



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 power kW	Motor nominal current: standardized values in blue colour (according to IEC 60947-4-1 Annex G)									
	220 V	230 V	240 V	380 V	400 V	415 V	440 V	500 V	660 V	690 V
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 power hp	Motor nominal current: single and three phase (according to UL 60947-4-1A)									
	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
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
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AX contactor range

Control made simple - The performance you need

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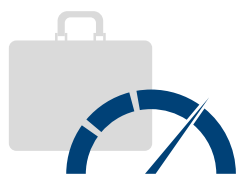
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AX contactors

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.



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.



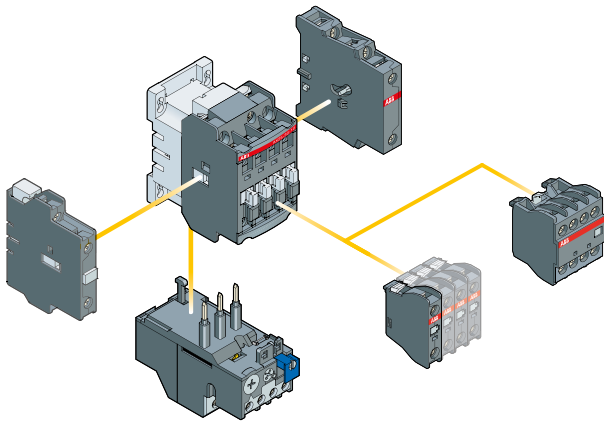
AX contactors

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.



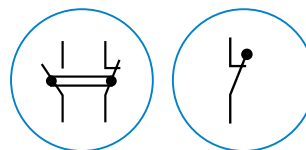
Safe and reliable control circuits

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	$\theta \leq 55^\circ\text{C}, 400\text{ V}$	kW
	AC Control supply		Type
IEC	AC-3 Rated operational current	$\theta \leq 55^\circ\text{C}, 400\text{ V}$	A
	AC-1 Rated operational current	$\theta \leq 40^\circ\text{C}, 690\text{ V}$	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
	Side mounting
Timers	Electronic
Interlocking units	Mechanical Mechanical / Electrical
Surge suppressors	Varistor (AC / DC) RC type (AC)

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)
CAL5X-11 (1 x N.O. + 1 x N.C.)
TEF5-ON
TEF5-OFF
VM5-1
VE5-1
RV5 (24...440 V)
RC5-1 (24...440 V)


Overload relays

Thermal relays	 Class 10A
Electronic relays	 Class 10E, 20E, 30E

TA25DU-M (0.10...32 A) (1)	TA42DU-M (18...42 A)
----------------------------	----------------------

- (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.



	22	30	37	45	55	75	90	110	132	160	200
	AX50	AX65	AX80	AX95	AX115	AX150	AX185	AX205	AX260	AX300	AX370
	50	65	80	96	115	150	185	205	265	305	370
	100	115	125	145	160	190	250	275	400	500	600

		CAL18X-11 (1 x N.O. + 1 x N.C.)	CAL19-11 (1 x N.O. + 1 x N.C.)
	VE5-2		VM300H
			VM19
	RC5-2 (24...440 V)		RC5-3 (250...440 V)

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





Manual motor starters

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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

Comprehensive accessory range

Manual motor starters can be equipped with busbars, auxiliary contacts, signalling contacts, undervoltage releases and shunt trips. Moreover it is possible to order IP65 (UL/CSA Type 12) door mounting kits, IP65 (UL/CSA Type 12) enclosures and shafts for doors.

MS116, MS132, MS165, MO132, MO165 and MS132-T share almost the same accessory range. Customers can optimize administration costs and inventory costs through reduced number of order codes by benefiting from a compatible range of accessories.



Manual motor starters with busbar connection



Accessory range



Door mounting kits

Manual motor starters

Features

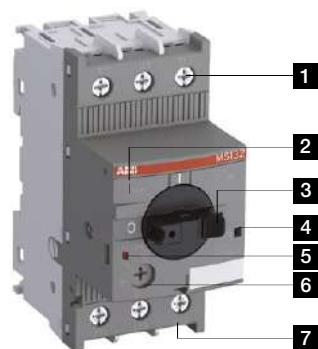
Features

- 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

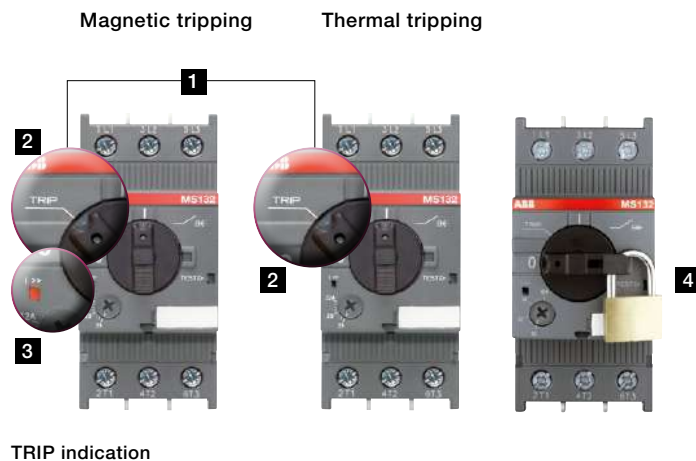
- Magnetic trip indication for several types available (MS132, MS165, and MS132-T)
- One product family in 45 mm width (MS116, MS132, MO132, and MS132-T)
- Variants from 0.1 up to 100 A available
- Short-circuit service breaking capacity I_{CS} up to 100 kA

- 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

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



Features of type MS132



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_n	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
contact for short-circuit alarm	- CK1
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



2CDC241010F0011

MS116-16



2CDC241001F0011

MS116-25



2CDC241013F0011

MS116-0.16-HKF1-11



2CDC241012F0011

MS116-32-HKF1-11

Description

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

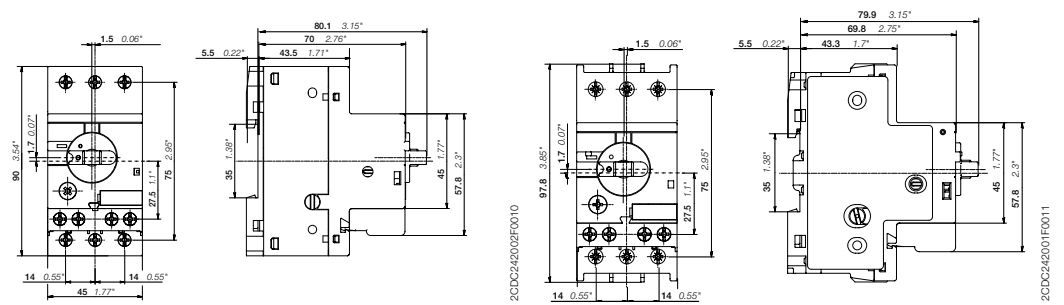
Ordering details

Rated operational power 400 V AC-3 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	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



1SBC101232F0010

MS132-10



2CDC241001F0011

MS132-32



2CDC241014F0011

MS132-0.16-HKF1-11



2CDC241015F0011

MS132-32-HKF1-11

Description

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

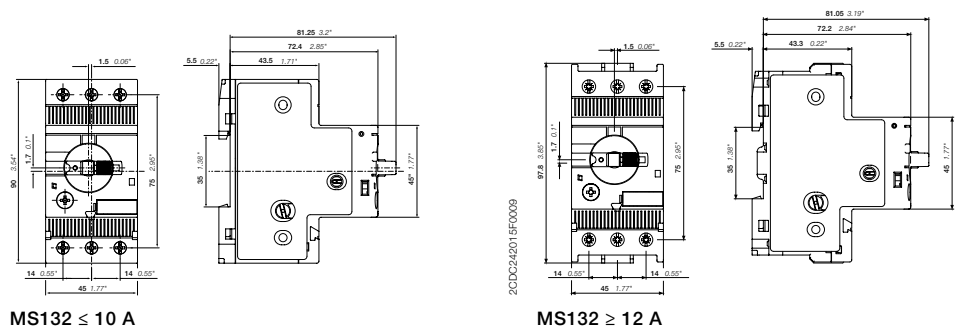
Ordering details

Rated operational power 400 V AC-3 kW	Setting range A	Short-circuit breaking capacity I _{CS} at 400 V AC kA	Rated instantaneous short-circuit current setting I _t 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



MS165 manual motor starters

10 to 65 A – with thermal and electromagnetic protection

2



MS165-65

2CDC241004V0015

Description

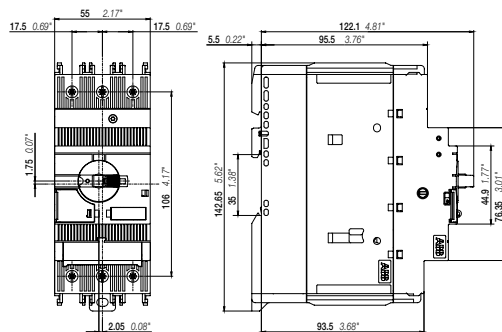
MS165 is a compact and powerful range for motor protection up to 30 kW (400 V) / 65 A in width of 55 mm. This type has also a clear and reliable indication of fault in a separate window in the event of short-circuit tripping. Further features are the build-in disconnect function, temperature compensation,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

2CDC242001F0014

2CDC13110C0201

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



MO132-6.3

2CDC241008F0011



MO132-32

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.

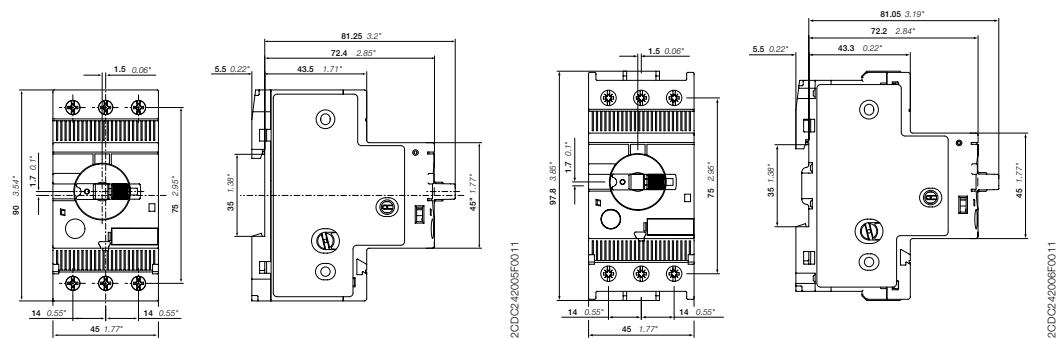
Ordering details

Rated operational power 400 V AC-3 ¹⁾	Rated operational current	Short-circuit breaking capacity I_{cs} at 400 V AC	Rated instantaneous short-circuit current setting I_i	Type	Order code	Weight (1 pce)
kW	A	kA	A			kg
-	0.16	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



MO132 ≤ 10 A

MO132 ≥ 12 A

2CDC242005F0011

2CDC242006F0011

2CDC13110C0201

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

2



MO165-65

2CDC241005V0015

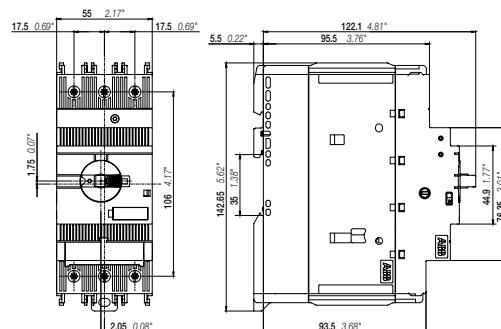
Description

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 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
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

2CDC24002F0014

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.

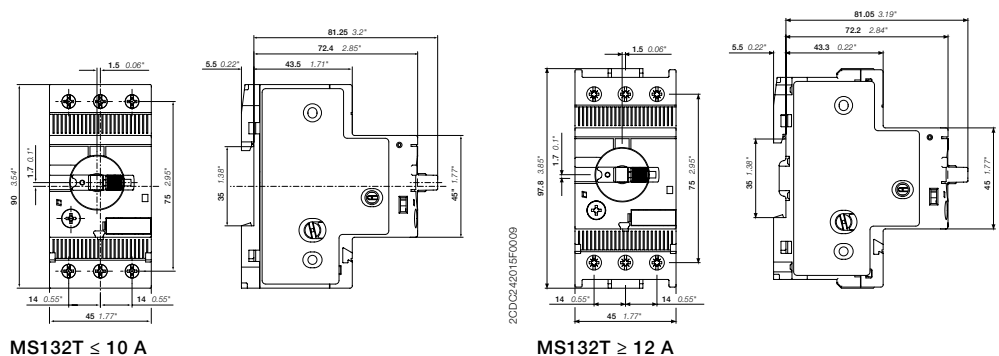
MS132-T is a 45 mm (width) compact and powerful range for transformer protection up to 12.5 kW (400 V) / 25 A. This type has also a clear and reliable indication of fault in a separate window in the event of short-circuit tripping. Further features are the build-in disconnect function, temperature compensation, 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	25000 cycles	50000 cycles
	20 ... 65 A	50000 cycles	50000 cycles	25000 cycles	50000 cycles	25000 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} 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
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

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_{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⁾	Horsepower Full Load Amps (FLA) Locked Rotor Amps (LRA)					See table "Motor ratings, three phase" See table "Motor ratings, three phase" 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

2

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.

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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⁾		480 V	600 V	480 V	600 V	480 V	600 V	480Y / 277 V	600Y / 347 V
	Fuses	Circuit breaker	kA	kA	kA	kA	kA	kA	kA	kA
A	A									
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⁾		480 V	600 V	480 V	600 V	480 V	600 V	480Y / 277 V	600Y / 347 V
	Fuses	Circuit breaker								
	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⁾		480 V	600 V	480 V	600 V	480 V	600 V
	Fuses	Circuit breaker						
	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⁾		480 V	600 V	480 V	600 V	480 V	600 V
	Fuses	Circuit breaker						
	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 kA	600 V 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		MS165	
Type			
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		

2

Main circuit		MO132 ≤ 10 A		MO132 ≥ 12 A	
Type					
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		

Main circuit		MO165	
Type			
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		

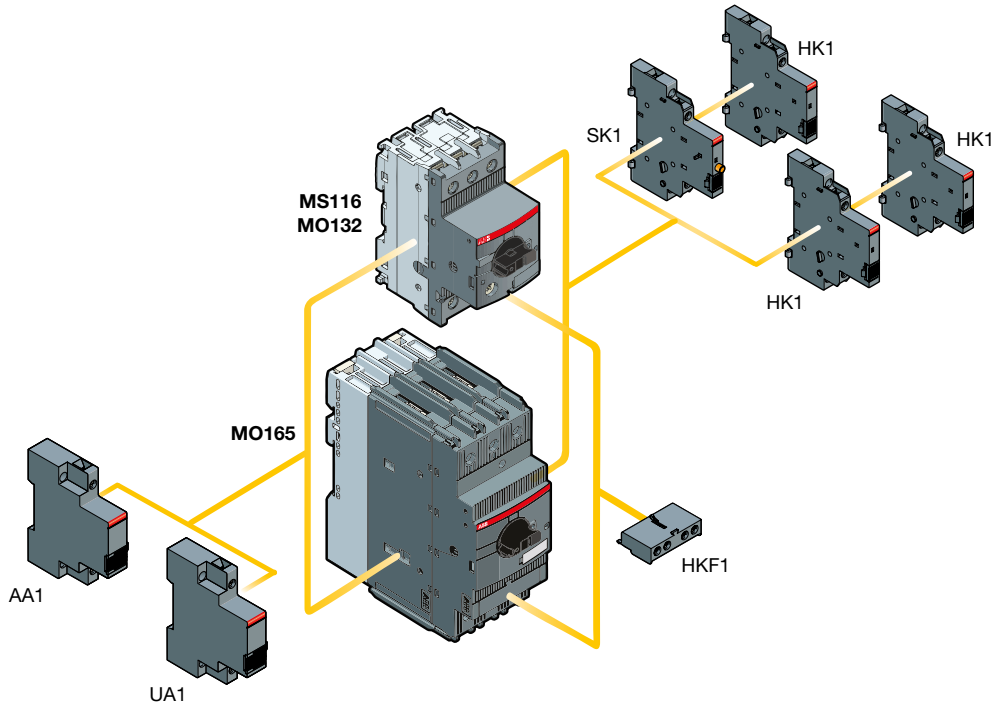
Main circuit		MS132-T ≤ 10 A		MS132-T ≥ 12 A	
Type					
Connecting capacity					
 Rigid	1 or 2 x	1 ... 4 mm ²		1/2 x 1 ... 2.5 mm ²	1/2 x 2.5 ... 6 mm ²
 Flexible with ferrule	1 or 2 x	0.75 ... 2.5 mm ²		1/2 x 0.75 ... 6 mm ²	
 Flexible with insulated ferrule	1 or 2 x	0.75 ... 2.5 mm ²		1/2 x 0.75 ... 6 mm ²	
 Flexible	1 or 2 x	0.75 ... 2.5 mm ²		1/2 x 1 ... 2.5 mm ²	1/2 x 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		

Main accessories

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

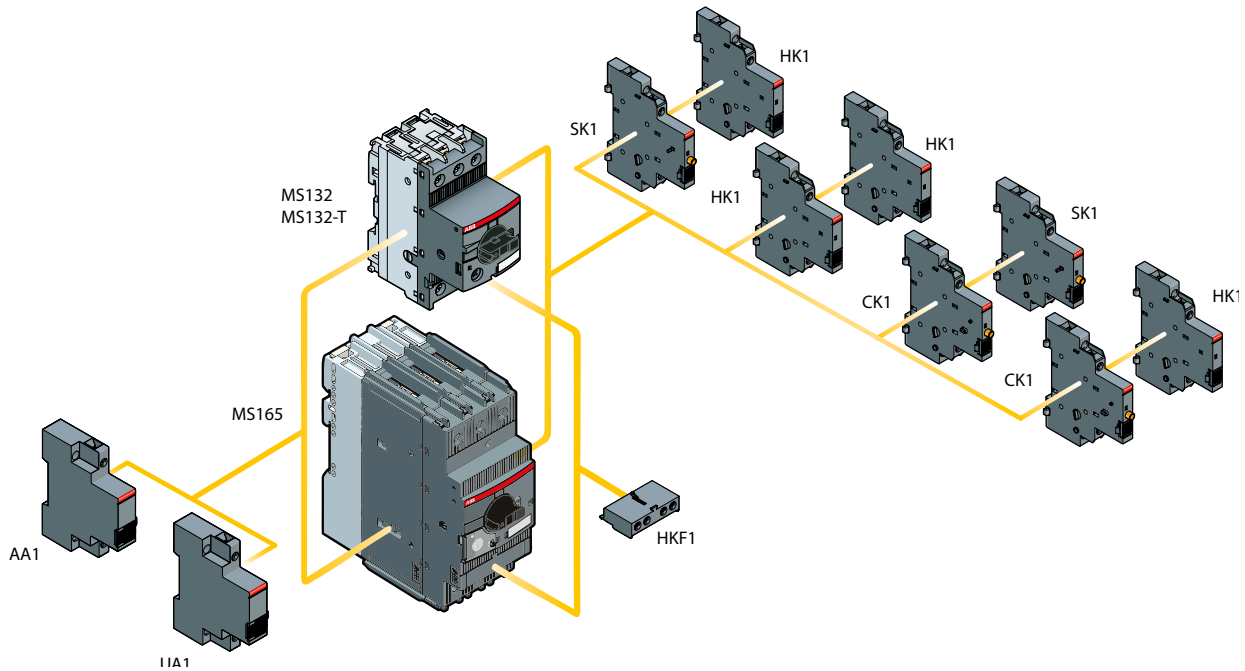
Manual motor starters with accessories (MS116, MO132, MO165)

2



2CDC242001F0015

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



2CDC24202F0015

2CDC131050C0201

Main accessories

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



HKF1-11

1SBC101208F0014



HK1-11

1SBC101208F0014



SK1-11

1SBC101210F0014



CK1-11

1SBC101288F0014

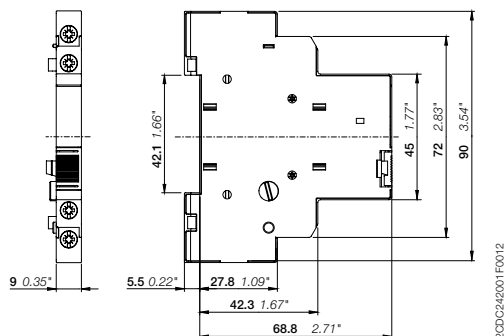
Description

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-T							
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

20DC242001F0012

2CDC131050C0201

Main accessories

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

2



1SBC101211F0014

AA1-24



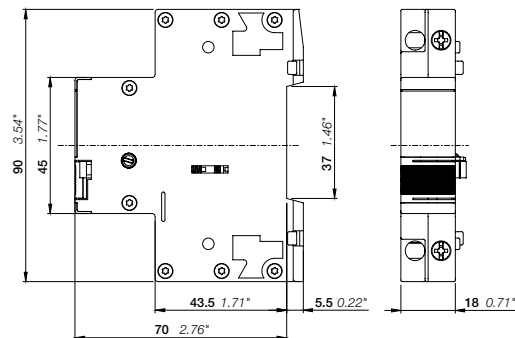
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UA1-24

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

2DC24202F0012

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_n	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_n / 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_n / 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
Power consumption	Pull-in	AC on request
		DC on request
	Holding	AC on request
		DC 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
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

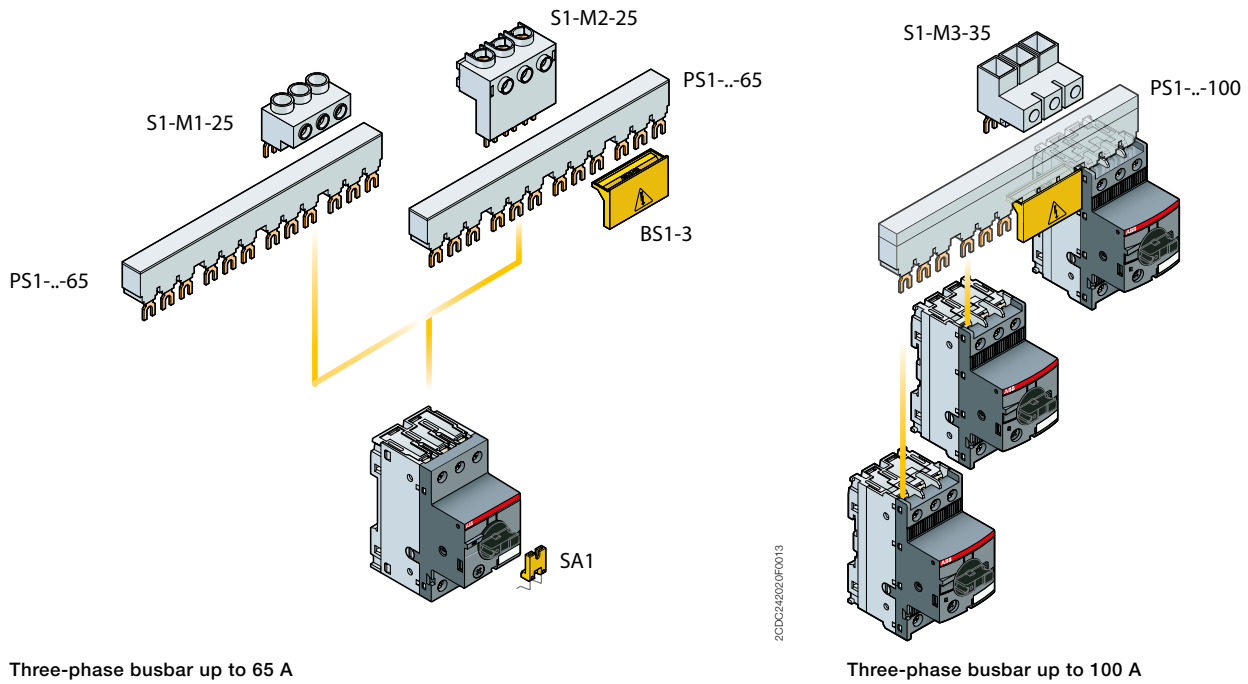
Auxiliary circuit

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
Stripping length	10 mm	
Tightening torque	0.8 ... 1.2 Nm / 7 lb.in	
Recommended screw driver	Pozidriv 2	

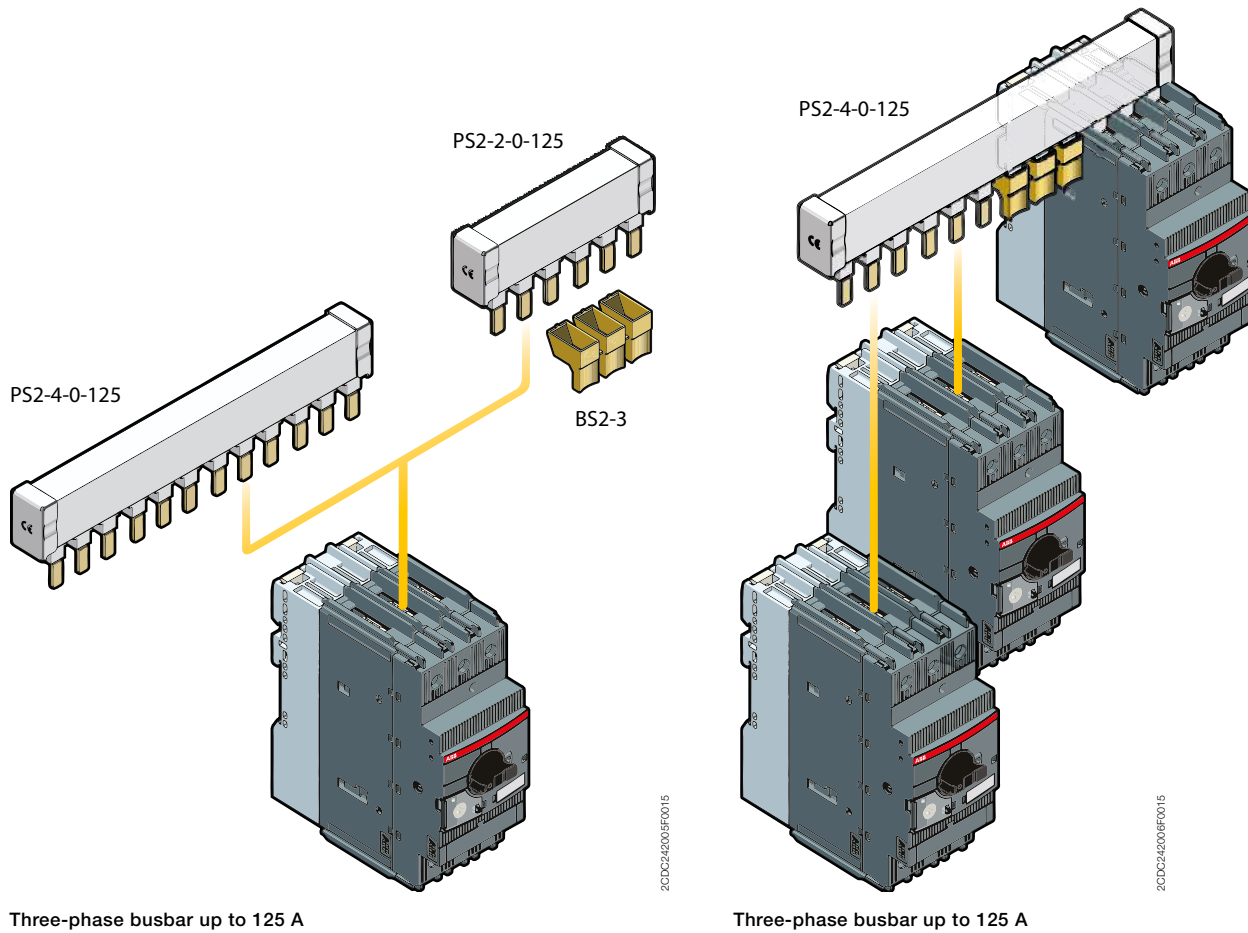
Main accessories

MS116, MS132, MS165, MO132, MO165

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



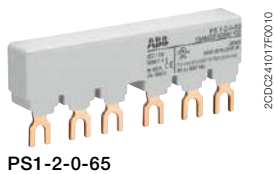
Manual motor starter with three-phase busbar systems (MS165, MO165)



Main accessories

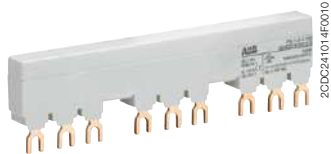
MS116, MS132, MO132, MS132-T

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

2CDC241004R0014



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

Suitable for	Rated operational current	Rated cross section	Mounting form	Type	Order code	Pkg qty	Weight (1 pce)
	A	mm ²					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

2CDC241002V0015



PS2-3-0-125

2CDC241003V0015



KA165

2CDC241010V0014



BS2-3

2CDC241001V0015



SA2

2CDC241023F0013

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,	125	2	0	PS2-2-0-125	1SAM401920R1002	10	0.100
	125	3	0	PS2-3-0-125	1SAM401920R1003	10	0.162
MO165	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_n	690 V			
Rated operational voltage U_n acc. to UL/CSA	600 V AC			
Rated operational current I_n	65 A	100 A	65 A	100 A
Rated operational current I_n 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



2CDC241004F0010

IB132-Y



2CDC241003F0010

IB132-G



2CDC241002F0010

DMS132-Y



2CDC241001F0010

DMS132-G

Description

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

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

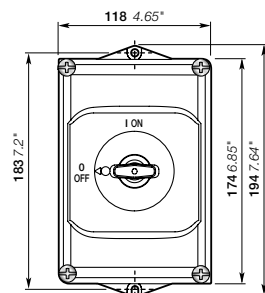
Ordering details

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

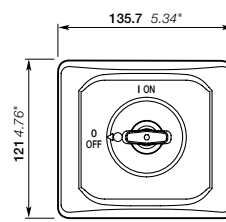
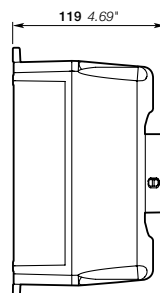
Indication I-O-T and ON-OFF-T

Please check for further equipment chapter General accessories.

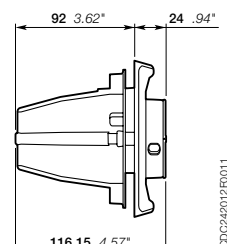
Main dimensions mm, inches



IB132



DMS132



2CDC242012F0011

2CDC131050C0201

MS495, MS497 manual motor starters

22 to 100 A – with thermal and electromagnetic protection

2



1SBC101184F0014

MS495-40



2CDC241020F0011

MS497-100

Description

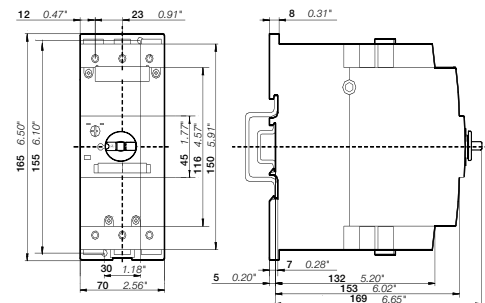
Manual motor starters (MMS) are protection devices for the main circuit. They combine motor control and protection in a single device. MMS are used mainly to switch motors manually ON/OFF and protect them and the installation fuse-less against short-circuit, overload and phase failures ¹⁾. Fuse-less 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	650	MS497-50	1SAM580000R1006	2.230
30	45 ... 63	50	819	MS497-63	1SAM580000R1007	2.255
37	57 ... 75	50	975	MS497-75	1SAM580000R1008	2.266
45	70 ... 90	50	1170	MS497-90	1SAM580000R1009	2.268
55	80 ... 100	50	1235	MS497-100	1SAM580000R1010	2.275

¹⁾ The MS49x range offers phase loss sensitivity

Main dimensions mm, inches



MS495, MS497

2CDC241014F0011

2CDC131042C0201

MS495, MS497 manual motor starters

Technical data

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				50	100		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	No back-up fuse required up to $I_{cc} = 100$ kA	9	18	160	6	12	80
MS497-50				50	100		50	100	No back-up fuse required up to $I_{cc} = 100$ kA	7.5	15	160	5	10	100
MS497-63	No back-up fuse required up to $I_{cc} = 100$ kA			50	100		50	70	200	7.5	15	160	4	7.5	100
MS497-75				50	100		50	70	200	5	10	160	3	6	125
MS497-90				50	100		50	70	200	5	10	160	3	6	160
MS497-100				50	100		50	70	200	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

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	hp
MS495-63	63	63	20	25	50	60	60
MS495-75	75	75	25	25	60	75	75
MS495-90	90	90	30	30	75	100	100
MS495-100	100	100	40	40	75	100	100
MS497-32	32	32	10	10	25	30	30
MS497-40	40	40	15	15	30	40	40
MS497-50	50	50	15	20	40	50	50
MS497-63	63	63	20	25	50	60	60
MS497-75	75	75	25	25	60	75	75
MS497-90	90	90	30	30	75	100	100
MS497-100	100	100	30	40	75	100	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 V		600 V		480 V	600 V	480Y/277V	600Y/347V	Type E ¹⁾	Type E
			kA	kA	kA	kA	kA	kA	kA	kA	480Y/277V	600Y/347V
MS495-63	250	500	65	30	65	30	65	30	65	30	30	
MS495-75	300	500	65	30	65	30	65	30	65	30	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	30	
MS497-40	160	500	65	30	65	30	65	30	65	30	30	
MS497-50	200	500	65	30	65	30	65	30	65	30	30	
MS497-63	250	500	65	30	65	30	65	30	65	30	30	
MS497-75	300	500	65	30	65	30	65	30	65	30	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			MS495	MS497
Type				
Connecting capacity				
 Rigid	1 or 2 x	2.5 ... 16 mm ²	2.5 ... 16 mm ²	2.5 ... 16 mm ²
 Flexible with ferrule	1 x	10 ... 70 mm ²	10 ... 70 mm ²	10 ... 70 mm ²
	2 x	10 ... 50 mm ²	10 ... 50 mm ²	10 ... 50 mm ²
 Flexible	1 x	10 ... 70 mm ²	10 ... 70 mm ²	10 ... 70 mm ²
	2 x	10 ... 50 mm ²	10 ... 50 mm ²	10 ... 50 mm ²
Stranded acc. to UL/CSA	1 x	AWG 10-2/0	AWG 10-2/0	AWG 10-2/0
	2 x	AWG 10-1/0	AWG 10-1/0	AWG 10-1/0
Flexible acc. to UL/CSA	1 x	AWG 10-2/0	AWG 10-2/0	AWG 10-2/0
	2 x	AWG 10-1/0	AWG 10-1/0	AWG 10-1/0
Stripping length		17 mm	17 mm	17 mm
Tightening torque		4 - 6 Nm / 35 - 53 lb.in	4 - 6 Nm / 35 - 53 lb.in	4 - 6 Nm / 35 - 53 lb.in
Recommended screw driver		Hexagon 4	Hexagon 4	Hexagon 4

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

2



MO495-75

ST02801



MO496-100

2CDC241021F0011

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.

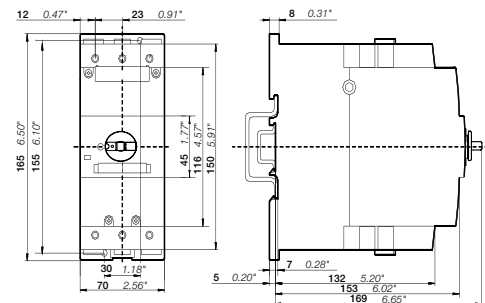
Ordering details

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_{sc}	
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				25	50	160	20	50	160	6	12	160	3	6	80
MO495-75	No back-up fuse required up to $I_{cc} = 100$ kA			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	200	7.5	15	160	4	7.5	100		
MO496-75				50	100		50	70	200	5	10	160	3	6	125		
MO496-90				50	100		50	70	200	5	10	160	3	6	160		
MO496-100			50	100	50	70	200	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

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			
	480/600 V	480/600 V	for motor disconnect		for group installation	
	A	A	480 V kA	600 V kA	480 V kA	600 V 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	

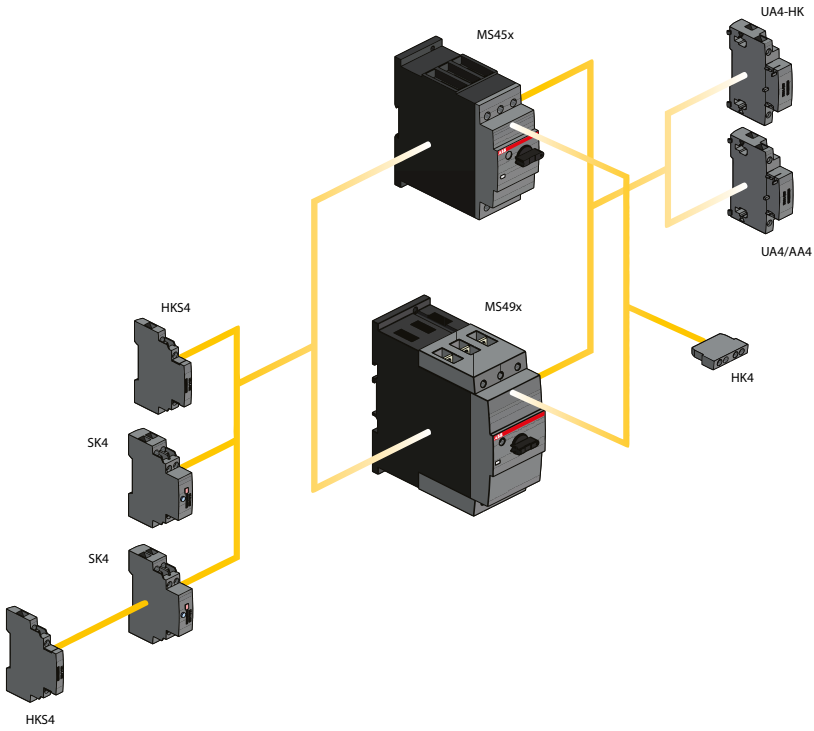
Connecting characteristics

Main circuit		MO495	MO496
Type			
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

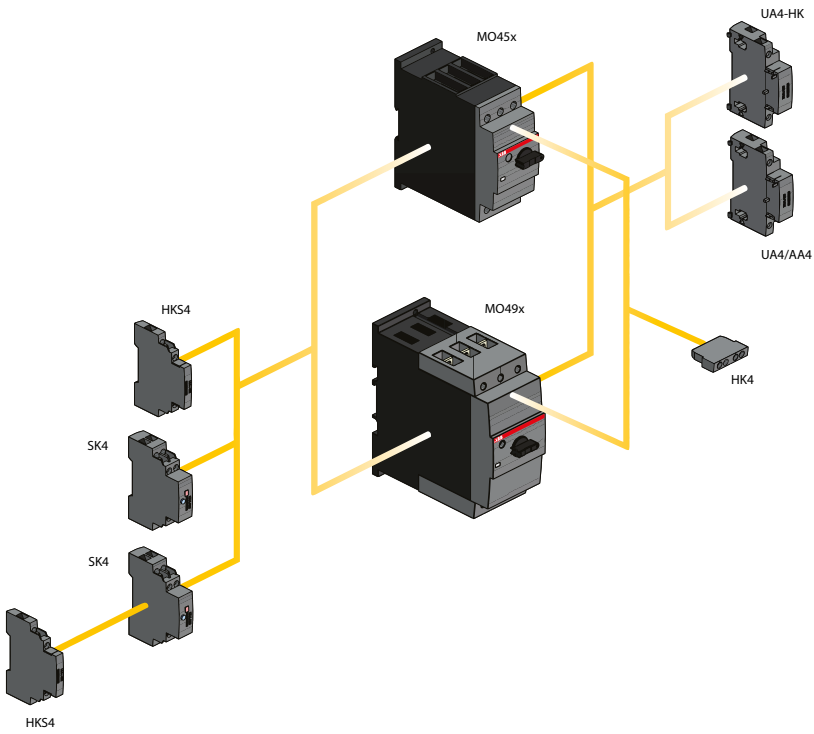
Main accessories

MS49x, MO49x manual motor starters

Manual motor starter MS49x with accessories



Manual motor starter MO49x with accessories



Main accessories

MS49x, MO49x manual motor starters



HK4-11

2CDC24102BF0011



HKS4-20

2CDC24102ZF0011



SK4-11

2CDC24102AF0011



AA4-24

2CDC24102BF0011



UA4-110

2CDC24102BF0011



SA2

2CDC241023F0013

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)
						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
	230 V	0.5 A	3 A	4 A
	400 V	-	1.5 A	3 A
	690 V	-	0.5 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
	48 V	0.3 A	-	-
	60 V	0.15 A	-	-
	110 V	-	0.22 A	0.5 A
	230 V	-	0.1 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 mm ²			
	2 x	0.5 ... 1.5 mm ² or 0.75 ... 2.5 mm			
 Flexible with ferrule	1 x	0.5 ... 2.5 mm ²			
	2 x	0.5 ... 1.5 mm ² or 0.75 ... 2.5 mm			
 Flexible	1 x	0.5 ... 2.5 mm ²			
	2 x	0.5 ... 1.5 mm ² 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					

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, 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

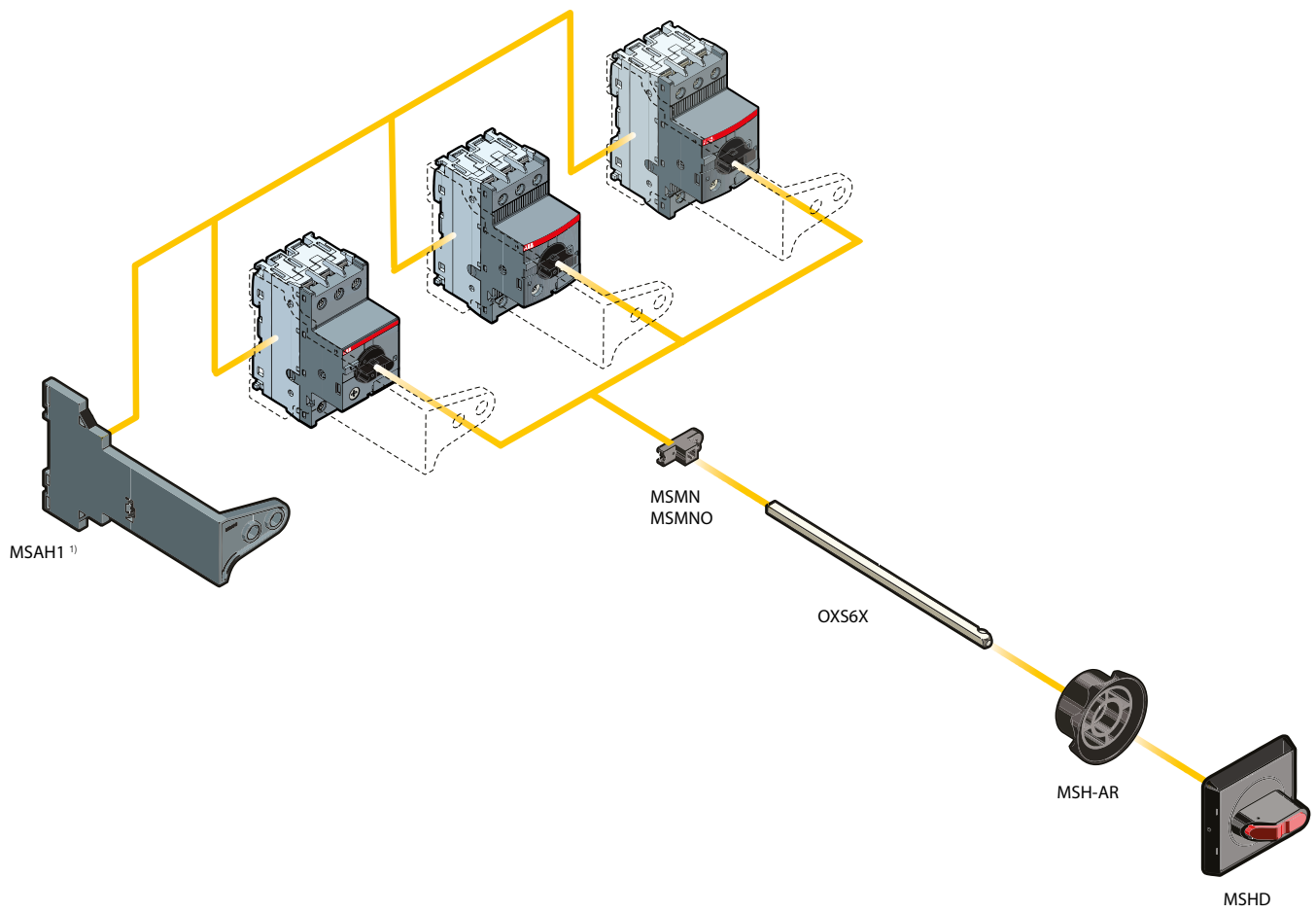
¹⁾ Indication I-O and ON-OFF (recommended for MS116, MS4xx, MO4xx)

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

2CDC240022F0013

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
Main accessories		69
Technical data		72
Electrical durability		86
Star-delta starting		90
Terminal marking and positioning		92
Dimensions		93

NX contactor relays

NX	AC operated	98
Main accessories		99
Technical data		100
Terminal marking and positioning		102

Accessories for AX06 ... AX80 3-pole contactors and NX contactor relays

103

Voltage code table

126

AX06 ... AX12 3-pole contactors

3 to 5.5 kW

AC operated



AX01002AX

3

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:

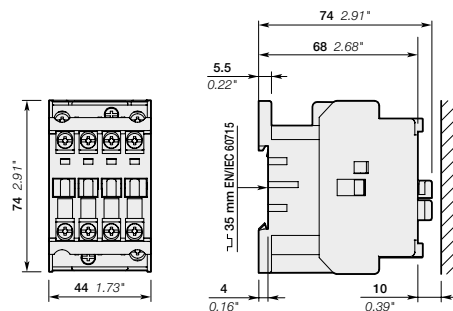
- 3 main poles and 1 built-in auxiliary contact
- control circuit: AC operated
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Ordering details

IEC Rated 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				kg		
kW	A								
3	20	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

1SBC100211S0201

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:

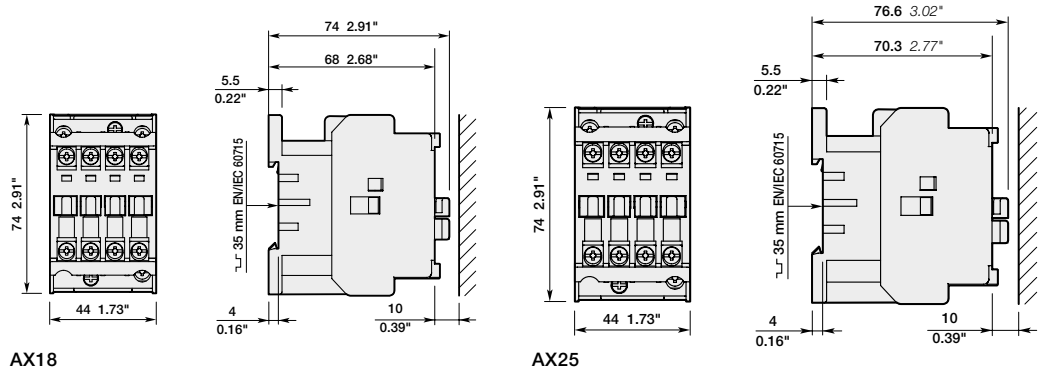
- 3 main poles and 1 built-in auxiliary contact
- control circuit: AC operated
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Ordering details

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

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

Main dimensions mm, inches



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:

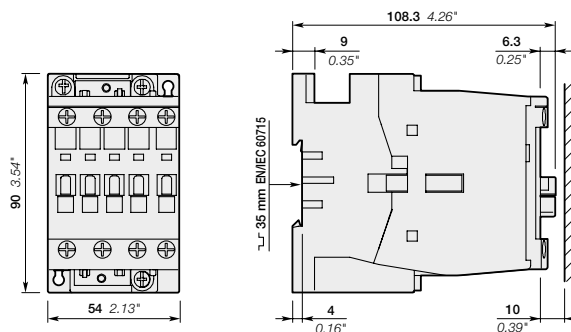
- 3 main poles and 1 built-in auxiliary contact
- control circuit: AC operated
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

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)		
current $\theta \leq 40^\circ\text{C}$ AC-1		V 50 Hz	V 60 Hz				kg		
kW	A								
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	230...240	230...240	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
						1 0	AX40-30-10-81	1SBL321074R8110	0.71
						0 1	AX40-30-01-81	1SBL321074R8101	0.71
18.5	60	24	24	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		
				1 0	AX40-30-10-88	1SBL321074R8810	0.71		
				0 1	AX40-30-01-88	1SBL321074R8801	0.71		
		110	110...120	230...240	230...240	1 0	AX40-30-10-86	1SBL321074R8610	0.71
						0 1	AX40-30-01-86	1SBL321074R8601	0.71
						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
220...230	230...240	230...240	230...240	1 0	AX40-30-10-80	1SBL321074R8010	0.71		
				0 1	AX40-30-01-80	1SBL321074R8001	0.71		
				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		

(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:

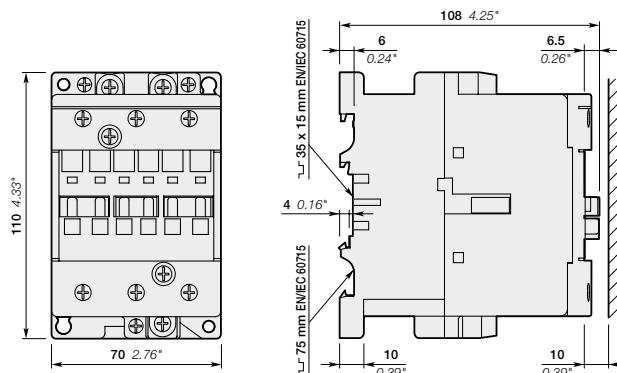
- 3 main poles
- control circuit: AC operated
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Ordering details (without auxiliary block)

IEC Rated operational power 400 V AC-3	Rated operational current $\theta \leq 40^\circ\text{C}$ AC-1	Rated control circuit voltage U_c (1)		Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce)
		V 50 Hz	V 60 Hz				
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:

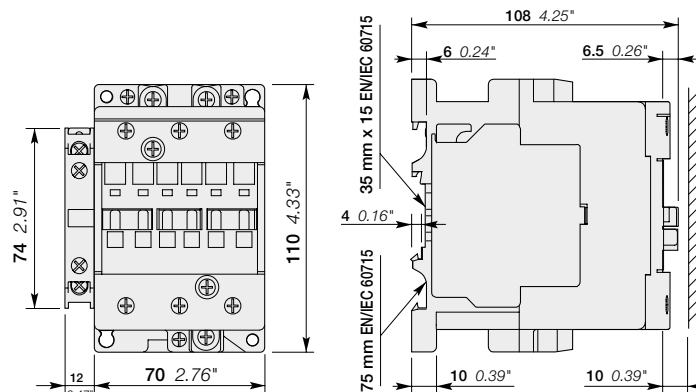
- 3 main poles and 1 side-mounted auxiliary contact block
- control circuit: AC operated
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Ordering details

IEC		Rated control circuit voltage U_c (1)		Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce)
Rated operational power	current	V 50 Hz	V 60 Hz				kg
400 V AC-3	$\theta \leq 40^\circ\text{C}$ AC-1						
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

AX0-0002

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:

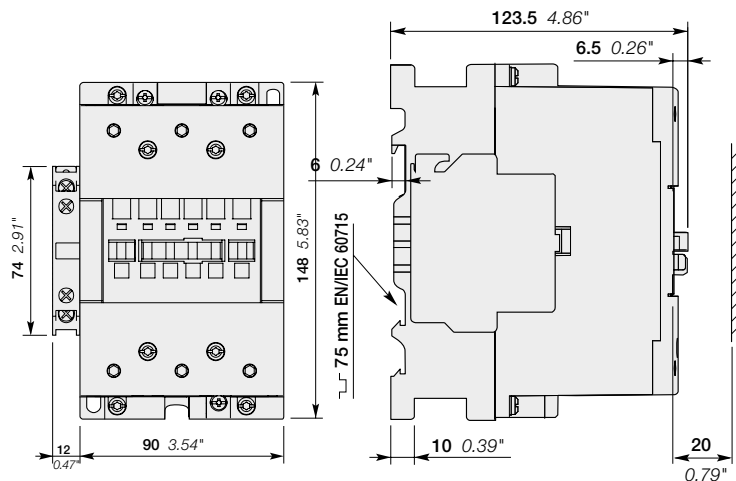
- 3 main poles and side mounted auxiliary contact block
- control circuit: AC operated
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Ordering details

IEC Rated operational power 400 V AC-3	current $\theta \leq 40^\circ\text{C}$ AC-1	Rated control circuit voltage U_c (1)		Auxiliary contacts fitted 	Type	Order code	Weight Pkg (1 pce) kg
		V 50 Hz	V 60 Hz				
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

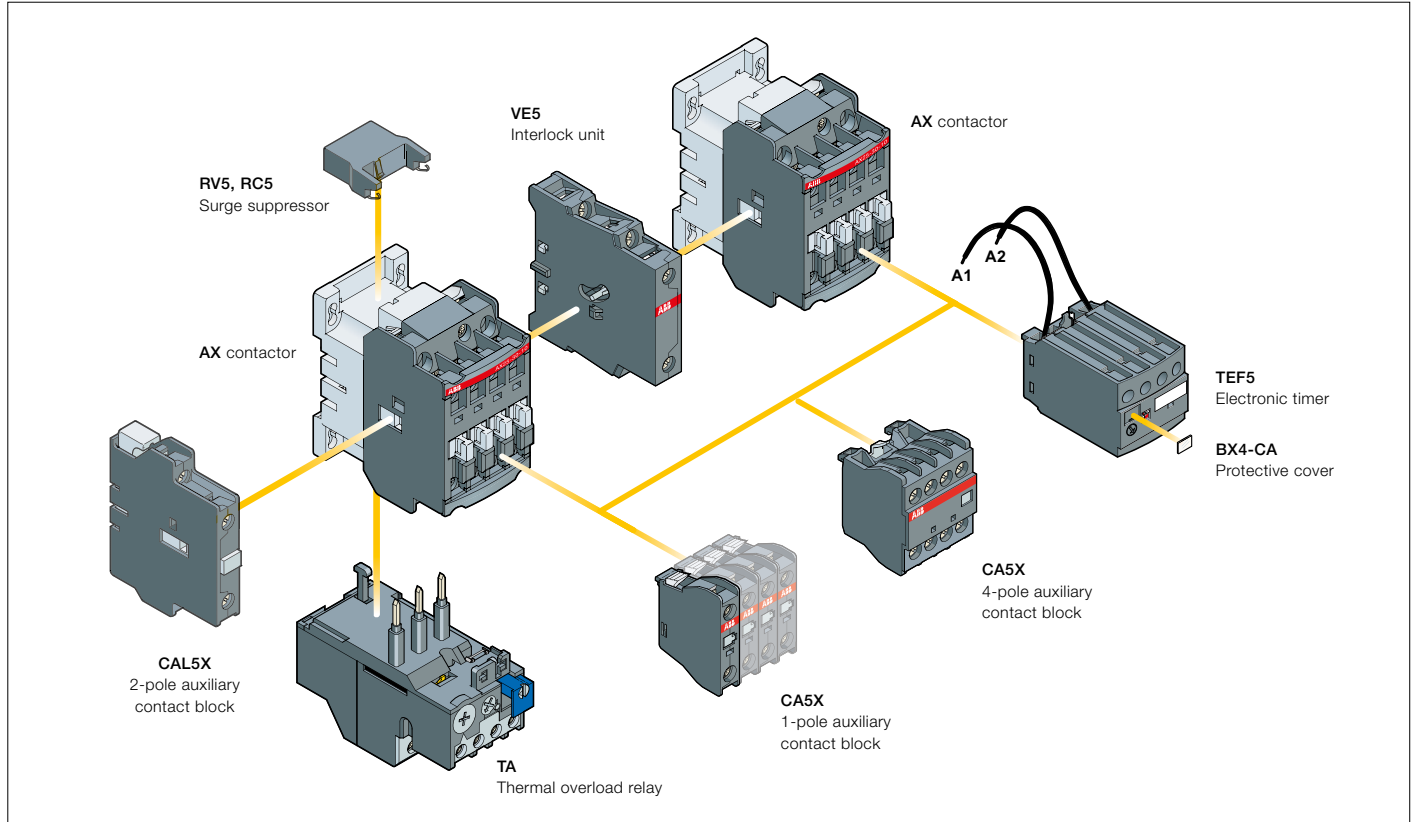


AX95, AX115, AX150

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

(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



1SBC101398F0014

TEF5-OFF

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	OFF-delay	1 1	TEF5-OFF	1SBN020314R1000	1	0.065
	10...100 s						

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



1SBC665483F0001

WB75-A

Mechanical latching units

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



1SBC574001F03001

RV5/50

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



1SBC382813F03001

BEA

Connecting links with manual motor starters

For contactors	MMS type	Type	Order code	Pkg qty	Weight (1 pce)
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".

1SBC100216S0201

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 1000 V AC.

These contactors are of the block type design with:

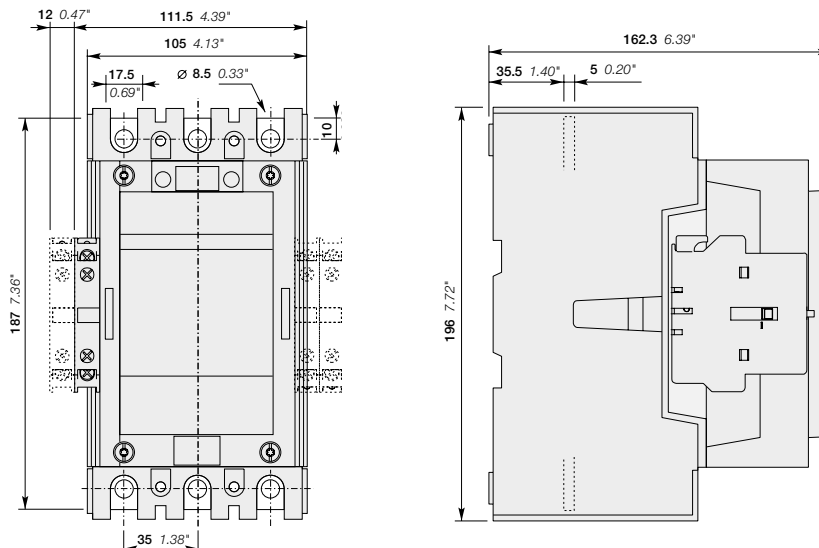
- 3 main poles and side mounted auxiliary contact block
- control circuit: AC operated
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

Ordering details

IEC		Rated control circuit voltage Uc (1)		Auxiliary contacts fitted		Type	Order code	Weight Pkg (1 pce)
Rated operational power	current	V 50 Hz	V 60 Hz	1 1				kg
400 V AC-3	$\theta \leq 40^\circ\text{C}$ AC-1			1 1				
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

AX00622


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:

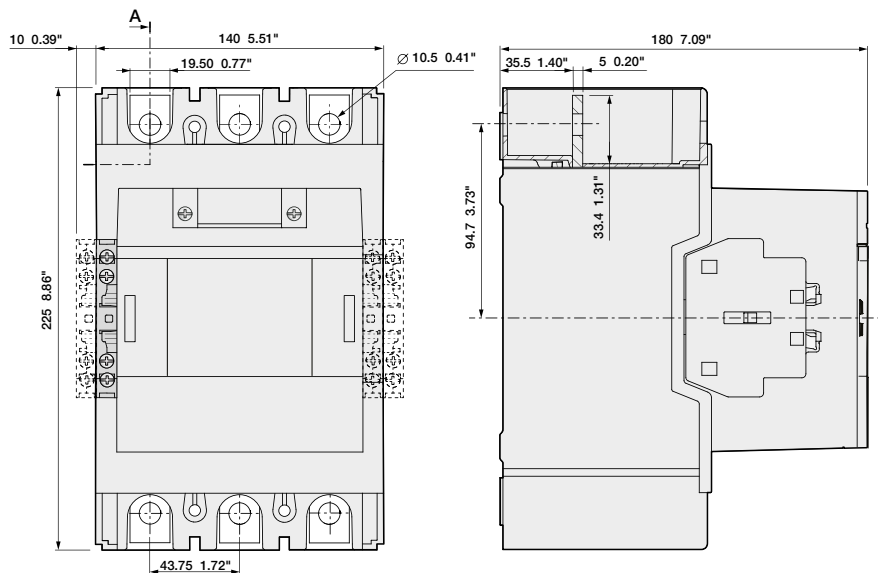
- 3 main poles and side mounted auxiliary contact block
- control circuit: AC operated
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

Ordering details

IEC Rated operational power 400 V AC-3	Rated operational current $\theta \leq 40^\circ\text{C}$ AC-1	Rated control circuit voltage U_c (1)		Auxiliary contacts fitted 	Type	Order code	Weight Pkg (1 pce) kg
		V 50 Hz	V 60 Hz				
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



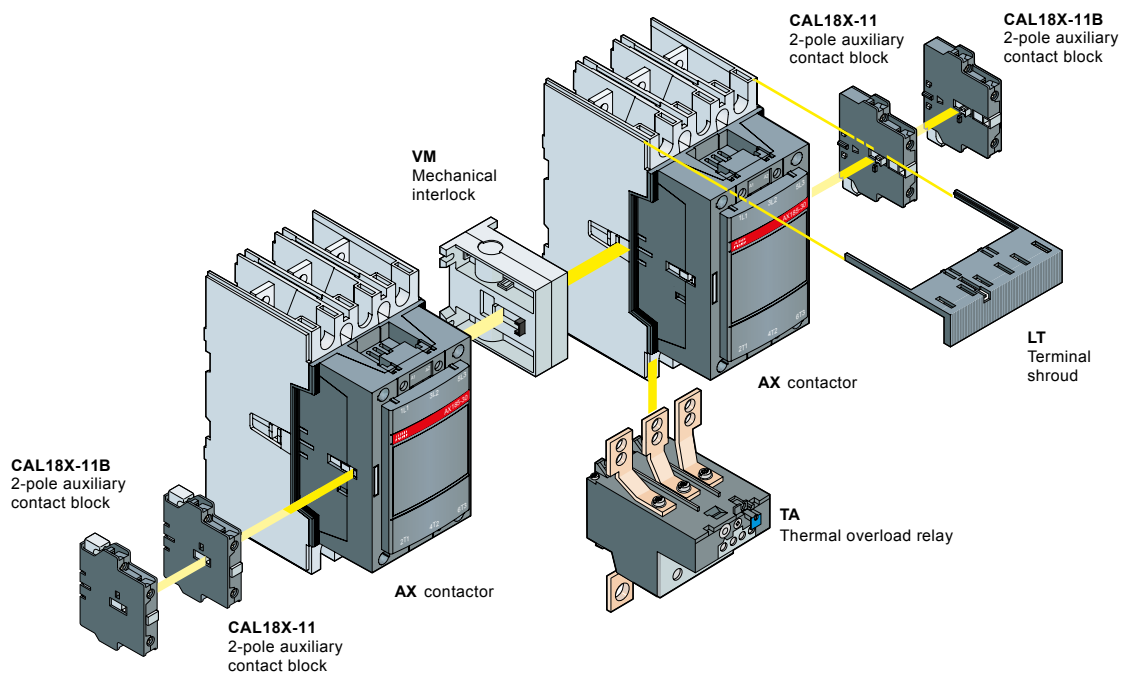
AX260, AX300, AX370

AX185 ... AX370 3-pole contactors

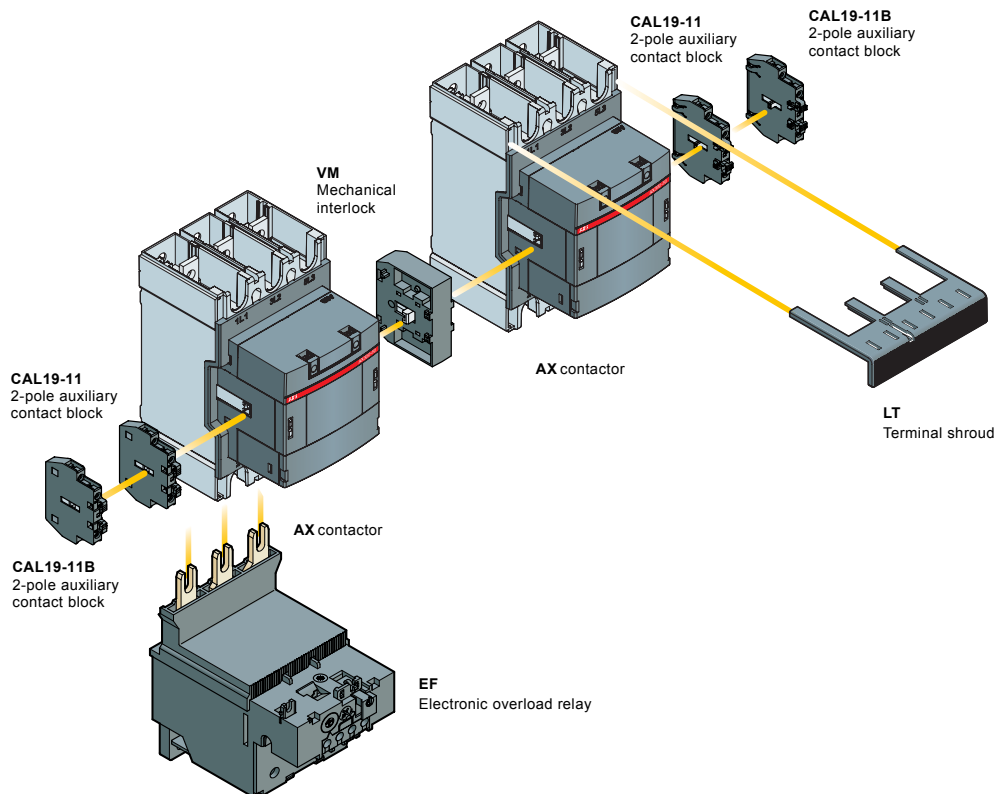
Main accessories

Main accessories (other accessories available)

AX185, AX205





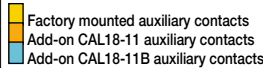
AX260 ... AX370



AX185 ... AX370 3-pole contactors

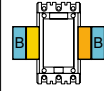
Main accessories

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		 <ul style="list-style-type: none"> ■ Factory mounted auxiliary contacts ■ Add-on CAL18-11 auxiliary contacts ■ Add-on CAL18-11B auxiliary contacts

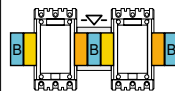
3

Contactor types + 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.

Contactor types 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



1SFC10103RF0201

CAL18X-11



1SBC5804 11F0301

VM300H



1SFT98099-019C3

LT...AC



1SFT98099-125

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	bar				
	mm	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 U _c	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, $\theta \leq 40\text{ }^\circ\text{C}$		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								
U _e max. $\leq 690\text{ V}$, 50/60 Hz	$\theta \leq 40\text{ }^\circ\text{C}$	20 A	22 A	25 A	27 A	32 A	55 A	60 A
	$\theta \leq 55\text{ }^\circ\text{C}$	20 A	22 A	22 A	25 A	27 A	55 A	60 A
	$\theta \leq 70\text{ }^\circ\text{C}$	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 $\theta \leq 55\text{ }^\circ\text{C}$								
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 - $\theta \leq 40\text{ }^\circ\text{C}$)								
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 $\leq 500\text{ V}$ 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}								
at 40 °C ambient temperature,	1 s	220 A	250 A	280 A	300 A	300 A	600 A	600 A
in free air from a cold state	10 s	80 A	100 A	120 A	145 A	200 A	400 A	400 A
	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 $\phi = 0.45$	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}		100 A		125 A	125 A	145 A	160 A	190 A
acc. to IEC 60947-4-1, open contactors, $\theta \leq 40^\circ\text{C}$		35 mm ²		50 mm ²	50 mm ²	50 mm ²	70 mm ²	95 mm ²
With conductor cross-sectional area								
AC-1 Utilization category								
For air temperature close to contactor								
I_e / Rated operational current AC-1	$\theta \leq 40^\circ\text{C}$	100 A	115 A	125 A	145 A	160 A	190 A	
U _e max. $\leq 690\text{ V}$, 50/60 Hz	$\theta \leq 55^\circ\text{C}$	85 A	95 A	105 A	135 A	145 A	145 A	
	$\theta \leq 70^\circ\text{C}$	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 $\theta \leq 55^\circ\text{C}$								
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	
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	
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		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 $\leq 500\text{ V AC}$ - 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 $\phi = 0.45$	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

Contactors 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	



3-phase motors



1500 r.p.m. 50 Hz
1800 r.p.m. 60 Hz
3-phase motors

(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		150	150	170	250	260	350	400	520
600 V AC		AWG 1	AWG 1/0	AWG 2/0	MCM 250	MCM 300	MCM 500	2// AWG 3/0	2//MCM 300
With conductor cross-sectional area									
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	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								

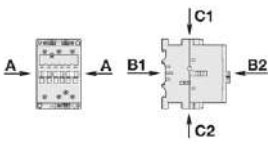
(1) For the corresponding kW/A or hp/A values of 1500 r.p.m, 50 Hz or 1800 r.p.m, 60 Hz, 3-phase motors, see "Motor rated operational powers and currents".
 (2) In preparation.

