 	1 1 	1 to 6 x CA5X	or 1 x CA5X (4-pole) + 2 x 1-pole CA5X	–	+	1 x CAL18X-11 or 1 x VE5-2	

(1) 2 N.C. CA5X auxiliary contacts maximum in mounting position 5. for mounting position refer technical data page.
(2) The total number of N.O. or N.C. CE5 and other N.C. CA5X is limited to 2. CE5 not allowed in mounting position 5.
(3) The total number of N.O. or N.C. CE5 and other N.C. CA5X is limited to 3. CE5 not allowed in mounting position 5.
(4) The total number of N.O. or N.C. CE5 and other N.C. CA5X is limited to 5. CE5 not allowed in mounting position 5.

Overload relays fitting details (1)

Contactor types	Thermal overload relays	Electronic overload relays
AX06 ... AX25	TA25DU-M (0.1...32 A)	-
AX32, AX40	TA25DU-M (0.1...32 A) or TA42DU-M (18...42 A)	-
AX50 ... AX80	TA75DU-M (18...80 A)	-
AX95 ... AX150	TA80DU (29...80 A) or TA110DU (66...110 A)	E140DU (50 ... 140 A)

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

AX06 ... AX150 3-pole contactors

Main accessories



CA5X-10



CA5X-4P



CAL5X-11



VE5-1

Ordering details (1)

For contactors	Auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce)
					kg

Front-mounted instantaneous auxiliary contact blocks

AX06 ... AX150 and NX 4-pole	1 0	CA5X-10	1SBN019010R1010	10	0.014
	0 1	CA5X-01	1SBN019010R1001	10	0.014
AX06-30-10 ... AX40-30-10	2 2	CA5X-22M	1SBN019040R1122	2	0.060
AX50 ... AX150	2 2	CA5X-22E	1SBN019040R1022	2	0.060

Side-mounted instantaneous auxiliary contact block, 2 pole

AX06 ... AX80 and NX - 4 pole	1 1	CAL5X-11	1SBN019020R1011	2	0.050
AX95 ... AX205 (1)	1 1	CAL18X-11	1SFN019820R1011	2	0.050

Mechanical interlock units for two horizontal mounted contactors (2)

Left side contactor	Right side contactor	Mounting					
AX06 ... AX40	AX06 ... AX40	Horizontal	- -	VM5-1	1SBN030100R1000	1	0.066
AX95 ... AX205	AX185 ... AX205	Horizontal	- -	VM300H	1SFN034700R1000	1	0.150

Mechanical interlock units for two vertical mounted contactors

Up contactor	Down contactor	Mounting					
AX95 ... AX150	AX150 ... AX370	Vertical	- -	VM300V	1SFN034701R100	1	0.150

Mechanical and electrical interlock units for two horizontal mounted contactors

Left side contactor	Right side contactor	Mounting					
AX06 ... AX40	AX06 ... AX40	Horizontal	0 2	VE5-1	1SBN030110R1000	1	0.076
AX32 ... AX80	AX50 ... AX80	Horizontal	0 2	VE5-2	1SBN030210R1000	1	0.146
AX50 ... AX80	AX32 ... AX80	Horizontal	0 2	VE5-2	1SBN030210R1000	1	0.146
AX50 ... AX80	AX95 ... AX150	Horizontal	0 2	VE5-2 (3)	1SBN030210R1000	1	0.146
AX95 ... AX150	AX50 ... AX80	Horizontal	0 2	VE5-2 (3)	1SBN030210R1000	1	0.146
AX95 ... AX150	AX95 ... AX150	Horizontal	0 2	VE5-2	1SBN030210R1000	1	0.146

(1) See "Main accessory fitting details".

(2) Mechanical durability: VM5-1 = 5 millions cycles, VM300H = 1 million cycles.

(3) The combination of AX50 ... AX80 contactors interlocked with AX95...AX150 contactors cannot be mounted on symmetrical rail (75 mm, IEC/EN 60715).

AX06 ... AX150 3-pole contactors

Main accessories

3



TEF5-OFF

1SBC101398F0014

Ordering details (1)

For contactors	Time delay range selected by switch	Delay type	Auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce)
							kg

Electronic timers

AX06 ... AX80	0.1...1 s	ON-delay	1 1	TEF5-ON	1SBN020312R1000	1	0.065
NX 4 pole	1...10 s 10...100 s	OFF-delay	1 1	TEF5-OFF	1SBN020314R1000	1	0.065

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



WB75-A

1SBC665483F0001

Mechanical latching units

For contactors	Rated control circuit voltage U_c		Type	Order code	Pkg qty	Weight (1 pce)
	50Hz	60 Hz				kg
AX06...AX80	24	24...28	WB75-A	FPTN372726R1001	1	0.120
	220...230	220...255	WB75-A	FPTN372726R1006	1	0.120

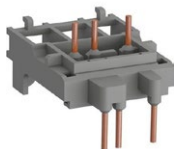


RV5/50

1SBC574001F0301

Surge suppressors

For contactors	Rated control circuit voltage U_c	Type	Order code	Pkg qty	Weight (1 pce)
	V AC				kg
AX06 ... AX150	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
AX06 ... AX40	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
AX50 ... AX150	24...50	RC5-2/50	1SBN050200R1000	2	0.015
	50...133	RC5-2/133	1SBN050200R1001	2	0.015
	110...250	RC5-2/250	1SBN050200R1002	2	0.015
	250...440	RC5-2/440	1SBN050200R1003	2	0.015



BEA

1SBC382813F0301

Connecting links with manual motor starters

For contactors	MMS type	Type	Order code	Pkg qty	Weight (1 pce)
					kg
AX06 ... AX18	MS116-0.16 ... MS116-16 / MS132-0.16 ... MS132-10	BEA16/116	1SBN081406R1000	10	0.020
AX25	MS116-0.16 ... MS116-16 / MS132-0.16 ... MS132-10	BEA25/116	1SBN089306T1000	10	0.020
AX25	MS116-20 ... MS116-32 / MS132-12 ... MS132-32	BEA25/132	1SBN089306T1001	10	0.020
AX50 ... AX80	MS495	BEA75/495	1SBN084106R1000	1	0.120
AX95 ... AX150	MS495	BEA110/495	1SBN084506R1000	1	0.124

(1) See "Main accessory fitting details".

1SBC100218S0201

AX185, AX205 3-pole contactors

90 to 110 kW

AC operated with 1 N.O. + 1 N.C. auxiliary contacts



AX185, AX205

Description

AX185, AX205 contactors are mainly used for controlling 3-phase motors and power circuits up to 1 000 V AC.

These contactors are of the block type design with:

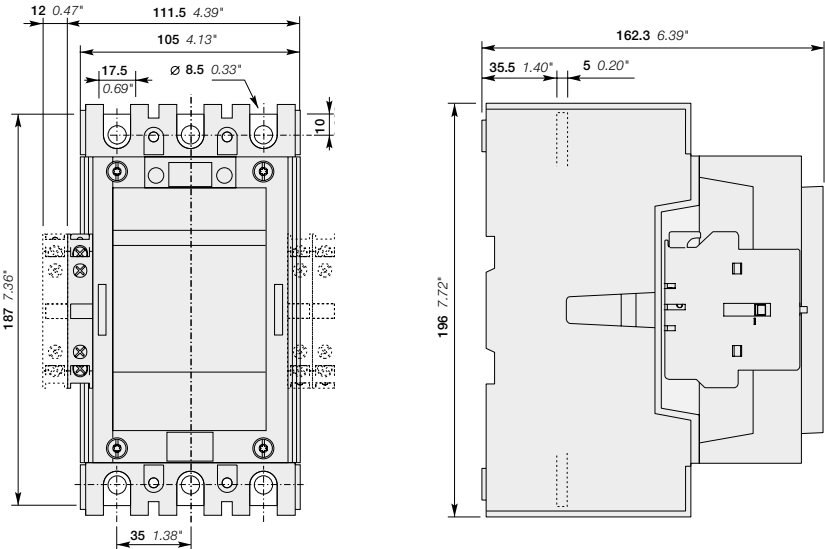
- 3 main poles and side mounted auxiliary contact block
- control circuit: AC operated
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

Ordering details

IEC		Rated control circuit voltage Uc (1)		Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce)
Rated operational power 400 V AC-3	current $\theta \leq 40\text{ }^{\circ}\text{C}$ AC-1						
kW	A	V 50 Hz	V 60 Hz				kg
90	250	24	24	1 1	AX185-30-11-81	1SFL491074R8111	3.80
		110	110...120	1 1	AX185-30-11-84	1SFL491074R8411	3.80
		220...230	230...240	1 1	AX185-30-11-80	1SFL491074R8011	3.80
		230...240	240...260	1 1	AX185-30-11-88	1SFL491074R8811	3.80
		400...415	415...440	1 1	AX185-30-11-86	1SFL491074R8611	3.80
110	275	24	24	1 1	AX205-30-11-81	1SFL501074R8111	3.80
		110	110...120	1 1	AX205-30-11-84	1SFL501074R8411	3.80
		220...230	230...240	1 1	AX205-30-11-80	1SFL501074R8011	3.80
		230...240	240...260	1 1	AX205-30-11-88	1SFL501074R8811	3.80
		400...415	415...440	1 1	AX205-30-11-86	1SFL501074R8611	3.80

(1) For other voltage version see voltage code table.

Main dimensions mm, inches



AX185, AX205

AX260 ... AX370 3-pole contactors

132 to 200 kW

AC operated with 1 N.O. + 1 N.C. auxiliary contacts

3



AX260 ... AX370

AX06022

Description

AX260 ... AX370 contactors are mainly used for controlling 3-phase motors and power circuits up to 1 000 V AC.

These contactors are of the block type design with:

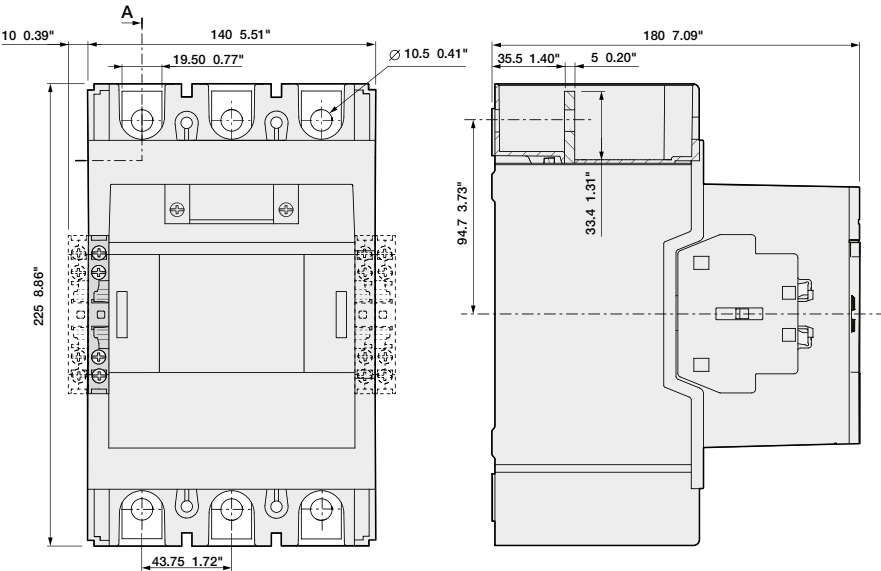
- 3 main poles and side mounted auxiliary contact block
- control circuit: AC operated
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

Ordering details

IEC Rated operational power 400 V AC-3		Rated control circuit voltage Uc (1)		Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce)
current $\theta \leq 40^{\circ}\text{C}$ AC-1		V 50 Hz	V 60 Hz				
kW	A						kg
132	400	24	24	1 1	AX260-30-11-81	1SFL547074R8111	5.4
		110	110...120	1 1	AX260-30-11-84	1SFL547074R8411	5.4
		220...230	230...240	1 1	AX260-30-11-80	1SFL547074R8011	5.4
		230...240	240...260	1 1	AX260-30-11-88	1SFL547074R8811	5.4
		400...415	415...440	1 1	AX260-30-11-86	1SFL547074R8611	5.4
160	500	24	24	1 1	AX300-30-11-81	1SFL587074R8111	5.4
		110	110...120	1 1	AX300-30-11-84	1SFL587074R8411	5.4
		220...230	230...240	1 1	AX300-30-11-80	1SFL587074R8011	5.4
		230...240	240...260	1 1	AX300-30-11-88	1SFL587074R8811	5.4
		400...415	415...440	1 1	AX300-30-11-86	1SFL587074R8611	5.4
200	600	24	24	1 1	AX370-30-11-81	1SFL607074R8111	5.4
		110	110...120	1 1	AX370-30-11-84	1SFL607074R8411	5.4
		220...230	230...240	1 1	AX370-30-11-80	1SFL607074R8011	5.4
		230...240	240...260	1 1	AX370-30-11-88	1SFL607074R8811	5.4
		400...415	415...440	1 1	AX370-30-11-86	1SFL607074R8611	5.4

(1) For other voltage version see voltage code table

Main dimensions mm, inches



AX260, AX300, AX370

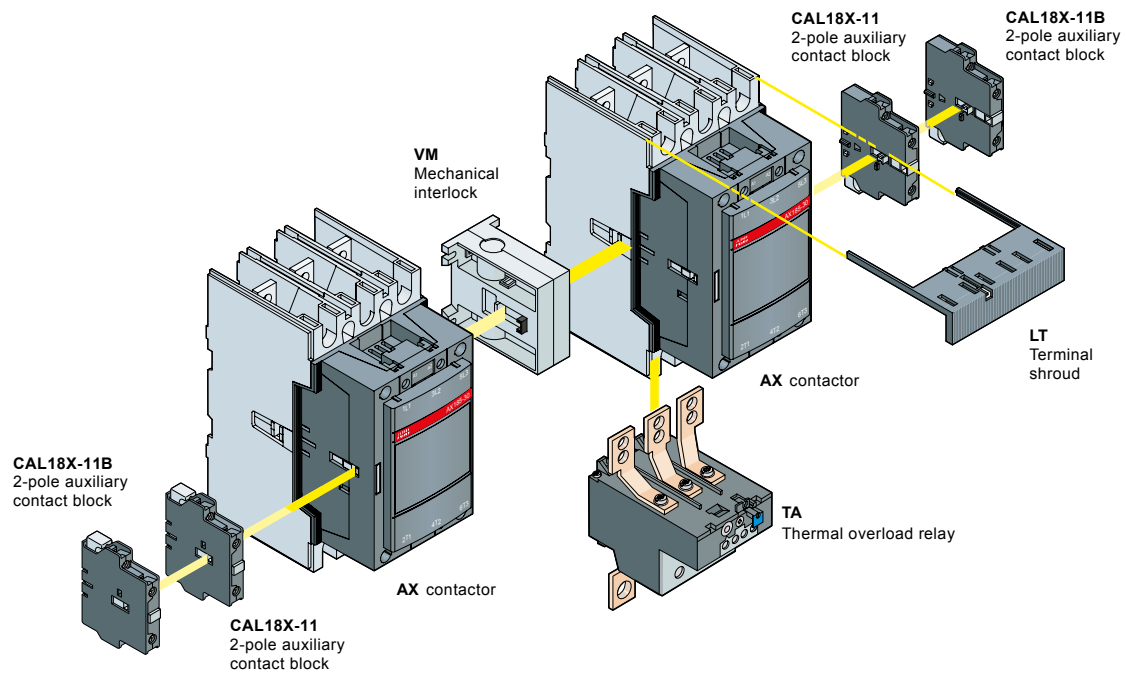
1SFC101309C0201

AX185 ... AX370 3-pole contactors

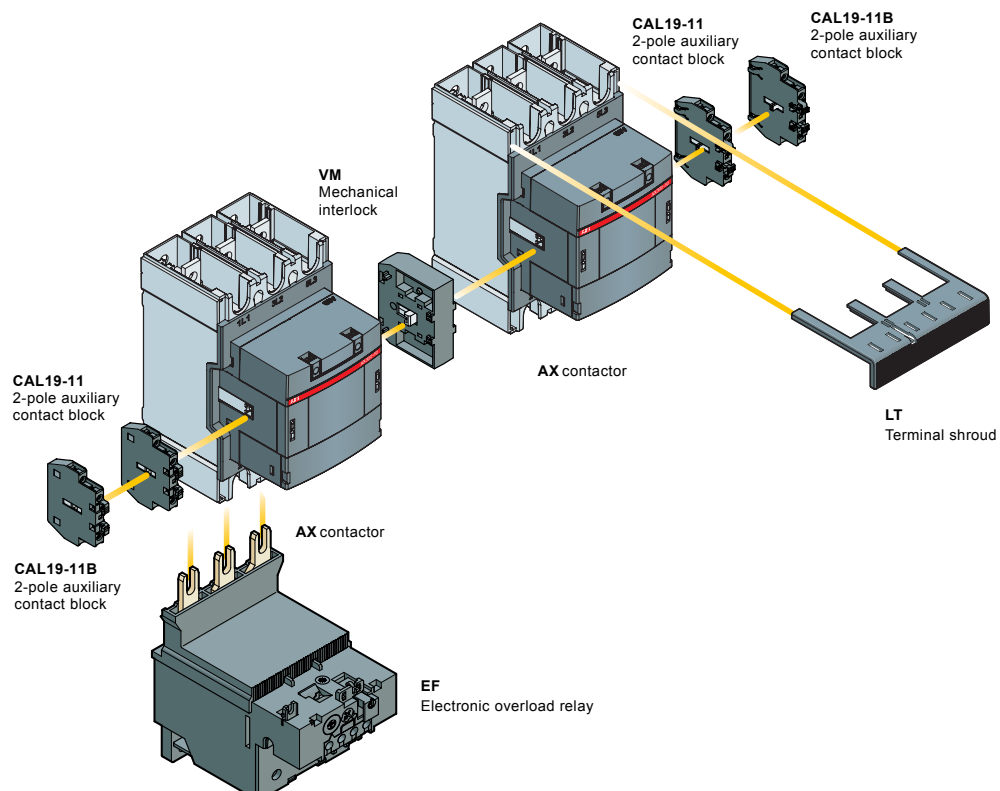
Main accessories

Main accessories (other accessories available)

AX185, AX205



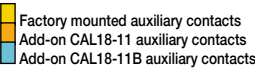
AX260 ... AX370



AX185 ... AX370 3-pole contactors

Main accessories

Main accessory fitting details

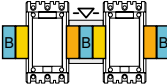
Contactor types	Main poles	Available auxiliary contacts	Side-mounted accessories Add-on auxiliary contact blocks	Mechanical interlock units	Mounting and positioning
			CAL18X-11, CAL18X-11B, CAL19-11, CAL19-11B		

3 Contactors + auxiliary contact blocks

AX185 ... AX205	3 0	1 1	1 x CAL18X-11	+	2 x CAL18X-11B	–	
AX260 ... AX370	3 0	1 1	1 x CAL19-11	+	2 x CAL19-11B	–	

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

Contactors with mechanical interlocking + auxiliary contact blocks

AX185 ... AX205	3 0	1 1	2 x CAL18-11 (1)	+	2 x CAL18-11B (1)	+	VM...H (2)	
AX260 ... AX370	3 0	1 1	–	+	2 x CAL19-11B	+	VM... (2)	

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

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

Overload relays fitting details (1)

Contactor types	Thermal overload relays	Electronic overload relays
AX185, AX205	TA200DU (66 ... 200 A)	EF205 (63 ... 210 A)
AX260 ... AX370	–	EF370 (115 ... 380 A)

The addition of a thermal overload relay on the contactor does not prevent fitting of many other accessories as shown above.

(1) Direct mounting - No kit required.

AX185 ... AX370 3-pole contactors

Main accessories



1SFC101039F0201

CAL18X-11



1SBC5804 11F0301

VM300H



1SFT98099-019C3

LT...AC



1SFT9099-125

LT...AL



1SFT98000-012C3

LX



1SFT98000-011C3

LW

Ordering details (1)

For contactors	Auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce)
					kg

Side-mounted instantaneous auxiliary contact blocks

AX185 ... AX205	1 1	CAL18X-11	1SFN019820R1011	2	0.050
	1 1	CAL18X-11B	1SFN019820R3311	2	0.050
AX260 ... AX370	1 1	CAL19-11	1SFN010820R1011	2	0.040
	1 1	CAL19-11B	1SFN010820R3311	2	0.040

Mechanical interlock unit for two horizontal mounted contactors

Left side contactor	Right side contactor	Mounting					
AX95 ... AX205	AX185 ... AX205	Horizontal	- -	VM300H	1SFN034700R1000	1	0.150
AX260 ... AX370	AX260 ... AX370	Horizontal	- -	VM19	1SFN030300R1000	1	0.054
AX185 ... AX205	AX260 ... AX370	Horizontal	- -	VM205/260	1SFN035003R1000	1	0.075
AX260 ... AX370	AX185 ... AX205	Horizontal	- -	VM205/260	1SFN035003R1000	1	0.075
AX260 ... AX370	AF400 ... AF460	Horizontal	- -	VM370/400	1SFN035403R1000	1	0.239
AF400 ... AF460	AX260 ... AX370	Horizontal	- -	VM370/400	1SFN035403R1000	1	0.239

Mechanical interlock units for two vertical mounted contactors

Up contactor	Down contactor	Mounting					
AX95 ... AX150	AX150 ... AX205	Vertical	- -	VM300V	1SFN034701R1000	1	0.150

Terminal shrouds

AX185 ... AX205 with connectors	LT185-AC	1SFN124701R1000	2	0.050
AX185 ... AX205 with lugs	LT185-AL	1SFN124703R1000	2	0.220
AX185 ... AX205 with shorting bar or between contactor and TOL/ EOL in DOL starters	LT185-AY	1SFN124704R1000	2	0.050
AX260 ... AX370, with cable clamps	LT370-30C	1SFN125401R1000	2	0.035
AX260 ... AX370, with compression lugs	LT370-30L	1SFN125403R1000	2	0.280
AX260 ... AX370, with shorting bar or between contactor and TOL/ EOL in DOL starters	LT370-30Y	1SFN125404R1000	1	0.075

For contactors	Dimensions	Type	Order code	Pkg qty	Weight (1 pce)
	hole Ø mm	bar mm			kg

Terminal extension

AX185 ... AX205	10.5	20 x 5	LX185	1SFN074710R1000	1	0.250
AX260 ... AX370	10.5	25 x 5	LX370	1SFN075410R1000	1	0.234

Terminal enlargements

AX185 ... AX205	8.5	20 x 5	LW185	1SFN074707R1000	1	0.250
AX260 ... AX370	10.5	20 x 5	LW370	1SFN075407R1000	1	0.340

Surge suppressor

For contactors	Rated control circuit voltage Uc	Type	Order code	Pkg qty	Weight (1 pce)
	V AC				kg
AX185 ... AX205	250...440	RC5-3/440	1SFN050300R1003	2	0.028

(1) See "Main accessory fitting details".

AX06 ... AX40 3-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types	AC operated	AX06	AX09	AX12	AX18	AX25	AX32	AX40
Standards		IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1						
Rated operational voltage U _e max.		690 V						
Rated frequency limits		25...400 Hz						
Rated frequency (without derating)		50 / 60 Hz						
Conventional free-air thermal current I _{th}								
acc. to IEC 60947-4-1, open contactors, θ ≤ 40 °C		22 A	24 A	26 A	28 A	32 A	65 A	65 A
With conductor cross-sectional area		4 mm ²	4 mm ²	4 mm ²	4 mm ²	6 mm ²	16 mm ²	16 mm ²
AC-1 Utilization category								
For air temperature close to contactor								
I _e / Rated operational current AC-1	θ ≤ 40 °C	20 A	22 A	25 A	27 A	32 A	55 A	60 A
U _e max. ≤ 690 V, 50/60 Hz	θ ≤ 55 °C	20 A	22 A	22 A	25 A	27 A	55 A	60 A
	θ ≤ 70 °C	16 A	18 A	18 A	20 A	23 A	39 A	42 A
With conductor cross-sectional area		2.5 mm ²	2.5 mm ²	2.5 mm ²	4 mm ²	6 mm ²	10 mm ²	16 mm ²
AC-3 Utilization category								
For air temperature close to contactor θ ≤ 55 °C								
I _e / Max. rated operational current AC-3 (1)								
	220-230-240 V	7 A	9 A	12 A	18 A	25 A	32 A	40 A
	380-400 V	7 A	9 A	12 A	18 A	25 A	32 A	40 A
	415 V	7 A	9 A	12 A	18 A	25 A	32 A	40 A
	440 V	7 A	9 A	9 A	12 A	16 A	32 A	37 A
	500 V	6 A	9 A	9 A	12 A	14 A	28 A	33 A
	690 V	5 A	7 A	7 A	9 A	10 A	21 A	25 A
Rated operational power AC-3 (1)								
	220-230-240 V	1.5 kW	2.2 kW	3 kW	4 kW	6.5 kW	9 kW	11 kW
	380-400 V	3 kW	4 kW	5.5 kW	7.5 kW	11 kW	15 kW	18.5 kW
	415 V	3 kW	4 kW	5.5 kW	9 kW	11 kW	15 kW	18.5 kW
	440 V	3 kW	4 kW	4 kW	5.5 kW	9 kW	18.5 kW	22 kW
	500 V	3.5 kW	5.5 kW	5.5 kW	7.5 kW	9 kW	18.5 kW	22 kW
	690 V	4 kW	5.5 kW	5.5 kW	7.5 kW	9 kW	18.5 kW	22 kW
Rated making capacity AC-3								
10 x I _e AC-3 acc. to IEC 60947-4-1								
Rated breaking capacity AC-3								
8 x I _e AC-3 acc. to IEC 60947-4-1								
AC-8a Utilization category								
(without thermal overload relay - U _e 400 V 50/60 Hz - θ ≤ 40 °C)								
I _e / Rated operational current AC-8a		9 A	12 A	16 A	22 A	30 A	40 A	50 A
Rated operational power AC-8a		4 kW	5.5 kW	7.5 kW	11 kW	15 kW	20 kW	25 kW
Short-circuit protection device for contactors								
without thermal overload relay - Motor protection excluded (2)								
U _e ≤ 500 V AC - gG type fuse		25 A	25 A	25 A	32 A	32 A	63 A	63 A
Rated short-time withstand current I _{cw}	1 s	220 A	250 A	280 A	300 A	300 A	600 A	600 A
at 40 °C ambient temperature,	10 s	80 A	100 A	120 A	145 A	200 A	400 A	400 A
in free air from a cold state	30 s	50 A	60 A	70 A	80 A	105 A	225 A	225 A
	1 min	45 A	50 A	55 A	60 A	85 A	150 A	150 A
	15 min	22 A	26 A	26 A	28 A	32 A	65 A	65 A
Maximum breaking capacity								
cos φ = 0.45	at 440 V	250 A	250 A	250 A	250 A	250 A	820 A	820 A
	at 690 V	90 A	90 A	90 A	90 A	90 A	340 A	340 A
Power dissipation per pole								
	I _e / AC-1	0.8 W	0.8 W	0.8 W	1 W	1.2 W	2.5 W	3 W
	I _e / AC-3	0.1 W	0.1 W	0.1 W	0.2 W	0.35 W	0.9 W	1.3 W
Max. electrical switching frequency								
	AC-1	600 cycle/h						
	AC-3	1200 cycle/h						
Mechanical durability								
Number of operating cycles		10 millions operating cycles						
Max. switching frequency		3600 cycles/h						

(1) For the corresponding kW/A values of 1500 r.p.m., 50 Hz or 1800 r.p.m., 60 Hz, 3-phase motors, see "Motor rated operational powers and currents".

(2) For the protection of motor starters against short circuits, see "Coordination with short-circuit protection devices".

AX50 ... AX150 3-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types	AC operated	AX50	AX65	AX80	AX95	AX115	AX150
Standards		IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1					
Rated operational voltage U _e max.		690 V				1000 V	
Rated frequency limits		25 ... 400 Hz					
Rated frequency (without derating)		50 / 60 Hz					
Conventional free-air thermal current I _{th}							
acc. to IEC 60947-4-1, open contactors, θ ≤ 40 °C		100 A	125 A	125 A	145 A	160 A	190 A
With conductor cross-sectional area		35 mm ²	50 mm ²	50 mm ²	50 mm ²	70 mm ²	95 mm ²
AC-1 Utilization category							
For air temperature close to contactor							
I _e / Rated operational current AC-1	θ ≤ 40 °C	100 A	115 A	125 A	145 A	160 A	190 A
U _e max. ≤ 690 V, 50/60 Hz	θ ≤ 55 °C	85 A	95 A	105 A	135 A	145 A	145 A
	θ ≤ 70 °C	70 A	80 A	85 A	115 A	130 A	130 A
With conductor cross-sectional area		35 mm ²	50 mm ²	50 mm ²	50 mm ²	70 mm ²	95 mm ²
AC-3 Utilization category							
For air temperature close to contactor θ ≤ 55 °C							
I _e / Max. rated operational current AC-3 (1)							
	220-230-240 V	53 A	65 A	80 A	96 A	115 A	150 A
	380-400 V	50 A	65 A	80 A	96 A	115 A	150 A
	415 V	50 A	65 A	80 A	96 A	115 A	150 A
	440 V	45 A	65 A	70 A	93 A	100 A	100 A
	500 V	45 A	55 A	65 A	80 A	100 A	100 A
	690 V	35 A	43 A	46 A	65 A	82 A	82 A
 3-phase motors							
Rated operational power AC-3 (1)							
	220-230-240 V	15 kW	18.5 kW	22 kW	25 kW	30 kW	45 kW
	380-400 V	22 kW	30 kW	37 kW	45 kW	55 kW	75 kW
	415 V	25 kW	37 kW	40 kW	55 kW	59 kW	75 kW
	440 V	25 kW	37 kW	40 kW	55 kW	59 kW	59 kW
	500 V	30 kW	37 kW	45 kW	55 kW	59 kW	59 kW
	690 V	30 kW	37 kW	40 kW	55 kW	75 kW	75 kW
 1500 r.p.m. 50 Hz 1800 r.p.m. 60 Hz 3-phase motors							
Rated making capacity AC-3		10 x I _e AC-3 acc. to IEC 60947-4-1					
Rated breaking capacity AC-3		8 x I _e AC-3 acc. to IEC 60947-4-1					
AC-8a Utilization category							
(without thermal overload relay - U _e 400 V 50/60 Hz - θ ≤ 40 °C)							
I _e / Rated operational current AC-8a		63 A	85 A	95 A	120 A	140 A	-
Rated operational power AC-8a		30 kW	45 kW	50 kW	59 kW	75 kW	-
Short-circuit protection device for contactors							
without thermal overload relay - Motor protection excluded (2)							
U _e ≤ 500 V AC - gG type fuse		100 A	125 A	160 A	160 A	200 A	315 A
Rated short-time withstand current I _{cw}	1 s	1000 A	1000 A	1000 A	1320 A	1320 A	1320 A
at 40 °C ambient temperature,	10 s	650 A	650 A	650 A	800 A	800 A	800 A
in free air from a cold state	30 s	370 A	370 A	370 A	500 A	500 A	500 A
	1 min	250 A	250 A	250 A	350 A	350 A	350 A
	15 min	110 A	135 A	135 A	160 A	160 A	175 A
Maximum breaking capacity							
cos Ø = 0.45	at 440 V	1300 A	1300 A	1300 A	1160 A	1160 A	1160 A
	at 690 V	630 A	630 A	630 A	800 A	800 A	800 A
Power dissipation per pole	I _e / AC-1	5 W	6.5 W	7 W	6.5 W	7.5 W	10.5 W
	I _e / AC-3	1.3 W	1.5 W	2.3 W	2.7 W	3.9 W	6.5 W
Max. electrical switching frequency	AC-1	600 cycle/h			300 cycles/h		
	AC-3	600 cycle/h			300 cycles/h		
Mechanical durability							
Number of operating cycles		10 millions operating cycles					
Max. switching frequency		3600 cycles/h					

(1) For the corresponding kW/A values of 1500 r.p.m. 50 Hz or 1800 r.p.m. 60 Hz, 3-phase motors, see "Motor rated operational powers and currents".

