Efficient solutions for motor control

xStart

xStart

The complete range of contactors, efficient motor-starters and variable speed drives for the motor circuit. New simple to install solutions based on clever communication.

- Contactors DIL
- Motor-protective circuit-breakers PKZ
- Motor-starters MSC
- Softstarters DS/DM
- Frequency inverters DF/DV
- Rapid Link

Product Information

Motor contactors DIL M
Motor-protective circuit-breakers PKZ
Motor-starters MSC

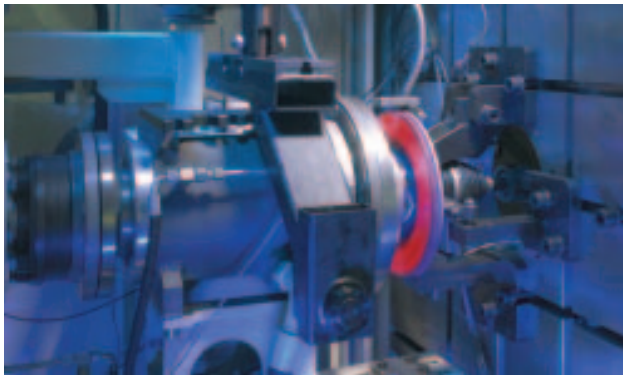
MOELLER

An Eaton Brand

Contactors DIL: Efficient Solutions for the Motor Feeder

The identifier for the new contactor generation is the green print. The innovations are already partly known as they have been integrated into the series on an ongoing basis over the last few years. The contactors up to 15.5 A have been extended with plug-in accessories such as motor filters and solder pin adapters. Motor starters in the size range can also be plugged-in. The necessary openings have been perfectly enclosed just as the entire contactor to assure perfect operation. An even higher level of operational safety is now guaranteed by the new knurled contacts for the auxiliary contacts.

The contactors are becoming more efficient, particularly due to the new Eco types for 15.5, 38, 72 and 170 A, as well as through the many innovations with the motor starters, for example, such as SmartWire.



Safety

Continuous operation requires the components used to have a high level of operational reliability. That's why contactors DIL M offer not only offer high lifespan values for standard AC-3 operation, but are also ideally suited for demanding AC-4 motor inching applications. This increases safety even when machines and plants are being reset or refitted. Active safety features are inherent in these devices: interlocked opposing contacts, isolation and protection against direct contact are standard.

Economy worldwide

Machine and panel builders alike are looking for economical solutions for low-voltage switchgear assemblies.
The contactors DIL M and overload relays ZB are ideal for integrating in complete systems, thus enabling considerable cost savings. In many places, coupling levels are completely unnecessary since intelligent electronics take over this task. The low pick-up and sealing power means that smaller transformers can be used.

Contactors DIL M

With the same dimensions for AC and DC contactors, planning and engineering can be carried out with even greater efficiency. With only four component sizes covering the rating range up to 170 A, engineering is made even simpler.
A key benefit with contactors up to 38 A is that the auxiliary contact is already built in, and the DC contactors include a suppressor circuit up to 170 A. From 15 A, the DC contactors have an electronic drive that removes the need for coupling relays. With all these extras already included in the contactors, your costs are clearly reduced.

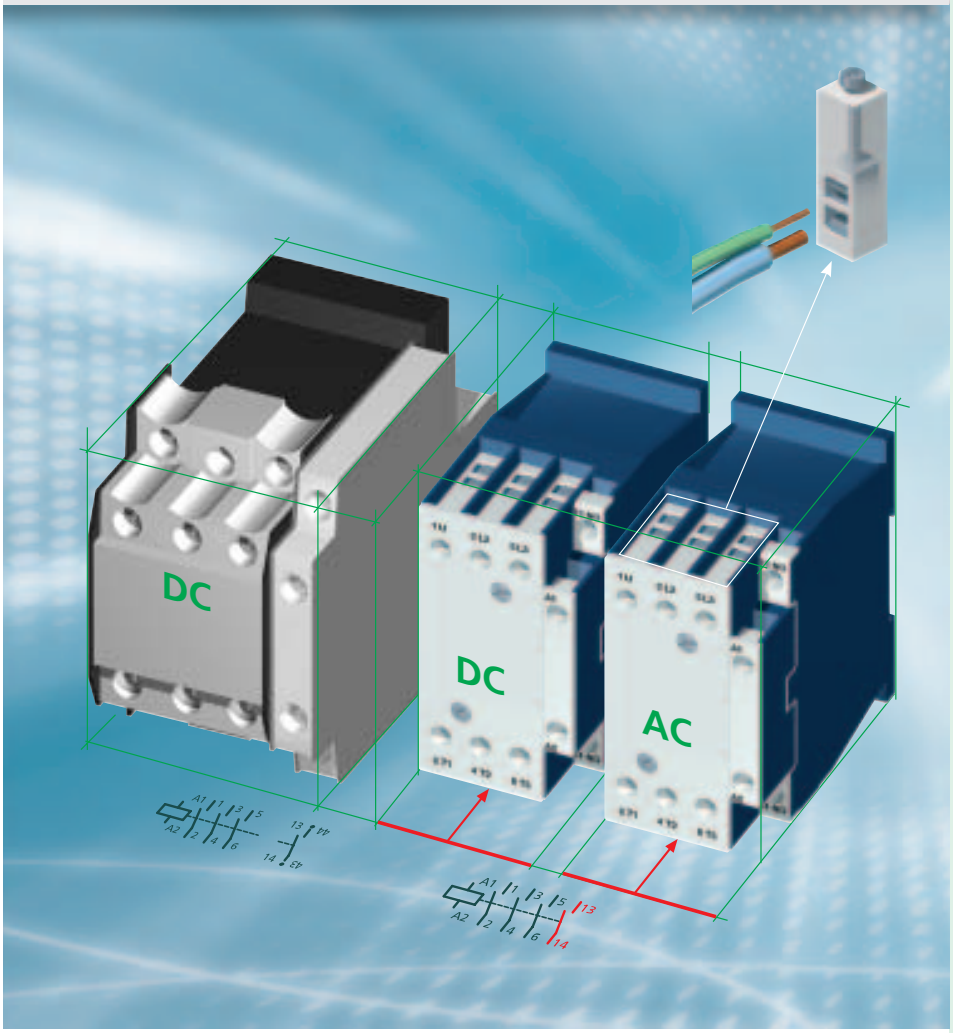
Contactor relays DIL A

The new auxiliary contacts DIL A perfectly complement the new motor contactors DIL M. A wide range of auxiliary contacts specially designed for the contactor relays ensures optimum solutions and reliable identification.

ZB overload relays

Overloads relays ZB protect the motor against phase failure or overload. Their auxiliary contacts switch the motor contactor off, and signal the fault. These relays are suitable for protecting EEx e-motors according to the ATEX 100 a guideline.

AC and DC Contactors: With Same Frame Size – For Simpler Engineering



The new contactors DIL M are significantly more compact than their predecessors, even though, up to 32 A, the auxiliary contact is included. The advantage of this is particularly striking with the DC contactors that now are the same size as their AC counterparts. This makes everything easier, i.e. planning, engineering and fitting, without having to alter the control system, even if the control current has to change for another customer. The same range of accessories are used both for AC and DC actuators contactors.

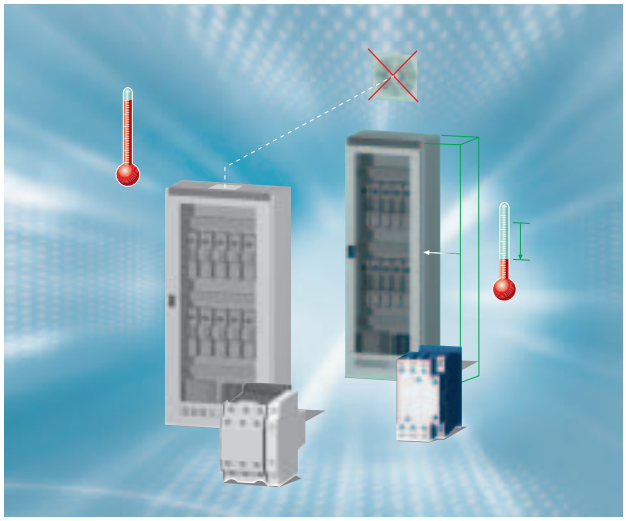
No compromise where termination reliability is concerned

DIL contactors up to 150 A have box terminals with two clamping chambers, allowing unequal cable cross-sections to be terminated absolutely securely. This makes wiring easier and cuts down on associated errors.

Speedier wiring using spring-loaded terminations

Moeller provides proven quality with tension clamp terminals. Numerous tests have proved that contactors and motor-protective circuit-breakers are just as securely wired in this way as by screw connection – even in strongly vibrating machines. But wiring work using tension clamp terminals is very much quicker to do. The main current paths on PKZM 0 and motor contactors up to 12 A all use spring-loaded terminals. The sundries for termination are always available for both screw and tension clamp connection.

The new electronic timer modules DIL M32-XTE are connected to the front of the new contactors DIL M7 to DIL M32, DIL MP20 and DIL A. Thus a simple contactor control with a timer function can be created which does not require a higher level PLC, or for cases where a PLC would be uneconomical. The on-delayed, off-delayed and star-delta functions allow a large range of applications.

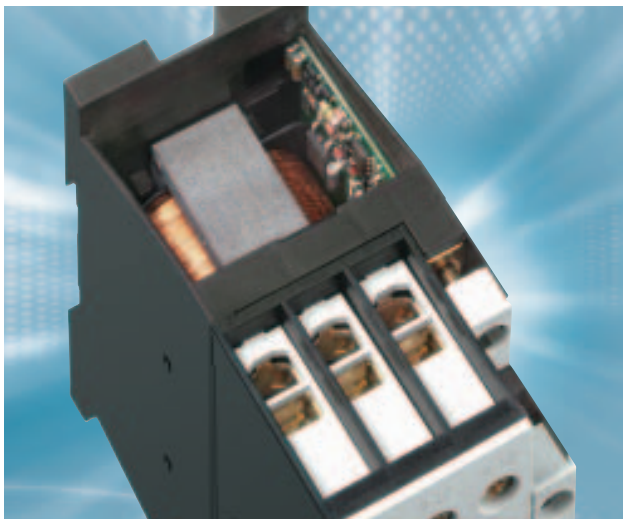


This reduces the cost of your control panel

The space-saving is achieved not just by the reduced component dimensions, but also due to the lower heat dissipation that, particularly with the DC contactors, helps keep the cabinet size down and saves the cost of a fan. The significantly reduced sealing consumption achieved by innovative, electronic drives makes this possible. The Moeller DC contactors from 17 up to 65 A have a sealing consumption of only 0.5 Watt, even those at 170 A only use 2.1 Watt. This also results in lower power consumption for the whole installation.

