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Assembly Instructions

Circuit-Breakers M3 for motor control

Rated current In A	Suitable for motors 1) 3~400V kW	Current setting range Thermal overload release **A**	Instantaneous short-circuit release A	Short-circuit breaking capacity at 3~400V kA		**Type**	Pack pcs.	Weight approx. kg/pcs.
Circuit-Breakers M3/12								
								
0,16	-	0,11 – 0,16	2,1	100	✓	**M3/12-0,16**	1	0,21
0,2	-	0,14 – 0,2	2,6	100		**M3/12-0,2**	1	0,21
0,25	0,06	0,18 – 0,25	3,3	100	✓	**M3/12-0,25**	1	0,21
0,32	0,09	0,22 – 0,32	4,2	100		**M3/12-0,32**	1	0,21
0,4	-	0,28 – 0,4	5,2	100	✓	**M3/12-0,4**	1	0,21
0,5	0,12	0,35 – 0,5	6,5	100		**M3/12-0,5**	1	0,21
0,63	0,18	0,45 – 0,63	8,2	100	✓	**M3/12-0,63**	1	0,21
0,8	-	0,55 – 0,8	10	100		**M3/12-0,8**	1	0,21
1	0,25	0,7 – 1	13	100	✓	**M3/12-1**	1	0,21
1,25	0,37	0,9 – 1,25	16	100		**M3/12-1,25**	1	0,21
1,6	0,55	1,1 – 1,6	21	100	✓	**M3/12-1,6**	1	0,21
2	0,75	1,4 – 2	26	100		**M3/12-2**	1	0,21
2,5	-	1,8 – 2,5	33	100	✓	**M3/12-2,5**	1	0,21
3,2	1,1	2,2 – 3,2	42	100		**M3/12-3,2**	1	0,21
4	1,5	2,8 – 4	52	100	✓	**M3/12-4**	1	0,21
5	-	3,5 – 5	65	100		**M3/12-5**	1	0,21
6,3	2,2	4,5 – 6,3	82	100	✓	**M3/12-6,3**	1	0,21
8	3	5,5 – 8	104	50		**M3/12-8**	1	0,21
10	4	7 – 10	130	50	✓	**M3/12-10**	1	0,21
12	5,5	9 – 12	156	50	✓	**M3/12-12**	1	0,21
Circuit-Breakers M3/25								
								
0,16	-	0,11 – 0,16	2,1	100		**M3/25-0,16**	1	0,32
0,2	-	0,14 – 0,2	2,6	100		**M3/25-0,2**	1	0,32
0,25	0,06	0,18 – 0,25	3,3	100		**M3/25-0,25**	1	0,32
0,32	0,09	0,22 – 0,32	4,2	100		**M3/25-0,32**	1	0,32
0,4	-	0,28 – 0,4	5,2	100		**M3/25-0,4**	1	0,32
0,5	0,12	0,35 – 0,5	6,5	100		**M3/25-0,5**	1	0,32
0,63	0,18	0,45 – 0,63	8,2	100		**M3/25-0,63**	1	0,32
0,8	-	0,55 – 0,8	10	100		**M3/25-0,8**	1	0,32
1	0,25	0,7 – 1	13	100		**M3/25-1**	1	0,32
1,25	0,37	0,9 – 1,25	16	100		**M3/25-1,25**	1	0,32
1,6	0,55	1,1 – 1,6	21	100		**M3/25-1,6**	1	0,32
2	0,75	1,4 – 2	26	100		**M3/25-2**	1	0,32
2,5	-	1,8 – 2,5	33	100		**M3/25-2,5**	1	0,32
3,2	1,1	2,2 – 3,2	42	100		**M3/25-3,2**	1	0,32
4	1,5	2,8 – 4	52	100		**M3/25-4**	1	0,32
5	-	3,5 – 5	65	100		**M3/25-5**	1	0,32
6,3	2,2	4,5 – 6,3	82	100		**M3/25-6,3**	1	0,32
8	3	5,5 – 8	104	100		**M3/25-8**	1	0,32
10	4	7 – 10	130	100		**M3/25-10**	1	0,32
12,5	5,5	9 – 12,5	163	100	✓	**M3/25-12,5**	1	0,32
16	7,5	11 – 16	208	50	✓	**M3/25-16**	1	0,32
20	-	14 – 20	260	50	✓	**M3/25-20**	1	0,32
22	-	17 – 22	286	50		**M3/25-22**	1	0,32
25	11	20 – 25	325	50	✓	**M3/25-25**	1	0,32
Circuit-Breakers M3/50								
								
25	11	18 – 25	325	50		**M3/50-25**	1	0,96
32	15	22 – 32	416	50		**M3/50-32**	1	0,96
40	18,5	28 – 40	520	50	✓	**M3/50-40**	1	0,96
45	-	36 – 45	585	50		**M3/50-45**	1	0,96
50	22	40 – 50	650	50	✓	**M3/50-50**	1	0,96
Circuit-Breakers M3/100								
								
63	30	45 – 63	819	50		**M3/100-63**	1	2,1
75	37	57 – 75	975	50	✓	**M3/100-75**	1	2,1
90	-	70 – 90	1170	50		**M3/100-90**	1	2,1
100	45	80 – 100 2)	1235	50	✓	**M3/100-100**	1	2,1

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1) Recommended values for standard motors 2) Max. motor current 95A

Accessories

	Description	Version	for circuit-breaker		Type	Pack pcs.	Weight approx. kg/pcs.
Transverse auxiliary contact block, max. 1pc. per circuit-breaker							
	**Contact block**	2NO	all		**M3 HQ20**	10	0,02
	Contact block	1 changeover contact	all		**M3 HQW**	10	0,02
	Contact block	1NO + 1NC	all	✓	**M3 HQ11**	10	0,02
	**Contact block** for low level switching	1 changeover contact AC15/DC13 1 - 300mA 3 - 60V	all		**M3 HQWE**	10	0,02
	**Covering cap**	for transverse aux. contact block	M3/12 M3/25		**M3 HA**	10	
Auxiliary contact block for left hand side mounting, max. 1pc. per circuit-breaker							
	**Contact block**	1NO + 1NC 9mm	all	✓	**M3 HS11**	1	0,03
	Contact block	2NO 9mm	all	✓	**M3 HS20**	1	0,03
	Contact block	2NC 9mm	all		**M3 HS02**	1	0,03
Signalling switch for left hand side mounting, max. 1pc. per circuit-breaker							
	**Signalling switch**	1NO + 1NC each Individual tripped and short-circuit signalling	M3/25 M3/50 M3/100	✓	**M3 M11**	1	0,07
Auxiliary releases for right hand side mounting, max. 1pc. per circuit-breaker							
	**Undervoltage release** 18mm Trips the circuit-breaker when the voltage is interrupted. Prevents the motor from being restarted accidentally when the voltage is restored, suitable for EMERGENCY STOP acc. to VDE 0113						
	AC 50Hz	AC 60Hz					
	110V	120V	all		**M3 U110**	1	0,12
	230V	240V	all	✓	**M3 U230**	1	0,12
	400V		all	✓	**M3 U400**	1	0,12
	415V	480V	all		**M3 U415**	1	0,12
	**Shunt release** 18mm Trips the circuit-breaker when the release coil energized.						
	50/60Hz	50/60Hz, DC					
	100% ON	5sek. ON					
	20-24V	20-70V	all		**M3 A24**	1	0,11
	210-240V	190-330V	all	✓	**M3 A230**	1	0,11
Isolator modules							
	**Isolator module** for visible isolating distance	for isolating individual circuit-breakers from the system, lockable in isolating position	M3/25 M3/50		**M3 25 TB** **M3 50 TB**	1 1	0,15 0,29

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Enclosures and Front Plates

	Description	Version	for circuit-breaker		Type	Pack pcs.	Weight approx. kg/pcs.
Front Plates							
	**Moulded plastic front plate** with actuator diaphragm and holder for circuit breaker	for actuation of circuit-breakers in any enclosure protection degree IP55	M3/12		**M3 12 P**	1	0,08
	**Moulded plastic front plate** with rotary operating mechanism lockable	for actuation of circuit-breakers in any enclosure protection degree IP65	M3/25 M3/50 M3/100		**M3 25-100 P**	1	0,08
	Holder for front plate M3 25-100P	Holder is mounted on front plate, circuit-breaker (with accessories) is snapped in	M3/25		**M3 25 PH**	1	0,12
Enclosures							
	**Moulded plastic enclose** with actuator diaphragm knockouts for M25 sealable	protection degree IP55 with N- and PE-terminal 54mm (+ lateral contact block) 72mm (+aux. contact + release)	 M3/12 M3/12	✓ 	 **M3 12 PF 54** **M3 12 PF 72**	 1 1	 0,23 0,27
	**Moulded plastic enclose** with rotary operating mechanism knockouts for M25 lockable	protection degree IP55 with N- and PE-terminal 54mm (+ lateral contact block) 72mm (+aux. contact + release)	 M3/25 M3/25	✓ 	 **M3 25 PFH4 54** **M3 25 PFH4 72**	 1 1	 0,26 0,30
Accessories for Enclosures							
	**Emergency-Stop button** for all enclosures and front plates M3 12..	Mushroom button, latching unlatching by turning	M3/12		**M3 12 P44**	1	0,07
	**Indicator light** for all enclosures and front plates	with glow lamps and coloured lenses, red, green, yellow orange and clear 110 - 120V 230 - 240V 380 - 415V 480 - 500V	 M3/12-50 M3/12-50 M3/12-50 M3/12-50	 ✓ ✓ 	 **M3 L110** **M3 L230** **M3 L400** **M3 L480**	 1 1 1 1	 0,03 0,03 0,03 0,03
Door-coupling rotary mechanisms							
	The door-coupling rotary operating mechanisms consist of a knob, a coupling driver and a extension shaft (5 mm x 5 mm). The door-coupling rotary operating mechanisms are designed for degree of protection IP 65. The door locking device prevents accidental opening of the cubicle door in the ON position of the circuit-breaker. The OFF position can be locked with up to 3 padlocks.						
	Door-coupling rotary mechanism black	 extension shaft 130mm extension shaft 330mm with supporting bracket	M3/25 - 100		 **M3 25-100 ZH4 130** **M3 25-100 ZH4 330**	 1 1	 0,1 0,3
	Emergency-Stop Door-coupling rotary mechanism red/yellow	 extension shaft 130mm extension shaft 330mm with supporting bracket	M3/25 - 100		 **M3 25-100 ZHN4 130** **M3 25-100 ZHN4 330**	 1 1	 0,1 0,3
Skalenabdeckung							
	**Scale cover** sealable	for covering the current setting scale	all		**M3 K**	10	0,01
Mounting accessories							
	**Push-in lugs**	for screwing the circuit-breaker onto mounting plates. 2 units required (1 pag with 10 units)	M3/12-25		**M3 12-25 L**	10	0,01

