



Short form catalog | November 2016

Motor protection and control

Manual motor starters, contactors and overload relays

Motor rated operational powers and currents

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

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

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

3-pole contactors

Mini contactors

Contactors for motor control and

1



IEC (1)	AC-3 Rated operational power	$\theta \leq 60^\circ\text{C}$ (2), 400 V	kW	4	5.5
UL/CSA	3-phase motor rating	480 V	hp	3	5
AC / DC Control supply			Type	—	—
AC Control supply			Type	B6	B7
DC Control supply			Type	BC6	BC7
IEC	AC-3 Rated operational current	$\theta \leq 60^\circ\text{C}$ (2), 400 V	A	8.5	11.5
	AC-1 Rated operational current	$\theta \leq 40^\circ\text{C}$, 690 V	A	20 (400 V)	20 (400 V)
UL/CSA	General use rating	600 V	A	12 (300 V)	16
NEMA	NEMA Size			—	—

(1) 1000 V IEC ratings available for AF80, AF96 and AF146 ... AF2650 contactors.
 (2) $\theta \leq 55^\circ\text{C}$ for mini contactors and AF400 ... AF2650 contactors.

Main accessories

Auxiliary contact blocks	Front mounting	CAF6
	Side mounting	CA6
Timers	Electronic	
Interlocking units (3)	Mechanical	
Connection sets	Mechanical / Electrical	
	For reversing contactors	BSM6-30
Surge suppressors	Varistor (AC/DC)	RV-BC6
	RC type (AC)	
	Transil diode (DC)	RD7

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

Overload relays

Thermal relays	Class 10 (Class 10A for TF140, TA200DU)	T16 (0.10...16 A)
Electronic relays	Class 10E, 20E, 30E	E16DU (0.10...18.9 A)



Manual motor starters

	Thermal / magnetic protection Class 10	MS116 (0.10...32 A) Ics up to 50 kA for class 10A
		MS132 (0.10...32 A) Ics up to 100 kA
	Magnetic only types	MO132 (0.16...32 A)
Accessories		For contactor mounting
		BEA7/132

4	5.5	7.5	4	5.5	7.5	11	15	18.5
5	7.5	10	5	7.5	10	15	20	25
—	—	—	AF09	AF12	AF16	AF26	AF30	AF38
AS09	AS12	AS16	AF09	AF12	AF16	AF26	AF30	AF38
ASL09	ASL12	ASL16	AF09	AF12	AF16	AF26	AF30	AF38
9	12	15.5	9	12	18	26	32	38
22	24	24	25	28	30	45	50	50
20	20	20	25	28	30	45	50	50
00	00	0	00	0	—	1	—	—

CA3-10 (1 x N.O.)	CA4-10 (1 x N.O.)	
CA3-01 (1 x N.C.)	CA4-01 (1 x N.C.)	
	CAL4-11 (1 x N.O. + 1 x N.C.)	
TEF3-ON	TEF4-ON	
TEF3-OFF	TEF4-OFF	
VM3	VM4	
	VEM4	
BER16C-3	BER16-4	BER38-4
RV5 (24...440 V)	Built-in surge protection	
RC5-1 (24...440 V)		
RT5 (12...264 V)		

T16 (0.10...16 A)	TF42 (0.10...38 A)	
	EF19 (0.10...18.9 A)	EF19 (0.10...18.9 A)
		EF45 (9...45 A)