Electronic-compatible auxiliary contact

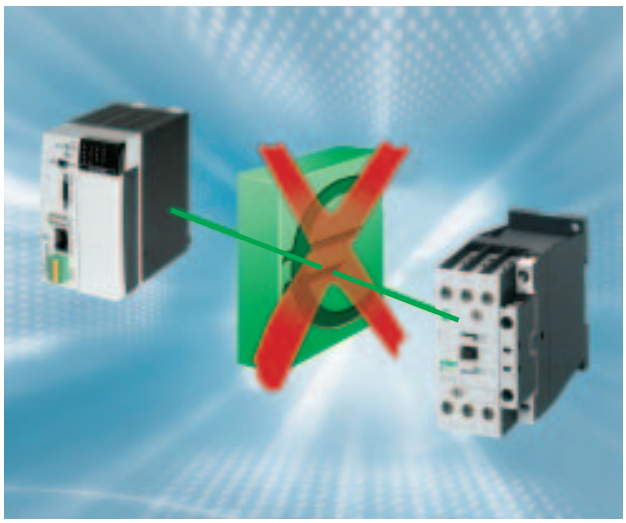
Often very small signals have to be switched for indicating the state of the contactor to the PLC. In order to increase the of the feedback signal Moeller has developed a new auxiliary contact with a make and break contact which is suitable for switching small currents with low voltages. The DILA-XHIR11 auxiliary contact is tested for contact reliability at 1mA and 17VDC. The failure rate is less than 1 failure in 100 million switching operations.
The auxiliary break contact is designed as a mirror contact so that it can be used in safety applications as feedback signal.



The benefits of the electronically controlled drive

All DC motor contactors with DC actuation from DIL M17 have an electronically controlled drive that offers the following advantages:

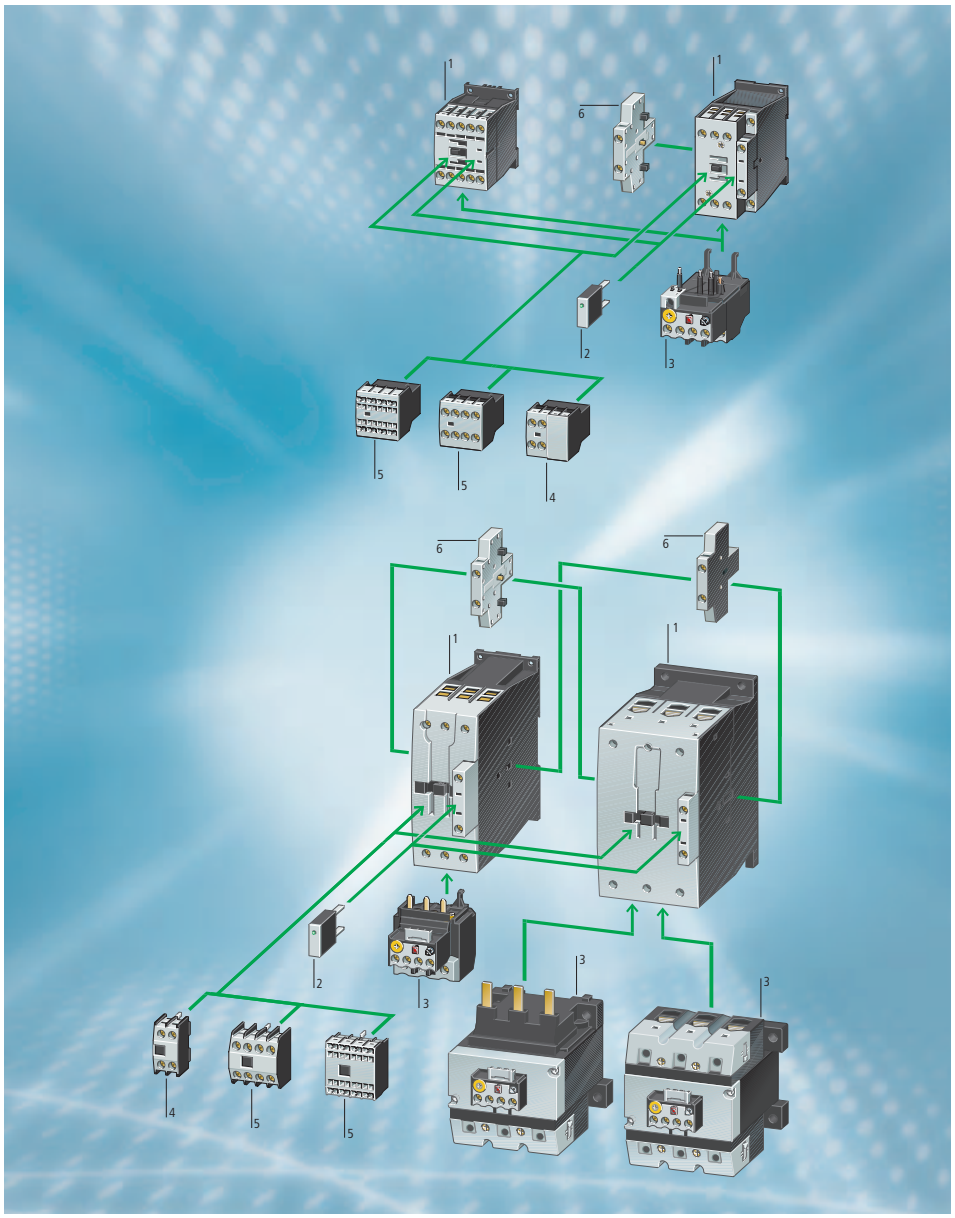
- Significantly less heat dissipation due to reduced sealing consumption
- Smaller control transformers because of lower pick-up consumption
- Direct actuation from the PLC without coupling contactors up to 32 A



Switching contactors directly from the PLC

This is a feature that is becoming increasingly more popular and is primarily made possible by the limitation of the DC pick-up power. Moeller's new contactors DIL M up to 32 A can be switched directly from the PLC using 0.5 A DC outputs. An additional coupling relay thus becomes unnecessary, and this also applies to expensive and cumbersome relay outputs. The new contactors DIL M thus enable the use of more compact switching cabinets and inexpensive solutions.

Simply Select:
Contactors DIL M:



1. **Contactors up to 90 kW**
2. **Suppressor**[1]
3. **Overload relays**
4. **Auxiliary contact modules, 2-pole**
5. **Auxiliary contact modules, 4-pole**
6. **Side-mounted auxiliary contact modules, 2-pole**

Contactor, 3-pole			
AC-3 380 V/ 400 V		**AC** 230 V 50 HZ 240 V 60 Hz, 110 V 50 HZ 120 V 60 Hz, 24 V 50/60 HZ, **DC** 24 V	
I_e A	*P* kW	**Contacts**	**Part no.** Add voltages from above
7	3	1N/O	**DILM7-10 (…)**
7	3	1N/C	**DILM7-01(…)**
9	4	1N/O	**DILM9-10 (…)**
9	4	1N/C	**DILM9-01 (…)**
12	5.5	1N/O	**DILM12-10 (…)**
12	5.5	1N/C	**DILM12-01 (…)**
15.5	7.5	1N/O	**DILM15-10 (…)**
15.5	7.5	1N/C	**DILM15-01 (…)**
18	7.5	1N/O	**DILM17-10 (…)**
18	7.5	1N/C	**DILM17-01 (…)**
25	11	1N/O	**DILM25-10 (…)**
25	11	1N/C	**DILM25-01 (…)**
32	15	1N/O	**DILM32-10 (…)**
32	15	1N/C	**DILM32-01 (…)**
38	18.5	1N/O	**DILM38-10 (…)**
38	18.5	1N/C	**DILM38-01 (…)**
40	18.5	–	**DILM40 (…)**
50	22	–	**DILM50 (…)**
65	30	–	**DILM65 (…)**
72	37	–	**DILM72 (…)**
80	37	–	**DILM80 (…)**
95	45	–	**DILM95 (…)**
115	55	–	**DILM115 (…)**[1]
150	75	–	**DILM150 (…)**[1]
170	90	–	**DILM170 (…)**[1]

[1] DILM 115, DILM 150, DILM 170
suppressor circuit also not required with the AC version

http://www.moeller.net/xstart

Auxiliary contact		Overload relay		Suppressor[1]			Electronic timer modules	
AC 15, 380 V 400 V 415 V		Setting range, Overload release			Varistor suppressor * with LED	RC suppressor	RAC240 = 200-240V AC RAC130 = 100-130V AC RA24 = 24V AC/DC	
Contacts	**Part no.**	I_r A	**Part no.**	U_s V AC	**Part no.**	**Part no.**	**Time ranges**	**Supplement part no. DILM32-XTE...**
– 1N/C	**DILA-XHI01-S**[2]	0.1-0.16	**ZB12-0,16**	24-48	**DILM12-XSPV48**	**DILM12-XSPR48**	**on-delayed**	
1N/O –	**DILA-XHI10-S**[2]	0.16-0.24	**ZB12-0,24**		**DILM12-XSPVL48***		0.05 s - 100 s	**E11-100 (RA24)**
– 1N/C	**DILA-XHIC01-S**[2]	0.24-0.4	**ZB12-0,4**	48-130	**DILM12-XSPV130**		0.05 s - 100 s	**E11-100 (RAC130)**
1N/O –	**DILA-XHIC10-S**[2]	0.4-0.6	**ZB12-0,6**	130-240	**DILM12-XSPV240**	**DILM12-XSPR240**	0.05 s - 100 s	**E11-100 (RAC240)**
1N/O 1N/C	**DILM 32-XHI11**[3]	0.6-1	**ZB12-1,0**		**DILM12-XSPVL240***			
– 2N/C	**DILM 32-XHI02**[3]	1-1.6	**ZB12-1,6**	240-500	**DILM12-XSPV500**	**DILM12-XSPR500**	**off-delayed**	
2N/O 2N/C	**DILM 32-XHI22**[3]	1.6-2.4	**ZB12-2,4**				0.05 s - 1 s	**D11-1 (RA24)**
2N/O –	**DILA-XHI20**	2.4-4	**ZB12-4**				0.5 s - 10 s	**D11-10 (RA24)**
1N/O 1N/C	**DILA-XHI11**	4-6	**ZB12-6**				5 s - 100 s	**D11-100 (RA24)**
– 2N/C	**DILA-XHI02**	6-10	**ZB12-10**					
1N/O 1N/C	**DILA-XHIV11**	9-12	**ZB12-12**				0.05 s - 1 s	**D11-1 (RAC130)**
4N/O –	**DILA-XHI40**	12-16	**ZB12-16**				0.5 s - 10 s	**D11-10 (RAC130)**
3N/O 1N/C	**DILA-XHI31**						5 s - 100 s	**D11-100 (RAC130)**
2N/O 2N/C	**DILA-XHI22**	0.1-0.16	**ZB32-0,16**	24-48	**DILM32-XSPV48**	**DILM32-XSPR48**		
1N/O 3N/C	**DILA-XHI13**	0.16-0.24	**ZB32-0,24**		**DILM32-XSPVL48***		0.05 s - 1 s	**D11-1 (RAC240)**
– 4N/C	**DILA-XHI04**	0.24-0.4	**ZB32-0,4**	48-130	**DILM32-XSPV130**		0.5 s - 10 s	**D11-10 (RAC240)**
2N/O 2N/C	**DILA-XHIV22**	0.4-0.6	**ZB32-0,6**	130-240	**DILM32-XSPV240**	**DILM32-XSPR240**	5 s - 100 s	**D11-100 (RAC240)**
2N/O –	**DILA-XHIT20**[4]	0.6-1	**ZB32-1,0**		**DILM32-XSPVL240***			
1N/O 1N/C	**DILA-XHIT11**[4]	1-1.6	**ZB32-1,6**	240-500	**DILM32-XSPV500**	**DILM32-XSPR500**	**star-delta**	
– 2N/C	**DILA-XHIT02**[4]	1.6-2.4	**ZB32-2,4**				1 s - 30 s	**Y20 (RA24)**
2N/O 2N/C	**DILA-XHIT22**[4]	2.4-4	**ZB32-4**				switch-over delay	**Y20 (RAC130)**
1N/O 1N/C	**DILA-XHIR11**[5]	4-6	**ZB32-6**				50 ms	**Y20 (RAC240)**
1N/O 1N/C	**DILM32-XHI11-S**[6]	6-10	**ZB32-10**					
		10-16	**ZB32-16**					
		16-24	**ZB32-24**					
		24-32	**ZB32-32**					
		32-38	**ZB32-38**					
2N/O –	**DILM150-XHI20**	6-10	**ZB65-10**	24-48	**DILM95-XSPV48**	**DILM95-XSPR48**	**IP2X Cover**	
1N/O 1N/C	**DILM150-XHI11**	10-16	**ZB65-16**		**DILM95-XSPVL48***			
– 2N/C	**DILM150-XHI02**	16-24	**ZB65-24**	48-130	**DILM95-XSPV130**		For use with	Part no.
4N/O –	**DILM150-XHI40**	24-40	**ZB65-40**	130-240	**DILM95-XSPV240**	**DILM95-XSPR24**		
3N/O 1N/C	**DILM150-XHI31**	40-57	**ZB65-57**		**DILM95-XSPVL240***			
2N/O 2N/C	**DILM150-XHI22**	57-65	**ZB65-65**	240-500	**DILM95-XSPV500**	**DILM95-XSPR50**		
1N/O 3N/C	**DILM150-XHI13**							
– 4N/C	**DILM150-XHI04**	25-35	**ZB150-35**	24-48	**DILM95-XSPV48**	**DILM95-XSPR48**	**DILM17 to**	
2N/O 2N/C	**DILM150-XHIV22**	35-50	**ZB150-50**		**DILM95-XSPVL48***		**DILM38**	**DILM32-XIP2X**
1N/O 1N/C	**DILM150-XHI11-SI**	50-70	**ZB150-70**	48-130	**DILM95-XSPV130**		**DILM40 to**	
1N/O 1N/C	**DILM150-XHIA11**	70-100	**ZB150-100**	130-240	**DILM95-XSPV240**	**DILM95-XSPR240**	**DILM72**	**DILM65-XIP2X**
		95-125	**ZB150-125**		**DILM95-XSPVL240***		**DILM80 to**	
		120-142	**ZB150-150**	240-500	**DILM95-XSPV500**	**DILM95-XSPR500**	**DILM170**	**DILM150-XIP2X**

