

Self-protected Combination Starters System PKZ 2-SP

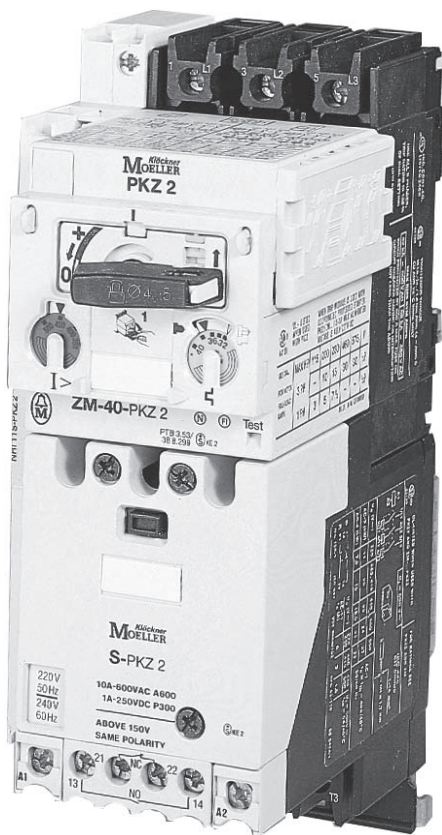
Type PKZ 2/ZM/S-SP motor starters: a higher level of protection and versatility

General:

The PKZ 2/ZM/S-SP is a self-protected starter, the first motor controller to be UL listed and CSA certified under Type E, the category for self-protected control devices. In other words, it is a combination motor controller featuring main disconnect, overcurrent, overload and motor switching functions in one compact unit.

In addition, the PKZ 2/ZM/S-SP incorporates the latest technological advances in current limitation to provide a high short-circuit interrupting rating and continuity of service capability.

The PKZ2/ZM/S-SP is a stand-alone device which does not require any backup protection up to its maximum interrupting rating! It is available in both, full voltage non-reversing and full voltage reversing versions.



Features

- UL listed, CSA certified self-protected combination motor controller UL 508 / CSA 22.2 No. 14, Category E.
- Fuseless, high fault interrupting current-limiting design, with separate main contacts for disconnect and contactor.
- The modular construction integrates both thermal and magnetic trips.
- Controls and protects motors up to 30 HP at 460V, 25 HP at 575V
- One basic device accommodates up to 11 different plug-in modules, simplifying engineering and reducing stocking costs.
- Suitable for PLC controlled, fully automated operation.
- Differentiated overload and short-circuit trip indication.
- A wide range of accessories.

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System PKZ 2-SP Self-protected Combination Starters

All-in-one starter eliminates upstream circuit breaker or fuses

As per the intent of NEC article 430 and CEC Rule 28, the self-protected control device will perform the functions of motor disconnecting means (part IX), motor branch circuit, short circuit and ground fault protection (part IV), motor controller (part VII) and motor overload protection (part III).

Up to the maximum rated short-circuit current available, no upstream circuit breaker or set of fuses is required.

The PKZ 2/ZM-.../S-SP has two sets of main contacts, both current-limiting in design. This provides it with a high interrupting rating and the capability to protect itself against damage under fault conditions. No contact welding can ensue thus providing for continuity of service.

Each unit consists of a basic frame (disconnect switch and contactor) rated to switch a motor load of 30Hp at 460V, 25 Hp at 575V AC. Eleven plug-in trip modules are available to cover motor loads ranging from fractional Hp sizes through 30 Hp at 460V and 25 Hp at 575V AC. As a result, stocking of parts is minimized and use of the starter for other motor loads may be as simple as plugging-in a new trip module and setting the trip module response dials.