(2) For the protection of motor starters against short circuits, see "Coordination with short-circuit protection devices".

AX185 ... AX370 3-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types	AC operated	AX185	AX205	AX260	AX300	AX370
Standards		IEC 60947-1 / 60947-4-1 / EN 60947-1 / 60947-4-1				
Rated operational voltage U_e max.		1000 V				
Rated frequency limits		25 ... 400 Hz				
Rated frequency (without derating)		50 / 60 Hz				
Conventional free-air thermal current I_{th}						
acc. to IEC 60947-4-1, open contactors, $\theta \leq 40^\circ\text{C}$		250 A	275 A	400 A	500 A	600 A
With conductor cross-sectional area		120 mm ²	150 mm ²	240 mm ² (1)	300 mm ²	2X185 mm ² (2)
AC-1 Utilization category						
For air temperature close to contactor						
I_e / Rated operational current AC-1	$\theta \leq 40^\circ\text{C}$	250 A	275 A	400 A	500 A	600 A
U _e max. $\leq 690\text{ V}$, 50/60 Hz	$\theta \leq 55^\circ\text{C}$	230 A	250 A	350 A	400 A	500 A
	$\theta \leq 70^\circ\text{C}$	180 A	180 A	290 A	325 A	400 A
With conductor cross-sectional area		120 mm ²	150 mm ²	240 mm ² (1)	300 mm ²	2X185 mm ² (2)
AC-3 Utilization category						
For air temperature close to contactor $\theta \leq 55^\circ\text{C}$						
I_e / Max. rated operational current AC-3 (1)						
	220-230-240 V	185 A	205 A	265 A	305 A	370 A
	380-400 V	185 A	205 A	265 A	305 A	370 A
	415 V	185 A	205 A	265 A	305 A	370 A
	440 V	145 A	185 A	265 A	305 A	370 A
	500 V	145 A	170 A	250 A	290 A	315 A
	690 V	120 A	170 A	250 A	290 A	315 A
Rated operational power AC-3 (1)						
	220-230-240 V	55 kW	59 kW	75 kW	90 kW	110 kW
	380-400 V	90 kW	110 kW	132 kW	160 kW	200 kW
	415 V	90 kW	110 kW	132 kW	160 kW	200 kW
	440 V	75 kW	90 kW	160 kW	160 kW	200 kW
	500 V	90 kW	110 kW	160 kW	200 kW	250 kW
	690 V	110 kW	132 kW	200 kW	250 kW	315 kW
Rated making capacity AC-3		10 x I _e AC-3 acc. to IEC 60947-4-1				
Rated breaking capacity AC-3		8 x I _e AC-3 acc. to IEC 60947-4-1				
AC-8a Utilization category						
(without thermal overload relay - U _e 400 V 50/60 Hz - $\theta \leq 40^\circ\text{C}$)						
I_e / Rated operational current AC-8a		-	-	-	-	-
Rated operational power AC-8a		-	-	-	-	-
Short-circuit protection device for contactors						
without thermal overload relay - Motor protection excluded (2)						
U _e $\leq 500\text{ V}$ AC - gG type fuse		315 A	355 A	500 A	500 A	630 A
Rated short-time withstand current I_{cw}						
at 40 °C ambient temperature, in free air from a cold state						
	1 s	1800 A	2000 A	2650 A	3050 A	3700 A
	10 s	1200 A	1500 A	2120 A	2440 A	2960 A
	30 s	800 A	1000 A	1224 A	1409 A	1709 A
	1 min	600 A	800 A	865 A	996 A	1208 A
	15 min	280 A	320 A	400 A	500 A	600 A
Maximum breaking capacity						
cos $\phi = 0.45$						
	at 440 V	1500 A	2000 A	3800 A	4600 A	5000 A
	at 690 V	1200 A	1600 A	3300 A	3800 A	4000 A
Power dissipation per pole						
	I_e / AC-1	16 W	17 W	32 W	50 W	72 W
	I_e / AC-3	8 W	10 W	14 W	19 W	27 W
Max. electrical switching frequency						
	AC-1	300 cycles/h				
	AC-3	300 cycles/h				
Mechanical durability						
Number of operating cycles		5 millions operating cycles				
Max. switching frequency		3600 cycles/h			300 cycles/h	

(1) For currents above 275 A use terminal enlargements or terminal extensions
(2) For currents above 450 A use terminal enlargements or terminal extensions

AX06 ... AX40 3-pole contactors

Technical data

Main pole - Utilization characteristics according to UL / NEMA / CSA

Contactor types	AC operated	AX06	AX09	AX12	AX18	AX25	AX32	AX40
Standards		UL 60947-4-1, CSA C22.2 NO. 60947-4-1-07						
Maximum operational voltage		600 V						
UL / CSA general use rating								
600 V AC		20 A	21 A	25 A	30 A	30 A	50 A	60 A
With conductor cross-sectional area		AWG 12	AWG 10	AWG 10	AWG 10	AWG 10	AWG 8	AWG 6
UL / CSA maximum 1-phase motor rating								
Full load current	120 V AC	7.2 A	9.8 A	13.8 A	16 A	24 A	34 A	34 A
	240 V AC	6.9 A	10 A	12 A	17 A	17 A	40 A	40 A
Horse power rating	120 V AC	1/3 hp	1/2 hp	3/4 hp	1 hp	2 hp	3 hp	3 hp
	240 V AC	3/4 hp	1.5 hp	2 hp	3 hp	3 hp	7.5 hp	7.5 hp
UL / CSA maximum 3-phase motor rating								
Full load current (1)	200-208 V AC	6.9 A	7.8 A	11 A	17.5 A	25.3 A	32.2 A	32.2 A
	220-240 V AC	6.8 A	6.8 A	9.6 A	15.2 A	22 A	28 A	42 A
	440-480 V AC	4.8 A	7.6 A	11 A	14 A	21 A	34 A	40 A
	550-600 V AC	6.1 A	9 A	11 A	17 A	17 A	32 A	41 A
Horse power rating (1)	200-208 V AC	1.5 hp	2 hp	3 hp	5 hp	7.5 hp	10 hp	10 hp
	220-240 V AC	2 hp	2 hp	3 hp	5 hp	7.5 hp	10 hp	15 hp
	440-480 V AC	3 hp	5 hp	7.5 hp	10 hp	15 hp	25 hp	30 hp
	550-600 V AC	5 hp	7.5 hp	10 hp	15 hp	15 hp	30 hp	40 hp
Short-circuit protection device for contactors								
without thermal overload relay - Motor protection excluded								
High fault current		100 kA	100 kA	100 kA	100 kA	100 kA	100 kA	100 kA
Fuse rating		30 A	30 A	30 A	30 A	45 A	200 A	200 A
Fuse type, 600 V		J	J	J	J	J	J	J
Maximum electrical switching frequency								
For general use		600 cycles/h						
For motor use		1200 cycles/h						

(1) For the corresponding kW/A or hp/A values of 1500 r.p.m, 50 Hz or 1800 r.p.m, 60 Hz, 3-phase motors, see "Motor rated operational powers and currents".

AX50 ... AX80 3-pole contactors

Technical data

Main pole - Utilization characteristics according to UL / NEMA / CSA

Contactor types	AC operated	AX50	AX65	AX80
Standards		UL 60947-4-1, CSA C22.2 NO. 60947-4-1-07		
Maximum operational voltage		600 V		
UL / CSA general use rating				
600 V AC		80 A	90 A	105 A
With conductor cross-sectional area		AWG 4	AWG 3	AWG 2
UL / CSA maximum 1-phase motor rating				
Full load current	120 V AC	34 A	56 A	80 A
	240 V AC	50 A	50 A	68 A
Horse power rating	120 V AC	3 hp	5 hp	7-1/2 hp
	240 V AC	10 hp	10 hp	15 hp
UL / CSA maximum 3-phase motor rating				
Full load current (1)	200-208 V AC	48.3 A	62.1 A	78.2 A
	220-240 V AC	54 A	68 A	80 A
	440-480 V AC	52 A	77 A	77 A
	550-600 V AC	52 A	77 A	77 A
Horse power rating (1)	200-208 V AC	15 hp	20 hp	25 hp
	220-240 V AC	20 hp	25 hp	30 hp
	440-480 V AC	40 hp	60 hp	60 hp
	550-600 V AC	50 hp	75 hp	75 hp
Short-circuit protection device for contactors				
without thermal overload relay - Motor protection excluded				
High fault current		100 kA	100 kA	100 kA
Fuse rating		100 A	200 A	200 A
Fuse type, 600 V		J	J	J
Maximum electrical switching frequency				
For general use		600 cycles/h		
For motor use		600 cycles/h		

(1) For the corresponding kW/A or hp/A values of 1500 r.p.m, 50 Hz or 1800 r.p.m, 60 Hz, 3-phase motors, see "Motor rated operational powers and currents".

AX95 ... AX370 3-pole contactors

Technical data

Main pole - Utilization characteristics according to UL / NEMA / CSA

Contactor types	AC operated	AX95	AX115	AX150	AX185	AX205	AX260	AX300	AX370
Standards		UL 508, CSA C22.2 N°14, UL 60947-1 / 60947-4-1A and CSA 60947-1 / 60947-4-1A							
Maximum operational voltage		600 V							
UL / CSA general use rating									
600 V AC		150	150	170	250	260	350	400	520
With conductor cross-sectional area		AWG 1	AWG 1/0	AWG 2/0	MCM 250	MCM 300	MCM 500	2// AWG 3/0	2//MCM 300
UL / CSA maximum 3-phase motor rating									
Full load current (1)									
200-208 V AC		92 A	92 A	120 A	150 A	169 A	221 A	285 A	359 A
220-240 V AC		80 A	104 A	130 A	145 A	192 A	248 A	312 A	360 A
440-480 V AC		77 A	96 A	124 A	156 A	180 A	240 A	302 A	361 A
550-600 V AC		77 A	99 A	125 A	144 A	192 A	242 A	298 A	336 A
Horse power rating (1)									
200-208 V AC		30 hp	30 hp	40 hp	50 hp	60 hp	75 hp	100 hp	125 hp
220-240 V AC		30 hp	40 hp	50 hp	60 hp	75 hp	100 hp	125 hp	150 hp
440-480 V AC		60 hp	75 hp	100 hp	125 hp	150 hp	200 hp	250 hp	300 hp
550-600 V AC		75 hp	100 hp	125 hp	150 hp	200 hp	250 hp	300 hp	350 hp
Short-circuit protection device for contactors									
without thermal overload relay - Motor protection excluded									
High fault current		100 kA	100 kA	100 kA	100 kA	100 kA	100 kA	100 kA	100 kA
Fuse rating		200 A	200 A	(2)	400 A	400 A	500 A	600 A	800 A
Fuse type, 600 V		J	J	(2)	J	J	J	J	J
Maximum electrical switching frequency									
For general use		300 cycles/h							
For motor use		300 cycles/h							

(1) For the corresponding kW/A or hp/A values of 1500 r.p.m, 50 Hz or 1800 r.p.m, 60 Hz, 3-phase motors, see "Motor rated operational powers and currents".

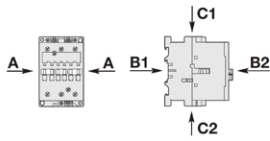
(2) In preparation.

AX06 ... AX40 3-pole contactors

Technical data

General technical data

Contactor types	AC operated	AX06	AX09	AX12	AX18	AX25	AX32	AX40
Rated insulation voltage U_i		690 V						
acc. to IS / IEC 60947-4-1		600 V						
acc. to UL / CSA		6 kV						
Rated impulse withstand voltage U_{imp}								
Ambient air temperature close to contactor								
Operation	Fitted with thermal overload relay	-25...+55 °C (1)						
	Without thermal overload relay	-40...+70 °C						
Storage		-60...+80 °C						
Climatic withstand		acc. to IEC 60068-2-30 and 60068-2-11 - UTE C 63-100 specification II						
Maximum operating altitude (without derating)		3000 m						
Shock withstand								
acc. to IEC 60068-2-27 and EN 60068-2-27								
Mounting position 1								
	Shock direction	1/2 sinusoidal shock for 11 ms: no change in contact position, closed or open position						
	A	20 g						
	B1	10 g closed position / 5 g open position						
	B2	15 g						
	C1	20 g						
	C2	20 g						



(1) The max. operational current is 23 A for AX25 with TA25DU-25M.

Magnet system characteristics

Contactor types	AC operated	AX06	AX09	AX12	AX18	AX25	AX32	AX40
Coil operating limits	AC supply	at $\theta \leq 55$ °C $0.85...1.1 \times U_c$						
acc. to IS / IEC 60947-4-1		Please also refer to "Mounting characteristics and conditions for use"						
AC control voltage 50/60 Hz								
Rated control circuit voltage U_c	at 50 Hz	24...440 V						
	at 60 Hz	24...440 V						
Coil consumption	Average pull-in value	50 Hz 70 VA					120 VA	
		60 Hz 80 VA					140 VA	
		50/60 Hz (1) 74 VA / 70 VA					125 VA / 120 VA	
	Average holding value	50 Hz 8 VA / 2 W					12 VA / 3 W	
		60 Hz 8 VA / 2 W					12 VA / 3 W	
		50/60 Hz (1) 8 VA / 2 W					12 VA / 3 W	
Drop-out voltage		approx. 40...65 % of U_c						
Operating time								
Between coil energization and:	N.O. contact closing	10...26 ms					8...21 ms	
	N.C. contact opening	7...21 ms					6...18 ms	
Between coil de-energization and:	N.O. contact opening	4...15 ms					4...11 ms	
	N.C. contact closing	9...20 ms					7...14 ms	

(1) 50/60 Hz coils: see "Coil voltage code table".

Mounting characteristics and conditions for use

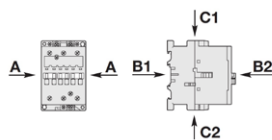
Contactor types	AC operated	AX06	AX09	AX12	AX18	AX25	AX32	AX40
Mounting positions								
		Max. N.O. or N.C. built-in and add-on N.O. or N.C. auxiliary contacts: see accessory fitting details for 3-pole contactor AX06 ... AX80						
Control voltage / Ambient temperature								
Mounting positions	1, $1 \pm 30^\circ$, 2, 3, 4, 5	at $\theta \leq 55$ °C $0.85...1.1 \times U_c$						
		at 55 °C $< \theta \leq 70$ °C U_c						
	6	at $\theta \leq 55$ °C $0.95...1.1 \times U_c$						
		at $\theta > 55$ °C Unauthorized						
Mounting distances		The contactors can be assembled side by side						
Fixing								
On rail according to IEC 60715, EN 60715		35 x 7.5 mm or 35 x 15 mm						
By screws (not supplied)		2 x M4 screws placed diagonally						

AX50 ... AX150 3-pole contactors

Technical data

General technical data

Contactor types	AC operated	AX50	AX65	AX80	AX95	AX115	AX150
Rated insulation voltage U_i							
acc. to IEC 60947-4-1		690 V			1000 V		
acc. to UL / CSA		600 V			–		
Rated impulse withstand voltage U_{imp}		6 kV			8 kV		
Ambient air temperature close to contactor							
Operation	Fitted with thermal overload relay	-25...+55 °C (1)					
	Without thermal overload relay	-40...+70 °C					
Storage		-60...+80 °C			-40 to +70 °C		
Climatic withstand		acc. to IEC 60068-2-30 and 60068-2-11 - UTE C 63-100 specification II			acc. to IEC 60068-2-30		
Maximum operating altitude (without derating)		3000 m					
Shock withstand							
acc. to IEC 60068-2-27 and EN 60068-2-27							
Mounting position 1							
	Shock direction	1/2 sinusoidal shock for 11 ms: no change in contact position, closed or open position (2)					
	A	20 g					
	B1	10 g closed position / 5 g open position					
	B2	15 g					
	C1	20 g					
	C2	20 g					



(1) The max. operational current is 74A for AX80 with TA75DU-80M.

(2) These values are not valid for rail mounting with contactors AX95 ... AX150.

Magnet system characteristics

Contactor types		AC operated	AX50	AX65	AX80	AX95	AX115	AX150
Coil operating limits		AC supply	at $\theta \leq 55$ °C 0.85...1.1 x Uc				At $\theta \leq 70$ °C 0.85 ... 1.1 x Uc	
acc. to IEC 60947-4-1			Please also refer to "Mounting characteristics and conditions for use"					
AC control voltage 50/60 Hz								
Rated control circuit voltage Uc		at 50 Hz	24...440 V					
		at 60 Hz	24...440 V					
Coil consumption	Average pull-in value	50 Hz	180 VA			350 VA		
		60 Hz	210 VA			450 VA		
		50/60 Hz (1)	190 VA / 180 VA			410 VA / 365 VA		
	Average holding value	50 Hz	18 VA / 5.5 W			22 VA / 6.5 W		
		60 Hz	18 VA / 5.5 W			26 VA / 8 W		
		50/60 Hz (1)	18 VA / 5.5 W			27 VA / 7.5 W		
Drop-out voltage		approx. 40...65 % of Uc						
Operating time								
Between coil energization and:	N.O. contact closing	8...27 ms			10...25 ms			
	N.C. contact opening	7...22 ms			7...22 ms			
Between coil de-energization and:	N.O. contact opening	4...11 ms			7...15 ms			
	N.C. contact closing	7...14 ms			10...18 ms			

(1) 50/60 Hz coils: see "Coil voltage code table".

Mounting characteristics and conditions for use

Contractor types		AC operated	AX50	AX65	AX80	AX95	AX115	AX150
Mounting positions								
			Add on max. N.O. or N.C. auxiliary contacts: see accessory fitting details for 3-pole contactor AX50 ... AX150					
Control voltage / Ambient temperature								
Mounting positions	1, 1±30°, 2, 3, 4, 5	at $\theta \leq 55\text{ }^{\circ}\text{C}$	0.85...1.1 x U_c					
		at $55\text{ }^{\circ}\text{C} \leq \theta \leq 70\text{ }^{\circ}\text{C}$	U_c			0.85...1.1 x U_c		
	6	at $\theta \leq 55\text{ }^{\circ}\text{C}$	0.95...1.1 x U_c					
		at $\theta \leq 55\text{ }^{\circ}\text{C}$	Unauthorized					
Mounting distances			The contactors can be assembled side by side					
Fixing								
On rail according to IEC 60715, EN 60715			35 x 15 mm or 75 x 25 mm			-		
By screws (not supplied)			2 x M6 screws placed diagonally			2 x M6 screws placed diagonally		

AX185 ... AX370 3-pole contactors

Technical data

General technical data

Contactor types	AC operated	AX185	AX205	AX260	AX300	AX370
Rated insulation voltage U_i acc. to IEC 60947-4-1		1000 V				
Rated impulse withstand voltage U_{imp} close to contactor		8 kV				
Ambient air temperature close to contactor						
Operation	Fitted with thermal overload relay	-25...+55 °C (1)				
	Without thermal overload relay	-40...+70 °C				
Storage		-40 to +70 °C				
Climatic withstand		Category B according to IEC60947-1 / EN 60947-1 Annex Q				
Maximum operating altitude (without derating)		3000 m				
Shock withstand acc. to IEC 60068-2-27 and EN 60068-2-27		1/2 sinusoidal shock for 11 ms: no change in contact position, closed or open position (2)				
Mounting position 1						
		Shock direction				
		A	5 g	20 g		
		B1	5 g	15 g closed position / 3 g open position		
		B2	5 g	15 g closed position / 3 g open position		
		C1	5 g	20 g		
		C2	5 g	20 g		

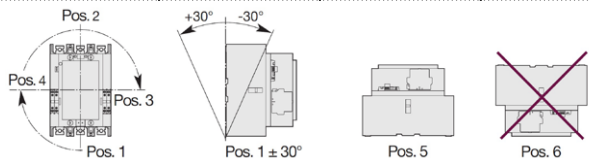
- (1) The max. operational current is 182A for AX205 with TA200DU-200
 (2) These values are not valid for rail mounting with contactors AX95 ... AX150.

Magnet system characteristics

Contactor types	AC operated	AX185	AX205	AX260	AX300	AX370
Coil operating limits acc. to IEC 60947-4-1	AC supply	at $\theta \leq 55$ °C $0.85 \dots 1.1 \times U_c$		At $\theta \leq 70$ °C $0.85 \dots 1.1 \times U_c$ max		
		Please also refer to "Mounting characteristics and conditions for use"				
AC control voltage 50/60 Hz						
Rated control circuit voltage U_c	at 50 Hz	24...440 V				
	at 60 Hz	24...440 V				
Coil consumption	Average pull-in value	50 Hz	550 VA	-		
		60 Hz	600 VA	-		
		50/60 Hz (1)	700 VA / 650 VA	475 VA		
	Average holding value	50 Hz	35 VA / 11 W	-		
		60 Hz	40 VA / 12 W	-		
		50/60 Hz (1)	44 VA / 13 W	17.5 VA		
Drop-out voltage		approx. 40...65 % of U_c		55% of U_c min.		
Operating time						
Between coil energization and:	N.O. contact closing	13...27 ms		30...60 ms		
	N.C. contact opening	8...22 ms		-		
Between coil de-energization and:	N.O. contact opening	5...10 ms		45...80 ms		
	N.C. contact closing	9...13 ms		-		

(1) 50/60 Hz coils: see "Coil voltage code table".

Mounting characteristics and conditions for use

Contactor types	AC operated	AX185	AX205	AX260	AX300	AX370
Mounting positions						
		Max. add-on N.O. or N.C. auxiliary contacts: see accessory fitting details for 3-pole contactor AX185 ... AX370				
Control voltage / Ambient temperature						
	Mounting positions	1, 1±30°, 2, 3, 4, 5	at $\theta \leq 55\text{ °C}$	0.85...1.1 x Uc		
			at $55\text{ °C} \leq \theta \leq 70\text{ °C}$	0.85...1.1 x Uc		
	6		at $\theta \leq 55\text{ °C}$	Unauthorized		
			at $\theta \leq 55\text{ °C}$	Unauthorized		
Mounting distances		The contactors can be assembled side by side				
Fixing						
On rail according to IEC 60715, EN 60715		-				
By screws (not supplied)		4 x M5				

AX06 ... AX40 3-pole contactors

Technical data

Connecting characteristics

Contractor types	AC operated	AX06	AX09	AX12	AX18	AX25	AX32	AX40
Main terminals		 Screw terminals with cable clamp					 Screw terminals with double connector 2 x (5.6 x 6.5 mm)	
Connection capacity (min. ... max.)								
Main conductors (poles)								
 Rigid Solid ($\leq 4 \text{ mm}^2$)	} 1 x	1...4 mm ²					1...6 mm ²	2.5...16 mm ²
 Stranded ($\geq 6 \text{ mm}^2$)		2 x 1...4 mm ²					1...6 mm ²	2.5...16 mm ²
 Flexible with non insulated ferrule	1 x	0.75...2.5 mm ²					0.75...6 mm ²	2.5...10 mm ²
 Flexible with non insulated ferrule	2 x	0.75...2.5 mm ²					0.75...6 mm ²	2.5...10 mm ²
 Flexible with insulated ferrule	1 x	-					0.75...4 mm ²	2.5...10 mm ²
 Flexible with insulated ferrule	2 x	-					0.75...2.5 mm ²	2.5...10 mm ²
 Bars or lugs	L <	7.7 mm					9.6 mm	-
	L >	3.7 mm					3.7 mm	-
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 18...10					AWG 16...10	AWG 8...4
Stripping length		10 mm					14 mm	
Tightening torque		1 Nm / 9 lb.in					1.5 Nm / 13 lb.in	2.3 Nm / 20 lb.in
Auxiliary conductors								
(built-in auxiliary terminals + coil terminals)								
 Rigid solid	1 x	1...4 mm ²						
 Rigid solid	2 x	1...4 mm ²						
 Flexible with non insulated ferrule	1 x	0.75...2.5 mm ²						
 Flexible with non insulated ferrule	2 x	0.75...2.5 mm ²						
 Lugs	L <	7.7 mm					8 mm	
	L >	3.7 mm					3.7 mm	
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 18...14						
Stripping length		10 mm						
Tightening torque								
Coil terminals		1 Nm / 9 lb.in						
Built-in auxiliary terminals		1 Nm / 9 lb.in						
Degree of protection								
acc. to IEC 60947-1 / EN 60947-1 and IEC 60529								
Main terminals		IP20 (only front side)						
Coil terminals		IP20					IP20	
Built-in auxiliary terminals		IP20 (only front side)					IP20	
Screw terminals		Delivered in open position, screws of unused terminals must be tightened						
Main terminals		M3.5					M5	
	Screwdriver type	Flat Ø 5.5 / Pozidriv 2					Flat Ø 6.5 / Pozidriv 2	
Coil terminals		M3.5						
	Screwdriver type	Flat Ø 5.5 / Pozidriv 2						
Built-in auxiliary terminals		M3.5						
	Screwdriver type	Flat Ø 5.5 / Pozidriv 2						

AX50 ... AX150 3-pole contactors

Technical data

Connecting characteristics

Contactors types		AC operated	AX50	AX65	AX80	AX95	AX115	AX150
Main terminals								
			Screw terminals with single connector (13 x 10 mm)			Screw terminals with single connector (14 x 14 mm)		
Connection capacity (min. ... max.)								
Main conductors (poles)								
	Rigid	Solid ($\leq 4 \text{ mm}^2$)	}	1 x	6...50 mm ²	10...95 mm ²		
		Stranded ($\geq 6 \text{ mm}^2$)		2 x	6...25 mm ²	6...35 mm ²		
	Flexible with ferrule		1 x	6...35 mm ²	10...70 mm ² (1)			
			2 x	6...16 mm ²	6...35 mm ² (1)			
	Flexible with insulated ferrule		1 x	6...35 mm ²	10...70 mm ² (1)			
			2 x	6...16 mm ²	6...35 mm ² (1)			
	Bars or lugs		L <	-	30 mm (2)			
			L >	-	6 mm			
Connection capacity acc. to UL / CSA			AWG 18 ... 14			AWG 6 ... 2/0		
Stripping length			16 mm			9 mm		
Tightening torque		Recommended	4.00 Nm / 35 lb.in			8 Nm / 71 lb.in		
		Max.	4.50 Nm			9 Nm		
Auxiliary conductors								
(built-in auxiliary terminals + coil terminals)								
	Rigid solid		1 x	1...4 mm2		0.75...2.5 mm ²		
			2 x	1...4 mm2		0.75...2.5 mm ²		
	Flexible with ferrule		1 x	1...2.5 mm ²		0.75...2.5 mm ²		
			2 x	0.75...2.5 mm ²				
	Lugs		L <	8 mm2				
			L >	3.7 mm2				
Connection capacity acc. to UL / CSA			1 or 2x	AWG 18 ... 14		AWG 18 ... 14		
Stripping length								
Coil terminals				9 mm		9 mm		
Built-in auxiliary terminals				10 mm				
Tightening torque								
Coil terminals		Recommended		1 Nm / 9 lb.in				
		Max.		1.2 Nm				
Built-in auxiliary terminals		Recommended		-				
		Max.		-				
Degree of protection								
acc. to IEC 60947-1 / EN 60947-1 and IEC 60529								
Main terminals				IP 10				
Coil terminals				IP20				
Built-in auxiliary terminals				-				
Screw terminals			Delivered in open position, screws of unused terminals must be tightened					
Main terminals				M6		M8		
			Screwdriver type	Flat Ø 6.5 / Pozidriv 2		Hexagon socket (s = 4 mm)		
Coil terminals				M3.5				
			Screwdriver type	Flat Ø 5.5 / Pozidriv 2				
Built-in auxiliary terminals				-				
			Screwdriver type	-				

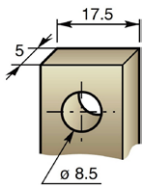
(1) AX95 - AX150: use flexible without ferrule.

(2) With LW110 enlargement piece, see "Accessories".

