Motor-protective circuit-breakers PKZ: now better than ever

xStart

Motor-protective circuit-breakers PKZ from Moeller have long set the benchmark for quality. And now, for inclusion in the xStart concept, these products have been updated once again, and enhanced in terms of their technical specification.

The PKZM 0 now switches motors up to 32 A. At the same time, its short-circuit switching capacity is significantly increased: the short-circuit rating (400 V) is now 150 kA up to 10 A and 50 kA up to 32 A. The PKZM 4 also has a switching capacity of 50 kA. This simplifies the engineering of safety and reliability, with current limiters becoming virtually obsolete. PKZM 01 is a completely new product with push-button operation for switching motors up to 16 A (50 kA/400 V).

Common accessories throughout the system

Whether PKZM 0, PKZM 01 or PKZM 4, the accessories are always the same. Whether On or Off, overload or short circuit, differential indication helps to locate the cause of tripping without delay, every time. The auxiliary contacts can be fitted without tools and are fail-safe in the way they signal every switching state. One particularly convenient component is the front auxiliary contact NHI-E that can be optionally built into already installed and wired circuit-breakers. It goes without saying that all the auxiliary contacts and releases are worldmarket devices, for all the customary mains voltages.

1 Shunt trips and undervoltage trips

2 Motor-protective circuit-breakers PKZM 0 from 0 to 32 A

3 Motor-protective circuit-breakers PKZM 4 from 10 to 65 A

4 The optionally integrable front auxiliary contact indicates the switching position of 1 NO and NC contact or 1 NO contact

5 Trip-indicating contacts: two contacts provide differential indication of short circuit or overload

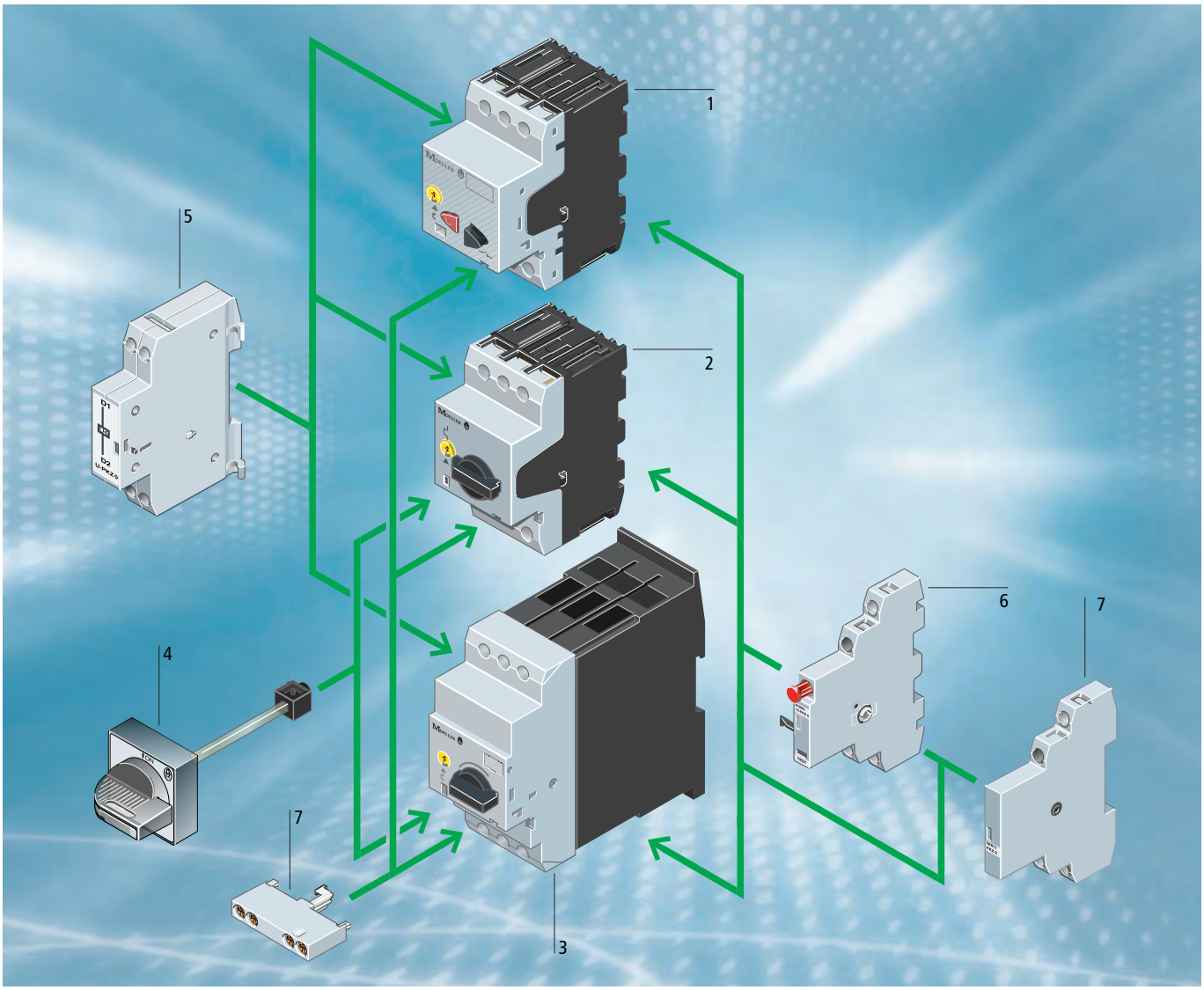
6 Standard auxiliary contacts with up to three contacts for the On/Off switching position

The door coupling handle (IP 65) has a tripped position in addition to the On and Off positions.

Motor-protective circuit-breakers PKZM 01: easy to operate by pressing or hitting a button

The new motor-protective circuit-breakers PKZM 01 for motors up to 12 A are ideally suited to small machines and applications where operation by pressing or even hitting a button is preferred. In addition to the auxiliary contacts from the PKZM 0 range, special enclosures with ingress protection IP 65 or IP 40 and the appropriate Emergency-Stop buttons are available for these new components. Their short-circuit switching capacity is 50 kA.

