MOELLER

Start with Moeller

starter products catalog

Start with Moeller

A: contactors

B: motor protection

C: manual motor controllers

D: combination motor starters

E: busbar system

F: relays

G: pre-assembled enclosed starters

H: softstarters

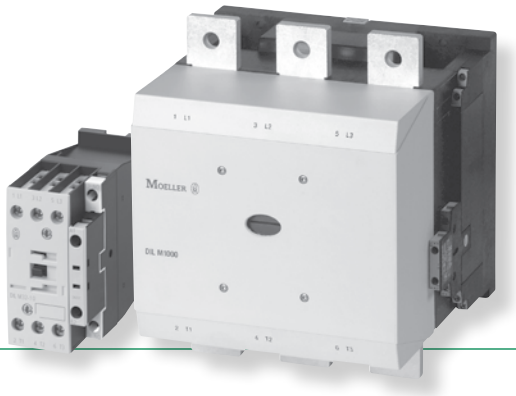
MOELLER

contactors

MOELLER

series DIL M contactors

reliable switching for applications up to 1000A



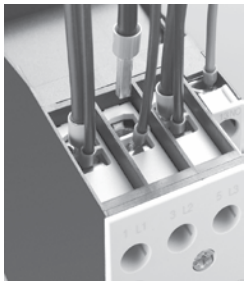
Moeller's DIL M contactor line packs all the control you need into a smart, compact design. Our modern IEC contactors can handle up to 1000A in virtually any application worldwide. Their compliance with IEC standards ensures the most accurate match to your motor size – you'll never buy more control than you need.

For a broad range of applications

Twenty-four contactors in seven frame sizes cover all applications from fractional to 1000HP (@ 575V). This extensive range allows you to select exactly the right size for your application, whether it be resistive AC-1 environments; common starting and stopping AC-3 applications; or even extreme AC-4 situations involving inching and plugging of motors.

Easy installation by design

The DIL M contactor series features dual power terminals on units up to 400A. The clamping chambers are cleverly designed to apply sufficient holding pressure to cables of varying sizes. Conventional designs are often limited by the size of the largest cable in the chamber.



The line also features ingenious mechanical interlocks (rocker and ball style) that allow fast and easy assembly of contactor combinations without requiring additional space.

> 24 contactors

> 7 frame sizes

> Switches motors up to 1000HP

> Same compact dimensions for AC and DC units

Accessories extend flexibility

Several ranges within the DIL M series share common auxiliary contacts and other components. This lowers inventories even when accommodating a complete range of control solutions. Voltage indicators, reversing kits, and many other optional accessories are also available that feature plug-in technology for error-free and fast installations.

Safety

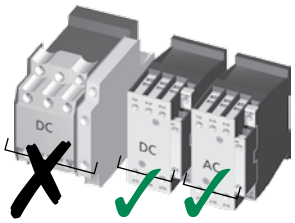
All DIL M series contactors provide isolation and protection from direct hand contact. Designed with safety and reliability in mind, Moeller contactors are 'positively guided' and are 'mirror contact' rated for safety circuits. Even the largest contactors accept terminal shields.

NEW

DIL M Low Range

Moeller's DIL M contactor series includes a completely NEW offering in the lower 7 to 150A range. Consisting of four frame sizes, this range is the newest and most modern of any control manufacturer!

Compact design for BOTH currents



Conventional contactors designed for DC control applications can be up to 30% larger than their AC counterparts. Not anymore! Unique to Moeller's DIL M contactors, AC and DC units are the same frame size throughout the entire range. The reduced size means smaller DC panels than ever before. This also means you can now design one panel for either AC or DC control, without having to plan for a larger DC contactor.

Easy to assemble

Coil terminals are located on the front of the new con-

tactors to simplify wiring. Both two and four-pole auxiliary contacts snap on without tools. Units 40A and above accept both side and top mount auxiliaries for increased flexibility. In addition, devices up to 32A include built-in auxiliary contacts for increased economy with no additional space requirement.

Contacts designed for safety

Auxiliary contact blocks for new DIL M contactors have positively guided contacts for added safety in control circuits. Positively guided auxiliary contacts insure that, throughout the life of the contactor, NO and NC contacts will never close simultaneously. . . even if a contact welds. In addition, DIL M contactors to 65A have "mirror" contacts, which ensure that all auxiliary contacts (whether built-in or add-on) function correctly in relation to the power contacts.

Special advantages of going DC

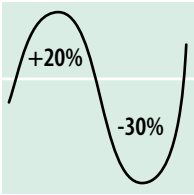
In addition to sharing the same frame size as AC contactors, DC units of 17A and above also feature electronic drives that dramatically reduce pick-up and sealing consumption. These drives produce several benefits:

- less heat is generated, eliminating the need for a fan
- smaller control transformers are required
- contactors up to DIL M32 can be directly actuated from PLCs, eliminating the need for a coupling relay

These benefits lower your cost by consuming less power, eliminating additional components, and permitting higher packing density in the panel.

DC units to 150A also carry a built-in high-speed suppressor circuit, eliminating the need for purchasing and installing a separate external suppressor. Again, lower total cost and smaller panel space result.

For additional safety and convenience, Moeller's DIL M DC contactors feature an expanded voltage tolerance, beyond that specified by IEC/EN 60947. This accommodates a range of -30% to +20% for DIL M contactors 17A and above. It is one of the largest voltage tolerance ranges of any control manufacturer.

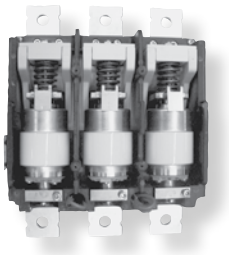


DIL M High Range

For heavy-duty applications, Moeller's contactor line continues with the DIL M185 to DIL M1000. This range includes 11 contactors in three frame sizes. All applications and worldwide voltages, both AC and DC, can be accommodated with only four coils.

On-board electronics for efficient operation

All DIL M185 to 1000 contactors utilize electronically-controlled magnet systems. This feature provides flexible actuation, and contributes to lower panel temperature, smaller control transformer requirements and greater control voltage tolerance. Direct actuation from a PLC or other low level source is easily accomplished. In addition, a built-in suppressor circuit for control protection is standard. All of this adds up to fewer external components and smaller panel space.



Vacuum contactors designed for small size, long life

DIL M580 to DIL M1000 are vacuum contactors. This feature reduces contact damage caused by electrical arcing, leading to longer life of the contactor. It also permits tighter packing density in the panel because there are no open arcs or escaping gases that would typically require additional space for dissipation.

DIL EM Miniature Contactors

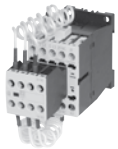
Moeller also offers a miniature contactor, the DIL EM. Designed for small loads, it is available in units up to 20A, and provides reliable performance for motors up to 5HP (@575V). AC and DC units are available.

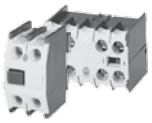
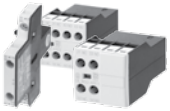
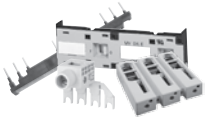
The DIL EM miniature contactor features a large ambient temperature range, and its low power consumption permits direct actuation from a PLC. The DC version of the DIL EM also includes an integrated suppressor to protect from voltage peaks that may occur when the coil is disconnected. Top-mount auxiliary contacts are available in both 2- and 4-pole configurations.

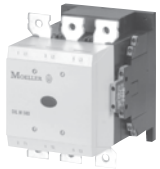
Standards and Approvals

Moeller's DIL M and DIL EM contactors carry UL, CSA, IEC/EN 60947 and VDE 0660 approvals. They are manufactured to ISO 9001 quality standards.

DILM Contactors Overview

Device	Description	Range	Pages
Contactors			
	General Use Contactors	Up to 150 Amps AC operated	A10
		Up to 150 Amps DC operated	A12
	Electronic Coil AC Contactors	Up to 155 Amps	A11
	Electronic Coil AC & DC Contactors	185 – 1000 Amps	A13
	Miniature Contactors	Up to 15 Amps Three-pole	A14
		Up to 15 Amps Four-pole	A15
	Four Pole Contactors	Up to 20 Amps	A16
	Reversing Contactors	Up to 80 Amps	A17
	Capacitor Switching Contactors	Up to 75 kvar @ 600 V	A18
	NEMA/EEMAC Contactors	Size 00 – 7	A19

Device	Description	Range	Pages
Auxiliary Contacts			
	Auxiliary Contacts for Miniature Contactors	Top Mount	A21
	Auxiliary Contacts for DILM7 – 32 Contactors	Top Mount	A22 – A23
		Side Mount	A23
		Top Mount High Version	A23
	Auxiliary Contacts for DILM40 – 1000 Contactors	Top Mount	A24 – A25
		Side Mount	A24 – A25
Suppressors			
	RC, Varistor, with or without LED, Free-Wheel Diode, Voltage indicator	24 – 500 V AC 12 – 250 V DC	A26 – A27
Timing Modules			
	Timing Modules		A28
CMD Contactor Monitor Device			
	Contactor Monitor Device	24 V DC 110 – 120 V AC 220 – 240 V AC	A29
Accessories			
	Miscellaneous Accessories		A30 – A35
Replacement Coils			
	Replacement Coils for Contactors	24 – 500 V AC 24 – 250 V DC	A36 – A37

Frame Size	Moeller Contactor	Maximum Horsepower (UL/CSA)						
		Single Phase		Three Phase				
		115 Volt	230 Volt	200 Volt	230 Volt	460 Volt	575 Volt	
	DIL M7	¼	1	1½	2	3	5	
		⅓	1	1½	1½	2	2	NEMA Size 00
	DIL M9	½	1½	3	3	5	7½	
		1	2	3	3	5	5	NEMA Size 0
	DIL M12	1	2	3	3	10	10	
	DIL M17	2	3	5	5	10	15	
		2	3	7½	7½	10	10	NEMA Size 1
	DIL M25	2	5	7½	10	15	20	
	DIL M32	3	5	10	10	20	25	
		3	7½	10	15	25	25	NEMA Size 2
	DIL M40	3	7½	10	15	30	40	
	DIL M50	3	10	15	20	40	50	
	DIL M65	5	15	20	25	50	60	
		7½	15	25	30	50	50	NEMA Size 3
	DIL M80	7½	15	25	30	60	75	
	DIL M95	7½	15	25	40	75	100	
		–	–	40	50	100	100	NEMA Size 4
	DIL M115	10	25	40	50	100	100	
	DIL M150	10	30	40	60	125	125	
	DIL M185	–	–	50	60	125	150	
	DIL M225	–	–	60	75	150	200	
		–	–	75	100	200	200	NEMA Size 5
	DIL M250	–	–	75	100	200	250	
	DIL M300	–	–	100	125	250	300	
	DIL M400	–	–	125	150	300	400	
		–	–	150	200	400	400	NEMA Size 6
	DIL M500	–	–	150	200	400	500	
	DIL M580	–	–	200	200	400	600	
	DIL M650	–	–	200	250	500	600	
		–	–	–	300	600	600	NEMA Size 7
	DIL M750	–	–	250	300	600	700	
	DIL M820	–	–	290	350	700	860	
		–	–	–	450	900	900	NEMA Size 8
	DIL M1000	–	–	350	400	800	1000	

Compare Moeller's 24 contactor sizes to just 10 equivalent NEMA sizes

The full-load current values listed in the table below are for motors running at usual speeds, with normal torque characteristics at 1.15 service factor. This table is a guide only. The actual full load motor amps for your motor may be different than the average values listed here. Always use the actual motor current listed on the motor nameplate when purchasing motor control and protection products.

Motor Rating (HP)	AC Induction Motor – Full Load Current (A)						
	Single Phase			Three Phase			
	115 V	200 V	230 V	200 V	230 V	460 V	575 V
⅙	4.4	2.5	2.2	–	–	–	–
¼	5.8	3.3	2.9	–	–	–	–
⅓	7.2	4.1	3.6	–	–	–	–
½	9.8	5.6	4.9	2.3	2.0	1.0	0.8
¾	13.8	7.9	6.9	3.2	2.8	1.4	1.1
1	16	9.2	8	4.1	3.6	1.8	1.4
1½	20	11.5	10	6.0	5.2	2.6	2.1
2	24	13.8	12	7.8	6.8	3.4	2.7
3	34	19.6	17	11.0	9.6	4.8	3.9
5	56	32.2	28	17.5	15.2	7.6	6.1
7½	80	46	40	25.3	22	11	9
10	100	57.5	50	32.2	28	14	11
15	–	–	–	48.3	42	21	17
20	–	–	–	62.1	54	27	22
25	–	–	–	78.2	68	34	27
30	–	–	–	92.0	80	40	32
40	–	–	–	119.6	104	52	41
50	–	–	–	149.5	130	65	52
60	–	–	–	177.1	154	77	62
75	–	–	–	220.8	192	96	77
100	–	–	–	285.2	248	124	99
125	–	–	–	358.8	312	156	125
150	–	–	–	414	360	180	144
200	–	–	–	552	480	240	192
300	–	–	–	825	720	360	288
350	–	–	–	963	840	420	336
400	–	–	–	1100	960	480	384
450	–	–	–	1238	1080	540	432
500	–	–	–	1375	1200	600	480
600	–	–	–	1650	1440	720	576
700	–	–	–	1925	1680	840	672
800	–	–	–	2200	1920	960	768
900	–	–	–	2475	2160	1080	864
1000	–	–	–	2750	2400	1200	960

NOTE: This chart was developed from Table 430-148 & 430-150 of the NEC, Table 52.2 of UL standard 508 and from the Canadian Electrical Code (CEC), Part 1, table 44 and 45.

Moeller's catalog numbering system for contactors and other devices follows a logical system. Device attributes can be determined by the following nomenclature.

Dashes (–) are used to separate device attributes and should always be included when ordering.

DIL M 7 – 10 (240V60Hz)

Product Line

DIL	*Non-reversing contactors*
DIUL	*Reversing contactors*

Contactor Type

M	*Contactors*
MF	*Electronic AC coil contactors*
EM	*Miniature contactors*
MP	*4-pole contactors*
K	*Capacitor switching contactors*
M-*N	*NEMA rated contactors*

Contactor Size

7 ↓ **1000**

Moeller contactors are available in 24 sizes ranging from 7 to 1000 A

Coil Voltage

(values shown are for illustration purposes only - more voltages available)

(208V60HZ)	*Standard electromechanical AC coil of 208V / 60Hz*
(24VDC)	*Standard electromechanical DC coil of 24V*
(RA250)	*Electronic AC coil of 110-250V 50/60Hz*
(RDC24)	*Electronic DC coil of 24V*

Auxiliary Contacts

(these characters only appear when Auxiliary Contacts are integrated into the base contactor)

10	*1 Normally Open - No Normally Closed*
01	*No Normally Open - 1 Normally Closed*
22	*2 Normally Open - 2 Normally Closed*

This page for reference only.
Please turn to the appropriate pages to determine
the exact device and/or accessories required for your application.

- Wide voltage tolerance +10% to -20% nominal
- Front mounted coil terminals
- Four compact frame sizes cover applications to 150A
- Dual box terminals make wiring safer and easier for cables with uneven cross-sections
- New plug-in technology provides tool-less connection with other contactors and accessories, saving time and reducing wiring errors

Three-pole Contactors with Electro-magnetic AC Coil *(to 150 Amps)* ❶

UL/CSA General Use [A]	Maximum UL / CSA Horsepower Ratings									Integrated Auxiliary Contacts			
	Single Phase AC			Three Phase AC				DC					
600 V	115 V	200 V	230 V	200 V	230 V	460 V	575 V	125 V	250 V	NO	NC	Catalog Number	Price
20	¼	¾	1	1½	2	3	5	¼	1	1	0	DILM7-10◆ ❷	176
										0	1	DILM7-01◆ ❷	176
20	½	1	1½	3	3	5	7½	½	1½	1	0	DILM9-10◆ ❷	200
										0	1	DILM9-01◆ ❷	200
20	1	2	2	3	3	10	10	¾	2	1	0	DILM12-10◆ ❷	248
										0	1	DILM12-01◆ ❷	248
40	2	2	3	5	5	10	15	2	3	1	0	DILM17-10◆	260
										0	1	DILM17-01◆	260
40	2	3	5	7½	10	15	20	2	5	1	0	DILM25-10◆	350
										0	1	DILM25-01◆	350
40	3	5	5	10	10	20	25	3	5	1	0	DILM32-10◆	440
										0	1	DILM32-01◆	440
55	3	5	7½	10	15	30	40	5	10	0	0	DILM40◆ ❸	500
65	3	7½	10	15	20	40	50	7½	15	0	0	DILM50◆ ❸	580
80	5	10	15	20	25	50	60	10	20	0	0	DILM65◆ ❸	780
125	7½	15	15	25	30	60	75	10	25	0	0	DILM80◆ ❸	960
125	7½	15	15	25	40	75	100	10	25	0	0	DILM95◆ ❸	1190
155	10	25	25	40	50	100	100	15	30	0	0	DILM115◆ ❸❹	1640
155	10	25	30	40	60	125	125	15	30	0	0	DILM150◆ ❸❹	2020

AC Coil Codes - DILM7 – 95 ❺

Complete catalog number (◆) with…	Voltage Range	
	50Hz	60Hz
(24V60HZ)	–	24V
(110V50HZ,120V60HZ)	110V	120V
(208V60HZ)	–	208V
(190V50HZ,220V60HZ)	190V	220V
(230V50HZ,240V60HZ)	230V	240V
(415V50HZ,480V60HZ)	415V	480V
(600V60HZ)	–	600V

AC Coil Codes - DILM115 – 150 ❹

Complete catalog number (◆) with…	Voltage Range
	50/60Hz
(RAC24)	24V
(RAC120)	120V
(RAC240)	190 – 240V
(RAC500)	480V – 500V

Ordering Instructions

1. **Locate the desired contactor**
2. **Complete the catalog number with coil code.**
3. **See pages A21 – A37 for auxiliaries and accessories.**

❶ Positively guided contacts within all auxiliary contact modules (including any internal auxiliaries). Mirror contacts on all contactors (in relation to internal or external auxiliaries).

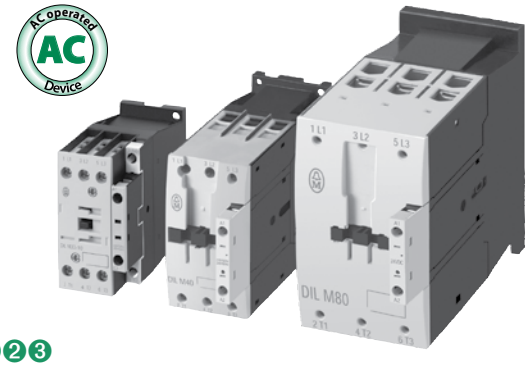
❷ Coils not replaceable.

❸ May combine side mount and front mount auxiliary contact modules. For maximum number of auxiliary contacts see page A24.

❹ Includes integrated surge suppressor.

❺ Other coil voltages between 24 and 600V AC available by special order. Contact your Moeller representative for information.

- Contactors fullfil the requirements of the semi-conductor industry according to SEMI F47
- Contactors can be used at control voltages with a frequency of 50 to 400 Hz
- Designed to hold at 50% of control voltage for 200 ms, where typical AC contactors would drop-out
- Single frame size up to 40 A, 20 HP @ 460V and 25 HP @ 575V



Three-pole Contactors with Electronic AC Coil *(to 150 Amps)* ❶❷❸

UL/CSA General Use [A]	Maximum UL / CSA Horsepower Ratings									Integrated Auxiliary Contacts			
	Single Phase AC			Three Phase AC				DC					
600 V	115 V	200 V	230 V	200 V	230 V	460 V	575 V	125 V	250 V	NO	NC	Catalog Number	Price
20	¼	¾	1	1½	2	3	5	¼	1	1	0	DILMF8-10◆	500
										0	1	DILMF8-01◆	500
20	½	1	1½	3	3	5	7½	½	1½	1	0	DILMF11-10◆	515
										0	1	DILMF11-01◆	515
20	1	2	2	3	3	10	10	¾	2	1	0	DILMF14-10◆	550
										0	1	DILMF14-01◆	550
40	2	2	3	5	5	10	15	2	3	1	0	DILMF17-10◆	600
										0	1	DILMF17-01◆	600
40	2	3	5	7½	10	15	20	2	5	1	0	DILMF25-10◆	675
										0	1	DILMF25-01◆	675
40	3	5	5	10	10	20	25	3	5	1	0	DILMF32-10◆	830
										0	1	DILMF32-01◆	830
55	3	5	7½	10	15	30	40	5	10	0	0	DILMF40◆ ❹	950
65	3	7½	10	15	20	40	50	7½	15	0	0	DILMF50◆ ❹	1115
80	5	10	15	20	25	50	60	10	20	0	0	DILMF65◆ ❹	1390
125	7½	15	15	25	30	60	75	10	25	0	0	DILMF80◆ ❹	1645
125	7½	15	15	25	40	75	100	10	25	0	0	DILMF95◆ ❹	1950
155	10	25	25	40	50	100	100	15	30	0	0	DILMF115◆ ❹	2385
155	10	25	30	40	60	125	125	15	30	0	0	DILMF150◆ ❹	2800

AC Coil Codes - DILMF ❷❸

Complete catalog number (◆) with…	Voltage Range
	50/60Hz
(RAC24)	24V
(RAC48)	42 – 48V
(RAC120)	100 – 120V
(RAC240)	190 – 240 V

Ordering Instructions

1. **Locate the desired contactor**
2. **Complete the catalog number with coil code.**
3. **See pages A21 – A37 for auxiliaries and accessories.**

❶ Positively guided contacts within all auxiliary contact modules (including any internal auxiliaries). Mirror contacts on all contactors (in relation to internal or external auxiliaries).

❷ Coils not replaceable.

❸ Includes integrated surge suppressor.

❹ May combine side mount and front mount auxiliary contact modules. For maximum number of auxiliary contacts see page A24.

- Wide voltage tolerance +20% to -30% nominal
- Front mounted coil terminals
- Exact same compact size as Moeller's AC contactors, saving panel space
- Electronically controlled magnet system (from DIL M17) provides less heat dissipation and reduced power consumption
- Direct actuation from a PLC without coupling relays (DIL M17 to 65)
- Integrated surge suppressor standard
- New plug-in technology provides tool-less connection with other contactors and accessories, saving time and reducing wiring errors

Three-pole Contactors with DC Coil *(to 150 Amps)* ❶

UL/CSA General Use [A]	Maximum UL / CSA Horsepower Ratings									Integrated Auxiliary Contacts			
	Single Phase AC			Three Phase AC				DC					
600 V	115 V	200 V	230 V	200 V	230 V	460 V	575 V	125 V	250 V	NO	NC	Catalog Number	Price
20	¼	¾	1	1½	2	3	5	¼	1	1	0	DILM7-10◆ ❷	220
										0	1	DILM7-01◆ ❷	220
20	½	1	1½	3	3	5	7½	½	1½	1	0	DILM9-10◆ ❷	240
										0	1	DILM9-01◆ ❷	240
20	1	2	2	3	3	10	10	¾	2	1	0	DILM12-10◆ ❷	316
										0	1	DILM12-01◆ ❷	316
40	2	2	3	5	5	10	15	2	3	1	0	DILM17-10◆	370
										0	1	DILM17-01◆	370
40	2	3	5	7½	10	15	20	2	5	1	0	DILM25-10◆	450
										0	1	DILM25-01◆	450
40	3	5	5	10	10	20	25	3	5	1	0	DILM32-10◆	620
										0	1	DILM32-01◆	620
55	3	5	7½	10	15	30	40	5	10	0	0	DILM40◆ ❸	650
65	3	7½	10	15	20	40	50	7½	15	0	0	DILM50◆ ❸	920
80	5	10	15	20	25	50	60	10	20	0	0	DILM65◆ ❸	1170
125	7½	15	15	25	30	60	75	10	25	0	0	DILM80◆ ❸	1300
125	7½	15	15	25	40	75	100	10	25	0	0	DILM95◆ ❸	1550
155	10	25	25	40	50	100	100	15	30	0	0	DILM115◆ ❸	1850
155	10	25	30	40	60	125	125	15	30	0	0	DILM150◆ ❸	2300

DC Coil Codes - DILM7 – 12 ❹

Complete catalog number (◆) with...	Voltage
	DC
(24VDC)	24V
(48VDC)	48V

DC Coil Codes - DILM17 – 150 ❹

Complete catalog number (◆) with...	Voltage Range
	DC
(RDC24)	24 – 27V
(RDC60)	48 – 60V
(RDC130)	110 – 130V
(RDC240)	200 – 240V

Ordering Instructions

1. **Locate the desired contactor**
2. **Complete the catalog number with coil code.**
3. **See pages A21 – A37 for auxiliaries and accessories.**

❶ Positively guided contacts within all auxiliary contact modules (including any internal auxiliaries). Mirror contacts on all contactors (in relation to internal or external auxiliaries).

❷ Coils not replaceable.

❸ May combine side mount and front mount auxiliary contact modules. For maximum number of auxiliary contacts see page A24.

❹ Other coil voltages between 12 and 250V DC available by special order. Contact your Moeller representative for information.

- Wide voltage tolerance +15% to -30% nominal
- Heavy duty contactors for demanding applications
- Electronically controlled magnet systems dramatically reduce pick-up and seal-in, DIL M500 and smaller are air-break contactors
- DIL M580 and larger are vacuum contactors, which increase lifespan and are extremely compact in size
- Direct connection to PLCs and low level input devices
- Built-in suppressor circuit for control protection standard
- High operational current
- Rated to 1000 V AC

Three-pole Contactors with AC or DC Electronic Coil *(185 to 1000 Amps)* ❶❷

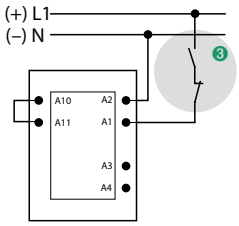
UL/CSA General Use [A]		Maximum UL / CSA Horsepower Ratings Three Phase				Integrated Auxiliary Contacts			
Open	Enclosed	200 V	230 V	460 V	575 V	NO	NC	Catalog Number	Price
225	202	50	60	125	150	2	2	**DILM185/22◆**	3600
250	225	60	75	150	200	2	2	**DILM225/22◆**	4400
350	315	75	100	200	250	2	2	**DILM250/22◆**	5600
350	315	100	125	250	300	2	2	**DILM300/22◆**	6200
450	405	125	150	300	400	2	2	**DILM400/22◆**	7800
550	495	150	200	400	500	2	2	**DILM500/22◆**	11600
630	567	200	200	400	600	2	2	**DILM580/22◆** ❹	14800
700	630	200	250	500	600	2	2	**DILM650/22◆** ❹	15800
800	720	250	300	600	700	2	2	**DILM750/22◆** ❹	18200
850	765	290	350	700	860	2	2	**DILM820/22◆** ❹	20200
1000	900	–	400	800	1000	2	2	**DILM1000/22◆** ❹	23400

AC & DC Coil Codes ❺

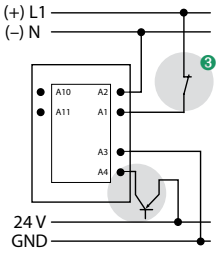
Complete catalog number (◆) with…	Voltage
(RDC48)	24 – 48V DC *(only for DILM185 – 500)*
(RA110)	48 – 110V AC 48 – 110V DC
(RA250)	110 – 250V AC 110 – 250V DC
(RAC500)	250 – 500V AC

Electronic Coil - Application Notes

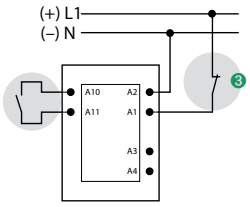
Conventional coil connection
A1/A2 are applied to voltage in the usual manner.



Direct from the PLC
A 24 V output from the PLC can be connected directly to connections A3/A4.



From low-consumption command devices
Command devices that can only be subject to minimal loads such as circuit board relays, control circuit devices or position switches can be connected directly to A10/A11.



Ordering Instructions

1. **Locate the desired contactor**
2. **Complete the catalog number with coil code.**
3. **See pages A21 – A37 for auxiliaries and accessories.**
4. **See page A34 for terminal lug selection.**

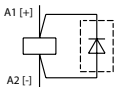
❶ May combine side mount and front mount auxiliary contact modules. For maximum number of auxiliary contacts see page A24.
❷ Order lugs separately - see page A34
❸ Standstill in an emergency (emergency stop).
❹ When operating with frequency inverters or when performing a high-voltage test, the suppressor on the load side must be removed.
❺ Wide range electronic coils; all AC coils operate between 40Hz and 60Hz.

- Miniature, economical contactors for small motors and loads
- Approved for worldwide use
- High degree of climatic approvals and large ambient temperature range
- DC model includes integrated diode/resistor surge suppressor

Miniature Three-pole Contactors with AC Coil ❶

General Use [A]		Maximum UL / CSA Horsepower Ratings							Integrated Auxiliary Contacts			
		Single Phase			Three Phase							
Open	Enclosed	115 V	200 V	230 V	200 V	230 V	460 V	575 V	NO	NC	Catalog Number	Price
15	13.5	½	1	1½	2	3	5	5	1	0	DILEM-10◆	144
15	13.5	½	1	1½	2	3	5	5	0	1	DILEM-01◆	144

Miniature Three-pole Contactors with DC Coil ❶❷

General Use [A]		Maximum UL / CSA Horsepower Ratings								Integrated Auxiliary Contacts			
		Single Phase			Three Phase								
Open	Enclosed	115 V	200 V	230 V	200 V	230 V	460 V	575 V	Circuit Diagram	NO	NC	Catalog Number	Price
15	13.5	½	1	1½	2	3	5	5		1	0	DILEM-10-G◆	180
15	13.5	½	1	1½	2	3	5	5		0	1	DILEM-01-G◆	180

AC Coil Codes ❶

Complete catalog number (◆) with…	Voltage Range	
	50Hz	60Hz
(24V60HZ)	–	24V
(110V50HZ,120V60HZ)	110V	120V
(208V60HZ)	–	208V
(190V50HZ,220V60HZ)	190V	220V
(230V50HZ,240V60HZ)	230V	240V
(415V50HZ,480V60HZ)	415V	480V
(600V60HZ)	–	600V

DC Coil Codes ❶❷

Complete catalog number (◆) with…	Voltage
(24VDC)	24V
(48VDC)	48V
(110VDC)	110V

Ordering Instructions

1. Locate the desired contactor
2. Complete the catalog number with coil code.
3. See pages A21 – A37 for auxiliaries and accessories.

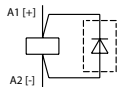
❶ Coil not replaceable.
❷ Includes integrated resistor/diode surge suppressor.

- Miniature, economical four-pole contactors
- Approved for worldwide use
- High degree of climatic approvals and large ambient temperature range
- AC and DC versions available
- DC model includes integrated diode/resistor surge suppressor

Miniature Four-pole Contactors with AC Coil ❶

General Use [A]		Maximum UL / CSA Horsepower Ratings							Integrated Auxiliary Contacts			
		Single Phase			Three Phase							
Open	Enclosed	115 V	200 V	230 V	200 V	230 V	460 V	575 V	NO	NC	Catalog Number	Price
15	13.5	½	1	1½	2	3	5	5	0	0	DILEM4◆	144

Miniature Four-pole Contactors with DC Coil ❶❷

General Use [A]		Maximum UL / CSA Horsepower Ratings								Integrated Auxiliary Contacts			
		Single Phase			Three Phase								
Open	Enclosed	115 V	200 V	230 V	200 V	230 V	460 V	575 V	Circuit Diagram	NO	NC	Catalog Number	Price
15	13.5	½	1	1½	2	3	5	5		0	0	DILEM4-G◆	180

AC Coil Codes ❶

Complete catalog number (◆) with…	Voltage Range	
	50Hz	60Hz
(24V60HZ)	–	24V
(110V50HZ,120V60HZ)	110V	120V
(190V50HZ,220V60HZ)	190V	220V
(230V50HZ,240V60HZ)	230V	240V
(415V50HZ,480V60HZ)	415V	480V

DC Coil Codes ❶❷

Complete catalog number (◆) with…	Voltage
(24VDC)	24V
(48VDC)	48V
(110VDC)	110V

Ordering Instructions

1. Locate the desired contactor
2. Complete the catalog number with coil code.
3. See pages A21 – A37 for auxiliaries and accessories.

❶ Coil not replaceable.
❷ Includes integrated resistor/diode surge suppressor.

- Space-saving four-pole design reduces panel space and cost
- Dual box terminals make wiring safer and easier for cables with uneven cross-sections
- DC operated contactors have an integrated surge suppressor

Four-pole Contactors with AC Coil ❶

General Use [A]		Maximum UL / CSA Horsepower Ratings							Integrated Auxiliary Contacts			
		Single Phase			Three Phase							
Open	Enclosed	115 V	200 V	230 V	200 V	230 V	460 V	575 V	NO	NC	Catalog Number	Price
20	18	½	1	1½	3	3	5	7½	0	0	DILMP20◆	260

Four-pole Contactors with DC Coil ❶❷

General Use [A]		Maximum UL / CSA Horsepower Ratings							Integrated Auxiliary Contacts			
		Single Phase			Three Phase							
Open	Enclosed	115 V	200 V	230 V	200 V	230 V	460 V	575 V	NO	NC	Catalog Number	Price
20	18	½	1	1½	3	3	5	7½	0	0	DILMP20◆	320

AC Coil Codes ❶

Complete catalog number (◆) with…	Voltage Range	
	50Hz	60Hz
(24V60HZ)	–	24V
(110V50HZ,120V60HZ)	110V	120V
(208V60HZ)	–	208V
(230V50HZ,240V60HZ)	230V	240V
(415V50HZ,480V60HZ)	415V	480V
(600V60HZ)	–	600V

DC Coil Codes - DILMP20 ❶❷

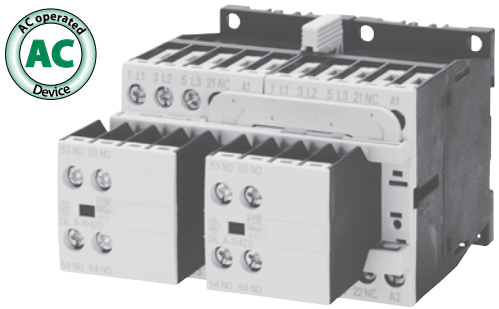
Complete catalog number (◆) with…	Voltage
(24VDC)	24V

Ordering Instructions

1. Locate the desired contactor
2. Complete the catalog number with coil code.
3. See pages A21 – A37 for auxiliaries and accessories.

❶ Coil not replaceable.
❷ DC contactors include integrated varistor surge suppressor.

- Space-saving design reduces panel space and cost
- Units are pre-assembled with mechanical interlock and reversing wiring kit
- Ingenious mechanical interlocks add no additional space
- Dual box terminals make wiring safer and easier for cables with uneven cross-sections



Assembled Reversing Contactor Combinations with AC Coils ❶❷❸

General Use [A]	Maximum UL / CSA Horsepower Ratings				Standard Auxiliary Contacts *per contactor*			
	Three Phase							
600 V	200 V	230 V	460 V	575 V	NO	NC	Catalog Number	Price
20	1½	2	3	5	2	1	DIULM7/21◆ ❸	730
20	3	3	5	7½	2	1	DIULM9/21◆ ❸	760
20	3	3	10	10	2	1	DIULM12/21◆ ❸	800
40	5	5	10	15	2	1	DIULM17/21◆ ❸	1000
40	7½	10	15	20	2	1	DIULM25/21◆	1150
40	10	10	20	25	2	1	DIULM32/21◆	1340
55	10	15	30	40	1	1	DIULM40/11◆	1620
65	15	20	40	50	1	1	DIULM50/11◆	1720
80	20	25	50	60	1	1	DIULM65/11◆	1960

AC Coil Codes ❸

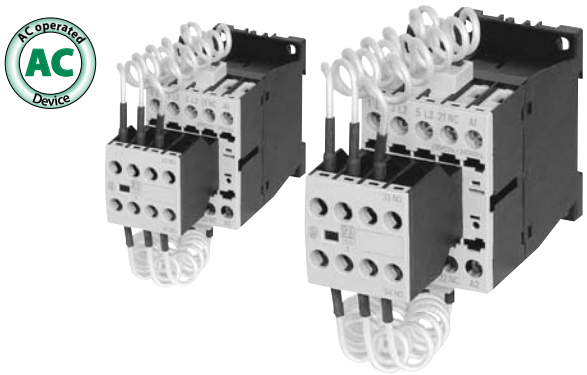
Complete catalog number (◆) with…	Voltage Range	
	50Hz	60Hz
(24V60HZ)	–	24V
(110V50HZ,120V60HZ)	110V	120V
(208V60HZ)	–	208V
(190V50HZ,220V60HZ)	190V	220V
(230V50HZ,240V60HZ)	230V	240V
(415V50HZ,480V60HZ)	415V	480V
(600V60HZ)	–	600V

Ordering Instructions

1. **Locate the desired contactor**
2. **Complete the catalog number with coil code.**
3. **See pages A21 – A37 for auxiliaries and accessories.**

❶ Positively guided contacts within all auxiliary contact modules (including any internal auxiliaries). Mirror contacts on all contactors (in relation to internal or external auxiliaries).
❷ Contact elements of the contactor to EN 50012.
❸ Coils not replaceable.

- Economical solution for both individual and group power factor correction applications
- Special weld resistant contact material ensures longer life
- All units pre-wired and ready to install



Capacitor Switching Contactor; with Series Resistors ❶

Three-Phase Capacitors 50 – 60 Hz			Standard Auxiliary Contacts			
240 V kvar	480 V kvar	600 V kvar	NO	NC	Catalog Number	Price
7.5	15	15	1	1	**DILK12-11◆**	325
12	20	30	1	1	**DILK20-11◆**	425
15	30	40	1	1	**DILK25-11◆**	550
20	40	50	1	0	**DILK33-10◆**	775
30	60	75	1	0	**DILK50-10◆**	1250

AC Coil Codes ❶

Complete catalog number (◆) with…	Voltage Range	
	50Hz	60Hz
(24V60HZ)	–	24V
(110V50HZ,120V60HZ)	110V	120V
(208V60HZ)	–	208V
(190V50HZ,220V60HZ)	190V	220V
(230V50HZ,240V60HZ)	230V	240V
(415V50HZ,480V60HZ)	415V	480V
(600V60Hz)	–	600V

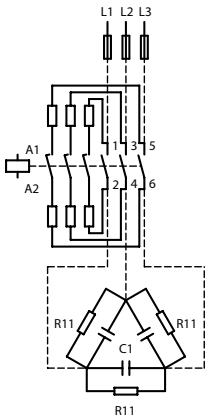
Application Note

In the case of group compensation, multi-stage capacitor banks are connected to the main supply as required. In the process, transient currents of up to 180 x I_e can flow between the capacitors.

The capacitors are pre-charged via the early-make auxiliary contacts and the fitted wire resistors, thereby reducing the inrush current. The main contacts then close after a time lag and carry the uninterrupted current.

Moeller's Capacitor Switching Contactors are weld-resistant with inrush current peaks up to 180 x I_e due to their special contact material.

Circuit Without Quick Discharge Resistor



Ordering Instructions

1. Locate the desired contactor
2. Complete the catalog number with coil code.
3. See pages A21 – A37 for auxiliaries and accessories.

❶ Coils not replaceable.

- Wide voltage tolerance +10% to -20% nominal
- Front mounted coil terminals
- Seven compact frame sizes cover applications to 810A
- Dual box terminals make wiring safer and easier for cables with uneven cross-sections
- New plug-in technology provides tool-less connection with other contactors and accessories, saving time and reducing wiring errors

3-Pole NEMA/EEMAC Rated Contactors with Electro-magnetic AC Coil *(to 810 Amps)* ❶

NEMA/ EEMAC Size	Continuous Current Rating [A]		Maximum UL / CSA Horsepower Ratings						Integrated Auxiliary Contacts		Catalog Number	Price
			Single Phase		Three Phase							
	Open	Enclosed	115 V	230 V	200 V	230 V	460 V	575 V	NO	NC		
00	–	9	⅓	1	1½	1½	2	2	1	0	DILM00N-10◆ ❷	200
0	–	18	1	2	3	3	5	5	1	0	DILM0N-10◆ ❷	248
1	32	27	2	3	7½	7½	10	10	1	0	DILM1N-10◆	350
2	52	45	3	7½	10	15	25	25	0	0	DILM2N◆ ❸	500
3	104	90	7½	15	25	30	50	50	0	0	DILM3N◆ ❸	960
4	156	135	–	–	40	50	100	100	0	0	DILM4N◆ ❸	1640
5	311	270	–	–	75	100	200	200	0	0	DILM5N◆ ❸	5600
6	–	540	–	–	150	200	400	400	0	0	DILM6N◆ ❸	11600
7	–	810	–	–	–	300	600	600	0	0	DILM7N◆ ❸❹	18200
UL/CSA approval pending. Contact your Moeller representative for availability.												

AC Coil Codes - DILM00N – 3N ❺

Complete catalog number (◆) with…	Voltage Range	
	50Hz	60Hz
(24V60HZ)	–	24V
(110V50HZ,120V60HZ)	110V	120V
(208V60HZ)	–	208V
(190V50HZ,220V60HZ)	190V	220V
(230V50HZ,240V60HZ)	230V	240V
(415V50HZ,480V60HZ)	415V	480V
(600V60HZ)	–	600V

AC Coil Codes - DILM4N

Complete catalog number (◆) with…	Voltage Range
	50/60Hz
(RAC24)	24V
(RAC120)	120V
(RAC240)	190 – 240 V
(RAC500)	480V – 500V

AC Coil Codes - DILM5N – 7N

Complete catalog number (◆) with…	Voltage Range
	40 – 60Hz
(RA110)	48 – 110V AC
(RA250)	110 – 250V AC
(RAC500)	250 – 500V AC

Ordering Instructions

1. **Locate the desired contactor**
2. **Complete the catalog number with coil code.**
3. **See pages A21 – A37 for auxiliaries and accessories.**

❶ Positively guided contacts within all auxiliary contact modules (including any internal auxiliaries). Mirror contacts on all contactors (in relation to internal or external auxiliaries).
❷ Coils not replaceable.
❸ May combine side mount and front mount auxiliary contact modules. For maximum number of auxiliary contacts see page A24.
❹ When operating with frequency inverters or when performing a high-voltage test, the suppressor on the load side must be removed.
❺ Other coil voltages between 24 and 600V AC available by special order. Contact your Moeller representative for information.

Moeller's catalog numbering system for most Accessories follows a logical system. Device attributes can be determined by the following nomenclature.

Dashes (–) are used to separate device attributes and should always be included when ordering.

DILM32 – X HI V 11 – SI

Type of Basic Unit

DILM32 ↓ **DILM1000** *Refers to the frame size of the device on which the Accessory is used. The numeric value ("32") is the largest device on which the Accessory will fit.*

Code for Accessories

X *Signifies that the remaining characters in the part number describe an Accessory*

Accessory Type

X *Auxiliary contacts*

MV *Mechanical interlocking*

SP *Replacement coils*

Auxiliary Contact Mounting Position

SI *Side mounting - inside*

SA *Side mounting - outside*

Auxiliary Contacts

10 *1 Normally Open - No Normally Closed*

20 *2 Normally Open - No Normally Closed*

31 *3 Normally Open - 1 Normally Closed*

40 *4 Normally Open - No Normally Closed*

01 *No Normally Open - 1 Normally Closed*

02 *No Normally Open - 2 Normally Closed*

13 *1 Normally Open - 3 Normally Closed*

04 *No Normally Open - 4 Normally Closed*

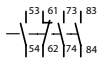
22 *2 Normally Open - 2 Normally Closed*

Characteristic of Auxiliary Contacts

V *1 Early Make - 1 Late Break Contact*

This page for reference only.
Please turn to the appropriate pages to determine
the exact device and/or accessories required for your application.

Auxiliary Contact Modules *(for DILEM Miniature Contactors)* ❶❷

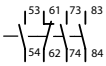
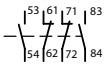
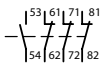
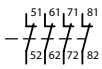
Auxiliary	NO	NC	Schematic	For use with...	Catalog Number	Price
Top Mount - Standard Terminal Markings						
	0	2		DILEM-10 DILEM-4	**02DILEM**	40
	1	1			**11DILEM**	40
	2	2		DILEM-10 DILEM-4	**22DILEM**	64
Top Mount - Alternative Terminal Markings						
	0	2		DILEM DILER	**02DILE**	40
	1	1			**11DILE**	40
	2	0			**20DILE**	40
	1EM ❸	1LB ❸			**11DDILE**	80
	0	4		DILEM DILER	**04DILE**	64
	1	3			**13DILE**	64
	2	2			**22DILE**	64
	3	1			**31DILE**	64
	4	0			**40DILE**	64
	1 + 1EM ❸	1 + 1LB ❸			**22DDILE**	120

❶ DILE Terminal Markings comply with European Standards EN 50005 while DILEM Terminal Markings comply with EN 50005 and EN 50012.

❷ Auxiliary Contact Modules have interlocked opposing contacts (does not apply to early-make or late-break contacts).

❸ EM = Early Make.
LB = Late Break.

Auxiliary Contact Modules *(for DILM7 – DILM32 Contactors)* ❶❷❸

Auxiliary	NO	NC	Schematic	For use with...	Catalog Number	Price
Top Mount - Standard Terminal Markings						
	1	1		DILM7-10 – DILM32-10 ❹	**DILM32-XHI11**	52
	0	2			**DILM32-XHI02**	52
	2	2			**DILM32-XHI22**	92
Top Mount - Alternative Terminal Markings						
	2	0		DILM7 – DILM32 DILA	**DILA-XHI20**	52
	1	1			**DILA-XHI11**	52
	0	2			**DILA-XHI02**	52
	1EM ❺	1LB ❺			**DILA-XHIV11**	100
	4	0			**DILA-XHI40**	92
	3	1			**DILA-XHI31**	92
	2	2			**DILA-XHI22**	92
	1	3			**DILA-XHI13**	92
	0	4			**DILA-XHI04**	92
	1 + 1EM ❺	1 + 1LB ❺			**DILA-XHIV22**	144

❶ DILM-7 – DILM-32 contactors include a built-in one pole auxiliary contact.

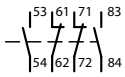
❷ Positively guided contacts with DILM7 – DILM32 between the integrated auxiliary contact and auxiliary contact module, as well as within the auxiliary contact modules (except DILA-XHIV11 early make/late break).

❸ Mirror contact with DILM7-01 – DILM32-01, as well as in combination with auxiliary contact modules.

❹ The 2 and 4-pole DILM32-XHI... auxiliary contact modules with terminal markings 21/22 cannot be used with DILM...-01 contactors. Use Top Mount DILA-XHI... with Alternative Terminal Markings instead.

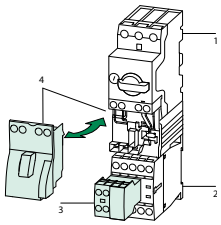
❺ EM = Early Make
LB = Late Break

Auxiliary Contact Modules *(for DILM7 – DILM32 Contactors)* ❶❷❸

Auxiliary	NO	NC	Schematic	For use with…	Catalog Number	Price
Side Mount - Alternative Terminal Markings						
	1	1		DILM17 – DILM32 ❹❺	**DILM32-XHI11-S**	100
Top Mount Electronic Compatible Auxiliary						
	1	1		DILM17 – DILM32 DILMP20 – DILMP45 10 mA @ 24V DC	**DILA-XHIR11**	335
Top Mount - High Version for MSC Starter Applications						
	2	0		DILM7 – DILM12 contactors when using the PKZM0-XDM12 Quick Connector or DILM12-XRL Reversing Kit.	**DILA-XHIT20**	54
	1	1			**DILA-XHIT11**	54
	0	2			**DILA-XHIT02**	54
	2	2			**DILA-XHIT22**	96

Application Note:

Top Mount-High Version auxiliary contact blocks are intended for use when combining DILM7 – 12 contactors with Moeller's PKZM0 self-protected starter. These contactors are designed to accept a "tool-less" plug connection (PKZM0-XDM12) that physically connects the two devices. The high profile of the auxiliary contact blocks allows access to the terminals after the plug connector is in place.



1 PKZM0
2 DILM7 - DILM12
3 DILA-XHIT
4 PKZM0-XDM12

❶ DILM7 – DILM32 contactors include a built-in one pole auxiliary contact.

❷ Positively guided contacts with DILM7 – DILM32 between the integrated auxiliary contact and auxiliary contact module, as well as within the auxiliary contact modules (except DILA-XHIV11 early make/late break).

❸ Mirror contact with DILM7-01 – DILM32-01, as well as in combination with auxiliary contact modules.

❹ Snaps on to left side of contactor only. Cannot be combined with top-mount auxiliary contacts or mechanical interlocks.

❺ Designed for use with contactors manufactured after date code of "4405" (**4405** = week **44** of year 20**05**).

A

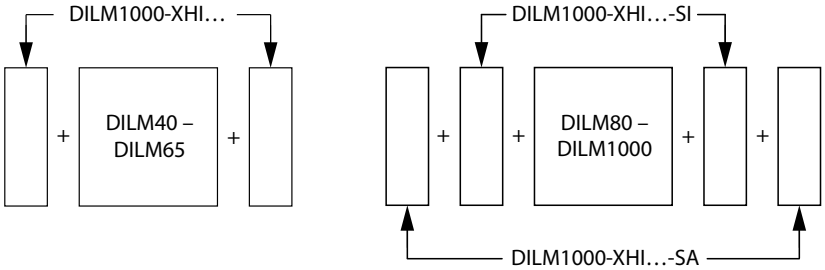
Contactors

Accessory Guide

Maximum possible combinations of accessories

Use this guide to determine which auxiliary contacts will fit on the devices listed below.
Order the desired auxiliary contacts on the following page.

Maximum possible combinations of auxiliary contacts when using the following contactors		Standard Side-Mount Auxiliary Contacts *(see page A25)*  DILM1000-XHI(V)11-SI	Alt. Markings Side-Mount Aux. Contacts *(see page A25)*  DILM1000-XHI(V)11-SA	Standard 2-pole Top-Mount Auxiliary Contacts *(see page A25)*  DILM150-XHI(20)(11)(02)	Standard 4-pole Top-Mount Auxiliary Contacts *(see page A25)*  DILM150-XHI(40)(04) DILM150-XHI(31)(13) DILM150-XHI(V)22	Alt. Markings 2-pole Top-Mount Aux. Contacts *(see page A25)*  DILM150-XHIA11	Alt. Markings 4-pole Top-Mount Aux. Contacts *(see page A25)*  DILM150-XHIA22
Contactor Frame Size DILM40 – 65							
 DILM40 – 65 *(see page A10)*	Option #1	2x				1x	
	Option #2		2x	1x			
	Option #3	1x					1x
	Option #4		1x		1x		
Contactor Frame Size DILM80 – 150							
 DILM80 – 150 *(see page A10)*	Option #1	2x	2x				
	Option #2	2x					1x
	Option #3	2x				1x	
	Option #4		2x		1x		
	Option #5		2x	1x			
Large Contactor Frame Size DILM185 – 1000							
 DILM185 – 1000 *(see page A13)*	Option #1	2x	2x ❶				



❶ Can only be mounted to Type . . .-SI contact module; Will not fit directly on contactor.

Auxiliary Contact Modules *(for DILM40 – DILM1000 Contactors)* ❶❷

Auxiliary	NO	NC	Schematic	For use with...	Catalog Number	Price
Top Mount - Standard Terminal Markings						
	2	0		DILM40 – DILM150	**DILM150-XHI20**	52
	1	1			**DILM150-XHI11**	52
	0	2			**DILM150-XHI02**	52
	4	0			**DILM150-XHI40**	92
	3	1			**DILM150-XHI31**	92
	2	2			**DILM150-XHI22**	92
	1	3			**DILM150-XHI13**	92
	0	4			**DILM150-XHI04**	92
	1 + 1EM ❸	1 + 1LB ❸			**DILM150-XHIV22**	144
Top Mount - Alternative Terminal Markings						
	1	1		DILM40 – DILM150	**DILM150-XHIA11**	52
	2	2			**DILM150-XHIA22**	92
Side Mount - Standard Terminal Markings						
	1	1		DILM40 – DILM1000	**DILM1000-XHI11-SI**	92
	1EM ❸	1LB ❸			**DILM1000-XHIV11-SI**	92
Side Mount - Alternative Terminal Markings						
	1	1		DILM40 – DILM1000	**DILM1000-XHI11-SA**	92

See Accessory Guide on previous page

❶ Positively guided contacts with DILM40 – DILM65 within the auxiliary contact module.

❷ Mirror contact with DILM40 – DILM65 in combination with auxiliary contact module.

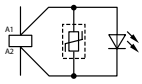
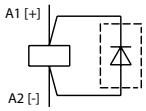
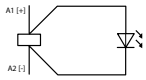
❸ EM = Early Make.
LB = Late Break.

Suppressors and Voltage Indicator ❶❷

Module	Description	Supply Voltage	Schematic	For use with...	Catalog Number	Price
RC Suppressors ❶						
	• For AC operated contactors (50 – 60 Hz) • Please be aware that RC Suppressors can cause a drop-out delay	24 – 48V AC		DILEM DILER	**RCDILE48**	64
		110 – 250V AC			**RCDILE250**	64
	• For AC operated contactors (50 – 60 Hz) • DC operated Contactors have an integrated suppressor. Please be aware that Suppressors can cause a drop-out delay	24 – 48V AC		DILM7 – DILM12 DILMP20 DILA	**DILM12-XSPR48**	90
		110 – 240V AC			**DILM12-XSPR240**	90
		240 – 500V AC			**DILM12-XSPR500**	90
		24 – 48V AC		DILM17 – DILM32	**DILM32-XSPR48**	100
		110 – 240V AC			**DILM32-XSPR240**	100
		240 – 500V AC			**DILM32-XSPR500**	100
		24 – 48V AC		DILM40 – DILM95	**DILM95-XSPR48**	128
		110 – 240V AC			**DILM95-XSPR240**	128
		240 – 500V AC			**DILM95-XSPR500**	128
Varistor Suppressors ❶						
	• For AC operated Contactors (50 – 60 Hz) • DC operated Contactors have an integrated suppressor	24 – 48V AC		DILEM DILER	**VGDILE48**	56
		110 – 250V AC			**VGDILE250**	56
		380 – 415V AC			**VGDILE415**	56
	• For AC operated Contactors (50 – 60 Hz) • DC operated Contactors have an integrated suppressor	24 – 48V AC		DILM7 – DILM12 DILMP20 DILA	**DILM12-XSPV48**	90
		48 – 130V AC			**DILM12-XSPV130**	90
		130 – 240V AC			**DILM12-XSPV240**	90
		240 – 500V AC			**DILM12-XSPV500**	90
		24 – 48V AC		DILM17 – DILM32	**DILM32-XSPV48**	100
		48 – 130V AC			**DILM32-XSPV130**	100
		130 – 240V AC			**DILM32-XSPV240**	100
		240 – 500V AC			**DILM32-XSPV500**	100
		24 – 48V AC		DILM40 – DILM95	**DILM95-XSPV48**	128
		48 – 130V AC			**DILM95-XSPV130**	128
		130 – 240V AC			**DILM95-XSPV240**	128
		240 – 500V AC			**DILM95-XSPV500**	128

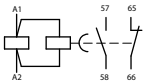
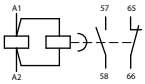
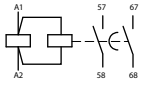
❶ RC Suppressor and Varistor Suppressor cannot be used at the same time.
❷ All DC coils are supplied with an integrated surge suppressor.

Suppressors and Voltage Indicator *(continued)* ❶❷

Module	Description	Supply Voltage	Schematic	For use with...	Catalog Number	Price
Varistor Suppressor with Integrated LED ❶						
	• For AC operated Contactors (50 – 60 Hz). • DC operated Contactors have an integrated suppressor.	24 – 48V AC		DILM7 – DILM12 DILMP20 DILA	**DILM12-XSPVL48**	100
		130 – 240V AC			**DILM12-XSPVL240**	100
		24 – 48V AC		DILM17 – DILM32	**DILM32-XSPVL48**	110
		130 – 240V AC			**DILM32-XSPVL240**	110
		24 – 48V AC		DILM40 – DILM95	**DILM95-XSPVL48**	136
		130 – 240V AC			**DILM95-XSPVL240**	136
Free-wheel Diode Suppressor						
	• For DC operated Contactors. • Functions in addition to the built-in DC suppressor circuit. Prevents negative breaking voltage when relays are used with sensitive electronics.	12 – 250V DC		DILM7 – DILM12 DILMP20 DILA	**DILM12-XSPD**	54
Voltage Indicator						
	• Indicates presence of control voltage. • For DC operated Contactors.	12 – 48V DC		DILM7 – DILM12 DILMP20 DILA	**DILM12-XSPI48**	70
		48 – 130V DC			**DILM12-XSPI130**	70
		110 – 250V DC			**DILM12-XSPI250**	70
		RDC24		DILM17 – DILM32	**DILM32-XSPI48**	80
		RDC60; RDC130			**DILM32-XSPI130**	80
		RDC240			**DILM32-XSPI250**	80
	• For DC operated contactors DILM40 – DILM95 and AC or DC contactors DILM115 and DILM150	RDC24; RAC24; RAC48		DILM40 – DILM150	**DILM150-XSPI48**	90
		RDC120; RAC60; RAC130			**DILM150-XSPI130**	90
		RDC240; RAC240			**DILM150-XSPI250**	90

❶ RC Suppressor and Varistor Suppressor cannot be used at the same time.
❷ All DC coils are supplied with an integrated surge suppressor.

Electronic Timing Modules

Module	Description	Supply Voltage	Timing Range (sec)	Schematic	For use with...	Catalog Number	Price
	**ON delay** May not be combined with Auxiliary Contact Blocks, Suppressors or Voltage Indicator.	24V AC/DC	Selectable: 0.05 – 1 0.5 – 10 5 – 100		DILM7 – DILM32 DILMP20 DILA	**DILM32-XTEE11(RA24)**	314
		100 – 130V AC				**DILM32-XTEE11(RAC130)**	314
		200 – 240V AC				**DILM32-XTEE11(RAC240)**	314
	**OFF delay** May not be combined with Auxiliary Contact Blocks, Suppressors or Voltage Indicator.	24V AC/DC	0.05 – 1		DILM7 – DILM32 DILMP20 DILA	**DILM32-XTED11-1(RA24)**	350
			0.5 – 10			**DILM32-XTED11-10(RA24)**	350
			5 – 100			**DILM32-XTED11-100(RA24)**	350
		100 – 130V AC	0.05 – 1			**DILM32-XTED11-1(RAC130)**	350
			0.5 – 10			**DILM32-XTED11-10(RAC130)**	350
			5 – 100			**DILM32-XTED11-100(RAC130)**	350
		200 – 240V AC	0.05 – 1			**DILM32-XTED11-1(RAC240)**	350
			0.5 – 10			**DILM32-XTED11-10(RAC240)**	350
			5 – 100			**DILM32-XTED11-100(RAC240)**	350
	**STAR-DELTA applications** May not be combined with Auxiliary Contact Blocks, Suppressors or Voltage Indicator.	24V AC/DC	1 – 30 Switching break, 50ms		DILM7 – DILM32 DILMP20	**DILM32-XTEY20(RA24)**	350
		100 – 130V AC				**DILM32-XTEY20(RAC130)**	350
		200 – 240V AC				**DILM32-XTEY20(RAC240)**	350
Transparent Cover							
	Snap-mounts onto the Timing Module to prevent tampering				DILM32-XTE...	**DILM32-XTEPLH**	18

Safety Technology
Control the unexpected

CMD contactor monitor device

protection against contactor welding

NEW

- EN 954-1
  safety categories 3 & 4
- EN 60204-1
  emergency-stop applications
- EN ISO 13849-1
  contactor monitoring
- IEC EN 60947-4-1, Annex F
  mirror contacts

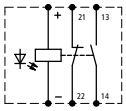
Processes and applications designed with safety in mind implement the use of redundant circuits, typically solved by installation of a second contactor. This method can be costly, particularly with larger contactors. Moeller's CMD uses mirror contacts to monitor a single contactor, and trips an upstream circuit breaker when welded contacts are detected.

These devices are only part of Moeller's spectrum of safety products. Other products include emergency-stop FAK foot & palm switches, LS-TITAN limit switches, EMR4 monitoring relays and ESR4 safety relays.

Contactor Monitor Device

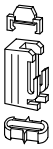
Contactor Monitor Device	Description	For Use With...	Operating Voltage DC [V]	Operating Voltage AC [V]	Catalog Number	Price
	Used to monitor contacts for welding	DILEM DILM7-150 DILM185-500 DILM580-1000 S-PKZ2	24	–	**CMD(24VDC)**	950
			–	110 – 120	**CMD(110-120VAC)**	700
			–	220 – 240	**CMD(220-240VAC)**	700
UL/CSA pending; contact your Moeller representative						

Miscellaneous Accessories

Module	Description	Supply Voltage / Current Rating	Schematic	For use with...	Catalog Number	Price
Amplifier Module						
	• DC operated • Interposing relay that provides a dry contact signal to activate an AC operated Contactor or Relay; Actuates on as little as 25mA	24V DC [25mA . . . 2A] ❶		When 24V DC low current [25mA . . . 2A] control is required to operate AC coils ❶	**ETS4-VS3**	200
4th Pole						
	• Only for resistive loads. • Up to two auxiliary contacts can be fitted • Suitable for isolating non-grounded and poorly grounded neutral conductors	30 A		DILM40	**NDIL0M**	76
		44 A		DILM40	**NDIL1M**	133
		60 A		DILM50 – DILM65	**NDIL2M**	183
Motor Suppressor Module						
	• Utilizes tool-less plug connection on contactor • EMC suitable design • Reduces interferance of induction voltage produced when motors are disconnected • Increases lifespan of contactor contacts	380 – 575 V AC @50/60Hz		DILM7 – DILM12	**DILM12-XMSM**	830
Contactor Test Block						
	• For manual closing of main power poles without voltage • Simple and fast control circuit testing			DILM7 – DILM32 DILA	**DILM32-XMAN**	44
Printed Circuit Board Adapter						
	• For mounting and connection of a printed circuit board to top of contactor			DILM7 – DILM12 DILA	**DILM12-XPBC**	200

❶ When contactor AC coil is over 2A, use DILER or DILEM-G relay instead.

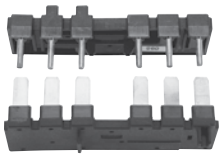
Connectors

Connector	Description	For use with...	Catalog Number	Price
	• Provides a mechanical link when coupling multiple contactors together • Distance between Contactors = 0 mm	DILEM	**V0DILE**	0.70
		DILM7 – DILM65	**DILM32-XVB** *(sold in 50 pack only price shown is for each)*	2
		DILM80 – DILM150	**DILM150-XVB**	2

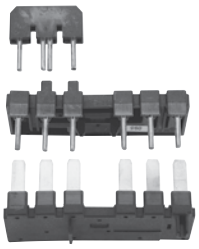
Mechanical Interlocks

Mechanical Interlocks	Description	For use with...	Catalog Number	Price
	• For two contactors with AC or DC operated magnet systems • Distance between Contactors = 0 mm • Mechanical Lifespan = 2.5 x 10^6 operations • Additional auxiliary contact modules can be fitted	DILEM	**MVDILE**	40
	• For two contactors with AC or DC operated magnet systems • Distance between Contactors = 0 mm • Mechanical Lifespan = 2.5 x 10^6 operations • Additional auxiliary contact modules can be fitted	DILM7 – DILM12 DILMP20	**DILM12-XMV**	36
		DILM17 – DILM32	**DILM32-XMV**	36
		DILM40 – DILM65	**DILM65-XMV**	48
		DILM80 – DILM150	**DILM150-XMVE**	48
	• Same as above; includes mounting plate	DILM80 – DILM150	**DILM150-XMV**	450
	• For two contactors with the same or different magnetic systems • Mechanical lifespan 5 x 10^6 operations. No auxiliary contact is possible between the mechanical interlock and contactor • Combination with same frame size only • Distance between contactors: 15 mm	DILM185 – DILM500	**DILM500-XMV**	124
	• For two contactors with the same or different magnetic systems • Mechanical lifespan 5 x 10^6 operations. No auxiliary contact is possible between the mechanical interlock and contactor • DILM820-XMV consists of interlock element and mounting support plate	DILM580 – DILM1000	**DILM820-XMV**	1100

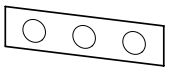
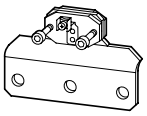
Reversing Kits

Reversing Kits	Description	For use with...	Catalog Number	Price
	• Consisting of one 3-pole paralleling link with control bridge and reversing link with A2 bridge	DILEM+MVDILEM	**MVS-WB-EM**	50
	• Main current wiring for reversing combinations • Tool-less plug connection on face of contactor • Control cables are integrated, in addition to electrical interlock • If using auxiliary contacts, use Top Mount - High Version (DILA-XHIT...)	DILM7 – DILM12	**DILM12-XRL**	60
	• Main current wiring for reversing combinations	DILM17 – DILM32	**DILM32-XRL**	100
		DILM40 – DILM65	**DILM65-XRL**	190
		DILM80 – DILM150	**DILM150-XRL**	740
UL/CSA pending. Contact your Moeller representative.				

Star-Delta Wiring Kits

Star-Delta Wiring Kit	Description	For use with...	Catalog Number	Price
	• Main current wiring for star-delta combinations (including star-point bridge) • Tool-less plug connection on face of contactor • Control cables are integrated, in addition to electrical interlock • If using auxiliary contacts, use Top Mount - High Version (DILA-XHIT...)	DILM7 – DILM12	**DILM12-XSL**	90
	• Main current wiring for star-delta combinations	DILM17 – DILM32	**DILM32-XSL**	130
	• Main current wiring for star-delta combinations	DILM40 – DILM65	**DILM65-XSL**	230

Bridges, Links and Jumpers

Bridges	Description	For use with . . .	Catalog Number	Price
Star-Point Bridges				
	• Finger-safe (in accordance with IEC 536)	DILEM	**S1DILEM**	40
		DILM7 – DILM12	**DILM12-XS1** ❶	40
		DILM17 – DILM32	**DILM32-XS1**	40
		DILM40 – DILM65	**DILM65-XS1**	56
		DILM80 – DILM150	**DILM150-XS1**	126
	• A cover is included for protection against accidental contact	DILM185 – DILM400	**DILM400-XS1**	280
		DILM500	**DILM500-XS1**	360
Paralleling Bridges ***(Consisting of two paralleling links)***				
	• 4th pole can be broken off. • AC-1 current carrying capacity of the open contactor increases by a factor of 2.5. • Protected against accidental contact (in accordance with IEC 536). *Terminal capacity can be found in the Technical Data section.*	DILEM	**P1DILEM**	50
		DILM7 – DILM12	**DILM12-XP1**	32
		DILM17 – DILM32	**DILM32-XP1**	60
		DILM40 – DILM65	**DILM65-XP1**	80
		DILM80 – DILM150	**DILM150-XP1**	330
	• 3-pole • AC-1 current carrying capacity of the open Contactor increases by a factor of 2.5. • A cover is included for protection against accidental contact.	DILM185	**DILM185-XP1**	536
Three-phase Commoning Links				
	• For linking three contactors; length 135mm • Rated to 690V; 63A general purpose • Protected against accidental contact; short circuit proof	DILM7 – DILM12	**DILM12-XDSB0/3**	60
	• For linking four contactors; length 180mm • Rated to 690V; 63A general purpose • Protected against accidental contact; short circuit proof		**DILM12-XDSB0/4**	70
	• For linking five contactors; length 225mm • Rated to 690V; 63A general purpose • Protected against accidental contact; short circuit proof		**DILM12-XDSB0/5**	76
Jumper				
	• For parallel connection of auxiliary contacts • Not insulated • Standard quantity: 100 *Must be ordered in standard quantity*	DILEM DILER	**BT480**	0.70

❶ Tool-less plug connection on face of contactor. If using auxiliary contacts, use Top Mount, High Version (DILA-XHIT. . .).

Terminal Blocks, Lugs, Kits and Accessories [1]

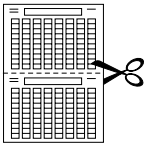
Terminal Blocks & Kits	Description	For use with…	Catalog Number	Price
Cable Terminal Blocks				
	• Terminal capacity: 1 x (AWG 6 – MCM 350) or 2 x (AWG 6 – MCM 300)	DILM185 DILM225	**DILM225-XKU-S**	240
	• Terminal capacity: 1 x (1/Ø – MCM 600) or 2 x (1/Ø – MCM 500)	DILM250 – DILM400	**DILM400-XKU-S**	250
	• Terminal cover included • Consists of three individual terminals (Cu, Al), with integrated control circuit terminal • Terminal capacity: 2 x (AWG 4 – MCM 500)	DILM500/22	**DILM500-XK-CNA**	280
	• Terminal cover included • Consists of three individual terminals (Cu, Al), with integrated control circuit terminal • Terminal capacity: 2 x (AWG 2 – MCM 500)	DILM580/22 DILM650/22	**DILM650-XK-CNA**	500
	• Terminal cover included • Consists of three individual terminals (Cu, Al) • Terminal capacity: 4 x (AWG 2 – MCM 500)	DILM750/22 DILM820/22	**DILM820-XK-CNA**	1060
Flat Strip Conductor Terminal Kit				
	• Includes three flat strip conductor terminals and control circuit terminal • For bus and flexibus connection *See Technical Data for terminal capacity.*	DILM500 – DILM650	**DILM650-XKB-S**	220
		DILM750 DILM820	**DILM820-XKB-S**	230
Control Circuit Tap				
	• Pressure connector that mounts directly to a power terminal for feeding a control circuit • 15A, 600V maximum; AWG 18 – 14	DILM80 – DILM150	**DILM150-XZK**	16

[1] No factory lugs available for DILM1000 size contactors

Covers

Covers	Description	For use with...	Catalog Number	Price
Sealable Shrouds				
	• Cover snap-mounts onto the device and can be sealed to prevent tampering.	DILEM DILER	**HDILE**	13
Terminal Insert				
	• Provides finger-safe protection (IP2x) by covering the unused terminal in contactors with dual power terminals • One package includes 8 Terminal Covers	DILM40 – DILM65	**DILM65-XIP2X**	6
		DILM80 – DILM150	**DILM150-XIP2X**	8
Terminal Cover				
	• Protection against shock hazards and accidental contact.	DILM185 – DILM400	**DILM400-XHB**	60
		DILM500	**DILM500-XHB**	68
		DILM580 – DILM650	**DILM650-XHB**	148
		DILM750 – DILM1000	**DILM820-XHB**	170

Device Labeling

Accessory	Description	For use with...	Catalog Number	Price
	• For inscriptions using a laser printer, plotter, marker pen or copier • 240 labels per sheet (A4 size sheet); Can be split into two A5 sheets • package of 25 sheets	As required	**XGKE-GE**	12

AC Coils DILM17 – DILM65 Contactors ❶

Coil Voltage 50Hz	Coil Voltage 60Hz	For Use With...	Catalog Number (Shading indicates standard voltages)	Price
24	–	DILM17 DILM25 DILM32 DIULM17 DIULM25 DIULM32 DILK20 DILK25 DILK33	DILM32-XSP(24V50HZ)	144
48	–		DILM32-XSP(48V50HZ)	144
240	–		DILM32-XSP(240V50HZ)	144
500	–		DILM32-XSP(500V50HZ)	144
–	24		DILM32-XSP(24V60HZ)	144
–	110		DILM32-XSP(110V60HZ)	144
–	115		DILM32-XSP(115V60HZ)	144
–	208		DILM32-XSP(208V60HZ)	144
–	600		DILM32-XSP(600V60HZ)	144
42	48		DILM32-XSP(42V50HZ,48V60HZ)	144
110	120		DILM32-XSP(110V50HZ,120V60HZ)	144
190	220		DILM32-XSP(190V50HZ,220V60HZ)	144
220	240		DILM32-XSP(220V50HZ,240V60HZ)	144
230	240		DILM32-XSP(230V50HZ,240V60HZ)	144
380	440		DILM32-XSP(380V50HZ,440V60HZ)	144
400	440		DILM32-XSP(400V50HZ,440V60HZ)	144
415	480		DILM32-XSP(415V50HZ,480V60HZ)	144
24	24		DILM32-XSP(24V50/60HZ)	144
42	42		DILM32-XSP(42V50/60HZ)	144
110	110		DILM32-XSP(110V50/60HZ)	144
220	220		DILM32-XSP(220V50/60HZ)	144
230	230		DILM32-XSP(230V50/60HZ)	144
380	380		DILM32-XSP(380V50/60HZ)	144
24	–	DILM40 DILM50 DILM65 DIULM40 DIULM50 DIULM65 DILK50	DILM65-XSP(24V50HZ)	180
48	–		DILM65-XSP(48V50HZ)	180
240	–		DILM65-XSP(240V50HZ)	180
500	–		DILM65-XSP(500V50HZ)	180
–	24		DILM65-XSP(24V60HZ)	180
–	110		DILM65-XSP(110V60HZ)	180
–	115		DILM65-XSP(115V60HZ)	180
–	208		DILM65-XSP(208V60HZ)	180
–	600		DILM65-XSP(600V60HZ)	180
42	48		DILM65-XSP(42V50HZ,48V60HZ)	180
110	120		DILM65-XSP(110V50HZ,120V60HZ)	180
190	220		DILM65-XSP(190V50HZ,220V60HZ)	180
220	240		DILM65-XSP(220V50HZ,240V60HZ)	180
230	240		DILM65-XSP(230V50HZ,240V60HZ)	180
380	440		DILM65-XSP(380V50HZ,440V60HZ)	180
400	440		DILM65-XSP(400V50HZ,440V60HZ)	180
415	480		DILM65-XSP(415V50HZ,480V60HZ)	180
24	24		DILM65-XSP(24V50/60HZ)	180
42	42		DILM65-XSP(42V50/60HZ)	180
110	110		DILM65-XSP(110V50/60HZ)	180
220	220		DILM65-XSP(220V50/60HZ)	180
230	230		DILM65-XSP(230V50/60HZ)	180
380	380		DILM65-XSP(380V50/60HZ)	180

AC Coils DILM80 – DILM95 Contactors ❶

Coil Voltage 50Hz	Coil Voltage 60Hz	For Use With...	Catalog Number (Shading indicates standard voltages)	Price
24	–	DILM80 DILM95	DILM95-XSP(24V50HZ)	246
48	–		DILM95-XSP(48V50HZ)	246
240	–		DILM95-XSP(240V50HZ)	246
500	–		DILM95-XSP(500V50HZ)	246
–	24		DILM95-XSP(24V60HZ)	246
–	110		DILM95-XSP(110V60HZ)	246
–	115		DILM95-XSP(115V60HZ)	246
–	208		DILM95-XSP(208V60HZ)	246
–	600		DILM95-XSP(600V60HZ)	246
42	48		DILM95-XSP(42V50HZ,48V60HZ)	246
110	120		DILM95-XSP(110V50HZ,120V60HZ)	246
190	220		DILM95-XSP(190V50HZ,220V60HZ)	246
220	240		DILM95-XSP(220V50HZ,240V60HZ)	246
230	240		DILM95-XSP(230V50HZ,240V60HZ)	246
380	440		DILM95-XSP(380V50HZ,440V60HZ)	246
400	440		DILM95-XSP(400V50HZ,440V60HZ)	246
415	480		DILM95-XSP(415V50HZ,480V60HZ)	246
24	24		DILM95-XSP(24V50/60HZ)	246
42	42		DILM95-XSP(42V50/60HZ)	246
110	110		DILM95-XSP(110V50/60HZ)	246
220	220		DILM95-XSP(220V50/60HZ)	246
230	230		DILM95-XSP(230V50/60HZ)	246
380	380		DILM95-XSP(380V50/60HZ)	246

DC Coils DILM17 – DILM150 Contactors ❶❷

Coil Voltage V DC	For Use With...	Catalog Number (Shading indicates standard voltages)	Price
24 – 27	DILM17 – DILM32	DILM32-XSP(RDC24)	380
48 – 60		DILM32-XSP(RDC60)	380
110 – 130		DILM32-XSP(RDC130)	380
200 – 240		DILM32-XSP(RDC240)	380
24 – 27	DILM40 – DILM65	DILM65-XSP(RDC24)	500
48 – 60		DILM65-XSP(RDC60)	500
110 – 130		DILM65-XSP(RDC130)	500
200 – 240		DILM65-XSP(RDC240)	500
24 – 27	DILM80 – DILM95	DILM95-XSP(RDC24)	486
48 – 60		DILM95-XSP(RDC60)	486
110 – 130		DILM95-XSP(RDC130)	486
200 – 240		DILM95-XSP(RDC240)	486
24 – 27	DILM115 – 150	DILM150-XSP(RDC24)	520
48 – 60		DILM150-XSP(RDC60)	520
110 – 130		DILM150-XSP(RDC130)	520
200 – 240		DILM150-XSP(RDC240)	520

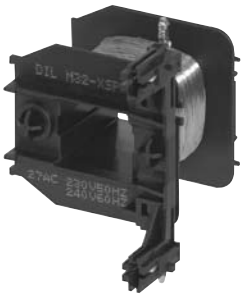
Note: Coils are not replaceable with DILEM...-G; DILM7 – 12 or DILMP20

❶ Special Voltage Coils are available - Contact your Moeller Representative.

❷ All DC coils are supplied with integrated surge suppressor.

DILM115 – DILM1000 Contactors *(Electronic Modules including coil)* ❶

Coil Voltage AC	Coil Voltage DC	For Use With...	Catalog Number *(Shading indicates standard voltages)*	Price
24V 50 – 60Hz	See preceding page for DC voltages	DILM115 – 150	**DILM150-XSP(RAC24)**	420
42 – 48V 50 – 60Hz			**DILM150-XSP(RAC48)**	420
100 – 120V 50 – 60Hz			**DILM150-XSP(RAC120)**	420
190 – 240V 50 – 60Hz			**DILM150-XSP(RAC240)**	420
380 – 440V 50Hz			**DILM150-XSP(RAC440)**	420
480 – 500V 50 – 60Hz			**DILM150-XSP(RAC500)**	420
–	24 – 48V	DILM185 – 250	**DILM250-XSP/E(RDC48)**	1200
48 – 110V 40...60Hz	48 – 110V		**DILM250-XSP/E(RA110)**	1200
110 – 250V 40 – 60Hz	110 – 250V		**DILM250-XSP/E(RA250)**	1200
250...500V 40 – 60Hz	–		**DILM250-XSP/E(RAC500)**	1200
–	24 – 48V	DILM300 – 500	**DILM500-XSP/E(RDC48)**	1820
48 – 110V 40 – 60Hz	48 – 110V		**DILM500-XSP/E(RA110)**	1820
110 – 250V 40 – 60Hz	110 – 250V		**DILM500-XSP/E(RA250)**	1820
250 – 500V 40 – 60Hz	–		**DILM500-XSP/E(RAC500)**	1820
48 – 110V 40 – 60Hz	48 – 110V	DILM580 – DILM1000	**DILM1000-XSP/E(RA110)**	2960
110 – 250V 40 – 60Hz	110 – 250V		**DILM1000-XSP/E(RA250)**	2960
250 – 500V 40 – 60Hz	–		**DILM1000-XSP/E(RAC500)**	2960



DILM32-XSP... replacement coil. (typical)

Replacement Contacts *(set of 3)*

For Use With...	Catalog Number	Price
DILM40 – 65	**DILM65-XCT**	508
DILM80 – 150	**DILM150-XCT**	736
DILM185 – 250	**DILM250-XCT**	874
DILM300 – 500	**DILM500-XCT**	1800
DILM580	**DILM580-XCT**	5900
DILM650	**DILM650-XCT**	6712
DILM750	**DILM750-XCT**	7530
DILM820	**DILM820-XCT**	8610

Replacement Arc Chutes

For Use With...	Catalog Number	Price
DILM185	**DILM185-XOT**	490
DILM225	**DILM225-XOT**	490
DILM250	**DILM250-XOT**	432
DILM300	**DILM300-XOT**	690
DILM400	**DILM400-XOT**	690
DILM500	**DILM500-XOT**	690

❶ DILM115 – 1000 electronic coils are supplied with integrated surge suppressor.

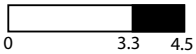
Travel Diagrams for Contactors

The diagrams show the closing and opening clearance of built-in auxiliary contacts and modules at no-load. Clearances of add-on auxiliary contact modules are shown relative to the contactor on which they are mounted. Tolerances are not taken into consideration.

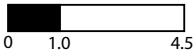
DILM7/9/12/P20... AC Contactors

Built-in Auxiliary Contact

N/O Contact

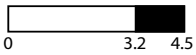


N/C Contact

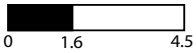


+ DILM32-XHI... Auxiliary Contact

N/O Contact

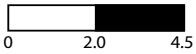


N/C Contact



+ DILA-XHIV... Auxiliary (EM/LB)

N/O Contact



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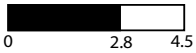
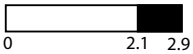


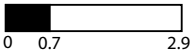
DILM7/9... DC Contactors

Built-in Auxiliary Contact

N/O Contact

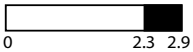


N/C Contact



+ DILM32-XHI... Auxiliary Contact

N/O Contact



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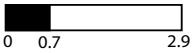
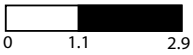
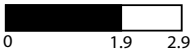


+ DILA-XHIV... Auxiliary (EM/LB)

N/O Contact



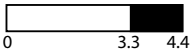
N/C Contact



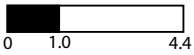
DILM12/P20... DC Contactors

Built-in Auxiliary Contact

N/O Contact

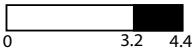


N/C Contact

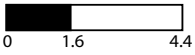


+ DILM32-XHI... Auxiliary Contact

N/O Contact

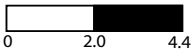


N/C Contact

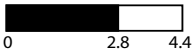


+ DILA-XHIV... Auxiliary (EM/LB)

N/O Contact



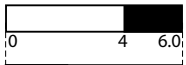
N/C Contact



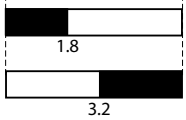
DILM17/25/32 Contactors

Built-in Auxiliary Contact

N/O Contact



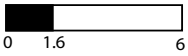
N/C Contact



+ DILM32-XHI... or DILA-XHI... Auxiliary

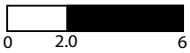
N/O Contact

N/C Contact

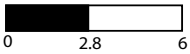


+ DILA-XHIV... Auxiliary (EM/LB)

N/O Contact



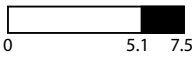
N/C Contact



DILM40/50/65 Contactors

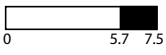
Built-in Auxiliary Contact

N/O Contact

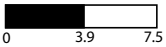


+ DILM150-XHI... Auxiliary Contact

N/O Contact



N/C Contact



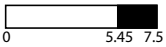
+ DILM150-XHIV... Auxiliary (EM/LB)

N/O Contact

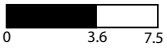
N/C Contact

+ DILM1000-XHI... Auxiliary Contact

N/O Contact

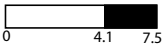


N/C Contact



+ DILM1000-XHIV... Auxiliary (EM/LB)

N/O Contact

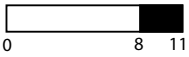


N/C Contact

DILM80/95/115/150 Contactors

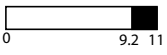
Built-in Auxiliary Contact

N/O Contact

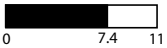


+ DILM150-XHI... Auxiliary Contact

N/O Contact

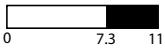


N/C Contact



+ DILM150-XHIV... Auxiliary (EM/LB)

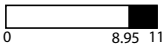
N/O Contact



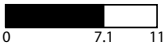
N/C Contact

+ DILM1000-XHI... Auxiliary Contact

N/O Contact

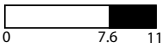


N/C Contact



+ DILM1000-XHIV... Auxiliary (EM/LB)

N/O Contact



N/C Contact

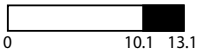
Travel Diagrams for Contactors *(continued)*

The diagrams show the closing and opening clearance of built-in auxiliary contacts and modules at no-load. Clearances of add-on auxiliary contact modules are shown relative to the contactor on which they are mounted. Tolerances are not taken into consideration.

DILM185/225/250 Contactors

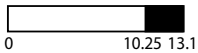
Built-in Auxiliary Contact

N/O Contact



+ DILM1000-XHI11 Auxiliary Contact

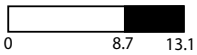
N/O Contact



N/C Contact

+ DILM1000-XHI11V-SI Auxiliary (EM/LB)

N/O Contact

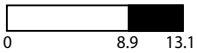


N/C Contact

DILM300/400/500 Contactors

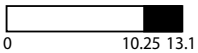
Built-in Auxiliary Contact

N/O Contact



+ DILM1000-XHI11 Auxiliary Contact

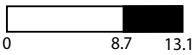
N/O Contact



N/C Contact

+ DILM1000-XHI11V-SI Auxiliary (EM/LB)

N/O Contact

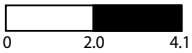


N/C Contact

DILM580/650 Contactors

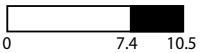
Built-in Auxiliary Contact

N/O Contact

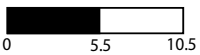


+ DILM1000-XHI11 Auxiliary Contact

N/O Contact

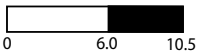


N/C Contact

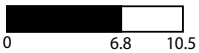


+ DILM1000-XHI11V-SI Auxiliary (EM/LB)

N/O Contact



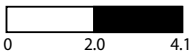
N/C Contact



DILM750/820/1000 Contactors

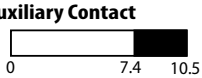
Built-in Auxiliary Contact

N/O Contact

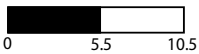


+ DILM1000-XHI11 Auxiliary Contact

N/O Contact

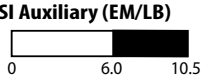


N/C Contact



+ DILM1000-XHI11V-SI Auxiliary (EM/LB)

N/O Contact

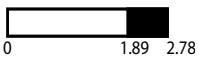


N/C Contact

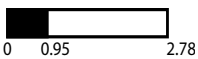
DILEM… AC Miniature Contactors

Built-in Auxiliary Contact

N/O Contact



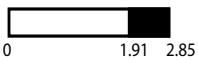
N/C Contact



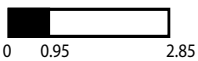
DILEM… DC Miniature Contactors

Built-in Auxiliary Contact

N/O Contact



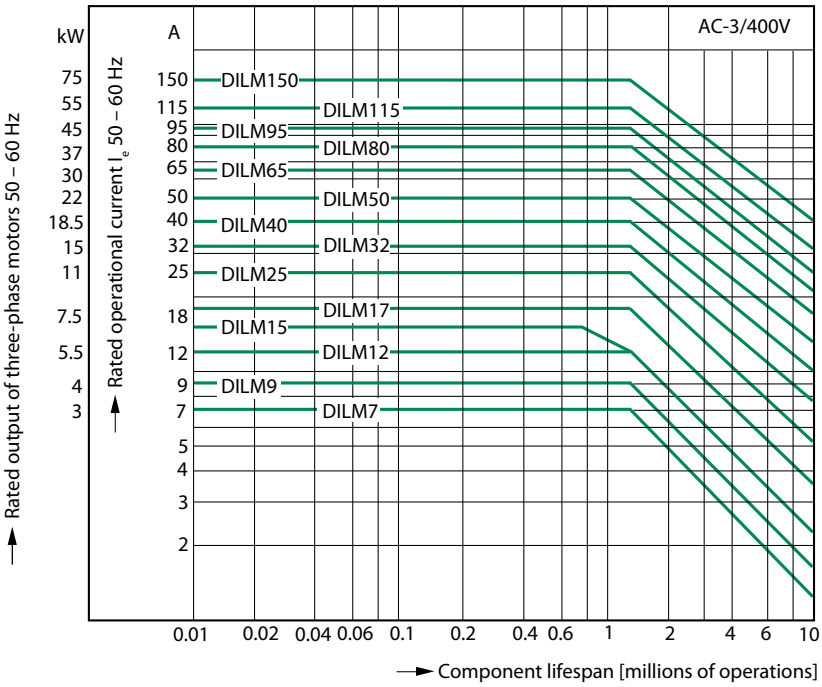
N/C Contact



A

Contactors

AC-3 Normal Switching Duty *(DILM7 – DILM150)*



Squirrel-Cage Motors

Operating Characteristics:
Starting: from rest
Stopping: after attaining full running speed

Electrical Characteristics:
Make: up to 6 x rated motor current
Break: up to 1 x rated motor current

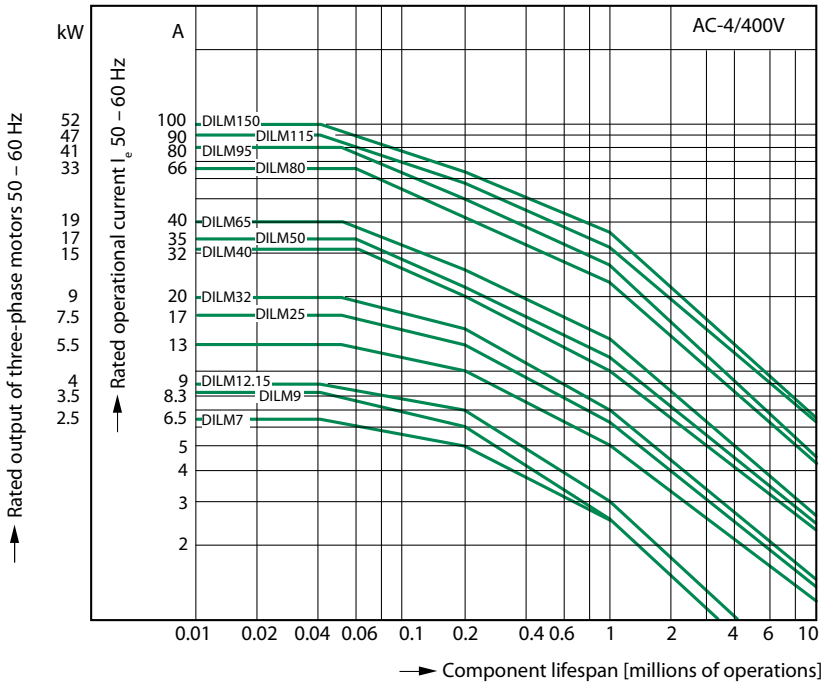
Utilization Category:
100% AC-3

Typical Applications:

Compressors	Elevators
Pumps	Escalators
Fans	Conveyor Belts
Hinged Flaps/Valves	Bucket-elevators
Mixers	Agitators
Centrifuges	Air-conditioning Systems

General drives in manufacturing and processing machines

AC-4 Extreme Switching Duty *(DILM7 – DILM150)*



Squirrel-Cage Motors

Operating Characteristics:
Jogging, plugging, reversing

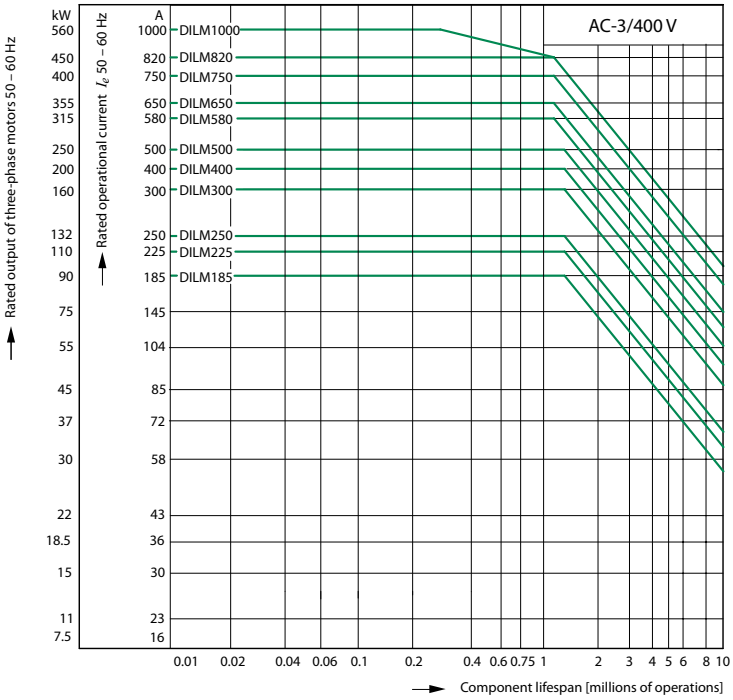
Electrical Characteristics:
Make: up to 6 x rated motor current
Break: up to 6 x rated motor current

Utilization Category:
100% AC-4

Typical Applications:
Printing Presses
Wire Drawing Machines
Centrifuges

Special drives for manufacturing and processing machines

AC-3 Normal Switching Duty *(DILM185 – DILM1000)*



Squirrel-Cage Motors

Operating Characteristics:
Starting: from rest
Stopping: after attaining full running speed

Electrical Characteristics:
Make: up to 6 x rated motor current
Break: up to 1 x rated motor current

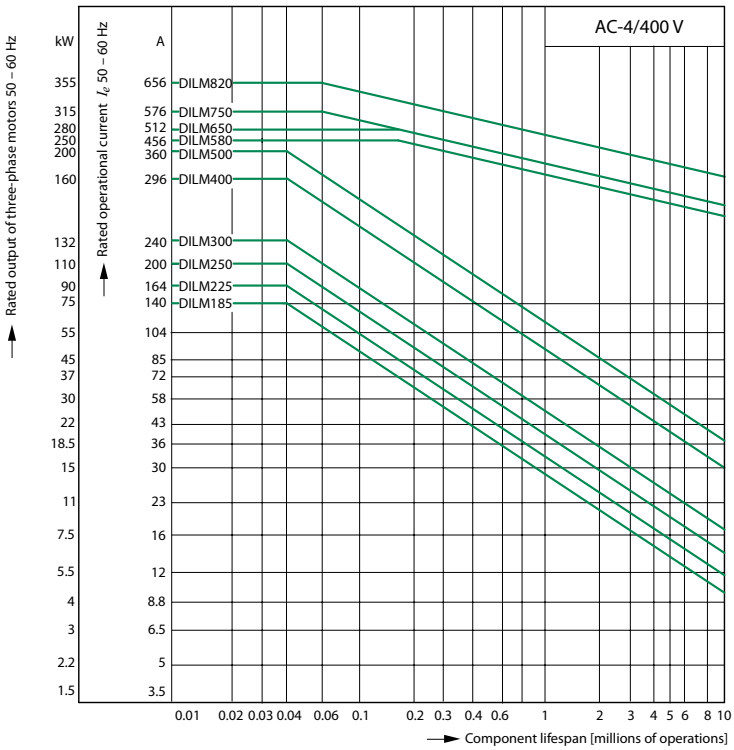
Utilization Category:
100% AC-3

Typical Applications:

Compressors	Elevators
Pumps	Escalators
Fans	Conveyor Belts
Hinged Flaps	Bucket-elevators
Mixers	Agitators
Centrifuges	Air-conditioning Systems

General drives in manufacturing and processing machines

AC-4 Extreme Switching Duty *(DILM185 – DILM820)*



Squirrel-Cage Motors

Operating Characteristics:
Jogging, plugging, reversing

Electrical Characteristics:
Make: up to 6 x rated motor current
Break: up to 6 x rated motor current

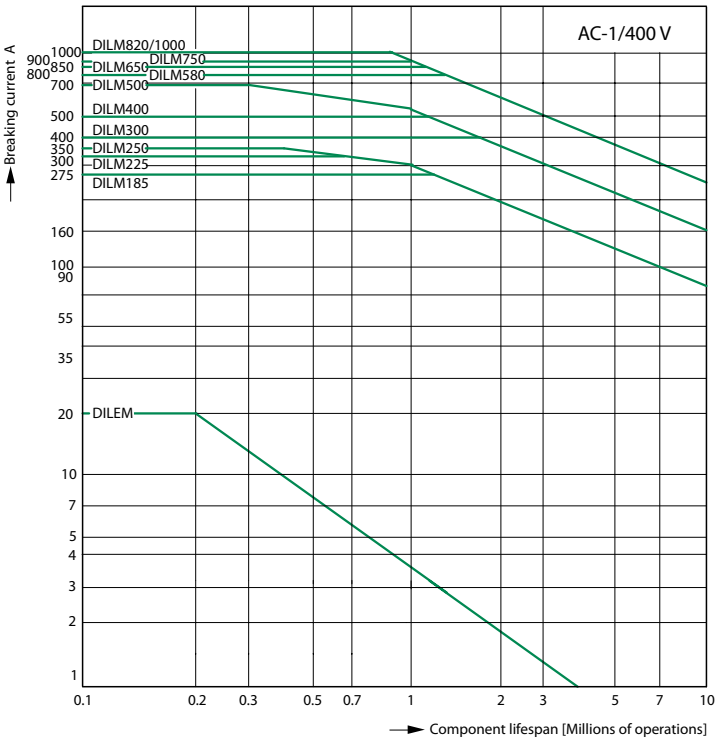
Utilitzation Category:
100% AC-4

Typical Applications:

Printing Presses	Wire Drawing
Centrifuges	

Special drives for manufacturing and processing machines

AC-1 Switching Duty for Non-Motor Loads *(DILEM – DILM1000)*



3-pole, 4-pole

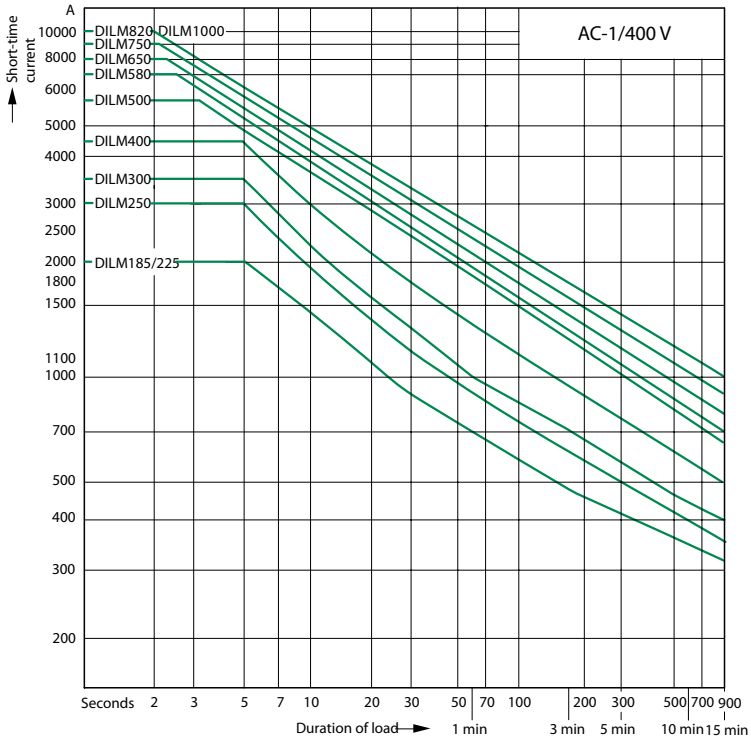
Operating Characteristics:
Non-inductive or slightly inductive loads

Electrical Characteristics:
Make: 1 x rated current
Break: 1 x rated current

Utilization Category:
100% AC-1

Typical Applications:
Electrical heaters

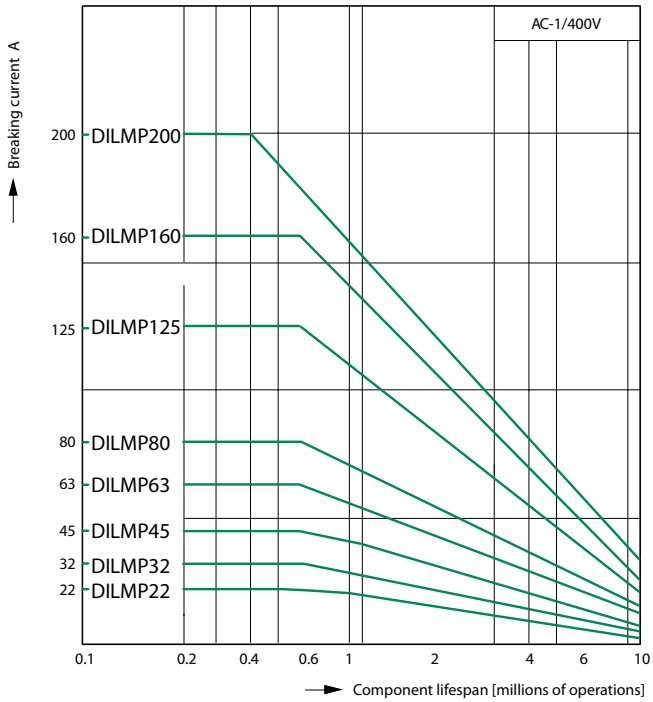
Short-Time Loading *(DILM185 – DILM1000)*



3-pole

Time interval between two loading cycles: 15 minutes

AC-1 Switching Duty for Non-Motor Loads *(DILMP20)*



4-pole

Operating Characteristics:
Non-inductive or slightly inductive loads

Electrical Characteristics:

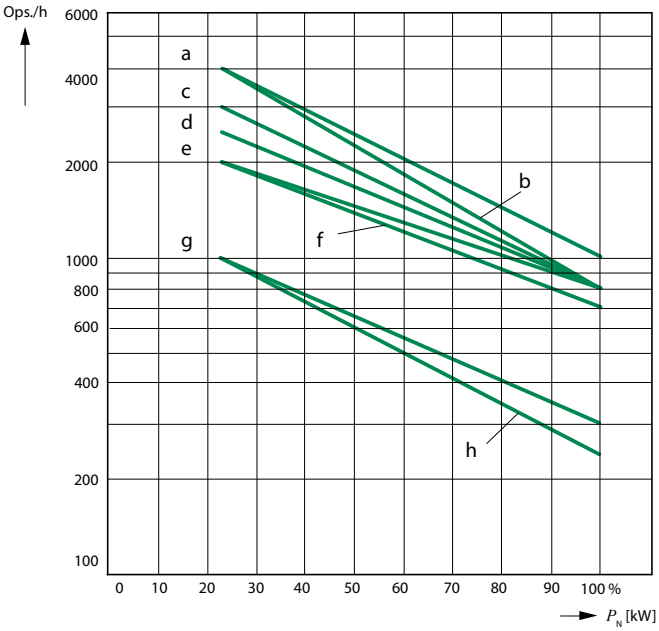
Make:	1 x rated current
Break:	1 x rated current

Utilization Category:
100% AC-1

Typical Applications:
Electrical heaters

Maximum Operating Frequency for 400 V

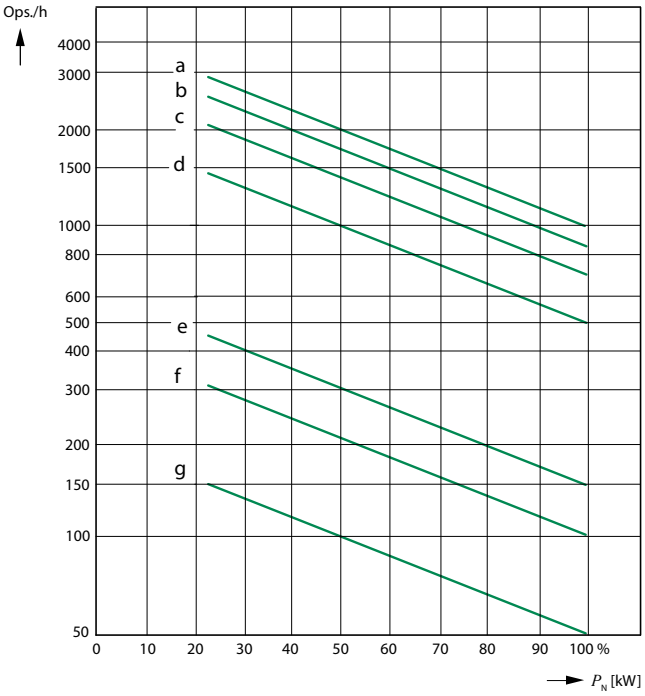
(dependant on rating and utilization category)



Contactor(s)	Characteristic		
	AC-1	AC-3	AC-2 AC-4
DILEM	e	b	h
DILM7, 9, 12	d	a	g
DILM17, 25, 32	d	c	g
DILM40, 50, 65	d	c	g
DILM80, 95, 115, 150	d	f	g

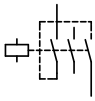
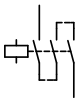
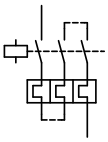
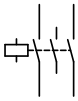
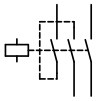
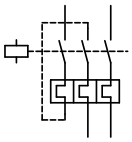
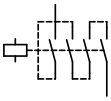
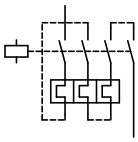
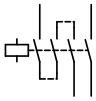
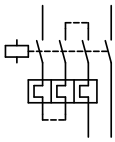
Maximum Operating Frequency for 400 V

(dependant on rating and utilization category)



Contactor(s)	Characteristic		
	AC-1	AC-3	AC-4
DILM185	b	a	f
DILM225	b	a	f
DILM250	b	a	f
DILM300	c	b	g
DILM400	c	b	g
DILM500	c	b	g
DILM580	c	d	e
DILM650	c	d	e
DILM750	c	d	e
DILM820	c	d	e
DILM1000	c	d	e

Switching of DC Currents

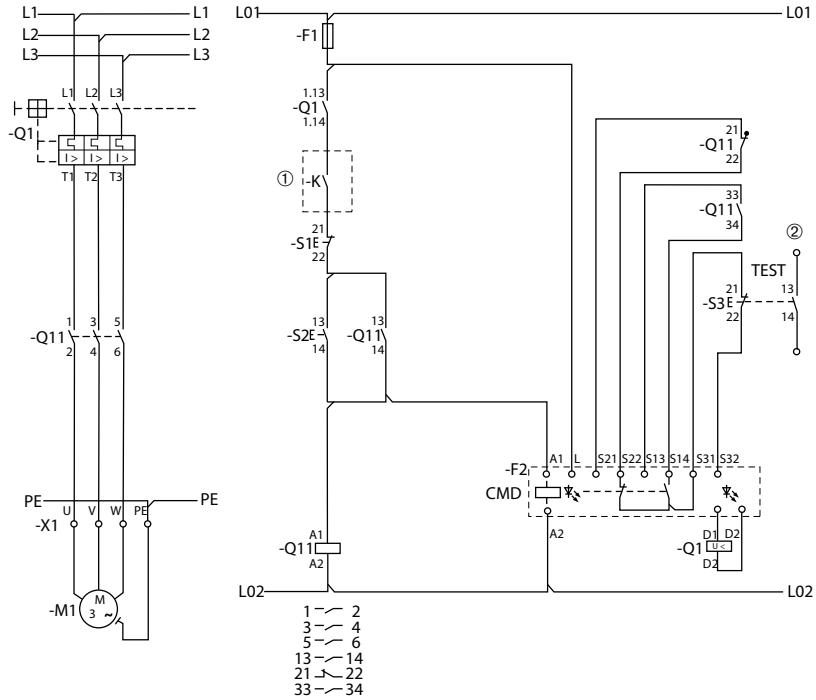
Contactor(s)	1 Pole			2 Pole		
	with Overload Relay ≤ 60 V DC	> 60 V DC	with Overload Relay > 60 V DC	with Overload Relay ≤ 60 V DC	> 60 V DC	with Overload Relay > 60 V DC
DILEM – DILM500 *– – – –: connection supplied by customer*						
DILEM4 DILMP20 *– – – –: connection supplied by customer*	–			–		

A

Contactors

CMD

For Direct On-Line Starters

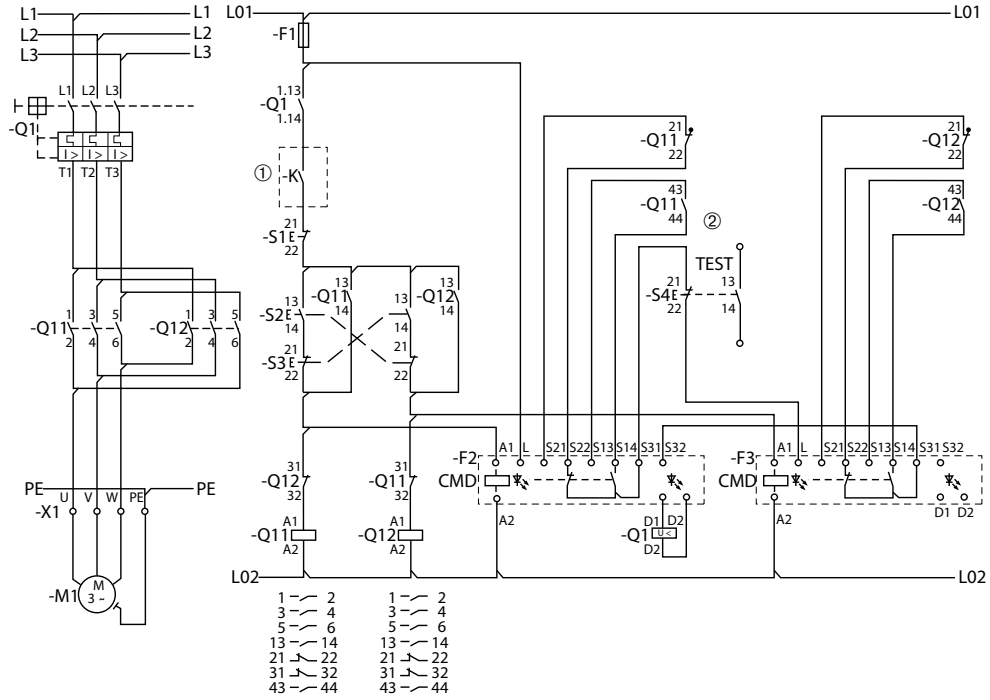


Schematic Legend

①: Switching by safety relay or safety PLC
②: Signal contact to PLC evaluation

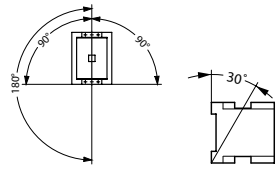
CMD

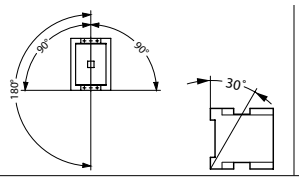
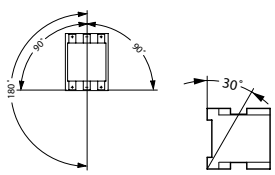
For Reversing Starters



Schematic Legend

①: Switching by safety relay or safety PLC
②: Signal contact to PLC evaluation

Contactors				DILEM(4)	DILMP20	DILM7 DILMF8	DILM9 DILMF11	DILM12 DILMF14	DILM17 DILMF17
General									
Standards						UL, CSA, IEC/EN60947, VDE 0660			
UL Report Number						E29096			
CSA Report Number						3211 04			
Lifespan, mechanical									
AC operated		Ops	[x 10^6]	10	10	10	10	10	10
DC operated		Ops	[x 10^6]	10	10	10	10	10	10
Max. Operating frequency, mechanical									
AC operated			[Ops/h]	9000	9000	9000	9000	9000	5000
DC operated			[Ops/h]	9000	9000	9000	9000	9000	5000
Climatic proofing									
Open						Damp heat constant to IEC60068-2-78			
Enclosed						Damp heat, cyclic, to IEC60068-2-30			
Ambient temperature									
Open			[C]	-25...50 °C	-25...60 °C	-25...60 °C	-25...60 °C	-25...60 °C	-25...60 °C
			[F]	*-13...122 °F*	*-13...140 °F*	*-13...140 °F*	*-13...140 °F*	*-13...140 °F*	*-13...140 °F*
Enclosed			[C]	-25...40 °C	-25...40 °C	-25...40 °C	-25...40 °C	-25...40 °C	-25...40 °C
			[F]	*-13...104 °F*	*-13...104 °F*	*-13...104 °F*	*-13...104 °F*	*-13...104 °F*	*-13...104 °F*
Storage			[C]	-40...80 °C	-40...80 °C	-40...80 °C	-40...80 °C	-40...80 °C	-40...80 °C
			[F]	*-40...176 °F*	*-40...176 °F*	*-40...176 °F*	*-40...176 °F*	*-40...176 °F*	*-40...176 °F*
Mounting position									
AC and DC				As required except vertical with terminals A1/A2 at the bottom					
Mechanical shock resistance (IEC/EN 60068-2-27)									
Half-sinusoidal shock, 10 ms									
Main Contacts	NO contacts	Make	[g]	10	10	10	10	10	10
	NO/NC contacts	Make/Break	[g]	20/20	–	–	–	–	–
Auxiliary contacts	NO contacts	Make	[g]	–	7	7	7	7	7
	NC contacts	Break	[g]	–	5	5	5	5	5
Degree of protection				IP20	IP20	IP20	IP20	IP20	IP00
Protection against direct contact when actuated from front (IEC536)						Finger and-back-of-hand proof			
Weight									
AC			[kg]	0.2	0.23	0.23	0.23	0.23	0.42
DC			[kg]	0.0	0.28	0.28	0.28	0.28	0.48
Main terminals									
Wire Capacity		minimum	[AWG]	18 AWG (single or double)	18 AWG (single or double)	18 AWG (single or double)	18 AWG (single or double)	18 AWG (single or double)	14 AWG (single or double)
(Cu cable)		maximum	[AWG]	14 AWG (single or double)	14 AWG (single or double)	14 AWG (single or double)	14 AWG (single or double)	14 AWG (single or double)	6 AWG (single or double)

DILM25 DILMF25	DILM32 DILMF32	DILM40 DILMF40	DILM50 DILMF50	DILM65 DILMF65	DILM80 DILMF80	DILM95 DILMF95	DILM115 DILMF115	DILM150 DILMF150
UL, CSA, IEC/EN60947, VDE 0660 E29096 3211 04								
10 10	10 10	10 10	10 10	10 10	10 10	10 10	10 10	10 10
5000 5000	5000 5000	5000 5000	5000 5000	5000 5000	3600 3600	3600 3600	3600 3600	3600 3600
Damp heat constant to IEC60068-2-78 Damp heat, cyclic, to IEC60068-2-30								
-25…60 °C *-13…140 °F*	-25…60 °C *-13…140 °F*	-25…60 °C *-13…140 °F*	-25…60 °C *-13…140 °F*	-25…60 °C *-13…140 °F*	-25…60 °C *-13…140 °F*	-25…60 °C *-13…140 °F*	-25…60 °C *-13…140 °F*	-25…60 °C *-13…140 °F*
-25…40 °C *-13…104 °F*	-25…40 °C *-13…104 °F*	-25…40 °C *-13…104 °F*	-25…40 °C *-13…104 °F*	-25…40 °C *-13…104 °F*	-25…40 °C *-13…104 °F*	-25…40 °C *-13…104 °F*	-25…40 °C *-13…104 °F*	-25…40 °C *-13…104 °F*
-40…80 °C *-40…176 °F*	-40…80 °C *-40…176 °F*	-40…80 °C *-40…176 °F*	-40…80 °C *-40…176 °F*	-40…80 °C *-40…176 °F*	-40…80 °C *-40…176 °F*	-40…80 °C *-40…176 °F*	-40…80 °C *-40…176 °F*	-40…80 °C *-40…176 °F*
								
10 – 7 5	10 – 7 5	10 – 7 5	10 – 7 5	10 – 7 5	10 – 7 5	10 – 7 5	10 – 7 5	10 – 7 5
IP00	IP00	IP00	IP00	IP00	IP00	IP00	IP00	IP00
Finger and-back-of-hand proof								
0.42 0.48	0.42 0.48	0.9 1.1	0.9 1.1	0.9 1.1	2 2.1	2 2.1	2 2.1	2 2.1
14 AWG (single or double)	14 AWG (single or double)	14 AWG (single or double)	14 AWG (single or double)	14 AWG (single or double)	10 AWG (single or double)	10 AWG (single or double)	8 AWG (single or double)	8 AWG (single or double)
6 AWG (single or double)	6 AWG (single or double)	1 AWG (2 x 2 AWG)	1 AWG (2 x 2 AWG)	1 AWG (2 x 2 AWG)	3/0 AWG (2 x 2/0 AWG)	3/0 AWG (2 x 2/0 AWG)	3/0 AWG (2 x 2/0 AWG)	3/0 AWG (2 x 2/0 AWG)

Contactors				DILEM(4)	DILMP20	DILM7 DILMF8	DILM9 DILMF11	DILM12 DILMF14	DILM17 DILMF17
General *(continued)*									
Main cable cross sections									
Solid			[mm²]	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 4.0) 2 x (0.75 – 2.5)	1 x (0.75 – 4.0) 2 x (0.75 – 2.5)	1 x (0.75 – 4.0) 2 x (0.75 – 2.5)	1 x (0.75 – 4.0) 2 x (0.75 – 2.5)	1 x (0.75 – 16) 2 x (0.75 – 10)
Flexible with ferrule			[mm²]	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 16) 2 x (0.75 – 10)
Flexible with cable lug			[mm²]	–	–	–	–	–	–
Stranded			[mm²]	–	–	–	–	–	1 x 16
Stranded with cable lug			[mm²]	–	–	–	–	–	–
Flat conductor Number of segments x width x thickness			[mm]	–	–	–	–	–	–
Bus bar		Width	[mm]	–	–	–	–	–	–
Main cable connection screw/bolt				M3.5	M3.5	M3.5	M3.5	M3.5	M5
Tightening torque			[Nm]	1.2	1.2	1.2	1.2	1.2	3
Control circuit cable cross sections									
Solid			[mm²]	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 4.0) 2 x (0.75 – 2.5)	1 x (0.75 – 4.0) 2 x (0.75 – 2.5)	1 x (0.75 – 4.0) 2 x (0.75 – 2.5)	1 x (0.75 – 4.0) 2 x (0.75 – 2.5)	1 x (0.75 – 4) 2 x (0.75 – 4)
Flexible with ferrule			[mm²]	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)
Solid or stranded			[AWG]	18 – 14	18 – 14	18 – 14	18 – 14	18 – 14	18 – 14
Control circuit cable connection screw/bolt				M3.5	M3.5	M3.5	M3.5	M3.5	M3.5
Tightening torque			[Nm]	1.2	1.2	1.2	1.2	1.2	1.2
Tools									
Main cable	Posidriv screwdriver		[Size]	2	2	2	2	2	2
	Hexagon socket-head spanner	SW	[mm]	–	–	–	–	–	–
	Standard screw driver		[mm]	0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6
	Wrench		[mm]	–	–	–	–	–	–
Control cable	Posidrive screwdriver		[Size]	2	2	2	2	2	2
	Standard screwdriver		[mm]	0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6
Main Contacts									
Rated impulse withstand		U_{imp}	[V AC]	6000	8000	8000	8000	8000	8000
Overvoltage category/pollution degree				III/3	III/3	III/3	III/3	III/3	III/3
Rated insulation		U_i	[V AC]	690	690	690	690	690	690
Rated operational voltage		U_e	[V AC]	690	690	690	690	690	690
Safe isolation to VDE 0106 Part 101 and Part 101/A1									
Between coil and contacts			[V AC]	300	400	400	400	400	440
Between contacts			[V AC]	300	400	400	400	400	440
Making capacity cos φ to IEC/EN 60-947 up to 690V			[A]	110	144	112	112	144	238
Breaking capacity cos φ = 0.35, AC, 50 – 60 Hz									
	200V		[A]	–	–	–	–	–	–
	230V		[A]	–	–	–	–	–	–
	200…230V		[A]	–	–	–	–	–	–
	220…230V		[A]	90	120	70	90	120	170
	380…400V		[A]	90	120	70	90	120	170
	460V		[A]	–	–	–	–	–	–
	500V		[A]	64	100	50	70	100	170
	575V		[A]	–	–	–	–	–	–
	660-690V		[A]	54	70	40	50	70	120
	1000V		[A]	–	–	–	–	–	–

DILM25 DILMF25	DILM32 DILMF32	DILM40 DILMF40	DILM50 DILMF50	DILM65 DILMF65	DILM80 DILMF80	DILM95 DILMF95	DILM115 DILMF115	DILM150 DILMF150
1 x (0.75 – 16) 2 x (0.75 – 10)	1 x (0.75 – 16) 2 x (0.75 – 10)	1 x (2.5 – 16) 2 x (2.5 – 16)	1 x (2.5 – 16) 2 x (2.5 – 16)	1 x (2.5 – 16) 2 x (2.5 – 16)	–	–	–	–
1 x (0.75 – 16) 2 x (0.75 – 10)	1 x (0.75 – 16) 2 x (0.75 – 10)	1 x (2.5 – 35) 2 x (2.5 – 25)	1 x (2.5 – 35) 2 x (2.5 – 25)	1 x (2.5 – 35) 2 x (2.5 – 25)	1 x (10 – 95) 2 x (10 – 70)	1 x (10 – 95) 2 x (10 – 70)	1 x (10 – 95) 2 x (10 – 70)	1 x (10 – 95) 2 x (10 – 70)
–	–	–	–	–	–	–	–	–
1 x 16	1 x 16	1 x (16 – 50) 2 x (16 –35)	1 x (16 – 50) 2 x (16 – 35)	1 x (16 – 50) 2 x (16 – 35)	1 x (16 – 120) 2 x (16 – 95)	1 x (16 – 120) 2 x (16 – 95)	1 x (16 – 120) 2 x (16 – 95)	1 x (16 – 120) 2 x (16 – 95)
–	–	–	–	–	–	–	–	–
–	–	2 x (6 x 9 x 0.8)	2 x (6 x 9 x 0.8)	2 x (6 x 9 x 0.8)	2 x (6 x 16 x 0.8)	2 x (6 x 16 x 0.8)	2 x (6 x 16 x 0.8)	2 x (6 x 16 x 0.8)
–	–	–	–	–	–	–	–	–
M5	M5	M6	M6	M6	M10	M10	M10	M10
3	3	3	3	3	14	14	14	14
1 x (0.75 – 4) 2 x (0.75 – 4)	1 x (0.75 – 4) 2 x (0.75 – 4)	1 x (0.75 – 4) 2 x (0.75 – 4)	1 x (0.75 – 4) 2 x (0.75 – 4)	1 x (0.75 – 4) 2 x (0.75 – 4)	1 x (0.75 – 4) 2 x (0.75 – 4)	1 x (0.75 – 4) 2 x (0.75 – 4)	1 x (0.75 – 4) 2 x (0.75 – 4)	1 x (0.75 – 4) 2 x (0.75 – 4)
1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)
18 – 14	18 – 14	18 – 14	18 – 14	18 – 14	18 – 14	18 – 14	18 – 14	18 – 14
M3.5	M3.5	M3.5	M3.5	M3.5	M3.5	M3.5	M3.5	M3.5
1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
2	2	2	2	2	–	–	–	–
–	–	–	–	–	5	5	5	5
0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6	–	–	–	–
–	–	–	–	–	–	–	–	–
2	2	2	2	2	2	2	2	2
0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6
8000	8000	8000	8000	8000	8000	8000	8000	8000
III/3	III/3	III/3	III/3	III/3	III/3	III/3	III/3	III/3
690	690	690	690	690	-	-	-	-
690	690	690	690	690	1000	1000	1000	1000
440	440	440	440	440	690	690	690	690
440	440	440	440	440	690	690	690	690
350	384	560	700	910	1120	1330	1610	2100
–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–
250	320	400	500	650	800	950	1150	1500
250	320	400	500	650	800	950	1150	1500
–	–	–	–	–	–	–	–	–
250	320	400	500	650	800	950	1150	1500
–	–	–	–	–	–	–	–	–
150	180	250	320	370	650	800	1100	1200
–	–	–	–	–	–	–	–	–

Contactors					DILEM(4)	DILMP20	DILM7 DILMF8	DILM9 DILMF11	DILM12 DILMF14	DILM17 DILMF17
Main Contacts *(cont.)*										
Component lifespan										
AC-1		400V	I_e	[x 10^6]	–	0.6	0.6	0.6	0.6	0.6
Maximum operating frequency										
AC-1	400V		I_e	[Ops/h]	–	800	800	800	800	800
AC-3	400V		I_e	[Ops/h]	–	1000	1000	1000	1000	800
AC-4	400V		I_e	[Ops/h]	–	300	300	300	300	300
Short circuit rating - Max. fuse										
Type "2"	400V	gG/gL 500V		[A]	10	20	20	20	20	25
	690V	gG/gL 690V		[A]	–	20	16	16	20	25
	1000V	gG/gL 1000V		[A]	–	–	–	–	–	–
Type "1"	400V	gG/gL 500V		[A]	20	35	35	35	35	63
	690V	gG/gL 690V		[A]	–	25	20	20	25	50
	1000V	gG/gL 1000V		[A]	–	–	–	–	–	–
UL/CSA - General Use										
Continuous current rating										
AC, 50/60Hz, 3 pole		600V		[A]	15	20	20	20	20	40
DC		250V		[A]	–	20	20	20	20	40
Full load amperes (FLA)										
1 - pole		115V		[A]	–	–	5.8	9.8	9.8	16
		200V		[A]	–	–	7.9	9.2	11.5	13.8
		230V		[A]	–	–	8	10	12	17
3 - pole		208V		[A]	–	–	–	–	–	17.5
		230V		[A]	–	–	6.8	9.6	9.6	15.2
		480V		[A]	–	–	4.8	7.6	14	14
		600V		[A]	–	–	6.1	9	11	17
Locked rotor amperes (LRA)										
3 - pole		230V		[A]	–	–	50	64	64	92
		480V		[A]	–	–	32	46	81	81
		600V		[A]	–	60	36.8	50.8	64.8	93
Horsepower ratings, AC										
Single phase		115V		[HP]	½	½	¼	½	1	2
		200V		[HP]	1	1	¾	1	2	2
		230V		[HP]	1½	1½	1	1½	2	3
Three phase		200V		[HP]	2	3	1½	3	3	5
		230V		[HP]	3	3	2	3	3	5
		460V		[HP]	5	5	3	5	10	10
		575V		[HP]	5	7½	5	7½	10	15
Horsepower ratings, DC										
Full load amperes (FLA)		125V		[A]	–	–	–	–	–	–
		250V		[A]	–	–	–	–	–	–
3 - pole break		125V	I_e	[HP]	–	¾	¼	½	¾	2
		250V	I_e	[HP]	–	2	1	1½	2	3

DILM25 DILMF25	DILM32 DILMF32	DILM40 DILMF40	DILM50 DILMF50	DILM65 DILMF65	DILM80 DILMF80	DILM95 DILMF95	DILM115 DILMF115	DILM150 DILMF150
0.6	0.6	0.6	0.6	0.6	0.6	0.6	1	1
800	800	800	800	800	–	–	–	–
800	800	800	800	800	–	–	–	–
300	300	300	300	300	–	–	–	–
35	63	63	80	125	160	160	250	250
35	35	50	63	80	160	160	–	–
–	–	–	–	–	–	–	–	–
100	125	125	160	250	250	250	250	250
50	63	80	80	100	200	200	–	–
–	–	–	–	–	–	–	–	–
40	40	55	65	80	125	125	155	155
40	40	63	80	80	125	125	160	180
20	24	34	34	56	80	80	100	100
19.6	19.6	32.2	46	57.5	68	68	110	136
28	28	40	50	68	68	68	110	136
25.3	32.2	32.2	48.3	62.1	78.2	78.2	120	120
22	28	42	54	68	80	104	130	154
21	27	40	52	65	77	96	124	156
22	27	41	52	62	77	99	99	125
127	162	232	290	365	435	580	725	870
116	145	218	290	363	435	543	725	908
116	146	232	290	348	434	580	580	726
2	3	3	3	5	7½	7½	10	10
3	5	5	7½	10	15	15	25	25
5	5	7½	10	15	15	15	25	30
7½	10	10	15	20	25	25	40	40
10	10	15	20	25	30	40	50	60
15	20	30	40	50	60	75	100	125
20	25	40	50	60	75	100	100	125
–	–	–	–	–	76	76	110	110
–	–	–	–	–	89	89	106	106
2	3	5	7½	10	10	10	15	15
5	5	10	15	20	25	25	30	30

Contactors				DILEM(4)	DILMP20	DILM7 DILMF8	DILM9 DILMF11	DILM12 DILMF14	DILM17 DILMF17
UL/CSA - Special Purpose									
Lighting ratings									
Electrical discharge lamps (Ballast)									
Three phase, 60Hz	480V		[A]	–	20	12	18	20	27
	600V		[A]	–	20	12	18	20	27
Two phase, 60Hz	277V		[A]	–	20	12	18	20	27
	347V		[A]	–	20	12	18	20	27
Incandescent lamps (Tungsten)									
Three phase, 60Hz	480V		[A]	–	14	8	11	14	23
	600V		[A]	–	14	8	11	14	23
Two phase, 60Hz	277V		[A]	–	14	8	11	14	23
	347V		[A]	–	14	8	11	14	23
Resistance heating ratings									
Three phase, 60Hz	480V		[A]	–	20	12	18	20	27
	600V		[A]	–	20	12	18	20	27
Two phase, 60Hz	277V		[A]	–	20	12	18	20	27
	347V		[A]	–	20	12	18	20	27
Refrigeration ratings (CSA only)									
Locked rotor amperes (LRA)									
Three phase, 60Hz	480V		[A]	–	60	60	60	60	240
	600V		[A]	–	60	60	60	60	180
3 - pole break									
Three phase, 60Hz	480V	FLA	[A]	–	10	6	7.5	10	23
	600V	FLA	[A]	–	10	6	7.5	10	17
Elevator ratings									
Three phase, 60Hz, Amperes									
	200V		[A]	–	7.8	3.7	7.8	7.8	11
	240V		[A]	–	6.8	6.0	6.8	6.8	9.6
	480V		[A]	–	11	3.4	4.8	11	11
	600V		[A]	–	9.6	3.9	6.1	9.6	11
Three phase, 60Hz, Horsepower									
	200V		[HP]	–	2	¾	2	2	3
	240V		[HP]	–	2	1½	2	2	3
	480V		[HP]	–	7½	2	3	7½	7½
	600V		[HP]	–	7½	3	5	7½	10

DILM25 DILMF25	DILM32 DILMF32	DILM40 DILMF40	DILM50 DILMF50	DILM65 DILMF65	DILM80 DILMF80	DILM95 DILMF95	DILM115 DILMF115	DILM150 DILMF150
35	40	63	79	88	85	100	136	160
35	40	63	79	88	85	100	136	160
35	40	63	79	88	85	100	136	160
35	40	63	79	88	85	100	136	160
32	40	55	74	88	85	100	136	160
32	40	55	74	88	85	100	136	160
32	40	55	74	88	85	100	136	160
32	40	55	74	88	85	100	136	160
35	40	63	79	88	94	110	136	160
35	40	63	79	88	94	110	136	160
35	40	63	79	88	94	110	136	160
35	40	63	79	88	94	110	136	160
240	240	270	270	270	540	540	540	540
180	180	270	270	270	420	420	540	540
32	40	26	36	45	63	70	84	90
24	30	26	36	45	63	70	84	90
11	25.3	25.3	32.2	32.2	62.1	62.1	92	92
15.2	22	28	42	42	68	80	104	104
14	27	34	40	40	65	77	96	96
17	22	32	41	41	62	77	99	99
3	7½	7½	10	10	20	20	30	30
5	7½	10	15	15	25	30	40	40
10	20	25	30	30	50	60	75	75
15	20	30	40	40	60	75	100	100

Contactors				DILEM(4)	DILMP20	DILM7 DILMF8	DILM9 DILMF11	DILM12 DILMF14	DILM17 DILMF17
IEC (AC) Application Ratings									
AC-1 Duty									
3-pole, conventional free air, thermal current, 50 – 60 Hz									
Open	40 °C / *104 °F*	I_{th}	[A]	22	22	22	22	22	40
	50 °C / *122 °F*	I_{th}	[A]	20	21	21	21	21	38
	55 °C / *137 °F*	I_{th}	[A]	19	21	21	21	21	37
	60 °C / *140 °F*	I_{th}	[A]	–	20	20	20	20	35
Enclosed (at maximum permissible ambient temperature)		I_{th}	[A]	16	18	18	18	18	32
1-pole, conventional free air, thermal current, 50 – 60 Hz									
Open (at maximum permissible ambient temperature)		I_{th}	[A]	50	50	50	50	50	85
Enclosed (at maximum permissible ambient temperature)		I_{th}	[A]	40	45	45	45	45	80
AC-3 Duty									
Rated operational current, 50 – 60 Hz									
Open ❶	200V	I_e	[A]	–	–	–	–	–	–
	220/230V	I_e	[A]	9	12	7	9	12	18
	230V	I_e	[A]	–	–	–	–	–	–
	240V	I_e	[A]	9	12	7	9	12	18
	380/400	I_e	[A]	9	12	7	9	12	18
	415V	I_e	[A]	9	12	7	9	12	18
	440V	I_e	[A]	9	12	7	9	12	18
	460V	I_e	[A]	–	–	–	–	–	–
	500V	I_e	[A]	–	10	5	7	10	18
	550V	I_e	[A]	6.4	–	–	–	–	–
	575V	I_e	[A]	–	–	–	–	–	–
	660V	I_e	[A]	–	–	–	–	–	–
	660/690V	I_e	[A]	4.8	7	4	5	7	12
	1000V	I_e	[A]	–	–	–	–	–	–
Rated power, 50 – 60 Hz									
Open ❶	220/230V	P_n	[kW]	2.2	3.5	2.2	2.5	3.5	5
	240V	P_n	[kW]	2.5	4	2.2	3	4	5.5
	380/400V	P_n	[kW]	4	5.5	3	4	5.5	7.5
	415V	P_n	[kW]	4.3	7	4	5.5	7	10
	440V	P_n	[kW]	4.6	7.5	4.5	5.5	7.5	10.5
	500V	P_n	[kW]	4	7	3.5	4.5	7	12
	660/690V	P_n	[kW]	4	6.5	3.5	4.5	6.5	11
	1000V	P_n	[kW]	–	–	–	–	–	–

❶ At maximum permissible ambient temperature.

DILM25 DILMF25	DILM32 DILMF32	DILM40 DILMF40	DILM50 DILMF50	DILM65 DILMF65	DILM80 DILMF80	DILM95 DILMF95	DILM115 DILMF115	DILM150 DILMF150
45	45	60	80	98	110	130	160	190
43	43	57	71	88	98	125	142	180
42	42	55	68	83	94	115	135	170
40	40	50	65	80	90	110	130	160
36	36	45	58	72	80	100	115	144
85	85	125	150	180	225	275	325	400
80	80	112	135	162	200	250	285	360
–	–	–	–	–	–	–	–	–
25	32	40	50	65	80	95	115	150
–	–	–	–	–	–	–	–	–
25	32	40	50	65	80	95	115	150
25	32	40	50	65	80	95	115	150
25	32	40	50	65	80	95	115	150
25	32	40	50	65	80	95	115	150
–	–	–	–	–	–	–	–	–
25	32	40	50	65	80	95	115	150
–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–
15	18	25	32	37	65	80	93	100
–	–	–	–	–	–	–	–	–
7.5	10	12.5	15.5	20	25	30	37	48
8.5	11	13.5	17	22	27.5	40	40	52
11	15	18.5	22	30	37	45	55	75
14.5	19	24	30	39	48	57	70	91
15.5	20	25	32	41	51	60	75	95
17.5	23	28	36	47	58	70	85	110
14	17	23	30	35	63	75	90	96
–	–	–	–	–	–	–	–	–

Contactors				DILEM(4)	DILMP20	DILM7 DILMF8	DILM9 DILMF11	DILM12 DILMF14	DILM17 DILMF17
IEC (AC) Application Ratings *(cont.)*									
AC-4 Duty									
Rated operational current, 50 – 60 Hz									
Open ❶	200V	I_e	[A]	–	–	–	–	–	–
	220/230V	I_e	[A]	6.6	7	5	6	7	10
	230V	I_e	[A]	–	–	–	–	–	–
	240V	I_e	[A]	6.6	7	5	6	7	10
	380/400V	I_e	[A]	6.6	7	5	6	7	10
	415V	I_e	[A]	6.6	7	5	6	7	10
	440V	I_e	[A]	6.6	7	5	6	7	10
	460V	I_e	[A]	–	–	–	–	–	–
	500V	I_e	[A]	5	6	4.5	5	6	10
	575V	I_e	[A]	–	–	–	–	–	–
	660V	I_e	[A]	–	–	–	–	–	–
	660/690V	I_e	[A]	3.4	5	4	4.5	5	8
	1000V	I_e	[A]	–	–	–	–	–	–
Rated power, 50 – 60 Hz									
Open ❶	220/230V	P_n	[kW]	1.5	2	1	1.5	2	2.5
	240V	P_n	[kW]	1.8	2.2	1.5	1.6	2.2	3
	380/400V	P_n	[kW]	3	3	2.2	2.5	3	4.5
	415V	P_n	[kW]	3.1	3.4	2.3	2.8	3.4	5
	440V	P_n	[kW]	3.3	3.6	2.4	3	3.6	5.5
	500V	P_n	[kW]	3	3.5	2.5	2.8	3.5	6
	660/690V	P_n	[kW]	3	4.4	2.9	3.6	4.4	6.5
	1000V	P_n	[kW]	–	–	–	–	–	–
IEC (DC) Application Ratings									
DC-1 Duty									
Rated operational current									
Open ❷	12VDC	I_e	[A]	20	–	–	–	–	–
	24VDC	I_e	[A]	20	–	–	–	–	–
	60VDC	I_e	[A]	20	20	20	20	20	35
	110VDC	I_e	[A]	20	20	20	20	20	35
	220VDC	I_e	[A]	20	15	15	15	15	35
	440VDC	I_e	[A]	–	1.3	1.3	1.3	1.3	2.9
DC-3 Duty									
Rated operational current									
Open	12VDC	I_e	[A]	8	–	–	–	–	–
	24VDC	I_e	[A]	8	–	–	–	–	–
	60VDC	I_e	[A]	4	20	20	20	20	35
	110VDC	I_e	[A]	3	20	20	20	20	35
	220VDC	I_e	[A]	1	1.5	1.5	1.5	1.5	10
	440VDC	I_e	[A]	–	0.2	0.2	0.2	0.2	0.6

❶ At maximum permissible ambient temperature.

❷ True DC voltage or derived from a full wave 3-phase bridge rectifier or filtered 1-phase AC supply.

DILM25 DILMF25	DILM32 DILMF32	DILM40 DILMF40	DILM50 DILMF50	DILM65 DILMF65	DILM80 DILMF80	DILM95 DILMF95	DILM115 DILMF115	DILM150 DILMF150
–	–	–	–	–	–	–	–	–
13	15	18	21	25	40	50	55	65
–	–	–	–	–	–	–	–	–
13	15	18	21	25	40	50	55	65
13	15	18	21	25	40	50	55	65
13	15	18	21	25	40	50	55	65
13	15	18	21	25	40	50	55	65
–	–	–	–	–	–	–	–	–
13	15	18	21	25	40	50	55	65
–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–
1	12	14	17	20	27	37	45	50
–	–	–	–	–	–	–	–	–
3.5	4	5	6	7	12	16	17	20
4	4.5	5.5	6.5	7.5	13	17	19	22
6	7	9	10	12	20	26	28	33
6.5	7.5	9.5	11	13	24	30	33	39
7	8	10	12	14	25	32	35	41
8	9	11	13	16	29	36	40	47
8.5	10	12	14	17	26	35	43	48
–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–
40	40	50	60	72	110	110	160	160
40	40	50	50	72	110	110	160	160
40	40	45	45	65	70	70	90	90
2.9	2.9	2.9	2.9	2.9	4.5	4.5	4.5	4.5
–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–
35	40	50	60	72	110	110	160	160
35	40	50	50	72	110	110	160	160
10	25	25	25	35	35	35	40	40
0.6	0.6	0.6	0.6	0.6	1	1	1	1

Contactors				DILEM(4)	DILMP20	DILM7 DILMF8	DILM9 DILMF11	DILM12 DILMF14	DILM17 DILMF17
IEC (DC) Application Ratings *(cont.)*									
DC-5 Duty									
Rated operational current									
Open	12VDC	I_e	[A]	2.5	–	–	–	–	–
	24VDC	I_e	[A]	2.5	–	–	–	–	–
	60VDC	I_e	[A]	2.5	20	20	20	20	35
	110VDC	I_e	[A]	1.5	20	20	20	20	35
	220VDC	I_e	[A]	0.3	1.5	1.5	1.5	1.5	10
	440VDC	I_e	[A]	–	0.2	0.2	0.2	0.2	0.6
Current Heat Loss *(3 or 4 pole)*									
Current heat loss at I_{th}		I_{th}	[W]	2.7	4.7	4.7	4.7	4.7	7.3
Current heat loss at I_e to AC-3/400V		I_e	[W]	0.5	1.1	0.37	0.6	1.1	1.7
Impedance per pole			[mΩ]	–	2.5	2.5	2.5	2.5	2
Magnet System									
Voltage tolerance									
AC operated									
Single Voltage coil 60Hz	Pick-up	x V coil	[x U_c]	–	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1
	Drop-out	x V coil	[x U_c]	–	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6
Single Voltage coil 50Hz	Pick-up	x V coil	[x U_c]	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1
	Drop-out	x V coil	[x U_c]	–	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6
Dual Voltage coil 50Hz, 60Hz	Pick-up	x V coil	[x U_c]	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1
	Drop-out	x V coil	[x U_c]	–	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6
Dual Frequency coil 50/60Hz	Pick-up	x V coil	[x U_c]	0.85 – 1.1	–	–	–	–	–
	Drop-out	x V coil	[x U_c]	–	–	–	–	–	–
DC operated ❶	Pick-up	x V coil	[x U_c]	0.8 – 1.1	0.8 – 1.1 ❷	0.8 – 1.1 ❷	0.8 – 1.1 ❷	0.8 – 1.1 ❷	0.7 – 1.2 ❸
	Drop-out	x V coil	[x U_c]	–	0.15 – 0.6	0.15 – 0.6	0.15 – 0.6	0.15 – 0.6	0.15 – 0.6
Power consumption of the coil in a cold state and 1.0 X U_c									
AC operated									
Single Voltage coil 60Hz	Pick-up		[VA]	–	30	30	30	30	67
	Sealed		[VA/W]	–	4.4/1.4	4.4/1.4	4.4/1.4	4.4/1.4	8.7/2.6
Single Voltage coil 50Hz	Pick-up		[VA]	25	24	24	24	24	52
	Sealed		[VA/W]	4.6/1.3	3.4/1.2	3.4/1.2	3.4/1.2	3.4/1.2	7.1/2.1
Dual Voltage coil 50Hz, 60Hz	Pick-up		[VA]	25	–	–	–	–	–
	Sealed		[VA/W]	4.6/1.3	–	–	–	–	–
Dual Frequency coil 50/60Hz	Pick-up		[VA]	29	25 – 27	25 – 27	25 – 27	25 – 27	58 – 62
	Sealed		[VA/W]	3.9/1.1	3.3 – 4.2/ 1.2 – 1.4	3.3 – 4.2/ 1.2 – 1.4	3.3 – 4.2/ 1.2 – 1.4	3.3 – 4.2/ 1.2 – 1.4	6.5 – 9.1/ 2 – 2.5
DC operated ❶	Pick-up		[W]	2.6	4.5	3	3	4.5	12@24V
	Sealed		[W]	2.6	4.5	3	3	4.5	0.5@24V

❶ True DC voltage or derived from a full wave 3-phase bridge rectifier or filtered 1-phase AC supply.

❷ At 24V: 0.7 . . . 1.3 without additional auxiliary contact modules and ambient temperature 40 °C

DILM25 DILMF25	DILM32 DILMF32	DILM40 DILMF40	DILM50 DILMF50	DILM65 DILMF65	DILM80 DILMF80	DILM95 DILMF95	DILM115 DILMF115	DILM150 DILMF150
–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–
35	40	50	60	72	110	110	160	160
35	40	50	50	72	110	110	160	160
10	10	25	25	35	35	35	40	40
0.6	0.6	0.6	0.6	0.6	1	1	1	1
9.6	12.1	11.3	19	28.8	14.6	21.8	30.4	46.1
3.8	6.1	7.2	11.3	19	11.5	16.2	23.8	40.5
2	2	1.5	1.5	1.5	0.6	0.6	0.6	0.6
0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1
0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.25 – 0.6	0.25 – 0.6
0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1
0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6
0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1
0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6
–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–
0.7 – 1.2 ❸	0.7 – 1.2 ❸	0.7 – 1.2 ❸	0.7 – 1.2 ❸	0.7 – 1.2 ❸	0.7 – 1.2 ❸	0.7 – 1.2 ❸	0.7 – 1.2 ❸	0.7 – 1.2 ❸
0.15 – 0.6	0.15 – 0.6	0.15 – 0.6	0.15 – 0.6	0.15 – 0.6	0.15 – 0.6	0.15 – 0.6	0.15 – 0.6	0.15 – 0.6
67	67	178	178	178	345	345	170	170
8.7/2.6	8.7/2.6	19/5.3	19/5.3	19/5.3	30/7.1	30/7.1	3.1/2.1	3.1/2.1
52	52	149	149	149	310	310	180	180
7.1/2.1	7.1/2.1	16/4.6	16/4.6	16/4.6	26/5.8	26/5.8	3.1/2.1	3.1/2.1
–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–
58 – 62	58 – 62	154 – 168	154 – 168	154 – 168	328 – 372	328 – 372	170	170
6.5 – 9.1/ 2 – 2.5	6.5 – 9.1/ 2 – 2.5	14 – 22/ 4.3 – 5.3	14 – 22/ 4.3 – 5.3	14 – 22/ 4.3 – 5.3	22.6 – 37.1/ 6.1 – 7.5	22.6 – 37.1/ 6.1 – 7.5	3.1/2.1	3.1/2.1
12@24V	12@24V	12@24V	12@24V	12@24V	90@24V	90@24V	149@24V	149@24V
0.5@24V	0.5@24V	0.5@24V	0.5@24V	0.5@24V	1.3@24V	1.3@24V	2.1@24V	2.1@24V

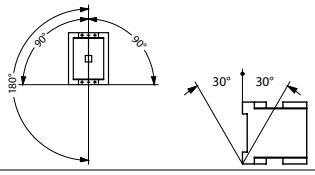
❸ RDC 24 (U_C min 24V DC, U_C max 27V DC)
RDC 60 (U_C min 48V DC, U_C max 60V DC)
RDC 130 (U_C min 110V DC, U_C max 130V DC)
RDC 240 (U_C min 200V DC, U_C max 240V DC)
i.e.: $U_C = 0.7 \times U_C$ min - $1.2 \times U_C$ max
$U_C = 0.7 \times 24V = 16.8$ V DC - $1.2 \times 27V = 32.4$V DC

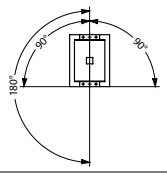
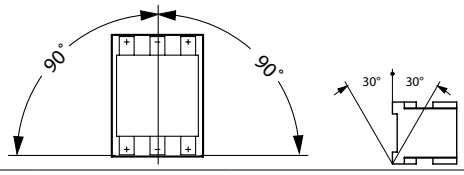
Contactors				DILEM(4)	DILMP20	DILM7 DILMF8	DILM9 DILMF11	DILM12 DILMF14	DILM17 DILMF17
Magnet System *(cont.)*									
Duty factor DF			[% DF]	100	100	100	100	100	100
Recommend VA			[VA]	50	50	50	50	50	50
Switching times at 100% U_C (rated coil voltage) main contacts									
AC operated									
	Closing delay	Min./Max.	[ms]	14 – 27	15 – 21	15 – 21	15 – 21	15 – 21	16 – 22
	Opening delay	Min./Max.	[ms]	8 – 18	9 – 18	9 – 18	9 – 18	9 – 18	8 – 14
DC operated ❶									
	Closing delay	Min./Max.	[ms]	26 – 35	31	31	31	31	47
	Opening delay	Min./Max.	[ms]	15 – 25	12	12	12	12	30
Arcing time (AC)		Maximum	[ms]	12	10	10	10	10	10
Permissible residual current									
with actuation of A11 by the electronics with 0 signal			[mA]	–	–	–	–	–	–
Electromagnetic Compatibility (EC)									
Emitted interference						to EN 60947-1			
Noise immunity						to EN 60947-1			

❶ True DC voltage or derived from a full wave 3-phase bridge rectifier or filtered 1-phase AC supply.

