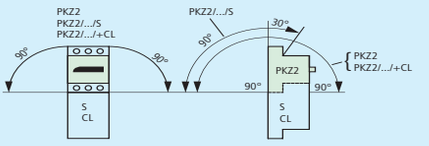
PKZ 2 Manual Motor Protectors
Technical Data

General						
Standards					UL 508, CSA C 22.2 No. 14, IEC/EN 60 947, VDE 0660 GL, LR, DNV, PRS, BV, RINA, RS, EZU, MEEI	
Climatic proofing					Damp heat, constant, to IEC 60 068-2-3 Damp heat, cyclical, to IEC 60 068-2-30	
Ambient temperature	Storage		min./max.	°C	–25/+70	
	Open		min./max.	°C	–25/+60	
	Enclosed		min./max.	°C	–25/+40	
Mounting position						
Direction of incoming supply					as required	
Degree of protection					IP 20	
Shock resistance (half-sinsoidal shock 20 ms) to IEC 60 068-2-27				g	Motor protector: 30	Motor protector combination: 8
Altitude				m	2000	
Terminal capacity						
IEC/EN	solid or stranded			mm^2	1 × (1 – 16) or 2 × (1 – 6)	
	flexible with ferrule			mm^2	1 × (1,5 – 10) or 2 × (1,5 – 6)	
UL/CSA	solid or stranded			AWG	14 – 6	
Tightening torque for terminal screws						
Power terminals				Nm	1,8	
Control terminals				Nm	1,0	
Main contacts IEC/EN 60 947 ratings						
Rated impulse withstand voltage U_{imp}				V	6000	
Overvoltage category / pollution degree					III/3	
Rated operational voltage U_e				V AC	690	
Rated uninterrupted current I_u = rated operational current I_e				A	40	
Rated frequency				Hz	50 – 60	
Current heat losses, 3-pole, at operational temperature				W	Motor protector: 14	Motor protector combination: 23
Lifespan	mechanical			ops.	Motor protector: 0,1 × 10^6	(High-capacity) contact module: 5 × 10^6 (mechanical lifespan is reduced by 30% for a dual frequency coil 50/60Hz)
	electrical	100 % AC-3		ops.	Motor protector: 0,05 × 10^6	(High-capacity) contact module: 1 × 10^6
		AC-4		ops.		(High-capacity) contact module: 0,03 × 10^6
Max. operating frequency				ops./h	Motor protector: 60	(High-capacity) contact module: characteristic curve → page 08/058
Motor switching capacity		AC-3		V AC	max. 690	
		DC-5		V DC	max. 250	
				A DC	max. 40	
DC application					PKZ2/ZM-..	PKZ2/ZM-../S(+CL)
Rated short-circuit breaking capacity						
	I_{cn} (250 V DC) L/R = 15 ms			kA	30	50
	I_{cn} (125 V DC)			kA	50	65
Operating times under short-circuit conditions						
Minimum command time				ca. ms	2	2
Opening delay				ca. ms	0,5	0,5
Total opening time				ca. ms	6	4
Trip blocks						
Temperature compensation						
IEC/EN 60 947-4-1			min./max.	°C	–5/+40	
Operating range			min./max.	°C	–25/+60	
Temperature compensation residual error				%/K	0,25	
Magnetic trip tolerance				%	±20	
ZM-..-PKZ2, ZMR-..-PKZ2 motor-protective trip blocks						
Adjustable overload trips				× I_u	0,6 – 1,0	
Adjustable magnetic trip setting range				× I_u	8,5 – 14	
Single-phasing sensitivity					UL 508, CSA 22.2 # 14, IEC/EN 60 947-4-1, VDE 0660 part 102	

PKZ 2 Manual Motor Protectors
Technical Data

System PKZ2 short-circuit ratings per IEC/EN 60 947 standards for international applications

I_u = Maximum continuous current rating of each device

I_q = Conditional short-circuit current rating (per IEC/EN 60 947-2, relevant for motor starters and motor starter combinations)

I_{cu} = Ulitmate braking capacity (per IEC/EN 60 947-2, relevant for circuit breakers)