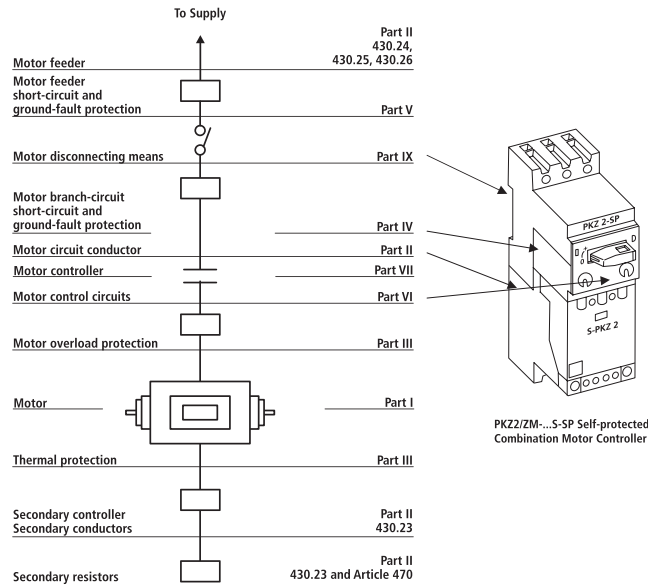


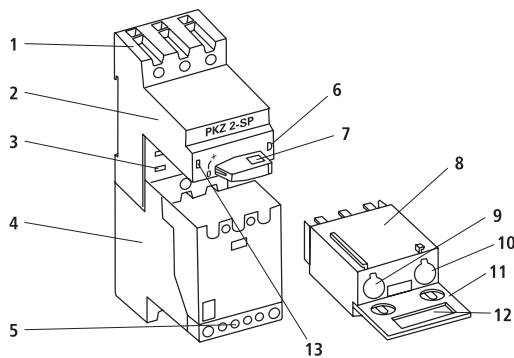
Diagram 430.1 from NEC Article 430

The PKZ2/ZM-.../S-SP self-protected starter comes standard as a one piece construction featuring a main disconnect and a contactor. The unit can be either panel or rail mounted. Integral power takeoffs are provided between the disconnect and contactor for control circuit feed. Adjustable motor protective thermal -magnetic trip modules are set in accordance with the motor full load current and plugged directly into the base of the disconnect.

Choose the PKZ2/ZM-.../S-SP starter for maximum protection and flexibility

- UL listed for use on circuits capable of delivering 65kA RMS sym. at 480Y/277V AC and 42kA RMS sym. at 600Y/347V AC.
- No backup short-circuit protection required (replaces fuses or circuit breakers required by other conventional starters).
- Plug-in trip modules can be removed/installed without disturbing power wiring.
- Field-adjustable, coordinated and sealable settings for motor overload and short-circuit trip response.
- Compact design allows installation in hard-to-fit areas.
- Exceeds IEC "Type 2" coordination without the need for additional fuses or circuit breakers.
- Removal of trip block (for maintenance or servicing) provides visible electrical isolation gap between line disconnecting and contactor portions.
- All live parts (including terminals) are shrouded against accidental contact ("finger-proof" per IEC 536), even with the plug-in trip module removed.
- Maximum continuity of service (protects itself against damage from fault currents).

Trip modules and accessories can be field installed for maximum versatility. The main disconnect and contactor modules can also be separately mounted. This is particularly suitable for full voltage reversing applications which combine the PKZ2-SP disconnect switch and two mechanically interlocked S-PKZ2 contactors. (→ page 08/024)



- 1 Both field wiring terminals on the line side (disconnect) and load side (contactor) have large service entrance spacings typical of molded case circuit breakers.
- 2 The main disconnect isolating contacts are current limiting in design.
- 3 Visible "finger-touch-proof" open circuit power path when trip module is removed.
- 4 The contactor main switching contacts are also current limiting in design and significantly enhance the device's overall interrupting ability.
- 5 The contactor comes standard with 1 N.O. and 1 N.C. auxiliary contacts. 2 N.O. contacts are also available.
- 6 The trip module can be set and then sealed with a wire lock.
- 7 Padlockable handle with ON, OFF and + (tripped) indication.
- 8 Field-interchangeable plug-in motor protective trip modules with coordinated overload and short-circuit protection built in.
- 9 Adjustable magnetic trip dial, range 8.5 - 14 x trip module rating.
- 10 Adjustable thermal trip dial, range 0.6 - 1 x trip module rating (set to motor FLC.)
- 11 Test-to-trip slot.
- 12 Coding feature to differentiate trip modules.
- 13 Short-circuit trip indicator K-AGM-PKZ2 provides visual indication of short circuit trip condition and differentiation between short-circuit and general trip due to overload and/or voltage trips.

