



Catalog

Motor protection and control

Manual motor starters

Power and productivity
for a better world™





Manual motor starters

Benefits	2/2
Features	2/3
Overview	2/4

0.10 to 65 A – with thermal and electromagnetic protection

MS116 manual motor starters	2/6
MS132 manual motor starters	2/7
MS165 manual motor starters	2/8

0.16 to 65 A – with electromagnetic protection

MO132 manual motor starters magnetic only	2/9
MO165 manual motor starters magnetic only	2/10

0.10 to 25 A – with thermal and electromagnetic protection

MS132-T circuit breakers for transformer protection	2/11
---	------

Technical data

MS116, MS132, MS165, MO132, MO165, MS132-T	2/12
--	------

Main accessories

MS116, MS132, MS165, MO132, MO165, MS132-T	2/22
MS116, MS132, MS165, MO132, MO165	2/27
MS116, MS132, MO132, MS132-T	2/28
MS165, MO165	2/29
MS116, MS132, MS165, MO132, MO165	2/30
MS116, MS132, MO132	2/31

22 to 100 A – with thermal and electromagnetic protection

MS450, MS495, MS497 manual motor starters	2/32
---	------

Technical data

MS450, MS495, MS497 manual motor starters	2/33
---	------

32 to 100 A – with electromagnetic protection

MO450, MO495, MO496 manual motor starters magnetic only	2/36
---	------

Technical data

MO450, MO495, MO496 manual motor starters magnetic only	2/37
---	------

Main accessories

MS45x, MS49x, MO45x, MO49x manual motor starters	2/40
--	------

0.10 to 25 A – with thermal and electromagnetic protection

MS325 manual motor starters	2/46
-----------------------------	------

0.4 to 25 A – with electromagnetic protection

MO325 manual motor starters magnetic only	2/47
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Technical data

MS325, MO325 manual motor starters	2/48
MS325 manual motor starters	2/49
MS325, MO325 manual motor starters	2/50

Main accessories

MS325, MO325 manual motor starters	2/51
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General accessories

MS116, MS132, MO132, MS4xx, MO4xx, MS325, MO325	2/55
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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



Direct-on-line starters



Door mounting kits

Manual motor starters

Features

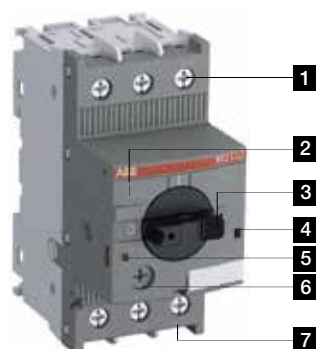
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Features

- 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

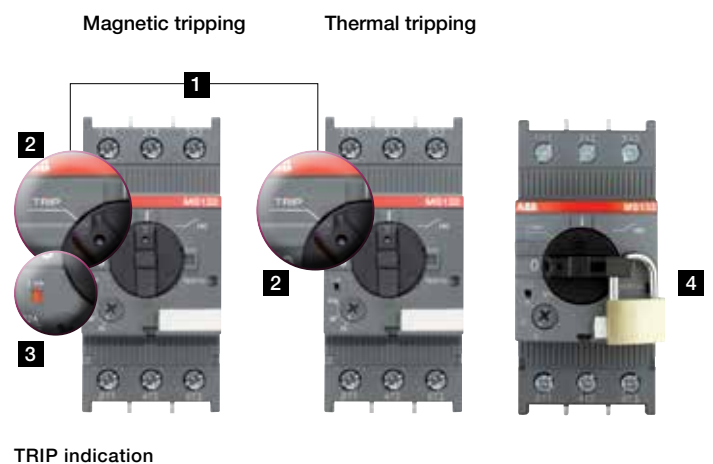
- Magnetic trip indication for several types available (MS132, MS165, and MS132-T)
- One product family in 45 mm width (MS116, MS132, MO132, and MS132-T)
- Setting ranges from 0.1 up to 65 A (MS116, MS132, MS165, MO132, and MO165)
- Short-circuit service breaking capacity I_{CS} up to 100 kA

- 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



Features of type MS132

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



2CDC131072C0201

Manual motor starters

Overview

2



Type	MS116	MS132	MS165	MS450	MS495	MS497	MS325
Thermal and electromagnetic protection	Yes	Yes	Yes	Yes	Yes		Yes
Electromagnetic protection	-	-	-	-	-		-
Phase loss sensitivity	Yes	Yes	Yes	Yes	Yes		Yes
Switch position	ON/OFF	ON/OFF/TRIP	ON/OFF/TRIP	ON/OFF/TRIP	ON/OFF/TRIP		ON/OFF
Magnetic trip indication	-	Yes	Yes	-	-		-
Lockable handle without accessories	-	Yes	Yes	Yes	Yes		-
Disconnecting feature	Yes	Yes	Yes	Yes	Yes		Yes
Width	45 mm	45 mm	55 mm	55 mm	70 mm		54 mm
Rated operational current I_e	0.16 ... 32 A	0.16 ... 32 A	16 ... 65 A	40 ... 50 A	63 ... 100 A	32 ... 100 A	0.16 ... 25 A
Setting range	0.1 ... 32 A	0.1 ... 32 A	10 ... 65 A	28 ... 50 A	45 ... 100 A	22 ... 100 A	0.1 ... 25 A
Ambient air temperature	-25 ... +55 °C *)	-25 ... +60 °C *)	-20 ... +60 °C *)	-20 ... +60 °C *)	-20 ... +60 °C *)		-25 ... +50 °C *)

*) Compensated

Table for short-circuit ratings for 400/415 V

	Standard range MS116, MS450, MS495	Performance range MS132, MS165, MS497	Modular DIN rail design MS325
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Selection parameters

Rated operational power	Setting range for thermal release	Type	Short-circuit breaking capacity		Type	Short-circuit breaking capacity		Type	Short-circuit breaking capacity
			I_{cu}	I_{cs}		I_{cu}	I_{cs}		I_{cs} / I_{cu}
0.03 kW ¹⁾	0.1 ... 0.16 A	MS116-0.16	50 kA	50 kA	MS132-0.16	100 kA	100 kA	MS325-0.16	100 kA
0.06 kW	0.16 ... 0.25 A	MS116-0.25	50 kA	50 kA	MS132-0.25	100 kA	100 kA	MS325-0.25	100 kA
0.09 kW	0.25 ... 0.4 A	MS116-0.4	50 kA	50 kA	MS132-0.4	100 kA	100 kA	MS325-0.4	100 kA
0.18 kW	0.4 ... 0.63 A	MS116-0.63	50 kA	50 kA	MS132-0.63	100 kA	100 kA	MS325-0.63	100 kA
0.25 kW	0.63 ... 1.0 A	MS116-1.0	50 kA	50 kA	MS132-1.0	100 kA	100 kA	MS325-1	100 kA
0.55 kW	1.0 ... 1.6 A	MS116-1.6	50 kA	50 kA	MS132-1.6	100 kA	100 kA	MS325-1.6	100 kA
0.75 kW	1.6 ... 2.5 A	MS116-2.5	50 kA	50 kA	MS132-2.5	100 kA	100 kA	MS325-2.5	100 kA
1.5 kW	2.5 ... 4.0 A	MS116-4.0	50 kA	50 kA	MS132-4.0	100 kA	100 kA	MS325-4	100 kA
2.2 kW	4.0 ... 6.3 A	MS116-6.3	50 kA	50 kA	MS132-6.3	100 kA	100 kA	MS325-6.3	100 kA
4.0 kW	6.3 ... 10 A	MS116-10	50 kA	50 kA	MS132-10	100 kA	100 kA	MS325-9	100 kA
5.5 kW	8 ... 12 A	MS116-12	25 kA	25 kA	MS132-12	100 kA	100 kA	MS325-12.5	75 kA
7.5 kW	10 ... 16 A	MS116-16	16 kA	16 kA	MS132-16 / MS165-16	100 kA	100 kA	MS325-16	60 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	MS325-20	55 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	MS325-25	50 kA
15 kW	25 ... 32 A	MS116-32	10 kA	10 kA	MS132-32	50 kA	25 kA		
15 kW	22 ... 32 A				MS497-32	100 kA	50 kA		
15 kW	23 ... 32 A				MS165-32	100 kA	75 kA		
18.5 kW	28 ... 40 A	MS450-40	50 kA	25 kA	MS497-40	100 kA	50 kA		
22 kW	30 ... 42 A				MS165-42	50 kA	25 kA		
22 kW	36 ... 45 A	MS450-45	50 kA	25 kA					
22 kW	40 ... 50 A	MS450-50	50 kA	25 kA	MS497-50	100 kA	50 kA		
22 kW	40 ... 54 A				MS165-54	50 kA	25 kA		
30 kW	45 ... 63 A	MS495-63	50 kA	25 kA	MS497-63	100 kA	50 kA		
30 kW	52 ... 65 A				MS165-65	50 kA	25 kA		
37 kW	57 ... 75 A	MS495-75	50 kA	25 kA	MS497-75	100 kA	50 kA		
45 kW	70 ... 90 A	MS495-90	50 kA	25 kA	MS497-90	100 kA	50 kA		
55 kW	80 ... 100 A	MS495-100	50 kA	25 kA	MS497-100	100 kA	50 kA		

¹⁾ 690 V



MO132	MO165	MO450	MO495	MO496	MO325	MS132-T
-	-	-	-	-	-	Yes
Yes	Yes	Yes	Yes	Yes	Yes	-
-	-	-	-	-	-	Yes
ON/OFF/TRIP	ON/OFF/TRIP	ON/OFF/TRIP	ON/OFF/TRIP	ON/OFF/TRIP	ON/OFF	ON/OFF/TRIP
-	-	-	-	-	-	Yes
Yes	Yes	Yes	Yes	-	-	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes
45 mm	55 mm	55 mm	70 mm		54 mm	45 mm
0.16 ... 32 A	16 ... 65 A	40 ... 50 A	63 ... 100 A	32 ... 100 A	0.4 ... 25 A	0.16 ... 32 A
-	-	-	-	-	-	0.1 ... 25 A
-25 ... +60 °C	-25 ... +60 °C	-20 ... +60 °C	-20 ... +60 °C		-25 ... +50 °C	-25 ... +60 °C *)

Standard range MO132, MO450, MO495			Performance range MO132, MO165, MO496			Modular DIN rail design MO325		Transformer protection MS132-T	
Type	Short-circuit breaking capacity		Type	Short-circuit breaking capacity		Type	Short-circuit breaking capacity	Type	Short-circuit breaking capacity
	I_{cu}	I_{cs}		I_{cu}	I_{cs}		I_{cs} / I_{cu}		I_{cs} / I_{cu}
MO132-0.16	100 kA	100 kA	MO132-0.16	100 kA	100 kA		100 kA	MS132-0.16T	100 kA
MO132-0.25	100 kA	100 kA	MO132-0.25	100 kA	100 kA		100 kA	MS132-0.25T	100 kA
MO132-0.4	100 kA	100 kA	MO132-0.4	100 kA	100 kA	MO325-0.4	100 kA	MS132-0.4T	100 kA
MO132-0.63	100 kA	100 kA	MO132-0.63	100 kA	100 kA	MO325-0.63	100 kA	MS132-0.63T	100 kA
MO132-1.0	100 kA	100 kA	MO132-1.0	100 kA	100 kA	MO325-1	100 kA	MS132-1.0T	100 kA
MO132-1.6	100 kA	100 kA	MO132-1.6	100 kA	100 kA	MO325-1.6	100 kA	MS132-1.6T	100 kA
MO132-2.5	100 kA	100 kA	MO132-2.5	100 kA	100 kA	MO325-2.5	100 kA	MS132-2.5T	100 kA
MO132-4.0	100 kA	100 kA	MO132-4.0	100 kA	100 kA	MO325-4	100 kA	MS132-4.0T	100 kA
MO132-6.3	100 kA	100 kA	MO132-6.3	100 kA	100 kA	MO325-6.3	100 kA	MS132-6.3T	100 kA
MO132-10	100 kA	100 kA	MO132-10	100 kA	100 kA	MO325-9	100 kA	MS132-10T	100 kA
MO132-12	100 kA	100 kA	MO132-12	100 kA	100 kA	MO325-12.5	75 kA	MS132-12T	100 kA
MO132-16	100 kA	100 kA	MO132-16 / MO165-16	100 kA	100 kA	MO325-16	60 kA	MS132-16T	100 kA
			MO165-20	100 kA	100 kA				
MO132-20	100 kA	100 kA	MO132-20	100 kA	100 kA	MO325-20	55 kA	MS132-20T	100 kA
MO132-25	50 kA	50 kA	MO132-25 / MO165-25	50 kA / 100 kA	50 kA / 100 kA	MO325-25	50 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.	
			MO496-32	100 kA	50 kA				
			MO165-32	100 kA	50 kA				
MO450-40	50 kA	25 kA	MO496-40	100 kA	50 kA				
			MO165-42	50 kA	25 kA				
MO450-45	50 kA	25 kA							
MO450-50	50 kA	25 kA	MO496-50	100 kA	50 kA				
			MO165-54	50 kA	25 kA				
MO495-63	50 kA	25 kA	MO496-63	100 kA	50 kA				
			MO165-65	50 kA	25 kA				
MO495-75	50 kA	25 kA	MO496-75	100 kA	50 kA				
MO495-90	50 kA	25 kA	MO496-90	100 kA	50 kA				
MO495-100	50 kA	25 kA	MO496-100	100 kA	50 kA				

0.10 to 65 A – with thermal and electromagnetic protection

MS116 manual motor starters

2



MS116-16



MS116-25



MS116-0.16-HKF1-11



MS116-32-HKF1-11

Description

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

Ordering details

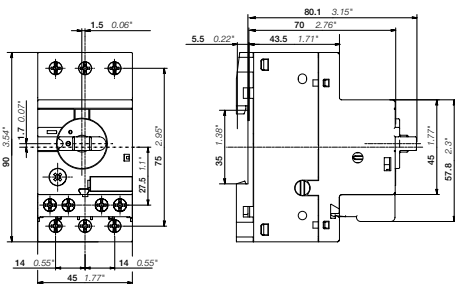
Rated operational power 400 V AC-3	Setting range	Short-circuit breaking capacity I_{cs} at 400 V AC	Rated instantaneous short-circuit current setting I_i	Type	Order code	Weight (1 pc)
kW	A	kA	A			kg
0.03 ²⁾	0.10 ... 0.16	50	2.00 ¹⁾	MS116-0.16	1SAM250000R1001	0.225
0.06	0.16 ... 0.25	50	3.10 ¹⁾	MS116-0.25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

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

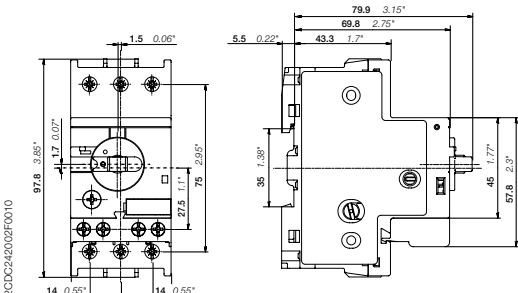
¹⁾ The data is valid for products, produced after week 34, 2014.