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								
acc. to IS / IEC 60947-4-1		690 V						
acc. to UL / CSA		600 V						
Rated impulse withstand voltage U_{imp}		6 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						
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 $0.85 \dots 1.1 \times U_c$						
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

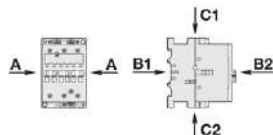
Contactor types	AC operated	AX06	AX09	AX12	AX18	AX25	AX32	AX40
Mounting positions								
		Max. N.O. or N.C. built-in and add-on N.O. or N.C. auxiliary contacts: see accessory fitting details for 3-pole contactor AX06 ... AX80						
Control voltage / Ambient temperature								
Mounting positions	1, 1±30°, 2, 3, 4, 5	at $\theta \leq 55$ °C	0.85... 1.1 x U_c					
		at 55 °C < $\theta \leq 70$ °C	U_c					
	6	at $\theta \leq 55$ °C	0.95... 1.1 x 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 acc. to IEC 60947-4-1	AC supply	at $\theta \leq 55$ °C 0.85...1.1 x U_c			At $\theta \leq 70$ °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	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 U_c					
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".

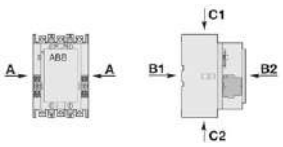
Mounting characteristics and conditions for use

Contactor 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	at $\theta \leq 55$ °C	0.85...1.1 x U_c				0.85...1.1 x U_c	
	at 55 °C $\leq \theta \leq 70$ °C	U_c					
	at $\theta \leq 55$ °C	0.95...1.1 x U_c					
	at $\theta \leq 55$ °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}		8 kV				
Ambient air temperature close to contactor						
Operation	Fitted with thermal overload relay	-25...+55 °C (1)				
Storage	Without thermal overload relay	-40...+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)		1/2 sinusoidal shock for 30 ms		
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		

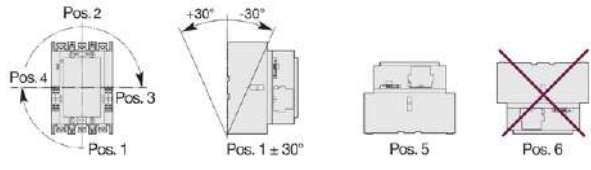
(1) The max. operational current is 182A for AX205 with TA200DU-200
 (2) These values are not valid for rail mounting with contactors AX95 ... AX150.

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...1.1 x U_c		At $\theta \leq 70$ °C 0.85 ... 1.1 x 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 $\theta \leq 55$ °C	0.85...1.1 x U_c			
		at 55 °C ≤ $\theta \leq 70$ °C	0.85...1.1 x U_c			
	6	at $\theta \leq 55$ °C	Unauthorized			
		at $\theta \leq 55$ °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

Contactor 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...6 mm ²	2.5...16 mm ²	
 Stranded ($\geq 6 \text{ mm}^2$)			2 x					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 insulated ferrule		2 x	0.75...2.5 mm ²				0.75...4 mm ²	2.5...10 mm ²	
 Flexible with insulated ferrule		1 x	-				0.75...2.5 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	-	
		I >	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		
		I >	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

Contactor 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)		
		I >	-		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 mm ²		0.75...2.5 mm ²		
		2 x	1...4 mm ²		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 mm ²				
		I >	3.7 mm ²				
Connection capacity acc. to UL / CSA		1 or 2x	AWG 18 ... 14		AWG 18 ... 14		
Stripping length			9 mm		9 mm		
Coil terminals			10 mm				
Built-in auxiliary terminals							
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

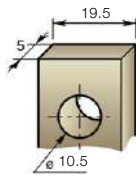

















Connecting characteristics

		AC operated	AX185	AX205
Contactors 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
			l >	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

AC operated		AX260	AX300	AX370
Contactor types				
Main terminals				
Flat type				
				
Connection capacity (min. ... max.)				
Main conductors (poles)				
	Rigid with connector	Cu cable Stranded	1 x	16...300 mm ²
		Clamp type		1SDA055016R1
		Tightening torque		25 Nm
		Cu cable Stranded	2 x	70...185 mm ²
		Clamp type		1SCA022194R0890 (OZXB4)
		Tightening torque		22 Nm
		Al cable Stranded	1 x	185...240 mm ²
		Clamp type		1SDA055020R1
		Tightening torque		43 Nm
		Cu cable Flexible	1 x	16...240 mm ²
		Clamp type		1SDA055016R1
		Tightening torque		25 Nm
		Cu cable Flexible	2 x	70...185 mm ²
		Clamp type		1SCA022194R0890 (OZXB4)
		Tightening torque		22 Nm
	Bars or lugs	Double for Al/Cu cable		70...185 mm ²
		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 mm ²
			2 x	1...4 mm ²
	Flexible		1 x	0.75...2.5 mm ²
			2 x	0.75...2.5 mm ²
	Flexible with non insulated		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...2.5 mm ²
	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		16 A						
	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		10 x I _e AC-15 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 with failure rate acc. to IEC 60947-5-4		12 V / 3 mA						
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 acc. to annex L of IEC 60947-5-1		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.						
Mirror contacts acc. to annex F of IEC 60947-4-1		Built-in N.C. auxiliary contacts or additional N.C. auxiliary contacts (CA5X, CAL5X-11) are mirror contacts.						

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.

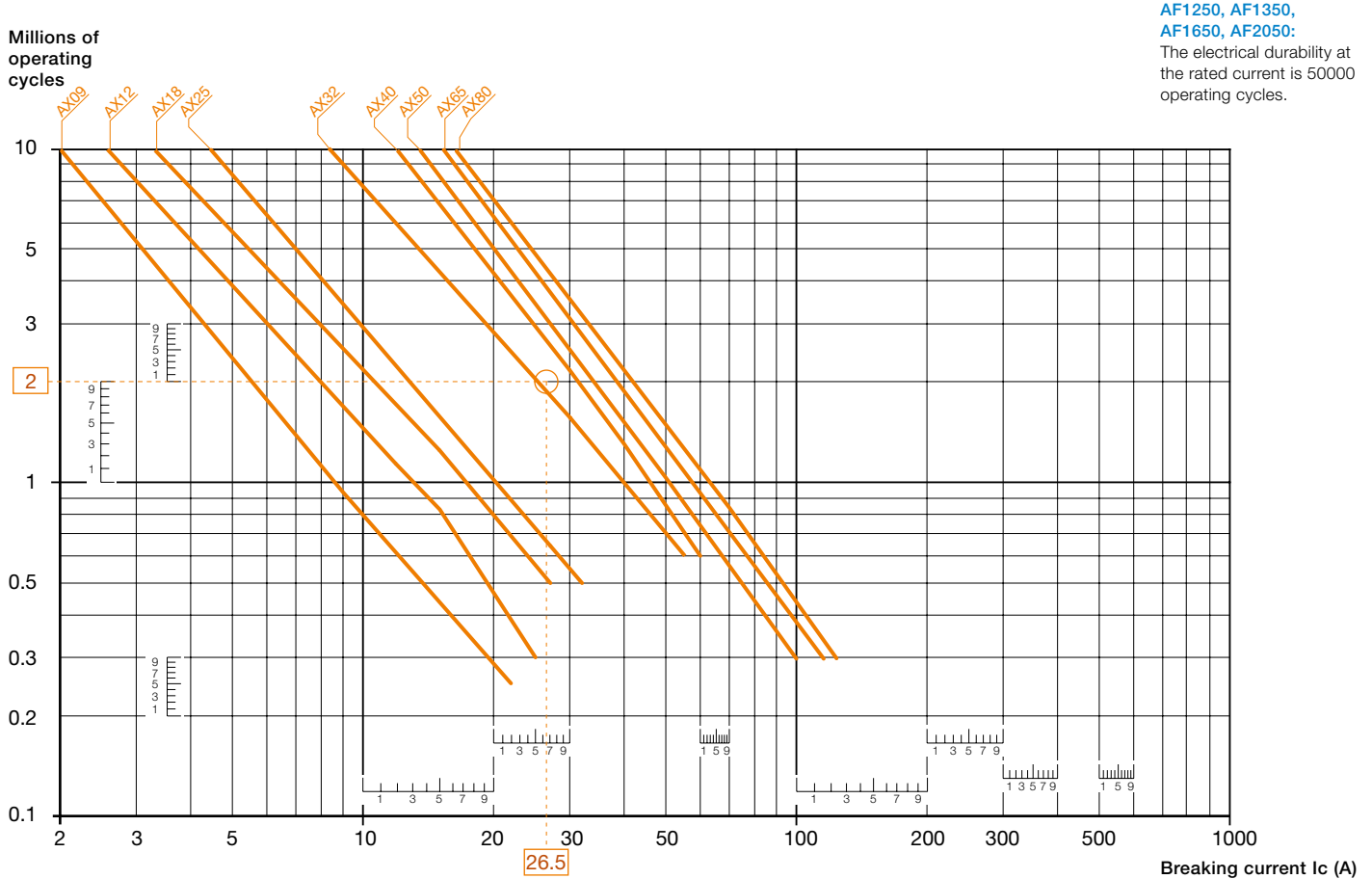
3-pole contactors

Electrical durability

Electrical durability for AC-1 utilization category - $U_e \leq 690$ 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".



**AF1250, AF1350,
AF1650, AF2050:**
The electrical durability at
the rated current is 50000
operating cycles.

Example:

$I_c / AC-1 = 26.5$ 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

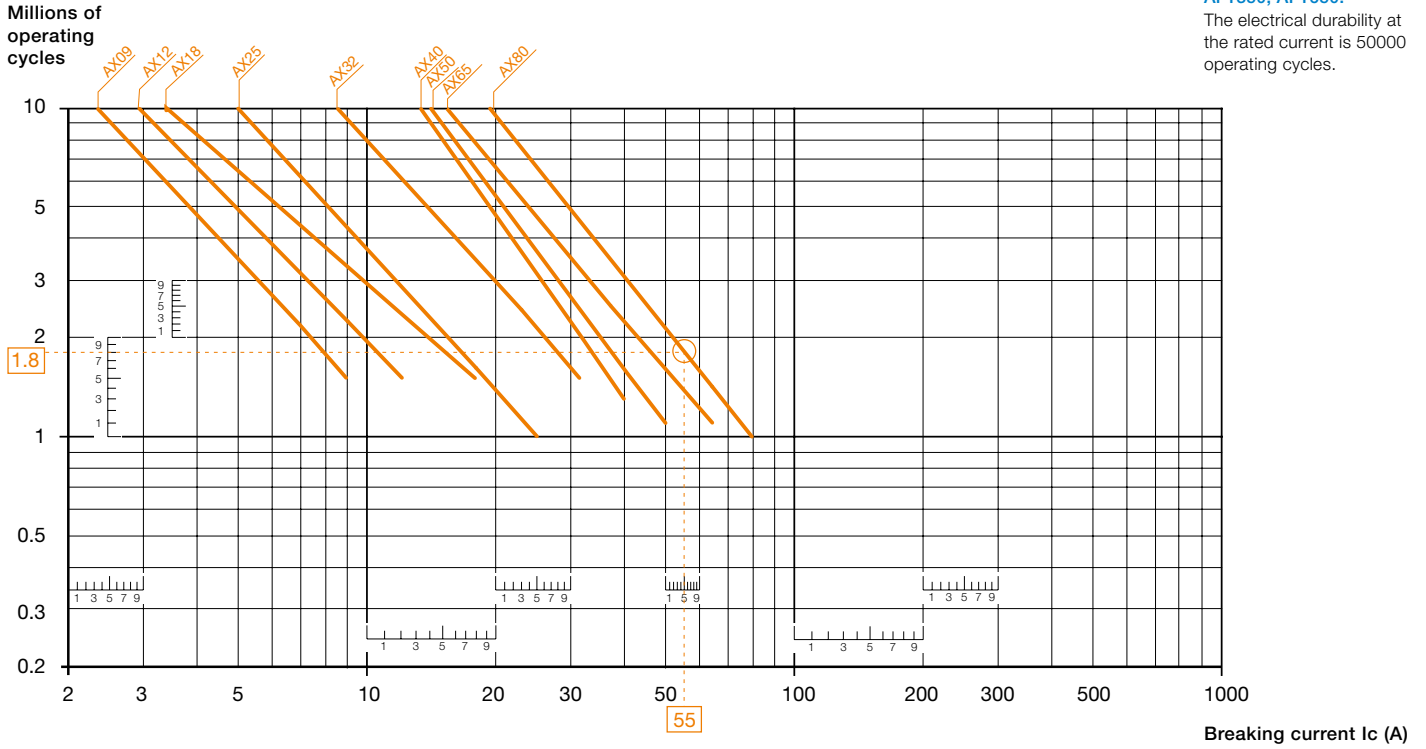
Electrical durability

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".

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 "O" (55 A / 1.8 million operating cycles) on the curves (AC-3 - $U_e \leq 440$ V).

3-pole contactors

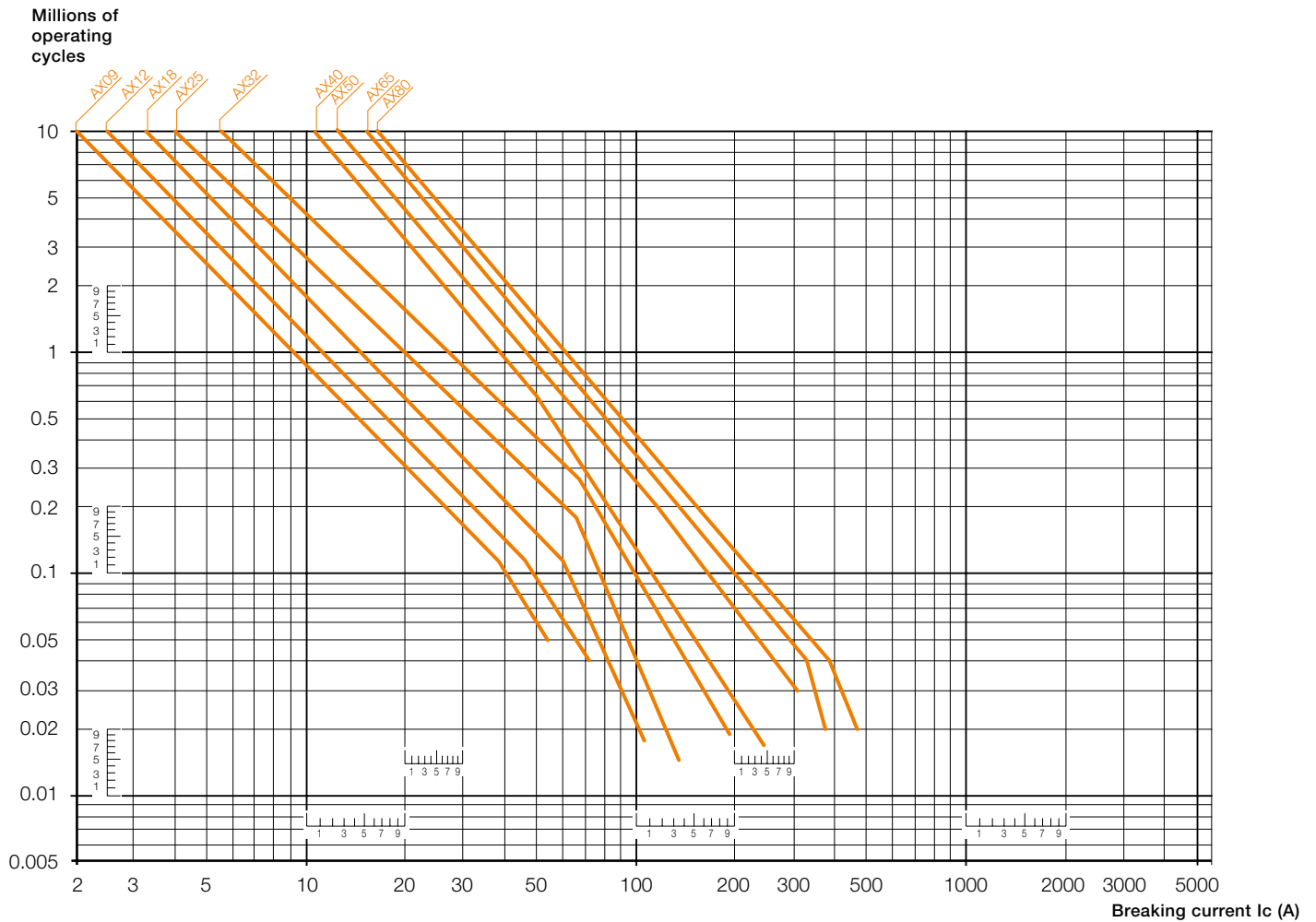
Electrical durability

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

Ambient temperature $\leq 55\text{ }^\circ\text{C}$

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

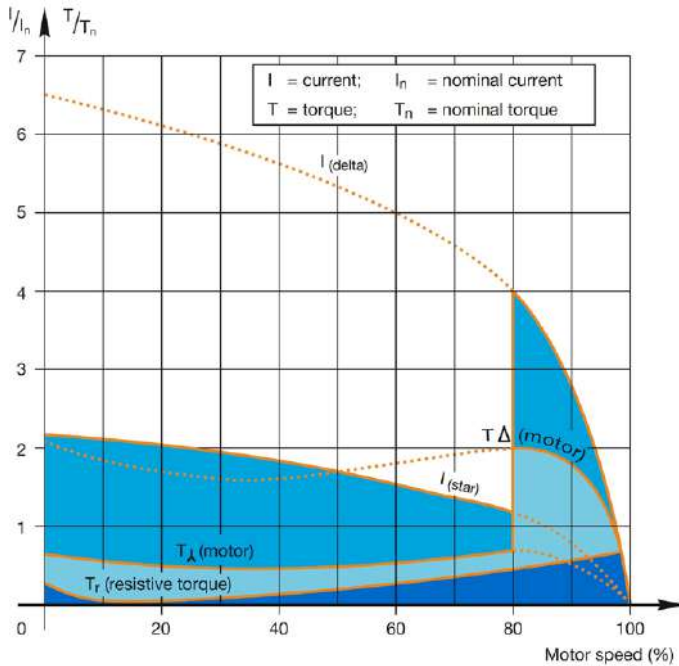
General

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

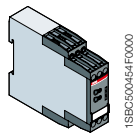
Contactor selection

3

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

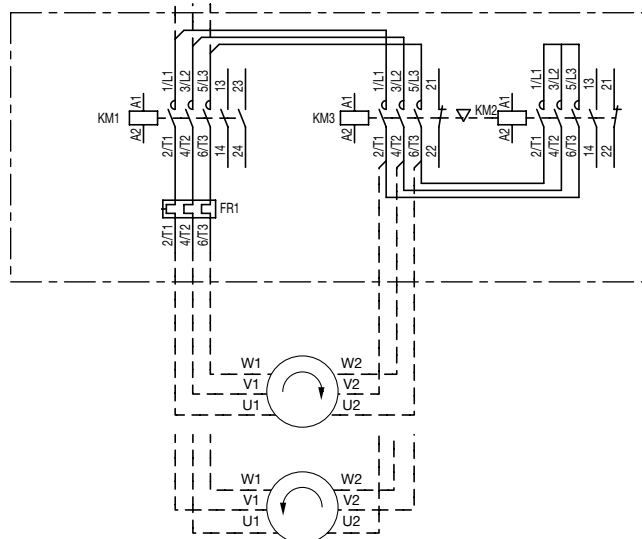
Timing function	Time ranges	Output	Rated control supply voltage	Type	Order code	Pkg qty	Weight (1 pce) kg
Star-delta change-over (3)	7 (0.05 s - 10 min)	2 n/o contacts, 3 LEDs	28-48 V DC 24-240 V AC	CT-SDS.22S	1SVR730210R3300	1	0.114
ON-delay (4)	10 (0.05 s - 300h)	2 c/o SPDT contacts	380-440 V AC 24-240 V AC/DC	CT-ERS.21S	1SVR730211R2300 1SVR730100R0300	1	0.118 0.152

(3) 50 ms transition time

(4) No transition time

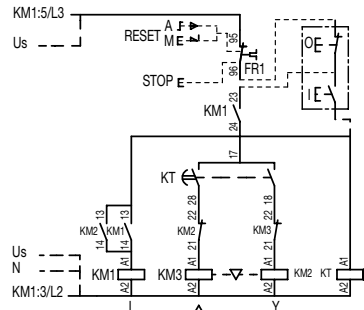
Power circuit diagram

AX06 ... AX370 contactors

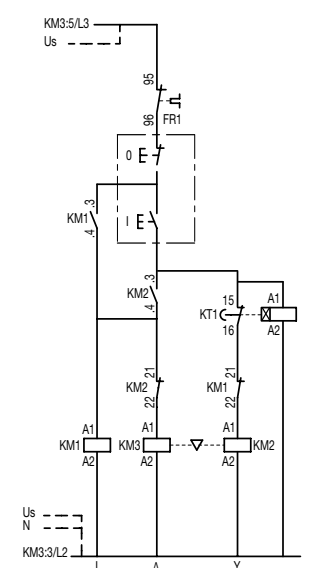


Control circuit diagrams - Remote control

AX06 ... AX205 contactors



AX260 ... AX370 contactors



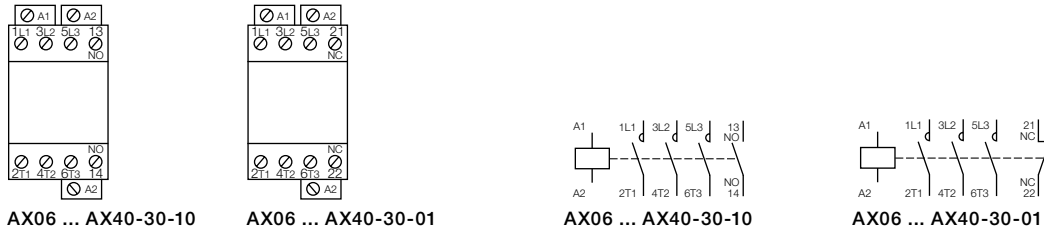
18BCT100224-S0201

AX06 ... AX370 3-pole contactors

Terminal marking and positioning

AX06 ... AX150 contactors - AC operated

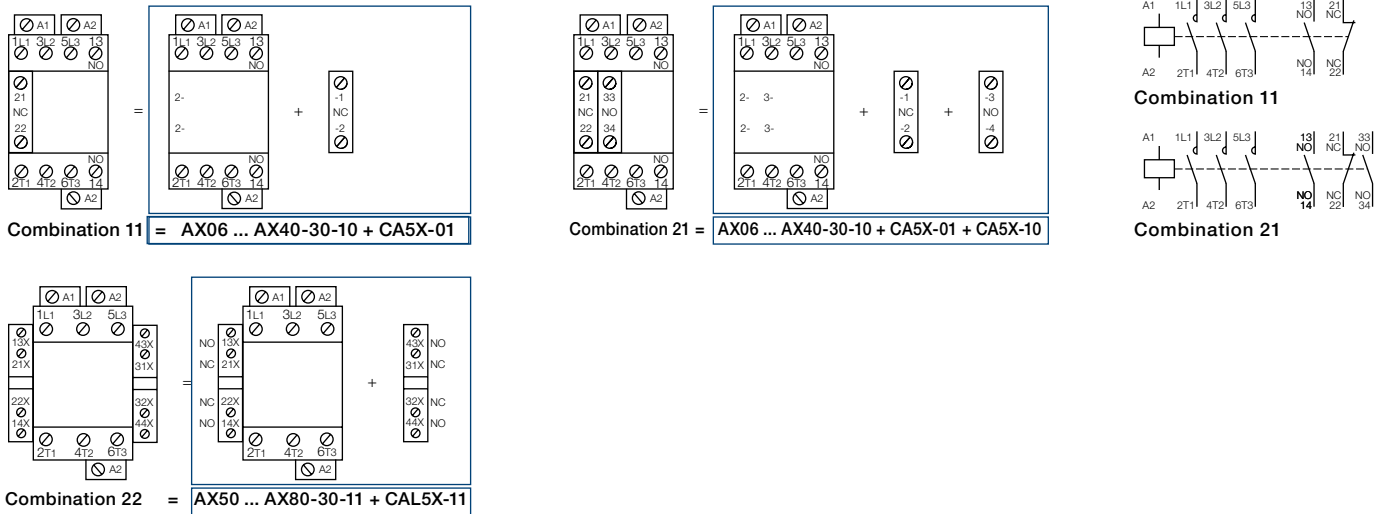
Standard devices without addition of auxiliary contacts



Standard devices with factory mounted auxiliary contacts

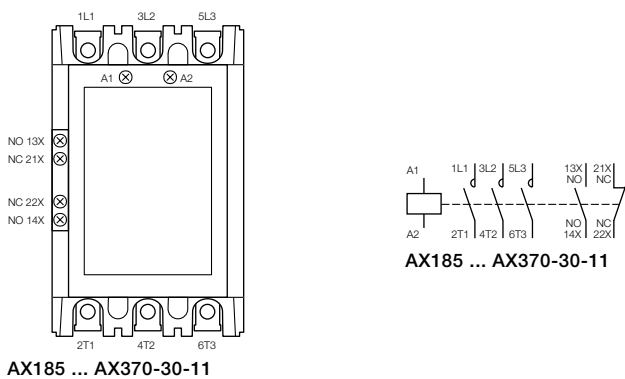


Other possible contact combinations with auxiliary contacts added by the user



AX185 ... AX370 contactors - AC operated

Standard devices with factory mounted auxiliary contacts

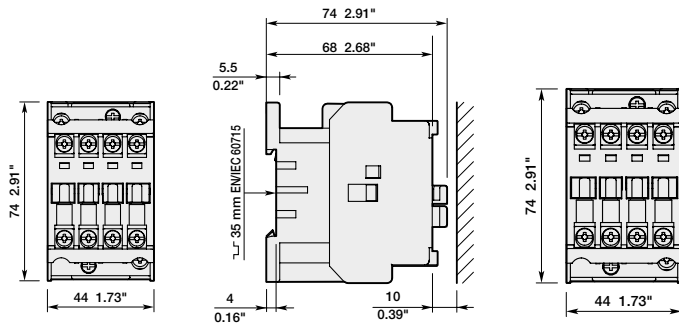


AX185 ... AX370-30-11

AX06 ... AX40 3-pole contactors

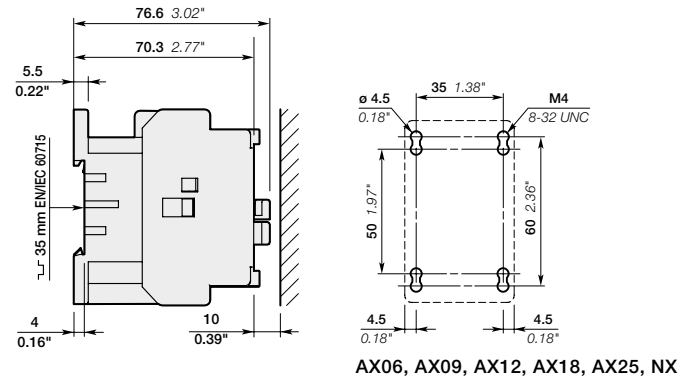
Dimensions

Main dimensions mm, inches

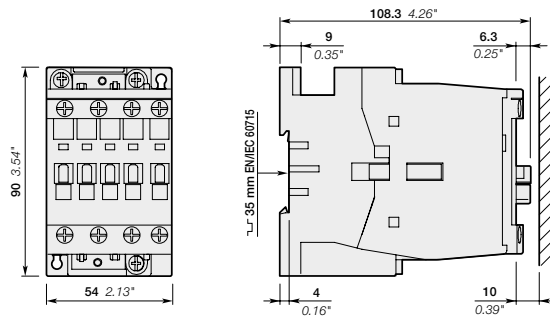


AX06, AX09, AX12, AX18, NX

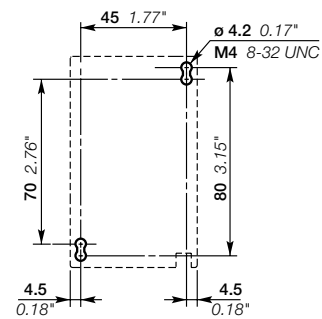
AX25



AX06, AX09, AX12, AX18, AX25, NX



AX32, AX40



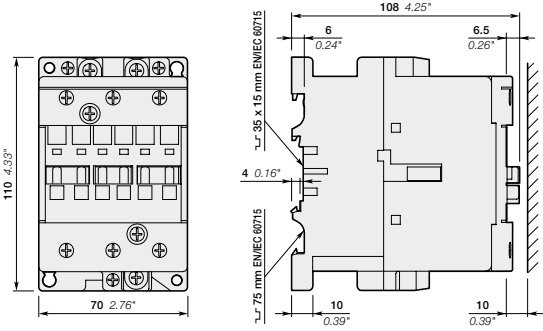
AX32, AX40

AX50 ... AX150 3-pole contactors

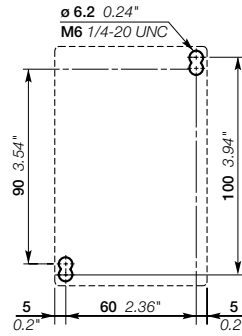
Dimensions

Main dimensions mm, inches

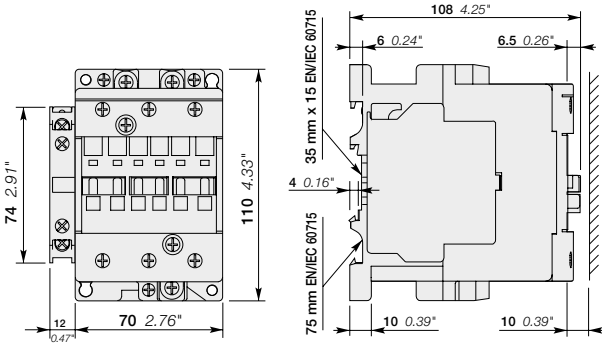
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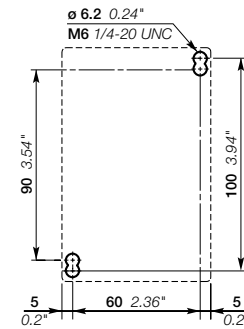
AX50, AX65, AX80



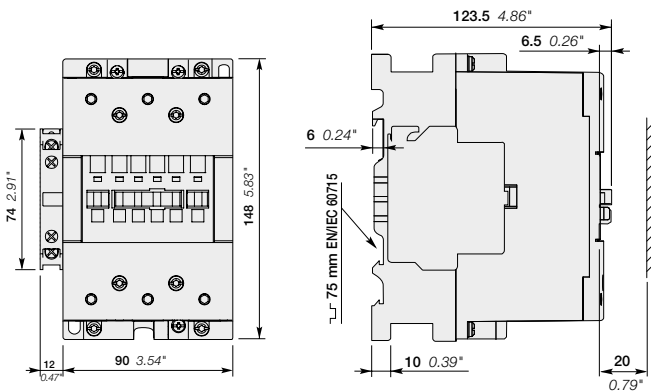
AX50, AX65, AX80



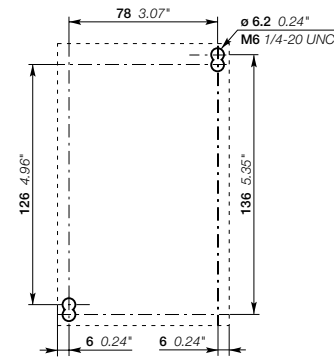
AX50, AX65, AX80 + CAL5X-11



AX50, AX65, AX80 + CAL5X-11



AX95, AX115, AX150 + CAL18X-11

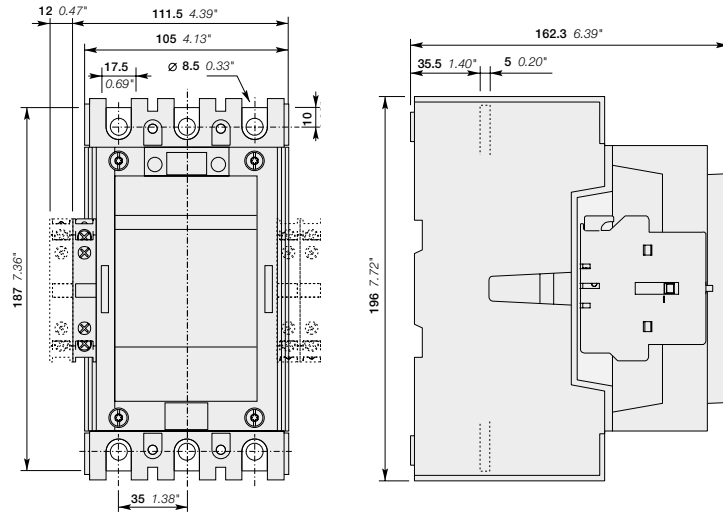


AX95, AX115, AX150 + CAL18X-11

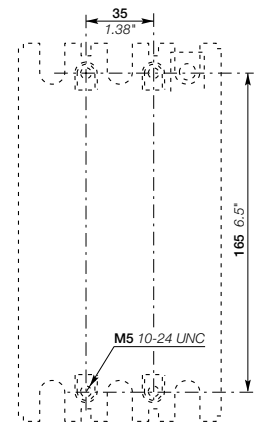
AX185 ... AX370 3-pole contactors

Dimensions

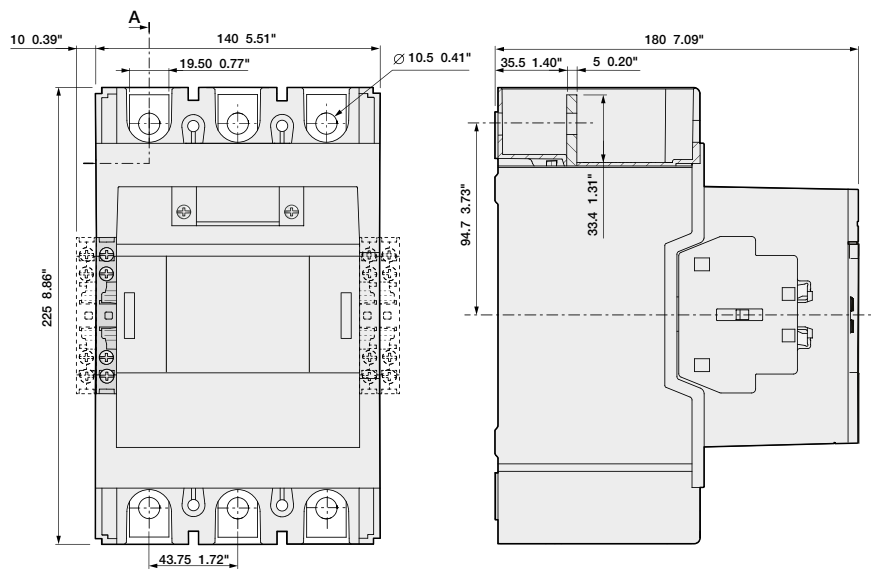
Main dimensions mm, inches



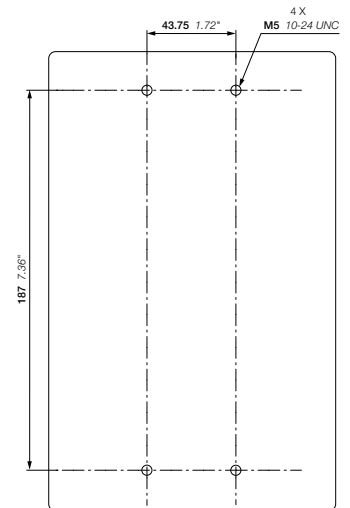
AX185, AX205 + CAL18X-11



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

3

NX contactor relays

AC operated



AX08002

3

NX40E

Description

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

These contactor relays are of the block type design with:

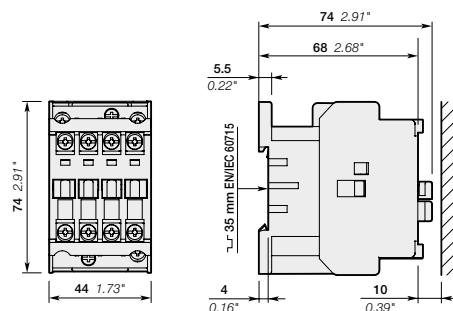
- 4 poles. Contactor relays have mechanically linked auxiliary contact elements
- control circuit: AC operated
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Ordering details

Number of contacts	Rated control circuit voltage U _c (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

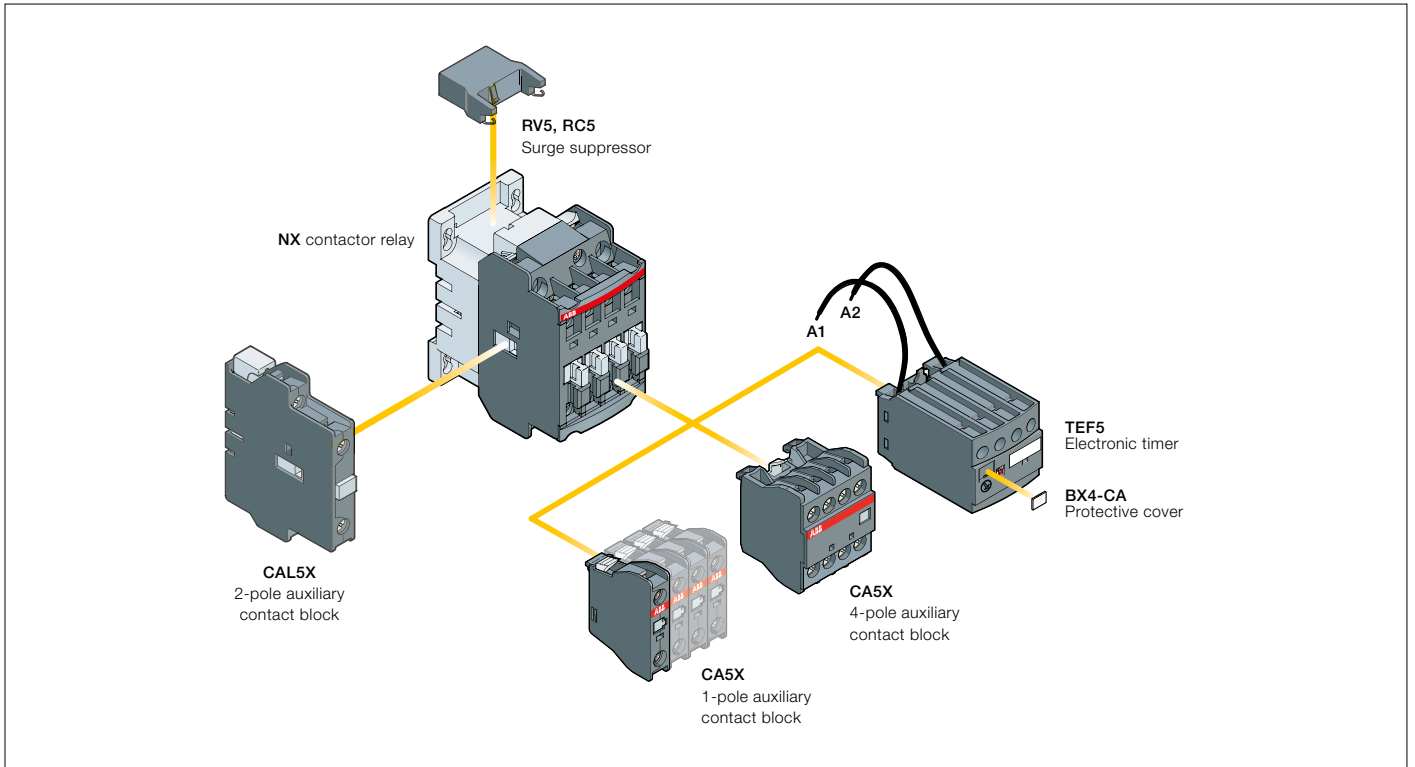


NX22E, NX31E, NX40E

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	
NX		1-pole CA5X		TEF5	2-pole CAL5X-11	
		1 to 4 x CA5X (or 1 x CE5) (2)	or 1 x CA5X (4-pole)		or 1 x TEF5	+
		1 to 4 x CA5X (1 to 2 x CE5 max) (3)	or 1 x CA5X (4-pole)	or 1 x TEF5	+	1 to 2 x CAL5X-11

(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

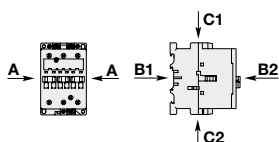
Contact relay types	AC operated	NX
Standards		IEC 60947-1 / 60947-5-1 and EN 60947-1 / 60947-5-1
Rated operational voltage U_e max.		690 V
Rated frequency (without derating)		50 / 60 Hz
Conventional free-air thermal current $I_{th} \theta \leq 40^\circ\text{C}$		16 A
le / Rated operational current AC-15		
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, in free air from a cold state	for 1.0 s	100 A
	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

Contact 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

Contact 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} .		
Ambient air temperature		
Operation in free air		$-40 \dots +70^\circ\text{C}$
Storage		$-60 \dots +80^\circ\text{C}$
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 $\theta \leq 55\text{ °C}$ 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
	Average holding value	50/60 Hz (1)	74 VA / 70 VA
		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		
Control voltage / Ambient temperature	Add-on N.O. or N.C. auxiliary contacts: see accessory fitting details for contactor relays	
Mounting positions	1, 1±30°, 2, 3, 4, 5	at $\theta \leq 55\text{ °C}$ 0.85...1.1 x U_c
		at $\theta \leq 70\text{ °C}$ U_c
	6	at $\theta \leq 55\text{ °C}$ 0.95...1.1 x U_c
		at $\theta \leq 70\text{ °C}$ 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

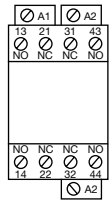
Contactor relay types	AC operated	NX
Main terminals		
	Screw terminals with cable clamp	
Connection capacity (min. ... max.)		
Main conductors (poles + coil terminals)		
Rigid	1 x	1...4 mm ²
	2 x	1...4 mm ²
Flexible with ferrule	1 x	0.75...2.5 mm ²
	2 x	0.75...2.5 mm ²
Bars or lugs	Pole terminals	L < 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

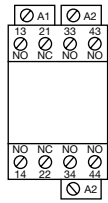
Terminal marking and positioning

NX contactor relays - AC operated

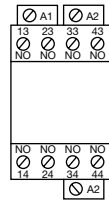
Standard devices without addition of auxiliary contacts



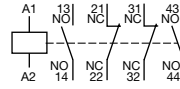
NX22E



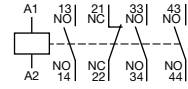
NX31E



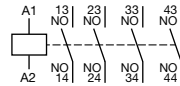
NX40E



NX22E



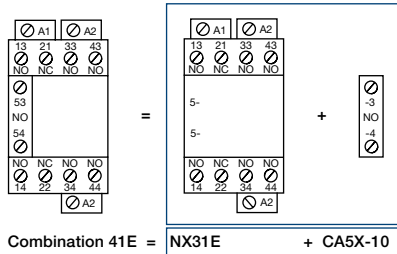
NX31E



NX40E

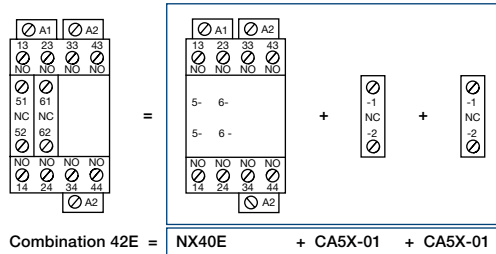
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Other possible contact combinations with auxiliary contacts added by the user



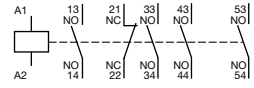
Combination 41E =

NX31E + CA5X-10

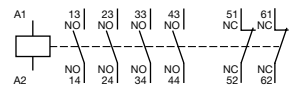


Combination 42E =

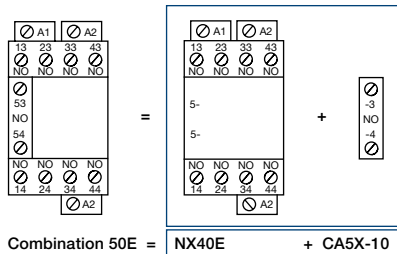
NX40E + CA5X-01 + CA5X-01



Combination 41E

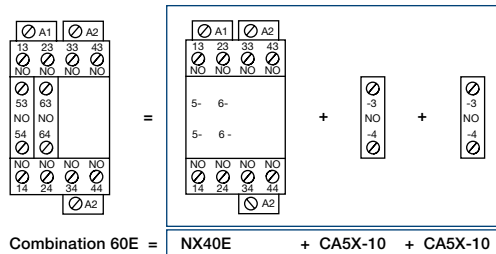


Combination 42E



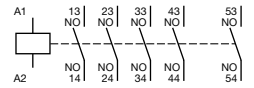
Combination 50E =

NX40E + CA5X-10

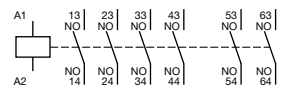


Combination 60E =

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



CA5X-10

AX07015



CA5X-4P

AX07013 CA5X-4P



CAL5X-11

1SBEC573752FC001



CAL18X-11

1SFC101033FC001

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		Side mounted	
	1-pole CA5X, 4-pole CA5X	CAL5X-11	CAL18X-11, CAL18X-11B	CAL19-11, CAL19-11B
Standards	IEC 60947-5-1 and EN 60947-5-1			
Rated insulation voltage Ui acc. to IEC 60947-5-1	690 V			
Rated operational voltage Ue max.	24...690 V AC			
Conventional thermal current Ith - $\theta \leq 40^\circ\text{C}$ Ie / Rated operational current AC-15 acc. to IEC 60947-5-1	16 A			
	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 Ie AC-15 acc. to IEC 60947-5-1			
Breaking capacity Ie / Rated operational current DC-13 acc. to IEC 60947-5-1	10 x Ie AC-15 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 Icw $\theta = 40^\circ\text{C}$	for 1.0 s	100 A		
	for 0.1 s	140 A		
Minimum switching capacity				
AX06 ... AX80 contactors with failure rate acc. to IEC 60947-5-4	12 V / 3 mA $\leq 10^{-6}$		-	-
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 rated 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 \leq	7.7 mm	8 mm
	L $>$	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 acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529	Terminals	IP20	
Screw terminals All terminals		Delivered in open position, screws of unused terminals must be tightened M3.5	
Screwdriver type		Flat \varnothing 5.5 / Pozidriv 2	

Auxiliary contact blocks for severe industrial environments



1SBC58101 1F0001

CE5-01W

3

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 - $\theta \leq 40$ °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 0.1 A	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	2 A
	48 V DC 0.1 A	1 A
	72 V DC 0.1 A	0.3 A
	110 V DC 0.1 A	0.2 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 With failure rate acc. to IEC 60947-5-4	3 V / 1 mA –	17 V / 1 mA $\leq 10^{-7}$
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

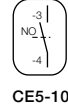
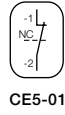
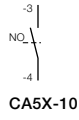
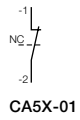
Connection capacity (min. ... max.)		
 Rigid solid	1 x	1...4 mm ²
	2 x	1...4 mm ²
 Flexible with ferrule	1 x	0.75...2.5 mm ²
	2 x	0.75...2.5 mm ²
 Lugs	L <	7.7 mm
	L >	3.7 mm
Connection capacity acc. to UL / CSA	1 or 2 x	AWG 18...14
Tightening torque		1 Nm
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529	Terminals	IP20
	Microswitches	IP40 for CE5-..D0.1 IP40 for CE5-..D2 IP67 for CE5-..W0.1 IP67 for CE5-..W2
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

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

Add-on auxiliary contacts

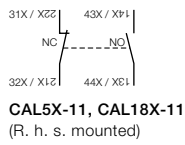
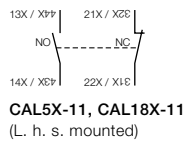
Terminal marking and positioning

1-pole auxiliary contacts

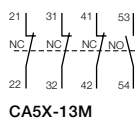
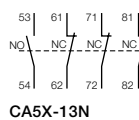
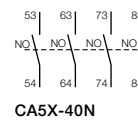
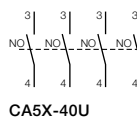
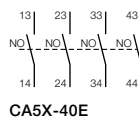
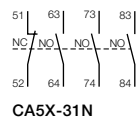
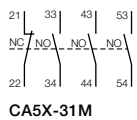
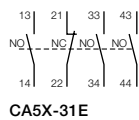
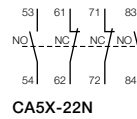
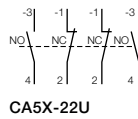
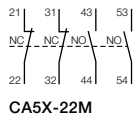
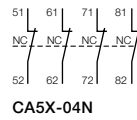
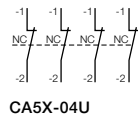
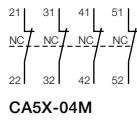
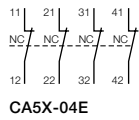


3

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 U_c 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 I_e AC-15 acc. to IEC 60947-5-1	
Breaking capacity		10 x I_e 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}			
		for 1.0 s	8 A
$\theta = 40^\circ\text{C}$		for 0.1 s	8 A
Minimum switching capacity		12 V / 3 mA	
with failure rate acc. to IEC 60947-5-4			
		24 V DC	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	
	50/60 Hz	Average consumption	1.5 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		<input type="checkbox"/> 0.1...1 s <input type="checkbox"/> 1...10 s <input type="checkbox"/> 10...100 s	
On-load reiteration accuracy under constant conditions		$\leq 1\%$	
Minimum ON period		0.1 s	
Recovery time		0.15 s	
		1 s	
Ambient air temperature			
	Operation	-25 °C ... +70 °C	
	Storage	-40 °C ... +80 °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			
(Mounting position 1)		Same as contactor or contactor relay	
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





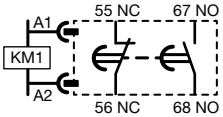
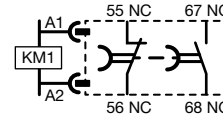
Technical data

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		

3

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
	L >	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



1SBC59041F0301

VM300H

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	Auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce)
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).

Mechanical and electrical interlock units

Technical data




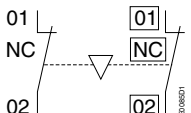
Contact utilization characteristics according to IEC

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} - $\theta \leq 40$ °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_{sw} $\theta = 40$ °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	Number of operating cycles	
	5 millions operating cycles	
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
	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 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
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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
Storage	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
	I >	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

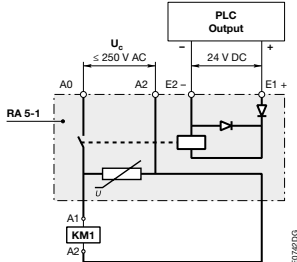
Electrical input data

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.

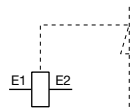
Mechanical latching units



1SBC66483F0301

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 U_c		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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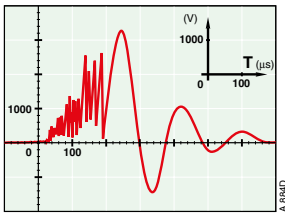
Utilization characteristics according to IEC

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
	I >	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



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.



RV5/50



RC5-1/50

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	1SBN050300R1003	2	0.028

Surge suppressors for contactor coils

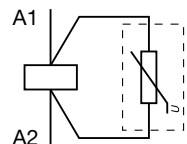
Technical data

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.			

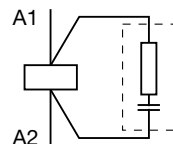
(1) Uvdr = Varistor operating voltage (voltage dependent resistor), tolerance $\pm 10\%$.

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

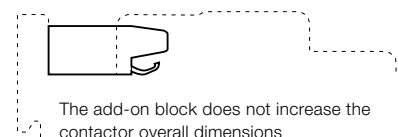


Varistor



RC type

Dimensions



RV5, RC5

Additional terminal blocks



LD75

1SBC1980742P001



LD110

1SBC1980723P001

3

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 2 x 6...25 mm ²	10...70 mm ² 10...35 mm ²
 Stranded ($\geq 6 \text{ mm}^2$)		
 Flexible with ferrule	1 x 6...35 mm ² 2 x 6...16 mm ²	10...50 mm ² 10...25 mm ²
 Bars	10 mm	12 mm
Tightening torque	4 Nm	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

1SBC575874FC301

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

1SNC16010F0014

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

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.

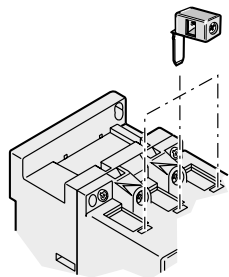
The LK75 are fitted with a pin designed to hold them in place until the connector has been fully clamped with its power cable.

- 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 conductors 1...4 mm²
 - 1 or 2 flexible conductors with cable end 0.75...2.5 mm²
- Tightening torque for the LK screw:
 - recommended 1.00 Nm
 - maxi 1.20 Nm



LK75-F

1SBC57573FC001

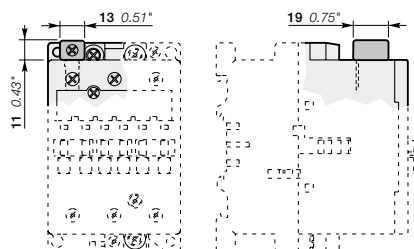


LK positioning

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

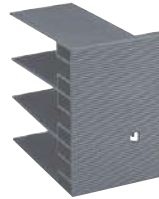
Terminal enlargements and extension

3



1SFT180099-018C3

LT ... AC



1SFT180099-125

LT ... AL



1SFT180000-014

LT ... AY



1SFT180000-011C3

LW



1SFT180000-012C3

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	Bar	Type	Order code	Pkg qty	Weight (1 pce) kg
	hole Ø mm	mm				
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

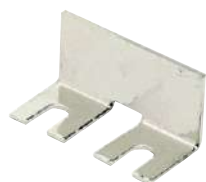
Extension pieces designed to extend the main terminals of contactors for combined mounting of contactors and connection sets.

Sets containing 3 tin plated copper bars fixed by an isolating spacer.

Ordering details

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

1SFTB9600-010C3



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				
AX185, AX205	300	-	LP185	1SFN074712R1000	2	0.300
AX260, AX300, AX370	475	-	LP300	1SFN075112R1000	2	0.400
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

1SFT96001-005C3

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

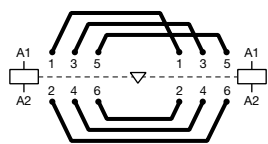
Description

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.

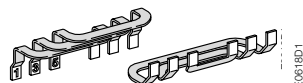
- BER16V ... BER40V: Insulated, stranded, rigid copper wires
- BEM75-30 ... BEM185-30 and BER370-4: Insulated, solid copper bars

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

EO618D1

Phase to phase connections

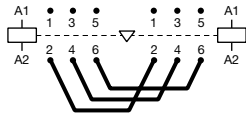
Connection sets for star-delta starters

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.

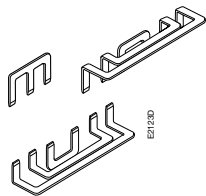


BEP, BES

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.



BED 110

Connections sets for star-delta starters

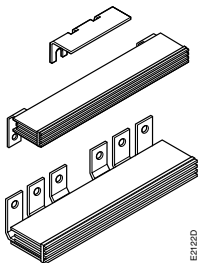
Description

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.



BED 185

Ordering details

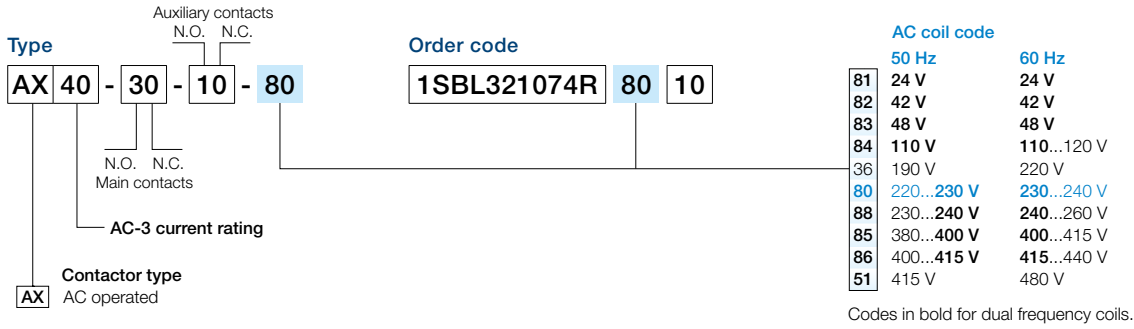
For line and delta contactors	For star contactors	Interlock unit between delta and star contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
AX150	AX95	VE5-2	BED110 (1)	1SFN084503R1000	1	0.500
AX185	AX115	VM300H	BED145A	1SFN084703R1000	1	1.300
AX205	AX150	VM300H	BED185	1SFN084903R1000	1	1.100
AX370	AX260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

(1) up to 160 A AC-1.

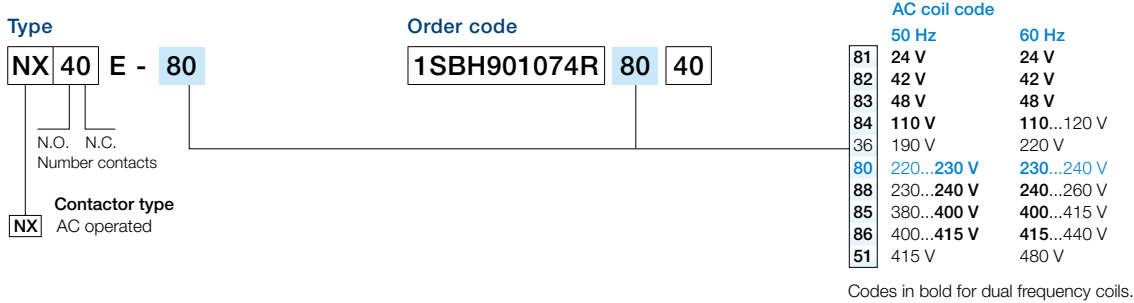
Voltage code table

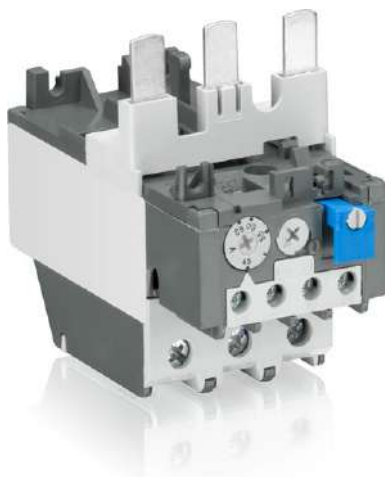
The below tables indicate the available coil voltages and corresponding digits for order codes. When placing an order, please give the order code. Select a standard contactor from ordering detail pages. Change the **coil voltage code** in the order code according to the table below. Example: for contactor AX40-30-10 and coil 80 V 50/60 Hz, the order code is 1SBL321074R**80**10.

AX contactors



NX contactor relays





Overview 130

Thermal overload relays

TA25DU-M / TA42DU-M / TA75DU-M (0.10 ... 80 A)

Ordering details	131
Technical data	132
Accessories	135

TA80DU / TA110DU / TA200DU (29 ... 200 A)

Ordering details	136
Technical data	137
Dimensions	140

Electronic overload relays

E140DU (50 ... 140 A)

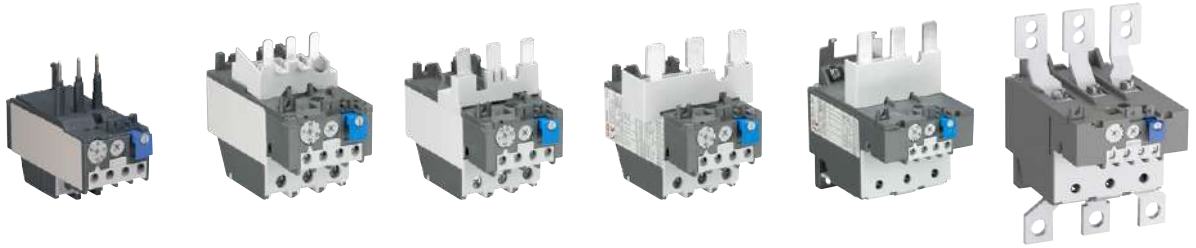
Ordering details	142
Technical data	143
Accessories	146

EF205, EF370 (63 ... 380 A)

Ordering details	147
Technical data	148
Dimensions	151

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					
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

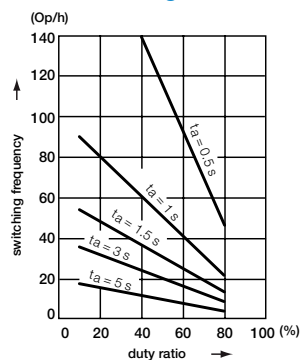
Main circuit – Utilization characteristics according to IEC/EN

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	10 A	
	N.O., 97-98	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	3.00 A	
	N.O., 97-98	1.50 A	
220-230-240 V	N.C., 95-96	3.00 A	
	N.O., 97-98	1.50 A	
440 V	N.C., 95-96	1.00 A	
	N.O., 97-98	1.00 A	
480-500 V	N.C., 95-96	1.00 A	
	N.O., 97-98	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	1.25 A	
	N.O., 97-98	1.25 A	
60 V	N.C., 95-96	0.25 A	
	N.O., 97-98	0.25 A	
110-120-125 V	N.C., 95-96	0.25 A	
	N.O., 97-98	0.25 A	
250 V	N.C., 95-96	0.12 A	
	N.O., 97-98	0.04 A	
Minimum switching capacity	17 V / 3 mA		
Short-circuit protective device	N.C., 95-96	10 A, Fuse type gG	
	N.O., 97-98	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	
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 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 (Pozi driv 2)	M4 (Pozi driv 2)	M5 (Pozi driv 2)

Main circuit

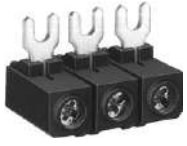
Type	TA42DU-M	TA75DU-M
Connecting capacity		
 Rigid	1 x 2.5 ... 25 mm ² 2 x 2.5 ... 16 mm ²	
 Flexible with ferrule	1 x 2.5 ... 25 mm ² 2 x 2.5 ... 10 mm ²	
Stranded acc. to UL/CSA	1 x or 2 x AWG 8-1	
Flexible acc. to UL/CSA	1 x or 2 x AWG 8-1	
Stripping length	14 mm	
Tightening torque	4.5 Nm / 40 in·lb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

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

Accessories



DX25

SST01494



DB25/25A

2CDC251017F0006



DR25-A-220/380

SST20891



KPR-101L

1SFC151402FC001



DB80

2CDC251007F0010

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.