System PKZ 2-SP

Self-protected Combination Starters - FVNR, FVR, Open Type

Max. HP rating, 3 phase	Type	Price	Notes:
200 V 230 V 460 V 575 V	Specify coil voltage and frequency, → page 03/038	see price list	
HP HP HP HP			
Full voltage, non-reversing starter			Ready to be mounted and wired in its own enclosure. The HP values shown are the maximum allowable and are dependent on the trip module chosen. Trip modules shown below can be selected later according to desired motor HP and FLC and plugged into the disconnect to complete the starter. Trip modules can be field installed for maximum flexibility.
without trip module			
10 15 30 25	PKZ2/S-SP (...)		
Full voltage, reversing starter			Supplied with factory mounted and wired disconnect and mechanically interlocked contactors. The HP values shown are the maximum allowable and are dependent on the trip module chosen. Trip modules shown below can be selected later according to desired motor HP and FLC and plugged into the disconnect to complete the starter. Trip modules can be field installed for maximum flexibility.
without trip module			
10 15 30 25	PKZ2/S-SP-FVR (...)		

Magnetic Contactors, Magnetic Starters

Trip modules				Adjustable thermal current range	Adjustable magnetic current range	Type	Price	with overload function	
Max. HP rating 3 phase								Type	Price
200V 230V 460V 575V				A ¹⁾	A	Article No.	see price list	Article No.	see price list
HP HP HP HP									
Trip modules are added to above devices to complete starter									
In this range select devices in accordance with motor FLC				0.4 - 0.6	5 - 8	ZM-0.6-PKZ2 024232		ZMR-0.6-PKZ2 033943	
		1/2	1/2	0.6 - 1.0	8 - 14	ZM-1-PKZ2 028979		ZMR-1-PKZ2 033950	
	1/3	3/4	1	1.0 - 1.6	14 - 22	ZM-1.6-PKZ2 031352		ZMR-1.6-PKZ2 033952	
1/2	1/2	1	1 1/2	1.6 - 2.4	20 - 35	ZM-2.4-PKZ2 033725		ZMR-2.4-PKZ2 033955	
1	1	2	3	2.4 - 4.0	35 - 55	ZM-4-PKZ2 036098		ZMR-4-PKZ2 033957	
1 1/2	1 1/2	3	5	4.0 - 6.0	50 - 80	ZM-6-PKZ2 038471		ZMR-6-PKZ2 033966	
2	3	5	7 1/2	6 - 10	80 - 140	ZM-10-PKZ2 040844		ZMR-10-PKZ2 033967	
3	5	10	10	10 - 16	130 - 220	ZM-16-PKZ2 043217		ZMR-16-PKZ2 033968	
7 1/2	7 1/2	20	25	16 - 27	200 - 350	ZM-25-PKZ2 045590		ZMR-25-PKZ2 033969	
10	10	20	-	24 - 32	275 - 425	ZM-32-PKZ2 047963		ZMR-32-PKZ2 033973	
10	15	30	-	32 - 42	350 - 500	ZM-40-PKZ2 050336		ZMR-40-PKZ2 033975	

- Notes:**
- ¹⁾ Set bimetal trips (yellow dial) to motor FLC
 - Tripping current = 125% of setting
 - For motors of service factor 1.0, set dial to 0.9 of motor FLC setting
 - Ambient compensated
 - Phase failure sensitive

**UL listed / CSA certified
Maximum interrupting ratings**

240 V AC	100 kA RMS sym.
480 Y / 277 V AC	65 kA RMS sym.
600 Y / 347 V AC	42 kA RMS sym.
up to 27 A	Suitable for maximum 600 V AC power distribution system when the voltage between any phase to ground does not exceed 347 V
up to 42 A	Suitable for maximum 480 V AC power distribution system when the voltage between any phase to ground does not exceed 277 V

Trip module type ZMR

Under overload and short-circuit fault conditions the standard trip module will open the main disconnect portion of the PKZ2 Self-protected Starter, much like the operation of an inverse time molded case breaker. As an option, the trip module type ZMR can be provided. It features a set of auxiliary contacts which are activated under overload conditions. Similar to the operation of an overload relay in a conventional combination controller, the N.C. contact can be used to de-energize the contactor coil circuit in the event of an overload and the N.O. contact can be used to annunciate the condition. A short-circuit fault will trip open the main disconnect instantaneously, just like the standard trip module.