²⁾ 690 V

Main dimensions mm, inches



MS116 ≤ 16 A & MS116-HKF1-11 ≤ 16 A



MS116 ≥ 20 A & MS116-HKF1-11 ≥ 20 A

0.10 to 65 A – with thermal and electromagnetic protection MS132 manual motor starters

2



MS132-10

1SBC101232F0010



MS132-32

2CDC241001F0011



MS132-0.16-HKF1-11

2CDC241014F0011



MS132-32-HKF1-11

2CDC241015F0011

Description

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

Ordering details

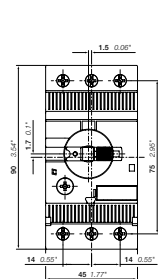
Rated operational power 400 V AC-3	Setting range	Short-circuit breaking capacity I_{cs} at 400 V AC	Rated instantaneous short-circuit current setting I_i	Type	Order code	Weight (1 pc)
kW	A	kA	A			kg
0.03 ²⁾	0.10 ... 0.16	100	2.00 ¹⁾	MS132-0.16	1SAM350000R1001	0.215
0.06	0.16 ... 0.25	100	3.10 ¹⁾	MS132-0.25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

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

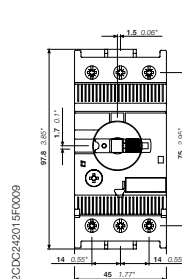
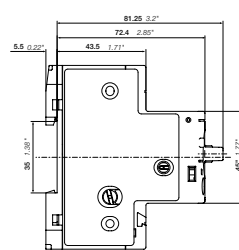
¹⁾ The data is valid for products, produced after week 34, 2014.

²⁾ 690 V

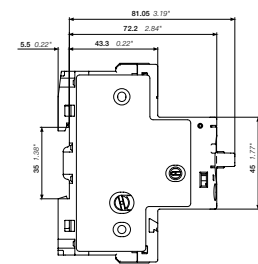
Main dimensions mm, inches



MS132 ≤ 10 A



MS132 ≥ 12 A



0.10 to 65 A – with thermal and electromagnetic protection

MS165 manual motor starters

2



MS165-65

2CDC241004V0015

Description

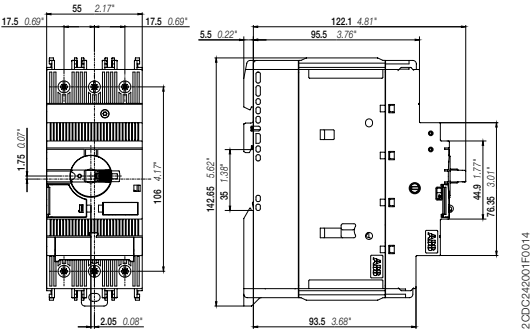
MS165 is a compact and powerful range for motor protection up to 30 kW (400 V) / 65 A in width of 55 mm. This type has also a clear and reliable indication of fault in a separate window in the event of short-circuit tripping. Further features are the build-in disconnect function, temperature compensation, 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 pc)
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	75	480	MS165-32	1SAM451000R1014	0.970
22	30 ... 42	25	630	MS165-42	1SAM451000R1015	0.970
22	40 ... 54	25	810	MS165-54	1SAM451000R1016	0.970
30	52 ... 65	25	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

2CDC131062C0201

0.16 to 65 A – with electromagnetic protection

MO132 manual motor starters magnetic only



MO132-6.3



MO132-32

2CDC241008F0011

2CDC241008F0011

Description

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

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

Ordering details

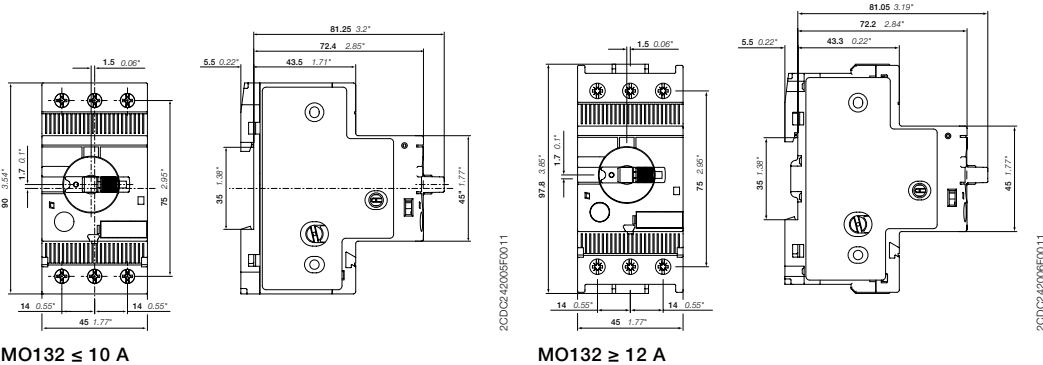
Rated operational power 400 V AC-3 ¹⁾	Rated operational current	Short-circuit breaking capacity I _{cs} at 400 V AC	Rated instantaneous short-circuit current setting I _i	Type	Order code	Weight (1 pc)
kW	A	kA	A			kg
0.03 ³⁾	0.16	100	2.00 ²⁾	MO132-0.16	1SAM360000R1001	0.215
0.06	0.25	100	3.10 ²⁾	MO132-0.25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

¹⁾ For overload protection of motors, an appropriate thermal or electronic overload relay must be used

²⁾ The data is valid for products, produced after week 34, 2014.

³⁾ 690 V

Main dimensions mm, inches



2CDC242008F0011
2CDC131062C0201

0.16 to 65 A – with electromagnetic protection

MO165 manual motor starters magnetic only

2



MO165-65

2CDC241005V0015

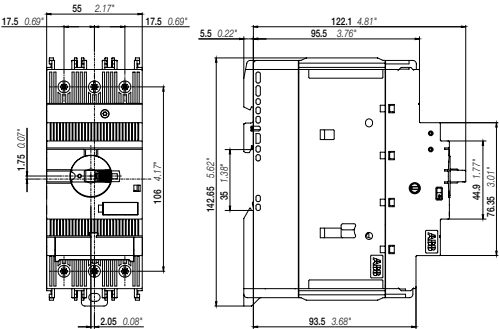
Description

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

Main dimensions mm, inches



MO165

2CDC242002F0014

2CDC131062C0201

0.10 to 25 A – with thermal and electromagnetic protection

MS132-T circuit breakers for transformer 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.

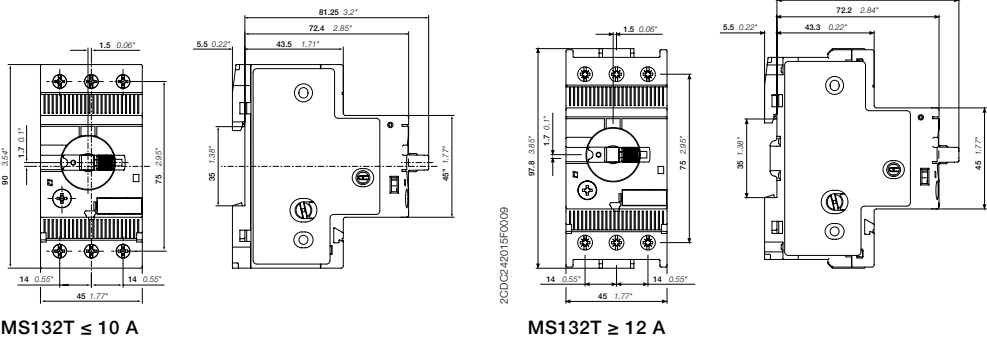
MS132-T is a 45 mm (width) compact and powerful range for transformer protection up to 12.5 kW (400 V) / 25 A. This type has also a clear and reliable indication of fault in a separate window in the event of short-circuit tripping. Further features are the build-in disconnect function, temperature compensation,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



MS132T ≤ 10 A

MS132T ≥ 12 A

Technical data

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

2

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	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Trip class	10A	10 (10A for 1SA M350000R1001)	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 20 ... 65 A 50000 cycles	50000 cycles 50000 cycles	25000 cycles 25000 cycles	50000 cycles 50000 cycles	25000 cycles 25000 cycles	50000 cycles 50000 cycles
Rated impulse withstand voltage U_{imp}	6 kV	6 kV	8 kV	6 kV	8 kV	6 kV
Rated insulation voltage U_i	690 V	690 V	1000 V	690 V	1000 V	690 V
Rated operational current I_n	See ordering details					
Rated operational current DC-5 I_{DC-5} 3 conducting paths in series up to 250 V	-	See "Rated operational current I_n "	-	-	-	-
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} 3 conducting paths in series up to 250 V	-	10 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	No back-up fuse required up to $I_{cc} = 50$ kA						No back-up fuse required up to $I_{cc} = 30$ kA								
MS116-0.25															
MS116-0.4															
MS116-0.63															
MS116-1.0															
MS116-1.6	No back-up fuse required up to $I_{cc} = 50$ kA						10	10	25	10	10	25	5	5	25
MS116-2.5							6	6	25	6	6	25	2	2	25
MS116-4.0							6	6	63	6	6	63	2	2	40
MS116-6.3							6	6	63	6	6	63	2	2	50
MS116-10							6	6	63	6	6	63	2	2	50
MS116-12	25	25	80	25	25	80	6	6	63	6	6	63	2	2	50
MS116-16	16	16	80	16	16	80	6	6	63	4	4	63	2	2	63
MS116-20	10	15	125	10	15	125	3	6	125	3	4	125	2	2	80
MS116-25	10	15	125	10	15	125	3	6	125	3	4	125	2	2	100
MS116-32	10	10	125	10	10	125	3	6	125	3	4	125	2	2	100

MS116-10: No need for back-up fuse in networks with a prospective current of up to 50 kA at 400 V.

MS116-16: No need for back-up fuse in networks with a prospective current of up to 16 kA at 400 V.

With an appropriate 80 A type gG fuse the device can be used in a network with a prospective current of up to 100 kA.

MS116-32: No need for back-up fuse in networks with a prospective current of up to 10 kA at 400 V.

Technical data

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

2

Type	230 V AC			400 V AC			440 V AC			500 V AC			690 V AC		
	I_{CS} kA	I_{CU} kA	gG, aM A	I_{CS} kA	I_{CU} kA	gG, aM A	I_{CS} kA	I_{CU} kA	gG, aM A	I_{CS} kA	I_{CU} kA	gG, aM A	I_{CS} kA	I_{CU} kA	gG, aM A
MS132-0.16	No back-up fuse required up to $I_{cc} = 100$ kA														
MS132-0.25															
MS132-0.4															
MS132-0.63															
MS132-1.0															
MS132-1.6															
MS132-2.5							20	20	35	20	20	35	3	3	32
MS132-4.0							20	20	63	20	20	63	3	3	50
MS132-6.3							20	20	100	20	20	100	3	3	50
MS132-10							20	20	100	20	20	100	3	3	63
MS132-12							20	20	125	20	20	125	3	3	63
MS132-16							20	20	125	20	20	125	3	3	80
MS132-20							20	20	125	20	20	125	3	3	100
MS132-25	50	50	125	50	50	125	20	20	125	10	10	125	3	3	100
MS132-32	25	50	125	25	50	125	20	20	125	10	10	125	3	3	100

MS132-16: No need for back-up fuse in networks with a prospective current of up to 100 kA at 400 V.

MS132-32: 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.

Type	230 V AC			400 V AC			440 V AC			500 V AC			690 V AC		
	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	-	100	100	-	8	8	125	8	8	125	8	8	63
MS165-20	100	100	-	100	100	-	8	8	125	8	8	125	8	8	63
MS165-25	100	100	-	100	100	-	8	8	125	8	8	125	8	8	80
MS165-32	75	100	-	75	100	-	5	5	125	5	5	125	5	5	100
MS165-42	25	50	125	25	50	125	5	5	125	5	5	125	5	5	100
MS165-54	25	50	125	25	50	125	5	5	125	5	5	125	5	5	100
MS165-65	25	50	125	25	50	125	5	5	125	5	5	125	5	5	100

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	No back-up fuse required up to $I_{cc} = 100$ kA														
MO132-0.25															
MO132-0.4															
MO132-0.63															
MO132-1.0															
MO132-1.6															
MO132-2.5							20	20	35	20	20	35	3	3	32
MO132-4.0							20	20	63	20	20	63	3	3	50
MO132-6.3							20	20	100	20	20	100	3	3	50
MO132-10							20	20	100	20	20	100	3	3	63
MO132-12							20	20	125	20	20	125	3	3	63
MO132-16							20	20	125	20	20	125	3	3	80
MO132-20							20	20	125	20	20	125	3	3	100
MO132-25	50	50	125	50	50	125	10	10	125	10	10	125	3	3	100
MO132-32	25	50	125	25	50	125	10	10	125	10	10	125	3	3	100

MO132-20: No need for back-up fuse in networks with a prospective current of up to 100 kA at 400 V.

MO132-32: 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.