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



TA80DU

2DCD231009F0011



TA200DU

2DCD231016F0013



DB80

2DCD23100750010



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

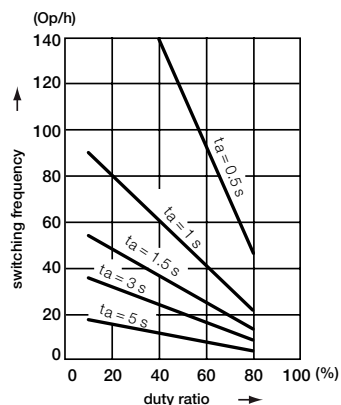
Main circuit – Utilization characteristics according to IEC/EN

Type	TA80DU	TA110DU	TA200DU
Standards	IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1		
Rated operational voltage U_n	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_n	500 V AC, 440 V DC		
Conventional free air thermal current I_{th}	N.C., 95-96	10 A	
	N.O., 97-98	6 A	
Rated frequency	DC, 50/60 Hz		
Number of poles	1 N.O. + 1 N.C.		
I_n / Rated operational current AC-15 acc. to IEC/EN 60947-5-1 for utilization category			
110-120 V	N.C., 95-96	3.00 A	
	N.O., 97-98	1.50 A	
220-230-240 V	N.C., 95-96	3.00 A	
	N.O., 97-98	1.50 A	
440 V	N.C., 95-96	1.00 A	
	N.O., 97-98	1.00 A	
480-500 V	N.C., 95-96	1.00 A	
	N.O., 97-98	1.00 A	
I_n / Rated operational current DC-13 acc. to IEC/EN 60947-5-1 for utilization category			
24 V	N.C., 95-96	1.25 A	
	N.O., 97-98	1.25 A	
60 V	N.C., 95-96	0.25 A	
	N.O., 97-98	0.25 A	
110-120-125 V	N.C., 95-96	0.25 A	
	N.O., 97-98	0.25 A	
250 V	N.C., 95-96	0.12 A	
	N.O., 97-98	0.04 A	
Minimum switching capacity	17 V / 3 mA		
Short-circuit protective device	N.C., 95-96	10 A, Fuse type gG	
	N.O., 97-98	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



2C0C106103C0201

t_a : 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	480 / 600 V AC 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	16 ... 35 mm ²	25 ... 120 mm ²
	2 x 2.5 ... 16 mm ²	-	-
 Flexible with ferrule	1 x 2.5 ... 25 mm ²	16 ... 35 mm ²	25 ... 120 mm ²
	2 x 2.5 ... 10 mm ²	-	-
 Lugs	-		
	Stranded acc. to UL/CSA	1 x or 2 x AWG 8-1	AWG 6-2/0
	Flexible acc. to UL/CSA	1 x or 2 x AWG 8-1	AWG 6-2/0
Stripping length	14 mm		
Tightening torque	4.5 Nm / 40 lb.in		25 Nm / 220 lb.in
Recommended screw driver	M6 (Pozidriv 2)		M8 (Hexagon 4)

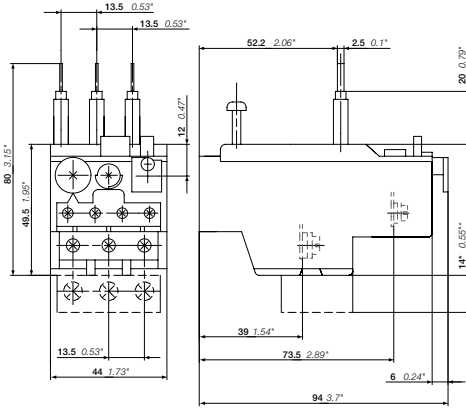
Auxiliary circuit

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

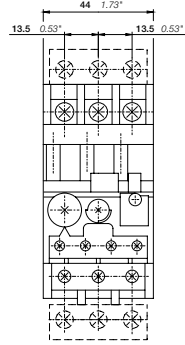
Dimensions

Main dimensions mm, inches

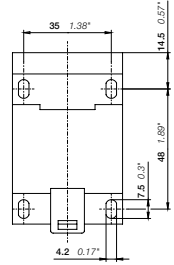
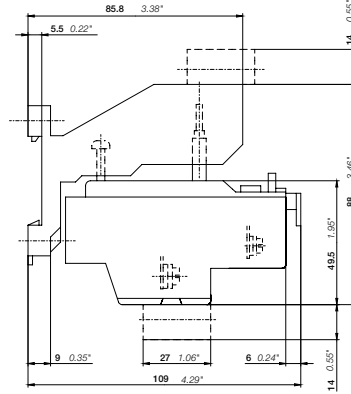


TA25DU-M + DX25

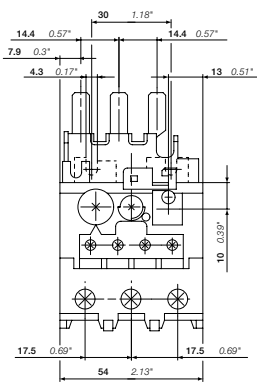
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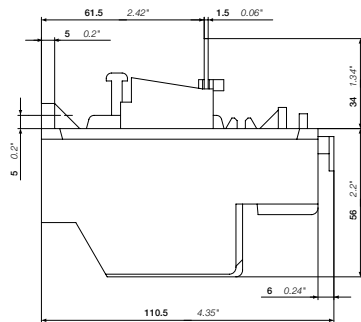
TA25DU-M + DB25 + DX25



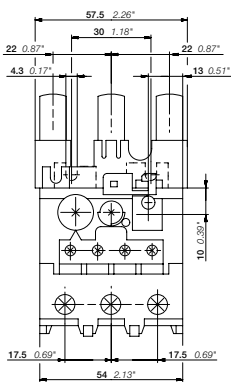
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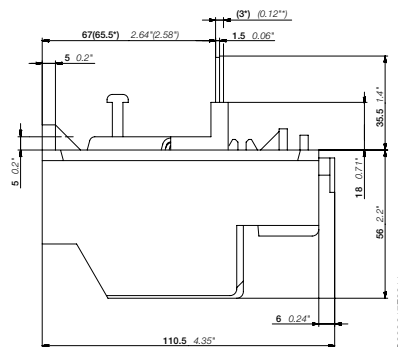
TA42DU-M



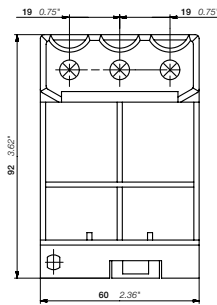
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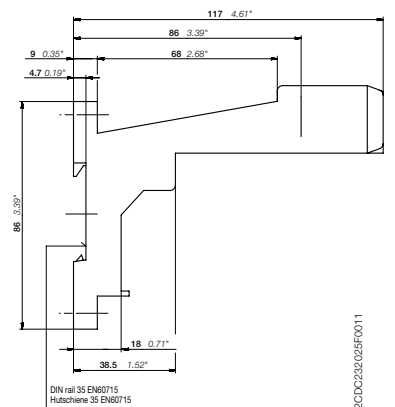
TA75DU-M



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TA75DU-M + DB80
TA42DU-M + DB80



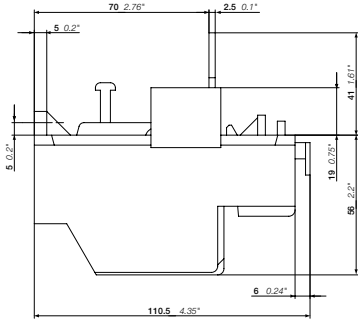
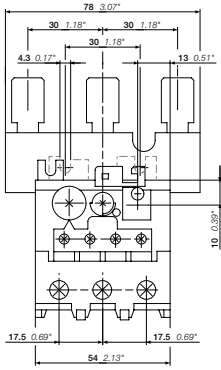
DIN rail 35 EN60715
Hutschiene 35 EN60715

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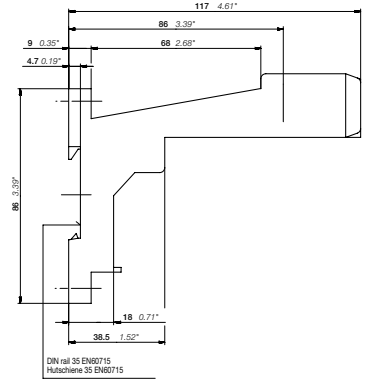
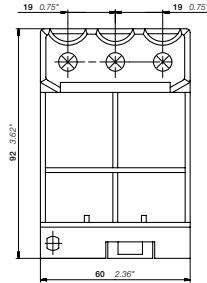
Thermal overload relays TA80DU / TA110DU / TA200DU

Dimensions

Main dimensions mm, inches



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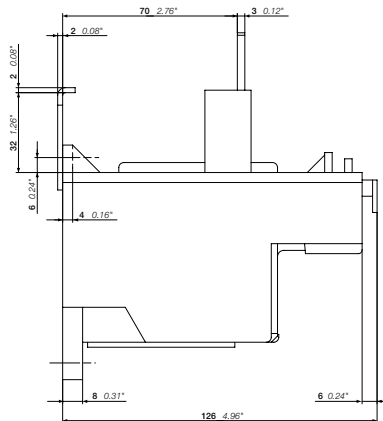
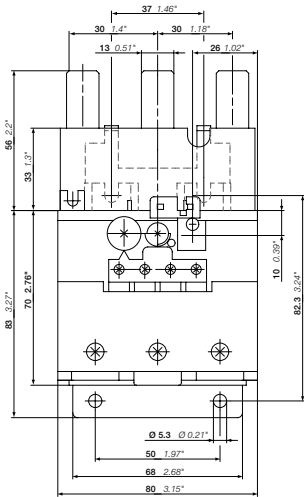


DIN rail 35 EN60715
Hutschene 35 EN60715

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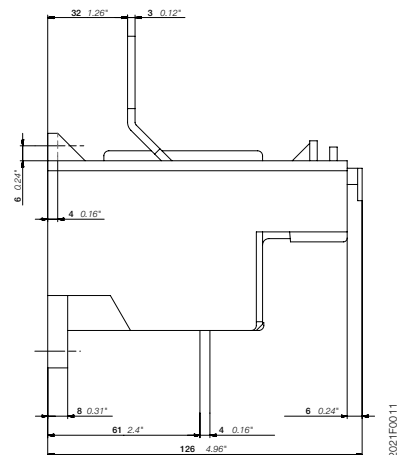
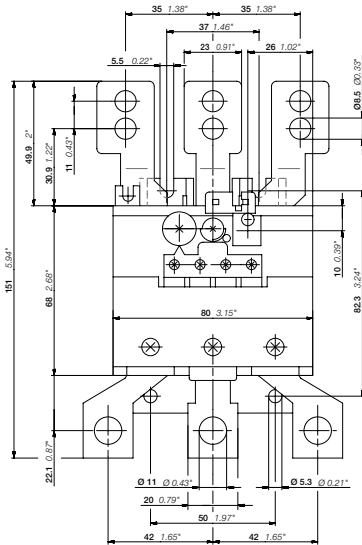
TA80DU

TA80DU + DB80



2CDC232020F0011

TA110DU



2CDC232021F0011

TA200DU

2CDC106105C0201

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

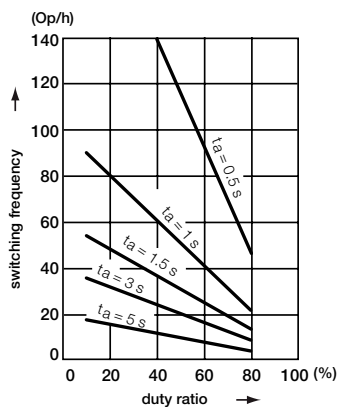
Main circuit – Utilization characteristics according to IEC/EN

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_e	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_e	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_e / 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_e / 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



2CDC332004FD214

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	-25 ... +70 °C
Storage		-50 ... +85 °C
Ambient air temperature compensation	Continuous	
Maximum operating altitude permissible	2000 m	
Resistance to shock acc. to IEC 60068-2-27	15 g / 11 ms	
Resistance to vibrations acc. to IEC 60068-2-6	5 g / 3 ... 150 Hz	
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	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
	1 x or 2 x	AWG 8-0
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
	1 x or 2 x	AWG 16-10
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

2DCD231065S0010

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



2CDC231010V0012

EF205-210



2CDC231013V0012

EF370-380



1SFC151224F0002

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

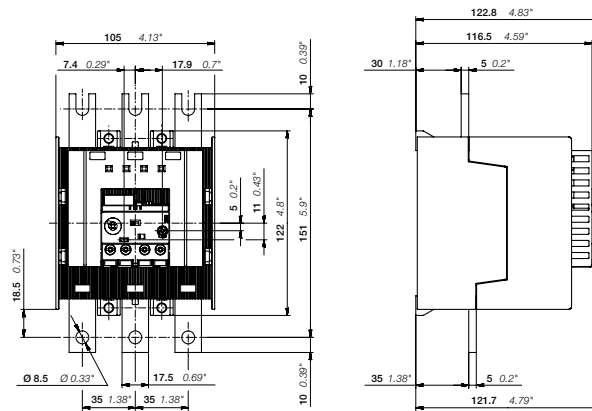
¹⁾ ATEX is valid for products, produced from week 42, 2014.

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

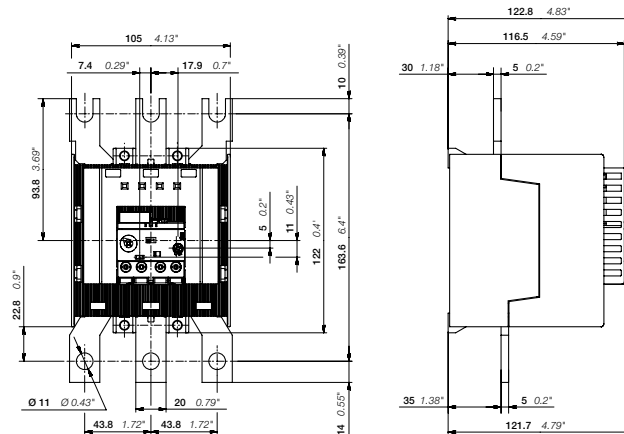
²⁾ Note: for more information see catalog 1SFC151005C0201 - rev. B

Main dimensions mm, inches



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EF205-210



2CDC233005F0012

EF370-380

EF205, EF370 electronic overload relays – 63 to 380 A

Technical data

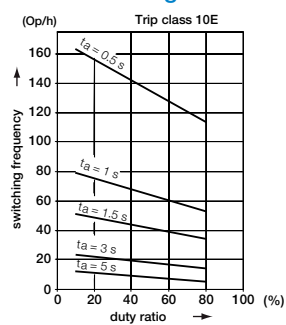
Main circuit – Utilization characteristics according to IEC/EN

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

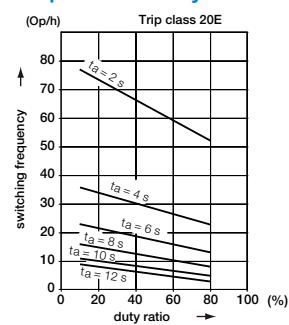
Auxiliary circuit according to IEC/EN

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

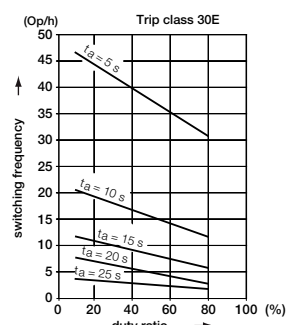
Technical diagram – Intermittent periodic duty



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		600 V AC			
		480 V AC		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	
Storage		
Operation	-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	
	Main circuit terminals	
	IP20	
	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

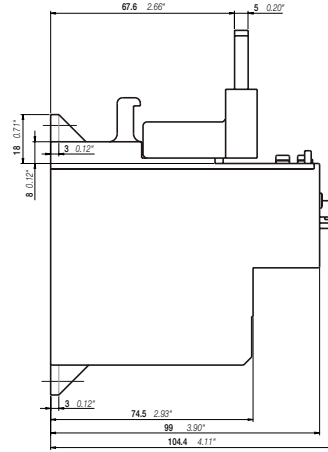
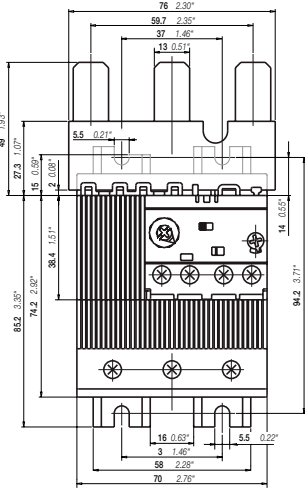
Type	EF205, EF370
Connecting capacity	
 Rigid	1 or 2 x 1 ... 4 mm ²
 Flexible with ferrule	1 or 2 x 0.75 ... 2.5 mm ²
 Flexible with insulated ferrule	1 or 2 x 0.75 ... 2.5 mm ²
 Flexible	1 or 2 x 0.75 ... 2.5 mm ²
Stranded acc. to UL/CSA	1 or 2 x AWG 18-10
Flexible acc. to UL/CSA	1 or 2 x AWG 18-10
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

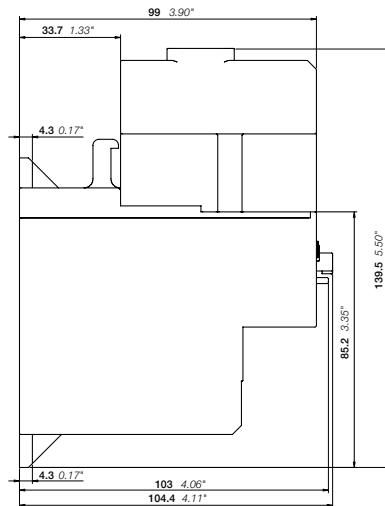
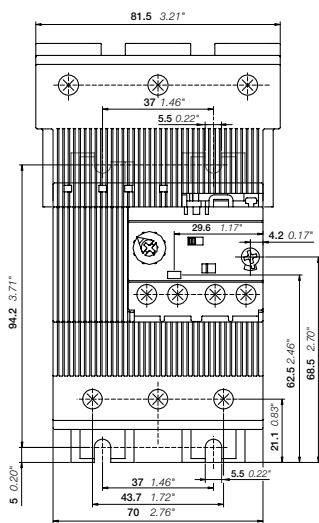
Main dimensions mm, inches

4



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E140DU



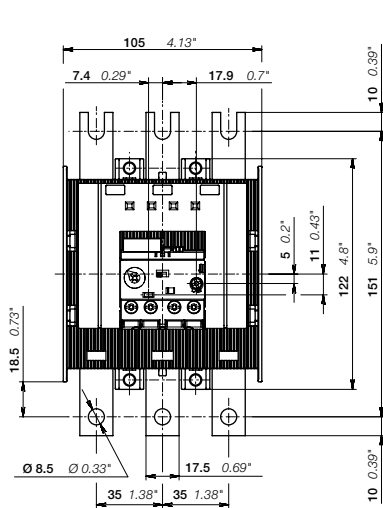
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E140DU + DB140E

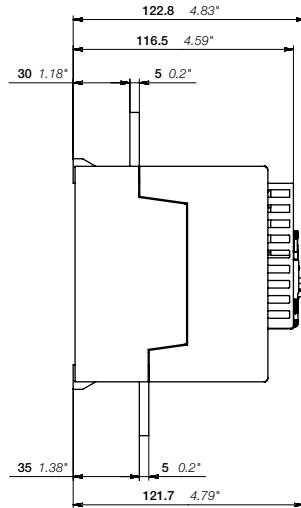
Electronic overload relays EF205, EF370

Dimensions

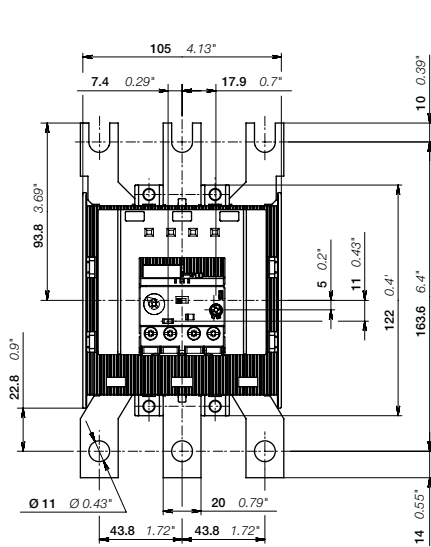
Main dimensions mm, inches



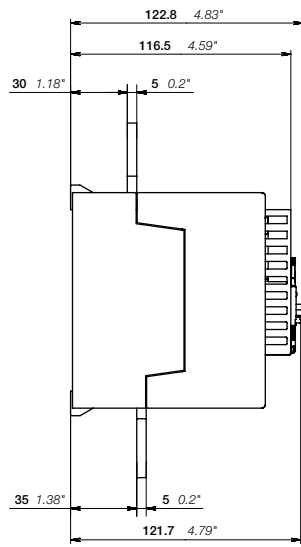
EF205



2DCD232000AF0012



EF370



2DCD232000BF0012

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.

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 = 1kA for I_e AC-3 < 16 A
 - r = 3 kA for 16 A < I_e AC-3 < 63 A
 - r = 5 kA for 63 A < I_e AC-3 < 125 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 s. - Difficult starting means an accelerating time 10 s < t_s < 30 s
 - Tripping classes of thermal overload relays according to IEC 60947-4-1 (EN 60947-4-1): 10A and 10
 - Tripping classes of electronic overload relays according to IEC 60947-4-1 (EN 60947-4-1): 10E, 20E, 30E selectable
- In the tables with MCCBs, these are fitted with the magnetic relay alone. Setting is always carried out at > 12.3 I_e 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

SEMIF47-0706 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
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 stator 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.

5

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 and breaking capacities - 50 operating cycles		
	I/le	U/Ur	Cos. or L/R (ms)	I/le	U/Ur	Cos. or L/R (ms)	Ic/le	U/Ur	Cos. or L/R (ms)	Ic/le	U/Ur	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	le < 17 A	6	1	0.65	1	0.17	0.65	10	1.05	0.45	8	1.05	0.45
	17 < le < 100 A	6	1	0.35	1	0.17	0.35	10	1.05	0.45	8	1.05	0.45
	le > 100 A	6	1	0.35	1	0.17	0.35	10	1.05	0.35	8	1.05	0.35
AC-4	le < 17 A	6	1	0.65	6	1	0.65	12	1.05	0.45	10	1.05	0.45
	17 < le < 100 A	6	1	0.35	6	1	0.35	12	1.05	0.45	10	1.05	0.45
	le > 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

Contactors 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

Contactors for AC circuit switching

Utilization category	Standard operation						Occasional operation					
	Making conditions			Breaking conditions			Making and breaking capacities - 50 operating cycles			Making and breaking capacities - 50 operating cycles		
	I/le	U/Ur	T _{0.95}	I/le	U/Ur	T _{0.95}	Ic/le	U/Ur	T _{0.95}	Ic/le	U/Ur	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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You can find the address of your local sales organisation
on the ABB home page



<http://www.abb.com/lowvoltage>

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US Catalog

Motor protection and control AF Range contactors & overload relays

Power and productivity
for a better world™



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 power kW	Motor nominal current: standardized values in blue colour (according to IEC 60947-4-1 Annex G)									
	220 V A	230 V A	240 V A	380 V A	400 V A	415 V A	440 V A	500 V A	660 V A	690 V 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 power hp	Motor nominal current: single and three phase (according to UL 60947-4-1A)									
	120 V 1-ph A	200 V 1-ph A	200 V 3-ph A	208 V 1-ph A	208 V 3-ph A	220- 240 V 1-ph A	220- 240 V 3-ph A	380- 415 V 3-ph A	440- 480 V 3-ph A	550- 600 V 3-ph 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

Motor protection and control

AF Range contactors and overload relays

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ABB sets a new standard in motor control and power switching

1

Featuring AF technology as standard, the latest range of ABB's contactors establishes a new industry benchmark. The electronically controlled coil offers multiple benefits over conventional alternatives, and together with ABB's wide product offering – an optimal configuration, every time.



Access Global Support

The contactor and motor protection range from ABB is compatible with all major national and international standards and is available worldwide via a global distribution network. One contactor coil now handles 100 V – 250 V, AC/DC for use in Europe or Asia as well as North America.



Optimize logistics

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



Simplify design

By reducing contactor coil energy consumption by up to 80%, panels can be built smaller and transformers more compact. All the features of the AF technology, along with access to drawings and coordination tables online, simplifies your design and assembly process.



Secure uptime

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



MacGregor. Keeping turnarounds brief.

Until the AF range was installed, voltage sags were affecting MacGregor's deck cranes. Conventional contactors welded shut, leading to several stoppages a week. No longer. Known for superior quality and an ability to operate in the most hostile environments, MacGregor deck cranes enjoy a global reputation for reliability. A small but vital component, the AF contactor helps maintain this reputation.

To keep things moving, you need Control. Connect to Control.

Explore all our case studies at www.abb.com/connecttocontrol

SSAB
Making certainty
standard

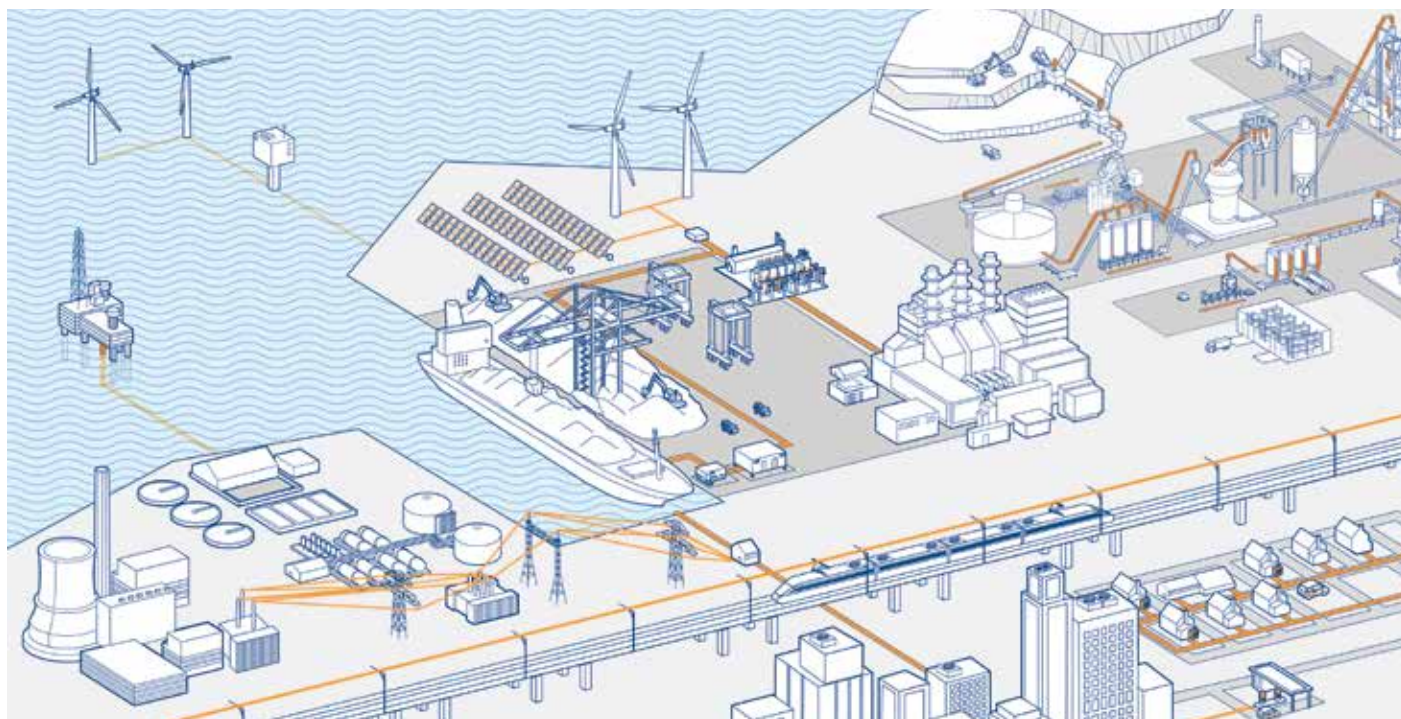
Gamesa
Taming the wind

LKAB
Providing fresh air

Contactors and motor protection

For a wide variety of segments

1



HVAC, General Machinery, Rail, Critical Power, Wind, Solar, Marine and Water & Wastewater

Contactors for any use

The AF contactor range covers small motor starting solutions from 4 kW / 5 hp up to big power switching solutions with our unique AF2650, the biggest single case block contactor in the world.

The contactor and motor protection range is part of one of the widest product offerings on the market meaning that ABB not only can provide the contactor but the full solution.

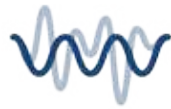
In addition to the standard product range ABB also offer products for special needs such as Bar contactors, GAF and contactors for capacitor switching.

Cooperating with customers

ABB cooperates closely with its customers to ensure that products meet requirements from their specific segments and applications. With over 100 years' experience in motor control and power switching ABB knows how to create efficient solutions for its customers.

AF technology

Benefits

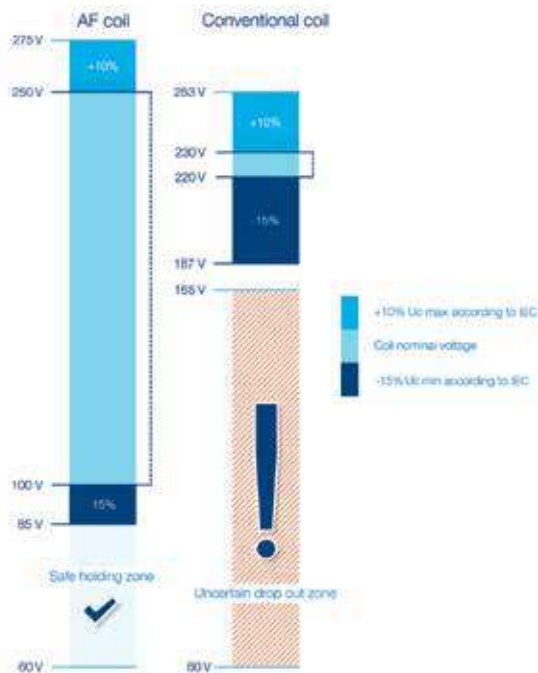


Reliable in all networks

The electronic system within the AF contactor rectifies the AC or DC control circuit voltage to a DC control voltage that is applied on the coil. The contactor is safely operated in an always optimized condition making it virtually noise free.

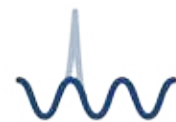
Four coils for the entire voltage range

The AF contactor features both AC and DC support. With the complete AF contactor range, functionality is improved. Still, the total number of product variants compared to a conventional range is reduced by 90%. Only four coils are required to cover 24 V AC, 20 V DC - 500 V AC/DC.



Wide control voltage range

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



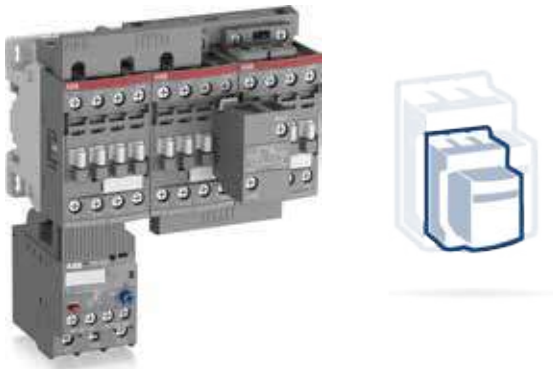
Built-in surge suppression

With conventional contactor technology it is recommended to use an external surge suppressor, an accessory that could cost as much as half the contactor itself. With the AF technology the surges are handled by the contactor itself and the surge never reaches the control circuit. Neither the surge suppressor nor the actual surge has to be considered anymore. One less product and one less complication to worry about.

Contactors and motor protection

Advanced but simple

1



The AF contactor is compact

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



The AF contactor is flexible

AF09...AF370 is perfect for motor starting applications and for solutions where space is limited. Interlocked reversing pairs require no spacing between contactors meaning you can fit more functionality into cabinets or other small enclosures.



Coil terminal access in the front

The AF contactor has its coil terminals accessible from the front. The cables or bars do not have to be disconnected in order to perform voltage measurement or servicing work.



More functionality without adding width

The AF116 ... AF2650 can take up to 2 side mounted auxiliary contact blocks without adding to its width and are delivered with 1 N.O. + 1 N.C. as standard.

Contactors and motor protection

Mechanical features



Front-mounted



Top-mounted



Bottom-mounted



Additional LDC4 coil terminal block

Easy-to-use accessories

Contactors up to 96 A offer free choice of coil terminal access and can take side and front mounted auxiliary contact blocks. All the accessories: Coil connection terminals, mechanical and electrical interlocks and electronic timers are easily connected through the snap-to-connect function.



Safe control circuit with:

- Mirror contact according to IEC 60947-4-1
- Mechanically linked contacts according to IEC 60947-5-1
- Sealable and transparent protective covers on AF09...AF96 and overload relays TF/EF
- Third party certification:
 - AF09...AF96, NF
 - AF400...AF2050



CONNECT TO CONTROL | CASE STUDIES | VALUE PROPOSITIONS | PRODUCT TOUR | HISTORY | NEWS

Power and productivity for a better world™ **ABB**

Connect to Control

ABB is introducing its complete AF contactor range. The AF technology is well appreciated by customers and establishes a new industry benchmark. ABB sets a new standard in motor control and power switching. Watch the video above or read how our customers experience the AF technology.

Case studies

Instead of telling our customers about the AF contactor – we asked them. They are the ones using the products everyday and therefore they should have the most interesting stories

→ Read more

Value propositions

Choose AF contactors and ABB to secure uptime, simplify design, optimize logistics and gain access to global support. Watch videos and read why AF contactors are the right choice.

→ Read more

Product tour

Read more about the technical details of the AF contactor and the technology. What has made it so appreciated by customers?

→ Read more

Sitemap

- Connect to Control
- Case studies
- Value propositions
- Product tour
- History
- News

Contact us

Sales → Low Voltage Products and Systems

Downloads

- Product panorama (1 mb)
- Promotion video (360p, 15 mb)
- Promotion video (720p, 25 mb)
- Promotion video (1080p, 104 mb)
- Main catalog (84 mb)
- Short-form catalog (50 mb)

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Videos, prints, technical presentations and more



Videos



Success stories



Global main catalog : 1SBC100173C0201
 Global short form catalog : 1SBC100180C0201
 Global panorama : 1SBC100176L0203

For direct product details information,
 use product type or order code, ex:

- www.abb.com/productdetails/AF09-30-10-13 or
- www.abb.com/productdetails/1SBL137001R1310



New

The AF range in your pocket

The eBinder gives you all the information you need about the AF range.



Always updated
 Always available
 Stay connected!

Tools



Cadenas portal: Download 2D or 3D files according to your needs (STEP, IGES...)




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

3-pole contactors, for motor control and power switching

1




AC / DC Control supply				Type	AF09	AF12	AF16	AF26	AF30	AF38	AF40	AF52	AF65	AF80	AF96
IEC	AC-3	Rated operational power	220 - 230 - 240 V	kW	2.2	3	4	6.5	9	11	11	15	18.5	22	25
			380 - 400 V	kW	4	5.5	7.5	11	15	18.5	18.5	22	30	37	45
	AF370		415 V	kW	4	5.5	9	11	15	18.5	22	30	37	45	55
			440 V	kW	4	5.5	9	15	18.5	22	22	30	37	45	55
			500 V	kW	5.5	7.5	9	15	18.5	22	22	30	37	45	55
			690 V	kW	5.5	7.5	9	15	18.5	22	22	30	37	45	55
	1000 V	kW	—	—	—	—	—	—	—	—	—	—	—	—	
	Rated operational current	380 - 400 V	A	9	12	18	26	32	38	40	53	65	80	96	
AC-1	Rated operational current	$\theta \leq 40^\circ\text{C}$, 690 V	A	25	28	30	45	50	50	70	100	105	125	130	
UL / CSA	1-phase motor rating	120 V	hp	0.75	1	1.5	2	2	2	3	3	5	7.5	7.5	
		240 V	hp	1.5	2	3	3	5	5	7.5	10	15	15	20	
	3-phase motor rating	200 - 208 V	hp	2	3	5	7.5	10	10	10	15	20	25	30	30
		220 - 240 V	hp	2	3	5	7.5	10	10	15	20	25	30	30	
		440 - 480 V	hp	5	7.5	10	15	20	20	30	40	50	60	60	
		550 - 600 V	hp	7.5	10	15	20	25	25	40	50	60	75	75	
General use rating	600 V	A	25	28	30	45	50	50	60	80	90	105	115		
NEMA	NEMA Size			00	0	—	1	—	—	2	—	—	3	—	


Main accessories

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

Overload relays

Thermal relays	 Class 10 (Class 10A for TF140, TA200DU)	TF42 (0.10...38 A)	TF65 (22...67 A)	TF96 (40...96 A)
Electronic relays	Class 10E, 20E, 30E	EF19 (0.10...18.9 A)	EF19 (0.10...18.9 A) EF45 (9...45 A)	EF65 (25...70 A) EF96 (36...100 A)

Manual motor starters

	Thermal / magnetic protection	MS116 (0.10...32 A) SCCR up to 30 kA	MS450 (28...50 A) SCCR up to 65 kA	
	Class 10	MS132 (0.10...32 A) SCCR up to 65 kA		MS495 (45...100 A) SCCR up to 65 kA
	Magnetic only types	MO132 (0.16...32 A) SCCR up to 65 kA		MO496 (32...100 A) SCCR up to 65 kA
Accessories	For contactor mounting	BEA16-4	BEA38-4	MO450 (40...50 A) SCCR up to 65 kA MO495 (63...100 A) SCCR up to 65 kA



AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370	AF400	AF460	AF580	AF750	AF1250	AF1350	AF1650	AF2050	AF2650
30	37	45	55	55	75	90	110	110	132	160	220	—	257	315	—	—
55	75	75	90	110	132	160	200	200	250	315	400	—	475	560	—	—
55	75	75	90	110	132	160	200	220	250	355	425	—	500	600	—	—
75	90	90	110	132	160	160	200	220	250	355	450	—	560	670	—	—
75	90	90	110	132	160	200	250	250	315	400	520	—	560	700	—	—
55	75	90	132	160	200	250	315	315	355	500	600	—	750	900	—	—
—	—	75	110	132	132	132	132	220	280	355	400	—	—	—	—	—
116	140	146	190	205	265	305	370	400	460	580	750	—	860	1050	—	—
160	200	225	275	350	400	500	600	600	700	800	1050	1260	1350	1650	2050	2650
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
30	40	40	50	60	75	100	125	125	150	200	250	—	—	—	—	—
40	50	50	60	75	100	125	150	150	200	250	300	—	400	450	—	—
75	100	100	125	150	200	250	300	350	400	500	600	—	800	900	—	—
100	125	125	150	200	250	300	350	400	500	600	700	—	1000	1150	—	—
160	200	200	230 (1)	250 (1)	300 (1)	350 (1)	400 (1)	550	650	750	900	1210	1350	1650	2100	2700
—	4	—	—	—	5	—	—	—	6	—	7	—	—	8	—	—

(1) Higher ratings achievable through the use of LX.. terminal extensions. See page 2.6 for additional information.

CAL19-11 (1 x N.O. + 1 x N.C.) CAL18-11 (1 x N.O. + 1 x N.C.)

VM19 (for same size contactors) VM750H VM750V VM1650H

BER140-4 BER205-4 BER370-4 BEM460-30 BEM750-30

TF140DU (66...142 A) θ ≤ 55 °C	TA200DU (66...200 A) θ ≤ 55 °C	EF370 (115...380 A)	E500DU (150...500 A)	E800DU (250...800 A)	E1250DU (375...1250 A)
EF146 (54...150 A)	EF205 (63...210 A)				

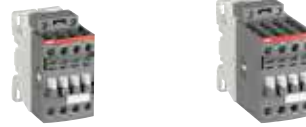
Short-circuit protection devices


Tmax circuit breakers & OS Fusible disconnect switches



4-pole contactors

1



IEC	AC-1 Rated operational current	$\theta \leq 40\text{ }^\circ\text{C}$, 690 V	A	25	30	45	55	
UL/CSA	General use rating	600 V	A	25	30	45	55	
AC / DC Control supply				Type	AF09	AF16	AF26	AF38
IEC	AC-1 Rated operational current	$\theta \leq 40\text{ }^\circ\text{C}$	A	25	30	45	55	
		$\theta \leq 55\text{ }^\circ\text{C}$ (1)	A	25	30	40	45	
		$\theta \leq 70\text{ }^\circ\text{C}$	A	22	26	32	37	
With conductor cross sectional area			mm ²	4	6	10	16	
Rated operational voltage U _e max.			V	690	690	690	690	
UL/CSA	General use rating	600 V	A	25	30	45	55	

(1) $\theta \leq 60\text{ }^\circ\text{C}$ for AF09 ... AF38 contactors

Main accessories

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

AF Range contactors and control relays

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AF09 ... AF38 3-pole contactors

5 to 20 hp at 480 V AC

AC / DC operated

2



AF09-30-10



AF26-30-00

Description

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

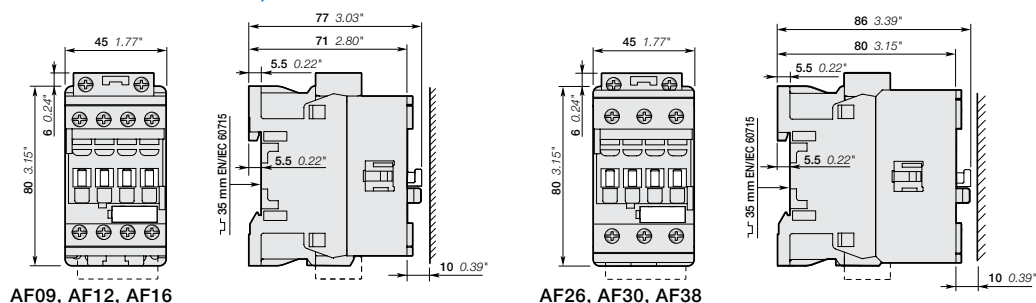
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...500V 50/60 Hz and 20...500 V DC
- can manage large control voltage variations
- reduced panel energy consumption
- very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

Ordering details

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

(1) For 24...60 V 50/60 Hz - 20...60 V DC, use AF..-30-..-11 (see voltage code table). AF..-30-..-11 not suitable for direct control by PLC-output.

Main dimensions mm, inches



AF09Z ... AF38Z 3-pole contactors

5 to 20 hp at 480 V AC

AC / DC operated - low consumption



AF09Z-30-10



AF26Z-30-00

Description

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

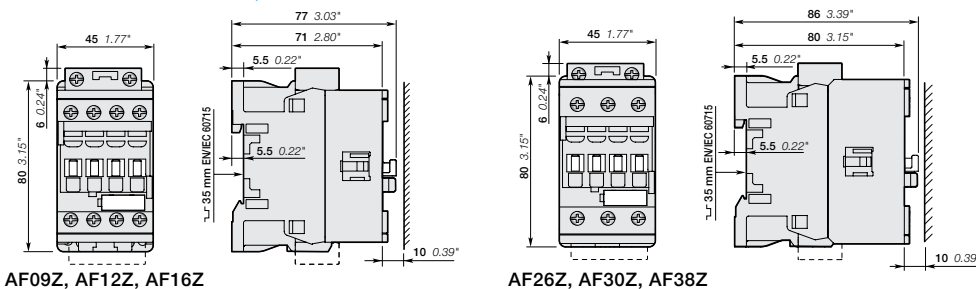
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...250 V 50/60 Hz and 12...250 V DC
- can manage large control voltage variations
- allow direct control by PLC-output ≥ 24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

Ordering details

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

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

Main dimensions mm, inches



AF09Z, AF12Z, AF16Z

AF26Z, AF30Z, AF38Z

AF40 ... AF96 3-pole contactors

30 to 60 hp at 480 V AC

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

2



AF40-30-11



AF80-30-11

Description

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

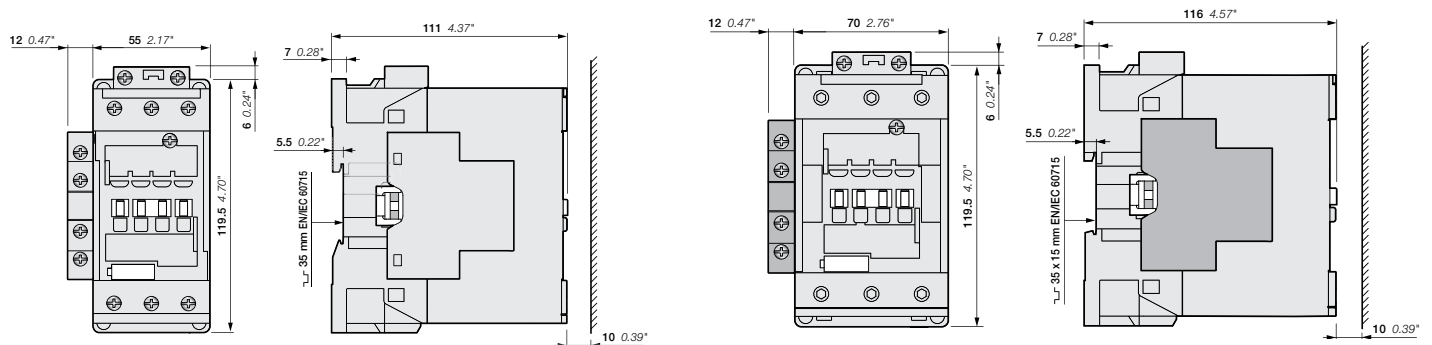
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...500 V 50/60 Hz and 20...500 V DC
- can manage large control voltage variations
- reduced panel energy consumption
- very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

Ordering details

IEC		UL / CSA		Rated control circuit voltage		Auxiliary contacts fitted	Catalog number	Global reference code	Weight Pkg (1 pce)
Rated operational power	current $\theta \leq 40^\circ\text{C}$	3-phase motor rating	General use rating	Uc min. ... Uc max.					
400 V AC-3	AC-1	hp	A	V 50/60 Hz	V DC				kg
18.5	70	30	60	24...60	-	1 1	AF40-30-11-41	1SBL347001R4111	1.010
				24...60	20...60 (1)	1 1	AF40-30-11-11	1SBL347001R1111	1.010
				48...130	48...130	1 1	AF40-30-11-12	1SBL347001R1211	1.010
				100...250	100...250	1 1	AF40-30-11-13	1SBL347001R1311	1.000
22	100	40	80	250...500	250...500	1 1	AF40-30-11-14	1SBL347001R1411	1.000
				24...60	-	1 1	AF52-30-11-41	1SBL367001R4111	1.010
				24...60	20...60 (1)	1 1	AF52-30-11-11	1SBL367001R1111	1.010
				48...130	48...130	1 1	AF52-30-11-12	1SBL367001R1211	1.010
30	105	50	90	100...250	100...250	1 1	AF52-30-11-13	1SBL367001R1311	1.000
				250...500	250...500	1 1	AF52-30-11-14	1SBL367001R1411	1.000
				24...60	-	1 1	AF65-30-11-41	1SBL387001R4111	1.010
				24...60	20...60 (1)	1 1	AF65-30-11-11	1SBL387001R1111	1.010
37	125	60	105	48...130	48...130	1 1	AF65-30-11-12	1SBL387001R1211	1.010
				100...250	100...250	1 1	AF65-30-11-13	1SBL387001R1311	1.000
				250...500	250...500	1 1	AF65-30-11-14	1SBL387001R1411	1.000
				24...60	-	1 1	AF80-30-11-41	1SBL397001R4111	1.260
45	130	60	115	24...60	20...60 (1)	1 1	AF80-30-11-11	1SBL397001R1111	1.260
				48...130	48...130	1 1	AF80-30-11-12	1SBL397001R1211	1.260
				100...250	100...250	1 1	AF80-30-11-13	1SBL397001R1311	1.210
				250...500	250...500	1 1	AF80-30-11-14	1SBL397001R1411	1.210
				24...60	20...60 (1)	1 1	AF96-30-11-11	1SBL407001R1111	1.260
				48...130	48...130	1 1	AF96-30-11-12	1SBL407001R1211	1.260
				100...250	100...250	1 1	AF96-30-11-13	1SBL407001R1311	1.210
				250...500	250...500	1 1	AF96-30-11-14	1SBL407001R1411	1.210

(1) AF.-30-...-11 not suitable for direct control by PLC-output.

Main dimensions mm, inches



AF40, AF52, AF65

AF80, AF96

AF116 ... AF146 3-pole contactors

75 to 100 hp at 480 V AC

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



AF146-30-11




AF146-30-11B

Description

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

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

Ordering details

IEC		UL / CSA		Rated control circuit voltage		Auxiliary contacts fitted		Catalog number	Global reference code	Weight Pkg (1 pce)
Rated operational power	operational current $\theta \leq 40^\circ\text{C}$	3-phase motor rating	General use rating	Uc min. ... Uc max.						
400 V AC-3	AC-1	hp	600 V AC	V 50/60 Hz	V DC					kg

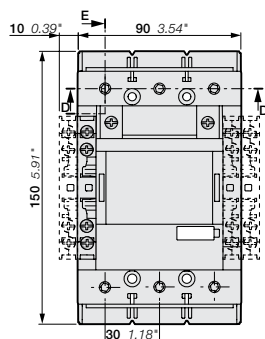
For connection with built-in cable clamps

Rated operational power	operational current	3-phase motor rating	General use rating	Uc min. ... Uc max. (V 50/60 Hz)	Uc min. ... Uc max. (V DC)	NO	NC	Catalog number	Global reference code	Weight
55	160	75	160	24...60	20...60	1	1	AF116-30-11-11	1SFL427001R1111	1.750
				48...130	48...130	1	1	AF116-30-11-12	1SFL427001R1211	1.750
				100...250	100...250	1	1	AF116-30-11-13	1SFL427001R1311	1.750
				250...500	250...500	1	1	AF116-30-11-14	1SFL427001R1411	1.750
75	200	100	200	24...60	20...60	1	1	AF140-30-11-11	1SFL447001R1111	1.750
				48...130	48...130	1	1	AF140-30-11-12	1SFL447001R1211	1.750
				100...250	100...250	1	1	AF140-30-11-13	1SFL447001R1311	1.750
				250...500	250...500	1	1	AF140-30-11-14	1SFL447001R1411	1.750
75	225	100	200	24...60	20...60	1	1	AF146-30-11-11	1SFL467001R1111	1.750
				48...130	48...130	1	1	AF146-30-11-12	1SFL467001R1211	1.750
				100...250	100...250	1	1	AF146-30-11-13	1SFL467001R1311	1.750
				250...500	250...500	1	1	AF146-30-11-14	1SFL467001R1411	1.750

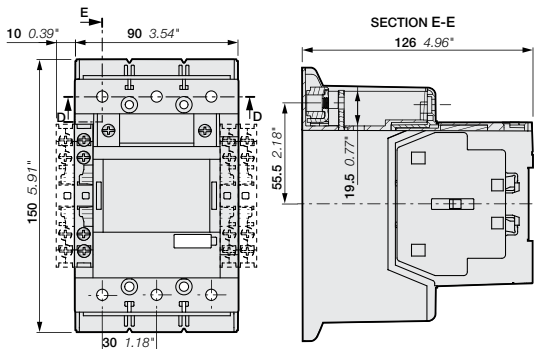
With bar connections

Rated operational power	operational current	3-phase motor rating	General use rating	Uc min. ... Uc max. (V 50/60 Hz)	Uc min. ... Uc max. (V DC)	NO	NC	Catalog number	Global reference code	Weight
55	160	75	160	24...60	20...60	1	1	AF116-30-11B-11	1SFL427002R1111	1.500
				48...130	48...130	1	1	AF116-30-11B-12	1SFL427002R1211	1.500
				100...250	100...250	1	1	AF116-30-11B-13	1SFL427002R1311	1.500
				250...500	250...500	1	1	AF116-30-11B-14	1SFL427002R1411	1.500
75	200	100	200	24...60	20...60	1	1	AF140-30-11B-11	1SFL447002R1111	1.500
				48...130	48...130	1	1	AF140-30-11B-12	1SFL447002R1211	1.500
				100...250	100...250	1	1	AF140-30-11B-13	1SFL447002R1311	1.500
				250...500	250...500	1	1	AF140-30-11B-14	1SFL447002R1411	1.500
75	225	100	200	24...60	20...60	1	1	AF146-30-11B-11	1SFL467002R1111	1.500
				48...130	48...130	1	1	AF146-30-11B-12	1SFL467002R1211	1.500
				100...250	100...250	1	1	AF146-30-11B-13	1SFL467002R1311	1.500
				250...500	250...500	1	1	AF146-30-11B-14	1SFL467002R1411	1.500

Main dimensions mm, inches



AF116, AF140, AF146-30-11



AF116, AF140, AF146-30-11B

AF190 ... AF370 3-pole contactors

125 to 300 hp at 480 V AC

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

2



AF205-30-11



AF370-30-11

Description

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

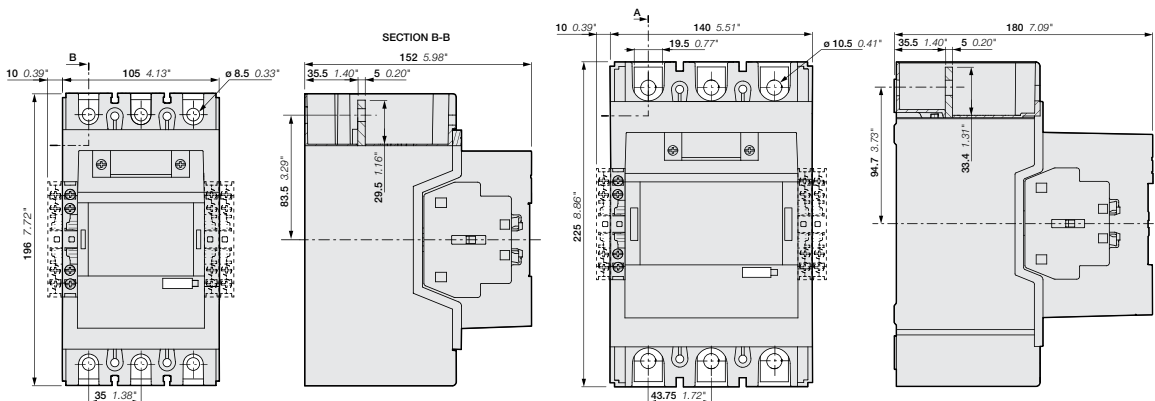
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...500 V 50/60 Hz and 20...500 V DC
- can manage large control voltage variations
- reduced panel energy consumption
- very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

Ordering details

IEC		UL / CSA		Rated control circuit voltage		Auxiliary contacts fitted	Catalog number	Global reference code	Weight
Rated operational power	current $\theta \leq 40^\circ\text{C}$	3-phase motor rating	General use rating	Uc min. ... Uc max.	Uc min. ... Uc max.				
400 V AC-3	AC-1	480 V	600 V AC	V 50/60 Hz	V DC				kg
90	275	125	230 [250]	24...60	20...60	1 1	AF190-30-11-11	1SFL487002R1111	3.000
				48...130	48...130	1 1	AF190-30-11-12	1SFL487002R1211	3.000
				100...250	100...250	1 1	AF190-30-11-13	1SFL487002R1311	3.000
				250...500	250...500	1 1	AF190-30-11-14	1SFL487002R1411	3.000
110	350	150	250 [300]	24...60	20...60	1 1	AF205-30-11-11	1SFL527002R1111	3.000
				48...130	48...130	1 1	AF205-30-11-12	1SFL527002R1211	3.000
				100...250	100...250	1 1	AF205-30-11-13	1SFL527002R1311	3.000
				250...500	250...500	1 1	AF205-30-11-14	1SFL527002R1411	3.000
140	400	200	300 [350]	24...60	20...60	1 1	AF265-30-11-11	1SFL547002R1111	4.640
				48...130	48...130	1 1	AF265-30-11-12	1SFL547002R1211	4.640
				100...250	100...250	1 1	AF265-30-11-13	1SFL547002R1311	4.640
				250...500	250...500	1 1	AF265-30-11-14	1SFL547002R1411	4.640
160	500	250	350 [400]	24...60	20...60	1 1	AF305-30-11-11	1SFL587002R1111	4.640
				48...130	48...130	1 1	AF305-30-11-12	1SFL587002R1211	4.640
				100...250	100...250	1 1	AF305-30-11-13	1SFL587002R1311	4.640
				250...500	250...500	1 1	AF305-30-11-14	1SFL587002R1411	4.640
200	600	300	400 [520]	24...60	20...60	1 1	AF370-30-11-11	1SFL607002R1111	4.640
				48...130	48...130	1 1	AF370-30-11-12	1SFL607002R1211	4.640
				100...250	100...250	1 1	AF370-30-11-13	1SFL607002R1311	4.640
				250...500	250...500	1 1	AF370-30-11-14	1SFL607002R1411	4.640

(1) The higher ratings shown in [brackets] can be achieved through the use of LX.. terminal extensions.

Main dimensions mm, inches



AF190, AF205

AF265, AF305, AF370

AF400 ... AF750 3-pole contactors

350 to 600 hp at 480 V AC

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



AF460-30-11



AF750-30-11

Description

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

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

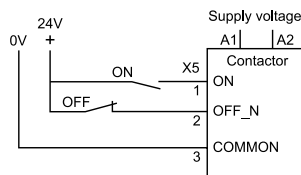
Ordering details

IEC		UL/CSA		Rated control circuit voltage		Auxiliary contacts fitted	Catalog number	Global reference code	Weight
Rated operational power	operational current $\theta \leq 40^\circ\text{C}$	3-phase motor rating	General use rating	Uc min. ... Uc max.					
400 V AC-3	690 V AC-1	hp	A	V 50/60 Hz	V DC				kg
200	600	350	550	-	24...60 (1)	1 1	AF400-30-11-68	1SFL577001R6811	12.000
				48...130	48...130	1 1	AF400-30-11-69	1SFL577001R6911	12.000
				100...250	100...250	1 1	AF400-30-11-70	1SFL577001R7011	12.000
				250...500	250...500	1 1	AF400-30-11-71	1SFL577001R7111	12.000
250	700	400	650	-	24...60 (1)	1 1	AF460-30-11-68	1SFL597001R6811	12.000
				48...130	48...130	1 1	AF460-30-11-69	1SFL597001R6911	12.000
				100...250	100...250	1 1	AF460-30-11-70	1SFL597001R7011	12.000
				250...500	250...500	1 1	AF460-30-11-71	1SFL597001R7111	12.000
315	800	500	750	-	24...60 (1)	1 1	AF580-30-11-68	1SFL617001R6811	15.000
				48...130	48...130	1 1	AF580-30-11-69	1SFL617001R6911	15.000
				100...250	100...250	1 1	AF580-30-11-70	1SFL617001R7011	15.000
				250...500	250...500	1 1	AF580-30-11-71	1SFL617001R7111	15.000
400	1050	600	900	-	24...60 (1)	1 1	AF750-30-11-68	1SFL637001R6811	15.000
				48...130	48...130	1 1	AF750-30-11-69	1SFL637001R6911	15.000
				100...250	100...250	1 1	AF750-30-11-70	1SFL637001R7011	15.000
				250...500	250...500	1 1	AF750-30-11-71	1SFL637001R7111	15.000

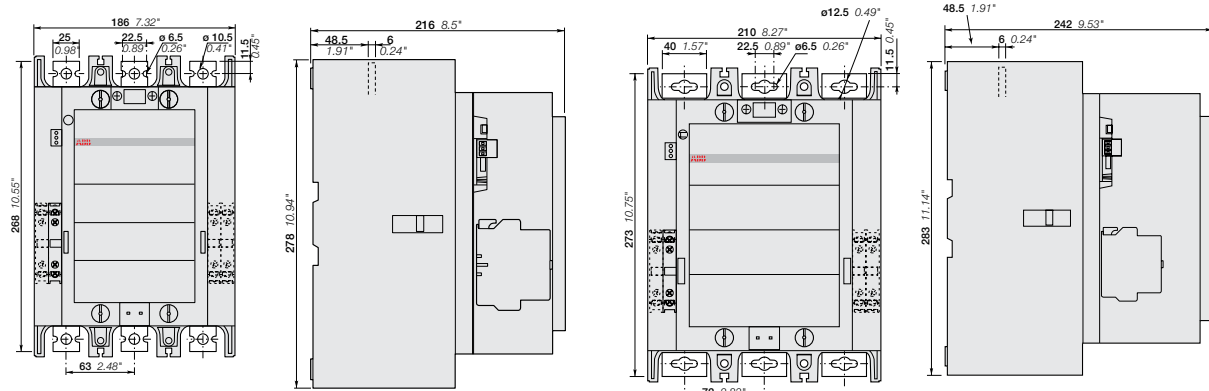
(1) The connection polarities indicated close to the coil terminals must be respected: A1 for the positive pole and A2 for the negative pole.
 (2) Up to 850 V DC for AF580, AF750.

Control inputs

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



Main dimensions mm, inches



AF400, AF460

AF580, AF750

AF1250 ... AF2650 3-pole contactors

800 to 900 hp at 480 V AC and up to 2700 A general use AC / DC operated with 1 N.O. + 1 N.C. auxiliary contacts

2



AF1250-30-11



AF2650-30-11

Description

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

– control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC)

– only 4 coils for AF1250 to cover control voltages between 48...500 V 50/60 Hz and 24...500 V DC
 – only 1 coil for AF1350 ... AF2650 to cover control voltages between 100...250 V 50/60 Hz and 100...250 V DC

– can manage large control voltage variations

– reduced panel energy consumption

– very distinct closing and opening

– can withstand short voltage dips and voltages sags (SEMI F47 conditions of use on request).

– built-in surge suppression

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

Ordering details

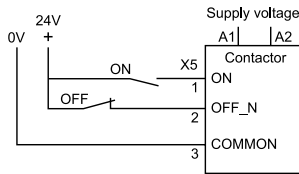
IEC Rated operational power 400 V AC-3 kW	UL/CSA 3-phase motor rating 480 V hp	General use rating 600 V AC A (2)	Rated control circuit voltage Uc (1)		Auxiliary contacts fitted	Catalog number	Global reference code	Weight Pkg (1 pce) kg	
			V 50/60 Hz	V DC					
-	1260	-	1210	-	24...60 (1)	1 1	AF1250-30-11-68	1SFL647001R6811	16.000
				48...130	48...130	1 1	AF1250-30-11-69	1SFL647001R6911	16.000
				100...250	100...250	1 1	AF1250-30-11-70	1SFL647001R7011	16.000
				250...500	250...500	1 1	AF1250-30-11-71	1SFL647001R7111	16.000
475	1350	800	1350	100...250	100...250	1 1	AF1350-30-11-70	1SFL657001R7011	34.000
560	1650	900	1650	100...250	100...250	1 1	AF1650-30-11-70	1SFL677001R7011	35.000
-	2050	-	2100	100...250	100...250	1 1	AF2050-30-11-70	1SFL707001R7011	35.000
-	2650	-	2700	100...250	100...250	1 1	AF2650-30-11-70	1SFL667001R7011	45.000

(1) The connection polarities indicated close to the coil terminals must be respected: A1 for the positive pole and A2 for the negative pole.

(2) AF2650 : Maximum operational voltage = 1000 V according to UL / CSA.

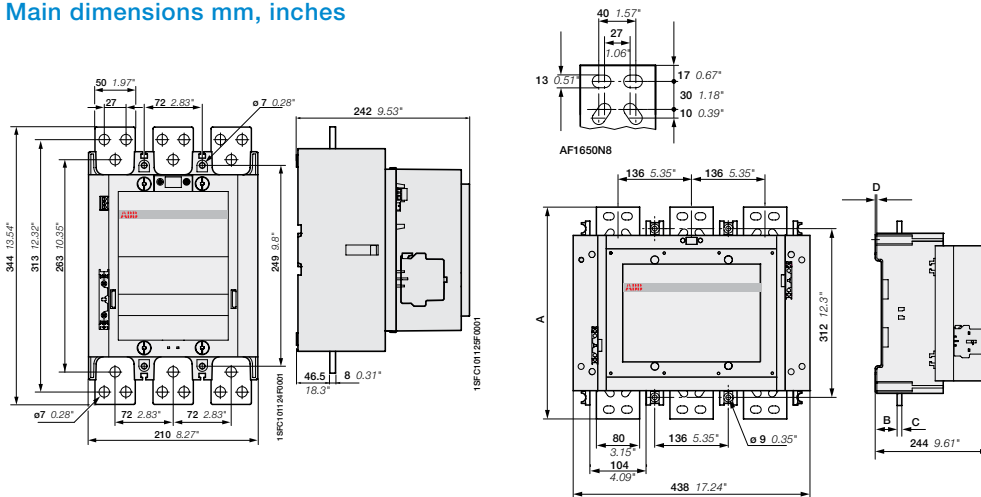
Control inputs

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



	AF1350, AF1650, AF2050	AF2650
A	392 mm / 15.43"	422 mm / 16.61"
B	47 mm / 1.85"	53.5 mm / 2.11"
C	10 mm / 0.39"	25 mm / 0.98"
D	3 mm / 0.12"	-

Main dimensions mm, inches



AF1250

AF1350, AF1650, AF2050, AF2650

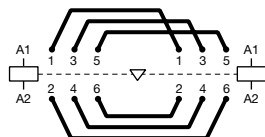
AF09R ... AF30R 3-pole reversing contactors

5 to 20 hp at 480 V AC

AC / DC operated



AF09R-30-22



Power bus diagram

Description

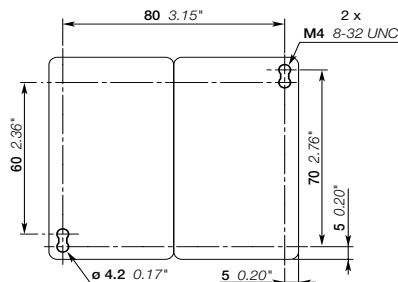
- AF09R ... AF30R reversing contactors are mainly used for directionally controlling 3-phase motor circuits up to 690V AC. These devices include two 3-pole contactors, a mechanical and electrical interlock, power bus (see diagram to the left), and are assembled using fixing clips.
- **Note: for mechanically and electrically interlocked devices without power bus, replace the R in the catalog number with an M (ie. AF09R-30-22-13 becomes AF09M-30-22-13).**
- Control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...500V 50/60 Hz and 20...500 V DC
 - can manage large control voltage variations
 - reduced panel energy consumption
 - very distinct closing and opening.
- Built-in surge suppression
- Add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Ordering details

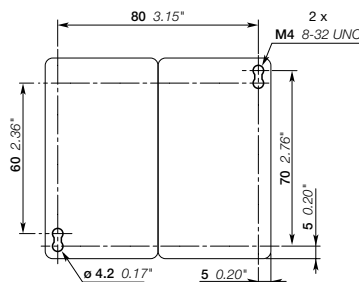
IEC		UL/CSA		Rated control circuit voltage		Auxiliary contacts fitted		Catalog number	Global reference code (3)	Weight Pkg (1 pce)
Rated operational power	Rated operational current $\theta \leq 40^\circ\text{C}$	3-phase motor rating	General use rating	Uc min. ... Uc max.						
400 V AC-3	AC-1	480 V	600 V AC	V 50/60 Hz	V DC					kg
4	25	5	25	24...60	-	(1)	2 2	AF09R-30-22-41		0.622
				48...130	48...130	2 2	AF09R-30-22-12		0.622	
				100...250	100...250	2 2	AF09R-30-22-13		0.622	
				250...500	250...500	2 2	AF09R-30-22-14		0.702	
5.5	28	7.5	28	24...60	-	(1)	2 2	AF12R-30-22-41		0.622
				48...130	48...130	2 2	AF12R-30-22-12		0.622	
				100...250	100...250	2 2	AF12R-30-22-13		0.622	
				250...500	250...500	2 2	AF12R-30-22-14		0.702	
7.5	30	10	30	24...60	-	(1)	2 2	AF16R-30-22-41		0.622
				48...130	48...130	2 2	AF16R-30-22-12		0.622	
				100...250	100...250	2 2	AF16R-30-22-13		0.622	
				250...500	250...500	2 2	AF16R-30-22-14		0.702	
11	45	15	45	24...60	-	(1)	0 2	AF26R-30-02-41		0.757
							2 2	AF26R-30-22-41		0.785
				48...130	48...130	0 2	AF26R-30-02-12		0.757	
							2 2	AF26R-30-22-12		0.785
				100...250	100...250	0 2	AF26R-30-02-13		0.757	
							2 2	AF26R-30-22-13		0.785
				250...500	250...500	0 2	AF26R-30-02-14		0.837	
							2 2	AF26R-30-22-14		0.865
15	50	20	50	24...60	-	(1)	0 2	AF30R-30-02-41		0.757
							2 2	AF30R-30-22-41		0.785
				48...130	48...130	0 2	AF30R-30-02-12		0.757	
							2 2	AF30R-30-22-12		0.785
				100...250	100...250	0 2	AF30R-30-02-13		0.757	
							2 2	AF30R-30-22-13		0.785
				250...500	250...500	0 2	AF30R-30-02-14		0.837	
							2 2	AF30R-30-22-14		0.865

(1) For 24...60 V 50/60 Hz - 20...60 V DC, use AF.-30.-11 (see voltage code table). AF.-30.-11 not suitable for direct control by PLC-output.
 (2) Normally closed contacts included as part of the electrical interlock. Normally open auxiliaries are either integral or front-mount.
 (3) Available in the US and Canada only.

Mounting dimensions mm, inches



AF09R, AF12R, AF16R



AF26R, AF30R

AF09ZR ... AF30ZR 3-pole reversing contactors

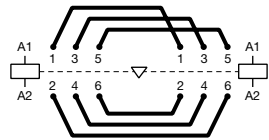
5 to 20 hp at 480 V AC

AC / DC operated - low consumption

2



AF09ZR-30-22



Power bus diagram

Description

- AF09ZR ... AF30ZR reversing contactors are mainly used for directionally controlling 3-phase motor circuits up to 690V AC. These devices include two 3-pole contactors, a mechanical and electrical interlock, power bus (see diagram to the left), and are assembled using fixing clips.
- **Note: for mechanically and electrically interlocked devices without power bus, replace the R in the catalog number with an M (ie. AF09ZR-30-22-23 becomes AF09ZM-30-22-23).**
- Control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage
- Range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...250 V 50/60 Hz and 20...250 V DC
 - can manage large control voltage variations
 - allow direct control by PLC-output ≥ 24 V DC 500 mA
 - reduced panel energy consumption
 - very distinct closing and opening
 - can withstand short voltage dips and voltage sags (SEMI F47-0706 conditions of use on request).
- Built-in surge suppression
- Add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

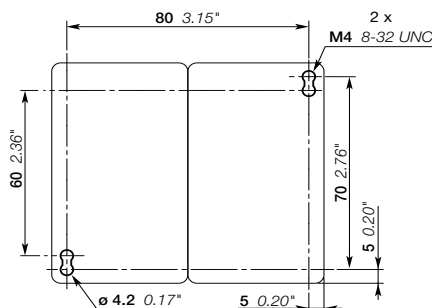
Ordering details

IEC Rated operational power kW	UL/CSA 3-phase motor rating 480 V AC-1 A	General use rating 600 V AC hp	Rated control circuit voltage Uc min. ... Uc max.		Auxiliary contacts fitted (1)	Catalog number	Global reference code (2)	Weight Pkg (1 pce) kg	
			V 50/60 Hz	V DC					
4	25	5	25	24...60	20...60	2	2	AF09ZR-30-22-21	0.702
				48...130	48...130	2	2	AF09ZR-30-22-22	0.702
				100...250	100...250	2	2	AF09ZR-30-22-23	0.702
5.5	28	7.5	28	24...60	20...60	2	2	AF12ZR-30-22-21	0.702
				48...130	48...130	2	2	AF12ZR-30-22-22	0.702
				100...250	100...250	2	2	AF12ZR-30-22-23	0.702
7.5	30	10	30	24...60	20...60	2	2	AF16ZR-30-22-21	0.702
				48...130	48...130	2	2	AF16ZR-30-22-22	0.702
				100...250	100...250	2	2	AF16ZR-30-22-23	0.702
11	45	15	45	24...60	20...60	0	2	AF26ZR-30-02-21	0.837
				48...130	48...130	2	2	AF26ZR-30-02-22	0.837
				100...250	100...250	2	2	AF26ZR-30-02-23	0.837
				24...60	20...60	2	2	AF26ZR-30-22-21	0.865
				48...130	48...130	0	2	AF26ZR-30-22-22	0.837
				100...250	100...250	0	2	AF26ZR-30-22-23	0.837
15	50	20	50	24...60	20...60	0	2	AF30ZR-30-02-21	0.837
				48...130	48...130	2	2	AF30ZR-30-02-22	0.837
				100...250	100...250	2	2	AF30ZR-30-02-23	0.865
				24...60	20...60	2	2	AF30ZR-30-22-21	0.865
				48...130	48...130	0	2	AF30ZR-30-22-22	0.837
				100...250	100...250	0	2	AF30ZR-30-22-23	0.837

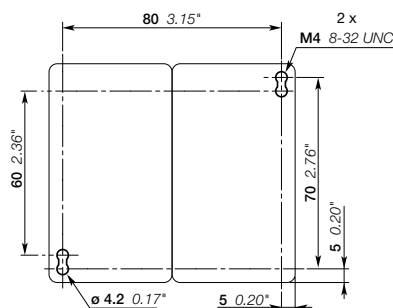
(1) Normally closed contacts included as part of the electrical interlock. Normally open auxiliaries are either integral or front-mount.