DILM25 DILMF25	DILM32 DILMF32	DILM40 DILMF40	DILM50 DILMF50	DILM65 DILMF65	DILM80 DILMF80	DILM95 DILMF95	DILM115 DILMF115	DILM150 DILMF150
100	100	100	100	100	100	100	100	100
50	50	100	100	100	150	150	100	100
16 – 22 8 – 14	16 – 22 8 – 14	12 – 18 8 – 13	12 – 18 8 – 13	12 – 18 8 – 13	14 – 20 9 – 14	14 – 20 9 – 14	28 – 33 35 – 41	28 – 33 35 – 41
47 30	47 30	54 24	54 24	54 24	45 34	45 34	35 30	35 30
10	10	10	10	10	15	15	15	15
–	–	–	–	–	< 1	< 1	< 1	< 1
to EN 60947-1								
to EN 60947-1								

Contactors *(continued)*

			DILM185	DILM225	DILM250	DILM300
General						
Standards				UL, CSA, IEC/EN60947, VDE 0660		
Lifespan, mechanical						
AC operated	Ops	[x 10^6]	10	10	10	7
DC operated	Ops	[x 10^6]	10	10	10	7
Max. Operating frequency, mechanical						
AC operated		[Ops/h]	3000	3000	3000	2000
DC operated		[Ops/h]	3000	3000	3000	2000
Climatic proofing						
Open				Damp heat constant to IEC60068-2-78		
Enclosed				Damp heat, cyclic to IEC 60068-2-30		
Ambient temperature						
Open		[C]	-25...60 °C	-25...60 °C	-25...60 °C	-25...60 °C
		[F]	*-13...140 °F*	*-13...140 °F*	*-13...140 °F*	*-13...140 °F*
Enclosed		[C]	-25...40 °C	-25...40 °C	-25...40 °C	-25...40 °C
		[F]	*-13...104 °F*	*-13...104 °F*	*-13...104 °F*	*-13...104 °F*
Storage		[C]	-40...80 °C	-40...80 °C	-40...80 °C	-40...80 °C
		[F]	*-40...176 °F*	*-40...176 °F*	*-40...176 °F*	*-40...176 °F*
Mounting position						
AC and DC						
Mechanical shock resistance (IEC/EN 60068-2-27)						
Half-sinusoidal shock, 10 ms						
Main Contacts						
NO contacts	Make	[g]	10	10	10	10
NO/NC contacts	Make/Break	[g]	–	–	–	–
Auxillary contacts						
NO contacts	Make	[g]	10	10	10	10
NC contacts	Break	[g]	8	8	8	8
Degree of protection			IP00	IP00	IP00	IP00
Protection against direct contact when actuated from front (IEC536)				Finger and-back-of-hand proof		
Weight						
AC		[kg]	6.5	6.5	6.5	8
DC		[kg]	6.5	6.5	6.5	8
Main terminals			DILM225-XKU-S	DILM225-XKU-S	DILM400-XKU-S	DILM400-XKU-S
Wire Capacity	minimum	[AWG]	6 AWG (single or double)	6 AWG (single or double)	4 AWG (single or double)	4 AWG (single or double)
(Cu cable)	maximum	[AWG]	350 MCM (2 x 300 MCM)	350 MCM (2 x 300 MCM)	600 MCM (2 x 500 MCM)	600 MCM (2 x 500 MCM)
Main cable cross sections						
Solid		[mm^2]	–	–	–	–
Flexible with ferrule		[mm^2]	–	–	–	–
Flexible with cable lug		[mm^2]	35-95	50-240	50-240	50-240
Stranded		[mm^2]	–	–	–	–
Stranded with cable lug		[mm^2]	50-120	70-240	70-240	70-240
Flat conductor		[mm]	–	–	–	–
Bus bar	Width	[mm]	20	20	25	25
Main cable connection						
Screw/bolt			M10	M10	M10	M10
Tightening torque		[Nm]	24	24	24	24

DILM400	DILM500	DILM580	DILM650	DILM750	DILM820	DILM1000
UL, CSA, IEC/EN60947, VDE 0660						
7 7	5 5	5 5	5 5	5 5	5 5	5 5
2000 2000	2000 2000	1000 1000	1000 1000	1000 1000	1000 1000	1000 1000
Damp heat constant to IEC60068-2-78 Damp heat, cyclic to IEC 60068-2-30						
-25…60 °C *-13…140 °F*	-25…60 °C *-13…140 °F*	-25…60 °C *-13…140 °F*	-25…60 °C *-13…140 °F*	-25…60 °C *-13…140 °F*	-25…60 °C *-13…140 °F*	-25…60 °C *-13…140 °F*
-25…40 °C *-13…104 °F*	-25…40 °C *-13…104 °F*	-25…40 °C *-13…104 °F*	-25…40 °C *-13…104 °F*	-25…40 °C *-13…104 °F*	-25…40 °C *-13…104 °F*	-25…40 °C *-13…104 °F*
-40…80 °C *-40…176 °F*	-40…80 °C *-40…176 °F*	-40…80 °C *-40…176 °F*	-40…80 °C *-40…176 °F*	-40…80 °C *-40…176 °F*	-40…80 °C *-40…176 °F*	-40…80 °C *-40…176 °F*
						
10 –	10 –	10 –	10 –	10 –	10 –	10 –
10 8	10 8	10 8	10 8	10 8	10 8	10 8
IP00	IP00	IP00	IP00	IP00	IP00	IP00
Finger and-back-of-hand proof						
8 8	8 8	15 15	15 15	15 15	15 15	15 15
DILM400-XKU-S	DILM500-XK-CNA	DILM650-XK-CNA	DILM650-XK-CNA	DILM820-XK-CNA	DILM820-XK-CNA	–
4 AWG (single or double)	2 x 4 AWG	2 x 2 AWG	2 x 2 AWG	4 x 2 AWG	4 x 2 AWG	Terminal pad
600 MCM (2 x 500 MCM)	2 x 500 MCM	2x 500 MCM	2x 500 MCM	4 x 500 MCM	4 x 500 MCM	Terminal pad
– –	– –	– –	– –	– –	– –	– –
50-240 –	50-240 –	50-240 –	50-240 –	50-240 –	50-240 –	50-240 –
70-240 – 25	70-240 – 30	70-240 – 50	70-240 – 50	70-240 – 60	70-240 – 60	70-240 – 60
M10 24	M10 24	M10 24	M10 24	M12 35	M12 35	M12 35

Contactors *(continued)*				DILM185	DILM225	DILM250	DILM300
General *(continued)*							
Control circuit cable cross sections							
Solid			[mm²]	1 x (0.75-25) 2 x (0.75-2.5)	1 x (0.75-25) 2 x (0.75-2.5)	1 x (0.75-25) 2 x (0.75-2.5)	1 x (0.75-25) 2 x (0.75-2.5)
Flexible with ferrule			[mm²]	1 x (0.75-25) 2 x (0.75-2.5)	1 x (0.75-25) 2 x (0.75-2.5)	1 x (0.75-25) 2 x (0.75-2.5)	1 x (0.75-25) 2 x (0.75-2.5)
Solid or stranded			[AWG]	2 x (18-12)	2 x (18-12)	2 x (18-12)	2 x (18-12)
Control circuit cable connection							
Screw/bolt				M3.5	M3.5	M3.5	M3.5
Tightening torque			[Nm]	1.2	1.2	1.2	1.2
Tools							
Main cable							
Posidriv screwdriver			[Size]	–	–	–	–
Hexagon socket-head spanner		SW	[mm]	–	–	–	–
Standard screwdriver			[mm]	–	–	–	–
Wrench			[mm]	16	16	16	16
Control cable							
Posidrive screwdriver			[Size]	2	2	2	2
Standard screwdriver			[mm]	–	–	–	–
Main Contacts							
Rated impulse withstand		U_{imp}	[V AC]	8000	8000	8000	8000
Overvoltage category / pollution degree				III/3	III/3	III/3	III/3
Rated insulation		U_i	[V AC]	1000	1000	1000	1000
Rated operational voltage		U_e	[V AC]	1000	1000	1000	1000
Safe isolation to VDE 0106 Part 101 and Part 101/A1							
Between coil and contacts			[V AC]	500	500	500	500
Between contacts			[V AC]	500	500	500	500
Making capacity cos φ to IEC/EN 60-947 up to 690V			[A]	3000	3000	3000	5500
Breaking capacity, AC, cos φ = 0.35, 50 – 60 Hz							
	200V		[A]	–	–	–	–
	230V		[A]	–	–	–	–
	200…230V		[A]	–	–	–	–
	220…230V		[A]	2500	2500	2500	5000
	380…400V		[A]	2500	2500	2500	5000
	460V		[A]	–	–	–	–
	500V		[A]	2500	2500	2500	5000
	575V		[A]	–	–	–	–
	660…690V		[A]	2500	2500	2500	5000
	1000V		[A]	760	760	760	950
Component lifespan							
AC-1	400V	I_e	[Ops x10⁶]	see page A42	see page A42	see page A42	see page A42
Maximum operating frequency							
AC-1	400V	I_e	[Ops/h]	see page A44	see page A44	see page A44	see page A44
AC-3	400V	I_e	[Ops/h]	see page A44	see page A44	see page A44	see page A44
AC-4	400V	I_e	[Ops/h]	see page A44	see page A44	see page A44	see page A44
Short circuit rating - maximum fuse							
Type "2" 400V	gG/gL 500V		[A]	315	315	315	500
690V	gG/gL 690V		[A]	315	315	315	500
1000V	gG/gL 1000V		[A]	160	160	160	200
Type "1" 400V	gG/gL 500V		[A]	400	400	400	630
690V	gG/gL 690V		[A]	400	400	400	630
1000V	gG/gL 1000V		[A]	200	200	200	250

DILM400	DILM500	DILM580	DILM650	DILM750	DILM820	DILM1000
1 x (0.75-25) 2 x (0.75-2.5)	1 x (0.75-25) 2 x (0.75-2.5)	1 x (0.75-25) 2 x (0.75-2.5)	1 x (0.75-25) 2 x (0.75-2.5)	1 x (0.75-25) 2 x (0.75-2.5)	1 x (0.75-25) 2 x (0.75-2.5)	1 x (0.75-25) 2 x (0.75-2.5)
1 x (0.75-25) 2 x (0.75-2.5)	1 x (0.75-25) 2 x (0.75-2.5)	1 x (0.75-25) 2 x (0.75-2.5)	1 x (0.75-25) 2 x (0.75-2.5)	1 x (0.75-25) 2 x (0.75-2.5)	1 x (0.75-25) 2 x (0.75-2.5)	1 x (0.75-25) 2 x (0.75-2.5)
2 x (18-12)	2 x (18-12)	2 x (18-12)	2 x (18-12)	2 x (18-12)	2 x (18-12)	2 x (18-12)
M3.5 1.2	M3.5 1.2	M3.5 1.2	M3.5 1.2	M3.5 1.2	M3.5 1.2	M3.5 1.2
–	–	–	–	–	–	–
–	–	–	–	–	–	–
–	–	–	–	–	–	–
16	16	16	16	18	18	18
2	2	2	2	2	2	2
–	–	–	–	–	–	–
8000	8000	8000	8000	8000	8000	8000
III/3	III/3	III/3	III/3	III/3	III/3	III/3
1000	1000	1000	1000	1000	1000	1000
1000	1000	1000	1000	1000	1000	1000
500	500	500	500	500	500	500
500	500	500	500	500	500	500
5500	5500	7800	7800	9840	9840	9840
–	–	–	–	–	–	–
–	–	–	–	–	–	–
–	–	–	–	–	–	–
5000	5000	6500	6500	8200	8200	8200
5000	5000	6500	6500	8200	8200	8200
–	–	–	–	–	–	–
5000	5000	6500	6500	8200	8200	8200
–	–	–	–	–	–	–
5000	5000	6500	6500	8200	8200	8200
950	950	4350	4350	5800	5800	5800
see page A42	see page A42	see page A42	see page A42	see page A42	see page A42	see page A42
see page A44	see page A44	see page A44	see page A44	see page A44	see page A44	see page A44
see page A44	see page A44	see page A44	see page A44	see page A44	see page A44	see page A44
see page A44	see page A44	see page A44	see page A44	see page A44	see page A44	see page A44
500	500	630	630	630	630	630
500	500	630	630	630	630	630
200	200	500	500	630	630	630
630	630	1000	1000	1200	1200	1200
630	630	1000	1000	1200	1200	1200
250	250	630	630	800	800	800

Contactors *(continued)*				DILM185	DILM225	DILM250	DILM300
UL/CSA Ratings							
Continuous current rating							
AC @ 40-60 Hz, or DC, 3-pole	Open		[A]	225	250	350	350
	Enclosed		[A]	203	225	315	315
Horsepower ratings, AC or DC							
Three Phase	200V		[HP]	50	60	75	100
	230V		[HP]	60	75	100	125
	460V		[HP]	125	150	200	250
	575V		[HP]	150	200	250	300
IEC (AC) Application Ratings							
AC-1 Duty							
Conventional free air, thermal current, 3-pole, 50 – 60 Hz							
Open	40 °C / *104 °F*	I_{th}	[A]	337	386	429	490
	50 °C / *122 °F*	I_{th}	[A]	301	345	383	438
	55 °C / *137 °F*	I_{th}	[A]	287	329	366	418
	60 °C / *140 °F*	I_{th}	[A]	275	315	350	400
Enclosed ❶		I_{th}	[A]	250	275	300	350
Conventional free air, thermal current, 1-pole, 50 – 60 Hz							
Open ❶		I_{th}	[A]	685	785	875	1000
Enclosed ❶		I_{th}	[A]	625	685	750	875
AC-3 Duty							
Rated operational current, 50 – 60 Hz							
Open ❶	200V	I_e	[A]	–	–	–	–
	220/230V	I_e	[A]	185	225	250	300
	230V	I_e	[A]	–	–	–	–
	240V	I_e	[A]	185	225	250	300
	380/400V	I_e	[A]	185	225	250	300
	415V	I_e	[A]	185	225	250	300
	440V	I_e	[A]	185	225	250	300
	460V	I_e	[A]	–	–	–	–
	500V	I_e	[A]	185	225	250	300
	550V	I_e	[A]	–	–	–	–
	575V	I_e	[A]	–	–	–	–
	660V	I_e	[A]	–	–	–	–
	660/690V	I_e	[A]	185	225	250	300
	1000V	I_e	[A]	76	76	76	95
Rated power, 50 – 60 Hz							
Open ❶	220/230V	P_n	[kW]	55	70	75	90
	240V	P_n	[kW]	62	75	85	100
	380/400V	P_n	[kW]	90	110	132	160
	415V	P_n	[kW]	110	132	148	180
	440V	P_n	[kW]	115	142	157	190
	500V	P_n	[kW]	132	160	180	215
	660/690V	P_n	[kW]	175	215	240	286
	1000V	P_n	[kW]	108	108	108	132

❶ At maximum permissible ambient temperature.

DILM400	DILM500	DILM580	DILM650	DILM750	DILM820	DILM1000
450	550	630	700	800	850	1000
405	495	567	630	720	765	900
125	150	200	200	250	290	–
150	200	200	250	300	350	400
300	400	400	500	600	700	800
400	500	600	600	700	860	1000
612	857	980	1041	1102	1225	1225
548	767	876	931	986	1095	1095
522	731	836	888	940	1044	1044
500	700	800	850	900	1000	1000
450	650	–	–	–	–	–
1250	1750	2000	2125	2250	2500	2500
1125	1600	–	–	–	–	–
–	–	–	–	–	–	–
400	500	580	650	750	820	1000
–	–	–	–	–	–	–
400	500	580	650	750	820	1000
400	500	580	650	750	820	1000
400	500	580	650	750	820	1000
400	500	580	650	750	820	1000
–	–	–	–	–	–	–
400	500	580	650	750	820	1000
–	–	–	–	–	–	–
–	–	–	–	–	–	–
–	–	–	–	–	–	–
360	360	580	650	750	820	1000
95	95	435	435	580	580	700
125	155	185	205	240	260	315
132	170	200	225	260	285	340
200	250	315	355	400	450	560
240	300	348	390	455	500	610
255	345	370	420	480	525	650
290	360	420	470	550	600	730
344	344	560	630	720	750	1000
132	132	600	600	800	800	1000

Contactors *(continued)*				DILM185	DILM225	DILM250	DILM300
IEC (AC) Application Ratings *(cont.)*							
AC-4 Duty							
Rated operational current, 50 – 60 Hz							
Open ❶	200V	I_e	[A]	–	–	–	–
	220/230V	I_e	[A]	136	164	200	240
	230V	I_e	[A]	–	–	–	–
	240V	I_e	[A]	136	164	200	240
	380/400V	I_e	[A]	136	164	200	240
	415V	I_e	[A]	136	164	200	240
	440V	I_e	[A]	136	164	200	240
	460V	I_e	[A]	–	–	–	–
	500V	I_e	[A]	136	164	200	240
	575V	I_e	[A]	–	–	–	–
	660V	I_e	[A]	–	–	–	–
	660/690V	I_e	[A]	136	164	200	240
	1000V	I_e	[A]	76	76	76	95
Rated power, 50 – 60 Hz							
	220/230V	P_n	[kW]	41	51	62	75
	240V	P_n	[kW]	45	54	68	82
	380/400V	P_n	[kW]	75	90	110	132
	415V	P_n	[kW]	80	96	117	142
	440V	P_n	[kW]	85	102	125	151
	500V	P_n	[kW]	96	116	143	172
	660/690V	P_n	[kW]	127	155	189	229
	1000V	P_n	[kW]	108	108	108	132
IEC Capacitor Duty Ratings							
Individual compensation rated operational current of three-phase capacitors							
Open	up to 525V	I_e	[A]	220	220	220	307
	690V	I_e	[A]	133	133	133	177
Making capacity (I - peak value) without damping			[x I_e]	30	30	30	30
Component lifespan			[Ops x10^6]	0.1	0.1	0.1	0.1
Maximum operating frequency			[Ops/h]	200	200	200	200
IEC (DC) Application Ratings							
DC-1 Duty							
Rated operational current							
Open ❶	12V DC	I_e	[A]	–	–	–	–
	24V DC	I_e	[A]	–	–	–	–
	60V DC	I_e	[A]	300	300	300	400
	110V DC	I_e	[A]	300	300	300	400
	220V DC	I_e	[A]	300	300	300	400
	440V DC	I_e	[A]	11	11	11	11
DC-3 Duty							
Rated operational current							
Open	12V DC	I_e	[A]	–	–	–	–
	24V DC	I_e	[A]	–	–	–	–
	60V DC	I_e	[A]	300	300	300	400
	110V DC	I_e	[A]	300	300	300	400
	220V DC	I_e	[A]	300	300	300	400
	440V DC	I_e	[A]	–	–	–	–

❶ At maximum permissible ambient temperature.

DILM400	DILM500	DILM580	DILM650	DILM750	DILM820	DILM1000
–	–	–	–	–	–	–
296	360	456	512	576	656	800
–	–	–	–	–	–	–
296	360	456	512	576	656	800
296	360	456	512	576	656	800
296	360	456	512	576	656	800
296	360	456	512	576	656	800
–	–	–	–	–	–	–
296	360	456	512	576	656	800
–	–	–	–	–	–	–
–	–	–	–	–	–	–
296	296	456	512	576	656	800
95	95	348	348	464	464	700
92	112	143	161	181	209	260
101	122	156	176	200	228	280
160	200	250	280	315	355	450
176	216	274	307	346	394	490
186	229	290	326	367	418	520
214	260	330	370	417	474	590
283	344	440	494	556	633	780
132	132	509	509	678	678	1000
307	307	463	463	463	463	463
177	177	265	265	265	265	265
30	30	30	30	30	30	30
0.1	0.1	0.1	0.1	0.1	0.1	0.1
200	200	200	200	200	200	200
–	–	–	–	–	–	–
–	–	–	–	–	–	–
400	400	–	–	–	–	–
400	400	–	–	–	–	–
400	400	–	–	–	–	–
11	11	–	–	–	–	–
–	–	–	–	–	–	–
–	–	–	–	–	–	–
400	400	–	–	–	–	–
400	400	–	–	–	–	–
400	400	–	–	–	–	–
–	–	–	–	–	–	–

Contactors *(continued)*				DILM185	DILM225	DILM250	DILM300
IEC (DC) Application Ratings *(cont.)*							
DC-5 Duty							
Rated operational current							
Open	12V DC	I_e	[A]	–	–	–	–
	24V DC	I_e	[A]	–	–	–	–
	60V DC	I_e	[A]	300	300	300	400
	110V DC	I_e	[A]	300	300	300	400
	220V DC	I_e	[A]	300	300	300	400
	440V DC	I_e	[A]	–	–	–	–
Current Heat Loss (three or four pole)							
Current heat loss at I_{th}		I_{th}	[W]	79	108	95	123
Current heat loss at I_e to AC-3 @ 400V		I_e	[W]	36	55	48	69
Impedance per pole			[mΩ]	–	–	–	–
Magnet System							
Voltage tolerance							
AC operated							
Single Voltage Coil 60Hz	Pick-up	x V coil	[x U_c]	0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max
	Drop-out	x V coil	[x U_c]	0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max
Single Voltage Coil 50Hz	Pick-up	x V coil	[x U_c]	0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max
	Drop-out	x V coil	[x U_c]	0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max
Dual Voltage Coil 50Hz, 60Hz	Pick-up	x V coil	[x U_c]	0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max
	Drop-out	x V coil	[x U_c]	0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max
Dual Frequency Coil 50/60Hz	Pick-up	x V coil	[x U_c]	–	–	–	–
	Drop-out	x V coil	[x U_c]	–	–	–	–
DC operated ❶	Pick-up	x V coil	[x U_c]	0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max
	Drop-out	x V coil	[x U_c]	0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max
Power consumption of the coil in a cold state and 1.0 x U_c							
AC operated							
Single Voltage Coil 60Hz	Pick-up		[VA]	380	380	380	450
	Sealed		[VA/W]	4.3/3.3	4.3/3.3	4.3/3.3	4.3/3.3
Single Voltage Coil 50Hz	Pick-up		[VA]	380	380	380	450
	Sealed		[VA/W]	4.3/3.3	4.3/3.3	4.3/3.3	4.3/3.3
Dual Voltage Coil 50Hz, 60Hz	Pick-up		[VA]	–	–	–	–
	Sealed		[VA/W]	–	–	–	–
Dual Frequency Coil 50/60Hz	Pick-up		[VA]	380	380	380	450
	Sealed		[VA/W]	4.3/3.3	4.3/3.3	4.3/3.3	4.3/3.3
DC operated ❶	Pick-up		[W]	250	250	250	350
	Sealed		[W]	4.3	4.3	4.3	4.3

❶ True DC voltage or derived from a full wave 3-phase bridge rectifier or filtered 1-phase AC supply.

DILM400	DILM500	DILM580	DILM650	DILM750	DILM820	DILM1000
–	–	–	–	–	–	–
–	–	–	–	–	–	–
400	400	–	–	–	–	–
400	400	–	–	–	–	–
400	400	–	–	–	–	–
–	–	–	–	–	–	–
188	236	227	257	288	355	355
120	120	120	150	200	239	355
–	–	–	–	–	–	–
0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max
0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max
0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max
0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max
0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max
0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max
–	–	–	–	–	–	–
–	–	–	–	–	–	–
0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max	0.7 x U_c min... 1.15 x U_c max
0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max	0.2 x U_c min... 0.6 U_c max
450	800	800	800	800	800	800
4.3/3.3	7.5/6.5	7.5/6.5	7.5/6.5	7.5/6.5	7.5/6.5	7.5/6.5
450	800	800	800	800	800	800
4.3/3.3	7.5/6.5	7.5/6.5	7.5/6.5	7.5/6.5	7.5/6.5	7.5/6.5
–	–	–	–	–	–	–
–	–	–	–	–	–	–
450	800	800	800	800	800	800
4.3/3.3	7.5/6.5	7.5/6.5	7.5/6.5	7.5/6.5	7.5/6.5	7.5/6.5
350	350	900	900	900	900	900
4.3	4.3	9.5	9.5	9.5	9.5	9.5

Contactors *(continued)*				DILM185	DILM225	DILM250	DILM300
Magnet System *(cont.)*							
Duty factor DF			[%DF]	100	100	100	100
Switching times at 100% U_C (rated coil voltage) main contacts							
AC operated	Closing Delay	Min./Max.	[ms]	< 100	< 100	< 80	< 80
	Opening Delay	Min./Max.	[ms]	< 80	< 80	< 80	< 80
DC operated ❶	Closing Delay	Min./Max.	[ms]	< 100	< 100	< 80	< 80
	Opening Delay	Min./Max.	[ms]	< 80	< 80	< 80	< 80
Arcing time (AC)		Maximum	[ms]				
Permissible contact resistance (of the external command device with actuation of A11)			[mΩ]	< 500	< 500	< 500	< 500
Permissible residual current (with actuation of A11 by the electronics with 0 signal)			[mA]	< 1	< 1	< 1	< 1
SPS signal level (A3 - A4) to IEC/EN61131-2 (Type 2)		High	[V]	15	15	15	15
		Low	[V]	5	5	5	5
Electromagnetic Compatibility (EC)							
Emitted interference				This product is designed for operation in industrial environments (Environment 2). Usage in domestic areas (Environment 1) can cause radio frequency interference (RFI) so that additional interference to noise suppression measures must be provided.			
Noise immunity							

DILM400	DILM500	DILM580	DILM650	DILM750	DILM820	DILM1000
100	100	100	100	100	100	100
< 80	< 80	< 70	< 70	< 70	< 70	< 70
< 80	< 80	< 70	< 70	< 70	< 70	< 70
< 80	< 80	< 70	< 70	< 70	< 70	< 70
< 80	< 80	< 70	< 70	< 70	< 70	< 70
< 500	< 500	< 500	< 500	< 500	< 500	< 500
< 1	< 1	< 1	< 1	< 1	< 1	< 1
15	15	15	15	15	15	15
5	5	5	5	5	5	5

This product is designed for operation in industrial environments (Environment 2). Usage in domestic areas (Environment 1) can cause radio frequency interference (RFI) so that additional interference to noise suppression measures must be provided.

Auxiliary Contacts					...DILE(M)	DILA-XHI DILM32-XHI	DILM150-XHI	DILM1000-XHI
General								
UL/CSA Pilot duty rating								
A600 - 10A 600V				[AC]	Yes	Yes	Yes	Yes
P300 - 1A 250V				[DC]	Yes	Yes	Yes	Yes
Positively guided contacts within an auxiliary contact module ❶ (to IEC60947-5-1 Annex L) does not apply to early make - late break contacts.					–	Yes	Yes	Yes
Break contact (not late break contact) suitable as a mirror contact ❷ (to IEC/EC 60947-4-1 Annex F)					–	Yes	Yes	Yes
Interlocked opposing contacts to ZH 1 / 457, ❸ including auxiliary contact module (not late break contact)					Yes	–	–	–
Rated Impulse withstand voltage			U_{imp}	[VAC]	6000	6000	6000	6000
Overvoltage category/pollution degree					III/3	III/3	III/3	III/3
Rated (insulation) voltage - IEC			U_i	[VAC]	690	690	690	690
Rated operational voltage - IEC			U_e	[VAC]	600	500	500	500
Safe isolation to VDE 0106 Part 101 and Part 101/A1								
Between coil and auxiliary contacts				[VAC]	300	400	440	440
Between the auxiliary contacts				[VAC]	300	400	440	440
IEC 974 Operating Current I_e								
AC-15		220...240V	I_e	[A]	6/4	–	–	–
		230V	I_e	[A]	–	6	6	6
		380...415V	I_e	[A]	3/2	4	4	4
		500V	I_e	[A]	1.5/1.5	1.5	1.5	1.5
DC-13 ❹	L/R ≤ 15 ms	24V	I_e	[A]	2.5	10	10	10
Single contact		60V	I_e	[A]	–	6	6	6
		110V	I_e	[A]	–	3	3	3
		220V	I_e	[A]	–	1	1	1
Contacts in series	2	60V	I_e	[A]	2.5	–	–	–
	3	110V	I_e	[A]	1.5	–	–	–
	3	220V	I_e	[A]	0.5	–	–	–
Conventional thermal current			I_{th}	[A]	10	10	15	15
Control circuit reliability ❺			Failure rate	[Ops]	Less than (1) one failure at 100 million operations			
Component lifespan at $U_e = 230V$, AC-15, 3A			Ops	[x 10^6]	0.2	1.3	1.3	1.3
DC-13 ❻ L/R = 50ms: 2 contacts in series at I_e=0.5A			Ops	[x 10^6]	0.15	–	–	–
Short-circuit rating without welding								
Maximum overcurrent protective device					PKZM0-4	–	–	–
Maximum fuse		500V		[A gG/gL]	6	10	16	16
		500V		[A fast]	10	–	–	–
Current heat loss at conventional free air thermal current								
Per contact			I_{th}	[W]	0.2	0.2	–	–

❹ Making and breaking conditions to DC-13, time L/R constant as stated.
❺ At $U_e = 24V$ DC, $U_{min} = 17V$, $I_{min} = 5.4mA$
❻ True DC voltage or derived from a full wave 3-phase bridge rectifier or filtered 1-phase AC supply.

Parallel Links				DILM12-XP1	DILM32-XP1	DILM65-XP1	DILM150-XP1
General							
Terminal capacities							
Solid			[mm²]	1 - 16	16	16	–
Flexible with ferrule			[mm²]	1 x (0.5-25) 2 x (0.5-16)	1 x (16-35)	1 x (16-120)	–
Stranded			[mm²]	1 x (0.5-25) 2 x (0.5-16)	1 x (16-50)	1 x (16-120)	1 x (35-300) 2 x (35-120)
Flat conductor	Number of segments X width X thickness		[mm]	6 x 9 x 0.8	–	–	2 x (11 x 21 x 1)
Tightening torque			[Nm]	4	4	14	–
Tool							
Pozidriv screwdriver			[Size]	2	2	–	–
Hexagon socket-head spanner		SW	[mm]	–	–	5	6
Conventional thermal current							
3 - Pole		I_{th}	[A]	50	100	180	400
4 - Pole		I_{th}	[A]	60	–	–	–
Single phase rating AC-1 (single contactor - 3 poles in series) open style							
Voltage	220V,230V,240V		[KW]	13	18	26	47
	380V,400V,440V		[KW]	22	32	45	81
	660V,690V		[KW]	38	55	78	141
Rated operational current $I_e = I_{th}$ or I_{the}			[A]	60	88	125	225
Three - phase rating AC-1 (single contactor - 3 poles in parallel) open style							
Voltage	220V,230V,240V		[KW]	–	13	18	33
	380V,400V,440V		[KW]	–	22	31	56
	660V,690V		[KW]	–	38	54	98
Rated operational current $I_e = I_{th}$ or I_{the}			[A]	–	35	50	90
Three - phase rating AC-1 (three contactors - 3 poles in series) open style							
Voltage	220V,230V,240V		[KW]	22	32	45	81
	380V,400V,440V		[KW]	38	55	78	141
	660V,690V		[KW]	65	95	136	244
Rated operational current $I_e = I_{th}$ or I_{the}			[A]	60	88	125	225

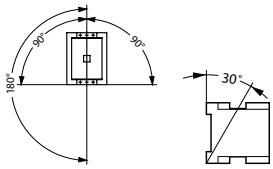
Amplifier Module; Timing Relay				ETS4-VS3 Amplifier Module	DILM32-XTE Timing Relay
General					
Standards				UL, CSA, IEC/EN 60947, VDE 0660	UL, CSA, DIN EN61812, IEC/EN 60947, VDE 0660
Lifespan, mechanical					
AC operated		Ops	[x 10^6]	–	3
DC operated		Ops	[x 10^6]	30	3
Maximum operating frequency	220V 230V	Ops	[x 10^6]	72000	–
Climatic proofing				Damp heat, constant to IEC 60068-2-78; Damp heat, cyclical, to IEC 60068-2-30	
Ambient temperature					
Storage			[°C / °F]	10 °C / *50 °F*	-40...80 °C / *-40...176 °F*
Open			[°C / °F]	-25...60 °C / *-13...140 °F*	-25...60 °C / *-13...140 °F*
Enclosed			[°C / °F]	-25...45 °C / *-13...113 °F*	-25...40 °C / *-13...104 °F*
Mounting position				As required	As required, not suspended
Mechanical shock resistance (IEC/EN 60068-2-27)					
Half-sinusoidal shock 20 ms					
NO contact			[g]	10	–
Hald-sinusoidal shock 10 ms					
NO contact			[g]	10	6
NC contact			[g]	8	6
Degree of protection				IP20	IP20
Protection against direct contact when actuated from the front (IEC 536)				Finger and back-of-hand proof	
Weight			[kg / *oz*]	0.09 / *3.17*	0.09 / *3.17*
Terminal capacity					
Solid			[mm^2]	1 x (0.75 – 2.5) 2 x (0.75 – 2.5) ❶	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)
Flexible with ferrule			[mm^2]	1 x (0.75 – 2.5) 2 x (0.75 – 1.5) ❶	1 x (0.75 – 1.5) 2 x (0.75 – 1.5)
Solid or stranded			[AWG]	16 – 14	18 – 14
Terminal screw				M3.5	M3.5
Tools					
Pozidriv screwdriver			[Size]	2	2
Standard screwdriver			[mm]	0.8 x 5.5 – 1 x 6	0.8 x 5.5 – 1 x 6
Tightening torque			[Nm]	1.2	1.2
Contacts					
Rated impulse withstand voltage		U_{imp}	[V AC]	6000	6000
Overvoltage category/pollution degree				III/3	III/3
Rated insulation voltage					
UL / CSA		U_i	[V AC]	250	–
IEC		U_i	[V AC]	440	600
Rated operational voltage		U_e	[V AC]	440	400

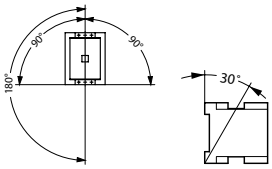
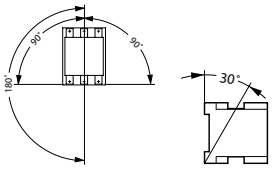
❶ Use only equal cross sections.

Amplifier Module; Timing Relay				ETS4-VS3 Amplifier Module	DILM32-XTE Timing Relay
General *(cont.)*					
Rated operational current					
UL / CSA (general purpose) B300		I_e	[A]	10	–
AC-15	220/240V	I_e	[A]	2	contact Moeller
	380/415V	I_e	[A]	2	contact Moeller
DC-13 ❶					
DC-13 L/R - 15 ms (one contact in series)					
	24V		[A]	2.6	–
	60V		[A]	1	–
	110V		[A]	0.6	–
	220V		[A]	0.2	–
DC-13 L/R - 50 ms (one contact in series)					
	24V		[A]	2	–
	60V		[A]	0.6	–
	110V		[A]	0.08	–
	220V		[A]	0.08	–
DC-13 L/R - 300 ms (one contact in series)					
	24V		[A]	0.6	–
	60V		[A]	0.2	–
	110V		[A]	0.08	–
	220V		[A]	0.03	–
Safe isolation to VDE 0106 Part 101 and Part 101/A1					
Between coil and auxiliary contacts			[V AC]	–	250
Between the auxiliary contacts			[V AC]	–	250
Control circuit reliability (at $U_e = 24$ V DC, $U_{min} = 17$ V, $I_{min} = 5.4$ mA)		Failure rate	[λ]	$< 10^8$ (less than one failure in 100 million operations)	–
Conventional thermal current		I_{th}	[A]	6	6
Component lifespan					
AC-15					
230V, $I_e = 0.1$A		Ops	[x 10^6]	7	–
230V, $I_e = 1.2$A		Ops	[x 10^6]	1	–
Short-circuit rating without welding					
Short-circuit protection, max. fuse					
500V			[A gG/gL]	–	6
500V			[A fast]	4	–
Magnet Systems					
Voltage tolerance					
AC operated		Pick-up	[x U_c]	–	0.8 – 1.1
DC operated		Pick-up	[x U_c]	0.85 – 1.2	0.7 – 1.2
Power consumption					
AC		Pick-up	[VA]	–	2
DC		Pick-up	[W]	–	1.8
DC operated		Pull in - Sealing	[W]	0.6	0
Duty factor			[% DF]	100	100
Switching times at 100% U_c (approximate values)					
DC operated closing delay			[ms]	7	–
DC operated opening delay			[ms]	3	–
Maximum operating frequency			[Ops/h]	–	3600
250V / 6A			[Ops/h]	9000	360
Minimum contact closing time					
On-delayed			[ms]	–	< 50
Off-delayed			[ms]	–	< 200
Repetition accuracy (with constant parameters)		Deviation	[%]	–	< 5
Recovery time (after 100% time delay)			[ms]	–	70
Contact changeover time		t_u	[ms]	–	10

❶ Making and breaking conditions to DC-13, time constant as stated.

NEMA/EEMAC Rated Contactors

				DILM-00N	DILM-0N
General					
Standards				UL, CSA, IEC/EN60947, VDE 0660	
Lifespan, mechanical					
AC operated		Operations	[x 10^6]	10	10
DC operated		Operations	[x 10^6]	10	10
Max. Operating frequency, mechanical					
AC operated			[Ops/h]	9000	9000
DC operated			[Ops/h]	9000	9000
Climatic proofing					
Open				Damp heat constant to IEC60068-2-78	
Enclosed				Damp heat, cyclic, to IEC60068-2-30	
Ambient temperature					
Open			[°C]	-25 °C...60 °C	-25 °C...60 °C
			[°F]	*-13 °F...140 °F*	*-13 °F...140 °F*
Enclosed			[°C]	-25 °C...40 °C	-25 °C...40 °C
			[°F]	*-13 °F...104 °F*	*-13 °F...104 °F*
Storage			[°C]	-40 °C...80 °C	-40 °C...80 °C
			[°F]	*-40 °F...176 °F*	*-40 °F...176 °F*
Mounting position					
AC and DC					
Mechanical shock resistance (IEC/EN 60068-2-27)					
Half-sinusoidal shock, 10 ms					
Main Contacts	NO contacts	Make	[g]	10	10
	NO/NC contacts	Make/Break	[g]	–	–
Auxiliary contacts	NO contacts	Make	[g]	7	7
	NC contacts	Break	[g]	5	5
Degree of protection				IP20	IP20
Protection against direct contact when actuated from front (IEC536)				Finger and-back-of-hand proof	
Weight					
AC			[kg]	0.23	0.23
DC			[kg]	0.28	0.28
Main terminals					
Wire Capacity		minimum	[AWG]	18 AWG (single or double)	18 AWG (single or double)
(Cu cable)		maximum	[AWG]	14 AWG (single or double)	14 AWG (single or double)
Main cable cross sections					
Solid			[mm^2]	1 x (0.75 – 4.0)	1 x (0.75 – 4.0)
Flexible with ferrule			[mm^2]	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)
Flexible with cable lug			[mm^2]	–	–
Stranded			[mm^2]	–	–
Stranded with cable lug			[mm^2]	–	–
Flat conductor	Number of segments x width x thickness		[mm]	–	–
Bus bar		Width	[mm]	–	–
Main cable connection screw/bolt				M3.5	M3.5
Tightening torque			[Nm]	1.2	1.2
Control circuit cable cross sections					
Solid			[mm^2]	1 x (0.75 – 4.0) 2 x (0.75 – 2.5)	1 x (0.75 – 4.0) 2 x (0.75 – 2.5)
Flexible with ferrule			[mm^2]	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)
Solid or stranded			[AWG]	18 – 14	18 – 14

DILM-1N	DILM-2N	DILM-3N	DILM-4N	DILM-5N
		UL, CSA, IEC/EN60947, VDE 0660		
10	10	10	10	10
10	10	10	10	10
5000	5000	3600	3600	3600
5000	5000	3600	3600	3600
		Damp heat constant to IEC60068-2-78 Damp heat, cyclic, to IEC60068-2-30		
-25 °C...60 °C *-13 °F...140 °F*	-25 °C...60 °C *-13 °F...140 °F*	-25 °C...60 °C *-13 °F...140 °F*	-25 °C...60 °C *-13 °F...140 °F*	-25 °C...60 °C *-13 °F...140 °F*
-25 °C...40 °C *-13 °F...104 °F*	-25 °C...40 °C *-13 °F...104 °F*	-25 °C...40 °C *-13 °F...104 °F*	-25 °C...40 °C *-13 °F...104 °F*	-25 °C...40 °C *-13 °F...104 °F*
-40 °C...80 °C *-40 °F...176 °F*	-40 °C...80 °C *-40 °F...176 °F*	-40 °C...80 °C *-40 °F...176 °F*	-40 °C...80 °C *-40 °F...176 °F*	-40 °C...80 °C *-40 °F...176 °F*
				
10	10	10	10	10
–	–	–	–	–
7	7	7	7	7
5	5	5	5	5
IP00	IP00	IP00	IP00	IP00
		Finger and-back-of-hand proof		
0.42	0.9	2	2	2
0.48	1.1	2.1	2.1	2.1
14 AWG (single or double) 6 AWG (single or double)	14 AWG (single or double) 1 AWG (2 x 2 AWG)	10 AWG (single or double) 3/0 AWG (2 x 2/0 AWG)	8 AWG (single or double) 3/0 AWG (2 x 2/0 AWG)	8 AWG (single or double) 3/0 AWG (2 x 2/0 AWG)
1 x (0.75 – 16)	1 x (2.5 – 16)	–	–	–
1 x (0.75 – 16) 2 x (0.75 – 10)	1 x (2.5 – 35) 2 x (2.5 – 25)	1 x (10 – 95) 2 x (10 – 70)	1 x (10 – 95) 2 x (10 – 70)	1 x (10 – 95) 2 x (10 – 70)
–	–	–	–	–
1 x 16	1 x (16 – 50) 2 x (16 – 35)	1 x (16 – 120) 2 x (16 – 95)	1 x (16 – 120) 2 x (16 – 95)	1 x (16 – 120) 2 x (16 – 95)
–	–	–	–	–
–	12 x (6 x 9 x 0.8)	2 x (6 x 16 x 0.8)	2 x (6 x 16 x 0.8)	2 x (6 x 16 x 0.8)
–	–	–	–	–
M5	M6	M10	M10	M10
3	3	14	14	14
1 x (0.75 – 4) 1 x (0.75 – 4)	1 x (0.75 – 4) 1 x (0.75 – 4)	1 x (0.75 – 4) 2 x (0.75 – 4)	1 x (0.75 – 4) 2 x (0.75 – 4)	1 x (0.75 – 4) 2 x (0.75 – 4)
1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)
18 – 14	18 – 14	18 – 14	18 – 14	18 – 14

NEMA/EEMAC Rated Contactors				DILM-00N	DILM-0N
General *(cont.)*					
Control circuit cable connection screw/bolt				M3.5	M3.5
Tightening torque			[Nm]	1.2	1.2
Tools					
Main cable					
Posidriv screwdriver			[Size]	2	2
Hexagon socket-head spanner		SW	[mm]	–	–
Standard screw driver			[mm]	0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6
Wrench			[mm]	–	–
Control cable					
Posidriv screwdriver			[Size]	2	2
Standard screwdriver			[mm]	0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6
Main Contacts					
Rated impulse withstand		U_{imp}	[V AC]	8000	8000
Overvoltage category/pollution degree				III/3	III/3
Rated insulation		U_i	[V AC]	690	690
Rated operational voltage		U_e	[V AC]	690	690
Safe isolation to VDE 0106 Part 101 and Part 101/A1					
Between coil and contacts			[V AC]	400	400
Between contacts			[V AC]	400	400
Making capacity cos φ to IEC/EN 60-947 up to 690V			[A]	112	144
Breaking capacity cos φ = 0.35, AC, 50 – 60Hz					
	200V		[A]	–	–
	230V		[A]	–	–
	200…230V		[A]	–	–
	220…230V		[A]	90	120
	380…400V		[A]	90	120
	460V		[A]	–	–
	500V		[A]	70	100
	575V		[A]	–	–
	660…690V		[A]	50	70
	1000V		[A]	–	–
Component lifespan					
AC-1	400V	I_e	[Ops x10^6]	see page A42	see page A42
AC-3	400V	I_e	[Ops x10^6]	see page A40	see page A40
AC-4	400V	I_e	[Ops x10^6]	see page A40	see page A40
Maximum operating frequency					
AC-1	400V	I_e	[Ops/h]	see page A44	see page A44
AC-3	400V	I_e	[Ops/h]	see page A44	see page A44
AC-4	400V	I_e	[Ops/h]	see page A44	see page A44
Short-circuit rating, max. fuse					
Type "2"	400V	gG/gL 500V	[A]	20	20
	690V	gG/gL 690V	[A]	16	20
	1000V	gG/gL 1000V	[A]	–	–
Type "1"	400V	gG/gL 500V	[A]	35	35
	690V	gG/gL 690V	[A]	20	25
	1000V	gG/gL 1000V	[A]	–	–
UL/CSA Ratings					
Continuous current rating					
50/60Hz, three-pole	Open		[A]	20	20
	Enclosed		[A]	18	18

DILM-1N	DILM-2N	DILM-3N	DILM-4N	DILM-5N
M3.5	M3.5	M3.5	M3.5	M3.5
1.2	1.2	1.2	1.2	1.2
2	2	–	–	–
–	–	5	5	5
0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6	–	–	–
–	–	–	–	–
2	2	2	2	2
0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6
8000	8000	8000	8000	8000
III/3	III/3	III/3	III/3	III/3
690	690	–	–	–
690	690	1000	1000	1000
440	440	690	690	690
440	440	690	690	690
238	560	1120	1610	1610
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–
170	400	800	1150	1150
170	400	800	1150	1150
–	–	–	–	–
170	400	800	1150	1150
–	–	–	–	–
120	250	650	1100	1100
–	–	–	–	–
see page A42	see page A42	see page A42	see page A42	see page A42
see page A40	see page A40	see page A40	see page A40	see page A41
see page A40	see page A40	see page A40	see page A40	see page A41
see page A44	see page A44	see page A44	see page A44	see page A44
see page A44	see page A44	see page A44	see page A44	see page A44
see page A44	see page A44	see page A44	see page A44	see page A44
25	63	160	250	250
25	50	160	–	–
–	–	–	–	–
63	125	250	250	250
50	80	200	–	–
–	–	–	–	–
35	55	125	160	160
32	50	113	144	144

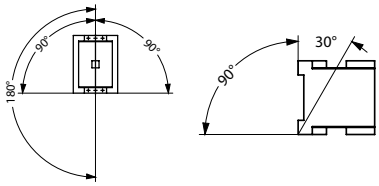
NEMA/EEMAC Rated Contactors				DILM-00N	DILM-0N
UL/CSA Ratings *(cont.)*					
Horsepower ratings (AC)					
Single phase					
	115V		[HP]	⅓	1
	200V		[HP]	–	–
	230V		[HP]	1	2
Three phase					
	200V		[HP]	1½	3
	230V		[HP]	1½	3
	460V		[HP]	2	5
	575V		[HP]	2	5
NEMA Size (non-jogging duty)			[Size]	00	0
Current heat loss at I_{th}		I_{th}	[W]	4.7	4.7
Current heat loss at I_e to AC-3; 400V		I_e	[W]	0.6	1.1
Impedance per pole			[mΩ]	2.5	2.5
Magnet System					
Voltage tolerance					
AC operated					
Single voltage coil 60Hz	Pick-up	x V coil	[x U_c]	0.8 – 1.1	0.8 – 1.1
	Drop-out	x V coil	[x U_c]	0.3 – 0.6	0.3 – 0.6
Single voltage coil 50Hz	Pick-up	x V coil	[x U_c]	0.8 – 1.1	0.8 – 1.1
	Drop-out	x V coil	[x U_c]	0.3 – 0.6	0.3 – 0.6
Dual voltage coil 50Hz, 60Hz	Pick-up	x V coil	[x U_c]	0.8 – 1.1	0.8 – 1.1
	Drop-out	x V coil	[x U_c]	0.3 – 0.6	0.3 – 0.6
Dual frequency coil 50/60Hz	Pick-up	x V coil	[x U_c]	–	–
	Drop-out	x V coil	[x U_c]	–	–
DC operated ❶	Pick-up	x V coil	[x U_c]	0.8 – 1.1 ❷	0.8 – 1.1 ❷
	Drop-out	x V coil	[x U_c]	0.15 – 0.6	0.15 – 0.6
Power consumption of the coil in a cold state and 1.0 x U_c					
AC operated					
Single voltage coil 60Hz	Pick-up		[VA]	30	30
	Sealed		[VA/W]	4.4/1.4	4.4/1.4
Single voltage coil 50Hz	Pick-up		[VA]	24	24
	Sealed		[VA/W]	3.4/1.2	3.4/1.2
Dual voltage coil 50Hz, 60Hz	Pick-up		[VA]	–	–
	Sealed		[VA/W]	–	–
Dual frequency coil 50/60Hz	Pick-up		[VA]	25 – 27	25 – 27
	Sealed		[VA/W]	3.3 – 4.2/1.2 – 1.4	3.3 – 4.2/1.2 – 1.4
DC operated	Pick-up		[W]	3	4.5
	Sealed		[W]	3	4.5
Duty factor (DF)			[%DF]	100	100
Switching times at 100% U_c (rated coil voltage main contacts					
AC operated	Closing delay	Min./Max.	[ms]	15 – 21	15 – 21
	Opening delay	Min./Max.	[ms]	9 – 18	9 – 18
DC operated ❶	Closing delay	Min./Max.	[ms]	31	31
	Opening delay	Min./Max.	[ms]	12	12
Arcing time (AC)		Maximum	[ms]	10	10
Permissible residual current (with actuation of A11 by the electronics with no signal)			[mA]	–	–
Electromagnetic Cmopatibility (EC)					
Emitted interference				to EN 60947-1	
Noise immunity				to EN 60947-1	

❶ True DC voltage or derived from a full wave 3-phase bridge rectifier or filtered 1-phase AC supply.

❷ At 24V: 0.7 . . . 1.3 without additional auxiliary contact modules and ambient temperature 40 °C

DILM-1N	DILM-2N	DILM-3N	DILM-4N	DILM-5N
2	3	7½	–	–
–	–	–	–	–
3	7½	15	–	–
7½	10	25	40	75
7½	15	30	50	100
10	25	50	100	200
10	25	50	100	200
1	2	3	4	5
7.3	11.3	14.6	30.4	30.4
1.7	7.2	11.5	23.8	23.8
2	1.5	0.6	0.6	0.6
0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1
0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.25 – 0.6	0.25 – 0.6
0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1
0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6
0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1
0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6
–	–	–	–	–
–	–	–	–	–
0.7 – 1.2 ❸	0.7 – 1.2 ❸	0.7 – 1.2 ❸	0.7 – 1.2 ❸	0.7 – 1.2 ❸
0.15 – 0.6	0.15 – 0.6	0.15 – 0.6	0.15 – 0.6	0.15 – 0.6
67	178	345	170	170
8.7/2.6	19/5.3	30/7.1	3.1/2.1	3.1/2.1
52	149	310	180	180
7.1/2.1	16/4.6	26/5.8	3.1/2.1	3.1/2.1
–	–	–	–	–
–	–	–	–	–
58 – 62	154 – 168	328 – 372	170	170
6.5 – 9.1/2 – 2.5	14 – 22/4.3 – 5.3	22.6 – 37.1/6.1 – 7.5	3.1/2.1	3.1/2.1
12@24V	12@24V	90@24V	149@24V	149@24V
0.5@24V	0.5@24V	1.3@24V	2.1@24V	2.1@24V
100	100	100	100	100
16 – 22	12 – 18	14 – 20	28 – 33	28 – 33
8 – 14	8 – 13	9 – 14	35 – 41	35 – 41
47	54	45	35	35
30	24	34	30	30
10	10	15	15	15
–	< 1	< 1	< 1	< 1
		to EN 60947-1		
		to EN 60947-1		

❸ RDC 24 (U_c min 24V DC, U_c max 27V DC)
RDC 60 (U_c min 48V DC, U_c max 60V DC)
RDC 130 (U_c min 110V DC, U_c max 130V DC)
RDC 240 (U_c min 200V DC, U_c max 240V DC)
i.e.: $U_c = 0.7 \times U_c$ min - $1.2 \times U_c$ max
$U_c = 0.7 \times 24V = 16.8$ V DC - $1.2 \times 27V = 32.4$V DC

Capacitor Switching Contactors				DILK12	DILK20	DILK25	DILK33	DILK50
General								
Standards					UL, CSA, IEC/EN60947, VDE 0660			
UL Report Number						E29096		
CSA Report Number						3211 04		
Lifespan, mechanical								
AC operated		Ops	[x 10^6]	10	10	10	10	10
DC operated		Ops	[x 10^6]	10	10	10	10	10
Max. Operating frequency, mechanical								
AC operated			Ops/h	9000	5000	5000	5000	5000
DC operated			Ops/h	9000	5000	5000	5000	5000
Climatic proofing								
Open					Damp heat constant to IEC60068-2-78			
Enclosed					Damp heat, cyclic to IEC 60068-2-30			
Ambient temperature								
Open			[C]	-25 °C...60 °C	-25 °C...60 °C	-25 °C...60 °C	-25 °C...60 °C	-25 °C...60 °C
			[F]	*-13 °F...140 °F*	*-13 °F...140 °F*	*-13 °F...140 °F*	*-13 °F...140 °F*	*-13 °F...140 °F*
Enclosed			[C]	-25 °C...40 °C	-25 °C...40 °C	-25 °C...40 °C	-25 °C...40 °C	-25 °C...40 °C
			[F]	*-13 °F...104 °F*	*-13 °F...104 °F*	*-13 °F...104 °F*	*-13 °F...104 °F*	*-13 °F...104 °F*
Storage			[C]	-40 °C...80 °C	-40 °C...80 °C	-40 °C...80 °C	-40 °C...80 °C	-40 °C...80 °C
			[F]	*-40 °F...176 °F*	*-40 °F...176 °F*	*-40 °F...176 °F*	*-40 °F...176 °F*	*-40 °F...176 °F*
Mounting position								
AC and DC								
Mechanical shock resistance (IEC/EN 60068-2-27)								
Half-sinusoidal shock, 10 ms								
Main Contacts	NO contacts	Make	[g]	10	10	10	10	10
	NO/NC contacts	Make/Break	[g]	–	–	–	–	–
Auxiliary contacts	NO contacts	Make	[g]	7	7	7	7	7
	NC contacts	Break	[g]	5	5	5	5	5
Degree of protection				IP20	IP00	IP00	IP00	IP00
Protection against direct contact when actuated from front (IEC536)					Finger and-back-of-hand proof			
Weight								
AC			[kg]	0.41	0.55	0.55	1	1
DC			[kg]	–	–	–	–	–
Main terminals								
Wire Capacity		min	[AWG]	1 x 18 2 x 18	1 x 18 2 x 18	1 x 18 2 x 18	1 x (12 – 2) 2 x (12 – 2)	1 x (12 – 2) 2 x (12 – 2)
(Cu cable)		max	[AWG]	1 x 14 2 x 14	1 x 6 2 x 6	1 x 6 2 x 6	1 x 1 2 x 2	1 x 1 2 x 2

Capacitor Switching Contactors			DILK12	DILK20	DILK25	DILK33	DILK50
General *(cont.)*							
Main cable cross sections							
Solid		[mm²]	1 x (0.75 – 4.0)	1 x (0.75 – 16)	1 x (0.75 – 16)	1 x (2.5 – 16)	1 x (2.5 – 16)
			2 x (0.75 – 2.5)	2 x (0.75 – 10)	2 x (0.75 – 10)	2 x (2.5 – 16)	2 x (2.5 – 16)
Flexible with ferrule		[mm²]	1 x (0.75 – 2.5)	1 x (0.75 – 16)	1 x (0.75 – 16)	1 x (2.5 – 35)	1 x (2.5 – 35)
			2 x (0.75 – 2.5)	2 x (0.75 – 10)	2 x (0.75 – 10)	2 x (2.5 – 25)	2 x (2.5 – 25)
Flexible with cable lug		[mm²]	–	–	–	–	–
Stranded		[mm²]	–	1 x 16	1 x 16	1 x (16 – 50)	1 x (16 – 50)
			–	–	–	2 x (16 – 35)	2 x (16 – 35)
Stranded with cable lug		[mm²]	–	–	–	–	–
Flat conductor	Number of segments x width x thickness	[mm]	–	–	–	12 x (6 x 9 x 0.8)	12 x (6 x 9 x 0.8)
Bus bar	Width	[mm]	–	–	–	–	–
Main cable connection screw/bolt			M3.5	M5	M5	M6	M6
Tightening torque		[Nm]	1.2	3	3	3	3
Control circuit cable cross sections							
Solid		[mm²]	1 x (0.75 – 4.0)	1 x (0.75 – 4)	1 x (0.75 – 4)	1 x (0.75 – 4)	1 x (0.75 – 4)
			2 x (0.75 – 2.5)	1 x (0.75 – 4)	1 x (0.75 – 4)	1 x (0.75 – 4)	1 x (0.75 – 4)
Flexible with ferrule		[mm²]	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)
			2 x (0.75 – 2.5)	2 x (0.75 – 2.5)	2 x (0.75 – 2.5)	2 x (0.75 – 2.5)	2 x (0.75 – 2.5)
Solid or stranded		[AWG]	18 – 14	18 – 14	18 – 14	18 – 14	18 – 14
Control circuit cable connection screw/bolt			M3.5	M3.5	M3.5	M3.5	M3.5
Tightening torque		[Nm]	1.2	1.2	1.2	1.2	1.2
Tools							
Main cable							
Posidriv screwdriver		[Size]	2	2	2	2	2
Hexagon socket-head spanner	SW	[mm]	–	–	–	–	–
Standard screw driver		[mm]	0.8 x 5.5	0.8 x 5.5	0.8 x 5.5	0.8 x 5.5	0.8 x 5.5
			1 x 6	1 x 6	1 x 6	1 x 6	1 x 6
Wrench		[mm]	–	–	–	–	–
Control cable							
Posidriv screwdriver		[Size]	2	2	2	2	2
Standard screwdriver		[mm]	0.8 x 5.5	0.8 x 5.5	0.8 x 5.5	0.8 x 5.5	0.8 x 5.5
			1 x 6	1 x 6	1 x 6	1 x 6	1 x 6
Main Contacts							
Rated impulse withstand	U_{imp}	[V AC]	8000	8000	8000	8000	8000
Overvoltage category/pollution degree			III/3	III/3	III/3	III/3	III/3
Rated insulation	U_i	[V AC]	690	690	690	690	690
Rated operational voltage	U_e	[V AC]	690	690	690	690	690
Safe isolation to VDE 0106 Part 101 and Part 101/A1							
Between coil and contacts		[V AC]	400	440	440	440	440
Between contacts		[V AC]	400	440	440	440	440

Capacitor Switching Contactors				DILK12	DILK20	DILK25	DILK33	DILK50
Main Contacts *(cont.)*								
Making capacity cos φ to IEC/EN 60-947 up to 690V			[A]	144	238	384	560	910
Breaking capacity cos φ = 0.35, AC, 50 – 60Hz								
	200V		[A]	–	–	–	–	–
	230V		[A]	–	–	–	–	–
	200…230V		[A]	–	–	–	–	–
	220…230V		[A]	120	170	320	400	650
	380…400V		[A]	120	170	320	400	650
	460V		[A]	–	–	–	–	–
	500V		[A]	100	170	320	400	650
	575V		[A]	–	–	–	–	–
	660…690V		[A]	70	120	180	250	370
	1000V		[A]	–	–	–	–	–
Short circuit rating								
Max. fuse								
Type "2"	400V	gG/gL 500V	[A]	20	25	63	63	125
	690V	gG/gL 690V	[A]	20	25	35	50	80
	1000V	gG/gL 1000V	[A]	–	–	–	–	–
Type "1"	400V	gG/gL 500V	[A]	35	63	125	125	250
	690V	gG/gL 690V	[A]	25	50	63	80	100
	1000V	gG/gL 1000V	[A]	–	–	–	–	–
UL/CSA Ratings								
Continuous current rating								
50/60Hz, 3-pole	Open		[A]	20	35	40	55	80
	Enclosed		[A]	18	32	36	50	72
Capacitive switching ratings								
Three phase, 60Hz, Amperes								
	240V		[A]	18	28	36	48	72
	480V		[A]	18	28	36	48	72
	600V		[A]	14.4	28	38.4	48	72
Three phase, 60Hz, kVAR								
	240V		[kVAR]	7.5	12	15	20	30
	480V		[kVAR]	15	20	30	40	60
	600V		[kVAR]	15	30	40	50	75
IEC Capacitor Duty Ratings								
Group compensation motor rating of three phase capacitors								
	230V		[kVAR]	7.5	11	15	20	25
	400V		[kVAR]	12.5	20	25	33.3	50
	525V		[kVAR]	16.7	25	33.3	40	65
	690V		[kVAR]	20	33.3	40	55	85

Capacitor Switching Contactors				DILK12	DILK20	DILK25	DILK33	DILK50
IEC Capacitor Duty Ratings *(cont.)*								
Group compensation rated operational current I_e of three phase capacitors								
Open								
	230V	I_e	[A]	18	29	38	50	72
	400V	I_e	[A]	18	29	38	50	72
	525V	I_e	[A]	18	29	38	50	72
	690V	I_e	[A]	18	29	38	50	72
Enclosed								
	230V	I_e	[A]	16	26	34	45	65
	400V	I_e	[A]	16	26	34	45	65
	525V	I_e	[A]	16	26	34	45	65
	690V	I_e	[A]	16	26	34	45	65
Making capacity (I - peak value) without damping			[x I_e]	180	180	180	180	180
Component lifespan		Ops	[x 10^6]	0.15	0.15	0.15	0.15	0.15
Max. operating frequency			[Ops/h]	120	120	120	120	120
Current Heat Loss *(3 or 4 pole)*								
Current heat loss at I_{th}		I_{th}	[W]	4.7	7.3	12.1	11.3	28.8
Current heat loss at I_e to AC-3/400V		I_e	[W]	1.1	1.7	6.1	7.2	19
Impedance per pole			[mΩ]	2.5	2	2	1.5	1.5
Magnet System								
Voltage tolerance								
AC operated								
Single voltage coil 60Hz	Pick-up	x V coil	[x U_c]	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1
	Drop-out	x V coil	[x U_c]	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6
Single voltage coil 50Hz	Pick-up	x V coil	[x U_c]	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1
	Drop-out	x V coil	[x U_c]	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6
Dual voltage coil 50Hz, 60Hz	Pick-up	x V coil	[x U_c]	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1
	Drop-out	x V coil	[x U_c]	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6
Dual frequency coil 50/60Hz	Pick-up	x V coil	[x U_c]	–	–	–	–	–
	Drop-out	x V coil	[x U_c]	–	–	–	–	–
DC operated ❶	Pick-up	x V coil	[x U_c]	0.8 – 1.1 ❷	0.7 – 1.2 ❸	0.7 – 1.2 ❸	0.7 – 1.2 ❸	0.7 – 1.2 ❸
	Drop-out	x V coil	[x U_c]	0.15 – 0.6	0.15 – 0.6	0.15 – 0.6	0.15 – 0.6	0.15 – 0.6

❶ True DC voltage or derived from a full wave 3-phase bridge rectifier or filtered 1-phase AC supply.

❷ At 24V: 0.7 . . . 1.3 without additional auxiliary contact modules and ambient temperature 40 °C

❸ RDC 24 (U_c min 24V DC, U_c max 27V DC)
RDC 60 (U_c min 48V DC, U_c max 60V DC)
RDC 130 (U_c min 110V DC, U_c max 130V DC)
RDC 240 (U_c min 200V DC, U_c max 240V DC)
i.e.: $U_c = 0.7 \times U_c$ min - $1.2 \times U_c$ max
$U_c = 0.7 \times 24V = 16.8$ V DC - $1.2 \times 27V = 32.4$V DC

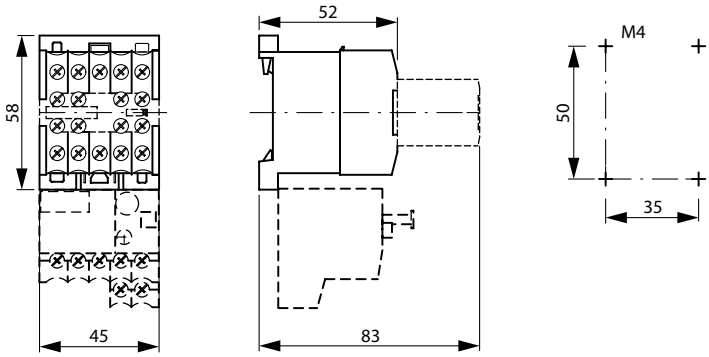
Capacitor Switching Contactors				DILK12	DILK20	DILK25	DILK33	DILK50
Magnet System *(cont.)*								
Power consumption of the coil in a cold state and 1.0 x U_C								
AC operated								
Single voltage coil 60Hz	Pick-up		[VA]	30	67	67	178	178
	Sealed		[VA/W]	4.4/1.4	8.7/2.6	8.7/2.6	19/5.3	19/5.3
Single voltage coil 50Hz	Pick-up		[VA]	24	52	52	149	149
	Sealed		[VA/W]	3.4/1.2	7.1/2.1	7.1/2.1	16/4.6	16/4.6
Dual frequency coil 50/60Hz	Pick-up		[VA]	25 – 27	58 – 62	58 – 62	154 – 168	154 – 168
	Sealed		[VA/W]	3.3 – 4.2/ 1.2 – 1.4	6.5 – 9.1/ 2 – 2.5	6.5 – 9.1/ 2 – 2.5	14 – 22/ 4.3 – 5.3	14 – 22/ 4.3 – 5.3
DC operated ❶	Pick-up		[W]	4.5	12@24V	12@24V	12@24V	12@24V
	Sealed		[W]	4.5	0.5@24V	0.5@24V	0.5@24V	0.5@24V
Duty factor (DF)			[%DF]	100	100	100	100	100
Switching times at 100% U_C (rated coil voltage) main contacts								
AC operated	Closing delay	Min./Max.	[ms]	15 – 21	16 – 22	16 – 22	12 – 18	12 – 18
	Opening delay	Min./Max.	[ms]	9 – 18	8 – 14	8 – 14	8 – 13	8 – 13
DC operated	Closing delay	Min./Max.	[ms]	31	47	47	54	54
	Opening delay	Min./Max.	[ms]	12	30	30	24	24
Arcing time (AC)		Maximum	[ms]	10	10	10	10	10
Electromagnetic Compatibility (EC)								
Emitted interference						to EN 60947-1		
Noise immunity						to EN 60947-1		

❶ True DC voltage or derived from a full wave 3-phase bridge rectifier or filtered 1-phase AC supply.

Dimensions are in millimeters.
Not intended for manufacturing purposes.

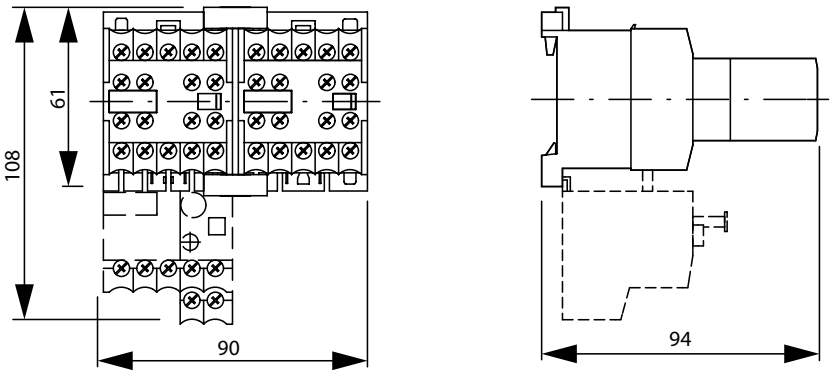
Miniature Contactor

DILEM-...



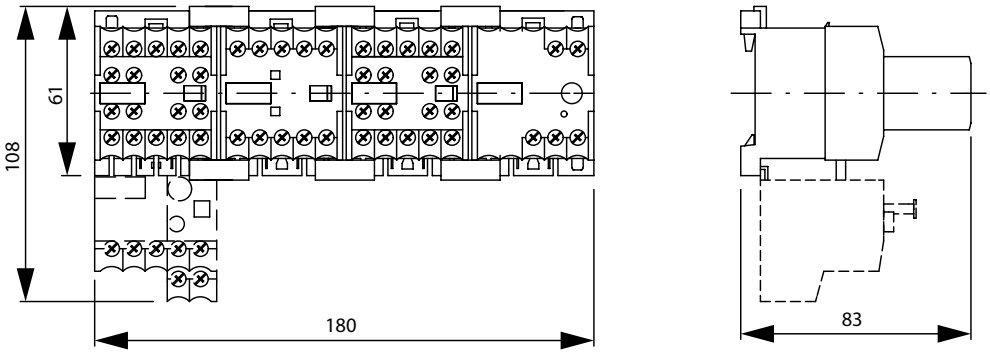
Reversing Combination

DIULEM...



Star-Delta Starter Combinations

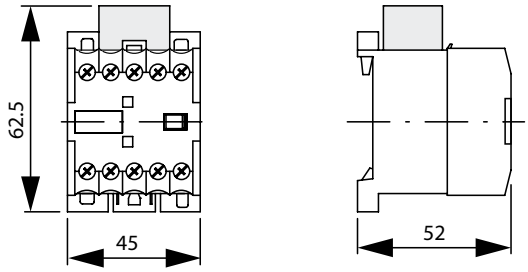
SDAINLEM...



Dimensions are in millimeters.
Not intended for manufacturing purposes.

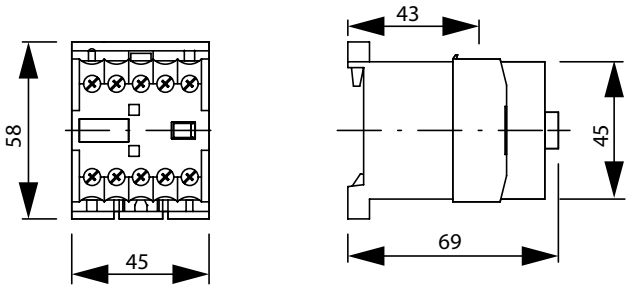
Miniature Contactor with Suppressor

RCDILE…; VGDILE…



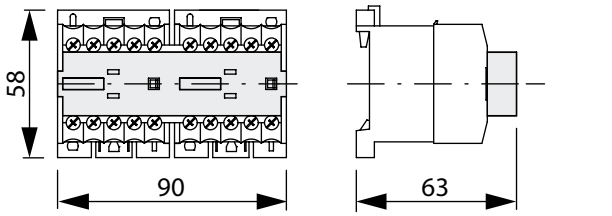
With Sealable Shroud

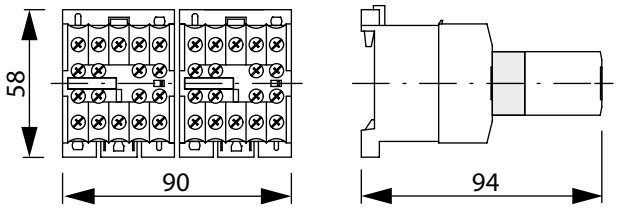
DILEM-…+HDILE



Mechanical Interlock

MVDILE

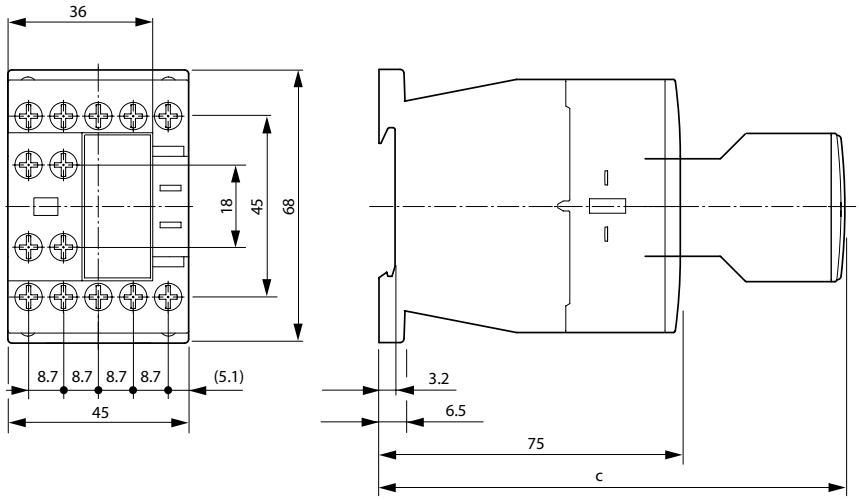


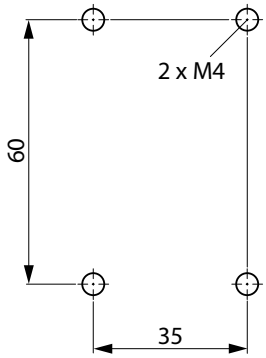


Contactors *(low range)*

Dimensions are in millimeters.
Not intended for manufacturing purposes.

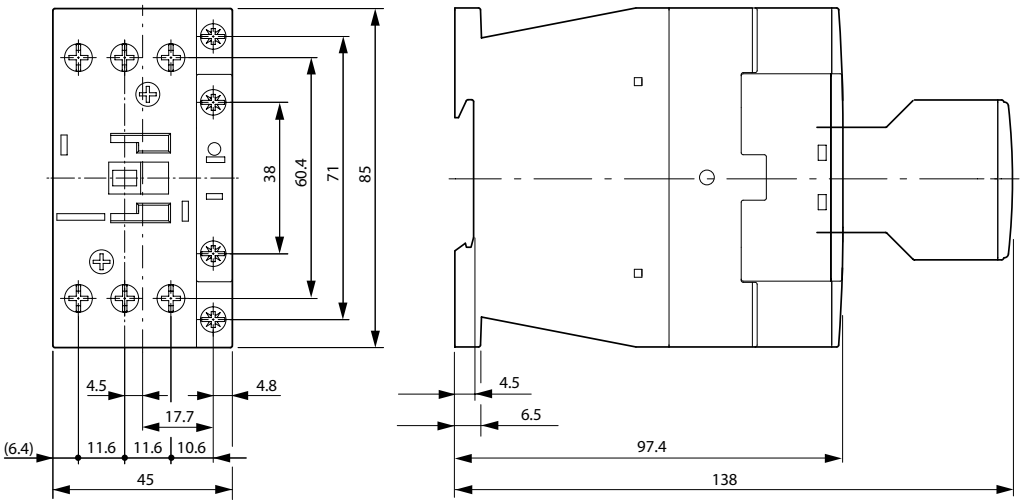
DILM7-...; DILM9-...; DILM12-...

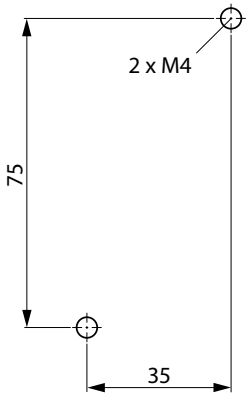




Auxiliary Contact	c
DILM32-XHI	117
DILA-XHI	117
DILA-XHI...T	125

DILMF8-...; DILMF11-...; DILMF14-...; DILM(F)17-...; DILM(F)25-...; DILM(F)32-...





Sideways distance to grounding parts: 6mm

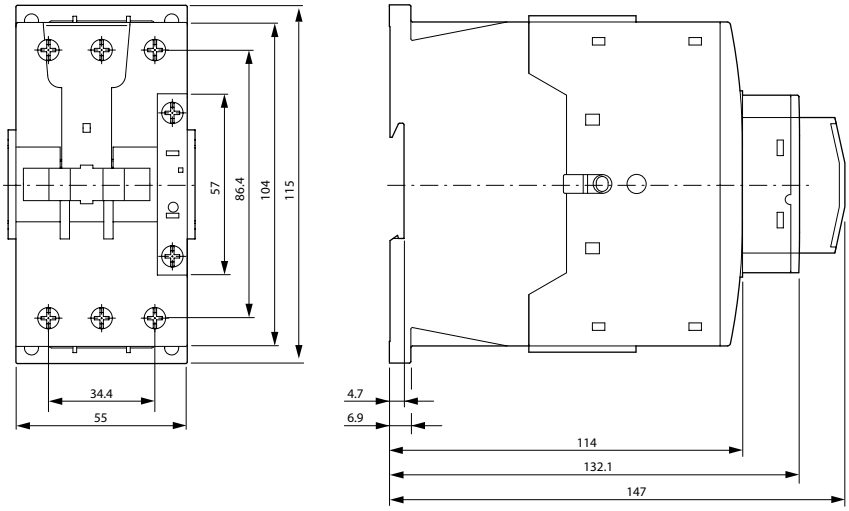
A

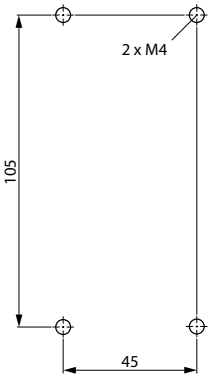
Contactors

Contactors *(low range)*

DILM(F)40-...; DILM(F)50-...; DILM(F)65-...

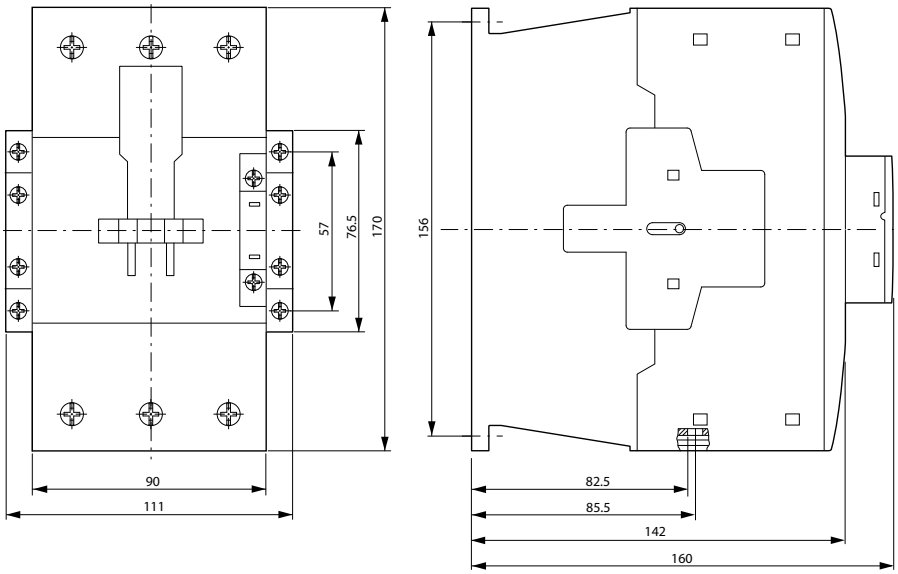
Dimensions are in millimeters.
Not intended for manufacturing purposes.

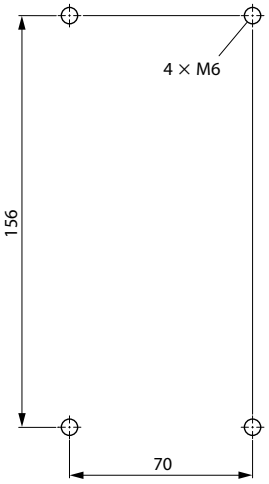




Sideways distance to grounding parts: 6mm

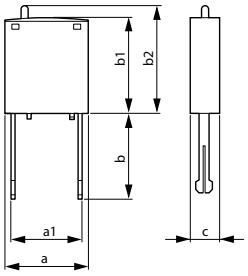
DILM(F)80-...; DILM(F)95-...; DILM(F)115-...; DILM(F)150-...





Sideways distance to grounding parts: 10mm

Plug-in Modules

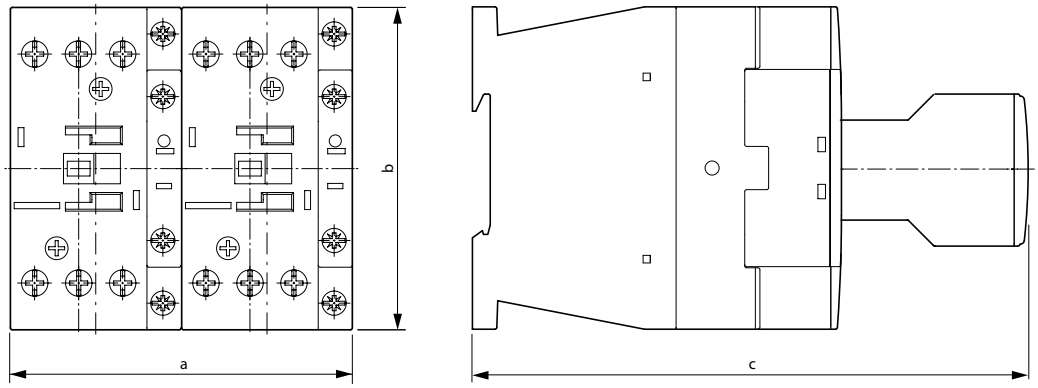


dimension	DILM12-XSPR... DILM12-XSPV... DILM12-XSPI... DILM12-XSPD...	DILM32-XSPR... DILM32-XSPV... DILM32-XSPI...	DILM95-XSPR... DILM95-XSPV... DILM95-XSPI...
a	25	25	25
a1	9.2	9.2	20
b	25.9	16	18.5
b1	28	28	28
b2	≈32	≈32	≈32
c	9	9	9

Reversing Combinations

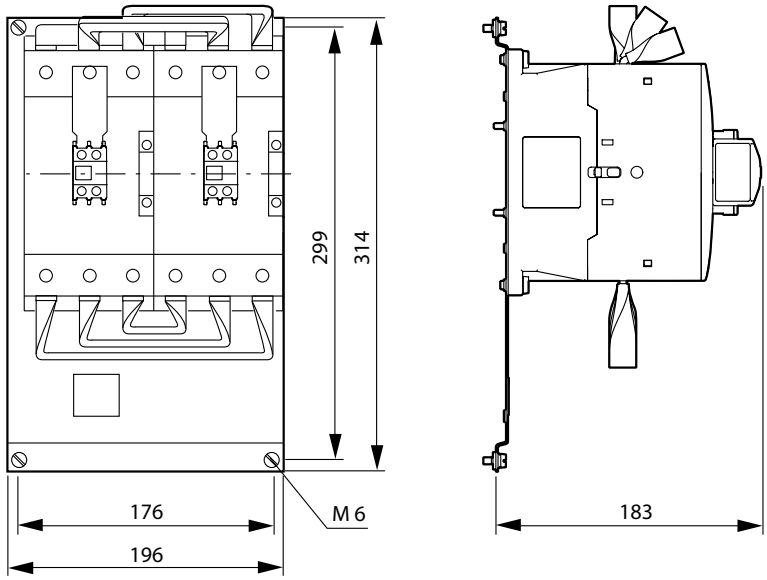
DIULM7-... – DIULM65-...

Dimensions are in millimeters.
Not intended for manufacturing purposes.



dimension	DIULM7/11 – DIULM12/21	DIULM17/21 – DIULM32/21	DIULM40/11 – DIULM65/11
a	90	90	110
b	68	85	115
c	117	138	147

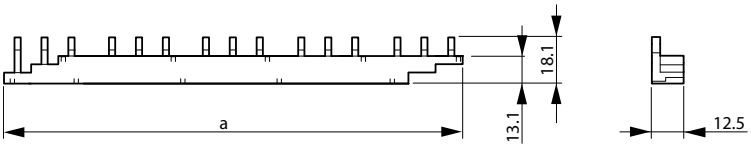
DIULM80-... – DIULM150-...



Three-phase Commoning Link

DILM12-XDSB…

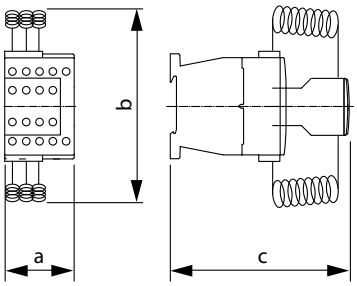
Dimensions are in millimeters.
Not intended for manufacturing purposes.



	DILM12-XDSB0/3	DILM12-XDSB0/4	DILM12-XDSB0/5
a	112	157	202

Capacitor Switching Contactors

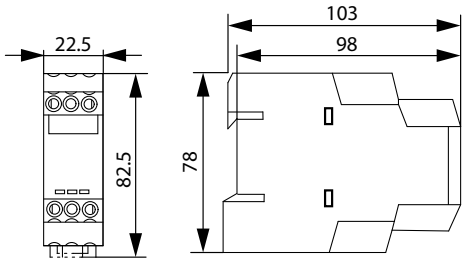
DILK12-… – DILK50-…



dimension	DILK	DILK20	DILK25	DILK33	DILK50
a	45	45	45	55	55
b	120	135	135	190	190
c	118	138	138	147	147
a1	35	35	35	45	45
b1	60	75	75	105	105
d	2 x M4	2 x M4	2 x M4	2 x M4	2 x M4

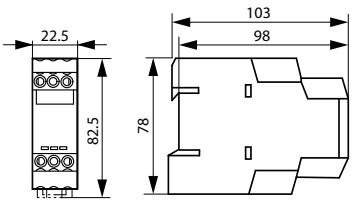
Amplifier Module

ETS4-VS3



Contactor Monitor Device

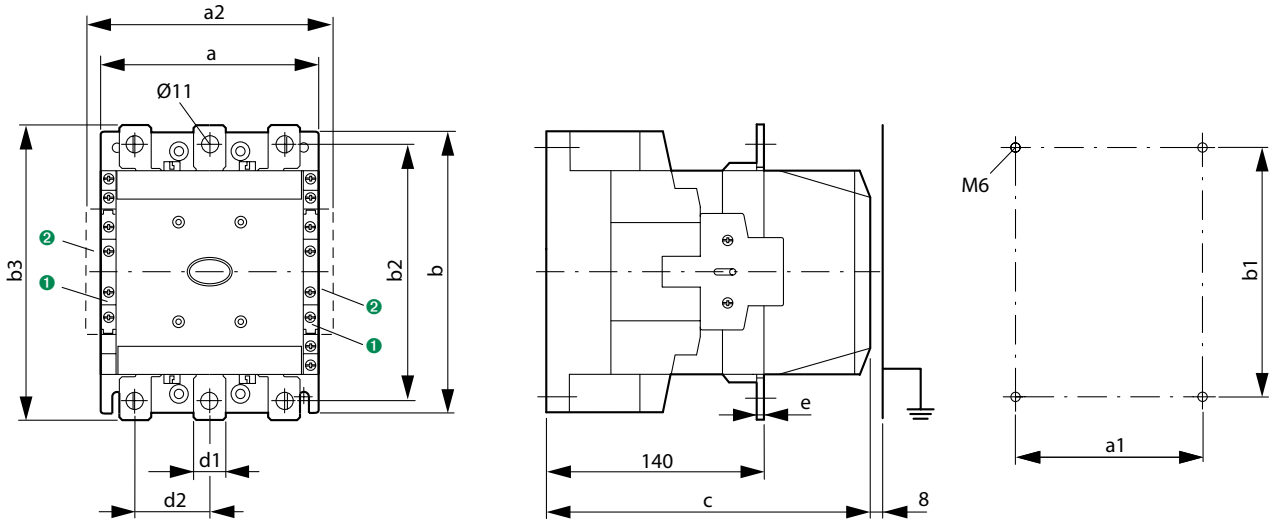
CMD…



Contactors *(high range)*

DILM185-. . . – DILM500-. . .

Dimensions are in millimeters.
Not intended for manufacturing purposes.



dimension	DILM185	DILM225	DILM250	DILM300	DILM400	DILM500
a	140	140	140	160	160	160
a1	120	120	120	130	130	130
a2	160	160	160	180	180	180
b	180	180	180	200	200	200
b1	160	160	160	180	180	180
b2	164	164	164	184	184	189
b3	189	189	189	209	209	219
d1	20	20	25	25	25	38
d2	48	48	48	48	48	57
e	5	5	5	6	6	6
c	208	208	208	216	216	216

❶ DILM1000-XHI. . .-SI
❷ DILM1000-XHI11-SA

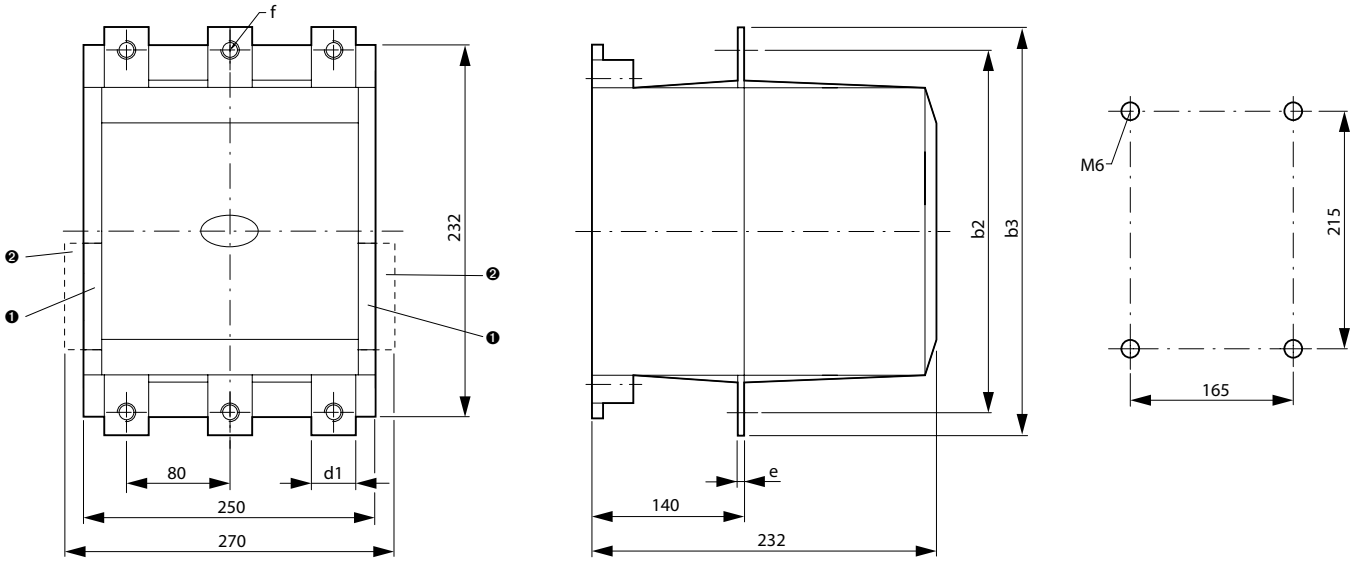
A

Contactors

Contactors *(high range)*

DILM580-. . . – DILM1000-. . .

Dimensions are in millimeters.
Not intended for manufacturing purposes.



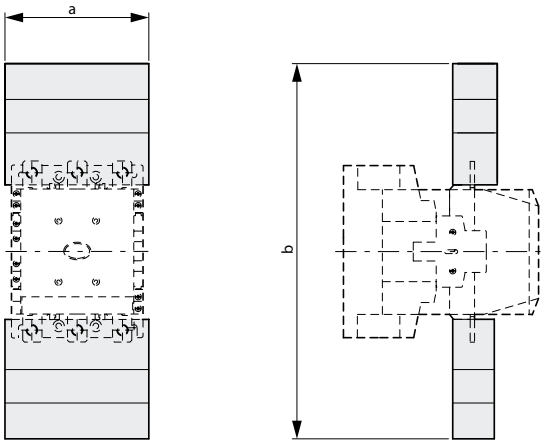
dimension	DILM580	DILM650	DILM750	DILM820	DILM1000
b2	256	256	256	256	256
b3	286	286	296	296	296
d1	35	35	45	45	45
e	6	6	6	6	10
f	11	11	13.5	13.5	13.5

❶ DILM1000-XHI. . .-SI
❷ DILM1000-XHI11-SA

Dimensions are in millimeters.
Not intended for manufacturing purposes.

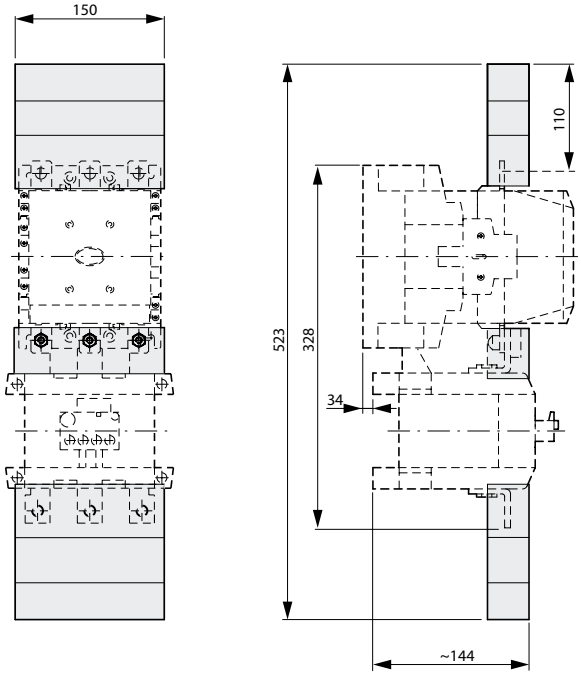
Contactor with Terminal Shroud

DILM185-... – DILM1000-... + DILM...-XHB



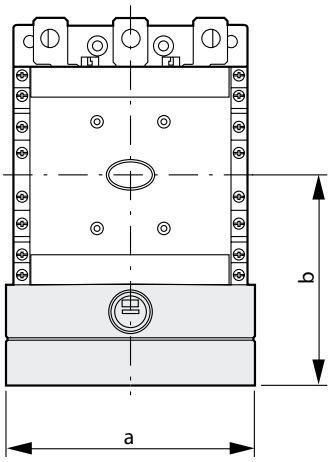
dimension	DILM185 DILM225 DILM250 DILM185-XP1	DILM300 DILM400	DILM500	DILM580 DILM650 DILM750 DILM820 DILM1000
a	150	150	174	236
b	384	404	426	506

DILM185-... – DILM250-... + Z5-.../FF250



Contactor with Start-Point Bridge + Terminal Shroud

DILM...-XS1

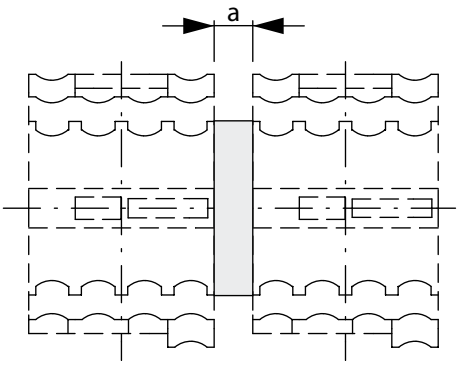


dimension	DILM185 – DILM250	DILM300 - DILM400	DILM500
a	150	150	176
b	127	137	146

Dimensions are in millimeters.
Not intended for manufacturing purposes.

Mechanical Interlock

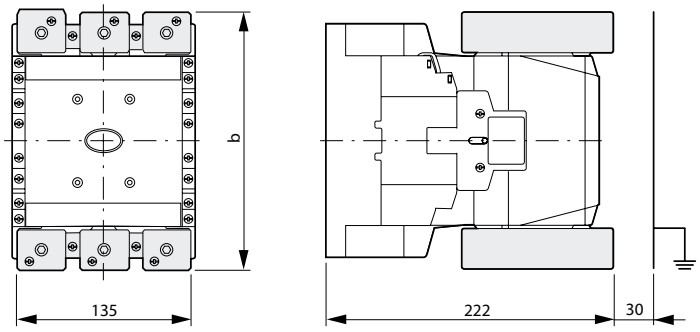
DILM500-XMV



dimension	DILM185 – DILM500
a	15

Cable Terminal Block

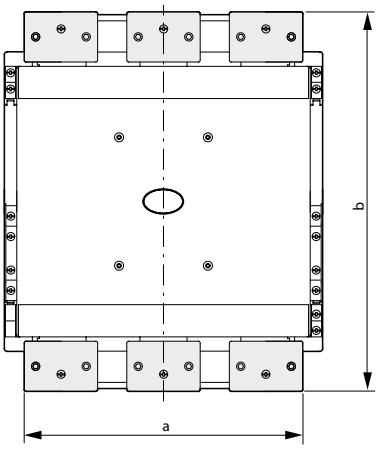
DILM…-XKU-S



dimension	DILM185 – DILM225	DILM250	DILM300 – DILM400
b	198	198	218

Flat Strip Conductor Terminals

DILM…-XKB-S



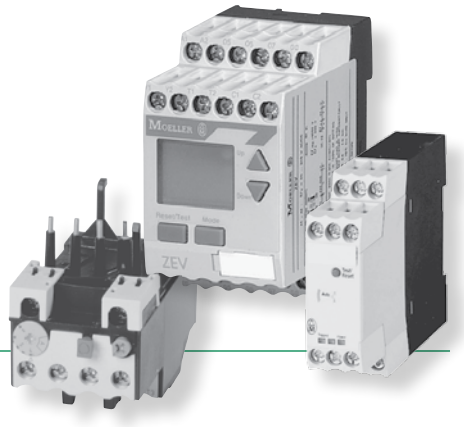
dimension	DILM500	DILM580-650	DILM750-820
a	171	218	231
b	295	295	310

motor protection

MOELLER

motor protection from Moeller

protection solutions to 820A



> Superior IEC designs

> Class 10 protection for modern motors

> Ambient temperature compensation

> Test / OFF button

> Automatic & manual reset

> Trip indication & trip-free release

> Integrated NO & NC contact

Moeller offers an array of motor protection solutions, from the modest "ZE" bi-metallic thermal overload relay, to our advanced ZEV electronic motor protector. We also offer relays specifically built for motors with PTC thermistors.

Better protection

Modern motors are built with less metal, which means they dissipate less heat. This calls for the modern protection offered by IEC-style Class 10 overload relays... they trip in 10 seconds under locked rotor conditions. Most motor manufacturers today recommend this type of "close" protection. If your application calls for longer run-up times, our ZW7 current transformer relay or ZEV programmable relay are an ideal choice.

Many standard features

All Moeller overload relays come with a host of standard features including phase-failure sensitivity, temperature compensation, test / reset buttons and a trip-free release. The auxiliary contacts of the relay disconnect the motor contactor and signal a fault. Moeller relays can also be used for protecting EExe hazardous location motors.

Worldwide approvals

With the benefit of all major approvals, motor protection from Moeller can be used in virtually every country on the planet.

Feature Comparison	Protection Relay					
	ZE	ZB	Z5	ZW7	ZEV	EMT
Phase-failure sensitivity	✔	✔	✔		✔	✔
Temperature compensation	✔	✔	✔	✔	✔	N / A
Auxiliary switch 1 NO + 1 NC	✔	✔	✔	✔	✔	✔
Test / OFF button	✔	✔	✔	✔	✔	✔
Reset button manual / auto	✔	✔	✔	✔	✔	✔
Separate mounting		✔	✔	✔	✔	N / A
Protection for heavy starting duty				✔	✔	✔
Trip-free release	✔	✔	✔	✔	✔	N / A
LCD Display					✔	
LED Display						✔
Selectable trip time					✔	

✔ = standard features

Overload Protection Guide

Select Contactor

Locate contactor first, then scan down to determine appropriate overload relay

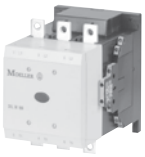

DILEM


DILM7
DILM9
DILM12

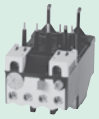
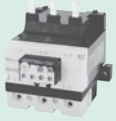
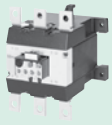
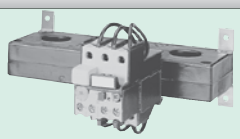

DILM17
DILM25
DILM32


DILM40
DILM50
DILM65


DILM80
DILM95
DILM150


DILM185
DILM225
DILM250


DILM300
to
DILM1000

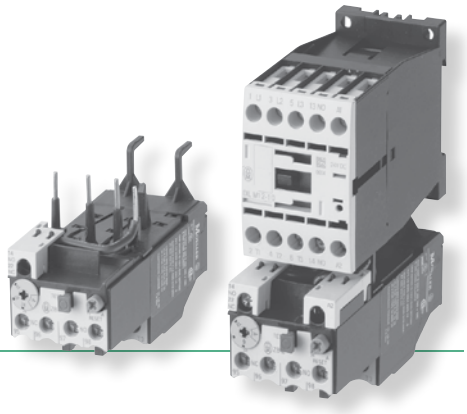
Thermal Overload Relays							
ZE - Direct Mount 0.1 – 12A setting range *See page B6*							
ZB12 - Direct Mount 0.1 – 16A setting range *See page B7*							
ZB32 - Direct Mount 0.1 – 32A setting range *See page B7*							
ZB65 - Direct Mount 6 – 65A setting range *See page B8*							
ZB150 - Direct or Separate Mount 25 – 150A setting range *See page B8*							
Z5-.../FF250 - Direct or Separate Mount 50 – 250A setting range *See page B9*							
Current Transformer-operated Overload Relay							
ZW7-... ❶ 42 – 540A setting range *See page B10*							
Electronic Motor-protective Relay							
ZEV ❷ 1 – 820A setting range *See page B20*							
Thermistor Protection Relays							
EMT6(DB)K *See page B30*	 						

❶ Can only be used from DILM50 to DILM580.
❷ Can only be used up to DILM820.

NEW

thermal overload relays

reliable, consistent motor protection



B

Motor Protection

Thermal overload motor protection has come a long way from the eutectic alloy solder-pots and replaceable "heaters" of yesterday. Today's IEC-style relays from Moeller feature bimetal technology that is very consistent, reliable and economical.

A great combination

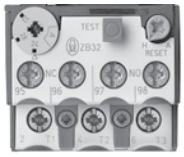
Most of our thermal relays are specifically designed to be close-coupled to a matching contactor. Virtually all ZE, ZB and Z5-series overloads, which cover the range from fractional to 250A, are direct mount designs. The resulting motor starters fit in an extremely compact footprint as narrow as 45mm. Protection for larger amp sizes is accomplished with Moeller's ZW7 overload relay with integrated current transformers.

Many standard features

Z-series overloads are the ideal choice In most industrial starting applications. Below 250A, all relays are Class 10, which means they trip within 10 seconds of a locked rotor condition. Many motor manufacturers agree that Class 10 devices offer superior protection against overloads, and also extend motor life by protecting winding insulation.

All of Moeller's thermal overload relays have ambient temperature compensation, automatic or manual reset and a test button. In addition, trip indication and a trip-free release are important safety features. Trip-free releases prevent the device from being held closed, even in the event of an overload.

Easy installation and operation

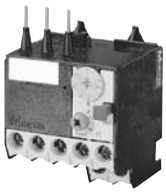


Once the overload is installed, a convenient dial adjustment is used to set the motor full load amps. Moeller's factory calibration assures that your motor investment is protected accurately.

- > Superior IEC designs
- > Class 10 protection for modern motors
- > Ambient temperature compensation
- > Test / OFF button
- > Automatic & manual reset
- > Trip indication & trip-free release
- > Integrated NO & NC contact

- Designed for Moeller's DIL EM miniature contactors
- Class 10 overload; trip response from 2 to 10 seconds
- Ambient compensated, bimetallic overload tripping mechanism
- Phase failure sensitive to IEC/EN 60947
- Manual / Automatic reset button
- Built-in NO and NC auxiliary contacts

Direct Mount ZE Thermal Overload Relays for DILEM Miniature Contactors ❶

Overload Relay	Adjustable Setting Range [A]	Auxiliary Contacts		For use with...	Short-Circuit Protection (Max 600V AC)		Catalog Number	Price
		NO	NC		Fuses [A]	Circuit Breaker [A]		
	0.1 – 0.16	1	1	DILEM DIULEM	1	15	**ZE-0,16**	144
	0.16 – 0.24	1	1		1	15	**ZE-0,24**	144
	0.24 – 0.4	1	1		1	15	**ZE-0,4**	144
	0.4 – 0.6	1	1		1	15	**ZE-0,6**	144
	0.6 – 1	1	1		3	15	**ZE-1,0**	144
	1 – 1.6	1	1		6	15	**ZE-1,6**	144
	1.6 – 2.4	1	1		6	15	**ZE-2,4**	144
	2.4 – 4	1	1		15	15	**ZE-4**	144
	4 – 6	1	1		20	15	**ZE-6**	144
	6 – 9	1	1		35	15	**ZE-9**	144
	9 – 12	1	1		45	–	**ZE-12** ❷	144

❶ When using DILEM and ZE, a distance of at least 5mm should be maintained between overload relays mounted side-by-side.
❷ Max. 480V AC.

- Class 10 overload; trip response from 2 to 10 seconds
- Ambient compensated, bimetallic overload tripping mechanism
- Phase failure sensitive to IEC/EN 60947
- Manual / Automatic reset button
- Built-in NO and NC auxiliary contacts

Direct Mount ZB Thermal Overload Relays for DILM7 – DILM32 Contactors [1]

Overload Relay	Adjustable Setting Range [A]	Auxiliary Contacts		For use with...	Short-Circuit Protection (Max 600V AC)		Catalog Number	Price
		NO	NC		Fuses [A]	Circuit Breaker [A]		
	0.1 – 0.16	1	1	DILM7 – DILM12 DIULM7 – DIULM12	1	25	**ZB12-0,16**	144
	0.16 – 0.24	1	1		1	25	**ZB12-0,24**	144
	0.24 – 0.4	1	1		1	25	**ZB12-0,4**	144
	0.4 – 0.6	1	1		1	25	**ZB12-0,6**	144
	0.6 – 1	1	1		3	25	**ZB12-1**	144
	1 – 1.6	1	1		6	25	**ZB12-1,6**	144
	1.6 – 2.4	1	1		6	25	**ZB12-2,4**	144
	2.4 – 4	1	1		15	25	**ZB12-4**	144
	4 – 6	1	1		20	25	**ZB12-6**	144
	6 – 10	1	1		40	25	**ZB12-10**	144
	9 – 12	1	1		60	30	**ZB12-12**	144
	12 – 16	1	1		60	30	**ZB12-16**	144
	0.1 – 0.16	1	1	DILM17 – DILM32 DIULM17 – DIULM32	1	25	**ZB32-0,16**	152
	0.16 – 0.24	1	1		1	25	**ZB32-0,24**	152
	0.24 – 0.4	1	1		1	25	**ZB32-0,4**	152
	0.4 – 0.6	1	1		1	25	**ZB32-0,6**	152
	0.6 – 1	1	1		3	25	**ZB32-1**	152
	1 – 1.6	1	1		6	25	**ZB32-1,6**	152
	1.6 – 2.4	1	1		6	25	**ZB32-2,4**	152
	2.4 – 4	1	1		15	25	**ZB32-4**	152
	4 – 6	1	1		20	25	**ZB32-6**	152
	6 – 10	1	1		40	25	**ZB32-10**	152
	10 – 16	1	1		60	30	**ZB32-16**	152
	16 – 24	1	1		90	30	**ZB32-24**	152
	24 – 32	1	1		125	40	**ZB32-32**	192

[1] ZB32 overload relays can be separately mounted using separate mounting base (catalog number: ZB32-XEZ).

- Class 10 overload; trip response from 2 to 10 seconds
- Ambient compensated, bimetallic overload tripping mechanism
- Phase failure sensitive to IEC/EN 60947
- Manual / Automatic reset button
- Built-in NO and NC auxiliary contacts

Direct Mount ZB Thermal Overload Relays for DILM40 – DILM150 Contactors [1]

Overload Relay	Adjustable Setting Range [A]	Auxiliary Contacts		For use with...	Short-Circuit Protection (Max 600V AC)		Catalog Number	Price
		NO	NC		Fuses [A]	Circuit Breaker [A]		
	6 – 10	1	1	DILM40 – DILM65 DIULM40 – DIULM65	40	40	**ZB65-10**	200
	10 – 16	1	1		60	60	**ZB65-16**	200
	16 – 24	1	1		90	90	**ZB65-24**	236
	24 – 40	1	1		125	125	**ZB65-40**	236
	40 – 57	1	1		200	150	**ZB65-57**	260
	50 – 65	1	1		200	150	**ZB65-65**	260
	25 – 35	1	1	DILM80 – DILM150 DIULM80 – DIULM150	125	125	**ZB150-35**	380
	35 – 50	1	1		225	200	**ZB150-50**	380
	50 – 70	1	1		250	250	**ZB150-70**	380
	70 – 100	1	1		600 Class J	400	**ZB150-100**	400
	95 – 125	1	1		500 Class J	500	**ZB150-125**	560
	120 – 150	1	1		400 Class J	600	**ZB150-150**	560

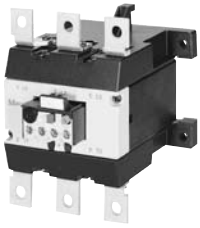
Separate Mount ZB Thermal Overload Relays for DILM80 – DILM150 Contactors

Overload Relay	Adjustable Setting Range [A]	Auxiliary Contacts		For use with...	Short-Circuit Protection (Max 600V AC)		Catalog Number	Price
		NO	NC		Fuses [A]	Circuit Breaker [A]		
	25 – 35	1	1	DILM80 – DILM150 DIULM80 – DIULM150	400 Class J	600	**ZB150-35/KK**	400
	35 – 50	1	1		400 Class J	600	**ZB150-50/KK**	400
	50 – 70	1	1		400 Class J	600	**ZB150-70/KK**	400
	70 – 100	1	1		400 Class J	600	**ZB150-100/KK**	424
	95 – 125	1	1		400 Class J	600	**ZB150-125/KK**	600
	120 – 150	1	1		400 Class J	600	**ZB150-150/KK**	600

[1] ZB65 overload relays can be separately mounted using separate mounting base (catalog number: ZB65-XEZ).

- Class 10 overload; trip response from 2 to 10 seconds
- Ambient compensated, bimetallic overload tripping mechanism
- Phase failure sensitive to IEC/EN 60947
- Manual / Automatic reset button
- Built-in NO and NC auxiliary contacts

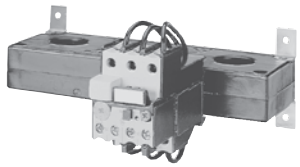
Direct or Separate Mount Z5 Thermal Overload Relays for DILM185 – DILM250 Contactors

Overload Relay	Adjustable Setting Range [A]	Auxiliary Contacts		For use with...	Short-Circuit Protection (Max 600V AC) ❶		Catalog Number	Price
		NO	NC		Fuses [A]	Circuit Breaker [A]		
	50 – 70	1	1	DILM185 – DILM250 DIULM185 – DIULM250	250	250	**Z5-70/FF250**	760
	70 – 100	1	1		400 class J	400	**Z5-100/FF250**	790
	95 – 125	1	1		500 class J	500	**Z5-125/FF250**	790
	120 – 160	1	1		600 class J	600	**Z5-160/FF250**	820
	160 – 220	1	1		800 class L	800	**Z5-220/FF250**	860
	200 – 250	1	1		700 class L	600	**Z5-250/FF250**	860

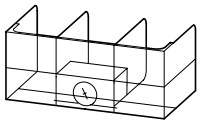
❶ When directly mounting device observe the maximum permissible fuse of the contactor.

- Designed for heavy-duty starting applications having long accelerating times
- Tripping time in 20 to 30 seconds under locked rotor conditions
- Ambient compensated, bimetallic overload tripping mechanism
- Manual / Automatic reset button
- Built-in NO and NC auxiliary contacts

Separate Mount ZW7 Current Transformer-Operated Thermal Overload Relays [1]

Overload Relay	Adjustable Setting Range [A]	Auxiliary Contacts		For use with…	Short-Circuit Protection		Catalog Number	Price
		NO	NC		Fuses [A]	Circuit Breaker [A]		
	42 – 63	1	1	DILM50 – DILM580 DIULM50 – DIULM580	As required by associated contactor. Overload relay is self-protecting.		ZW7-63	1060
	60 – 90	1	1				ZW7-90	1060
	85 – 125	1	1				ZW7-125	1200
	110 – 160	1	1				ZW7-160	1200
	160 – 240	1	1				ZW7-240	1450
	190 – 290	1	1				ZW7-290	1450
	270 – 400	1	1				ZW7-400	1450
	360 – 540	1	1				ZW7-540	1550

[1] The specified primary rated current applies to one cable loop; For lower rated motor current, loop cable several times (e.g., Looping cable twice with ZW7-63 will produce 21 – 31.5 A rated motor current).

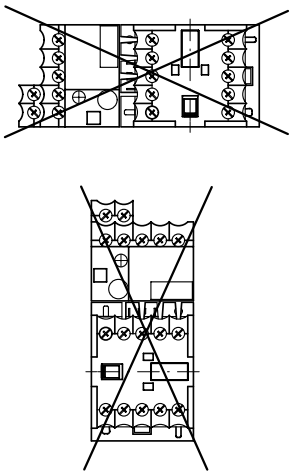
Accessory	Description	For use with...	Catalog Number	Price	Discount Code
Bases (for separate mounting)					
	For snap mounting on EN 50 022 DIN-rail or screw mounting.	ZB32	**ZB32-XEZ**	36	A14
		ZB65	**ZB65-XEZ**	60	A14
External Reset/Off Pushbuttons (for enclosed overload relays – mounting diameter: 22.5mm)					
	Actuator and Rod; 4X; IP 65 with: • Blue button plate with "R" inscription	ZE; Z5; ZW7 ZB12 – ZB150	**M22-DZ-B-X6**	36	A14
	Actuator and Rod; 4X; IP 65 with: • Blue button plate with "RESET" inscription		**M22-DZ-B-GB14**	36	A14
	Actuator and Rod; 4X; IP65 without button plate Order with button plate from selection below:	ZE; Z5; ZW7 ZB12 – ZB150	**M22-DZ-X**	28	A14
	• Red button plate; blank	Order with M22-DZ-X above to complete accessory unit.	**M22-XD-R**	4.40	C10
	• Red button plate with white circle inscription		**M22-XD-R-X0**	6.80	C10
	• Red button plate with "STOP" inscription		**M22-XD-R-GB0**	6.80	C10
Terminal Covers					
	Overload relays for separate mounting Possible configurations for cover combinations: Z5/FF250 -XHB Z5-.../FF250 Z5/FF250 -XHB	Z5-. . . /FF250	**Z5/FF250-XHB**	120	A14
	Overload relay fitted directly to contactor Possible configurations for cover combinations: DIL M185/ 225/250 Z5/FF250 -XHB-Z Z5-.../FF250 Z5/FF250 -XHB	Direct mounting of Z5-. . . /FF250 to DILM185, DILM225, DILM250	**Z5/FF250-XHB-Z**	80	A14
Set of box terminals					
	One set of three terminals. Wire size: #6 AWG – 350 MCM UL Recognized/CSA Approved.	Z5-. . . /FF250	**Z5-FF250-XK-CNA**	250	A14

EC prototype test certification number:

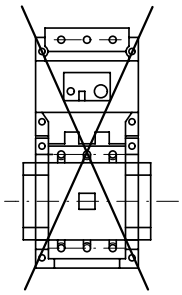
ZE	PTB 01 ATEX 3331
ZB	PTB 04 ATEX 3022
Z5	PTB 02 ATEX 3165

Cannot be Mounted in these positions:

ZE

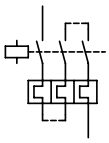


ZB12 – ZB150; Z5

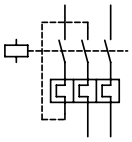


Protection of single-phase and DC current motors:

1-pole

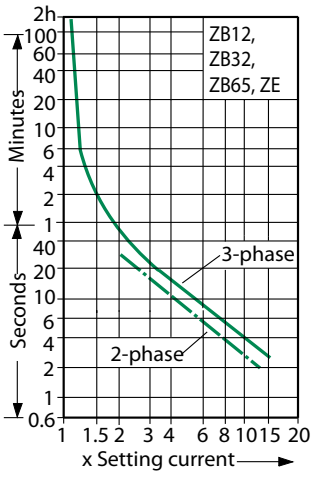


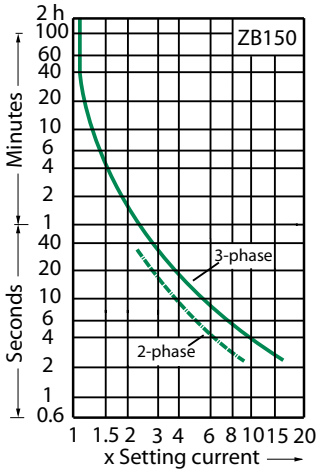
2-pole

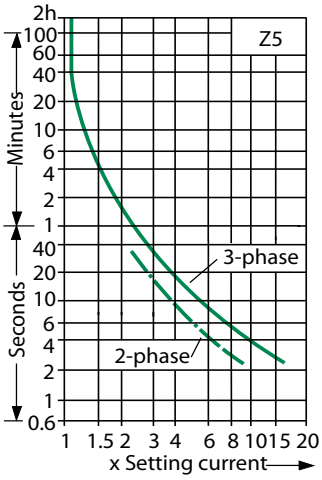


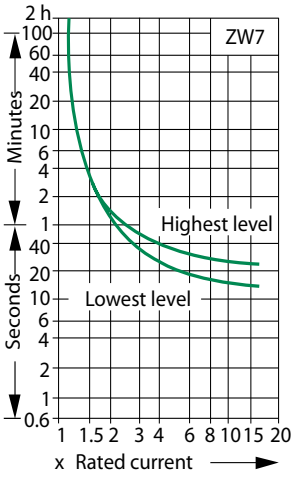
Tripping characteristics:

These tripping characteristics are mean values of the spread at 20 °C ambient temperature in a cold state. Tripping time depends on response current. With devices at operating temperature, the tripping time of the overload relay reduces to approximately 25% of the read off value.









Thermal Overload Relays			ZE	ZB12 ZB32	ZB65	ZB150	Z5-…/FF250	ZW7
General								
Standards					IEC/EN 60947, VDE 0660, UL, CSA			
Climatic proofing					Damp heat, constant, to IEC 60068-2-78; Damp heat, cyclic, to IEC 60068-2-30			
Ambient temperature								
Open		[°C]	-25…50 °C	-25…55 °C	-25…55 °C	-25…55 °C	-25…50 °C	-25…50 °C
		[°F]	*-13…122 °F*	*-13…131 °F*	*-13…131 °F*	*-13…131 °F*	*-13…122 °F*	*-13…122 °F*
Enclosed		[°C]	-25…40 °C	-25…40 °C	-25…40 °C	-25…40 °C	-25…40 °C	-25…40 °C
		[°F]	*-13…104 °F*	*-13…104 °F*	*-13…104 °F*	*-13…104 °F*	*-13…104 °F*	*-13…104 °F*
Temperature compensation					Continuous			
Mounting position					See previous page			
Weight		[kg]	0.09	0.15	0.25	1.64	1.8	0.95
Mechanical shock resistance half-sinusoidal shock 10ms		[g]	10	10	10	10	10	10
Degree of protection			IP20	IP00	IP00	IP00	IP00	IP00
Protection against direct contact when actuated from front			Finger and back-of-hand proof	Finger and back-of-hand proof	Finger and back-of-hand proof	Finger and back-of-hand proof	With terminal cover	Finger and back-of-hand proof
Main Contacts								
Rated impulse withstand voltage	U_{imp}	[V AC]	6000	6000	6000	6000	8000	6000
Overvoltage category / pollution degree			III/3	III/3	III/3	III/3	III/3	III/3
Rated insulation voltage	U_i	[V AC]	690	690	690	690	1000	690
Rated operational voltage	U_e	[V AC]	690	690	690	690	1000	690
Safe isolation to VDE 0106 Part 101 and Part 101/A1								
Between auxiliary contacts and main contacts		[V AC]	300	440	440	440	440	440
Between the main contacts		[V AC]	300	440	440	440	440	440
Overload relay setting range		[A]	0.1 – 9	0.1 – 32	6 – 65	25 – 150	50 – 250	40 – 540
Temperature compensation residual error > 20 °C		[% / K]	≤ 0.25	≤ 0.25	≤ 0.25	≤ 0.25	≤ 0.25	–
Short-circuit protection rating maximum fuse					see selection pages			❶
Current heat loss (3 conductors)								
Lower value of setting range		[W]	2.5	2.5	3	16	16	3
Upper value of setting range		[W]	6	6	7.5	28	28	10
Terminal capacity								
Solid		[mm²]	2 x (0.75 – 2.5)	2 x (1 – 6)	2 x (1 – 6)	2 x (4 – 16)	–	–
Flexible without ferrules		[mm²]	–	–	–	–	–	–
Flexible with ferrule		[mm²]	2 x (0.5 – 1.5)	2 x (1 – 4) 2 x (1 – 6) ❷	1 x 25 2 x (1 – 10) ❸	1 x (4 – 70) 2 x (4 – 50)	–	–
Stranded		[mm²]	–	–	1 x 35; 2 x 10	–	–	–
Flexible with cable lug		[mm²]	–	–	–	–	95	–
Stranded with cable lug		[mm²]	–	–	–	–	120	–
Solid or stranded		[AWG]	18 – 14	14 – 8	14 – 2	2/0	250 MCM	–
Flat conductor								
Number of segments x width x thickness		[mm]	–	–	–	–	6 x 15 x 0.8 ❹	–
Busbar	Width	[mm]	–	–	–	–	20 x 3	–
Push-through opening	Ø	[mm]	–	–	–	–	–	27
Terminal screw			M3.5	M4	M6	M10	M8 x 25	–
Tightening torque		[Nm]	1.2	1.8	3.5	10	24	–
Tools								
Pozidriv screwdriver		[Size]	2	2	2	–	–	–
Standard screwdriver		[mm]	0.8 x 5.5	1 x 6	1 x 6	–	–	–
Hexagon socket-head screw	SW	[mm]	–	–	–	5	13	–

❶ As required by the contactor.
❷ 6 mm² flexible with ferrules to DIN 46228.
❸ When using 2 conductors, use identical cross-section.
❹ Fixing with box terminals.

Thermal Overload Relays				ZE	ZB12 ZB32	ZB65	ZB150	Z5-.../FF250	ZW7
Auxiliary and Control Circuit Connections									
Rated impulse withstand voltage		U_{imp}	[V]	6000	6000	6000	6000	6000	6000
Overvoltage category / pollution degree				III/3	III/3	III/3	III/3	III/3	III/3
Terminal capacity									
Solid			[mm²]	2 x (0.75 – 2.5)	2 x (0.75 – 4)	2 x (0.75 – 4)	2 x (0.75 – 2.5)	2 x (0.75 – 4)	2 x (0.75 – 4)
Flexible with ferrule			[mm²]	2 x (0.5 – 1.5)	2 x (0.75 – 2.5)	2 x (0.75 – 2.5)	2 x (0.5 – 1.5)	2 x (0.75 – 2.5)	2 x (0.75 – 2.5)
Solid or stranded			[AWG]	2 x (18 – 12)	2 x (18 – 12)	2 x (18 – 12)	2 x (18 – 12)	2 x (18 – 12)	2 x (18 – 12)
Terminal screw				M3.5	M3.5	M3.5	M3.5	M3.5	M3.5
Tightening torque			[Nm]	0.8 – 1.2	0.8 – 1.2	0.8 – 1.2	0.8 – 1.2	0.8 – 1.2	0.8 – 1.2
Tools									
Pozidriv screwdriver			[Size]	2	2	2	2	2	2
Standard screwdriver			[mm]	0.8 x 5.5	1 x 6	1 x 6	1 x 6	1 x 6	1 x 6
Auxiliary circuit rated insulation voltage		U_i	[V AC]	690	500	500	500	500	500
Rated operational voltage		U_e	[V AC]	500	500	500	500	500	500
Safe isolation to VDE 0106 Part 101 and Part 101/A1									
Between the auxiliary contacts			[V AC]	300	240	240	240	240	240
Conventional thermal current		I_{th}	[A]	6	6	6	6	6	6
Rated operational current									
AC-15									
Make contact	120V	I_e	[A]	1.5	1.5	1.5	1.5	1.5	1.5
	240V	I_e	[A]	1.5	1.5	1.5	1.5	1.5	1.5
	415V	I_e	[A]	0.5	0.5	0.5	0.5	0.5	0.5
	500V	I_e	[A]	0.3	0.5	0.5	0.5	0.5	0.5
Break contact	120 V	I_e	[A]	1.5	1.5	1.5	1.5	1.5	1.5
	240V	I_e	[A]	1.5	1.5	1.5	1.5	1.5	1.5
	415V	I_e	[A]	0.7	0.9	0.9	0.9	0.9	0.9
	500V	I_e	[A]	0.5	0.8	0.8	0.8	0.8	0.8
DC-13 ❶ L/R ≤ 15 ms	24V	I_e	[A]	0.9	0.9	0.9	0.9	0.9	0.9
	60V	I_e	[A]	0.75	0.75	0.75	0.75	0.75	0.75
	110V	I_e	[A]	0.4	0.4	0.4	0.4	0.4	0.4
	220V	I_e	[A]	0.2	0.2	0.2	0.2	0.2	0.2
Short-circuit rating without welding									
Max. fuse			[A gG/gL]	4	6	6	6	6	6
UL / CSA Data									
Rated voltage			[V AC/DC]	300 / 300	600 / 300	600 / 300	600 / 300	600 / 300	600 / 300
Pilot duty rating			[AC]	D300 ❷	Same polarity: B600; Opposite polarity: R300				
			[DC]	R300	R300	R300	R300	R300	R300

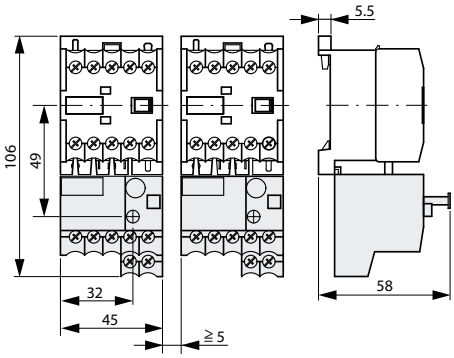
❶ Rated operational current: Making and breaking conditions to DC-13, L/R constant as stated.

❷ Additional rating of 0.6A at 600V AC and 1.5A at 240V AC.

Dimensions are in millimeters.
Not intended for manufacturing purposes.

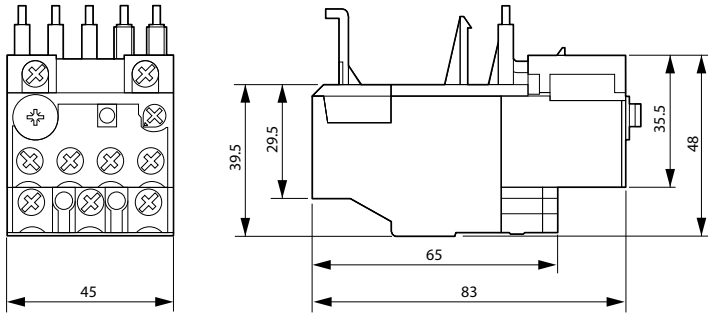
Overload Relays

ZE-...



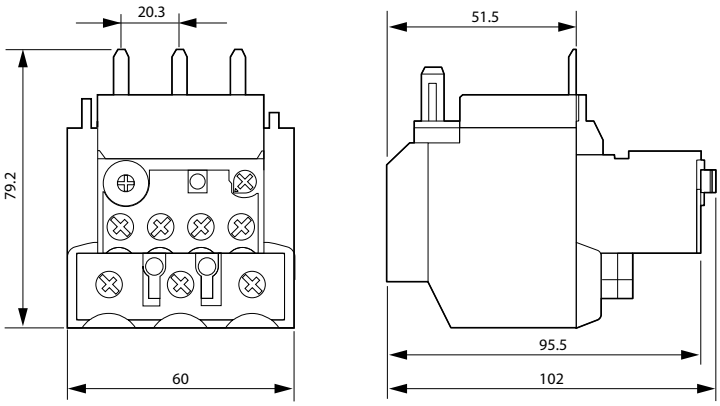
Overload Relays

ZB12-...; ZB32-...



Overload Relays

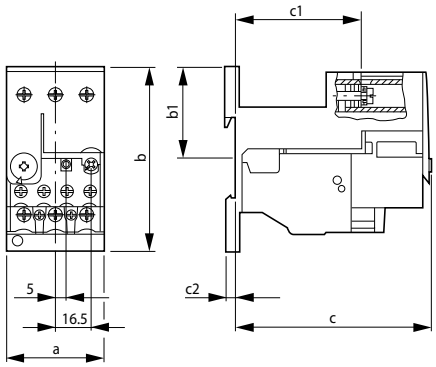
ZB65-...



Overload Relays

ZB32-XEZ; ZB65-XEZ

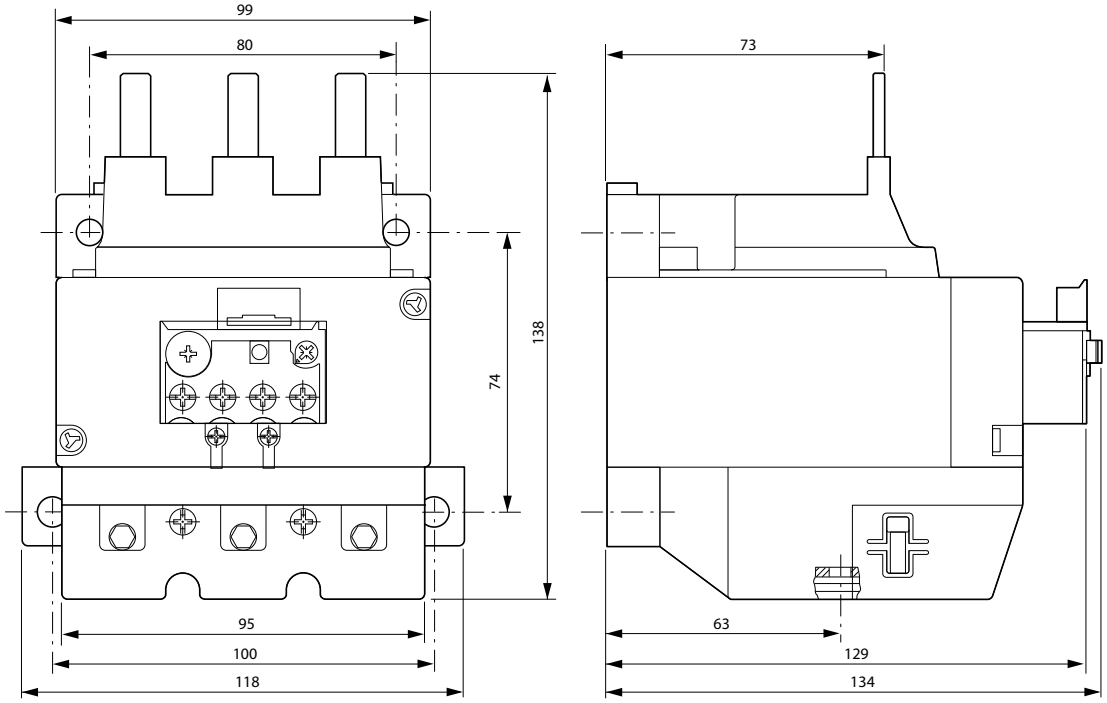
Dimensions are in millimeters.
Not intended for manufacturing purposes.



	ZB32-XEZ	ZB65-XEZ
a	45	60
b	85	86
b1	42.5	42.5
c	90.5	112
c1	58.3	80.5
c2	3.8	4.7

Overload Relays

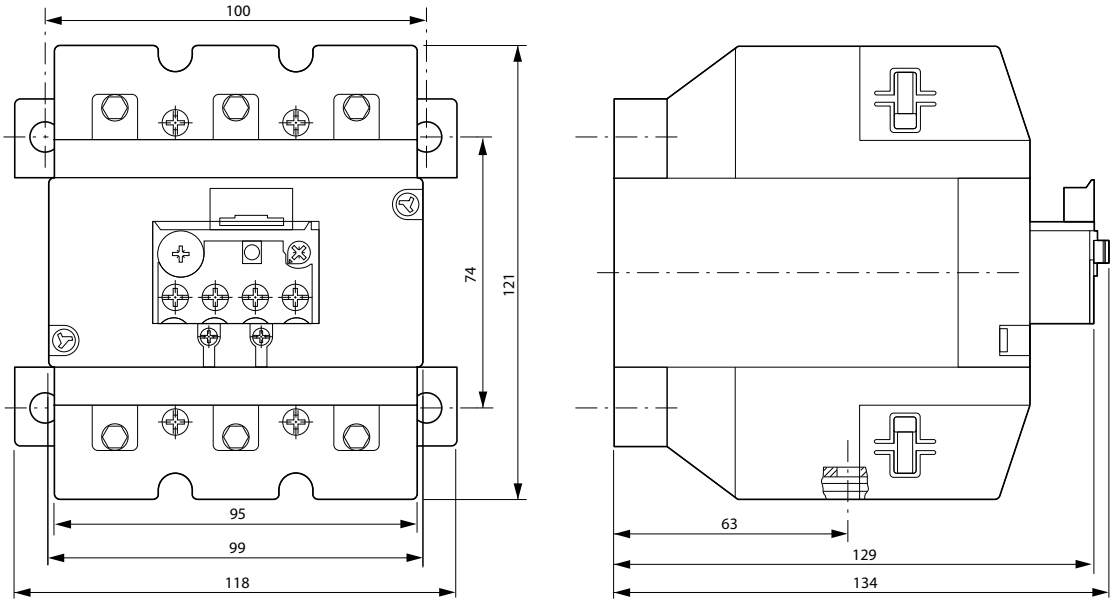
ZB150-...



Overload Relays

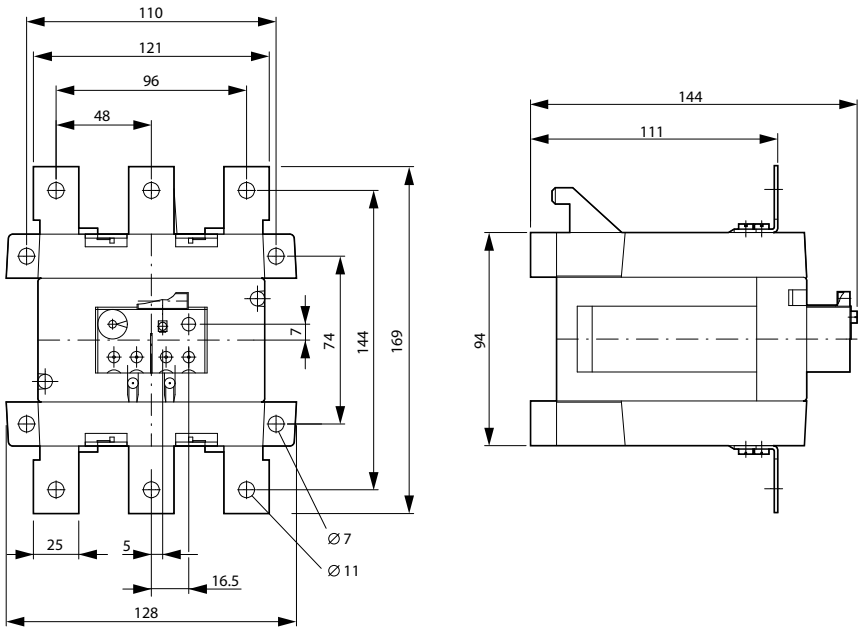
ZB150-. . ./KK

Dimensions are in millimeters.
Not intended for manufacturing purposes.



Overload Relays

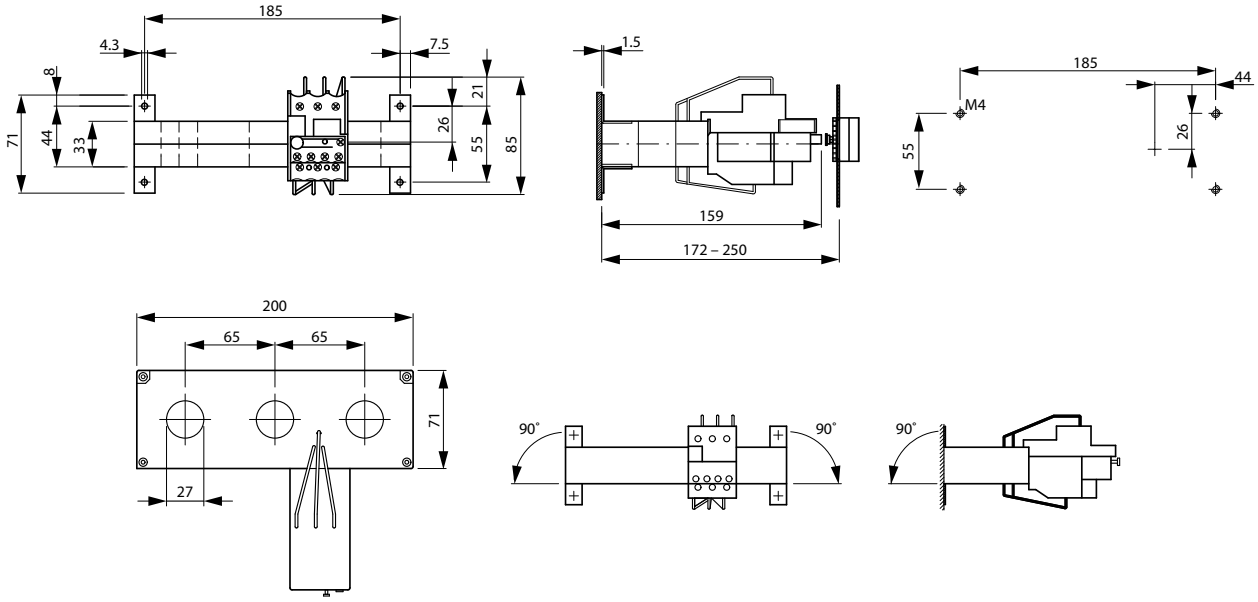
Z5-. . ./FF250



Current Transformer Operated Overload Relays

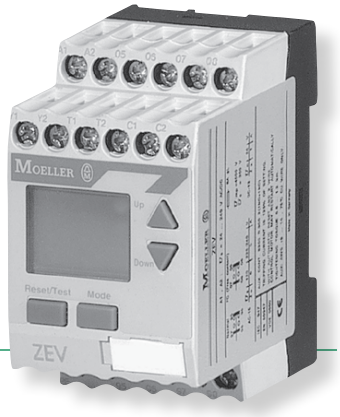
ZW7-. . .

Dimensions are in millimeters.
Not intended for manufacturing purposes.



ZEV electronic overload relay

the ultimate motor protection for applications to 820A



Moeller's ZEV electronic overload relay offers the ultimate motor protection at an economical price. The base unit protects against overloads, phase failure and phase imbalance in motors from 1 to 820A. Thermistor connections and optional ground-fault protection make the ZEV a great choice for virtually all applications where sophisticated, yet economical motor protection is required.

The new standard in protection

Newly-developed sensor systems and tripping units make the ZEV electronic overload relay the "top-of-the-range" in motor protection. Enhanced tripping classes provide reliable protection for motors with run-up times as long as 40 seconds. Trip classes are selectable from 5 to 40 seconds, allowing precise protection for a range of applications.

Additional features and options

Optional core-balance transformers detect ground faults quickly, while an integrated thermistor connection makes it easy to upgrade to a full motor-protection system. Check out other great features of the ZEV relay listed on the left.

Easy to operate

A built-in LCD guides you through set-up and operation. In the event of a fault, the display indicates the origin – speeding the process of troubleshooting and repair. Configurable auxiliary contacts may be added for communication of ground faults, thermistor trips, internal faults or early warning of an overload.

Flexibility for multiple environments

The multi-voltage module automatically adapts to different voltages from 24-240V AC/ DC, providing a fast and flexible connection to all conventional control.

Compact design

Ring-type current sensors make the ZEV a great choice for protection of even small motors. There's no need for main current wiring or back pan drilling. The sensor is installed quickly and easily with hook & loop fasteners. With small light-weight sensors and extremely wide current ranges, making the right sensor selection is easy. A compact design with a 58 to 1 current ratio reduces inventory cost and saves valuable panel space compared to traditional transformers.

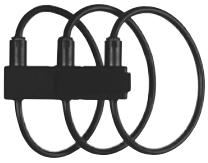
Safety and approvals

The ZEV electronic overload relay is touch safe to IP20 specifications. It meets approval standards of UL, CSA, IEC/EN 60 947 and VDE 0660.

- > Early warning of an overload
- > Internal fault detection
- > Ambient temperature compensation
- > Test / OFF button
- > Automatic & manual reset
- > Trip indication & trip-free release
- > Integrated NO & NC contact

- Protects against overloads, phase failure, phase imbalance, internal fault, thermistor tripping and optional ground-fault
- Eight tripping classes from Class 5 to Class 40 protection
- LCD guides set-up and ensures straightforward operation during a fault condition
- DIN-rail or optional screw mounting

ZEV Electronic Motor-Protective Relays *(Complete Unit Selection)*

Overload Relay	Adjustable Setting Range [A]	Length [mm]	Diameter [mm]	For use with...	Catalog Number	Price
ZEV Electronic Motor-Protective Relay						
	1 – 820	–	–	DILEM DILM7 – DILM820	**ZEV**	496
Current Sensors						
	1 – 25	–	6	DILEM; DILM7 – DILM25	**ZEV-XSW-25**	320
	3 – 65	–	13	DILM32 – DILM50	**ZEV-XSW-65**	320
	10 – 145	–	21	DILM65 – DILM115	**ZEV-XSW-145**	780
	40 – 820	–	110	DILM185 – DILM820	**ZEV-XSW-820**	960
Connecting Cables						
	–	200	–	ZEV-XSW-25 ZEV-XSW-65 ZEV-XSW-145 ZEV-XSW-820	**ZEV-XVK-20**	24
	–	400	–		**ZEV-XVK-40**	28
	–	800	–		**ZEV-XVK-80**	32

Ordering Instructions

1. **A complete ZEV Electronic Motor Protective Relay consists of One ZEV Base Unit, One Current Sensor and One Connecting Cable**
2. **For optional ground leakage protection, select one Core Balance Transformer**

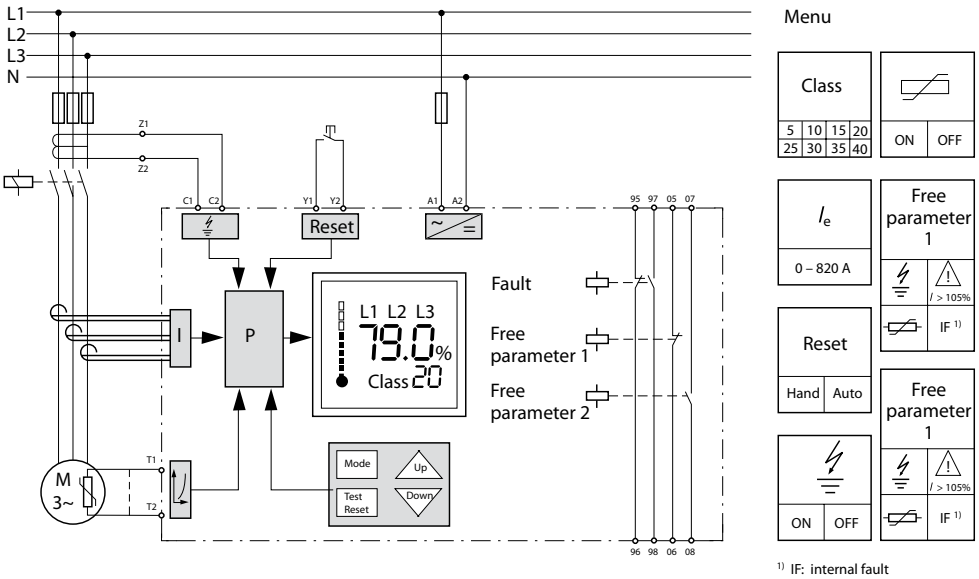
Accessories for ZEV Electronic Motor-Protective Relays

Accessory	Diameter [mm]	For use with…	Fault Current [A]	Catalog Number	Price
SSW Core-Balance Transformers (for ground-leakage monitoring)					
	40	–	0.3	**SSW40-0,3**	670
	40	–	0.5	**SSW40-0,5**	670
	40	–	1	**SSW40-1**	670
	65	–	0.5	**SSW65-0,5**	890
	65	–	1	**SSW65-1**	890
	120	–	0.5	**SSW120-0,5**	2344
	120	–	1	**SSW120-1**	2344
Mounting Adapter					
	Enables screw mounting of ZEV and Current Sensors to back pan	ZEV ZEV-XSW-25 ZEV-XSW-65 ZEV-XSW-145	–	**ZB4-101-GF1**	8

Ordering Instructions

1. **A complete ZEV Electronic Motor Protective Relay consists of One ZEV Base Unit, One Current Sensor and One Connecting Cable**
2. **For optional ground leakage protection, select one Core Balance Transformer**

Circuit for Manual Restart



1) IF: internal fault

Inputs		Outputs	
A 1 / A 2	Rated control voltage	95 / 96	NC contact for overload / thermistor
T 1 / T 2	Thermistor sensor	97 / 98	NO contact for overload / thermistor
C 1 / C 2	SSW core-balance transformers	05 / 06	NC contact freely assignable
Y 1 / Y 2	Remote reset	07 / 08	NO contact freely assignable

Switchgear and cable sizing corresponding to the respective starting inertia (CLASS)

The switchgear is designed for "CLASS 10" in normal and overload operation. To ensure that the switchgear (circuit-breaker and contactor) as well as the cables are not overloaded with extended tripping times, they must be over-dimensioned accordingly. The rated operational current I_e for switchgear and cables can be calculated with the following current factor while taking the tripping class into account:

Tripping Class	Class 5	Class 10	Class 15	Class 20	Class 25	Class 30	Class 35	Class 40
Current factor for rated operational current I_e	1.00	1.00	1.22	1.41	1.58	1.73	1.89	2.00

Relays with integrated sensor

With the ZEV-XSW-25 to ZEV-XSW-145 push-through sensors, the motor supply leads for each phase are pushed through the respective push-through openings. On motor currents which are less than 1 A, the motor supply leads with the ZEV-XSW-25 are inserted in loops. The number of loops depends on the rated motor current involved.