AX185 ... AX205 3-pole contactors

Technical data

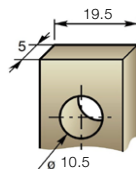
Connecting characteristics

		AC operated	AX185	AX205
Contactor types				
Main terminals				
Flat type				
				
Connection capacity (min. ... max.)				
Main conductors (poles)				
	Rigid with connector	Single for Cu cable	6...185 mm ²	
		Single for Al/Cu cable	25...150 mm ²	
		Double for Al/Cu cable	-	
	Bars or lugs	L <	24 mm	
		Ø >	8 mm	
Connection capacity acc. to UL / CSA			6 ... 250 MCM	
Stripping length			9 mm	
Tightening torque		Recommended	18 Nm / 160 lb.in	
		Max.	20 Nm	
Auxiliary conductors				
(built-in auxiliary terminals + coil terminals)				
	Rigid solid	1 x	1...4 mm ²	
		2 x	1...4 mm ²	
	Flexible with ferrule	1 x	0.75...2.5 mm ²	
		2 x	0.75...2.5 mm ²	
	Lugs	L <	8 mm ²	
		I >	3.7 mm ²	
Connection capacity acc. to UL / CSA		1 or 2x	AWG 18 ... 14	
Stripping length			9 mm	
Tightening torque				
Coil terminals		Recommended	1 Nm / 9 lb.in	
		Max.	1.2 Nm	
Degree of protection				
acc. to IEC 60947-1 / EN 60947-1 and IEC 60529				
Main terminals			IP00	
Coil terminals			IP20	
Screw terminals				
Main terminals			M8	
			Screw and bolts	
Coil terminals (delivered in open position)			M3.5	
Screwdriver type			Flat Ø 5.5 / Pozidriv 2	

AX260 ... AX370 3-pole contactors

Technical data

Connecting characteristics

Contactor types		AC operated	AX260	AX300	AX370
Main terminals					
Flat type					
Connection capacity (min. ... max.)					
Main conductors (poles)					
	Rigid with connector	Cu cable Stranded	1 x	16...300 mm²	
		Clamp type		1SDA055016R1	
		Tightening torque		25 Nm	
		Cu cable Stranded	2 x	70...185 mm²	
		Clamp type		1SCA022194R0890 (OZXB4)	
		Tightening torque		22 Nm	
		Al cable Stranded	1 x	185...240 mm²	
		Clamp type		1SDA055020R1	
		Tightening torque		43 Nm	
		Cu cable Flexible	1 x	16...240 mm²	
		Clamp type		1SDA055016R1	
		Tightening torque		25 Nm	
		Cu cable Flexible	2 x	70...185 mm²	
		Clamp type		1SCA022194R0890 (OZXB4)	
		Tightening torque		22 Nm	
	Bars or lugs	Double for Al/Cu cable		70...185 mm²	
		W <		32 mm (1.260 in)	
		Ø >		10 mm (0.394 in)	
		Socket type		LL...included	
		Tightening torque		28 Nm / 248 lb.in	
	Connection capacity acc. to UL / CSA		1 x	4 ... 400 MCM	
	Tightening torque			42 Nm / 372 lb.in	
Auxiliary conductors					
(Coil terminals)					
	Rigid /Stranded		1 x	1...4 mm2	
			2 x	1...4 mm2	
	Flexible		1 x	0.75...2.5 mm2	
			2 x	0.75...2.5 mm2	
	Flexible with non insulated		1 x	0.75...2.5 mm2	
			2 x	0.75...2.5 mm2	
	Flexible with insulated ferrule		1 x	0.75...2.5 mm2	
			2 x	0.75...2.5 mm2	
	Lugs		L <	8 mm	
			L >	3.5 mm	
	Connection capacity acc. to UL / CSA		1 or 2x	AWG 18 ... 14	
	Stripping length			9 mm	
	Tightening torque			1.00 Nm / 9 lb.in	
Degree of protection					
acc. to IEC 60947-1 / EN 60947-1 and IEC 60529					
	Main terminals			IP00	
	Coil terminals			IP20	
Screw terminals					
	Main terminals			M10	
		Screwdriver type		Screws and bolts	
	Coil terminals (delivered in open position)			M3.5	
		Screwdriver type		Flat Ø 5.5 mm / Pozidriv 2	

AX06 ... AX40 3-pole contactors

Technical data

Built-in auxiliary contacts according to IEC - Other auxiliary contacts see "Accessories"

Contactor types	AC operated	AX06	AX09	AX12	AX18	AX25	AX32	AX40
Rated operational voltage U _e max.		690 V						
Rated frequency (without derating)		50 / 60 Hz						
Conventional free air thermal current I _{th} - θ ≤ 40 °C		16 A						
I _e / Rated operational current AC-15								
acc. to IEC 60947-5-1	24-127 V 50/60 Hz	6 A						
	220-240 V 50/60 Hz	4 A						
	380-440 V 50/60 Hz	3 A						
	500 V 50/60 Hz	2 A						
	690 V 50/60 Hz	2 A						
Making capacity AC-15		10 x I _e AC-15 acc. to IEC 60947-5-1						
Breaking capacity AC-15		10 x I _e AC-15 acc. to IEC 60947-5-1						
I _e / Rated operational current DC-13								
acc. to IEC 60947-5-1	24 V DC	6 A / 144 W						
	48 V DC	2.8 A / 134 W						
	72 V DC	2 A / 144 W						
	110 V DC	1.1 A / 121 W						
	125 V DC	1.1 A / 138 W						
	220 V DC	0.55 A / 121 W						
	250 V DC	0.55 A / 138 W						
Short-circuit protection device gG type fuse		10 A						
Rated short-time withstand current I _{cw}	for 1.0 s	100 A						
	for 0.1 s	140 A						
Minimum switching capacity		12 V / 3 mA						
with failure rate acc. to IEC 60947-5-4								
Non-overlapping time between N.O. and N.C. contacts		≥ 2 ms						
Power dissipation per pole at 6 A		0.1 W						
Max. electrical switching frequency	AC-15	1200 cycles/h						
	DC-13	900 cycles/h						
Mechanically linked contacts		Built-in N.O. or N.C. auxiliary contacts and additional N.O. or N.C. auxiliary contacts of 4-pole CA5X are mechanically linked contacts.						
acc. to annex L of IEC 60947-5-1								
Mirror contacts		Built-in N.C. auxiliary contacts or additional N.C. auxiliary contacts (CA5X, CAL5X-11) are mirror contacts.						
acc. to annex F of IEC 60947-4-1								

Built-in auxiliary contacts according to UL / CSA

Contactor types	AC operated	AX06	AX09	AX12	AX18	AX25	AX32	AX40
Max. operational voltage		600 V AC, 600 V DC						
Pilot duty		A600, P300						
AC thermal rated current		10 A						
AC maximum volt-ampere making		7200 VA						
AC maximum volt-ampere breaking		720 VA						
DC thermal rated current		5 A						
DC maximum volt-ampere making-breaking		138 VA						

3-pole contactors

Electrical durability and utilization categories

General

Utilization categories determine the current making and breaking conditions relating to the characteristics of the loads to be controlled by the contactors. International standard IEC 60947-4-1 and European standard EN 60947-4-1 are the standards to be referred to.

If I_c is the current to be broken by the contactor and I_e the rated operational current normally drawn by the load, then:

- Categories AC-1 and AC-3: $I_c = I_e$
- Category AC-2: $I_c = 2.5 \times I_e$
- Category AC-4: $I_c = 6 \times I_e$

Generally speaking $I_c = m \times I_e$ where m is a multiple of the load operational current.

On next pages, the curves corresponding to categories AC-1, AC-3 and AC-4 represent the electrical durability variation of standard contactors in relation to the breaking current I_c .

Electrical durability is expressed in millions of operating cycles.

Curve utilization mode

Electrical durability forecast and contactor selection for categories AC-1, AC-2, AC-3 or AC-4

- Note the characteristics of the load to be controlled:
 - Operational voltage U_e
 - Current normally drawn I_e (U_e / I_e / kW relation for motors, see "Motor rated operational powers and currents").
 - Utilization category AC-1, AC-2, AC-3 or AC-4
 - Breaking current $I_c = I_e$ for AC-1 and for AC-3 ; $I_c = 2.5 \times I_e$ for AC-2 ; $I_c = 6 \times I_e$ for AC-4
- Define the number of operating cycles N required.
- On the diagram corresponding to the operational category, select the contactor with the curve immediately above the intersection point (I_c ; N).

Electrical durability forecast and contactor selection for mixed duty motor control: AC-3 ($I_c = I_e$) type switching off while "motor running" and, occasionally, AC-4 ($I_c = 6 \times I_e$) type switching off while "motor accelerating"

- Note the characteristics of the motor to be controlled:
 - Operational voltage U_e
 - Current normally drawn while "motor running" I_e (U_e / I_e / kW relation for motors, see "Motor rated operational powers and currents")
 - Breaking current for AC-3 $I_c = I_e$
 - Breaking current for AC-4 while "motor accelerating" $I_c = 6 \times I_e$
 - Percentage of AC-4 operating cycles K (on the basis of the total number of operating cycles)
- Define the total number of operating cycles N required.
- Note the smallest contactor rating compatible for AC-3 (U_e / I_e) on Main pole utilization characteristic table (see "Technical data").
- For the selected contactor make a note of the following in relation to the voltage using diagram AC-3 in next pages:
 - The number of operating cycles A for $I_c = I_e$ (AC-3)
 - The number of operating cycles B for $I_c = 6 \times I_e$ (AC-4)
- Calculate the estimated number of cycles N' (N' is always below A)

$$N' = \frac{A}{1 + 0.01 K (A/B - 1)}$$

- If N' is too low in relation to the target N , calculate the estimated number of cycles for a higher contactor rating.

Case of uninterrupted duty

For uninterrupted duty, some verifications of preventing maintenance are necessary to check the functionality of the concerned product (consult us).

The combined effect of environmental conditions and the proper temperature of the product may require some disposals. As a matter of fact, for this duty, the use duration prevails over the number of operating cycles.

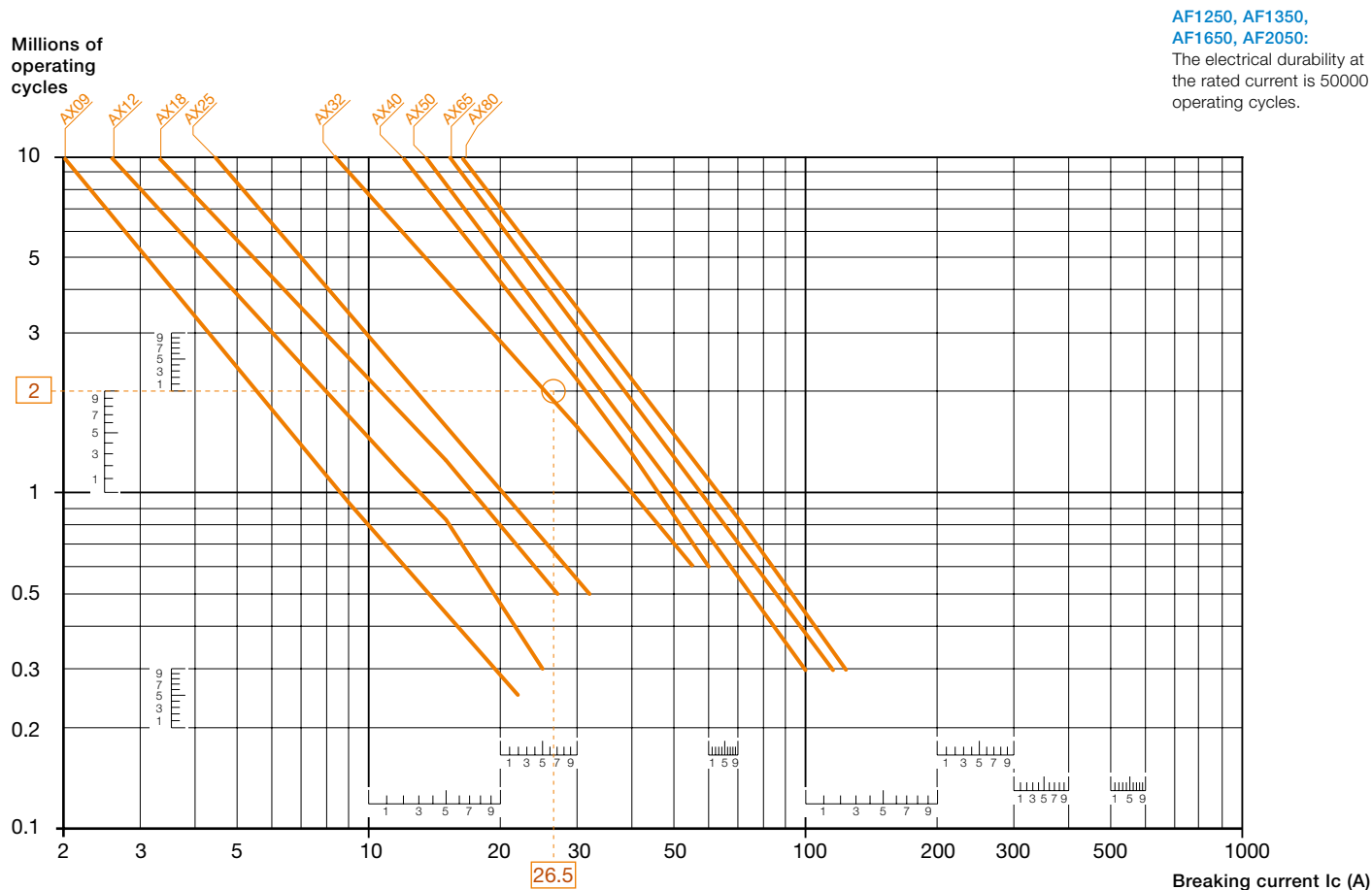
3-pole contactors

Electrical durability

Electrical durability for AC-1 utilization category - $U_e \leq 690\text{ V}$

Switching non-inductive or slightly inductive loads. The breaking current I_c for AC-1 is equal to the rated operational current of the load.

Ambient temperature and maximum electrical switching frequency: see "Technical data".



Example:

$I_c / \text{AC-1} = 26.5\text{ A}$ – Electrical durability required = 2 millions operating cycles.

Using the AC-1 curves above select the AX32 contactor at intersection "O" (26.5 A / 2 millions operating cycles).

3-pole contactors

Electrical durability

Electrical durability for AC-3 utilization category - $U_e \leq 440$ V.

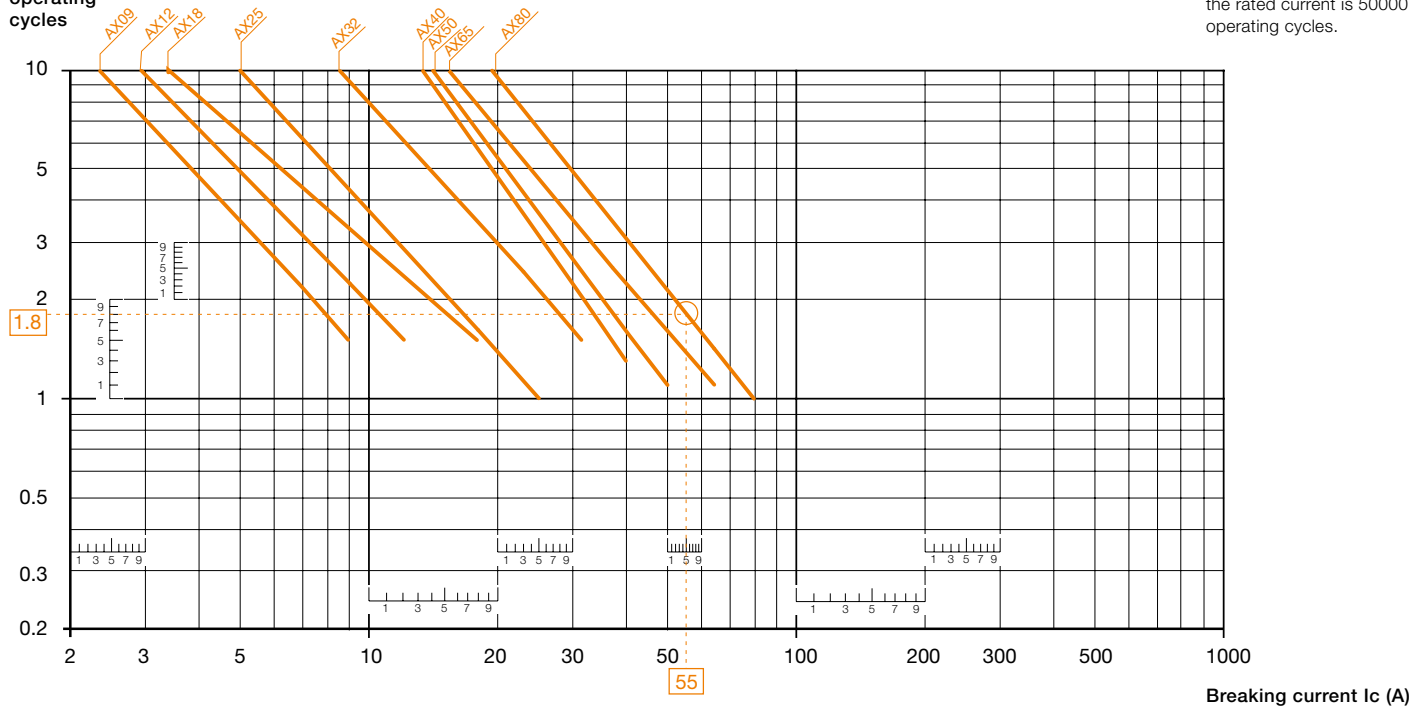
Switching cage motors: starting and switching off running motors. The breaking current I_c for AC-3 is equal to the rated operational current I_e (I_e = motor full load current).

Ambient temperature and maximum electrical switching frequency: see "Technical data".

Millions of
operating
cycles

AF1350, AF1650:

The electrical durability at the rated current is 50000 operating cycles.



Example:

Motor power 30 kW for AC-3 - $U_e = 400$ V and $I_e = 55$ A utilization – Electrical durability required = 1.8 million operating cycles. For AC-3: $I_c = I_e$. Select the AX80 contactor at intersection "○" (55 A / 1.8 million operating cycles) on the curves (AC-3 - $U_e \leq 440$ V).

3-pole contactors

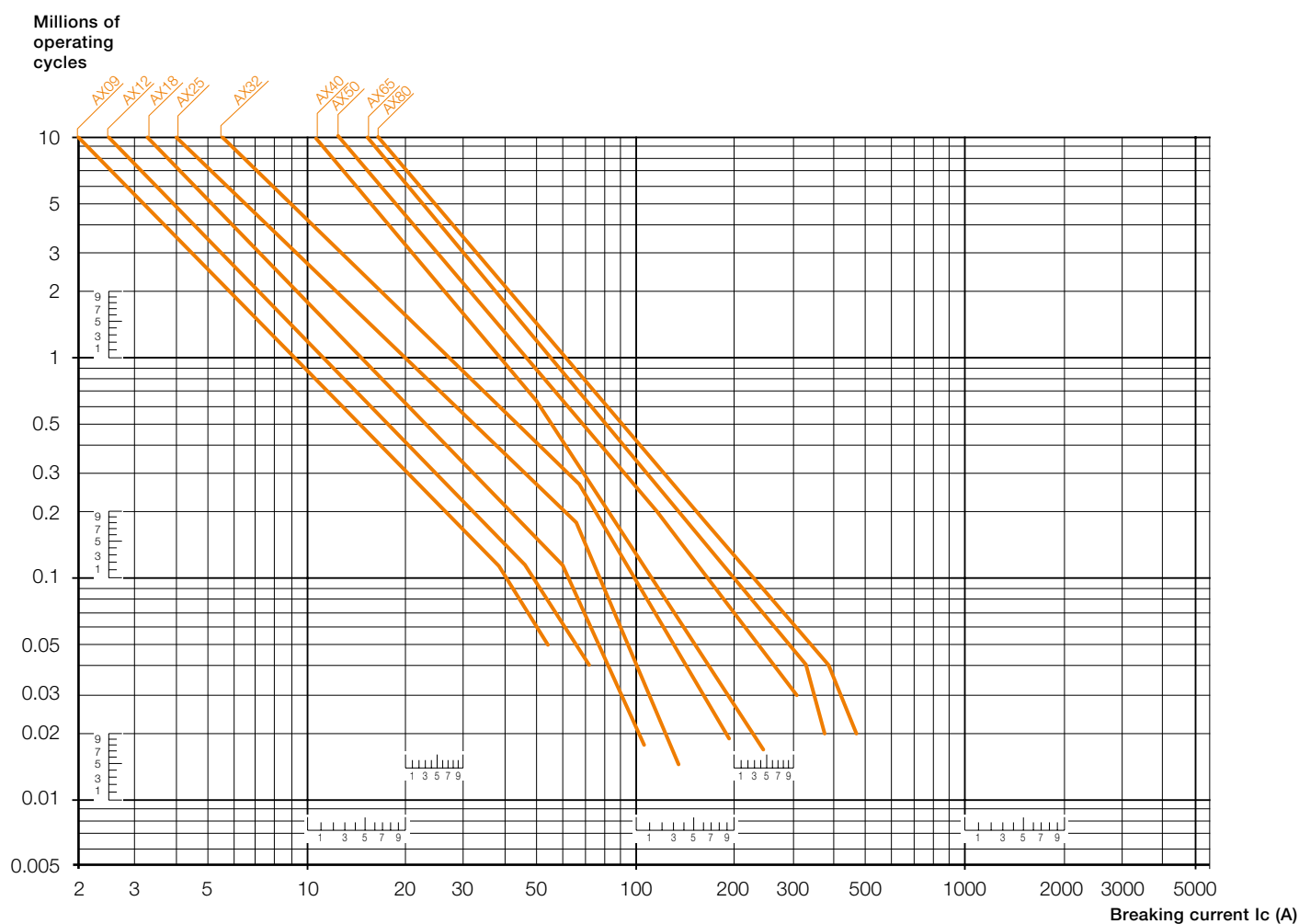
Electrical durability

Electrical durability for AC-4 utilization category - $U_e \leq 440 \text{ V}$

Ambient temperature $\leq 55 \text{ °C}$

Switching cage motors: starting, reverse operation and step-by-step operation. The breaking current I_c is equal to $6 \times I_e$ for AC-4, keeping in mind that I_e is the motor rated operational current (I_e = motor full-load current).

Maximum electrical switching frequency: see "Technical data".



Star-delta starting of three-phase asynchronous motors

Contactor selection

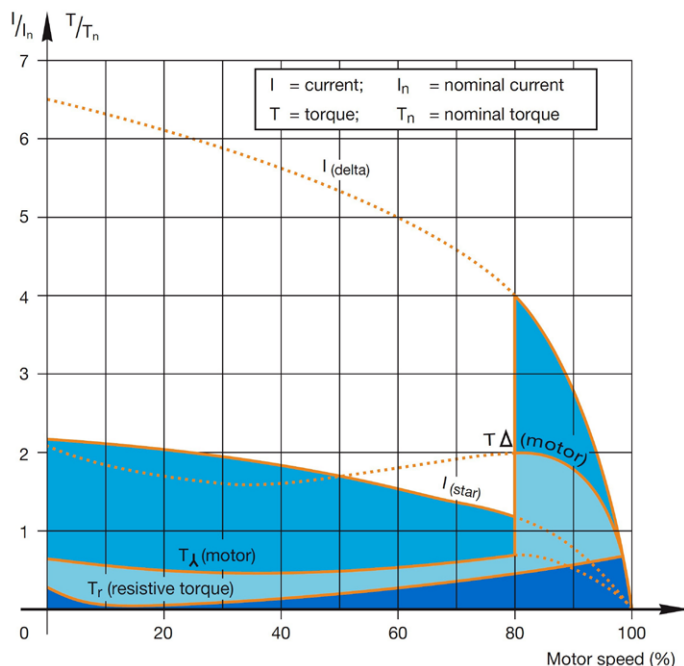
General

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.

3

Star-delta starting



Technical Data

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.

Utilization

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, etc.

In order to prevent a high current peak, at least 85% of nominal speed must be reached before switching from star to delta.

Precautions

Motor nominal voltage in delta connection must be equal to that of the mains.

Example:

A motor for 415 V star-delta starting must be designed for 415 V in "delta" connection. Its usual designation is "415 V / 690 V motor". The motor must be constructed with 6 terminal windings.

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 (normally 6 to 16 s) then begins.

2nd stage - "Star" to "Delta" switching

When the programmed starting time is over, the KM2 "star" contactor opens.

3rd stage - "Delta" connection

For AX06 ... AX205, A transition time (or dwelling time) of 50 ms is fixed between opening of the "star" contactor and closing of the "delta" contactor by the use of CT-SDS timer. This prevents short circuit between "star" and "delta".

For AX260 ... AX370, an on-delay timer without dwelling time (CT-ERS.21S) is enough to countdown the programmed starting time (6 to 10s) during "Star connection". The use of a star-delta timer including dwelling time is not permitted.

Note: An electrical interlock between star and delta is mandatory such as VE 5 or through auxiliary contacts.

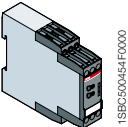
Furthermore, in open transition, the current interruption may reach up to 95 ms: it shall be checked that this duration is compatible with the application i.e. mainly if the decreasing in rotation speed is acceptable during the starting phase.

Star-delta starting of three-phase asynchronous motors

Contactor selection

Rated operational power - AC-3									Max. starting time from cold state (1) seconds	Line contactor	Delta contactor	Star contactor	Overload relay (2)	Timer
220-230 V kW	240 V kW	380 V kW	400 V kW	415 V kW	440 V kW	500 V kW	660 V kW	690 V kW						
3	3	5.5	5.5	5.5	5.5	5.5	5.5	5.5	15	AX06	AX06	AX06	TA25DU M	CT-SDS.22S
4	4	5.5	7.5	7.5	7.5	9	9	9	15	AX09	AX09	AX06	TA25DU M	CT-SDS.22S
5.5	5.5	9	9	9	9	9	9	9	15	AX12	AX12	AX06	TA25DU M	CT-SDS.22S
7.5	9	15	15	15	11	11	11	11	15	AX18	AX18	AX12	TA25DU M	CT-SDS.22S
11	11	22	22	22	15	15	15	15	15	AX25	AX25	AX18	TA25DU M	CT-SDS.22S
15	15	25	30	30	30	30	30	30	15	AX32	AX32	AX25	TA42DU M	CT-SDS.22S
18.5	22	37	37	37	37	37	37	37	30	AX40	AX40	AX32	TA42DU M	CT-SDS.22S
25	30	45	45	45	45	55	55	55	30	AX50	AX50	AX32	TA75DU M	CT-SDS.22S
30	37	55	55	55	55	55	55	55	30	AX65	AX65	AX40	TA75DU M	CT-SDS.22S
37	45	55	75	75	75	75	75	75	30	AX80	AX80	AX50	TA75DU M	CT-SDS.22S
45	55	75	90	90	90	90	90	90	20	AX95	AX95	AX65	TA110DU	CT-SDS.22S
55	55	90	110	110	110	110	132	132	20	AX115	AX115	AX80	TA110DU / E140DU	CT-SDS.22S
75	75	132	132	132	110	110	132	132	20	AX150	AX150	AX95	TA110DU / E140DU	CT-SDS.22S
90	90	160	160	160	160	160	160	200	20	AX185	AX185	AX115	TA200DU	CT-SDS.22S
110	110	160	200	200	200	200	250	250	20	AX205	AX205	AX185	TA200DU / EF 205	CT-SDS.22S
132	132	250	250	250	250	315	400	400	20	AX260	AX260	AX205	EF370	CT-ERS.21S
160	160	250	250	315	315	355	400	500	20	AX300	AX300	AX205	EF370	CT-ERS.21S
200	200	355	355	355	400	355	500	500	20	AX370	AX370	AX260	EF370	CT-ERS.21S

- (1) Usual time value = 6...16 s.
(2) The setting current value is : nominal motor current x 0.58



CT-SDS...