Technical data

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

2

Type	230 V AC			400 V AC			440 V AC			500 V AC			690 V AC		
	I _{CS} kA	I _{CU} kA	gG 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
MO165-16	100	100	-	100	100	-	8	8	125	8	8	125	8	8	63
MO165-20	100	100	-	100	100	-	8	8	125	8	8	125	8	8	63
MO165-25	100	100	-	100	100	-	8	8	125	8	8	125	8	8	80
MO165-32	50	100	-	50	100	-	5	5	125	5	5	125	5	5	100
MO165-42	25	50	125	25	50	125	5	5	125	5	5	125	5	5	100
MO165-54	25	50	125	25	50	125	5	5	125	5	5	125	5	5	100
MO165-65	25	50	125	25	50	125	5	5	125	5	5	125	5	5	100

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
MS132-0.16T	No back-up fuse required up to I _{CC} = 100 kA														
MS132-0.25T															
MS132-0.4T															
MS132-0.63T															
MS132-1.0T															
MS132-1.6T															
MS132-2.5T															
MS132-4.0T							30	30	35	20	20	35	3	3	32
MS132-6.3T							30	30	63	20	20	63	3	3	50
MS132-10T							30	30	100	20	20	100	3	3	50
MS132-12T							30	30	100	20	20	100	3	3	63
MS132-16T							30	30	125	20	20	125	3	3	63
MS132-20T							30	30	125	20	20	125	3	3	80
MS132-25T	50	50	125	50	50	125	30	30	125	10	10	125	3	3	100

Main circuit – Utilization characteristics according to UL/CSA

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

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

UL/CSA ratings overview

Type	MS116	MS132	MS165	MO132	MO165	MS132-T
Manual Motor Controller	x	x	x	x	x	-
Manual Motor Controller, Suitable as Motor Disconnect	x	x	x	x	x	-
Manual Motor Controller, Suitable for use in Group Installations	x	x	x	x	x	-
Manual Motor Controller, Suitable for Tap Conductor Protection in Group Installations	-	x	x	x	x	-
Manual self-protected Combination Motor Controller (Type E)	-	x	x	-	-	-
Combination Motor Controller (Type F)	-	with AF contactor	with AF contactor	with AF contactor and EOL	-	-

Technical data

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

2

UL/CSA Motor ratings, three-phase – MS116

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

UL/CSA Motor ratings, three-phase – MS132

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

UL/CSA Motor ratings, three-phase – MS165

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

hp Horsepower
FLA Full Load Amps
LRA Locked Rotor Amps

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

Technical data

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

2

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

hp Horsepower
FLA Full Load Amps
LRA Locked Rotor Amps

Technical data

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

2

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 A	Circuit breaker A	480 V kA	600 V kA	480 V kA	600 V kA
MS116-0.16	100	-	30	5	30	5
MS116-0.25	100	-	30	5	30	5
MS116-0.40	100	-	30	5	30	5
MS116-0.63	100	-	30	5	30	5
MS116-1.0	100	-	30	5	30	5
MS116-1.6	100	-	30	5	30	5
MS116-2.5	100	-	30	5	30	5
MS116-4.0	100	-	18	5	18	5
MS116-6.3	100	-	18	5	18	5
MS116-10	100	-	18	5	18	5
MS116-12	100	-	18	5	18	5
MS116-16	100	-	18	5	18	5
MS116-20	100	-	18	5	18	5
MS116-25	100	-	18	5	18	5
MS116-32	100	-	18	5	18	5

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

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

UL/CSA Maximum short-circuit current ratings – MS132

Type	Manual Motor Controllers		for motor disconnect		for group installations		for tap conductor protection in group installations		Manual self-protected Combination Motor Controllers (Type E) ²⁾	
	Branch circuit protection, max. size per NEC/CEC ¹⁾									
	Fuses A	Circuit breaker A	480 V kA	600 V kA	480 V kA	600 V kA	480 V kA	600 V kA	480Y / 277 V kA	600Y / 374 V kA
MS132-0.16	Any Listed fuses. Size per NEC/CEC	Any Listed UL489 / CSA C22.2 No.5 circuit breaker. Size per NEC/CEC	65	47	65	47	65	47	65	47
MS132-0.25			65	47	65	47	65	47	65	47
MS132-0.40			65	47	65	47	65	47	65	47
MS132-0.63			65	47	65	47	65	47	65	47
MS132-1.0			65	47	65	47	65	47	65	47
MS132-1.6			65	47	65	47	65	47	65	47
MS132-2.5			65	47	65	47	65	47	65	47
MS132-4.0			65	47	65	47	65	47	65	47
MS132-6.3			65	18	65	35	65	18	65	18
MS132-10			65	18	65	35	65	18	65	18
MS132-12			30	18	35	35	30	18	30	-
MS132-16			30	18	35	35	30	18	30	-
MS132-20			30	18	35	35	30	18	30	-
MS132-25			30	18	35	35	30	18	30	-
MS132-32			30	18	35	35	30	18	30	-

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

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

Technical data

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

2

UL/CSA Maximum short-circuit current ratings – MS132 with AF contactors

Type	Combination Motor Controllers (Type F) ¹⁾		
	Minimum contactor size	480Y / 277 V	600Y / 374 V
		kA	kA
MS132-0.16	AF09	65	47
MS132-0.25	AF09	65	47
MS132-0.40	AF09	65	47
MS132-0.63	AF09	65	47
MS132-1.0	AF09	65	47
MS132-1.6	AF09	65	47
MS132-2.5	AF09	65	47
MS132-4.0	AF09	65	47
MS132-6.3	AF09	65	47 ²⁾
MS132-10	AF09	65	47
MS132-12	AF09	65	-
MS132-16	AF09	65	-
MS132-20	AF26	30	-
MS132-25	AF26	30	-
MS132-32	AF30	30	-

¹⁾ Requires the use of S1-M3-xx line-side terminal feeder block.

²⁾ Requires AF26 contactor as minimum.

UL/CSA Maximum short-circuit current ratings – MS165

Type	Manual Motor Controllers Branch circuit protection, max. size per NEC/CEC ¹⁾		for motor disconnect		for group installations		for tap conductor protection in group installations		Manual self-protected Com- bination Motor Controllers (Type E)	
	Fuses	Circuit breaker	480 V	600 V	480 V	600 V	480 V	600 V	480Y / 277 V	600Y / 374 V
	A	A	kA	kA	kA	kA	kA	kA	kA	kA
	Any Listed fuses. Size per NEC/CEC		UL489 / CSA C22.2 No.5 circuit breaker. Size per NEC/CEC	65	30	65	30	65	30	65
MS165-16	Any Listed fuses. Size per NEC/CEC	65		30	65	30	65	30	65	30
MS165-20	Any Listed fuses. Size per NEC/CEC	65		30	65	30	65	30	65	30
MS165-25	Any Listed fuses. Size per NEC/CEC	65		30	65	30	65	30	65	30
MS165-32	Any Listed fuses. Size per NEC/CEC	65		30	65	30	65	30	65	30
MS165-42	Any Listed fuses. Size per NEC/CEC	65		30	65	30	65	30	65	-
MS165-54	Any Listed fuses. Size per NEC/CEC	65	30	65	30	65	30	65	-	
MS165-65	Any Listed fuses. Size per NEC/CEC	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 – MS165 with AF contactors

Type	Combination Motor Controllers (Type F)		
	Minimum contactor size	480Y / 277 V	600Y / 374 V
		kA	kA
MS165-16	AF09	65	30
MS165-20	AF26	65	30
MS165-25	AF26	65	30
MS165-32	AF26	65	30
MS165-42	AF40	65	-
MS165-54	AF40	65	-
MS165-65	AF40	65	-

Technical data

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

2

UL/CSA Maximum short-circuit current ratings – MO132

Type	Manual Motor Controllers		for motor disconnect		for group installations		for tap conductor protection in group installations	
	Branch circuit protection, max. size per NEC/CEC ¹⁾							
	Fuses	Circuit breaker	480 V	600 V	480 V	600 V	480 V	600 V
	A	A	kA	kA	kA	kA	kA	kA
MO132-0.16	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
MO132-0.25			65	47	65	47	65	47
MO132-0.40			65	47	65	47	65	47
MO132-0.63			65	47	65	47	65	47
MO132-1.0			65	47	65	47	65	47
MO132-1.6			65	47	65	47	65	47
MO132-2.5			65	47	65	47	65	47
MO132-4.0			65	47	65	47	65	47
MO132-6.3			65	18	65	35	65	18
MO132-10			65	18	65	35	65	18
MO132-12			30	18	35	35	30	18
MO132-16			30	18	35	35	30	18
MO132-20			30	18	35	35	30	18
MO132-25			30	18	35	35	30	18
MO132-32			30	18	35	35	30	18

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

UL/CSA Maximum short-circuit current ratings – MO165

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

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

Technical data

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

2

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)	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	-
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	IP20	IP20	IP10	IP20	IP10	IP20

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

2

Connecting characteristics

Main circuit			
Type	MS165		
Connecting capacity			
 Rigid	1 or 2 x	1 ... 50 mm²	
 Flexible with ferrule	1 or 2 x	1 ... 35 mm²	
 Flexible with insulated ferrule	1 or 2 x	1 ... 35 mm²	
 Flexible	1 or 2 x	1 ... 35 mm²	
Stranded acc. to UL/CSA		1 or 2 x	AWG 16-3
Stripping length		16 mm	
Tightening torque		4.0 Nm / 35 lb.in	
Recommended screw driver		Pozidriv 2	

Main circuit			
Type		MO132 ≤ 10 A	MO132 ≥ 12 A
Connecting capacity			
 Rigid	1 or 2 x	1 ... 4 mm ²	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			
Type	MO165		
Connecting capacity			
 Rigid	1 or 2 x	1 ... 50 mm²	
 Flexible with ferrule	1 or 2 x	1 ... 35 mm²	
 Flexible with insulated ferrule	1 or 2 x	1 ... 35 mm²	
 Flexible	1 or 2 x	1 ... 35 mm²	
Stranded acc. to UL/CSA		1 or 2 x	AWG 16-3
Stripping length		16 mm	
Tightening torque		4.0 Nm / 35 lb.in	
Recommended screw driver		Pozidriv 2	

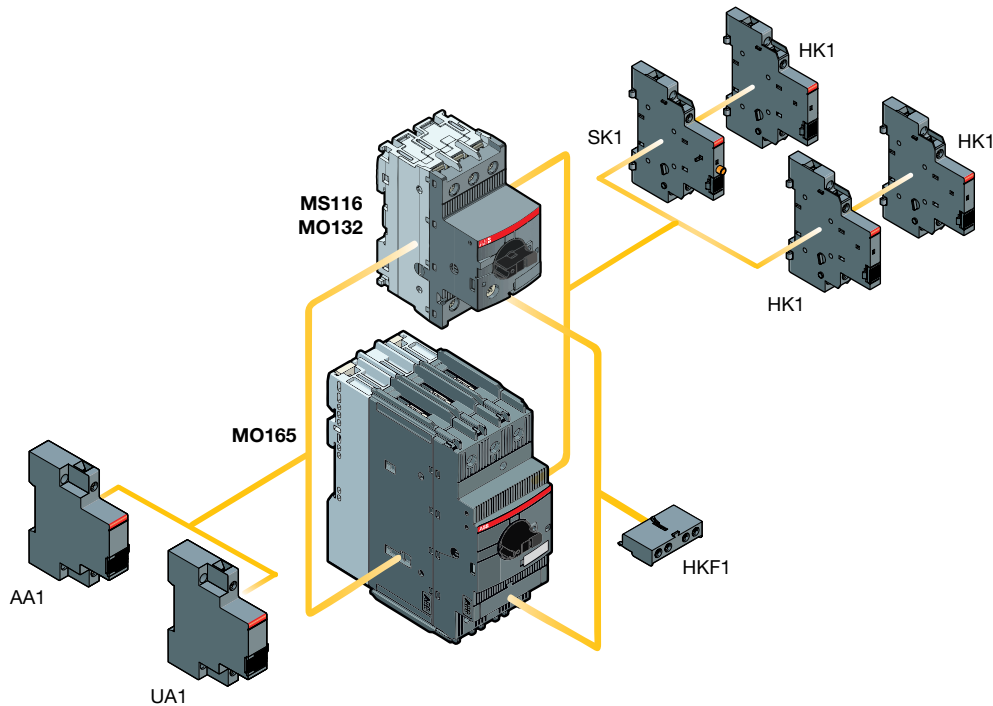
Main circuit			
Type		MS132-T ≤ 10 A	MS132-T ≥ 12 A
Connecting capacity			
 Rigid	1 or 2 x	1 ... 4 mm ²	1/2 x 1 ... 2.5 mm ² 1/2 x 2.5 ... 6 mm ²
 Flexible with ferrule	1 or 2 x	0.75 ... 2.5 mm ²	1/2 x 0.75 ... 6 mm ²
 Flexible with insulated ferrule	1 or 2 x	0.75 ... 2.5 mm ²	1/2 x 0.75 ... 6 mm ²
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