Motor-protective circuit-breaker PKZ



1. **Motor-protective circuit-breaker PKZM 01**
2. **Motor-protective circuit-breaker PKZM 0**
3. **Motor-protective circuit-breaker PKZM 4**
4. **Door coupling rotary handle IP65**
5. **Voltage release**
6. **Trip-indicating auxiliary contact**
7. **Auxiliary contacts**

http://www.moeller.net/xstart

Motor-protective circuit-breaker PKZM 0, PKZM 4

	Max. motor rating	Rated uninterrupted current	Setting range		Screw terminals
	AC-3		Overload releases	Short-circuit release	**Part no.**
	380 V 400 V 415 V	I_u	I_r	I_{rm}	
	P	A	A	A	
	kW				
Motor-protective circuit-breakers, coordination type "1" and "2"	–	0.16	0.1 – 0.16	2.2	**PKZM0-0,16**
	0.06	0.25	0.16 – 0.25	3.5	**PKZM0-0,25**
	0.09	0.4	0.25 – 0.4	5.6	**PKZM0-0,4**
	0.12	0.63	0.4 – 0.63	8.8	**PKZM0-0,63**
	0.25	1	0.63 – 1	14	**PKZM0-1**
	0.55	1.6	1 – 1.6	22	**PKZM0-1,6**
	0.75	2.5	1.6 – 2.5	35	**PKZM0-2,5**
	1.5	4	2.5 – 4	56	**PKZM0-4**
	2.2	6.3	4 – 6.3	88	**PKZM0-6,3**
	4	10	6.3 – 10	140	**PKZM0-10**
	5.5	12	8 – 12	168	**PKZM0-12**
	7.5	16	10 – 16	224	**PKZM0-16**
	9	20	16 – 20	280	**PKZM0-20**
	12.5	25	20 – 25	350	**PKZM0-25**
	15	32	25 – 32	448	**PKZM0-32**
Motor-protective circuit-breaker, coordination type "1" and "2"	7.5	16	10 – 16	224	**PKZM4-16**
	12.5	25	16 – 25	350	**PKZM4-25**
	15	32	25 – 32	448	**PKZM4-32**
	20	40	32 – 40	560	**PKZM4-40**
	25	50	40 – 50	700	**PKZM4-50**
	30	58	50 – 58	812	**PKZM4-58**
	34	65	55 – 65	882	**PKZM4-63**

Note Three-phase motors (approximate values for squirrel-cage rotors)

Motor-protective circuit-breaker PKZM 01

	Max. motor rating AC-3 380 V 400 V 415 V P kW	Rated uninterrupted current I_u A	Setting range Overload releases I_r A	Short-circuit releases I_{rm} A	Screw terminals **Part no.**
Motor-protective circuit-breakers, coordination type "1" and "2"	–	0.16	0.1 – 0.16	2.2	**PKZM01-0,16**
	0.06	0.25	0.16 – 0.25	3.5	**PKZM01-0,25**
	0.09	0.4	0.25 – 0.4	5.6	**PKZM01-0,4**
	0.12	0.63	0.4 – 0.63	8.8	**PKZM01-0,63**
	0.25	1	0.63 – 1	14	**PKZM01-1**
	0.55	1.6	1 – 1.6	22	**PKZM01-1,6**
	0.75	2.5	1.6 – 2.5	35	**PKZM01-2,5**
	1.5	4	2.5 – 4	56	**PKZM01-4**
	2.2	6.3	4 – 6.3	88	**PKZM01-6,3**
	4	10	6.3 – 10	140	**PKZM01-10**
	5.5	12	8 – 12	168	**PKZM01-12**
	7.5	16	10 – 16	224	**PKZM01-16**

Note Three-phase motors (approximate values for squirrel-cage rotors)

Insulated enclosures

		Protection	For use with	Part no.
Insulated enclosures for surface mounting	–	IP40 NEMA Type 1	PKZM01+NHI-E or VHI-PKZ01+U or A or NHI+L (2 off)	**CI-PKZ01**
	With actuating diaphragm	IP65 NEMA 4X	PKZM01+NHI-E or VHI-PKZ01+U or A or NHI+L (2 off)	**CI-PKZ01-G**
	Lockable in the Off position	IP65 NEMA 4X	PKZM01+NHI-E+U or A+L (2 off)	**CI-PKZ01-SVB**
	Lockable in the Off position, in conjunction with VHI-PKZ01	IP65 NEMA 4X	PKZM01+NHI-E or VHI-PKZ01+U or A+L (2 off)	**CI-PKZ01-SVB-V**
	With stay-put Emergency-Stop mushroom button	IP65 NEMA 4X	PKZM01+NHI-E or VHI-PKZ01+U or A+L (2 off)	**CI-PKZ01-PVT**
	With key-release Emergency-Stop mushroom button	IP65 NEMA 4X	PKZM01+NHI-E or VHI-PKZ01+U or A+L (2 off)	**CI-PKZ01-PVS**
Insulated enclosures for flush mounting	–	Front IP40 NEMA Type 1	PKZM01+NHI-E or VHI-PKZ01+U or A or NHI+L (2 off)	**E-PKZ01**
	With actuating diaphragm	Front IP65 NEMA 4X	PKZM01+NHI-E or VHI-PKZ01+U or A or NHI+L (2 off)	**E-PKZ01-G**
	Lockable in the Off position	Front IP65 NEMA 4X	PKZM01+NHI-E+U or A+L (2 off)	**E-PKZ01-SVB**
	Lockable in the Off position, in conjunction with VHI-PKZ01	Front IP65 NEMA 4X	PKZM01+NHI-E or VHI-PKZ01+U or A+L (2 off)	**E-PKZ01-SVB-V**
	With stay-put Emergency-Stop mushroom button	Front IP65 NEMA 4X	PKZM01+NHI-E or VHI-PKZ01+U or A+L (2 off)	**E-PKZ01-PVT**
	With key-release Emergency-Stop mushroom button	Front IP65 NEMA 4X	PKZM01+NHI-E or VHI-PKZ01+U or A+L (2 off)	**E-PKZ01-PVS**