(2) Available in the US and Canada only.

Mounting dimensions mm, inches



AF09ZR, AF12ZR, AF16ZR



AF26ZR, AF30ZR

AF116R ... AF140R 3-pole reversing contactors

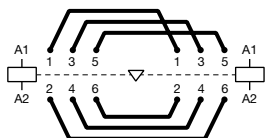
75 to 100 hp at 480 V AC

AC / DC operated

2



AF140R-30-22



Power bus diagram

Description

AF116R and AF140R reversing contactors are mainly used for directionally controlling 3-phase motor circuits up to 690V AC. These devices include two 3-pole contactors, a mechanical interlock, side-mounted auxiliary contacts for electrical interlocking, power bus (see diagram to the left), and are mounted on a backplate.

Note: for mechanically and electrically interlocked devices without power bus, replace the R in the catalog number with an M (ie. AF116R-30-22-13 becomes AF116M-30-22-13).

- Control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...500V 50/60 Hz and 20...500 V DC
- can manage large control voltage variations
- reduced panel energy consumption
- very distinct closing and opening
- can withstand short voltage dips and voltage sags (SEMI F47-0706 conditions of use on request).
- Built-in surge suppression
- Add-on auxiliary contact blocks for side mounting and a wide range of accessories.

Ordering details

IEC	UL / CSA		Rated control circuit voltage		Auxiliary contacts fitted	Catalog number	Global reference code (1)	Weight Pkg (1 pce)
Rated operational power	current	3-phase motor rating	General use rating	Uc min. ... Uc max.				
400 V AC-3	AC-1	480 V	600 V AC					
kW	A	hp	A	V 50/60 Hz V DC				kg (2)

For connection with built-in cable clamps

55	160	75	160	24...60	20...60	2	2	AF116R-30-22-11		
				48...130	48...130	2	2	AF116R-30-22-12		
				100...250	100...250	2	2	AF116R-30-22-13		
				250...500	250...500	2	2	AF116R-30-22-14		
75	200	100	200	24...60	20...60	2	2	AF140R-30-22-11		
				48...130	48...130	2	2	AF140R-30-22-12		
				100...250	100...250	2	2	AF140R-30-22-13		
				250...500	250...500	2	2	AF140R-30-22-14		

(1) Available in the US and Canada only.

(2) Available upon request.

Mounting dimensions mm, inches (upon request)

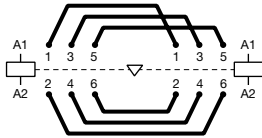
AF190R ... AF370R 3-pole reversing contactors

125 to 300 hp at 480 V AC

AC / DC operated



AF205M-30-22



Power bus diagram

Description

AF190R ... AF370R reversing contactors are mainly used for directionally controlling 3-phase motor circuits up to 690V AC. These devices include two 3-pole contactors, a mechanical interlock, side-mounted auxiliary contacts for electrical interlocking, power bus (see diagram to the left), and are mounted on a backplate.

Note: for mechanically and electrically interlocked devices without power bus, replace the R in the catalog number with an M (ie. AF190R-30-22-13 becomes AF190M-30-22-13).

- Control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...500V 50/60 Hz and 20...500 V DC
- can manage large control voltage variations
- reduced panel energy consumption
- very distinct closing and opening
- can withstand short voltage dips and voltage sags (SEMI F47-0706 conditions of use on request).
- Built-in surge suppression
- Add-on auxiliary contact blocks for side mounting and a wide range of accessories.

Ordering details

IEC		UL / CSA		Rated control circuit voltage Uc min. ... Uc max.		Auxiliary contacts fitted	Catalog number	Global reference code (2)	Weight Pkg (1 pce)
Rated operational power	current $\theta \leq 40^\circ\text{C}$	3-phase motor rating 480 V	General use rating 600 V AC						
400 V AC-3	AC-1			V 50/60 Hz	V DC				kg (3)
90	275	125	230 [250]	24...60	20...60	2 2	AF190R-30-22-11		
				48...130	48...130	2 2	AF190R-30-22-12		
				100...250	100...250	2 2	AF190R-30-22-13		
				250...500	250...500	2 2	AF190R-30-22-14		
110	350	150	250 [300]	24...60	20...60	2 2	AF205R-30-22-11		
				48...130	48...130	2 2	AF205R-30-22-12		
				100...250	100...250	2 2	AF205R-30-22-13		
				250...500	250...500	2 2	AF205R-30-22-14		
140	400	200	300 [350]	24...60	20...60	2 2	AF265R-30-22-11		
				48...130	48...130	2 2	AF265R-30-22-12		
				100...250	100...250	2 2	AF265R-30-22-13		
				250...500	250...500	2 2	AF265R-30-22-14		
160	500	250	350 [400]	24...60	20...60	2 2	AF305R-30-22-11		
				48...130	48...130	2 2	AF305R-30-22-12		
				100...250	100...250	2 2	AF305R-30-22-13		
				250...500	250...500	2 2	AF305R-30-22-14		
200	600	300	400 [520]	24...60	20...60	2 2	AF370R-30-22-11		
				48...130	48...130	2 2	AF370R-30-22-12		
				100...250	100...250	2 2	AF370R-30-22-13		
				250...500	250...500	2 2	AF370R-30-22-14		

(1) The higher ratings shown in [brackets] can be achieved through the use of LX.. Terminal extensions. Terminal extensions are included as standard for reversing contactors, but must be purchased separately for mechanically and electrically interlocked devices.
 (2) Available in the US and Canada only.
 (3) Available upon request.

Mounting dimensions mm, inches (upon request)

AF400R ... AF750R 3-pole reversing contactors

350 to 600 hp at 480 V AC

AC / DC operated

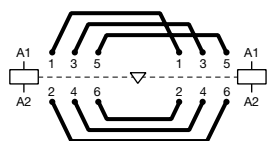
2



AF460R-30-11

Description

- AF400R ... AF750R reversing contactors are mainly used for directionally controlling 3-phase motor circuits up to 690V AC. These devices include two 3-pole contactors, a mechanical interlock, side-mounted auxiliary contacts for electrical interlocking, power bus (see diagram to the left), and are mounted on a back-plate.
- **Note: for mechanically and electrically interlocked devices without power bus, replace the R in the catalog number with an M (ie. AF400R-30-22-70 becomes AF400M-30-22-70).**
- Control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage
- Range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...500V 50/60 Hz and 20...500 V DC
 - can manage large control voltage variations
 - reduced panel energy consumption
 - very distinct closing and opening
 - can withstand short voltage dips and voltage sags (SEMI F47-0706 conditions of use on request).
- Built-in surge suppression
- Add-on auxiliary contact blocks for side mounting and a wide range of accessories.



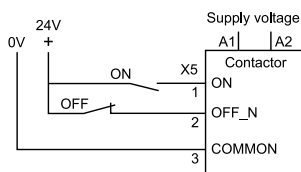
Power bus diagram

Ordering details

IEC Rated operational power	UL/CSA 3-phase motor rating 480 V	General use rating 600 V AC	Rated control circuit voltage Uc min. ... Uc max.		Auxiliary contacts fitted	Catalog number	Global reference code (2)	Weight Pkg (1 pce) kg (3)
			V 50/60 Hz	V DC				
400 V AC-3 kW	AC-1 current $\theta \leq 40^\circ\text{C}$ A	hp	A	-	24...60 (1)	2 2	AF400R-30-11-68	
				48...130	48...130	2 2	AF400R-30-11-69	
				100...250	100...250	2 2	AF400R-30-11-70	
				250...500	250...500	2 2	AF400R-30-11-71	
250	700	400	650	-	24...60 (1)	2 2	AF460R-30-11-68	
				48...130	48...130	2 2	AF460R-30-11-69	
				100...250	100...250	2 2	AF460R-30-11-70	
				250...500	250...500	2 2	AF460R-30-11-71	
315	800	500	750	-	24...60 (1)	2 2	AF580R-30-11-68	
				48...130	48...130	2 2	AF580R-30-11-69	
				100...250	100...250	2 2	AF580R-30-11-70	
				250...500	250...500	2 2	AF580R-30-11-71	
400	1050	600	900	-	24...60 (1)	2 2	AF750R-30-11-68	
				48...130	48...130	2 2	AF750R-30-11-69	
				100...250	100...250	2 2	AF750R-30-11-70	
				250...500	250...500	2 2	AF750R-30-11-71	

- (1) The connection polarities indicated close to the coil terminals must be respected: A1 for the positive pole and A2 for the negative pole.
 (2) Available in the US and Canada only.
 (3) Available upon request.

Control inputs



Mounting dimensions mm, inches (upon request)

AF09N00 ... AF26N1 3-pole NEMA rated contactors

Sizes 00 to 1

AC / DC operated



AF09N00-30-10



AF26N1-30-00

Description

- AF09N00 ... AF26N1 NEMA rated contactors are mainly used for controlling 3-phase motor circuits up to 575V AC. These contactors are of the block type design with 3 main poles.
- Control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...500V 50/60 Hz and 20...500 V DC
 - can manage large control voltage variations
 - reduced panel energy consumption
 - very distinct closing and opening.
- Built-in surge suppression
- Add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

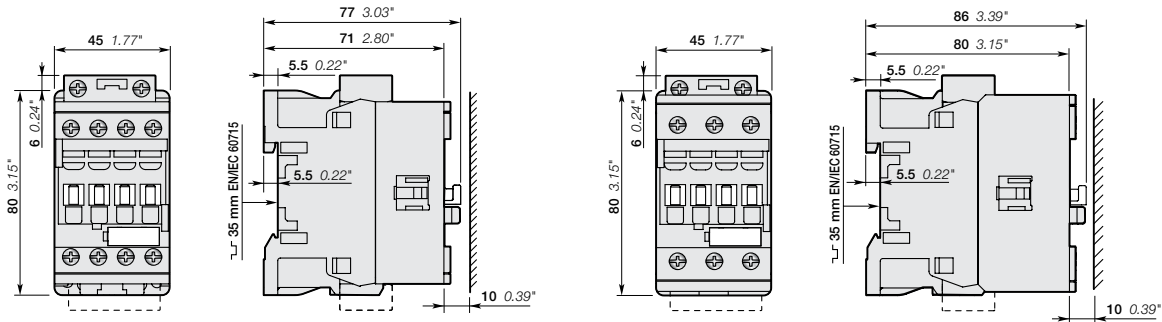
Ordering details

NEMA				Rated control circuit voltage		Auxiliary contacts fitted	Catalog number	Global reference code (2)	Weight Pkg (1 pce)
Size	Continuous current	3-phase motor rating		Uc min. ... Uc max.					
	A	230 V hp	460/575V hp	V 50/60 Hz	V DC				kg
00	9	1.5	25	24...60	-	(1)	1 0	AF09N00-30-10-41	0.270
				48...130	48...130	1 0	AF09N00-30-01-41	0.270	
				100...250	100...250	1 0	AF09N00-30-10-12	0.270	
				250...500	250...500	1 0	AF09N00-30-01-12	0.270	
				250...500	250...500	1 0	AF09N00-30-10-13	0.270	
0	18	3	5	24...60	-	(1)	0 1	AF09N00-30-01-14	0.310
				48...130	48...130	1 0	AF12N0-30-10-41	0.270	
				100...250	100...250	1 0	AF12N0-30-10-12	0.270	
				250...500	250...250	1 0	AF12N0-30-10-13	0.270	
				250...500	250...500	1 0	AF12N0-30-01-13	0.270	
1	27	7.5	10	24...60	-	(1)	0 0	AF12N0-30-01-14	0.310
				48...130	48...130	0 0	AF26N1-30-00-41	0.310	
				100...250	100...250	0 0	AF26N1-30-00-12	0.310	
				250...500	250...250	0 0	AF26N1-30-00-13	0.310	
				250...500	250...500	0 0	AF26N1-30-00-14	0.350	

(1) For 24...60 V 50/60 Hz - 20...60 V DC, use AF.-30-.-11 (see voltage code table). AF.-30-.-11 not suitable for direct control by PLC-output.

(2) Available in the US and Canada only.

Main dimensions mm, inches



AF09N00, AF12N0

AF26N1

AF09N00Z ... AF26N1Z 3-pole NEMA rated contactors

Sizes 00 to 1

AC / DC operated - low consumption

2



AF09N00Z-30-10



AF26N1Z-30-00

Description

- AF09N00 ... AF26N1 NEMA rated contactors are mainly used for controlling 3-phase motor circuits up to 575V AC. These contactors are of the block type design with 3 main poles.
- Control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...500V 50/60 Hz and 20...500 V DC
 - can manage large control voltage variations
 - reduced panel energy consumption
 - very distinct closing and opening.
- Built-in surge suppression
- Add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

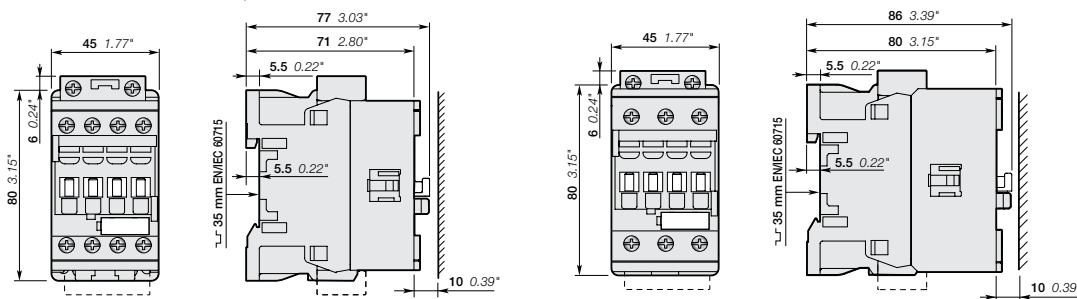
Ordering details

NEMA				Rated control circuit voltage		Auxiliary contacts fitted	Catalog number	Global reference code (2)	Weight Pkg (1 pce)
Size	Continuous current	3-phase motor rating		Uc min. ... Uc max.					
	A	230 V hp	460/575V hp	V 50/60 Hz	V DC			kg	
0	9	1.5	25	-	12...20 (1)	1 0	AF09N00Z-30-10-20	0.310	
						0 1	AF09N00Z-30-01-20	0.310	
				24...60	20...60	1 0	AF09N00Z-30-10-21	0.310	
						0 1	AF09N00Z-30-01-21	0.310	
				48...130	48...130	1 0	AF09N00Z-30-10-22	0.310	
						0 1	AF09N00Z-30-01-22	0.310	
				100...250	100...250	1 0	AF09N00Z-30-10-23	0.310	
						0 1	AF09N00Z-30-01-23	0.310	
0	18	3	5	-	12...20 (1)	1 0	AF12N0Z-30-10-20	0.310	
						0 1	AF12N0Z-30-01-20	0.310	
				24...60	20...60	1 0	AF12N0Z-30-10-21	0.310	
						0 1	AF12N0Z-30-01-21	0.310	
				48...130	48...130	1 0	AF12N0Z-30-10-22	0.310	
						0 1	AF12N0Z-30-01-22	0.310	
				100...250	100...250	1 0	AF12N0Z-30-10-23	0.310	
						0 1	AF12N0Z-30-01-23	0.310	
1	27	7.5	10	-	12...20 (1)	0 0	AF26N1Z-30-00-20	0.350	
				24...60	20...60	0 0	AF26N1Z-30-00-21	0.350	
				48...130	48...130	0 0	AF26N1Z-30-00-22	0.350	
				100...250	100...250	0 0	AF26N1Z-30-00-23	0.350	
						0 0	AF26N1Z-30-00-23	0.350	

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

(2) Available in the US and Canada only.

Main dimensions mm, inches



AF09N00Z, AF12N0Z

AF26N1Z

AF40N2 & AF80N3 3-pole NEMA rated contactors

Sizes 2 & 3

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



AF40N2-30-11



AF80N3-30-11

Description

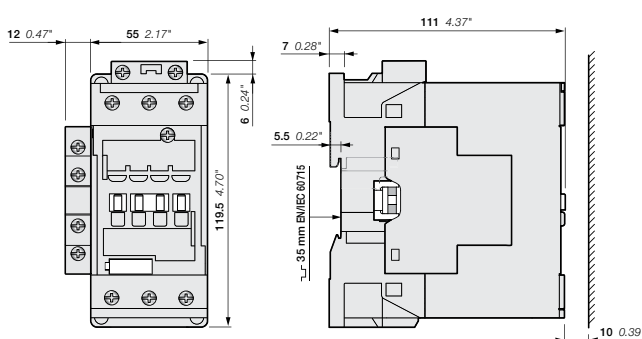
- AF40N2 and AF80N3 NEMA rated contactors are mainly used for controlling 3-phase motor circuits up to 575V AC. These contactors are of the block type design with 3 main poles.
- Control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...500V 50/60 Hz and 20...500 V DC
- can manage large control voltage variations
- reduced panel energy consumption
- very distinct closing and opening.
- Built-in surge suppression
- Add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Ordering details

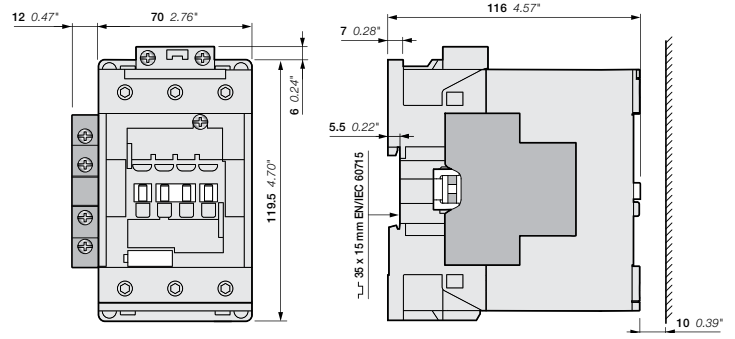
NEMA				Rated control circuit voltage		Auxiliary contacts fitted	Catalog number	Global reference code (2)	Weight Pkg (1 pce)
Size	Continuous current	3-phase motor rating		Uc min. ... Uc max.					
	A	230 V	460/575V	V 50/60 Hz	V DC				kg
2	45	15	25	24...60	-	1 1	AF40N2-30-11-41		1,010
				24...60	20...60 (1)	1 1	AF40N2-30-11-11		1,010
				48...130	48...130	1 1	AF40N2-30-11-12		1,010
				100...250	100...250	1 1	AF40N2-30-11-13		1,000
				250...500	250...500	1 1	AF40N2-30-11-14		1,000
3	90	30	50	24...60	-	1 1	AF80N3-30-11-41		1,260
				24...60	20...60 (1)	1 1	AF80N3-30-11-11		1,260
				48...130	48...130	1 1	AF80N3-30-11-12		1,260
				100...250	100...250	1 1	AF80N3-30-11-13		1,210
				250...500	250...500	1 1	AF80N3-30-11-14		1,210

(1) AF.-30-...-11 not suitable for direct control by PLC-output.
 (2) Available in the US and Canada only.

Main dimensions mm, inches



AF40N2



AF80N3

AF140N4 & AF265N5 3-pole NEMA rated contactors

Sizes 4 & 5

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

2



AF140N4-30-11



AF140N4-30-11B



AF265N5-30-11

Description

AF140N4 and AF265N5 NEMA rated contactors are mainly used for controlling 3-phase motor circuits up to 575V AC. These contactors are of the block type design with 3 main poles.

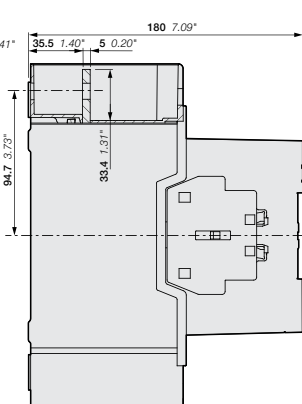
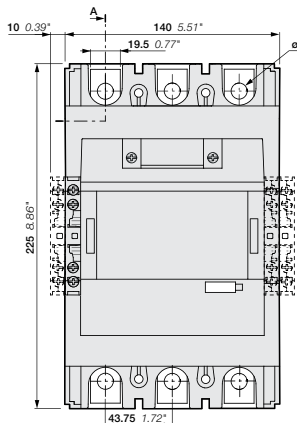
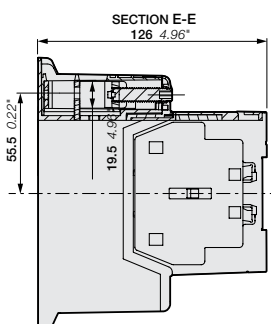
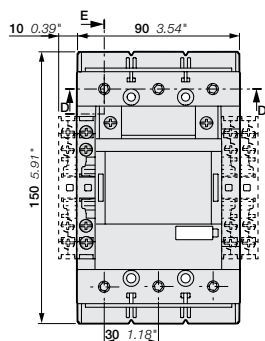
- Control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...500V 50/60 Hz and 20...500 V DC
- can manage large control voltage variations
- reduced panel energy consumption
- very distinct closing and opening
- can withstand short voltage dips and voltage sags (SEMI F47-0706 conditions of use on request).
- Built-in surge suppression
- Add-on auxiliary contact blocks for side mounting and a wide range of accessories.

Ordering details

NEMA		3-phase motor rating		Rated control circuit voltage		Auxiliary contacts fitted	Catalog number	Global reference code (1)	Weight
Size	Continuous current	230 V	460/575V	Uc min. ... Uc max.					Pkg (1 pce)
A	hp	hp	V 50/60 Hz	V DC	kg				
For connection with built-in cable clamps									
4	135	50	100	24...60	20...60	1 1	AF140N4-30-11-11		1.750
				48...130	48...130	1 1	AF140N4-30-11-12		1.750
				100...250	100...250	1 1	AF140N4-30-11-13		1.750
				250...500	250...500	1 1	AF140N4-30-11-14		1.750
With bar connections									
4	135	50	100	24...60	20...60	1 1	AF140N4-30-11B-11		1.500
				48...130	48...130	1 1	AF140N4-30-11B-12		1.500
				100...250	100...250	1 1	AF140N4-30-11B-13		1.500
				250...500	250...500	1 1	AF140N4-30-11B-14		1.500
5	270	100	200	24...60	20...60	1 1	AF265N5-30-11-11		4.640
				48...130	48...130	1 1	AF265N5-30-11-12		4.640
				100...250	100...250	1 1	AF265N5-30-11-13		4.640
				250...500	250...500	1 1	AF265N5-30-11-14		4.640

(1) Available in the US and Canada only.

Main dimensions mm, inches



AF140N4

AF265N5

AF460N6 & AF750N7 3-pole NEMA rated contactors

Sizes 6 & 7

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



AF460N6-30-11



AF750N7-30-11

Description

AF460N6 and AF750N7 NEMA rated contactors are mainly used for controlling 3-phase motor circuits up to 575V AC. These contactors are of the block type design with 3 main poles.

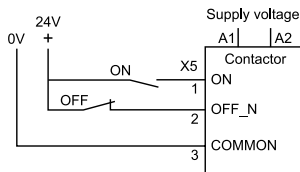
- Control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 coils to cover control voltages between 48...500 V 50/60 Hz and 24...500 V DC
- can manage large control voltage variations
- reduced panel energy consumption
- very distinct closing and opening
- can withstand short voltage dips and voltage sags (SEMI F47-0706 conditions of use on request).
- Built-in surge suppression
- Add-on auxiliary contact blocks for side mounting and a wide range of accessories.

Ordering details

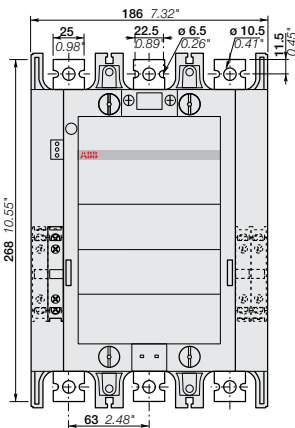
NEMA		3-phase motor rating		Rated control circuit voltage		Auxiliary contacts fitted		Catalog number	Global reference code (2)	Weight
Size	Continuous current	230 V	460/575V	Uc min. ... Uc max.						Pkg (1 pce)
	A	hp	hp	V 50/60 Hz	V DC					kg
6	540	200	400	-	24...60 (1)	1	1	AF460N6-3011-68		12.000
				48...130	48...130	1	1	AF460N6-3011-69		12.000
				100...250	100...250	1	1	AF460N6-3011-70		12.000
				250...500	250...500	1	1	AF460N6-3011-71		12.000
7	810	300	600	-	24...60 (1)	1	1	AF750N7-3011-68		15.000
				48...130	48...130	1	1	AF750N7-3011-69		15.000
				100...250	100...250	1	1	AF750N7-3011-70		15.000
				250...500	250...500	1	1	AF750N7-3011-71		15.000

(1) The connection polarities indicated close to the coil terminals must be respected: A1 for the positive pole and A2 for the negative.
 (2) Available in the US and Canada only.

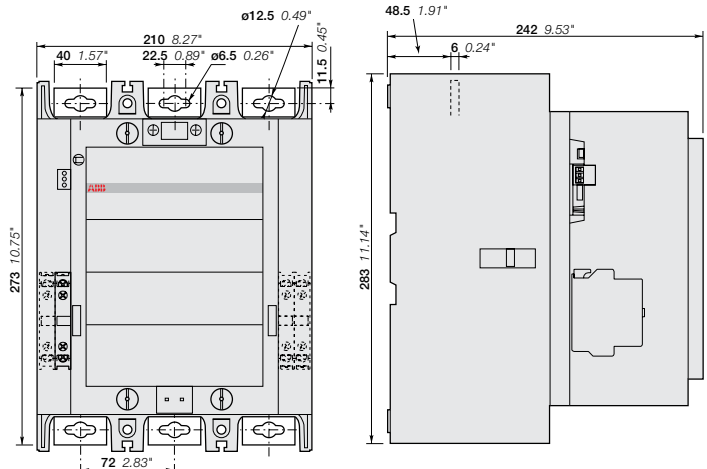
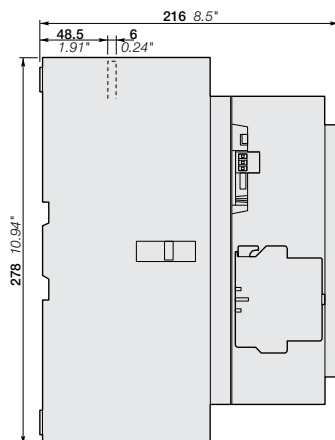
Control inputs



Main dimensions mm, inches



AF460N6



AF750N7

AF1650N8 3-pole NEMA rated contactor

Size 8

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

Description

AF1650N8 NEMA rated contactor is mainly used for controlling 3-phase motor circuits up to 575V AC. This contactor is of the block type design with 3 main poles.

- Control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range, only 1 coil to cover control voltages between between 100...250 V 50/60 Hz and 100...250 V DC
- can manage large control voltage variations
- reduced panel energy consumption
- very distinct closing and opening
- can withstand short voltage dips and voltage sags (SEMI F47-0706 conditions of use on request).
- Built-in surge suppression
- Add-on auxiliary contact blocks for side mounting and a wide range of accessories.

Ordering details

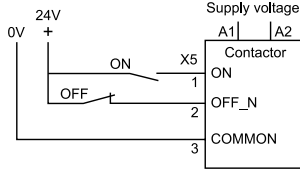


AF1650N8-30-11

NEMA		3-phase motor rating		Rated control circuit voltage		Auxiliary contacts fitted		Global reference code (1)	Weight
Size	Continuous current	230 V	460/575V	Uc min. ... Uc max.	V 50/60 Hz	V DC			Pkg (1 pce)
8	A	450 hp	900 hp				1 1	AF1650N83011-70	35.000 kg

(1) Available in the US and Canada only.

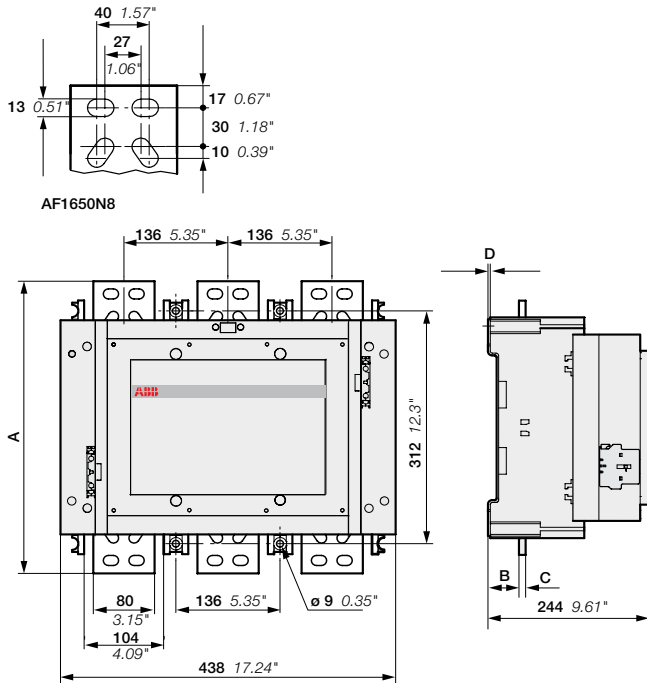
Control inputs



AF1650N8

A	392 mm / 15.43"
B	47 mm / 1.85"
C	10 mm / 0.39"
D	3 mm / 0.12"

Main dimensions mm, inches



AF1650N8

AF09N00R ... AF26N1R 3-pole NEMA rated reversing contactors

Sizes 00 to 1

AC / DC operated



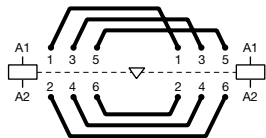
AF09N00R-3022

Description

AF09N00R ... AF26N1R NEMA rated reversing contactors are mainly used for directionally controlling 3-phase motor circuits up to 575V AC. These devices include two 3-pole contactors, a mechanical and electrical interlock, power bus (see diagram to the left), and are assembled using fixing clips.

Note: for mechanically and electrically interlocked devices without power bus, replace the R in the catalog number with an M (ie. AF09N00R-3022-13 becomes AF09N00M-3022-13).

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



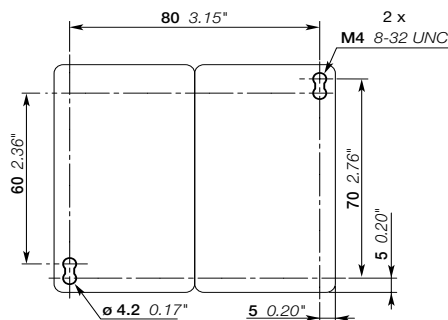
Power bus diagram

Ordering details

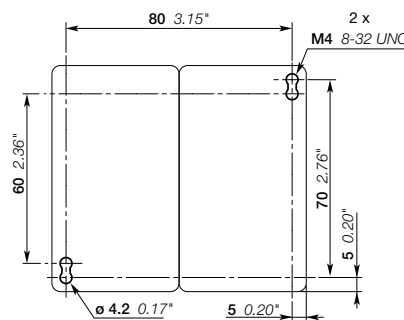
NEMA Size	Continuous current	3-phase motor rating		Rated control circuit voltage		Auxiliary contacts fitted (2)	Catalog number	Global reference code (3)	Weight Pkg (1 pce)
		230V	460/575	V 50/60 Hz	V DC				
00	9	1.5	2	24...60	-	(1)	2 2	AF09N00R-3022-41	0.622
				48...130	48...130		2 2	AF09N00R-3022-12	0.622
				100...250	100...250		2 2	AF09N00R-3022-13	0.622
				250...500	250...500		2 2	AF09N00R-3022-14	0.702
0	18	3	5	24...60	-	(1)	2 2	AF12N0R-3022-41	0.622
				48...130	48...130		2 2	AF12N0R-3022-12	0.622
				100...250	100...250		2 2	AF12N0R-3022-13	0.622
				250...500	250...500		2 2	AF12N0R-3022-14	0.702
1	27	7.5	10	24...60	-	(1)	0 2	AF26N1R-3002-41	0.757
				48...130	48...130		2 2	AF26N1R-3022-41	0.785
				100...250	100...250		0 2	AF26N1R-3002-12	0.757
				250...500	250...500		2 2	AF26N1R-3022-12	0.785
				250...500	250...500		0 2	AF26N1R-3002-13	0.757
				250...500	250...500		2 2	AF26N1R-3022-13	0.785
				250...500	250...500		0 2	AF26N1R-3002-14	0.837
				250...500	250...500		2 2	AF26N1R-3022-14	0.865

(1) For 24...60 V 50/60 Hz - 20...60 V DC, use AF.-30-.-11 (see voltage code table). AF.-30-.-11 not suitable for direct control by PLC-output.
 (2) Normally closed contacts included as part of the electrical interlock. Normally open auxiliaries are either integral or front-mount.
 (3) Available in the US and Canada only.

Mounting dimensions mm, inches



AF09N00R, AF12N0R



AF26N1R

AF09N00ZR ... AF26N1ZR 3-pole NEMA rated reversing contactors

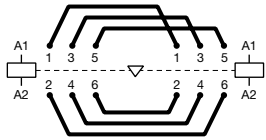
Sizes 00 to 1

AC / DC operated - low consumption

2



AF09N00ZR-30-22



Power bus diagram

Description

AF09N00ZR ... AF26N1ZR NEMA rated reversing contactors are mainly used for directionally controlling 3-phase motor circuits up to 575V AC. These devices include two 3-pole contactors, a mechanical and electrical interlock, power bus (see diagram to the left), and are assembled using fixing clips.

Note: for mechanically and electrically interlocked devices without power bus, replace the R in the catalog number with an M (ie. AF09N00ZR-3022-13 becomes AF09N00ZM-3022-13).

- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...250 V 50/60 Hz and 20...250 V DC
- can manage large control voltage variations
- allow direct control by PLC-output ≥ 24 V DC 500 mA
- reduced panel energy consumption
- very distinct closing and opening
- can withstand short voltage dips and voltage sags (SEMI F47-0706 conditions of use on request)
- built-in surge suppression
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories

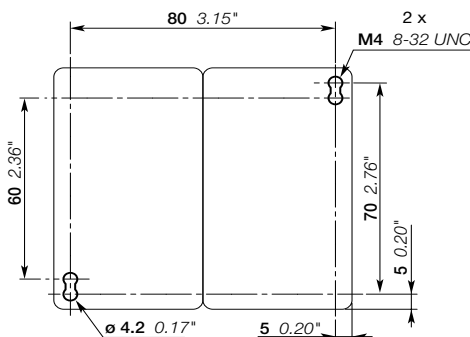
Ordering details

NEMA Size	Continuous current	3-phase motor rating		Rated control circuit voltage		Auxiliary contacts fitted (2)	Catalog number	Global reference code (3)	Weight Pkg (1 pce)
		230V	460/575	Uc min. ... Uc max.	Uc min. ... Uc max.				
	A	hp	hp	V 50/60 Hz	V DC				kg
00	9	1.5	2	24...60	20...60	2 2	AF09N00ZR-3022-21		0.702
				48...130	48...130	2 2	AF09N00ZR-3022-22		0.702
				100...250	100...250	2 2	AF09N00ZR-3022-23		0.702
0	18	3	5	24...60	20...60	2 2	AF12N0ZR-3022-21		0.702
				48...130	48...130	2 2	AF12N0ZR-3022-22		0.702
				100...250	100...250	2 2	AF12N0ZR-3022-23		0.702
1	27	7.5	10	24...60	20...60	0 2	AF26N1ZR-3002-21		0.837
				48...130	48...130	2 2	AF26N1ZR-3022-21		0.865
				48...130	48...130	0 2	AF26N1ZR-3002-22		0.837
				48...130	48...130	2 2	AF26N1ZR-3022-22		0.865
				100...250	100...250	0 2	AF26N1ZR-3002-23		0.837
				100...250	100...250	2 2	AF26N1ZR-3022-23		0.865

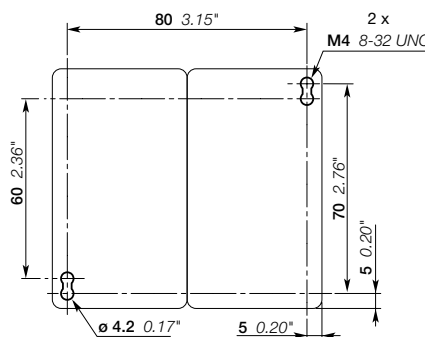
(1) Normally closed contacts included as part of the electrical interlock. Normally open auxiliaries are either integral or front-mount.

(2) Available in the US and Canada only.

Mounting dimensions mm, inches



AF09N00ZR, AF12N0ZR



AF26N1ZR

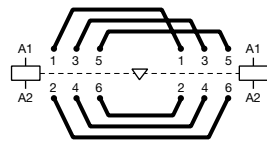
AF40N2R & AF80N3R 3-pole NEMA rated reversing contactors

Sizes 2 & 3

AC / DC operated



AF40N2M-3022



Power bus diagram

Description

AF40N2R and AF80N3R NEMA rated reversing contactors are mainly used for directionally controlling 3-phase motor circuits up to 575V AC. These devices include two 3-pole contactors, a mechanical interlock, side-mounted auxiliary contacts for electrical interlocking, power bus (see diagram to the left), and are assembled using fixing clips.

Note: for mechanically and electrically interlocked devices without power bus, replace the R in the catalog number with an M (ie. AF40N2R-30-22-13 becomes AF40N2M-30-22-13).

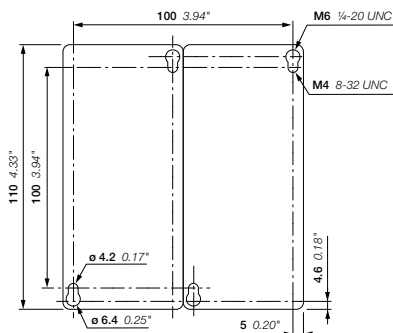
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...500V 50/60 Hz and 20...500 V DC
- can manage large control voltage variations
- reduced panel energy consumption
- very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

Ordering details

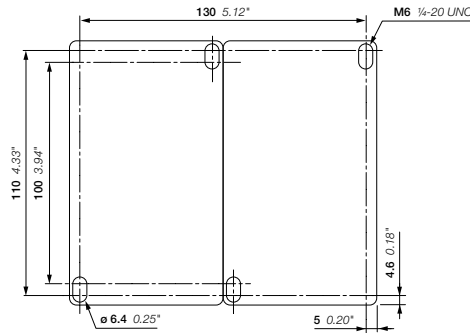
NEMA Size	Continuous current	3-phase motor rating		Rated control circuit voltage		Auxiliary contacts fitted (2)	Catalog number	Global reference code (3)	Weight Pkg (1 pce)
		230V	460/575	Uc min. ... Uc max.					
	A	hp	hp	V 50/60 Hz	V DC				kg
2	45	15	25	24...60	-	2 2	AF40N2R-3022-41		2.283
				24...60	20...60 (1)	2 2	AF40N2R-3022-11		2.283
				48...130	48...130	2 2	AF40N2R-3022-12		2.283
				100...250	100...250	2 2	AF40N2R-3022-13		2.263
				250...500	250...500	2 2	AF40N2R-3022-14		2.263
3	90	30	50	24...60	-	2 2	AF80N3R-3022-41		2.858
				24...60	20...60 (1)	2 2	AF80N3R-3022-11		2.858
				48...130	48...130	2 2	AF80N3R-3022-12		2.858
				100...250	100...250	2 2	AF80N3R-3022-13		2.758
				250...500	250...500	2 2	AF80N3R-3022-14		2.758

(1) AF.-30...-11 not suitable for direct control by PLC-output.
 (2) Normally closed contacts included as part of the electrical interlock. Normally open auxiliaries are either integral or front-mount.
 (3) Available in the US and Canada only.

Mounting dimensions mm, inches



AF40N2R



AF80N3R

AF140N4R & AF265N5R 3-pole NEMA rated reversing contactors

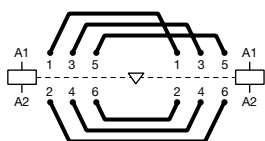
Sizes 4 & 5

AC / DC operated

2



AF140N4R-30-22



Power bus diagram

Description

AF140N4 and AF265N5 NEMA rated contactors are mainly used for directionally controlling 3-phase motor circuits up to 575V AC. These devices include two 3-pole contactors, a mechanical interlock, side-mounted auxiliary contacts for electrical interlocking, power bus (see diagram to the left), and are mounted on a back-plate.

Note: for mechanically and electrically interlocked devices without power bus, replace the R in the catalog number with an M (ie. AF140N4R-30-22-13 becomes AF140N4M-30-22-13).

- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...500V 50/60 Hz and 20...500 V DC
- can manage large control voltage variations
- reduced panel energy consumption
- very distinct closing and opening
- can withstand short voltage dips and voltage sags (SEMI F47-0706 conditions of use on request).
- built-in surge suppression
- add-on auxiliary contact blocks for side mounting and a wide range of accessories

Ordering details

NEMA Size	Continuous current	3-phase motor rating		Rated control circuit voltage Uc min. ... Uc max.		Auxiliary contacts fitted (2)	Catalog number	Global reference code (1)	Weight Pkg (1 pce) kg (2)
		230V	460/575	V 50/60 Hz	V DC				
4	135	50	100	24...60	20...60	2 2	AF140N4R-3022-11		
				48...130	48...130	2 2	AF140N4R-3022-12		
				100...250	100...250	2 2	AF140N4R-3022-13		
				250...500	250...500	2 2	AF140N4R-3022-14		
5	270	100	200	24...60	20...60	2 2	AF265N5R-3022-11		
				48...130	48...130	2 2	AF265N5R-3022-12		
				100...250	100...250	2 2	AF265N5R-3022-13		
				250...500	250...500	2 2	AF265N5R-3022-14		

(1) Available in the US and Canada only.

(2) Available upon request.

Mounting dimensions mm, inches (upon request)

AF460N6 & AF750N7 3-pole NEMA rated reversing contactors

Sizes 6 & 7

AC / DC operated



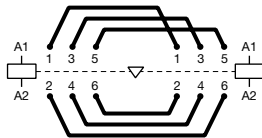
AF460N6R-11

Description

AF460N6 and AF750N7 NEMA rated contactors are mainly used for directionally controlling 3-phase motor circuits up to 575V AC. These devices include two 3-pole contactors, a mechanical interlock, side-mounted auxiliary contacts for electrical interlocking, power bus (see diagram to the left), and are mounted on a back-plate.

Note: for mechanically and electrically interlocked devices without power bus, replace the R in the catalog number with an M (ie. AF460N6R-11-70 becomes AF460N6M-11-70).

- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 coils to cover control voltages between 48...500 V 50/60 Hz and 24...500 V DC
- can manage large control voltage variations
- reduced panel energy consumption
- very distinct closing and opening
- can withstand short voltage dips and voltage sags (SEMI F47-0706 conditions of use on request)
- built-in surge suppression
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories



Power bus diagram

Ordering details

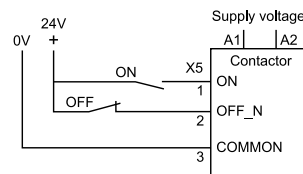
NEMA Size	Continuous current	3-phase motor rating		Rated control circuit voltage		Auxiliary contacts fitted (2)	Catalog number	Global reference code (2)	Weight Pkg (1 pce) kg (3)
		230V	460/575	V 50/60 Hz	V DC				
6	540	200	400	-	24...60 (1)	2 2	AF460N6R-11-68		
				48...130	48...130	2 2	AF460N6R-11-69		
				100...250	100...250	2 2	AF460N6R-11-70		
				250...500	250...500	2 2	AF460N6R-11-71		
7	810	300	600	-	24...60 (1)	2 2	AF750N7R-11-68		
				48...130	48...130	2 2	AF750N7R-11-69		
				100...250	100...250	2 2	AF750N7R-11-70		
				250...500	250...500	2 2	AF750N7R-11-71		

(1) The connection polarities indicated close to the coil terminals must be respected: A1 for the positive pole and A2 for the negative.

(2) Available in the US and Canada only.

(3) Available upon request.

Control inputs



Mounting dimensions mm, inches (upon request)

AF09 ... AF38 4-pole contactors

25 to 55 A general use

AC / DC operated

2



AF09-40-00





AF26-40-00

Description

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

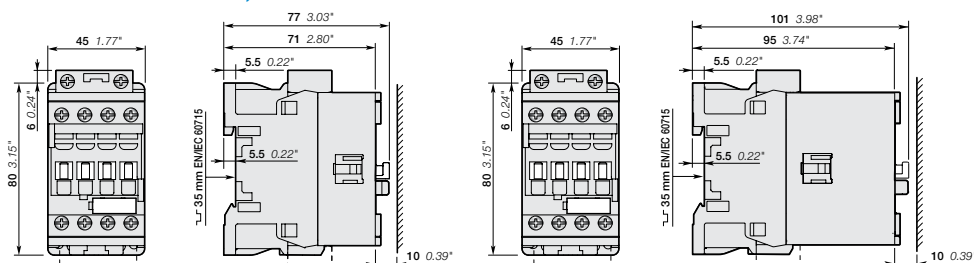
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...500 V 50/60 Hz and 20...500 V DC
- can manage large control voltage variations
- reduced panel energy consumption
- very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

Ordering details

IEC	UL/CSA	Rated control circuit voltage		Auxiliary contacts fitted	Catalog number	Global reference code	Weight	
		Uc min. ... Uc max.						
Rated operational current $\theta \leq 40^\circ\text{C}$ AC-1	General use rating 600 V AC						Pkg (1 pce)	
A	A	V 50/60 Hz	V DC				kg	
4 N.O. main poles								
25	25	24...60	-	(1)	0 0	AF09-40-00-41	1SBL137201R4100	0.270
		48...130	48...130		0 0	AF09-40-00-12	1SBL137201R1200	0.270
		100...250	100...250		0 0	AF09-40-00-13	1SBL137201R1300	0.270
		250...500	250...500		0 0	AF09-40-00-14	1SBL137201R1400	0.310
30	30	24...60	-	(1)	0 0	AF16-40-00-41	1SBL177201R4100	0.270
		48...130	48...130		0 0	AF16-40-00-12	1SBL177201R1200	0.270
		100...250	100...250		0 0	AF16-40-00-13	1SBL177201R1300	0.270
		250...500	250...500		0 0	AF16-40-00-14	1SBL177201R1400	0.310
45	45	24...60	-	(1)	0 0	AF26-40-00-41	1SBL237201R4100	0.360
		48...130	48...130		0 0	AF26-40-00-12	1SBL237201R1200	0.360
		100...250	100...250		0 0	AF26-40-00-13	1SBL237201R1300	0.360
		250...500	250...500		0 0	AF26-40-00-14	1SBL237201R1400	0.400
55	55	24...60	-	(1)	0 0	AF38-40-00-41	1SBL297201R4100	0.360
		48...130	48...130		0 0	AF38-40-00-12	1SBL297201R1200	0.360
		100...250	100...250		0 0	AF38-40-00-13	1SBL297201R1300	0.360
		250...500	250...500		0 0	AF38-40-00-14	1SBL297201R1400	0.400
2 N.O. + 2 N.C. main poles								
25	25	24...60	-	(1)	0 0	AF09-22-00-41	1SBL137501R4100	0.270
		48...130	48...130		0 0	AF09-22-00-12	1SBL137501R1200	0.270
		100...250	100...250		0 0	AF09-22-00-13	1SBL137501R1300	0.270
		250...500	250...500		0 0	AF09-22-00-14	1SBL137501R1400	0.310
30	30	24...60	-	(1)	0 0	AF16-22-00-41	1SBL177501R4100	0.270
		48...130	48...130		0 0	AF16-22-00-12	1SBL177501R1200	0.270
		100...250	100...250		0 0	AF16-22-00-13	1SBL177501R1300	0.270
		250...500	250...500		0 0	AF16-22-00-14	1SBL177501R1400	0.310
45	45	24...60	-	(1)	0 0	AF26-22-00-41	1SBL237501R4100	0.360
		48...130	48...130		0 0	AF26-22-00-12	1SBL237501R1200	0.360
		100...250	100...250		0 0	AF26-22-00-13	1SBL237501R1300	0.360
		250...500	250...500		0 0	AF26-22-00-14	1SBL237501R1400	0.400
55	55	24...60	-	(1)	0 0	AF38-22-00-41	1SBL297501R4100	0.360
		48...130	48...130		0 0	AF38-22-00-12	1SBL297501R1200	0.360
		100...250	100...250		0 0	AF38-22-00-13	1SBL297501R1300	0.360
		250...500	250...500		0 0	AF38-22-00-14	1SBL297501R1400	0.400

(1) For 24...60 V 50/60 Hz - 20...60 V DC, use AF-...-11 (see voltage code table). AF-...-11 not suitable for direct control by PLC-output.

Main dimensions mm, inches



AF09, AF16

AF26, AF38

AF09Z ... AF38Z 4-pole contactors

25 to 55 A general use

AC / DC operated - low consumption



AF09Z-40-00



AF26Z-40-00

Description

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

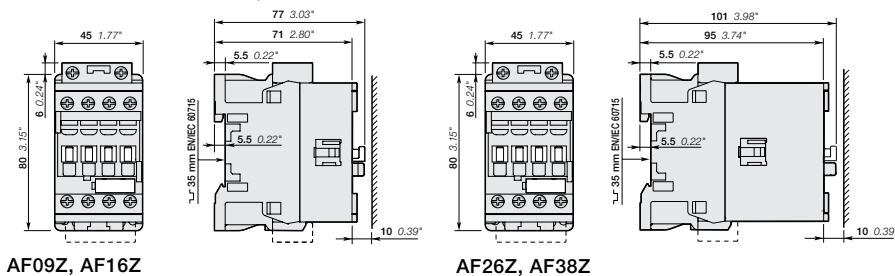
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...250 V 50/60 Hz and 12...250 V DC
- can manage large control voltage variations
- allow direct control by PLC-output ≥ 24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

Ordering details

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

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

Main dimensions mm, inches



NF 4-pole control relays

Pilot duty rated A600 / Q600

AC / DC operated

2



NF22E

Description

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

These control relays are of the block type design with:

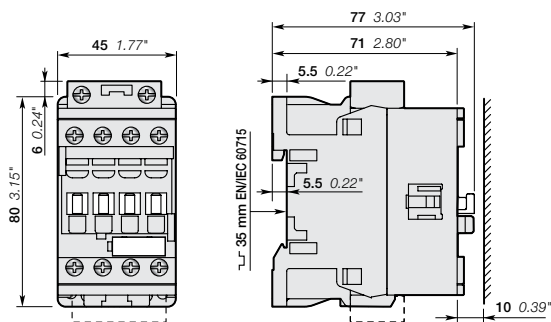
- 4 poles. Control relays have mechanically linked auxiliary contact elements (side-marked symbol)
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC)
 - can manage large control voltage variations
 - only 4 control voltage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

Ordering details

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

(1) For 24...60 V 50/60 Hz - 20...60 V DC, use NF..E-11 (see voltage code table). NF..E-11 not suitable for direct control by PLC-output.

Main dimensions mm, inches



NF22E, NF31E, NF40E

NFZ 4-pole control relays

Pilot duty rated A600 / Q600

AC / DC operated - low consumption



NFZ22E

Description

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

These control relays are of the block type design with:

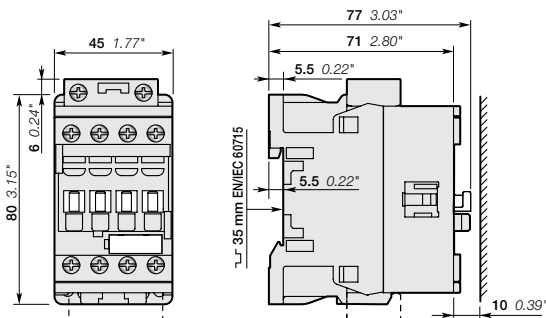
- 4 poles. Control relays have mechanically linked auxiliary contact elements (side-marked symbol)
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC)
 - can manage large control voltage variations
 - only 4 control voltage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

Ordering details

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

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

Main dimensions mm, inches



NFZ22E, NFZ31E, NFZ40E

NF 8-pole control relays

Pilot duty rated A600 / Q600

AC / DC operated

2



NF44E

Description

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

These control relays are of the block type design with:

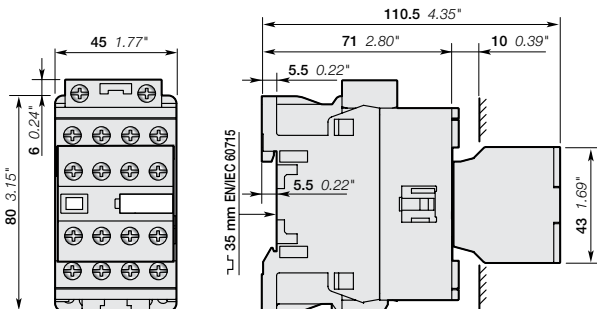
- 8 poles with a permanently fixed 4-pole auxiliary contact block. Control relays have mechanically linked auxiliary contact elements (side-marked symbol)
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC)
 - can manage large control voltage variations
 - only 4 control voltage ranges covering 24...500 V 50/60 Hz and 20...500 V DC
 - reduced panel energy consumption
 - very distinct closing and opening
- built-in surge suppression
- add-on auxiliary contact blocks for side mounting and a wide range of accessories

Ordering details

Number of contacts		Rated control circuit voltage Uc min. ... Uc max.	Catalog number	Global reference code	Weight Pkg (1 pce) kg	
1st stack	2nd stack					
		V 50/60 Hz	V DC			
		24...60	- (1)	NF44E-41	1SBH137001R4144	0.320
		48...130	48...130	NF44E-12	1SBH137001R1244	0.320
		100...250	100...250	NF44E-13	1SBH137001R1344	0.320
		250...500	250...500	NF44E-14	1SBH137001R1444	0.360
		24...60	- (1)	NF53E-41	1SBH137001R4153	0.320
		48...130	48...130	NF53E-12	1SBH137001R1253	0.320
		100...250	100...250	NF53E-13	1SBH137001R1353	0.320
		250...500	250...500	NF53E-14	1SBH137001R1453	0.360
		24...60	- (1)	NF62E-41	1SBH137001R4162	0.320
		48...130	48...130	NF62E-12	1SBH137001R1262	0.320
		100...250	100...250	NF62E-13	1SBH137001R1362	0.320
		250...500	250...500	NF62E-14	1SBH137001R1462	0.360
		24...60	- (1)	NF71E-41	1SBH137001R4171	0.320
		48...130	48...130	NF71E-12	1SBH137001R1271	0.320
		100...250	100...250	NF71E-13	1SBH137001R1371	0.320
		250...500	250...500	NF71E-14	1SBH137001R1471	0.360
		24...60	- (1)	NF80E-41	1SBH137001R4180	0.320
		48...130	48...130	NF80E-12	1SBH137001R1280	0.320
		100...250	100...250	NF80E-13	1SBH137001R1380	0.320
		250...500	250...500	NF80E-14	1SBH137001R1480	0.360

(1) For 24...60 V 50/60 Hz - 20...60 V DC, use NF.E-11 (see voltage code table). NF.E-11 not suitable for direct control by PLC-output.

Main dimensions mm, inches



NF44E, NF53E, NF62E, NF71E, NF80E

NFZ 8-pole control relays

Pilot duty rated A600 / Q600

AC / DC operated – Low consumption



NFZ44E

Description

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

These control relays are of the block type design with:

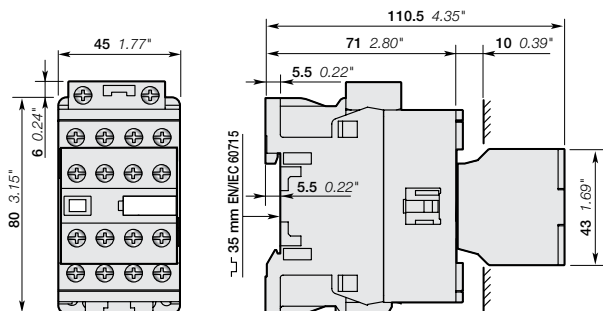
- 8 poles with a permanently fixed 4-pole auxiliary contact block. Control relays have mechanically linked auxiliary contact elements (side-marked symbol)
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC)
 - can manage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

Ordering details

Number of contacts		Rated control circuit voltage Uc min. ... Uc max.	Catalog number	Global reference code	Weight kg	
1st stack	2nd stack					
		V 50/60 Hz	V DC			
		-	12...20	NFZ44E-20	1SBH136001R2044	0.360
		24...60	20...60	NFZ44E-21	1SBH136001R2144	0.360
		48...130	48...130	NFZ44E-22	1SBH136001R2244	0.360
		100...250	100...250	NFZ44E-23	1SBH136001R2344	0.360
		-	12...20	NFZ53E-20	1SBH136001R2053	0.360
		24...60	20...60	NFZ53E-21	1SBH136001R2153	0.360
		48...130	48...130	NFZ53E-22	1SBH136001R2253	0.360
		100...250	100...250	NFZ53E-23	1SBH136001R2353	0.360
		-	12...20	NFZ62E-20	1SBH136001R2062	0.360
		24...60	20...60	NFZ62E-21	1SBH136001R2162	0.360
		48...130	48...130	NFZ62E-22	1SBH136001R2262	0.360
		100...250	100...250	NFZ62E-23	1SBH136001R2362	0.360
		-	12...20	NFZ71E-20	1SBH136001R2071	0.360
		24...60	20...60	NFZ71E-21	1SBH136001R2171	0.360
		48...130	48...130	NFZ71E-22	1SBH136001R2271	0.360
		100...250	100...250	NFZ71E-23	1SBH136001R2371	0.360
		-	12...20	NFZ80E-20	1SBH136001R2080	0.360
		24...60	20...60	NFZ80E-21	1SBH136001R2180	0.360
		48...130	48...130	NFZ80E-22	1SBH136001R2280	0.360
		100...250	100...250	NFZ80E-23	1SBH136001R2380	0.360

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

Main dimensions mm, inches



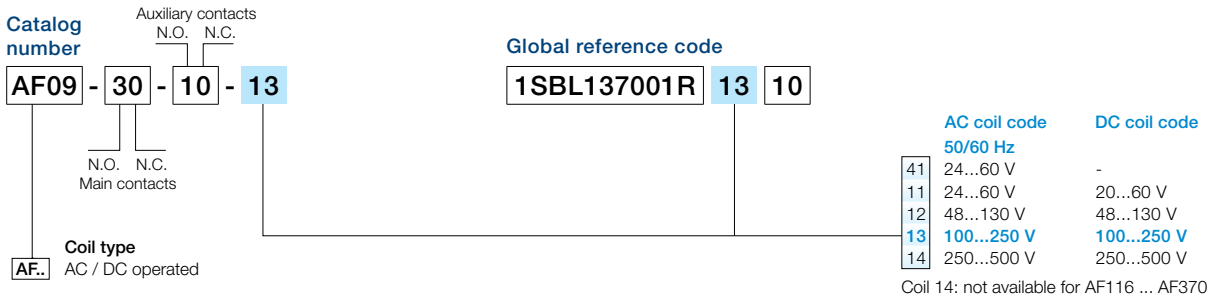
NFZ44E, NFZ53E, NFZ62E, NFZ71E, NFZ80E

Voltage code table

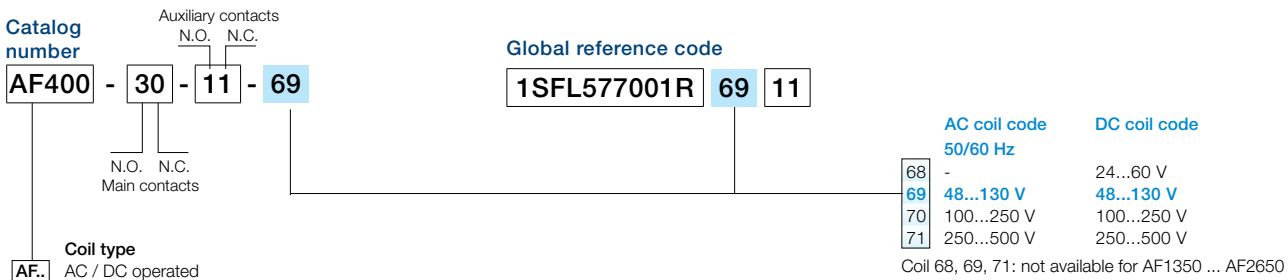
The below tables indicate the available coil voltages and corresponding digits for catalog numbers. When placing an order, please give the catalog number. Select a standard contactor from ordering detail pages. Change the coil voltage code in the catalog number according to the table below.

Example: for contactor AF400-30-11 and coil 100...250 V 50/60 Hz, the catalog number is AF400-30-11-70.

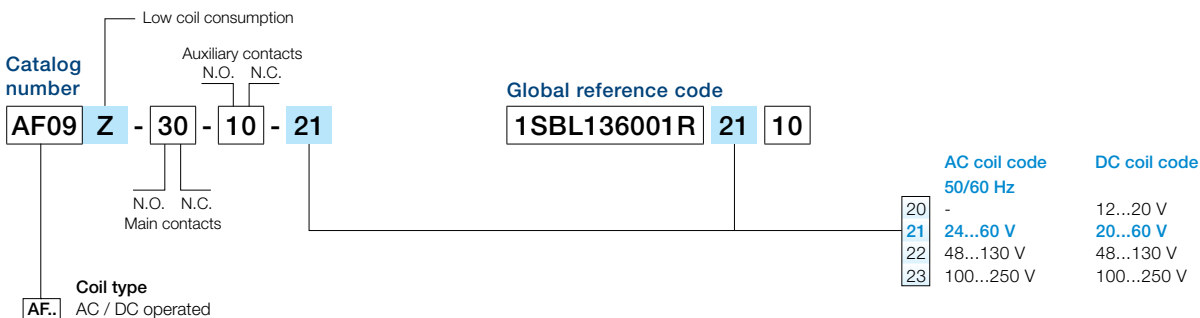
2 AF09 ... AF370 3-pole contactors AF09 ... AF38 4-pole contactors



AF400 ... AF2650 3-pole contactors

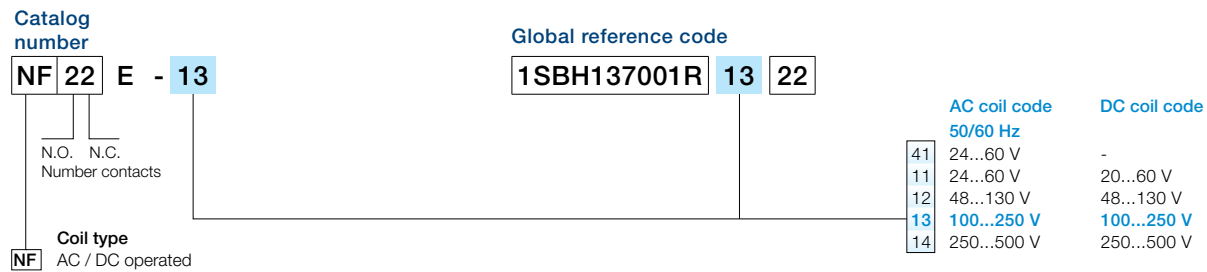


AF09 ... AF38 3- and 4-pole contactors - low consumption

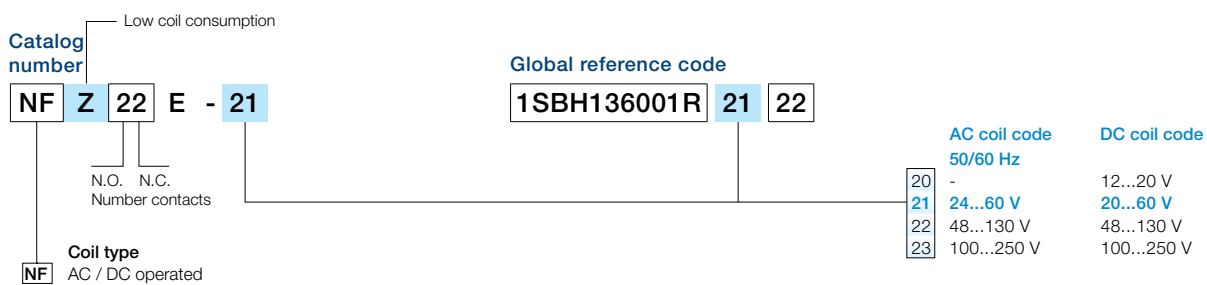


Voltage code table

NF control relays



NF control relays - low consumption





AF09 ... AF96 3-pole contactors

Accessory fitting details

For AF09 ... AF38 contactors + CE5 auxiliary contacts for severe industrial environments

Main accessory fitting details

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

Contactor types	Main poles 	Built-in auxiliary contacts 	Front-mounted accessories			Side-mounted accessories		
			Auxiliary contact blocks		Electronic timer mechanical interlock set (between 2 contactors) VEM4	Auxiliary contact blocks		
			1-pole CE5	1-pole CA4 1-pole CC4		Left side 2-pole CAL4-11	Right side	

3-pole contactors AF09 ... AF38

Max. N.C. built-in and add-on N.C. auxiliary contacts (CA4, CC4, CAL4, VEM4):
2 max. with 1 CE5, none with 2 CE5 on positions 1, 2, 3, 4

AF09 ... AF16	3 0	0 1	1	+	3 max.	-	+	1	-
AF09 ... AF16	3 0	1 0	2	+	2 max.	-	-	-	-
AF26 ... AF38	3 0	0 0	1	+	3 max.	-	+	1	-
			1	+	1 max.	-	+	1	+ 1
			1	+	2 max.	+	1	+	1
1 max. N.C. built-in and add-on N.C. auxiliary contacts (CA4, CC4, CAL4, VEM4) on positions 1 ±30°, 5									
AF09 ... AF16	3 0	0 1	1	+	3 max.	-	-	-	-
AF09 ... AF16	3 0	1 0	1	+	3 max.	-	+	1	-
AF26 ... AF38	3 0	0 0	1	+	2 max.	+	1	-	-

4-pole contactors AF09 ... AF38

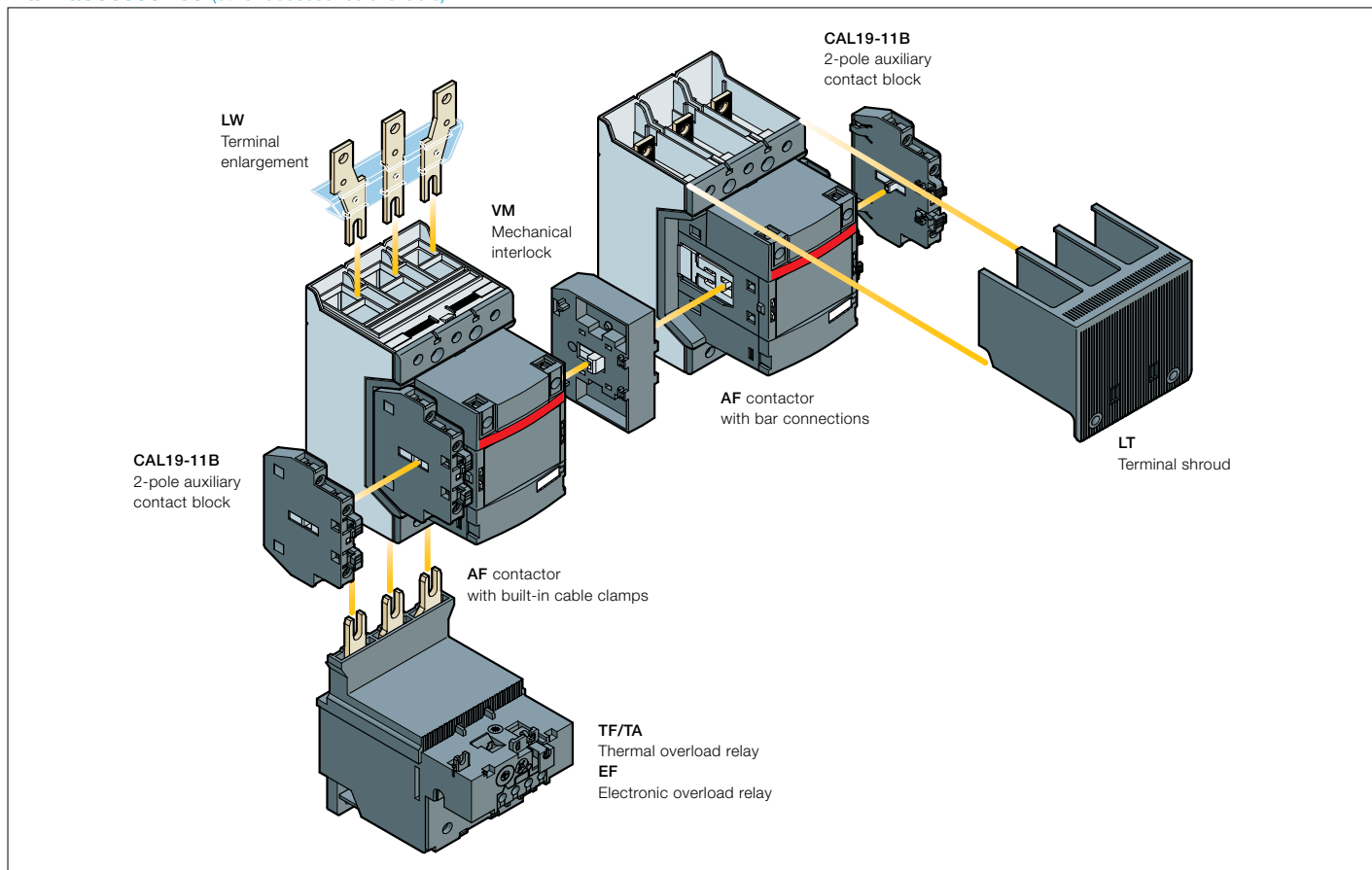
Max. add-on N.C. auxiliary contacts (CA4, CC4, CAL4, VEM4):
2 max. with 1 CE5, none with 2 CE5 on positions 1, 2, 3, 4

AF09, AF16	4 0	0 0	2	+	2 max.	-	-	-	-
			1	+	3 max.	-	+	1	-
			1	+	1 max.	-	+	1	+ 1
			1	+	2 max.	+	1	+	1
1 max. add-on N.C. auxiliary contacts (CA4, CC4, CAL4, VEM4) on positions 1, 2, 3, 4									
AF26, AF38	4 0	0 0	1	+	3 max.	-	+	1	-
			1	+	2 max.	+	1	-	-
AF09, AF16	2 2	0 0	1	+	3 max.	-	+	1	-
AF26, AF38	2 2	0 0							
1 max. add-on N.C. auxiliary contacts (CA4, CC4, CAL4, VEM4) on positions 1 ±30°, 5									
AF09, AF16	4 0	0 0	1	+	3 max.	-	+	1	-
			1	+	2 max.	+	1	-	-
No add-on N.C. auxiliary contacts on positions 1 ±30°, 5									
AF26, AF38	4 0	0 0	1	+	3 max.	-	-	-	-
AF09, AF16	2 2	0 0							
AF26, AF38	2 2	0 0							

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

Accessory fitting details

Main accessories (other accessories available)



Main accessory fitting details

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

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

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

Overload relays fitting details (1)

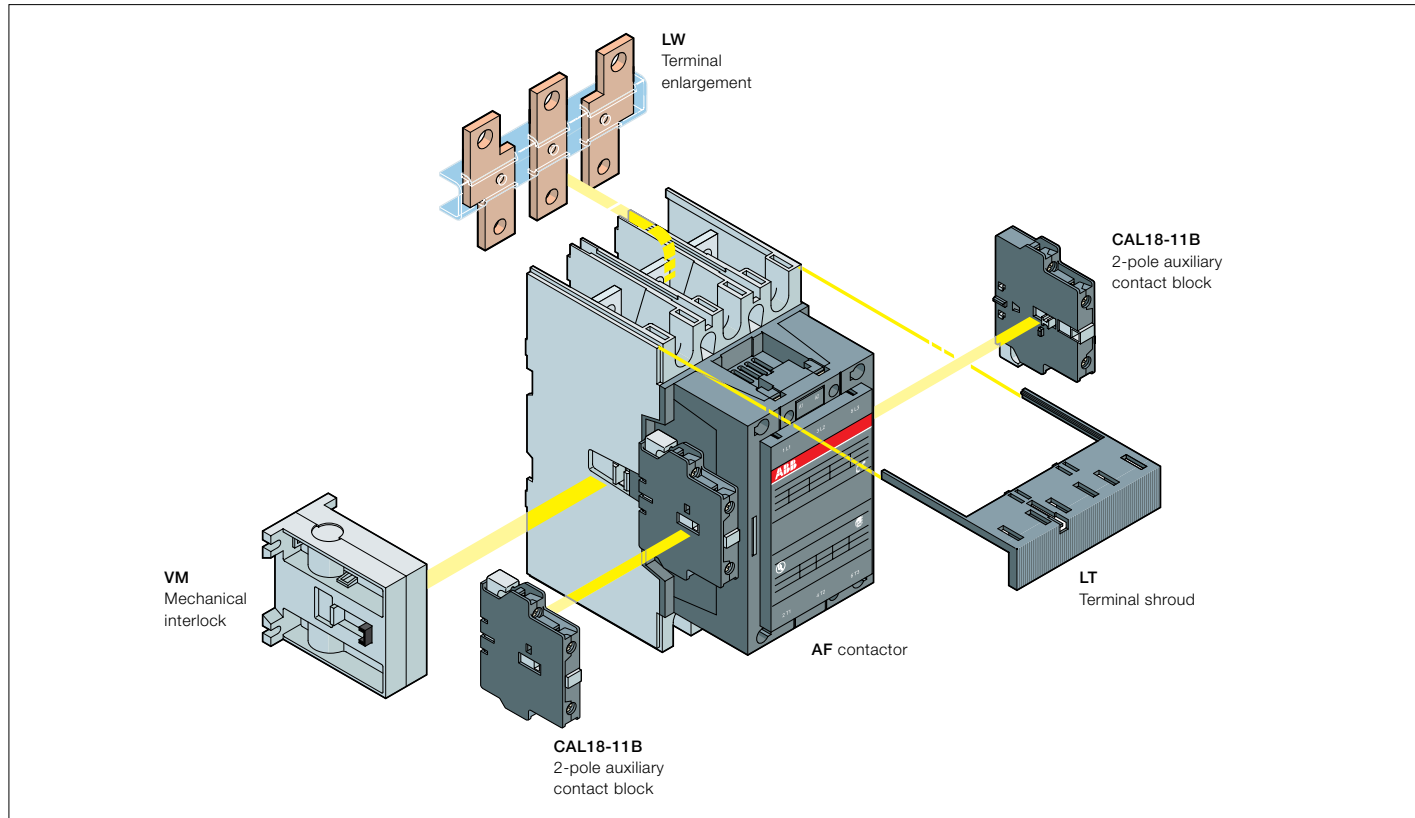
Contactor types	Thermal overload relays	Electronic overload relays
AF116 ... AF140	TF140DU (66...142 A)	EF146 (54...150 A)
AF146	-	EF146 (54...150 A)
AF190, AF205	TA200DU (66...200 A)	EF205 (63...210 A)
AF265 ... AF370	-	EF370 (115...380 A)

The addition of a thermal or electronic overload relay on the contactor does not prevent fitting of many other accessories as shown in "Main accessory fitting details" table.