I_{cs} = Continuity of service breaking capacity (per IEC/EN 60 947-2, relevant for circuit breakers)

All kA ratings are RMS Sym. values

Indicates self-protected range(100 kA)

N Not necessary. Backup protection is not required whenever device is operating within its self-protected range or up to the available short-circuit fault

	230 V				400 V				440 V				500 V				690 V			
				1)				1)				1)				1)				1)
I_u	I_q	I_{cu}	I_{cs}		I_q	I_{cu}	I_{cs}		I_q	I_{cu}	I_{cs}		I_q	I_{cu}	I_{cs}		I_q	I_{cu}	I_{cs}	
A	kA	kA	kA	A	kA	kA	kA	A	kA	kA	kA	A	kA	kA	kA	A	kA	kA	kA	A
PKZ2/ZM motor protector, ccordination type "1" and "2"																				
0,16 – 1,6				N				N				N				N				N
2,4				N				N				N				N				N
4				N				N				N				N	4,5	4,5	2,5	63
6				N				N				N				N	4,5	4,5	2,5	80
10			30	N			30	N	10	10	5	80	7	7	3,5	80	4,5	4,5	2,5	80
16			30	N			30	N	10	10	5	100	7	7	3,5	100	4,5	4,5	2,5	100
25	30	30	7,5	160	30	30	7,5	160	10	10	5	125	7	7	3,5	125	4,5	4,5	2,5	125
32	30	30	7,5	160	30	30	7,5	160	10	10	5	160	7	7	3,5	160	4,5	4,5	2,5	160
40	30	30	7,5	160	30	30	7,5	160	10	10	5	160	7	7	3,5	160	4,5	4,5	2,5	160
PKZ2/ZM motor protector + CL-PKZ2 current limiter, coordination type "1" and "2"																				
0,16 – 1,6				N				N				N				N				N
2,4				N				N				N				N				N
4				N				N				N				N	10	4,5	2,5	N
6				N				N				N				N	10	4,5	2,5	N
10			30	N			30	N			5	N			3,5	N	10	4,5	2,5	N
16			30	N			30	N			5	N			3,5	N	10	4,5	2,5	N
25			7,5	N			7,5	N			5	N			3,5	N	10	4,5	2,5	N
32			7,5	N			7,5	N			5	N			3,5	N	10	4,5	2,5	N
40			7,5	N			7,5	N			5	N			3,5	N	10	4,5	2,5	N
PKZ2/ZM-.../S(-G) high capacity motor protector combination. coordination type "1" and "2"																				
0,6 – 2,4		N	N			N	N			N	N			N	N			N	N	
4 – 6		N	N			N	N			N	N			N	N		10	N	N	80
10 – 16		N	N			N	N			N	N			N	N		10	N	N	100
25 – 40		N	N			N	N			N	N			N	N		10	N	N	160

Notes

1) Fuse (A gL/gG) increases the switching capacity of the motor protector to 100 kA

		PKZ2/ZM-.../S-SP
Specifications		UL 508 / CSA 22.2 No. 14, Category E self-protected combination controllers
Max. continuous current	A	42 at 480 V AC
	A	27 at 600 V AC
Max. HP ratings 3 phase at	200 V	10 HP
	230 V	15 HP
	460 V	30 HP
	575 V	25 HP
UL listed / CSA certified maximum interrupting ratings		
240 V AC	kA RMS sym	100
480Y/277V AC	kA RMS sym	65
600Y/347V AC	kA RMS sym	42
System Rating		600Y/347V AC, up to 27A 480Y/277V AC, up to 42 A
	up to 27A	Suitable for maximum 600V AC power distribution systems when the voltage between any phase to ground does not exceed 347V.
	up to 42A	Suitable for maximum 480V AC power distribution systems when the voltage between any phase to ground does not exceed 277V.