Accessories

	Contacts		Type of current AC/DC	For use with	Part no.
Trip-indicating auxiliary contact 	2 × 1 N/O	–	–	PKZM0 PKZM4 PKZM01	**AGM2-10-PKZ0**
	–	2 × 1 N/C	–		**AGM2-01-PKZ0**
Early-make auxiliary contacts 	2 N/O	–	–	PKZM0	**VHI20-PKZ0**
	2 N/O	–	–	PKZM01	**VHI20-PKZ01**
Shunt release 	–	–	AC operation	PKZM0 PKZM4 PKZM01	**A-PKZ0(230V50HZ)**
	–	–	DC operation		**A-PKZ0(24VDC)**
Undervoltage release 	–	–	AC operation	PKZM0 PKZM4 PKZM01	**U-PKZ0(230V50HZ)**
Standard auxiliary contact 	1 N/O	1 N/C	–	PKZM0 PKZM4 PKZM01	**NHI11-PKZ0**
	1 N/O	2 N/C	–		**NHI12-PKZ0**
	2 N/O	1 N/C	–		**NHI21-PKZ0**
Standard auxiliary contact 	1 N/O	1 N/C	–		**NHI-E-11-PKZ0**
	1 N/O	–	–		**NHI-E-10-PKZ0**

Motorprotective circuit-breakers for North America

Rating data for approved types[1] UL 508/CSA C 22.2 No. 14	Maximum motor rating Three-phase current HP				Setting ranges		Maximum protective device to UL/CSA **Group protection**[2]					
							Maximum					
	200 V	230 V	460 V	575 V	Overload release	Overload release	Max. short-circuit current 600 V		Fuse		Circuit breaker	
	HP	HP	HP	HP	A	A	kA	with CL kA	A	with CL A	A	with CL A
PKZM 01 motor-protective circuit-breakers "Manual Motor Starter with thermal and magnetic trip"												
PKZM01-0,16	[3]				0.1 – 0.16	2.2	50		600		600	
PKZM01 -0,25					0.16 – 0.25	3.4	50		600		600	
PKZM01 -0,4					0.25 – 0.4	5.6	50		600		600	
PKZM01-0,63					0.4 – 0.63	8.8	50		600		600	
PKZM01-1			0.5	0.5	0.63 – 1	14	50		600		600	
PKZM01-1,6			0.75	1	1 – 1.6	22	50		600		600	
PKZM01-2,5	0.5	0.5	1	1.5	1.6 – 2.5	35	50		600		600	
PKZM01-4	1	1	2	3	2.5 – 4	56	50		600		600	
PKZM01-6,3	1.5	1.5	3	5	4 – 6.3	88	50		600		600	
PKZM01-10	3	3	7.5	10	6.3 – 11	140	22	50	150	600	125	600
PKZM01-12	3	3	7.5	10	9 – 12	168	22	50	150	600	125	600
PKZM01-16	3	5	10	10	10 – 16	224	22	50	150	600	125	600
PKZM 0 motor-protective circuit-breakers "Manual Motor Starter with thermal and magnetic trip"												
PKZM0-0,16	[3]				0.1 – 0.16	2.2	50		600		600	
PKZM0-0,25					0.16 – 0.25	3.4	50		600		600	
PKZM0-0,4					0.25 – 0.4	5.6	50		600		600	
PKZM0-0,63					0.4 – 0.63	8.8	50		600		600	
PKZM0-1			0.5	0.5	0.63 – 1	14	50		600		600	
PKZM0-1,6			0.75	1	1 – 1.6	22	50		600		600	
PKZM0-2,5	0.5	0.5	1	1.5	1.6 – 2.5	35	50		600		600	
PKZM0-4	1	1	2	3	2.5 – 4	56	50		600		600	
PKZM0-6,3	1.5	1.5	3	5	4 – 6.3	88	50		600		600	
PKZM0-10	3	3	7.5	10	6.3 – 11	140	22	50	150	600	125	600
PKZM0-12	3	3	7.5	10	9 – 12	168	22	50	150	600	125	600
PKZM0-16	3	5	10	10	10 – 16	224	22	50	150	600	125	600
PKZM0-20	5	5	10	15	16 – 20	280	10	18	150	600	125	600
PKZM0-25	5	7.5	15	20	20 – 25	350	10	18	150	600	125	600
PKZM0-32	7.5	10	25	30	24 – 32	448	10	18	150	600	125	600
PKZM 4 motor-protective circuit-breakers												
PKZM4-16	3	5	10	15	10 – 16	224	10		600		600	
PKZM4-25	7,5	7,5	20	25	16 – 25	350	10		600		600	
PKZM4-32	10	10	25	30	25 – 32	448	10		600		600	
PKZM4-40	10	10	30	30	32 – 40	560	10		600		600	
PKZM4-50	10	15	30	40	40 – 50	700	10		600		600	
PKZM4-63	15	15	40	-	52 – 63	882	-		600		600	

Notes Service factor (SF)
Setting I_r of current scale in dependence of load factor
SF = 1.15 → I_r = 1 x → $I_{n\ mot}$
SF = 1 → I_r = 0.9 x $I_{n\ mot}$

[1] Devices for world markets: IEC = UL/CSA
[2] Important: Changed requirements for group protection
[3] In this range, calculate motor rating according to rated current. Specified values to NEC Table 430 – 150

Manual Motor Controllers (Starters) for the North American market

Manual Motor Starters *PKZ*

As components, manual motor starters are Industrial Control devices that are tested and UL listed per *UL 508* and *CSA* certified per *CSA-C22.2 No.14*. The *PKZM* manual motor starters are world market devices. They feature fixed instantaneous trips (*PKZM0* and *PKZM4*) or adjustable magnetic trips (*PKZ2*) for short circuit protection, adjustable bimetal trips for motor overload protection and they can switch motors directly across the line. They can also be equipped with auxiliary contacts for switching control circuits. *In North America, per current product standards, the built-in and functionally active instantaneous magnetic trips are not recognized as elements that provide the necessary branch circuit overcurrent protective function.*

Manual motor starters are used primarily as manually operated protective switches in industrial control panels as well as