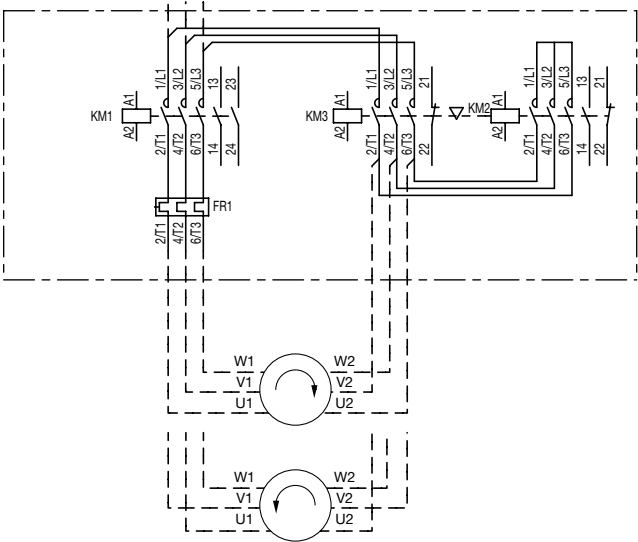
Ordering details - Electronic timer

Timing function	Time ranges	Ouput	Rated control supply voltage	Type	Order code	Pkg qty	Weight (1 pce) kg
Star-delta change-over (3)	7 (0.05 s - 10 min)	2 n/o contacts, 3 LEDs	28-48 V DC	CT-SDS.22S	1SVR730210R3300	1	0.114
			24-240 V AC	CT-SDS.23S	1SVR730211R2300	1	0.118
ON-delay (4)	10 (0.05 s - 300h)	2 c/o SPDT contacts	24-240 V AC/DC	CT-ERS.21S	1SVR730100R0300	1	0.152

- (3) 50 ms transition time
(4) No transition time

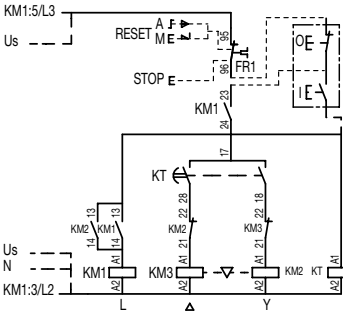
Power circuit diagram

AX06 ... AX370 contactors

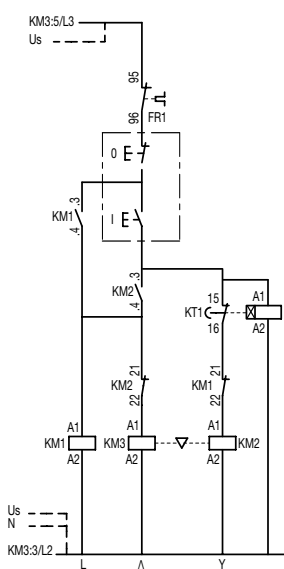


Control circuit diagrams - Remote control

AX06 ... AX205 contactors



AX260 ... AX370 contactors



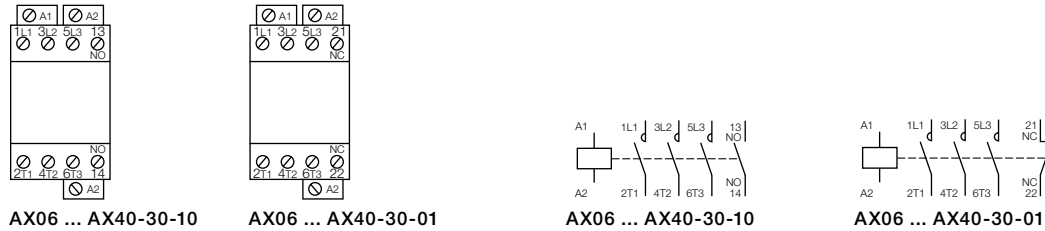
1SBC100224 S0201

AX06 ... AX370 3-pole contactors

Terminal marking and positioning

AX06 ... AX150 contactors - AC operated

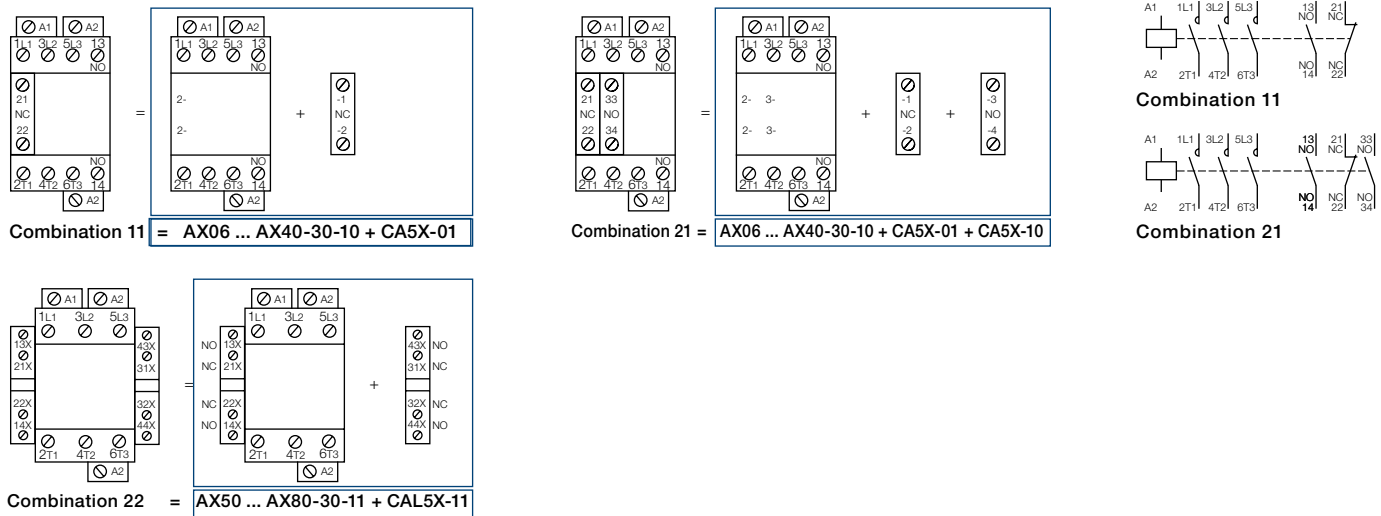
Standard devices without addition of auxiliary contacts



Standard devices with factory mounted auxiliary contacts

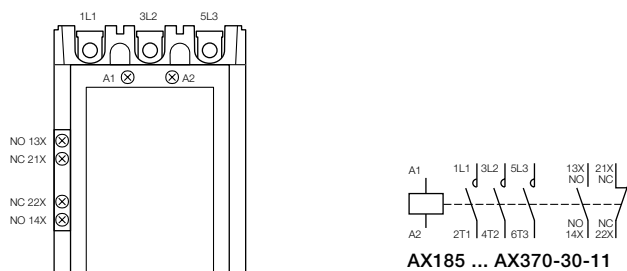


Other possible contact combinations with auxiliary contacts added by the user



AX185 ... AX370 contactors - AC operated

Standard devices with factory mounted auxiliary contacts

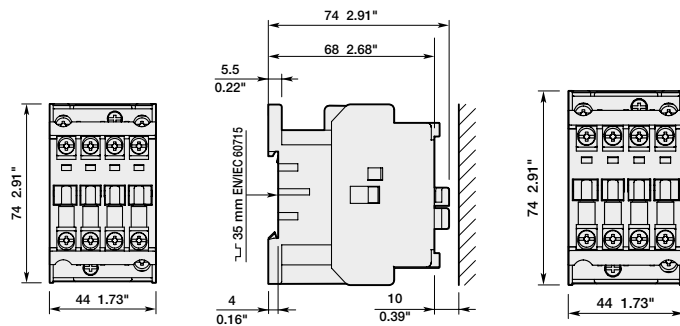


AX185 ... AX370-30-11

AX06 ... AX40 3-pole contactors

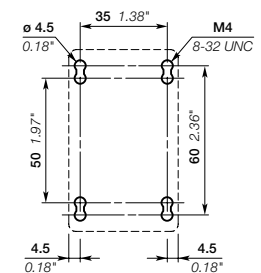
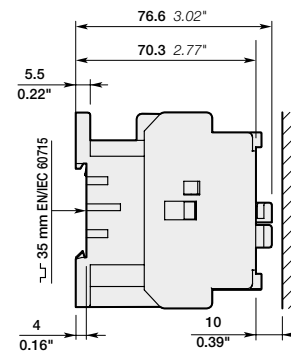
Dimensions

Main dimensions mm, inches

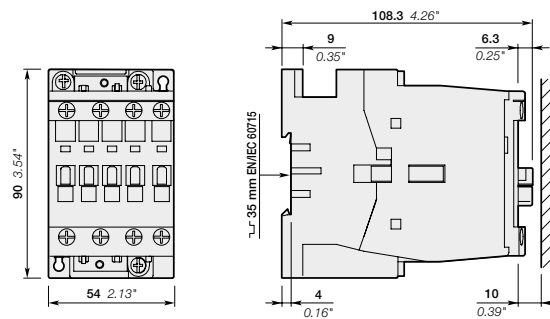


AX06, AX09, AX12, AX18, NX

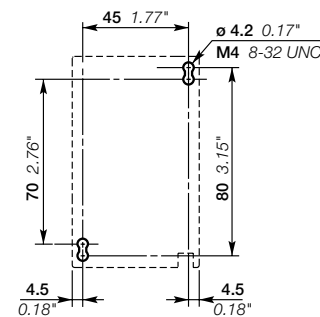
AX25



AX06, AX09, AX12, AX18, AX25, NX



AX32, AX40



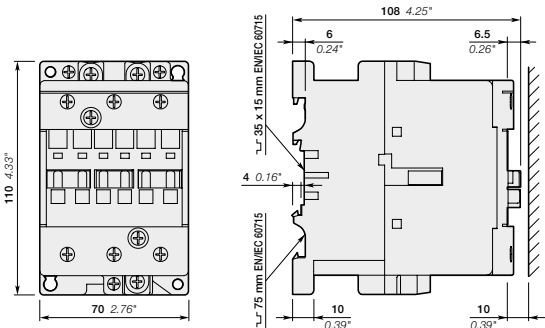
AX32, AX40

AX50 ... AX150 3-pole contactors

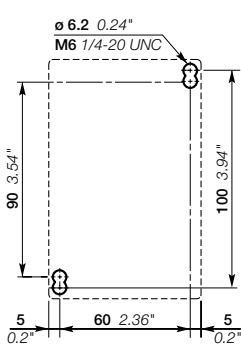
Dimensions

Main dimensions mm, inches

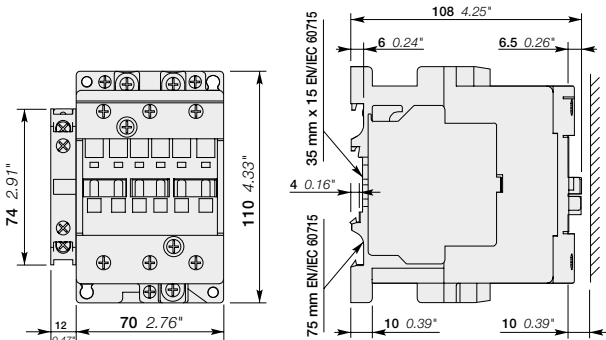
3



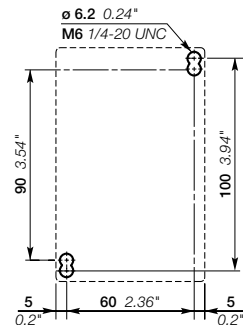
AX50, AX65, AX80



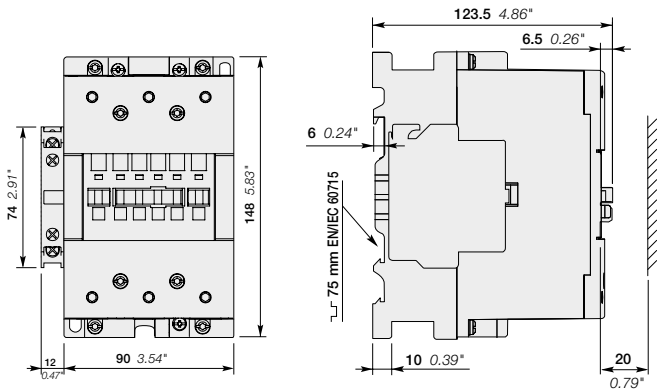
AX50, AX65, AX80



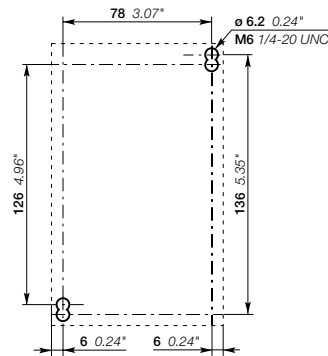
AX50, AX65, AX80 + CAL5X-11



AX50, AX65, AX80 + CAL5X-11



AX95, AX115, AX150 + CAL18X-11

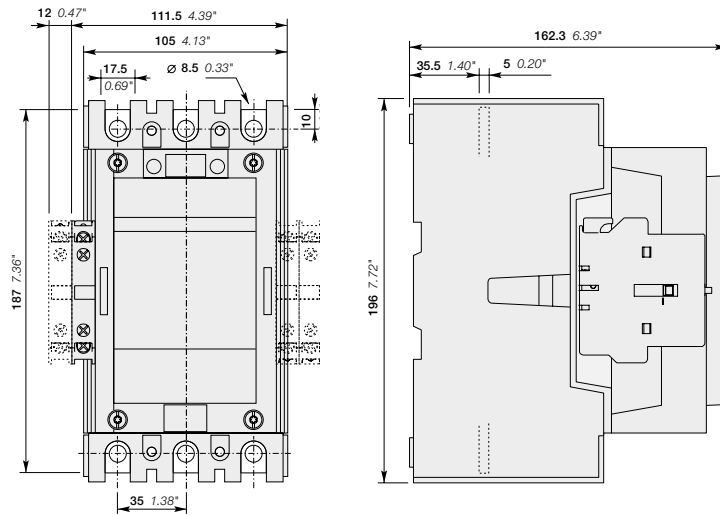


AX95, AX115, AX150 + CAL18X-11

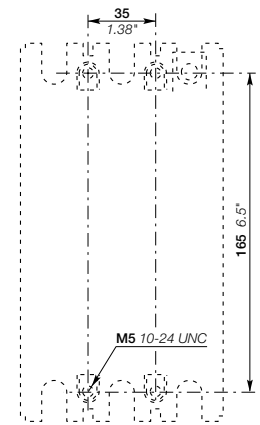
AX185 ... AX370 3-pole contactors

Dimensions

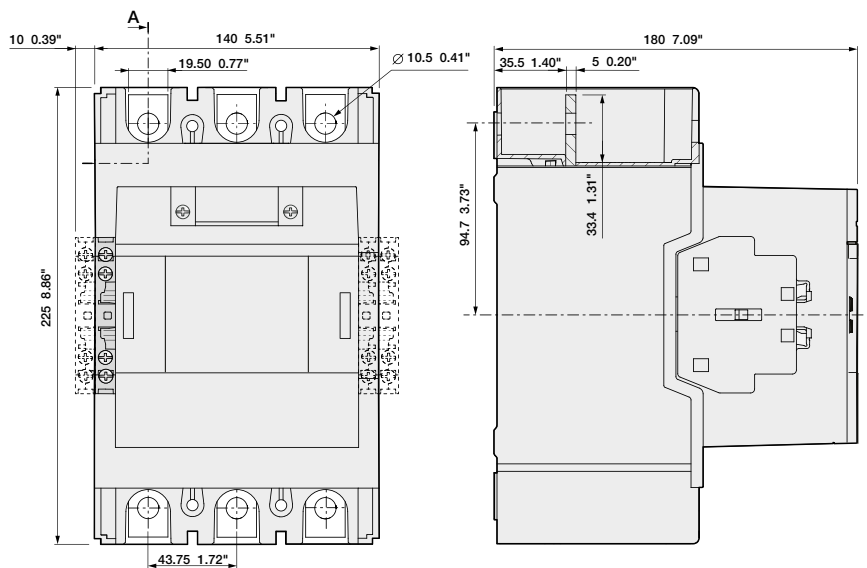
Main dimensions mm, inches



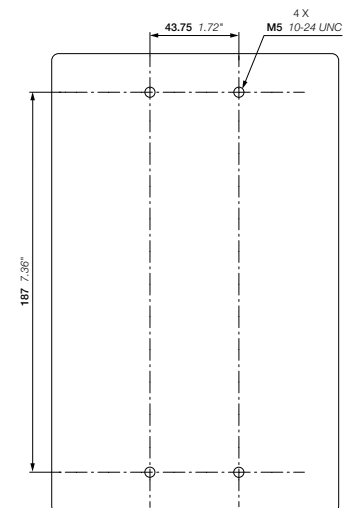
AX185, AX205 + CAL18X-11



AX185, AX205 + CAL18X-11



AX260, AX300, AX370 + CAL19



NX contactor relays

NX contactor relays

Ordering details

AC operated	98
Main accessories	99

Technical data

100

Terminal marking and positioning

102

NX contactor relays

AC operated



NX40E

Description

NX contactor relays are used for switching auxiliary circuits and control circuits. These contactor relays are of the block type design with:

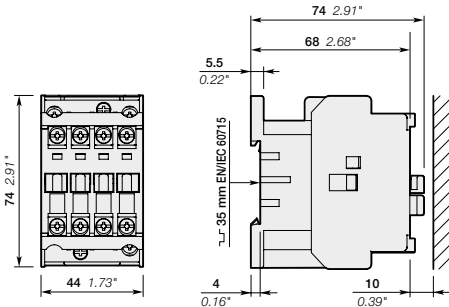
- 4 poles. Contactor relays have mechanically linked auxiliary contact elements
- control circuit: AC operated
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Ordering details

Number of contacts	Rated control circuit voltage Uc (1)		Type	Order code	Weight Pkg (1 pce) kg
	V 50 Hz	V 60 Hz			
	24	24	NX22E-81	1SBH901074R8122	0.326
	110	110...120	NX22E-84	1SBH901074R8422	0.326
	220...230	230...240	NX22E-80	1SBH901074R8022	0.326
	230...240	240...260	NX22E-88	1SBH901074R8822	0.326
	400...415	415...440	NX22E-86	1SBH901074R8622	0.326
	24	24	NX31E-81	1SBH901074R8131	0.326
	110	110...120	NX31E-84	1SBH901074R8431	0.326
	220...230	230...240	NX31E-80	1SBH901074R8031	0.326
	230...240	240...260	NX31E-88	1SBH901074R8831	0.326
	400...415	415...440	NX31E-86	1SBH901074R8631	0.326
	24	24	NX40E-81	1SBH901074R8140	0.326
	110	110...120	NX40E-84	1SBH901074R8440	0.326
	220...230	230...240	NX40E-80	1SBH901074R8040	0.326
	230...240	240...260	NX40E-88	1SBH901074R8840	0.326
	400...415	415...440	NX40E-86	1SBH901074R8640	0.326

(1) Other control voltages see voltage code table.

Main dimensions mm, inches

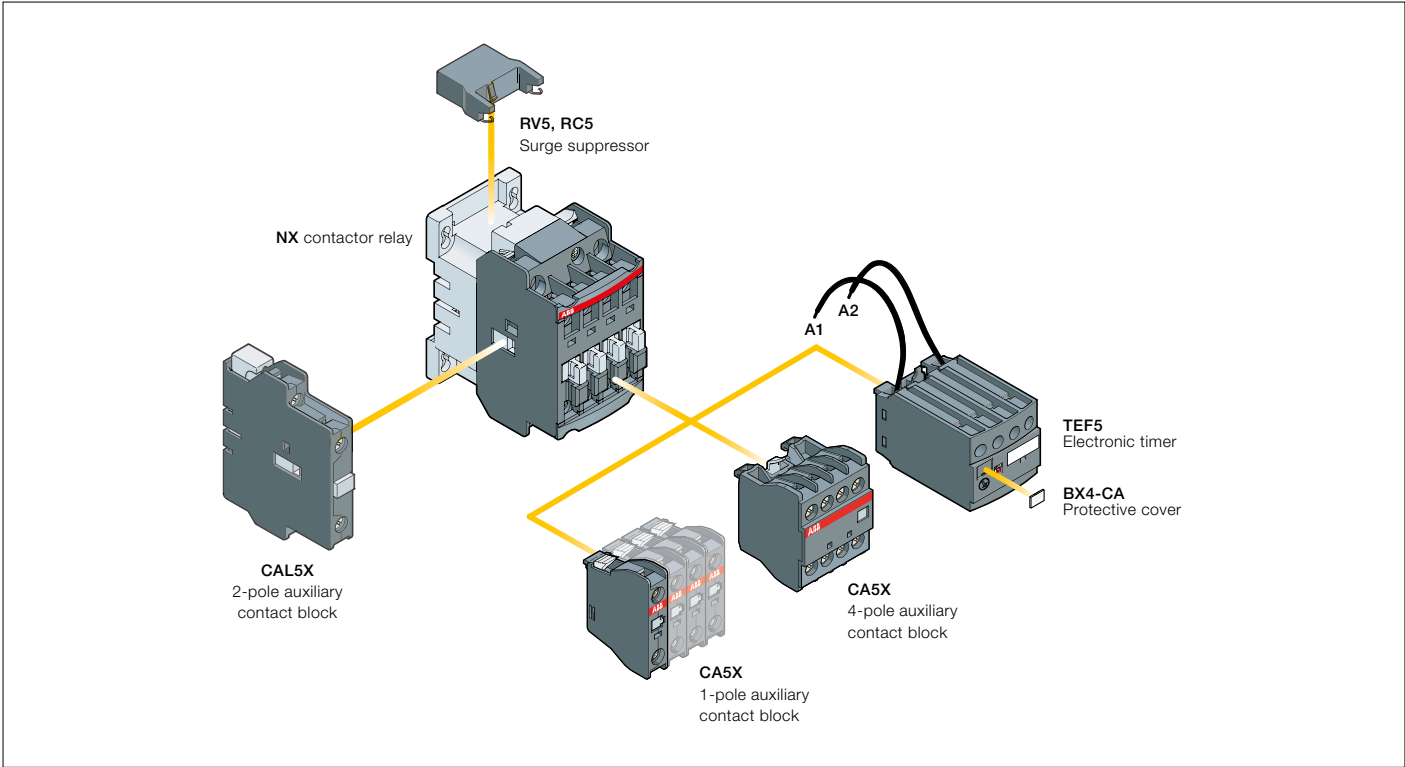


NX22E, NX31E, NX40E

NX contactor relays

Main accessories

Contactor relay 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	Front-mounted accessories			Side-mounted accessories		
		Auxiliary contact blocks		Electronic timer	Auxiliary contact blocks		
		1-pole CA5X	4-pole CA5X	TEF5	2-pole CAL5X-11		
NX	2 2 E (1)	1 to 4 x CA5X (or 1 x CE5) (2)	or 1 x CA5X (4-pole)	or 1 x TEF5	+	1 to 2 x CAL5X-11	
	3 1 E (1)	1 to 4 x CA5X	or 1 x CA5X (4-pole)	or 1 x TEF5	+	1 to 2 x CAL5X-11	
	4 0 E	(1 to 2 x CE5 max) (3)					

(1) 2 N.C. front mounted auxiliary contacts maximum in mounting position 5.
 (2) CE5 auxiliary contacts not allowed in mounting position 5.
 (3) The total number of N.O. or N.C. CE5 and other N.C. CA5X auxiliary contacts is limited to 2.

NX contactor relays

Technical data

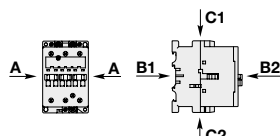
Contact utilization characteristics according to IEC

Contactor relay types	AC operated	NX
Standards	IEC 60947-1 / 60947-5-1 and EN 60947-1 / 60947-5-1	
Rated operational voltage U_e max.	690 V	
Rated frequency (without derating)	50 / 60 Hz	
Conventional free-air thermal current $I_{th} \theta \leq 40^\circ\text{C}$	16 A	
le / Rated operational current AC-15		
acc. to IEC 60947-5-1	24-127 V 50/60 Hz	6 A
	220-230 V 50/60 Hz	4 A
	380-415 V 50/60 Hz	3 A
	500 V 50/60 Hz	2 A
	690 V 50/60 Hz	2 A
Rated making capacity AC-15	10 x le AC-15 acc. to IEC 60947-5-1	
Rated breaking capacity AC-15	10 x le AC-15 acc. to IEC 60947-5-1	
le / Rated operational current DC-13		
acc. to IEC 60947-5-1	24 V DC	6 A / 144 W
	48 V DC	2.8 A / 134 W
	72 V DC	1 A / 72 W
	110 V DC	0.55 A / 60 W
	125 V DC	0.55 A / 69 W
	220 V DC	0.30 A / 66 W
	250 V DC	0.30 A / 75 W
Short-circuit protection device for contactors		
$U_e \leq 500$ V AC - gG type fuse	10 A	
Rated short-time withstand current I_{cw}		
at 40°C ambient temperature,	for 1.0 s	100 A
in free air from a cold state	for 0.1 s	140 A
Minimum switching capacity	17 V / 5 mA	
with failure rate acc. to IEC 60947-5-4	10^{-6}	
Non-overlapping time between N.O. and N.C. contacts	≥ 2 ms	
Power dissipation per pole at 6 A	0.1 W	
Max. electrical switching frequency	AC-15	1200 cycles/h

Contact utilization characteristics according to UL / CSA

Contactor relay types	AC operated	NX
Standards	UL 508, CSA C22.2 N°14-05	
Max. operational voltage	600 V AC	
Pilot duty	A600, Q300	

General technical data

Contactor relay types	AC operated	NX
Rated insulation voltage U_i	690 V	
acc. to IEC 60947-5-1	600 V	
acc. to UL / CSA	6 kV	
Rated impulse withstand voltage U_{imp} .	6 kV	
Ambient air temperature		
Operation in free air	$-40...+70^\circ\text{C}$	
Storage	$-60...+80^\circ\text{C}$	
Climatic withstand	acc. to IEC 60068-2-30 and 60068-2-11 - UTE C 63-100 specification II	
Maximum operating altitude (without derating)	3000 m	
Mechanical durability		
Number of operating cycles	≥ 20 millions operating cycles	
Max. switching frequency	6000 cycles/h	
Shock withstand		
acc. to IEC 60068-2-27 and EN 60068-2-27		
Mounting position 1		
	Shock direction	1/2 sinusoidal shock for 11 ms: no change in contact position, closed or open position
	A	20 g
	B1	5 g
	B2	15 g
	C1	20 g
	C2	20 g

NX contactor relays

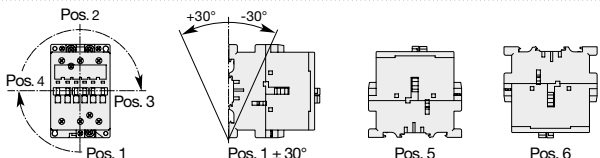
Technical data

Magnet system characteristics

Contactor relay types	AC operated	NX
Coil operating limits acc. to IEC 60947-4-1	AC supply	at $\theta \leq 55^\circ\text{C}$ 0.85...1.1 x U_c Please also refer to "Mounting characteristics and conditions for use"
AC control voltage 50/60 Hz		
Rated control circuit voltage U_c	at 50 Hz	24...440 V
	at 60 Hz	24...440 V
Coil consumption	Average pull-in value	50 Hz 70 VA 60 Hz 80 VA
	50/60 Hz (1)	74 VA / 70 VA
Average holding value	50 Hz	8 VA / 2 W
	60 Hz	8 VA / 2 W
	50/60 Hz (1)	8 VA / 2 W
Drop-out voltage		approx. 40...65 % of U_c
Operating time		
Between coil energization and:	N.O. contact closing	10...26 ms
	N.C. contact opening	7...21 ms
Between coil de-energization and:	N.O. contact opening	4...11 ms
	N.C. contact closing	9...16 ms

(1) 50/60 Hz coils: see "Coil voltage code table".

Mounting characteristics and conditions for use

Contactor relay types		AC operated	NX
Mounting positions			
		Add-on N.O. or N.C. auxiliary contacts: see accessory fitting details for contactor relays	
Control voltage / Ambient temperature			
Mounting positions	1, 1±30°, 2, 3, 4, 5	at $\theta \leq 55\text{ }^{\circ}\text{C}$	0.85...1.1 x U_c
		at $\theta \leq 70\text{ }^{\circ}\text{C}$	U_c
	6	at $\theta \leq 55\text{ }^{\circ}\text{C}$	0.95...1.1 x U_c
		at $\theta \leq 70\text{ }^{\circ}\text{C}$	unauthorized
Mounting distances		The contactors can be assembled side by side	
Fixing			
On rail according to IEC 60715, EN 60715		35 x 7.5 mm or 35 x 15 mm	
By screws (not supplied)		2 x M4 screws placed diagonally	

Connecting characteristics

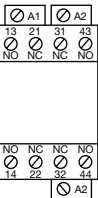
Contactor relay types		AC operated	NX
Main terminals		 Screw terminals with cable clamp	
Connection capacity (min. ... max.)			
Main conductors (poles + coil terminals)			
 Rigid	1 x	1...4 mm ²	
	2 x	1...4 mm ²	
 Flexible with ferrule	1 x	0.75...2.5 mm ²	
	2 x	0.75...2.5 mm ²	
 Bars or lugs	Pole terminals		L < 7.7 mm
			I < 3.7 mm
	Coil terminals		L < 8 mm
			I < 3.7 mm
Connection capacity acc. to UL / CSA	1 or 2 x	AWG 18...14	
Stripping length	10 mm		
Tightening torque	1 Nm / 9 lb.in		
Degree of protection			
acc. to IEC 60947-1 and IEC 60529			
All terminals		IP20 (only front side)	
Screw terminals		Delivered in open position, screws of unused terminals must be tightened	
All terminals		M3.5	
Screwdriver type		Flat Ø 5.5 / Pozidriv 2	

NX contactor relays

Terminal marking and positioning

NX contactor relays - AC operated

Standard devices without addition of auxiliary contacts



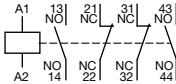
NX22E



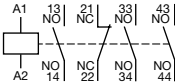
NX31E



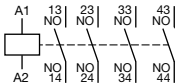
NX40E



NX22E

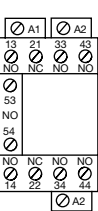


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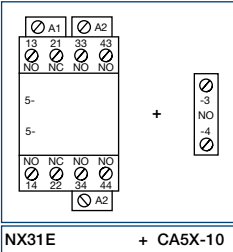


NX40E

Other possible contact combinations with auxiliary contacts added by the user



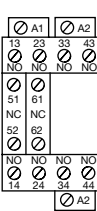
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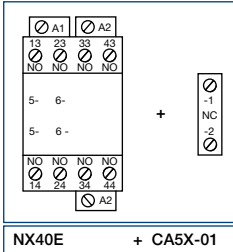
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CA5X-10



Combination 42E =



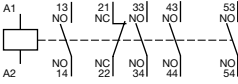
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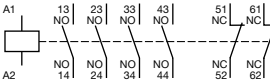
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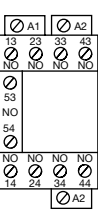
CA5X-01



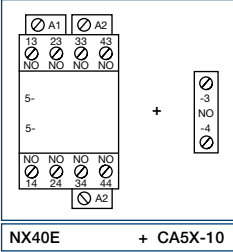
Combination 41E



Combination 42E



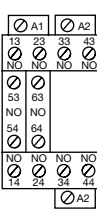
Combination 50E =



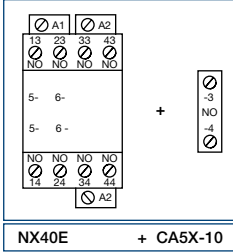
NX40E

+

CA5X-10



Combination 60E =



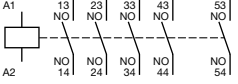
NX40E

+

CA5X-10

+

CA5X-10



Combination 50E



Combination 60E

Accessories for AX06 ... AX370 3-pole contactors and NX contactor relays

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Auxiliary contact blocks

3



CA5X-10



CA5X-4P



CAL5X-11



CAL18X-11

Description

The auxiliary contact blocks are used for the operation of auxiliary circuits and control circuits for standard industrial environments.

Types of auxiliary contact blocks for front mounting:

– CA5X 1 or 4-pole block, instantaneous with N.O., N.C. contacts.

Select the 4-pole auxiliary contact blocks CA5X-..E, CA5X-..M, CA5X-..U, CA5X-..N, according to the contactor type for compliance with the standard requirements (see "Terminal Marking and Positioning").

Types of auxiliary contact blocks for side mounting:

– CAL... 2-pole block instantaneous N.O. + N.C. contacts.

For clipping onto the right- and/or left-hand side of the contactors.

The CAL...-11B is a second block for mounting in addition to a first CAL...-11 block, right- and/or left-hand of the AX185 ... AX370 contactors.

The auxiliary contact blocks are equipped with screw type connecting terminals delivered open, protected against accidental direct contact and bear the corresponding function marking.

Ordering details (1)

For contactors	Auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce)
					kg
Front-mounted instantaneous auxiliary contact blocks					
AX06 ... AX150 and NX 4-pole	1 0	CA5X-10	1SBN019010R1010	10	0.014
	0 1	CA5X-01	1SBN019010R1001	10	0.014
AX50 ... AX150	2 2	CA5X-22E	1SBN019040R1022	2	0.060
	3 1	CA5X-31E	1SBN019040R1031	2	0.060
	4 0	CA5X-40E	1SBN019040R1040	2	0.060
	0 4	CA5X-04E	1SBN019040R1004	2	0.060
AX06 ... AX40-30-10	2 2	CA5X-22M	1SBN019040R1122	2	0.060
	3 1	CA5X-31M	1SBN019040R1131	2	0.060
	1 3	CA5X-13M	1SBN019040R1113	2	0.060
	0 4	CA5X-04M	1SBN019040R1104	2	0.060
AX06 ... AX40-30-01	2 2	CA5X-22U	1SBN019040R1322	2	0.060
	3 1	CA5X-31U	1SBN019040R1331	2	0.060
	4 0	CA5X-40U	1SBN019040R1340	2	0.060
	0 4	CA5X-04U	1SBN019040R1304	2	0.060
NX 4-pole	2 2	CA5X-22N	1SBN019040R1222	2	0.060
	3 1	CA5X-31N	1SBN019040R1231	2	0.060
	0 4	CA5X-04N	1SBN019040R1204	2	0.060
	4 0	CA5X-40N	1SBN019040R1240	2	0.060
	1 3	CA5X-13N	1SBN019040R1213	2	0.060
Side-mounted instantaneous auxiliary contact block, 2 pole					
AX06 ... AX80 and NX - 4 pole	1 1	CAL5X-11	1SBN019020R1011	2	0.050
AX95 ... AX205	1 1	CAL18X-11	1SBN019820R1011	2	0.050
AX185 ... AX205	1 1	CAL18X-11	1SBN019820R1011	2	0.050
	1 1	CAL18X-11B	1SBN019820R3311	2	0.050
AX260 ... AX370	1 1	CAL19-11	1SBN010820R1011	2	0.040
	1 1	CAL19-11B	1SBN010820R3311	2	0.040

(1) For each contactor or contactor relay, refer to "Accessories fitting details" table.