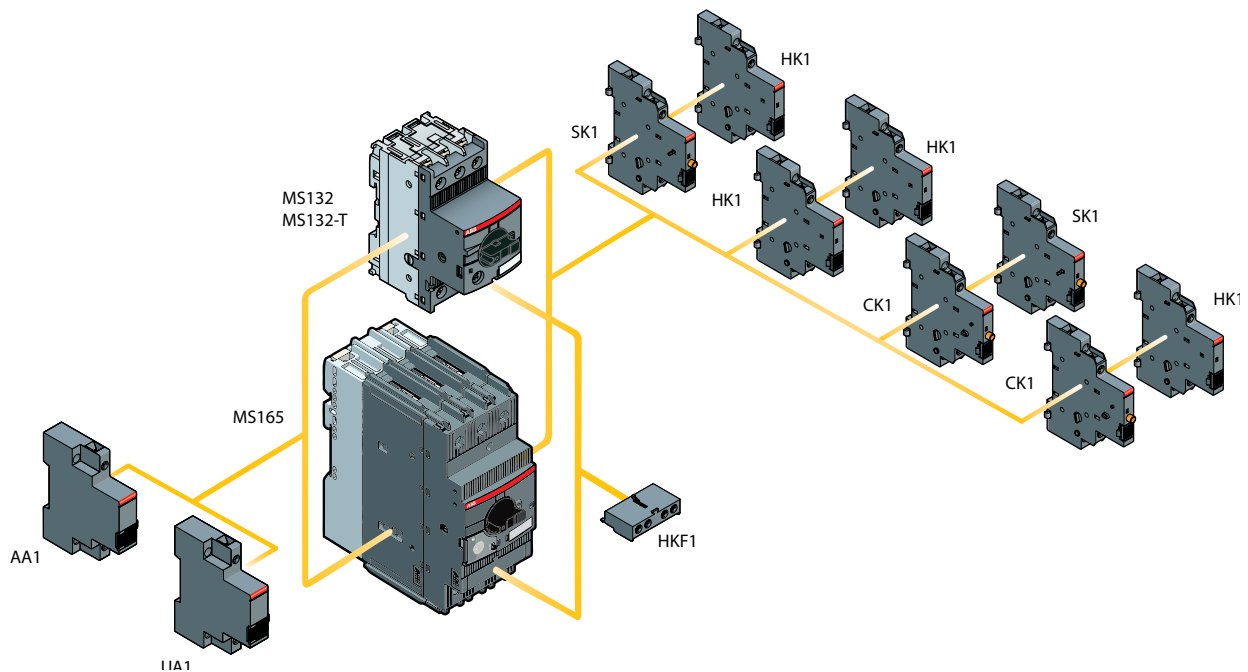
MS116, MS132, MS165, MO132, MO165, MS132-T

2

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



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



Main accessories

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

2



HKF1-11

1SBC101209F0014



HK1-11

1SBC101209F0014



SK1-11

1SBC101210F0014



CK1-11

1SBC101286F0014

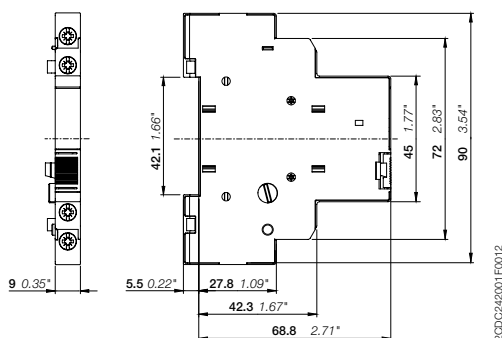
Description

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	Order code	Pkg qty	Weight (1 pc)
						pcs	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

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Main accessories

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

2



AA1-24

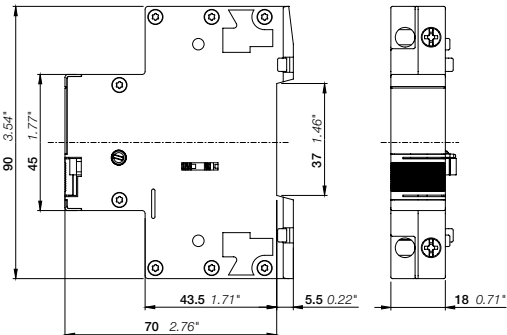


UA1-24

Ordering details

Suitable for	Rated control supply voltage		Type	Order code		Pkg qty	Weight (1 pc)
	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

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Main accessories

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

2

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 mm²	1 ... 2.5 mm²
 Flexible with ferrule	1 or 2 x	0.75 ... 1.5 mm²	
 Flexible with insulated ferrule	1 or 2 x	0.75 ... 1.5 mm²	
 Flexible	1 or 2 x	0.75 ... 1.5 mm²	
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	

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Main accessories

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

2

General technical data

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

Connecting characteristics

Auxiliary circuit

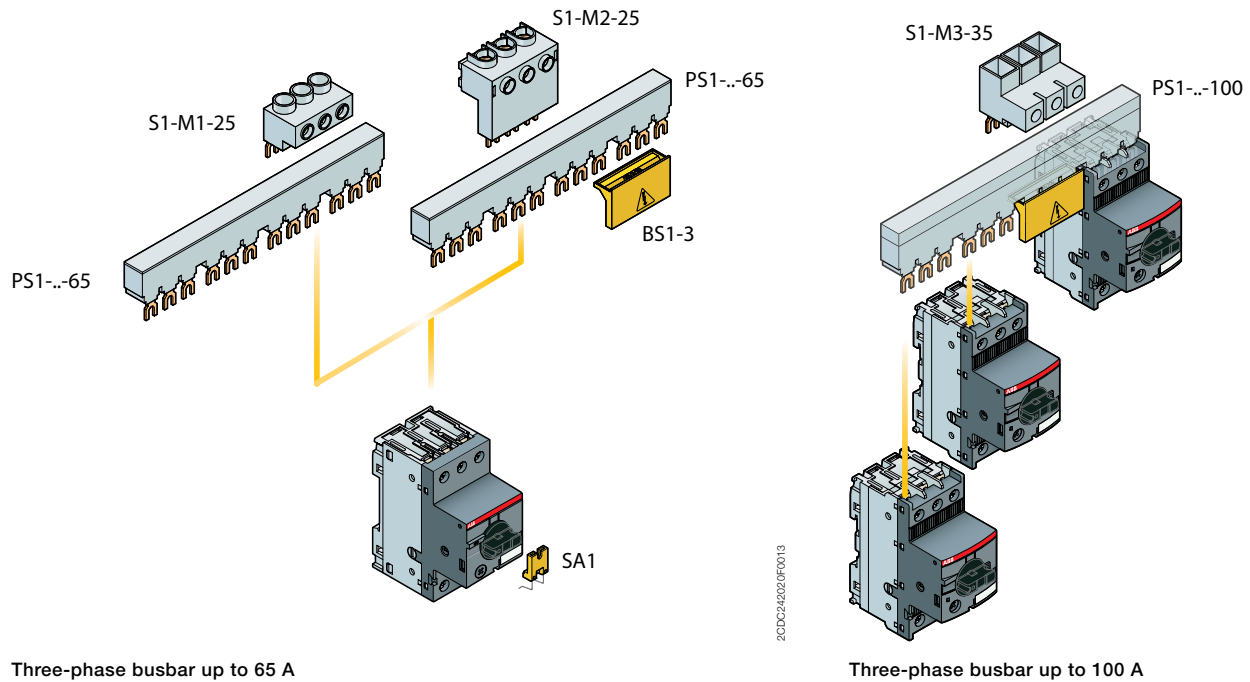
Type	UA1	AA1
Connecting capacity		
 Rigid	1 or 2 x 1 ... 4 mm ²	
 Flexible with ferrule	1 or 2 x 0.75 ... 2.5 mm ²	
 Flexible with insulated ferrule	1 x 0.75 ... 2.5 mm ² 2 x 0.75 ... 1.5 mm ²	
 Flexible	1 or 2 x 0.75 ... 2.5 mm ²	
Stranded acc. to UL/CSA	1 or 2 x AWG 16-12	
Stripping length	10 mm	
Tightening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

Main accessories

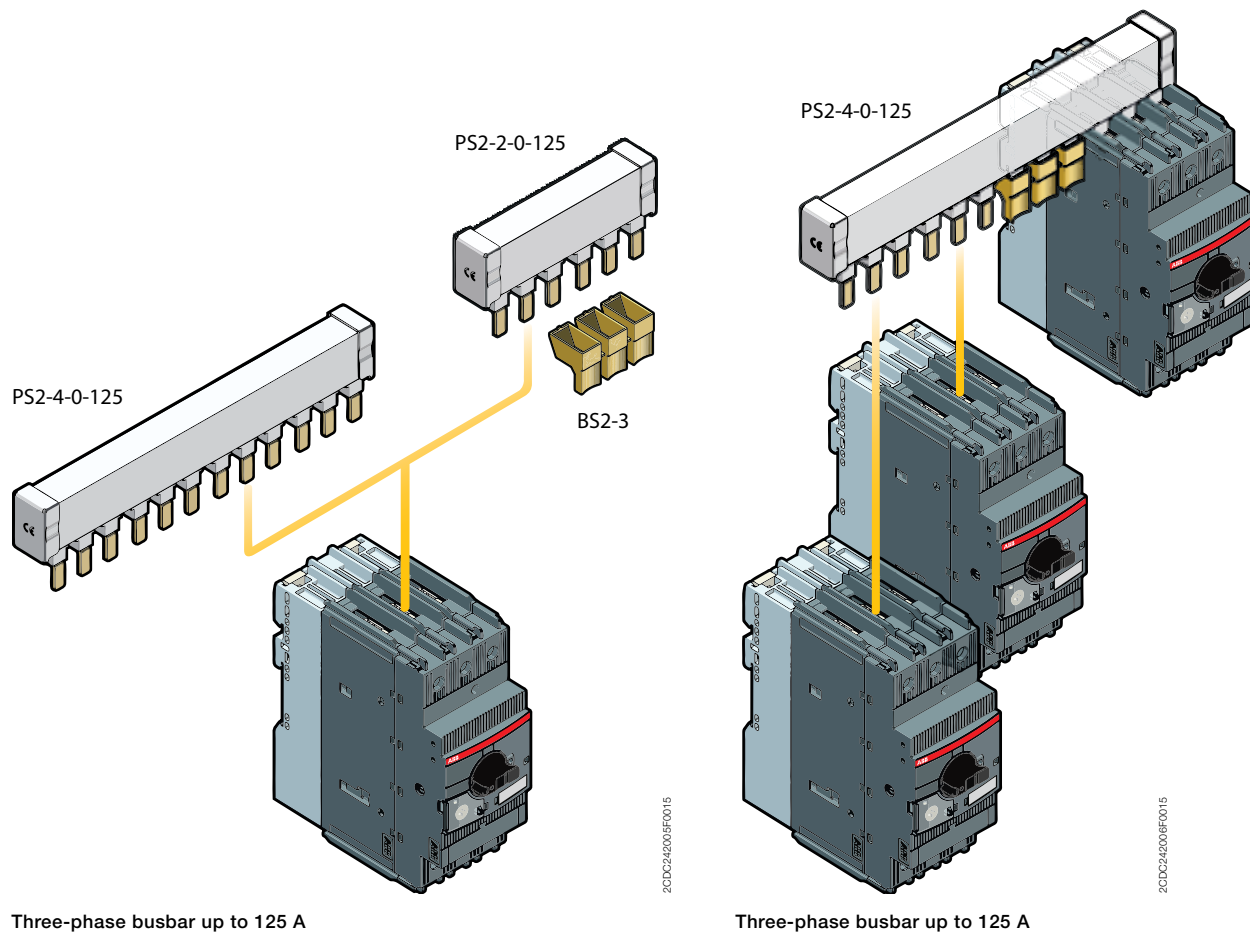
MS116, MS132, MS165, MO132, MO165

2

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



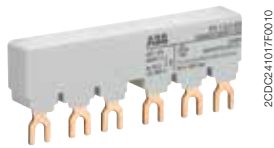
Manual motor starter with three-phase busbar systems (MS165, MO165)



Main accessories

MS116, MS132, MO132, MS132-T

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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 pc)
A							pcs	kg
Three-phase busbars								
MS116, MS132, MO132	65	2	0	PS1-2-0-65	1SAM201906R1102		10	0.034
	65	3	0	PS1-3-0-65	1SAM201906R1103		10	0.055
	65	4	0	PS1-4-0-65	1SAM201906R1104		10	0.077
	65	5	0	PS1-5-0-65	1SAM201906R1105		10	0.098
	65	2	1	PS1-2-1-65	1SAM201906R1112		10	0.036
	65	3	1	PS1-3-1-65	1SAM201906R1113		10	0.060
	65	4	1	PS1-4-1-65	1SAM201906R1114		10	0.087
	65	5	1	PS1-5-1-65	1SAM201906R1115		10	0.108
	65	2	2	PS1-2-2-65	1SAM201906R1122		10	0.040
	65	3	2	PS1-3-2-65	1SAM201906R1123		10	0.067
MS116, MS132, MO132	65	4	2	PS1-4-2-65	1SAM201906R1124		10	0.095
	65	5	2	PS1-5-2-65	1SAM201906R1125		10	0.122
	100	3	0	PS1-3-0-100	1SAM201916R1103		10	0.084
	100	4	0	PS1-4-0-100	1SAM201916R1104		10	0.117
	100	5	0	PS1-5-0-100	1SAM201916R1105		10	0.154
	100	3	1	PS1-3-1-100	1SAM201916R1113		10	0.094
	100	4	1	PS1-4-1-100	1SAM201916R1114		10	0.134
	100	5	1	PS1-5-1-100	1SAM201916R1115		10	0.172
	100	3	2	PS1-3-2-100	1SAM201916R1123		10	0.105
	100	4	2	PS1-4-2-100	1SAM201916R1124		10	0.145

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

2CDC241025F0013

Description

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

Ordering details

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

Other busbar types on request.

Suitable for	Description	Type	Order code		Pkg qty pcs	Weight (1 pc) kg
MS165, MO165	Terminal shroud	KA165	1SAM401922R1001		10	0.025
	Protection cover for busbars	BS2-3	1SAM401921R1001		50	0.005
	Padlock + two keys	SA2	GJF1101903R0002		10	0.020

Main accessories

MS116, MS132, MS165, MO132, MO165

2

General technical data

Type		PS1-xxx-65	PS1-xxx-100	S1-Mx-25	S1-Mx-35
Standards		IEC/EN 60947-4-1, IEC/EN 60947-1, UL 60947-1, UL 60947-4-1 (UL 508), CSA C22.2 No.60947-4-1 (CSA C22.2 No.14)			
Rated operational voltage U _e		690 V			
Rated operational voltage U _e acc. to UL/CSA		600 V AC			
Rated operational current I _e		65 A	100 A	65 A	100 A
Rated operational current I _e acc. to UL/CSA		65 A	92 A	65 A	92 A
Rated frequency		50/60 Hz			
Rated impulse withstand voltage U _{imp}		6 kV			
Rated insulation voltage U _i		690 V AC			
Pollution degree		3			
Cross-section		10 mm²	16 mm²	25 mm²	35 mm²
Ambient air temperature	Operation	-25 ... +70 °C			
	Storage	-50 ... +80 °C			
Resistance to shock acc. to IEC 60068-2-27		25g / 11 ms			
Resistance to vibrations acc. to IEC 60068-2-6		5g / 3 ... 150 Hz			

Electrical connection

Main circuit

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

Technical data for PS2-xxx on request.