Type E Manual motor protector (MMP) for North America										
Maximum motor rating Three-phase current HP				Setting ranges		Rated short-circuit breaking capacity				
200 V	230 V	460 V	575 V	Overload release	Short-circuit release	240 V	480 V	600 V	Incoming terminal	Manual motor protector (MMP)
HP	HP	HP	HP	A	A	kA	kA	kA	**Part no.**	**Part no.**
				0.16 – 0.25	3.4	50	50	50	**BK25/3-PKZ0-E**	**PKZM0-0,25**
				0.25 – 0.4	5.6	50	50	50	**BK25/3-PKZ0-E**	**PKZM0-0,4**
				0.4 – 0.63	8.8	50	50	50	**BK25/3-PKZ0-E**	**PKZM0-0,63**
		0.5	0.5	0.63 – 1	14	50	50	50	**BK25/3-PKZ0-E**	**PKZM0-1**
		0.75	1	1 – 1.6	22	50	50	50	**BK25/3-PKZ0-E**	**PKZM0-1,6**
0.5	0.5	1	1.5	1.6 – 2.5	35	50	50	50	**BK25/3-PKZ0-E**	**PKZM0-2,5**
1	1	2	3	2.5 – 4	56	50	50	50	**BK25/3-PKZ0-E**	**PKZM0-4**
1.5	1.5	3	5	4 – 6.3	88	50	50	50	**BK25/3-PKZ0-E**	**PKZM0-6,3**
3	3	7.5	10	6.3 – 11	140	50	50	50	**BK25/3-PKZ0-E**	**PKZM0-10**
3	3	7.5	10	6.3 – 11	168	42	42	18	**BK25/3-PKZ0-E**	**PKZM0-12**
3	5	10	10	10 – 16	224	42	42	10	**BK25/3-PKZ0-E**	**PKZM0-16**
5	5	10	–	16 – 20	280	42	42	–	**BK25/3-PKZ0-E**	**PKZM0-20**
5	7.5	15	–	20 – 25	350	18	18	–	**BK25/3-PKZ0-E**	**PKZM0-25**
7.5	10	20	–	25 – 32	448	18	18	–	**BK25/3-PKZ0-E**	**PKZM0-32**
3	5	10	15	10 – 16	224	50	50	25	**BK50/3-PKZ4-E**	**PKZM4-16**
7.5	7.5	20	25	20 – 25	350	50	50	25	**BK50/3-PKZ4-E**	**PKZM4-25**
10	10	25	30	25 – 32	448	50	50	25	**BK50/3-PKZ4-E**	**PKZM4-32**
10	10	30	30	32 – 40	560	50	50	25	**BK50/3-PKZ4-E**	**PKZM4-40**

individually enclosed starters for separate motor loads. In North America they are selected primarily in accordance with the motor HP rating, whereas in Europe the selection process is done more in line with respective current ranges as opposed to assigned motor kW ratings. These simply reflect local conventions. Regardless of the method used, the end result will more or less be the same in both cases.
It is worth noting that, apart from molded case circuit breakers, these manual motor starters belong in a category of low voltage equipment for which North American and international approaches and viewpoints tend to be the furthest apart.

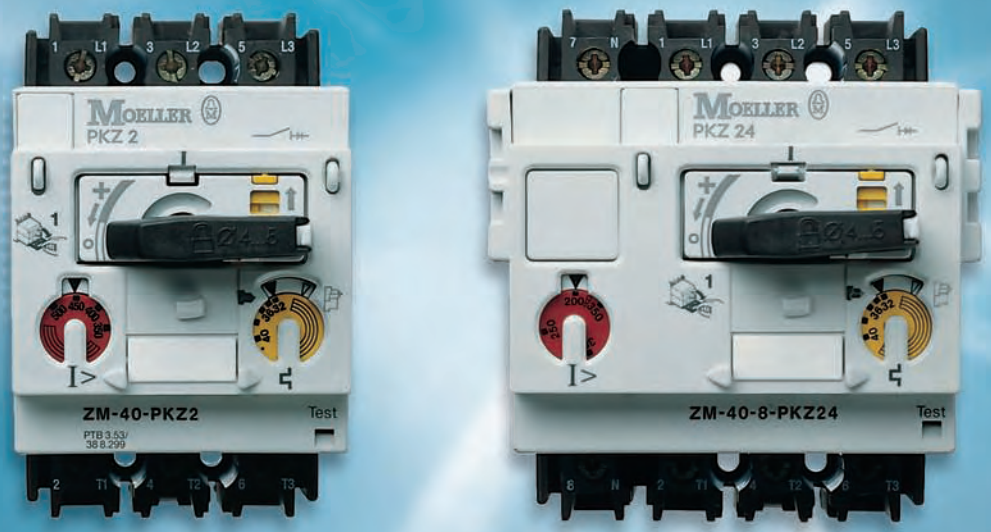
From a **North American perspective** this constructionally identical motor protective switch is simply categorized in its basic form as a „manual motor controller", **and is thus not recognized as providing any short circuit protective features**. All of these controllers, aside from those that have undergone further evaluation as explained later in the text, require a back-up overcurrent protective device in their respective branch circuit. This applies equally in cases where the device is operating in its self-protective range and even when the device is additionally *UL* listed and *CSA* certified in group installations per local *NEC* and *CEC* electrical Codes. This rather demoted performance capability is not the result of failed testing but has more to do with the fact that, historically, North American standards have required that the short circuit protective feature be relegated to a separate set of overcurrent protective devices specifically listed or certified for the purpose. As the following clarifications will show however, we have witnessed in the meantime a rapprochement of the *NA* and *IEC* worlds in this respect.

Type E Self-Protected Combination Motor Controller
A significant step in the expansion of *UL 508* and *CSA-C22.2 No. 14* with respect to combination motor controllers came about with the introduction of "Construction Type E" in each respective standard. In order to fulfill the necessary upstream main disconnect and short circuit protective functions which are inherent elements of every combination starter, these components needed to feature a high short circuit rating as well as large electrical clearances on their incoming supply side field wiring terminals in accordance with *UL 489* and *CSA-C22.2 No. 5-02* specifications. It is worth noting that all currently available self-protected *„Type E"*-Starters have only been listed and certified for use in solidly grounded 4 wire, wye-type supply networks (e.g. 480Y/277 VAC or 600Y/347 VAC).