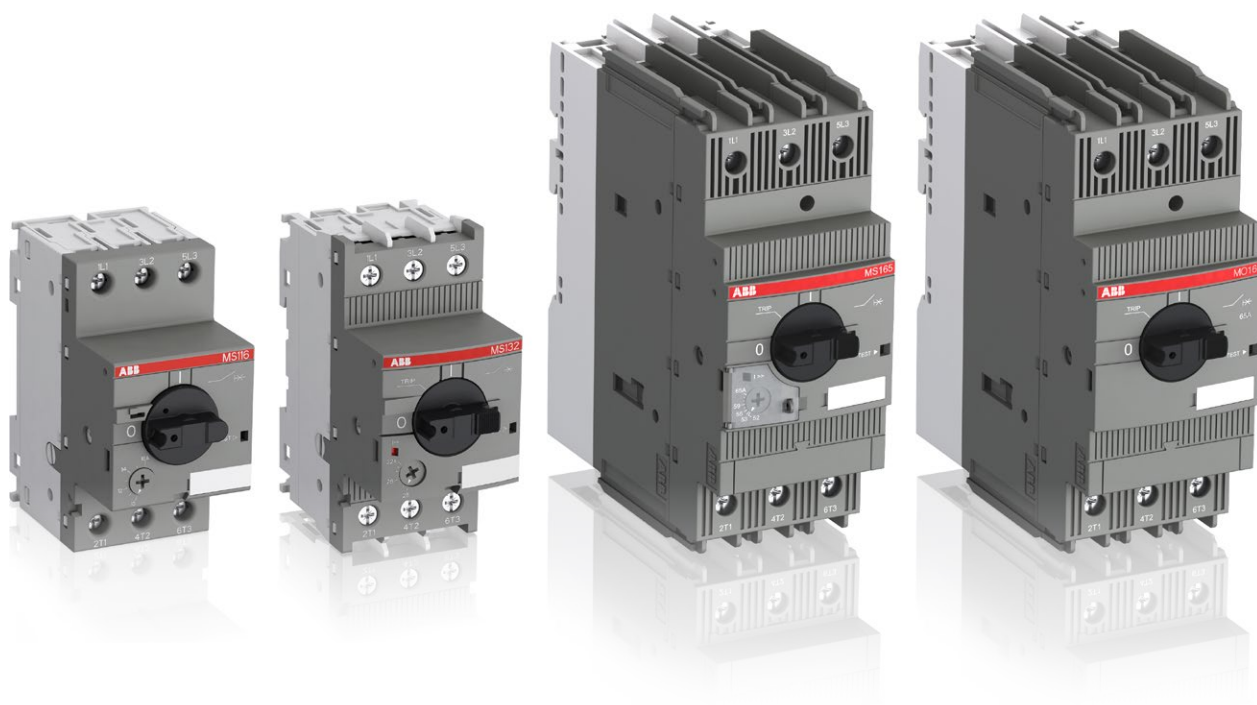
MS116 (0.10...32 A) Ics up to 50 kA for class 10A	MS165 (4) (10...65 A) Ics up to 100 kA
MS132 (0.10...32 A) Ics up to 100 kA	MS497 (22...100 A) Ics up to 100 kA
MO132 (0.16...32 A) Ics up to 100 kA	MO165 (4) (16...65 A) Ics up to 100 kA

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

MS and MO manual motor starters

A complete motor protection concept

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



Safety and protection

Protect equipment and people

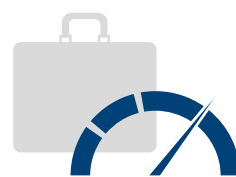
With its broad range of manual motor starters, ABB offers protection and safety in almost every situation including hazardous areas. Save people from electrical shocks and the installation from short-circuits, overloads and phase failures while also controlling the current flow through a simple and handy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



