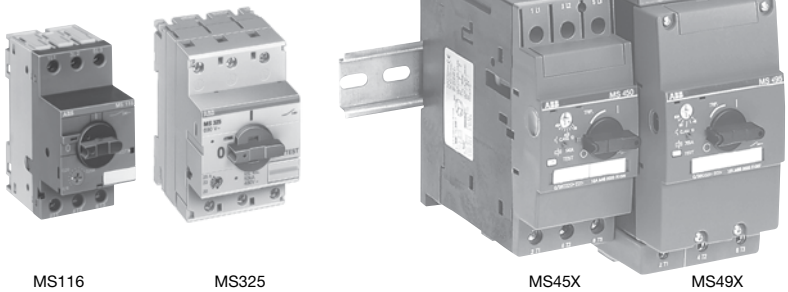
Manual motor protectors



MS116 MS325 MS45X MS49X

Description

Type MS116

- Suitable for use with 3-phase motors up to 10 HP @ 480V
- UL Listed and CSA certified for Group Motor Installations
- 12 Setting ranges from 0.1 to 16 amps.
- Up to 30kA or 50kA with no back up fuse required
- 35mm DIN rail snap-on mounting
- Wide range of accessories

Type MS325

- Suitable for use with 3-phase motors up to 15 HP @ 480V
- UL Listed and CSA certified for Group Motor Installations
- 12 Setting ranges from 0.1 to 25 amps.
- Up to 50kA or 100kA with no back up fuse required
- 35mm DIN rail snap-on mounting
- Wide range of accessories

Type MS45x

- Suitable for use with 3-phase motors up to 40 HP @ 480V
- UL Listed and CSA certified for Group Motor Installations
- 14 Setting ranges from 11 to 50 amps
- Up to 100kA with no back up fuse required
- 35mm DIN rail snap-on mounting
- Wide range of accessories

Type MS49x

- Suitable for use with 3-phase motors up to 75 HP @ 480V
- UL Listed and CSA certified for Group Motor Installations
- 22 Setting ranges from 11 to 100 amps
- Up to 100kA with no back up fuse required
- 35mm DIN rail snap-on mounting
- Wide range of accessories

Single motor applications

Single motor applications employing a manual motor protector (MMP) result in a simple, compact and economical alternative to conventional magnetic motor controllers for manual operation of a single motor. Upstream short circuit and overcurrent protection in the form of fuses or a circuit breaker is required but the MMP can replace the overload relay, contactor and associated electrical components and wiring for controlling the contactor.

Group motor applications

Group motor installations offer several advantages when controlling two or more motors or other loads over conventional single motor starters. Several MMPs can be grouped together and fed from a single set of fuses or a circuit breaker. These devices can be installed together on a single DIN rail and fed power through three phase insulated busbars and a power feed terminal. Protecting this group of MMPs is a single circuit breaker or fusible switch, sized specifically for the load. Excellent coordination and short circuit protection can be achieved, as high as 50kAIC, when using the MS325 product in this manner. Close coupling adapters are offered to connect contactors to the load side of each MMP for automatic operation of each motor. If a single motor experiences an overload, the associated MMP trips and allows the other motors to continue running. Numerous accessories are available for signaling in the event of a trip, to indicate status, to provide shunt trip and for undervoltage release. The main benefits of group installation are quick, fool proof assembly, minimal wiring and a reduction of the necessary enclosure size. The only constraint is that the upstream circuit protective device must be sized specifically for the load – a highly desirable feature in order to provide the closest coordination and the greatest level of circuit protection. Article 430.53(C) of the *NEC®* specifies the requirements for group motor installations; all ABB MMPs meet these requirements.

Manual motor Protectors

General information

Selection

Group installation is an approach to building multi-motor control systems in accordance with Section 430-53 of the National Electrical Code. The selection of components used in group installations is a simple process which consists of several steps.

- First is the selection of the appropriate fuse as Branch Circuit Protective Device (BCPD).
- Second is the selection of the appropriate motor starter and protector.
- Third, the selected MMP must be checked for UL listing with the selected BCPD and the available short circuit current at the application location.

1. Fused disconnect

Calculate maximum fuse size according to NEC 430-53 (c). I_{max} (fuse size) = 175% x FLC (full load current for largest motor) + the sum of FLC (full load current for largest motor) + the sum of FLC values for other motors on that branch using NEC Table 430-150 on the right. Select fuse from NEC Table 240-6 below. Where I_{max} falls between two fuse ampere ratings NEC 430-53 (c) permits going to the next high ampere rating.