Main accessories

MS116, MS132, MO132



IB132-Y



IB132-G



DMS132-Y



DMS132-G

Description

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

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

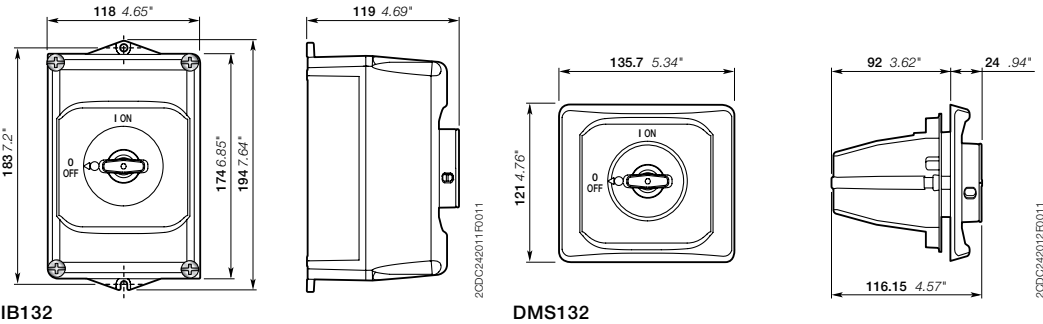
Ordering details

Suitable for	Description	Color	Type	Order code		Pkg qty pcs	Weight (1 pc) 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



22 to 100 A – with thermal and electromagnetic protection

MS450, MS495, MS497 manual motor starters

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2CDC241004F0009

MS450-40



1SBC101184F0014

MS495-40



2CDC241020F0011

MS497-100

Description

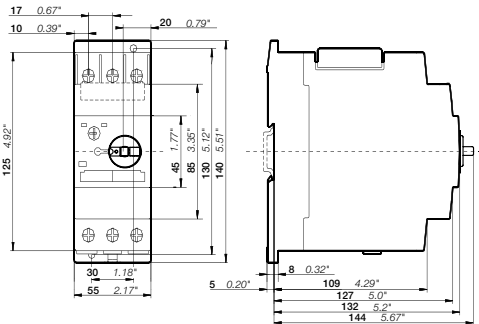
Manual motor starters (MMS) are protection devices for the main circuit. They combine motor control and protection in a single device. MMS are used mainly to switch motors manually ON/OFF and protect them and the installation fuse-less against short-circuit, overload and phase failures. Fuse-less protection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

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, signalling contacts, undervoltage releases, shunt trips, three-phase busbars, power in-feed blocks are available as accessory.

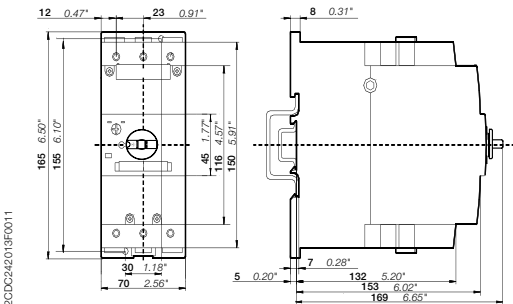
Ordering details

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 pc) kg
MS450 manual motor starters						
18.5	28.0 ... 40.0	25	520.00	MS450-40	1SAM450000R1005	1.047
22	36.0 ... 45.0	25	585.00	MS450-45	1SAM450000R1006	1.039
22	40.0 ... 50.0	25	650.00	MS450-50	1SAM450000R1007	1.027
MS495 manual motor starters						
30	45.0 ... 63.0	25	819.00	MS495-63	1SAM550000R1007	2.247
37	57.0 ... 75.0	25	975.00	MS495-75	1SAM550000R1008	2.253
45	70.0 ... 90.0	25	1170.00	MS495-90	1SAM550000R1009	2.280
55	80.0 ... 100.0	25	1235.00	MS495-100	1SAM550000R1010	2.295
MS497 manual motor starters						
15	22.0 ... 32.0	50	416.00	MS497-32	1SAM580000R1004	2.222
18.5	28.0 ... 40.0	50	520.00	MS497-40	1SAM580000R1005	2.203
22	36.0 ... 50.0	50	650.00	MS497-50	1SAM580000R1006	2.230
30	45.0 ... 63.0	50	819.00	MS497-63	1SAM580000R1007	2.255
37	57.0 ... 75.0	50	975.00	MS497-75	1SAM580000R1008	2.266
45	70.0 ... 90.0	50	1170.00	MS497-90	1SAM580000R1009	2.268
55	80.0 ... 100.0	50	1235.00	MS497-100	1SAM580000R1010	2.275

Main dimensions mm, inches



MS450



MS495, MS497

2CDC242019F0011

2CDC131042C0201

Technical data

MS450, MS495, MS497 manual motor starters

2

Main circuit – Utilization characteristics according to IEC/EN

Type	MS450, MS495, MS497
Standards	IEC/EN 60947-2, IEC/EN 60947-4-1, IEC/EN 60947-1
Rated operational voltage U_n	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_n	See ordering details
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"

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 MS450

MS450-40	No back-up fuse required up to $I_{cc} = 100$ kA	25	50	160	15	50	125	5	10	100	2	4	63
MS450-45		25	50	160	15	50	125	5	10	100	2	4	63
MS450-50		25	50	160	15	50	125	5	10	100	2	4	80

MS450: 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 MS495

MS495-40	No back-up fuse required up to $I_{cc} = 100$ kA	25	50	125	20	50	125	6	12	125	3	6	63
MS495-50		25	50	125	20	50	125	6	12	125	3	6	80
MS495-63		25	50	160	20	50	160	6	12	160	3	6	80
MS495-75		25	50	160	20	50	160	6	8	160	3	5	100
MS495-90		25	50	160	20	50	160	6	8	160	3	5	125
MS495-100		25	50	160	20	50	160	6	8	160	3	5	125

MS495-40: No need for back-up fuse in networks with a prospective current of up to 50 kA at 400 V.
With an appropriate 125 A type gG fuse the device can be used in a network with a prospective current of up to 100 kA.
MS495-100: No need for back-up fuse in networks with a prospective current of up to 50 kA at 400 V.
With an appropriate 160 A type gG fuse the device can be used in a network with a prospective current of up to 100 kA.

Short-circuit protection MS497

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

Technical data

MS450, MS495, MS497 manual motor starters

2

Main circuit – Utilization characteristics according to UL/CSA

Type	MS450, 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"
	Locked Rotor Amps (LRA)	See table "Motor ratings, three-phase"

Motor ratings, three-phase

hp Horsepower

FLA Full Load Amps

LRA Locked Rotor 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
MS450-40	40	40	10	15	30	40
MS450-45	45	45	15	15	30	40
MS450-50	50	50	15	20	40	50
MS495-63	63	63	20	25	50	60
MS495-75	75	75	25	25	60	75
MS495-90	90	90	30	30	75	100
MS495-100	100	100	40	40	75	100
MS497-32	32	32	10	10	25	30
MS497-40	40	40	15	15	30	40
MS497-50	50	50	15	20	40	50
MS497-63	63	63	20	25	50	60
MS497-75	75	75	25	25	60	75
MS497-90	90	90	30	30	75	100
MS497-100	100	100	30	40	75	100

UL 508 – Manual motor controller

Type	Circuit breaker or class R fuse per UL/NEC	Max. circuit breaker or fuse per UL/ NEC	Maximum short-circuit current							
			for motor disconnect		for group installation		for tap conductor	for protection	UL 508	
									Type E *	Type E
	480/600 V A	480/600 V A	480 V kA	600 V kA	480 V kA	600 V kA	480Y/277V kA	600Y/347V kA	480Y/277V kA	600Y/347V kA
MS450-40	150	350	65	25	65	25	65	25	65	25
MS450-45	175	350	65	25	65	25	65	25	65	25
MS450-50	200	350	65	25	65	25	65	25	65	25
MS495-63	250	500	65	30	65	30	65	30	65	30
MS495-75	300	500	65	30	65	30	65	30	65	30
MS495-90	350	500	65	10	65	10	65	-	65	-
MS495-100	400	500	65	10	65	10	65	-	65	-
MS497-32	120	500	65	30	65	30	65	30	65	30
MS497-40	160	500	65	30	65	30	65	30	65	30
MS497-50	200	500	65	30	65	30	65	30	65	30
MS497-63	250	500	65	30	65	30	65	30	65	30
MS497-75	300	500	65	30	65	30	65	30	65	30
MS497-90	350	500	65	10	65	10	-	-	65	-
MS497-100	400	500	65	10	65	10	-	-	65	-

* only with use DX495

Technical data

MS450, MS495, MS497 manual motor starters

2

General technical data

Type	MS450	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	25g / 11 ms	-	
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 35 mm (EN 60715)	DIN-rail 15 mm / 75 mm (EN 60715)	
Minimum distance to other units same type			
Horizontal	0 mm	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	50 mm	-	
Minimum distance to electrical conductive board			
Horizontal	10 mm	-	
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	50 mm	-	
Degree of protection			
Housing	IP20		
Main circuit terminals	IP00		

Connecting characteristics

Main circuit			
Type	MS450	MS495	MS497
Connecting capacity			
 Rigid	1 or 2 x 0.75 ... 16 mm ²	2.5 ... 16 mm ²	2.5 ... 16 mm ²
 Flexible with ferrule	1 x 0.75 ... 35 mm ²	10 ... 70 mm ²	10 ... 70 mm ²
	2 x 0.75 ... 25 mm ²	10 ... 50 mm ²	10 ... 50 mm ²
 Flexible	1 x 0.75 ... 35 mm ²	10 ... 70 mm ²	10 ... 70 mm ²
	2 x 0.75 ... 25 mm ²	10 ... 50 mm ²	10 ... 50 mm ²
Stranded acc. to UL/CSA	1 x AWG 18-2	AWG 10-2/0	AWG 10-2/0
	2 x AWG 18-2	AWG 10-1/0	AWG 10-1/0
Flexible acc. to UL/CSA	1 x AWG 18-2	AWG 10-2/0	AWG 10-2/0
	2 x AWG 18-2	AWG 10-1/0	AWG 10-1/0
Stripping length	13 mm	17 mm	17 mm
Tightening torque	3 - 4.5 Nm / 27 ... 40 lb.in	4 - 6 Nm / 35 - 53 lb.in	4 - 6 Nm / 35 - 53 lb.in
Recommended screw driver	Pozidriv 2	Hexagon 4	Hexagon 4

32 to 100 A – with electromagnetic protection

MO450, MO495, MO496 manual motor starters magnetic only

2



MO450-40

ST02601



MO495-75

ST02601



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.

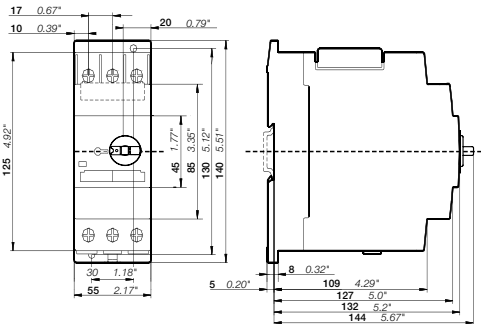
Further features are the build-in disconnect function, trip-free mechanism and a rotary handle with a clear switch position indication. The manual motor starter magnetic only is suitable for three- and single-phase applications. The handle is lockable to protect against unauthorized changes. Auxiliary contacts, signalling contacts, undervoltage releases, shunt trips, three-phase busbars, power in-feed blocks are available as accessory.

Ordering details

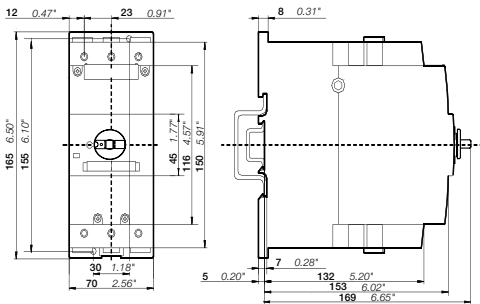
Rated operational power 400 V AC-3 ¹⁾ kW	Rated operational current A	Short-circuit breaking capacity I _{cs} at 400 V AC kA	Rated instantaneous short-circuit current setting I _i A	Type	Order code	Weight (1 pc) kg
MO450 manual motor starter magnetic only						
18.5	40	25	520.00	MO450-40	1SAM460000R1005	1.033
22	45	25	585.00	MO450-45	1SAM460000R1006	1.040
22	50	25	650.00	MO450-50	1SAM460000R1007	1.019
MO495 manual motor starter magnetic only						
30	63	25	819.00	MO495-63	1SAM560000R1007	2.244
37	75	25	975.00	MO495-75	1SAM560000R1008	2.247
45	90	25	1170.00	MO495-90	1SAM560000R1009	2.269
55	100	25	1235.00	MO495-100	1SAM560000R1010	2.292
MO496 manual motor starter magnetic only						
15	32	50	416.00	MO496-32	1SAM590000R1004	2.208
18.5	40	50	520.00	MO496-40	1SAM590000R1005	2.218
22	50	50	650.00	MO496-50	1SAM590000R1006	2.218
30	63	50	819.00	MO496-63	1SAM590000R1007	2.248
37	75	50	975.00	MO496-75	1SAM590000R1008	2.278
45	90	50	1170.00	MO496-90	1SAM590000R1009	2.266
55	100	50	1235.00	MO496-100	1SAM590000R1010	2.293

¹⁾ For overload protection of motors, an appropriate thermal or electronic overload relay must be used

Main dimensions mm, inches



MO450



MO495, MO496

2CDC242019F0011

2CDC242016F0011

2CDC131038C0201

Technical data

MO450, MO495, MO496 manual motor starters magnetic only

2

Main circuit – Utilization characteristics according to IEC/EN

Type	MO450, MO495, MO496
Standards	IEC/EN 60947-2, IEC/EN 60947-4-1, IEC/EN 60947-1
Rated operational voltage U_n	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_n	See ordering details
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"

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 MO450															
MO450-40	No back-up fuse required up to $I_{cc} = 100$ kA			25	50	160	15	50	125	5	10	100	2	4	63
MO450-45				25	50	160	15	50	125	5	10	100	2	4	63
MO450-50				25	50	160	15	50	125	5	10	100	2	4	80

MO450: 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 MO495

MO495-63	No back-up fuse required up to $I_{cc} = 100$ kA	25	50	160	20	50	160	6	12	160	3	6	80		
MO495-75		25	50	160	20	50	160	6	8	160	3	5	100		
MO495-90		25	50	160	20	50	160	6	8	160	3	5	125		
MO495-100		25	50	160	20	50	160	6	8	160	3	5	125		

MO495-100: No need for back-up fuse in networks with a prospective current of up to 50 kA at 400 V.
With an appropriate 160 A type gG fuse the device can be used in a network with a prospective current of up to 100 kA.