(1) Direct mounting - No kit required.

AF400 ... AF2650 3-pole contactors with 1 N.O. + 1 N.C. auxiliary contacts Accessory fitting details

Main accessories (other accessories available)



Main accessory fitting details

Contactor types	Main poles	Available auxiliary contacts	Side-mounted accessories		Mechanical interlock units (between two contactors)
			Auxiliary contact blocks		
			CAL18-11	CAL18-11B (3)	

Contactors + auxiliary contact blocks

AF400 ... AF2650	3	0	1	1	1 x CAL18-11	+	2 x CAL18-11B	-
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Contactors with mechanical interlocking + auxiliary contact blocks

AF400 ... AF2650	3	0	1	1	2 x CAL18-11 (1)	+	4 x CAL18-11B (1)	+	VM...H (2)
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(1) Total number of auxiliary contact blocks for the two contactors.

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

(3) The CEL18-... auxiliary contact blocks can replace the CAL18-11 and CAL18-11B. Though, no auxiliary contact block can be mounted outside the CEL18-...

Overload relays fitting details

Contactor types	Thermal overload relays	Electronic overload relays
AF400, AF460	-	E500DU (150...500 A) (4)
AF580, AF750	-	E800DU (250...800 A) (4)
AF1350, AF1650	-	E1250DU (375...1250 A) (4)

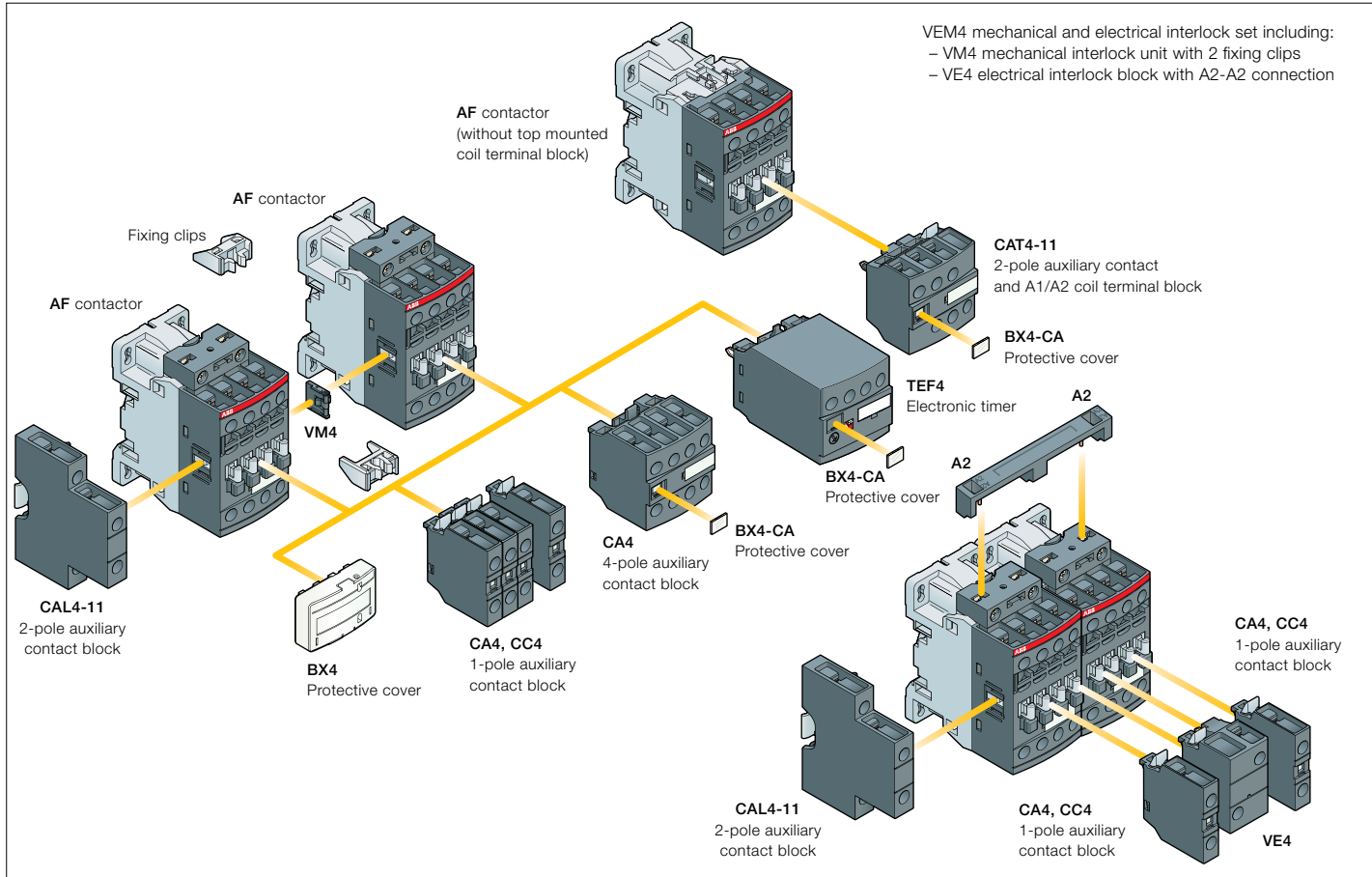
The addition of a thermal or electronic overload relay on the contactor does not prevent fitting of many other accessories as shown in "Main accessory fitting details" table.

(4) Mounting kit required (see overload relay page).

AF09 ... AF38 4-pole contactors

Accessory fitting details

Contactor and main accessories (other accessories available)



Main accessory fitting details

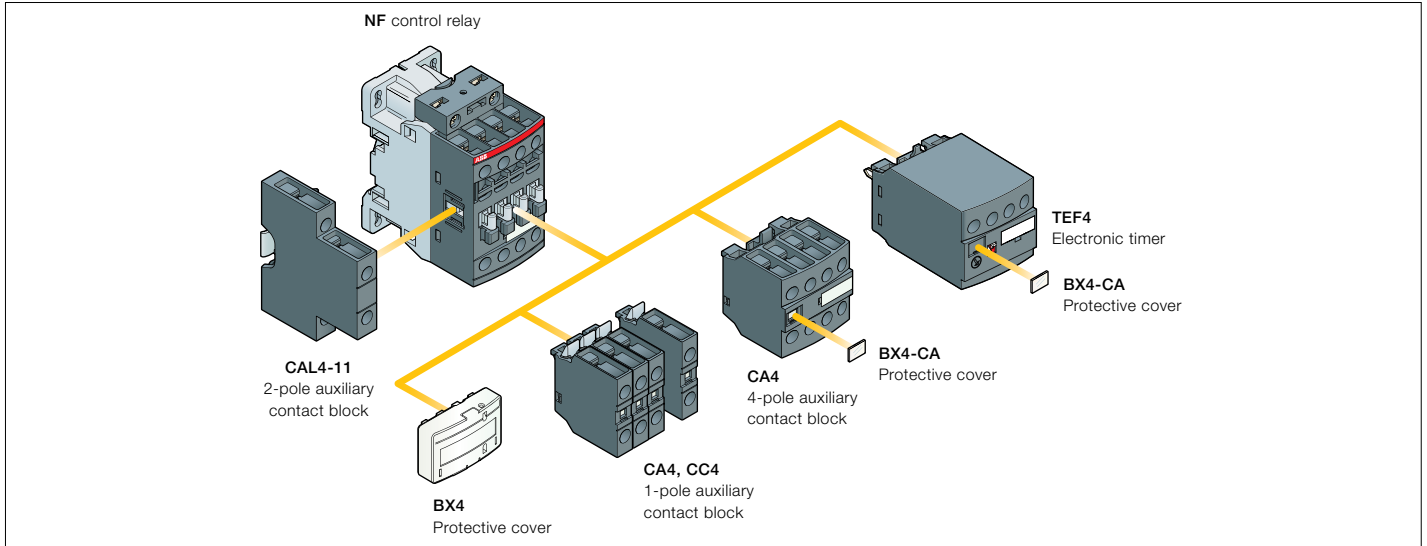
Many configurations of accessories are possible depending on whether these are front-mounted or side-mounted.

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

NF 4-pole control relays

Accessory fitting details

Control relays and main accessories (other accessories available)



Main accessory fitting details

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

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

For NF control relays + CE5 auxiliary contacts for severe industrial environments

Main accessory fitting details

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

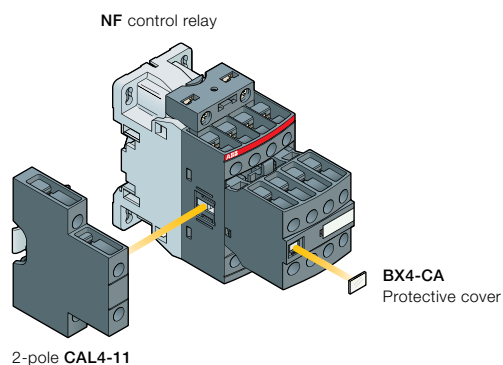
Control relay types	Main poles	Front-mounted accessories			Side-mounted accessories			
		Auxiliary contact blocks			Left side	Right side		
		1-pole CE5	1-pole CA4	1-pole CC4	2-pole CAL4-11			
Max. add-on N.C. auxiliary contacts (CA4, CC4, CAL4): 1 max. with 1 CE5 on positions 1, 2, 3, 4								
NF	2 2 3 1	E	1	+	3 max.	+	1	-
Max. add-on N.C. auxiliary contacts (CA4, CC4, CAL4): 2 max. with 1 CE5, none with 2 CE5 on positions 1, 2, 3, 4								
NF	4 0	E	2	+	2 max.	-	-	-
		E	1	+	3 max.	-	+	1
		E	1	+	1 max.	-	+	1
Max. add-on N.C. auxiliary contacts (CA4, CC4): none with 1 CE5 on positions 1 ±30°, 5								
NF	2 2 3 1	E	1	+	3 max.	-	-	-
Max. add-on N.C. auxiliary contacts (CA4, CC4, CAL4): 1 max. with 1 CE5 on positions 1 ±30°, 5								
NF	4 0	E	1	+	3 max.	-	+	1

NF 8-pole control relays

Accessory fitting details

Control relays and main accessories (other accessories available)

2



Main accessory fitting details

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

Control relay types	Main poles	Front-mounted accessories				Side-mounted accessories																
		Auxiliary contact blocks				Auxiliary contact blocks																
		1-pole CA4	1-pole CC4	4-pole CA4	Left side	Right side																
					2-pole CAL4-11																	
NF	<table border="0"> <tr><td>4</td><td>4</td><td>E</td></tr> <tr><td>5</td><td>3</td><td>E</td></tr> <tr><td>6</td><td>2</td><td>E</td></tr> <tr><td>7</td><td>1</td><td>E</td></tr> <tr><td>8</td><td>0</td><td>E</td></tr> </table>	4	4	E	5	3	E	6	2	E	7	1	E	8	0	E	-		-	+	1	-
4	4	E																				
5	3	E																				
6	2	E																				
7	1	E																				
8	0	E																				

Auxiliary contact blocks for AF09 ... AF96 contactors and NF control relays



CA4-10



CAL4-11



CA4-22E



CAT4-11E

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:

- CA4 1 or 4-pole block, with instantaneous N.O., N.C. contacts
- CC4 1-pole block, with N.O. leading contact or N.C. lagging contact
- CAT4 2-pole block, with instantaneous N.O. + N.C. contacts and A1 / A2 coil terminal connection on front face.

Select the 4-pole auxiliary contact blocks CA4-..E, CA4-..M, CA4-..U or CA4-..N type, according to the contactor or contactor relay type for compliance with the standard requirements (see "Terminal marking and positioning").





Types of auxiliary contact blocks for side mounting:

- CAL4 2-pole block, with instantaneous N.O. + N.C. contacts.

For clipping onto the right- and/or left-hand side of the 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	Catalog number	Global reference code	Pkg qty	Weight (1 pce)
	   				kg

Front-mounted instantaneous auxiliary contact blocks

AF09 ... AF96 4-pole NF	1 0 - -	CA4-10	1SBN010110R1010	1	0.014
	1 0 - -	CA4-10-T	1SBN010110T1010	10	0.014
	0 1 - -	CA4-01	1SBN010110R1001	1	0.014
	0 1 - -	CA4-01-T	1SBN010110T1001	10	0.014
AF09 ... AF16..-30-10	2 2 - -	CA4-22M	1SBN010140R1122	1	0.055
	3 1 - -	CA4-31M	1SBN010140R1131	1	0.055
	1 3 - -	CA4-13M	1SBN010140R1113	1	0.055
	0 4 - -	CA4-04M	1SBN010140R1104	1	0.055
AF26 ... AF96..-30-00 AF09 ... AF38..-40-00 AF09 ... AF38..-22-00	2 2 - -	CA4-22E	1SBN010140R1022	1	0.055
	3 1 - -	CA4-31E	1SBN010140R1031	1	0.055
	4 0 - -	CA4-40E	1SBN010140R1040	1	0.055
	0 4 - -	CA4-04E	1SBN010140R1004	1	0.055
AF09 ... AF16..-30-01	2 2 - -	CA4-22U	1SBN010140R1322	1	0.055
	3 1 - -	CA4-31U	1SBN010140R1331	1	0.055
	4 0 - -	CA4-40U	1SBN010140R1340	1	0.055
	2 2 - -	CA4-22N	1SBN010140R1222	1	0.055
4-pole NF	3 1 - -	CA4-31N	1SBN010140R1231	1	0.055
	4 0 - -	CA4-40N	1SBN010140R1240	1	0.055
	1 3 - -	CA4-13N	1SBN010140R1213	1	0.055
	0 4 - -	CA4-04N	1SBN010140R1204	1	0.055
NF..40E					

Front-mounted auxiliary contact blocks with N.O. leading contact and N.C. lagging contact

AF09 ... AF96 4-pole NF	- - 1 0	CC4-10	1SBN010111R1010	1	0.014
	- - 0 1	CC4-01	1SBN010111R1001	1	0.014

Side-mounted instantaneous auxiliary contact blocks

AF09 ... AF96 NF	1 1 - -	CAL4-11	1SBN010120R1011	1	0.040
	1 1 - -	CAL4-11-T	1SBN010120T1011	10	0.040

Front-mounted instantaneous auxiliary contact and A1/A2 coil terminal blocks

AF09 ... AF16..-30-10	1 1 - -	CAT4-11M	1SBN010151R1111	1	0.040
AF26 ... AF65..-30-00 AF09 ... AF38..-40-00 AF09 ... AF38..-22-00	1 1 - -	CAT4-11E	1SBN010151R1011	1	0.040
AF09 ... AF16..-30-01	1 1 - -	CAT4-11U	1SBN010151R1311	1	0.040

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

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

Auxiliary contact blocks for AF116 ... AF2650 contactors

2



CAL19-11

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 side mounting:

- CAL 2-pole block, with 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 AF116 ... AF2650 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

For contactors	Auxiliary contacts	Catalog number	Global reference code	Pkg qty	Weight (1 pce)
					kg

Side-mounted instantaneous auxiliary contact blocks

AF116 ... AF370	1	1	CAL19-11	1SFN010820R1011	2	0.040
	1	1	CAL19-11B	1SFN010820R3311	2	0.040
AF400 ... AF2650	1	1	CAL18-11	1SFN010720R1011	2	0.050
	1	1	CAL18-11B	1SFN010720R3311	2	0.050

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



CAL18-11

Auxiliary contact blocks for AF09 ... AF38 contactors and NF control relays for severe industrial environments



CE5-10W

Description

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

Types of auxiliary contact blocks for front mounting:

- CE5 1-pole block, instantaneous with N.O. contact or N.C. contact, available in 2 IP degrees
- 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.

Ordering details (1)

For contactors	Auxiliary contacts	Catalog number	Global reference code	Pkg qty	Weight (1 pce) kg
AF09 ... AF38	1 - - -	CE5-10D0.1	1SBN010015R1010	1	0.020
NF	- 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 for AF400 ... AF2650 contactors for severe industrial environments

2



CEL18

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 side mounting:

- CEL18 1-pole block, with built-in microswitch IP67 degree of protection (IP20 on terminals). Instantaneous N.O. or N.C. contact.

For clipping onto the right- and/or left-hand side of the 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	Catalog number	Global reference code	Pkg qty	Weight (1 pce)
	 				kg
Side-mounting instantaneous auxiliary contact blocks					
AF400 ... AF2650	1 0	CEL18-10	1SFN010716R1010	1	0.050
	0 1	CEL18-01	1SFN010716R1001	1	0.050

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

Impulse contact blocks



CB5

Description

Impulse contact blocks are designed for use in enclosures, in association with an adjustable mechanical pushbutton. Two types are available:

CB5-10: N.O. contact with a black actuator ("ON" function)

CB5-01: N.C. contact with a light grey actuator ("OFF" function).

These blocks are equipped with 2 connecting leads 0.5 mm² with end, approximately 18 cm long.

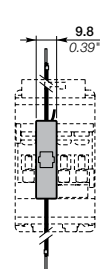
Mounting: Clipped onto the front face of the contactors.

Ordering details

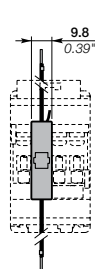
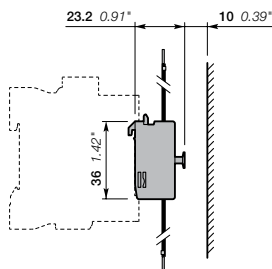
For contactors	Contacts	Catalog number	Global reference code	Pkg qty	Weight (1 pce) kg
AF09 ... AF38	1 -	CB5-10	1SBN010013R1010	1	0.012
	- 1	CB5-01	1SBN010013R1001	1	0.012

Note: For AF40 ... AF96 mounting: please consult us.

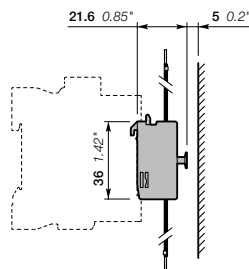
Main dimensions mm, inches



CB5-10



CB5-01



Electronic timers

2



TEF4-ON

Description

TEF4 front-mount electronic timers are used for timing function and are available in ON-delay and OFF-delay versions.

Compact solution in cabinet compared to separate timers

TEF4 electronic timers are front-mounted and clip on AF contactors or NF control relays. A mechanical indicator shows the state of the contactor.

Safe and cost-reduced wiring

TEF4 electronic timers are supplied by a direct plug-in parallel connection 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

TEF4-ON or TEF4-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.



TEF4-OFF

Ordering details

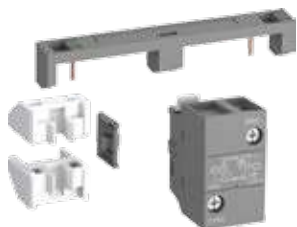
For contactors, control relays	Time delay range selected by switch	Delay type	Rated control circuit voltage U_c	Auxiliary contacts	Catalog number	Global reference code	Weight Pkg (1 pce) kg
AF09 ... AF96 NF	0.1...1 s	ON-delay	24...240	1 1	TEF4-ON	1SBN020112R1000	0.065
	1...10 s 10...100 s	OFF-delay	24...240	1 1	TEF4-OFF	1SBN020114R1000	0.065



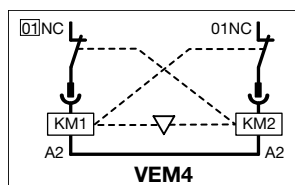
VM4



VM19



VEM4



BB4

Mechanical interlock units

Description

The VM mechanical interlock units are designed for the interlocking of two AF 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 mechanical interlock units VM4 and VM96-4 include 2 fixing clips.

Ordering details

For contactors	Mounting	Catalog number	Global reference code	Pkg qty	Weight (1 pce) kg
Mechanical interlock units for two contactors mounted side by side					
AF09 ... AF38...-30-... AF09 ... AF38...-40-00	Fixed between two contactors, mounted flush side by side	VM4	1SBN030105T1000	10	0.005
AF40 ... AF96		VM96-4	1SBN033405T1000	10	0.006
For same size contactors: AF116 ... AF146 AF190, AF205 AF265 ... AF370		VM19	1SFN030300R1000	1	0.054
AF116 ... AF146 and AF190, AF205		VM140/190	1SFN034403R1000	1	0.088
AF190, AF205 and AF265 ... AF370		VM205/265	1SFN035203R1000	1	0.090
AF400 ... AF1250	PN.. mounting plate to be ordered separately	VM750H	1SFN035700R1000	1	0.200
AF1350 ... AF2650	Plate included	VM1650H	1SFN036503R1000	1	6.000
Mechanical interlock units for two contactors mounted one above the other					
AF400 ... AF1250	Additional plate (not supplied)	VM750V	1SFN035701R1000	1	0.200

Mechanical and electrical interlock sets

Description

VEM4 mechanical and electrical interlock set for the interlocking of two AF contactors. VEM4 set includes a mechanical interlock unit VM4 with 2 fixing clips (BB4) and a VE4 electrical interlock block with A2-A2 connection.

Fixing the electrical interlock block to the contactor front face connects the 2 built-in N.C. interlocking contacts with the two coils. VE4 block must be used with A2-A2 connection to respect the electrical connection diagram.

Ordering details

For contactors	Auxiliary contacts	Catalog number	Global reference code	Pkg qty	Weight (1 pce) kg
Mechanical and electrical interlock set					
For same size contactors: AF09 ... AF16...-30-... AF26 ... AF38...-30-00 AF09, AF16...-40-00 AF26, AF38...-40-00	0 2	VEM4	1SBN030111R1000	1	0.035
Fixing clips					
AF09 ... AF38		BB4	1SBN110120W1000	50	0.002

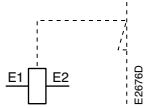
Note: VEM4 not suitable for AF..Z contactors with DC control voltage 12...20 V DC.

Mechanical latching units

2



WB75-A



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 should the supply voltage fail at the contactor coil terminals.

Contact 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 do not accept CA4 single pole auxiliary contacts. Up to 2 CAL4-11 auxiliary contact blocks can be side-mounted on contactors (except NF22E and AF..-22-00, refer to main accessory fitting details table in main accessories section).

Ordering details

For contactors	Rated control circuit voltage Uc		Catalog number	Global reference code	Pkg qty	Weight (1 pce) kg
	V 50 Hz or DC	V 60 Hz				
AF09 ... AF38 NF	24	24...28	WB75A-01	FPTN372726R1001	1	0.120
	42	42...48	WB75A-02	FPTN372726R1002	1	0.120
	48	48...55	WB75A-03	FPTN372726R1003	1	0.120
	110	110...127	WB75A-04	FPTN372726R1004	1	0.120
	220...230	220...255	WB75A-06	FPTN372726R1006	1	0.120
	230...240	230...277	WB75A-05	FPTN372726R1005	1	0.120
	380...415	380...440	WB75A-07	FPTN372726R1007	1	0.120
	415...440	440...480	WB75A-08	FPTN372726R1008	1	0.120

Note: For WB75-A produced since week 06-2012.

Other accessories



LDC4

Ordering details

For contactors	Catalog number	Global reference code	Pkg qty	Weight (1 pce)
				kg



BX4

Additional coil terminal blocks

Additional coil terminal blocks for contactors or control relays.

AF09 ... AF96, NF	LDC4	1SBN070156T1000	10	0.010
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Protective covers

Sealable and transparent protective covers BX4 and non-removable BX4-CA to protect the devices against accidental contact.

AF09 ... AF96 1-stack contactors and NF contactor relays	BX4	1SBN110108T1000	10	0.006
4-pole CA4, 2-pole CAT4 auxiliary contact blocks and TEF4 electronic timer	BX4-CA	1SBN110109W1000	50	0.001

Note: BX4 produced since 13045 (day 045 - year 2013) are suitable for AF40 ... AF96.



BX4-CA



BA4

Function markers AF09 ... AF370

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").

AF09 ... AF370 contactors, TF thermal overload relays, EF electronic overload relays and MS116, MS132 manual motor starters	BA4	1SNA235156R2700	16	0.011
AMS 500 support plate for 8 BA4	XUSP02633	1SNA360010R1500	1	0.220
HTP500 support plate	HTP500-BA4	1SNA235712R2400	1	0.290



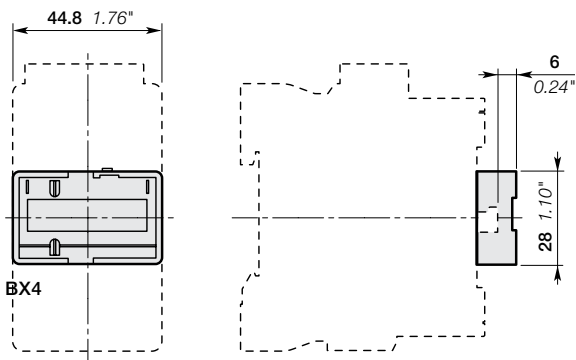
BA5-50

Function markers AF400 ... AF2650

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 (.276" x .748").

AF400 ... AF2650 and accessories	BA5-50	1SBN110000R1000	50	0.017
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Main dimensions mm, inches



BX4

Other accessories



2

BP38-4



BDT4
For AF09 ... AF65, NF



BDT4
For AF80 ... AF96

Ordering details

For contactors	Catalog number	Global reference code	Pkg qty	Weight (1 pce)
				kg

Mounting pieces

Mounting piece for replacing A Line contactors mounted by screws with AF Range contactors.

From contactor	To contactor				
A26 ... A40, AL26 ... AL40	AF09 ... AF38	BP38-4	1SBN112303T1000	10	0.003
A40 ... A75, AE50 ... AE75, AF50 ... AF75	AF40 ... AF65	BP65-4	1SBN113403T1000	10	0.004
A95, A110, AE95, AE110, AF95, AF110	AF80 ... AF96	BP96-4	1SBN113903T1000	10	0.005

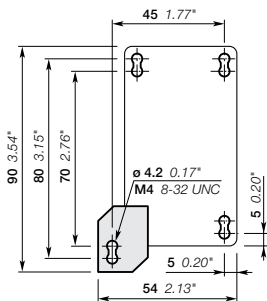
Test block

BDT4 test block is suitable for switching on contactor off-load.

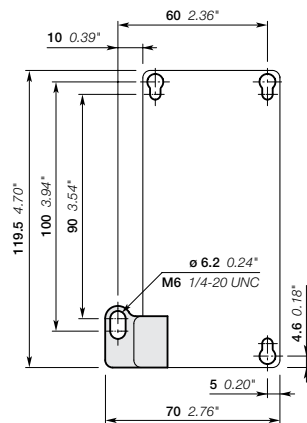
Marking on the block indicates the contactor type to fit with.

AF09 ... AF96, NF	BDT4	1SBN110122T1000	10	0.007
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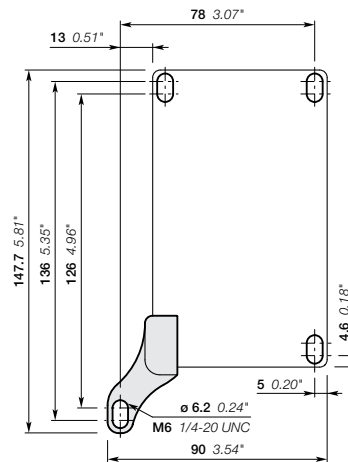
Main dimensions mm, inches



BP38-4



BP65-4



BP96-4

Terminal shrouds and mechanical lugs



LT140-30L



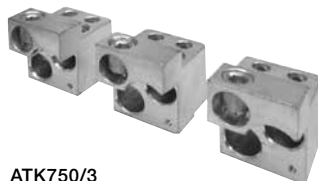
LT370-30C



LT460-AC



ATK185



ATK750/3

Description

Main terminal protection for AF116 ... AF1250 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	Catalog number	Global reference code	Pkg qty	Weight (1 pce) kg
AF116 ... AF146, with compression lugs	LT140-30L	1SFN124203R1000	2	0.070
AF190, AF205, with cable clamps	LT205-30C	1SFN124801R1000	2	0.050
AF190, AF205, with compression lugs	LT205-30L	1SFN124803R1000	2	0.220
AF190, AF205, with shorting bar or between contactor and TOL/EOL in DOL starters	LT205-30Y	1SFN124804R1000	1	0.050
AF265 ... AF370, with cable clamps	LT370-30C	1SFN125401R1000	2	0.035
AF265 ... AF370, with compression lugs	LT370-30L	1SFN125403R1000	2	0.280
AF265 ... AF370, with shorting bar or between contactor and TOL/EOL in DOL starters	LT370-30Y	1SFN125404R1000	1	0.075
AF265 ... AF370, for use with extending cable clamps, ATK300/2 and OZXB4	LT370-30D	1SFN125406R1000	1	0.15
AF400, AF460 with cable clamps	LT460-AC	1SFN125701R1000	2	0.100
AF400, AF460 with compression lugs	LT460-AL	1SFN125703R1000	2	0.800
AF580, AF750 with cable clamps	LT750-AC	1SFN126101R1000	2	0.120
AF580, AF1250 with compression lugs	LT750-AL	1SFN126103R1000	2	0.825

Description

Large contactors (AF190 and above) include bar terminals as standard to easily facilitate the use of busbar as a means of internal wiring. Mechanical lugs are a common solution for allowing the use of stranded or solid wire, and are widely utilized for field wiring termination.

Ordering details

For contactors (1)	Description	Catalog number	Global reference code	Pkg qty	Weight (1 pce) kg
AF190, AF205	Lug kit, 1-wire, 4 AWG ... 300 MCM	ATK185	(2)	3	0.164
AF265 ... AF370	Lug kit, 1-wire, 4 AWG ... 400 MCM	ATK300	(2)	3	0.166
AF265 ... AF370	Lug kit, 2-wire, 4 AWG ... 500 MCM	ATK300/2	(2)	3	0.445
AF400 ... AF580	Lug kit, 2-wire, 2/0 AWG ... 500 MCM	ATK580/2	(2)	3	0.345
AF580, AF750	Lug kit, 3-wire, 2/0 AWG ... 500 MCM	ATK750/3	(2)	3	1.071
AF1350	Lug kit, 4-wire, 4/0 AWG ... 500 MCM (3)	ATK1350/4	(2)	3	1.883
AF1350, AF1650	Lug kit, 4-wire, 1/0 AWG ... 750 MCM (3)	ATK1650/4	(2)	3	3.353
AF1350, AF1650	Lug kit, 6-wire, 1/0 AWG ... 750 MCM (3)	ATK1650/6	(2)	3	4.378
AF190, AF205	Spare terminal hardware	LE185	1SFN074716R1000	1 set	0.200
AF265 ... AF370	Spare terminal hardware	LE300	1SFN075116R1000	1 set	0.300
AF400 ... AF580	Spare terminal hardware	LE460	1SFN075716R1000	1 set	0.600
AF580, AF750	Spare terminal hardware	LE750	1SFN076116R1000	1 set	0.750

(1) Note: AF1250, AF2050 & AF2650 intended for busbar connection only and terminal hardware is intended to be sourced separately.

(2) North American applications only.

(3) Note: Use of lug kits for AF1350 & AF1650 in general use applications reduces the ratings to 1050A and 1350A respectively. Recommend busbar connection for full ratings.

Terminal enlargements and extensions

2



LW140

Terminal enlargements

Description

Enlargement pieces designed to increase the width of the contactor terminal pads in order to allow larger connections to be mounted.

Ordering details

For contactors	Dimensions		Catalog number	Global reference code	Pkg qty	Weight (1 pce)
	hole Ø mm	bar mm				
AF116 ... AF146	6.5	13 x 3	LW140	1SFN074207R1000	1	0.115
AF190, AF205	10.5	17.5 x 5	LW205	1SFN074807R1000	1	0.260
AF265 ... AF370	10.5	20 x 5	LW370	1SFN075407R1000	1	0.340
AF400, AF460	10.5	25 x 5	LW460	1SFN075707R1000	1	0.730
AF580, AF750	13	40 x 6	LW750	1SFN076107R1000	1	1.230
AF1250	13	50 x 10	LW1250	1SFN076407R1000	1	2.000



LX140

Terminal extension

Description

Extension pieces designed to extend the main terminals of contactors for combined mounting of contactors and connection sets.

Ordering details

For contactors	Dimensions		Catalog number	Global reference code	Pkg qty	Weight (1 pce)
	hole Ø mm	bar mm				
AF116 ... AF146	6.5	13 x 3	LX140	1SFN074210R1000	1	0.072
AF190, AF205	8.5	17.5 x 5	LX205	1SFN074810R1000	1	0.180
AF265 ... AF370	10.5	20 x 5	LX370	1SFN075410R1000	1	0.234
AF400, AF460	10.5	25 x 5	LX460	1SFN075710R1000	1	0.500
AF580, AF750	13	40 x 6	LX750	1SFN076110R1000	1	0.850

Connection module

Description

Connection module can be fixed on AF116 ... AF146 delivered with bar terminals.



LD146-30

Ordering details

For contactor	Catalog number	Global reference code	Pkg qty	Weight (1 pce)
AF116 ... AF146	LD146-30	1SFN074208R1000	2	0.165

Terminal connecting strips and shorting bars



LY16-4



LY185



LH38-4



LF16-4



LG16-4

Description

Parallel and series connection of 3-pole contactors:

To obtain a star point (3 parallel-connected poles)

To connect poles in parallel and thus increase the AC load passing through the flow path made up of the parallel-connected poles: LP, LY, LH, LF, LG.

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, LY (only LY16-4 and LY38-4 selectable strips).

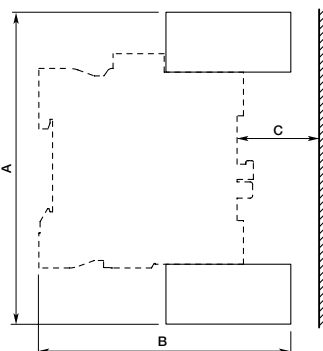
Types	for connection of "n" poles	with terminal	insulated
LP	n = 2	no	no (1)
LY	n = 2 (selectable LY16-4, LY38-4 connecting strips)	no	yes
	n = 3	no	yes (1)
LH	n = 2	yes	no
LF	n = 3	yes	yes
LG	n = 4	yes	yes

(1) LP460 ... LP750, LY185 ... LY750 not insulated. Use terminal shrouds.

Ordering details

For contactors	max. nominal continuous current with "n" poles				Cable cross-sectional area mm ²	Catalog number	Global reference code	Pkg qty	Weight (1 pce) kg
	in parallel		in series						
	2 poles	3 poles	4 poles	2 poles					
	A								
AF09	30	33	-	25	6	LY16-4	1SBN071303T1000	10	0.006
AF12	32	36	-	27					
AF16	34	40	-	30					
AF26	50	60	-	45	10	LY38-4	1SBN072303T1000	10	0.012
AF116 ... AF146	-	240	-	-	-	LY140	1SFN074203R1000	1	0.055
AF190, AF205	-	400	-	-	-	LY185	1SFN074703R1000	1	0.200
AF265 ... AF370	-	670	-	-	-	LY300	1SFN075103R1000	1	0.300
AF400, AF460	-	1000	-	-	-	LY460	1SFN075703R1000	1	0.450
AF580, AF750	-	1650	-	-	-	LY750	1SFN076103R1000	1	0.800
AF190, AF205	300	-	-	-	-	LP185	1SFN074712R1000	2	0.300
AF265 ... AF370	475	-	-	-	-	LP300	1SFN075112R1000	2	0.400
AF400, AF460	725	-	-	-	-	LP460	1SFN075712R1000	2	0.550
AF580, AF750	1200	-	-	-	-	LP750	1SFN076112R1000	2	0.950
AF09	45	-	-	-	10	LH38-4	1SBN072304R1000	2	0.012
AF12	50	-	-	-	10				
AF16	54	-	-	-	16				
AF26	81	-	-	-	25				
AF30, AF38	90	-	-	-	25				
AF09	-	62	-	-	16	LF16-4	1SBN071305R1000	2	0.020
AF12	-	70	-	-	25				
AF16	-	75	-	-	25				
AF26	-	112	-	-	35	LF38-4	1SBN072305R1000	2	0.040
AF30, AF38	-	125	-	-	50				
AF09	-	-	70	-	25	LG16-4	1SBN071306R1000	2	0.025
AF12	-	-	78	-	25				
AF16	-	-	84	-	25				

Main dimensions



Type	For contactors	Dimensions					
		A		B		C	
		mm	inch	mm	inch	mm	inch
LH38-4	AF09 ... AF16	111.20	4.38"	83	3.27"	22	0.87"
	AF26 ... AF38	114	4.49"	86	3.39"	16	0.63"
LF16-4	AF09 ... AF16	121	4.76"	87	3.43"	23	0.91"
LF38-4	AF26 ... AF38	135.20	5.32"	103	4.06"	31	1.22"
LG16-4	AF09 ... AF16	124.20	4.89"	87	3.43"	23	0.91"

Reversing and phase-to-phase bus kits

2



BER16-4

Connection sets for reversing contactors

Description

The BER and BEM connection sets are used to connect the main poles of two 3-pole contactors mounted side by side.

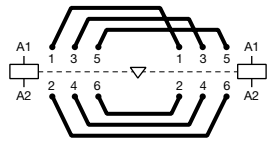
The BER connection sets are made up of 1 upstream and 1 downstream connections.

The BEM connection sets are made up of 3 upstream and 3 downstream connections.

BER and BEM connection sets are insulated and made of solid copper bars.

Ordering details

For 3-pole contactors	Catalog number	Global reference code	Pkg qty	Weight (1 pce) kg
AF09 ... AF16	BER16-4	1SBN081311R1000	1	0.045
AF26 ... AF38	BER38-4	1SBN082311R1000	1	0.100
AF40 ... AF65	BER65-4	1SBN083411R1000	1	0.175
AF80, AF96	BER96-4	1SBN083911R1000	1	0.250
AF116 ... AF146	BER140-4	1SFN084211R1000	1	0.615
AF190, AF205	BER205-4	1SFN084811R1000	1	1.237
AF265 ... AF370	BER370-4	1SFN085411R1000	1	2.140
AF400, AF460	BEM460-30	1SFN085701R1000	1	4.400
AF580, AF750	BEM750-30	1SFN086101R1000	1	7.300



BER, BEM
Reversing connections



BEP140-30

3-pole phase to phase connections

Description

The BEP and BES connection sets are used to connect phase to phase the main poles of two 3-pole contactors mounted side by side.

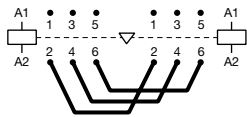
The BEP connection sets are made up of 1 upstream or downstream connections.

The BES connection sets are made up of 3 upstream or downstream connections.

BEP and BES connection sets are insulated and made of solid copper bars.

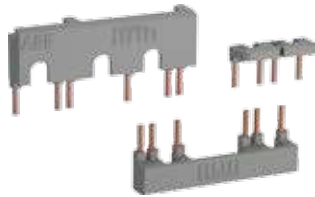
Ordering details

For 3-pole contactors	Catalog number	Global reference code	Pkg qty	Weight (1 pce) kg
AF116 ... AF146	BEP140-30	1SFN084214R1000	1	0.320
AF190, AF205	BEP205-30	1SFN084814R1000	1	0.534
AF265 ... AF370	BEP370-30	1SFN085414R1000	1	0.926
AF400, AF460	BES460	1SFN085704R1000	1	2.200
AF580, AF750	BES750	1SFN086104R1000	1	3.700

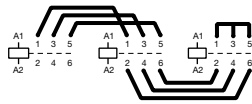


BEP, BES
Phase to phase connections

Wye-delta bus kits



BEY16-4



AF09 ... AF750
1M - 2M -1S

Description

The BEY and BED connection sets are used to connect the main poles of the Line, Delta and Wye contactors of a wye-delta starter.

The connection sets are made up of:

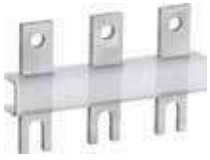
- Line contactor / delta contactor:
 - BEY: upstream phase-to-phase connection
 - BED: upstream connection in parallel
- Delta contactor / Wye contactor: downstream connection in parallel
- Wye contactor: Wye point upstream
- Insulated, solid copper bar.

Ordering details

For 3-pole line, delta & wye contactors	Interlock unit between delta & wye contactors	Catalog number	Global reference code	Pkg qty	Weight (1 pce) kg
AF09 ... AF16	With or without VM4 or VEM4	BEY16-4	1SBN081313R2000	1	0.050
AF26 ... AF38	With or without VM4 or VEM4	BEY38-4	1SBN082713R2000	1	0.110
AF40 ... AF65	With or without VM96-4	BEY65-4	1SBN083413R2000	1	0.200
AF80, AF96	With or without VM96-4	BEY96-4	1SBN083913R2000	1	0.250
AF116 ... AF146	With or without VM19	BEY140-4	1SFN084413R1000	1	1.040
AF190 ... AF205 (line and delta) AF140 ... AF146 (wye)	With or without VM140/190	BEY190-4	1SFN084813R1000	1	1.154
AF190, AF205	With or without VM19	BEY205-4	1SFN085213R1000	1	1.205
AF265 ... AF370 (line and delta) AF190 ... AF205 (wye)	With or without VM205/265	BEY265-4	1SFN085413R1000	1	2.020
AF265 ... AF370	With or without VM19	BEY370-4	1SFN085813R1000	1	2.110
AF400 ... AF460	With or without VM750H	BED460U	-	1	4.700
AF580 ... AF750 (line and delta) AF400 ... AF460 (wye)	With or without VM750H	BED580U	-	1	6.300
AF580 ... AF750	With or without VM750H	BED750U	-	1	7.700

Coupling units

2



BEA140/XT2



BEA205/T4



BEA370/T5

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	Catalog number	Global reference code	Pkg qty	Weight (1 pce) kg
Vertical assembly					
AF116 ... AF146	XT2	BEA140/XT2	1SFN084206R1000	1	0.058
AF116 ... AF146	XT4	BEA140/XT4	1SFN084206R1001	1	0.068
AF190, AF205	XT4	BEA205/XT4	1SFN084806R1000	1	0.200
AF190, AF205	T4	BEA205/T4	1SFN084806R1001	1	0.190
AF265 ... AF370	T5	BEA370/T5	1SFN085406R1000	1	0.350
AF400 ... AF750	T6	BEA750/T6	1SFN086106R1000	1	0.410
AF400 ... AF750	T5	BEA750/T5	1SFN086106R1001	1	0.410
Vertical assembly with control wire terminals (also suitable when using busbar kits for starter combinations)					
AF400 ... AF750	T5	BEA750D/T5	1SFN086106R1003	1	0.720
AF400 ... AF750	T6	BEA750D/T6	1SFN086106R1002	1	0.720
Horizontal assembly (also suitable when using busbar kits for starter combinations)					
AF400, AF460	T4	BEA460H/T4	1SFN085907R1000	1	2.450

Connection bars between contactors and fusible disconnects

Description

Connection between contactors/starters and fusible disconnect switches.
These connection sets are solid copper bars.

Ordering details

For contactors	Switch fuse	Catalog number	Global reference code	Pkg qty	Weight (1 pce) kg
Vertical assembly					
AF400, AF460	OESA400	BEF460/OESA400	1SFN085708R1000	1	0.340
AF460 ... AF750	OESA630 to OESA800	BEF750/OESA800	1SFN086108R1000	1	0.740
Horizontal assembly					
AF400, AF460	OESA400...LR	OESA460H/OESA400	1SFN085709R1000	1	1.250

Note: The BEF connection bars provided for the A145 ... A300 contactors can be used for the AF145 ... AF300 contactors.



BEA16-4

Connecting links with manual motor starters

Description

The BEA insulated 3-pole connecting links are used to connect AF09 ... AF38 contactors with the MS116 or MS132 manual motor starters. The BEA insulated 3-pole connecting links ensure the electrical and mechanical connection between the contactor and the associated manual motor starter.

Ordering details

For 3-pole contactors	Manual motor starter	Catalog number	Global reference code	Pkg qty	Weight (1 pce) kg
AF09 ... AF16	MS116-0.16 ... MS116-25, MS132-0.16... MS132-25	BEA16-4	1SBN081306T1000	10	0.025
AF26 ... AF38	MS116-0.16 ... MS116-16, MS132-0.16 ... MS132-10	BEA26-4	1SBN082306T1000	10	0.025
	MS116-20 ... MS116-32, MS132-12 ... MS132-32	BEA38-4	1SBN082306T2000	10	0.030

Mounting plates

2



PN460

Description

Mounting plates with fixing holes for the specified contactors and overload relays.

Ordering details

For contactors	For overload relays	Catalog number	Global reference code	Pkg qty	Weight (1 pce)
					kg

Mounting plates for Direct on line starters

AF400, AF460	E500DU	PN460-11	1SFN095705R1000	1	2.120
AF580, AF750	E800DU	PN750-11	1SFN096105R1000	1	2.500

For two contactors side by side with space for mechanical interlock	For one or two overload relays	Catalog number	Global reference code	Pkg qty	Weight (1 pce)
					kg

Mounting plates for mechanical interlocked contactors, reversing starters and two speed starters for double windings

AF400, AF460	E500DU	PN460-21	1SFN095701R1000	1	3.490
AF580, AF750	E800DU	PN750-21	1SFN096101R1000	1	4.230

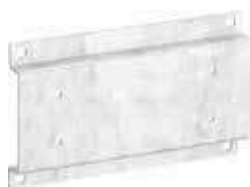
For main and delta contactors	For wye contactor (1)	For overload relays	Catalog number	Global reference code	Pkg qty	Weight (1 pce)
						kg

Mounting plates for wye-delta starters and two speed starters for single windings

AF400, AF460	A300, AF400	E500DU	PN460-41	1SFN095703R1000	1	5.310
AF580, AF750	AF400 ... AF580	E800DU	PN750-41	1SFN096103R1000	1	6.320

(1) Space for mechanical interlock included.

Adapter plates



PR146-1

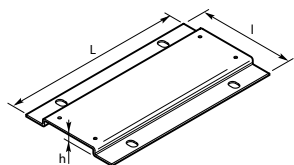
Description

Adapter plates with fixing holes for replacing installed contactors.

Ordering details

From contactors	To contactor	Catalog number	Global reference code	Pkg qty	Weight (1 pce)
A95, AF95, A110, AF110	AF116, AF140, AF146	PR146-1	1SFN094200R1000	1	0.300
EH150, EH160, EH175, EH210, EG160	AF190, AF205	PR210-1	1SFN094900R1000	1	0.440
EH250, EH260, EH300	AF265, AF305, AF370	PR300-1	1SFN095300R1000	1	0.560
EH370, EH550, EG315	AF400, AF460, AF580	PR460-1	1SFN095700R1000	1	0.900
EH700, EH800	AF750	PR750-1	1SFN096100R1000	1	0.500
OKYM150, OKYM175	AF190	PR185-2	1SFN095100R1001	1	0.500
OKYM200, OKYM250	AF265, AF305, AF370	PR300-2	1SFN095300R1001	1	0.500
OKYM315	AF400, AF460	PR400-2	1SFN095700R1002	1	0.820
OKYM400	AF400, AF460	PR460-2	1SFN095700R1001	1	0.800
OKYM500	AF580	PR580-2	1SFN096100R1002	1	0.700
EH550, EG630, OKYM630	AF580, AF750	PR750-2	1SFN096100R1001	1	1.100

Note: for smaller devices, see mounting pieces on the other accessories page.



Dimensions (mm)

Type of the plate	Dimensions			Fixing holes
	L	l	h	mm
PR146-1	150	90	15	4 x \varnothing 6.5
PR210-1	200	132	11.5	4 x \varnothing 7
PR300-1	200	172	11.5	4 x \varnothing 7
PR460-1	278	198	11.5	4 x \varnothing 7
PR750-1	283	244	11.5	4 x \varnothing 7
PR185-2	202	152	11.2	4 x \varnothing 11
PR300-2	202	152	11.2	4 x \varnothing 11
PR400-2	278	151	11.5	4 x \varnothing 11
PR460-2	278	176	11.5	4 x \varnothing 11
PR580-2	283	176	11.5	4 x \varnothing 11
PR750-2	283	255	11.5	4 x \varnothing 14

Fixing holes according to the plate types

Service parts

Contactors coils, main contact sets and arc chutes

2



ZAF1650

Contactors coils

Ordering details

For contactors	Rated control circuit voltage Uc min. ... Uc max.		Catalog number	Global reference code	Pkg qty	Weight (1 pce) kg
	V 50/60 Hz	V DC				
AF400, AF460	-	24...60	ZAF460-68	1SFN155770R6806	1	0.525
	48...130	48...130	ZAF460-69	1SFN155770R6906	1	0.525
	100...250	100...250	ZAF460-70	1SFN155770R7006	1	0.525
	250...500	250...500	ZAF460-71	1SFN155770R7106	1	0.525
AF580 ... AF1250	-	24...60	ZAF750-68	1SFN156170R6806	1	1.335
	48...130	48...130	ZAF750-69	1SFN156170R6906	1	1.335
	100...250	100...250	ZAF750-70	1SFN156170R7006	1	1.335
	250...500	250...500	ZAF750-71	1SFN156170R7106	1	1.335
AF1350 ... AF2050	100...250	100...250	ZAF1650-70 (1)	1SFN156570R7026	1 set	0.900
			ZP1650 (2)	1SFN166521R1070	1	0.300
AF2650	100...250	100...250	ZAF2650-70 (1)	1SFN156670R7026	1 set	0.900
			ZP2650 (2)	1SFN166621R1070	1	0.300

(1) One set of two coil.
(2) Printed circuit board.

Main contact sets

Description

The contact sets for 3-pole contactors consists of six fixed contacts, three moving contacts, springs and the required screws.

Ordering details

For contactors	Catalog number	Global reference code	Pkg qty	Weight (1 pce) kg
AF400	ZL400	1SFN165703R1000	1 set	1.320
AF460	ZL460	1SFN165903R1000	1 set	1.320
AF580	ZL580	1SFN166103R1000	1 set	1.840
AF750	ZL750	1SFN166303R1000	1 set	1.840
AF1250	ZL1250	1SFN166403R1000	1 set	1.840
AF1350 (1)	ZL1350	1SFN166503R1000	1 set	2.500
AF1650 (1)	ZL1650	1SFN166703R1000	1 set	3.500
AF2050 (1)	ZL2050	1SFN167003R1000	1 set	3.500
AF2650 (2)	ZL2650	1SFN166603R1000	1 set	1.200

(1) Six fixed, three moving contacts per each power pole.
(2) Moving contacts only.

Arc chutes

Description

The arc chute sets for 3-pole contactors include six arc chutes, two for each power pole.

Ordering details

For contactors	Catalog number	Global reference code	Pkg qty	Weight (1 pce) kg
AF400, AF460	ZW460	1SFN165710R1000	1 set	1.380
AF580, AF750, AF1250	ZW750	1SFN166110R1000	1 set	1.500
AF1350, AF1650, AF2050	ZW1650	1SFN166510R1000	1 set	4.000
AF2650	ZW2650	1SFN166610R1000	1 set	4.000

AF09 ... AF38 3-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types	AC / DC operated	AF09	AF12	AF16	AF26	AF30	AF38
Standards		IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1					
Rated operational voltage U _e max.		690 V					
Rated frequency (without derating)		50 / 60 Hz					
Conventional free-air thermal current I _{th}							
acc. to IEC 60947-4-1, open contactors, $\theta \leq 40\text{ }^\circ\text{C}$		35 A	35 A	35 A	50 A	50 A	50 A
With conductor cross-sectional area		6 mm ²	6 mm ²	6 mm ²	10 mm ²	10 mm ²	10 mm ²
AC-1 Utilization category							
For air temperature close to contactor							
I_e / Rated operational current AC-1	$\theta \leq 40\text{ }^\circ\text{C}$	25 A	28 A	30 A	45 A	50 A	50 A
U _e max. $\leq 690\text{ V}$, 50/60 Hz	$\theta \leq 60\text{ }^\circ\text{C}$	25 A	28 A	30 A	40 A	42 A	42 A
	$\theta \leq 70\text{ }^\circ\text{C}$	22 A	24 A	26 A	32 A	37 A	37 A
With conductor cross-sectional area		4 mm ²	6 mm ²	6 mm ²	10 mm ²	10 mm ²	10 mm ²
AC-3 Utilization category							
For air temperature close to contactor $\theta \leq 60\text{ }^\circ\text{C}$							
I_e / Max. rated operational current AC-3 (1)							
	220-230-240 V	9 A	12 A	18 A	26 A	33 A	40 A
	380-400 V	9 A	12 A	18 A	26 A	32 A	38 A
	415 V	9 A	12 A	18 A	26 A	32 A	38 A
	440 V	9 A	12 A	18 A	26 A	32 A	38 A
	500 V	9,5 A	12,5 A	15 A	23 A	28 A	33 A
	690 V	7 A	9 A	10,5 A	17 A	21 A	24 A
Rated operational power AC-3 (1)							
	220-230-240 V	2,2 kW	3 kW	4 kW	6,5 kW	9 kW	11 kW
	380-400 V	4 kW	5,5 kW	7,5 kW	11 kW	15 kW	18,5 kW
	415 V	4 kW	5,5 kW	9 kW	11 kW	15 kW	18,5 kW
	440 V	4 kW	5,5 kW	9 kW	15 kW	18,5 kW	22 kW
	500 V	5,5 kW	7,5 kW	9 kW	15 kW	18,5 kW	22 kW
	690 V	5,5 kW	7,5 kW	9 kW	15 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 - $\theta \leq 40\text{ }^\circ\text{C}$)							
I_e / Rated operational current AC-8a		12 A	16 A	22 A	30 A	40 A	50 A
Rated operational power AC-8a		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 $\leq 500\text{ V AC}$ - gG type fuse		25 A	32 A	32 A	50 A	63 A	63 A
Rated short-time withstand current I_{cw}							
at 40 °C ambient temperature,	1 s	300 A	300 A	300 A	700 A	700 A	700 A
in free air from a cold state	10 s	150 A	150 A	150 A	350 A	350 A	350 A
	30 s	80 A	80 A	80 A	225 A	225 A	225 A
	1 min	60 A	60 A	60 A	150 A	150 A	150 A
	15 min	35 A	35 A	35 A	50 A	50 A	50 A
Maximum breaking capacity							
cos $\phi = 0,45$	at 440 V	250 A	250 A	250 A	500 A	500 A	500 A
	at 690 V	106 A	106 A	106 A	200 A	200 A	200 A
Power dissipation per pole							
	I _e / AC-1	0,8 W	1 W	1,2 W	1,8 W	2,4 W	2,4 W
	I _e / AC-3	0,1 W	0,2 W	0,35 W	0,6 W	0,9 W	1,3 W
Max. electrical switching frequency							
	AC-1	600 cycles/h					
	AC-3	1200 cycles/h					
	AC-2, AC-4	300 cycles/h				150 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) For the protection of motor starters against short circuits, see "Coordination with short-circuit protection devices".

AF40 ... AF96 3-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types	AC / DC operated	AF40	AF52	AF65	AF80	AF96	
Standards		IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1					
Rated operational voltage U_e max.		690 V					
Rated frequency (without derating)		50 / 60 Hz					
Conventional free-air thermal current I_{th} acc. to IEC 60947-4-1, open contactors, $\theta \leq 40^\circ\text{C}$ With conductor cross-sectional area		105 A	105 A	105 A	130 A	130 A	
		35 mm ²	35 mm ²	35 mm ²	50 mm ²	50 mm ²	
AC-1 Utilization category							
For air temperature close to contactor							
I_e / Rated operational current AC-1 U_e max. ≤ 690 V, 50/60 Hz	$\theta \leq 40^\circ\text{C}$	70 A	100 A	105 A	125 A	130 A	
	$\theta \leq 60^\circ\text{C}$	60 A	80 A	90 A	100 A	105 A	
	$\theta \leq 70^\circ\text{C}$	50 A	70 A	80 A	85 A	90 A	
With conductor cross-sectional area		25 mm ²	35 mm ²	35 mm ²	50 mm ²	50 mm ²	
AC-3 Utilization category							
For air temperature close to contactor $\theta \leq 60^\circ\text{C}$							
I_e / Max. rated operational current AC-3 (1)	220-230-240 V	40 A	53 A	65 A	80 A	96 A	
	380-400 V	40 A	53 A	65 A	80 A	96 A	
 3-phase motors	415 V	40 A	53 A	65 A	80 A	96 A	
	440 V	40 A	53 A	65 A	80 A	96 A	
	500 V	35 A	45 A	55 A	65 A	80 A	
	690 V	25 A	35 A	39 A	49 A	57 A	
	Rated operational power AC-3 (1)						
	220-230-240 V	11 kW	15 kW	18.5 kW	22 kW	25 kW	
380-400 V	18.5 kW	22 kW	30 kW	37 kW	45 kW		
 1500 r.p.m. 50 Hz 1800 r.p.m. 60 Hz 3-phase motors	415 V	22 kW	30 kW	37 kW	45 kW	55 kW	
	440 V	22 kW	30 kW	37 kW	45 kW	55 kW	
	500 V	22 kW	30 kW	37 kW	45 kW	55 kW	
	690 V	22 kW	30 kW	37 kW	45 kW	55 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		53 A	70 A	85 A	105 A	120 A	
	Rated operational power AC-8a	25 kW	37 kW	45 kW	55 kW	65 kW	
Short-circuit protection device for contactors							
without thermal overload relay - Motor protection excluded (2)							
$U_e \leq 500$ V AC - gG type fuse							
Rated short-time withstand current I_{cw} at 40 °C ambient temperature, in free air from a cold state	1 s	1000 A	1000 A	1000 A	1200 A	1200 A	
	10 s	600 A	600 A	600 A	780 A	780 A	
	30 s	350 A	350 A	350 A	450 A	450 A	
	1 min	250 A	250 A	250 A	300 A	300 A	
	15 min	110 A	110 A	110 A	140 A	140 A	
Maximum breaking capacity							
$\cos \varphi = 0.45$							
	at 440 V	(3)					
	at 690 V	(3)					
Power dissipation per pole	I_e / AC-1	3 W	6.3 W	7 W	7.6 W	8.2 W	
	I_e / AC-3	1 W	1.7 W	2.7 W	3 W	4.5 W	
Max. electrical switching frequency	AC-1	600 cycles/h					
	AC-3	1200 cycles/h					
	AC-2, AC-4	150 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) For the protection of motor starters against short circuits, see "Coordination with short-circuit protection devices".

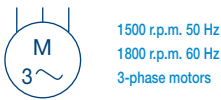
(3) On request.

AF116 ... AF370 3-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types	AC / DC operated	AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370
Standards		IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1							
Rated operational voltage Ue max.		690 V	690 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V
Rated frequency (without derating)		50 / 60 Hz							
Conventional free-air thermal current Ith		160 A	200 A	225 A	275 A	350 A	400 A	500 A	600 A
acc. to IEC 60947-4-1, open contactors, $\theta \leq 40^\circ\text{C}$ With conductor cross-sectional area		70 mm ²	95 mm ²	95 mm ²	150 mm ²	240 mm ²	240 mm ² (3)	300 mm ²	2 x 185 mm ² (4)
AC-1 Utilization category									
For air temperature close to contactor									
Ie / Rated operational current AC-1	$\theta \leq 40^\circ\text{C}$	160 A	200 A	225 A	275 A	350 A	400 A	500 A	600 A
Ue max. $\leq 690\text{ V}$, 50/60 Hz	$\theta \leq 60^\circ\text{C}$	145 A	175 A	200 A	250 A	300 A	350 A	400 A	500 A
	$\theta \leq 70^\circ\text{C}$	130 A	160 A	175 A	200 A	240 A	290 A	325 A	400 A
Ie / Rated operational current AC-1	$\theta \leq 40^\circ\text{C}$	—	—	225 A	250 A	275 A	350 A	375 A	400 A
Ue max. $\leq 1000\text{ V}$, 50/60 Hz	$\theta \leq 60^\circ\text{C}$	—	—	200 A	225 A	250 A	300 A	325 A	350 A
	$\theta \leq 70^\circ\text{C}$	—	—	175 A	185 A	200 A	240 A	260 A	290 A
With conductor cross-sectional area		70 mm ²	95 mm ²	95 mm ²	150 mm ²	240 mm ²	240 mm ² (3)	300 mm ²	2 x 185 mm ² (4)
AC-3 Utilization category									
For air temperature close to contactor $\theta \leq 60^\circ\text{C}$									
Ie / Max. rated operational current AC-3 (1)									
	220-230-240 V	116 A	140 A	146 A	190 A	205 A	265 A	305 A	370 A
	380-400 V	116 A	140 A	146 A	190 A	205 A	265 A	305 A	370 A
	415 V	116 A	140 A	146 A	190 A	205 A	265 A	305 A	370 A
	440 V	116 A	140 A	146 A	190 A	205 A	265 A	305 A	370 A
	500 V	110 A	130 A	130 A	160 A	185 A	260 A	290 A	350 A
	690 V	65 A	80 A	93 A	135 A	165 A	250 A	290 A	315 A
	1000 V	—	—	60 A	85 A	100 A	100 A	100 A	100 A
Rated operational power AC-3 (1)									
	220-230-240 V	30 kW	37 kW	45 kW	55 kW	55 kW	75 kW	90 kW	110 kW
	380-400 V	55 kW	75 kW	75 kW	90 kW	110 kW	132 kW	160 kW	200 kW
	415 V	55 kW	75 kW	75 kW	90 kW	110 kW	132 kW	160 kW	200 kW
	440 V	75 kW	90 kW	90 kW	110 kW	132 kW	160 kW	160 kW	200 kW
	500 V	75 kW	90 kW	90 kW	110 kW	132 kW	160 kW	200 kW	250 kW
	690 V	55 kW	75 kW	90 kW	132 kW	160 kW	200 kW	250 kW	315 kW
	1000 V	—	—	75 kW	110 kW	132 kW	132 kW	132 kW	132 kW
Rated making capacity AC-3		10 x Ie AC-3 acc. to IEC 60947-4-1							
Rated breaking capacity AC-3		8 x Ie AC-3 acc. to IEC 60947-4-1							
Short-circuit protection device for contactors									
without thermal overload relay - Motor protection excluded (2)									
Ue $\leq 500\text{ V}$ AC - gG type fuse		250 A	315 A	315 A	355 A	400 A	500 A	500 A	630 A
Rated short-time withstand current Icw	1 s	1300 A	1460 A	1460 A	1900 A	2050 A	2650 A	3050 A	3700 A
at 40 °C ambient temperature,	10 s	928 A	1168 A	1168 A	1520 A	1640 A	2120 A	2440 A	2960 A
in free air from a cold state	30 s	536 A	674 A	674 A	878 A	947 A	1224 A	1409 A	1709 A
	1 min	379 A	477 A	477 A	621 A	670 A	865 A	996 A	1208 A
	15 min	160 A	200 A	225 A	275 A	350 A	400 A	500 A	600 A
Maximum breaking capacity									
$\cos \varphi = 0.45$	at 440 V	2000 A	3000 A	3000 A	3300 A	3500 A	3800 A	4600 A	5000 A
($\cos \varphi = 0.35$ for Ie > 100 A)	at 690 V	1000 A	1500 A	1500 A	2200 A	2500 A	3300 A	3800 A	4000 A
Power dissipation per pole									
	Ie / AC-1	12 W	18 W	23 W	15 W	25 W	32 W	50 W	72 W
	Ie / AC-3	6 W	9 W	10 W	7 W	8 W	14 W	19 W	27 W
Maximum electrical switching frequency									
	AC-1	300 cycles/h							
	AC-3	300 cycles/h							
	AC-2, AC-4	150 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) For the protection of motor starters against short circuits, see "Coordination with short-circuit protection devices".
 (3) For currents above 275A use terminal enlargements or terminal extensions.
 (4) For currents above 450A use terminal enlargements or terminal extensions.