The use of Self-protected *Type E*-Combination Starters provides numerous benefits:

- Simplified engineering, no need to coordinate with a back-up overcurrent protective device (often unknown) due to its stand-alone rating.
- The amount of necessary layout space is greatly reduced.
- No assembly and wiring required between individually mounted starter components.
- Lower component costs
- Lower panel wiring and assembly charges
- A design more in line with current technological control panel advances used throughout the *IEC*-world.

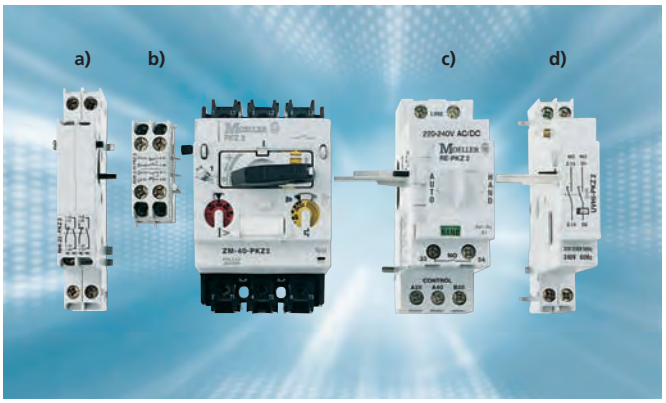
Motor- and System-Protective-Circuit-Breakers PKZ 2: Versatile in Application



Motor and system protection: All the options in one range

Various plug-in trip blocks allow the PKZ 2 to be converted in a single action. 3-pole and 4-pole trip blocks are available for motor and system protection. Differential signalling clearly indicates the switching state of the circuit-breaker. Auxiliary contact modules, voltage releases or trip-indicating auxiliary contacts can be fitted quickly and easily.

"Motor-protective circuit-breakers PKZ are, and always will be, the epitome of safety, reliability and quality in motor protection."



Accessories:
a) Standard auxiliary contact module, b) Trip-indicating auxiliary contact module, c) Remote operator
d) Voltage releases
- Shunt release
- Undervoltage release with/without early-make auxiliary contact
- Delayed-response under-voltage release

Plug-in trip blocks allow fast adaptation to engineering changes.

Switching and signalling, locally and remotely

PKZ 2 has intelligent accessories to allow flexible solutions to a wide range of communication tasks. The electronic remote operator RS-PKZ 2 can be actuated directly, without any coupling elements, from the semiconductor outputs of a PLC (24 V DC).

With electrical isolation between CONTROL and LINE, it can take the power for the switching process from a separate power supply (e.g. 230 V 50 Hz).

On the RE-PKZ 2, the electronic remote operator for standard applications, CONTROL and LINE are separate inputs too, although they use the same potential reference. This allows actuation by low consumption units, such as control circuit devices.

1 The door coupling handle: Operation from the outside

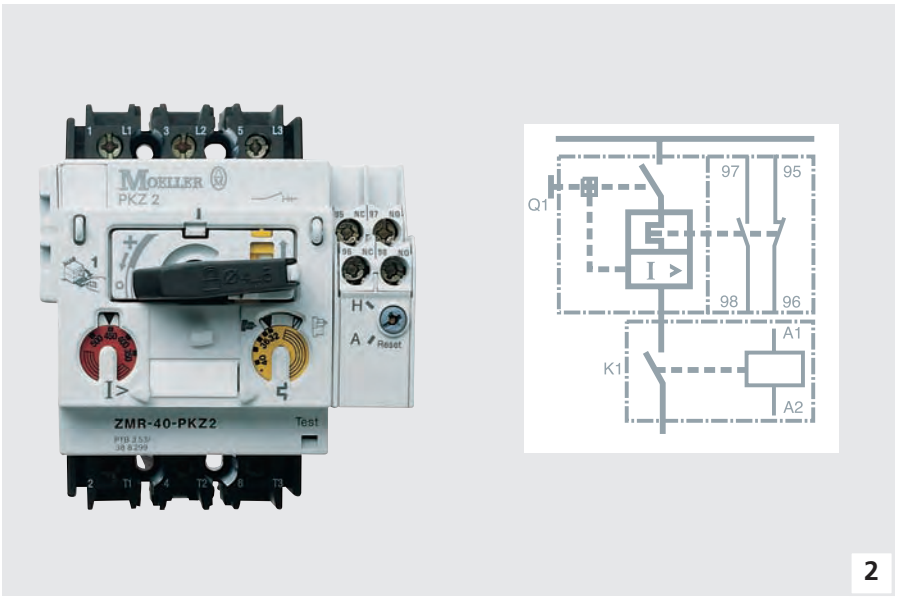
Like the basic unit, the door coupling handle has ON, OFF and TRIPPED positions. When installed in the control panel door, the handle enables the door to be interlocked, if required.

2 Motor-starter with or without manual reset – many advantages rather than many parts

Valuable not just in the chemical industry: the trip block ZMRPKZ 2.