Short-circuit protection MO496

MO496-32	No back-up fuse required up to I _{cc} = 100 kA	50	100	No back-up fuse required up to I _{cc} = 100 kA	50	100	No back-up fuse required up to I _{cc} = 100 kA	11	22	100	7	12	63
MO496-40		50	100		50	100	9	18	160	6	12	80	
MO496-50		50	100		50	100	7.5	15	160	5	10	100	
MO496-63		50	100		50	70	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.

Technical data

MO450, MO495, MO496 manual motor starters magnetic only

2

Main circuit – Utilization characteristics according to UL/CSA

Type	M0450, M0495, M0496	
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"
	Locked Rotor Amps (LRA)	See table "Motor ratings, three-phase"

Motor ratings, three-phase

hp Horsepower

FLA Full Load Amps

LRA Locked Rotor 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
MO450-40	40	40	10	15	30	40
MO450-45	45	45	15	15	30	40
MO450-50	50	50	15	20	40	50
MO495-63	63	63	20	25	50	60
MO495-75	75	75	25	25	60	75
MO495-90	90	90	30	30	75	100
MO495-100	100	100	40	40	75	100
MO496-32	32	32	10	10	25	30
MO496-40	40	40	15	15	30	40
MO496-50	50	50	15	20	40	50
MO496-63	63	63	20	25	50	60
MO496-75	75	75	25	25	60	75
MO496-90	90	90	30	30	75	100
MO496-100	100	100	30	40	75	100

UL 508 – Manual motor controller

Type	Circuit breaker or class R fuse per UL/NEC	Max. circuit breaker or fuse per UL/NEC	Maximum short-circuit current for motor disconnect		for group installation	
	480/600 V A	480/600 V A	480 V kA	600 V kA	480 V kA	600 V kA
MO450-40	150	-	65	25	65	25
MO450-45	175	-	65	25	65	25
MO450-50	200	-	65	25	65	25
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

* only with use DX495

Technical data

MO450, MO495, MO496 manual motor starters magnetic only

2

General technical data

Type	MO450	MO495	MO496
Pollution degree	3		
Phase loss sensitivity	No		
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	2g / 5-150 Hz	-	
Mounting position	Position 1-6 (optional for single mounting)		
Mounting	DIN-rail 35 mm (EN 60715)	DIN-rail 15 mm / 75 mm (EN 60715)	
Minimum distance to other units same type			
Horizontal	0 mm	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	50 mm	-	
Minimum distance to electrical conductive board			
Horizontal	10 mm	-	
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	50 mm	-	
Degree of protection			
Housing	IP20		
Main circuit terminals	IP20		

Connecting characteristics

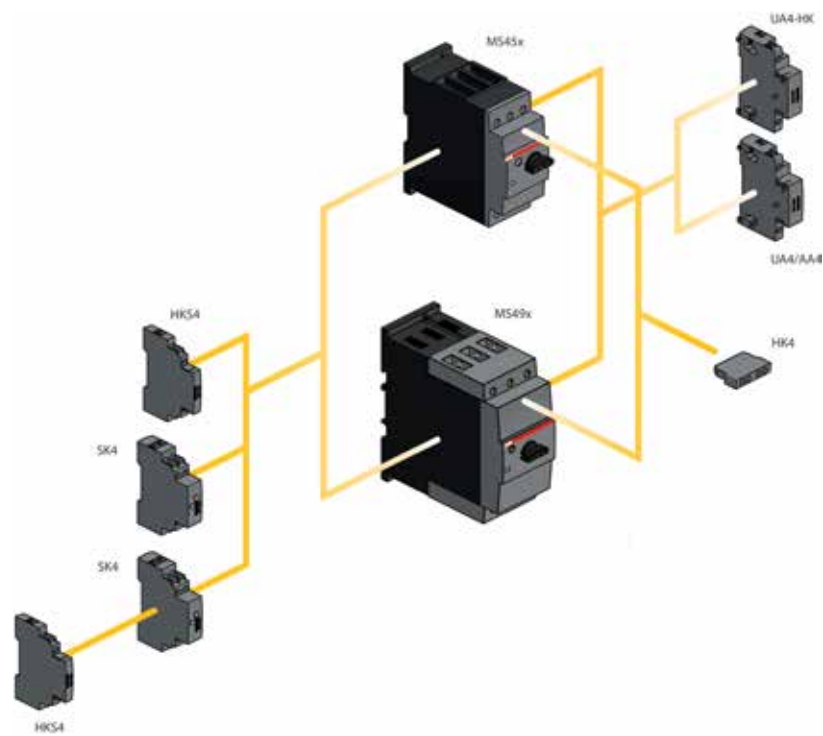
Main circuit			
Type	MO450	MO495	MO496
Connecting capacity			
 Rigid	1 or 2 x 0.75 ... 16 mm ²	2.5 ... 16 mm ²	2.5 ... 16 mm ²
 Flexible with ferrule	1 x 0.75 ... 35 mm ²	10 ... 70 mm ²	10 ... 70 mm ²
	2 x 0.75 ... 25 mm ²	10 ... 50 mm ²	10 ... 50 mm ²
 Flexible	1 x 0.75 ... 35 mm ²	10 ... 70 mm ²	10 ... 70 mm ²
	2 x 0.75 ... 25 mm ²	10 ... 50 mm ²	10 ... 50 mm ²
Stranded acc. to UL/CSA	1 x AWG 18-2	AWG 10-2/0	AWG 10-2/0
	2 x AWG 18-2	AWG 10-1/0	AWG 10-1/0
Flexible acc. to UL/CSA	1 x AWG 18-2	AWG 10-2/0	AWG 10-2/0
	2 x AWG 18-2	AWG 10-1/0	AWG 10-1/0
Stripping length	13 mm	17 mm	17 mm
Tightening torque	3 - 4.5 Nm / 27 ... 40 lb.in	4 - 6 Nm / 35 - 53 lb.in	4 - 6 Nm / 35 - 53 lb.in
Recommended screw driver	Pozidriv 2	Hexagon 4	Hexagon 4

Main accessories

MS45x, MS49x, MO45x, MO49x manual motor starters

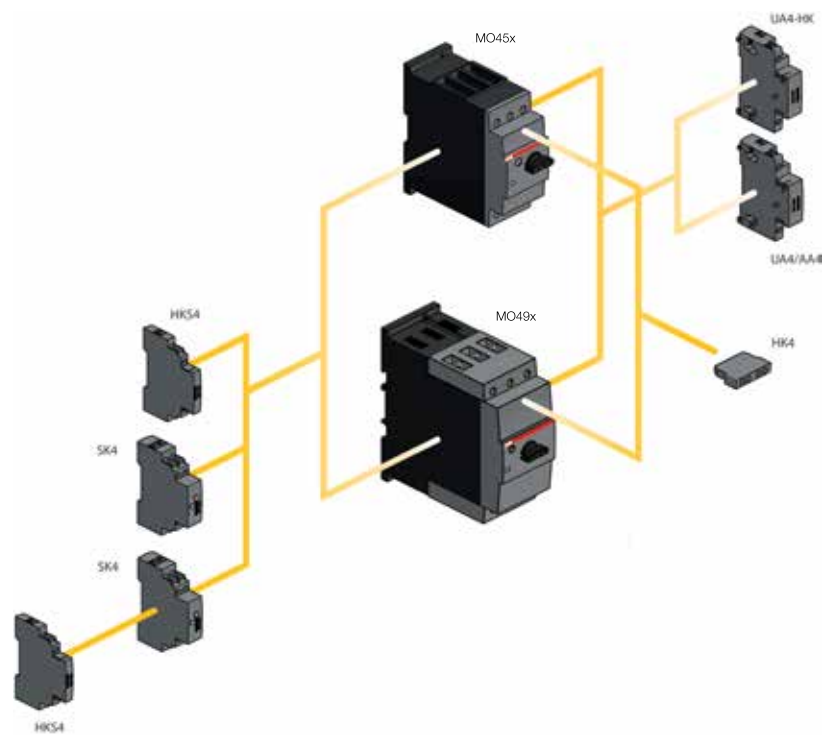
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Manual motor starters MS45x and MS49x with accessories



2CDC24025F0011

Manual motor starters MO45x and MO49x with accessories



2CDC24025F0011

Main accessories

MS45x, MS49x, MO45x, MO49x manual motor starters

2



2CDC241025F0011

HK4-11



2CDC241022F0011

HKS4-20



2CDC241024F0011

SK4-11



2CDC241023F0011

AA4-24



2CDC241026F0011

UA4-110

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.

Ordering details

Suitable for	Auxiliary contacts N.O.	Auxiliary contacts N.C.	Description	Type	Order code		Pkg qty	Weight (1 pc)
							pcs	kg

Auxiliary contacts – mountable on the front

MS45x, MS49x, MO45x, MO49x	1	1		HK4-11	1SAM401901R1001		10	0.017
			Changeover	HK4-W	1SAM401901R1002		10	0.015

Auxiliary contacts – mountable on the left

MS45x, MS49x, MO45x, 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

MS45x, MS49x, MO45x, 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 pc)
	V	Hz				pcs	kg

Shunt trip units – mountable on the right

MS45x, MS49x, MO45x, 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

MS45x, MS49x, MO45x, 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

Main accessories

MS45x, MS49x, MO45x, MO49x manual motor starters

2

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_n		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_n / Rated operational current AC-15 acc. to IEC/EN 60947-5-1 for utilization category					
	24 V	2 A	4 A	6 A	6 A
	230 V	0.5 A	3 A	4 A	4 A
	400 V	-	1.5 A	3 A	3 A
	690 V	-	0.5 A	1 A	1 A
I_n / Rated operational current DC-13 acc. to IEC/EN 60947-5-1 for utilization category					
	24 V	1 A	1 A	2 A	2 A
	48 V	0.3 A	-	-	-
	60 V	0.15 A	-	-	-
	110 V	-	0.22 A	0.5 A	0.5 A
	230 V	-	0.1 A	0.25 A	0.25 A
Minimum switching capacity		17 V / 1 mA		-	-
Short-circuit protective device		10 A Type gG			
Duty time		100 %			
Mounting		Front of MMS	Front of MMS	Left side of MMS	Left side of MMS
Mounting positions		1-6			
Mechanical durability		100000 cycles			
Electrical durability		100000 cycles			

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

Main accessories

MS45x, MS49x, MO45x, MO49x manual motor starters

2

Connecting characteristics

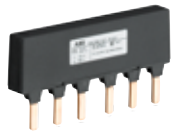
Auxiliary circuit

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			

Main accessories

MS45x, MS49x, MO45x, MO49x manual motor starters

2



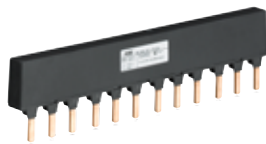
PS4-2-0

2CDC241008F0012



PS4-3-0

2CDC241004F0012



PS4-4-0

2CDC241005F0012



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 108 A are in the assortment. Between 2 and 4 manual motor starter with none or two lateral auxiliary contacts can be connected.

Ordering details

Suitable for	Rated operational current A	Number of MMS	Number of lateral aux.	Type	Order code		Pkg qty pcs	Weight (1 pc) kg
Three-phase busbars								
MS450, MO450	108 A	2	0	PS4-2-0	1SAM401911R1001		5	0.134
	108 A	3	0	PS4-3-0	1SAM401911R1002		5	0.206
	108 A	4	0	PS4-4-0	1SAM401911R1003		5	0.280
	108 A	2	1	PS4-2-2	1SAM401911R1004		5	0.148
	108 A	3	1	PS4-3-2	1SAM401911R1005		5	0.250
	108 A	4	1	PS4-4-2	1SAM401911R1006		5	0.362

Suitable for	Rated operational current A	Rated cross section mm ²	Mounting form	Type	Order code		Pkg qty pcs	Weight (1 pc) kg
Three-phase feeder terminals								
MS450, MO450	108 A	25	Flat	S4-M1	1SAM401911R1007		2	0.106

Suitable for	Description	Type	Order code		Pkg qty pcs	Weight (1 pc) kg
MS450, MO450	Protection cover for busbar	BS4-3	1SAM401911R1008		10	0.001
	Disconnecter module	TB450	1SAM401910R1001		1	0.315
	Terminal shroud	KA450	1SAM401908R1001		1	0.154
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
MS450, MS495, MS497, MO450, 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

MS45x, MS49x, MO45x, MO49x manual motor starters

General technical data

Type	PS4-xxx	S4-M1
Standards	IEC/EN 60947-1	
Rated operational voltage U _e	690 V AC	
Rated operational current I _e	108 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	25 mm ²
Ambient air temperature	Operation	-25 ... +70 °C
	Storage	-50 ... +80 °C

Connecting characteristics

Main circuit

Type	S4-M1	
Connecting capacity		
 Rigid	1 x	2.5 ... 50 mm ²
 Flexible with ferrule	1 x	4 ... 16 mm ²
 Flexible	1 x	4 ... 16 mm ²
Stranded acc. to UL/CSA	1 x	AWG 14-4
Flexible acc. to UL/CSA	1 x	AWG 14-4
Tightening torque	4 Nm	
Recommended screw driver	Pozidriv 2	

Please check for further equipment chapter General accessories.