PKZ 2 Manual Motor Protectors
Technical Data

S-PKZ2 high-capacity magnetic contactor							
Operating times							
	Closing delay		ms	9 – 30			
	Opening delay		ms	4 – 12			
Duty factor			% DF	100			
Rated making capacity cos φ = 0,45			A	400			
Rated breaking capacity cos φ = 0,45			A	400			
Magnet systems							
AC operation (U_S - coil voltage rating)							
Operating range	Pull-in		× U_s	0,85 – 1,1			
	Drop-out		× U_s	0,4 – 0,6			
Power consumption	Pull-in		VA	≦ 190			
	Sealing		VA	≦ 13			
DC operation (S-G-PKZ2)							
Rated control supply voltage U_s			V DC	24	24V DC energization using PLC semi-conductor outputs is possible. Use PLC type: PS416-OUT-410 (HPL 0213-2001/2002, Section 02) and switch two outputs in parallel. The alternative is to use interface relay type ETS4-VS3 (section 02)		
Power consumption							
Pull-in			VA	150			
Pull-in			A	6,3 (16 – 22 ms)			
Sealing			W	2,7			
Sealing			mA	113			
Auxiliary contacts							
UL/CSA Pilot duty ratings							
NHI, NHI...S				A 600, R 300			
AGM				A 600, R 300			
NHI2-11S, HI....-S				A 600, R 300			
HI11-S/EZ				A 600, R 300			
ZMR				0.5 A @ 300 V AC			
IEC/EN 60 947 ratings							
Rated impulse withstand current U_{imp}			V	6000			
Overvoltage category / pollution degree				III/3			
Rated operational voltage U_e			V AC	500			
Rated operational current I_e							
AC-15				230/240 V	400/415 V	440/500 V	
	NHI11, NHI11S, NHI2-11S, HI11S/EZ		A	6	3	1,5	
	NHI22, NHI22S, HI11S, HI20-S		A	6	1,5	1,5	
	AGM2-11		A	5	3	1,5	
	ZMR-... 95 – 96		A	1,5	0,7	0,5	
	ZMR-... 97 – 98		A	1,5	0,5	0,3	
DC-13				24 V	60 V	110 V	220 V
	ZMR-... L/R ≦ 200 ms		A	1	0,8	0,7	0,3
Lifespan							
mechanical	NHI, NHI..S		ops.	0,1 × 10^6			
	AGM		ops.	0,01 × 10^6			
	NHI2-11S, HI..-S, HI11-S/EZ		ops.	5 × 10^6			
	ZMR		ops.	0,01 × 10^6			
electrical	NHI, NHI..S		ops.	0,05 × 10^6			
	AGM		ops	5 × 10^3			
	NHI2-11S, HI..-S, HI11-S/EZ		ops.	1 × 10^6			
	ZMR		ops.	5 × 10^6			
Control circuit reliability at U_e = 24 V DC U_{min} = 24 V, I_{min} = 10 mA		Fault probability H_F		Fail-safe over the entire mechanical lifespan			
Positively driven contacts to ZH 1/457				NHI2-11 S, AGM2-11			
Short-circuit rating without welding	fuseless			with PKZM0 – 6,3: 240 V PKZM0 – 4: 415 V PKZM0 – 1,6: 500 V			
	fuse		A gL/gG	10			
Terminal capacity 1 conductor or 2 conductors							
solid and flexible with ferrule		IEC/EN	mm^2	0,75 – 2,5			
solid or stranded		UL/CSA	AWG	18 – 14			

PKZ 2 Manual Motor Protectors
Technical Data

Voltage trips						
Rated impulse withstand voltage U_{imp}			V	6000		
Overvoltage category / pollution degree				III/3		
Rated operational voltage U_e			V AC	24 – 600		
			V DC	A-PKZ2: 24 – 250, U-PKZ2: 24 – 125		
Terminal capacity 1 conductor or 2 conductors						
solid or flexible with ferrule		IEC/EN	mm^2	0,75 – 2,5		
solid or stranded		UL/CSA	AWG	22 – 14		
Shunt trips (U_S = trip coil rated voltage)						
Operating range						
AC			× U_s	0,7 – 1,1		
DC			× U_s	0,7 – 1,1		
Power consumption						
AC	Pull-in		VA	5		
	Sealing		VA	3		
DC	Pull-in		W	3		
	Sealing		W	0,3		
Undervoltage trips (U_S = trip coil rated voltage)						
Drop-out voltage			× U_s	0,7 – 0,35		
Power consumption						
AC	Pull-in		VA	5		
	Sealing		VA	3		
DC	Pull-in		W	3		
	Sealing		W	3		
Drop-out delay with UVHI-PKZ2			ms	200		
Rated operational current I_e						
AC-15				230 V	400 V	440 V
U-HI20-PKZ2, UVHI-PKZ2			A	6	3	1,5
UL/CSA Pilot duty rating				B 600, R 300		
Remote control drives RE-PKZ2, RS-PKZ2						
Rated impulse withstand voltage U_{imp}			V	6000		
Overvoltage category / pollution degree				III/3		
Rated operational current U_e						
AC (50/60 Hz), DC			V	24 – 240 (> 120V, IEC only)		
AC (50/60 Hz)			V	380 – 440 (IEC only)		
Required short-time rating (30 ms)			VA/W	700		
Control transformer short time rating			VA	1100 → STI 0,4		
Short-circuit voltage			%	4,35		
Closing delay			ms	≦30		
Opening delay			ms	≦30		
Reset time to OFF			ms	≦30		
Operating frequency			ops./h	60		
Operating range						
AC			× U_s	0,85 – 1,1		
DC			× U_s	0,85 – 1		
Electrical lifespan			ops.	50 000		
Integrated auxiliary contact (N.O. 33/34 Hand/Auto indication)						
UL/CSA Pilot duty rating				D 300, R 300		
IEC/EN Rated operational current I_e						
AC-14			50 Hz	230/240 V	400/415 V	440 V
			A	1,5	1	0,5
Terminal capacity 1 conductor or 2 conductors						
solid or flexible with ferrule		IEC/EN	mm^2	0,75 – 2,5		
solid or stranded		UL/CSA	AWG	22 – 14		

PKZ 2 Manual Motor Protectors
Technical Data

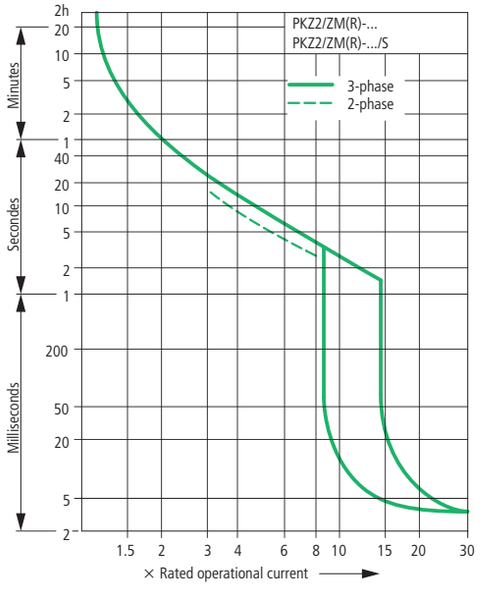
Three-phase feeder bus connectors		
UL/CSA ratings		
Maximum rated voltage	V AC	600
Maximum rated current		
Type B 3.1/2-PKZ2	A	85
Type B3.1/3-PKZ2	A	100
Bus connector incoming supply terminal		
UL/CSA ratings		
Maximum rated voltage	V AC	600
Maximum rated current Type BK50/3-PKZ2	A	100
Terminal capacities min./max.	AWG	14 ... 0
Torque rating	Nm	4.5

PKZ2/ZM(R)-...(/S) motor protector trip curve

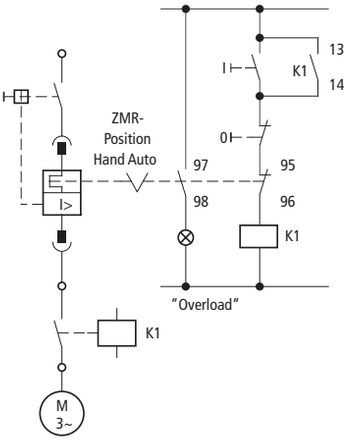
The trip curve shows the tripping time of the motor protector in relation to the response current. The curve shows mean values of the tolerance ranges at an ambiant temperature of 20°C, starting from cold. The tripping time of the bimetal trips at operating temrperature (warm state) is reduced to approximately ¼ of the values shown. System PKZ2 motor protectors are suitable for protection of IEC type EEx e- explosion-proof motors.
Specific characteristics for each individual setting range are available upon request. These characterstics, inn 55 x 75 mm format are self-adhesive and can be used as on-site documentation to verify the suitability of each motor protector for this application. The data has been independently verified by the German PTB testing agency and laboratory.

PTB certificate
No. 3.53/388.299
Tripping characteristcs on request

Setting range A	Tripping characteristic to AWA No.
0,4 – 0,6	128-881-1
0,6 – 1,0	128-881-2
1,0 – 1,6	128-881-3
1,6 – 2,4	128-881-4
2,4 – 4,0	128-881-5
4,0 – 6,0	128-881-6
6,0 – 10	128-881-7
10 – 16	128-881-8
16 – 25	128-881-9
25 – 32	128-881-10
32 – 40	128-881-11



Circuit diagram
for PKZ2/ZMR-...
and PKZ2/ZMR-.../S



Use of the ZMR-..-PKZ2 protective trip module in EEx e applications:
In EEX e applications, the N.C. contact 95-96 of the ZMR protective trip module must always be wired in series with the contactor coil in the starter circuit. See diagram above.

PKZ 2 Manual Motor Protectors
Technical Data

UL/CSA Single-phase HP ratings							
Always use 3 poles for wiring		1-phase HP @	115 V AC	200 V AC	230 V AC		
	Manual motor protector	PKZ2/ZM-1.6	-	-	1/10		
		PKZ2/ZM-2.4	-	1/8	1/6		
		PKZ2/ZM-4	1/8	1/4	1/3		
		PKZ2/ZM-6	1/4	1/2	1/2		
		PKZ2/ZM-10	1/2	1	1 1/2		
		PKZ2/ZM-16	1	2	2		
		PKZ2/ZM-25	2	3	3		
		PKZ2/ZM-32	2	5	5		
		PKZ2/ZM-40	3	5	7 1/2		
	(High capacity) magnetic contactor	S-PKZ2	3	5	7 1/2		
Three-phase IEC/EN kW ratings (AC-3)							
		AC-3 kW ratings @	220 V 230 V 240 V	380 V 400 V 415 V	440 V	500 V	660 V 690 V
			kW	kW	kW	kW	kW
	Manual motor protector	PKZ2/ZM-0.6	0.09	0.12	0.18	0.25	0.25
		PKZ2/ZM-1	0.18	0.25	0.25	0.37	0.55
		PKZ2/ZM-1.6	0.25	0.55	0.55	0.8	1.1
		PKZ2/ZM-2.4	0.37	0.8	1.1	1.1	1.5
		PKZ2/ZM-4	0.8	1.5	1.5	2.2	3
		PKZ2/ZM-6	1.5	2.5	3	3	4
		PKZ2/ZM-10	2.5	4	5	5.5	7.5
		PKZ2/ZM-16	4	7.5	9	10	13.5
		PKZ2/ZM-25	5.5	12.5	12.5	15	22
		PKZ2/ZM-32	7.5	15	17.5	22	22
		PKZ2/ZM-40	11	20	22	24	30
	Motor protector + contactor combination	PKZ2/ZM-0.6/S...	0.09	0.12	0.18	0.25	0.25
		PKZ2/ZM-1/S...	0.18	0.25	0.25	0.37	0.55
		PKZ2/ZM-1.6/S...	0.25	0.55	0.55	0.8	1.1
		PKZ2/ZM-2.4/S...	0.37	0.8	1.1	1.1	1.5
		PKZ2/ZM-4/S...	0.8	1.5	1.5	2.2	3
		PKZ2/ZM-6/S...	1.5	2.5	3	3	4
		PKZ2/ZM-10/S...	2.5	4	5	5.5	7.5
		PKZ2/ZM-16/S...	4	7.5	9	10	13.5
		PKZ2/ZM-25/S...	5.5	12.5	12.5	15	22
		PKZ2/ZM-32/S...	7.5	15	17.5	22	22
		PKZ2/ZM-40/S...	11	20	22	24	30