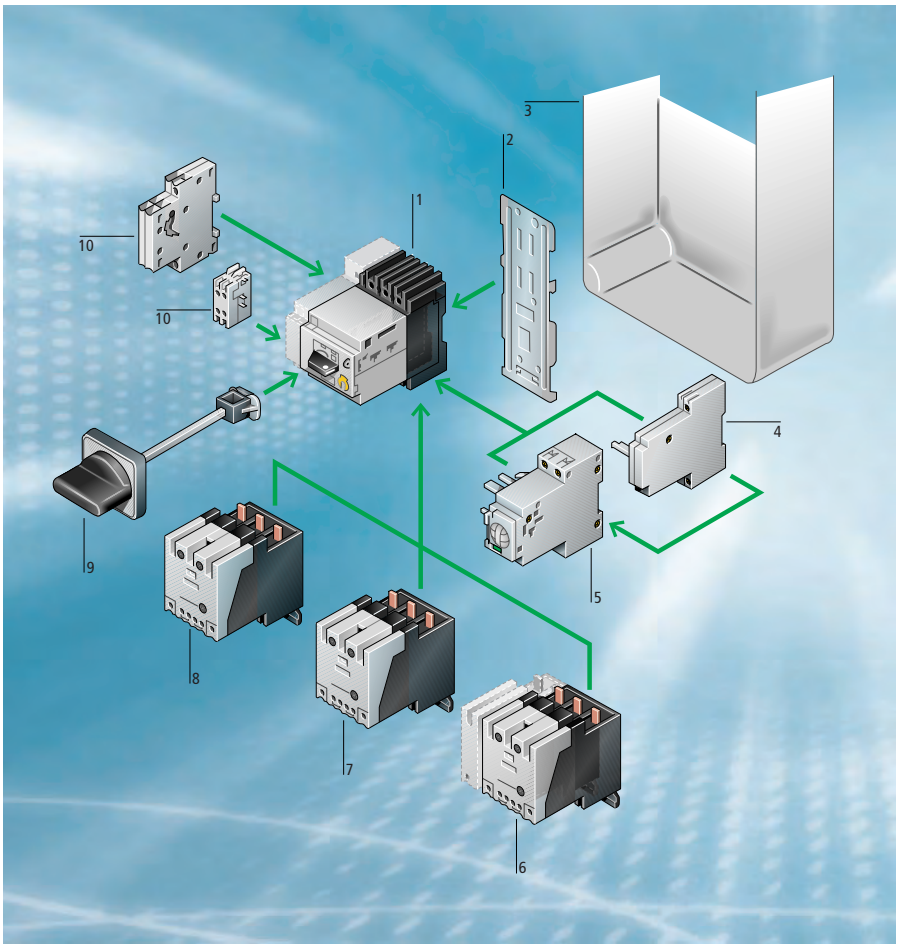
When used in combination with the PKZ 2 basic unit, the trip block with overload relay function switches Off the down-stream contactor, rather than disconnecting the circuit-breaker in the event of a motor overload. The circuit-breaker PKZ 2 thus remains switched On and does not need to be manually reset locally. After a cooling-down phase for the trip block ZMR, the contactor is reset automatically. In the "Manual" setting, the ZMR block has to be reset by hand.

1



2

The complete range for flexible solutions



1 Motor-protective circuit-breakers, Circuit-breakers

2 Clip plate

3 Insulated enclosures

4 Voltage releases

5 Remote operators

6 Contact module

7 High-capacity contact module

8 Current limiter

9 Door coupling rotary handle IP65

10 Auxiliary contacts

Motor protective basic unit, 3-pole			
Rated uninterrupted current		PKZ2 basic unit with S-PZK2 high-capacity contact module fitted (1 M, 1 B). Supplied on C-PKZ2 clip plate. Cannot be combined with Z...-0,6-PKZ2	PKZ2 basic unit with SE1A/11-PKZ2 contact module fitted (1 M, 1 B). Supplied on C-PKZ2 clip plate. Cannot be combined with Z...-0,6-PKZ2
I_u A	**Part no.**	**Part no.**	**Part no.**
40	**PKZ2**	**PKZ2/S(230V50HZ)**	**PKZ2/SE1A/11(230V50HZ)**

Motor protective trip blocks, 3-pole

AC3 220 V 230 V 240 V	AC3 380 V 400 V 415 V	Rated uninterrupted current	Overload release	Short-circuit release	With overload release	With overload/ relay function, with manual/automatic position[1]	Without overload release[2]
P kW	**P** kW	I_u A	I_r A	I_{rm} A	**Part no.**	**Part no.**	**Part no.**
0.09	0.12	0.6	0.4 – 0.6	5 – 8	**ZM-0,6-PKZ2**	**ZMR-0,6-PKZ2**	**M-0,6-PKZ2**
0.12	0.25	1	0.6 – 1	8 – 14	**ZM-1-PKZ2**	**ZMR-1-PKZ2**	**M-1-PKZ2**
0.25	0.55	1.6	1 – 1.6	14 – 22	**ZM-1,6-PKZ2**	**ZMR-1,6-PKZ2**	**M-1,6-PKZ2**
0.37	0.75	2.4	1.6 – 2.4	20 – 35	**ZM-2,4-PKZ2**	**ZMR-2,4-PKZ2**	**M-2,4-PKZ2**
0.75	1.5	4	2.4 – 4	35 – 55	**ZM-4-PKZ2**	**ZMR-4-PKZ2**	**M-4-PKZ2**
1.1	2.2	6	4 – 6	50 – 80	**ZM-6-PKZ2**	**ZMR-6-PKZ2**	**M-6-PKZ2**
2.2	4	10	6 – 10	80 – 140	**ZM-10-PKZ2**	**ZMR-10-PKZ2**	**M-10-PKZ2**
4	7.5	16	10 – 16	130 – 220	**ZM-16-PKZ2**	**ZMR-16-PKZ2**	**M-16-PKZ2**
5.5	12.5	25	16 – 25	200 – 350	**ZM-25-PKZ2**	**ZMR-25-PKZ2**	**M-25-PKZ2**
7.5	15	32	24 – 32	275 – 425	**ZM-32-PKZ2**	**ZMR-32-PKZ2**	**M-32-PKZ2**
11	20	40	32 – 40	350 – 500	**ZM-40-PKZ2**	**ZMR-40-PKZ2**	**M-40-PKZ2**

Accessories

Standard auxiliary contact
For motor-protective circuit-breakers, circuit-breakers and (high-capacity) compact starters

		Part no.
1 N/O	1 N/C	**NHI11-PKZ2**
2 N/O	2 N/C	**NHI22-PKZ2**

Standard auxiliary contact
For (high-capacity) compact starters

		Part no.
1 N/O	1 N/C	**NHI11S-PKZ2**
2 N/O	2 N/C	**NHI22S-PKZ2**
2 x 1 N/O	2 x 1 N/C	**NHI2-11S-PKZ2**

Trip-indicating auxiliary contact with short-circuit indicator
For motor-protective circuit-breakers, circuit-breakers and (high-capacity) compact starters