The ZMR module is ideal for applications which need to take full advantage of the self-protected starter's capabilities over conventional combination controllers, but wish to retain the operating features of a conventional overload relay in a starter.

System PKZ2-SP Combination Starters - Self-protected FVNR

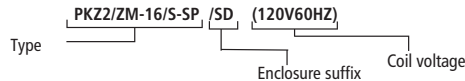
Rating data UL/CSA maximum Horsepower rating (HP) 50/60Hz 3 phase				Adjustable current range		with ZM trip module Type	Price see price list
200 V HP	230 V HP	460 V HP	575 V HP	Thermal setting (set to motor FLC) ¹⁾	Magnetic trip		
				A	A	Specify coil voltage and frequency, → see below	Enclosed General purpose Type 1 Replace <input type="checkbox"/> with suffix /S Industrial use Type 12 dusttight Replace <input type="checkbox"/> with suffix /SD Type 3R weather-proof Replace <input type="checkbox"/> with suffix /DW Insulating material Type 12 corrosion-resistant dusttight Replace <input type="checkbox"/> with suffix /I Open without enclosure Delete <input type="checkbox"/> in type
In this range, select devices in accordance with motor FLC				0.4 - 0.6	5 - 8	PKZ2/ZM-0.6/S-SP <input type="checkbox"/> (...)	
	1/2	1/2		0.6 - 1.0	8 - 14	PKZ2/ZM-1/S-SP <input type="checkbox"/> (...)	
	1/3	3/4	1	1.0 - 1.6	14 - 22	PKZ2/ZM-1.6/S-SP <input type="checkbox"/> (...)	
1/2	1/2	1	1 1/2	1.6 - 2.4	20 - 35	PKZ2/ZM-2.4/S-SP <input type="checkbox"/> (...)	
1	1	2	3	2.4 - 4.0	35 - 55	PKZ2/ZM-4/S-SP <input type="checkbox"/> (...)	
1 1/2	1 1/2	3	5	4.0 - 6.0	50 - 80	PKZ2/ZM-6/S-SP <input type="checkbox"/> (...)	
2	3	5	7 1/2	6 - 10	80 - 140	PKZ2/ZM-10/S-SP <input type="checkbox"/> (...)	
3	5	10	10	10 - 16	130 - 220	PKZ2/ZM-16/S-SP <input type="checkbox"/> (...)	
7 1/2	7 1/2	20	25	16 - 27	200 - 350	PKZ2/ZM-25/S-SP <input type="checkbox"/> (...)	
10	10	20	-	24 - 32	275 - 425	PKZ2/ZM-32/S-SP <input type="checkbox"/> (...)	
10	15	30	-	32 - 42	350 - 500	PKZ2/ZM-40/S-SP <input type="checkbox"/> (...)	

Notes:

- ¹⁾ Set bimetal trips (yellow dial) to motor FLC
- Tripping current = 125% of setting
- For motors of service factor 1.0, set dial to 0.9 of motor FLC setting
- Ambient compensated
- Phase failure sensitive

To order specify:

- Type number
- Enclosure suffix
- Coil voltage
- Accessories



Available Coil Voltages

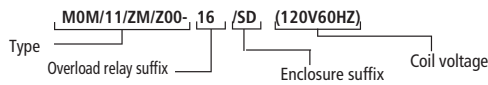
Standard voltages				Special voltages (other than the standard coils listed) ¹⁾	
24V 50Hz	24V 60Hz	110V 50Hz, 120V 60Hz	380V 50Hz, 440V 60Hz	24V 50/60Hz	...V 50Hz (24 - 600V)
48V 50Hz		190V 50Hz, 220V 60Hz	400V 50Hz, 440V 60Hz	110V 50/60Hz	...V 60Hz (24 - 600V)
240V 50Hz		220V 50Hz, 240V 60Hz	415V 50Hz, 480V 60Hz	230V 50/60Hz	
		230V 50Hz, 240V 60Hz			¹⁾ when ordering special coils, please state the required actuating voltage from the given range (...-...V).