Number of loops n		4	3	2
Rated motor current I_N	[A]	0.31 – 0.4	0.41 – 0.62	0.63 – 1.24
Current settings on relay I_E between lowest and highest value	[A]	1.24 – 1.6	1.23 – 1.86	1.26 – 2.48

The current setting I_E of the device is calculated as: $I_E = n \times I_N$

Tripping times for ZEV electronic motor-protective relay

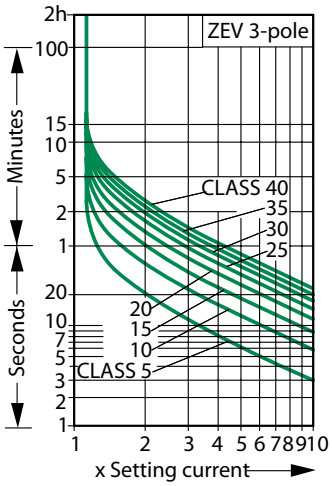
Tripping class, can be selected		5	10	15	20	25	30	35	40
Tripping time in s (± 20 %)		With 3-pole symmetric loading from cold state							
Setting current I_E	**x 3**	11.3	22.6	34	45.3	56.6	67.9	79.2	90.5
	x 4	8	15.9	23.9	31.8	39.8	47.7	55.7	63.6
	x 5	6.1	12.3	18.4	24.6	30.7	36.8	43	49.1
	x 6	5	10	15	20	25	30	35	40
	x 7.2	4.1	8.2	12.3	16.4	20.5	24.5	28.6	32.7
	x 8	3.6	7.3	10.9	14.6	18.2	21.9	25.5	29.2
	x 10	2.9	5.7	8.6	11.5	14.4	17.2	20.1	23

Recovery time after trip

Class		5	10	15	20	25	30	35	40
$t$recovery after overload trip	**[min]**	5	6	7	8	9	10	11	12
$t$recovery after test button trip	**[sec]**	5	5	5	5	5	5	5	5

Tripping characteristics:

These tripping characteristics are mean values of the spread at 20°C ambient temperature in a cold state. Tripping time depends on response current. With devices at operating temperature, the tripping time of the overload relay reduces to approximately 25% of the read off value.



With a phase failure or unbalance > 50%, the ZEV will trip within 2.5 seconds.

Thermistor tripping

Rated trip resistance $R = 3200\ \Omega \pm 15\%$

Recovery resistance $R = 1500\ \Omega \pm 10\%$

Total PTC thermistor resistance $\sum R_K \leq 1500\ \Omega$
at $R_K \leq 250\ \Omega$ per sensor: 6 sensors
at $R_K \leq 100\ \Omega$ per sensor: 9 sensors

Ready to respond after trip at 5 °C under response temperature

EC prototype test certification number:

ZEV	PTB 01 ATEX 3233

For protection of motors in EEx e area, also order AWB2300-1433G "ZEV motor-protective system, Overload monitoring of motors in EEX e areas".

B
Motor Protection

Electronic Overload Relay		ZEV
General		
Standards		IEC/EN 60947, VDE 0660, UL, CSA
Climatic proofing		Damp heat, constant, to IEC 60068-2-78; Damp heat, cyclic, to IEC 60068-2-30
Ambient temperature		
Open ❶	[°C]	-25...60 °C
	[°F]	-13...140 °F
Enclosed ❶	[°C]	-25...40 °C
	[°F]	-13...104 °F
Storage	[°C]	-40...80 °C
	[°F]	-40...176 °F
Temperature compensation		Continuous
Mounting position		As required
Weight	[kg]	0.20
Mechanical shock resistance half-sinusoidal shock 10ms	[g]	15
Degree of protection		IP20
Protection against direct contact when actuated from front		Finger and back-of-hand proof
Main Contacts		
Overload relay setting range	[A]	1 – 820 ❷
Short-circuit protection rating maximum fuse		With overload relay in conjunction with a transformer as required for the contactor
Terminal screw		M3.5
Tightening torque	[Nm]	0.8
Tools		
Pozidriv screwdriver	[Size]	1
Standard screwdriver	[mm]	0.8 x 5.5
Auxiliary and Control Circuit Connections		
Rated impulse withstand voltage U_{imp}	[V]	4000
Overvoltage category / pollution degree		III/3
Terminal capacity		
Solid	[mm²]	1 x (0.5 – 2.5) 2 x (0.5 – 1.5) ❸
Flexible with ferrule	[mm²]	1 x (0.5 – 2.5) 2 x (0.5 – 1.5) ❸
Solid or stranded	[AWG]	1 x (18 – 14)
Terminal screw		M3.5
Tightening torque	[Nm]	0.8
Tools		
Pozidriv screwdriver	[Size]	1
Standard screwdriver	[mm]	0.8 x 5.5

Electronic Overload Relay *(continued)*				ZEV
Auxiliary and Control Circuit Connections *(continued)*				
Auxiliary circuit rated insulation voltage		U_i	[V AC]	250
Rated operational voltage		U_e	[V AC]	240
Safe isolation to VDE 0106 Part 101 and Part 101/A1				
Between the auxiliary contacts			[V AC]	240 ❹
Conventional thermal current		I_{th}	[A]	6
Rated operational current				
AC-15				
Make contact	120V	I_e	[A]	3 ❺
	240V	I_e	[A]	3 ❺
	415V	I_e	[A]	–
	500V	I_e	[A]	–
Break contact	120 V	I_e	[A]	3
	240V	I_e	[A]	3
	415V	I_e	[A]	–
	500V	I_e	[A]	–
DC-13 L/R ≤ 15 ms ❻				
	24V	I_e	[A]	1
	60V	I_e	[A]	–
	110V	I_e	[A]	–
	220V	I_e	[A]	–
Power consumption		$P_{max.}$	[W]	2.5
Short-circuit rating without welding				
Max. fuse			[A gG/gL]	6
Pick-up and drop-out values				
AC operated			[x U_c]	0.85 – 1.1
DC operated			[x U_c]	0.85 – 1.1
UL / CSA Data				
Rated Voltage			[V AC/DC]	600 / 300
Pilot Duty				
AC operated			[AC]	Same polarity: B600 Opposite polarity: B300
DC operated			[DC]	R300
Thermistor Protection				
Total resistance (cold)			[Ω]	1500
Response value			[Ω]	2720 – 3680
Reset range			[Ω]	1500 – 1650
Recovery time				
Overload				See page B23
Thermistor tripping				5 °C under response temperature
Ground-fault protection				Immediate

❶ Limited readability of the LCD display at < -15 °C (5 °F).
❷ Setting range dependant on current sensor.
❸ Only the following combinations are permissible: 0.5 and 0.75mm², 0.75 and 1 mm², 1 and 1.5 mm².
❹ Up to 240 V depending on contact assignment between main supply voltage and outputs. No potential isolation to thermistor, core balance transformer or the current sensor.
❺ Auxiliary contacts are 1.5 A.
❻ Making and breaking conditions to DC-13, L/R constant as stated.

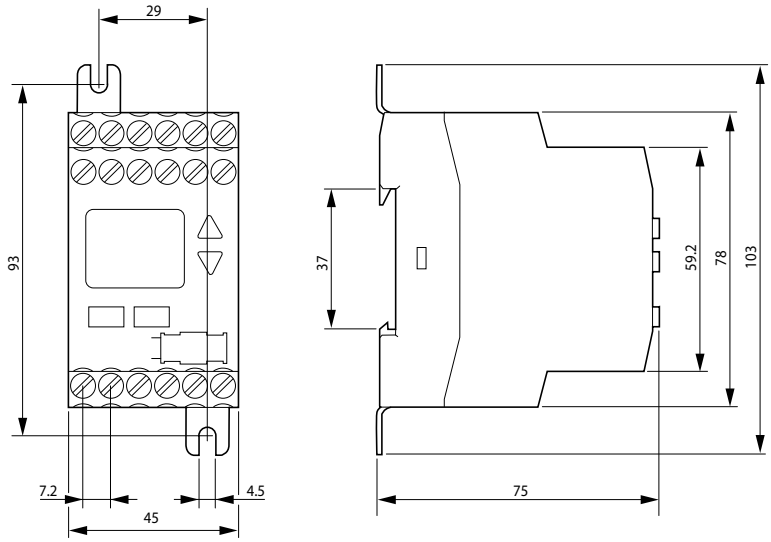
Current Sensors			ZEV-XSW-25	ZEV-XSW-65	ZEV-XSW-145	ZEV-XSW-820
General						
Standards			IEC/EN 60947, VDE 0660, UL, CSA			
Climatic proofing			Damp heat, constant, to IEC 60068-2-78; Damp heat, cyclic, to IEC 60068-2-30			
Ambient temperature						
Open		[°C]	-25...60 °C	-25...60 °C	-25...60 °C	-25...60 °C
		[°F]	*-13...140 °F*	*-13...140 °F*	*-13...140 °F*	*-13...140 °F*
Enclosed		[°C]	-25...40 °C	-25...40 °C	-25...40 °C	-25...40 °C
		[°F]	*-13...104 °F*	*-13...104 °F*	*-13...104 °F*	*-13...104 °F*
Storage		[°C]	-40...80 °C	-40...80 °C	-40...80 °C	-40...80 °C
		[°F]	*-40...176 °F*	*-40...176 °F*	*-40...176 °F*	*-40...176 °F*
Temperature compensation			Continuous			
Mounting position			As required			
Weight		[kg]	0.21	0.37	0.45	0.30
Mechanical shock resistance half-sinusoidal shock 10ms		[g]	15	15	15	15
Degree of protection			IP20	IP20	IP20	IP20
Protection against direct contact when actuated from front			Finger and back-of-hand proof			
Main Contacts						
Rated impulse withstand voltage	U_{imp}	[V AC]	❶	❶	❶	8000
Overvoltage category / pollution degree			❶	❶	❶	III/3
Rated insulation voltage	U_i	[V AC]	❶	❶	❶	1000
Rated operational voltage	U_e	[V AC]	❶	❶	❶	1000
Safe isolation to VDE 0106 Part 101 and Part 101/A1						
Between busbar and sensor		[V AC]	–	–	–	500
Overload relay setting range		[A]	1 – 25	3 – 65	10 – 145	40 – 820
Short-circuit protection rating maximum fuse			With overload relay in conjunction with a transformer, as required for the contactor			
Push-through opening	Ø	[mm]	6	13	21	110

❶ Dependant on the current wiring that is used.

Overload Relays

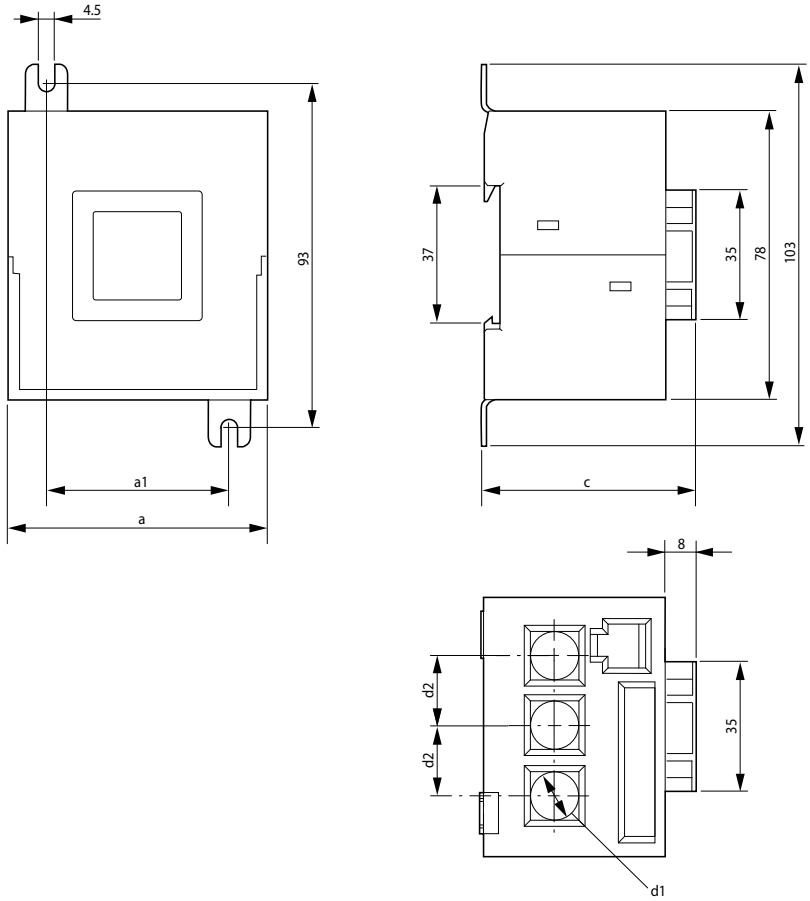
ZEV

Dimensions are in millimeters.
Not intended for manufacturing purposes.



Current Sensors

ZEV-XSW-...

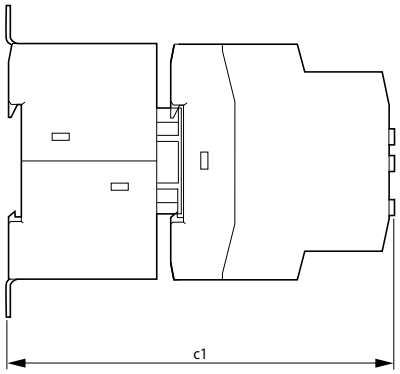


ZEV-XSW-...	25	65	145
a	45	70	90
a1	24	49	68
c	50	58	65
d1	6	13	21
d2	11.2	19	26

Overload Relays with Current Sensor

ZEV + ZEV-XSW-...

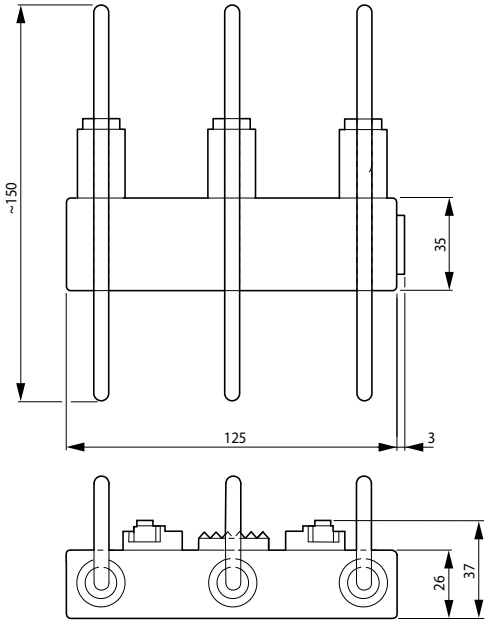
Dimensions are in millimeters.
Not intended for manufacturing purposes.



ZEV + ZEV-XSW-...	25	65	145
c1	120	128	134

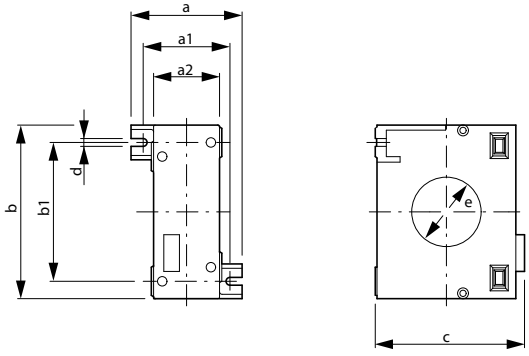
Current Sensor

ZEV-XSW-820



Core-balance Transformer

SSW40-...; SSW65-...; SSW120-...



SSW...	40-...	65-...	120-...
a	64	75	86.5
a1	50	60	70
a2	38	43	54.5
b	100	124	200
b1	80	100	170
c	86	112	205
d	4.5	4.5	4.5
e	40	65	120

EMT thermistor protection relays

for motors with imbedded P.T.C. thermistors

Moeller's EMT Thermistor Protection Relays are specifically designed to monitor positive temperature coefficient (PTC) thermistors embedded in the motor windings. Typically used in "mission critical" applications, PTC thermistors, coupled with EMT Thermistor Protection Relays provide extremely precise thermal feedback and increased motor protection.

B

Motor Protection

Three designs to choose

All EMT relays feature automatic reset with Power-ON and fault-indicating LED. Depending on the model chosen, the following additional features are also available:

- Selectable manual or automatic reset
- Remote reset
- Short circuit recognition in the sensor circuit
- Reliable fault signaling even under supply voltage failure (zero voltage safety)
- Short circuit recognition and zero-voltage safety can be switched off
- Test button

> Extremely accurate overload protection

> Universal supply voltage

> Choose from basic to advanced protection

Universal input voltage

Moeller EMT Thermistor Protection relays accept voltage inputs of 24 – 240V AC 50-60Hz; and 24 – 240V DC making them ideal for the majority of normal control circuit applications.

Zero-voltage safety

The EMT6-DBK includes fault signaling even with a loss of supply voltage. This important safety feature stores the condition of the relay prior to the loss of power. When power is restored, the relay's output and LED fault indication retain state and act accordingly.

Feature Comparison	Protection Relay		
	EMT-6	EMT6-DB	EMT6-DBK
LED power-ON and fault indication	✔	✔	✔
Thermal overload protection (from PTC sensors)	✔	✔	✔
Automatic reset	✔	✔	✔
Universal control voltage	✔	✔	✔
Short circuit recognition in the sensor circuit	✔ (option)	✔ (option)	✔
Manual or automatic reset		✔	✔
Remote or local reset		✔	✔
Test button		✔	✔
Fault signaling with loss of supply voltage (zero-voltage safety)			✔
Short circuit recognition and zero voltage safety can be turned off			✔

✔ = standard features

- For protection of motors with P.T.C. thermistors embedded in their windings
- LED display of operational status
- Manual / Automatic reset or remote reset available

Thermistor Protection Relays

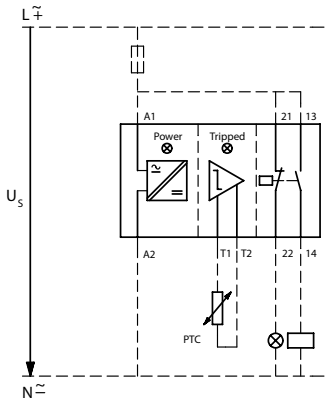
Protection Relay	Description	IEC Rated Operating Current		UL/CSA		Catalog Number	Price
		AC-15 220 – 240 V [A]	AC-14 380 – 400 V [A]	Pilot Duty Rating	Rated Operational Voltage Range		
Automatic Reset							
	• Automatic RESET • Power ON and fault indicating LED display	3	3	B 300	24 – 240 V 50/60 Hz; 24 – 240 V DC	**EMT6**	630
	• Automatic RESET • Power ON and fault indicating LED display • Short-circuit recognition in the sensor circuit	3	3	B 300	24 – 240 V 50/60 Hz; 24 – 240 V DC	**EMT6-K**	510
	• Automatic RESET • Power ON and fault indicating LED display	3	3	B 300	230 V 50/60 Hz	**EMT6(230V)**	630
Manual + Automatic Reset							
	• Manual or automatic RESET • For manual or remote resetting • Test button • Power ON and fault indicating LED display	3	3	B 300	24 – 240 V 50/60 Hz; 24 – 240 V DC	**EMT6-DB**	930
	• Manual or automatic RESET • For manual or remote resetting • Test button • Power ON and fault indicating LED display • Short-circuit recognition in the sensor circuit	3	3	B 300	24 – 240 V 50/60 Hz; 24 – 240 V DC	**EMT6-KDB**	880
	• Manual or automatic RESET • For manual or remote resetting • Test button • Power ON and fault indicating LED display	3	3	B 300	230 V 50/60 Hz	**EMT6-DB(230V)**	930
Manual + Automatic Reset / Multi-function Device							
	• Manual or automatic reset / Multi-function device • Short-circuit recognition in the sensor circuit • Reliable fault signalling even under supply voltage failure (zero-voltage safety) • For manual or remote resetting • Test button • Short-circuit recognition and zero-voltage safety can be switched off • Power ON and fault indicating LED display	3	3	B 300	24 – 240 V 50/60 Hz; 24 – 240 V DC	**EMT6-DBK**	1080

LED display	Flow diagrams	Notes
green		Supply voltage is applied
red		Device has tripped
red		Device has tripped/short circuit in the sensor circuit

Accessories

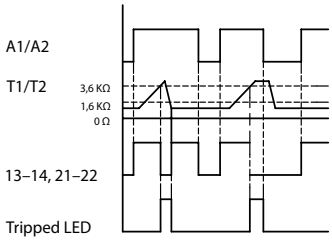
Accessory	Description	For use with...	Catalog Number	Price
Screw Adapter				
	Without the adaptor the EMT 6 is suitable for 35mm DIN-rail mounting only. The adapter enables the relay to become a panel mounted device using conventional screws.	EMT6	**CS-TE**	18

Application Notes



EMT6-K, EMT6-(K)DB, EMT6-DBK

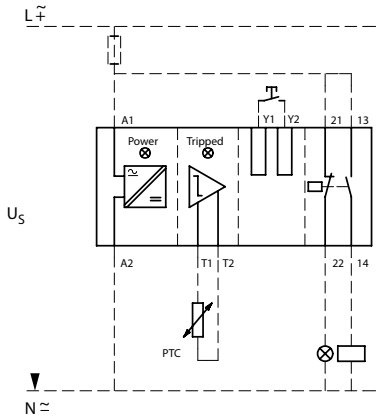
Auto



With the EMT6, EMT6(230V), EMT6-DB and EMT6-DB(230V) an additional short-circuit protection in the sensor circuit with current monitor is to be provided.

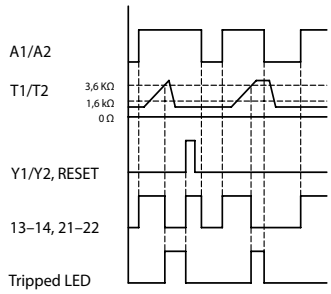
Can be snap-mounted on an EN 50 022 35mm DIN rail.

At $R_k \leq 250\ \Omega$ per sensor: 6 sensors,
At $R_k \leq 100\ \Omega$ per sensor: 9 sensors in the winding (provided by user)
Maximum length of thermistor cable 250 m (un-screened);
Total PTC thermistor resistance $\Sigma R_k \leq 1500\ \Omega$



EMT6-(K)DB, EMT6-DBK

Manual

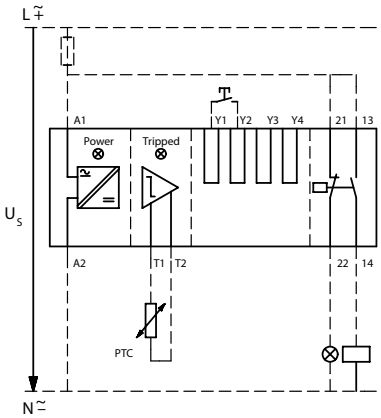


Sensor characteristic values at U_s and +20 °C

	EMT6...	
T1, T2 short-circuited	–	1.9
4 k Ω	3	0.8
T1-T2 open	5.1	–

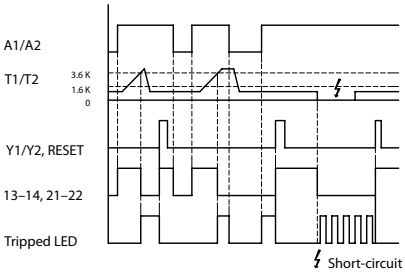
Functions that can be disconnected on EMT6-DBK:

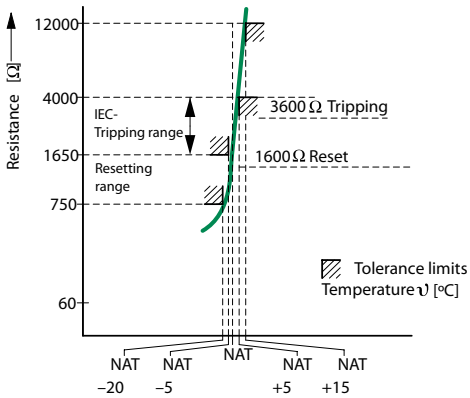
Function	Disconnection via jumper
Short-circuit recognition	$Y_1 - Y_3$
Zero-voltage safety	$Y_1 - Y_4$



EMT6-DBK

Zero-voltage safe operation



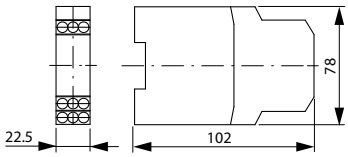


Thermistor Overload Relays				EMT6...
General				
Standards				IEC/EN 60947, VDE 0660, UL, CSA
EC Prototype test certification number				PTB 02 ATEX 3162
Climatic proofing				Damp heat, constant, to IEC 60068-2-78; Damp heat, cyclic, to IEC 60068-2-30
Ambient temperature				
Open			[°C / °F]	-25...60 °C / *-13...140 °F*
Enclosed			[°C / °F]	-25...45 °C / *-13...113 °F*
Storage			[°C / °F]	-45...60 °C / *-49...140 °F*
Mounting position				As required
Weight			[kg]	0.13
Mechanical shock resistance half-sinusoidal shock 10ms			[g]	10
Degree of protection				IP20
Protection against direct contact when actuated from front				Finger and back-of-hand proof
Safe isolation to VDE 0106 Part 101 and Part 101/A1				
Between the contacts			[V AC]	250
Between contacts and supply voltage			[V AC]	250
Auxiliary and Control Circuit Connections				
Rated impulse withstand voltage		U_{imp}	[V AC]	6000
Overvoltage category / pollution degree				III/3
Auxiliary and control circuit terminal capacity				
Solid			[mm²]	1 x 2.5; 2 x (0.5 – 1.5)
Flexible with ferrule			[mm²]	1 x 2.5; 2 x (0.5 – 1.5)
Solid or stranded			[AWG]	20 – 14
Terminal screw				M3.5
Tightening torque			[Nm]	1.2
Tools				
Pozidriv screwdriver			[Size]	2
Standard screwdriver			[mm]	1 x 6
Auxiliary Circuit				
Rated insulation voltage		U_i	[V]	400
Rated operational current				
AC-14				
Make contact	415V	I_e	[A]	3
Break contact	415V	I_e	[A]	3
AC-15				
Make contact	240V	I_e	[A]	3
	415V	I_e	[A]	1
Break contact	240V	I_e	[A]	3
	415V	I_e	[A]	1
Short-circuit protective device				
Max. fuse			[A gG/gL]	6
Control Circuit				
Rated insulation voltage		U_i	[V]	240
Rated operational voltage		U_e	[V]	240 ❶
Pick-up and drop-out values			[x U_e]	0.85 – 1.1
Power consumption				
AC			[VA]	3.5
DC			[W]	2
Trip at approx.			[Ω]	≥ 3600
Recovery at approx.			[Ω]	≥ 1600

❶ EMT6(-DB)230 V; $U_e = 230$ V

Thermistor Protection Relays

EMT6...



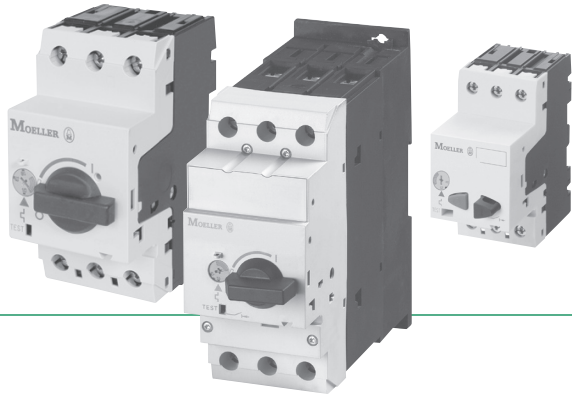
Dimensions are in millimeters.
Not intended for manufacturing purposes.

manual motor controllers

MOELLER

PKZM series of manual motor controllers

The "all-in-one" starter solution



Never confuse imitation with innovation!

Moeller designed the first PKZ "motor protective controller" in 1932! Since then, the term "PKZ" has become synonymous worldwide with these types of devices, regardless of manufacturer. Eight decades of continuous innovation has resulted in today's best technology, built from the ground up, only by Moeller.

The Swiss Army Knife® of motor control

The base PKZM controller combines single-break power contacts with Class 10 thermal overload protection and current limiting short circuit protection to manually control motor loads. The PKZM can also be equipped with a DIL M contactor for remote control of individual or group motor loads. Collectively, the PKZM family is UL and CSA listed for a wide range of uses including:

- *Manual Starter applications*
- *Group Fusing applications*
- *Motor Disconnect means*
- *Type E, Self-protected, Combination Starter applications*
- *Multi-motor Starter Combination applications*
- *Tap Conductor protection*

Information on PKZM starter applications can be found in Tab D of this catalog.

> Starts and protects motors to 40HP @ 460V (50HP @ 575V) with two frame sizes

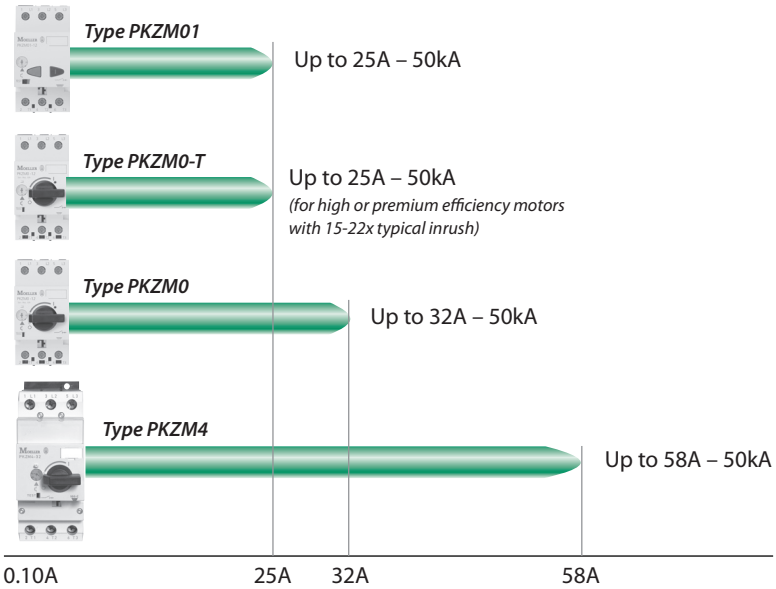
> UL/CSA listed as a Type E self-protected motor controller and "at motor" disconnect

> Adjustable Class 10 overload protection with ambient temperature compensation

> Models available to handle high efficiency motors without nuisance tripping

> Extensive range of accessories and enclosures

> Worldwide approvals

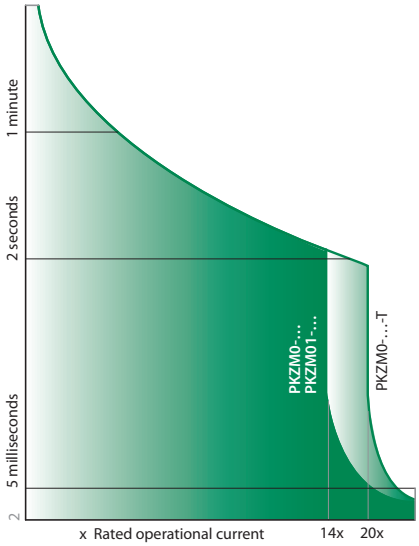


® Swiss Army Knife is a registered trademark of Wenger, SA.

Sure, but flexible motor protection

The PKZM family features adjustable bi-metal thermal trips and a fixed magnetic trip of 14x rated uninterrupted current. This provides superior protection for standard and high efficiency motors.

The PKZM0-T version has a fixed magnetic trip of 20x times rated uninterrupted current, providing optimal protection for today's popular premium efficiency motors that have higher inrush starting currents. Both versions allow you to adjust the thermal trip range from 0.6 to 1.0 times full load amps. Other standard motor protection features of the PKZM family include phase loss and phase imbalance protection, as well as ambient temperature compensation.



PKZM controllers have adjustable thermal protection and fixed magnetic protection for both standard and high efficiency motors.

A design for every application

The popular PKZM01 is ideally suited for small machines and applications that are preferably operated using a pushbutton, palm switch or E-stop. In an emergency, just hit the button!

All other devices in the family have a rotary switch handle better suited to larger multi-motor starter applications or applications with an external handle operator.

Expand your options!

The PKZM family has a broad range of accessories to expand your control scheme options. All parts are interchangeable, simplifying ordering and reducing inventory.

Auxiliary contact modules can be fitted without any tools and provide fail-safe information about each switching state. This also applies to the NHI-E auxiliary contact module that fits within the PKZ without increasing its overall width.

Differential trip indicator auxiliaries show you at a glance if the problem was an overload or short-circuit, saving time in troubleshooting and enabling the shortest return to production time.

PKZM0 manual starters are being used with increasing frequency for decentralized electrical equipment. For these applications, Moeller offers door coupling rotary handles with door interlocks for use in control cabinet installations. The devices are simple to adapt to various cabinet depths thanks to shaft extensions with centred guides.

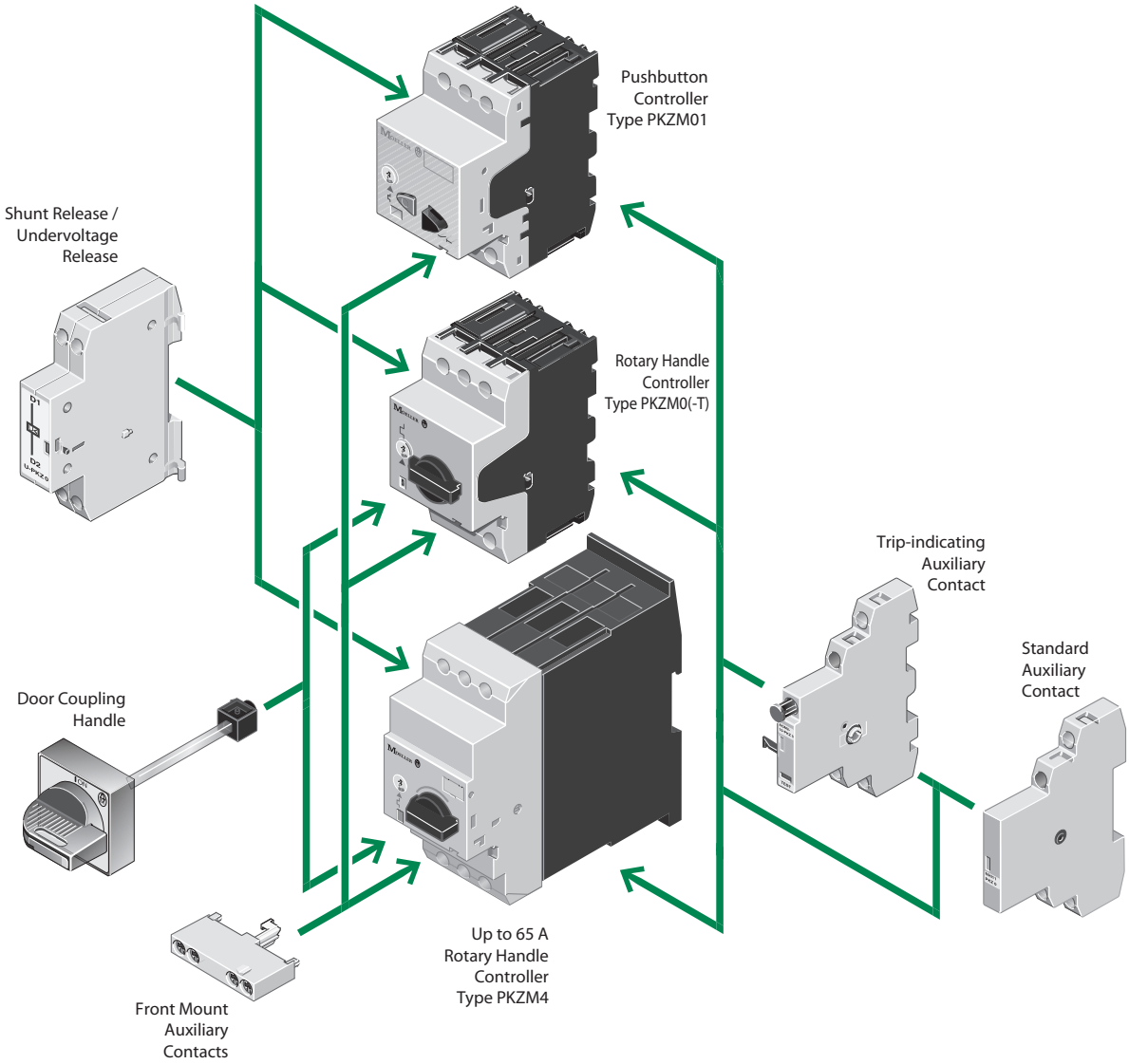
Wide range of enclosures

Moeller has one of the largest enclosure offerings for manual starters, including NEMA 1, 12 and 4X. PKZM controllers can be installed in an insulated surface mount enclosure or fitted within the machine or apparatus housing with the unique flush-mounting plate.

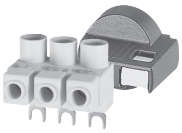
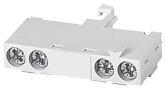
Whether equipped with protective membranes, locking devices or emergency-stop pushbuttons, all methods of actuation are available.

Worldwide approvals

In addition to being UL/CSA listed, PKZM controllers have been approved by ATEX for the protection of EEx e hazardous location motors.

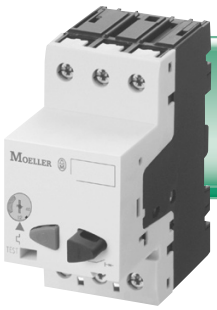

Pushbutton Controller Type PKZM01
Shunt Release / Undervoltage Release
Rotary Handle Controller Type PKZM0(-T)
Trip-indicating Auxiliary Contact
Standard Auxiliary Contact
Door Coupling Handle
Up to 65 A Rotary Handle Controller Type PKZM4
Front Mount Auxiliary Contacts

PKZM01, PKZM0 and PKZM4 Manual Motor Controllers Overview

Device	Description	Range	Pages
Manual Motor Controllers			
	Self-Protected Type E Pushbutton Operated *PKZM01*	0.1 – 16 Amps	C6 – C7
	Self-Protected Type E Rotary Handle *PKZM0*	0.1 – 32 Amps	C8 – C9
	For High In-rush Rotary Handle *PKZM0-T*	0.1 – 25 Amps	C10 – C11
	Self-Protected Type E Rotary Handle *PKZM4*	16 – 65 Amps	C12 – C13
Type E One-stop-shop			
	Type E Required Components	For North America	C15
Standard Auxiliary Contacts			
	Side-mounted Standard Auxiliary Contacts	1 NO / 1 NC 1 NO / 2 NC 2 NO / 1 NC	C16
	Front-mounted Standard Auxiliary Contacts	1 NO / 1 NC 1 NO / 0 NC	C16

Device	Description	Range	Pages
Other Auxiliary Contacts			
	Trip-Indicating Auxiliary Contacts Side Mounted	1 NO / 0 NC 0 NO / 1 NC	C17
	Early-Make Auxiliary Contacts Front Mounted	2 NO / 0 NC	C17
Releases			
	Shunt Release	24 V DC 24 – 480 V AC	C18
	Undervoltage Release	24 – 480 V AC	C18
Accessories			
	Miscellaneous Accessories		C19
Enclosures			
	Enclosures		C20 – C25

- Approved by UL 508/CSA C 22.2 No. 14 for use as a self-protected Type E manual starter
- Suitable for use in group motor applications
- Common accessories with PKZM0, PKZM0-T and PKZM4 series helps reduce inventories
- Phase failure sensitive and ambient temperature compensated
- Pushbutton operation; ideal for manual starter applications



See Next Page for UL/CSA Application Ratings Guide

Pushbutton manual motor controller type PKZM01

Rated Uninterrupted Current ❶	Setting ❶		Maximum Motor Rating								
	Overload Releases	Short-Circuit Releases	Typical Single Phase [HP]			Typical Three Phase [HP]					
I_e	I_r	I_{rm}									
[A]	[A]	[A]	115V	200V	240V	200V	240V	480V	600V	Catalog Number	Price
0.16	0.1 – 0.16	2.2	See note below							PKZM01-0,16	190
0.25	0.16 – 0.25	3.5								PKZM01-0,25	190
0.4	0.25 – 0.4	5.6								PKZM01-0,4	190
0.63	0.4 – 0.63	8.8								PKZM01-0,63	210
1	0.63 – 1	14						½	½	PKZM01-1	212
1.6	1 – 1.6	22			1/10			¾	1	PKZM01-1,6	212
2.5	1.6 – 2.5	35		⅛	⅙	½	½	1	1½	PKZM01-2,5	212
4	2.5 – 4	56	⅛	¼	⅓	1	1	2	3	PKZM01-4	230
6.3	4 – 6.3	88	¼	½	½	1½	1½	3	5	PKZM01-6,3	230
10	6.3 – 10	140	½	1	1½	3	3	7½	10	PKZM01-10	276
12	8 – 12	168	½	1½	2	3	3	7½	10	PKZM01-12	276
16	10 – 16	224	1	2	2	3	5	10	10	PKZM01-16	276
20	16 – 20	280	1½	3	3	5	5	10	15	PKZM01-20	276
25	20 – 25	350	1½	3	3	5	7½	15	20	PKZM01-25	330

Horsepower ratings shown in the table are for reference only.
The final selection of the manual starter depends on the actual motor full load current and service factor on the motor nameplate.
Overload should be set at motor FLA full load current and is calibrated to 1.15 S.F.
Specified values to NEC table 430-150.

Ordering Instructions

1. **Determine the motor FLA and Service Factor.**
2. **Use the application rating guide on next page.**
3. **Locate the desired manual motor controller.**
4. **See pages C14 – C27 for auxiliaries and accessories.**

❶ All types have adjustable dial for setting motor full load current. Trip current is 125% of set value. For motors with a service factor (SF) of 1.0, set dial to 90% of motor full load current.

UL/CSA Application Ratings Guide for PKZM01

Catalog Number	Maximum short circuit current RMS symmetrical [kA] when used as. . .										
	Manual Motor Starter		Max. Fuse [A]	Max. Circuit Breaker [A]	Manual Controller in Group Installation ❶			Max. Fuse [A]	Max. Fuse + CL ❷ [A]	Max. Circuit Breaker [A]	Max. Circuit Breaker + CL ❷ [A]
	480V	600V			480V	600V	600V + CL ❷				
PKZM01-0,16	5	5	1	15	50	50	–	600	–	600	–
PKZM01-0,25	5	5	1	15	50	50	–	600	–	600	–
PKZM01-0,4	5	5	1	15	50	50	–	600	–	600	–
PKZM01-0,63	5	5	1	15	50	50	–	600	–	600	–
PKZM01-1	5	5	3	15	50	50	–	600	–	600	–
PKZM01-1,6	5	5	6	15	50	50	–	600	–	600	–
PKZM01-2,5	5	5	10	15	50	50	–	600	–	600	–
PKZM01-4	5	5	15	15	50	50	–	600	–	600	–
PKZM01-6,3	5	5	25	25	50	50	–	600	–	600	–
PKZM01-10	5	5	40	40	50	22	50	150	600	125	600
PKZM01-12	5	5	4 x FLC	60	50	10	50	150	600	125	600
PKZM01-16	5	5	60	60	50	10	50	150	600	125	600
PKZM01-20	5	5	80	80	10	10	18	150	600	125	600
PKZM01-25	5	5	100	100	10	10	18	150	600	125	600

❶ CSA 22.2 No. 14 / UL 508 for group installation with short circuit protection.
❷ CL = Current Limiter (CL-PKZ0 - see page C16) ratings apply to manual controller configuration only; cannot be combined with contactor.

- Approved by UL 508/CSA C 22.2 No. 14 for use as a manual starter, tap conductor protector and type E self-protected combination motor controller
- Suitable for use in group motor applications
- Common accessories with PKZM01, PKZM0-T and PKZM4 series helps reduce inventories
- Phase failure sensitive and ambient temperature compensated
- Rotary handle operation

See Next Page for UL/CSA Application Ratings Guide

Rotary handle manual motor controller type PKZM0 *(up to 32 Amps)*

Rated Uninterrupted Current ❶	Setting ❶		Maximum Motor Rating								
	Overload Releases	Short-Circuit Releases	Typical Single Phase [HP]			Typical Three Phase [HP]					
I_e	I_r	I_{rm}									
[A]	[A]	[A]	115V	200V	240V	200V	240V	480V	600V	Catalog Number	Price
0.16	0.1 – 0.16	2.2	See note below							PKZM0-0,16	200
0.25	0.16 – 0.25	3.5								PKZM0-0,25	200
0.4	0.25 – 0.4	5.6								PKZM0-0,4	200
0.63	0.4 – 0.63	8.8								PKZM0-0,63	220
1	0.63 – 1	14						½	½	PKZM0-1	240
1.6	1 – 1.6	22			1/10			¾	¾	PKZM0-1,6	240
2.5	1.6 – 2.5	35		1/8	1/6	½	½	1	1½	PKZM0-2,5	240
4	2.5 – 4	56	1/8	¼	⅓	¾	¾	2	3	PKZM0-4	240
6.3	4 – 6.3	88	¼	½	½	1	1½	3	5	PKZM0-6,3	240
10	6.3 – 10	140	½	1	1½	3	3	7½	10	PKZM0-10	290
12	8 – 12	168	½	1½	2	3	3	7½	10	PKZM0-12	290
16	10 – 16	224	1	2	2	3	5	10	10	PKZM0-16	290
20	16 – 20	280	1½	3	3	5	5	10	15	PKZM0-20	300
25	20 – 25	350	1½	3	3	5	7½	15	20	PKZM0-25	340
32	25 – 32	448	2	3	5	7½	10	20	25	PKZM0-32	480

Horsepower ratings shown in the table are for reference only.
The final selection of the manual starter depends on the actual motor full load current and service factor on the motor nameplate.
Overload should be set at motor FLA full load current and is calibrated to 1.15 S.F.
Specified values to NEC table 430-150.

See page C12 for larger manual motor controllers

Ordering Instructions

1. Determine the motor FLA and Service Factor.
2. Use the application rating guide on next page.
3. Locate the desired manual motor controller.
4. See pages C14 – C27 for auxiliaries and accessories.

❶ All types have adjustable dial for setting motor full load current. Trip current is 125% of set value. For motors with a service factor (SF) of 1.0, set dial to 90% of motor full load current.

UL/CSA Application Ratings Guide for PKZM0

Catalog Number	Maximum short circuit current RMS symmetrical [kA] when used as…												
	Manual Motor Starter		Max. Fuse [A]	Max. Circuit Breaker [A]	Manual Controller in Group Installation ❶			Max. Fuse [A]	Max. Circuit Breaker [A]	Suitable for Tap Conductor Protection		Self-Protected Type E Manual Controller ❷❸	
	480V	600V			480V	600V	600V +CL ❹			480Y/277V	600Y/347V	480Y/277V	600Y/347V
PKZM0-0,16	5	5	1	15	50	50	–	600	600	42	65	42	65
PKZM0-0,25	5	5	1	15	50	50	–	600	600	42	65	42	65
PKZM0-0,4	5	5	1	15	50	50	–	600	600	42	65	42	65
PKZM0-0,63	5	5	1	15	50	50	–	600	600	42	65	42	65
PKZM0-1	5	5	3	15	50	50	–	600	600	42	65	42	65
PKZM0-1,6	5	5	6	15	50	50	–	600	600	42	65	42	65
PKZM0-2,5	5	5	10	15	50	50	–	600	600	42	65	42	65
PKZM0-4	5	5	15	15	50	50	–	600	600	42	65	42	65
PKZM0-6,3	5	5	25	25	50	50	–	600	600	42	65	42	65
PKZM0-10	5	5	40	40	50	22	50	150	125	42	65	42	65
PKZM0-12	5	5	4 x FLA	60	50	22	50	150	125	42	–	42	–
PKZM0-16	5	5	60	60	50	22	50	150	125	42	–	42	–
PKZM0-20	5	5	80	80	50	10	18	150	125	18	–	18	–
PKZM0-25	5	5	100	100	50	10	18	150	125	18	–	18	–
PKZM0-32	5	5	4 x FLA	100	50	10	18	150	125	18	–	18	–

❶ CSA 22.2 No. 14 / UL 508 for group installation with short circuit protection.

❷ **In USA and Canada**: Type E requires a line side connector feeder terminal (BK25/3-PKZ0-E see page C15). This terminal is not a requirement for tap conductor protection.
In Canada only: Type E also requires the handle to be padlockable (AK-PKZ0, SVB-PKZ0, or PKZ0-X(R)H see pages C15, C26).

❸ According to UL 508, Part IV.

❹ CL = Current Limiter (CL-PKZ0 - see page C16) ratings apply to manual controller configuration only; cannot be combined with contactor.

- Approved by UL 508/CSA C 22.2 No. 14 for use as a manual starter and tap conductor protector
- Suitable for use with high and premium efficiency motors with 15 – 22x inrush current
- Common accessories with PKZM01, PKZM0 and PKZM4 series helps reduce inventories
- Phase failure sensitive and ambient temperature compensated

See Next Page for UL/CSA Application Ratings Guide

Manual motor controller type PKZM0-T for high-inrush *(up to 25 Amps)* ❶

Rated Uninterrupted Current ❷	Setting ❷		Maximum Motor Rating								
	Overload Releases	Short-Circuit Releases	Typical Single Phase [HP]			Typical Three Phase [HP]					
I_e	I_r	I_{rm}									
[A]	[A]	[A]	115V	200V	240V	200V	240V	480V	600V	Catalog Number	Price
0.16	0.1 – 0.16	2.4	See note below							PKZM0-0,16-T	220
0.25	0.16 – 0.25	4.25								PKZM0-0,25-T	220
0.4	0.25 – 0.4	6.8								PKZM0-0,4-T	220
0.63	0.4 – 0.63	12								PKZM0-0,63-T	220
1	0.63 – 1	20						½	½	PKZM0-1-T	240
1.6	1 – 1.6	32			1/10			¾	¾	PKZM0-1,6-T	240
2.5	1.6 – 2.5	50		1/8	1/6	½	½	1	1½	PKZM0-2,5-T	240
4	2.5 – 4	84	1/8	¼	⅓	¾	¾	2	3	PKZM0-4-T	240
6.3	4 – 6.3	141	¼	½	½	1	1½	3	5	PKZM0-6,3-T	240
10	6.3 – 10	224	½	1	1½	3	3	7½	10	PKZM0-10-T	290
12	8 – 12	224	½	1½	2	3	3	7½	10	PKZM0-12-T	290
16	10 – 16	358	1	2	2	3	5	10	10	PKZM0-16-T	290
20	16 – 20	380	1½	3	3	5	5	10	15	PKZM0-20-T	300
25	20 – 25	420	1½	3	3	5	7½	15	20	PKZM0-25-T	354

Horsepower ratings shown in the table are for reference only.
The final selection of the manual starter depends on the actual motor full load current and service factor on the motor nameplate.
Overload should be set at motor FLA full load current and is calibrated to 1.15 S.F.
Specified values to NEC table 430-150.

Ordering Instructions

1. **Determine the motor FLA and Service Factor.**
2. **Use the application rating guide on next page.**
3. **Locate the desired manual motor controller.**
4. **See pages C14 – C27 for auxiliaries and accessories.**

❶ Not Type E rated; for use as a manual controller only.
❷ All types have adjustable dial for setting motor full load current. Trip current is 125% of set value. For motors with a service factor (SF) of 1.0, set dial to 90% of motor full load current.

UL/CSA Application Ratings Guide for PKZM0-T

Catalog Number	Maximum short circuit current RMS symmetrical [kA] when used as. . .										
	Manual Motor Starter		Max. Fuse [A]	Max. Circuit Breaker [A]	Manual Controller in Group Installation ❶			Max. Fuse [A]	Max. Circuit Breaker [A]	Suitable for Tap Conductor Protection	
	480V	600V			480V	600V	600V +CL ❷			480Y/277V	600Y/347V
PKZM0-0,16-T	5	5	1	15	50	50	–	600	600	42	65
PKZM0-0,25-T	5	5	1	15	50	50	–	600	600	42	65
PKZM0-0,4-T	5	5	1	15	50	50	–	600	600	42	65
PKZM0-0,63-T	5	5	1	15	50	50	–	600	600	42	65
PKZM0-1-T	5	5	3	15	50	50	–	600	600	42	65
PKZM0-1,6-T	5	5	6	15	50	50	–	600	600	42	65
PKZM0-2,5-T	5	5	10	15	50	50	–	600	600	42	65
PKZM0-4-T	5	5	15	15	50	50	–	600	600	42	65
PKZM0-6,3-T	5	5	25	25	50	50	–	600	600	42	65
PKZM0-10-T	5	5	40	40	50	22	50	150	125	42	65
PKZM0-12-T	5	5	4 x FLA	60	50	10	50	150	125	42	–
PKZM0-16-T	5	5	60	60	50	10	50	150	125	42	–
PKZM0-20-T	5	5	80	80	50	10	18	150	125	18	–
PKZM0-25-T	5	5	100	100	50	10	18	150	125	18	–

❶ CSA 22.2 No. 14 / UL 508 for group installation with short circuit protection.
❷ CL = Current Limiter (CL-PKZ0 - see page C16) ratings apply to manual controller configuration only; cannot be combined with contactor.

- Approved by UL 508/CSA C 22.2 No. 14 for use as a manual starter, tap conductor protector and type E self-protected combination motor controller
- Suitable for use in group motor applications
- Common accessories with PKZM01, PKZM0 and PKZM0-T series helps reduce inventories
- Phase failure sensitive and ambient compensated
- Rotary handle operation

See Next Page for UL/CSA Application Ratings Guide

Manual motor controller for larger applications type PKZM4

Rated Uninterrupted Current ❶	Setting ❶		Maximum Motor Rating								
	Overload Releases	Short-Circuit Releases	Typical Single Phase [HP]			Typical Three Phase [HP]					
I_e	I_r	I_{rm}									
[A]	[A]	[A]	115V	200V	240V	200V	240V	480V	600V	Catalog Number	Price
16	10 – 16	224	1	2	3	3	5	10	15	PKZM4-16	434
25	16 – 25	350	2	3	3	7½	7½	15	20	PKZM4-25	508
32	25 – 32	448	3	5	5	10	10	25	30	PKZM4-32	590
40	32 – 40	560	3	–	7½	10	–	30	30	PKZM4-40	690
50	40 – 50	700	–	–	–	–	15	30	40	PKZM4-50	784
58	50 – 58 ❷	812	–	–	10	–	–	40	50	PKZM4-58	932
58	55 – 63 ❷	882	–	–	–	–	–	40	50	PKZM4-63	932

Horsepower ratings shown in the table are for reference only.
The final selection of the manual starter depends on the actual motor full load current and service factor on the motor nameplate.
Overload should be set at motor FLA full load current and is calibrated to 1.15 S.F.
Specified values to NEC table 430-150.

See page C8 for smaller manual motor controllers

Ordering Instructions

1. Determine the motor FLA and Service Factor.
2. Use the application rating guide on next page.
3. Locate the desired manual motor controller.
4. See pages C14 – C27 for auxiliaries and accessories.

❶ All types have adjustable dial for setting motor full load current. Trip current is 125% of set value. For motors with a service factor (SF) of 1.0, set dial to 90% of motor full load current.

❷ Maximum three-phase at 480V is 58A; at 600V is 52A.

UL/CSA Application Ratings Guide for PKZM4

Catalog Number	Maximum short circuit current RMS symmetrical [kA] when used as…											
	Manual Motor Starter		(NTD) OTS Fuse [A]	Circuit Breaker [A]	Manual Controller in Group Installation ❶		Max. Fuse [A] ❷	Max. Circuit Breaker [A] ❷	Suitable for Tap Conductor Protection		Self-Protected Type E Manual Controller ❸❹	
	480V	600V			480V	600V			480Y/277V	600Y/347V	480Y/277V	600Y/347V
PKZM4-16	5	5	60	60	65	42	600	600	50	25	50	25
PKZM4-25	5	5	100	100	65	42	600	600	50	25	50	25
PKZM4-32	5	5	125	125	65	42	600	600	50	25	50	25
PKZM4-40	5	5	150	150	65	42	600	600	50	25	50	25
PKZM4-50	5	5	150	150	65	42	600	600	50	–	50	–
PKZM4-58	5	5	150	150	65	42	600	600	50	–	50	–
PKZM4-63	5	5	150	150	65	42	600	600	50	–	50	–

❶ CSA 22.2 No. 14 / UL 508 for group installation with short circuit protection.

❷ Tests have been performed successfully without fuse or circuit breaker protection.

❸ **In USA and Canada**: Type E requires a line side connector feeder terminal (BK50/3-PKZ4-E see page C15). This terminal is not a requirement for tap conductor protection.
In Canada only: Type E also requires the handle to be padlockable (AK-PKZ0, SVB-PKZ0, or PKZ0-X(R)H see pages C15, C26).

❹ According to UL 508, Part IV.

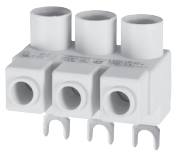
Accessory Guide

Maximum possible combinations of accessories

Use this guide to determine which accessories fit on the devices listed below.
Order the desired accessories on the pages that follow.

Maximum possible combinations of accessories when using the following manual motor controllers		Auxiliary Contacts *(see page C16)*  NHI(11)(12)(21)-PKZ0	Trip-Indicating Auxiliary Contacts *(see page C17)*  AGM2...PKZ0	Front-mounted Auxiliary Contacts *(see page C16)*  NHI-E...PKZ0	Early-make Auxiliary Contacts *(see page C17)*  VHI20-PKZ0(1)	Shunt Trip *(see page C18)*  A-PKZ0...	Undervoltage Trip *(see page C18)*  U-PKZ0...	Padlockable Handle *(see page C15)*  AK-PKZ0
Manual Motor Controller PKZM01								
 PKZM01... *(see page C6)*	Option #1	1x		1x		1x		
	Option #2		1x	1x		1x		
	Option #3	1x			1x	1x		
	Option #4		1x		1x	1x		
	Option #5	1x		1x			1x	
	Option #6		1x	1x			1x	
	Option #7	1x			1x		1x	
	Option #8		1x		1x		1x	
Manual Motor Controller PKZM0(-T)								
 PKZM0...(-T) *(see pages C8 – C10)*	Option #1	1x		1x		1x		1x
	Option #2		1x	1x		1x		1x
	Option #3	1x			1x	1x		
	Option #4		1x		1x	1x		
	Option #5	1x		1x			1x	1x
	Option #6		1x	1x			1x	1x
	Option #7	1x			1x		1x	
	Option #8		1x		1x		1x	
Manual Motor Controller PKZM4								
 PKZM4... *(see page C12)*	Option #1	1x		1x		1x		1x
	Option #2		1x	1x		1x		1x
	Option #3	1x		1x			1x	1x
	Option #4		1x	1x			1x	1x

Feeder Terminal - Required for Type E in USA and Canada ❶

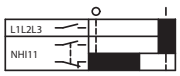
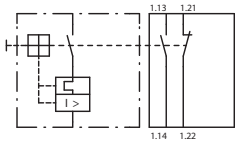
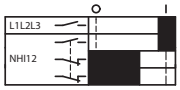
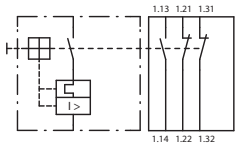
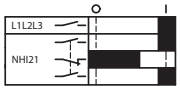
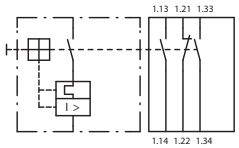
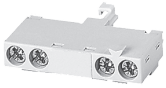
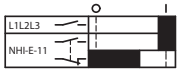
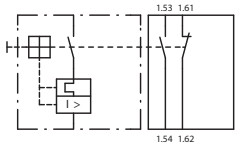
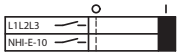
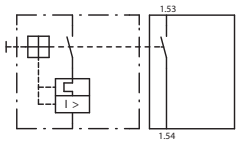
Line Side Connector Feeder Terminal	Description	For use with...	Catalog Number	Price
Feeder Terminal				
	Finger and back-of-hand proof $U_e = 690$ V, $I_u = 60$ A Conductor cross-sections: 2.5...25 mm² flexible; 2.5...25 mm² flexible with ferrule AWG 14...6 This device is not suitable for a commoning link incoming supply termnial	PKZM0	**BK25/3-PKZ0-E**	40
		PKZM4	**BK50/3-PKZ4-E**	110

Padlockable Handle - Required for Type E in Canada ❷

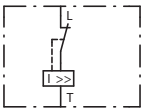
Accessory	Description	For use with...	Catalog Number	Price
Lockable Rotary Handle				
	For connection of the manual motor controller PKZM0 and PKZM4 as a main switch to EN 60204 Can be padlocked in the 0 position with a padlock Hasp thickness: 3 – 6.35 mm Cannot be used with early-make front-mount auxiliary contact (VHI20-PKZ0)	PKZM0 PKZM4	**AK-PKZ0**	8

❶ This terminal is not a requirement for Type E tap conductor protection.
❷ Other padlocking options include: SVB-PKZ0 and PKZ0-X(R)H (see page C26).

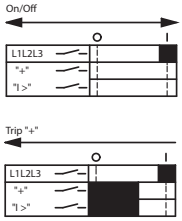
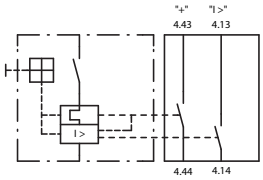
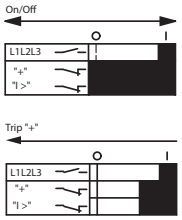
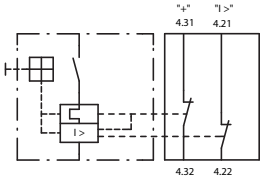
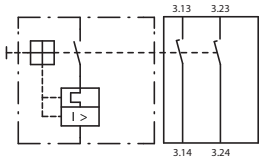
Standard Auxiliary Contacts

Auxiliary	Contacts NO	Contacts NC	Description	Travel Diagram	Schematic	For use with...	Catalog Number	Price
Side Mount								
	1	1	Screw terminals			PKZM01 PKZM0 PKZM0-T PKZM4	**NHI11-PKZ0**	48
	1	2	Screw terminals				**NHI12-PKZ0**	72
	2	1	Screw terminals				**NHI21-PKZ0**	72
Front Mount								
	1	1	Screw terminals			PKZM01 PKZM0 PKZM0-T PKZM4	**NHI-E-11-PKZ0**	40
	1	0	Screw terminals				**NHI-E-10-PKZ0**	28

Current Limiter

Current Limiter	Description	Schematic	For use with...	Catalog Number	Price
Current Limiter					
	To increase the switching capacity of manual motor controllers up to 50 kA/600V Cannot be combined with a contactor		PKZM0 PKZM0-T PKZM4	**CL-PKZ0**	120

Other Auxiliary Contacts

Auxiliary	Contacts NO	Contacts NC	Description	Travel Diagram	Schematic	For use with . . .	Catalog Number	Price
Trip-indicating auxiliary contact								
	1	0	Trips on short circuit or overcurrent A600 / Q300 pilot duty 5A @ 600V AC; 1A @ 250V DC			PKZM01 PKZM0 PKZM0-T PKZM4	**AGM2-10-PKZ0**	80
	0	1	A600 / Q300 pilot duty 5A @ 600V AC; 1A @ 250V DC				**AGM2-01-PKZ0**	80
Early-make auxiliary contact								
	2	0	E150 pilot duty 0.5A @ 250V AC Cannot be used with padlockable handle (AK-PKZ0)			PKZM0 PKZM0-T	**VHI20-PKZ0**	48
						PKZM01	**VHI20-PKZ01**	48

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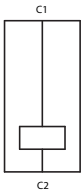
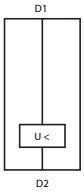
Manual Motor Controllers

Shunt Releases and Undervoltage Releases

Auxiliary	Description	Schematic	For use with...	Catalog Number	Price
Shunt Releases					
	AC coil Screw Terminals		PKZM01 PKZM0 PKZM0-T PKZM4	**A-PKZ0◆**	128
	DC coil Screw Terminals			**A-PKZ0(24VDC)**	152
Undervoltage Releases ❶					
	AC coil Screw Terminals		PKZM01 PKZM0 PKZM0-T PKZM4	**U-PKZ0◆**	128

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Manual Motor Controllers

AC Coil Codes ❶

Complete catalog number (◆) with...	Voltage Range	
	50 Hz	60Hz
(24V50Hz)	24V	–
(120V60Hz)	–	120V
(208V60Hz)	–	208V
(240V60Hz)	–	240V
(480V60Hz)	–	480V
(600V60Hz)	–	600V

DC Coil Information

DC operated devices listed on this page are 24V DC. Other DC voltages are special order; contact your Moeller representative.

❶ Other coil voltages are special order; contact your Moeller representative.

Accessories

Accessory	Description	For use with...	Catalog Number	Price
Terminal Shroud				
	• White • Enhances the degree of protection of PKZM4 to IP2X	PKZM4	**HB-PKZ4**	16
Tamper Shield				
	To prevent tampering with the overload release and the test function, it can be sealed using industry standard sealing wire For use with manual motor controllers PKZM0 and PKZM4	PKZM0 PKZM0-T PKZM4	**PL-PKZ0**	4

Enclosure Guide

Maximum possible combinations of accessories

Use this guide to determine which accessories fit in the enclosures listed below.
Order the desired enclosures on the pages that follow.

 Maximum possible combinations of accessories when PKZM01 is used in the following enclosures		Auxiliary Contacts *(see page C16)*  NHI(11)(12)(21)-PKZ0	Shunt Trip *(see page C18)*  A-PKZ0...	Undervoltage Trip *(see page C18)*  U-PKZ0...	Trip-Indicating Auxiliary Contacts *(see page C17)*  AGM2...PKZ0	Front-mounted Auxiliary Contacts *(see page C16)*  NHI-E...PKZ0	Early-make Auxiliary Contacts *(see page C17)*  VHI...PKZ01	Indicator Lights *(see page C27)*  L-PKZ0...
Base Mounted Enclosures for PKZM01								
NEMA Type 1 NEMA Type 4X: (-G)  CI-PKZ01-NA(-G) *(see page C23)*	Option #1	1x				1x		2x
	Option #2		1x			1x		2x
	Option #3			1x		1x		2x
	Option #4	1x					1x	2x
	Option #5		1x				1x	2x
	Option #6			1x			1x	2x
NEMA Type 4X  CI-PKZ01-NA-SVB *(see page C23)*	Option #1		1x			1x		2x
	Option #2			1x		1x		2x
NEMA Type 4X  CI-PKZ01-NA-SVB-V *(see page C23)*	Option #1		1x				1x ❶	2x
	Option #2			1x			1x ❶	2x
NEMA Type 4X  CI-PKZ01-NA-PV(T)(S) *(see page C23)*	Option #1		1x			1x		2x
	Option #2			1x		1x		2x
	Option #3		1x				1x	2x
	Option #4			1x			1x	2x
Feeder terminal not required for manual motor starter applications.								

❶ Early-make auxiliary contact VHI...PKZ01 is required for enclosure operation.

Enclosure Guide

Maximum possible combinations of accessories

Use this guide to determine which accessories fit in the enclosures listed below.
Order the desired enclosures on the pages that follow.

 Maximum possible combinations of accessories when PKZM0(-T) or PKZM4 is used in the following enclosures		Auxiliary Contacts *(see page C16)*  NHI(11)(12)(21)-PKZ0	Shunt Trip *(see page C18)*  A-PKZ0...	Undervoltage Trip *(see page C18)*  U-PKZ0...	Trip-Indicating Auxiliary Contacts *(see page C17)*  AGM2...PKZ0	Front-mounted Auxiliary Contacts *(see page C16)*  NHI-E...PKZ0	Early-make Auxiliary Contacts *(see page C17)*  VHI...PKZ0	Indicator Lights *(see page C27)*  L-PKZ0...
Base Mounted Enclosures for PKZM0(-T)								
NEMA Type 12, 3R, 4X  CI-K2-PKZ0-NA(-G)(R) *(see page C24)*	Option #1	1x	1x			1x		2x
	Option #2		1x		1x	1x		2x
	Option #3	1x		1x		1x		2x
	Option #4			1x	1x	1x		2x
NEMA Type 12, 3R, 4X  CI-K2-PKZ0-NA-G(R)V *(see page C24)*	Option #1	1x	1x				1x	2x
	Option #2		1x		1x		1x	2x
	Option #3	1x		1x			1x	2x
	Option #4			1x	1x		1x	2x
Base Mounted Enclosures for PKZM4								
NEMA Type 1, 3R, 4X  CI-K4-PKZ4-NA-G(R) *(see page C24)*	Option #1	1x	1x			1x		2x
	Option #2	1x	1x				1x	2x
	Option #3	1x		1x		1x		2x
	Option #4	1x		1x			1x	2x
	Option #5		1x		1x	1x		2x
	Option #6		1x		1x		1x	2x
	Option #7			1x	1x	1x		2x
	Option #8			1x	1x		1x	2x
Feeder terminal not required for manual motor starter applications.								

Enclosure Guide

Maximum possible combinations of accessories

Use this guide to determine which accessories fit in the enclosures listed below.
Order the desired enclosures on the pages that follow.

 Maximum possible combinations of accessories when PKZM01 or PKZM0(-T) is used in the following enclosures		Auxiliary Contacts *(see page C16)*  NHI(11)(12)(21)-PKZ0	Shunt Trip *(see page C18)*  A-PKZ0...	Undervoltage Trip *(see page C18)*  U-PKZ0...	Trip-Indicating Auxiliary Contacts *(see page C17)*  AGM2...PKZ0	Front-mounted Auxiliary Contacts *(see page C16)*  NHI-E...PKZ0	Early-make Auxiliary Contacts *(see page C17)*  VHI...PKZ01	Indicator Lights *(see page C27)*  L-PKZ0...
Flush Mounted Enclosures for PKZM01								
NEMA Type 1 NEMA Type 4X: (-G)  E-PKZ01(-G) *(see page C25)*	Option #1	1x				1x		2x
	Option #2		1x			1x		2x
	Option #3			1x		1x		2x
	Option #4	1x					1x	2x
	Option #5		1x				1x	2x
	Option #6			1x			1x	2x
NEMA Type 4X  E-PKZ01-SVB(-V ❶) E-PKZ01-PV(T)(S) *(see page C25)*	Option #1		1x				1x ❶	2x
	Option #2			1x			1x ❶	2x
	Option #3 *not for (-V)*		1x			1x		2x
	Option #4 *not for (-V)*			1x		1x		2x
Flush Mounted Enclosures for PKZM0(-T)								
CSA: NEMA Type 1  E-PKZ0 *(see page C25)*	Option #1	1x						2x
	Option #2		1x					2x
	Option #3			1x				2x
CSA: NEMA Type 1  E-PKZ0-G(R) *(see page C25)*	Option #1	1x				1x		2x
	Option #2		1x			1x		2x
	Option #3			1x		1x		2x
Feeder terminal not required for manual motor starter applications.								

❶ Enclosure E-PKZ01-SVB-V requires early-make auxiliary contact VHI...PKZ01 for operation.

Insulated enclosures; base mounted for PKZM01

Enclosure	Protection Rating	Cable Entry Knockouts	Description	For use with...	Catalog Number	Price
Surface mounted for PKZM01						
	NEMA Type 1 IP41	• 2x M25 top • 2x M25 bottom	• Integrated terminal for N (neutral) connection • Will accept indicating lights *(see page C27)*	PKZM01	**CI-PKZ01-NA**	86
	NEMA Type 4x IP65	• 2x M25 top • 2x M25 bottom	• With actuation membrane • Integrated terminal for N (neutral) connection • Will accept indicating lights *(see page C27)*	PKZM01	**CI-PKZ01-NA-G**	108
	NEMA Type 4x IP65	• 2x M25 top • 2x M25 bottom	• Lockable in off position • Integrated terminal for N (neutral) connection • Will accept indicating lights *(see page C27)*	PKZM01	**CI-PKZ01-NA-SVB**	134
			• Lockable in off position in combination with VHI-PKZ01 • Integrated terminal for N (neutral) connection • Will accept indicating lights *(see page C27)*		**CI-PKZ01-NA-SVB-V**	134
	NEMA Type 4x IP65	• 2x M25 top • 2x M25 bottom	• With emergency stop pushbutton operator, turn-to-release • Integrated terminal for N (neutral) connection • Will accept indicating lights *(see page C27)*	PKZM01	**CI-PKZ01-NA-PVT**	190
			• With emergency stop pushbutton operator, keyed release • Integrated terminal for N (neutral) connection • Will accept indicating lights *(see page C27)*		**CI-PKZ01-NA-PVS**	286

See Enclosure Guide on page C20

Insulated enclosures; base mounted for PKZM0(-T) and PKZM4

Enclosure	Protection Rating	Cable Entry Knockouts	Description	For use with...	Catalog Number	Price
Base mounted for PKZM0(-T)						
	NEMA Type 1, 12, 3R, 4x IP40 IP41 when mounted vertically	• 2 x ½" top • 2 x ½" bottom • Knockouts on top, bottom and back • Control cable entry	• Cover with aperture dimensioned to accommodate front of manual motor controller • Integrated terminal for N (neutral) connection • Will accept indicating lights *(see page C27)*	PKZM0 PKZM0-T	**CI-K2-PKZ0-NA**	48
	NEMA Type 12, 3R, 4x IP65	• 2 x ½" top • 2 x ½" bottom • Knockouts on top, bottom and back • Control cable entry	• With black/grey rotary handle • Integrated terminal for N (neutral) connection • Will accept indicating lights *(see page C27)*	PKZM0 PKZM0-T	**CI-K2-PKZ0-NA-G**	60
			• With red/yellow rotary handle for use as emergency stop switches to IEC/EN 60204 • Integrated terminal for N (neutral) connection • Will accept indicating lights *(see page C27)*		**CI-K2-PKZ0-NA-GR**	72
Base mounted for PKZM0(-T) with Early-make VHI auxiliary contacts						
	NEMA Type 12, 3R, 4x IP65	• 2 x ½" top • 2 x ½" bottom • Knockouts on top, bottom and back • Control cable entry	• With black/grey rotary handle • Integrated terminal for N (neutral) connection • Will accept indicating lights *(see page C27)*	PKZM0 PKZM0-T	**CI-K2-PKZ0-NA-GV**	60
			• With red/yellow rotary handle for use as emergency stop switches to IEC/EN 60204 • Integrated terminal for N (neutral) connection • Will accept indicating lights *(see page C27)*		**CI-K2-PKZ0-NA-GRV**	72
Base mounted for PKZM4						
	NEMA Type 1, 3R, 4x IP65	• 2 x ½" top • 2 x ½"bottom • 2 x ½" back • Control cable entry	• With black/grey rotary handle • Integrated terminal for N (neutral) connection • Will accept indicating lights *(see page C27)*	PKZM4	**CI-K4-PKZ4-NA-G** ❶	contact Moeller for availability
			• With red/yellow rotary handle for use as emergency stop switches to IEC/EN 60204 • Integrated terminal for N (neutral) connection • Will accept indicating lights *(see page C27)*		**CI-K4-PKZ4-NA-GR**	200

See Enclosure Guide on page C21

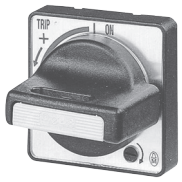
❶ UL/CSA pending; contact your Moeller representative.

Insulated enclosures; flush mounted for PKZM01 and PKZM0(-T)

Enclosure	Protection Rating	Description	For use with...	Catalog Number	Price
Flush mounted for PKZM01					
	NEMA Type 1 IP40	• Integrated terminal for N (neutral) connection • Will accept indicating lights *(see page C27)*	PKZM01	**E-PKZ01**	46
	NEMA Type 4x Front IP65	• With actuation membrane • Integrated terminal for N (neutral) connection • Will accept indicating lights *(see page C27)*	PKZM01	**E-PKZ01-G**	68
	NEMA Type 4x Front IP65	• Lockable in off position • Integrated terminal for N (neutral) connection • Will accept indicating lights *(see page C27)*	PKZM01	**E-PKZ01-SVB**	98
		• Lockable in off position in combination with VHI-PKZ01 • Integrated terminal for N (neutral) connection • Will accept indicating lights *(see page C27)*		**E-PKZ01-SVB-V**	98
	NEMA Type 4x Front IP65	• With emergency stop pushbutton operator, turn-to-release • Integrated terminal for N (neutral) connection • Will accept indicating lights *(see page C27)*	PKZM01	**E-PKZ01-PVT**	152
		• With emergency stop pushbutton operator, keyed release • Integrated terminal for N (neutral) connection • Will accept indicating lights *(see page C27)*		**E-PKZ01-PVS**	248
Flush mounted for PKZM0(-T)					
	CSA: NEMA Type 1 Front IP65	• Cover with aperture dimensioned to accommodate front of manual motor controller • Integrated terminal for N (neutral) connection • Will accept indicating lights *(see page C27)*	PKZM0 PKZM0-T	**E-PKZ0**	50
	CSA: NEMA Type 1 Front IP55	• With black/grey rotary handle • Integrated terminal for N (neutral) connection • Will accept indicating lights *(see page C27)*	PKZM0 PKZM0-T	**E-PKZ0-G**	70
		• With red/yellow rotary handle, for use as emergency-stop switch in accordance with EN 60204 • Integrated terminal for N (neutral) connection • Will accept indicating lights *(see page C27)*		**E-PKZ0-GR**	80

See Enclosure Guide on page C22

Through-the-door Mounted Handles for PKZM0 and PKZM4

Handle	Description	Color	Protection Rating	For use with...	Catalog Number	Price
Door Coupling Handle						
	• Rotary handle operator • Padlockable in OFF and ON positions • Includes shaft mounting depth for PKZM0: 100 – 125 mm mounting depth for PKZM4: 177 – 200 mm **Includes door interlock; not engaged when shipped**	Black	NEMA 3R, 4X, 12, 13	PKZM0(-T) PKZM4	**PKZ0-XH**	132
		Red/Yellow	NEMA 3R, 4X, 12, 13	PKZM0(-T) PKZM4	**PKZ0-XRH**	154
	• Rotary handle operator • Padlockable in OFF and ON positions • To be used when PKZ is rotated by 90˚ • Includes shaft mounting depth for PKZM0: 100 – 125 mm mounting depth for PKZM4: 177 – 200 mm • Selectable handle positions **Includes door interlock; not engaged when shipped**	Black	NEMA 3R, 4X, 12, 13	PKZM0(-T) PKZM4	**PKZ0-XH-MCC**	132
		Red/Yellow	NEMA 3R, 4X, 12, 13	PKZM0(-T) PKZM4	**PKZ0-XRH-MCC**	154
Extension Shaft						
	• Mounting depths 125 – 240 mm for PKZM0 • Mounting depths 200 – 317 mm for PKZM4	–	–	PKZM0(-T) PKZM4	**PKZ0-XAH**	40

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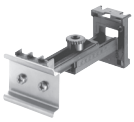
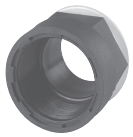
Manual Motor Controllers

Enclosure Accessories

Accessory	Protection Rating	Description	For use with...	Catalog Number	Price	Discount Code
Padlocking Feature						
	NEMA Type 1, 3R, 4x, 12, 13	Lockable in the 0-posistion of the PKZM0 or PKZM4 manual motor controller For use with up to three padlocks, hasp thickness 3 – 6 mm	CI-K2-PKZ0-G(R)(V)	**SVB-PKZ0-CI**	32	A31
			CI-K4-PKZ-G(R)	**SVB-PKZ4-CI**	32	A31
	CSA: NEMA Type 1		E-PKZ0-G(R)	**SVB-PKZ0-E**	32	A31
Neutral Terminal						
	–	Flexible, 1 - 4 mm^2 Up to 32 Amps Included as standard on enclosure CI-K2-PKZ0-...	CI-K2-PKZ0-...	**K-CI-K1/2**	8	D11
	–	63 A, flexible, 6 - 16 mm^2	CI-K4-PKZ4-G(R)	**K25/1**	24	D11
	–	For connection of a 5th conductor	E-PKZ0(-G)(-GR) E-PKZ01(-G)	**N-PKZ0**	7.80	A31
Telescopic Adapter						
	–	• With 45 mm DIN rail to IEC/EN 60712, for compensating of the mounting depth of rear mounted devices in CI-K... enclosures and cabinets • Steplessly adjustable by means of a scale, from 75 – 115 mm	CI-K enclosures	**M22-TA**	46	C10

Glands and Grommets

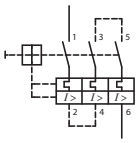
Accessory	Cable entry	Hole diameter [mm]	External diameter of cable [mm]	Catalog Number	Price	Discount Code
Cable glands						
	M20	20.5	6 – 13	**V-M20**	10	D11
	M25	25.5	9 – 17	**V-M25**	7	D11
	M32	32.5	13 – 21	**V-M32**	11	D11
Conduit Adapter - *(metric to english measurement)*						
	M20	½″	6 – 13	**V1/2″/M20-NA**	15	D11
Diaphragm Grommets						
	M20	20.5	1 – 13	**KT-M20**	6	D11
	M25	25.5	1 – 18	**KT-M25**	6	D11
	M32	32.5	1 – 24	**KT-M32**	6	D11

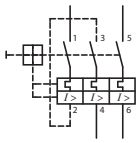
Indicator Lights with Neon Bulb ❶

Light	Voltage	Color	For use with . . .	Catalog Number	Price
	110 – 230	White	CI-PKZ01 CI-K2-PKZ0 CI-K4-PKZ4 E-PKZ01 E-PKZ0	**L-PKZ0(230V)**	48
	230 – 400			**L-PKZ0(400V)**	48
	110 – 230	Green		**L-PKZ0-GN(230V)**	48
	230 – 400			**L-PKZ0-GN(400V)**	48
	110 – 230	Red		**L-PKZ0-RT(230V)**	48
	230 – 400			**L-PKZ0-RT(400V)**	48

❶ These devices are not approved by UL or CSA.

PKZM0 and PKZM4 in 1- and 2-pole Circuits for DC and AC



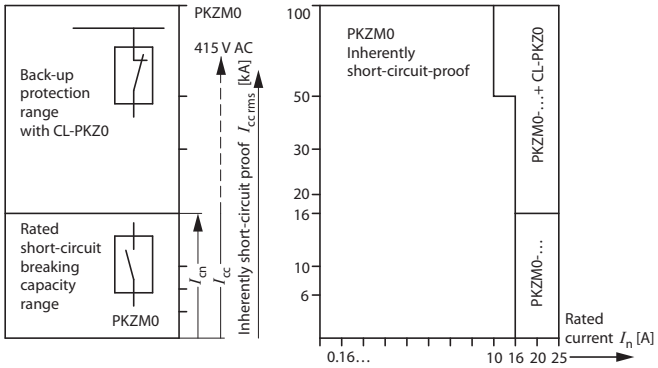


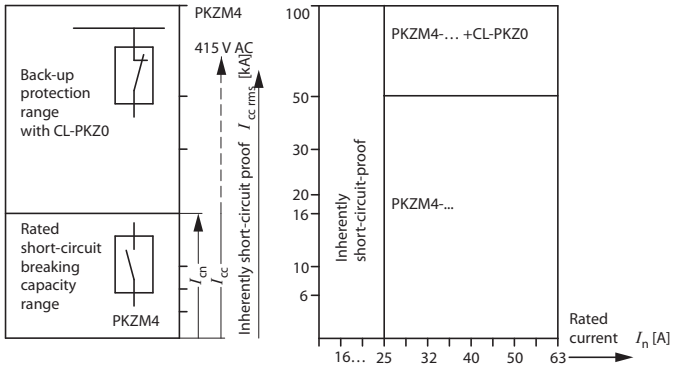
Protection Of PVC Insulated Cables Against Thermal Overload with Short Circuits

The table indicates which minimum cable cross-sections are protected by PKZM0 and PKZM4 manual motor controllers up to their rated conditional short-circuit current I_q.

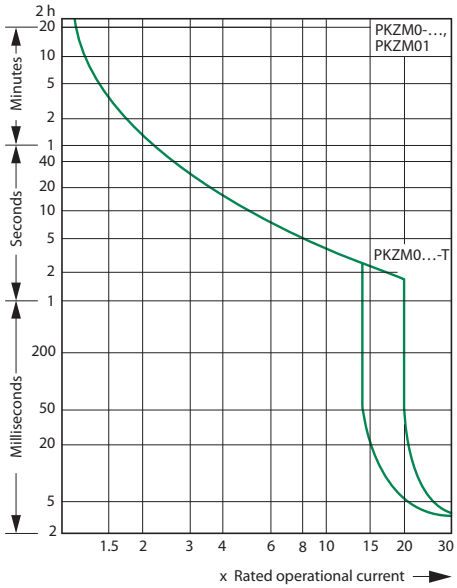
Min. cross-section protected 380–415V, 50 Hz, Cu mm²					Device Part No.
4	2.5	1.5	1	0.75	
					PKZM0-0.16
					⋮
					PKZM0-6.3
					PKZM0-10
					PKZM0-12
					PKZM0-16
					PKZM0-20
					PKZM0-25
					PKZM0-32
					PKZM4-16
					PKZM4-25
					PKZM4-32
					PKZM4-40
					PKZM4-50
					PKZM4-58
					PKZM4-63

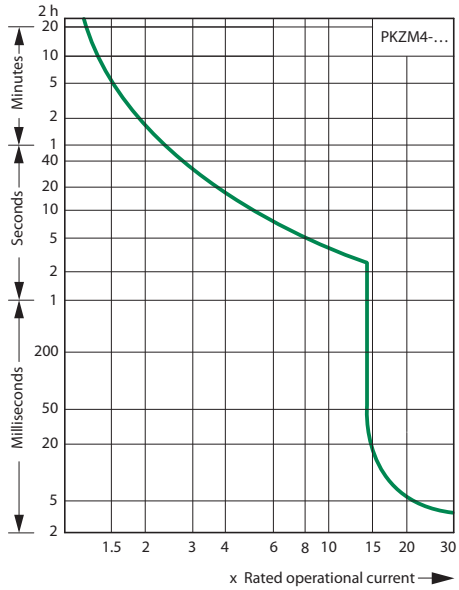
Fuseless Installation with PKZM0 and PKZM4, Back-Up Protection Diagrams





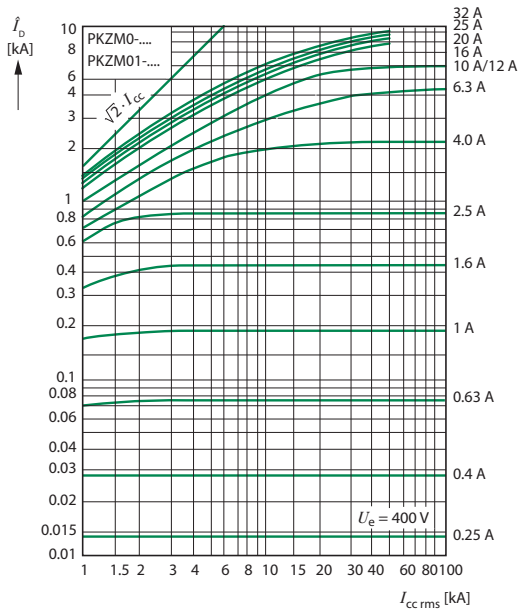
Thermal Tripping Characteristics for PKZM01, PKZM0, PKZM0-T and PKZM4



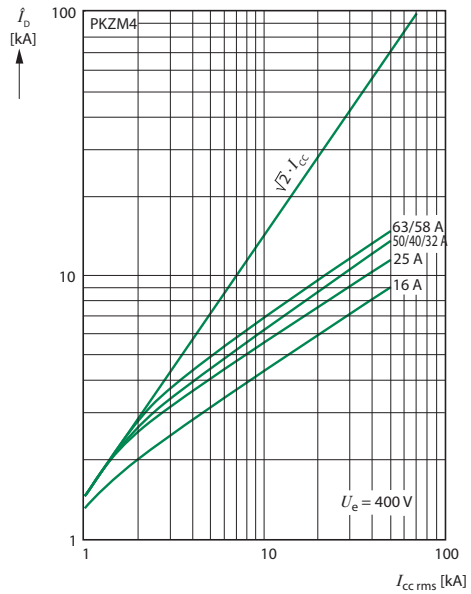


Short-Circuit Let-through Characteristics

PKZM01; PKZM0



PKZM4



Manual Motor Controller Switching Capacity

- Rated uninterrupted current I_u
- Rated conditional short-circuit current I_q IEC/EN 60947-4-1
- Rated ultimate short-circuit breaking capacity I_{cu} IEC/EN 60947-2
- Rated operational short-circuit breaking capacity I_{cs} IEC/EN 60947-2

I_u	230V				400V				440V				500V				690V			
	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 ❶	kA	kA	kA	A ❶	kA	kA	kA	A ❶	kA	kA	kA	A ❶	kA	kA	kA	A ❶
PKZM0(-T) with Classification Type "1" and "2"																				
0.16 – 1	150	150	150	N	150	150	150	N				N				N				N
1.6	150	150	150	N	150	150	150	N				N				N				N
2.5	150	150	150	N	150	150	150	N				N				N	5	5	5	50
4	150	150	150	N	150	150	150	N				N				N	3	3	3	50
6.3	150	150	150	N	150	150	150	N				N	42	42	6	50	3	3	2	50
10	150	150	150	N	150	150	150	N	42	42	10	50	42	42	6	50	3	3	2	50
12	50	50	10	50	50	50	10	50	15	15	10	50	15	15	6	50	3	3	2	50
16	50	50	10	50	50	50	10	50	15	15	10	50	15	15	6	50	3	3	2	50
20	50	50	10	50	50	50	10	50	10	10	10	50	6	6	6	50	3	3	2	50
25	50	50	10	50	50	50	10	50	10	10	10	50	6	6	6	50	3	3	2	50
32	50	50	10	50	50	50	10	50	10	10	10	50	6	6	6	50	3	3	2	50
PKZM0(-T) + CL-PKZ0																				
0.16 – 1				N				N				N				N			20	N
1.6				N				N				N				N			20	N
2.5				N				N				N				N	20	20	20	N
4				N				N				N				N	20	20	20	N
6.3				N				N				N			50	N	20	20	20	N
10				N				N				N			20	N	20	20	20	N
12				N				N				N			20	N	5	5	2.5	N
16				N				N				N			20	N	5	5	2.5	N
20				N				N				N	10	10	10	N	5	5	2.5	N
25				N				N				N	10	10	10	N	5	5	2.5	N
32				N				N				N	10	10	10	N	5	5	2.5	N
PKZM0(-T) + 2 CL-PKZ0																				
0.16 – 1				N				N				N				N			20	N
1.6				N				N				N				N			20	N
2.5				N				N				N				N	40	40	20	N
4				N				N				N				N	40	40	20	N
6.3				N				N				N			50	N	20	20	20	N
10				N				N				N			40	N	20	20	20	N
12				N				N				N			40	N	10	10	2.5	N
16				N				N				N			40	N	10	10	2.5	N
20				N				N				N	20	20	20	N	10	10	2.5	N
25				N				N				N	20	20	20	N	10	10	2.5	N
32				N				N				N	20	20	20	N	10	10	2.5	N

☐ No upstream protective device required, as it is the autoprotected range (100/150 kA).
N—Not required.

❶ Necessary back-up fuse when the short-circuit current exceeds the rated conditional short-circuit current of the device ($I_{cc} > I_q$).

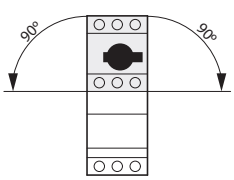
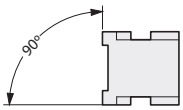
Manual Motor Controller Switching Capacity

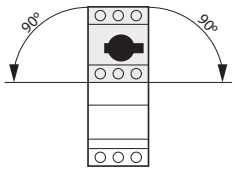
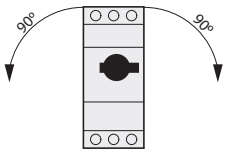
- Rated uninterrupted current I_u
- Rated conditional short-circuit current I_q IEC/EN 60947-4-1
- Rated ultimate short-circuit breaking capacity I_{cu} IEC/EN 60947-2
- Rated operational short-circuit breaking capacity I_{cs} IEC/EN 60947-2

I_u	230V				400V				440V				500V				690V			
	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 ❶	kA	kA	kA	A ❶	kA	kA	kA	A ❶	kA	kA	kA	A ❶	kA	kA	kA	A ❶
PKZM01 with Classification Type "1" and "2"																				
0.16 – 1	50	50	50	50	50	50	50	50	50	50	50	50								
1.6	50	50	50	50	50	50	50	50	50	50	50	50								
2.5	50	50	50	50	50	50	50	50	50	50	50	50								
4	50	50	50	50	50	50	50	50	50	50	50	50								
6.3	50	50	50	50	50	50	50	50	50	50	50	50								
10	50	50	50	50	50	50	50	50	42	42	10	50								
12	50	50	10	50	50	50	10	50	15	15	10	50								
16	50	50	10	50	50	50	10	50	15	15	10	50								
PKZM4 with Classification Type "1" and "2"																				
16	150	150	25	N	150	150	25	N	45	45	25	100	15	15		100	8	8	2.5	100
25	150	150	25	N	150	150	25	N	45	45	25	100	15	15		100	8	8	2.5	100
32	50	50	25	100	50	50	25	100	45	45	25	100	15	15		100	5	5	2.5	100
40	50	50	25	100	50	50	25	100	45	45	25	100	15	15		100	5	5	2.5	100
50	50	50	25	100	50	50	25	100	45	45	25	100	15	15		100	5	5	2.5	100
58	50	50	25	160	50	50	25	160	45	45	25	160	15	15		160	5	5	2.5	160
63	50	50	25	160	50	50	25	160	45	45	25	160	15	15		160	5	5	2.5	160

No upstream protective device required, as it is the autoprotected range (150 kA).
N–Not necessary.

❶ Fuse (A gG/gL) for enhancing the switching capacity of the motor-protective circuit breaker to 100 kA.

Manual Motor Controllers			PKZM01...	PKZM0...
General				
Standards			IEC/EN 60947, VDE 0660, UL 508, CSA C 22.2 No. 14	
Climatic proofing			Damp heat, constant, to IEC 60068-2-78; Damp heat, cyclic, to IEC 60068-2-30	
Ambient temperature	Storage	[°C / °F]	-25...80 °C / *-13...176 °F*	-25...80 °C / *-13...176 °F*
	Open	[°C / °F]	-25...55 °C / *-13...131 °F*	-25...55 °C / *-13...131 °F*
	Enclosed	[°C / °F]	-25...40 °C / *-13...104 °F*	-25...40 °C / *-13...104 °F*
Mounting position				
Direction of incoming supply			As required	As required
Degree of protection	Device		IP 20	IP 20
	Terminations		IP00	IP00
Protection against direct contact			Finger and back-of-hand proof	
Mechanical shock resistance half-sinusoidal shock 10 ms to IEC 60068-2-27		[g]	25	25
Altitude		[m]	2000	2000
Terminal capacity screw terminals	Solid	[mm²]	1 x (1 – 6); 2 x (1 – 6)	1 x (1 – 6); 2 x (1 – 6)
	Flexible with ferrule to DIN 46228	[mm²]	1 x (1 – 6); 2 x (1 – 6)	1 x (1 – 6); 2 x (1 – 6)
	Solid or stranded	[AWG]	18 – 10	18 – 10
Specified tightening torque for terminal screws				
Main cable		[Nm]	1.7	1.7
Control circuit cables		[Nm]	1	1
Main Conducting Paths				
Rated impulse withstand voltage	U_{imp}	[V AC]	6000	6000
Overvoltage category/pollution degree			III/3	III/3
Rated operational voltage	U_e	[V AC]	690	690
Rated uninterrupted current = rated operational current	$I_u = I_e$	[A]	16 or current setting of the overcurrent release	32 or current setting of the overcurrent release
Rated frequency		[Hz]	40 – 60	40 – 60
Current heat loss (3 pole at operating temperature)		[W]	6	6
Lifespan, mechanical	Operations	[x 10⁶]	0.05	0.1
Lifespan, electrical (AC-3 at 400 V)	Operations	[x 10⁶]	0.05	0.1
Maximum operating frequency	Operations/h	[Ops/h]	25	40
Short-circuit rating				
AC			see graph on page C29	
DC		[kA]	60	60 (up to PKZM0-16) 40 (PKZM0-20 to PKZM0-32)
Motor switching capacity	AC-3 (up to 690 V)	[A]	16	32
	DC-5 (up to 250 V)	[A]	16 (3 contacts in series)	25 (3 contacts in series)
Releases				
Temperature compensation				
to IEC/EN 60947, VDE 0660		[°C / °F]	-5...40 °C/ *23...104 °F*	-5...40 °C/ *23...104 °F*
Operating range		[°C / °F]	-25...55 °C / *-13...131 °F*	-25...55 °C / *-13...131 °F*
Temperature compensation residual error for T > 40 °C		[%/K]	≤ 0.25	≤ 0.25
Setting range of overload releases		[x I_u]	0.6 – 1	0.6 – 1
Short-circuit release fixed		[x I_u]	14	14
Short-circuit release tolerance		[%]	± 20	± 20
Phase-failure sensitivity			IEC/EN 60947-4-1, VDE 0660 Part 102	

Manual Motor Controllers			PKZM0-...-T	PKZM4...
General				
Standards			IEC/EN 60947, VDE 0660, UL 508, CSA C 22.2 No. 14	
Climatic proofing			Damp heat, constant, to IEC 60068-2-78; Damp heat, cyclic, to IEC 60068-2-30	
Ambient temperature	Storage	[°C / °F]	-25...80 °C / *-13...176 °F*	-25...70 °C / *-13...158 °F*
	Open	[°C / °F]	-25...55 °C / *-13...131 °F*	-25...55 °C / *-13...131 °F*
	Enclosed	[°C / °F]	-25...40 °C / *-13...104 °F*	-25...40 °C / *-13...104 °F*
Mounting position				
Direction of incoming supply			As required	As required
Degree of protection	Device		IP20	IP20
	Terminations		IP00	IP00
Protection against direct contact			Finger and back-of-hand proof	Finger and back-of-hand proof
Mechanical shock resistance half-sinusoidal shock 10 ms to IEC 60068-2-27		[g]	25	15
Altitude		[m]	2000	2000
Terminal capacity screw terminals	Solid	[mm²]	1 x (1 – 6); 2 x (1 – 6)	1 x (1 – 50); 2 x (1 – 35)
	Flexible with ferrule to DIN 46228	[mm²]	1 x (1 – 6); 2 x (1 – 6)	1 x (1 – 35); 2 x (1 – 35)
	Solid or stranded	[AWG]	18 – 10	14 – 2
Specified tightening torque for terminal screws				
Main cable		[Nm]	1.7	3
Control circuit cables		[Nm]	1	1
Main Conducting Paths				
Rated impulse withstand voltage	U_{imp}	[V AC]	6000	6000
Overvoltage category/pollution degree			III/3	III/3
Rated operational voltage	U_e	[V AC]	690	690
Rated uninterrupted current = rated operational current	$I_u = I_e$	[A]	25 or current setting of the overcurrent release	65 open 63 enclosed
Rated frequency		[Hz]	40 – 60	40 – 60
Current heat loss (3 pole at operating temperature)		[W]	6	22
Lifespan, mechanical	Operations	[x 10⁶]	0.1	0.03
Lifespan, electrical (AC-3 at 400 V)	Operations	[x 10⁶]	0.1	0.03
Maximum operating frequency	Operations/h	[Ops/h]	40	40
Short-circuit rating				
AC			see graph on page C29	
DC		[kA]	60 (up to PKZM0-16-T) 40 (PKZM0-20-T to PKZM0-25-T)	60
Motor switching capacity	AC-3 (up to 690 V)	[A]	25	65
	DC-5 (up to 250 V)	[A]	25 (3 contacts in series)	63 (3 contacts in series)
Releases				
Temperature compensation				
to IEC/EN 60947, VDE 0660		[°C / °F]	-5...40 °C/ *23...104 °F*	-5...40 °C/ *23...104 °F*
Operating range		[°C / °F]	-25...55 °C / *-13...131 °F*	-25...55 °C / *-13...131 °F*
Temperature compensation residual error for T > 40 °C		[%/K]	≤ 0.25	≤ 0.25
Setting range of overload releases		[x I_u]	0.6 – 1	0.6 - 1
Short-circuit release fixed		[x I_u]	20	14
Short-circuit release tolerance		[%]	± 20	± 20
Phase-failure sensitivity			IEC/EN 60947-4-1, VDE 0660 Part 102	

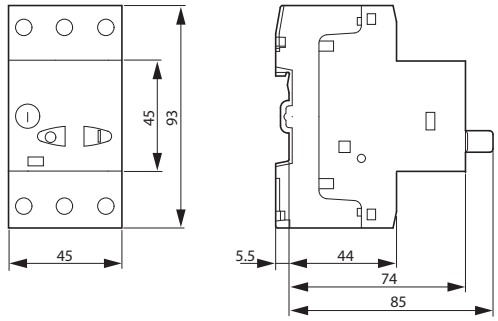
Auxiliary Contacts			NHI...PKZ0	NHI-E-...PKZ0	VHI...PKZ0	AGM Trip Indication
General						
Rated impulse withstand voltage	U_{imp}	[V AC]	6000	4000	4000	6000
Overvoltage category/pollution degree			III/3	III/3	III/3	III/3
Rated operational voltage	U_e	[V AC]	500	440	440	500
	U_e	[V DC]	250	250	250	250
Safe isolation to VDE 0106 Part 101 and Part 101/A1						
Between auxiliary contacts and main contacts		[V AC]	690	690	690	690
Rated operational current						
AC-15						
220–240V	I_e	[A]	3.5	1	1	3.5
380–415V	I_e	[A]	2	–	–	2
440–500V	I_e	[A]	1	–	–	1
DC-13 L/R–100 ms						
24V	I_e	[A]	2	2	2	2
60V	I_e	[A]	1.5	–	–	1.5
110V	I_e	[A]	1	–	–	1
220V	I_e	[A]	0.25	–	–	0.25
Lifespan						
Mechanical	Operations	[x 10^6]	0.1	0.1	0.1	0.01
Electrical	Operations	[x 10^6]	0.05	0.1	0.1	0.005
Control circuit reliability (at U_e = 24V DC, U_{min} = 17 V, I_{min}=5.4 mA)	Failure Rate	[λ]	$< 10^{-8}$ (less than 1 failure in 10^8 operations)			
Interlocked opposing contacts to ZH 1/457			Yes	–	–	–
Short-circuit rating without welding						
Fuseless			FAZ-B4/1-HI	–	–	FAZ-B4/1-HI
Fuse		[A gG/gL]	10	10	10	10
Terminal Capacities						
Solid or flexible conductor with ferrule		[mm²]	0.75 – 2.5	0.75 – 1.5	0.75 – 1.5	0.75 – 2.5
Solid or stranded		[AWG]	18 – 14	18 – 16	18 – 16	18 – 14
UL / CSA Ratings						
Pilot Duty			A600, Q300	E150	E150	A600, Q300
General Use			5A @ 600V AC; 1A @ 250V DC	0.5A @ 250V AC	0.5A @ 250V AC	5A @ 600V AC; 1A @ 250V DC

Undervoltage Trips, Shunt Trips				U-PKZ0...	A-PKZ0...
General					
Terminal capacities					
Solid or flexible conductor with ferrule			[mm²]	2 x (0.75 – 2.5)	2 x (0.75 – 2.5)
Solid or stranded			[AWG]	2 x (18 – 14)	2 x (18 – 14)
Main Conducting Paths					
Rated operating voltage		U_e	[V AC]	42 – 480	42 – 480
		U_e	[V DC]	24 – 250	24 – 250
Pick-up voltage			[x U_S]	0.85 – 1.1	–
Drop-out voltage			[x U_S]	0.7 – 0.35	–
Operating range	AC		[x U_S]	–	0.7 – 1.1
	DC		[x U_S]	–	0.7 – 1.1
Power consumption					
AC	Pick-up AC	Pick-up	[VA]	5	5
	Sealing AC	Sealing	[VA]	3	3
DC	Pick-up DC	Pick-up	[W]	–	3
	Pick-up DC	Sealing	[W]	–	3

Dimensions are in millimeters.
Not intended for manufacturing purposes.

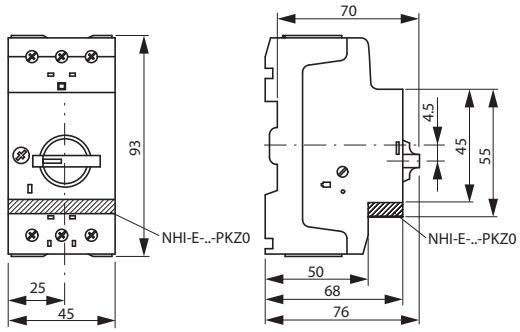
Manual Motor Controller

PKZM01...



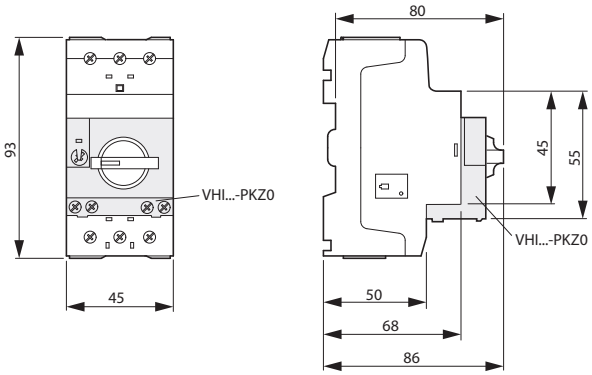
Manual Motor Controller

PKZM0...(-T) with Standard Auxiliary Contact NHI-E-...-PKZ0



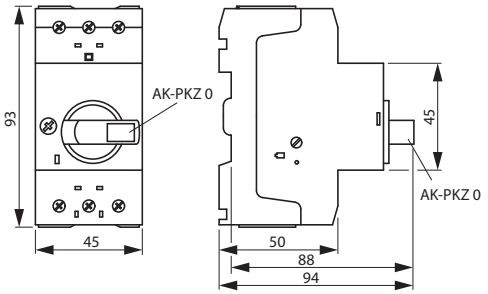
Manual Motor Controller

PKZM0...(-T) with Early-make Auxiliary Contact VHI-...-PKZ0



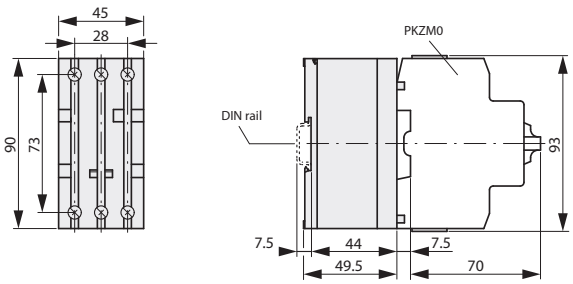
Manual Motor Controller

PKZM0...(-T) with Lockable Rotary Handle AK-PKZ0



Current Limiter

CL-PKZ0

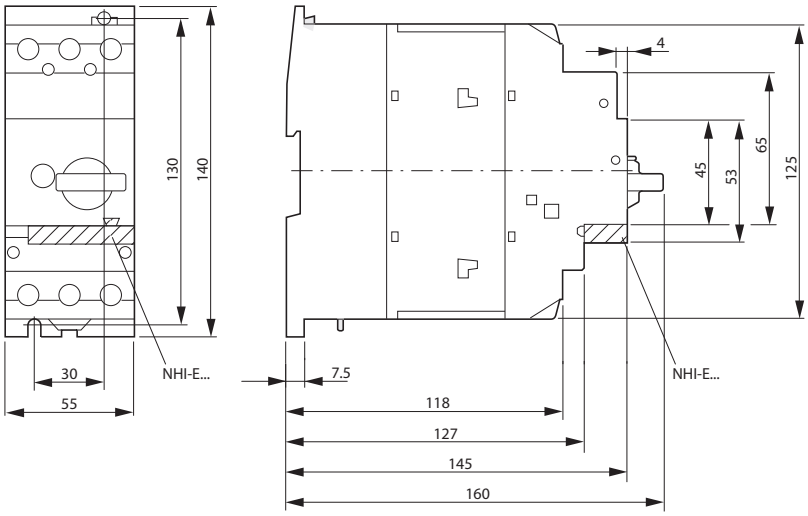


C
Manual Motor Controllers

Manual Motor Controller

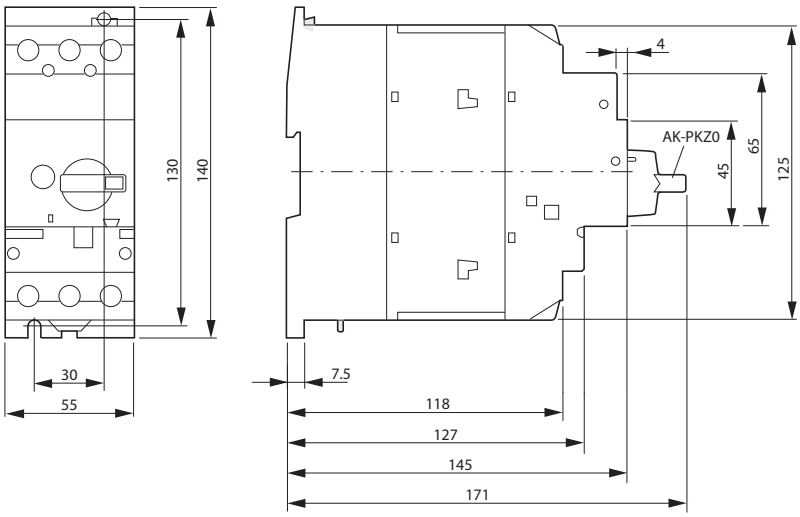
PKZM4-. . . with Standard Auxiliary Contact NHI-E-. . .-PKZ0

Dimensions are in millimeters.
Not intended for manufacturing purposes.



Manual Motor Controller

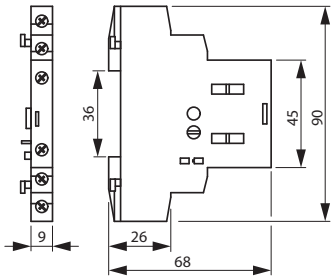
PKZM4-. . . with Lockable Rotary Handle AK-PKZ0



Dimensions are in millimeters.
Not intended for manufacturing purposes.

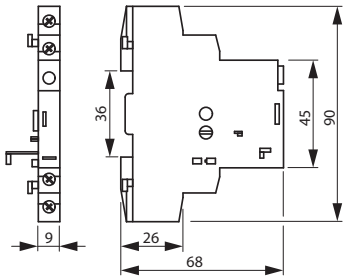
Standard Auxiliary Contacts

NHI...-PKZ...



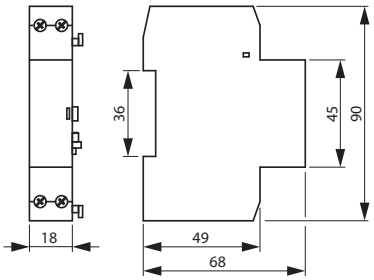
Trip-indicating Auxiliary Contacts

AGM2...-PKZ...



Shunt Releases / Undervoltage Releases

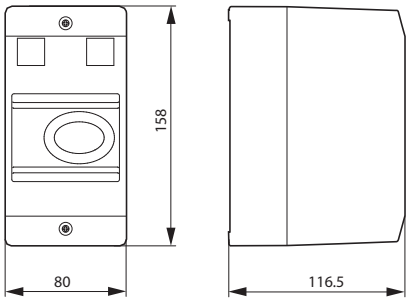
A-PKZ0...; U-PKZ0...



Dimensions are in millimeters.
Not intended for manufacturing purposes.

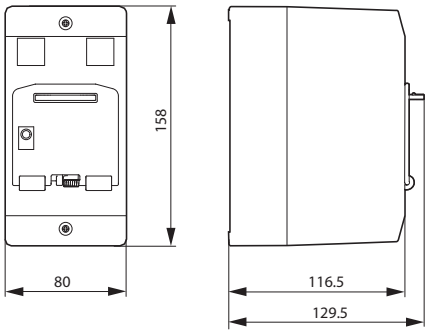
Base Mounted Insulated Enclosure

CI-PKZ01-NA(-G)



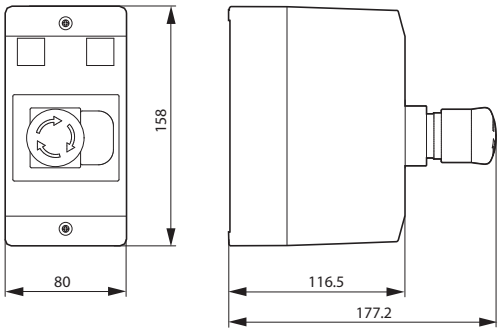
Base Mounted Insulated Enclosure

CI-PKZ01-NA-SVB(-V)



Base Mounted Insulated Enclosure

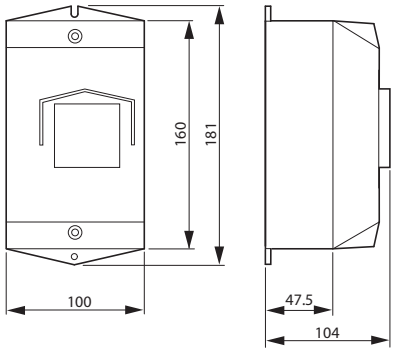
CI-PKZ01-PV(T)(S)



Dimensions are in millimeters.
Not intended for manufacturing purposes.

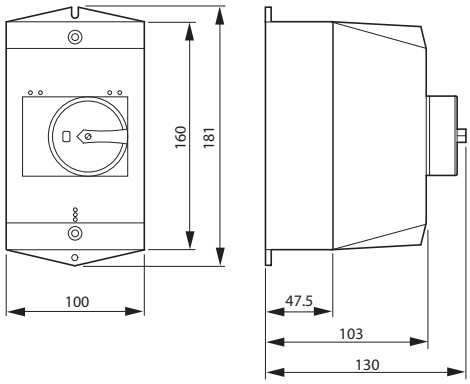
Base Mounted Insulated Enclosure

CI-K2-PKZ0-NA



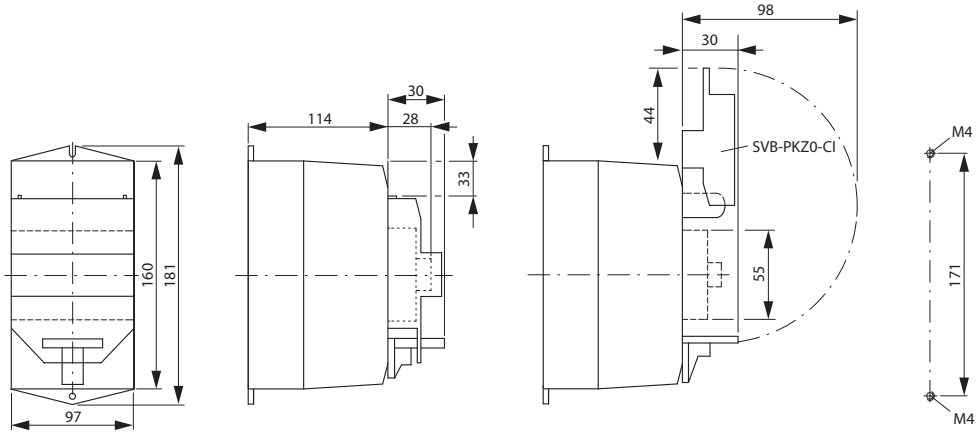
Base Mounted Insulated Enclosure

CI-K2-PKZ0-NA-G(R)(V)



Base Mounted Insulated Enclosure

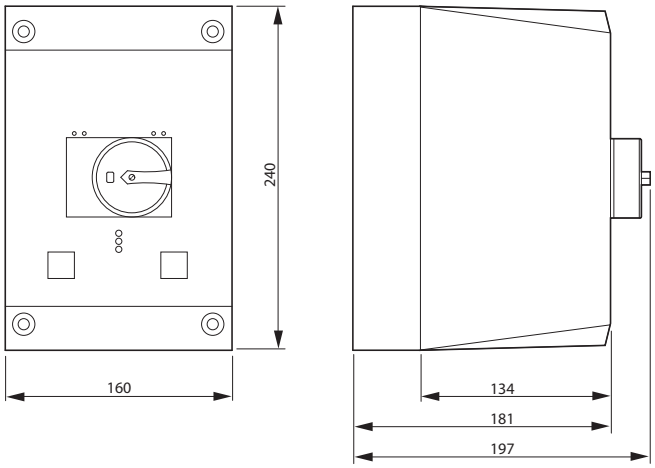
CI-K2-PKZ0-NA(-G)(R)(V) with padlocking feature SVB-PKZ0-CI



Base Mounted Insulated Enclosure

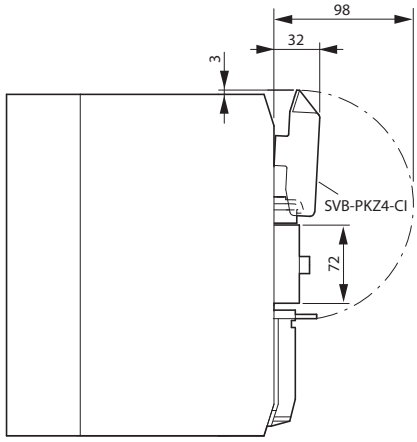
CI-K4-PKZ4-NA-G(R)

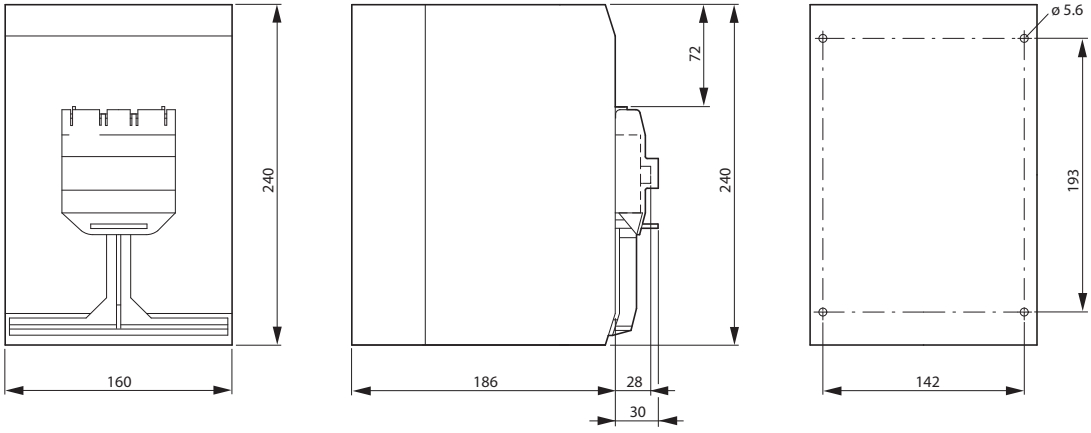
Dimensions are in millimeters.
Not intended for manufacturing purposes.



Base Mounted Insulated Enclosure

CI-K4-PKZ4-NA-G(R) with padlocking feature SVB-PKZ4-CI

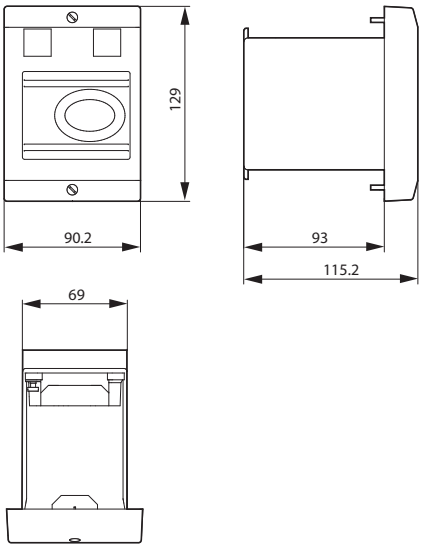




Dimensions are in millimeters.
Not intended for manufacturing purposes.

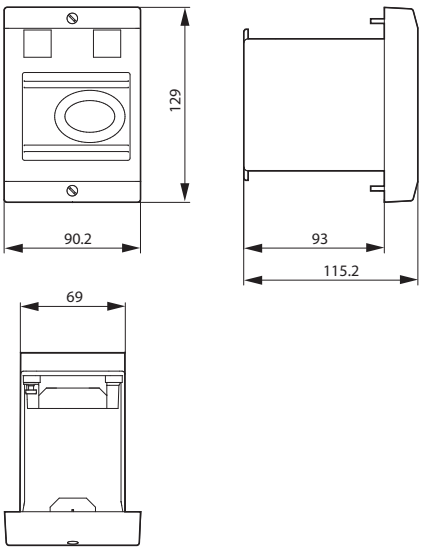
Flush Mounted Insulated Enclosure

E-PKZ01(-G)



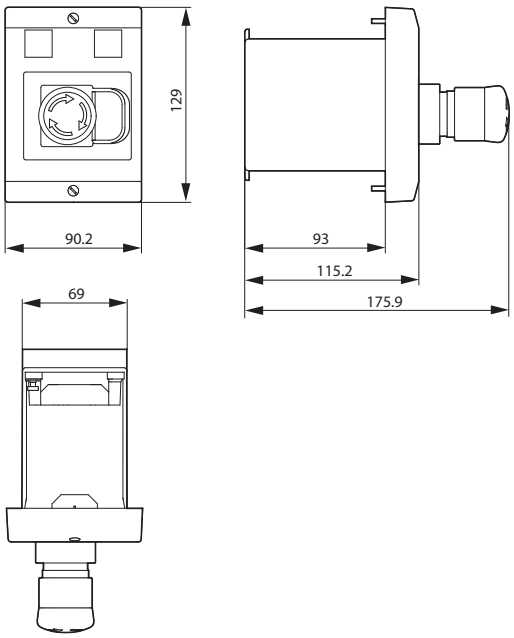
Flush Mounted Insulated Enclosure

E-PKZ01-SVB(-V)



Flush Mounted Insulated Enclosure

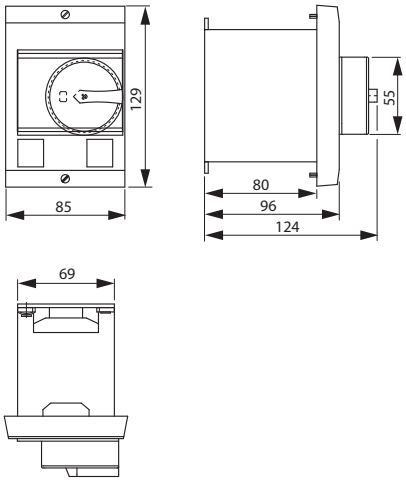
E-PKZ01-PV(T)(S)



Flush Mounted Insulated Enclosure

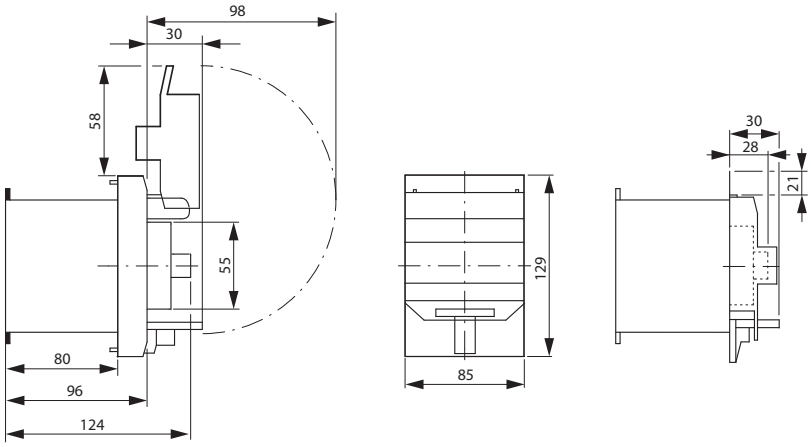
E-PKZ0(-G)(R)

Dimensions are in millimeters.
Not intended for manufacturing purposes.

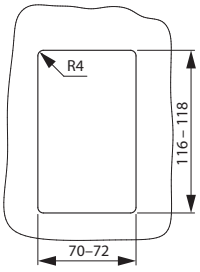


Flush Mounted Insulated Enclosure

E-PKZ0-G(R) with padlocking feature SVB-PKZ0-E

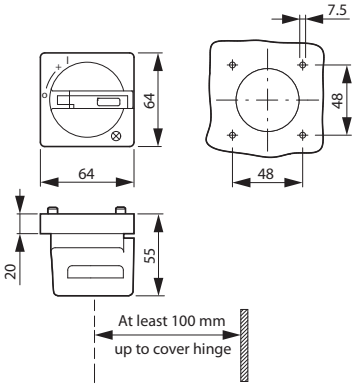


Mounting Aperture for E-PKZ0-. . .



Door Coupling Handles

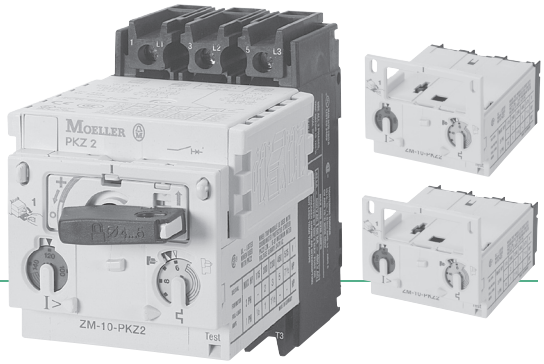
PKZ0-XH



Mounting depth: 100 to 240 mm from top edge of DIN rail up to front of panel door/cover. Clearance of switch shaft/cover hinge: at least 100 mm.

PKZ2 manual motor controllers

the industry standard



C

Manual Motor Controllers

- > Starts and protects motors to 25HP @ 460V (30HP @ 575V) with one frame size
- > Eleven different interchangeable trip modules reduce inventory
- > Incorporates both adjustable over-current and short-circuit protection for motors
- > Remote over-current or short-circuit trip differentiation
- > Extensive range of accessories
- > Worldwide approvals

Never confuse imitation with innovation!

Moeller designed the first PKZ "motor protective controller" in 1932! Since then, the term "PKZ" has become synonymous worldwide with these types of devices, regardless of manufacturer. Eight decades of continuous innovation has resulted in today's best technology, built from the ground up, only by Moeller.

The Swiss Army Knife® of motor control

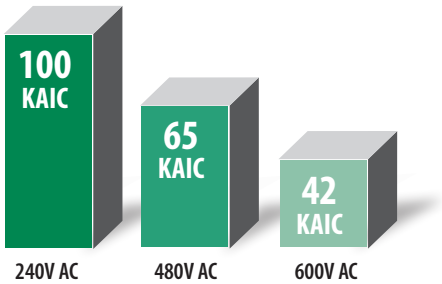
The base PKZ2 controller combines single-break power contacts with Class 10 thermal overload protection and current limiting short circuit protection to manually control motor loads. The PKZ2 can also be equipped with a high capacity contactor for remote control of individual or group motor loads. Collectively, the PKZ2 family is UL and CSA listed for a wide range of uses including:

- *Manual Starter applications*
- *Group Fusing applications*
- *Motor Disconnect means*
- *Type E, Self-protected, Combination Starter applications*
- *Multi-motor Starter Combination applications*
- *Tap Conductor protection*

Information on PKZ2 starter applications can be found in Tab D of this catalog.

Excellent control & protection with one frame size!

PKZ2 devices have a 42 amp continuous current rating. They control and protect motors to 30HP at 480V or 25HP @ 600V with one frame size. Their excellent current-limiting design clears fault currents of 100 KAIC at 240VAC; 65KAIC at 480VAC; and 42KAIC at 600VAC (all values RMS Symmetrical). The total clearing time of the device at the highest fault condition is a maximum of 3.5ms at 480V and 4.0ms at 600VAC.



® Swiss Army Knife is a registered trademark of Wenger, SA.

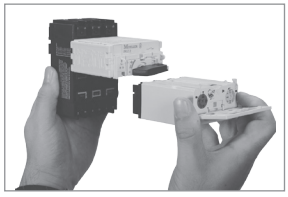
what sets PKZ2 apart

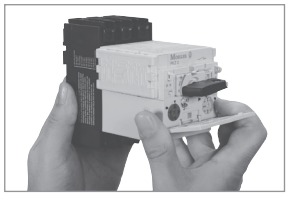
Fully adjustable and interchangeable trip modules!

Stocking a lot of devices with different over-current and short circuit trip characteristics is an expensive task. Even if you did, the time it takes rewiring devices to accommodate application changes is an avoidable waste. The PKZ2 is the first self-protected combination controller in the industry with interchangeable and adjustable, "tool-less," plug-in trip modules.

Eleven different modules cover the range from fractional to 30 HP at 460V AC (25HP @ 600V AC). Exchanging trip modules can be done in seconds… *without rewiring power conductors.*

Custom control for your exact application



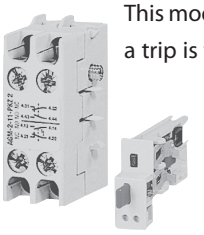


Each trip module has a coordinated, independently adjustable, over-current trip (yellow dial) for overload protection (0.6 -1.0 x I_u) and an adjustable, instantaneous, magnetic trip (red dial) for short circuit protection (8.5 – 14 x I_u). Each dial can be set in accordance with the motor full load current and inrush, making it ideal for installations with varying motor efficiencies. All trip modules have temperature compensation from –5° C (23° F) to +40° C (102° F) and include built-in single phase protection.

Trip response like an MCCB

In the event of an over-current or short-circuit situation, standard ZM trip modules cause the motor protective switch mechanism to open and disconnect power to the load, much like the operation of an inverse time molded case breaker. They make excellent manual motor starters, not only because of their all-in-one design and excellent thermal protection, but because they also provide "close" individual protection from short circuits.

Optional trip indicating contact module



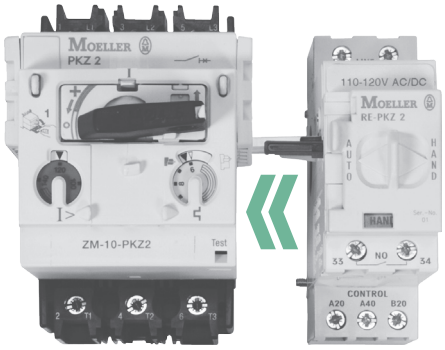
This module indicates whether the cause of a trip is from a thermal overload or a more serious short circuit condition. The differentiated trip signal increases safety and speeds diagnosis of the trip. The trip indicating contact also comes with a special module that provides visual indication of a short-circuit trip on the PKZ2 itself.

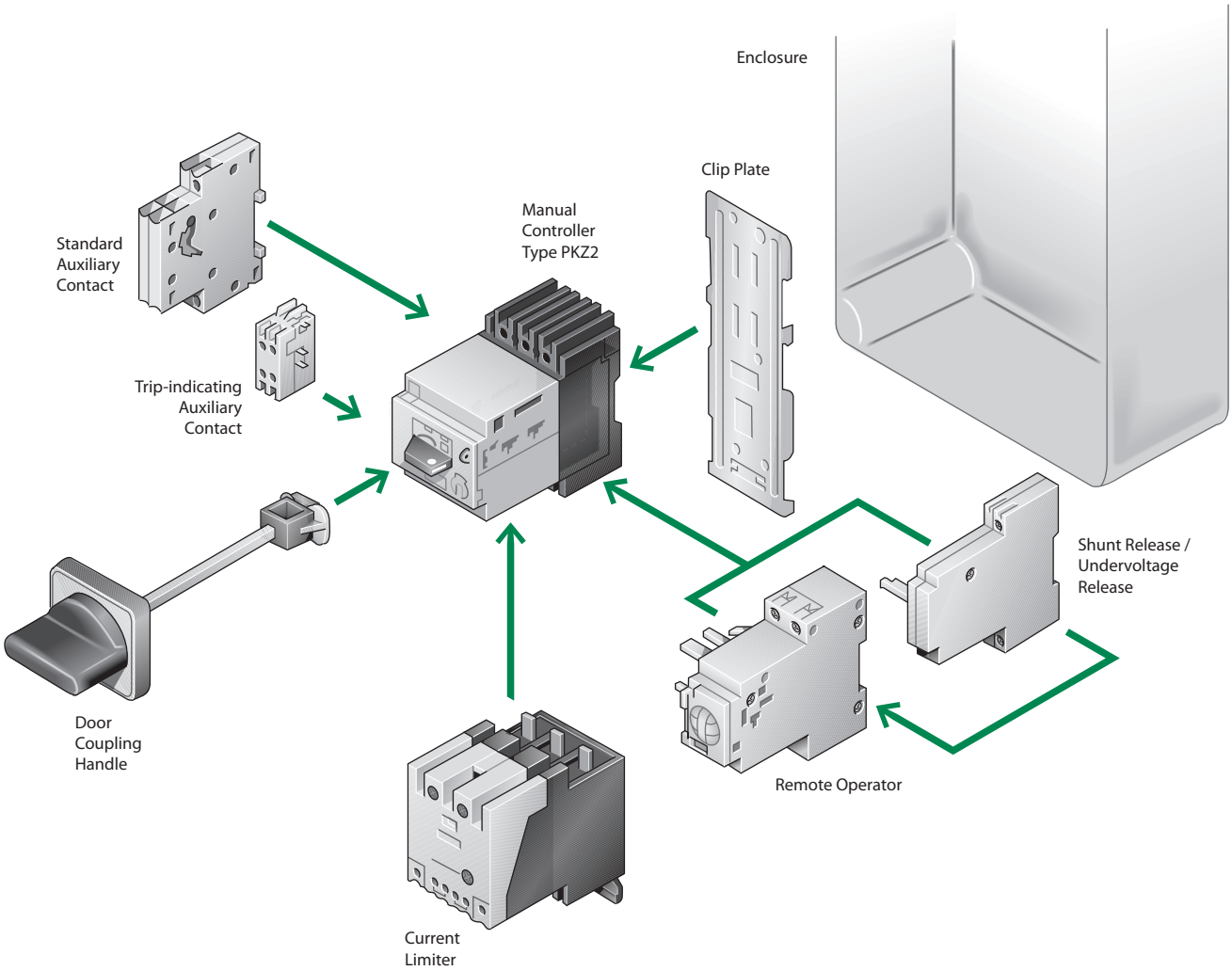
Undervoltage Trip and Shunt Trip Modules

Available with an optional 200 millisecond delay, undervoltage trip modules prevent automatic restarting of the motor after a power loss by turning the motor protective switch to the OFF position. Shunt trip modules will trip the motor protective switch from a remote location, de-enegizing the load.

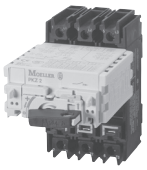
Remote Operator

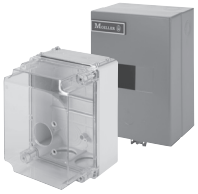
When this electromechanical device is set in the AUTO position, it can be used to perform ON, OFF and RESET operations of the disconnect module from a remote location. The HAND position acts as a local manual override to prevent remote actuation of the disconnect. The Remote Operator is especially designed to operate with PLC 24VDC electronic outputs.



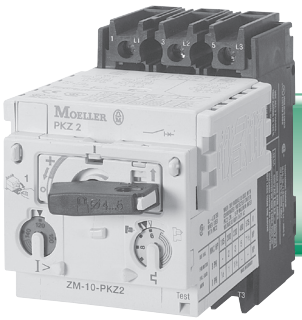

Enclosure
Clip Plate
Manual
Controller
Type PKZ2
Standard
Auxiliary
Contact
Trip-indicating
Auxiliary
Contact
Shunt Release /
Undervoltage
Release
Door
Coupling
Handle
Remote Operator
Current
Limiter

PKZ2 Manual Motor Controllers Overview

Device	Description	Range	Pages
Manual Motor Controllers			
	With Interchangeable Trip Module	0.4 – 42 Amps	C48 – C49
	Main Switch Component	–	C50
	Trip Module Components	0.4 – 42 Amps	C50
Auxiliary Contacts			
	Side-mounted Standard Auxiliary Contacts	1 NO / 1 NC 2 NO / 2 NC	C53
	Trip-indicating Auxiliary Contacts	1 NO / 1 NC	C53
Current Limiter			
	Current Limiter to 100 kA / 500 V	$U_e = 690$ V $I_u = 40$ A	C51

Device	Description	Range	Pages
Releases			
	Shunt Release	24 – 250 V DC 24 – 600 V AC	C54
	Undervoltage Release	24 V DC 48 V DC 24 – 440 V AC	C54
Remote Operators			
	Remote Operator	24 – 240 V DC 24 – 415 V DC	C55
Accessories			
	Miscellaneous Accessories		C56
Enclosures			
	Enclosures		C57

- Interchangeable trip module makes changing tripping characteristics a snap, even after wiring
- Adjustable thermal *and* magnetic trip settings
- Overcurrent, short-circuit protection and motor switching functions are combined in one compact unit; all functions are ambient compensated and phase failure sensitive
- Worldwide approvals, including UL 508/CSA 22.2 No. 14
- One frame size simplifies engineering and reduces stocking cost



See Next Page for UL/CSA Application Ratings Guide

Manual motor controller with adjustable magnetic and thermal standard trip module

UL/CSA Short-circuit current rating kA RMS sym @		Adjustable thermal range set to motor FLC ❶	Adjustable trip setting current of magnetic trips ❶	"Typical" Maximum Horsepower							Auxiliary Contacts		Catalog Number	Price
				Typical Single Phase [HP]			Typical Three Phase [HP]							
480 V AC	600 V AC	[A]	[A]	115V	200V	240V	200V	240V	480V	600V	NO	NC		
65	42	0.4 – 0.6	5 – 8	*See note below*							0	0	**PKZ2/ZM-0,6**	480
65	42	0.6 – 1	8 – 14						½	½	0	0	**PKZ2/ZM-1**	480
65	42	1 – 1.6	14 – 22			1/10		⅓	¾	1	0	0	**PKZ2/ZM-1,6**	488
65	42	1.6 – 2.4	20 – 35		⅛	⅙	½	½	1	1½	0	0	**PKZ2/ZM-2,4**	488
65	42	2.4 – 4	35 – 55	⅛	¼	⅓	1	1	2	3	0	0	**PKZ2/ZM-4**	488
65	42	4 – 6	50 – 80	¼	½	½	1½	1½	3	5	0	0	**PKZ2/ZM-6**	488
65	42	6 – 10	80 – 140	½	1	1½	2	3	5	7½	0	0	**PKZ2/ZM-10**	488
65	42	10 – 16	130 – 220	1	2	2	3	5	10	10	0	0	**PKZ2/ZM-16**	488
65	42	16 – 25	200 – 350	2	3	3	5	7½	20	25	0	0	**PKZ2/ZM-25**	552
65	42	24 – 32	275 – 425	2	5	5	10	10	20	–	0	0	**PKZ2/ZM-32**	680
65	42	32 – 42	350 – 500	3	5	7½	10	15	30	–	0	0	**PKZ2/ZM-40**	780

Horsepower ratings shown in the table are for reference only.
The final selection of the manual starter depends on the actual motor full load current and service factor on the motor nameplate.
Overload should be set at motor FLA full load current and is calibrated to 1.15 S.F.
Specified values to NEC table 430-150.

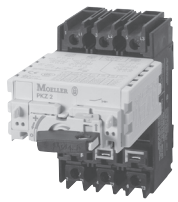
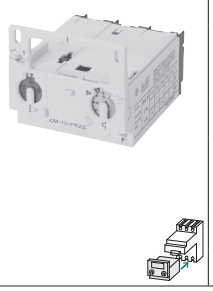
Ordering Instructions

1. **Determine the motor FLA and Service Factor.**
2. **Use the application rating guide on next page.**
3. **Locate the desired manual motor controller.**
4. **See pages C51 – C56 for auxiliaries and accessories.**

❶ All types have adjustable dial for setting motor full load current. Trip current is 125% of set value. For motors with a service factor (SF) of 1.0, set dial to 90% of motor full load current.

UL/CSA Application Ratings Guide for PKZ2/ZM							
	Maximum short circuit current [kA] when used as. . .						
	Manual Motor Starter			Manual Controller in Group Installation		Max. Fuse [A]	Max. Circuit Breaker [A]
Catalog Number	**240V**	**480V**	**600V**	**480V**	**600V**		
PKZ2/ZM-0,6	100	65	42	65	42	500	600
PKZ2/ZM-1	100	65	42	65	42	500	600
PKZ2/ZM-1,6	100	65	42	65	42	500	600
PKZ2/ZM-2,4	100	65	42	65	42	500	600
PKZ2/ZM-4	100	65	42	65	42	500	600
PKZ2/ZM-6	100	65	42	65	42	500	600
PKZ2/ZM-10	100	65	42	65	42	500	600
PKZ2/ZM-16	100	65	42	65	42	500	600
PKZ2/ZM-25	100	65	42	65	42	500	600
PKZ2/ZM-32	100	65	42	65	42	500	600
PKZ2/ZM-40	100	65	42	65	42	500	600

Basic Components

Module	Description	Adjustable thermal range set to motor FLC ❶	Adjustable trip setting current of magnetic trips ❶	"Typical" Maximum Horsepower – Typical Three Phase [HP]				Contacts		For use with…	Catalog Number	Price
		[A]	[A]	200V	240V	480V	600V	NO	NC			
Base Module												
	Maximum continuous motor load current 42A	As per the trip module inserted *(see below for selection)*						0	0	all other PKZ2 devices	**PKZ2**	320
Standard Trip Module												
	Standard trip module for PKZ2 Adjustable thermal and magnetic trips Includes a manual test feature and tamper-preventive settings cover	0.4 – 0.6	5 – 8	*see note below*				0	0	PKZ2 PKZ2/S-SP	**ZM-0,6-PKZ2**	160
		0.6 – 1	8 – 14			½	½	0	0		**ZM-1-PKZ2**	160
		1 – 1.6	14 – 22			¾	1	0	0		**ZM-1,6-PKZ2**	168
		1.6 – 2.4	20 – 35	½	½	1	1½	0	0		**ZM-2,4-PKZ2**	168
		2.4 – 4	35 – 55	1	1	2	3	0	0		**ZM-4-PKZ2**	168
		4 – 6	50 – 80	1½	1½	3	5	0	0		**ZM-6-PKZ2**	168
		6 – 10	80 – 140	2	3	5	7½	0	0		**ZM-10-PKZ2**	168
		10 – 16	130 – 220	3	5	10	10	0	0		**ZM-16-PKZ2**	168
		16 – 25	200 – 350	7½	7½	20	25	0	0		**ZM-25-PKZ2**	232
		24 – 32	275 – 425	10	10	20	30	0	0		**ZM-32-PKZ2**	360
		32 – 42	350 – 500	10	15	30	30	0	0		**ZM-40-PKZ2**	460

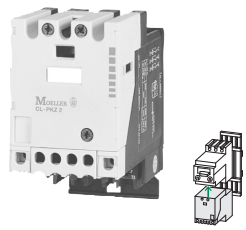
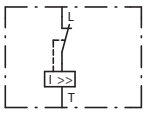
Horsepower ratings shown in the table are for reference only.
The final selection of the manual starter depends on the actual motor full load current and service factor on the motor nameplate.
Overload should be set at motor FLA full load current and is calibrated to 1.15 S.F.
Specified values to NEC table 430-150.

Ordering Instructions

1. **Determine the motor FLA and Service Factor.**
2. **Locate the desired trip module.**
3. **Order trip module and base module separately.**
4. **See pages C51 – C56 for auxiliaries and accessories.**

❶ All types have adjustable dial for setting motor full load current. Trip current is 125% of set value. For motors with a service factor (SF) of 1.0, set dial to 90% of motor full load current.

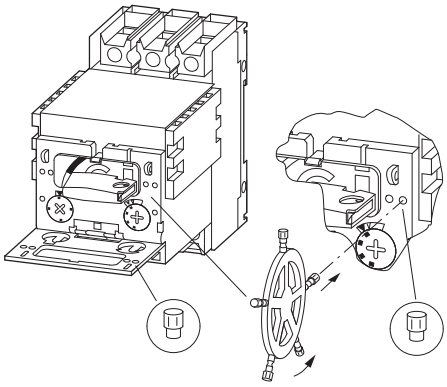
Current Limiter ❶

Module	Description	Schematic	For use with . . .	Catalog Number	Price
Current Limiter					
	Max. rated operational voltage $U_e = 690$ V Rated uninterrupted current $I_u = 40$ A Can be fitted to controller with mounting plate C-PKZ2, or can be fitted individually with mounting base EZ-PKZ2 See page C65 for capacity ratings		PKZ2 PKZ2/ZM	**CL-PKZ2**	436

Tamper-preventive coding pins ❷

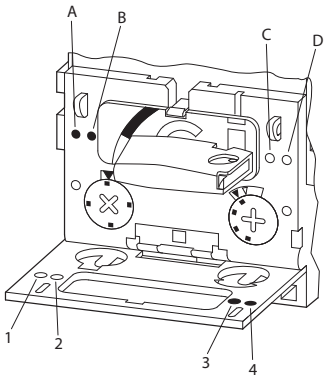
Accessory	Description	For use with . . .	Catalog Number	Price
Coding Pins				
	Tamper-preventive feature used to pair proper trip module with base module. Once inserted, coding pins are not removable. Deters tampering or an accidental incorrect insertion during maintenance. Unique coding for up to 6 different trip modules.	PKZ2 + ZM	**CS-PKZ2**	6.90

Easy to use Coding Pins
Just snap pins off into intended slots ❷



Example of unique coding for up to 6 different trip modules
(see diagram on right)

If you have this controller *(examples)*	Code the base module		Then code all trip modules of this type with same coding	
Examples of main switch and trip module pairs	Base module	Break off pins in slots on	Trip module from example	Break off pins in slots on
PKZ2/ZM-0,6	PKZ2	C, D	ZM-0,6-PKZ2	1, 2
PKZ2/ZM-1	PKZ2	B, D	ZM-1-PKZ2	1, 3
PKZ2/ZM-1,6	PKZ2	B, C	ZM-1,6-PKZ2	1, 4
PKZ2/ZM-2,4	PKZ2	A, D	ZM-2,4-PKZ2	2, 3
PKZ2/ZM-4	PKZ2	A, C	ZM-4-PKZ2	2, 4
PKZ2/ZM-6	PKZ2	A, B	ZM-6-PKZ2	3, 4



❶ Device is not approved by UL or CSA.
❷ Once inserted, coding pins are not removable.