AF400 ... AF2650 3-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types	AC / DC operated	AF400	AF460	AF580	AF750	AF1250	AF1350	AF1650	AF2050	AF2650	
Standards		IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1									
Rated operational voltage Ue max.		1000 V									
Rated frequency (without derating)		50/60 Hz									
Conventional free-air thermal current Ith		acc. to IEC 60947-4-1, open contactors, $\theta \leq 40^\circ\text{C}$									
	With conductor cross-sectional area (3)	600 A	700 A	800 A	1050 A	1260 A	1350 A	1650 A	2050 A	2650 A	
		2x185 mm ²	2x240 mm ²	2x240 mm ²	800 mm ² (4)	1000 mm ² (4)	1000 mm ² (5)	1500 mm ² (5)	2000 mm ² (5)	3000 mm ² (5)	
AC-1 Utilization category		For air temperature close to contactor									
	Ie / Rated operational current AC-1	$\theta \leq 40^\circ\text{C}$									
	Ue max. $\leq 690\text{ V}$, 50/60 Hz	600 A	700 A	800 A	1050 A	1260 A	1350 A	1650 A	2050 A	2650 A	
		$\theta \leq 55^\circ\text{C}$	500 A	600 A	700 A	875 A	1040 A	1150 A	1450 A	1750 A	2350 A
		$\theta \leq 70^\circ\text{C}$	400 A	480 A	580 A	720 A	875 A	1000 A	1270 A	1500 A	2120 A
	Ie / Rated operational current AC-1	$\theta \leq 40^\circ\text{C}$									
	Ue max. $\leq 1000\text{ V}$, 50/60 Hz	600 A	700 A	800 A	1000 A	1260 A	1350 A	1650 A	2050 A	2650 A	
		$\theta \leq 55^\circ\text{C}$	500 A	600 A	700 A	875 A	1040 A	1150 A	1450 A	1750 A	2350 A
		$\theta \leq 70^\circ\text{C}$	400 A	480 A	580 A	720 A	875 A	1000 A	1270 A	1500 A	2120 A
	With conductor cross-sectional area	2x185 mm ²	2x240 mm ²	2x240 mm ²	800 mm ² (4)	1000 mm ² (4)	1000 mm ² (5)	1500 mm ² (5)	2000 mm ² (5)	3000 mm ² (5)	
AC-3 Utilization category		For air temperature close to contactor $\theta \leq 55^\circ\text{C}$									
	Ie / Max. rated operational current AC-3 (1)										
	220-230-240 V	400 A	460 A	580 A	750 A	-	860 A	1050 A	-	-	
	380-400 V	400 A	460 A	580 A	750 A	-	860 A	1050 A	-	-	
	415 V	400 A	460 A	580 A	750 A	-	860 A	1050 A	-	-	
	440 V	400 A	460 A	580 A	750 A	-	860 A	1050 A	-	-	
	500 V	400 A	460 A	580 A	750 A	-	800 A	950 A	-	-	
	690 V	350 A	400 A	500 A	650 A	-	800 A	950 A	-	-	
	1000 V	155 A	200 A	250 A	300 A	-	-	-	-	-	
	Rated operational power AC-3 (1)										
	220-230-240 V	110 kW	132 kW	160 kW	220 kW	-	257 kW	315 kW	-	-	
	380-400 V	200 kW	250 kW	315 kW	400 kW	-	475 kW	560 kW	-	-	
	415 V	220 kW	250 kW	355 kW	425 kW	-	500 kW	600 kW	-	-	
	440 V	220 kW	250 kW	355 kW	450 kW	-	560 kW	670 kW	-	-	
	500 V	250 kW	315 kW	400 kW	520 kW	-	560 kW	700 kW	-	-	
	690 V	315 kW	355 kW	500 kW	600 kW	-	750 kW	900 kW	-	-	
	1000 V	220 kW	280 kW	355 kW	400 kW	-	-	-	-	-	
	Rated making capacity AC-3	10 x Ie AC-3 acc. to IEC 60947-4-1									
	Rated breaking capacity AC-3	8 x Ie AC-3 acc. to IEC 60947-4-1									
Short-circuit protection device for contactors		without thermal overload relay									
	Motor protection excluded (2)										
	Ue $\leq 500\text{ V AC}$ - gG type fuse	630 A	800 A	1000 A	1000 A	Please consult us for coordination with circuit-breaker					
Rated short-time withstand current Icw		at 40 °C ambient temperature, in free air from a cold state									
	1 s	4600 A	4600 A	7000 A	7000 A	8000 A	10000 A	12000 A	12000 A	12000 A	
	10 s	4400 A	4400 A	6400 A	6400 A	7200 A	8000 A	10000 A	10000 A	10000 A	
	30 s	3100 A	3100 A	4500 A	4500 A	5200 A	6000 A	7500 A	7500 A	7500 A	
	1 min	2500 A	2500 A	3500 A	3500 A	4000 A	4500 A	5500 A	5500 A	5500 A	
	15 min	840 A	840 A	1300 A	1300 A	1500 A	1600 A	2200 A	2200 A	2800 A	
Maximum breaking capacity		cos $\varphi = 0.45$									
	at 440 V	4000 A	5000 A	6000 A	7500 A	10000 A		12000 A	8400 A	8400 A	
	at 690 V	3500 A	4500 A	5000 A	7000 A	-		-	-	-	
	(cos $\varphi = 0.35$ for Ie > 100 A)										
Power dissipation per pole		Ie / AC-1									
		30 W	42 W	32 W	50 W	80 W	80 W	80 W	125 W	200 W	
	Ie / AC-3	16 W	21 W	17 W	28 W	-	50 W	50 W	-	-	
Max. electrical switching frequency		AC-1									
		300 cycles/h		300 cycles/h		300 cycles/h		60 cycles/h		60 cycles/h	
	AC-3	300 cycles/h		300 cycles/h		-		60 cycles/h		-	
	AC-2, AC-4	60 cycles/h		60 cycles/h		-		60 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) For the protection of motor starters against short circuits, see "Coordination with short-circuit protection devices".

(3) Conductors with preparation.

(4) Max. connection bar width 50 mm.

(5) Max. connection bar width 100 mm.

AF09 ... AF38 3-pole contactors

Technical data

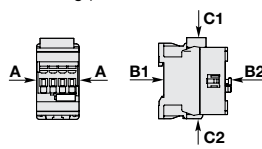
Main pole - Utilization characteristics according to UL / NEMA / CSA

Contactor types	AC / DC operated	AF09	AF12	AF16	AF26	AF30	AF38	
Standards		UL 60947-1 / 60947-4-1A and CSA 60947-1 / 60947-4-1A						
Max. operational voltage		600 V						
NEMA size		00	0	-	1	-	-	
NEMA continuous amp rating	Thermal current	9 A	18 A		27 A			
NEMA maximum horse power ratings 1-phase, 60 Hz	115 V AC	1/3 hp	1 hp		2 hp			
	230 V AC	1 hp	2 hp		3 hp			
NEMA maximum horse power ratings 3-phase, 60 Hz	200 V AC	1-1/2 hp	3 hp		7-1/2 hp			
	230 V AC	1-1/2 hp	3 hp		7-1/2 hp			
	460 V AC	2 hp	5 hp		10 hp			
	575 V AC	2 hp	5 hp		10 hp			
UL / CSA general use rating	600 V AC	25 A	28 A	30 A	45 A	50 A	50 A	
	With conductor cross-sectional area	AWG 10	AWG 10	AWG 10	AWG 8	AWG 8	AWG 8	
UL / CSA maximum 1-phase motor rating	Full load current	120 V AC	13.8 A	16 A	20 A	24 A	24 A	
		240 V AC	10 A	12 A	17 A	17 A	28 A	
	Horse power rating	120 V AC	3/4 hp	1 hp	1-1/2 hp	2 hp	2 hp	
		240 V AC	1-1/2 hp	2 hp	3 hp	3 hp	5 hp	
UL / CSA maximum 3-phase motor rating	Full load current (1)	200-208 V AC	7.8 A	11 A	17.5 A	25.3 A	32.2 A	32.2 A
		220-240 V AC	6.8 A	9.6 A	15.2 A	22 A	28 A	28 A
		440-480 V AC	7.6 A	11 A	14 A	21 A	27 A	27 A
		550-600 V AC	9 A	11 A	17 A	22 A	27 A (2)	27 A (2)
	Horse power rating (1)	200-208 V AC	2 hp	3 hp	5 hp	7-1/2 hp	10 hp	10 hp
		220-240 V AC	2 hp	3 hp	5 hp	7-1/2 hp	10 hp	10 hp
		440-480 V AC	5 hp	7-1/2 hp	10 hp	15 hp	20 hp	20 hp
		550-600 V AC	7-1/2 hp	10 hp	15 hp	20 hp	25 hp (2)	25 hp (2)
Short-circuit protection device for contactors								
without thermal overload relay - Motor protection excluded								
High fault current		100 kA						
Fuse rating		30 A	30 A	60 A	60 A	100 A	200 A	
Fuse type, 600 V		J						
Max. 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".

(2) For contactors produced since week 49-2011.

General technical data

Contactor types	AC / DC operated	AF09	AF12	AF16	AF26	AF30	AF38
Rated insulation voltage Ui							
acc. to IEC 60947-4-1		690 V					
acc. to UL / CSA		600 V					
Rated impulse withstand voltage Uimp.		6 kV					
Electromagnetic compatibility		Devices complying with IEC 60947-1 / EN 60947-1 - Environment A					
Ambient air temperature close to contactor							
Operation	Fitted with thermal overload relay	-25...+60 °C					
	Without thermal overload relay	-40...+70 °C					
Storage		-60...+80 °C					
Climatic withstand		Category B according to IEC 60947-1 Annex Q					
Maximum operating altitude (without derating)		3000 m					
Mechanical durability							
Number of operating cycles		10 millions operating cycles					
Max. switching frequency		3600 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		30 g			
		B1		25 g closed position / 5 g open position			
		B2		15 g			
		C1		25 g			
C2		25 g					
Vibration withstand							
acc. to IEC 60068-2-6							
		5...300 Hz					
		4 g closed position / 2 g open position					

AF40 ... AF96 3-pole contactors

Technical data

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

Contactor types	AC / DC operated	AF40	AF52	AF65	AF80	AF96
Standards		UL 60947-1 / 60947-4-1A and CSA 60947-1 / 60947-4-1A				
Maximum operational voltage		600 V				
NEMA size		2	-	-	3	-
NEMA continuous amp rating	Thermal current	45 A	-	-	90 A	-
NEMA maximum horse power ratings						
1-phase, 60 Hz	115 V AC	3 hp	-	-	-	-
	230 V AC	7.5 hp	-	-	-	-
NEMA maximum horse power ratings						
3-phase, 60 Hz	200 V AC	10 hp	-	-	25 hp	-
	230 V AC	15 hp	-	-	30 hp	-
	460 V AC	25 hp	-	-	50 hp	-
	575 V AC	25 hp	-	-	50 hp	-
UL / CSA general use rating						
600 V AC		60 A	80 A	90 A	105 A	115 A
With conductor cross-sectional area		AWG 6	AWG 4	AWG 3	AWG 2	AWG 2
UL / CSA maximum 1-phase motor rating						
Full load current	120 V AC	34 A	34 A	56 A	80 A	80 A
	240 V AC	40 A	50 A	68 A	68 A	88 A
Horse power rating	120 V AC	3 hp	3 hp	5 hp	7-1/2 hp	7-1/2 hp
	240 V AC	7-1/2 hp	10 hp	15 hp	15 hp	20 hp
UL / CSA maximum 3-phase motor rating						
Full load current (1)	200-208 V AC	32.2 A	48.3 A	62.1 A	78.2 A	92 A
	220-240 V AC	42 A	54 A	68 A	80 A	80 A
	440-480 V AC	40 A	52 A	65 A	77 A	77 A
	550-600 V AC	41 A	52 A	62 A	77 A	77 A
Horse power rating (1)	200-208 V AC	10 hp	15 hp	20 hp	25 hp	30 hp
	220-240 V AC	15 hp	20 hp	25 hp	30 hp	30 hp
	440-480 V AC	30 hp	40 hp	50 hp	60 hp	60 hp
	550-600 V AC	40 hp	50 hp	60 hp	75 hp	75 hp
Short-circuit protection device for contactors						
without thermal overload relay - Motor protection excluded						
High fault current		100 kA				
Fuse rating		150 A	150 A	150 A	200 A	200 A
Fuse type, 600 V		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".

General technical data

Contactor types	AC / DC operated	AF40	AF52	AF65	AF80	AF96
Rated insulation voltage Ui						
acc. to IEC 60947-4-1		690 V			1000 V	
acc. to UL / CSA		600 V				
Rated impulse withstand voltage Uimp.		6 kV			8 kV	
Electromagnetic compatibility		Devices complying with IEC 60947-1 / EN 60947-1				
Ambient air temperature close to contactor						
Operation	Fitted with thermal overload relay	(2)				
	Without thermal overload relay	-40...+70 °C				
Storage		-60...+80 °C				
Climatic withstand		Category B according to IEC 60947-1 Annex Q				
Maximum operating altitude (without derating)		3000 m				
Mechanical durability						
Number of operating cycles		10 millions operating cycles				
Maximum switching frequency		3600 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				

(2) On request.

AF116 ... AF370 3-pole contactors

Technical data

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

Contactor types	AC / DC operated	AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370
Standards		UL 60947-1 / 60947-4-1A and CSA 60947-1 / 60947-4-1A							
Maximum operational voltage		600V							
NEMA size		—	4	—	—	—	5	—	—
NEMA continuous amp rating	Thermal current	—	135 A	—	—	—	270 A	—	—
NEMA maximum horse power ratings									
1-phase, 60 Hz									
	115 V AC	—	—	—	—	—	—	—	—
	230 V AC	—	—	—	—	—	—	—	—
NEMA maximum horse power ratings									
3-phase, 60 Hz									
	200 V AC	—	40 hp	—	—	—	75 hp	—	—
	230 V AC	—	50hp	—	—	—	100 hp	—	—
	460 V AC	—	100 hp	—	—	—	200 hp	—	—
	575 V AC	—	100 hp	—	—	—	200 hp	—	—
UL / CSA general use rating									
600 V AC		160 A	200 A	200 A	230 A	250 A	300 A	350 A	400 A
600 V AC (w/ LX.. terminal extensions)		160 A	200 A	200 A	250 A	300 A	350 A	400 A	520 A
With conductor cross-sectional area		AWG 2/0	AWG 3/0	AWG 3/0	MCM 250	MCM 350 (2)	MCM 500	2//AWG 3/0	2//MCM 300
UL / CSA maximum 1-phase motor rating									
Full load current									
	120 V AC	—	—	—	—	—	—	—	—
	240 V AC	—	—	—	—	—	—	—	—
Horse power rating									
	120 V AC	—	—	—	—	—	—	—	—
	240 V AC	—	—	—	—	—	—	—	—
UL / CSA maximum 3-phase motor rating									
Full load current (1)									
	200-208 V AC	92 A	120 A	120 A	150 A	177 A	221 A	285 A	359 A
	220-240 V AC	104 A	130 A	130 A	154 A	192 A	248 A	312 A	360 A
	440-480 V AC	96 A	124 A	124 A	156 A	180 A	240 A	302 A	361 A
	550-600 V AC	99 A	125 A	125 A	144 A	192 A	242 A	289 A	336 A
Horse power rating (1)									
	200-208 V AC	30 hp	40 hp	40 hp	50 hp	60 hp	75 hp	100 hp	125 hp
	220-240 V AC	40 hp	50 hp	50 hp	60 hp	75 hp	100 hp	125 hp	150 hp
	440-480 V AC	75 hp	100 hp	100 hp	125 hp	150 hp	200 hp	250 hp	300 hp
	550-600 V AC	100 hp	125 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							
Fuse rating		225 A	250 A	250 A	450 A	400 A	500 A	600 A	800 A
Fuse type, 600 V		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) For conductor cross-sectional area above MCM 300 use terminal enlargements LW205.

General technical data

Contactor types	AC / DC operated	AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370
Rated insulation voltage Ui		1000 V							
acc. to IEC 60947-4-1		600 V							
acc. to UL / CSA		600 V							
Rated impulse withstand voltage Uimp.		8 kV							
Electromagnetic compatibility		AF contactors comply with IEC 60947-1 / EN 60947-1 - Environment A							
Ambient air temperature close to contactor									
Operation	Fitted with thermal overload relay	-25 to +55 °C							
	Without thermal overload relay	-40 to +70 °C							
Storage		-40 to +70 °C							
Maximum operating altitude (without derating)		3000 m							
Mechanical durability									
Number of operating cycles		5 million operating cycles							
Maximum switching frequency		300 cycles/h							

AF400 ... AF2650 3-pole contactors

Technical data

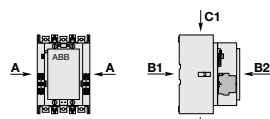
Main pole - Utilization characteristics according to UL / NEMA / CSA

Contactor types	AC / DC operated	AF400	AF460	AF580	AF750	AF1250	AF1350	AF1650	AF2050	AF2650
Standards		UL 60947-1 / 60947-4-1A and CSA 60947-1 / 60947-4-1A								
Maximum operational voltage		600 V								
NEMA size		-	6	-	7	-	-	8	-	-
NEMA maximum horse power ratings										
1-phase, 60 Hz	115 V AC	-	-	-	-	-	-	-	-	-
	230 V AC	-	-	-	-	-	-	-	-	-
NEMA maximum horse power ratings										
3-phase, 60 Hz	200 V AC	-	150 hp	-	-	-	-	-	-	-
	230 V AC	-	200 hp	-	300 hp	-	-	450 hp	-	-
	460 V AC	-	400 hp	-	600 hp	-	-	900 hp	-	-
	575 V AC	-	400 hp	-	600 hp	-	-	900 hp	-	-
UL / CSA general use rating										
600 V AC		550 A	650 A	750 A	900 A	1210 A	1350 A	1650 A	2100 A	2700 A
UL / CSA maximum 1-phase motor rating										
Full load current	120 V AC	-	-	-	-	-	-	-	-	-
	240 V AC	-	-	-	-	-	-	-	-	-
Horse power rating	120 V AC	-	-	-	-	-	-	-	-	-
	240 V AC	-	-	-	-	-	-	-	-	-
UL / CSA maximum 3-phase motor rating										
Full load current (1)	200-208 V AC	358.8 A	414 A	552 A	692.3 A	-	-	954 A	1030 A	-
	220-240 V AC	360 A	480 A	604 A	722 A	-	-	954 A	1030 A	-
	440-480 V AC	414 A	477 A	590 A	722 A	-	-	954 A	1030 A	-
	550-600 V AC	382 A	472 A	578 A	672 A	-	-	944 A	1050 A	-
Horse power rating (1)	200-208 V AC	125 hp	150 hp	200 hp	250 hp	-	-	-	-	-
	220-240 V AC	150 hp	200 hp	250 hp	300 hp	-	-	400 hp	450 hp	-
	440-480 V AC	350 hp	400 hp	500 hp	600 hp	-	-	800 hp	900 hp	-
	550-600 V AC	400 hp	500 hp	600 hp	700 hp	-	-	1000 hp	1150 hp	-
Short-circuit protection device for contactors										
without thermal overload relay - Motor protection excluded										
Fuse rating		1000 A		1200 A		Please consult us for coordination with circuit-breaker				
Fuse type, 600 V		L								
Maximum electrical switching frequency										
For general use		300 cycles/h				60 cycles/h			15 cycles/h	
For motor use		300 cycles/h				60 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".

General technical data

Contactor types	AC / DC operated	AF400	AF460	AF580	AF750	AF1250	AF1350	AF1650	AF2050	AF2650
Rated insulation voltage Ui										
acc. to IEC 60947-4-1		1000 V								
acc. to UL		600 V								
Rated impulse withstand voltage Uimp.		8 kV								
Electromagnetic compatibility		AF contactors complying with IEC 60947-1 / EN 60947-1 - Environment A								
Ambient air temperature close to contactor										
Operation	Fitted with electronic overload relay	-25 to +70 °C								
	Without electronic overload relay	-40 to +70 °C								
Storage		-40 to +70 °C								
Maximum operating altitude (without derating)		3000 m								
Mechanical durability										
Number of operating cycles		3 millions operating cycles				0.5 million operating cycles			0.3 million operating cycles	
Max. switching frequency		300 cycles/h				60 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 30 ms: no change in contact position, closed or open position								
A		5 g								
B1		5 g								
B2		5 g								
C1		5 g								
C2		5 g								



AF09 ... AF38 3-pole contactors

Technical data

Magnet system characteristics

Contactor types	AC / DC operated	AF09	AF12	AF16	AF26	AF30	AF38
Coil operating limits acc. to IEC 60947-4-1	AC supply	At $\theta \leq 60\text{ °C}$ $0.85 \times U_c \text{ min...} 1.1 \times U_c \text{ max.}$ At $\theta \leq 70\text{ °C}$ $0.85 \times U_c \text{ min...} U_c \text{ max.}$					
	DC supply	At $\theta \leq 60\text{ °C}$ $0.85 \times U_c \text{ min...} 1.1 \times U_c \text{ max.}$ At $\theta \leq 70\text{ °C}$ (AF) $0.85 \times U_c \text{ min...} U_c \text{ max.}$ - (AF..Z) $0.85 \times U_c \text{ min...} 1.1 \times U_c \text{ max.}$					
AC control voltage 50/60 Hz		24...500 V AC					
Rated control circuit voltage U_c		24...500 V AC					
Coil consumption	Average pull-in value	(AF) 50 VA - (AF..Z) 16 VA					
	Average holding value	(AF) 2.2 VA / 2 W - (AF..Z) 1.7 VA / 1.5 W					
DC control voltage		12...500 V DC					
Rated control circuit voltage U_c		12...500 V DC					
Coil consumption	Average pull-in value	(AF) 50 W - (AF..Z) 12...16 W					
	Average holding value	(AF) 2 W - (AF..Z) 1.7 W					
PLC-output control		(AF..Z) $\geq 500\text{ mA}$ 24 V DC					
Drop-out voltage		$\leq 60\%$ of $U_c \text{ min.}$					
Voltage sag immunity acc. to SEMI F47-0706		(AF..Z) conditions of use on request					
Dips withstand $-20\text{ °C} \leq \leq +60\text{ °C}$		(AF..Z) 22 ms average for $U_c \geq 24\text{ V}$ 50/60 Hz or $U_c \geq 20\text{ V}$ DC					
Operating time							
Between coil energization and:	N.O. contact closing	40...95 ms					
	N.C. contact opening	38...90 ms					
Between coil de-energization and:	N.O. contact opening	11...95 ms					
	N.C. contact closing	13...98 ms					

Mounting characteristics and conditions for use

Contactor types	AC / DC operated	AF09	AF12	AF16	AF26	AF30	AF38
Mounting positions							
Mounting distances		Max. N.C. built-in and add-on N.C. auxiliary contacts: see accessory fitting details for a 3-pole contactor AF09 ... AF38					
Fixing		The contactors can be assembled side by side					
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					

AF40 ... AF96 3-pole contactors

Technical data

Magnet system characteristics

Contactor types	AC / DC operated	AF40	AF52	AF65	AF80	AF96
Coil operating limits acc. to IEC 60947-4-1	AC supply	At $\theta \leq 70^\circ\text{C}$ $0.85 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max.}$				
	DC supply	At $\theta \leq 70^\circ\text{C}$ $0.85 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max.}$				
AC control voltage 50/60 Hz						
Rated control circuit voltage U_c		24...500 V AC				
Coil consumption	Average pull-in value	25 VA				40 VA
	Average holding value	4 VA / 2 W				
DC control voltage						
Rated control circuit voltage U_c		20...500 V DC				
Coil consumption	Average pull-in value	25 W				40 W
	Average holding value	2 W				
PLC-output control		-				
Drop-out voltage		$\leq 60\%$ of $U_c \text{ min.}$				
Voltage sag immunity acc. to SEMI F47-0706		conditions of use on request				
Dips withstand $-20^\circ\text{C} \leq \theta \leq +60^\circ\text{C}$		24 ms average				
Operating time						
Between coil energization and:	N.O. contact closing	42...100 ms				
	N.C. contact opening	38...95 ms				
Between coil de-energization and:	N.O. contact opening	17...100 ms				
	N.C. contact closing	19...105 ms				

Mounting characteristics and conditions for use

Contactor types	AC / DC operated	AF40	AF52	AF65	AF80	AF96
Mounting positions						
Mounting distances		Max. N.C. built-in and add-on N.C. auxiliary contacts: see accessory fitting details for a 3-pole contactor AF40 ... AF96				
Fixing		The contactors can be assembled side by side				
On rail according to IEC 60715, EN 60715		35 x 7.5 mm or 35 x 15 mm				35 x 15 mm
	By screws (not supplied)	2 x M4 or 2 x M6 screws placed diagonally				

AF116 ... AF370 3-pole contactors

Technical data

Magnet system characteristics

Contactor types	AC / DC operated	AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370
Coil operating limits	AC supply	At $\theta \leq 70^\circ\text{C}$ $0.85 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max}$							
acc. to IEC 60947-4-1	DC supply	At $\theta \leq 70^\circ\text{C}$ $0.80 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max}$							
Rated control circuit voltage U_c									
Coil consumption									
AC control voltage 50/60 Hz									
24...60 V AC	Average pull-in value	225 VA			165 VA		475 VA		
	Average holding value	5.5 VA			6 VA		8.5 VA		
48...130 V AC	Average pull-in value	170 VA			175 VA		340 VA		
	Average holding value	4 VA			4 VA		17 VA		
100...250 V AC	Average pull-in value	130 VA			220 VA		385 VA		
	Average holding value	6 VA			7 VA		17.5 VA		
250...500 V AC	Average pull-in value	200 VA			200 VA		400 VA		
	Average holding value	18 VA			18 VA		20 VA		
DC control voltage									
20...60 V DC	Average pull-in value	210 W			205 W		400 W		
	Average holding value	2.5 W			2.5 W		3 W		
48...130 V DC	Average pull-in value	130 W			130 W		360 W		
	Average holding value	2.5 W			2.5 W		2.5 W		
100...250 V DC	Average pull-in value	135 W			190 W		410 W		
	Average holding value	3 W			2.5 W		4.5 W		
250...500 V DC	Average pull-in value	180 W			160 W		270 W		
	Average holding value	3.5 W			3.5 W		4 W		
Drop-out voltage		55 % of $U_c \text{ min}$							
Operating time									
Coil supply between A1 - A2									
Between coil energization and:	N.O. contact closing	20...55 ms			25...60 ms		30...60 ms		
Between coil de-energization and:	N.O. contact opening	40...70 ms			45...80 ms		45...80 ms		

Mounting characteristics and conditions for use

Contactor types	AC / DC operated	AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370
Mounting positions									
Max. add-on N.O. or N.C. auxiliary contacts: see accessory fitting details for 3-pole contactor AF116 ... AF370									
Mounting distances									
The contactors can be assembled side by side									
Fixing									
On rail acc. to IEC 60715, EN 60715									
By screws (not supplied)									
4 x M5									

AF400 ... AF2650 3-pole contactors

Technical data

Magnet system characteristics

Contactor types	AC / DC operated	AF400	AF460	AF580	AF750	AF1250	AF1350	AF1650	AF2050	AF2650
Coil operating limits	AC supply	At $\theta \leq 70^\circ\text{C}$ $0.85 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max}$								
acc. to IEC 60947-4-1	DC supply	At $\theta \leq 70^\circ\text{C}$ $0.80 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max}$								
Rated control circuit voltage U_c										
Coil consumption										
AC control voltage 50/60 Hz										
24...60 V AC	Average pull-in value	900 VA		780 VA		-				
	Average holding value	12 VA		12 VA		-				
48...130 V AC	Average pull-in value	1215 VA		1100 VA		-				
	Average holding value	12 VA		12 VA		-				
100...250 V AC	Average pull-in value	955 VA		880 VA		2450 VA		-		
	Average holding value	12 VA		12 VA		48 VA		-		
250 ... 500 V AC	Average pull-in value	950 VA		985 VA		-				
	Average holding value	12 VA		12 VA		-				
DC control voltage										
20...60 V DC	Average pull-in value	900 VA		785 VA		-				
	Average holding value	5 VA		5.5 VA		-				
48...130 V DC	Average pull-in value	1150 VA		1020 VA		-				
	Average holding value	5 VA		5 VA		-				
100...250 V DC	Average pull-in value	895 VA		880 VA		2290 VA		-		
	Average holding value	5 VA		5 VA		20.5 VA		-		
250 ... 500 V AC	Average pull-in value	885 VA		910 VA		-				
	Average holding value	7.5 VA		7.5 VA		-				
Drop-out voltage	55 % of $U_c \text{ min.}$									
Voltage sag immunity	Conditions of use on request									
acc. to SEMI F47										
Dips withstand	$\geq 20 \text{ ms}$									
Operating time										
Coil supply between A1 - A2										
Between coil energization and:	Main contact closing	50...120 ms				50...80 ms				
Between coil de-energization and:	Main contact opening	33...70 ms				35...55 ms				
Control input for PLC's										
Between coil energization and:	Main contact closing	40...60 ms		40...90 ms		40...65 ms				
Between coil de-energization and:	Main contact opening	10...30 ms				10...30 ms				
















Mounting characteristics and conditions for use

Contactor types	AC / DC operated	AF400	AF460	AF580	AF750	AF1250	AF1350	AF1650	AF2050	AF2650
Mounting positions										
Max. add-on N.O. or N.C. auxiliary contacts: see accessory fitting details for 3-pole contactor AF400 ... AF2650										
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		4 x M6		4 x M8				

AF09 ... AF38 3-pole contactors

Technical data

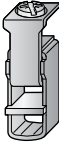
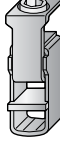














Connecting characteristics

Contactor types	AC / DC operated	AF09	AF12	AF16	AF26	AF30	AF38	
Main terminals		 <p>Screw terminals with cable clamp</p>						
Connection capacity (min. ... max.)								
Main conductors (poles)								
 Rigid	Solid ($\leq 4 \text{ mm}^2$)	} 1 x	1...6 mm ²			2.5...10 mm ²		
 Stranded ($\geq 6 \text{ mm}^2$)			1...6 mm ²			2.5...10 mm ²		
 Flexible with non insulated ferrule		1 x	0.75...6 mm ²			1.5...10 mm ²		
 Flexible with insulated ferrule		2 x	0.75...6 mm ²			1.5...10 mm ²		
 Flexible with insulated ferrule		1 x	0.75...4 mm ²			1.5...10 mm ²		
 Flexible with insulated ferrule		2 x	0.75...2.5 mm ²			1.5...4 mm ²		
 Bars or lugs		L <	9.6 mm			12.5 mm		
Connection capacity acc. to UL/CSA		1 or 2 x	AWG 16...10			AWG 14...8		
Stripping length			10 mm			14 mm		
Tightening torque			1.5 Nm / 13 lb.in			2.5 Nm / 22 lb.in		
Auxiliary conductors								
(built-in auxiliary terminals + coil terminals)								
 Rigid solid		1 x	1...2.5 mm ²					
 Rigid solid		2 x	1...2.5 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					
 Flexible with insulated ferrule		1 x	0.75...2.5 mm ²					
 Flexible with insulated ferrule		2 x	0.75...2.5 mm ²					
 Lugs		L <	8 mm					
Connection capacity acc. to UL/CSA		1 or 2 x	AWG 18...14					
Stripping length			10 mm					
Tightening torque								
Coil terminals			1.2 Nm / 11 lb.in					
Built-in auxiliary terminals			1.2 Nm / 11 lb.in					
Degree of protection								
acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529								
Main terminals		IP20						
Coil terminals		IP20						
Built-in auxiliary terminals		IP20						
Screw terminals		Delivered in open position, screws of unused terminals must be tightened						
Main terminals		M3.5			M4			
		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					

AF40 ... AF96 3-pole contactors

Technical data

Connecting characteristics

Contactor types	AC / DC operated	AF40	AF52	AF65	AF80	AF96
Main terminals						
		Screw terminals with double connector 2 x (9.3 width x 7.9/10.3 depth)			Screw terminals with double connector 2 x (12.4 width x 9.3/11.1 depth)	
Connection capacity (min. ... max.)						
Main conductors (poles)						
 Rigid	Solid ($\leq 4 \text{ mm}^2$)	} 1 x	6...35 mm ²			6...70 mm ²
 Stranded ($\geq 6 \text{ mm}^2$)			2 x 6...35 mm ²			6...50 mm ²
 Flexible with non insulated ferrule		1 x	4...35 mm ²			6...50 mm ²
 Flexible with insulated ferrule		2 x	4...35 mm ²			6...50 mm ²
 Flexible with insulated ferrule		1 x	4...35 mm ²			6...50 mm ²
 Flexible with insulated ferrule		2 x	4...35 mm ²			6...50 mm ²
 Bars or lugs		L <	9.2 mm			12.2 mm
Connection capacity acc. to UL/CSA		1 or 2 x	AWG 10...2			AWG 6...1
Stripping length			16 mm			17 mm
Tightening torque			4 Nm / 35 lb.in			6 Nm / 53 lb.in
Auxiliary conductors (built-in auxiliary terminals + coil terminals)						
 Rigid solid		1 x	1...2.5 mm ²			
 Rigid solid		2 x	1...2.5 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			
 Flexible with insulated ferrule		1 x	0.75...2.5 mm ²			
 Flexible with insulated ferrule		2 x	0.75...2.5 mm ²			
 Lugs		L <	8 mm			
Connection capacity acc. to UL/CSA		1 or 2 x	AWG 18...14			
Stripping length			10 mm			
Tightening torque			1.2 Nm / 11 lb.in			
Coil terminals			1.2 Nm / 11 lb.in			
Built-in auxiliary terminals			1.2 Nm / 11 lb.in			
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529						
Main terminals			IP10			
Coil terminals			IP20			
Built-in auxiliary terminals			IP20			
Screw terminals						
Main terminals			Delivered in open position, screws of unused terminals must be tightened			
		Screwdriver type	M6			M8
Coil terminals		Screwdriver type	Flat Ø 6.5 / Pozidriv 2			Hexagon socket (s = 4 mm)
		Screwdriver type	M3.5			
Built-in auxiliary terminals		Screwdriver type	Flat Ø 5.5 / Pozidriv 2			
		Screwdriver type	M3.5			
		Screwdriver type	Flat Ø 5.5 / Pozidriv 2			

AF116 ... AF370 3-pole contactors

Technical data

Connecting characteristics

Contactor types	AC / DC operated	AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370
Main terminals									
Flat type									
Connection capacity (min. ... max.)									
Main conductors (poles)									
	Cu cable - Stranded	1 x	10...95 mm ²		6...150 mm ²		16...300 mm ²		
	Clamp type		LD... included (1)		1SDA066917R1		1SDA055016R1		
	Tightening torque		8 Nm		14 Nm		25 Nm		
	Cu cable - Stranded	2 x	10...95 mm ²		50...120 mm ²		70...185 mm ²		
	Clamp type		LD... included (1)		1SFN074709R1000, LZ185-2C/120		1SCA022194R0890, OZXB4		
	Tightening torque		8 Nm		16 Nm		22 Nm		
	Al cable - Stranded	1 x	-		95...185 mm ²		185...240 mm ²		
	Clamp type		-		1SDA054988R1		1SDA055020R1		
	Tightening torque		-		31 Nm		43 Nm		
	Cu cable - Flexible	1 x	10...70 mm ²		6...120 mm ²		16...240 mm ²		
	Clamp type		LD... included (1)		1SDA066917R1		1SDA055016R1		
	Tightening torque		8 Nm		14 Nm		25 Nm		
	Cu cable - Flexible	2 x	10...70 mm ²		50...95 mm ²		70...185 mm ²		
	Clamp type		LD... included (1)		1SFN074709R1000, LZ185-2C/120		1SCA022194R0890, OZXB4		
	Tightening torque		8 Nm		16 Nm		22 Nm		
	Lugs	W ≤	22 mm (.866 in)		24 mm (.945 in)		32 mm (1.260 in)		
		Ø >	6 mm (.236 in)		8 mm (.315 in)		10 mm (.394 in)		
	Socket type		LL... included		LL... included		LL... included		
	Tightening torque		9 Nm / 80 lb.in		18 Nm / 160 lb.in		28 Nm / 248 lb.in		
Connection capacity acc. to UL / CSA		1 x	AWG 6...3/0		6...300 MCM		4...400 MCM		
	Clamp type		LD... included (1)		ATK185 (2)		ATK300 (2)		
	Tightening torque		8 Nm / 71 lb.in		34 Nm / 301 lb.in		42 Nm / 372 lb.in		
Connection capacity acc. to UL / CSA		2 x	AWG 6...3/0		-		4...500 MCM		
	Clamp type		LD... included (1)		-		ATK300/2 (2)		
	Tightening torque		8 Nm / 71 lb.in		-		42 Nm / 372 lb.in		
Auxiliary conductors									
(coil terminals)									
	Solid / stranded	1 x	1...4 mm ²						
		2 x	1...4 mm ²						
	Flexible	1 x	0.75...2.5 mm ²						
		2 x	0.75...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...2.5 mm ²						
	Lugs	L <	8 mm						
		L >	3.5 mm						
Connection capacity acc. to UL / CSA		1 or 2 x	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 / EN 60529									
Main terminals			IP00						
Coil terminals			IP20						
Screw terminals									
Main terminals			M6		M8		M10		
		Screwdriver type	Screws and bolts						
Coil terminals (delivered in open position)			M3.5						
		Screwdriver type	Flat Ø 5.5 mm / Pozidriv 2						

(1) LD... not included for AF116 ... AF146-30...B.

(2) Available in North America only.

AF400 ... AF2650 3-pole contactors

Technical data

Connecting characteristics

Contactor types	AC / DC operated	AF400	AF460	AF580	AF750	AF1250	AF1350	AF1650	AF2050	AF2650
Main terminals										
Flat type										
Connection capacity (min. ... max.)										
Main conductors (poles)										
	Cu cable - Stranded	2 x	240 mm ²							
	Clamp type		1SDA013922R1							
	Tightening torque		35 Nm							
	Cu cable - Stranded	3 x	-	185 mm ²						
	Clamp type		-	1SDA013956R1						
	Tightening torque		35 Nm	45 Nm						
	Al cable - Stranded	2 x	240 mm ²							
	Clamp type		1SDA013922R1							
	Tightening torque		35 Nm							
		3 x	-	185 mm ²						
	Clamp type		-	1SDA013956R1						
	Tightening torque		35 Nm	45 Nm						
	Lugs	W ≤	47 mm	50 mm			100 mm			
		Ø >	10 mm	12 mm						
	Tightening torque		35 Nm / 310 lb.in	45 Nm / 398 lb.in						
Connection capacity acc. to UL / CSA										
		2 x	250-500 MCM alt. 2/0 AWG-400 MCM	-			2// 3 x 0.25 in	4/0 AWG - 500 MCM	4//4 x 0.25 in	
	Clamp type		K6TH alt. ATK580	-			bars, use LW1250	K7TK	K7TK	bars
	Tightening torque		275 lb.in	-				375 lb.in		
Connection capacity acc. to UL / CSA										
		3 x	2/0 AWG-400 MCM	2/0 AWG-500 MCM			1/0-750 MCM			
	Clamp type		K6TJ	ATK750/3			K8TL, K8TM, ATK1650/4		K8TL, K8TM, ATK1650/4, ATK1650/6	
	Tightening torque		275 lb.in	375 lb.in			500 lb.in			
Auxiliary conductors (coil terminals)										
	Solid / stranded	1 x	1...4 mm ²							
		2 x	1...4 mm ²							
	Flexible	1 x	0.75...2.5 mm ²							
		2 x	0.75...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...2.5 mm ²							
	Lugs	L ≤	8 mm							
		L >	3.7 mm							
Connection capacity acc. to UL / CSA										
		1 or 2 x	AWG 18...14							
	Tightening torque	Recommended	1.00 Nm / 9 lb.in							
		Max.	1.20 Nm							
Degree of protection										
acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529										
Main terminals										
IP00										
Coil terminals										
IP20										
Screw terminals										
Main terminals										
M10										
Screws and bolts										
M12										
Coil terminals (delivered in open position)										
M3.5										
Screwdriver type										
Flat Ø 5.5 mm / Pozidriv 2										

AF09 ... AF96 3-pole contactors

Technical data

Built-in auxiliary contacts according to IEC

Contactor types	AC / DC operated	AF09	AF12	AF16	AF26	AF30	AF38	AF40	AF52	AF65	AF80	AF96
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										
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										
	400-440 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										
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	0.27 A / 60 W										
	250 V DC	0.27 A / 68 W										
	400 V DC	0.15 A / 60 W										
	500 V DC	0.13 A / 65 W										
	600 V DC	0.1 A / 60 W										
Short-circuit protection device gG type fuse		10 A										
Rated short-time withstand current I _{ow}	for 1.0 s	100 A										
	for 0.1 s	140 A										
Minimum switching capacity with failure rate acc. to IEC 60947-5-4		12 V / 3 mA										
Non-overlapping time between N.O. and N.C. contacts		10 ⁻⁷										
Power dissipation per pole at 6 A		≥ 2 ms										
Max. electrical switching frequency	AC-15	0.1 W										
	DC-13	1200 cycles/h										
		900 cycles/h										
Mechanically linked contacts acc. to annex L of IEC 60947-5-1		Built-in N.O. or N.C. auxiliary contacts and additional N.O. or N.C. auxiliary contacts (CA4, CAL4, CAT4 aux. contact blocks) are mechanically linked contacts.										
Mirror contacts acc. to annex F of IEC 60947-4-1		Built-in N.C. auxiliary contacts or additional N.C. auxiliary contacts (CA4, CAL4, CAT4 aux. contact blocks) are mirror contacts.										



Built-in auxiliary contacts according to UL / CSA

Contactor types	AC / DC operated	AF09	AF12	AF16	AF26	AF30	AF38	AF40	AF52	AF65	AF80	AF96
Max. operational voltage		600 V AC, 600 V DC										
Pilot duty		A600, Q600										
AC thermal rated current		10 A										
AC maximum volt-ampere making		7200 VA										
AC maximum volt-ampere breaking		720 VA										
DC thermal rated current		2.5 A										
DC maximum volt-ampere making-breaking		69 VA										

AF09 ... AF38 4-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactors types	AC / DC operated	AF09	AF16	AF26	AF38	
Standards		IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1				
Rated operational voltage U_e max.		690 V				
Rated frequency (without derating)		50 / 60 Hz				
Conventional free-air thermal current I_{th} acc. to IEC 60947-4-1, open contactors, $\theta \leq 40^\circ\text{C}$ With conductor cross-sectional area		35 A	35 A	55 A	55 A	
		6 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 U_e max. ≤ 690 V, 50/60 Hz	$\theta \leq 40^\circ\text{C}$	25 A	30 A	45 A	55 A	
	$\theta \leq 60^\circ\text{C}$	25 A	30 A	40 A	45 A	
	$\theta \leq 70^\circ\text{C}$	22 A	26 A	32 A	37 A	
With conductor cross-sectional area		4 mm ²	6 mm ²	10 mm ²	16 mm ²	
AC-3 Utilization category						
For air temperature close to contactor $\theta \leq 60^\circ\text{C}$						
I_e / Max. rated operational current AC-3 (1)						
	220-230-240 V	9 A	18 A	23.2 A	23.2 A	
 3-phase motors	380-400 V	9 A	18 A	22 A	22 A	
	415 V	9 A	18 A	21.2 A	21.2 A	
	440 V	9 A	18 A	20 A	20 A	
	500 V	9.5 A	15 A	17.6 A	17.6 A	
	690 V	7 A	10.5 A	10.5 A	10.5 A	
	Rated operational power AC-3 (1)					
	 1500 r.p.m. 50 Hz 1800 r.p.m. 60 Hz 3-phase motors	220-230-240 V	2.2 kW	4 kW	5.5 kW	5.5 kW
		380-400 V	4 kW	7.5 kW	11 kW (2)	11 kW (2)
		415 V	4 kW	9 kW	11 kW	11 kW
		440 V	4 kW	9 kW	11 kW	11 kW
500 V		5.5 kW	9 kW	11 kW	11 kW	
690 V		5.5 kW	9 kW	9 kW	9 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						
Short-circuit protection device for contactors						
Without thermal overload relay - Motor protection excluded						
$U_e \leq 500$ V AC - gG type fuse		25 A	32 A	50 A	63 A	
Rated short-time withstand current I_{cw} At 40 °C ambient temperature, in free air from a cold state	1 s	300 A	300 A	450 A	450 A	
	10 s	150 A	150 A	300 A	300 A	
	30 s	80 A	80 A	225 A	225 A	
	1 min	60 A	60 A	150 A	150 A	
	15 min	35 A	35 A	55 A	55 A	
Power dissipation per pole	I_e / AC-1	0.8 W	1.2 W	1.6 W	2.3 W	
	I_e / AC-3	0.1 W	0.35 W	0.42 W	0.42 W	
Max. electrical switching frequency	AC-1	600 cycles/h				
	AC-3	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".

(2) 400V 3-phase motor only.

Main pole - Utilization characteristics according to UL / CSA

Contactors types	AC / DC operated	AF09	AF16	AF26	AF38
Standards		UL 60947-1 / 60947-4-1A and CSA 60947-1 / 60947-4-1A			
Max. operational voltage		600 V			
UL / CSA general use rating	600 V AC	25 A	30 A	45 A	55 A
	With conductor cross-sectional area	AWG 10	AWG 10	AWG 8	AWG 6
Max. electrical switching frequency		600 cycles/h			
For general use					

Note: 4-pole contactors fitted with 2 N.O. + 2 N.C. main poles, see "General technical data".

AF09 ... AF38 4-pole contactors

Technical data

Magnet system characteristics

Contactor types	AC / DC operated	AF09	AF16	AF26	AF38
Coil operating limits acc. to IEC 60947-4-1	AC supply	At $\theta \leq 60\text{ }^\circ\text{C}$ $0.85 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max}$. At $\theta \leq 70\text{ }^\circ\text{C}$ $0.85 \times U_c \text{ min} \dots U_c \text{ max}$.			
	DC supply	At $\theta \leq 60\text{ }^\circ\text{C}$ $0.85 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max}$. At $\theta \leq 70\text{ }^\circ\text{C}$ (AF) $0.85 \times U_c \text{ min} \dots U_c \text{ max}$. - (AF..Z) $0.85 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max}$.			
AC control voltage 50/60 Hz		24...500 V AC			
Rated control circuit voltage U_c					
Coil consumption	Average pull-in value	(AF) 50 VA - (AF..Z) 16 VA			
	Average holding value	(AF) 2.2 VA / 2 W - (AF..Z) 1.7 VA / 1.5 W			
DC control voltage		12...500 V DC			
Rated control circuit voltage U_c					
Coil consumption	Average pull-in value	(AF) 50 W - (AF..Z) 12...16 W			
	Average holding value	(AF) 2 W - (AF..Z) 1.7 W			
PLC-output control		(AF..Z) $\geq 500\text{ mA}$ 24 V DC			
Drop-out voltage		$\leq 60\%$ of $U_c \text{ min}$.			
Voltage sag immunity acc. to SEMI F47-0706		(AF..Z) conditions of use on request			
Dips withstand $-20\text{ }^\circ\text{C} \leq \dots \leq +60\text{ }^\circ\text{C}$		(AF..Z) 22 ms average for $U_c \geq 24\text{ V}$ 50/60 Hz or $U_c \geq 20\text{ V}$ DC			
Operating time					
Between coil energization and:	N.O. contact closing	40...95 ms			
	N.C. contact opening	38...90 ms			
Between coil de-energization and:	N.O. contact opening	11...95 ms			
	N.C. contact closing	13...98 ms			

Mounting characteristics and conditions for use

Contactor types	AF09	AF16	AF26	AF38
Mounting positions				
	Max. add-on N.C. auxiliary contacts: see accessory fitting details for a 4-pole contactor AF09 ... AF38			
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			

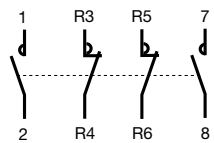
AF09 ... AF38 4-pole contactors

Technical data

General technical data

Contactor types	AC / DC operated	AF09	AF16	AF26	AF38
Rated insulation voltage U_i					
acc. to IEC 60947-4-1		690 V			
acc. to UL / CSA		600 V			
Rated impulse withstand voltage U_{imp}		6 kV			
Electromagnetic compatibility		Devices complying with IEC 60947-1 / EN 60947-1 - Environment A			
Ambient air temperature close to contactor					
Operation		-40...+70 °C			
Storage		-60...+80 °C			
Climatic withstand		Category B according to IEC 60947-1 Annex Q			
Maximum operating altitude (without derating)		3000 m			
Mechanical durability					
Number of operating cycles		10 millions operating cycles			
Max. switching frequency		3600 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			
	4 N.O. Main poles	A	30 g		
		B1	25 g closed position / 5 g open position		
		B2	15 g		
		C1	25 g		
		C2	25 g		
	2 N.O. + 2 N.C. Main poles	A	30 g closed position / 25 g open position		
		B1	25 g closed position / 5 g open position		
		B2	15 g closed position / 10 g open position		
		C1	25 g closed position / 20 g open position		
		C2	25 g closed position / 20 g open position		
Vibration withstand		5...300 Hz			
acc. to IEC 60068-2-6		4 g closed position / 2 g open position			

Remark for 4-pole contactors fitted with 2 N.O. + 2 N.C. main poles



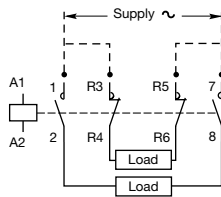
These contactors are suitable for controlling 2 separate circuits, i.e. 2 loads with 2 separate supplies, or 1 circuit comprising 2 separate loads with a single supply (see diagrams below). When the contactor operates there is no mechanical overlapping between the N.O. poles and the N.C. poles: BREAK before MAKE.



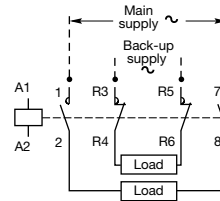
These contactors are not suitable for a reversing starter or for controlling a single load from 2 separate supplies.

Block diagrams

– Single supply and 2 separate loads




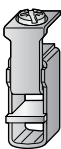














– 2 separate supplies and 2 separate loads



AF09 ... AF38 4-pole contactors

Technical data

Connecting characteristics

Contactor types	AF09	AF16	AF26	AF38
Main terminals				
	Screw terminals with cable clamp		Screw terminals with double connector 2 x (5.5 width x 6.8 depth)	
Connection capacity (min. ... max.)				
Main conductors (poles)				
 Rigid	Solid ($\leq 4 \text{ mm}^2$)	} 1 x	1...6 mm ²	1.5...16 mm ²
 Stranded ($\geq 6 \text{ mm}^2$)			2 x	1...6 mm ²
 Flexible with non insulated ferrule		1 x	0.75...6 mm ²	1.5...16 mm ²
 Flexible with non insulated ferrule		2 x	0.75...6 mm ²	1.5...16 mm ²
 Flexible with insulated ferrule		1 x	0.75...4 mm ²	1.5...16 mm ²
 Flexible with insulated ferrule		2 x	0.75...2.5 mm ²	1.5...16 mm ²
 Bars or lugs		L <	9.6 mm	-
Connection capacity acc. to UL/CSA	1 or 2 x		AWG 16...10	AWG 16...6
Stripping length			10 mm	12 mm
Tightening torque			1.5 Nm / 13 lb.in	2.5 Nm / 22 lb.in
Auxiliary conductors (coil terminals)				
 Rigid solid		1 x	1...2.5 mm ²	
 Rigid solid		2 x	1...2.5 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	
 Flexible with insulated ferrule		1 x	0.75...2.5 mm ²	
 Flexible with insulated ferrule		2 x	0.75...1.5 mm ²	
 Lugs		L <	8 mm	
Connection capacity acc. to UL/CSA	1 or 2 x		AWG 18...14	
Stripping length			10 mm	
Tightening torque			1.2 Nm / 11 lb.in	
Degree of protection				
acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529				
Main terminals	IP20			
Coil terminals	IP20			
Screw terminals	Delivered in open position, screws of unused terminals must be tightened			
Main terminals			M3.5	M4.5
	Screwdriver type	Flat Ø 5.5 / Pozidriv 2		
Coil terminals			M3.5	
	Screwdriver type	Flat Ø 5.5 / Pozidriv 2		

NF control relays

Technical data

Contact utilization characteristics according to IEC

Control relay types	AC / DC operated	NF
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} $\theta \leq 40$ °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
	400-440 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 I_e AC-15 acc. to IEC 60947-5-1
Rated 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	1 A / 72 W
	110 V DC	0.55 A / 60 W
	125 V DC	0.55 A / 69 W
	220 V DC	0.27 A / 60 W
	250 V DC	0.27 A / 68 W
	400 V DC	0.15 A / 60 W
	500 V DC	0.13 A / 65 W
	600 V DC	0.1 A / 60 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		10^{-7}
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 acc. to annex L of IEC 60947-5-1		Built-in N.O. or N.C. auxiliary contacts and additional N.O. or N.C. auxiliary contacts (CA4, CAL4 aux. contact blocks) are mechanically linked contacts.

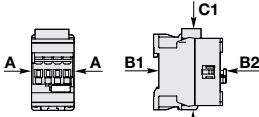
Contact utilization characteristics according to UL / CSA

Control relay types	AC / DC operated	NF
Standards		UL 60947-1 / 60947-4-1A and CSA 60947-1 / 60947-4-1A
Max. operational voltage		600 V AC, 600 V DC
Pilot duty		A600, Q600
AC thermal rated current		10 A
AC maximum volt-ampere making		720 VA
AC maximum volt-ampere breaking		720 VA
DC thermal rated current		2.5 A
DC maximum volt-ampere making-breaking		69 VA

NF control relays

Technical data

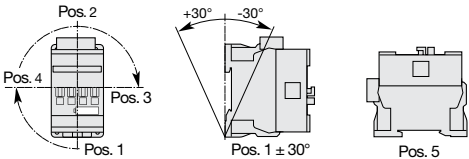
General technical data

Control relay types	AC / DC operated	NF
Rated insulation voltage Ui acc. to IEC 60947-5-1 acc. to UL / CSA		690 V 600 V
Rated impulse withstand voltage Uimp.		6 kV
Electromagnetic compatibility		Devices complying with IEC 60947-1 / EN 60947-1 - Environment A
Ambient air temperature close to contactor relay Operation in free air Storage		-40...+70 °C -60...+80 °C
Climatic withstand		Category B according to IEC 60947-1 Annex Q
Maximum operating altitude (without derating)		3000 m
Mechanical durability Number of operating cycles Max. switching frequency		20 millions operating cycles 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	30 g
	B1	25 g closed position / 5 g open position
	B2	15 g
	C1	25 g
	C2	25 g
Vibration withstand acc. to IEC 60068-2-6		5...300 Hz 4 g closed position / 2 g open position

Magnet system characteristics

Control relay types	AC / DC operated	NF
Coil operating limits acc. to IEC 60947-5-1	AC supply	At $\theta \leq 60\text{ °C}$ $0.85 \times U_c \text{ min...} 1.1 \times U_c \text{ max.}$ At $\theta \leq 70\text{ °C}$ $0.85 \times U_c \text{ min...} U_c \text{ max.}$
	DC supply	At $\theta \leq 60\text{ °C}$ $0.85 \times U_c \text{ min...} 1.1 \times U_c \text{ max.}$ At $\theta \leq 70\text{ °C}$ (AF) $0.85 \times U_c \text{ min...} U_c \text{ max.}$ - (NFZ) $0.85 \times U_c \text{ min...} 1.1 \times U_c \text{ max.}$
AC control voltage 50/60 Hz Rated control circuit voltage U_c Coil consumption	Average pull-in value Average holding value	24...500 V AC (NF) 50 VA - (NFZ) 16 VA (NF) 2.2 VA / 2 W - (NFZ) 1.7 VA / 1.5 W
DC control voltage Rated control circuit voltage U_c Coil consumption	Average pull-in value Average holding value	12...500 V DC (NF) 50 W - (NFZ) 12...16 W (NF) 2 W - (NFZ) 1.7 W
PLC-output control		(NFZ) $\geq 500\text{ mA}$ 24 V DC
Drop-out voltage		$\leq 60\%$ of $U_c \text{ min.}$
Voltage sag immunity acc. to SEMI F47-0706		(NFZ) conditions of use on request
Dips withstand -20 °C \leq \leq +60 °C		(NFZ) 22 ms average for $U_c \geq 24\text{ V}$ 50/60 Hz or $U_c \geq 20\text{ V}$ DC
Operating time Between coil energization and:	N.O. contact closing N.C. contact opening	40...95 ms 38...90 ms
Between coil de-energization and:	N.O. contact opening N.C. contact closing	11...95 ms 13...98 ms









Mounting characteristics

Control relay types	AC / DC operated	NF
Mounting positions		
Mounting distances		Max. add-on N.C. auxiliary contacts: see accessory fitting details for a NF contactor relay
Fixing On rail according to IEC 60715, EN 60715 By screws (not supplied)		The contactor relays can be assembled side by side. 35 x 7.5 mm or 35 x 15 mm 2 x M4 screws placed diagonally

NF control relays

Technical data

Connecting characteristics

Control relay types	AC / DC operated	NF
Main terminals		 Screw terminals with cable clamp
2 Connection capacity (min. ... max.)		
Pole and coil terminals		
 Rigid	1 x	1...2.5 mm ²
 Rigid	2 x	1...2.5 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
 Flexible with insulated ferrule	1 x	0.75...2.5 mm ²
 Flexible with insulated ferrule	2 x	0.75...1.5 mm ²
 Lugs	L <	8 mm
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 18...14
Stripping length		10 mm
Tightening torque		
Pole terminals		1.2 Nm / 11 lb.in
Coil terminals		1.2 Nm / 11 lb.in
Degree of protection		
acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529		
All terminals		IP20
Screw terminals		
All terminals		Delivered in open position, screws of unused terminals must be tightened M3.5
	Screwdriver type	Fiat Ø 5.5 / Pozidriv 2

Auxiliary contact blocks for AF09 ... AF96 contactors and NF control relays

Technical data





Contact utilization characteristics according to IEC

Types	1-pole CA4 , 1-pole CC4 , 4-pole CA4 , 2-pole CAT4 , 2-pole CAL4	
Standards	IEC 60947-5-1 and EN 60947-5-1	
Rated insulation voltage U_i acc. to IEC 60947-5-1	690 V	
Rated impulse withstand voltage U_{imp}	6 kV	
Rated operational voltage U_e max.	24...690 V	
Conventional thermal current I_{th} - $\leq 40^\circ\text{C}$	16 A	
Rated frequency (without derating)	50/60 Hz	
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
	400-440 V 50/60 Hz	3 A
	500 V 50/60 Hz	2 A
	690 V 50/60 Hz	2 A
Making capacity acc. to IEC 60947-5-1	10 x I_e AC-15	
Breaking capacity acc. to IEC 60947-5-1	10 x I_e AC-15	
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	1 A / 72 W
	110 V DC	0.55 A / 60 W
	125 V DC	0.55 A / 69 W
	220 V DC	0.27 A / 60 W
	250 V DC	0.27 A / 68 W
	400 V DC	0.15 A / 60 W
	500 V DC	0.13 A / 65 W
	600 V DC	0.1 A / 60 W
Short-circuit protection device gG type fuse	10 A	
Rated short-time withstand current I_{cw} = 40°C	for 1.0 s	100 A
	for 0.1 s	140 A
Minimum switching capacity with failure rate acc. to IEC 60947-5-4	12 V / 3 mA	
Power dissipation per pole at 6 A	0.1 W	
Mechanical durability	Number of operating cycles	10 millions operating cycles
	Max. switching frequency	3600 cycles/h
Max. electrical switching frequency	AC-15	1200 cycles/h
	DC-13	900 cycles/h
Mechanically linked contacts acc. to annex L of IEC 60947-5-1	Additional N.O. or N.C. auxiliary contacts (CA4, CAL4, CAT4) are mechanically linked contacts	
Mirror contacts acc. to annex F of IEC 60947-4-1	Additional N.C. auxiliary contacts (CA4, CAL4, CAT4) are mirror contacts	

Contact utilization characteristics according to UL / CSA

Types	1-pole CA4 , 1-pole CC4 , 4-pole CA4 , 2-pole CAT4 , 2-pole CAL4	
Standards	UL 60947-1 / 60947-4-1A and CSA 60947-1 / 60947-4-1A	
Max. operational voltage	600 V AC, 600 V DC	
Pilot duty	A600, Q600	
AC thermal rated current	10 A	
AC maximum volt-ampere making	7200 VA	
AC maximum volt-ampere breaking	720 VA	
DC thermal rated current	2.5 A	
DC maximum volt-ampere making-breaking	69 VA	

Connecting characteristics

Types	1-pole CA4 , 1-pole CC4 , 4-pole CA4 , 2-pole CAT4 , 2-pole CAL4	
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
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 18...14
Stripping length	10 mm	
Tightening torque	1.2 Nm / 11 lb.in	
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529	IP20	
Screw terminals	Delivered in open position, screws of unused terminals must be tightened	
All terminals	M3.5	
Screwdriver type	Flat \varnothing 5.5 / Pozidriv 2	

Auxiliary contact blocks for AF116 ... AF2650 contactors

Technical data

Types	CAL18	CAL19
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Contact utilization characteristics according to IEC

Standards	IEC 60947-5-1 and EN 60947-5-1	
Rated insulation voltage U_i acc. to IEC 60947-5-1	690 V	
Rated impulse withstand voltage U_{imp}	6 kV	
Rated operational voltage U_e max.	24...690 V AC	
Conventional thermal current I_{th} - $\leq 40^\circ\text{C}$	16 A	
Rated frequency (without derating)	50/60 Hz	
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 acc. to IEC 60947-5-1	10 x I_e AC-15	
Breaking capacity acc. to IEC 60947-5-1	10 x I_e AC-15	
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	1 A / 72 W
	110 V DC	0.55 A / 60 W
	125 V DC	0.55 A / 69 W
	220 V DC	0.3 A / 66 W
	250 V DC	0.3 A / 75 W
Short-circuit protection device gG type fuse	10 A	
Rated short-time withstand current I_{sw}	for 1.0 s	100 A
= 40°C	for 0.1 s	140 A
Minimum switching capacity	24 V / 50 mA (0.5 million of operating cycles)	24 V / 50 mA
with failure rate acc. to IEC 60947-5-4	$\leq 10^{-6}$	
Power dissipation per pole at 6 A	0.15 W	
Mechanical durability	Number of operating cycles	3 millions (A/AF400 ... AF750)
	Max. switching frequency	0.5 million (AF1250 ... AF2050)
		3600 cycles/h
Max. electrical switching frequency	AC-15	1200 cycles/h
	DC-13	900 cycles/h
		300 cycles/h
Mechanically linked contacts acc. to annex L of IEC 60947-5-1	N.O. or N.C. auxiliary contacts are mechanically linked contacts	
Mirror contacts acc. to annex F of IEC 60947-4-1	N.C. auxiliary contacts are mirror contacts	

Contact utilization characteristics according to UL / CSA

Standards	UL 60947-1 / 60947-4-1A and CSA 60947-1 / 60947-4-1A
Max. operational voltage	600 V AC, 250 V DC
Pilot duty	A600, Q300
AC thermal rated current	10 A
AC maximum volt-ampere making	7200 V A
AC maximum volt-ampere breaking	720 V A
DC thermal rated current	2.5 A
DC maximum volt-ampere making-breaking	69 V A

Connecting characteristics

Connection capacity (min. ... max.)		
 Solid / stranded	1 x	1...4 mm ²
 Solid / stranded	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
 Flexible with insulated ferrule	1 x	0.75...2.5 mm ²
 Flexible with insulated ferrule	2 x	0.75...2.5 mm ²
 Lugs	L \leq	8 mm
	L $>$	3.7 mm
Connection capacity acc. to UL/CSA	1 or 2 x	AWG18...14
Stripping length	9 mm	
Tightening torque	1 Nm	
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 must be tightened	
All terminals	M3.5	
Screwdriver type	Flat \varnothing 5.5 / Pozidriv 2	

Auxiliary contact blocks for AF09 ... AF96 contactors and NF control relays for severe industrial environments

Technical data

Types	Front mounted 1-pole CE5-..0.1	1-pole CE5-..2
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Contact utilization characteristics according to IEC

Standards	IEC 60947-5-1 and EN 60947-5-1	
Rated insulation voltage Ui acc. to IEC 60947-5-1	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
Rated frequency (without derating)	50 / 60 Hz	
le / Rated operational current	AC-14	AC-15
acc. to IEC 60947-5-1	24-127 V 50/60 Hz 0.1 A	2 A
	220-240 V 50/60 Hz -	2 A
Making capacity	6 x Ie AC-14 acc. to IEC 60947-5-1	10 x Ie AC-15 acc. to IEC 60947-5-1
Breaking capacity	6 x Ie AC-14 acc. to IEC 60947-5-1	10 x Ie AC-15 acc. to IEC 60947-5-1
Ie / Rated operational current DC-12 acc. to IEC 60947-5-1	24 V DC 0.1 A	2 A
	48 V DC 0.1 A	1 A
	72 V DC 0.1 A	0.3 A
	110 V DC 0.1 A	0.2 A
	125 V DC -	0.2 A
	220 V DC -	0.1 A
Short-circuit protection device FF type fuse (1)	0.1 A	
Minimum switching capacity	3 V / 1 mA	17 V / 1 mA
AF09 ... AF38 contactors 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. electrical switching frequency	AC-14 AC-15 DC-12	1200 cycles/h 1200 cycles/h 900 cycles/h

Contact utilization characteristics according to UL / CSA

Standards	UL 60947-1 / 60947-4-1A and CSA 60947-1 / 60947-4-1A	
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
 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 \leq	7.7 mm
	L $>$	3.7 mm
Connecting 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 IP67 for CE5-..W0.1
		IP40 for CE5-..D2 IP67 for CE5-..W2
Screw terminals	Delivered in open position, screws of unused terminals must be tightened	
All terminals	M3.5	
Screwdriver type	Flat \varnothing 5.5 / Pozidriv 2	

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

Auxiliary contact blocks for AF400 ... AF2650 contactors for severe industrial environments

Technical data

Types	CEL18
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Contact utilization characteristics according to IEC






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Standards	IEC 60947-5-1 and EN 60947-5-1	
Rated insulation voltage U_i acc. to IEC 60947-5-1	250 V	
Rated operational voltage U_e max.	125 V	
Conventional thermal current I_{th} - $\theta \leq 40^\circ\text{C}$	0.1 A	
le / Rated operational current AC-14		
acc. to IEC 60947-5-1	24-127 V 50/60 Hz	0.1 A
Making capacity acc. to IEC 60947-5-1	6 x I_e AC-14	
Breaking capacity acc. to IEC 60947-5-1	6 x I_e AC-14	
le / 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
	220 V DC	-
Short-circuit protection device	0.1 A (FF type fuses) (1)	
Minimum switching capacity		
with failure rate acc. to IEC 60947-5-4	3 V / 1 mA	
Mechanical durability	Number of operating cycles	1 million
	Max. switching frequency	1200 cycles/h
Electrical durability	Number of operating cycles	0.7 millions
	Max. switching frequency	AC-14, AC15 DC-12 1200 cycles/h 900 cycles/h