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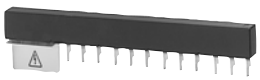
Busbars

	Description	Version	for circuit-breaker	Type	Pack pcs.	Weight approx. kg/pcs.
Insulated 3-phase busbar system						
	For feeding several modular circuit-breakers on standard mounting rails, insulated, shock-protected Rated operational voltage max. 690 V					
	**3-phase busbars** modular spacing 45mm 63A	for 2 circuit-breakers for 3 circuit-breakers for 4 circuit-breakers for 5 circuit-breakers	M3/12, 25 ✓ ✓ ✓ ✓	**M3 12-25 S2** **M3 12-25 S3** **M3 12-25 S4** **M3 12-25 S5**	1 1 1 1	0,03 0,05 0,07 0,10
	For connecting the 3-phase busbars from circuit-breakers different sizes. Clamping together M3/12 and M3/25 circuit-breakers is not possible due to the different modular spacings and the different heights of the terminals.					
	**Connector** modular spacing 45mm, 63A	circuit-breakers M3/25 left with circuit-breakers M3/12 right hand side	M3/12 M3/25 ✓	**M3 12-25 SV**	1	0,04
	3-phase busbars modular spacing 55mm, 108A	for 2 circuit-breakers for 3 circuit-breakers for 4 circuit-breakers	M3/50	**M3 50 S2** **M3 50 S3** **M3 50 S4**	1 1 1	0,15 0,2 0,3
	**Line side terminal** 3-pole, connection from above	Conductor cross-section solid or stranded 6-25mm² with end sleeve 4-16mm² 1 x 2,5 - 50mm² 2 x 35mm²	M3/12 ✓ M3/25 ✓ M3/50	**M3 12 SE** **M3 25 SE** **M3 50 SE**	1 1 1	0,04 0,04 0,1
	**Cover for tags**	Touch guard for empty spaces	M3/12, 25 M3/50	**M3 12-25 SF** **M3 50 SF**	1 1	0,003 0,065
Mounting accessories						
	**Solder pin connection** for main contacts	for soldering the connections to a printed circuit board 1 pack = 8 parts	M3/12	**M3 12 LA1**	1	0,1
	Solder pin connection for main contacts and aux. contact M3 HQ11	for soldering the connections to a printed circuit board 1 pack = 12 parts	M3/12	**M3 12 LA2**	1	0,19
Terminal block with increased creepage distances and clearances acc. to cULus Type "E"						
	**Terminal block**	up to 600V acc. to UL 489 not for transverse aux. contact block	M3/25 M3/100	**M3 25 E** **M3 100 E**	1 1	0,12 0,12

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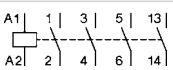
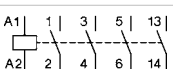
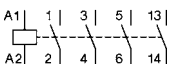
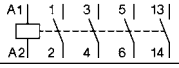
Mounting Parts for Fuseless Load Feeders

	Description	Version	for circuit-breaker		Type	Pack pcs.	Weight kg/pcs.
DIN-rail adapters							
	**Adapter** for mechanical fixing of circuit-breaker and contactor	35mm-DIN-rail (DIN EN50022) or screw mounting	M3/12 M3/25	✓	**M3 12-25 HU1**	1	0,05
	Adapter for mechanical fixing of circuit-breaker and reversing or YD contactor	35mm-DIN-rail (DIN EN50022) or screw mounting	M3/12 M3/25		**M3 12-25 HU2**	1	0,10
	**Adapter** for mechanical fixing of circuit-breaker and contactor	DIN-rail mounting 2x35mm-DIN-rails with 125mm distance or 75mm-DIN-rail or screw mounting	M3/50	✓	**M3 50 HU1**	1	0,20
	Adapter for mechanical fixing of circuit-breaker and contactor	DIN-rail mounting 2x35mm-DIN-rails with 125mm distance or 75mm-DIN-rail or screw mounting	M3/100	✓	**M3 100 HU1**	1	0,25
Busbar adapters							
	**f**or circuit-breaker and contactor 40-mm-system for 3 copper busbars acc. to DIN 46433 width: 12 and 15mm, thickness: 5 and 10mm **Busbar adapter**	25A, up to 690V 45mm width, 121mm long	M3/12 M3/25		**M3 12-25 SA40**	1	0,10
	40-mm-system for 3 copper busbars acc. to DIN 46433 width: 12 and 15mm thickness: 5 and 10mm or T-profile **Busbar adapter**	25A, up to 690V 45mm width, 182mm long	M3/12 M3/25	✓	**M3 12-25 SA60**	1	0,18
	Busbar adapter	56A, up to 690V 55mm width, 182mm long	M3/50		**M3 50 SA60**	1	0,17
	Busbar adapter	100A, up to 400V 70mm width, 182mm long	M3/50		**M3 100 SA601**	1	0,17
	Busbar adapter	100A, up to 690V 72mm width, 182mm long	M3/50		**M3 100 SA602**	1	0,17
Link modules							
	for connection between circuit-breaker and contactor **Link module** mechanical a. electr.	for contactors K1-.. max. 25A	M3/12 M3/25	✓	**M3 12-25 VK1**	1	0,015
	Link module mechanical a. electr.	for contactors K3-10 up to K3-22, max. 25A	M3/12 M3/25	✓	**M3 12-25 VK3**	1	0,02
	Link module mechanical a. electr.	for contactors KG3-10 up to KG3-22, max. 25A	M3/12 M3/25	✓	**M3 12-25 VKG3**	1	0,02
	**Link module** electrical	up to 20A up to 32A up to 50A up to 100A	M3/12 M3/25 M3/50 M3/100	 ✓ ✓	**M3 12 VD** **M3 25 VD** **M3 50 VD** **M3 100 VD**	1 1 1 1	

Contactors for Circuit Breakers M3/12 and M3/25

Motor AC3 400V kW	Current I_{th} A		add. contact blocks max.	Type Coil VAC ▼	Pack pcs.	Weight approx. kg/pcs.
4	25		4 HN..	**K3-10A10 230 VK3**	1	0,25
5,5	25		4 HN..	**K3-14A10 230 VK3**	1	0,25
7,5	32		4 HN..	**K3-18A10 230 VK3**	1	0,25
11	32		4 HN..	**K3-22A10 230 VK3**	1	0,25

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Components for Fuseless Load Feeders, DIN-Rail Mounting

Type of coordination "1" 3x415V 10kA [1)]





Motor 3~400V kW	Setting range A		Circuit-breaker page 2 Type	Contactor [2)] 220-230V 50Hz Type	**Link module Type**	**DIN-rail adapter Type**	**Fuseless Load Feeders Type**
-	0,11 – 0,16	✓	M3/12-0,16	K1-09D10 230	**M3 12-25 VK1**	**-**	**A12-0,16/09D10 230**
-	0,14 – 0,2		M3/12-0,2	K1-09D10 230	**M3 12-25 VK1**	**-**	**A12-0,2/09D10 230**
0,06	0,18 – 0,25	✓	M3/12-0,25	K1-09D10 230	**M3 12-25 VK1**	**-**	**A12-0,25/09D10 230**
0,09	0,22 – 0,32		M3/12-0,32	K1-09D10 230	**M3 12-25 VK1**	**-**	**A12-0,32/09D10 230**
-	0,28 – 0,4	✓	M3/12-0,4	K1-09D10 230	**M3 12-25 VK1**	**-**	**A12-0,4/09D10 230**
0,12	0,35 – 0,5		M3/12-0,5	K1-09D10 230	**M3 12-25 VK1**	**-**	**A12-0,5/09D10 230**
0,18	0,45 – 0,63	✓	M3/12-0,63	K1-09D10 230	**M3 12-25 VK1**	**-**	**A12-0,63/09D10 230**
-	0,55 – 0,8		M3/12-0,8	K1-09D10 230	**M3 12-25 VK1**	**-**	**A12-0,8/09D10 230**
0,25	0,7 – 1	✓	M3/12-1	K1-09D10 230	**M3 12-25 VK1**	**-**	**A12-1/09D10 230**
0,37	0,9 – 1,25		M3/12-1,25	K1-09D10 230	**M3 12-25 VK1**	**-**	**A12-1,25/09D10 230**
0,55	1,1 – 1,6	✓	M3/12-1,6	K1-09D10 230	**M3 12-25 VK1**	**-**	**A12-1,6/09D10 230**
0,75	1,4 – 2		M3/12-2	K1-09D10 230	**M3 12-25 VK1**	**-**	**A12-2/09D10 230**
-	1,8 – 2,5	✓	M3/12-2,5	K1-09D10 230	**M3 12-25 VK1**	**-**	**A12-2,5/09D10 230**
1,1	2,2 – 3,2		M3/12-3,2	K1-09D10 230	**M3 12-25 VK1**	**-**	**A12-3,2/09D10 230**
1,5	2,8 – 4	✓	M3/12-4	K1-09D10 230	**M3 12-25 VK1**	**-**	**A12-4/09D10 230**
-	3,5 – 5		M3/12-5	K1-09D10 230	**M3 12-25 VK1**	**-**	**A12-5/09D10 230**
2,2	4,5 – 6,3	✓	M3/12-6,3	K1-09D10 230	**M3 12-25 VK1**	**-**	**A12-6,3/09D10 230**
3	5,5 – 8		M3/12-8	K1-09D10 230	**M3 12-25 VK1**	**-**	**A12-8/09D10 230**
4	7 – 10	✓	M3/12-10	K1-09D10 230	**M3 12-25 VK1**	**-**	**A12-10/09D10 230**
5,5	9 – 12	✓	M3/12-12	K1-12D10 230	**M3 12-25 VK1**	**-**	**A12-12/12D10 230**
-	0,11 – 0,16		M3/25-0,16	**K3-10A10 230 VK3**	-	**-**	**A25-0,16/10A10 230A**
-	0,14 – 0,2		M3/25-0,2	**K3-10A10 230 VK3**	-	**-**	**A25-0,2/10A10 230A**
0,06	0,18 – 0,25		M3/25-0,25	**K3-10A10 230 VK3**	-	**-**	**A25-0,25/10A10 230A**
0,09	0,22 – 0,32		M3/25-0,32	**K3-10A10 230 VK3**	-	**-**	**A25-0,32/10A10 230A**
-	0,28 – 0,4		M3/25-0,4	**K3-10A10 230 VK3**	-	**-**	**A25-0,4/10A10 230A**
0,12	0,35 – 0,5		M3/25-0,5	**K3-10A10 230 VK3**	-	**-**	**A25-0,5/10A10 230A**
0,18	0,45 – 0,63		M3/25-0,63	**K3-10A10 230 VK3**	-	**-**	**A25-0,63/10A10 230A**
-	0,55 – 0,8		M3/25-0,8	**K3-10A10 230 VK3**	-	**-**	**A25-0,8/10A10 230A**
0,25	0,7 – 1		M3/25-1	**K3-10A10 230 VK3**	-	**-**	**A25-1/10A10 230A**
0,37	0,9 – 1,25		M3/25-1,25	**K3-10A10 230 VK3**	-	**-**	**A25-1,25/10A10 230A**
0,55	1,1 – 1,6		M3/25-1,6	**K3-10A10 230 VK3**	-	**-**	**A25-1,6/10A10 230A**
0,75	1,4 – 2		M3/25-2	**K3-10A10 230 VK3**	-	**-**	**A25-2/10A10 230A**
-	1,8 – 2,5		M3/25-2,5	**K3-10A10 230 VK3**	-	**-**	**A25-2,5/10A10 230A**
1,1	2,2 – 3,2		M3/25-3,2	**K3-10A10 230 VK3**	-	**-**	**A25-3,2/10A10 230A**
1,5	2,8 – 4		M3/25-4	**K3-10A10 230 VK3**	-	**-**	**A25-4/10A10 230A**
-	3,5 – 5		M3/25-5	**K3-10A10 230 VK3**	-	**-**	**A25-5/10A10 230A**
2,2	4,5 – 6,3		M3/25-6,3	**K3-10A10 230 VK3**	-	**-**	**A25-6,3/10A10 230A**
3	5,5 – 8		M3/25-8	**K3-10A10 230 VK3**	-	**-**	**A25-8/10A10 230A**
4	7 – 10		M3/25-10	**K3-10A10 230 VK3**	-	**-**	**A25-10/10A10 230A**
5,5	9 – 12,5	✓	M3/25-12,5	**K3-14A10 230 VK3**	-	**-**	**A25-12,5/14A10 230A**
7,5	11 – 16	✓	M3/25-16	**K3-18A10 230 VK3**	-	**-**	**A25-16/18A10 230A**
-	14 – 20	✓	M3/25-20	**K3-22A10 230 VK3**	-	**-**	**A25-20/22A10 230A**
-	17 – 22		M3/25-22	**K3-22A10 230 VK3**	-	**-**	**A25-22/22A10 230A**
11	20 – 25	✓	M3/25-25	**K3-22A10 230 VK3**	-	**-**	**A25-25/22A10 230A**
11	20 – 25		M3/50-25	K3-24A00 230	**M3 50 VD**	**M3 50 HU1**	**A50-25/24A00 230A**
15	22 – 32		M3/50-32	K3-32A00 230	**M3 50 VD**	**M3 50 HU1**	**A50-32/32A00 230A**
18,5	28 – 40	✓	M3/50-40	K3-40A00 230	**M3 50 VD**	**M3 50 HU1**	**A50-40/40A00 230A**
-	36 – 45		M3/50-45	K3-50A00 230	**M3 50 VD**	**M3 50 HU1**	-
22	40 – 50	✓	M3/50-50	K3-50A00 230	**M3 50 VD**	**M3 50 HU1**	-
30	45 – 63		M3/100-63	K3-62A00 230	**M3 100 VD**	**M3 100 HU1**	-
37	57 – 75	✓	M3/100-75	K3-74A00 230	**M3 100 VD**	**M3 100 HU1**	-
-	70 – 90		M3/100-90	K85A22 230	**-**	**-**	-
45	80 – 100	✓	M3/100-100	K110A22 230	**-**	**-**	-