Accessory Guide

Maximum possible combinations of accessories

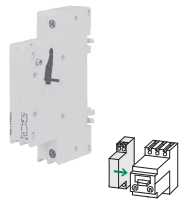
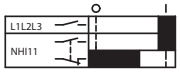
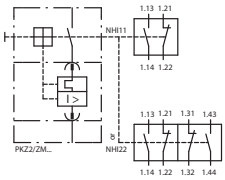
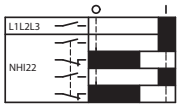
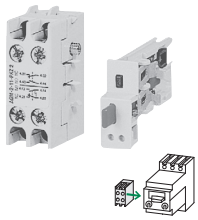
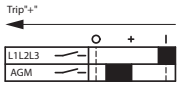
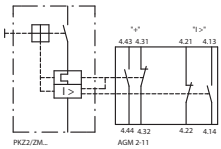
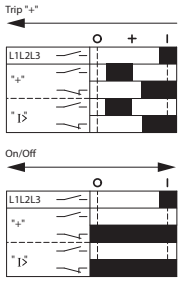
Use this guide to determine which accessories fit on the devices listed below.
Order the desired accessories on the pages that follow.

Maximum possible combinations of accessories when using the following manual motor controllers		Auxiliary Contacts *(see page C53)*  NHI(11)(22)-PKZ2	Trip-Indicating Auxiliary Contacts *(see page C53)*  AGM2-11-PKZ2 ❶	Short-Circuit Indicator *(see page C53)*  K-AGM-PKZ2	Shunt Trip *(see page C54)*  A-PKZ2-...	Undervoltage Trip *(see page C54)*  U-PKZ2... U-HI20-PKZ2... UVHI-PKZ2...	Remote Operator *(see page C55)*  RE-PKZ2... RS-PKZ2...
Manual Motor Controller with Standard Trip Module *(ZM-...)*							
 PKZ2/ZM-... *(see page C48)*	Option #1	1x	1x	1x	1x		1x ❷
	Option #2	1x	1x	1x		1x	1x ❷

❶ Trip Indicating Auxiliary Contacts (AGM2-11-PKZ2) includes a Short-Circuit Indicator (K-AGM-PKZ2).

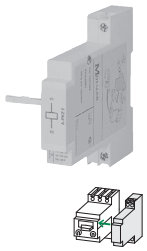
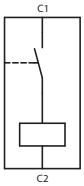
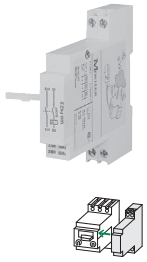
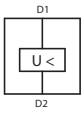
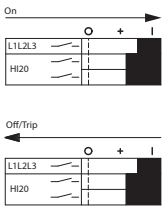
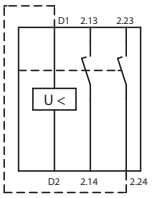
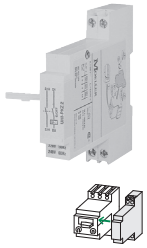
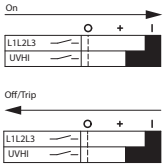
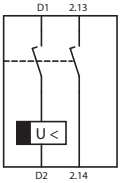
❷ An auxiliary contact (NHI...PKZ2) is required for use of a remote operator; cannot be used with a door mounted handle.

Auxiliary contacts *(see Accessory Guide on page C52)*

Auxiliary	Contacts NO	Contacts NC	Description	Travel Diagram	Schematic	For use with...	Catalog Number	Price
Standard Auxiliary Contacts								
	1	1	Can be used in conjunction with trip indicating auxiliary contact (AGM2-11-PKZ2). Maximum of one per device. This device is required for remote operator use.			PKZ2 PKZ2/S-SP	**NHI11-PKZ2**	80
	2	2					**NHI22-PKZ2**	130
Trip-indicating Auxiliary Contact								
	2x 1	2x 1	Includes short-circuit indicator K-AGM-PKZ2 *(below)* Can be used in conjunction with standard auxiliary contacts Maximum of one per device. 1 NO & 1 NC switches state during overcurrent condition or short-circuit; 1 NO & 1 NC switches state during short-circuit only *(see schematic on right)*			PKZ2 PKZ2/S-SP	**AGM2-11-PKZ2**	140
Short-circuit Indicator								
	0	0	Provides a resettable red flag indicator of a short-circuit trip Maximum of one per device.			PKZ2 PKZ2/S-SP	**K-AGM-PKZ2**	60

See Accessory Guide on page C52

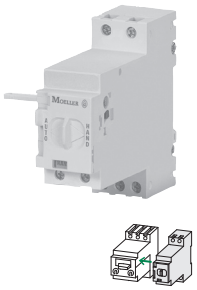
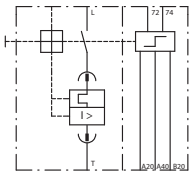
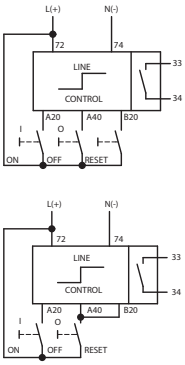
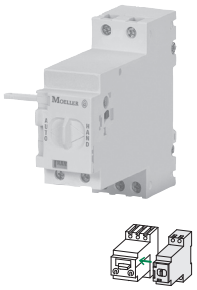
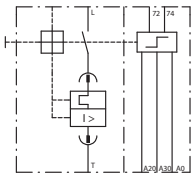
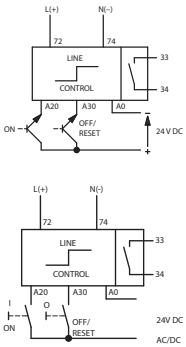
Shunt trips; undervoltage trips *(see Accessory Guide on page C52)* ❶

Module	Description	Travel Diagram	Schematic	Contacts NO	Contacts NC	Operating Voltage DC	Operating Voltage AC 50 Hz	Operating Voltage AC 60 Hz	Catalog Number	Price
Shunt Trips										
	Used to disengage the main switch when voltage is applied. Units will operate with specific voltages and frequency applied			0	0	24 48 60	24 48	24 48	**A-PKZ2-A**	240
				0	0	110 125 250	110 127 220 230 240	110 120 208 220 240	**A-PKZ2-B**	240
				0	0	–	380 400 415 440 500	480 600	**A-PKZ2-C**	240
Undervoltage Trips - non delayed										
	Can be used for Emergency-stop applications as per IEC/EN 60 204			0	0	24	–	–	**U-PKZ2(24VDC)**	220
				0	0	–	24	–	**U-PKZ2(24V50HZ)**	220
				0	0	–	230	240	**U-PKZ2(230V50HZ,240V60HZ)**	220
				2	0	–	24	24	**U-HI20-PKZ2(24V50/60HZ)**	240
				2	0	–	110	120	**U-HI20-PKZ2(110V50HZ,120V60HZ)**	240
				2	0	–	230	240	**U-HI20-PKZ2(230V50HZ,240V60HZ)**	240
Undervoltage Trips - delayed										
	Has a built-in time delay to prevent tripping due to momentary power loss of 200 ms or less			1	0	–	230	240	**UVHI-PKZ2(230V50HZ,240V60HZ)**	240

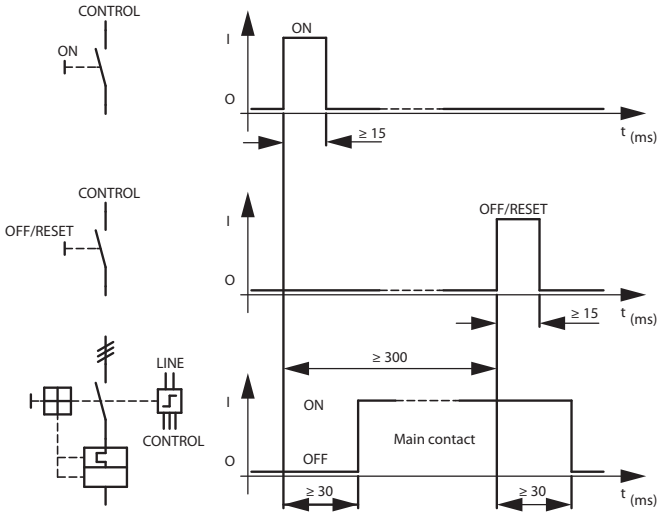
See Accessory Guide on page C52

❶ Maximum of either one shunt trip or one undervoltage trip can be used for each controller device.

Remote Operators *(see Accessory Guide on page C52)* ❶❷

Module	Description	Schematic	Circuit Diagram	For use with...	Operating Voltage	Catalog Number	Price
Remote operator							
	Used to electrically operate the motor controller An auxiliary contact is required for use of this product - see page C53.			PKZ2/ZM PKZ2/S-SP	24 V 50/60 Hz AC 24 V DC	**RE-PKZ2(24V50/60HZ,DC)**	700
					110 – 120 V 50/60 Hz AC 110 – 120 V DC	**RE-PKZ2(110-120V50/60HZ,DC)**	700
Remote operator that uses separate power supply							
	Used to electrically operate the motor controller An auxiliary contact is required for use of this product - see page C53.			PKZ2/ZM PKZ2/S-SP	24 V 50/60 Hz AC 24 V DC	**RS-PKZ2(24V50/60HZ,DC)**	700
					110 – 120 V 50/60 Hz AC 110 – 120 V DC	**RS-PKZ2(110-120V50/60HZ,DC)**	700
See Accessory Guide on page C52							

Minimum Command Time



❶ An auxiliary contact is required for use of this product - see page C53.
❷ Can be used in conjunction with either a shunt trip or undervoltage trip; cannot be used with a door mounted handle.

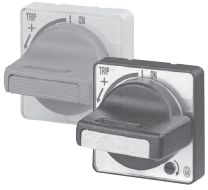
Miscellaneous accessories

Accessory	Description	For use with . . .	Catalog Number	Price
Clip Plate				
	Provides DIN rail mounting Required to couple a contact module to the controller	PKZ2/ZM PKZ2/S-SP	**C-PKZ2**	32
Padlocking Feature				
	For locking rear mounting motor controllers in the OFF position	PKZ2/ZM PKZ2/S-SP	**SVB-PKZ2**	35

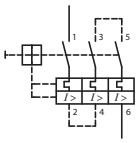
Enclosures

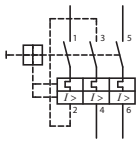
Enclosure	Protection Rating	Description	For use with...	Catalog Number	Price	Discount Code
Enclosures for Manual Motor Controller						
	NEMA Type 12 dust-tight	Plastic enclosure 200 x 150 x 150 (H x W x D in mm)	PKZ2 PKZ2/ZM	**CI19EE-PKZ2-NA**	220	A31
	NEMA Type 1 general purpose	Steel enclosure 240 x 170 x 120 (H x W x D in mm)	PKZ2 PKZ2/ZM	**CS3-PKZ2**	286	D12

Through-the-door Mounted Handles for PKZ2

Accessory	Description	Color	Protection Rating	For use with...	Catalog Number	Price
Door Coupling Handle						
	• Rotary handle operator • Padlockable in OFF and ON positions • Includes handle coupling mechanism that accommodates mounting depth of 132 mm **Includes door interlock; not engaged when shipped**	Black	NEMA 3R, 4X, 12, 13	PKZ2/ZM PKZ2/S-SP	**PKZ2-XH**	80
		Red/Yellow	NEMA 3R, 4X, 12, 13	PKZ2/ZM PKZ2/S-SP	**PKZ2-XRH**	100
	• Rotary handle operator • Padlockable in OFF and ON positions • To be used when PKZ is rotated by 90˚ • Selectable handle positions • Includes handle coupling mechanism that accommodates mounting depth of 132 mm **Includes door interlock; not engaged when shipped**	Black	NEMA 3R, 4X, 12, 13	PKZ2/ZM PKZ2/S-SP	**PKZ2-XH-MCC**	80
Extension Shaft						
	• For mounting depths 171 – 300 mm • Includes shaft interlock mechanism	–	–	PKZ2/ZM PKZ2/S-SP	**PKZ2-XAH**	40

PKZ2 in 1- and 2-pole Circuits for DC and AC



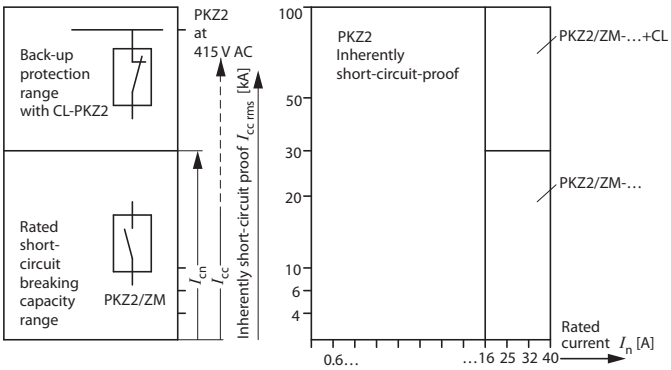


Protection of PVC Insulated Cables Against Thermal Overload with Short Circuits

The table indicates which minimum cable cross-sections are protected by PKZ2 manual motor controller up to their rated conditional short-circuit current I_q.

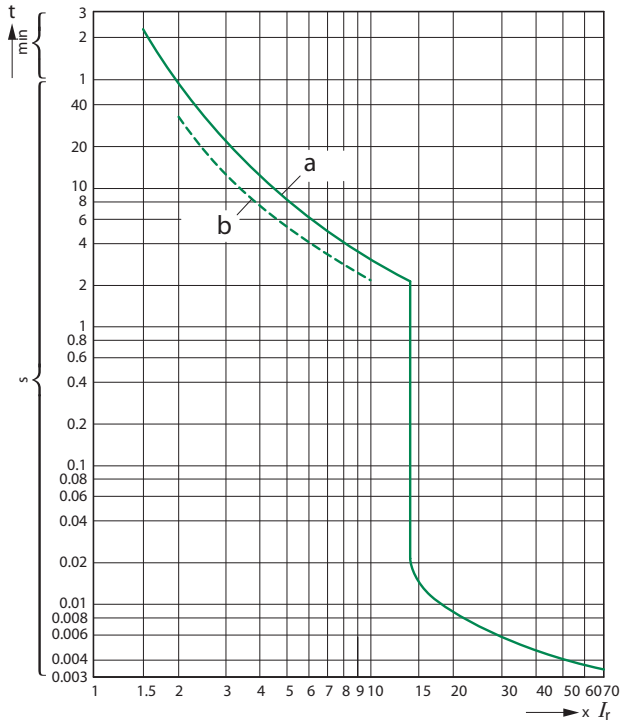
Min. cross-section protected 380–415V, 50 Hz, Cu mm²					Device Part No.
4	2.5	1.5	1	0.75	
					PKZ2/ZM-0,6
					⋮
					PKZ2/ZM-2.4
					PKZ2/ZM-4
					PKZ2/ZM-6
					PKZ2/ZM-10
					PKZ2/ZM-16
					PKZ2/ZM-25
					PKZ2/ZM-32
					PKZ2/ZM-40

Fuseless Installation with PKZ2, Back-Up Protection Diagrams



Tripping Characteristics, Manual Motor Controller

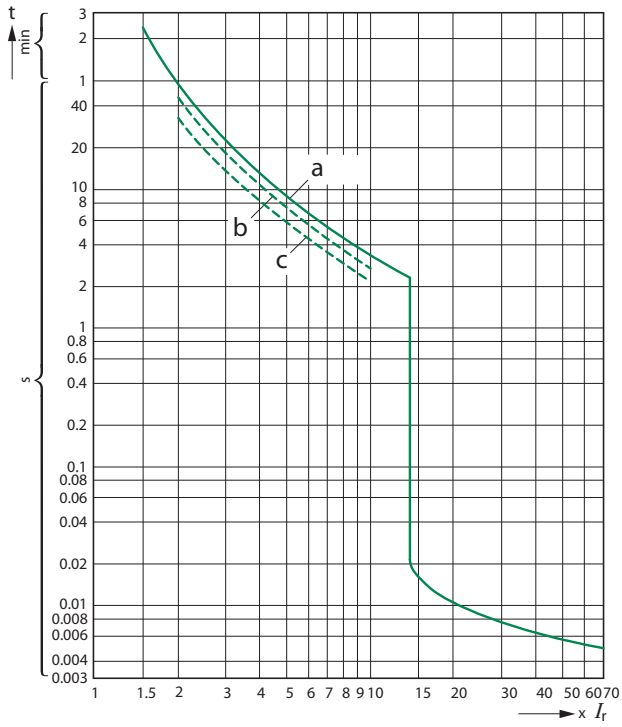
PKZ2/ZM-0,6



PKZ2/ZM-0,6	2-phase		3-phase	
	NM	HM	NM	HM
Curve	b	b	a	a
3 x I_r Trip time [s]	12.2	12.2	21	21
7.2 x I_r Trip time [s]	3.2	3.2	4.5	4.5

Tripping Characteristics, Manual Motor Controller

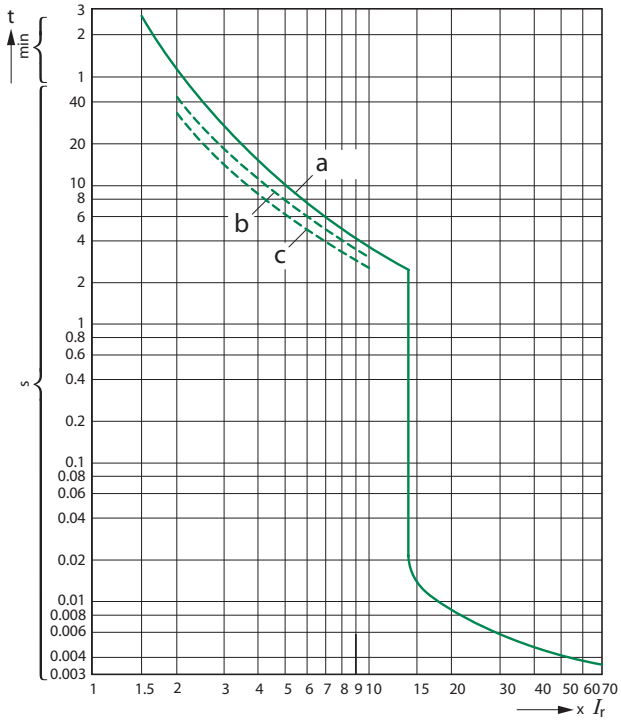
PKZ2/ZM-1



PKZ2/ZM-1	2-phase		3-phase	
	NM	HM	NM	HM
Curve	b	c	a	a
3 x I_r Trip time [s]	19	14	23	23
7.2 x I_r Trip time [s]	4.4	3.4	5.3	5.3

Tripping Characteristics, Manual Motor Controller

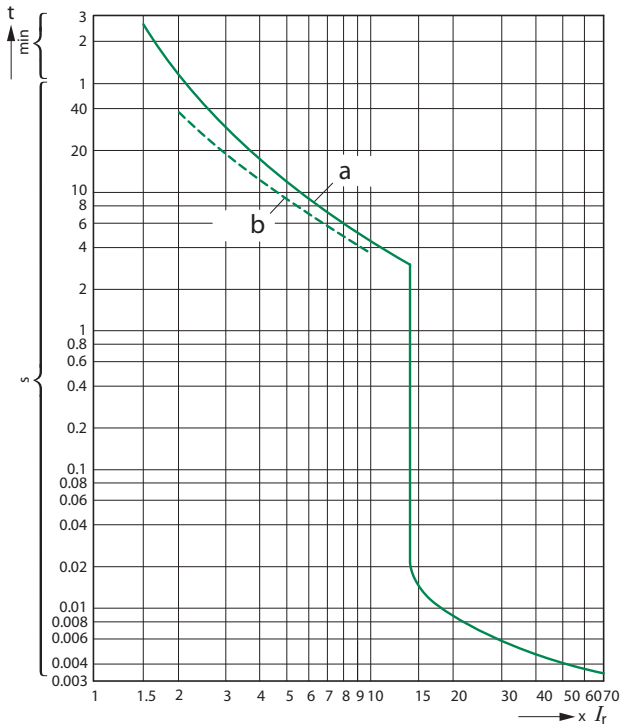
PKZ2/ZM-1,6



PKZ2/ZM-1,6	2-phase		3-phase	
	NM	HM	NM	HM
Curve	b	c	a	a
3 x I_r Trip time [s]	17.5	13.5	25	25
7.2 x I_r Trip time [s]	4.5	3.6	5.5	5.5

Tripping Characteristics, Manual Motor Controller

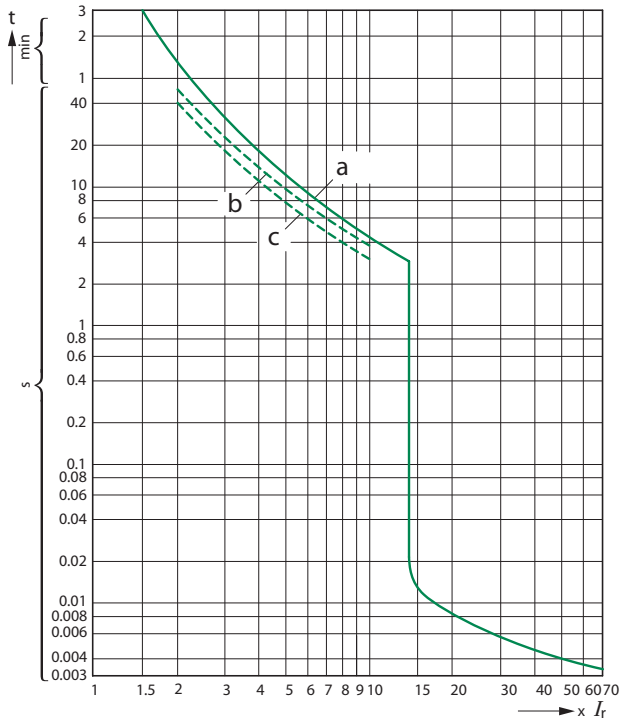
PKZ2/ZM-2,4



PKZ2/ZM-2,4	2-phase		3-phase	
	NM	HM	NM	HM
Curve	b	b	a	a
3 x I_r Trip time [s]	18.2	18.2	27	27
7.2 x I_r Trip time [s]	5.4	5.4	6.5	6.5

Tripping Characteristics, Manual Motor Controller

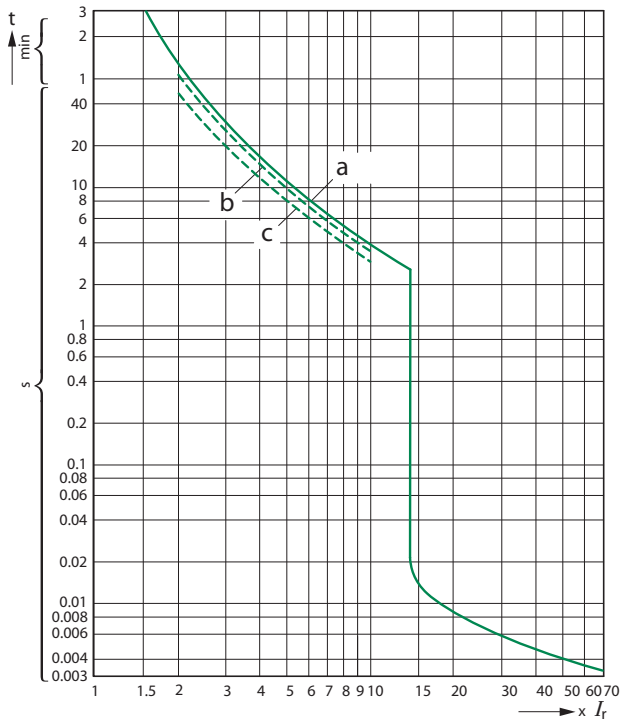
PKZ2/ZM-4



PKZ2/ZM-4	2-phase		3-phase	
	NM	HM	NM	HM
Curve	b	c	a	a
3 x I_r Trip time [s]	23	18.2	31	31
7.2 x I_r Trip time [s]	5.8	4.7	6.8	6.8

Tripping Characteristics, Manual Motor Controller

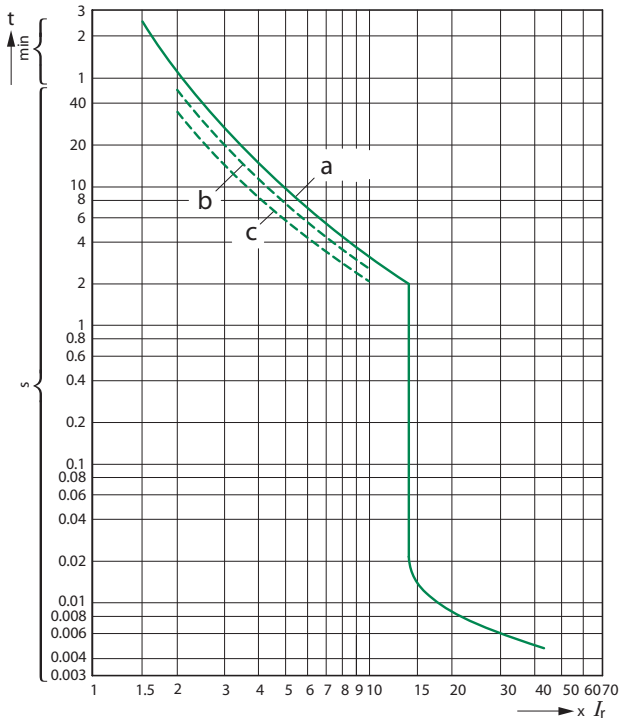
PKZ2/ZM-6



PKZ2/ZM-6	2-phase		3-phase	
	NM	HM	NM	HM
Curve	b	c	a	a
3 x I_r Trip time [s]	26	20.1	30	30
7.2 x I_r Trip time [s]	5.6	4.7	6.5	6.5

Tripping Characteristics, Manual Motor Controller

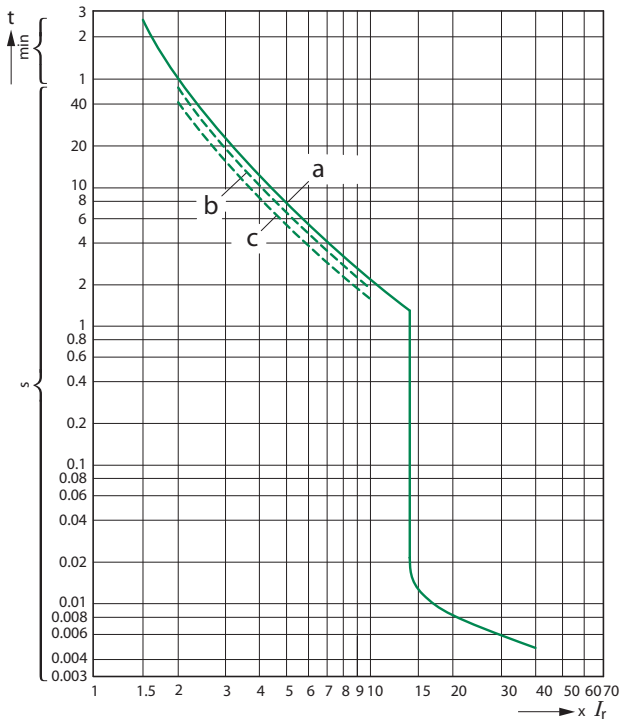
PKZ2/ZM-10



PKZ2/ZM-10	2-phase		3-phase	
	NM	HM	NM	HM
Curve	b	c	a	a
3 x I_r Trip time [s]	20	15	26	26
7.2 x I_r Trip time [s]	4	3.3	5.3	5.3

Tripping Characteristics, Manual Motor Controller

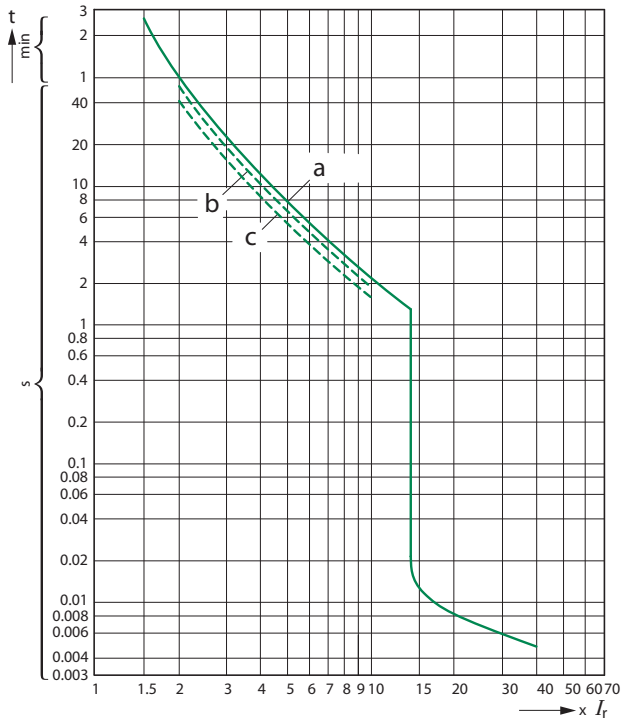
PKZ2/ZM-16



PKZ2/ZM-16	2-phase		3-phase	
	NM	HM	NM	HM
Curve	b	c	a	a
3 x I_r Trip time [s]	21	15.9	23	23
7.2 x I_r Trip time [s]	3.65	2.9	4	4

Tripping Characteristics, Manual Motor Controller

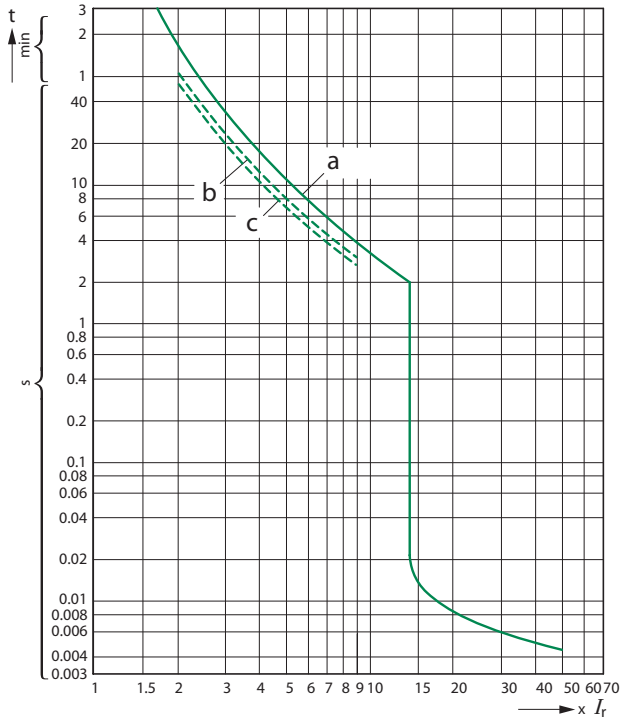
PKZ2/ZM-25



PKZ2/ZM-25	2-phase		3-phase	
	NM	HM	NM	HM
Curve	b	c	a	a
3 x I_r Trip time [s]	21	17	25.4	25.4
7.2 x I_r Trip time [s]	3.5	3	3.9	3.9

Tripping Characteristics, Manual Motor Controller

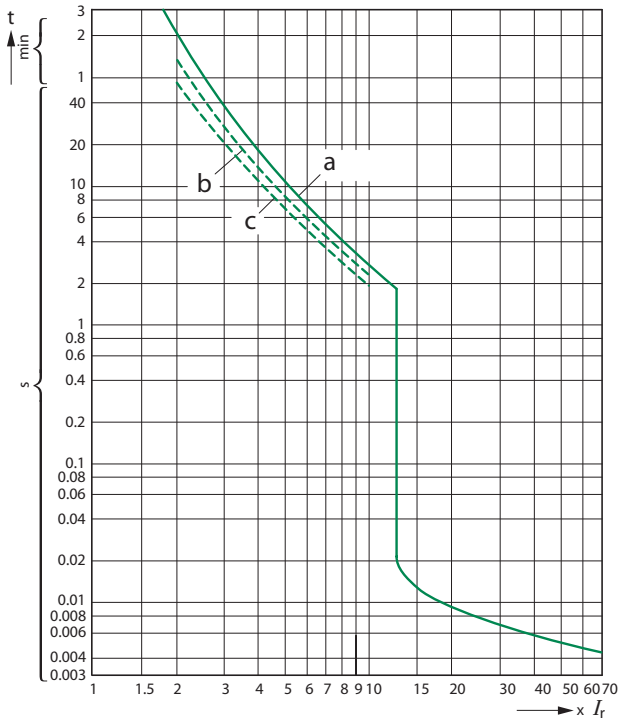
PKZ2/ZM-32



PKZ2/ZM-32	2-phase		3-phase	
	NM	HM	NM	HM
Curve	b	c	a	a
3 x I_r Trip time [s]	21	17	25.5	25.5
7.2 x I_r Trip time [s]	4.2	3.5	4.8	4.8

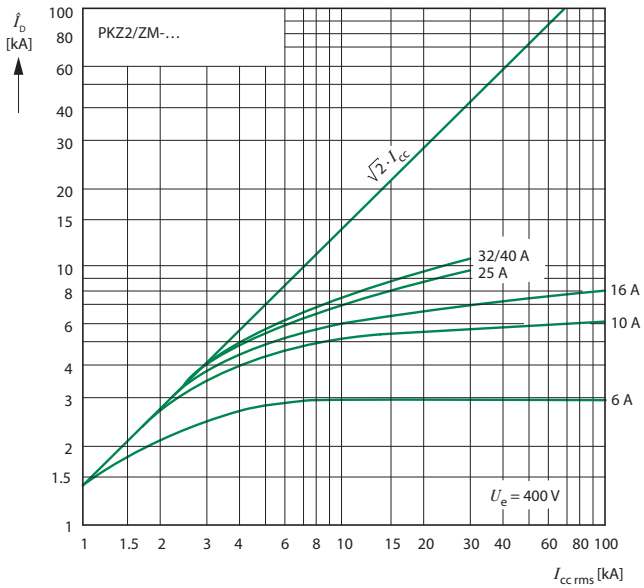
Tripping Characteristics, Manual Motor Controller

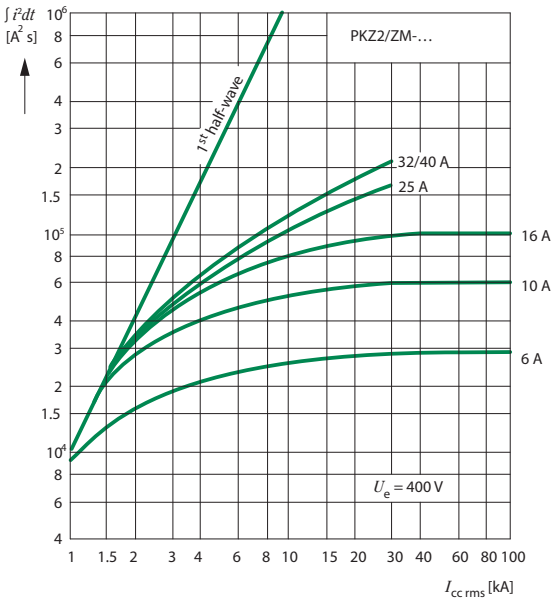
PKZ2/ZM-40



PKZ2/ZM-40		2-phase		3-phase	
		NM	HM	NM	HM
Curve		b	c	a	a
3 x I_r	Trip time [s]	21	17	26	26
7.2 x I_r	Trip time [s]	3.7	3.1	4.3	4.3

Let-through Characteristics, Manual Motor Controllers





Manual Motor Controller Switching Capacity

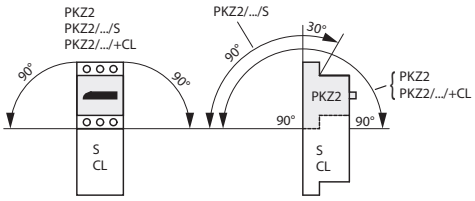
- Rated uninterrupted current I_u
- Rated conditional short-circuit current I_q IEC/EN 60947-4-1
- Rated ultimate short-circuit breaking capacity I_{cu} IEC/EN 60947-2
- Rated operational short-circuit breaking capacity I_{cs} IEC/EN 60947-2

I_u	230V				400V				440V				500V				690V			
	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 ❶	kA	kA	kA	A ❶	kA	kA	kA	A ❶	kA	kA	kA	A ❶	kA	kA	kA	A ❶
PKZ2/ZM with classification 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 + CL-PKZ2 with classification 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

No upstream protective device required, as it is the autoprotected range (150 kA).
N–Not necessary.

❶ Fuse (A gG/gL) for enhancing the switching capacity of the motor-protective circuit breaker to 100 kA.

Manual Motor Controllers

			PKZ2/ZM-. . .
General			
Standards			IEC/EN 60947, VDE 0660, UL 508, CSA C 22.2 No. 14, GL, LR, DNV, PRS, BV, RINA, RS, EZU, MEEI
Climatic proofing			Damp heat, constant, to IEC 60068-2-78; Cyclic to IEC 60068-2-30
Ambient temperature	Storage	[°C / °F]	-25. . .70 °C / *-13. . . 158 °F*
	Open	[°C / °F]	-25. . .60 °C / *-13. . . 140 °F*
	Enclosed	[°C / °F]	-25. . .40 °C / *-13. . . 104 °F*
Mounting position			
Direction of incoming supply			As required
Protection type			IP00
Mechanical shock resistance			
Half-sinusoidal shock 20 ms to IEC 60068-2-27		[g]	30
Altitude		[m]	2000
Terminal capacities	Solid or stranded	[mm²]	1 x (1 – 16); 2 x (1 – 6)
	Flexible with ferrule	[mm²]	1 x (1.5 – 10); 2 x (1.5 – 6)
	Solid or stranded	[AWG]	14 – 6
Specified tightening torque for	Main cable	[Nm]	1.8
terminal screws	Control circuit cables	[Nm]	1
Main Conducting Paths			
Rated impulse withstand voltage	U_{imp}	[V AC]	6000
Overvoltage category/pollution degree			III/3
Rated operational voltage	U_e	[V AC]	690
Rated uninterrupted current = rated operational current	$I_u = I_e$	[A]	40
Rated frequency		[Hz]	50 – 60
Current heat loss (3-pole at operating temperature)		[W]	14
Lifespan			
Mechanical ❶	Operations	[x 10⁶]	0.1
Electrical	100% AC-3 Operations	[x 10⁶]	0.05
	AC-4 Operations	[x 10⁶]	–
Maximum operating frequency	Operations/h	[Ops/h]	60
Motor switching capacity	AC-3 (up to 690V)	[A]	40
	DC-5 up to 250V	[A]	40
DC application			
Rated short-circuit	I_{cn}(250V DC), L/R = 15 ms	[kA]	30
breaking capacity I_{cn}	I_{cn}(125V DC), L/R = 15 ms	[kA]	50
Operating times under short-circuit	Minimum command time	[ms]	Approx. 2
conditions	Opening delay	[ms]	Approx. 0.5
	Total opening delay	[ms]	6

Trip Modules

		ZM-. . .-PKZ2
General		
Function		Motor protection
Temperature compensation		
To IEC/EN 60947, VDE 0660	[°C / °F]	-5. . .40 °C / *23. . . 104 °F*
Operating range	[°C / °F]	-25. . .60 °C / *-13. . . 140 °F*
Temperature compensation residual error for T > 40 °C	[%/K]	≤ 0.25
Short-circuit release tolerance	[%]	± 20
Setting range of overload releases	[x I_u]	0.6 – 1
Short-circuit releases	[x I_u]	8.5 – 14

❶ With dual-frequency coil 50/60 Hz, the mechanical lifespan reduces by 30%.

Standard and Trip Indicating Auxiliary Contacts				NHI11-PKZ2	NHI22-PKZ2	AGM2-11-PKZ2
General						
Rated impulse withstand voltage		U_{imp}	[V AC]	6000	6000	6000
Overvoltage category/pollution degree				III/3	III/3	III/3
Rated operational voltage		U_e	[V AC]	500	500	500
Rated operational current						
AC-15	230 – 240V	I_e	[A]	6	6	5
	400 – 415V	I_e	[A]	3	1.5	3
	440V	I_e	[A]	1.5	1.5	1.5
	500V	I_e	[A]	1.5	1.5	1.5
Lifespan						
Mechanical		Operations	[x 10^6]	0.1	0.1	0.01
Electrical		Operations	[x 10^6]	0.05	0.05	0.005
Control circuit reliability (at U_e = 24V DC, U_{min} = 17V, I_{min} = 10 mA)		Failure rate	[λ]	Control circuit reliability through the entire mechanical lifespan		–
Interlocked opposing contacts to ZH 1/457				–	–	Yes
Short-circuit rating without welding						
	Fuseless			240V: PKZM0-6,3 415V: PKZM0-4 500V: PKZM0-1,6	240V: PKZM0-6,3 415V: PKZM0-4 500V: PKZM0-1,6	240V: PKZM0-6,3 415V: PKZM0-4 500V: PKZM0-1,6
	Fuse		[A gG/gL]	10	10	10
Terminal capacities						
	Solid or flexible conductor with ferrule		[mm²]	1 x (0.75 – 2.5) 2 x (0.75 –2.5)	1 x (0.75 – 2.5) 2 x (0.75 –2.5)	1 x (0.75 – 2.5) 2 x (0.75 –2.5)
	Solid or stranded		[AWG]	1 x (22 – 14) 2 x (22 – 14)	1 x (22 – 14) 2 x (22 – 14)	22 – 14
Safe isolation to VDE 01 06 Part 101 and Part 101/A1						
	Between auxiliary contacts and main contacts		[V AC]	690	690	–

Undervoltage Releases				U-PKZ2...	U-HI20-PKZ2...	UVHI-PKZ2...
General						
Rated impulse withstand voltage		U_{imp}	[V AC]	6000	6000	6000
Overvoltage category/pollution degree				III/3	III/3	III/3
Terminal capacities						
Solid or flexible conductor with ferrule			[mm²]	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)
Solid or stranded			[AWG]	22 – 14	22 – 14	22 – 14
Rated operating voltage		U_e	[V AC]	24 – 600	24 – 600	24 – 600
		U_e	[V DC]	24 – 125	24 – 125	24 – 125
Drop-out voltage		x U_s	[V]	0.7 – 0.35	0.7 – 0.35	0.7 – 0.35
Power consumption						
AC	Pick-up AC	Pick-up	[VA]	5	5	5
	Sealing AC	Sealing	[VA]	3	3	3
DC	Pick-up-DC	Pick-up	[W]	3	3	3
	Sealing DC	Sealing	[W]	3	3	3
Off-delay			[ms]	–	–	200
Rated operational current						
AC-15	230V	I_e	[A]	–	6	6
	400V	I_e	[A]	–	3	3
	440V	I_e	[A]	–	1.5	1.5

Shunt Releases

				A-PKZ2...
General				
Rated impulse withstand voltage		U_{imp}	[V AC]	6000
Overvoltage category/pollution degree				III/3
Terminal capacities				
Solid or flexible conductor with ferrule			[mm²]	1 x (0.75 – 2.5); 2 x (0.75 – 2.5)
Solid or stranded			[AWG]	22 – 14
Rated operating voltage		U_e	[V AC]	24 – 600
		U_e	[V DC]	24 – 250
Operating range				
Alternating voltage			[x U_S]	0.7 – 1.1
DC			[x U_S]	0.7 – 1.1
Power consumption				
AC	Pick-up AC	Pick-up	[VA]	5
	Sealing AC	Sealing	[VA]	3
DC	Pick-up DC	Pick-up	[W]	3
	Sealing DC	Sealing	[W]	0.3

Incoming Terminals

			BK...-PKZ2, B3.1/...-PKZ2
General			
Rated impulse withstand voltage	U_{imp}	[V AC]	6000
Overvoltage category/pollution degree			III/3
Rated operational voltage	U_e	[V AC]	690
Rated uninterrupted current	I_u	[A]	120

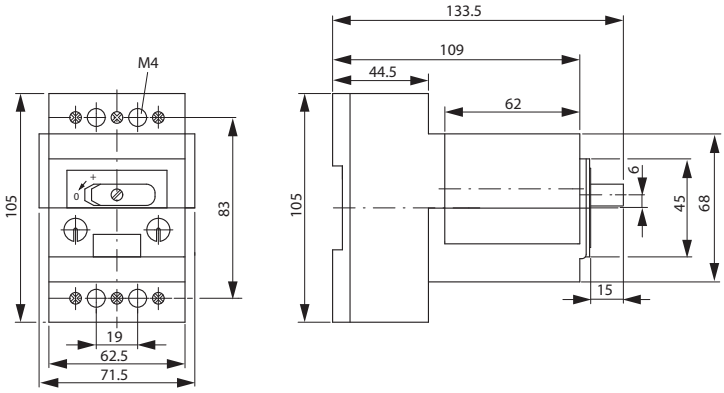
Remote Operators

				RE-PKZ2...	RS-PKZ2...
General					
Rated impulse withstand voltage		U_{imp}	[V AC]	6000	6000
Overvoltage category/pollution degree				III/3	III/3
Rated operating voltage		U_e	[V AC]	380 – 440	380 – 440
		U_e	[V DC]	24 – 240	24 – 240
Safe isolation to VDE 0106 Part 101 and Part 101 A1 between auxiliary contacts and main contacts			[V AC]	500	500
Required short-time rating (30 ms)			[VA/W]	700	700
Control transformer short-time rating			[VA]	1000	1000
Short-circuit voltage			[%]	4.4	4.4
Closing delay			[ms]	30	30
Opening delay			[ms]	30	30
Reset time to Off			[ms]	30	30
Maximum operating frequency			[Ops/h]	60	60
Operating range	Alternating voltage		[x U_S]	0.85 – 1.1	0.85 – 1.1
	DC		[x U_S]	0.85 – 1	0.85 – 1
Lifespan, electrical		Operations	[x 10^6]	0.05	0.05
Integral auxiliary contacts (make contact 33/34 HAND/AUTO Indication)					
Conventional free air thermal current th	I_{th}		[A]	1.5	1.5
Rated operational current					
AC-14	230/240V	I_e	[A]	1.5	1.5
	400/415V	I_e	[A]	1	1
	440V	I_e	[A]	0.5	0.5
Terminal capacities					
Solid or flexible conductor with ferrule			[mm²]	1 x (0.75 – 2.5); 2 x (0.75 – 2.5)	1 x (0.75 – 2.5); 2 x (0.75 – 2.5)
Solid or stranded			[AWG]	22 – 14	22 – 14

Manual Motor Controller with Trip Module

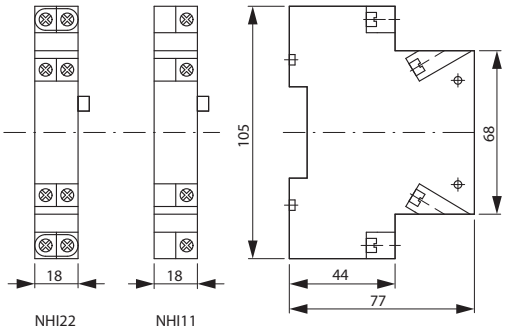
PKZ2/ZM-...

Dimensions are in millimeters.
Not intended for manufacturing purposes.



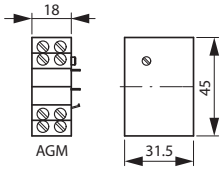
Standard Auxiliary Contacts

NHI...-PKZ2



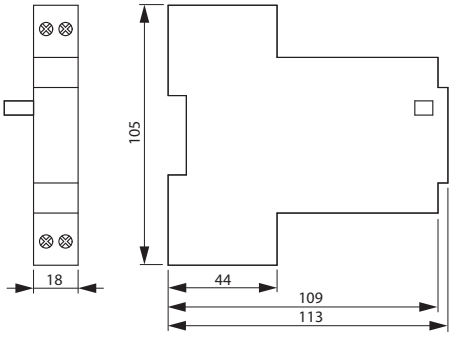
Trip-indicating Auxiliary Contacts

AGM2-11-PKZ2



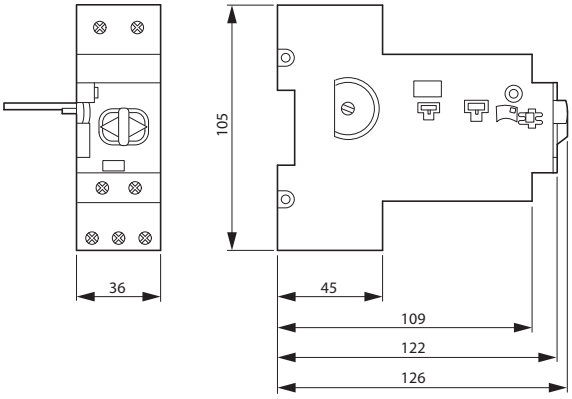
Shunt / Undervoltage Release

A-PKZ2... / U-PKZ2...



Remote Operator

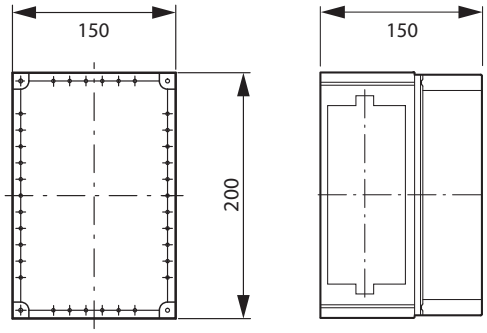
RE-PKZ2... / RS-PKZ2...



NEMA 12 Plastic Enclosure

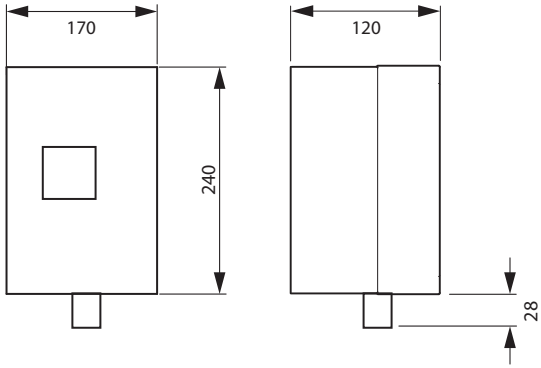
CI19EE-PKZ2-NA

Dimensions are in millimeters.
Not intended for manufacturing purposes.



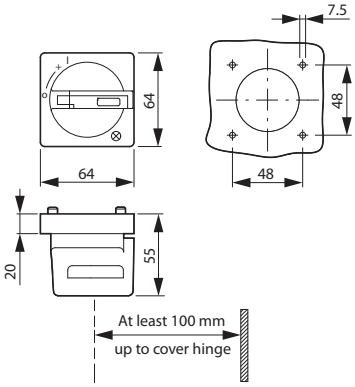
NEMA 1 Steel Enclosure

CS3-PKZ2

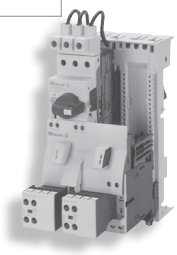


Door Coupling Handles

PKZ2-X...



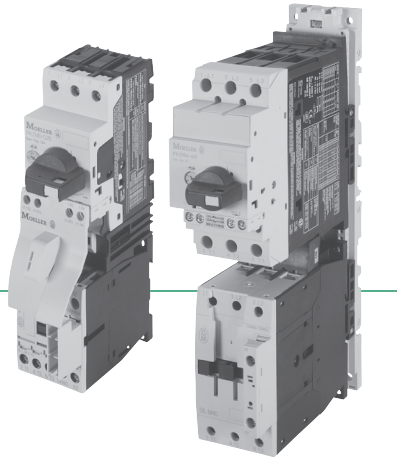
combination motor starters



MOELLER

series MSC combination motor circuit controllers

Replaces the combination starter



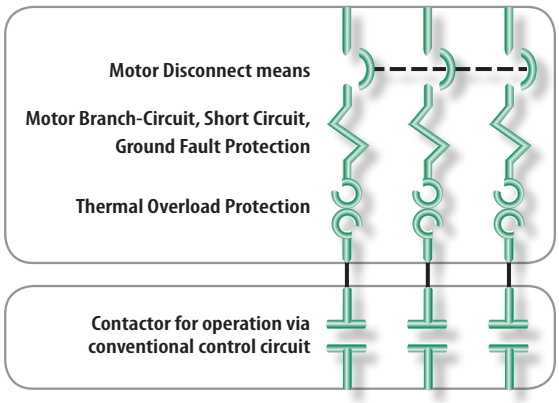
When PKZM manual motor controllers are combined with our new high performance DIL M contactors, the result is a combination motor circuit controller we call "MSC." The assemblies are UL listed and CSA certified, which means they can be used to replace traditional combination starters in many applications.

For use in over 90% of industrial applications

MSC combination starters control and protect motors up to 40HP @ 460V and 50HP at 575V. This covers well over 90% of industrial motor applications. The excellent current limiting design of MSC combination starters clears faults to 50kA @ 460V and 18kA at 575V. This eliminates the need for an upstream fuse or circuit breaker.

- > Starts and protects motors to 40HP @ 460V (50HP @ 575V) with two frame sizes
- > Replaces the traditional combination starter
- > Features a fuseless, high fault interrupting current limiting design
- > Suitable for manual control or fully automatic (HAND-AUTO) PLC applications
- > Over-current or short-circuit trip differentiation
- > Worldwide approvals

A compact, space-saving alternative to the traditional combination starter

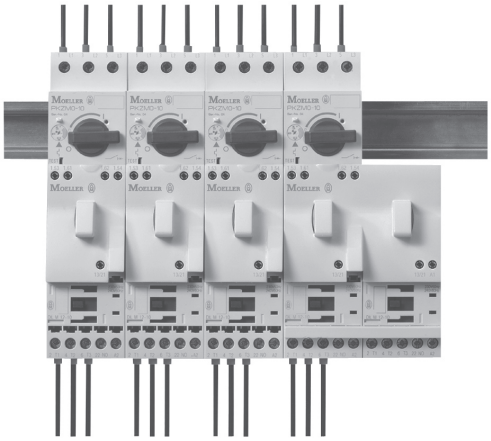


Many users are unfamiliar with the rules covering MSC self-protected combination controllers. According to NEC Article 430 and CEC Rule 28, governing motor branch circuit requirements, MSC controllers provide a motor disconnect means, motor branch-circuit protection, a motor controller, overload protection and remote operation without the need for any additional protection or devices.

These rules allow a compact, space-saving alternative to the conventional combination starter. When the MSC motor controller is paired with a DIL M contactor for control circuit operation, the resulting compact starter saves significant cost and panel space by eliminating a separate MCCB or other disconnect. Straight-through wiring also reduces the time and labor it takes to build the assembly.

Ideal for multi-motor starter panels

MSC starters eliminate individual Branch Circuit Protective Devices (BCPDs) in traditional Group Motor applications. What was once a fused disconnect or MCCB, contactor and overload relay is replaced with a compact integrated unit made up of a PKZM motor controller, close coupled to a DIL M contactor. One group BCPD for the entire panel completes the installation. This method of controlling multiple motors is extremely cost effective. It eliminates multiple fuse blocks or circuit breakers and significantly reduces the size of the panel. Installation time it also greatly reduced.



Connections made easy

Moeller's DIL M7 through 12 contactors are designed from the ground up to connect seamlessly with PKZM0 motor circuit controllers. The faceplate of the contactor has built-in stab connections to work with Moeller's unique tooless connector system, eliminating wiring errors.

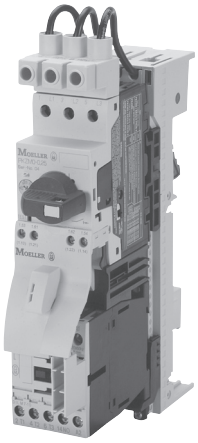
The contactor and controller can literally be joined in seconds, both mechanically and electrically with no external wiring. The finished starter is ready to mount on standard 35mm DIN-rail with a clean, finished appearance.

Even the largest MSC starters available can be assembled in seconds using main current wiring sets and a flexible mounting module for quick installation.

Installations are a snap

In addition to flexible mounting modules that enable quick mounting to DIN-rail or backpan, bus bar adaptors are also available that allow mounting on Moeller's SASY 60i horizontal bus bar system (See Tab E in this catalog). Whichever method you choose, both systems provide fast assembly and maintenance changeout.

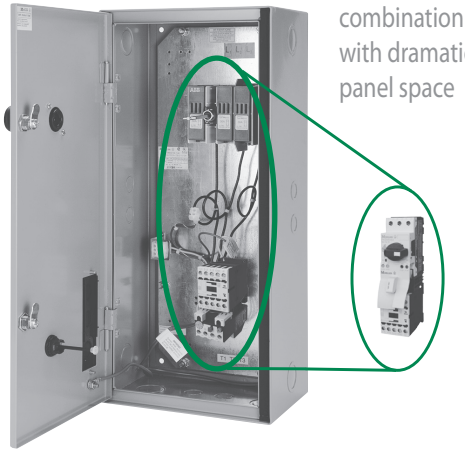
Moeller's new generation of MSC starters and the SASY 60i bus bar system makes us one of the first manufacturers to offer a consistent UL508/CSA certified solution to distribute power, while switching, controlling and protecting equipment at the same time.



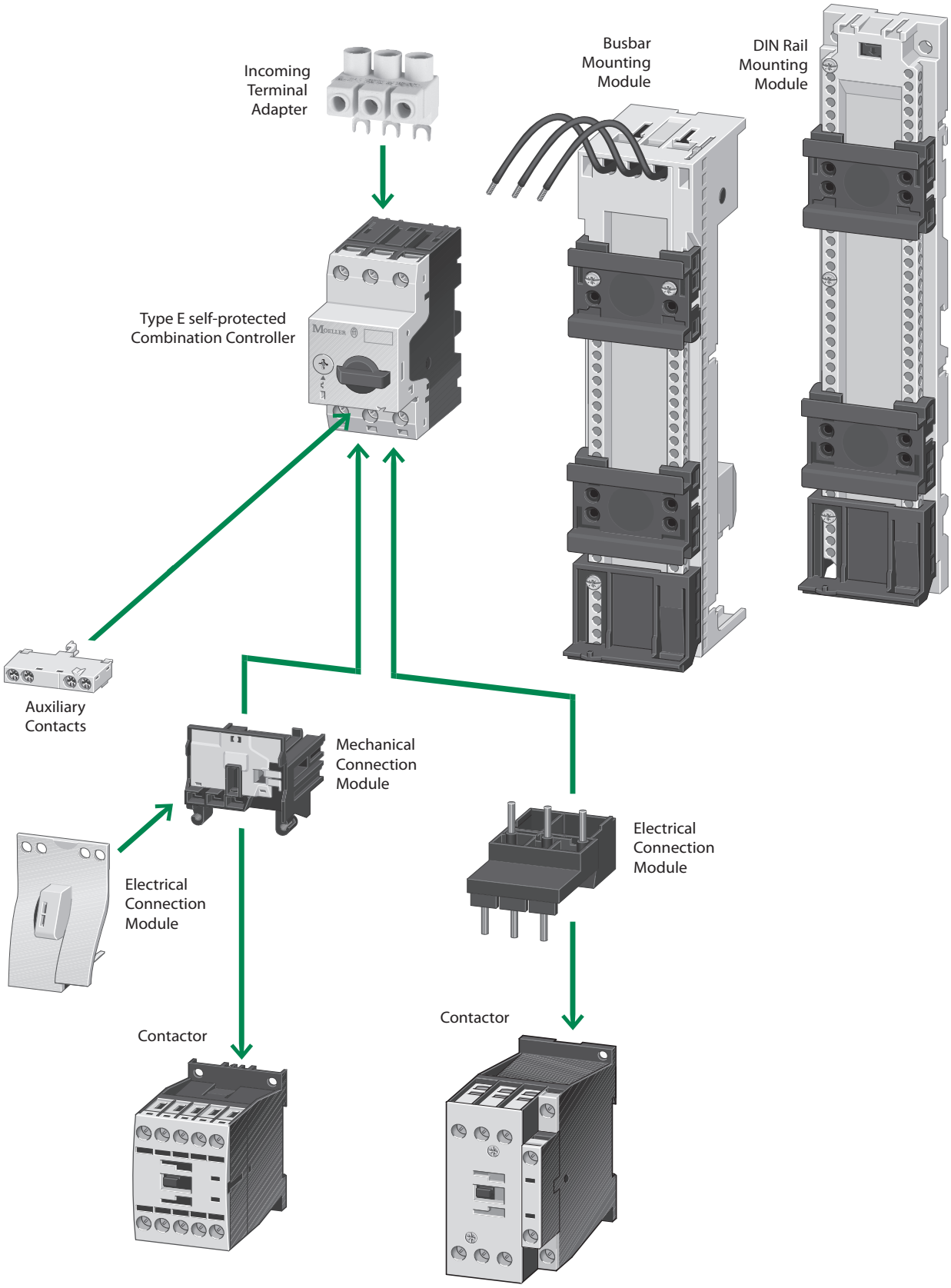
The product range dramatically reduces labor and inventory, while providing flexible solutions to assemble complex control panels in hours rather than days.

The last word…

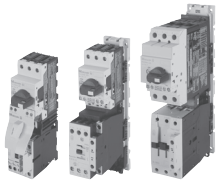
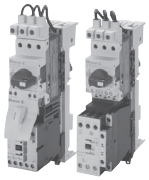
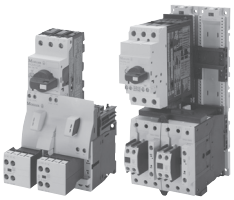
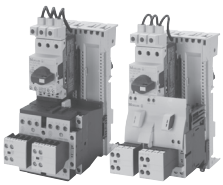
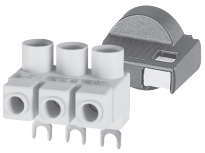
Moeller's combination motor circuit controllers are a simple, compact alternative to traditional combination starters. With decreased overall dimensions and fewer required components, MSC starters can be housed in a dramatically smaller enclosure. Ultimately, costs for parts, labor and the enclosure itself are significantly lower.

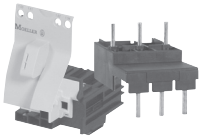
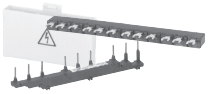


MSC starters provide the same functionality as traditional combination starters with dramatically less panel space


Incoming Terminal Adapter
Busbar Mounting Module
DIN Rail Mounting Module
Type E self-protected Combination Controller
Auxiliary Contacts
Mechanical Connection Module
Electrical Connection Module
Electrical Connection Module
Contactor
Contactor

MSC and MSC4 Combination Motor Starters Overview

Device	Description	Range	Pages
Combination Motor Starters			
	Non-Reversing Combination Starters	Up to 65 Amps AC operated	D8 – D9
		Up to 65 Amps DC operated	D10 – D11
	Non-Reversing Combination Starters with Busbar Mounting Module	Up to 32 Amps AC operated	D12
		Up to 32 Amps DC operated	D13
	Reversing Combination Starters	Up to 65 Amps AC operated	D14 – D15
		Up to 65 Amps DC operated	D16 – D17
	Reversing Combination Starters with Busbar Mounting Module	Up to 32 Amps AC operated	D18
		Up to 32 Amps DC operated	D19
Type F One-stop-shop			
	Type F Required Components	For North America	D36

Device	Description	Range	Pages
Wiring Sets			
	Connectors for Reversing and Non-Reversing Starters		D37
DIN Rail Mounting Modules			
	Mounting Modules		D38
Commoning Links			
	Connection for Multiple Controllers or Starters in Series	$U_e = 690$ V $I_u = 63 - 128$ A	D39 – D40

Moeller's catalog numbering system for motor starters and other devices follows a logical system. Device attributes can be determined by the following nomenclature.

Dashes (–) and slashes (/) are used to separate device attributes and should always be included when ordering.

MSC – D – 10 – M7 (208V60HZ) / BBA – NA

Product Line

MSC *Motor Starter Combination*

MSC4 *Combination using PKZM4*

Starter Type

D *Direct (non-reversing) Starter*

R *Reversing Starter*

Manual Controller Size

0,25 ↓ 63 *Moeller manual motor controllers are available from 0.25 Amps – 65 Amps*

Contactor Size

M7 ↓ M65 *Moeller contactors are available from DILM7 – DILM65*

North American Version

NA *Includes AK-PKZ0 padlockable handle and NHI-E-11-PKZ0 (1 NO and 1 NC) front-mount auxiliary contacts*

Optional Busbar Mounting

(these characters only appear when Busbar mounting module is included in the motor starter combination)

BBA *With busbar mounting module and incoming terminal adapter*

Coil Voltage

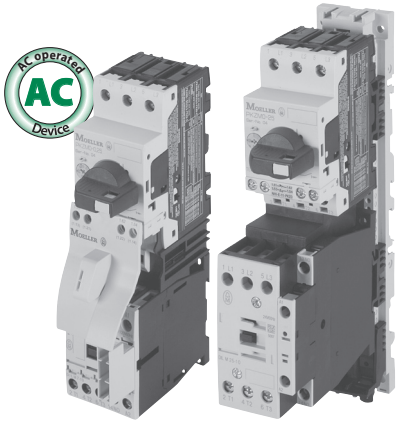
(values shown are for illustration purposes only - more voltages available)

(208V60HZ) *Standard electromechanical AC coil of 208V / 60Hz*

(24VDC) *Standard electromechanical DC coil of 24V*

This page for reference only.
Please turn to the appropriate pages to determine
the exact device and/or accessories required for your application.

- World wide approvals, including UL 508, Part III
- Phase failure sensitive, overcurrent and short-circuit protection is ideal for switching, protection and indication use
- Suitable for wye connected power systems above 240V AC
- Adjustable thermal trip settings



See next page for larger combination motor starters

AC non-reversing combination motor controller starter *(up to 32 A)* ❶

UL/CSA Short-circuit current rating kA RMS sym @		Adjustable thermal range set to motor FLC ❷	Trip setting current of magnetic trips ❷	"Typical" Maximum Horsepower Typical Three Phase [HP]				Standard Auxiliary Contacts				Reference Code
480/277V AC ❸	600/347V AC ❸	[A]	[A]	200V	240V	480/277V ❸	600/347V ❸	NO	NC	Catalog Number	Price	*Use for: Components List page D20*
50	18	0.1 – 0.16	2.2	*see note below*				2	1	MSC-D-0,16-M7◆-NA	535	NAC-01
50	18	0.16 – 0.25	3.5					2	1	MSC-D-0,25-M7◆-NA	535	NAC-02
50	18	0.25 – 0.4	5.6					2	1	MSC-D-0,4-M7◆-NA	535	NAC-03
50	18	0.4 – 0.63	8.82					2	1	MSC-D-0,63-M7◆-NA	560	NAC-04
50	18	0.63 – 1	14			½	½	2	1	MSC-D-1-M7◆-NA	580	NAC-05
50	18	1 – 1.6	22.4			¾	¾	2	1	MSC-D-1,6-M7◆-NA	580	NAC-06
50	18	1.6 – 2.5	35	½	½	1	1½	2	1	MSC-D-2,5-M7◆-NA	580	NAC-07
50	18	2.5 – 4	56	¾	¾	2	3	2	1	MSC-D-4-M7◆-NA	580	NAC-08
50	18	4 – 6.3	88.2	1½	1½	3	5	2	1	MSC-D-6,3-M7◆-NA	580	NAC-09
50	18	6.3 – 10	140	3	3	7½	10	2	1	MSC-D-10-M9◆-NA	670	NAC-10
50	18	8 – 12	168	3	3	7½	–	2	1	MSC-D-12-M12◆-NA	725	NAC-11
18	–	10 – 16	224	3	5	10	–	2	1	MSC-D-16-M17◆-NA	750	NAC-12
18	–	16 – 20	280	5	5	10	–	2	1	MSC-D-20-M25◆-NA	870	NAC-13
18	–	20 – 25	350	5	7½	15	–	2	1	MSC-D-25-M25◆-NA	920	NAC-14
18	–	25 – 32	448	7½	10	20	–	2	1	MSC-D-32-M32◆-NA ❹	1190	NAC-15

Horsepower ratings shown in the table are for reference only.
The final selection of the manual starter depends on the actual motor full load current and service factor on the motor nameplate.
Overload should be set at motor FLA full load current and is calibrated to 1.15 S.F.
Specified values to NEC table 430-150.

AC Coil Codes - MSC-D-... ❺

Complete catalog number (◆) with...	Voltage Range 50 Hz	60 Hz
(24V60HZ)	–	24V
(110V50HZ,120V60HZ)	110V	120V
(190V50HZ,220V60HZ)	190V	220V
(208V60HZ)	–	208V
(230V50HZ,240V60HZ)	230V	240V
(415V50HZ,480V60HZ)	415V	480V
(600V60HZ)	–	600V

Ordering Instructions

1. **Determine the motor FLA and Service Factor.**
2. **Locate the desired combination motor starter.**
3. **Complete the catalog number.**
4. **See pages D36 – D40 for accessories.**

❶ Type F requires a line side connector feeder terminal (BK25/3-PKZ0-E see page D36). This terminal is not a requirement for tap conductor protection or if commoning links are used. Type F also requires the handle to be padlockable with either AK-PKZ0 (included), SVB-PKZ0, or PKZ0-X(R)H see pages D36, C26.

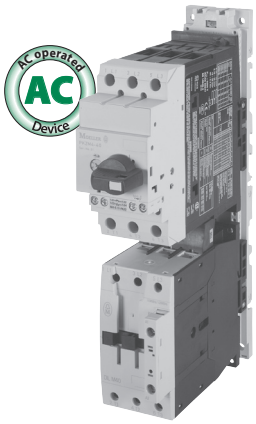
❷ All types have adjustable dial for setting motor full load current. Trip current is 125% of set value. For motors with a service factor (SF) of 1.0, set dial to 90% of motor full load current.

❸ Suitable for wye-connected power systems above 240V AC

❹ Maximum rating for three-phase at 480/600V is 27 Amps.

❺ Other coil voltages are special order; contact your Moeller representative.

- World wide approvals, including UL 508, Part III
- Phase failure sensitive, overcurrent and short-circuit protection is ideal for switching, protection and indication use
- Suitable for wye connected power systems above 240V AC
- Adjustable thermal trip settings



See previous page for smaller combination motor starters

AC non-reversing combination motor controller starter *(up to 65 A)* ❶

UL/CSA Short-circuit current rating kA RMS sym @		Adjustable thermal range set to motor FLC ❷	Trip setting current of magnetic trips ❷	"Typical" Maximum Horsepower				Standard Auxiliary Contacts				Reference Code
				Typical Three Phase [HP]								
480/277V AC ❸	600/347V AC ❸	[A]	[A]	200V	240V	480/277V ❸	600/347V ❸	NO	NC	Catalog Number	Price	*Use for: Components List page D20*
50	50	10 – 16	224	*3*	*5*	*10*	*15*	1	1	**MSC4-D-16-M40◆-NA**	1400	NAC-16
50	50	20 – 25	350	*7½*	*7½*	*15*	*20*	1	1	**MSC4-D-25-M40◆-NA**	1420	NAC-17
50	50	25 – 32	448	*10*	*10*	*25*	*30*	1	1	**MSC4-D-32-M40◆-NA**	1515	NAC-18
50	50	32 – 40	560	*10*	*–*	*30*	*30*	1	1	**MSC4-D-40-M40◆-NA**	1635	NAC-19
65	–	40 – 50	700	*–*	*15*	*30*	*40*	1	1	**MSC4-D-50-M65◆-NA**	2075	NAC-20
65	–	50 – 58	812	*–*	*–*	*40*	*50*	1	1	**MSC4-D-58-M65◆-NA** ❹	2250	NAC-21

Horsepower ratings shown in the table are for reference only.
The final selection of the manual starter depends on the actual motor full load current and service factor on the motor nameplate.
Overload should be set at motor FLA full load current and is calibrated to 1.15 S.F.
Specified values to NEC table 430-150.

AC Coil Codes - MSC4-D-. . . ❺

Complete catalog number (◆) with. . .	Voltage Range	
	50 Hz	60 Hz
(24V60HZ)	–	24V
(110V50HZ,120V60HZ)	110V	120V
(190V50HZ,220V60HZ)	190V	220V
(208V60HZ)	–	208V
(230V50HZ,240V60HZ)	230V	240V
(415V50HZ,480V60HZ)	415V	480V
(600V60HZ)	–	600V

Ordering Instructions

1. **Determine the motor FLA and Service Factor.**
2. **Locate the desired combination motor starter.**
3. **Complete the catalog number.**
4. **See pages D36 – D40 for accessories.**

❶ Type F requires a line side connector feeder terminal (BK50/3-PKZ4-E see page D36). This terminal is not a requirement for tap conductor protection or if commoning links are used. Type F also requires the handle to be padlockable with either AK-PKZ0 (included), SVB-PKZ0, or PKZ0-X(R)H see pages D36, C26.

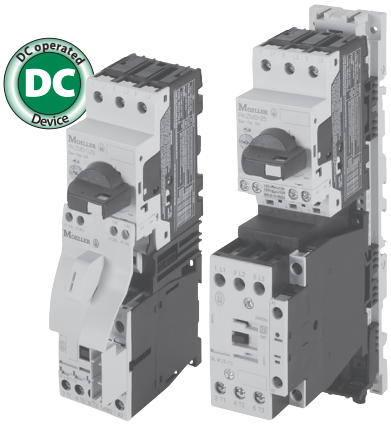
❷ All types have adjustable dial for setting motor full load current. Trip current is 125% of set value. For motors with a service factor (SF) of 1.0, set dial to 90% of motor full load current.

❸ Suitable for wye-connected power systems above 240V AC

❹ Maximum rating for three-phase at 480V is 58 Amps, 600V is 52 Amps.

❺ Other coil voltages are special order; contact your Moeller representative.

- World wide approvals, including UL 508, Part III
- Phase failure sensitive, overcurrent and short-circuit protection is ideal for switching, protection and indication use
- Suitable for wye connected power systems above 240V AC
- Adjustable thermal trip settings



See next page for larger combination motor starters

DC non-reversing combination motor controller starter *(up to 32 A)* ❶

UL/CSA Short-circuit current rating kA RMS sym @		Adjustable thermal range set to motor FLC ❷	Trip setting current of magnetic trips ❷	"Typical" Maximum Horsepower Typical Three Phase [HP]				Standard Auxiliary Contacts				Reference Code
480/277V AC ❸	600/347V AC ❸	[A]	[A]	200V	240V	480/277V ❸	600/347V ❸	NO	NC	Catalog Number	Price	*Use for: Components List page D24*
50	18	0.1 – 0.16	2.2	see note below				2	1	MSC-D-0,16-M7(24VDC)-NA	585	NDC-01
50	18	0.16 – 0.25	3.5					2	1	MSC-D-0,25-M7(24VDC)-NA	585	NDC-02
50	18	0.25 – 0.4	5.6					2	1	MSC-D-0,4-M7(24VDC)-NA	585	NDC-03
50	18	0.4 – 0.63	8.82					2	1	MSC-D-0,63-M7(24VDC)-NA	600	NDC-04
50	18	0.63 – 1	14			½	½	2	1	MSC-D-1-M7(24VDC)-NA	635	NDC-05
50	18	1 – 1.6	22.4			¾	¾	2	1	MSC-D-1,6-M7(24VDC)-NA	635	NDC-06
50	18	1.6 – 2.5	35	½	½	1	1½	2	1	MSC-D-2,5-M7(24VDC)-NA	635	NDC-07
50	18	2.5 – 4	56	¾	¾	2	3	2	1	MSC-D-4-M7(24VDC)-NA	635	NDC-08
50	18	4 – 6.3	88.2	1½	1½	3	5	2	1	MSC-D-6,3-M7(24VDC)-NA	635	NDC-09
50	18	6.3 – 10	140	3	3	7½	10	2	1	MSC-D-10-M9(24VDC)-NA	715	NDC-10
50	18	8 – 12	168	3	3	7½	–	2	1	MSC-D-12-M12(24VDC)-NA	800	NDC-11
18	–	10 – 16	224	3	5	10	–	2	1	MSC-D-16-M17(RDC24)-NA	880	NDC-12
18	–	16 – 20	280	5	5	10	–	2	1	MSC-D-20-M25(RDC24)-NA	988	NDC-13
18	–	20 – 25	350	5	7½	15	–	2	1	MSC-D-25-M25(RDC24)-NA	1035	NDC-14
18	–	25 – 32	448	7½	10	20	–	2	1	MSC-D-32-M32(RDC24)-NA ❹	1400	NDC-15

Horsepower ratings shown in the table are for reference only.
The final selection of the manual starter depends on the actual motor full load current and service factor on the motor nameplate.
Overload should be set at motor FLA full load current and is calibrated to 1.15 S.F.
Specified values to NEC table 430-150.

DC Coil Information

DC operated devices listed on this page are 24V DC. Other DC voltages are special order; contact your Moeller representative.

Ordering Instructions

1. **Determine the motor FLA and Service Factor.**
2. **Locate the desired combination motor starter.**
3. **See pages D36 – D40 for accessories.**

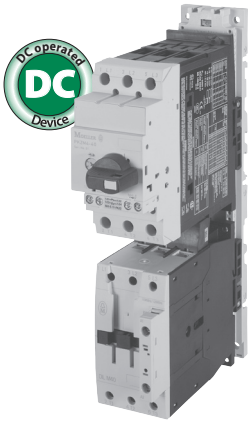
❶ Type F requires a line side connector feeder terminal (BK25/3-PKZ0-E see page D36). This terminal is not a requirement for tap conductor protection or if commoning links are used. Type F also requires the handle to be padlockable with either AK-PKZ0 (included), SVB-PKZ0, or PKZ0-X(R)H see pages D36, C26.

❷ All types have adjustable dial for setting motor full load current. Trip current is 125% of set value. For motors with a service factor (SF) of 1.0, set dial to 90% of motor full load current.

❸ Suitable for wye-connected power systems above 240V AC

❹ Maximum rating for three-phase at 480/600V is 27 Amps.

- World wide approvals, including UL 508, Part III
- Phase failure sensitive, overcurrent and short-circuit protection is ideal for switching, protection and indication use
- Suitable for wye connected power systems above 240V AC
- Adjustable thermal trip settings



See previous page for smaller combination motor starters

DC non-reversing combination motor controller starter *(up to 65 A)* ❶

UL/CSA Short-circuit current rating kA RMS sym @		Adjustable thermal range set to motor FLC ❷	Trip setting current of magnetic trips ❷	"Typical" Maximum Horsepower Typical Three Phase [HP]				Standard Auxiliary Contacts				Reference Code
480/277V AC ❸	600/347V AC ❸	[A]	[A]	200V	240V	480/277V ❸	600/347V ❸	NO	NC	Catalog Number	Price	Use for: Components List page D24
50	50	10 – 16	224	3	5	10	15	1	1	MSC4-D-16-M40(RDC24)-NA	1580	NDC-16
50	50	20 – 25	350	7½	7½	15	20	1	1	MSC4-D-25-M40(RDC24)-NA	1595	NDC-17
50	50	25 – 32	448	10	10	25	30	1	1	MSC4-D-32-M40(RDC24)-NA	1690	NDC-18
50	50	32 – 40	560	10	–	30	30	1	1	MSC4-D-40-M40(RDC24)-NA	1800	NDC-19
65	–	40 – 50	700	–	15	30	40	1	1	MSC4-D-50-M65(RDC24)-NA	2530	NDC-20
65	–	50 – 58	812	–	–	40	50	1	1	MSC4-D-58-M65(RDC24)-NA ❹	2700	NDC-21

Horsepower ratings shown in the table are for reference only.
The final selection of the manual starter depends on the actual motor full load current and service factor on the motor nameplate.
Overload should be set at motor FLA full load current and is calibrated to 1.15 S.F.
Specified values to NEC table 430-150.

DC Coil Information

DC operated devices listed on this page are 24V DC. Other DC voltages are special order; contact your Moeller representative.

Ordering Instructions

1. **Determine the motor FLA and Service Factor.**
2. **Locate the desired combination motor starter.**
3. **See pages D36 – D40 for accessories.**

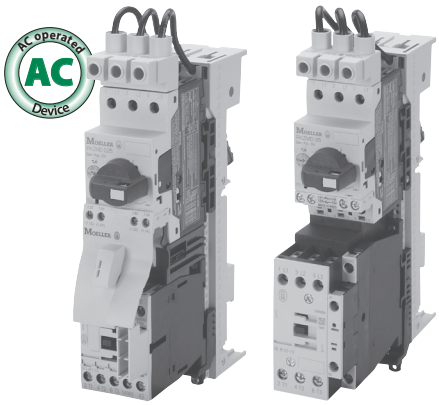
❶ Type F requires a line side connector feeder terminal (BK50/3-PKZ4-E see page D36). This terminal is not a requirement for tap conductor protection or if commoning links are used. Type F also requires the handle to be padlockable with either AK-PKZ0 (included), SVB-PKZ0, or PKZ0-X(R)H see pages D36, C26.

❷ All types have adjustable dial for setting motor full load current. Trip current is 125% of set value. For motors with a service factor (SF) of 1.0, set dial to 90% of motor full load current.

❸ Suitable for wye-connected power systems above 240V AC

❹ Maximum rating for three-phase at 480V is 58 Amps, 600V is 52 Amps.

- World wide approvals, including UL 508, Part III
- Phase failure sensitive, overcurrent and short-circuit protection is ideal for switching, protection and indication use
- Suitable for wye connected power systems above 240V AC
- Adjustable thermal trip settings



AC non-reversing combination motor controller starter with busbar mounting module ❶

UL/CSA Short-circuit current rating kA RMS sym @		Adjustable thermal range set to motor FLC ❷	Trip setting current of magnetic trips ❷	"Typical" Maximum Horsepower Typical Three Phase [HP]				Standard Auxiliary Contacts				Reference Code
480/277V AC ❸	600/347V AC ❸	[A]	[A]	200V	240V	480/277V ❸	600/347V ❸	NO	NC	Catalog Number	Price	*Use for: Components List page D22*
50	18	0.1 – 0.16	2.2	*see note below*				2	1	MSC-D-0,16-M7◆/BBA-NA	710	NAC-22
50	18	0.16 – 0.25	3.5					2	1	MSC-D-0,25-M7◆/BBA-NA	710	NAC-23
50	18	0.25 – 0.4	5.6					2	1	MSC-D-0,4-M7◆/BBA-NA	710	NAC-24
50	18	0.4 – 0.63	8.82					2	1	MSC-D-0,63-M7◆/BBA-NA	735	NAC-25
50	18	0.63 – 1	14			½	½	2	1	MSC-D-1-M7◆/BBA-NA	760	NAC-26
50	18	1 – 1.6	22.4			¾	¾	2	1	MSC-D-1,6-M7◆/BBA-NA	760	NAC-27
50	18	1.6 – 2.5	35	½	½	1	1½	2	1	MSC-D-2,5-M7◆/BBA-NA	760	NAC-28
50	18	2.5 – 4	56	¾	¾	2	3	2	1	MSC-D-4-M7◆/BBA-NA	760	NAC-29
50	18	4 – 6.3	88.2	1½	1½	3	5	2	1	MSC-D-6,3-M7◆/BBA-NA	760	NAC-30
50	18	6.3 – 10	140	3	3	7½	10	2	1	MSC-D-10-M9◆/BBA-NA	845	NAC-31
50	18	8 – 12	168	3	3	7½	–	2	1	MSC-D-12-M12◆/BBA-NA	900	NAC-32
18	–	10 – 16	224	3	5	10	–	2	1	MSC-D-16-M17◆/BBA-NA	915	NAC-33
18	–	16 – 20	280	5	5	10	–	2	1	MSC-D-20-M25◆/BBA-NA	1035	NAC-34
18	–	20 – 25	350	5	7½	15	–	2	1	MSC-D-25-M25◆/BBA-NA	1080	NAC-35
18	–	25 – 32	448	7½	10	20	–	2	1	MSC-D-32-M32◆/BBA-NA ❹	1350	NAC-36

Horsepower ratings shown in the table are for reference only.
The final selection of the manual starter depends on the actual motor full load current and service factor on the motor nameplate.
Overload should be set at motor FLA full load current and is calibrated to 1.15 S.F.
Specified values to NEC table 430-150.

AC Coil Codes - MSC-D-.../BBA ❺

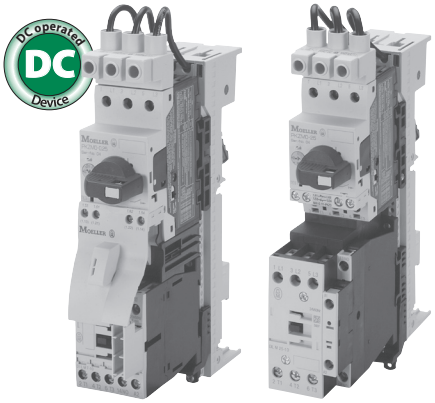
Complete catalog number (◆) with...	Voltage Range 50 Hz	Voltage Range 60 Hz
(24V60HZ)	–	24V
(110V50HZ,120V60HZ)	110V	120V
(190V50HZ,220V60HZ)	190V	220V
(208V60HZ)	–	208V
(230V50HZ,240V60HZ)	230V	240V
(415V50HZ,480V60HZ)	415V	480V
(600V60HZ)	–	600V

Ordering Instructions

1. **Determine the motor FLA and Service Factor.**
2. **Locate the desired combination motor starter.**
3. **Complete the catalog number.**
4. **See pages D36 – D40 for accessories.**

❶ Type F requires the handle to be padlockable with either AK-PKZ0 (included), SVB-PKZ0, or PKZ0-X(R)H see pages D36, C26.
❷ All types have adjustable dial for setting motor full load current. Trip current is 125% of set value. For motors with a service factor (SF) of 1.0, set dial to 90% of motor full load current.
❸ Suitable for wye-connected power systems above 240V AC
❹ Maximum rating for three-phase at 480/600V is 27 Amps.
❺ Other coil voltages are special order; contact your Moeller representative.

- World wide approvals, including UL 508, Part III
- Phase failure sensitive, overcurrent and short-circuit protection is ideal for switching, protection and indication use
- Suitable for wye connected power systems above 240V AC
- Adjustable thermal trip settings



DC non-reversing combination motor controller starter with busbar mounting module ❶

UL/CSA Short-circuit current rating kA RMS sym @		Adjustable thermal range set to motor FLC ❷	Trip setting current of magnetic trips ❷	"Typical" Maximum Horsepower				Standard Auxiliary Contacts				Reference Code
				Typical Three Phase [HP]								
480/277V AC ❸	600/347V AC ❸	[A]	[A]	200V	240V	480/277V ❸	600/347V ❸	NO	NC	Catalog Number	Price	*Use for: Components List page D26*
50	18	0.1 – 0.16	2.2	*see note below*				2	1	MSC-D-0,16-M7(24VDC)/BBA-NA	760	NDC-22
50	18	0.16 – 0.25	3.5					2	1	MSC-D-0,25-M7(24VDC)/BBA-NA	760	NDC-23
50	18	0.25 – 0.4	5.6					2	1	MSC-D-0,4-M7(24VDC)/BBA-NA	760	NDC-24
50	18	0.4 – 0.63	8.82					2	1	MSC-D-0,63-M7(24VDC)/BBA-NA	785	NDC-25
50	18	0.63 – 1	14			½	½	2	1	MSC-D-1-M7(24VDC)/BBA-NA	800	NDC-26
50	18	1 – 1.6	22.4			¾	¾	2	1	MSC-D-1,6-M7(24VDC)/BBA-NA	800	NDC-27
50	18	1.6 – 2.5	35	½	½	1	1½	2	1	MSC-D-2,5-M7(24VDC)/BBA-NA	800	NDC-28
50	18	2.5 – 4	56	¾	¾	2	3	2	1	MSC-D-4-M7(24VDC)/BBA-NA	800	NDC-29
50	18	4 – 6.3	88.2	1½	1½	3	5	2	1	MSC-D-6,3-M7(24VDC)/BBA-NA	800	NDC-30
50	18	6.3 – 10	140	3	3	7½	10	2	1	MSC-D-10-M9(24VDC)/BBA-NA	890	NDC-31
50	18	8 – 12	168	3	3	7½	–	2	1	MSC-D-12-M12(24VDC)/BBA-NA	980	NDC-32
18	–	10 – 16	224	3	5	10	–	2	1	MSC-D-16-M17(RDC24)/BBA-NA	1045	NDC-33
18	–	16 – 20	280	5	5	10	–	2	1	MSC-D-20-M25(RDC24)/BBA-NA	1150	NDC-34
18	–	20 – 25	350	5	7½	15	–	2	1	MSC-D-25-M25(RDC24)/BBA-NA	1200	NDC-35
18	–	25 – 32	448	7½	10	20	–	2	1	MSC-D-32-M32(RDC24)/BBA-NA ❹	1560	NDC-36

Horsepower ratings shown in the table are for reference only.
The final selection of the manual starter depends on the actual motor full load current and service factor on the motor nameplate.
Overload should be set at motor FLA full load current and is calibrated to 1.15 S.F.
Specified values to NEC table 430-150.

DC Coil Information

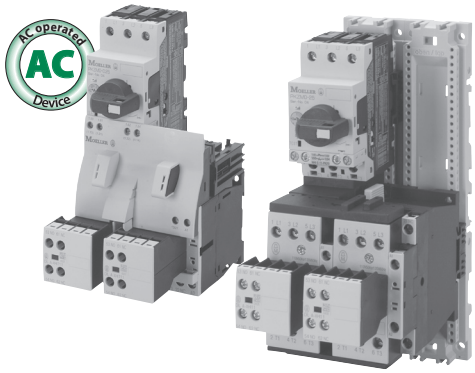
DC operated devices listed on this page are 24V DC. Other DC voltages are special order; contact your Moeller representative.

Ordering Instructions

1. **Determine the motor FLA and Service Factor.**
2. **Locate the desired combination motor starter.**
3. **See pages D36 – D40 for accessories.**

❶ Type F requires the handle to be padlockable with either AK-PKZ0 (included), SVB-PKZ0, or PKZ0-X(R)H see pages D36, C26.
❷ All types have adjustable dial for setting motor full load current. Trip current is 125% of set value. For motors with a service factor (SF) of 1.0, set dial to 90% of motor full load current.
❸ Suitable for wye-connected power systems above 240V AC
❹ Maximum rating for three-phase at 480/600V is 27 Amps.

- World wide approvals, including UL 508, Part III
- Phase failure sensitive, overcurrent and short-circuit protection is ideal for switching, protection and indication use
- Suitable for wye connected power systems above 240V AC
- Adjustable thermal trip settings



See next page for larger combination motor starters

AC reversing combination motor controller starter *(up to 32 A)* ❶

UL/CSA Short-circuit current rating kA RMS sym @		Adjustable thermal range set to motor FLC ❷	Trip setting current of magnetic trips ❷	"Typical" Maximum Horsepower Typical Three Phase [HP]				Standard Auxiliary Contacts				Reference Code
480/277V AC ❸	600/347V AC ❸	[A]	[A]	200V	240V	480/277V ❸	600/347V ❸	NO	NC	Catalog Number	Price	*Use for: Components List page D28*
50	18	0.1 – 0.16	2.2	*see note below*				3	5	MSC-R-0,16-M7◆-NA	990	RAC-01
50	18	0.16 – 0.25	3.5					3	5	MSC-R-0,25-M7◆-NA	990	RAC-02
50	18	0.25 – 0.4	5.6					3	5	MSC-R-0,4-M7◆-NA	990	RAC-03
50	18	0.4 – 0.63	8.82					3	5	MSC-R-0,63-M7◆-NA	1015	RAC-04
50	18	0.63 – 1	14			½	½	3	5	MSC-R-1-M7◆-NA	1040	RAC-05
50	18	1 – 1.6	22.4			¾	¾	3	5	MSC-R-1,6-M7◆-NA	1040	RAC-06
50	18	1.6 – 2.5	35	½	½	1	1½	3	5	MSC-R-2,5-M7◆-NA	1040	RAC-07
50	18	2.5 – 4	56	¾	¾	2	3	3	5	MSC-R-4-M7◆-NA	1040	RAC-08
50	18	4 – 6.3	88.2	1½	1½	3	5	3	5	MSC-R-6,3-M7◆-NA	1040	RAC-09
50	18	6.3 – 10	140	3	3	7½	10	3	5	MSC-R-10-M9◆-NA	1155	RAC-10
50	18	8 – 12	168	3	3	7½	–	3	5	MSC-R-12-M12◆-NA	1270	RAC-11
18	–	10 – 16	224	3	5	10	–	3	5	MSC-R-16-M17◆-NA	1320	RAC-12
18	–	16 – 20	280	5	5	10	–	3	5	MSC-R-20-M25◆-NA	1545	RAC-13
18	–	20 – 25	350	5	7½	15	–	3	5	MSC-R-25-M25◆-NA	1590	RAC-14
18	–	25 – 32	448	7½	10	20	–	3	5	MSC-R-32-M32◆-NA ❹	1965	RAC-15

Horsepower ratings shown in the table are for reference only.
The final selection of the manual starter depends on the actual motor full load current and service factor on the motor nameplate.
Overload should be set at motor FLA full load current and is calibrated to 1.15 S.F.
Specified values to NEC table 430-150.

AC Coil Codes - MSC-R-. . . ❺

Complete catalog number (◆) with . . .	Voltage Range 50 Hz	60 Hz
(24V60HZ)	–	24V
(110V50HZ,120V60HZ)	110V	120V
(190V50HZ,220V60HZ)	190V	220V
(208V60HZ)	–	208V
(230V50HZ,240V60HZ)	230V	240V
(415V50HZ,480V60HZ)	415V	480V
(600V60HZ)	–	600V

Ordering Instructions

1. **Determine the motor FLA and Service Factor.**
2. **Locate the desired combination motor starter.**
3. **Complete the catalog number.**
4. **See pages D36 – D40 for accessories.**

❶ Type F requires a line side connector feeder terminal (BK25/3-PKZ0-E see page D36). This terminal is not a requirement for tap conductor protection or if commoning links are used. Type F also requires the handle to be padlockable with either AK-PKZ0 (included), SVB-PKZ0, or PKZ0-X(R)H see pages D36, C26.

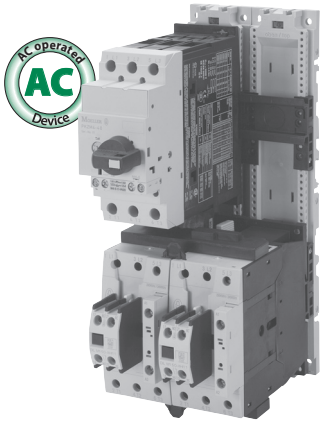
❷ All types have adjustable dial for setting motor full load current. Trip current is 125% of set value. For motors with a service factor (SF) of 1.0, set dial to 90% of motor full load current.

❸ Suitable for wye-connected power systems above 240V AC

❹ Maximum rating for three-phase at 480/600V is 27 Amps.

❺ Other coil voltages are special order; contact your Moeller representative.

- World wide approvals, including UL 508, Part III
- Phase failure sensitive, overcurrent and short-circuit protection is ideal for switching, protection and indication use
- Suitable for wye connected power systems above 240V AC
- Adjustable thermal trip settings



See previous page for smaller combination motor starters

AC reversing combination motor controller starter *(up to 65 A)* ❶

UL/CSA Short-circuit current rating kA RMS sym @		Adjustable thermal range set to motor FLC ❷	Trip setting current of magnetic trips ❷	"Typical" Maximum Horsepower Typical Three Phase [HP]				Standard Auxiliary Contacts				Reference Code
480/277V AC ❸	600/347V AC ❸	[A]	[A]	200V	240V	480/277V ❸	600/347V ❸	NO	NC	Catalog Number	Price	*Use for: Components List page D28*
50	50	10 – 16	224	*3*	*5*	*10*	*15*	3	3	**MSC4-R-16-M40◆-NA**	2380	RAC-16
50	50	20 – 25	350	*7½*	*7½*	*15*	*20*	3	3	**MSC4-R-25-M40◆-NA**	2400	RAC-17
50	50	25 – 32	448	*10*	*10*	*25*	*30*	3	3	**MSC4-R-32-M40◆-NA**	2495	RAC-18
50	50	32 – 40	560	*10*	*–*	*30*	*30*	3	3	**MSC4-R-40-M40◆-NA**	2615	RAC-19
65	–	40 – 50	700	*–*	*15*	*30*	*40*	3	3	**MSC4-R-50-M65◆-NA**	3380	RAC-20
65	–	50 – 58	812	*–*	*–*	*40*	*50*	3	3	**MSC4-R-58-M65◆-NA** ❹	3555	RAC-21

Horsepower ratings shown in the table are for reference only.
The final selection of the manual starter depends on the actual motor full load current and service factor on the motor nameplate.
Overload should be set at motor FLA full load current and is calibrated to 1.15 S.F.
Specified values to NEC table 430-150.

AC Coil Codes - MSC4-R-... ❺

Complete catalog number (◆) with...	Voltage Range 50 Hz	Voltage Range 60 Hz
(24V60HZ)	–	24V
(110V50HZ,120V60HZ)	110V	120V
(190V50HZ,220V60HZ)	190V	220V
(208V60HZ)	–	208V
(230V50HZ,240V60HZ)	230V	240V
(415V50HZ,480V60HZ)	415V	480V
(600V60HZ)	–	600V

Ordering Instructions

1. **Determine the motor FLA and Service Factor.**
2. **Locate the desired combination motor starter.**
3. **Complete the catalog number.**
4. **See pages D36 – D40 for accessories.**

❶ Type F requires a line side connector feeder terminal (BK50/3-PKZ4-E see page D36). This terminal is not a requirement for tap conductor protection or if commoning links are used. Type F also requires the handle to be padlockable with either AK-PKZ0 (included), SVB-PKZ0, or PKZ0-X(R)H see pages D36, C26.

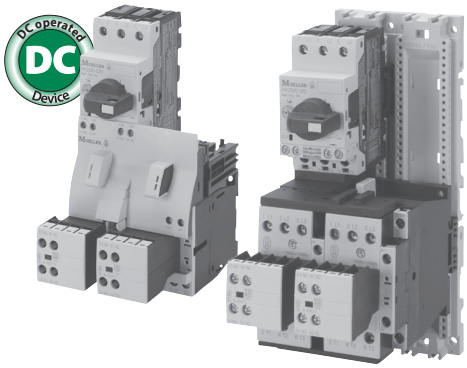
❷ All types have adjustable dial for setting motor full load current. Trip current is 125% of set value. For motors with a service factor (SF) of 1.0, set dial to 90% of motor full load current.

❸ Suitable for wye-connected power systems above 240V AC

❹ Maximum rating for three-phase at 480V is 58 Amps, 600V is 52 Amps.

❺ Other coil voltages are special order; contact your Moeller representative.

- World wide approvals, including UL 508, Part III
- Phase failure sensitive, overcurrent and short-circuit protection is ideal for switching, protection and indication use
- Suitable for wye connected power systems above 240V AC
- Adjustable thermal trip settings



See next page for larger combination motor starters

DC reversing combination motor controller starter *(up to 32 A)* ❶

UL/CSA Short-circuit current rating kA RMS sym @		Adjustable thermal range set to motor FLC ❷	Trip setting current of magnetic trips ❷	"Typical" Maximum Horsepower Typical Three Phase [HP]				Standard Auxiliary Contacts				Reference Code
480/277V AC ❸	600/347V AC ❸	[A]	[A]	200V	240V	480/277V ❸	600/347V ❸	NO	NC	Catalog Number	Price	*Use for: Components List page D32*
50	18	0.1 – 0.16	2.2	*see note below*				3	5	MSC-R-0,16-M7(24VDC)-NA	1095	RDC-01
50	18	0.16 – 0.25	3.5					3	5	MSC-R-0,25-M7(24VDC)-NA	1095	RDC-02
50	18	0.25 – 0.4	5.6					3	5	MSC-R-0,4-M7(24VDC)-NA	1095	RDC-03
50	18	0.4 – 0.63	8.82					3	5	MSC-R-0,63-M7(24VDC)-NA	1120	RDC-04
50	18	0.63 – 1	14			½	½	3	5	MSC-R-1-M7(24VDC)-NA	1145	RDC-05
50	18	1 – 1.6	22.4			¾	¾	3	5	MSC-R-1,6-M7(24VDC)-NA	1145	RDC-06
50	18	1.6 – 2.5	35	½	½	1	1½	3	5	MSC-R-2,5-M7(24VDC)-NA	1145	RDC-07
50	18	2.5 – 4	56	¾	¾	2	3	3	5	MSC-R-4-M7(24VDC)-NA	1145	RDC-08
50	18	4 – 6.3	88.2	1½	1½	3	5	3	5	MSC-R-6,3-M7(24VDC)-NA	1145	RDC-09
50	18	6.3 – 10	140	3	3	7½	10	3	5	MSC-R-10-M9(24VDC)-NA	1250	RDC-10
50	18	8 – 12	168	3	3	7½	–	3	5	MSC-R-12-M12(24VDC)-NA	1425	RDC-11
18	–	10 – 16	224	3	5	10	–	3	5	MSC-R-16-M17(RDC24)-NA	1580	RDC-12
18	–	16 – 20	280	5	5	10	–	3	5	MSC-R-20-M25(RDC24)-NA	1780	RDC-13
18	–	20 – 25	350	5	7½	15	–	3	5	MSC-R-25-M25(RDC24)-NA	1825	RDC-14
18	–	25 – 32	448	7½	10	20	–	3	5	MSC-R-32-M32(RDC24)-NA ❹	2390	RDC-15

Horsepower ratings shown in the table are for reference only.
The final selection of the manual starter depends on the actual motor full load current and service factor on the motor nameplate.
Overload should be set at motor FLA full load current and is calibrated to 1.15 S.F.
Specified values to NEC table 430-150.

DC Coil Information

DC operated devices listed on this page are 24V DC. Other DC voltages are special order; contact your Moeller representative.

Ordering Instructions

1. **Determine the motor FLA and Service Factor.**
2. **Locate the desired combination motor starter.**
3. **See pages D36 – D40 for accessories.**

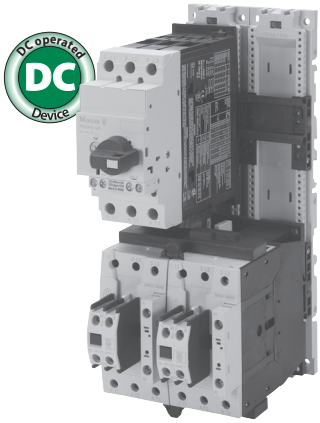
❶ Type F requires a line side connector feeder terminal (BK25/3-PKZ0-E see page D36). This terminal is not a requirement for tap conductor protection or if commoning links are used. Type F also requires the handle to be padlockable with either AK-PKZ0 (included), SVB-PKZ0, or PKZ0-X(R)H see pages D36, C26.

❷ All types have adjustable dial for setting motor full load current. Trip current is 125% of set value. For motors with a service factor (SF) of 1.0, set dial to 90% of motor full load current.

❸ Suitable for wye-connected power systems above 240V AC

❹ Maximum rating for three-phase at 480/600V is 27 Amps.

- World wide approvals, including UL 508, Part III
- Phase failure sensitive, overcurrent and short-circuit protection is ideal for switching, protection and indication use
- Suitable for wye connected power systems above 240V AC
- Adjustable thermal trip settings



See previous page for smaller combination motor starters

DC reversing combination motor controller starter *(up to 65 A)* ❶

UL/CSA Short-circuit current rating kA RMS sym @		Adjustable thermal range set to motor FLC ❷	Trip setting current of magnetic trips ❷	"Typical" Maximum Horsepower Typical Three Phase [HP]				Standard Auxiliary Contacts				Reference Code
480/277V AC ❸	600/347V AC ❸	[A]	[A]	200V	240V	480/277V ❸	600/347V ❸	NO	NC	Catalog Number	Price	Use for: Components List page D32
50	50	10 – 16	224	3	5	10	15	3	3	MSC4-R-16-M40(RDC24)-NA	2735	RDC-16
50	50	20 – 25	350	7½	7½	15	20	3	3	MSC4-R-25-M40(RDC24)-NA	2750	RDC-17
50	50	25 – 32	448	10	10	25	30	3	3	MSC4-R-32-M40(RDC24)-NA	2850	RDC-18
50	50	32 – 40	560	10	–	30	30	3	3	MSC4-R-40-M40(RDC24)-NA	2965	RDC-19
65	–	40 – 50	700	–	15	30	40	3	3	MSC4-R-50-M65(RDC24)-NA	4300	RDC-20
65	–	50 – 58	812	–	–	40	50	3	3	MSC4-R-58-M65(RDC24)-NA ❹	4475	RDC-21

Horsepower ratings shown in the table are for reference only.
The final selection of the manual starter depends on the actual motor full load current and service factor on the motor nameplate.
Overload should be set at motor FLA full load current and is calibrated to 1.15 S.F.
Specified values to NEC table 430-150.

DC Coil Information

DC operated devices listed on this page are 24V DC. Other DC voltages are special order; contact your Moeller representative.

Ordering Instructions

1. **Determine the motor FLA and Service Factor.**
2. **Locate the desired combination motor starter.**
3. **See pages D36 – D40 for accessories.**

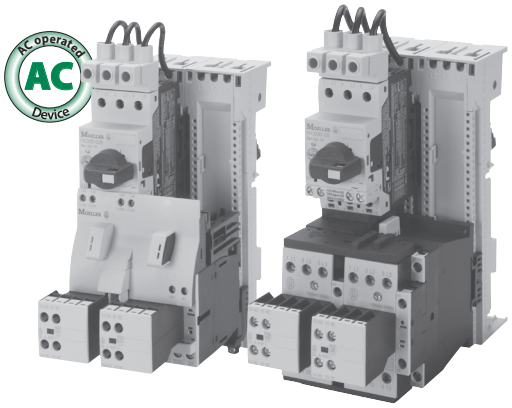
❶ Type F requires a line side connector feeder terminal (BK50/3-PKZ4-E see page D36). This terminal is not a requirement for tap conductor protection or if commoning links are used. Type F also requires the handle to be padlockable with either AK-PKZ0 (included), SVB-PKZ0, or PKZ0-X(R)H see pages D36, C26.

❷ All types have adjustable dial for setting motor full load current. Trip current is 125% of set value. For motors with a service factor (SF) of 1.0, set dial to 90% of motor full load current.

❸ Suitable for wye-connected power systems above 240V AC

❹ Maximum rating for three-phase at 480V is 58 Amps, 600V is 52 Amps.

- World wide approvals, including UL 508, Part III
- Phase failure sensitive, overcurrent and short-circuit protection is ideal for switching, protection and indication use
- Suitable for wye connected power systems above 240V AC
- Adjustable thermal trip settings



AC reversing combination motor controller starter with busbar mounting module ❶

UL/CSA Short-circuit current rating kA RMS sym @		Adjustable thermal range set to motor FLC ❷	Trip setting current of magnetic trips ❷	"Typical" Maximum Horsepower Typical Three Phase [HP]				Standard Auxiliary Contacts				Reference Code
480/277V AC ❸	600/347V AC ❸	[A]	[A]	200V	240V	480/277V ❸	600/347V ❸	NO	NC	Catalog Number	Price	*Use for: Components List page D30*
50	18	0.1 – 0.16	2.2	*see note below*				3	5	MSC-R-0,16-M7◆/BBA-NA	1320	RAC-22
50	18	0.16 – 0.25	3.5					3	5	MSC-R-0,25-M7◆/BBA-NA	1320	RAC-23
50	18	0.25 – 0.4	5.6					3	5	MSC-R-0,4-M7◆/BBA-NA	1320	RAC-24
50	18	0.4 – 0.63	8.82					3	5	MSC-R-0,63-M7◆/BBA-NA	1340	RAC-25
50	18	0.63 – 1	14			½	½	3	5	MSC-R-1-M7◆/BBA-NA	1365	RAC-26
50	18	1 – 1.6	22.4			¾	¾	3	5	MSC-R-1,6-M7◆/BBA-NA	1365	RAC-27
50	18	1.6 – 2.5	35	½	½	1	1½	3	5	MSC-R-2,5-M7◆/BBA-NA	1365	RAC-28
50	18	2.5 – 4	56	¾	¾	2	3	3	5	MSC-R-4-M7◆/BBA-NA	1365	RAC-29
50	18	4 – 6.3	88.2	1½	1½	3	5	3	5	MSC-R-6,3-M7◆/BBA-NA	1365	RAC-30
50	18	6.3 – 10	140	3	3	7½	10	3	5	MSC-R-10-M9◆/BBA-NA	1480	RAC-31
50	18	8 – 12	168	3	3	7½	–	3	5	MSC-R-12-M12◆/BBA-NA	1595	RAC-32
18	–	10 – 16	224	3	5	10	–	3	5	MSC-R-16-M17◆/BBA-NA	1690	RAC-33
18	–	16 – 20	280	5	5	10	–	3	5	MSC-R-20-M25◆/BBA-NA	1715	RAC-34
18	–	20 – 25	350	5	7½	15	–	3	5	MSC-R-25-M25◆/BBA-NA	1760	RAC-35
18	–	25 – 32	448	7½	10	20	–	3	5	MSC-R-32-M32◆/BBA-NA ❹	2140	RAC-36

Horsepower ratings shown in the table are for reference only.
The final selection of the manual starter depends on the actual motor full load current and service factor on the motor nameplate.
Overload should be set at motor FLA full load current and is calibrated to 1.15 S.F.
Specified values to NEC table 430-150.

AC Coil Codes - MSC-R-.../BBA ❺

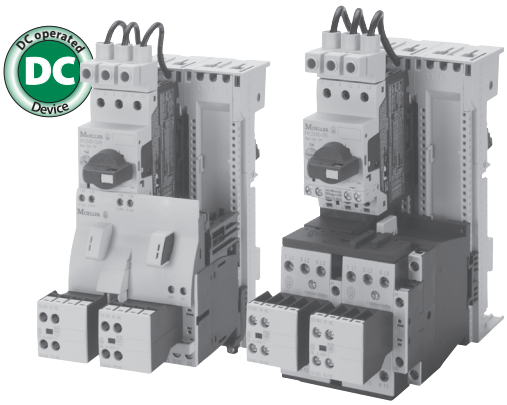
Complete catalog number (◆) with...	Voltage Range 50 Hz	Voltage Range 60 Hz
(24V60HZ)	–	24V
(110V50HZ,120V60HZ)	110V	120V
(190V50HZ,220V60HZ)	190V	220V
(208V60HZ)	–	208V
(230V50HZ,240V60HZ)	230V	240V
(415V50HZ,480V60HZ)	415V	480V
(600V60HZ)	–	600V

Ordering Instructions

1. **Determine the motor FLA and Service Factor.**
2. **Locate the desired combination motor starter.**
3. **Complete the catalog number.**
4. **See pages D36 – D40 for accessories.**

❶ Type F requires the handle to be padlockable with either AK-PKZ0 (included), SVB-PKZ0, or PKZ0-X(R)H see pages D36, C26.
❷ All types have adjustable dial for setting motor full load current. Trip current is 125% of set value. For motors with a service factor (SF) of 1.0, set dial to 90% of motor full load current.
❸ Suitable for wye-connected power systems above 240V AC
❹ Maximum rating for three-phase at 480/600V is 27 Amps.
❺ Other coil voltages are special order; contact your Moeller representative.

- World wide approvals, including UL 508, Part III
- Phase failure sensitive, overcurrent and short-circuit protection is ideal for switching, protection and indication use
- Suitable for wye connected power systems above 240V AC
- Adjustable thermal trip settings



DC reversing combination motor controller starter with busbar mounting module ❶

UL/CSA Short-circuit current rating kA RMS sym @		Adjustable thermal range set to motor FLC ❷	Trip setting current of magnetic trips ❷	"Typical" Maximum Horsepower				Standard Auxiliary Contacts				Reference Code
				Typical Three Phase [HP]								
480/277V AC ❸	600/347V AC ❸	[A]	[A]	200V	240V	480/277V ❸	600/347V ❸	NO	NC	Catalog Number	Price	*Use for: Components List page D34*
50	18	0.1 – 0.16	2.2	*see note below*				3	5	MSC-R-0,16-M7(24VDC)/BBA-NA	1420	RDC-22
50	18	0.16 – 0.25	3.5					3	5	MSC-R-0,25-M7(24VDC)/BBA-NA	1420	RDC-23
50	18	0.25 – 0.4	5.6					3	5	MSC-R-0,4-M7(24VDC)/BBA-NA	1420	RDC-24
50	18	0.4 – 0.63	8.82					3	5	MSC-R-0,63-M7(24VDC)/BBA-NA	1445	RDC-25
50	18	0.63 – 1	14			½	½	3	5	MSC-R-1-M7(24VDC)/BBA-NA	1470	RDC-26
50	18	1 – 1.6	22.4			¾	¾	3	5	MSC-R-1,6-M7(24VDC)/BBA-NA	1470	RDC-27
50	18	1.6 – 2.5	35	½	½	1	1½	3	5	MSC-R-2,5-M7(24VDC)/BBA-NA	1470	RDC-28
50	18	2.5 – 4	56	¾	¾	2	3	3	5	MSC-R-4-M7(24VDC)/BBA-NA	1470	RDC-29
50	18	4 – 6.3	88.2	1½	1½	3	5	3	5	MSC-R-6,3-M7(24VDC)/BBA-NA	1470	RDC-30
50	18	6.3 – 10	140	3	3	7½	10	3	5	MSC-R-10-M9(24VDC)/BBA-NA	1575	RDC-31
50	18	8 – 12	168	3	3	7½	–	3	5	MSC-R-12-M12(24VDC)/BBA-NA	1755	RDC-32
18	–	10 – 16	224	3	5	10	–	3	5	MSC-R-16-M17(RDC24)/BBA-NA	1885	RDC-33
18	–	16 – 20	280	5	5	10	–	3	5	MSC-R-20-M25(RDC24)/BBA-NA	2085	RDC-34
18	–	20 – 25	350	5	7½	15	–	3	5	MSC-R-25-M25(RDC24)/BBA-NA	2130	RDC-35
18	–	25 – 32	448	7½	10	20	–	3	5	MSC-R-32-M32(RDC24)/BBA-NA ❹	2695	RDC-36

Horsepower ratings shown in the table are for reference only.
The final selection of the manual starter depends on the actual motor full load current and service factor on the motor nameplate.
Overload should be set at motor FLA full load current and is calibrated to 1.15 S.F.
Specified values to NEC table 430-150.

DC Coil Information

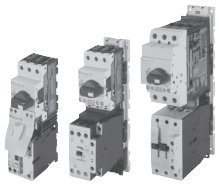
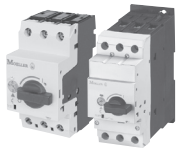
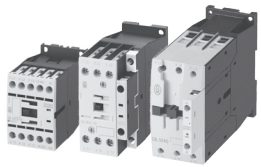
DC operated devices listed on this page are 24V DC. Other DC voltages are special order; contact your Moeller representative.

Ordering Instructions

1. **Determine the motor FLA and Service Factor.**
2. **Locate the desired combination motor starter.**
3. **See pages D36 – D40 for accessories.**

❶ Type F requires the handle to be padlockable with either AK-PKZ0 (included), SVB-PKZ0, or PKZ0-X(R)H see pages D36, C26.
❷ All types have adjustable dial for setting motor full load current. Trip current is 125% of set value. For motors with a service factor (SF) of 1.0, set dial to 90% of motor full load current.
❸ Suitable for wye-connected power systems above 240V AC
❹ Maximum rating for three-phase at 480/600V is 27 Amps.

Component List for Type F, AC non-reversing combination motor controller starters

Reference Code	See Motor Starter Ratings on Page	Assembled Combination Starter  Catalog Number	=	Manual Motor Controller  Catalog Number	Price	+	Contactor  Catalog Number	Price
NAC-01	D8	MSC-D-0,16-M7◆-NA		PKZM0-0,16	200		DILM7-10◆ ❶	176
NAC-02	D8	MSC-D-0,25-M7◆-NA		PKZM0-0,25	200		DILM7-10◆ ❶	176
NAC-03	D8	MSC-D-0,4-M7◆-NA		PKZM0-0,4	200		DILM7-10◆ ❶	176
NAC-04	D8	MSC-D-0,63-M7◆-NA		PKZM0-0,63	220		DILM7-10◆ ❶	176
NAC-05	D8	MSC-D-1-M7◆-NA		PKZM0-1	240		DILM7-10◆ ❶	176
NAC-06	D8	MSC-D-1,6-M7◆-NA		PKZM0-1,6	240		DILM7-10◆ ❶	176
NAC-07	D8	MSC-D-2,5-M7◆-NA		PKZM0-2,5	240		DILM7-10◆ ❶	176
NAC-08	D8	MSC-D-4-M7◆-NA		PKZM0-4	240		DILM7-10◆ ❶	176
NAC-09	D8	MSC-D-6,3-M7◆-NA		PKZM0-6,3	240		DILM7-10◆ ❶	176
NAC-10	D8	MSC-D-10-M9◆-NA		PKZM0-10	290		DILM9-10◆ ❶	200
NAC-11	D8	MSC-D-12-M12◆-NA		PKZM0-12	290		DILM12-10◆ ❶	248
NAC-12	D8	MSC-D-16-M17◆-NA		PKZM0-16	290		DILM17-10◆ ❶	260
NAC-13	D8	MSC-D-20-M25◆-NA		PKZM0-20	300		DILM25-10◆ ❶	350
NAC-14	D8	MSC-D-25-M25◆-NA		PKZM0-25	340		DILM25-10◆ ❶	350
NAC-15	D8	MSC-D-32-M32◆-NA		PKZM0-32	480		DILM32-10◆ ❶	440
NAC-16	D9	MSC4-D-16-M40◆-NA		PKZM4-16	494		DILM40◆	500
NAC-17	D9	MSC4-D-25-M40◆-NA		PKZM4-25	508		DILM40◆	500
NAC-18	D9	MSC4-D-32-M40◆-NA		PKZM4-32	590		DILM40◆	500
NAC-19	D9	MSC4-D-40-M40◆-NA		PKZM4-40	690		DILM40◆	500
NAC-20	D9	MSC4-D-50-M65◆-NA		PKZM4-50	784		DILM65◆	780
NAC-21	D9	MSC4-D-58-M65◆-NA		PKZM4-58	932		DILM65◆	780
				Discount Code: A31			*Discount Code: A11*	

AC Coil Codes - DILM... ❷

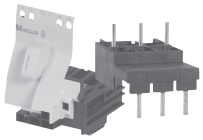
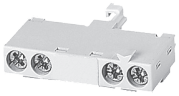
Complete catalog number (◆) with...	Voltage Range 50 Hz	Voltage Range 60 Hz
(24V60HZ)	–	24V
(110V50HZ,120V60HZ)	110V	120V
(190V50HZ,220V60HZ)	190V	220V
(208V60HZ)	–	208V
(230V50HZ,240V60HZ)	230V	240V
(415V50HZ,480V60HZ)	415V	480V
(600V60HZ)	–	600V

❶ Contactor includes 1 N.O. contact.
❷ Other coil voltages are special order; contact your Moeller representative.

Ordering Instructions

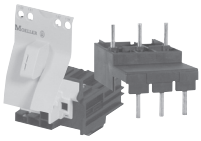
1. Locate the desired combination motor starter.
2. Order each component individually in entire row *(2 pages)*.
3. Complete the catalog number of contactor.
4. See pages D36 – D40 for accessories.

AC operated Device

Reference Code (cont.)	+ Connection Module 		+ Auxiliary Contacts (on motor controller)  (1 N.O. and 1 N.C.)		+ Padlockable Handle ❷ 		Recommended Option Feeder Terminal ❸ 	
	Catalog Number	Price	Catalog Number	Price	Catalog Number	Price	Catalog Number	Price
NAC-01	PKZM0-XDM12	30	NHI-E-11-PKZ0	40	AK-PKZ0	8	BK25/3-PKZ0-E	40
NAC-02	PKZM0-XDM12	30	NHI-E-11-PKZ0	40	AK-PKZ0	8	BK25/3-PKZ0-E	40
NAC-03	PKZM0-XDM12	30	NHI-E-11-PKZ0	40	AK-PKZ0	8	BK25/3-PKZ0-E	40
NAC-04	PKZM0-XDM12	30	NHI-E-11-PKZ0	40	AK-PKZ0	8	BK25/3-PKZ0-E	40
NAC-05	PKZM0-XDM12	30	NHI-E-11-PKZ0	40	AK-PKZ0	8	BK25/3-PKZ0-E	40
NAC-06	PKZM0-XDM12	30	NHI-E-11-PKZ0	40	AK-PKZ0	8	BK25/3-PKZ0-E	40
NAC-07	PKZM0-XDM12	30	NHI-E-11-PKZ0	40	AK-PKZ0	8	BK25/3-PKZ0-E	40
NAC-08	PKZM0-XDM12	30	NHI-E-11-PKZ0	40	AK-PKZ0	8	BK25/3-PKZ0-E	40
NAC-09	PKZM0-XDM12	30	NHI-E-11-PKZ0	40	AK-PKZ0	8	BK25/3-PKZ0-E	40
NAC-10	PKZM0-XDM12	30	NHI-E-11-PKZ0	40	AK-PKZ0	8	BK25/3-PKZ0-E	40
NAC-11	PKZM0-XDM12	30	NHI-E-11-PKZ0	40	AK-PKZ0	8	BK25/3-PKZ0-E	40
NAC-12	PKZM0-XDM32 ❶	42	NHI-E-11-PKZ0	40	AK-PKZ0	8	BK25/3-PKZ0-E	40
NAC-13	PKZM0-XDM32 ❶	42	NHI-E-11-PKZ0	40	AK-PKZ0	8	BK25/3-PKZ0-E	40
NAC-14	PKZM0-XDM32 ❶	42	NHI-E-11-PKZ0	40	AK-PKZ0	8	BK25/3-PKZ0-E	40
NAC-15	PKZM0-XDM32 ❶	42	NHI-E-11-PKZ0	40	AK-PKZ0	8	BK25/3-PKZ0-E	40
NAC-16	PKZM4-XDM65 ❶	150	NHI-E-11-PKZ0	40	AK-PKZ0	8	BK50/3-PKZ4-E	110
NAC-17	PKZM4-XDM65 ❶	150	NHI-E-11-PKZ0	40	AK-PKZ0	8	BK50/3-PKZ4-E	110
NAC-18	PKZM4-XDM65 ❶	150	NHI-E-11-PKZ0	40	AK-PKZ0	8	BK50/3-PKZ4-E	110
NAC-19	PKZM4-XDM65 ❶	150	NHI-E-11-PKZ0	40	AK-PKZ0	8	BK50/3-PKZ4-E	110
NAC-20	PKZM4-XDM65 ❶	150	NHI-E-11-PKZ0	40	AK-PKZ0	8	BK50/3-PKZ4-E	110
NAC-21	PKZM4-XDM65 ❶	150	NHI-E-11-PKZ0	40	AK-PKZ0	8	BK50/3-PKZ4-E	110
	Discount Code: A31		*Discount Code: A31*		*Discount Code: A31*		*Discount Code: A31*	

❶ Connection module includes DIN rail mounting module. (page D37)
❷ Other padlocking options include: SVB-PKZ0 and PKZ0-X(R)H (see page C26).
❸ Requirement for Type F except when used for tap conductor protection or if commoning links are used.

Component List for Type F, AC non-reversing combination motor controller starters

Reference Code	See Motor Starter Ratings on Page	Assembled Combination Starter	=	Manual Motor Controller		+	Contactor ❶		+	Connection Module	
											
		Catalog Number		Catalog Number	Price		Catalog Number	Price		Catalog Number	Price
NAC-22	D12	MSC-D-0,16-M7◆/BBA-NA		PKZM0-0,16	200		DILM7-10◆	176		PKZM0-XDM12	30
NAC-23	D12	MSC-D-0,25-M7◆/BBA-NA		PKZM0-0,25	200		DILM7-10◆	176		PKZM0-XDM12	30
NAC-24	D12	MSC-D-0,4-M7◆/BBA-NA		PKZM0-0,4	200		DILM7-10◆	176		PKZM0-XDM12	30
NAC-25	D12	MSC-D-0,63-M7◆/BBA-NA		PKZM0-0,63	220		DILM7-10◆	176		PKZM0-XDM12	30
NAC-26	D12	MSC-D-1-M7◆/BBA-NA		PKZM0-1	240		DILM7-10◆	176		PKZM0-XDM12	30
NAC-27	D12	MSC-D-1,6-M7◆/BBA-NA		PKZM0-1,6	240		DILM7-10◆	176		PKZM0-XDM12	30
NAC-28	D12	MSC-D-2,5-M7◆/BBA-NA		PKZM0-2,5	240		DILM7-10◆	176		PKZM0-XDM12	30
NAC-29	D12	MSC-D-4-M7◆/BBA-NA		PKZM0-4	240		DILM7-10◆	176		PKZM0-XDM12	30
NAC-30	D12	MSC-D-6,3-M7◆/BBA-NA		PKZM0-6,3	240		DILM7-10◆	176		PKZM0-XDM12	30
NAC-31	D12	MSC-D-10-M9◆/BBA-NA		PKZM0-10	290		DILM9-10◆	200		PKZM0-XDM12	30
NAC-32	D12	MSC-D-12-M12◆/BBA-NA		PKZM0-12	290		DILM12-10◆	248		PKZM0-XDM12	30
NAC-33	D12	MSC-D-16-M17◆/BBA-NA		PKZM0-16	290		DILM17-10◆	260		PKZM0-XM32DE	10
NAC-34	D12	MSC-D-20-M25◆/BBA-NA		PKZM0-20	300		DILM25-10◆	350		PKZM0-XM32DE	10
NAC-35	D12	MSC-D-25-M25◆/BBA-NA		PKZM0-25	340		DILM25-10◆	350		PKZM0-XM32DE	10
NAC-36	D12	MSC-D-32-M32◆/BBA-NA		PKZM0-32	480		DILM32-10◆	440		PKZM0-XM32DE	10
				Discount Code: A31			*Discount Code: A11*			*Discount Code: A31*	

D

Combination Motor Starters

AC Coil Codes - DILM . . . ❷

Complete catalog number (◆) with . . .	Voltage Range	
	50 Hz	60 Hz
(24V60HZ)	–	24V
(110V50HZ,120V60HZ)	110V	120V
(190V50HZ,220V60HZ)	190V	220V
(208V60HZ)	–	208V
(230V50HZ,240V60HZ)	230V	240V
(415V50HZ,480V60HZ)	415V	480V
(600V60HZ)	–	600V

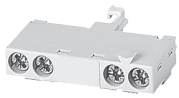
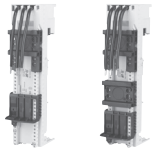
❶ Contactor includes 1 N.O. contact.

❷ Other coil voltages are special order; contact your Moeller representative.

Ordering Instructions

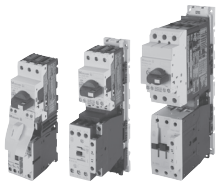
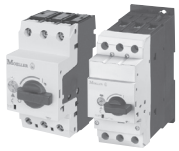
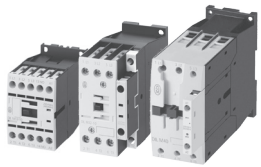
1. Locate the desired combination motor starter.
2. Order each component individually in entire row *(2 pages)*.
3. Complete the catalog number of contactor.
4. See pages D36 – D40 for accessories.

AC operated AC Device

Reference Code *(cont.)*	+	Auxiliary Contacts *(on motor controller)*  *(1 N.O. and 1 N.C.)*		+	Padlockable Handle ❶ 		+	Busbar Mounting Module 		+	Feeder Terminal 	
		Catalog Number	**Price**		**Catalog Number**	**Price**		**Catalog Number**	**Price**		**Catalog Number**	**Price**
NAC-22		NHI-E-11-PKZ0	40		AK-PKZ0	8		BBA0-25	110		BK25/3-PKZ0-E	40
NAC-23		NHI-E-11-PKZ0	40		AK-PKZ0	8		BBA0-25	110		BK25/3-PKZ0-E	40
NAC-24		NHI-E-11-PKZ0	40		AK-PKZ0	8		BBA0-25	110		BK25/3-PKZ0-E	40
NAC-25		NHI-E-11-PKZ0	40		AK-PKZ0	8		BBA0-25	110		BK25/3-PKZ0-E	40
NAC-26		NHI-E-11-PKZ0	40		AK-PKZ0	8		BBA0-25	110		BK25/3-PKZ0-E	40
NAC-27		NHI-E-11-PKZ0	40		AK-PKZ0	8		BBA0-25	110		BK25/3-PKZ0-E	40
NAC-28		NHI-E-11-PKZ0	40		AK-PKZ0	8		BBA0-25	110		BK25/3-PKZ0-E	40
NAC-29		NHI-E-11-PKZ0	40		AK-PKZ0	8		BBA0-25	110		BK25/3-PKZ0-E	40
NAC-30		NHI-E-11-PKZ0	40		AK-PKZ0	8		BBA0-25	110		BK25/3-PKZ0-E	40
NAC-31		NHI-E-11-PKZ0	40		AK-PKZ0	8		BBA0-25	110		BK25/3-PKZ0-E	40
NAC-32		NHI-E-11-PKZ0	40		AK-PKZ0	8		BBA0-25	110		BK25/3-PKZ0-E	40
NAC-33		NHI-E-11-PKZ0	40		AK-PKZ0	8		BBA0-32	130		BK25/3-PKZ0-E	40
NAC-34		NHI-E-11-PKZ0	40		AK-PKZ0	8		BBA0-32	130		BK25/3-PKZ0-E	40
NAC-35		NHI-E-11-PKZ0	40		AK-PKZ0	8		BBA0-32	130		BK25/3-PKZ0-E	40
NAC-36		NHI-E-11-PKZ0	40		AK-PKZ0	8		BBA0-32	130		BK25/3-PKZ0-E	40
		Discount Code: A31			*Discount Code: A31*			*Discount Code: A34*			*Discount Code: A31*	

❶ Other padlocking options include: SVB-PKZ0 and PKZ0-X(R)H (see page C26).

Component List for Type F, DC non-reversing combination motor controller starters

Reference Code	See Motor Starter Ratings on Page	Assembled Combination Starter  Catalog Number	=	Manual Motor Controller  Catalog Number	Price	+	Contactor  Catalog Number	Price
NDC-01	D10	MSC-D-0,16-M7(24VDC)-NA		PKZM0-0,16	200		DILM7-10(24VDC) ❶	220
NDC-02	D10	MSC-D-0,25-M7(24VDC)-NA		PKZM0-0,25	200		DILM7-10(24VDC) ❶	220
NDC-03	D10	MSC-D-0,4-M7(24VDC)-NA		PKZM0-0,4	200		DILM7-10(24VDC) ❶	220
NDC-04	D10	MSC-D-0,63-M7(24VDC)-NA		PKZM0-0,63	220		DILM7-10(24VDC) ❶	220
NDC-05	D10	MSC-D-1-M7(24VDC)-NA		PKZM0-1	240		DILM7-10(24VDC) ❶	220
NDC-06	D10	MSC-D-1,6-M7(24VDC)-NA		PKZM0-1,6	240		DILM7-10(24VDC) ❶	220
NDC-07	D10	MSC-D-2,5-M7(24VDC)-NA		PKZM0-2,5	240		DILM7-10(24VDC) ❶	220
NDC-08	D10	MSC-D-4-M7(24VDC)-NA		PKZM0-4	240		DILM7-10(24VDC) ❶	220
NDC-09	D10	MSC-D-6,3-M7(24VDC)-NA		PKZM0-6,3	240		DILM7-10(24VDC) ❶	220
NDC-10	D10	MSC-D-10-M9(24VDC)-NA		PKZM0-10	290		DILM9-10(24VDC) ❶	240
NDC-11	D10	MSC-D-12-M12(24VDC)-NA		PKZM0-12	290		DILM12-10(24VDC) ❶	316
NDC-12	D10	MSC-D-16-M17(RDC24)-NA		PKZM0-16	290		DILM17-10(RDC24) ❶	370
NDC-13	D10	MSC-D-20-M25(RDC24)-NA		PKZM0-20	300		DILM25-10(RDC24) ❶	450
NDC-14	D10	MSC-D-25-M25(RDC24)-NA		PKZM0-25	340		DILM25-10(RDC24) ❶	450
NDC-15	D10	MSC-D-32-M32(RDC24)-NA		PKZM0-32	480		DILM32-10(RDC24) ❶	620
NDC-16	D11	MSC4-D-16-M40(RDC24)-NA		PKZM4-16	494		DILM40(RDC24)	650
NDC-17	D11	MSC4-D-25-M40(RDC24)-NA		PKZM4-25	508		DILM40(RDC24)	650
NDC-18	D11	MSC4-D-32-M40(RDC24)-NA		PKZM4-32	590		DILM40(RDC24)	650
NDC-19	D11	MSC4-D-40-M40(RDC24)-NA		PKZM4-40	690		DILM40(RDC24)	650
NDC-20	D11	MSC4-D-50-M65(RDC24)-NA		PKZM4-50	784		DILM65(RDC24)	1170
NDC-21	D11	MSC4-D-58-M65(RDC24)-NA		PKZM4-58	932		DILM65(RDC24)	1170
				Discount Code: A31			*Discount Code: A11*	

DC Coil Information

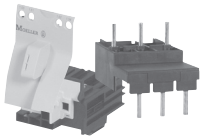
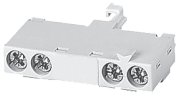
DC operated devices listed on this page are 24V DC. Other DC voltages are special order; contact your Moeller representative.

Ordering Instructions

1. **Locate the desired combination motor starter.**
2. **Order each component individually in entire row** *(2 pages)*.
3. **See pages D36 – D40 for accessories.**

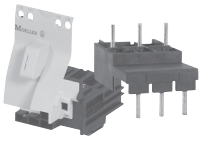
❶ Contactor includes 1 N.O. contact.

DC operated Device

Reference Code (cont.)	+	Connection Module 		+	Auxiliary Contacts (on motor controller)  (1 N.O. and 1 N.C.)		+	Padlockable Handle ❷ 		Recommended Option	Feeder Terminal ❸ 	
		Catalog Number	Price		Catalog Number	Price		Catalog Number	Price		Catalog Number	Price
NDC-01		PKZM0-XDM12	30		NHI-E-11-PKZ0	40		AK-PKZ0	8		BK25/3-PKZ0-E	40
NDC-02		PKZM0-XDM12	30		NHI-E-11-PKZ0	40		AK-PKZ0	8		BK25/3-PKZ0-E	40
NDC-03		PKZM0-XDM12	30		NHI-E-11-PKZ0	40		AK-PKZ0	8		BK25/3-PKZ0-E	40
NDC-04		PKZM0-XDM12	30		NHI-E-11-PKZ0	40		AK-PKZ0	8		BK25/3-PKZ0-E	40
NDC-05		PKZM0-XDM12	30		NHI-E-11-PKZ0	40		AK-PKZ0	8		BK25/3-PKZ0-E	40
NDC-06		PKZM0-XDM12	30		NHI-E-11-PKZ0	40		AK-PKZ0	8		BK25/3-PKZ0-E	40
NDC-07		PKZM0-XDM12	30		NHI-E-11-PKZ0	40		AK-PKZ0	8		BK25/3-PKZ0-E	40
NDC-08		PKZM0-XDM12	30		NHI-E-11-PKZ0	40		AK-PKZ0	8		BK25/3-PKZ0-E	40
NDC-09		PKZM0-XDM12	30		NHI-E-11-PKZ0	40		AK-PKZ0	8		BK25/3-PKZ0-E	40
NDC-10		PKZM0-XDM12	30		NHI-E-11-PKZ0	40		AK-PKZ0	8		BK25/3-PKZ0-E	40
NDC-11		PKZM0-XDM12	30		NHI-E-11-PKZ0	40		AK-PKZ0	8		BK25/3-PKZ0-E	40
NDC-12		PKZM0-XDM32 ❶	42		NHI-E-11-PKZ0	40		AK-PKZ0	8		BK25/3-PKZ0-E	40
NDC-13		PKZM0-XDM32 ❶	42		NHI-E-11-PKZ0	40		AK-PKZ0	8		BK25/3-PKZ0-E	40
NDC-14		PKZM0-XDM32 ❶	42		NHI-E-11-PKZ0	40		AK-PKZ0	8		BK25/3-PKZ0-E	40
NDC-15		PKZM0-XDM32 ❶	42		NHI-E-11-PKZ0	40		AK-PKZ0	8		BK25/3-PKZ0-E	40
NDC-16		PKZM4-XDM65 ❶	150		NHI-E-11-PKZ0	40		AK-PKZ0	8		BK50/3-PKZ4-E	110
NDC-17		PKZM4-XDM65 ❶	150		NHI-E-11-PKZ0	40		AK-PKZ0	8		BK50/3-PKZ4-E	110
NDC-18		PKZM4-XDM65 ❶	150		NHI-E-11-PKZ0	40		AK-PKZ0	8		BK50/3-PKZ4-E	110
NDC-19		PKZM4-XDM65 ❶	150		NHI-E-11-PKZ0	40		AK-PKZ0	8		BK50/3-PKZ4-E	110
NDC-20		PKZM4-XDM65 ❶	150		NHI-E-11-PKZ0	40		AK-PKZ0	8		BK50/3-PKZ4-E	110
NDC-21		PKZM4-XDM65 ❶	150		NHI-E-11-PKZ0	40		AK-PKZ0	8		BK50/3-PKZ4-E	110
		Discount Code: A31			*Discount Code: A31*			*Discount Code: A31*			*Discount Code: A31*	

❶ Connection module includes DIN rail mounting module. (page D37)
❷ Other padlocking options include: SVB-PKZ0 and PKZ0-X(R)H (see page C26).
❸ Requirement for Type F except when used for tap conductor protection or if commoning links are used.

Component List for Type F, DC non-reversing combination motor controller starters

Reference Code	See Motor Starter Ratings on Page	Assembled Combination Starter	=	Manual Motor Controller		+	Contactor ❶		+	Connection Module	
											
		Catalog Number		Catalog Number	Price		Catalog Number	Price		Catalog Number	Price
NDC-22	D13	MSC-D-0,16-M7(24VDC)/BBA-NA		PKZM0-0,16	200		DILM7-10(24VDC)	220		PKZM0-XDM12	30
NDC-23	D13	MSC-D-0,25-M7(24VDC)/BBA-NA		PKZM0-0,25	200		DILM7-10(24VDC)	220		PKZM0-XDM12	30
NDC-24	D13	MSC-D-0,4-M7(24VDC)/BBA-NA		PKZM0-0,4	200		DILM7-10(24VDC)	220		PKZM0-XDM12	30
NDC-25	D13	MSC-D-0,63-M7(24VDC)/BBA-NA		PKZM0-0,63	220		DILM7-10(24VDC)	220		PKZM0-XDM12	30
NDC-26	D13	MSC-D-1-M7(24VDC)/BBA-NA		PKZM0-1	240		DILM7-10(24VDC)	220		PKZM0-XDM12	30
NDC-27	D13	MSC-D-1,6-M7(24VDC)/BBA-NA		PKZM0-1,6	240		DILM7-10(24VDC)	220		PKZM0-XDM12	30
NDC-28	D13	MSC-D-2,5-M7(24VDC)/BBA-NA		PKZM0-2,5	240		DILM7-10(24VDC)	220		PKZM0-XDM12	30
NDC-29	D13	MSC-D-4-M7(24VDC)/BBA-NA		PKZM0-4	240		DILM7-10(24VDC)	220		PKZM0-XDM12	30
NDC-30	D13	MSC-D-6,3-M7(24VDC)/BBA-NA		PKZM0-6,3	240		DILM7-10(24VDC)	220		PKZM0-XDM12	30
NDC-31	D13	MSC-D-10-M9(24VDC)/BBA-NA		PKZM0-10	290		DILM9-10(24VDC)	240		PKZM0-XDM12	30
NDC-32	D13	MSC-D-12-M12(24VDC)/BBA-NA		PKZM0-12	290		DILM12-10(24VDC)	316		PKZM0-XDM12	30
NDC-33	D13	MSC-D-16-M17(RDC24)/BBA-NA		PKZM0-16	290		DILM17-10(RDC24)	370		PKZM0-XM32DE	10
NDC-34	D13	MSC-D-20-M25(RDC24)/BBA-NA		PKZM0-20	300		DILM25-10(RDC24)	450		PKZM0-XM32DE	10
NDC-35	D13	MSC-D-25-M25(RDC24)/BBA-NA		PKZM0-25	340		DILM25-10(RDC24)	450		PKZM0-XM32DE	10
NDC-36	D13	MSC-D-32-M32(RDC24)/BBA-NA		PKZM0-32	480		DILM32-10(RDC24)	620		PKZM0-XM32DE	10
				Discount Code: A31			*Discount Code: A11*			*Discount Code: A31*	

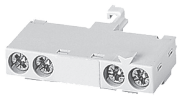
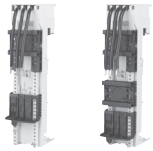
DC Coil Information

DC operated devices listed on this page are 24V DC. Other DC voltages are special order; contact your Moeller representative.

Ordering Instructions

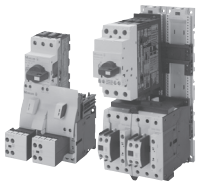
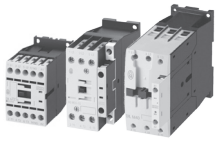
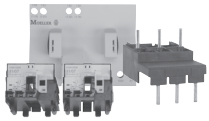
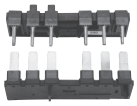
1. **Locate the desired combination motor starter.**
2. **Order each component individually in entire row** *(2 pages)*.
3. **See pages D36 – D40 for accessories.**

❶ Contactor includes 1 N.O. contact.

Reference Code *(cont.)*	+	Auxiliary Contacts *(on motor controller)*  *(1 N.O. and 1 N.C.)*		+	Padlockable Handle ❶ 		+	Busbar Mounting Module 		+	Feeder Terminal 	
		Catalog Number	**Price**		**Catalog Number**	**Price**		**Catalog Number**	**Price**		**Catalog Number**	**Price**
NDC-22		NHI-E-11-PKZ0	40		AK-PKZ0	8		BBA0-25	110		BK25/3-PKZ0-E	40
NDC-23		NHI-E-11-PKZ0	40		AK-PKZ0	8		BBA0-25	110		BK25/3-PKZ0-E	40
NDC-24		NHI-E-11-PKZ0	40		AK-PKZ0	8		BBA0-25	110		BK25/3-PKZ0-E	40
NDC-25		NHI-E-11-PKZ0	40		AK-PKZ0	8		BBA0-25	110		BK25/3-PKZ0-E	40
NDC-26		NHI-E-11-PKZ0	40		AK-PKZ0	8		BBA0-25	110		BK25/3-PKZ0-E	40
NDC-27		NHI-E-11-PKZ0	40		AK-PKZ0	8		BBA0-25	110		BK25/3-PKZ0-E	40
NDC-28		NHI-E-11-PKZ0	40		AK-PKZ0	8		BBA0-25	110		BK25/3-PKZ0-E	40
NDC-29		NHI-E-11-PKZ0	40		AK-PKZ0	8		BBA0-25	110		BK25/3-PKZ0-E	40
NDC-30		NHI-E-11-PKZ0	40		AK-PKZ0	8		BBA0-25	110		BK25/3-PKZ0-E	40
NDC-31		NHI-E-11-PKZ0	40		AK-PKZ0	8		BBA0-25	110		BK25/3-PKZ0-E	40
NDC-32		NHI-E-11-PKZ0	40		AK-PKZ0	8		BBA0-25	110		BK25/3-PKZ0-E	40
NDC-33		NHI-E-11-PKZ0	40		AK-PKZ0	8		BBA0-32	130		BK25/3-PKZ0-E	40
NDC-34		NHI-E-11-PKZ0	40		AK-PKZ0	8		BBA0-32	130		BK25/3-PKZ0-E	40
NDC-35		NHI-E-11-PKZ0	40		AK-PKZ0	8		BBA0-32	130		BK25/3-PKZ0-E	40
NDC-36		NHI-E-11-PKZ0	40		AK-PKZ0	8		BBA0-32	130		BK25/3-PKZ0-E	40
		Discount Code: A31			*Discount Code: A31*			*Discount Code: A34*			*Discount Code: A31*	

❶ Other padlocking options include: SVB-PKZ0 and PKZ0-X(R)H (see page C26).

Component List for Type F, AC reversing combination motor controller starters

Ref. Code	See Motor Starter Ratings on Page	Assembled Combination Starter	=	Manual Motor Controller		+	Contactors (x2)			+	Connection Module		+	Power Wiring Set	
															
		Catalog Number		Catalog No.	Price		Catalog Number	Price	x2		Catalog No.	Price		Catalog No.	Price
RAC-01	D14	MSC-R-0,16-M7◆-NA		PKZM0-0,16	200		DILM7-01◆ ❶	176	x2		PKZM0-XRM12	100		–	–
RAC-02	D14	MSC-R-0,25-M7◆-NA		PKZM0-0,25	200		DILM7-01◆ ❶	176	x2		PKZM0-XRM12	100		–	–
RAC-03	D14	MSC-R-0,4-M7◆-NA		PKZM0-0,4	200		DILM7-01◆ ❶	176	x2		PKZM0-XRM12	100		–	–
RAC-04	D14	MSC-R-0,63-M7◆-NA		PKZM0-0,63	220		DILM7-01◆ ❶	176	x2		PKZM0-XRM12	100		–	–
RAC-05	D14	MSC-R-1-M7◆-NA		PKZM0-1	240		DILM7-01◆ ❶	176	x2		PKZM0-XRM12	100		–	–
RAC-06	D14	MSC-R-1,6-M7◆-NA		PKZM0-1,6	240		DILM7-01◆ ❶	176	x2		PKZM0-XRM12	100		–	–
RAC-07	D14	MSC-R-2,5-M7◆-NA		PKZM0-2,5	240		DILM7-01◆ ❶	176	x2		PKZM0-XRM12	100		–	–
RAC-08	D14	MSC-R-4-M7◆-NA		PKZM0-4	240		DILM7-01◆ ❶	176	x2		PKZM0-XRM12	100		–	–
RAC-09	D14	MSC-R-6,3-M7◆-NA		PKZM0-6,3	240		DILM7-01◆ ❶	176	x2		PKZM0-XRM12	100		–	–
RAC-10	D14	MSC-R-10-M9◆-NA		PKZM0-10	290		DILM9-01◆ ❶	200	x2		PKZM0-XRM12	100		–	–
RAC-11	D14	MSC-R-12-M12◆-NA		PKZM0-12	290		DILM12-01◆ ❶	248	x2		PKZM0-XRM12	100		–	–
RAC-12	D14	MSC-R-16-M17◆-NA		PKZM0-16	290		DILM17-01◆ ❶	260	x2		PKZM0-XRM32 ❷	124		–	–
RAC-13	D14	MSC-R-20-M25◆-NA		PKZM0-20	300		DILM25-01◆ ❶	350	x2		PKZM0-XRM32 ❷	124		–	–
RAC-14	D14	MSC-R-25-M25◆-NA		PKZM0-25	340		DILM25-01◆ ❶	350	x2		PKZM0-XRM32 ❷	124		–	–
RAC-15	D14	MSC-R-32-M32◆-NA		PKZM0-32	480		DILM32-01◆ ❶	440	x2		PKZM0-XRM32 ❷	124		–	–
RAC-16	D15	MSC4-R-16-M40◆-NA		PKZM4-16	494		DILM40◆	500	x2		PKZM4-XM65DE	60		DILM65-XRL	190
RAC-17	D15	MSC4-R-25-M40◆-NA		PKZM4-25	508		DILM40◆	500	x2		PKZM4-XM65DE	60		DILM65-XRL	190
RAC-18	D15	MSC4-R-32-M40◆-NA		PKZM4-32	590		DILM40◆	500	x2		PKZM4-XM65DE	60		DILM65-XRL	190
RAC-19	D15	MSC4-R-40-M40◆-NA		PKZM4-40	690		DILM40◆	500	x2		PKZM4-XM65DE	60		DILM65-XRL	190
RAC-20	D15	MSC4-R-50-M65◆-NA		PKZM4-50	784		DILM65◆	780	x2		PKZM4-XM65DE	60		DILM65-XRL	190
RAC-21	D15	MSC4-R-58-M65◆-NA		PKZM4-58	932		DILM65◆	780	x2		PKZM4-XM65DE	60		DILM65-XRL	190
				Discount Code: A31			*Discount Code: A11*				*Discount Code: A31*			*Discount Code: A11*	

❶ Contactors include 1 N.C. contact.
❷ Connection module includes DIN rail mounting module.  (page D37)
❸ Other coil voltages are special order; contact your Moeller representative.

AC Coil Codes - DILM . . . ❸

Complete catalog number (◆) with . . .	Voltage Range	
	50 Hz	60 Hz
(24V60HZ)	–	24V
(110V50HZ,120V60HZ)	110V	120V
(190V50HZ,220V60HZ)	190V	220V
(208V60HZ)	–	208V
(230V50HZ,240V60HZ)	230V	240V
(415V50HZ,480V60HZ)	415V	480V
(600V60HZ)	–	600V

Ordering Instructions

1. **Locate the desired combination motor starter.**
2. **Order each component individually in entire row** *(2 pages)*.
3. **Complete the catalog number of contactors.**
4. **See pages D36 – D40 for accessories.**

AC operated AC Device

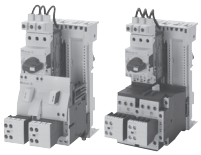
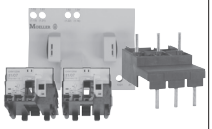
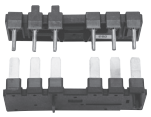
Ref. Code (cont.)	+ Mechanical Interlock		+ Auxiliary Contacts (on motor controller) (1 N.O. and 1 N.C.)		+ Auxiliary Contacts (x2) (on contactors) (1 N.O. and 1 N.C.)			+ Padlockable Handle ❶		+ DIN Rail Mounting Module		Recommended Option Feeder Terminal ❷	
	Catalog No.	Price	Catalog No.	Price	Catalog No.	Price	x2	Cat. No.	Price	Catalog No.	Price	Catalog No.	Price
RAC-01	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	–	–	BK25/3-PKZ0-E	40
RAC-02	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	–	–	BK25/3-PKZ0-E	40
RAC-03	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	–	–	BK25/3-PKZ0-E	40
RAC-04	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	–	–	BK25/3-PKZ0-E	40
RAC-05	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	–	–	BK25/3-PKZ0-E	40
RAC-06	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	–	–	BK25/3-PKZ0-E	40
RAC-07	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	–	–	BK25/3-PKZ0-E	40
RAC-08	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	–	–	BK25/3-PKZ0-E	40
RAC-09	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	–	–	BK25/3-PKZ0-E	40
RAC-10	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	–	–	BK25/3-PKZ0-E	40
RAC-11	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	–	–	BK25/3-PKZ0-E	40
RAC-12	DILM32-XMV	36	NHI-E-11-PKZ0	40	DILA-XHI11	52	x2	AK-PKZ0	8	❸	–	BK25/3-PKZ0-E	40
RAC-13	DILM32-XMV	36	NHI-E-11-PKZ0	40	DILA-XHI11	52	x2	AK-PKZ0	8	❸	–	BK25/3-PKZ0-E	40
RAC-14	DILM32-XMV	36	NHI-E-11-PKZ0	40	DILA-XHI11	52	x2	AK-PKZ0	8	❸	–	BK25/3-PKZ0-E	40
RAC-15	DILM32-XMV	36	NHI-E-11-PKZ0	40	DILA-XHI11	52	x2	AK-PKZ0	8	❸	–	BK25/3-PKZ0-E	40
RAC-16	DILM65-XMV	48	NHI-E-11-PKZ0	40	DILM150-XHI11	52	x2	AK-PKZ0	8	PKZM4-XC55/2	80	BK50/3-PKZ4-E	110
RAC-17	DILM65-XMV	48	NHI-E-11-PKZ0	40	DILM150-XHI11	52	x2	AK-PKZ0	8	PKZM4-XC55/2	80	BK50/3-PKZ4-E	110
RAC-18	DILM65-XMV	48	NHI-E-11-PKZ0	40	DILM150-XHI11	52	x2	AK-PKZ0	8	PKZM4-XC55/2	80	BK50/3-PKZ4-E	110
RAC-19	DILM65-XMV	48	NHI-E-11-PKZ0	40	DILM150-XHI11	52	x2	AK-PKZ0	8	PKZM4-XC55/2	80	BK50/3-PKZ4-E	110
RAC-20	DILM65-XMV	48	NHI-E-11-PKZ0	40	DILM150-XHI11	52	x2	AK-PKZ0	8	PKZM4-XC55/2	80	BK50/3-PKZ4-E	110
RAC-21	DILM65-XMV	48	NHI-E-11-PKZ0	40	DILM150-XHI11	52	x2	AK-PKZ0	8	PKZM4-XC55/2	80	BK50/3-PKZ4-E	110
	Discount Code: A11		*Discount Code: A31*		*Discount Code: A11*			*Discount Code: A31*		*Discount Code: A31*		*Discount Code: A31*	

❶ Other padlocking options include: SVB-PKZ0 and PKZ0-X(R)H (see page C26).

❷ Requirement for Type F except when used for tap conductor protection or if commoning links are used.

❸ Connection module includes DIN rail mounting module.  (page D37)

Component List for Type F, AC reversing combination motor controller starters

Ref. Code	See Motor Starter Ratings on Page	Assembled Combination Starter  Catalog Number	=	Manual Motor Controller  Catalog No.	Price	+	Contactors (x2) ❶  Catalog No.	Price	x2	+	Connection Module  Catalog No.	Price	+	Power Wiring Set  Catalog No.	Price
RAC-22	D18	MSC-R-0,16-M7◆/BBA-NA		PKZM0-0,16	200		DILM7-01◆	176	x2		PKZM0-XRM12	100		–	–
RAC-23	D18	MSC-R-0,25-M7◆/BBA-NA		PKZM0-0,25	200		DILM7-01◆	176	x2		PKZM0-XRM12	100		–	–
RAC-24	D18	MSC-R-0,4-M7◆/BBA-NA		PKZM0-0,4	200		DILM7-01◆	176	x2		PKZM0-XRM12	100		–	–
RAC-25	D18	MSC-R-0,63-M7◆/BBA-NA		PKZM0-0,63	220		DILM7-01◆	176	x2		PKZM0-XRM12	100		–	–
RAC-26	D18	MSC-R-1-M7◆/BBA-NA		PKZM0-1	240		DILM7-01◆	176	x2		PKZM0-XRM12	100		–	–
RAC-27	D18	MSC-R-1,6-M7◆/BBA-NA		PKZM0-1,6	240		DILM7-01◆	176	x2		PKZM0-XRM12	100		–	–
RAC-28	D18	MSC-R-2,5-M7◆/BBA-NA		PKZM0-2,5	240		DILM7-01◆	176	x2		PKZM0-XRM12	100		–	–
RAC-29	D18	MSC-R-4-M7◆/BBA-NA		PKZM0-4	240		DILM7-01◆	176	x2		PKZM0-XRM12	100		–	–
RAC-30	D18	MSC-R-6,3-M7◆/BBA-NA		PKZM0-6,3	240		DILM7-01◆	176	x2		PKZM0-XRM12	100		–	–
RAC-31	D18	MSC-R-10-M9◆/BBA-NA		PKZM0-10	290		DILM9-01◆	200	x2		PKZM0-XRM12	100		–	–
RAC-32	D18	MSC-R-12-M12◆/BBA-NA		PKZM0-12	290		DILM12-01◆	248	x2		PKZM0-XRM12	100		–	–
RAC-33	D18	MSC-R-16-M17◆/BBA-NA		PKZM0-16	290		DILM17-01◆	260	x2		PKZM0-XM32DE	10		DILM32-XRL	100
RAC-34	D18	MSC-R-20-M25◆/BBA-NA		PKZM0-20	300		DILM25-01◆	350	x2		PKZM0-XM32DE	10		DILM32-XRL	100
RAC-35	D18	MSC-R-25-M25◆/BBA-NA		PKZM0-25	340		DILM25-01◆	350	x2		PKZM0-XM32DE	10		DILM32-XRL	100
RAC-36	D18	MSC-R-32-M32◆/BBA-NA		PKZM0-32	480		DILM32-01◆	440	x2		PKZM0-XM32DE	10		DILM32-XRL	100
				Discount Code: A31			*Discount Code: A11*				*Discount Code: A31*			*Discount Code: A11*	

D

Combination Motor Starters

AC Coil Codes - DILM . . . ❷

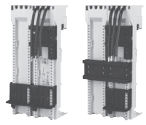
Complete catalog number (◆) with . . .	Voltage Range 50 Hz	60 Hz
(24V60HZ)	–	24V
(110V50HZ,120V60HZ)	110V	120V
(190V50HZ,220V60HZ)	190V	220V
(208V60HZ)	–	208V
(230V50HZ,240V60HZ)	230V	240V
(415V50HZ,480V60HZ)	415V	480V
(600V60HZ)	–	600V

❶ Contactors include 1 N.C. contact.
❷ Other coil voltages are special order; contact your Moeller representative.

Ordering Instructions

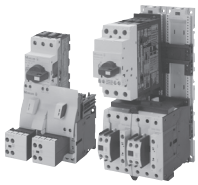
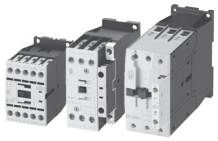
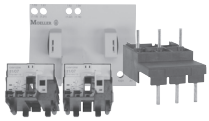
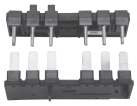
1. Locate the desired combination motor starter.
2. Order each component individually in entire row *(2 pages)*.
3. Complete the catalog number of contactors.
4. See pages D36 – D40 for accessories.

AC operated AC Device

Ref. Code (cont.)	+	Mechanical Interlock 		+	Auxiliary Contacts (on motor controller)  (1 N.O. and 1 N.C.)		+	Auxiliary Contacts (x2) (on contactors)  (1 N.O. and 1 N.C.)			+	Padlockable Handle ❶ 		+	Busbar Mounting Module 		+	Feeder Terminal 	
		Catalog No.	Price		Catalog No.	Price		Catalog No.	Price	x2		Cat. No.	Price		Cat. No.	Price		Catalog No.	Price
RAC-22		DILM12-XMV	36		NHI-E-11-PKZ0	40		DILA-XHIT11	54	x2		AK-PKZ0	8		BBA0R-25	220		BK25/3-PKZ0-E	40
RAC-23		DILM12-XMV	36		NHI-E-11-PKZ0	40		DILA-XHIT11	54	x2		AK-PKZ0	8		BBA0R-25	220		BK25/3-PKZ0-E	40
RAC-24		DILM12-XMV	36		NHI-E-11-PKZ0	40		DILA-XHIT11	54	x2		AK-PKZ0	8		BBA0R-25	220		BK25/3-PKZ0-E	40
RAC-25		DILM12-XMV	36		NHI-E-11-PKZ0	40		DILA-XHIT11	54	x2		AK-PKZ0	8		BBA0R-25	220		BK25/3-PKZ0-E	40
RAC-26		DILM12-XMV	36		NHI-E-11-PKZ0	40		DILA-XHIT11	54	x2		AK-PKZ0	8		BBA0R-25	220		BK25/3-PKZ0-E	40
RAC-27		DILM12-XMV	36		NHI-E-11-PKZ0	40		DILA-XHIT11	54	x2		AK-PKZ0	8		BBA0R-25	220		BK25/3-PKZ0-E	40
RAC-28		DILM12-XMV	36		NHI-E-11-PKZ0	40		DILA-XHIT11	54	x2		AK-PKZ0	8		BBA0R-25	220		BK25/3-PKZ0-E	40
RAC-29		DILM12-XMV	36		NHI-E-11-PKZ0	40		DILA-XHIT11	54	x2		AK-PKZ0	8		BBA0R-25	220		BK25/3-PKZ0-E	40
RAC-30		DILM12-XMV	36		NHI-E-11-PKZ0	40		DILA-XHIT11	54	x2		AK-PKZ0	8		BBA0R-25	220		BK25/3-PKZ0-E	40
RAC-31		DILM12-XMV	36		NHI-E-11-PKZ0	40		DILA-XHIT11	54	x2		AK-PKZ0	8		BBA0R-25	220		BK25/3-PKZ0-E	40
RAC-32		DILM12-XMV	36		NHI-E-11-PKZ0	40		DILA-XHIT11	54	x2		AK-PKZ0	8		BBA0R-25	220		BK25/3-PKZ0-E	40
RAC-33		DILM32-XMV	36		NHI-E-11-PKZ0	40		DILA-XHI11	52	x2		AK-PKZ0	8		BBA0R-32	220		BK25/3-PKZ0-E	40
RAC-34		DILM32-XMV	36		NHI-E-11-PKZ0	40		DILA-XHI11	52	x2		AK-PKZ0	8		BBA0R-32	220		BK25/3-PKZ0-E	40
RAC-35		DILM32-XMV	36		NHI-E-11-PKZ0	40		DILA-XHI11	52	x2		AK-PKZ0	8		BBA0R-32	220		BK25/3-PKZ0-E	40
RAC-36		DILM32-XMV	36		NHI-E-11-PKZ0	40		DILA-XHI11	52	x2		AK-PKZ0	8		BBA0R-32	220		BK25/3-PKZ0-E	40
		Discount Code: A11			*Discount Code: A31*			*Discount Code: A11*				*Discount Code: A31*			*Discount Code: A34*			*Discount Code: A31*	

❶ Other padlocking options include: SVB-PKZ0 and PKZ0-X(R)H (see page C26).

Component List for Type F, DC reversing combination motor controller starters

Ref. Code	See Motor Starter Ratings on Page	Assembled Combination Starter	=	Manual Motor Controller		+	Contactors (x2)			+	Connection Module		+	Power Wiring Set	
															
		Catalog Number		Catalog No.	Price		Catalog Number	Price	x2		Catalog No.	Price		Catalog No.	Price
RDC-01	D16	MSC-R-0,16-M7(24VDC)-NA		PKZM0-0,16	200		DILM7-01(24VDC) ❶	220	x2		PKZM0-XRM12	100		–	–
RDC-02	D16	MSC-R-0,25-M7(24VDC)-NA		PKZM0-0,25	200		DILM7-01(24VDC) ❶	220	x2		PKZM0-XRM12	100		–	–
RDC-03	D16	MSC-R-0,4-M7(24VDC)-NA		PKZM0-0,4	200		DILM7-01(24VDC) ❶	220	x2		PKZM0-XRM12	100		–	–
RDC-04	D16	MSC-R-0,63-M7(24VDC)-NA		PKZM0-0,63	220		DILM7-01(24VDC) ❶	220	x2		PKZM0-XRM12	100		–	–
RDC-05	D16	MSC-R-1-M7(24VDC)-NA		PKZM0-1	240		DILM7-01(24VDC) ❶	220	x2		PKZM0-XRM12	100		–	–
RDC-06	D16	MSC-R-1,6-M7(24VDC)-NA		PKZM0-1,6	240		DILM7-01(24VDC) ❶	220	x2		PKZM0-XRM12	100		–	–
RDC-07	D16	MSC-R-2,5-M7(24VDC)-NA		PKZM0-2,5	240		DILM7-01(24VDC) ❶	220	x2		PKZM0-XRM12	100		–	–
RDC-08	D16	MSC-R-4-M7(24VDC)-NA		PKZM0-4	240		DILM7-01(24VDC) ❶	220	x2		PKZM0-XRM12	100		–	–
RDC-09	D16	MSC-R-6,3-M7(24VDC)-NA		PKZM0-6,3	240		DILM7-01(24VDC) ❶	220	x2		PKZM0-XRM12	100		–	–
RDC-10	D16	MSC-R-10-M9(24VDC)-NA		PKZM0-10	290		DILM9-01(24VDC) ❶	240	x2		PKZM0-XRM12	100		–	–
RDC-11	D16	MSC-R-12-M12(24VDC)-NA		PKZM0-12	290		DILM12-01(24VDC) ❶	316	x2		PKZM0-XRM12	100		–	–
RDC-12	D16	MSC-R-16-M17(RDC24)-NA		PKZM0-16	290		DILM17-01(RDC24) ❶	370	x2		PKZM0-XRM32 ❷	124		–	–
RDC-13	D16	MSC-R-20-M25(RDC24)-NA		PKZM0-20	300		DILM25-01(RDC24) ❶	450	x2		PKZM0-XRM32 ❷	124		–	–
RDC-14	D16	MSC-R-25-M25(RDC24)-NA		PKZM0-25	340		DILM25-01(RDC24) ❶	450	x2		PKZM0-XRM32 ❷	124		–	–
RDC-15	D16	MSC-R-32-M32(RDC24)-NA		PKZM0-32	480		DILM32-01(RDC24) ❶	620	x2		PKZM0-XRM32 ❷	124		–	–
RDC-16	D17	MSC4-R-16-M40(RDC24)-NA		PKZM4-16	494		DILM40(RDC24)	650	x2		PKZM4-XM65DE	60		DILM65-XRL	190
RDC-17	D17	MSC4-R-25-M40(RDC24)-NA		PKZM4-25	508		DILM40(RDC24)	650	x2		PKZM4-XM65DE	60		DILM65-XRL	190
RDC-18	D17	MSC4-R-32-M40(RDC24)-NA		PKZM4-32	590		DILM40(RDC24)	650	x2		PKZM4-XM65DE	60		DILM65-XRL	190
RDC-19	D17	MSC4-R-40-M40(RDC24)-NA		PKZM4-40	690		DILM40(RDC24)	650	x2		PKZM4-XM65DE	60		DILM65-XRL	190
RDC-20	D17	MSC4-R-50-M65(RDC24)-NA		PKZM4-50	784		DILM65(RDC24)	1170	x2		PKZM4-XM65DE	60		DILM65-XRL	190
RDC-21	D17	MSC4-R-58-M65(RDC24)-NA		PKZM4-58	932		DILM65(RDC24)	1170	x2		PKZM4-XM65DE	60		DILM65-XRL	190
				Discount Code: A31			*Discount Code: A11*				*Discount Code: A31*			*Discount Code: A11*	

D

Combination Motor Starters

DC Coil Information

DC operated devices listed on this page are 24V DC. Other DC voltages are special order; contact your Moeller representative.

Ordering Instructions

1. Locate the desired combination motor starter.
2. Order each component individually in entire row *(2 pages)*.
3. See pages D36 – D40 for accessories.

❶ Contactors include 1 N.C. contact.
❷ Connection module includes DIN rail mounting module.  (page D37)

DC operated Device

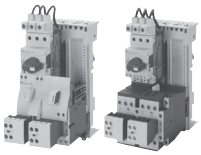
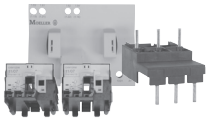
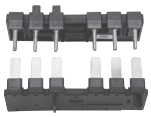
Ref. Code (cont.)	+ Mechanical Interlock		+ Auxiliary Contacts (on motor controller) (1 N.O. and 1 N.C.)		+ Auxiliary Contacts (x2) (on contactors) (1 N.O. and 1 N.C.)			+ Padlockable Handle ❶		+ DIN Rail Mounting Module		Recommended Option Feeder Terminal ❷	
	Catalog No.	Price	Catalog No.	Price	Catalog No.	Price	x2	Cat. No.	Price	Catalog No.	Price	Catalog No.	Price
RDC-01	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	–		BK25/3-PKZ0-E	40
RDC-02	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	–		BK25/3-PKZ0-E	40
RDC-03	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	–		BK25/3-PKZ0-E	40
RDC-04	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	–		BK25/3-PKZ0-E	40
RDC-05	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	–		BK25/3-PKZ0-E	40
RDC-06	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	–		BK25/3-PKZ0-E	40
RDC-07	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	–		BK25/3-PKZ0-E	40
RDC-08	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	–		BK25/3-PKZ0-E	40
RDC-09	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	–		BK25/3-PKZ0-E	40
RDC-10	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	–		BK25/3-PKZ0-E	40
RDC-11	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	–		BK25/3-PKZ0-E	40
RDC-12	DILM32-XMV	36	NHI-E-11-PKZ0	40	DILA-XHI11	52	x2	AK-PKZ0	8	❸		BK25/3-PKZ0-E	40
RDC-13	DILM32-XMV	36	NHI-E-11-PKZ0	40	DILA-XHI11	52	x2	AK-PKZ0	8	❸		BK25/3-PKZ0-E	40
RDC-14	DILM32-XMV	36	NHI-E-11-PKZ0	40	DILA-XHI11	52	x2	AK-PKZ0	8	❸		BK25/3-PKZ0-E	40
RDC-15	DILM32-XMV	36	NHI-E-11-PKZ0	40	DILA-XHI11	52	x2	AK-PKZ0	8	❸		BK25/3-PKZ0-E	40
RDC-16	DILM65-XMV	48	NHI-E-11-PKZ0	40	DILM150-XHI11	52	x2	AK-PKZ0	8	PKZM4-XC55/2	80	BK50/3-PKZ4-E	110
RDC-17	DILM65-XMV	48	NHI-E-11-PKZ0	40	DILM150-XHI11	52	x2	AK-PKZ0	8	PKZM4-XC55/2	80	BK50/3-PKZ4-E	110
RDC-18	DILM65-XMV	48	NHI-E-11-PKZ0	40	DILM150-XHI11	52	x2	AK-PKZ0	8	PKZM4-XC55/2	80	BK50/3-PKZ4-E	110
RDC-19	DILM65-XMV	48	NHI-E-11-PKZ0	40	DILM150-XHI11	52	x2	AK-PKZ0	8	PKZM4-XC55/2	80	BK50/3-PKZ4-E	110
RDC-20	DILM65-XMV	48	NHI-E-11-PKZ0	40	DILM150-XHI11	52	x2	AK-PKZ0	8	PKZM4-XC55/2	80	BK50/3-PKZ4-E	110
RDC-21	DILM65-XMV	48	NHI-E-11-PKZ0	40	DILM150-XHI11	52	x2	AK-PKZ0	8	PKZM4-XC55/2	80	BK50/3-PKZ4-E	110
	Discount Code: A11		*Discount Code: A31*		*Discount Code: A11*			*Discount Code: A31*		*Discount Code: A31*		*Discount Code: A31*	

❶ Other padlocking options include: SVB-PKZ0 and PKZ0-X(R)H (see page C26).

❷ Requirement for Type F except when used for tap conductor protection or if commoning links are used.

❸ Connection module includes DIN rail mounting module.  (page D37)

Component List for Type F, DC reversing combination motor controller starters

Ref. Code	See Motor Starter Ratings on Page	Assembled Combination Starter  Catalog Number	=	Manual Motor Controller  Catalog No.	Price	+	Contactors (x2) ❶  Catalog No.	Price	x2	+	Connection Module  Catalog No.	Price	+	Power Wiring Set  Catalog No.	Price
RDC-22	D19	MSC-R-0,16-M7(24VDC)/BBA-NA		PKZM0-0,16	200		DILM7-01(24VDC)	220	x2		PKZM0-XRM12	100		–	
RDC-23	D19	MSC-R-0,25-M7(24VDC)/BBA-NA		PKZM0-0,25	200		DILM7-01(24VDC)	220	x2		PKZM0-XRM12	100		–	
RDC-24	D19	MSC-R-0,4-M7(24VDC)/BBA-NA		PKZM0-0,4	200		DILM7-01(24VDC)	220	x2		PKZM0-XRM12	100		–	
RDC-25	D19	MSC-R-0,63-M7(24VDC)/BBA-NA		PKZM0-0,63	220		DILM7-01(24VDC)	220	x2		PKZM0-XRM12	100		–	
RDC-26	D19	MSC-R-1-M7(24VDC)/BBA-NA		PKZM0-1	240		DILM7-01(24VDC)	220	x2		PKZM0-XRM12	100		–	
RDC-27	D19	MSC-R-1,6-M7(24VDC)/BBA-NA		PKZM0-1,6	240		DILM7-01(24VDC)	220	x2		PKZM0-XRM12	100		–	
RDC-28	D19	MSC-R-2,5-M7(24VDC)/BBA-NA		PKZM0-2,5	240		DILM7-01(24VDC)	220	x2		PKZM0-XRM12	100		–	
RDC-29	D19	MSC-R-4-M7(24VDC)/BBA-NA		PKZM0-4	240		DILM7-01(24VDC)	220	x2		PKZM0-XRM12	100		–	
RDC-30	D19	MSC-R-6,3-M7(24VDC)/BBA-NA		PKZM0-6,3	240		DILM7-01(24VDC)	220	x2		PKZM0-XRM12	100		–	
RDC-31	D19	MSC-R-10-M9(24VDC)/BBA-NA		PKZM0-10	290		DILM9-01(24VDC)	240	x2		PKZM0-XRM12	100		–	
RDC-32	D19	MSC-R-12-M12(24VDC)/BBA-NA		PKZM0-12	290		DILM12-01(24VDC)	316	x2		PKZM0-XRM12	100		–	
RDC-33	D19	MSC-R-16-M17(RDC24)/BBA-NA		PKZM0-16	290		DILM17-01(RDC24)	370	x2		PKZM0-XM32DE	10		DILM32-XRL	100
RDC-34	D19	MSC-R-20-M25(RDC24)/BBA-NA		PKZM0-20	300		DILM25-01(RDC24)	450	x2		PKZM0-XM32DE	10		DILM32-XRL	100
RDC-35	D19	MSC-R-25-M25(RDC24)/BBA-NA		PKZM0-25	340		DILM25-01(RDC24)	450	x2		PKZM0-XM32DE	10		DILM32-XRL	100
RDC-36	D19	MSC-R-32-M32(RDC24)/BBA-NA		PKZM0-32	480		DILM32-01(RDC24)	620	x2		PKZM0-XM32DE	10		DILM32-XRL	100
				Discount Code: A31			*Discount Code: A11*				*Discount Code: A31*			*Discount Code: A11*	

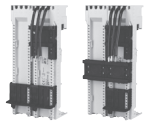
DC Coil Information

DC operated devices listed on this page are 24V DC. Other DC voltages are special order; contact your Moeller representative.

Ordering Instructions

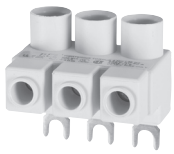
1. Locate the desired combination motor starter.
2. Order each component individually in entire row *(2 pages)*.
3. See pages D36 – D40 for accessories.

❶ Contactors include 1 N.C. contact.

Ref. Code (cont.)	+ Mechanical Interlock 		+ Auxiliary Contacts (on motor controller)  (1 N.O. and 1 N.C.)		+ Auxiliary Contacts (x2) (on contactors)  (1 N.O. and 1 N.C.)			+ Padlockable Handle ❶ 		+ Busbar Mounting Module 		+ Feeder Terminal 	
	Catalog No.	Price	Catalog No.	Price	Catalog No.	Price	x2	Cat. No.	Price	Cat. No.	Price	Catalog No.	Price
RDC-22	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	BBA0R-25	220	BK25/3-PKZ0-E	40
RDC-23	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	BBA0R-25	220	BK25/3-PKZ0-E	40
RDC-24	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	BBA0R-25	220	BK25/3-PKZ0-E	40
RDC-25	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	BBA0R-25	220	BK25/3-PKZ0-E	40
RDC-26	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	BBA0R-25	220	BK25/3-PKZ0-E	40
RDC-27	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	BBA0R-25	220	BK25/3-PKZ0-E	40
RDC-28	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	BBA0R-25	220	BK25/3-PKZ0-E	40
RDC-29	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	BBA0R-25	220	BK25/3-PKZ0-E	40
RDC-30	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	BBA0R-25	220	BK25/3-PKZ0-E	40
RDC-31	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	BBA0R-25	220	BK25/3-PKZ0-E	40
RDC-32	DILM12-XMV	36	NHI-E-11-PKZ0	40	DILA-XHIT11	54	x2	AK-PKZ0	8	BBA0R-25	220	BK25/3-PKZ0-E	40
RDC-33	DILM32-XMV	36	NHI-E-11-PKZ0	40	DILA-XHI11	52	x2	AK-PKZ0	8	BBA0R-32	220	BK25/3-PKZ0-E	40
RDC-34	DILM32-XMV	36	NHI-E-11-PKZ0	40	DILA-XHI11	52	x2	AK-PKZ0	8	BBA0R-32	220	BK25/3-PKZ0-E	40
RDC-35	DILM32-XMV	36	NHI-E-11-PKZ0	40	DILA-XHI11	52	x2	AK-PKZ0	8	BBA0R-32	220	BK25/3-PKZ0-E	40
RDC-36	DILM32-XMV	36	NHI-E-11-PKZ0	40	DILA-XHI11	52	x2	AK-PKZ0	8	BBA0R-32	220	BK25/3-PKZ0-E	40
	Discount Code: A11		*Discount Code: A31*		*Discount Code: A11*			*Discount Code: A31*		*Discount Code: A34*		*Discount Code: A31*	

❶ Other padlocking options include: SVB-PKZ0 and PKZ0-X(R)H (see page C26).

Feeder Terminal - Required for Type F in USA and Canada ❶

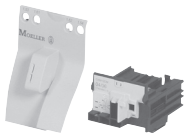
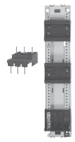
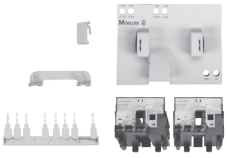
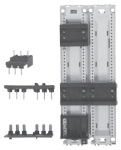
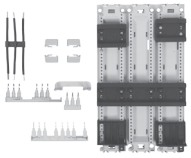
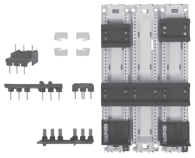
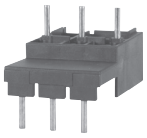
Line Side Connector Feeder Terminal	Description	For use with...	Catalog Number	Price
Feeder Terminal				
	Finger and back-of-hand proof $U_e = 690$ V, $I_u = 60$ A Conductor cross-sections: 2.5...25 mm² flexible; 2.5...25 mm² flexible with ferrule AWG 14...6 This device is not suitable for a commoning link incoming supply termnial (see pages D39 – D40).	PKZM0 PKZM0-T	**BK25/3-PKZ0-E**	40
		PKZM4	**BK50/3-PKZ4-E**	110

Padlockable Handle - Required for Type F in Canada ❷

Accessory	Description	For use with...	Catalog Number	Price
Lockable Rotary Handle				
	For connection of the manual motor controller PKZM0 and PKZM4 as a main switch to EN 60204 Can be padlocked in the 0 position with a padlock Hasp thickness: 3 – 6.35 mm Cannot be used with early-make front-mount auxiliary contact (VHI20-PKZ0)	PKZM0 PKZM0-T PKZM4	**AK-PKZ0**	8

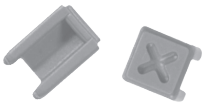
❶ This terminal is not a requirement for Type F tap conductor protection.
❷ Other padlocking options include: SVB-PKZ0 and PKZ0-X(R)H (see page C26).

Connection Modules

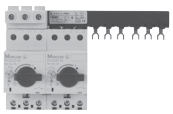
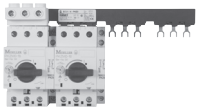
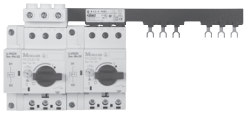
Connection Sets	Description	For use with...	Catalog Number	Price
Non-Reversing Starters				
	Comprised of: • Mechanical connection element for PKZM0 and contactor • Main current wiring between PKZM0 and contactor in tool-less plug connection • Cable routing	MSC-D-0,16-M7 to MSC-D-12-M12	**PKZM0-XDM12** ❶	30
	Comprised of: • DIN rail mounting module • Main current wiring between PKZ and contactor	MSC-D-10-M17 to MSC-D-32-M32	**PKZM0-XDM32**	42
		MSC4-D-40-M40 to MSC4-D-63-M65	**PKZM4-XDM65**	150
Reversing Starters				
	Comprised of: • Mechanical connection element for PKZM0 and contactor • Reversing starter main current wiring in tool-less plug connection • Control cables for electrical interlocking in tool-less plug connection: K1M: A1; K2M: 21; K1M: 21; K2M: A1; K1M: A2; K2M: A2 • Cable routing Cannot be combined with Trip-indicating auxiliary contacts AGM...-PKZ0 *(page C17)*	MSC-R-0,16-M7 to MSC-R-12-M12	**PKZM0-XRM12** ❶	100
	Comprised of: • DIN rail mounting module • Reversing starter main current wiring • Order mechanical interlock separately	MSC-R-10-M17 to MSC-R-32-M32	**PKZM0-XRM32**	124
Star-delta Starter				
	Comprised of: • DIN rail mounting module • Main current wiring between PKZM0 and contactor • Electrical interlock between delta and star connector	PKZM0 + DILM7 PKZM0 + DILM9 PKZM0 + DILM12	**PKZM0-XSM12** ❶	210
	Comprised of: • DIN rail mounting module • Main current wiring between PKZM0 and contactor	PKZM0 + DILM17 PKZM0 + DILM25 PKZM0 + DILM32	**PKZM0-XSM32**	180
Electrical Connection Module				
	• Main current wiring between PKZM0 and contactor • Use only in combination with busbar mounting module	MSC-(D)(R)-10-M17 to MSC-(D)(R)-32-M32	**PKZM0-XM32DE**	10
	• Main current wiring between PKZM4 and contactor • Use only in combination with busbar mounting module	MSC4-D-40-M40 to MSC4-D-63-M65	**PKZM4-XM65DE**	60

❶ Only Top Mount - High Version auxiliary contacts may be used with this wiring set.

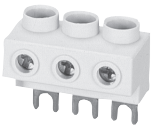
DIN rail mounting modules

Mounting Module	Description	For use with...	Catalog Number	Price
DIN Rail Mounting Module				
	Comprised of: • 45 mm wide mounting module • Connection element for side-by-side positioning of further plates	MSC-D-0,16-M7 to MSC-D-32-M32	**PKZM0-XC45/2**	44
	Comprised of: • 55 mm wide mounting module • Connection cams for further plates • For use with reversing and star-delta starters	MSC4-D-40-M40 to MSC4-D-63-M65	**PKZM4-XC55/2**	80
for Side Mounted Module				
	Can be grouped on the DIN rail mounting module. Expansion of the mounting width by 9 mm.	All mounting modules	**PKZM0-XS**	20
Connection Element				
	For connection of multiple DIN rail mounting modules	All mounting modules	**PKZM0-XCM**	1.60

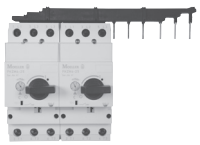
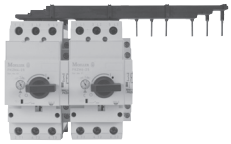
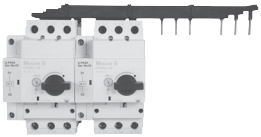
Three-phase commoning links for PKZM0, for incoming line terminals

Commoning Link	Number of 3-pole controllers	Length [mm]	Unit Width [mm]	Description	Catalog Number	Price
Without side mounted accessories						
	2	90	45	For parallel power feed to multiple manual motor controllers on terminals L1, L2, L3 Protection against direct contact (touch-proof), $U_e = 690$ V, $I_u = 63$ A Can be lengthened by inverting and overlapping multiple commoning links	**B3.0/2-PKZ0**	44
	3	135	45		**B3.0/3-PKZ0**	52
	4	180	45		**B3.0/4-PKZ0**	52
	5	225	45		**B3.0/5-PKZ0**	56
With side mounted auxiliary contact or trip-indicating auxiliary contact						
	2	99	45 + 9	For parallel power feed to multiple manual motor controllers on terminals L1, L2, L3 Protection against direct contact (touch-proof), $U_e = 690$ V, $I_u = 63$ A Can be lengthened by inverting and overlapping multiple commoning links	**B3.1/2-PKZ0**	44
	3	153	45 + 9		**B3.1/3-PKZ0**	52
	4	207	45 + 9		**B3.1/4-PKZ0**	60
	5	261	45 + 9		**B3.1/5-PKZ0**	64
With side mounted shunt trip or undervoltage release						
	2	108	45 + 18	For parallel power feed to multiple manual motor controllers on terminals L1, L2, L3 Protection against direct contact (touch-proof), $U_e = 690$ V, $I_u = 63$ A Can be lengthened by inverting and overlapping multiple commoning links	**B3.2/2-PKZ0**	60
	4	234	45 + 18		**B3.2/4-PKZ0**	64

Accessories for three-phase commoning links for PKZM0, for incoming line terminals

Accessory	Description	Catalog Number	Price
Shroud for unused terminals			
	Protection against direct contact of unused terminals on three phase commoning links B3…-PKZ0	**H-B3-PKZ0**	7.20
Incoming supply terminal			
	• For three-phase commoning link, protected against accidental contact, $U_e = 690$ V, $I_u = 63$ A • For conductor cross-sections: 2.5 - 25 mm² stranded 2.5 - 16 mm² flexible with ferrules AWG 14 - 6 • For use on terminals L1, L2, L3 • This device does not fulfill the requirements for Type E or Type F - use BK25/3-PKZ0-E (see page D36).	**BK25/3-PKZ0**	40

Three-phase commoning links for PKZM4, for incoming line terminals

Commoning Link	Number of Circuit Breakers	Length [mm]	Unit Width [mm]	Description	Catalog Number	Price
Without side mounted auxiliary contact or voltage release						
	2	110	55	For parallel power feed to multiple manual motor controllers on terminals L1, L2, L3 Protection against direct contact (touch-proof), $U_e = 690$ V, $I_u = 128$ A	**B3.0/2-PKZ4**	84
	3	165	55		**B3.0/3-PKZ4**	110
	4	220	55		**B3.0/4-PKZ4**	136
With side mounted auxiliary contact or trip-indicating auxiliary contact						
	2	119	55 + 9	For parallel power feed to multiple manual motor controllers on terminals L1, L2, L3 Protection against direct contact (touch-proof), $U_e = 690$ V, $I_u = 63$ A	**B3.1/2-PKZ4**	88
	3	183	55 + 9		**B3.1/3-PKZ4**	112
	4	247	55 + 9		**B3.1/4-PKZ4**	140
With side mounted shunt trip or undervoltage release						
	2	128	55 + 18	For parallel power feed to multiple manual motor controllers on terminals L1, L2, L3 Protection against direct contact (touch-proof), $U_e = 690$ V, $I_u = 63$ A	**B3.2/2-PKZ4**	96
	4	274	55 + 18		**B3.2/4-PKZ4**	146

D

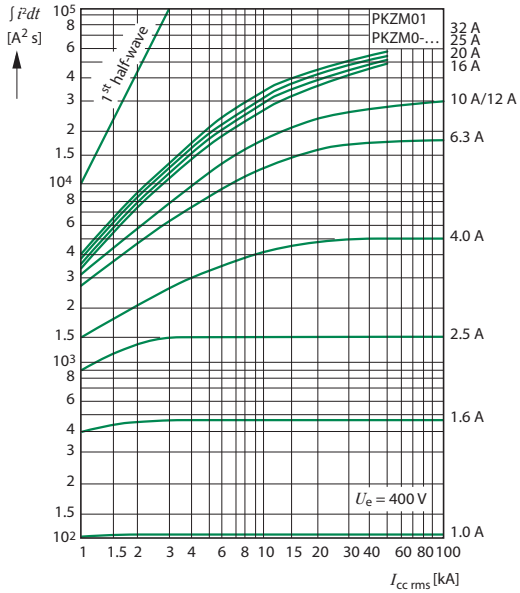
Combination Motor Starters

Accessories for three-phase commoning links for PKZM4

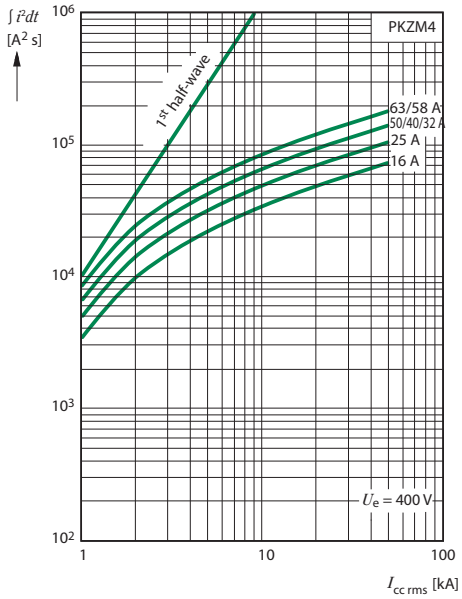
Accessory	Description	Catalog Number	Price
Shroud for unused terminals			
	Protection against direct contact of unused terminals on three phase commoning links B3…-PKZ4	**H-B3-PKZ4**	10

Incoming power cables can be directly wired into PKZM4 devices. An incoming supply terminal is not needed for PKZM4 commoning links.

Short-Circuit Let-through Characteristics for PKZM01 and PKZM0



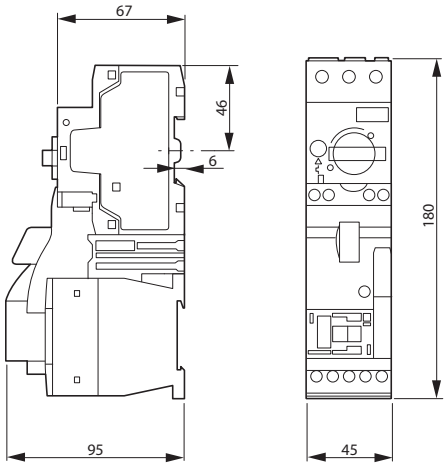
Short-Circuit Let-through Characteristics for PKZM4



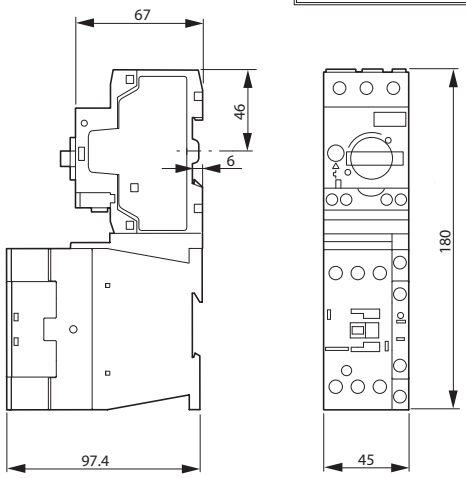
Non-Reversing Combination Motor Starters

Dimensions are in millimeters.
Not intended for manufacturing purposes.

MSC-D-...(M7)–(M12)...

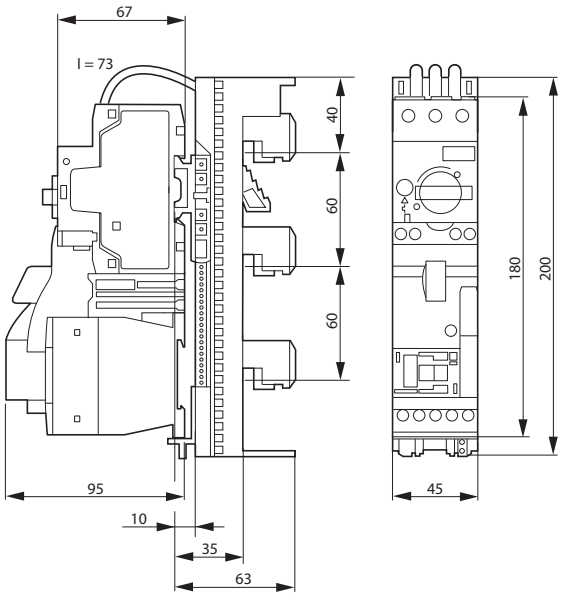


MSC-D-...(M17)–(M32)...

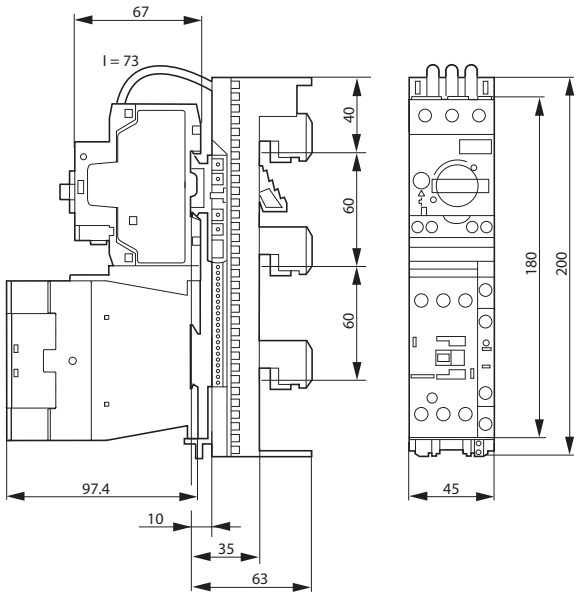


Non-Reversing Combination Motor Starters with Busbar Mounting Module

MSC-D-...(M7)–(M12).../BBA



MSC-D-...(M17)–(M32).../BBA

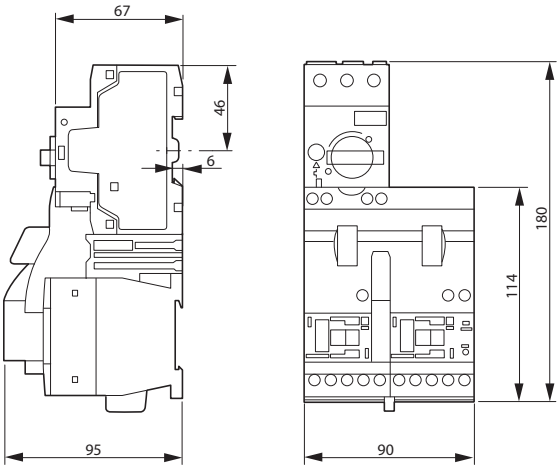


D
Combination Motor Starters

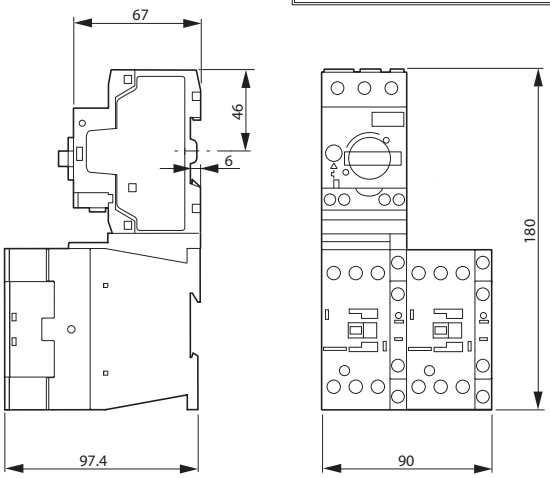
Reversing Combination Motor Starters

Dimensions are in millimeters.
Not intended for manufacturing purposes.

MSC-R-...(M7)–(M12)...

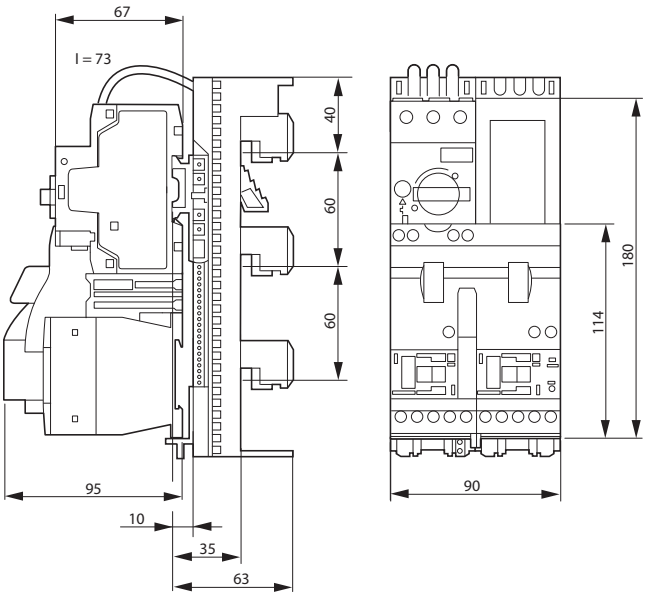


MSC-R-...(M17)–(M32)...

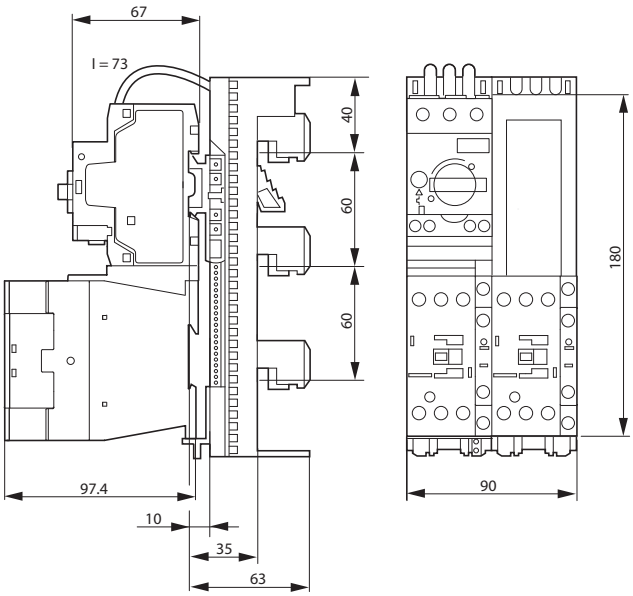


Reversing Combination Motor Starters with Busbar Mounting Module

MSC-R-...(M7)–(M12).../BBA



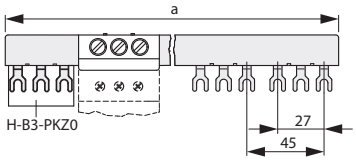
MSC-R-...(M17)–(M32).../BBA



Dimensions are in millimeters.
Not intended for manufacturing purposes.

Three-phase Commoning Links

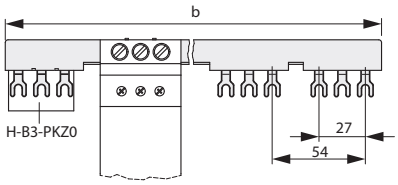
B3.0/...-PKZ0



Commoning Link	a
B3.0/2-PKZ0	90
B3.0/3-PKZ0	135
B3.0/4-PKZ0	180
B3.0/5-PKZ0	225

Three-phase Commoning Links

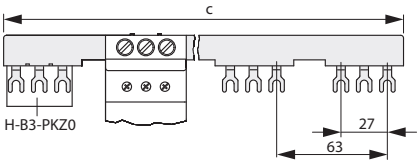
B3.1/...-PKZ0



Commoning Link	b
B3.1/2-PKZ0	99
B3.1/3-PKZ0	153
B3.1/4-PKZ0	207
B3.1/5-PKZ0	261

Three-phase Commoning Links

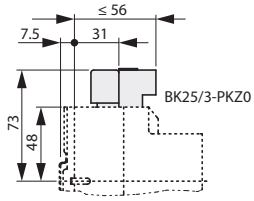
B3.2/...-PKZ0



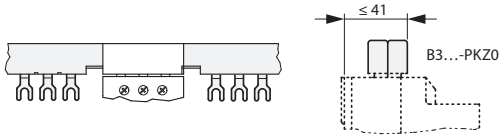
Commoning Link	c
B3.2/2-PKZ0	108
B3.2/4-PKZ0	234

Incoming Terminal

BK25/3-PKZ0



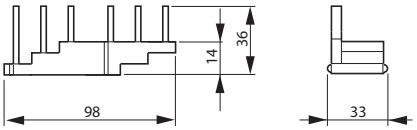
Mounting overlap to extend the three-phase commoning link.



Dimensions are in millimeters.
Not intended for manufacturing purposes.

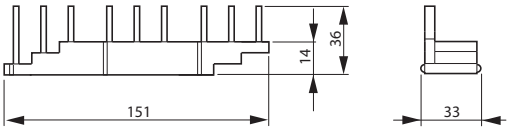
Three-phase Commoning Links

B3.0/2-PKZ4



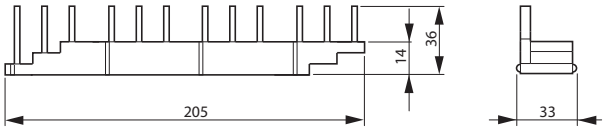
Three-phase Commoning Links

B3.0/3-PKZ4



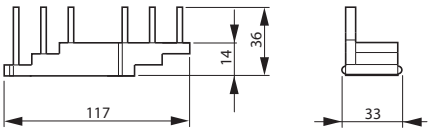
Three-phase Commoning Links

B3.0/4-PKZ4



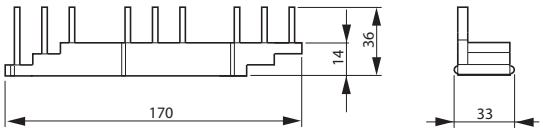
Three-phase Commoning Links

B3.1/2-PKZ4



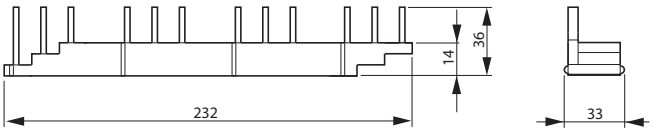
Three-phase Commoning Links

B3.1/3-PKZ4



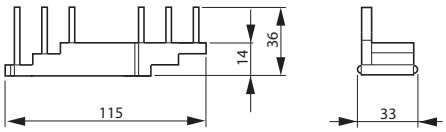
Three-phase Commoning Links

B3.1/4-PKZ4



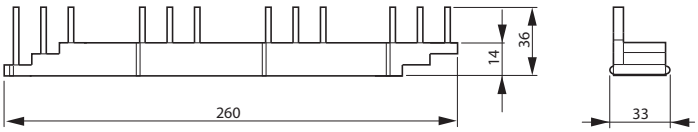
Three-phase Commoning Links

B3.2/2-PKZ4



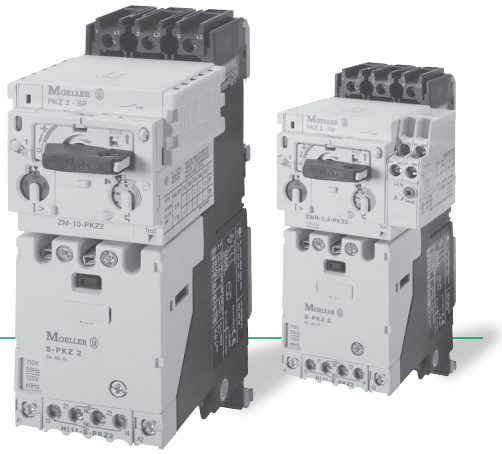
Three-phase Commoning Links

B3.2/4-PKZ4



PKZ2, Type E, self protected combination controllers

Replaces the combination starter

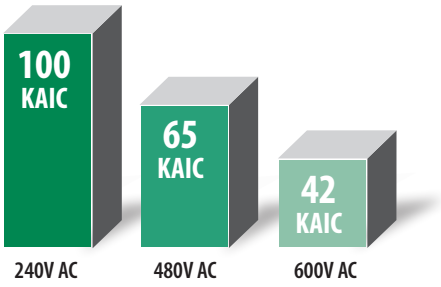


PKZ2 devices were the first to be UL Listed and CSA Certified as Type E, self-protected, combination motor controllers. This means they can be used to replace traditional combination starters in many applications.

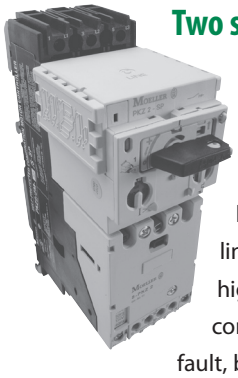
"Type E" designates a device that functions as intended after a short-circuit event, with no effect on performance. This designation is the highest rating for devices with this functionality.

Excellent control & protection with one frame size!

PKZ2 self-protected combination controllers have a 42 amp continuous current rating. They control and protect motors to 30HP at 480V or 25HP @ 600V with one frame size. Their excellent current-limiting design clears fault currents of 100 KAIC at 240VAC; 65KAIC at 480VAC; and 42KAIC at 600VAC (all values RMS Symmetrical). The total clearing time of the device at the highest fault condition is a maximum of 3.5ms at 480V and 4.0ms at 600VAC.



- > Starts and protects motors to 25HP @ 460V (30HP @ 575V) with one frame size
- > Replaces the traditional combination starter
- > Features a fuseless, high fault interrupting unique current limiting design, with separate contacts for controller and contactor
- > Suitable for manual control or fully automatic (HAND-AUTO) PLC applications
- > Remote over-current or short-circuit trip differentiation
- > Worldwide approvals



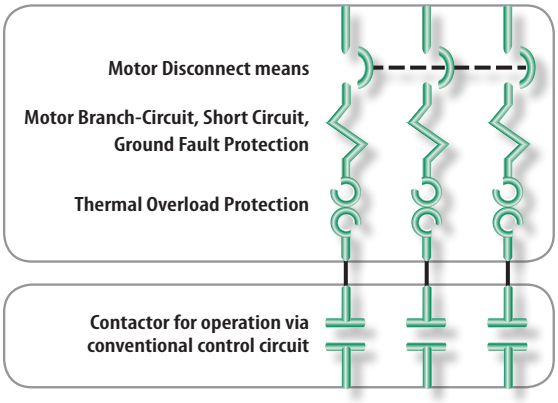
Two sets of main contacts for ultimate protection

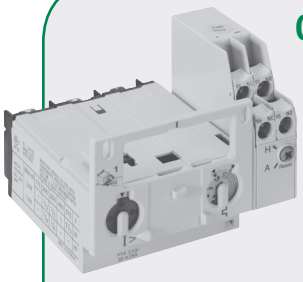
PKZ2 combination motor controllers contain two separate sets of current limiting main contacts. This provides a high interrupting rating and the capacity to protect itself against damage under fault conditions. The controller has single break, current-limiting contacts and is first in line to interrupt overloads and low level short circuits. The high capacity contactor has double-break current limiting contacts and a built-in magnetic trip. In the event of a high fault, both portions will join and act in a coordinated fashion to severely limit the short circuit let-through current and energy.

A compact, space-saving alternative to the traditional combination starter

Many users are unfamiliar with the rules covering PKZ2 self-protected motor controllers. According to NEC Article 430 and CEC Rule 28, governing motor branch circuit requirements, PKZ2…S-SP provides a motor disconnect means, motor branch-circuit protection, a motor controller, overload protection and remote operation without the need for any additional protection or devices.

These rules allow a compact, space-saving alternative to the conventional combination starter. When the PKZ2 motor controller is paired with an "SP" high capacity contactor module for control circuit operation, the resulting compact starter saves significant cost and panel space by eliminating a separate MCCB or other disconnect. Straight-through wiring also reduces the time and labor it takes to build the assembly.





Optional ZMR Trip Module

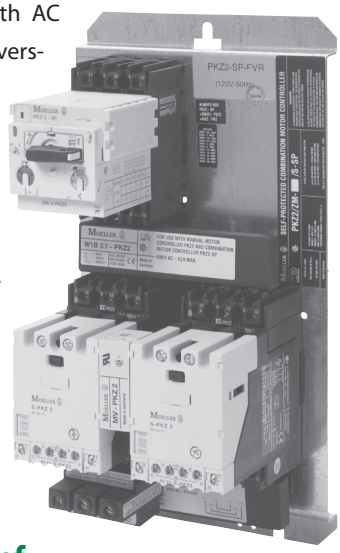
Ideal for critical processes, the ZMR trip module can be set to either HAND or AUTO reset mode. In either case, the main switch contacts remain closed during a thermal trip, only the auxiliary contacts change state. This shuts down the motor while still supplying control voltage to auxiliary monitoring equipment. When HAND mode is selected, trips are manually reset, while AUTO mode resets the auxiliary contacts automatically. Only a short circuit disconnects all power to the load and cause the main contacts of the protective switch to open.

Optional Trip Indicating Contact Module

This module indicates whether the cause of a trip is from a thermal overload or a more serious short circuit condition. The differentiated trip signal increases safety and speeds diagnosis of the trip.

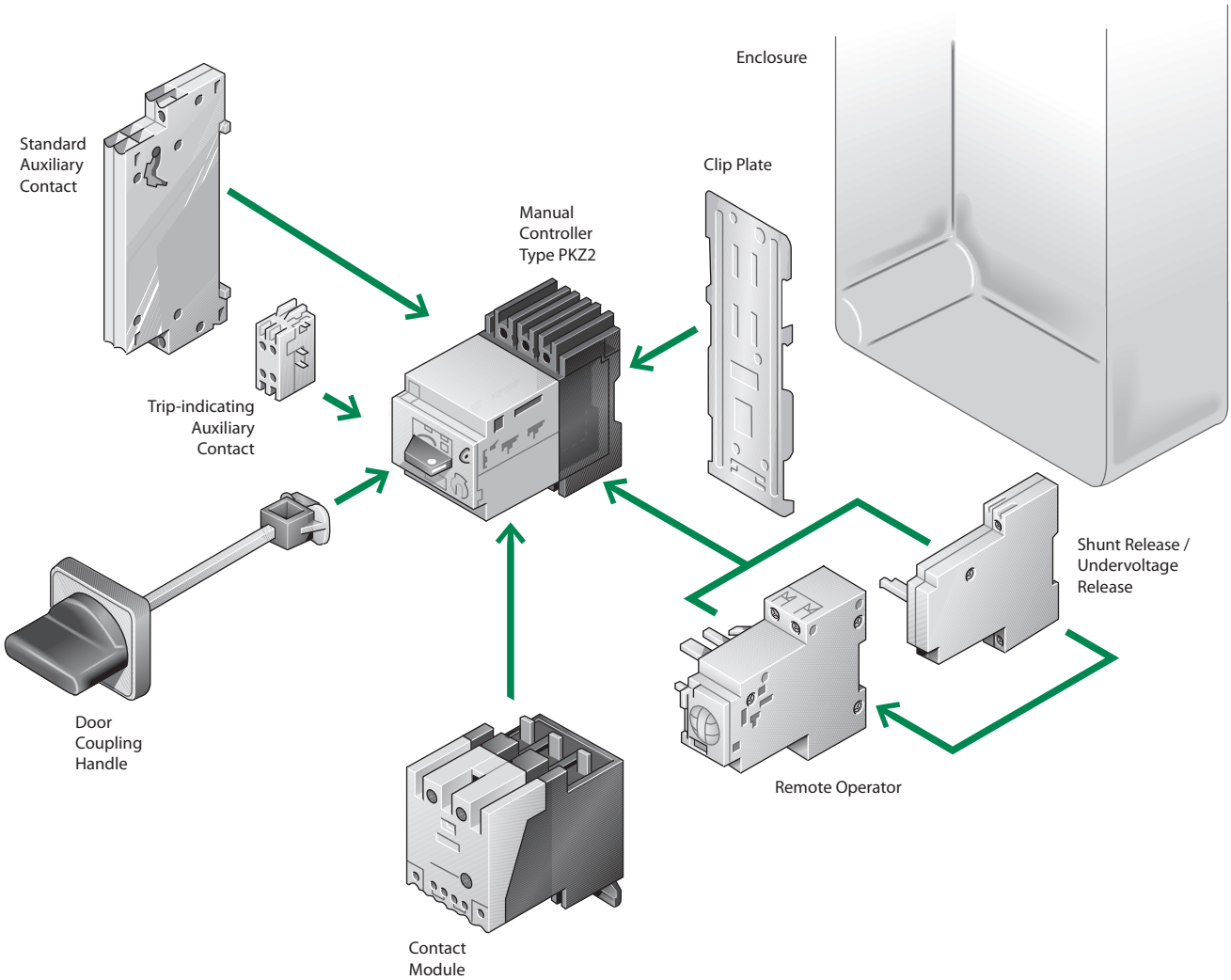
All bases covered…

Starters are available in both AC and DC, full voltage non-reversing and full voltage reversing models to 42 amps continuous current rating. FVNR versions are ready to be mounted and wired on standard 35mm DIN rail. FVR versions are supplied with factory mounted and wired disconnect and mechanically interlocked contactors.



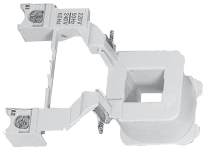
Choose from a variety of enclosures

House both full voltage non-reversing and reversing starters in our NEMA 1 and NEMA 12 enclosures. Rotary handles, shaft extensions and other accessories make it a snap to create a complete PKZ2 enclosed solution for your application.


Enclosure
Standard Auxiliary Contact
Clip Plate
Manual Controller Type PKZ2
Trip-indicating Auxiliary Contact
Shunt Release / Undervoltage Release
Door Coupling Handle
Remote Operator
Contact Module

PKZ2 Combination Motor Starters Overview

Device	Description	Range	Pages
Combination Motor Starters			
	Non-Reversing Combination Starters with Standard Trip Module	Up to 42 Amps AC operated	D50
		Up to 42 Amps DC operated	D51
	Non-Reversing Combination Starters with HAND-AUTO Trip Module	Up to 42 Amps AC operated	D52
		Up to 42 Amps DC operated	D53
	Reversing Combination Starters with Standard Trip Module	Up to 42 Amps AC operated	D54
		Up to 42 Amps DC operated	D55
Contactor Modules			
	Contactor Component Specially Designed for PKZ2	10 – 30 HP	D58
Trip Module			
	Trip Module Components	0.4 – 42 Amps	D57

Device	Description	Range	Pages
Current Limiter			
	Current Limiter to 100 kA / 500 V	$U_e = 690$ V $I_u = 40$ A	D58
Replacement Coils			
	Voltage Coils for Contactor Modules	24 V DC 24 – 600 V AC	D59
Auxiliary Contacts			
	Side Mount Auxiliary Contacts	1 NO / 1 NC 2 NO / 2 NC (2x) 1 NO / 1 NC	D60
Accessories			
	Miscellaneous Accessories		D60 – D61
Enclosures			
	Enclosures		D62

- High fault interrupting, current-limiting design with separate main contacts for switch and contactor module
- Interchangeable trip module makes changing tripping characteristics a snap, even after wiring
- Adjustable for both thermal *and* magnetic trip settings
- Overcurrent, short-circuit protection and motor switching functions are combined in one compact unit; all functions are ambient compensated and phase failure sensitive
- Worldwide approvals, including UL 508/CSA 22.2 No. 14 Cat E
- One frame size simplifies engineering and reduces stocking cost

AC non-reversing combination motor controller starter with standard trip module

UL/CSA Short-circuit current rating kA RMS sym @			Adjustable thermal range set to motor FLC ❶	Adjustable trip setting current of magnetic trips ❶	"Typical" Maximum Horsepower							Auxiliary Contacts			
					Typical Single Phase [HP]			Typical Three Phase [HP]							
240 V AC	480 V AC	600 V AC	[A]	[A]	115V	200V	240V	200V	240V	480/277V ❷	600/347V ❸	NO	NC	Catalog Number	Price
100	65	42	0.4 – 0.6	5 – 8	See note below							1	1	PKZ2/ZM-0,6/S-SP◆	1360
100	65	42	0.6 – 1	8 – 14						½	½	1	1	PKZ2/ZM-1/S-SP◆	1360
100	65	42	1 – 1.6	14 – 22			1/10		⅓	¾	1	1	1	PKZ2/ZM-1,6/S-SP◆	1368
100	65	42	1.6 – 2.4	20 – 35		⅛	⅙	½	½	1	1½	1	1	PKZ2/ZM-2,4/S-SP◆	1368
100	65	42	2.4 – 4	35 – 55	⅛	¼	⅓	1	1	2	3	1	1	PKZ2/ZM-4/S-SP◆	1368
100	65	42	4 – 6	50 – 80	¼	½	½	1½	1½	3	5	1	1	PKZ2/ZM-6/S-SP◆	1368
100	65	42	6 – 10	80 – 140	½	1	1½	2	3	5	7½	1	1	PKZ2/ZM-10/S-SP◆	1368
100	65	42	10 – 16	130 – 220	1	2	2	3	5	10	10	1	1	PKZ2/ZM-16/S-SP◆	1368
100	65	42	16 – 25	200 – 350	2	3	3	5	7½	20	25	1	1	PKZ2/ZM-25/S-SP◆	1432
100	65	–	24 – 32	275 – 425	2	5	5	10	10	20	–	1	1	PKZ2/ZM-32/S-SP◆	1560
100	65	–	32 – 42	350 – 500	3	5	7½	10	15	30	–	1	1	PKZ2/ZM-40/S-SP◆	1660

Horsepower ratings shown in the table are for reference only.

The final selection of the manual starter depends on the actual motor full load current and service factor on the motor nameplate. Overload should be set at motor FLA full load current and is calibrated to 1.15 S.F. Specified values to NEC table 430-150.

Application Note:

Standard trip modules will cause the motor protective switch mechanism to open and disconnect power to the load in the case of either an overcurrent or a short circuit condition; similar to the operation of an inverse-time molded case circuit breaker.

AC Coil Codes - PKZ2/ZM-. . . /S-SP ❹

Complete catalog number (◆) with. . .	Voltage Range	
	50 Hz	60 Hz
(24V50/60HZ)	24V	24V
(110V50HZ,120V60HZ)	110V	120V
(190V50HZ,220V60HZ)	190V	220V
(208V60HZ)	–	208V
(230V50HZ,240V60HZ)	230V	240V
(415V50HZ,480V60HZ)	415V	480V
(600V60HZ)	–	600V

Ordering Instructions

1. **Determine the motor FLA and Service Factor.**
2. **Locate the desired combination motor starter.**
3. **Complete the catalog number with coil code.**
4. **See pages D58 – D63 for auxiliaries and accessories.**

❶ All types have adjustable dial for setting motor full load current. Trip current is 125% of set value. For motors with a service factor (SF) of 1.0, set dial to 90% of motor full load current.

❷ Suitable for maximum 480V AC power systems up to 42 Amps when voltage between any phase to ground does not exceed 277V AC.

❸ Suitable for maximum 600V AC power systems up to 27 Amps when voltage between any phase to ground does not exceed 347V AC.

❹ Other coil voltages are special order; contact your Moeller representative.

- High fault interrupting, current-limiting design with separate main contacts for switch and contactor module
- Interchangeable trip module makes changing tripping characteristics a snap, even after wiring
- Adjustable for both thermal *and* magnetic trip settings
- Overcurrent, short-circuit protection and motor switching functions are combined in one compact unit; all functions are ambient compensated and phase failure sensitive
- Worldwide approvals, including UL 508/CSA 22.2 No. 14 Cat E
- One frame size simplifies engineering and reduces stocking cost

DC non-reversing combination motor controller starter with standard trip module

UL/CSA Short-circuit current rating kA RMS sym @			Adjustable thermal range set to motor FLC ❶	Adjustable trip setting current of magnetic trips ❶	"Typical" Maximum Horsepower							Auxiliary Contacts			
					Typical Single Phase [HP]			Typical Three Phase [HP]							
240 V AC	480 V AC	600 V AC	[A]	[A]	115V	200V	240V	200V	240V	480/277V ❷	600/347V ❸	NO	NC	Catalog Number	Price
100	65	42	0.4 – 0.6	5 – 8	See note below							1	0	PKZ2/ZM-0,6/S-G-SP(24VDC)	1548
100	65	42	0.6 – 1	8 – 14						½	½	1	0	PKZ2/ZM-1/S-G-SP(24VDC)	1548
100	65	42	1 – 1.6	14 – 22			1/10		1/3	¾	1	1	0	PKZ2/ZM-1,6/S-G-SP(24VDC)	1548
100	65	42	1.6 – 2.4	20 – 35		1/8	1/6	½	½	1	1½	1	0	PKZ2/ZM-2,4/S-G-SP(24VDC)	1548
100	65	42	2.4 – 4	35 – 55	1/8	¼	1/3	1	1	2	3	1	0	PKZ2/ZM-4/S-G-SP(24VDC)	1548
100	65	42	4 – 6	50 – 80	¼	½	½	1½	1½	3	5	1	0	PKZ2/ZM-6/S-G-SP(24VDC)	1548
100	65	42	6 – 10	80 – 140	½	1	1½	2	3	5	7½	1	0	PKZ2/ZM-10/S-G-SP(24VDC)	1548
100	65	42	10 – 16	130 – 220	1	2	2	3	5	10	10	1	0	PKZ2/ZM-16/S-G-SP(24VDC)	1548
100	65	42	16 – 25	200 – 350	2	3	3	5	7½	20	25	1	0	PKZ2/ZM-25/S-G-SP(24VDC)	1612
100	65	–	24 – 32	275 – 425	2	5	5	10	10	20	–	1	0	PKZ2/ZM-32/S-G-SP(24VDC)	1900
100	65	–	32 – 42	350 – 500	3	5	7½	10	15	30	–	1	0	PKZ2/ZM-40/S-G-SP(24VDC)	1950

DC Coil Information

DC operated devices listed on this page are 24V DC. Other DC voltages are special order; contact your Moeller representative.

Horsepower ratings shown in the table are for reference only.

The final selection of the manual starter depends on the actual motor full load current and service factor on the motor nameplate. Overload should be set at motor FLA full load current and is calibrated to 1.15 S.F. Specified values to NEC table 430-150.

Application Note:

Standard trip modules will cause the motor protective switch mechanism to open and disconnect power to the load in the case of either an overcurrent or a short circuit condition; similar to the operation of an inverse-time molded case circuit breaker.

Ordering Instructions

1. **Determine the motor FLA and Service Factor.**
2. **Locate the desired combination motor starter.**
3. **See pages D58 – D63 for auxiliaries and accessories.**

❶ All types have adjustable dial for setting motor full load current. Trip current is 125% of set value. For motors with a service factor (SF) of 1.0, set dial to 90% of motor full load current.

❷ Suitable for maximum 480V AC power systems up to 42 Amps when voltage between any phase to ground does not exceed 277V AC.

❸ Suitable for maximum 600V AC power systems up to 27 Amps when voltage between any phase to ground does not exceed 347V AC.

In addition to features of standard trip modules on previous page:

- Able to be remotely reset
- Continues to supply control voltage to safety monitoring equipment within panel after a trip

HAND-AUTO Trip Module

This feature is unique to Moeller.

Ideal for critical processes, this trip module can be set to either HAND or AUTO reset mode. In either case, the main switch contacts remain closed during a thermal trip, only the auxiliary contacts change state. When HAND mode is selected, trips are manually reset. In AUTO mode, the auxiliary contacts are reset automatically after a trip.

AC non-reversing combination motor controller starter with HAND-AUTO trip module

UL/CSA Short-circuit current rating kA RMS sym @			Adjustable thermal range set to motor FLC ❶	Adjustable trip setting current of magnetic trips ❶	"Typical" Maximum Horsepower							Auxiliary Contacts			
					Typical Single Phase [HP]			Typical Three Phase [HP]							
240 V AC	480 V AC	600 V AC	[A]	[A]	115V	200V	240V	200V	240V	480/277V ❷	600/347V ❸	NO	NC	Catalog Number	Price
100	65	42	0.4 – 0.6	5 – 8	See note below							2	2	PKZ2/ZMR-0,6/S-SP◆	1456
100	65	42	0.6 – 1	8 – 14						½	½	2	2	PKZ2/ZMR-1/S-SP◆	1456
100	65	42	1 – 1.6	14 – 22			1/10		1/3	¾	1	2	2	PKZ2/ZMR-1,6/S-SP◆	1468
100	65	42	1.6 – 2.4	20 – 35		1/8	1/6	½	½	1	1½	2	2	PKZ2/ZMR-2,4/S-SP◆	1468
100	65	42	2.4 – 4	35 – 55	1/8	¼	1/3	1	1	2	3	2	2	PKZ2/ZMR-4/S-SP◆	1468
100	65	42	4 – 6	50 – 80	¼	½	½	1½	1½	3	5	2	2	PKZ2/ZMR-6/S-SP◆	1468
100	65	42	6 – 10	80 – 140	½	1	1½	2	3	5	7½	2	2	PKZ2/ZMR-10/S-SP◆	1468
100	65	42	10 – 16	130 – 220	1	2	2	3	5	10	10	2	2	PKZ2/ZMR-16/S-SP◆	1468
100	65	42	16 – 25	200 – 350	2	3	3	5	7½	20	25	2	2	PKZ2/ZMR-25/S-SP◆	1552
100	65	–	24 – 32	275 – 425	2	5	5	10	10	20	–	2	2	PKZ2/ZMR-32/S-SP◆	1676
100	65	–	32 – 42	350 – 500	3	5	7½	10	15	30	–	2	2	PKZ2/ZMR-40/S-SP◆	1776

Horsepower ratings shown in the table are for reference only.

The final selection of the manual starter depends on the actual motor full load current and service factor on the motor nameplate. Overload should be set at motor FLA full load current and is calibrated to 1.15 S.F. Specified values to NEC table 430-150.

Application Note:

HAND-AUTO trip modules use a set of auxiliary contacts to de-energize the contactor module coil circuit and signal an overload condition. This enables the motor to be de-energized while still supplying control voltage to critical monitoring equipment within the panel; similar to the operation of a conventional overload relay. Only a short-circuit will cause the protective switch mechanism to open and disconnect power to the load.

AC Coil Codes - PKZ2/ZMR-. . ./S-SP ❹

Complete catalog number (◆) with. . .	Voltage Range	
	50 Hz	60 Hz
(24V50/60HZ)	24V	24V
(110V50HZ,120V60HZ)	110V	120V
(190V50HZ,220V60HZ)	190V	220V
(208V60HZ)	–	208V
(230V50HZ,240V60HZ)	230V	240V
(415V50HZ,480V60HZ)	415V	480V
(600V60HZ)	–	600V

Ordering Instructions

1. **Determine the motor FLA and Service Factor.**
2. **Locate the desired combination motor starter.**
3. **Complete the catalog number with coil code.**
4. **See pages D58 – D63 for auxiliaries and accessories.**

❶ All types have adjustable dial for setting motor full load current. Trip current is 125% of set value. For motors with a service factor (SF) of 1.0, set dial to 90% of motor full load current.

❷ Suitable for maximum 480V AC power systems up to 42 Amps when voltage between any phase to ground does not exceed 277V AC.

❸ Suitable for maximum 600V AC power systems up to 27 Amps when voltage between any phase to ground does not exceed 347V AC.

❹ Other coil voltages are special order; contact your Moeller representative.

In addition to features of standard trip modules on previous page:

- Able to be remotely reset
- Continues to supply control voltage to safety monitoring equipment within panel after a trip

HAND-AUTO Trip Module

This feature is unique to Moeller.

Ideal for critical processes, this trip module can be set to either HAND or AUTO reset mode. In either case, the main switch contacts remain closed during a thermal trip, only the auxiliary contacts change state. When HAND mode is selected, trips are manually reset. In AUTO mode, the auxiliary contacts are reset automatically after a trip.

DC non-reversing combination motor controller starter with HAND-AUTO trip module

UL/CSA Short-circuit current rating kA RMS sym @			Adjustable thermal range set to motor FLC ❶	Adjustable trip setting current of magnetic trips ❶	"Typical" Maximum Horsepower							Auxiliary Contacts			
					Typical Single Phase [HP]			Typical Three Phase [HP]							
240 V AC	480 V AC	600 V AC	[A]	[A]	115V	200V	240V	200V	240V	480/277V ❷	600/347V ❸	NO	NC	Catalog Number	Price
100	65	42	0.4 – 0.6	5 – 8	See note below							2	1	PKZ2/ZMR-0,6/S-G-SP(24VDC)	1636
100	65	42	0.6 – 1	8 – 14						½	½	2	1	PKZ2/ZMR-1/S-G-SP(24VDC)	1648
100	65	42	1 – 1.6	14 – 22			1/10		1/3	¾	1	2	1	PKZ2/ZMR-1,6/S-G-SP(24VDC)	1648
100	65	42	1.6 – 2.4	20 – 35		1/8	1/6	½	½	1	1½	2	1	PKZ2/ZMR-2,4/S-G-SP(24VDC)	1648
100	65	42	2.4 – 4	35 – 55	1/8	¼	1/3	1	1	2	3	2	1	PKZ2/ZMR-4/S-G-SP(24VDC)	1648
100	65	42	4 – 6	50 – 80	¼	½	½	1½	1½	3	5	2	1	PKZ2/ZMR-6/S-G-SP(24VDC)	1648
100	65	42	6 – 10	80 – 140	½	1	1½	2	3	5	7½	2	1	PKZ2/ZMR-10/S-G-SP(24VDC)	1648
100	65	42	10 – 16	130 – 220	1	2	2	3	5	10	10	2	1	PKZ2/ZMR-16/S-G-SP(24VDC)	1648
100	65	42	16 – 25	200 – 350	2	3	3	5	7½	20	25	2	1	PKZ2/ZMR-25/S-G-SP(24VDC)	1732
100	65	–	24 – 32	275 – 425	2	5	5	10	10	20	–	2	1	PKZ2/ZMR-32/S-G-SP(24VDC)	1856
100	65	–	32 – 42	350 – 500	3	5	7½	10	15	30	–	2	1	PKZ2/ZMR-40/S-G-SP(24VDC)	1956

DC Coil Information

DC operated devices listed on this page are 24V DC. Other DC voltages are special order; contact your Moeller representative.

Horsepower ratings shown in the table are for reference only.

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Application Note:

HAND-AUTO trip modules use a set of auxiliary contacts to de-energize the contactor module coil circuit and signal an overload condition. This enables the motor to be de-energized while still supplying control voltage to critical monitoring equipment within the panel; similar to the operation of a conventional overload relay. Only a short-circuit will cause the protective switch mechanism to open and disconnect power to the load.

Ordering Instructions

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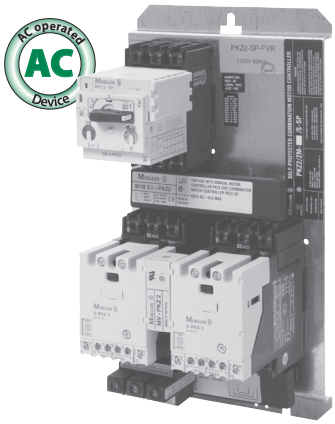
2. **Locate the desired combination motor starter.**
3. **See pages D58 – D63 for auxiliaries and accessories.**

❶ All types have adjustable dial for setting motor full load current. Trip current is 125% of set value. For motors with a service factor (SF) of 1.0, set dial to 90% of motor full load current.

❷ Suitable for maximum 480V AC power systems up to 42 Amps when voltage between any phase to ground does not exceed 277V AC.

❸ Suitable for maximum 600V AC power systems up to 27 Amps when voltage between any phase to ground does not exceed 347V AC.

- High fault interrupting, current-limiting design with separate main contacts for switch and contactor modules
- Interchangeable trip module makes changing tripping characteristics a snap, even after wiring
- Adjustable for both thermal *and* magnetic trip settings
- Overcurrent, short-circuit protection and motor switching functions are combined in one compact unit; all functions are ambient compensated and phase failure sensitive
- Worldwide approvals, including UL 508/CSA 22.2 No. 14 Cat E
- One frame size simplifies engineering and reduces stocking cost



AC reversing combination motor controller starter with standard trip module

UL/CSA Short-circuit current rating kA RMS sym @			Adjustable thermal range set to motor FLC ❶	Adjustable trip setting current of magnetic trips ❶	"Typical" Maximum Horsepower							Auxiliary Contacts			
					Typical Single Phase [HP]			Typical Three Phase [HP]							
240 V AC	480 V AC	600 V AC	[A]	[A]	115V	200V	240V	200V	240V	480/277V ❷	600/347V ❸	NO	NC	Catalog Number	Price
100	65	42	0.4 – 0.6	5 – 8	See note below							2	2	PKZ2/ZM-0,6/S-SP-FVR◆	2680
100	65	42	0.6 – 1	8 – 14						½	½	2	2	PKZ2/ZM-1/S-SP-FVR◆	2680
100	65	42	1 – 1.6	14 – 22			1/10		1/3	¾	1	2	2	PKZ2/ZM-1,6/S-SP-FVR◆	2688
100	65	42	1.6 – 2.4	20 – 35		1/8	1/6	½	½	1	1½	2	2	PKZ2/ZM-2,4/S-SP-FVR◆	2688
100	65	42	2.4 – 4	35 – 55	1/8	¼	1/3	1	1	2	3	2	2	PKZ2/ZM-4/S-SP-FVR◆	2688
100	65	42	4 – 6	50 – 80	¼	½	½	1½	1½	3	5	2	2	PKZ2/ZM-6/S-SP-FVR◆	2688
100	65	42	6 – 10	80 – 140	½	1	1½	2	3	5	7½	2	2	PKZ2/ZM-10/S-SP-FVR◆	2688
100	65	42	10 – 16	130 – 220	1	2	2	3	5	10	10	2	2	PKZ2/ZM-16/S-SP-FVR◆	2688
100	65	42	16 – 25	200 – 350	2	3	3	5	7½	20	25	2	2	PKZ2/ZM-25/S-SP-FVR◆	2752
100	65	–	24 – 32	275 – 425	2	5	5	10	10	20	–	2	2	PKZ2/ZM-32/S-SP-FVR◆	2880
100	65	–	32 – 42	350 – 500	3	5	7½	10	15	30	–	2	2	PKZ2/ZM-40/S-SP-FVR◆	2980

Horsepower ratings shown in the table are for reference only.

The final selection of the manual starter depends on the actual motor full load current and service factor on the motor nameplate. Overload should be set at motor FLA full load current and is calibrated to 1.15 S.F. Specified values to NEC table 430-150.

Application Note:

Standard trip modules will cause the motor protective switch mechanism to open and disconnect power to the load in the case of either an overcurrent or a short circuit condition; similar to the operation of an inverse-time molded case circuit breaker.

AC Coil Codes - PKZ2/ZM-.../S-SP-FVR ❹

Complete catalog number (◆) with...	Voltage Range	
	50 Hz	60 Hz
(24V50/60HZ)	24V	24V
(110V50HZ,120V60HZ)	110V	120V
(190V50HZ,220V60HZ)	190V	220V
(208V60HZ)	–	208V
(230V50HZ,240V60HZ)	230V	240V
(415V50HZ,480V60HZ)	415V	480V
(600V60HZ)	–	600V

Ordering Instructions

1. **Determine the motor FLA and Service Factor.**
2. **Locate the desired combination motor starter.**
3. **Complete the catalog number with coil code.**
4. **See pages D58 – D63 for auxiliaries and accessories.**

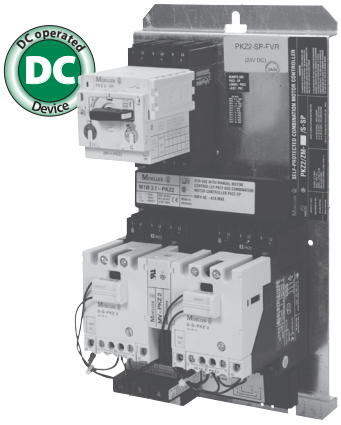
❶ All types have adjustable dial for setting motor full load current. Trip current is 125% of set value. For motors with a service factor (SF) of 1.0, set dial to 90% of motor full load current.

❷ Suitable for maximum 480V AC power systems up to 42 Amps when voltage between any phase to ground does not exceed 277V AC.

❸ Suitable for maximum 600V AC power systems up to 27 Amps when voltage between any phase to ground does not exceed 347V AC.

❹ Other coil voltages are special order; contact your Moeller representative.

- High fault interrupting, current-limiting design with separate main contacts for switch and contactor modules
- Interchangeable trip module makes changing tripping characteristics a snap, even after wiring
- Adjustable for both thermal *and* magnetic trip settings
- Overcurrent, short-circuit protection and motor switching functions are combined in one compact unit; all functions are ambient compensated and phase failure sensitive
- Worldwide approvals, including UL 508/CSA 22.2 No. 14 Cat E
- One frame size simplifies engineering and reduces stocking cost



DC reversing combination motor controller starter with standard trip module

UL/CSA Short-circuit current rating kA RMS sym @			Adjustable thermal range set to motor FLC ❶	Adjustable trip setting current of magnetic trips ❶	"Typical" Maximum Horsepower							Auxiliary Contacts			
					Typical Single Phase [HP]			Typical Three Phase [HP]							
240 V AC	480 V AC	600 V AC	[A]	[A]	115V	200V	240V	200V	240V	480/277V ❷	600/347V ❸	NO	NC	Catalog Number	Price
100	65	42	0.4 – 0.6	5 – 8	See note below							2	0	PKZ2/ZM-0,6/S-G-SP-FVR(24VDC)	3040
100	65	42	0.6 – 1	8 – 14						½	½	2	0	PKZ2/ZM-1/S-G-SP-FVR(24VDC)	3040
100	65	42	1 – 1.6	14 – 22			1/10		1/3	¾	1	2	0	PKZ2/ZM-1,6/S-G-SP-FVR(24VDC)	3048
100	65	42	1.6 – 2.4	20 – 35		1/8	1/6	½	½	1	1½	2	0	PKZ2/ZM-2,4/S-G-SP-FVR(24VDC)	3048
100	65	42	2.4 – 4	35 – 55	1/8	¼	1/3	1	1	2	3	2	0	PKZ2/ZM-4/S-G-SP-FVR(24VDC)	3048
100	65	42	4 – 6	50 – 80	¼	½	½	1½	1½	3	5	2	0	PKZ2/ZM-6/S-G-SP-FVR(24VDC)	3048
100	65	42	6 – 10	80 – 140	½	1	1½	2	3	5	7½	2	0	PKZ2/ZM-10/S-G-SP-FVR(24VDC)	3048
100	65	42	10 – 16	130 – 220	1	2	2	3	5	10	10	2	0	PKZ2/ZM-16/S-G-SP-FVR(24VDC)	3048
100	65	42	16 – 25	200 – 350	2	3	3	5	7½	20	25	2	0	PKZ2/ZM-25/S-G-SP-FVR(24VDC)	3112
100	65	–	24 – 32	275 – 425	2	5	5	10	10	20	–	2	0	PKZ2/ZM-32/S-G-SP-FVR(24VDC)	3240
100	65	–	32 – 42	350 – 500	3	5	7½	10	15	30	–	2	0	PKZ2/ZM-40/S-G-SP-FVR(24VDC)	3340

DC Coil Information

DC operated devices listed on this page are 24V DC. Other DC voltages are special order; contact your Moeller representative.

Horsepower ratings shown in the table are for reference only.

The final selection of the manual starter depends on the actual motor full load current and service factor on the motor nameplate. Overload should be set at motor FLA full load current and is calibrated to 1.15 S.F. Specified values to NEC table 430-150.

Application Note:

Standard trip modules will cause the motor protective switch mechanism to open and disconnect power to the load in the case of either an overcurrent or a short circuit condition; similar to the operation of an inverse-time molded case circuit breaker.

Ordering Instructions

1. **Determine the motor FLA and Service Factor.**
2. **Locate the desired combination motor starter.**
3. **See pages D58 – D63 for auxiliaries and accessories.**

❶ All types have adjustable dial for setting motor full load current. Trip current is 125% of set value. For motors with a service factor (SF) of 1.0, set dial to 90% of motor full load current.

❷ Suitable for maximum 480V AC power systems up to 42 Amps when voltage between any phase to ground does not exceed 277V AC.

❸ Suitable for maximum 600V AC power systems up to 27 Amps when voltage between any phase to ground does not exceed 347V AC.

Starter Base Modules

Base Module	Description	"Typical" Maximum Horsepower Typical Three Phase [HP] 200V	240V	480/277V ❶	600/347V ❷	Auxiliary Contacts NO	NC	For use with...	Catalog Number	Price
AC Operated, Non-Reversing Starter *(without Trip Module)*										
	Basic Starter Module is fully assembled and includes: • PKZ2 base unit • Clip plate • One contactor with front auxiliary insert • Trip indicator • Terminal tap-off	10	15	30	25	1	1	all other PKZ2 devices	**PKZ2/S-SP◆**	1200
DC Operated, Non-Reversing Starter *(without Trip Module)*										
	Basic Starter Module is fully assembled and includes: • PKZ2 base unit • Clip plate • One contactor with front auxiliary insert • Trip indicator • Terminal tap-off • Integrated Surge Suppressor on contactor	10	15	30	25	1	0	all other PKZ2 devices	**PKZ2/S-G-SP(24VDC)**	1380
AC Operated, Reversing Starter *(without Trip Module)*										
	Basic Starter Module is fully assembled and includes: • PKZ2 Base unit • Mounting plate • Two Contactors with front auxiliary inserts • Mechanical Interlock • Trip Indicator	10	15	30	25	2	2	all other PKZ2 devices	**PKZ2/S-SP-FVR◆**	2200
DC Operated, Reversing Starter *(without Trip Module)*										
	Basic Starter Module is fully assembled and includes: • PKZ2 Base unit • Mounting plate • Two Contactors with front auxiliary inserts • Mechanical Interlock • Trip Indicator • Integrated Surge Suppressors on contactors	10	15	30	25	2	0	all other PKZ2 devices	**PKZ2/S-G-SP-FVR(24VDC)**	2560

❶ Suitable for maximum 480V AC power systems up to 42 Amps when voltage between any phase to ground does not exceed 277V AC.
❷ Suitable for maximum 600V AC power systems up to 27 Amps when voltage between any phase to ground does not exceed 347V AC.
❸ Other coil voltages are special order; contact your Moeller representative.

AC Coil Codes - PKZ2/S-SP(-FVR) ❸

Complete catalog number (◆) with...	Voltage Range 50 Hz	60 Hz
(24V50/60HZ)	24V	24V
(110V50HZ,120V60HZ)	110V	120V
(190V50HZ,220V60HZ)	190V	220V
(208V60HZ)	–	208V
(230V50HZ,240V60HZ)	230V	240V
(415V50HZ,480V60HZ)	415V	480V
(600V60HZ)	–	600V

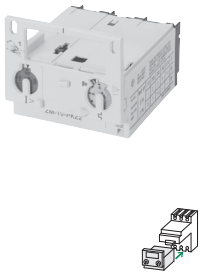
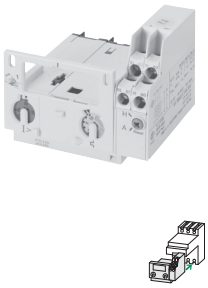
DC Coil Information

DC operated devices listed on this page are 24V DC. Other DC voltages are special order; contact your Moeller representative.

Ordering Instructions

1. **Locate the desired base unit.**
2. **Complete catalog number (if needed).**
3. **Order trip module on next page.**
4. **See pages D58 – D63 for auxiliaries and accessories.**

Trip Modules

Module	Description	Adjustable thermal range set to motor FLC ❶ [A]	Adjustable trip setting current of magnetic trips ❶ [A]	"Typical" Maximum Horsepower – Typical Three Phase [HP] 200V	240V	480V	600V	Auxiliary Contacts NO	NC	For use with…	Catalog Number	Price
Standard Trip Module												
	Standard trip module for PKZ2 Adjustable thermal and magnetic trips Includes a manual test feature and tamper-preventive settings cover	0.4 – 0.6	5 – 8	see note below				0	0	PKZ2 PKZ2/S-SP	ZM-0,6-PKZ2	160
		0.6 – 1	8 – 14			½	½	0	0		ZM-1-PKZ2	160
		1 – 1.6	14 – 22			¾	1	0	0		ZM-1,6-PKZ2	168
		1.6 – 2.4	20 – 35	½	½	1	1½	0	0		ZM-2,4-PKZ2	168
		2.4 – 4	35 – 55	1	1	2	3	0	0		ZM-4-PKZ2	168
		4 – 6	50 – 80	1½	1½	3	5	0	0		ZM-6-PKZ2	168
		6 – 10	80 – 140	2	3	5	7½	0	0		ZM-10-PKZ2	168
		10 – 16	130 – 220	3	5	10	10	0	0		ZM-16-PKZ2	168
		16 – 25	200 – 350	7½	7½	20	25	0	0		ZM-25-PKZ2	232
		24 – 32	275 – 425	10	10	20	30 ❷	0	0		ZM-32-PKZ2	360
		32 – 42	350 – 500	10	15	30	30 ❷	0	0		ZM-40-PKZ2	460
Trip Module with HAND-AUTO Feature												
	Main switch contacts only open during short-circuit; auxiliary contacts de-energize contactor module coil circuit during overload condition Adjustable thermal and magnetic trips Includes a manual test feature and tamper-preventive settings cover	0.4 – 0.6	5 – 8	see note below				1	1	PKZ2 PKZ2/S-SP	ZMR-0,6-PKZ2	256
		0.6 – 1	8 – 14			½	½	1	1		ZMR-1-PKZ2	256
		1 – 1.6	14 – 22			¾	1	1	1		ZMR-1,6-PKZ2	268
		1.6 – 2.4	20 – 35	½	½	1	1½	1	1		ZMR-2,4-PKZ2	268
		2.4 – 4	35 – 55	1	1	2	3	1	1		ZMR-4-PKZ2	268
		4 – 6	50 – 80	1½	1½	3	5	1	1		ZMR-6-PKZ2	268
		6 – 10	80 – 140	2	3	5	7½	1	1		ZMR-10-PKZ2	268
		10 – 16	130 – 220	3	5	10	10	1	1		ZMR-16-PKZ2	268
		16 – 25	200 – 350	7½	7½	20	25	1	1		ZMR-25-PKZ2	352
		24 – 32	275 – 425	10	10	20	30 ❷	1	1		ZMR-32-PKZ2	476
		32 – 42	350 – 500	10	15	30	30 ❷	1	1		ZMR-40-PKZ2	576

Horsepower ratings shown in the table are for reference only.
The final selection of the manual starter depends on the actual motor full load current and service factor on the motor nameplate.
Overload should be set at motor FLA full load current and is calibrated to 1.15 S.F.
Specified values to NEC table 430-150.

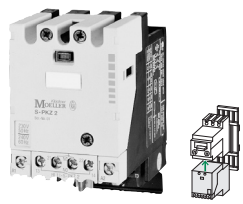
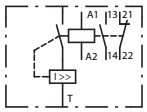
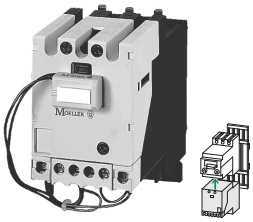
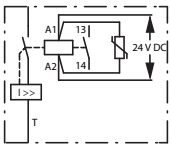
Ordering Instructions

1. **Determine the motor FLA and Service Factor.**
2. **Locate the desired trip module.**
3. **Order base module on previous page.**
4. **See pages D58 – D63 for auxiliaries and accessories.**

❶ All types have adjustable dial for setting motor full load current. Trip current is 125% of set value. For motors with a service factor (SF) of 1.0, set dial to 90% of motor full load current.

❷ Rating applies to manual motor controller only; not suitable for combination motor starter.

Replacement Contactor Modules

Module	Schematic	"Typical" Maximum Horsepower – Typical Three Phase [HP] 200V	240V	480/277V ❶	600/347V ❷	Auxiliary Contacts NO	NC	For use with...	Catalog Number	Price
AC Contactor Modules										
		10	15	30	25	1	1	PKZ2 PKZ2/ZM	S-PKZ2◆	620
DC Contactor Modules										
		10	15	30	25	1	0	PKZ2 PKZ2/ZM	S-G-PKZ2(24VDC)	800

AC Coil Codes - S-PKZ2 ❸

Complete catalog number (◆) with...	Voltage Range 50 Hz	60 Hz
(24V50/60HZ)	24V	24V
(110V50HZ,120V60HZ)	110V	120V
(190V50HZ,220V60HZ)	190V	220V
(208V60HZ)	–	208V
(230V50HZ,240V60HZ)	230V	240V
(415V50HZ,480V60HZ)	415V	480V
(600V60HZ)	–	600V

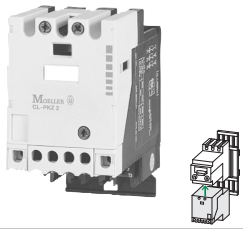
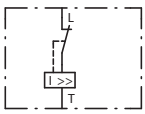
DC Coil Information

DC operated devices listed on this page are 24V DC. Other DC voltages are special order; contact your Moeller representative.

Special note about UL approval of Contactor Modules:

Replacing the contactor module in a PKZ2 combination motor starter results in a device no longer UL approved. If UL approval is required, purchase starter base module (page D56) and add desired trip module (page D57).

Current Limiter ❹

Module	Description	Schematic	For use with...	Catalog Number	Price
Current Limiter					
	Max. rated operational voltage $U_e = 690$ V Rated uninterrupted current $I_u = 40$ A Can be fitted to controller with mounting plate C-PKZ2, or can be fitted individually with mounting base EZ-PKZ2 See page C65 for capacity ratings		PKZ2 PKZ2/ZM	CL-PKZ2	436

❶ Suitable for maximum 480V AC power systems up to 42 Amps when voltage between any phase to ground does not exceed 277V AC.

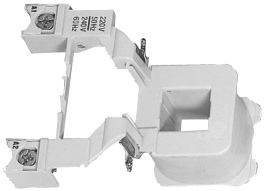
❷ Suitable for maximum 600V AC power systems up to 27 Amps when voltage between any phase to ground does not exceed 347V AC.

❸ Other coil voltages are special order; contact your Moeller representative.

❹ Device is not approved by UL or CSA.

Replacement AC Coils for PKZ2 Starters

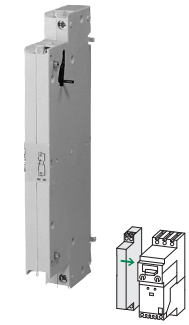
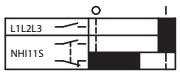
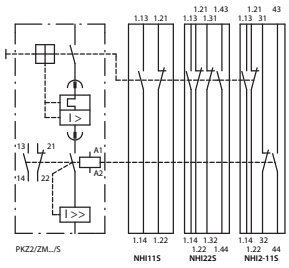
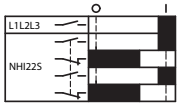
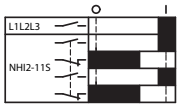
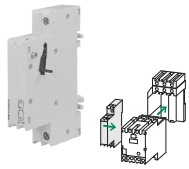
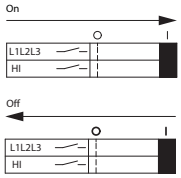
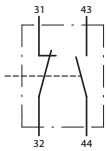
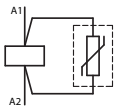
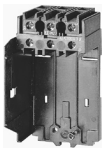
Coil Voltage 50Hz	Coil Voltage 60Hz	For Use With...	Catalog Number (Shading indicates standard voltages) ❶	Price
24	24	S-PKZ2	J-S-PKZ2(24V50/60HZ)	144
24	–		J-S-PKZ2(24V50HZ)	144
–	24		J-S-PKZ2(24V60HZ)	144
110	110		J-S-PKZ2(110V50/60HZ)	144
110	120		J-S-PKZ2(110V50HZ,120V60HZ)	144
190	220		J-S-PKZ2(190V50HZ,220V60HZ)	144
–	208		J-S-PKZ2(208V60HZ)	144
220	240		J-S-PKZ2(220V50HZ,240V60HZ)	144
230	230		J-S-PKZ2(230V50/60HZ)	144
230	240		J-S-PKZ2(230V50HZ,240V60HZ)	144
240	–		J-S-PKZ2(240V50HZ)	144
415	480		J-S-PKZ2(415V50HZ,480V60HZ)	144
–	600		J-S-PKZ2(600V60HZ)	144



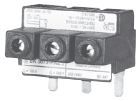
J-S-PKZ2... replacement coil. (typical)

❶ Non-standard coils are specially ordered; contact your Moeller representative.

Accessories for combination motor starters

Accessory	Contacts NO	Contacts NC	Description	Travel Diagram	Schematic	For use with…	Catalog Number	Price
Standard Auxiliary Contacts - side mount								
	1	1	Standard auxiliary contact for combination motor starters. Maximum of one per device. This device is required for remote operator use.			PKZ2/S-SP	**NHI11S-PKZ2**	110
	2	2					**NHI22S-PKZ2**	170
	2x 1	2x 1	1 NO & 1 NC connect to main switch; 1 NO & 1 NC connect to contactor module *(see schematic on right)*				**NHI2-11S-PKZ2**	176
Auxiliary Contact for Separately Mounted Contactor - side mount								
	1	1	For separately mounted contactors Maximum of one per device.			S(-G)-PKZ2	**HI11-S/EZ-PKZ2**	100
Auxiliary Contacts - front insert								
	1	1	Supplied with AC contactor			PKZ2/S-SP S(-G)-PKZ2	**HI11-S-PKZ2**	80
	2	0					**HI20-S-PKZ2**	80
Surge Suppressor								
	–	–	24 – 48 V AC			PKZ2/S-SP S(-G)-PKZ2	**VGSPKZ48**	44
	–	–	110 – 250 V AC				**VGSPKZ250**	44
	–	–	380 – 415 V AC				**VGSPKZ415**	44
Mounting Base								
	–	–	For separate mounting of a contactor used for reversing starters DIN rail mountable			S(-G)-PKZ2 CL-PKZ2	**EZ-PKZ2**	120
Mechanical Interlock								
	–	–	Used to interlock two contactors in reversing starter applications			S(-G)-PKZ2	**MV-PKZ2**	110
Control Terminal Tap-off								
	–	–	Used to tap-off control voltage or control transformers from main terminals			S(-G)-PKZ2	**ST-PKZ2**	24

Accessories for combination motor starters

Accessory	Description	For use with . . .	Catalog Number	Price
Clip Plate				
	Provides DIN rail mounting Required to couple a contactor or current limiter to the main switch module	PKZ2/S-SP PKZ2 + CL-PKZ2	**C-PKZ2**	32
Incoming Supply Terminal				
	For three-phase commoning link Protected against accidental contact $U_e = 690$ V $I_u = 120$ A	B3.1/(2)(3)-PKZ2	**BK50/3-PKZ2**	64
Three-phase Commoning Link				
	For wiring of two PKZ2 modules Space for either one side-mounted auxiliary contact or one voltage release	PKZ2/ZM PKZ2/S-SP	**B3.1/2-PKZ2**	80
	For wiring of three PKZ2 modules Space for either two side-mounted auxiliary contacts or two voltage releases	PKZ2/ZM PKZ2/S-SP	**B3.1/3-PKZ2**	96
Reversing Power Wiring Kit				
	Used to connect two contactor modules for reversing applications 42A @ 600V	PKZ2. . . /S-SP	**WB3.1-PKZ2**	200
Shroud for Unused Terminals				
	To cover unused terminals on three-phase commoning link Protection against accidental contact	B3.1/(2)(3)-PKZ2	**H-B3-PKZ2**	16
Padlocking Feature				
	For locking rear mounting motor controllers in the OFF position	PKZ2/ZM PKZ2/S-SP	**SVB-PKZ2**	80
Tamper-preventive Coding Pins				
	See page C51 for examples of use. Tamper-preventive feature used to pair proper trip module with base module. Once inserted, coding pins are not removable. Deters tampering or an accidental incorrect insertion during maintenance. Unique coding for up to 6 different trip modules.	PKZ2 + ZM PKZ2 + ZMR	**CS-PKZ2**	6.90

NEMA 1 Enclosures

Enclosure	Description	For use with...	Catalog Number	Price
For Non-Reversing PKZ2 Combination Motor Starters				
	NEMA Type 1 General purpose Steel enclosure 400 x 230 x 202 (H x W x D in mm)	PKZ2/S-SP	**S1GK23X40X20-PP**	452
For Reversing PKZ2 Combination Motor Starters				
	NEMA Type 1 General purpose Steel enclosure 600 x 270 x 202 (H x W x D in mm)	PKZ2/S-SP-FVR	**S1GK27X60X20-PP**	500

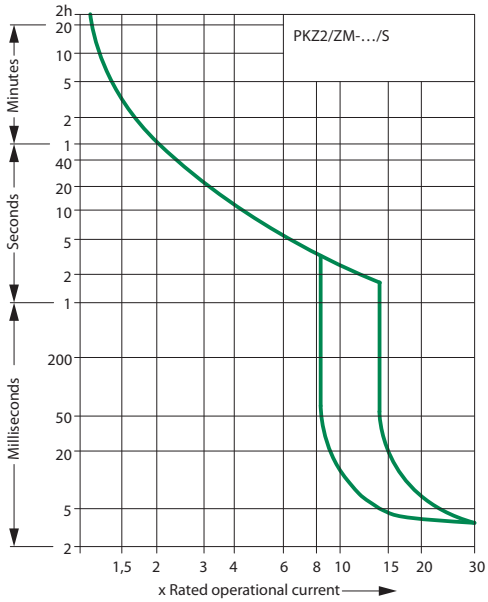
NEMA 12 Enclosures

Enclosure	Description	For use with...	Catalog Number	Price	Discount Code
For Non-Reversing PKZ2 Combination Motor Starters					
	NEMA Type 12 Dust-tight Plastic enclosure 373 x 248 x 176 (H x W x D in mm)	PKZ2/S-SP	**CI43X-150-PKZ2-SP**	400	A31
	NEMA Type 12 Dust-tight Steel enclosure Includes wall-mount brackets 400 x 230 x 200 (H x W x D in mm)	PKZ2/S-SP	**GKSD23X40X20+W**	679	D12
For Reversing PKZ2 Combination Motor Starters					
	NEMA Type 12 Dust-tight Steel enclosure Includes wall-mount brackets 600 x 270 x 200 (H x W x D in mm)	PKZ2/S-SP-FVR	**GKSD27X60X20+W**	690	D12

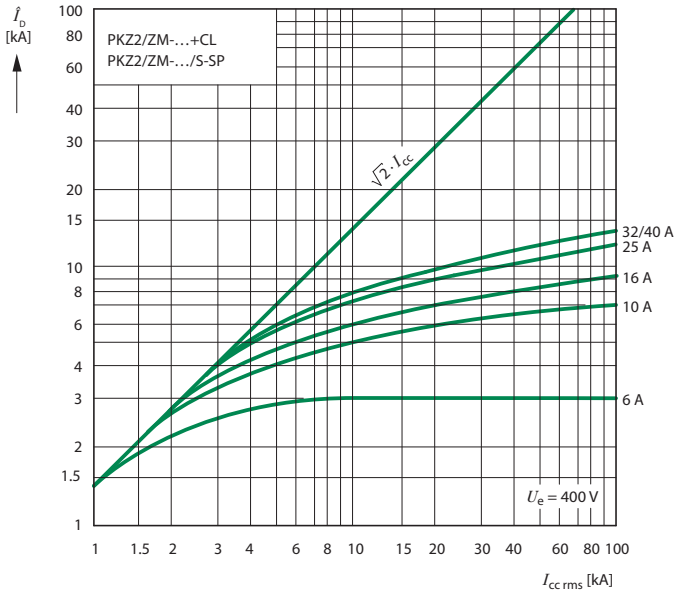
Through-the-door Mounted Handles for PKZ2

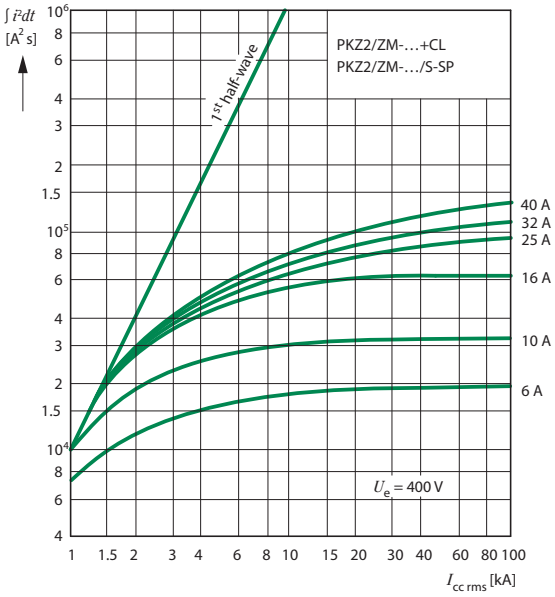
Accessory	Description	Color	Protection Rating	For use with...	Catalog Number	Price
Door Coupling Handle						
	• Rotary handle operator • Padlockable in OFF and ON positions • Includes handle coupling mechanism that accommodates mounting depth of 132 mm **Includes door interlock; not engaged when shipped**	Black	NEMA 3R, 4X, 12, 13	PKZ2/ZM PKZ2/S-SP	**PKZ2-XH**	80
		Red/Yellow	NEMA 3R, 4X, 12, 13	PKZ2/ZM PKZ2/S-SP	**PKZ2-XRH**	100
	• Rotary handle operator • Padlockable in OFF and ON positions • To be used when PKZ is rotated by 90˚ • Selectable handle positions • Includes handle coupling mechanism that accommodates mounting depth of 132 mm **Includes door interlock; not engaged when shipped**	Black	NEMA 3R, 4X, 12, 13	PKZ2/ZM PKZ2/S-SP	**PKZ2-XH-MCC**	80
Extension Shaft						
	• For mounting depths 171 – 300 mm • Includes shaft interlock mechanism	–	–	PKZ2/ZM PKZ2/S-SP	**PKZ2-XAH**	40

Tripping Characteristics, Combination Motor Starters



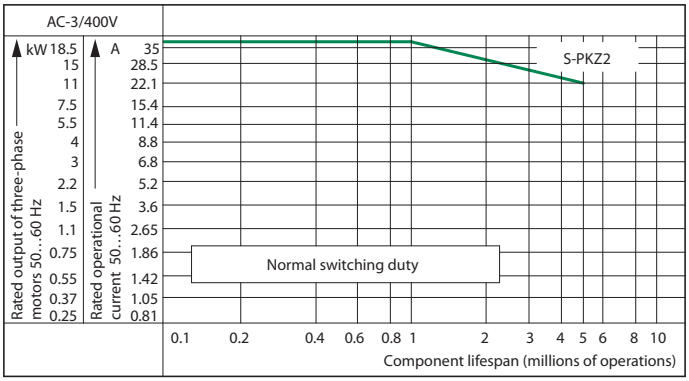
Combination Motor Starter with Current Limiter Let-through Characteristics





S-PKZ2 Contact Module

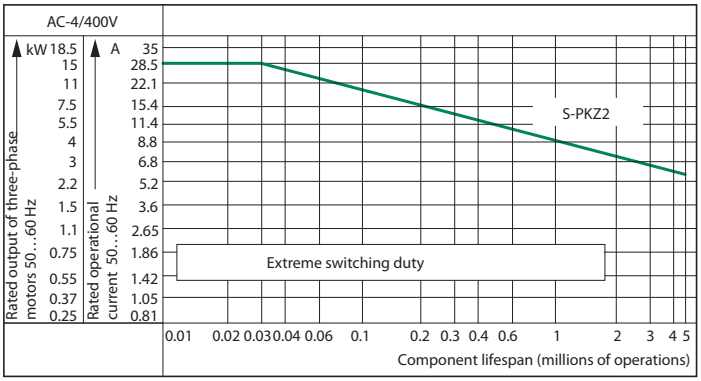
Normal Switching Duty



Normal AC Induction Motor

Operating characteristics:	Starting:	from rest	
	Stopping:	during running	
Typical applications:	compressors	lifts	mixers
	pumps	escalators	agitators
	fans	conveyors	centrifuges
	valves	bucket-elevators	air-conditioning systems
	General drives for manufacturing and processing machines		
Electrical characteristics:	Starting:	up to	
	Stopping:	6 x rated motor current	
		1 x rated motor current	
Utilization category:	100% AC-3		

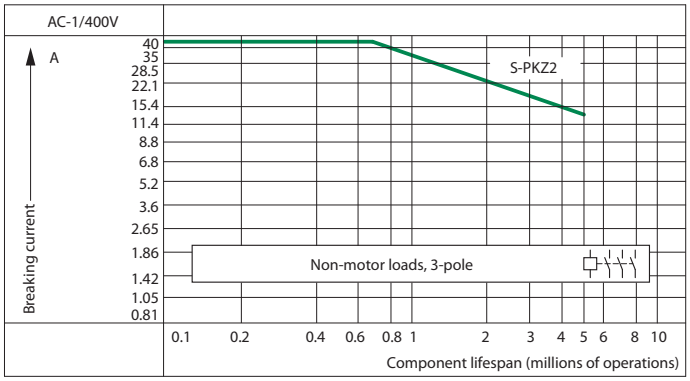
Extreme Switching Duty



Normal AC Induction Motor

Operating characteristics:	Inching, plugging, reversing	
Typical applications:	printing machines	
	wire-drawing machines	
	centrifuges	
	Special drives on manufacturing and processing machines	
Electrical characteristics:	Starting:	6 x rated motor current
	Stopping:	6 x rated motor current
Utilization category:	100% AC-4	

Light Switching Duty

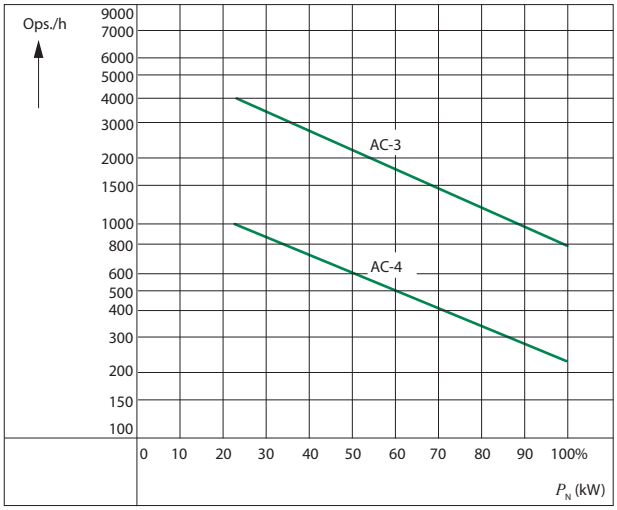


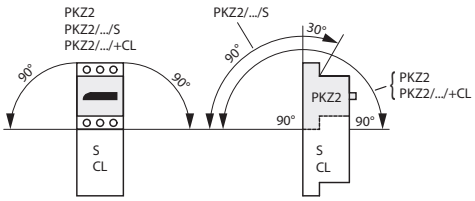
Non-Motor Loads

Operating characteristics:	Non-inductive and slightly inductive loads	
Typical applications:	Electrical heaters	
Electrical characteristics:	Starting:	up to
	Stopping:	1.5 x rated motor current
		1 x rated motor current
Utilization category:	100% AC-1	

Determination of the maximum operating frequency dependent on the rating and utilization category (recommended values) for (high-capacity) contact modules

P_N = max. motor rating (kW) ops/h = max. operations per hour



Combination Motor Starters, Contact Modules				PKZ2/ZM(R)-.../S(-G)-SP(...)	S(-G)-PKZ2(...)
General					
Standards				IEC/EN 60947, VDE 0660, UL 508, CSA C 22.2 No. 14, GL, LR, DNV, PRS, BV, RINA, RS, EZU, MEEI	
Climatic proofing				Damp heat, constant, to IEC 60068-2-78; Cyclic to IEC 60068-2-30	
Ambient temperature	Storage		[°C / °F]	-25...70 °C / *-13...158 °F*	-25...70 °C / *-13...158 °F*
	Open		[°C / °F]	-25...60 °C / *-13...140 °F*	-25...60 °C / *-13...140 °F*
	Enclosed		[°C / °F]	-25...40 °C / *-13...104 °F*	-25...40 °C / *-13...104 °F*
Mounting position					
Direction of incoming supply				As required	As required
Protection type				IP00	IP00
Mechanical shock resistance					
Half-sinusoidal shock 20 ms to IEC 60068-2-27			[g]	8	8
Altitude			[m]		
Terminal capacities	Solid or stranded		[mm²]	1 x (1 – 16); 2 x (1 – 6)	
	Flexible with ferrule		[mm²]	1 x (1.5 – 10); 2 x (1.5 – 6)	
	Solid or stranded		[AWG]	14 – 6	14 – 6
Specified tightening torque for	Main cable		[Nm]	1.8	1.8
Terminal screws	Control circuit cables		[Nm]	1	1
Main Conducting Paths					
Rated impulse withstand voltage		U_{imp}	[V AC]	6000	6000
Overvoltage category/pollution degree				III/3	III/3
Rated operational voltage		U_e	[V AC]	690	690
Rated uninterrupted current = rated operational current	$I_u = I_e$		[A]	40	40
Rated frequency			[Hz]	50 – 60	50 – 60
Current heat loss (3-pole at operating temperature)			[W]	23	9
Lifespan					
Mechanical ❶		Operations	[x 10⁶]	5	5
Electrical	100% AC-3	Operations	[x 10⁶]	1	1
	AC-4	Operations	[x 10⁶]	0.03	0.03
Maximum operating frequency		Operations/h	[Ops/h]	See graph on page D66	
Motor switching capacity	AC-3 (up to 690V)		[A]	40	40
	DC-5 up to 250V		[A]	40	40
DC application					
Rated short-circuit	I_{cn}(250V DC), L/R = 15 ms		[kA]	50	50
Breaking capacity I_{cn}	I_{cn}(125V DC), L/R = 15 ms		[kA]	65	65
Operating times under short-circuit	Minimum command time		[ms]	Approx. 2	Approx. 2
Conditions	Opening delay		[ms]	Approx. 0.5	Approx. 0.5
	Total opening delay		[ms]	4	4

❶ With dual-frequency coil 50/60 Hz, the mechanical lifespan reduces by 30%.

Trip Modules		ZM-...-PKZ2	ZMR-...-PKZ2
General			
Function		Motor protection	Motor protection
Temperature compensation			
To IEC/EN 60947, VDE 0660	[°C / °F]	-5...40 °C / *23...104 °F*	-5...40 °C / *23...104 °F*
Operating range	[°C / °F]	-25...60 °C / *-13...140 °F*	-25...60 °C / *-13...140 °F*
Temperature compensation residual error for T > 40 °C	[%/K]	≤ 0.25	≤ 0.25
Short-circuit release tolerance	[%]	± 20	± 20
Setting range of overload releases	[x I_u]	0.6 – 1	0.6 – 1
Short-circuit releases	[x I_u]	8.5 – 14	8.5 – 14

Contact Modules				S(-G)-PKZ2(...)
General				
Operating delays	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				
Operating range	Pick-up voltage		[x U_s]	0.85 – 1.1
	Drop-out voltage		[x U_s]	0.4 – 0.6
Power consumption	Pick-up AC	Pick-up	[VA]	190
	Sealing AC	Sealing	[VA]	13
DC operation				
Rated control voltage		U_s	[V DC]	24
Operating range	Pick-up voltage		[x U_s]	0.85 – 1.1
Power consumption	Pick-up DC	Pick-up	[VA]	150
	Sealing DC	Sealing	[VA]	2.7
Current consumption	Pick-up		[A]	6.3
	Sealing		[mA]	113
Rated operational current, open, enclosed				
AC-1	230V	I_e	[A]	40
	400V	I_e	[A]	40
	440V	I_e	[A]	40
	500V	I_e	[A]	40
	690V	I_e	[A]	40
AC-3	230V	I_e	[A]	40
	400V	I_e	[A]	40
	440V	I_e	[A]	40
	500V	I_e	[A]	40
	690V	I_e	[A]	40
AC-4	230V	I_e	[A]	30
	400V	I_e	[A]	30
	440V	I_e	[A]	30
	500V	I_e	[A]	28
	690V	I_e	[A]	25

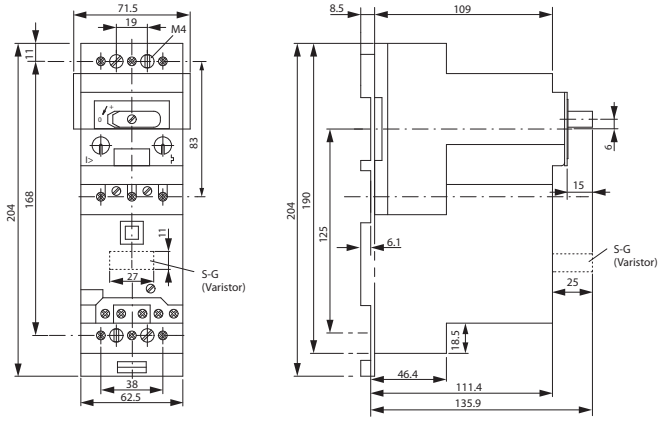
Auxiliary Contacts				NHI11S-PKZ2	NHI22S-PKZ2	NHI2-11S-PKZ2
General						
Rated impulse withstand voltage		U_{imp}	[V AC]	6000	6000	6000
Overvoltage category/pollution degree				III/3	III/3	III/3
Rated operational voltage		U_e	[V AC]	500	500	500
Rated operational current						
AC-15	230 – 240V	I_e	[A]	6	6	6
	400 – 415V	I_e	[A]	3	1.5	3
	440V	I_e	[A]	1.5	1.5	1.5
	500V	I_e	[A]	1.5	1.5	1.5
Lifespan						
Mechanical		Operations	[x 10^6]	0.1	0.1	5
Electrical		Operations	[x 10^6]	0.05	0.05	1
Control circuit reliability (at U_e = 24V DC, U_{min} = 17V, I_{min} = 10 mA)		Failure rate	[λ]	Control circuit reliability through the entire mechanical lifespan		
Interlocked opposing contacts to ZH 1/457				–	–	Yes
Short-circuit rating without welding						
	Fuseless			240V: PKZM0-6,3 415V: PKZM0-4 500V: PKZM0-1,6	240V: PKZM0-6,3 415V: PKZM0-4 500V: PKZM0-1,6	240V: PKZM0-6,3 415V: PKZM0-4 500V: PKZM0-1,6
	Fuse		[A gG/gL]	10	10	10
Terminal capacities						
	Solid or flexible conductor with ferrule		[mm²]	1 x (0.75 – 2.5) 2 x (0.75 –2.5)	1 x (0.75 – 2.5) 2 x (0.75 –2.5)	1 x (0.75 – 2.5) 2 x (0.75 –2.5)
	Solid or stranded		[AWG]	1 x (22 – 14) 2 x (22 – 14)	1 x (22 – 14) 2 x (22 – 14)	1 x (22 – 14) 2 x (22 – 14)
Safe isolation to VDE 01 06 Part 101 and Part 101/A1						
Between auxiliary contacts and main contacts			[V AC]	690	690	500

Auxiliary Contacts *(cont.)*				HI…-S-PKZ2	HI11-S/EZ-PKZ2	ZMR-…(95–96)	ZMR-…(97–98)
General							
Rated impulse withstand voltage		U_{imp}	[V AC]	6000	6000	6000	6000
Overvoltage category/pollution degree				III/3	III/3	III/3	III/3
Rated operational voltage		U_e	[V AC]	500	500	500	500
Rated operational current							
AC-15	230 – 240V	I_e	[A]	6	6	1.5	1.5
	400 – 415V	I_e	[A]	1.5	3	0.7	0.5
	440V	I_e	[A]	1.5	1.5	0.5	0.3
	500V	I_e	[A]	1.5	1.5	0.5	0.3
Lifespan							
Mechanical		Operations	[x 10^6]	5	5	0.01	0.01
Electrical		Operations	[x 10^6]	1	1	0.005	0.005
Control circuit reliability (at U_e = 24V DC, U_{min} = 17V, I_{min} = 10 mA)		Failure rate	[λ]	Control circuit reliability through the entire mechanical lifespan			–
Interlocked opposing contacts to ZH 1/457				–	–	–	–
Short-circuit rating without welding							
	Fuseless			240V: PKZM0-6,3 415V: PKZM0-4 500V: PKZM0-1,6	240V: PKZM0-6,3 415V: PKZM0-4 500V: PKZM0-1,6	–	–
	Fuse		[A gG/gL]	10	10	10	10
Terminal capacities							
	Solid or flexible conductor with ferrule		[mm²]	1 x (0.75 – 2.5) 2 x (0.75 –2.5)	1 x (0.75 – 2.5) 2 x (0.75 –2.5)	1 x (0.75 – 2.5) 2 x (0.75 –2.5)	1 x (0.75 – 2.5) 2 x (0.75 –2.5)
	Solid or stranded		[AWG]	22 – 14	22 – 14	22 – 14	22 – 14
Safe isolation to VDE 01 06 Part 101 and Part 101/A1							
Between auxiliary contacts and main contacts			[V AC]	500	500	–	–

Dimensions are in millimeters.
Not intended for manufacturing purposes.

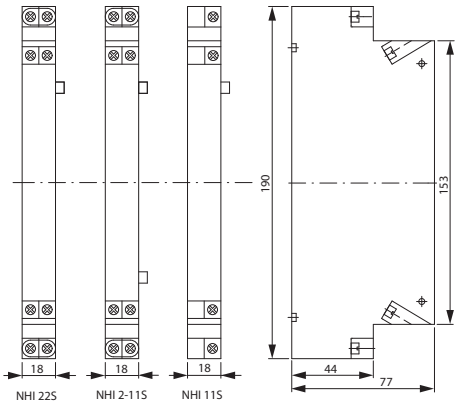
Combination Motor Starter

PKZ2/ZM(R)-…/S(-G)-SP(…)



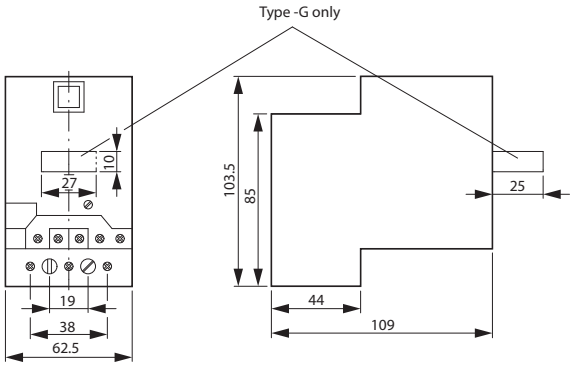
Standard Auxiliary Contacts

NHI…S-PKZ2



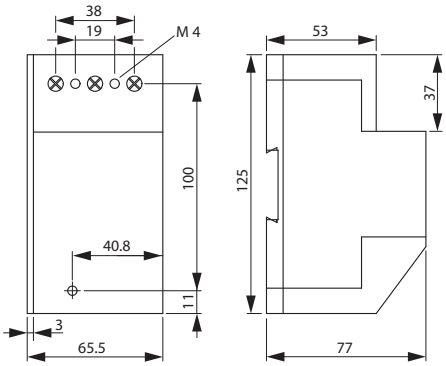
Contact Modules

S(-G)-PKZ2(…)



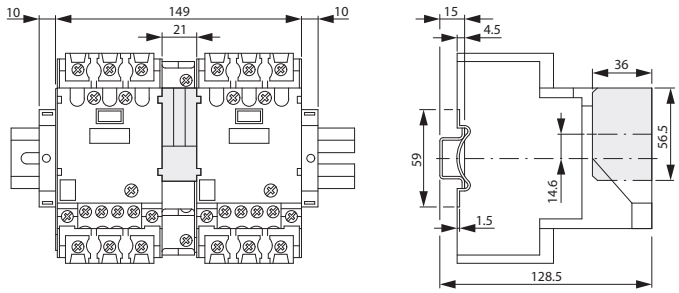
Separately Mounted Base

EZ-PKZ2, HI11-S/EZ-PKZ2



Mechanical Interlock

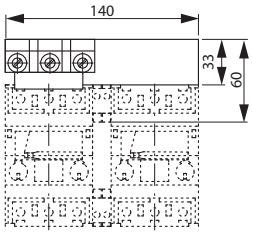
MV-PKZ2



Dimensions are in millimeters.
Not intended for manufacturing purposes.

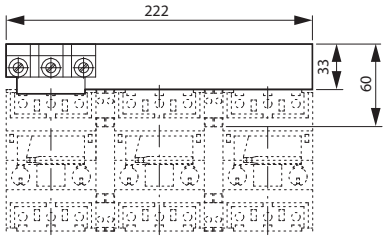
Three-phase Commoning Link

B3.1/2-PKZ2



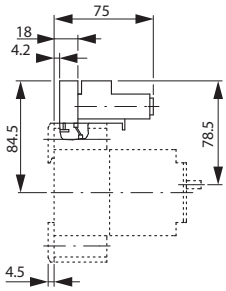
Three-phase Commoning Link

B3.1/3-PKZ2



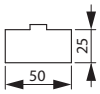
Incoming Terminal

BK50/3-PKZ2



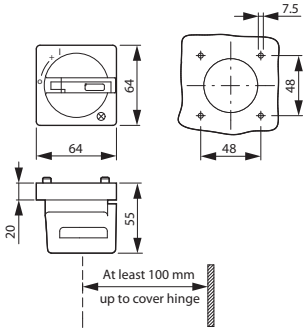
Shroud for Unused Terminals

H-B3-PKZ2



Door Coupling Handles

PKZ2-X...

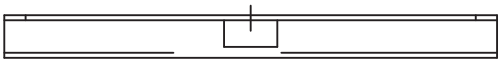


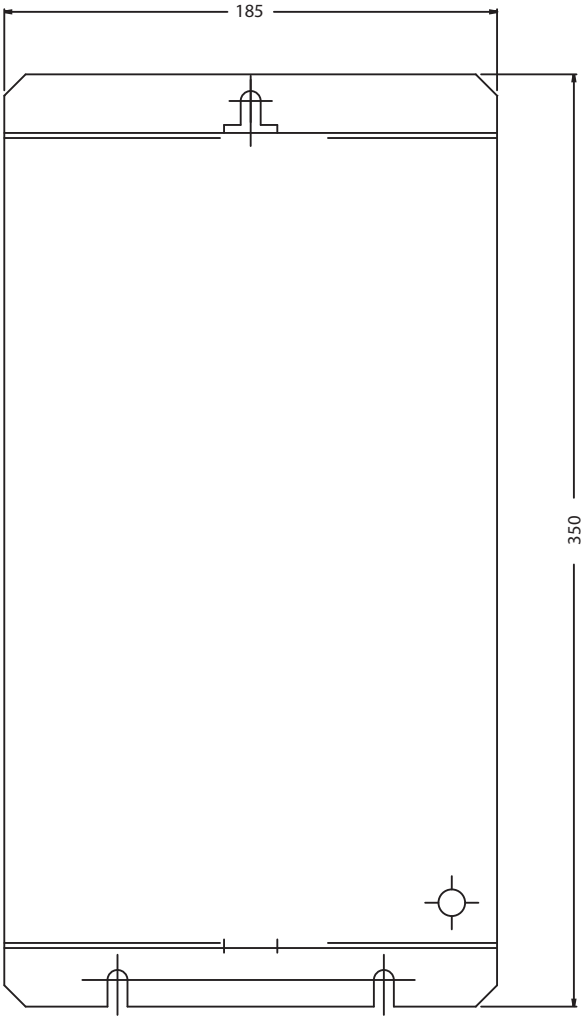
D
Combination Motor Starters

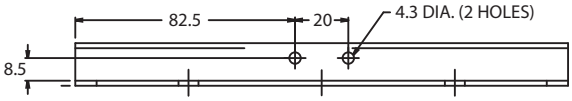
Mounting Plate for Reversing Starters

PKZ2/...-FVR

Dimensions are in millimeters.
Not intended for manufacturing purposes.



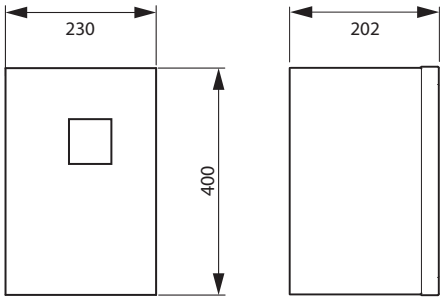




Dimensions are in millimeters.
Not intended for manufacturing purposes.

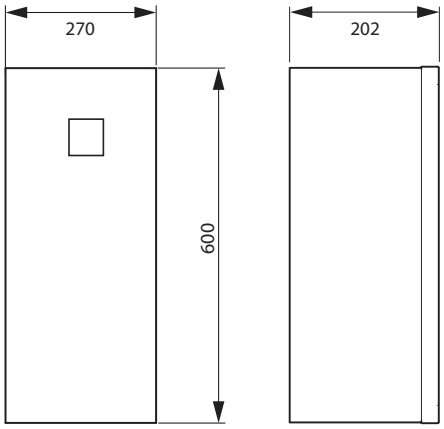
NEMA 1 Steel Enclosure

S1GK23X40X20-PP



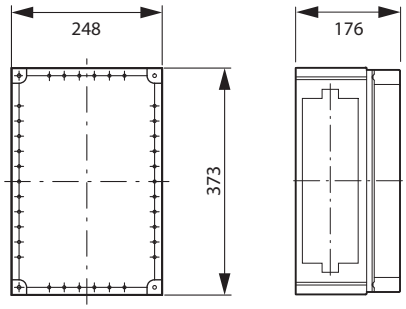
NEMA 1 Steel Enclosure

S1GK27X60X20-PP



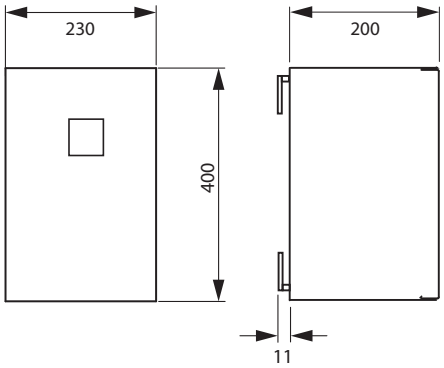
NEMA 12 Plastic Enclosure

CI43X-150-PKZ2-SP



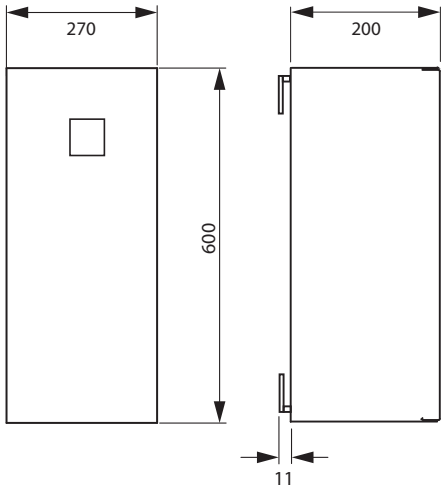
NEMA 12 Steel Enclosure

GKSD23X40X20-W



NEMA 12 Steel Enclosure

GKSD27X60X20-W



busbar system - SASY 60i

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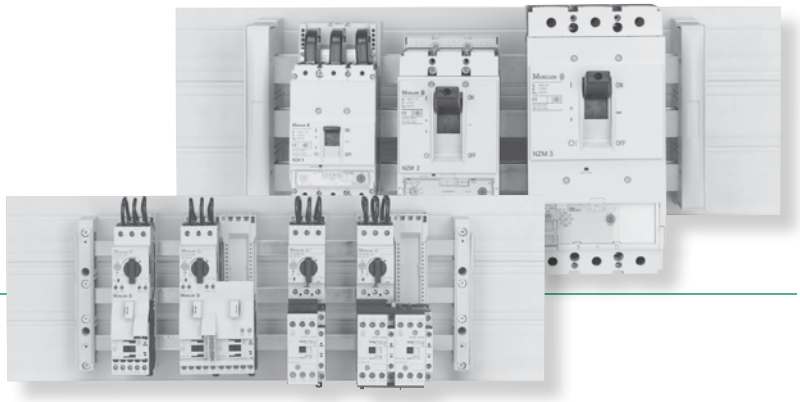
busbar system SASY 60i

E

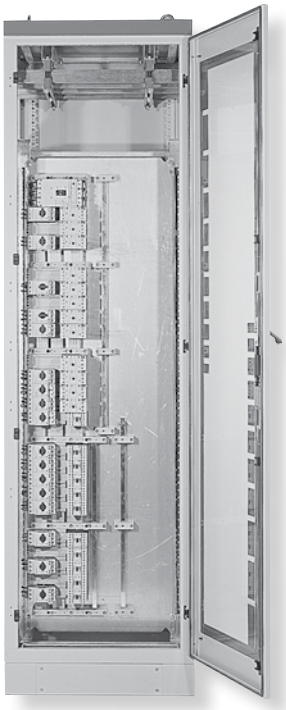
Busbar System

SASY 60i busbar system

modular system solution



Quick and cost-effective, busbar systems reduce installation time while increasing modular flexibility. Busbar systems provide a simple method of delivering power to contained processes within a control panel or motor control center. Designed with the North American market in mind, Moeller's SASY 60i busbar system is fully UL 508A compliant.



Power delivered.

SASY 60i busbar supports are rated up to 630 amps for flat busbar, and up to1200 amps for double-T profile busbar. All SASY 60i components are designed for a 60 millimeter center spacing system.

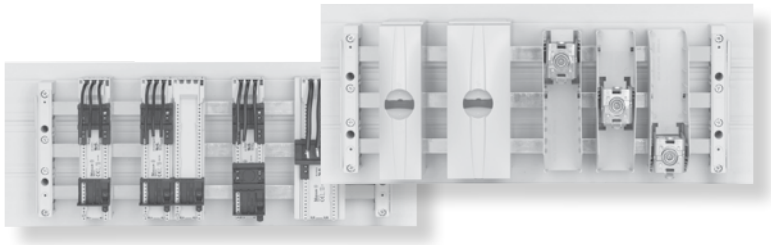
It's a snap

Components and component combinations are mounted directly to Moeller's innovative busbar adapter, and in turn are quickly and easily snapped anywhere on the busbar without using tools. Specially designed busbar adapters are available for circuit breakers, motor controllers and combination motor starters.

Ready for the future

With a modular design and use of reserved busbar section covers, expanding your system is easy. A little careful planning and foresight can make your SASY 60i busbar system virtually future-proof for expansion and growth.

- > Saves panel space and installation costs
- > Flexible and modular design allows for easy expansion to systems
- > 60 mm center spacing system is UL 508A compliant
- > Suitable for a wide range of devices and device combinations to fit many typical applications



SASY 60i Busbar System Overview

Device	Description	Range	Pages
Device Adapters			
	Manual Motor Controller Adapters	Up to 63 Amps	E5
	Combination Motor Starter Busbar Adapters	For Reversing and Non-Reversing Starters up to 63 Amps	E6
	Circuit Breaker Adapters	Up to 550 Amps	E7
Busbar Supports			
	UL/CSA IEC	For Flat Busbars Up to 630 Amps	E8
	UL/CSA/IEC; Neutral Pole	For Double-T Profile Busbars Up to 1200 Amps	E12
Busbar			
	Flat Busbar Tin-plated Unplated 1500 mm 2250 mm	Up to 630 Amps	E8
	Double-T Profile Tin-plated 2400 mm	Up to 1200 Amps	E12

Device	Description	Range	Pages
UL Required Base Plate			
	UL Required Base Plate	For North America	E9 / E13
Busbar Covers			
	1000 mm	For Flat Busbars Up to 630 Amps	E9
	1000 mm	For Double-T Profile Busbars Up to 1200 Amps	E13
Terminals			
	Universal Conductors	For Flat Busbars Up to 440 Amps	E10 – E11
	Brace Terminals	For Flat and Double-T Profile Busbars Up to 800 Amps	E14
	Profile Terminals	For Double-T Profile Busbars Up to 1200 Amps	E14
Feeder Adapters			
	Busbar adapters for flat and Double-T Profile busbars	Up to 800 Amps	E15
Insulated Copper Banding			
	Black	Up to 600 Amps	E16

SASY 60i busbar adapters

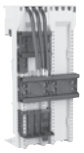
connecting components is a snap

Components and component combinations are mounted directly to Moeller's innovative busbar adapter, and in turn are quickly and easily snapped anywhere on the busbar without using tools. Specially designed busbar adapters are available for circuit breakers, motor controllers and combination motor starters.

Manual Motor Controller Busbar Adapters

Adapter	Max. Rated Operating Current I_e [A]	Rated Operating Voltage U_e [V]	Wire Cross Section	Adapter Width [mm]	Adapter Length [mm]	Number of Support Rails	For Use With...	Description	Catalog Number	Price
for Manual Motor Controllers										
	63	690	AWG 8	54	200	1	PKZM4	• Combi-base suitable for busbars both 5 and 10 mm thick • Base body temperature resistant to 120 °C / 248 °F • Support rails temperature resistant to 100 °C / 212 °F • PVC conductor insulation temperature resistant to 105 °C / 221 °F • Self-extinguishing according to UL 94 • Creepage resistance CTI 200 • Silicon and chlorine free	**BBA4-63**	140
	63	690	AWG 8	72	200	1	PKZ2		**BBA2-63**	175

Combination Motor Starter Busbar Adapters

Adapter	Max. Rated Operating Current I_e [A]	Rated Operating Voltage U_e [V]	Wire Cross Section	Adapter Width [mm]	Adapter Length [mm]	Number of Support Rails	For Use With...	Description	Catalog Number	Price
for Non-Reversing Combination Starters										
	25	690	AWG 12	45	200	1	MSC-D-0,16-M7 to MSC-D-12-M12 *(see pages D8, D10)*	• Combi-base suitable for busbars both 5 and 10 mm thick • Base body temperature resistant to 120 °C / 248 °F • Support rails temperature resistant to 100 °C / 212 °F • PVC conductor insulation temperature resistant to 105 °C / 221 °F • Self-extinguishing according to UL 94 • Creepage resistance CTI 200 • Silicon and chlorine free	**BBA0-25**	110
	32	690	AWG 10	45	200	2	MSC-D-16-M17 to MSC-D-32-M32 *(see pages D8, D10)*		**BBA0-32**	130
	63	690	AWG 8	55	260	2	MSC4-D-16-M40 to MSC4-D-58-M65 *(see pages D9, D11)*		**BBA4L-63**	160
	63	690	AWG 8	72	260	2	PKZ2/ZM + S/SP		**BBA2L-63**	220
for Reversing Combination Starters										
	25	690	AWG 12	90	200	1	MSC-R-0,16-M7 to MSC-R-12-M12 *(see pages D14, D16)*	• Combi-base suitable for busbars both 5 and 10 mm thick • Base body temperature resistant to 120 °C / 248 °F • Support rails temperature resistant to 100 °C / 212 °F • PVC conductor insulation temperature resistant to 105 °C / 221 °F • Self-extinguishing according to UL 94 • Creepage resistance CTI 200 • Silicon and chlorine free	**BBA0R-25**	220
	32	690	AWG 10	90	200	3	MSC-R-16-M17 to MSC-R-32-M32 *(see pages D14, D16)*		**BBA0R-32**	220

Circuit Breaker Busbar Adapters

Adapter	Max. Rated Operating Current I_e [A]	Rated Operating Voltage U_e [V]	Adapter Width [mm]	Adapter Length [mm]	For Use With...	Description	Catalog Number	Price
for Circuit Breakers								
	160	690	90	200	NZM1 N1 NS1	• Combi-base suitable for busbars both 5 and 10 mm thick • Base body: Thermoplast Temperature resistant to 120 °C / 248 °F Halogen free • Cover Cap: Thermoplast Temperature resistant to 125 °C / 257 °F Bromine and chlorine free • Conductor insulation: PVC Temperature resistant to 105 °C / 221 °F • Self-extinguishing according to UL 94 • Creepage resistance CTI 200 • Connects at top	**NZM1-XAD160**	380
	250	690	106	190	NZM2 N2 NS2	• Claw-type terminal • Base body: Thermoplast Temperature resistant to 120 °C / 248 °F Halogen free • Self-extinguishing according to UL 94 • Creepage resistance CTI 200 • Connects to top or bottom	**NZM2-XAD250**	420
	550	690	140	270	NZM3 N3	• Claw-type terminal • Base body: Thermoplast Temperature resistant to 120 °C / 248 °F Halogen free • Self-extinguishing according to UL 94 • Creepage resistance CTI 200 • Connects at top	**NZM3-XAD550**	590

Universal Busbar Adapters

Adapter	Max. Rated Operating Current I_e [A]	Rated Operating Voltage U_e [V]	Wire Cross Section	Adapter Width [mm]	Adapter Length [mm]	Number of Support Rails	Description	Catalog Number	Price
for Universal Use									
	25	690	AWG 12	45	200	2	• Mounting rail can be offset on 1.25mm grid	**BBA0-25/2TS**	114
Empty Module without electrical contacts									
	–	–	–	45	200	2	• Mounting rail can be offset on 1.25mm grid • For use with reversing and star-delta starters.	**BBA0/2TS-L**	84
				54	200	2		**BBA4/2TS-L**	110
Side Mount Module									
	–	–	–	9	200	–	• Can be used to extend mounting width	**BBA-XSM**	36

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Busbar System

- Temperature resistant up to 120 °C / 248 °F.
- Self-extinguishing according to UL 94
- Creepage resistance CTI 200
- Silicon and Chlorine free

Busbar Supports for Flat Busbars *(up to 630 A)*

Component	Number of Poles	Max. Rated Operating Current I_e [A]	Description	For Use With Busbar Dimensions [mm]	Catalog Number	Price
UL/CSA Supports						
	3	630	Must be used in conjunction with UL base plate BBC-BT-NA for UL 508A With snap-in slide to fit multiple busbar sizes Pre-drilled holes for screw-fixing	12 x 5 20 x 5 20 x 10 30 x 10	**BBS-3/FL-NA**	100
IEC and UL/CSA Supports						
	3	630	With snap-in slide to fit multiple busbar sizes Pre-drilled holes for screw-fixing	12 x 5 20 x 5 20 x 10 30 x 10	**BBS-3/FL**	120

Flat Busbars *(up to 400 A)*

Flat Busbar	Max. Rated Operating Current I_e [A]	Description	Dimensions width x thickness [mm]	Length [mm]	Catalog Number	Price
Flat Copper Busbar						
	200	Tin-plated copper busbar	12 x 5	1500	**CU12X5**	41
	200	Tin-plated copper busbar	12 x 5	2250	**CU12X5-2250**	69
	320	Tin-plated copper busbar	20 x 5	1500	**CU20X5**	62
	320	Tin-plated copper busbar	20 x 5	2250	**CU20X5-2250**	104
	520	Tin-plated copper busbar	20 x 10	1500	**CU20X10**	124
	520	Tin-plated copper busbar	20 x 10	2250	**CU20X10-2250**	234
	630	Unplated copper busbar	30 x 10	1500	**CU30X10**	174

- Temperature resistant up to 110 °C / 230 °F.
- Self-extinguishing according to UL 94
- Silicon and Chlorine free

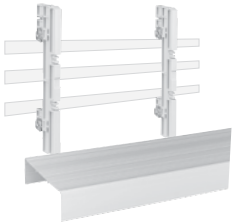
UL / CSA Required Busbar Base Plate

Component	Description	Catalog Number	Price
UL/CSA Base Plate			
	Base plate required for UL 508A operation 1100 mm in length	**BBC-BT-NA** **Required for UL**	180

Busbar Covers for Flat Busbars *(up to 630 A)*

Component	Description	For Use With Busbar Dimensions [mm]	Catalog Number	Price
Busbar Covers				
	1000 mm in length	12 x 5 20 x 5	**BBC-FL5**	50
	1000 mm in length	20 x 10 30 x 10	**BBC-FL10**	54
End Cover				
	Covers side of busbar supports BBS-3/FL-NA BBS-3/FL	–	**ES-BBS-3/FL**	12

Reserved Busbar Section Covers

Cover System	For Use With…	Description		Catalog Number	Price
	• Flat Busbar: 12 x 5 20 x 5 20 x 10 30 x 10	To cover unused sections of flat busbar 1100 mm in length Support for single busbar cover system	Front, top and bottom protection	**BBC-RCOV1**	144
			Side support	**BBC-MRCOV1**	22

Busbar Terminals for Flat 5 mm Busbars *(up to 440 A)*

Terminal	Max. Rated Operating Current I_e [A]	Conductor Type	Description	Catalog Number	Price
Universal Conductor Terminals					
	180	1.5 – 16 mm² AWG 14 – 6 Round conductor Cu-Band: 8x6x0.5	With integrated retaining spring For use with all flat busbars 5mm thick	**AKU16/5**	2.60
	270	4 – 35 mm² AWG 10 – 2 Round conductor Cu-Band: 3x9x0.8 or 6x9x0.8	With integrated retaining spring For use with all flat busbars 5mm thick	**AKU35/5**	4
	400	16 – 70 mm² AWG 4 – 2/0 Round conductor Cu-Band: 2x(3x9x0.8) or 6x9x0.8	With integrated retaining spring For use with all flat busbars 5mm thick	**AKU70/5**	4.70
	440	16 – 120 mm² AWG 4 – MCM 250 Round conductor Cu-Band: 4x16x0.8 or 6x16x0.8 or 10x16x0.8	With integrated retaining spring For use with all flat busbars 5mm thick	**AKU120/5**	10

Busbar Terminals for Flat 10 mm Busbars *(up to 440 A)*

Terminal	Max. Rated Operating Current I_e [A]	Conductor Type	Description	Catalog Number	Price
Universal Conductor Terminals					
	180	1.5 – 16 mm² AWG 14 – 6 Round conductor Cu-Band: 8x6x0.5	With integrated retaining spring For use with all flat busbars 10mm thick	**AKU16/10**	4.50
	270	4 – 35 mm² AWG 10 – 2 Round conductor Cu-Band: 3x9x0.8 or 6x9x0.8	With integrated retaining spring For use with all flat busbars 10mm thick	**AKU35/10**	5
	400	16 – 70 mm² AWG 4 – 2/0 Round conductor Cu-Band: 2x(3x9x0.8) or 6x9x0.8	With integrated retaining spring For use with all flat busbars 10mm thick	**AKU70/10**	6
	440	16 – 120 mm² AWG 4 – MCM 250 Round conductor Cu-Band: 4x16x0.8 or 6x16x0.8 or 10x16x0.8	With integrated retaining spring For use with all flat busbars 10mm thick	**AKU120/10**	10

- Temperature resistant up to 120 °C / 248 °F.
- Self-extinguishing according to UL 94
- Creepage resistance CTI 200
- Silicon and Chlorine free

Busbar Supports for Double-T Profile Busbars *(up to 1200 A)*

Component	Number of Poles	Max. Rated Operating Current I_e [A]	Description	Catalog Number	Price
Supports					
	3	1200	Must be used in conjunction with UL base plate BBC-BT-NA for UL 508A Pre-drilled holes for screw-fixing	**BBS-3/PR**	480
Neutral Supports					
	1	1200	Pre-drilled holes for screw-fixing	**BBS-1/PR**	39

Double-T Profile Busbars *(up to 950 A and 1200 A)*

Busbar	Max. Rated Operating Current I_e [A]	Description	Catalog Number	Price
Double-T Profile Busbar				
	950	Tin-plated Cross-section 500 mm² 2400 mm in length	**CU-BAR-500/T**	1550
	1200	Tin-plated Cross-section 720 mm² 2400 mm in length	**CU-BAR-720/T**	2390

- Temperature resistant up to 110 °C / 230 °F.
- Self-extinguishing according to UL 94
- Silicon and Chlorine free

UL / CSA Required Busbar Base Plate

Component	Description	Catalog Number	Price
UL/CSA Base Plate			
	Base plate required for UL 508A operation 1100 mm in length	**BBC-BT-NA** **Required for** UL	180

Busbar Covers for Double-T Profile Busbars *(up to 950 A and 1200 A)*

Component	Description	Catalog Number	Price
Double-T Profile Busbar Covers			
	1000 mm in length	**BBC-CU-BAR/PR**	70
End Cover			
	Covers side of double-T profile busbar supports BBS-3/PR	**ES-BBS-3/PR**	68

Reserved Busbar Section Covers

Cover System	For Use With…	Description		Catalog Number	Price
	• Flat Busbar: 12 x 5 20 x 5 20 x 10 30 x 10 • Double-T Profile	To cover unused sections of Double-T Profile or flat busbar Temperature resistant up to 120 °C / 248 °F Self-extinguishing according to UL 94 Silicon and chlorine free	Front cover 1100 mm in length	**BBC-CS2-F**	65
			Top and Bottom 1100 mm in length	**BBC-CS2-T/B**	24
			Left and Right side supports	**BBC-MCS2**	43

Busbar Terminals for Flat and Double-T Profile Busbars *(up to 1200 A)*

Terminal	Max. Rated Operating Current I_e [A]	Conductor Type	Description	Catalog Number	Price
Brace Terminals					
	500	95 – 185 mm² AWG 3/0 – MCM 350 Round conductor Sector conductor	For use with: • Flat busbars: 20 x 5 20 x 10 30 x 10 • Double-T Profile busbars	**AKS185**	33
	600	150 – 300 mm² MCM 300 – MCM 600 Round conductor Sector conductor	For use with: • Flat busbars: 20 x 5 20 x 10 30 x 10 • Double-T Profile busbars	**AKS300**	55
	800	Cu-Band: from 2x(10x16x0,8) to 2x(11x21x1)	For use with: • Flat busbars: 20 x 5 20 x 10 30 x 10 • Double-T Profile busbars	**AKS-CU-BAND**	70
Profile Terminals					
	1200	800 mm² Termination space: 41 x 20-42 Cu-Band Cu-Bar	For use with Double-T Profile busbars	**AKP800**	147
	1200	1000 mm² Termination space: 51 x 20-42 Cu-Band Cu-Bar	For use with Double-T Profile busbars	**AKP1000**	166

Busbar Feeder Adapters for Flat and Double-T Profile Busbars *(up to 800 A)*

Connector	Number of Poles	Max. Rated Operating Current I_e [A]	Conductor Type	For Use With…	Description	Catalog Number	Price
	3	300	6 – 50 mm² AWG 10 – 2/0 Round conductor Cu-Band: 6x9x0.8	• Flat busbars: 12 x 5 20 x 5 20 x 10 30 x 10 • Double-T Profile	• Center line distance between busbars: 60 mm • Temperature resistant to 120 °C / 248 °F • Self-extinguishing according to UL 94 • Terminal plates creepage resistance CTI 200 • Silicon and chlorine free	**BBA-TP3/50**	100
	3	440	35 – 120 mm² AWG 2 – MCM 250 Round conductor Cu-Band: 10x16x0.8	• Flat busbars: 12 x 5 20 x 5 20 x 10 30 x 10 • Double-T Profile	• Center line distance between busbars: 60 mm • Temperature resistant to 120 °C / 248 °F • Self-extinguishing according to UL 94 • Terminal plates creepage resistance CTI 200 • Silicon and chlorine free	**BBA-TP3/120**	140
	3 x 1	560	120 – 300 mm² MCM 300 – MCM 600 Round conductor Sector conductor	• Flat busbars: 20 x 5 20 x 10 30 x 10 • Double-T Profile	• CSA Only • Center line distance between busbars: 60 mm • Includes cover cap	**BBA-TP3/300**	280
	3 x 1	800	Up to Cu-Band: 2x(10x16x0,8)	• Flat busbars: 20 x 5 20 x 10 30 x 10 • Double-T Profile	• CSA Only • Center line distance between busbars: 60 mm • Includes cover cap	**BBA-TP3/CU-BAND**	280

Multi-layer Insulated Copper Band

Copper Band	Max. Rated Operating Current I_e [A]	Dimensions (in mm) [no. of layers x width x thickness of layers]	Cross Section [mm]	Description	Color	Catalog Number	Price
Multi-layer Copper Bands							
	100	3 x 9 x 0.8	21.6	UL listed for max. 600V AC Used primarily for busbar jumpers • E-Cu conductor, tin-plated • Rated voltage 690V AC • Breakdown voltage 20 kV/mm • Insulating material heat resistant up to 105 °C / 221 °F • Self-extinguishing according to UL 94 V0 • 2000 mm (2 meters) in length	Black	**CU-BAND3X9X0,8SCHW-ULAPPTYP7-4223**	48
	160	6 x 9 x 0.8	43.2		Black	**CU-BAND6X9X0,8SCHW-ULAPPTYP7-4223**	83
	200	4 x 16 x 0.8	64.8		Black	**CU-BAND4X16X0,8SCHW-ULAPPTYP7-4223**	115
	250	6 x 16 x 0.8	74.4		Black	**CU-BAND6X16X0,8SCHW-ULAPPTYP7-4223**	119
	400	10 x 16 x 0.8	124		Black	**CU-BAND10X16X0,8SCHW-ULAPPTYP7-4223**	185
	600	11 x 21 x 1	231		Black	**CU-BAND11X21X1SCHW-ULAPPTYP7-4223**	325

UL / CSA Approvals List

Catalog Number	USA ❶	Canada
AKP800	✔	✔
AKP1000	✔	✔
AKS185	✔	✔
AKS300	✔	✔
AKS-CU-BAND	✔	✔
AKU16/5	✔	✔
AKU16/10	✔	✔
AKU35/5	✔	✔
AKU35/10	✔	✔
AKU70/5	✔	✔
AKU70/10	✔	✔
AKU120/5	✔	✔
AKU120/10	✔	✔
BBA0-25	✔	✔
BBA0-32	✔	✔
BBA0R-25	✔	✔
BBA0R-32	✔	✔
BBA2-63	✔	✔
BBA2L-63	✔	✔
BBA4-63	✔	✔
BBA4L-63	✔	✔
BBA-TP3/50	✔	✔
BBA-TP3/120	✔	✔
BBA-TP3/300		✔
BBA-TP3/CU-BAND		✔
BBC-BT-NA	✔	✔
BBC-CS2-F	✔	✔
BBC-CS2-T/B	✔	✔
BBC-CU-BAR/PR	✔	✔
BBC-FL5	✔	✔
BBC-FL10	✔	✔
BBC-MCS2	✔	✔
BBC-MRCOV1	✔	✔
BBC-RCOV1	✔	✔
BBS-1/PR	✔	✔
BBS-3/FL	✔	✔
BBS-3/FL-NA	✔	✔
BBS-3/PR	✔	✔
CU-BAR-500/T	✔	✔
CU-BAR-720/T	✔	✔
ES-BBS-3/FL	✔	✔
ES-BBS-3/PR	✔	✔
NZM1-XAD160	✔	✔
NZM2-XAD250	✔	✔
NZM3-XAD550	✔	✔

Cross Sections vs AWG/MCM Sizes reference table

Cross Section [mm²]	AWG/MCM [Size]
1.5	16 AWG
2.5	14 AWG
4	12 AWG
6	10 AWG
10	8 AWG
16	6 AWG
25	4 AWG
35	2 AWG
50	0 AWG
70	2/0 AWG
95	3/0 AWG
120	250 MCM
150	300 MCM
185	350 MCM
240	500 MCM
300	600 MCM

❶ Tested for feeder circuits according to UL-508A up to 600V.

UL–Approbation File No: E307559, E300273
CSA–Approbation Report No: 236217, 232140
UL File No. for CU-Band: E248096

According to UL - 60 mm Busbar Support Systems

1-Pole	2-Pole	3-Pole
–	–	• Flat busbar (width) x (thickness): 12 x 5, 20 x 5, 20 x 10, 30 x 10 • Double-T profile
Minimum screw torque for fixing cover and bottom of support: 4 Nm		

According to DIN EN 13601 - Busbar Systems

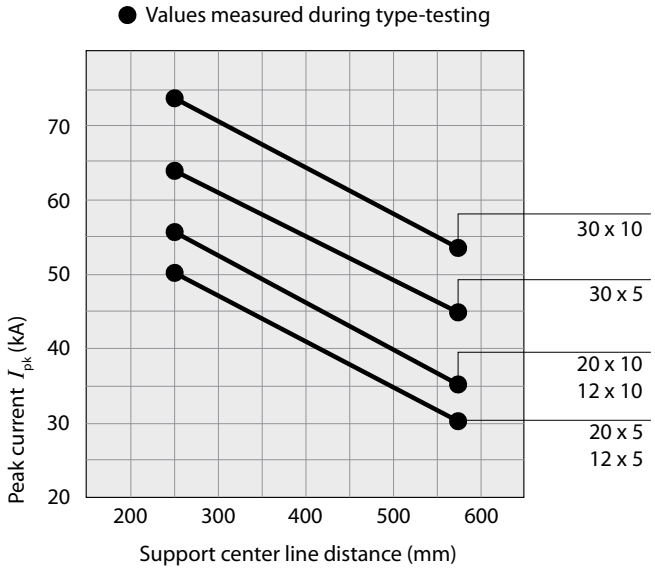
Permissible Tolerances [mm]	Center Line Distance (for 60mm system)	Variance on the contacting level
Radius (R): 0.3 – 0.7 Width: +0.1 / -0.5 Thickness: +0.1 / -0.1	± 0.5 mm	0.4 mm
Tin-plated Cu bars significantly reduce the work necessary for preparing the contact points. Cu busbars are effectively protected against aggresssive environments.		
The higher current carrying capacities to DIN 43671 were obtained under operating conditions. The busbar temperature is normally positively influenced by mounting components on the busbar and by air circulation within the installation. Depending on the respective ambient temperature, you can calculate the correction factor k2 according to DIN 43671 for flat busbars. If ambient conditions change, a correction factor needs to be taken into account. On the other hand, increased loads may occur if the components feature a correspondingly high temperature resistance. A 30 x 10 tin-plated busbar can, under normal conditions, be loaded with 630A. With a load of 800A, for instance, a k2 correction factor of 1.3 is necessary. It follows from the diagram on E20 that with this factor and 35 °C / *95 °F* air temperature, the busbar heats up to approximately 85 °C / *185 °F*.		

According to IEC - 60 mm Busbar Support Systems

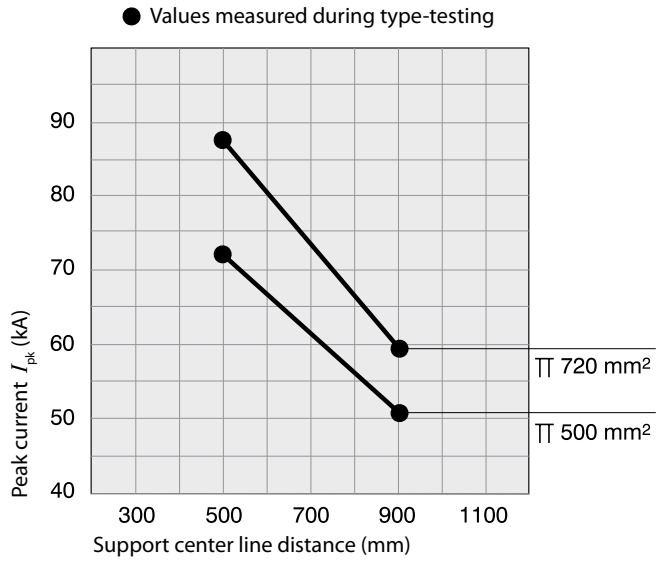
1-Pole	2-Pole	3-Pole
• Flat busbar (width) x (thickness): (12 – 30) x (5 – 10) • Double-T profile	• Flat busbar (width) x (thickness): (12 – 30) x (5 – 10)	• Flat busbar (width) x (thickness): (12 – 30) x (5 – 10) • Double-T profile
Minimum screw torque for fixing cover and bottom of support: 4 Nm		

Short-circuit strength diagrams according to IEC / EN 60439-1 for 60mm SASY 60i Busbar Systems

BBS-3/FL

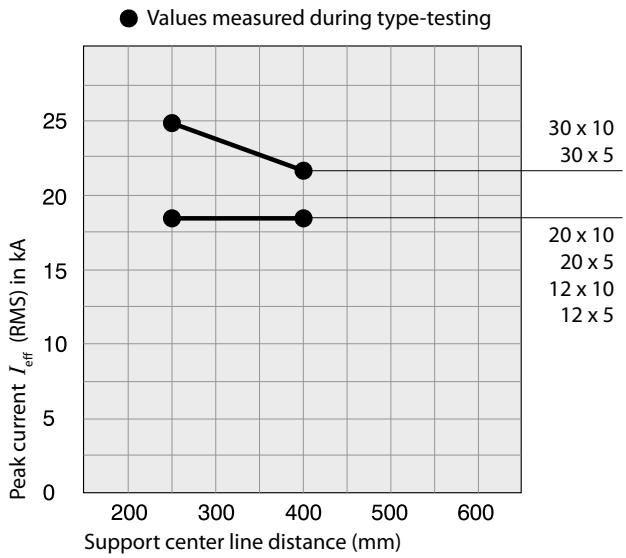


BBS-3/PR

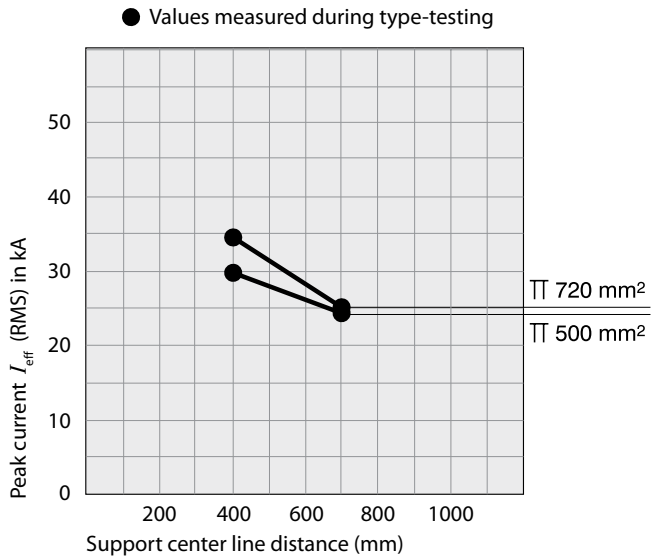


Short-circuit strength diagrams according to UL 845 for 60mm SASY 60i Busbar Systems

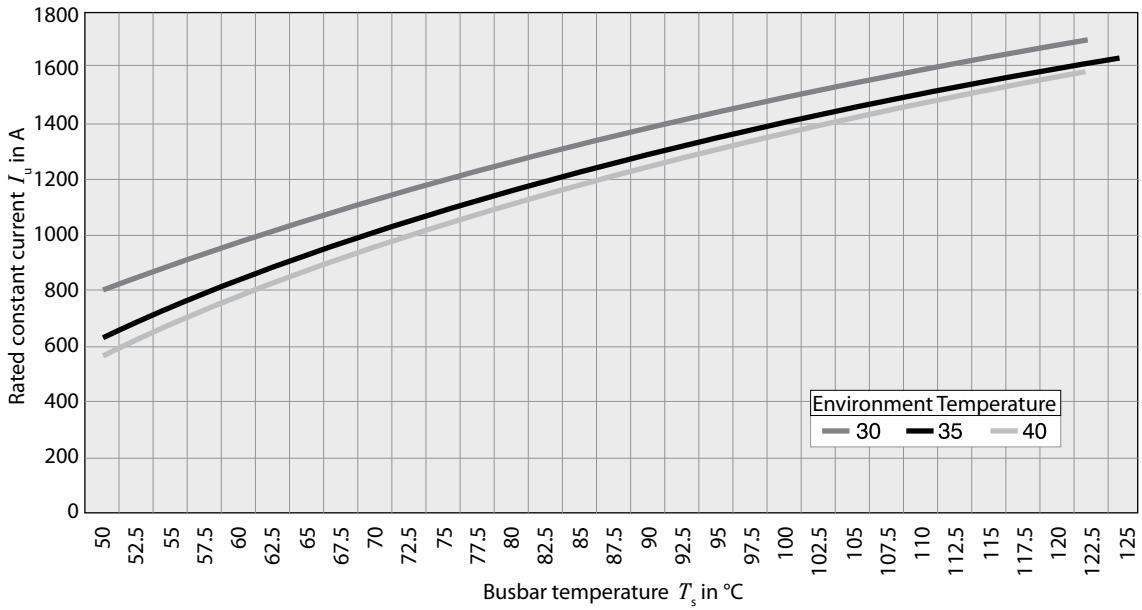
BBS-3/FL-NA



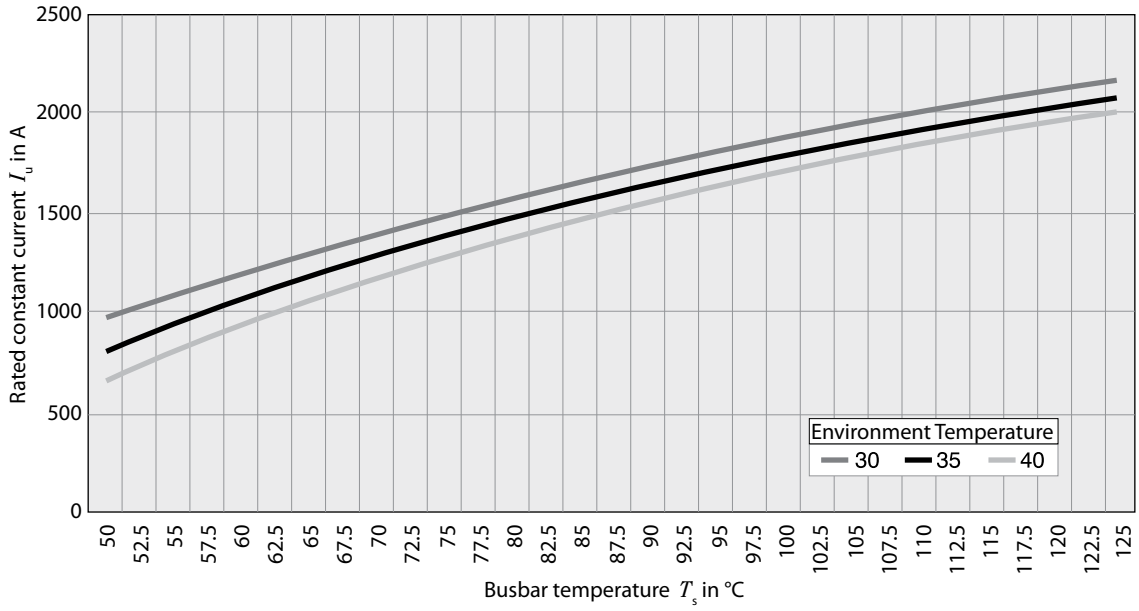
BBS-3/PR



Current Load TT 500 mm²



Current Load TT 720 mm²



Busbar Supports			BBS-3/FL(-NA)	BBS-3/PR
General				
Standards and regulations			type-tested according to VDE 0660 Part 500; IEC/EN 60439-1	
Fitting position			vertical position of bar width, any	
Tightening torque of cover	M_d	[Nm]	4	4
Material				
Material			Thermoplast	Thermoplast
Halogens			halogen-free	halogen-free
Flammability			self-extinguishing according to UL 94-V0	
Color			RAL 7035	RAL 7035
Creepage resistance			CTI 200	CTI 200
Continuous operation temperature		[°C / °F]	120 °C / *248 °F*	120 °C / *248 °F*
Current Paths				
Rated insulation voltage	U_i	[V]	3000	3000
Rated operating voltage	U_e	[V]	690	690
Rated frequency	f	[Hz]	50/60	50/60
Center line distance of busbars		[mm]	60	60
Rated constant current ❶				
with busbar 12 x 5 mm	I_u	[A]	218	–
with busbar 15 x 5 mm	I_u	[A]	273	–
with busbar 20 x 5 mm	I_u	[A]	349	–
with busbar 25 x 5 mm	I_u	[A]	436	–
with busbar 30 x 5 mm	I_u	[A]	491	–
with busbar 12 x 10 mm	I_u	[A]	392	–
with busbar 20 x 10 mm	I_u	[A]	567	–
with busbar 30 x 10 mm	I_u	[A]	687	–
with 500 mm²	I_u	[A]	–	1003
with 720 mm²	I_u	[A]	–	1281
Ambient temperature		[°C / °F]	35 °C / *95 °F*	35 °C / *95 °F*
Temperature of busbar		[°C / °F]	70 °C / *158 °F*	70 °C / *158 °F*
Rated peak withstand current ❷				
with busbar 12 x 5 mm	I_{pk}	[kA]	50	–
with busbar 15 x 5 mm	I_{pk}	[kA]	50	–
with busbar 20 x 5 mm	I_{pk}	[kA]	50	–
with busbar 25 x 5 mm	I_{pk}	[kA]	50	–
with busbar 30 x 5 mm	I_{pk}	[kA]	64	–
with busbar 12 x 10 mm	I_{pk}	[kA]	56	–
with busbar 20 x 10 mm	I_{pk}	[kA]	56	–
with busbar 30 x 10 mm	I_{pk}	[kA]	73	–
with 500 mm²	I_{pk}	[kA]	–	72
with 720 mm²	I_{pk}	[kA]	–	87
Short-circuit time	t	[ms]	20	20
Support center line distance		[mm]	250	500

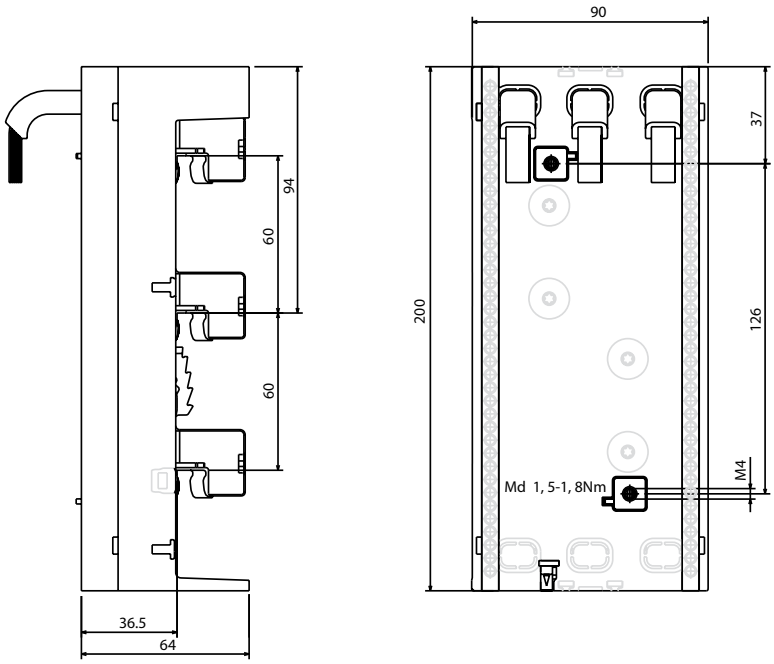
❶ In case of temperature variances, DIN 43671 requires a kA correction factor to be taken into account.

❷ For other support center line distances, please refer to the short-circuit strength diagrams.

Busbar Adapters

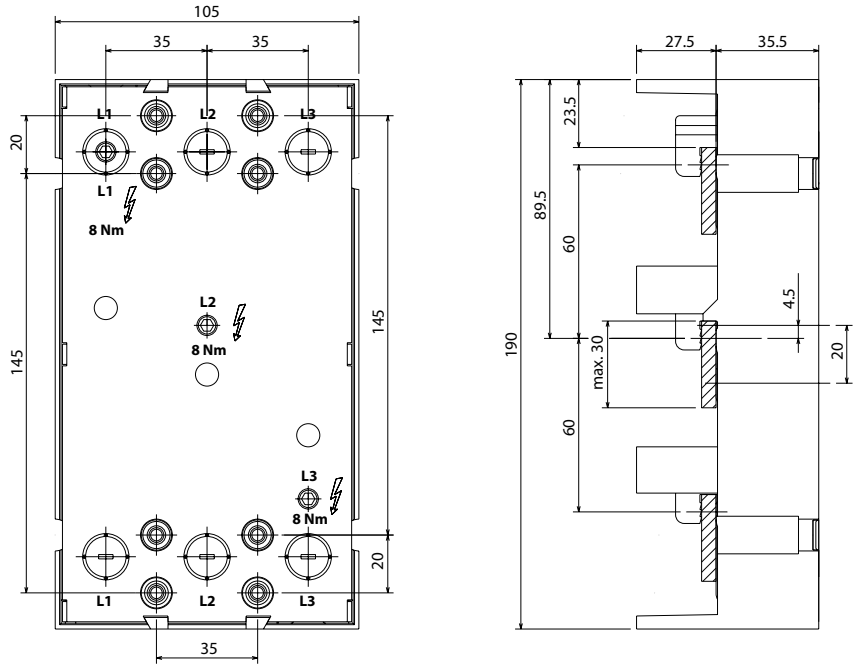
NZM1-XAD160

Dimensions are in millimeters.
Not intended for manufacturing purposes.



Busbar Adapters

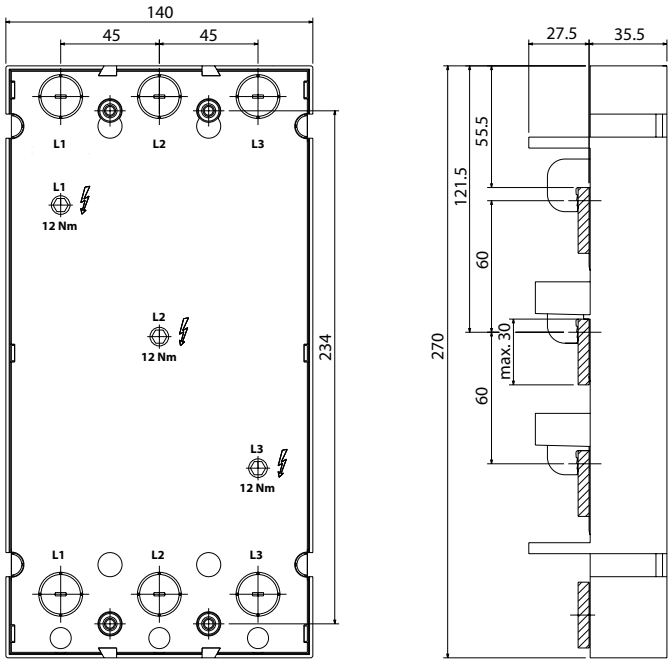
NZM1-XAD250



Busbar Adapters

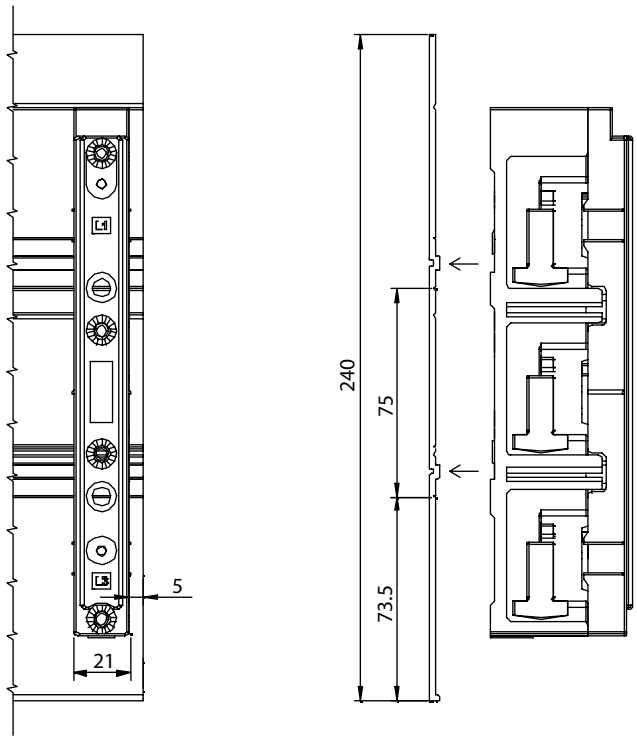
NZM1-XAD550

Dimensions are in millimeters.
Not intended for manufacturing purposes.



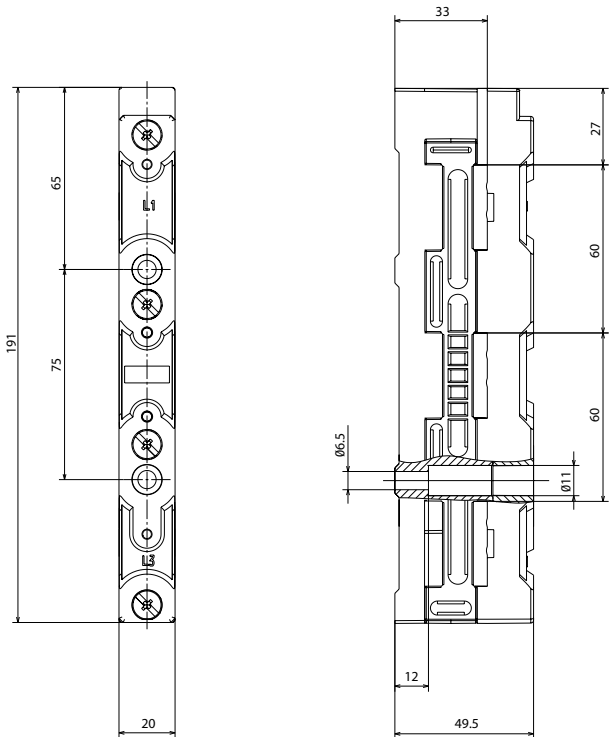
Busbar Supports - Flat Busbar

BBS-3/FL-NA



Busbar Supports - Flat Busbar

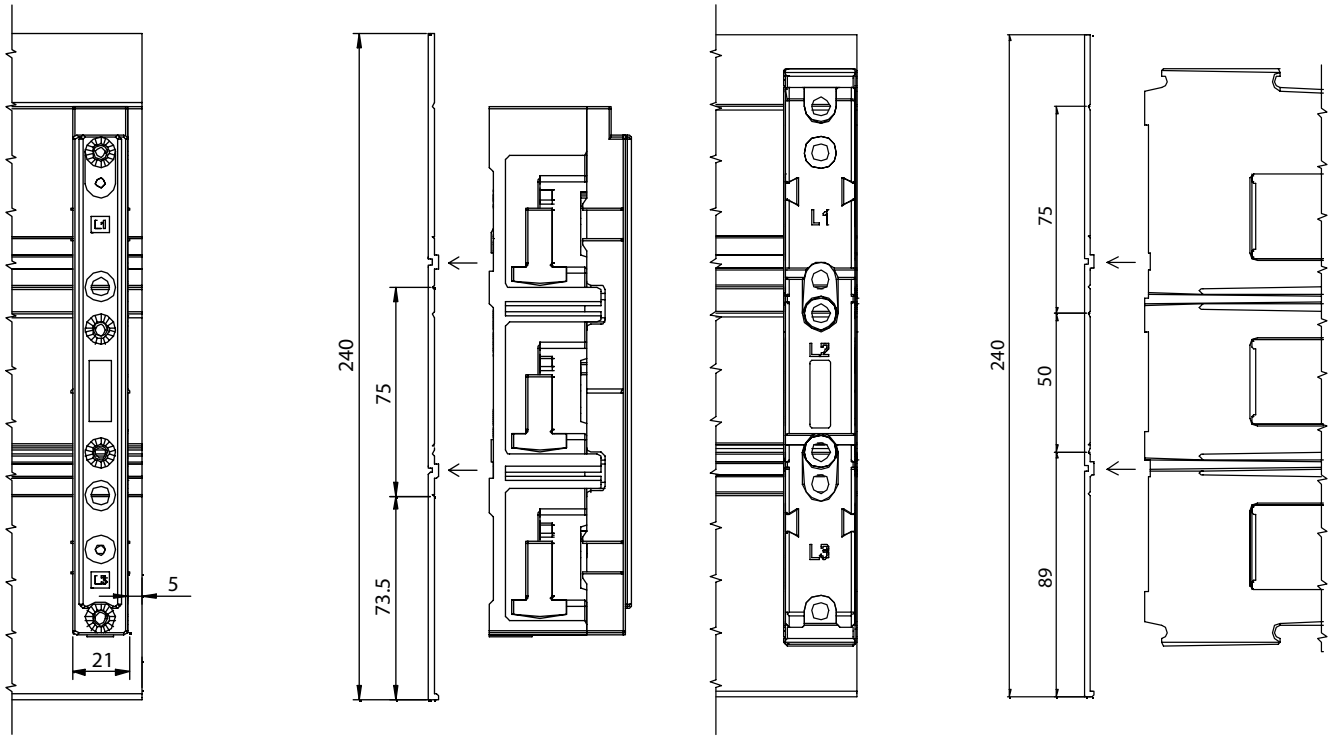
BBS-3/FL



Base Plate

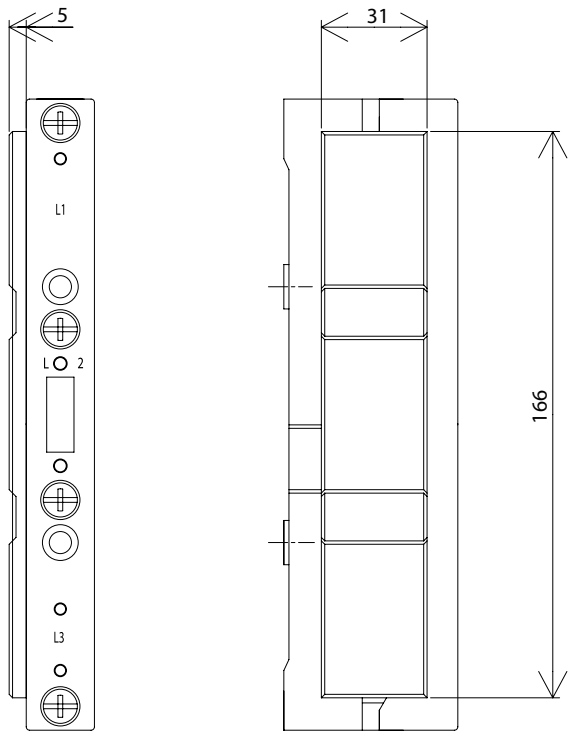
BBC-BT-NA

Dimensions are in millimeters.
Not intended for manufacturing purposes.



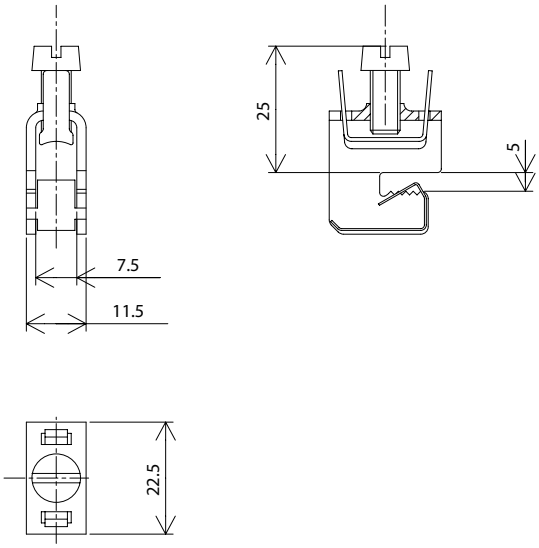
Busbar Support for Flat Busbar End Cover

ES-BBS-3/FL



Terminals for 5 mm Flat Busbars

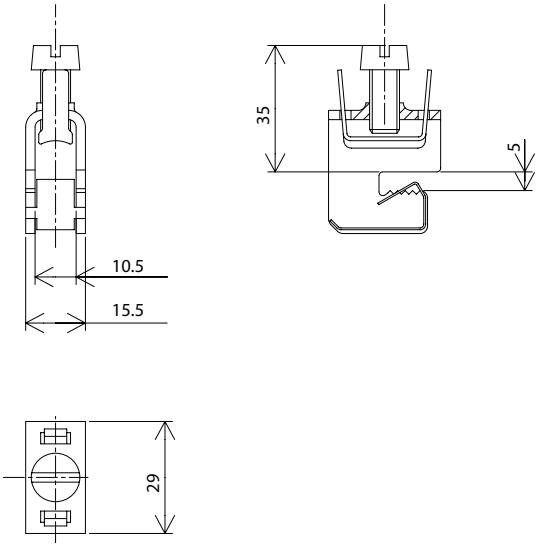
AKU16/5



Terminals for 5 mm Flat Busbars

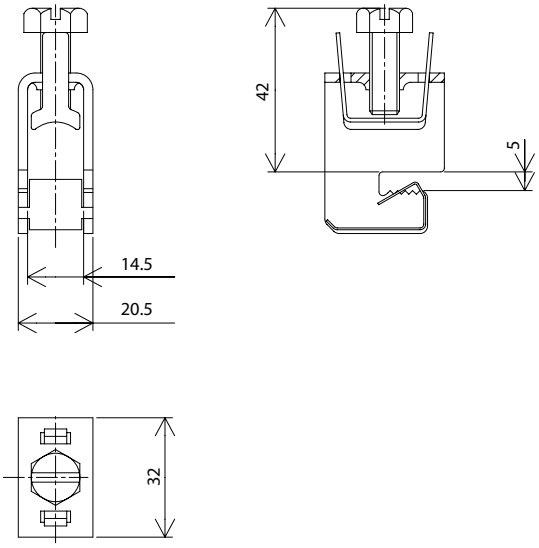
AKU35/5

Dimensions are in millimeters.
Not intended for manufacturing purposes.



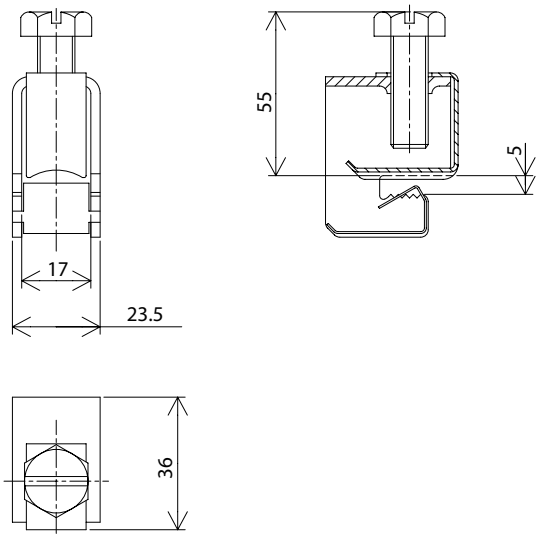
Terminals for 5 mm Flat Busbars

AKU70/5



Terminals for 5 mm Flat Busbars

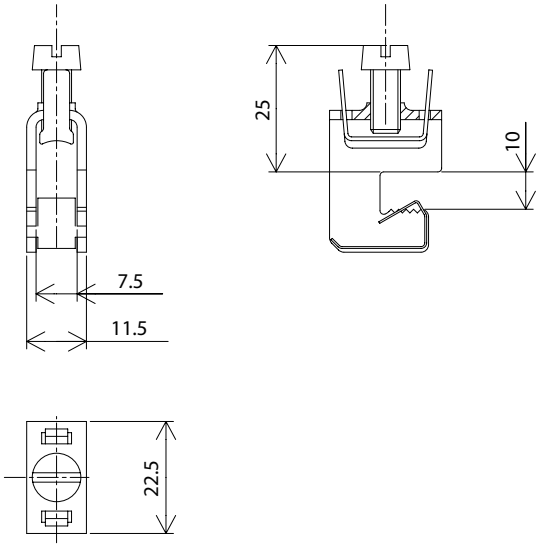
AKU120/5



Terminals for 10 mm Flat Busbars

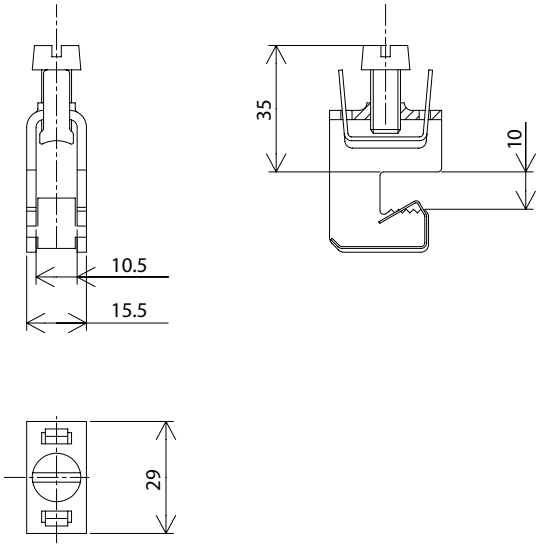
AKU16/10

Dimensions are in millimeters.
Not intended for manufacturing purposes.



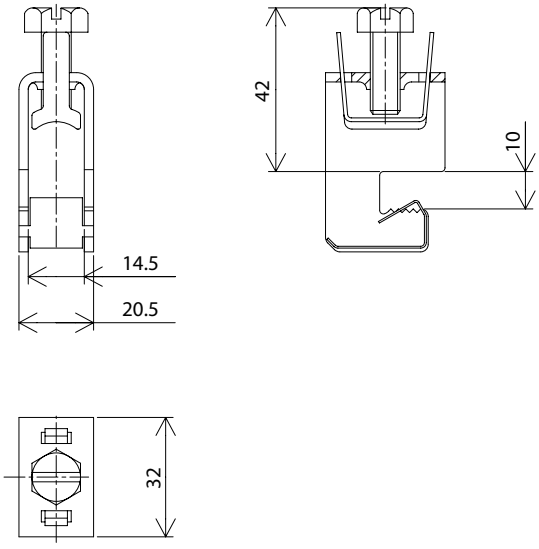
Terminals for 10 mm Flat Busbars

AKU35/10



Terminals for 10 mm Flat Busbars

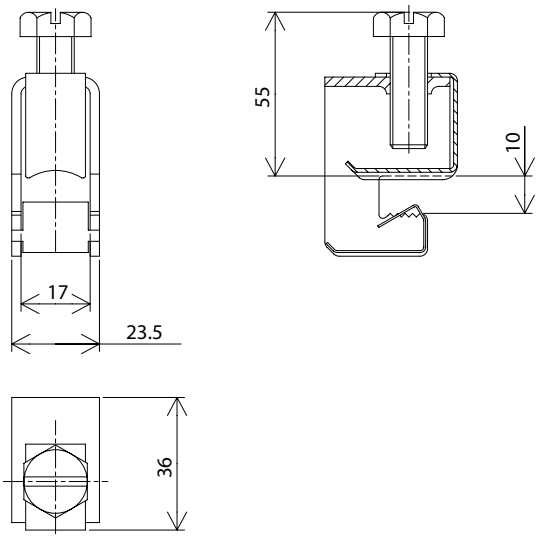
AKU70/10



Terminals for 10 mm Flat Busbars

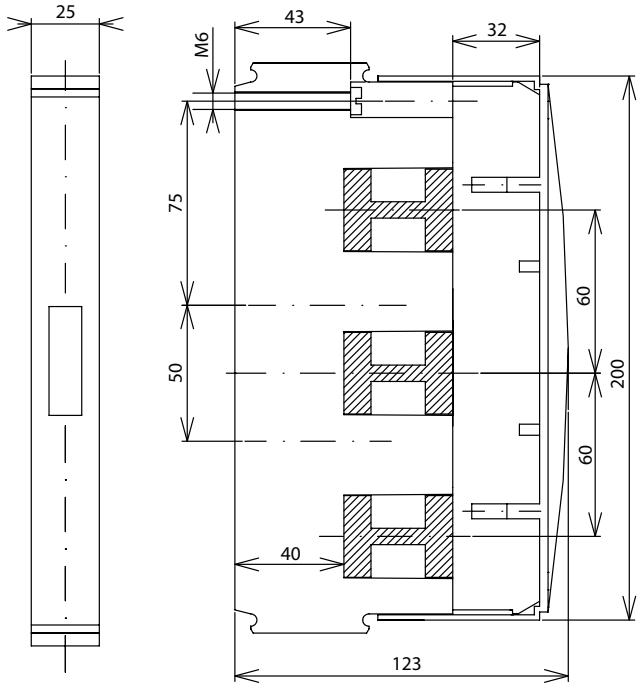
AKU120/10

Dimensions are in millimeters.
Not intended for manufacturing purposes.



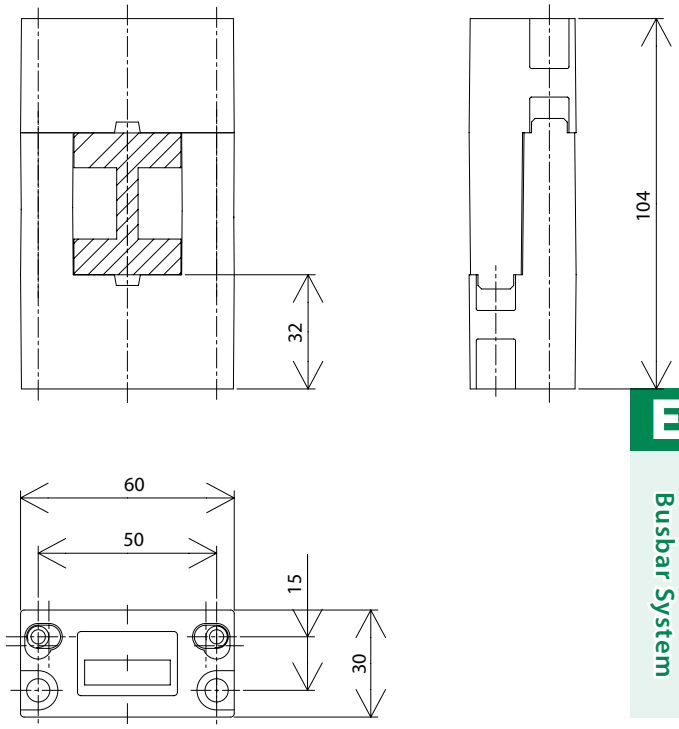
Busbar Supports - Double T Profile

BBS-3/PR



Busbar Supports - Double T Profile

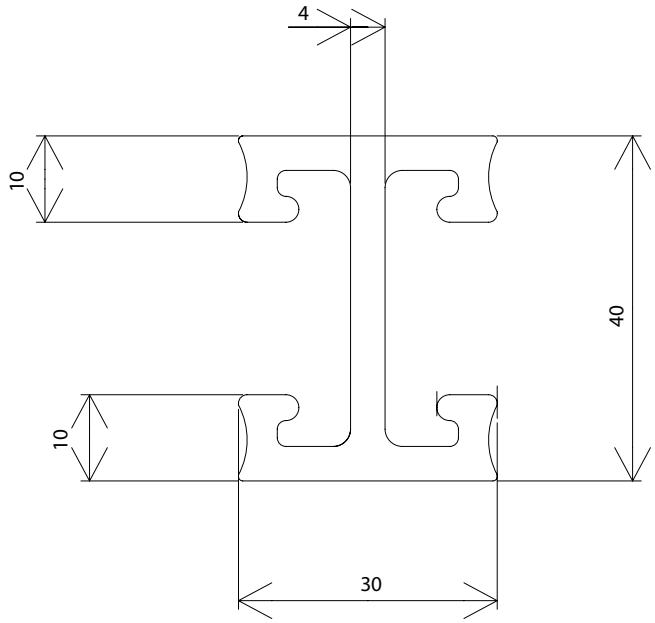
BBS-1/PR



Double T Profile Busbar

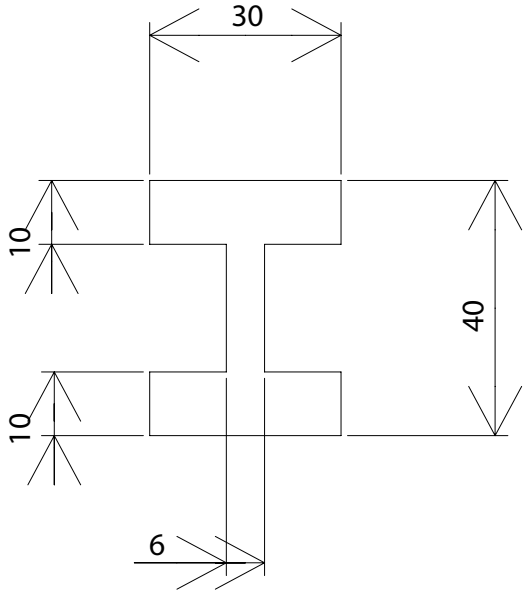
CU-BAR-500/T

Dimensions are in millimeters.
Not intended for manufacturing purposes.



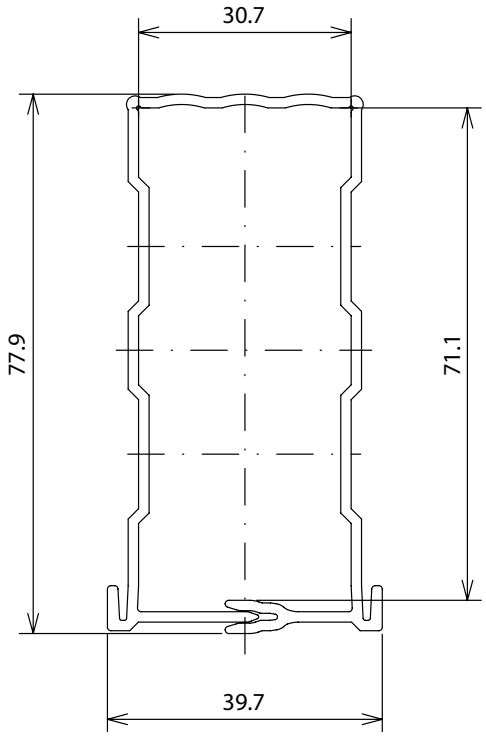
Double T Profile Busbar

CU-BAR-720/T



Double T Profile Busbar Cover

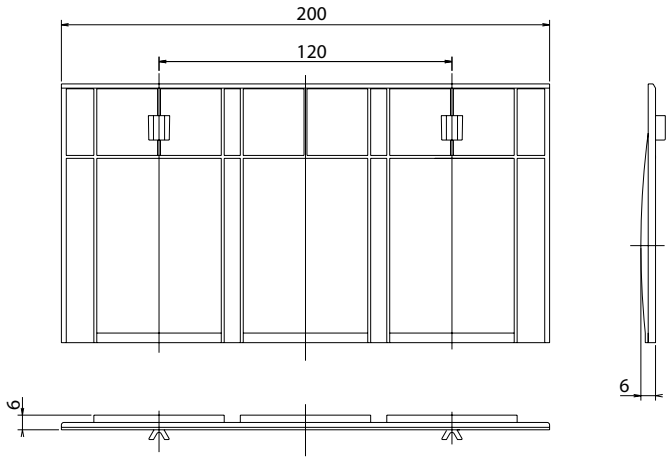
BBC-CU-BAR/PR



Busbar Support for Double T Profile End Cover

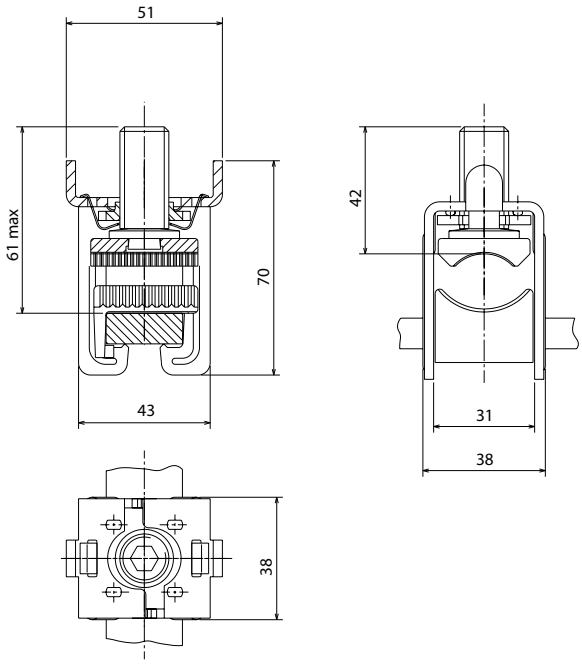
ES-BBS-3/PR

Dimensions are in millimeters.
Not intended for manufacturing purposes.



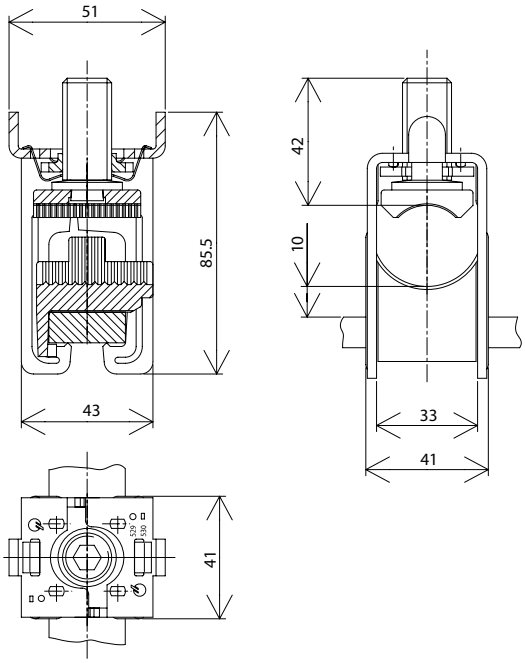
Brace Terminals for Flat and Double T Profile Busbars

AKS185



Brace Terminals for Flat and Double T Profile Busbars

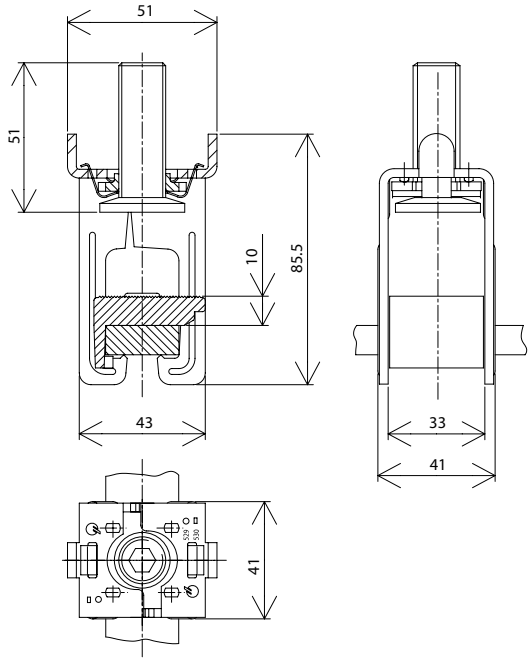
AKS300



Brace Terminals for Flat and Double T Profile Busbars

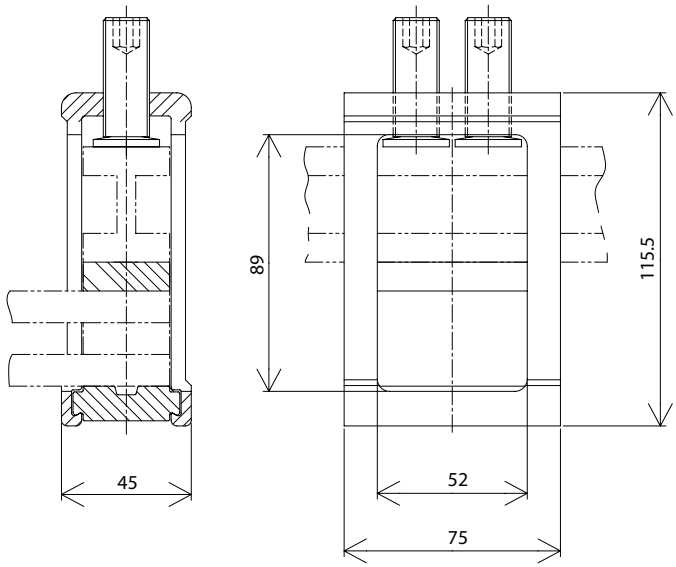
AKS-CU-BAND

Dimensions are in millimeters.
Not intended for manufacturing purposes.



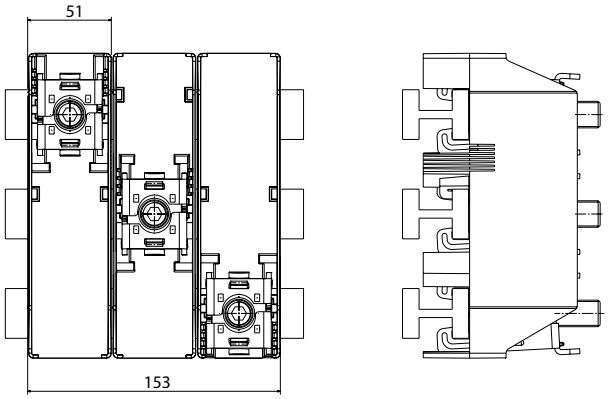
Profile Terminals for Flat and Double T Profile Busbars

AKP1000



Busbar Feeder Adapters

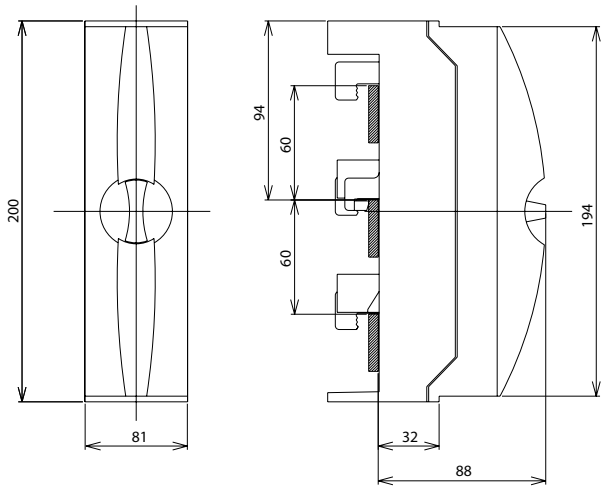
BBA-TP3/50



Busbar Feeder Adapters

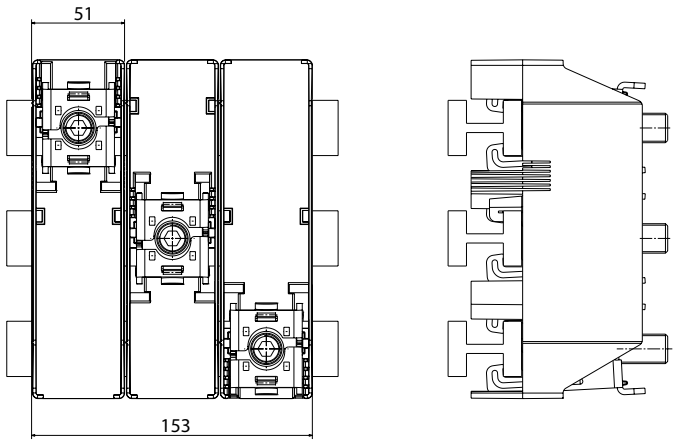
BBA-TP3/120

Dimensions are in millimeters.
Not intended for manufacturing purposes.



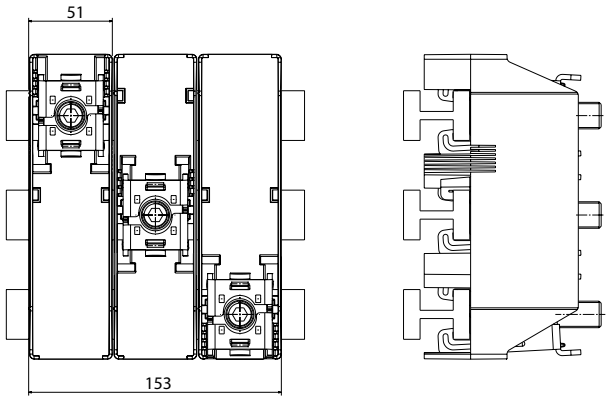
Busbar Feeder Adapters

BBA-TP3/300



Busbar Feeder Adapters

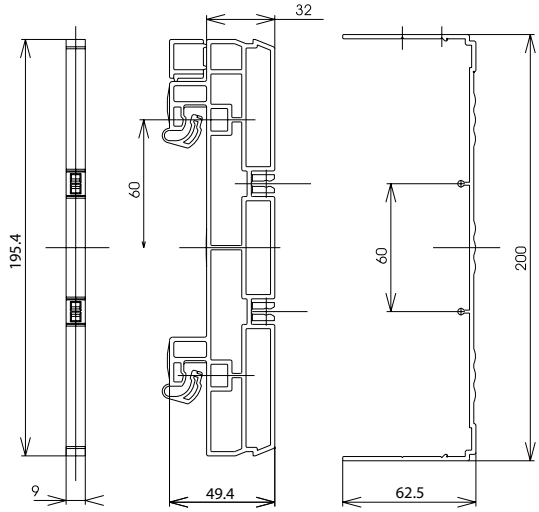
BBA-TP3/CU-BAND



Busbar Covers

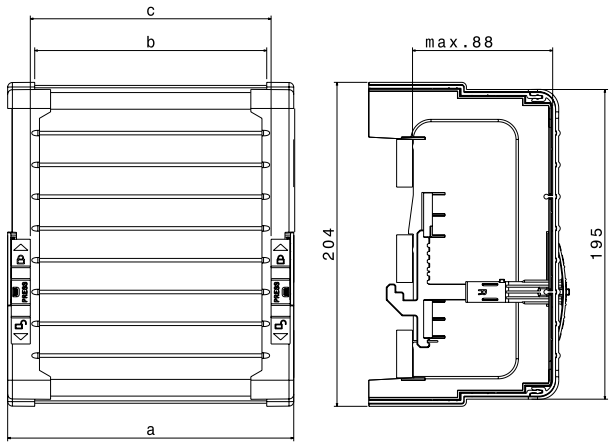
BBC-RC0V1

Dimensions are in millimeters.
Not intended for manufacturing purposes.



Modular System Cover

BBC-CS2-F + BBC-CS2-T/B + BBC-MCS2



relays

MOELLER

Start with Moeller

relays

series DIL control relays

compact general purpose relays for industry

Flexibility, safety and economy. . . Moeller's DIL series of control relays offer modern features in a compact, smart design. The line is made up of two models; DIL A relays, which are based on Moeller's new range of popular DIL M contactors; and DIL ER relays, which are built in the same compact frame as our miniature DIL EM contactors. Both lines share the same accessories with their contactor family. This simplifies stocking and makes ordering fast and efficient.

> 4, 6 and 8 pole general purpose relays

> Two product lines to choose

> Versatile and economical

> Broad line of accessories

Ideal for fail-safe control circuits

Modern applications requiring safety redundancy circuits ensure trouble free fault detection if the control relays have positively guided contacts. Both the DIL A and the miniature DIL ER control relays and auxiliary contacts (except overlapping contacts) meet these requirements. Positively-guided contacts are designed such that no NO contact can close before any NC contact can open. This important feature maintains a minimum contact clearance of 0.5mm and ensures that the NC contact stays open if a NO contact welds. This feature makes Moeller's DIL series of control relays ideal for critical applications such as press control.

Moeller's DC relays also include built-in surge suppressors that eliminate harmful voltage spikes caused when the relay is de-energized. This protects sensitive electronics, such as PLCs, that are within the same control circuit. Suppressors for AC relays are an available option.

DIL A – comprehensive and modern

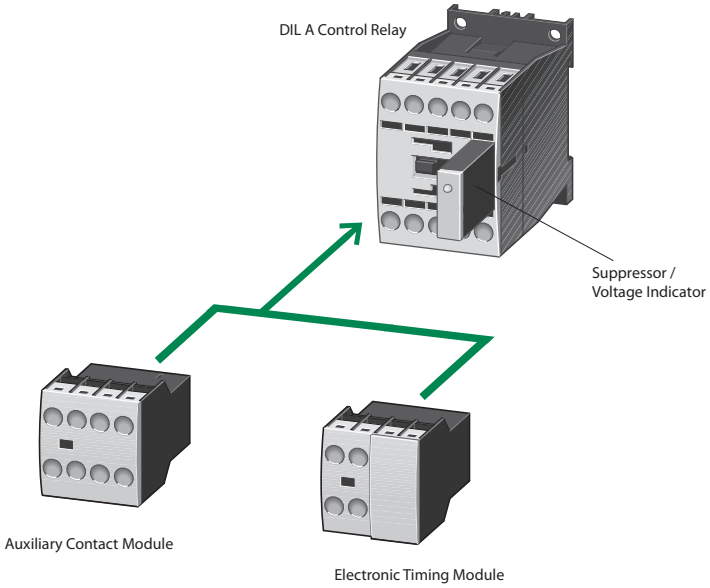
Base DIL A control relays have four-poles rated to 10 amps, (UL/CSA general purpose). Two and four-pole auxiliary contact blocks may be added to increase the relay's capacity to a maximum of eight poles. Various NO and NC configurations are available, including late break and early make. Auxiliary contacts are also rated to 10 amps.

A comprehensive range of accessories from suppressors and voltage indicators to amplifiers and timing modules make DIL A relays a great choice for applications demanding maximum flexibility.

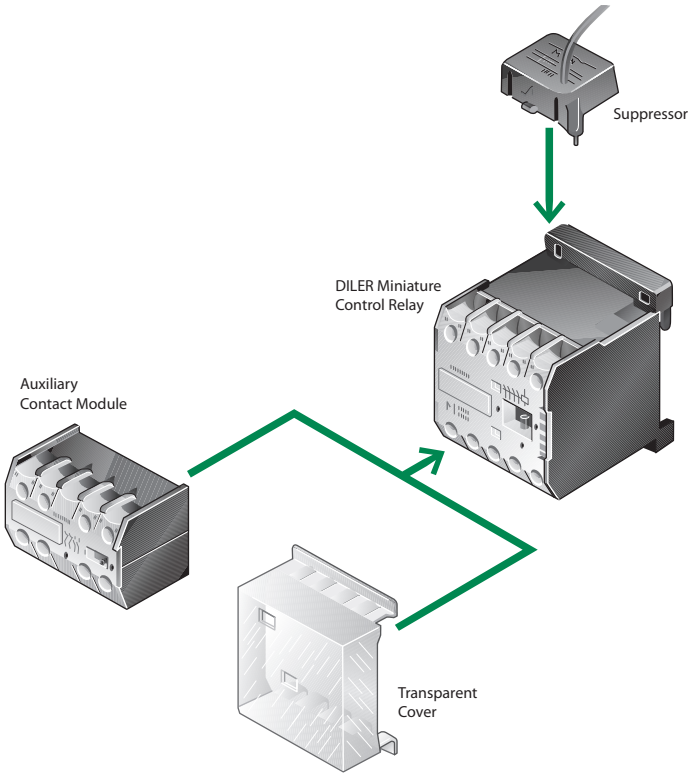
DIL ER – compact and economical

Moeller's miniature DIL ER relays are small but rugged. These four-pole devices are housed in a package only 45mm (1.77") wide, but provide up to 10 million operations! Two and four-pole auxiliary contact blocks can be used to create a six or eight pole relay. The base relay and auxiliaries are all rated to 10 amps (UL/CSA general purpose).

DILA Control Relays



DILER Miniature Control Relays

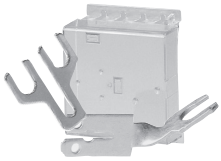


F

Relays

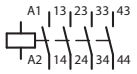
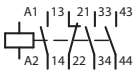
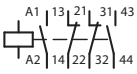
Control Relays Overview

Device	Description	Range	Pages
Control Relays			
	Four-pole Control Relays	AC & DC 10 Amps A600/P300	F6 – F7
	Miniature Control Relays	AC & DC 10 Amps A600/P300	F8 – F9
Auxiliary Contact Modules			
	For DILA Control Relays	10A @ 600V AC 1A @ 250V DC A600/P300	F10
	For Miniature Control Relays	10A @ 600V AC 1A @ 250V DC A600/P300	F11
Suppressors			
	RC Suppressor	24 – 500V AC	F12
	Varistor Suppressor	24 – 500V AC	F12
	Free Wheel Diode Suppressor	12 – 250V DC	F12

Device	Description	Range	Pages
Voltage Indicator			
	Voltage Indicator	24 – 250V DC	F12
Amplifier Module			
	Amplifier Module	24V DC	F12
Electronic Timing Modules			
	On-delay	24V DC 24 – 240V AC	F13
	Off-delay	24V DC 24 – 240V AC	F13
Miscellaneous Accessories			
	Miscellaneous Accessories		F13

- Six and eight-pole relays available by adding snap-on auxiliary contact block
- Positively guided contacts; NO and NC contacts can never be closed simultaneously
- Share common accessories with Moeller's popular DIL M contactor line

DILA Control Relays with AC Coil, 4-pole ❶

Control Relay	Schematic	Contacts NO	Contacts NC	UL/CSA Pilot Duty Rating	UL/CSA General Purpose (A)	Catalog Number	Price
		4	0	A 600 P 300	10	**DILA-40◆**	124
		3	1			**DILA-31◆**	124
		2	2			**DILA-22◆**	124

AC Coil Codes ❶

Complete catalog number (◆) with...	Voltage Range 50Hz	Voltage Range 60Hz
(24V60HZ)	–	24V
(42V50HZ,48V60HZ)	42V	48V
(110V50HZ,120V60HZ)	110V	120V
(208V60HZ)	–	208V
(230V50HZ,240V60HZ)	230V	240V
(415V50HZ,480V60HZ)	415V	480V
(600V60HZ)	–	600V

UL/CSA Rating Codes *(per UL508 and CSA 22.2 No.14-95)*

UL/CSA Standard	Continuous Amps	Circuit Voltage 120VAC Make	120VAC Break	240VAC Make	240VAC Break	480VAC Make	480VAC Break	600VAC Make	600VAC Break	VA Make	VA Break
A600	10	60	6	30	3	15	1.5	12	1.2	7200	720
UL/CSA Standard	Continuous Amps	125VDC Make	125VDC Break	250VDC Make	250VDC Break	301-600VDC Make	301-600VDC Break			VA Make	VA Break
P300	5	1.1	1.1	0.55	0.55	–	–			138	138

NOTE: This table represents minimum requirements to achieve a rating of A600/P300. All Moeller relays meet or exceed these standards.

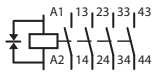
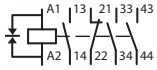
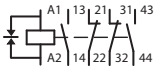
❶ Other coil voltages between 12 and 600VAC available by special order; Contact your Moeller representative for information.

Ordering Instructions

1. **Locate the desired control relay.**
2. **Complete catalog number with coil code.**
3. **See pages F10 – F13 for auxiliaries and accessories.**

- Six and eight-pole relays available by adding snap-on auxiliary contact block
- DC coils supplied with an integrated varistor surge suppressor
- Positively guided contacts; NO and NC contacts can never be closed simultaneously
- Share common accessories with Moeller's popular DIL M contactor line

DILA Control Relays with DC Coil, 4-pole ❶

Control Relay	Schematic	Contacts NO	Contacts NC	UL/CSA Pilot Duty Rating	UL/CSA General Purpose (A)	Catalog Number	Price
		4	0	A 600 P 300	10	**DILA-40◆**	148
		3	1			**DILA-31◆**	148
		2	2			**DILA-22◆**	148

DC Coil Codes ❶

Complete catalog number (◆) with…	Voltage DC
(24VDC)	24V
(48VDC)	48V

UL/CSA Rating Codes *(per UL508 and CSA 22.2 No.14-95)*

UL/CSA Standard	Continuous Amps	Circuit Voltage 120VAC Make	120VAC Break	240VAC Make	240VAC Break	480VAC Make	480VAC Break	600VAC Make	600VAC Break	VA Make	VA Break
A600	10	60	6	30	3	15	1.5	12	1.2	7200	720
UL/CSA Standard	Continuous Amps	125VDC Make	125VDC Break	250VDC Make	250VDC Break	301-600VDC Make	301-600VDC Break			VA Make	VA Break
P300	5	1.1	1.1	0.55	0.55	–	–			138	138

NOTE: This table represents minimum requirements to achieve a rating of A600/P300. All Moeller relays meet or exceed these standards.

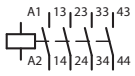
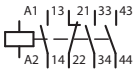
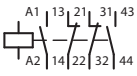
❶ Other coil voltages between 12 and 250VDC available by special order; Contact your Moeller representative for information.

Ordering Instructions

1. **Locate the desired control relay.**
2. **Complete catalog number with coil code.**
3. **See pages F10 – F13 for auxiliaries and accessories.**

- Miniature, economical relay for worldwide use
- Six and eight-pole relays available by adding snap-on auxiliary contact block
- Positively guided contacts; NO and NC contacts can never be closed simultaneously
- Share common accessories with Moeller's popular DIL EM contactor line

DILER Miniature Control Relays with AC Coil, 4-pole

Control Relay	Schematic	Contacts NO	Contacts NC	UL/CSA Pilot Duty Rating	UL/CSA General Purpose (A)	Catalog Number	Price
		4	0	A 600 P 300	10	**DILER-40◆**	120
		3	1			**DILER-31◆**	120
		2	2			**DILER-22◆**	120

AC Coil Codes

Complete catalog number (◆) with…	Voltage Range 50Hz	Voltage Range 60Hz
(24V60HZ)	–	24V
(42V50HZ,48V60HZ)	42V	48V
(110V50HZ,120V60HZ)	110V	120V
(208V60HZ)	–	208V
(230V50HZ,240V60HZ)	230V	240V
(415V50HZ,480V60HZ)	415V	480V
(600V60HZ)	–	600V

UL/CSA Rating Codes *(per UL508 and CSA 22.2 No.14-95)*

UL/CSA Standard	Continuous Amps	Circuit Voltage 120VAC Make	120VAC Break	240VAC Make	240VAC Break	480VAC Make	480VAC Break	600VAC Make	600VAC Break	VA Make	VA Break
A600	10	60	6	30	3	15	1.5	12	1.2	7200	720
UL/CSA Standard	Continuous Amps	125VDC Make	125VDC Break	250VDC Make	250VDC Break	301-600VDC Make	301-600VDC Break			VA Make	VA Break
P300	5	1.1	1.1	0.55	0.55	–	–			138	138

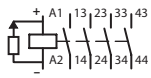
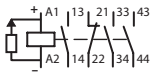
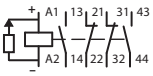
NOTE: This table represents minimum requirements to achieve a rating of A600/P300. All Moeller relays meet or exceed these standards.

Ordering Instructions

1. **Locate the desired control relay.**
2. **Complete catalog number with coil code.**
3. **See pages F10 – F13 for auxiliaries and accessories.**

- Miniature, economical relay for worldwide use
- Six and eight-pole relays available by adding snap-on auxiliary contact block
- DC coils have an integrated Resistor/Diode combination surge suppressor
- Positively guided contacts; NO and NC contacts can never be closed simultaneously
- Share common accessories with Moeller's popular DIL EM contactor line

DILER Miniature Control Relays with DC Coil, 4-pole

Control Relay	Schematic	Contacts		UL/CSA		Catalog Number	Price
		NO	NC	Pilot Duty Rating	General Purpose (A)		
		4	0	A 600 P 300	10	**DILER-40-G◆**	140
		3	1			**DILER-31-G◆**	140
		2	2			**DILER-22-G◆**	140

DC Coil Codes

Complete catalog number (◆) with…	Voltage
	DC
(24VDC)	24V
(48VDC)	48V
(110VDC)	110V

UL/CSA Rating Codes *(per UL508 and CSA 22.2 No.14-95)*

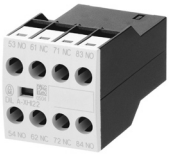
UL/CSA Standard	Continuous Amps	Circuit Voltage								VA	
		120VAC		240VAC		480VAC		600VAC			
		Make	Break	Make	Break	Make	Break	Make	Break	Make	Break
A600	10	60	6	30	3	15	1.5	12	1.2	7200	720
UL/CSA Standard	Continuous Amps	125VDC		250VDC		301-600VDC				VA	
		Make	Break	Make	Break	Make	Break			Make	Break
P300	5	1.1	1.1	0.55	0.55	–	–			138	138

NOTE: This table represents minimum requirements to achieve a rating of A600/P300. All Moeller relays meet or exceed these standards.

Ordering Instructions

1. **Locate the desired control relay.**
2. **Complete catalog number with coil code.**
3. **See pages F10 – F13 for auxiliaries and accessories.**

DILA Auxiliary Contact Modules ❶

Accessory	Contacts NO	Contacts NC	UL/CSA Pilot Duty Rating	UL/CSA General Use (A) 600V AC	UL/CSA General Use (A) 250V DC	Schematic	For Use With...	Catalog Number	Price
	2	0	A600 P300	10	1		DILA DILM7 – DILM32	**DILA-XHI20**	52
	1	1						**DILA-XHI11**	52
	0	2						**DILA-XHI02**	52
	1EM ❷	1LB ❷						**DILA-XHIV11**	100
	4	0	A600 P300	10	1		DILA DILM7 – DILM32	**DILA-XHI40**	92
	3	1						**DILA-XHI31**	92
	2	2						**DILA-XHI22**	92
	1	3						**DILA-XHI13**	92
	0	4						**DILA-XHI04**	92
	1 + 1EM ❷	1 + 1LB ❷						**DILA-XHIV22**	144

❶ Positively guided contacts: Standard NO and NC contacts can never be closed simultaneously; By definition, overlapping contacts (i.e., Early Make and Late Break) cannot be positively guided.

❷ EM = Early Make.
LB = Late Break.

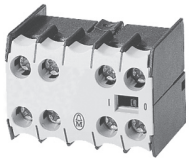
UL/CSA Rating Codes *(per UL508 and CSA 22.2 No.14-95)*

UL/CSA Standard	Continuous Amps	Circuit Voltage 120VAC Make	120VAC Break	240VAC Make	240VAC Break	480VAC Make	480VAC Break	600VAC Make	600VAC Break	VA Make	VA Break
A600	10	60	6	30	3	15	1.5	12	1.2	7200	720

UL/CSA Standard	Continuous Amps	125VDC Make	125VDC Break	250VDC Make	250VDC Break	301-600VDC Make	301-600VDC Break	VA Make	VA Break
P300	5	1.1	1.1	0.55	0.55	–	–	138	138

NOTE: This table represents minimum requirements to achieve a rating of A600/P300. All Moeller relays meet or exceed these standards.

DILER Auxiliary Contact Modules ❶

Accessory	Contacts NO	Contacts NC	UL/CSA Pilot Duty Rating	UL/CSA General Use (A) 600V AC	UL/CSA General Use (A) 250V DC	Schematic	For Use With...	Catalog Number	Price
	0	2	A600 P300	10	1		DILER DILEM	02DILE	40
	1	1						11DILE	40
	2	0						20DILE	40
	1EM ❷	1LB ❷						11DDILE	80
	0	4	A600 P300	10	1		DILER DILEM	04DILE	64
	1	3						13DILE	64
	2	2						22DILE	64
	3	1						31DILE	64
	4	0						40DILE	64
	1 + 1EM ❷	1 + 1LB ❷						22DDILE	120

❶ Positively guided contacts: Standard NO and NC contacts can never be closed simultaneously; By definition, overlapping contacts (i.e., Early Make and Late Break) cannot be positively-driven.

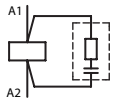
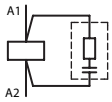
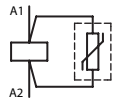
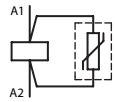
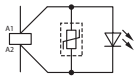
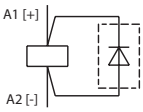
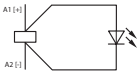
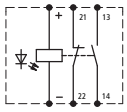
❷ EM = Early Make.
LB = Late Break.

UL/CSA Rating Codes *(per UL508 and CSA 22.2 No.14-95)*

UL/CSA Standard	Continuous Amps	Circuit Voltage 120VAC Make	120VAC Break	240VAC Make	240VAC Break	480VAC Make	480VAC Break	600VAC Make	600VAC Break	VA Make	VA Break
A600	10	60	6	30	3	15	1.5	12	1.2	7200	720
UL/CSA Standard	Continuous Amps	125VDC Make	125VDC Break	250VDC Make	250VDC Break	301-600VDC Make	301-600VDC Break			VA Make	VA Break
P300	5	1.1	1.1	0.55	0.55	–	–			138	138

NOTE: This table represents minimum requirements to achieve a rating of A600/P300. All Moeller relays meet or exceed these standards.

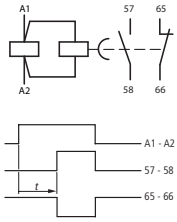
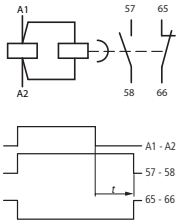
Suppressors and Voltage Indicator ❶

Accessory	Description	Supply Voltage	Schematic	For use with...	Catalog Number	Price
RC Suppressors ❶						
	For AC operated relays (50-60 Hz). Please be aware that RC Suppressors can cause a drop-out delay.	24 – 48V AC		DILER DILEM	**RCDILE48**	64
		110 – 250V AC			**RCDILE250**	64
	For AC operated relays (50-60 Hz). DC operated relays have an integrated suppressor. Please be aware that Suppressors can cause a drop-out delay.	24 – 48V AC		DILA DILM7 – 12 DILMP20	**DILM12-XSPR48**	90
		110 – 240V AC			**DILM12-XSPR240**	90
		240 – 500V AC			**DILM12-XSPR500**	90
Varistor Suppressors ❶						
	For AC operated Relays (50-60 Hz). DC operated Relays have an integrated suppressor.	24 – 48V AC		DILER DILEM	**VGDILE48**	56
		110 – 250V AC			**VGDILE250**	56
		380 – 415V AC			**VGDILE415**	56
	For AC operated Relays (50-60 Hz). DC operated Relays have an integrated suppressor.	24 – 48V AC		DILA DILM7 – 12 DILMP20	**DILM12-XSPV48**	90
		48 – 130V AC			**DILM12-XSPV130**	90
		130 – 240V AC			**DILM12-XSPV240**	90
		240 – 500V AC			**DILM12-XSPV500**	90
	**Suppressor with LED** For AC operated Relays (50-60 Hz). DC operated Relays have an integrated suppressor.	24 – 48V AC		DILA DILM7 – 12 DILMP20	**DILM12-XSPVL48**	100
		130 – 240V AC			**DILM12-XSPVL240**	100
Free Wheel Diode Suppressor ❶						
	For DC operated Relays. Functions in addition to the built-in DC suppressor circuit. Prevents negative breaking voltage when relays are used with sensitive electronics.	12 – 250V DC		DILA DILM7 – DILM12 DILMP20	**DILM12-XSPD**	54
Voltage Indicator ❶						
	For DC operated Relays. Indicates presence of control voltage.	24 – 48V DC		DILA DILM7 – 12 DILMP20	**DILM12-XSPI48**	70
		48 – 130V DC			**DILM12-XSPI130**	70
		130 – 250V DC			**DILM12-XSPI250**	70
Amplifier Module (separate mounting) ❶						
	DC operated Relays. Interposing relay that provides a dry contact signal to activate an AC operated Contactor or Relay; Actuates on as little as 25mA	24V DC [25mA...2A] ❷		When 24VDC low current [25mA...2A] control is required to operate AC coils ❷	**ETS4-VS3**	200

❶ Suppressors, voltage indicators and electronic timers cannot be mounted simultaneously.

❷ When contactor AC coil is over 2A, use DILER or DILEM-G relay instead.

Electronic Timing Modules ❶

Accessory	Description	Supply Voltage	Timing Range (sec)	Schematic	For use with...	Catalog Number	Price
	**ON delay** May not be combined with Auxiliary Contact Blocks, Suppressors or Voltage Indicator.	24V AC/DC	Selectable: 0.05 – 1 0.5 – 10 5 – 100		DILA DILM7 – 32 DILMP20	**DILM32-XTEE11(RA24)**	314
		100 – 130V AC				**DILM32-XTEE11(RAC130)**	314
		200 – 240V AC				**DILM32-XTEE11(RAC240)**	314
	**OFF delay** May not be combined with Auxiliary Contact Blocks, Suppressors or Voltage Indicator.	24V AC/DC	0.05 – 1		DILA DILM7 – 32 DILMP20	**DILM32-XTED11-1(RA24)**	350
			0.5 – 10			**DILM32-XTED11-10(RA24)**	350
			5 – 100			**DILM32-XTED11-100(RA24)**	350
		100 – 130V AC	0.05 – 1			**DILM32-XTED11-1(RAC130)**	350
			0.5 – 10			**DILM32-XTED11-10(RAC130)**	350
			5 – 100			**DILM32-XTED11-100(RAC130)**	350
		200 – 240V AC	0.05 – 1			**DILM32-XTED11-1(RAC240)**	350
			0.5 – 10			**DILM32-XTED11-10(RAC240)**	350
			5 – 100			**DILM32-XTED11-100(RAC240)**	350
Transparent Cover							
	Snap-mounts onto the Timing Module to prevent tampering				DILM32-XTE...	**DILM32-XTEPLH**	18

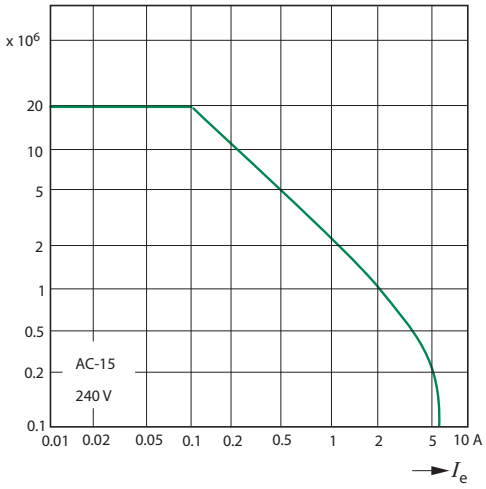
Miscellaneous Accessories

Accessory	Description	For use with...	Catalog Number	Price
Jumper				
	• For parallel connection of auxiliary contacts • Not insulated • Standard quantity: 100	DILER DILEM	**BT480**	0.70
Transparent Cover				
	• Cover snap-mounts onto the relay to prevent tampering • Protection to IP40 • Cannot be used with any externally mounted components	DILER DILEM	**HDILE**	13

❶ Suppressors, voltage indicators and electronic timers cannot be mounted simultaneously; Electronic timers cannot be combined with Auxiliary Contact Blocks.

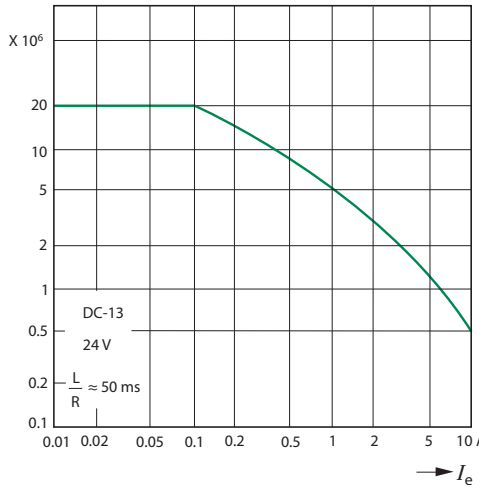
DILA (AC-15)

Component lifespan (operations)
I_e = Rated operational current



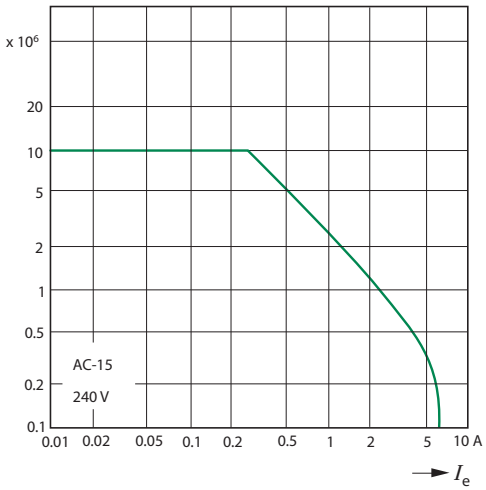
DILA (DC-13) ❶

Component lifespan (operations)
I_e = Rated operational current



DILER (AC-15)

Component lifespan (operations)
I_e = Rated operational current



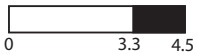
❶ Making and breaking conditions to DC-13; time constant as stated on page F17.

Travel Diagrams for Control Relays

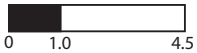
The diagrams show the closing and opening of the auxiliary contacts of control relays and auxiliary contacts at no load. Tolerances are not taken into consideration.

DILA-... AC Relay

N/O Contact

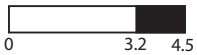


N/C Contact



+ DILA-XHI... Auxiliary Contact

N/O Contact



N/C Contact

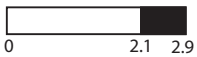
+ DILA-XHIV... Auxiliary Contact (EM/LB)

N/O Contact

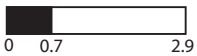
N/C Contact

DILA-... DC Relay

N/O Contact

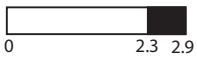


N/C Contact

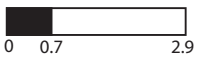


+ DILA-XHI... Auxiliary Contact

N/O Contact



N/C Contact



+ DILA-XHIV... Auxiliary Contact (EM/LB)

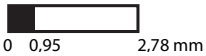
N/O Contact

N/C Contact

DILER-... AC Relay

N/O Contact

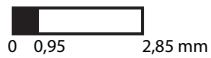
N/C Contact



DILER-... DC Relay

N/O Contact

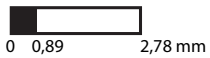
N/C Contact



...DILE Auxiliary Contact

N/O Contact

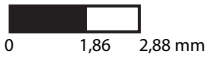
N/C Contact



...DDILE Auxiliary Contact

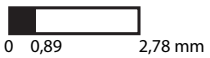
N/O Contact (EM)

N/C Contact (LB)



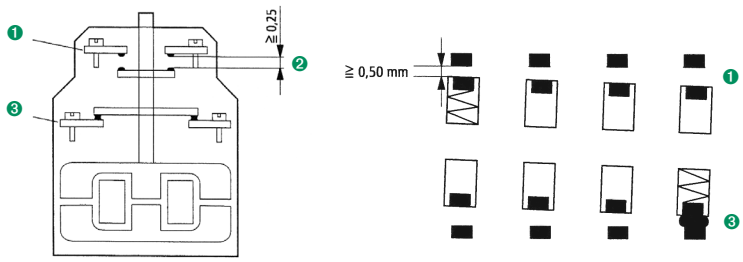
N/O Contact

N/C Contact

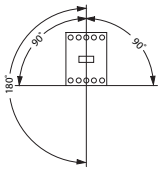
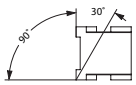


Positively Guided Contacts

Both DIL A and DIL ER relays are designed with positively guided contacts. The break contact will not close if the make contact becomes welded.



❶ Break contact.
❷ ≥0.25 mm with double-break contacts.
❸ Make contact.

Control Relays			DILA	DILA-XHI	DILER	...(D)DILE
General						
Standards			IEC/EN 60947, VDE 0660, UL, CSA			
Lifespan, mechanical						
AC operated	Ops	[x 10^6]	20	10	10	10
DC operated	Ops	[x 10^6]	20	10	20	20
Maximum operating frequency	Ops/h		9000	9000	9000	9000
Climatic proofing			Damp heat, constant to IEC 60068-2-78; Damp heat, cyclical, to IEC 60068-2-30			
Ambient temperature						
Open		[°C]	-25...60 °C	-25...60 °C	-25...50 °C	-25...50 °C
		[°F]	*-13...140 °F*	*-13...140 °F*	*-13...122 °F*	*-13...122 °F*
Enclosed		[°C]	-25...40 °C	-25...40 °C	-25...40 °C	-25...40 °C
		[°F]	*-13...104 °F*	*-13...104 °F*	*-13...104 °F*	*-13...104 °F*
Storage		[°C]	-40...80 °C	-40...80 °C	–	–
		[°F]	*-40...176 °F*	*-40...176 °F*	–	–
Mounting position					As required, except vertically A1/A2 at the bottom	As required, except vertically A1/A2 at the bottom
Mechanical shock resistance (IEC/EN 60068-2-27) half-sinusoidal shock 10 ms						
Base unit with auxiliary contact module						
Make contact		[g]	7	7	10	10
Break contact		[g]	5	5	8	8
Degree of protection			IP20	IP20	IP20	IP20
Protection against direct contact from the front (IEC 536)			Finger and back-of-hand proof			
Weight						
AC operated		[kg]	0.23	0.23	0.17	–
DC operated		[kg]	0.28	0.28	0.2	–
Terminal capacity						
Solid		[mm^2]	1 x (0.75 – 4) 2 x (0.75 – 2.5)	1 x (0.75 – 4) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)
Flexible with ferrule		[mm^2]	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 1.5) 2 x (0.75 – 1.5)	1 x (0.75 – 1.5) 2 x (0.75 – 1.5)
Solid or stranded		[AWG]	18 – 14	18 – 14	18 – 14	18 – 14
Terminal screw			M3.5	M3.5	M3.5	M3.5
Tightening torque		[Nm]	1.2	1.2	1.2	1.2
Tools						
Pozidriv screwdriver		[Size]	2	2	2	2
Standard screwdriver		[mm]	0.8 x 5.5 / 1 x 6	0.8 x 5.5 / 1 x 6	0.8 x 5.5 / 1 x 6	0.8 x 5.5 / 1 x 6

Control Relays *(continued)*				DILA	DILA-XHI	DILER	...(D)DILE
Contacts							
Interlocked opposing contacts to ZH 1/457, including auxiliary contact module				Yes	Yes	Yes	Yes
Rated impulse withstand voltage		U_{imp}	[V AC]	6000	6000	6000	6000
Overvoltage category/pollution degree				III/3	III/3	III/3	III/3
Rated insulation voltage		U_i	[V AC]	690	690	690	690
Rated operational voltage		U_e	[V AC]	690	500	600	600
Safe isolation to VDE 0106 Part 101 and Part 101/A1							
Between coil and auxiliary contacts			[V AC]	400	400	300	300
Between the auxiliary contacts			[V AC]	400	400	300	300
Rated operational current							
AC-15	220/240V	I_e	[A]	6	6	6	4
	380/415V	I_e	[A]	4	3	3	2
	500V	I_e	[A]	1.5	–	1.5	1.5
DC-13 ❶ L/R ≤ 15 ms							
Contacts in series	1	24V	[A]	10	10	2.5	2.5
	1	60V	[A]	6	6	–	–
	2	60V	[A]	10	10	2.5	2.5
	1	110V	[A]	3	3	–	–
	3	110V	[A]	6	6	1.5	1.5
	1	220V	[A]	1	1	–	–
	3	220V	[A]	5	5	0.5	0.5
DC-13 ❶ L/R ≤ 50 ms							
Contacts in series	3	24V	[A]	4	–	–	–
	3	60V	[A]	4	–	–	–
	3	110V	[A]	2	–	–	–
	3	220V	[A]	1	–	–	–
Contact reliability							
U_e = 24V DC, U_{min} = 17V, I_{min} = 5.4 mA		Fault probability	[λ]	$<10^8$, < one failure in 100 million operations			
Conventional thermal current		I_{th}	[A]	16	16	10	10
Short-circuit rating without welding							
Maximum overcurrent protective device							
	220/240V		[PKZM0]	4	–	4	4
	380/415V		[PKZM0]	4	–	4	4
Short-circuit protection, max. fuse							
	500V		[A gG/gL]	10	10	6	6
	500V		[A fast]	–	–	10	10
Current heat losses at load of I_{th}							
AC operated			[W]	0.3	0.3	0.2	0.2
DC operated			[W]	0.3	0.3	0.3	0.3

❶ Making and breaking conditions to DC-13, time constant as stated.

Control Relays *(continued)*			DILA	DILA-XHI	DILER	...(D)DILE
Magnet Systems						
Voltage Tolerance						
AC operated						
Single voltage coil 50Hz	Pick-up	[x U_C]	0.8 – 1.1	–	0.8 – 1.1	–
Dual voltage coil 50Hz, 60Hz	Pick-up	[x U_C]	0.8 – 1.1	–	0.8 – 1.1	–
Dual frequency coil 50/60Hz	Pick-up	[x U_C]	0.8 – 1.1	–	0.85 – 1.1	–
DC operated ❶						
Pick-up voltage	Pick-up	[x U_C]	0.8 – 1.1	–	0.85 – 1.3	–
24V, 40 °C, without auxiliary contact module	Pick-up	[x U_C]	0.7 – 1.3	–	0.7 – 1.3	–
Power consumption						
Single voltage coil 50Hz	Pick-up	[VA/W]	24 / 19	–	25 / 22	–
	Sealing	[VA/W]	3.4 / 1.2	–	4.6 / 1.3	–
Dual voltage coil 50Hz, 60Hz	Pick-up	[VA/W]	24 / 19	–	25 / 22	–
	Sealing	[VA/W]	3.4 / 1.2	–	4.6 / 1.3	–
Dual frequency coil 50/60Hz, at 50Hz	Pick-up	[VA/W]	27 / 22	–	30 / 26	–
	Sealing	[VA/W]	4.2 / 1.4	–	5.4 / 1.6	–
Dual frequency coil 50/60Hz, at 60Hz	Pick-up	[VA/W]	25 / 25	–	29 / 24	–
	Sealing	[VA/W]	3.3 / 1.2	–	3.9 / 1.1	–
DC operated	Pull-in = Sealing	[W]	3	–	2.6	–
Duty factor		[% DF]	100	–	100	–
Switching times at 100 % U_C (approximate values)						
AC operated						
closing delay		[ms]	≤ 21	–	14 – 21	–
make contact opening delay		[ms]	≤18	–	8 – 18	–
with auxiliary contact, max. closing delay		[ms]	–	–	45	45
DC operated						
closing delay		[ms]	≤ 31	–	26 – 35	–
make contact opening delay		[ms]	≤ 12	–	15 – 25	–
with auxiliary contact module, max. closing delay		[ms]	–	–	70	70

❶ Pure DC voltage or three-phase bridge rectifier or full wave rectifier with smoothing capacitor (or filter).

Amplifier Module; Timing Relay				ETS4-VS3	DILM32-XTE...
General					
Standards				UL, CSA, IEC/EN 60947, VDE 0660	UL, CSA, DIN EN61812, IEC/EN 60947, VDE 0660
Lifespan, mechanical					
AC operated		Ops	[x 10^6]	–	3
DC operated		Ops	[x 10^6]	30	3
Maximum operating frequency	220V/230V		[Ops/h]	720	–
Climatic proofing				Damp heat, constant to IEC 60068-2-78; Damp heat, cyclical, to IEC 60068-2-30	
Ambient temperature					
Storage			[°C / °F]	10 °C / *50 °F*	-40...80 °C / *-40...176 °F*
Open			[°C / °F]	-25...60 °C / *-13...140 °F*	-25...60 °C / *-13...140 °F*
Enclosed			[°C / °F]	-25...45 °C / *-13...113 °F*	-25...40 °C / *-13...104 °F*
Mounting position				As required	As required, not suspended
Mechanical shock resistance (IEC/EN 60068-2-27)					
Half-sinusoidal shock 20 ms					
NO contact			[g]	10	–
Half-sinusoidal shock 10 ms					
NO contact			[g]	10	6
NC contact			[g]	8	6
Degree of protection				IP20	IP20
Protection against direct contact when actuated from the front (IEC 536)				Finger and back-of-hand proof	
Weight			[kg (oz)]	0.09 (3.17)	0.09 (3.17)
Terminal capacity					
Solid			[mm^2]	1 x (0.75 – 2.5) 2 x (0.75 – 2.5) ❶	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)
Flexible with ferrule			[mm^2]	1 x (0.75 – 2.5) 2 x (0.75 – 1.5) ❶	1 x (0.75 – 1.5) 2 x (0.75 – 1.5)
Solid or stranded			[AWG]	16 – 14	18 – 14
Terminal screw				M3.5	M3.5
Tools					
Pozidriv screwdriver			[Size]	2	2
Standard screwdriver			[mm]	0.8 x 5.5 / 1 x 6	0.8 x 5.5 / 1 x 6
Tightening torque			[Nm]	1.2	1.2
Contacts					
Rated impulse withstand voltage		U_{imp}	[V AC]	6000	6000
Overvoltage category/pollution degree				III/3	III/3
Rated insulation voltage					
UL / CSA			[V AC]	250	–
IEC		U_i	[V AC]	440	600
Rated operational voltage		U_e	[V AC]	440	400

❶ Use only equal cross sections.

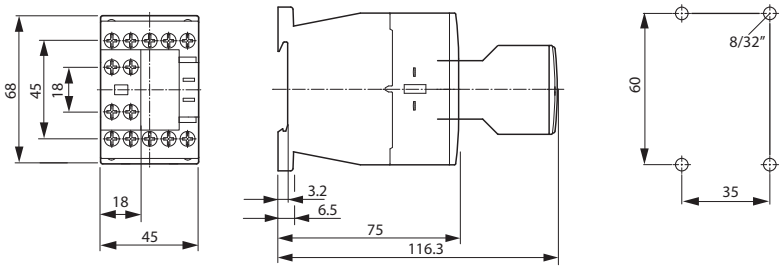
Amplifier Module; Timing Relay *(continued)*				ETS4-VS3	DILM32-XTE...
Contacts *(continued)*					
Rated operational current					
UL / CSA (general purpose) B300		I_e	[A]	10	–
AC-15	220/240V	I_e	[A]	2	contact Moeller
	380/415V	I_e	[A]	2	contact Moeller
DC-13 ❶ L/R - 15 ms					
Contacts in series	1	24V	[A]	2.6	–
	1	60V	[A]	1	–
	1	110V	[A]	0.6	–
	1	220V	[A]	0.2	–
DC-13 ❶ L/R - 50 ms					
Contacts in series	1	24V	[A]	2	–
	1	60V	[A]	0.6	–
	1	110V	[A]	0.08	–
	1	220V	[A]	0.08	–
DC-13 ❶ L/R - 300 ms					
Contacts in series	1	24V	[A]	0.6	–
	1	60V	[A]	0.2	–
	1	110V	[A]	0.08	–
	1	220V	[A]	0.03	–
Safe isolation to VDE 0106 Part 101 and Part 101/A1					
Between coil and auxiliary contacts			[V AC]	–	250
Between the auxiliary contacts			[V AC]	–	250
Control circuit reliability					
U_e = 24V DC, U_{min} = 17V, I_{min} = 5.4 mA		Failure rate	[λ]	$<10^8$, < one failure in 100 million operations	–
Conventional thermal current		I_{th}	[A]	6	6
Component lifespan					
AC-15					
I_e = 0.1 A	230V	Ops	[x 10^6]	7	–
I_e = 1.2 A	230V	Ops	[x 10^6]	1	–
Short-circuit rating without welding					
Short-circuit protection, max. fuse					
	500V		[A gG/gL]	–	6
	500V		[A fast]	4	–
Magnet Systems					
Voltage tolerance					
AC operated	Pick-up		[x U_c]	–	0.8 – 1.1
DC operated	Pick-up		[x U_c]	0.85 – 1.2	0.7 – 1.2
Power consumption					
AC operated	Sealing		[VA/W]	–	2 / 1.8
DC operated	Pull in = Sealing		[W]	0.6	0
Duty factor			[% DF]	100	100
Switching times at 100 % U_c (approximate values)					
DC operated closing delay			[ms]	7	–
DC operated opening delay			[ms]	3	–
Maximum operating frequency			[Ops/h]	–	3600
6A, 250V			[Ops/h]	9000	360
Minimum contact closing time					
On-delayed			[ms]	–	< 50
Off-delayed			[ms]	–	< 200
Repetition accuracy (with constant parameters)		Deviation	[%]	–	< 5
Recovery time (after 100% time delay)			[ms]	–	70
Contact changeover time	t_u		[ms]	–	10

❶ Making and breaking conditions to DC-13, time constant as stated.

Dimensions are in millimeters.
Not intended for manufacturing purposes.

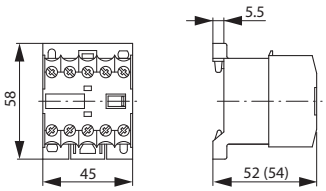
Control Relays

DILA-…+ DILA-XHI…



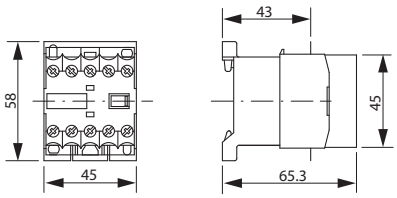
Control Relays

DILER-…



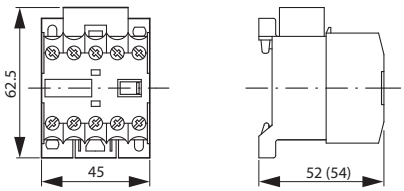
Control Relays

DILER-… + HDILE



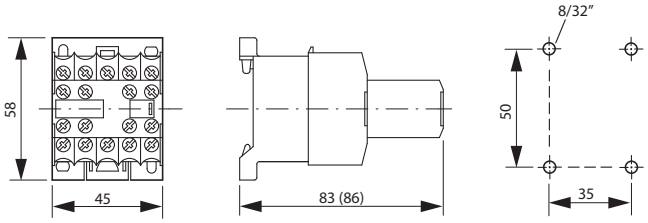
Control Relays

DILER-… + RCDILE; DILER-… + VGDILE



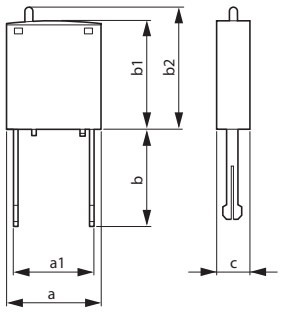
Control Relays

DILER-… + …(D)DILE



Varistor / RC Suppressors

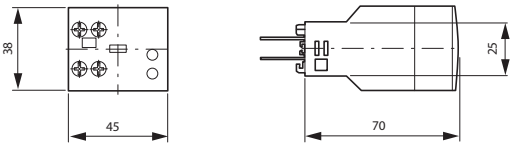
DILM12-XSP…



dimension	DILM12-XSPR… DILM12-XSPV…
a	25
a1	9.2
b	25.9
b1	28
b2	~ 32
c	9

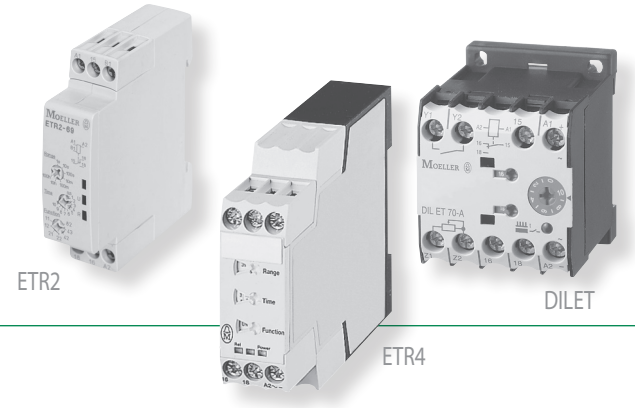
Timing Modules

DILM32-XTE…



timing relays

reliable and precise



Timing functionality is essential to many industrial control applications. Initiating tasks at precise intervals expands control over your application to nearly infinite possibilities. For simple to moderate timing functions, timing relays offer an economical solution compared to sophisticated automation devices, such as PLCs (programmable logic controllers) and intelligent control relays.

Buying more time

Moeller offers multiple timing relay product lines to suit a broad range of user requirements. Our DILET line offers the most economical solutions, while the ETR2 line provides the most single function devices in the smallest footprint at only 17.5 millimeters wide. Our top-of-the-line ETR4 series offers higher actuating voltages and extreme resistance to interference voltage. Even in close proximity to high current pulses, you can expect precision timing performance. The ETR4-70 multi-function device has two changeover contacts and available connection to a potentiometer, to satisfy a multitude of typical applications, all in a single device.

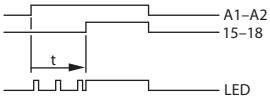
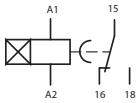
- > Expands control over applications
- > Economical solution for simple to moderate time-based processes
- > Multi-function devices reduce inventory

Feature Comparison	Actuating Voltage Range	Device Width [mm]	Adjustable Time Range	Number of Changeover Contacts	Potentiometer Connection	On-delayed	Off-delayed	On- and Off-delayed	Fleeting contact on energization	Fleeting contact on de-energization	Flashing	Flashing, two speeds	Flashing, pause starting	Pulse generating	Pulse shaping	Star-Delta	On - Off
 DILET	24 – 240V DC or AC 50/60 Hz; 400V AC 50/60 Hz	45	0.05 seconds to 60 hours	0	No	✔ ★	★	★	★	★	★			★	★		★
 ETR2	24 – 48V DC; 24 – 240V AC 50/60 Hz	17.5	0.05 seconds to 100 hours	1 (multi-function device only)	No	✔ ★	✔ ★		✔ ★	★	✔ ★	✔	★		★		
 ETR4	24 – 240V DC or AC 50/60 Hz; 400V AC 50/60 Hz	22.5	0.05 seconds to 100 hours	2 (multi-function device only)	Yes (multi-function device only)	✔ ★	★	★	★	★	★			★	★	✔	★

✔ = available in single function device; ★ = available in multi-function device

- Accurate timing control
- Most economical solution for basic On-delay functionality
- Wide voltage range reduces inventory
- Enormous time range of 0.05 seconds to 60 hours

DIL ET On-delayed Timing Relays

Function Diagram	Schematic	Selectable Time Ranges			Actuating Voltage		Catalog Number	Price
		Seconds	Minutes	Hours	DC	AC 50/60 Hz		
On-delayed (11) 		1.5 – 30 *(fixed range)*			24 – 240	24 – 240	**DILET11-30-A**	190
					–	400	**DILET11-30-W**	190
		0.05 – 1 0.15 – 3 0.5 – 10 3 – 60	0.15 – 3 0.5 – 10 3 – 60	0.15 – 3 0.5 – 10 3 – 60	24 – 240	24 – 240	**DILET11-M-A**	245
					–	400	**DILET11-M-W**	245

LED Display Legend

- Time not running; contact 15-18 closed
- Time running; contact 15-18 closed
- Time running; contact 15-18 not closed

UL/CSA Rating Codes *(per UL508 and CSA 22.2 No.14-95)*

UL/CSA Standard	Continuous Amps	Circuit Voltage								VA	
		120VAC		240VAC		480VAC		600VAC			
		Make	Break	Make	Break	Make	Break	Make	Break	Make	Break
B300	5	30	3	15	1.5	–	–	–	–	3600	360

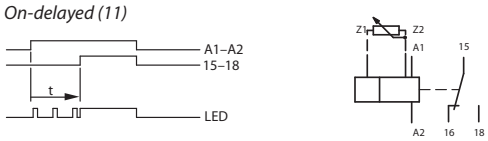
NOTE: This table represents minimum requirements to achieve a rating of B300. All Moeller timing relays meet or exceed these standards.

- Accurate timing control
- Multiple functions in one device - select function by number on face-mounted function dial
- Time can be remotely set by a connection to a potentiometer
- Enormous time range of 0.05 seconds to 100 hours

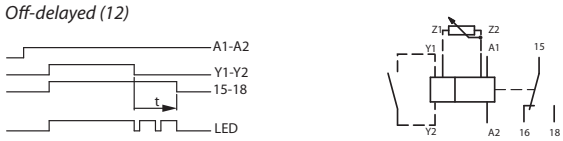
DIL ET Multi-Function Timing Relays

Description	Selectable Time Ranges			Actuating Voltage		Catalog Number	Price
	Seconds	Minutes	Hours	DC	AC 50/60 Hz		
Selectable time range, multiple functions See below for function diagrams and schematics	0.05 – 1 0.15 – 3 0.5 – 10 3 – 60	0.15 – 3 0.5 – 10 3 – 60	0.15 – 3 0.5 – 10 3 – 60	24 – 240	24 – 240	**DILET70-A**	360
				–	400	**DILET70-W**	360

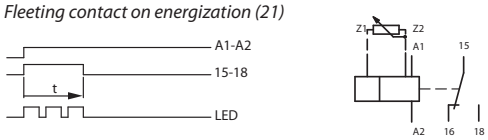
On-delayed (11)



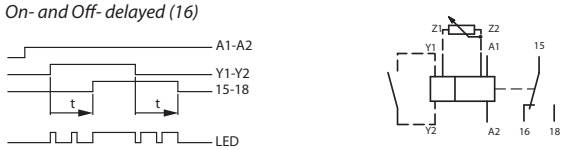
Off-delayed (12)



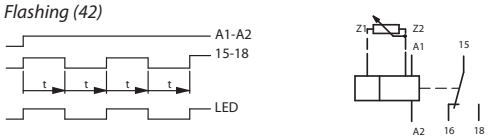
Fleeting contact on energization (21)



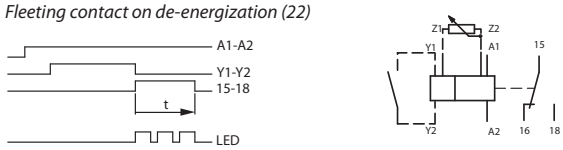
On- and Off- delayed (16)



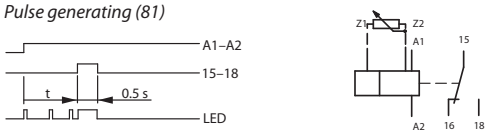
Flashing (42)



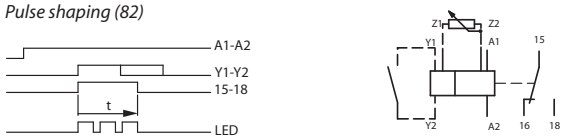
Fleeting contact on de-energization (22)



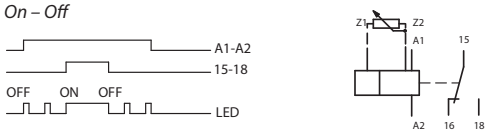
Pulse generating (81)



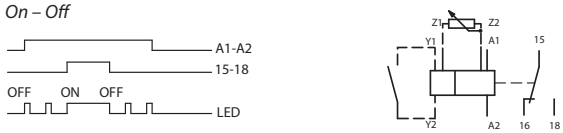
Pulse shaping (82)



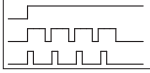
On – Off



On – Off



LED Display Legend



Time not running; contact 15-18 closed
Time running; contact 15-18 closed
Time running; contact 15-18 not closed

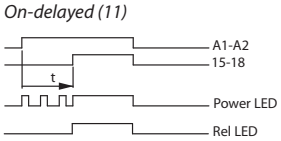
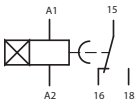
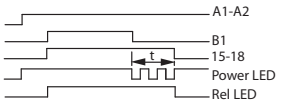
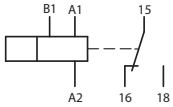
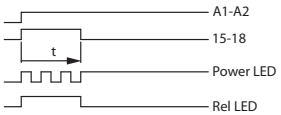
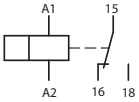
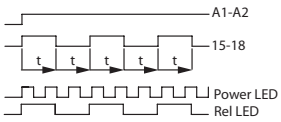
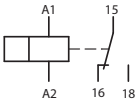
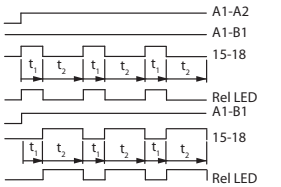
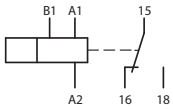
UL/CSA Rating Codes *(per UL508 and CSA 22.2 No.14-95)*

UL/CSA Standard	Continuous Amps	Circuit Voltage								VA	
		120VAC		240VAC		480VAC		600VAC			
		Make	Break	Make	Break	Make	Break	Make	Break	Make	Break
B300	5	30	3	15	1.5	–	–	–	–	3600	360

NOTE: This table represents minimum requirements to achieve a rating of B300. All Moeller timing relays meet or exceed these standards.

- Accurate timing control
- Slim profile - only 17.5 mm wide
- Wide voltage range reduces inventory
- Enormous time range of 0.05 seconds to 100 hours

ETR2 Slim Profile Electronic Timing Relays

Function Diagram	Schematic	Selectable Time Ranges			Actuating Voltage		Catalog Number	Price
		Seconds	Minutes	Hours	DC	AC 50/60 Hz		
On-delayed (11) 		0.05 – 1 1.5 – 30 5 – 100	1.5 – 30 5 – 100	0.5 – 10 5 – 100	24 – 48	24 – 240	**ETR2-11**	182
Off-delayed (12) 		0.05 – 1 1.5 – 30 5 – 100	1.5 – 30 5 – 100	0.5 – 10 5 – 100	24 – 48	24 – 240	**ETR2-12**	182
Fleeting contact on energization (21) 		0.05 – 1 1.5 – 30 5 – 100	1.5 – 30 5 – 100	0.5 – 10 5 – 100	24 – 48	24 – 240	**ETR2-21**	210
Flashing (42) 		0.05 – 1 1.5 – 30 5 – 100	1.5 – 30 5 – 100	0.5 – 10 5 – 100	24 – 48	24 – 240	**ETR2-42**	182
Flashing, two speeds (44) 		0.05 – 1 1.5 – 30 5 – 100	1.5 – 30 5 – 100	0.5 – 10 5 – 100	24 – 48	24 – 240	**ETR2-44**	240

LED Display Legend

- Time not running; contact 15-18 closed
- Time running; contact 15-18 closed
- Time running; contact 15-18 not closed

UL/CSA Rating Codes *(per UL508 and CSA 22.2 No.14-95)*

UL/CSA Standard	Continuous Amps	Circuit Voltage								VA	
		120VAC		240VAC		480VAC		600VAC			
		Make	Break	Make	Break	Make	Break	Make	Break	Make	Break
B300	5	30	3	15	1.5	–	–	–	–	3600	360

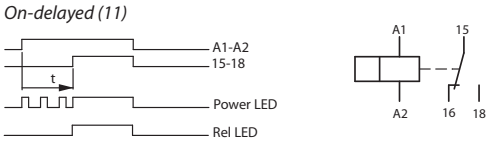
NOTE: This table represents minimum requirements to achieve a rating of B300. All Moeller timing relays meet or exceed these standards.

- Accurate timing control
- Slim profile - only 17.5 mm wide
- Multiple functions in one device - select function by number on face-mounted function dial
- Enormous time range of 0.05 seconds to 100 hours

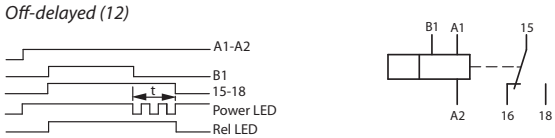
ETR2 Slim Profile Multi-Function Electronic Timing Relays

Description	Selectable Time Ranges			Actuating Voltage		Catalog Number	Price
	Seconds	Minutes	Hours	DC	AC 50/60 Hz		
Selectable time range, multiple functions See below for function diagrams and schematics	0.05 – 1 1.5 – 30 5 – 100	1.5 – 30 5 – 100	0.5 – 10 5 – 100	24 – 48	24 – 240	**ETR2-69**	210

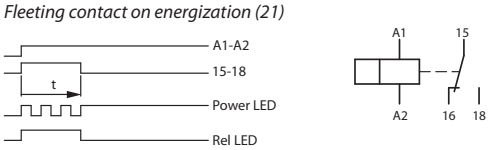
On-delayed (11)



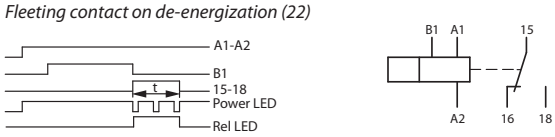
Off-delayed (12)



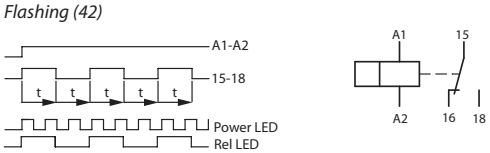
Fleeting contact on energization (21)



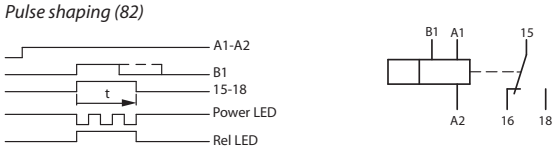
Fleeting contact on de-energization (22)



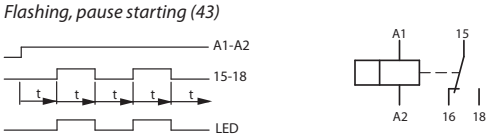
Flashing (42)



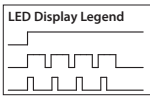
Pulse shaping (82)



Flashing, pause starting (43)



LED Display Legend



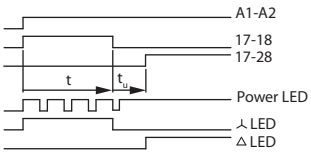
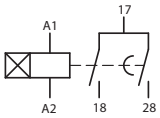
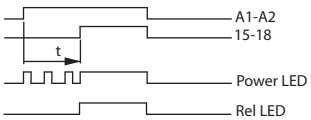
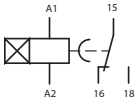
UL/CSA Rating Codes *(per UL508 and CSA 22.2 No.14-95)*

UL/CSA Standard	Continuous Amps	Circuit Voltage								VA	
		120VAC		240VAC		480VAC		600VAC			
		Make	Break	Make	Break	Make	Break	Make	Break	Make	Break
B300	5	30	3	15	1.5	–	–	–	–	3600	360

NOTE: This table represents minimum requirements to achieve a rating of B300. All Moeller timing relays meet or exceed these standards.

- Accurate timing control
- High level of interference voltage resistance
- Time can be remotely set by a connection to a potentiometer
- Enormous time range of 0.05 seconds to 100 hours

ETR4 Single Function Electronic Timing Relays

Function Diagram	Schematic	Selectable Time Ranges			Actuating Voltage		Catalog Number	Price
		Seconds	Minutes	Hours	DC	AC 50/60 Hz		
Star-delta (51) 		3 – 60 *(fixed range)*			24 – 240	24 – 240	**ETR4-51-A**	190
					–	400	**ETR4-51-W**	200
On-delayed (11) 		0.05 – 1 0.15 – 3 0.5 – 10 1.5 – 30 5 – 100 15 – 300	1.5 – 30 15 – 300	1.5 – 30 5 – 100	24 – 240	24 – 240	**ETR4-11-A**	175
					–	400	**ETR4-11-W**	185

LED Display Legend

- Time not running; contact 15-18 closed
- Time running; contact 15-18 closed
- Time running; contact 15-18 not closed

UL/CSA Rating Codes *(per UL508 and CSA 22.2 No.14-95)*

UL/CSA Standard	Continuous Amps	Circuit Voltage								VA	
		120VAC		240VAC		480VAC		600VAC			
		Make	Break	Make	Break	Make	Break	Make	Break	Make	Break
B300	5	30	3	15	1.5	–	–	–	–	3600	360

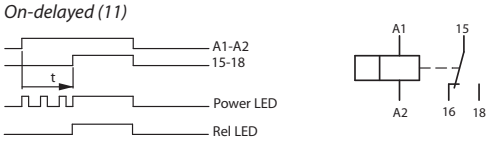
NOTE: This table represents minimum requirements to achieve a rating of B300. All Moeller timing relays meet or exceed these standards.

- Accurate timing control
- High level of interference voltage resistance
- Multiple functions in one device - select function by number on face-mounted function dial
- Time can be remotely set by a connection to a potentiometer

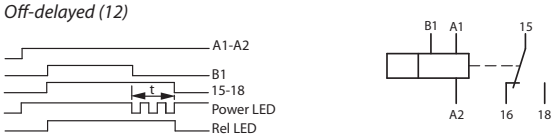
ETR4 Multi-Function Electronic Timing Relays

Description	Selectable Time Ranges			Actuating Voltage		Catalog Number	Price
	Seconds	Minutes	Hours	DC	AC 50/60 Hz		
Selectable time range, multiple functions See below for function diagrams and schematics	0.05 – 1 0.15 – 3 0.5 – 10 1.5 – 30 5 – 100 15 – 300	1.5 – 30 15 – 300	1.5 – 30 5 – 100	24 – 240	24 – 240	**ETR4-69-A**	245
				–	400	**ETR4-69-W**	255

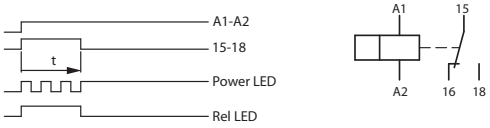
On-delayed (11)



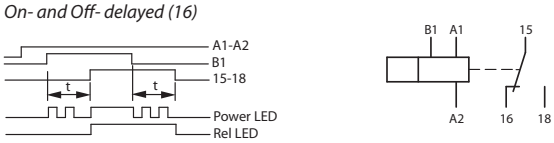
Off-delayed (12)



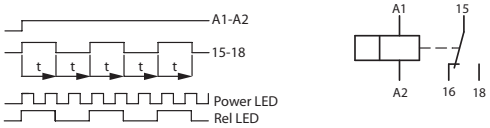
Fleeting contact on energization (21)



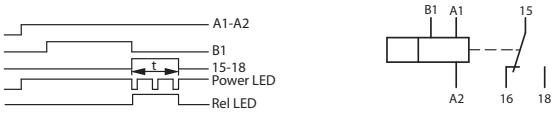
On- and Off- delayed (16)



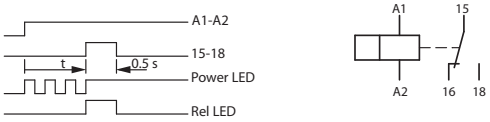
Flashing (42)



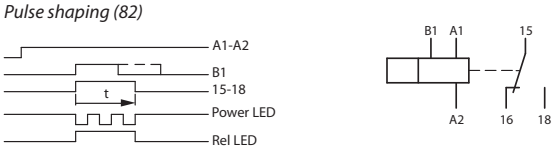
Fleeting contact on de-energization (22)



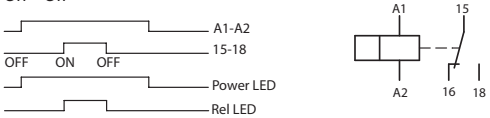
Pulse generating (81)



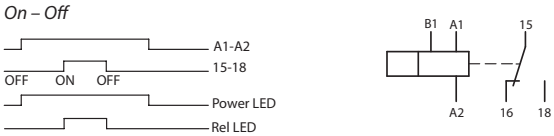
Pulse shaping (82)



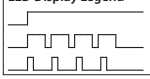
On – Off



On – Off



LED Display Legend



UL/CSA Rating Codes *(per UL508 and CSA 22.2 No.14-95)*

UL/CSA Standard	Continuous Amps	Circuit Voltage								VA	
		120VAC		240VAC		480VAC		600VAC			
		Make	Break	Make	Break	Make	Break	Make	Break	Make	Break
B300	5	30	3	15	1.5	–	–	–	–	3600	360

NOTE: This table represents minimum requirements to achieve a rating of B300. All Moeller timing relays meet or exceed these standards.

In addition to features of multi-function device on previous page:

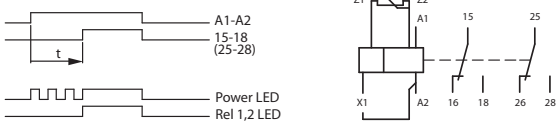
- Two changeover contacts
- Built-in connection for a potentiometer allows for remote timing adjustments

ETR4 Multi-Function Electronic Timing Relay with Two Changeover Contacts

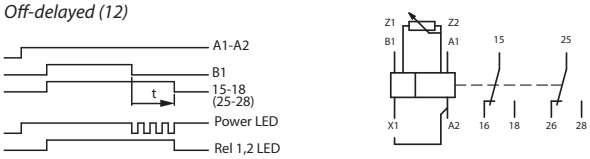
Description	Selectable Time Ranges			Actuating Voltage		Catalog Number	Price
	Seconds	Minutes	Hours	DC	AC 50/60 Hz		
Selectable time range, multiple functions With two changeover contacts and connection for potentiometer. Can be converted to two timed contacts or one non-delayed and one timed contact. See this page and next page for function diagrams and schematics	0.05 – 1 0.15 – 3 0.5 – 10 1.5 – 30 5 – 100 15 – 300	1.5 – 30 15 – 300	1.5 – 30 5 – 100	24 – 240	24 – 240	**ETR4-70-A**	330

With A2/X1 Linked

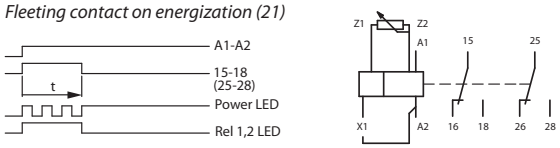
On-delayed (11)



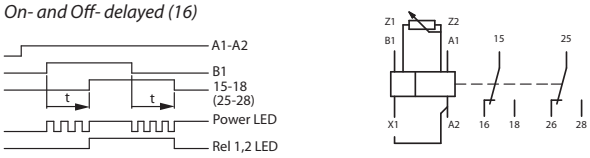
Off-delayed (12)



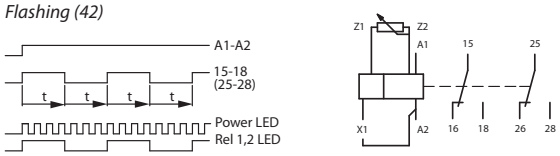
Fleeting contact on energization (21)



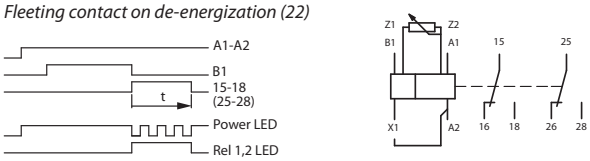
On- and Off- delayed (16)



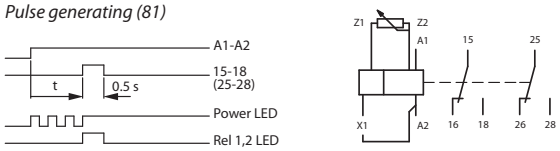
Flashing (42)



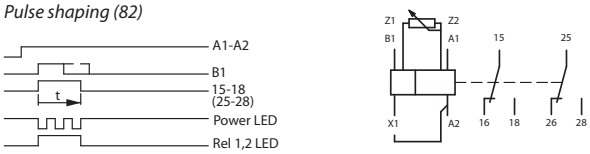
Fleeting contact on de-energization (22)



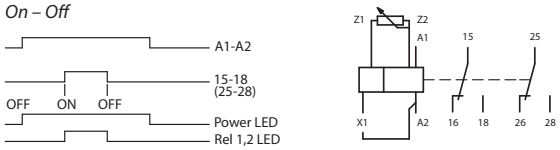
Pulse generating (81)



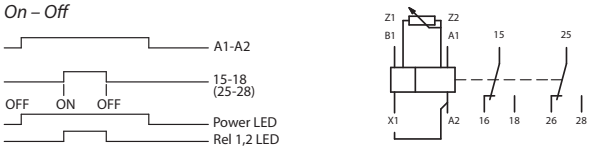
Pulse shaping (82)



On – Off



On – Off



LED Display Legend

- Time not running; contact 15-18 closed
- Time running; contact 15-18 closed
- Time running; contact 15-18 not closed

UL/CSA Rating Codes *(per UL508 and CSA 22.2 No.14-95)*

UL/CSA Standard	Continuous Amps	Circuit Voltage								VA	
		120VAC		240VAC		480VAC		600VAC			
		Make	Break	Make	Break	Make	Break	Make	Break	Make	Break
B300	5	30	3	15	1.5	–	–	–	–	3600	360

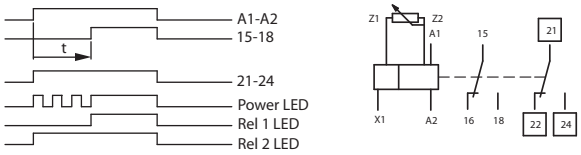
NOTE: This table represents minimum requirements to achieve a rating of B300. All Moeller timing relays meet or exceed these standards.

Function diagrams for ETR4-70-A *(continued)*

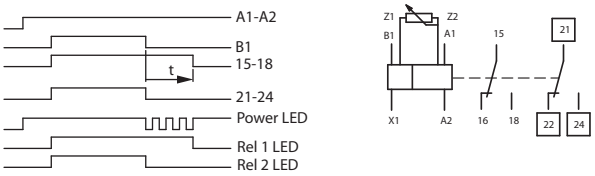
Below are function diagrams of ETR4-70-A when A2 and X1 are not linked.
See previous page for function diagrams when A2 and X1 are linked.

A2/X1 Not Linked

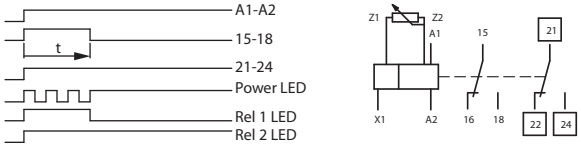
On-delayed (11)



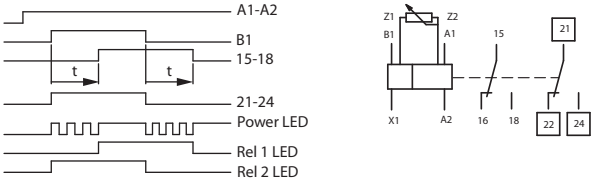
Off-delayed (12)



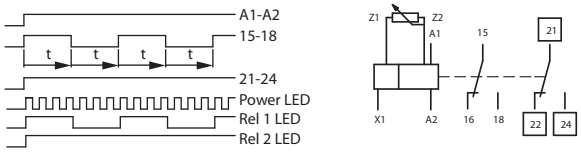
Fleeting contact on energization (21)



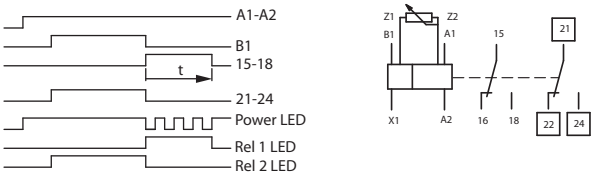
On- and Off- delayed (16)



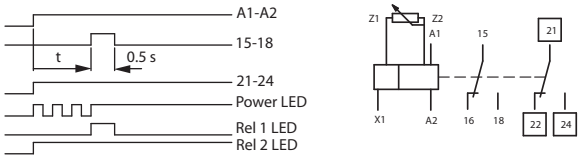
Flashing (42)



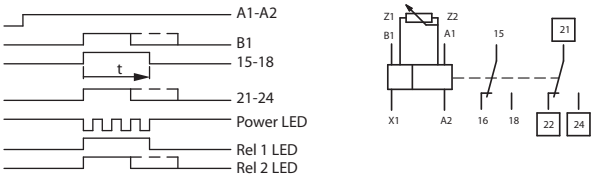
Fleeting contact on de-energization (22)



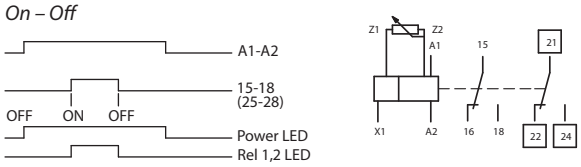
Pulse generating (81)



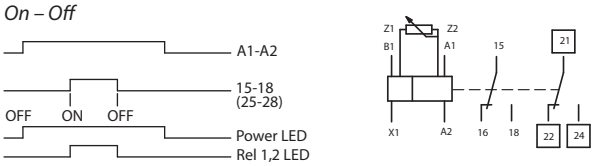
Pulse shaping (82)



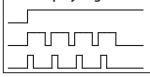
On – Off



On – Off



LED Display Legend



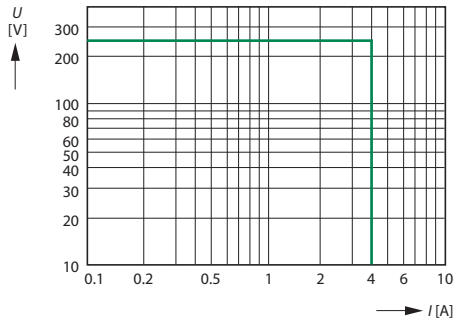
Time not running; contact 15-18 closed
Time running; contact 15-18 closed
Time running; contact 15-18 not closed

F

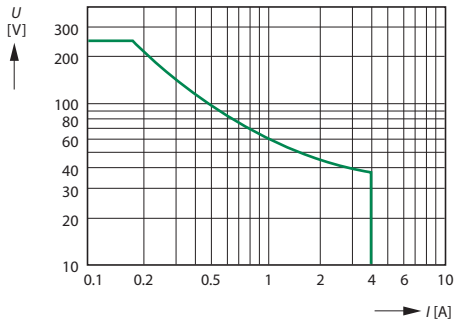
Relays

Load Limit Curves, 22.5 mm range

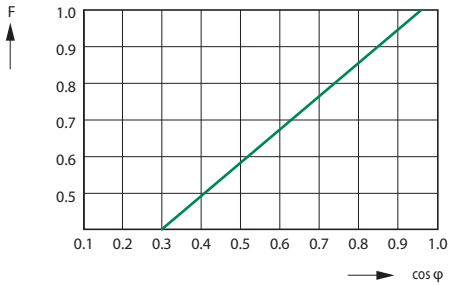
AC Load (Resistive)



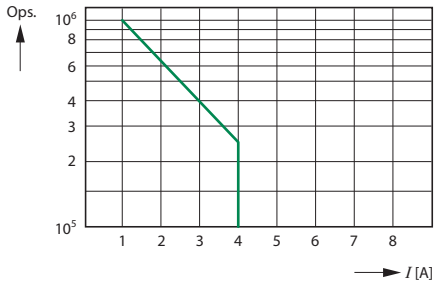
DC Load (Resistive)



Derating Factor with Inductive AC Load

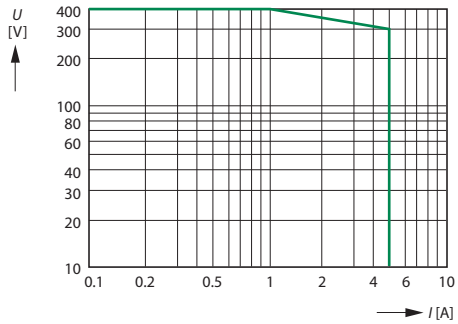


Contact Life *(220V 50Hz, AC-1, 360 Operations/hour)*

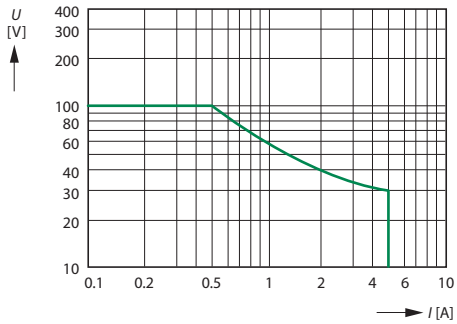


Load Limit Curves, 45 mm range

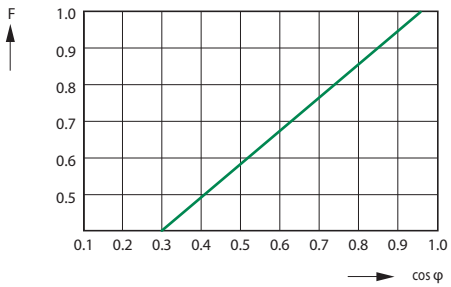
AC Load (Resistive)



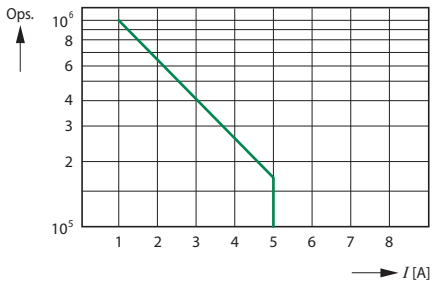
DC Load (Resistive)



Derating Factor with Inductive AC Load

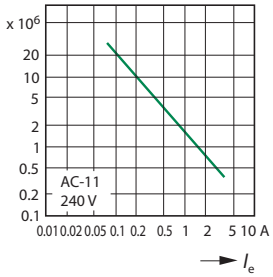


Contact Life *(220V 50Hz, AC-1, 360 Operations/hour)*



DILET (AC-11)

Component lifespan (operations)
I_e = Rated operational current



Timing Relays				DILET-A	DILET-W	ETR2	ETR4-A	ETR4-W
General								
Standards				IEC/EN 60947, VDE 0660, UL, CSA IEC/EN 60255, VDE 0435				
Lifespan, mechanical								
AC operated		Operations	[x 10^6]	30	30	30	30	30
DC operated		Operations	[x 10^6]	30	30	30	30	30
Climatic proofing				Damp heat, constant, to IEC 60068-2-78; Damp heat, cyclical, to IEC 60068-2-30				
Ambient temperature								
Storage			[°C / °F]	–	–	40…85 °C / *104…185 °F*	45…60 °C / *113…140 °F*	45…60 °C / *113…140 °F*
Open			[°C / °F]	-20…60 °C / *-4…140 °F*	-20…60 °C / *-4…140 °F*	-20…60 °C / *-4…140 °F*	-25…60 °C / *-13…140 °F*	-25…60 °C / *-13…140 °F*
Enclosed			[°C / °F]	-20…45 °C / *-4…113 °F*	-20…45 °C / *-4…113 °F*	-20…60 °C / *-4…140 °F*	-25…45 °C / *-13…113 °F*	-25…45 °C / *-13…113 °F*
Mounting position				As required	As required	As required	As required	As required
Mechanical shock resistance (IEC/EN 60068-2-27)								
Half-sinusoidal shock, 20 ms		Make contact	[g]	4	4	4	4	4
Degree of protection								
Terminals				IP 20	IP 20	IP 20	IP 20	IP 20
Weight			[kg]	0.09	0.09	0.05	0.1	0.1
Terminal capacities								
Solid			[mm^2]	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 1.5)	1 x (0.75 – 2.5) 2 x (0.75 – 1.5)	1 x (0.75 – 2.5) 2 x (0.75 – 1.5)
Flexible with ferrule			[mm^2]	1 x (0.75 – 1.5) 2 x (0.75 – 1.5)	1 x (0.75 – 1.5) 2 x (0.75 – 1.5)	1 x (0.75 – 2.5) 2 x (0.75 – 1.5)	1 x (0.75 – 2.5) 2 x (0.75 – 1.5)	1 x (0.75 – 2.5) 2 x (0.75 – 1.5)
Solid or stranded			[AWG]	1 x (18 – 14)	1 x (18 – 14)	1 x (20 – 14)	1 x (20 – 14)	1 x (20 – 14)
Contacts								
Rated impulse withstand voltage		U_{imp}	[V AC]	6000	6000	4000	6000	6000
Overvoltage category/pollution degree				III/2	III/2	III/3	III/3	III/3
Rated insulation voltage		U_i	[V AC]	600	600	300	600	600
Rated operational voltage		U_e	[V AC]	440	440	250	440	440
Safe isolation to VDE 0106 Part 101 and Part 101/A1								
Between coil and auxiliary contacts			[V AC]	250	250	–	250	250
Between the auxiliary contacts			[V AC]	250	250	–	250	250
Making capacity								
AC-14	cos φ = 0.3	440V	[A]	48	48	–	48	48
AC-15	cos φ = 0.3	220V	[A]	50	50	30	50	50
DC-11	L/R – 40 ms		[x I_e]	1.1	1.1	–	1.1	1.1
Breaking capacity								
AC-14	cos φ = 0.3	440V	[A]	3	3	–	3	3
AC-15	cos φ = 0.3	220V	[A]	3	3	–	3	3
DC-11	L/R – 40 ms		[x I_e]	1.1	1.1	1.1	1.1	1.1

Timing Relays *(continued)*				DILET-A	DILET-W	ETR2	ETR4-A	ETR4-W
Contacts *(continued)*								
Rated operational current								
AC-14	440V	I_e	[A]	3	3	–	3	3
AC-15	220V	I_e	[A]	3	3	3	3	3
AC-12	230V	I_e	[A]	–	–	4	–	–
DC-12		I_e	[A]	–	–	6	–	–
DC-13	24V	I_e	[A]	–	–	2	–	–
DC-11 ❶								
L/R max. 15 ms	24V	I_e	[A]	1.5	1.5	–	1.5	1.5
L/R max. 50 ms			[A]	1.2	1.2	–	1.2	1.2
Conventional thermal current		I_{th}	[A]	6	6	6	6	6
Short-circuit rating without welding ❷								
Max. fuse, make contacts			[A gG/gL]	6	6	10	6	6
Max. fuse, break contacts			[A gG/gL]	6	6	6	6	6
Max. overcurrent protective device, 220/230V			[Type]	–	–	–	FAZ-B4/1-HI	FAZ-B4/1-HI
Magnet Systems								
Voltage tolerance								
Pick-up voltage								
AC operated	Pick-up		[x U]	0.85 – 1.1	0.85 – 1.1	0.85 – 1.1	0.85 – 1.1	0.85 – 1.1
DC operated	Pick-up		[x U_c]	0.7 – 1.1	–	0.85 – 1.1	0.7 – 1.1	–
Power consumption								
Pick-up AC			[VA]	2	0.5	–	2	0.5
Sealing AC			[VA]	2	0.5	–	2	0.5
Pick-up DC			[W]	1.8	–	–	1.8	–
Sealing DC			[W]	1.8	–	–	1.8	–
Duty factor			[% DF]	100	100	100	100	100
Maximum operating frequency								
Mechanical			[Ops/h]	4000	4000	360: 8A/250V 7200: 120mA/12V	4000	4000
Electrical			[Ops/h]	–	–	–	–	–
Maximum command time								
AC			[ms]	50	50	20	50	50
DC			[ms]	30	–	20	30	–
Repetition accuracy (deviation)			[%]	≤ 0.5	≤ 0.5	≤ 0.5	≤ 0.5	≤ 0.5
Recovery time (after 100% time delay)			[ms]	70	70	50	70	70
Contact changeover time		t_u	[ms]	–	–	10	4	4

❶ Making and breaking conditions to DC-13, time constant as stated.
❷ When supplied directly from mains or transformer > 1000 VA.

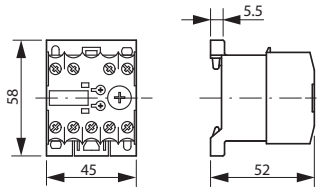
F

Relays

Dimensions are in millimeters.
Not intended for manufacturing purposes.

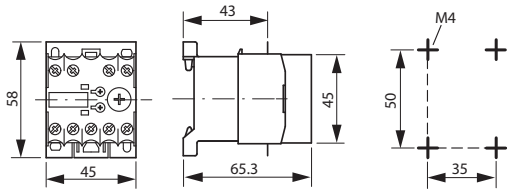
Electronic Timing Relays

DILET...



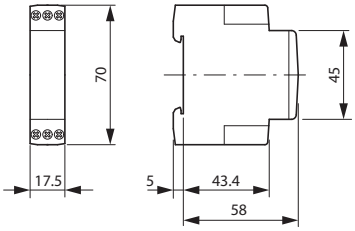
Electronic Timing Relays

DILET... with Sealable Shroud HDILE



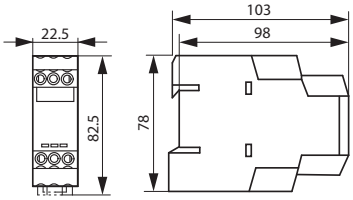
Electronic Timing Relays

ETR2...



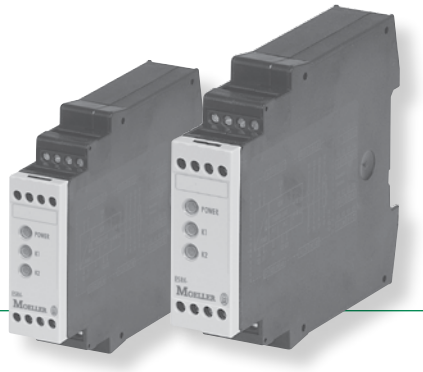
Electronic Timing Relays

ETR4...



safety relays

critical protection



Safety of personnel is paramount. Moeller takes guarding operator safety very seriously, and has designed safety relays to perform without fault when properly installed. In accordance with the highest safety regulations, Moeller's safety relays are positively guided with an exceptional level of contact reliability. Safety applications require the use of redundant circuits, traditionally achieved by use of a second set of contactors and/or relays to perform the tasks needed to protect operating personnel. Moeller's safety relays contain redundant positively guided contacts in a single device, resulting in a dramatic cost savings over traditional methods.

Nothing else comes first

Designed for the highest safety standards, all Moeller safety relays adhere to:

- Category 4 of EN 954-1
- PL e of EN ISO 13849-1
- SIL CL 3 of EN IEC 62061
- SIL 3 of EN IEC 61508

Whenever you want it

IEC/EN 60204 distinguishes between an instantaneous stop with Stop Category 0, and a delayed stop with Stop Category 1. Moeller offers models in each stop category, all with redundant enabling paths. Available in single and dual channel, Moeller safety relays have an actuating voltage of 24V DC, up to 230V AC at 50/60 Hz. Options for two-hand controls and expansion modules are also available.

Complete solutions

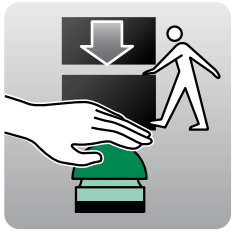
Moeller safety relays are the solution for a wide range of safety applications, including emergency stops, safety doors and guards, contact mats, optical barriers and two-hand controls. These devices are only part of Moeller's spectrum of safety products. Other products include emergency-stop FAK foot & palm switches, LS-TITAN limit switches, EMR4 monitoring relays and CMD contactor monitor devices.

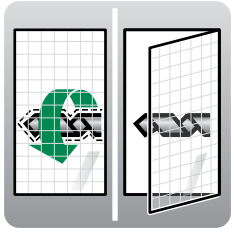
> Adheres to the highest level of safety standards

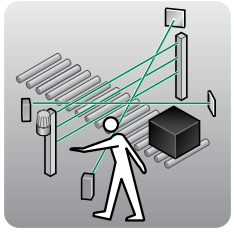
> Ideal for even the most critical safety applications

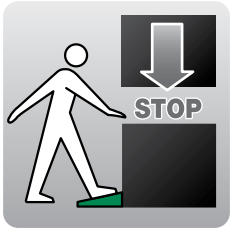
> Built-in redundant contacts offer substantial cost savings

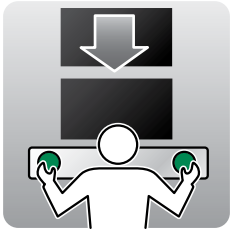
> Tamper-proof design











- Dual Channel relays offer up to EN 954-1 category 4 protection
- All Moeller safety relays contain redundant positively guided contacts in a single device
- Product available for both IEC/EN 60204 Stop Category 0 and Stop Category 1

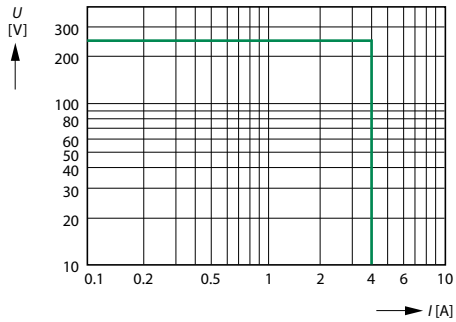
Safety Relays

Description	Category (EN 954-1)	No. of enabling paths to Stop Category (IEC/EN 60204) 0	1	No. of Signalling Contacts	Actuating Voltage DC	AC 50/60 Hz	Catalog Number	Price
Single Channel								
Suitable for Emergency Stop or Protective Guard monitoring applications	2	3	–	1	24	24	**ESR4-NO-31**	595
	2	3	–	1	–	115	**ESR4-NO-31-115VAC**	494
	2	3	–	1	–	230	**ESR4-NO-31-230VAC**	494
Dual Channel - Without Delay								
Suitable for Emergency Stop or Protective Guard monitoring applications	4	2	–	1	24	24	**ESR4-NO-21**	650
	4	3	–	–	24	24	**ESR4-NO-30-24VAC-DC**	720
	4	3	–	–	–	115	**ESR4-NO-30-115VAC**	590
	4	3	–	–	–	230	**ESR4-NO-30-230VAC**	676
Dual Channel - With Delay Option								
Off-delayed; 0.15 – 3 seconds	4 (non-delayed) 3 (delayed)	2	1	–	24	–	**ESR4-NV3-30**	1045
Off-delayed; 1.5 – 30 seconds Suitable for use with safety position switch with interlocking option, LS-S-. . . MT-ZBZ	4 (non-delayed) 3 (delayed)	2	1	–	24	–	**ESR4-NV30-30**	1045
Dual Channel - Performance Level e *(EN ISO 13849-1)*								
Safety integrity level 3 according to EN 61508 Safety integrity level claim limit 3, according to EN 62061 Approved for lifts according to EN 81-1 Approved for furnaces according to EN 50156-1 (Safety-level step 3)	4	3	–	1	24	24	**ESR4-NOE-31-24VAC-DC**	658
	4	3	–	1	–	230	**ESR4-NOE-31-230VAC**	724
	4	4	–	–	24	24	**ESR4-NOE-40-24VAC-DC**	658
	4	4	–	–	–	230	**ESR4-NOE-40-230VAC**	724
Two-hand Relay								
Dual channel	❶	2	–	1	24	24	**ESR4-NZ-21**	750
Contact Expansion Modules ❷								
Without delay	4	4	–	2	24	24	**ESR4-NE-42**	550
Off-delayed; $t_A = 3$ seconds	4	–	4	2	24	–	**ESR4-VE3-42**	725

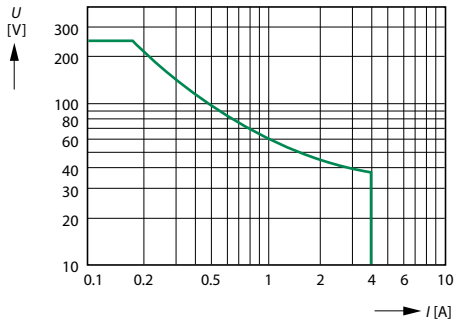
❶ The base unit determines the maximum safety category.
❷ The base unit determines the maximum stop category.

Load Limit Curves, 22.5 mm range

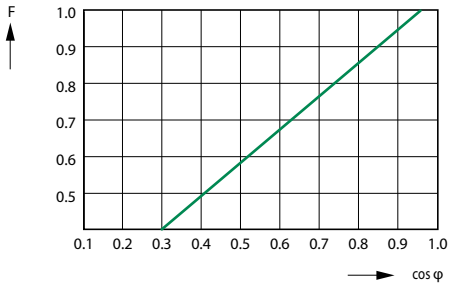
AC Load (Resistive)



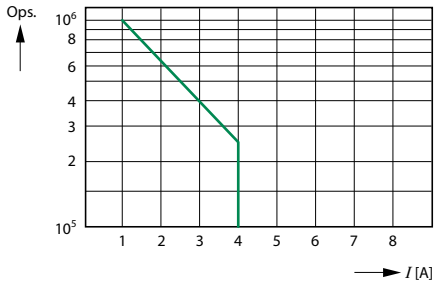
DC Load (Resistive)



Derating Factor with Inductive AC Load

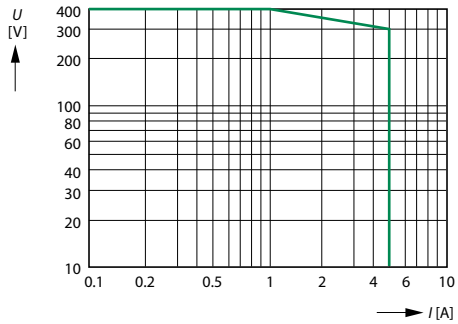


Contact Life *(220V 50Hz, AC-1, 360 Operations/hour)*

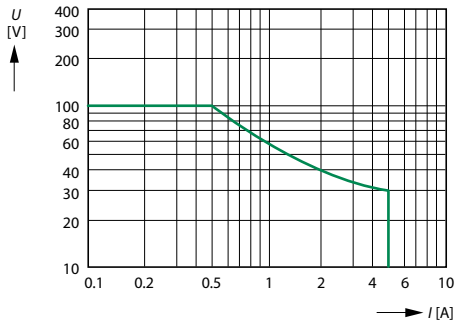


Load Limit Curves, 45 mm range

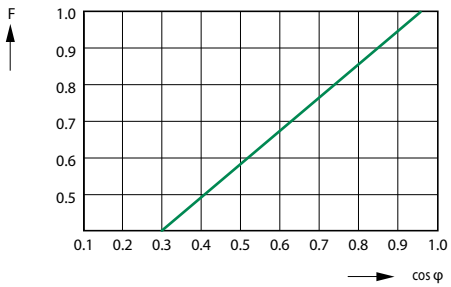
AC Load (Resistive)



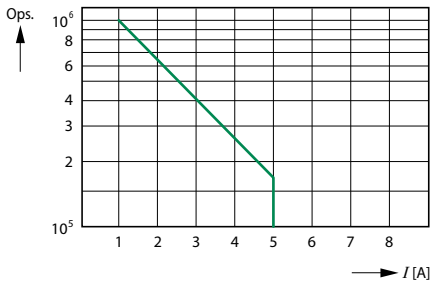
DC Load (Resistive)



Derating Factor with Inductive AC Load



Contact Life *(220V 50Hz, AC-1, 360 Operations/hour)*



Safety Relays			ESR4-NO-30	ESR4-NO-31	ESR4-NO-21	ESR4-NV3(30)-30	ESR4-NZ-21	ESR4-NE-42	ESR4-VE3-42
General									
Standards			IEC/EN 60947, VDE 0660, IEC/ EN 60255, UL, CSA, EN 954-1						
Lifespan, mechanical	Operations	[x 10^6]	1	10	10	10	10	10	10
Maximum operating frequency		[Ops/h]	3600	3600	3600	3600	3600	3600	3600
Climatic proofing									
Cold			EN 60068-2-1						
Dry heat			EN 60068-2-2						
Temperature change			EN 60068-2-14						
Damp heat			EN 60068-2-30						
Ambient temperature		[°C / °F]	-25 . . . 55 °C / -13 . . . 131 °F						
Storage		[°C / °F]	-25 . . . 75 °C / -13 . . . 167 °F						
Mounting position			As required	As required	As required	As required	As required	As required	As required
Vibration resistance									
To IEC/EN 60068-2-6; frequency: 10 – 55Hz; amplitude: 0.35 mm		[g]	5	5	5	5	5	5	5
Degree of protection									
Enclosures			IP40	IP40	IP40	IP40	IP40	IP40	IP40
Terminals			IP20	IP20	IP20	IP20	IP20	IP20	IP20
Protection against direct contact when actuated from front (IEC 536)			Finger and back-of-hand proof						
Weight		[kg]	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Terminal capacities									
Solid core or stranded		[mm^2]	1 x (0.14 – 2.5); 2 x (0.14 – 0.75)						
Flexible with ferrule		[mm^2]	1 x (0.25 – 2.5); 2 x (0.25 – 0.5)						
Solid or stranded		[AWG]	18 – 16	18 – 16	18 – 16	18 – 16	18 – 16	18 – 16	18 – 16
Terminal screw									
Pozidriv screwdriver		[Size]	2	2	2	2	2	2	2
Standard screwdriver		[mm]	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5
Max. tightening torque		[Nm]	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Main Conducting Paths									
Rated impulse withstand voltage	U_{imp}	[V AC]	4000	4000	4000	4000	4000	4000	4000
Overvoltage category/pollution degree									
Outside			III/3	III/3	III/3	III/3	III/3	III/3	III/3
Inside			III/2	III/2	III/2	III/2	III/2	III/2	III/2
Rated insulation voltage	U_i	[V AC]	300	300	300	300	300	300	300
Rated operational voltage	U_e	[V AC]	230	230	230	230	230	230	230
Rated operational current									
AC-15									
230V (360 ops/h)	I_e	[A]	4	4	4	–	4	–	–
230V (3600 ops/h)	I_e	[A]	3	3	3	4	3	6	6
DC-13									
24V (360 ops/h)	I_e	[A]	4	4	4	5	4	6	6
24V (3600 ops/h)	I_e	[A]	2.5	2.5	2.5	–	2.5	3	3
Max. summation current of all poles									
24V AC/DC devices		[A]	12	12	12	12	12	12	12
115 – 120V AC devices		[A]	–	8	–	–	–	–	–
230V AC devices		[A]	8	–	–	–	–	–	–
Short-circuit protection									
Max. fuse		[A gG/gL]	6	6	6	6	6	6	6

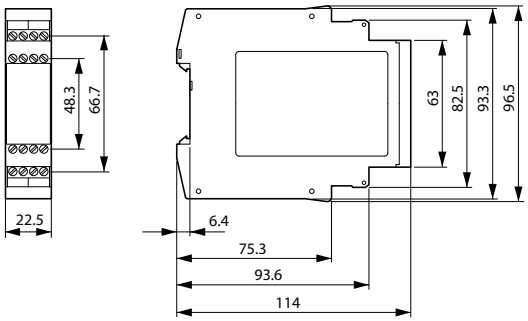
Safety Relays *(continued)*			ESR4-NO-30	ESR4-NO-31	ESR4-NO-21	ESR4-NV3(30)-30	ESR4-NZ-21	ESR4-NE-42	ESR4-VE3-42
Magnet Systems									
Actuating voltage, 50/60 Hz		[V AC]	24, 115, 230	24, 115, 230	24	24	24	24	–
Actuating voltage, DC	U_S	[V DC]	24	24	24	24	24	24	24
Voltage tolerance, Pick-up		[x U_e]	0.85 – 1.1	0.85 – 1.1	0.85 – 1.1	0.85 – 1.1	0.85 – 1.1	0.85 – 1.1	0.85 – 1.1
Power consumption									
AC operated, 50/60 Hz, 24V/230V		[VA]	4.4 / 4.4 / 4.4	3.2 / 2.3 / 2.3	4.4	–	3.1	2.7	2.7
AC operated, 50/60 Hz, 24V/230V		[W]	2.4 / 2.4	1.8 / 2.0 / 2.0	2.4	–	1.9	1.5	1.5
DC operated		[W]	2.0	1.3	2.0	2.6	2.4	1	1
Control Circuit									
Rated output voltage		[V DC]	≤ 24	≤ 24	≤ 24	≤ 24	≤ 24	–	–
No-load voltage		[V DC]	≤ 40	–	–	–	–	–	–
Rated current		[mA]	40	40	50	50	60	–	–
Max. resistive load of the cable	R	[Ω]	70	70	70	70	70	–	–
Short-circuit current		[A]	1	1.4	2.2	2.2	1	–	–
Fuse		[W]	Short-circuit protected	24V: PTC resistance 230V: short-circuit proof transformer	PTC resistor	PTC resistor	PTC resistor	–	–
Inputs									
Rated current		[mA]	S12, S31, S32, S33: 40; S34, S35: 5	Y2: 90; Y3: 1500	S12, S22, S31: 40; S34, S35: 40	S12, S22, S31: 25; S34, S35: 40	Y2: 60; Y11, Y21: 60	65	65
Response time with reset monitoring	t_{A1}	[ms]	20 – 40	40 (DC) 180 (AC)	20 – 40	30	–	–	–
Response time without reset monitoring	t_{A2}	[ms]	200 – 600	40	200 – 500	700	40	20	20
Reset time	t_R/t_{R1}	[ms]	< 2	> 60	< 25	25/adjustable	< 50	40	500, 1000, 2000, 3000
Minimum contact closing time	t_M	[ms]	> 80	> 60	> 50	200	–	–	75
Recovery time	t_W	[ms]	≥ 100	< 200	≥ 40	500	≤ 250	–	–
Synchronous monitoring	t_S	[ms]	200	–	200	> 100, < 500	≤ 500	–	–
Electromagnetic Compatibility (EMC)									
Emitted interference			to EN 50081-1 and EN 50081-2						
Interference immunity			EN 50082-2						

Safety Relays *(continued)*			ESR4-NOE-31	ESR4-NOE-40
General				
Standards			IEC/EN 60947, VDE 0660, IEC/EN 60255, UL, CSA, EN 81-1	
EN 954-1			Category 4	
prEN ISO 13849-1			PL e	
IEC/EN 62061			SILCL 3	
IEC/EN 61508			SIL 3	
EN 50156-1			Safety Level 3	
Lifespan, mechanical	Operations	[x 10^6]	10	10
Maximum operating frequency		[Ops/h]	3600	3600
Climatic proofing				
Cold			EN 60068-2-1	
Dry heat			EN 60068-2-2	
Temperature change			EN 60068-2-14	
Damp heat			EN 60068-2-30	
Ambient temperature		[°C / °F]	-25 . . . 65 °C / *-13 . . . 149 °F*	-25 . . . 65 °C / *-13 . . . 149 °F*
Storage		[°C / °F]	-25 . . . 70 °C / *-13 . . . 158 °F*	-25 . . . 70 °C / *-13 . . . 158 °F*
Mounting position			As required	As required
Vibrations (IEC/EN 60068-2-6)			5 – 9 Hz: 1 g 9 – 150 Hz: 10 g	5 – 9 Hz: 1 g 9 – 150 Hz: 10 g
Mechanical shock resistance (IEC 60068-2-27)			15 g, 11 ms	15 g, 11 ms
Degree of protection				
Enclosures			IP40	IP40
Terminals			IP 20	IP 20
Protection against direct contact when actuated from front (IEC 536)			Finger and back-of-hand proof	Finger and back-of-hand proof
Weight		[kg]	DC-device: 0.21 AC-device: 0.25	DC-device: 0.21 AC-device: 0.25
Terminal capacity screw terminals				
Solid core or stranded		[mm^2]	1 x (0.14 – 2.5); 2 x (0.14 – 0.75)	1 x (0.14 – 2.5); 2 x (0.14 – 0.75)
Flexible with ferrule		[mm^2]	1 x (0.25 – 2.5); 2 x (0.25 – 0.5)	1 x (0.25 – 2.5); 2 x (0.25 – 0.5)
Solid or stranded		[AWG]	18 – 16	18 – 16
Terminal screw				
Pozidriv screwdriver		[Size]	2	2
Standard screwdriver		[mm]	0.6 x 3.5	0.6 x 3.5
Max. tightening torque		[Nm]	0.6	0.6
Main Conducting Paths				
Rated impulse withstand voltage	U_{imp}	[V AC]	4000	4000
Overvoltage category/pollution degree				
Outside			III/3	III/3
Inside			III/2	III/2
Rated insulation voltage	U_i	[V AC]	300	300
Rated operational voltage	U_e	[V AC]	230	230
Rated operational current				
AC-15, 230V (3600 ops/h)	I_e	[A]	5	5
DC-13, 24V (3600 ops/h)	I_e	[A]	5	5
Max. summation current of all poles				
24V AC/DC devices		[A]	12	12
230V AC devices		[A]	8	8
Short-circuit protection				
Max. fuse		[A gG/gL]	8	8

Safety Relays *(continued)*			ESR4-N0E-31	ESR4-N0E-40
Power Supply Circuit				
Actuating voltage 50/60 Hz		[V AC]	24, 230	24, 230
Actuating voltage	U_S	[V DC]	24	24
Voltage tolerance, Pick-up		[x U_e]	0.85 – 1.1	0.85 – 1.1
Power consumption				
AC operated, 50/60Hz, 24V/230V		[VA]	2.9 / 2.4	2.9 / 2.4
AC operated, 50/60Hz, 24V/230V		[W]	1.6 / 2.1	1.6 / 2.1
DC operated		[W]	1.6 / –	1.6 / –
Control Circuit				
Rated output voltage		[V DC]	≤ 24	≤ 24
No-load voltage		[V DC]	≤ 40	≤ 40
Rated current		[mA]	S12, S52, S22: 25; S34: 5	S12, S52, S22: 25; S34: 5
Peak current		[mA]	S12, S52, S22, S34: 100	S12, S52, S22, S34: 100
Max. resistive load of the cable	R	[Ω]	≤ 25	≤ 25
Short-circuit current		[A]	1	1
Fuse				
24V			Electronic fuse	Electronic fuse
115V/2320V			Transformer	Transformer
Response time		[ms]	350	350
Response time with reset monitoring	t_{A1}	[ms]	150 – 350	150 – 350
Response time without reset monitoring	t_{A2}	[ms]	50 – 100	50 – 100
Minimum contact closing time	t_M	[ms]	< 100	< 100
Inputs				
Response time with reset monitoring	t_{A1}	[ms]	150 – 350	150 – 350
Response time without reset monitoring	t_{A2}	[ms]	50 – 100	50 – 100
Permissible test pulse duration	t_{TP}	[ms]	≤ 1	≤ 1
Minimum contact closing time	t_M	[ms]	< 100	< 100
Recovery time	t_W	[ms]	Approx. ≤ 750	Approx. ≤ 750
Reset time	t_R		10	10
Electromagnetic Compatibility (EMC)				
Emitted interference			to EN 50081-1 and EN 50081-2	to EN 50081-1 and EN 50081-2
Interference immunity			EN 50082-2	EN 50082-2

Electronic Safety Relays

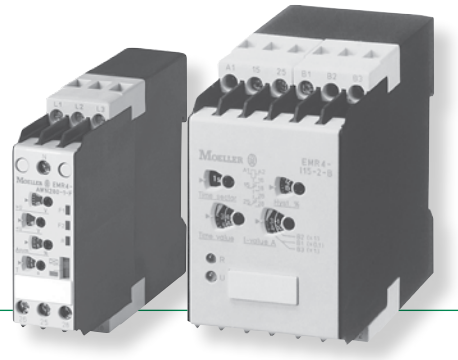
ESR4-. . .



Dimensions are in millimeters.
Not intended for manufacturing purposes.

monitoring relays

measuring up



Ideal for critical or sensitive processes, measuring and monitoring relays ensure the power that reaches your equipment is within specifications. Monitoring the power flow to critical or sensitive processes can prevent disastrous results, costly damage to equipment, and may even protect personnel from serious risk. Monitoring relays provide a reliable solution for many different applications.

> Single and Three phase monitoring

> Liquid levels & Insulation relays available

> Multi-functional monitoring

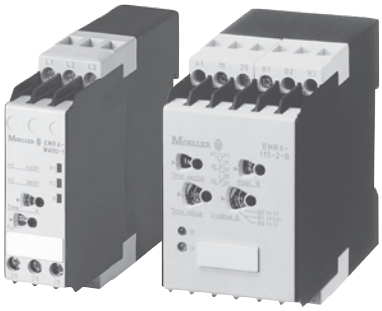
> Asymmetrical phase monitoring

A window to your application

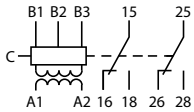
- **Current monitoring** is typical in industrial control applications
- **Phase monitors** can be used for monitoring destruction/damage protection
- **Phase sequence** relays monitor the rotating field
- **Phase imbalance** relays provide reliable phase loss detection
- **Level monitoring** relays monitor liquid fill levels
- **Ground fault monitors** enhances operational safety

Feature Comparison	Phase Sequence	Phase Failure	Phase Imbalance	Voltage Monitoring	Undervoltage	Overvoltage	Current Monitoring	Neutral Monitoring	Liquid Level Monitoring	Insulation Resistance	On-delay	Off-delay	1 Changeover Contact	2 Changeover Contacts	LED Status Indication
Single-Phase															
EMR4-I1-1-A							✔				✔			✔	✔
EMR4-I15-1-A							✔				✔			✔	✔
EMR4-I15-1-B							✔				✔			✔	✔
Three-Phase															
EMR4-F500-2	✔	✔		✔										✔	✔
EMR4-A400-1	✔	✔	✔				✔				✔		✔		✔
EMR4-A300-1-C	✔	✔	✔	✔							✔	✔		✔	✔
EMR4-A500-1-D	✔	✔	✔	✔							✔	✔		✔	✔
EMR4-W580-2-D	✔	✔			✔	✔					✔	✔		✔	✔
EMR4-W300-1-C	✔	✔		✔	✔	✔					✔	✔		✔	✔
EMR4-W500-1-D	✔	✔			✔	✔					✔	✔		✔	✔
EMR4-W380-1	✔	✔		✔	✔	✔					✔	✔		✔	✔
EMR4-W400-1	✔	✔		✔	✔	✔					✔	✔		✔	✔
EMR4-AW300-1-C	✔	✔	✔	✔	✔	✔					✔	✔		✔	✔
EMR4-AW500-1-D	✔	✔	✔	✔	✔	✔					✔	✔		✔	✔
EMR4-AWN170-1-E	✔	✔	✔	✔	✔	✔		✔			✔	✔		✔	✔
EMR4-AWN280-1-F	✔	✔	✔	✔	✔	✔		✔			✔	✔		✔	✔
Liquid Level Monitoring															
EMR4-N100-1-B									✔				✔		✔
EMR4-N500-2-B									✔		✔	✔		✔	✔
EMR4-N500-2-A									✔		✔	✔		✔	✔
Insulation Monitoring															
EMR4-RDC-1-A										✔			✔		✔
EMR4-RAC-1-A										✔			✔		✔

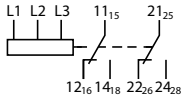
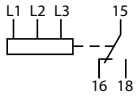
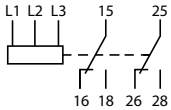
> Ideal for critical or sensitive processes and equipment
> Available for single-phase and three-phase monitoring
> Delay available to prevent nuisance tripping



Single-Phase Current Monitoring Relays

Description	Current Measuring Range	Contact Sequence	Supply Voltage DC	Supply Voltage AC	Catalog Number	Price
Single-Phase Current Monitoring						
Switching hysteresis adjustable from 3 – 30% Response delay 0.1 – 30 seconds Monitoring of one upper or lower limit Extension of the measurement range possible with current transformers	3 – 30 mA 10 – 100 mA 0.1 – 1 A		24 –240	24 –240	**EMR4-I1-1-A**	685
	0.3 – 1.5 A 1 – 5 A 3 – 15 A		24 –240	24 –240	**EMR4-I15-1-A**	685
	0.3 – 1.5 A 1 – 5 A 3 – 15 A		–	220 – 240	**EMR4-I15-1-B**	575

Three-Phase Sequence and Three-Phase Imbalance Monitoring Relays

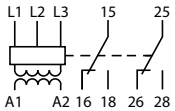
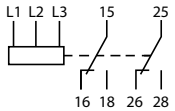
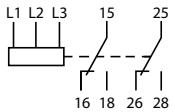
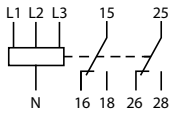
Description	Contact Sequence	Monitoring Voltage AC	Supply Voltage AC	Catalog Number	Price
Phase Sequence Monitoring					
Monitors three-phase systems for phase sequence and phase failure (< 0.6 x U_e) Supply voltage = voltage being monitored		200 – 500	200 – 500	**EMR4-F500-2**	325
Phase Imbalance Monitoring					
Monitors three-phase systems for phase imbalance Detects phase failure even at 95% regeneration of the failed phase Response delay: 0.5 seconds Switching threshold adjustable from 5 –15 % imbalance Phase sequence detection Supply voltage = voltage being monitored		380 – 415 50Hz	380 – 415 50Hz	**EMR4-A400-1**	510
		160 – 300 50Hz	160 – 300 50Hz	**EMR4-A300-1-C**	538
		300 – 500 50Hz	300 – 500 50Hz	**EMR4-A500-1-D**	538

Ordering Instructions

1 **Locate the desired monitoring relay.**
2 **See page F49 for auxiliaries and accessories.**

- Ideal for critical or sensitive processes and equipment
- Three-phase monitoring includes undervoltage and overvoltage thresholds
- Adjustable delay setting to prevent nuisance tripping

Three-Phase Monitoring Relays with Undervoltage and Overvoltage Thresholds

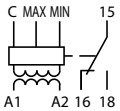
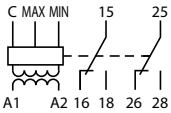
Description	Contact Sequence	Threshold Value	Monitoring Voltage 50/60 Hz AC	Supply Voltage 50/60 Hz AC	Catalog Number	Price
Phase Sequence Monitoring						
Monitors Three-Phase: • Phase Sequence • Phase Failure • Overvoltage • Undervoltage • Asymmetry: 2 – 15 % On-delay or Off-delay: 0.1 – 10 seconds		U_{min} 350 – 430 V AC U_{max} 500 – 580 V AC	300 – 500	300 – 500	**EMR4-W580-2-D**	630
		U_{min} 160 – 220 V AC U_{max} 220 – 300 V AC	160 – 300	160 – 300	**EMR4-W300-1-C**	578
		U_{min} 300 – 380 V AC U_{max} 420 – 500 V AC	300 – 500	300 – 500	**EMR4-W500-1-D**	578
		U_{min} 342 V AC *(fixed)* U_{max} 418 V AC *(fixed)*	380	380	**EMR4-W380-1**	465
		U_{min} 360 V AC *(fixed)* U_{max} 440 V AC *(fixed)*	400	400	**EMR4-W400-1**	465
Phase Imbalance Monitoring						
Monitors Three-Phase: • Phase Sequence • Phase Failure • Overvoltage • Undervoltage • Asymmetry: 2 – 15 % On-delay or Off-delay: 0.1 – 10 seconds Power supply from the measuring circuit		U_{min} 160 – 220 V AC U_{max} 220 – 300 V AC	160 – 300	160 – 300	**EMR4-AW300-1-C**	585
		U_{min} 300 – 380 V AC U_{max} 420 – 500 V AC	300 – 500	300 – 500	**EMR4-AW500-1-D**	670
In addition to above: Neutral monitoring		U_{min} 90 – 120 V AC U_{max} 120 – 170 V AC	90 – 170	90 – 170	**EMR4-AWN170-1-E**	610
		U_{min} 180 – 220 V AC U_{max} 240 – 280 V AC	180 – 280	180 – 280	**EMR4-AWN280-1-F**	610

Ordering Instructions

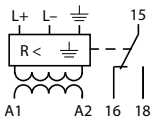
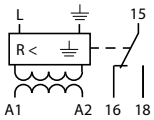
1. **Locate the desired monitoring relay.**
2. **See page F49 for auxiliaries and accessories.**

- Ideal for critical or sensitive processes and equipment
- Delay available to prevent nuisance tripping
- Available with one or two changeover contacts
- LED status indication

Liquid Level Monitoring Relays

Description	Response Sensitivity Range	Contact Sequence	Supply Voltage DC	Supply Voltage AC	Catalog Number	Price
Liquid Level Monitoring						
Monitors the level of conductive liquids Monitors the ratio of mixtures of conductive liquids Dual-voltage protection against running dry or overflow	5 kΩ – 100 kΩ		–	220 – 240	**EMR4-N100-1-B**	298
Monitors the level of conductive liquids Monitors the ratio of mixtures of conductive liquids Selectable On-delay or Off-delay: 0.5 – 10 seconds	250 Ω – 500 kΩ		–	220 – 240	**EMR4-N500-2-B**	420
	250 Ω – 500 kΩ		24 – 240	24 – 240	**EMR4-N500-2-A**	590

Insulation Monitoring Relays

Description	Insulation Resistance Range	Contact Sequence	Supply Voltage DC	Supply Voltage AC	Catalog Number	Price
Insulation Monitoring - DC						
Monitors the insulation resistance in non-earthed DC supply systems Selector switch between open-circuit or closed circuit principle With test and reset functions Status indication with LEDs	10 kΩ – 110 kΩ		24 – 240	24 – 240	**EMR4-RDC-1-A**	825
Insulation Monitoring - AC						
Monitors the insulation resistance between non-earthed AC supply systems and protective conductor/earth Tripping function memory Insulation monitoring in Single and Three Phase AC supply systems Test with local test button or by remote test operation Status indication with LEDs to VDE 0413/Part 2	1 kΩ – 110 kΩ		24 – 240	24 – 240	**EMR4-RAC-1-A**	640

Ordering Instructions

1. **Locate the desired monitoring relay.**
2. **See page F49 for auxiliaries and accessories.**

Sealable Shrouds

Shroud	Description	Mounting Width [mm]	Catalog Number	Price
Sealable Shrouds				
	Covers face of relay Prevents accidental contact Helps to keep device dust-free Deters tampering while in operation	22.5	EMR4-PH22	28
	Covers face of relay Prevents accidental contact Helps to keep device dust-free Deters tampering while in operation	45	EMR4-PH45	28

Potentiometers

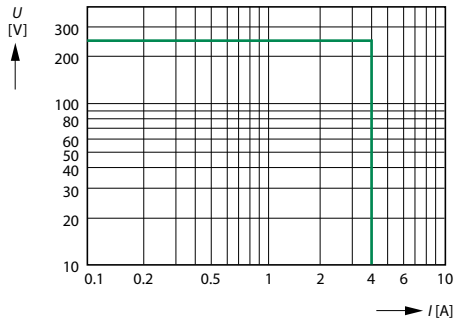
Resistance R kΩ	Titanium Color			Black			Titanium Color with Oversized Knob		
									
	Catalog Number	Price	Discount Code	Catalog Number	Price	Discount Code	Catalog Number	Price	Discount Code
1	M22-R1K	163	C10	M22S-R1K	163	C10	M22-R1K-RH	170	C10
4.7	M22-R4K7	163	C10	M22S-R4K7	163	C10	M22-R4K7-RH	170	C10
10	M22-R10K	163	C10	M22S-R10K	163	C10	M22-R10K-RH	170	C10
47	M22-R47K	163	C10	M22S-R47K	163	C10	M22-R47K-RH	170	C10
100	M22-R100K	163	C10	M22S-R100K	163	C10	M22-R100K-RH	170	C10
470	M22-R470K	163	C10	M22S-R470K	163	C10	M22-R470K-RH	170	C10
1000	M22-R1M	163	C10	M22S-R1M	163	C10	M22-R1M-RH	170	C10

Screw Adapter

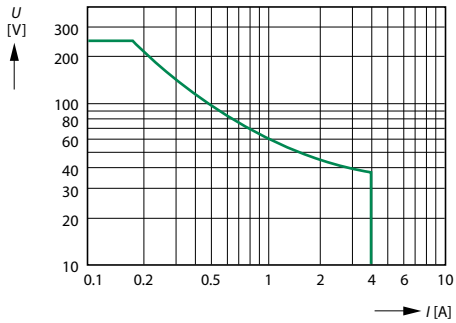
Accessory	Description	For use with…	Catalog Number	Price	Discount Code
Screw Adapter					
	The adapter enables the relay to become a panel mounted device using conventional screws.	22.5 mm DIN rail mountable devices	CS-TE	18	A11

Load Limit Curves, 22.5 mm range

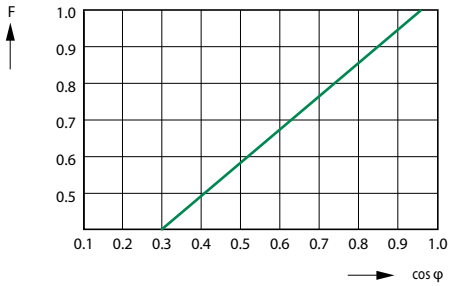
AC Load (Resistive)



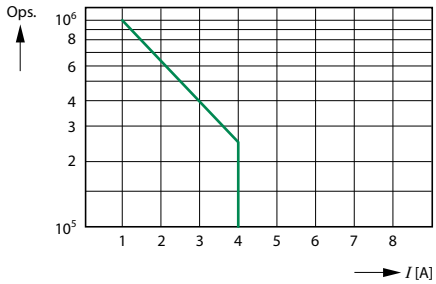
DC Load (Resistive)



Derating Factor with Inductive AC Load

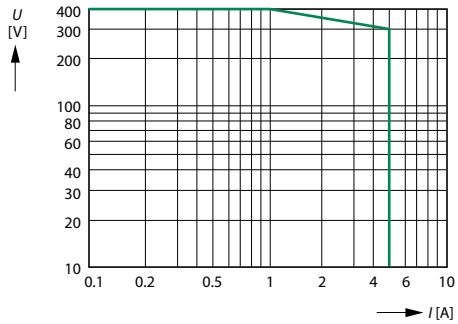


Contact Life *(220V 50Hz, AC-1, 360 Operations/hour)*

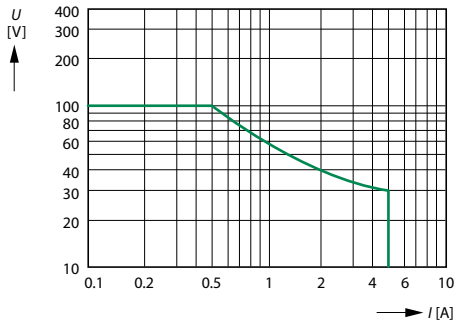


Load Limit Curves, 45 mm range

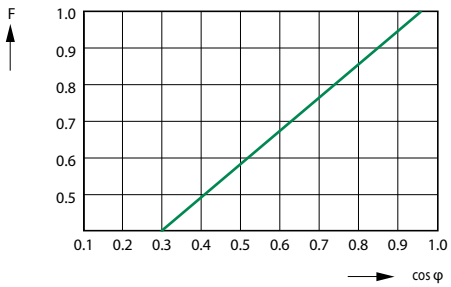
AC Load (Resistive)



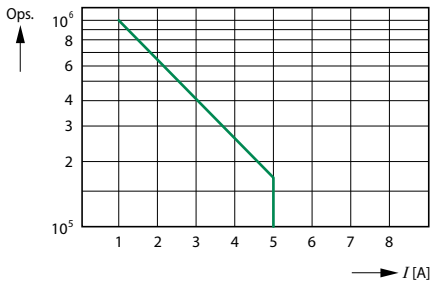
DC Load (Resistive)



Derating Factor with Inductive AC Load



Contact Life *(220V 50Hz, AC-1, 360 Operations/hour)*



Overload Capacity of EMR4-I...

Monitoring Relay	Current measuring ranges	Input resistance R_i	Terminal configuration, measuring input	Long-term overload	Overload for t < 1 s
EMR4-I1...	3 – 30 mA 10 – 100 mA 0.1 – 1 A	3.3 Ω 1 Ω 0.1 Ω	B1-C B2-C B3-C	50 mA 150 mA 1.5 A	500 mA 1 A 10 A
EMR4-I15...	0.3 – 1.5 A 1 – 5 A 3 – 15 A	0.05 Ω 0.01 Ω 0.0025 Ω	B1-C B2-C B3-C	2 A 7 A 17 A ❶	15 A 50 A 100 A

❶ Keep a side clearance of a minimum of 10 mm when mounting.

Monitoring Relays			EMR4-I1-1-A	EMR4-I15-1-A	EMR4-I15-1-B
General					
Standards			IEC/EN 60255-6, UL, CSA, GL		
Lifespan, mechanical	Operations	[x 10^6]	30	30	30
Climatic proofing			Damp heat, cyclical to IEC 60068-2-30: 24 h cycle, 55° C, 93% relative humidity, 96h		
Ambient temperature					
Open		[°C / °F]	-20…60 °C / *-4…140 °F*	-20…60 °C / *-4…140 °F*	-20…60 °C / *-4…140 °F*
Storage		[°C / °F]	-20…85 °C / *-4…185 °F*	-20…85 °C / *-4…185 °F*	-20…85 °C / *-4…185 °F*
Mounting position			As required	As required	As required
Shock resistance		[g]	10	10	10
Degree of protection			IP 20	IP 20	IP 20
Weight		[kg]	0.3	0.3	0.3
Terminal capacities					
Solid		[mm^2]	2 x 2.5	2 x 2.5	2 x 2.5
Flexible with ferrule		[mm^2]	2 x 2.5 / 2 x AWG14	2 x 2.5 / 2 x AWG14	2 x 2.5 / 2 x AWG14
Standard screwdriver		[mm]	5.5 x 0.8	5.5 x 0.8	5.5 x 0.8
Tightening torque		[Nm]	0.8	0.8	0.8
Fixing			Snap fixing, top-hat rail IEC/EN 60715		
Contacts					
Rated impulse withstand voltage		[V AC]	2500/2000	2500/2000	2500/2000
Overvoltage category/pollution degree			III/3	III/3	III/3
Rated insulation voltage	U_i	[V AC]	600/250	600/250	600/250
Power Supply					
Supply voltage AC/DC		[V AC/DC]	24 – 240	24 – 240	220 – 240
Voltage tolerance		[x U_C]	0.85 – 1.1	0.85 – 1.1	0.85 – 1.1
Power consumption		[VA]	2.6	2.6	2.6
Rated frequency		[Hz]	50 – 60	50 – 60	50 – 60
Duty factory		[% DF]	100	100	100
Timing Cycle					
Response delay time		[s]	Adjustable from 0.1 – 30	Adjustable from 0.1 – 30	Adjustable from 0.1 – 30
Time error within supply voltage		[%]	≤ 0.5	≤ 0.5	≤ 0.5
Time error within temperature range		[%/°C]	≤ 0.06	≤ 0.06	≤ 0.06

Monitoring Relays *(continued)*			EMR4-I1-1-A	EMR4-I15-1-A	EMR4-I15-1-B
Measuring Circuits					
Inputs					
B1-C		[A]	0.003 – 0.03	0.3 – 1.5	0.3 – 1.5
B2-C		[A]	0.01 – 0.1	1 – 5	1 – 5
B3-C		[A]	0.1 – 1	3 – 15	3 – 15
Hysteresis		[%]	3 – 30	3 – 30	3 – 30
Measuring cycle		[ms]	80	80	80
Temperature error		[%/°C]	0.06	0.06	0.06
Error within supply voltage		[%]	0.5	0.5	0.5
Status Indication					
Supply voltage			LED: green	LED: green	LED: green
Output relay energized			LED: yellow	LED: yellow	LED: yellow
Measured value			LED: red	LED: red	LED: red
Relay Output Contacts					
Rated operational voltage	U_e	[V AC]	250	250	250
Rated operational current					
AC-12 at 230V	I_e	[A]	4	4	4
AC-15 at 230V	I_e	[A]	3	3	3
DC-12 at 24V	I_e	[A]	4	4	4
DC-13 at 24V	I_e	[A]	2	2	2
Lifespan, electrical (AC-12, 230V, 4A)	Operations	[x 10^6]	0.1	0.1	0.1
Short-circuit rating					
Max. fuse	Fast/gL	[A]	10	10	10
Load limit curves			see page F50	see page F50	see page F50
Electromagnetic Compatibility (EMC)					
Electromagnetic compatibility			IEC/EN 60947-6-2	IEC/EN 60947-6-2	IEC/EN 60947-6-2
ESD			IEC/EN 61000-4-2, Level 3	IEC/EN 61000-4-2, Level 3	IEC/EN 61000-4-2, Level 3
HF-immunity to radiation			IEC/EN 61000-4-3, Level 3	IEC/EN 61000-4-3, Level 3	IEC/EN 61000-4-3, Level 3
Burst			IEC/EN 61000-4-4, Level 3	IEC/EN 61000-4-4, Level 3	IEC/EN 61000-4-4, Level 3
Surge			IEC/EN 61000-4-9, Level 3	IEC/EN 61000-4-9, Level 3	IEC/EN 61000-4-9, Level 3
HF-immunity to line-conducted interference			IEC/EN 61000-4-6, Level 3	IEC/EN 61000-4-6, Level 3	IEC/EN 61000-4-6, Level 3

Monitoring Relays *(continued)*			EMR4-A400-1	EMR4-A300-1-C EMR4-A500-1-D
General				
Standards			IEC/EN 60255-6, EN 61557, UL, CSA, GL	IEC/EN 60255-6, IEC 255-6, UL, CE
Lifespan, mechanical	Operations	[x 10^6]	30	30
Climatic proofing			Damp heat, cyclical to IEC 60068-2-30: 24 h cycle, 55° C, 93% relative humidity, 96 h	
Ambient temperature				
Open		[°C / °F]	-20...60 °C / *-4...140 °F*	-20...60 °C / *-4...140 °F*
Storage		[°C / °F]	-40...80 °C / *-40...176 °F*	-20...60 °C / *-4...140 °F*
Mounting position			As required	As required
Shock resistance			10 g	IEC/EN 60255-21-12, Class 12
Degree of protection				
Terminals			IP 20	IP 20
Enclosures			IP 50	IP 50
Weight		[kg]	0.3	0.13
Terminal capacities				
Solid		[mm^2]	2 x 2.5	–
Flexible with ferrule		[mm^2]	2 x 2.5	2 x 2.5 / 2 x AWG14
Standard screwdriver		[mm]	5.5 x 0.8	5.5 x 0.8
Tightening torque		[Nm]	0.5 – 0.8	0.5 – 0.8
Fixing			Snap fixing, DIN rail IEC/EN 60715	
Contacts				
Rated impulse withstand voltage	U_{imp}	[V AC]	4000	4000
Overvoltage category/pollution degree			III/3	III/3
Rated insulation voltage	U_i	[V AC]	600	600
Power Supply				
Supply voltage AC		[V AC]	380 – 415	see selection pages
Voltage tolerance		[x U_c]	0.8 – 1.2	0.8 – 1.2
Power consumption		[VA]	15	20
Rated frequency	f	[Hz]	50	50
Duty factor		[% DF]	100	100
Timing Cycle				
Response delay time		[s]	0.5 indication of phase balance	Adjustable from 0.1 – 10 s
Time error within supply voltage		[%]	0.5	0.5
Time error within temperature range		[% / °C]	0.06	0.06

Monitoring Relays *(continued)*			EMR4-A400-1	EMR4-A300-1-C EMR4-A500-1-D
Measuring Circuits				
Monitoring voltage	U_n	[V AC]	380 – 415	see selection pages
Frequency		[Hz]	50	50/60 ± 10 %
Phase imbalance level adjustable		[%]	5 – 15	2 – 15, from mean value of phase voltage
Switching hysteresis		[%]	20	20
Temperature error		[% / °C]	0.06	0.06
Error within supply voltage		[%]	0.5	0.5
Status Indication				
Output relay energized			LED: steady yellow	LED R: flashing green
Supply voltage			–	LED R: steady green
Phase failure			–	LED F1: steady red; LED F2: flashing red
Phase sequence error			–	LED F1: flashing red; LED F2: flashing red
Relay Output Contacts				
Rated operational voltage	U_e	[V AC]	500	500
Rated operational current				
AC-12 at 230V	I_e	[A]	4	4
AC-15 at 230V	I_e	[A]	3	3
DC-12 at 24V	I_e	[A]	4	4
DC-13 at 24V	I_e	[A]	2	2
Lifespan, electrical (AC-12, 230V, 4A)	Operations	[x 10^6]	0.3	0.1
Short-circuit rating				
Max. fuse	Fast/gL	[A]	10	10
Load limit curves			see page F50	see page F50
Electromagnetic Compatibility (EMC)				
Electromagnetic compatibility			IEC/EN 60947-6-2	
ESD			IEC/EN 61000-4-2, Level 3	
HF-immunity to radiation			IEC/EN 61000-4-3, Level 3	
Burst			IEC/EN 61000-4-4, Level 3	
Surge			IEC/EN 61000-4-5, Level 4	
HF-immunity to line-conducted interference			IEC/EN 61000-4-6, Level 3	

Monitoring Relays *(continued)*			EMR4-W300-1-C EMR4-W380-1 EMR4-W400-1	EMR4-W500-1-D	EMR4-W580-2-D	EMR4-AW(N)...
General						
Standards			IEC/EN 60255-6, IEC 255-6, UL, CE	IEC/EN 60255-6, IEC 255-6, UL, CE	IEC/EN 60255-6, EN 61557, UL, CSA, GL	IEC/EN 60255-6, IEC 255-6, UL, CE
Lifespan, mechanical	Operations	[x 10^6]	30	30	30	30
Climatic proofing			Damp heat, cyclical to IEC 60068-2-30: 24 h cycle, 55° C, 93% relative humidity, 96 h			
Ambient temperature						
Open		[°C / °F]	-20...60 °C / *-4...140 °F*	-20...60 °C / *-4...140 °F*	-25...65 °C / *-13...149 °F*	-20...60 °C / *-4...140 °F*
Storage		[°C / °F]	-20...60 °C / *-4...140 °F*	-20...60 °C / *-4...140 °F*	-40...85 °C / *-40...185 °F*	-20...60 °C / *-4...140 °F*
Mounting position			As required	As required	As required	As required
Shock resistance			10 g	10 g	10 g	IEC/EN 60255-21-12, Class 2
Degree of protection						
Terminals			IP 20	IP 20	IP 20	IP 20
Enclosures			IP 50	IP 50	IP 50	IP 50
Weight		[kg]	0.13	0.13	0.3	0.14
Terminal capacities						
Solid		[mm^2]	2 x 2.5	2 x 2.5	2 x 2.5	2 x 2.5
Flexible with ferrule		[mm^2]	2 x 2.5 / 2 x AWG14	2 x 2.5 / 2 x AWG14	2 x 2.5	2 x 2.5 / 2 x AWG14
Standard screwdriver		[mm]	5.5 x 0.8	5.5 x 0.8	5.5 x 0.8	5.5 x 0.8
Tightening torque		[Nm]	0.5 – 0.8	0.5 – 0.8	0.5 – 0.8	0.5 – 0.8
Fixing			Snap fixing, DIN rail IEC/EN 60715			
Contacts						
Rated impulse withstand voltage	U_{imp}	[V AC]	4000	4000	4000	4000
Overvoltage category/pollution degree			III/3	III/3	III/3	III/3
Rated insulation voltage	U_i	[V AC]	600	600	600	600
Power Supply						
Supply voltage AC		[V AC]	see page F47	300 – 500	300 – 500	see page F47
Voltage tolerance		[x U_c]	0.85 – 1.1	0.85 – 1.1	0.85 – 1.1	0.85 – 1.1
Power consumption		[VA]	3	3	3	20
Rated frequency		[Hz]	50 – 60	50 – 60	50 – 60	50 – 60
Duty factor		[% DF]	100	100	100	100
Timing Cycle						
Response delay time		[s]	Adjustable 0.1 – 10	Adjustable 0.1 – 10	Adjustable 0.1 – 10	Adjustable 0.1 – 10
Reset delay/Off-delay time		[s]	Adjustable 0.1 – 10	Adjustable 0.1 – 10	Adjustable 0.1 – 10	Adjustable 0.1 – 10
Time error within supply voltage		[%]	0.5	0.5	0.5	0.5
Time error within temperature range		[%/°C]	0.06	0.06	0.06	0.06
Measuring Circuits						
Response range for undervoltage	U_{min}	[V AC]	see page F47	300 – 380	350 – 430	see page F47
Response range for overvoltage	U_{max}	[V AC]	see page F47	420 – 500	500 – 580	see page F47
Hysteresis		[%]	0 – 5	0 – 5	0 – 5	0 – 5
Frequency		[Hz]	50/60 ± 10%	50/60 ± 10%	50/60 ± 10%	50/60 ± 10%
Phase imbalance level adjustable		[%]	–	–	–	2 – 15, from mean value of the phase voltage
Measuring cycle		[ms]	50	50	50	50
Temperature error		[%/°C]	0.06	0.06	0.06	0.06
Error within supply voltage		[%]	0.5	0.5	0.5	0.5

Monitoring Relays *(continued)*			EMR4-W300-1-C EMR4-W380-1 EMR4-W400-1	EMR4-W500-1-D	EMR4-W580-2-D	EMR4-AW(N)...
Status Indication						
Supply voltage			LED R: steady green	LED R: steady green	LED: steady green	LED R: steady green
Output relay energized			LED R: flashing green	LED R: flashing green	LED: steady yellow	LED R: flashing green
Overvoltage			LED F1: steady red	LED F1: steady red	LED > U: steady red	LED F1: steady red
Undervoltage			LED F2: steady red	LED F2: steady red	LED < U: steady red	LED F2: steady red
Phase failure			LED F1: steady red; LED F2: flashing red	LED F1: steady red; LED F2: flashing red	LED P: steady red	LED F1: steady red; LED F2: flashing red
Phase sequence error			LED F1: flashing red; LED F2: flashing red	LED F1: flashing red; LED F2: flashing red	LED P: steady red	LED F1: flashing red; LED F2: flashing red
Relay Output Contacts						
Rated operational voltage	U_e	[V AC]	250	250	500	250
Rated operational current						
AC-12 at 230V	I_e	[A]	4	4	5	4
AC-15 at 230V	I_e	[A]	3	3	3	3
DC-12 at 24V	I_e	[A]	4	4	5	4
DC-13 at 24V	I_e	[A]	2	2	2.5	2
Lifespan, electrical (AC-12, 230V, 5A)	Operations	[x 10^6]	0.1	0.1	0.1	0.1
Short-circuit rating						
Max. fuse	Fast/gL	[A]	5	5	5	10
Load limit curves			see page F50	see page F50	see page F50	see page F50
Electromagnetic Compatibility (EMC)						
Electromagnetic compatibility			IEC/EN 60947-6-2			
ESD			IEC/EN 61000-4-2, Level 3			
HF-immunity to radiation			IEC/EN 61000-4-3, Level 3			
Burst			IEC/EN 61000-4-4, Level 3			
Surge			IEC/EN 61000-4-5, Level 4			
HF-immunity to line-conducted interference			IEC/EN 61000-4-6, Level 3			

Monitoring Relays *(continued)*			EMR4-N100-1-B	EMR4-N500-2-B	EMR4-N500-2-A
General					
Standards			IEC/EN 60255-6, EN 61557, UL, CSA, GL		
Lifespan, mechanical		[x 10^6]	30	30	30
Climatic proofing			Damp heat, cyclical to IEC 60068-2-30: 24 h cycle, 55 °C, 93% relative humidity, 96 h		
Ambient temperature					
Open		[°C / °F]	-20…60 °C / *-4…140 °F*	-25…65 °C / *-13…149 °F*	-25…65 °C / *-13…149 °F*
Storage		[°C / °F]	-20…80 °C / *-4…176 °F*	-20…85 °C / *-4…185 °F*	-20…85 °C / *-4…185 °F*
Mounting position			As required	As required	As required
Mechanical shock resistance		[g]	10	10	10
Degree of protection					
Terminals			IP 20	IP 20	IP 20
Weight		[kg]	0.15	0.3	0.3
Terminal capacities					
Solid		[mm^2]	2 x 2.5	2 x 2.5	2 x 2.5
Flexible with ferrule		[mm^2]	2 x 2.5 / 2 x AWG14	2 x 2.5 / 2 x AWG14	2 x 2.5 / 2 x AWG14
Standard screwdriver		[mm]	5.5 x 0.8	5.5 x 0.8	5.5 x 0.8
Tightening torque		[Nm]	0.5 – 0.8	0.5 – 0.8	0.5 – 0.8
Fixing			Snap fixing, DIN rail IEC/EN 60715		
Contacts					
Rated impulse withstand voltage	U_{imp}	[V AC]	4000	4000	4000
Overvoltage category/pollution degree			III/3	III/3	III/3
Rated insulation voltage	U_i	[V AC]	400	400	400
Power Supply					
Supply voltage AC		[V AC]	220 – 240	220 – 240	24 – 240
Supply voltage DC		[V DC]	–	–	24 – 240
Voltage tolerance		[x U_C]	0.85 – 1.1	0.85 – 1.1	0.85 – 1.1
Power consumption		[VA]	2.5	3	2
Rated frequency		[Hz]	50 – 60	50 – 60	50 – 60
Duty factor		[% DF]	100	100	100
Timing Cycle					
Response delay time		[s]	–	Adjustable, 0.1 – 10	
Reset delay/Off-delay time		[s]	–	Adjustable, 0.1 – 10	

Monitoring Relays *(continued)*			EMR4-N100-1-B	EMR4-N500-2-B	EMR4-N500-2-A
Measuring Circuits					
Sensor inputs					
B1			Earth reference sensor	Earth reference sensor	Earth reference sensor
B2			Maximum level	Maximum level	Maximum level
B3			Minimum level	Minimum level	Minimum level
Response range		[kΩ]	5 – 100	5 – 100	5 – 100
Sensor voltage		[V AC]	30	20	20
Reset range		[kΩ]	1.3 – 2.3	–	–
Sensor current		[mA]	1	–	–
Cable capacity		[nF]	10	–	–
Cable length		[m]	100	–	–
Response delay/On-delay		[ms]	250	–	–
Status Indication					
Supply voltage			LED: green	LED: green	LED: green
Output relay energized			LED: yellow	LED: yellow	LED: yellow
Relay Output Contacts					
Rated operational voltage	U_e	[V AC]	250	400	400
Rated operational current					
AC-12 at 230V	I_e	[A]	4	5	5
AC-15 at 230V	I_e	[A]	3	3	3
DC-12 at 24V	I_e	[A]	4	5	5
DC-13 at 24V	I_e	[A]	2	2.5	2.5
Lifespan, electrical (AC-12, 30V, 5A)	Operations	[x 10^6]	0.3	0.1	0.1
Short-circuit rating					
Max. fuse	Fast/gL	[A]	10	5	5
Load limit curves			see page F50	see page F50	see page F50
Electromagnetic Compatibility (EMC)					
Electromagnetic compatibility				IEC/EN 60947-6-2	
ESD				IEC/EN 61000-4-2, Level 3	
HF-immunity to radiation				IEC/EN 61000-4-3, Level 3	
Burst				IEC/EN 61000-4-4, Level 3	
Surge				IEC/EN 61000-4-5, Level 4	
HF-immunity to line-conducted interference				IEC/EN 61000-4-6, Level 3	

Monitoring Relays *(continued)*			EMR4-RDC-1-A	EMR4-RAC-1-A
General				
Standards			IEC/EN 60255-6, EN 61557, UL, CSA, GL	
Lifespan, mechanical	Operations	[x 10^6]	30	30
Climatic proofing			Damp heat, cyclical to IEC 60068-2-30: 24 h cycle, 55° C, 93% relative humidity, 96 h	
Ambient temperature				
Open		[°C / °F]	-25...65 °C / *-13...149 °F*	-25...65 °C / *-13...149 °F*
Storage		[°C / °F]	-20...85 °C / *-4...185 °F*	-20...85 °C / *-4...185 °F*
Mounting position			As required	As required
Mechanical shock resistance		[g]	10	10
Degree of protection				
Terminals			IP 20	IP 20
Weight		[kg]	0.3	0.13
Terminal capacities				
Solid		[mm^2]	2 x 2.5	2 x 2.5
Flexible with ferrule		[mm^2]	2 x 2.5 / 2 x AWG14	2 x 2.5 / 2 x AWG14
Standard screwdriver		[mm]	5.5 x 0.8	5.5 x 0.8
Tightening torque		[Nm]	0.5 – 0.8	0.5 – 0.8
Fixing			Snap fixing, DIN rail IEC/EN 60715	
Contacts				
Rated impulse withstand voltage	U_{imp}	[V AC]	4000	4000
Overvoltage category/pollution degree			III/3	III/3
Rated insulation voltage	U_i	[V AC]	400	400
Power Supply				
Supply voltage AC/DC		[V AC/DC]	24 – 240	24 – 240
Voltage tolerance		[x U_c]	0.85 – 1.1	0.85 – 1.1
Power consumption		[VA]	5.5	4.5
Rated frequency		[Hz]	50 – 60	50 – 60
Duty factor		[% DF]	100	100
Timing Cycle				
Time delay / Delay time				
At $R_{isolation}$		[s]	1	1
x response value		[s]	0.9	0.9

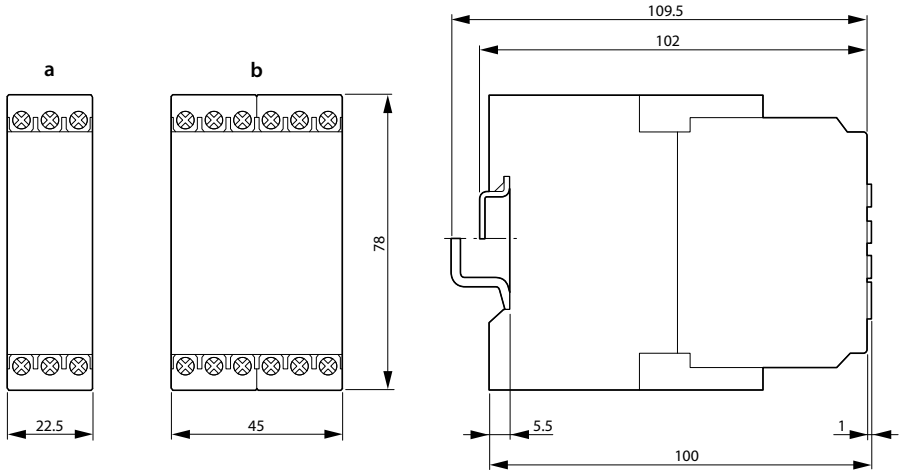
Monitoring Relays *(continued)*			EMR4-RDC-1-A	EMR4-RAC-1-A
Measuring Circuits				
Input			L+, L–, PE	L, PE
Response range		[kΩ]	10 –110	1 – 11
Min. internal resistance of alternating current		[kΩ]	–	100
Min. internal resistance of direct current		[kΩ]	–	100
Minimum internal resistance		[kΩ]	57	–
Test resistance		[kΩ]	–	0.82
Insulation voltage				
AC		[V AC]	–	415
DC		[V DC]	300	–
Voltage being monitored/test voltage		[V]	24 – 240	≤ 30
Cable length for cancellation and test button		[m]	10	10
Status Indication				
Supply voltage			LED: green	LED: green
Error			LED: yellow	LED: red
Fault at L+			LED: red	LED: red
Fault at L–			LED: red	LED: red
Relay Output Contacts				
Rated operational voltage	U_e	[V AC]	400	320
Rated operational current				
AC-12 at 230V	I_e	[A]	5	5
AC-15 at 230V	I_e	[A]	3	3
DC-12 at 24V	I_e	[A]	5	3
DC-13 at 24V	I_e	[A]	2.5	2.5
Lifespan, electrical (AC-12 / 230V / 5A)	Operations	[x 10^6]	0.1	0.1
Short-circuit rating				
Max. fuse	Fast/gL	[A]	5	5
Load limit curves			see page F50	see page F50
Electromagnetic Compatibility (EMC)				
Electromagnetic compatibility			IEC/EN 60947-6-2	
ESD			IEC/EN 61000-4-2, Level 3	
HF-immunity to radiation			IEC/EN 61000-4-3, Level 3	
Burst			IEC/EN 61000-4-4, Level 3	
Surge			IEC/EN 61000-4-5, Level 4	
HF-immunity to line-conducted interference			IEC/EN 61000-4-6, Level 3	

Monitoring Relays *(continued)*			EMR4-F500-2
General			
Standards			IEC/EN 60255-6, EN 61557, UL, CSA, GL
Lifespan, mechanical	Operations	[x 10^6]	30
Climatic proofing			Damp heat, cyclical to IEC 60068-2-30: 24 h cycle, 55° C, 93% relative humidity, 96 h
Ambient temperature			
Open		[°C / °F]	-20...60 °C / *-4...140 °F*
Storage		[°C / °F]	-40...80 °C / *-40...176 °F*
Mounting position			As required
Mechanical shock resistance		[g]	10
Degree of protection			
Terminals			IP 20
Weight		[kg]	0.15
Terminal capacities			
Solid		[mm^2]	2 x 2.5
Flexible with ferrule		[mm^2]	2 x 2.5 / 2 x AWG14
Standard screwdriver		[mm]	5.5 x 0.8
Tightening torque		[Nm]	0.5 – 0.8
Fixing			Snap fixing, DIN rail IEC/EN 60715
Contacts			
Rated impulse withstand voltage	U_{imp}	[V AC]	4000
Overvoltage category/pollution degree			III/3
Rated insulation voltage	U_i	[V AC]	400
Power Supply			
Supply voltage AC		[V AC]	200 – 500
Voltage tolerance		[x U_C]	0.85 – 1.1
Power consumption		[VA]	15
Rated frequency		[Hz]	50 – 60
Duty factor		[% DF]	100
Measuring Circuits			
Monitoring voltage	U_n	[V AC]	200 – 500
Frequency		[Hz]	50 – 60
Measuring cycle		[ms]	500
Temperature error		[% / °C]	0.06
Error within supply voltage		[%]	0.5
Status Indication			
Output relay energized			LED: yellow
Relay Output Contacts			
Rated operational voltage	U_e	[V AC]	500
Rated operational current			
AC-12 at 230V	I_e	[A]	4
AC-15 at 230V	I_e	[A]	3
DC-12 at 24V	I_e	[A]	4
DC-13 at 24V	I_e	[A]	2
Lifespan, electrical (AC-12, 230V, 4A)	Operations	[x 10^6]	0.3
Short-circuit rating			
Max. fuse	Fast/gL	[A]	10
Load limit curves			see page F50
Electromagnetic Compatibility (EMC)			
Electromagnetic compatibility			IEC/EN 60947-6-2
ESD			IEC/EN 61000-4-2, Level 3
HF-immunity to radiation			IEC/EN 61000-4-3, Level 3
Burst			IEC/EN 61000-4-4, Level 3
Surge			IEC/EN 61000-4-5, Level 4
HF-immunity to line-conducted interference			IEC/EN 61000-4-6, Level 3

Monitoring Relays

EMR4-...

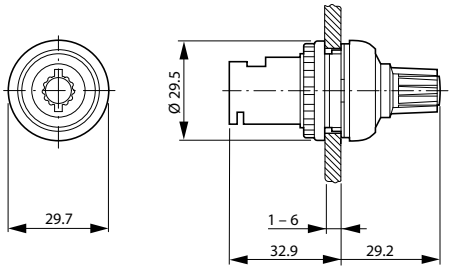
Dimensions are in millimeters.
Not intended for manufacturing purposes.



a (22.5 mm width)	b (45 mm width)
EMR4-F500-2	EMR4-W...2...
EMR4-W...1...	EMR4-N500...
EMR4-A...1...	EMR4-R...
EMR4-N100-1-B	EMR4-I...
EMR4-AW...	

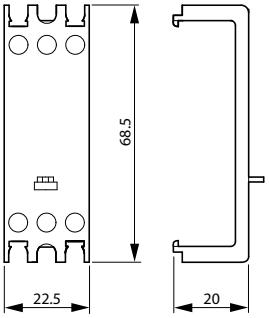
Potentiometer

M22-R...K...



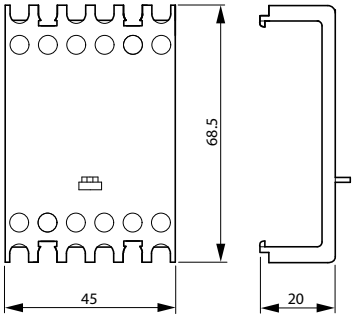
Sealable Shroud

EMR4-PH22



Sealable Shrouds

EMR4-PH45



SYST M

pre-assembled enclosed starters

MOELLER

Start with Moeller

pre-assembled enclosed starters

SYST-M starters from Moeller

Economical, ready-made starters to 60HP *(at 575V)*

SYST M

- > Pre-assembled, ready made starters to 60HP *(at 575V)*
- > Non-reversing, reversing, combination and non-combination models available
- > Heavy duty NEMA 1 enclosure for rugged performance
- > Many pilot device control options available
- > Convenient plug-in technology

Moeller has designed a complete line of enclosed, ready-made starters, called SYST-M, that you can install and use immediately. The entire SYST-M family is designed to be fully modular, so availability is generally from stock. The line is designed for a variety of applications to 60HP (@575V), including basic non-reversing and reversing starters. Both configurations are also available in fused combination designs.

Ready-made and rugged

At the heart of every SYST-M starter is the new Moeller DIL M contactor (with 120V coil) and a ZB overload relay. These starter components are the newest and most modern on the market today.

All starters are housed in a heavy duty NEMA 1 enclosure with back plate, grounding terminals and knockouts.

Plug-in speed and convenience

The essence of SYST-M starters is their modularity. All starters come equipped with plug-in connectors for pilot device modules and optional control power transformers. This not only allows us to build and ship the starters quickly, but allows you to change or add components in a snap.

A variety of control

Pre-assembled pilot device kits come in many configurations, from simple 2-position and H-O-A selector switches, to START/STOP pushbuttons with a pilot light. A manual RESET button is also pre-installed on the front cover. All pilot devices are selected from Moeller's exceptional RMQ-Titan line that is rugged and good looking.

Optional accessories available

Optional Control Power Transformers (CPT) are available with both a fused primary and secondary. There are four incoming voltages to choose, including 208, 240, 480 and 600. Output voltage is 120V to match the contactor. You may also choose a Remote Adaptor for use when the starter is being controlled from a remote location. As with all SYST-M components, all accessories are pre-wired with plug-in technology that installs in seconds.

- Ready made, economical AC, magnetic, non-reversing starters in a heavy duty NEMA 1 enclosure
- SYST-M starters are in-stock for immediate delivery, or available in 24 hour turn
- Convenient plug-in technology allows quick-build and quick-change of components
- All SYST-M starters utilize Moeller contactors. . . the newest and most modern on the market today.

SYST-M Base Unit ❷ – Full Voltage, Non-Reversing, Non-Combination

Maximum UL / CSA Horsepower Ratings				Auxiliary Contacts		Dimensions *centimeters (inches)*				
Three Phase										
200 V	230 V	460 V	575 V	NO	NC	H	W	D	Catalog Number	Price ❷
3	3	10	10	1	0	24 (9.5)	17 (6.7)	15 (5.9)	**SYSTM-STR-10**	304
10	10	20	25	1	0	24 (9.5)	17 (6.7)	15 (5.9)	**SYSTM-STR-20**	449
20	25	50	60	1	1	40 (15.8)	23 (9.1)	20 (7.9)	**SYSTM-STR-30**	936

SYST-M Base Units Include ❶❷

- NEMA 1 heavy gauge enclosure with back plate, lift-off cover and knockouts
- Moeller DILM contactor (mounted) with 120V coil
- Plug-in quick connector for pilot device module (must order Pilot Device module for a complete SYST-M starter)
- Quick connector for an optional Control Power Transformer (CPT)
- Reset push button pre-mounted on cover
- Pre-installed grounding terminals

Ordering Instructions

1. **Locate the desired SYST-M base unit.**
2. **Select appropriate overload relay on page G8.**
3. **Select pilot device control kit on pages G9 – G10.**
4. **Select optional accessories on page G11.**

❶ All SYST-M starters are designed in a heavy duty NEMA 1 enclosure with 120V AC control. Moeller offers a wide array of custom control panels for any application. If other starter types, enclosures or coil voltages are required, please contact your Moeller representative for a custom solution.

❷ Must order an overload relay and pilot device module for a complete SYST-M starter.

- Ready made, economical, AC reversing starters, in a heavy duty NEMA 1 enclosure
- SYST-M starters are in-stock for immediate delivery, or available in 24 hour turn
- Convenient plug-in technology allows quick-build and quick-change of components
- All SYST-M starters utilize Moeller contactors. . . the newest and most modern on the market today.

SYST-M Base Unit ❷ – Full Voltage, Reversing, Non-Combination

Maximum UL / CSA Horsepower Ratings				Auxiliary Contacts		Dimensions *centimeters (inches)*				
Three Phase										
200 V	230 V	460 V	575 V	NO	NC	H	W	D	Catalog Number	Price ❷
3	3	10	10	1	1	24 (9.5)	17 (6.7)	15 (5.9)	SYSTM-STR-10R	734
10	10	20	25	1	1	40 (15.8)	23 (9.1)	20 (7.9)	SYSTM-STR-20R	1245
20	25	50	60	1	1	40 (15.8)	23 (9.1)	20 (7.9)	SYSTM-STR-30R	1798

SYST-M Base Units Include ❶ ❷

- NEMA 1 heavy gauge enclosure with back plate, lift-off cover and knockouts
- Moeller DILM reversing contactors (mounted) with 120V coil
- Plug-in quick connector for pilot device module (must order Pilot Device module for a complete SYST-M starter)
- Quick connector for an optional Control Power Transformer (CPT)
- Reset push button pre-mounted on cover
- Pre-installed grounding terminals

Ordering Instructions

1. **Locate the desired SYST-M base unit.**
2. **Select appropriate overload relay on page G8.**
3. **Select pilot device control kit on pages G9 – G10.**
4. **Select optional accessories on page G11.**

❶ All SYST-M starters are designed in a heavy duty NEMA 1 enclosure with 120V AC control. Moeller offers a wide array of custom control panels for any application. If other starter types, enclosures or coil voltages are required, please contact your Moeller representative for a custom solution.

❷ Must order an overload relay and pilot device module for a complete SYST-M starter.

- Ready made, economical AC, combination fusible (HRC 1J), non-reversing starters in a heavy duty NEMA 1 enclosure
- SYST-M starters are in-stock for immediate delivery, or available in 24 hour turn
- Convenient plug-in technology allows quick-build and quick-change of components
- All SYST-M starters utilize Moeller contactors. . . the newest and most modern on the market today.

SYST-M Base Unit ❷ – Full Voltage, Non-Reversing, Combination, Fusible (HRC 1J)

Maximum UL / CSA Horsepower Ratings				Fused Disconnect [A]	Auxiliary Contacts		Dimensions *centimeters (inches)*			Catalog Number	Price ❷
Three Phase											
200 V	230 V	460 V	575 V		NO	NC	H	W	D		
3	3	10	10	30	1	0	60 (23.6)	27 (10.6)	20 (7.9)	SYSTM-STR-11C	1006
7½	7½	15	20	30	1	0	60 (23.6)	27 (10.6)	20 (7.9)	SYSTM-STR-21C	1081
10	10	20	25	60	1	0	60 (23.6)	27 (10.6)	20 (7.9)	SYSTM-STR-22C	1253
10	15	30	40	60	1	1	60 (23.6)	27 (10.6)	20 (7.9)	SYSTM-STR-32C	1313
20	25	50	60	100	1	1	60 (23.6)	50 (19.7)	20 (7.9)	SYSTM-STR-33C	1945

SYST-M Base Units Include ❶❷

- NEMA 1 heavy gauge enclosure with back plate, lift-off cover and knockouts
- Moeller DILM contactor (mounted) with 120V coil
- Fused disconnect (HRC 1J) with rotary handle (fuses not included)
- Plug-in quick connector for pilot device module (must order Pilot Device module for a complete SYST-M starter)
- Quick connector for an optional Control Power Transformer (CPT)
- Reset push button pre-mounted on cover
- Pre-installed grounding terminals

Ordering Instructions

1. **Locate the desired SYST-M base unit.**
2. **Select appropriate overload relay on page G8.**
3. **Select pilot device control kit on pages G9 – G10.**
4. **Select optional accessories on page G11.**

❶ All SYST-M starters are designed in a heavy duty NEMA 1 enclosure with 120V AC control. Moeller offers a wide array of custom control panels for any application. If other starter types, enclosures or coil voltages are required, please contact your Moeller representative for a custom solution.

❷ Must order an overload relay and pilot device module for a complete SYST-M starter.

- Ready made, economical AC reversing, combination fusible (HRC 1J) starters in a heavy duty NEMA 1 enclosure
- Popular SYST-M starters are in-stock for immediate delivery, or available in 24 hour turn
- Convenient plug-in technology allows quick-build and quick-change of components
- All SYST-M starters utilize Moeller contactors. . . the newest and most modern on the market today.

SYST-M Base Unit ❷ – Full Voltage, Reversing, Combination, Fusible (HRC 1J)

Maximum UL / CSA Horsepower Ratings				Fused Disconnect	Auxiliary Contacts		Dimensions *centimeters (inches)*				
Three Phase											Price ❷
200 V	230 V	460 V	575 V	[A]	NO	NC	H	W	D	Catalog Number	
3	3	10	10	30	1	1	60 (23.6)	27 (10.6)	20 (7.9)	SYSTM-STR-11CR	1443
7½	7½	15	20	30	1	1	60 (23.6)	27 (10.6)	20 (7.9)	SYSTM-STR-21CR	1496
10	10	20	25	60	1	1	60 (23.6)	27 (10.6)	20 (7.9)	SYSTM-STR-22CR	1611
10	15	30	40	60	1	1	60 (23.6)	27 (10.6)	20 (7.9)	SYSTM-STR-32CR	2264
20	25	50	60	100	1	1	60 (23.6)	50 (19.7)	20 (7.9)	SYSTM-STR-33CR	2553

SYST-M Base Units Include ❶❷

- NEMA 1 heavy gauge enclosure with back plate, lift-off cover and knockouts
- Moeller DILM reversing contactors (mounted) with 120V coil
- Fused disconnect (HRC 1J) with rotary handle (fuses not included)
- Plug-in quick connector for pilot device module (must order Pilot Device module for a complete SYST-M starter)
- Quick connector for an optional Control Power Transformer (CPT)
- Reset push button pre-mounted on cover
- Pre-installed grounding terminals

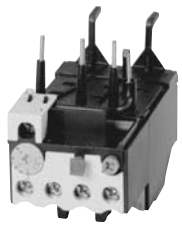
Ordering Instructions

1. **Locate the desired SYST-M base unit.**
2. **Select appropriate overload relay on page G8.**
3. **Select pilot device control kit on pages G9 – G10.**
4. **Select optional accessories on page G11.**

❶ All SYST-M starters are designed in a heavy duty NEMA 1 enclosure with 120V AC control. Moeller offers a wide array of custom control panels for any application. If other starter types, enclosures or coil voltages are required, please contact your Moeller representative for a custom solution.

❷ Must order an overload relay and pilot device module for a complete SYST-M starter.

Direct Mount ZB Thermal Overload Relays for SYST-M Starters

Overload Relay	Adjustable Setting Range	Auxiliary Contacts NO	Auxiliary Contacts NC	For use with SYST-M starter...	Short-Circuit Protection (Max 600V AC) ❶ Fuses [A]	Short-Circuit Protection (Max 600V AC) ❶ Circuit Breaker [A]	Catalog Number	Price
	0.1 – 0.16	1	1	All series "10"	1	25	**ZB12-0,16**	144
	0.16 – 0.24	1	1		1	25	**ZB12-0,24**	144
	0.24 – 0.4	1	1		1	25	**ZB12-0,4**	144
	0.4 – 0.6	1	1		1	25	**ZB12-0,6**	144
	0.6 – 1	1	1		3	25	**ZB12-1**	144
	1 – 1.6	1	1		6	25	**ZB12-1,6**	144
	1.6 – 2.4	1	1		6	25	**ZB12-2,4**	144
	2.4 – 4	1	1		15	25	**ZB12-4**	144
	4 – 6	1	1		20	25	**ZB12-6**	144
	6 – 10	1	1		40	25	**ZB12-10**	144
	9 – 12	1	1		60	30	**ZB12-12**	144
	12 – 16	1	1		60	30	**ZB12-16**	144
	10 – 16	1	1	All series "20"	60	30	**ZB32-16**	152
	16 – 24	1	1		90	30	**ZB32-24**	152
	24 – 32	1	1		125	40	**ZB32-32**	192
	24 – 40	1	1	All series "30"	125	125	**ZB65-40**	236
	40 – 57	1	1		200	150	**ZB65-57**	260
	50 – 65	1	1		200	150	**ZB65-65**	260

Ordering Instructions

1. **Locate the desired SYST-M base unit.**
2. **Select appropriate overload relay on this page.**
3. **Select pilot device control kit on pages G9 – G10.**
4. **Select optional accessories on page G11.**

❶ Observe the maximum permissible fuse of the contactor with direct device mounting.

Pilot Device Kits for Non-reversing SYST-M Starters

Kit	Description	Catalog No.	Price
	• One green START pushbutton • One red STOP pushbutton	**SYSTM-SS**	109
	French inscriptions • One green MARCHE pushbutton • One red ARRÊT pushbutton	**SYSTM-SS-F**	109
	• One green START pushbutton • One red STOP pushbutton • One red pilot light with ON legend plate (LED element with 85 – 264V operating range)	**SYSTM-SS/PL**	174
	French inscriptions • One green MARCHE pushbutton • One red ARRÊT pushbutton • One red pilot light with MARCHE legend plate (LED element with 85 – 264V operating range)	**SYSTM-SS/PL-F**	174
	• One red pilot light with ON legend plate (LED element with 85 – 264V operating range)	**SYSTM-PL**	91
	French inscriptions • One red pilot light with MARCHE legend plate (LED element with 85 – 264V operating range)	**SYSTM-PL-F**	91
	• Two-position OFF-ON selector switch	**SYSTM-OO**	83
	French inscriptions • Two-position MARCHE-ARRÊT selector switch	**SYSTM-OO-F**	83

Kit	Description	Catalog No.	Price
	• Two-position OFF-ON selector switch • One red pilot light with ON legend plate (LED element with 85 – 264V operating range)	**SYSTM-OO/PL**	147
	French inscriptions • Two-position MARCHE-ARRÊT selector switch • One red pilot light with MARCHE legend plate (LED element with 85 – 264V operating range)	**SYSTM-OO/PL-F**	147
	• Three-position HAND-O-AUTO selector switch	**SYSTM-HOA**	117
	French inscriptions • Three-position MAN-0-AUTO selector switch	**SYSTM-HOA-F**	94
	• Three-position HAND-O-AUTO selector switch • One red pilot light with ON legend plate (LED element with 85 – 264V operating range)	**SYSTM-HOA/PL**	160
	French inscriptions • Three-position MAN-0-AUTO selector switch • One red pilot light with MARCHE legend plate (LED element with 85 – 264V operating range)	**SYSTM-HOA/PL-F**	160

Ordering Instructions

1. **Locate the desired SYST-M base unit.**
2. **Select appropriate overload relay on page G8.**
3. **Select pilot device control kit on this page or next.**
4. **Select optional accessories on page G11.**

Pilot Device Kit for Reversing SYST-M Starters

Kit	Description	Catalog Number	Price
	• One black FORWARD pushbutton • One black REVERSE pushbutton • One red STOP pushbutton, raised	**SYSTM-SFR**	196
	French inscriptions • One black AVANT pushbutton • One black ARRIÈRE pushbutton • One red ARRÊT pushbutton, raised	**SYSTM-SFR-F**	196
	• Three-position FWD-0-REV selector switch with thumb grip handle	**SYSTM-FOR**	102
	French inscriptions • Three-position AV-0-AR selector switch with thumb grip handle	**SYSTM-FOR-F**	102
	• Three-position FWD-0-REV selector switch with thumb grip handle • Two red pilot lights (LED element with 85 – 264V operating range): - one with FORWARD legend plate - one with REVERSE legend plate	**SYSTM-FOR/PL/PL**	221
	French inscriptions • Three-position AV-0-AR selector switch with thumb grip handle • Two red pilot lights (LED element with 85 – 264V operating range) – one with AVANT legend plate – one with ARRIÈRE legend plate	**SYSTM-FOR/PL/PL-F**	221

Ordering Instructions

1. **Locate the desired SYST-M base unit.**
2. **Select appropriate overload relay on page G8.**
3. **Select pilot device control kit on this page or previous.**
4. **Select optional accessories on page G11.**

Control Transformers *(optional)*

Transformer	VA Rating [VA]	Maximum Primary Fuse [A]	Maximum Secondary Fuse [A]	Primary Voltage	Secondary Voltage	Catalog Number	Price
	50	1⅛	6/10	208	120	SYSTM-T50-208/120-NA	240
	50	1	6/10	240	120	SYSTM-T50-240/120-NA	
	50	½	6/10	480	120	SYSTM-T50-480/120-NA	
	50	4/10	6/10	600	120	SYSTM-T50-600/120-NA	

Remote Control Adaptor *(optional)*

Adaptor	Description	Catalog Number	Price
	5-wire plug-in adaptor. For use when the starter is controlled from a remote location only.	SYSTM-RA	21

softstarters

Series DS4 H5

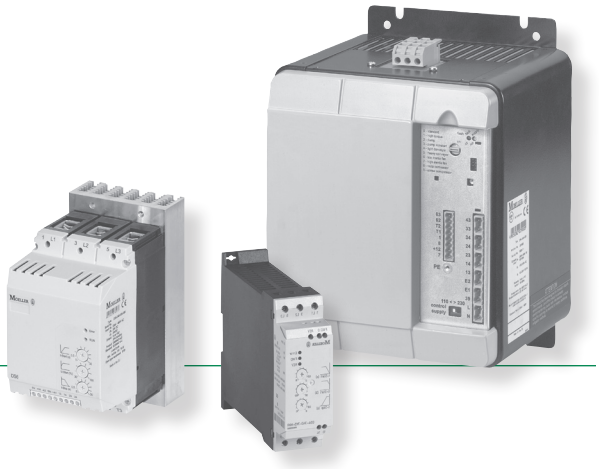
Series DS6 H21

Series DM4 H33

MOELLER

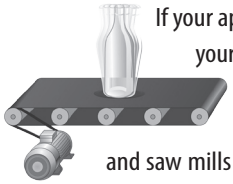
softstarters

start with *intelligence*



Comprehensive and modern, Moeller's line of softstarters offer many benefits compared to conventional across-the-line starting and stopping. Clever design and patented features make Moeller Softstarters the intelligent choice. Whatever your application, Moeller has a softstarter that can match your precise starting and stopping characteristics to produce smooth motion, steady torque and evenly-ramped voltage to your systems.

Smooth operator



If your application requires tight control over your motor operations, the smart solution is softstarters. Ideal for conveyor systems, overhead cranes, and saw mills - among many others - softstarters provide the ablility to closely match motor starting and stopping functions for smooth, consistant control.

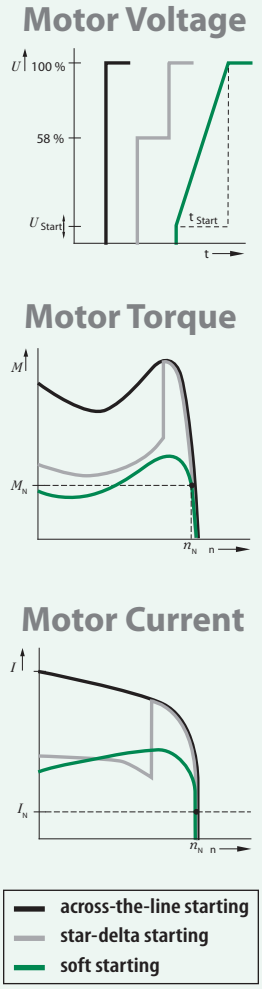
Got the jitters?

Typical across-the-line starting and stopping can cause excessive noise and vibration, resulting in stress and wear on mechanical parts and systems, especially on chains, gearboxes and belts. Harsh starting and stopping over time can lead to expensive maintenance and costly downtime. Softstarters have the ability to smooth the entire process by reducing inrush currents and controlling applied voltage - preventing noise, jitter and stressful mechanical torque.

Avoid peak demand fees

Electrical companies typically place limits on peak demands, and impose steep fees for exceeding peak demand limits. Softstarters reduce current peaks, promoting an even level of usage and lower energy costs.

Softstarter Characteristics



- > Smooth starting and stopping prevents jerking or spilling loads
- > Steady torque reduces wear on mechanical parts and systems
- > Minimizes power supply cost by dampening peak demands
- > Smoother acceleration with patented Asymmetrical Trigger Control technology
- > Designed for three-phase induction motors
- > Available models control resistive loads

Vast knowledge

Available from 3 - 1300 HP for reversing or non-reversing applications, Moeller offers a wide array of softstarters. Optional features include:

- built-in bypass circuitry
- control for resistive or inductive loads
- selectable application presets
- network enabled connections
- DIN rail or panel mount

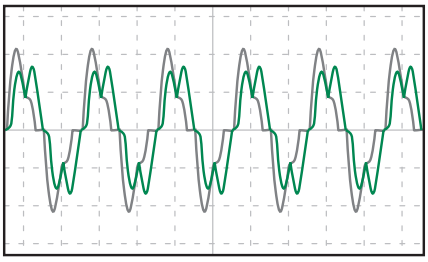
Patented technology

Moeller's patented Asymmetrical Trigger Control can significantly reduce irregular acceleration of motors typically found in two phase controlled softstarters. This makes Moeller softstarters the ideal choice for even the most acceleration-sensitive applications.

Infinite wisdom

Unlike other softstarters that offer a fixed number of starting voltage values, all Moeller softstarters are infinitely variable through dial adjustment. Two infinitely adjustable dials are also provided for starting and stopping times. All of these features combine to provide the exact starting and stopping characteristics you desire.

Current characteristic in the uncontrolled phase



Typical Softstarter

Asymmetrical Trigger Control
exclusive from Moeller

By eliminating DC sine wave components within two-phase softstarters, Moeller has significantly reduced current peaks in the uncontrolled phase - resulting in smoother acceleration for your application.

H

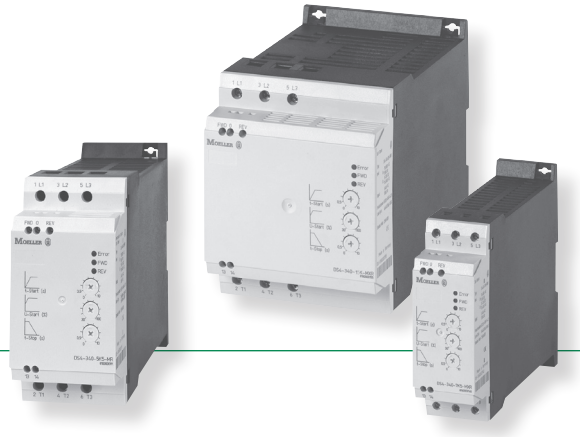
Softstarters

Feature Comparison

Softstarter Series		Horsepower	Built-in Bypass Contacts	Controls Resistive Loads	For Three-Phase Motors	DIN-Rail Mountable	Network-Capable	Selectable Presets	Reversing Functions
DS4	DS4-…-M(-DC)	15 HP		✔	✔	✔			
	DS4-…-MR	15 HP		✔	✔	✔			✔
	DS4-…-MX	10 HP – 20 HP	✔		✔	✔			
	DS4-…-MXR	10 HP – 20 HP	✔		✔	✔			✔
DS6		30 HP – 150 HP	✔		✔				
DM4		10 HP – 1300 HP		✔	✔		✔	✔	

series DS4 *(up to 20 HP)*

economical intelligence



Moeller's DS4 Series offers basic starting and stopping functions in three compact frame sizes. The economical choice for many applications, our DS4 series provides precise control with a simple-to-use interface.

Large control in a small footprint

Series DS4 is available from 3 HP to 20 HP, with an operating voltage range of 110 to 500 V AC, at 50/60 Hz. The control voltage is auto-sensing with a range of 15 to 30 V DC or 110 to 240 V AC. These flexible parameters provide enough versatility for virtually all industrial control applications. Screw or DIN-rail mountable in 45, 65 and 110 millimeters width, these compact, off-the-shelf softstarters offer big features in a small package.

It doesn't get much easier

As with Moeller's DS6 series, the DS4 line includes a dial for infinite setting of starting voltage percent and additional dials for starting and stopping ramp times. Together with LED status indication, the DS4's simple interface makes this softstarters series one of the easiest to operate.

So much equipment… in so little space

Available DS4 models offer reversing functions typical in applications such as overhead doors, cranes and lift gates - without the need of an additional softstarter. Built-in bypass circuitry is also available that diverts voltage from the softstarter after the load has ramped to full power. In addition to increasing lifespan, this prevents damage to the unit if a fault occurs, and eliminates the need to purchase an additional bypass contactor. Control of resistive loads, typically found in lighting and heating applications, is also available in the DS4 series.

> Control reversing applications without the need for a second softstarter

> Built-in bypass prevents damage and increases lifespan without additional equipment

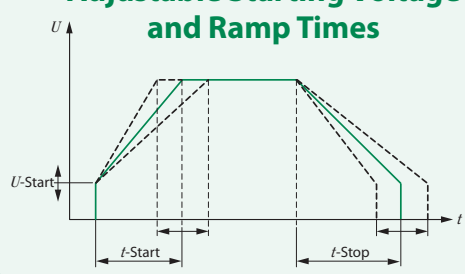
> Available models control resistive loads such as lighting or heating applications

> Softer starts with patented Asymmetrical Trigger Control technology

> Ideal for applications such as:

- conveyor belts
- escalators
- fans
- pumps
- crane drives
- material handlers
- mixers
- lumber mills
- and many others

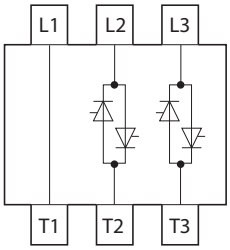
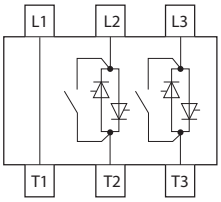
Adjustable Starting Voltage and Ramp Times



Moeller's DS4 series feature three dials to control starting voltage, starting ramp time and stopping ramp time. These dials are infinitely adjustable within the range of each dial.

- Start and stop functions with infinitely adjustable ramp time of 0 – 10 seconds
- Infinite control of starting voltage between 30 – 92 percent of full voltage
- Simple-to-use interface with status LEDs
- Auto-sensing control voltage input
- Two-phase controlled softstarters with patented Asymmetrical Trigger technology produces smooth operations that rival three-phase controlled softstarters

Non-Reversing softstarters

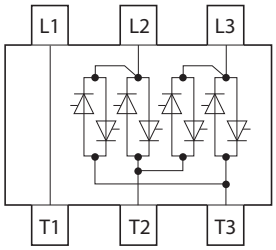
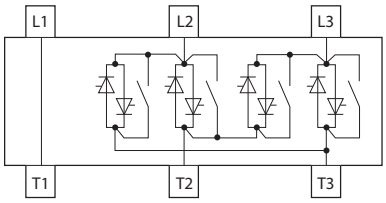
Softstarter	Description	Rated Operational Voltage U_e	Rated Operational Current I_e		Rated Power for Motors with Three-Phase *(AC 460 V)*	Circuit Diagram	Catalog Number	Price
		AC [V]	AC-51 [A]	AC-53 [A]	[HP]			
Non-Reversing								
	DC actuation only fast control inputs Suitable for resistive loads	110 – 500	11	6	3		DS4-340-2K2-M-DC	1220
	AC actuated Suitable for resistive loads	110 – 500	11	6	3		DS4-340-2K2-M	1220
		110 – 500	17	9	5		DS4-340-4K0-M	1275
		110 – 500	22	12	7½		DS4-340-5K5-M	1420
		110 – 500	29	16	10		DS4-340-7K5-M	1500
		110 – 500	41	23	15		DS4-340-11K-M	1680
With Built-in Bypass								
	With Built-in Bypass	110 – 500	–	16	10		DS4-340-7K5-MX	1285
		110 – 500	–	23	15		DS4-340-11K-MX	1390
		110 – 500	–	31	20		DS4-340-15K-MX	1575

Ordering Instructions

1. **Locate the desired softstarter.**
2. **See pages H10 – H11 for rated component list.**

- For reversing applications without the need for an additional softstarter
- Start and stop functions with infinitely adjustable ramp time of 0 – 10 seconds
- Infinite control of starting voltage between 30 – 92 percent of full voltage
- Simple-to-use interface with status LEDs
- Auto-sensing control voltage input
- Two-phase controlled softstarters with patented Asymmetrical Trigger technology produces smooth operations that rival three-phase controlled softstarters

Reversing softstarters

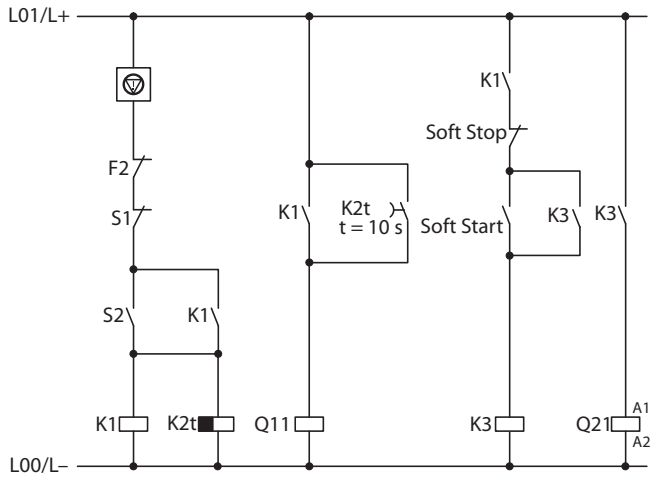
Softstarter	Description	Rated Operational Voltage U_e AC [V]	Rated Operational Current I_e AC-53 [A]	Rated Power for Motors with Three-Phase *(AC 460 V)* [HP]	Circuit Diagram	Catalog Number	Price
Reversing							
	With reversing function Suitable for resistive loads	110 – 500	6	3		DS4-340-2K2-MR	1590
		110 – 500	9	5		DS4-340-4K0-MR	1730
		110 – 500	12	7½		DS4-340-5K5-MR	1890
		110 – 500	16	10		DS4-340-7K5-MR	2060
		110 – 500	23	15		DS4-340-11K-MR	2450
With Built-in Bypass							
	With Built-in Bypass and Reversing function	110 – 500	16	10		DS4-340-7K5-MXR	1850
		110 – 500	23	15		DS4-340-11K-MXR	2020
		110 – 500	31	20		DS4-340-15K-MXR	2320

Ordering Instructions

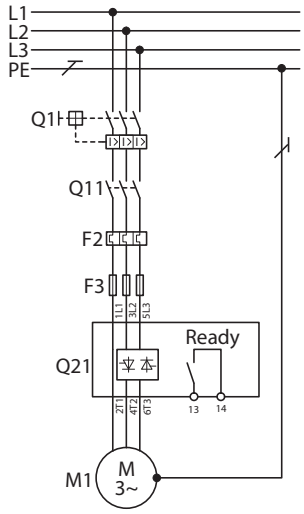
1. Locate the desired softstarter.
2. See pages H10 – H11 for rated component list.

Softstarters, Non-Reversing

DS4-340-M(X)

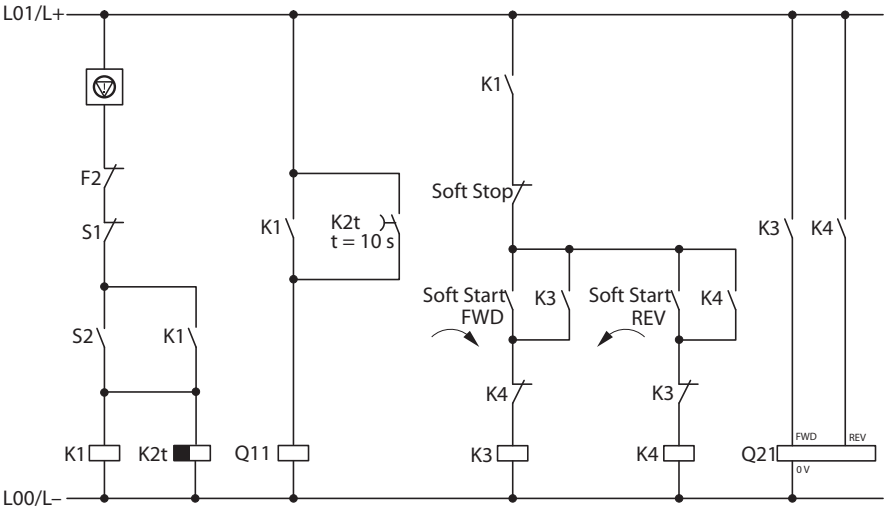


Power Section

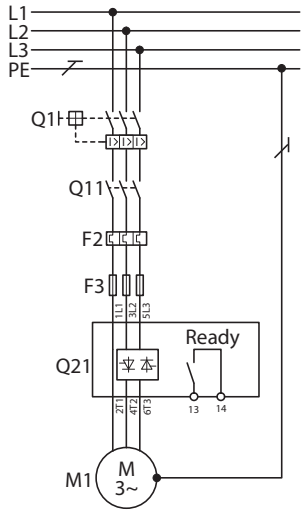


Softstarters, Reversing

DS4-340-M(X)R



Power Section



Schematic Legend

Q1: Line Protection
Q11: Mains Contactor *(optional)*
F2: Overload Relay
F3: Semiconductor Fuse, for type 2 coordination, in addition to Q1 *(optional)*
Q21: Softstarter
S1: Off
S2: On
: Emergency Stop

Assigned Switching and Protective Elements – DS4

Softstarter	Motor Rating @ 460 V	Rated Operational Current ❶			Softstarter Function		
		Device	Motor	Rating ❷			
	P [HP]	I [A]	I_e [A]	I [A]	Line Protection ❸	Mains Contactor *(optional)* ❹	Overload Relay ❺
Soft Starter for Three-Phase Power Supply, Low Operating Frequency (5 s, 3 x I_e, 10 starts/h)							
DS4-340-2K2-M(R)(-DC)	3	6	5	7	PKZM0-6,3 (+ CL-PKZ0)	DILM7	ZB12-6
DS4-340-4K0-M(R)	5	9	8.5	10	PKZM0-10 (+ CL-PKZ0)	DILM9	ZB12-10
DS4-340-5K5-M(R)	7.5	12	11.3	14	PKZM0-12 (+ CL-PKZ0)	DILM12	ZB12-12
DS4-340-7K5-M(R)	10	16	15.2	18	PKZM0-16 (+ CL-PKZ0)	DILM17	ZB32-16 (+ZB32-XEZ)
DS4-340-11K-M(R)	15	23	21.7	27	PKZM0-25 (+ CL-PKZ0)	DILM25	ZB32-24 (+ZB32-XEZ)
DS4-340-7K5-MX(R)	10	16	15.2	18	PKZM0-16 (+ CL-PKZ0)	DILM17	ZB32-16 (+ZB32-XEZ)
DS4-340-11K-MX(R)	15	23	21.7	27	PKZM0-25 (+ CL-PKZ0)	DILM25	ZB32-24 (+ZB32-XEZ)
DS4-340-15K-MX(R)	20	31	29.3	37	PKZM0-32 (+ CL-PKZ0)	DILM32	ZB32-32 (+ZB32-XEZ)
Soft Starter for Three-Phase Power Supply, High Operating Frequency (5 s, 6 x I_e, 20 starts/h), > Class 25							
DS4-340-2K2-M(R)(-DC)	3	6	5	9	PKZM0-10 (+ CL-PKZ0)	DILM9	ZEV (+ ZEV-XSW-25)
DS4-340-4K0-M(R)	5	9	8.5	14	PKZM0-16 (+ CL-PKZ0)	DILM17	ZEV (+ ZEV-XSW-25)
DS4-340-5K5-M(R)	7.5	12	11.3	19	PKZM0-20 (+ CL-PKZ0)	DILM20	ZEV (+ ZEV-XSW-25)
DS4-340-7K5-M(R)	10	16	15.2	25	PKZM0-25 (+ CL-PKZ0)	DILM25	ZEV (+ ZEV-XSW-25)
DS4-340-11K-M(R)	15	23	21.7	36	PKZM4-40 (+ CL-PKZ0)	DILM40	ZEV (+ ZEV-XSW-65)
Semiconductor Contactor for Three-Phase Power Supply, High Operating Frequency (0,5 s, 6 x I_e, 600 starts/h), > Class 25							
DS4-340-2K2-M(R)(-DC)	3	6	5	12	PKZM0-10 (+ CL-PKZ0)	DILM12	ZEV (+ ZEV-XSW-25)
DS4-340-4K0-M(R)	5	9	8.5	18	PKZM0-20 (+ CL-PKZ0)	DILM25	ZEV (+ ZEV-XSW-25)
DS4-340-5K5-M(R)	7.5	12	11.3	24	PKZM0-25 (+ CL-PKZ0)	DILM25	ZEV (+ ZEV-XSW-25)
DS4-340-7K5-M(R)	10	16	15.2	32	PKZM4-40 (+ CL-PKZ0)	DILM32	ZEV (+ ZEV-XSW-25)
DS4-340-11K-M(R)	15	23	21.7	46	PKZM4-50 (+ CL-PKZ0)	DILM50	ZEV (+ ZEV-XSW-65)
Semiconductor Contactor for for AC 51 Applications (1 s, 1.5 x I_e, 600 starts/h, 600 switching operations/h)							
DS4-340-2K2-M(R)(-DC)	–	11	–	–	PKZM0-12 (+ CL-PKZ0)	DILM7	–
DS4-340-4K0-M(R)	–	17	–	–	PKZM0-20 (+ CL-PKZ0)	DILM17	–
DS4-340-5K5-M(R)	–	22	–	–	PKZM0-25 (+ CL-PKZ0)	DILM17	–
DS4-340-7K5-M(R)	–	29	–	–	PKZM0-32 (+ CL-PKZ0)	DILM25	–
DS4-340-11K-M(R)	–	41	–	–	PKZM4-50	DILM50	–

❶ Rated operational current relative to the specified load cycle.

❷ Indicates the current for which the supply cable must be dimensioned at the specified switching duty and motor current. At different switching duty (operating frequency, overcurrent, overcurrent time, DF), this value changes and must then be adapted accordingly. The same applies for higher motor currents.

❸ Max. short-circuit current as per technical specifications of used circuit-breaker.

❹ If the control section is configured so that the control signal is inhibited before the mains contactor is disabled in the event of an Emergency-Stop, the contactors in the "Bypass Contactor" column can also be used as mains contactors.

❺ Alternatively, a motor-protective circuit-breaker with built-in overload protection can be used (e.g., PKZM0, NZM without the "-OBI" extension).

Semiconductor Protection *(optional; fuses required for Type 2 coordination are in addition to the protective elements required for Type 1 coordination)* ❶		DC Braking Unit					
Fuses	Fuse Holders	Hilger & Kern Frenomat/Frenostat					
Number x Type	Number x Type	Recommended @ 400V Mains Voltage	Output Contactor for Softstarter ❷	Line Protection	Mains Reactor ❸	Braking Contactor	Fuse for Standstill Monitoring ❹
3 x 50.140.06-50	3 x 51.060.04	Frenomat-6000.0309	DILM7	PKZM0-10 (+ CL-PKZ0)	External	DILM7	FAZ-B4/1-HI
3 x 50.140.06-63	3 x 51.060.04	Frenomat-6000.0185	DILM7	PKZM0-16 (+ CL-PKZ0)	External	DILM9	FAZ-B4/1-HI
3 x 50.140.06-80	3 x 51.060.04	Frenostat-6000.0304	DILM7	PKZM0-20 (+ CL-PKZ0)	External	Built-In	FAZ-B4/1-HI
3 x 20.282.20-125	3 x 21.313.02	Frenostat-6000.0316	DILM7	PKZM0-25 (+ CL-PKZ0)	External	DILM17	FAZ-B4/1-HI
3 x 20.282.20-160	3 x 21.313.02	Frenostat-6000.0316	DILM17	PKZM0-40 (+ CL-PKZ0)	External	DILM25	FAZ-B4/1-HI
3 x 50.140.06-63	3 x 51.060.04	Frenostat-6000.0316	DILM7	PKZM0-25 (+ CL-PKZ0)	External	DILM17	FAZ-B4/1-HI
3 x 50.140.06-80	3 x 51.060.04	Frenostat-6000.0316	DILM17	PKZM0-40 (+ CL-PKZ0)	External	DILM25	FAZ-B4/1-HI
3 x 20.282.20-125	3 x 21.313.02	Frenostat-6000.0247	DILM17	PKZM0-50 (+ CL-PKZ0)	Built-In	DILM32	FAZ-B4/1-HI
3 x 50.140.06-50	3 x 51.060.04	Frenomat-6000.0309	DILM7	PKZM0-10 (+ CL-PKZ0)	External	DILM7	FAZ-B4/1-HI
3 x 50.140.06-63	3 x 51.060.04	Frenomat-6000.0185	DILM7	PKZM0-16 (+ CL-PKZ0)	External	DILM9	FAZ-B4/1-HI
3 x 50.140.06-80	3 x 51.060.04	Frenostat-6000.0304	DILM7	PKZM0-20 (+ CL-PKZ0)	External	Built-In	FAZ-B4/1-HI
3 x 20.282.20-125	3 x 21.313.02	Frenostat-6000.0316	DILM17	PKZM0-25 (+ CL-PKZ0)	External	DILM17	FAZ-B4/1-HI
3 x 20.282.20-160	3 x 21.313.02	Frenostat-6000.0316	DILM17	PKZM0-40 (+ CL-PKZ0)	External	DILM25	FAZ-B4/1-HI
3 x 50.140.06-50	3 x 51.060.04	Frenomat-6000.0309	DILM7	PKZM0-10 (+ CL-PKZ0)	External	DILM7	FAZ-B4/1-HI
3 x 50.140.06-63	3 x 51.060.04	Frenomat-6000.0185	DILM7	PKZM0-16 (+ CL-PKZ0)	External	DILM9	FAZ-B4/1-HI
3 x 50.140.06-80	3 x 51.060.04	Frenostat-6000.0304	DILM17	PKZM0-20 (+ CL-PKZ0)	External	Built-In	FAZ-B4/1-HI
3 x 20.282.20-125	3 x 21.313.02	Frenostat-6000.0316	DILM17	PKZM0-25 (+ CL-PKZ0)	External	DILM17	FAZ-B4/1-HI
3 x 20.282.20-160	3 x 21.313.02	Frenostat-6000.0316	DILM25	PKZM0-40 (+ CL-PKZ0)	External	DILM25	FAZ-B4/1-HI
3 x 50.140.06-50	3 x 51.060.04	–	–	–	–	–	–
3 x 50.140.06-63	3 x 51.060.04	–	–	–	–	–	–
3 x 50.140.06-80	3 x 51.060.04	–	–	–	–	–	–
3 x 20.282.20-125	3 x 21.313.02	–	–	–	–	–	–
3 x 20.282.20-160	3 x 21.313.02	–	–	–	–	–	–

❶ Semiconductor fuses are required only for Type 2 coordination; max. short-circuit current 100 kA.

❷ If a DC braking unit is used, the softstarter's output must be isolated with this contactor before braking.

❸ If external, included as standard.

❹ If a measuring line with a cross-section F 1.5 mm^2 is used, the fuse can be omitted.

Softstarter Series DS4			DS4-340-2K2-M(R)	DS4-340-2K2-M(R)-DC
General				
Standards			. . .-M(R): IEC/EN 60947-4-2; . . .-M: IEC/EN 60947-4-3	
Approvals			UL/CSA	UL/CSA
Climatic proofing			Damp heat, constant according to IEC 60068-2-78; Damp heat, cyclical, according to IEC 60068-2-10	
Ambient temperature		[°C / °F]	0 . . . 40 °C / *32 . . . 104 °F*	0 . . . 40 °C / *32 . . . 104 °F*
Ambient temperature, storage		[°C / °F]	-25 . . . 55 °C / *-13 . . . 131 °F*	-25 . . . 55 °C / *-13 . . . 131 °F*
Altitude		[m]	0 – 1000	0 – 1000
Mounting position			vertical	vertical
Degree of protection (power connection)			IP21	IP21
Protection against direct contact			Finger and back-of-hand proof	Finger and back-of-hand proof
Overvoltage category/pollution degree			II/2	II/2
Shock resistance			8 g/11 ms	8 g/11 ms
Vibration resistance to EN 60721-3-2		[g]	2M2	2M2
Power loss at rated operational current e		[W]	–	–
Dimensions (W x H x D)		[mm]	45 x 149 x 189.5	45 x 149 x 189.5
Weight		[kg]	0.8	0.8
Radio interference level			"A"	"A"
Main Conducting Paths				
Rated operating voltage	U_e	[V AC]	110 – 500	110 – 500
Supply frequency		[Hz]	50/60	50/60
Control section power supply		[V AC]	internal via power connection	internal via power connection
Rated operational current				
AC-51	I_e	[A]	11	11
AC-53 (inductive load)	I_e	[A]	6	6
Assigned motor rating (standard connection)				
230V		[kW]	1.1	1.1
400V		[kW]	2.2	2.2
460V		[HP]	3	3
500V		[kW]	3	3
Overload cycle to IEC/EN 60947-4-2				
AC-51 (only for M types)			11A: AC-51: 1.5 – 1: 99 – 600	11A: AC-51: 1.5 – 1: 99 – 600
AC-53a (without bypass)			6A: AC-53a: 6 – 0.5: 99 – 600 6A: AC-53a: 6 – 5: 99 – 20	6A: AC-53a: 6 – 0.5: 99 – 600 6A: AC-53a: 6 – 5: 99 – 20
AC-53b (without bypass)			–	–
Terminal Capacities				
Cable lengths				
Solid		[mm²]	1 x (1.5 – 6); 2 x (1.5 – 4)	1 x (1.5 – 6); 2 x (1.5 – 4)
Flexible with ferrule		[mm²]	1 x (1.5 – 6); 2 x (1.5 – 2.5)	1 x (1.5 – 6); 2 x (1.5 – 2.5)
Stranded		[mm²]	1 x (1.5 – 6); 2 x (1.5 – 4)	1 x (1.5 – 6); 2 x (1.5 – 4)
Solid or stranded		[AWG]	1 x (16 – 8); 2 x (16 – 12)	1 x (16 – 8); 2 x (16 – 12)
Tightening torque		[Nm]	1.7	1.7
Standard screwdriver		[mm]	6	6
Posidriv screwdriver		[Size]	2 or 1	2 or 1
Control cables				
Solid		[mm²]	1 x (0.75 – 2.5); 2 x (0.75 – 1.5)	1 x (0.75 – 2.5); 2 x (0.75 – 1.5)
Flexible with ferrule		[mm²]	1 x (0.75 – 2.5); 2 x (0.75 – 1.5)	1 x (0.75 – 2.5); 2 x (0.75 – 1.5)
Stranded		[mm²]	1 x (0.75 – 2.5); 2 x (0.75 – 1.5)	1 x (0.75 – 2.5); 2 x (0.75 – 1.5)
Solid or stranded		[AWG]	1 x (18 – 12); 2 x (18 – 16)	1 x (18 – 12); 2 x (18 – 16)
Tightening torque		[Nm]	0.8	0.8
Standard screwdriver		[mm]	0.5 x 3.5	0.5 x 3.5

Rated impulse withstand voltage:

- 1.2 µs/50 µs (rise time/fall time of the pulse to IEC/EN 60947-2 or -3)
- Applies for control circuit/power section/enclosure

DS4-340-4K0-M(R)	DS4-340-5K5-M(R)	DS4-340-7K5-M(R)	DS4-340-11K-M(R)
. . .-M(R): IEC/EN 60947-4-2; . . .-M: IEC/EN 60947-4-3			
UL/CSA	UL/CSA	UL/CSA	UL/CSA
Damp heat, constant according to IEC 60068-2-78; Damp heat, cyclical, according to IEC 60068-2-10			
0. . .40 °C / *32. . .104 °F*	0. . .40 °C / *32. . .104 °F*	0. . .40 °C / *32. . .104 °F*	0. . .40 °C / *32. . .104 °F*
-25. . .55 °C / *-13. . .131 °F*	-25. . .55 °C / *-13. . .131 °F*	-25. . .55 °C / *-13. . .131 °F*	-25. . .55 °C / *-13. . .131 °F*
0 – 1000	0 – 1000	0 – 1000	0 – 1000
vertical	vertical	vertical	vertical
IP21	IP21	IP21	IP21
Finger and back-of-hand proof	Finger and back-of-hand proof	Finger and back-of-hand proof	Finger and back-of-hand proof
II/2	II/2	II/2	II/2
8 g/11 ms	8 g/11 ms	8 g/11 ms	8 g/11 ms
2M2	2M2	2M2	2M2
–	–	–	–
45 x 149 x 189.5	45 x 149 x 189.5	45 x 149 x 189.5	45 x 149 x 189.5
1.0	1.0	1.7	1.7
"A"	"A"	"A"	"A"
110 – 500	110 – 500	110 – 500	110 – 500
50/60	50/60	50/60	50/60
internal via power connection	internal via power connection	internal via power connection	internal via power connection
17	22	29	41
9	12	16	23
2.2	3	4	5.5
4	5.5	7.5	11
5	7	10	15
5.5	5.5	7.5	11
17A: AC-51: 1.5 – 1: 99 – 600	22A: AC-51: 1.5 – 1: 99 – 600	29A: AC-51: 1.5 – 1: 99 – 600	41A: AC-51: 1.5 – 1: 99 – 600
9A: AC-53a: 6 – 0.5: 99 – 600 9A: AC-53a: 6 – 5: 99 – 20	12A: AC-53a: 6 – 0.5: 99 – 600 12A: AC-53a: 6 – 5: 99 – 20	16A: AC-53a: 6 – 0.5: 99 – 600 16A: AC-53a: 6 – 5: 99 – 20	23A: AC-53a: 6 – 0.5: 99 – 600 23A: AC-53a: 6 – 5: 99 – 20
–	–	–	41A AC-53b:3 – 5:360 (-M only)
1 x (1.5 – 35); 2 x (1.5 –10)	1 x (1.5 – 35); 2 x (1.5 –10)	1 x (2.5 – 50); 2 x (2.5 – 16)	1 x (2.5 – 50); 2 x (2.5 – 16)
1 x (1.5 – 25); 2 x (1.5 – 6)	1 x (1.5 – 25); 2 x (1.5 – 6)	1 x (2.5 – 35); 2 x (2.5 – 10)	1 x (2.5 – 35); 2 x (2.5 – 10)
1 x (1.5 – 35); 2 x (1.5 – 10)	1 x (1.5 – 35); 2 x (1.5 – 10)	1 x (2.5 – 50); 2 x (2.5 – 16)	1 x (2.5 – 50); 2 x (2.5 – 16)
1 x (16 – 4); 2 x (16 – 10)	1 x (16 – 4); 2 x (16 – 10)	1 x (14 – 2); 2 x (14 – 8)	1 x (14 – 2); 2 x (14 – 8)
3	3	3.5	3.5
6mm	6mm	6mm	6mm
2 or 1	2 or 1	2 or 1	2 or 1
1 x (0.75 – 2.5); 2 x (0.75 – 1.5)	1 x (0.75 – 2.5); 2 x (0.75 – 1.5)	1 x (0.75 – 2.5); 2 x (0.75 – 1.5)	1 x (0.75 – 2.5); 2 x (0.75 – 1.5)
1 x (0.75 – 2.5); 2 x (0.75 – 1.5)	1 x (0.75 – 2.5); 2 x (0.75 – 1.5)	1 x (0.75 – 2.5); 2 x (0.75 – 1.5)	1 x (0.75 – 2.5); 2 x (0.75 – 1.5)
1 x (0.75 – 2.5); 2 x (0.75 – 1.5)	1 x (0.75 – 2.5); 2 x (0.75 – 1.5)	1 x (0.75 – 2.5); 2 x (0.75 – 1.5)	1 x (0.75 – 2.5); 2 x (0.75 – 1.5)
1 x (18 – 12); 2 x (18 – 16)	1 x (18 – 12); 2 x (18 – 16)	1 x (18 – 12); 2 x (18 – 16)	1 x (18 – 12); 2 x (18 – 16)
0.8	0.8	0.8	0.8
0.5 x 3.5	0.5 x 3.5	0.5 x 3.5	0.5 x 3.5

Softstarter Series DS4			DS4-340-2K2-M(R)	DS4-340-2K2-M(R)-DC
Power Section				
Rated impulse withstand voltage	U_{imp}	[kV]	6	6
Rated insulation voltage	U_i	[V AC]	500	500
Short-circuit rating				
Type "1" coordination				
For AC-51: 1.5-1: 600-99			PKZM0-16 (+CL-PKZ0)	PKZM0-16 (+CL-PKZ0)
For AC-53a: 3-5: 10-99 and AC-53b: 3-5 : 360			PKZM0-6,3 (+CL-PKZ0) + Z00-6 (+EZ00)	PKZM0-6,3 (+CL-PKZ0) + Z00-6 (+EZ00)
For AC-53a: 6-0.5: 600-99			PKZM0-10 (+CL-PKZ0) + ZEV + ZEV-XSW-25	PKZM0-10 (+CL-PKZ0) + ZEV + ZEV-XSW-25
Type "2" coordination (in addition to coordination type "1")			3 x 50.140.06-50	3 x 50.140.06-50
Fuse base			3 x 51.060.04	3 x 51.060.04
Control Circuit				
Current consumption				
Minimum control voltage		[V AC/DC]	110 / 24	24
Digital inputs				
24V DC		[mA]	14	14
230V AC		[mA]	14	14
Control section power supply		[V AC]	internal via power connection	internal via power connection
Control voltage				
DC operated		[V DC]	24 ±15%	24 ±15%
AC operated		[V AC]	110 – 240 ±15%	–
Pick-up voltage				
DC operated		[V DC]	15 – 27	15 – 27
AC operated		[V AC]	79 – 264	–
Drop-out voltage				
DC operated		[V DC]	0 – 3	0 – 3
AC operated		[V AC]	0 – 22	–
Pick-up time				
DC operated		[ms]	95	45
AC operated		[ms]	115	–
Drop-out time				
DC operated		[ms]	165	45
AC operated		[ms]	165	–
Programmable relay output				
Number			1	1
Voltage range		[V AC]	250	250
AC-1 current range		[A]	3	3
Soft Start Function				
Ramp times				
Acceleration		[s]	0 – 10	0 – 10
Deceleration		[s]	0 – 10	0 – 10
Start voltage (= turn-off voltage)		[%]	30 – 92	30 – 92
Voltage reduction at stop		[%]	8	8
Torque-free time for rotation direction reversal		[ms]	60	60

Rated impulse withstand voltage:
- 1.2 µs/50 µs (rise time/fall time of the pulse to IEC/EN 60947-2 or -3)
- Applies for control circuit/power section/enclosure

DS4-340-4K0-M(R)	DS4-340-5K5-M(R)	DS4-340-7K5-M(R)	DS4-340-11K-M(R)
6	6	6	6
500	500	500	500
PKZM0-20 (+CL-PKZ0)	PKZM0-16 (+CL-PKZ0)	PKZM4-32	PKZM4-50
PKZM0-10 (+CL-PKZ0) + Z00-10 (+EZ00)	PKZM0-16 (+CL-PKZ0) + Z00-16 (+EZ00)	PKZM0-16 (+CL-PKZ0) + Z00-16 (+EZ00)	PKZM0-25 (+CL-PKZ0) + Z00-24 (+EZ00)
PKZM0-20 (+CL-PKZ0) + ZEV + ZEV-XSW-25	PKZM0-25 (+CL-PKZ0) + ZEV + ZEV-XSW-25	PKZM4-40 (+CL-PKZ0) + ZEV + ZEV-XSW-65	PKZM4-50 (+CL-PKZ0) + ZEV + ZEV-XSW-65
3 x 50.140.06-63	3 x 50.140.06-80	3 x 50.140.06-125	3 x 50.140.06-160
3 x 51.060.04	3 x 51.060.04	3 x 21.189.01	3 x 21.189.01
110 / 24	110 / 24	110 / 24	110 / 24
14	14	14	14
14	14	14	14
internal via power connection	internal via power connection	internal via power connection	internal via power connection
24 ±15%	24 ±15%	24 ±15%	24 ±15%
110 – 240 ±15%	110 – 240 ±15%	110 – 240 ±15%	110 – 240 ±15%
15 – 27	15 – 27	15 – 27	15 – 27
79 – 264	79 – 264	79 – 264	79 – 264
0 – 3	0 – 3	0 – 3	0 – 3
0 – 22	0 – 22	0 – 22	0 – 22
95	95	95	95
115	115	115	115
165	165	165	165
165	165	165	165
1	1	1	1
250	250	250	250
3	3	3	3
0 – 10	0 – 10	0 – 10	0 – 10
0 – 10	0 – 10	0 – 10	0 – 10
30 – 92	30 – 92	30 – 92	30 – 92
8	8	8	8
60	60	60	60

Softstarter Series DS4			DS4-340-7K5-MX(R)	DS4-340-11K-MX(R)	DS4-340-15K-MX(R)
General					
Standards			IEC/EN 60947-4-2	IEC/EN 60947-4-2	IEC/EN 60947-4-2
Approvals			UL/CSA	UL/CSA	UL/CSA
Climatic proofing			Damp heat, constant according to IEC 60068-2-78; Damp heat, cyclical, according to IEC 60068-2-10		
Ambient temperature		[°C / °F]	0 . . . 40 °C / *32 . . . 104 °F*	0 . . . 40 °C / *32 . . . 104 °F*	0 . . . 40 °C / *32 . . . 104 °F*
Ambient temperature, storage		[°C / °F]	-25 . . . 55 °C / *-13 . . . 131 °F*	-25 . . . 55 °C / *-13 . . . 131 °F*	-25 . . . 55 °C / *-13 . . . 131 °F*
Altitude		[m]	0 – 1000	0 – 1000	0 – 1000
Mounting position			vertical	vertical	vertical
Degree of protection (power connection)			IP21	IP21	IP21
Protection against direct contact			Finger and back-of-hand proof	Finger and back-of-hand proof	Finger and back-of-hand proof
Overvoltage category/pollution degree			II/2	II/2	II/2
Shock resistance			8 g/11 ms	8 g/11 ms	8 g/11 ms
Dimensions (W x H x D)		[mm]	45 x 149 x 189.5	45 x 149 x 189.5	45 x 149 x 189.5
Weight		[kg]	0.8	0.8	1.6
Radio interference level			"A"	"A"	"A"
Vibration resistance to EN 60721-3-2			2M2	2M2	2M2
Average heat dissipation at rated load cycle		[W]	11.2	11.9	12.7
Main Conducting Paths					
Rated operating voltage	U_e	[V AC]	110 – 500	110 – 500	110 – 500
Supply frequency		[Hz]	50/60	50/60	50/60
Control section power supply		[V AC]	internal via power connection	internal via power connection	internal via power connection
Rated operational current					
AC-53 (inductive load)	I_e	[A]	16	23	31
Assigned motor rating (standard connection)					
230V		[kW]	4	5.5	7.5
400V		[kW]	7.5	11	15
460V		[HP]	10	15	20
500V		[kW]	7.5	11	18.5
Overload cycle to IEC/EN 60947-4-2					
AC-53b (without bypass)			16A: AC-53b: 3 – 5; 360	23A: AC-53b: 3 – 5; 360	31A: AC-53b: 3 – 5; 360
Terminal Capacities					
Cable lengths					
Solid		[mm²]	1 x (1.5 – 6); 2 x (1.5 – 4)	1 x (1.5 – 6); 2 x (1.5 – 4)	1 x (2.5 – 50); 2 x (2.5 – 16)
Flexible with ferrule		[mm²]	1 x (1.5 – 6); 2 x (1.5 – 2.5)	1 x (1.5 – 6); 2 x (1.5 – 2.5)	1 x (2.5 – 35); 2 x (2.5 – 10)
Stranded		[mm²]	1 x (1.5 – 6); 2 x (1.5 – 4)	1 x (1.5 – 6); 2 x (1.5 – 4)	1 x (2.5 – 50); 2 x (2.5 – 16)
Solid or stranded		[AWG]	1 x (16 – 8); 2 x (16 – 12)	1 x (16 – 8); 2 x (16 – 12)	1 x (14 – 2); 2 x (14 – 8)
Tightening torque		[Nm]	1.7	1.7	3.5
Standard screwdriver		[mm]	6	6	6
Posidriv screwdriver		[Size]	2 or 1	2 or 1	2 or 1
Control cables					
Solid		[mm²]	1 x (0.75 – 2.5); 2 x (0.75 – 1.5)	1 x (0.75 – 2.5); 2 x (0.75 – 1.5)	1 x (0.75 – 2.5); 2 x (0.75 – 1.5)
Flexible with ferrule		[mm²]	1 x (0.75 – 2.5); 2 x (0.75 – 1.5)	1 x (0.75 – 2.5); 2 x (0.75 – 1.5)	1 x (0.75 – 2.5); 2 x (0.75 – 1.5)
Stranded		[mm²]	1 x (0.75 – 2.5); 2 x (0.75 – 1.5)	1 x (0.75 – 2.5); 2 x (0.75 – 1.5)	1 x (0.75 – 2.5); 2 x (0.75 – 1.5)
Solid or stranded		[AWG]	1 x (18 –12); 2 x (18 –16)	1 x (18 –12); 2 x (18 –16)	1 x (18 –12); 2 x (18 –16)
Tightening torque		[Nm]	0.8	0.8	0.8
Standard screwdriver		[mm]	0.5 x 3.5	0.5 x 3.5	0.5 x 3.5

Rated impulse withstand voltage:
- 1.2 µs/50 µs (rise time/fall time of the pulse to IEC/EN 60947-2 or -3)
- Applies for control circuit/power section/enclosure

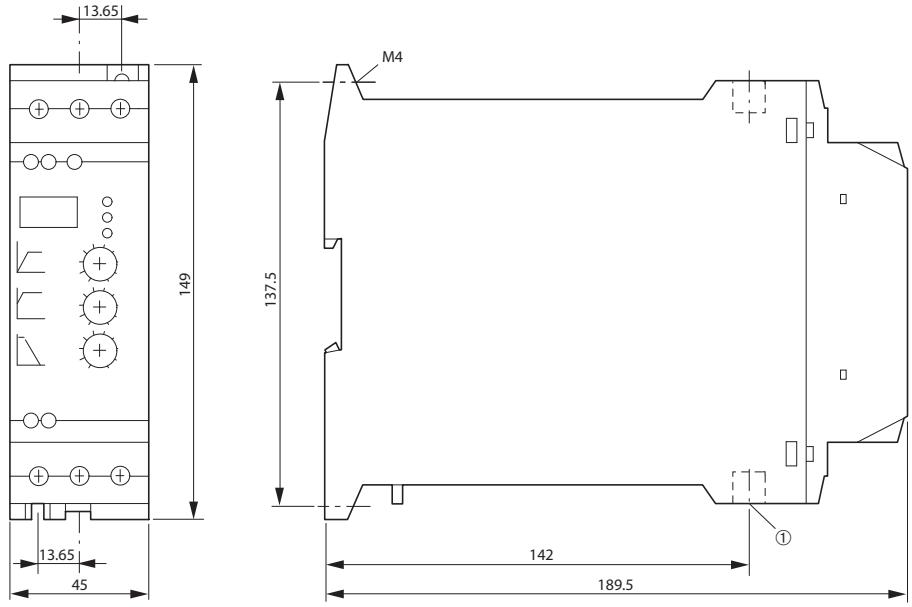
Softstarter Series DS4			DS4-340-7K5-MX(R)	DS4-340-11K-MX(R)	DS4-340-15K-MX(R)
Power Section					
Rated impulse withstand voltage	U_{imp}	[kV]	6	6	6
Rated insulation voltage	U_i	[V AC]	500	500	500
Short-circuit rating					
Type "1" coordination					
with AC-53a:3-5:10-99 and AC-53b::3-5:360			PKZM0-16 (+CL-PKZ0) + Z00-16 (+EZ00)	PKZM0-25 (+CL-PKZ0) + Z00-24 (+EZ00)	PKZ2+M-32-PKZ2 (+CL-PKZ2) + Z1-40 (+EZ1)
Type "2" coordination (in addition to coordination type "1")			3 x 50.140.06-63	3 x 50.140.06-80	3 x 20.282.20-125
Fuse base			3 x 50.060.04	3 x 50.060.04	3 x 21.189.01
Control Circuit					
Current consumption					
Minimum control voltage		[V AC/DC]	110 / 24	110 / 24	110 / 24
Digital inputs					
24V DC		[mA]	14	14	14
230V AC		[mA]	14	14	14
Control section power supply		[V AC]	internal via power connection	internal via power connection	internal via power connection
Control voltage					
DC operated		[V DC]	24 ±15%	24 ±15%	24 ±15%
AC operated		[V AC]	110 – 240 ±15%	110 – 240 ±15%	110 – 240 ±15%
Pick-up voltage					
DC operated		[V DC]	15 – 27	15 – 27	15 – 27
AC operated		[V AC]	79 – 264	79 – 264	79 – 264
Drop-out voltage					
DC operated		[V DC]	0 – 3	0 – 3	0 – 3
AC operated		[V AC]	0 – 22	0 – 22	0 – 22
Pick-up time					
DC operated		[ms]	95	95	95
AC operated		[ms]	115	115	115
Drop-out time					
DC operated		[ms]	165	165	165
AC operated		[ms]	165	165	165
Programmable relay output					
Number			1	1	1
Voltage range		[V AC]	250	250	250
AC-1 current range		[A]	3	3	3
Soft Start Function					
Ramp times					
Acceleration		[s]	.05 – 10	.05 – 10	.05 – 10
Deceleration		[s]	0 – 10	0 – 10	0 – 10
Start voltage (= turn-off voltage)		[%]	30 – 92	30 – 92	30 – 92
Voltage reduction at stop		[%]	8	8	8
Torque-free time for rotation direction reversal		[ms]	60	60	60

Rated impulse withstand voltage:
- 1.2 µs/50 µs (rise time/fall time of the pulse to IEC/EN 60947-2 or -3)
- Applies for control circuit/power section/enclosure

Softstarters DS4

DS4-340-2K2-M(R)(-DC); DS4-340-7K5-MX(R); DS4-340-11K-MX(R)

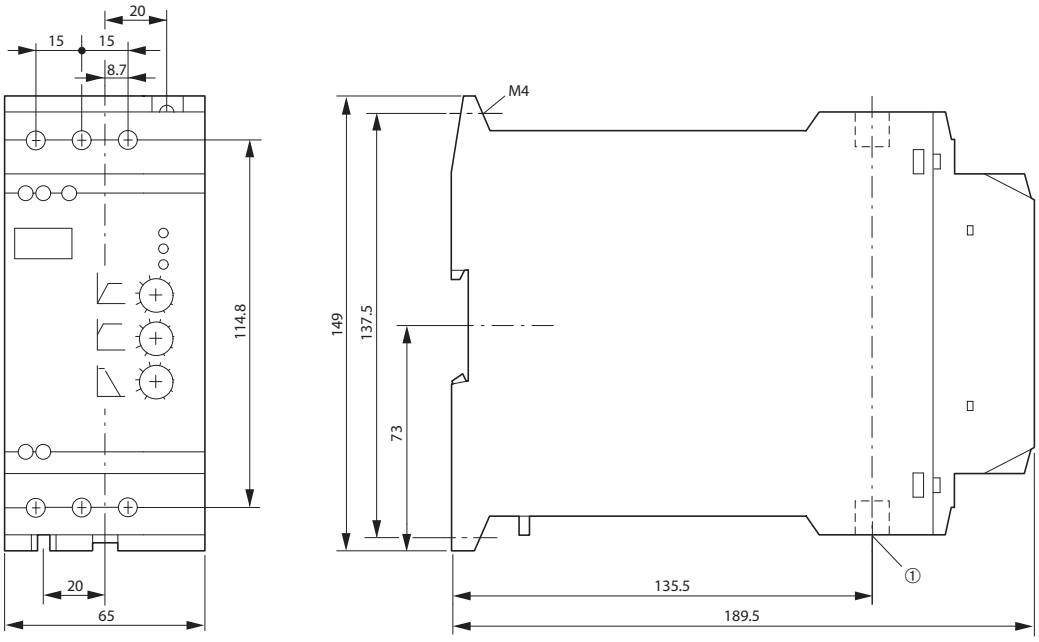
Dimensions are in millimeters.
Not intended for manufacturing purposes.