Continuous operation

Secure uptime

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



Speed up your projects

Simplified design

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

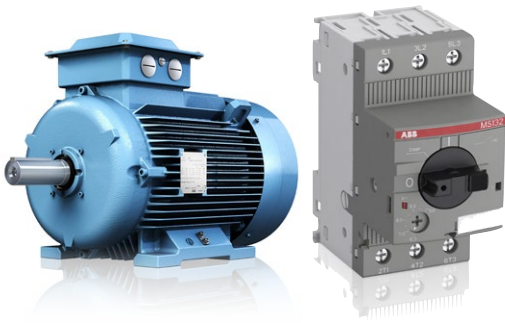
Protection and control

A full motor protection solution

MS116

MS132/
MO132

MS165/
MO165



An all-in-one solution

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

High performance in compact size

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



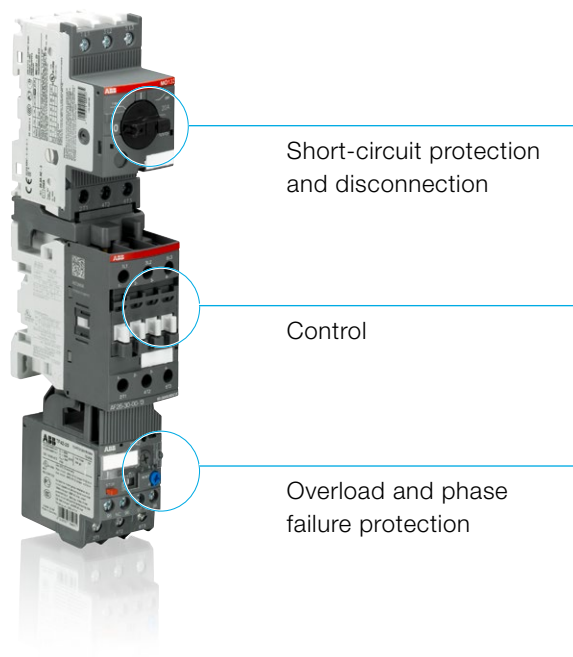
Troubleshooting made easy

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

Always an option

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

Control everywhere and anytime Tuned for your application

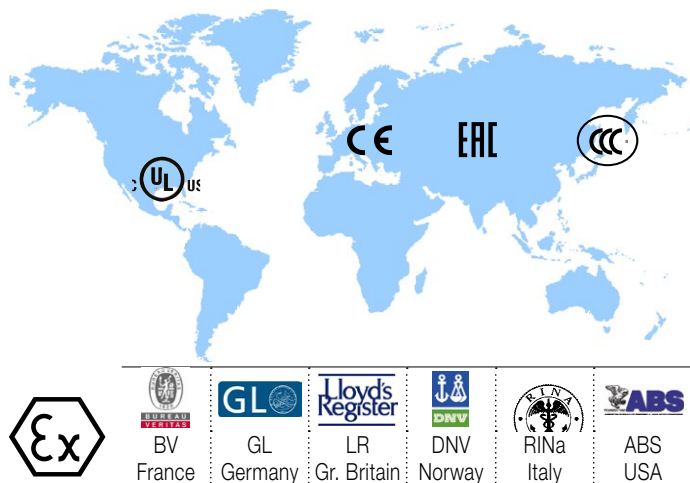


Dedicated for short-circuit protection

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

Transformer protection

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



Protection wherever you are

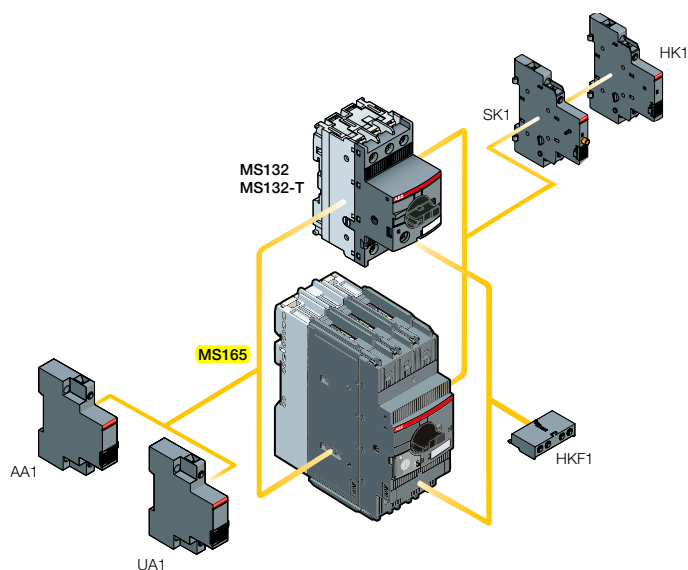
The manual motor starter range is worldwide applicable. With its wide range of certifications, it covers standards like IEC, cULus, CCC, EAC and ship approvals. All manual motor starters also apply to ATEX standards and will protect your motors in hazardous areas.

Ready for IE3 motors

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

Accessories

Easy add-ons, easier control



Busbar connectors and enclosures

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

Harmonized range of accessories

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



Safety at work

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

Easy to connect

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

Manual motor starters

Overview



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

1) Compensated

²⁾ For motor loads only up to 80 A

Accessories

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

Table for short-circuit ratings for 400/415 V

	Standard range MS116	Performance range MS132, MS165, MS5100
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Selection parameters

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

¹⁾ 690 V

MS165 manual motor starters

10 to 65 A – with thermal and electromagnetic protection



MS165-65

Description

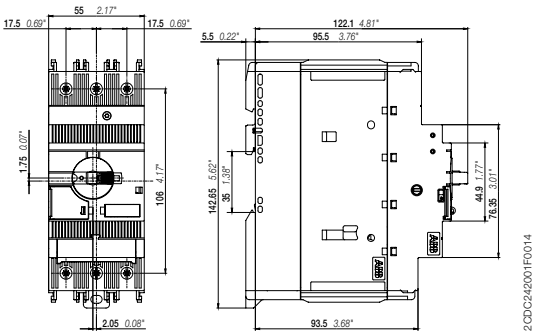
MS165 is a compact and powerful range for motor protection up to 30 kW (400 V) / 65 A in width of 55 mm. This type has also a clear and reliable indication of fault in a separate window in the event of short-circuit tripping. Further features are the build-in disconnect function, temperature compensation,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