Combination Starters Breaker Type - FVNR

Rating data UL/CSA maximum Horsepower rating (HP) 50/60Hz 3 phase				Standard auxiliary contacts		Non reversing Type	Price includes 3-phase bimetal overload relay Price see price list	Enclosed			
200 V HP	230 V HP	460 V HP	575 V HP	N.O.	N.C.	Specify coil voltage and frequency, → page 03/065, 066 Specify overload relay suffix, → page 03/023	General purpose Type 1 Replace <input type="checkbox"/> with suffix /S	Industrial use Type 12 dusttight Replace <input type="checkbox"/> with suffix /SD Type 3R weatherproof Replace <input type="checkbox"/> with suffix / DW	Insulating material Type 12 corrosion-resis- tant, dusttight Replace <input type="checkbox"/> with suffix /I		
3	3	5	-	1	0	M00M-10/ZM/Z00-... <input type="checkbox"/> (...)					
-	-	7 ½	-	1	0	M00AM-10/ZM/Z00-... <input type="checkbox"/> (...)					
5	7 ½	10	15	1	1	M0M/11/ZM/Z00-... <input type="checkbox"/> (...)					
7 ½	10	15	20	1	1	M0AM/11/ZM6/Z...-... <input type="checkbox"/> (...)					
10	-	20	25	1	1	M1M/11/ZM6/Z1-40 <input type="checkbox"/> (...)					
-	15	25	30	1	1	M1AM/11/ZM6/Z1-... <input type="checkbox"/> (...)					
15	20	40	40	1	1	M2M/11/ZM6/Z1-57 <input type="checkbox"/> (...)					
20	25	50	50	1	1	M2AM/11/ZM6/Z1-... <input type="checkbox"/> (...)					
25	30	60	75	1	1	M3M80/11/ZM6/Z5-... <input type="checkbox"/> (...)					
30	-	75	100	1	1	M4M115/11/ZM6/Z5-100 <input type="checkbox"/> (...)					
-	40	-	-	1	1	M4M115/11/ZM6/Z5-125 <input type="checkbox"/> (...)					
40	50	100	125	1	1	M4M115/11/ZM9/Z5-... <input type="checkbox"/> (...)					
50	60	125	150	2	2	MM185/22/ZM9/Z5-160 <input type="checkbox"/> (...)					
60	75	150	200	2	2	MM225/22/ZM9/Z5-220 <input type="checkbox"/> (...)					
75	100	200	250	2	2	MM250/22/ZM10/Z5-... <input type="checkbox"/> (...)					
100	125	250	300	2	2	MM300/22/ZM10/ZW7-... <input type="checkbox"/> (...)					
125	150	300	400	2	2	MM400/22/ZM10/ZW7-400 <input type="checkbox"/> (...)					

To order specify:

- Type number
- Overload relay suffix
- Enclosure suffix
- Coil voltage
- Accessories



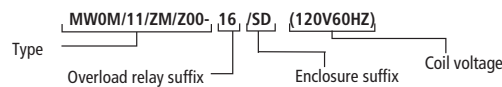
Combination Reversing Starters Breaker Type - FVR