✓ promptly available

1) other conditions on request
2) Contactors K1.. 220-230V 50HZ, Contactors K3.. 220-240V 50HZ, further technical data see Catalog D677..

Components for Fuseless Load Feeders, Busbar Mounting, 60mm-System

Type of coordination "1" 3x415V 10kA [1]




Motor 3~400V kW	Setting range A		Circuit-breaker page 2 Type	Contactor [2] 220-230V 50Hz Type	**Link module Type**	**Busbar adapter Type**
-	0,11 – 0,16	✓	M3/12-0,16	K1-09D10 230	**M3 12-25 VK1**	**M3 12-25 SA60**
-	0,14 – 0,2		M3/12-0,2	K1-09D10 230	**M3 12-25 VK1**	**M3 12-25 SA60**
0,06	0,18 – 0,25	✓	M3/12-0,25	K1-09D10 230	**M3 12-25 VK1**	**M3 12-25 SA60**
0,09	0,22 – 0,32		M3/12-0,32	K1-09D10 230	**M3 12-25 VK1**	**M3 12-25 SA60**
-	0,28 – 0,4	✓	M3/12-0,4	K1-09D10 230	**M3 12-25 VK1**	**M3 12-25 SA60**
0,12	0,35 – 0,5		M3/12-0,5	K1-09D10 230	**M3 12-25 VK1**	**M3 12-25 SA60**
0,18	0,45 – 0,63	✓	M3/12-0,63	K1-09D10 230	**M3 12-25 VK1**	**M3 12-25 SA60**
-	0,55 – 0,8		M3/12-0,8	K1-09D10 230	**M3 12-25 VK1**	**M3 12-25 SA60**
0,25	0,7 – 1	✓	M3/12-1	K1-09D10 230	**M3 12-25 VK1**	**M3 12-25 SA60**
0,37	0,9 – 1,25		M3/12-1,25	K1-09D10 230	**M3 12-25 VK1**	**M3 12-25 SA60**
0,55	1,1 – 1,6	✓	M3/12-1,6	K1-09D10 230	**M3 12-25 VK1**	**M3 12-25 SA60**
0,75	1,4 – 2		M3/12-2	K1-09D10 230	**M3 12-25 VK1**	**M3 12-25 SA60**
-	1,8 – 2,5	✓	M3/12-2,5	K1-09D10 230	**M3 12-25 VK1**	**M3 12-25 SA60**
1,1	2,2 – 3,2		M3/12-3,2	K1-09D10 230	**M3 12-25 VK1**	**M3 12-25 SA60**
1,5	2,8 – 4	✓	M3/12-4	K1-09D10 230	**M3 12-25 VK1**	**M3 12-25 SA60**
-	3,5 – 5		M3/12-5	K1-09D10 230	**M3 12-25 VK1**	**M3 12-25 SA60**
2,2	4,5 – 6,3	✓	M3/12-6,3	K1-09D10 230	**M3 12-25 VK1**	**M3 12-25 SA60**
3	5,5 – 8		M3/12-8	K1-09D10 230	**M3 12-25 VK1**	**M3 12-25 SA60**
4	7 – 10	✓	M3/12-10	K1-09D10 230	**M3 12-25 VK1**	**M3 12-25 SA60**
5,5	9 – 12	✓	M3/12-12	K1-12D10 230	**M3 12-25 VK1**	**M3 12-25 SA60**
-	0,11 – 0,16		M3/25-0,16	**K3-10A10 230 VK3**	-	**M3 12-25 SA60**
-	0,14 – 0,2		M3/25-0,2	**K3-10A10 230 VK3**	-	**M3 12-25 SA60**
0,06	0,18 – 0,25		M3/25-0,25	**K3-10A10 230 VK3**	-	**M3 12-25 SA60**
0,09	0,22 – 0,32		M3/25-0,32	**K3-10A10 230 VK3**	-	**M3 12-25 SA60**
-	0,28 – 0,4		M3/25-0,4	**K3-10A10 230 VK3**	-	**M3 12-25 SA60**
0,12	0,35 – 0,5		M3/25-0,5	**K3-10A10 230 VK3**	-	**M3 12-25 SA60**
0,18	0,45 – 0,63		M3/25-0,63	**K3-10A10 230 VK3**	-	**M3 12-25 SA60**
-	0,55 – 0,8		M3/25-0,8	**K3-10A10 230 VK3**	-	**M3 12-25 SA60**
0,25	0,7 – 1		M3/25-1	**K3-10A10 230 VK3**	-	**M3 12-25 SA60**
0,37	0,9 – 1,25		M3/25-1,25	**K3-10A10 230 VK3**	-	**M3 12-25 SA60**
0,55	1,1 – 1,6		M3/25-1,6	**K3-10A10 230 VK3**	-	**M3 12-25 SA60**
0,75	1,4 – 2		M3/25-2	**K3-10A10 230 VK3**	-	**M3 12-25 SA60**
-	1,8 – 2,5		M3/25-2,5	**K3-10A10 230 VK3**	-	**M3 12-25 SA60**
1,1	2,2 – 3,2		M3/25-3,2	**K3-10A10 230 VK3**	-	**M3 12-25 SA60**
1,5	2,8 – 4		M3/25-4	**K3-10A10 230 VK3**	-	**M3 12-25 SA60**
-	3,5 – 5		M3/25-5	**K3-10A10 230 VK3**	-	**M3 12-25 SA60**
2,2	4,5 – 6,3		M3/25-6,3	**K3-10A10 230 VK3**	-	**M3 12-25 SA60**
3	5,5 – 8		M3/25-8	**K3-10A10 230 VK3**	-	**M3 12-25 SA60**
4	7 – 10		M3/25-10	**K3-10A10 230 VK3**	-	**M3 12-25 SA60**
5,5	9 – 12,5	✓	M3/25-12,5	**K3-14A10 230 VK3**	-	**M3 12-25 SA60**
7,5	11 – 16	✓	M3/25-16	**K3-18A10 230 VK3**	-	**M3 12-25 SA60**
-	14 – 20	✓	M3/25-20	**K3-22A10 230 VK3**	-	**M3 12-25 SA60**
-	17 – 22		M3/25-22	**K3-22A10 230 VK3**	-	**M3 12-25 SA60**
11	20 – 25	✓	M3/25-25	**K3-22A10 230 VK3**	-	**M3 12-25 SA60**
11	20 – 25		M3/50-25	K3-24A00 230	**M3 50 VD**	**M3 50 SA60**
15	22 – 32		M3/50-32	K3-32A00 230	**M3 50 VD**	**M3 50 SA60**
18,5	28 – 40	✓	M3/50-40	K3-40A00 230	**M3 50 VD**	**M3 50 SA60**
-	36 – 45		M3/50-45	K3-50A00 230	**M3 50 VD**	**M3 50 SA60**
22	40 – 50	✓	M3/50-50	K3-50A00 230	**M3 50 VD**	**M3 50 SA60**
30	45 – 63		M3/100-63	K3-62A00 230	**M3 100 VD**	**M3 100 SA601**
37	57 – 75	✓	M3/100-75	K3-74A00 230	**M3 100 VD**	**M3 100 SA601**

✓ promptly available

1) other conditions on request
2) Contactors K1.. 220-230V 50HZ, Contactors K3.. 220-240V 50HZ, further technical data see Catalog D677..