[2] can only be combined with DIL A, DILM 7(…) until DILM 15(…)
[3] cannot be combined with DIL M ….-01
[4] high version
[5] suitable for electronic applications
[6] side-mounted auxiliary contact modules only for DILM 17, 25, 32, can only be installed on left, cannot be combined with top mounting auxiliary contacts or mechanical interlocks

Simply Select: Contactor Relays DIL A, Mini Contactor Relays DIL E

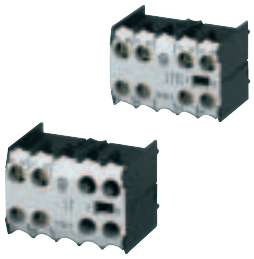
Contactor relays DIL A		Auxiliary contact modules DIL A		Note
AC 15, 380 V 415 V I_e 4 A	**AC** 230 V 50 HZ 240 V 60 Hz, 110 V 50 HZ 120 V 60 Hz, **DC** 24 V	AC 15, 380 V / 400 V / 415 V I_e 4 A		The listed auxiliary contacts are available with springloaded terminals. The auxiliary contact modules listed for the contactor relay DIL A can also be used for the contactors DIL M up to 32 A. Auxiliary contact members: DILA-XHI to EN 50005, DILM32-XHI to DIN 50012 The contactor relay DILA-22 can not be combined with the 4-pole auxiliary contact module. For use with tool-less plug connection we recommend the auxiliary contact DILA-XHIT... in the high version.
Contacts	**Part no.** Add voltages from above	**Contacts**	**Part no.**	
4N/O	**DILA-40(...)**	- 2N/C	**DILA-XHI02**	
3N/O 1N/C	**DILA-31(...)**	1N/O 1N/C	**DILA-XHI11**	
2N/O 2N/C	**DILA-22(...)**	2N/O -	**DILA-XHI20**	
		1N/O 1N/C	**DILA-XHIV11**	
		- 4N/C	**DILA-XHI04**	
		1N/O 3N/C	**DILA-XHI13**	
		2N/O 2N/C	**DILA-XHI22**	
		3N/O 1N/C	**DILA-XHI31**	
		4N/O -	**DILA-XHI40**	
		2N/O 2N/C	**DILA-XHIV22**	
		2N/O -	**DILA-XHIT20**	
		1N/O 1N/C	**DILA-XHIT11**	
		- 2N/C	**DILA-XHIT02**	
		2N/O 2N/C	**DILA-XHIT22**	

Thermistor overload relay EMT6
Remarkable functional versatility in the smallest possible space the EMT 6 thermistor overload relay protects machines against overtemperatures during severe starting duty, braking duty, undervotage and overvoltage, and high switching frequency. The temperature is monitored by means of a thermistor, directly on the motor winding. In the event of overtemperature, the appropriate signal is passed to the EMT 6. It trips, and the fault is clearly displayed in the control panel. Another field of application for the EMT 6 is the monitoring of temperatures in bearings, gearboxes, oils and coolants.

Universal and economical
Three types with differing functions are available: EMT6, EMT6-DB,EMT6-DBK. The EMT 6-DBK is the most versatile with functions such as automatic or manual operation, recognition of short circuits in the sensor circuit and zero-voltage safety.

Zero-voltage safety ensures reliable fault signalling even in the event of supply voltage failure; signalling which helps prevent expensive downtimes. The multivoltage module automatically adapts to all conventional control voltages from 24 V DC to 240 V AC.






Mini contactor relays DIL EM[1]				Mini contactor relays DIL ER[1]		Auxiliary contact modules[1]		Overload relays ZE	
AC-3 380 V/ 400 V		**AC** 230 V 50 Hz 240 V 60 Hz,		AC 15, 380 V / 400 V / 415 V I_e 3A		AC 15, 380 V / 400 V / 415 V I_e 2A		Setting range, overload release	
I_e A	P kW	**Contacts**	**Part no.** Add voltages from above	**Contacts**	**Part no.**	**Contacts**	**Part no.**	I_r A	**Part no.**
6.6	3	1N/O -	**DILEEM-10(...)**	4N/O -	**DILER-40(...)**	- 2N/C	**02DILEM**	0.1 - 0.16	**ZE-0,16**
6.6	3	- 1N/C	**DILEEM-01(...)**	3N/O 1N/C	**DILER-31(...)**	1N/O 1N/C	**11DILEM**	0.16 - 0.24	**ZE-0,24**
8.8	4	1N/O -	**DILEM-10(...)**	2N/O 2N/C	**DILER-22(...)**	2N/O 2N/C	**22DILEM**	0.24 - 0.4	**ZE-0,4**
8.8	4	- 1N/C	**DILEM-01(...)**			- 2N/C	**02DILE**	0.4 - 0.6	**ZE-0,6**
						1N/O 1N/C	**11DILE**	0.6 - 1	**ZE-1,0**
						2N/O -	**20DILE**	1.6 - 2.4	**ZE-2,4**
						1N/O 1N/C	**11DDILE**	2.4 - 4	**ZE-4**
						- 4N/C	**04DILE**	4 - 6	**ZE-6**
						1N/O 3N/C	**13DILE**	6 - 9	**ZE-9**
						2N/O 2N/C	**22DILE**		
						3N/O 1N/C	**31DILE**		
						4N/O -	**40DILE**		
						2N/O 2N/C	**22DDILE**		

[1] The auxiliary and main contacts listed are available with spring-loaded terminals.

Thermistor relay for machine protection EMT6		
Basic functions: thermistor protection, autoreset, diagnostics LEDs		
Functions		**Part no.**
Basic functions	24-240V DC/AC 230 V AC	**EMT6** **EMT6 (230V)**
Basic functions + short-circuit recognition in the sensor circuit	230V AC	**EMT6-K**
Basic functions + manual/autoreset + remote reset + test function + error memory	24-240V DC/AC 230V AC	**EMT6-DB** **EMT6-DB (230V)**
Basic functions + manual/autoreset + remote reset + test function + error memory + short-circuit recognition in the sensor circuit	24-240V DC/AC	**EMT6-KDB**
Basic functions + manual/autoreset + remote reset + test function + error memory + short-circuit recognition in the sensor circuit (disconnectable) + zero-voltage safety (disconnectable)	24-240V DC/AC	**EMT6-DBK**

DILMP Four-Pole Contactors

4-pole contactor		
AC-1 Conventional free air thermal current Open		**AC** 230 V 50 HZ 240 V 60 Hz, o.RAC240[1], 110 V 50 HZ 120 V 60 Hz, 24 V 50/60 Hz, **DC** 24 VDC or RDC24[2]
$I_{th}=I_e$ A	N/O N/C	**Part No.** Add voltage from above
20	–	**DILMP20 (…)**
32 45	1N/O 1N/O	**DILMP32-10 (…)** **DILMP45-10 (…)**
63 80	– –	**DILMP63 (…)** **DILMP80 (…)**
125 160 200	– – –	**DILMP125 (…)** **DILMP160 (…)** **DILMP200 (…)**

[1] For DILMP20 to DILMP80 *230 V 50 HZ 240 V 60 HZ*, for DILMP125, DILMP160 and DILMP200 RAC240
[2] For DILMP20 *24 VDC*, for DILMP32 to DILMP200 *RDC24*

New 4-pole contactors from the xStart series

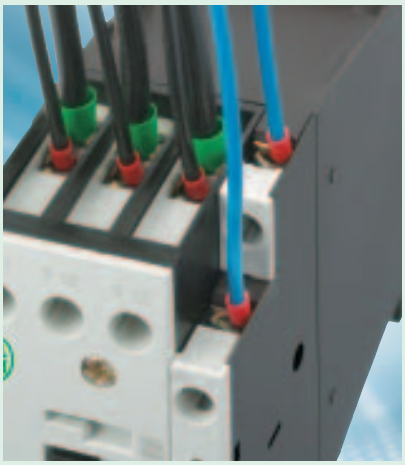
The new 4-pole contactor from Moeller optimized for AC-1 switched loads. They are the specialists for applications where the mains is switched off or over, heating systems are switched and 4-pole loads are switched.

Four compact contactors cover the performance range up to 200 A. The identical size for AC and DC operated contactors as well as a common range of accessories for 3 and 4-pole contactors guarantee efficient and simple planning and engineering.

Combination plug connections

These combinations always consist of universal standard components which offer a constantly high level of quality at an attractive price due to the large production volumes involved. With contactors < 16 A DIL M12-XSL or DIL M12-XRL star-delta and reversing starter wiring kits can be fitted in the plug connectors rapidly and with optimum space saving.

Wiring



The coil terminals are now arranged at the front of the contactors. As they are no longer covered by main current wiring that is often rigid, this simplifies and reduces the time required for wiring work and voltage testing. The terminals of the integrated auxiliary contact are arranged on the second level.