Auxiliary contact blocks

Technical data

Contact utilization characteristics according to IEC

Types	Front mounted 1-pole CA5X, 4-pole CA5X	Side mounted CAL5X-11	CAL18X-11, CAL18X-11B	CAL19-11, CAL19-11B
Standards	IEC 60947-5-1 and EN 60947-5-1			
Rated insulation voltage U_i acc. to IEC 60947-5-1	690 V			
Rated operational voltage U_e max.	24...690 V AC			
Conventional thermal current I_{th} - $\theta \leq 40^\circ\text{C}$	16 A			
le / Rated operational current AC-15 acc. to IEC 60947-5-1	24-127 V 50/60 Hz	6 A		
	220-240 V 50/60 Hz	4 A		
	380-440 V 50/60 Hz	3 A		
	500-690 V 50/60 Hz	2 A		
Making capacity	10 x le AC-15 acc. to IEC 60947-5-1			
Breaking capacity	10 x le AC-15 acc. to IEC 60947-5-1			
le / Rated operational current DC-13 acc. to IEC 60947-5-1	24 V DC	6 A / 144 W		3 A / 72 W
	48 V DC	2.8 A / 134 W		1.5 A / 72 W
	72 V DC	1 A / 72 W		1 A / 72 W
	110 V DC	0.55 A / 60 W		0.55 A / 60 W
	125 V DC	0.55 A / 69 W		0.55 A / 69 W
	220 V DC	0.3 A / 66 W		0.3 A / 69 W
	250 V DC	0.3 A / 75 W		0.3 A / 75 W
Short-circuit protection device gG type fuse	10 A			
Rated short-time withstand current I_{cw} $\theta = 40^\circ\text{C}$	for 1.0 s	100 A		
	for 0.1 s	140 A		
Minimum switching capacity				
AX06 ... AX80 contactors		12 V / 3 mA	–	–
with failure rate acc. to IEC 60947-5-4		$\leq 10^{-6}$	–	–
AX95 ... AX150 contactors		24 V / 50 mA	–	24 V / 50 mA (0.5 million of operating cycles)
with failure rate acc. to IEC 60947-5-4		–	–	$\leq 10^{-6}$
AX185 ... AX205 contactors		–	–	24 V / 50 mA (0.5 million of operating cycles)
with failure rate acc. to IEC 60947-5-4		–	–	$\leq 10^{-6}$
AX260 ... AX370 contactors		–	–	24 V / 50 mA
with failure rate acc. to IEC 60947-5-4		–	–	$\leq 10^{-6}$
Power dissipation per pole at 6 A		0.1 W	0.15 W	
Mechanical durability				
Number of operating cycles		10 millions (AX06 ... AX80) 3 millions (AX95 ... AX150)	10 millions	5 millions (AX95 ... AX205)
Max. switching frequency		3600 cycles/h		300 cycles/h
Max. electrical switching frequency	AC-15	1200 cycles/h		300 cycles/h
	DC-13	900 cycles/h		300 cycles/h

Contact utilization characteristics according to UL / CSA

Standards	UL 508, CSA C22.2 N°14
Max. operational voltage	600 V AC, 250 V DC
Pilot duty	A600, Q300
AC thermal taed current	10 A

Connecting characteristics

Connection capacity (min. ... max.)				
 Rigid solid	1 x	1...4 mm ²		
	2 x	1...4 mm ²		
 Flexible with ferrule	1 x	0.75...2.5 mm ²		
	2 x	0.75...2.5 mm ²		
 Lugs	L ≤	7.7 mm	8 mm	
	I >	3.7 mm	3.7 mm	
Tightening torque		1 Nm / 9 lb.in		
Connection capacity acc. to UL / CSA	1 or 2 x	AWG 18...14	–	
Stripping length		1-pole: 11 mm	10 mm	–
		4-pole: 10 mm		
Degree of protection	Terminals	IP20		
acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529				
Screw terminals		Delivered in open position, screws of unused terminals must be tightened		
All terminals		M3.5		
Screwdriver type		Flat Ø 5.5 / Pozidriv 2		

Auxiliary contact blocks for severe industrial environments



Description

The auxiliary contact blocks are used for the operation of auxiliary and control circuits for severe industrial environments.

Types of auxiliary contact blocks for front mounting:

- 1-pole block, instantaneous with N.O. contact or N.C. contact, designed in 2 protection versions:
- CE5-..D with built-in microswitch IP40, degree of protection (IP20 on terminals)
- CE5-..W with built-in microswitch IP67, degree of protection (IP20 on terminals).

The auxiliary contact blocks are equipped with screw type connecting terminals delivered open, protected against accidental direct contact and bear the corresponding function marking each side of the mechanical latch).

Ordering details (1)

For contactors	Auxiliary contacts	Type	Order code		Pkg qty	Weight (1 pce)
	 					kg
Front-mounting instantaneous auxiliary contact blocks, 1-pole						
AX06 ... AX80, NX	1 - - -	CE5-10D0.1	1SBN010015R1010		1	0.020
	- 1 - -	CE5-01D0.1	1SBN010015R1001		1	0.020
	1 - - -	CE5-10D2	1SBN010017R1010		1	0.020
	- 1 - -	CE5-01D2	1SBN010017R1001		1	0.020
	1 - - -	CE5-10W0.1	1SBN010016R1010		1	0.020
	- 1 - -	CE5-01W0.1	1SBN010016R1001		1	0.020
	1 - - -	CE5-10W2	1SBN010018R1010		1	0.020
	- 1 - -	CE5-01W2	1SBN010018R1001		1	0.020

(1) For each contactor type, refer to "Accessory fitting details" table.

Auxiliary contact blocks

Technical data

Contact utilization characteristics according to IEC

Types		Front-mounted 1-pole CE5-..0.1	1-pole CE5-..2
Standards		IEC 60947-5-1 and EN 60947-5-1	
Rated insulation voltage Ui acc. to IEC 60947-5-1		250 V	250 V
Rated operational voltage Ue max.		125 V	250 V
Conventional thermal current Ith - $\theta \leq 40^\circ\text{C}$		0.1 A	2 A
Ie / Rated operational current acc. to IEC 60947-5-1		AC-14	AC-15
		24-127 V 50/60 Hz	2 A
		220-240 V 50/60 Hz	2 A
Making capacity acc. to IEC 60947-5-1		6 x Ie AC-14	10 x Ie AC-15
Breaking capacity acc. to IEC 60947-5-1		6 x Ie AC-14	10 x Ie AC-15
Ie / Rated operational current DC-12 acc. to IEC 60947-5-1			
		24 V DC	0.1 A
		48 V DC	0.1 A
		72 V DC	0.1 A
		110 V DC	0.1 A
		125 V DC	0.2 A
		220 V DC	0.1 A
Short-circuit protection device		0.1 A (FF type fuses) (1)	10 A (FF type fuses) (1)
Minimum switching capacity			
AX06 ... AX80, NX contactors		3 V / 1 mA	17 V / 1 mA
With failure rate acc. to IEC 60947-5-4		–	$\leq 10^{-7}$
Mechanical durability	Number of operating cycles	5 millions for CE5-..D0.1 2.5 millions for CE5-..W0.1	5 millions for CE5-..D2 2.5 millions for CE5-..W2
	Max. switching frequency	3600 cycles/h	
Electrical durability	Number of operating cycles	2.5 millions for CE5-..D0.1 0.7 millions for CE5-..W0.1	1 million for CE5-..D2 0.3 millions for CE5-..W2
	Max. switching frequency	AC-14 1200 cycles/h	
		AC-15 1200 cycles/h	
		DC-12 900 cycles/h	

Contact utilization characteristics according to UL / CSA

Standards		UL 508, CSA C22.2 N°14	
Max. operational voltage		125 V AC / 110 V DC	250 V AC / 220 V DC
Pilot duty			
AC thermal rated current		0.1 A	2 A

Connecting characteristics

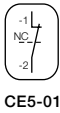
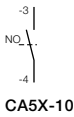
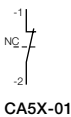
Connection capacity (min. ... max.)			
	Rigid solid	1 x	1...4 mm ²
		2 x	1...4 mm ²
	Flexible with ferrule	1 x	0.75...2.5 mm ²
		2 x	0.75...2.5 mm ²
	Lugs	L <	7.7 mm
		I >	3.7 mm
Connection capacity acc. to UL / CSA		1 or 2 x	AWG 18...14
Tightening torque			1 Nm
Degree of protection		Terminals	IP20
acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529		Microswitches	IP40 for CE5-..D0.1
			IP40 for CE5-..D2
			IP67 for CE5-..W0.1
			IP67 for CE5-..W2
Screw terminals		Delivered in open position, screws of unused terminals must be tightened	
All terminals		M3.5	
Screwdriver type		Flat Ø 5.5 / Pozidriv 2	

(1) or HRC fuses for very fast action (6.3 x 32 mm size).

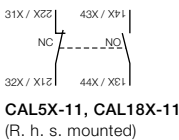
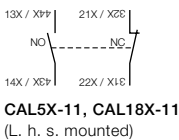
Add-on auxiliary contacts

Terminal marking and positioning

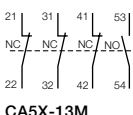
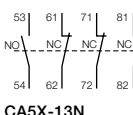
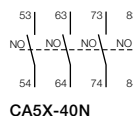
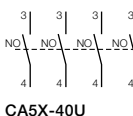
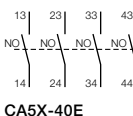
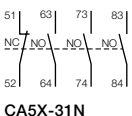
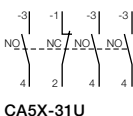
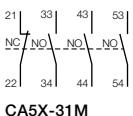
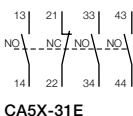
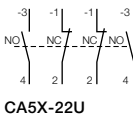
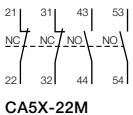
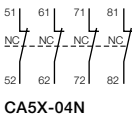
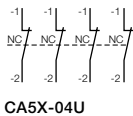
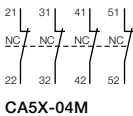
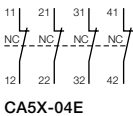
1-pole auxiliary contacts



2-pole auxiliary contacts



4-pole auxiliary contacts



Electronic timers



TEF5-OFF

Description

TEF5 frontal electronic timers are used for realizing timing function and are available in ON-delay and OFF-delay versions.

Compact solution in cabinet compared to separate timers

TEF5 electronic timers are front-mounted and locked on AX contactors or NX contactor relays. A mechanical indicator allows to show the state of the contactor.

TEF5 electronic timers are supplied by direct wiring to the coil terminals A1 - A2 of the contactor or contactor relay. A varistor is integrated on the timer to offer a built-in protection against surges in the contactor coil.

Available for a wide control voltage range 24...240 V AC / DC

TEF5-ON or TEF5-OFF allow time-delayed functions up to 100 s in 3 distinct time ranges, independently of the control system. The time delay ranges are selected by a switch and the time delay can be adjusted by means of a rotary switch. The timing function is activated by closing or opening the device on which the timer is mounted. The OFF-delay version operates without additional control supply.

Ordering details

For contactors, contactor relays	Time delay range selected by switch	Delay type	Rated control circuit voltage Uc V 50/60 Hz or DC	Auxiliary contacts  	Type	Order code	Weight Pkg (1 pce) kg
AX06 ... AX80 NX 4-pole	0.1...1 s 1...10 s 10...100 s	ON-delay	24...240	1 1	TEF5-ON	1SBN020312R1000	0.065
		OFF-delay	24...240	1 1	TEF5-OFF	1SBN020314R1000	0.065

Electronic timers

Technical data

Contact utilization characteristics according to IEC

Types		TEF5-ON	TEF5-OFF
Standards		IEC 60947-5-1 and EN 60947-5-1	
Rated insulation voltage U_i		400 V	
acc. to IEC 60947-5-1			
Rated impulse withstand voltage U_{imp}		4 kV	
Rated operational voltage U_e max.		240 V	
Rated frequency (without derating)		50 / 60 Hz	
Conventional thermal current I_{th} - $\theta \leq 40^\circ\text{C}$		5 A	
le / Rated operational current AC-15			
acc. to IEC 60947-5-1			
		24-127 V 50/60 Hz	3 A
		220-240 V 50/60 Hz	1.5 A
Making capacity		10 x le AC-15 acc. to IEC 60947-5-1	
Breaking capacity		10 x le AC-15 acc. to IEC 60947-5-1	
le / Rated operational current DC-13			
acc. to IEC 60947-5-1			
		24 V DC	1 A / 24 W
Short-circuit protection device gG type fuse		6 A	
Rated short-time withstand current I_{cw}		8 A	
$\theta = 40^\circ\text{C}$		8 A	
Minimum switching capacity		12 V / 3 mA	
with failure rate acc. to IEC 60947-5-4		10^{-7}	
Power dissipation per pole at 3 A		0.1 W	
Function diagram		ON-delay	OFF-delay
		Bistable relay inside. Before use, once apply U_c then switch it off in order to initialize position of the contacts.	
Control circuit voltage			
AC control voltage	Rated control circuit voltage U_c	24...240 V AC	
	Average consumption	1.5 mA RMS	1 mA RMS
DC control voltage	Rated control circuit voltage U_c	24...240 V DC	
	Average consumption	1.5 mA	1 mA
Rated frequency limits		50 / 60 Hz	
Supply voltage range		0.85...1.1 x U_c (at $\theta \leq 70^\circ\text{C}$)	
Overvoltage protection		Varistor included	
Time delay range (t) selected by switch		0.1...1 s ☐ 1...10 s ☐ 10...100 s ☐	
On-load reiteration accuracy under constant conditions		$\leq 1\%$	
Minimum ON period		0.1 s	1 s
Recovery time		0.15 s	0.1 s
Ambient air temperature	Operation	$-25^\circ\text{C} \dots +70^\circ\text{C}$	
	Storage	$-40^\circ\text{C} \dots +80^\circ\text{C}$	
Climatic withstand		Category B according to IEC 60947-1 Annex Q	
Maximum operating altitude		2000 m	
Mounting positions		Acc. to mounting positions permitted on contactors or contactor relays	
Shock withstand		1/2 sinusoidal shock for 11 ms: no change in contact position	
acc. to IEC 60068-2-27 and EN 60068-2-27		Same as contactor or contactor relay	
(Mounting position 1)			
Mechanical durability			
Number of operating cycles		5 millions operating cycles	
Max. switching frequency		3600 cycles/h	1800 cycles/h
Max. electrical switching frequency			
		AC-15	1200 cycles/h
		DC-13	900 cycles/h

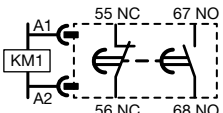
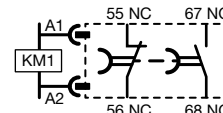
Electronic timers

Technical data

Contact utilization characteristics according to UL / CSA

Types	TEF5-ON	TEF5-OFF
Standards	UL 508, CSA C22.2 N°14	
Rated insulation voltage Ui	300 V	
acc. to UL / CSA	240 V	
Max. operational voltage	B300, R300	
Pilot duty	5 A	
AC thermal rated current	3600 VA	
AC maximum volt-ampere making	360 VA	
AC maximum volt-ampere breaking	1 A	
DC thermal rated current	28 VA	
DC maximum volt-ampere making-breaking		

Connecting characteristics

Connection capacity (min. ... max.)	
 Rigid solid	1 x 1...2.5 mm ² 2 x 1...2.5 mm ²
 Flexible with non insulated ferrule	1 x 0.75...2.5 mm ² 2 x 0.75...2.5 mm ²
 Flexible with insulated ferrule	1 x 0.75...2.5 mm ² 2 x 0.75...1.5 mm ²
 Lugs	L ≤ 8 mm I > 3.7 mm
Connection capacity acc. to UL / CSA	1 or 2 x AWG 18...14
Stripping length	10 mm
Tightening torque	1 N.m / 9 lb.in
Degree of protection	IP20
acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529	
Screw terminals	Delivered in open position, screws of unused terminals should be tightened
All terminals	M3.5
Screwdriver type	Flat Ø 5.5 / Pozidriv 2
Terminal Marking	 

Mechanical and electrical interlock units



1SBC590411F0301

VM300H

3

Mechanical interlock units

Description

The VM mechanical interlock units are designed for the interlocking of two AX contactors. When mounted between two contactors, the VM mechanical interlock unit prevents one of the contactors from closing as long as the other contactor is closed.

Ordering details

Left side contactor	Right side contactor	Mounting	Auxiliary contacts	Type	Order code		Pkg qty	Weight (1 pce)
								kg

Mechanical interlock units for two horizontal mounted contactors (1)

AX06 ... AX40	AX06 ... AX40	Horizontal	- -	VM5-1	1SBN030100R1000		1	0.066
AX95 ... AX205	AX185 ... AX205	Horizontal	- -	VM300H	1SFN034700R1000		1	0.150
AX260 ... AX370	AX260 ... AX370	Horizontal	- -	VM19	1SFN030300R1000		1	0.054
AX185 ... AX205	AX260 ... AX370	Horizontal	- -	VM205/260	1SFN035003R1000		1	0.075
AX260 ... AX370	AX185 ... AX205	Horizontal	- -	VM205/260	1SFN035003R1000		1	0.075
AX260 ... AX370	AF400 ... AF460	Horizontal	- -	VM370/400	1SFN035403R1000		1	0.239
AF400 ... AF460	AX260 ... AX370	Horizontal	- -	VM370/400	1SFN035403R1000		1	0.239

Mechanical interlock units for two vertical mounted contactors

Up contactor	Down contactor	Mounting						
AX95 ... AX150	AX150 ... AX205	Vertical	- -	VM300V	1SFN034701R1000		1	0.150



AX07021

VE5-1

Mechanical and electrical interlock sets

Description

The VM mechanical interlock units are designed for the interlocking of two AX contactors. When mounted between two contactors, the VM mechanical interlock unit prevents one of the contactors from closing as long as the other contactor is closed.

The VE units include 2 N.C. contacts for electrical interlocking function.

Ordering details

Left side contactor	Right side contactor	Mounting	Auxiliary contacts	Type	Order code		Pkg qty	Weight (1 pce)
								kg

Mechanical interlock units for two horizontal mounted contactors

AX06 ... AX40	AX06 ... AX40	Horizontal	- 2	VE5-1	1SBN030110R1000		1	0.076
AX32 ... AX80	AX50 ... AX80	Horizontal	- 2	VE5-2	1SBN030210R1000		1	0.146
AX50 ... AX80	AX32 ... AX80	Horizontal	- 2	VE5-2	1SBN030210R1000		1	0.146
AX50 ... AX80	AX95 ... AX150	Horizontal	- 2	VE5-2 (2)	1SBN030210R1000		1	0.146
AX95 ... AX150	AX50 ... AX80	Horizontal	- 2	VE5-2 (2)	1SBN030210R1000		1	0.146
AX95 ... AX150	AX95 ... AX150	Horizontal	- 2	VE5-2	1SBN030210R1000		1	0.146

(1) Mechanical durability: VM5-1 = 5 millions cycles, VM300H = 1 million cycles.

VM19 = 0,5 million cycles, VM205/260 = 1 million cycles, VM300V = 1 million cycles.

(2) The combination of AX50 ... AX80 contactors interlocked with AX95 ... AX150 contactors cannot be mounted on symmetrical rail (75 mm, IEC/EN 60715).

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Mechanical and electrical interlock units

Technical data

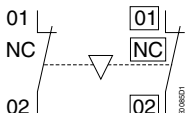
Contact utilization characteristics according to IEC

Types	VE5-1	VE5-2
Standards	IEC 60947-5-1 and EN 60947-5-1	
Rated insulation voltage U_i acc. to IEC 60947-5-1	690 V	
Rated operational voltage U_e max.	24...690 V	
Conventional thermal current I_{th} - $\theta \leq 40^\circ\text{C}$	16 A	
I_e / Rated operational current AC-15 acc. to IEC 60947-5-1	24-127 V 50/60 Hz 6 A 220-240 V 50/60 Hz 4 A 380-440 V 50/60 Hz 3 A 500-690 V 50/60 Hz 2 A	
Making capacity	10 x I_e AC-15 acc. to IEC 60947-5-1	
Breaking capacity	10 x I_e AC-15 acc. to IEC 60947-5-1	
I_e / Rated operational current DC-13 acc. to IEC 60947-5-1	24 V DC 6 A 48 V DC 2.8 A 72 V DC 1 A 125 V DC 0.55 A 250 V DC 0.3 A	
Short-circuit protection device - gG type fuse	10 A	
Rated short-time withstand current I_{cw} $\theta = 40^\circ\text{C}$	for 1.0 s 100 A for 0.1 s 140 A	
Power dissipation per pole at 6 A	0.15 W	
Mechanical durability	5 millions operating cycles	
Number of operating cycles	600 cycles/h	
Max. switching frequency	600 cycles/h	

Utilization characteristics according to UL / CSA

Standards	UL 508, CSA C22.2 N°14
Max. operational voltage	600 V

Connecting characteristics

Connection capacity (min. ... max.)		
 Rigid solid	1 x	1...4 mm ²
 Flexible with ferrule	2 x	1...4 mm ²
 Flexible with ferrule	1 x	0.75...2.5 mm ²
 Lugs	2 x	0.75...2.5 mm ²
	L <	8 mm
	L >	3.5 mm
Tightening torque	Recommended	1 Nm
	Max.	1.2 Nm
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529	IP20	
Screw terminals All terminals	Delivered in open position, screws of unused terminals must be tightened M3.5	
Screwdriver type	Flat Ø 5.5 / Pozidriv 2	
Terminal marking		

Technical note: when, during switching, the arc time is estimated to more than 40 ms, the closing signal of one of the two contactors must be delayed with respect to the opening signal of the other contactor in order to prevent a short-circuit.

Interface relays



3 RA5-1

Description

RA5-1 interface relay is designed to receive 24 V DC signals delivered by PLC's or other sources with a low output power and to restore them with sufficient power to operate the coils of the relevant AX50, AX65 and AX80 contactors.

RA5-1 interface relay is made up of a miniature electromechanical relay equipped with a N.O. contact and with a low consumption 24 V DC coil.

The interface relay coil is controlled by the PLC while the N.O. contact ensures switching of the power contactor.

Coil switching gives rise to overvoltages which have adverse effects on the electronic devices, insulators and, more generally, on component lifetime. The RA5-1 is equipped with surge suppressors:

- on the 24 V DC relay coil via a diode,
- on the power contactor coil via a varistor.

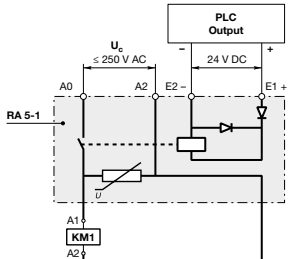
Furthermore, the RA5-1 is protected against relay pole reversal by a diode inserted between the E1 and E2 input terminals.

Ordering details

For contactors	Coil voltages	Rated control circuit voltage Uc	Type	Order code	Pkg qty	Weight (1 pce)
	V 50/60 Hz	V DC				kg
AX50 ... AX80	24...250	24	RA5-1	1SBN060300R1000	1	0.050
			RA5-1	1SBN060300T1000	10	0.050

Interface relays

Technical data

Type	RA5-1	
Utilization characteristics according to IEC		
Standards	IEC 60255-5	
Rated insulation voltage U_i acc. to IEC 60947-4-1	250 V AC	
Ambient air temperature		
In free air operation	at $U_c = 24$ V DC (between E1 and E2)	-25...+70 °C
	from 0.85 to 1.1 x U_c	-25...+55 °C
Storage		-40...+70 °C
Climatic withstand	Complies with that of associated contactors	
Maximum operating altitude	3000 m	
Mounting positions	No limitation	
Fixing	Using the contactor A1 and A2 terminal connecting parts	
Connecting characteristics		
Connection capacity (min. ... max.)		
 Rigid solid	1 x	1...4 mm ²
	2 x	1...4 mm ²
 Flexible with ferrule	1 x	0.75...2.5 mm ²
	2 x	0.75...2.5 mm ²
 Lugs	L <	8 mm
	L >	3.5 mm
Tightening torque		
Recommended	1 Nm	
Max.	1.2 Nm	
Degree of protection	Protection against direct contact in acc. with EN 50274	
acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529	RA5-1 wired and mounted on the associated contactor	
Screw terminals	Delivered in open position, screws of unused terminals must be tightened	
All terminals	M3.5	
Screwdriver type	Flat Ø 5.5 / Pozidriv 2	
Working data		
Surge suppression		
For contactor coil	Varistor	
For interface relay coil	Diode	
Protection against polarity reversal between terminals E1 and E2	Diode	
Interface relay operating time	Closing and drop-out ≤ 10 ms	
Total operating time, interface relay + contactor		
Between energization and:	N.O. contact closing	20...37 ms
	N.C. contact opening	17...32 ms
Between de-energization and:	N.O. contact opening	17...25 ms
	N.C. contact closing	20...28 ms
Electrical input data		
Control voltage (E1 and E2 terminals) U_c		
Rated value	24 V DC	
Max. range at ambient temperature 20 °C	19...30 V DC	
Max. consumption for $U_c = 24$ V DC, $\theta = 20$ °C	0.3 W	
"0" status (relay open)	for U_c	≤ 2.4 V DC
	for I_c	< 1 mA
"1" status (relay closed)	for U_c	≥ 19 V DC
Max. short supply interruption immunity time	2 ms	
Electrical output data		
Switching voltage (A0 and A2 terminals)	≤ 250 V AC	
Electrical durability		
Number of operating cycles	2 millions	
Connection		
	The "E1+" and "E2-" input terminals must be connected, according to their polarity, to the PLC output. The RA5-1 is equipped with two terminal pads for connection to the A1 and the A2 terminals of the contactor coil. This coil is supplied between the A0 and the A2 terminals of the RA 5-1. Mounting: terminals pads clamped inside the contactor coil terminals.	

3

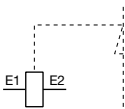
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Mechanical latching units



WB75-A

3



Terminal marking

Description

For converting standard contactors into latched contactors.
The WB75-A block contains a mechanical latching device with electromagnetic impulse unlatching (AC or DC) or manual unlatching.
Captive screw type connecting terminals, built-in cable clamps, M3.5 (+, -) pozidriv 2 screw with screwdriver guidance; delivered untightened and protected against accidental direct contact.

Operation

After closing, the contactor continues to be held in the closed position by the latching mechanism without supply voltage at the contactor coil terminals.
Contactor opening can be controlled:
– electrically by an impulse (AC or DC) on the WB75-A block coil.
 (the coil is not designed to be permanently energized)
– manually by pressing the pushbutton on the front face of the WB75-A block.

Mounting

The WB75-A block is clipped onto the front face of the 1-stack contactor where it takes up two slots. The two other slots may accept CA5X single pole auxiliary contacts (1 block on each side of the mechanical latch).

Ordering details

For contactors	Rated control circuit voltage Uc		Type	Order code	Pkg qty	Weight (1 pce) kg
	V 50 Hz or DC	V 60 Hz				
AX06 ... AX80	24	24...28	WB75-A	FPTN372726R1001	1	0.120
	42	42...48	WB75-A	FPTN372726R1002	1	0.120
	48	48...55	WB75-A	FPTN372726R1003	1	0.120
	110	110...127	WB75-A	FPTN372726R1004	1	0.120
	220...230	220...255	WB75-A	FPTN372726R1006	1	0.120
	230...240	230...277	WB75-A	FPTN372726R1005	1	0.120
	380...415	380...440	WB75-A	FPTN372726R1007	1	0.120
	415...440	440...480	WB75-A	FPTN372726R1008	1	0.120

Mechanical latching units

Technical data

Type	WB75-A
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Utilization characteristics according to IEC

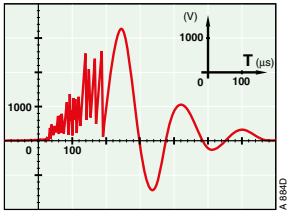
Rated insulation voltage U_i acc. to IEC 60947-1	690 V
Max. electrical impulse time	
On AC coil (with load factor 5 %)	20 s
On DC coil (with load factor 3 %)	8 s
Min. electrical impulse time	
For latching (energizing of the contactor coil)	AC 50 ms
For pull-out (energizing of the WB block coil)	AC 30 ms
Coil operating limits	AC or DC supply 0.85...1.1 x U_c
AC control voltage 50/60 Hz	
Rated control circuit voltage U_c	24...480 V AC
Coil consumption	Average pull-in value 90 VA
	Average holding value 60 VA
DC control voltage	
Rated control circuit voltage U_c	24...440 V DC
Coil consumption	Average pull-in value 110 W
	Average holding value 110 W
Operating time	
On contactor closing (latching)	
Between coil energization and:	
	N.O. contact closing No difference with the operation of a contactor without mechanical latching unit
	N.C. contact opening No difference with the operation of a contactor without mechanical latching unit
On contactor opening (unlatching)	
Between WB coil energization and:	
	N.O. contact opening 5...25 ms
	N.C. contact closing 7...28 ms
Mechanical durability	
	Number of operating cycles 1 million operating cycles
Max. switching frequency	3600 cycles/h with on-load factor of 8 %

Connecting characteristics

Connection capacity (min. ... max.)	
 Rigid solid	1 x 1...4 mm ²
 Flexible with ferrule	2 x 1...4 mm ²
 Flexible with ferrule	1 x 0.75...2.5 mm ²
 Flexible with ferrule	2 x 0.75...2.5 mm ²
 Lugs	L < 8 mm
	L > 3.5 mm
Tightening torque	Recommended 1 Nm
	Max. 1.2 Nm
Screw terminals	Delivered in open position, screws of unused terminals must be tightened
All terminals	M3.5
Screwdriver type	Flat Ø 5.5 / Pozidriv 2

Surge suppressors for contactor coils

3



Description

The operation of inductive circuits causes overvoltages, in particular on opening of the contactor coil. The electromagnetic energy stored in the coil during contactor closing is restored on opening in the form of surges, the slope and amplitude of which may rise to several kilovolts. A number of drawbacks are observed ranging from interference on the electronic devices to breakdown of insulators and even destruction of certain sensitive components. The graph opposite reproduces the oscillogram showing voltage discharges at the terminals of a 42 V / 50 Hz coil without peak clipping. The coil was switched by 8 series-connected poles of a contactor relay. Following a burst of discharges with a very steep slope a damped oscillation emerges with a peak value of 3500 V.