Ordering details

Rated operational power 400 V AC-3	Setting range	Short-circuit breaking capacity I_{cs} at 400 V AC	Rated instantaneous short-circuit current setting I_i	Type
kW	A	kA	A	
7.5	10 ... 16	100	240	MS165-16
7.5	14 ... 20	100	300	MS165-20
11	18 ... 25	100	375	MS165-25
15	23 ... 32	100	480	MS165-32
22	30 ... 42	50	630	MS165-42
22	40 ... 54	30	810	MS165-54
30	52 ... 65	30	975	MS165-65

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

Main dimensions mm, inches



MS165

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

Main accessories



HKF1-11

1SBC101209F0014



HK1-11

1SBC101209F0014



SK1-11

1SBC101210F0014



CK1-11

1SBC101286F0014

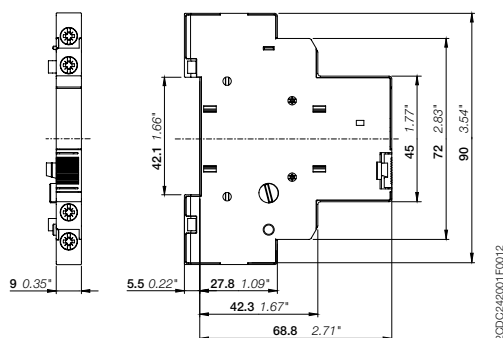
Description

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
Auxiliary contacts – mountable on the front				
MS116,	1	1		HKF1-11
MS132, MS165	1	0		HKF1-10
MO132, MO165	0	1		HKF1-01
MS132-T	2	0		HKF1-20
Auxiliary contacts – mountable on the right				
MS116,	1	1	max. 2 pieces	HK1-11
MS132, MS165	2	0	max. 2 pieces	HK1-20
MO132, MO165	0	2	max. 2 pieces	HK1-02
MS132-T	2	0	with lead contacts	HK1-20L
Signaling contacts – mountable on the right				
MS116,	1	1	for tripped alarm, max. 2 pieces	SK1-11
MS132, MS165	2	0	for tripped alarm, max. 2 pieces	SK1-20
MO132, MO165	0	2	for tripped alarm, max. 2 pieces	SK1-02
MS132-T				
MS132, MS165	1	1	for short-circuit alarm, max. 2 pieces	CK1-11
MS132-T	2	0	for short-circuit alarm, max. 2 pieces	CK1-20
	0	2	for short-circuit alarm, max. 2 pieces	CK1-02

Main dimensions mm, inches



HK1

20DC242001F0012

2CDC131050C0201a

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

Main accessories



AA1-24

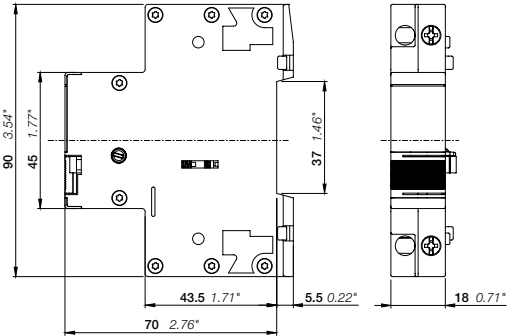


UA1-24

Ordering details

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

Main dimensions mm, inches



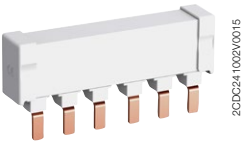
AA1, UA1

2CDC24202F0012

2CDC131050C0201a

MS165, MO165

Main accessories



PS2-2-0-125



PS2-3-0-125



KA165



BS2-3



SA2

Description

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

Ordering details

Suitable for	Rated operational current A	Number of MMS	Number of lateral aux.	Type
Three-phase busbars				
MS165, MO165	125	2	0	PS2-2-0-125
	125	3	0	PS2-3-0-125
	125	4	0	PS2-4-0-125
	125	2	2	PS2-2-2-125
	125	3	2	PS2-3-2-125
	125	4	2	PS2-4-2-125

Other busbar types on request.

Suitable for	Description	Type
MS165, MO165	Terminal shroud	KA165
	Protection cover for busbars	BS2-3
	Padlock + two keys	SA2

General accessories

MS1xx, MO1xx, MS5100, MO5100, MS49x, MO49x



MSHD-LB



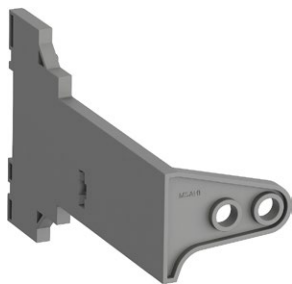
MSHD-LY



MSMN



MSH-AR



MSAH1



RHD Normal Direct Handle

Description

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

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

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

Ordering details

Suitable for	Description	Shaft length mm	Color	Type
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
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⁾
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⁾
Shaft alignment ring				
MS116, MS132, MO132, MS165, MO165, MS4xx, MO4xx	The MSH-AR supports the long shafts for alignment to the handle inlet. It makes closing panel doors more easy. Use for OXS6X > 105 mm.			MSH-AR
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
Rotary handle operating mechanism				
MS5100	Rotary handle operating mechanism			RHD Normal Direct Handle ⁵⁾
MO5100	Rotary handle operating mechanism			RHD Normal Direct Handle ⁵⁾