0.10 to 25 A – with thermal and electromagnetic protection

MS325 manual motor starters

2



MS325-16

Description

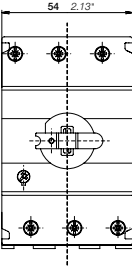
Manual motor starters (MMS) are protection devices for the main circuit. They combine motor control and protection in a single device. MMS are used mainly to switch motors manually ON/OFF and protect them and the installation fuse-less against short-circuit, overload and phase failures. Fuse-less protection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

MS325 is a compact and powerful range for motor protection up to 12.5 kW (400 V) / 25 A in width of 54 mm with modular DIN rail design. 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 starters are suitable for three- and single-phase applications. Auxiliary contacts, signalling contacts, undervoltage releases, shunt trips, three-phase busbars, power in-feed blocks are available as accessories.

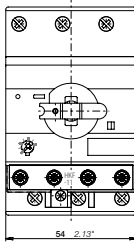
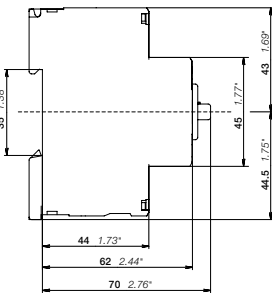
Ordering details

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 pc) kg
0.03	0.10 ... 0.16	100	1.56	MS325-0.16	1SAM150000R1001	0.280
0.06	0.16 ... 0.25	100	2.44	MS325-0.25	1SAM150000R1002	0.280
0.09	0.25 ... 0.40	100	3.9	MS325-0.4	1SAM150000R1003	0.280
0.12	0.40 ... 0.63	100	6.14	MS325-0.63	1SAM150000R1004	0.280
0.25	0.63 ... 1.00	100	11.5	MS325-1	1SAM150000R1005	0.310
0.55	1.00 ... 1.60	100	18.4	MS325-1.6	1SAM150000R1006	0.340
0.75	1.60 ... 2.50	100	28.75	MS325-2.5	1SAM150000R1007	0.340
1.5	2.50 ... 4.00	100	50	MS325-4	1SAM150000R1008	0.340
2.2	4.00 ... 6.30	100	78.75	MS325-6.3	1SAM150000R1009	0.340
4.0	6.30 ... 9.00	100	135	MS325-9	1SAM150000R1010	0.340
5.5	9.00 ... 12.5	75	180	MS325-12.5	1SAM150000R1011	0.340
7.5	12.5 ... 16.0	60	240	MS325-16	1SAM150000R1012	0.340
9.0	16.0 ... 20.0	55	300	MS325-20	1SAM150000R1013	0.340
12.5	20.0 ... 25.0	50	375	MS325-25	1SAM150000R1014	0.340
0.03	0.10 ... 0.16	100	1.56	MS325-0.16-HKF11	1SAM150005R0001	0.300
0.06	0.16 ... 0.25	100	2.44	MS325-0.25-HKF11	1SAM150005R0002	0.300
0.09	0.25 ... 0.40	100	3.9	MS325-0.4-HKF11	1SAM150005R0003	0.300
0.12	0.40 ... 0.63	100	6.14	MS325-0.63-HKF11	1SAM150005R0004	0.300
0.25	0.63 ... 1.00	100	11.5	MS325-1-HKF11	1SAM150005R0005	0.330
0.55	1.00 ... 1.60	100	18.4	MS325-1.6-HKF11	1SAM150005R0006	0.360
0.75	1.60 ... 2.50	100	28.75	MS325-2.5-HKF11	1SAM150005R0007	0.360
1.5	2.50 ... 4.00	100	50	MS325-4-HKF11	1SAM150005R0008	0.360
2.2	4.00 ... 6.30	100	78.75	MS325-6.3-HKF11	1SAM150005R0009	0.360
4.0	6.30 ... 10.0	100	135	MS325-9-HKF11	1SAM150005R0010	0.360
5.5	8.00 ... 12.0	75	180	MS325-12.5-HKF11	1SAM150005R0011	0.360
7.5	10.0 ... 16.0	60	240	MS325-16-HKF11	1SAM150005R0012	0.360
9.0	16.0 ... 20.0	55	300	MS325-20-HKF11	1SAM150005R0013	0.360
12.5	20.0 ... 25.0	50	375	MS325-25-HKF11	1SAM150005R0014	0.360

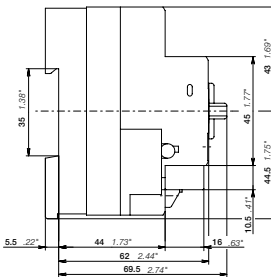
Main dimensions mm, inches



MS325



MS325 + HKF11



0.4 to 25 A – with electromagnetic protection

MO325 manual motor starters magnetic only



MO325-16

Description

The MO325 manual motor starters magnetic only are 54 mm width devices with modular DIN rail design. These devices are used to manually switch on and off motors and to protect them reliably and without the need for a fuse from short-circuits.

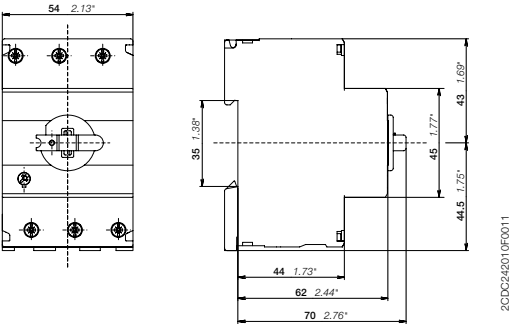
Further features are the build-in disconnect function, trip-free mechanism and a rotary handle with a clear switch position indication. The manual motor starter magnetic only is suitable for three- and single-phase applications. Auxiliary contacts, signalling contacts, undervoltage releases, shunt trips, three-phase busbars, power in-feed blocks are available as accessory.

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 pc) kg
0.09	0.40	100	3.9	MO325-0.4	1SAM160000R1003	0.280
0.12	0.63	100	6.14	MO325-0.63	1SAM160000R1004	0.280
0.25	1.0	100	11.5	MO325-1	1SAM160000R1005	0.310
0.55	1.6	100	18.4	MO325-1.6	1SAM160000R1006	0.340
0.75	2.5	100	28.75	MO325-2.5	1SAM160000R1007	0.340
1.5	4.0	100	50	MO325-4	1SAM160000R1008	0.340
2.2	6.3	100	78.75	MO325-6.3	1SAM160000R1009	0.340
4.0	9.0	100	135	MO325-9	1SAM160000R1010	0.340
5.5	12.5	75	180	MO325-12.5	1SAM160000R1011	0.340
7.5	16	60	240	MO325-16	1SAM160000R1012	0.340
9.0	20	55	300	MO325-20	1SAM160000R1013	0.340
12.5	25	50	375	MO325-25	1SAM160000R1014	0.340

¹⁾ For overload protection of motors, an appropriate thermal or electronic overload relay must be used

Main dimensions mm, inches



MO325

Technical data

MS325, MO325 manual motor starters

2

Main circuit – Utilization characteristics according to IEC/EN

Type	MS325	MO325
Standards	IEC/EN 60947-2, IEC/EN 60947-4-1, IEC/EN 60947-1	
Rated operational voltage U_n	690 V AC / 440 V DC	
Rated frequency	50/60 Hz	
Trip class	10A	-
Number of poles	3	
Duty time	100 %	
Rated impulse withstand voltage U_{imp}	6 kV	
Rated insulation voltage U_i	690 V AC	
Rated operational current I_n	See ordering details	
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"	

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
MS325-0.16															
MS325-0.25															
MS325-0.4															
MS325-0.63															
MS325-1															
MS325-1.6															
MS325-2.5													40	40	25
MS325-4										60	60	40	10	10	40
MS325-6.3							70	70	50	40	40	50	7	7	40
MS325-9							50	50	80	30	30	80	5	5	50
MS325-12.5				75	75	80	45	45	80	27	27	80	4.5	4.5	50
MS325-16				60	60	100	40	40	100	25	25	100	4	4	50
MS325-20				55	55	100	35	35	100	22	22	100	3.5	3.5	50
MS325-25				50	50	125	30	30	125	20	20	125	3	3	50

MS325-9: No need for back-up fuse in networks with a prospective current of up to 100 kA at 400 V.

MS325-16: No need for back-up fuse in networks with a prospective current of up to 60 kA at 400 V.

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

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
MO325-0.4															
MO325-0.63															
MO325-1															
MO325-1.6															
MO325-2.5															
MO325-4															
MO325-6.3													40	40	25
MO325-9										60	60	40	10	10	40
MO325-12.5							70	70	50	40	40	50	7	7	40
MO325-16							50	50	80	30	30	80	5	5	50
MO325-20				75	75	80	45	45	80	27	27	80	4.5	4.5	50
MO325-25				60	60	100	40	40	100	25	25	100	4	4	50

MO325-9: No need for back-up fuse in networks with a prospective current of up to 100 kA at 400 V.

MO325-16: No need for back-up fuse in networks with a prospective current of up to 60 kA at 400 V.

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

Technical data

MS325 manual motor starters

2

Main circuit – Utilization characteristics according to UL/CSA

Type	MS325	
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"
	Locked Rotor Amps (LRA)	See table "Motor ratings, three-phase"

Motor ratings, three-phase

hp Horsepower

FLA Full Load Amps

LRA Locked Rotor Amps

Type	220-240 V AC			440-480 V AC			500-600 V AC		
	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA
MS325-0.16	-	0.16	0.96	-	0.16	0.96	-	0.16	0.96
MS325-0.25	-	0.25	1.5	-	0.25	1.5	-	0.25	1.5
MS325-0.4	-	0.4	2.4	-	0.4	2.4	-	0.4	2.4
MS325-0.63	-	0.63	3.78	-	0.63	3.78	-	0.63	3.78
MS325-1	-	1.0	6.0	1/2	1.1	10.0	1/2	0.9	8.0
MS325-1.6	-	1.6	9.6	3/4	1.6	12.5	3/4	1.3	10.0
MS325-2.5	1/2	2.2	20.0	1	2.1	15.0	1-1/2	2.4	16.0
MS325-4	1	4.2	30.0	2	3.4	25.0	3	3.9	25.6
MS325-6.3	1-1/2	6.0	40.0	3	4.8	32.0	5	6.1	36.8
MS325-9	2-1/2	-	-	5	7.6	46.0	7-1/2	9.0	50.8
MS325-12.5	3	9.6	64.0	7-1/2	11.0	63.5	10	11.0	64.8
MS325-16	5	15.2	92.0	10	14.0	81.0	10	11.0	64.8
MS325-20	5	15.2	92.0	10	14.0	81.0	15	27.0	93.0
MS325-25	7-1/2	22.0	127.0	15	21.0	116.0	20	35.0	116.0

UL 508 – Manual motor controller

Type	Max. Circuit Breaker UL/ NEC	Max. Circuit Breaker UL/ NEC	Max. fuse type UL/NEC	Maximum fuse type K5 o. RK5 per UL/ NEC	Maximum short-circuit current for motor disconnect ¹⁾		for group installation		for Tap Conductor	UL 508
	480 V	600 V	480 V	600 V	480 V	600 V	480 V	600 V	Protection 480Y/277V	Type E 480Y/277V
	A	A	A	A	kA	kA	kA	kA	kA	kA
MS325-0.16	-	S7H1200	1600 (class L)	1200	85	50	85	50	18	18
MS325-0.25	-	S7H1200	1600 (class L)	1200	85	50	85	50	18	18
MS325-0.4	-	S7H1200	1600 (class L)	1200	85	50	85	50	18	18
MS325-0.63	-	S7H1200	1600 (class L)	1200	85	50	85	50	18	18
MS325-1	-	S7H1200	1600 (class L)	1200	85	50	85	50	18	18
MS325-1.6	-	S7H1200	1600 (class L)	1200	85	50	85	50	18	18
MS325-2.5	-	S7H1200	1600 (class L)	1200	85	50	85	50	18	18
MS325-4	-	S7H1200	1600 (class L)	1200	85	50	85	50	18	18
MS325-6.3	S7H1200	S7H1200	600 (class K5)	1200	50	50	50	50	18	18
MS325-9	S7H1200	S4H2500	600 (class K5)	250	50	50	50	50	18	18
MS325-12.5	S4H250	S7H1200	400 (class K5)	1200	50	30	50	30	18	18
MS325-16	S4H250	S7H1200	400 (class K5)	1200	50	30	50	30	18	18
MS325-20	S4H250	S4H250	400 (class K5)	250	50	30	50	30	18	18
MS325-25	S4H250	S4H250	400 (class K5)	250	50	30	50	30	18	18

¹⁾ Suitable as motor disconnect only when provided with padlock SA1 or SA3...

Technical data

MS325, MO325 manual motor starters

2

General technical data

Type	MS325/MO325	
Pollution degree	3	
Phase loss sensitive	Yes	
Ambient air temperature		
Operation	Open - compensated	-25 ... +50 °C
	Open	-25 ... +50 °C
	Enclosed (IB325)	0 ... +40 °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	15g / 1/2 sinusoidal shock for 11 ms	
Resistance to vibrations acc. to IEC 60068-2-6	5g / 3 ... 150 Hz	
Mounting position	Position 1-6 (optional for single mounting)	
Mounting	DIN-rail (EN 60715)	
Minimum distance to other units same type	Horizontal	0 mm
	Vertical	100 mm
Minimum distance to electrical conductive board	Horizontal, up to 400 V	> 1.5 mm
	Horizontal, up to 690 V	> 1.5 mm
	Vertical	75 mm
Degree of protection	Housing	IP20
	Main circuit terminals	IP20

Connecting characteristics

Main circuit			
Type		MS325/MO325	
Connecting capacity			
	Rigid	1 or 2 x	1 ... 6 mm²
	Flexible with ferrule	1 or 2 x	0.75 ... 4 mm²
	Flexible with insulated ferrule	1 or 2 x	0.75 ... 4 mm²
	Flexible	1 or 2 x	1 ... 6 mm²
	Stranded acc. to UL/CSA	1 or 2 x	AWG 14-8
	Flexible acc. to UL/CSA	1 or 2 x	AWG 14-8
Stripping length		10 mm	
Tightening torque		1.4 Nm / 14 lb.in	
Recommended screw driver		Pozidriv 2	

Main accessories

MS325, MO325 manual motor starters



SA1

SK0108B01



SA2

2CDC241023R0013



SA3

SK0110B01

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 63 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.