Overvoltage Factor

The overvoltage factor k is defined as the ratio of the maximum overvoltage peak value $\hat{U}_s$ to the peak value $\hat{U}_c$ of the coil rated control voltage U_c :

$$k = \frac{\hat{U}_s \text{ max.}}{\hat{U}_c} \quad \text{or in AC:} \quad k = \frac{\hat{U}_s \text{ max.}}{U_{c\sqrt{2}}}$$

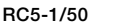
For example the following is obtained for the above graph: $k = \frac{3500}{42 \sqrt{2}} \approx 60$

To reduce the harmful effects of these overvoltages, ABB has developed a range of surge suppressors designed to reduce the k factor defined above and to limit or even completely eliminate the high pre-damping voltage frequencies.

Each case is different, but the technical data tolerances and the generous sizing of parts have enabled us to reduce the number of variants.

We have chosen the following solutions: varistors and RC blocks.

Note: A varistor is a resistor whose value decreases to a very large extent when a certain voltage is applied at its terminals.



Ordering details

For contactors	Rated control circuit voltage U_c V AC	Type	Order code	Pkg qty	Weight (1 pce) kg
AX06 ... AX150	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
AX06 ... AX40	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
AX50 ... AX150	24...50	RC5-2/50	1SBN050200R1000	2	0.015
	50...133	RC5-2/133	1SBN050200R1001	2	0.015
	110...250	RC5-2/250	1SBN050200R1002	2	0.015
	250...440	RC5-2/440	1SBN050200R1003	2	0.015
AX185 ... AX205	250...440	RC5-3/440	1SFN050300R1003	2	0.028

Surge suppressors for contactor coils

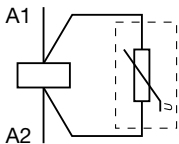
Technical data

Varistor	RV5/50	RV5/133	RV5/250	RV5/440
Rated control circuit voltage U_c	24...50 V AC	50...133 V AC	110...250 V AC	250...440 V AC
Residual overvoltage (clipping voltage)	132 V AC	270 V AC	480 V AC	825 V AC
Opening time growth factor	1.1...1.5			
Operating temperature	-20...+70 °C			
Connection to the coil terminals (parallel mounting)	Clip-on for both fixing and connection.			
Fixing	Clipped onto the top part of the contactor base without change in contactor overall dimensions.			
Advantages	High energy absorption: good damping - Unpolarized system.			
Drawback	Clipping as from Uvdr (1), thus voltage front up to this point.			

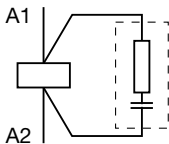
(1) Uvdr = Varistor operating voltage (voltage dependent resistor), tolerance ±10 %.

RC type	RC5-1/50	RC5-1/133	RC5-1/250	RC5-1/440
	RC5-2/50	RC5-2/133	RC5-2/250	RC5-2/440
	–	–	–	RC5-3/440
Rated control circuit voltage U_c	24...50 V AC	50...133 V AC	110...250 V AC	250...440 V AC
Residual overvoltage (clipping voltage)	2 to 3 x U_c max.			
Opening time growth factor	1.2...1.3			
Operating temperature	-20...+70 °C			
Connection to the coil terminals (parallel mounting)	Clip-on for both fixing and connection.			
Fixing	Clipped onto the top part of the contactor base without change in contactor overall dimensions.			
Advantages	Very fast clipping - Attenuation of steep fronts and thus of high frequencies. No operating delays.			

Wiring diagrams

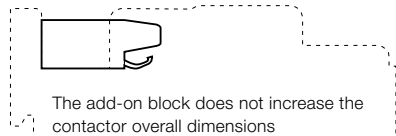


Varistor



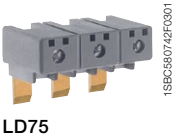
RC type

Dimensions



RV5, RC5

Additional terminal blocks



Description

The LD terminal block is designed to increase the connecting capacity of the contactor on which it is fitted and for preparation of the wiring before final connection on the contactor.

The LD blocks are 3-pole terminal blocks with tunnel terminals. The available range can be used on AX50 to AX150 contactors.

The LD75 and LD110 terminal blocks are fixed in the 3 independent slots located above the built-in connectors.

Ordering details

For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
AX50 ... AX80	LD75	1SBN073508R1000	1	0.115
AX95 ... AX150	LD110 (1)	1SFN074308R1000	1	0.150

(1) up to 160 A AC-1.

Technical data

Types	LD75	LD110
Rated insulation voltage U_i acc. to IEC 60947-4-1 acc. to UL / CSA		
Main terminals	 Screw terminals with single connector 10 x 11 mm	 Screw terminals with single connector 12 x 12 mm
Connection capacity (min. ... max.)		
 Rigid Solid ($\leq 4 \text{ mm}^2$)	1 x 6...50 mm ²	10...70 mm ²
 Stranded ($\geq 6 \text{ mm}^2$)	2 x 6...25 mm ²	10...35 mm ²
 Flexible with ferrule	1 x 6...35 mm ²	10...50 mm ²
 Bars	2 x 6...16 mm ²	10...25 mm ²
Tightening torque	10 mm 4 Nm	12 mm 6 Nm
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529		
Screw terminals	M6	M8
Screwdriver type	Pozidriv 2	Hexagon socket (s = 4 mm)

Note: The utilization of LD additional terminal blocks keeps the possibility to connect the following cables directly in the contactor main terminals but the BED and BEM connecting sets can no longer be used.

	LD75	LD110
Possible cross section of rigid cable in the contactor terminals	50 mm ²	95 mm ²

Function markers

Terminals for control lead connections



BA5-50

Function markers AX06 ... AX205

Description

Set of 50 function markers designed to be clipped onto the front face of devices. Details can be added to these markers using a ball point pen, indelible felt-tip pen or pentel white.
Self-adhesive labels (not supplied) can also be added to them.
Marker dimensions: 7 x 19 mm (0.276" x 0.748").

Ordering details

For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
AX06 ... AX205 and accessories	BA5-50	1SBN110000R1000	1	0.017



BA4

Function markers AX260 ... AX370

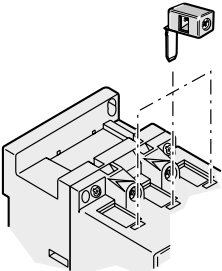
Description

Box of 16 blank cards (16 markers by card) printable on HTP500 thermal transfer printer and AMS 500 marking table to identify your contactors, overload relays or manual motor starters.
Marker dimensions: 7 x 20 mm (.276" x .787").

AX260 ... AX370 contactors, EF electronic overload relays and MS116, MS132, M165 manual motor starters	BA4	1SNA235156R2700	16	0.011
AMS 500 support plate for 8 BA4	SPRC 1	1SNA360010R1500	1	0.220
HTP500 support plate	HTP500-BA4	1SNA235712R2400	1	0.290



LK75-F



LK positioning

Terminals for control lead connections

Description

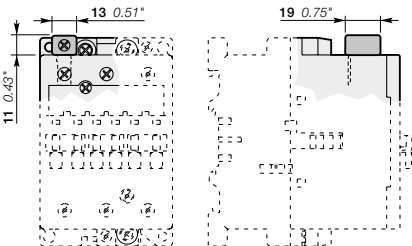
Terminals designed to connect the control conductors to the main poles of the AX50 ... AX80 contactors. Accessories clipped into the slots placed above each power terminal connector.
The LK75 are fitted with a pin designed to hold them in place until the connector has been fully clamped with its power cable.

- Degree of protection IP20
- Connecting terminal delivered in open position: cable clamp and M3.5 (+, -) pozidriv 2 screw.
- Cable cross-sectional area:
 - 1 or 2 rigid conductors1...4 mm²
 - 1 or 2 flexible conductors with cable end0.75...2.5 mm²
- Tightening torque for the LK screw:
 - recommended1.00 Nm
 - maxi1.20 Nm

Ordering details

For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
AX50 ... AX80	LK75-F	1SBN073552R1002	2	0.006

Main dimensions mm, inches

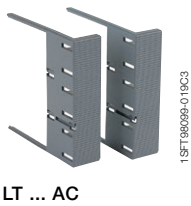


LK75-F

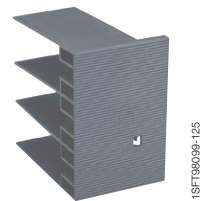
Terminal shrouds

Terminal enlargements and extension

3



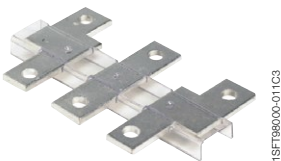
LT ... AC



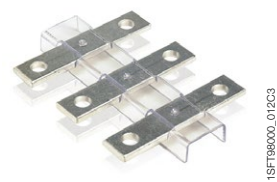
LT ... AL



LT ... AY



LW



LX

Terminal shrouds

Description

Main terminal protection for AX185 ... AF370 contactors.
The auxiliary contact blocks and coils are designed to provide an IP 20 degree of protection.
The main terminals, equipped with compression lugs or cable clamps, can be protected against accidental direct contact after wiring (EN 50274) by the addition of terminal shrouds (see table below).

Ordering details

For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
AX185 ... AX205 with connectors	LT185-AC	1SFN124701R1000	2	0.050
AX185 ... AX205 with lugs	LT185-AL	1SFN124703R1000	2	0.220
AX185 ... AX205 with shorting bar or between contactor and TOL/EOL in DOL starters	LT185-AY	1SFN124704R1000	2	0.050
AX260 ... AX370, with cable clamps	LT370-30C	1SFN125401R1000	2	0.035
AX260 ... AX370, with compression lugs	LT370-30L	1SFN125403R1000	2	0.280
AX260 ... AX370, with shorting bar or between contactor and TOL/EOL in DOL starters	LT370-30Y	1SFN125404R1000	1	0.075

Terminal enlargements

Description

Enlargement pieces designed to increase the width of the contactor terminal pads in order to allow larger connections to be mounted.
Sets containing 3 tin plated copper bars fixed by an isolating spacer.

Ordering details

For contactors	Dimension hole Ø mm	Bar mm	Type	Order code	Pkg qty	Weight (1 pce) kg
AX185 ... AX205	10.5	20 x 5	LW185	1SFN074707R1000	1	0.250
AX260 ... AX370	10.5	20 x 5	LW370	1SFN075407R1000	1	0.340

Terminal extension

Description

Extension pieces designed to extend the main terminals of contactors for combined mounting of contactors and connection sets.
Sets containing 3 tin plated copper bars fixed by an isolating spacer.

Ordering details

For contactors	Dimension hole Ø mm	Bar mm	Type	Order code	Pkg qty	Weight (1 pce) kg
AX185 ... AX205	8.5	17.5 x 5	LX185	1SFN074710R1000	1	0.250
AX260 ... AX370	10.5	20 x 5	LX370	1SFN075410R1000	1	0.234

Terminal connecting strips and shorting bars



LP185

1SFT96000-01003



LY185

1SFC101088V0001

Description

Parallel and series connection of 3-pole contactors:

- To obtain a star point (3 parallel-connected poles): LY allows 3 phases to be short-circuited.
- To connect poles in parallel and thus increase the AC load passing through the flow path made up of the parallel-connected poles: LP (2 poles); LY (3 poles).
- For the maximum permissible current values with parallel-connected poles see "Parallel connection of main poles".

The relevant cable cross-sectional area may limit the maximum permissible current. Consult information in table below.

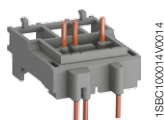
- To connect poles in series and thus increase the DC load controlled by the poles: LP.

Types	for connection of "n" poles	with terminal	insulated
LP	n = 2	no	yes
LY	n = 3	no	yes

Ordering details

For contactors	max. nominal continuous current with "n" poles		Type	Order code	Pkg qty	Weight (1 pce)
	A	mm ²				
AX06	28	6	LP16	FPEP407000R0001	10	0.002
AX09	30	6				
AX12	32	6				
AX18	34	6				
NX	-	6	LP185	1SFN074712R1000	2	0.300
AX185, AX205	300	-				
AX260, AX300, AX370	475	-				
AX06	30	6	LY16	FPEP407002R0001	10	0.005
AX09	33	6				
AX12	36	6				
AX18	39	6				
AX185, AX205	400	-	LY185	1SFN074703R1000	1	0.200
AX260, AX300, AX370	670	-				
			LY300	1SFN075103R1000	1	0.300

Connection accessories for starting solutions



BEA

1SBC100014V0014

3



BEA 300

1SFT9001-005C3

Connection links between contactors and manual motor starters

Description

The BEA connecting links are used to connect a contactor to associated manual motor starters. These are then used together as DOL or reversing starters in type 1 or type 2 coordination, complying with IEC 60947-4-1 and EN 60947-4-1.

The BEA insulated 3-pole connecting link (touch safe) ensures the electrical linking between the contactor and the corresponding manual motor starter.

Ordering details

For contactors	Manual motor starter	Type	Order code	Pkg qty	Weight (1 pce) kg
AX06 ... AX18	MS116-0.16 ... MS116-16 MS132-0.16 ... MS132-10	BEA16/116	1SBN081406R1000	10	0.020
AX25	MS116-0.16 ... MS116-16 / MS132-0.16 ... MS132-10	BEA25/116	1SBN089306T1000	10	0.020
AX25	MS116-20 ... MS116-32 / MS132-12 ... MS132-32	BEA25/132	1SBN089306T1001	10	0.020
AX50 ... AX80	MS495	BEA75/495	1SBN084106R1000	1	0.120
AX95 ... AX150	MS495	BEA110/495	1SBN084506R1000	1	0.124

Connection bars between contactors and MCCB

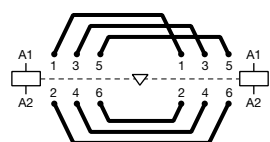
Description

Connection between contactors/starters and moulded case circuit breakers.

These connection sets are solid copper bars.

Ordering details

For contactors	MCCB	Type	Order code	Pkg qty	Weight (1 pce) kg
AX185, AX205	T3	BEA185/T3	1SFN084706R1003	1	0.150
AX260, AX300, AX370	T5	BEA370/T5	1SFN085406R1000	1	0.350



BEM ... connections

Connection sets for reversing contactors

Description

Connections between the main poles of two 3-pole contactors mounted side by side as reversing contactors with mechanical or electrical interlock.

The sets are made up of three upstream connections and three downstream connections.

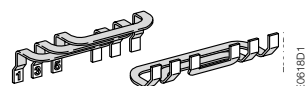
- BER16V ... BER40V: Insulated, stranded, rigid copper wires
- BEM75-30 ... BEM185-30 and BER370-4: Insulated, solid copper bars

On the AX contactors, the power supply by bars or cables equipped with lugs is directly connected to the terminal pads of the main poles. For flange connectors, LX terminal extension pieces should be used.

Ordering details

For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
AX06 ... AX18	BER16V	1SBN081411R1000	1	0.045
AX32, AX40	BER40V	1SBN082411R1000	1	0.085
AX50 ... AX80	BEM75-30	1SBN083501R1000	1	0.243
AX95 ... AX150	BEM110-30 (1)	1SFN084301R1000	1	0.450
AX185, AX205	BEM185-30	1SFN084701R1000	1	0.900
AX260 ... AX370	BER370-4	1SFN085411R1000	1	2.140

(1) up to 160 A AC-1

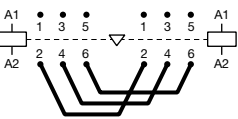


BEM 75-30

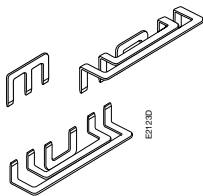
E061BD1

Phase to phase connections

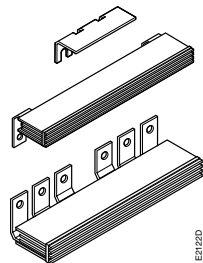
Connection sets for star-delta starters



BEP, BES



BED 110



BED 185

Phase to phase connections

Description

Connections between the main poles of two 3-pole contactors horizontal mounted.
This set is made up of three downstream or upstream connections.

Ordering details

For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
AX50 ... AX80	BES75-30	1SBN083504R1000	1	0.130
AX95 ... AX150	BES110 (1)	1SFN084304R1000	1	0.250
AX185, AX205	BES185	1SFN084704R1000	1	0.500
AX260 ... AX370	BEP370-30	1SFN085414R1000	1	0.926

(1) up to 160 A AC-1.

Connections sets for star-delta starters

Description

Connections between the main poles of a star-delta starter.

These sets are made up of:

- Three line contactor / delta contactor connections, upstream side
- Three connections for star and delta contactors, downstream side
- The necessary elements to create the star point upstream of the star contactor.
- Insulated, solid copper bars.

BED are designed for both star and delta contactors with or without mechanical interlock unit.

Ordering details

For line and delta contactors	For star contactors	Interlock unit between delta and star contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
AX150	AX95	VE5-2	BED110 (1)	1SFN084503R1000	1	0.500
AX185	AX115	VM300H	BED145A	1SFN084703R1000	1	1.300
AX205	AX150	VM300H	BED185	1SFN084903R1000	1	1.100
AX370	AX260	VM19	BEY370-4	1SFN085813R1000	1	2.020

(1) up to 160 A AC-1.

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 AX40-30-10 and coil 80 V 50/60 Hz, the order code is 1SBL321074R**80**10.

AX contactors

3

Type

AX 40 - 30 - 10 - 80

AX

40

-

30

-

10

-

80

Auxiliary contacts

N.O. N.C.

N.O. N.C.

Main contacts

AC-3 current rating

Contactor type

AX AC operated

Order code

1SBL321074R 80 10

AC coil code

50 Hz 60 Hz

81 24 V 24 V

82 42 V 42 V

83 48 V 48 V

84 110 V 110...120 V

36 190 V 220 V

80 220...230 V 230...240 V

88 230...240 V 240...260 V

85 380...400 V 400...415 V

86 400...415 V 415...440 V

51 415 V 480 V

Codes in bold for dual frequency coils.

NX contactor relays

Type

NX 40 E - 80

NX

40

E

-

80

N.O. N.C.

Number contacts

Contactor type

NX AC operated

Order code

1SBH901074R 80 40

AC coil code

50 Hz 60 Hz

81 24 V 24 V

82 42 V 42 V

83 48 V 48 V

84 110 V 110...120 V

36 190 V 220 V

80 220...230 V 230...240 V

88 230...240 V 240...260 V

85 380...400 V 400...415 V

86 400...415 V 415...440 V

51 415 V 480 V

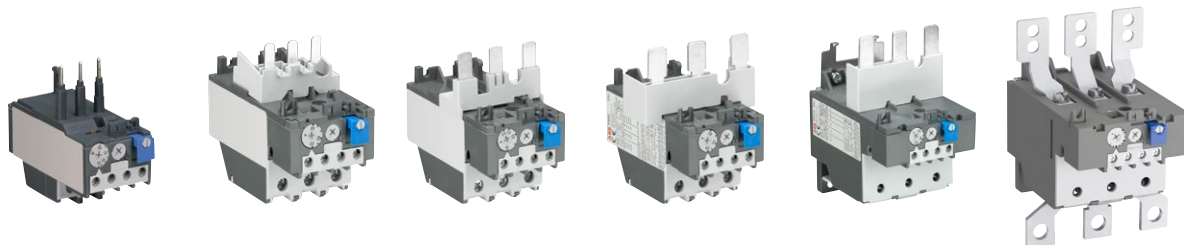
Codes in bold for dual frequency coils.



Overview	130
Thermal overload relays	
TA25DU-M / TA42DU-M / TA75DU-M (0.10 ... 80 A)	
Ordering details	131
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E140DU (50 ... 140 A)	
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Ordering details	147
Technical data	148
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Overload relays

Thermal overload relay



Type	TA25DU-M	TA42DU-M	TA75DU-M	TA80DU	TA110DU	TA200DU
Current range	0.10 ... 32 A	18 ... 42 A	18 ... 80 A	29 ... 80 A	66 ... 110 A	66 ... 200 A
Trip class	10A	10A	10A	10A	10A	10A
Single mounting kit	DB25	DB80	DB80	DB80	DB200	DB200
For contactors	AX09 ... AX40	AX32 ... AX40	AX50 ... AX80	AX95 ... AX150	AX95 ... AX150	AX185 ... AX205

Electronic overload relay



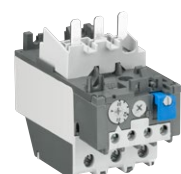
Type	E140DU	EF205	EF370
Current range	50 ... 140 A	63 ... 210 A	115 ... 380 A
Trip class	10E, 20E, 30E selectable		
Single mounting kit	DB140E	-	-
For contactors	AX95 ... AX150	AX185 ... AX205	AX260 ... AX370

Thermal overload relays TA25DU-M / TA42DU-M / TA75DU-M 0.10 to 80 A



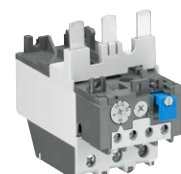
TA25DU-M

2CDC231019F0013



TA42DU-M

2CDC231020F0013



TA75DU-M

2CDC231022F0013

Description

The TA25DU-M / TA42DU-M and TA75DU-M 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
- Two electrically isolated auxiliary contacts – 1 N.O. + 1 N.C.
- TEST and STOP function – Trip indication on the front
- Temperature compensation
- Suitable for three- and single-phase applications

Ordering details

Setting range	Short-circuit protective device	Trip class	Type	Order code	Weight (1 pce)
A					kg
TA25DU-M					
0.10 ... 0.16	0.50 A, Fuse type F	10A	TA25DU-0.16M	1SAZ211201R2005	0.150
0.16 ... 0.25	0.63 A, Fuse type F	10A	TA25DU-0.25M	1SAZ211201R2009	0.150
0.25 ... 0.40	1.25 A, Fuse type F	10A	TA25DU-0.4M	1SAZ211201R2013	0.150
0.40 ... 0.63	2 A, Fuse type gG / -	10A	TA25DU-0.63M	1SAZ211201R2017	0.150
0.63 ... 1.00	4 A, Fuse type gG / 2 A aM	10A	TA25DU-1.0M	1SAZ211201R2021	0.150
1.00 ... 1.40	6 A, Fuse type gG / 2 A aM	10A	TA25DU-1.4M	1SAZ211201R2023	0.150
1.30 ... 1.80	6 A, Fuse type gG / 4 A aM	10A	TA25DU-1.8M	1SAZ211201R2025	0.150
1.70 ... 2.40	6 A, Fuse type gG / 4 A aM	10A	TA25DU-2.4M	1SAZ211201R2028	0.150
2.20 ... 3.10	10 A, Fuse type gG / 6 A aM	10A	TA25DU-3.1M	1SAZ211201R2031	0.150
2.80 ... 4.00	10 A, Fuse type gG / 6 A aM	10A	TA25DU-4.0M	1SAZ211201R2033	0.150
3.50 ... 5.00	16 A, Fuse type gG / 10 A aM	10A	TA25DU-5.0M	1SAZ211201R2035	0.150
4.50 ... 6.50	20 A, Fuse type gG / 16 A aM	10A	TA25DU-6.5M	1SAZ211201R2038	0.150
6.00 ... 8.50	20 A, Fuse type gG / 20 A aM	10A	TA25DU-8.5M	1SAZ211201R2040	0.150
7.50 ... 11.00	35 A, Fuse type gG / 25 A aM	10A	TA25DU-11M	1SAZ211201R2043	0.150
10.00 ... 14.00	35 A, Fuse type gG / 25 A aM	10A	TA25DU-14M	1SAZ211201R2045	0.150
13.00 ... 19.00	50 A, Fuse type gG / 35 A aM	10A	TA25DU-19M	1SAZ211201R2047	0.170
18.00 ... 25.00	63 A, Fuse type gG / 50 A aM	10A	TA25DU-25M	1SAZ211201R2051	0.170
24.00 ... 32.00	80 A, Fuse type gG / 63 A aM	10A	TA25DU-32M	1SAZ211201R2053	0.200
TA42DU-M					
18 ... 25	63 A, Fuse type gG / 50 A aM	10A	TA42DU-25M	1SAZ311201R2001	0.335
22 ... 32	80 A, Fuse type gG / 63 A aM	10A	TA42DU-32M	1SAZ311201R2002	0.335
29 ... 42	100 A, Fuse type gG / 80 A aM	10A	TA42DU-42M	1SAZ311201R2003	0.335
TA75DU-M					
18 ... 25	63 A, Fuse type gG / 50 A aM	10A	TA75DU-25M	1SAZ321201R2001	0.335
22 ... 32	80 A, Fuse type gG / 63 A aM	10A	TA75DU-32M	1SAZ321201R2002	0.335
29 ... 42	100 A, Fuse type gG / 80 A aM	10A	TA75DU-42M	1SAZ321201R2003	0.335
36 ... 52	125 A, Fuse type gG / 100 A aM	10A	TA75DU-52M	1SAZ321201R2004	0.335
45 ... 63	160 A, Fuse type gG / 125 A aM	10A	TA75DU-63M	1SAZ321201R2005	0.335
60 ... 80	200 A, Fuse type gG / 160 A aM	10A	TA75DU-80M	1SAZ321201R2006	0.370

Thermal overload relays TA25DU-M / TA42DU-M / TA75DU-M

Technical data

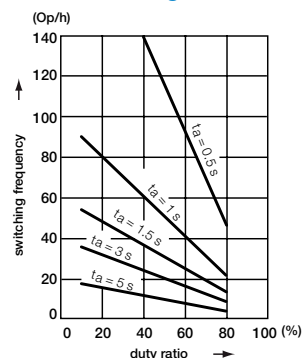
Main circuit – Utilization characteristics according to IEC/EN

Type	TA25DU-M	TA42DU-M	TA75DU-M
Standards	IEC/EN 60947-4-1, IEC/EN 60947-5-1, IEC/EN 60947-1		
Rated operational voltage U_e	690 V AC		
Rated frequency	DC, 50/60 Hz		
Frequency range	0 ... 400 Hz		
Trip class	10A		
Number of poles	3		
Duty time	100 %		
Operating frequency without early tripping	Up to 15 operations/h, see "Technical diagram – Intermittent periodic duty"		
Rated impulse withstand voltage U_{imp}	6 kV		
Rated insulation voltage U_i	690 V AC		

Auxiliary circuit according to IEC/EN

Type	TA25DU-M	TA42DU-M	TA75DU-M
Rated operational voltage U_e	500 V AC, 440 V DC		
Conventional free air thermal current I_{th}	N.C., 95-96 N.O., 97-98	10 A 6 A	
Rated frequency	DC, 50/60 Hz		
Number of poles	1 N.O. + 1 N.C.		
I_e / Rated operational current AC-15 acc. to IEC/EN 60947-5-1 for utilization category			
110-120 V	N.C., 95-96 N.O., 97-98	3.00 A 1.50 A	
220-230-240 V	N.C., 95-96 N.O., 97-98	3.00 A 1.50 A	
440 V	N.C., 95-96 N.O., 97-98	1.00 A 1.00 A	
480-500 V	N.C., 95-96 N.O., 97-98	1.00 A 1.00 A	
I_e / Rated operational current DC-13 acc. to IEC/EN 60947-5-1 for utilization category			
24 V	N.C., 95-96 N.O., 97-98	1.25 A 1.25 A	
60 V	N.C., 95-96 N.O., 97-98	0.25 A 0.25 A	
110-120-125 V	N.C., 95-96 N.O., 97-98	0.25 A 0.25 A	
250 V	N.C., 95-96 N.O., 97-98	0.12 A 0.04 A	
Minimum switching capacity	17 V / 3 mA		
Short-circuit protective device	N.C., 95-96 N.O., 97-98	10 A, Fuse type gG 6 A, Fuse type gG	
Rated impulse withstand voltage U_{imp}	6 kV		
Rated insulation voltage U_i	690 V		

Technical diagram – Intermittent periodic duty



t_a : Motor starting time - TA25DU-M,
TA42DU-M, TA75DU-M

Thermal overload relays TA25DU-M / TA42DU-M / TA75DU-M

Technical data

Main circuit – Utilization characteristics according to UL/CSA

Type	TA25DU-M / TA42DU-M / TA75DU-M
Standards	UL 508, CSA 22.2 No. 14
Maximum operational voltage	600 V AC
Trip rating	125 % of FLA
Full load amps (FLA)	See table "Full load amps and short-circuit protective device"
Short-circuit rating RMS symmetrical	See table "Full load amps and short-circuit protective device"
Short-circuit protective device	See table "Full load amps and short-circuit protective device"

Auxiliary circuit according to UL/CSA

Type	TA25DU-M / TA42DU-M / TA75DU-M
Contact rating	N.C., 95-96 B600 N.O., 97-98 C600
Conventional free-air thermal current	5 A