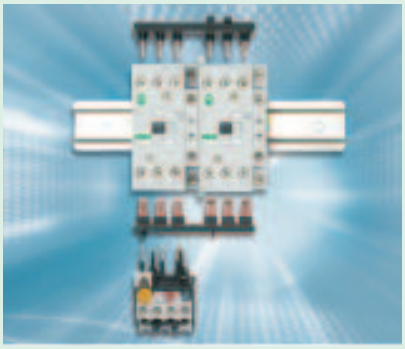
Reversing Starter Combination and Star-Delta Combination

Reversing combinations				
AC-3 380 V/400 V		**AC** 230 V 50 HZ 240 V 60 HZ 24 V 50/60 HZ **DC** 24 V[1]	Reversing starter wiring set	Wiring set
I_e A	***P*** kW	**Part no.** Add voltages from above	Coordination type "1"	Coordination type "2"
7 9 12	3 4 5.5	**DIULM7/21 (…)** **DIULM9/21 (…)** **DIULM12/21 (…)**	DILM12-XRL	PKZM0-XRM12
18 25 32	7.5 11 15	**DIULM17/21 (…)** **DIULM25/21 (…)** **DIULM32/21 (…)**	DILM32-XRL	PKZM0-XRM32
40 50 65	18.5 22 30	**DIULM40/11 (…)** **DIULM50/11 (…)** **DIULM65/11 (…)**	DILM65-XRL	–
80 95 115 150	37 45 55 75	**DIULM80/11 (…)** **DIULM95/11 (…)** **DIULM115/11 (…)** **DIULM150/11 (…)**	DILM150-XRL	–

Star-delta combinations				
AC-3 380 V/400 V		**AC** 230 V 50 HZ 240 V 60 HZ **DC** 24 V[1]	Reversing starter wiring set	Wiring set
I_e A	***P*** kW	**Part no.** Add voltages from above	Coordination type "1"	Coordination type "2"
12 16 22	5.5 7.5 11	**SDAINLM12 (...)** **SDAINLM16 (...)** **SDAINLM22 (...)**	DILM12-XSL	PKZM0-XSM12
30 45 55	15 22 30	**SDAINLM30 (...)** **SDAINLM45 (...)** **SDAINLM55 (...)**	DILM32-XSL	PKZM0-XSM32
70 90 115	37 45 55	**SDAINLM70 (...)** **SDAINLM90 (...)** **SDAINLM115 (...)**	DILM65-XSL	–
140 165	75 90	**SDAINLM140 (...)** **SDAINLM165 (...)**	DILM95-XSL	–
200 260	110 132	**SDAINLM200 (...)** **SDAINLM260 (...)**	DILM150-XSL	–

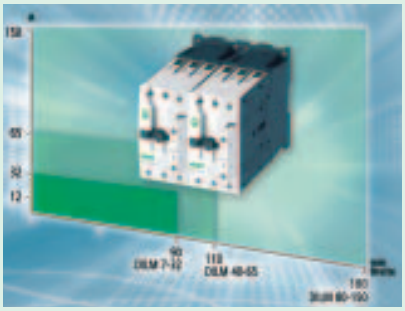
[1] for SDAINLM12 - SDAINLM55

Wiring kits



The new reversing and star-delta wiring kits (DIL M32-XRL and DIL M32-XSL) for contactors from 12 A to 32 A come with a considerably more compact design. They now also fit between contactor and overload relay. The finished wiring kits considerably reduce the time required for mounting.

Reversing starter combinations come with a particularly slimline design



Moeller is also once more setting new standards with a more economical product system for the drive systems of its new contactor generation. New contactors DIL M have a considerably more compact design than their predecessors. The reversing starter combination is particularly slimline: The mounting width up to 32 A versions is 90 mm, 110 mm for versions between 32 A and 65 A, and just 180 mm for 65 A to 150 A versions.

Simple to select:
DIL L – safe switching of lamp loads in the xStart system

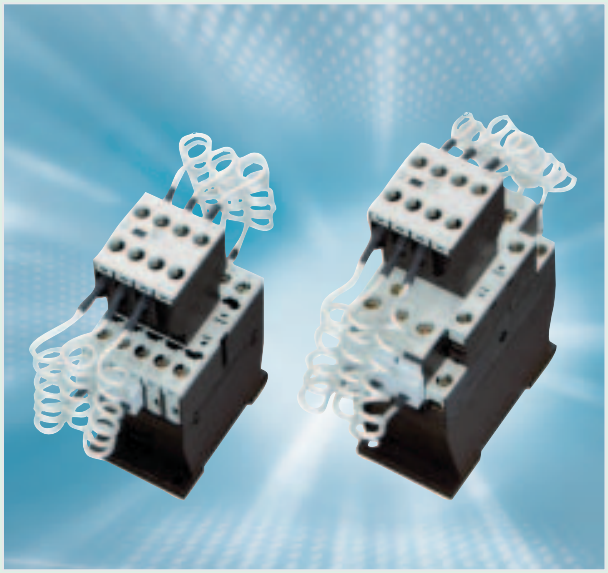
Base units 3-pole				
AC 24 V 50 Hz, 230 V 50 Hz 240 V 60 Hz, 400 V 50 Hz 440 V 60 Hz				
Part no. Complement with above voltages		**DILL12(...)**	**DILL18(...)**	**DILL20(...)**
Rated operational current I_e AC1, conventional free air thermal current at 40° C 380 V, 400 V	A	27	40	45
Lighting load				
Filament lamp	A	14	21	27
Hybrid lamps	A	12	16	23
Fluorescent lamps				
Conventional choke-starter circuit	A	20	26	35
Duo circuit (series compensation)	A	20	26	35
Electronic upstream device	A	12	18	20
High-pressure mercury-arc lamps	A	12	18	20
Halogen metal vapour lamp	A	12	18	20
Sodium metal vapour arc lamps	A	12	18	20
Low-pressure sodium lamps	A	7.5	10	12
Maximum permissible compensation capacity	µF	470	470	470

The Xstart series has been extended by an additional device the contactor DILL for lighting loads.
The DILL has been developed on the basis of the contactor DILM and has been optimised for switching lamps.
The high switching capacity masters the inrush currents associated with all kinds of lamps.
The box terminal enables the connection of larger conductor cross-sections in order to facilitate long distances.

Simple to select:
DIL K – contactor for reactive current compensation systems

Base units for group compensation				
Three-phase capacitor 50 – 60 Hz open				
230 V	400 V 420 V 440 V	525 V	690 V	**AC** 230 V 50 Hz 240 V 60 Hz
kvar	kvar	kvar	kvar	
				Part no. Complement with above voltages
7.5	12.5	16.7	20	**DILK12-11(...)**
11	20	25	33.3	**DILK20-11(...)**
15	25	33.3	40	**DILK25-11(...)**
20	33.3	40	55	**DILK33-10(...)**
25	50	65	85	**DILK50-10(...)**

The contactors for capacitor have been developed on the basis of the DILM contactors and thus fit perfectly into the xStart system range. The installation and connection as well as the handling are identical with the xStart standard contactors. In addition to a special anti-weld contact material, this contactor also contains series resistors. The capacitors are pre-charged via a special early-make auxiliary switch and only them do the main contacts then close and conduct continuous current.



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

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

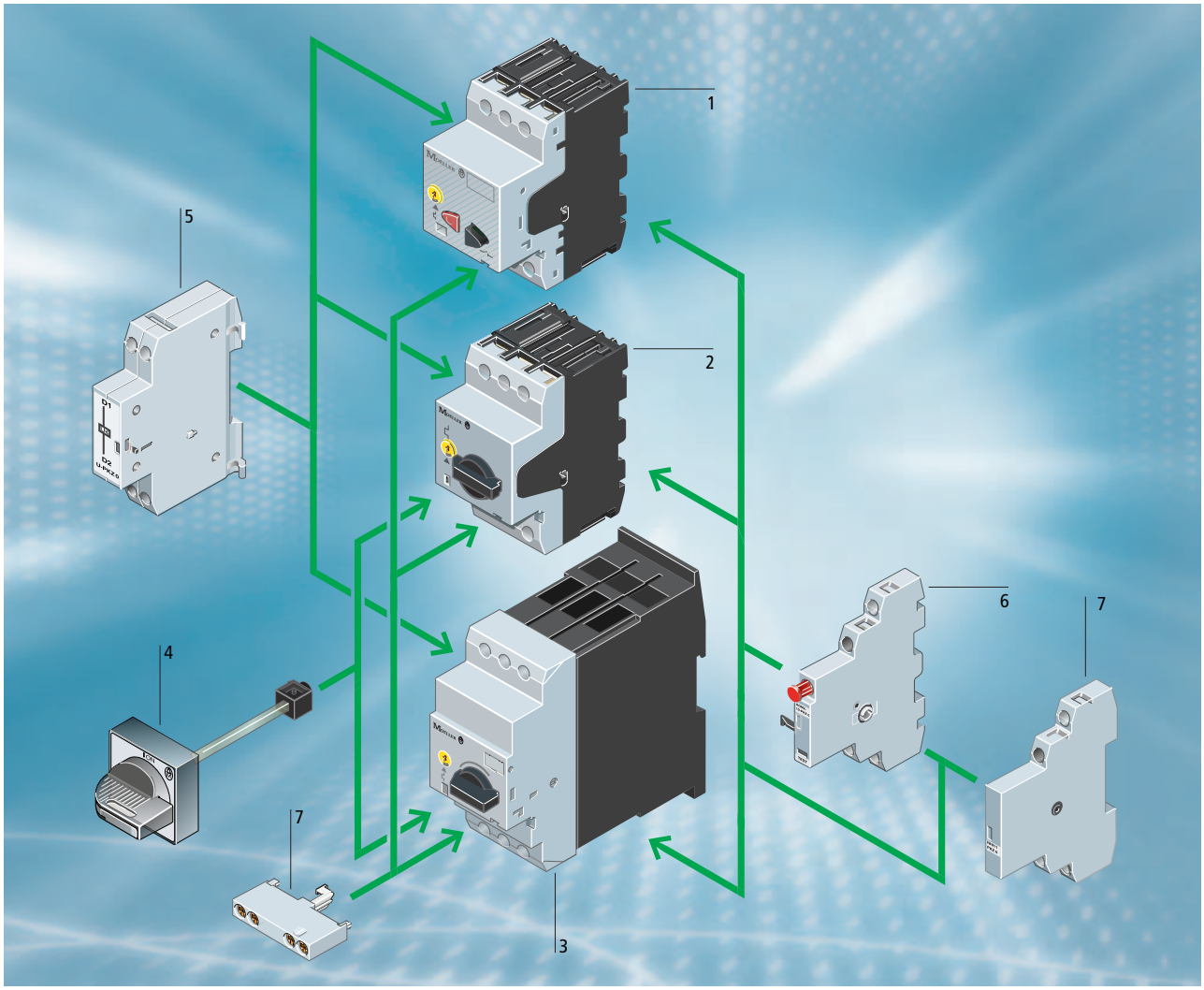
6 Standard auxiliary contacts with up to three contacts for the On/Off switching position

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

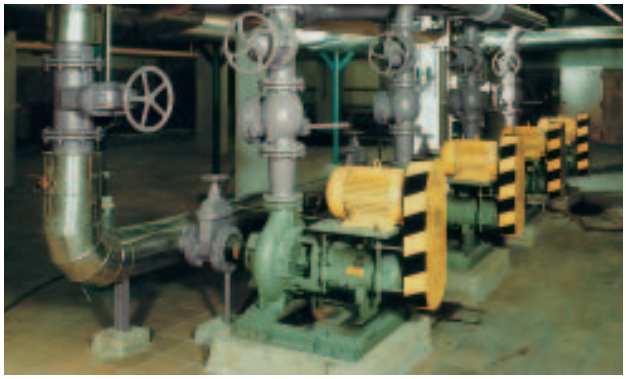
		Protection	For use with	**Part no.**
Insulated enclosures for surface mounting 	–	IP40 NEMA Type 1	PKZM01+NHI-E or VHI-PKZ01+U or A or NHI+L (2 off)	**CI-PKZ01**
	With actuating diaphragm	IP65 NEMA 4X	PKZM01+NHI-E or VHI-PKZ01+U or A or NHI+L (2 off)	**CI-PKZ01-G**
	Lockable in the Off position	IP65 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**

The simplicity of it! – Tool-less plug connection without tools!