Technical Data according to IEC/EN 60947-1, 60947-2, 60947-4-1 and VDE 0660

This table shows the rated ultimate short-circuit breaking capacity Icu and the rated service short-circuit breaking capacity Ics of the M3 circuit-breakers with different operational voltages as a function of the rated current In of the circuit-breakers.
The circuit-breakers can be fed at the top or bottom supply terminals without any reduction of the rated data.

If the short-circuit current exceeds the rated short-circuit breaking capacity of the circuit-breaker specified in the tables at the installation point, a back-up fuse is to be used.
The maximum rated current for the back-up fuse is specified in the tables. These fuses are only suitable for the short-circuit-currents as indicated on the fuses.

Circuit-breaker	Rated current In	up to AC 240V [2]			up to AC 400V [2] up to AC 415V [3]			up to AC 440V [2] up to AC 460V [3]			up to AC 500V [2] up to AC 525V [3]			up to AC 690V [2]		
		Icu	Ics	max. fuse [1] (gL/gG)	Icu	Ics	max. fuse [1] (gL/gG)	Icu	Ics	max. fuse [1] (gL/gG)	Icu	Ics	max. fuse [1] (gL/gG)	Icu	Ics	max. fuse [1] (gL/gG)
Type	A	kA	kA	A	kA	kA	A	kA	kA	A	kA	kA	A	kA	kA	A
M3/12	0,16 bis 0,8	100	100	--	100	100	--	100	100	--	100	100	--	100	100	--
	1	100	100	--	100	100	--	100	100	--	100	100	--	100	100	--
	1,25	100	100	--	100	100	--	100	100	--	100	100	--	2	2	20
	1,6	100	100	--	100	100	--	100	100	--	100	100	--	2	2	20
	2	100	100	--	100	100	--	100	100	--	10	10	35	2	2	35
	2,5	100	100	--	100	100	--	100	100	--	10	10	35	2	2	35
	3,2	100	100	--	100	100	--	50	10	40	3	3	40	2	2	40
	4	100	100	--	100	100	--	50	10	40	3	3	40	2	2	40
	5	100	100	--	100	100	--	50	10	50	3	3	50	2	2	50
	6,3	100	100	--	100	100	--	50	10	50	3	3	50	2	2	50
	8	100	100	--	50	12,5	80	50	10	63	3	3	63	2	2	63
	10	100	100	--	50	12,5	80	10	10	63	3	3	63	2	2	63
	12	100	100	--	50	12,5	80	10	10	80	3	3	80	2	2	80
M3/25	0,16 bis 1,25	100	100	--	100	100	--	100	100	--	100	100	--	100	100	--
	1,6	100	100	--	100	100	--	100	100	--	100	100	--	100	100	--
	2	100	100	--	100	100	--	100	100	--	100	100	--	8	8	25
	2,5	100	100	--	100	100	--	100	100	--	100	100	--	8	8	25
	3,2	100	100	--	100	100	--	100	100	--	100	100	--	8	8	32
	4	100	100	--	100	100	--	100	100	--	100	100	--	6	3	32
	5	100	100	--	100	100	--	100	100	--	100	100	--	6	3	32
	6,3	100	100	--	100	100	--	100	100	--	100	100	--	6	3	50
	8	100	100	--	100	100	--	50	25	63	42	21	63	6	3	50
	10	100	100	--	100	100	--	50	25	80	42	21	63	6	3	50
	12,5	100	100	--	100	100	--	50	25	80	42	21	80	6	3	63
	16	100	100	--	50	25	100	50	10	80	10	5	80	4	2	63
	20	100	100	--	50	25	125	50	10	80	10	5	80	4	2	63
	22	100	100	--	50	25	125	50	10	100	10	5	80	4	2	63
	25	100	100	--	50	25	125	50	10	100	10	5	80	4	2	63
M3/50	25	100	100	--	50	25	100	50	15	100	12	6	80	5	3	63
	32	100	100	--	50	25	125	50	15	125	10	5	100	4	2	63
	40	100	100	--	50	25	160	50	15	125	10	5	100	4	2	63
	45	100	100	--	50	25	160	50	15	125	10	5	100	4	2	63
	50	100	100	--	50	25	160	50	15	125	10	5	100	4	2	80
M3/100	63	100	100	--	50	25	160	50	20	160	12	6	100	6	3	80
	75	100	100	--	50	25	160	50	20	160	8	4	125	5	3	100
	90	100	100	--	50	25	160	50	20	160	8	4	125	5	3	125
	100	100	100	--	50	25	160	50	20	160	8	4	125	5	3	125

-- No back-up fuse required
1) Back up fuse required if short-cicuit current at installation point > Icu
2) 10 % overvoltage
3) 5 % overvoltage

Technical Data according to IEC/EN 60947-1, 60947-2, 60947-4-1 and VDE 0660

Main Circuit

Type			M3/12	M3/25	M3/50	M3/100
Number of poles			3	3	3	3
Max. rated current Inmax (=max. rated operational current Ie)		A	12	25	50	100
Permissible ambient temperature						
Storage/transport		°C	-50 to +80			
Operation		°C	-20 to +70 [1]			
Permissible rated current at temperature inside cubicle of:						
	+60 °C	%	100			
	+70 °C	%	87			
Circuit-breaker inside enclosure						
Permissible rated current at temperature inside enclosure of:						
	+35 °C	%	100			
	+60 °C	%	87			
Rated operational voltage Ue		V	690 [2]			
Rated frequency		Hz	50/60			
Rated insulation voltage Ui		V	690			
Rated impulse withstand voltage Uimp		kV	6			
Utilization category						
IEC 60 947-2 (circuit-breaker)			A			
IEC 60 947-4-1 (motor starter)			AC-3			
Class	acc. to IEC 60 947-4-1		10			
DC short-circuit breaking capacity (time constant t = 5 ms)						
1 conducting path DC 150 V		kA	10			
2 conducting paths in series DC 300 V		kA	10			
3 conducting paths in series DC 450 V		kA	10			
Power loss Pv per circuit-breaker	In -> to 1,25 A	W	5	-	-	-
dependent on rated current In	In -> 1,6 to 6,3 A	W	6	-	-	-
(upper setting range)	In -> 8 to 12 A	W	7	-	-	-
R per conducting path = P/I² × 3	In -> 1 to 6,3 A	W	-	6	-	-
	In -> 8 to 16 A	W	-	7	-	-
	In -> 20 to 25 A	W	-	8	-	-
	In -> to 25 A	W	-	-	12	-
	In -> 32 A	W	-	-	15	-
	In -> 40 to 50 A	W	-	-	20	-
	In -> to 63 A	W	-	-	-	20
	In -> 75 and 90 A	W	-	-	-	30
	In -> to 100 A	W	-	-	-	38
Shock resistance	acc. to IEC 68 Part 2-27	g	25	25	25	25
Degree of protection	acc. to IEC 60 529		IP 20	IP 20	IP 20 [3]	IP 20 [3]
Shock hazard protection	acc. to DIN VDE 0106 Part 100		**safe against finger touch**			
Temperature compensation	acc. to IEC 60 947-4-1	°C	-20 to +60			
Phase failure sensitivity	acc. to IEC 60 947-4-1		yes			
Explosion protection	acc. to EC Directive 94191 EC		yes [4]			
Isolator characteristics	acc. to IEC 60 947-3		yes			
Main and EM. STOP switch characteristics	acc. to IEC 60 204-1 (VDE 0113)		yes [5]			
Safe isolation between main and auxiliary circuits						
	acc. to DIN VDE 0106 Part 101					
	up to 400 V + 10 %		yes			
	up to 415 V+ 5 %		yes			
Mechanical endurance		operating cycles	100 000	100 000	50 000	50 000
Electrical endurance			100 000	100 000	25 000	25 000
Max. operating frequency per hour (motor starts)		1/h	15	15	15	15
Permissible mounting position	any, acc. to IEC 60 447 start command "I" right-hand side or top					

1) Over +60°C current reduction
2) 500V with moulded-plastic enclosure
3) Terminal compartment IP00
4) KEMA-test certification on request
5) With appropriate accessories

Technical Data according to IEC/EN 60947-1, 60947-2, 60947-4-1 and VDE 0660

Conductor cross-sections for main circuit

Type		M3/12	M3/25	M3/50	M3/100
Terminal type		Screw-type	Screw-type	Box terminal	Box terminal
Terminal screw		Pozidriv size 2	Pozidriv size 2	Pozidriv size 2	Allen screw 4mm
Tightening torque	Nm	0,8 to 1,2	2 to 2,5	3 to 4,5	4 to 6
Conductor cross-sections					
solid	mm^2	2 x (0,5 to 1,5)	2 x (1 to 2,5)	2 x (0,75 to 16)	2 x (2,5 to 16)
	mm^2	2 x (0,75 to 2,5)	2 x (2,5 to 6)	–	–
	mm^2	1 x (0,5 to 4)			
finely stranded with end sleeve	mm^2	2 x (0,5 to 1,5)	2 x (1 to 2,5)	2 x (0,75 to 16)	2 x (2,5 to 35)
	mm^2	2 x (0,75 to 2,5)	2 x (2,5 to 6)	1 x (0,75 to 25)	1 x (2,5 to 50)
	mm^2		1 x (1 to 10)		
stranded	mm^2	2 x (0,5 to 1,5)	2 x (1 to 2,5)	2 x (0,75 to 25)	2 x (10 to 50)
	mm^2	2 x (0,75 to 2,5)	2 x (2,5 to 6)	1 x (0,75 to 35)	1 x (10 to 70)
	mm^2	1 x (0,5 to 4)	1 x (1 to 10)		
AWG-wires, solid or stranded	AWG	2 x (18 to 14)	2 x (14 to 10)	2 x (18 to 3)	2 x (10 to 1/0)
	AWG	–	–	1 x (18 to 2)	1 x (10 to 2/0)
conductor bar (number x width x thick)	mm	–	–	2 x (6 x 9 x 0,8)	2 x (6 x 9 x 0,8)
Removeable box terminal [1]					
conductor bar	mm	–	–	–	18 x 10
with cable lug	mm^2	–	–	–	up to 2 x 70