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

²⁾ Indication I-O and ON-OFF + Trip indication

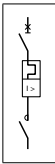
³⁾ Coded - Positioning of ON indication dependent from mounting orientation of the MMS

⁴⁾ Uncoded - Positioning of ON indication independent from mounting orientation of the MMS

⁵⁾ UL Listed

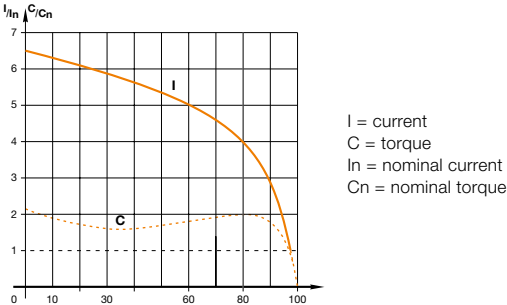
DOL and reversing starters protected by manual motor starters

With AF contactors - open type version in kit form

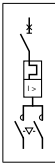


Application

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



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



Coordination types

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

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

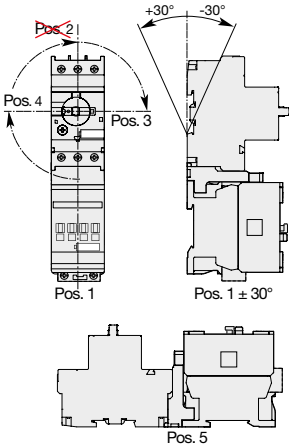
Type 2: In short-circuit conditions, the contactor or starter does not endanger persons or installations and will be able to operate afterwards. The risk of contacts light welding is acceptable.

Main Technical Data

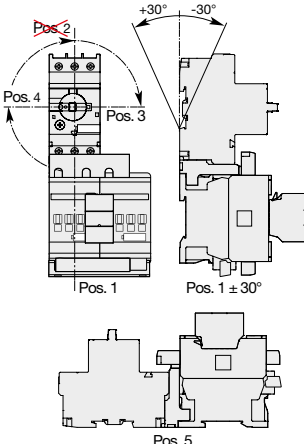
Standards		IEC 60947-4-1 / EN 60947-4-1
Rated operational voltage U_e max.		690 V - 50/60 Hz
Rated insulation voltage U_i		
acc. to IEC 60947-4-1		690 V
acc. to UL / CSA		600 V
Switching frequency		≤ 15 starts/hour - 80 % max. load factor - with max. 1.5 s starting time ≤ 30 starts/hour - 50 % max. load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