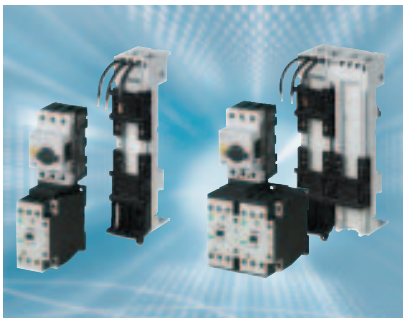
Using the new xStart motor-starter combinations it is possible to create the best solutions from standard products even more easily and efficiently. Moeller has optimised the DIL and PKZ standard products in such a way that, by using simple toolless plug connectors, they can be assembled to form reliable motor-starters. Without the need for tools! The MSC motor-starter combinations can also be supplied as complete devices. Costs for fitting and wiring can be considerably reduced in this way. Costs for testing are cut and errors are prevented from the start. Another advantage lies in increased safety during maintenance work where removal of the combination plug connector produces a visible isolating gap. This Moeller technology is available on our direct-on-line and reversing starters up to 15 A.



Simple and low-priced engineering
If coordination type "1" or coordination type "2": PKZM 0 and PKZM 4 motor-starter combinations with DIL M contactors master short-circuit currents from 50 kA to 35 kW/400 V. With a power of 5.5 kW/400 V even 100 kA is not a problem.
Depending on the combination of motor-protective circuit-breaker and contactor, a motor starter conform to coordination type "1" or coordination type "2" is the result. Thus, the most frequent applications are covered with just a few standard components. This provides added benefits in terms of stockkeeping.

Tested motor-starter combinations from Moeller – staying on the safe side.

Operational continuity with standard components
The IEC/EN 60947 and VDE 0660 standards differentiate between motor starters according to coordination type "1" and coordination type "2". The coordination types provide information about the behaviour of motor starters under short-circuit conditions. Both types safely shutdown the short-circuit. Motor starters to coordination type "1" are low-priced starters for standard applications. The standard allows damage to the starter with a short-circuit. In order to comply with the demands of coordination type "2", the motor starter must be capable of continued operation without replacing parts after shutting down a short-circuit. These motor starter types assure the highest level of operational continuity.



Slim solutions: DOL starters from standard components

The new direct-on-line starters built from standard components are available in four slim frame sizes. The contactor and the protective switch are of the same compact width dimension. Thus you lose not a millimetre of control panel space. The convenient MSC motor-starters using toolless plug connection technology are available up to 15 A and require only a top-hat rail for mounting. The mechanical connector ensures a secure hold and the electrical connector provides optimum reliability and safety. Complete mounting connectors are offered for DOL and reversing starters from 16 up to 32 A. This prevents fitting errors and cuts down on wiring time.

New busbar adapters (not only) for motor-starter combinations

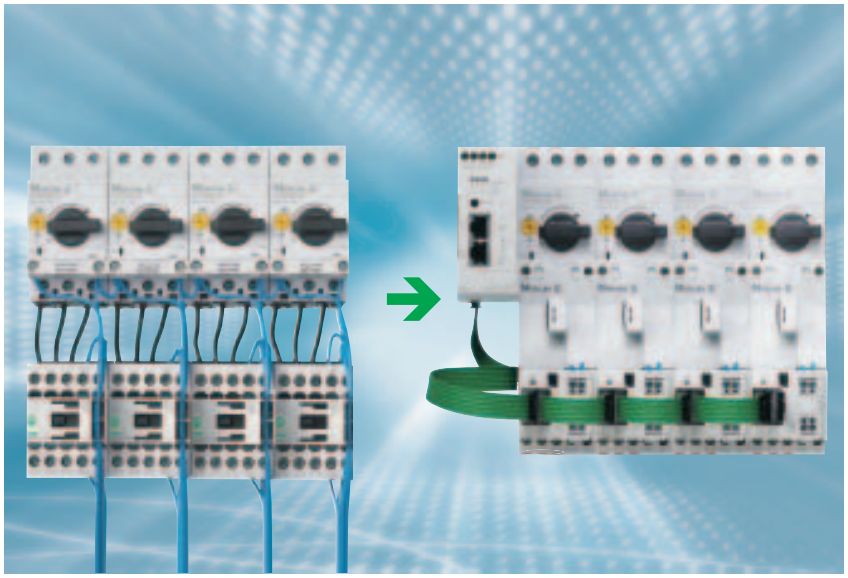
Their standard dimensions enable them to be fitted on all 60mm busbar systems of leading manufacturers. Their UL/CSA approvals make them suitable for use in both the European and the North American market. They are 100% compatible with Wöhner system accessories. The new busbar adapters support the mounting of starter combinations that are assembled with the tool-less connectors of the xStart system. They are available as single devices or complete with motor starters. This saves the customer time and money and provides a complete solution from a single source.

Easier installation and removal of individual motor starters

The switchgear interconnected with the three phase commoning links is generally snapped onto a mounting rail. If it is a motor starter, all motor-protective circuit-breakers and all contactors are snapped onto two mounting rails underneath one another, or onto a particularly useful mounting rail adapter.
The result is an additional benefit where components can be easily removed from an interconnected group by offsetting the adapter mounting rail without having to disassemble the entire three phase commoning link.

Connect don’t wire.
”Plug & Work” for Motor Starters.

Moeller SmartWire enables switching devices to be connected to a PLC without any complex control circuit wiring necessary. The control circuit wiring between the PLC and the switching devices is completely replaced by pluggable, pre-assembled connection cables. The wiring requirement is drastically reduced and wiring faults thus become a thing of the past. This allows savings in mounting, commissioning and troubleshooting during operation. Moeller SmartWire is an addition to the tried and tested Moeller range of switching devices and is designed as an accessory for standard devices. The flexibility of all switching devices is fully retained since even existing system accessories can still be used.
The use of standard devices means that inventory costs are not unnecessarily increased and the worldwide availability of spare parts is ensured.

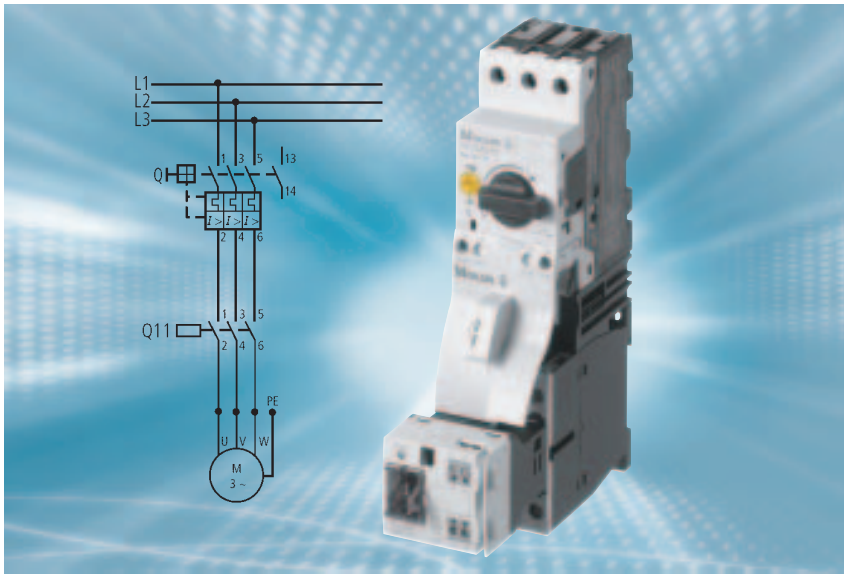


Replacing the control circuit wiring

The connection of motor starters usually involves the laying of a separate control cable for each individual connection. This means a very high wiring requirement. Experience has shown that every single wire increases the risk of faults during the installation. On the other hand, connecting motor starters with Moeller SmartWire offers an astonishingly simple and manageable solution. In order to make a motor starter Moeller SmartWire-compatible, the user simply plugs an additional Moeller SmartWire module onto the contactor. This module provides a six-pole plug connector that replaces the control circuit connections. Moeller SmartWire is simply connected and not wired.

Eliminating the PLC I/O level

The control circuit wiring is eliminated not only on the switching devices but also on the PLC. This also saves the costs for I/O modules which are now no longer required. Wherever compact design is called for, the space saved provides options for effective control cabinet design. Moeller SmartWire also eliminates wiring faults here since only plug connections are used.



Easy engineering

Moeller SmartWire considerably simplifies the engineering of motor starters. Where previously the control circuit wiring had to be adapted individually to the machine or system configuration at hand and the connection of the motor starter to the PLC required an individual circuit diagram, this is now completely unnecessary. Only the main circuit connection to the motor has to be planned separately. Up to 16 Moeller SmartWire enabled motor starters can be connected together and with a gateway without any complex control circuit wiring necessary.

Direct-on-line starter and Reversing starter

Direct-on-line starter, 400/415 V

				Setting range		Motor starter	
	AC-3 380 V 400 V 415 V	Rated operation current 400 V	Rated short-circuit current 380 – 415 V	Overload release	short-circuit release	Actuating voltage Coordination type "1"	Actuating voltage Coordination type "2"
Complete units PKZ and DIL M	***P*** kW	I_e A	I_q kA	I_r A	I_{rm} A	**Part no.**	**Part no.**
	0.06	0.21	150 (50)[1]	0.16 – 0.25	3.5	**MSC-D-0,25-M7 (...)**	**MSC-D-0,25-M7 (...)**
	0.09	0.31	150 (50)[1]	0.25 – 0.4	5.6	**MSC-D-0,4-M7 (...)**	**MSC-D-0,4-M7 (...)**
	0.12	0.41	150 (50)[1]	0.40 – 0.63	8.82	**MSC-D-0,63-M7 (...)**	**MSC-D-0,63-M7 (...)**
	0.18	0.6	150 (50)[1]	0.40 – 0.63	8.82	**MSC-D-0,63-M7 (...)**	**MSC-D-0,63-M7 (...)**
	0.25	0.8	150 (50)[1]	0.63 – 1	14	**MSC-D-1-M7 (...)**	**MSC-D-1-M7 (...)**
	0.37	1.1	150 (50)[1]	1.00 – 1.6	22.4	**MSC-D-1,6-M7 (...)**	**MSC-D-1,6-M7 (...)**
	0.55	1.5	150 (50)[1]	1.00 – 1.6	22.4	**MSC-D-1,6-M7 (...)**	**MSC-D-1,6-M7 (...)**
	0.75	1.9	150 (50)[1]	1.60 – 2.5	35	**MSC-D-2,5-M7 (...)**	**MSC-D-2,5-M7 (...)**
	1.1	2.6	150 (50)[1]	2.50 – 4	56	**MSC-D-4-M7 (...)**	**MSC-D-4-M7 (...)**
	1.5	3.6	150 (50)[1]	2.50 – 4	56	**MSC-D-4-M7 (...)**	**MSC-D-4-M7 (...)**
	2.2	5	150 (50)[1]	4.00 – 6.3	88.2	**MSC-D-6,3-M7 (...)**	**MSC-D-6,3-M7 (...)**
	3	6.6	150 (50)[1]	6.30 – 10	140	**MSC-D-10-M7 (...)**	**MSC-D-10-M17 (...)**
	4	8.5	150 (50)[1]	6.30 – 10	140	**MSC-D-10-M9 (...)**	**MSC-D-10-M17 (...)**
	5.5	11.3	50	8 – 12	168	**MSC-D-12-M12 (...)**	**MSC-D-12-M17 (...)**
	7.5	16 (15.5)[2]	50	10 - 16	224	**MSC-D-16-M15(...)**	**MSC-D-16-M17(...)**
	11	21.7	50	20 – 25	350	**MSC-D-25-M25 (...)**	**MSC-D-25-M25 (...)**
	15	29.3	50	25 – 32	448	**MSC-D-32-M32 (...)**	**MSC-D-32-M32 (...)**