Auxiliary switches

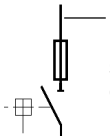
Switching capacity				Control voltage			
Front transverse auxiliary switch with 1 changeover contact							
Rated operational voltage Ue	AC	V		24	230	400	690
Rated operational current Ie/AC-15		A		4	3	1,5	0,5
Rated operational current Ie/AC-12 Ith		A		10	10	10	10
Rated operational voltage Ue	DC L/R 200 ms	V		24	110	220	
Rated operational current Ie/DC-13		A		1	0,22	0,1	
Front transverse auxiliary switch with 1 NO + 1 NC, 2 NO							
Rated operational voltage Ue	AC	V		24	230		
Rated operational current Ie/AC-15		A		2	0,5		
Rated operational current Ie/AC-12 Ith		A		2,5	2,5		
Rated operational voltage Ue	DC L/R 200 ms	V		24	48	60	
Rated operational current Ie/DC-13		A		1	0,3	0,15	
Lateral auxiliary switch and signalling switch							
Rated operational voltage Ue	AC	V		24	230	400	690
Rated operational current Ie/AC-15		A		6	6	3	1
Rated operational current Ie/AC-12 Ith		A		10	10	10	10
Rated operational voltage Ue	DC L/R 200 ms	V		24	110	220	440
Rated operational current Ie/DC-13		A		2	0,5	0,25	0,1
Undervoltage release	Power consumption	during pick-up	VA/W	20,2/13			
		uninterrupted duty	VA/W	7,2/2,4			
	Response voltage	trip	V	0,7 to 0,35 × Us			
		pick-up	V	0,85 to 1,1 × Us			
	Max. opening time		ms	20			
Shunt release	Power consumption during pick-up		AC VA/W	20,2/13			
			DC W	13 to 80			
	Response voltage acc. to IEC 60 947-1, trip		V	0,7 to 1,1 × Us			
	Max. opening time		ms	20			
Short-circuit protection for auxiliary and control circuits							
	Fuse	gL/gG	A	10			
	Miniature circuit breaker C-characteristic		A	6 [2]			
Conductor cross-sections for auxiliary and control circuits				Screw-type Pozidriv size 2			
	solid		mm^2	2 x (0,5 to 1,5) / 2 x (0,75 to 2,5)			
	finely stranded with end sleeve		mm^2	2 x (0,5 to 1,5) / 2 x (0,75 to 2,5)			
	stranded		mm^2	2 x (0,5 to 1,5) / 2 x (0,75 to 2,5)			
	AWG-wires, solid or stranded		AWG	2 x (18 to 14)			

1) After removing the box terminals, connection with cable lugs and busbars is also possible
2) Prospective short-circuit current < 0.4 kA.

Permissible ratings of devices approved for North America

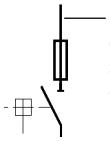
Circuit breakers of M3 series are approved for USA and Canada. According to UL 508 and C22.2 No.14 they can also be used with a load feeder contactor. These Circuit breakers can be used as „Manual Motor Starter“ for „Group Fusing“ or for „Group Installation“ or as „Manual Motor Controller Suitable for Tap Conductor Protection in Group Installations“ or as „Self Protected Combination Motor Controller“ (Type E).

Circuit breakers M3 as „**Manual Motor Starter**“
If used as „Manual Motor Starter“ the circuit breaker is always operated in combination with a short circuit device. For use with approbated fuses or circuit breakers according to UL489 or CSA22.2 No. 5 only. The size are selected according to National Electrical Code (UL), or Canadian Electrical Code (CSA).



Circuit breaker	**M3/12**		**M3/25**		**M3/50**		**M3/100**	
	NEMA Size 00 FLA max. 12 A, 600 V hp-rating max.		NEMA Size 1 FLA max. 25 A, 600 V hp-rating max.		NEMA Size 2 FLA max. 50 A, 600 V hp-rating max.		NEMA Size 3 FLA max. 100 A, 600 V hp-rating max.	
V	1-phas.	3-phas.	1-phas.	3-phas.	1-phas.	3-phas.	1-phas.	3-phas.
110/120	1/2	–	2	–	3	–	10	–
200	11/2	3	3	71/2	71/2	15	20	30
220/240	2	3	5	71/2	10	20	20	40
440/480	–	71/2	–	15	–	40	–	75
550/600	–	10	–	20	–	50	–	100

Circuit breakers M3 as „**Manual Motor Controller Suitable for Tap Conductor Protection in Group Installations**“
For UL only, not for CSA. If used as „Manual Motor Controller Suitable for Tap Conductor Protection in Group Installations“ the circuit breaker is always operated in combination with a short circuit device. For use with approbated fuses or circuit breakers according to UL489 only. The size are selected according to National Electrical Code .



Circuit breaker	**M3/12**		**M3/25**		**M3/50**		**M3/100**	
	NEMA Size 00 FLA max. 12 A, 600 V hp-rating max.		NEMA Size 1 FLA max. 25 A, 600 V hp-rating max.		NEMA Size 2 FLA max. 50 A, 600 V hp-rating max.		NEMA Size 3 FLA max. 100 A, 600 V hp-rating max.	
V	1-phas.	3-phas.	1-phas.	3-phas.	1-phas.	3-phas.	1-phas.	3-phas.
110/120	1/3	–	2	–	3	–	10	–
200	3/4	2	3	71/2	71/2	15	20	30
220/240	1	2	3	71/2	10	20	20	40
440/480	–	5	–	15	–	40	–	75
550/600	–	–	–	10	–	50	–	75

Circuit breakers M3 as „**Combination Motor Controller Type E**“
As of UL 16. 07. 2001, UL508 demands a line-side 1 air and 2 creepage distance for „Combination Motor Controller Type E“ Therefor circuit-breakers M3/25 and M3/100 are approved to UL 508 in combination with the terminal blocks listed below. The basic unit of circuit-breakers M3/25 conforms with the required air/creepage distances. According to CSA these terminal blocks can be omitted when the device is used as „Combination Motor Controller Type E“.

Circuit breaker	**M3/12**	**M3/25** (+ M3 25 E)		**M3/50**		**M3/100** (+ M3 100 E)	
	-	NEMA Size 1 FLA max. 25 A, 600 V hp-rating max.		NEMA Size 2 FLA max. 50 A, 600 V hp-rating max.		NEMA Size 3 FLA max. 100 A, 600 V hp-rating max.	
V		1-phas.	3-phas.	1-phas.	3-phas.	1-phas.	3-phas.
110/120	-	2	–	3	–	10	–
200	-	3	71/2	71/2	15	20	30
220/240	-	3	71/2	10	20	20	40
440/480	-	–	15	–	40	–	75
550/600	-	–	10	–	50	–	75

Ratings of auxiliary switches and alarm switches		Lateral auxiliary switch with M3 HS.. and signalling switch M3 M11	Transversal auxiliary switch with changeover contact M3 HQW	Transversal auxiliary switch with 1NO + 1NC, 2NO M3 HQ11, M3 HQ20
Max. rated voltage to NEMA	AC V	600	600	240
uninterupted current	A	10	5	2,5
Breaking capacity	AC	A600	B600	C300
	DC	Q300	R300	R300

Permissible ratings of devices approved for North America

Ratings **Icu** complies with „short circuit breaking breaking capacity“		**Manual Motor Starter**						**Manual Motor Controller Suitable for Tap Conductor Protection in Group Installations“**			**Combination Motor Controller Type E“**					
Circuit breaker Type	Rated current In A	up to AC 240 V UL kA	CSA kA	up to AC 480V UL kA	CSA kA	up to AC 600V UL kA	CSA kA	up to AC 240 V UL kA	up to AC 480V UL kA	up to AC 600V UL kA	up to AC 240 V UL kA	CSA kA	up to AC 480V UL kA	CSA kA	up to AC 600V UL kA	CSA kA
M3/12	0,11 ... 3,2	65	50	65	50	30	10	65	65	-	-	-	-	-	-	-
	4	65	50	65	50	30	10	65	65	-	-	-	-	-	-	-
	5	65	50	65	50	30	10	65	65	-	-	-	-	-	-	-
	6,3	65	50	65	50	30	10	65	65	-	-	-	-	-	-	-
	8	65	50	65	50	30	10	65	65	-	-	-	-	-	-	-
	10	50	50	10	-	-	-	-	-	-	-	-	-	-	-	-
	12	50	50	10	-	-	-	-	-	-	-	-	-	-	-	-
M3/25	0,11 ... 3,2	65	50	65	50	30	30	65	65	30	65	50	65	30	50	30
	4	65	50	65	50	30	30	65	65	30	65	50	65	30	50	30
(+M3 25 E)	5	65	50	65	50	30	30	65	65	30	65	50	65	30	50	30
	6,3	65	50	65	50	30	30	65	65	30	65	50	65	30	50	30
	8	65	50	65	50	30	30	65	65	30	65	50	65	30	50	30
	10	65	50	65	50	30	30	65	65	30	65	50	65	30	50	30
	12,5	65	50	65	50	30	30	65	65	30	65	50	65	30	50	30
	16	65	50	65	50	30	30	65	65	-	65	50	65	30	-	-
	20	65	50	65	50	30	30	65	65	-	65	50	65	30	-	-
	22	65	50	65	50	30	30	65	65	-	65	50	65	30	-	-
	25	65	50	65	50	30	30	-	-	-	-	-	-	-	-	-
M3/50	25	65	50	65	50	25	25	65	65	25	65	50	65	50	25	25
	32	65	50	65	50	25	25	65	65	25	65	50	65	50	25	25
	40	65	50	65	50	25	25	65	65	25	65	50	65	50	25	25
	45	65	50	65	50	25	25	65	65	25	65	50	65	50	25	25
	50	65	50	65	50	25	25	65	65	25	65	50	65	50	25	25
M3/100	50	65	50	65	50	30	30	65	65	30	65	50	65	30	50	30
	63	65	50	65	50	30	30	65	65	30	65	50	65	30	50	30
(+M3 100 E)	75	65	50	65	50	30	30	65	65	30	65	50	65	30	50	30
	90	65	50	65	50	30	30	65	65	-	65	50	65	30	-	-
	100(99)	65	50	65	50	30	30	65	65	-	65	50	65	30	-	-

hp-rating = Power rating in in horse power (maximum motor rating)
FLA = Full Load Amps / Motor full load current
Icu complies with „short circuit breaking capacity“ to UL

Approvals

Country	USA MANUAL MOTOR CONTROLLER UL	Canada UL	USA COMBONATION MOTOR CONTROLLER UL	Canada UL	Europe
Type	c UL us		c UL us		CE
M3/12	o	o	-	-	o
M3/25	o	o	o 1)	o 1)	o
M3/50	o	o	o	o	o
M3/100	o	o	o 2)	o 2)	o
M3 H..	o	o	-	-	o
M3 U..	o	o	-	-	o
M3 A..	o	o	-	-	o
M3 M11	o	o	-	-	o
M3 12-25 S.	o	-	-	-	o
M3 50 S.	-	-	-	-	o
M3 25 E	o	o	-	-	o
M3 100 E	o	o	-	-	o

o In standard version approved
\- Not provided for test till now
1) in use with M3 25 E
2) in usewith M3 100 E

UL- and CSA- Guide- and File-No.
These data are important for UL-inspecting engineers.