Ordering details

Suitable for	Rated operational current A	Number of MMS	Number of lateral aux.	Type	Order code		Pkg qty pcs	Weight (1 pc) kg
--------------	--------------------------------	---------------	------------------------	------	------------	--	----------------	------------------------

Three-phase busbars

MS325, MO325	63	2	0	PS3-2-0	1SAM101937R0012		10	0.038
	63	3	0	PS3-3-0	1SAM101937R0013		10	0.062
	63	4	0	PS3-4-0	1SAM101937R0014		10	0.087
	63	5	0	PS3-5-0	1SAM101937R0015		10	0.115
	63	6	0	PS3-6-0	1SAM101937R0016		10	0.137
	63	2	1	PS3-2-1	1SAM101937R0022		10	0.040
	63	3	1	PS3-3-1	1SAM101937R0023		10	0.068
	63	4	1	PS3-4-1	1SAM101937R0024		10	0.097
	63	5	1	PS3-5-1	1SAM101937R0025		10	0.126
	63	3	2	PS3-2-2	1SAM101937R0032		10	0.043
	63	4	2	PS3-4-2	1SAM101937R0034		10	0.106

Suitable for	Rated operational current A	Rated cross section mm²	Mounting form	Type	Order code		Pkg qty pcs	Weight (1 pc) kg
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Three-phase feeder terminals

MS325, MO325	63	25	Flat	S3-M1	1SAM101938R0001		10	0.041
	63	25	High	S3-M2	1SAM101938R0002		10	0.053
	63	35	UL type E and IEC	S3-M3	1SAM101938R0004		10	0.050

Suitable for	Description	Type	Order code		Pkg qty pcs	Weight (1 pc) kg
MS325, MO325	Protection cover for busbars	BS3-3	1SAM101938R0003		50	0.001
	Lock handle	SA1	GJF1101903R0001		10	0.003
	Padlock + two keys	SA2	GJF1101903R0002		10	0.020
	Lock handle box SA1/SA2	SA3	GJF1101903R0003		10	0.050

Main accessories

MS325, MO325 manual motor starters

2

Description

MS325 and MO325 manual motor starters can be equipped with auxiliary contacts for lateral/front mounting, signalling contact for lateral mounting, undervoltage release and shunt trips. A variety of combinations is possible as required for the application. The auxiliary contacts change position with the main contacts. The signalling contact signals tripping regardless if it was caused by short-circuit or overload. 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.

Ordering details

Suitable for	Auxiliary contacts N.O.	Auxiliary contacts N.C.	Description	Type	Order code		Pkg qty	Weight (1 pc)
							pcs	kg
Auxiliary contacts – mountable on the front								
MS325,	1	1		HKF-11	1SAM101928R0001		10	0.015
MO325	2	0		HKF-20	1SAM101928R0002		10	0.020
Auxiliary contacts – mountable on the left								
MS325,	1	1	Max. 2 pieces	HK-11	1SAM101901R0001		2	0.030
MO325	2	0	Max. 2 pieces	HK-20	1SAM101901R0002		2	0.030
	0	2	Max. 2 pieces	HK-02	1SAM101901R0003		2	0.030
Signalling contacts – mountable on the left								
MS325,	1	1	For tripped alarm, max. 1 piece	SK-11	1SAM101904R0003		10	0.030
MO325								
Signalling contacts – mountable on the right								
MS325,	1	1	For short-circuit alarm	CK-11	1SAM101943R0001		10	0.035
MO325								

Suitable for	Rated control supply voltage	Frequency	Type	Order code		Pkg qty	Weight (1 pc)
	V	Hz				pcs	kg
Shunt trips – mountable as slide in							
MS325,	24 ... 60	50/60	AA-24	1SAM101909R0001		10	0.025
MO325	110 ... 240	50/60	AA-230	1SAM101909R0002		10	0.025
	220 ... 415	50/60	AA-400	1SAM101909R0003		10	0.025
Undervoltage releases – mountable as slide in							
MS325,	24	50	UAF-24	1SAM101903R0024		10	0.02
MO325	48	50	UAF-48	1SAM101903R0048		10	0.02
	60	50	UAF-60	1SAM101903R0060		10	0.02
	110	50	UAF-110	1SAM101903R0110		10	0.02
	230	50	UAF-230	1SAM101903R0230		10	0.02
	400	50	UAF-400	1SAM101903R0400		10	0.02
	415	50	UAF-415	1SAM101903R0415		10	0.02
	500	50	UAF-500	1SAM101903R0500		10	0.02

Main accessories

MS325, MO325 manual motor starters

General technical data

Type		PS3	S3-M1/S3-M2	S3-M3
Standards		IEC/EN 60947-2, IEC/EN 60947-4-1, IEC/EN 60947-1		
Rated operational voltage U _e		690 V AC		
Rated operational current I _e		63 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	25 mm ²	
Ambient air temperature	Operation	-25 ... +70 °C		
	Storage	-50 ... +80 °C		
Resistance to shock acc. to IEC 60068-2-27		15g / 11 ms		
Resistance to vibrations acc. to IEC 60068-2-6		3g / 3 ... 150 Hz		

Electrical connection

Main circuit

Type	PS3, S3-Mx
Connecting capacity	
 Rigid	1 x 6 ... 25 mm ²
 Flexible with ferrule	1 x 6 ... 16 mm ²
 Flexible with insulated ferrule	1 x 6 ... 16 mm ²
 Flexible	1 x 6 ... 16 mm ²
Stranded acc. to UL/CSA	1 x AWG 10-4
Flexible acc. to UL/CSA	1 x AWG 10-6
Stripping length	10 mm
Tightening torque	2.5 Nm / 22 lb.in
Recommended screw driver	Pozidriv 2

Main accessories

MS325, MO325 manual motor starters

2



IB325-Y



IB325-G



DMS325-Y



DMS325-G

Description

IB325 are IP65 (UL/CSA Type 12) enclosures for single MMS installation. Additional mounting of auxiliary and signalling contacts, shunt trips and undervoltage release is possible. The handle is lockable in OFF position. For detailed specification see installation instruction.

DMS325 are IP65 (UL/CSA Type 12) door mounting kits for MMS installation in any enclosure. Additional mounting of auxiliary, signalling, shunt trips and undervoltage release is possible. The handle is lockable in OFF position. For detailed specification see installation instruction.

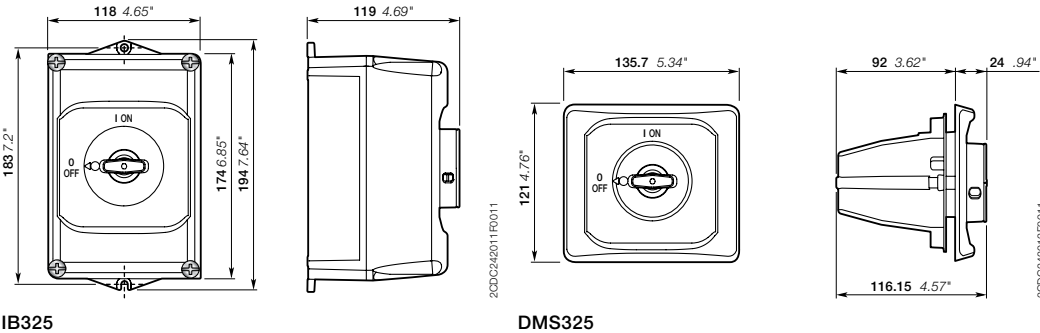
Ordering details

Suitable for	Description	Color	Type	Order code	Pkg qty	Weight (1 pc)
					pcs	kg
IP65 enclosures (UL/CSA Type 12)						
MS325,	Padlockable max. 3 padlocks	Yellow/red	IB325-G	1SAM101940R1000	1	0.370
MO325	with bail diameter 4 ... 6.5 mm	Grey/black	IB325-Y	1SAM101940R1001	1	0.370
IP65 door mounting kits (UL/CSA Type 12)						
MS325,	Padlockable max. 3 padlocks	Yellow/red	DMS325-G	1SAM101941R1000	1	0.170
MO325	with bail diameter 4 ... 6.5 mm	Grey/black	DMS325-Y	1SAM101941R1001	1	0.170

Indication I-O and ON-OFF

Please check for further equipment chapter General accessories.

Main dimensions mm, inches



General accessories

MS116, MS132, MO132, MS4xx, MO4xx, MS325, MO325

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.

All 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

Suit- able for	Description	Shaft length	Color	Type	Order code		Pkg qty	Weight (1 pc)
		mm					pcs	kg
Shafts								
MS116, MS132, MO132, MS4xx, MO4xx, MS325, MO325	For MSHD handles. Shaft diameter 6 mm. Shaft extension for door coupling driver.	85		OXS6X85	1SCA101647R1001		1	0.020
		105		OXS6X105	1SCA108043R1001		1	0.020
		130		OXS6X130	1SCA101655R1001		1	0.030
		180		OXS6X180	1SCA101659R1001		1	0.040
IP64 handles (UL/CSA Type 1, 3R, 12)								
MS116, MS132, MO132, MS4xx, MO4xx, MS325, MO325	Padlockable max. 3 padlocks with bail diameter 5 ... 8 mm, door interlock in ON position defeatable, for use with 6 mm OXS6...types up to 180 mm or driver shafts MSOX.		Black	MSHD-LB ¹⁾	1SAM201920R1001		1	0.065
			Yellow	MSHD-LY ¹⁾	1SAM201920R1002		1	0.065
			Black	MSHD-LTB ²⁾	1SAM201920R1011		1	0.065
			Yellow	MSHD-LTY ²⁾	1SAM201920R1012		1	0.065
Driver								
MS116, MS132, MO132, MS4xx, MO4xx, MS325, MO325	Coupling driver for use with 6 mm OXS6... types up to 180 mm.			MSMN ⁴⁾	1SAM101923R0002		1	0.002
					MSMNO ⁴⁾	1SAM101923R0012		1
Shaft alignment ring								
MS116, MS132, MO132, MS4xx, MO4xx, MS325, MO325	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

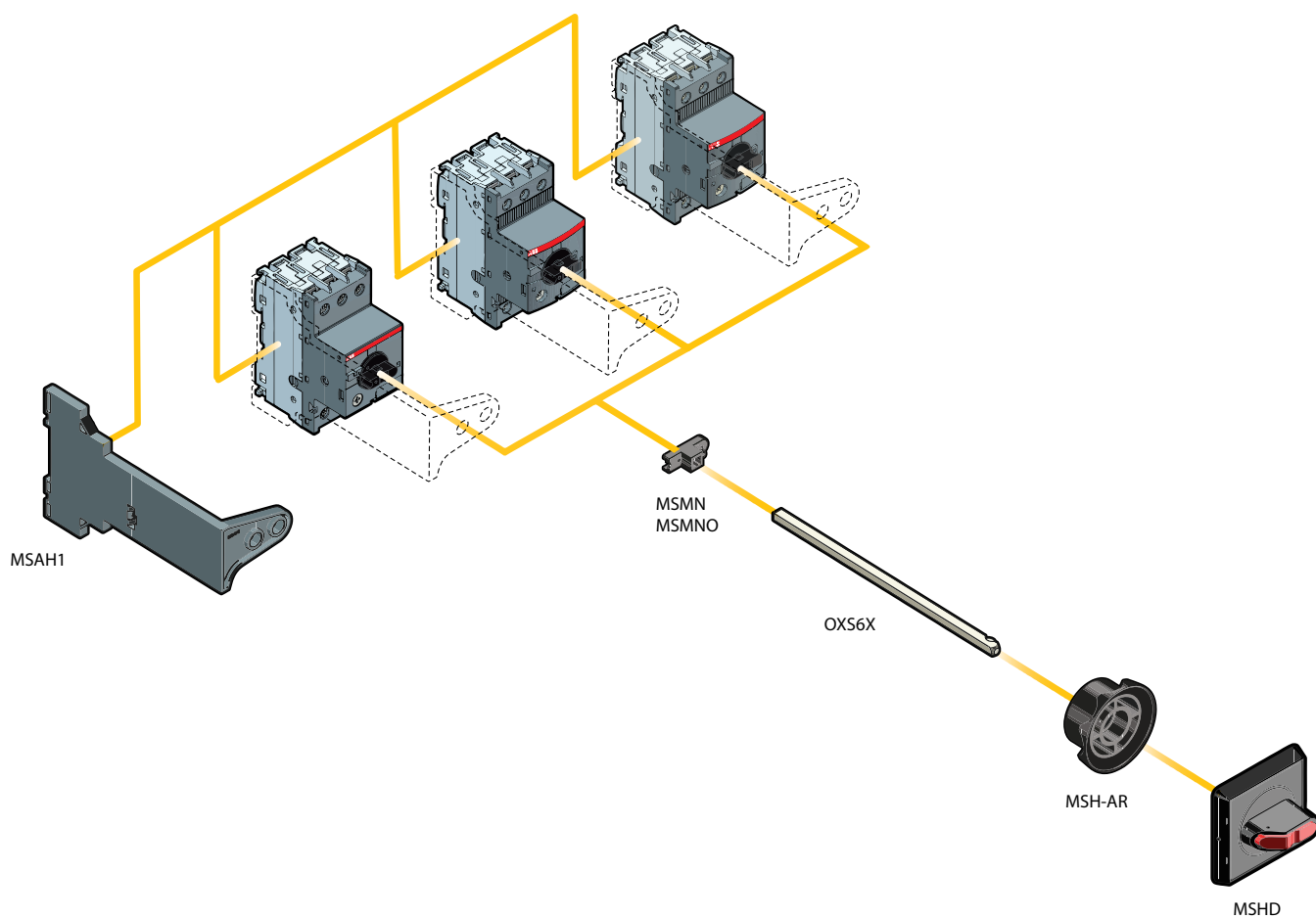
³⁾ Coded - Positioning of ON indication dependent from mounting orientation of the MMS

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

General accessories

MS116, MS132, MO132, MS4xx, MO4xx, MS325, MO325

2



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