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

Mounting positions



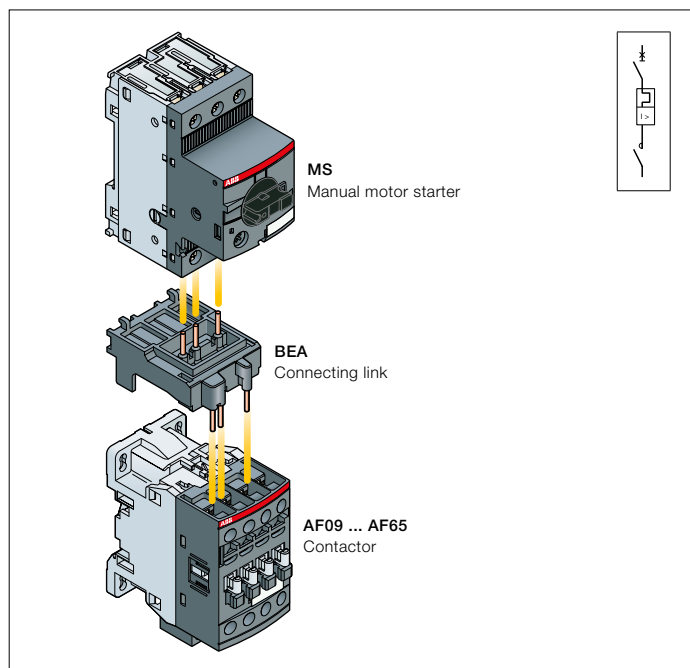
DOL starters



Reversing starters

DOL and reversing starters protected by manual motor starters

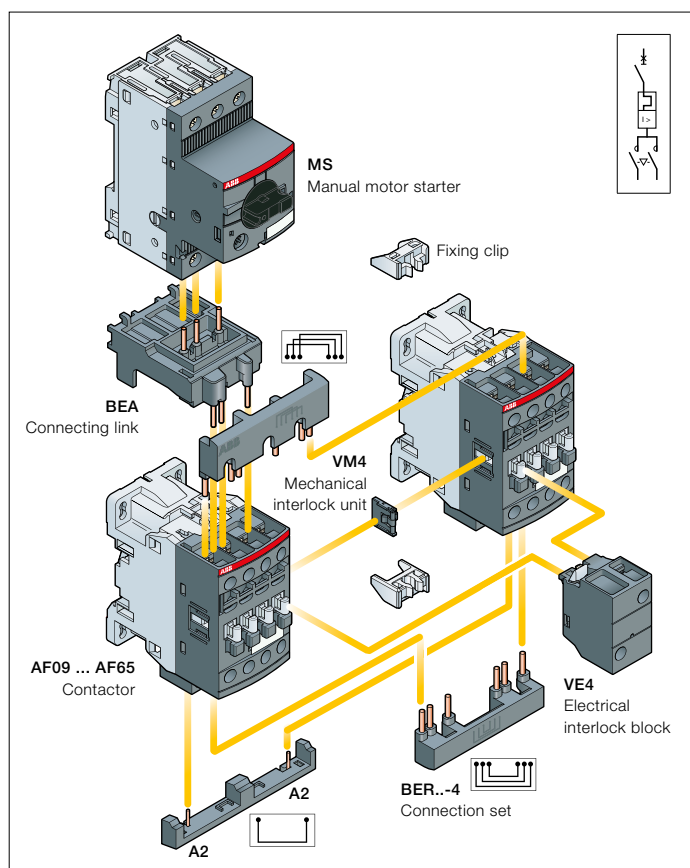
With AF contactors - open type version in kit form



Direct-on-line starters

Description

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



Reversing starters

Description

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

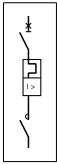
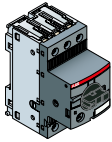
- BEA...-4 connecting link 3-pole insulated: it is used to electrically and mechanically connect MS116, MS132 or MS165 manual motor starter and AF09 ... AF65 contactor, AC or DC operated
- For AF09 ... AF38, use VEM4 mechanical and electrical interlock set for reversing starter in 90 mm width. It includes: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

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

DOL starters protected by MS manual motor starters

Coordination type 1

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

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

(1) MS116 manual motor starter can be selected according to the current setting range indicated on the coordination line, up to:

- 15 kW, 400 V - AC-3 at 16 kA
- 4 kW, 400 V - AC-3 at 50 kA.

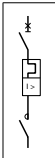
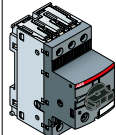
(2) For other control voltages, see "Voltage code table".

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

DOL starters protected by MS manual motor starters

Coordination type 2

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

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

(1) MS116 manual motor starter can be selected according to the current setting range indicated on the coordination line, up to

- 15 kW 400V - AC-3 at 16 kA
- 4 kW, 400 V - AC-3 at 50 kA.

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

(3) AF26 3-pole contactor can be selected for coordination type 2, 16 kA, 7.5 kW, 400 V - AC-3.

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

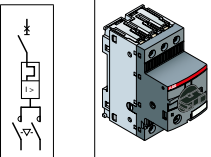
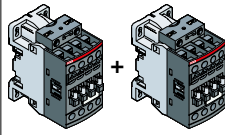
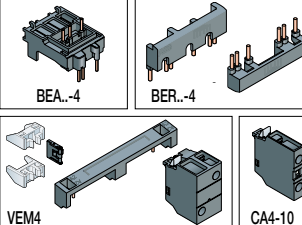
(4) BEA26-4 should be selected with MS116-12 ... MS116-16 and AF26 ... AF38.

BEA38-4 can only be selected with MS116-20 ... MS116-32.

Reversing starters protected by MS manual motor starters

Coordination type 1

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

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

(1) MS116 manual motor starter can be selected according to the current setting range indicated on the coordination line, up to:

- 15 kW, 400 V - AC-3 at 16 kA
- 4 kW, 400 V - AC-3 at 50 kA.