Devices	Guide-No. Canada	USA	File-No.
Circuit-breakers M3.. as Manual Motor Controller	NLRV7	NLRV	E129916
Circuit-breakers M3.. as Combination Motor Controller	NKJH7	NKJH	E197641
M3 busbar system	NLRV7	NLRV	E129916
M3 accessories	NKCR7	NKCR	E66273

Description

M3 circuit-breakers are compact, current-limiting circuit-breakers which are optimised for load feeders. The circuit-breakers are used for switching and protecting three-phase induction motors of up to 45 kW at AC 400 V and for loads with rated currents of up to 100 A.

Construction
The circuit-breakers are available in four sizes:

M3/12 overall width 45 mm. Max. rated current 12 A. Suitable for 3-phase induction motors of up to 5.5 kW at voltages of 400 V AC.

M3/25 overall width 45 mm. Max. rated current 25 A. Suitable for 3-phase induction motors of up to 11 kW at voltages of 400 V AC.

M3/50 overall width 55 mm. Max. rated current 50 A. Suitable for 3-phase induction motors of up to 22 kW at voltages of 400 V AC.

M3/100 overall width 70 mm. Max. rated current 100 A. Suitable for 3-phase induction motors of up to 45 kW at voltages of 400 V AC.

Releases
Circuit-breakers M3 are equipped with bimetallic-based, inverse-time delayed overload releases and with instantaneous overcurrent releases (electromagnetic short-circuit releases).
The overload releases can be set in accordance with the load current. The overcurrent releases are permanently set to a value 13 times the rated current and thus enable trouble-free start-up of motors.
The scale cover can be sealed to prevent unauthorized adjustments to the set current.

Operating mechanisms
circuit-breakers M3/12 are actuated via a rocker operating mechanism and circuit-breakers M3/25, M3/50 and M3/100 via a rotary operating mechanism. If the circuit-breaker trips, the rotary operating mechanism switches to the tripped position to indicate this. Before the circuit-breaker is reclosed, the rotary operating mechanism must be reset to the 0 position by hand, in order to prevent the former from closing by mistake before the fault has been cleared.
In the case of circuit-breakers with rotary operating mechanisms, an electrical signal can be output via a signalling switch to indicate that the circuit-breaker has tripped.
All operating mechanisms can be locked in the 0 position with a padlock (shackle diameter 3.5 to 4.5 mm).
The M3 circuit-breakers fulfil the isolation characteristics specified in IEC 60 947-2.

Operating conditions
Circuit-breakers M3 are suitable for use in any climate. They are designed for operation in enclosed rooms under normal conditions (e. g. no dust, corrosive vapours or harmful gases). Suitable enclosures must be provided for installation in dusty or damp rooms. Circuit-breakers M3 can also be fed from below.
The standards in accordance with which the circuit-breakers are constructed, the permissible ambient temperatures, the maximum making and breaking capacities, the tripping currents and other boundary conditions can be found in the technical data and tripping characteristics.
Since the operational currents, starting currents and current peaks vary as a result of the inrush current, even in the case of motors with identical output ratings, the values specified for these output ratings in the selection tables are intended as a guide only. The specific rated and start-up data of the motor to be protected is always paramount to the choice of the most suitable circuit-breaker.
In order to prevent premature tripping due to phase failure sensitivity, the circuit-breakers should always be connected in such a way that current flows through all three main conducting paths.

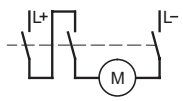
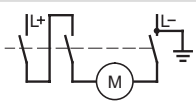
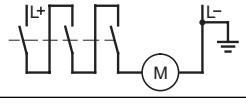
Short-circuit protection
The short-circuit releases of M3 circuit-breakers disconnect the faulty load feeder from the system in the event of a short circuit and thus prevent any further damage from being caused.
Circuit-breakers with a short-circuit breaking capacity of 50 kA or 100 kA at a voltage of 400 V AC are practically short-circuit-proof at this voltage, as higher short-circuit currents are not usually encountered at the installation point.
Back-up fuses are only necessary if the short-circuit current at the installation point exceeds the rated ultimate short-circuit breaking capacity of the circuit-breakers.

Motor protection
The tripping characteristics of M3 circuit-breakers are designed mainly to protect three-phase induction motors. The circuit-breakers are therefore also referred to as motor circuit-breakers. The current of the motor to be protected is set with the aid of the scale.
Circuit-breakers with thermal overload releases are normally designed in accordance with release Class 10.

Line protection
M3 circuit-breakers for motor protection are also suitable for line protection. In order to prevent premature tripping due to phase failure sensitivity, the three conducting paths must always be uniformly loaded. The conducting paths must be connected in series in the case of single-phase loads.
The M3 circuit-breakers fulfil the isolation conditions of IEC 60 947-3 as well as the additional test conditions for circuit-breakers with isolation characteristics specified in IEC 60 947-2. Taking IEC 60 204-1 into consideration, they can thus be implemented as main and EMERGENCY STOP switches.
Door-coupling rotary operating mechanism do not fulfil the isolation characteristics specified in IEC 60 947-2. Door-coupling rotary operating mechanism according isolation characteristics specified in IEC 60 947-2 on request.

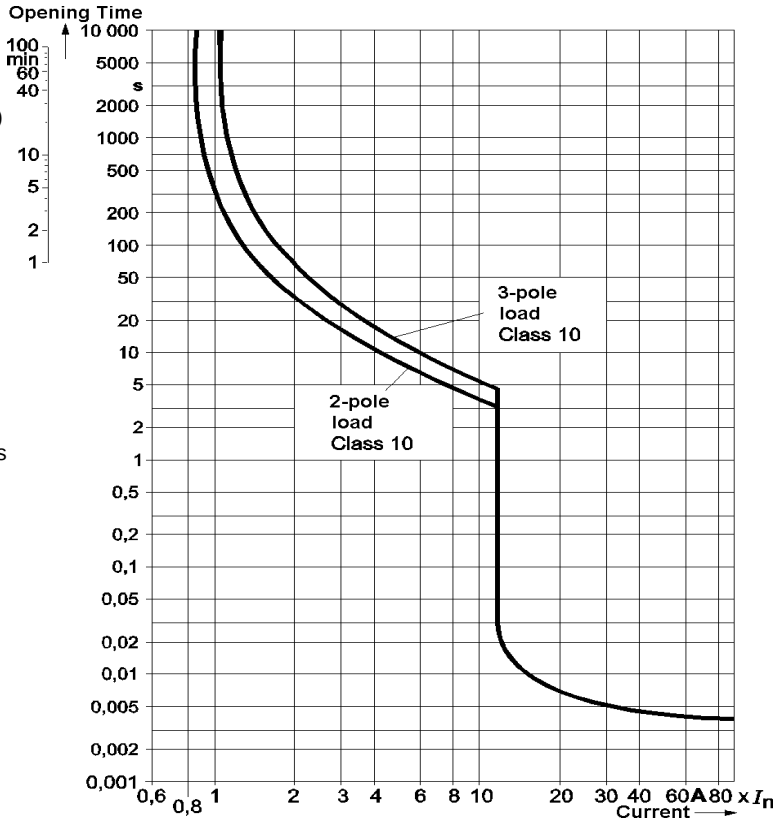
DC switching

M3/12; M3/25; M3/50 and M3/100 - AC circuit-breakers are also suitable for DC switching.
- The maximum permissible DC voltage per conducting path must however be adhered to here.
- At higher voltages, 2 or 3 conducting paths must be connected in series.
- The response values of the overload releases remain unchanged; the response values of the short-circuit releases increase by approximately 30 % for DC. The recommended circuits for DC switching can be seen in the table below.

Recommended circuit for M3/.. circuit breakers	Max. permissible DC voltage Ue	Notes
	**DC 150 V**	**2-pole switching, unearthed system** (It is assumed with this circuit that a safe cut-out always occurs, even in the event of a double earth fault when both contacts are bridged.) If an earth fault cannot occur, or if every earth fault is immediately cleared (earth fault monitoring), the maximum permissible DC voltage can be tripled.
	**DC 300 V**	**2-pole switching, earthed system** The earthed pole must always be assigned to the specific conducting path, so that in the event of an earth fault 2 conducting paths will be connected in series.
	**DC 450 V**	**1-pole switching, earthed system** 3 conducting paths connected in series. The earthed pole must be assigned to the disconnected conducting path.

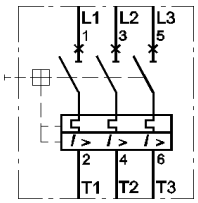
Characteristics

The time/ current characteristic, the current limiting characteristics and the I²t characteristics were determined in accordance with DIN VDE 0660 and IEC 60 947.
The tripping characteristic of the inverse-time delayed overload releases (thermal overload releases or 'a' releases) for DC and AC with a frequency of 0 to 400 Hz also apply to the time/current characteristic.
The characteristics apply to the cold state. At operating temperature, the tripping times of the thermal releases are reduced to approximately 25 %.
Under normal operating conditions, all three poles of the device must be loaded. The three main conducting paths must be connected in series in order to protect single-phase or DC loads.
With 3-pole loading, the maximum deviation in the tripping time for 3 times the setting current and upwards is ± 20 % and thus in accordance with DIN VDE 0165.
The tripping characteristics for the instantaneous, electromagnetic overcurrent releases (short-circuit releases or 'n' releases) are based on the rated current In, which is also the maximum value of the setting range for circuit-breakers with adjustable overload releases. If the current is set to a lower value, the tripping current of the 'n' release is increased by a corresponding factor.
The characteristics of the electromagnetic overcurrent releases apply to frequencies of 50/60 Hz. Appropriate correction factors must be used for lower frequencies up to 16 2/3 Hz, for higher frequencies up to 400 Hz and for DC.
The characteristic shown here is a schematic representation of circuit-breakers for all ranges.
Time/current characteristics, current limiting characteristics and I²t characteristics are available on request.