Rating data UL/CSA maximum Horsepower rating (HP) 50/60Hz 3 phase				Standard auxiliary contacts		Reversing Type	Price includes 3-phase bimetal overload relay Price see price list
200 V HP	230 V HP	460 V HP	575 V HP	N.O.	N.C.	Specify coil voltage and frequency, → page 03/065, 066	Enclosed General purpose Type 1 Replace <input type="checkbox"/> with suffix /S
						Specify overload relay suffix, → page 03/023	Industrial use Type 12 dusttight Replace <input type="checkbox"/> with suffix /SD Type 3R weatherproof Replace <input type="checkbox"/> with suffix /DW
							Insulating material Type 12 corrosion-resis- tant, dusttight Replace <input type="checkbox"/> with suffix /I
3	3	5	-	0	1	MW00M-01/ZM/Z00-... <input type="checkbox"/> (...)	
-	-	7 ½	-	0	1	MW00AM-01/ZM/Z00-... <input type="checkbox"/> (...)	
5	7 ½	10	15	1	1	MW0M/11/ZM/Z00-... <input type="checkbox"/> (...)	
7 ½	10	15	20	1	1	MW0AM/11/ZM6/Z...-... <input type="checkbox"/> (...)	
10	-	20	25	1	1	MW1M/11/ZM6/Z1-40 <input type="checkbox"/> (...)	
-	15	25	30	1	1	MW1AM/11/ZM6/Z1-... <input type="checkbox"/> (...)	
15	20	40	40	1	1	MW2M/11/ZM6/Z1-57 <input type="checkbox"/> (...)	
20	25	50	50	1	1	MW2AM/11/ZM6/Z1-... <input type="checkbox"/> (...)	
25	30	60	75	1	1	MW3M80/11/ZM6/Z5-... <input type="checkbox"/> (...)	
30	-	75	100	1	1	MW4M115/11/ZM6/Z5-100 <input type="checkbox"/> (...)	
-	40	-	-	1	1	MW4M115/11/ZM6/Z5-125 <input type="checkbox"/> (...)	
40	50	100	125	1	1	MW4M115/11/ZM9/Z5-... <input type="checkbox"/> (...)	
50	60	125	150	2	2	MWM185/22/ZM9/Z5-160 <input type="checkbox"/> (...)	
60	75	150	200	2	2	MWM225/22/ZM9/Z5-220 <input type="checkbox"/> (...)	
75	100	200	250	2	2	MWM250/22/ZM10/Z5-... <input type="checkbox"/> (...)	
100	125	250	300	2	2	MWM300/22/ZM10/ZW7-... <input type="checkbox"/> (...)	
125	150	300	400	2	2	MWM400/22/ZM10/ZW7-400 <input type="checkbox"/> (...)	

Magnetic Contactors,
Magnetic Starters

To order specify:

- Type number
- Overload relay suffix
- Enclosure suffix
- Coil voltage
- Accessories



Combination Starters - Fusible Disconnect Switch Type with fuse holders for Class J fuses - FVNR

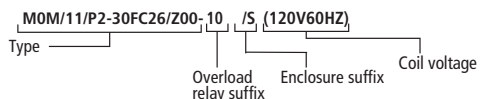
UL/CSA max. Hp rating 50/60Hz 3 phase				Discon- nect Switch Size	Fuse Clip Size ¹⁾	Standard auxiliary contacts		Type	Price includes 3 phase, bimetallic overload relay	
200 V HP	230 V HP	460 V HP	575 V HP	A	A	N.O.	N.C.	Specify coil voltage and frequency → pages 03/065, 066	Enclosed	
								Specify overload relay suffix code → page 03/023	General purpose Type 1 Replace <input type="checkbox"/> with suffix /S	Industrial use Type 12 dusttight Replace <input type="checkbox"/> with suffix /SD Type 3R weatherproof Replace <input type="checkbox"/> with suffix / DW
								... (...)	see price list	see price list
3	3	5	7 1/2	30	30	1	0	M00M-10/P2-30FC23/Z00-... <input type="checkbox"/> (...)		
-	-	7 1/2	10	30	30	1	0	M00AM-10/P2-30FC23/Z00-... <input type="checkbox"/> (...)		
5	5	10	15	30	30	1	1	M0M/11/P2-30FC23/Z00-... <input type="checkbox"/> (...)		
7 1/2	7 1/2	-	-	30	60	1	1	M0M/11/P2-30FC26/Z00-... <input type="checkbox"/> (...)		
-	-	15	20	30	30	1	1	M0AM/11/P2-30FC26/Z00-... <input type="checkbox"/> (...)		
-	10	-	-	30	60	1	1	M0AM/11/P2-30FC26/Z1-... <input type="checkbox"/> (...)		
-	-	20	25	30	60	1	1	M1M/11/P2-30FC26/Z1-... <input type="checkbox"/> (...)		
10	-	-	-	60	60	1	1	M1M/11/P2-60FC26/Z1-... <input type="checkbox"/> (...)		
-	-	25	30	60	60	1	1	M1AM/11/P2-60FC26/Z1-... <input type="checkbox"/> (...)		
-	15	-	-	60	100	1	1	M1AM/11/P2-60FC110/Z1-... <input type="checkbox"/> (...)		
-	-	30	-	60	60	1	1	M2M/11/P2-60FC26/Z1-... <input type="checkbox"/> (...)		
15	20	40	40	60	100	1	1	M2M/11/P2-60FC110/Z1-... <input type="checkbox"/> (...)		
-	-	-	50	60	100	1	1	M2AM/11/P2-60FC110/Z1-... <input type="checkbox"/> (...)		
20	25	50	-	100	100	1	1	M2AM/11/P2-100FC110/Z1-... <input type="checkbox"/> (...)		
-	-	-	60	100	100	1	1	M3M80/11/P2-100FC110/Z1-100 <input type="checkbox"/> (...)		
25	30	60	75	100	200	1	1	M3M80/11/P2-100+62003J/Z5-100 <input type="checkbox"/> (...)		
30	-	75	100	100	200	1	1	M4M115/11/P2-100+62003J/Z5-100 <input type="checkbox"/> (...)		