Reversing starter 400/415 V

				Setting range		Motor starter	
	AC-3 380 V 400 V 415 V	Rated operational current 400 V	Rated short-circuit current 380 – 415 V	Overload release	Short-circuit release	Actuating voltage Coordination type "1"	Actuating voltage Coordination type "2"
Complete units PKZ and DIL M	***P*** kW	I_e A	I_q kA	I_r A	I_{rm} A	**Part no.**	**Part no.**
	0.06	0.21	150 (50)[1]	0.16 – 0.25	3.5	**MSC-R-0,25-M7 (...)**	**MSC-R-0,25-M7 (...)**
	0.09	0.31	150 (50)[1]	0.25 – 0.4	5.6	**MSC-R-0,4-M7 (...)**	**MSC-R-0,4-M7 (...)**
	0.12	0.41	150 (50)[1]	0.40 – 0.63	8.82	**MSC-R-0,63-M7 (...)**	**MSC-R-0,63-M7 (...)**
	0.18	0.6	150 (50)[1]	0.40 – 0.63	8.82	**MSC-R-0,63-M7 (...)**	**MSC-R-0,63-M7 (...)**
	0.25	0.8	150 (50)[1]	0.63 – 1	14	**MSC-R-1-M7 (...)**	**MSC-R-1-M7 (...)**
	0.37	1.1	150 (50)[1]	1.00 – 1.6	22.4	**MSC-R-1,6-M7 (...)**	**MSC-R-1,6-M7 (...)**
	0.55	1.5	150 (50)[1]	1.00 – 1.6	22.4	**MSC-R-1,6-M7 (...)**	**MSC-R-1,6-M7 (...)**
	0.75	1.9	150 (50)[1]	1.60 – 2.5	35	**MSC-R-2,5-M7 (...)**	**MSC-R-2,5-M7 (...)**
	1.1	2.6	150 (50)[1]	2.50 – 4	56	**MSC-R-4-M7 (...)**	**MSC-R-4-M7 (...)**
	1.5	3.6	150 (50)[1]	2.50 – 4	56	**MSC-R-4-M7 (...)**	**MSC-R-4-M7 (...)**
	2.2	5	150 (50)[1]	4.00 – 6.3	88.2	**MSC-R-6,3-M7 (...)**	**MSC-R-6,3-M7 (...)**
	3	6.6	150 (50)[1]	6.30 – 10	140	**MSC-R-10-M7 (...)**	**MSC-R-10-M17 (...)**
	4	8.5	150 (50)[1]	6.30 – 10	140	**MSC-R-10-M9 (...)**	**MSC-R-10-M17 (...)**
	5.5	11.3	50	8 – 12	168	**MSC-R-12-M12 (...)**	**MSC-R-12-M17 (...)**
	7.5	16	50	10 - 16	224	**MSC-R-16-M17(...)**	**MSC-R-16-M17(...)**
	11	21.7	50	20 – 25	350	**MSC-R-25-M25 (...)**	**MSC-R-25-M25 (...)**
	15	29.3	50	25 – 32	448	**MSC-R-32-M32 (...)**	**MSC-R-32-M32 (...)**

[1] For coordination type "2" [2] If DILM15-... is used

	Motor protective circuit-breaker	Coordination type "1"		Coordination type "2"	
		Contactor	DOL starter Set Mechanical connection element + Electrical contact element	Contactor	DOL starter Set Mechanical connection element + Electrical contact element
	Part no.	**Part no.**	**Part no.**	**Part no.**	**Part no.**
	PKZM0-0,25	**DILM7-..**	**PKZM0-XD M12**	**DILM7-..**	**PKZM0-XD M12**
	PKZM0-0,4	**DILM7-..**	**PKZM0-XD M12**	**DILM7-..**	**PKZM0-XD M12**
	PKZM0-0,63	**DILM7-..**	**PKZM0-XD M12**	**DILM7-..**	**PKZM0-XD M12**
	PKZM0-0,63	**DILM7-..**	**PKZM0-XD M12**	**DILM7-..**	**PKZM0-XD M12**
	PKZM0-1	**DILM7-..**	**PKZM0-XD M12**	**DILM7-..**	**PKZM0-XD M12**
	PKZM0-1,6	**DILM7-..**	**PKZM0-XD M12**	**DILM7-..**	**PKZM0-XD M12**
	PKZM0-1,6	**DILM7-..**	**PKZM0-XD M12**	**DILM7-..**	**PKZM0-XD M12**
	PKZM0-2,5	**DILM7-..**	**PKZM0-XD M12**	**DILM7-..**	**PKZM0-XD M12**
	PKZM0-4	**DILM7-..**	**PKZM0-XD M12**	**DILM7-..**	**PKZM0-XD M12**
	PKZM0-4	**DILM7-..**	**PKZM0-XD M12**	**DILM7-..**	**PKZM0-XD M12**
	PKZM0-6,3	**DILM7-..**	**PKZM0-XD M12**	**DILM7-..**	**PKZM0-XD M12**
	PKZM0-10	**DILM7-..**	**PKZM0-XD M12**	**DILM17-..**	**PKZM0-XD M32**
	PKZM0-10	**DILM9-..**	**PKZM0-XD M12**	**DILM17-..**	**PKZM0-XD M32**
	PKZM0-12	**DILM12-..**	**PKZM0-XD M12**	**DILM17-..**	**PKZM0-XD M32**
	PKZM0-16	**DILM15-..**	**PKZM0-XD M12**	**DILM17-..**	**PKZM0-XD M32**
	PKZM0-25	**DILM25-..**	**PKZM0-XD M32**	**DILM25-..**	**PKZM0-XD M32**
	PKZM0-32	**DILM32-..**	**PKZM0-XD M32**	**DILM32-..**	**PKZM0-XD M32**

	Motor protective circuit-breaker	Coordination type "1"		Coordination type "2"	
		Contactor	Reversing starter set Mechanical connection element + Electrical contact element	Contactor	Reversing starter set Mechanical connection element + Electrical contact element
	Part no.	**Part no.**	**Part no.**	**Part no.**	**Part no.**
	PKZM0-0,25	**2x DILM7-01**	**PKZM0-XR M12**	**2x DILM7-01**	**PKZM0-XR M12**
	PKZM0-0,4	**2x DILM7-01**	**PKZM0-XR M12**	**2x DILM7-01**	**PKZM0-XR M12**
	PKZM0-0,63	**2x DILM7-01**	**PKZM0-XR M12**	**2x DILM7-01**	**PKZM0-XR M12**
	PKZM0-0,63	**2x DILM7-01**	**PKZM0-XR M12**	**2x DILM7-01**	**PKZM0-XR M12**
	PKZM0-1	**2x DILM7-01**	**PKZM0-XR M12**	**2x DILM7-01**	**PKZM0-XR M12**
	PKZM0-1,6	**2x DILM7-01**	**PKZM0-XR M12**	**2x DILM7-01**	**PKZM0-XR M12**
	PKZM0-1,6	**2x DILM7-01**	**PKZM0-XR M12**	**2x DILM7-01**	**PKZM0-XR M12**
	PKZM0-2,5	**2x DILM7-01**	**PKZM0-XR M12**	**2x DILM7-01**	**PKZM0-XR M12**
	PKZM0-4	**2x DILM7-01**	**PKZM0-XR M12**	**2x DILM7-01**	**PKZM0-XR M12**
	PKZM0-4	**2x DILM7-01**	**PKZM0-XR M12**	**2x DILM7-01**	**PKZM0-XR M12**
	PKZM0-6,3	**2x DILM7-01**	**PKZM0-XR M12**	**2x DILM7-01**	**PKZM0-XR M12**
	PKZM0-10	**2x DILM7-01**	**PKZM0-XR M12**	**2x DILM17-01**	**PKZM0-XR M32**
	PKZM0-10	**2x DILM9-01**	**PKZM0-XR M12**	**2x DILM17-01**	**PKZM0-XR M32**
	PKZM0-12	**2x DILM12-01**	**PKZM0-XR M12**	**2x DILM17-01**	**PKZM0-XR M32**
	PKZM0-16	**2x DILM17-01**	**PKZM0-XR M32**	**2x DILM17-01**	**PKZM0-XR M32**
	PKZM0-25	**2x DILM25-01**	**PKZM0-XR M32**	**2x DILM25-01**	**PKZM0-XR M32**
	PKZM0-32	**2x DILM32-01**	**PKZM0-XR M32**	**2x DILM32-01**	**PKZM0-XR M32**

Notes

The direct-on-line starters (complete units) consist of a motor-protective circuit-breaker PKZM 0 and a contactor DIL M.
The reversing starters (complete units) consist of a motor-protective circuit-breaker PKZM 0 and two contactors DIL M. Up to 15 A, starters are mounted without adapter plates, with only the motor-protective circuit-breaker being secured to the top-hat rail. The contactors receive their mechanical hold via a mechanical connection module.
Up to 15 A, starters are mounted without adapter plates, with only the motor-protective circuit-breaker being secured to the top-hat rail. The contactors receive their mechanical hold via a mechanical connection module.
From 16 A, motor-protective circuit-breakers and contactors are mounted on top-hat-rail adapter plates.
The connection of the main contacts between PKZ and contactor is effected via an electrical contact module.