Full load amps and short-circuit protective device

Type	Full load amps (FLA)	Short-circuit protective device			
		480 / 600 V AC		480 / 600 V AC	
		Short circuit rating RMS symmetrical	Fuse K5 / RK5	Short circuit rating RMS symmetrical	Fuse J
TA25DU-0.16M	0.16 A	5000 A	1 A	50000 A	30 A
TA25DU-0.25M	0.25 A	5000 A	1 A	50000 A	30 A
TA25DU-0.4M	0.40 A	5000 A	3 A	50000 A	30 A
TA25DU-0.63M	0.63 A	5000 A	3 A	50000 A	30 A
TA25DU-1.0M	1.0 A	5000 A	6 A	50000 A	30 A
TA25DU-1.4M	1.4 A	5000 A	6 A	50000 A	30 A
TA25DU-1.8M	1.8 A	5000 A	6 A	50000 A	30 A
TA25DU-2.4M	2.4 A	5000 A	10 A	50000 A	30 A
TA25DU-3.1M	3.1 A	5000 A	10 A	50000 A	30 A
TA25DU-4.0M	4.0 A	5000 A	15 A	50000 A	30 A
TA25DU-5.0M	5.0 A	5000 A	20 A	50000 A	30 A
TA25DU-6.5M	6.5 A	5000 A	25 A	50000 A	30 A
TA25DU-8.5M	8.5 A	5000 A	35 A	50000 A	30 A
TA25DU-11M	11 A	5000 A	45 A	50000 A	35 A
TA25DU-14M	14 A	5000 A	60 A	50000 A	60 A
TA25DU-19M	19 A	5000 A	60 A	50000 A	60 A
TA25DU-25M	25 A	5000 A	70 A	50000 A	100 A
TA25DU-32M	32 A	5000 A	100 A	50000 A	100 A
TA42DU-25M	25 A	5000 A	80 A	50000 A	100 A
TA42DU-32M	32 A	5000 A	100 A	50000 A	100 A
TA42DU-42M	42 A	5000 A	150 A	50000 A	200 A
TA75DU-25M	25 A	5000 A	80 A	50000 A	100 A
TA75DU-32M	32 A	5000 A	100 A	50000 A	100 A
TA75DU-42M	42 A	5000 A	150 A	50000 A	200 A
TA75DU-52M	52 A	5000 A	175 A	50000 A	200 A
TA75DU-63M	63 A	10000 A	200 A	50000 A	200 A
TA75DU-80M	80 A	10000 A	250 A	50000 A	200 A

Thermal overload relays TA25DU-M / TA42DU-M / TA75DU-M

Technical data

General technical data

Type	TA25DU-M	TA42DU-M	TA75DU-M
Pollution degree	3		
Phase loss sensitive	Yes		
Ambient air temperature			
Operation	Open - compensated	-25 ... +55 °C	
Storage	Open	-25 ... +55 °C	
		-40 ... +70 °C	
Ambient air temperature compensation	Acc. to IEC/EN60947-4-1		
Maximum operating altitude permissible	2000 m		
Resistance to shock acc. to IEC 60068-2-27	12g / 15 ms		
Mounting position	Position 1-6		
Mounting	Mount on the contactor and tighten the screws of the main circuit terminals or with single mounting kit on DIN rail (35 mm)		
Degree of protection	Housing	IP20	
	Main circuit terminals	IP10	

Electrical connection

Main circuit

Type	TA25DU-M (0.16 ... 11 A)	TA25DU-M (14 ... 25 A)	TA25DU-M (32 A)
Connecting capacity			
 Rigid	1 x 0.75 ... 4 mm ² 2 x 0.75 ... 4 mm ²	1.5 ... 6 mm ² 1.5 ... 6 mm ²	1.5 ... 10 mm ² -
 Flexible with ferrule	1 x or 2 x 0.75 ... 4 mm ²	1.5 ... 4 mm ²	1.5 ... 6 mm ²
 Flexible	1 x or 2 x 0.75 ... 4 mm ²	1.5 ... 4 mm ²	1.5 ... 6 mm ²
Stranded acc. to UL/CSA	1 x or 2 x AWG 16-8	AWG 16-8	AWG 10-8
Flexible acc. to UL/CSA	1 x or 2 x AWG 16-8	AWG 16-8	AWG 10-8
Stripping length	12 mm	12 mm	15 mm
Tightening torque	1.5 ... 1.9 Nm / 12 in-lb	1.5 ... 1.9 Nm / 12 in-lb	2.5 ... 3.2 Nm / 20 in-lb
Recommended screw driver	M4 (Pozidriv 2)	M4 (Pozidriv 2)	M5 (Pozidriv 2)

Main circuit

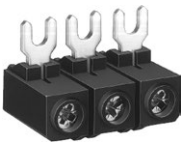
Type	TA42DU-M	TA75DU-M
Connecting capacity		
 Rigid	1 x 2.5 ... 25 mm ² 2 x 2.5 ... 16 mm ²	
 Flexible with ferrule	1 x 2.5 ... 25 mm ² 2 x 2.5 ... 10 mm ²	
Stranded acc. to UL/CSA	1 x or 2 x AWG 8-1	
Flexible acc. to UL/CSA	1 x or 2 x AWG 8-1	
Stripping length	14 mm	
Tightening torque	4.5 Nm / 40 in-lb	
Recommended screw driver	M6 (Pozidriv 2)	

Auxiliary circuit

Type	TA25DU-M	TA42DU-M	TA75DU-M
Connecting capacity			
 Rigid	1 x or 2 x 0.75 ... 4 mm ²		
 Flexible	1 x or 2 x 0.75 ... 2.5 mm ²		
Stranded acc. to UL/CSA	1 x or 2 x AWG 18-14		
Flexible acc. to UL/CSA	1 x or 2 x AWG 18-14		
Stripping length	9 mm		
Tightening torque	1 ... 1.3 Nm / 12 in-lb		
Recommended screw driver	M3.5 (Pozidriv 2)		

Thermal overload relays TA25DU-M / TA42DU-M / TA75DU-M

Accessories



DX25

SST01494

Description

The single mounting kits offer the possibility to mount the overload relays separately from the contactor. DR25-A coil for remote reset of TA25DU-M.

Ordering details

For thermal overload relays	Description	Type	Order code	Weight (1 pce) kg
Terminal block and mounting kits				
TA25DU-0.16M; ... 25M / DB25/25 A	Terminal block 10 mm ²	DX25	1SAZ201307R0002	0.030
TA25DU-0.16M ... 25M	Single mounting kit	DB25/25A	1SAZ201108R0001	0.055
TA25DU-32M	Single mounting kit	DB25/32A	1SAZ201108R0002	0.080
TA42DU-M / TA75DU-M	Single mounting kit	DB80	1SAZ301110R0001	0.155
Remote reset coil				
TA25DU-M	24/48 V, 50/60 Hz	DR25-A-24	1SAZ201504R0001	0.050
TA25DU-M	110 V, 50/60 Hz	DR25-A-110	1SAZ201504R0003	0.050
TA25DU-M	220/380 V, 50/60 Hz	DR25-A-220/380	1SAZ201504R0005	0.050
TA25DU-M	500 V, 50/60 Hz	DR25-A-500	1SAZ201504R0006	0.050
Reset push button				
TA25DU-M / TA42DU -M / TA75DU -M	Reset push button*	KPR-101L	1SFA616162R1014	0.027

* The remote reset coil is to be connected to auxiliary contact 97-98 of TA25DU-M.
The coil is not suitable for continuous operation. Impulse duration: maximum 0.2 seconds.



DB25/25A

2CDC231017F0008



DR25-A-220/380

SST20891



KPR-101L

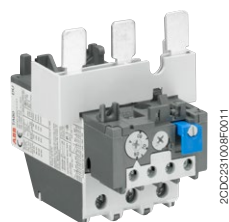
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DB80

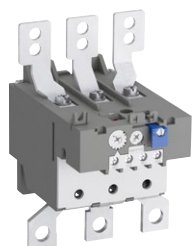
2CDC231007F0010

Thermal overload relays TA80DU / TA110DU / TA200DU 29 to 200 A



TA80DU

2DCD231009F0011



TA200DU

2DCD231016F0013



DB80

2DCD231007S0010



KPR-101L

1SFC151402F0001

Description

The TA80DU 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
- Two electrically isolated auxiliary contacts – 1 N.O. + 1 N.C.
- TEST and STOP function – Trip indication on the front
- Temperature compensation
- Suitable for three- and single-phase applications

Ordering details

Setting range	Short-circuit protective device	Trip class	Type	Order code	Weight (1 pce) kg
A					
TA80DU					
29 ... 42	100 A, Fuse type gG / 80 A aM	10A	TA80DU-42	1SAZ331201R1003	0.360
36 ... 52	125 A, Fuse type gG / 100 A aM	10A	TA80DU-52	1SAZ331201R1004	0.365
45 ... 63	160 A, Fuse type gG / 125 A aM	10A	TA80DU-63	1SAZ331201R1005	0.365
60 ... 80	200 A, Fuse type gG / 160 A aM	10A	TA80DU-80	1SAZ331201R1006	0.375
TA110DU					
66 ... 90	200 A, Fuse type gG / 160 A aM	10A	TA110DU-90	1SAZ411201R1001	0.750
80 ... 110	224 A, Fuse type gG / 200 A aM	10A	TA110DU-110	1SAZ411201R1002	0.755
TA200DU					
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

Ordering details accessories

For thermal overload relays	Description	Type	Order code	Weight (1 pce) kg
TA80DU	Single mounting kit	DB80	1SAZ301110R0001	0.155
TA200DU	Terminal shroud	LT200/A	1SAZ401901R1001	0.090
TA110DU / TA200DU	Single mounting kit	DB200	1SAZ401110R0001	0.225
TA80DU / TA110DU / TA200DU	Reset push button	KPR-101L	1SFA616162R1014	0.027

Thermal overload relays TA80DU / TA110DU / TA200DU

Technical data

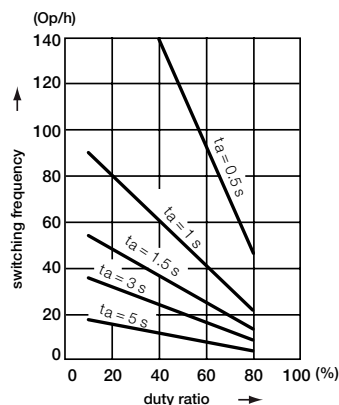
Main circuit – Utilization characteristics according to IEC/EN

Type	TA80DU	TA110DU	TA200DU
Standards	IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1		
Rated operational voltage U_e	690 V AC		
Rated frequency	DC, 50/60 Hz		
Frequency range	0 ... 400 Hz		
Trip class	10A		
Number of poles	3		
Duty time	100 %		
Operating frequency without early tripping	Up to 15 operations/h, see "Technical diagram – Intermittent periodic duty"		
Rated impulse withstand voltage U_{imp}	6 kV		
Rated insulation voltage U_i	690 V AC		

Auxiliary circuit according to IEC/EN

Type	TA80DU	TA110DU	TA200DU
Rated operational voltage U_e	500 V AC, 440 V DC		
Conventional free air thermal current I_{th}	N.C., 95-96 N.O., 97-98	10 A 6 A	
Rated frequency	DC, 50/60 Hz		
Number of poles	1 N.O. + 1 N.C.		
I_e / Rated operational current AC-15 acc. to IEC/EN 60947-5-1 for utilization category			
110-120 V	N.C., 95-96 N.O., 97-98	3.00 A 1.50 A	
220-230-240 V	N.C., 95-96 N.O., 97-98	3.00 A 1.50 A	
440 V	N.C., 95-96 N.O., 97-98	1.00 A 1.00 A	
480-500 V	N.C., 95-96 N.O., 97-98	1.00 A 1.00 A	
I_e / Rated operational current DC-13 acc. to IEC/EN 60947-5-1 for utilization category			
24 V	N.C., 95-96 N.O., 97-98	1.25 A 1.25 A	
60 V	N.C., 95-96 N.O., 97-98	0.25 A 0.25 A	
110-120-125 V	N.C., 95-96 N.O., 97-98	0.25 A 0.25 A	
250 V	N.C., 95-96 N.O., 97-98	0.12 A 0.04 A	
Minimum switching capacity	17 V / 3 mA		
Short-circuit protective device	N.C., 95-96 N.O., 97-98	10 A, Fuse type gG 6 A, Fuse type gG	
Rated impulse withstand voltage U_{imp}	6 kV		
Rated insulation voltage U_i	690 V		

Technical diagram – Intermittent periodic duty



t_s : Motor starting time - TA80DU, TA110DU, TA200DU

Thermal overload relays TA80DU / TA110DU / TA200DU

Technical data

Main circuit – Utilization characteristics according to UL/CSA

Type	TA80DU	TA110DU	TA200DU
Standards	UL 508, CSA 22.2 No. 14		
Maximum operational voltage	600 V AC		
Trip rating	125 % of FLA		
Full load amps (FLA)	See table "Full load amps and short-circuit protective device"		
Short-circuit rating RMS symmetrical	See table "Full load amps and short-circuit protective device"		
Short-circuit protective device	See table "Full load amps and short-circuit protective device"		

Auxiliary circuit according to UL/CSA

Type	TA80DU / TA110DU / TA200DU		
Contact rating	N.C., 95-96	B600	
	N.O., 97-98	C600	
Conventional free-air thermal current	5 A		

Full load amps and short-circuit protective device

Type	Full load amps (FLA)	Short-circuit protective device			
		480 / 600 V AC		480 / 600 V AC	
		Short circuit rating RMS symmetrical	Fuse K5 / RK5	Short circuit rating RMS symmetrical	Fuse J
TA80DU-42	42 A	5000 A	150 A	50000 A	200 A
TA80DU-52	52 A	5000 A	175 A	50000 A	200 A
TA80DU-63	63 A	10000 A	200 A	50000 A	200 A
TA80DU-80	80 A	10000 A	250 A	50000 A	200 A
TA110DU-90	90 A	10000 A	250 A	65000 A	200 A
TA110DU-110	110 A	10000 A	250 A	65000 A	200 A
TA200DU-90	90 A	10000 A	250 A	100000 A	250 A
TA200DU-110	110 A	10000 A	250 A	100000 A	250 A
TA200DU-135	135 A	10000 A	300 A	100000 A	250 A
TA200DU-150	150 A	10000 A	300 A	100000 A	250 A
TA200DU-175	175 A	10000 A	300 A	100000 A	300 A
TA200DU-200	200 A	10000 A	400 A	100000 A	400 A

Thermal overload relays TA80DU / TA110DU / TA200DU

Technical data

General technical data

Type	TA80DU	TA110DU	TA200DU
Pollution degree	3		
Phase loss sensitive	Yes		
Ambient air temperature			
Operation	Open - compensated	-25 ... +55 °C	
Storage	Open	-25 ... +55 °C	
Storage		-40 ... +70 °C	
Ambient air temperature compensation	Acc. to IEC/EN60947-4-1		
Maximum operating altitude permissible	2000 m		
Resistance to shock acc. to IEC 60068-2-27	12g / 15 ms		
Mounting position	Position 1-6		
Mounting	Mount on the contactor and tighten the screws of the main circuit terminals or with single mounting kit		
Degree of protection	Housing	IP20	
	Main circuit terminals	IP10	

Electrical connection

Main circuit

Type	TA80DU	TA110DU	TA200DU
Connecting capacity			
 Rigid	1 x 2.5 ... 25 mm ² 2 x 2.5 ... 16 mm ²	16 ... 35 mm ² -	25 ... 120 mm ² -
 Flexible with ferrule	1 x 2.5 ... 25 mm ² 2 x 2.5 ... 10 mm ²	16 ... 35 mm ² -	25 ... 120 mm ² -
 Lugs	-	-	L > 10 mm
Stranded acc. to UL/CSA	1 x or 2 x AWG 8-1	AWG 6-2/0	AWG 4-0000
Flexible acc. to UL/CSA	1 x or 2 x AWG 8-1	AWG 6-2/0	AWG 4-0000
Stripping length	14 mm	25 mm	-
Tightening torque	4.5 Nm / 40 lb.in	7.2 ... 9.6 Nm	25 Nm / 220 lb.in
Recommended screw driver	M6 (Pozidriv 2)	M8 (Hexagon 4)	Open Bars

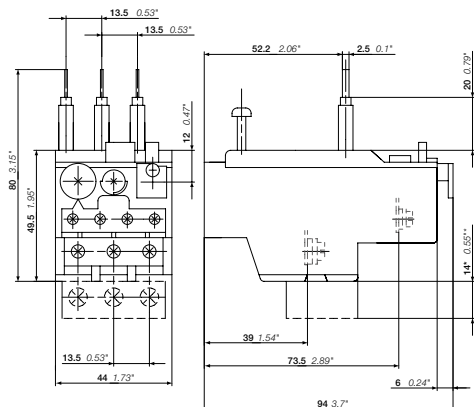
Auxiliary circuit

Type	TA80DU	TA110DU	TA200DU
Connecting capacity			
 Rigid	1 x or 2 x 0.75 ... 4 mm ²		
 Flexible with ferrule	1 x or 2 x 0.75 ... 2.5 mm ²		
 Flexible	1 x or 2 x 0.75 ... 2.5 mm ²		
Stranded acc. to UL/CSA	1 x or 2 x AWG 18-14		
Flexible acc. to UL/CSA	1 x or 2 x AWG 18-14		
Stripping length	9 mm		
Tightening torque	1 ... 1.3 Nm / 12 lb.in		
Recommended screw driver	M3.5 (Pozidriv 2)		

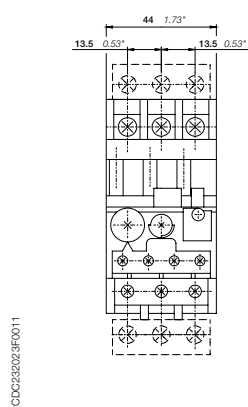
Thermal overload relays TA25DU-M / TA42DU-M / TA75DU-M

Dimensions

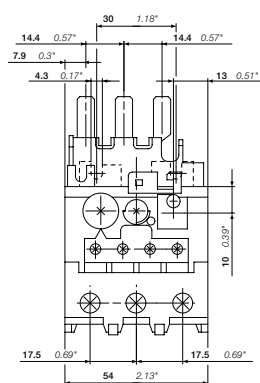
Main dimensions mm, inches



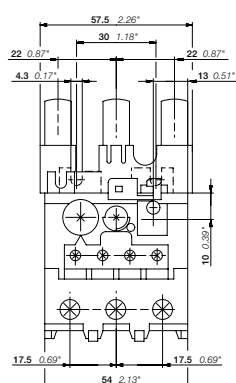
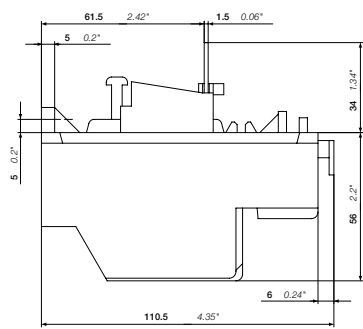
TA25DU-M + DX25



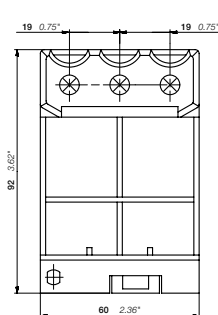
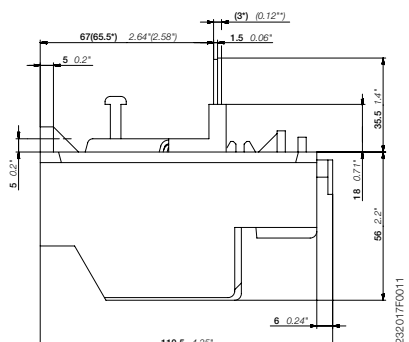
TA25DU-M + DB25 + DX25



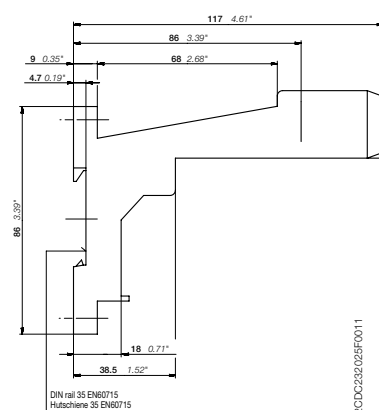
TA42DU-M



TA75DU-M



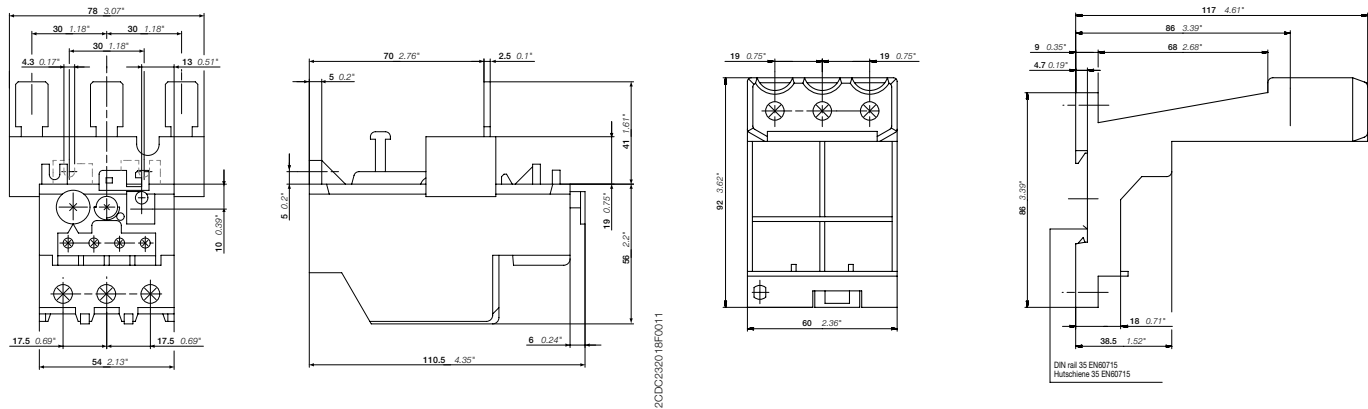
TA75DU-M + DB80
TA42DU-M + DB80



Thermal overload relays TA80DU / TA110DU / TA200DU

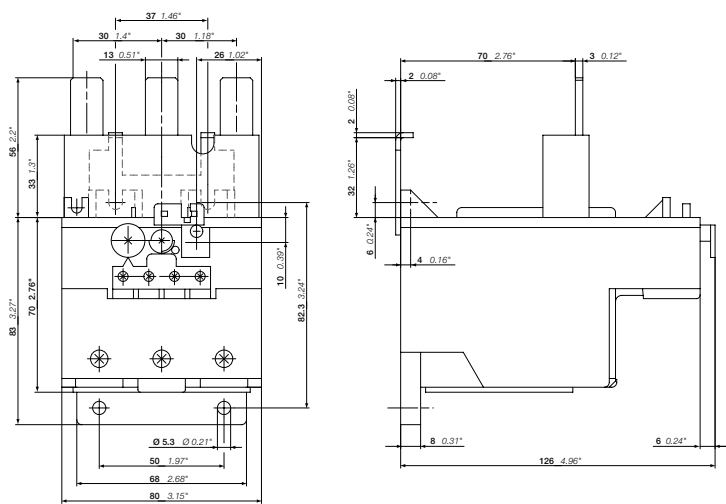
Dimensions

Main dimensions mm, inches

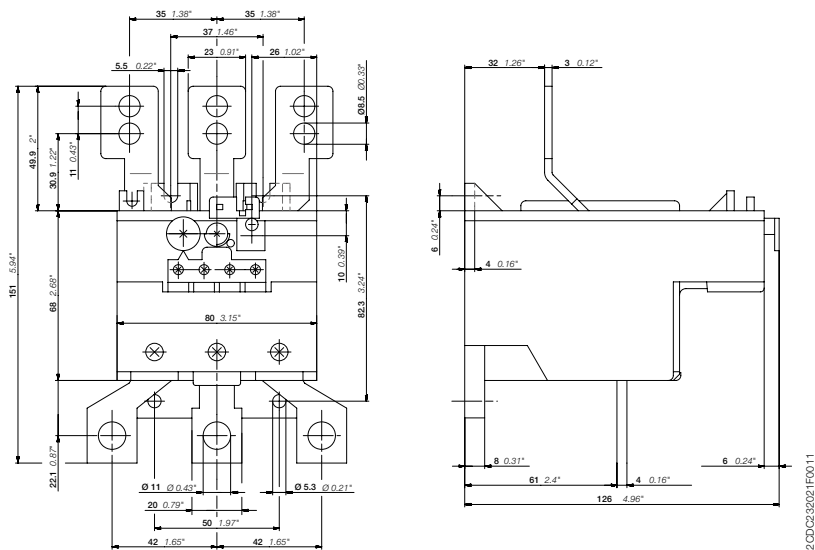


TA80DU

TA80DU + DB80



TA110DU



TA200DU

Electronic overload relay E140DU

50 to 140 A



E140DU

Description

The E140DU 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. Single mounting kits are available as accessory.

Ordering details

Setting range	Short-circuit protective device	Trip class	Type	Order code	Weight (1 pce) kg
A					
50.0 ... 140.0 A	400 A	10E, 20E, 30E	E140DU-140	1SAX321001R1101	0.915

Electronic overload relay E140DU

Technical data

4

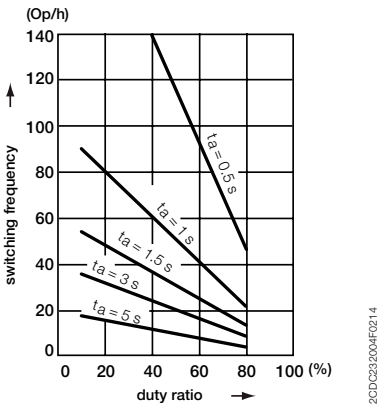
Main circuit – Utilization characteristics according to IEC/EN

Type	E140DU
Standards	IEC 60947-1 / 60947-4-1 / 60947-5-1 and EN 60947-1 / 60947-4-1 / 60947-5-1
Rated operational voltage U_n	1000 V AC
Rated frequency	50/60 Hz
Trip class	10E, 20E, 30E, selectable
Number of poles	3
Duty time	100 %
Operating frequency without early tripping	Up to 15 operations/h, see "Technical diagram – Intermittent periodic duty"
Rated impulse withstand voltage U_{imp}	6 kV
Rated insulation voltage U_i	1000 V AC

Auxiliary circuit according to IEC/EN

Type	E140DU
Rated operational voltage U_n	600 V AC / DC
Conventional free air thermal current I_{th}	6 A
Rated frequency	DC, 50/60 Hz
Number of poles	1 N.C. + 1 N.O.
I_n / Rated operational current AC-15 acc. to IEC/EN 60947-5-1 for utilization category	
110-120 V	50/60 Hz 3.00 A
220-230-240 V	50/60 Hz 3.00 A
440 V	50/60 Hz 1.10 A
480-500 V	50/60 Hz 0.72 A
I_n / Rated operational current DC-13 acc. to IEC/EN 60947-5-1 for utilization category	
24 V	1.50 A
60 V	0.55 A
110-120-125 V	0.55 A
250 V	0.27 A
Minimum switching capacity	12 V / 3 mA
Short-circuit protective device	6 A, Fuse type gG
Rated impulse withstand voltage U_{imp}	6 kV
Rated insulation voltage U_i	690 V

Technical diagram – Intermittent periodic duty



t_a : Motor starting time - TA80DU, TA110DU, TA200DU

Electronic overload relay E140DU

Technical data

Main circuit – Utilization characteristics according to UL/CSA

Type	E140DU
Standards	UL 508, CSA 22.2 No. 14
Maximum operational voltage	600 V AC
Trip rating	125 % of FLA
Full load amps (FLA)	See table "Full load amps and short-circuit protective device"
Short-circuit rating RMS symmetrical	See table "Full load amps and short-circuit protective device"
Short-circuit protective device	See table "Full load amps and short-circuit protective device"

Auxiliary circuit according to UL/CSA

Type	E140DU
Contact rating	N.C., 95-96 B600, Q300
	N.O., 97-98 B600, Q300
Conventional free-air thermal current	5 A

Full load amps and short-circuit protective device

Type	Full load amps (FLA)	Short-circuit protective device			
		480 / 600 V AC		480 / 600 V AC	
		Short circuit rating RMS symmetrical	Fuse K5 / RK5	Short circuit rating RMS symmetrical	Fuse J
E140DU-140	140 A	10000 A	400 A	18000 A	400 A

Electronic overload relay E140DU

Technical data

General technical data

Type	E140DU
Pollution degree	3
Phase loss sensitive	Yes
Ambient air temperature	
Operation	Open - compensated
Storage	-25 ... +70 °C
Ambient air temperature compensation	-50 ... +85 °C
Maximum operating altitude permissible	Continuous
Resistance to shock acc. to IEC 60068-2-27	2000 m
Resistance to vibrations acc. to IEC 60068-2-6	15 g / 11 ms
Mounting position	5 g / 3 ... 150 Hz
Mounting	Position 1-6
Degree of protection	Mount on the contactor and tighten the screws of the main circuit terminals or with single mounting kit
	IP20

Electrical connection

Main circuit

Type	E140DU
Connecting capacity	
 Rigid	1 x 6 ... 95 mm ² 2 x 6 ... 35 mm ²
 Flexible	1 x 6 ... 70 mm ² 2 x 6 ... 35 mm ²
Stranded acc. to UL/CSA	1 x or 2 x AWG 8-0
Flexible acc. to UL/CSA	1 x or 2 x AWG 8-0
Stripping length	-
Tightening torque	6 - 6.5 Nm / 53 lb.in
Recommended screw driver	M8 (Hexagon 4)

Auxiliary circuit

Type	E140DU
Connecting capacity	
 Rigid	1 x or 2 x 1 ... 4 mm ²
 Flexible with ferrule	1 x or 2 x 0.75 ... 2.5 mm ²
 Flexible with insulated ferrule	1 x or 2 x 0.75 ... 2.5 mm ²
 Flexible	1 x or 2 x 0.75 ... 2.5 mm ²
Stranded acc. to UL/CSA	1 x or 2 x AWG 16-10
Flexible acc. to UL/CSA	1 x or 2 x AWG 16-10
Stripping length	9 mm
Tightening torque	0.8 ... 1.2 Nm / 7 lb.in
Recommended screw driver	M3.5 (Pozidriv 2)

Electronic overload relay E140DU

Accessories



DB140E

2CDC231065S0010

Description

Single mounting kits are available as accessory for E140DU. The single mounting kits offer the possibility to mount the overload relay separately from the contactor.

Ordering details

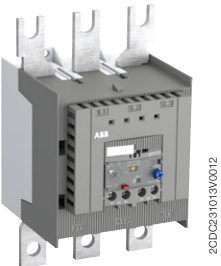
For thermal overload relays	Description	Type	Order code	Weight (1 pce) kg
E140DU	Single mounting kit	DB140E	1SAX301110R1002	0.145

EF205, EF370 electronic overload relays

63 to 380 A



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	Short-circuit protective device	Trip class	Type	Order code	Weight (1 pc) kg
A					
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

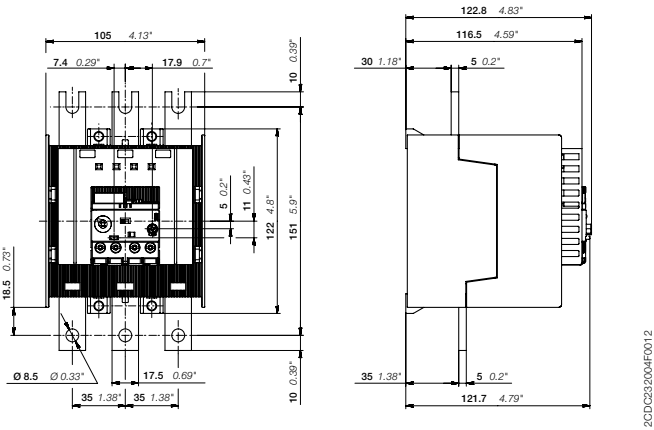
¹⁾ ATEX is valid for products, produced from week 42, 2014.