Contact utilization characteristics according to UL / CSA

Standards	UL 60947-1 / 60947-4-1A and CSA 60947-1 / 60947-4-1A
Max. operational voltage	125 V
Pilot duty	
AC thermal rated current	0.1 A

Connecting characteristics

Connection capacity (min. ... max.)		
	Rigid solid	1 x 1...4 mm ²
	Flexible with ferrule	2 x 1...4 mm ²
		1 x 0.75...2.5 mm ²
	Lugs	2 x 0.75...2.5 mm ²
		$L \leq 7.7$ mm
		$L > 3.7$ 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	IP67
Screw terminals	Delivered in open position, screws of unused terminals must be tightened	
All terminals	M3.5	
Screwdriver type	Flat $\varnothing 5.5$ / Pozidriv 2	

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

Electronic timers

Technical data

Contact utilization characteristics according to IEC

Types	TEF4-ON	TEF4-OFF
Standards	IEC 60947-5-1 and EN 60947-5-1	
Rated insulation voltage U_i acc. to IEC 60947-5-1	400 V	
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 $I_{th} - \leq 40^\circ C$	5 A	
I_e / 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 acc. to IEC 60947-5-1	10 x I_e AC-15	
Breaking capacity acc. to IEC 60947-5-1	10 x I_e AC-15	
I_e / 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} = 40 °C	for 1.0 s	8 A
	for 0.1 s	8 A
Minimum switching capacity with failure rate acc. to IEC 60947-5-4	24 V DC	12 V / 3 mA 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 50/60 Hz	Rated control circuit voltage U_c	24...240 V AC
	Average consumption	1.5 mA RMS
DC control voltage	Rated control circuit voltage U_c	24...240 V DC
	Average consumption	1.5 mA
Rated frequency limits	50 / 60 Hz	
Supply voltage range	0.85...1.1 x U_c (at $\leq 70^\circ C$)	
Overvoltage protection	Varistor included	
Time delay range (t) selected by switch	0.1...1 s	<input type="checkbox"/>
	1...10 s	<input type="checkbox"/>
	10...100 s	<input type="checkbox"/>
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 °C ... +70 °C
	Storage	-40 °C ... +80 °C
Climatic withstand	Category B according to IEC 60947-1 Annex Q	
Maximum operating altitude	2000 m	
Mounting positions	Mounting positions 1, 1 +/- 30°, 2, 3, 4, 5	
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 (Mounting position 1)	Same as contactor or contactor relay	
Vibration withstand	5...300 Hz	
acc. to IEC 60068-2-6	3 g closed position / 2 g open position	
Mechanical durability	Number of operating cycles	5 millions operating cycles
	Max. switching frequency	3600 cycles/h
Max. electrical switching frequency	AC-15	1200 cycles/h
	DC-13	900 cycles/h

Electronic timers









Technical data

2

Contact utilization characteristics according to UL / CSA

Types	TEF4-ON	TEF4-OFF
Standards	UL 60947-1 / 60947-4-1A and CSA 60947-1 / 60947-4-1A	
Rated insulation voltage U_i acc. to UL / CSA	300 V	
Max. operational voltage	240 V	
Pilot duty	B300, R300	
AC thermal rated current	5 A	
AC maximum volt-ampere making	3600 VA	
AC maximum volt-ampere breaking	360 VA	
DC thermal rated current	1 A	
DC maximum volt-ampere making-breaking	28 VA	

Connecting characteristics

Connection capacity (min. ... max.)		
 Rigid solid	1 x	1...2.5 mm ²
 Flexible with non insulated ferrule	2 x	1...2.5 mm ²
 Flexible with non insulated ferrule	1 x	0.75...2.5 mm ²
 Flexible with insulated ferrule	2 x	0.75...2.5 mm ²
 Flexible with insulated ferrule	1 x	0.75...2.5 mm ²
 Flexible with insulated ferrule	2 x	0.75...1.5 mm ²
 Lugs	L ≤	8 mm
	L >	3.7 mm
Connection capacity acc. to UL / CSA	1 or 2 x	AWG 18...14
Stripping length		10 mm
Tightening torque		1.2 N.m / 11 lb.in
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529		IP20
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		

Interlocks

Technical data

Mechanical interlock unit

Types		VM4, VM96	VM19 ... VM750	VM1650H
Mechanical durability	Number of operating cycles	5 millions operating cycles	1 million operating cycles	500 000 operating cycles
	Max. mechanical switching frequency	1800 cycles/h	300 cycles/h	

2

Mechanical and electrical interlock set





Contact utilization characteristics according to IEC

Types		VEM4
Standards		IEC 60947-5-1 and EN 60947-5-1
Rated insulation voltage U_i acc. to IEC 60947-5-1		690 V
Rated impulse withstand voltage U_{imp} .		6 kV
Rated control circuit voltage U_c	AC 50/60 Hz control voltage	24...500 V AC
	DC control voltage	20...500 V DC
Conventional thermal current I_{th} - $\leq 40^\circ\text{C}$		16 A
Mechanical durability	Number of operating cycles	5 millions operating cycles
	Max. mechanical switching frequency	1800 cycles/h
Electrical durability	Max. electrical switching frequency	1200 cycles/h

Contact utilization characteristics according to UL / CSA

Types		VEM4
Standards		UL 60947-1 / 60947-4-1A and CSA 60947-1 / 60947-4-1A
Max. operational voltage		500 V AC, 500 V DC

Connecting characteristics

Types		VEM4	
Connection capacity (min. ... max.)  Rigid solid  Flexible with ferrule  Flexible with insulated ferrule  Lugs			
		1 x	1...2.5 mm ²
		2 x	1...2.5 mm ²
		1 x	0.75...2.5 mm ²
		2 x	0.75...2.5 mm ²
	1 x	0.75...2.5 mm ²	
	2 x	0.75...1.5 mm ²	
	L <	8 mm	
Connection capacity acc. to UL / CSA	1 or 2 x	AWG 18...14	
Stripping length		10 mm	
Tightening torque		1.2 Nm / 11 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 must be tightened	
All terminals		M3.5	
Screwdriver type		Flat Ø 5.5 / Pozidriv 2	

Mechanical latching units

Technical data




Type	WB75-A
------	--------

Utilization characteristics according to IEC

2

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	120 ms
	DC	120 ms
For pull-out (energizing of the WB block coil)	AC	30 ms
	DC	50 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

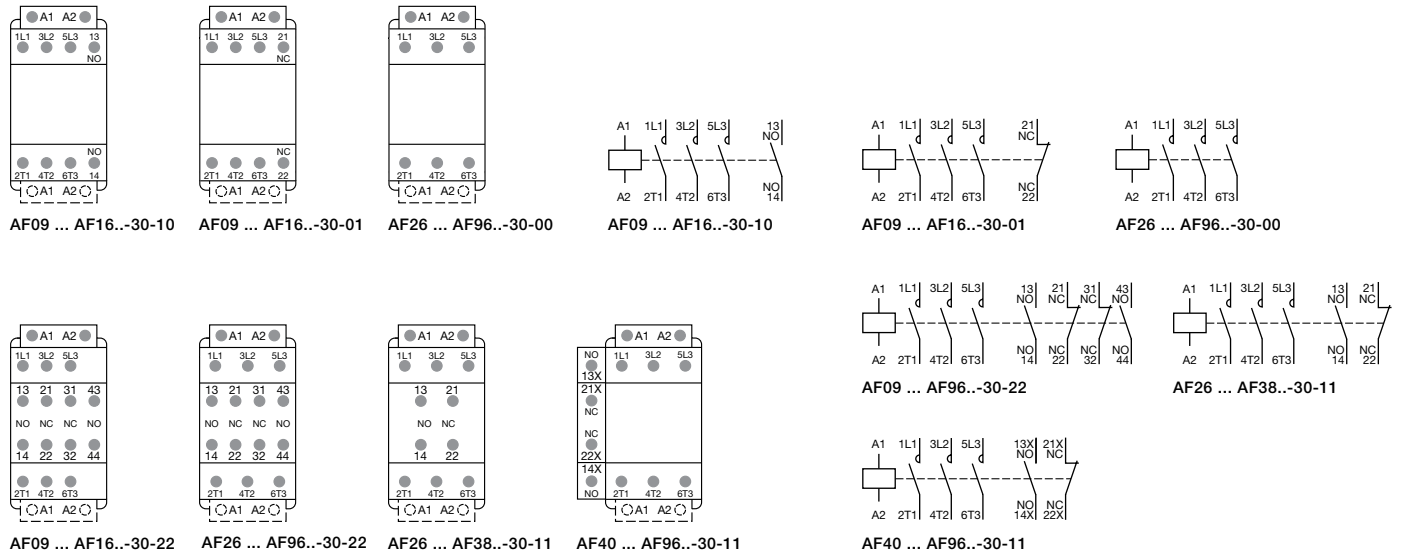
Connection capacity (min. ... max.)		
 Rigid solid	1 x	1...4 mm ²
	2 x	1...4 mm ²
 Flexible with ferrule	1 x	0.75...2.5 mm ²
	2 x	0.75...2.5 mm ²
 Lugs	L <	8 mm
	I >	3.5 mm
Tightening torque		
Recommended		1 Nm
Max.		1.2 Nm
Screw terminals		Delivered in open position, screws of unused terminals must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

AF09 ... AF96 3-pole contactors

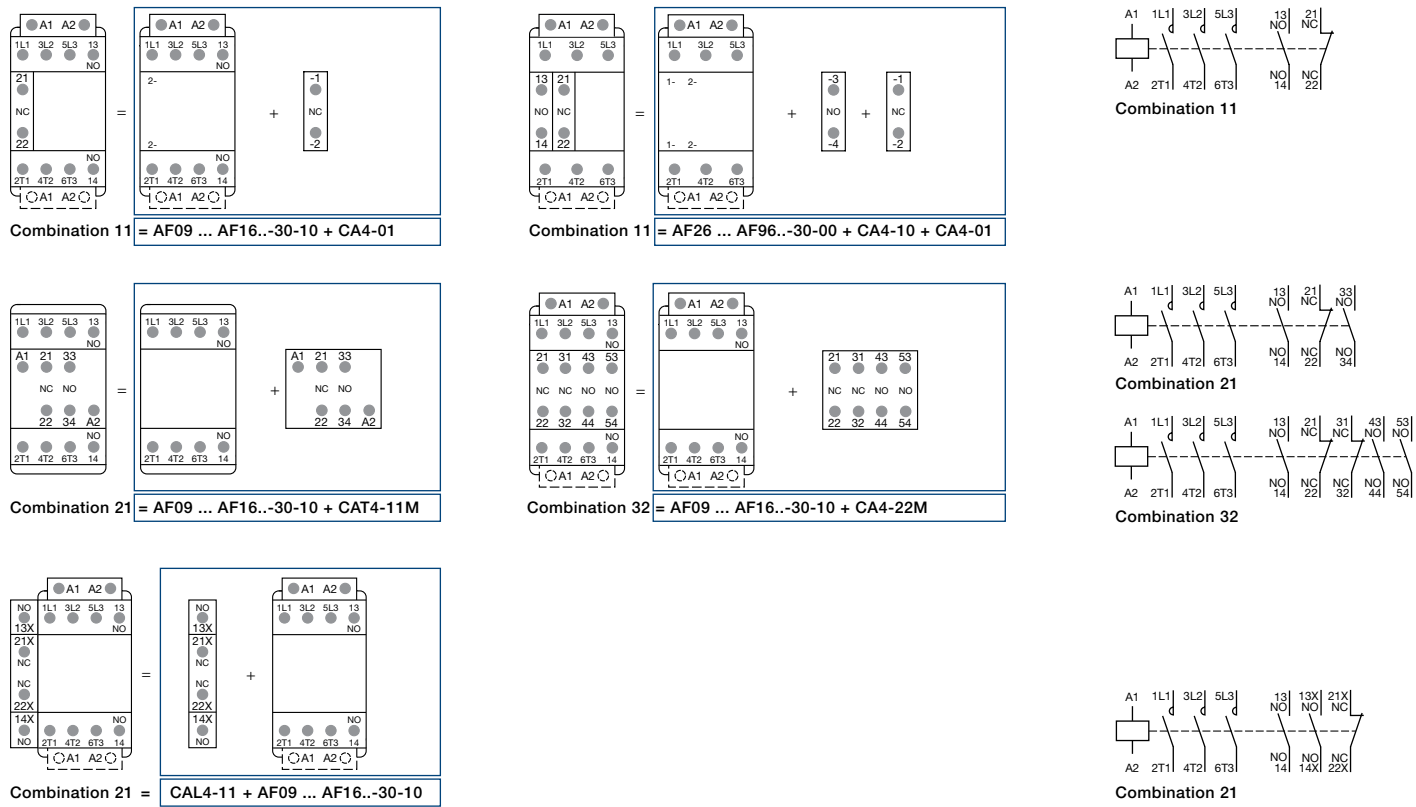
Terminal marking and positioning

AF09 ... AF96 contactors - AC / DC operated

Standard devices without addition of auxiliary contacts



Other possible contact combinations with auxiliary contacts added by the user



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

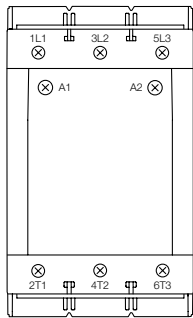
AF116 ... AF370 3-pole contactors

Terminal marking and positioning

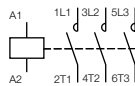
AF116 ... AF370 contactors - AC / DC operated

Standard devices without addition of auxiliary contacts

2

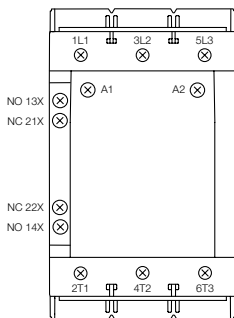


AF116 ... AF370-30-00

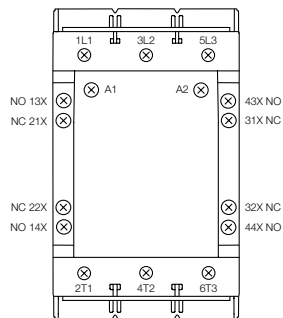


AF116 ... AF370-30-00

Standard devices with factory mounted auxiliary contacts



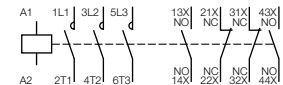
AF116 ... AF370-30-11



AF116 ... AF370-30-22



AF116 ... AF370-30-11



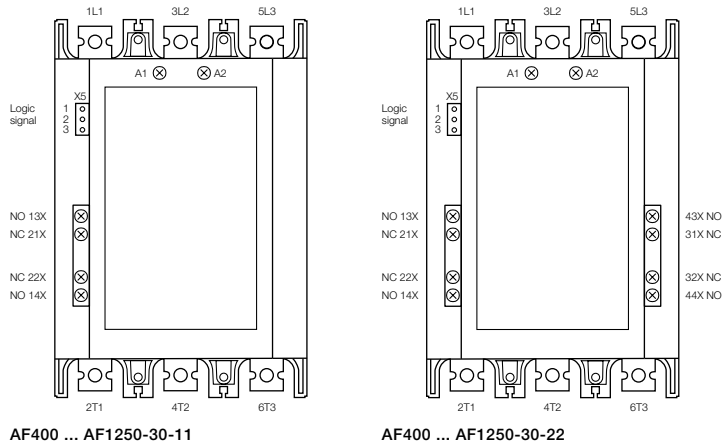
AF116 ... AF370-30-22

AF400 ... AF2650 3-pole contactors

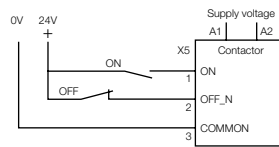
Terminal marking and positioning

AF400 ... AF1250 contactors - AC / DC operated

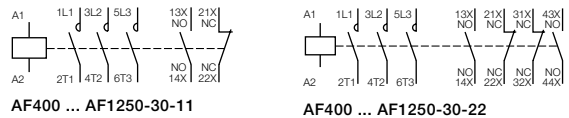
Standard devices with factory mounted auxiliary contacts



Control with logic signal

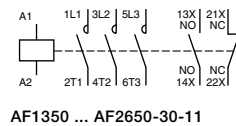
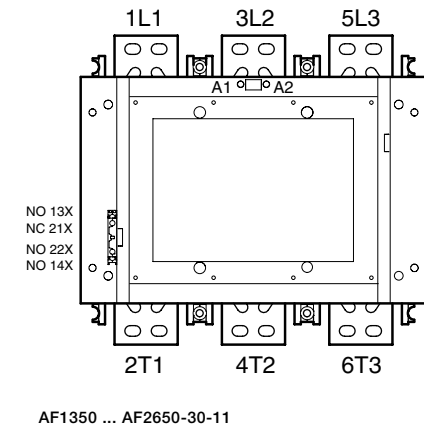


AF400 ... AF1250-30-11, AF400 ... AF1250-30-22

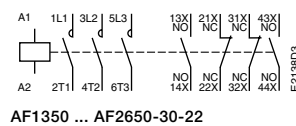


AF1350 ... AF2650 contactors - AC / DC operated

Standard devices with factory mounted auxiliary contacts



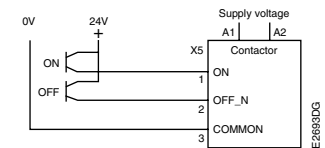
AF1350 ... AF2650-30-11



AF1350 ... AF2650-30-22

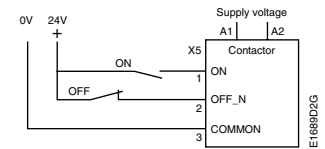
Wiring diagrams

when used with transistor output



AF1350, AF1650

when used with transistor output



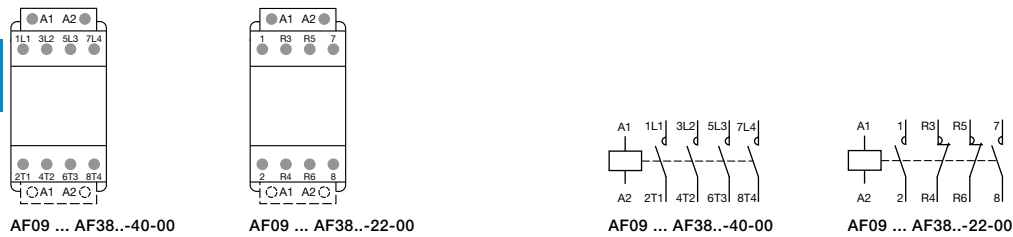
AF09 ... AF38 4-pole contactors

Terminal marking and positioning

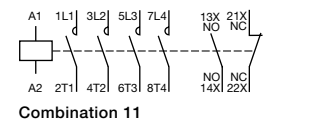
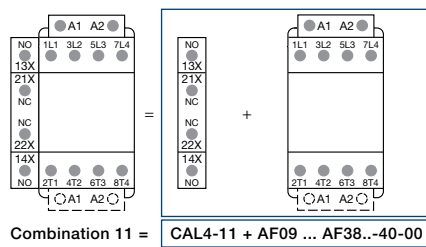
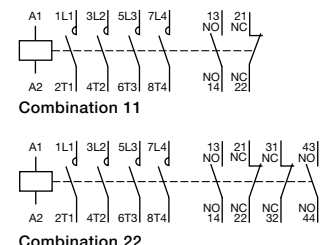
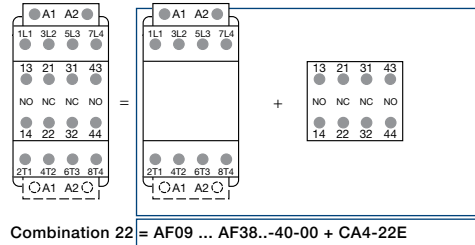
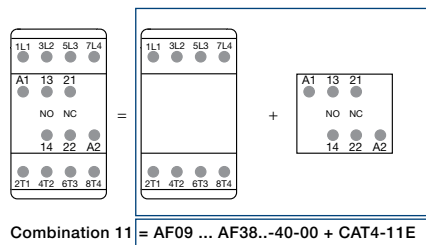
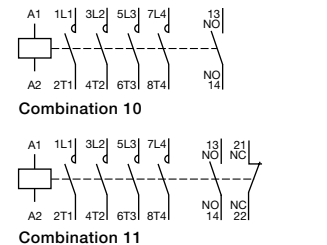
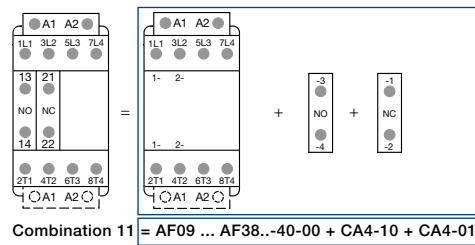
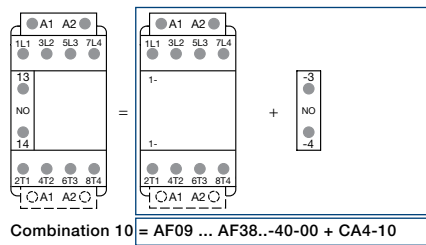
2

AF09 ... AF38 contactors - AC / DC operated

Standard devices without addition of auxiliary contacts



Other possible contact combinations with auxiliary contacts added by the user

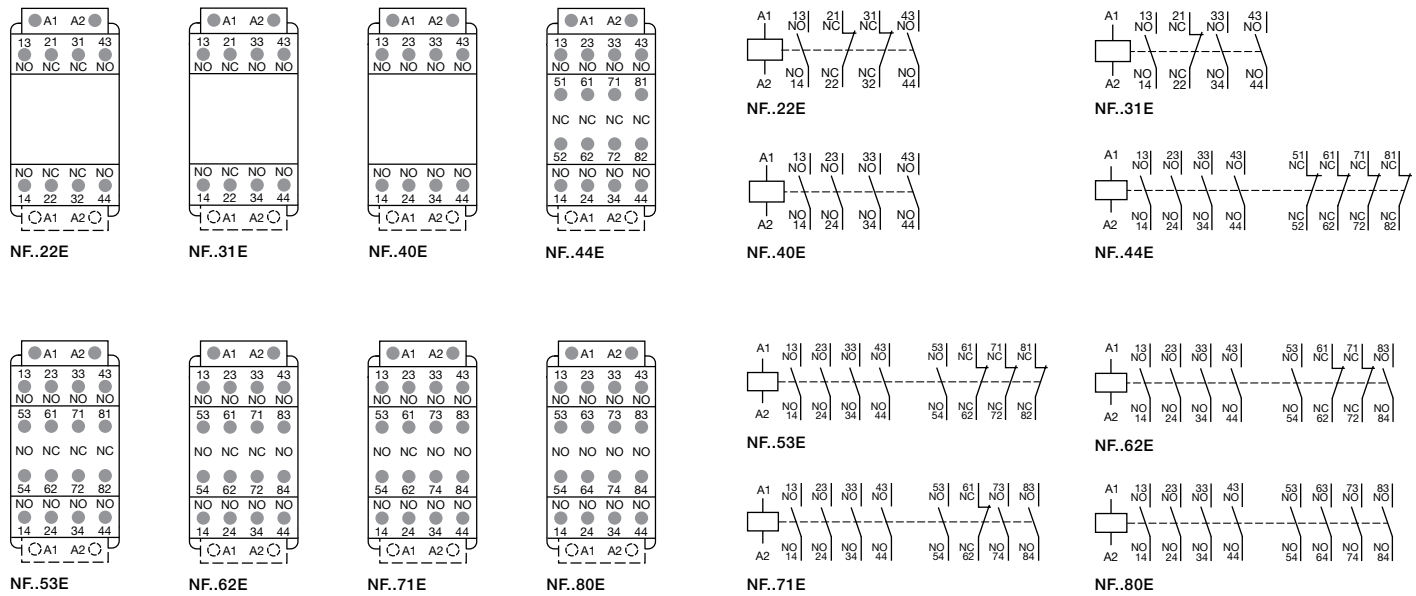


Note: Only AF.Z contactor with DC control voltage 12...20 V DC need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole

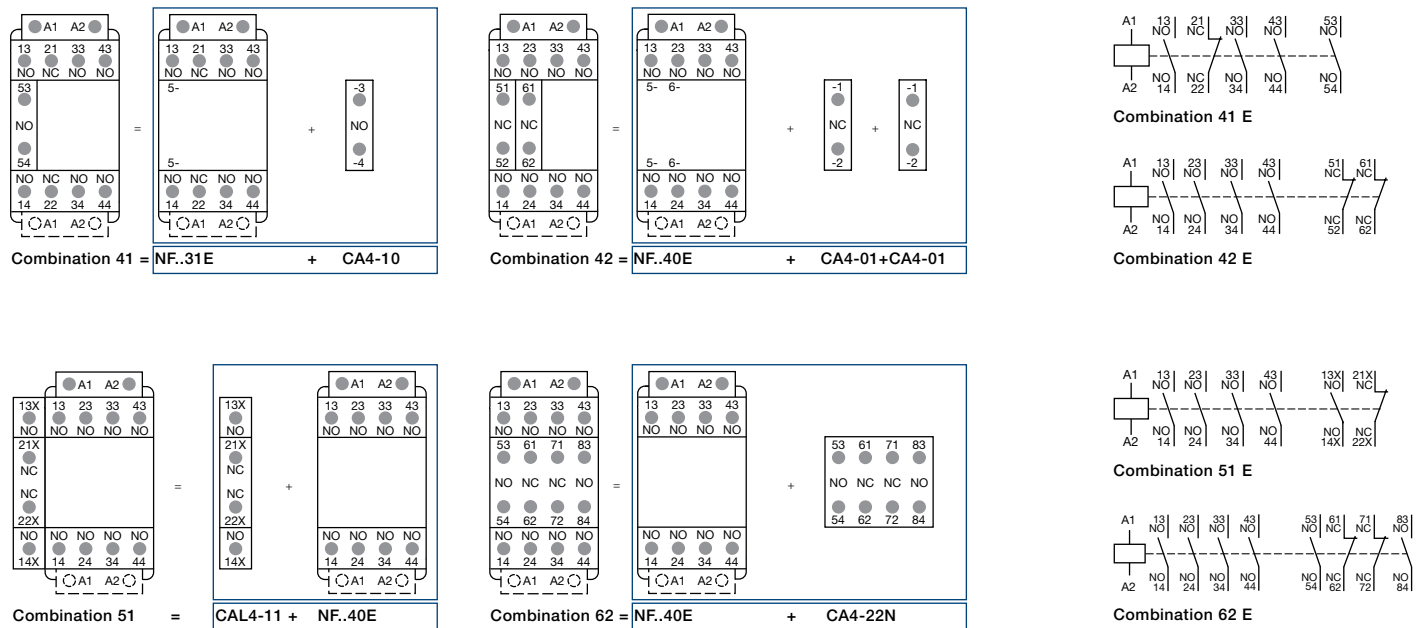
NF control relays

Terminal marking and positioning

Standard devices without addition of auxiliary contacts



Other possible contact combinations with auxiliary contacts added by the user



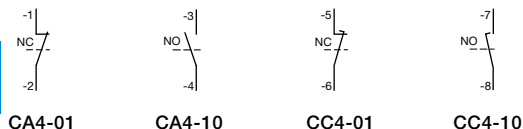
Note: Only NFZ control relays with DC control voltage 12...20 V DC need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole

Add-on auxiliary contacts

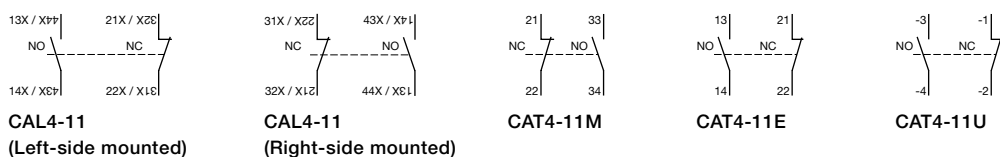
Terminal marking and positioning

1-pole auxiliary contacts

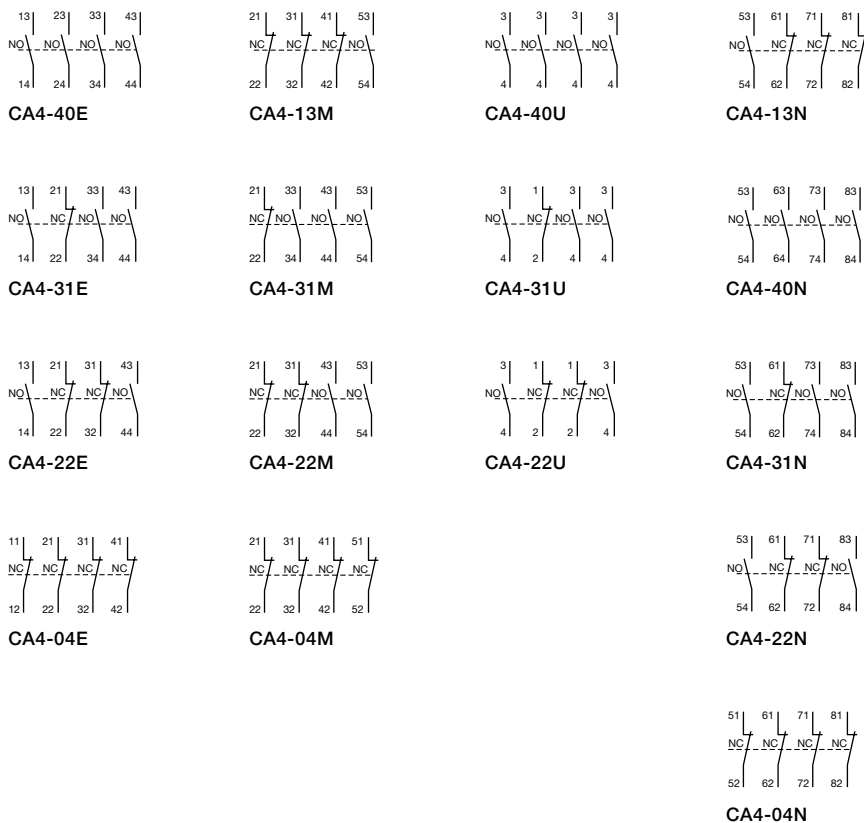
2



2-pole auxiliary contacts



4-pole auxiliary contacts



Overload relays

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Thermal overload relays, Class 10

TF42 (0.10 ... 38 A) for AF09 ... AF38	3.2
TF65 (22 ... 67 A) for AF40 ... AF65	3.3
TF96 (40 ... 96 A) for AF80, AF96	3.4
TF140DU (66 ... 142 A) for AF116 ... AF146	3.5
TA200DU (66 ... 200 A) for AF190, AF205	3.6

Electronic overload relays

EF19, EF45 (0.10 ... 45 A) for AF09 ... AF38	3.7
EF65, EF96, EF154 (25 ... 150 A) for AF40 ... AF146	3.8
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Technical data

Thermal overload relays	3.12 - 3.26
Electronic overload relays	3.27 - 3.37

TF42 thermal overload relays

0.10 ... 38.0 A

For direct coupling to AF09 ... AF38 3-pole contactors

Description

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

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

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

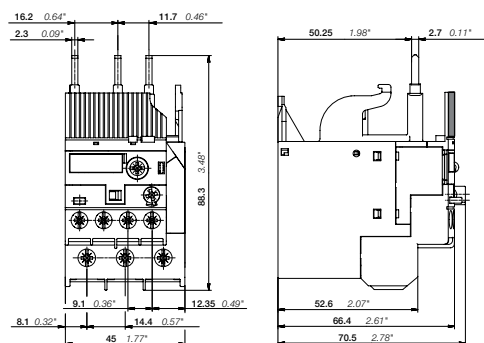
Ordering details

Setting range	For contactors	Trip class	Catalog number	Global reference code	Weight (1 pce) kg
A					
0.10 ... 0.13	AF09... AF38	10	TF42-0.13	1SAZ721201R1005	0.130
0.13 ... 0.17	AF09... AF38	10	TF42-0.17	1SAZ721201R1008	0.130
0.17 ... 0.23	AF09... AF38	10	TF42-0.23	1SAZ721201R1009	0.130
0.23 ... 0.31	AF09... AF38	10	TF42-0.31	1SAZ721201R1013	0.130
0.31 ... 0.41	AF09... AF38	10	TF42-0.41	1SAZ721201R1014	0.130
0.41 ... 0.55	AF09... AF38	10	TF42-0.55	1SAZ721201R1017	0.130
0.55 ... 0.74	AF09... AF38	10	TF42-0.74	1SAZ721201R1021	0.130
0.74 ... 1.00	AF09... AF38	10	TF42-1.0	1SAZ721201R1023	0.130
1.00 ... 1.30	AF09... AF38	10	TF42-1.3	1SAZ721201R1025	0.130
1.30 ... 1.70	AF09... AF38	10	TF42-1.7	1SAZ721201R1028	0.130
1.70 ... 2.30	AF09... AF38	10	TF42-2.3	1SAZ721201R1031	0.130
2.30 ... 3.10	AF09... AF38	10	TF42-3.1	1SAZ721201R1033	0.130
3.10 ... 4.20	AF09... AF38	10	TF42-4.2	1SAZ721201R1035	0.130
4.20 ... 5.70	AF09... AF38	10	TF42-5.7	1SAZ721201R1038	0.130
5.70 ... 7.60	AF09... AF38	10	TF42-7.6	1SAZ721201R1040	0.130
7.60 ... 10.0	AF09... AF38	10	TF42-10	1SAZ721201R1043	0.130
10.0 ... 13.0	AF09... AF38	10	TF42-13	1SAZ721201R1045	0.130
13.0 ... 16.0	AF09... AF38	10	TF42-16	1SAZ721201R1047	0.130
16.0 ... 20.0	AF09... AF38	10	TF42-20	1SAZ721201R1049	0.145
20.0 ... 24.0	AF09... AF38	10	TF42-24	1SAZ721201R1051	0.145
24.0 ... 29.0	AF09... AF38	10	TF42-29	1SAZ721201R1052	0.145
29.0 ... 35.0	AF09... AF38	10	TF42-35	1SAZ721201R1053	0.145
35.0 ... 38.0/40.0	AF09... AF38	10	TF42-38	1SAZ721201R1055	0.145

Ordering details accessories

For thermal overload relays	Description	Catalog number	Global reference code	Weight (1 pce) kg
A				
TF42	Single mounting kit	DB42	1SAZ701902R0001	0.087
TF42	Reset push button (1)	KPR-101L	1SFA616162R1014	0.027

Main dimensions mm, inches



TF42

(1) Note: for more information see catalog 1SXU000023C0202 Rev. A.

TF65 thermal overload relays

22.0 ... 67.0 A

For direct coupling to AF40... AF65 3-pole contactors



TF65

Description

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

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

Manual or automatic reset selectable

Phase loss sensitive acc. to IEC/EN 60947-4-1

TEST and STOP function – Trip indication on the front

Temperature compensation

Suitable for three- and single-phase applications

Ordering details

Setting range	For contactors	Trip class	Catalog number	Global reference code	Weight (1 pce) kg
A					
22.0 ... 28.0	AF40 ... AF65	10	TF65-28	1SAZ811201R1001	0.456
25.0 ... 33.0	AF40 ... AF65	10	TF65-33	1SAZ811201R1002	0.456
30.0 ... 40.0	AF40 ... AF65	10	TF65-40	1SAZ811201R1003	0.456
36.0 ... 47.0	AF40 ... AF65	10	TF65-47	1SAZ811201R1004	0.456
44.0 ... 53.0	AF40 ... AF65	10	TF65-53	1SAZ811201R1005	0.456
50.0 ... 60.0	AF40 ... AF65	10	TF65-60	1SAZ811201R1006	0.466
57.0 ... 67.0	AF40 ... AF65	10	TF65-67	1SAZ811201R1007	0.466



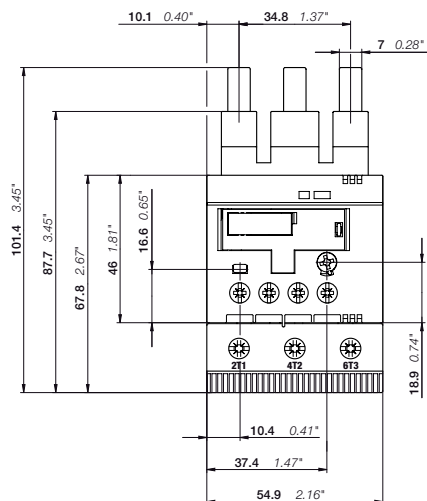
KPR-101L

Ordering details accessories

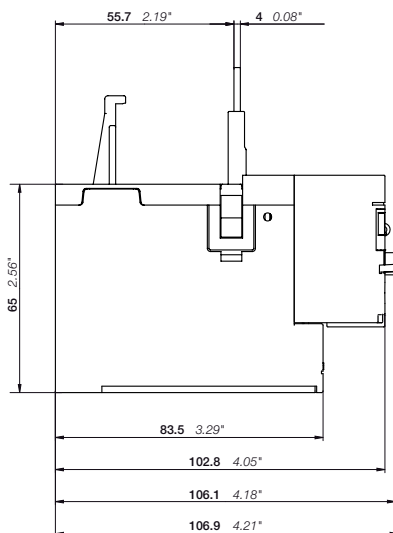
For thermal overload relays	Description	Catalog number	Global reference code	Weight (1 pce) kg
A				
TF65	Reset push button (1)	KPR-101L	1SFA616162R1014	0.027

(1) Note: for more information see catalog 1SXU000023C0202 Rev. A.

Main dimensions mm, inches



TF65



TF96 thermal overload relays

40.0 ... 96.0 A

For direct coupling to AF80, AF96 3-pole contactors

3



TF96

Description

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

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

Manual or automatic reset selectable

Phase loss sensitive acc. to IEC/EN 60947-4-1

TEST and STOP function – Trip indication on the front

Temperature compensation

Suitable for three- and single-phase applications

Ordering details

Setting range	For contactors	Trip class	Catalog number	Global reference code	Weight (1 pce) kg
A					
40.0 ... 51.0	AF80, AF96	10	TF96-51	1SAZ911201R1001	0.620
48.0 ... 60.0	AF80, AF96	10	TF96-60	1SAZ911201R1002	0.620
57.0 ... 68.0	AF80, AF96	10	TF96-68	1SAZ911201R1003	0.620
65.0 ... 78.0	AF80, AF96	10	TF96-78	1SAZ911201R1004	0.620
75.0 ... 87.0	AF80, AF96	10	TF96-87	1SAZ911201R1005	0.620
84.0 ... 96.0	AF80, AF96	10	TF96-96	1SAZ911201R1006	0.630



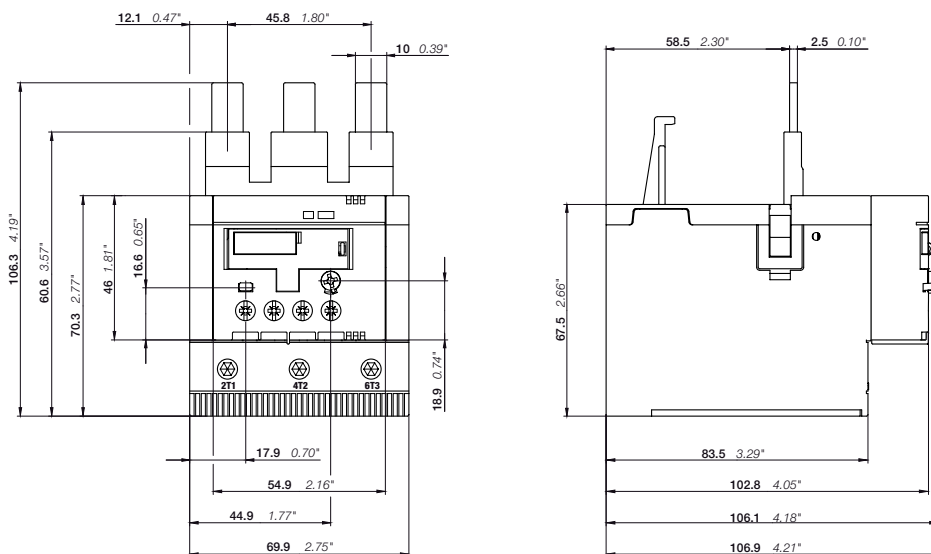
KPR-101L

Ordering details accessories

For thermal overload relays	Description	Catalog number	Global reference code	Weight (1 pce) kg
A				
TF96	Reset push button (1)	KPR-101L	1SFA616162R1014	0.027

(1) Note: for more information see catalog 1SXU000023C0202 Rev. A.

Main dimensions mm, inches



TF96

TF140DU thermal overload relays

66 ... 142 A

For direct coupling to AF116 ... AF146 3-pole contactors



TF140DU



KPR-101L

Description

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

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

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

Ordering details

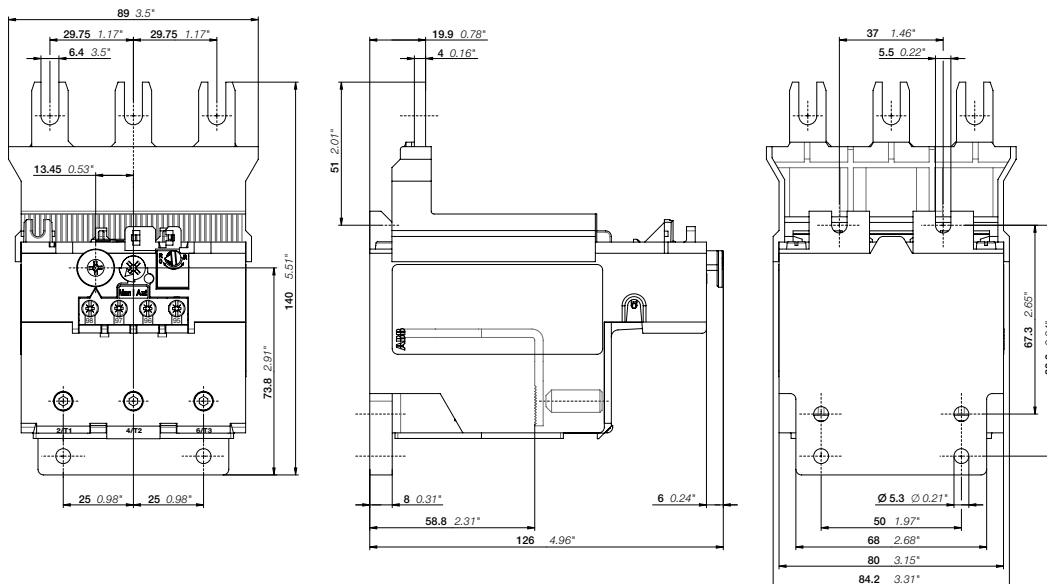
Setting range	For contactors	Trip class	Catalog number	Global reference code	Weight (1 pce) kg
A					
66 ... 90	AF116 ... AF146	10A	TF140DU-90	1SAZ431201R1001	0.820
80 ... 110	AF116 ... AF146	10A	TF140DU-110	1SAZ431201R1002	0.820
100 ... 135	AF116 ... AF146	10A	TF140DU-135	1SAZ431201R1003	0.820
110 ... 142	AF116 ... AF146	10A	TF140DU-142	1SAZ431201R1004	0.820

Ordering details accessories

For thermal overload relays	Description	Catalog number	Global reference code	Weight (1 pce) kg
A				
TF140DU	Reset push button (1)	KPR-101L	1SFA616162R1014	0.027

(1) Note: for more information see catalog 1SXU000023C0202 Rev. A.

Main dimensions mm, inches

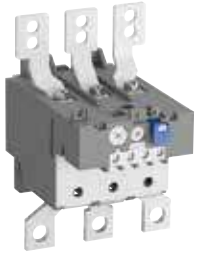


TF140DU

TA200DU thermal overload relays

66 ... 200 A

For direct coupling to AF190, AF205 3-pole contactors



TA200DU-200



KPR-101L

Description

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

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

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

Ordering details

Setting range	For contactors	Trip class	Catalog number	Global reference code	Weight (1 pce) kg
A					
66 ... 90	AF190, AF205	10A	TA200DU90	1SAZ421201R1001	0.755
80 ... 110	AF190, AF205	10A	TA200DU110	1SAZ421201R1002	0.760
100 ... 135	AF190, AF205	10A	TA200DU135	1SAZ421201R1003	0.760
110 ... 150	AF190, AF205	10A	TA200DU150	1SAZ421201R1004	0.760
130 ... 175	AF190, AF205	10A	TA200DU175	1SAZ421201R1005	0.770
150 ... 200	AF190, AF205	10A	TA200DU200	1SAZ421201R1006	0.785

Ordering details accessories

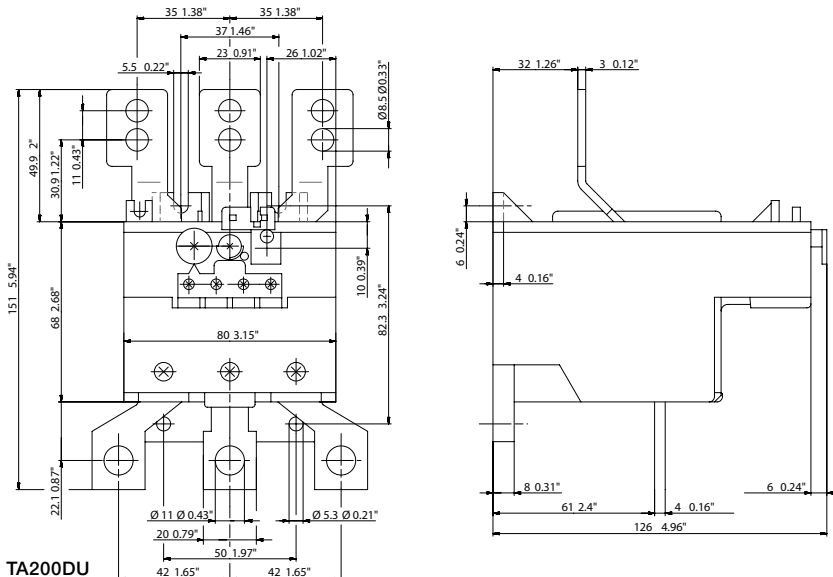
For thermal overload relays	Description	Catalog number	Global reference code	Weight (1 pce) kg
A				
TA200DU (1)	Terminal shroud	LT200A185	1SAZ401901R1001	0.090
TA200DU	Single mounting kit	DB200	1SAZ401110R0001	0.225
TA200DU	Mechanical lug kit, 1 conductor/phase	EHTK210	(2)	0.118
TA200DU	Reset push button (3)	KPR-101L	1SFA616162R1014	0.027

(1) Load side only.

(2) North American applications only.

(3) Note: for more information see catalog 1SXU000023C0202 Rev. A.

Main dimensions mm, inches



EF19, EF45 electronic overload relays

0.10 to 45.0 A

For direct coupling to AF09 ... AF38 3-pole contactors



EF19-18.9



EF45-30



DB19EF



KPR-101L

Description

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

Ordering details

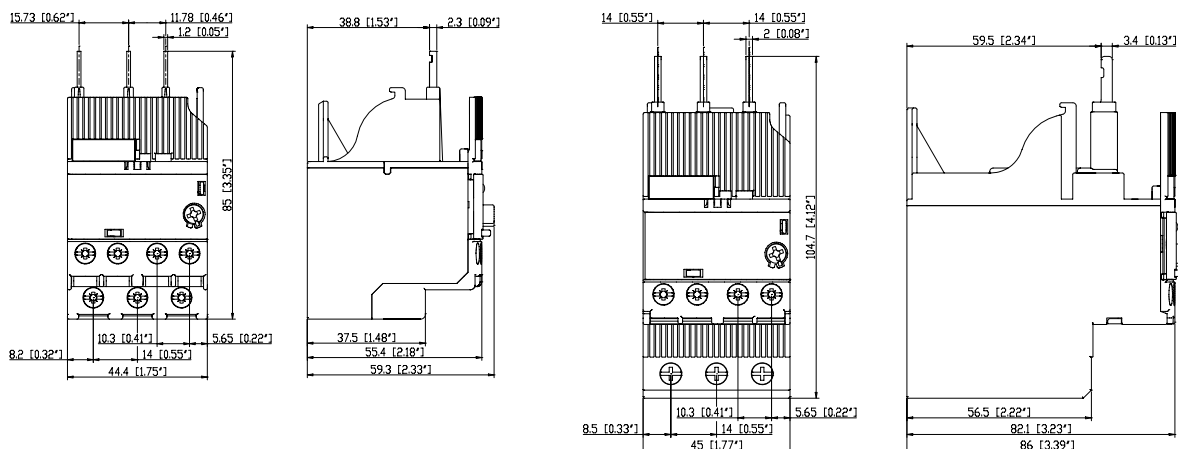
Setting range	For contactors	Trip class	Catalog number	Global reference code	Weight (1 pce) kg
A					
EF19 electronic overload relays					
0.10 ... 0.32	AF09 ... AF38	10E, 20E, 30E	EF19-0.32	1SAX121001R1101	0.158
0.30 ... 1.00	AF09 ... AF38	10E, 20E, 30E	EF19-1.0	1SAX121001R1102	0.158
0.80 ... 2.70	AF09 ... AF38	10E, 20E, 30E	EF19-2.7	1SAX121001R1103	0.158
1.90 ... 6.30	AF09 ... AF38	10E, 20E, 30E	EF19-6.3	1SAX121001R1104	0.158
5.70 ... 18.9	AF09 ... AF38	10E, 20E, 30E	EF19-18.9	1SAX121001R1105	0.158
EF45 electronic overload relays					
9.00 ... 30.0	AF09 ... AF38	10E, 20E, 30E	EF45-30	1SAX221001R1101	0.362
15.0 ... 45.0	AF09 ... AF38	10E, 20E, 30E	EF45-45	1SAX221001R1102	0.362

Ordering details accessories

For thermal overload relays	Description	Catalog number	Global reference code	Weight (1 pce) kg
A				
EF19	Single mounting kit	DB19EF	1SAX101910R1001	0.042
EF19, EF45	Reset push button (1)	KPR-101L	1SFA616162R1014	0.019

(1) Note: for more information see catalog 1SXU000023C0202 Rev. A.

Main dimensions mm, inches



EF65, EF96, EF146 electronic overload relays

25 to 150 A

For direct coupling to AF40 ... AF146 3-pole contactors

3



EF65-70



EF96-100



EF146-150



KPR-101L

Description

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

Ordering details

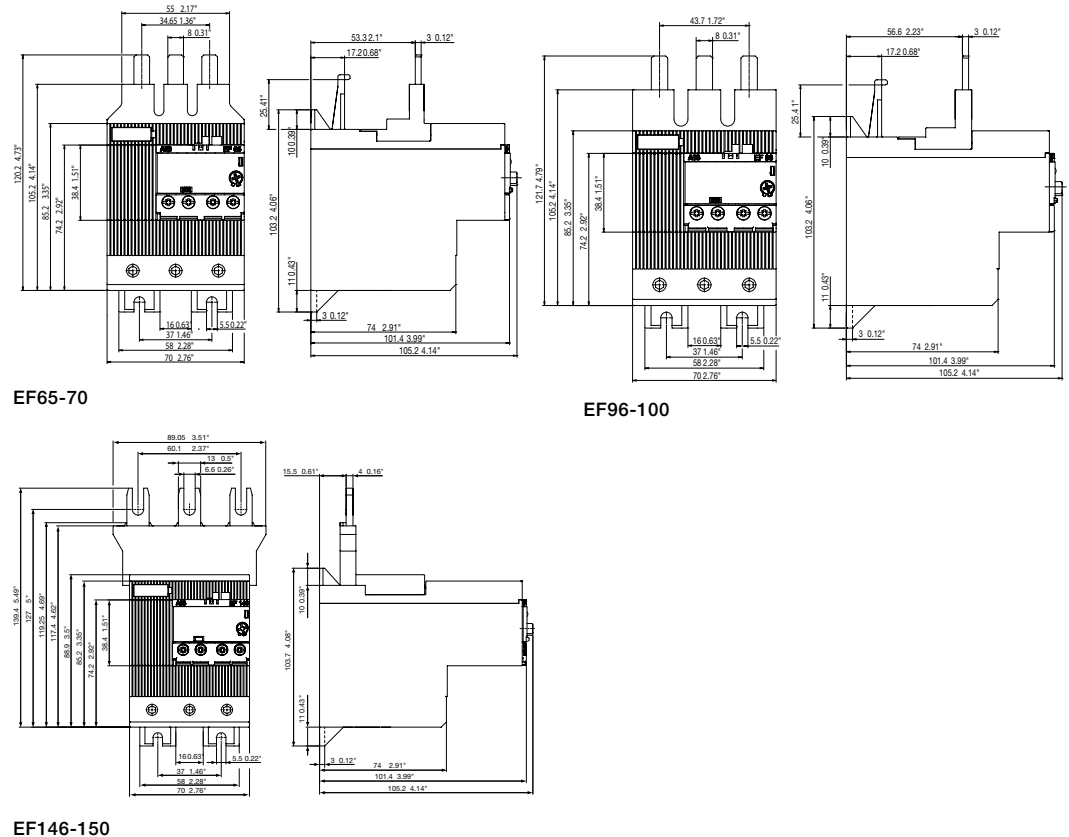
Setting range	For contactors	Trip class	Catalog number	Global reference code	Weight (1 pce) kg
A					
25 ... 70	AF40 ... AF65	10E, 20E, 30E	EF65-70	1SAX331001R1101	0.790
36 ... 100	AF80, AF96	10E, 20E, 30E	EF96-100	1SAX341001R1101	0.780
54 ... 150	AF116 ... AF146	10E, 20E, 30E	EF146-150	1SAX351001R1101	0.890

Ordering details accessories

For thermal overload relays	Description	Catalog number	Global reference code	Weight (1 pce) kg
A				
EF65, EF96, EF146	Reset push button (1)	KPR-101L	1SFA616162R1014	0.027

(1) Note: for more information see catalog 1SXU00023C0202 Rev. A.

Main dimensions mm, inches



EF205, EF370 electronic overload relays

63 to 380 A

For direct coupling to AF190 ... AF370 3-pole contactors



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.

Ordering details

Setting range	For contactors	Trip class	Catalog number	Global reference code	Weight (1 pce) kg
A					
63 ... 210	AF190, AF205	10E, 20E, 30E	EF205-210	1SAX531001R1101	1.210
115 ... 380	AF265 ... AF370	10E, 20E, 30E	EF370-380	1SAX611001R1101	1.430

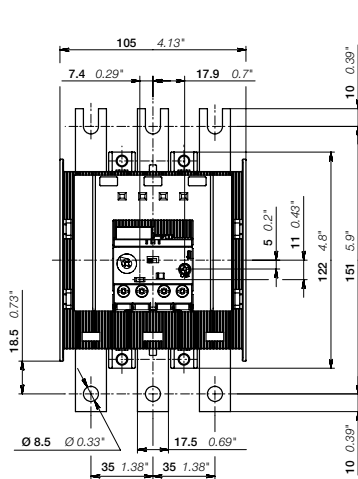
Ordering details accessories

For thermal overload relays	Description	Catalog number	Global reference code	Weight (1 pce) kg
A				
EF205, EF370	Reset push button (1)	KPR-101L	1SFA616162R1014	0.027
EF205	Lug kit, 1-wire, 4 AWG... 300 MCM	ATK185	(2)	0.164
EF370	Lug kit, 1-wire, 4 AWG... 400 MCM	ATK300	(2)	0.166
EF370	Lug kit, 2-wire, 4 AWG... 500 MCM	ATK300/2	(2)	0.445
EF205	LT200E Terminal shroud for EF205	LT200E	1SAX501904R0001	0.145
EF370	LT320E Terminal shroud for EF370	LT320E	1SAX601904R0001	0.160

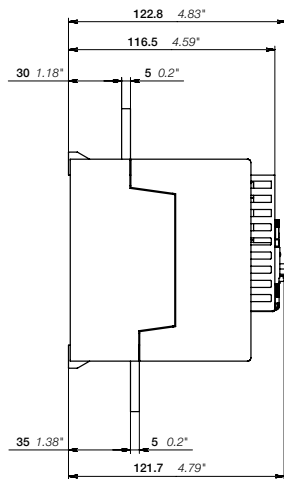
(1) Note: for more information see catalog 1SXU000023C0202 Rev. A.

(2) North American applications only.

Main dimensions mm, inches



EF205-210



EF370-380

E500DU, E800DU, E1250DU electronic overload relays

150 to 1250 A

For use with AF400 ... AF1650 3-pole contactors



E500DU-500

3



E800DU-800



E1250DU-1250



KPR-101L

Description

The E500DU up to E1250DU are self-supplied electronic overload relays, which means no extra external supply is needed. It offers reliable protection for motors in the event of overload or phase failure. Easy to use like a thermal overload relay and compatible with standard motor applications, the electronic overload relay is convincing, above all, due to its wide setting range, high accuracy, high operational temperature range and the possibility to select a trip class (10E, 20E, 30E). Further features are the temperature compensation, trip contact (N.C.), signal contact (N.O.), automatic or manual reset selectable, trip-free mechanism, STOP and TEST function and a trip indication. Busbar kits are available as accessory for contactor mounting.

Ordering details

Setting range	For contactors	Trip class	Catalog number	Global reference code	Weight (1 pce) kg
A					
E500DU electronic overload relay					
150 ... 500	AF400, AF460	10E, 20E, 30E	E500DU-500	1SAX711001R1101	1.170
E800DU electronic overload relay					
250 ... 800	AF580, AF750	10E, 20E, 30E	E800DU-800	1SAX811001R1101	3.905
E1250DU electronic overload relay					
375 ... 1250	AF1350, AF1650	10E, 20E, 30E	E1250DU-1250	1SFA739001R1000	12.181

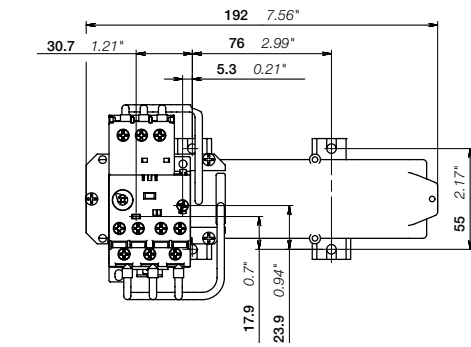
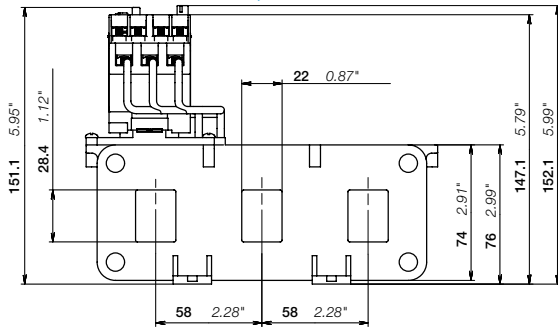
Ordering details accessories

For electronic overload relays	Description	Catalog number	Global reference code	Weight (1 pce) kg
E500DU	LT500E Terminal shroud for E500DU	LT500E	1SAX701904R0001	0.360
E800DU	LT320E Terminal shroud for E320DU	LT800-E	1SAX601904R0001	0.105
E500DU, E800DU	Reset push button (1)	KPR-101L	1SFA616162R1014	0.027
E500DU	Lug kit, 3-wire, 2/0 AWG... 500 MCM, w/hardware	ATK580/2HK	(2)	0.880
E800DU	Lug kit, 3-wire, 2/0 AWG... 500 MCM, w/hardware	ATK750/3HK	(2)	1.897
E1250DU	Lug kit, 4-wire, 4/0 AWG... 500 MCM	ATK1350/4	(2)	1.883
E500DU	Panel mount adaptors, AF400, AF460 non-reversing	DT500/AF460S	1SAX701902R1011	0.650
E500DU	Panel mount adaptors, AF400, AF460 reversing	DT500/AF460L	1SAX701902R1001	0.755
E800DU	Panel mount adaptors, AF580, AF750 non-reversing	DT800/AF750S	1SAX801902R1011	1.490
E800DU	Panel mount adaptors, AF580, AF750 reversing	DT800/AF750L	1SAX801902R1001	1.490

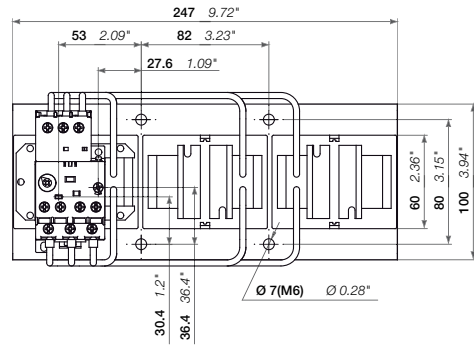
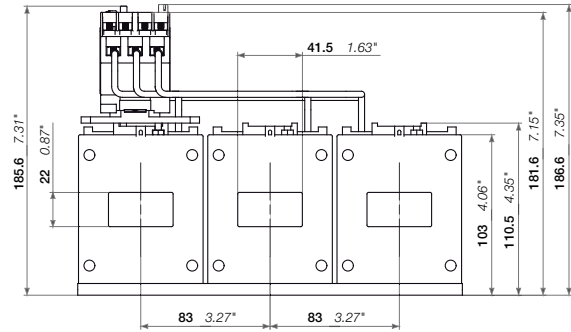
(1) Note: for more information see catalog 1SXU000023C0202 Rev. A.

(2) North American applications only.