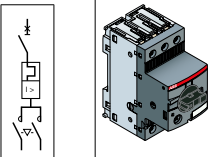
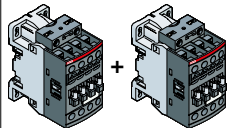
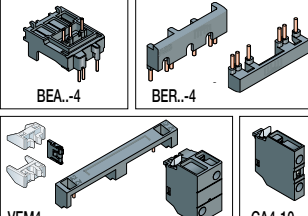
(2) For other control voltages, see "Voltage code table".

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

Reversing starters protected by MS manual motor starters

Coordination type 2

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

Manual motor starters										Contactors				Accessories			
																	
IEC AC-3, 400 V Rated operational power kW	Type (1)	Order code		Current setting range A	Magnetic tripping current A	Rated control circuit voltage Uc min. ... Uc max. (2)		Type (3)	Order code		Allowed setting current A	Type (4)	Order code				
						V 50/60 Hz	V DC										
0.06	0.2	MS132-0.25	1SAM350000R1002	0.16...0.25	2.44	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110		0.25	+	BEA16-4 BER16-4 VEM4	1SBN081306T1000 1SBN081311R1000 1SBN030111R1000			
						100...250	100...250	AF09-30-10-13	1SBL137001R1310								
0.09	0.3	MS132-0.4	1SAM350000R1003	0.25...0.40	3.9	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110		0.4						
						100...250	100...250	AF09-30-10-13	1SBL137001R1310								
0.12	0.44	MS132-0.63	1SAM350000R1004	0.40...0.63	6.14	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110		0.63						
						100...250	100...250	AF09-30-10-13	1SBL137001R1310								
0.18	0.6	MS132-0.63	1SAM350000R1004	0.40...0.63	6.14	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110		0.63						
						100...250	100...250	AF09-30-10-13	1SBL137001R1310								
0.25	0.85	MS132-1.0	1SAM350000R1005	0.63...1.00	11.5	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110		1	+	BEA26-4 BER38-4 VEM4 CA4-10	1SBN082306T1000 1SBN082311R1000 1SBN030111R1000 1SBN010110R1010			
						100...250	100...250	AF09-30-10-13	1SBL137001R1310								
0.37	1.1	MS132-1.6	1SAM350000R1006	1.00...1.60	18.4	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110		1.6						
						100...250	100...250	AF09-30-10-13	1SBL137001R1310								
0.55	1.5	MS132-1.6	1SAM350000R1006	1.00...1.60	18.4	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110		1.6						
						100...250	100...250	AF09-30-10-13	1SBL137001R1310								
0.75	1.9	MS132-2.5	1SAM350000R1007	1.60...2.50	28.75	24...60	20...60	AF09Z-30-10-21	1SBL136001R2110		2.5						
						100...250	100...250	AF09-30-10-13	1SBL137001R1310								
1.1	2.7	MS132-4.0	1SAM350000R1008	2.50...4.00	50	24...60	20...60	AF26Z-30-00-21	1SBL236001R2100		4	+	BEA26-4 BER38-4 VEM4 CA4-10	1SBN082306T1000 1SBN082311R1000 1SBN030111R1000 1SBN010110R1010			
						100...250	100...250	AF26-30-00-13	1SBL237001R1300								
1.5	3.6	MS132-4.0	1SAM350000R1008	2.50...4.00	50	24...60	20...60	AF26Z-30-00-21	1SBL236001R2100		4						
						100...250	100...250	AF26-30-00-13	1SBL237001R1300								
2.2	4.9	MS132-6.3	1SAM350000R1009	4.00...6.30	78.75	24...60	20...60	AF26Z-30-00-21	1SBL236001R2100		6.3						
						100...250	100...250	AF26-30-00-13	1SBL237001R1300								
3	6.5	MS132-10	1SAM350000R1010	6.30...10.0	150	24...60	20...60	AF26Z-30-00-21	1SBL236001R2100		10	+	BEA38-4 BER38-4 VEM4 CA4-10	1SBN082306T2000 1SBN082311R1000 1SBN030111R1000 1SBN010110R1010			
						100...250	100...250	AF26-30-00-13	1SBL237001R1300								
4	8.5	MS132-10	1SAM350000R1010	6.30...10.0	150	24...60	20...60	AF26Z-30-00-21	1SBL236001R2100		10						
						100...250	100...250	AF26-30-00-13	1SBL237001R1300								
5.5	11.5	MS132-12	1SAM350000R1012	8.00...12.0	180	24...60	20...60	AF26Z-30-00-21	1SBL236001R2100		12						
						100...250	100...250	AF26-30-00-13	1SBL237001R1300								
7.5	15.5	MS132-16	1SAM350000R1011	10.0...16.0	240	24...60	20...60	AF30Z-30-00-21	1SBL276001R2100		16	+	BEA38-4 BER38-4 VEM4 CA4-10	1SBN082311R1000 1SBN030111R1000 1SBN010110R1010			
						100...250	100...250	AF30-30-00-13	1SBL277001R1300								
11	22	MS132-25	1SAM350000R1014	20.0...25.0	375	24...60	20...60	AF30Z-30-00-21	1SBL276001R2100		25						
						100...250	100...250	AF30-30-00-13	1SBL277001R1300								
15	29	MS132-32	1SAM350000R1015	25.0...32.0	480	24...60	20...60	AF30Z-30-00-21	1SBL276001R2100		32	+	BEA65-4 BER65-4 VM96-4 CA4-10 CA4-01	1SBN083406R1000 1SBN083411R1000 1SBN033405T1000 1SBN010110R1010 1SBN010110R1001			
						100...250	100...250	AF30-30-00-13	1SBL277001R1300								
18.5	35	MS165-42	1SAM451000R1015	30.0...42.0	630	24...60	20...60	AF40-30-00-11	1SBL347001R1100		40						
						100...250	100...250	AF40-30-00-13	1SBL347001R1300								
22	41	MS165-54	1SAM451000R1016	40.0...54.0	810	24...60	20...60	AF52-30-00-11	1SBL367001R1100		53						
						100...250	100...250	AF52-30-00-13	1SBL367001R1300								
30	55	MS165-65	1SAM451000R1017	52.0...65.0	975	24...60	20...60	AF65-30-00-11	1SBL387001R1100		65	+	BEA96-4 VM96-4 CA4-10 CA4-01	1SBN083911R1000 1SBN033405T1000 1SBN010110R1010 1SBN010110R1001			
						100...250	100...250	AF65-30-00-13	1SBL387001R1300								
37	66	MS495-75	1SAM550000R1008	57.0...75.0	975	24...60	20...60	AF80-30-00-11	1SBL397001R1100		75						
						100...250	100...250	AF80-30-00-13	1SBL397001R1300								
45	80	MS495-90	1SAM550000R1009	70.0...90.0	1170	24...60	20...60	AF96-30-00-11	1SBL407001R1100		90	+	BEA96-4 VM96-4 CA4-10 CA4-01	1SBN083911R1000 1SBN033405T1000 1SBN010110R1010 1SBN010110R1001			
						100...250	100...250	AF96-30-00-13	1SBL407001R1300								