Ordering details accessories

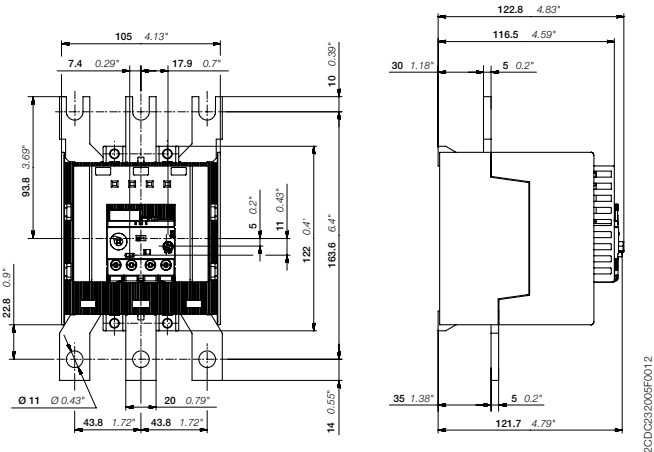
Suitable for	Description	Type	Order code	Weight (1 pc) kg
EF205, EF370	Reset push button ²⁾	KPR-101L	1SFA616162R1014	0.027
EF205	Terminal shroud	LT200E	1SAX501904R0001	0.085
EF370	Terminal shroud	LT320E	1SAX601904R0001	0.105

²⁾ Note: for more information see catalog 1SFC151005C0201 - rev. B

Main dimensions mm, inches



EF205-210



EF370-380

EF205, EF370 electronic overload relays – 63 to 380 A

Technical data

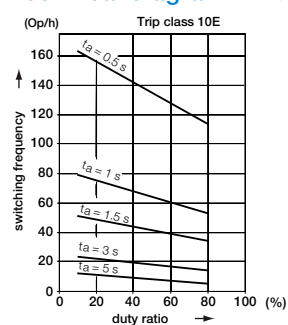
Main circuit – Utilization characteristics according to IEC/EN

Type	EF205, EF370
Standards	IEC/EN 60947-1, IEC/EN 60947-4-1, IEC/EN 60947-5-1
Rated operational voltage U_n	1000 V AC
Rated frequency	50/60 Hz – not suitable for DC applications
Trip class	10E, 20E, 30E, selectable
Number of poles	3
Duty time	100 %
Operating frequency without early tripping	Up to 15 operations/h, see "Technical diagram – Intermittent periodic duty"
Rated impulse withstand voltage U_{imp}	8 kV
Rated insulation voltage U_i	1000 V

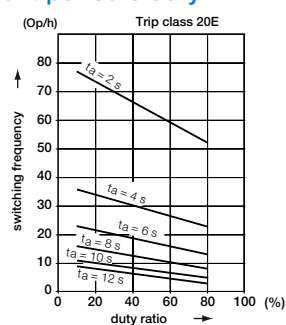
Auxiliary circuit according to IEC/EN

Type	EF205, EF370
Rated operational voltage U_n	600 V AC / DC
Conventional free air thermal current I_{th}	6 A
Rated frequency	DC, 50/60 Hz
Number of poles	1 N.C. + 1 N.O.
I_n / Rated operational current AC-15 acc. to IEC/EN 60947-5-1 for utilization category	
110-120 V	50/60 Hz 3.00 A
220-230-240 V	50/60 Hz 3.00 A
400 V	50/60 Hz 1.10 A
480-500 V	50/60 Hz 0.75 A
I_n / Rated operational current DC-13 acc. to IEC/EN 60947-5-1 for utilization category	
24 V	1.50 A
60 V	0.55 A
110-120-125 V	0.55 A
250 V	0.27 A
Minimum switching capacity	12 V / 3 mA
Short-circuit protective device	6 A, fuse type gG
Rated impulse withstand voltage U_{imp}	6 kV
Rated insulation voltage U_i	690 V

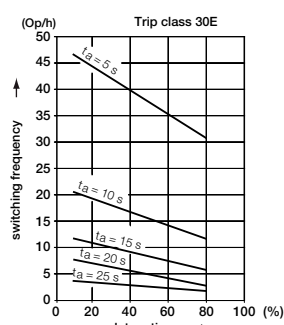
Technical diagram – Intermittent periodic duty



Trip class 10E



Trip class 20E



Trip class 30E

EF205, EF370 electronic overload relays – 63 to 380 A

Technical data

Main circuit – Utilization characteristics according to UL/CSA

Type	EF205, EF370
Standards	UL 508, CSA 22.2 No. 14, UL 60947-4-1A
Maximum operational voltage	600 V AC
Trip rating	125 % of FLA
Full load amps (FLA)	See table "Full load amps and short-circuit protective device"
Short-circuit rating RMS symmetrical	See table "Full load amps and short-circuit protective device"
Short-circuit protective device	See table "Full load amps and short-circuit protective device"

Auxiliary circuit according to UL/CSA

Type	EF205, EF370
Contact rating	N.C., 95-96 B600, Q600 N.O., 97-98 B600, Q600
Conventional thermal current	6 A

Full load amps and short-circuit protective device

Type	Full load amps (FLA)	Short-circuit protective device					
		480 V AC		600 V AC			
		SCCR	Fuse type	SCCR	Fuse type	SCCR	Fuse type
EF205-210	210 A	10 kA	400 A, R5/RK5	10kA	400 A, R5/RK5	100 kA	400 A, J
EF370-380	380 A	18 kA	800 A, L/T	18kA	800 A, L/T	-	-

EF205, EF370 electronic overload relays – 63 to 380 A

Technical data

General data

Type	EF205	EF370
Pollution degree	3	
Phase loss sensitive	Yes	
Ambient air temperature		
Operation	Open - compensated	-25 ... +70 °C
Storage		-50 ... +85 °C
Ambient air temperature compensation	Acc. to IEC/EN 60947-4-1	
Maximum operating altitude permissible	2000 m	
Resistance to shock acc. to IEC 60068-2-27	25g / 11 ms	
Resistance to vibrations acc. to IEC 60068-2-6	5g / 3 ... 150 Hz	
Mounting position	Position 1-6	
Mounting	Mount on the contactor and tighten the screws of the main circuit terminals	
Degree of protection	Housing	IP20
	Main circuit terminals	IP20

Electrical connection

Main circuit

Type	EF205	EF370
Connecting capacity		
 Rigid	1 x 16 ... 185 mm ² 2 x 16 ... 120 mm ²	50 ... 240 mm ² 50 ... 150 mm ²
 Flexible	1 x 16 ... 185 mm ² 2 x 16 ... 120 mm ²	50 ... 240 mm ² 50 ... 150 mm ²
 Lugs	L ≤ 24 mm	32 mm
 Bars	Ø > 8 mm	10 mm
Stranded acc. to UL/CSA	1 x AWG 6-0000 2 x AWG 6-0000	AWG 1-500 kcmil AWG 1-500 kcmil
Flexible acc. to UL/CSA	1 x AWG 6-0000 2 x AWG 6-0000	AWG 1-500 kcmil AWG 1-500 kcmil
Stripping length	-	-
Tightening torque	18 Nm / 160 lb.in	28 Nm / 247 lb.in
Recommended screw driver	M8	M10

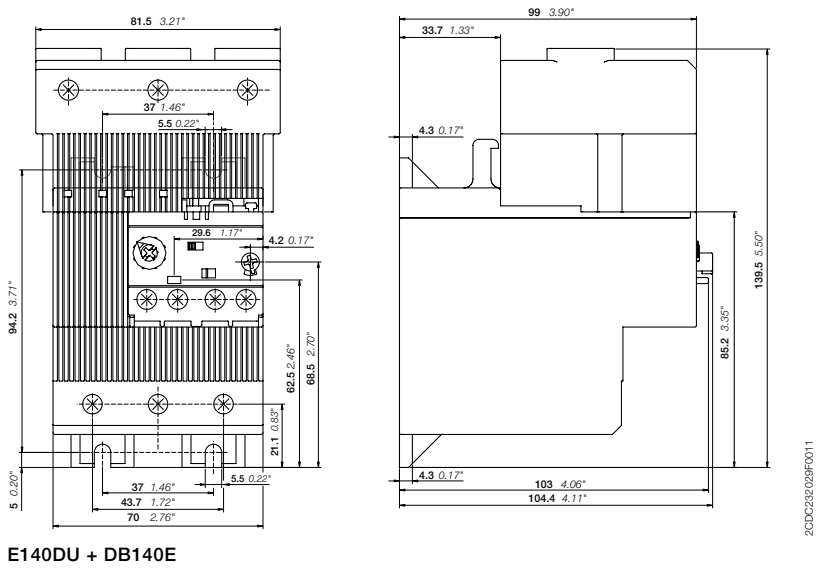
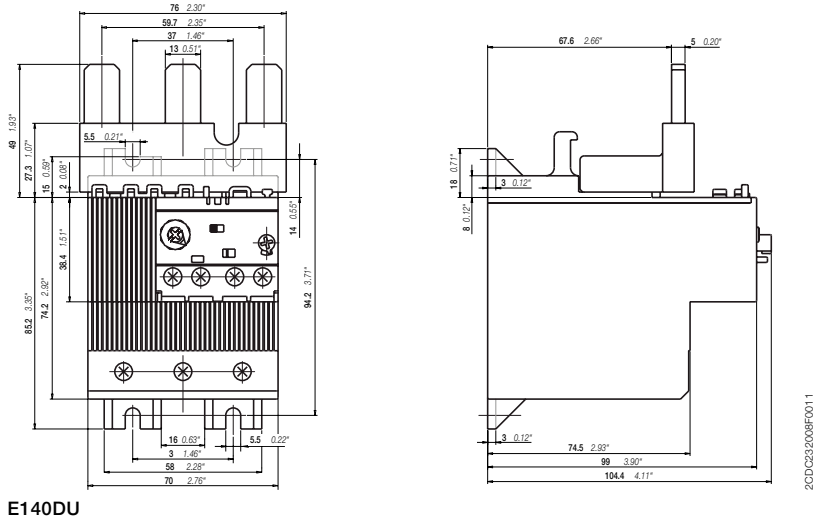
Auxiliary circuit

Type	EF205, EF370		
Connecting capacity			
	Rigid	1 or 2 x	1 ... 4 mm²
	Flexible with ferrule	1 or 2 x	0.75 ... 2.5 mm²
	Flexible with insulated ferrule	1 or 2 x	0.75 ... 2.5 mm²
	Flexible	1 or 2 x	0.75 ... 2.5 mm²
	Stranded acc. to UL/CSA	1 or 2 x	AWG 18-10
	Flexible acc. to UL/CSA	1 or 2 x	AWG 18-10
Stripping length			
9 mm			
Tightening torque			
0.8 ... 1.2 Nm / 7 ... 11 lb.in			
Recommended screw driver			
M3.5 (Pozidriv 2)			

Electronic overload relay E140DU

Dimensions

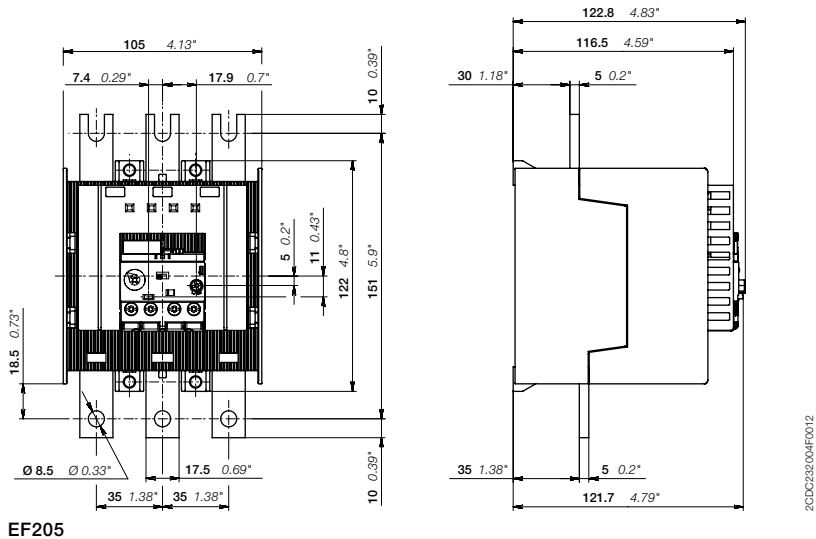
Main dimensions mm, inches



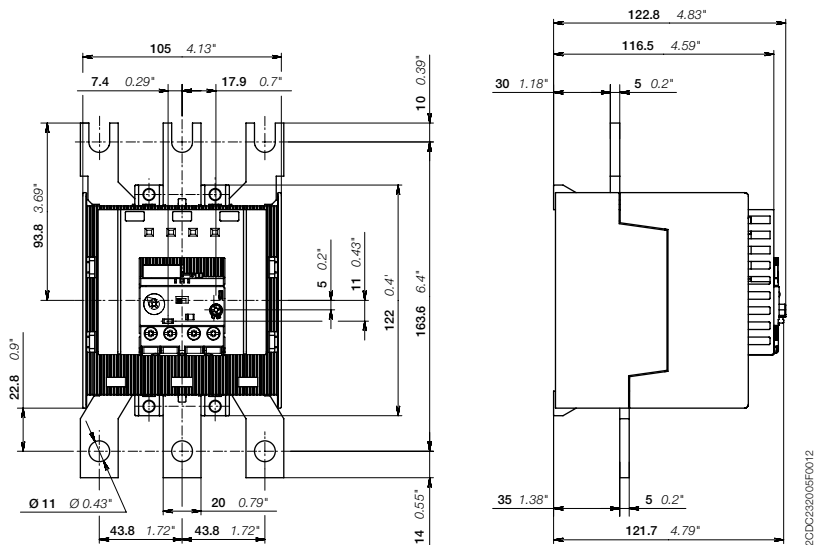
Electronic overload relays EF205, EF370

Dimensions

Main dimensions mm, inches



EF205



EF370

General technical data

General technical data	
Coordination with short-circuit protection devices	155
Terms and technical definitions	156
Standards and utilization categories	158
Degrees of protection	160

Coordination with short-circuit protection devices

In compliance with standards IEC 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.

5

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 (I_e AC-3) and are given by the standard (Table 13). For example:
 - $r = 1 \text{ kA}$ for $I_e \text{ AC-3} < 16 \text{ A}$
 - $r = 3 \text{ kA}$ for $16 \text{ A} < I_e \text{ AC-3} < 63 \text{ A}$
 - $r = 5 \text{ kA}$ for $63 \text{ A} < I_e \text{ AC-3} < 125 \text{ A}$ etc.
 - at the rated conditional short-circuit current " I_q " - 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 I_n for an ambient temperature of 70 °C
 - MCCBs and MCBs: factor of 0.8 applied to I_n 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 I_n 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 $< 2 \text{ s}$. - Difficult starting means an accelerating time $10 \text{ s} < t_s < 30 \text{ s}$
 - 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 $> 12.3 I_e \text{ AC-3}$ so that the transient current peak occurring during starting does not lead to tripping.

Terms and technical definitions

Circuits

- auxiliary circuit: All the conductive parts of a contactor designed to be inserted in a different circuit from the main circuit and the contactor control circuits.
- control circuit: All the conductive parts of a contactor (other than the main circuit and the auxiliary circuit) used to control the contactor's closing operation or opening operation or both.
- main circuit: All the conductive parts of a contactor designed to be inserted in the circuit that it controls.

Thermal overload relay tripping classes

IEC 60947-4-1 defines tripping classes 10 A, 10, 20 and 30. Types 10 A, 10, etc. correspond to the maximum tripping time for a making current at 7.2 times the setting current.

Furthermore, for each class the standard specifies the tripping time for 1.5 times the setting current and sets the non tripping condition at 1.05 times the setting current.

All these data are summarized in the table below.

Extract from IEC 60947-4-1:

Tripping class		10 A	10	20	30
Max. tripping time for 1.5 times the setting current (warm state)	s	120	240	480	720
Tripping time for 7.2 times the setting current (cold state)	s	2 - 10	4 - 10	6 - 20	9 - 30
For 1.05 times the setting current		No tripping			

Electromagnetic compatibility

AF... contactors comply with IEC 60947-1, 60947-4-1 and EN 60947-1, 60947-4-1 standards.

Definitions:

Environment A: "Mainly relates to low-voltage non public or industrial networks/locations/installations (EN 50082-2 article 4) including highly disturbing sources".

Environment B: "Mainly relates to low-voltage public networks (EN 50082-1 article 5) such as residential, commercial and light industrial locations/installations. Highly disturbing sources such as arc welders are not covered by this environment".

Notice for AF09 ... AF38, AF116 ... AF2650 contactors and NF contactor relays: these products have been designed for environment A. Use of this product in environment B may cause unwanted electromagnetic disturbances in which case the user may be required to take adequate mitigation measures.

AF40 ... AF96 have been designed for environment B.

Definitions according to SEMI F47-0706

SEMI F47-0706 defines the voltage sag immunity required for semiconductor processing, metrology and automated test equipment, and on subsystems and components which are used in the construction of semiconductor processing equipment including but not limited to:

- Power supplies
- Generators
- Robots and factory interface
- Chillers, pumps, blowers
- AC operated contactors and contactor relays
- voltage sag: an rms reduction in the AC voltage, at the power frequency, for durations from a half cycle to a few seconds.

The IEC terminology for this phenomenon is voltage dip.

voltage sag immunity: the ability of equipment to withstand momentary electrical power interruptions or sags

Coordination of protections against short circuit

The goal here is to protect electromechanical starters and softstarters.

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.

The characteristics of the starter must comply with the international standard IEC 60947-4-1 which defines the above items as follows:

contactor: a mechanical switching device having only one position of rest, operated otherwise than by hand, capable of making, carrying and breaking currents under normal circuit conditions including overload conditions.

overload release: overload relay or release which operates in the case of overload and also in case of loss of phase.

circuit-breaker: defined by IEC 60947-2 as a mechanical switching device, capable of making, carrying and breaking currents under normal circuit conditions and also making, carrying for a specified time and breaking currents under specified abnormal circuit conditions.

IEC publication 60947-4-1 defines coordination types "1" and "2":

- Type "1" coordination requires that, in the event of a short-circuit, the contactor or starter does not endanger persons or installations and will not then be able to operate without being repaired or parts being replaced.
- Type "2" coordination requires that, 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 being light welded is acceptable. In this case, the manufacturer must stipulate the measures to be taken with respect to maintenance of the equipment.

Rated operational current I_e.

Current rated by the manufacturer. It is mainly based on the rated operational voltage U_e, the rated frequency, the utilization category, the rated duty and the type of protective enclosure, if necessary.

Conventional free air thermal current I_{th}

Current that the contactor can withstand in free air for a duty time of 8 hours without the temperature rise of its various parts exceeding the maximum values given by the standard.

Operating cycle or cycle

Includes one making operation and one breaking operation.

Cycle time

This is the sum of the current flow time and the no-current time for given cycle.

Electrical durability

Number of on-load operating cycles that the contactor is able to carry out. It depends on the operational current, the operational voltage and the utilization category.

Terms and technical definitions

Mechanical durability

Number of no-current operating cycles that a contactor is able to carry out.

Assessed failure rate

Defined according to IEC 60947-5-4. This rate is given in standard industrial environments for the contactor relays and for the built-in auxiliary contact of contactors.

Load factor

Ratio of the on-load operating time to the total cycle time x 100.

Switching frequency

Number of switching cycles per hour.

Plugging

Stopping or fast reversal in rotation direction of a motor by two supply leads being interchanged while the motor is running.

Inching

Energization of a motor's circuit repeatedly or for short periods with the aim of obtaining small movements of the driven mechanism.

Coil operating limits

Expressed in multiples of the nominal control circuit voltage U_c for the upper and lower limits.

Mounting position

Comply with the manufacturer's instructions. Restrictions are to be taken into account for certain mounting positions.

Rated breaking or making capacity

Root mean square (r.m.s.) value of the current that the contactor is able to break or make at a given voltage according to the conditions specified by standards and for a given utilization category.

Intermittent duty

Duty during which the contactor is successively closed or open for periods which are too short to enable the contactor to achieve thermal balance.

Ambient temperature

Air temperature close to the contactor.

Time

- Time constant: Ratio of the inductance to the resistance ($L/R = \text{mH}/\Omega = \text{ms}$).
- Short-time withstand current: Current that the contactor is able to withstand in closed position for a short time interval and in specified conditions.
- Closing time: Time interval between the coil energization and the instant the contacts touch on all the poles.
- Opening time: Time interval between the coil de-energization and the instant the contacts separate on all the poles.

Rated control voltage U_c

Control voltage value for which the control circuit is sized.

Rated operational voltage U_e

Voltage to which the contactor's utilization characteristics refer. In three-phase it is the phase-to-phase voltage.

Rated insulation voltage U_i

Reference voltage for dielectric tests and creepage distances.

Rated impulse withstand voltage U_{imp}

Peak value of an impulse voltage, having a specified form and polarity, which does not cause breakdown in specific test conditions.

Shock withstand

Requirement for vehicles, crane drives, installations on board ships and plug-in equipment. For the acceptable "g" values, the contacts must not change position and the thermal overload relays must not trip.

Resistance to vibrations

Requirements for vehicles, boats and other means of transport. For the specified vibration amplitude and frequency values the device must remain able to operate.

Standards and utilization categories

Utilization categories:

A contactor's duty is characterised by the utilization category together with the rated operational voltage and current indicated.

Utilization categories for contactors according to IEC 60947-4-1:

Alternating current:	AC-1	Non-inductive or slightly inductive loads, resistance furnaces.
	AC-2	Slip-ring motors: starting, switching off.
	AC-3	Cage motors: starting, switching off running motors.
	AC-4	Cage motors: starting, plugging, inching.
	AC-5a	Discharge lamp switching.
	AC-5b	Incandescent lamp switching.
	AC-6a	Transformer switching.
	AC-6b	Capacitor bank switching.
Direct current:	AC-8a	Hermetic refrigeration compressor motor control with manual resetting of overload releases.
	AC-8b	Hermetic refrigeration compressor motor control with automatic resetting of overload releases.
	DC-1	Non inductive or slightly inductive loads, resistance furnaces.
	DC-3	Shunt motors: starting, plugging, inching, dynamic breaking of DC motors.
	DC-5	Series motors: starting, plugging, inching, dynamic breaking of DC motors.
	DC-6	Incandescent lamp switching.

Utilization categories for contactor relays according to IEC 60947-5-1:

Alternating current:	AC-12	Control of resistive loads and static loads with opto-coupler isolation.
	AC-13	Control of static loads with transformer isolation.
	AC-14	Control of weak electromagnetic loads (≤ 72 VA).
	AC-15	Control of electromagnetic loads (> 72 VA).
Direct current:	DC-12	Control of resistive loads and static loads with opto-coupler isolation.
	DC-13	Control of DC electromagnets.
	DC-14	Control of DC electromagnets having economy resistors.

In fact some applications, and the specific criteria characterizing the various loads controlled by contactors, may modify the utilization characteristics of the contactors. The main applications concerned are:

Capacitor bank switching

Account must be taken of high peaks when the current is made and of harmonic currents during continuous duty. For this application, IEC publication 60947-4-1 stipulates utilization category AC-6b. The operational currents or powers acceptable for the contactors are determined by our electrical tests; IEC publication 60947-4-1 gives the calculating formula for determining the operational current (Table 9).

Transformer switching

Account must be taken of the peaks due to magnetization phenomena when the current is made.

For this application, IEC publication 60947-4-1 stipulates utilization category AC-6a. The operational currents or powers acceptable for the contactors are determined using the values obtained for AC-3 or AC-4 category tests and the calculating formula given in IEC 60947-4-1 (Table 9).

Lighting circuit switching

The current peaks occurring on energization of the circuit and the power factor depend on the type of lamps, the connection mode and whether or not there is compensation.

For this application, IEC publication 60947-4-1 stipulates two standard utilization categories:

- AC-5a for discharge lamp switching.
- AC-5b for incandescent lamp switching.

Slip-ring motor switching

The contactors used for short-circuiting rotor resistors can be used for rotor voltages up to 2 times the rated operational voltage.

The conditions of use of rotor contactors depend on the connection mode of the main poles. IEC 60947-4-1 stipulates AC-2 utilization category for startor contactor.

Standards and utilization categories

Utilization categories (cont.)

DC power circuit switching

Arc suppression is more difficult in direct current than in alternating current. Higher the time constant and voltage, heavier the breaking conditions: consequently several poles have to be connected in series.

AC high current circuit switching

Possibility of increasing performances by connecting poles in parallel.

Circuit switching during temporary and intermittent duty

In these cases higher operational currents are acceptable.

Influence of the length of the conductors used in the contactor control circuit

According to the operational voltages, the cross-sectional areas, the coil consumption and the control layout, difficulties due to line resistances and capacitances may appear during contactor closing and opening orders.

Making and breaking conditions for utilization categories

Utilization category	Durability test conditions						Occasional operation					
	Making conditions			Breaking conditions			Making and breaking capacities - 50 operating cycles			Making conditions		
	I/Ie	U/Ue	Cos. or L/R (ms)	I/Ie	U/Ue	Cos. or L/R (ms)	Ic/Ie	Ur/Ue	Cos. or L/R (ms)	Ic/Ie	Ur/Ue	Cos. or L/R (ms)

Contactors for AC circuit switching

AC-1		1	1	0.95	1	1	0.95	1.5	1.05	0.8	1.5	1.05	0.8
AC-2		2.5	1	0.65	2.5	1	0.65	4	1.05	0.65	4	1.05	0.65
AC-3	Ie < 17 A	6	1	0.65	1	0.17	0.65	10	1.05	0.45	8	1.05	0.45
	17 < Ie <100 A	6	1	0.35	1	0.17	0.35	10	1.05	0.45	8	1.05	0.45
	Ie >100 A	6	1	0.35	1	0.17	0.35	10	1.05	0.35	8	1.05	0.35
AC-4	Ie < 17 A	6	1	0.65	6	1	0.65	12	1.05	0.45	10	1.05	0.45
	17 < Ie <100 A	6	1	0.35	6	1	0.35	12	1.05	0.45	10	1.05	0.45
	Ie >100 A	6	1	0.35	6	1	0.35	12	1.05	0.35	10	1.05	0.35

Contactors for DC circuit switching

DC-1	1	1	1	1	1	1	1.5	1.05	1	1.5	1.05	1
DC-3	2.5	1	2	2.5	1	2	4	1.05	2.5	4	1.05	2.5
DC-5	2.5	1	7.5	2.5	1	7.5	4	1.05	15	4	1.05	15

Contactor relays for AC circuit switching

AC-14	(≤ 72 VA)	–	–	–	–	–	6	1.1	0.7	6	1.1	0.7	
AC-15	(> 72 VA)	10	1	0.7	1	1	0.4	10	1.1	0.3	10	1.1	0.3

Contactor relays for AC circuit switching

Utilization category	Standard operation						Occasional operation					
	Making conditions			Breaking conditions			Making and breaking capacities - 50 operating cycles			Making conditions		
	I/Ie	U/Ue	T _{0.95}	I/Ie	U/Ue	T _{0.95}	Ic/Ie	Ur/Ue	T _{0.95}	Ic/Ie	Ur/Ue	T _{0.95}
DC-13	1	1	6 P(1)	1	1	6 P(1)	1.1	1.1	6 P(1)	1.1	1.1	6 P(1)
DC-14	–	–	–	–	–	–	10	1.1	15 ms	10	1.1	15 ms

(1) The value "6 x P" is the result of an empirical relation which is estimated to represent most DC magnetic loads up to the highest limit of P = 50 W (6 x P = 300 ms). It is accepted that loads having drawn energy above 50 W are made up of weaker loads in parallel. As a consequence, the 300 ms value must form the highest limit whatever the value of the power drawn.

Key:

U (I) = applied voltage (current)

Ur = recovery voltage

L/R = test circuit time constant

Ue (Ie) = rated operational voltage (current)

Ic = making and breaking current expressed in DC or in AC like the r.m.s. value of the symmetrical components

T_{0.95} = time required to reach 95% of the current in steady-state conditions, expressed in milliseconds

Degrees of protection

General

In an installation, the degree of protection required for electrical equipment depends on the environmental characteristics. The degree of protection, ensured by the enclosure of equipment or by the cubicle containing the equipment is expressed by the IP code which gives the level of protection against access to hazardous parts, the ingress of foreign bodies and/or the ingress of water, in compliance with IEC 60529, IEC 60947-1.

Besides the IP symbol, the complete code has two figures followed (optionally) by two additional letters. A short description of the elements used in IP coding is given below.

IP... code	Figures or letters	Specifications for installation protection	Protection of persons
First figure		Against ingress of foreign bodies	Against access to hazardous parts with:
	0	No protection	No protection
	1	Diameter > 50 mm	Back of hand
	2	Diameter > 12.5 mm	Finger
	3	Diameter > 2.5 mm	Tool
	4	Diameter > 1 mm	Wire
	5	Limited protection against dust	Wire
	6	Total protection against dust	Wire
Second figure		Against entrance of water having a harmful effect	
	0	No protection	
	1	Vertical dripping	
	2	Dripping at a vertical angle of < 15°	
	3	Rain at a vertical angle of < 60°	
	4	Splashing	
	5	Low pressure water jet	
	6	Powerful water jets	
	7	Temporary immersion	
	8	Permanent immersion	
Additional letter (optional) for use with:		Against ingress of foreign bodies	Against access to hazardous parts with:
First figure 0	A	Stopped by a barrier with a 50 mm Ø sphere	Back of hand
First figure 0 or 1	B	Entrance of test finger limited to 80 mm	Finger
First figure 1 or 2	C	Wire with 2.5 mm Ø and length of 100 mm	Tool
First figure 2 or 3	D	Wire with 1 mm Ø and length of 100 mm	Wire
Additional letter (optional)		Specific additional information	
	H	High voltage apparatus	–
	M	Moving parts which are moving during water test	
	S	Moving parts which are stationary during water test	
	W	Specified atmospheric conditions	

Note: The type of enclosure or cubicle in which the equipment must be installed prevails with respect to the degree of protection.

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