		Part no.
2 x 1 N/O	2 x 1 N/C	**AGM2-11-PKZ2**

Short-circuit indicators
For motor-protective circuit-breakers, circuit-breakers and (high-capacity) compact starters

		Part no.
-	-	**K-AGM-PKZ2**

Shunt release
For AC and DC voltage

	Part no.
24 – 60 V DC 24 – 48 V 50Hz 24 – 48 V 60Hz	**A-PKZ2-A**
110 – 250 V DC 110 – 240 V 50Hz 110 – 240 V 60Hz	**A-PKZ2-B**
380 – 500 V 50Hz 480 – 600 V 60Hz	**A-PKZ2-C**

Current limiter
To increase the switching capacity of non-inherently short-circuit proof motor-protective circuit-breakers to 100 kA/500 V
CL-PKZ2

Undervoltage release off-delayed, delay time 200 ms
With auxiliary contact
For AC **UVHI-PKZ2** (230V50HZ)

Undervoltage release, non-delayed
Without auxiliary contact
For AC **U-PKZ2** (230V50HZ)
For DC **U-PKZ2** (24VDC)

With auxiliary contact
For AC **U-HI-PKZ2** (230V50HZ)

Remote operator RE-PKZ2
Actuation via auxiliary contact
RE-PKZ2 (220-240V50/60HZ, DC)
RE-PKZ2 (24V50/60HZ, DC)

Remote operator RS-PKZ2
Actuation from PLC semiconductor outputs
RS-PKZ2 (220-240V50/60HZ, DC)
RS-PKZ2 (24V50/60HZ, DC)

Door coupling handle
Degree of protection IP65

		Part no.
For use on main sswitches to IEC/EN 60204	Black	**PKZ2-XH**
	Red-yellow	**PKZ2-XRH**
For use in MCC distribution boards with PKZ2 turned through 90°	Black	**PKZ2-XHMCC**

Plug-fit extension shaft for door coupling handle
Can be extended as required for mounting depths of 171 - 300 mm
PKZ2-XAH

[1] Single-phasing sensitivity, adjustability and Ex as with ZM blocks. When using motor protective trip blocks with overload relay function, an overload does not cause the motor-protective circuitbreaker to trip. The overload indication is produced by means of two auxiliary contacts.
[2] When using the short-circuit protection for motors with heavy starting duty, please notice the projecting notes on page 8/41 in the Main Catalogue Industrial Switchgear, Motor-protective circuit-breakers PKZ 2, Motor protection modules

PKZ 2 motor-protective circuit-breakers, PKZ 2 circuit-breakers for North America

Rating data for approved types[1] UL 508/CSA C 22.2 No. 14	**Maximum motor rating** Three-phase current HP				Setting ranges		Maximum protective device to UL/CSA **Group protection**[2]			
	200 V	230 V	460 V	575 V	Overload release	Short-circuit release	To max. short-circuit rating 600 V		Maximum fuse rating	Circuit-breaker max.
	HP	HP	HP	HP	A	A	480 V kA	600 V kA	A	A
PKZ 2 motor-protective circuit-breakers	"Manual Motor Starter with thermal and magnetic trip"									
PKZ2/ZM-0.6	[3]				0.4 – 0.6	5 – 8	65	42	500	600
PKZ2/ZM-1			0.5	0.5	0.6 – 1	8 – 14	65	42	500	600
PKZ2/ZM-1,6			0.75	1	1 – 1.6	14 – 22	65	42	500	600
PKZ2/ZM-2,4	0.5	0.5	1	1.5	1.6 – 2.4	20 – 35	65	42	500	600
PKZ2/ZM-4	1	1	2	3	2.4 – 4	35 – 55	65	42	500	600
PKZ2/ZM-6	1.5	1.5	3	5	4 – 6	50 – 80	65	42	500	600
PKZ2/ZM-10	2	3	5	7.5	6 – 10	80 – 140	65	42	500	600
PKZ2/ZM-16	3	5	10	10	10 – 16	130 – 220	65	42	500	600
PKZ2/ZM-25	7.5	7.5	20	25	16 – 27	200 – 350	65	42	500	600
PKZ2/ZM-32	10	10	20	30	24 – 32	275 – 425	65	42	500	600
PKZ2/ZM-40	10	15	30	30	32 – 42	350 – 500	65	42	500	600
PKZ 2 high-capacity compact starters	"Manual Motor Starter with thermal and magnetic trip"									
PKZ2/ZM-0,6/S(...)	[3]				0.4 – 0.6	5 – 8	65	42	2000	2000
PKZ2/ZM-1/S(...)			0.5	0.5	0.6 – 1	8 – 14	65	42	2000	2000
PKZ2/ZM-1,6/S(...)			0.75	1	1 – 1.6	14 – 22	65	42	2000	2000
PKZ2/ZM-2,4/S(...)	0.5	0.5	1	1.5	1.6 – 2.4	20 – 35	65	42	2000	2000
PKZ2/ZM-4/S(...)	1	1	2	3	2.4 – 4	35 – 55	65	42	2000	2000
PKZ2/ZM-6/S(...)	1.5	1.5	3	5	4 – 6	50 – 80	65	42	2000	2000
PKZ2/ZM-10/S(...)	2	3	5	7.5	6 – 10	80 – 140	65	42	2000	2000
PKZ2/ZM-16/S(...)	3	5	10	10	10 – 16	130 – 220	65	42	2000	2000
PKZ2/ZM-25/S(...)	7.5	7.5	20	25	16 – 27	200 – 350	65	42	2000	2000
PKZ2/ZM-32/S(...)	10	10	20	30	24 – 32	275 – 425	65	42	2000	2000
PKZ2/ZM-40/S(...)	10	15	30	30	32 – 42	350 – 500	65	42	2000	2000
High-capacity contact module motor-protective circuit-breaker	"Contact module" in combination with PKZ2/ZM(R)-...or base for separate mounting of EZ-PKZ2									
S-PKZ2(...)	10		15		30	30				
S/HI20-S-PKZ2(...)	10		15		30	30				
S-G-PKZ2(...)	10		15		30	30				
Reversing combination	"Reversing combination" in combination with ZM-...PKZ2 trip block for motor protection									
PKZ2/SW-MV-11(...) Reversing busbar system	10		15		30	30 42 A 600 V AC				
	For UL/CSA-conformance, order a BK50/3-PKZ2 terminal separately.									