2. Motor protector selection

Select the proper MMP catalog number for each motor load from the following pages based on the actual motor full load current (FLA) using the "Thermal setting range" column for reference.

3. MMP Interruption ratings

Using the interruption ratings table on the next page, identify the system application voltage and interrupting capacity for the type of fuse selected in step 1 above.

NEC 240-6 Standard fuse amperes
15, 20, 25, 30, 40, 45, 50, 60, 70, 80, 90, 110, 125, 150, 175, 200, 225, 250, 300, 350, 400, 450, 500, 600, 700, 800, 1000, 1200, 1600

Examples: Select components for protecting the following 3-phase, 460VAC, squirrel cage induction motors. The nameplate data are:
1/2 HP, 1.0 FLA; 3 HP, 4.8 FLA; 5 HP, 7.6 FLA; 7.5 HP, 11 FLA;
10 HP, 14 FLA.

Example: using fused disconnect
- I_{max} = 175% x 14 + (11 + 7.6 + 4.8 + 1) = 48.9A
- Fuse rating using Table NEC 240-6 = 50A
- Minimum disconnect size = 115% x Total FLA
- NEC 430-150 table = 115% x (14+ 11 + 7.6 + 4.8 + 1) = 44.16

Disconnect for 50A fuses is ok.
Note: Refer to NEC 310-1 and NEC 430-53(d) for cable sizing.

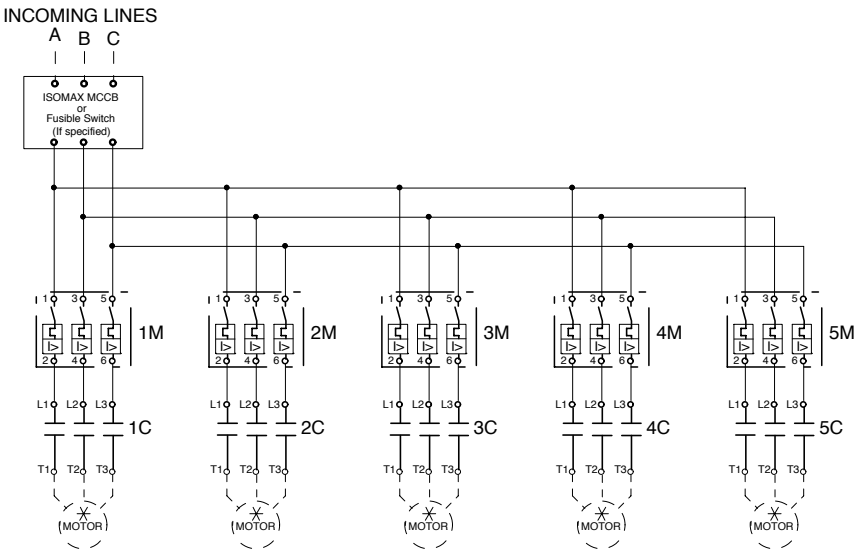
NEC Table 430-150 full load current, 3ph AC motor

Horsepower	Induction type squirrel cage & wound rotor ①		
	230V amps	460V amps	575V amps
1/2	2	1	.8
3/4	2.8	1.4	1.1
1	3.6	1.8	1.4
1.5	5.2	2.6	2.1
2	6.8	3.4	2.7
3	9.6	4.8	3.9
5	15.2	7.6	6.1
7.5	22	11	9
10	28	14	11
15	42	21	17
20	54	27	22
25	68	34	27

For full load currents of 208 and 200 volt motors, increase the corresponding 230 volt motor full-load current by 10% and 15%, respectively.

MS325 data

Motor rating at 460V		MS325	Contactor
Horsepower	FLA, AC3		
1/2	1.0	MS325-1.0	A9C
3	4.8	MS325-6.3	A9C
5	7.6	MS325-9.0	A9C
7.5	11	MS325-12.5	A12C
10	14	MS325-16	A16C



① These values of full-load current are for motors running at speeds usual for belted motors and motors with normal torque characteristics. Motors built for especially low speeds or high torques may require more running current, and multispeed motors will have full-load current varying with speed, in which case the nameplate current rating shall be used.

The voltage listed are rated motor voltages. The currents listed shall be permitted for system voltage ranges of 110 to 120, 220 to 240, 440 to 480, and 550 to 600 volts.