(1) MS116 manual motor starter can be selected according to the current setting range indicated on the coordination line, up to

- 15 kW 400V - AC-3 at 16 kA

- 4 kW, 400 V - AC-3 at 50 kA.

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

(3) AF26 3-pole contactor can be selected for coordination type 2, 16 kA, 7.5 kW, 400 V - AC-3.

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

(4) BEA26-4 should be selected with MS116-12 ... MS116-16 and AF26 ... AF38.

BEA38-4 can only be selected with MS116-20 ... MS116-32.

3-pole contactors, for motor control and power switching



AC / DC Control supply				Type	AF09	AF12	AF16	AF26	AF30	AF38	AF40	AF52	AF65	AF80	AF96
IEC	AC-3	Rated operational power	220 - 230 - 240 V	kW	2.2	3	4	6.5	9	11	11	15	18.5	22	25
		$\theta \leq 60^\circ\text{C}$ for AF09 ... AF370	380 - 400 V	kW	4	5.5	7.5	11	15	18.5	18.5	22	30	37	45
		$\theta \leq 55^\circ\text{C}$ for AF400 ... AF2650	415 V	kW	4	5.5	9	11	15	18.5	22	30	37	45	55
			440 V	kW	4	5.5	9	15	18.5	22	22	30	37	45	55
			500 V	kW	5.5	7.5	9	15	18.5	22	22	30	37	45	55
			690 V	kW	5.5	7.5	9	15	18.5	22	22	30	37	45	55
			1000 V	kW	—	—	—	—	—	—	—	—	—	35	40
			Rated operational current	380 - 400 V	A	9	12	18	26	32	38	40	53	65	80
	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
		220 - 240 V	hp	2	3	5	7.5	10	10	15	20	25	30	30
		440 - 480 V	hp	5	7.5	10	15	20	25	30	40	50	60	60
		550 - 600 V	hp	7.5	10	15	20	25	30	40	50	60	75	75
	General use rating	600 V	A	25	28	30	45	50	50	60	80	90	105	115
NEMA	NEMA Size			00	0	—	1	—	—	2	—	—	3	—

Main accessories

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

Overload relays

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

Manual motor starters

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

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

Certifications and approvals

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

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