Main dimensions mm, inches



E500DU



E800DU

TF42 thermal overload relays

Technical data

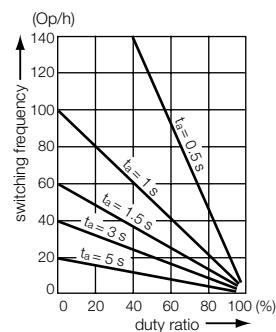
Main circuit – Utilization characteristics according to IEC/EN

Type	TF42
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	50/60 Hz
Trip class	10
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	TF42
Rated operational voltage U_e	600 V
Conventional free air thermal current I_{th}	N.C., 95-96 6 A N.O., 97-98 4 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 3.00 A N.O., 97-98 0.75 A
220-230-240 V	N.C., 95-96 3.00 A N.O., 97-98 0.75 A
440 V	N.C., 95-96 0.75 A N.O., 97-98 0.75 A
480-500 V	N.C., 95-96 0.75 A N.O., 97-98 0.75 A
I_e / Rated operational current DC-13 acc. to IEC/EN 60947-5-1 for utilization category	
24 V	N.C., 95-96 1.25 A N.O., 97-98 1.25 A
110-120-125 V	N.C., 95-96 0.55 A N.O., 97-98 0.55 A
250 V	N.C., 95-96 0.27 A N.O., 97-98 0.27 A
Minimum switching capacity	17 V / 3 mA
Short-circuit protective device	N.C., 95-96 6 A, Fuse type gG N.O., 97-98 4 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

TF42 thermal overload relays

Technical data

Main circuit – Utilization characteristics according to UL/CSA

Type	TF42
Standards	UL 60947-1 / 60947-4-1A and CSA 60947-1 / 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	TF42
Contact rating	N.C., 95-96 B600, Q300 N.O., 97-98 D300, Q300
Conventional thermal current	N.C., 95-96 5 A N.O., 97-98 2.5 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 type	Short circuit rating RMS symmetrical	Fuse type
TF42-0.13	0.13 A	18 kA	1 A, K5	100 kA	30 A, Class J
TF42-0.17	0.17 A	18 kA	1 A, K5	100 kA	30 A, Class J
TF42-0.23	0.23 A	18 kA	1 A, K5	100 kA	30 A, Class J
TF42-0.31	0.31 A	18 kA	3 A, K5	100 kA	30 A, Class J
TF42-0.41	0.41 A	18 kA	3 A, K5	100 kA	30 A, Class J
TF42-0.55	0.55 A	18 kA	3 A, K5	100 kA	30 A, Class J
TF42-0.74	0.74 A	18 kA	3 A, K5	100 kA	30 A, Class J
TF42-1.0	1.00 A	18 kA	6 A, K5	100 kA	30 A, Class J
TF42-1.3	1.30 A	18 kA	6 A, K5	100 kA	30 A, Class J
TF42-1.7	1.70 A	18 kA	6 A, K5	100 kA	30 A, Class J
TF42-2.3	2.30 A	18 kA	10 A, K5	100 kA	30 A, Class J
TF42-3.1	3.10 A	18 kA	10 A, K5	100 kA	30 A, Class J
TF42-4.2	4.20 A	18 kA	15 A, K5	100 kA	30 A, Class J
TF42-5.7	5.70 A	18 kA	20 A, K5	100 kA	30 A, Class J
TF42-7.6	7.60 A	18 kA	25 A, K5	100 kA	30 A, Class J
TF42-10	10.0 A	18 kA	35 A, K5	100 kA	45 A, Class J
TF42-13	13.0 A	18 kA	40 A, K5	100 kA	45 A, Class J
TF42-16	16.0 A	18 kA	60 A, K5	100 kA	45 A, Class J
TF42-20	20.0 A	18 kA	80 A, K5	100 kA	60 A, Class J
TF42-24	24.0 A	18 kA	80 A, K5	100 kA	60 A, Class J
TF42-29	29.0 A	18 kA	100 A, K5	100 kA	100 A, Class J
TF42-35	35.0 A	18 kA	150 A, K5	100 kA	175 A, Class J
TF42-38	38.0 A	18 kA	150 A, K5	100 kA	175 A, Class J

TF42 thermal overload relays



Technical data

General technical data

Type	TF42	
Pollution degree	3	
Phase loss sensitive	Yes	
Ambient air temperature		
Operation	Open - compensated	-25 ... +60 °C
	Open	-25 ... +60 °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	25g / 11 ms	
Resistance to vibrations acc. to IEC 60068-2-6	3g / 3 ... 150 Hz	
Mounting position	Position 1-5	
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	TF42 (TF42-0.13 ... TF42-16)		TF42 (TF42-20 ... TF42-38)
Connecting capacity			
 Rigid	1 x or 2 x	0.75 ... 4 mm ²	1.5 ... 2.5 mm ² or 2.5 ... 10 mm ² ¹⁾
 Flexible with insulated ferrule	1 x or 2 x	0.75 ... 4 mm ²	2.5 ... 4 mm ² or 4 ... 6 mm ²
Stranded acc. to UL/CSA	1 x or 2 x	AWG 18-10	AWG 14-6
Flexible acc. to UL/CSA	1 x or 2 x	AWG 18-10	AWG 14-6
Stripping length	12 mm		
Tightening torques	1.5 - 2.5 Nm / 13 ... 22 lb.in		2.5 - 2.7 Nm / 22 lb.in
Connection screw	M4 (Pozidriv 2)		

¹⁾ Only connect two different "conductor/wire" cross-sections, if they are within the indicated ranges

Auxiliary circuit

Type	TF42	
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 with insulated ferrule	1 x	0.75 ... 2.5 mm ²
	2 x	0.75 ... 1.5 mm ²
 Flexible	1 x or 2 x	0.75 ... 1 mm ² or 1 ... 2.5 mm ²
Stranded acc. to UL/CSA	1 x or 2 x	AWG 18-12
Flexible acc. to UL/CSA	1 x or 2 x	AWG 18-12
Stripping length	9 mm	
Tightening torques	1.1 ... 1.5 Nm / 9 ... 13 lb.in	
Connection screw	M3 (Pozidriv 2)	

TF65 thermal overload relays

Technical data

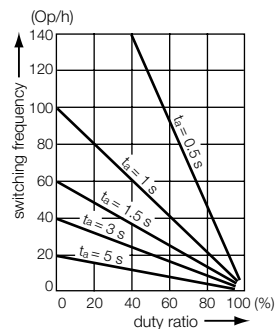
Main circuit – Utilization characteristics according to IEC/EN

Type	TF65
Standards	IEC/EN 60947-1, IEC/EN 60947-4-1, IEC/EN 60947-5-1
Rated operational voltage U_e	690 V AC
Rated frequency	50/60 Hz
Trip class	10
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	690 V

Auxiliary circuit according to IEC/EN

Type	TF65
Rated operational voltage U_e	600 V
Conventional free air thermal current I_{th}	N.C., 95-96 6 A N.O., 97-98 4 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 3.00 A N.O., 97-98 0.75 A
220-230-240 V	N.C., 95-96 3.00 A N.O., 97-98 0.75 A
440 V	N.C., 95-96 0.75 A N.O., 97-98 0.75 A
480-500 V	N.C., 95-96 0.75 A N.O., 97-98 0.75 A
I_e / Rated operational current DC-13 acc. to IEC/EN 60947-5-1 for utilization category	
24 V	N.C., 95-96 1.25 A N.O., 97-98 1.25 A
110-120-125 V	N.C., 95-96 0.55 A N.O., 97-98 0.55 A
250 V	N.C., 95-96 0.27 A N.O., 97-98 0.27 A
Minimum switching capacity	17 V / 3 mA
Short-circuit protective device	N.C., 95-96 6 A, gG Type Fuses N.O., 97-98 4 A, gG Type Fuses
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

TF65 thermal overload relays

Technical data

Main circuit – Utilization characteristics according to UL/CSA

Type	TF65
Standards	UL 60947-1 / 60947-4-1A and CSA 60947-1 / 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"

3 Auxiliary circuit according to UL/CSA

Type	TF65	
Contact rating	N.C., 95-96	B600, Q600
	N.O., 97-98	D300, Q600
Conventional thermal current	N.C., 95-96	6 A
	N.O., 97-98	4 A

Full load amps and short-circuit protective device

Type	Full load amps (FLA)	480 / 600 V AC		480 / 600 V AC	
		Short circuit rating RMS symmetrical	Fuse type	Short circuit rating RMS symmetrical	Fuse type
TF65-28	28 A	5 kA	100 A, K5 / RK5	18 kA	110 A, Class J
TF65-33	33 A	5 kA	100 A, K5 / RK5	18 kA	110 A, Class J
TF65-40	40 A	5 kA	100 A, K5 / RK5	18 kA	110 A, Class J
TF65-47	47 A	5 kA	125 A, K5 / RK5	18 kA	125 A, Class J
TF65-53	53 A	10 kA	125 A, K5 / RK5	18 kA	125 A, Class J
TF65-60	60 A	10 kA	150 A, K5 / RK5	18 kA	150 A, Class J
TF65-67	67 A	10 kA	150 A, K5 / RK5	18 kA	150 A, Class J

TF65 thermal overload relays





Technical data

General technical data

Type	TF65
Pollution degree	3
Phase loss sensitive	Yes
Ambient air temperature	
Operation	Open - compensated
Open	-25 ... +60 °C
Open	-25 ... +60 °C
Storage	-50 ... +80 °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
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
	Main circuit terminals
	IP20
	IP10





Electrical connection

Main circuit

Type	TF65
Connecting capacity	
 Rigid	1 x or 2 x
	2.5 ... 16 mm ²
	1 x
	2.5 ... 35 mm ²
 Flexible with ferrule	1 x or 2 x
	2.5 ... 10 mm ²
	1 x
	2.5 ... 35 mm ²
 Flexible with insulated ferrule	1 x or 2 x
	2.5 ... 4 mm ²
	1 x
	2.5 ... 35 mm ²
 Flexible	1 x or 2 x
	2.5 ... 16 mm ²
	1 x
	2.5 ... 35 mm ²
Stranded acc. to UL/CSA	1 x
	AWG 12 ... 2
	2 x
	AWG 12 ... 6
Flexible acc. to UL/CSA	1 x
	AWG 12 ... 2
	2 x
	AWG 12 ... 6
Stripping length	17 mm
Tightening torques	4.0 - 4.5 Nm / 35 ... 40 lb.in
Connection screw	M6 (Pozidriv 2)

¹⁾ Only connect two different "conductor/wire" cross-sections, if they are within the indicated ranges

Auxiliary circuit

Type	TF65
Connecting capacity	
 Rigid	1 x or 2 x
	0.75 ... 4 mm ²
 Flexible with ferrule	1 x or 2 x
	0.75 ... 4 mm ²
 Flexible with insulated ferrule	1 x
	0.75 ... 2.5 mm ²
	2 x
	0.75 ... 1.5 mm ²
 Flexible	1 x or 2 x
	0.75 ... 1 mm ² or 1 ... 2.5 mm ²
Stranded acc. to UL/CSA	1 x or 2 x
	AWG 18 ... 12
Flexible acc. to UL/CSA	1 x or 2 x
	AWG 18 ... 12
Stripping length	9 mm
Tightening torques	1.1 ... 1.5 Nm / 9 ... 13 lb.in
Connection screw	M3 (Pozidriv 2)

TF96 thermal overload relays

Technical data

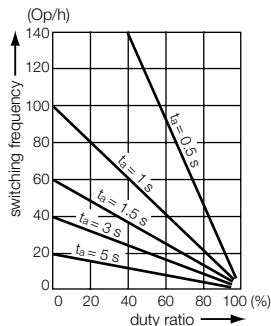
Main circuit – Utilization characteristics according to IEC/EN

Type	TF96
Standards	IEC/EN 60947-1, IEC/EN 60947-4-1, IEC/EN 60947-5-1
Rated operational voltage U_e	690 V AC
Rated frequency	50/60 Hz
Trip class	10
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	690 V

Auxiliary circuit according to IEC/EN

Type	TF96
Rated operational voltage U_e	600 V
Conventional free air thermal current I_{th}	N.C., 95-96 6 A N.O., 97-98 4 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 3.00 A N.O., 97-98 0.75 A
220-230-240 V	N.C., 95-96 3.00 A N.O., 97-98 0.75 A
440 V	N.C., 95-96 0.75 A N.O., 97-98 0.75 A
480-500 V	N.C., 95-96 0.75 A N.O., 97-98 0.75 A
I_e / Rated operational current DC-13 acc. to IEC/EN 60947-5-1 for utilization category	
24 V	N.C., 95-96 1.25 A N.O., 97-98 1.25 A
110-120-125 V	N.C., 95-96 0.55 A N.O., 97-98 0.55 A
250 V	N.C., 95-96 0.27 A N.O., 97-98 0.27 A
Minimum switching capacity	17 V / 3 mA
Short-circuit protective device	N.C., 95-96 6 A, Fuse type gG N.O., 97-98 4 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

TF96 thermal overload relays

Technical data

Main circuit – Utilization characteristics according to UL/CSA

Type	TF96
Standards	UL 60947-1 / 60947-4-1A and CSA 60947-1 / 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	TF96	
Contact rating	N.C., 95-96	B600, Q600
	N.O., 97-98	D300, Q600
Conventional thermal current	N.C., 95-96	6 A
	N.O., 97-98	4 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 type	Short circuit rating RMS symmetrical	Fuse type
TF96-51	51 A	5 kA	150 A, K5 / RK5	18 kA	125 A, Class J
TF96-60	60 A	10 kA	150 A, K5 / RK5	18 kA	150 A, Class J
TF96-68	68 A	10 kA	150 A, K5 / RK5	18 kA	150 A, Class J
TF96-78	78 A	10 kA	175 A, K5 / RK5	18 kA	175 A, Class J
TF96-87	87 A	10 kA	200 A, K5 / RK5	18 kA	200 A, Class J
TF96-96	96 A	10 kA	250 A, K5 / RK5	18 kA	200 A, Class J

TF96 thermal overload relays





Technical data

General technical data

Type		TF96
Pollution degree		3
Phase loss sensitive		Yes
Ambient air temperature		
Operation	Open - compensated	-25 ... +60 °C
	Open	-25 ... +60 °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		25g / 11 ms
Resistance to vibrations acc. to IEC 60068-2-6		5g / 3 ... 150 Hz
Mounting position		Position 1
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		TF96
Connecting capacity		
 Rigid	1 x or 2 x	6 ... 35 mm ²
	1 x	6 ... 50 mm ²
 Flexible with ferrule	1 x or 2 x	6 ... 35 mm ²
	1 x	6 ... 50 mm ²
 Flexible with insulated ferrule	1 x or 2 x	6 ... 16 mm ²
	1 x	6 ... 50 mm ²
 Flexible	1 x or 2 x	6 ... 35 mm ²
	1 x	6 ... 50 mm ²
	Stranded acc. to UL/CSA	1 x
		2 x
	Flexible acc. to UL/CSA	1 x
		2 x
Stripping length		22 mm
Tightening torques		6.5 - 9 Nm / 57 ... 80 lb.in
Connection screw		M8 (Hexagon)

¹⁾ Only connect two different "conductor/wire" cross-sections, if they are within the indicated ranges

Auxiliary circuit

Type		TF96
Connecting capacity		
 Rigid	1 x or 2 x	0.75 ... 4 mm ²
 Flexible with ferrule	1 x or 2 x	0.75 ... 4 mm ²
 Flexible with insulated ferrule	1 x	0.75 ... 2.5 mm ²
	2 x	0.75 ... 1.5 mm ²
 Flexible	1 x or 2 x	0.75 ... 1 mm ² or 1 ... 2.5 mm ²
	Stranded acc. to UL/CSA	1 x or 2 x
		1 x or 2 x
	Flexible acc. to UL/CSA	1 x or 2 x
Stripping length		9 mm
Tightening torques		1.1 ... 1.5 Nm / 9 ... 13 lb.in
Connection screw		M3 (Pozi driv 2)

TF140DU thermal overload relays

Technical data

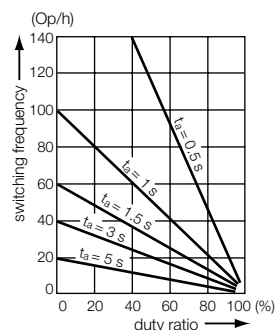
Main circuit – Utilization characteristics according to IEC/EN

Type	TF140DU
Standards	IEC/EN 60947-1, IEC/EN 60947-4-1, IEC/EN 60947-5-1
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}	8 kV
Rated insulation voltage U_i	690 V

Auxiliary circuit according to IEC/EN

Type	TF140DU
Rated operational voltage U_e	500 V AC, 440 V DC
Conventional free air thermal current I_{th}	N.C., 95-96 10 A N.O., 97-98 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 3.00 A N.O., 97-98 1.50 A
220-230-240 V	N.C., 95-96 1.50 A N.O., 97-98 1.50 A
440 V	N.C., 95-96 1.00 A N.O., 97-98 1.00 A
480-500 V	N.C., 95-96 1.00 A N.O., 97-98 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 1.25 A N.O., 97-98 1.25 A
60 V	N.C., 95-96 0.25 A N.O., 97-98 0.25 A
110-120-125 V	N.C., 95-96 0.25 A N.O., 97-98 0.25 A
250 V	N.C., 95-96 0.12 A N.O., 97-98 0.04 A
Minimum switching capacity	17 V / 3 mA
Short-circuit protective device	N.C., 95-96 10 A, Fuse type gG N.O., 97-98 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

TF140DU thermal overload relays

Technical data

Main circuit – Utilization characteristics according to UL/CSA

Type	TF140DU
Standards	UL 60947-1 / 60947-4-1A and CSA 60947-1 / 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	TF140DU
Contact rating	N.C., 95-96 B600 N.O., 97-98 C300
Conventional thermal current	N.C./N.O. 10 A / 6 A

Full load amps and short-circuit protective device

Type	Full load amps (FLA)	480 / 600 V AC		480 / 600 V AC		480 / 600 V AC	
		Short-circuit protective device Short circuit rating RMS symmetrical	Fuse type	Short circuit rating RMS symmetrical	Fuse type	Short circuit rating RMS symmetrical	Listed circuit breaker
TF140DU-90	90 A	10 kA	250 A, K5 / RK5	100 kA	250 A, Class J	100 kA	250 A
TF140DU-110	110 A	10 kA	250 A, K5 / RK5	100 kA	250 A, Class J	100 kA	250 A
TF140DU-135	135 A	10 kA	250 A, K5 / RK5	100 kA	250 A, Class J	100 kA	250 A
TF140DU-142	142 A	10 kA	250 A, K5 / RK5	100 kA	250 A, Class J	100 kA	250 A

TF140DU thermal overload relays



Technical data

General technical data





Type	TF140DU	
Pollution degree	3	
Phase loss sensitive	Yes	
Ambient air temperature		
Operation	Open - compensated	-25 ... +55 °C
	Open	-25 ... +55 °C
Storage	-40 ... +70 °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	12g / 11 ms	
Mounting position	Position 1-5	
Mounting	Mount on the contactor and tighten the screws of the main circuit terminals	
Degree of protection	Housing	IP20
	Main circuit terminals	IP00

Electrical connection

Main circuit

Type	TF140DU	
Connecting capacity		
 Rigid	1 x	16 ... 70 mm ²
	2 x	-
 Flexible	1 x	16 ... 70 mm ²
	2 x	-
	Stranded acc. to UL/CSA	1 x or 2 x AWG 6-2/0
	Flexible acc. to UL/CSA	1 x or 2 x AWG 6-2/0
Stripping length	25 mm	
Tightening torques	8 ... 10 Nm / 77 ... 88 lb.in	
Connection screw	M8 (Hexagon)	

Auxiliary circuit

Type	TF140DU	
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 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 18-14
	Flexible acc. to UL/CSA	1 x or 2 x AWG 18-14
Stripping length	9 mm	
Tightening torques	0.8 ... 1.3 Nm / 12 lb.in	
Connection screw	M3.5 (Pozi driv 2)	

TA200DU thermal overload relays

Technical data

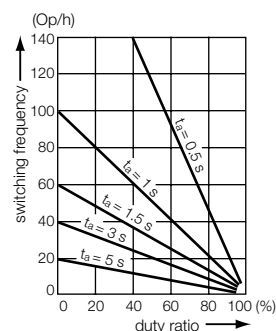
Main circuit – Utilization characteristics according to IEC/EN

Type	TA200DU
Standards	IEC/EN 60947-1, IEC/EN 60947-4-1
Rated operational voltage U_n	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	TA200DU
Rated operational voltage U_n	500 V AC, 440 V DC
Conventional free air thermal current I_{th}	N.C., 95-96 10 A N.O., 97-98 6 A
Rated frequency	DC, 50/60 Hz
Number of poles	1 N.O. + 1 N.C.
I_0 / Rated operational current AC-15 acc. to IEC/EN 60947-5-1 for utilization category	
110-120 V	N.C., 95-96 3.00 A N.O., 97-98 1.50 A
220-230-240 V	N.C., 95-96 3.00 A N.O., 97-98 1.50 A
440 V	N.C., 95-96 1.00 A N.O., 97-98 1.00 A
480-500 V	N.C., 95-96 1.00 A N.O., 97-98 1.00 A
I_0 / Rated operational current DC-13 acc. to IEC/EN 60947-5-1 for utilization category	
24 V	N.C., 95-96 1.25 A N.O., 97-98 1.25 A
60 V	N.C., 95-96 0.25 A N.O., 97-98 0.25 A
110-120-125 V	N.C., 95-96 0.25 A N.O., 97-98 0.25 A
250 V	N.C., 95-96 0.12 A N.O., 97-98 0.04 A
Minimum switching capacity	17 V / 3 mA
Short-circuit protective device	N.C., 95-96 10 A, Fuse type gG N.O., 97-98 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

TA200DU thermal overload relays

Technical data

Main circuit – Utilization characteristics according to UL/CSA

Type	TA200DU
Standards	UL 60947-1 / 60947-4-1A and CSA 60947-1 / 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	TA200DU
Contact rating	N.C., 95-96 : C600 N.O., 97-98 : B600
Conventional 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		Listed circuit breaker	Short circuit rating RMS symmetrical	Fuse type	Short circuit rating RMS symmetrical	Listed circuit breaker
Short circuit rating RMS symmetrical	Fuse type							
TA200DU-90	90 A	10 kA	250 A, K5 / RK5	225 A	100 kA	250 A, Class J	100 kA	250 A
TA200DU-110	110 A	10 kA	250 A, K5 / RK5	225 A	100 kA	250 A, Class J	100 kA	250 A
TA200DU-135	135 A	10 kA	300 A, K5 / RK5	225 A	100 kA	250 A, Class J	100 kA	250 A
TA200DU-150	150 A	10 kA	300 A, K5 / RK5	225 A	100 kA	250 A, Class J	100 kA	250 A
TA200DU-175	175 A	10 kA	300 A, K5 / RK5	225 A	100 kA	300 A, Class J	100 kA	300 A
TA200DU-200	200 A	10 kA	400 A, K5 / RK5	400 A	100 kA	400 A, Class J	100 kA	400 A



TA200DU thermal overload relays

Technical data





General technical data

Type	TA200DU	
Pollution degree	3	
Phase loss sensitive	Yes	
Ambient air temperature		
Operation	Open - compensated	-25 ... +55 °C
	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	IP00

Electrical connection

Main circuit			
Type	TA200DU		
Connecting capacity			
	Rigid	1 x	25 ... 120 mm ²
	Flexible	1 x	25 ... 120 mm ²
	Stranded acc. to UL/CSA	1 x	AWG 4 ... 0000
	Flexible acc. to UL/CSA	1 x	AWG 4 ... 0000
	Lugs	L > 10 mm	
Tightening torques	25 Nm / 220 lb.in		
Connection screw	Open bars		

Auxiliary circuit

Type	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 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 18 ... 14
	Flexible acc. to UL/CSA	1 x or 2 x	AWG 18 ... 14
Stripping length	9 mm		
Tightening torques	0.8 ... 1.3 Nm / 12 lb.in		
Connection screw	M3.5 (Pozidriv 2)		

EF19, EF45 electronic overload relays

Technical data

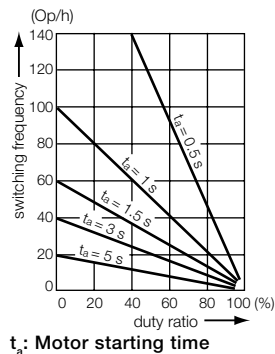
Main circuit – Utilization characteristics according to IEC/EN

Type	EF19	EF45
Standards	IEC/EN 60947-1, IEC/EN 60947-4-1, IEC/EN 60947-5-1	
Rated operational voltage U_n	690 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}	6 kV	
Rated insulation voltage U_i	690 V AC	

Auxiliary circuit according to IEC/EN

Type	EF19	EF45
Rated operational voltage U_n	600 V AC / DC	
Conventional free air thermal current I_n	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	0.75 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



EF19, EF45 electronic overload relays

Technical data

Main circuit – Utilization characteristics according to UL/CSA

Type	EF19	EF45
Standards	UL 60947-1 / 60947-4-1A and CSA 60947-1 / 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	EF19	EF45
Contact rating	N.C., 95-96 N.O., 97-98	B600, Q600 B600, Q600
Conventional thermal current	5 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
EF19-0.32	0.32 A	50 kA	2 A, Class J	5 kA	2 A, K5 / RK5	100 kA	2 A, Class J
EF19-1.0	1.00 A	50 kA	2 A, K5 / RK5	5 kA	2 A, K5 / RK5	100 kA	2 A, Class J
EF19-2.7	2.70 A	50 kA	4 A, K5 / RK5	5 kA	4 A, K5 / RK5	100 kA	4 A, Class J
EF19-6.3	6.30 A	50 kA	15 A, K5 / RK5	5 kA	15 A, K5 / RK5	100 kA	15 A, Class J
EF19-18.9	18.90 A	50 kA	30 A, K5 / RK5	5 kA	30 A, K5 / RK5	100 kA	30 A, Class J

Type	Full load amps (FLA)	Short-circuit protective device					
		480 V AC		600 V AC			
		SCCR	Fuse type	SCCR	Fuse type	SCCR	Fuse type
EF45-30	30 kA	18 kA	150 A, K5 / RK5	18 kA	150 A, K5 / RK5	100 kA	150 A, Class J
EF45-45	45 kA	18 kA	200 A, K5 / RK5	18 kA	200 A, K5 / RK5	100 kA	200 A, Class J

EF19, EF45 electronic overload relays



Technical data

General data





		EF19	EF45
Type			
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/EN60947-4-1	
Maximum operating altitude permissible		2000 m	
Resistance to shock acc. to IEC 60068-2-27		15g / 11 ms	
Resistance to vibrations acc. to IEC 60068-2-6		1g / 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

		EF19	EF45
Type			
Connecting capacity			
 Rigid	1 or 2 x	1 ... 4 mm ²	2.5 ... 16 mm ²
 Flexible with insulated ferrule	1 or 2 x	0.75 ... 2.5 mm ²	2.5 ... 10 mm ²
Stranded acc. to UL/CSA	1 or 2 x	AWG 16-10	AWG 14-6
Flexible acc. to UL/CSA	1 or 2 x	AWG 16-10	AWG 14-6
Stripping length		9 mm	13 mm
Tightening torques		0.8 ... 1.5 Nm / 7 ... 13 lb.in	2.3 ... 2.6 Nm / 20 ... 22 lb.in
Connection screw		M3.5 (Pozidriv 2)	

Auxiliary circuit

		EF19	EF45
Type			
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 18-10	
Flexible acc. to UL/CSA	1 or 2 x	AWG 18-10	
Stripping length		9 mm	
Tightening torques		0.8 ... 1.2 Nm / 7 ... 11 lb.in	
Connection screw		M3 (Pozidriv 2)	

EF65, EF96, EF146 electronic overload relays

Technical data

3

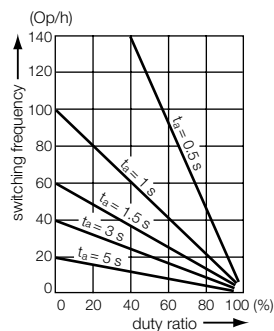
Main circuit – Utilization characteristics according to IEC/EN

Type	EF65, EF96, EF146
Standards	IEC/EN 60947-1, IEC/EN 60947-4-1, IEC/EN 60947-5-1
Rated operational voltage U_e	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	EF65, EF96, EF146
Rated operational voltage U_e	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_e / 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_e / 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

EF65, EF96, EF146 electronic overload relays

Technical data

Main circuit – Utilization characteristics according to UL/CSA

Type	EF65, EF96, EF146
Standards	UL 60947-1 / 60947-4-1A and CSA 60947-1 / 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	EF65, EF96, EF146
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		600 V AC			
		480 V AC		SCCR		Fuse type	
		SCCR	Fuse type	SCCR	Fuse type	SCCR	Fuse type
EF65-70	70 A	10 kA	150 A, R5/RK5	10kA	150 A, R5/RK5	100 kA	175 A, J
EF96-100	100 A	10 kA	200 A, R5/RK5	10kA	200 A, R5/RK5	100 kA	225 A, J
EF146-150	150 A	10 kA	250 A, R5/RK5	10kA	250 A, R5/RK5	100 kA	350 A, J

EF65, EF96, EF146 electronic overload relays



Technical data

General data





Type	EF65, EF96, EF146	
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	15g / 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	IP10

Electrical connection

Main circuit

Type		EF65	EF96	EF146
Connecting capacity				
 Rigid	1 x	4 ... 35 mm ²	6 ... 70 mm ²	10 ... 95 mm ²
	2 x	4 ... 35 mm ²	6 ... 35 mm ²	10 ... 35 mm ²
 Flexible	1 x	4 ... 35 mm ²	6 ... 50 mm ²	10 ... 70 mm ²
	2 x	4 ... 35 mm ²	6 ... 35 mm ²	10 ... 35 mm ²
	1 x	AWG 10-2	AWG 8-2	AWG 6-00
Stranded acc. to UL/CSA	2 x			AWG 6-2
	1 x	AWG 10-2	AWG 8-2	AWG 6-00
Flexible acc. to UL/CSA	2 x			AWG 6-2
Stripping length		20 mm	20 mm	20 mm
Tightening torques		4 Nm / 35 lb.in	6 Nm / 55 lb.in	8 Nm / 70 lb.in
Connection screw		M8 (Pozi driv 2)	M8 (Hexagon 4)	M8 (Hexagon 4)

Auxiliary circuit

Type	EF65, EF96, EF146		
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 18-10	
Flexible acc. to UL/CSA	1 or 2 x	AWG 18-10	
Stripping length		9 mm	
Tightening torques		0.8 ... 1.2 Nm / 7 ... 11 lb.in	
Connection screw		M3.5 (Pozi driv 2)	

EF205, EF370 electronic overload relays

Technical data

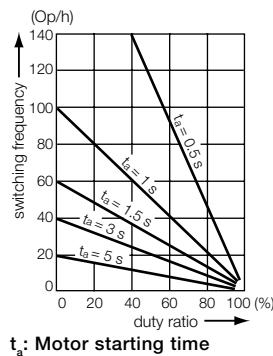
Main circuit – Utilization characteristics according to IEC/EN

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_n	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



EF205, EF370 electronic overload relays

Technical data

Main circuit – Utilization characteristics according to UL/CSA

Type	EF205, EF370
Standards	UL 60947-1 / 60947-4-1A and CSA 60947-1 / 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 N.O., 97-98	B600, Q600 B600, Q600
Conventional thermal current		6 A

Full load amps and short-circuit protective device

Type	Full load amps (FLA)	Short-circuit protective device		600 V AC			
		480 V AC	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





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 torques	18 Nm / 160 lb.in	28 Nm / 247 lb.in
Connection screw	M8	M10

Auxiliary circuit

Type	EF205, EF370
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 18-10
Flexible acc. to UL/CSA	1 or 2 x AWG 18-10
Stripping length	9 mm
Tightening torques	0.8 ... 1.2 Nm / 7 ... 11 lb.in
Connection screw	M3.5 (Pozi driv 2)

E500DU, E800DU, E1250DU electronic overload relays

Technical data

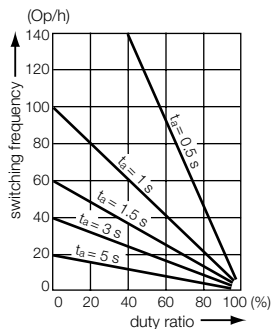
Main circuit – Utilization characteristics according to IEC/EN

Type	E500DU	E800DU	E1250DU
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 AC		

Auxiliary circuit according to IEC/EN

Type	E500DU	E800DU	E1250DU
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}	8 kV		
Rated insulation voltage U_i	690 V		

Technical diagram – Intermittent periodic duty



E500DU, E800DU, E1250DU electronic overload relays

Technical data

Main circuit – Utilization characteristics according to UL/CSA

Type	E500DU	E800DU	E1250DU
Standards	UL 60947-1 / 60947-4-1A and CSA 60947-1 / 60947-4-1A		
Maximum operational voltage	600 V AC		
Trip rating	125 % of FLA		

Auxiliary circuit according to UL/CSA





Type	E500DU	E800DU	E1250DU
Contact rating	N.C., 95-96	B600, Q300	
	N.O., 97-98	B600, Q300	
Conventional thermal current	5 A		

General data

Type	E500DU	E800DU	E1250DU
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/EN60947-4-1		
Maximum operating altitude permissible	2000 m		
Resistance to shock acc. to IEC 60068-2-27	15g / 11 ms		
Resistance to vibrations acc. to IEC 60068-2-6	5g / 3 ... 150 Hz		
Degree of protection	Housing	IP20	
	Main circuit terminals	IP20	

Electrical connection

Auxiliary circuit

Type	E500DU	E800DU	E1250DU
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 16-10	
Flexible acc. to UL/CSA	1 or 2 x	AWG 16-10	
Stripping length	9 mm		
Tightening torques	0.8 ... 1.2 Nm / 7 lb.in		
Connection screw	M3.5 (Pozidriv 2)		

Lined area for notes, consisting of numerous horizontal dotted lines.

General technical data and additional ratings

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Coordination with short-circuit protection devices

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

Basic functions

Any starter is designed to:

- start motors,
- ensure continuous functioning of motors,
- disconnect motors from the supply line,
- guarantee protection of motors against overloads.

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

4

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

Applicable standards

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

Complete coordination for a combination includes the following points:

- Selectivity test between the overload relay and the short-circuit protection device SCPD.
- Short-circuit condition tests:
 - at prospective "r" currents - These currents depend on the rated operational current of the starter (**I_e AC-3**) and are given by the standard (Table 13). For example:
 - r = 1kA for **I_e AC-3** < 16 A
 - r = 3 kA for 16 A < **I_e AC-3** < 63 A
 - r = 5 kA for 63 A < **I_e AC-3** < 125 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

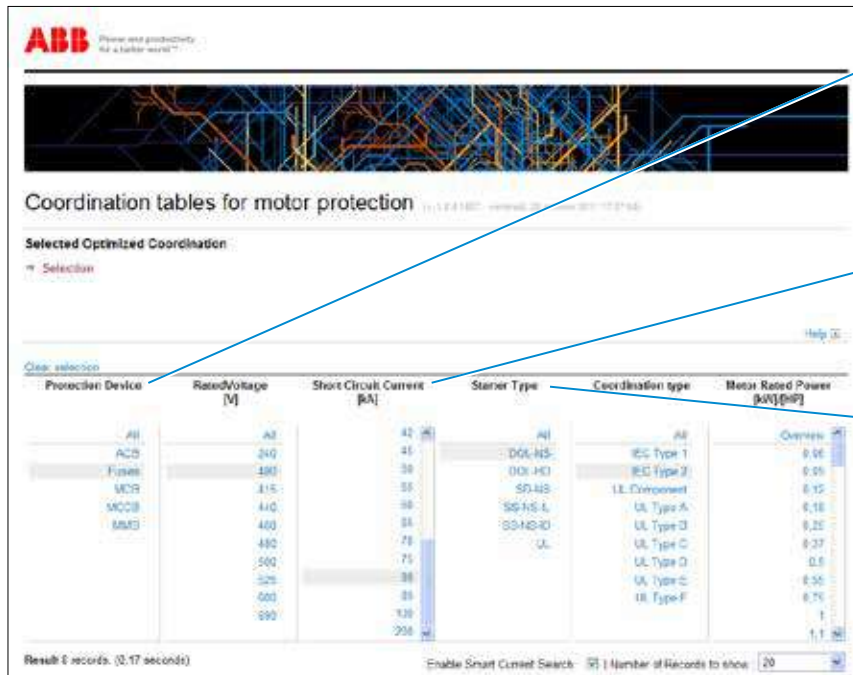
- Each table is defined for a maximum ambient temperature of 40 °C. For higher temperatures, apply a derating factor according to the following rules:
 - Fuses: factor of 0.8 applied to **I_n** for an ambient temperature of 70 °C
 - MCCBs and MCBs: factor of 0.8 applied to **I_n** for an ambient temperature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

Coordination with short-circuit protection devices

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

Selection

Simple or multiple selections all from the same screen.



Short-circuit protection devices

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

Starter type

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

Coordination

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

Results

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

Fuses, 400 V, 80 kA, DOL-NS, Coordination type IEC Type 2									
Rated Power [kW]	Rated Current [A]	Switch-Fuse Type	Fuse IEC Rating gG [kA]	Type and Size	Contactor Type	Overload Relay Type	Current setting range [A]	Max allowed load current [A]	Table
0.37	1.1	OS32D	2	OFAM 80aM A9	A9	E16DU2.7.10	0.90 - 2.70	1.4	Table
0.37	1.1	OS32D	2	OFAM 80aM A9	A9	TA25DU 1.4	1.00 - 1.40	1.1	Table
0.37	1.1	OS32D	2	OFAM 80aM A9	A9	UMC22(100) 10	0.24 - 53.00	1.4	Table
0.37	1.1	OS32D	4	OFAA 60H A9	A9	UMC22(100) 10	0.24 - 53.00	1.3	Table
0.37	1.1	OS32D	4	OFAA 60H A9	A9	E16DU2.7.10	0.90 - 2.70	1.3	Table
0.37	1.1	OS32D	4	OFAA 60H A9	A9	TA25DU 1.4	1.00 - 1.40	1.1	Table

Fuses, 400 V, 80 kA, DOL-NS, Coordination type IEC Type 2, Overload Relay TOL									
Rated Power [kW]	Rated Current [A]	Switch-Fuse Type	Fuse IEC Rating gG [kA]	Type and Size	Contactor Type	Overload Relay Type	Current setting range [A]	Max allowed load current [A]	Table
0.25	0.85	OS32D	2	OFAF 30aM AF09	AF09	TF42.0.65	0.74 - 1.00	1	Table
0.12	0.44	OS32D	2	OFAF 30aM AF09	AF09	TF42.0.65	0.42 - 0.55	0.65	Table

Access

To find the coordination tables for motor protection, please see:

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

Standards, specifications and certifying organizations

Definitions

ABB low voltage devices are developed and manufactured in accordance with the applicable regulations as stated in the international IEC standards, the European EN standards and the national ones such as NF, DIN, GB and BS. For devices installed in ships, an approval issued by independent classification societies is demanded by the maritime insurance companies.

CB scheme

Certification Body certificates (CB certificates) are available to prove the complete conformity to standards

The IEC CB (Certification Body) scheme is multilateral agreement between the National Certification Bodies to allow international certification of electrical and electronic products so that a single certification allows worldwide market access.

The CB Scheme was established by the International Electrotechnical Committee for conformity testing to standards for electrical equipment (IECEE).

Certified products

In some cases, products are validated and tested according to a standard by a certification body and the manufacturer is regularly visited by this body in order to check the respect of the design and the materials used. This process creates a certified product. This is the case of UL (Underwriters Laboratories) and CSA (Canadian Standard Association) for instance (see below).

Specifications

International Specifications

The International Electrotechnical Commission, IEC, which is part of the International Standards Organization, ISO, publishes IEC publications which act as a basis for the world market.

European Specifications and National Specifications

The European committee for electrotechnical standardization (CENELEC), which groups together European countries, publishes EN standards.

These European standards may differ very little from IEC international standards and have similar numbering.

The same applies for national standards which use, without exception, the same numbering and reproduce the texts of these unified standards in their entirety. Contradicting national standards are withdrawn.

European Directives

The guarantee of the free movement of goods within the European Community means that any regulatory differences between member states have been eliminated. The European directives set up common rules that are included in the legislation of each state while contradictory regulations are cancelled.

Three directives are essential:

- **Low Voltage Directive** 2006/95/EC concerns electrical equipment from 0 to 1000 V AC and from 0 to 1500 V DC.

This specifies that compliance with the requirements that it sets out is acquired if the equipment conforms to the standards harmonized on an European level. EN 60947-1 and EN 60947-4-1 for contactors.

- **Machinery Directive** 2006/42/EC for safety specifications of machines and equipment on complete machines.
- **Electromagnetic Compatibility Directive** 2004/108/EC which concerns all devices able to create electromagnetic disturbance.

CE Marking:

CE marking indicates that the marked equipment conforms to the relevant EU directive.

CE marking is part of an administrative procedure and guarantees free movement of the product within the European Community.

Standards in Canada and the USA

Canadian and American specifications are more or less equivalent but differ greatly from IEC standards.

UL Underwriters Laboratories USA

CSA Canadian Standard Association Canada

UL (USA) specifications make the following distinction between devices:



Listed Product

A product that has been produced under UL's listing and follow-up service program in accordance with the terms of UL's service agreement and that bears the UL listing mark as the manufacturer's declaration that the product complies with UL's requirements.



Recognized Component

A part or subassembly covered under UL's recognition service and intended for factory installation in listed (or other) products. Recognized components are incomplete in certain construction features or restricted in performance capabilities and not intended for separate installation in the field, rather they are intended for use as components of incomplete equipment submitted for investigation by UL. Final acceptance of the component in the complete equipment is dependent upon its installation and use in accordance with all applicable use conditions and ratings noted in the component report issued by UL, in the guide information and in the individual client's Recognized Component information page.

The combined UL signs for the USA and Canada are recognized by the authorities of both countries.

Compulsory China Certification (CCC): The CCC mark is a compulsory certification mark in the field of safety for products sold on the Chinese market.

GOST: Russia (please consult your local ABB sales office)

C-Tick: The C-Tick mark certifies compliance with the Australian EMC requirements. The mark is also recognized in New Zealand

ANCE: Mexico

Marine Approvals

The following specifications must be respected when these devices are used on ships:

BV	Bureau Veritas France
DNV	Det Norske Veritas Norway
GL	Germanischer Lloyd Germany
LRS	Lloyd's Register of Shipping Great Britain
ABS	American Bureau of Shipping
RMRS	Russian Maritime Register of Shipping RMRS
RRR	Russian River Register
MRS	Maritime Register of Shipping Russia
PRS	Polski Rejestr Statkow Poland
RINA	Registro Italiano Navale Italy

Standards, specifications and certifying organizations

Specifications (cont.)

International Standards

IEC 60947-1 Low-voltage switchgear and controlgear – Part 1: General rules

IEC 60947-4-1 Low-voltage switchgear and controlgear – Part 4: Contactors and motor starters – Section 1: Electromechanical contactors and motor starters

IEC 60947-5-1 Low-voltage switchgear and controlgear – Part 5: Control circuit devices and switching elements – Section 1: Electromechanical control circuit devices

IEC 60947-5-4 Low-voltage switchgear and controlgear – Part 5-4: Control circuit devices and switching elements. Method of assessing the performance of low-energy contacts. Special tests

IEC 60947-6-1 Low-voltage switchgear and controlgear – Part 6: Multiple function equipment – Section 1: Automatic transfer switching equipment

IEC 60204-1 Electrical equipment of industrial machines – Part 1: General requirements

IEC 60715 Dimensions of low-voltage switchgear and controlgear. Standardized mounting on rails for mechanical support of electrical devices in switchgear and controlgear installations

European Standards

EN 50 005 Low-voltage switchgear and controlgear for industrial use – Terminal marking and distinctive number: General rules (Annex L of IEC 60947-1).

EN 50 011 Low-voltage switchgear and controlgear for industrial use – Terminal marking, distinctive number and distinctive letter for particular contactor relays (Annex M of IEC 60947-5-1)

EN 60947-1 Low-voltage switchgear and controlgear – Part 1: General rules.

EN 60947-4-1 Low-voltage switchgear and controlgear – Part 4: Contactors and motor starters – Section 1: Electromechanical contactors and motor starters.

EN 60947-5-1 Low-voltage switchgear and controlgear – Part 5: Control circuit devices and switching elements – Section 1: Electromechanical control circuit devices.

EN 60947-5-4 Low-voltage switchgear and controlgear – Part 5-4: Control circuit devices and switching elements. Method of assessing the performance of low-energy contacts. Special tests.

EN 60947-6-1 Low-voltage switchgear and controlgear – Part 6: Multiple function equipment – Section 1: Automatic transfer switching equipment.

EN 60204-1 Electrical equipment of industrial machines – Part 1: General requirements.

EN 60 715 Dimensions of low-voltage switchgear and controlgear. Standardized mounting on rails for mechanical support of electrical devices in switchgear and controlgear installations.

National Standards

European countries national standards reproduce the corresponding EN... standards. Codification is built by addition of a prefix to EN numbering.

For instance:

- France **NF** EN...
- Germany **DIN** EN...
- Great Britain **BS** EN...
- Italy **CEI** EN...
- Sweden **SS** EN...

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.

4

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 characterized 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 and breaking capacities - 50 operating cycles					
	Making conditions			Breaking conditions			Making conditions			Breaking conditions		
	I/le	U/Ur	Cos. θ or L/R (ms)	I/le	U/Ur	Cos. θ or L/R (ms)	Ic/le	Ur/Ur	Cos. θ or L/R (ms)	Ic/le	Ur/Ur	Cos. θ 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	le < 17 A	6	1	0.65	1	0.17	0.65	10	1.05	0.45	8	1.05	0.45
	17 < le < 100 A	6	1	0.35	1	0.17	0.35	10	1.05	0.45	8	1.05	0.45
	le > 100 A	6	1	0.35	1	0.17	0.35	10	1.05	0.35	8	1.05	0.35
AC-4	le < 17 A	6	1	0.65	6	1	0.65	12	1.05	0.45	10	1.05	0.45
	17 < le < 100 A	6	1	0.35	6	1	0.35	12	1.05	0.45	10	1.05	0.45
	le > 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

Contactors 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

Contactors for AC circuit switching

Utilization category	Standard operation						Occasional operation Making and breaking capacities - 50 operating cycles					
	Making conditions			Breaking conditions			Making conditions			Breaking conditions		
	I/le	U/Ur	$T_{0.95}$	I/le	U/Ur	$T_{0.95}$	Ic/le	Ur/Ur	$T_{0.95}$	Ic/le	Ur/Ur	$T_{0.95}$
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.

Climatic withstand of devices

The life time of devices are mainly influenced by series of climatic factors which cause their corrosion.

In practice, besides climatic conditions, there are other factors which may damage equipment such as fungi, insects (termites), dust, work site dirt and aggressive environment (salty or sulphurous atmosphere, etc.) which can often only be identified at the place of installation.

Climatic stress, definitions and test conditions are dealt with in national publications such as the DIN 50 series and UTE 63-100 publication which are attached to international publications such as IEC 60068.

The test conditions are:

Description	Symbolization	Time of one cycle	Cycle phase time	Temperature in test chamber	Relative humidity
Humidity and variable temperature	IEC 60068-2-30 Test Db	24 hours	12 hours including rise in temperature	40 °C	95 %
			12 hours including cooling (open device)	25 °C	95 %

ABB contactors have been used for many years in the most countries, with hot and humid climates for example: Brazil, Indonesia, India or on ships. Experience has shown that ABB devices can be used in most countries throughout the world.

The climate of the country in which the apparatus is installed is not the determining choice factor.

Account must be taken of:

- the immediate environment of the devices (sheltered, ventilated, temperature),
- the aggressivity of the immediate atmosphere at the place of installation,
- the length and frequency of non operating periods.

In the case of frequent condensation (i.e. the formation of condensation caused by rapid changes in temperature), heating resistors must be installed in cubicles (100 to 250 W per m³ of enclosure).

The table below gives the cases where heating is necessary.

Environment		Operating conditions	Climate	Internal heating of enclosure
Inside premises	No running water no condensation	Continuous or not	All climates	Without
	With running water	Continuous	All climates	Without
		Frequent or long stops	Temperate Tropical	Without With
Outside, sheltered	No running water no condensation	Continuous or not	Temperate	Without
			Tropical	With
Outside or by the seaside	With running water	Continuous	All climates	Without
			Frequent or long stops	Temperate Tropical

The entrance of dust, insects, dirt, etc. in devices may be prevented if the appropriate degree of protection according to IEC 60529 is chosen (See "Degree of protection" table).

Electrical cross-reference

AF Range vs. A Line

UL / CSA



Contactor	AC general use [A]				AC motor ratings, break all lines, 50/60 Hz							UL file / vol. / sec.	CSA file
	300V	600V	600V (1)	1000V	Max. FLA	1 phase [hp]		3 phase [hp]					
						110-120V	220-240V	200-208V	220-240V	440-480V	550-600V		
AF Range, 3 pole contactors													
AF09/Z-30..	25	25	—	—	9	0.75	1.5	2	2	5	7.5	E312527/7/1	cULus
AF12/Z-30..	28	28	—	—	11	1	2	3	3	7.5	10	E312527/7/1	cULus
AF16/Z-30..	30	30	—	—	17.5	1.5	3	5	5	10	15	E312527/7/1	cULus
AF26/Z-30..	45	45	—	—	25.3	2	3	7.5	7.5	15	20	E312527/7/1	cULus
AF30/Z-30..	50	50	—	—	32.2	2	5	10	10	20	25	E312527/7/1	cULus
AF38/Z-30..	50	50	—	—	Use AF30 for UL / CSA motor applications.						E312527/7/1	cULus	
AF40-30..	60	60	—	—	42	3	7.5	10	15	30	40	E312527/14/1	cULus
AF52-30..	80	80	—	—	54	3	10	15	20	40	50	E312527/14/1	cULus
AF65-30..	90	90	—	—	68	5	15	20	25	50	60	E312527/14/1	cULus
AF80-30..	105	105	—	—	80	7.5	15	25	30	60	75	E312527/14/1	cULus
AF96-30..	115	115	—	—	92	7.5	20	30	30	60	75	E312527/14/1	cULus
AF116-30..	160	160	—	—	104	—	—	30	40	75	100	E36588/9/101	cULus
AF140-30..	200	200	—	—	130	—	—	40	50	100	125	E36588/9/101	cULus
AF146-30..	200	200	—	—	130	—	—	40	50	100	125	E36588/9/101	cULus
AF190-30..	230	230	250	—	156	—	—	50	60	125	150	E36588/9/102	cULus
AF205-30..	250	250	300	—	192	—	—	60	75	150	200	E36588/9/102	cULus
AF265-30..	300	300	350	—	248	—	—	75	100	200	250	E36588/9/103	cULus
AF305-30..	350	350	400	—	312	—	—	100	125	250	300	E36588/9/103	cULus
AF370-30..	400	400	520	—	361	—	—	125	150	300	350	E36588/9/103	cULus
AF400-30..	550	550	—	—	414	—	—	125	150	350	400	E36588/6/4	cULus
AF460-30..	650	650	—	—	480	—	—	150	200	400	500	E36588/6/4	cULus
AF580-30..	750	750	—	—	604	—	—	200	250	500	600	E36588/6/5	cULus
AF750-30..	900	900	—	—	722	—	—	250	300	600	700	E36588/6/5	cULus
AF1250-30..	1210	1210	—	—	—	—	—	—	—	—	—	E73397/2/11	cULus
AF1350-30..	1350	1350	—	—	954	—	—	—	400	800	1000	E36588/6/6	cULus
AF1650-30..	1650	1650	—	—	1050	—	—	—	450	900	1150	E36588/6/6	cULus
AF2050-30..	2100	2100	—	—	—	—	—	—	—	—	—	E73397/2/12	cULus
AF2650-30..	2700	2700	—	2700	—	—	—	—	—	—	—	E73397/2/15	cULus

A Line, 3 pole contactors													
A/E9-30..	21	21	—	—	9	0.5	2	2	2	5	7.5	E312527/10/2	LR56745
A/E12-30..	25	25	—	—	11	0.75	2	3	3	7.5	10	E312527/10/2	LR56745
A/E16-30..	30	30	—	—	17	2	3	5	5	10	15	E312527/10/2	LR56745
A/E26-30..	40	40	—	—	28	2	5	7.5	10	20	25	E312527/10/3	LR56745
A/E30-30..	50	50	—	—	34	3	7.5	10	10	25	30	E312527/10/4	LR56745
A/E40-30..	60	60	—	—	42	3	7.5	10	15	30	40	E312527/10/4	LR56745
A/E/F50-30..	80	80	—	—	54	3	7.5	15	20	40	50	E312527/10/1	LR56745
A/E/F63-30..	90	90	—	—	68	5	10	20	25	50	60	E312527/10/1	LR56745
A/E/F75-30..	105	105	—	—	80	7.5	15	25	30	60	75	E312527/10/1	LR56745
A/F95-30..	125	125	—	—	88	7.5	20	30	30	60	75	E36588/6/1	cULus
A/F110-30..	150	150	—	—	104	10	25	30	40	75	100	E36588/6/1	cULus
A/F145-30..	230	230	—	—	130	—	—	40	50	100	125	E36588/6/2	cULus
A/F185-30..	250	250	—	—	156	—	—	50	60	125	150	E36588/6/2	cULus
A/F210-30..	300	300	—	—	192	—	—	60	75	150	200	E36588/6/3	cULus
A/F260-30..	350	350	—	—	248	—	—	75	100	200	250	E36588/6/3	cULus
A/F300-30..	400	400	—	—	302	—	—	100	100	250	300	E36588/6/3	cULus

(1) When used with LX.. terminal extension.

Electrical cross-reference

AF Range vs. A Line

IEC / NEMA



Controller	Utilization category AC-1, 40°C, Ie [A]			Utilization Category AC-3, 55°C, 50/60 Hz								AC motor ratings, Class A controllers, break all lines						
	440V	690V	1000V	AC-3 Ie [A]	Rated operational power 3 phase [kW]						NEMA size	Continuous [A]	1 phase [hp]		3 phase [hp]			
					230V	380V 400V	415V	440V	500V	690V			1000V	115V	230V	200V	230V	460V 575V
AF Range, 3 pole contactors																		
AF09/Z-30..	25	25	—	9	2.2	4	4	4	5.5	5.5	—	00	9	0.33	1	1.5	1.5	2
AF12/Z-30..	28	28	—	12	3	5.5	5.5	5.5	7.5	7.5	—	0	18	1	2	3	3	5
AF16/Z-30..	30	30	—	18	4	7.5	9	9	9	9	—	—	—	—	—	—	—	—
AF26/Z-30..	45	45	—	26	6.5	11	11	15	15	15	—	1	27	2	3	7.5	7.5	10
AF30/Z-30..	50	50	—	32	9	15	15	18.5	18.5	18.5	—	—	—	—	—	—	—	—
AF38/Z-30..	50	50	—	38	11	18.5	18.5	22	22	22	—	—	—	—	—	—	—	—
AF40-30..	70	70	—	40	11	18.5	22	22	22	22	—	2	45	3	7.5	10	15	25
AF52-30..	100	100	—	53	15	22	30	30	30	30	—	—	—	—	—	—	—	—
AF65-30..	105	105	—	65	18.5	30	37	37	37	37	—	—	—	—	—	—	—	—
AF80-30..	125	125	—	80	22	37	45	45	45	45	—	3	90	—	—	25	30	50
AF96-30..	130	130	—	96	25	45	55	55	55	55	—	—	—	—	—	—	—	—
AF116-30..	160	160	—	116	30	55	55	75	75	55	—	—	—	—	—	—	—	—
AF140-30..	200	200	—	140	37	75	75	90	90	75	—	4	135	—	—	40	50	100
AF146-30..	225	225	225	146	45	75	75	90	90	90	75	—	—	—	—	—	—	—
AF190-30..	275	275	250	190	55	90	90	110	110	132	110	—	—	—	—	—	—	—
AF205-30..	350	350	275	205	55	110	110	132	132	160	132	—	—	—	—	—	—	—
AF265-30..	400	400	350	265	75	132	132	160	160	200	132	5	270	—	—	75	100	200
AF305-30..	500	500	375	305	90	160	160	160	200	250	132	—	—	—	—	—	—	—
AF370-30..	600	600	400	370	110	200	200	200	250	315	132	—	—	—	—	—	—	—
AF400-30..	600	600	600	400	110	200	220	220	250	315	220	—	—	—	—	—	—	—
AF460-30..	700	700	700	460	132	250	250	250	315	355	280	6	540	—	—	150	200	400
AF580-30..	800	800	800	580	160	315	355	355	400	500	355	—	—	—	—	—	—	—
AF750-30..	1050	1050	1000	750	220	400	425	450	520	600	400	7	810	—	—	—	300	600
AF1250-30..	1260	1260	1260	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
AF1350-30..	1350	1350	1350	860	257	475	500	560	560	750	—	—	—	—	—	—	—	—
AF1650-30..	1650	1650	1650	1050	315	560	600	670	700	900	—	8	1215	—	—	—	450	900
AF2050-30..	2050	2050	2050	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
AF2650-30..	2650	2650	2650	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

A Line, 3 pole contactors																		
A/E9-30..	25	25	—	9	2.2	4	4	4	5.5	5.5	—	00	9	0.33	1	1.5	1.5	2
A/E12-30..	27	27	—	12	3	5.5	5.5	5.5	7.5	7.5	—	—	—	—	—	—	—	—
A/E16-30..	30	30	—	17	4	7.5	9	9	9	9	—	0	18	1	2	3	3	5
A/E26-30..	45	45	—	26	6.5	11	11	15	15	15	—	1	27	2	3	7.5	7.5	10
A/E30-30..	55	55	—	32	9	15	15	18.5	18.5	18.5	—	—	—	—	—	—	—	—
A/E40-30..	60	60	—	37	11	18.5	18.5	22	22	22	—	—	—	—	—	—	—	—
A/E/F50-30..	100	100	—	50	15	22	25	25	30	30	—	2	45	3	7.5	10	15	25
A/E/F63-30..	115	115	—	65	18.5	30	37	37	37	37	—	—	—	—	—	—	—	—
A/E/F75-30..	125	125	—	75	22	37	40	40	45	40	—	3	90	—	—	25	30	50
A/F95-30..	145	145	—	96	25	45	55	55	55	55	40	—	—	—	—	—	—	—
A/F110-30..	160	160	—	110	30	55	59	59	59	75	40	—	—	—	—	—	—	—
A/F145-30..	250	250	180	145	45	75	75	75	90	110	110	4	135	—	—	40	50	100
A/F185-30..	275	275	200	185	55	90	90	90	110	132	132	—	—	—	—	—	—	—
A/F210-30..	350	350	—	210	59	110	110	110	132	160	—	—	—	—	—	—	—	—
A/F260-30..	400	400	—	260	80	140	140	140	180	200	—	5	270	—	—	75	100	200
A/F300-30..	500	500	—	305	90	160	160	160	200	250	—	—	—	—	—	—	—	—

North American HVAC applications

General

AF Range contactors can be used for North American HVAC applications, controlling loads such as resistive heaters and refrigerant compressor motors. The cycling endurance required for controllers in these applications is typically higher than those for squirrel cage motors.

This testing has been performed in accordance with UL 60947-4-1A and CSA C22.2 No. 60947-4-1A, 1st edition.

Ordering details

UL / CSA						Catalog number (1)	Global reference code (1)	cULus
Resistance air heating, 3-phase 600 V	Definite purpose ratings for use with hermetic refrigeration compressors, 3-phase, utilization category AC-8a							
A	Full load Amps	200-208V	220-240V	440-480V	550-600V			
	FLA	LRA	LRA	LRA	LRA			
3-pole non-reversing contactors								
20	20	120	120	120	80	AF09-30-10-13	1SBL137001R1310	E312527
25	25	150	150	150	100	AF12-30-10-13	1SBL157001R1310	E312527
30	30	180	180	180	120	AF16-30-10-13	1SBL177001R1310	E312527
45	35	210	210	210	140	AF26-30-00-13	1SBL237001R1300	E312527
50	40	240	240	240	160	AF30-30-00-13	1SBL277001R1300	E312527
50	45	270	270	270	180	AF38-30-00-13	1SBL297001R1300	E312527
65						AF40-30-11-13	1SBL347001R1311	E312527
80						AF52-30-11-13	1SBL367001R1311	E312527
90		Planned testing.				AF65-30-11-13	1SBL387001R1311	E312527
105						AF80-30-11-13	1SBL397001R1311	E312527
115						AF96-30-11-13	1SBL407001R1311	E312527
—	116	800	800	800	800	AF116-30-11-13	1SFL427001R1311	E36588
—	125	875	875	875	875	AF140-30-11-13	1SFL447001R1311	E36588
—	160	1050	1050	1050	1050	AF146-30-11-13	1SFL467001R1311	E36588
—	200	1400	1400	1400	1400	AF190-30-11-13	1SFL487002R1311	E36588
—	250	1500	1500	1500	1500	AF205-30-11-13	1SFL527002R1311	E36588
—	300	2100	2100	2100	2100	AF265-30-11-13	1SFL547002R1311	E36588
—	350	2450	2450	2450	2450	AF305-30-11-13	1SFL587002R1311	E36588
—	520	3120	3120	3120	3120	AF370-30-11-13	1SFL607002R1311	E36588
—	520	3120	3120	3120	3120	AF400-30-11-70	1SFL577001R7011	E36588
—	650	3746	3746	3746	3746	AF460-30-11-70	1SFL597001R7011	E36588
4-pole non-reversing contactors								
	20	120	120	120	80	AF09-40-00-13	1SBL137201R1300	E319322
Planned testing.	30	180	180	180	120	AF16-40-00-13	1SBL177201R1300	E319322
	—	—	—	—	—	AF26-40-00-13	1SBL237201R1300	E319322
	—	—	—	—	—	AF38-40-00-13	1SBL297201R1300	E319322

(1) Ratings representative of all auxiliary configurations and coil voltages, including low-consumption versions.

CSA elevator applications

General

AF Range contactors can be used for CSA elevator applications, controlling motors utilized in equipment designed to transport personnel. These devices have been tested under load to 500,000 electrical cycles at twice their rated nominal current.

This testing has been performed in accordance with CSA B44.1 / ASME 19.2.2

Ordering details

Acc. CSA B44.1 / ASME 19.2.2						Catalog number (1)	Global reference code (1)	cULus
Elevator control, load switching, 500,000 cycles								
1-phase		3-phase						
110-120V	220-240V	200-208V	220-240V	440-480V	550-600V			
hp	hp	hp	hp	hp	hp			
3-pole non-reversing contactors								
0.25	0.5	1	1	3	3	AF09-30-10-13	1SBL137001R1310	E312527
0.33	0.75	2	2	5	5	AF12-30-10-13	1SBL157001R1310	E312527
Use 4-pole version						AF16-30-10-13	1SBL177001R1310	E312527
1.5	3	5	5	15	15	AF26-30-00-13	1SBL237001R1300	E312527
2	3	7.5	7.5	20	20	AF30-30-00-13	1SBL277001R1300	E312527
2	5	7.5	10	20	20	AF38-30-00-13	1SBL297001R1300	E312527
Planned testing.						AF40-30-11-13	1SBL347001R1311	E312527
						AF52-30-11-13	1SBL367001R1311	E312527
						AF65-30-11-13	1SBL387001R1311	E312527
						AF80-30-11-13	1SBL397001R1311	E312527
						AF96-30-11-13	1SBL407001R1311	E312527
4-pole non-reversing contactors								
0.5	1.5	3	3	7.5	10	AF16-40-00-13	1SBL177201R1300	E319322

(1) Ratings representative of all auxiliary configurations and coil voltages, including low-consumption versions.

North American lighting applications

General

AF Range contactors can be used for North American lighting applications, controlling the two basic types of lighting loads: Tungsten, or incandescent, and ballast, or fluorescent. These devices are rated for controlling single phase (one load per pole up to 347 V AC) and three phase loads up to 600 V AC.

This testing has been performed in accordance with UL 60947-4-1A and CSA C22.2 No. 60947-4-1A, 1st edition.

Ordering details

UL/CSA				Catalog number (1)	Global reference code (1)	cULus
Tungsten lamps		Electrical discharge lamps (ballast)				
1-phase, per pole	3-phase, break all lines	1-phase, per pole	3-phase, break all lines			
347 V	600 V	347 V	600 V			
A	A	A	A			
3-pole non-reversing contactors						
		20	20	AF09-30-10-13	1SBL137001R1310	E312527
		25	25	AF12-30-10-13	1SBL157001R1310	E312527
		30	30	AF16-30-10-13	1SBL177001R1310	E312527
		45	45	AF26-30-00-13	1SBL237001R1300	E312527
		50	50	AF30-30-00-13	1SBL277001R1300	E312527
Planned testing.		50	50	AF38-30-00-13	1SBL297001R1300	E312527
		65	65	AF40-30-11-13	1SBL347001R1311	E312527
		80	80	AF52-30-11-13	1SBL367001R1311	E312527
		90	90	AF65-30-11-13	1SBL387001R1311	E312527
		105	105	AF80-30-11-13	1SBL397001R1311	E312527
		115	115	AF96-30-11-13	1SBL407001R1311	E312527
–	–			AF116-30-11-13	1SFL427001R1311	E36588
–	–			AF140-30-11-13	1SFL447001R1311	E36588
–	–			AF146-30-11-13	1SFL467001R1311	E36588
–	–			AF190-30-11-13	1SFL487002R1311	E36588
–	–		Planned testing.	AF205-30-11-13	1SFL527002R1311	E36588
–	–			AF265-30-11-13	1SFL547002R1311	E36588
–	–			AF305-30-11-13	1SFL587002R1311	E36588
–	–			AF370-30-11-13	1SFL607002R1311	E36588
4-pole non-reversing contactors						
				AF09-40-00-13	1SBL137201R1300	E319322
				AF09-22-00-13	1SBL137501R1300	E319322
				AF16-40-00-13	1SBL177201R1300	E319322
Planned testing.			Planned testing.	AF16-22-00-13	1SBL177501R1300	E319322
				AF26-40-00-13	1SBL237201R1300	E319322
				AF26-22-00-13	1SBL237501R1300	E319322
				AF38-40-00-13	1SBL297201R1300	E319322
				AF38-22-00-13	1SBL297501R1300	E319322

(1) Ratings representative of all auxiliary configurations and coil voltages, including low-consumption versions.

Pilot duty and overload trip classes

Pilot duty

Pilot duty is a rating assigned to a relay or switch that controls the coil of another relay or switch. This rating is applied to auxiliary devices utilized in the control circuit. Devices are typically marked with contact rating designations, first an AC value, and second a DC value (ie. A600, Q600). Charts like the ones below can be used to determine the maximum current and voltage that the device is suitable for.

Pilot duty ratings for AC control circuits acc. UL 508, Table 139.1

Contact rating designation	Continuous thermal current	Maximum current								Volt-amperes	
		120 V AC		240 V AC		480 V AC		600 V AC		Make VA	Break VA
		Make	Break	Make	Break	Make	Break	Make	Break		
A	A	A	A	A	A	A	A	VA	VA		
A150	10	60	6	—	—	—	—	—	—	7200	720
A300	10	60	6	30	3	—	—	—	—	7200	720
A600	10	60	6	30	3	15	1.5	12	1.2	7200	720
B150	5	30	3	—	—	—	—	—	—	3600	360
B300	5	30	3	15	1.5	—	—	—	—	3600	360
B600	5	30	3	15	1.5	7.5	0.75	6	0.6	3600	360
C150	2.5	15	1.5	—	—	—	—	—	—	1800	180
C300	2.5	15	1.5	7.5	0.75	—	—	—	—	1800	180
C600	2.5	15	1.5	7.5	0.75	3.75	0.375	3	0.3	1800	180
D150	1	3.6	0.6	—	—	—	—	—	—	432	72
D300	1	3.6	0.6	1.8	0.3	—	—	—	—	432	72
E150	0.5	1.8	0.3	—	—	—	—	—	—	216	36

Pilot duty ratings for DC control circuits acc. UL 508, Table 139.2

Contact rating designation	Continuous thermal current	Maximum current						Volt-amperes	
		120 V DC		250 V DC		600 V DC		Make VA	Break VA
		Make	Break	Make	Break	Make	Break		
A	A	A	A	A	A	A	VA	VA	
N150	10	2.2	2.2	—	—	—	—	275	275
N300	10	2.2	2.2	1.1	1.1	—	—	275	275
N600	10	2.2	2.2	1.1	1.1	0.4	0.4	275	275
P150	5	1.1	1.1	—	—	—	—	138	138
P300	5	1.1	1.1	0.55	0.55	—	—	138	138
P600	5	1.1	1.1	0.55	0.55	0.2	0.2	138	138
Q150	2.5	0.55	0.55	—	—	—	—	69	69
Q300	2.5	0.55	0.55	0.27	0.27	—	—	69	69
Q600	2.5	0.55	0.55	0.27	0.27	0.1	0.1	69	69
R150	1	0.22	0.22	—	—	—	—	28	28
R300	1	0.22	0.22	0.11	0.11	—	—	28	28
E150	0.5	1.8	0.3	—	—	—	—	216	36

Overload trip classes

In addition to their current setting, overloads are also marked with a trip class. This class indicates the period of time that an overload will delay before normal tripping characteristics take effect. This delay is an important consideration based on the starting time of the motor.

Overload trip classes acc. UL 60947-4-1A

Trip class	Tripping Time Tp (Seconds)
10A	2 < Tp ≤ 10
10	4 < Tp ≤ 10
20	6 < Tp ≤ 20
30	9 < Tp ≤ 30

AF09 ... AF96 contactors

DC circuit switching

General

The arc switching on DC is more difficult than on AC.

For selecting a contactor it is essential to determine the current, the voltage and the L/R time constant of the controlled load

For information, typical time constant values are quoted hereafter: non inductive loads such as resistance furnaces (L/R ≈ 1 ms), inductive loads such as shunt motors (L/R ≈ 2 ms) or series motors (L/R ≈ 7.5 ms)

The addition of a resistor in parallel with an inductive winding helps in the elimination of the arcs

All the poles required for breaking must be connected in series between the load and the source polarity not linked to earth (or chassis).

Technical data

The tables indicate for the standard contactors the I_e max. operating currents depending on: the utilization category (i.e. L/R) DC-1, DC-3, DC-5 as defined in the IEC 60947-4-1 publication, the operating voltage U_e and the pole coupling details.

Ampere values quoted in these tables are valid for a -25...+70 °C temperature close to the contactors, as long as these values do not exceed the AC-1 Ampere values for the corresponding ambient temperature




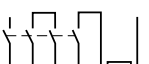
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Max. switching frequency: 300 cycles/h.





Selection table

Contactor types	AF09	AF12	AF16	AF26	AF30	AF38	AF40	AF52	AF65	AF80	AF96
	3 or 4-pole			3-pole	4-pole	3-pole	3-pole	4-pole	3-pole	3-pole	3-pole




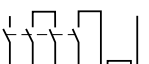
Utilization category DC-1, L/R ≤ 1 ms

	≤ 72 V	25 A	27 A	30 A	45 A	45 A	50 A	50 A	55 A	70 A	100 A	105 A	125 A	130 A
	110 V	10 A	15 A	20 A	-	-	-	-	-	-	-	-	-	-
	220 V	-	-	-	-	-	-	-	-	-	-	-	-	-
	≤ 72 V	25 A	27 A	30 A	45 A	45 A	50 A	50 A	55 A	70 A	100 A	105 A	125 A	130 A
	110 V	25 A	27 A	30 A	45 A	45 A	50 A	50 A	55 A	70 A	100 A	105 A	125 A	130 A
	220 V	10 A	15 A	20 A	-	-	-	-	-	-	-	-	-	-
	≤ 72 V	25 A	27 A	30 A	45 A	45 A	50 A	50 A	55 A	70 A	100 A	105 A	125 A	130 A
	110 V	25 A	27 A	30 A	45 A	45 A	50 A	50 A	55 A	70 A	100 A	105 A	125 A	130 A
	220 V	25 A	27 A	30 A	45 A	45 A	50 A	50 A	55 A	70 A	100 A	105 A	125 A	130 A
	≤ 72 V	25 A	-	30 A	-	45 A	-	-	55 A	-	-	-	-	-
	110 V	25 A	-	30 A	-	45 A	-	-	55 A	-	-	-	-	-
	220 V	25 A	-	30 A	-	45 A	-	-	55 A	-	-	-	-	-
	440 V	10 A	-	20 A	-	-	-	-	-	-	-	-	-	-

Utilization category DC-3, L/R ≤ 2 ms

	≤ 72 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	105 A	125 A	130 A
	110 V	6 A	7 A	8 A	-	-	-	-	-	-	-	-	-	-
	220 V	-	-	-	-	-	-	-	-	-	-	-	-	-
	≤ 72 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	105 A	125 A	130 A
	110 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	105 A	125 A	130 A
	220 V	6 A	7 A	8 A	-	-	-	-	-	-	-	-	-	-
	≤ 72 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	105 A	125 A	130 A
	110 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	105 A	125 A	130 A
	220 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	105 A	125 A	130 A
	≤ 72 V	25 A	-	30 A	-	-	-	-	-	-	-	-	-	-
	110 V	25 A	-	30 A	-	-	-	-	-	-	-	-	-	-
	220 V	25 A	-	30 A	-	-	-	-	-	-	-	-	-	-
	440 V	6 A	-	8 A	-	-	-	-	-	-	-	-	-	-

Utilization category DC-5, L/R ≤ 7.5 ms

	≤ 72 V	9 A	12 A	16 A	20 A	-	25 A	25 A	-	70 A	100 A	105 A	125 A	130 A
	110 V	4 A	4 A	4 A	-	-	-	-	-	-	-	-	-	-
	220 V	-	-	-	-	-	-	-	-	-	-	-	-	-
	≤ 72 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	105 A	125 A	130 A
	110 V	10 A	15 A	20 A	45 A	-	50 A	50 A	-	70 A	100 A	105 A	125 A	130 A
	220 V	4 A	4 A	4 A	-	-	-	-	-	-	-	-	-	-
	≤ 72 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	105 A	125 A	130 A
	110 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	105 A	125 A	130 A
	220 V	9 A	12 A	16 A	20 A	-	25 A	25 A	-	70 A	100 A	105 A	125 A	130 A
	≤ 72 V	25 A	-	30 A	-	-	-	-	-	-	-	-	-	-
	110 V	25 A	-	30 A	-	-	-	-	-	-	-	-	-	-
	220 V	10 A	-	20 A	-	-	-	-	-	-	-	-	-	-
	440 V	4 A	-	4 A	-	-	-	-	-	-	-	-	-	-

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AF16-40-00-12	2.26	AF190R-30-22-14	2.13	AF265N5R-3022-14	2.24	AF26N1ZM-3022-23	2.22
AF16-40-00-13	2.26	AF2050-30-11-70	2.8	AF265R-30-22-11	2.13	AF26N1ZR-3002-21	2.22
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AF26Z-30-00-21	2.3	AF30R-30-02-14	2.9	AF38-40-00-41	2.26	AF40N2R-3022-41	2.23
AF26Z-30-00-22	2.3	AF30R-30-02-41	2.9	AF38Z-22-00-20	2.27	AF40R-30-22-11	2.11
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