Type MS325

MS325-1.0

Manual motor protectors — Type MS325

Thermal setting range (Amps)	Single-phase horsepower ratings ① 120V	240V	3-phase horsepower ratings 240V	480V	600V		Catalog number	List price
0.10 – 0.16	—	—	—	—	—		MS325-0.16	
0.16 – 0.25	—	—	—	—	—		MS325-0.25	**$ 144**
0.25 – 0.40	—	—	—	—	—		MS325-0.40	
0.40 – 0.63	—	—	—	—	—		MS325-0.63	
0.63 – 1.0	—	—	—	1/2	1/2		MS325-1.0	
1.0 – 1.6	—	1/10	—	3/4	3/4		MS325-1.6	
1.6 – 2.5	—	1/6	1/2	1	1.5		MS325-2.5	**165**
2.5 – 4.0	1/8	1/3	1	2	3		MS325-4.0	
4.0 – 6.3	1/4	1/2	1.5	3	5		MS325-6.3	
6.3 – 9.0	1/3	1	2.5	5	7.5		MS325-9.0	
9.0 – 12.5	1/2	2	3	7.5	10		MS325-12.5	**192**
12.5 – 16	1	2.5	5	10	10		MS325-16	
16 – 20	1.5	3	5	10	15		MS325-20	**211.50**
20 – 25	2	3	7.5	15	20		MS325-25	**223.50**

MS325 UL File #E137861
Accessories UL File #E90353

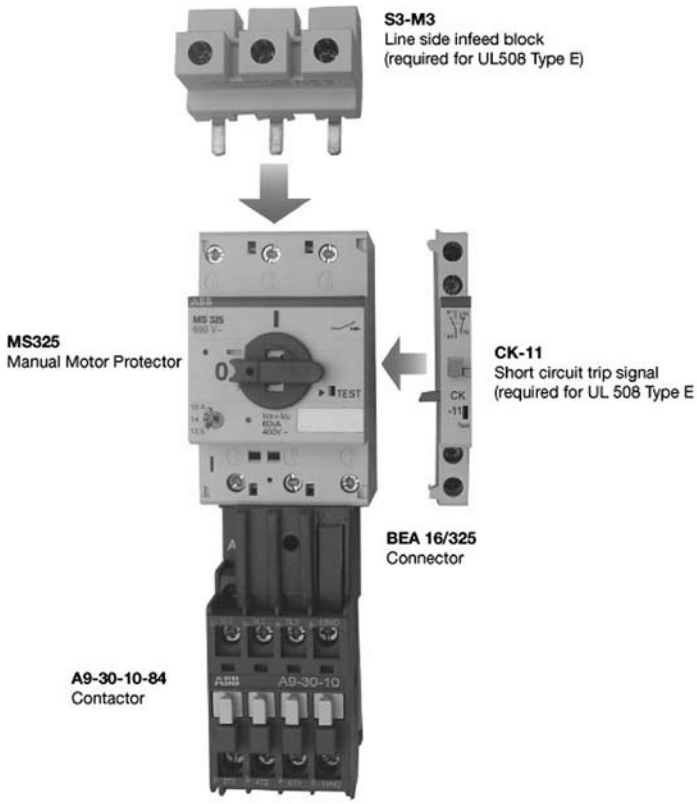
① Single phase motor ratings are based upon wiring all three poles in series.

MS325-1.0

Manual motor protectors — Type MS325

Thermal setting range (Amps)	Single-phase horsepower ratings ① 120V	240V	3-phase horsepower ratings 240V	480V	600V		Catalog number ②	List price
0.10 – 0.16	—	—	—	—	—		MS325-0.16E	
0.16 – 0.25	—	—	—	—	—		MS325-0.25E	**$ 223**
0.25 – 0.40	—	—	—	—	—		MS325-0.40E	
0.40 – 0.63	—	—	—	—	—		MS325-0.63E	
0.63 – 1.0	—	—	—	1/2	1/2		MS325-1.0E	
1.0 – 1.6	—	1/10	—	3/4	3/4		MS325-1.6E	
1.6 – 2.5	—	1/6	1/2	1	1.5		MS325-2.5E	**244**
2.5 – 4.0	1/8	1/3	1	2	3		MS325-4.0E	
4.0 – 6.3	1/4	1/2	1.5	3	5		MS325-6.3E	
6.3 – 9.0	1/3	1	2.5	5	7.5		MS325-9.0E	
9.0 – 12.5	1/2	2	3	7.5	10		MS325-12.5E	**271**
12.5 – 16	1	2.5	5	10	10		MS325-16E	
16 – 20	1.5	3	5	10	15		MS325-20E	**290**
20 – 25	2	3	7.5	15	20		MS325-25E	**302**

MS325 UL File #E137861
Accessories UL File #E90353
Class 10 overload
Short circuit rating of 18kA @ 480V



① Single phase motor ratings are based upon wiring all three poles in series.
② Part includes MMP, barrier and trip signal.