Notes:

- ¹⁾ Recommended Class J time-delay fuse ampacity.
Range: 1.25 - 1.5 x motor full load current
- ²⁾ Contact Moeller Electric for larger sizes

To order specify:

- Type number
- Overload relay suffix
- Enclosure suffix
- Coil voltage
- Accessories



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Combination Starters - Fusible Disconnect Switch Type with fuse holders for Class R fuses - FVNR

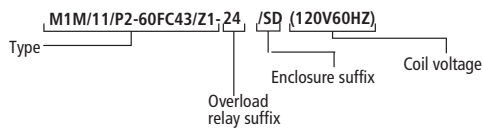
UL/CSA max. Hp rating 50/60Hz 3 phase				Discon- nect Switch Size	Fuse Clip Size ¹⁾	Standard auxiliary contacts	Type	Price includes 3 phase, bimetallic overload relay	
							Specify coil voltage and frequency → pages 03/065, 066	Enclosed	
							Specify overload relay suffix code → page 03/023	General purpose Type 1 Replace <input type="checkbox"/> with suffix / S	
								Industrial use Type 12 dusttight Replace <input type="checkbox"/> with suffix / SD Type 3R weatherproof Replace <input type="checkbox"/> with suffix /DW	
200 V	230 V	460 V	575 V	A	A	N.O.	N.C.	...	(...)
3	3	-	-	30	30	1	0		
-	-	5	7 1/2	30	30	1	0		
-	-	7 1/2	10	30	30	1	0		
5	5	-	-	30	30	1	1		
7 1/2	7 1/2	10	15	30	60	1	1		
-	10	-	-	30	60	1	1		
-	-	15	20	30	60	1	1		
10	-	-	-	60	60	1	1		
-	-	20	25	30	60	1	1		
-	15	-	-	60	100	1	1		
-	-	25	30	60	60	1	1		
-	-	30	-	60	60	1	1		
15	20	40	40	60	100	1	1		
20	-	50	-	100	100	1	1		
-	25	-	-	100	200	1	1		
-	-	-	50	60	100	1	1		
25	30	-	-	100	200	1	1		
-	-	60	75	100	200	1	1		
30	-	-	-	100	200	1	1		
-	-	75	100	100	200	1	1		

Notes:

- 1) Recommended Class R rejection-time-delay fuse ampacity
Range: 1.25 - 1.5 x motor full load current
- 2) Contact Moeller Electric for larger sizes

To order specify:

- Type number
- Overload relay suffix
- Enclosure suffix
- Coil voltage
- Accessories



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