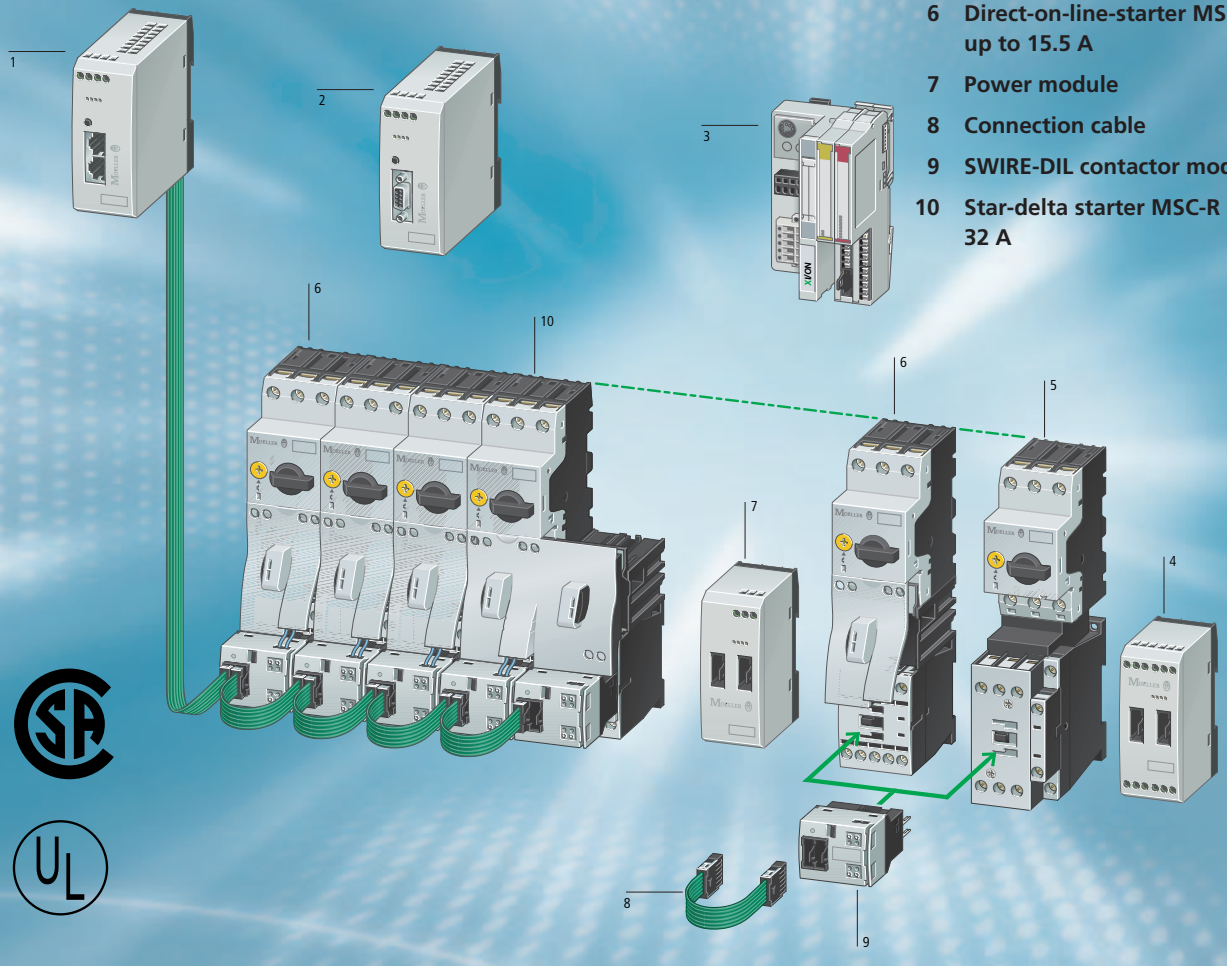
Moeller provides a PC-based electronic selection program for motor starters in addition to the comprehensive selection page in the Moeller main catalogue. This program considers various operating voltages, short-circuit ratings and co-ordination types, as well as fuseless and fused combinations. This small program is available from Moeller free of charge on the Internet. Moeller has provided the practically-minded with a carton selection slider for a number of years.

www.moeller.net/select

PKZM accessories

PKZM motor-protective circuit-breaker accessories			
	For use with	Part no.	Application note The set consists of
Wiring set DOL starter 	PKZM0+DILM7 PKZM0+DILM9 PKZM0+DILM12 PKZM0+DILM15	**PKZM0-XDM12**	Mechanical connection module for PKZM 0 and contactor Main current wiring between PKZM 0 and contactor in tool-less plug connection
	PKZM0+DILM17 PKZM0+DILM25 PKZM0+DILM32	**PKZM0-XDM32**	Mounting rail adapter plate Main current wiring between PKZM 0 and contactor
	PKZM4+DILM40 PKZM4+DILM50 PKZM4+DILM65	**PKZM4-XDM65**	Mounting rail adapter plate Main current wiring between PKZM 4 and contactor
Wiring set reversing starter 	PKZM0+DILM7-01 PKZM0+DILM9-01 PKZM0+DILM12-01	**PKZM0-XRM12**	Mechanical connection module for PKZM 0 and contactor Main current wiring between reversing starters in tool-less plug connection Control cable in tool-less plug connection
	PKZM0+DILM17-01 PKZM0+DILM25-01 PKZM0+DILM32-01	**PKZM0-XRM32**	Mounting rail adapter plate Reversing starter main current wiring
Wiring set star-delta starter 	PKZM0+DILM7 PKZM0+DILM9 PKZM0+DILM12	**PKZM0-XSM12**	Mechanical connection module for PKZM 0 and contactor Star-delta starter in tool-less plug connection main current wiring Control cable in tool-less plug connection Mounting rail adapter plate
	PKZM0+DILM17-01 PKZM0+DILM25-01 PKZM0+DILM32-01	**PKZM0-XSM32**	Mounting rail adapter plate Star-delta starter main current wiring
Electrical contact module for main current wiring 	PKZM0+DILM17 PKZM0+DILM25 PKZM0+DILM32	**PKZM0-XM32DE**	For electrical connection of the main current contacts between PKZM 0 and DIL M17..M25..M32 contactors only for use in conjunction with busbar adapter or mounting rail adapter plate
	PKZM4+DILM40 PKZM4+DILM50 PKZM4+DILM65	**PKZM4-XM65DE**	For electrical connection of the main current contacts between PKZM 4 and DIL M40..M50..M65 contactors only for use in conjunction with busbar adapter or mounting rail adapter plate
Mounting rail adapter plate 	PKZM0-XDM12 PKZM0-XRM12	**PKZM0-XC45**	Consisting of: 45 mm wide adapter plate Connection nose for alignment of further plates
		PKZM4-XC55	Consisting of: 55 mm wide adapter plate Connection nose for alignment of further plates **Reversing starter design with DIL M40..M50..M65 contactors** 1x PKZM 4-XDM65 + 1x PKZM 0-XC55 adapter plate + 1x DIL M65-XRL **Star-delta starter design with DIL M40..M50..M65 contactors** 1x PKZM 4-XDM65 + 2x PKZM 0-XC55 adapter plates + 1 x DIL M65-XSL
Side module		**PKZM0-XS**	Can be grouped on PKZM 0-XC45 mounting rail adapter plate and PKZM 0-XC55 for extendibility by 9 mm
Connection element		**PKZM0-XCM**	Connection nose for alignment of multiple mounting rail adapter plates PKZM 0-XC45 and PKZM 0-XC55

Simply Select – Extract From the Range.



1 easyNet / CANopen gateway
2 PROFIBUS DP gateway
3 XI/ON gateway with Smart-Wire interface slice
4 I/O module
5 Direct-on-line-starter MSC-D up to 32 A
6 Direct-on-line-starter MSC-D up to 15.5 A
7 Power module
8 Connection cable
9 SWIRE-DIL contactor module
10 Star-delta starter MSC-R up to 32 A

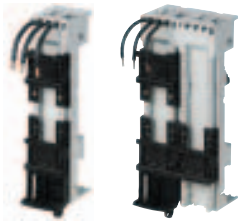
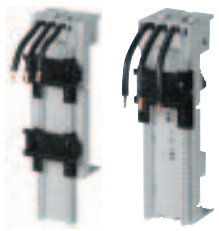
Moeller SmartWire			
		Description	Part no.
Gateway	Profibus DP (2)	Gateway with integrated power supply for the SmartWire modules and control voltage for the switching devices : • Connection to PROFIBUS DP as slave. • Transfer rate: 9.6 Kbit/s to 12 Mbit/s. • 9-pole SUB-D socket. • Address range 1-126. • Connection to SmartWire as master. • Supports 16 SmartWire modules.	SWIRE-GW-DP
	easyNet/ CANopen (1)	Gateway with integrated power supply for the SmartWire modules and control voltage for the switching devices : • Connection to easyNet or CANopen • Supports 16 SmartWire modules. • Mode selectable: easyNet or CANopen	EASY223-SWIRE
Modules	Modules for DILM (9)	SmartWire module for mounting on DILM 7 to DILM 38 contactor : • One module is required for each module • Connection to SmartWire as slave. • Max. 16 SmartWire modules per line • 1 digital input for isolated contact • Indication of contactor switch position	SWIRE-DIL
	I/O module (4)	SmartWire I/O module for connecting switching devices over 15 kW : • 4 digital inputs for isolated contacts • 2 relay outputs	SWIRE-4DI-2DO-R
	Power module (7)	SmartWire Power module for feeding the control voltage : • Connection to SmartWire as passive module (no address)	SWIRE-PF
Accessories	Connection cable (8)	SmartWire connection cable fully made up: Length : 85 mm	SWIRE-CAB-008
		Length : 110 mm	SWIRE-CAB-011
		Length : 150 mm	SWIRE-CAB-015
		Length : 250 mm	SWIRE-CAB-025
		Length : 500 mm	SWIRE-CAB-050
		Length : 1000 mm	SWIRE-CAB-100
		Length : 2000 mm	SWIRE-CAB-200
	Termination plug	Termination plug for last SmartWire Module, 6-pole, no electrical function.	SWIRE-CAB-000
	NHI-E with cable	NHI-E-10-PKZ0 with connection cable AWG18 blue, for connection to SmartWire module for DILM.	NHI-E-10L-PKZ0

Note: The number of motor starters or DILM contactors to be connected depends on the power consumption of the magnet systems per SmartWire line. Power modules can be used to increase the number of SmartWire modules to be connected.

Busbar adapter

for all 60 mm busbar systems

Busbar adapter, 3-pole[1]

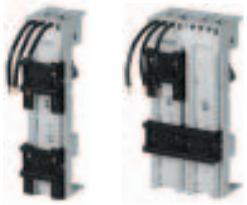
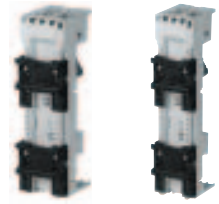
Version	Rated operational voltage U_e V	Rated operational current I_e A	Cable cross-section	Adapter width mm	Adapter-length mm	Support rail	For use with:	Designation	Notes Electrical connections
Busbar adapter 25 A 	690	25	AWG 12 (4 mm²)	45	200	1	PKZM0+ Contactor DILM7 Contactor DILM9 Contactor DILM12 Contactor DILM15 MSC-D-0,25-M7… : MSC-D-16-M15…	**BBA0-25**	Set direct starter *PKZM0-XDM12*
	690	25	AWG 12 (4 mm²)	90	200	1	PKZM0+ 2 x Contactor DILM7-01 2 x Contactor DILM9-01 2 x Contactor DILM12-01 MSC-R-0,25-M7… : MSC-R-12-M12…	**BBA0R-25**	Set reversing starter *PKZM0-XRM12*
Busbar adapter 32 A 	690	32	AWG 10 (6 mm²)	45	200	2	PKZM0+ Contactor DILM17 Contactor DILM25 Contactor DILM32 MSC-D-16-M17… : MSC-D-32-M32…	**BBA0-32**	Electrical contact module *PKZM0-XM32 DE*
	690	32	AWG 10 (6 mm²)	90	200	3	PKZM0+ 2 x Contactor DILM17-01 2 x Contactor DILM25-01 2 x Contactor DILM32-01 MSC-R-16-M17… : MSC-R-32-M32…	**BBA0R-32**	Electrical contact module *PKZM0-XM32 DE* Reverse wiring set *DILM32-XRL*
Busbar adapter 63 A 	690	63	AWG 8 (10 mm²)	72	260	2	PKZ2+ Contactor DILM7 Contactor DILM9 Contactor DILM12 Contactor DILM17 Contactor DILM25 Contactor DILM32 Contactor DILM40	**BBA2L-63**	Electrical connector for *PKZ2 + DILM7…12: MVS-LB0-00M-G* *PKZ2 + DILM17…32: MVS-LB0-0M-G*
	690	63	AWG 8 (10 mm²)	72	200	1	PKZ2	**BBA2-63**	
	690	63	AWG 8 (10 mm²)	55	260	2	PKZM4+ Contactor DILM17 Contactor DILM25 Contactor DILM32 Contactor DILM40 Contactor DILM50 Contactor DILM65	**BBA4L-63**	Electrical connector for *PKZM4+DILM17…32: MVS-LB0-0M-G* *PKZM4+DILM40…65: PKZM4-XM65 DE*
	690	63	AWG 8 (10 mm²)	55	200	1	PKZM4	**BBA4-63**	
Side module	–	–	–	9	200	–		**BBA-XSM**	Can be attached to both sides of the BBA, for extension of the width

[1] Can be used on all busbars in a 60 mm system. Suitable for double T and triple T profiles using a combined adaper for 5 and 10 mm busbar thicknesses.