Notes Service factor (SF)

Setting I_r of current scale in dependence of load factor

SF = 1.15 → I_r = 1 x → $I_{n\ mot}$

SF = 1 → I_r = 0.9 x $I_{n\ mot}$

[1] Devices for world markets: IEC = UL/CSA

[2] Important: Changed requirements for group protection

[3] In this range, calculate motor rating according to rated current. Specified values to NEC Table 430 – 150

PKZ2 system self-protected starters for North America									
Maximum motor rating Three-phase current HP				Setting ranges		Rated short-circuit breaking capacity			
200 V	230 V	460 V	575 V	Overload release	Short-circuit release	230 V	460 V	575 V	
HP	HP	HP	HP	A	A	kA	kA	kA	**Part no.**
[1]	[1]	0.5	0.5	0.6 – 1	8 – 14	100	65	42	**PKZ2/ZM-1/S-SP(120V60HZ)**
[1]	[1]	0.75	1	1 – 1.6	14 – 22	100	65	42	**PKZ2/ZM-1,6/S-SP(120V60HZ)**
0.5	0.5	1	1.5	1.6 – 2.4	20 – 35	100	65	42	**PKZ2/ZM-2,4/S-SP(120V60HZ)**
1	1	2	3	2.4 – 4	35 – 55	100	65	42	**PKZ2/ZM-4/S-SP(120V60HZ)**
1.5	1.5	3	5	4 – 6	50 – 80	100	65	42	**PKZ2/ZM-6/S-SP(120V60HZ)**
2	3	5	7.5	6 – 10	80 – 140	100	65	42	**PKZ2/ZM-10/S-SP(120V60HZ)**
3	5	10	10	10 – 16	130 – 220	100	65	42	**PKZ2/ZM-16/S-SP(120V60HZ)**
7.5	7.5	20	25	16 – 27	200 – 350	100	65	42	**PKZ2/ZM-25/S-SP(120V60HZ)**
10	10	20	–	24 – 32	275 – 425	100	65	–	**PKZ2/ZM-32/S-SP(120V60HZ)**
10	15	30	–	32 – 42	350 – 500	100	65	–	**PKZ2/ZM-40/S-SP(120V60HZ)**

Notes Without additional short-circuit protection element, with built-in short-circuit indicator, to UL 508 "Combination motor controller Type E". Immediate continuity of service possible after short-circuit tripping.

[1] In this range, calculate motor rating according to rated current. Specified values to NEC Table 430 – 150

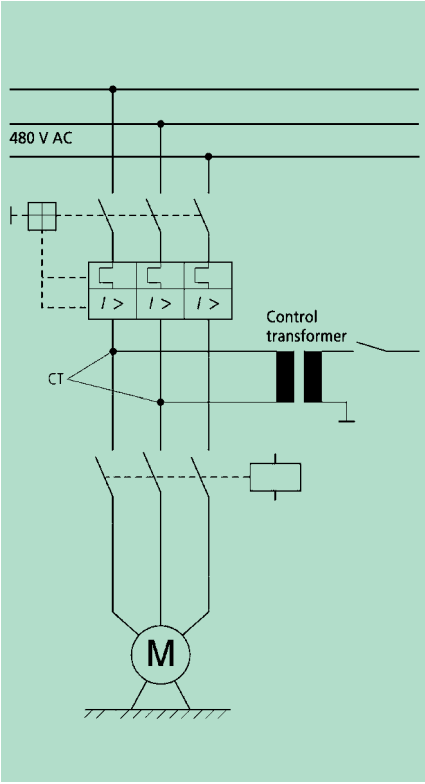
Self-Protected Combination Starter PKZ2/ZM-.../S-SP

The Self-Protected Combination Starter Type *PKZ2/ZM-.../S-SP* fulfills all „Type E"-requirements. This high fault rated compact combination starter is made up of a thermal-magnetic manual motor protective switch *PKZ2/ZM-*.. and a high fault capacity magnetic controller (contactor) /*S*. The unit features a built-in short circuit trip indicator. Following a short circuit interruption and after the source of the fault has been cleared, the device remains fully calibrated and can be immediately brought back in line to provide „Continuity of service" performance. The manual motor protective portion *PKZ2/ZM-*… features the large electrical clearances on its incoming supply side field wiring terminals in accordance with *UL 489*. An important element in fulfilling *Type E* requirements for high fault ratings is the high capacity magnetic contactor which features current limiting contacts and a customized internal magnetic trip to provide the starter's high level fault interrupting capability. This special contactor is a vital part of the assembly and provides the additional current limitation capability necessary to achieve self-protection. The starter is suitable for 600 *VAC* solidly grounded wye supply systems (600Y/ 347 V) for motor full load currents up to 27A (25HP at 575 V) and 480Y/277 *VAC* circuits for motor FLCs up to 42 A (15/30 HP at 230/460 V).

The *PKZ2/ZM-.../S-SP's* stand alone short circuit rating is 65 kA / 480 V and 42 kA / 600 V. The compact starter's main design features include:

- A plug-in, adjustable thermal-magnetic trip module in line with North American motor full load current ratings and a high capacity, high fault current limiting contactor for motor switching purposes which is countoured to fit directly into the protective switch portion.

All system component modules, e.g. auxiliary contacts, voltage trips and remote control drive are *UL* listed and *CSA* certified accessories which can be field installed. The starter also features control circuit tap-offs between the disconnect and the contactor. That is especially useful in tight, limited space applications like Motor Control Center (*MCC*) starter units which incorporate control transformers to supply the starter's control circuit loads and circuitry. All of these features contribute to make the *PKZ 2* a truly innovative and high performance combination motor starter.



Control circuit tap-offs on the *PKZ2-ZM../S-SP* for transformer feed in a Motor Control Center starter application.

Content