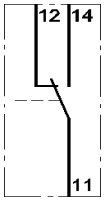


Wiring diagrams

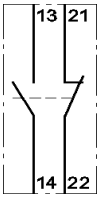
Circuit-breaker M3



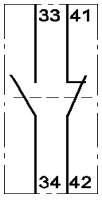
Transverse auxiliary contact block
M3 HQW



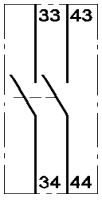
M3 HQ11



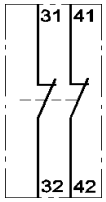
Lateral auxiliary contact block
M3 HS11



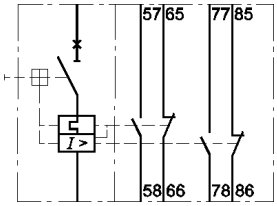
M3 HS20



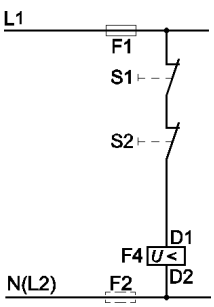
M3 HS02



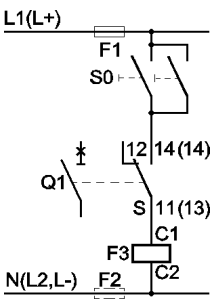
Signalling switch
M3 M11



Undervoltage release

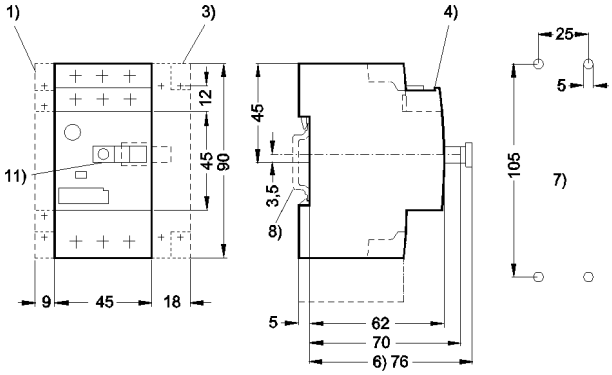


Shunt release

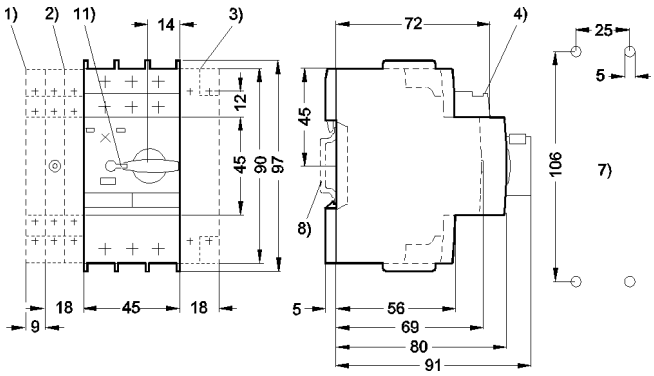


Dimensions

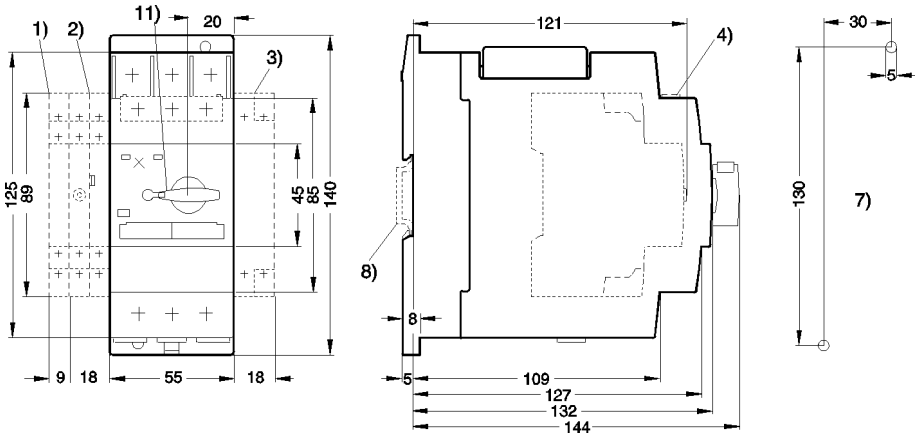
Circuit-breaker M3/12



Circuit-breaker M3/25

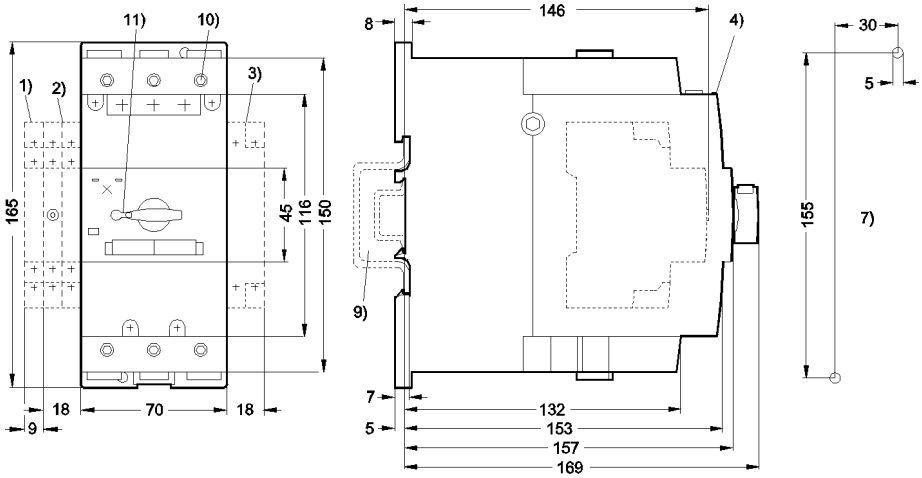


Circuit-breaker M3/50



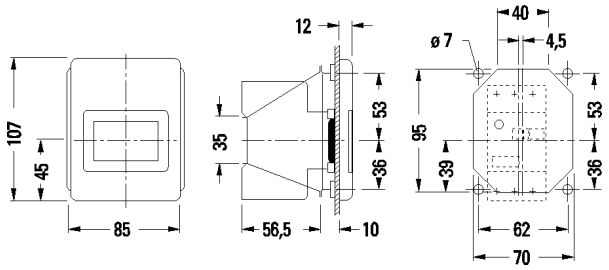
1) Lateral aux. contact
2) Signalling contact
3) Auxiliary release
4) Transverse aux. contact
7) Mounting holes
8) 35mm DIN-rail
9) 35mm DIN-rail15mm high or 75mm DIN-rail
10) 4mm hexagon socket screw
11) Lockable in 0-position with shackle diameter max.5mm

Circuit-breaker M3/100

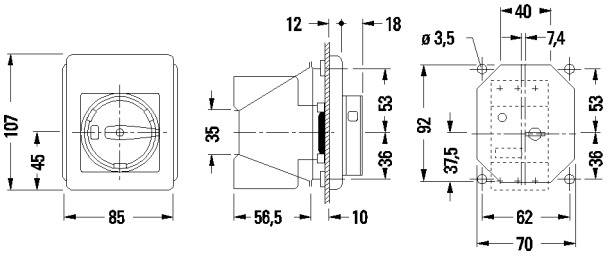


Dimensions

Moulded plastic front plate M3 12 P



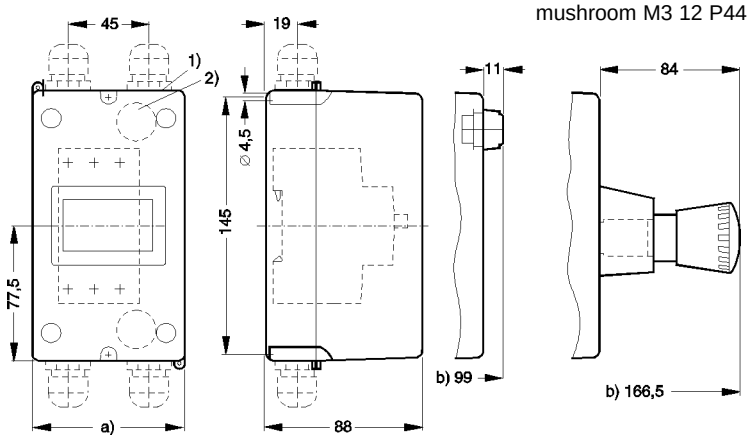
Moulded plastic front plate M3 25-100 P



Moulded plastic enclosure M3 12 PF

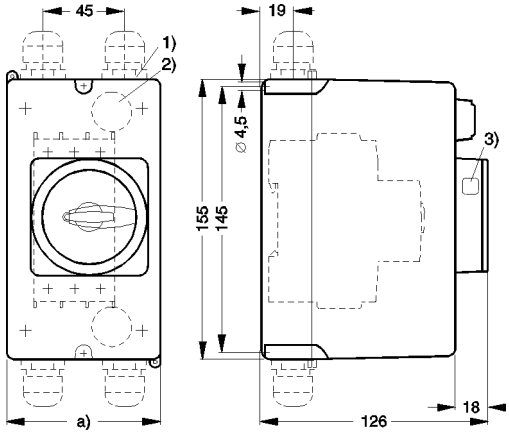
with indicator light M3 L..

with EMERGENCY STOP mushroom M3 12 P44



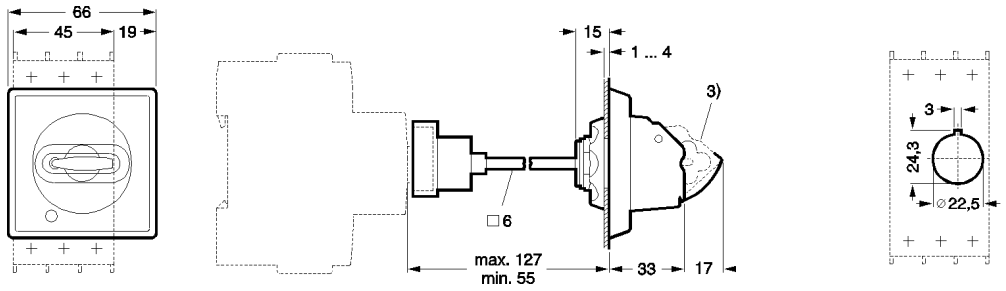
Dim. a M3 12PF 54 85mm
M3 12PF 72 105mm

Moulded plastic enclosure M3 25PFH4

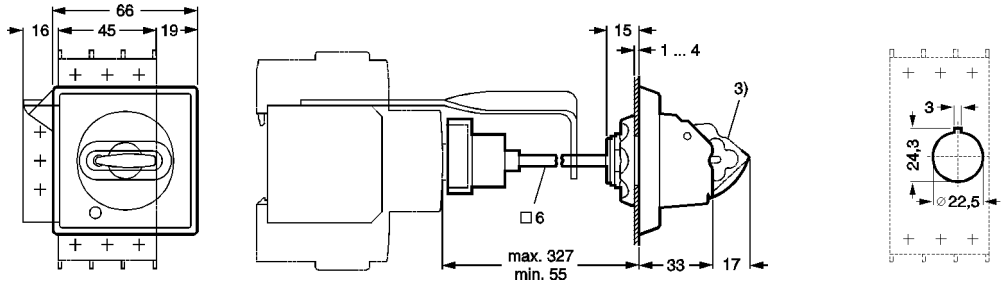


Dim. a M3 25PFH4 54 85mm
M3 25PFH4 72 105mm

Door-coupling rotary operating mechanism M3 25-100 ... 130



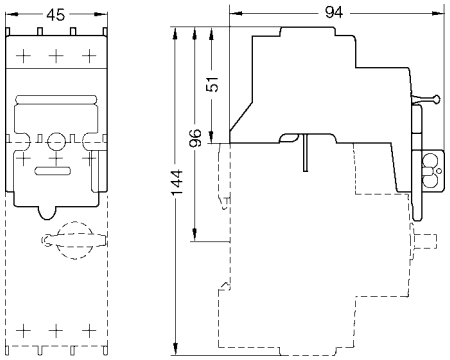
Door-coupling rotary operating mechanism M3 25-100 ... 330