① 1L1, 3L2, 5L3
2T1, 4T2, 6T3

Softstarters DS4

DS4-340-4K0-M(R); DS4-340-5K5-M(R)

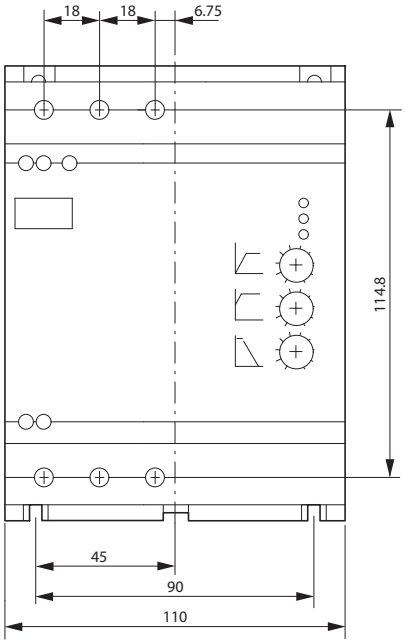


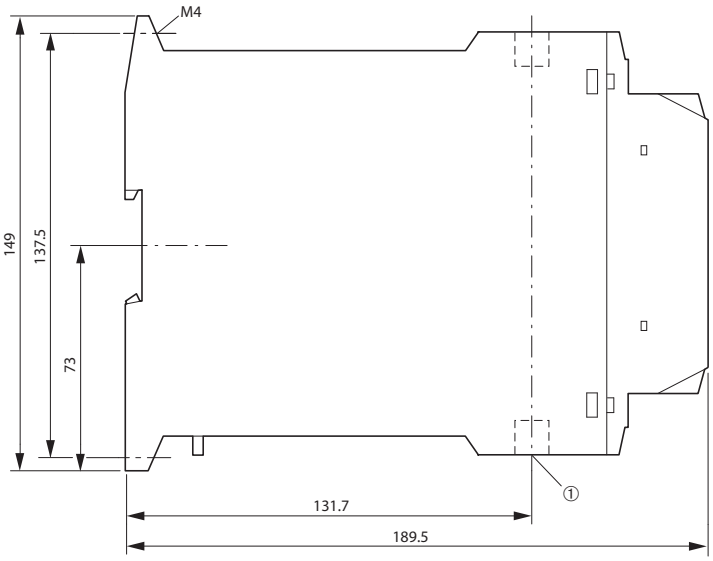
① 1L1, 3L2, 5L3
2T1, 4T2, 6T3

Softstarters DS4

DS4-340-7K5-M(R); DS4-340-11K-M(R); DS4-340-15K-MX(R)

Dimensions are in millimeters.
Not intended for manufacturing purposes.

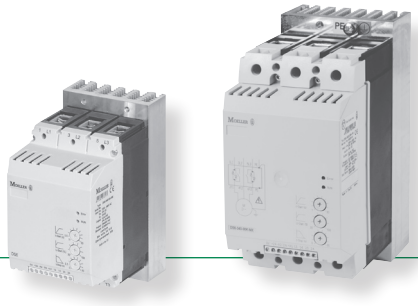




① 1L1, 3L2, 5L3
2T1, 4T2, 6T3

series DS6 *(from 30 HP to 150 HP)*

powerful intelligence



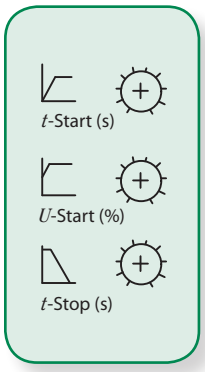
Moeller's DS6 series provides an array of power options in just two frame sizes. If your application requires more horsepower than DS4 series provides, our DS6 series is the likely choice. All softstarters in this range have built-in bypass circuitry that prevents damage if a fault occurs and increases lifespan.

Powerful and compact

Moeller's DS6 line offers surprising power capabilities in a minimal panel space of only 93 and 108 millimeters in width. Designed for medium horsepower applications, the DS6 series softstarter is available from 30 HP to 150 HP, with an operating voltage of 230 to 460 V AC at 50/60 Hz. These devices are suitable for three-phase induction motors and have a control voltage of 24 V DC.

'Keep it simple' intelligence

The DS6 line includes a dial for infinite setting of starting voltage percent and additional dials for starting and stopping ramp times. LED status indicators and a simple interface makes the DS6 softstarter series one of the easiest to operate.



Built-in benefits

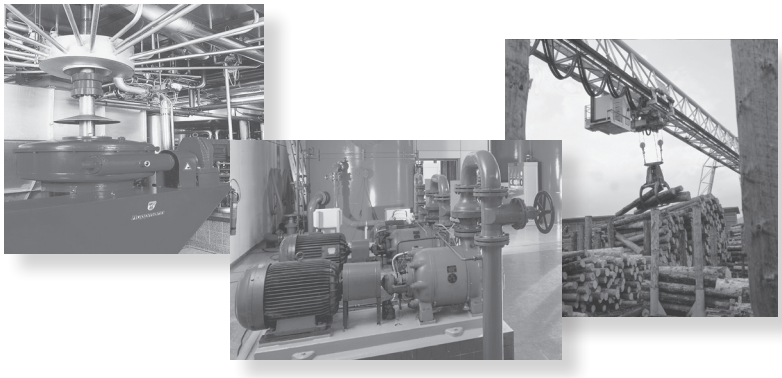
All DS6 softstarters contain an integrated heat sink and built-in bypass - features that are typically offered as separately purchased items. A bypass diverts voltage from the softstarter after the load has ramped to full power. This increases the lifespan of the softstarter and prevents damage to the unit if a fault occurs.

> Built-in bypass prevents damage and increases lifespan without additional equipment

> Softer starts with patented Asymmetrical Trigger Control technology

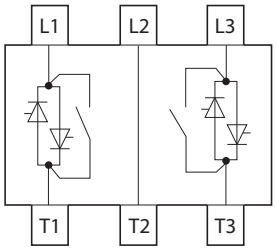
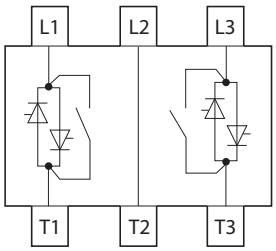
> Ideal for applications such as

- conveyor belts
- escalators
- fans
- pumps
- crane drives
- material handlers
- mixers
- lumber mills
- and many others



- Start and stop functions with infinitely adjustable ramp time of 0 – 30 seconds
- Infinite control of starting voltage between 30 – 92 percent of full voltage
- Simple-to-use interface with status LEDs
- Built-in bypass offers increased lifespan and protection if a fault occurs without additional equipment
- Two-phase controlled softstarters with patented Asymmetrical Trigger technology produces smooth operations that rival three-phase controlled softstarters

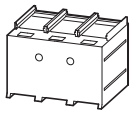
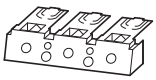
Series DS6 Softstarters

Softstarter	Description	Mains Supply Voltage U_{LN} AC [V]	Rated Operational Current I_e [A]	Rated Power for Motors with Three-Phase *(AC 460 V)* [HP]	Circuit Diagram	Catalog Number	Price
DS6 Softstarters							
	AC actuated with built-in bypass	230 – 480	41	30		DS6-340-22K-MX	2120
		230 – 480	55	40		DS6-340-30K-MX	2340
		230 – 480	68	50		DS6-340-37K-MX	2840
		230 – 480	81	60		DS6-340-45K-MX	3120
		230 – 480	99	75		DS6-340-55K-MX	3390
	AC actuated with built-in bypass	230 – 480	134	100		DS6-340-75K-MX	4360
		230 – 480	161	125		DS6-340-90K-MX	5410
		230 – 480	196	150		DS6-340-110K-MX	6070
UL/CSA pending; contact your Moeller representative.							

Ordering Instructions

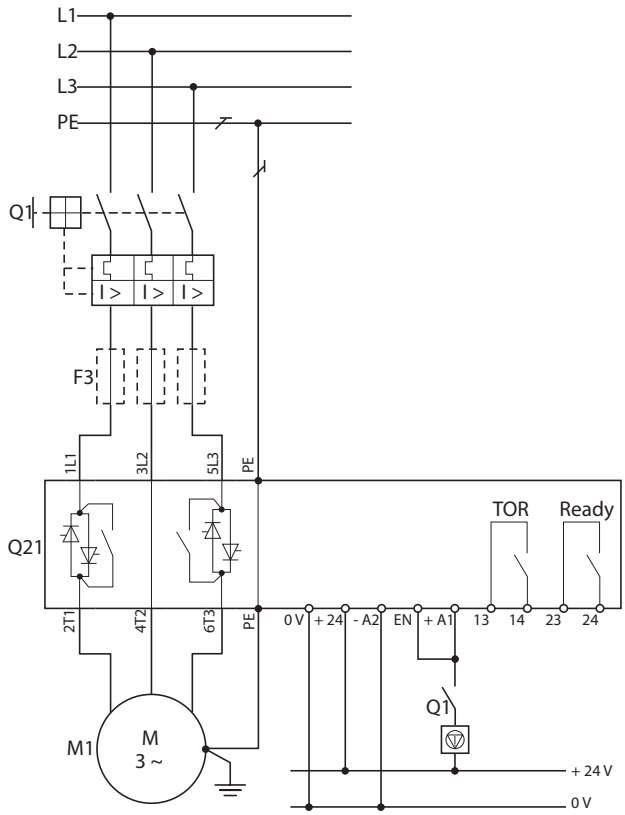
1. Locate the desired softstarter.
2. Order accessories on page H23.
3. See pages H26 – H27 for rated component list.

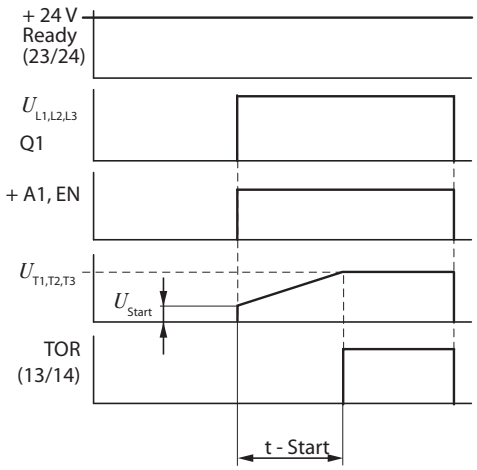
Terminal Protection

Terminal Protection	Description	For Use With...	Catalog Number	Price
Terminal Covers				
	For Box Terminal	DS6-340-22K-MX DS6-340-30K-MX DS6-340-37K-MX DS6-340-45K-MX DS6-340-55K-MX	**NZM1-XKSFA**	48
	Terminal Cover	DS6-340-75K-MX DS6-340-90K-MX DS6-340-110K-MX	**NZM2-XKSA**	70
	Terminal Cover	DS6-340-75K-MX DS6-340-90K-MX DS6-340-110K-MX	**NZM2-XKSFA**	80
IP2X Protection				
	For Box Terminal	DS6-340-75K-MX DS6-340-90K-MX DS6-340-110K-MX	**NZM2-XIPK**	70
	For Cover NZM2-XKSA	DS6-340-75K-MX DS6-340-90K-MX DS6-340-110K-MX	**NZM2-XIPA**	44

Standard Connection

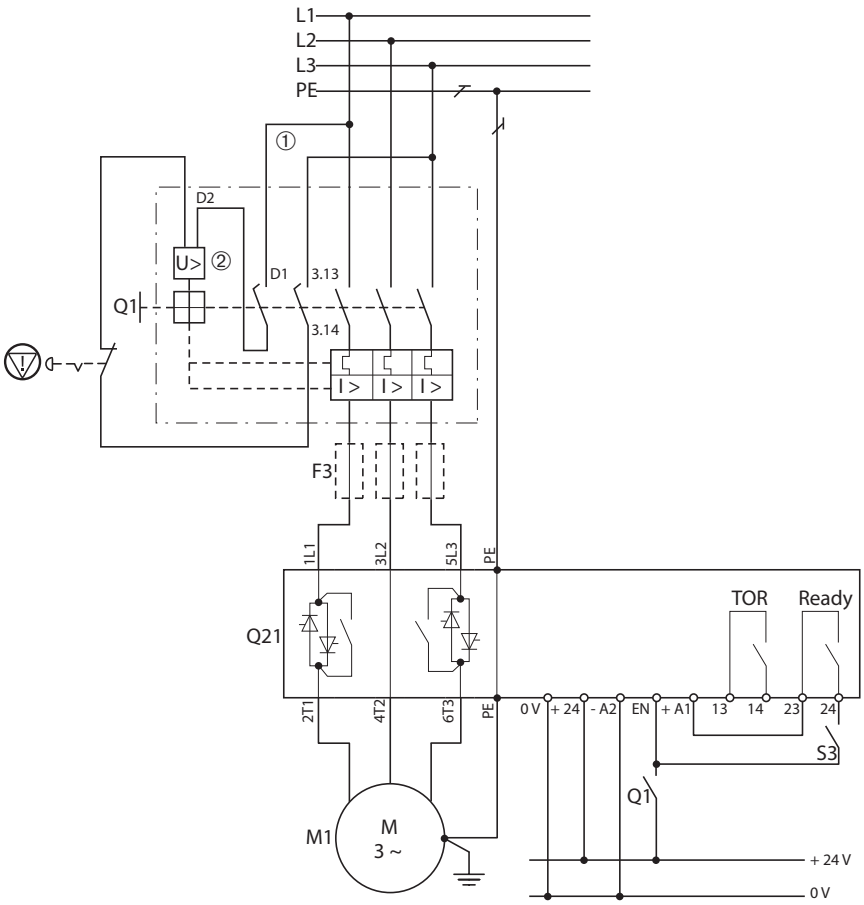
Direct Soft Start





Standard Connection

Direct Soft Start



Schematic Legend

Q1: Circuit Breaker
①: Control Circuit Terminal
②: Undervoltage Release with Early-Make Auxiliary Contact

3 AC, 230V	NZM1-XUHIV208-240AC
	NZM2/3-XUHIV208-240AC
3 AC, 400V	NZM1-XUHIV380-440AC
	NZM2/3-XUHIV380-440AC

: Emergency Stop

Assigned Switching and Protective Elements – DS6

Softstarter	Assigned Motor Rating 400V [kW]	Assigned Motor Rating 460V [HP]	Rated Operational Current ❶ Device I_e [A]	Rated Operational Current ❶ Motor I_e [A]	Softstarter Function: Line Protection ❷ Type 1 Coordination	Softstarter Function: Mains Contactor *(optional)* ❸	Softstarter Function: Overload Relay ❹
Soft Starter for Three-Phase Power Supply, Low Operating Frequency (5 s, 3 x I_e, 10 starts/h)							
DS6-340-22K-MX	18.5	25	41	36	NZMN1-M40/PKZM4-40	DILM40	ZB65-40 (+ZB65-XEZ)
DS6-340-22K-MX	22	30	41	41	NZMN1-M50/PKZM4-50	DILM50	ZB65-40 (+ZB65-XEZ)
DS6-340-30K-MX	30	40	55	55	NZMN1-M63/PKZM4-58	DILM65	ZB65-57 (+ZB65-XEZ)
DS6-340-37K-MX	37	50	68	68	NZMN1-M80	DILM80	Z5-70/KK3
DS6-340-45K-MX	45	60	81	81	NZMN1-M100	DILM95	Z5-100/KK3
DS6-340-55K-MX	55	75	99	99	NZMN1-M100	DILM115	Z5-100/KK4
DS6-340-75K-MX	75	100	135	134	NZMN2-M160	DILM150	Z5-100/KK4
DS6-340-90K-MX	90	125	160	160	NZMN2-M200	DILM185	Z5-160/FF250
DS6-340-110K-MX	110	150	200	196	NZMN2-M200	DILM225	Z5-160/FF250

❶ Rated operational current relative to the specified load cycle.

❷ Indicates the required circuit-breaker for the specified load cycle. At different switching duty (operating frequency, overcurrent, overcurrent time, DF), this value changes and must then be adapted accordingly. The same applies for higher motor currents.

❸ A mains contactor is not required. VDE-conformant isolating properties can be ensured only with the specified circuit-breaker.

❹ An external overload relay is required if a controlled soft stop is required in the event of an overload instead of an opening of the main contacts.

Semiconductor Protection *(optional; fuses required for Type 2 coordination are in addition to the protective elements required for Type 1 coordination)* ❶		DC Braking Unit					
Fuses	Fuse Holders	Hilger & Kern Frenomat/Frenostat	Output Contactor for Softstarter ❷	Line Protection	Mains Reactor ❸	Braking Contactor	Fuse for Standstill Monitoring ❹
Number x Type	Number x Type	Recommended @ 400V Mains Voltage					
2 x 20.282.20-100	3 x 21.189.01	Frenostat-6000.0248	DILM25	PKZM4-63 (+ CL-PKZ0)	Built-in	DILM50	FAZ-B4HI
3 x 20.282.20-100	3 x 21.189.01	Frenostat-6000.0248	DILM25	PKZM4-63 (+ CL-PKZ0)	Built-in	DILM50	FAZ-B4HI
3 x 20.282.20-125	3 x 21.189.01	Frenostat-6000.0249	DILM40	NZMN1-M80	Built-in	DILM65	FAZ-B4HI
3 x 20.610.32-200	3 x 21.313.02	Frenostat-6000.0173	DILM65	NZMN1-M100	External	DILM80	FAZ-B4HI
3 x 20.610.32-200	3 x 21.313.02	Frenostat-6000.0173	DILM65	NZMN2-M125	External	DILM95	FAZ-B4HI
3 x 20.610.32-200	3 x 21.313.02	Frenostat-6000.0177	DILM80	NZMN2-M160	External	DILM115	FAZ-B4HI
3 x 20.610.32-350	3 x 21.313.02	Frenostat-6000.0181	DILM115	NZMN2-M200	External	DILM150	FAZ-B4HI
3 x 20.610.32-400	3 x 21.313.02	Frenostat-6000.0169	DILM115	NZMN3-ME220	External	DILM185	FAZ-B4HI
3 x 20.610.32-500	3 x 21.313.02	Frenostat-6000.0169	DILM185	NZMN3-ME350	External	DILM225	FAZ-B4HI

❶ The superfast semiconductor fuses protect the soft starter from short-circuits on the motor side. They cannot prevent damage caused by voltage peaks, such as those caused by lightning.

❷ If a DC braking unit is used, the soft starter's output must be isolated with this contactor before braking.

❸ If external, included as standard.

❹ If a measuring line with a cross-section F 1.5 mm^2 is used, the fuse can be omitted.

Softstarter Series DS6			DS6-340-22K-MX	DS6-340-30K-MX	DS6-340-37K-MX
General					
Standards			IEC/EN 60947-4-2	IEC/EN 60947-4-2	IEC/EN 60947-4-2
Climatic proofing			Damp heat, constant according to IEC 60068-2-78; Damp heat, cyclical, according to IEC 60068-2-10		
Ambient temperature		[°C / °F]	0 . . . 40 °C / *32. . . 104 °F* (up to 60 °C / *140 °F* with a current reduction of 1% per °C)		
Ambient temperature, storage		[°C / °F]	-25 . . . 55 °C / *-13. . . 131 °F*	-25 . . . 55 °C / *-13. . . 131 °F*	-25 . . . 55 °C / *-13. . . 131 °F*
Altitude		[m]	0 – 1000 (up to 2000 m with a current reduction of 1% per 100 m)		
Mounting position			vertical	vertical	vertical
Degree of protection (power connection)			IP20	IP20	IP20
Protection against direct contact			Finger and back-of-hand proof		
Overvoltage category/pollution degree			II/2	II/2	II/2
Shock resistance			8 g/11 ms	8 g/11 ms	8 g/11 ms
Vibration resistance to EN 60721-3-2		[g]	2M2	2M2	2M2
Average heat dissipation at rated load cycle		[W]	7	10	13
Radio interference level			"A1"	"A1"	"A1"
Weight		[kg]	1.8	1.8	1.8
Main Conducting Paths					
Rated operating voltage	U_e	[V AC]	230 – 460	230 – 460	230 – 460
Supply frequency		[Hz]	50/60	50/60	50/60
Rated operational current					
AC-51 (resistive loads)	I_e	[A]	41	55	68
AC-53 (inductive load)	I_e	[A]	41	55	68
Assigned motor rating (standard connection)					
230V		[kW]	11	15	15
400V		[kW]	22	30	37
460V		[HP]	30	40	50
Overload cycle to IEC/EN 60947-4-2					
AC-51 (built-in bypass)			41A: AC-53a: 3...5; 75...10	55A: AC-53a: 3...5; 75...10	68A: AC-53a: 3...5; 75...10
Terminal Capacities					
Cable lengths					
Solid		[mm²]	1 x (25 – 70); 2 x (6 – 25)	1 x (25 – 70); 2 x (6 – 25)	1 x (25 – 70); 2 x (6 – 25)
Stranded		[mm²]	1 x (25 –70); 2 x (6 – 25)	1 x (25 –70); 2 x (6 – 25)	1 x (25 –70); 2 x (6 – 25)
Solid or stranded		[AWG]	1 x (12 – 2/0)	1 x (12 – 2/0)	1 x (12 – 2/0)
Band	min.	[mm]	2 x 9 x 0.8	2 x 9 x 0.8	2 x 9 x 0.8
	max.	[mm]	9 x 9 x 0.9	9 x 9 x 0.9	9 x 9 x 0.9
Control cables					
Solid		[mm²]	1 x (0.5 – 2.5); 2 x (0.5 – 1.0)	1 x (0.5 – 2.5); 2 x (0.5 – 1.0)	1 x (0.5 – 2.5); 2 x (0.5 – 1.0)
Flexible with ferrule		[mm²]	1 x (0.5 – 1.5); 2 x (0.5 – 0.75)	1 x (0.5 – 1.5); 2 x (0.5 – 0.75)	1 x (0.5 – 1.5); 2 x (0.5 – 0.75)
Stranded		[mm²]	1 x (0.5 – 1.5); 2 x (0.5 – 1.0)	1 x (0.5 – 1.5); 2 x (0.5 – 1.0)	1 x (0.5 – 1.5); 2 x (0.5 – 1.0)
Solid or stranded		[AWG]	1 x (21 – 14); 2 x (21 – 18)	1 x (21 – 14); 2 x (21 – 18)	1 x (21 – 14); 2 x (21 – 18)
Tightening torque		[Nm]	0.4	0.4	0.4
Standard screwdriver		[mm]	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5

Rated impulse withstand voltage:

- 1.2 µs/50 µs (rise time/fall time of the pulse to IEC/EN 60947-2 or -3)
- Applies for control circuit/power section/enclosure

DS6-340-45K-MX	DS6-340-55K-MX	DS6-340-75K-MX	DS6-340-90K-MX	DS6-340-110K-MX
IEC/EN 60947-4-2	IEC/EN 60947-4-2	IEC/EN 60947-4-2	IEC/EN 60947-4-2	IEC/EN 60947-4-2
Damp heat, constant according to IEC 60068-2-78; Damp heat, cyclical, according to IEC 60068-2-10				
0 . . . 40 °C / *32. . . 104 °F* (up to 60 °C / *140 °F* with a current reduction of 1% per °C)				
-25 . . . 55 °C / *-13. . . 131 °F*	-25 . . . 55 °C / *-13. . . 131 °F*	-25 . . . 55 °C / *-13. . . 131 °F*	-25 . . . 55 °C / *-13. . . 131 °F*	-25 . . . 55 °C / *-13. . . 131 °F*
0 – 1000 (up to 2000 m with a current reduction of 1% per 100 m)				
vertical	vertical	vertical	vertical	vertical
IP20	IP20	IP20	IP20	IP20
Finger and back-of-hand proof				
II/2	II/2	II/2	II/2	II/2
8 g/11 ms	8 g/11 ms	8 g/11 ms	8 g/11 ms	8 g/11 ms
2M2	2M2	2M2	2M2	2M2
18	25	24	30	42
"A1"	"A1"	"A1"	"A1"	"A1"
1.8	3.7	3.7	3.7	3.7
230 – 460	230 – 460	230 – 460	230 – 460	230 – 460
50/60	50/60	50/60	50/60	50/60
81	99	135	160	200
81	99	135	160	200
22	30	30	45	55
45	55	75	90	110
60	75	100	125	150
81A: AC-53a: 3...5; 75...10	99A: AC-53a: 3...5; 75...10	135A: AC-53a: 3...5; 75...10	160A: AC-53a: 3...5; 75...10	200A: AC-53a: 3...5; 75...10
1 x (25 – 70); 2 x (6 – 25)	1 x (25 – 70); 2 x (6 – 25)	1 x (4 – 185); 2 x (4 – 70)	1 x (4 – 185); 2 x (4 – 70)	1 x (4 – 185); 2 x (4 – 70)
1 x (25 –70); 2 x (6 – 25)	1 x (25 –70); 2 x (6 – 25)	1 x (4 – 185); 2 x (4 – 70)	1 x (4 – 185); 2 x (4 – 70)	1 x (4 – 185); 2 x (4 – 70)
1 x (12 – 2/0)	1 x (12 – 2/0)	1 x (12 – 350 kcmil); 2 x (12 – 00)	1 x (12 – 350 kcmil); 2 x (12 – 00)	1 x (12 – 350 kcmil); 2 x (12 – 00)
2 x 9 x 0.8	2 x 9 x 0.8	2 x 9 x 0.8	2 x 9 x 0.8	2 x 9 x 0.8
9 x 9 x 0.9	9 x 9 x 0.9	10 x 16 x 0.8	10 x 16 x 0.8	10 x 16 x 0.8
1 x (0.5 – 2.5); 2 x (0.5 – 1.0)	1 x (0.5 – 2.5); 2 x (0.5 – 1.0)	1 x (0.5 – 2.5); 2 x (0.5 – 1.0)	1 x (0.5 – 2.5); 2 x (0.5 – 1.0)	1 x (0.5 – 2.5); 2 x (0.5 – 1.0)
1 x (0.5 – 1.5); 2 x (0.5 – 0.75)	1 x (0.5 – 1.5); 2 x (0.5 – 0.75)	1 x (0.5 – 1.5); 2 x (0.5 – 0.75)	1 x (0.5 – 1.5); 2 x (0.5 – 0.75)	1 x (0.5 – 1.5); 2 x (0.5 – 0.75)
1 x (0.5 – 1.5); 2 x (0.5 – 1.0)	1 x (0.5 – 1.5); 2 x (0.5 – 1.0)	1 x (0.5 – 1.5); 2 x (0.5 – 1.0)	1 x (0.5 – 1.5); 2 x (0.5 – 1.0)	1 x (0.5 – 1.5); 2 x (0.5 – 1.0)
1 x (21 – 14); 2 x (21 – 18)	1 x (21 – 14); 2 x (21 – 18)	1 x (21 – 14); 2 x (21 – 18)	1 x (21 – 14); 2 x (21 – 18)	1 x (21 – 14); 2 x (21 – 18)
0.4	0.4	0.4	0.4	0.4
0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5

Softstarter Series DS6			DS6-340-22K-MX	DS6-340-30K-MX	DS6-340-37K-MX
Power Section					
Rated impulse withstand voltage	U_{imp}	[kV]	4	4	4
Rated insulation voltage	U_i	[V AC]	500	500	500
Short-circuit rating					
Type "1" coordination					
at AC-53a: 3...5: 75...10			NZMN1-M50/PKZM4-50	NZMN1-M63/PKZM4-50	NZMN1-M80
Type "2" coordination (in addition to coordination type "1")			3 x 20.282.20-100	3 x 20.282.20-125	3 x 20.610.32-200
Fuse holders			3 x 21.189.01	3 x 21.189.01	3 x 21.313.02
Control Circuit					
Regulator supply voltage					
Voltage		[V]	24 DC, +10%/-15%	24 DC, +10%/-15%	24 DC, +10%/-15%
Current consumption					
Current consumption at 24V DC		[mA]	35	35	35
Current consumption in operation at 24V DC		[mA]	65	65	65
Current consumption at peak performance (close bypass) at 24V DC			600/50 ms	600/50 ms	600/50 ms
Control voltage					
DC operated		[V DC]	24, +10%/-15%	24, +10%/-15%	24, +10%/-15%
Current consumption at 24V DC		[mA]	14	14	14
Pick-up voltage					
DC operated		[V DC]	17.3 – 27	17.3 – 27	17.3 – 27
Drop-out voltage					
DC operated		[V DC]	0 – 3	0 – 3	0 – 3
Pick-up time					
DC operated		[ms]	250	250	250
Drop-out time					
DC operated		[ms]	190	190	190
Relay outputs					
Number (top of ramp)			2 (TOR, Ready)	2 (TOR, Ready)	2 (TOR, Ready)
Voltage range		[V AC]	250	250	250
AC-1 current range		[A]	3	3	3
Soft Start Function					
Ramp times					
Acceleration		[s]	1 – 30	1 – 30	1 – 30
Deceleration		[s]	0 – 30	0 – 30	0 – 30
Start voltage (= turn-off voltage)		[%]	30 – 92	30 – 92	30 – 92
Voltage reduction at stop		[%]	8	8	8
Torque-free time for rotation direction reversal		[ms]	–	–	–

Rated impulse withstand voltage:

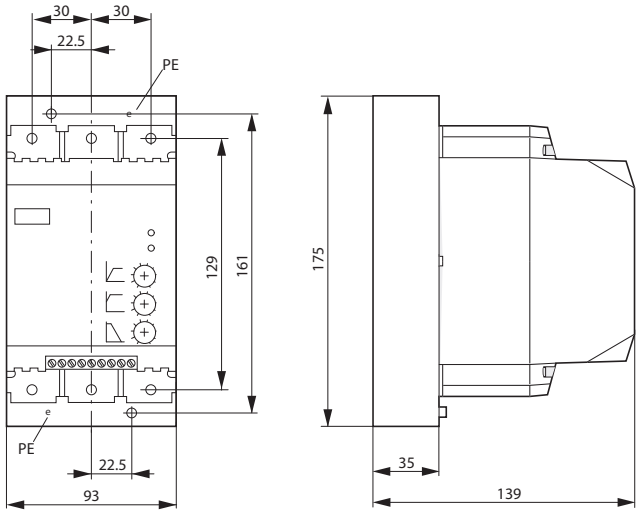
- 1.2 µs/50 µs (rise time/fall time of the pulse to IEC/EN 60947-2 or -3)
- Applies for control circuit/power section/enclosure

DS6-340-45K-MX	DS6-340-55K-MX	DS6-340-75K-MX	DS6-340-90K-MX	DS6-340-110K-MX
4	4	4	4	4
500	500	500	500	500
NZMN1-M100	NZMN1-M100	NZMN1-M160	NZMN1-M200	NZMN1-M200
3 x 20.610.32-200	3 x 20.610.32-200	3 x 20.610.32-350	3 x 20.610.32-400	3 x 20.610.20-500
3 x 21.313.02	3 x 21.313.02	3 x 21.313.02	3 x 21.313.02	3 x 21.313.02
24 DC, +10%/-15%	24 DC, +10%/-15%	24 DC, +10%/-15%	24 DC, +10%/-15%	24 DC, +10%/-15%
35	35	35	35	35
65	65	65	65	65
600/50 ms	600/50 ms	600/50 ms	600/50 ms	600/50 ms
24, +10%/-15%	24, +10%/-15%	24, +10%/-15%	24, +10%/-15%	24, +10%/-15%
14	14	14	14	14
17.3 – 27	17.3 – 27	17.3 – 27	17.3 – 27	17.3 – 27
0 – 3	0 – 3	0 – 3	0 – 3	0 – 3
250	250	250	250	250
190	190	190	190	190
2 (TOR, Ready)	2 (TOR, Ready)	2 (TOR, Ready)	2 (TOR, Ready)	2 (TOR, Ready)
250	250	250	250	250
3	3	3	3	3
1 – 30	1 – 30	1 – 30	1 – 30	1 – 30
0 – 30	0 – 30	0 – 30	0 – 30	0 – 30
30 – 92	30 – 92	30 – 92	30 – 92	30 – 92
8	8	8	8	8
–	–	–	–	–

Softstarters DS6

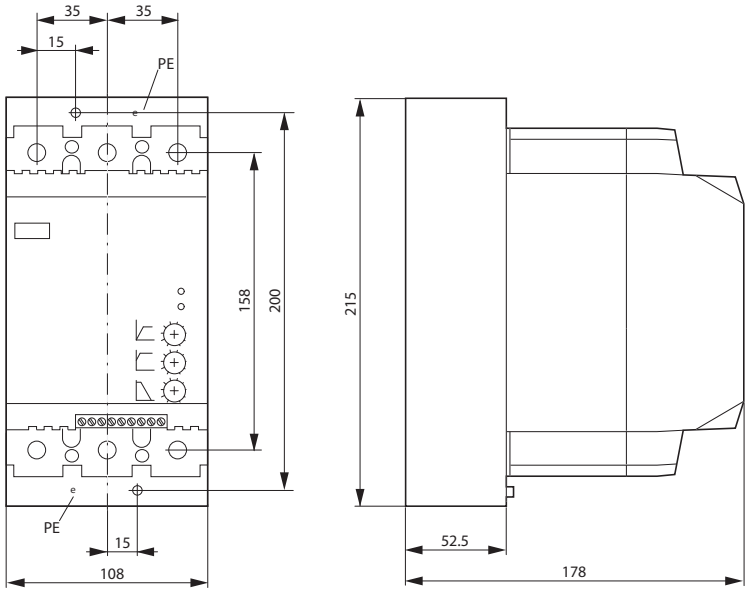
DS6-340-(22)(30)(37)(45)(55)K-MX

Dimensions are in millimeters.
Not intended for manufacturing purposes.



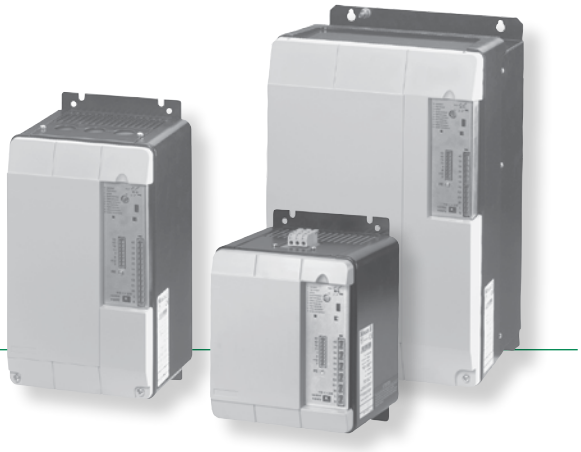
Softstarters DS6

DS6-340-(75)(90)(110)K-MX



series DM4

versatile intelligence



Robust and packed with features, Moeller series DM4 softstarters deliver. The DM4 line handles the most critical control situations from small-power to power-intensive applications. With the ability to perform a multitude of tasks beyond simple ramped starting and stopping, the DM4 series has the versatility to control even the most unique application requirements.

Versatile connections

Series DM4 is available in four frame sizes from 10 HP to 1300 HP with an operating range of 230 to 460 V AC at 50/60 Hz. The control voltage is auto-sensing with a range of 24 to 230 V AC or DC. Suitable for either In-Line or In-Delta connections, these three-phase controlled softstarters can control resistive as well as inductive loads.

Pre-configured versatility

When basic ramped starting or stopping isn't enough, series DM4 is the intelligent choice. With 10 built-in presets for commonly used applications, matching your requirements can be as easy as toggling a switch. Programming methods are also available to ensure DM4 softstarters exactly match the required control for your specific application.

Versatile communication

Moeller also offers many different communication options for the DM4 softstarter series. In addition to a keypad for manual input, options include an RS232C / RS485 serial interface adapter and a Profibus DP adapter. These additional communication choices allow for direct programming and monitoring with a PLC or computer.

> Built-in presets for commonly used applications

> Available models control resistive loads such as lighting or heating applications

> Suitable for In-Delta connections

> Ideal for applications such as:

- conveyor belts
- escalators
- fans
- pumps
- crane drives
- material handlers
- mixers
- lumber mills
- and many others

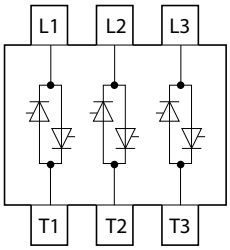
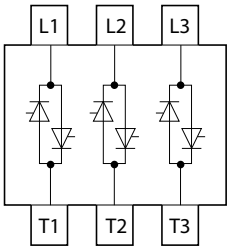
Selectable Application Presets

- standard
- high torque
- pump
- pump kickstart
- light conveyor
- heavy conveyor
- low inertia fan
- high inertia fan
- reciprocal compressor
- screw compressor

programming options available to exactly match application requirements

- Selectable presets for 10 different commonly used applications
- Suitable for both In-Line and In-Delta configurations
- Three-phase controlled softstarters
- Can be used for resistive or inductive loads

Series DM4 Softstarters

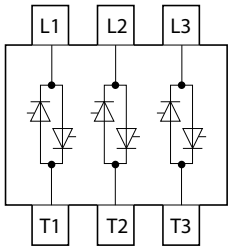
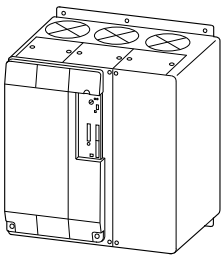
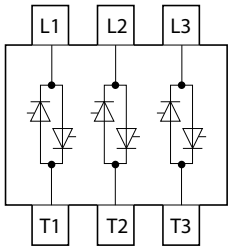
Softstarter	Description	Supply Voltage U_L AC [V]	Rated Operational Current I_e [A]	Rated Power for Motors with Three-Phase (AC 460 V) [HP]	Circuit Diagram	Catalog Number	Price
DM4 Softstarters up to 50 HP at 460V							
	AC actuated	190 – 520 ±0%	16	10		DM4-340-7K5	9215
		190 – 520 ±0%	23	15		DM4-340-11K	10340
		190 – 520 ±0%	30	20		DM4-340-15K	11200
		190 – 520 ±0%	44	30		DM4-340-22K	12100
		190 – 520 ±0%	59	40		DM4-340-30K	13325
		190 – 520 ±0%	72	50		DM4-340-37K	15565
DM4 Softstarters up to 100 HP at 460V							
	AC actuated	190 – 520 ±0%	85	60		DM4-340-45K	17600
		190 – 520 ±0%	105	75		DM4-340-55K	19800
		190 – 520 ±0%	146	100		DM4-340-75K	22900

Ordering Instructions

1. Locate the desired softstarter.
2. Order accessories on page H36.
3. See pages H40 – H47 for rated component list.

- Selectable presets for 10 different commonly used applications
- Suitable for both In-Line and In-Delta configurations
- Three-phase controlled softstarters
- Can be used for resistive or inductive loads

Series DM4 Softstarters

Softstarter	Description	Supply Voltage U_L AC [V]	Rated Operational Current I_e [A]	Rated Power for Motors with Three-Phase (AC 460 V) [HP]	Circuit Diagram	Catalog Number	Price
DM4 Softstarters up to 300 HP at 460V							
	AC actuated	190 – 520 ±0%	174	125		DM4-340-90K	30000
		190 – 520 ±0%	202	150		DM4-340-110K	32125
		190 – 520 ±0%	242	200		DM4-340-132K	35250
		190 – 520 ±0%	300	250		DM4-340-160K	39350
		190 – 520 ±0%	370	300		DM4-340-200K	46190
DM4 Softstarters up to 750 HP at 460V							
	AC actuated	190 – 520 ±0%	500	400		DM4-340-250K	57150
		190 – 520 ±0%	600	500		DM4-340-315K	62000
		190 – 520 ±0%	750	600		DM4-340-400K	74200
		190 – 520 ±0%	900	750		DM4-340-500K	86160

Ordering Instructions

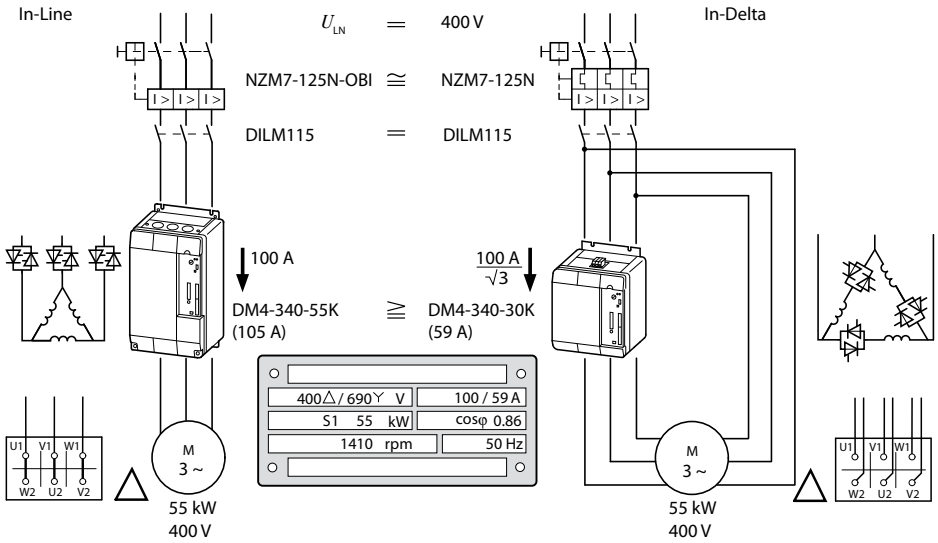
1. **Locate the desired softstarter.**
2. **Order accessories on page H36.**
3. **See pages H40 – H47 for rated component list.**

Accessories for DM4 Softstarters

Accessory	Description	For Use With...	Catalog Number	Price	Discount Code
Manual Keypad					
	Two-line text display Notification of operating states through status symbols Allows matching of all softstarter parameters for any application and drive control through the keypad Connection to softstarter DM4 through simple snap-on/pull-off connection, even during operation With non-volitile memory for parameters; parameter sets can be transferred between soft starters for series applications	DM4-...	**DE4-KEY-2**	1000	F21
RS 232C/RS 485 Serial Interface					
	RS 232C: 9-pin SUB-D plug RS 485: plug-in screw terminals PS416-ZBK-210 serial interface cable required (below)	DM4-...	**DE4-COM-2X**	1755	F21
	Interface cable for above For connecting the programming PC to the CPU card through the RS 232C interface	DE4-COM-2X	**PS416-ZBK-210**	300	E22
PROFIBUS DP Communication Module					
	All parameters can be addressed and transferred Connection through 9-pin SUB-D plug	DM4-...	**DE4-NET-DP2**	3650	F21

DM4 Series

In-line vs. In-delta configurations



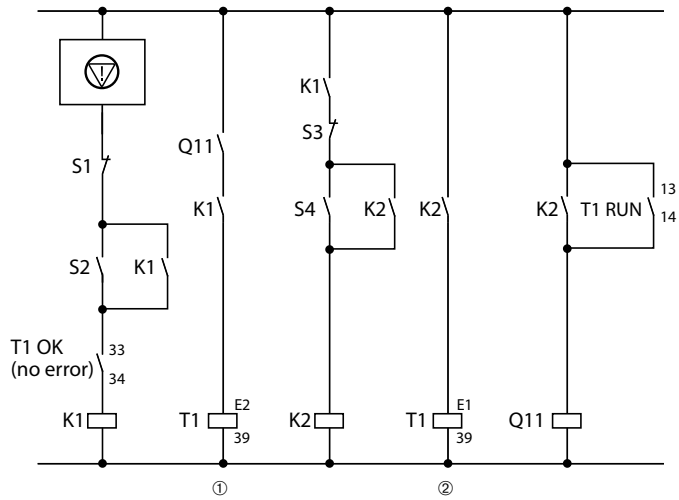
As a rule, softstarters are connected directly in series with the motor (in line). The DM4 softstarters also allow operation in delta configuration.

Advantages to delta:
This circuit is cheaper because the softstarter has to be laid out for only 58% of the motor full load current.

Disadvantages to delta:
The motor must be connected with six conductors, similar to a star-delta connection. The DM4's overload protection is active only in one line. An additional motor protection must be installed in the parallel line or in the incomer.

With Separate Mains Contactor

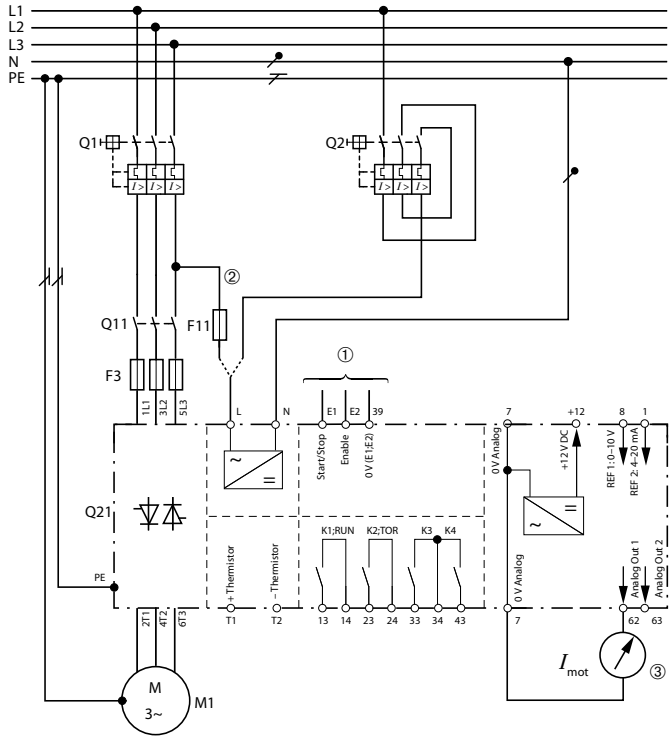
Actuation



Schematic Legend
S1: Off (unguided deceleration)
S2: On
S3: Soft Start
S4: Soft Stop
①: Enable
②: Soft Start / Soft Stop
Ⓥ : Emergency Stop

With Separate Mains Contactor

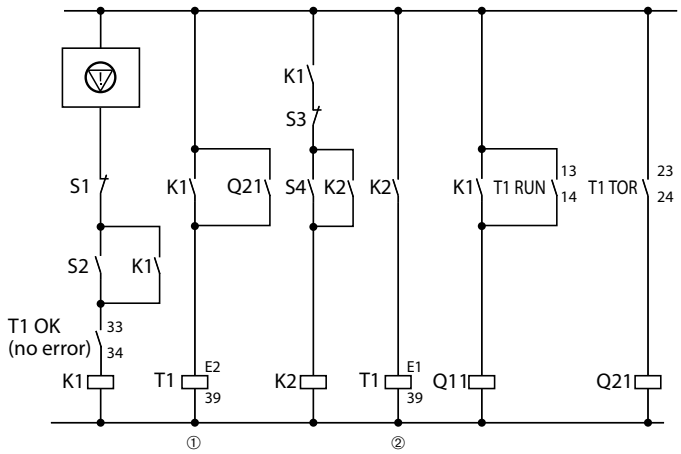
Schematic



Schematic Legend
①: See actuation
②: Control voltage through Q1 and F11 or through Q2
③: Motor current indication

Bypass Circuit

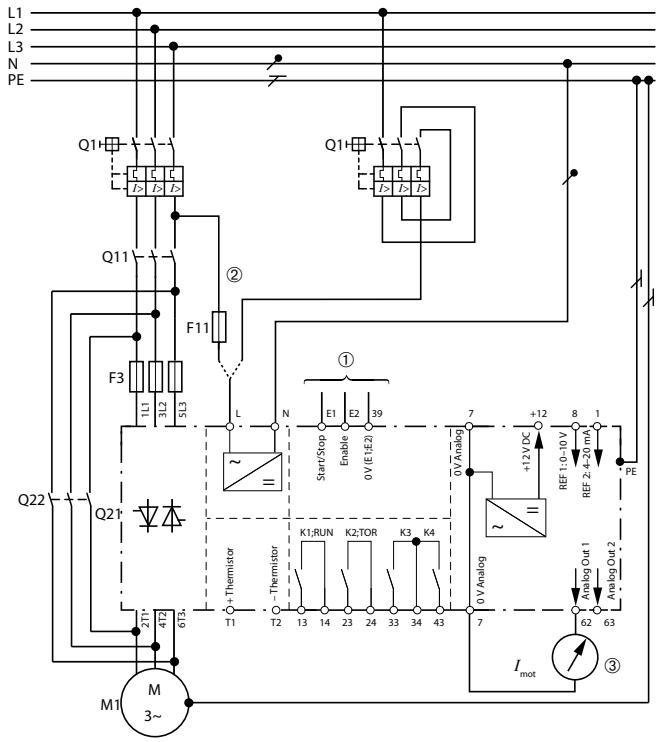
Actuation



Schematic Legend
S1: Off (unguided deceleration)
S2: On
①: Enable
②: Soft Start / Soft Stop
: Emergency Stop

Bypass Circuit

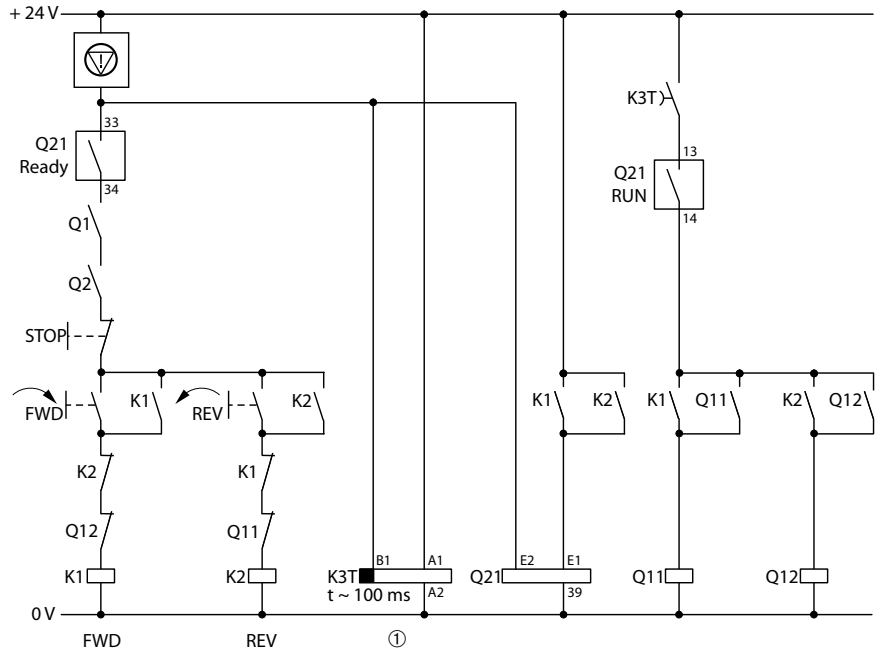
Schematic



Schematic Legend
①: See actuation
②: Control voltage through Q1 and F11 or through Q2
③: Motor current indication

With Reversing Circuit

Actuation

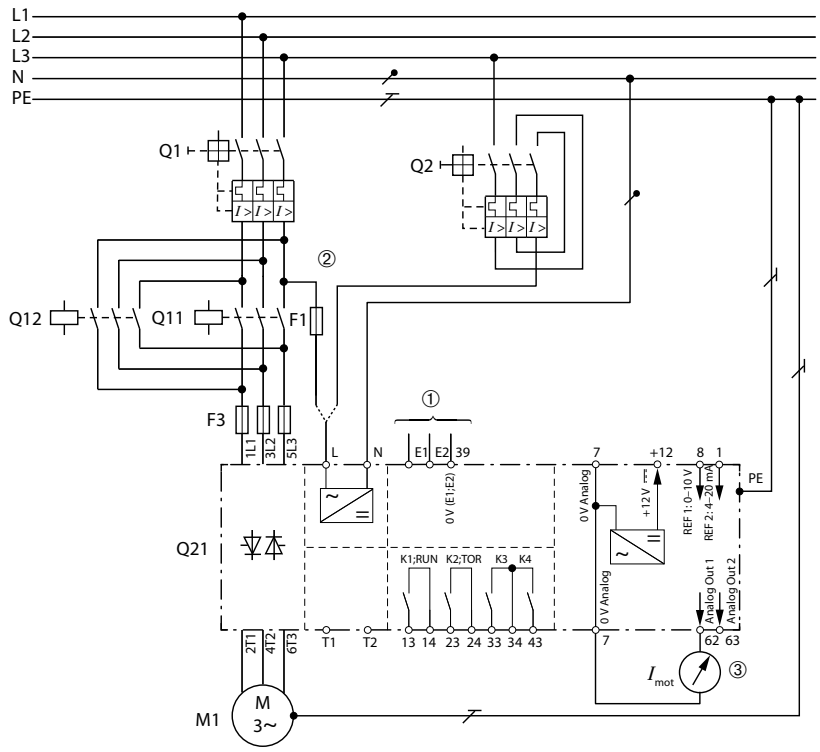


Schematic Legend

S1: Off (unguided deceleration)
S2: On
①: Enable
②: Soft Start / Soft Stop
: Emergency Stop

With Reversing Circuit

Schematic



Schematic Legend

E1: Start / Stop
E2: Enable
①: See actuation
②: Control voltage through Q1 and F11 or through Q2
③: Motor current indication

Assigned Switching and Protective Elements – DM4

Softstarter ❶	Motor Rating @ 460 V	Rated Operational Current ❷			Softstarter Function			Bypass Contactor (optional) ❼
		Device	Motor	Rating ❸				
	P [HP]	I [A]	I_e [A]	I [A]	Line Protection ❹	Mains Contactor (optional) ❹	Overload Relay ❺❻	
Soft Starter for Three-Phase Power Supply, Short Start-up Time, Tripping Class 10 (15 s, 3.5 x I_e)								
In-line Connection (Before the Load, Standard)								
DM4-340-7K5	10	16	15.2	16	PKZM0-16 (+ CL-PKZ0)	DILM17	ZB32-16 (+ZB32-XEZ)	DILM7
DM4-340-11K	15	22	21.7	23	PKZM0-25 (+ CL-PKZ0)	DILM25	ZB32-24 (+ZB32-XEZ)	DILM7
DM4-340-15K	20	30	29.3	30	PKZM0-32 (+ CL-PKZ0)	DILM32	ZB32-32 (+ZB32-XEZ)	DILM17
DM4-340-22K	30	44	41	44	PKZM4-50 (+ CL-PKZ0)	DILM50	ZB65-57 (+ZB65-XEZ)	DILM25
DM4-340-30K	40	59	55	59	PKZM4-63 (+ CL-PKZ0)	DILM65	ZB65-65 (+ZB65-XEZ)	DILM40
DM4-340-37K	50	72	68	72	NZMN1-S80	DILM80	ZB150-100/KK	DILM65
DM4-340-45K	60	85	81	85	NZMN1-S100	DILM95	ZB150-100/KK	DILM65
DM4-340-55K	75	105	99	105	NZMN2-S125	DILM115	ZB150-125/KK	DILM95
DM4-340-75K	100	146	134	146	NZMN2-S160	DILM150	ZB150-150/KK	DILM150
DM4-340-90K	125	174	161	174	NZMN2-S200	DILM185	Z5-220/FF6	DILM150
DM4-340-110K	150	202	196	202	NZMN2-ME220	DILM225	Z5-220/FF6	DILM185
DM4-340-132K	200	242	231	242	NZMN3-ME350 ❽	DILM250	ZW7-290	DILM185
DM4-340-160K	250	300	279	300	NZMN3-ME350 ❽	DILM300	ZW7-400	DILM185
DM4-340-200K	300	370	349	370	NZMN3-ME350/...-ME450 ❽	DILM400	ZW7-400	DILM225
DM4-340-250K	400	500	437	500	NZMN3-ME450/...-ME550 ❽	DILM500	ZW7-540	DILM400
DM4-340-315K	500	600	544	600	NZMN3-ME550/...-ME875 ❽	DILM580/750 ❾	ZW7-630	DILM400
DM4-340-400K	600	750	683	750	NZMN3-ME875	DILM750	ZEV (+ZEV-XSW-820)	DILM500
DM4-340-500K	750	900	860	900	NZMN3-ME875/...-ME1400 ❾	DILM1000	–	DILM580

❶ At a different operating cycle, the r.m.s. current changes so that a higher-rated device may have to be used. The switching and protective elements are always dimensioned for the following operating cycles (no bypass for any operating cycle):

- Devices DM4-340-7K5 to DM4-340-90K each 10 switching operations per hour, continuous operation
- Devices DM4-340-110K and DM4-340-132K: each 10 switching operations per hour with at least 3 minutes no-load pause before each start
- Devices from DM4-340-160K each 3 operations per hour with at least 8 minutes no-load pause before each start.

For all other switching cycles or when a bypass is used, the effective rating changes and a different device is therefore required. The device's rated operational current must be greater than the motor current (in-line operation) or motor current √3 (delta operation) indicated on the motor's nameplate.

❷ Rated operational current relative to the specified load cycle.

❸ Indicates the current for which the supply cable must be dimensioned at the specified switching duty and motor current. At higher motor currents and different switching duty (operating frequency, overcurrent, overcurrent time, DF), the current value changes and must then be adapted accordingly.

❹ For motors with the same rating but a higher current than specified, a higher-rated switch/contactor may have to be used. The decisive factor is the motor current.

❺ If the softstarter remains continually live, it can also act as overload relay. In delta connection, set the overload relay to the value motor current/ √3.

❻ In delta connection, the overload relay is connected in series with the motor winding (set to value motor current/ √3.)

❼ The bypass is laid out to AC1. If it must be opened in an Emergency-Stop, it must be laid out to AC3. The contactors of the mains contactor column must then be used.

❽ Setting of overload trip block to $t_r = \infty$.

❾ If the device's rated current is fully utilized, use the larger switch or contactor.

Circuit Breaker Controller Supply	Semiconductor Protection (*optional; fuses required for Type 2 coordination are in addition to the protective elements required for Type 1 coordination*)		DC Braking Unit					
	Fuses	Fuse Switch	Hilger & Kern Frenomat/Frenostat					
	Number x Type	Number x Type	Recommended @ 400V Mains Voltage	Output Contactor ❶	Line Protection	Line Reactor ❷	Braking Contactor	Fuse for Standstill Monitoring ❸
In-line Connection (Before the Load, Standard)								
PKZM0-0,16	3 x 20.282.20-40	3 x 21.189.01	Frenostat-6000.0316	DILM7	PKZM0-25 (+ CL-PKZ0)	External	DILM17	FAZ-B4HI
PKZM0-0,16	3 x 20.282.20-80	3 x 21.189.01	Frenostat-6000.0316	DILM7	PKZM0-40 (+ CL-PKZ0)	External	DILM25	FAZ-B4HI
PKZM0-0,16	3 x 20.282.20-80	3 x 21.189.01	Frenostat-6000.0247	DILM17	PKZM0-50 (+ CL-PKZ0)	Built-in	DILM32	FAZ-B4HI
PKZM0-0,16	3 x 20.282.20-125	3 x 21.189.01	Frenostat-6000.0248	DILM25	PKZM0-63 (+ CL-PKZ0)	Built-in	DILM50	FAZ-B4HI
PKZM0-0,16	3 x 20.282.20-125	3 x 21.189.01	Frenostat-6000.0249	DILM40	NZMN1-M80	Built-in	DILM65	FAZ-B4HI
PKZM0-0,16	3 x 20.189.20-200	3 x 21.189.01	Frenostat-6000.0173	DILM65	NZMN1-M100	External	DILM80	FAZ-B4HI
PKZM0-0,16	3 x 20.189.20-200	3 x 21.189.01	Frenostat-6000.0173	DILM65	NZMN2-M125	External	DILM95	FAZ-B4HI
PKZM0-0,16	3 x 20.610.32-350	3 x 21.313.02	Frenostat-6000.0177	DILM95	NZMN2-M160	External	DILM150	FAZ-B4HI
PKZM0-0,16	3 x 20.610.32-350	3 x 21.313.02	Frenostat-6000.0181	DILM150	NZMN2-M200	External	DILM150	FAZ-B4HI
PKZM0-0,16	3 x 20.610.32-450	3 x 21.313.02	Frenostat-6000.0169	DILM150	NZMN3-ME220	External	DILM185	FAZ-B4HI
PKZM0-0,16	3 x 20.610.32-450	3 x 21.313.02	Frenostat-6000.0169	DILM185	NZMN3-ME350	External	DILM225	FAZ-B4HI
PKZM0-0,16	3 x 20.610.32-500	3 x 21.313.02	Frenostat-6000.0307	DILM185	NZMN3-ME350	External	DILM250	FAZ-B4HI
PKZM0-0,16	3 x 20.610.32-500	3 x 21.313.02	Frenostat-6000.0307	DILM185	NZMN4-ME450	External	DILM300	FAZ-B4HI
PKZM0-0,16	3 x 20.610.32-630	3 x 21.313.02	Frenostat-6000.0308	DILM225	NZMN4-ME550	External	DILM400	FAZ-B4HI
PKZM0-1,6	3 x 20.630.32-900	3 x 21.313.02	Frenostat-6000.0308	DILM400	NZMN4-ME875	External	DILM500	FAZ-B4HI
PKZM0-1,6	3 x 20.630.32-900	3 x 21.313.02	Frenostat-6000.0171	DILM400	NZMN4-ME875	External	DILM580/750	FAZ-B4HI
PKZM0-1,6	3 x 20.630.32-1250	3 x 21.313.02	Frenostat-6000.0171	DILM500	NZMN4-ME1400	External	DILM750	FAZ-B4HI
PKZM0-1,6	3 x 20.630.32-1250	3 x 21.313.02	–	–	–	–	–	–

❶ If a DC braking unit is used, the softstarter's output must be isolated with this contactor before braking. In delta connection, both the input and the output must be isolated. In this case, two contactors are required.

❷ On external surface mounting included as standard.

❸ If a measuring line with a cross-section F 1.5 mm^2 is used, the fuse can be omitted.

Assigned Switching and Protective Elements – DM4

Softstarter ❶	Motor Rating @ 460 V P [HP]	Rated Operational Current ❷ Device I [A]	Motor I_e [A]	Rating ❸ I [A]	Softstarter Function Line Protection ❹	Mains Contactor (optional) ❹	Overload Relay ❺❻	Bypass Contactor (optional) ❼
Soft Starter for Three-Phase Power Supply, Short Start-up Time, Tripping Class 10 (15 s, 3.5 x I_e)								
Delta Connection (In Series with Each Motor Winding)								
DM4-340-7K5	20	16	21.7	21.7	PKZM0-25 (+ CL-PKZ0)	DILM25	ZB32-16 (+EZ00)	DILM7
DM4-340-11K	25	22	29.3	29.3	PKZM0-32 (+ CL-PKZ0)	DILM32	ZB32-24 (+EZ00)	DILM7
DM4-340-15K	30	30	41	41	PKZM0-50 (+ CL-PKZ0)	DILM50	ZB32-32 (+EZ1)	DILM17
DM4-340-22K	40	44	55	55	PKZM0-58 (+ CL-PKZ0)	DILM65	ZB65-57 (+EZ1)	DILM25
	50	44	68	68	NZMN1-S80	DILM80	ZB65-57 (+EZ1)	DILM25
DM4-340-30K	60	59	81	81	NZMN1-S100	DILM95	ZB65-65 (+EZ1)	DILM40
	75	59	99	99	NZMN1-S100	DILM115	ZB65-65 (+EZ1)	DILM40
DM4-340-45K	100	85	134	134	NZMN2-S160	DILM150	ZB150-100/KK	DILM65
DM4-340-55K	150	105	161	161	NZMN2-S200 ❽	DILM185	ZB150-125/KK	DILM95
DM4-340-75K	150	146	196	196	NZMN2-ME220 ❽	DILM225	ZB150-150/KK	DILM150
	200	146	231	231	NZMN3-ME350 ❽	DILM250	ZB150-150/KK	DILM150
DM4-340-90K	250	174	279	279	NZMN3-ME350 ❽	DILM300	Z5-220/FF6	DILM150
DM4-340-132K	350	242	349	349	NZMN3-ME350 ❽	DILM400	ZW7-290	DILM185
DM4-340-160K	400	300	437	437	NZMN3-ME450 ❽	DILM500	ZW7-400	DILM185
DM4-340-200K	500	370	544	544	NZMN3-ME550 ❽	DILM580	ZW7-400	DILM225
DM4-340-250K	600	500	683	683	NZMN4-ME875 ❽	DILM750	ZW7-540	DILM400
DM4-340-315K	750	600	860	860	NZMN4-ME875 ❽	DILM1000	ZW7-630	DILM400
	850	600	960	960	NZMN4-ME1400 ❽	DILM1000	ZW7-630	DILM400
DM4-340-400K	1100	750	1280	1280	NZMN4-ME1400 (+NZM4-XR…) ❽		ZEV (+ZEV-XSW-820)	DILM500
DM4-340-500K	1300	900	1540	1540	IZMB2-U2000 ❾		–	DILM580

❶ At a different operating cycle, the r.m.s. current changes so that a higher-rated device may have to be used. The switching and protective elements are always dimensioned for the following operating cycles (no bypass for any operating cycle):

- Devices DM4-340-7K5 to DM4-340-90K each 10 switching operations per hour, continuous operation
- Devices DM4-340-110K and DM4-340-132K: each 10 switching operations per hour with at least 3 minutes no-load pause before each start
- Devices from DM4-340-160K each 3 operations per hour with at least 8 minutes no-load pause before each start.

For all other switching cycles or when a bypass is used, the effective rating changes and a different device is therefore required. The device's rated operational current must be greater than the motor current (in-line operation) or motor current √3 (delta operation) indicated on the motor's nameplate.

❷ Rated operational current relative to the specified load cycle.

❸ Indicates the current for which the supply cable must be dimensioned at the specified switching duty and motor current. At higher motor currents and different switching duty (operating frequency, overcurrent, overcurrent time, DF), the current value changes and must then be adapted accordingly.

❹ For motors with the same rating but a higher current than specified, a higher-rated switch/contactor may have to be used. The decisive factor is the motor current.

❺ If the soft starter remains continually live, it can also act as overload relay. In delta connection, set the overload relay to the value motor current/ √3.

❻ In delta connection, the overload relay is connected in series with the motor winding (set to value motor current/ √3.)

❼ The bypass is laid out to AC1. If it must be opened in an Emergency-Stop, it must be laid out to AC3. The contactors of the mains contactor column must then be used.

❽ Setting of overload trip block to $t_r = \infty$.

❾ To use IZM as "contactor", accessories are required see IZM catalog. In that case, the recommended circuits may not apply since different contacts may have to be assigned depending on the selected accessories.

Circuit Breaker Controller Supply	Semiconductor Protection (*optional; fuses required for Type 2 coordination are in addition to the protective elements required for Type 1 coordination*)		DC Braking Unit					
	Fuses	Fuse Switch	Hilger & Kern Frenomat/Frenostat					
	Number x Type	Number x Type	Recommended @ 400V Mains Voltage	Output Contactor ❶	Line Protection	Line Reactor ❷	Braking Contactor	Fuse for Standstill Monitoring ❸
Delta Connection (In Series with Each Motor Winding)								
PKZM0-0,16	3 x 20.282.20-40	3 x 21.189.01	Frenostat-6000.0316	DILM7	PKZM4-40 (+ CL-PKZ0)	External	DILM17	FAZ-B4HI
PKZM0-0,16	3 x 20.282.20-80	3 x 21.189.01	Frenostat-6000.0316	DILM7	PKZM4-50 (+ CL-PKZ0)	Built-in	DILM25	FAZ-B4HI
PKZM0-0,16	3 x 20.282.20-80	3 x 21.189.01	Frenostat-6000.0248	DILM17	PKZM4-63 (+ CL-PKZ0)	Built-in	DILM50	FAZ-B4HI
PKZM0-0,16	3 x 20.282.20-125	3 x 21.189.01	Frenostat-6000.0249	DILM25	NZMN1-M80	Built-in	DILM65	FAZ-B4HI
PKZM0-0,16	3 x 20.282.20-125	3 x 21.189.01	Frenostat-6000.0173	DILM25	NZMN1-M100	External	DILM80	FAZ-B4HI
PKZM0-0,16	3 x 20.282.20-125	3 x 21.189.01	Frenostat-6000.0173	DILM40	NZMN2-M125	External	DILM95	FAZ-B4HI
PKZM0-0,16	3 x 20.282.20-125	3 x 21.189.01	Frenostat-6000.0177	DILM40	NZMN2-M160	External	DILM150	FAZ-B4HI
PKZM0-0,16	3 x 20.189.20-200	3 x 21.189.01	Frenostat-6000.0181	DILM65	NZMN2-M200	External	DILM150	FAZ-B4HI
PKZM0-0,16	3 x 20.610.32-350	3 x 21.313.02	Frenostat-6000.0169	DILM95	NZMN3-ME220	External	DILM185	FAZ-B4HI
PKZM0-0,16	3 x 20.610.32-350	3 x 21.313.02	Frenostat-6000.0169	DILM150	NZMN3-ME350	External	DILM225	FAZ-B4HI
PKZM0-0,16	3 x 20.610.32-350	3 x 21.313.02	Frenostat-6000.0307	DILM150	NZMN3-ME350	External	DILM250	FAZ-B4HI
PKZM0-0,16	3 x 20.610.32-450	3 x 21.313.02	Frenostat-6000.0307	DILM150	NZMN4-ME450	External	DILM300	FAZ-B4HI
PKZM0-0,16	3 x 20.610.32-500	3 x 21.313.02	Frenostat-6000.0308	DILM185	NZMN4-ME550	External	DILM400	FAZ-B4HI
PKZM0-0,16	3 x 20.610.32-500	3 x 21.313.02	Frenostat-6000.0308	DILM185	NZMN4-ME875	External	DILM500	FAZ-B4HI
PKZM0-0,16	3 x 20.610.32-630	3 x 21.313.02	Frenostat-6000.0171	DILM225	NZMN4-ME875	External	DILM580	FAZ-B4HI
PKZM0-1,6	3 x 20.630.32-900	3 x 21.313.02	Frenostat-6000.0171	DILM400	NZMN4-ME1400	External	DILM750	FAZ-B4HI
PKZM0-1,6	3 x 20.630.32-900	3 x 21.313.02	–	–	–	–	–	–
PKZM0-1,6	3 x 20.630.32-900	3 x 21.313.02	–	–	–	–	–	–
PKZM0-1,6	3 x 20.630.32-1250	3 x 21.313.02	–	–	–	–	–	–
PKZM0-1,6	3 x 20.630.32-1250	3 x 21.313.02	–	–	–	–	–	–

❶ If a DC braking unit is used, the soft starter's output must be isolated with this contactor before braking. In delta connection, both the input and the output must be isolated. In this case, two contactors are required.

❷ On external surface mounting included as standard.

❸ If a measuring line with a cross-section F 1.5 mm^2 is used, the fuse can be omitted.

Assigned Switching and Protective Elements – DM4

Softstarter ❶	Motor Rating @ 460 V	Rated Operational Current ❷			Softstarter Function			Bypass Contactor (optional) ❼
		Device	Motor	Rating ❸				
	P [HP]	I [A]	I_e [A]	I [A]	Line Protection ❹	Mains Contactor (optional) ❹	Overload Relay ❺❻	
Soft Starter for Three-Phase Power Supply, Long Start-up Time, Tripping Class 20 (40 s, 3.5 x I_e)								
In-line Connection (Before the Load, Standard)								
DM4-340-11K	10	22	15.2	21	PKZM0-25 (+ CL-PKZ0)	DILM17	ZB32-16 (+ZB32-XEZ)	DILM7
DM4-340-15K	15	30	21.7	31	PKZM0-32 (+ CL-PKZ0)	DILM25	ZB32-24 (+ZB32-XEZ)	DILM17
DM4-340-22K	20	44	29.3	41	PKZM4-58 (+ CL-PKZ0)	DILM32	ZB32-32 (+ZB32-XEZ)	DILM25
DM4-340-30K	30	59	41	58	PKZM4-58 (+ CL-PKZ0)	DILM50	ZB65-57 (+ZB65-XEZ)	DILM40
DM4-340-37K	40	72	55	78	NZMN1-ME90 ❽	DILM65	ZB65-65 (+ZB65-XEZ)	DILM65
DM4-340-45K	50	85	68	96	NZMN1-ME90 ❽	DILM80	ZEV (+ ZEV-XSW-145)	DILM65
DM4-340-55K	60	105	81	114	NZMN1-ME90 ❽	DILM95	ZEV (+ ZEV-XSW-145)	DILM95
DM4-340-75K	75	146	99	140	NZMN2-ME140 ❽	DILM115	ZEV (+ ZEV-XSW-145)	DILM115
DM4-340-90K	100	174	134	189	NZMN2-ME140 ❽	DILM150	ZEV (+ ZEV-XSW-145)	DILM150
DM4-340-110K	120	202	161	227	NZMN2-ME220 ❽	DILM185	ZEV (+ ZEV-XSW-820)	DILM185
DM4-340-132K	150	242	196	276	NZMN2-ME220 ❽	DILM225	ZEV (+ ZEV-XSW-820)	DILM185
DM4-340-160K	200	300	231	326	NZMN3-ME350 ❽	DILM250	ZEV (+ ZEV-XSW-820)	DILM185
DM4-340-200K	250	370	279	393	NZMN3-ME350 ❽	DILM300	ZEV (+ ZEV-XSW-820)	DILM225
DM4-340-250K	300	500	349	492	NZMN3-ME350 ❽	DILM400	ZEV (+ ZEV-XSW-820)	DILM400
DM4-340-315K	350	600	437	616	NZMN3-ME450 ❽	DILM500	ZEV (+ ZEV-XSW-820)	DILM400
DM4-340-400K	450	750	544	767	NZMN3-ME550 ❽	DILM580	ZEV (+ ZEV-XSW-820)	DILM500
DM4-340-500K	500	900	683	963	NZMN3-ME875 ❽	DILM750	ZEV (+ ZEV-XSW-820)	DILM580

❶ At a different operating cycle, the r.m.s. current changes so that a higher-rated device may have to be used. The switching and protective elements are always dimensioned for the following operating cycles (no bypass for any operating cycle):

- Devices DM4-340-7K5 to DM4-340-90K each 10 switching operations per hour, continuous operation
- Devices DM4-340-110K and DM4-340-132K: each 10 switching operations per hour with at least 3 minutes no-load pause before each start
- Devices from DM4-340-160K each 3 operations per hour with at least 8 minutes no-load pause before each start.

For all other switching cycles or when a bypass is used, the effective rating changes and a different device is therefore required. The device's rated operational current must be greater than the motor current (in-line operation) or motor current √3 (delta operation) indicated on the motor's nameplate.

❷ Rated operational current relative to the specified load cycle.

❸ Indicates the current for which the supply cable must be dimensioned at the specified switching duty and motor current. At higher motor currents and different switching duty (operating frequency, overcurrent, overcurrent time, DF), the current value changes and must then be adapted accordingly.

❹ For motors with the same rating but a higher current than specified, a higher-rated switch/contactor may have to be used. The decisive factor is the motor current.

❺ If the softstarter remains continualy live, it can also act as overload relay. In delta connection, set the overload relay to the value motor current/ √3.

❻ In delta connection, the overload relay is connected in series with the motor winding (set to value motor current/ √3.)

❼ The bypass is laid out to AC1. If it must be opened in an Emergency-Stop, it must be laid out to AC3. The contactors of the mains contactor column must then be used.

❽ ZMM trip block set to $t_r = \infty$ (OBI).

Circuit Breaker Controller Supply	Semiconductor Protection (*optional; fuses required for Type 2 coordination are in addition to the protective elements required for Type 1 coordination*)		DC Braking Unit					
	Fuses	Fuse Switch	Hilger & Kern Frenomat/Frenostat					
	Number x Type	Number x Type	Recommended @ 400V Mains Voltage	Output Contactor ❶	Line Protection	Line Reactor ❷	Braking Contactor	Fuse for Standstill Monitoring ❸
In-line Connection (Before the Load, Standard)								
PKZM0-0,16	3 x 20.282.20-80	3 x 21.189.01	Frenostat-6000.0316	DILM7	PKZM0-25 (+ CL-PKZ0)	Built-in	DILM17	FAZ-B4/1-HI
PKZM0-0,16	3 x 20.282.20-80	3 x 21.189.01	Frenostat-6000.0316	DILM17	PKZM0-40 (+ CL-PKZ0)	Built-in	DILM25	FAZ-B4/1-HI
PKZM0-0,16	3 x 20.282.20-125	3 x 21.189.01	Frenostat-6000.0247	DILM17	PKZM0-50 (+ CL-PKZ0)	Built-in	DILM32	FAZ-B4/1-HI
PKZM0-0,16	3 x 20.282.20-125	3 x 21.189.01	Frenostat-6000.0248	DILM40	PKZM0-63 (+ CL-PKZ0)	Built-in	DILM50	FAZ-B4/1-HI
PKZM0-0,16	3 x 20.189.20-200	3 x 21.189.01	Frenostat-6000.0249	DILM65	NZMN1-M80	Built-in	DILM65	FAZ-B4/1-HI
PKZM0-0,16	3 x 20.189.20-200	3 x 21.189.01	Frenostat-6000.0173	DILM80	NZMN1-M100	External	DILM80	FAZ-B4/1-HI
PKZM0-0,16	3 x 20.610.32-350	3 x 21.313.02	Frenostat-6000.0173	DILM80	NZMN2-M125	External	DILM95	FAZ-B4/1-HI
PKZM0-0,16	3 x 20.610.32-350	3 x 21.313.02	Frenostat-6000.0177	DILM80	NZMN2-M160	External	DILM115	FAZ-B4/1-HI
PKZM0-0,16	3 x 20.610.32-450	3 x 21.313.02	Frenostat-6000.0181	DILM115	NZMN2-M200	External	DILM150	FAZ-B4/1-HI
PKZM0-0,16	3 x 20.610.32-450	3 x 21.313.02	Frenostat-6000.0169	DILM185	NZMN3-ME220	External	DILM185	FAZ-B4/1-HI
PKZM0-0,16	3 x 20.610.32-500	3 x 21.313.02	Frenostat-6000.0169	DILM185	NZMN3-ME350	External	DILM225	FAZ-B4/1-HI
PKZM0-0,16	3 x 20.610.32-500	3 x 21.313.02	Frenostat-6000.0307	DILM185	NZMN3-ME350	External	DILM250	FAZ-B4/1-HI
PKZM0-0,16	3 x 20.610.32-630	3 x 21.313.02	Frenostat-6000.0307	DILM225	NZMN4-ME450	External	DILM300	FAZ-B4/1-HI
PKZM0-1,6	3 x 20.630.32-900	3 x 21.313.02	Frenostat-6000.0308	DILM400	NZMN4-ME550	External	DILM400	FAZ-B4/1-HI
PKZM0-1,6	3 x 20.630.32-900	3 x 21.313.02	Frenostat-6000.0308	DILM400	NZMN4-ME875	External	DILM500	FAZ-B4/1-HI
PKZM0-1,6	3 x 20.630.32-1250	3 x 21.313.02	Frenostat-6000.0171	DILM500	NZMN4-ME875	External	DILM580	FAZ-B4/1-HI
PKZM0-1,6	3 x 20.630.32-1250	3 x 21.313.02	Frenostat-6000.0171	DILM580	NZMN4-ME1400	External	DILM750	FAZ-B4/1-HI

❶ If a DC braking unit is used, the soft starter's output must be isolated with this contactor before braking. In delta connection, both the input and the output must be isolated. In this case, two contactors are required.

❷ On external surface mounting included as standard.

❸ If a measuring line with a cross-section F 1.5 mm^2 is used, the fuse can be omitted.

Assigned Switching and Protective Elements – DM4

Softstarter ❶	Motor Rating @ 460 V	Rated Operational Current ❷			Softstarter Function			Bypass Contactor *(optional)* ❼
		Device	Motor	Rating ❸				
	P [HP]	I [A]	I_e [A]	I [A]	Line Protection ❹	Mains Contactor *(optional)* ❹	Overload Relay ❺❻	
Soft Starter for Three-Phase Power Supply, Long Start-up Time, Tripping Class 20 (40 s, 3.5 x I_e)								
Delta Connection (In Series with Each Motor Winding)								
DM4-340-7K5	15	16	21.7	31	PKZM0-32 (+ CL-PKZ0)	DILM25	ZEV (+ ZEV-XSW-25)	DILM7
DM4-340-15K	20	30	29.3	41	PKZM4-58 (+ CL-PKZ0)	DILM32	ZEV (+ ZEV-XSW-65)	DILM17
DM4-340-22K	30	44	41	58	PKZM4-58 (+ CL-PKZ0)	DILM50	ZEV (+ ZEV-XSW-65)	DILM25
DM4-340-30K	40	59	55	78	NZMN1-ME90 ❽	DILM65	ZEV (+ ZEV-XSW-65)	DILM40
	50	59	68	96	NZMN1-ME90 ❽	DILM80	ZEV (+ ZEV-XSW-145)	DILM40
DM4-340-37K	60	72	81	114	NZMN1-ME90 ❽	DILM95	ZEV (+ ZEV-XSW-145)	DILM65
DM4-340-45K	75	85	99	140	NZMN2-ME140 ❽	DILM115	ZEV (+ ZEV-XSW-145)	DILM65
DM4-340-55K	100	105	134	189	NZMN2-ME140 ❽	DILM150	ZEV (+ ZEV-XSW-145)	DILM95
DM4-340-75K	120	146	161	227	NZMN2-ME220 ❽	DILM185	ZEV (+ ZEV-XSW-820)	DILM150
DM4-340-90K	150	174	196	276	NZMN2-ME220 ❽	DILM225	ZEV (+ ZEV-XSW-820)	DILM150
	175	174	231	326	NZMN3-ME350 ❽	DILM250	ZEV (+ ZEV-XSW-820)	DILM150
DM4-340-110K	200	202	279	393	NZMN3-ME350 ❽	DILM300	ZEV (+ ZEV-XSW-820)	DILM185
DM4-340-160K	250	300	349	492	NZMN3-ME350 ❽	DILM400	ZEV (+ ZEV-XSW-820)	DILM185
DM4-340-200K	300	370	437	616	NZMN3-ME450 ❽	DILM500	ZEV (+ ZEV-XSW-820)	DILM225
DM4-340-250K	400	500	544	767	NZMN3-ME550 ❽	DILM580	ZEV (+ ZEV-XSW-820)	DILM400
DM4-340-315K	500	600	683	963	NZMN3-ME875 ❽	DILM750	ZEV (+ ZEV-XSW-820)	DILM400
DM4-340-400K	650	750	860	1213	NZMN3-ME875 ❽	DILM1000	ZEV (+ ZEV-XSW-820)	DILM500
DM4-340-500K	750	900	960	1354	NZMN4-ME1400 ❽	DILM1000	ZEV (+ ZEV-XSW-820)	DILM580

❶ At a different operating cycle, the r.m.s. current changes so that a higher-rated device may have to be used. The switching and protective elements are always dimensioned for the following operating cycles (no bypass for any operating cycle):

- Devices DM4-340-7K5 to DM4-340-90K each 10 switching operations per hour, continuous operation
- Devices DM4-340-110K and DM4-340-132K: each 10 switching operations per hour with at least 3 minutes no-load pause before each start
- Devices from DM4-340-160K each 3 operations per hour with at least 8 minutes no-load pause before each start.

For all other switching cycles or when a bypass is used, the effective rating changes and a different device is therefore required. The device's rated operational current must be greater than the motor current (in-line operation) or motor current √3 (delta operation) indicated on the motor's nameplate.

❷ Rated operational current relative to the specified load cycle.

❸ Indicates the current for which the supply cable must be dimensioned at the specified switching duty and motor current. At higher motor currents and different switching duty (operating frequency, overcurrent, overcurrent time, DF), the current value changes and must then be adapted accordingly.

❹ For motors with the same rating but a higher current than specified, a higher-rated switch/contactor may have to be used. The decisive factor is the motor current.

❺ If the softstarter remains continualy live, it can also act as overload relay. In delta connection, set the overload relay to the value motor current/ √3.

❻ In delta connection, the overload relay is connected in series with the motor winding (set to value motor current/ √3.)

❼ The bypass is laid out to AC1. If it must be opened in an Emergency-Stop, it must be laid out to AC3. The contactors of the mains contactor column must then be used.

❽ ZMM trip block set to $t_r = \infty$ (OBI).

Circuit Breaker Controller Supply	Semiconductor Protection (*optional; fuses required for Type 2 coordination are in addition to the protective elements required for Type 1 coordination*)		DC Braking Unit					
	Fuses	Fuse Switch	Hilger & Kern Frenomat/Frenostat					
	Number x Type	Number x Type	Recommended @ 400V Mains Voltage	Output Contactor ❶	Line Protection	Line Reactor ❷	Braking Contactor	Fuse for Standstill Monitoring ❸
Delta Connection (In Series with Each Motor Winding)								
PKZM0-0,16	3 x 20.282.20-40	3 x 21.189.01	Frenostat-6000.0316	DILM17	PKZM4-40 (+ CL-PKZ0)	Built-in	DILM25	FAZ-B4/1-HI
PKZM0-0,16	3 x 20.282.20-80	3 x 21.189.01	Frenostat-6000.0247	DILM17	PKZM4-50 (+ CL-PKZ0)	Built-in	DILM32	FAZ-B4/1-HI
PKZM0-0,16	3 x 20.282.20-125	3 x 21.189.01	Frenostat-6000.0248	DILM40	PKZM4-63 (+ CL-PKZ0)	Built-in	DILM50	FAZ-B4/1-HI
PKZM0-0,16	3 x 20.282.20-125	3 x 21.189.01	Frenostat-6000.0249	DILM65	NZMN1-M80	Built-in	DILM65	FAZ-B4/1-HI
PKZM0-0,16	3 x 20.282.20-125	3 x 21.189.01	Frenostat-6000.0173	DILM80	NZMN1-M100	External	DILM80	FAZ-B4/1-HI
PKZM0-0,16	3 x 20.189.20-200	3 x 21.189.01	Frenostat-6000.0173	DILM95	NZMN2-M125	External	DILM95	FAZ-B4/1-HI
PKZM0-0,16	3 x 20.189.20-200	3 x 21.189.01	Frenostat-6000.0177	DILM115	NZMN2-M160	External	DILM115	FAZ-B4/1-HI
PKZM0-0,16	3 x 20.610.32-350	3 x 21.313.02	Frenostat-6000.0181	DILM150	NZMN2-M200	External	DILM150	FAZ-B4/1-HI
PKZM0-0,16	3 x 20.610.32-350	3 x 21.313.02	Frenostat-6000.0169	DILM185	NZMN3-ME220	External	DILM185	FAZ-B4/1-HI
PKZM0-0,16	3 x 20.610.32-450	3 x 21.313.02	Frenostat-6000.0169	DILM185	NZMN3-ME350	External	DILM225	FAZ-B4/1-HI
PKZM0-0,16	3 x 20.610.32-450	3 x 21.313.02	Frenostat-6000.0307	DILM185	NZMN3-ME350	External	DILM250	FAZ-B4/1-HI
PKZM0-0,16	3 x 20.610.32-450	3 x 21.313.02	Frenostat-6000.0307	DILM225	NZMN4-ME450	External	DILM300	FAZ-B4/1-HI
PKZM0-0,16	3 x 20.610.32-500	3 x 21.313.02	Frenostat-6000.0308	DILM400	NZMN4-ME550	External	DILM400	FAZ-B4/1-HI
PKZM0-0,16	3 x 20.610.32-630	3 x 21.313.02	Frenostat-6000.0308	DILM400	NZMN4-ME875	External	DILM500	FAZ-B4/1-HI
PKZM0-1,6	3 x 20.630.32-900	3 x 21.313.02	Frenostat-6000.0171	DILM500	NZMN4-ME875	External	DILM580	FAZ-B4/1-HI
PKZM0-1,6	3 x 20.630.32-900	3 x 21.313.02	Frenostat-6000.0171	DILM500	NZMN4-ME1400	External	DILM750	FAZ-B4/1-HI
PKZM0-1,6	3 x 20.630.32-1250	3 x 21.313.02	–	–	–	–	–	–
PKZM0-1,6	3 x 20.630.32-1250	3 x 21.313.02	–	–	–	–	–	–

❶ If a DC braking unit is used, the soft starter's output must be isolated with this contactor before braking. In delta connection, both the input and the output must be isolated. In this case, two contactors are required.

❷ On external surface mounting included as standard.

❸ If a measuring line with a cross-section F 1.5 mm^2 is used, the fuse can be omitted.

Softstarter Series DM4				DM4-340-7K5	DM4-340-11K	DM4-340-15K	DM4-340-22K
General							
Standards				IEC/EN 60947-4-2			
Approvals				UL, cUL			
Climatic proofing				Damp heat, constant according to IEC 60068-2-78; Damp heat, cyclical, according to IEC 60068-2-30			
Ambient temperature			[°C / °F]	0 . . . 40 °C / *32 . . . 104 °F* (up to 60 °C / *140 °F* with a current reduction of 2% per °C)			
Ambient temperature, storage			[°C / °F]	-25 . . . 55 °C / *-13 . . . 131 °F*			
Altitude			[m]	0 – 1000 (up to 2000 m with a current reduction of 1% per 100 m)			
Mounting position				vertical	vertical	vertical	vertical
Protection type				IP20	IP20	IP20	IP20
Protection against direct contact				Finger and back-of-hand proof			
Pollution degree				2	2	2	2
Heat dissipation with rated operational current Ie			[W]	50	63	91	120
Dimensions (W x H x D)			[mm]	222 x 290 x 195	222 x 290 x 195	222 x 290 x 195	222 x 290 x 195
Weight			[kg]	6.7	6.7	6.7	6.7
Main Conducting Paths							
Rated operating voltage		U_e	[V AC]	230 – 460	230 – 460	230 – 460	230 – 460
Rated insulation voltage		U_i		460	460	460	460
Supply frequency			[Hz]	50/60	50/60	50/60	50/60
Control section power supply			[V AC]	110/230	110/230	110/230	110/230
Rated operational current							
AC-53a	400V	I_e	[A]	16	23	30	44
Assigned motor rating (standard connection)							
	230V		[kW]	4	5.5	7.5	11
	400V		[kW]	7.5	11	15	22
	460V		[HP]	10	15	20	30
Phase current							
In-delta connection			[A]	27	39	51	76
Assigned motor rating (delta connection)							
	230V		[kW]	7.5	11	15	22
	400V		[kW]	11	15	22	37
	460V		[HP]	20	25	30	50
Overload cycle to IEC/EN 60947-4-2							
AC-53a (without bypass)				16A:AC-53a:3-35:99-10	23A:AC-53a:3-35:99-10	30A:AC-53a:3-35:99-10	44A:AC-53a:3-35:99-10
AC-53b (with bypass)				16A:AC-53b:3-35:120	23A:AC-53b:3-35:120	30A:AC-53b:3-35:120	44A:AC-53b:3-35:120
Short-circuit rating							
Type "1" coordination				PKZM0-16	PKZM0-25	PKZ2/ZM-32	NZM7-63N
Type "2" coordination (in addition to coordination type "1")				20.282.20-40	20.282.20-80	20.282.20-80	20.282.20-125

DM4-340-30K	DM4-340-37K	DM4-340-45K	DM4-340-55K	DM4-340-75K	DM4-340-90K
IEC/EN 60947-4-2					
UL, cUL					
Damp heat, constant according to IEC 60068-2-78; Damp heat, cyclical, according to IEC 60068-2-30					
0 . . . 40 °C / *32 . . . 104 °F* (up to 60 °C / *140 °F* with a current reduction of 2% per °C)					
-25 . . . 55 °C / *-13 . . . 131 °F*					
0 – 1000 (up to 2000 m with a current reduction of 1% per 100 m)					
vertical	vertical	vertical	vertical	vertical	vertical
IP20	IP20	IP20	IP20	IP20	IP20
Finger and back-of-hand proof					
2	2	2	2	2	2
152	190	227	276	380	452
222 x 290 x 195	222 x 290 x 195	222 x 290 x 195	222 x 290 x 195	222 x 290 x 195	520 x 338 x 248
6.7	6.7	15	15	15	15.7
230 – 460	230 – 460	230 – 460	230 – 460	230 – 460	230 – 460
460	460	460	460	460	460
50/60	50/60	50/60	50/60	50/60	50/60
110/230	110/230	110/230	110/230	110/230	110/230
59	72	85	105	146	174
15	18.5	22	30	37	45
30	37	45	55	75	90
40	50	60	75	100	125
102	124	147	181	252	301
30	37	45	55	75	90
55	55	75	90	132	160
75	100	100	150	200	250
59A:AC-53a:3-35:99-10	72A:AC-53a:3-35:99-10	85A:AC-53a:3-35:99-10	105A:AC-53a:3-35:99-10	146A:AC-53a:3-35:99-10	174A:AC-53a:3-35:99-10
59A:AC-53b:3-35:120	72A:AC-53b:3-35:120	85A:AC-53b:3-35:120	105A:AC-53b:3-35:120	146A:AC-53b:3-35:120	174A:AC-53b:3-35:120
NZM7-63N 20.282.20-125	NZM7-80N 20.189.20-200	NZM7-100N 20.189.20-200	NZM7-100N 20.610.32-350	NZM7-160N 20.610.32-350	NZM7-200N 20.610.32-450

Softstarter Series DM4			DM4-340-7K5	DM4-340-11K	DM4-340-15K	DM4-340-22K
Terminal Capacities						
Cable lengths						
Connection			–	–	–	–
Solid		[mm²]	1 x (1.5 – 16) 2 x (1 – 4)	1 x (1.5 – 16) 2 x (1 – 4)	1 x (1.5 – 16) 2 x (1 – 4)	1 x (1.5 – 16) 2 x (1 – 4)
Flexible with ferrule		[mm²]	1 x (1.5 – 16) 2 x (1 – 4)	1 x (1.5 – 16) 2 x (1 – 4)	1 x (1.5 – 16) 2 x (1 – 4)	1 x (1.5 – 16) 2 x (1 – 4)
Flexible with cable lug		[mm²]	–	–	–	–
Stranded		[mm²]	1 x (2.5 – 25) 2 x (2.5 – 4)	1 x (2.5 – 25) 2 x (2.5 – 4)	1 x (2.5 – 25) 2 x (2.5 – 4)	1 x (2.5 – 25) 2 x (2.5 – 4)
Stranded with cable lug		[mm²]	–	–	–	–
Solid or stranded		[AWG]	12 – 4	12 – 4	12 – 4	12 – 4
Flat conductor (Number of segments x width x thickness)		[mm]	–	–	–	–
Busbar	Width	[mm]	–	–	–	–
Tightening torque		[Nm]	1.2	1.2	1.2	1.2
Standard screwdriver		[mm]	0.8 x 4	0.8 x 4	0.8 x 4	0.8 x 4
Control cables						
Solid		[mm²]	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)
Flexible with ferrule		[mm²]	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)
Stranded		[mm²]	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)
Solid or stranded		[AWG]	22 – 12	22 – 12	22 – 12	22 – 12
Tightening torque		[Nm]	0.5	0.5	0.5	0.5
Standard screwdriver		[mm]	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5
Control Circuit						
Current consumption						
Digital inputs	24V DC	[mA]	0.45	0.45	0.45	0.45
	230V AC	[mA]	4.5	4.5	4.5	4.5
Analog inputs	10V	[mA]	1	1	1	1
Pick-up voltage						
DC operated		[V DC]	24 – 230	24 – 230	24 – 230	24 – 230
AC operated		[V AC]	24 – 230	24 – 230	24 – 230	24 – 230
Drop-out voltage						
DC operated		[V DC]	0 – 3	0 – 3	0 – 3	0 – 3
AC operated		[V AC]	0 – 3	0 – 3	0 – 3	0 – 3
Programmable relay outputs	Number		4	4	4	4
Max. voltage		[V AC]	250	250	250	250
Max. current AC-11		[A]	3	3	3	3
With back-up fuse	Number		2	2	2	2
Voltage range		[V DC]	0 – 10	0 – 10	0 – 10	0 – 10
Current carrying capacity		[mA]	10	10	10	10
Programmable analog inputs						
Ref 1		[V DC]	0 – 10	0 – 10	0 – 10	0 – 10
Ref 2		[mA]	4 – 20	4 – 20	4 – 20	4 – 20
Soft Start Function						
Ramp times						
Acceleration		[s]	1 – 255	1 – 255	1 – 255	1 – 255
Deceleration		[s]	0 – 255	0 – 255	0 – 255	0 – 255
Start pedestal		[%]	10 – 60	10 – 60	10 – 60	10 – 60
Voltage reduction at stop		[%]	0 – 100	0 – 100	0 – 100	0 – 100
Kickstart						
Voltage		[%]	60 – 90	60 – 90	60 – 90	60 – 90
Duration	50 Hz	[ms]	100 – 400	100 – 400	100 – 400	100 – 400
	60 Hz	[ms]	166 – 664	166 – 664	166 – 664	166 – 664
Current limitation			(0.5 – 8) x I_e	(0.5 – 8) x I_e	(0.5 – 8) x I_e	(0.5 – 8) x I_e

DM4-340-30K	DM4-340-37K	DM4-340-45K	DM4-340-55K	DM4-340-75K	DM4-340-90K
–	–	M8 screws for cable lug	M8 screws for cable lug	M8 screws for cable lug	M8 screws for cable lug
1 x (4 – 35) 2 x (4 – 10)	1 x (4 – 35) 2 x (4 – 10)	–	–	–	–
1 x (6 – 35) 2 x (6 – 10)	1 x (6 – 35) 2 x (6 – 10)	–	–	–	–
–	–	35 – 95	35 – 95	35 – 95	35 – 95
1 x (10 – 50) 2 x (10)	1 x (10 – 50) 2 x (10)	–	–	–	–
–	–	50 – 120	50 – 120	50 – 120	50 – 120
10 – 1	10 – 1	1 – 0; 250 MCM	1 – 0; 250 MCM	1 – 0; 250 MCM	1 – 0; 250 MCM
–	–	6 x 16 x 0.8	6 x 16 x 0.8	6 x 16 x 0.8	6 x 16 x 0.8
–	–	–	–	–	2 x (20 x 6)
3	3	0.5	0.5	0.5	0.5
1.2 x 6.5	1.2 x 6.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5
1 x (0.75 – 2.5) 1 x (0.75 – 2.5)	1 x (0.75 – 2.5) 1 x (0.75 – 2.5)	1 x (0.75 – 2.5) 1 x (0.75 – 2.5)	1 x (0.75 – 2.5) 1 x (0.75 – 2.5)	1 x (0.75 – 2.5) 1 x (0.75 – 2.5)	1 x (0.75 – 2.5) 1 x (0.75 – 2.5)
1 x (0.75 – 2.5) 22 – 12	1 x (0.75 – 2.5) 22 – 12	1 x (0.75 – 2.5) 22 – 12	1 x (0.75 – 2.5) 22 – 12	1 x (0.75 – 2.5) 22 – 12	1 x (0.75 – 2.5) 22 – 12
0.5	0.5	0.5	0.5	0.5	0.5
0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5
0.45	0.45	0.45	0.45	0.45	0.45
4.5	4.5	4.5	4.5	4.5	4.5
1	1	1	1	1	1
24 – 230 24 – 230	24 – 230 24 – 230	24 – 230 24 – 230	24 – 230 24 – 230	24 – 230 24 – 230	24 – 230 24 – 230
0 – 3 0 – 3	0 – 3 0 – 3	0 – 3 0 – 3	0 – 3 0 – 3	0 – 3 0 – 3	0 – 3 0 – 3
4	4	4	4	4	4
250	250	250	250	250	250
3	3	3	3	3	3
2	2	2	2	2	2
0 – 10	0 – 10	0 – 10	0 – 10	0 – 10	0 – 10
10	10	10	10	10	10
0 – 10 4 – 20	0 – 10 4 – 20	0 – 10 4 – 20	0 – 10 4 – 20	0 – 10 4 – 20	0 – 10 4 – 20
1 – 255 0 – 255	1 – 255 0 – 255	1 – 255 0 – 255	1 – 255 0 – 255	1 – 255 0 – 255	1 – 255 0 – 255
10 – 60	10 – 60	10 – 60	10 – 60	10 – 60	10 – 60
0 – 100	0 – 100	0 – 100	0 – 100	0 – 100	0 – 100
60 – 90 100 – 400 166 – 664	60 – 90 100 – 400 166 – 664	60 – 90 100 – 400 166 – 664	60 – 90 100 – 400 166 – 664	60 – 90 100 – 400 166 – 664	60 – 90 100 – 400 166 – 664
(0.5 – 8) x I_e	(0.5 – 8) x I_e	(0.5 – 8) x I_e	(0.5 – 8) x I_e	(0.5 – 8) x I_e	(0.5 – 8) x I_e

Softstarter Series DM4			DM4-340-110K	DM4-340-132K	DM4-340-160K
General					
Standards			IEC/EN 60947-4-2	IEC/EN 60947-4-2	IEC/EN 60947-4-2
Approvals			UL, cUL	UL, cUL	UL, cUL
Climatic proofing			Damp heat, constant according to IEC 60068-2-78; Damp heat, cyclical, according to IEC 60068-2-30		
Ambient temperature		[°C / °F]	0 . . . 40 °C / *32 . . . 104 °F* (up to 60 °C / *140 °F* with a current reduction of 2% per °C)		
Ambient temperature, storage		[°C / °F]	-25 . . . 55 °C / *-13 . . . 131 °F*	-25 . . . 55 °C / *-13 . . . 131 °F*	-25 . . . 55 °C / *-13 . . . 131 °F*
Altitude		[m]	0 – 1000 (up to 2000 m with a current reduction of 1% per 100 m)		
Mounting position			vertical	vertical	vertical
Degree of protection (power connection)			IP20	IP20	IP20
Protection against direct contact			Finger and back-of-hand proof		
Pollution degree			2	2	2
Heat dissipation with rated operational current	I_e	[W]	545	662	795
Dimensions (W x H x D)		[mm]	338 x 520 x 248	338 x 520 x 248	338 x 520 x 248
Weight		[kg]	15.7	22	22
Main Conducting Paths					
Rated operating voltage	U_e	[V AC]	230 – 460	230 – 460	230 – 460
Rated insulation voltage	U_i	[V AC]	460	460	460
Supply frequency		[Hz]	50/60	50/60	50/60
Control section power supply		[V AC]	110/230	110/230	110/230
Rated operational current					
AC-53a 400V	I_e	[A]	202	242	300
Assigned motor rating (standard connection)					
230V		[kW]	55	75	90
400V		[kW]	110	132	160
460V		[HP]	150	200	250
Phase current					
In-delta connection		[A]	349	419	519
Assigned motor rating (delta connection)					
230V		[kW]	110	132	160
400V		[kW]	160	200	250
460V		[HP]	250	350	400
Overload cycle to IEC/EN 60947-4-2					
AC-53a (without bypass)			202 A : AC-53a : 3–35 : 60–10	242 A : AC-53a : 3–35 : 60–10	300 A : AC-53a : 3–35 : 60–3
AC-53b (with bypass)			202 A : AC-53b : 3–35 : 360	242 A : AC-53b : 3–35 : 360	300 A : AC-53b : 3–35 : 360
Short-circuit rating					
Type "1" coordination			NZM7-200N	NZM7-250N	NZM10-400N/ZM-400
Type "2" coordination (in addition to coordination type "1")			20.610.32-450	20.610.32-500	20.610.32-500

DM4-340-200K	DM4-340-250K	DM4-340-315K	DM4-340-400K	DM4-340-500K
IEC/EN 60947-4-2	IEC/EN 60947-4-2	IEC/EN 60947-4-2	IEC/EN 60947-4-2	IEC/EN 60947-4-2
UL, cUL	UL, cUL	UL, cUL	UL, cUL	UL, cUL
Damp heat, constant according to IEC 60068-2-78; Damp heat, cyclical, according to IEC 60068-2-30				
0 . . . 40 °C / *32 . . . 104 °F* (up to 60 °C / *140 °F* with a current reduction of 2% per °C)				
-25 . . . 55 °C / *-13 . . . 131 °F*	-25 . . . 55 °C / *-13 . . . 131 °F*	-25 . . . 55 °C / *-13 . . . 131 °F*	-25 . . . 55 °C / *-13 . . . 131 °F*	-25 . . . 55 °C / *-13 . . . 131 °F*
0 – 1000 (up to 2000 m with a current reduction of 1% per 100 m)				
vertical	vertical	vertical	vertical	vertical
IP20	IP20	IP20	IP20	IP20
Finger and back-of-hand proof				
2	2	2	2	2
925	1371	1705	2106	2775
338 x 520 x 248	640 x 610 x 375	640 x 610 x 375	640 x 610 x 375	640 x 610 x 375
22	56	65	72	72
230 – 460	230 – 460	230 – 460	230 – 460	230 – 460
460	460	460	460	460
50/60	50/60	50/60	50/60	50/60
110/230	110/230	110/230	110/230	110/230
370	500	600	750	900
110 200 300	132 250 400	160 315 500	200 400 600	250 500 750
640	866	1039	1299	1558
200 315 500	250 400 600	315 560 850	400 750 1100	500 900 1300
370 A : AC-53a : 3–35 : 60–3 370 A : AC-53b : 3–35 : 360	500 A : AC-53a : 3–35 : 60–3 500 A : AC-53b : 3–35 : 360	600 A : AC-53a : 3–35 : 60–3 600 A : AC-53b : 3–35 : 360	750 A : AC-53a : 3–35 : 60–3 750 A : AC-53b : 3–35 : 360	900 A : AC-53a : 3–35 : 60–3 900 A : AC-53b : 3–35 : 360
NZM10-400N/ZM-400 20.610.32-630	NZM10-630N/ZM-630 20.610.32-900	NZM10-630N/ZM-630 20.610.32-900	NZM14-800S 20.610.32-1250	NZM14-1000S 20.610.32-1250

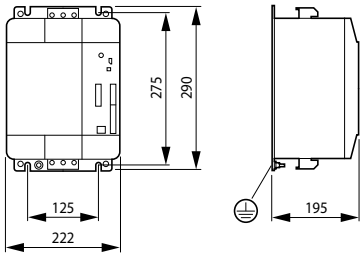
Softstarter Series DM4			DM4-340-110K	DM4-340-132K	DM4-340-160K
Terminal Capacities					
Cable lengths					
Connection			M8 screws for cable lug	M8 screws for cable lug	M8 screws for cable lug
Flexible with cable lug		[mm²]	2 x (35 – 95)	2 x (35 – 95)	2 x (35 – 95)
Stranded with cable lug		[mm²]	2 x (50 – 120)	2 x (50 – 120)	2 x (50 – 120)
Solid or stranded		[AWG]	2 x 1/0; 2 x 250 MCM	2 x 1/0; 2 x 250 MCM	2 x 1/0; 2 x 250 MCM
Flat conductor (Number of segments x width x thickness)		[mm]	2 x (6 x 16 x 0.8)	2 x (6 x 16 x 0.8)	2 x (6 x 16 x 0.8)
Busbar	Width	[mm]	2 x (20 x 6)	2 x (20 x 6)	2 x (20 x 6)
Tightening torque		[Nm]	0.5	0.5	0.5
Standard screwdriver		[mm]	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5
Control cables					
Solid		[mm²]	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)
Flexible with ferrule		[mm²]	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)
Stranded		[mm²]	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)
Solid or stranded		[AWG]	22 – 12	22 – 12	22 – 12
Tightening torque		[Nm]	0.5	0.5	0.5
Standard screwdriver		[mm]	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5
Control Circuit					
Current consumption					
Digital inputs	24V DC	[mA]	0.45	0.45	0.45
	230V AC	[mA]	4.5	4.5	4.5
Analog inputs	10V	[mA]	1	1	1
Pick-up voltage					
DC operated		[V DC]	24 – 230	24 – 230	24 – 230
AC operated		[V AC]	24 – 230	24 – 230	24 – 230
Drop-out voltage					
DC operated		[V DC]	0 – 3	0 – 3	0 – 3
AC operated		[V AC]	0 – 3	0 – 3	0 – 3
Programmable relay outputs					
Number			4	4	4
Max. voltage		[V AC]	250	250	250
Max. current AC-11		[A]	3	3	3
With back-up fuse					
Number			2	2	2
Voltage range		[V DC]	0 – 10	0 – 10	0 – 10
Current carrying capacity		[mA]	10	10	10
Programmable analog inputs					
Ref 1		[V DC]	0 – 10	0 – 10	0 – 10
Ref 2		[mA]	4 – 20	4 – 20	4 – 20
Soft Start Function					
Ramp times					
Acceleration		[s]	1 – 255	1 – 255	1 – 255
Deceleration		[s]	0 – 255	0 – 255	0 – 255
Start pedestal		[%]	10 – 60	10 – 60	10 – 60
Voltage reduction at stop		[%]	0 – 100	0 – 100	0 – 100
Kickstart					
Voltage		[%]	60 – 90	60 – 90	60 – 90
Duration	50 Hz	[ms]	100 – 400	100 – 400	100 – 400
	60 Hz	[ms]	166 – 664	166 – 664	166 – 664
Current limitation			(0.5 – 8) x I_e	(0.5 – 8) x I_e	(0.5 – 8) x I_e

DM4-340-200K	DM4-340-250K	DM4-340-315K	DM4-340-400K	DM4-340-500K
M8 screws for cable lug	2 x M12 screws for cable lug	2 x M12 screws for cable lug	2 x M12 screws for rail connection	2 x M12 screws for rail connection
2 x (35 – 95)	2 x (50 – 240)	2 x (50 – 240)	–	–
2 x (50 – 120)	2 x (70 – 240)	2 x (70 – 240)	–	–
2 x 1/0; 2 x 250 MCM	2 x 2/0; 2 x 500 MCM	2 x 2/0; 2 x 500 MCM	–	–
2 x (6 x 16 x 0.8)	2 x (10 x 21 x 1)	2 x (10 x 21 x 1)	–	–
2 x (20 x 6)	21 x 20	21 x 20	45 x 20; 60 x 10; 80 x 10	45 x 20; 60 x 10; 80 x 10
0.5	0.5	0.5	0.5	0.5
0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5
1 x (0.75 – 2.5)	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)
1 x (0.75 – 2.5)	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)
1 x (0.75 – 2.5)	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)
22 – 12	22 – 12	22 – 12	22 – 12	22 – 12
0.5	0.5	0.5	0.5	0.5
0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5
0.45	0.45	0.45	0.45	0.45
4.5	4.5	4.5	4.5	4.5
1	1	1	1	1
24 – 230	24 – 230	24 – 230	24 – 230	24 – 230
24 – 230	24 – 230	24 – 230	24 – 230	24 – 230
0 – 3	0 – 3	0 – 3	0 – 3	0 – 3
0 – 3	0 – 3	0 – 3	0 – 3	0 – 3
4	4	4	4	4
250	250	250	250	250
3	3	3	3	3
2	2	2	2	2
0 – 10	0 – 10	0 – 10	0 – 10	0 – 10
10	10	10	10	10
0 – 10	0 – 10	0 – 10	0 – 10	0 – 10
4 – 20	4 – 20	4 – 20	4 – 20	4 – 20
1 – 255	1 – 255	1 – 255	1 – 255	1 – 255
0 – 255	0 – 255	0 – 255	0 – 255	0 – 255
10 – 60	10 – 60	10 – 60	10 – 60	10 – 60
0 – 100	0 – 100	0 – 100	0 – 100	0 – 100
60 – 90	60 – 90	60 – 90	60 – 90	60 – 90
100 – 400	100 – 400	100 – 400	100 – 400	100 – 400
166 – 664	166 – 664	166 – 664	166 – 664	166 – 664
(0.5 – 8) x I_e	(0.5 – 8) x I_e	(0.5 – 8) x I_e	(0.5 – 8) x I_e	(0.5 – 8) x I_e

Dimensions are in millimeters.
Not intended for manufacturing purposes.

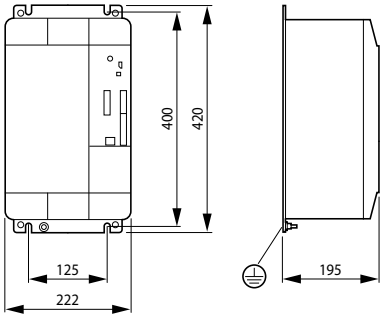
Softstarters DM4

DM4-340-(7K5)(11K)(15K)(22K)(30K)(37K)



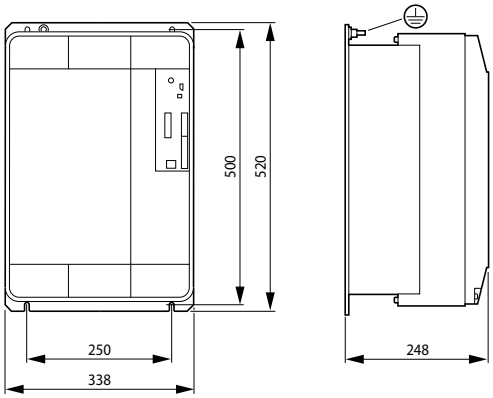
Softstarters DM4

DM4-340-(45)(55)(75)K



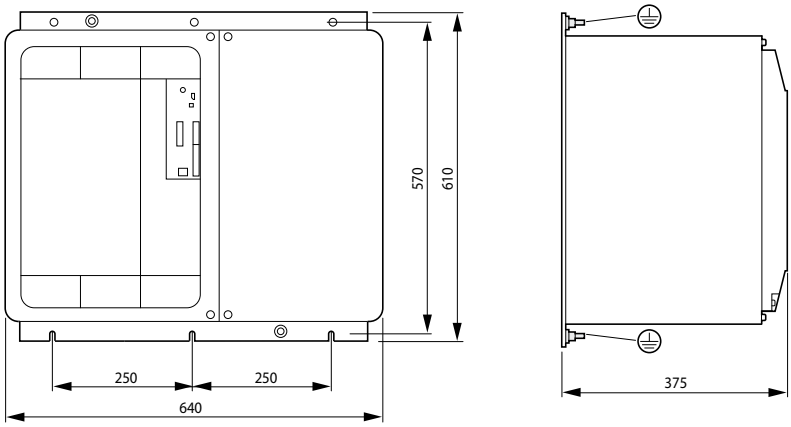
Softstarters DM4

DM4-340-(90)(110)(132)(160)(200)K



Softstarters DM4

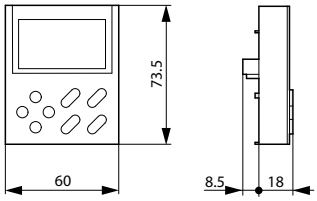
DM4-340-(250)(315)(400)(500)K



Dimensions are in millimeters.
Not intended for manufacturing purposes.

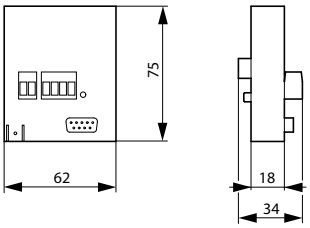
Keypad

DE4-KEY-2



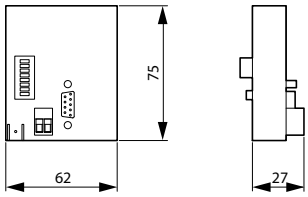
Serial Interface

DE4-COM-2X



Profibus DP Communication Module

DE4-NET-DP2



Note: The following terms are for general information only. All conditions of sales are subject to change and are valid as determined in the latest terms and conditions publication of CopperLogic, Inc. (referred to herein after as "The Company").

1. Acceptance of orders
All orders are subject to final acceptance by an authorized representative of the Company and are subject to the Company's terms and conditions in effect at the time of acceptance. The Company takes exception to any other terms and conditions except for such terms and conditions as the Company may expressly accept in writing.

2. Prices
Prices and discounts as shown in the company's publications are subject to change without notice. In the event of a net price change, the price of equipment on order but unshipped will be the price in effect on the date of shipment. In no case will the amount of a price increase exceed 10% of the price at which the order was accepted, except that, if the delivery is delayed upon instructions from the purchaser, prices shall be those in effect when the instructions are received to proceed with the order. Price reductions shall only apply to unshipped portions of outstanding orders. Any addition or alteration to an outstanding order will be accepted at prices in effect when the addition or alteration is accepted. Applicable taxes are additional.

3. Quotations
All quotations are in accordance with the Company's interpretation of plans and specifications and only material shown on the Company's quotations are included. Written quotations automatically expire thirty (30) days from the date of issue unless sooner terminated by notice. Quotations are subject to all existing or future limitations and regulations issued by any government agency. In the event that a quotation is not accepted in its entirety, the Company reserves the right to decline any parts of the order based on such quotation.

All Accounting, clerical or other errors are subject to correction.

4. Minimum Billing
Orders amounting to less than $100.00 net will be billed at $100.00 plus the transportation charge, at a minimum of $25.00.

5. Terms - Regular
Terms to purchasers of satisfactory credit are: 30 days net from the date of invoice. Cash discounts, when applicable, are indicated on the face of the Company's invoice. To avoid delay in filling orders purchasers without previous experience with the Company should include credit references with the first order, or send a certified check or money order. Any amount owed to the Company becomes due and payable immediately in case of change of ownership of the purchaser, attachment or execution against the purchaser or it's representatives, unless the Company otherwise agrees.

6. Payments
Payments should be made to the address indicated on the invoice, or to CopperLogic, Inc., PO Box 62073, Houston, TX 77205.

7. Delivery
The Company reserves the right to make delivery in installments, unless otherwise expressly stipulated in the contract for sale; and all such installments when separately invoiced shall be paid for when due per invoice, without regard to subsequent deliveries. Delay in delivery of any installment shall not relieve the purchaser of its obligations to accept remaining deliveries. Shipments delayed to accommodate the purchaser will be invoiced upon completion of fabrication and additional charges for warehousing, trucking and other incidental expenses created by the delay will be at the expense of the purchaser. Delivery is dependent upon prompt receipt of all specifications, final approved prints and any other details essential to the proper execution of the purchaser's order. Claims for shortages or other errors must be reported in writing to the Company within 10 days after receipt of shipment. Failure to do so will constitute a waiver of all claims by the purchaser.

8. Shipping Terms
The method and route of shipment is determined by the Company. All merchandise orders of $500.00 net or more will be shipped F.O.B. CopperLogic's warehouse, freight prepaid, best way ground transportation. All engineered equipment orders will be shipped F.O.B. CopperLogic's loading dock, freight not allowed. When purchaser specifies a method or routing of shipment other than that selected by the Company, the purchaser will be billed accordingly. No credits will be allowed in lieu of transportation in the case of pickups at the Company's warehouses, branches, or factory. No transportation charges can be deducted from a selling price. Air freight, water freight, heavy lift charges, pier delivery charges, wharfage, marine insurance and the cost of stevedoring are chargeable to the purchaser. These terms include shipments to Alaska, Hawaii, Puerto Rico, and the Virgin Islands.

9. Packing other than standard
If other than standard commercial packing is required the cost of such special packing (determinable only after packing is completed) will be charged to the purchaser. Export packing shall be considered as packing other than standard.

10. Acceptance of orders
The purchaser will be responsible for any applicable export license and all associated costs involved with said license on any export project.

11. Export Control
Equipment and associated materials supplied or licensed under this transaction may be subject to various export laws and regulations. It is the responsibility of the exporter to comply with all such laws and regulations.

12. Responsibility and Title
Title in the equipment shall remain with the Company as security only and until full payment is received. Risk of loss for the equipment shall pass to purchaser upon shipment from F.O.B. point of shipment or date of invoicing, which ever is sooner.

13. Loss or Damage in Transit
The Company does not hold itself responsible for any loss, damage, (obvious or concealed) or pilferage sustained in transit. Claims of such character should be made, by the purchaser, promptly against the transportation company. If the Company is notified of such claims, the Company will offer to lend assistance to secure adjustment. The Company employs experienced packers and cannot be held responsible for breakage that occurs after the Company's securing the "Received in Good Order" receipt from the transportation company.

14. Return of Merchandise
No equipment may be returned unless authorization has been obtained from an authorized representative of the Company. Unauthorized returns of equipment cannot be accepted.

A. To be returned for credit
Only unused equipment of current design may be returned for credit. Where a purchaser returns equipment for reasons of his own, a minimum restocking charge of 20% of billing, plus transportation charges, will be made. Any cost incurred in putting the equipment into saleable condition shall also be deducted from allowed credit. If return of equipment is made necessary by fault of the Company, full credit will be allowed including transportation charges.

B. To be returned for replacement
If the equipment is under guarantee and the return is made necessary because of defect in material and/or workmanship, providing permission is obtained from the Company for its return, the Company will replace the defective goods "no charge", and will assume the transportation charges.

C. Custom-built equipment
Equipment built based upon purchaser specification cannot be returned for credit.

15. Cancellations:
Any order placed with the Company can be canceled by the purchaser provided that: a) the cancellation is agreed to in writing by the Company; and b) the purchaser agrees to compensate the Company for engineering, fabrication, outside sourcing of devices and any other demonstrated expenses incurred or commitments made by the Company up to the date of notice of cancellation and all charges incurred by the Company in respect of the cancellation.

16. Force Majeure
The Company shall not be liable for any delay in the performance of orders or contracts or in the delivery or shipment of equipment or for any loss and/or damages suffered by purchaser by reason of such delay when such delay is directly or indirectly caused by fire, floods, accidents, riots, acts of God, war, invasion, sabotage, terrorism and governmental interference or embargoes, strikes, labor difficulties, shortage of labor, fuel, power, materials or supplies

or any other cause beyond the Company's reasonable control. In any event, the Company shall not be liable for special or consequential damages for loss of use. Should such a delay occur, the delivery date shall be extended as may be necessary to compensate for the delay. The Company shall not be liable for any change of dimensions, weights and materials as long as the change is nonessential for the proper performance of the product.

17. Guarantee
The Company guarantees for a period of one (1) year from the date of the Company invoice that equipment furnished under the order will be of merchantable quality, free from defects in material, workmanship and design each as determined, at the date of shipment by the Company by generally recognized, applicable and accepted practices and procedures in the industry including any specifications furnished by the purchaser and agreed to in writing by the Company for incorporation into the equipment. Satisfaction of this guarantee, consistent with other provisions herein, will be limited to the replacement or repair or modification of, or issuance of a credit for, the equipment involved at the Company's option, with the Company to determine the availability of service personnel and purchaser to pay associated service expenses: such guarantee satisfaction available only if: (a) the Company is promptly notified in writing upon discovery of an alleged defect and (b) the company's examination of the subject equipment discloses, to the Company's satisfaction, that any defect has not been caused by misuse, neglect, improper installation, improper operation, improper maintenance, repair or alteration, accident, or unusual deterioration or degradation of the equipment parts, thereof due to physical environment or due to electrical or electromagnetic noise environment. THIS GUARANTEE IS IN LIEU OF ALL OTHER GUARANTEES WHETHER EXPRESSED, IMPLIED OR STATUTORY, INCLUDING IMPLIED GUARANTEES OF MERCHANTABILITY OR FITNESS and thereby excludes certifications or the like for equipment performance, use or design with respect to any standard, regulation or the like (unless and to the extent independently approved in writing by the Company) AND EXTENDS ONLY TO THE CUSTOMER OR PURCHASER PURCHASING FROM THE COMPANY OR AN AUTHORIZED COMPANY DISTRIBUTOR.

18. Limitation of Liability
IN NO EVENT WILL THE COMPANY BE LIABLE FOR INCIDENTAL, INDIRECT OR AS IS CONSEQUENTIAL DAMAGES OF ANY KIND. THE COMPANY'S MAXIMUM CUMULATIVE LIABILITY RELATIVE TO ALL OTHER CLAIMS AND LIABILITIES, INCLUDING THAT WITH RESPECT TO DIRECT DAMAGES AND OBLIGATIONS UNDER ANY INDEMNITY, WHETHER OR NOT INSURED, WILL NOT EXCEED THE COST OF THE PRODUCTS GIVING RISE TO THE CLAIM OR LIABILITY. THE COMPANY DISCLAIMS ALL LIABILITY RELATIVE TO GRATUITOUS INFORMATION OR ASSISTANCE PROVIDED BY, BUT NOT REQUIRED OF THE COMPANY HEREUNDER. ANY ACTION AGAINST THE COMPANY MUST BE BROUGHT WITHIN EIGHTEEN (18) MONTHS AFTER THE CAUSE OF ACTIONS ACCRUES. THESE DISCLAIMERS AND LIMITATIONS OF LIABILITY WILL APPLY REGARDLESS OF ANY OTHER CONTRARY PROVISION OF THE AGREEMENT AND REGARDLESS OF THE FORM OF ACTION, WHETHER IN CONTRACT, TORT OR OTHERWISE AND FURTHER WILL EXTEND TO THE BENEFIT OF THE COMPANY'S VENDORS, APPOINTED DISTRIBUTORS AND OTHER AUTHORIZED RESELLERS AS THIRD-PARTY BENEFICIARIES. EACH PROVISION IN THE AGREEMENT WHICH PROVIDES FOR A LIMITATION OF LIABILITY, DISCLAIMER OF WARRANTY OR CONDITION OR EXCLUSION OF DAMAGES IS SEVERABLE AND INDEPENDENT OF ANY OTHER PROVISION AND IS TO BE ENFORCED AS SUCH.

19. Penalty Clauses
The Company will not accept any liability for penalty clauses of any kind, written or implied, unless specifically approved in writing by the Company.

20. Nuclear Applications
Unless otherwise agreed to in writing by a duly authorized representative of the Company, equipment sold hereunder are not intended for use in connection with, any nuclear facility or activity. The Company disclaims all liability for any nuclear damage, injury or contamination and purchaser shall indemnify the Company against such liability, whether as a result of breach of contract, warranty, tort (including negligence) or otherwise. The Company shall identify special controls which are manufactured and tested for use in connection with any nuclear installation or activity by the appropriate catalog number. The Company will charge a price addition for control devices sold for nuclear applications. Any questions by purchaser regarding products or pricing should be referred to the Company for clarification.

21. Government Clauses and Contracts
No government contract regulations or clauses will apply to the equipment agreement or act to bind the Company unless specifically agreed to by the Company in writing at the Company's headquarters. Equipment sold or licensed hereunder are not intended to be used, nor should they be used, in any nuclear-related application either as a "Basic Component" under 10 CFR 21 (United States NRC) or otherwise under similar nuclear laws and regulations of this or any other country.

22. Intellectual Property (not applicable to third-party branded products as is)
The Company will defend any suit or proceeding brought against the customer based on a claim that the design or construction of the Products sold or licensed hereunder by the Company infringe any United States or Canadian Patent, Copyright or Mask Work Registration, provided that the customer promptly notifies the Company of any such claim and resulting suit or proceeding, in writing and further provided that, at the Company's expense, (a) the customer gives the Company the sole right to defend or control the defense of the suit or proceeding including settlement, and (b) the customer provides all necessary information and assistance for that defense. Except for any consequential damages, the Company will pay all costs and damages finally awarded or agreed upon by Sell that are directly related to any such claim. In the event of a charge of infringement the Company's obligation under the Agreement will be fulfilled if the Company, at its option and expense, either (i) procures for the customer the right to continue using such Products; (ii) replaces the same with non-infringing Products; (iii) modifies the same so as to make them non-infringing: or (iv) accepts the return of any infringing Products and refunds their purchase price, Notwithstanding the foregoing. The Company will have no liability with respect to any claim of infringement to the extent based on a configuration or modification incorporated in the Products at the request of the customer, on any process application into which the Products are integrated by the customer, or on use of the Products in combination with other equipment or products not supplied by the Company. THIS PARAGRAPH SETS FORTH THE COMPANY'S ENTIRE LIABILITY WITH RESPECT TO INTELLECTUAL PROPERTY AN INFRINGEMENT OF PATENTS BY ANY PRODUCTS (INCLUDING SOFTWARE PROGRAMS, EQUIPMENT OR PRODUCTS THEREOF) OR BY THEIR OPERATION, AND IS IN LIEU OF ALL WARRANTIES OR CONDITIONS RELATION TO INFRINGEMENT OR INTELLECTUAL PROPERTY, EITHER EXPRESS OR IMPLIED.

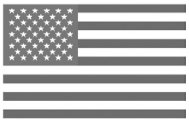
23. Third Party Branded Products
THE COMPANY MAKES NO REPRESENTATIONS AND DISCLAIMS ALL WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, RELATIVE TO ANY THIRD-PARTY BRANDED EQUIPMENT WHICH MAY BE SOLD BY THE COMPANY HEREUNDER. The only warranty associated with such equipment will be that provided directly by the original manufacturer, if any. The Company assumes no post-sale technical support or warranty repair obligation with respect to such equipment, however, at its discretion, the Company may assist the customer in processing warranties or representations made or provided relative to such equipment, which in all cases will be the responsibility of the original equipment solely for the convenience of the purchaser, and the purchaser must make its own determination as to the accuracy and completeness of such information.

24. Disputes
The parties will attempt in good faith promptly to resolve any dispute arising out of this transaction by negotiations between representatives who have authority to settle the controversy. If unsuccessful, the parties further will attempt in good faith to settle the dispute by non-binding third-party mediation, with fees and expenses of such mediation apportioned equally to each side. Any dispute not so resolved by negotiation or mediation may then be submitted to a court of competent jurisdiction in accordance with the terms of this transaction. These procedures are the exclusive procedures for the resolution of all such disputes between the parties.

25. Governing Law
This transaction and all disputes arising thereunder will be governed by and interpreted in accordance with the internal laws of the state, province or other governmental jurisdiction in which the Company's principal place of business resides, but specifically excluding its conflict of laws provisions and the provisions of the 1980 UN Convention on Contracts for the International Sales of Goods.

26. Assignment
This transaction may not be assigned by either party without the written consent of the other (which consent will not be unreasonably withheld), however, consent will not be required for internal transfers and assignments as between the company and its parent corporations, subsidiaries or affiliates as part of consolidation, merger or other form of corporate reorganization.

27. Language
The parties acknowledge that they have required that this transaction be drawn up in English, Les parties reconnaissent avoir exigE la rEdaction en anglais du Contrat. In the event of a conflict between the English and other language versions of this agreement, the English version will prevail.



Note: The following terms are for general information only. All conditions of sales are subject to change and are valid as determined in the latest terms and conditions publication of CopperLogic Ltd. (referred to herein after as "The Company").

1. Acceptance of orders:
All orders are subject to final acceptance by an authorized representative of the Company and are subject to the Company's terms and conditions in effect at the time of acceptance. The Company takes exception to any other terms and conditions except for such terms and conditions as the Company may expressly accept in writing.

2. Prices:
Prices and discounts as shown in the company's publications are subject to change without notice. In the event of a net price change, the price of equipment on order but unshipped will be the price in effect on the date of shipment. In no case will the amount of a price increase exceed 10% of the price at which the order was accepted, except that, if the delivery is delayed upon instructions from the purchaser, prices shall be those in effect when the instructions are received to proceed with the order. Price reductions shall only apply to unshipped portions of outstanding orders. Any addition or alteration to an outstanding order will be accepted at prices in effect when the addition or alteration is accepted. Applicable taxes are additional.

3. Quotations:
All quotations are in accordance with the Company's interpretation of plans and specifications and only material shown on the Company's quotations are included. Written quotations automatically expire thirty (30) days from the date of issue unless sooner terminated by notice. Quotations are subject to all existing or future limitations and regulations issued by any government agency. In the event that a quotation is not accepted in its entirety, the Company reserves the right to decline any parts of the order based on such quotation.

All Accounting, clerical or other errors are subject to correction.

4. Minimum Billing:
Orders amounting to less than $ 100.00 net will be billed at $ 100.00 plus the transportation charge, at a minimum of $25.00.

5. Terms - Regular:
Terms to purchasers of satisfactory credit are: 30 days net from the date of invoice. Cash discounts, when applicable, are indicated on the face of the Company's invoice. To avoid delay in filling orders purchasers without previous experience with the Company should include credit references with the first order, or send a certified check or money order. Any amount owed to the Company becomes due and payable immediately in case of change of ownership of the purchaser, attachment or execution against the purchaser or it's representatives, unless the Company otherwise agrees.

6. Payments:
Payments should be made to the address indicated on the invoice, or to CopperLogic Ltd, 6175 Kenway Drive, Mississauga, Ontario, L5T 2L3.

7. Delivery:
The Company reserves the right to make delivery in installments, unless otherwise expressly stipulated in the contract for sale; and all such installments when separately invoiced shall be paid for when due per invoice, without regard to subsequent deliveries. Delay in delivery of any installment shall not relieve the purchaser of its obligations to accept remaining deliveries. Shipments delayed to accommodate the purchaser will be invoiced upon completion of fabrication and additional charges for warehousing, trucking and other incidental expenses created by the delay will be at the expense of the purchaser. Delivery is dependent upon prompt receipt of all specifications, final approved prints and any other details essential to the proper execution of the purchaser's order. Claims for shortages or other errors must be reported in writing to the Company within 10 days after receipt of shipment. Failure to do so will constitute a waiver of all claims by the purchaser.

8. Shipping Terms:
The method and route of shipment is determined by the Company. All merchandise orders of $500.00 net or more will be shipped F.O.B. CopperLogic's warehouse, freight prepaid, best way ground transportation. All engineered equipment orders will be shipped F.O.B. CopperLogic's loading dock, freight not allowed. When purchaser specifies a method or routing of shipment other than that selected by the Company, the purchaser will be billed accordingly. No credits will be allowed in lieu of transportation in the case of pickups at the Company's warehouses, branches, or factory. No transportation charges can be deducted from a selling price. Air freight, water freight, heavy lift charges, pier delivery charges, wharfage, marine insurance and the cost of stevedoring are chargeable to the purchaser.

9. Packing other than standard:
If other than standard commercial packing is required the cost of such special packing (determinable only after packing is completed) will be charged to the purchaser. Export packing shall be considered as packing other than standard.
10. Acceptance of orders:
The purchaser will be responsible for any applicable export license and all associated costs involved with said license on any export project.

11. Export Control
Equipment and associated materials supplied or licensed under this transaction may be subject to various export laws and regulations. It is the responsibility of the purchaser to comply with all such laws and regulations.

12. Responsibility and Title:
Title in the equipment shall remain with the Company as security only and until full payment is received. Risk of loss for the equipment shall pass to purchaser upon shipment from F.O.B. point of shipment or date of invoicing, which ever is sooner.

13. Loss or Damage in Transit:
The Company does not hold itself responsible for any loss, damage, (obvious or concealed) or pilferage sustained in transit. Claims of such character should be made, by the purchaser, promptly against the transportation company. If the Company is notified of such claims, the Company will offer to lend assistance to secure adjustment. The Company employs experienced packers and cannot be held responsible for breakage that occurs after the Company's securing the "Received in Good Order" receipt from the transportation company.

14. Return of Merchandise:
No equipment may be returned unless authorization has been obtained from an authorized representative of the Company and if so authorized is subject to the conditions below. Unauthorized returns of equipment cannot be accepted.

A. To be returned for credit:
Only unused equipment of current design may be returned for credit. Where a purchaser returns equipment for reasons of his own, a minimum restocking charge of 20% of billing, plus transportation charges, will be made. Any cost incurred in putting the equipment into saleable condition shall also be deducted from allowed credit. If return of equipment is made necessary by fault of the Company, full credit will be allowed including transportation charges.

B. To be returned for replacement:
If the equipment is under guarantee and the return is made necessary because of defect in material and/or workmanship, the Company will replace the defective goods "no charge", and will assume the transportation charges.

C. Custom-built equipment:
Equipment built based upon purchaser specification cannot be returned for credit.

15. Cancellations:
Any order placed with the Company can be canceled by the purchaser provided that: a) the cancellation is agreed to in writing by the Company; and b) the purchaser agrees to compensate the Company for engineering, fabrication, outside sourcing of devices and any other demonstrated expenses incurred or commitments made by the Company up to the date of notice of cancellation and all charges incurred by the Company in respect of the cancellation.

16. Force Majeure:
The Company shall not be liable for any delay in the performance of orders or contracts or in the delivery or shipment of equipment or for any loss and/or damages suffered by purchaser by reason of such delay when such delay is directly or indirectly caused by fire, floods, accidents, riots, acts of God, war, invasion, sabotage, terrorism and governmental interference or embargoes, strikes, labor difficulties, shortage of labor, fuel, power, materials or supplies or any other cause beyond the Company's reasonable control. In any event, the Company shall not be liable for special or consequential damages for loss of use. Should such a delay occur, the delivery date shall be extended as may be necessary to compensate for the delay. The Company shall not be liable for any change of dimensions, weights and materials as long as the change is nonessential for the proper performance of the product.

17. Guarantee:
The Company guarantees for a period of one (1) year from the date of the Company invoice that equipment furnished under the order will be of merchantable quality, free from defects in material, workmanship and design each as determined, at the date of shipment by the Company by generally recognized, applicable and accepted practices and procedures in the industry including any specifications furnished by the purchaser and agreed to in writing by the Company for incorporation into the equipment. Satisfaction of this guarantee, consistent with other provisions herein, will be limited to the replacement or repair or modification of, or issuance of a credit for, the equipment involved at the Company's option, with the Company to determine the availability of service personnel and purchaser to pay associated service expenses: such guarantee satisfaction available only if: (a) the Company is promptly notified in writing upon discovery of an alleged defect and (b) the company's examination of the subject equipment discloses, to the Company's satisfaction, that any defect has not been caused by misuse, neglect, improper installation, improper operation, improper maintenance, repair or alteration, accident, or unusual deterioration or degradation of the equipment parts, thereof due to physical environment or due to electrical or electromagnetic noise environment. THIS GUARANTEE IS IN LIEU OF ALL OTHER GUARANTEES WHETHER EXPRESSED, IMPLIED OR STATUTORY, INCLUDING IMPLIED GUARANTEES OF MERCHANTABILITY OR FITNESS and thereby excludes certifications or the like for equipment performance, use or design with respect to any standard, regulation or the like (unless and to the extent independently approved in writing by the Company) AND EXTENDS ONLY TO THE CUSTOMER OR PURCHASER PURCHASING FROM THE COMPANY OR AN AUTHORIZED COMPANY DISTRIBUTOR.

18. Limitation of Liability:
IN NO EVENT WILL THE COMPANY BE LIABLE FOR INCIDENTAL, INDIRECT OR AS IS CONSEQUENTIAL DAMAGES OF ANY KIND. THE COMPANY'S MAXIMUM CUMULATIVE LIABILITY RELATIVE TO ALL OTHER CLAIMS AND LIABILITIES, INCLUDING THAT WITH RESPECT TO DIRECT DAMAGES AND OBLIGATIONS UNDER ANY INDEMNITY, WHETHER OR NOT INSURED, WILL NOT EXCEED THE COST OF THE PRODUCTS GIVING RISE TO THE CLAIM OR LIABILITY. THE COMPANY DISCLAIMS ALL LIABILITY RELATIVE TO GRATUITOUS INFORMATION OR ASSISTANCE PROVIDED BY, BUT NOT REQUIRED OF THE COMPANY HEREUNDER. ANY ACTION AGAINST THE COMPANY MUST BE BROUGHT WITHIN EIGHTEEN (18) MONTHS AFTER THE CAUSE OF ACTIONS ACCRUES. THESE DISCLAIMERS AND LIMITATIONS OF LIABILITY WILL APPLY REGARDLESS OF ANY OTHER CONTRARY PROVISION OF THE AGREEMENT AND REGARDLESS OF THE FORM OF ACTION, WHETHER IN CONTRACT, TORT OR OTHERWISE AND FURTHER WILL EXTEND TO THE BENEFIT OF THE COMPANY'S VENDORS, APPOINTED DISTRIBUTORS AND OTHER AUTHORIZED RESELLERS AS THIRD-PARTY BENEFICIARIES. EACH PROVISION IN THE AGREEMENT WHICH PROVIDES FOR A LIMITATION OF LIABILITY, DISCLAIMER OF WARRANTY OR CONDITION OR EXCLUSION OF DAMAGES IS SEVERABLE AND INDEPENDENT OF ANY OTHER PROVISION AND IS TO BE ENFORCED AS SUCH.

19. Penalty Clauses:
The Company will not accept any liability for penalty clauses of any kind, written or implied, unless specifically approved in writing by the Company.

20. Nuclear Applications:
Unless otherwise agreed to in writing by a duly authorized representative of the Company, equipment sold hereunder are not intended for use in connection with, any nuclear facility or activity. The Company disclaims all liability for any nuclear damage, injury or contamination and purchaser shall indemnify the Company against such liability, whether as a result of breach of contract, warranty, tort (including negligence) or otherwise. Upon authorization by a representative of the Company for sale or use of equipment in a nuclear facility or activity, the Company shall identify special controls which are manufactured and tested for use in connection with any nuclear installation or activity by the appropriate catalog number. The Company will charge a price addition for control devices sold for nuclear applications. Any questions by purchaser regarding products or pricing should be referred to the Company for clarification.

21. Government Clauses and Contracts:
No government contract regulations or clauses will apply to the equipment agreement or act to bind the Company unless specifically agreed to by the Company in writing at the Company's headquarters. Equipment sold or licensed hereunder are not intended to be used, nor should they be used, in any nuclear-related application either as a "Basic Component" under 10 CFR 21 (United States NRC) or otherwise under similar nuclear laws and regulations of this or any other country.

22. Intellectual Property: (not applicable to third-party branded products as is)
The Company will defend any suit or proceeding brought against the customer based on a claim that the design or construction of the Products sold or licensed hereunder by the Company infringe any United States or Canadian Patent, Copyright or Mask Work Registration, provided that the customer promptly notifies the Company of any such claim and resulting suit or proceeding, in writing and further provided that, at the Company's expense, (a) the customer gives the Company the sole right to defend or control the defense of the suit or proceeding including settlement, and (b) the customer provides all necessary information and assistance for that defense. Except for any consequential damages, the Company will pay all costs and damages finally awarded or agreed upon by the Company that are directly related to any such claim. In the event of a claim of infringement the Company's obligation under the Agreement will be fulfilled if the Company, at its option and expense, either (i) procures for the customer the right to continue using such Products; (ii) replaces the same with non-infringing Products; (iii) modifies the same so as to make them non-infringing: or (iv) accepts the return of any infringing Products and refunds their purchase price, Notwithstanding the foregoing. The Company will have no liability with respect to any claim of infringement to the extent based on a configuration or modification incorporated in the Products at the request of the customer, on any process application into which the Products are integrated by the customer, or on use of the Products in combination with other equipment or products not supplied by the Company. THIS PARAGRAPH SETS FORTH THE COMPANY'S ENTIRE LIABILITY WITH RESPECT TO INTELLECTUAL PROPERTY AND INFRINGEMENT OF PATENTS BY ANY PRODUCTS (INCLUDING SOFTWARE PROGRAMS, EQUIPMENT OR PRODUCTS THEREOF) OR BY THEIR OPERATION, AND IS IN LIEU OF ALL WARRANTIES OR CONDITIONS RELATION TO INFRINGEMENT OR INTELLECTUAL PROPERTY, EITHER EXPRESS OR IMPLIED.

23. Third Party Branded Products:
THE COMPANY MAKES NO REPRESENTATIONS AND DISCLAIMS ALL WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, RELATIVE TO ANY THIRD-PARTY BRANDED EQUIPMENT WHICH MAY BE SOLD BY THE COMPANY HEREUNDER. The only warranty associated with such equipment will be that provided directly by the original manufacturer, if any. The Company assumes no post-sale technical support or warranty repair obligation with respect to such equipment, however, at its discretion, the Company may assist the customer in processing warranties or representations made or provided relative to such equipment, which in all cases will be the responsibility of the original equipment solely for the convenience of the purchaser, and the purchaser must make its own determination as to the accuracy and completeness of such information.

24. Disputes:
The parties will attempt in good faith promptly to resolve any dispute arising out of this transaction by negotiations between representatives who have authority to settle the controversy. If unsuccessful, the parties further will attempt in good faith to settle the dispute by non-binding third-party mediation, with fees and expenses of such mediation apportioned equally to each side. Any dispute not so resolved by negotiation or mediation may then be submitted to a court of competent jurisdiction in accordance with the terms of this transaction. These procedures are the exclusive procedures for the resolution of all such disputes between the parties.

25. Governing Law:
This transaction and all disputes arising thereunder will be governed by and interpreted in accordance with the domestic-laws of the Province of Ontario. The provisions of the International Sale of Goods Act, R.S.O. (1990), C.I.10 as amended shall not be applicable to this transaction and are specifically excluded. At the sole discretion of the Company, for the purpose of legal proceedings, this transaction shall be deemed to have been performed in the Province of Ontario and the Courts of the Province of Ontario shall have jurisdiction to entertain any action arising under this transaction. The purchaser hereby attorns to the jurisdiction of the Courts of the Province of Ontario. However, nothing contained herein shall derogate from the right of the Company to proceed in such other jurisdiction as, in its sole discretion, it deems necessary.

26. Assignment:
This transaction may not be assigned by either party without the written consent of the other (which consent will not be unreasonably withheld), however, consent will not be required for internal transfers and assignments as between the company and its parent corporations, subsidiaries or affiliates as part of consolidation, merger or other form of corporate reorganization.

27. Language:
The parties acknowledge that they have required that this transaction be drawn up in English, Les parties reconnaissent avoir exigE la rEdaction en anglais du Contrat. In the event of a conflict between the English and other language versions of this agreement, the English version will prevail.

The full-load current values listed in the table below are for motors running at usual speeds, with normal torque characteristics at 1.15 service factor. This table is a guide only. The actual full load motor amps for your motor may be different than the average values listed here. Always use the actual motor current listed on the motor nameplate when purchasing motor control and protection products.

Motor Rating (HP)	AC Induction Motor – Full Load Current (A)						
	Single Phase			Three Phase			
	115 V	200 V	230 V	200 V	230 V	460 V	575 V
⅙	4.4	2.5	2.2	–	–	–	–
¼	5.8	3.3	2.9	–	–	–	–
⅓	7.2	4.1	3.6	–	–	–	–
½	9.8	5.6	4.9	2.3	2.0	1.0	0.8
¾	13.8	7.9	6.9	3.2	2.8	1.4	1.1
1	16	9.2	8	4.1	3.6	1.8	1.4
1½	20	11.5	10	6.0	5.2	2.6	2.1
2	24	13.8	12	7.8	6.8	3.4	2.7
3	34	19.6	17	11.0	9.6	4.8	3.9
5	56	32.2	28	17.5	15.2	7.6	6.1
7½	80	46	40	25.3	22	11	9
10	100	57.5	50	32.2	28	14	11
15	–	–	–	48.3	42	21	17
20	–	–	–	62.1	54	27	22
25	–	–	–	78.2	68	34	27
30	–	–	–	92.0	80	40	32
40	–	–	–	119.6	104	52	41
50	–	–	–	149.5	130	65	52
60	–	–	–	177.1	154	77	62
75	–	–	–	220.8	192	96	77
100	–	–	–	285.2	248	124	99
125	–	–	–	358.8	312	156	125
150	–	–	–	414	360	180	144
200	–	–	–	552	480	240	192
300	–	–	–	825	720	360	288
350	–	–	–	963	840	420	336
400	–	–	–	1100	960	480	384
450	–	–	–	1238	1080	540	432
500	–	–	–	1375	1200	600	480
600	–	–	–	1650	1440	720	576
700	–	–	–	1925	1680	840	672
800	–	–	–	2200	1920	960	768
900	–	–	–	2475	2160	1080	864
1000	–	–	–	2750	2400	1200	960

NOTE: This chart was developed from Table 430-148 & 430-150 of the NEC, Table 52.2 of UL standard 508 and from the Canadian Electrical Code (CEC), Part 1, table 44 and 45.

Moeller products are represented exclusively in North America by CopperLogic Inc.

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