Busbar adapter

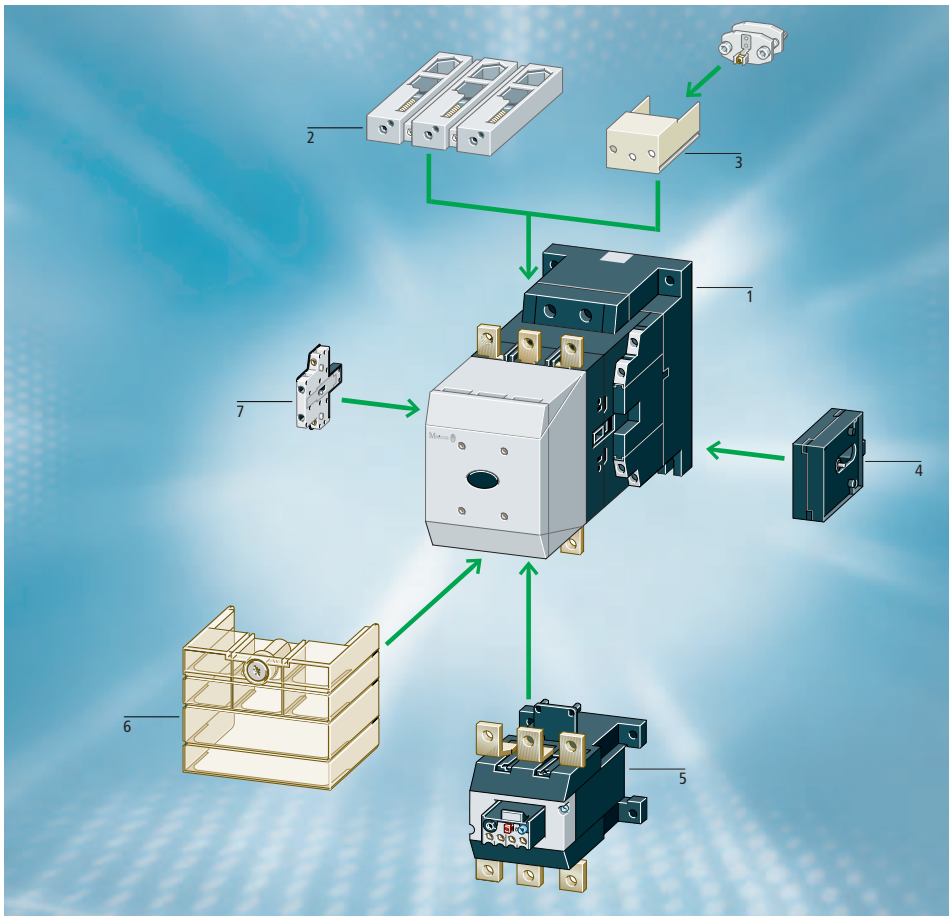
for all 60 mm busbar systems

Busbar adapter, 3-pole[1]

Version	Rated operational voltage U_e V	Rated operational current I_e A	Cable cross-section	Adapter width mm	Adapter length mm	Support rail	For use with:	Designation	Notes Electrical connections
Busbar adapter 16 A, for springloaded terminals 	690	16	AWG 14 (2.5 mm²)	45	200	2	PKZM0…C+ Contactor DILM7 Contactor DILM9 Contactor DILM12 Contactor DILM15	**BBA0C-16**	For PKZM0C... with springloaded terminals
	690	16	AWG 14 (2.5 mm²)	90	200	3	PKZM0…C+ 2 x Contactor DILM7-01 2 x Contactor DILM9-01 2 x Contactor DILM12-01	**BBA0RC-16**	For PKZM0C... with springloaded terminals
Busbar adapter 25 A, universal 	690	25	AWG 12 (4 mm²)	45	200	2	Mounting rail can be offset on 1.25 mm grid	**BBA0-25/2TS**	
Busbar adapter 63 A, universal empty module 	–	–	–	45	200	2	Mounting rail can be offset on 1.25 mm grid	**BBA0/2TS-L**	without electrical contacts as an extension of BBA... for installation of e.g. reversing starters
	–	–	–	54	260	2	Mounting rail can be offset on 1.25 mm grid	**BBA4/2TS-L**	without electrical contacts as an extension of BBA... for installation of e.g. reversing starters
Busbar adapter 160 A 	690	160	6 x 9 x 0.8	90	200	–	NZM1 PN1 N1 NS1	**NZM1-XAD160**	For switch with standard box terminal connection, connection to system top by supplied connection cable
Busbar adapter 250 A 	690	250	–	106	190	–	NZM2 PN2 N2 NS2	**NZM2-XAD250**	Connection to system optionally at top or bottom by rear side connection *(+)NZM2-XKR4…*
Busbar adapter 550 A 	690	550	–	140	270	–	NZM3 PN3 N3	**NZM3-XAD550**	Connection to system top by rear side connection *(+)NZM3-XKR13*

[1] Can be used on all busbars in a 60 mm system. Suitable for double T and triple T profiles using a combined adaper for 5 and 10 mm busbar thicknesses.

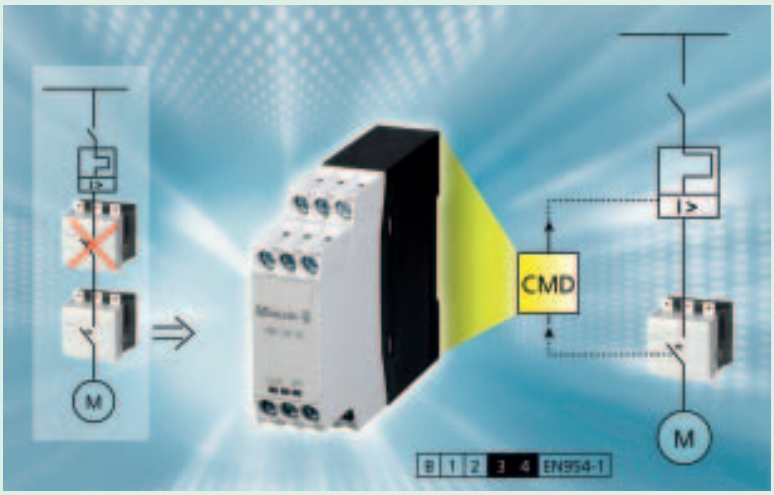
Simply Select: Contactors DIL M and DIL H up to 2200 A



Contactor, 3-pole			
AC-1	AC-3		**Standard electronics AC:** 110 - 120 V 50/60 Hz 220 - 240 V 50/60 Hz
$I_e=I_{th}$ at 60° C	I_e A (400 V)	P kW (400 V)	**Part no.** Add voltages from above
275	185	90	**DILM185-S/22(...)**
315	225	110	**DILM225-S/22(...)**
350	250	132	**DILM250-S/22(...)**
400	300	160	**DILM300-S/22(...)**
500	400	200	**DILM400-S/22(...)**
700	500	250	**DILM500-S/22(...)**
750	570	315	**DILM570-S/22(...)**
800	580	315	–
850	650	355	–
900	750	400	–
1000	820	450	–
1000	1000	560	–
1400	–	–	–
1800	1600	900	–
2000	–	–	–
2200	–	–	–

UL/CSA see page 124

1. **Contactors 90 - 900 kW**
2. **Cable terminal block**
3. **Flat strip conductor terminals**
4. **Mechanical interlock**
5. **Overload relay**
6. **Terminal cover, finger-proof**
7. **Auxiliary contact modules, 2-pole, side mounted**



Redundant design of contactors becomes unnecessary

		Auxiliary contacts		Overload/motor protection			
Premium electronics **AC/DC:** RDC48*, RA110* RA250*, RAC500* conventionel	**AC/DC:** RDC110* RA250*, RAC500* vacuum	2 DILM1000-XHI11SI **integrated**	**Optional** Max. total number of auxiliary contacts: 8	**Relays**			**Circuit-breakers**
Part no. Add voltages from above	**Part no.** Add voltages from above	**Contacts**	**Part no.** SI at side internally SA at side externally	**Part no.**	**Part no.**	**Part no.**	**Part no.**
DILM185/22(...)	–	2N/O 2N/C	**DILM1000-XHI11-SI**				
DILM225/22(...)	–	2N/O 2N/C	**DILM1000-XHI11-SA**	**Z5**			
DILM250/22(...)	–	2N/O 2N/C	**DILM1000-XHI11V-SI**				
DILM300/22(...)	–	2N/O 2N/C	**DILM1000-XHIC11-SI**		**ZW7**		
DILM400/22(...)	–	2N/O 2N/C	**DILM1000-XHIC11-SA**				
DILM500/22(...)	–	2N/O 2N/C				**ZEV**	**NZM...**
–	–	2N/O 2N/C					
–	**DILM580/22(...)**	2N/O 2N/C					
–	**DILM650/22(...)**	2N/O 2N/C					
–	**DILM750/22(...)**	2N/O 2N/C					
–	**DILM820/22(...)**	2N/O 2N/C					
–	**DILM1000/22(...)**	2N/O 2N/C					
–	**DILH1400/22(RAW250)***	2N/O 2N/C					
–	**DILM1600/22(RAW250)***	2N/O 2N/C					**IZM...**
–	**DILH2000/22(RAW250)***	2N/O 2N/C					
–	**DILH2200/22(RAW250)***	2N/O 2N/C					

* RDC48 = 24-48 V DC, RA110 = 48-110 V, 40-60Hz/48-110 V DC, RA250 = 110-250 V, 40-60Hz/110-250 V DC, RAC500 = 250-500 V, 40-60Hz, RAW250 = 230-250 V, 40-60Hz/DC

CMD contactor montoring device

The CMD (Contactor Monitoring Device) monitors the main contacts of a contactor for welding. For this it compares the contactor control voltage with the state of the main contacts, which is indicated reliably by a mirror contact (IEC EN 60947-4-1 Ann. F). If the contactor coil is de-energized and the contactor does not drop out, the CMD trips the backup circuit-breaker, motor-protective circuit-breaker or switch-disconnector via an undervoltage release. The CMD also monitors the functioning of the internal relay using an additional auxiliary make contact of the monitored contactor. For this the auxiliary make and break contact is positively driven. The break contact is designed as a mirror contact.

Components with which the CMD can be combined	
Contactors	**Motor-protective circuit-breakers and circuit-breakers**
DIL EM	PKZ 2 + U-PKZ2 (18 VDC)
DIL M 7 to DILM 150	NZM 1 + NZM1-XUVL
DIL M 185 (-S) bis DILM 500 (-S)	NZM 2 + NZM2/3-XUVL
DIL M 580 to DIL M 1600	NZM 3 + NZM2/3-XUVL
DIL H 1400 to DIL H 2000	NZM 4 + NZM4-XUVL
SE-A-PKZ2 and S-PKZ2	N1 + NZM 1-XUVL
	N2 + NZM 2/3-XUVL
	N3 + NZM 3/3-XUVL
	N4 + NZM 4-XUVL

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