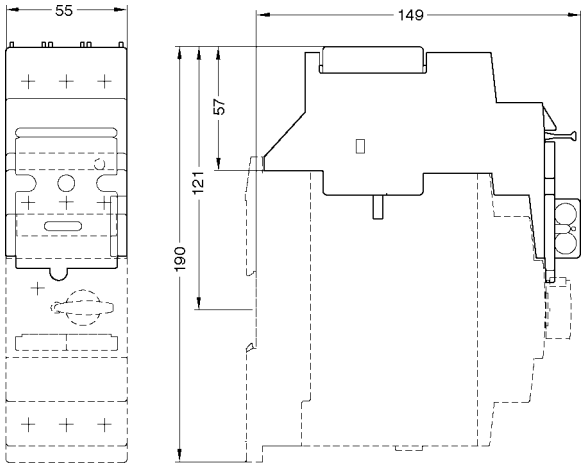
1) Knockout for M25
2) Knockout at the rear for M20
3) Max. for shackle diameter for padlock 8mm

Dimensions

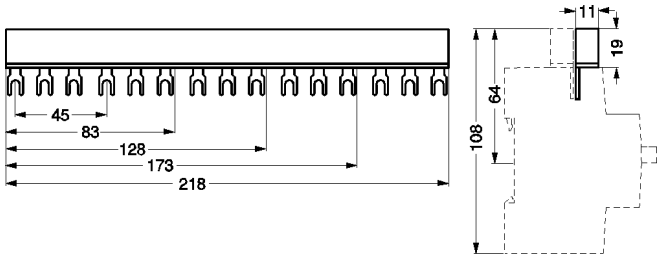
Isolator module M3 TB 25



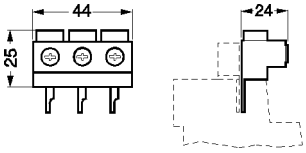
Isolator module M3 TB 50



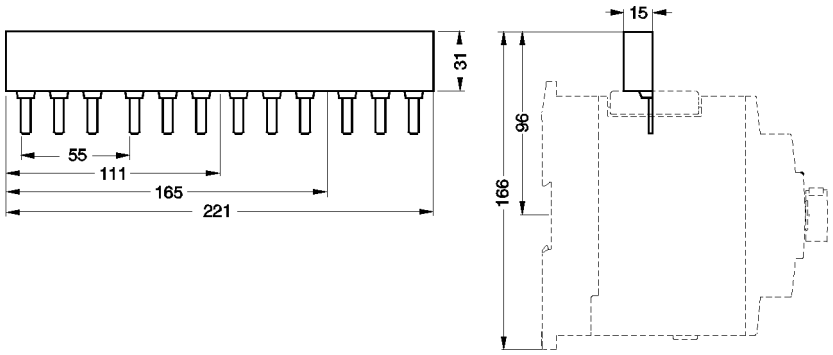
3-phase busbar for M3/12 and M3/25, modular spacing 45mm



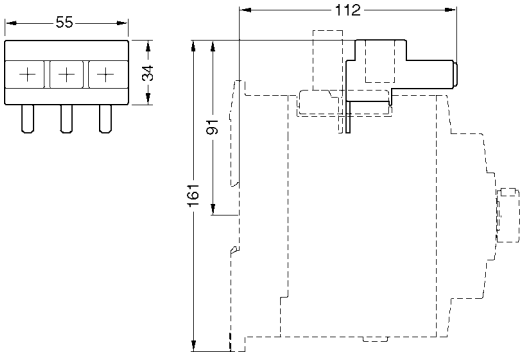
3-phase line-side terminal M3 12 SE



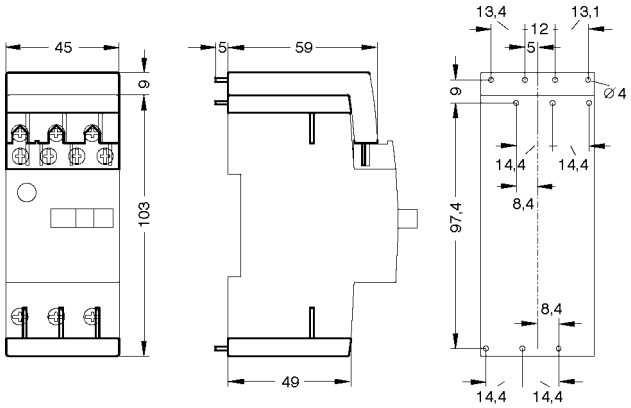
3-phase busbar for M3/50, modular spacing 55mm



3-phase line-side terminal M3 50 SE

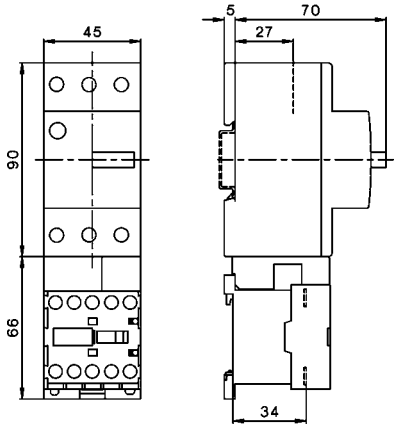


Solder pin connections M3 12 LA.

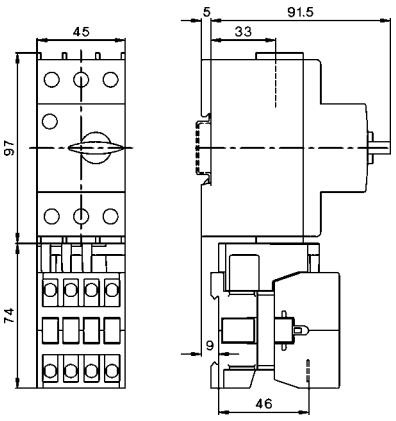


Dimensions

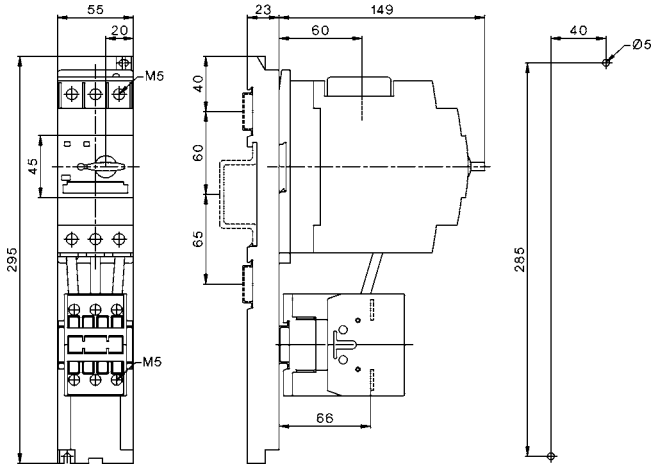
Fuseless Load Feeder A12-../09D10 230, A12-../12D10 230
M3/12 + K1-09D10 + M3 12-25 VK1
M3/12 + K1-12D10 + M3 12-25 VK1



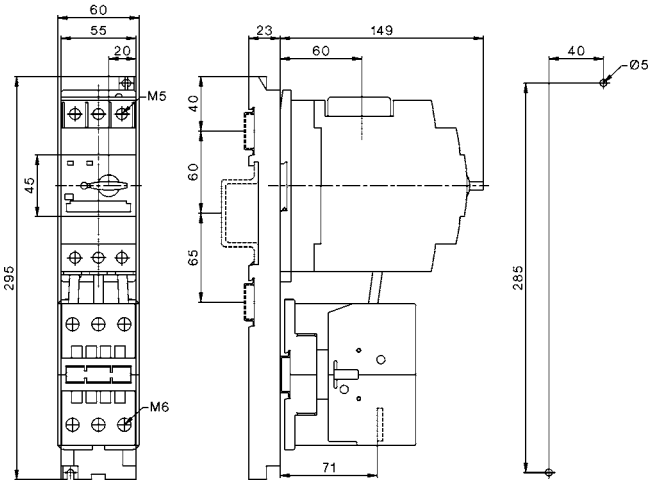
Fuseless Load Feeder A25-../10A10 230A, A25-../14A10 230A
A25-../18A10 230A, A25-../22A10 230A
M3/25 + K3-10A10 (14A10 - 22A10) + M3 12-25 VK3



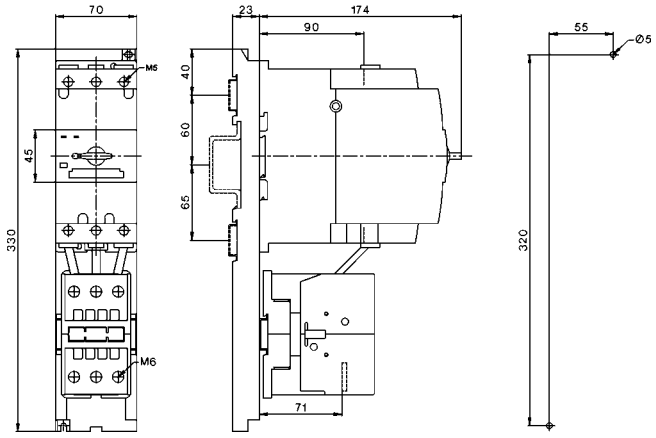
Fuseless Load Feeder A50-../32A00 230A, A50-../40A00 230A
M3/50 + K3-24A00 + M3 50 HU1
M3/50 + K3-32A00 + M3 50 HU1
M3/50 + K3-40A00 + M3 50 HU1



M3/50 + K3-50A00 + M3 50 HU1



M3/100 + K3-62A00 + M3 100 HU1
M3/100 + K3-74A00 + M3 100 HU1



Notice: