

CONNECTING COMPETENCE.



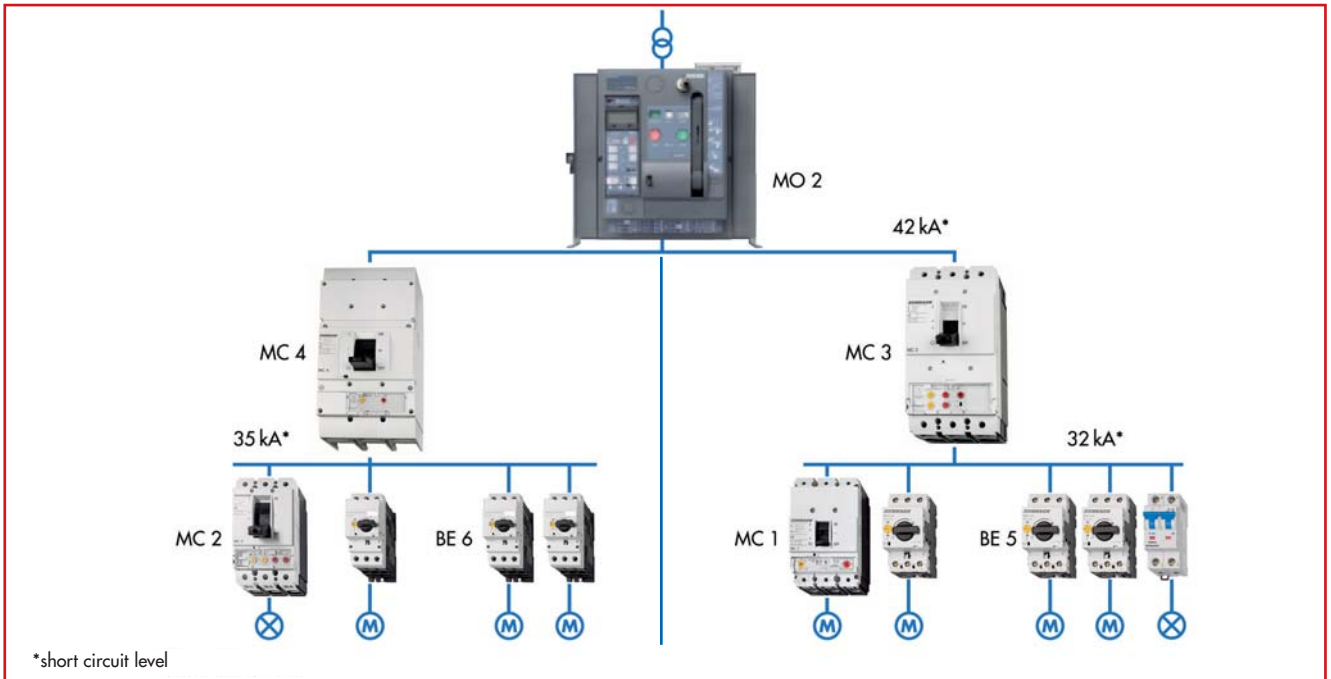
CIRCUIT BREAKERS UP TO 6300A

MC – MOULDED CASE CIRCUIT BREAKERS UP TO 2000A

MO – AIR CIRCUIT BREAKERS UP TO 6300A

GENERAL INFORMATION

■ CIRCUIT BREAKERS – OVERVIEW



■ OPTIMUM PROTECTION RANGE BETWEEN 0,16 A AND 6300 A

With the MC and MO circuit breaker concept, SCHRACK is now able to combine trusted technology with modern features. These circuit breakers work perfectly together and can communicate with each other. MC and MO circuit breakers have modern communication functions. They provide optimum protection between 0,16 A and 6300 A. MC and MO are part of a generation of circuit breakers whose modularity allows the use in any power distribution application.

These circuit breakers are cost competitive providing flexibility for engineering and can also be integrated into higher level system solutions. MC and MO circuit breakers are manufactured to international standards. Combining intelligent open and compact devices together with communication systems giving many benefits and solutions.

■ SELECTIVITY

Thanks to their design, MC circuit breakers have a high level of selectivity which enables you to construct a selective system.

■ COMMUNICATION OPENS UP NEW POSSIBILITIES

MC and MO circuit breakers open up new possibilities for power distribution and automation with their communication capability. They record all the important data you need, signal this data locally and can pass it on to higher level systems. This increases system transparency and reduces reaction times to critical states such as over-current, phase imbalance or phase failure. Targeted intervention can help avoid system breakdowns and preventative maintenance can be planned. This enhances system and machine availability, avoiding costly production downtimes.

■ SYSTEMS WITH CIRCUIT BREAKERS – THE BENEFITS

- Circuit breakers offer protection, contacting and disconnection capabilities.
- Contacts always use 3-pole triggering, thus preventing 2-phase motor operation.
- In the event of the circuit breaker being triggered by a fault, the circuit breaker is simply reset once the fault is removed.
- Remote on/off switching including appropriate indications is easy.
- Ageing / replace all three fuses / characteristic curve shift.

■ GENERAL INFORMATION

- All **dimensioned drawings** are displayed within the confines of available space on the page and are only intended as a guide.
- All **circuit diagrams** are schematic wiring diagrams which are intended to allow better understanding of the function, and will need to be edited/added to during the course of project planning.
- All **images** represent samples of the product and are intended for information purposes only.

Unless otherwise stipulated, the current version of the General Terms of Delivery issued by The Association of the Austrian Electrical and Electronics Industries "EEL" shall apply. You can find a copy of these at the end of this catalogue.

No liability for errors in text, type or images; we reserve the right to make changes to technical specifications of the product range.

The user information contained in this catalog reflect the opinion of the company at the time of writing. The information contained in it was assembled on the basis of published norms, specialist industry presentations, specialist literature and in-house expertise. The content is for informational purposes only and has no validity in law.

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SCHRACK 2008
TECHNIK

Item No.	Item Name	Unit	Price	Item No.	Item Name	Unit	Price	Item No.	Item Name	Unit	Price
1	101	...	...	...	201	...	...	...
2	102	...	...	...	202	...	...	...
3	103	...	...	...	203	...	...	...
4	104	...	...	...	204	...	...	...
5	105	...	...	...	205	...	...	...
6	106	...	...	...	206	...	...	...
7	107	...	...	...	207	...	...	...
8	108	...	...	...	208	...	...	...
9	109	...	...	...	209	...	...	...
10	110	...	...	...	210	...	...	...
11	111	...	...	...	211	...	...	...
12	112	...	...	...	212	...	...	...
13	113	...	...	...	213	...	...	...
14	114	...	...	...	214	...	...	...
15	115	...	...	...	215	...	...	...
16	116	...	...	...	216	...	...	...
17	117	...	...	...	217	...	...	...
18	118	...	...	...	218	...	...	...
19	119	...	...	...	219	...	...	...
20	120	...	...	...	220	...	...	...
21	121	...	...	...	221	...	...	...
22	122	...	...	...	222	...	...	...
23	123	...	...	...	223	...	...	...
24	124	...	...	...	224	...	...	...
25	125	...	...	...	225	...	...	...
26	126	...	...	...	226	...	...	...
27	127	...	...	...	227	...	...	...
28	128	...	...	...	228	...	...	...
29	129	...	...	...	229	...	...	...
30	130	...	...	...	230	...	...	...
31	131	...	...	...	231	...	...	...
32	132	...	...	...	232	...	...	...
33	133	...	...	...	233	...	...	...
34	134	...	...	...	234	...	...	...
35	135	...	...	...	235	...	...	...
36	136	...	...	...	236	...	...	...
37	137	...	...	...	237	...	...	...
38	138	...	...	...	238	...	...	...
39	139	...	...	...	239	...	...	...
40	140	...	...	...	240	...	...	...
41	141	...	...	...	241	...	...	...
42	142	...	...	...	242	...	...	...
43	143	...	...	...	243	...	...	...
44	144	...	...	...	244	...	...	...
45	145	...	...	...	245	...	...	...
46	146	...	...	...	246	...	...	...
47	147	...	...	...	247	...	...	...
48	148	...	...	...	248	...	...	...
49	149	...	...	...	249	...	...	...
50	150	...	...	...	250	...	...	...





“If you like your work then it’s not really work.”

Anders Jonas Ångström, Physicist

MOULDED CASE CIRCUIT BREAKERS / SWITCH DISCONNECTORS, MC SERIES

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■ A COMPACT DESIGN IN 4 FRAME SIZES FOR HIGH-PERFORMANCE APPLICATIONS



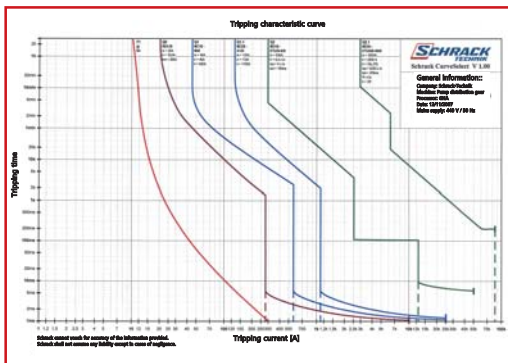
MCCBs - Enclosed compact circuit breakers from 15 to 2.000 A with only four frame sizes. These circuit breakers can be used universally – from the smallest of service distribution boards, to machine controls or motor starter combinations, up to large energy distribution systems with a maximum short-circuit breaking capacity of 150 kA. Special versions are available for smaller power ratings with phase failure sensitivity protection for motor and motor-related applications. The range of CBs is rounded off nicely with switch actuation using toggle-lever, rotary- or remote operators. Shunt-, undervoltage- and earth fault- and residualcurrent releases complete the range. The MCCBs can be used universally for DC applications thanks to their high DC-3 utilization category: ranging from photovoltaics to emergency generator batteries to sophisticated breaking and protection of DC shunt-wound motors in reverse- and jog mode. The new MC-A circuit breakers are the ideal protection devices for DC current networks with operating voltages up to 750 V and operating currents up to 500 A. Featuring thermomagnetic release systems for exact r.m.s detection of operating and fault currents. These contacts feature a double break system which enables safe breaking in high-energy networks with shortcircuit currents of up to 70.000 amps.

■ UNIFORM ACCESSORIES / UNIVERSAL CONNECTION SYSTEM



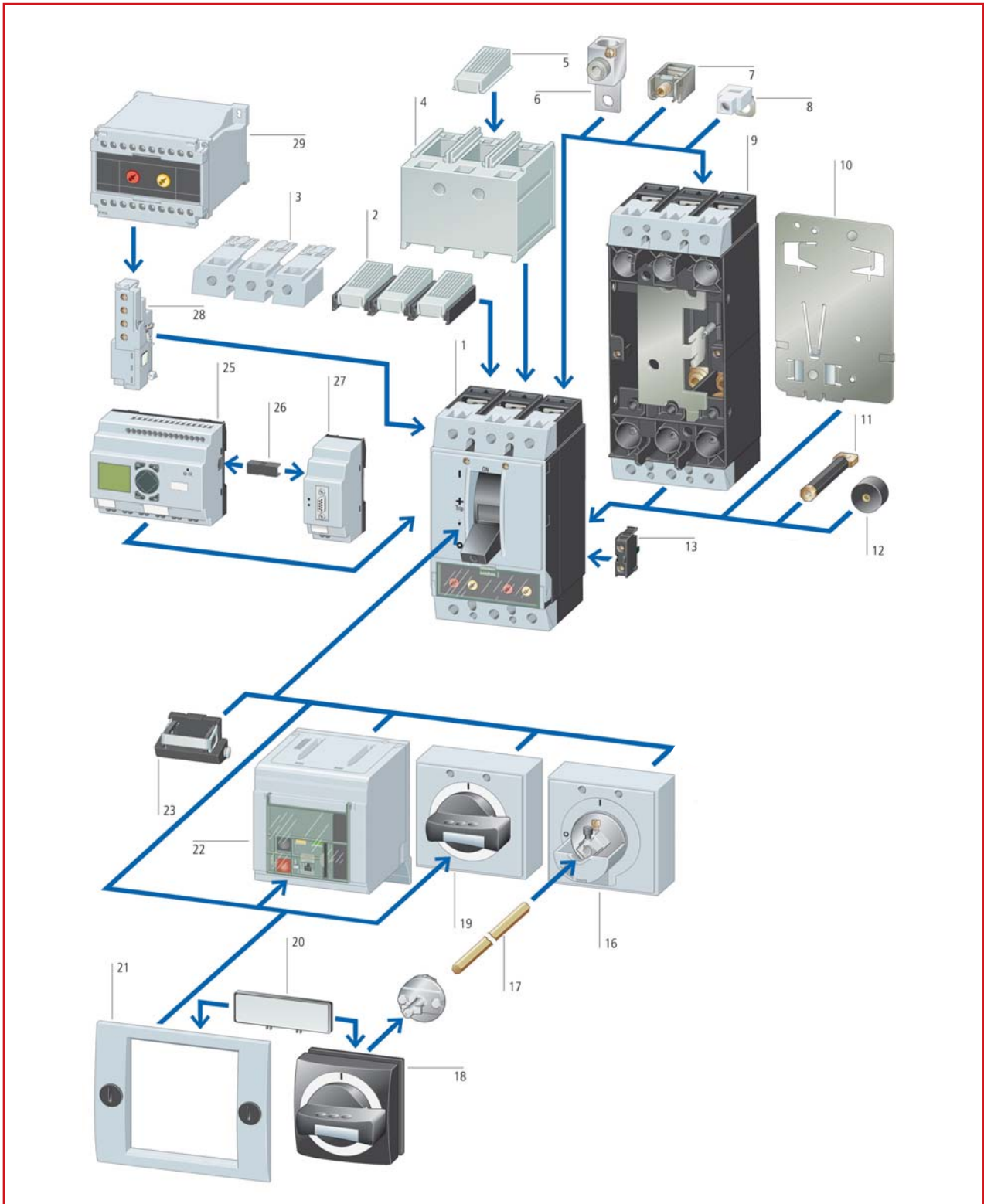
Front mountable retrofitable accessories. The installation location is the same for all frame sizes. The auxiliary contacts and trip-indicating modules are contact elements part of the RMQ Titan range of control switches. They are available in screw- or tension spring technology. This reduces assembly times and cuts costs. Effective shunt- and undervoltage releases are also available in combination with early make auxiliary contacts for Emergency Stop functions or load-shedding circuits and offer elegant solutions for a broad spectrum of applications. The connection features of MCCBs enable you to respond effectively to your system's demands, whatever they may be. Whether using copper or aluminium cables or copper busbars, these MCs offer the right solution for any connection type. An add-on part gives the circuit breaker IP (finger-proof) protection.

■ EASIER VISUALISATION, COMPARISON AND DOCUMENTATION OF CHARACTERISTIC CURVES



This characteristic curve program - available free-of-charge - supports the documentation of circuit-breakers used in completed switchgear systems. All setting parameters are easy to set, display in graphical form and print with the tripping characteristics. For example, you can make a direct comparison between MC and MO circuit breakers and H.R.C. fuses, which enables you to assess the selectivity class for the overload- and time-delayed overcurrent range.

MCCB- SYSTEM OVERVIEW



1. MC circuit breaker,
MC.-PN, MC.-N Switch disconnecter
2. Terminal cover
3. Terminal cover
4. IPX2 Finger protection for cover
5. IPX2 Finger protection for cover
6. Tunnel terminal for Al cable
7. Box terminal
8. Control circuit terminal
9. Plug-in and withdrawable unit

10. Clip plate
11. Reverse-side connection
12. Spacer
13. Standard auxiliary contact,
Trip-indicating auxiliary contact
16. Rotary operator with shaft support
17. Extension shaft
19. Rotary handle with rotary operator
20. Type plate

21. Insulating surround
22. Remote operator
23. Toggle-lever
interlock device
24. Toggle-lever
interlock device
25. Communication module (DMI)
26. Data plug
27. Profibus interface
28. Voltage release or
early-make auxiliary contact
29. Time-delay unit for voltage release

MC – SYSTEM OVERVIEW

ORDER KEY: MCCBS



DESCRIPTION	FRAME SIZE	BREAKING CAPACITY 415V	CONTACT TYPE	NO. OF POLES	RELEASE UNIT	RATED UNINTERRUPTED CURRENT 20A – 2000A
M	C	.	-	-	-	-

M	C	1 up to 160A	- Circuit breaker		A System protection, thermomagnetic
		2 up to 300A	N Switch disconnector remote tripping		A E System protection, electronic
		3 up to 630A	PN Switch disconnector remote tripping not available		V E Selective and generator protection, electronic
		4 up to 2000A	X Accessories		M Motor contactor, thermomagnetic
		B Basis 25kA	- 3 pole		M E Motor contactor, electronic
		N Normal 50kA	-	4 4 pole	-
		H High 150kA			

FOUR CIRCUIT BREAKERS WITH FOUR LEVELS OF BREAKING CAPACITY

SCHRACK INFO

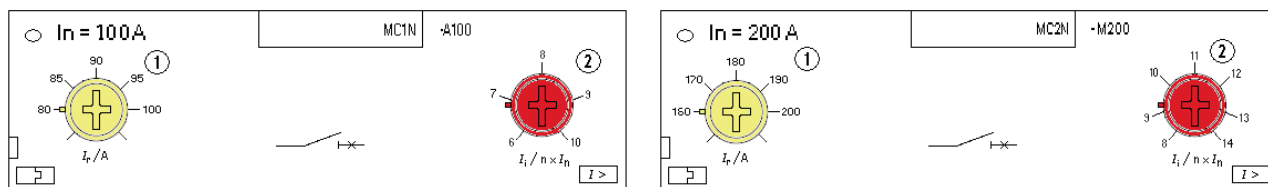
A full range is on offer with four switches with three levels of breaking capacity, from the value-for-money 25 kA version for small subdistribution boards up to 150 kA breaking capacity to more complex high-power installations.. The compact construction of the new small 160A switch (MC1) saves space when used as a main switch in machine control units, a main incomer switch in service distribution boards or as an outgoing switch in power distribution systems. Other device levels are 300 A (MC2), the particularly compact 630 A (MC3) and the large 2000-A (MC4) circuit breaker.

CIRCUIT BREAKER		MC1	MC2	MC3	MC4
Short-circuit breaking capacity $I_{cs} = I_{cs}$ at 415 V					
B	25 kA	X	X	–	–
N	50 kA	X	X	X	X
H	100/150 kA	X/–	X	X	X/–
Ranges of application in A		25 – 160	32 – 300	125 – 630	315 – 2000
Number of poles		3/4	3/4	3/4	3/4
Rated input voltage: in V		690	690	690	690
Overload releases					
Thermomagnetic		X	X	X	–
Electronic		–	X	X	X

SWITCH DISCONNECTOR	MC1-PN/N	MC2-PN/N	MC3-PN/N	MC4-PN/N
Ranges of application in A	63 – 160	160 – 250	400 – 630	800 – 1600
Number of poles	3/4	3/4	3/4	3/4
Rated input voltage: in V	690	690	690	690
Dimensions in mm				
Width	90/120	105/140	140/185	210/280
Height	145	184	275	401
Depth	68	103	120.5	138

This range of compact frame sizes offers features consistency with the same function, mounting and operation for switches and accessories. A range of competitively-priced releases with thermostatic bimetals or communication-capable digital electronics for a host of applications for various protection tasks: For AC and DC networks, cable and line protection and motor/generator protection. Applications such as main-, Emergency Stop- and coupling switches can be realised using switch disconnectors up to 1600 A.

SETTING INSTRUCTIONS FOR THERMAL MAGNETIC RELEASES, MC1, 2 AND 3



SCHRACK-INFO

- 1 **OVERLOAD RELEASE I_r**
The overload release can be set from $0,8$ to $1 \times I_n$
- 2 **UNDELAYED SHORT-CIRCUIT RELEASE I_i**
Undelayed releases are necessary to prevent damage to the system and to protect the switch itself. Releases for systems and line protection can be set from 6 to $1 \times I_n$, releases for motorprotection can be set from 8 to $14 \times I_n$

FOR SYSTEM AND LINE PROTECTION

MC1 I_n / A	MC2 I_n / A	MC3 I_n / A	OVERLOAD- RELEASE I_r / A	SHORT-CIRCUIT- RELEASE I_i / A
20	20		$0.8-1 \times I_n$	350
25	25		$0.8-1 \times I_n$	350
32	32		$0.8-1 \times I_n$	350
40	40		$0.8-1 \times I_n$	$8-10 \times I_n$
50	50		$0.8-1 \times I_n$	$6-10 \times I_n$
63	63		$0.8-1 \times I_n$	$6-10 \times I_n$
80	80		$0.8-1 \times I_n$	$6-10 \times I_n$
100	100		$0.8-1 \times I_n$	$6-10 \times I_n$
125	125		$0.8-1 \times I_n$	$6-10 \times I_n$
160	160		$0.8-1 \times I_n$	MC1: $8 \times I_n / 6-10 \times I_n$
	200		$0.8-1 \times I_n$	
	250		$0.8-1 \times I_n$	
	300	320	$0.8-1 \times I_n$	
		400	$0.8-1 \times I_n$	
		500	$0.8-1 \times I_n$	

FOR MOTOR PROTECTION

MC1 I_n / A	MC2 I_n / A	OVERLOAD- RELEASE I_r / A	SHORT CIRCUIT- RELEASE I_i / A
		$0.8-1 \times I_n$	350
		$0.8-1 \times I_n$	350
		$0.8-1 \times I_n$	$10-14 \times I_n$
40		$0.8-1 \times I_n$	$8-14 \times I_n$
50		$0.8-1 \times I_n$	$8-14 \times I_n$
63		$0.8-1 \times I_n$	$8-14 \times I_n$
80		$0.8-1 \times I_n$	$8-14 \times I_n$
100		$0.8-1 \times I_n$	MC1: $8-12.5 \times I_n$ MC2: $8-14 \times I_n$
	125	$0.8-1 \times I_n$	$8-14 \times I_n$
	160	$0.8-1 \times I_n$	$8-14 \times I_n$
	200	$0.8-1 \times I_n$	$8-14 \times I_n$

SETTING INSTRUCTIONS FOR ELECTRONIC RELEASES MC2, 3 AND 4

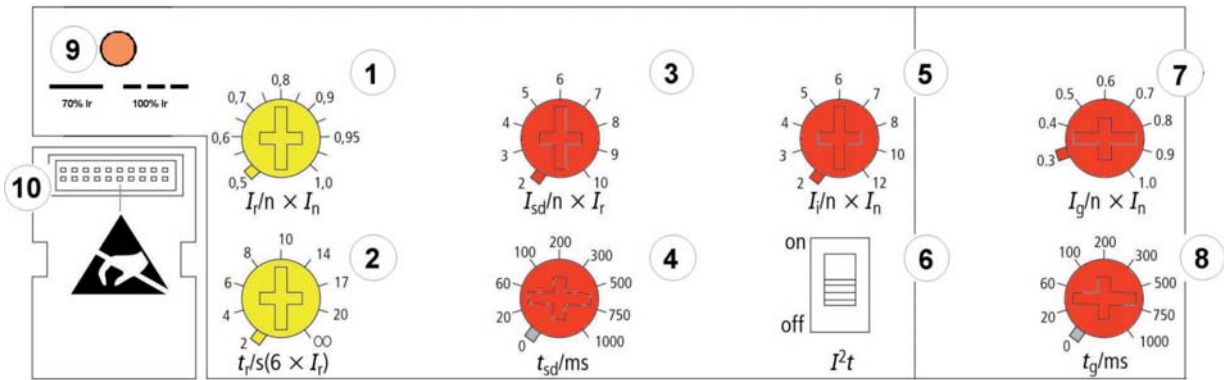
FOR INSTALLATION-, CABLE-, SELECTIVE AND GENERATOR PROTECTION

MC2 I_n / A	MC3 I_n / A	MC4 I_n / A	OVERLOAD- RELEASE I_r / A	SHORT-CIRCUIT- RELEASE I_{sd} / A	SHORT-CIRCUIT- RELEASE I_i / A
100	250	630	$0.5-1 \times I_n$	$2-10 \times I_r$	$2-12 \times I_n$
160	400	800	$0.5-1 \times I_n$	$2-10 \times I_r$	$2-12 \times I_n$
250	630	1000	$0.5-1 \times I_n$	$2-10 \times I_r$	$2-12 \times I_n$
		1250	$0.5-1 \times I_n$	$2-10 \times I_r$	$2-12 \times I_n$
		1600	$0.5-1 \times I_n$	$2-10 \times I_r$	$2-12 \times I_n$
		2000	$0.5-1 \times I_n$	$2-6 \times I_r$	$2-8 \times I_r$

FOR MOTOR PROTECTION

MC2 I_n / A	MC3 I_n / A	OVERLOAD- RELEASE I_r / A	SHORT-CIRCUIT- RELEASE I_i / A
90		$0.5-1 \times I_n$	$2-14 \times I_r$
140		$0.5-1 \times I_n$	$2-14 \times I_r$
220	220	$0.5-1 \times I_n$	$2-14 \times I_r$
	350	$0.5-1 \times I_n$	$2-14 \times I_r$
	450	$0.5-1 \times I_n$	$2-14 \times I_r$

SETTING INSTRUCTIONS FOR ELECTRONIC RELEASES, MC2, 3 AND 4



1 OVERLOAD RELEASE IR

The overload release has 13 possible settings (from 0,5 to 1 x In). The nominal current of the device In is multiplied by the factor for the overload setting to produce the calculated overload release current, Ir.

2 TIME DELAY SETTING TO OVERCOME CURRENT PEAKS tr

Electronic releases model the characteristics of a bi-metal. While each mechanical bimetal has its own particular characteristic, electronics allow use to generate various characteristics (with different time delays). The time delay setting is defined using the time at which the circuit breaker trips with an overload of 6 x Ir. A standard circuit-breaker trips after approx. 8 to 10 s. The setting is adjustable over a range of $t_r = 2,4,6,8,10,14,17,20$ or ∞ (without bi-metal tripping). Longer tripping times may for example be necessary if starters are placed downstream to hard-starting operators. Unexpected and premature trips are prevented. Lower settings are intended for the protection of electronic system elements. A t_r value of 10 s should be selected for standard applications.

3 DELAYED SHORT-CIRCUIT RELEASE I_{sd}

MC delayed short-circuit releases are suitable for the time-selective network design. Once the short-circuit current reaches the pre-set response time of the instantaneous release (2 to 10 x Ir), the switch will trip after a pre-set time-delay t_{sd} . The I_{sd} value is in respect to the pre-set Ir.

4 TIME DELAY t_{sd} (WITH RESPECT TO I_{sd})

The response time for the delayed short-circuit release is adjustable over 9 levels, from 0 to 1000 ms.

5 UNDELAYED SHORT-CIRCUIT RELEASE I_i

Even with time-selective network designs with very high short-circuit currents, a non-delayed release is necessary to prevent damage to the system and to offer protection to the switch itself. The response of the non-delayed instantaneous releases can be adjusted between 2 and 12 x In. The value I_i relates to the nominal current In of the switch.

6 I²t SETTING ON/OFF

In the event of an overload, a circuit breaker will trip after a current-dependent delay. As soon as the over-current exceeds the response value of the short-circuit instantaneous release, I_i , the overload characteristic will abruptly break down. Depending on the short-term-delay setting, the trigger will occur within milliseconds. The jolt in the characteristic curve can endanger the selectivity class if a safety fuse was chosen as the downstream protection device. Electronics allows us to ramp-up the tripping time as a separate ramp function ($I^2t = ON$). The resulting tripping time is determined by the maximum permissible thermal energy, I^2t .

7 EARTH-FAULT PROTECTION MODULE I_g (OPTIONAL)

The adjustable earth-fault protection module, I_g , detects and switches short-circuits to ground which do not cause the short-circuit instantaneous release to trip due to excessive impedances to earth. The response is adjustable between 0,3 and 1,0 x In with configurable time delay, t_g .

8 TIME-DELAY t_g (WITH RESPECT TO I_g)

Thanks to the time delay on the earth fault release $t_g = 0$ to 1000 ms, the source of the fault in the event of a earth contact can be selectively switched.

9 LED OVERLOAD INDICATOR, "ALARM"

The LED lights before the switch triggers if an overload was detected by the electronic system. Upon reaching an Ir of 70%, the LED will light permanently, at 100% Ir, the LED will start to flash slowly, and will do so quickly after 120%. The circuit breaker will switch after a time appropriate to the tripping characteristic curve.

10 DATA INTERFACE

Access to diagnostics and operational data via PC/Laptop or DMI (Data Management Interface). The (optional) DMI module enables the display, evaluation and measurement of current values, has built-in motor starter functions and enables the parameterisation and control of circuit breakers with electronic releases. A bus coupler (optionally available) makes it possible to connect automation systems (SPS/PLS) at any time (e.g. Profibus DP).

■ CIRCUIT BREAKER 3 POLE UP TO 160A WITH THERMAL MAGNETIC RELEASE TYPES MC1B-A, MC1N-A, MC1H-A



MC110231

■ SCHRACK INFO

- For system and line protection
- Adjustable overload release I_r : 0,8 – 1 x I_n (factory setting 0,8 x I_n)
- Adjustable short-circuit release I_s : 6 – 10 x I_n (factory setting 6 x I_n); except MC.-A40: 8 - 10 x I_n
- Box terminals as standard, screw terminals as accessories
- Breaking capacity 25 / 50 / 100 kA at 415 V 50/60 Hz
- Meets IEC/EN 60947-2
- Rated uninterrupted current = Rated current

RATED CURRENT/ BREAKING CAPACITY	SETTING RANGE		TYPE	ORDER NO.
	OVERLOAD- RELEASE (A)	SHORT CIRCUIT- RELEASE (A)		
3 POLE (BASIC BREAKING CAPACITY) 25 kA				
20 A/25 kA	15...20	fix 350	MC1B-A20	MC120131
25 A/25 kA	20...25	fix 350	MC1B-A25	MC125131
32 A/25 kA	25...32	fix 350	MC1B-A32	MC132131
40 A/25 kA	32...40	320...400	MC1B-A40	MC140131
50 A/25 kA	40...50	300...500	MC1B-A50	MC150131
63 A/25 kA	50...63	380...630	MC1B-A63	MC163131
80 A/25 kA	63...80	480...800	MC1B-A80	MC180131
100 A/25 kA	80...100	600...1000	MC1B-A100	MC110131
125 A/25 kA	100...125	750...1250	MC1B-A125	MC112131
160 A/25 kA	125...160	fix 1280	MC1B-A160	MC116131
3 POLE (NORMAL BREAKING CAPACITY) 50 kA				
20 A/50 kA	15...20	fix 350	MC1N-A20	MC120231
25 A/50 kA	20...25	fix 350	MC1N-A25	MC125231
32 A/50 kA	25...32	fix 350	MC1N-A32	MC132231
40 A/50 kA	32...40	320...400	MC1N-A40	MC140231
50 A/50 kA	40...50	300...500	MC1N-A50	MC150231
63 A/50 kA	50...63	380...630	MC1N-A63	MC163231
80 A/50 kA	63...80	480...800	MC1N-A80	MC180231
100 A/50 kA	80...100	600...1000	MC1N-A100	MC110231
125 A/50 kA	100...125	750...1250	MC1N-A125	MC112231
160 A/50 kA	125...160	fix 1280	MC1N-A160	MC116231
3 POLE (HIGH BREAKING CAPACITY) 100 kA				
20 A/100 kA	15...20	fix 350	MC1H-A20	MC120331
25 A/100 kA	20...25	fix 350	MC1H-A25	MC125331
32 A/100 kA	25...32	fix 350	MC1H-A32	MC132331
40 A/100 kA	32...40	320...400	MC1H-A40	MC140331
50 A/100 kA	40...50	300...500	MC1H-A50	MC150331
63 A/100 kA	50...63	380...630	MC1H-A63	MC163331
80 A/100 kA	63...80	480...800	MC1H-A80	MC180331
100 A/100 kA	80...100	600...1000	MC1H-A100	MC110331
125 A/100 kA	100...125	750...1250	MC1H-A125	MC112331
160 A/100 kA	125...160	fix 1280	MC1H-A160	MC116331

■ CIRCUIT BREAKER 4 POLE UP TO 160A WITH THERMAL MAGNETIC RELEASE TYPES MC1B-4-A, MC1N-4-A, MC1H-4-A



MC110231

■ SCHRACK INFO

- For system and line protection
- 100% overload- and short-circuit protection
- Adjustable overload release I: $0,8 - 1 \times I_n$ (factory setting $0,8 \times I_n$)
- Adjustable short-circuit release I: $6 - 10 \times I_n$ (factory setting $6 \times I_n$);
except MC.-A40: $8 - 10 \times I_n$
- Box terminals as standard, screw terminals as accessories
- Breaking capacity 25 / 50 / 100 kA at 415 V 50/60 Hz
- Specifications to IEC/EN 60947-2
- Rated uninterrupted current = Rated current

RATED CURRENT/ BREAKING CAPACITY	SETTING RANGE		TYPE	ORDER NO.
	OVERLOAD- RELEASE (A)	SHORT CIRCUIT- RELEASE (A)		
4 POLE (BASIC BREAKING CAPACITY) 25 kA				
20 A/25 kA	15...20	fix 350	MC1B-4-A20	MC120141
25 A/25 kA	20...25	fix 350	MC1B-4-A25	MC125141
32 A/25 kA	25...32	fix 350	MC1B-4-A32	MC132141
40 A/25 kA	32...40	320...400	MC1B-4-A40	MC140141
50 A/25 kA	40...50	300...500	MC1B-4-A50	MC150141
63 A/25 kA	50...63	380...630	MC1B-4-A63	MC163141
80 A/25 kA	63...80	480...800	MC1B-4-A80	MC180141
100 A/25 kA	80...100	600...1000	MC1B-4-A100	MC110141
125 A/25 kA	100...125	750...1250	MC1B-4-A125	MC112141
160 A/25 kA	125...160	fix 1280	MC1B-4-A160	MC116141
4 POLE (NORMAL BREAKING CAPACITY) 50 kA				
20 A/50 kA	15...20	fix 350	MC1B-4-A20	MC120241
25 A/50 kA	20...25	fix 350	MC1N-4-A25	MC125241
32 A/50 kA	25...32	fix 350	MC1N-4-A32	MC132241
40 A/50 kA	32...40	320...400	MC1N-4-A40	MC140241
50 A/50 kA	40...50	300...500	MC1N-4-A50	MC150241
63 A/50 kA	50...63	380...630	MC1N-4-A63	MC163241
80 A/50 kA	63...80	480...800	MC1N-4-A80	MC180241
100 A/50 kA	80...100	600...1000	MC1N-4-A100	MC110241
125 A/50 kA	100...125	750...1250	MC1N-4-A125	MC112241
160 A/50 kA	125...160	fix 1280	MC1N-4-A160	MC116241
4 POLE (HIGH BREAKING CAPACITY) 100 kA				
20 A/100 kA	15...20	fix 350	MC1H-A20	MC120341
25 A/100 kA	20...25	fix 350	MC1H-A25	MC125341
32 A/100 kA	25...32	fix 350	MC1H-A32	MC132341
40 A/100 kA	32...40	320...400	MC1H-A40	MC140341
50 A/100 kA	40...50	300...500	MC1H-A50	MC150341
63 A/100 kA	50...63	380...630	MC1H-A63	MC163341
80 A/100 kA	63...80	480...800	MC1H-A80	MC180341
100 A/100 kA	80...100	600...1000	MC1H-A100	MC110341
125 A/100 kA	100...125	750...1250	MC1H-A125	MC112341
160 A/100 kA	125...160	fix 1280	MC1H-A160	MC116341

■ MOTOR PROTECTION, 3 POLE UP TO 100A WITH THERMAL MAGNETIC RELEASE, TYPES MC1B-M, MC1N-M



MC110231

■ SCHRACK INFO

- Adjustable overload release I_t : $0,8 - 1 \times I_n$ (factory setting $0,8 \times I_n$); with phase sensitivity, tripping class 10 A ($2s < T_p \leq 10s$)
- Adjustable short-circuit release I_s : $8 - 14 \times I_n$ (ex-factory $12 \times I_n$); except MC1.-M100: $8 - 12,5 \times I_n$ (factory setting $12 \times I_n$)
- Connection terminals as standard, screw terminals as accessories
- Breaking capacity 25 / 50 kA at 415 V 50/60 Hz
- Meets IEC/EN 60947-4 and IEC/EN 60947-2
- Meet all requirements of utilization category AC3 at 400 VAC

NOMINAL CURRENT/ BREAKING CAPACITY	POWER RATING AC3 kW	CURRENT AC3 A	SETTING RANGE		TYPE	ORDER NO.
			OVERLOAD- RELEASE (A)	SHORT CIRCUIT- RELEASE (A)		
3 POLE (BASIC BREAKING CAPACITY) 25 kA						
40 A/25 kA	18.5	36	32...40	320...560	MC1B-M40	MC140136
50 A/25 kA	22	41	40...50	400...700	MC1B-M50	MC150136
63 A/25 kA	30	55	50...63	504...882	MC1B-M63	MC163136
80 A/25 kA	37	68	63...80	640...1120	MC1B-M80	MC180136
100 A/25 kA	55	99	80...100	800...1250	MC1B-M100	MC110136
3 POLE (NORMAL BREAKING CAPACITY) 50 kA						
40 A/50 kA	18.5	36	32...40	320...560	MC1N-M40	MC140236
50 A/50 kA	22	41	40...50	400...700	MC1N-M50	MC150236
63 A/50 kA	30	55	50...63	504...882	MC1N-M63	MC163236
80 A/50 kA	37	68	63...80	640...1120	MC1N-M80	MC180236
100 A/50 kA	55	99	80...100	800...1250	MC1N-M100	MC110236

SWITCH DISCONNECTOR UP TO 160A TYPES MC1-PN, MC1-PN-4, MC1-N, MC1-N-4



MC110231

SCHRACK INFO

- Rated uninterrupted current up to 160A
- Switch disconnecter type MC1-PN two switch positions, 0/I, cannot be tripped remotely
- Switch disconnecter type MC1-N, with Trip setting "0"; "+"; "I", can be tripped remotely with undervoltage/shunt release, trip-indicating auxiliary contacts possible
- Box terminals as standard, screw terminals as accessories
- Main switch characteristics including positive drive according to IEC/EN 60204 & VDE 0113
- Isolating characteristics to IEC/EN 60947-3 and VDE 0660 Protection against accidental contact to VDE 0160 Part 100
- Specifications to IEC/EN 60947-2
- Rated uninterrupted current = Rated current
- Rated short-circuit breaking capacity values: I_{cm} 2,8kA
- Rated short-time withstand current: I_{cw} 2kA

RATED CURRENT/ BREAKING CAPACITY	MAX. BACK-UP FUSE (gL) FOR SWITCH DISCONNECTOR (AgL)	TYPE	ORDER NO.
3 POLE CANNOT BE TRIPPED REMOTELY			
63 A	125 A	MC1-PN-63	MC163034
100 A	125 A	MC1-PN-100	MC110034
125 A	125 A	MC1-PN-125	MC112034
160 A	160 A	MC1-PN-160	MC116034
4 POLE CANNOT BE TRIPPED REMOTELY			
63 A	125 A	MC1-PN-4-63	MC163044
100 A	125 A	MC1-PN-4-100	MC110044
125 A	125 A	MC1-PN-4-125	MC112044
160 A	160 A	MC1-PN-4-160	MC116044
3 POLE CAN BE TRIPPED REMOTELY			
63 A	125 A	MC1-N-63	MC163035
100 A	125 A	MC1-N-100	MC110035
125 A	125 A	MC1-N-125	MC112035
160 A	160 A	MC1-N-160	MC116035
4 POLE CAN BE TRIPPED REMOTELY			
63 A	125 A	MC1-N-4-63	MC163045
100 A	125 A	MC1-N-4-100	MC110045
125 A	125 A	MC1-N-4-125	MC112045
160 A	160 A	MC1-N-4-160	MC116045

RESIDUAL-CURRENT (RCD) RELEASE TYPES MC1-N-XFI.R, MC1-N-4-XFI.R, MC1-N-XFI.U, MC1-N-4-XFI.U







MC194608

SCHRACK INFO

- Suitable for use in three- and single-phase systems
- Pulse current sensitive accord. to core-balance principle
- For 3- and 4-pole circuit breaker and switch disconnectors MC1, MC1-N, not for MC1-PN
- Dependant on mains power $U_e = 200 - 415 \text{ V } 50/60 \text{ Hz}$
- Meets IEC/EN 60947-2
- Bottom mounting up to 100 A
- Complete unit

TECHNICAL DATA

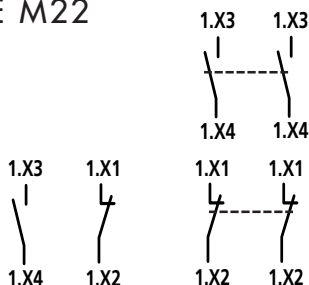
- At $I_{\Delta n} = 0,03 \text{ A}$: Time delay t_v permanently set to 10 ms.
- Alarm message $> 30 \% I_{\Delta n}$ via yellow LED.
- Trip-indicating auxiliary contacts can be fitted by user (max. 2 auxillary contacts):
N/O: Order No: MM216376, N/C: Order No: MM216378 (see page 13) are reset via a reset toggle lever.
- When using the trip-indicating auxiliary contacts in the FI module, the N/C contact works as an N/O contact and the N/O contact as an N/C.
- Not for use in XCS insulated enclosures.
- Type MC1-XFI...U cannot be combined with shunt or undervoltage releases and an early-make auxiliary contact.
- Rated short-circuit breaking capacity values are determined by installed MC1 or when using a switch disconnector MC1-N by the back-up fuse to be used.

FOR TYPE	RATED FAULT CURRENT ($I_{\Delta n}$)	TIME-DELAY (ms)	TYPE	ORDER NO.
3 POLE INSTALLED FROM RIGHT UP TO 160A 				
MC1-N	0.03	10	MC1-N-XFI30R	MC194603
MC1-N	0.3	10	MC1-N-XFI300R	MC194604
MC1-N	0.03-0.1-0.3-0.5-1-3	10, 60, 150, 300, 450	MC1-N-XFIR	MC194605
4 POLE INSTALLED FROM RIGHT UP TO 160A 				
MC1-4 / MC1-N-4	0.03	10	MC1-N-4-XFI30R	MC194606
MC1-4 / MC1-N-4	0.3	10	MC1-N-4-XFI300R	MC194607
MC1-4 / MC1-N-4	0.03-0.1-0.3-0.5-1-3	10, 60, 150, 300, 450	MC1-N-4-XFIR	MC194608
3 POLE BOTTOM MOUNTING UP TO 100A 				
MC1-N	0.03	10	MC1-N-XFI30U	MC194609
MC1-N	0.3	10	MC1-N-XFI300U	MC194610
MC1-N	0.03-0.1-0.3-0.5-1-3	10, 60, 150, 300, 450	MC1-N-XFIU	MC194611
4 POLE BOTTOM MOUNTING UP TO 100A 				
MC1-4 / MC1-N-4	0.03	10	MC1-N-4-XFI30U	MC194612
MC1-4 / MC1-N-4	0.3	10	MC1-N-4-XFI300U	MC194613
MC1-4 / MC1-N-4	0.03-0.1-0.3-0.5-1-3	10, 60, 150, 300, 450	MC1-N-4-XFIU	MC194614

STANDARD AUXILIARY CONTACT / TRIP-INDICATING AUXILIARY CONTACT TYPE M22



MM216378



SCHRACK INFO

- Switches with the main contacts, used for indicating and interlocking tasks
- General trip indication “+” with trip due to voltage release, overload release or short-circuit-release

TECHNICAL DATA

Breaking capacity: AC15: 4 A / 230 VAC
DC13: 3 A / 24 VDC

TIPS & TRICKS

The trip-indicating auxiliary contacts is the same contact as the standard auxiliary contact. It derives its function from its place of installation where it is installed (alarm contact on left).

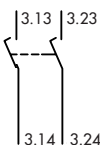
Maximum component installation with auxillary contacts: 1 x Standard auxiliary contact (HIN) M22-K.
1 x Trip-indicating contact (HIA) M22-CK.

DESCRIPTION	TYPE	ORDER NO.
1 N/O contact with plug screw terminals	M22-K10	MM216376
1 N/C contact with plug screw terminals	M22-K01	MM216378
2 N/O contacts with cage clamp terminals	M22-CK20	MM107898
2 N/C contacts with cage clamp terminals	M22-CK02	MM107899

EARLY-MAKE AUXILIARY CONTACT TYPE MC1-XHIVL



MC199432



SCHRACK INFO

For interlock- and load-shedding circuits as well as for early make of undervoltage release in main switch/Emergency stop applications.

TECHNICAL DATA

- Early-make during switch on and off (manual switch): approx. 20 ms
- Not in connection with undervoltage release MC1-XU... or shunt release MC1-XA...
- Breaking capacity: AC15: 4 A / 230 VAC
DC13: 3 A / 24 VDC

TIPS & TRICKS

Maximum component installation with auxillary contacts:

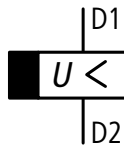
1 x early-make auxiliary contact

DESCRIPTION	TYPE	ORDER NO.
Early-make auxiliary contact, 2 N/O incl. 3 m cable	MC1-XHIVL	MC199432

UNDervOLTAGE RELEASE TYPES MC1-XUL



MC199471



SCHRACK INFO

- Non-delayed breaking of circuit breaker MC/ switch disconnector MC-N when the control voltage drops below 35 % -70% U_s .
- For use in Emergency stop devices in connection with EMERGENCY STOP button
- Installed in breaker
- Without auxiliary contact

TIPS & TRICKS

When the undervoltage release is de-energized, accidental contact with the main contacts of the switch is safely prevented during attempts to switch on. Undervoltage release cannot be installed simultaneously with an shunt release or early-make auxiliary contact MC1-XHIV.

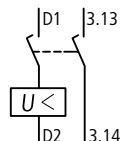
VOLTAGE	VERSION	TYPE	ORDER NO.
24 VAC	incl. 3m cable	MC1-XUL24AC	MC199462
24 VDC	incl. 3m cable	MC1-XUL24DC	MC199481
208-240 V AC	incl. 3m cable	MC1-XUL208-240AC	MC199471
380-440 V AC	incl. 3m cable	MC1-XUL380-440AC	MC199473

Other voltage variants available upon request.

UNDervOLTAGE RELEASE WITH TWO EARLY-MAKE AUXILIARY CONTACTS TYPES MC1-XUHIVL



MC199565



SCHRACK INFO

- With 2 early-make auxiliary contacts
- For early-make of the undervoltage release in main switch applications and for interlock- and load-shedding circuits
- Installed in breaker
- Other voltages and connection versions available on request

TIPS & TRICKS

When the undervoltage release is de-energized, accidental contact with the main contacts of the switch is safely prevented during attempts to switch on. Early-make of auxiliary contacts during switch on and off (20ms). Undervoltage releases cannot be installed simultaneously with shunt releases or early-make auxiliary contact, type MC1-XHIV.

VOLTAGE	VERSION	TYPE	ORDER NO.
208 - 240 VAC	incl. 3m cable	MC1-XUHIVL230V	MC199565
380 - 440 VAC	incl. 3m cable	MC1-XUHIVL400VAC	MC199567

Other voltage variants available upon request.

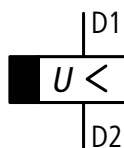
UNDervOLTAGE RELEASE, OFF-DELAY TYPES MC-UVU, MC-XUVL



MC199471



MC496189



SCHRACK INFO

- Voltage drops less than 0,07–16s do not cause MC circuit breakers or N switch disconnectors to trip.

TECHNICAL DATA

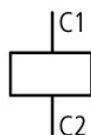
- Time-delay adjustable between 70 ms – 4 s
- With additional external capacitor:
30.000 μ F \geq 35 V to 8 s
90.000 μ F \geq 35 V to 16 s
- Special release MC1-XUVL is required.
- Cannot be installed at same time with early-make auxiliary contact MC1-XHIV... or shunt release MC1-XA...
- Time-delay device for separate mounting (Fixing: DIN rail or screws).
- For other operating voltages, please use a control transformer.

NAME	TYPE	ORDER NO.
Time-delay unit	MC-UVU	MC196154
Special undervoltage release for time-delay unit MC1	MC1-XUVL	MC191607

SHUNT RELEASE TYPE MC1-XAL



MC199744



SCHRACK INFO

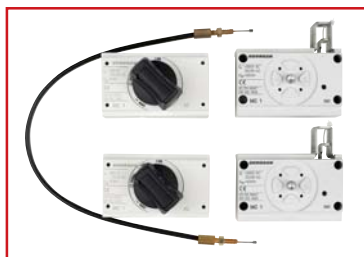
- Without auxiliary contact
- Switches are tripped by a voltage pulse or by the application of uninterrupted voltage

TECHNICAL DATA

When the shunt release is energized, accidental contact with the main contacts of the switch is safely prevented during attempts to switch on. Shunt release cannot be installed simultaneously with undervoltage releases or early-make auxiliary contact MC1-XHIV.

VOLTAGE	VERSION	TYPE	ORDER NO.
24 VAC/DC	incl. 3m cable	MC1-XAL24AC/DC	MC199736
208 - 250 VAC/DC	incl. 3m cable	MC1-XAL230AC/DC	MC199744

MECHANICAL INTERLOCK FOR (DOOR COUPLING-) ROTARY HANDLES FOR MC1



MC191581

SCHRACK INFO

Rotary handle on switch or door coupling rotary handle additionally required. Cannot be combined with remote operator or door frame.

At least 2 interlocking modules are required to construct a mechanical interlocking circuit. See Page 142 for possible combinations and variations of interlocking circuits. Bowden cable to be ordered separately.

DESCRIPTION	TYPE	ORDER NO.
Mechanical interlock	MC1-XMV	MC191581
Bowden cable 225 mm	MC-XBZ225	MC191585
Bowden cable 600 mm	MC-XBZ600	MC191586
Bowden cable 1000 mm	MC-XBZ1000	MC191587

ROTARY HANDLE DIRECTLY ON SWITCH FOR MC1



MC290127



MC390129

SCHRACK INFO

- Complete with rotary drive
- Can also be combined with door frame

TECHNICAL DATA

Available in the following versions:

Type MC.-XDV

Lockable in the "0" position (up to three padlocks), black/grey

Type MC.-XDVR

Lockable in the "0" position (up to three padlocks), Emergency stop red/yellow

Type MC.-XDTV

Lockable in the "0" position on handle, modification also available in "1" position, black/grey

Type MC.-XDTV

Lockable in "0" position, Emergency Stop red/yellow

Version comes with door interlock:

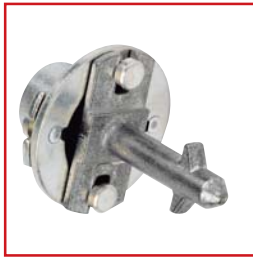
- Door frame supplied with door interlock
- Rotary handle can be rotated 90° for horizontally-mounted switches
- In the ON position, can be defeated from the outside using a 1 mm pin
- Cannot be defeated in the locked OFF and ON positions
- Door can be opened in OFF
- Can only be switched on when door closed

DESCRIPTION	TYPE	ORDER NO.
Lockable rotary handle for MC1, black/grey	MC1-XDV	MC190125
Lockable rotary handle for MC1, Emergency stop red/yellow	MC1-XDVR	MC190135
Rotary handle for MC1 with door interlock, lockable, black/grey	MC1-XDTV	MC190131
Rotary handle for MC1 with door interlock, lockable, Emergency stop red/yellow	MC1-XDTV	MC190142

DOOR COUPLING ROTARY HANDLE FOR MC1



MC190160



MC190160



MC190160

SCHRACK INFO

- Complete unit including rotary drive and coupling parts
- Degree of Protection IP66
- Rotary handle can be rotated 90° for horizontally-mounted switches
- Cannot be defeated in the locked OFF and ON positions
- Can be modified when in the unlocked ON position, can be defeated from the outside with a screwdriver
- Door can be opened in OFF
- External warning plate/designation plate can be clipped on

NOTES

- Order extension shaft separately!

TECHNICAL DATA

Available in the following versions:

Type MC.-XTVD

Lockable in the "0" position on handle with up to three padlocks, with door interlock, black/grey

Type MC.-XTVDV

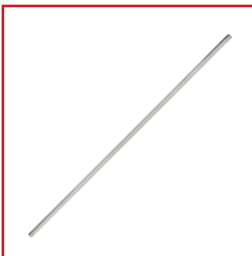
Lockable in the "0" position on handle and switch, with up to three padlocks, with door interlock, black/grey

Type MC.-XTVDVR

Lockable in the "0" position on handle and switch with up to three padlocks, with door interlock, Emergency stop red/yellow

DESCRIPTION	TYPE	ORDER NO.
Door coupling rotary handle for MC1 with door interlock, lockable, black/grey	MC1-XTVD	MC190166
Door coupling rotary handle for MC1 with door interlock, lockable, "0", "1", black/grey	MC1-XTVDV	MC190172
Door coupling rotary handle for MC1 with door interlock, lockable, Emergency stop red/yellow	MC1-XTVDVR	MC190178

EXTENSION SHAFT FOR MC1



MC190191

SCHRACK INFO

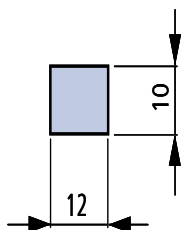
- For maximum cabinet depths of 400 or 600 mm
- Can be cut to required length

DESCRIPTION	CABINET DEPTH	TYPE	ORDER NO.
Extension shaft for MC1 max. 400 mm	max. 400 mm	MC1/2-XV4	MC191232
Extension shaft for MC1 max. 600 mm	max. 600 mm	MC1/2-XV6	MC190191

BOX TERMINALS FOR MC1



MC292240



SCHRACK INFO

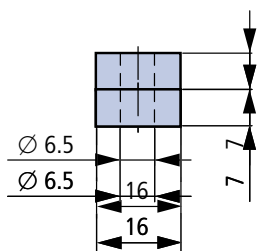
- Standard connection for all MC1, MC1-PN and MC1-N switches
- Conversion kit for switches with screw connection
- Contains parts for one switch side
- Installed inside the switch housing
- Use cover plate MC.-XSKA
- Terminal capacities
CU conductors 1 x 10–70 mm²
CU cables 2 x 6–25 mm²

DESCRIPTION	TYPE	ORDER NO.
Box terminal up to 160 A (contains 3 pcs.) for MC1	MC1-160-XKC	MC190015
Box terminal up to 160 A (includes 4 pcs.) for MC1-4	MC1-160-4-XKC	MC197075

SCREW CONNECTION FOR MC1



MC190019



SCHRACK INFO

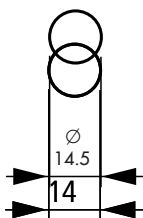
- Contains parts for one switch side located at top or bottom 3- or 4 pole switches
- Installed outside switch housing
- Cover plate MC.-XSKA included
- Terminal capacities
CU conductors 1 x 10–70 mm², 2 x 6–25 mm²
AL cable lugs 1 x 10–35 mm², 2 x 10–35 mm²

DESCRIPTION	TYPE	ORDER NO.
Screw connection 3 pcs. for MC1	MC1-XKS	MC190019
Screw connection 4 pcs. for MC1-4	MC4-4-XKC	MC196725

TUNNEL TERMINAL FOR MC1



MC196730



SCHRACK INFO

- Contains parts for one switch side, top or bottom
- With terminal for control circuit for 1 x 0,75–2,5 mm², 2 x 0,75–1,5 mm² Cu conductor
- Installed outside switch housing
- Maximum specified cross-section can only be connected stranded and without end sleeve.
- Cover plate MC1(-4)-XKSA must be installed (supplied).
- Terminal capacities:
Cu cable, Al cable 95 mm²

TECHNICAL DATA

- for Cu- And Al cables
- Includes cover plate
- Stranded round conductor / stranded sector-shaped conductor
- Use with flexible and ultra-flexible conductor end sleeves

DESCRIPTION	TYPE	ORDER NO.
Tunnel terminal 95 mm ² , 3 pole for MC1	MC1-XKA	MC196730
Tunnel terminal 95 mm ² , 4 pole for MC1-4	MC1-4-XKA	MC196731

REAR CONNECTION FOR MC1



MC196734

SCHRACK INFO

- Contains parts for one switch side located at top or bottom 3- or 4 pole switches
- Terminal capacities:
Cu cable lug 1 x 10–70 mm², 2 x 6–25 mm²
Al cable lug 1 x 10–35 mm², 2 x 10–35 mm²

DESCRIPTION	TYPE	ORDER NO.
Rear connection, 3 pole for MC1	MC1-XKR	MC196734
Rear connection, 4 pole for MC1-4	MC1-4-XKR	MC196737

CONTROL CIRCUIT TERMINAL FOR MC1



MC196739

SCHRACK INFO

- Contains parts for two terminals located at top or bottom for 3/ 4 pole switches
- Included with tunnel terminal
- Terminal capacities:
Screw connection 1 x 0,75 – 2,5 mm², 2 x 0,75 – 1,5 mm²

DESCRIPTION	TYPE	ORDER NO.
Control circuit terminal for box terminal MC1	MC-XSTK	MC196739
Control circuit terminal for screw connection MC1	MC1-XSTS	MC190150

TERMINAL COVER FOR MC1



MC290038

SCHRACK INFO

- Protection against accidental contact when using cable lugs, rails or Tunnel terminals
- Contains parts for one switch side located at top or bottom 3- or 4 pole switches
- Degree of protection IP4X front, side and rear, IP1X on the connection side when using insulated conductor material
- Cover plate included with tunnel terminals

DESCRIPTION	TYPE	ORDER NO.
Terminal cover, 3 pole for MC1	MC1-XKSA	MC190021
Terminal cover, 4 pole for MC1-4	MC1-4-XKSA	MC196741

CONNECTION COVER, KNOCKOUT FOR BOX TERMINAL MC1



MC196781

SCHRACK INFO

- Connection cover, knockout

DESCRIPTION	TYPE	ORDER NO.
Terminal cover, 3 pole for MC1	MC1-XKSFA	MC190780
Terminal cover, 4-pol. for MC1-4	MC1-4-XKSFA	MC196781

IP2X FINGER PROTECTION FOR DIRECT-MOUNTED MC1 SWITCHES



MC196744



MC196748

SCHRACK INFO

- Increases protection against accidental contact to IP2X
- Protection when reaching into the cable connection area when cables are connected
- MC1-XIPA and MC1-4-XIPA only in combination with cover plate
- Contains parts for one switch side, top or bottom

DESCRIPTION	TYPE	ORDER NO.
FOR BOX TERMINAL		
Finger protection, 3 pole for MC1	MC1-XIPK	MC196744
Finger protection, 4 pole for MC1	MC1-4-XIPK	MC196745
FOR TERMINAL COVER		
Finger protection, 3 pole for MC1	MC1-XPA	MC196748
Finger protection, 4 pole for MC1	MC1-4-XIPA	MC196749

INSULATED ENCLOSURE XCI



MC191522

SCHRACK INFO

- Only for switches with box terminals for direct cable connection
- With door coupling rotary handle
- Complete unit includes all necessary functional parts
- Degree of protection IP65
- MC1-XCI23 housing with flanges
- MC1-XCI43 are fitted with gland plates

TECHNICAL DATA

Enclosure suitable for installation of circuit-breakers and switch-disconnectors for separate mounting with top and bottom cable entry.

Including fixing straps for wall mounting. Short circuit protection at 415 V 50/60 Hz to 10 kA.

Not in combination with remote operator, plug-in- or withdrawable unit.

Additional insulated terminals for 4 or 5 pole must be ordered separately.

Available in the following versions:

Standard, black/grey

Lockable in the "0" position at handle with up to 3 padlocks. Additionally with cover interlock.

For Emergency stop, red/yellow

Lockable on handle and switch lockable with up to 3 padlocks in the "0" position on handle. Additionally with cover interlock and lockable at switch in the "0" position.

DESCRIPTION	MAX. RATED UNINTERRUPTED CURRENT	TYPE	ORDER NO.
STANDARD, BLACK/GREY			
Insulated enclosure for MC1, 3 pole	≤ 63 A	MC1-XCI23-TVD	MC191522
Insulated enclosure for MC1-4, 3-pole or 4 pole	≤ 125 A	MC1-XCI43	MC191523
Insulated enclosure for MC1-4, 3-pole or 4 pole	≤ 160 A	MC1-XCI43/2-TVD	MC194645
FOR EMERGENCY STOP, RED/YELLOW			
Insulated enclosure for MC1, 3 pole	≤ 63 A	MC1-XCI23-R	MC191527
Insulated enclosure for MC1-4, 3- or 4-pole	≤ 125 A	MC1-XCI43-R	MC191528
Insulated enclosure for MC1-4, 3- or 4 pole	≤ 160 A	MC1-XCI43/2-R	MC194646

ADDITIONAL INSULATED TERMINALS FOR MC1



MC198573



MC192336

SCHRACK INFO

- For looping through the neutral and earth conductor
- 1 pole

DESCRIPTION	TERMINAL CAPACITY	TYPE	ORDER NO.
Additional insulated terminal 32 A	Fine-wired 1 x (1,5-6 mm ²)	K10/1	MC193827
Additional insulated terminals 63 A	Fine-wired 1 x (6-16 mm ²), stranded 1 x (16-25 mm ²)	K25/1	MC196200
Additional insulated terminals 100 A	Fine-wired 1 x (10-35 mm ²), stranded 1 x (16-50 mm ²)	K50/1	MC198573
Additional insulated terminal 160 A	Stranded 1 x (16-95 mm ²)	K95/1N/BR	MC192336

DEVICE ADAPTERS FOR CIRCUIT-BREAKERS AND SWITCH-DISCONNECTORS FOR 60 mm BUSBAR SYSTEM, MC1



MC195700 – SIDE VIEW



MC195700 – FRONT VIEW

SCHRACK INFO

- For mounting on flat copper rails 12 x 5 mm bis 30 x 10 mm
- Double T and triple T profile
- Snaps onto the voltage-free busbar
- Rated operational voltage U_e: 690 V

TECHNICAL DATA

MC 1 up to 160 A:

- For switches with standard box terminal connection
- Connected to system via terminal strips above
- Can be used in connection with IP2X finger protection to increase accidental-contact protection against accidental contact on outgoing side

DESCRIPTION	TYPE	ORDER NO.
60 mm busbar adapter 160 A for MC1, 3 pole	32570	MC195700
4 pole adapter with cover plate	MC3-4XKR13	upon request

DOOR SEALING FRAME FOR MC1



MC190195

SCHRACK INFO

- For toggle levers, rotary handles with rotary- and remote operators
- Degree of protection IP40
- For rectangular cut-out on doors and enclosures with material thicknesses of 1,5 – 5 mm
- External warning plate/designation plate can be clipped on

DESCRIPTION	TYPE	ORDER NO.
Door sealing frame for MC1	MC1-XBR	MC190195

TOGGLE LEVER LOCKING DEVICE FOR MC1



MC190199

SCHRACK INFO

- Off position lockable with up to 3 padlocks (hasp thickness 4 – 8 mm)
- Cannot be combined with Insulating surround

DESCRIPTION	TYPE	ORDER NO.
Toggle lever locking device for MC1	MC1-XKAV	MC190199

SPACER FOR MC1



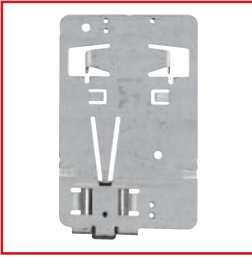
MC190203

SCHRACK INFO

- Enables fast and low-priced adjustment of various frame sizes with/without rotary handle or remote operator at identical front depth
- Grid depth 17,5 mm, thread M4
- Each set contains 4 x spacers
- Maximum component installation 4 pcs. per fastening screw
- 2 fastening screws included for each circuit breaker MC1

DESCRIPTION	TYPE	ORDER NO.
Spacer for MC1	MC1/2-XAB	MC190203

CLIP PLATE FOR MC1



MC190213

SCHRACK INFO

- Enables snap fit of circuit breakers / switch disconnectors to DIN rail (35 mm top-hat rail)

DESCRIPTION	TYPE	ORDER NO.
Clip plate for MC1	MC1-XC35	MC190213

■ CIRCUIT BREAKER 3 POLE UP TO 300A WITH THERMAL MAGNETIC RELEASE TYPES MC2B-A, MC2N-A, MC2H-A



MC216233

■ SCHRACK INFO

- For system and line protection
- Adjustable overload release I_r: 0,8 – 1 x I_n (factory setting 0,8 x I_n)
- Adjustable short-circuit release I_s: 6 – 10 x I_n (factory setting 6 x I_n);
except MC.-A40: 8 - 10 x I_n
- Screw terminals as standard, box terminals as accessories
- Breaking capacity 25 / 50 / 150 kA at 415 V 50/60 Hz
- Meets IEC/EN 60947-2
- Rated uninterrupted current = Rated current

RATED CURRENT/ BREAKING CAPACITY	SETTING RANGE		TYPE	ORDER NO.
	OVERLOAD- RELEASE (A)	SHORT CIRCUIT- RELEASE (A)		
3 POLE (BASIC BREAKING CAPACITY) 25 kA				
160 A/25 kA	125...160	960...1600	MC2B-A160	MC216131
200 A/25 kA	160...200	1200...2000	MC2B-A200	MC220131
250 A/25 kA	200...250	1500...2500	MC2B-A250	MC225131
300 A/25 kA	240...300	2000...2500	MC2B-A300	MC230131
3 POLE (NORMAL BREAKING CAPACITY) 50 kA				
160 A/50 kA	125...160	960...1600	MC2N-A160	MC216231
200 A/50 kA	160...200	1200...2000	MC2N-A200	MC220231
250 A/50 kA	200...250	1500...2500	MC2N-A250	MC225231
300 A/50 kA	240...300	2000...2500	MC2N-A300	MC230231
3 POLE (HIGH BREAKING CAPACITY) 150 kA				
20 A/150 kA	15...20	fix 350	MC2H-A20	MC202331
25 A/150 kA	20...25	fix 350	MC2H-A25	MC205331
32 A/150 kA	25...32	fix 350	MC2H-A32	MC232331
40 A/150 kA	32...40	320...400	MC2H-A40	MC240331
50 A/150 kA	40...50	300...500	MC2H-A50	MC250331
63 A/150 kA	50...63	380...630	MC2H-A63	MC263331
80 A/150 kA	63...80	480...800	MC2H-A80	MC280331
100 A/150 kA	80...100	600...1000	MC2H-A100	MC210331
125 A/150 kA	100...125	750...1250	MC2H-A125	MC212331
160 A/150 kA	125...160	960...1600	MC2H-A160	MC216331
200 A/150 kA	160...200	1200...2000	MC2H-A200	MC220331
250 A/150 kA	200...250	1500...2500	MC2H-A250	MC225331
300 A/150 kA	240...300	2000...2500	MC2H-A300	MC230331

■ CIRCUIT BREAKER 4 POLE UP TO 300A WITH THERMAL MAGNETIC RELEASE TYPES MC2B-4-A, MC2N-4-A, MC2H-4-A



MC216233

■ SCHRACK INFO

- For system and line protection
- Adjustable overload release I_r: 0,8 – 1 x I_n (factory setting 0,8 x I_n)
- Adjustable short-circuit release I_s: 6 – 10 x I_n (factory setting 6 x I_n); except MC.-A40: 8 - 10 x I_n
- Screw terminals as standard, box terminals as accessories
- Breaking capacity 25 / 50 / 150 kA at 415 V 50/60 Hz
- Meets IEC/EN 60947-2
- Rated uninterrupted current = Rated current

RATED CURRENT/ BREAKING CAPACITY	SETTING RANGE		TYPE	ORDER NO.
	OVERLOAD- RELEASE (A)	SHORT CIRCUIT- RELEASE (A)		
4 POLE (BASIC BREAKING CAPACITY) 25 kA				
160 A/25 kA	125...160	960...1600	MC2B-4-A160	MC216141
200 A/25 kA	160...200	1200...2000	MC2B-4-A200	MC220141
250 A/25 kA	200...250	1500...2500	MC2B-4-A250	MC225141
300 A/25 kA	240...300	2000...2500	MC2B-4-A300	MC230141
4 POLE (NORMAL BREAKING CAPACITY) 50 kA				
160 A/50 kA	125...160	960...1600	MC2N-4-A160	MC216241
200 A/50 kA	160...200	1200...2000	MC2N-4-A200	MC220241
250 A/50 kA	200...250	1500...2500	MC2N-4-A250	MC225241
300 A/50 kA	240...300	2000...2500	MC2N-4-A300	MC230241
4 POLE (HIGH BREAKING CAPACITY) 150 kA				
20 A/150 kA	15...20	fix 350	MC2H-4-A20	MC202341
25 A/150 kA	20...25	fix 350	MC2H-4-A25	MC205341
32 A/150 kA	25...32	fix 350	MC2H-4-A32	MC232341
40 A/150 kA	32...40	320...400	MC2H-4-A40	MC240341
50 A/150 kA	40...50	300...500	MC2H-4-A50	MC250341
63 A/150 kA	50...63	380...630	MC2H-4-A63	MC263341
80 A/150 kA	63...80	480...800	MC2H-4-A80	MC280341
100 A/150 kA	80...100	600...1000	MC2H-4-A100	MC210341
125 A/150 kA	100...125	750...1250	MC2H-4-A125	MC212341
160 A/150 kA	125...160	960...1600	MC2H-4-A160	MC216341
200 A/150 kA	160...200	1200...2000	MC2H-4-A200	MC220341
250 A/150 kA	200...250	1500...2500	MC2H-4-A250	MC225341
300 A/150 kA	240...300	2000...2500	MC2H-4-A300	MC230341

■ MOTOR PROTECTION, 3 POLE UP TO 200A WITH THERMAL MAGNETIC RELEASE, TYPES MC2B-M, MC2N-M



MC212236

■ SCHRACK INFO

- Adjustable overload release I: $0,8 - 1 \times I_n$ (factory setting $0,8 \times I_n$); with phase sensitivity, tripping class 10 A ($2s < T_p \leq 10s$)
- Adjustable short-circuit release I: $8 - 14 \times I_n$ (factory setting $12 \times I_n$)
- Screw terminals as standard, box terminals as accessories
- Breaking capacity 25 / 50 kA at 415 V 50/60 Hz
- Meets IEC/EN 60947-4 and IEC/EN 60947-2
- Meet all requirements of utilization category AC3 at 400 VAC

NOMINAL CURRENT/ BREAKING CAPACITY	POWER RATING AC3 kW	CURRENT AC3 A	SETTING RANGE		TYPE	ORDER NO.
			OVERLOAD- RELEASE (A)	SHORT CIRCUIT- RELEASE (A)		
3 POLE (BASIC BREAKING CAPACITY) 25 kA						
125 A/25 kA	55	99	100...125	1000...1750	MC2B-M125	MC212136
160 A/25 kA	75	134	125...160	1280...2240	MC2B-M160	MC216136
200 A/25 kA	110	196	160...200	1600...2800	MC2B-M200	MC220136
3 POLE (NORMAL BREAKING CAPACITY) 50 kA						
125 A/50 kA	55	99	100...125	1000...1750	MC2B-M125	MC212236
160 A/50 kA	75	134	125...160	1280...2240	MC2N-M160	MC216236
200 A/50 kA	110	196	160...200	1600...2800	MC2N-M200	MC220236

■ CIRCUIT BREAKER UP TO 250A 3-/4 POLE WITH DELAYED ELECTRONIC RELEASE TYPES MC2N-VE, MC2H-VE, MC2N-4-VE, MC2H-4-VE



MC216233

■ SCHRACK INFO

- System and line protection
- Selective and generator protection
- 3 and 4 pole versions
- RMS value and "thermal memory"
- Adjustable overload release I_r : 0,5 – 1 x I_n (factory setting 0,8 x I_n)
- Adjustable time delay setting to overcome current peaks t_r : 2 – 20 s at 6 x I_r as well as infinity (factory setting 10s)
- Adjustable delayed short-circuit releases I_{sd} : 2 – 10 x I_r (factory setting 6 x I_r)
- Adjustable time delay t_{sd} : Levels: 0, 20, 60, 100, 200, 300, 500, 750, 1000 ms (factory setting 0)
- Non-delayed short-circuit release I_i : permanent 12 x I_n)
- Screw terminals as standard, box terminals as accessories
- Meets IEC/EN 60947-2
- Rated uninterrupted current = Rated current

RATED CURRENT/ BREAKING CAPACITY	OVERLOAD- RELEASE (A)	SETTING RANGE		TYPE	ORDER NO.
		SHORT-CIRCUIT RELEASE UNDELAYED (A)	DELAYED (A)		
3 POLE (NORMAL BREAKING CAPACITY) 50 kA					
100 A/50 kA	50...100	1200	100...1000	MC2N-VE100	MC210233
160 A/50 kA	80...160	1920	160...1600	MC2N-VE160	MC216233
250 A/50 kA	125...250	3000	250...2500	MC2N-VE250	MC225233
3 POLE (HIGH BREAKING CAPACITY) 150 kA					
100 A/150 kA	50...100	1200	100...1000	MC2H-VE100	MC210333
160 A/150 kA	80...160	1920	160...1600	MC2H-VE160	MC216333
250 A/150 kA	125...250	3000	250...2500	MC2H-VE250	MC225333
4 POLE (NORMAL BREAKING CAPACITY) 50 kA					
100 A/50 kA	50...100	1200	100...1000	MC2N-4-VE100	MC210243
160 A/50 kA	80...160	1920	160...1600	MC2N-4-VE160	MC216243
250 A/50 kA	125...250	3000	250...2500	MC2N-4-VE250	MC225243
4 POLE (HIGH BREAKING CAPACITY) 150 kA					
100 A/150 kA	50...100	1200	100...1000	MC2H-4-VE100	MC210343
160 A/150 kA	80...160	1920	160...1600	MC2H-4-VE160	MC216343
250 A/150 kA	125...250	3000	250...2500	MC2H-4-VE250	MC225343

■ MOTOR PROTECTION, 3 POLE UP TO 220A WITH ELECTRONIC RELEASE TYPES MC2N-ME, MC2H-ME



MC290237

■ SCHRACK INFO

- Adjustable overload release I: 0,5 – 1 x I_n (factory setting 0,8 x I_n)
- Adjustable short-circuit release I: 2 – 14 x I_n (factory setting 12 x I_n)
- Adjustable time delay setting to overcome current peaks t: 2 – 20 s at 6 x I_r, as well as infinity (without overload release), (factory setting 10 s)
- RMS value and "thermal memory"
- Phase sensitivity
- Screw terminals as standard, box terminals as accessories
- Meets IEC/EN 60947-4 and IEC/EN 60947-2
- Meet all requirements of utilization category AC3 at 400 VAC

NOMINAL CURRENT/ BREAKING CAPACITY	POWER RATING AC3 kW	CURRENT AC3 A	SETTING RANGE		TYPE	ORDER NO.
			OVERLOAD- RELEASE (A)	SHORT CIRCUIT- RELEASE (A)		
3 POLE (NORMAL BREAKING CAPACITY) 50 kA						
90 A/50 kA	45	81	45...90	90...1260	MC2N-ME90	MC290237
140 A/50 kA	75	134	70...140	140...1960	MC2N-ME140	MC214237
220 A/50 kA	110	196	110...220	220...3080	MC2N-ME220	MC222237
3 POLE (HIGH BREAKING CAPACITY) 100 kA						
90 A/100 kA	45	81	45...90	90...1260	MC2H-ME90	MC290337
140 A/100 kA	75	134	70...140	140...1960	MC2H-ME140	MC214337
220 A/100 kA	110	196	110...220	220...3080	MC2H-ME220	MC222337

SWITCH DISCONNECTOR UP TO 250A TYPES MC2-PN, MC2-PN-4, MC2-N, MC2-N-4



MC216233

SCHRACK INFO

- 3- and 4-pole versions
- Rated uninterrupted current up to 250A
- Switch disconnecter, MC2-PN type, two switch positions 0/I, cannot be tripped remotely
- Switch disconnecter MC2-N, with trip setting "0"; "+"; "I", can be tripped remotely with undervoltage/shunt release
- Screw terminals as standard, box terminals as accessories
- Remote trip MC2-N can also be combined with remote operator MC-XR
- Main switch characteristics including positive drive according to IEC/EN 60204 & VDE 0113
- Isolating characteristics according to IEC/EN 60947-3 and VDE 0660. Protection against accidental contact accord. to VDE 0160 Part 100
- Meets IEC/EN 60947-2
- Rated uninterrupted current = Rated current
- Rated short-circuit breaking capacity values: I_{cm} 5,5kA
- Rated short-time withstand current: I_{cw} 3,5kA

RATED UNINTERRUPTED CURRENT	MAX. BACK-UP FUSE (gL) FOR SWITCH DISCONNECTOR (AgL)	TYPE	ORDER NO.
3 POLE CANNOT BE TRIPPED REMOTELY			
160 A	250	MC2-PN-160	MC216034
200 A	250	MC2-PN-200	MC220034
250 A	250	MC2-PN-250	MC225034
4 POLE CANNOT BE TRIPPED REMOTELY			
160 A	250	MC2-PN-4-160	MC216044
200 A	250	MC2-PN-4-200	MC220044
250 A	250	MC2-PN-4-250	MC225044
3 POLE CAN BE TRIPPED REMOTELY			
160 A	250	MC2-N-160	MC216035
200 A	250	MC2-N-200	MC220035
250 A	250	MC2-N-250	MC225035
4 POLE CAN BE TRIPPED REMOTELY			
160 A	250	MC2-N-4-160	MC216045
200 A	250	MC2-N-4-200	MC220045
250 A	250	MC2-N-4-250	MC225045

RESIDUAL CURRENT (RCD) RELEASE UP TO 250A TYPES MC2-4-XFI, MC2-4-XFIA





MC296720

SCHRACK INFO

- Direct mounting on 4 pole MC2 circuit breaker and MC2-N switch disconnector
- Type MC2-4-XFI pulse current sensitive accord. to core-balance principle
- Specifications to IEC/EN 60947-2
- Bottom mounting up to 250 A

TECHNICAL DATA

- Independent of mains- and auxiliary voltage, $U_e = 280\text{ V} - 690\text{ V } 50/60\text{ Hz}$
- Auxiliary contact: 1 N/O, 1 N/C reset via reset feature
- Type XFI(A)30: Rated fault current $I_{\Delta n} = 0,03\text{ A}$, suitable for human protection to Annex B of IEC/EN 60947-2 and VDE 664 Parts 2 and 3
- Type XFI(A): Rated fault current $I_{\Delta n} = 0,1-0,3-1-3\text{ A}$, time-delay $t_v = 60-150-300-450\text{ ms}$, AC/DC current sensitivity accord. to core-balance principle (0–100 kHz)
- Internal supply voltage $U_e = 50-400\text{ V}$
- Note that response threshold is dependent on frequency! (See Frequency response characteristic curve, Page 245).

DESCRIPTION	TYPE	ORDER NO.
4 POLE BOTTOM MOUNTING PULSE-CURRENT SENSITIVE 		
FI-human protection 30 mA $I_{\Delta n}$ for MC2-4	MC2-4-XFI30	MC296719
FI 0.1-3 A $I_{\Delta n}$ for MC2-4	MC2-4-XFI	MC296720
4 POLE BOTTOM MOUNTING AC/DC CURRENT SENSITIVITY 		
FI-human protection 30 mA $I_{\Delta n}$ for MC2-4	MC2-4-XFIA30	MC292345
FI 0.1-3 A $I_{\Delta n}$ for MC2-4	MC2-4-XFIA	MC292346

SOCKET UND PLUG-IN MODULE FOR MC2



MC294573

SCHRACK INFO

- 3- and 4-pole versions
- FOR CIRCUIT BREAKER MC2 AND SWITCH DISCONNECTOR MC2-N
- **Plug-in module only available in combination with switch**
- Socket can be ordered separately, available pre-assembled
- Order control circuit plug unit separately

TECHNICAL DATA

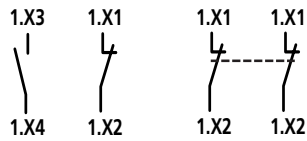
- I_n max. at 40 °C:
230A MC2
250A MC2-E (electronic release)

DESCRIPTION	TYPE	ORDER NO.
SOCKET		
Socket, 3 pole	MC2-XSVS	MC296699
Socket, 4 pole	MC2-4-XSVS	MC296700
PLUG-IN MODULE		
Plug-in module, 3 pole (add an S to end of switch part number if supplied with switch)	MC2-XSVE	MC296701
Plug-in module, 4 pole (add an S to end of switch part number if supplied with switch)	MC2-4-XSVE	MC296702
ACCESSORIES FOR PLUG-IN STYLE ASSEMBLY MC2/MC2-N		
Control circuit plug unit for auxiliary contact	MC2-XSVHI	MC296705
Control circuit plug unit undervoltage-/shunt release and remote operator	MC2-XSVR	MC296706

STANDARD AUXILIARY CONTACT / TRIP-INDICATING AUXILIARY CONTACT TYPE M22



MM216378



SCHRACK INFO

- Breaking with the main contacts, used for indicating and interlocking tasks
- General trip indication “+” with trip due to voltage release, overload release or short-circuit-release

TECHNICAL DATA

Breaking capacity: AC15: 4 A / 230 VAC
DC13: 3 A / 24 VDC

TIPS & TRICKS

The trip-indicating auxiliary contact is the same contact as the standard auxiliary contact. It derives its function from where it is installed (alarm contact on left).

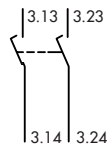
Maximum component installation with auxiliary contacts: 1 x Standard auxiliary contact (HIN) M22-K.
1 x Trip-indicating contact (HIA) M22-CK.

DESCRIPTION	TYPE	ORDER NO.
1 N/O contact with screw terminals	M22-K10	MM216376
1 N/C contact with screw terminals	M22-K01	MM216378
2 N/O contacts with cage clamp terminals	M22-CK20	MM107898
2 N/O contacts with cage clamp terminals	M22-CK02	MM107899

EARLY-MAKE AUXILIARY CONTACT TYPE MC2-XHIVL



MC299430



SCHRACK INFO

For interlock- and load-shedding circuits as well as for early make of undervoltage release in main switch/Emergency stop applications.

TECHNICAL DATA

- Early-make during switch on and off (manual switch): approx. 20 ms
- Not in connection with undervoltage release
MC2-XU... or shunt release MC2-XA...
- Breaking capacity: AC15: 4 A / 230 VAC
DC13: 3 A / 24 VDC

TIPS & TRICKS

Maximum component installation with auxiliary contacts:

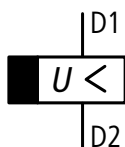
1 x early-make auxiliary contact

DESCRIPTION	TYPE	ORDER NO.
Early-make auxiliary contact, 2 N/O	MC2/3-XHIV	MC299430

■ UNDERVOLTAGE RELEASE TYPES MC2-XU



MC299499



■ SCHRACK INFO

- Non-delayed breaking of circuit breaker MC/ switch disconnector MC-N when the control voltage drops below 35 % - 70% U_s .
- For use in Emergency stop devices in connection with Emergency stop buttons
- Installed in breaker
- Without auxiliary contact

■ TIPS & TRICKS

When the undervoltage release is de-energized, accidental contact with the main contacts of the switch is safely prevented during attempts to switch on. Undervoltage releases cannot be installed at the same time with shunt releases or early-make auxiliary contact, type MC2-XHIV.

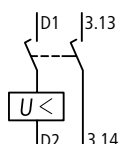
VOLTAGE		TYPE	ORDER NO.
24 VAC	Screw terminals	MC2/3-XU24AC	MC299491
24 VDC	Screw terminals	MC2/3-XU24DC	MC299509
208-240 V AC	Screw terminals	MC2/3-XU208-240AC	MC299499
380-440 V AC	Screw terminals	MC2/3-XU380-440AC	MC299501

Other voltage variants available upon request.

■ UNDERVOLTAGE RELEASE WITH TWO EARLY-MAKE AUXILIARY CONTACTS TYPES MC2-XUHIV



MC299591



■ SCHRACK INFO

- With 2 early-make auxiliary contacts
- For early-make of the undervoltage release in main switch applications and for interlock- and load-shedding circuits
- Installed in breaker
- Other voltages and connection versions available on request

■ TIPS & TRICKS

When the undervoltage release is de-energized, accidental contact with the main contacts of the switch is safely prevented during attempts to switch on. Early-make of auxiliary contacts during switch on and off (20ms). Undervoltage releases cannot be installed simultaneously with shunt releases or early-make auxiliary contact, type MC2-XHIV.

VOLTAGE		TYPE	ORDER NO.
208 - 240 VAC	screw terminals	MC2/3-XUHIV230V	MC299591
380 - 440 VAC	screw terminals	MC2/3-XUHIV400V	MC299594

Other voltage variants available upon request.

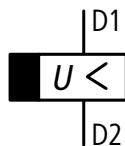
UNDervOLTAGE RELEASE, OFF-DELAY TYPES MC-UVU, MC-XUV



MC295927



MC299499



SCHRACK INFO

- Voltage drops less than 0,07–16 s do not cause MC circuit breakers or N switch disconnectors to trip.

TECHNICAL DATA

- Time-delay adjustable between 70 ms – 4 s
- With additional external capacitor:
30.000 µF ≥ 35 V to 8 s
90.000 µF ≥ 35 V to 16 s
- 1 x special release MC2-XUV required.
- Cannot be installed simultaneously with early-make auxiliary contact MC2-XHIV... or shunt release MC2-XA....
- Time-delay device for separate mounting (Fastening: DIN rail or screws).
- For other operating voltages, please use a control transformer.

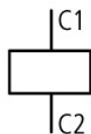
NAME	TYPE	ORDER NO.
Time-delay unit	MC-UVU	MC196154
Special undervoltage release for time-delay unit MC2	MC2/3-XUV	MC295927

Other voltage variants available upon request.

SHUNT RELEASE TYPES MC2-XA



MC299754



SCHRACK INFO

- Without auxiliary contact
- Switches are tripped by a voltage pulse or by the application of uninterrupted voltage

TECHNICAL DATA

When the shunt release is energized, accidental contact with the main contacts of the switch is safely prevented during attempts to switch on. Shunt release cannot be installed simultaneously with undervoltage releases or early-make auxiliary contact MC1-XHIV.

VOLTAGE	TYPE	ORDER NO.
24 VAC/DC	MC2/3-XA24V	MC299754
208 - 250 VAC/DC	MC2/3-XA230V	MC299763

Other voltage variants available upon request.

REMOTE OPERATOR FOR MC2



MC299832

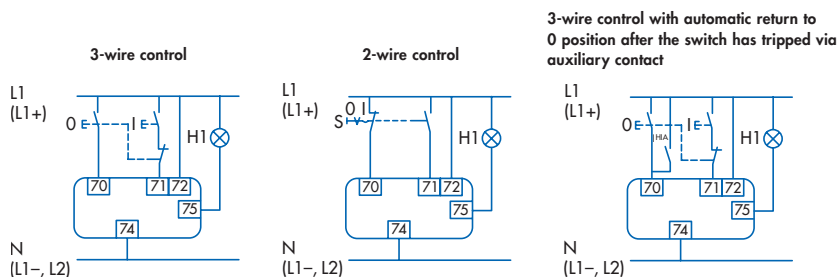
SCHRACK INFO

- Remote operator can be combined with circuit breaker MC and switch disconnector MC-N, but not with switch disconnector MC-PN.
- Do not deactivate switch simultaneously via remote control and trip via undervoltage/shunt release.

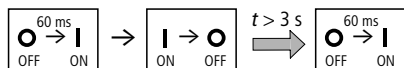
TECHNICAL DATA

- On/Off breaking and reset by means of 2-wire or 3-wire control.
- Can be synchronized
- Breaking time On: ≤ 60 ms
- Local manual breaking possible
- Pause between Off and On: 3 secs.
Command is ignored
- Function of Terminal 75:
Ready for activation signal when the cover is closed and not locked.
AC-15: 2 A/400 V
DC-13: 0,2 A/220 V

CIRCUIT DIAGRAMS

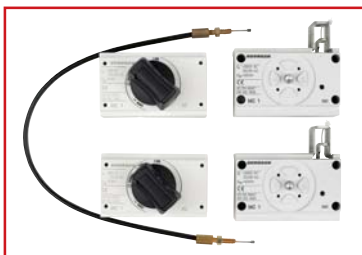


BREAKING CYCLE



VOLTAGE	TYPE	ORDER NO.
208 - 240 V AC	MC2-XR208-240AC	MC299832
Extra cover for 4-pole switches	MC2-XAVPR	MC296677

MECHANICAL INTERLOCK FOR (DOOR COUPLING) ROTARY HANDLES FOR MC2



MC191581

SCHRACK INFO

- **Rotary handle on switch or door coupling rotary handle additionally required.**
- Cannot be combined with remote operator or door frame.
- At least 2 interlocking modules are required in order to construct a mechanical interlocking circuit. See Page 142 for possible combinations and variations of interlocking circuits. Bowden cable to be ordered separately.

DESCRIPTION	TYPE	ORDER NO.
Mechanical interlock	MC2-XMV	MC291582
Bowden cable 225 mm	MC-XBZ225	MC191585
Bowden cable 600 mm	MC-XBZ600	MC191586
Bowden cable 1000 mm	MC-XBZ1000	MC191587

MECHANICAL INTERLOCK WITH REMOTE OPERATOR FOR MC2



MC294543



MC294543

SCHRACK INFO

- For 2 switches of the same or next frame size side by side
- Side-by-side mounting
- Mounted on top of each other, long version
- Contains parts for 2 switches
- Remote operator also required
- For maximum breaking distance, see Page 143

NOTES

Cannot be combined with rotary handles, door coupling rotary handles and early-make auxiliary contacts.

DESCRIPTION	TYPE	ORDER NO.
Mechanical interlock for MC2	MC2-XMVR	MC294543
Mechanical interlock for MC2 long version	MC2-MVRL	MC294548
Mechanical interlock for MC2/3	MC2/3-XMVR	MC294544
Mechanical interlock for MC2/3, long version	MC2/3-XMVRL	MC294549

ROTARY HANDLES DIRECTLY ON SWITCH FOR MC2



MC290127

SCHRACK INFO

- Complete with rotary drive
- Can also be combined with door frame

TECHNICAL DATA

Available in the following versions:

Type MC.-XDV

Lockable in the "0" position (up to three padlocks), black/grey

Type MC.-XDVR

Lockable in the "0" position (up to three padlocks), Emergency stop red/yellow

Type MC.-XDTV

Lockable in the "0" position on handle, modification also available in "1" position, black/grey

Type MC.-XDTVR

Lockable in "0" position, Emergency Stop red/yellow

Version comes with door interlock:

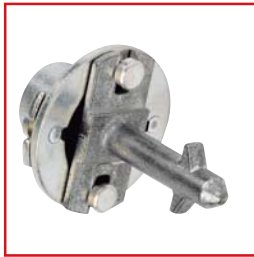
- Door frame supplied with door interlock
- Rotary handle can be rotated 90° for switches mounted horizontally
- In the ON position, can be defeated from the outside using a 1 mm pin
- Cannot be defeated in the locked OFF and ON positions
- Door can be opened in OFF
- Can only be switched on when door closed

DESCRIPTION	TYPE	ORDER NO.
Lockable rotary handle for MC2, black/grey	MC2-XDV	MC290127
Lockable rotary handle for MC2, Emergency stop red/yellow	MC2-XDVR	MC290137
Rotary handle for MC2 with door interlock, lockable, black/grey	MC2-XDTV	MC290133
Rotary handle for MC2 with door interlock, lockable, Emergency stop red/yellow	MC2-XDTVR	MC290144

DOOR COUPLING ROTARY HANDLE FOR MC2



MC190160



MC190160



MC190160

SCHRACK INFO

- Complete unit includes rotary drive and coupling parts
- Degree of Protection IP66
- Rotary handle can be rotated 90° for horizontally-mounted switches
- Cannot be defeated in the locked OFF and ON positions
- Can be modified when in the unlocked ON position, can be defeated from the outside with a screwdriver
- Door can be opened in OFF
- External warning plate/designation plate can be clipped on

NOTES

- Order extension shaft separately!

TECHNICAL DATA

Available in the following versions:

Type MC.-XTVD

Lockable in the "0" position on handle with up to three padlocks, with door interlock, black/grey

Type MC.-XTVDV

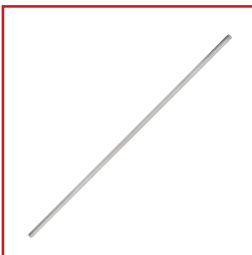
Lockable in the "0" position on handle and switch, with up to three padlocks, with door interlock, black/grey

Type MC.-XTVDVR

Lockable in the "0" position on handle and switch with up to three padlocks, with door interlock, Emergency stop red/yellow

DESCRIPTION	TYPE	ORDER NO.
Door coupling rotary handle for MC2 with door interlock, lockable, black/grey	MC2-XTVD	MC290168
Door coupling rotary handle for MC2 with door interlock, lockable, "0", "1", black/grey	MC2-XTVDV	MC290174
Door coupling rotary handle for MC2 with door interlock, lockable, Emergency stop red/yellow	MC2-XTVDVR	MC290180

EXTENSION SHAFT FOR MC2



MC190191

SCHRACK INFO

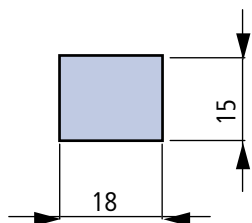
- for maximum cabinet depths of 400 or 600 mm
- Can be cut to required length

DESCRIPTION	CABINET DEPTH	TYPE	ORDER NO.
Extension shaft for MC2 max. 400 mm	max. 400 mm	MC1/2-XV4	MC191232
Extension shaft for MC2 max. 600 mm	max. 600 mm	MC1/2-XV6	MC190191

BOX TERMINALS FOR MC2



MC292240



SCHRACK INFO

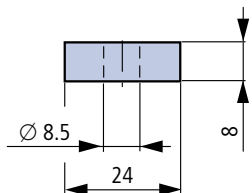
- Conversion kit for switches with screw connection
- Contains parts for one switch side
- Installed within the switch housing
- Use cover plate MC.-XSKA
- Terminal capacities:
Copper lines 1 x 4 – 185 mm²
Copper cables 2 x 4 – 70 mm²

DESCRIPTION	TYPE	ORDER NO.
Box terminal up to 160 A (contains 3 pcs.) for MC2	MC2-160-XKC	MC292240
Box terminal up to 250 A (contains 3 pcs.) for MC2	MC2-250-XKC	MC292244
Box terminal up to 160 A (contains 4 pcs.) for MC2-4	MC2-4-160-XKC	MC296755
Box terminal up to 250 A (contains 4 pcs.) for MC2-4	MC2-4-250-XKC	MC296756

SCREW CONNECTION FOR MC2



MC190019



SCHRACK INFO

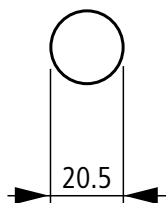
- Standard connection for all MC2, MC2-PN and MC2-N switches
- Conversion kit for switches with box terminal
- Installed inside switch housing
- Contains parts for one switch side located at top or bottom 3- or 4 pole switches
- Terminal capacities:
Copper cable lug 1 x 4 – 185 mm², 2 x 4 – 70 mm²
Aluminium cable lug 1 x 10 – 50 mm², 2 x 10 – 50 mm²

DESCRIPTION	TYPE	ORDER NO.
Screw connection, 3 pole for MC2	MC2-XKS	MC290030
Screw connection, 4 pole for MC2-4	MC2-4-XKS	MC296750

TUNNEL TERMINAL FOR MC2



MC196730



SCHRACK INFO

- Contains parts for one switch side, top or bottom
- Comes with terminal for control circuit cabling as standard for 1 x 0,75 – 2,5 mm² or 2 x 0,75 – 1,5 mm²
- Terminal capacities:
Copper cable, Aluminium cable 1 x 16 – 185 mm²
- Installed outside switch housing

TECHNICAL DATA

- For copper and aluminium cables, as ordered, up to 240 mm²
- Includes cover plate
- Stranded round conductor / stranded sector-shaped conductor

DESCRIPTION	TYPE	ORDER NO.
Tunnel terminal 185 mm ² , 3 pcs. included, for MC2	MC2-XKA	MC291457
Tunnel terminal 185 mm ² , 4 pcs. included, for MC2-4	MC2-4-XKA	MC291458

REAR CONNECTION FOR MC2



MC296765

SCHRACK INFO

- Contains parts for one switch side, top or bottom
- Terminal capacities:
Copper cable lug 1 x 4 – 185 mm², 2 x 4 – 70 mm²
Aluminium cable lug 1 x 10 – 50 mm², 2 x 10 – 50 mm²

DESCRIPTION	TYPE	ORDER NO.
Rear connection, 3 pole MC2	MC2-XKR	MC296765
Rear connection, 4 pole MC2-4	MC2-4-XKR	MC296768

CONTROL CIRCUIT TERMINAL FOR MC2



MC196739

SCHRACK INFO

- Contains parts for two terminals located at top or bottom for 3/ 4 pole switches
- Included with tunnel terminal
- Degree of protection IP1X
- Terminal capacities:
Screw connection 1 x 0,75 – 2,5 mm², 2 x 0,75 – 1,5 mm²
Box terminal 1 x 0,75 – 2,5mm², 2 x 0,75 – 1,5 mm²

DESCRIPTION	TYPE	ORDER NO.
Control circuit terminal for box terminal MC2	MC2-XSTK	MC196739
Control circuit terminal for screw connection MC2	MC2-XSTS	MC290156

TERMINAL COVER FOR MC2



MC290038

SCHRACK INFO

- Protection against accidental contact when using cable lugs, rails or Tunnel terminals
- Contains parts for one switch side located at top or bottom 3- or 4 pole switches
- Degree of protection IP4X front, side and rear, IP1X on the connection side when using insulated conductor material
- Cover plate included with tunnel terminals

DESCRIPTION	TYPE	ORDER NO.
Terminal cover, 3 pole for MC2	MC2-XKSA	MC290038
Terminal cover, 4 pole for MC2-4	MC2-4-XKSA	MC296770

■ CABLE LUG FOR MC2



MC299776

■ SCHRACK INFO

- Special cable lug in slimline design
- Cable lugs must be insulated when using without a cover plate.

DESCRIPTION	TYPE	ORDER NO.
Cable lug 95 mm ²	MC2-XKS95	MC299775
Cable lug 120 mm ²	MC2-XKS120	MC299776
Cable lug 150 mm ²	MC2-XKS150	MC299777
Cable lug 185 mm ²	MC2-XKS185	MC290032

■ CONNECTION COVER, KNOCKOUT FOR BOX TERMINAL MC2



MC294640

■ SCHRACK INFO

- Contains parts for a terminal located at top or bottom for 3 or 4 pole switches
- Increases protection against accidental contact (simplified finger protection)

DESCRIPTION	TYPE	ORDER NO.
Terminal cover, knockout, 3 pole for MC2	MC2-XKSFA	MC294640
Terminal cover, knockout, 4 pole for MC2	MC2-4-XKSFA	MC294641

■ IP2X FINGER PROTECTION FOR DIRECT-MOUNTED MC2 SWITCHES



MC196744



MC196748

■ SCHRACK INFO

- Increases the protection against accidental contact to IP2X
- Protection when reaching into the cable connection area when cables are connected in box terminal
- For 2 conductors, minimum cross-section equals 25 mm²
- MC2-XIPA and MC2-4-XIPA only in connection with cover plate MC2(-4)-XKSA

DESCRIPTION	TYPE	ORDER NO.
FOR BOX TERMINAL		
Finger protection, 3 pole for MC2	MC2-XIPK	MC296743
Finger protection, 4 pole for MC2-4	MC2-4-XIPK	MC296744
FOR TERMINAL COVER		
Finger protection, 3 pole for MC2	MC2-XIPA	MC296777
Finger protection, 4 pole for MC2-4	MC2-4-XIPA	MC296778

INSULATED ENCLOSURE XCI



MC291524

SCHRACK INFO

- For switches with box terminals only, for direct cable connection
- With door coupling rotary handle
- Complete unit including all necessary functional parts
- Degree of protection IP65
- Comes with gland plates

TECHNICAL DATA

Enclosure suitable for installation of circuit-breakers and switch-disconnectors for separate mounting with top and bottom cable entry. Includes fixing straps for wall mounting.

Short circuit protection at 415 V 50/60 Hz to 10 kA.

Not in combination with remote operator, plug-in- or withdrawable unit.

Additional insulated terminals for 4 or 5 pole must be ordered separately.

Available in the following versions:

Standard, black/grey

Lockable in the "0" position at handle with up to 3 padlocks. Additionally with cover interlock.

For Emergency stop, red/yellow

Lockable on handle and switch with up to 3 padlocks in the "0" position on handle. Additionally with cover interlock and lockable at switch in the "0" position.

DESCRIPTION	MAX. RATED UNINTERRUPTED CURRENT	TYPE	ORDER NO.
STANDARD, BLACK/GREY			
Insulated enclosure for MC2 and MC2-4	≤ 200 A	MC2-XCI43-TVD	MC291524
Insulated enclosure for MC2 and MC2-4	≤ 250 A	MC2-XCI45-TVD	MC290481
FOR EMERGENCY STOP, RED/YELLOW			
Insulated enclosure for MC2 and MC2-4	≤ 200 A	MC2-XCI43-TVDR	MC291529
Insulated enclosure for MC2 and MC2-4	≤ 250 A	MC2-XCI45-TVDR	MC299356

ADDITIONAL INSULATED TERMINALS FOR MC2



MC198573



MC192336

SCHRACK INFO

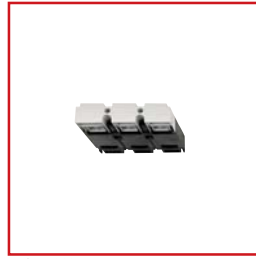
- For looping through the neutral and earth conductor
- 1 pole

DESCRIPTION	TERMINAL CAPACITY	TYPE	ORDER NO.
Additional insulated terminal 32 A	Fine-wired 1 x (1,5-6 mm ²)	K10/1	MC193827
Additional insulated terminals 63 A	Fine-wired 1 x (6-16 mm ²), stranded 1 x (16-25 mm ²)	K25/1	MC196200
Additional insulated terminals 100 A	Fine-wired 1 x (10-35 mm ²), stranded 1 x (16-50 mm ²)	K50/1	MC198573
Additional insulated terminal 160 A	stranded 1 x (16-95 mm ²)	K95/1N/BR	MC192336
Additional insulated terminal 250 A	stranded, 1 x (35-150mm ²), 2 x (16-70mm ²)	K150/1BR	MC294709

DEVICE ADAPTERS FOR CIRCUIT-BREAKERS AND SWITCH-DISCONNECTORS FOR 60 mm BUSBAR SYSTEM MC2



MC291400



MC291666

SCHRACK INFO

- For mounting on flat copper rails 12 x 5 mm to 30 x 10 mm
- Double T and triple T profile
- Mounted via terminal-, screw fixing
- Rated operational voltage Ue: 690 V
- Cover plate also required (MC-XKR)

TECHNICAL DATA

MC 2 up to 250 A:

- Top or bottom connection to system as required
- Cover plate MC2-XKR4 required

DESCRIPTION	TYPE	ORDER NO.
60 mm busbar adapter 250 A, 3 pole	32140	MC291400
Cover plate for component adapter, 3 pole	MC2-XKR4	MC291666
4 pole adapter with cover plate	MC3-4XKR13	upon request

DOOR SEALING FRAME FOR MC2



MC290197

SCHRACK INFO

- For toggle levers, rotary handles with rotary drive and remote operator
- Degree of protection IP40
- For rectangular cut-out on doors and enclosures with material thicknesses of 1,5 – 5 mm
- External warning plate/designation plate can be clipped on

DESCRIPTION	TYPE	ORDER NO.
Door sealing frame for MC2	MC2-XBR	MC290197

TOGGLE LEVER LOCKING DEVICE FOR MC2



MC290201

SCHRACK INFO

- Off position lockable with up to 3 padlocks (hasp thickness 4 – 8 mm)
- Cannot be combined with Insulating surround

DESCRIPTION	TYPE	ORDER NO.
Toggle lever locking device for MC2	MC2/3-XKAV	MC290201

SPACERS FOR MC2



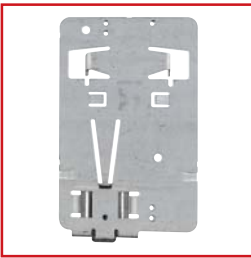
MC190203

SCHRACK INFO

- Enables fast and low-priced adjustment of various frame sizes with/without rotary handle or remote operator at same front depth
- Grid depth 17,5 mm, thread M4
- Each set contains 4 x spacers
- Maximum component installation 4 pcs. per fastening screw
- 2 fastening screws included for each circuit breaker MC2

DESCRIPTION	TYPE	ORDER NO.
Spacers for MC2	MC2-XAB	MC190203

CLIP PLATE FOR MC2



MC290215

SCHRACK INFO

- Enables snap fit of circuit breakers / switch disconnectors to DIN rail (75 mm top-hat rail)
- Not suitable for switches with remote operator

DESCRIPTION	TYPE	ORDER NO.
Clip plate for MC2	MC2-XC75	MC290215

■ CIRCUIT BREAKER 3/4-POLE UP TO 500A WITH THERMAL MAGNETIC RELEASE, TYPES MC3N-A, MC3H-A, MC3N-4-A, MC3H-4-A



MC332231

■ SCHRACK INFO

- System and line protection
- 3 and 4 pole versions
- Adjustable overload release I: 0,8 – 1 x I_n (factory setting 0,8 x I_n)
- Adjustable short-circuit release I: 8 – 10 x I_n (factory setting 8 x I_n)
- Breaking capacity 50 / 150 kA at 415 V 50/60 Hz
- Screw terminals as standard, box terminals as accessories
- Rated uninterrupted current = Rated current

RATED CURRENT/ BREAKING CAPACITY	SETTING RANGE		TYPE	ORDER NO.
	OVERLOAD- RELEASE (A)	SHORT CIRCUIT- RELEASE (A)		
3 POLE (NORMAL BREAKING CAPACITY) 50 kA				
320 A/50 kA	250...320	1920...3200	MC3N-A320	MC332231
400 A/50 kA	320...400	2400...4000	MC3N-A400	MC340231
500 A/50 kA	400...500	3000...5000	MC3N-A500	MC350231
3 POLE (HIGH BREAKING CAPACITY) 150 kA				
320 A/150 kA	250...320	1920...3200	MC3H-A320	MC332331
400 A/150 kA	320...400	2400...4000	MC3H-A400	MC340331
500 A/150 kA	400...500	3000...5000	MC3H-A500	MC350331
4 POLE (NORMAL BREAKING CAPACITY) 50 kA				
320 A/50 kA	250...320	1920...3200	MC3N-4-A320	MC332241
400 A/50 kA	320...400	2400...4000	MC3N-4-A400	MC340241
500 A/50 kA	400...500	3000...5000	MC3N-4-A500	MC350241
4 POLE (HIGH BREAKING CAPACITY) 150 kA				
320 A/150 kA	250...320	1920...3200	MC3H-4-A320	MC332341
400 A/150 kA	320...400	2400...4000	MC3H-4-A400	MC340341
500 A/150 kA	400...500	3000...5000	MC3H-4-A500	MC350341

■ CIRCUIT BREAKER 3/4-POLE UP TO 630A WITH ELECTRONIC RELEASE TYPES MC3N-AE, MC3H-AE, MC3N-4-AE, MC3H-4-AE



MC325232

■ SCHRACK INFO

- System and line protection
- Selective and generator protection
- 3 and 4 pole versions
- RMS value and "thermal memory"
- Adjustable overload release I: 0,5 – 1 x I_n (factory setting 0,8 x I_n)
- Adjustable short-circuit release I: 2 – 12 x I_n (factory setting 6 x I_n)
at MC3...-AE250/400: 2 – 11 x I_n (factory setting 6 x I_n)
at MC3...-AE630: 2 – 8 x I_n (factory setting 6 x I_n)
- Breaking capacity 50 / 150 kA at 415 V 50/60 Hz
- Screw terminals as standard, box terminals as accessory
- Rated uninterrupted current = Rated current

RATED CURRENT/ BREAKING CAPACITY	SETTING RANGE		TYPE	ORDER NO.
	OVERLOAD- RELEASE (A)	SHORT CIRCUIT- RELEASE (A)		
3 POLE (NORMAL BREAKING CAPACITY) 50 kA				
250 A/50 kA	125...250	500...2750	MC3N-AE250	MC325232
400 A/50 kA	200...400	800...4400	MC3N-AE400	MC340232
630 A/50 kA	315...630	1260...5040	MC3N-AE630	MC363232
3 POLE (HIGH BREAKING CAPACITY) 150 kA				
250 A/150 kA	125...250	500...2750	MC3H-AE250	MC325332
400 A/150 kA	200...400	800...4400	MC3H-AE400	MC340332
630 A/150 kA	315...630	1260...5040	MC3H-AE630	MC363332
4 POLE (NORMAL BREAKING CAPACITY) 50 kA				
250 A/50 kA	125...250	500...2750	MC3N-4-AE250	MC325242
400 A/50 kA	200...400	800...4400	MC3N-4-AE400	MC340242
630 A/50 kA	315...630	1260...5040	MC3N-4-AE630	MC363242
4 POLE (HIGH BREAKING CAPACITY) 150 kA				
250 A/150 kA	125...250	500...2750	MC3H-4-AE250	MC325342
400 A/150 kA	200...400	800...4400	MC3H-4-AE400	MC340342
630 A/150 kA	315...630	1260...5040	MC3H-4-AE630	MC363342

■ CIRCUIT BREAKER, 3/4 POLE UP TO 630A WITH DELAYED ELECTRONIC RELEASE TYPES MC3N-VE, MC3H-VE, MC3N-4-VE, MC3H-4-VE



MC325233

■ SCHRACK INFO

- System and line protection
- Selective and generator protection
- 3 and 4 pole versions
- RMS value and “thermal memory”
- Adjustable overload release I_r : 0,5 – 1 x I_n (factory setting 0,8 x I_n)
- Adjustable time delay setting to overcome current spikes t : 2 – 20 s at 6 x I_r as well as infinity
- Adjustable delayed short-circuit releases I_{sd} : 2 – 10 x I_r (factory setting 6 x I_r)
MC3...-4-VE630: 2 – 7 x I_r (factory setting 6 x I_r)
- Adjustable delay time t_{sd} : Levels:
0, 20, 60, 100, 200, 300, 500, 750, 1000 ms (factory setting 0)
- Adjustable not-delayed short-circuit release I : 2 – 12 x I_n (factory setting 12 x I_n)
MC3...-VE250/400: 2 – 11x I_n (factory setting 6 x I_n)
MC3...-VE630: 2 – 8x I_n (factory setting 6 x I_n)
- Switchable i^2t constant function (factory setting OFF)
- Screw terminals as standard, box terminals as accessories
- Rated uninterrupted current = Rated current

RATED CURRENT/ BREAKING CAPACITY	OVERLOAD- RELEASE (A)	SETTING RANGE		TYPE	ORDER NO.
		SHORT-CIRCUIT RELEASE NOT DELAYED (A)	SHORT-CIRCUIT RELEASE DELAYED (A)		
3 POLE (NORMAL BREAKING CAPACITY) 50 kA					
250 A/50 kA	125...250	500...2750	250...2500	MC3N-VE250	MC325233
400 A/50 kA	200...400	800...4400	400...4000	MC3N-VE400	MC340233
630 A/50 kA	315...630	1260...5040	472...4410	MC3N-VE630	MC363233
3 POLE (HIGH BREAKING CAPACITY) 150 kA					
250 A/150 kA	125...250	500...2750	250...2500	MC3H-VE250	MC325333
400 A/150 kA	200...400	800...4400	400...4000	MC3H-VE400	MC340333
630 A/150 kA	315...630	1260...5040	472...4410	MC3H-VE630	MC363333
4 POLE (NORMAL BREAKING CAPACITY) 50 kA					
250 A/50 kA	125...250	500...2750	250...2500	MC3N-4-VE250	MC325243
400 A/50 kA	200...400	800...4400	400...4000	MC3N-4-VE400	MC340243
630 A/50 kA	315...630	1260...5040	472...4410	MC3N-4-VE630	MC363243
4 POLE (HIGH BREAKING CAPACITY) 150 kA					
250 A/150 kA	125...250	500...2750	250...2500	MC3N-4-VE250	MC325343
400 A/150 kA	200...400	800...4400	400...4000	MC3N-4-VE400	MC340343
630 A/150 kA	315...630	1260...5040	472...4410	MC3H-4-VE630	MC363343

■ MOTOR PROTECTION, 3 POLE UP TO 450A WITH ELECTRONIC RELEASE TYPES MC3N-ME, MC3H-ME



MC325233

■ SCHRACK INFO

- Adjustable overload release I: 0,5 – 1 x I_n (factory setting 0,8 x I_n)
- Adjustable short-circuit release I: 2 – 14 x I_n (factory setting 12 x I_n)
- Adjustable time delay setting to overcome current spikes t: 2 – 20 s at 6 x I_r, as well as infinity (without overload release), (factory setting 10 s)
- RMS value and “thermal memory”
- Phase sensitivity
- Screw terminals as standard, box terminals as accessories
- Meets IEC/EN 60947-4 and IEC/EN 60947-2
- Circuit breakers satisfy all requirements of Utilization category AC3 at 400V AC

NOMINAL CURRENT/ BREAKING CAPACITY	POWER RATING AC3 kW	CURRENT AC3 A	SETTING RANGE		TYPE	ORDER NO.
			OVERLOAD- RELEASE (A)	SHORT CIRCUIT- RELEASE (A)		
3 POLE (NORMAL BREAKING CAPACITY) 50 kA						
220 A/50 kA	110	196	110...220	220...3080	MC3N-ME220	MC322237
350 A/50 kA	200	349	175...350	350...4900	MC3N-ME350	MC335237
450 A/50 kA	250	437	225...450	450...6300	MC3N-ME450	MC345237
3 POLE (HIGH BREAKING CAPACITY) 150 kA						
220 A/150 kA	110	196	110...220	220...3080	MC3H-ME220	MC322337
350 A/150 kA	200	349	175...350	350...4900	MC3H-ME350	MC335337
450 A/150 kA	250	437	225...450	450...6300	MC3H-ME450	MC345337

SWITCH DISCONNECTOR UP TO 630A TYPES MC3-PN, MC3-PN-4, MC3-N, MC3-N-4



MC340035

SCHRACK INFO

- 3- and 4-pole version
- Rated uninterrupted current up to 630A
- Switch disconnecter type MC3-PN, 2 switch positions 0/I, cannot be tripped remotely
- Switch disconnecter type MC3-N, with trip setting "0"; "+"; "I", can be tripped remotely with undervoltage/shunt release, trip-indicating auxiliary contacts possible
- For type MC...-N switch disconnectors, undervoltage/shunt releases and trip-indicating auxiliary contacts can also be used.
- Type MC3-N... can also be combined with remote control MC-XR...
- Screw terminals as standard, box terminals as accessories
- Remote-trip MC3-N can also be combined with remote operator
- Properties of main switches including positive drive to IEC/EN 60204 and VDE 0113
- Isolating characteristics according to IEC/EN 60947-3 and VDE 0660. Protection against accidental contact accord. to VDE 0160 Part 100
- Rated uninterrupted current = Rated current
- Rated short-circuit breaking capacity values: I_{cm} 25kA
- Rated short-time withstand current: I_{cw} 12kA

RATED UNINTERRUPTED CURRENT	MAX. BACK-UP FUSE (gL) FOR SWITCH DISCONNECTOR (AgL)	TYPE	ORDER NO.
3 POLE CANNOT BE TRIPPED REMOTELY			
400 A	630	MC3-PN-400	MC340034
630 A	630	MC3-PN-630	MC363034
4 POLE CANNOT BE TRIPPED REMOTELY			
400 A	630	MC3-PN-4-400	MC340044
630 A/630 A	630	MC3-PN-4-630	MC363044
3 POLE CAN BE TRIPPED REMOTELY			
400 A	630	MC3-N-400	MC340035
630 A	630	MC3-N-630	MC363035
4 POLE CAN BE TRIPPED REMOTELY			
400 A	630	MC3-N-4-400	MC340045
630 A	630	MC3-N-4-630	MC363045

SOCKET BASE AND WITHDRAWABLE MODULE FOR MC3



MC396707



MC396707

SCHRACK INFO

- 3- and 4-pole version
- For circuit breaker MC3 and switch disconnecter MC3-N

TECHNICAL DATA

- Withdrawable unit complete with control circuit plug unit
- I_n max. at 20° C – 605 A
- I_n max. at 40° C – 550 A
- Mounting position: vertical, 90° left
- 3 positions: Retracted, test, extended. The 3 positions are shown mechanically.
- Auxiliary contacts can also be used for remote signaling. Either one N/C or N/O contact per position.
- All connections of auxiliary switches (HIA, HIN, HIV) and undervoltage and shunt releases to the control circuit plug units are already present.
- **Withdrawable module only available in combination with switch.**
- Add an A to switch part number (e.g.: MC340232A) – Switch will be supplied ready for use with withdrawable feature.
- Socket base can be ordered separately, available pre-assembled.

DESCRIPTION	TYPE	ORDER NO.
SOCKET BASE		
Socket base, 3 pole	MC3-XAVS	MC396711
Socket base, 4 pole	MC3-4-XAVS	MC396712

WITHDRAWABLE MODULE

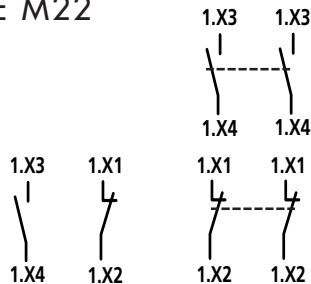
Withdrawable module, 3 pole, supplied with switch, add an A to end of switch part number

Withdrawable module, 4 pole, supplied with switch, add an A to end of switch part number

STANDARD AUXILIARY CONTACT / TRIP-INDICATING AUXILIARY CONTACT TYPE M22



MM216378



SCHRACK INFO

- Breaking with the main contacts, used for indicating and interlocking tasks
- General trip indication “+” with trip due to voltage release, overload release or short-circuit-release

TECHNICAL DATA

Breaking capacity: AC15: 4 A / 230 VAC
DC13: 3 A / 24 VDC

TIPS & TRICKS

The trip-indicating auxiliary contacts is the same contact as the standard auxiliary contact. It derives its function from where it is installed (alarm contact on left)

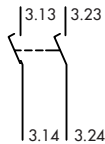
Maximum component installation with auxiliary contacts: 1 x Standard auxiliary contact (HIN) M22-K.
1 x Trip-indicating contact (HIA) M22-CK.

DESCRIPTION	TYPE	ORDER NO.
1 N/O contact with screw terminals	M22-K10	MM216376
1 N/C contact with screw terminals	M22-K01	MM216378
2 N/O contacts with cage clamp terminals	M22-CK20	MM107898
2 N/C contacts with cage clamp terminals	M22-CK02	MM107899

EARLY-MAKE AUXILIARY CONTACT TYPE MC3-XHIV



MC299430



SCHRACK INFO

For interlock- and load-shedding circuits as well as for early make of under-voltage release in main switch/Emergency stop applications.

TECHNICAL DATA

- Not in connection with undervoltage release MC3-XU... or shunt release MC3-XA... Early-make during switch on and off (manual switch): approx. 20 ms
- Not in connection with remote operator MC-XR
Undervoltage- or shunt releases
- Breaking capacity: AC15: 4 A / 230 VAC
DC13: 3 A / 24 VDC

TIPS & TRICKS

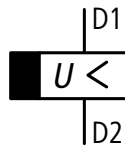
Maximum component installation with auxiliary contacts:
1 x early-make auxiliary contact

DESCRIPTION	TYPE	ORDER NO.
Early-make auxiliary contact, 2 N/O	MC2/3-XHIV	MC299430

UNDERVOLTAGE RELEASE TYPES MC3-XU



MC299499



SCHRACK INFO

- For use in Emergency stop devices in connection with Emergency stop buttons
- Installed in breaker
- Without auxiliary contact
- Not-delayed breaking of circuit breaker MC/ switch disconnector MC-N when the control voltage drops below 35 % - 70% Us.

TIPS & TRICKS

When the undervoltage release is de-energized, accidental contact with the main contacts of the switch is safely prevented during attempts to switch on. Undervoltage releases cannot be installed at the same time as operating current releases or early-make auxiliary contact MC2-XHIV.

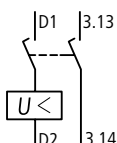
VOLTAGE	TYPE	ORDER NO.
24 VAC 50/60 Hz	MC2/3-XU24AC	MC299491
24 VDC 50/60 Hz	MC2/3-XU24DC	MC299509
208-240 VAC 50/60 Hz	MC2/3-XU208-240AC	MC299499
380-440 VAC 50/60 Hz	MC2/3-XU380-440AC	MC299501

Other voltage variants available upon request.

■ UNDERVOLTAGE RELEASE WITH TWO EARLY-MAKE AUXILIARY CONTACTS TYPES MC3-XUHIV



MC299591



■ SCHRACK INFO

- With 2 early-make auxiliary contacts
- For early-make of the undervoltage release in main switch applications and for interlock- and load-shedding circuits
- Installed in contact
- Other voltages and connection versions available on request

■ TIPS & TRICKS

When the undervoltage release is de-energized, accidental contact with the main contacts of the switch is safely prevented during attempts to switch on. Early-make of auxiliary contacts during switch on and off (20ms). Undervoltage releases cannot be installed at the same time as operating current releases or early-make auxiliary contact MC2-XHIV.

VOLTAGE	TYPE	ORDER NO.
208 - 240 VAC	MC2/3-XUHIV230V	MC299591
380 - 440 VAC	MC2/3-XUHIV400V	MC299594

Other voltage variants available upon request.

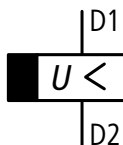
■ UNDERVOLTAGE RELEASE, OFF-DELAY TYPES MC-UVU, MC-XUV



MC295927



MC299499



■ SCHRACK INFO

- Voltage drops less than 0,07–16 s do not cause MC circuit breakers or N switch disconnectors to trip.

■ TECHNICAL DATA

- Time-delay adjustable between 70 ms – 4 s
- With additional external capacitor:
30.000 μ F \geq 35 V to 8 s
90.000 μ F \geq 35 V to 16 s
- 1 x special release MC2-XUV required.
- Cannot be installed simultaneously with early-make auxiliary contact MC2-XHIV... or shunt release MC2-XA...
- Time-delay device for separate mounting (Fastening: DIN rail or screws).
- For other operating voltages, please use a control transformer.

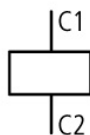
NAME	TYPE	ORDER NO.
Time-delay unit	MC-UVU	MC196154
Special undervoltage release for time-delay unit MC2	MC2/3-XUV	MC295927

Other voltage variants available upon request.

■ SHUNT RELEASE TYPES MC2-XA



MC299754



■ SCHRACK INFO

- Without auxiliary contact
- Switches are tripped by a voltage pulse or by the application of uninterrupted voltage

■ NOTES

When the shunt release is energized, accidental contact with the main contacts of the switch during attempts to switch on is safely prevented. Shunt release cannot be installed simultaneously with undervoltage release.

VOLTAGE	TYPE	ORDER NO.
24 V AC/DC	MC2-XA24VAC/DC	MC299754
208 - 250 V AC/DC	MC2-XA230VAC/DC	MC299763

Other voltage variants available upon request.

Order numbers marked in bold are priority types which are available in standard quantities.

REMOTE OPERATOR FOR MC3



MC299832

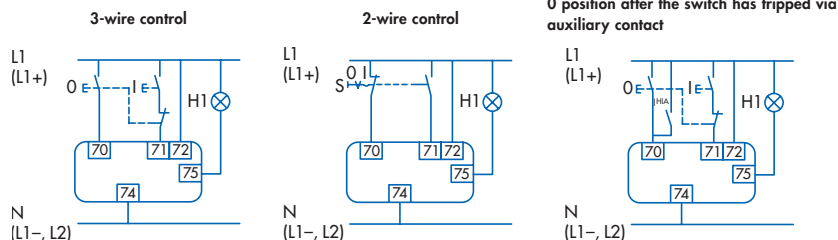
SCHRACK INFO

- Remote operator can be combined with circuit breaker MC and switch disconnector MC-N, but not with switch disconnector MC-PN.
- Do not deactivate simultaneously via remote control and trip via undervoltage/operating current release.

TECHNICAL DATA

- On/Off breaking and reset by means of 2-wire or 3-wire control.
 - Can be synchronized
 - Breaking time On: ≤ 80 ms
 - Local manual breaking possible
 - Pause between Off and On: 3 sec.
 - On command is ignored
- Function of Terminal 75:
Ready for operation signal, when cover is closed and not locked.
AC-15: 2 A/400 V
DC-13: 0,2 A/220 V

CIRCUIT DIAGRAMS



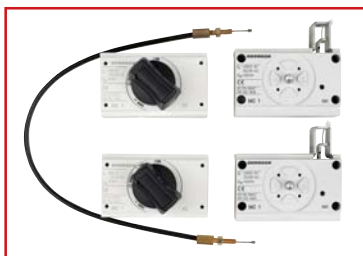
BREAKING CYCLE



VOLTAGE	TYPE	ORDER NO.
208 - 240 V AC	MC3-XR208-240AC	MC399850
Extra cover for 4-pole switches	MC3-XAVPR	MC396678

Other voltage variants available upon request.

MECHANICAL INTERLOCK FOR (DOOR COUPLING-) ROTARY HANDLES FOR MC3



MC191581

SCHRACK INFO

Rotary handle on switch or door coupling rotary handle additionally required.

Cannot be combined with remote operator or door frame.

At least 2 interlocking modules are required to construct a mechanical interlocking circuit. See Page 142 for possible combinations and variations in interlocking circuits. Bowden cable to be ordered separately.

DESCRIPTION	TYPE	ORDER NO.
Mechanical interlock	MC3-XMV	MC391583
Bowden cable 225 mm	MC-XBZ225	MC191585
Bowden cable 600 mm	MC-XBZ600	MC191586
Bowden cable 1000 mm	MC-XBZ1000	MC191587

MECHANICAL INTERLOCK FOR REMOTE OPERATOR FOR MC3



MC294543



MC294543

SCHRACK INFO

- For 2 switches of same or next frame size side by side
- Side-by-side mounting
- Mounted on top of each other, long version
- Type contains parts for 2 switches
- Remote operator also required
- For maximum breaking distance, see Page 143

NOTES

Cannot be combined with rotary handles, door coupling rotary handles and early-make auxiliary contacts.

DESCRIPTION	TYPE	ORDER NO.
Mechanical interlock for MC2/3	MC2/3-XMVR	MC294544
Mechanical interlock for MC2/3, long version	MC2/3-XMVRL	MC294549
Mechanical interlock for MC3	MC3-XMVR	MC394545
Mechanical interlock for MC3 long version	MC3-XMVRL	MC394550
Mechanical interlock for MC3/4	MC3/4-XMVR	MC394546
Mechanical interlock for MC3/4 long version	MC3/4-XMVRL	MC394551

ROTARY HANDLE DIRECTLY ON SWITCH FOR MC3



MC390129

SCHRACK INFO

- Complete with rotary drive
- Can also be combined with door frame

TECHNICAL DATA

Available in the following versions:

Type MC.-XDV

Lockable in the "0" position (up to three padlocks), black/grey

Type MC.-XDVR

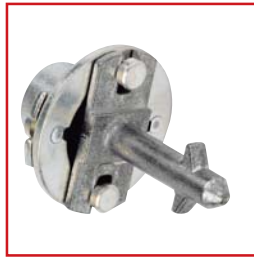
Lockable in the "0" position (up to three padlocks), Emergency stop red/yellow

DESCRIPTION	TYPE	ORDER NO.
Lockable rotary handle for MC3, black/grey	MC3-XDV	MC390129
Lockable rotary handle for MC3, Emergency stop red/yellow	MC3-XDVR	MC390140

DOOR COUPLING ROTARY HANDLE FOR MC3



MC390170



MC390170



MC390170

SCHRACK INFO

- Complete unit includes rotary drive and coupling parts
- Degree of Protection IP66
- Rotary handle can be rotated 90° for horizontally-mounted switches
- Cannot be defeated in the locked OFF and ON positions
- Can be modified when in the unlocked ON position, can be defeated from the outside with a screwdriver
- Door can be opened in OFF
- External warning plate/designation plate can be clipped on

NOTES

- Order extension shaft separately!

TECHNICAL DATA

Available in the following versions:

Type MC.-XTVD

Lockable in the "0" position on handle with up to three padlocks, with door interlock, black/grey

Type MC.-XTVDV

Lockable in the "0" position on handle and switch, with up to three padlocks, with door interlock, black/grey

Type MC.-XTVDVR

Lockable in the "0" position on handle and switch with up to three padlocks, with door interlock, Emergency stop red/yellow

DESCRIPTION	TYPE	ORDER NO.
Rotary handle for MC3 with door interlock, lockable, black/grey	MC3-XTVD	MC390170
Door coupling rotary handle for MC3 with door interlock, lockable, "0", "1", black/grey	MC3-XTVDV	MC390176
Door coupling rotary handle for MC3 with door interlock, lockable, Emergency stop red/yellow	MC3-XTVDVR	MC390182

EXTENSION SHAFT FOR MC3



MC190191

SCHRACK INFO

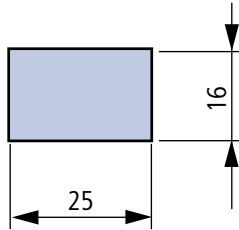
- for maximum cabinet depths of 400 or 600 mm
- Can be cut to required length

DESCRIPTION	CABINET DEPTH	TYPE	ORDER NO.
Extension shaft for MC3	max. 400 mm	MC3/4-XV4	MC391234
Extension shaft for MC3	max. 600 mm	MC3/4-XV6	MC390193

BOX TERMINALS FOR MC3



MC390042



SCHRACK INFO

- Installed within the switch housing
- If $U_e \geq 525V$ AC, use cover plate MC3(-4)-XSKA
- Conversion kit for switches with screw connection
- Contains parts for one switch side
- Terminal capacities:
Copper lines/cables 500A: 1 x 35 – 240 mm²
2 x 16 – 120 mm²
Copper strip 630A: 10 x 24 x 1 + 5 x 24 x 1 or (2x) 8 x 24 x 1

DESCRIPTION	TYPE	ORDER NO.
Box terminal (contains 3 pcs.) for MC3	MC3-XKC	MC390042
Box terminal (contains 4 pcs.) for MC3-4	MC3-4-XKC	MC396783

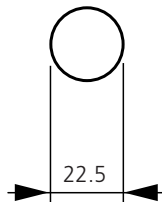
TUNNEL TERMINAL FOR MC3



MC391461



MC391461



SCHRACK INFO

- Contains parts for one switch side located at top or bottom for 3 or 4-pole switches
- Comes with terminal for control circuit cabling as standard for 1 x 0,75 – 2,5 mm² or 2 x 0,75 – 1,5 mm² copper conductors
- Terminal capacities:
XKA1 max. 350A: Cu/Al cable 1 x 16 – 185 mm²*
XKA2 max. 630A: Cu/Al-cable 2 x 50 – 240 mm²
(* depending on cable manufacturer up to 240 mm² can be connected)
- Installed outside switch housing

TECHNICAL DATA

- For Cu- and Al cables
- Includes cover plate
- Stranded round conductor / stranded sector-shaped conductor

DESCRIPTION	TYPE	ORDER NO.
Tunnel terminal 185 mm ² , 3 pole for MC3	MC3-XKA1	MC391459
Tunnel terminal 2 x 240 mm ² , 3-pole for MC3	MC3-XKA2	MC391461
Tunnel terminal 185 mm ² , 4 pole for MC3-4	MC3-4-XKA1	MC391460
Tunnel terminal 2 x 240 mm ² , 4-pole for MC3-4	MC3-4-XKA2	MC391462

■ CABLE LUG FOR MC3



MC399776

■ SCHRACK INFO

- Special cable lug in slimline design
- Cable lugs must be insulated when using without a cover plate.

DESCRIPTION	TYPE	ORDER NO.
Cable lug 185 mm ² , for MC3	MC3/4-XKS185	MC390040
Cable lug 240 mm ² , for MC3	MC3/4-XKS240	MC390041

■ REAR CONNECTION FOR MC3



MC396792

■ SCHRACK INFO

- Contains parts for one switch side located at top or bottom for 3- or 4-pole switches
- Terminal capacities: Copper cable 8 x 16 – 240 mm²

DESCRIPTION	TYPE	ORDER NO.
Rear connection, 3 pole for MC3	MC3-XKR	MC396792
Rear connection, 4 pole for MC3-4	MC3-4-XKR	MC396795

■ CONNECTION WIDTH EXTENSION FOR MC3



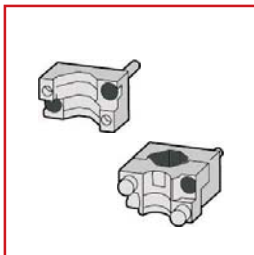
MC390514

■ SCHRACK INFO

- Contains parts for one switch side incl. phase separator
- Central holes, max. 2 cable lugs per phase
- Distance between pole centers 70 mm
- Terminal capacities: Copper cable lugs 2 x 300 mm²
Copper rails (2x) 10 x 50

DESCRIPTION	TYPE	ORDER NO.
Connection width extension, 3 pole 630 A for MC3	MC3-XKV70	MC390514
Connection width extension, 4 pole 630 A for MC3	MC3-4-XKV70	MC390515

CONNECTION TERMINALS FOR CONNECTION WIDTH EXTENSION MC3



MC390782 + MC390784

SCHRACK INFO

- Contains parts for one switch side located at top or bottom for 3- or 4-pole switches
- Only in combination with connection width extension
- Use with flexible and highly-flexible conductor end sleeves
- Comes with terminal for control circuit cabling as standard for 1 x 0,75 – 2,5 mm² or 2 x 0,75 – 1,5 mm² Cu conductors
- Terminal capacities: Copper cable 2 x 120 – 300 mm²
Cu strip (2x) 11 x 21 x 1 mm

DESCRIPTION	TYPE	ORDER NO.
3 POLE		
Connection terminals for connection width extension, 500 A for cable	MC3-XK300	MC390782
Connection terminals for connection width extension, 630 A for strip	MC3-XK22X21	MC390784
4 POLE		
Connection terminals for connection width extension, 500 A for cable	MC3-4-XK300	MC390783
Connection terminals for connection width extension, 630 A for strip	MC3-4-XK22X21	MC390785

PHASE SEPERATOR PLATE FOR MC3



MC4-XKP

SCHRACK INFO

- Contains parts for one switch side located at top or bottom for 3- or 4-pole switches
- Supplied with the connection width extension
- Insulation protection where cable lugs, busbars or flat conductor are connected.
- Cannot be combined with tunnel terminal, rear-side connection

DESCRIPTION	TYPE	ORDER NO.
Phase seperator plate for MC3	MC3-XKP	MC390512
Phase seperator plate for MC3-4	MC3-4-XKP	MC390513

CONTROL CIRCUIT TERMINAL FOR MC3



MC196739

SCHRACK INFO

- Contains parts for two terminals located at top or bottom for 3/ 4 pole switches
- Included with tunnel terminal
- Terminal capacities: Screw connection 1 x 0,75 – 2,5 mm², 2 x 0,75 – 1,5 mm²

DESCRIPTION	TYPE	ORDER NO.
Control circuit terminal for box terminal MC3	MC3/4-XSTK	MC196739
Control circuit terminal for screw connection MC3	MC3/4-XSTS	MC396797

■ TERMINAL COVER FOR MC3



MC390045

■ SCHRACK INFO

- Protection against accidental contact when using cable lugs, rails or tunnel terminals
- Contains parts for one switch side located at top or bottom for 3- or 4-pole switches
- Degree of protection IP4X front, side and rear, IP1X on the connection side when using insulated conductor material
- Cover plate included with tunnel terminals

DESCRIPTION	TYPE	ORDER NO.
Terminal cover, 3 pole for MC3	MC3-XKSA	MC390045
Terminal cover, 4 pole for MC3-4	MC3-4-XKSA	MC396801

■ IP2X FINGER PROTECTION FOR DIRECT-MOUNTED MC3 SWITCHES



MC196744



MC196748

■ SCHRACK INFO

- Increases the protection against accidental contact to IP2X
- Protects when reaching into the cable connection area when cables are connected in box terminal
- For 2 conductors, maximum cross-section 70 mm²
- MC3-XIPA and MC3-4-XIPA only in combination with cover plate

DESCRIPTION	TYPE	ORDER NO.
FOR BOX TERMINAL		
Finger protection, 3 pole for MC3	MC3-XIPK	MC396804
Finger protection, 4 pole for MC3-4	MC3-4-XIPK	MC396805
FOR TERMINAL COVER		
Finger protection, 3 pole for MC3	MC3-XIPA	MC396808
Finger protection, 4 pole for MC3-4	MC3-4-XIPA	MC396809

INSULATED ENCLOSURE XCI



MC391525

SCHRACK INFO

- Only for switches with box terminals for direct cable connection
- With door coupling rotary handle
- Complete including all necessary functional parts
- Degree of protection IP65
- Comes with gland plates

TECHNICAL DATA

Enclosure suitable for installation of circuit-breakers and switch-disconnectors for separate mounting with top and bottom cable entry. Including fixing straps for wall mounting.

Short circuit protection at 415 V 50/60 Hz to 10 kA.

Not in combination with remote operator, plug-in- or withdrawable unit.

Additional insulated terminals for 4 or 5 pole must be ordered separately.

Available in the following versions:

Standard, black/grey

Lockable in the "0" position at handle with up to 3 padlocks. Additionally with cover interlock.

For Emergency stop, red/yellow

Lockable on handle and switch with up to 3 padlocks. Lockable in the "0" position on handle. Additionally with cover interlock and lockable at switch in the "0" position.

DESCRIPTION	MAX. RATED UNINTERRUPTED CURRENT	TYPE	ORDER NO.
STANDARD, BLACK/GREY			
Insulated enclosure for MC3(-4)	≤ 400 A	MC3-XCI48-TVD	MC391525
FOR EMERGENCY STOP, RED/YELLOW			
Insulated enclosure for MC3(-4)	≤ 400 A	MC3-XCI48-TVD	MC391530

ADDITIONAL INSULATED TERMINALS FOR MC3



MC294709

SCHRACK INFO

- For looping through the neutral and earth conductor
- 1 pole

DESCRIPTION	TERMINAL CAPACITY	TYPE	ORDER NO.
Additional insulated terminal 250 A	stranded, 1 x (35-150mm ²), 2 x (16-70mm ²)	K150/1/BR	MC294709
Additional insulated terminals 400 A	stranded, 1 x (50-240mm ²), 2 x (25-120mm ²)	K240/1/BR	MC397082
Additional insulated terminals 630 A	stranded, 1 x (240 – 300mm ²), 2 x (50 – 240mm ²)	K2x240/1/BR	MC399455

DEVICE ADAPTERS FOR CIRCUIT-BREAKERS AND SWITCH-DISCONNECTORS FOR 60 mm MC3 BUSBAR SYSTEM



MC391668

SCHRACK INFO

- Cover plate MC-XKR necessary for frame size 2 and 3.
- For mounting on flat copper rails 12 x 5 mm bis 30 x 10 mm
- Double T and triple T profile
- Snaps onto the voltage-free busbar
- Rated operational voltage, Ue: 690 V

TECHNICAL DATA

MC 3 up to 630 A:

- Connection to system from top
- For component adapter MC3-XKR13 with rear connection, cover plate needed

DESCRIPTION	TYPE	ORDER NO.
60 mm busbar adapter 550 A, 3 pole for MC3	32170	MC391700
Cover plate for component adapter, 3 pole	MC3-XKR13	MC391668
4 pole adapter with cover plate	MC3-4XKR13	upon request

DOOR SEALING FRAME FOR MC3



MC394645

SCHRACK INFO

- For toggle levers, rotary handles with rotary drive and remote operator
- Degree of protection IP40
- For rectangular cut-out on doors and enclosures with material thicknesses of 1,5 – 5 mm
- External warning plate/designation plate can be clipped on

DESCRIPTION	TYPE	ORDER NO.
Door sealing frame for MC3	MC3-XBR	MC394645

TOGGLE LEVER LOCKING DEVICE FOR MC3



MC390201

SCHRACK INFO

- Off position lockable with up to 3 padlocks (hasp thickness 4 – 8 mm)
- Cannot be combined with Insulating surround

DESCRIPTION	TYPE	ORDER NO.
Toggle lever locking device for MC3	MC2/3-XKAV	MC290201

SPACERS FOR MC3



MC390211

SCHRACK INFO

- Enables fast and low-priced adjustment of a variety frame sizes with/without rotary handle or remote operator same front depth
- Grid depth 17,5 mm, thread M5
- Each set contains 4 x spacers
- 4 fastening screws included per switch

DESCRIPTION	TYPE	ORDER NO.
Spacers for MC3	MC3/4-XAB	MC390211

■ CIRCUIT BREAKER 3/4-POLE UP TO 1600A WITH ELECTRONIC RELEASE TYPES MC4N-AE, MC4H-AE, MC4N-4-AE, MC4H-4-AE



MC463232

■ SCHRACK INFO

- System and line protection
- 3 and 4 pole versions
- RMS value and "thermal memory"
- Adjustable overload release I: 0,5 – 1 x I_n (factory setting 0,8 x I_n)
- Adjustable short-circuit release I: 2 – 12 x I_n (factory setting 6 x I_n)
- Breaking capacity 50 / 85 kA at 415 V 50/60 Hz
- Screw terminals as standard
- Rated uninterrupted current = rated current

RATED CURRENT/ BREAKING CAPACITY	SETTING RANGE		TYPE	ORDER NO.
	OVERLOAD- RELEASE (A)	SHORT CIRCUIT- RELEASE (A)		
3 POLE (NORMAL BREAKING CAPACITY) 50 kA				
630 A/50 kA	315...630	1260...7560	MC4N-AE630	MC463232
800 A/50 kA	400...800	1600...9600	MC4N-AE800	MC480232
1000 A/50 kA	500...1000	2000...12000	MC4N-AE1000	MC410232
1250 A/50 kA	630...1250	2500...15000	MC4N-AE1250	MC412232
1600 A/50 kA	800...1600	3200...19200	MC4N-AE1600	MC416232
3 POLE (HIGH BREAKING CAPACITY) 85 kA				
630 A/85 kA	315...630	1260...7560	MC4H-AE630	MC463332
800 A/85 kA	400...800	1600...9600	MC4H-AE800	MC480332
1000 A/85 kA	500...1000	2000...12000	MC4H-AE1000	MC410332
1250 A/85 kA	630...1250	2500...15000	MC4H-AE1250	MC412332
1600 A/85 kA	800...1600	3200...19200	MC4H-AE1600	MC416332
4 POLE (NORMAL BREAKING CAPACITY) 50 kA				
630 A/50 kA	315...630	1260...7560	MC4N-4-AE630	MC463242
800 A/50 kA	400...800	1600...9600	MC4N-4-AE800	MC480242
1000 A/50 kA	500...1000	2000...12000	MC4N-4-AE1000	MC410242
1250 A/50 kA	630...1250	2500...15000	MC4N-4-AE1250	MC412242
1600 A/50 kA	800...1600	3200...19200	MC4N-4-AE1600	MC416242
4 POLE (HIGH BREAKING CAPACITY) 85 kA				
630 A/85 kA	315...630	1260...7560	MC4H-4-AE630	MC463342
800 A/85 kA	400...800	1600...9600	MC4H-4-AE800	MC480342
1000 A/85 kA	500...1000	2000...12000	MC4H-4-AE1000	MC410342
1250 A/85 kA	630...1250	2500...15000	MC4H-4-AE1250	MC412342
1600 A/85 kA	800...1600	3200...19200	MC4H-4-AE1600	MC416342

Higher breaking capacity available upon request

■ CIRCUIT BREAKER 3-/4 POLE UP TO 2000A WITH DELAYED ELECTRONIC RELEASE TYPES MC4N-VE, MC4H-VE, MC4N-4-VE, MC4H-4-VE



MC480233

■ SCHRACK INFO

- System and line protection
- Selective and generator protection
- 3 and 4 pole versions
- Rated uninterrupted current = rated current

■ TECHNICAL DATA

- RMS value and "thermal memory"
- Adjustable overload release I_r : $0,5 - 1 \times I_n$ (factory setting $0,8 \times I_n$)
- Adjustable time delay setting to overcome current peaks t_r :
 $2 - 20 \text{ s}$ at $6 \times I_r$ as well as infinity
- Adjustable delayed short-circuit releases I_{sd} :
 $2 - 10 \times I_r$ (factory setting $6 \times I_r$)
- Adjustable time delay t_{sd} : Levels: 0, 20, 60, 100, 200, 300, 500, 750, 1000 ms (factory setting 0)
- Adjustable not-delayed short-circuit release I_i :
 $2 - 12 \times I_n$ (factory setting $12 \times I_n$)
- Switchable i^2t constant function (factory setting: OFF)
- MC4.-VE...: $2 - 12 \times I_n$ (factory setting $12 \times I_n$)
- MC4.-VE2000: $2 - 8 \times I_n$ (factory setting $8 \times I_n$)
- 2000A cannot be combined with withdrawable units

RATED CURRENT/ BREAKING CAPACITY	OVERLOAD- RELEASE (A)	SETTING RANGE		TYPE	ORDER NO.
		SHORT-CIRCUIT RELEASE NOT DELAYED (A)	SHORT-CIRCUIT RELEASE DELAYED (A)		
3 POLE (NORMAL BREAKING CAPACITY) 50 kA					
630 A/50 kA	315...630	1260...7560	630...6300	MC4N-VE630	MC463233
800 A/50 kA	400...800	1600...9600	800...8000	MC4N-VE800	MC480233
1000 A/50 kA	500...1000	2000...12000	1000...10000	MC4N-VE1000	MC410233
1250 A/50 kA	630...1250	2500...15000	1250...12500	MC4N-VE1250	MC412233
1600 A/50 kA	800...1600	3200...19200	1600...16000	MC4N-VE1600	MC416233
2000 A/50 kA AC1	1000...2000	4000...16000	2000...12000	MC4N-VE2000	MC420233
3 POLE (HIGH BREAKING CAPACITY) 150 kA					
630 A/100 kA	315...630	1260...7560	630...6300	MC4H-VE630	MC463333
800 A/100 kA	400...800	1600...9600	800...8000	MC4H-VE800	MC480333
1000 A/100 kA	500...1000	2000...12000	1000...10000	MC4H-VE1000	MC410333
1250 A/100 kA	630...1250	2500...15000	1250...12500	MC4H-VE1250	MC412333
1600 A/100 kA	800...1600	3200...19200	1600...16000	MC4H-VE1600	MC416333
2000 A/100 kA AC1	1000...2000	4000...16000	2000...12000	MC4H-VE2000	MC420333
4 POLE (NORMAL BREAKING CAPACITY) 50 kA					
630 A/50 kA	315...630	1260...7560	630...6300	MC4N-4-VE630	MC463243
800 A/50 kA	400...800	1600...9600	800...8000	MC4N-4-VE800	MC480243
1000 A/50 kA	500...1000	2000...12000	1000...10000	MC4N-4-VE1000	MC410243
1250 A/50 kA	630...1250	2500...15000	1250...12500	MC4N-4-VE1250	MC412243
1600 A/50 kA AC1	800...1600	3200...19200	1600...16000	MC4N-4-VE1600	MC416243
4 POLE (HIGH BREAKING CAPACITY) 100 kA					
630 A/100 kA	315...630	1260...7560	630...6300	MC4H-4-VE630	MC463343
800 A/100 kA	400...800	1600...9600	800...8000	MC4H-4-VE800	MC480343
1000 A/100 kA	500...1000	2000...12000	1000...10000	MC4H-4-VE1000	MC410343
1250 A/100 kA	630...1250	2500...15000	1250...12500	MC4H-4-VE1250	MC412343
1600 A/100 kA AC1	800...1600	3200...19200	1600...16000	MC4H-4-VE1600	MC416343

■ MOTOR PROTECTION, 3 POLE UP TO 1400A WITH ELECTRONIC RELEASE TYPES MC4N-ME, MC4H-ME



MC480233

■ SCHRACK INFO

- Adjustable overload release I: $0,5 - 1 \times I_n$ (factory setting $0,8 \times I_n$)
- Adjustable short-circuit release I: $2 - 14 \times I_n$ (factory setting $12 \times I_n$)
- Adjustable time delay setting to overcome current peaks t: $2 - 20$ s at $6 \times I_r$, as well as infinity (without overload release), (factory setting 10 s)
- RMS value and "thermal memory"
- Phase sensitivity
- Screw terminals as standard, box terminals as accessories
- Meets IEC/EN 60947-4 and IEC/EN 60947-2
- Circuit breakers satisfy all requirements of Utilization category AC3 at 400V AC

■ NOTES

¹⁾ Rated operational voltage/current at 690 V AC:

MC4-ME550: $P_e = 560$ kW; $I_e = 550$ A

MC4-ME875: $P_e = 600$ kW; $I_e = 588$ A

MC4-ME1400: $P_e = 600$ kW; $I_e = 588$ A

NOMINAL CURRENT/ BREAKING CAPACITY	POWER RATING AC3 kW	CURRENT AC3 A	SETTING RANGE		TYPE	ORDER NO.
			OVERLOAD- RELEASE (A)	SHORT CIRCUIT- RELEASE (A)		
3 POLE (NORMAL BREAKING CAPACITY) 50 kA						
550 A/50 kA	315 ¹⁾	544 ¹⁾	275...550	550...7700	MC4N-ME550	MC455237
875 A/50 kA	500 ¹⁾	820 ¹⁾	438...875	875...12250	MC4N-ME875	MC487237
1400 A/50 kA	630 ¹⁾	1066 ¹⁾	700...1400	1400...19600	MC4N-ME1400	MC414237
3 POLE (HIGH BREAKING CAPACITY) 85 kA						
550 A/85 kA	315 ¹⁾	544 ¹⁾	275...550	550...7700	MC4H-ME550	MC455337
875 A/85 kA	500 ¹⁾	820 ¹⁾	438...875	875...12250	MC4H-ME875	MC487337
1400 A/85 kA	630 ¹⁾	1066 ¹⁾	700...1400	1400...19600	MC4H-ME1400	MC414337

SWITCH DISCONNECTOR 3-/4 POLE UP TO 1600A, REMOTE TRIP POSSIBLE TYPES MC4-N, MC4-N-4



MC480233

SCHRACK INFO

- 3 and 4 pole versions
- Main switch characteristics including positive drive according to IEC/EN 60204 & VDE 0113
- Isolating characteristics to IEC/EN 60947-3 and VDE 0660 Protection against accidental contact to VDE 0160 Part 100
- Rated uninterrupted current up to 1600A
- Switch disconnecter MC4-N, with trip setting "0"; "+"; "1", can be tripped remotely with undervoltage/shunt release, trip-indicating auxiliary contacts also possible
- Can be combined with remote operator MC-XR...
- Screw terminals as standard
- Rated uninterrupted current = Rated current
- Rated short-circuit breaking capacity values: I_{cm} 53kA
- Rated short-time withstand current: I_{cw} 25kA

RATED UNINTERRUPTED CURRENT	MAX. BACK-UP FUSE (gL) FOR SWITCH DISCONNECTOR (AgL)	TYPE	ORDER NO.
3 POLE CAN BE TRIPPED REMOTELY			
800 A	1600	MC4-N-800	MC480035
1000 A	1600	MC4-N-1000	MC410035
1250 A	1600	MC4-N-1250	MC412035
1600 A	1600	MC4-N-1600	MC416035
4 POLE CAN BE TRIPPED REMOTELY			
800 A	1600	MC4-N-4-800	MC480045
1000 A	1600	MC4-N-4-1000	MC410045
1250 A	1600	MC4-N-4-1250	MC412045
1600 A	1600	MC4-N-4-1600	MC416045

SOCKET BASE AND WITHDRAWABLE MODULE FOR MC4



MC396707



MC396707

SCHRACK INFO

- 3- and 4 pole versions
- for MC4 circuit breakers and MC4-N switch disconnectors

TECHNICAL DATA

- Withdrawable unit complete with control circuit plug unit
- I_n max. at 20° C – 1600A
- I_n max. at 40° C – 1500A
- Mounting position: vertical
- 3 positions: Retracted, test, extended. The 3 positions are indicated mechanically.
- Auxiliary contacts can also be used for remote signaling. Either one N/C or N/O contact per position.
- All connections of auxiliary switches (HIA, HIN, HIV) and undervoltage and shunt releases to the control circuit plug units come pre-fitted.
- **Withdrawable module only available in combination with switch.**
- Add A to switch part number (MC340232A), comes supplied ready for use with withdrawable units.
- Socket base can be ordered separately and supplied pre-assembled.

DESCRIPTION	TYPE	ORDER NO.
SOCKET BASE		
Socket base, 3 pole	MC4-XAVS	MC496713
Socket base, 4 pole	MC4-4-XAVS	MC496714

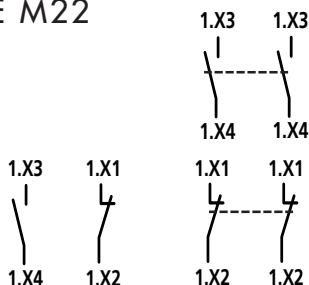
WITHDRAWABLE MODULE

Withdrawable module, 3 pole, supplied with switch, add an A to end of switch part number
Withdrawable module, 4 pole, supplied with switch, add an A to end of switch part number

STANDARD AUXILIARY CONTACT / TRIP-INDICATING AUXILIARY CONTACT TYPE M22



MM216378



SCHRACK INFO

- Switches with the main contacts, used for indicating and interlocking tasks
- General trip indication “+” with trip due to voltage release, overload release or short-circuit-release

TECHNICAL DATA

Breaking capacity: AC15: 4 A / 230 VAC
DC13: 3 A / 24 VDC

TIPS & TRICKS

The trip-indicating auxiliary contacts is the same contact as the standard auxiliary contact. It derives its function from where it is installed (alarm contact on left).

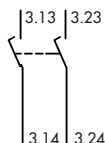
Maximum component installation with auxiliary contacts: 1 x Standard auxiliary contact (HIN) M22-K.
1 x Trip-indicating contact (HIA) M22-CK.

DESCRIPTION	TYPE	ORDER NO.
1 N/O contact with screw terminals	M22-K10	MM216376
1 N/C contact with screw terminals	M22-K01	MM216378
2 N/O contacts with cage clamp terminals	M22-CK20	MM107898
2 N/O contacts with cage clamp terminals	M22-CK02	MM107899

EARLY-MAKE AUXILIARY CONTACT TYPE MC4-XHIV



MC496172



SCHRACK INFO

For interlock- and load-shedding circuits as well as for early make of undervoltage release in main switch/Emergency stop applications.

TECHNICAL DATA

- Not in connection with undervoltage release MC4-XU... or shunt release MC4-XA... Early-make during switch on and off (manual switch): approx. 20 ms
- Not in connection with remote operator MC-XR
Undervoltage- or shunt voltage releases
- Breaking capacity: AC15: 4 A / 230 VAC
DC13: 3 A / 24 VDC

TIPS & TRICKS

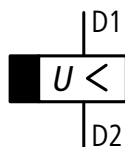
Maximum component installation with auxiliary contacts:
1 x early-make auxiliary contact

DESCRIPTION	TYPE	ORDER NO.
Early-make auxiliary contact, 2 N/O	MC4-XHIV	MC496172

■ UNDERVOLTAGE RELEASE TYPES MC4-XU



MC496189



■ SCHRACK INFO

- For use in Emergency stop devices in connection with Emergency stop buttons
- Installed in breaker
- Without auxiliary contact
- Non-delayed breaking of circuit breaker MC/ switch disconnector MC-N when the control voltage drops below 35 % - 70% U_s .

■ TIPS & TRICKS

When the undervoltage release is de-energized, accidental contact with the main contacts of the switch is safely prevented during attempts to switch on. Undervoltage releases cannot be installed at the same time with operating current releases or early-make auxiliary contact, type MC4-XHIV.

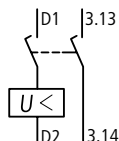
VOLTAGE	TYPE	ORDER NO.
24 V AC	MC4-XU24AC	MC496189
24 V DC	MC4-XU24DC	MC496204
208-240 V AC	MC4XU208-240AC	MC496193
380-440 V AC	MC4-XU380-440AC	MC496194

Other voltage variants available upon request.

■ UNDERVOLTAGE RELEASE WITH TWO EARLY-MAKE AUXILIARY CONTACTS TYPES MC4-XHIV



MC496221



■ SCHRACK INFO

- With 2 early-make auxiliary contacts
- For early-make of the undervoltage release in main switch applications and for interlock- and load-shedding circuits
- Installed in breaker
- Other voltages and connection versions available on request

■ TIPS & TRICKS

When the undervoltage release is de-energized, accidental contact with the main contacts of the switch is safely prevented during attempts to switch on. Early-make of auxiliary contacts during switch on and off (20ms). Undervoltage releases cannot be installed at the same time with operating current releases or early-make auxiliary contact, type MC4-XHIV.

VOLTAGE	TYPE	ORDER NO.
208 - 240 V AC	MC4-XUHIV230VAC	MC496221
380 - 440 V AC	MC4-XUHIV400VAC	MC496222

Other voltage variants available upon request.

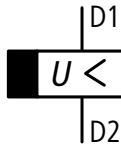
■ UNDERVOLTAGE RELEASE, OFF-DELAY TYPES MC4-UVU, MC4-XUV



MC196154



MC299499



■ SCHRACK INFO

- Voltage drops less than 0,07–16s do not cause MC circuit breakers or N switch disconnectors to trip.

■ TECHNICAL DATA

- Time-delay adjustable between 70 ms – 4 s
- With additional external capacitor:
30.000 μ F \geq 35 V to 8 s
90.000 μ F \geq 35 V to 16 s
- Special release MC4-XUVL is required.
- Cannot be installed at same time with early-make auxiliary contact MC4-XHIV... or operating current trip MC4-XA....
- Time-delay device for separate assembly (fixing: Top-hat rail or screws).
- For other operating voltages, please use a control transformer.

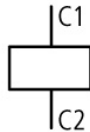
NAME	TYPE	ORDER NO.
Time-delay unit	MC4-UVU	MC196154
Special undervoltage release for time-delay unit MC4	MC4-XUV	MC496596

Other voltage variants available upon request.

■ SHUNT RELEASE TYPES MC4-XA



MC496451



■ SCHRACK INFO

- Without auxiliary contact
- Switches are tripped by a voltage pulse or by the application of uninterrupted voltage

■ TECHNICAL DATA

When the shunt release is energized, accidental contact with the main contacts of the switch is safely prevented during attempts to switch on. Undervoltage releases cannot be installed at the same time with undervoltage release or early-make auxiliary contact, type MC4-XHIV.

VOLTAGE	TYPE	ORDER NO.
24 VAC/DC	MC4-XA24AC/DC	MC496447
208 - 250 VAC/DC	MC4-XA230AC/DC	MC496451

Other voltage variants available upon request.

REMOTE OPERATOR FOR MC4



MC496685

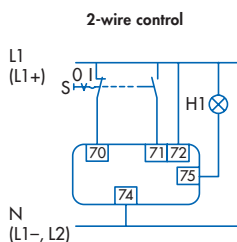
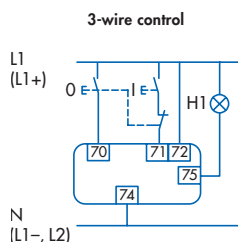
SCHRACK INFO

- Remote operator can be combined with circuit breaker MC and switch disconnecter MC-N, but not with switch disconnecter MC-PN.
- Do not switch off switch simultaneously via remote control and release via undervoltage/shunt release.

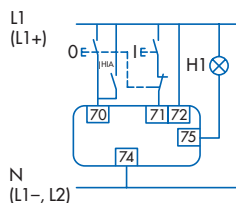
TECHNICAL DATA

- On/Off breaking and reset by means of 2-wire or 3-wire control.
- Can be synchronized
- Breaking time On: ≤ 100 ms
- Local manual breaking possible
- Pause between Off and On: 3 sec.
On command is ignored
- Function of Terminal 75:
Ready for operation signal, when cover is closed and not locked.
AC-15: 2 A/400 V
DC-13: 0,2 A/220 V

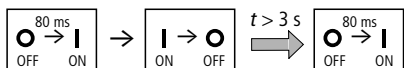
CIRCUIT DIAGRAMS



3-wire control with automatic return to 0 position after the switch has tripped via auxiliary contact



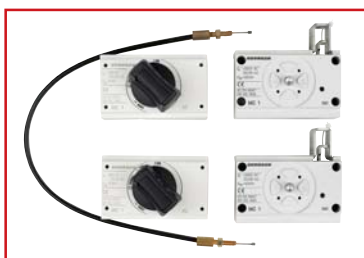
BREAKING CYCLE



VOLTAGE	TYPE	ORDER NO.
208 - 240 V AC	MC4-XR208-240AC	MC496685

Other voltage variants available upon request.

MECHANICAL INTERLOCK FOR (DOOR COUPLING) ROTARY HANDLES FOR MC4



MC491584

SCHRACK INFO

Rotary handle on switch or door coupling rotary handle additionally required.

Cannot be combined with remote operator or insulating surround.

At least 2 interlocking modules are required in order to construct a mechanical interlocking circuit. See Page 142 for possible combinations and variations in interlocking circuits. Bowden cable to be ordered separately.

DESCRIPTION	TYPE	ORDER NO.
Mechanical interlock	MC4-XMV	MC491584
Bowden cable 225 mm	MC-XBZ225	MC191585
Bowden cable 600 mm	MC-XBZ600	MC191586
Bowden cable 1000 mm	MC-XBZ1000	MC191587

MECHANICAL INTERLOCK FOR REMOTE OPERATOR FOR MC4



MC294543



MC494547 - montiert

SCHRACK INFO

- For 2 switches of the same or next frame size side by side
- Side-by-side mounting
- Mounted on top of each other, long version
- Contains parts for 2 switches
- Remote operator also required
- For maximum breaking distance, see Page 143

NOTES

Cannot be combined with rotary handles, door coupling rotary handles and early-make auxiliary contacts.

DESCRIPTION	TYPE	ORDER NO.
Mechanical interlock for MC4	MC4-XMVR	MC494547
Mechanical interlock for MC4, long version	MC4X-MXRL	MC494552
Mechanical interlock for MC3/4	MC3/4-XMVR	MC394546
Mechanical interlock for MC3/4, long version	MC3/4-XMVRL	MC394551

ROTARY HANDLE DIRECTLY ON SWITCH FOR MC4



MC496608

SCHRACK INFO

- Complete with rotary drive
- Can also be combined with door frame

TECHNICAL DATA

Available in the following versions:

Type MC.-XDV

Lockable in the "0" position (up to three padlocks), black/grey

Type MC.-XDVR

Lockable in the "0" position (up to three padlocks), Emergency stop red/yellow

Type MC.-XDTV

Lockable in the "0" position on handle, modification also available in "1" position, black/grey

Type MC.-XDTVR

Lockable in "0" position, Emergency Stop red/yellow

Version comes with door interlock:

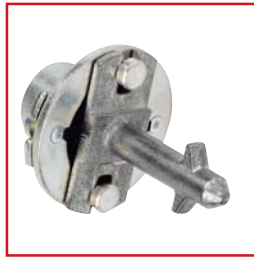
- Door frame supplier with door interlock
- Rotary handle can be rotated 90° for switches mounted horizontally
- In the ON position, can be defeated from the outside using a 1 mm pin
- Cannot be defeated in the locked OFF and ON positions
- Door can be opened in OFF
- Can only be switched on when door closed

DESCRIPTION	TYPE	ORDER NO.
Lockable rotary handle for MC4, black/grey	MC4-XDV	MC496608
Lockable rotary handle for MC4, Emergency stop red/yellow	MC4-XDVR	MC496610

DOOR COUPLING ROTARY HANDLE FOR MC4



MC494614



MC494614



MC494614

SCHRACK INFO

- Complete including rotary drive and coupling parts
- Degree of Protection IP66
- Rotary handle can be rotated 90° for switches mounted horizontally
- Cannot be defeated in the locked OFF and ON positions
- Can be modified when in the unlocked ON position, can be defeated from the outside with a screwdriver
- Door can be opened in OFF
- External warning plate/designation plate can be clipped on

NOTES

- Order extension shaft separately!

TECHNICAL DATA

Available in the following versions:

Type MC.-XTVD

Lockable in the "0" position on handle with up to three padlocks, with door interlock, black/grey

Type MC.-XTVDV

Lockable in the "0" position on handle and switch, with up to three padlocks, with door interlock, black/grey

Type MC.-XTVDVR

Lockable in the "0" position on handle and switch with up to three padlocks, with door interlock, Emergency stop red/yellow

DESCRIPTION	TYPE	ORDER NO.
Door-coupling rotary handle for MC4 with door interlock, lockable, black/grey	MC4-XTVD	MC496614
Door coupling rotary handle for MC4 with door interlock, lockable, "0", "1", black/grey	MC4-XTVDV	MC496616
Door coupling rotary handle for MC4 with door interlock, lockable, Emergency stop red/yellow	MC4-XTVDVR	MC496618

EXTENSION SHAFT FOR MC4



MC391234

SCHRACK INFO

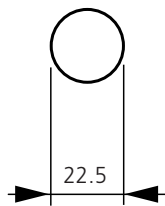
- For maximum cabinet depths of 400 or 600 mm
- Can be cut to required length

DESCRIPTION	CABINET DEPTH	TYPE	ORDER NO.
Extension shaft for MC4	max. 400 mm	MC3/4-XV4	MC391234
Extension shaft for MC4	max. 600 mm	MC3/4-XV6	MC390193

TUNNEL TERMINAL FOR MC4



MC496836



SCHRACK INFO

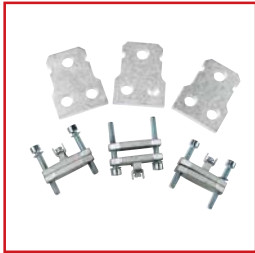
- Installed external to switch housing
- Contains parts for one switch side located at top or bottom for 3 pole switches
- Comes with terminal for control circuit cabling as standard for copper conductors, 1 x 0,75 – 2,5 mm², or 2 x 0,75 – 1,5 mm²
- Terminal capacities:
Cu/Al cable 1 x 50 – 240 mm², 4 x 50 – 240 mm²

TECHNICAL DATA

- For Cu- and Al cables, max. 1400A
- Includes cover plate
- Stranded round conductor / stranded sector-shaped conductor

DESCRIPTION	TYPE	ORDER NO.
Tunnel terminal 4 x 240 mm ² , 3-pole for MC4	MC4-XKA	MC496836
Tunnel terminal 4 x 240 mm ² , 4-pole for MC4	MC4-4-XKA	MC496837

▀ RIBBON CABLE FOR MC4



MC496829

▀ SCHRACK INFO

- $I_n \leq 1100$ A
- When mounting switch on conductive mounting plates you must use supplied cover plate MC4(-4)-XKSA
- Use cover plate for phase separator plates
- Contains parts for one switch side, top or bottom

DESCRIPTION	TYPE	ORDER NO.
Flat conductor terminal, 3 pole for MC4/MC4-N	MC4-XKB	MC496829
Flat conductor terminal, 4 pole for MC4-4/MC4-N-4	MC4-4-XKB	MC496831

▀ CABLE LUG FOR MC4



MC299776

▀ SCHRACK INFO

- Special cable lug in slimline design
- Cable lugs must be insulated when using without a cover plate.

DESCRIPTION	TYPE	ORDER NO.
Cable lug 185 mm ² , for MC4	MC3/4-XKS185	MC390040
Cable lug 240 mm ² , for MC4	MC3/4-XKS240	MC390041

▀ REAR CONNECTION FOR MC4



MC396792

▀ SCHRACK INFO

- Contains parts for one switch side, top or bottom
- Can be retrofitted:
Module plate MC4...-XKM... or connection width extension MC4...-XKV...
- Max. terminal capacities 1250A:
Copper cable lug 1 x 120 – 185 mm², 2 x 95 – 185 mm², 4 x 35 – 185 mm²
Al cable lug 1 x 185 mm², 2 x 70 – 185 mm², 4 x 50 – 185 mm²

DESCRIPTION	TYPE	ORDER NO.
Rear connection, 3-pol. for MC4	MC4-XKR	MC496842

MODULE PLATE FOR MC4



MC496814



MC496820



MC494473

SCHRACK INFO

- For M10 screws, can be bored for M12 screws
- Use special cable lugs in slimline design
- Can be mounted to switch with screw connection
- Contains parts for one switch side, top or bottom
- Insulated using cover plate MC4(-4)-XKSA or phase isolator MC4(-4)-XKP necessary

TECHNICAL DATA

- Terminal capacities, 1 bore: Copper cable lug 1 x 120 – 300 mm², 2 x 95 – 300 mm²
- Terminal capacities, 2 bore: Copper cable lug 2 x 95 – 185 mm², 4 x 35 – 185 mm²
- Connection width extension: 2 x 95 – 300

DESCRIPTION	TYPE	ORDER NO.
3 POLE		
Module plate 1 bore for MC4/MC4-N, I _n ≤ 1250 A	MC4-XKM1	MC496814
Module plate 2 bore for MC4/MC4-N, I _n ≤ 1400 A	MC4-XKM2	MC496820
Connection extension MC4 3 pole 1600 A	MC4-XKM2S-1600	MC494473
4 POLE		
Module plate 1 bore for MC4-4/MC4-N-4, I _n ≤ 800 A	MC4-4-XKM1	MC496815
Module plate 2 bore for MC4-4/MC4-N-4, I _n ≤ 1000 A	MC4-4-XKM2	MC496821
Connection extension MC4 4 pole 1600 A	MC4-4-XKM2S-1600	MC494474

CONNECTION WIDTH EXTENSION FOR MC4



MC496826

SCHRACK INFO

- Contains parts for one switch side located at top or bottom for 3 or 4 pole switches incl. phase separator
- 5x bore for up to 6 cable lugs per phase
- Can be mounted to switch with screw connection
- Phase separator supplied
- 4 mm bore holes fitted for control circuit terminal
- Terminal capacities: Copper cable lug 4 x 300 mm², 6 x 95 – 240 mm²

TECHNICAL DATA

Distance between pole centres, MC4(-4)-XKV95:	95 mm
Installation possible for current transformer:	up to width 130 mm given rail width of 80 mm
Distance between pole centres, MC4-XKV110:	107,5 mm
Installation possible for current transformer:	up to width 135 mm given rail width of 80 mm
Distance between pole centres, MC4-4-XKV120:	122 mm
Installation possible for current transformer:	up to width 164 mm given rail width of 80 mm

DESCRIPTION	TYPE	ORDER NO.
Connection extension MC4 3 pole 1600 A	MC4-XKV95	MC496826
Connection extension MC4 4 pole 1600 A	MC4-4-XKV95	MC496827
Connection extension MC4 3 pole 1600 A long version	MC4-XKV110	MC491593
Connection extension MC4 4 pole 1600 A long version	MC4-4-XKV120	MC491594

TERMINAL COVER FOR MC4



MC496846

SCHRACK INFO

- Protection against accidental contact when using cable lugs, rails or Tunnel terminals
- Contains parts for one switch side located at top or bottom 3- or 4 pole switches
- Degree of protection IP4X front, side and rear, IP1X on the connection side when using insulated conductor material
- Cover plate included with tunnel terminals

DESCRIPTION	TYPE	ORDER NO.
Terminal cover, 3 pole for MC4	MC4-XKSA	MC496846
Terminal cover, 4 pole for MC4	MC4-4-XKSA	MC496847

ADDITIONAL INSULATED TERMINALS FOR MC4



MC397082

SCHRACK INFO

- For looping through the neutral and earth conductor
- 1 pole

DESCRIPTION	TERMINAL CAPACITY	TYPE	ORDER NO.
Additional insulated terminals 400 A	stranded, 1 x (50-240mm ²), 2 x (25-120mm ²)	K240/1/BR	MC397082
Additional insulated terminal 630 A	stranded, 1 x (240 – 300mm ²), 2 x (50 – 240mm ²)	K2x240/1/BR	MC399455

DOOR SEALING FRAME FOR MC4



MC394645

SCHRACK INFO

- For toggle levers, rotary handles with rotary drive and remote operator
- Degree of protection IP40
- For rectangular cut-out on doors and enclosures with material thicknesses of 1,5 – 5 mm
- External warning plate/designation plate can be clipped on

DESCRIPTION	TYPE	ORDER NO.
Door sealing frame for MC4	MC4-XBR	MC494646

SPACERS FOR MC4



MC390211

SCHRACK INFO

- Enables fast and low-priced adjustment of a variety frame sizes with/without Rotary handle or remote operator same front depth
- Grid depth 17,5 mm, thread M5
- Each set contains 4 x spacers
- 4 fastening screws included per switch

DESCRIPTION	TYPE	ORDER NO.
Spacers for MC4	MC3/4-XAB	MC390211

RESIDUAL CURRENT (RCD) RELEASE RELAY, FIR



MC900001



MC900002



MC900003

SCHRACK INFO

Residual current release relay in combination with core-balance transformers. Switch-off can be achieved with undervoltage- and shunt releases or a contactor.

TECHNICAL DATA

Version corresponds to:	IEC 947-2, IEC 755, IEC 1008, IEC 1009			
Sensitivity:	Pulse current sensitive, type A			
Rated control voltage U_s (V):	230 +/- 20% (50/60 Hz)			
Rated operational voltage P_e (W):	3			
Relay contacts:	1 integral C/O			
Rated voltage of the relay contacts:	250 V AC 100 V DC			
Rated current of the relay contacts:	6 A			
Rated fault currents:	FIR-003	$I_{\Delta n}$	A	0.03
	FIR-03	$I_{\Delta n}$	A	0.3
	FIR-5	$I_{\Delta n}$	A	0.03 - 0.1 - 0.3 - 0.5 - 1 - 3 - 5
Time delay:	FIR-003	t_v	s	0.02 (non-delayed)
	FIR-03	t_v	s	0.02 (non-delayed)
	FIR-5	t_v	s	0.02 - 0.1 - 0.3 - 0.5 - 1 - 3 - 5
Fault current warning with FIR-5 through flashing red LED:	0.5Hz:	25% - 50% $I_{\Delta n}$		
	1Hz:	50% - 75% $I_{\Delta n}$		
	2Hz:	75% - <100% $I_{\Delta n}$		

DESCRIPTION	TYPE	ORDER NO.
Rated fault current $I_{\Delta n} = 0.03$ A Pulse current sensitive	FIR-003	MC900001
Rated fault current $I_{\Delta n} = 0.3$ A Pulse current sensitive	FIR-03	MC900002
Rated fault current $I_{\Delta n} = 0.03...5$ A Pulse current sensitive	FIR-5	MC900003

RESIDUAL CURRENT RELEASE RELAY WITH CONVERTER

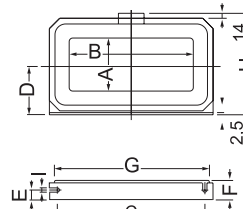
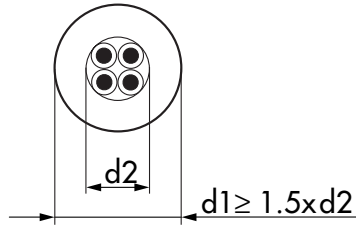
■ CORE-BALANCE TRANSFORMER FRI-WS, FIR-WR



MC900070



MC910305



■ SCHRACK INFO

The internal diameter of the transformer d_1 must be 1,5x wider than the average cross-section d_2 of the inserted conductors.

For load circuits with inrush current $> 4 \times I_n$, magnetic shielding is required (available upon request).

■ TECHNICAL DATA

Rectangular core-balance transformer

Type	A	B	C	D	E	F	G	H	I
FIR-WR-175	70	175	225	85	22	46	261	176	7,5
FIR-WR-305	115	305	360	116	25	55	402	240	8
FIR-WR-350	150	350	415	140	28	55	460	285	8

Round core-balance transformer

Max. nominal current		Diameter	
Power distribution (A)	Motor/capacitor (A)	Transformer type FIR-W-... d1	Maximum conductor cross-section (mm) d2
50	50	20	13
150	100	30	20
150	100	35	23
400	200	70	47
600	250	105	70
1200	630	140	93
1800	800	210	140

DESCRIPTION	TYPE	ORDER NO.
ROUND CORE-BALANCE TRANSFORMER		
Internal diameter 20 mm	FIR-WS-20	MC900020
Internal diameter 30 mm	FIR-WS-30	MC900030
Internal diameter 35 mm	FIR-WS-35	MC900035
Internal diameter 70 mm	FIR-WS-70	MC900070
Internal diameter 105 mm	FIR-WS-105	MC900105
Internal diameter 140 mm	FIR-WS-140	MC900140
Internal diameter 210 mm	FIR-WS-210	MC900210

RECTANGULAR CORE-BALANCE TRANSFORMER

70x175 mm	FIR-WR-175	MC910175
115x305 mm	FIR-WR-305	MC910305
150x350 mm	FIR-WR-350	MC910350

DIAGNOSTICS AND PARAMETERIZATION SOFTWARE



SCHRACK INFO

For the diagnosis of circuit breakers with electronic release via a PC and for the parameterization of the DMI module via a PC. Including necessary connection cable between MC and PC (MC-XPC-CAB) and DMI and PC (DMI-XPC-CAB). Can only be used in combination with circuit breakers with electronic releases.

TECHNICAL DATA

PC software for direct connection to all MC circuit breakers with electronic releases or for connection to the DMI module, including connecting cable. Protection parameters: Online display and characteristic representation, export option to Characteristics program. Warning and trip signals: Reads diagnostics memory even in voltage-free state. Load currents: Display and trend representation. Recording and export feature to MS-Excel for load currents and diagnosis signals. Configuration of the DMI: Motor starter, remote operator, assignment of the input and outputs and displays.

EXAMPLE

Should an overload, short circuit or other fault arise, your system or installation must be switched off immediately so as not to put staff at risk and to prevent damage to property. Once your installation has been switched off, you should address the following questions:

- Where is the fault?
- What can be done about it?
- When can the installation be reconnected to the mains?

The MC circuit breaker provides all the answers. It not only interrupts the current supply in a fraction of a second, but also directly documents what phases are affected at the location of the fault, what chain of events brought about the fault, what settings have been changed and much more besides.

TIPS & TRICKS

Trip

Intelligent MC circuit breakers record the cause of a trip in its internal memory. The memory stores detailed information about ten events which allows you to rapidly get to the root of the fault based on concrete information. The information is displayed clearly and concisely with the MC-XPCSOFT application. The file can be stored, printed out and emailed to enable subsequent analysis of the fault. The MC event log clears up inconsistencies and transmission errors over the entire lifecycle of the circuit breaker and low-voltage installation. Even replacement switches can be traced based on their internal serial number. MC-XPC-SOFT supports 9 languages for world-wide use.

MC protection settings

Thanks to the selectively MC, the interruption to power supply is limited to the areas actually affected by the fault. In this way, the impact of any fault is minimised along with any resultant costs without compromising on security. MC-XPC-SOFT is able to precisely show the active tripping characteristic and the planned selectivity using the pre-selected switch setting and tripping characteristic curve. This means you can choose the best-possible protection parameters in direct comparison with super- and subordinate breaking organs, even at implementation time. Any faults can be recognised immediately thanks to the visual comparison between the different protection settings. A comparison feature is also available for the representation of adjustments such as those which can be made at any time in low-voltage distribution boards. Even adjustment to a predefined motor characteristic is possible using a graphics-based optimisation of the protection features to the inrush-, starting- and operating current of the motor.

Documenting the current requirement

MC does not only supplies useful data in the event of a current interruption: In regular mode, the circuit breaker can also be used to generate load analyses. To do so, simply connect the MP to a PC - straight away MCXPC-SOFT will begin documenting the RMS values of all phases. MC can be used to document the development of the current requirement in detail. For example, you can record the precise load development for an entire working week. Afterwards, you can further process and compare this data using the log function in MS Excel® file format. In this way, you can get a good overview of instructive current developments. In this way you can improve the efficiency of your production processes and develop your power distribution system with regard to the future. This is sure to make the MC an indispensable part of your Resource Management.

DESCRIPTION	TYPE	ORDER NO.
Diagnostics and parameterization software	MC-XPC-KIT	upon request

DATA MANAGEMENT INTERFACE (DMI MODULE)



MC9260217

SCHRACK INFO

PC software for direct connection to all MC circuit breakers with electronic releases. Access to diagnostics and operational data, records current values, motor starterfunction, parameterisation and control of circuit breakers with elektronik release. A vast range of remote diagnosis capabilities and remote operation via Fieldbus in combination with a Fieldbus interface. Includes connecting cable between MC and DMI (length: 2 m) for MC2.E, MC3.E and MC4.E.

DESCRIPTION	TYPE	ORDER NO.
Data Management Interface	MC-XDMI612	MC9260217

PROFIBUS MODULE

SCHRACK INFO

- Fieldbus interface to PROFIBUS DPV1 slave
- Connected to the DMI module and has the same contour appearance.
- Addressable 1 to 126

Connection to the DMI module for transfer of the phase currents, parameter-, status- and diagnostics data as well as the position of the circuit-breaker (wiring of the auxiliary contact to the DMI inputs). DMI configuration via field bus. Actuation of the DMI motor starter function and the remote control (via DMI output wiring). Detection of digital inputs and actuation of the outputs via the fieldbus. Can be operated with class 1 and class 2 masters.

DESCRIPTION	TYPE	ORDER NO.
Profibus module	MC-XDMI-DPV1	MC9270333

CONTROL PANEL FOR DMI MODULE



EA212319

SCHRACK INFO

- For DMI module
- Rated input voltage: 50/60 Hz: 115/230 V AC
- Rated input voltage (residual ripple): 24 V DC ($\pm 3\%$)
- Rated output current: 1,25 A

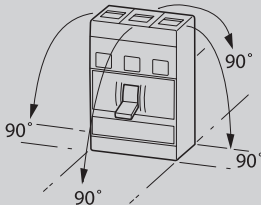
DESCRIPTION	TYPE	ORDER NO.
Power supply 100-240V AC/24V DC 1.25A	EASY400-POW	EA212319

GENERAL DATA, MECHANICAL DATA, WITHSTAND VOLTAGE

GENERAL DATA – MC1.

Standards and regulations	IEC/EN 60947, VDE 0660
Protection against accidental contact	Finger and back-of-hand proof to VDE 0106 Part 100
Climate resistance	Damp heat, constant to IEC 60068-2-78 Damp heat, cyclical to IEC 60068-2-30
Ambient temperature	
Storage	-25...+70°C
Operation	-25...+70°C
Shock resistance (IEC/EN 60068-2-27)	20 (half-sinusoidal shock 20 ms)
Safe isolation to EN 61140	
between auxiliary contacts and main circuits	500V AC
between auxiliary contacts	300V AC

MECHANICAL DATA – MC1.

Mounting position	vertical and 90° in all directions  with residual-current release MC1, N1: vertical and 90° in all directions
Direction of power supply	any
Degree of protection	
Device	in region of component parts: IP20 (basic degree of protection)
Housing	with insulating surround: IP40 with door coupling rotary handle: IP66
Connectors	Tunnel terminal: IP10 Phase isolator and strip terminal: IP00

WITHSTAND VOLTAGE, CIRCUIT BREAKER MC1.

	Max. rated uninterrupted current 160 A		
	MC1B	MC1N	MC1H
Rated impulse withstand voltage U_{imp}			
Main circuits	6000V	6000V	6000V
Auxiliary circuits	6000V	6000V	6000V
Rated operational voltage U_n	690V AC	690V AC	690V AC
Rated operational voltage Breaking via 3 conductors	500V DC ¹⁾	500V DC ¹⁾	
Surge protection/pollution degree	III/3	III/3	III/3
Rated insulation voltage U_i	690V	690V	690V
Range of application in IT networks	440V	690V	690V

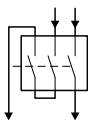
Notes ¹⁾ for rated operational voltage breaking via 3 conductors, the following applies: DC correction factor for instantaneous release response value:

MC1: 1.25, MC2: 1.35

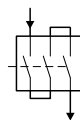
Setting for I, at DC = setting I, AC/correction factor DC

value applies to 3-pole protection devices with thermomagnetic release (H)1(2)-A...

Breaking one pole via two circuits in series



Breaking one pole via three circuits in series



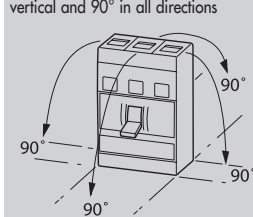
GENERAL DATA, MECHANICAL DATA, WITHSTAND VOLTAGE

GENERAL DATA – MC2., MC3., MC4.

Standards and regulations	IEC/EN 60947, VDE 0660
Protection against accidental contact	Finger and back-of-hand proof to VDE 0106 Part 100
Climate resistance	Damp heat, constant to IEC 60068-2-78 Damp heat, cyclical to IEC 60068-2-30
Ambient temperature	
Storage	-25...+70°C
Operation	-25...+70°C
Impact resistance (IEC/EN 60068-2-27)	20 (half-sinusoidal shock 20 ms)
Safe isolation to EN 61140	
between auxiliary contacts and main circuits	500V AC
between auxiliary contacts	300V AC

MECHANICAL DATA – MC2., MC3., MC4.

Mounting position	vertical and 90° in all directions	with plug-in adapter MC2, N2: vertical, 90° right/left with withdrawable unit MC3, N3: vertical, 90° left MC4, N4: vertical with remote operator: MC2, N2, 3, N3, 4, N4: vertical and 90° in all directions
Direction of power supply	any	
Degree of protection	in region of component parts: IP20 (basic degree of protection) with insulating surround: IP40 with door coupling rotary handle: IP66 Tunnel terminal: IP10 Phase isolator and strip terminal: IP00	
Device		
Housing		
Connectors		



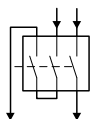
WITHSTAND VOLTAGE, CIRCUIT-BREAKER – MC2., MC3., MC4.

Max. rated uninterrupted current 250 A			Max. rated uninterrupted current 630 A		Max. rated uninterrupted current 2000 A	
MC2B	MC2N	MC2H	MC3N	MC3H	MC4N	MC4H
8000V	8000V	8000V	8000V	8000V	8000V	8000V
6000V	6000V	6000V	6000V	6000V	6000V	6000V
690V AC	690V AC	690V AC	690V AC	690V AC	690V AC	690V AC
-	750V DC ¹⁾	750V DC ¹⁾	-	-	-	-
III/3	III/3	III/3	III/3	III/3	III/3	III/3
1000V ²⁾	1000V	1000V	1000V	1000V	1000V	1000V
440V	690V	690V	690V	690V	525V	525V

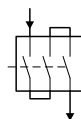
Notes

¹⁾ For rated operational voltage breaking via 3 conductors, the following applies: DC correction factor for instantaneous release response value:
MC1: 1.25, MC2: 1.35
Setting for I_n at DC = setting I_n AC/correction factor DC
Value applies to 3-pole protection devices with thermomagnetic release (H)1(2)-A...

Breaking one pole via two circuits in series



Breaking one pole via three circuits in series



²⁾ For 3 pole protection devices, the following applies: 690 V

■ BREAKING CAPACITY, SERVICE LIFE

■ BREAKING CAPACITY – MC1., MC2., MC3., MC4.

		Max. rated uninterrupted current 160 A			
		MC1B	MC1N	MC1H	
Rated short-circuit breaking capacity values I_{cn}					
240 V		63 kA	187 kA	220 kA	
400/415 V		53 kA	105 kA	220 kA	
440 V		53 kA	74 kA	74 kA	
525 V		–	40 kA	40 kA	
690 V		–	17 kA	17 kA	
Rated short-circuit breaking capacity value I_{cn}/I_{cs}					
I_{cn} meets IEC/EN 60947		240 V, 50/60Hz	30 kA	85 kA	100 kA
Breaking sequence O-t-CO		400/415 V 50/60 Hz	25 kA	50 kA	100 kA
		440 V, 50/60Hz	25 kA	35 kA	35 kA
		525 V, 50/60Hz	–	20 kA	20 kA
		690 V, 50/60Hz	–	10 kA	10 kA
		500 V DC	–	15 kA	30 kA
		750 V DC			
I_{cs} meets IEC/EN 60947		240 V, 50/60Hz	30 kA	85 kA	100 kA
Breaking sequence O-t-CO-t-CO		400/415 V 50/60 Hz	25 kA	50 kA	50 kA
		440 V, 50/60Hz	18.5 kA	35 kA	35 kA
		525 V, 50/60Hz	–	10 kA	10 kA
		690 V, 50/60Hz	–	7.5 kA	7.5 kA
Maximum HBC fuse ⁹⁾			MC1-...20...100: 200A gG/gL MC1-...125, 160: 315A gG/gL		
Utilization category to IEC/EN 60947-2		A	A	A	
Rated short-time withstand current I_{sw}					
$t = 0.3$ s		–	–	–	
$t = 1$ s		–	–	–	
Rated making and breaking capacity I_m					
Rated operating current		AC-1 400/415 V 50/60 Hz	160 A	160 A	160 A
		690 V, 50/60Hz	160 A	160 A	160 A
		AC-3 400/415 V 50/60 Hz	160 A	160 A	160 A
		690 V, 50/60Hz	160 A	160 A	160 A
		DC-1 500 V DC with thermal release	–	125 A	125 A
		750 V DC with thermal release	–	–	–
		DC-3 500 V DC with thermal release	–	125 A	125 A
		750 V DC with thermal release	–	–	–

■ SERVICE LIFE – MC1., MC2., MC3., MC4.

Service life, mechanical (operations)		20000	20000	20000
Maximum operating cycles		120 S/h	120 S/h	120 S/h
Service life, electrical				
AC-1 400/415 V 50/60 Hz		10000 ⁸⁾	10000	10000
690 V, 50/60Hz		–	7500	7500
AC-3 400/415 V 50/60 Hz		7500 ⁴⁾	7500	7500
690 V, 50/60Hz		–	5000	5000
DC-1 500 V DC with thermal release		–	10000	10000
750 V DC with thermal release		–	–	–
DC-3 500 V DC with thermal release		–	5000	5000
750 V DC with thermal release		–	–	–
Current heat loss per pole at I_m⁴⁾		16.7W	16.7W	16.7W
Total disconnecting time at short-circuit		< 10ms	< 10ms	< 10ms

Notes

²⁾ For rated operating current AC-3 for MC4, the following applies: 400 V: max. 650 kW; 690 V: max. 600 kW

⁴⁾ For 3 pole protection devices, the AC3 data does not apply

⁶⁾ The current heat loss per pole ratings refer to the maximum current rating for the particular frame size.

⁸⁾ Maximum back-up fuse, if the expected short-circuit current at the installation location exceeds the breaking capacity of the circuit-breaker.

⁹⁾ ≤ 1600 A

¹⁰⁾ Higher breaking capacity available upon request

Max. rated uninterrupted current 300 A			Max. rated uninterrupted current 630 A		Max. rated uninterrupted current 2000 A	
MC2B	MC2N	MC2H	MC3N	MC3H	MC4N	MC4H
63 kA	187 kA	330 kA	187 kA	330 kA	105 kA	275 kA
53 kA	105 kA	330 kA	105 kA	330 kA	105 kA	187 kA
53 kA	74 kA	286 kA	74 kA	286 kA	74 kA	187 kA
-	53 kA	105 kA	53 kA	143 kA	53 kA	143 kA
-	40 kA	40 kA	40 kA	74 kA	40 kA	105 kA
30 kA	85 kA	150 kA	85 kA	150 kA	50 kA	125 kA
25 kA	50 kA	150 kA	50 kA	150 kA	50 kA	85 kA
25 kA	35 kA	130 kA	35 kA	130 kA	35 kA	85 kA ¹⁰⁾
-	25 kA	50 kA	25 kA	65 kA	25 kA	65 kA
-	20 kA	20 kA	20 kA	35 kA	20 kA	50 kA
-	30 kA	60 kA	-	-	-	-
-	30 kA	60 kA	-	-	-	-
30 kA	85 kA	150 kA	85 kA	150 kA	37 kA	63 kA
25 kA	50 kA	150 kA	50 kA	150 kA	37 kA	43 kA
18.5 kA	35 kA	130 kA	35 kA	130 kA	26 kA	43 kA
-	25 kA	37.5 kA	13 kA	33 kA	19 kA	49 kA
-	5 kA	5 kA	5 kA	9 kA	15 kA	37 kA
355A gG/gL	355A gG/gL	355A gG/gL	MC3N-...250, 400: 400A gG/gL MC3N-...630: 630A gG/gL		MC4N-...630...1250: 2 x 630A gG/gL MC4N-...1600: 2 x 800A gG/gL MC4N-2000: 2 x 1000A gG/gL	
A	A	A	A	A	B (at 2000A: A)	B (at 2000A: A)
-	1.9 kA	1.9 kA	3.3 kA	3.3 kA	19.2 kA	19.2 kA
-	1.9 kA	1.9 kA	3.3 kA	3.3 kA	19.2 kA	19.2 kA
250 A	250 A	250 A	630 A	630 A	2000 A	2000 A
250 A	250 A	250 A	630 A	630 A	2000 A	2000 A
250 A	250 A	250 A	630 A	630 A	1600 A ²⁾	1600 A ²⁾
250 A	250 A	250 A	630 A	630 A	1600 A ²⁾	1600 A ²⁾
-	250 A	250 A	500 A	500 A	-	-
-	250 A	250 A	500 A	500 A	-	-
-	250 A	250 A	500 A	500 A	-	-
-	250 A	250 A	500 A	500 A	-	-
2000	2000	2000	1500	1500	1000	1000
120	120	120	60	60	60	60
10000 ⁹⁾	10000	10000	5000	5000	3000 ¹⁰⁾	3000 ¹⁰⁾
-	7500	7500	3000	3000	2000 ¹⁰⁾	2000 ¹⁰⁾
6500 ⁹⁾	6500	6500	2000	2000	2000 ¹⁰⁾	2000 ¹⁰⁾
-	5000	5000	2000	2000	1000 ¹⁰⁾	1000 ¹⁰⁾
-	7500	7500	5000	-	-	-
-	7500	7500	5000	-	-	-
-	3000	3000	2000	-	-	-
-	3000	3000	2000	-	-	-
19W	19W	19W	40W	40W	97W (2000 A)	97W (2000 A)
< 10ms	< 10ms	< 10ms	< 10ms	< 10ms	< 25ms ≤ 415 V; < 35ms > 415 V	< 25ms ≤ 415 V; < 35ms > 415 V

WEIGHTS

WEIGHTS – MC1., MC2., MC3., MC4.

Type	Weight
Circuit breaker	
MC1-	1.046 kg
MC1-4-	1.325 kg
MC2-	2.345 kg
MC2-4-	3.5 kg
MC3-	6.0 kg
MC3-4-	7.5 kg
MC4-	21 kg
MC4-4- / MC4-VE2000	27 kg
Plug-in adapter	
+MC2-XSV	4.7 kg
+MC2-4-XSV	5.9 kg
Withdrawable unit	
+MC3-XAV	21 kg
+MC3-4-XAV	27 kg
+MC4-XAV	52 kg
+MC4-4-XAV	65 kg
Switch disconnecter	
MC1-PN, MC1-N	0.926 kg
MC1-4-PN, MC1-4-N	1.325 kg
MC2-PN, MC2-N	2.15 kg
MC2-4-PN, MC2-4-N	2.65 kg
MC3-PN, MC3-N	5.7 kg
MC3-4-PN, MC3-4-N	7.1 kg
MC4-N	17 kg
MC4-4-N	22 kg

GENERAL DATA, CIRCUIT BREAKER / SWITCH DISCONNECTOR FOR 1000V AC, 3-POLE

GENERAL DATA – MC2., MC3., MC4., MC.-N

	MC2H, MC2-N max. 250 A	MC3H, MC3-N max. 630 A	MC4H, MC4-N max. 1600 A
Utilization category	A	A	A/B
Maximum operating cycles	120 S/h	60 S/h	60 S/h
Service life (operations)			
mechanical (of which max. 50 % trip by undervoltage/operating current release)	20000	15000	10000
electrical, AC-1 1000 V	3000	1000	500
Rated operational voltage U _e	1000V AC	1000V AC	1000V AC

CIRCUIT-BREAKERS – MC2., MC3., MC4., MC.-N

	250 A	630 A	1600 A
Rated uninterrupted current I _n	250 A	630 A	1600 A
Rated short-circuit breaking capacity values I _{cm}			
1000 V, 50/60Hz	17 kA	17 kA	40 kA
rated short-circuit breaking capacity value I _{cs}			
I _{cs} to IEC/EN 60947 Breaking sequence O-t-CO	3 kA	10 kA	20 kA
I _{cs} to IEC/EN 60947 Breaking sequence O-t-CO-t-CO	3 kA	10 kA	15 kA
Rated making and breaking capacity			
Rated operating current			
AC-1	250A	630A	1600A
Rated insulation voltage U _i	1000V	1000V	1000V
For use in IT networks	–	–	–

SWITCH DISCONNECTORS – MC2., MC3., MC4., MC.-N

	250 A	–	1600 A
Rated uninterrupted current I _n	250 A	–	1600 A
Rated short-time withstand current I _{sw}	3.5 kA	–	25 kA
Rated making and breaking capacity			
Rated operational voltage U _e			
AC-22/23A	250A	–	1600A
Rated insulation voltage U _i	1000V	–	1000V
For use in IT networks	–	–	–
Rated conditional short-circuit current			
with back-up fuse	MC2N-160-250A gG/gL	–	–
1000 V	10 kA	–	–
with downstream fuse	MC2N-160-250A gG/gL	–	–
1000 V	10 kA	–	–

SWITCH DISCONNECTOR, TECHNICAL DATA, BREAKING CAPACITY

CIRCUIT-BREAKERS – MC1., ;C2., MC3., MC4., MC.-N

	MC1-PN, MC1-N max. 160 A	MC2-PN, MC2-N max. 250 A	MC3-PN, MC3-N max. 630 A	MC4-N max. 1600 A
Rated impulse withstand voltage U_{imp}				
Main circuits	6000V	8000V	8000V	8000V
Auxiliary circuits	6000V	6000V	6000V	6000V
Rated operational voltage U_o	690V AC	690V AC	690V AC	690V AC
Rated uninterrupted current, max. I_n				
IEC/EN 60947-3	160 A	250 A	630 A	1600 A

TECHNICAL DATA – MC1., MC2., MC3., MC4., MC.-N

Technical data (I_n), differs from products destined for IEC market UL489, CSA 22.2 No. 5.1	125 A	160 A	550 A	1200 A
Surge protection/pollution degree	III/3	III/3	III/3	III/3
Rated insulation voltage U_i	690V AC	690V AC	1000V AC	1000V AC
For use in IT networks	690V	690V	690V	525V

BREAKING CAPACITY – MC1., MC2., MC3., MC4., MC.-N

Rated short-circuit-breaking capacity values I_{br}	2.8 kA	5.5 kA	25 kA	53 kA
Rated short-time withstand current I_{sw}				
$t = 0.3$ s	2 kA	3.5 kA ¹⁾	12 kA	25 kA
$t = 1$ s	2 kA	3.5 kA ¹⁾	12 kA	25 kA
Rated short-circuit current				
with back-up fuse	PN1(N1)-63...125A gG/gL PN1(N1)-160A gG/gL	PN2(N2)-160...250A gG/gL analogue	PN3(N3)-400...630A gG/gL analogue	N4-630...1600A gG/gL analogue
400/415 V	100 kA	100 kA	100 kA	100 kA
690 V	80 kA	80 kA	80 kA	80 kA
with downstream fuse	PN1(N1)-63...125A gG/gL PN1(N1)-160A gG/gL	PN2(N2)-160...250A gG/gL analogue	PN3(N3)-400...630A gG/gL analogue	N4-630...1600A gG/gL analogue
400/415 V	100 kA	100 kA	100 kA	100 kA
690 V	80 kA	80 kA	80 kA	80 kA
Rated making and -breaking capacity I_m				
Rated operating current AC-22/23A				
415 V	160 A	250 A	630 A	1600 A
690 V	160 A	250 A	630 A	1600 A
Service life, mechanical (operations)	20000	20000	15000	10000
Maximum operating cycles	120 S/h	120 S/h	60 S/h	60 S/h
Service life, electrical (operations) meets IEC/EN 60947-4-1 Section B				
AC-1				
400/415 V	10000	10000 ⁴⁾	5000	3000
690 V	7500	7500 ⁴⁾	3000	2000
AC-3				
400/415 V	7500	7500 ⁵⁾	3000	2000
690 V	5000	5000 ⁵⁾	2000	1000
Current heat loss per pole at I_n²⁾	12.7 W	16 W	40 W	97 W

Notes

¹⁾ The rated short-time withstand current with MC2-PN/MC2-N in connection with Residual-current release MC2-4-XFI... $I_{sw} = 1.5$ kA

²⁾ The current heat loss per pole ratings refer to the maximum current rating for the particular frame size.

³⁾ The following data applies to the service life, electrical AC-3 PN2/N2: 690 V: max. 160 kW

⁴⁾ For 3 pole switch disconnectors, the following applies: 400/415 V 7500 operations; 690 V 5000 operations

⁵⁾ For 3 pole switch disconnectors, the following applies: 400/415 V 6000 operations; 690 V 4000 operations

TEMPERATURE INFLUENCES - THERMOMAGNETIC RELEASE

RESPONSE TIMES FOR THE OVERLOAD RELEASE AT TEMPERATURES DIVERGING FROM THE REFERENCE TEMPERATURE (40°C)

Device type	Response times for the overload release at temperatures diverging from the reference temperature						
	Temperature compensation coefficient						
	20 °C	30 °C	40 °C	50 °C	60 °C	65 °C	70 °C
Thermomagnetic release (TM)	System protection (reference temperature 40 °C)						
System protection	System protection (reference temperature 40 °C)						
MC1(-4)-A15...80	1.14	1.07	1	0.93	0.86	0.83	0.79
MC1(-4)-A90...125	1.14	1.07	1	0.93	0.86	0.83	0.79
MC1(-4)-A160	1.08	1.04	1	0.96	0.92	0.90	0.88
MC2(-4)-A15...200	1.04	1.02	1	0.98	0.96	0.95	0.94
MC2(-4)-A250	1.04	1.02	1	0.98	0.96	0.95	0.94
MC2(-4)-A20...200 with plug-in technology	1.04	1.02	1	0.98	0.96	0.95	0.94
MC2(-4)-A250 with plug-in technology	1.04	1.02	1	0.98	0.96	0.95	0.94
MC3(-4)-A250...500	1.12	1.06	1	0.94	0.88	0.85	0.85
MC3(-4)-A250...500 with withdrawable units	1.06	1	0.94	0.88	0.82	0.79	0.79
Short-circuit-/motor contactor	Motor contactor (reference temperature 20 °C)						
MC1-M40...80	1	0.98	0.95	0.93	0.90	0.89	0.88
MC1-M100	1	0.98	0.95	0.93	0.90	0.89	0.88
MC2-M20...200	1	0.98	0.96	0.94	0.92	0.91	0.90
MC2-M20...200 with plug-in technology	1	0.98	0.96	0.94	0.92	0.91	0.90

Note A slight change to the overload protection properties occurs at temperatures which diverge from the reference temperature.. Therefore, in order to calculate the tripping time using the tripping characteristics curve, the temperature compensation coefficients set out in the table must also be taken into account.
 Example: An MC1-A100 has been calibrated for a reference temperature of 40 °C.
 What happens when it is operated at an ambient temperature of 60 °C?
 At 60 °C, a reduced operating current of $I_L = 100 \text{ A} \times 0,86 = 86 \text{ A}$ must be taken account above the temperature coefficients.
 In other words, at an ambient temperature of 60°C, the MC1-A100 would trip as if it were set to 86 A.

REDUCING RATED OPERATIONAL VOLTAGE (DERATING) UNDER SPECIAL AMBIENT CONDITIONS (TO IEC 947)

Device type	Reducing the rated operational voltage (derating) under certain ambient conditions (to IEC 947)						
	Derating coefficient						
	20 °C	30 °C	40 °C	50 °C	60 °C	65 °C	70 °C
Thermomagnetic release (TM)	System protection (reference temperature 40 °C)						
System protection	System protection (reference temperature 40 °C)						
MC1(-4)-A15...80	1	1	1	1	1	1	1
MC1(-4)-A90...125	1	1	1	1	0.86	0.83	0.8
MC1(-4)-A160	1	1	1	0.95	0.9	0.85	0.8
MC2(-4)-A15...200	1	1	1	1	1	1	1
MC2(-4)-A250	1	1	1	1	0.9	0.85	0.8
MC2(-4)-A20...200 with plug-in technology	1	1	1	1	1	1	1
MC2(-4)-A250 with plug-in technology	1	0.97	0.92	0.87	0.81	-	-
MC3(-4)-A250...500	1	1	1	0.94	0.88	0.85	0.85
MC3(-4)-A250...500 with withdrawable units	1	1	0.94	0.88	0.82	0.79	0.79
Short-circuit-/motor contactor	Motor contactor (reference temperature 20 °C)						
MC1-M40...80	1	1	1	1	1	1	1
MC1-M100	1	1	1	1	0.86	0.83	0.8
MC2-M20...200	1	1	1	1	1	1	1
MC2-M20...200 with plug-in technology	1	1	1	1	1	1	1

Note To calculate the maximum permissible current load at different ambient operating temperatures, the derating coefficients must be taken into account as set out in the table.
 Example: An MC2-A250 is to be used under an ambient operating temperature of 65 °C..
 How much is the permissible Rated operational voltage I_L ?
 At 65 °C, the derating coefficient is 0,85, in other words $I_L = 250 \text{ A} \times 0,85 = 212,5 \text{ A}$.
 In other words, the MC2-A250 may be operated at a maximum $I_L = 212,5 \text{ A}$ under an ambient temperature of 65°C.

TEMPERATURE INFLUENCES - ELECTRONIC RELEASE

REDUCING RATED OPERATIONAL VOLTAGE (DERATING) UNDER SPECIAL AMBIENT CONDITIONS (TO IEC 947) - CONTINUED

Device type	Reducing the rated operational voltage (derating) under special ambient conditions (to IEC 947)						
	Derating coefficient						
	20 °C	30 °C	40 °C	50 °C	60 °C	65 °C	70 °C
Electronic release (E)							
System protection							
MC3(-4)-AE250...500	1	1	1	1	1	1	1
MC3(-4)-AE550...630	1	1	1	1	0.9	0.85	0.8
MC3(-4)-AE250...400 with withdrawable units	1	1	1	1	1	1	1
MC3(-4)-AE630 with withdrawable units	0.96	0.92	0.87	0.83	0.78	0.75	0.73
MC4(-4)-AE600...1250	1	1	1	1	1	1	1
MC4(-4)-AE1600	1	1	1	1	0.87	0.85	0.82
MC4(-4)-AE630...1250 with withdrawable units	1	1	1	1	1	1	1
MC4(-4)-AE1600 with withdrawable units	1	0.98	0.93	0.89	0.85	0.83	0.8
Selective and generator protection							
MC2(-4)-VE100...175	1	1	1	1	1	1	1
MC2(-4)-VE200...250	1	1	1	1	0.9	0.85	0.8
MC2(-4)-VE100...160 with plug-in technology	1	1	1	1	1	1	1
MC2(-4)-VE250 with plug-in technology	1	1	1	0.94	0.88	0.84	0.81
MC3(-4)-VE250...500	1	1	1	1	1	1	1
MC3(-4)-VE550...630	1	1	1	1	0.9	0.85	0.8
MC3(-4)-VE250...400 with withdrawable units	1	1	1	1	1	1	1
MC3(-4)-VE630 with plug-in technology	0.96	0.92	0.87	0.83	0.78	0.75	0.73
MC4(-4)-VE600...1250	1	1	1	1	1	1	1
MC4(-4)-VE1600	1	1	1	1	0.87	0.85	0.82
MC4(-4)-AE630...1250 with withdrawable units	1	1	1	1	1	1	1
MC4(-4)-VE1600 with withdrawable units	1	0.98	0.93	0.89	0.85	0.83	0.8
Motor contactor							
MC2-ME(SE)90...140	1	1	1	1	1	1	1
MC2-ME(SE)220	1	1	1	1	0.9	0.85	0.8
MC2-ME90...140 with plug-in technology	1	1	1	1	1	1	1
MC2-ME220 with plug-in technology	1	1	1	0.94	0.88	0.84	0.81
MC3-ME(SE)220...350	1	1	1	1	1	1	1
MC3-ME(SE)450	1	1	1	1	1	1	1
MC3-ME220...350 with withdrawable units	1	1	1	1	1	1	1
MC3-ME450 with withdrawable units	0.96	0.92	0.87	0.83	0.78	0.75	0.73
MC4-ME550...875	1	1	1	1	1	1	1
MC4-ME1400	1	1	1	1	1	1	1
MC4-ME550...875 with withdrawable units	1	1	1	1	1	1	1
MC4-ME1400 with withdrawable units	1	0.98	0.93	0.89	0.85	0.83	0.8
Switch disconnecter							
MC1(-4)-N-63, MC1(-4)-PN-63	1	1	1	1	1	1	1
MC1(-4)-N-100...125, MC1(-4)-PN-100...125	1	1	1	1	0.86	0.83	0.8
MC1(-4)-N-160, MC1(-4)-PN-160	1	1	1	0.95	0.9	0.85	0.8
MC2(-4)-N-160...200, MC2(-4)-PN-160...200	1	1	1	1	1	1	1
MC2(-4)-N-250, MC2(-4)-PN-200	1	1	1	1	0.9	0.85	0.8
MC2(-4)-N-160...200 with plug-in technology	1	1	1	1	1	1	1
MC2(-4)-N-250	1	0.97	0.92	0.87	0.81	-	-
MC3(-4)-N-400, MC3(-4)-PN-400	1	1	1	1	1	1	1
MC3(-4)-N-630, MC3(-4)-PN-630	1	1	1	1	0.9	0.85	0.8
MC3(-4)-N-400 with withdrawable units	1	1	1	1	1	1	1
MC3(-4)-N-630 with withdrawable units	0.96	0.92	0.87	0.83	0.78	0.75	0.73
MC4(-4)-N-630...1250	1	1	1	1	1	1	1
MC4(-4)-N-1600	1	1	1	1	0.87	0.85	0.82
MC4(-4)-N-630...1250 with withdrawable units	1	1	1	1	1	1	1
MC4(-4)-N-1600 with withdrawable units	1	0.98	0.93	0.89	0.85	0.83	0.8

Notes

To calculate the maximum permissible current load at different ambient operating temperatures, the derating coefficients must be taken into account as set out in the table.

Example: An MC2-ME220 is to be used under an ambient operating temperature of 70 °C.

How much is the permissible rated operational voltage I_n ?

At 70 °C, the derating coefficient is 0,8, in other words $I_n = 250 \text{ A} \times 0,8 = 176 \text{ A}$.

In other words, the MC2-ME220 may be operated at a maximum $I_n = 176 \text{ A}$ under an ambient temperature of 70 °C.

EFFECTIVE POWER LOSS

MC UP TO 250A WITH THERMOMAGNETIC RELEASE (3-/4 POLE) MC1., MC2., MC3.

I _n [A]	Circuit breaker MC1-				Switch disconnecter MC1-N, MC1-PN		Circuit breaker MC2-		Switch disconnecter MC2-N, MC2-PN		Circuit breaker MC3-	
	System protection		Motor contactor		P	R	System protection		Motor contactor		System protection	
	P	R	P	R			P	R	P	R	P	R
[W]	[μOhm]	[W]	[μOhm]	[W]	[μOhm]	[W]	[μOhm]	[W]	[μOhm]	[W]	[μOhm]	
20	9.8	8180	-	-	-	-	5.1	4250	-	-	-	-
25	8.8	4680	-	-	-	-	8	4250	-	-	-	-
26	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-
32	9.1	3030	-	-	-	-	10	3140	-	-	-	-
33	-	-	-	-	-	-	-	-	-	-	-	-
35	-	-	-	-	-	-	-	-	-	-	-	-
40	11	2220	13.5	2810	-	-	13	2800	-	-	-	-
45	-	-	-	-	-	-	-	-	-	-	-	-
50	13.5	1760	15	1880	-	-	18	2270	-	-	-	-
60	-	-	-	-	-	-	-	-	-	-	-	-
63	14	1190	16.7	1250	6	380	20	1700	-	-	-	-
70	-	-	-	-	-	-	-	-	-	-	-	-
80	15.5	850	21.1	1085	-	-	22	1070	-	-	-	-
90	-	-	-	-	-	-	-	-	-	-	-	-
100	24	730	25	795	15	380	28	855	-	-	-	-
110	-	-	-	-	-	-	-	-	-	-	-	-
125	38	570	-	-	24	380	29	589	-	-	-	-
150	-	-	-	-	-	-	-	-	-	-	-	-
160	50	460	-	-	38	380	40	427	19.7	256	-	-
175	-	-	-	-	-	-	-	-	-	-	-	-
200	-	-	-	-	-	-	48	332	30.7	256	-	-
225	-	-	-	-	-	-	-	-	-	-	-	-
250	-	-	-	-	-	-	57	310	48	256	-	-
300	-	-	-	-	-	-	-	-	68	364	-	-
320	-	-	-	-	-	-	-	-	79	256	-	-
400	-	-	-	-	-	-	-	-	72	151	-	-
500	-	-	-	-	-	-	-	-	93	124	-	-

Note: The ratings in the table apply for permanently installed 3 and 4 pole devices which are loaded uniformly.
 On 4 pole devices the current in the N conductor is equal to zero.
 The entire resistive load is for the measured three-pole or four-pole value.
 The total power leakage is the measured value for I_n at 50/60Hz for a 3 pole or 4 pole switch.
 The power leakage can be calculated using the formula: $P = 3 \times R \times I^2$

MC UP TO 1600A WITH ELECTRONIC RELEASE (3-/4 POLE) MC2., MC3., MC4.

Circuit breaker MC2-	Switch disconnecter MC2-N, MC2-PN	Add-on Plug-in unit	Circuit breaker MC3-	Switch disconnecter MC3-N, MC3-PN	Add-on Withdrawable units	Circuit breaker MC4-	Switch disconnecter MC4-N	Add-on Withdrawable units
R	R	R	R	R	R	R	R	R
[μOhm]	[μOhm]	[μOhm]	[μOhm]	[μOhm]	[μOhm]	[μOhm]	[μOhm]	[μOhm]
275	256	100	100	90	70	37	37	10

Note: The ratings in the table apply for 3 and 4 pole devices which are loaded uniformly.
 On 4 pole devices the current in the N conductor is equal to zero.
 The total resistive load is the measured value for a 3 pole or 4 pole switch (independent of I_n and the type of release).
 The total resistive load for a switch in plug-in or withdrawable design is the result of:
 the resistive value for permanent installation + the resistive value for plug-in or withdrawable design.
 The power leakage can be calculated using the formula: $P = 3 \times R \times I^2$

TERMINAL CAPACITIES

TERMINAL CAPACITIES – MC1., MC2., MC3., MC4.

			MC1-PN1, MC1-N, 160 A	I _n ¹⁾	MC2-PN1, MC2-N, 250 A	I _n ¹⁾	MC3-PN1, MC3-N, 630 A	I _n ¹⁾
Standard equipment			Box terminal	–	Screw terminal	–	Screw terminal	–
Accessories			Screw connection		Box terminal		Box terminal	
			Tunnel terminals		Tunnel terminals		Tunnel terminals	
			Rear-side connection		Rear-side connection		Rear-side connection	
Cu conductors, Cu cable								
Box terminal	solid		1 x (10 – 16) mm ² 2 x (6 – 16) mm ²	160 A	1 x (4 – 16) mm ² 2 x (4 – 16) mm ²	250 A	2 x 16 mm ²	500 A
	stranded		1 x (25 – 70) ³⁾ mm ² 2 x 25 mm ²		1 x (25 – 185) mm ² 2 x (25 – 70) mm ²		1 x (35 – 240) mm ² 2 x (25 – 120) mm ²	
Tunnel terminal	solid		1 x 16 mm ²	160 A	1 x 16 mm ²	250 A	–	–
	stranded	1-hole	1 x (25 – 95) mm ²	–	1 x (25 – 185) mm ²	–	1 x (25 – 185) mm ²	350 A
		2-hole	–	–	–	–	1 x (50 – 240) mm ²	630 A
		4-hole	–	–	–	–	2 x (50 – 240) mm ²	2x185 A
Screw connection and rear connection								
directly on switch	solid		1 x (10 – 16) mm ² 2 x (6 – 16) mm ²	160 A	1 x (4 – 16) mm ² 2 x (4 – 16) mm ²	250 A	1 x 16 mm ² 2 x 16 mm ²	630 A 2x185 A
	stranded		1 x (25 – 70) ³⁾ mm ² 2 x 25 mm ²		1 x (25 – 185) mm ² 2 x (25 – 70) mm ²		1 x (25 – 240) mm ² 2 x (25 – 240) mm ²	
Module plate	1-hole	min.	–	–	–	–	–	
		max.	–	–	–	–	–	
Module plate	2-hole	min.	–	–	–	–	–	
		max.	–	–	–	–	–	
Connection width extension							2 x 300 mm ²	630 2x185 A
Cu conductors, Cu cable								
Tunnel terminal	solid		1 x 16 mm ²	160 A	1 x 16 mm ²	250 A	1 x 16 mm ²	350 A
	stranded	1-hole	1 x (25 – 95) mm ²	–	1 x (25 – 185) mm ²	–	1 x (25 – 185) ³⁾ mm ²	630 A
		2-hole	–	–	–	–	1 x (50 – 240) mm ²	630 A
	4-hole	–	–	–	–	2 x (50 – 240) mm ²	–	
Screw connection and rear connection								
directly on switch	solid		1 x (10 – 16) mm ² 2 x (10 – 16) mm ²	160 A	1 x (10 – 16) mm ² 2 x (10 – 16) mm ²	250 A	1 x 16 mm ² 2 x (10 – 16) mm ²	400 A
	stranded		1 x (25 – 35) mm ² 2 x (25 – 35) mm ²		1 x (25 – 50) mm ² 2 x (25 – 50) mm ²		1 x (25 – 120) mm ² 2 x (25 – 120) mm ²	
Module plate	1-hole	min.	–	–	–	–	–	
	1-hole	max.	–	–	–	–	–	
Module plate	2-hole		–	–	–	–	–	
Connection width extension								
Cu strip (number of segments x width x segment thickness)								
Box terminal		min.	2 x 9 x 0.8 mm	160 A	2 x 9 x 0.8 mm	250 A	6 x 16 x 0.8 mm	630 A
		max.	9 x 9 x 0.8 mm		10 x 16 x 0.8 mm		10 x 24 x 1.0 mm + 5 x 24 x 1.0 mm (2 x) 8 x 24 x 1.0 mm	
Flat conductor terminal, basic								
		min.	–	–	–	–	–	
		max.	–	–	–	–	–	
Module plate	1-hole		–	–	–	–	–	
Screw connection and rear connection								
Cu strip, with holes		min.	–	–	2 x 16 x 0.8 mm	250 A	6 x 16 x 0.8 mm	630 A
		max.	–	–	10 x 16 x 0.8 mm		10 x 32 x 1.0 mm + 5 x 32 x 1.0 mm (2x) 10 x 50 x 1.0 mm ²	
Connection width extension								
Cu rail (width x thickness)								
Screw connection and rear connection								
Screw connection								
directly on the switch		min.	M6 12 x 5 mm	160 A	M8 16 x 5 mm	250 A	M10 20 x 5 mm	630 A
		max.	16 x 5 mm		20 x 5 mm		30 x 10 mm +30 x 5 mm	
Module plate	1-hole	min.	–	–	–	–	–	
		max.	–	–	–	–	–	
Module plate	2-hole		–	–	–	–	–	
Connection width extension							630 A 10x40A	

Notes

¹⁾ The rated currents I_n have been calculated in accordance with IEC/EN 60947 (protection devices standard) and generally relate to the max. specified cross-sections and are used here for the purposes of orientation. The design standards which apply in each case must be observed.

²⁾ Depending on the cable manufacturer up to 240 mm² can be connected

³⁾ Depending on the cable manufacturer up to 95 mm² can be connected.

MC4, MC4N, 1600 A	I _n ¹⁾
Screw terminal	–
Tunnel terminals	
Rear-side connection	
Strip terminal	
–	–
–	–
–	–
–	–
–	–
4 x (50 – 240) mm ²	1400 A
–	–
1 x (120 – 185) mm ² 4 x (50 – 185) mm ²	1250 A
1 x (120 – 300) mm ²	1000 A
2 x (95 – 300) mm ²	
2 x (95 – 185) mm ²	1400 A
4 x (35 – 185) mm ²	
4 x 300 mm ²	1600 A
6 x (95 – 240) mm ²	4 x 240 A
–	–
–	–
–	–
4 x (50 – 240) mm ²	1400 A
–	–
–	–
1 x (185 – 240) mm ²	upon request
2 x (70 – 185) mm ²	upon request
4 x 50 mm ²	–
2 x 240 mm ²	upon request
6 x (70 – 240) mm ²	
–	–
–	–
6 x 16 x 0.8 mm	1100 A
(2x) 10 x 32 x 1.0 mm	
(2x) 10 x 50 x 1.0 mm	1250 A (2 x) 10 x 40 x 1.0 A
(2x) 10 x 50 x 1.0 mm	1600 A
(2x) 10 x 50 x 1.0 mm	
(2x) 10 x 80 x 1.0 mm ²	1600 A 2 x (10 x 50 x 1.0) A
–	–
M10	–
25 x 5 mm	1600 A
2 x (50 x 10) mm	2000 A
2 x (80x 10) mm	
25 x 5 mm	1250 A
2 x (50 x 10) mm	2 x (40 x 10) A
2 x (50 x 10) mm	1500 A
60 x 10 mm	1600 A
2 x (80 x 10) mm	2 x (50 x 10) A

AUXILIARY CONTACTS, CONTACT SEQUENCE

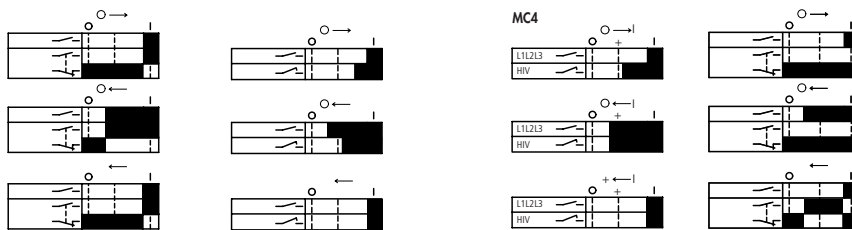
AUXILIARY CONTACTS M22-K..., XHIV

	Type M22-K... at AC = 50/60 Hz	Type MC-XHIV at AC = 50/60 Hz
Rated operational voltage U_e:		
AC	500V AC	500V AC
DC	220V DC	220V DC
Conventional thermal current $I_{th} = I_e$	4 A	4 A
Rated operational voltage I_e		
AC-15 115 V	4 A	4 A
230 V	4 A	4 A
400 V	2 A	2 A
500 V	1 A	1 A
DC-13 24 V	3 A	3 A
42 V	1.7 A	1.5 A
60 V	1.2 A	0.8 A
110 V	0.8 A	0.5 A
220 V	0.3 A	0.2 A
Short-circuit protection		
Max. safety fuse	10 A gG/gL	10 A gG/gL
Max. miniature circuit breaker	BE5-10	BM... (6A)
Early-make time compared to the main contacts during switch on and off (breaking times with manual operation)	-	MC1: approx. 20 ms MC2: approx. 20 ms MC3: approx. 20 ms MC4: approx. 90 ms The HIV is not early closing on the MC4
Terminal capacities		
Solid or flexible conductor with end sleeve	1 x (0.75 - 2.5) mm ² 2 x (0.75 - 2.5) mm ²	1 x (0.75 - 2.5) mm ² 2 x (0.75 - 2.5) mm ²

CONTACT SEQUENCE OF AUXILIARY CONTACTS

Standard auxiliary contact (HIN) Early-make auxiliary contact (HIV)

Trip-indicating auxiliary contact (HIA)



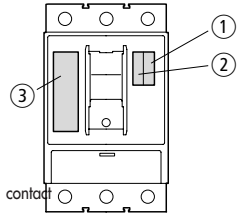
- 0 → I Switch on
- 0 ← I Switch off
- + ← I Trip
- Contacts closed
- Contacts open

Notes If early-make contacts are required in combination with shunt or undervoltage releases, please select the combination type from the section on "Releases".

COMPONENT INSTALLATION WITH AUXILIARY CONTACTS, TIME DIFFERENCES

MAXIMUM COMPONENT INSTALLATION AND POSITION OF INTERNAL ACCESSORIES

	①	②	③	Contacts per connection port HIA and HIN
	HIN	HIA	MC.-XHIV(2S) or -XA or -XU (early-make)	
	(normal)	(triggered)		
MC1, N(S)1	1	1	1	1 N/O
MC2, N(S)2	2	1	1	1 N/C
MC3, N(S)3	3	1	1	2 N/O
MC4, N(S)4	3	2	1	2 N/C
MC1-PN	1	-	1	1 N/O, 1 N/C
MC2-PN	2	-	1	
MC3-PN	3	-	1	



HIN = M22-K10 or M22-K01

HIA = M22-K10 or M22-K01

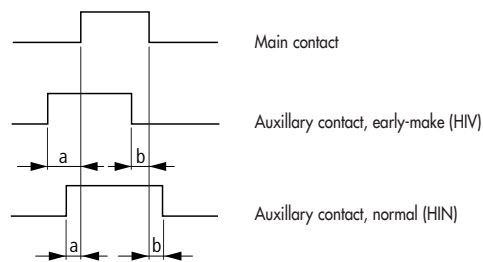
TIME DIFFERENCE MC1, MC2, MC3, MC4

	Time difference a (ms)						Time difference b (ms)					
	HIV	Manual operation		HIV	Motor operator		HIV	Manual operation		HIV	Motor operator	
		HIN	N/O		N/C	HIN		N/O	N/C		HIN	N/O	N/C
MC1	20 ²⁾	0	2.5	-	-	-	20 ²⁾	0	2.5	-	-	-
MC2	20 ²⁾	3.5	6.5	not permissible	2.5	4.5	20 ²⁾	3	4.5	not permissible	3	4
MC3	20 ²⁾	4	8	not permissible	2	4	20 ²⁾	3.5	8	not permissible	3	6.5
MC4	90 ²⁾	7	11	not permissible	upon request	upon request	0 ¹⁾²⁾	12	15	not permissible	upon request	upon request

Notes ¹⁾ With MC4/N(S)4, the HIV is not early-make.

²⁾ Minimum value, since it is dependent on the breaking speed

TIME DIFFERENCES ON-OFF



UNDervoltage Release / SHUNT TRIP Release

UNDervoltage Release, MC.-XU

	MC1(2/3)-XU...	MC4-XU...
Rated control voltage U_c		
AC at 50/60 Hz	24...600V AC	24...600V AC
DC	12...250V DC	12...250V DC
Operating range		
Drop-out voltage x U _c	0.35 – 0.7	0.35 – 0.7
Pull-in voltage x U _c	0.85 – 1.1	0.85 – 1.1
Power consumption		
AC		
Pull-in power AC	1.5 VA	3.6 VA
Standby power AC	1.5 VA	3.6 VA
DC		
Pull-in power DC	0.8 W	2.5 W
Standby power DC	0.8 W	2.5 W
Max. opening delay (response time until the main circuits open)	19 ms	23 ms
Minimum command time	10 – 15 ms	10 – 15 ms
Terminal capacities		
Solid or flexible conductor with end sleeve	1 x (0.75 – 2.5) mm ² 2 x (0.75 – 2.5) mm ²	1 x (0.75 – 2.5) mm ² 2 x (0.75 – 2.5) mm ²

UNDervoltage Release, OFF-DELAY, MC-UVU

	MC-UVU
Rated operational voltage U_c	
AC at 50/60 Hz	24, 220 – 550V AC
DC	24V DC
Peak inrush current I_p	< 500 mA
Power consumption	50VA
Delay time t_d	70 – 4000 ms
with additional external capacitor 90,000 mF ≥ 35 V	up to 16 s
with additional external capacitor 30,000 mF ≥ 35 V	up to 8 s
Terminal capacities	
Solid or flexible conductor with end sleeve	1 x (0.5 – 2.5) mm ² 2 x (0.5 – 1.5) mm ²

SHUNT Release MC.-XA

	MC1(2/3)-XA...	MC4-XA...
Rated control voltage U_c		
AC	12...440V AC	12...440V AC
DC	12...440V DC	12...440V DC
Frequency range	0 – 400 Hz	0 – 400 Hz
Operating range		
AC x U _c	0.7...1.1	0.7...1.1
DC x U _c	0.7...1.1	0.7...1.1
Power consumption		
Pull-in power AC/DC	2.5VA/W	2.5VA/W
Standby power AC/DC	2.5VA/W	2.5VA/W
Maximum current consumption at 110 % U_c (230 V 50 Hz)	–	–
Max. opening delay (response time until the main circuits open)	20 ms	22 ms
Maximum duty cover	∞∞	∞∞
Minimum command time	10 – 15 ms	10 – 15 ms
Terminal capacities		
Solid or flexible conductor with end sleeve	1 x (0.75 – 2.5) mm ² 2 x (0.75 – 2.5) mm ²	1 x (0.75 – 2.5) mm ² 2 x (0.75 – 2.5) mm ²

REMOTE OPERATOR

REMOTE OPERATOR MC...-XR...

		MC2-XR...	MC3-XR...	MC4-XR...
Rated control voltage U_c				
AC		110...440V AC	110...440V AC	110...440V AC
DC		24...250V DC	24...250V DC	24...250V DC
Operating range				
AC x U _c		0.85...1.1	0.85...1.1	0.85...1.1
DC x U _c		0.85...1.1	0.85...1.1	0.85...1.1
Rated operational voltage of motor				
AC	110 V - 130 V AC	350VA	350VA	350VA
	208 V - 240 V AC	350VA	350VA	350VA
	380 V - 440 V AC	350VA	350VA	350VA
DC	24 V - 30 V DC	250W	250W	250W
	110 V - 130 V DC	250W	250W	250W
	220 V - 250 V DC	250W	250W	250W
Rated operational voltage of coil				
AC	110 V - 130 V AC	270VA	270VA	270VA
	208 V - 240 V AC	270VA	270VA	270VA
	380 V - 440 V AC	270VA	270VA	270VA
DC	24 V - 30 V DC	210W	210W	210W
	100 V - 130 V DC	210W	210W	210W
	220 V - 250 V DC	210W	210W	210W
Total make time		60 ms	80 ms	100 ms
Total disconnecting time		300 ms	1000 ms	3000 ms
Minimum signal duration				
with switch on		30 ms	30 ms	30 ms
with switch off		150 ms	250 ms	500 ms
Service life, mechanical (operations)		20000	15000	10000
Maximum operating cycles		120 S/h	60 S/h	20 S/h
Terminal capacities				
Solid or flexible conductor with end sleeve		0.75 - 2.5 mm ²	0.75 - 2.5 mm ²	0.75 - 2.5 mm ²

DATA MANAGEMENT INTERFACE (DMI MODULE)

GENERAL DATA

	MC-XDMI612
Dimensions (W x H x D)	107.5 x 90 x 53 mm
Width (U)	6 U
Weight	0.3 kg
Mounting	Top-hat rail IEC/EN 60715, 35 mm

CLIMATIC ENVIRONMENTAL CONDITIONS

Operating ambient temperature	0 to +55°C
Mounting position	horizontal/vertical
Condensation	Prevent condensation by taking suitable measures
LCD display (easy to read)	0 to +55°C
Storage/transport	-40 to +70°C
Relative humidity, no condensation (IEC/EN 60068-2-30)	5...95%
Air pressure (operation)	795...1080 hPa
Corrosion resistance	
IEC/EN 60068-2-42	4 days
	SO ₂
IEC/EN 60068-2-43	4 days
	H ₂ S
	10 cm ³ /m ³
	1 cm ³ /m ³

MECHANICAL ENVIRONMENTAL CONDITIONS

Pollution degree	2
Degree of protection IEC/EN 60529	IP20
Vibrations (IEC/EN 60068-2-6)	
constant amplitude 0.15 mm	10...57 Hz
constant acceleration 2 g	57...150 Hz
Impact resistance (IEC/EN 60068-2-27) semi-sinusoidal 15 g/11 ms	18 impacts
Drop to (IEC/EN 60068-2-31)	50 mm Drop height
Free fall, packaged (IEC/EN 60068-2-32)	1 m Drop height

POWER SUPPLY

Rated operational voltage U _n	24V
Admissible range	20.4...28.8V DC
Residual ripple	≤ 5%
Input current at 24 V DC	210 mA
Voltage dips (IEC/EN 61131-2)	10 ms
Power loss at 24 V DC	5 W

PROFIBUS MODULE

GENERAL DATA

	MC-XDMI-DPV1
Standards and regulations	EN 55011, EN 55022, EN 61000-4, IEC 60068-2-6, IEC 60068-2-27
Dimensions (W x H x D)	35.5 x 90 x 58 mm (2 U)
Weight	0.15 kg
Mounting	Top-hat rail, EN 50022, 35 mm or screw fixing with fixings ZB4-101-GF1 (accessories)

TERMINAL CAPACITIES

Single-wire	0.2x4 (AWG 22 – 12) mm ²
Fine-wired with end sleeve	0.2x2.5 (AWG 22 – 12) mm ²
Slotted screwdriver	3.5 x 0.8 mm
Max. tightening torque	0.6 Nm

CLIMATIC ENVIRONMENTAL CONDITIONS

Operating ambient temperature	-25°C – 55°C, Cold as per IEC 60068-2-1, Heat as per IEC 60068-2-2	
Condensation	Prevent condensation by taking suitable measures	
Storage	40 – 70°C	
Relative humidity, no condensation (IEC/EN 60068-2-30)	5 – 95%	
Air pressure (operation)	795 – 1080 hPa	
Corrosion resistance		
IEC/EN 60068-2-42	4 days SO ₂	10 cm ³ /m ³
IEC/EN 60068-2-43	4 days H ₂ S	1 cm ³ /m ³

MECHANICAL ENVIRONMENTAL CONDITIONS

Pollution degree	2
Degree of protection (IEC/EN 60529)	IP20
Vibrations (IEC/EN 60068-2-6)	
constant amplitude 0.15 mm	10 – 57 Hz
constant acceleration 2 g	57 – 150 Hz
Impact resistance (IEC/EN 60068-2-27)	18 impacts
Semi-sinusoidal 15 g/11 ms	
Drop to (IEC/EN 60 068-2-31)	50 mm drop height
Free fall, packaged (IEC/EN 60068-2-32)	1 m drop height
Mounting position	horizontal/vertical

ELECTROMAGNETIC COMPATIBILITY (EMC)

Electrostatic Discharge (IEC/EN 61000-4-2, Level 3, ESD)	
Air discharge	8 kV
Contact discharge	6 kV
Electromagnetic fields (IEC/EN 61000-4-3, RFI)	10 V/m
Radio interference suppression (EN 55011)	EN 55 011 Class A, EN 55 022 Class A
Burst impulses (IEC/EN 61000-4-4, Level 3)	
Power lines	2 kV
Signal cables	2 kV
Energy-rich impulses (surge) (IEC/EN 61000-4-5, Level 2)	0.5 kV (symmetrical power lines)
Immunity to conducted interference (IEC/EN 61000-4-6)	10 V

PROFIBUS MODULE

DIELECTRIC STRENGTH

	MC-XDMI-DPV1
Rating of air and creepage distance	EN 50178, UL 508, CSA C22.2, No. 142
Dielectric strength	EN 50178

POWER SUPPLY

Rated operational voltage U_n	24V (-15/+20 %)
Permissible range	20.4...28.8V DC
Residual ripple	< 5%
At 24 V DC	typ. 200 mA
Voltage dips (IEC/EN 61131-2)	10 ms
Power loss at 24 V DC	4.8 W

POLARITY REVERSAL PROTECTION

Power supply	yes
--------------	-----

LED INDICATORS

Supply	LED power (POW): green
LED display	LED PROFIBUS DP (BUS): green

NETWORK

Connection accessories	SUB-D 9-pole, socket
Potential isolation	Bus to power supply (simple), Bus and power supply to MC-XDMI612 (safe isolation)
Function	PROFIBUS DP slave
Interface	RS 485
Bus protocol	PROFIBUS-DP
Baud rates	Automatic detection up to 12 MBit/s
Bus termination resistors	Separate, external bus connection required
Bus addresses	1 – 126 via DMI
Services	
Cyclical	Status ON/OFF triggered (detailed) Load warnings, phase currents I1/I2/I3[A] Actuation of remote control Display/Control MC-XDMI612 In-/Output motor starter functions
Acyclical	Display/Edit protective setting results list, identification, operating hours operations, time

RESIDUAL CURRENT RELEASE RELAY

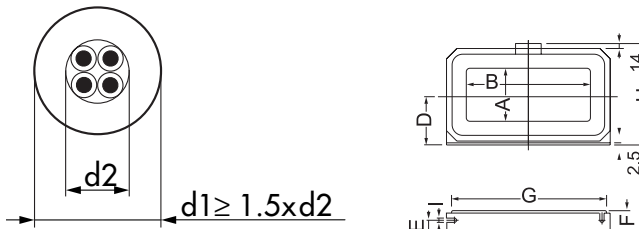
ELECTICAL

	FIR-003	FIR-03	FIR-5
Standards and regulations	IEC/EN 60947-2, IEC 755, IEC 1008, IEC 1009		
Sensitivity	Pulse current sensitive, type A		
Rated control voltage U_c	230V AC 620% (50/60 Hz)		
Rated control power P_c	3W	3W	3W
Rated fault currents I_{bn}	0.03A	0.3A	0.03, 0.1, 0.3, 0.5, 1, 3, 5A
Delay time t_d	0.02 s (not-delayed)	0.02 (not-delayed)	0.02, 0.1, 0.3, 0.5, 1, 3, 5A
Relay contacts	1 integral C/O	1 integral C/O	1 integral C/O
Rated input voltage, relay contacts	250/100V AC/DC	250/100V AC/DC	250/100V AC/DC
Rated current of the relay contacts	6A	6A	6A
Fault current warning	-	-	0.5 Hz = 25% - 50% I_{bn} 1 Hz = 50% - 75% I_{bn} 2 Hz = 75% - 100% I_{bn}

MECHANICAL

Front fitting width	45 mm	45 mm	45 mm
Size of device base	85 mm	85 mm	85 mm
Device width	45 mm	45 mm	45 mm
Assembly	Snap fixing for top hat rail DIN 46277, EN 50022		
Terminals above and below	Box terminals		
Terminal protection	Finger and back-of-hand proof to BGV A2, VDE 106 part 100		
Terminal capacities	2 x 0.75 mm ² - 2.5 mm ² solid, 2 x 0.75 mm ² - 1.5 mm ² flexi-/with sleeve		
Lead-sealability of setting buttons	-	-	yes

DIMENSIONS



Rectangular core-balance transformer

Type	A	B	C	D	E	F	G	H	I
FIR-WR-175	70	175	225	85	22	46	261	176	7,5
FIR-WR-305	115	305	360	116	25	55	402	240	8
FIR-WR-350	150	350	415	140	28	55	460	285	8

Round core-balance transformer

Max. nominal current		Diameter	
Power distribution (A)	Motor/capacitor (A)	Transformer type FIR-W-... d1	Maximum conductor cross-section (mm) d2
50	50	20	13
150	100	30	20
150	100	35	23
400	200	70	47
600	250	105	70
1200	630	140	93
1800	800	210	140

RESIDUAL CURRENT RELEASE MC1, MC2

ELECTRICAL DATA

	MC1(-4)-XFI30R	MC1(-4)-XFI300R	MC1(-4)-XFIR	MC1(-4)-XFI30U
Standards and regulations	IEC/EN 60947-2	IEC/EN 60947-2	IEC/EN 60947-2	IEC/EN 60947-2
Sensitivity	Pulse current sensitive accord. to core-balance principle			
Min. operational voltage				
for sensing residual currents Type A/AC	80 V (independent of supply voltage)	80 V (independent of supply voltage)	80 V (independent of supply voltage)	80 V (independent of supply voltage)
for sensing residual currents Type B	-	-	-	-
Suitable for use	in three- and single-phase systems			in single-phase systems
Rated operational voltage U_e	200...415V AC (3~)	200...415V AC (3~)	200...415V AC (3~)	200...415V AC (3~)
Rated frequency f	50/60Hz	50/60Hz	50/60Hz	50/60Hz
No. of poles	2/4 pole	3/4 pole	3/4 pole	3/4 pole
Rated current range I_n	15...125A	15...125A	15...125A	15...100A
Rated fault currents I_{bn}	0.03A	0.3A	0.03...0.1...0.3...A 0.5...1...3A	0.03A
Sensing range, fault current	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Rated making and breaking capacity I_{bn}	= I_{bn}	= I_{bn}	= I_{bn}	= I_{bn}
Fault current warning	$\geq 0.3 \times I_{bn}$	$\geq 0.3 \times I_{bn}$	$\geq 0.3 \times I_{bn}$	$\geq 0.3 \times I_{bn}$
Impact resistance (IEC 60068-2-27)	20 (half-sinusoidal impact 20 ms)			
Service life, mechanical (operations) (of which 50 % with fault current)	20000	20000	20000	20000

MECHANICAL DATA

Front fitting width	45 mm	45 mm	45 mm	45 mm
Assembly	side, on right	side, on right	bottom	bottom
Mounting position	vertical and 90° in all directions			
Power supply	MC1 from top	MC1 from top	MC1 from top	MC1 from top
Degree of protection	IP20 in the operating components area			
Ambient operating temperature	-5...+40°C	-5...+40°C	-5...+40°C	-5...+40°C
Lead sealability	-	-	yes, setting buttons	-
Terminal capacities				
Flexible without end sleeve	as standard terminal MC1			
Flexible with end sleeve	as standard terminal MC1			

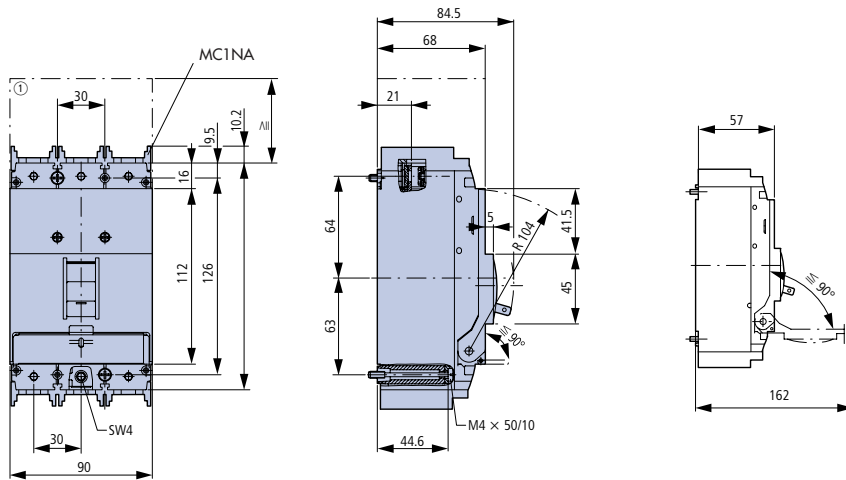
MC1(-4)-XFI300U	MC1(-4)-XFIU	MC2-4-XFI30	MC2-4-XFI	MC2-4-XFIA30	MC2-4-XFIA
IEC/EN 60947-2	IEC/EN 60947-2	IEC/EN 60947-2	IEC/EN 60947-2	IEC/EN 60947-2	IEC/EN 60947-2
pulse current sensitive accord. to core-balance principle		pulse current sensitive		AC/DC current sensitivity (type B)	AC/DC current sensitivity (type B)
80 V (dependant on mains supply)	80 V (dependant on mains supply)	Independent of supply voltage	dependent of supply voltage	V (dependant on mains supply)	0 V (dependant on mains supply)
-	-	-	-	50 V (dependant on mains supply)	50 V (dependant on mains supply)
in single-phase systems		in three- and single-phase systems			
200...415V AC (3~)	200...415V AC (3~)	280...690V AC	280...690V AC	50...400V AC (3~)	50...400V AC (3~)
50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz
3/4 pole	3/4 pole	4 pole	4 pole	4 pole	4 pole
15...100A	15...100A	15...250A	15...250A	15...250A	15...250A
0.3A	0.03...0.1...0.3...A 0.5...1...3A	0.03A	0.1...0.3...1...3A	0.03A	0.1...0.3...1A
50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	with AC: 0 – 100 kHz with intermittent DC : 50 Hz	with AC: 0 – 100 kHz with intermittent DC : 50 Hz
$= I_{cu}$	$= I_{cu}$	$= I_{cu}$	$= I_{cu}$	$= I_{cu}$	$= I_{cu}$
$\geq 0.3 \times I_{bn}$	$\geq 0.3 \times I_{bn}$	-	-	-	-
20 (half-sinusoidal shock 20 ms)					
20000	20000	≥ 2000	≥ 2000	≥ 2000	≥ 2000

45 mm	45 mm	96 mm	96 mm	96 mm	96 mm
bottom	bottom	bottom	bottom	bottom	bottom
vertical and 90° in all directions					
MC1 from top	MC1 from top	as required	as required	bottom	bottom
IP20 in the operating components area					
-5...+40°C	-5...+40°C	-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C
-	yes, setting buttons	-	-	yes, setting buttons	yes, setting buttons
as standard terminal MC1		as MC2 standard connection			
as standard terminal MC1		as MC2 standard connection			

DIMENSIONS MC1

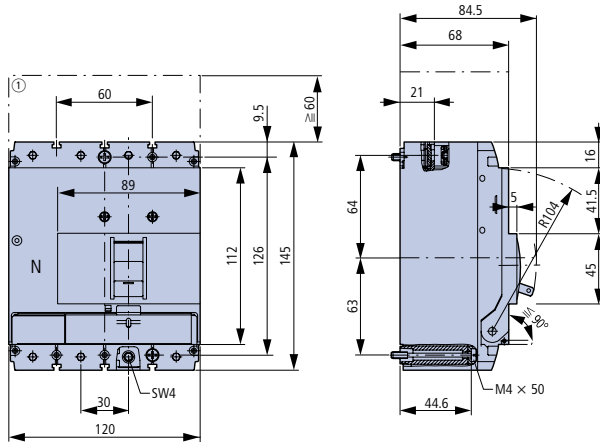
FRAME SIZE 1: BASIC UNITS

CIRCUIT-BREAKER / SWITCH DISCONNECTOR, 3-POLE TYPES MC1B, MC1N, MC1H, MC1-PN, MC1-N



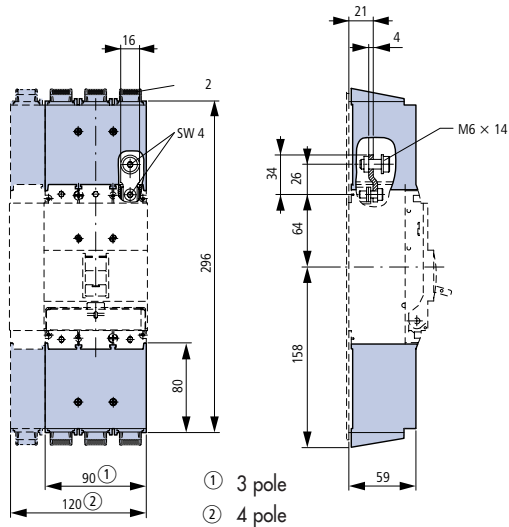
① Blow out area, minimum clearance to other parts ≥ 60 mm

CIRCUIT-BREAKER / SWITCH DISCONNECTOR, 4-POLE TYPES MC1B-4, MC1N-4, MC1H-4, MC1-PN-4, MC1-N-4



① Blow out area, minimum clearance to other parts ≥ 60 mm

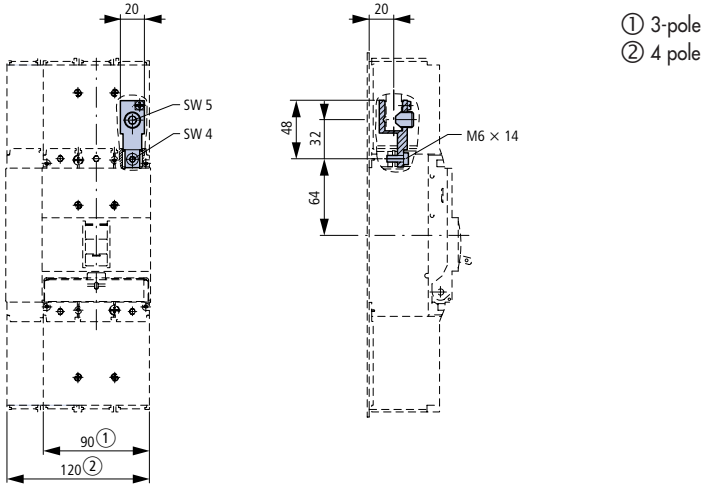
COVER PLATES TYPES MC1-XKSA, MC1-4-XKSA / SCREW FITTING TYPES MC1-XKS, MC1-4-XKS / IP2X FINGER PROTECTION FOR COVER PLATE TYPES MC1-XIPA, MC1-4-XIPA



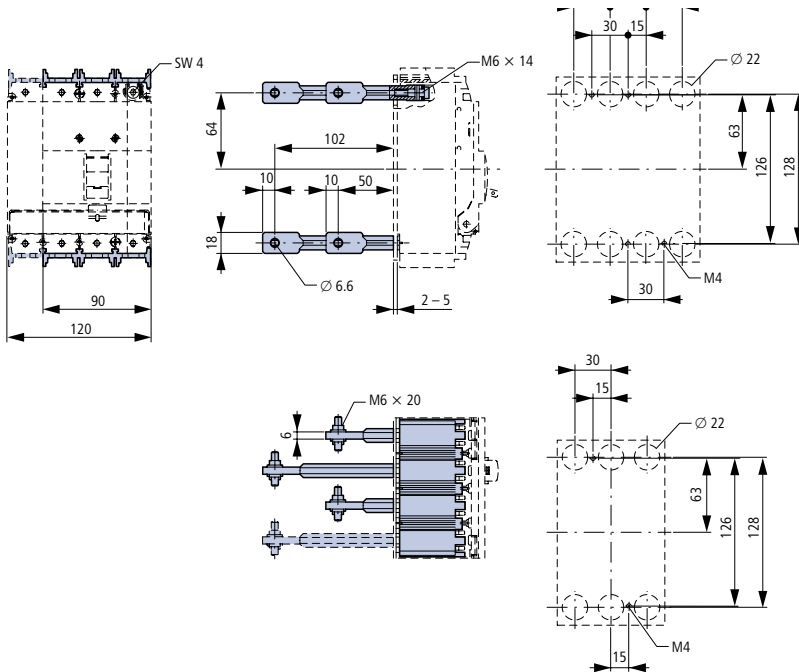
① 3 pole
② 4 pole

FRAME SIZE 1: ACCESSORIES

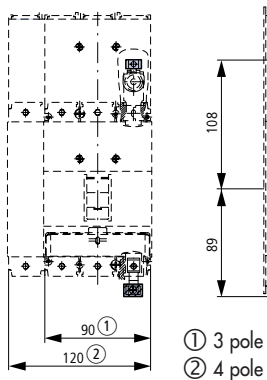
TUNNEL TERMINAL, TYPES MC1-XKA, MC1-4-XKA



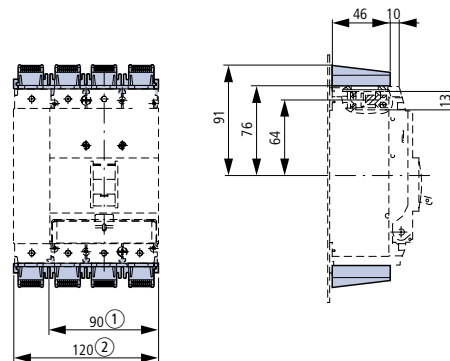
REAR CONNECTION, TYPES MC1-XKR, MC1-4-XKR



CONTROL CIRCUIT TERMINAL TYPE MC-XSTK



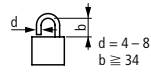
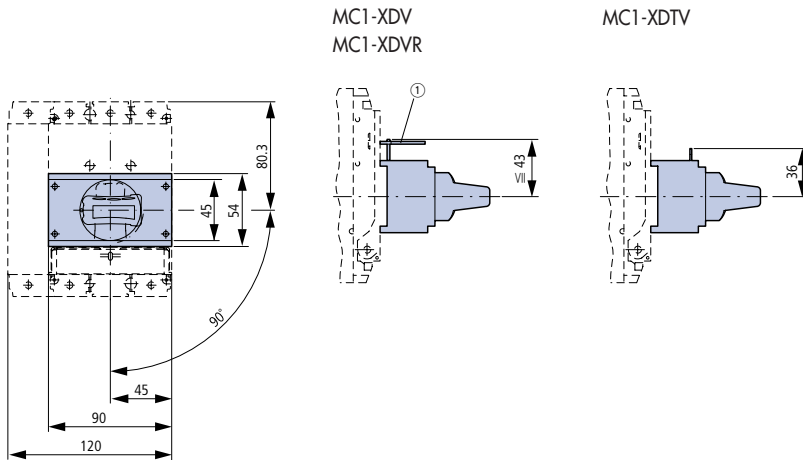
IP2X FINGER PROTECTION TYPES MC1-XIPK, MC1-4-XIPK



DIMENSIONS MC

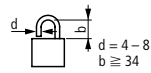
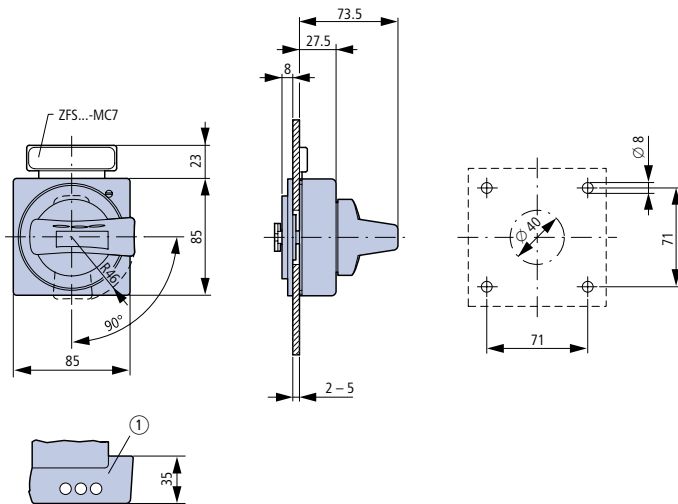
FRAME SIZE 1: ACCESSORIES

ROTAry OPERATOR, ROTAry HANDLE ON SWITCH, TYPES MC1-XDV, MC1-XDVR, MC1-XTVD



① Max. 3 padlocks

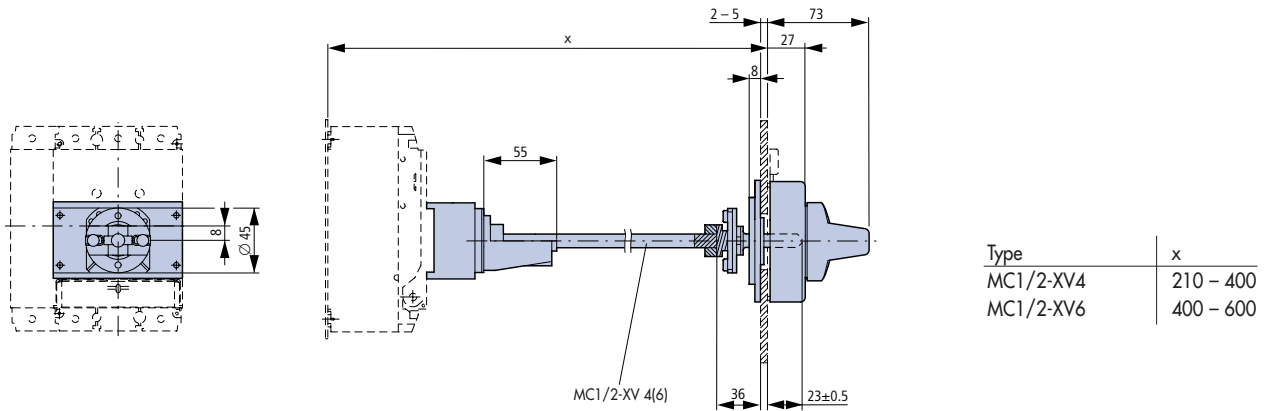
DOOR COUPLING ROTAry HANDLE TYPE MC1-XTVD(V)(R)



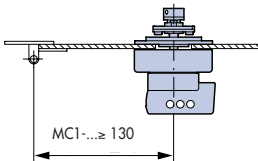
① Max. 3 padlocks

FRAME SIZE 1: ACCESSORIES

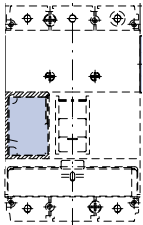
DOOR COUPLING ROTARY HANDLE WITH EXTENSION SHAFT, TYPES MC-XTVD(V)(R), MC1/2-XV4...6



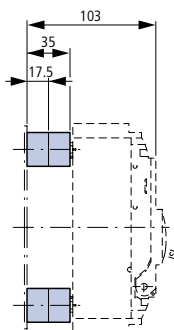
Minimum distance, door coupling rotary handle and door pivot point



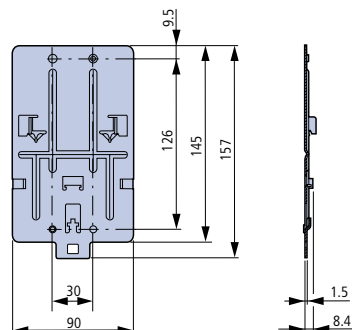
UNDervoltage RELEASE / SHUNT RELEASE / EARLY MAKE AUXILIARY CONTACT TYPE MC1-XHIV



SPACER TYPE MC1/2-XAB



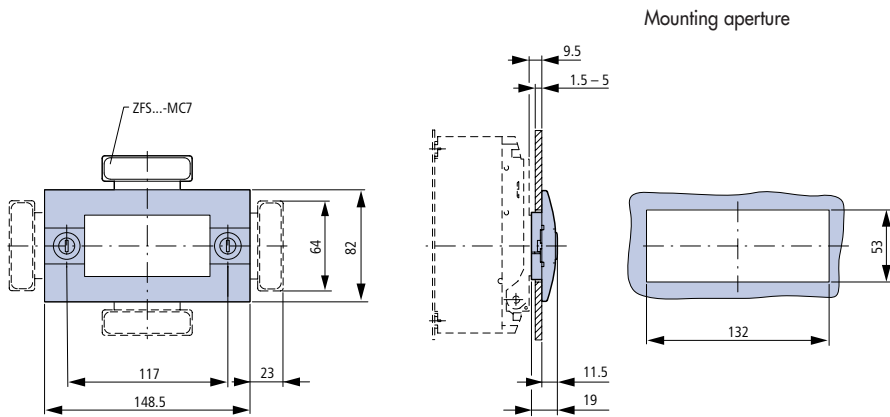
CLIP PLATE TYPE MC1-XC25



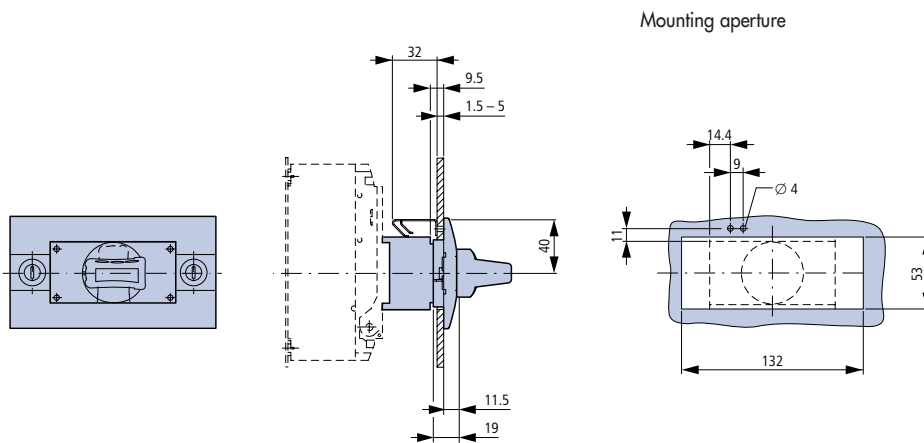
DIMENSIONS MC

FRAME SIZE 1: ACCESSORIES

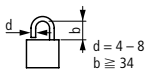
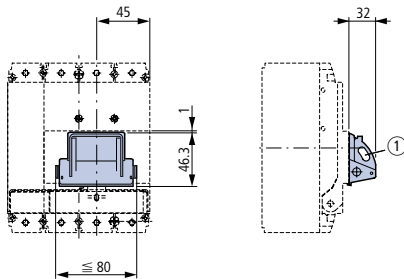
INSULATING SURROUND, TYPE MC1-XBR



ROTARY HANDLE ON SWITCH, TYPE MC1-XDTV(R)



TOGGLE LEVER LOCKING DEVICE, TYPE MC-XKAV

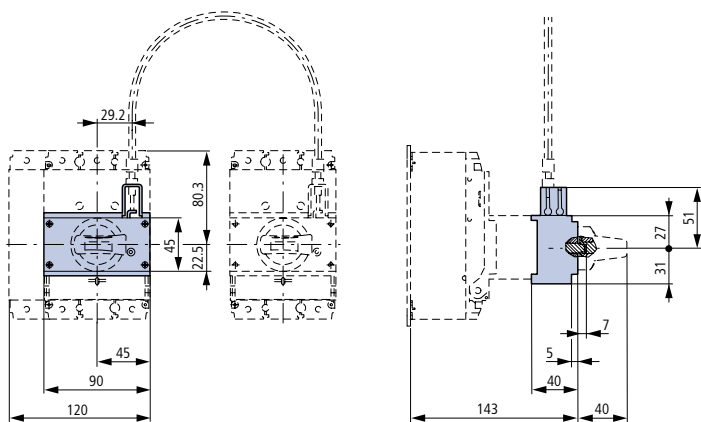


Max. 3 padlocks

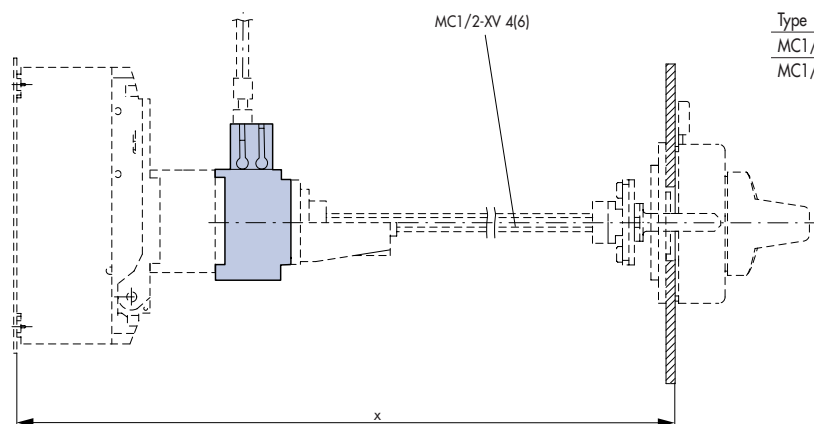
FRAME SIZE 1: ACCESSORIES

MECHANICAL INTERLOCK, TYPES MC1-XMV, MC1-XDV(R), MC1-XMV, MC1-XTVD(V)(R)

MC1-XMV + MC1-XDV(R)



MC1-XMV + MC1-XTVD(V)(R)



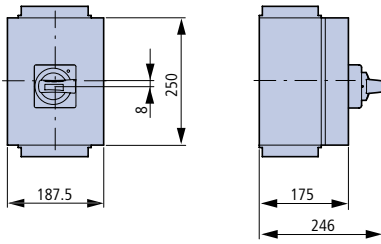
Type	x
MC1/2-XV4	245 - 400
MC1/2-XV6	400 - 600

DIMENSIONS MC

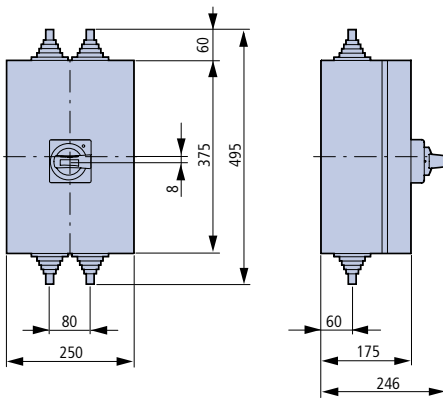
FRAME SIZE 1: ACCESSORIES

INSULATED ENCLOSURE, TYPES MC1-XCI23-T..., MC1-XCI43-T..., MC1-XCI43/2-T...

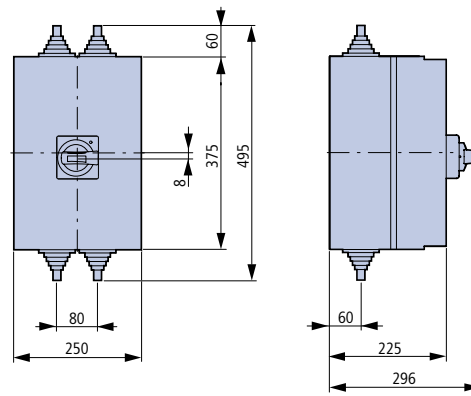
MC1-XCI23-T...



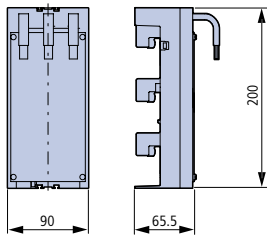
MC1-XCI43-T...



MC1-XCI43/2-T...

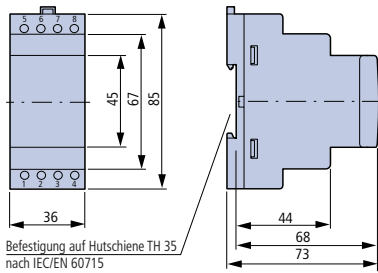


COMPONENT ADAPTER, TYPE 32570



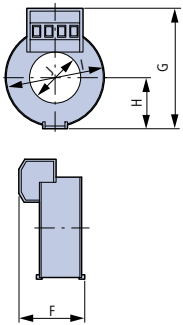
FRAME SIZE 1: ACCESSORIES

FAULT CURRENT BREAKER, TYPES FIR-003, FIR-03, FIR-5

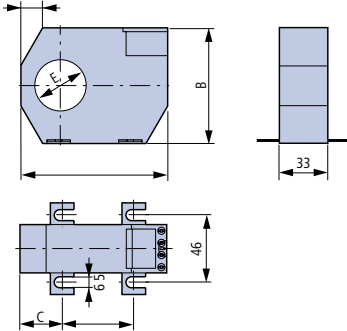


CORE-BALANCE TRANSFORMER TYPES FIR-W-20...30, FIR-W-35...210

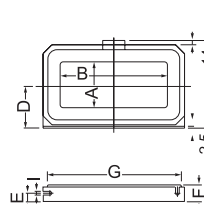
FIR-W-20...30



FIR-WS-35...210



FIR-WR-175...350

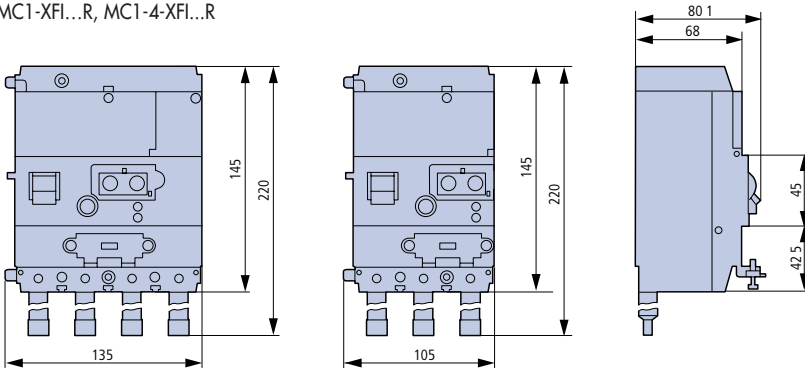


Type	F	G	H	I	J
FIR-WS-20	32	60	24	46	21
FIR-WS-30	32	70	30	59	30

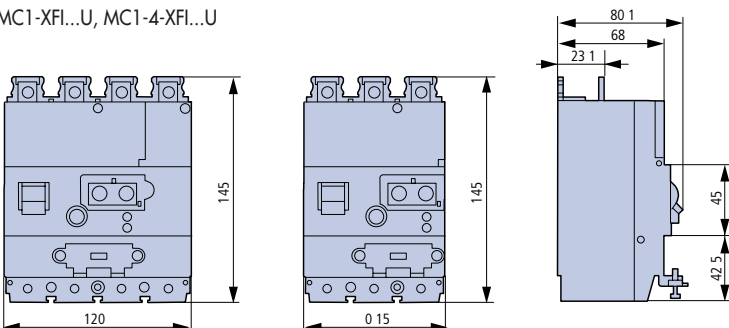
Type	A	B	C	D	E	F
FIR-WS-35	100	79	26	48.5	35	35
FIR-WS-70	130	110	32	66	70	52
FIR-WS-105	170	146	38	94	105	72
FIR-WS-140	220	196	48.5	123	140	97
FIR-WS-210	299	284	69	161	210	141

RESIDUAL-CURRENT RELEASE TYPES MC1-XFI...R, MC1-4-XFI...R, MC1-XFI...U, MC1-4-XFI...U

MC1-XFI...R, MC1-4-XFI...R



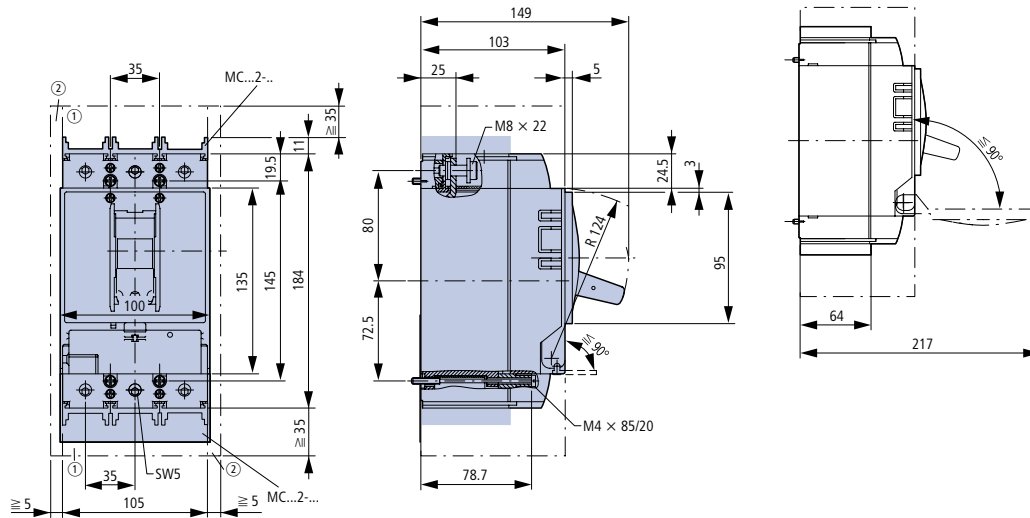
MC1-XFI...U, MC1-4-XFI...U



DIMENSIONS MC

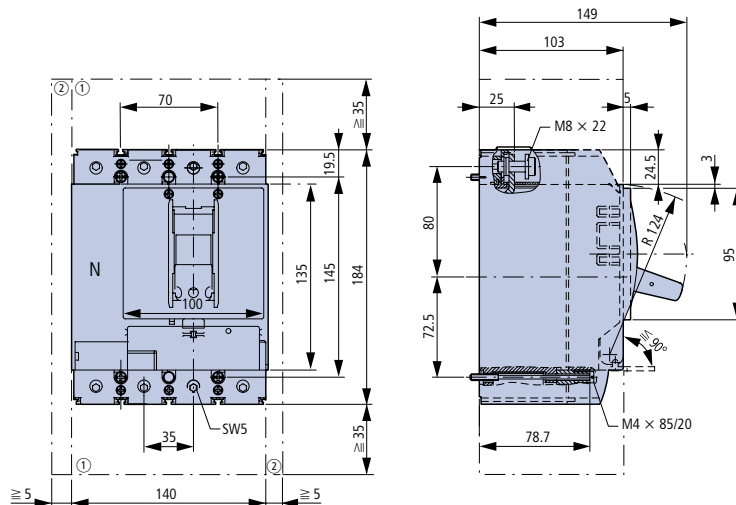
FRAME SIZE 2: BASIC UNITS

CIRCUIT-BREAKER / SWITCH DISCONNECTOR, 3-POLE TYPES MC2B, MC2N, MC2H, MC2-PN, MC2-N



- ① Blow out area, minimum clearance to other parts ≥ 35 mm
- ② Minimum clearance to adjacent parts ≥ 5 mm

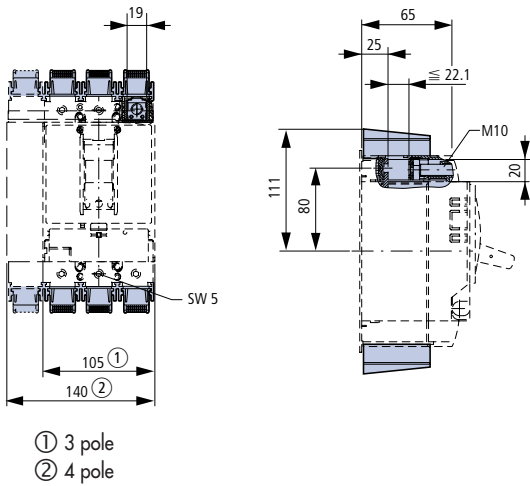
CIRCUIT-BREAKER / SWITCH DISCONNECTOR, 4-POLE TYPES MC2B-4, MC2N-4, MC2H-4, MC2-PN-4, MC2-N-4



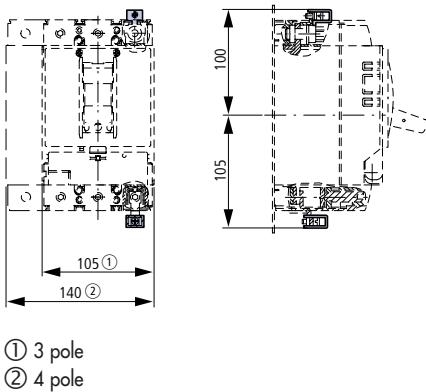
- ① Blow out area, minimum clearance to other parts ≥ 35 mm
- ② Minimum clearance to adjacent parts ≥ 5 mm

FRAME SIZE 2: ACCESSORIES

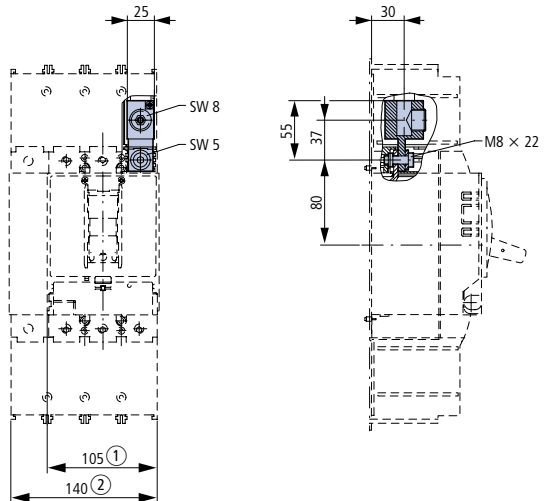
- BOX TERMINAL, TYPES MC2-...XKC, MC2-4-...XKC /
IP2X FINGER PROTECTION, TYPES MC2-XIPK, MC2-4-XIPK



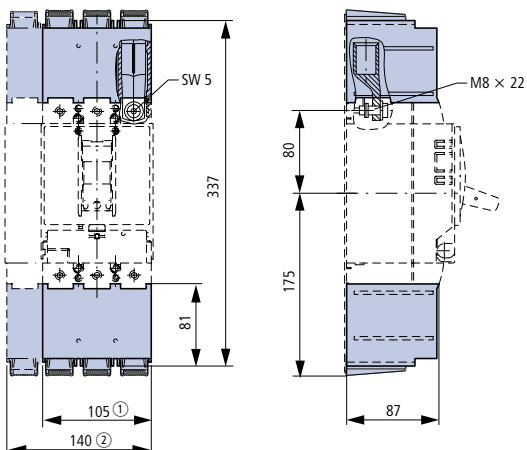
- CONTROL CIRCUIT TERMINAL
TYPES MC2-XSTS, MC-XSTK



- TUNNEL TERMINAL
TYPES MC2-XKA, MC2-4-XKA



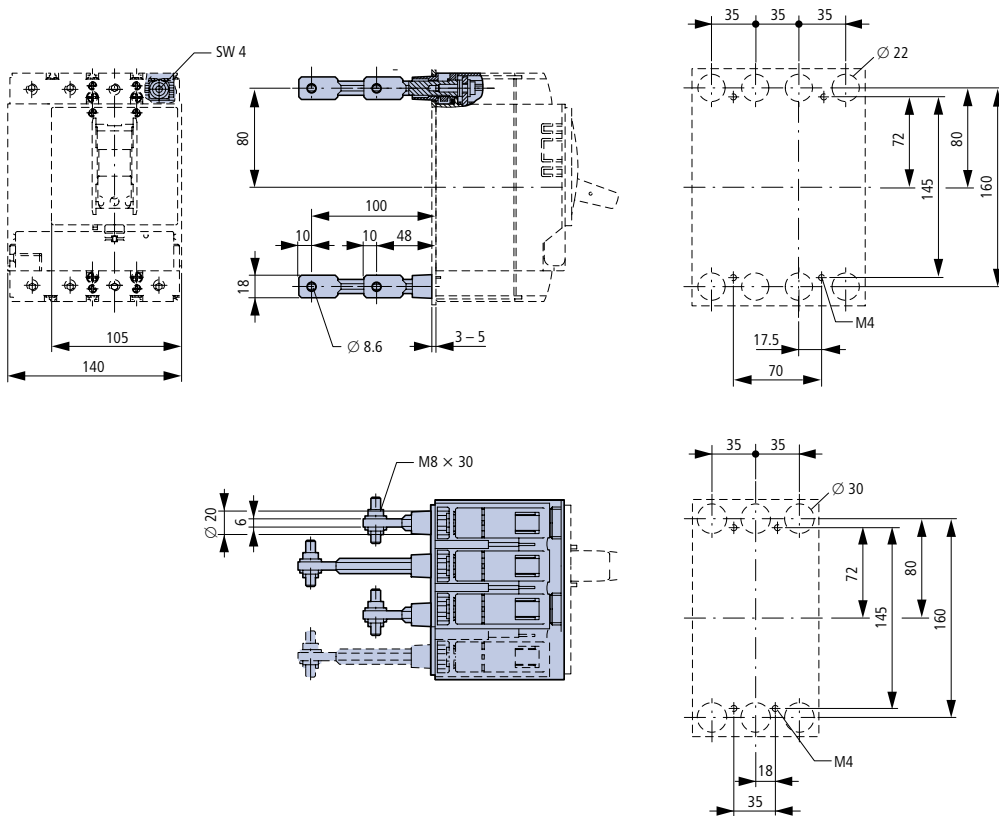
- COVER PLATE TYPES MC2-XKSA, MC2-4-XKSA / CABLE LUGTYPE MC2-XKS185 /
IP2X FINGER PROTECTION FOR COVER PLATE TYPES MC2-XIPA, MC2-4-XIPA



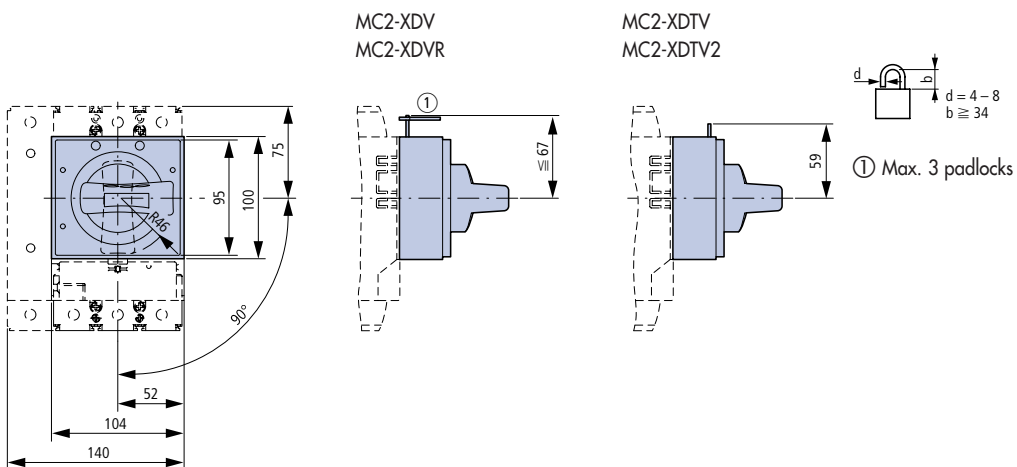
DIMENSIONS MC

FRAME SIZE 2: ACCESSORIES

REAR CONNECTION, TYPES MC2-XKR, MC2-4-XKR

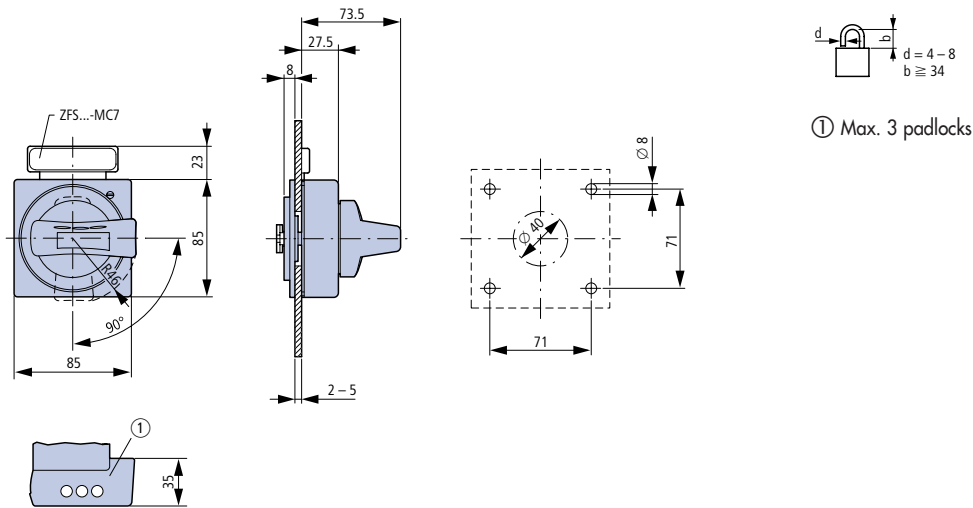


ROTARY OPERATOR, ROTARY HANDLE ON SWITCH, TYPES MC2-XDV, MC2-XDVR, MC2-XDTV, MC2-XDTV2

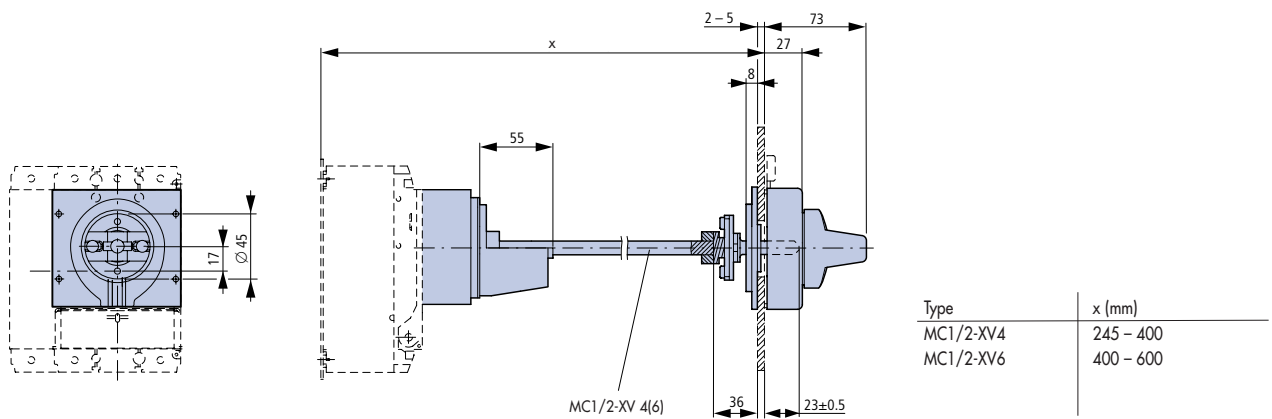


FRAME SIZE 2: ACCESSORIES

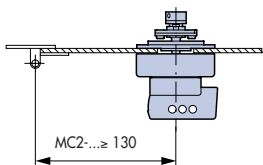
DOOR COUPLING ROTARY HANDLE TYPE MC2-XTVD(V)(R)



DOOR COUPLING ROTARY HANDLE WITH EXTENSION SHAFT, TYPES MC2-XTVD(V)(R), MC1/2-XV4...6



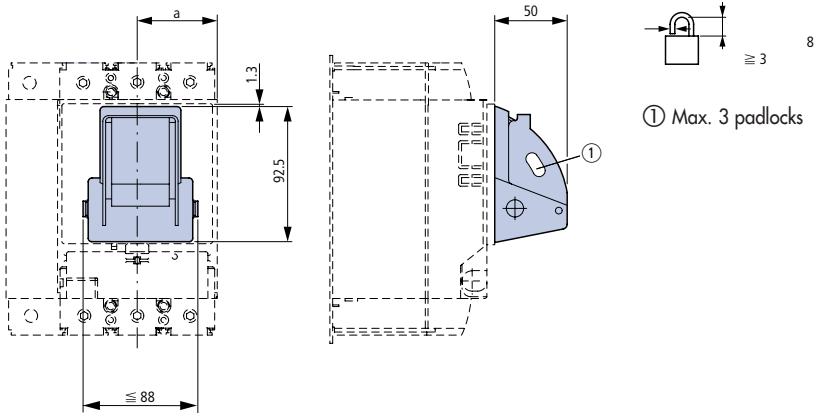
Minimum distance, door coupling rotary handle and door pivot point



DIMENSIONS MC

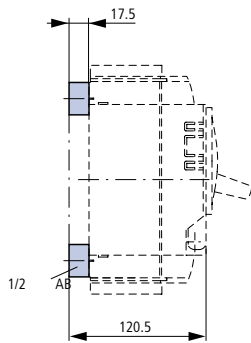
FRAME SIZE 2: ACCESSORIES

TOGGLE LEVER LOCKING DEVICE, TYPE MC2/3-XKAV

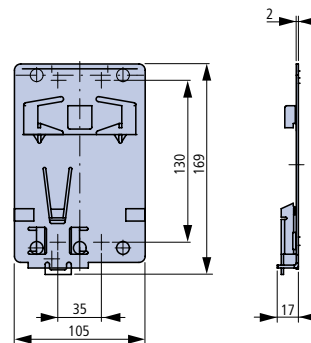


Type	a
MC2(-PN)(-N)	32
MC3(-PN)(-N)	32

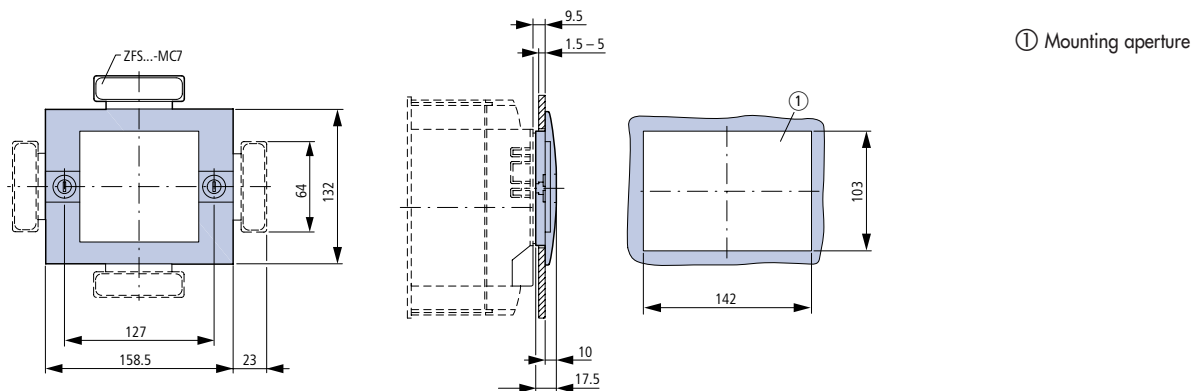
SPACER TYPE MC1/2-XAB



CLIP PLATE TYPE MC2-XC75

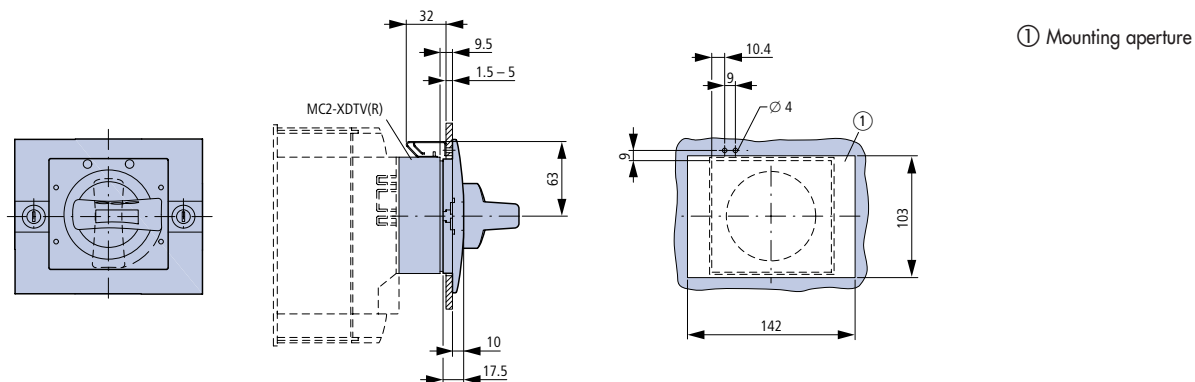


INSULATING SURROUND, TYPE MC2-XBR



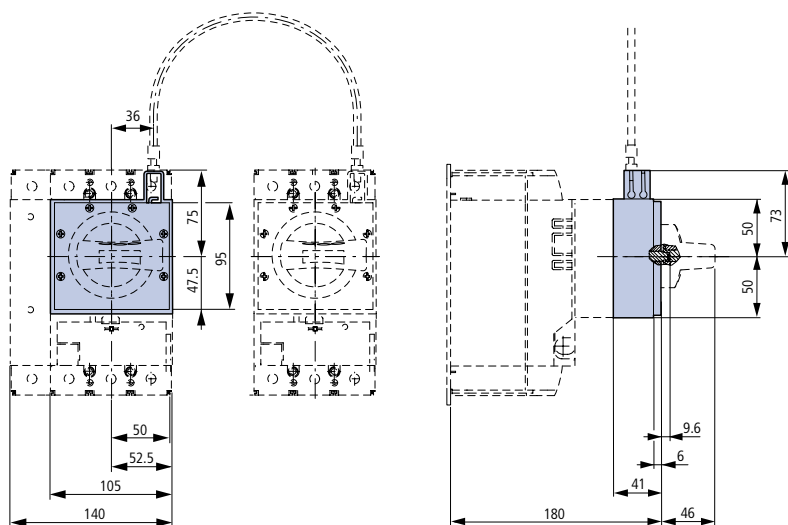
FRAME SIZE 2: ACCESSORIES

ROTARY HANDLE ON SWITCH WITH DOOR INTERLOCK TYPE MC2-XTVD

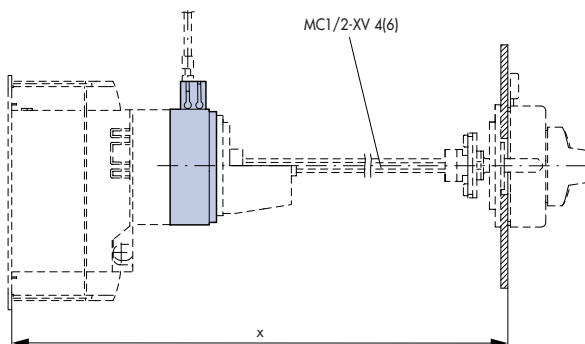


MECHANICAL INTERLOCK TYPES MC2-XMV, MC2-XD, MC2-XTVD(V)(R)

MC2-XMV + MC2-XD



MC2-XMV + MC2XTVD(V)(R)

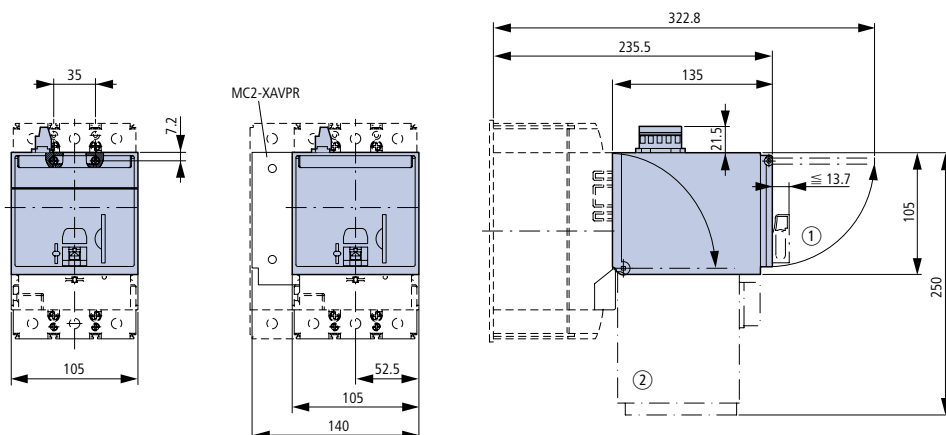


Type	x (mm)
MC1/2-XV4	280 - 400
MC1/2-XV6	400 - 600

DIMENSIONS MC

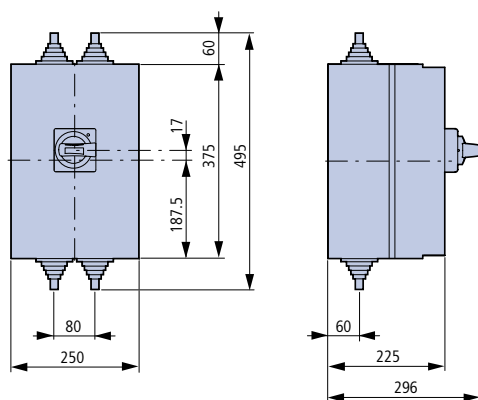
FRAME SIZE 2: ACCESSORIES

REMOTE OPERATOR, TYPE MC2-XR...

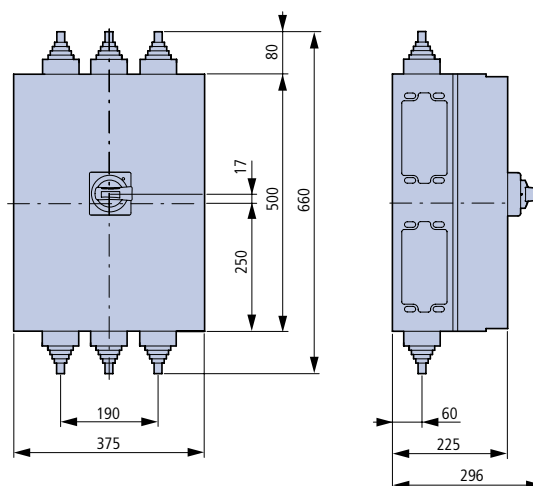


INSULATING ENCLOSURE, TYPES MC2-XCI43-TVD(R), MC2-XCI45-TVD(R)

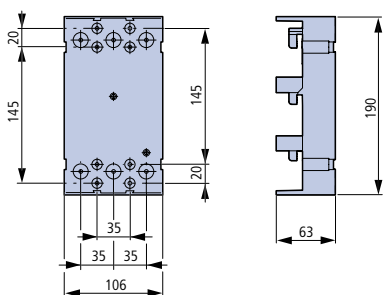
MC2-XCI43-TVD(R)



MC2-XCI45-TVD(R)

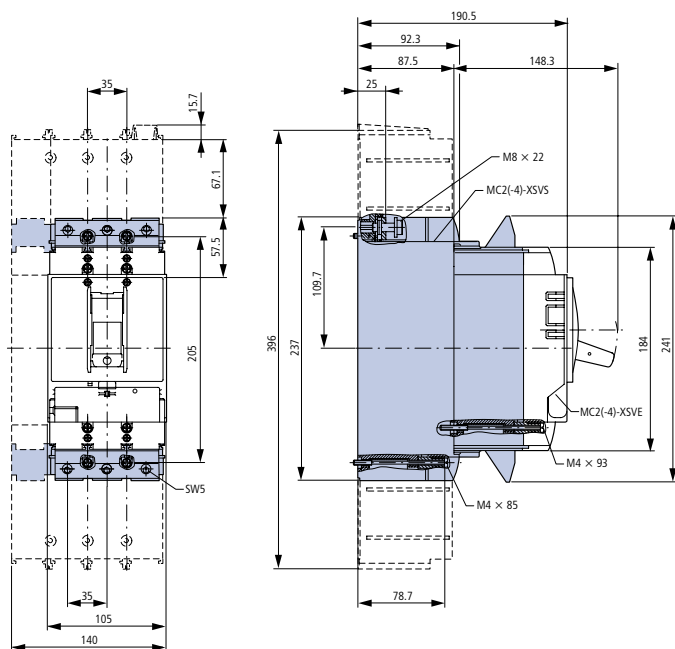


COMPONENT ADAPTER, TYPE 32140

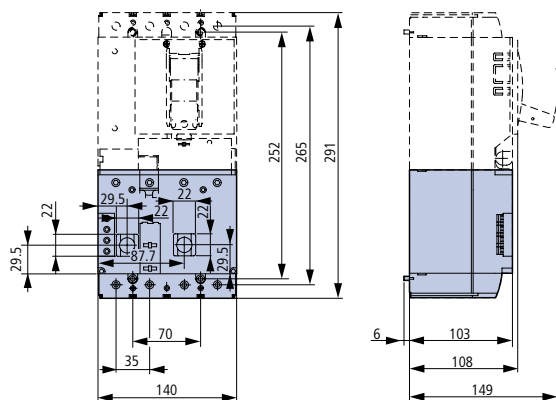


FRAME SIZE 2: ACCESSORIES

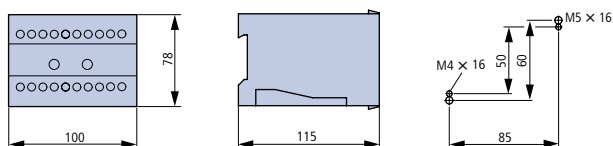
PLUG-IN STYLE ASSEMBLY, TYPES MC2-XSV, MC2-4-XSV - BASE COMPLETE WITH MODULE



RESIDUAL-CURRENT RELEASE, TYPES MC2-XFI..., MC2-4-XFI...



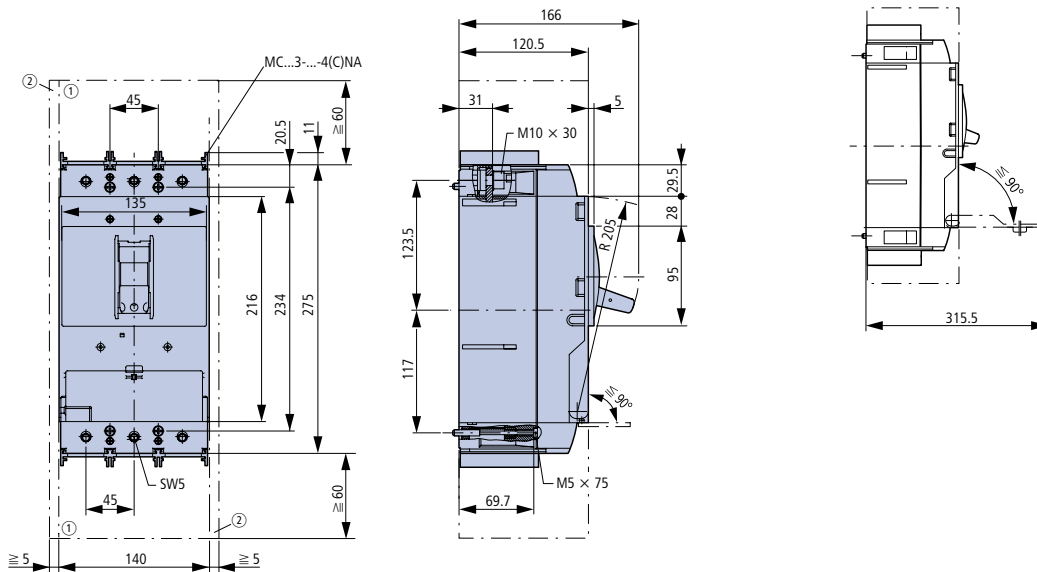
UNDERVOLTAGE RELEASE, OFF-DELAY MC-UUV



DIMENSIONS MC

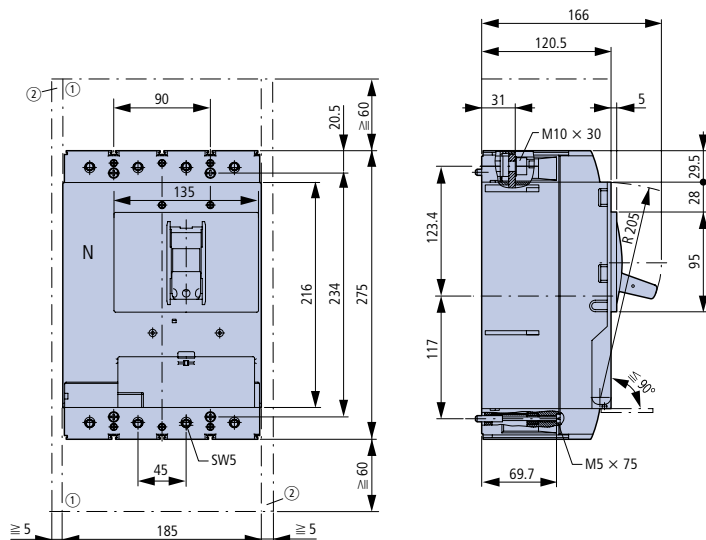
FRAME SIZE 3: BASIC UNITS

CIRCUIT-BREAKER / SWITCH DISCONNECTOR, 3-POLE TYPES MC3N, MC3H, MC3-PN, MC3-N



- ① Blow out area, minimum clearance to other parts ≥ 60 mm
- ② Minimum clearance to adjacent parts ≥ 5 mm

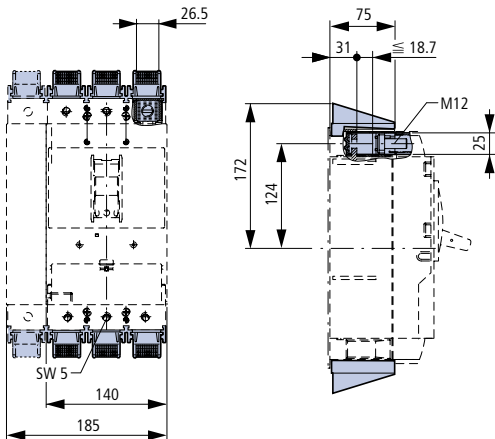
CIRCUIT-BREAKER / SWITCH DISCONNECTOR, 4-POLE TYPES MC3N-4, MC3H-4, MC3-N-4, MC3-H-4



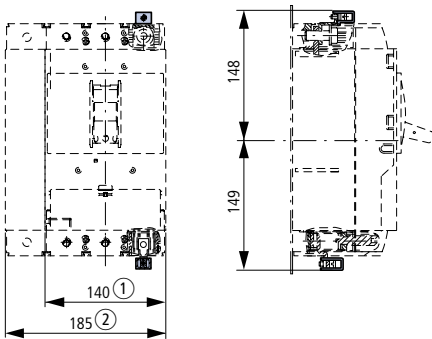
- ① Blow out area, minimum clearance to other parts ≥ 60 mm
- ② Minimum clearance to adjacent parts ≥ 5 mm

FRAME SIZE 3: ACCESSORIES

- BOX TERMINAL, TYPES MC3-XKC, MC3-4-XKC / IP2X FINGER PROTECTION, TYPES MC3-XIPK, MC3-4-XIPK

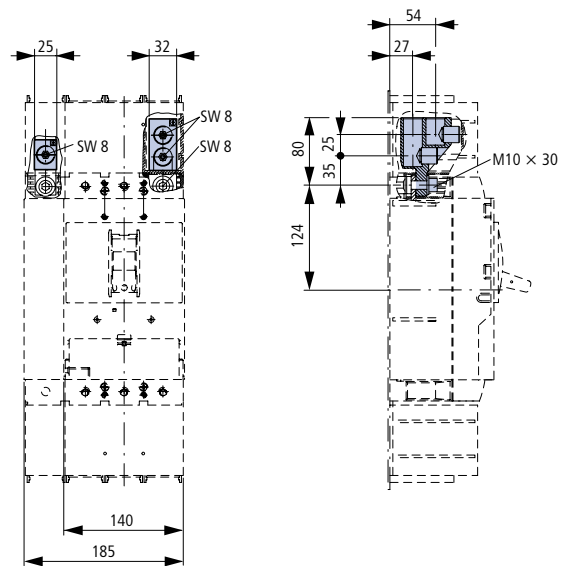


- CONTROL CIRCUIT TERMINAL TYPES MC3/4-XSTS, MC-XSTK

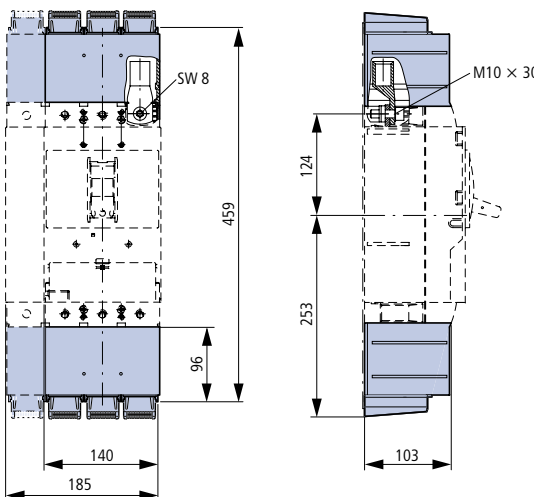


- ① 3 pole
- ② 4 pole

- TUNNEL TERMINAL TYPES MC3-4-XKA1...2, MC3-XKA1...2



- COVER PLATE TYPE MC3(-4)-XKSA / CABLE LUG TYPE MC3-XKS185 / IP2X FINGER PROTECTION FOR COVER PLATE TYPE MC3(-4)-XIPA

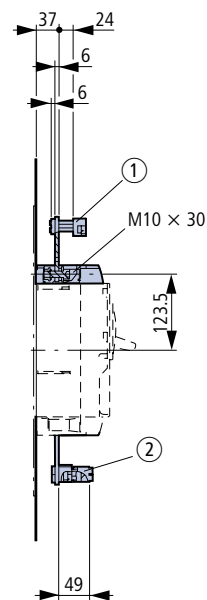
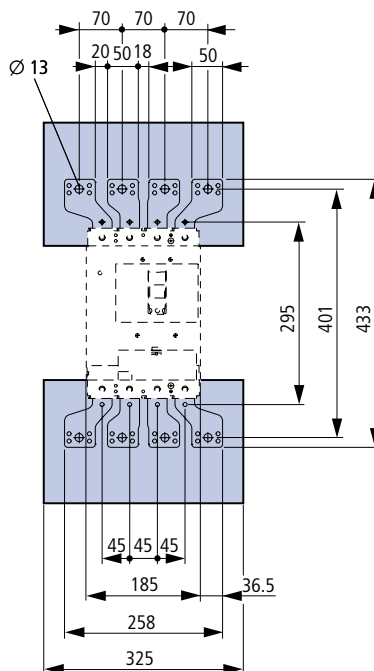
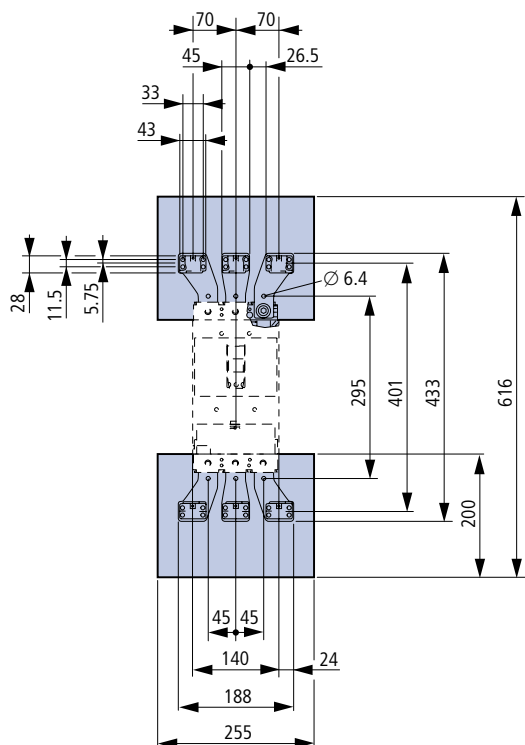


Dimensions in mm.

DIMENSIONS MC

FRAME SIZE 3: ACCESSORIES

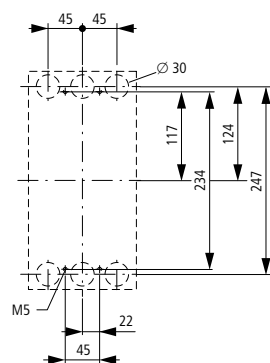
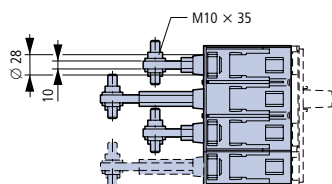
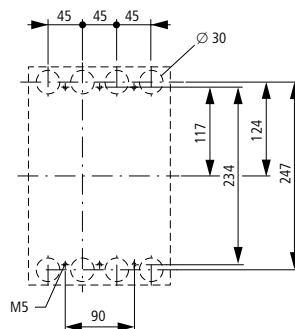
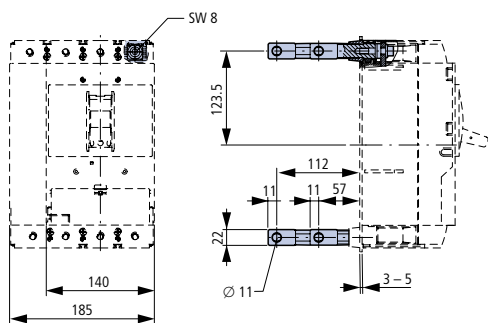
- CONNECTION WIDTH EXTENSION, TYPES MC3-XKV70, MC3-4-XKV70 / CONNECTION TERMINALS, TYPE MC3-XK22X21, MC3-4-XK22X21, MC3-XK300, MC3-4-XK300



- ① MC3-XK22X21, MC3-4-XK22X21
- ② MC3-XK300, MC3-4-XK300

Length with phase isolators approx. 599 mm

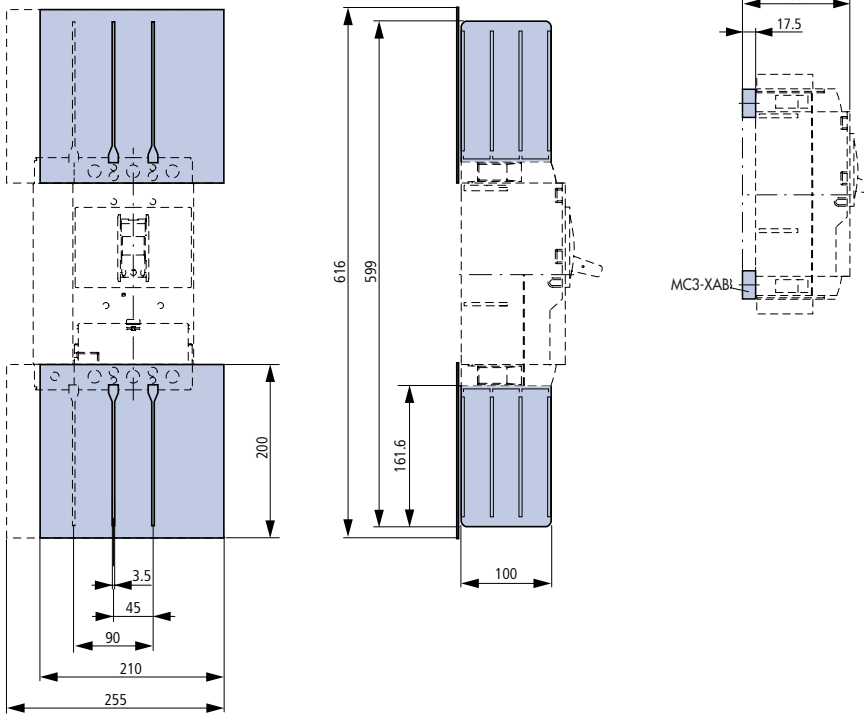
REAR CONNECTION, TYPES MC3-XKR, MC3-4-XKR



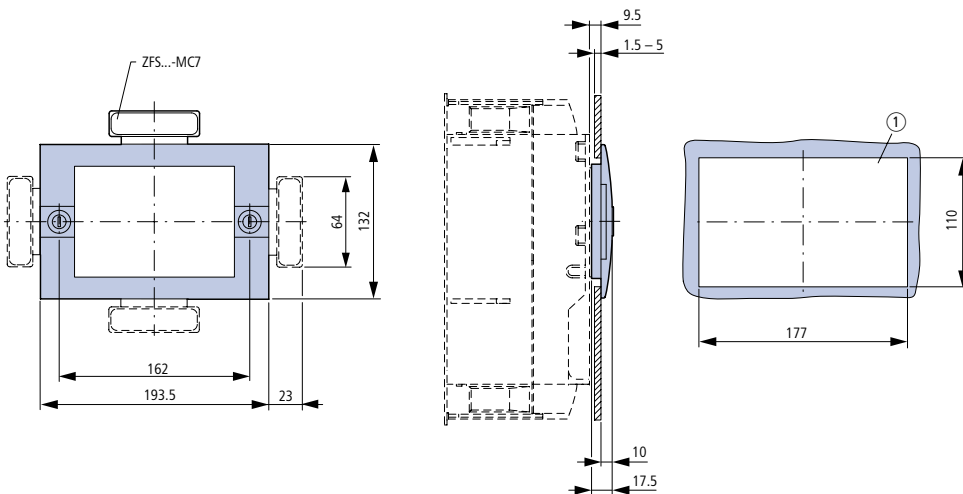
FRAME SIZE 3: ACCESSORIES

PHASE ISOLATOR, TYPE MC3-4-XKP

SPACER TYPE MC3-XAB



INSULATING SURROUND, TYPE MC3-XBR

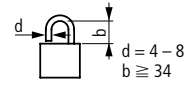
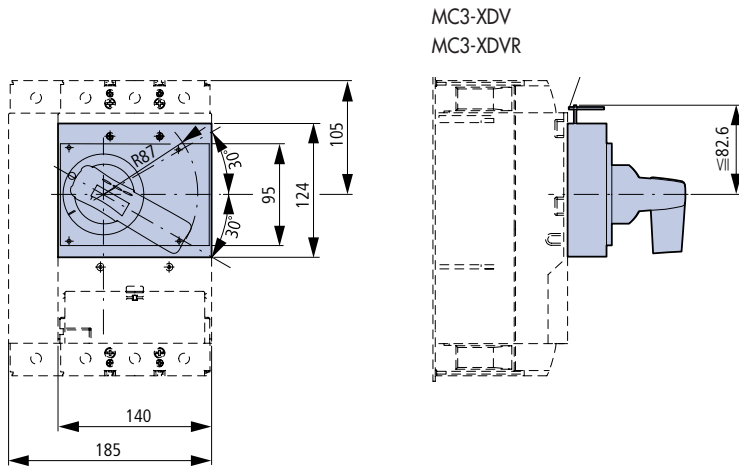


① Mounting aperture

DIMENSIONS MC

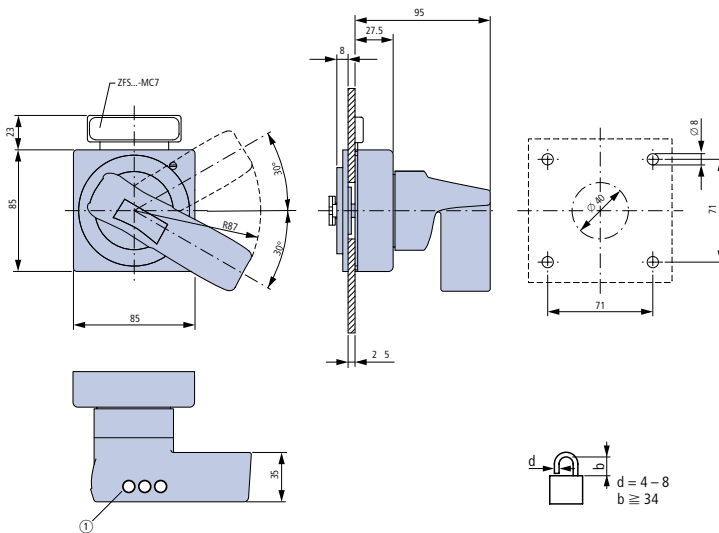
FRAME SIZE 3: ACCESSORIES

ROTARY OPERATOR, ROTARY HANDLE ON SWITCH, TYPES MC3-XDV, MC3-XDVR



① Max. 3 padlocks

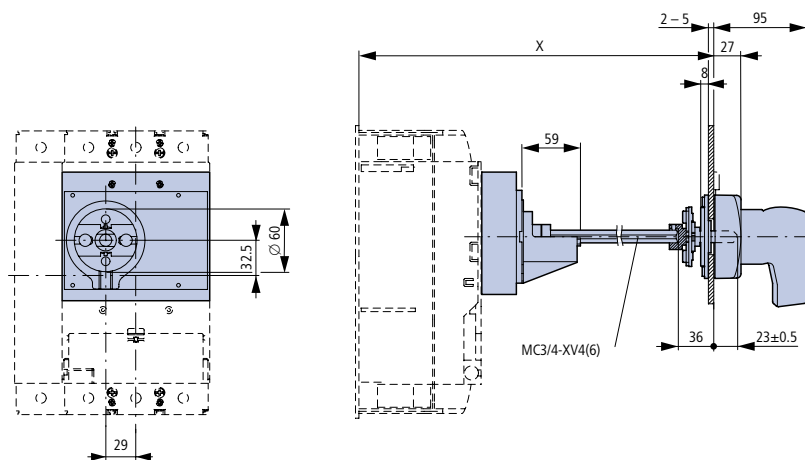
DOOR COUPLING ROTARY HANDLE TYPE MC3-XTVD(V)(R)...



① Max. 3 padlocks

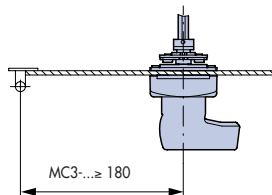
FRAME SIZE 3: ACCESSORIES

DOOR COUPLING ROTARY HANDLE WITH EXTENSION SHAFT, TYPES MC3-XTVD(V)(R), MC3/4-XV4...6



Type	x
MC3/4-XV4	270 - 400
MC3/4-XV6	400 - 600

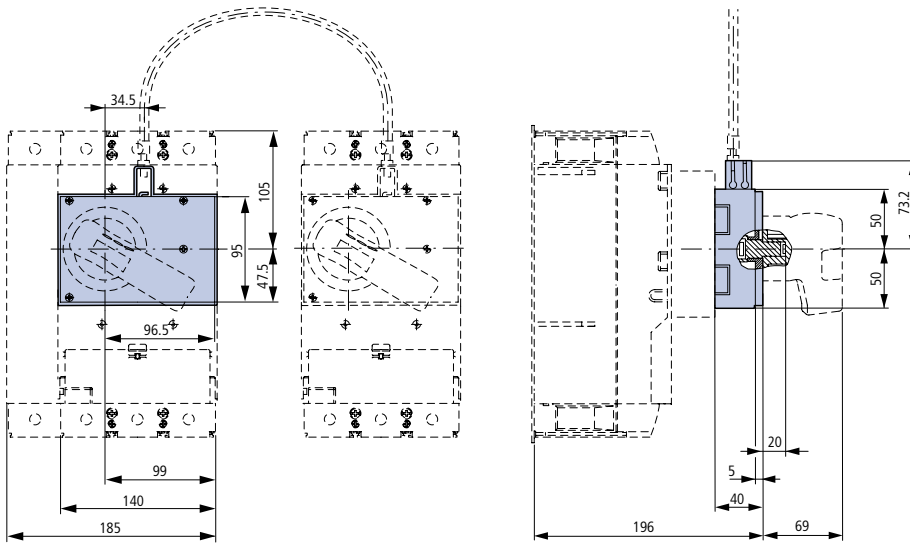
Minimum distance, door coupling rotary handle and door pivot point



FRAME SIZE 3: ACCESSORIES

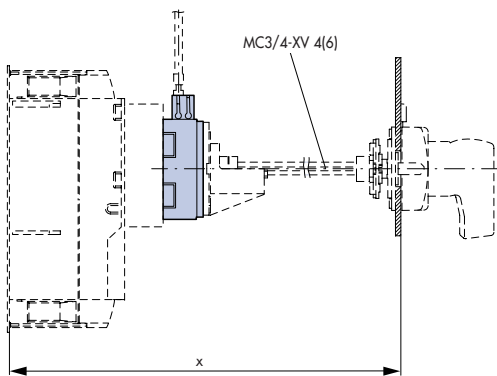
MECHANICAL INTERLOCK TYPES MC3-XMV, MC3-XD(R)

MC3-XMV + MC3-XDV(R)



MECHANICAL INTERLOCK TYPES WITH DOOR COUPLING ROTARY HANDLE, TYPES MC3-XMV, MC3-XTVD(V)(R)

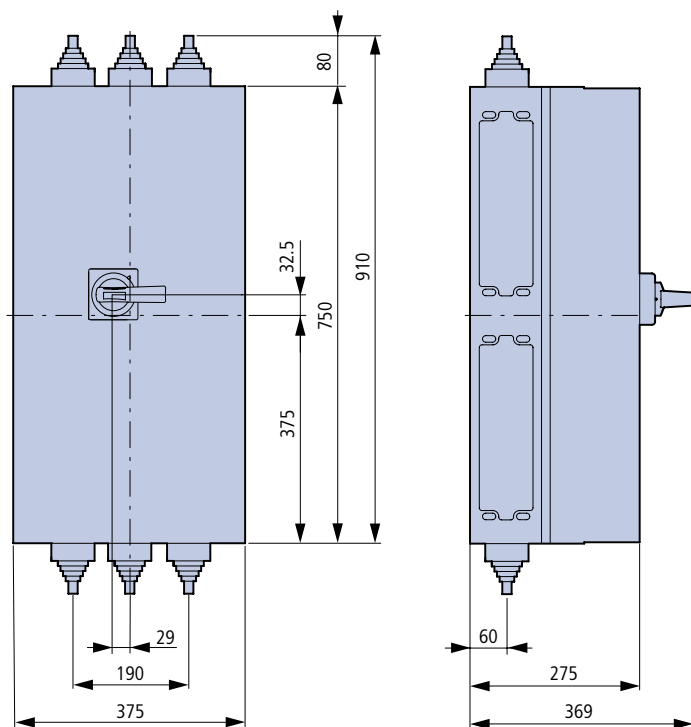
MC3-XMV + MC3-XTVD(V)(R)



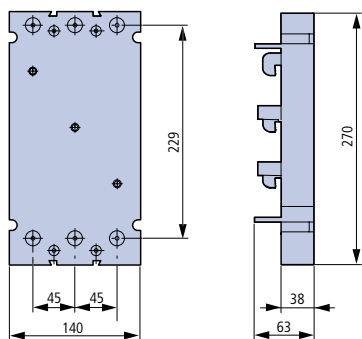
Type	x (mm)
MC3/4-XV4	305 - 400
MC3/4-XV6	400 - 600

FRAME SIZE 3: ACCESSORIES

INSULATED ENCLOSURE, TYPE MC3-XCI48-TVD



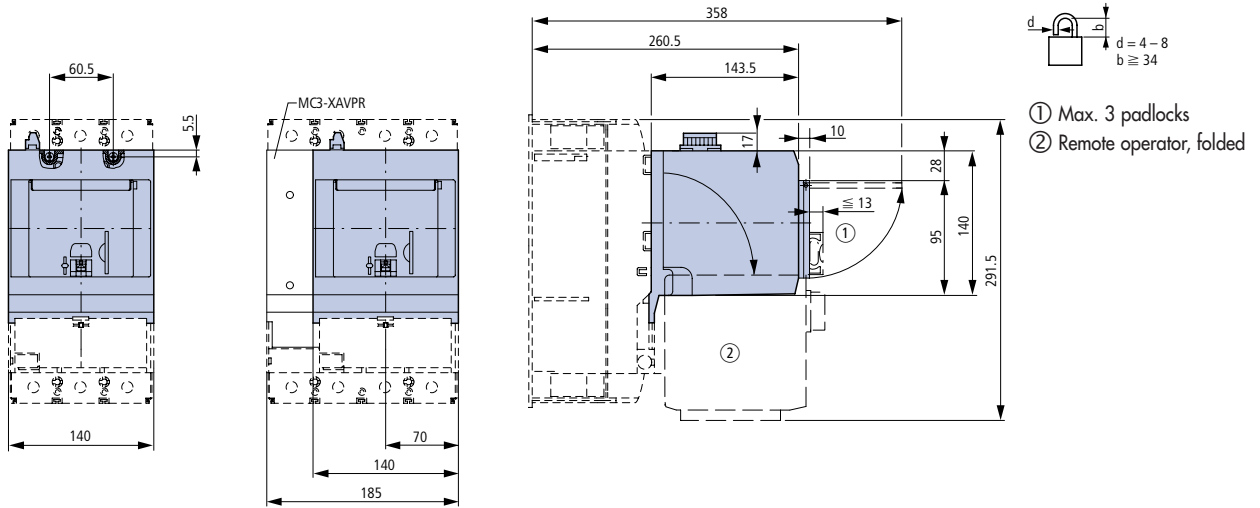
COMPONENT ADAPTER, TYPE 32170



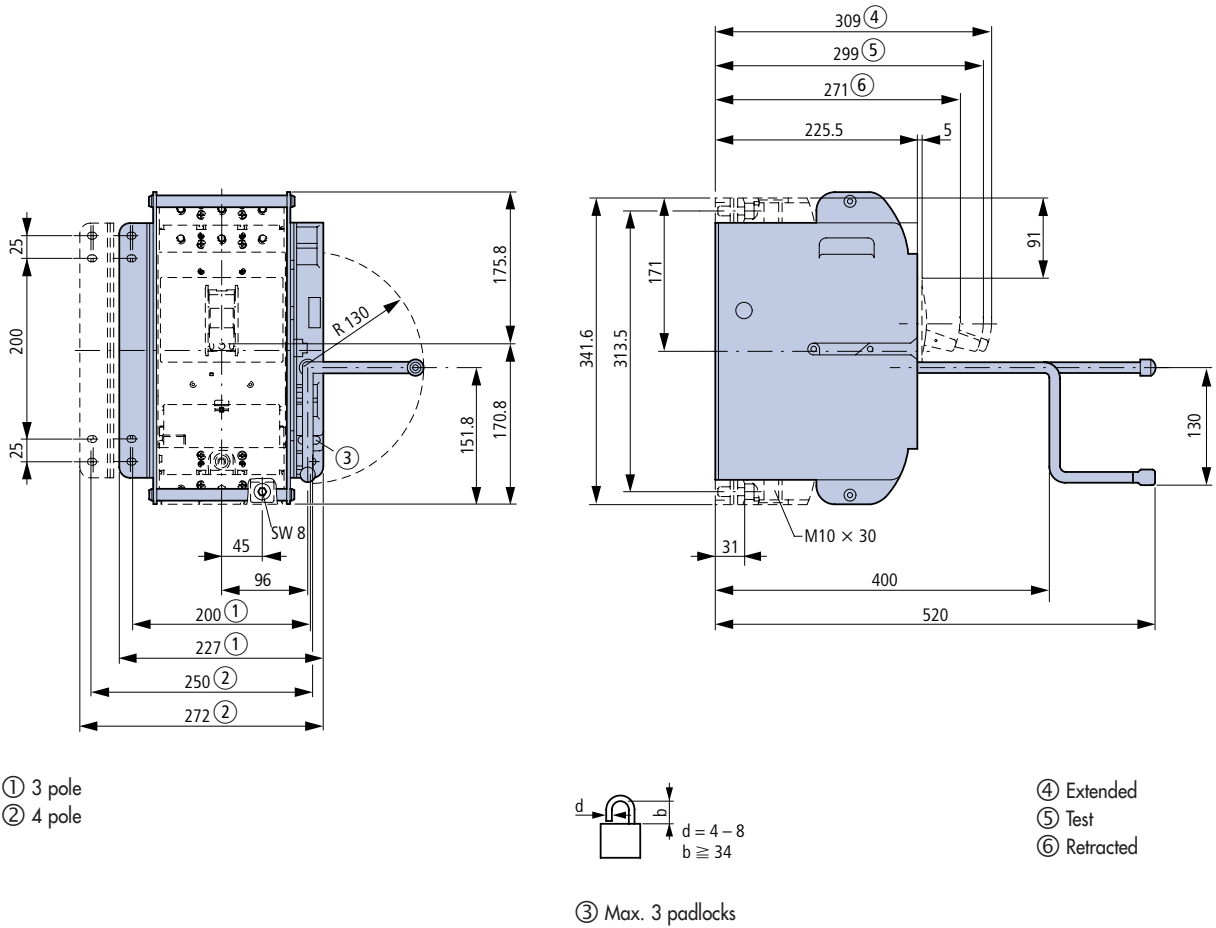
DIMENSIONS MC

FRAME SIZE 3: ACCESSORIES

REMOTE OPERATOR, TYPE MC3-XR...

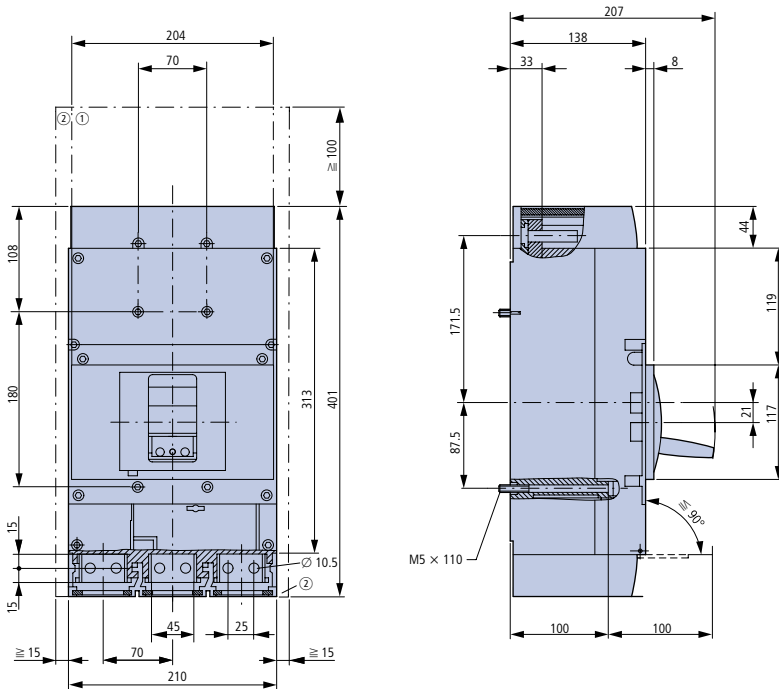


WITHDRAWABLE UNIT WITH CONTROL CIRCUIT PLUG UNIT TYPE MC3-XAV



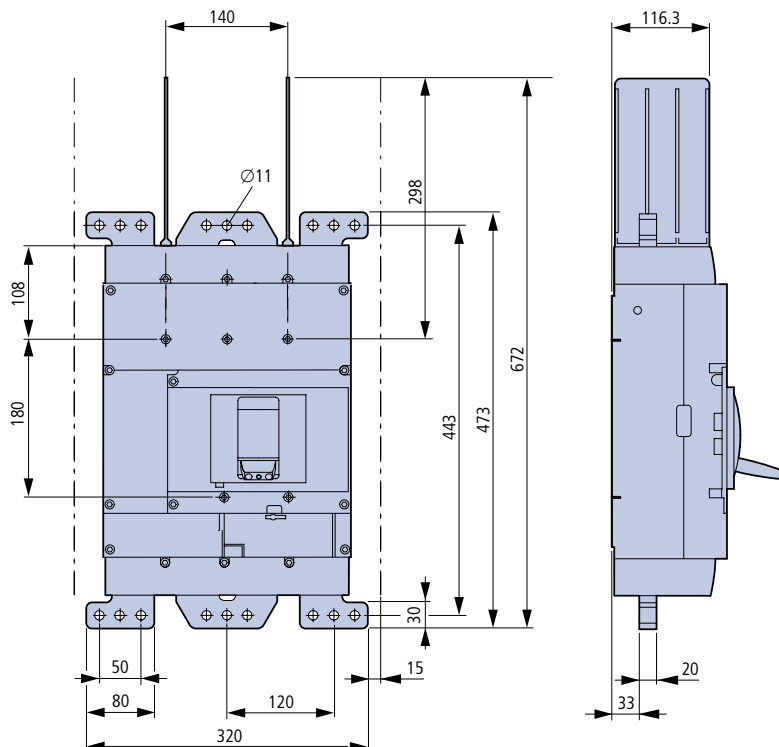
FRAME SIZE 4: BASIC UNITS

CIRCUIT-BREAKER / SWITCH DISCONNECTOR, 3-POLE TYPES MC4N, MC4H, MC4-N



- ① Blow out area, minimum clearance to other parts ≥ 100 mm to 690 V; ≥ 200 mm to 1000 V
- ② Minimum clearance to adjacent parts ≥ 15 mm

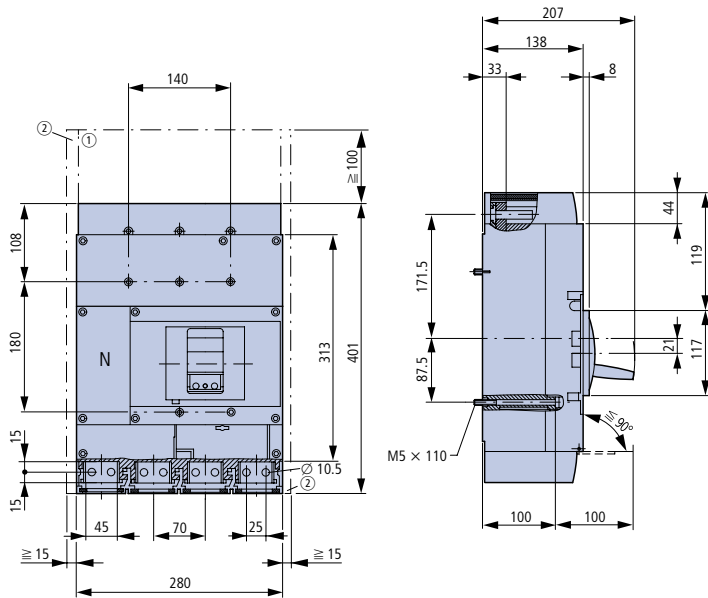
CIRCUIT-BREAKER, 3-POLE TYPES MC4N-VE2000, MC4H-VE2000



DIMENSIONS MC

FRAME SIZE 4: BASIC UNIT, ACCESSORIES

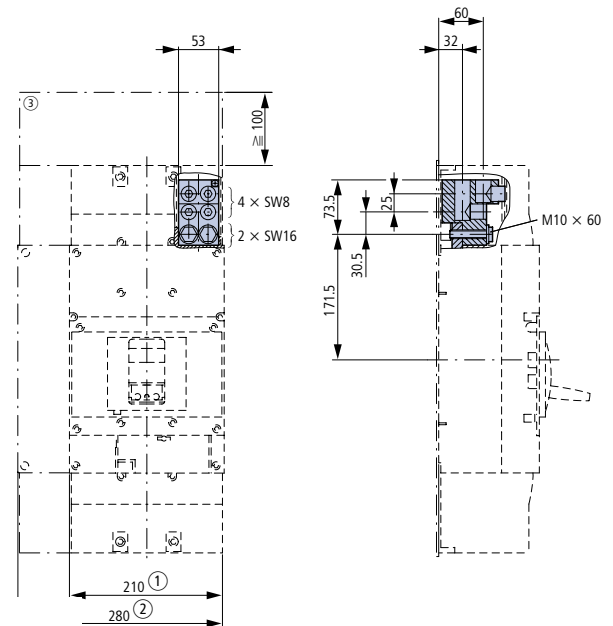
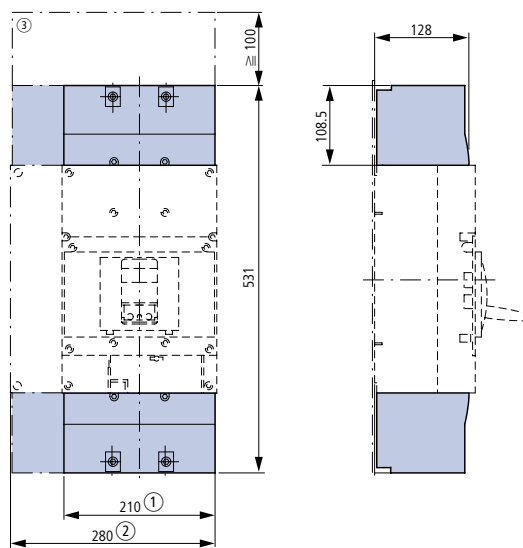
CIRCUIT-BREAKER / SWITCH DISCONNECTOR, 4-POLE TYPES MC4N-4, MC4H-4, MC4-N-4, MC4-H-4



- ① Blow out area, minimum clearance to other parts ≥ 100 mm
- ② Minimum clearance to adjacent parts ≥ 15 mm

COVER PLATE, TYPES MC4-XKSA, MC4-4-XKSA

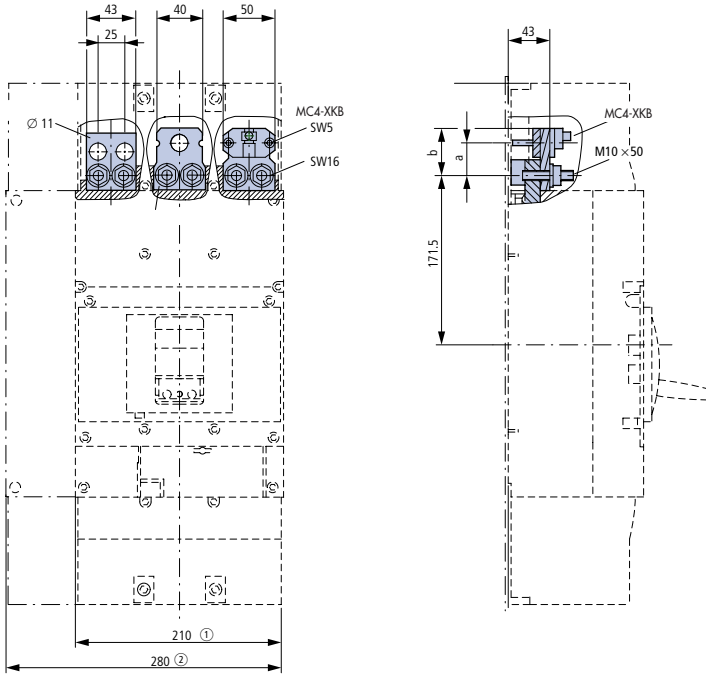
TUNNEL TERMINAL, TYPES MC4-XKA, MC4-4-XKA



- ① 3 pole
- ② 4 pole
- ③ Clearance to conductive parts ≥ 100 mm to 690 V; ≥ 200 mm at 1000V

FRAME SIZE 4: ACCESSORIES

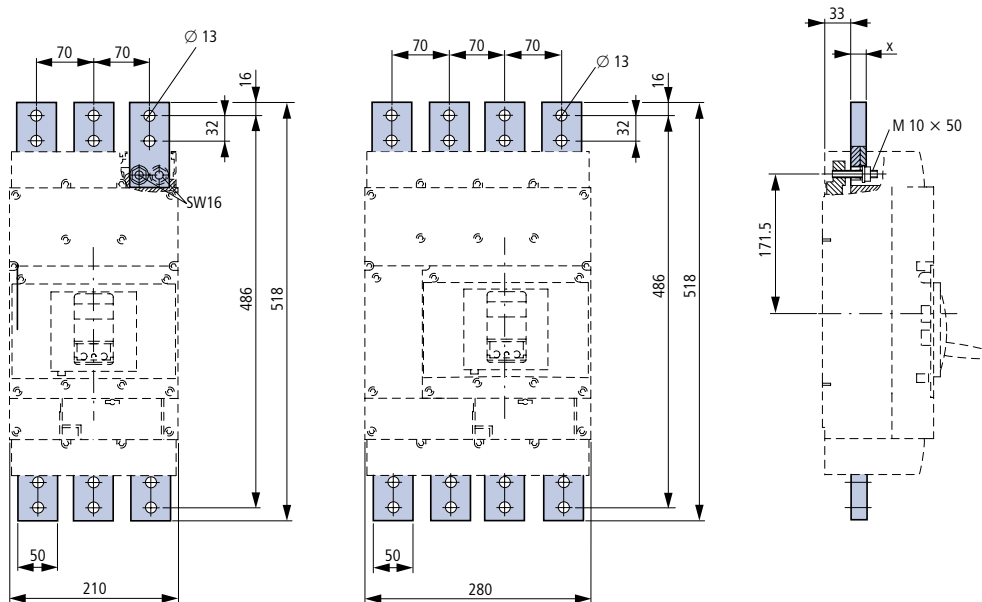
SCREW CONNECTION MODULE PLATE 1 BORE, TYPES MC4-XKM1, MC4-4-XKM1, 2 BORE TYPES MC4-XKM2, MC4-4-XKM2 / RIBBON CABLE, TYPES MC4-XKB, MC4-4-XKB



Type	a	b
MC4(-4)-XKM1	36	47
MC4(-4)-XKM2	32	40
MC4(-4)-XKB	-	47

- ① 3 pole
- ② 4 pole
- ③ Clearance to conductive parts
 ≥ 100 mm to 690 V;
 ≥ 200 mm to 1000 V

SCREW CONNECTION, MODULE PLATE, 2 BORE, VERTICAL, TYPE MC4-XKM2S..., MC4-4-XKM2S...



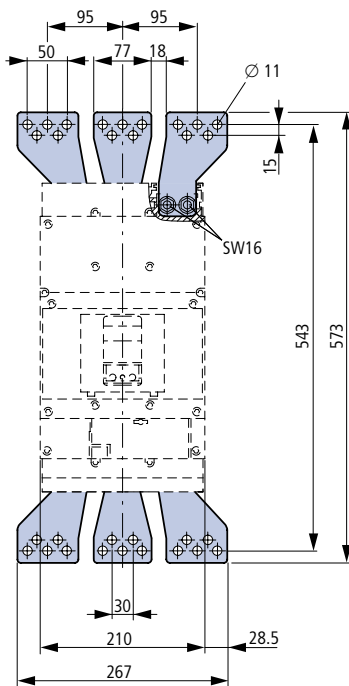
Type	x
MC4-XKM2S-1250,	12
MC4-4-XKM2S-1250	12
MC4-XKM2S-1600,	20
MC4-4-XKM2S-1600	20

DIMENSIONS MC

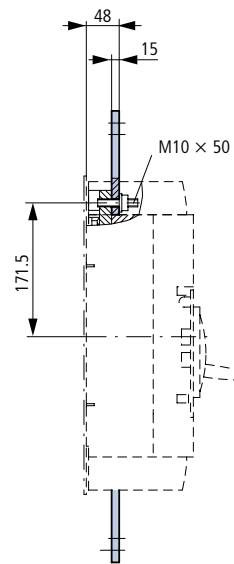
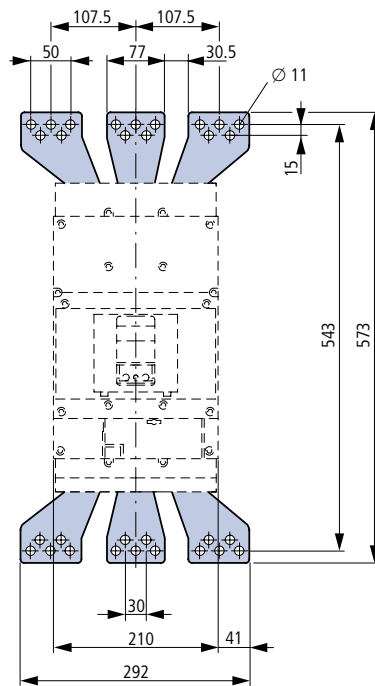
FRAME SIZE 4: ACCESSORIES

CONNECTION WIDTH EXTENSION, TYPES MC4-XKV95, MC4-XKV110, MC4-4-XKV95, MC4-4-XKV120

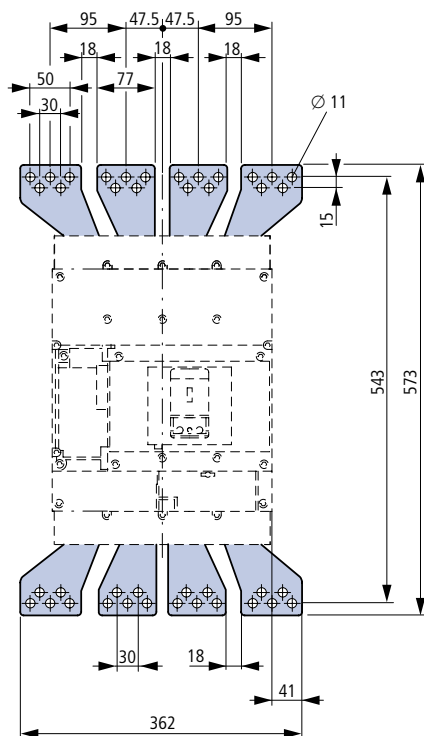
MC4-XKV95



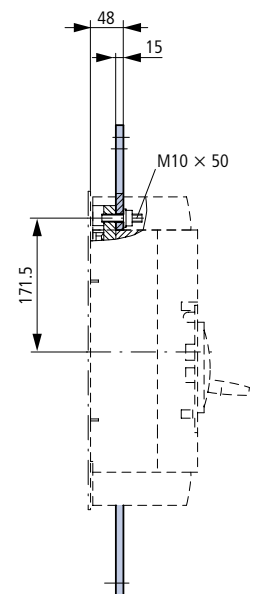
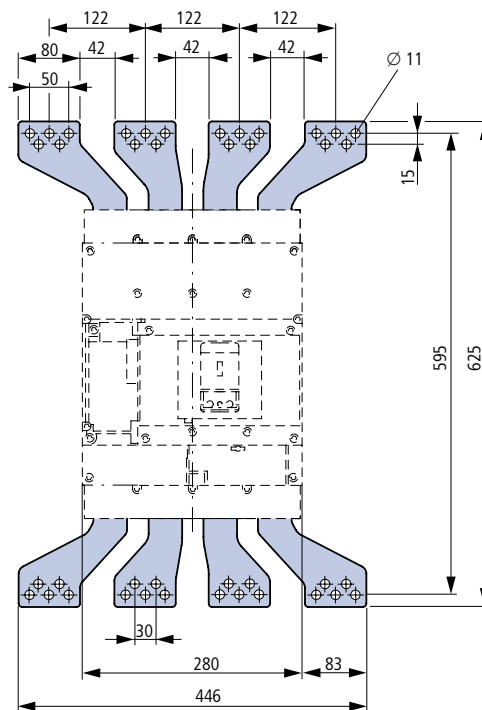
MC4-XKV110



MC4-4-XKV95

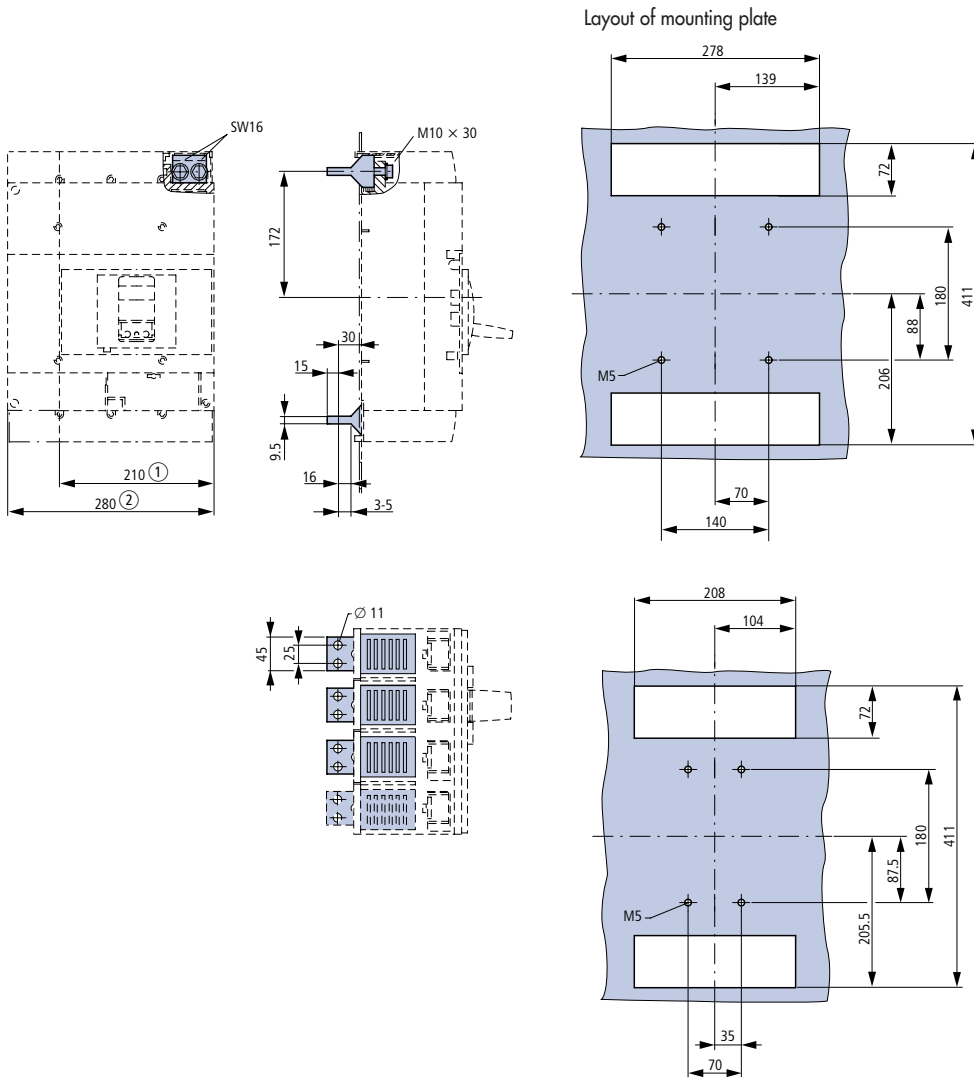


MC4-4-XKV120



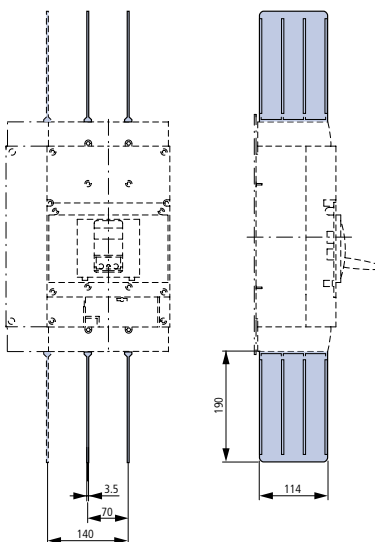
FRAME SIZE 4: ACCESSORIES

REAR-SIDE CONNECTION, TYPES MC4-XKR, MC4-4-XKR



Rear-side connection also possible with 90° rotation.

PHASE ISOLATORS, TYPES MC4-XKA, MC4-4-XKA

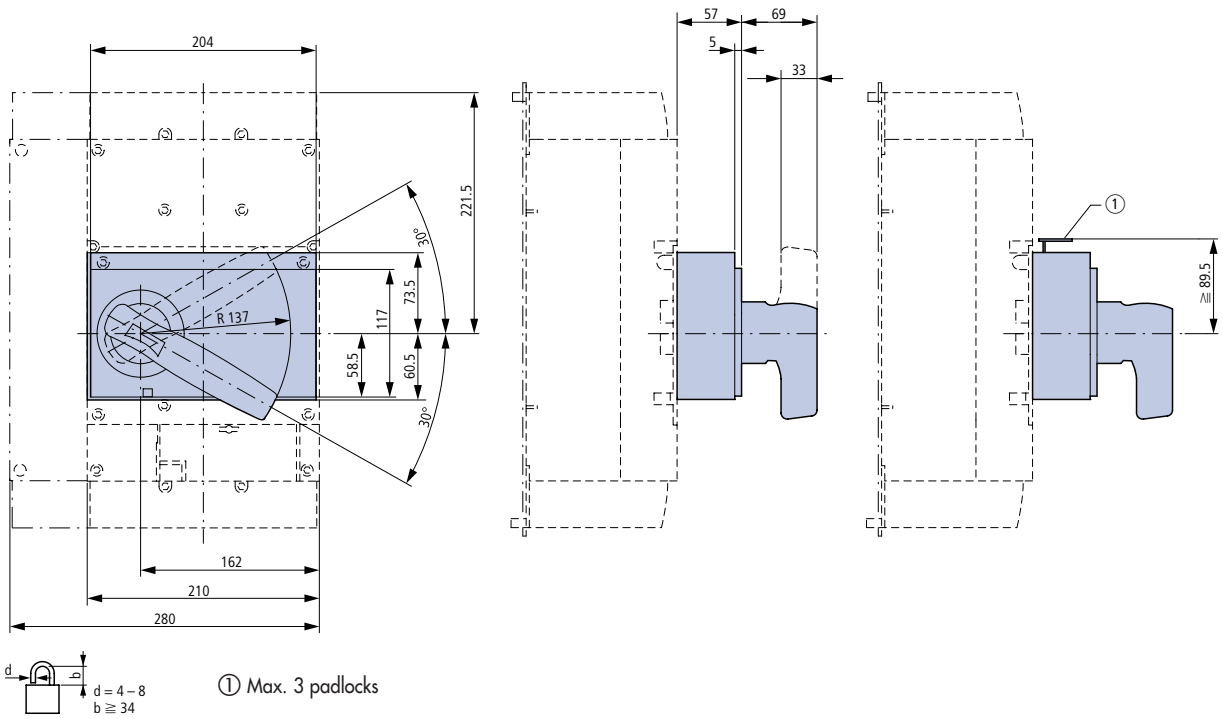


Dimensions in mm.

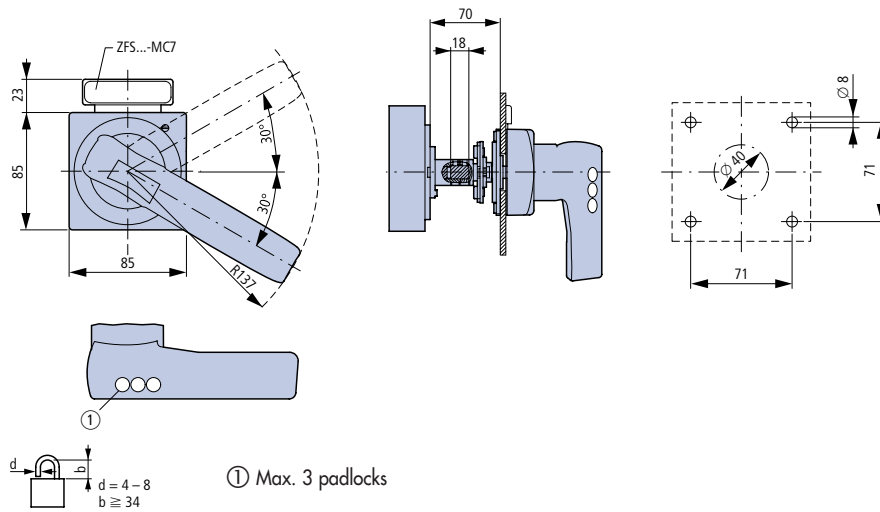
DIMENSIONS MC

FRAME SIZE 4: ACCESSORIES

ROTARY HANDLE ON SWITCH, TYPE MC4-XDV(R)

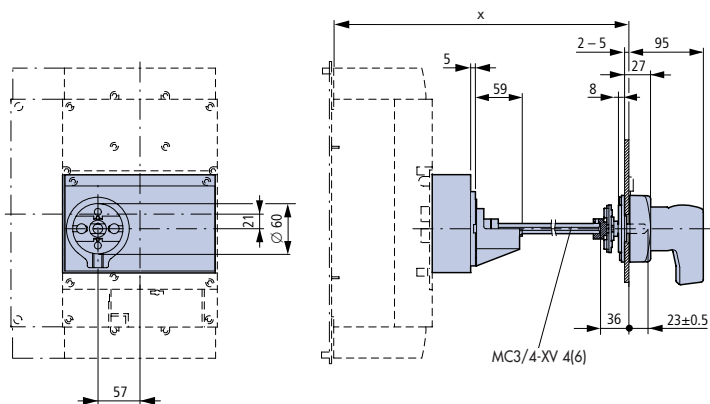


DOOR COUPLING ROTARY HANDLE TYPE MC4-XTVD(V)(R)...



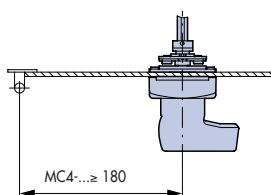
FRAME SIZE 4: ACCESSORIES

DOOR COUPLING ROTARY HANDLE WITH EXTENSION SHAFT, TYPES MC4-XTVD(V)(R), MC3/4-XV4(6)



Type	x (mm)
MC3/4-XV4	335 – 400
MC3/4-XV6	400 – 600

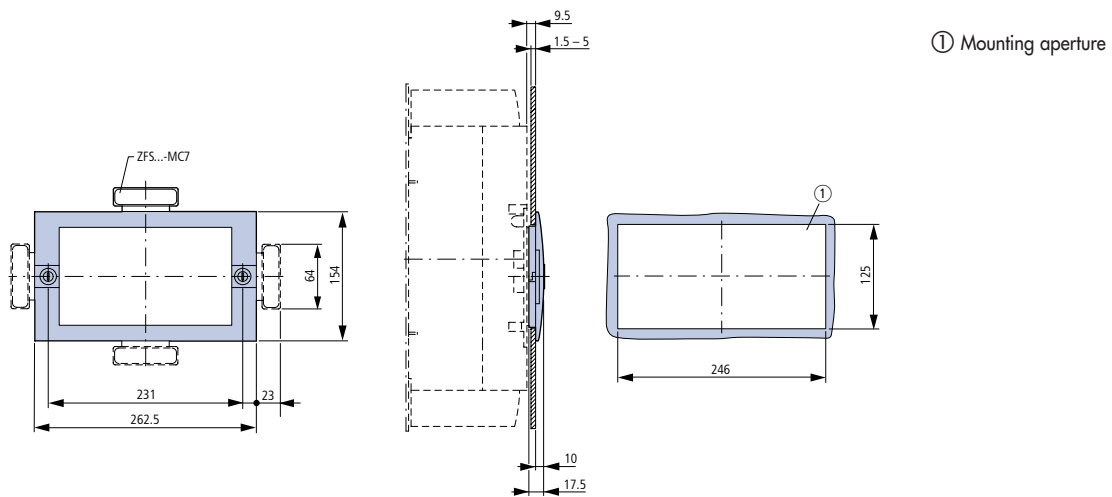
Minimum distance, door coupling rotary handle and door pivot point



DIMENSIONS MC

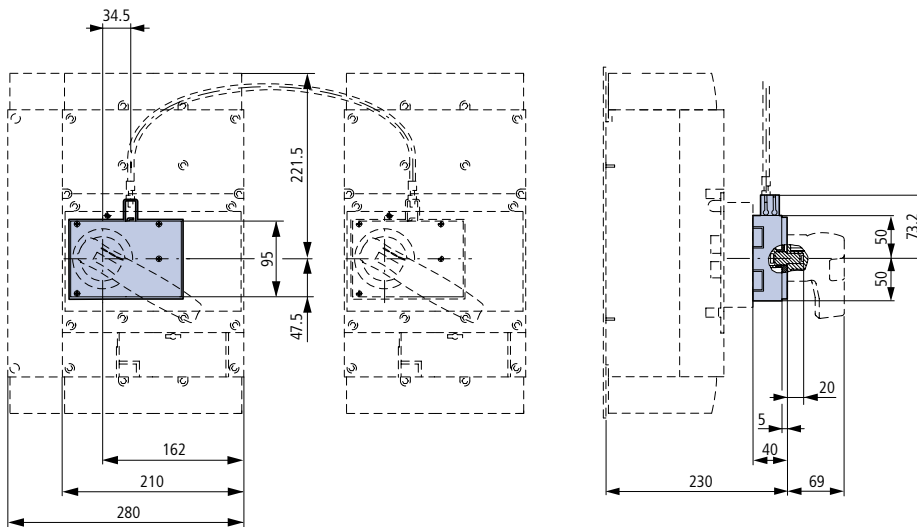
FRAME SIZE 4: ACCESSORIES

INSULATING SURROUND, TYPE MC4-XBR

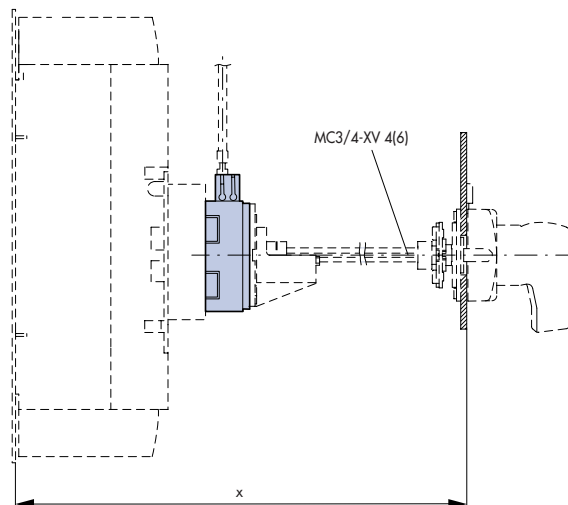


MECHANICAL INTERLOCK TYPES MC4-XMV, MC4-XDV(R)

MC4-XMV + MC4-XDV(R)



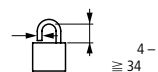
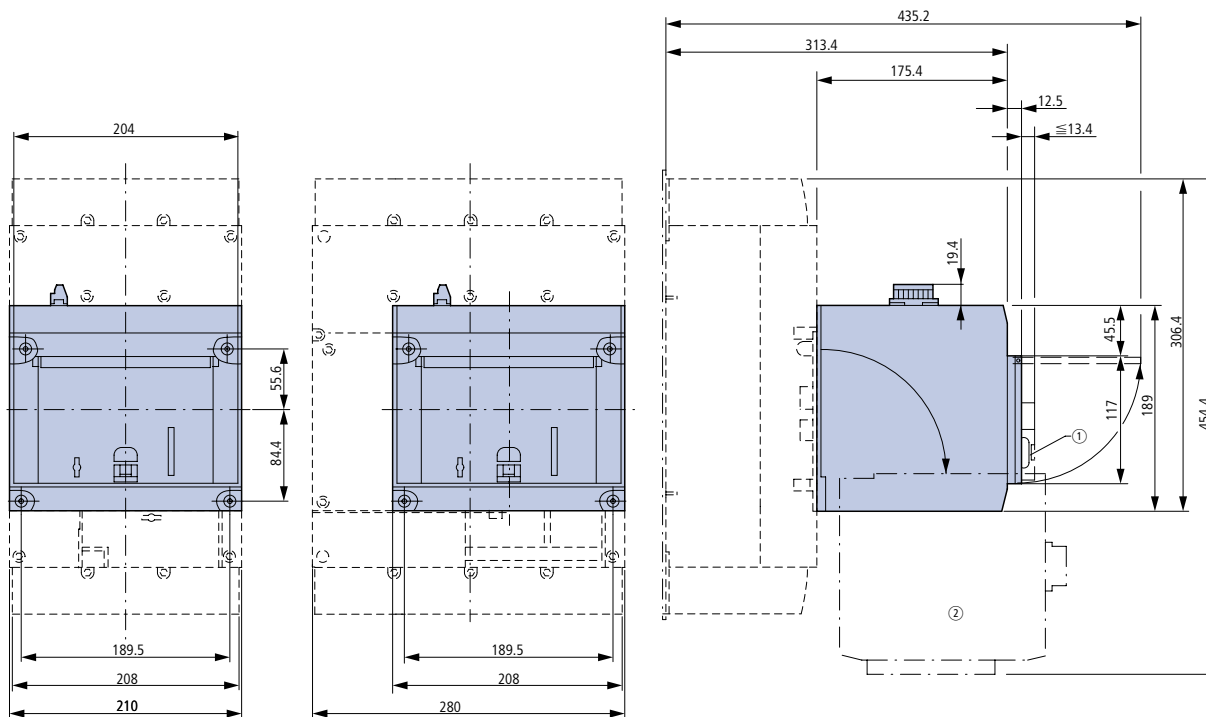
MC4-XMV + MC4-XTVD(V)(R)



Type	x (mm)
MC3/4-XV4	335 - 400
MC3/4-XV6	400 - 600

FRAME SIZE 4: ACCESSORIES

REMOTE OPERATOR, TYPE MC4-XR...

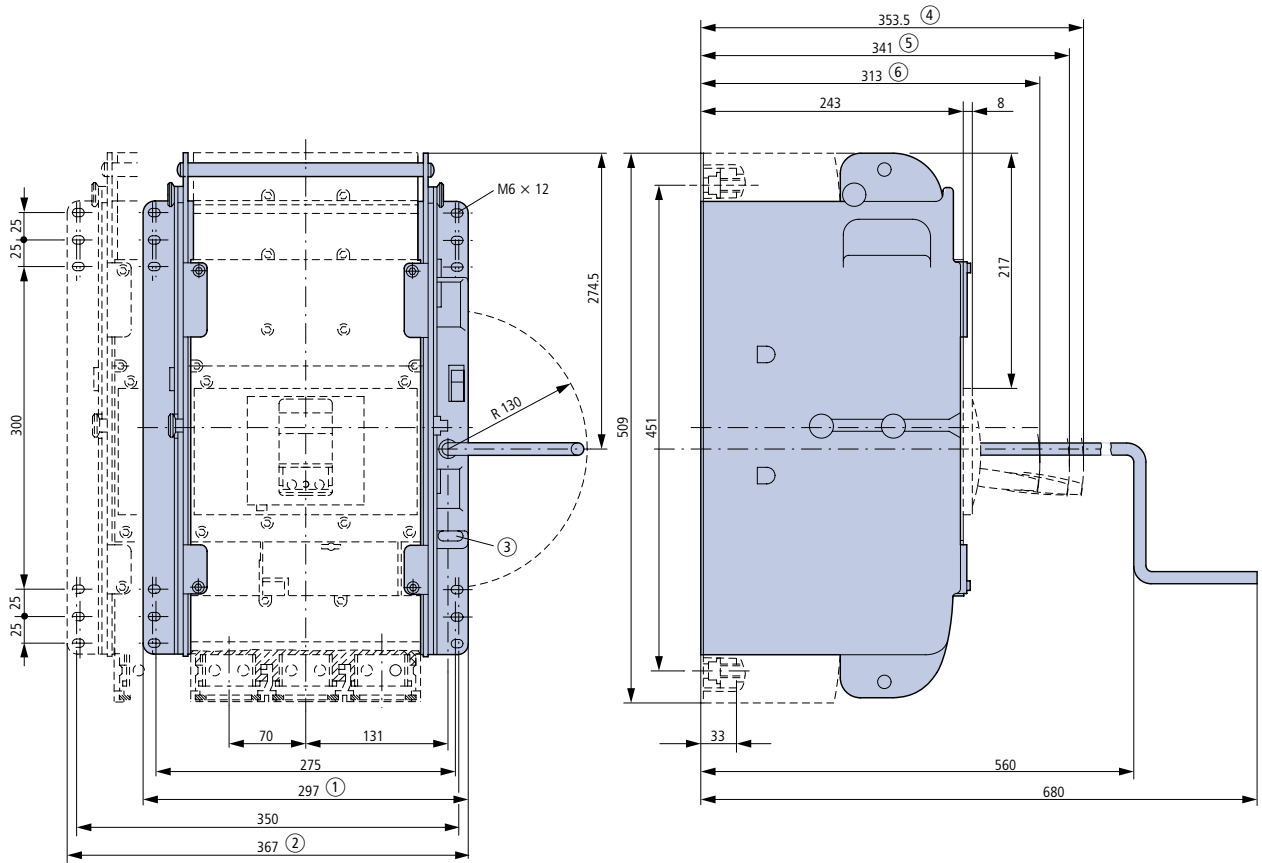


- ① Max. 3 padlocks
- ② Remote operator, folded

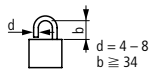
DIMENSIONS MC

FRAME SIZE 4: ACCESSORIES

WITHDRAWABLE UNIT WITH CONTROL CIRCUIT PLUG UNIT TYPE MC4-XAV



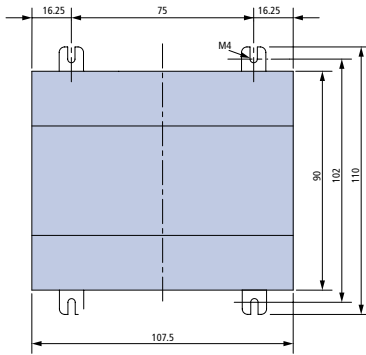
- ① 3 pole
- ② 4 pole



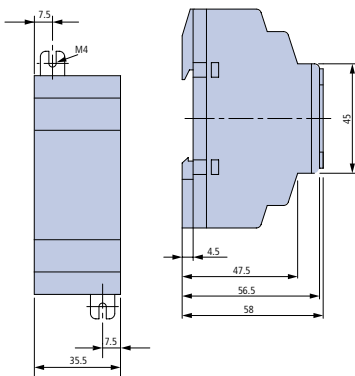
③ Max. 3 padlocks

- ④ Extended
- ⑤ Test
- ⑥ Retracted

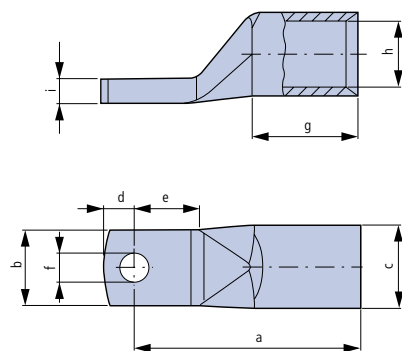
DATA MANAGEMENT INTERFACE (DMI MODULE)



PROFIBUS MODULE



PIPE CABLE LUGS



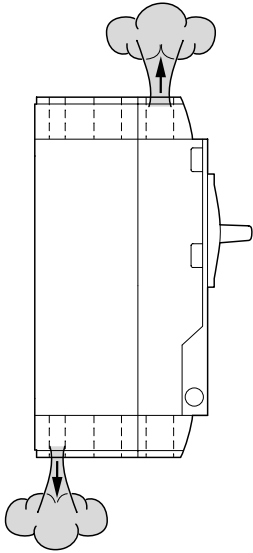
To press in the cable lugs, the K22, HK60/22 or EK22 pressing tool produced by Klauke is required with the following inserts:

- R22/95 for 95 mm²
- R22/120 for 120 mm²
- R22/150 for 150 mm²
- R22/185 for 185 mm²
- R22/240 for 240 mm²

Dimensions

Cable lug Types	for use in for	Nominal cross-section mm ²	Terminal bolts Ø	Dimensions in mm								
				a	b	c	d	e	f	g	h	i
MC2-XKS95	MC2	MC2	M8	53 ⁺²	23 ^{±0.5}	18 ^{±0.2}	10 ^{±1}	19	8.5	25	13.5	4.4
MC2-XKS120	MC2	MC2	M8	56 ⁺²	23 ^{±0.5}	19.5 ^{±0.2}	10 ^{±1}	19	8.5	26	15	4.4
MC2-XKS150	MC2	MC2	M8	61 ⁺²	23 ^{±0.5}	21 ^{±0.2}	10 ^{±1}	19	8.5	30	16.5	4.4
MC2-XKS185	MC2	MC2	M8	65 ^{±1.5}	22 ^{±1}	24 ^{±0.36}	9 ⁺¹ _{-0.5}	19 ^{+2.5} _{-0.5}	8.5 ^{+0.05} _{-0.1}	60 ^{±2}	19 ^{±0.4}	7
MC3-XKS185	MC3, MC4	MC3, MC4	M10	65	24.5	24	11.5	18	10.5	30	19	7.0 ^{±0.8}
MC3-XKS240	MC3, MC4	MC3, MC4	M10	72	31	26	11.5	19	10.5	35	21	5.0 ^{±0}

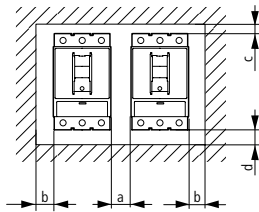
DIRECTION OF BLOW-OUT FOR MC1, MC2, MC3, MC4



	Top front	Bottom rear
MC1	X	-
MC2 ¹⁾	X	X
MC3	X	X
MC4	X	-

¹⁾ MC2 B-A...same as MC1

MINIMUM CLEARANCES FOR MC1, MC2, MC3, MC4



between two switches mounted side-by-side,
minimum clearance a in mm

	MC1	MC2	MC3	MC4
MC1	0	5	5	15
MC2	5	5	5	15
MC3	5	5	5	15
MC4	15	15	15	15

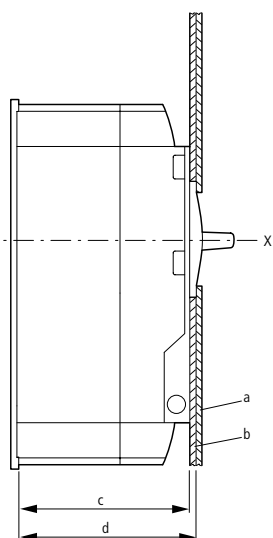
between switches and other parts,
minimum clearances in mm

	b		c		d	
	≤ 690 V	1000V	≥ 690V	1000V	≥ 690V	1000V
MC1	0	-	60	-	0	-
MC2 ¹⁾	5	5	35	35	35	35
MC3	5	5	60	60	60	60
MC4	15	15	100	200	0	0

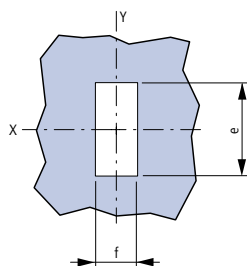
¹⁾ M2 B-A...C = 60 mm, d = 0 mm

AUXILIARY CONTACTS, TRIP-INDICATING CONTACTS FOR MC1, MC2, MC3, MC4

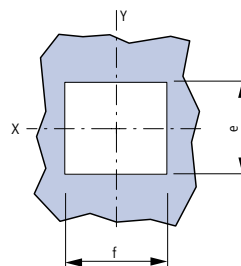
Cut-outs on front



Cutout a
Toggle lever



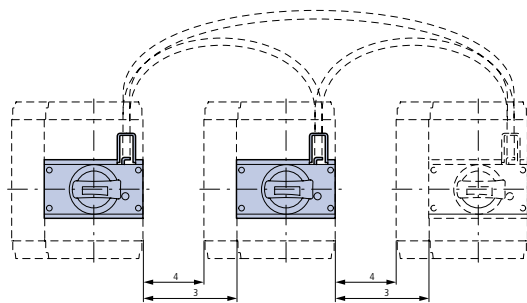
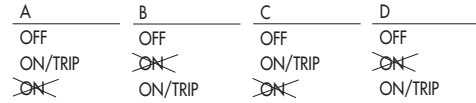
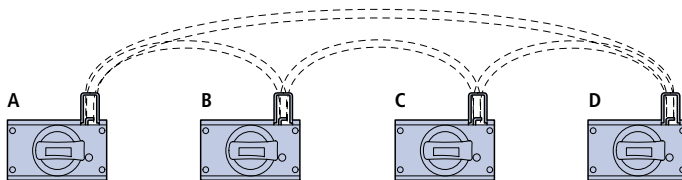
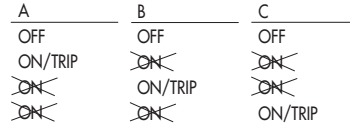
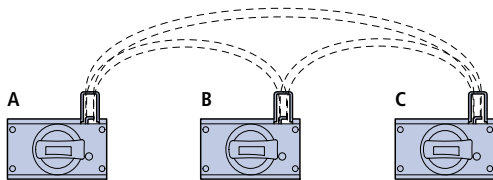
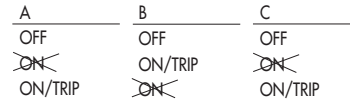
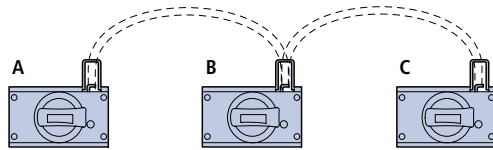
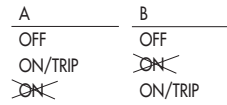
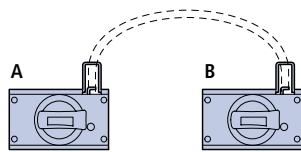
Cutout b
Rotary handle, remote operator



	Clearance from the mounting plate and door cutout		Cutout a		Cutout b	
	c mm	d mm	e mm	F mm	e mm	F mm
MC1	68,0	73.0	40	23	46	91
MC2	103.0	108.0	79	36	96	101
MC3	120.5	125.5	79	36	96	136
MC4	138.0	146.0	101	105	118	204

MECHANICAL INTERLOCK FOR (DOOR COUPLING) ROTARY HANDLES

POSSIBLE COMBINATIONS, INTERLOCKING CIRCUIT VARIATIONS, TYPES MC, MC...-XBZ-...



X_{3P} = Switch clearance, 3 pole
 X_{4P} = Switch clearance, 4 pole

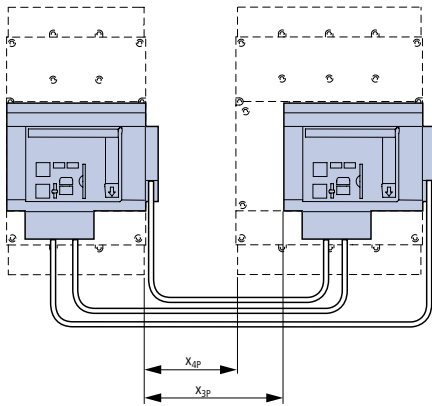
MC-XBZ225		Right switch							
Max. switch clearance		MC1	X4P	MC2	X4P	MC3	X4P	MC4	X4P
Left switch	mm	mm	mm	mm	mm	mm	mm	mm	mm
MC1	3/4 pole	135	105	120	85	135	90	125	80
MC2	3/4 pole	135	105	120	85	135	90	125	80
MC3	3/4 pole	90	75	75	35	85	40	80	45
MC4	3/4 pole	50	35	40	15	25	-	15	-

MC-XBZ600		Right-hand switch							
Max. switch clearance		MC1	X4P	MC2	X4P	MC3	X4P	MC4	X4P
Left switch	mm	mm	mm	mm	mm	mm	mm	mm	mm
MC1	3/4 pole	510	480	495	460	510	465	475	405
MC2	3/4 pole	510	480	495	460	510	465	475	405
MC3	3/4 pole	460	430	450	410	460	415	460	390
MC4	3/4 pole	400	370	380	340	400	375	390	320

MC-XBZ1000		Right switch							
Max. switch clearance		MC1	X4P	MC2	X4P	MC3	X4P	MC4	X4P
Left switch	mm	mm	mm	mm	mm	mm	mm	mm	mm
MC1	3/4 pole	910	880	895	860	910	865	865	795
MC2	3/4 pole	910	880	895	860	910	865	865	795
MC3	3/4 pole	820	790	850	810	860	815	860	790
MC4	3/4 pole	750	720	730	700	800	775	790	720

MECHANICAL INTERLOCK FOR REMOTE DRIVE, FAULT CURRENT BREAKER

TYPE MC...-XMVR(L)



X_{3p} = Switch clearance, 3 pole
 X_{4p} = Switch clearance, 4 pole

Mechanical interlock XMVR (Side-by-side mounting)

MC.-XMVR

Left switch	Max. switch clearance	Right switch					
		MC2 X3p	X4p	MC3 X3p	X4p	MC4 X3p	X4p
	mm	mm	mm	mm	mm	mm	
MC2 3/4 pole	130	95	95	50	-	-	
MC3 3/4 pole	-	-	135	90	155	85	
MC4 3/4 pole	-	-	-	-	120	50	

X = Max. switch clearance

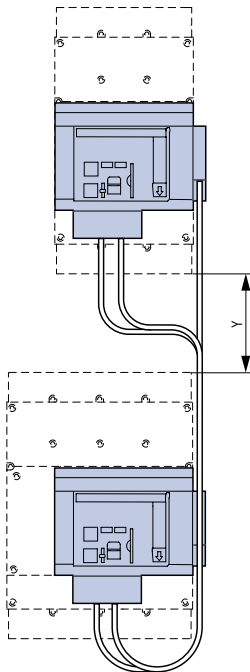
Mechanical interlock XMVRL (Mounting in adjacent switch cabinet sections)

MC.-XMVRL

Left switch	Max. switch clearance	Right switch					
		MC2 X3p	X4p	MC3 X3p	X4p	MC4 X3p	X4p
	mm	mm	mm	mm	mm	mm	
MC2 3/4 pole	350	315	420	385	-	-	
MC3 3/4 pole	-	-	400	365	460	390	
MC4 3/4 pole	-	-	-	-	420	350	

X = Max. switch clearance

TYPE MC...-XMVR(L)



Mechanical interlock XMVRL (mounting on top of one another)

MC.-XMVRL

Bottom switch	Max. switch clearance	Switch top		
		MC2 3/4 pole Y	MC3 3/4 pole Y	MC3 3/4 pole Y
	mm	mm	mm	
MC2 3/4 pole	220	225	-	
MC3 3/4 pole	-	220	230	
MC4 3/4 pole	-	-	230	

Y = max. switch clearance



“Curiosity is always the first step when solving a problem.”

Galileo Galilei, physicist and astronomer

AIR CIRCUIT-BREAKER / SWITCH DISCONNECTOR, MO

▀ CONTENTS

MO – SYSTEM OVERVIEW	Page 146
MO – FIXED-MOUNTED INSTALLATION	Page 156
MO – WITHDRAWABLE MODELS	Page 166
ACCESSORIES FOR MO	Page 176
TECHNICAL DATA MO SERIES	Page 195
DIMENSIONS MO SERIES.....	Page 210

MO AIR CIRCUIT BREAKERS



NOMINAL CURRENT MAX 6300 A, 3 SWITCHING CAPACITY CLASSES, 6 ELECTRONIC RELEASES, 3- AND 4-POLE VERSIONS

MO air circuit breakers offer full coverage of the 630 - 6300A range with just three contact frame sizes. The nominal current of all contacts can be optimally adjusted to the expansion stage using rating plugs. The smallest rating plug has 250A and at that even with a setting range of 0,4 to 1xIn.

STANDARD DIMENSIONS, EASY TO PLAN

The MO has a uniform frame height and -depth for all current ranges. Only the width of the circuit breaker varies, depending on the number of poles and the frame size. MOs for permanent installation and withdrawable models have identical widths.

CONNECTION SYSTEM

MO circuit breakers up to 5000A come with horizontal connections as standard. The MO 6300A is fitted with vertical connections. The following connections are available as optional extras: Vertical connections, front-side connections and flange connections.

RATED CURRENT MODULE

This replaceable module allows the user to reduce the nominal current of the device for optimal system adjustment, e.g. when commissioning a sub-system. The correct rating plug to choose is one which most closely matches the system's nominal current.

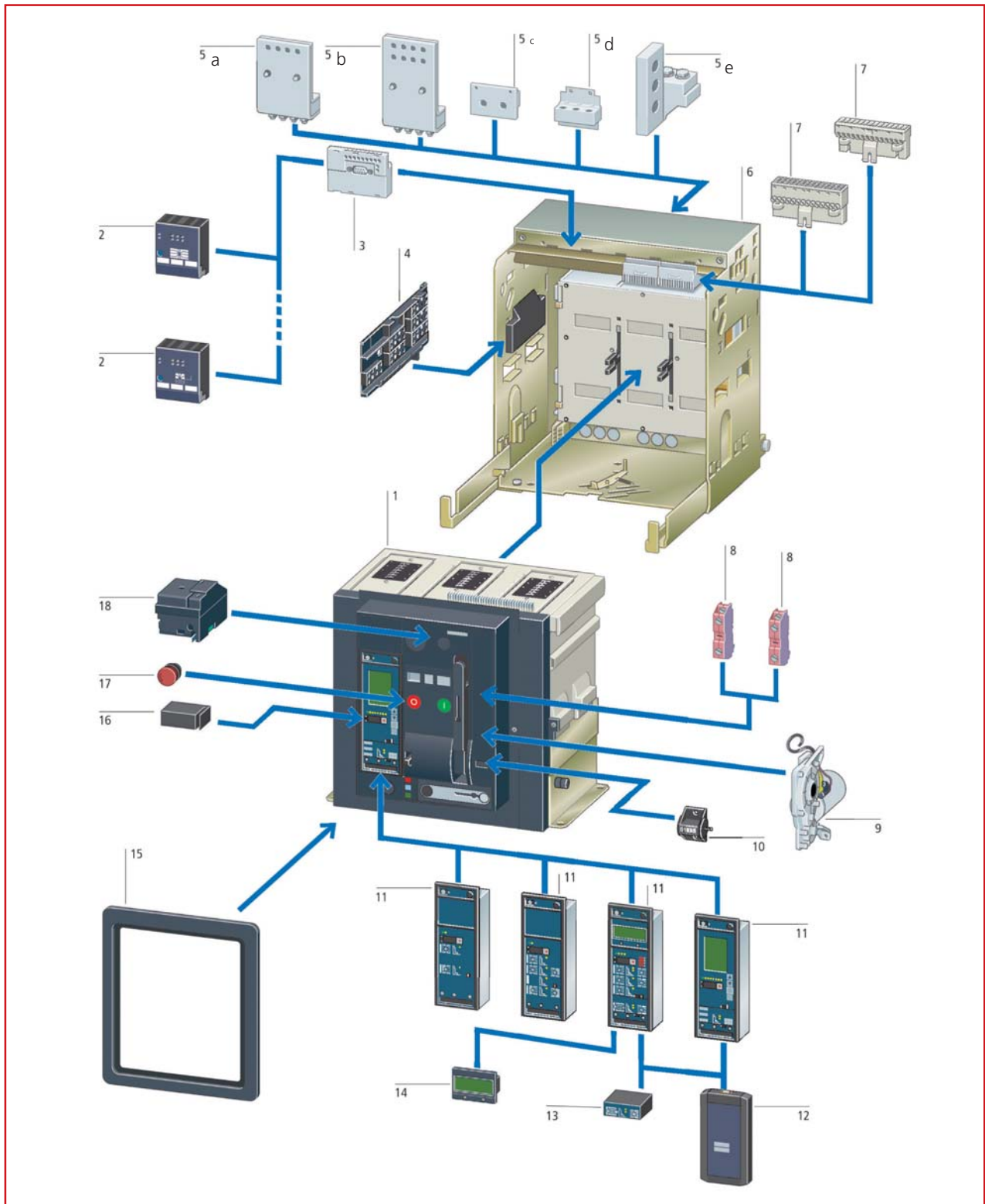
FRAME SIZE AND SHORT-CIRCUIT BREAKING CAPACITY

FRAME SIZE 1	FRAME SIZE 2	FRAME SIZE 3
250A	250A	
315A	315A	
400A	400A	
500A	500A	
630A	630A	
700A	700A	
800A	800A	
1000A	1000A	
1250A	1250A	1250A
1600A	1600A	1600A
	2000A	2000A
	2500A	2500A
	3200A	3200A
		4000A
		5000A
		6300A

RATED BREAKING CAPACITY
I_{sc} at AC 500V (kA) / I_{sc} at DC 300V (kA):

Frame Size 1: B = 55 kA, N = 66 kA
Frame Size 2: B = 55 kA, N = 80 kA
Frame Size 3: H = 100 kA

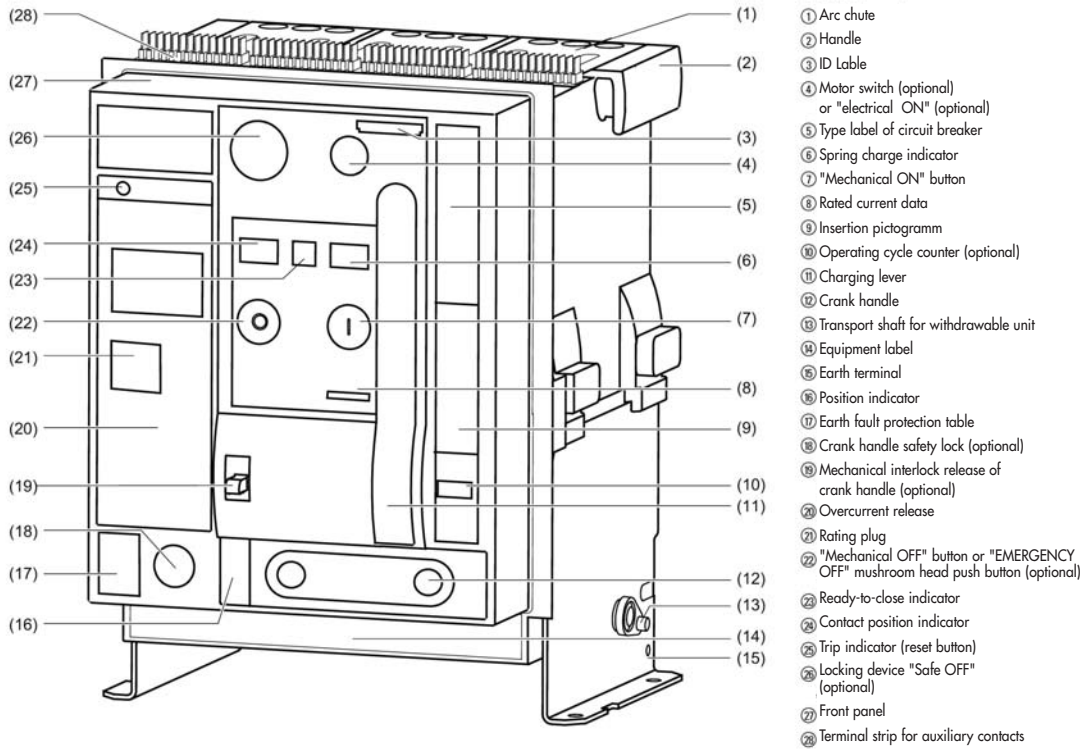
MO AIR CIRCUIT BREAKERS – SYSTEM OVERVIEW



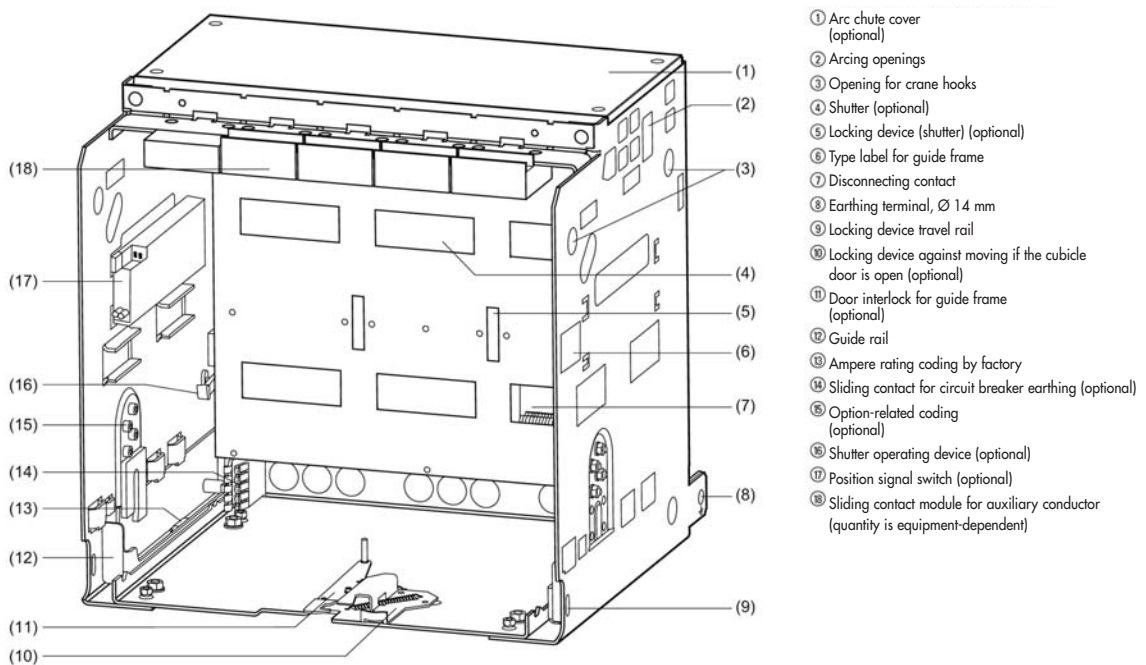
- | | | |
|---|-------------------------------------|---|
| 1. MO circuit breaker, between 630A and 6.300 A | c. Flange connection | 12. Parametric device |
| 2. External expansion modules | d. Horizontal connection, rear-side | 13. Earth-fault protection module |
| 3. Communication module for PROFIBUS | e. Vertical connection, rear-side | 14. 4-line LCD display |
| 4. Position indicator contact: Module for guide frame | 6. Guide frame | 15. Door sealing frame |
| 5. Main connection elements: | 7. Auxiliary plug connector | 16. Rating plug |
| a. Front connection | 8. Auxiliary contact | 17. EMERGENCY STOP mushroom push button |
| b. Front connection, double bole | 9. Motor operator | 18. Closing magnet, voltage release |
| | 10. Operating cycle counter | |
| | 11. Electronic release | |

MO AIR CIRCUIT BREAKERS – BREAKDOWN OF FUNCTIONS

CIRCUIT BREAKERS



GUIDE FRAME

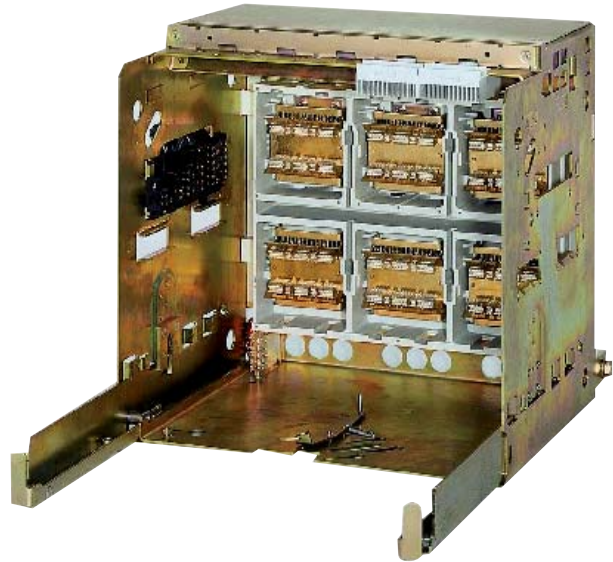


BASIC UNIT

CIRCUIT BREAKER



GUIDE FRAME



ACCESSORIES



VOLTAGE RELEASE



UNDERVOLTAGE RELEASE



COMBI-TRANSFORMER



CURRENT TRANSFORMER FOR EARTH-FAULT MEASUREMENT



CLOSING MAGNET



OPERATING CYCLE COUNTER

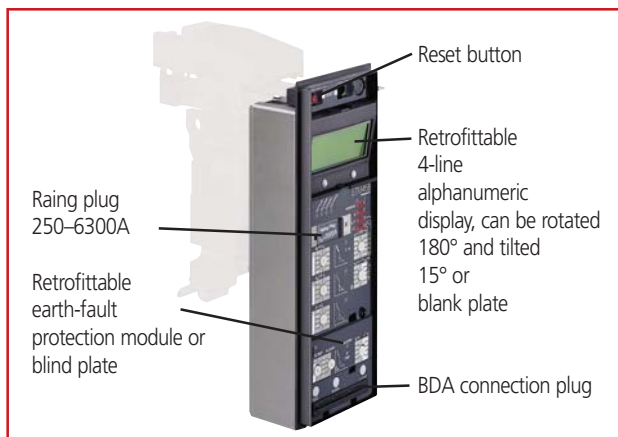


RESET MAGNET



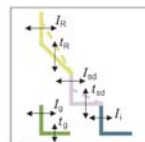
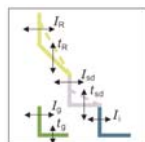
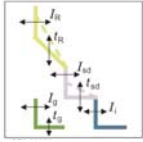
MOTOR OPERATOR

FUNCTIONS OF THE ETU (ELECTRONIC TRIP UNITS) OVERCURRENT RELEASE



FUNCTIONS OF THE OVERCURRENT RELEASE		ETU15B	ETU25B	ETU27B
BASIC PROTECTION FUNCTIONS				
Overload protection	L	✓	✓	✓
Short-time delayed short-circuit protection	S	--	✓	✓
Instantaneous short-circuit protection	I	✓	✓	✓
Neutral conductor protection	N	--	--	✓
Earth-fault protection	G	--	--	✓
ADDITIONAL FUNCTIONS				
Neutral conductor protection can be switched off		--	--	✓
Neutral conductor protection can be adjusted		--	--	--
Short-time-delayed short-circuit protection can be switched on/off		--	--	--
Instantaneous short-circuit protection can be switched on/off		--	--	--
Thermal memory can be switched on/off		--	--	--
Load monitoring		--	--	--
Short-time-delayed short-circuit protection can be switched to I ² t		--	--	--
Instantaneous short-circuit protection can be adjusted		✓	--	--
Overload protection switch-selectable I ¹ t		--	--	--
Overload protection can be switched on/off		--	--	--
Switch-selectable parameter sets		--	--	--
PARAMETERISATION AND DISPLAY				
Parameterisation by rotary switch (10 steps)		✓	✓	✓
Parameterisation by communication (absolute values)		--	--	--
Parameterisation by menu (absolute values)		--	--	--
Parameterisation of additional protection functions		--	--	--
LCD, alphanumeric		--	--	--
LCD, graphical		--	--	--
METERING FUNCTION				
Metering function Plus		--	--	--
COMMUNICATION				
CubicleBUS		--	--	--
Communication via PROFIBUS-DP		--	--	--
Communication via Ethernet		--	--	--

✓ Standard -- not available □ optional



ETU45B	ETU55B	ETU76B
✓	✓	✓
✓	✓	✓
✓	✓	✓
✓	✓	✓
□	□	□
✓	✓	✓
✓	✓	✓
✓	✓	✓
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MO AIR CIRCUIT BREAKERS TO 6,300A – MOUNTING VERSIONS

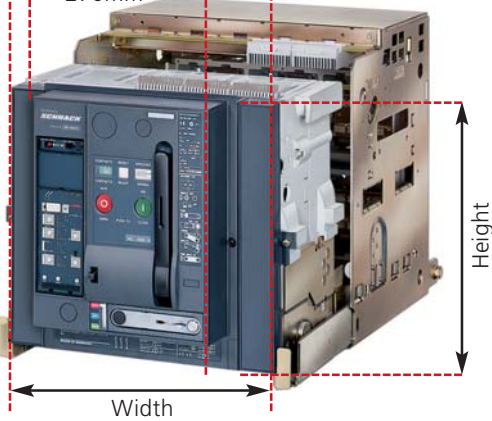
CIRCUIT BREAKER



Identical **width** for fixed installation and draw-out circuit breaker (with guide)

	3 pole	4 pole
Size 1	320 mm	410 mm
Size 2	460 mm	590 mm
Size 3	704 mm	914 mm

Identical **height** for each frame size fixed- and draw-out circuit breakers!



Same **depth** for each frame size (Size)

Fixed installation: Size 1 = Size 2 = Size 3 = 357 mm

Draw-out (with guide): Size 1 = Size 2 = Size 3 = 471 mm

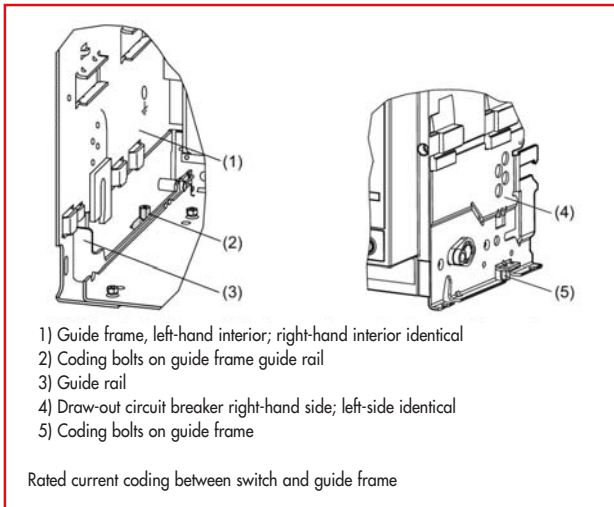
DRAW-OUT CIRCUIT-BREAKER (ADD-ON FOR PERMANENT INSTALLATION)



MO AIR CIRCUIT BREAKERS TO 6300A – GENERAL DATA

Rated current coding between circuit breaker and guide frame

Draw-out circuit breaker and guide frame come with one rated current coding as standard. The coding ensures that only circuit breakers can be inserted into a guide rail when its contact blades fit the contact fins on that guide rail (see diagram).



Option-related coding

Draw-out circuit breaker and guide frame can subsequently be equipped with an option-related coding facility. This ensures that circuit breakers with different equipment can only be inserted into certain guide rails. The circuit breaker cannot be inserted in a guide rail which has a different coding. 36 coding options are available.

POSITION INDICATOR CONTACTS FOR GUIDE FRAME

The guide frame can be equipped with position indicator contacts. These contacts can be used to determine the position of the circuit breaker in the guide frame.

Two versions are available:

Option 1

Connected position	1 C/O
Test position	1 C/O
Disconnected position	1 C/O

Option 2

Connected position	3 C/Os
Test position	2 C/Os
Disconnected position	1 C/O

POSITIONS OF THE DRAW-OUT CIRCUIT BREAKER IN THE GUIDE FRAME

	Diagram	Position indicator	Primary circuit	Secondary circuit	Switch cabinet door	Shutter
Maintenance position			disconnected	disconnected	open	closed
Disconnected position			disconnected	disconnected	closed	closed
Test position			disconnected	connected	closed	closed
Connected position			connected	connected	closed	open
(1) secondary circuit (2) primary circuit (3) switch cabinet door (4) shutter						

PHASE DIVIDING WALLS

The system constructor can produce phase-isolating walls made from insulating material as a barrier to arc faults. Guide slots have been fitted along the rear panel of the permanently installed circuit breaker or guide frame.

COVER FOR ARCING CHAMBER

A cover for the arcing chamber is available as an optional add-on for the guide frame. It provides protection for switchgear parts located immediately above the circuit breaker.

DOOR SEALING FRAME AND COVER

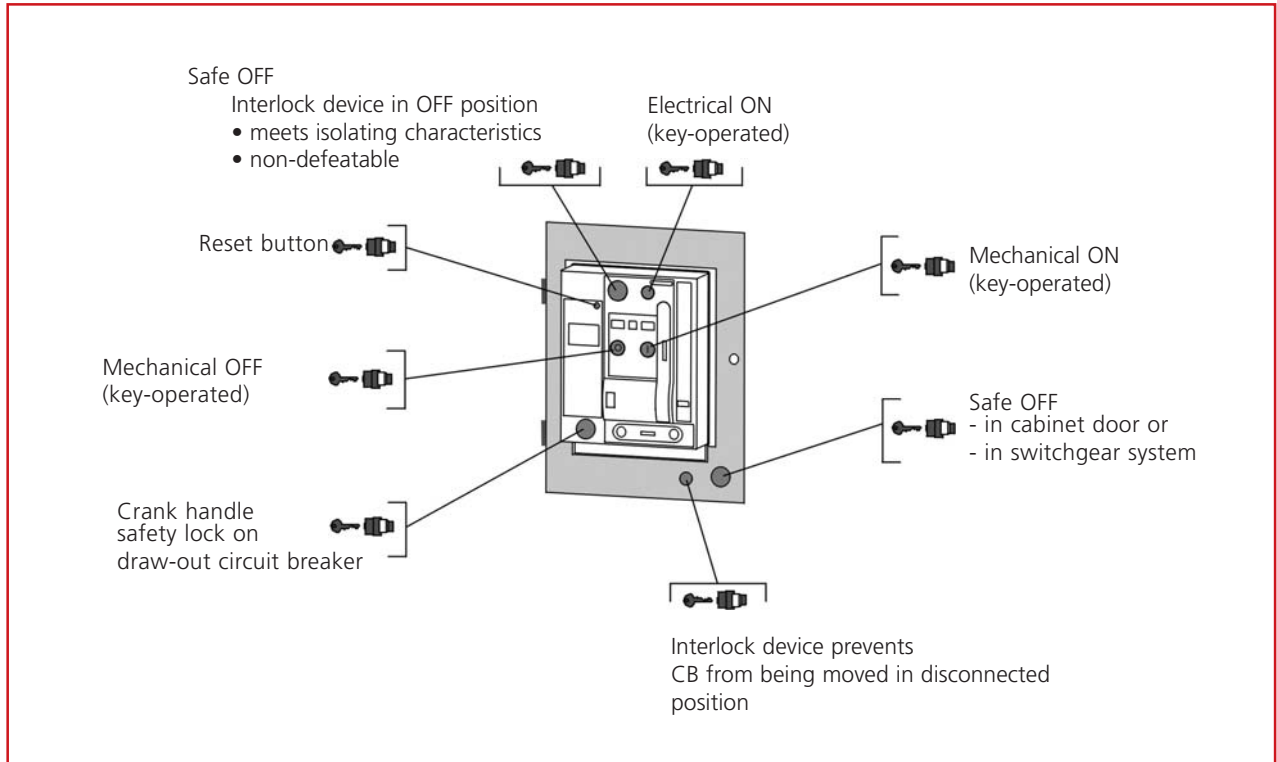
MO circuit breakers have degree of protection IP20 as standard. A door seal frame for IP41 and a cover for IP55 are also available when a higher degree of protection is required for the switchgear.

MO AIR CIRCUIT BREAKERS – LOCKING OPTIONS

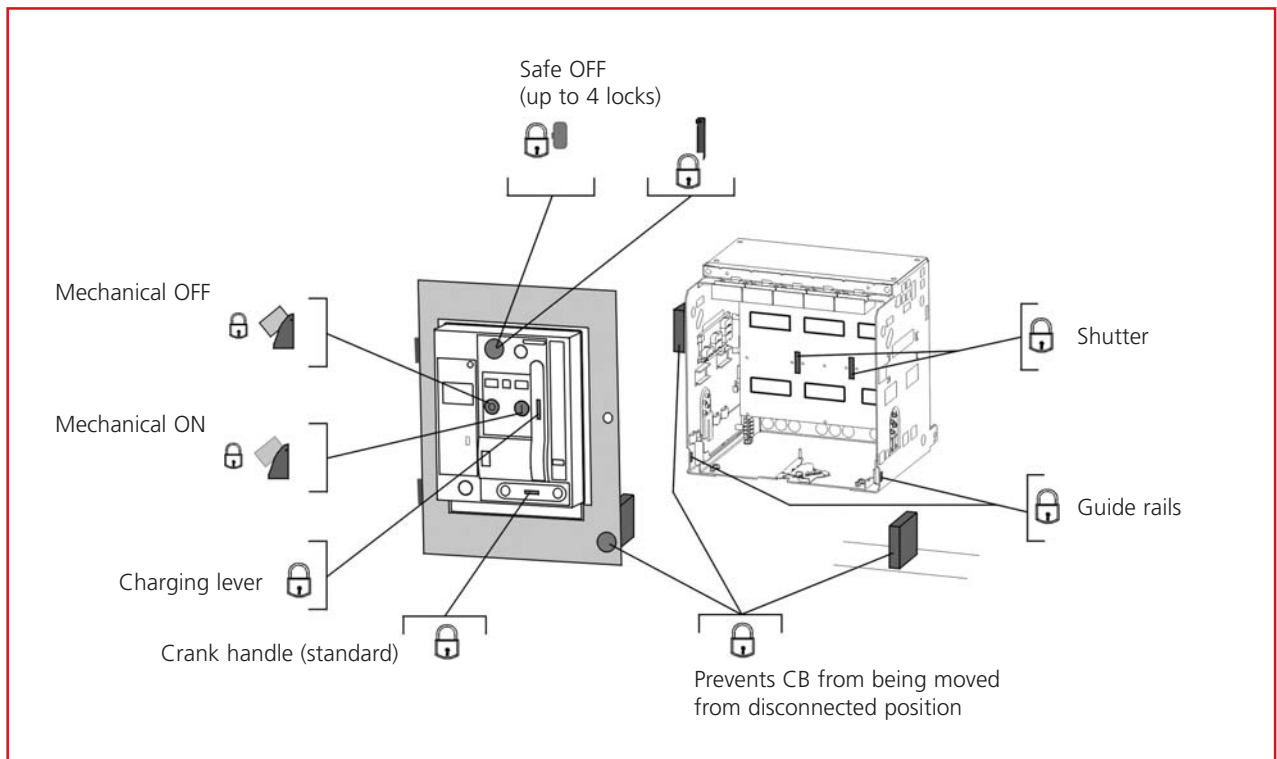
INTERLOCKING OPTIONS

- Internal and external accessory, can easily be retrofitted at any time
- Various interlocking options secure energy distribution within critical production processes

INTERLOCK- AND LEAD SEAL DEVICES



INTERLOCK DEVICE PADLOCKS - OVERVIEW



■ AIR CIRCUIT BREAKERS MO – INTERLOCKING

■ SCHRACK-INFO

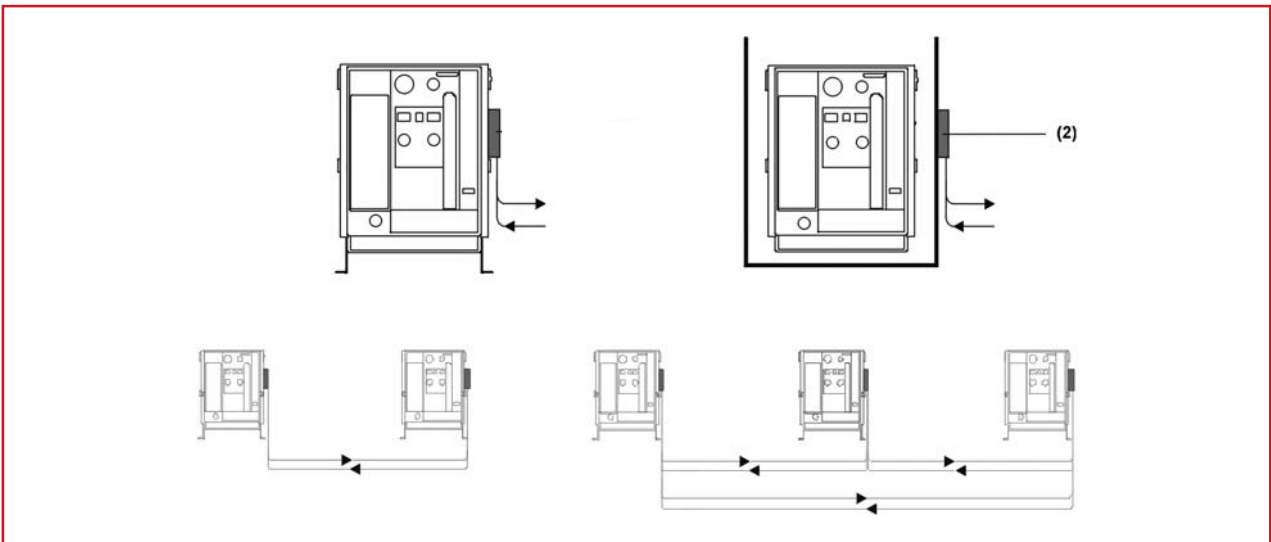
The module for mutual mechanical interlocking can be implemented for two or three ACBs and is simple to adapt to the respective version. Fixed-mounted and withdrawable circuit breakers are compatible and can be implemented together in a single system.

- Internal and external accessories can be fitted at any time
- Miscellaneous interlocking possibilities ensure power distribution of critical production processes

The following minimum conditions have to be achieved:

- Bowden wires have to run in a straight line, bends have to be avoided
- The bending radius of the bowden wire has to be > 500 mm
- The summation of all bending angles of the bowden wire must not exceed 640°
- All ACBs to be locked have to be placed in a way that all conditions mentioned above can be fulfilled, when using a 2m or 4,5m long bowden wire.
- The laying of the bowden wire has to be done prior to the adjustment of the interlocking.
- Openings or cut-outs in system elements have to be done in a way that the feed through of the bowden wire is possible without interfering its function.

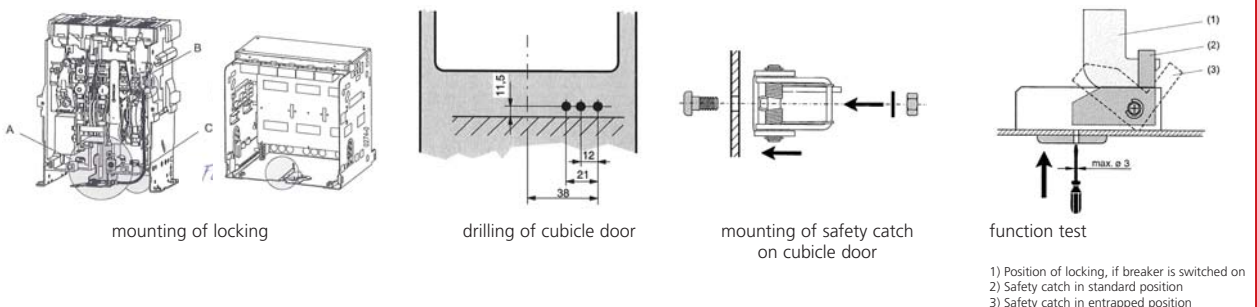
■ MUTUAL MECHANICAL INTERLOCKING



■ INTERLOCKING OF CUBICLE DOOR

The cubicle door cannot be opened if the fixed-mounted circuit breaker is closed (transmission of the locking signal by means of bowden wire), or if the withdrawable circuit breaker is in connected position.

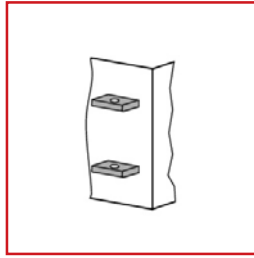
Mounting:



FRAME SIZE 1 TO 1600A – REAR-SIDE CONNECTION, HORIZONTAL



MO116232



SCHRACK INFO

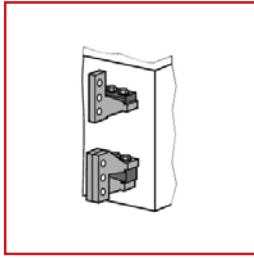
Basic unit without release, factory assembled with selected components and delivered as complete device.

DESCRIPTION	WEIGHT (kg)	I _{CU}	TYPE	ORDER NO.
3-POLE 55 kA				
800 A	43	55 kA	MO1B-800	MO108232
1000 A	43	55 kA	MO1B-1000	MO110232
1250 A	43	50kA	MO1B-1250	MO112232
1600 A	43	55 kA	MO1B-1600	MO116232
3-POLE 66 kA				
800 A	43	66 kA	MO1N-800	MO108332
1000 A	43	66 kA	MO1N-1000	MO110332
1250 A	43	66 kA	MO1N-1250	MO112332
1600 A	43	66 kA	MO1N-1600	MO116332
4-POLE 55 kA				
800 A	50	55 kA	MO1B-4-800	MO108242
1000 A	50	55 kA	MO1B-4-1000	MO110242
1250 A	50	55 kA	MO1B-4-1250	MO112242
1600 A	50	55 kA	MO1B-4-1600	MO116242
4 POLE 66 kA				
800 A	50	66 kA	MO1N-4-800	MO108342
1000 A	50	66 kA	MO1N-4-1000	MO110342
1250 A	50	66 kA	MO1N-4-1250	MO112342
1600 A	50	66 kA	MO1N-4-1600	MO116342

FRAME SIZE 1 TO 1600A – REAR-SIDE CONNECTION, VERTICAL



MO116232



SCHRACK INFO

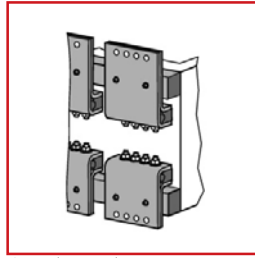
Basic unit without release, factory assembled with selected components and delivered as complete device.

DESCRIPTION	WEIGHT (kg)	I _{CU}	TYPE	ORDER NO.
3-POLE 55 kA				
800 A	43	55 kA	MO1B-800	MO108231
1000 A	43	55 kA	MO1B-1000	MO110231
1250 A	43	50kA	MO1B-1250	MO112231
1600 A	43	55 kA	MO1B-1600	MO116231
3-POLE 66 kA				
800 A	43	66 kA	MO1N-800	MO108331
1000 A	43	66 kA	MO1N-1000	MO110331
1250 A	43	66 kA	MO1N-1250	MO112331
1600 A	43	66 kA	MO1N-1600	MO116331
4-POLE 55 kA				
800 A	50	55 kA	MO1B-4-800	MO108241
1000 A	50	55 kA	MO1B-4-1000	MO110241
1250 A	50	55 kA	MO1B-4-1250	MO112241
1600 A	50	55 kA	MO1B-4-1600	MO116241
4-POLE 66 kA				
800 A	50	66 kA	MO1N-4-800	MO108341
1000 A	50	66 kA	MO1N-4-1000	MO110341
1250 A	50	66 kA	MO1N-4-1250	MO112341
1600 A	50	66 kA	MO1N-4-1600	MO116341

FRAME SIZE 1 TO 1600A – CONNECTION, FRONT, SINGLE BORE



MO116232



Connection, rear view

SCHRACK INFO

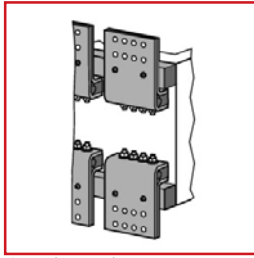
Basic unit without release, factory assembled with selected components and delivered as complete device.

DESCRIPTION	WEIGHT (kg)	I _{CU}	TYPE	ORDER NO.
3-POLE 55 kA				
800 A	43	55 kA	MO1B-800	MO108233
1000 A	43	55 kA	MO1B-1000	MO110233
1250 A	43	50kA	MO1B-1250	MO112233
1600 A	43	55 kA	MO1B-1600	MO116233
3-POLE 66 kA				
800 A	43	66 kA	MO1N-800	MO108333
1000 A	43	66 kA	MO1N-1000	MO110333
1250 A	43	66 kA	MO1N-1250	MO112333
1600 A	43	66 kA	MO1N-1600	MO116333
4-POLE 55 kA				
800 A	50	55 kA	MO1B-4-800	MO108243
1000 A	50	55 kA	MO1B-4-1000	MO110243
1250 A	50	55 kA	MO1B-4-1250	MO112243
1600 A	50	55 kA	MO1B-4-1600	MO116243
4-POLE 66 kA				
800 A	50	66 kA	MO1N-4-800	MO108343
1000 A	50	66 kA	MO1N-4-1000	MO110343
1250 A	50	66 kA	MO1N-4-1250	MO112343
1600 A	50	66 kA	MO1N-4-1600	MO116343

FRAME SIZE 1 TO 1600A – CONNECTION, FRONT, DOUBLE BORE



MO116232



Connection, rear view

SCHRACK INFO

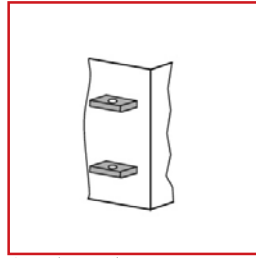
Basic unit without release, factory assembled with selected components and delivered as complete device.

DESCRIPTION	WEIGHT (kg)	I _{CU}	TYPE	ORDER NO.
3-POLE 55 kA				
800 A	43	55 kA	MO1B-800	MO108234
1000 A	43	55 kA	MO1B-1000	MO110234
1250 A	43	50kA	MO1B-1250	MO112234
1600 A	43	55 kA	MO1B-1600	MO116234
3-POLE 66 kA				
800 A	43	66 kA	MO1N-800	MO108334
1000 A	43	66 kA	MO1N-1000	MO110334
1250 A	43	66 kA	MO1N-1250	MO112334
1600 A	43	66 kA	MO1N-1600	MO116334
4-POLE 55 kA				
800 A	50	55 kA	MO1B-4-800	MO108244
1000 A	50	55 kA	MO1B-4-1000	MO110244
1250 A	50	55 kA	MO1B-4-1250	MO112244
1600 A	50	55 kA	MO1B-4-1600	MO116244
4-POLE 66 kA				
800 A	50	66 kA	MO1N-4-800	MO108344
1000 A	50	66 kA	MO1N-4-1000	MO110344
1250 A	50	66 kA	MO1N-4-1250	MO112344
1600 A	50	66 kA	MO1N-4-1600	MO116344

FRAME SIZE 2 TO 3200A – REAR-SIDE CONNECTION, HORIZONTAL



MO225232



Connection, rear view

SCHRACK INFO

Basic unit without release, factory assembled with selected components and delivered as complete device.

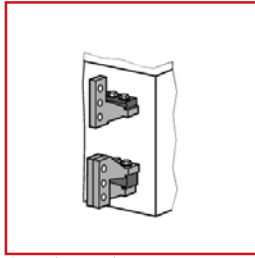
DESCRIPTION	WEIGHT (kg)	I _{CU}	TYPE	ORDER NO.
3-POLE 55 kA				
2000 A	56	55 kA	MO2B-2000	MO220232
2500 A	59	55 kA	MO2B-2500	MO225232
3-POLE 80 kA				
800 A	56	80 kA	MO2N-800	MO208332
1000 A	56	80 kA	MO2N-1000	MO210332
1250 A	56	80 kA	MO2N-1250	MO212332
1600 A	56	80 kA	MO2N-1600	MO216332
2000 A	56	80 kA	MO2N-2000	MO220332
2500 A	59	80 kA	MO2N-2500	MO225332
3200 A	64	80 kA	MO2N-3200	MO232332
4-POLE 55 kA				
2000 A	67	55 kA	MO2B-4-2000	MO220242
2500 A	71	55 kA	MO2B-4-2500	MO225242
4-POLE 80 kA				
800 A	67	80 kA	MO2N-4-800	MO208342
1000 A	67	80 kA	MO2N-4-1000	MO210342
1250 A	67	80 kA	MO2N-4-1250	MO212342
1600 A	67	80 kA	MO2N-4-1600	MO216342
2000 A	67	80 kA	MO2N-4-2000	MO220342
2500 A	71	80 kA	MO2N-4-2500	MO225342
3200 A	77	80 kA	MO2N-4-3200	MO232342

MO – FRAME SIZE 2 / FIXED-MOUNTED INSTALLATION

FRAME SIZE 2 TO 3200A – REAR-SIDE CONNECTION, VERTICAL



MO225232



Connection, rear view

SCHRACK INFO

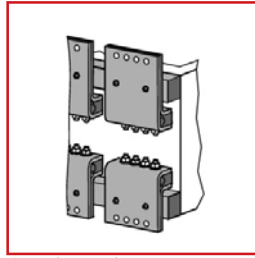
Basic unit without release, factory assembled with selected components and delivered as complete device.

DESCRIPTION	WEIGHT (kg)	I _{CU}	TYPE	ORDER NO.
3-POLE 55 kA				
2000 A	56	55 kA	MO2B-2000	MO220231
2500 A	59	55 kA	MO2B-2500	MO225231
3-POLE 80 kA				
800 A	56	80 kA	MO2N-800	MO208331
1000 A	56	80 kA	MO2N-1000	MO210331
1250 A	56	80 kA	MO2N-1250	MO212331
1600 A	56	80 kA	MO2N-1600	MO216331
2000 A	56	80 kA	MO2N-2000	MO220331
2500 A	59	80 kA	MO2N-2500	MO225331
3200 A	64	80 kA	MO2N-3200	MO232331
4-POLE 55 kA				
2000 A	67	55 kA	MO2B-4-2000	MO220241
2500 A	71	55 kA	MO2B-4-2500	MO225241
4-POLE 80 kA				
800 A	67	80 kA	MO2N-4-800	MO208341
1000 A	67	80 kA	MO2N-4-1000	MO210341
1250 A	67	80 kA	MO2N-4-1250	MO212341
1600 A	67	80 kA	MO2N-4-1600	MO216341
2000 A	67	80 kA	MO2N-4-2000	MO220341
2500 A	71	80 kA	MO2N-4-2500	MO225341
3200 A	77	80 kA	MO2N-4-3200	MO232341

FRAME SIZE 2 TO 3200A – CONNECTION, FRONT, SINGLE BORE



MO225232



Connection, rear view

SCHRACK INFO

Basic unit without release, factory assembled with selected components and delivered as complete device.

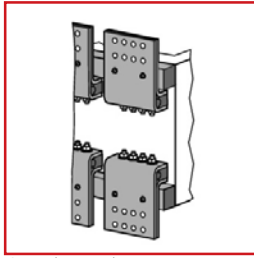
DESCRIPTION	WEIGHT (kg)	I _{CU}	TYPE	ORDER NO.
3-POLE 55 kA				
2000 A	56	55 kA	MO2B-2000	MO220233
2500 A	59	55 kA	MO2B-2500	MO225233
3-POLE 80 kA				
800 A	56	80 kA	MO2N-800	MO208333
1000 A	56	80 kA	MO2N-1000	MO210333
1250 A	56	80 kA	MO2N-1250	MO212333
1600 A	56	80 kA	MO2N-1600	MO216333
2000 A	56	80 kA	MO2N-2000	MO220333
2500 A	59	80 kA	MO2N-2500	MO225333
3200 A	64	80 kA	MO2N-3200	MO232333
4-POLE 55 kA				
2000 A	67	55 kA	MO2B-4-2000	MO220243
2500 A	71	55 kA	MO2B-4-2500	MO225243
4-POLE 80 kA				
800 A	67	80 kA	MO2N-4-800	MO208343
1000 A	67	80 kA	MO2N-4-1000	MO210343
1250 A	67	80 kA	MO2N-4-1250	MO212343
1600 A	67	80 kA	MO2N-4-1600	MO216343
2000 A	67	80 kA	MO2N-4-2000	MO220343
2500 A	71	80 kA	MO2N-4-2500	MO225343
3200 A	77	80 kA	MO2N-4-3200	MO232343

MO – FRAME SIZE 2 / FIXED-MOUNTED INSTALLATION

FRAME SIZE 2 TO 3200A – CONNECTION, FRONT, DOUBLE BORE



MO225232



Connection, rear view

SCHRACK INFO

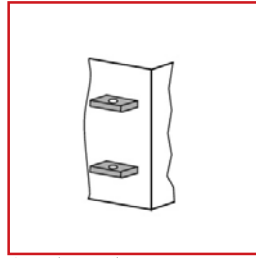
Basic unit without release, factory assembled with selected components and delivered as complete device.

DESCRIPTION	WEIGHT (kg)	I_{CU}	TYPE	ORDER NO.
3-POLE 55 kA				
2000 A	56	55 kA	MO2B-2000	MO220234
2500 A	59	55 kA	MO2B-2500	MO225234
3-POLE 80 kA				
800 A	56	80 kA	MO2N-800	MO208334
1000 A	56	80 kA	MO2N-1000	MO210334
1250 A	56	80 kA	MO2N-1250	MO212334
1600 A	56	80 kA	MO2N-1600	MO216334
2000 A	56	80 kA	MO2N-2000	MO220334
2500 A	59	80 kA	MO2N-2500	MO225334
3200 A	64	80 kA	MO2N-3200	MO232334
4-POLE 55 kA				
2000 A	67	55 kA	MO2B-4-2000	MO220244
2500 A	71	55 kA	MO2B-4-2500	MO225244
4-POLE 80 kA				
800 A	67	80 kA	MO2N-4-800	MO208344
1000 A	67	80 kA	MO2N-4-1000	MO210344
1250 A	67	80 kA	MO2N-4-1250	MO212344
1600 A	67	80 kA	MO2N-4-1600	MO216344
2000 A	67	80 kA	MO2N-4-2000	MO220344
2500 A	71	80 kA	MO2N-4-2500	MO225344
3200 A	77	80 kA	MO2N-4-3200	MO232344

FRAME SIZE 3 TO 6300A – REAR-SIDE CONNECTION, HORIZONTAL



MO340432



Connection, rear view

SCHRACK INFO

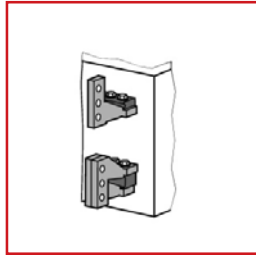
Basic unit without release, factory assembled with selected components and delivered as complete device.

DESCRIPTION	WEIGHT (kg)	I _{CU}	TYPE	ORDER NO.
3-POLE 100 kA				
4000 A	82	100 kA	MO3H-4000	MO340432
5000 A	82	100 kA	MO3H-5000	MO350432
6300 A	90	100 kA	MO3H-6300	MO363432
4-POLE 100 kA				
4000 A	99	100 kA	MO3H-4-4000	MO340442
5000 A	99	100 kA	MO3H-4-5000	MO350442
6300 A	100	100 kA	MO3H-4-6300	MO363442

FRAME SIZE 3 TO 6300A – REAR-SIDE CONNECTION, VERTICAL



MO340432



Connection, rear view

SCHRACK INFO

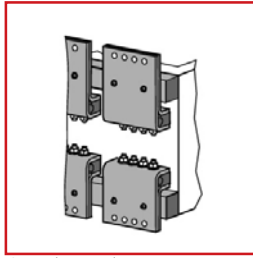
Basic unit without release, factory assembled with selected components and delivered as complete device.

DESCRIPTION	WEIGHT (kg)	I _{CU}	TYPE	ORDER NO.
3-POLE 100 kA				
4000 A	82	100 kA	MO3H-4000	MO340431
5000 A	82	100 kA	MO3H-5000	MO350431
6300 A	90	100 kA	MO3H-6300	MO363431
4-POLE 100 kA				
4000 A	99	100 kA	MO3H-4-4000	MO340441
5000 A	99	100 kA	MO3H-4-5000	MO350441
6300 A	108	100 kA	MO3H-4-6300	MO363441

FRAME SIZE 3 TO 6300A – CONNECTION, FRONT, SINGLE BORE



MO340432



Connection, rear view

SCHRACK INFO

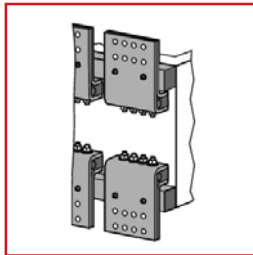
Basic unit without release, factory assembled with selected components and delivered as complete device.

DESCRIPTION	WEIGHT (kg)	I_{CU}	TYPE	ORDER NO.
3-POLE 100 kA				
4000 A	99	100 kA	MO3H-4000	MO340433
4-POLE 100 kA				
4000 A	99	100 kA	MO3H-4-4000	MO340443

FRAME SIZE 3 TO 6300A – CONNECTION, FRONT, DOUBLE BORE



MO340432



Connection, rear view

SCHRACK INFO

Basic unit without release, factory assembled with selected components and delivered as complete device.

DESCRIPTION	WEIGHT (kg)	I_{CU}	TYPE	ORDER NO.
3-POLE 100 kA				
4000 A	99	100 kA	MO3H-4000	MO340434
4-POLE 100 kA				
4000 A	99	100 kA	MO3H-4-4000	MO340444

FRAME SIZE 1 TO 1600A – WITHOUT GUIDE FRAME



MO116235

SCHRACK INFO

Basic unit without release, factory assembled with selected components and delivered as complete device. Replacement switch for existing frames. The nominal current must be appropriate for the guide frame.

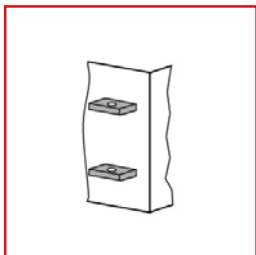
DESCRIPTION	WEIGHT (kg)	I _{CU}	TYPE	ORDER NO.
3-POLE 55 kA				
800 A	45	55 kA	MO1B-800	MO108235
1000 A	45	55 kA	MO1B-1000	MO110235
1250 A	45	50kA	MO1B-1250	MO112235
1600 A	45	55 kA	MO1B-1600	MO116235
3-POLE 66 kA				
800 A	45	66 kA	MO1N-800	MO108335
1000 A	45	66 kA	MO1N-1000	MO110335
1250 A	45	66 kA	MO1N-1250	MO112335
1600 A	45	66 kA	MO1N-1600	MO116335
4-POLE 55 kA				
800 A	54	55 kA	MO1B-4-800	MO108245
1000 A	54	55 kA	MO1B-4-1000	MO110245
1250 A	54	55 kA	MO1B-4-1250	MO112245
1600 A	54	55 kA	MO1B-4-1600	MO116245
4-POLE 66 kA				
800 A	54	66 kA	MO1N-4-800	MO108345
1000 A	54	66 kA	MO1N-4-1000	MO110345
1250 A	54	66 kA	MO1N-4-1250	MO112345
1600 A	54	66 kA	MO1N-4-1600	MO116345
FRAME				
Guide frame for frame size 1				upon request

MO – FRAME SIZE 1 / WITHDRAWABLE MODELS

FRAME SIZE 1 TO 1600A – WITH GUIDE FRAME, REAR-SIDE CONNECTION, HORIZONTAL



MO116236



Connection, rear view

SCHRACK INFO

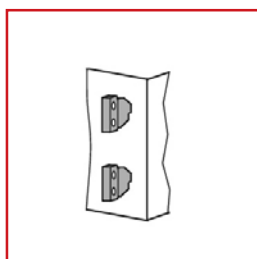
Basic unit without release, factory assembled with selected components and delivered as complete device.

DESCRIPTION	WEIGHT (kg)	I _{CU}	TYPE	ORDER NO.
3-POLE 55 kA				
800 A	70	55 kA	MO1B-800	MO108236
1000 A	70	55 kA	MO1B-1000	MO110236
1250 A	70	50kA	MO1B-1250	MO112236
1600 A	70	55 kA	MO1B-1600	MO116236
3-POLE 66 kA				
800 A	70	66 kA	MO1N-800	MO108336
1000 A	70	66 kA	MO1N-1000	MO110336
1250 A	70	66 kA	MO1N-1250	MO112336
1600 A	70	66 kA	MO1N-1600	MO116336
4-POLE 55 kA				
800 A	84	55 kA	MO1B-4-800	MO108246
1000 A	84	55 kA	MO1B-4-1000	MO110246
1250 A	84	55 kA	MO1B-4-1250	MO112246
1600 A	84	55 kA	MO1B-4-1600	MO116246
4-POLE 66 kA				
800 A	84	66 kA	MO1N-4-800	MO108346
1000 A	84	66 kA	MO1N-4-1000	MO110346
1250 A	84	66 kA	MO1N-4-1250	MO112346
1600 A	84	66 kA	MO1N-4-1600	MO116346

FRAME SIZE 1 TO 1600A – WITH GUIDE FRAME, REAR-SIDE CONNECTION, VERTICAL



MO116236



Connection, rear view

SCHRACK INFO

Basic unit without release, factory assembled with selected components and delivered as complete device.

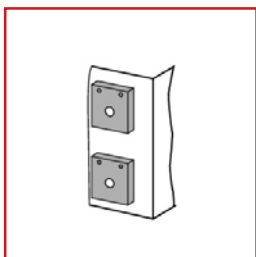
DESCRIPTION	WEIGHT (kg)	I _{CU}	TYPE	ORDER NO.
3-POLE 55 kA				
800 A	70	55 kA	MO1B-800	MO108237
1000 A	70	55 kA	MO1B-1000	MO110237
1250 A	70	55 kA	MO1B-1250	MO112237
1600 A	70	55 kA	MO1B-1600	MO116237
3-POLE 66 kA				
800 A	70	66 kA	MO1N-800	MO108337
1000 A	70	66 kA	MO1N-1000	MO110337
1250 A	70	66 kA	MO1N-1250	MO112337
1600 A	70	66 kA	MO1N-1600	MO116337
4-POLE 55 kA				
800 A	84	55 kA	MO1B-4-800	MO108247
1000 A	84	55 kA	MO1B-4-1000	MO110247
1250 A	84	55 kA	MO1B-4-1250	MO112247
1600 A	84	55 kA	MO1B-4-1600	MO116247
4-POLE 66 kA				
800 A	84	66 kA	MO1N-4-800	MO108347
1000 A	84	66 kA	MO1N-4-1000	MO110347
1250 A	84	66 kA	MO1N-4-1250	MO112347
1600 A	84	66 kA	MO1N-4-1600	MO116347

MO – FRAME SIZE 1 / WITHDRAWABLE MODELS

FRAME SIZE 1 TO 1600A – WITH GUIDE FRAME AND CONNECTING FLANGE



MO116236



Connection, rear view

SCHRACK INFO

Basic unit without release, factory assembled with selected components and delivered as complete device.

DESCRIPTION	WEIGHT (kg)	I_{CU}	TYPE	ORDER NO.
3-POLE 55 kA				
800 A	70	55 kA	MO1B-800	MO108234
1000 A	70	55 kA	MO1B-1000	MO110234
1250 A	70	55 kA	MO1B-1250	MO112234
1600 A	70	55 kA	MO1B-1600	MO116234
3-POLE 66 kA				
800 A	70	66 kA	MO1N-800	MO108334
1000 A	70	66 kA	MO1N-1000	MO110334
1250 A	70	66 kA	MO1N-1250	MO112334
1600 A	70	66 kA	MO1N-1600	MO116334
4-POLE 55 kA				
800 A	84	55 kA	MO1B-4-800	MO108244
1000 A	84	55 kA	MO1B-4-1000	MO110244
1250 A	84	55 kA	MO1B-4-1250	MO112244
1600 A	84	55 kA	MO1B-4-1600	MO116244
4-POLE 66 kA				
800 A	84	66 kA	MO1N-4-800	MO108344
1000 A	84	66 kA	MO1N-4-1000	MO110344
1250 A	84	66 kA	MO1N-4-1250	MO112344
1600 A	84	66 kA	MO1N-4-1600	MO116344

FRAME SIZE 2 TO 3200A – WITHOUT GUIDE FRAME



MO232335

SCHRACK INFO

Basic unit without release, factory assembled with selected components and delivered as complete device. Replacement switch for existing frames. The nominal current must be appropriate for the guide frame.

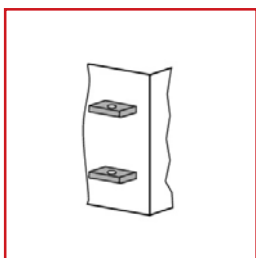
DESCRIPTION	WEIGHT (kg)	I _{CU}	TYPE	ORDER NO.
3-POLE 55 kA				
2000 A	60	55 kA	MO2B-2000	MO220235
2500 A	63	55 kA	MO2B-2500	MO225235
3-POLE 80 kA				
800 A	60	80 kA	MO2N-800	MO208335
1000 A	60	80 kA	MO2N-1000	MO210335
1250 A	60	80 kA	MO2N-1250	MO212335
1600 A	60	80 kA	MO2N-1600	MO216335
2000 A	60	80 kA	MO2N-2000	MO220335
2500 A	63	80 kA	MO2N-2500	MO225335
3200 A	68	80 kA	MO2N-3200	MO232335
4-POLE 55 kA				
2000 A	72	55 kA	MO2B-4-2000	MO220245
2500 A	76	55 kA	MO2B-4-2500	MO225245
4-POLE 80 kA				
800 A	72	80 kA	MO2N-4-800	MO208345
1000 A	72	80 kA	MO2N-4-1000	MO210345
1250 A	72	80 kA	MO2N-4-1250	MO212345
1600 A	72	80 kA	MO2N-4-1600	MO216345
2000 A	72	80 kA	MO2N-4-2000	MO220345
2500 A	76	80 kA	MO2N-4-2500	MO225345
3200 A	82	80 kA	MO2N-4-3200	MO232345
FRAME				
Guide frame for frame size 2				upon request

MO – FRAME SIZE 2 / WITHDRAWABLE MODELS

FRAME SIZE 2 TO 3200A – WITH GUIDE FRAME, REAR-SIDE CONNECTION, HORIZONTAL



MO220236



Connection, rear view

SCHRACK INFO

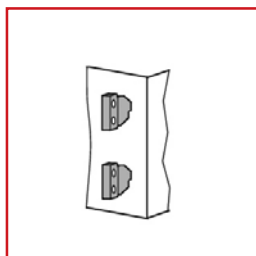
Basic unit without release, factory assembled with selected components and delivered as complete device.

DESCRIPTION	WEIGHT (kg)	I _{CU}	TYPE	ORDER NO.
3-POLE 55 kA				
2000 A	91	55 kA	MO2B-2000	MO220236
2500 A	102	55 kA	MO2B-2500	MO225236
3-POLE 80 kA				
800 A	91	80 kA	MO2N-800	MO208336
1000 A	91	80 kA	MO2N-1000	MO210336
1250 A	91	80 kA	MO2N-1250	MO212336
1600 A	91	80 kA	MO2N-1600	MO216336
2000 A	91	80 kA	MO2N-2000	MO220336
2500 A	102	80 kA	MO2N-2500	MO225336
3200 A	113	80 kA	MO2N-3200	MO232336
4-POLE 55 kA				
2000 A	109	55 kA	MO2B-4-2000	MO220246
2500 A	123	55 kA	MO2B-4-2500	MO225246
4-POLE 80 kA				
800 A	109	80 kA	MO2N-4-800	MO208346
1000 A	109	80 kA	MO2N-4-1000	MO210346
1250 A	109	80 kA	MO2N-4-1250	MO212346
1600 A	109	80 kA	MO2N-4-1600	MO216346
2000 A	109	80 kA	MO2N-4-2000	MO220346
2500 A	123	80 kA	MO2N-4-2500	MO225346
3200 A	136	80 kA	MO2N-4-3200	MO232346

FRAME SIZE 2 TO 3200A – WITH GUIDE FRAME, REAR-SIDE CONNECTION, VERTICAL



MO220236



Connection, rear view

SCHRACK INFO

Basic unit without release, factory assembled with selected components and delivered as complete device.

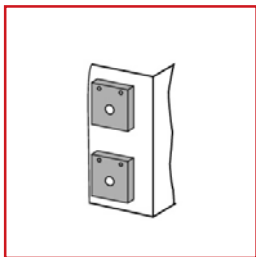
DESCRIPTION	WEIGHT (kg)	I _{CU}	TYPE	ORDER NO.
3-POLE 55 kA				
2000 A	91	55 kA	MO2B-2000	MO220237
2500 A	102	55 kA	MO2B-2500	MO225237
3-POLE 80 kA				
800 A	91	80 kA	MO2N-800	MO208337
1000 A	91	80 kA	MO2N-1000	MO210337
1250 A	91	80 kA	MO2N-1250	MO212337
1600 A	91	80 kA	MO2N-1600	MO216337
2000 A	91	80 kA	MO2N-2000	MO220337
2500 A	102	80 kA	MO2N-2500	MO225337
3200 A	113	80 kA	MO2N-3200	MO232337
4-POLE 55 kA				
2000 A	109	55 kA	MO2B-4-2000	MO220247
2500 A	123	55 kA	MO2B-4-2500	MO225247
4-POLE 80 kA				
800 A	109	80 kA	MO2N-4-800	MO208347
1000 A	109	80 kA	MO2N-4-1000	MO210347
1250 A	109	80 kA	MO2N-4-1250	MO212347
1600 A	109	80 kA	MO2N-4-1600	MO216347
2000 A	109	80 kA	MO2N-4-2000	MO220347
2500 A	123	80 kA	MO2N-4-2500	MO225347
3200 A	136	80 kA	MO2N-4-3200	MO232347

MO – FRAME SIZE 2 / WITHDRAWABLE MODELS

FRAME SIZE 2 TO 3200A – WITH GUIDE FRAME AND CONNECTING FLANGE



MO220236



ANSCHLUSS-RÜCKANSICHT

SCHRACK INFO

Basic unit without release, factory assembled with selected components and delivered as complete device.

DESCRIPTION	WEIGHT (kg)	I _{CU}	TYPE	ORDER NO.
3-POLE 55 kA				
2000 A	91	55 kA	MO2B-2000	MO220234
2500 A	102	55 kA	MO2B-2500	MO225234
3-POLE 80 kA				
800 A	91	80 kA	MO2N-800	MO208334
1000 A	91	80 kA	MO2N-1000	MO210334
1250 A	91	80 kA	MO2N-1250	MO212334
1600 A	91	80 kA	MO2N-1600	MO216334
2000 A	91	80 kA	MO2N-2000	MO220334
2500 A	102	80 kA	MO2N-2500	MO225334
3200 A	113	80 kA	MO2N-3200	MO232334
4-POLE 55 kA				
2000 A	109	55 kA	MO2B-4-2000	MO220244
2500 A	123	55 kA	MO2B-4-2500	MO225244
4-POLE 80 kA				
800 A	109	80 kA	MO2N-4-800	MO208344
1000 A	109	80 kA	MO2N-4-1000	MO210344
1250 A	109	80 kA	MO2N-4-1250	MO212344
1600 A	109	80 kA	MO2N-4-1600	MO216344
2000 A	109	80 kA	MO2N-4-2000	MO220344
2500 A	123	80 kA	MO2N-4-2500	MO225344
3200 A	136	80 kA	MO2N-4-3200	MO232344

FRAME SIZE 3 TO 6300A – WITHOUT GUIDE FRAME



MO340435

SCHRACK INFO

Basic unit without release, factory assembled with selected components and delivered as complete device. Replacement switch for existing frames. The nominal current must be appropriate for the guide frame.

DESCRIPTION	WEIGHT (kg)	I _{CU}	TYPE	ORDER NO.
3-POLE 100 kA				
4000 A	88	100 kA	MO3H-4000	MO340435
5000 A	88	100 kA	MO3H-5000	MO350435
6300 A	96	100 kA	MO3H-6300	MO363435
4-POLE 100 kA				
4000 A	106	100 kA	MO3H-4-4000	MO340445
5000 A	106	100 kA	MO3H-4-5000	MO350445
6300 A	108	100 kA	MO3H-4-6300	MO363445

FRAME

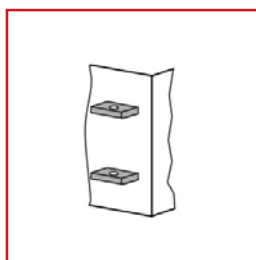
Guide frame for frame size 3

upon request

FRAME SIZE 3 TO 6300A – WITH GUIDE FRAME, REAR-SIDE CONNECTION, HORIZONTAL



MO340436



Connection, rear view

SCHRACK INFO

Basic unit without release, factory assembled with selected components and delivered as complete device.

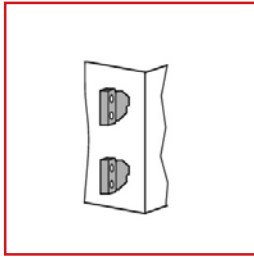
DESCRIPTION	WEIGHT (kg)	I _{CU}	TYPE	ORDER NO.
3-POLE 100 kA				
4000 A	148	100 kA	MO3H-4000	MO340436
5000 A	148	100 kA	MO3H-5000	MO350436
6300 A	160	100 kA	MO3H-6300	MO363436
4-POLE 100 kA				
4000 A	190	100 kA	MO3H-4-4000	MO340446
5000 A	190	100 kA	MO3H-4-5000	MO350446
6300 A	227	100 kA	MO3H-4-6300	MO363446

MO – FRAME SIZE 3 / WITHDRAWABLE MODELS

FRAME SIZE 3 TO 6300A – WITH GUIDE FRAME, REAR-SIDE CONNECTION, VERTICAL



MO340437



Connection, rear view

SCHRACK INFO

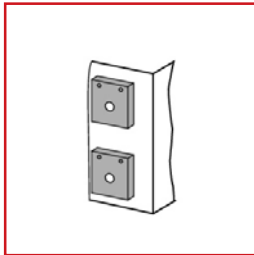
Basic unit without release, factory assembled with selected components and delivered as complete device.

DESCRIPTION	WEIGHT (kg)	I_{CU}	TYPE	ORDER NO.
3-POLE 100 kA				
4000 A	148	100 kA	MO3H-4000	MO340437
5000 A	148	100 kA	MO3H-5000	MO350437
6300 A	166	100 kA	MO3H-6300	MO363437
4-POLE 100 kA				
4000 A	190	100 kA	MO3H-4-4000	MO340447
5000 A	190	100 kA	MO3H-4-5000	MO350447
6300 A	227	100 kA	MO3H-4-6300	MO363447

FRAME SIZE 3 TO 6300A – WITH GUIDE FRAME AND CONNECTING FLANGE



MO340436



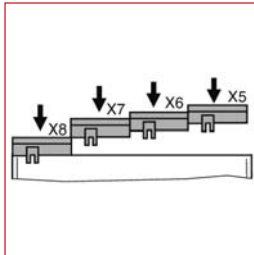
Connection, rear view

SCHRACK INFO

Basic unit without release, factory assembled with selected components and delivered as complete device.

DESCRIPTION	WEIGHT (kg)	I_{CU}	TYPE	ORDER NO.
3-POLE 100 kA				
4000 A	148	100 kA	MO3H-4000	MO340438
4-POLE 100 kA				
4000 A	190	100 kA	MO3H-4-4000	MO340448

OVERVIEW



SCHRACK-INFO

Calculation of the required number of auxiliary supply connectors

- Draw-out version: The auxiliary contacts automatically contact when the circuit-breaker is inserted in the guide frame. There are a range of connection models for connection of the auxiliary cable to the circuit breaker (see adjacent diagrams).
- Fixed version: The connection is carried out through a hand-held connector. The connectors are fitted with coded pins, which prevents any confusion with regard to the slots.

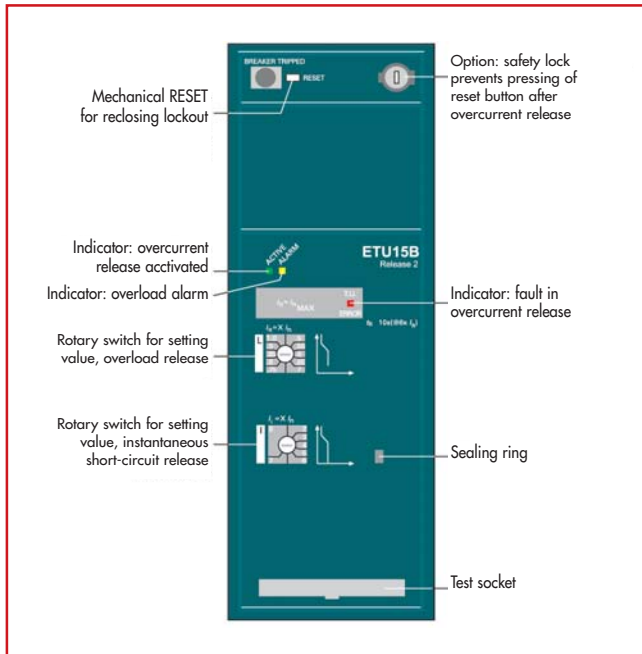
The number of auxiliary supply connectors required depends on:

- The operator type
- Overcurrent release with/without current transformer
- Type and quantity of the auxiliary releases
- The number of the auxiliary contacts
- Communication connection COM 15

Complete devices always come with all the required connectors

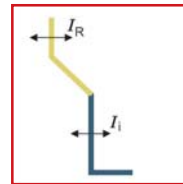
		No. of auxiliary supply connectors	Terminal
a	First auxiliary supply connector X6 always required.	1	X6
b	Operator		
b1	Manual operator with memory with mechanical call	0	
b2	Manual operator with stored-energy feature with electrical closing	0	X6
b3	Manual/motor operator with stored-energy feature with mechanical and electrical closing	+1	X5
c	Overcurrent release		
c1	Overcurrent release ETU15B, ETU25B, ETU27B	0	
c2	Overcurrent release ETU45B, ETU55B, ETU76B (internal Cubicle BUS)	+1	X8
	Ports for external current transformers for overload protection in the N conductor and earth-fault protection		
c3	Current transformer integral to N conductor (required for 3 pole circuit breakers when c2 is not selected)	+1	X8
c4	Current transformer installed in the neutral conductor (required if c2 or c3 not selected)	+1	X8
d	Auxiliary release		
d1	With/without 1st auxiliary release (Voltage release F1)	0	X6
d2	2nd auxiliary release (Voltage release F2, undervoltage release F3, delayable undervoltage release F4)	+1	X5
e	Auxiliary switch blocks		
e1	1st auxiliary switch block 2N/O + 2N/C	0	X6
e2	1. and 2nd auxiliary switch block 4N/O + 4N/C or 6N/O + 2N/C or 5N/O + 3N/C (required if b3 or d2 not selected)	+1	X5
f	Communications module		
f1	Without communications module COM15	0	
f2	With communications module COM15- occupies the entire terminal strip X7, making the following options no longer possible:	+1	X7
	<ul style="list-style-type: none"> • Tripped signal switch S24 • Stored-energy status indication S21 • Electrical On button S10 • Signaling switch on first and second auxiliary release S22 + S23 		
g	Optional signals/accessories		
g1	Tripped signal switch S24 (only possible if f2 not selected)	+1	X7
g2	Stored-energy status S21 (only possible if f2 not selected, required if g1 not selected)	+1	X7
g3	Electrical ON button S10 (only possible if f2 not selected, required if g1 or g2 not selected)	+1	X7
g4	Signaling switch on first auxiliary release S22 (only possible if f2 not selected, required if g1, g2 or g3 not selected)	+1	X7
g5	Signaling switch on second auxiliary release S23 (only possible if f2 not selected, required if g1, g2 or g3 or g4 not selected)	0	X6
g6	Ready-to-close signalling switch S20	0	X5
g7	Motor cut-off switch S12 (only possible if motor operator selected)	+1	X8
g8	Remote reset magnet F7 (required if c2 not selected)	+1	X8
h	Total number of auxiliary supply connectors	(max. 4)	

ELECTRONIC RELEASE ETU15B



SCHRACK INFO

Basic protection for installations and systems without time-selective grading up to 3200A.

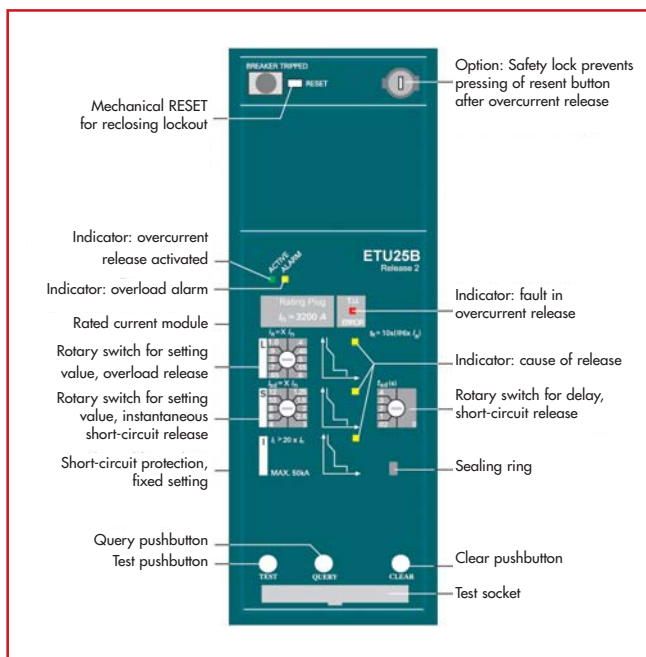


TECHNICAL DATA

- Adjustable overload release with I²t characteristic with fixed time delay $t_R = 10$ seconds at $6 \times I_R$
- Instantaneous short-circuit protection, adjustable between $2 \dots 8 \times I_n$
- Overload indicator
- Setting of protective functions by means of rotary switch

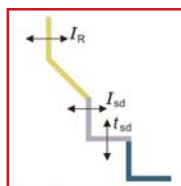
DESCRIPTION	TYPE	ORDER NO. FACTORY INSTALLED
ELECTRONIC RELEASE ETU15B		
With protection function LI	ETU15B	MO890150

ELECTRONIC RELEASE ETU25B



SCHRACK INFO

Classic protection for installations, motors and systems using time-selective grading up to 6300A.

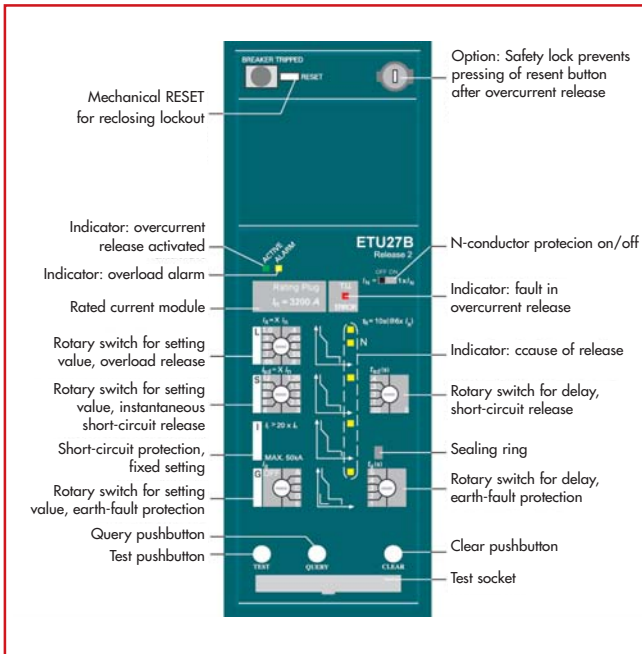


TECHNICAL DATA

- Adjustable overload release with I^2t characteristic with time delay $t_R = 10$ seconds at $6 * I_n$
- Short time-delay short-circuit protection, adjustable from $1,25 \dots 12 * I_n$ and
- Instantaneous short-circuit protection, fixed to $20 * I_n$, max. 55kA
- Replaceable rating plug allows instant adaptability to the required system currents, thus ensuring overload protection of 100 A to 6300 A
- Overload indicator
- Display of cause of release through LED
- Option for testing the release
- Setting of protective functions by means of rotary switch

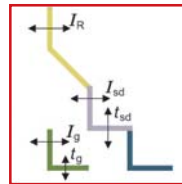
DESCRIPTION	TYPE	ORDER NO. FACTORY INSTALLED
ELECTRONIC RELEASE ETU25B		
With protection function LSI	ETU25B	MO890250

ELECTRONIC RELEASE ETU27B



SCHRACK INFO

Classic protection for installations, motors and systems using time-selective grading up to 6300A.



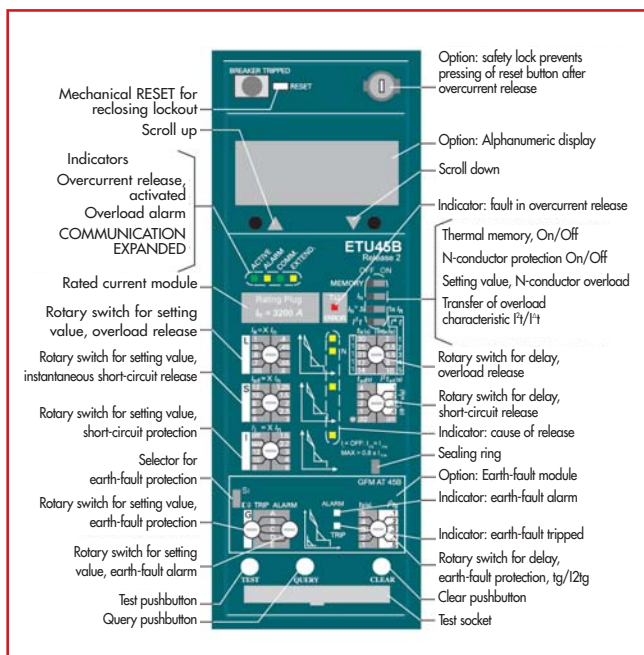
TECHNICAL DATA

Adjustable overload release with I²t characteristic with fixed time delay $t_R = 10$ seconds at $6 \times I_n$

- Short-time delay short-circuit protection, adjustable from 1,25 ... 12 x I_n
- Instantaneous short-circuit protection, fixed at 20 x I_n , max. 50 kA
- Replaceable rating plug allows instant adaptability to the required system currents, thus ensuring overload protection of 100 A to 6300 A
- Overload indicator
- Display of cause of release through LED
- Option for testing the release
- Connectable neutral conductor protection
- Permanently integrated earth-fault protection for the calculation of the earth-fault current through vectorial current summation
- Current transformer for N conductor has to be ordered separately
- Setting of protective functions by means of rotary switch

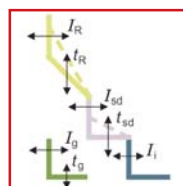
DESCRIPTION	TYPE	ORDER NO. FACTORY INSTALLED
ELECTRONIC RELEASE ETU27B		
With protection function LSING	ETU27B	MO890270

ELECTRONIC RELEASE ETU45B



SCHRACK INFO

An inexpensive allrounder for intelligent installations and all sorts of industrial applications – “Internal Cubicle BUS”.



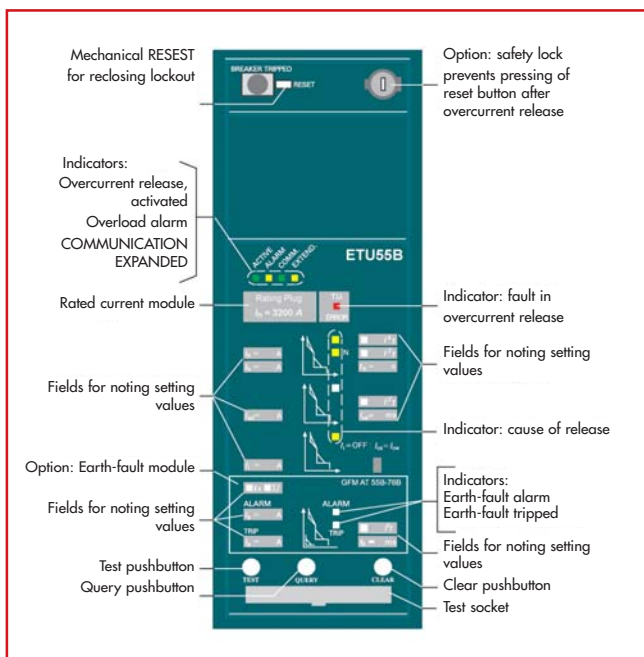
TECHNICAL DATA

- Adjustable overload release with I^2t characteristic with fixed time delay $t_R = 10$ seconds at $6 \times I_R$
- Short-time delay short-circuit protection, adjustable from $1,25 \dots 12 \times I_n$
- Instantaneous short-circuit protection, fixed at $20 \times I_n$, max. 50 kA
- Replaceable rating plug allows instant adaptability to the required system currents, thus ensuring overload protection of 100 A to 6300 A
- Overload indicator
- Display of cause of release through LED
- Option for testing the release
- Adjustable time-lag class for overload protection
- Switch-selectable characteristic of the overload and short-time delay short-circuit range (current discriminate) for finer selectivity conditioning to downstream fuses or protective devices
- Thermal memory as restart protection in the case of tripped motor circuits
- Connectable and adjustable neutral conductor protection
- Modular earth-fault protection, with separately adjustable alarm and trip function
- Communication interface, metering function (Plus), connection of external modules as option or retrofit option
- Optional high-contrast display with viewing angle adjustment
- Setting of protective functions by means of rotary or slide switch

DESCRIPTION	TYPE	ORDER NO. FACTORY INSTALLED
ELECTRONIC RELEASE ETU45B		
With LSIN protective function, excl. display	ETU45B	MO890450
With LSIN protective function, excl. display	ETU45B	MO890450
Display with LSING protective function incl. earth-fault protection unit		MO89045G

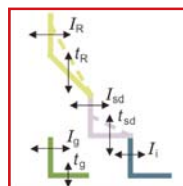
Order current converter for N conductor protection, and current converter for sensing ground fault current in earthed neutral conductor of transformer separately. The internal transformers for neutral conductors can be ordered by adding a “Z” and short order code “F23”.

ELECTRONIC RELEASE ETU55B



SCHRACK INFO

The release for special safety requirements when it comes to adjustability with an exclusive external parameterisation input for generator- and motor protection, industrial applications – “internal Cubicle BUS”.



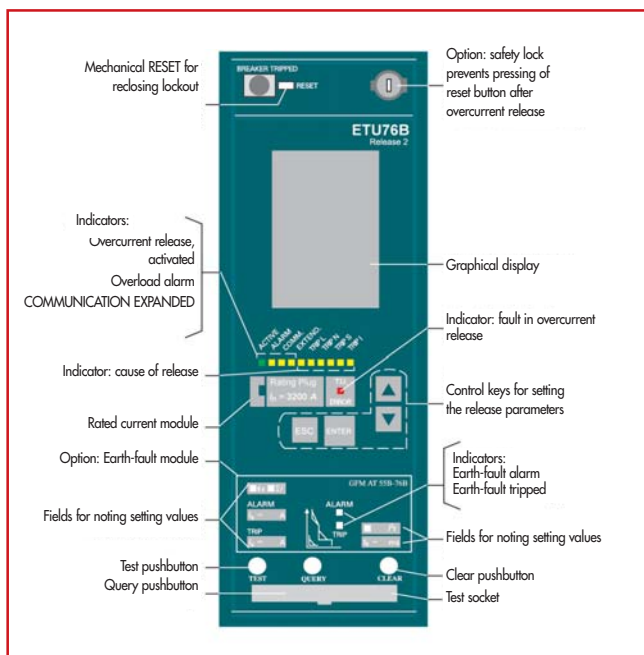
TECHNICAL DATA

- Adjustable overload release with I²t characteristic with fixed time delay $t_R = 10$ seconds at $6 \times I_n$
- Short-time delay short-circuit protection, adjustable from $1,25 \dots 12 \times I_n$
- Instantaneous short-circuit protection, fixed at $20 \times I_n$, max. 50 kA
- Replaceable rating plug allows instant adaptability to the required system currents, thus ensuring overload protection of 100 A to 6300 A
- Overload indicator
- Display of cause of release through LED
- Option for testing the release
- Adjustable time-lag class for overload protection
- Switch-selectable characteristic of the overload and short-time delay short-circuit range (current discriminate) for finer selectivity conditioning to downstream fuses or protective devices
- Thermal memory as restart protection in the case of tripped motor circuits
- Connectable and adjustable neutral conductor protection
- Modular earth-fault protection, with separately adjustable alarm and trip function
- Communication interface, metering function (Plus), connection of external modules as option or retrofit option
- Optional high-contrast display with viewing angle adjustment
- Two protective parameter sets that can be stored separately in the release (switch selectable through external signal)
- Overload protection that can be switched off for use with modern operating mechanism technology
- Adjustable lag of the delayed short-circuit protection up to 4000 ms
- Neutral conductor protection adjustable to $I_N = 2 \times I_n$
- Setting of protective functions by means of Breaker Data Adapter or through communication interface

DESCRIPTION	TYPE	ORDER NO. FACTORY INSTALLED
ELECTRONIC RELEASE ETU45B		
With protection function LSIN	ETU45B	MO890455
With LSING protective function incl. earth-fault protection unit	ETU45B	MO89055G

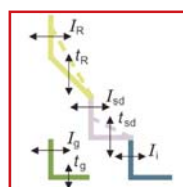
Order current converter for N conductor protection, and current converter for sensing ground fault current in earthed neutral conductor of transformer separately. The internal transformers for neutral conductors can be ordered by adding a “Z” and short order code “F23”.

ELECTRONIC RELEASE ETU76B



SCHRACK INFO

The multitasking system with graphical display for network analysis – “integrated Cubicle BUS”.



TECHNICAL DATA

- Adjustable overload release with I^2t characteristic with fixed time delay $t_R = 10$ seconds at $6 \times I_R$
- Short-time delay short-circuit protection, adjustable from $1,25 \dots 12 \times I_n$
- Instantaneous short-circuit protection, fixed at $20 \times I_n$, max. 50 kA
- Replaceable rating plug allows instant adaptability to the required system currents, thus ensuring overload protection of 100 A to 6300 A
- Overload indicator
- Display of cause of release through LED
- Option for testing the release
- Adjustable time-lag class for overload protection
- Switch-selectable characteristic of the overload and short-time delay short-circuit range (current discriminate) for finer selectivity conditioning to downstream fuses or protective devices
- Thermal memory as restart protection in the case of tripped motor circuits
- Connectable and adjustable neutral conductor protection
- Modular earth-fault protection, with separately adjustable alarm and trip function
- Communication interface, metering function (Plus), connection of external modules as option or retrofit option
- Two protective parameter sets that can be stored separately in the release (switch selectable through external signal)
- Overload protection that can be switched off for use with modern operating mechanism technology
- Adjustable lag of the delayed short-circuit protection up to 4000 ms
- Neutral conductor protection adjustable to $I_N = 2 \times I_n$
- Setting of protective functions by means of Breaker Data Adapter or through communication interface
- Graphical display of all parameters and event/curve characteristics
- Storage of events and causes of release for specific error analysis
- High contrast, background-lit graphical display with sleep mode

DESCRIPTION	TYPE	ORDER NO. FACTORY INSTALLED
ELECTRONIC RELEASE ETU76B		
With protection function LSIN	ETU76B	MO890760
With LSING protective function incl. earth-fault protection unit	ETU76B	MO89076G

Order current converter for N conductor protection, and current converter for sensing ground fault current in earthed neutral conductor of transformer separately. The internal transformers for neutral conductors can be ordered by adding a “Z” and short order code “F23”.

■ RATING PLUG



■ SCHRACK INFO

The Rating Plug is a replaceable module that enables users to reduce the rated device current for optimum adaptation to the system; e. g. during startup of a plant selection. The Rating Plug should be selected so that it roughly corresponds to the rated current of the system

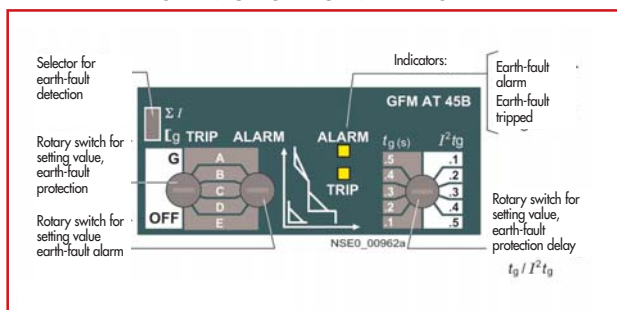
RATED CURRENT I_N (A)	ORDER NUMBER AS SPARE PART	ORDER NUMBER FACTORY INSTALLED
FOR FRAME SIZE 1, 2		
250	MO90AA51	MO800B02
315	MO90AA52	MO800B03
400	MO90AA53	MO800B04
500	MO90AA54	MO800B05
630	MO90AA55	MO800B06
800	MO90AA56	MO800B08
1000	MO90AA57	MO800B10
FOR FRAME SIZE 1, 2, 3		
1250	MO90AA58	MO800B12
1600	MO90AA61	MO800B16
FOR FRAME SIZE 2, 3		
2000	MO90AA62	MO800B20
2500	MO90AA63	MO800B25
3200	MO90AA64	MO800B32
4000	MO90AA65	MO800B40
FOR FRAME SIZE 3		
5000	MO90AA66	MO800B50
6300	MO90AA67	MO800B63

EARTH-FAULT PROTECTION MODULE

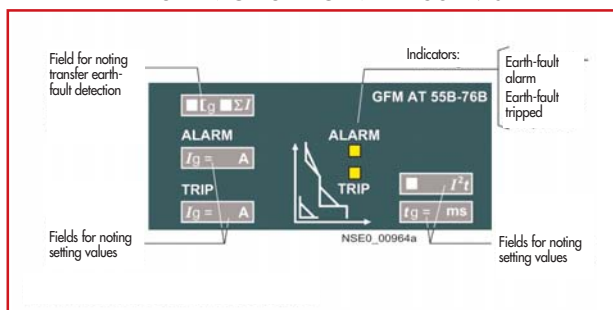
SCHRACK-INFO

The earth-fault release "G" detects fault currents that flow above ground and present a fire hazard to the system. The adjustable time lag allows the selective staggering of consecutively arranged circuit-breakers. When setting the parameters at the over current release, a selection can be made between "report" (alarm) and "trigger" (trip) if the set current value is exceeded. The cause of the release is displayed on a LED when the query button is pressed. Protection release ETU27B is equipped with an earth-fault protection module, ETU45B, ETU55B and ETU76B can be retrofitted.

EARTH-FAULT MODULE GFM AT 45B



EARTH-FAULT MODULE GFM AT 55B-76B



DESCRIPTION	ORDER NO.	ORDER NUMBER
	AS SPARE PART	FACTORY INSTALLED
GFM AT 45B (for ETU 45B only) Alarm and trigger	MO90AT53	-
GFM AT 55B-76B (for ETU55B, ETU76B only) Alarm and trigger	MO90AT56	-

DISPLAY



DESCRIPTION	ORDER NO.	ORDER NUMBER
	AS SPARE PART	FACTORY INSTALLED
4-line display for ETU45B	MO90AT81	-

EMC FILTER

SCHRACK INFO

Radio interference suppression filter for accentuating common-mode interferences (e. g. in IT networks, resulting from frequency converters). (Asymmetric) insertion loss in 40 kHz to 10 MHz > 40 dB range.

DESCRIPTION	ORDER NO.	ORDER NUMBER
	AS SPARE PART	FACTORY INSTALLED
EMC Filter	MO90AK32	MO800F31

TRANSFORMER FOR N CONDUCTOR

DESCRIPTION	ORDER NO.	ORDER NUMBER
	AS SPARE PART	FACTORY INSTALLED
Internal transformers for Neutral conductor – includes wiring kit		
Frame size 1	MO90AA11	MO810F23
Frame size 2	MO90AA12	MO820F23
Frame size 3	MO90AA13	MO830F23
External transformer for N conductor		
Frame size 1	MO90AA21	–
Frame size 2	MO90AA22	–
Frame size 3	MO90AA23	–
External transformer for N conductor with connection pieces		
Frame size 1	MO90AA31	–
Frame size 2	MO90AA32	–
Frame size 3	MO90AA33	–

AUTOMATIC RESET OF THE RECLOSING LOCKOUT

SCHRACK INFO

If the ETU is released the circuit-breaker cannot be reclosed until the release has been either electrically or manually reset. With the option “automatic reset of the reclosing lockout”, the circuit-breaker is ready-to-close immediately after a release. The reset of the manual trip indicator is not contained in this option.

DESCRIPTION	ORDER NO.	ORDER NUMBER
	AS SPARE PART	FACTORY INSTALLED
Lead sealable cover plate for ETU15B to ETU55B	MO90AT45	–
Lead-sealable cover plate for ETU76	MO90AT46	–
Automatic reset of the reclosing lock out	MO90AK21	MO800K01
Remote reset magnet – for mechanical trip display DC 24 V	MO90AK03	MO800K10
Remote reset magnet – for mechanical trip display AC 208-240 V/DC 220–250 V	MO900AK06	MO800K13
Retrofittable internal Cubicle BUS wiring for connection to Terminal X8 – (male connectors not included) for ETU45B to ETU76B	MO90AK30	–
Retrofittable internal wiring for connecting external N- and G transformers to Terminal X8 – (male connectors not included)	MO90AK31	–

LOCKING DEVICES

SCHRACK INFO

"Safe OFF" switch-independent interlock device to prevent unauthorised closing

This special feature available for draw-out circuit breakers prevents closing independently of the switch, thus satisfying main switch conditions to EN 60204 (VDE 0113) - Mains disconnecting equipment. Unauthorised closing is not possible after replacement of the circuit breaker. The circuit breaker must be switched off to activate the interlock. The interlock device is blocked when the circuit breaker is switched on. The blocking is only effective when the key has been removed. The safety key can only be removed in the "OFF" position.

DESCRIPTION	ORDER NO.	ORDER NUMBER
	AS SPARE PART	FACTORY INSTALLED
Locking device against unauthorised closing, in operator panel		
Mains equipment meets EN 60204 (VDE 0113) regulations for main switches.		
Installation kit FORTRESS or CASTELL	MO900BA31	-
Made by Ronis	MO90BA33	MO800S08
Made by KIRK-Key	MO90BA34	-
Made by Profalux	MO90BA35	MO800S09
Made by CES	MO90BA36	MO800S01
Made by IKON	MO90BA38	MO800S03
Installation kit for padlocks	MO90BA41	MO800S07

Locking device against unauthorised closing, for draw-out circuit breaker

Mains equipment meets EN 60204 (VDE 0113) regulations for main switches, comprising lock in cabinet door, effective in operating position, the function remains the same when replacing the switch.

Made by CES	MO90BA51	MO800R61
Made by IKON	MO90BA53	-
Made by KIRK key	MO90BA57	-
Made by Ronis	MO90BA58	MO800R68
Made by Profalux	MO90BA50	MO800R60

Locking device for operator lever using padlock

Locking device for operating lever (padlock not included)	MO90BA71	MO800S33
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Lock device to prevent movement of withdrawable circuit breaker – Safety lock for mounting on switch

Made by CES	MO90BA73	MO800S71
Made by IKON	MO90BA75	-
Made by Profalux	MO90BA76	MO800S75
Made by Ronis	MO90BA77	MO800S76

SEALING CAP FOR MECHANICAL ON/OFF

DESCRIPTION	ORDER NO.	ORDER NUMBER
	AS SPARE PART	FACTORY INSTALLED
Protective covers for mechanical ON/OFF		
each comprising 2 transparent covers for sealing or attachment of padlocks, Cover with 6,35 mm bore (for tool actuation), lock mount for safety lock for key operation		
Lock not included	MO90BA21	-
Made by CES	MO90BA22	-
Made by IKON	MO90BA24	-

LOCKING MECHANISMS

SCHRACK INFO

Locking device against moving if the cubicle door is open for withdrawable circuit-breakers

The crank handle is blocked if the cubicle door is open and cannot be withdrawn. It is not possible to move withdrawable circuit-breakers. The blocking is only effective if the crank handle is inserted.

Interlocking of cubicle door

The cubicle door cannot be opened if the

- fixed-mounted circuit-breaker is closed (transmission of the locking signal by means of Bowden wire) or
- if the withdrawable circuit-breaker is in connected position

DESCRIPTION	ORDER NO.	ORDER NUMBER
	AS SPARE PART	FACTORY INSTALLED
Prevents movement of draw-out circuit breaker in disconnect position , comprising Bowden cable and lock in cabinet door		
Made by CES	MO90BA81	MO800R81
Made by IKON	MO90BA83	–
Made by Profalux	MO90BA85	MO800R85
Made by Ronis	MO90BA86	MO800R86
Installation kit for padlocks	MO90BA87	–
Prevents opening of cabinet door in ON position (defeatable)		
For permanent installation	MO90BB12	MO800R30
Prevents opening of cabinet door in ON position (defeatable)		
For guide frame	MO90BB13	MO800S30
Prevents movement while cabinet door open		
For guide frame	MO90BB15	MO800R50

MECHANICAL INTERLOCK

SCHRACK INFO

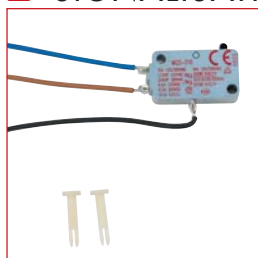
Mutual mechanical circuit-breaker interlocking

The module for mutual mechanical interlocking can be implemented for two or three circuit-breakers and is simple to adapt to the respective version. Fixed-mounted and withdrawable circuit-breakers are compatible and can be implemented together in a single system.

The circuit-breakers can be installed either next to one another or on top of one another, whereby the distance between circuit-breakers is determined only by the length of the Bowden wire.

DESCRIPTION	ORDER NO.	ORDER NUMBER
	AS SPARE PART	FACTORY INSTALLED
Mutual mechanical interlock , with Bowden cable 2000 mm (one required per circuit breaker)		
Module for fixed-mounted circuit breakers	MO90BB21	MO800S55
Module for draw-out circuit breaker with frame. To be ordered separately.	MO90BB24	MO800R55
Module for guide frame. To be ordered separately.	MO90BB22	MO800R56
Module for draw-out circuit breaker. To be ordered separately.	MO90BB23	MO800R57
Bowden cable		
2000 mm	MO90BB45	–
3000 mm	MO90BB46	–
4500 mm	MO90BB47	–

■ SIGNALISATION AND CONTROL



MO90AH01

■ SCHRACK INFO

Ready-to-close signalling switch

MO circuit breaker come with a visual ready-to-close signal indicator as standard. The option is also available to indicate ready-to-close using a signalling switch. This signalling switch is included as standard for switches operated via a communications interface.

Signalling switch for auxiliary release

One signalling contact is available per auxiliary release for polling switch status of the auxiliary releases.

Tripped signal switch

In the event that the circuit breaker tripped due to an overload, short-circuit, earth-fault or extended protection function, this can be indicated with a tripped signal switch. This indicator switch is available as an option. This signalling switch is included as standard for circuit breakers operated via a communications interface.

Operating cycle counter

A 5-digit operating cycle counter is available in connection with the motor operator. The counter increments by "1" once the storage spring is fully charged.

"Electrical ON" button

Used for the electrical switch-on of the circuit breaker via a local, electrical "ON" or remote operation.

Sealable cap covers "Electrical ON" button

The "Electrical ON button" comes with a sealable cap as standard.

Motor cut off switch

Rotary switch for switching off (automatic charging) of motor operator.

DESCRIPTION	ORDER NO.	ORDER NUMBER
	AS SPARE PART	FACTORY INSTALLED
Ready-to-close signalling switch	MO90AH01	MO800C22
Signalling switch, 1st auxiliary release	MO90AH02	MO800C26
Signalling switch, 2nd auxiliary release	MO90AH03	MO800C27
Tripped signal switch	MO90AH04	MO800K07
Mechanical operating cycle counter	MO90AH07	MO800C01
Stored energy status signalling switch	MO90AH08	MO800C20
Position indicator switch for guide frame, 1st block (3rd microswitch)	MO90AH11	MO800R15
Position indicator switch for guide frame, 2nd block (6th microswitch)	MO90AH12	MO800R16
Electical ON button (button+wiring) with sealable cap	MO90AJ02	MO800C11
Electical ON button (button+wiring) with CES installation kit	MO90AJ03	MO800C12
Motor cut-off switch, assembly on operator panel	MO90AJ06	MO800S25
EMERGENCY OFF button, mushroom button instead of mechanical OFF button	MO90BA72	MO800S24

TEST DEVICES

DESCRIPTION	ORDER NO.	ORDER NUMBER
	AS SPARE PART	FACTORY INSTALLED
Manual test device for overcurrent releases ETU15B to ETU76B for testing overcurrent release functions	MO90AT31	-
Function test device for testing release characteristic curves for overcurrent releases ETU15B to ETU76B	MO90AT44	-

CAPACITOR STORAGE DEVICE

SCHRACK INFO

Rated control voltage must be the same as the rated control voltage of the voltage release unit. Also suitable for circuit breakers 3VL and 3WN.

RATED CONTROL VOLTAGE/ RATED CONTROL VOLTAGE	ORDER NO.	ORDER NUMBER
	AS REPLACEMENT PART	FACTORY INSTALLED
For voltage release AC 50/60 Hz 110-127/DC 110-115 V	MO90BA13	-
For voltage release AC 50/60 Hz 220-240/DC 220-250 V	MO90BA14	-

AUX. PLUG CONNECTORS



MO90AB01



MO90AB03



MO90AB08

DESCRIPTION	ORDER NO.	ORDER NUMBER
	AS SPARE PART	FACTORY INSTALLED
Make connectors for circuit breakers	MO90AB01	-
Auxiliary supply connector for circuit breaker or guide frame, Screw connection (SIGUT)	MO90AB03	-
Auxiliary supply connector for circuit breaker or guide frame, Screwless connection type (tension spring)	MO90AB04	-
Coding set for fixed installation (X5 to X8)	MO90AB07	-
Sliding contact module for for guide frame	MO90AB08	-
Dummy block for circuit breaker	MO90AB12	-

1ST AUXILIARY RELEASE AFTER ETU



MO90AD01

SCHRACK INFO

Up to two auxiliary release switches can be installed at the same time. The 1st release must always be a voltage release. 2nd auxiliary release see below

DESCRIPTION	ORDER NO.	ORDER NUMBER
	AS SPARE PART	FACTORY INSTALLED
Shunt release		
DC 24 V – 100 % ED	MO90AD01	MO890B00
DC 30 V	MO90AD02	MO890C00
DC 48 V	MO90AD03	MO890D00
DC 60 V	MO90AD04	MO890E00
DC 110 V/AC 110 V	MO90AD05	MO890F00
DC 220 V/AC 230 V	MO90AD06	MO890G00

2ND AUXILIARY RELEASE AFTER ETU



MO90AD01

SCHRACK INFO

Possible combinations:

- 1 shunt release or 1 undervoltage release
- or 2 shunt releases
- or 1 shunt release + 1 undervoltage release.

DESCRIPTION	ORDER NO.	ORDER NUMBER
	AS SPARE PART	FACTORY INSTALLED
Shunt release		
DC 24 V – 100 % ED	MO90AD01	MO890B00
DC 30 V	MO90AD02	MO890C00
DC 48 V	MO90AD03	MO890D00
DC 60 V	MO90AD04	MO890E00
DC 110 V/AC 110 V	MO90AD05	MO890F00
DC 220 V/AC 230 V	MO90AD06	MO890G00

Undervoltage release – undelayed ($\geq 80\text{ms}$), short time-delayed ($\leq 200\text{ms}$)

DC 24 V	MO90AE01	MO890I00
DC 30 V	MO90AE02	MO890K00
DC 48 V	MO90AE03	MO890L00
DC 60 V	MO90AE07	MO890U00
DC 110-125 V/AC 110-127 V	MO90AE04	MO890M00
DC 220-250 V/AC 208-240 V	MO90AE05	MO890N00
AC 380-415 V	MO90AE06	MO890P00

Undervoltage release – time-delayable 0,2 s to 3,2 sec

DC 48 V	MO90AE11	MO890Q00
DC 110-125 V/AC 110-127 V	MO90AE12	MO890R00
DC 220-250 V/AC 208-240 V	MO90AE13	MO890S00
AC 380-415 V	MO90AE14	MO890T00

MOTOR OPERATOR



MO90AF04

SCHRACK INFO

For automatic charging of the stored energy mechanism.

Is switched on when the stored energy mechanism is released and the control voltage is available.

Automatically switches off after charging. Manual actuation of the storage can function independently

DESCRIPTION	ORDER NO.	ORDER NUMBER
	AS SPARE PART	FACTORY INSTALLED
Motor operator DC 220-250 V/AC 208-240 V	MO90AF04	MO896000
Motor operator DC 110-125 V/AC 110-127 V	MO90AF03	-
Motor operator DC 24-30 V	MO90AF01	MO895000
Motor operator DC 48-60 V	MO90AF02	MO894000
DC 110 V/AC 110 V	MO90AD05	MO892000
DC 220 V/AC 230 V	MO90AD06	MO893000

AUXILIARY CONTACTS



MO90A401

SCHRACK INFO

- Always includes 2 N/O + 2 N/C

DESCRIPTION	ORDER NO.	ORDER NUMBER
	AS SPARE PART	FACTORY INSTALLED
2 N/O + 2 N/C additionally	MO90AG01	MO890004
4 N/O additionally	-	MO890007
3 N/O + 1 N/C additionally	-	MO890008
2 N/O additionally	MO90AG02	-
1 N/O + 1 N/C additionally	MO90AG03	-

DOOR SEALING FRAME, COVER



MO800T40

DESCRIPTION	ORDER NO.	ORDER NUMBER
	AS SPARE PART	FACTORY INSTALLED
Door sealing frame	MO90AP01	MO800T40
Safety cover IP55 is not for use in combination with door sealing frame, removable cover is opened from both sides	MO90AP02	-

SHUTTER

SCHRACK INFO

The cover strips of the shutter lock the laminated contacts of the guide frame if the withdrawable circuit-breaker is withdrawn so that they fulfil the function of a touch guard.

The cover strips can be manually opened with the strip lifter.

The cover strips can be fixed in different positions with padlocks and protected from unauthorized manipulation.

DESCRIPTION	ORDER NO.	ORDER NUMBER
	AS SPARE PART	FACTORY INSTALLED
Shutter 3 pole		
Frame size 1	MO90AP04	MO810R21
Frame size 2	MO90AP06	MO820R21
Frame size 3	MO90AP07	MO830R21
Shutter 4 pole		
Frame size 1	MO90AP08	MO814R21
Frame size 2	MO90AP11	MO824R21
Frame size 3	MO90AP12	MO834R21

ARC CHUTE COVER/SHUTTER

DESCRIPTION	ORDER NO.	ORDER NUMBER
	AS SPARE PART	FACTORY INSTALLED
Arc chute cover Parts set for guide frame, 3 pole		
Frame size 1	MO90AS32	MO810R20
Frame size 2	MO90AS36	MO820R20
Frame size 3	MO90AS38	MO830R20
Arc chute cover Parts set for guide frame, 4 pole		
Frame size 1	MO90AS42	MO814R10
Frame size 2	MO90AS44	MO824R10
Frame size 3	MO90AS46	MO834R10

SUPPORT BRACKET

SCHRACK INFO

For mounting fixed-installed circuit breakers vertically, for frame sizes 1 and 2 only (1 set = 2 pcs.).

DESCRIPTION	ORDER NO.	ORDER NUMBER
	AS SPARE PART	FACTORY INSTALLED
Support bracket, frame size 1/2	MO90BB50	-

CUBICLE BUS MODULES

DESCRIPTION	ORDER NO.	ORDER NUMBER
	AS SPARE PART	FACTORY INSTALLED
Digital output module with rotary coding switch, relay outputs	MO90AT26	-
Digital output module, configurable, relay outputs	MO90AT20	-
Digital input module	MO90AT27	-
Analogue output module	MO90AT23	-
ZSS module	MO90AT21	-

PARAMETERISATION SYSTEMS, COMMUNICATION

DESCRIPTION	ORDER NO.
Breaker Data Adapter (BDA)	
Parameterisation, operation, monitoring and diagnosis of SENTRON circuit breakers via the local interface: Breaker Data Adapter, connecting cable to SENTRON 3WL circuit breakers and to programming device (e.g. laptop); runs on Internet Explorer with JAVA2 VM 1.4.0-01	MO90AT28
BDA Plus	
Same as BDA, also with Ethernet interface for connection to Ethernet/Intranet/Internet	MO90AT33
Connecting cable for BDA Plus	
Conencting cable for connection of BDA Plus to Terminal X8 on SENTRON 3WL circuit breaker. Required when a COM 15 or other external CUBICLE BUS modules are not present, 2 m in length.	MO90BC21
Switch ES Power parameterisation software	
Parameterisation, operation, monitoring and diagnosis of SENTRON circuit breakers via the PROFIBUS DB; Runs on Windows95, Windows98, WindowsNT, Windows2000 and Windows XP Professional also requires additional PROFIBUS card, e.g. CP5613	MO90CC10

ACCESSORIES FOR COMMUNICATION

DESCRIPTION	ORDER NO.
Pre-assembled cables for Cubicle BUS modules	
0,2 m long, for connection to SENTRON 3WL with COM15	MO90BC04
1 m long, for connection to SENTRON 3WL with COM15	MO90BC02
2 m long, for connection to SENTRON 3WL with COM15	MO90BC03
2 m long, for connection to SENTRON 3WL without COM15	MO90BC05
Voltage transformer, 3-pole for SENTRON 3WL with Plus measurement function	
230 V/100 V, Class 0,5	MO90BB70
380-630 V/100 V, Class 0,5	MO90BB68

RETROFFITING AND REPLACEMENT PARTS

DESCRIPTION	ORDER NO.
PROFIBUS retrofit kit	
Retrofit kit for PROFIBUS communication includes COM15, BSS and cable kit for all MO circuit breakers of 3WL type with ETU45B, ETU55B and ETU76B releases	MO90AT12
COM15 PROFIBUS Module	MO90AT15
Breaker Status Sensor (BSS)	MO90AT16
Plus measurement function (requires voltage transformer)	MO90AT03

PERMISSIBLE UNINTERRUPTED CURRENT (A)

MO1(-4), MO2(-4), MO3(-4)

As a factor of the ambient operating temperature with vertical or horizontal mounting

Type	Version	Ambient operating temperature		
		up to 55 °C	60 °C	70 °C
MO1(-4)				
MO1(-4)...630	Fixed-mounting	630	630	630
	Withdrawable units	630	630	630
MO1(-4)...800	Fixed-mounting	800	800	800
	Withdrawable units	800	800	800
MO1(-4)...1000	Fixed-mounting	1000	1000	1000
	Withdrawable units	1000	1000	910 (1000)
MO1(-4)...1250	Fixed-mounting	1250	1250	1250
	Withdrawable units	1250	1250	1140 (1210)
MO1(-4)...1600	Fixed-mounting	1600	1600	1500 (1600)
	Withdrawable units	1600	1600	1390 (1490)
MO2(-4)				
MO2(-4)...800	Fixed-mounting	800	800	800
	Withdrawable units	800	800	800
MO2(-4)...1000	Fixed-mounting	1000	1000	1000
	Withdrawable units	1000	1000	1000
MO2(-4)...1250	Fixed-mounting	1250	1250	1250
	Withdrawable units	1250	1250	1250
MO2(-4)...1600	Fixed-mounting	1600	1600	1600
	Withdrawable units	1600	1600	1520 (1600)
MO2(-4)...2000	Fixed-mounting	2000	2000	2000
	Withdrawable units	2000	2000	2000
MO2(-4)...2500	Fixed-mounting	2500	2500	2350 (2360)
	Withdrawable units	2500	2500	2220 (2280)
MO2(-4)...3200	Fixed-mounting	3200	3150	2910 (2940)
	Withdrawable units	3200	3070	2790 (2870)
MO3(-4)				
MO3(-4)...4000	Fixed-mounting	4000	4000	4000
	Withdrawable units	4000	4000	4000
MO3(-4)...5000	Fixed-mounting	5000	5000	5000 (4860)
	Withdrawable units	5000	5000	5000 (4730)
MO3(-4)...6300	Fixed-mounting 6300A (40 °C)	6150	5910 (5970)	5610 (5670)
	Withdrawable units 6300 A (40 °C)	5920	5810 (5900)	5400 (5500)

Notes:

Values in parentheses: Black-painted copper rails, partly with reduced recommended conductor cross-sections

CIRCUIT BREAKER MO1

GENERAL DATA


	MO1(-4)...630		MO1(-4)...800	
	B	N	B	N
Standards and regulations	IEC/EN 60947, VDE 0660			
Climate resistance	IEC/EN 60068-2-30			
Ambient operating temperature	-40 – 70°C (devices with LCD max. 55 °C)			
Storage	-25 – 70°C (devices with LCD max. 55 °C)			
Operation (open)				
Mounting position				
Utilization category	B	B	B	B
Degree of protection	IP20, IP41 with door sealing frame, IP55 with shrouding cover			
Direction of power supply	any			

MAIN CIRCUITS

	630 A	630 A	800 A	800 A
Rated current = rated uninterrupted current $I_n = I_r$	630 A	630 A	800 A	800 A
Rated impulse withstand voltage U_{imp}	12000 V AC	12000 V AC	12000 V AC	12000 V AC
Rated operational voltage U_n	690 V AC	690 V AC	690 V AC	690 V AC
Use in IT networks up to $U = 440$ AC I_{tr}	23 kA	23 kA	23 kA	23 kA
Use in IT networks up to $U = 690$ V I_{tr}	MO-4 ETU15, 25 are not suitable for IT networks without overload protection in 4th pole			
Overvoltage protection/pollution degree	III/3	III/3	III/3	III/3
Rated insulation voltage U_i	1000 V	1000 V	1000 V	1000 V

SWITCHING CAPACITY

		105 kA	143 kA	105 kA	143 kA		
Rated short-circuit breaking capacity value I_{cn}	up to 440 V 50/60 Hz	88 kA	105 kA	88 kA	105 kA		
	up to 690 V 50/60 Hz	–	–	–	–		
	1000 V, 50/60Hz	–	–	–	–		
Rated short-time withstand current 50/60 Hz I_{sw}	$t = 0.5$ s	42 kA	65 kA	42 kA	65 kA		
	$t = 1$ s	42 kA	50 kA	42 kA	50 kA		
	$t = 2$ s	29 kA	35 kA	29 kA	35 kA		
	$t = 3$ s	24 kA	29 kA	24 kA	29 kA		
	$t = 4$ s	21 kA	25 kA	21 kA	25 kA		
rated short-circuit breaking capacity value I_{cn}	IEC/EN 60947 Switching sequence I_{cs} O+CO	up to 440 V 50/60 Hz	50 kA	65 kA	50 kA	65 kA	
		up to 690 V 50/60 Hz	42 kA	50 kA	42 kA	50 kA	
		up to 1000 V 50/60 Hz	–	–	–	–	
	IEC/EN 60947 Switching sequence I_{cs} O+CO+CO	up to 440 V 50/60 Hz	50 kA	65 kA	50 kA	65 kA	
		up to 690 V 50/60 Hz	42 kA	50 kA	42 kA	50 kA	
		up to 1000 V 50/60 Hz	–	–	–	–	
	Switching times	Total disconnecting time ¹⁾	38 ms	38 ms	38 ms	38 ms	
		ON time ²⁾	5 ms	35 ms	35 ms	35 ms	
		ON time electr. (via closing release) ³⁾	80 ms	80 ms	80 ms	80 ms	
		OFF time electr. (via shunt-/undervoltage release) ⁴⁾	73 ms	73 ms	73 ms	73 ms	
		OFF time via control electronics (non-delayed short-circuit release)	50 ms	50 ms	50 ms	50 ms	
	Service life	mechanical, no maintenance	Operations	10000	10000	10000	10000
mechanical, maintenance ⁵⁾		Operations	20000	20000	20000	20000	
electrical, no maintenance		Operations	10000	10000	10000	10000	
electrical, w/ maintenance ⁶⁾		Operations	20000	20000	20000	20000	
Maximum operating cycles	1000 V version	–	–	–	–		
	690 V version	Operations/h	60	60	60	60	
Power loss at rated current I_n at 3-phase symmetrical load	permanent installation	100 W	100 W	100 W	100 W		
	Withdrawable units	195 W	195 W	195 W	195 W		
Weight	Permanent installation	3 pole	43 kg	43 kg	43 kg	43 kg	
		4 pole	50 kg	50 kg	50 kg	50 kg	
	Withdrawable units	3 pole	70 kg	70 kg	70 kg	70 kg	
		4 pole	84 kg	84 kg	84 kg	84 kg	
Conductor cross-sections	Cu rails	Permanent installation	blank	1 x 40 x 10 mm	1 x 40 x 10 mm	1 x 50 x 10 mm	1 x 50 x 10 mm
			black	1 x 40 x 10 mm	1 x 40 x 10 mm	1 x 60 x 10 mm	1 x 60 x 10 mm
		Withdrawable units	blank	1 x 40 x 10 mm	1 x 40 x 10 mm	1 x 50 x 10 mm	1 x 50 x 10 mm
			black	1 x 40 x 10 mm	1 x 40 x 10 mm	1 x 50 x 10 mm	1 x 50 x 10 mm

MO1(-4)-...1000		MO1(-4)-...1250		MO1(-4)-...1600	
B	N	B	N	B	N
IEC/EN 60947, VDE 0660					
IEC/EN 60068-2-30					
-40 – 70°C (devices with LCD max. 55 °C)					
-25 – 70°C (devices with LCD max. 55 °C)					
					
B	B	B	B	B	B
IP20, IP41 with door sealing frame, IP55 with shrouding cover as required					

Notes

- ¹⁾ Time of mechan. bending until contact separation + static average of the arc quenching time.
- ²⁾ Time of mechan. bending until main contact closes.
- ³⁾ Time from application of voltage until closing of main contacts. ON time with overexcited closing release ($5 \leq ED$): 50 ms.
- ⁴⁾ Time from applying voltage to separation of contact + static average of arcing. Except releases for ETU15 system protection: 85 ms.
- ⁵⁾ 'Maintenance' means: Replace main switch and arcing chamber elements.

1000 A	1000 A	1250 A	1250 A	1600 A	1600 A
12000 V AC	12000 V AC	12000 V AC	12000 V AC	12000 V AC	12000 V AC
690 V AC	690 V AC	690 V AC	690 V AC	690 V AC	690 V AC
23 kA	23 kA	23 kA	23 kA	23 kA	23 kA
MO-4 ETU15, 25 are not suitable for IT networks without overload protection in 4th pole					
III/3	III/3	III/3	III/3	III/3	III/3
1000 V	1000 V	1000 V	1000 V	1000 V	1000 V

105 kA	143 kA	105 kA	143 kA	105 kA	143 kA
88 kA	105 kA	88 kA	105 kA	88 kA	105 kA
-	-	-	-	-	-
42 kA	65 kA	42 kA	65 kA	42 kA	65 kA
42 kA	50 kA	42 kA	50 kA	42 kA	50 kA
29 kA	35 kA	29 kA	35 kA	29 kA	35 kA
24 kA	29 kA	24 kA	29 kA	24 kA	29 kA
21 kA	25 kA	21 kA	25 kA	21 kA	25 kA
50 kA	65 kA	50 kA	65 kA	50 kA	65 kA
42 kA	50 kA	42 kA	50 kA	42 kA	50 kA
-	-	-	-	-	-
50 kA	65 kA	50 kA	65 kA	50 kA	65 kA
42 kA	50 kA	42 kA	50 kA	42 kA	50 kA
-	-	-	-	-	-
38 ms	38 ms	38 ms	38 ms	38 ms	38 ms
35 ms	35 ms	35 ms	35 ms	35 ms	35 ms
80 ms	80 ms	80 ms	80 ms	80 ms	80 ms
73 ms	73 ms	73 ms	73 ms	73 ms	73 ms
50 ms	50 ms	50 ms	50 ms	50 ms	50 ms
10000	10000	10000	10000	10000	10000
20000	20000	20000	20000	20000	20000
10000	10000	10000	10000	10000	10000
20000	20000	20000	20000	20000	20000
-	-	-	-	-	-
60	60	60	60	60	60
-	-	-	-	-	-
100 W	100 W	105 W	105 W	150 W	150 W
195 W	195 W	205 W	205 W	350 W	350 W
43 kg	43 kg	43 kg	43 kg	43 kg	43 kg
50 kg	50 kg	50 kg	50 kg	50 kg	50 kg
70 kg	70 kg	70 kg	70 kg	70 kg	70 kg
84 kg	84 kg	84 kg	84 kg	84 kg	84 kg
1 x 60 x 10 mm	1 x 60 x 10 mm	2 x 40 x 10 mm	2 x 40 x 10 mm	2 x 50 x 10 mm	2 x 50 x 10 mm
1 x 60 x 10 mm	1 x 60 x 10 mm	2 x 40 x 10 mm	2 x 40 x 10 mm	2 x 50 x 10 mm	2 x 50 x 10 mm
1 x 60 x 10 mm	1 x 60 x 10 mm	2 x 40 x 10 mm	2 x 40 x 10 mm	2 x 50 x 10 mm	2 x 50 x 10 mm
1 x 60 x 10 mm	1 x 60 x 10 mm	2 x 40 x 10 mm	2 x 40 x 10 mm	2 x 50 x 10 mm	2 x 50 x 10 mm

CIRCUIT BREAKER MO2

GENERAL DATA

	MO2(-4)-... MO2(-4)-...800			MO2(-4)-...1000			MO2(-4)-...1250		
	B	N	H	B	N	H	B	N	H
Standards and regulations	IEC/EN 60947, VDE 0660								
Climate resistance	IEC/EN 60068-2-30								
Ambient temperature									
Storage	-40 – 70°C (devices with LCD max. 55 °C)								
Operation (open)	-25 – 70°C (devices with LCD max. 55 °C)								
Mounting position									

MAIN CIRCUITS

	B								
Utilization category	B								
Degree of protection	IP20, IP41 with door sealing frame, IP55 with shrouding cover								
Direction of power supply	any								
Rated current = rated uninterrupted current $I_n=I_r$	800 A	800 A	800 A	1000 A	1000 A	1000 A	1250 A	1250 A	1250 A
Rated impulse withstand voltage U_{imp}	12000V	12000 V	12000 V	12000 V	12000 V	12000 V	12000 V	12000 V	12000 V
Rated operational voltage U_o	690 V	690 V	690 V 1000 AC	690 V	690 V	690 V 1000 AC	690 V	690 V	690 V 1000 AC
Use in IT networks up to $U = 440 \text{ AC}^{1)}$ I_{IT}	50 kA	50 kA	50 kA	50 kA	50 kA	50 kA	50 kA	50 kA	50 kA
Use in IT networks up to $U = 690 \text{ V } I_{IT}$ for 1000V versions only ¹⁾	-	-	50 kA	-	-	50 kA	-	-	50 kA
Overvoltage protection/pollution degree	III/3	III/3	III/3	III/3	III/3	III/3	III/3	III/3	III/3
Rated insulation voltage U_i	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V

SWITCHING CAPACITY

Rated short-circuit breaking capacity values I_{cs}									
up to 440 V 50/60 Hz	121 kA	176 kA	220 kA	121 kA	176 kA	220 kA	121 kA	176 kA	220 kA
up to 690 V 50/60 Hz	105 kA	165 kA	187 kA	105 kA	165 kA	187 kA	105 kA	165 kA	187 kA
1000 V, 50/60Hz	-	-	95 kA	-	-	95 kA	-	-	95 kA
Rated short-time withstand current 50/60Hz I_{sw}									
t = 0,5 s	55 kA	65 kA	85 kA	55 kA	65 kA	85 kA	55 kA	65 kA	85 kA
t = 1 s	55 kA	65 kA	65 kA	55 kA	65 kA	65 kA	55 kA	65 kA	65 kA
t = 2 s	39 kA	46 kA	46 kA	39 kA	46 kA	46 kA	39 kA	46 kA	46 kA
t = 3 s	32 kA	37 kA	37 kA	32 kA	37 kA	37 kA	32 kA	37 kA	37 kA
t = 4 s	27 kA	32 kA	32 kA	27 kA	32 kA	32 kA	27 kA	32 kA	32 kA
Rated short-circuit breaking capacity value I_{cs}									
IEC/EN 60947 Switching sequence I_{cs} O-t-CO									
up to 440 V 50/60 Hz	55 kA	80 kA	100 kA	55 kA	80 kA	100 kA	55 kA	80 kA	100 kA
up to 690 V 50/60 Hz	50 kA	75 kA	85 kA	50 kA	75 kA	85 kA	50 kA	75 kA	85 kA
up to 1000 V 50/60 Hz	-	-	45 kA	-	-	45 kA	-	-	45 kA
IEC/EN 60947 Switching sequence I_{cs} O-t-CO-t-CO									
up to 440 V 50/60 Hz	55 kA	80 kA	100 kA	55 kA	80 kA	100 kA	55 kA	80 kA	100 kA
up to 690 V 50/60 Hz	50 kA	75 kA	85 kA	50 kA	75 kA	85 kA	50 kA	75 kA	85 kA
up to 1000 V 50/60 Hz	-	-	45 kA	-	-	45 kA	-	-	45 kA

Notes:

¹⁾ The following are not suitable for IT networks: MO-4 ETU15, 25 without overload protection in 4th pole.

MO2(-4)-...1600			MO2(-4)-...2000			MO2(-4)-...2500			MO2(-4)-...3200			MO2(-4)-...		
B	N	H	B	N	H	B	N	H	B	N	H	4000	5000	6300
H														
IEC/EN 60947, VDE 0660														
IEC/EN 60068-2-30														
-40 – 70°C (devices with LCD max. 55 °C)														
-25 – 70°C (devices with LCD max. 55 °C)														

B														
IP20, IP41 with door sealing frame, IP55 with shrouding cover														
as required														
1600 A														
12000 V														
690 V														
50 kA														
III/3														
1000 V														
1600 A	1600 A	1600 A	2000 A	2000 A	2000 A	2500 A	2500 A	2500 A	3200 A	3200 A	3200 A	4000 A	5000 A	6300 A
12000 V	2000 V	2000 V	2000 V	2000 V	2000 V	2000 V	2000 V	2000 V	12000 V	12000 V	12000 V	12000 V	12000 V	12000 V
690 V	690 V	690 V	690 V	690 V	690 V	690 V	690 V	690 V	690 V	690 V	690 V	690 V	690 V	690 V
50 kA	50 kA	1000 AC 50 kA	50 kA	50 kA	1000 AC 50 kA	50 kA	50 kA	1000 AC 50 kA	50 kA	50 kA	1000 AC 50 kA	1000 AC 50 kA	1000 AC 50 kA	1000 AC 50 kA
-	-	50 kA	-	-	50 kA	-	-	50 kA	-	-	50 kA	50 kA	50 kA	50 kA
III/3	III/3	III/3	III/3	III/3	III/3	III/3	III/3	III/3	III/3	III/3	III/3	III/3	III/3	III/3
1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V

121 kA	176 kA	220 kA	121 kA	176 kA	220 kA	121 kA	176 kA	220 kA	121 kA	176 kA	220 kA	220 kA	220 kA	220 kA
105 kA	165 kA	187 kA	105 kA	165 kA	187 kA	105 kA	165 kA	187 kA	105 kA	165 kA	187 kA	187 kA	187 kA	187 kA
-	-	95 kA	-	-	95 kA	-	-	95 kA	-	-	95 kA	105 kA	105 kA	105 kA
55 kA	65 kA	85 kA	55 kA	65 kA	85 kA	55 kA	65 kA	85 kA	55 kA	65 kA	85 kA	85 kA	85 kA	100 kA
55 kA	65 kA	65 kA	55 kA	65 kA	65 kA	55 kA	65 kA	65 kA	55 kA	65 kA	80 kA	80 kA	80 kA	100 kA
39 kA	46 kA	46 kA	39 kA	46 kA	46 kA	39 kA	46 kA	46 kA	39 kA	46 kA	56 kA	56 kA	56 kA	70 kA
32 kA	37 kA	37 kA	32 kA	37 kA	37 kA	32 kA	37 kA	37 kA	32 kA	37 kA	46 kA	46 kA	46 kA	57 kA
27 kA	32 kA	32 kA	27 kA	32 kA	32 kA	27 kA	32 kA	32 kA	27 kA	32 kA	40 kA	40 kA	40 kA	50 kA
55 kA	80 kA	100 kA	55 kA	80 kA	100 kA	55 kA	80 kA	100 kA	55 kA	80 kA	100 kA	100 kA	100 kA	100 kA
50 kA	75 kA	85 kA	50 kA	75 kA	85 kA	50 kA	75 kA	85 kA	50 kA	75 kA	85 kA	85 kA	85 kA	85 kA
-	-	45 kA	-	-	45 kA	-	-	45 kA	-	-	45 kA	50 kA	50 kA	50 kA
55 kA	80 kA	100 kA	55 kA	80 kA	100 kA	55 kA	80 kA	100 kA	55 kA	80 kA	100 kA	100 kA	100 kA	100 kA
50 kA	75 kA	85 kA	50 kA	75 kA	85 kA	50 kA	75 kA	85 kA	50 kA	75 kA	85 kA	85 kA	85 kA	85 kA
-	-	45 kA	-	-	45 kA	-	-	45 kA	-	-	45 kA	50 kA	50 kA	50 kA

■ CIRCUIT BREAKER MO2

■ SWITCHING TIMES, SERVICE LIFE, MAX. OPERATING CYCLES, WEIGHT, CONDUCTOR CROSS-SECTIONS

		MO2(-4)-... MO2(-4)-...800			MO2(-4)-...1000			MO2(-4)-...1250		
		B	N	H	B	N	H	B	N	H
Switching times										
Total disconnecting time ¹⁾		73 ms								
ON time ²⁾		100 ms								
ON time, electr. (via closing release) ³⁾		100 ms								
On-off switch, electr. (via shunt-/undervoltage release) ⁴⁾		73 ms								
OFF time via control electronics (non-delayed short-circuit-solution) ⁵⁾		50 ms								
Service life										
mechanical, w/o maintenance	Operations	10000	10000	10000	10000	10000	10000	10000	10000	10000
mechanical, with maintenance	Operations	15000	15000	15000	15000	15000	15000	15000	15000	15000
electrical, w/o maintenance	Operations	7500	7500	7500	7500	7500	7500	7500	7500	7500
electrical, with maintenance	Operations	15000	15000	15000	15000	15000	15000	15000	15000	15000
1000 V version	Operations	> 1000	> 1000	> 1000	> 1000	> 1000	> 1000	> 1000	> 1000	> 1000
Maximum operating cycles										
690 V version	Operations/h	60	60	60	60	60	60	60	60	60
1000 V version	Operations/h	-	-	20	-	-	20	-	-	20
Power loss at rated current I _n or 3-phase symmetrical load										
Fixed-mounting		40 W	40 W	40 W	45 W	45 W	45 W	80 W	80 W	80 W
Withdrawable units		85 W	85 W	85 W	95 W	95 W	95 W	165 W	165 W	165 W
Weight										
Fixed-mounting										
3 pole		56 kg	56 kg	56 kg	56 kg	56 kg	56 kg	56 kg	56 kg	56 kg
4 pole		67 kg	67 kg	67 kg	67 kg	67 kg	67 kg	67 kg	67 kg	67 kg
Withdrawable units										
3 pole		91 kg	91 kg	91 kg	91 kg	91 kg	91 kg	91 kg	91 kg	91 kg
4 pole		109 kg	109 kg	109 kg	109 kg	109 kg	109 kg	109 kg	109 kg	109 kg
Conductor cross-sections										
Cu busbar										
Fixed-mounting										
blank		1 x 50 x 10 mm			1 x 60 x 10 mm			2 x 40 x 10 mm		
black		1 x 50 x 10 mm			1 x 60 x 10 mm			2 x 40 x 10 mm		
Withdrawable units										
blank		1 x 50 x 10 mm			1 x 60 x 10 mm			2 x 40 x 10 mm		
black		1 x 50 x 10 mm			1 x 60 x 10 mm			2 x 40 x 10 mm		

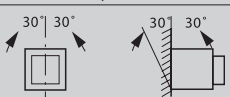
Notes

- ¹⁾ Time of mechan. bending until contact separation + static average of the arc quenching time.
- ²⁾ Time of mechan. bending until main contact closes.
- ³⁾ Time from application of voltage until closing of main contacts. ON time with overexcited closing release (5 ≤ ED): 50 ms.
- ⁴⁾ Time from applying voltage to separation of contact + static average of arcing.
- ⁵⁾ Except releases for ETU15 system protection: 85 ms.
- ⁶⁾ 'Maintenance' means: Replace main switch and arcing chamber elements

MO2(-4)-...1600			MO2(-4)-...2000			MO2(-4)-...2500			MO2(-4)-...3200			MO2(-4)-...		
B	N	H	B	N	H	B	N	H	B	N	H	4000	5000	6300
												H	H	H
73 ms														
100 ms														
100 ms														
73 ms														
50 ms														
10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	5000	5000	5000
15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	10000	10000	10000
7500	7500	7500	7500	7500	7500	7500	7500	7500	4000	4000	4000	2000	2000	2000
15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	10000	10000	10000
> 1000	> 1000	> 1000	> 1000	> 1000	> 1000	> 1000	> 1000	> 1000	> 1000	> 1000	> 1000	> 1000	> 1000	> 1000
60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
-	-	20	-	-	20	-	-	20	-	-	20	20	20	20
85 W	85 W	85 W	180 W	180 W	180 W	270 W	270 W	270 W	410 W	410 W	410 W	520 W	630 W	900 W
175 W	175 W	175 W	320 W	320 W	320 W	520 W	520 W	520 W	710 W	710 W	710 W	810 W	1050 W	1600 W
56 kg	56 kg	56 kg	56 kg	56 kg	56 kg	59 kg	59 kg	59 kg	64 kg	64 kg	64 kg	82 kg	82 kg	90 kg
67 kg	67 kg	67 kg	67 kg	67 kg	67 kg	71 kg	71 kg	71 kg	77 kg	77 kg	77 kg	99 kg	99 kg	108 kg
91 kg	91 kg	91 kg	91 kg	91 kg	91 kg	102 kg	102 kg	102 kg	113 kg	113 kg	113 kg	148 kg	148 kg	166 kg
109 kg	109 kg	109 kg	109 kg	109 kg	109 kg	123 kg	123 kg	123 kg	136 kg	136 kg	136 kg	190 kg	190 kg	227 kg
2 x 50 x 10 mm			3 x 50 x 10 mm			2 x 100 x 10 mm			3 x 100 x 10 mm			4 x 100 x 10 mm	5 x 100 x 10 mm	6 x 120 x 10 mm
2 x 50 x 10 mm			3 x 50 x 10 mm			2 x 100 x 10 mm			3 x 100 x 10 mm			4 x 100 x 10 mm	4 x 120 x 10 mm	6 x 120 x 10 mm
2 x 50 x 10 mm			3 x 50 x 10 mm			2 x 100 x 10 mm			3 x 100 x 10 mm			4 x 100 x 10 mm	5 x 100 x 10 mm	6 x 120 x 10 mm
2 x 50 x 10 mm			3 x 50 x 10 mm			2 x 100 x 10 mm			3 x 100 x 10 mm			4 x 100 x 10 mm	4 x 120 x 10 mm	6 x 120 x 10 mm

SWITCH DISCONNECTOR MO1

GENERAL DATA

	MO1(-4)-630		MO1(-4)-800		MO1(-4)-1000		MO1(-4)-1250		MO1(-4)-1600	
	B	N	B	N	B	N	B	N	B	N
Standards and regulations	IEC/EN 60947 VDE 0660									
Climate resistance	IEC/EN 60068-2-30									
Ambient temperature										
Storage	-40/70°C									
Operation (open)	-25/70°C									
Mounting position										
Utilization category	B									
Degree of protection	IP20, IP41 with door sealing frame, IP55 with shrouding cover									
Direction of power supply	any									

MAIN CIRCUITS

	630 A	630 A	800 A	800 A	1000 A	1000 A	1250 A	1250 A	1600 A	1600 A
Rated current = rated uninterrupted current $I_n = I_c$	630 A	630 A	800 A	800 A	1000 A	1000 A	1250 A	1250 A	1600 A	1600 A
Rated impulse withstand voltage U_{imp}	12000V AC									
Rated operational voltage U_n	690V AC									
Overvoltage protection/pollution degree	III/3									
Rated insulation voltage U_i	1000 V									

SWITCHING CAPACITY

Rated short-circuit breaking capacity values I_{cn}	105 kA	143 kA	105 kA	143 kA	105 kA	143 kA	105 kA	143 kA	105 kA	143 kA
	up to 440 V 50/60 Hz	105 kA	143 kA	105 kA	143 kA	105 kA	143 kA	105 kA	143 kA	105 kA
up to 690 V 50/60 Hz	88 kA	105 kA	88 kA	105 kA	88 kA	105 kA	88 kA	105 kA	88 kA	105 kA
1000 V, 50/60Hz	-									
Rated short-time withstand current 50/60Hz I_{sw}										
t = 0.5 s	42 kA	65 kA	42 kA	65 kA	42 kA	65 kA	42 kA	65 kA	42 kA	65 kA
t = 1 s	42 kA	50 kA	42 kA	50 kA	42 kA	50 kA	42 kA	50 kA	42 kA	50 kA
t = 2 s	29 kA	35 kA	29 kA	35 kA	29 kA	35 kA	29 kA	35 kA	29 kA	35 kA
t = 3 s	24 kA	29 kA	24 kA	29 kA	24 kA	29 kA	24 kA	29 kA	24 kA	29 kA
t = 4 s	21 kA	25 kA	21 kA	25 kA	21 kA	25 kA	21 kA	25 kA	21 kA	25 kA
Switching times										
Total disconnecting time ¹⁾	38 ms									
ON time ²⁾	35 ms									
ON time, electr. (via closing release) ³⁾	80 ms									
OFF time, electr. (via shunt-/undervoltage release) ⁴⁾	73 ms									
Service life										
mechanical, no maintenance	Operations	10000								
mechanical, with maintenance ⁵⁾	Operations	20000								
mechanical, no maintenance	Operations	10000								
electrical, w/ maintenance ⁵⁾	Operations	20000								
1000 V version, operations -										
Maximum operating cycles										
690 V version	Operations/h	60								
1000 V version	Operations/h	-								
Power loss at rated current I_n at 3-phase symmetrical load										
Fixed-mounting	100 W			105 W			170 W			
Withdrawable units	195 W			205 W			350 W			

Notes

- ¹⁾ Time of mechan. bending until contact separation + static average of the arc quenching time.
- ²⁾ Time of mechan. bending until main contact closes.
- ³⁾ Time from application of voltage until closing of main contacts. ON time with overexcited closing release (5 % ED): 50 ms.
- ⁴⁾ Time from applying voltage to separation of contact + static average of arcing.
- ⁵⁾ 'Maintenance' means: Replace main switch and arcing chamber elements

SWITCH DISCONNECTOR MO1

WEIGHT, CONNECTOR CROSS-SECTIONS MO1

		MO1(-4)-630	MO1(-4)-800	MO1(-4)-1000	MO1(-4)-1250	MO1(-4)-1600
Weight						
Fixed-mounting	3 pole	43 kg	43 kg	43 kg	43 kg	43 kg
	4 pole	50 kg	50 kg	50 kg	50 kg	50 kg
Withdrawable units	3 pole	70 kg	70 kg	70 kg	70 kg	70 kg
	4 pole	84 kg	84 kg	84 kg	84 kg	84 kg
Conductor cross-sections						
Cu busbar						
Fixed-mounting						
	blank	1 x 40 x 10 mm	1 x 50 x 10 mm	1 x 60 x 10 mm	2 x 40 x 10 mm	2 x 50 x 10 mm
	black	1 x 40 x 10 mm	1 x 50 x 10 mm	1 x 60 x 10 mm	2 x 40 x 10 mm	2 x 50 x 10 mm
Withdrawable units						
	blank	1 x 40 x 10 mm	1 x 50 x 10 mm	1 x 60 x 10 mm	2 x 40 x 10 mm	2 x 50 x 10 mm
	black	1 x 40 x 10 mm	1 x 50 x 10 mm	1 x 60 x 10 mm	2 x 40 x 10 mm	2 x 50 x 10 mm

WEIGHT, CONNECTOR CROSS-SECTIONS MO2

		MO2(-4)-800	MO2(-4)-1000	MO2(-4)-1250	MO2(-4)-1600	MO2(-4)-2000	MO2(-4)-2500	MO2(-4)-3200
Weight								
Fixed-mounting	3 pole	56 kg	56 kg	56 kg	56 kg	56 kg	59 kg	64 kg
	4 pole	67 kg	67 kg	67 kg	67 kg	67 kg	71 kg	77 kg
Withdrawable units	3 pole	91 kg	91 kg	91 kg	91 kg	91 kg	102 kg	113 kg
	4 pole	109 kg	109 kg	109 kg	109 kg	109 kg	123 kg	136 kg
Conductor cross-sections								
Cu busbar								
Fixed-mounting								
	blank	1 x 50 x 10 mm	1 x 60 x 10 mm	2 x 40 x 10 mm	2 x 50 x 10 mm	3 x 50 x 10 mm	2 x 100 x 10 mm	3 x 100 x 10 mm
	black	1 x 50 x 10 mm	1 x 60 x 10 mm	2 x 40 x 10 mm	2 x 50 x 10 mm	3 x 50 x 10 mm	2 x 100 x 10 mm	3 x 100 x 10 mm
Withdrawable units								
	blank	1 x 50 x 10 mm	1 x 60 x 10 mm	2 x 40 x 10 mm	2 x 50 x 10 mm	3 x 50 x 10 mm	2 x 100 x 10 mm	3 x 100 x 10 mm
	black	1 x 50 x 10 mm	1 x 60 x 10 mm	2 x 40 x 10 mm	2 x 50 x 10 mm	3 x 50 x 10 mm	2 x 100 x 10 mm	3 x 100 x 10 mm

WEIGHT, CONNECTOR CROSS-SECTIONS MO3

		MO3(-4)-4000	MO3(-4)-5000	MO3(-4)-6300
Weight				
Fixed-mounting	3 pole	82 kg	82 kg	90 kg
	4 pole	99 kg	99 kg	108 kg
Withdrawable units	3 pole	148 kg	148 kg	166 kg
	4 pole	190 kg	190 kg	227 kg
Conductor cross-sections				
Cu busbar				
Fixed-mounting				
	blank	4 x 100 x 10 mm	5 x 100 x 10 mm	6 x 120 x 10 mm
	black	4 x 100 x 10 mm	4 x 120 x 10 mm	6 x 120 x 10 mm
Withdrawable units				
	blank	4 x 100 x 10 mm	6 x 100 x 10 mm	6 x 120 x 10 mm
	black	4 x 100 x 10 mm	4 x 120 x 10 mm	6 x 120 x 10 mm

SWITCH DISCONNECTOR MO2

GENERAL DATA

	MO2(-4)-800			MO2(-4)-1000			MO2(-4)-1250		
	B	N	H	B	N	H	B	N	H
Standards and regulations	IEC/EN 60947, VDE 0660								
Climate resistance	IEC/EN 60068-2-30								
Ambient temperature									
Storage	-40/70°C								
Operation (open)	-25/70°C								
Mounting position									
Utilization category	B								
Degree of protection	IP20, IP41 with door sealing frame, IP55 with shrouding cover								
Direction of power supply	any								

MAIN CIRCUITS

	800 A	800 A	800 A	1000 A	1000 A	1000 A	1250 A	1250 A	1250 A
Rated current = rated uninterrupted current $I_n = I_c$	800 A	800 A	800 A	1000 A	1000 A	1000 A	1250 A	1250 A	1250 A
Rated impulse withstand voltage U_{imp}	12000V AC	12000V AC	12000VAC	12000VAC	12000VAC	12000VAC	12000VAC	12000VAC	12000VAC
Rated operational voltage U_n	690 V	690 V	690 V	690 V	690 V	690 V	690 V	690 V	690 V
			1000 AC			1000 AC			1000 AC
Overtoltage protection/pollution degree	III/3	III/3	III/3	III/3	III/3	III/3	III/3	III/3	III/3
Rated insulation voltage U_i	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V

SWITCHING CAPACITY

Rated short-circuit breaking capacity values I_{sc}										
up to 440 V 50/60 Hz		121 kA	176 kA	220 kA	121 kA	176 kA	220 kA	121 kA	176 kA	220 kA
up to 690 V 50/60 Hz		105 kA	165 kA	187 kA	105 kA	165 kA	187 kA	105 kA	165 kA	187 kA
up to 1000 V 50/60 Hz		-	-	95 kA	-	-	95 kA	-	-	95 kA
Rated short-time withstand current 50/60Hz I_{sw}										
t = 0,5 s		55 kA	80 kA	85 kA	55 kA	80 kA	85 kA	55 kA	80 kA	85 kA
t = 1 s		55 kA	65 kA	80 kA	55 kA	65 kA	80 kA	55 kA	65 kA	80 kA
t = 2 s		39 kA	46 kA	50 kA	39 kA	46 kA	50 kA	39 kA	46 kA	50 kA
t = 3 s		32 kA	37 kA	40 kA	32 kA	37 kA	40 kA	32 kA	37 kA	40 kA
t = 4 s		27 kA	32 kA	32 kA	27 kA	32 kA	32 kA	27 kA	32 kA	32 kA
Switching times										
Total disconnecting time ¹⁾		34 ms	34 ms	34 ms	34 ms	34 ms	34 ms	34 ms	34 ms	34 ms
ON time ²⁾		35 ms	35 ms	35 ms	35 ms	35 ms	35 ms	35 ms	35 ms	35 ms
ON time electr. (via closing release) ³⁾		80 ms	80 ms	80 ms	80 ms	80 ms	80 ms	80 ms	80 ms	80 ms
OFF time, electr. (via shunt- /undervoltage release) ⁴⁾		73 ms	73 ms	73 ms	73 ms	73 ms	73 ms	73 ms	73 ms	73 ms
Service life										
mechanical, no maintenance	Operations	10000	10000	10000	10000	10000	10000	10000	10000	10000
mechanical, w/ maintenance ⁵⁾	Operations	15000	15000	15000	15000	15000	15000	15000	15000	15000
mechanical, no maintenance	Operations	7500	7500	7500	7500	7500	7500	7500	7500	7500
electrical, w/ maintenance ⁵⁾	Operations	15000	15000	15000	15000	15000	15000	15000	15000	15000
1000 V version	Operations	-	-	1000	-	-	1000	-	-	1000
Maximum operating cycles										
690 V version	Operations/h	60	60	60	60	60	60	60	60	60
1000 V version	Operations/h	-	-	20	-	-	20	-	-	20
Power loss at rated current I_n at 3-phase symmetrical load										
Fixed-mounting		40 W	40 W	40 W	40 W	40 W	40 W	80 W	80 W	80 W
Withdrawable units		95 W	95 W	95 W	95 W	95 W	95 W	165 W	165 W	165 W

Notes

Switching capacity in N pole = 60 %

¹⁾ Time of mechan. bending until contact separation + static average of the arc quenching time.

²⁾ Time of mechan. bending until main contact closes.

³⁾ Time from application of voltage until closing of main contacts. ON time with overexcited closing release (5 % ED): 50 ms.

⁴⁾ Time from applying voltage to separation of contact + static average of arcing.

⁵⁾ 'Maintenance' means: Replace elements of main switch and arcing chambers

MO2(-4)-1600			MO2(-4)-2000			MO2(-4)-2500			MO2(-4)-3200			MO2(-4)-4000			MO2(-4)-5000			MO2(-4)-6300		
B	N	H	B	N	H	B	N	H	B	N	H	H	H	H	H	H	H	H	H	H
IEC/EN 60947 VDE 0660																				
IEC/EN 60068-2-30																				
-40/70°C																				
-25/70°C																				
B																				
IP20, IP41 with door sealing frame, IP55 with shrouding cover as required																				

1600 A	1600 A	1600 A	2000 A	2000 A	2000 A	2500 A	2500 A	2500 A	3200 A	3200 A	3200 A	4000 A	5000 A	6300 A
12000VAC	12000VAC	12000VAC	12000VAC	12000VAC	12000VAC	12000VAC	12000VAC	12000VAC	12000VAC	12000VAC	12000VAC	12000VAC	12000VAC	12000VAC
690 V	690 V	690 V	690 V	690 V	690 V	690 V	690 V	690 V	690 V	690 V	690 V	690 V	690 V	690 V
		1000 AC			1000 AC			1000 AC			1000 AC			1000 AC
III/3	III/3	III/3	III/3	III/3	III/3	III/3	III/3	III/3	III/3	III/3	III/3	III/3	III/3	III/3
1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V

121 kA	176 kA	220 kA	121 kA	176 kA	220 kA	121 kA	176 kA	220 kA	121 kA	176 kA	220 kA	220 kA	220 kA	220 kA
105 kA	165 kA	187 kA	105 kA	165 kA	187 kA	105 kA	165 kA	187 kA	105 kA	165 kA	187 kA	187 kA	187 kA	187 kA
-	-	95 kA	-	-	95 kA	-	-	95 kA	-	-	95 kA	105 kA	105 kA	105 kA
55 kA	80 kA	85 kA	55 kA	85 kA	85 kA	55 kA	80 kA	85 kA	55 kA	80 kA	85 kA	85 kA	85 kA	100 kA
55 kA	65 kA	80 kA	55 kA	65 kA	80 kA	55 kA	65 kA	80 kA	55 kA	65 kA	80 kA	80 kA	80 kA	100 kA
39 kA	46 kA	50 kA	39 kA	46 kA	50 kA	39 kA	46 kA	50 kA	39 kA	46 kA	56 kA	56 kA	56 kA	70 kA
32 kA	37 kA	40 kA	32 kA	37 kA	40 kA	32 kA	37 kA	40 kA	32 kA	37 kA	50 kA	50 kA	46 kA	57 kA
27 kA	32 kA	32 kA	27 kA	32 kA	32 kA	27 kA	32 kA	32 kA	27 kA	32 kA	40 kA	40 kA	40 kA	50 kA
34 ms	34 ms	34 ms	34 ms	34 ms	34 ms	34 ms	34 ms	34 ms	34 ms	34 ms	34 ms	34 ms	34 ms	34 ms
35 ms	35 ms	35 ms	35 ms	35 ms	35 ms	35 ms	35 ms	35 ms	35 ms	35 ms	35 ms	35 ms	35 ms	35 ms
80 ms	80 ms	80 ms	80 ms	80 ms	80 ms	80 ms	80 ms	80 ms	80 ms	80 ms	80 ms	80 ms	80 ms	80 ms
73 ms	73 ms	73 ms	73 ms	73 ms	73 ms	73 ms	73 ms	73 ms	73 ms	73 ms	73 ms	73 ms	73 ms	73 ms
10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	5000	5000	5000
15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	10000	10000	10000
7500	7500	7500	7500	7500	7500	7500	7500	7500	4000	4000	4000	2000	2000	2000
15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	10000	10000	10000
-	-	1000	-	-	1000	-	-	1000	-	-	1000	1000	1000	1000
60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
-	-	20	-	-	20	-	-	20	-	-	20	20	20	20
85 W	85 W	85 W	180 W	180 W	180 W	270 W	270 W	270 W	410 W	410 W	410 W	520 W	630 W	900 W
175 W	175 W	175 W	320 W	320 W	320 W	520 W	520 W	520 W	710 W	710 W	710 W	810 W	1050 W	1600 W

CONTROL ELECTRONICS

MO1/2, MO3 + ETU15, ETU25, ETU45, ETU76

	MO + ETU15	MO1/2 + ETU25	MO3 + ETU25	MO1/2 + ETU45	MO3 + ETU45	MO1/2 + ETU76	MO3 + ETU76
Overload protection I							
Setting range I_n	0.5 – 1.0 x I_n	0.4 – 1.0 x I_n	0.4 – 1.0 x I_n	0.4 – 1.0 x I_n	0.4 – 1.0 x I_n	0.4 – 1.0 x I_n	0.4 – 1.0 x I_n
Time-delay t_{td}							
$6 \times I_n$	10 s	10 s	10 s	–	–	–	–
$6 \times I_n$ at time-lag class setting on I ¹ t	–	–	–	2 – 30 s	2 – 30 s	2 – 30 s	2 – 30 s
$6 \times I_n$ at time-lag class setting on I ¹ t	–	–	–	1 – 5 s	1 – 5 s	1 – 5 s	1 – 5 s
Phase sensitivity	–	only at $t_{td} = 20$ (motor contactor) ms		only at $t_{td} = 20$ (motor contactor) ms		ON/OFF via internal system bus	
Thermal memory	–	–	–	switches on/off		switches on/off	
Tolerance	Protective features to IEC/EN 60947			Protective features to IEC/EN 60947			
				Current indicator $\leq 5\%$ Measurement function, basic variables $\leq 1\%$ Measurement features, derived variables $\leq 3\%$			
ZSI feature	–	–	–	Option		Option	
Short-circuit protection, short time-delayed S							
Setting range I_{sd}	–	1.25 – 12 x I_n		1.25 – 12 x I_n		1.25 x I_n – 0.8 x I_{sc} (max. 0.8 x I_{sc})	
Time delay t_{sd}	–	0, 20 (motor contactor), 100, 200, 300, 400 ms		20 (motor contactor), 100, 200, 300, 400 ms, OFF		20, 100, 200, 300, 400, 500, 1000, 2000, 3000, 4000 ms, OFF	
I ¹ t at 12 x I_n	–	–	–	100, 200, 300, 400 ms, OFF		100, 200, 300, 400 ms, OFF	
Short circuit protection, non-delayed I							
Can be deactivated	–	–	–	OFF ²⁾	OFF ²⁾	OFF via Menu/Comm ²⁾	OFF via Menu/Comm ²⁾
Setting range I_n Tolerance: g 0 ... + 20%	2 – 8 x I_n	$\geq 20 \times I_n$ (max. 50 kA)		1.5 x I_n – 0.8 x I_{cs} (max. 0.8 x I_{cs}), OFF: $I_{cs} = I_{sc}$ (0.5 s)		1.5 x I_n – 0.8 x I_{cs} (max. 0.8 x I_{cs}), OFF: $I_{cs} = I_{sc}$ (0.5 s)	
N conductor protection N							
Setting range	–	0 %, 100 % of I_n , switches on/off with slide switch		0 %, 50 %, 100 % of I_n , switches on with slide switch		via menu/COMM 50 % to 200 % of I_n	
Earth-fault protection G							
	–	Option		module can be fitted by user		module can be fitted by user	
Setting range of tripping current I_b for the release	–	OFF, 100, 300, 600, 900, 1200 A	OFF, 400, 600, 800, 1000, 1200 A	OFF, 100, 300, 600, 900, 1200 A	OFF, 400, 600, 800, 1000, 1200 A	100–1200 A	400–1200 A
Setting range of tripping I_b for the alarm	–	–	–	100, 300, 600, 900, 1200 A	400, 600, 800, 1000, 1200 A	100–1200 A	400–1200 A
Time delay t_b	–	100, 200, 300, 400, 500 ms		100, 200, 300, 400, 500 ms		100 ... 500 ms	
Time-delay at I ¹ t	–	–		100, 200, 300, 400, 500 ms		100 ... 500 ms	
Trigger feature	–	switches on/off		switches on/off		switches on/off	
Alarm feature	–	–	–	–	–	switches on/off	
ZSI feature	–	–	–	Option		Option	
Senses ground fault current via total current converter with internal or external N conductor converter	–	yes	yes	yes, switchable		yes, switchable	
Senses ground fault current via external protective conductor converter	–	–	–	yes, switchable		yes, switchable	

Notes

²⁾ When the I release has tripped, the rated breaking capacity of the circuit breaker drops to $I_b = I_{sc}$.

For the overcurrent release ETU45, 76 it is not possible to trip the short time-delayed short-circuit protection, setting $t_{sd} = \text{OFF}$, and the non-delayed short-circuit protection unit, $I_n = \text{OFF}$ at the same time! If at $t_{sd} = \text{OFF}$, the setting $I_n = \text{OFF}$ is selected, an internal correction to $I_n = 1.5 \times I_n$ will take place automatically.

AUXILIARY CONTACT

MO-XHI..., MO-XHIB, MO-XHIA, MO-XHIAV...

	Standard auxiliary contact MO-XHI...	ON ready indicator MO-XHIB	Trip-indicating contacts MO-XHIA	Position indicator contact- switch MO-XHIAV...
Rated insulation voltage U_i				
AC	500 V AC	–	–	440 V AC
DC	500 V AC	–	–	250 V AC
Rated operational voltage U_e	500 V AC 220 V DC	220 V AC 220 V DC	230 V AC 230 V DC	440 V AC 250 V DC
Rated impulse withstand voltage U_{imp}	4kV	–	–	4 kV
Short-circuit protection				
Max. safety fuse	10 A gL	2 A gL	6 A gL	8 A gL
Fuseless	BM-C10/1	–	–	BM-C6/1
Rated short-circuit breaking capacity				
AC-12				
24 – 230 V	10 A	–	–	–
110/127 V	10 A	0.14 A	–	13 A
220/230 V	10 A	0.1 A	6 A	13 A
400 V	10 A	–	–	–
500 V	10 A	–	–	–
AC-15				
24 – 230 V	4 A	–	–	–
110/127 V	4 A	–	–	5 A
220/230 V	4 A	–	–	4 A
400 V	3 A	–	–	3 A
440 V	–	–	–	3 A
500 V	2 A	–	–	–
DC-12				
24 V	10 A	0.2 A	6 A	13 A
30 V	–	–	–	10 A
48 V	8 A	–	–	2.5 A
110 V	3.5 A	–	0.4 A	0.8 A
220 V	1 A	0.1 A	0.2 A	0.6 A
DC-13				
24 V	8 A	–	–	3 A
48 V	4 A	–	–	–
100 V	1.2 A	–	–	–
220/250 V	0.4 A	–	–	0.1 A
400 V	–	–	–	–
DC-15				
24 V	10 A	–	–	–
48 V	4 A	–	–	–
110 V	1.2 A	–	–	–
220 V	0.4 A	–	–	–
Conductor cross-sections				
Flexible without end sleeve	2 x (0.5 – 2.5) mm ²	2 x (0.5 – 2.5) mm ²	2 x (0.5 – 2.5) mm ²	2 x (0.5 – 2.5) mm ²
Flexible with end sleeve	2 x (0.5 – 1.5) mm ²	2 x (0.5 – 1.5) mm ²	2 x (0.5 – 1.5) mm ²	2 x (0.5 – 1.5) mm ²

Notes

Conductor cross-sections:
Standard connection, spring-loaded connections

VOLTAGE RELEASE, MOTOR OPERATOR MO

VOLTAGE RELEASE

	Voltage release Closing release +MO-XE/A, MO-XE/A 100 % ED	5 % ED	Operating current- release +MO-XA(1) 100 % ED	Overvoltage- release MO-XU(V) time-delayed t = 0.2 – 3.2 s	Non time-delayed and t = 200 ms
Rated control voltage U_i					
AC50/60 Hz	110, 230 V	110 – 127, 208 – 240 V	110, 230 V	110 – 127, 208 – 240, 380 – 415 V	110 – 127, 208 – 240, 380 – 415 V
DC	24, 30, 48, 60, 110, 220 V	24, 48, 110 – 125, 220 – 250 V	24, 30, 48, 60, 110, 220 V	48, 110 – 125, 220 – 250 V	24, 30, 48, 60, 110 – 125, 220 – 250 V
Power consumption					
AC50/60 Hz	15 VA	15 VA	15 VA	5 VA (pull-in 200)	5 VA (pull-in 200)
DC	15 W	15 W	15 W	5 VA (pull-in 200)	5 VA (pull-in 200)
Response time of circuit breaker	80 ms	50 ms	73 ms	80 ms non-delayed, otherwise as per Time delay	80 ms non-delayed, otherwise as per Time delay
Minimum command time	60 ms	25 ms	60 ms	–	–
Operating range					
Drop-out voltage x U _i	–	–	–	0.35 – 0.7	0.35 – 0.7
Pick-up voltage x U _i	0.85 – 1.1	0.85 – 1.1	0.85 – 1.1	0.85 – 1.1	0.85 – 1.1
Extended operating range for battery operation					
Pick-up voltage x U _i	0.7 – 1.26	0.7 – 1.26	0.7 – 1.26	0.85 – 1.26	0.85 – 1.26
Short-circuit protection					
Diazed fuse (gL)	1 A TDz (slow)	1 A TDz (slow)	1 A TDz (slow)	1 A TDz (slow)	1 A TDz (slow)
Miniature circuit-breaker with C characteristics	1 A	1 A	1 A	1A	1 A
Conductor cross-sections					
Fine-wired without end sleeve	2 x (0.5 – 2.5) mm ²	2 x (0.5 – 2.5) mm ²	2 x (0.5 – 2.5) mm ²	2 x (0.5 – 2.5) mm ²	2 x (0.5 – 2.5) mm ²
Fine-wired with end sleeve	2 x (0.5 – 1.5) mm ²	2 x (0.5 – 1.5) mm ²	2 x (0.5 – 1.5) mm ²	2 x (0.5 – 1.5) mm ²	2 x (0.5 – 1.5) mm ²

Notes

Conductor cross-sections: Standard connection, spring-loaded connections
 Rated operational voltage. Undervoltage release: Pull-in power AC 200 VA /DC 200 W

MOTOR OPERATOR

	MO-XM24-30DC	MO-XM48-60DC	MO-XM110AC/DC	MO-XM230AC/220DC
Rated control voltage U_i				
AC50/60 Hz	–	–	110 – 125 V	208 – 250 V
DC	24 – 30 V	48 – 60 V	110 – 127 V	220 – 225 V
Operating range x U_i	0.85 – 1.1 V	0.85 – 1.1 V	0.85 – 1.1 V	0.85 – 1.1 V
Extended operating range for battery operation 24 V up to 220 V DC x U_i	0.7 – 1.26 V	0.7 – 1.26 V	0.7 – 1.26 V	0.7 – 1.26 V
Required time for charging stored energy mechanism at 1 x U_i	≤ 10 s	≤ 10 s	≤ 10 s	≤ 10 s
Starting current	19.3 A (24 V DC) 24.5 A (30 V DC)	7.6 A (48 V DC) 11.6 A (60 V DC)	8.8 A (110 V AC) 7 A (110 V DC)	3.9 A (220 V AC) 2.6 A (220 V DC)
Power consumption				
AC50/60 Hz	110 VA	110 VA	110 VA	110 VA
DC	110 W	110 W	110 W	110 W
Short-circuit protection				
Diazed fuse (gL)	2 A TDz (slow)	2 A TDz (slow)	2 A TDz (slow)	2 A TDz (slow)
Miniature circuit breaker with C characteristics	1 A	1 A	1 A	1 A
Conductor cross-sections				
Flexible without end sleeve	2 x (0.5 – 2.5) mm ²	2 x (0.5 – 2.5) mm ²	2 x (0.5 – 2.5) mm ²	2 x (0.5 – 2.5) mm ²
Flexible with end sleeve	2 x (0.5 – 1.5) mm ²	2 x (0.5 – 1.5) mm ²	2 x (0.5 – 1.5) mm ²	2 x (0.5 – 1.5) mm ²

Notes:

Conductor cross-sections: Standard connection, spring-loaded connections

CURRENT CONSUMPTION, SAFE CLEARANCES MO1, MO2, MO3

CURRENT CONSUMPTION

	Maximum uninterrupted current mA	Max. starting current I A	Type
Current consumption, communication modules			
Release ETU45	120	2	IZM-MO-X
Release ETU76	170	2	IZM-MO-X
Measurement function XMH	120	0.12	+IZM-MO-X
Breaker Status Sensor XBSS	40	0.11	+IZM-MO-X
Communication module XCOM-DP	125	0.28	+IZM-MO-X-DP
ZSI module	50	0.125	IZM-MO-X-ZSI
Digital output module with rotary coding switch, relay outputs	180	0.125	IZM-MO-X-6DO-R
Digital output module, configurable, relay outputs	180	0.125	IZM-MO-X-6PDO-
Analogue output module	110	0.8	IZM-MO-X-4AO
Digital input module	30	0.125	IZM-XMO-X-6DI
Parameter device PG (E)	250	0.35	IZM-MO-X-PG

SAFE CLEARANCES

Safe clearances to de-energized parts Rated operational voltage	MO1		MO2			MO3		
	440 V AC	690 V AC	440 V AC	690 V AC	1000 V AC	440 V AC	690 V AC	1000 V AC
Fixed-mounted system								
above control circuit plug	150 mm	300 mm	250 mm	600 mm	430 mm	75 mm	500 mm	430 mm
on side (each)	20 mm	50 mm	50 mm	100 mm	100 mm	20 mm	100 mm	100 mm
rear	20 mm	125 mm	20 mm	140 mm	125 mm	20 mm	125 mm	125 mm
Withdrawable units								
without cover for arcing chamber								
above control circuit plug	150 mm	300 mm	250 mm	600 mm	350 mm	50 mm	500 mm	350 mm
on side (each)	20 mm	50 mm	50 mm	100 mm	100 mm	20 mm	100 mm	100 mm
rear	14 mm	14 mm	14 mm	30 mm	14 mm	14 mm	14 mm	14 mm
with cover for arcing chamber								
above control circuit plug	14 mm	14 mm	14 mm	14 mm	–	14 mm	14 mm	–
on side (each)	100 mm	100 mm	50 mm	225 mm	–	50 mm	200 mm	–
rear	14 mm	14 mm	14 mm	14 mm	–	14 mm	14 mm	–

Safe clearances to earthed parts Rated operational voltage	MO1		MO2			MO3		
	440 V AC	690 V AC	440 V AC	690 V AC	1000 V AC	440 V AC	690 V AC	1000 V AC
Fixed-mounted system								
above control circuit plug	75 mm ¹⁾	75 mm ¹⁾	75 mm ¹⁾	75 mm ¹⁾	180 mm	75 mm ¹⁾	75 mm ¹⁾	180 mm
on side (each)	0 mm	0 mm	0 mm	0 mm	0 mm	0 mm	0 mm	0 mm
rear	0 mm	0 mm	0 mm	0 mm	0 mm	0 mm	0 mm	0 mm
Withdrawable units								
without cover for arcing chamber								
above control circuit plug	50 mm ¹⁾	50 mm ¹⁾	50 mm ¹⁾	50 mm ¹⁾	100 mm	50 mm ¹⁾	50 mm ¹⁾	100 mm
on side (each)	0 mm	0 mm	0 mm	0 mm	0 mm	0 mm	0 mm	0 mm
rear	0 mm	0 mm	0 mm	0 mm	0 mm	0 mm	0 mm	0 mm
with cover for arcing chamber								
above control circuit plug	0 mm	0 mm	0 mm	0 mm	–	0 mm	0 mm	–
on side (each)	0 mm ²⁾	0 mm ²⁾	0 mm ²⁾	0 mm ²⁾	–	0 mm ²⁾	0 mm ²⁾	–
rear	0 mm	0 mm	0 mm	0 mm	–	0 mm	0 mm	–

Notes

¹⁾ Value for plate; 0 mm for brace and grid

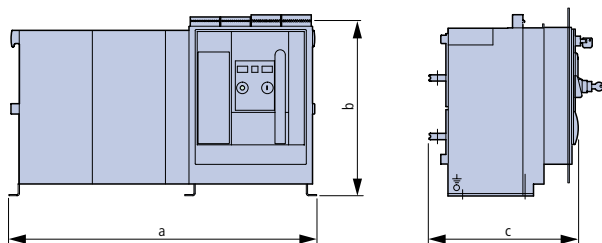
²⁾ 40 mm (MO2...: 70 mm) for plates which conceal the side openings in the guide frame.

All safe clearances above the switch are measured to the upper edge of the control circuit plug – and not to the upper edge of the arcing chamber! See dimensioned drawings.

DIMENSIONS MO

EXTERNAL DIMENSIONS, DOOR CUTOUTS

CIRCUIT BREAKER / SWITCH DISCONNECTOR MO



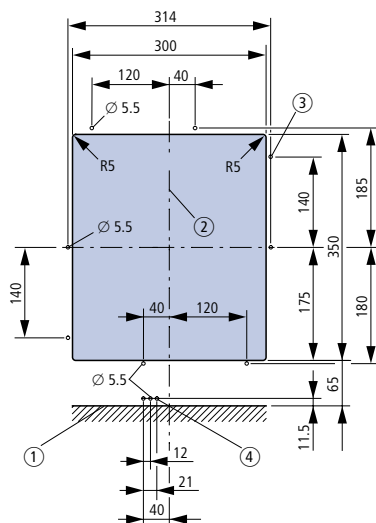
	Fixed-mounting			Withdrawable units		
	a	b	c ¹⁾	a	b	c ¹⁾
MO1	320	434	357	320	460	471
MO2	460	434	357	460	460	471
MO3	704	434	357	704	460	471
MO1 - 4	410	434	357	410	460	471
MO2 - 4	590	434	357	590	460	471
MO2 - 4	914	434	357	914	460	471

1) Including dimension for horizontal connection.

Height "b" to upper edge of control circuit plug in screw termination for circuit breaker/ switch disconnecter with $U_e \leq 690$ V. See detail drawing for deviations for $U_e = 1000$ V.

DOOR CUTOUTS

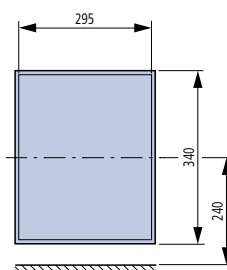
Door cutout for control panel
using door sealing frame



- ① Mounting surface
- ② Centre of IZM/IN control panel
- ③ 8 mounting bores for door sealing frame
- ④ 3 mounting bores for door interlock

Door cutout with edge protection

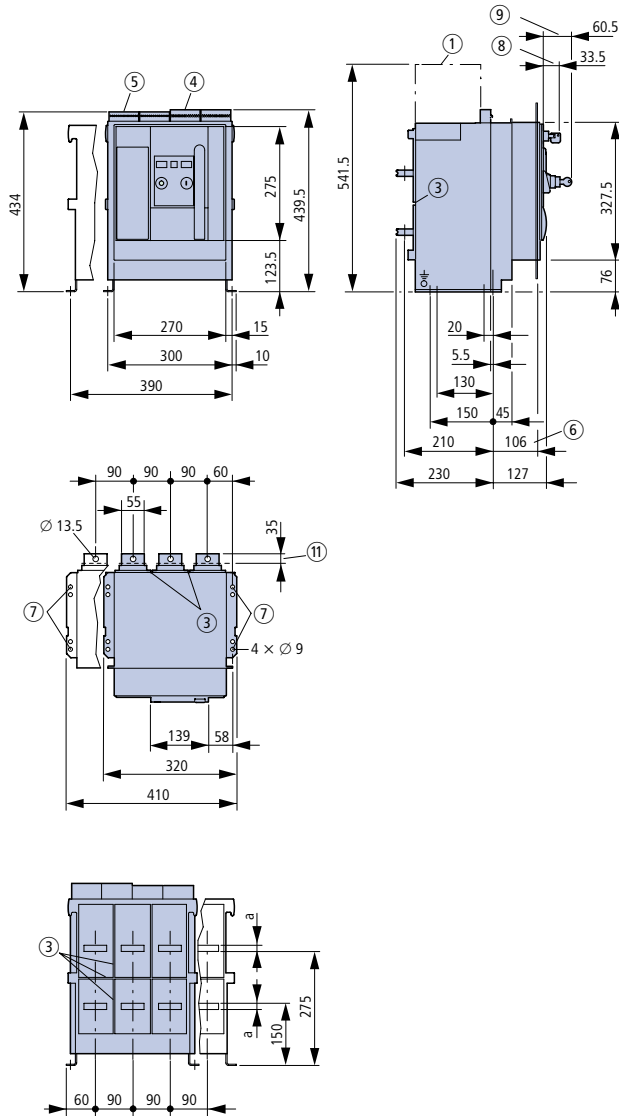
Cutout after assembling edge protection



MO1 – 3/4 POLE

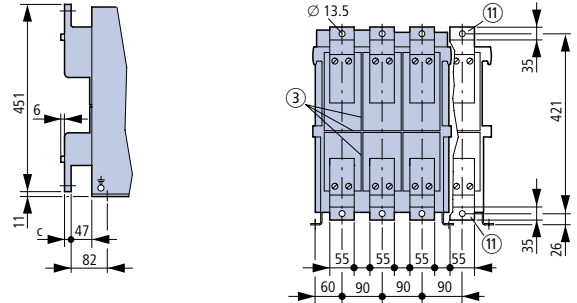
FIXED-MOUNTING AND OPTIONAL CONNECTION FEATURES

Standard design, horizontal connection

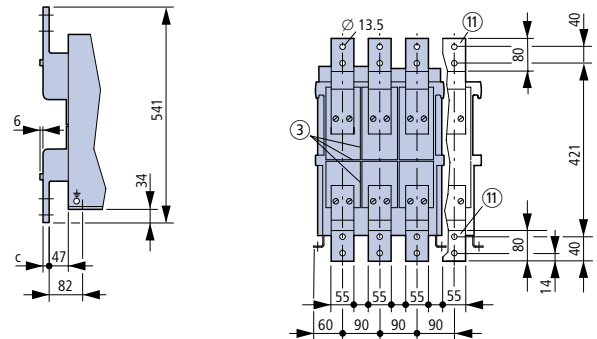


Optional connection features

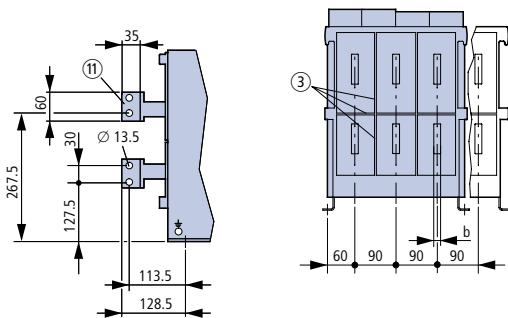
Front connection (single-bore fitting)



Front connection (double-bore fitting) to DIN 43 673



Vertical connection



Rated current I_n	a	b	c
up to 1000 A	10	10	10
1250 – 1600 A	15	15	15

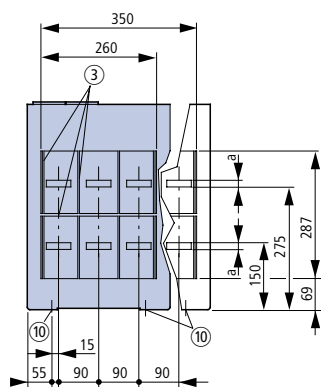
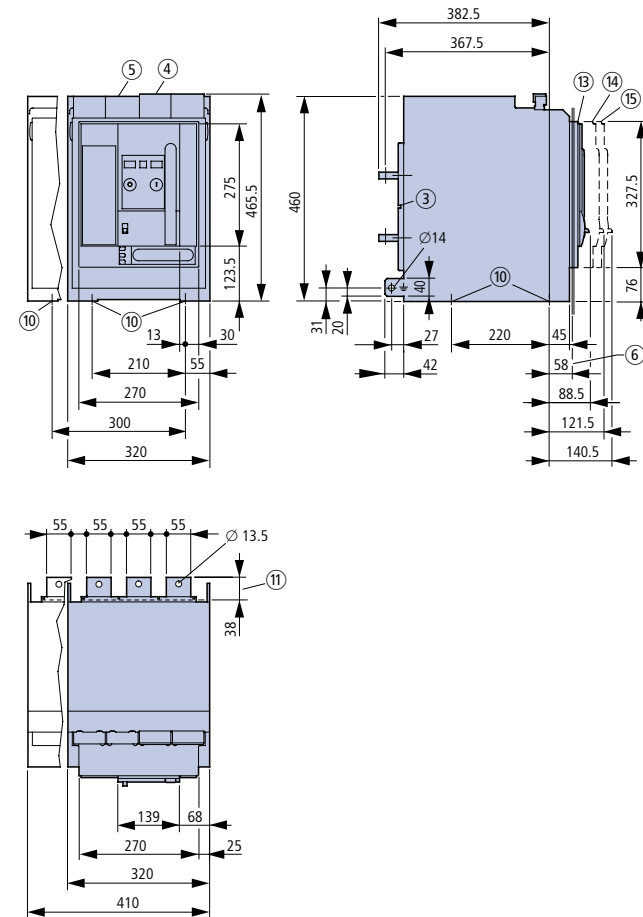
- ① Mounting space for removing of arcing chamber covers
- ② slots (4 mm wide, 5 mm deep) for supporting phase partitions in the system
- ③ Control circuit plug, screw terminals
- ④ Control circuit plug, spring terminals
- ⑤ Dimension to inside of closed switchgear door
- ⑥ Fixing points for the circuit-breaker in the system
- ⑦ Interlock in OFF (optional accessory)
- ⑧ key operation (optional accessory)
- ⑨ Connection area
- ⑪ When front connections are used, a partition between busbar and arcing space must be fitted on the system side.

DIMENSIONS MO

MO1 – 3/4 POLE

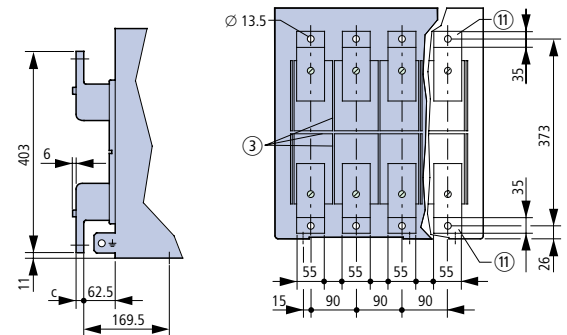
WITHDRAWABLE UNITS AND OPTIONAL CONNECTION FEATURES

Standard design, horizontal connection



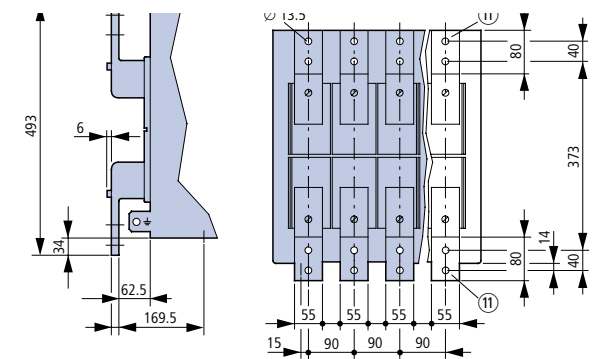
Optional connection features

Front connection (single-bore fitting)

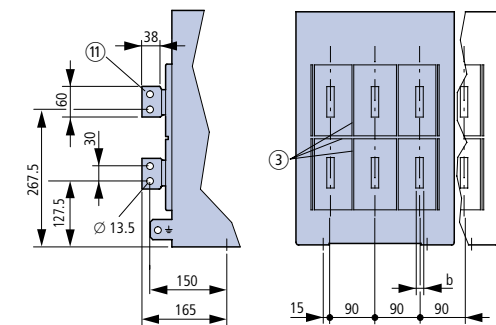


Front connection (double-bore fitting)

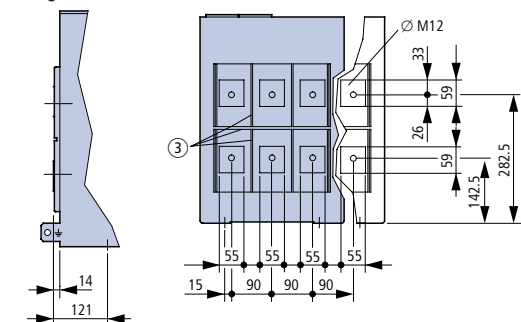
meets DIN 43 673



Vertical connection



Flange connection



Rated current I_n	a	b	c
up to 1000 A	10	10	10
1250 – 1600 A	15	15	15

③ Slots (4 mm wide, 5 mm deep) for supporting phase partitions in the system

④ Control circuit plug, screw terminals

⑤ Control circuit plug, spring terminals

⑥ Dimension to inside of closed switchgear door

⑩ Fixing holes, [10 mm

⑪ Connection area

⑬ MO in connected position

⑭ MO in test position

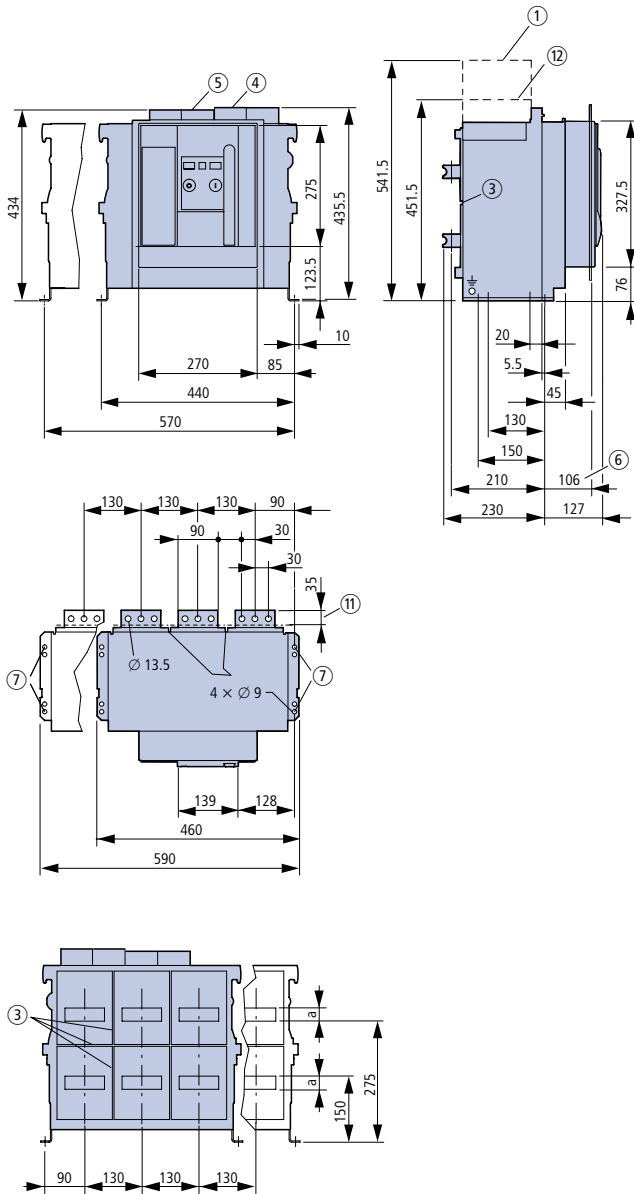
⑮ MO in disconnected position

When front connections are used, a partition between busbar and arcing space must be fitted on the system side.

MO2 – 3/4 POLE

FIXED-MOUNTING AND OPTIONAL CONNECTION TECHNOLOGY

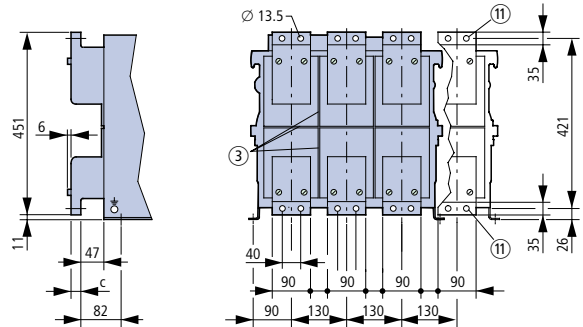
Standard design, horizontal connection



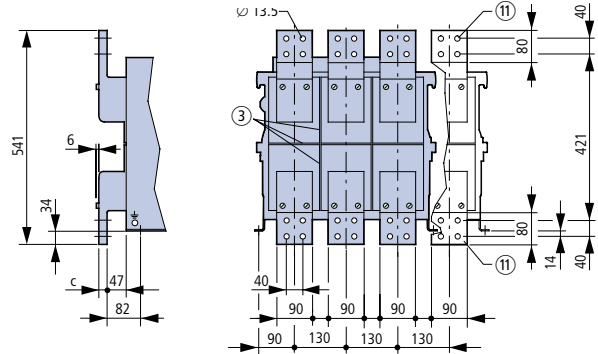
Rated current I_n	a	b	c
up to 2000 A	10	10	10
2500 A	15	15	20
3200 A	30	30	20

Optional connection features

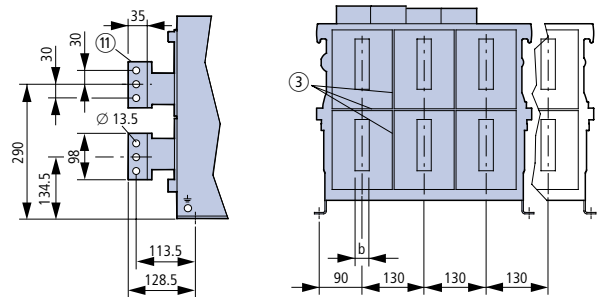
Front connection (single-bore fitting)



Front connection (double-bore fitting) to DIN 43 673



Vertical connection



① Mounting space for removal of arcing chamber covers

With $U_e = 1000$ V, 175 mm are required for removing of the arcing chamber.

③ Slots (4 mm wide, 5 mm deep) for supporting phase partitions in the system

④ Control circuit plug, screw terminals

⑤ Control circuit plug, spring terminals

⑥ Dimension to inside of closed switchgear door

⑦ Fixing points for the circuit-breaker in the system

⑪ Connection area

⑫ Circuit breaker top edge- AC-1000V version only

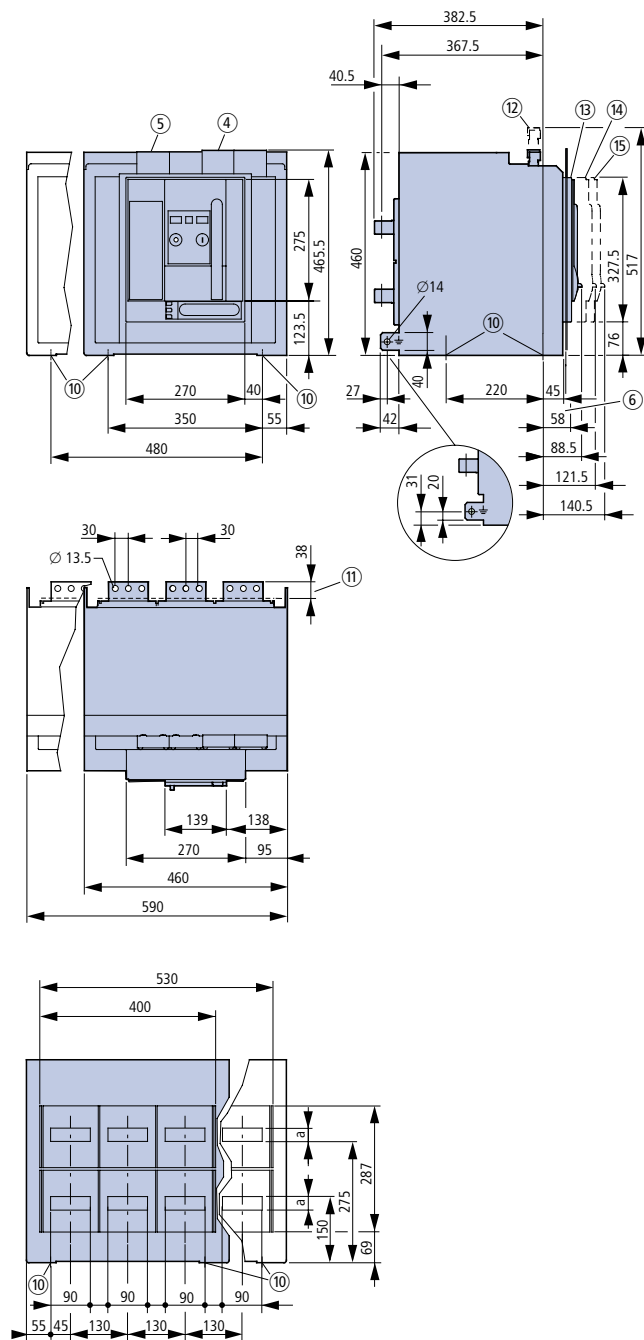
When front connections are used, a partition between busbar and arcing space must be fitted on the system side.

DIMENSIONS MO

MO2 – 3/4 POLE

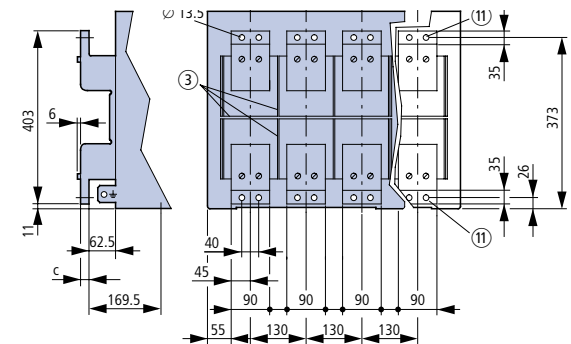
WITHDRAWABLE UNITS AND OPTIONAL CONNECTION FEATURES

Standard design, horizontal connection

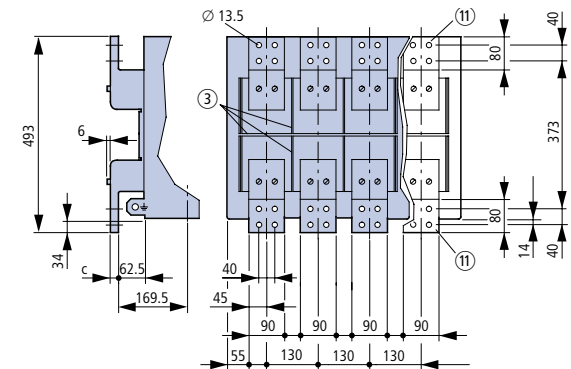


Optional connection features

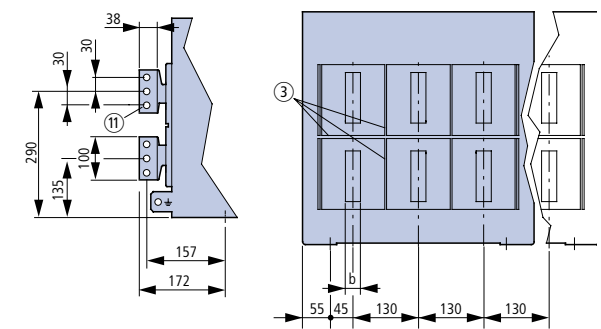
Front connection (single-bore fitting)



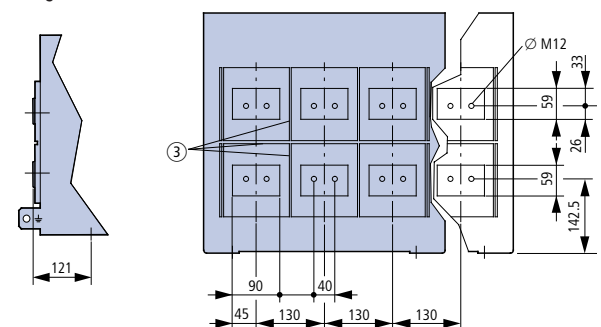
Front connection (double-bore fitting) to DIN 43 673



Vertical connection



Flange connection



With $U_n = 1000$ V, 175 mms are required for removal of the arcing chamber.

- ③ Slots (4 mm wide, 5 mm deep) for supporting phase partitions in the system
- ④ Control circuit plug, screw terminals
- ⑤ Control circuit plug, spring terminals
- ⑥ Dimension to inside of closed switchgear door
- ⑩ Fixing holes, $\varnothing 10$ mm
- ⑪ Connection area
- ⑫ Circuit breaker top edge- AC-1000V version only
- ⑬ MO in connected position
- ⑭ MO in test position
- ⑮ MO in disconnected position

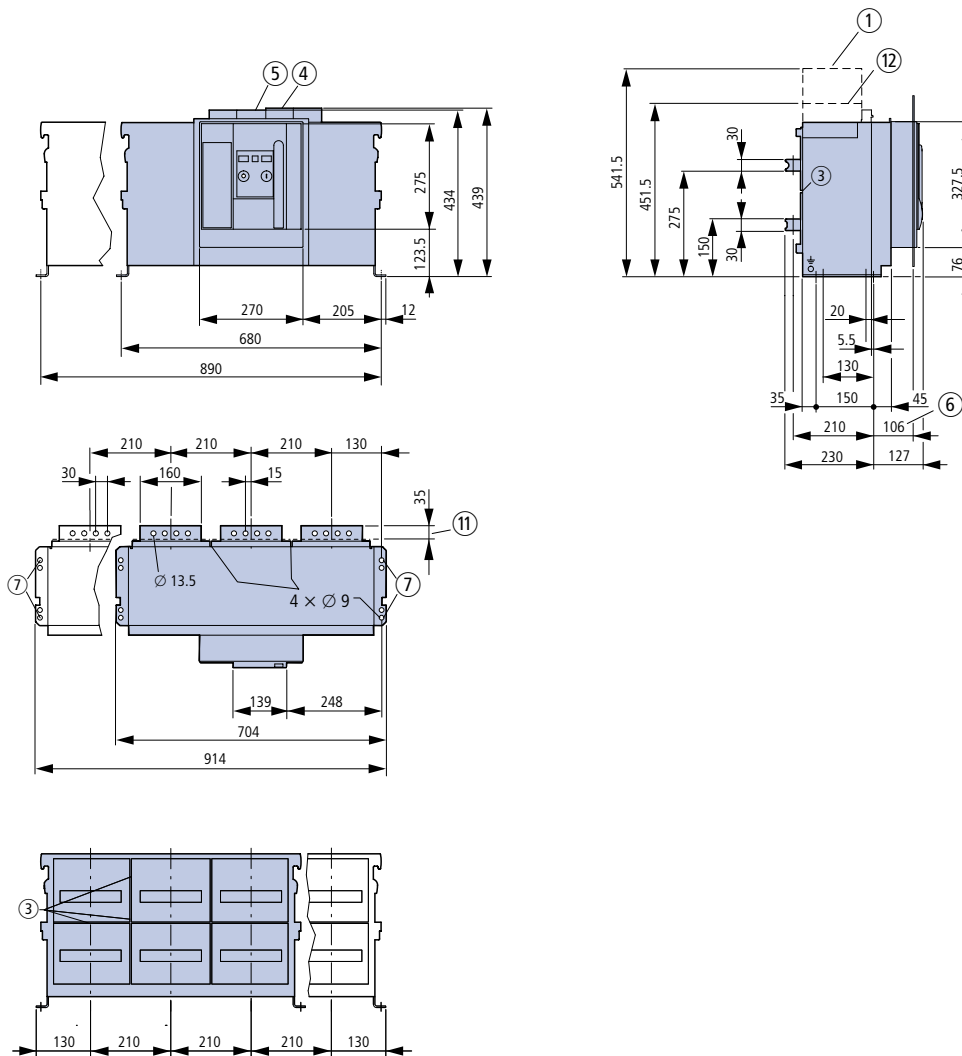
When front connections are used, a partition between busbar and arcing space must be fitted on the system side.

Rated current I_n	a	b	c
up to 2000 A	10	10	10
2500 A	15	15	20
3200 A	30	30	20

MO3 – 3/4 POLE

FIXED-MOUNTING

Standard design, horizontal connection ≤6300A



① Mounting space for removal of arcing chamber covers

With $U_n = 1000\text{ V}$, 175 mm are required for removal of the arcing chamber.

③ Slots (4 mm wide, 5 mm deep) for supporting phase partitions in the system

④ Control circuit plug, screw terminals

⑤ Control circuit plug, spring terminals

⑥ Dimension to inside of closed switchgear door

⑦ Fixing points for the circuit-breaker in the system

⑪ Connection area

⑫ Circuit breaker top edge- AC-1000V version only

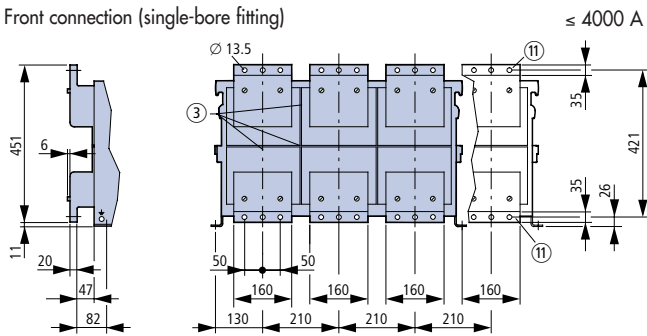
When front connections are used, a partition between busbar and arcing space must be fitted on the system side.

DIMENSIONS MO

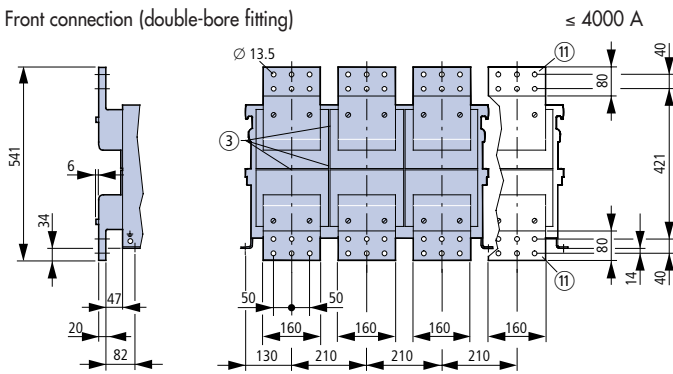
MO3 – 3/4 POLE

OPTIONAL CONNECTION FEATURES

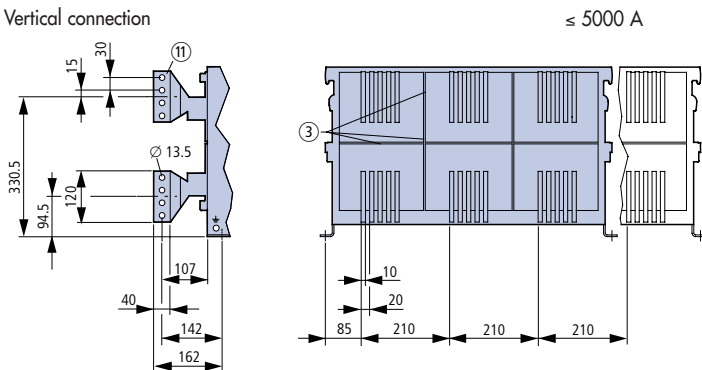
Front connection (single-bore fitting)



Front connection (double-bore fitting)



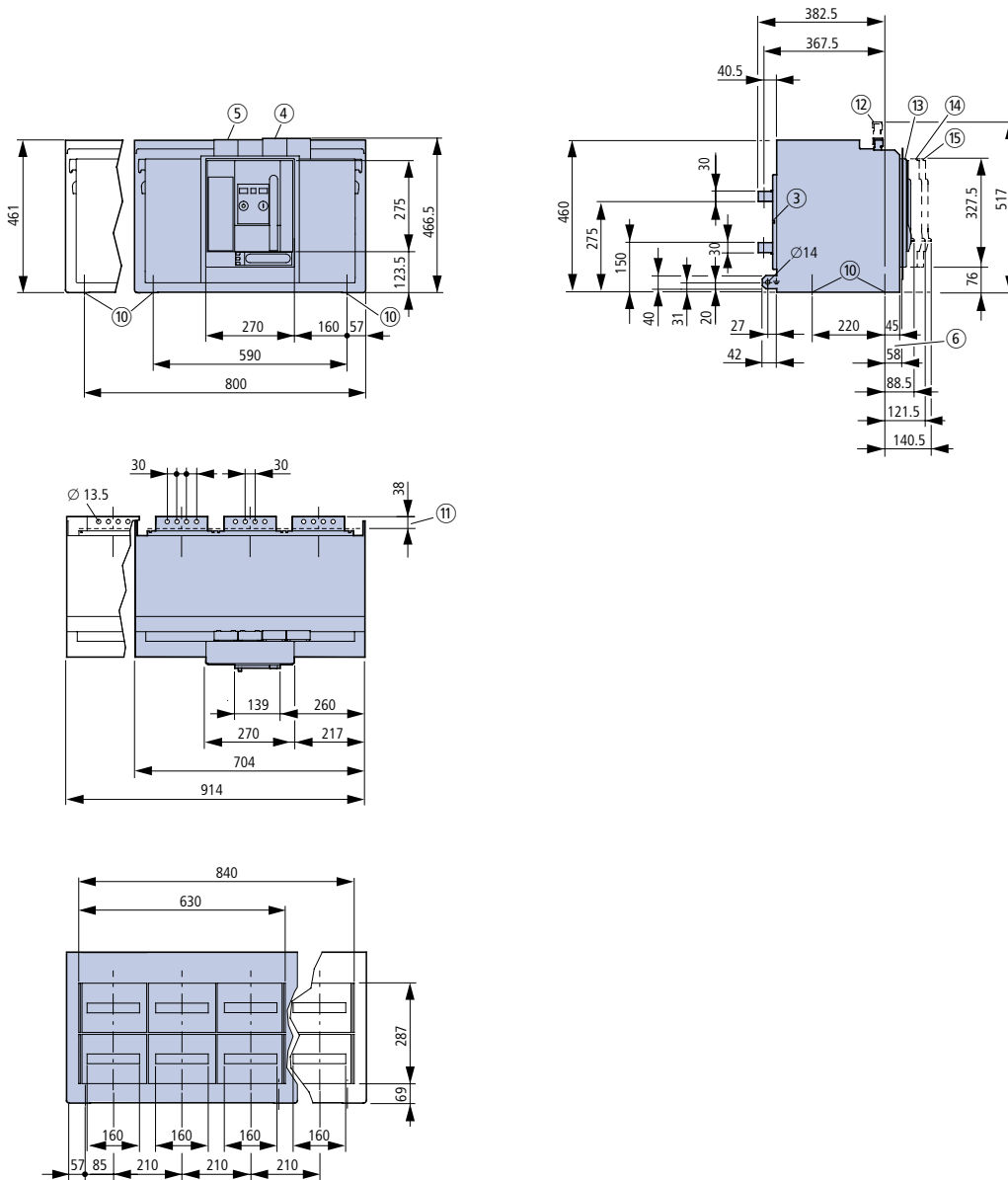
Vertical connection



MO3 – 3/4 POLE

OPTIONAL CONNECTION FEATURES

Standard design, horizontal connection ≤5000 A



Rated current I_n	a	b
4000 A	40	210
5000 A	40	210
6300 A	5	245

- ③ Slots (4 mm wide, 5 mm deep) for supporting phase partitions in the system
- ④ Control circuit plug, screw terminals
- ⑤ Control circuit plug, spring terminals
- ⑥ Dimension to inside of closed switchgear door
- Ⓣ Fixing holes, Ø 10 mm
- ⑪ Connection area
- ⑫ Circuit breaker top edge- AC-1000V version only
- ⑬ MO in connected position
- ⑭ MO in test position
- ⑮ MO in disconnected position

When front connections are used, a partition between busbar and arcing space must be fitted on the system side.

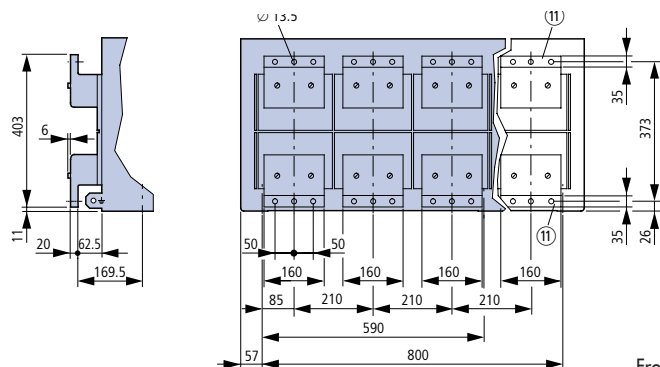
DIMENSIONS MO

MO3 – 3/4 POLE

OPTIONAL CONNECTION FEATURES, WITHDRAWABLE UNITS

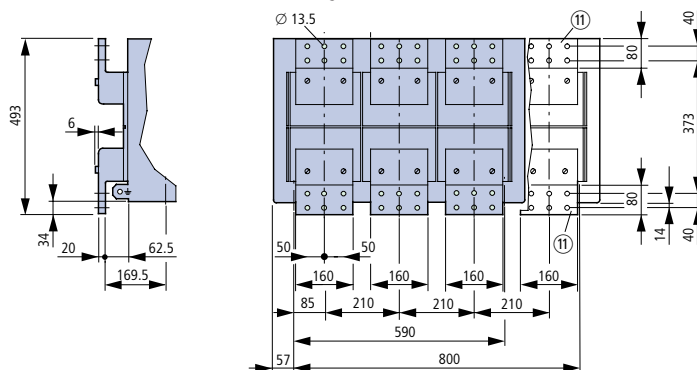
Front connection (single-bore fitting)

AV ≤ 4000 A



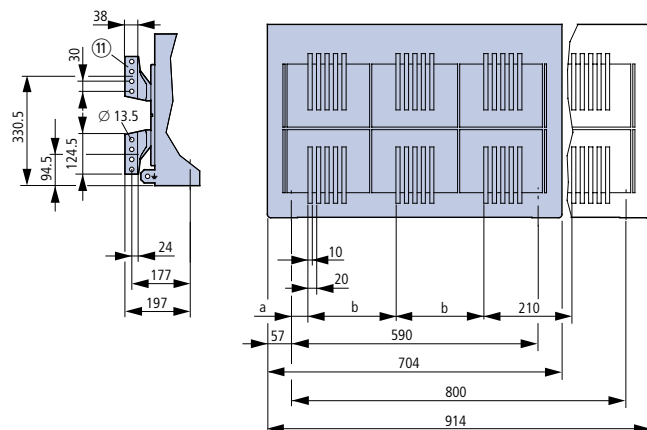
Front connection (double-bore fitting)

MC3-XATF...-AV ≤ 4000 A



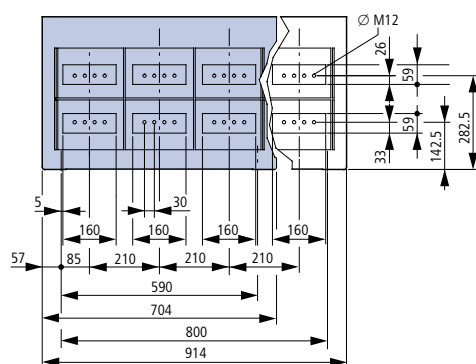
Vertical connection

MC3-XATV...-AV ≤ 6300 A



Flange connection

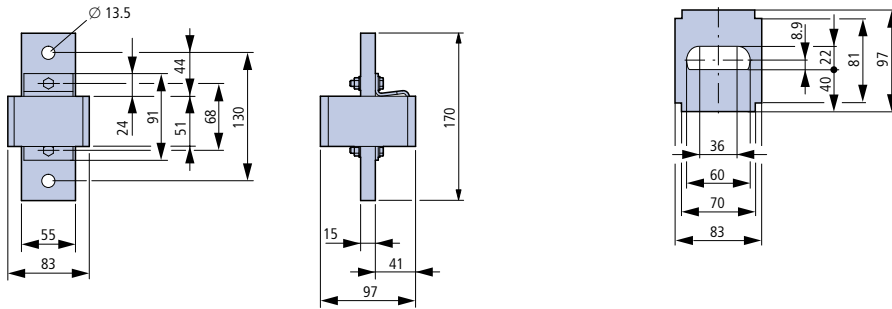
MC3-XATV...-AV ≤ 4000 A



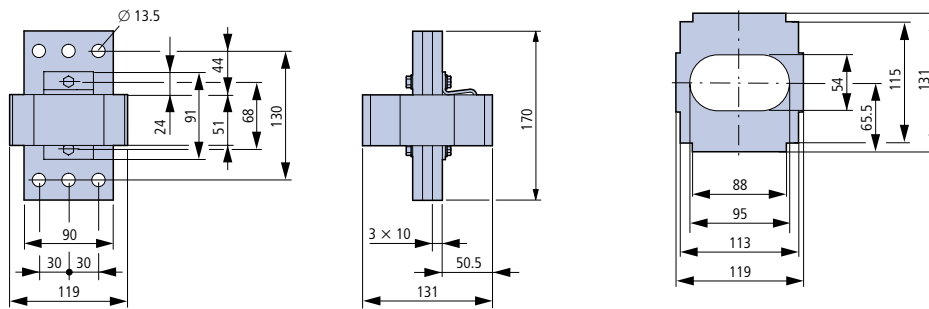
MO1, MO2, MO3

MEASURING TRANSDUCER, VOLTAGE RELEASE

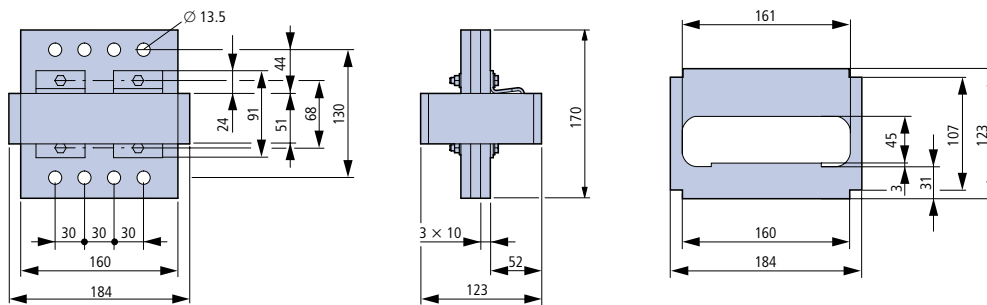
Measuring transducer for N conductor protection and earth-fault protection
MO1



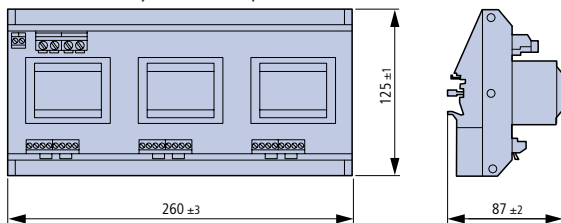
MO2



MO3



Voltage transformer
for MO with measuring function
for assembly on 35mm top-hat rail





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LEBENS
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“The most important part of work is the beginning.”

Plato

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DISCRIMINATION AND CHARACTERISTICS

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MC / MO – SYSTEM OVERVIEW	Page 222
DISCRIMINATION AND CHARACTERISTICS	Page 224

DISCRIMINATION AND BACK-UP PROTECTION IN LOW-VOLTAGE SYSTEMS

DISCRIMINATION – GENERAL INFORMATION

A system with several protective devices in series is termed selective if, in the event of an fault, the protection device directly before the location of the fault trips, seen from the power direction.

DISCRIMINATION WITH CIRCUIT BREAKERS – TYPES OF CIRCUIT BREAKER

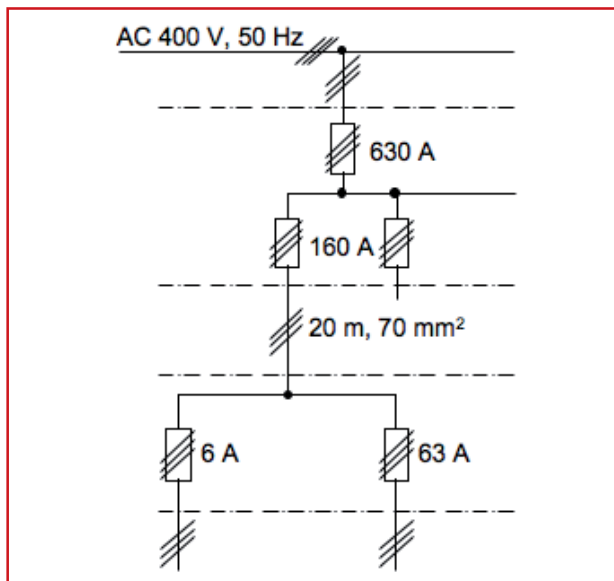
- **Moulded case** circuit breakers, mostly **current-limiting** switches, must affect a undelayed trip in the event of a short-circuit. Discrimination is only achievable to a limited extent and is called **current discrimination**.
- **Air** circuit breakers, mostly configured as **zero current interrupters** can withstand short-circuit currents for a certain periode of time. Discrimination is only achievable using a time delay and is termed **current time-discrimination**.

TERMS AND CONDITIONS FOR DISCRIMINATION

Fuses are selective if:

- The scatter bands of the characteristic curves do not touch
- Nominal current grading is observed as per Norm 1 : 1,6

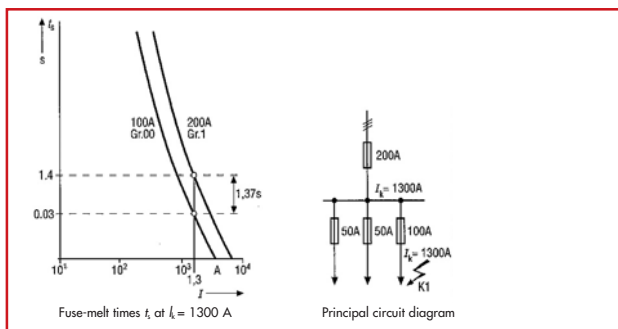
EXAMPLE: DISTRIBUTION SYSTEM WITH FUSES



Mains: AC 400 V, 50 Hz
Maximum short-circuit current
at main dist. board: **50 kA**

- **Switching capacity** of fuses
> **100 kA** (RMS value)
- **Discrimination is given** since the nominal current of the upstream fuse \geq corresponds to 1,6 x current of the down-stream fuse

EXAMPLE: DISCRIMINATION OF SERIES FUSES

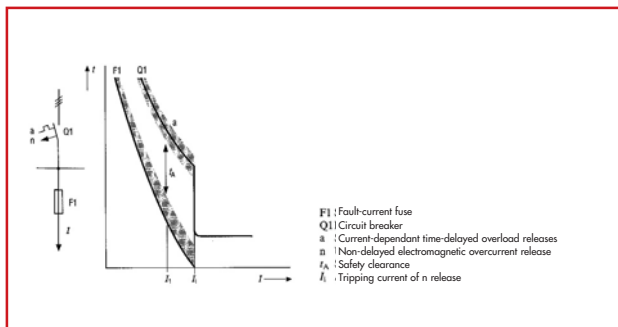


Discrimination applies if:

...the current vs. time characteristic curves (incl. scatter bands) do not touch and the clearance $> 1 \text{ s}$.

With larger short-circuits, the **switch-off I^2t_A** of the downstream fuse **must be smaller** than the **melting time I^2t_S** of the upstream fuse

EXAMPLE: DISCRIMINATION BETWEEN CB AND DOWNSTREAM FUSE IN OVERLOAD RANGE

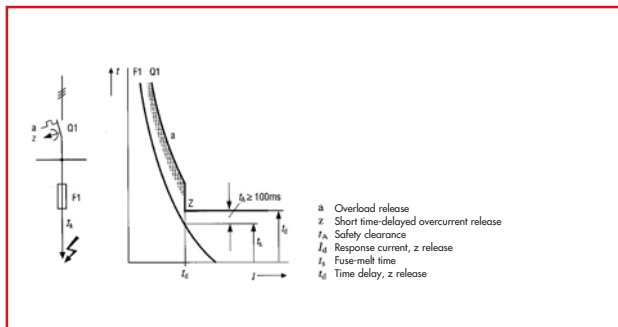


Discrimination applies if:

...the current vs. time characteristic curves (incl. scatter bands of the pre-loaded fuse) do not touch and the clearance $> 1 \text{ s}$.

...the value I_l of the short-circuit release from the circuit breaker (minus 20% tolerance $\Rightarrow 0,8 * I_l$) is less than the possible over-current (overload).

EXAMPLE: DISCRIMINATION BETWEEN CB AND DOWNSTREAM FUSE IN SHORT-CIRCUIT RANGE

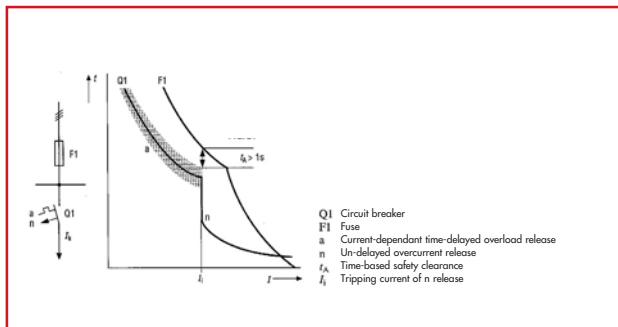


Discrimination applies if:

...the current vs. time characteristic curves (incl. scatter bands of pre-loaded fuse) do not touch and the clearance $> 1 \text{ s}$.

...the tripping time of the CB (t_d) is **100ms** larger than the tripping time (t_A) of the fuse or the let-through current of the fuse (i_D) is smaller than the response current ($0,8 * I_l$) of the short-circuit release of the circuit breaker.

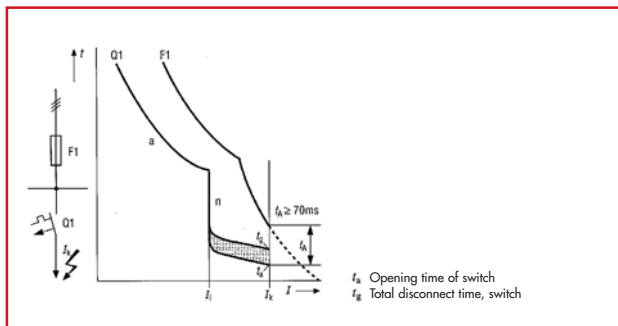
EXAMPLE: DISCRIMINATION BETWEEN FUSE AND DOWNSTREAM CB IN THE OVERLOAD RANGE



Discrimination applies if:

...the current vs. time characteristic curves (incl. scatter bands of pre-loaded fuse) do not touch, and the clearance $> 1 \text{ s}$.

EXAMPLE: DISCRIMINATION BETWEEN FUSE AND DOWNSTREAM CB IN THE SHORT-CIRCUIT RANGE



Discrimination applies if:

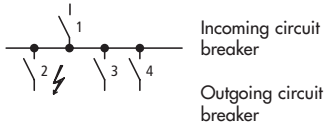
...the current vs. time characteristic curves (incl. scatter bands of pre-loaded fuse) do not touch and the clearance $> 1 \text{ s}$.

...the tripping time of the CB (t_A) is **70ms** larger than the melting time (t_S) or the **let-through- I^2t** of the switch **is less than** the **melting time- I^2t_S** .

DISCRIMINATION AND CHARACTERISTICS

DISCRIMINATION CHART, 415 V AC

MC, BM-B(C), BE5/6



Discrimination

between circuit-breakers enables faulty system sections to be shut down separately. There is discrimination between incoming circuit breaker 1 and outgoing circuit breaker 2 if, in the event of a short-circuit at position 2 only the outgoing circuit breaker trips. System sections 3 and 4 remain operational.

Incoming circuit breaker (S1)

MC1-A

MC2-A

		MC1-A							MC2-A										
		25(36)(50)(100)							25(36)(50)(150)										
		20	40	50	63	80	100	125	160	20	40	50	63	80	100	125	160	200	250
Outgoing circuit breaker (S2)	I_{sc} [kA]	Discrimination limit I [kA] for coordination between S2 and S1, overload- and short-circuit releases set to max. value																	
	I_n [A]	I_{sc415V} [kA]																	
BM-B(C)	0.5	15	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	1	15	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	2	15	2	T	T	T	T	T	T	T	3	T	T	T	T	T	T	T	T
	3	15	1.2	2	3	3	10	T	T	T	1.5	1.5	3	5	T	T	T	T	T
	4	15	1.2	2	3	3	8	T	T	T	1.2	1.5	3	4	T	T	T	T	T
	6	15	1.2	2	2.5	3	5	10	10	T	1.2	1.5	2.5	3	T	T	T	T	T
	10	15	1.2	1.5	2	2	4	10	10	T	1	1.5	2.5	3	10	10	10	10	10
	13	15	1	1.5	2	2	4	10	10	T	1	1.2	2	3	10	10	10	10	10
	16	15	1	1.2	1.5	2	3	8	8	T	1	1.2	1.5	2.5	10	10	10	10	10
	20	15	0.8	1.2	1.5	1.5	3	8	8	T	1	1.2	1.5	2.5	10	10	10	10	10
	25	15	0.7	1.2	1.5	1.5	3	7	7	T	0.8	1	1.5	2	10	10	10	10	10
	32	15	-	1.2	1	1.5	2	6	6	T	-	1	1.5	2	8	8	8	8	10
40	15	-	-	1	1.5	2	5	5	T	-	-	1.2	1.5	7	7	7	7	10	
50	15	-	-	-	1.2	1.5	4	4	T	-	-	-	1.5	6	6	6	6	10	
63	15	-	-	-	-	1.5	3	3	T	-	-	-	-	6	6	6	6	10	
BE5	0.16	100	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	0.25	100	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	0.4	100	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	0.63	100	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	1	100	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	1.6	100	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	2.5	100	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	4	100	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	6.3	100	4	5	5	T	T	T	T	T	2	3	4	5	T	T	T	T	T
	10	100	3	4	5	6	25	T	T	T	1.5	2.5	4	4	T	T	T	T	T
	12	50	3	4	5	6	25	T	T	T	1.5	2.5	4	4	T	T	T	T	T
	16	50	1.5	1.5	2	3	5	7	T	T	1	1.6	2	2.5	T	T	T	T	T
20	50	0.8	1.5	1.5	2	3	5	T	T	0.8	1.2	1.5	2	T	T	T	T	T	
25	50	-	1	1.5	1.5	2.5	4	T	T	-	1	1.5	2	10	T	T	T	T	
32	50	-	-	1	1	2	3.5	T	T	-	-	1	1.5	8	40	T	T	T	
BE6	16	100	0.5	0.8	0.8	0.8	2	5	5	0.5	0.8	0.8	0.8	2	5	5	5	5	
	25	100	-	0.7	0.8	0.8	1.5	5	5	-	0.7	0.8	0.8	1.5	5	5	5	5	
	32	50	-	-	0.8	0.8	1.5	4	4	-	-	0.8	0.8	1.5	4	4	4	4	
	40	50	-	-	-	0.8	1.5	3	3	-	-	-	0.8	1.5	3	3	3	3	
	50	50	-	-	-	-	1	2.5	2.5	-	-	-	-	1	2.5	2.5	2.5	2.5	
	58	50	-	-	-	-	-	2.5	2.5	-	-	-	-	-	2.5	2.5	2.5	2.5	
	63	50	-	-	-	-	-	2	2	-	-	-	-	-	2	2	2	2	

Notes:

T: Total discrimination

DISCRIMINATION AND CHARACTERISTICS

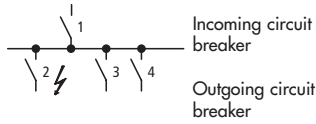
Incoming circuit breaker (S1)

MC2.-VE			MC3.-AE			MC3.-VE			MC4.-AE					MC4.-VE				
50(150)			50(150)			50(150)			50(85)					50(85)				
100	160	250	250	400	630	250	400	630	630	800	1000	1250	1600	630	800	1000	1250	1600
Discrimination limit I _n [kA] for coordination between S2 and S1, overload- and short-circuit release set to maximum value																		
T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
10	10	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
10	10	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
10	10	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
10	10	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
10	10	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
8	8	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
7	7	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
6	6	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
6	6	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
8	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
5	5	6	6	16	45	6	16	45	45	T	T	T	T	45	T	T	T	T
5	5	3.3	3.3	10	25	3.3	10	25	25	42	T	T	T	25	42	T	T	T
4	4	3	3	8	18	3	8	18	18	30	45	T	T	18	30	45	T	T
3	3	3	3	8	18	3	8	18	18	30	45	T	T	18	30	45	T	T
2.5	2.5	3	3	8	18	3	8	18	18	30	45	T	T	18	30	45	T	T
2.5	2.5	2.5	2.5	6.5	15	2.5	6.5	15	15	25	40	T	T	15	25	40	T	T
2	2	2.5	2.5	6.5	15	2.5	6.5	15	15	25	40	T	T	15	25	40	T	T

DISCRIMINATION AND CHARACTERISTICS

DISCRIMINATION CHART, 415 V AC

MC – MC



Discrimination

between circuit-breakers enables faulty system sections to be shut down separately. There is discrimination between incoming circuit breaker 1 and outgoing circuit breaker 2 if, in the event of a short-circuit at position 2 only the outgoing circuit breaker trips. System sections 3 and 4 remain operational.

Incoming circuit breaker (S1)

MC1-A

MC2-A

		25(36)(50)(100)							25(36)(50)(150)									
		20...40	50	63	80	100	125	160	20...40	50	63	80	100	125	160	200	250	
Outgoing circuit breaker (S2)	I_{sc} [kA]	Discrimination limit I _d (kA). Set the overload- and short-circuit release of the incoming circuit breaker to the maximum value.																
	I_n [A]	I_n [A]	$I_{sc(415V)}$ [kA]															
MC1-A	20...40	25...10	-	-	0.5	0.7	0.8	1.5	1.5	-	-	0.6	0.8	1.5	1.5	1.5	2	3
	50	25...10	-	-	-	0.6	0.8	1.5	1.5	-	-	-	0.8	1.5	1.5	1.5	2	3
	63	25...10	-	-	-	-	0.8	1.5	1.5	-	-	-	-	1.5	1.5	1.5	2	3
	80	25...10	-	-	-	-	-	1.5	1.5	-	-	-	-	-	1.5	1.5	2	3
	100	25...10	-	-	-	-	-	-	1.5	-	-	-	-	-	-	1.5	2	3
	125	25...10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	3
	160	25...10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	3
MC2-A	20...40	25...15	-	-	0.5	0.6	0.8	1	1	-	-	0.5	0.6	0.8	1	1.2	1.6	2
	50	25...15	-	-	-	0.6	0.8	1	1	-	-	-	0.6	0.8	1	1.2	1.6	2
	63	25...15	-	-	-	-	0.8	1	1	-	-	-	-	0.8	1	1.2	1.6	2
	80	25...15	-	-	-	-	-	1	1	-	-	-	-	-	1	1.2	1.6	2
	100	25...15	-	-	-	-	-	-	1	-	-	-	-	-	-	1.2	1.6	2
	125	25...15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.6	2
	160	25...15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
MC1-M	40	25...50	-	-	-	-	0.8	1	1	-	-	-	-	0.8	1	1.2	1.6	2
	50	25...50	-	-	-	-	-	-	1	-	-	-	-	-	-	1.2	1.6	2
	63	25...50	-	-	-	-	-	-	1	-	-	-	-	-	-	1.2	1.6	2
	80	25...50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.6	2
MC2-M	20...12	25...15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	160	25...15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	200	25...15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MC2-VE	100	50...15	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2	1.6	2
	160	50...15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	250	50...15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MC2-ME	90	50...15	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2	1.6	2
	140	50...15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	220	50...15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MC3-A	250	50...15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	400	50...15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	630	50...15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MC3-VE	250	50...15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	400	50...15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	630	50...15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MC3-ME	220	50...15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	350	50...15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	450	50...15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MC4-AE	630	50...10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	800	50...10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1000	50...10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1250	50...10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1600	50...10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MC4-VE	630	50...10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	800	50...10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1000	50...10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1250	50...10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1600	50...10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MC4-ME	550	50...10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	875	50...10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1400	50...10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes

T: Total discrimination

DISCRIMINATION AND CHARACTERISTICS

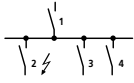
Incoming circuit breaker (S1)

MC2.-VE			MC3.-AE			MC3.-VE			MC4.-AE					MC4.-VE					
50(150)			50(150)			50(150)			50(85)					50(85)					
100	160	250	250	400	630	250	400	630	630	800	1000	1250	1600	630	800	1000	1250	1600	
Discrimination limit I _n (kA). Set the overload- and short-circuit release of the incoming circuit breaker to the maximum value.																			
2	5	7.5	7.5	20	20	12.5	25	25	T	T	T	T	T	T	T	T	T	T	
2	5	7.5	7.5	20	20	12.5	25	25	T	T	T	T	T	T	T	T	T	T	
2	5	6	6	15	15	11	20	20	T	T	T	T	T	T	T	T	T	T	
-	5	6	6	15	15	11	20	20	T	T	T	T	T	T	T	T	T	T	
-	5	6	6	15	15	11	20	20	T	T	T	T	T	T	T	T	T	T	
-	5	6	6	15	15	11	20	20	T	T	T	T	T	T	T	T	T	T	
-	5	6	6	15	15	11	20	20	T	T	T	T	T	T	T	T	T	T	
1	2	4	6	15	15	11	20	20	T	T	T	T	T	T	T	T	T	T	
1	2	4	6	15	15	11	20	20	T	T	T	T	T	T	T	T	T	T	
1	2	4	6	15	15	11	20	20	T	T	T	T	T	T	T	T	T	T	
-	2	4	6	15	15	11	20	20	T	T	T	T	T	T	T	T	T	T	
-	2	4	6	15	15	11	20	20	T	T	T	T	T	T	T	T	T	T	
-	-	4	6	15	15	11	20	20	T	T	T	T	T	T	T	T	T	T	
-	-	4	5	10	10	10	15	15	T	T	T	T	T	T	T	T	T	T	
-	-	-	-	10	10	-	15	15	T	T	T	T	T	T	T	T	T	T	
-	-	-	-	10	10	-	15	15	T	T	T	T	T	T	T	T	T	T	
1	2	4	6	15	15	11	20	20	T	T	T	T	T	T	T	T	T	T	
-	2	4	6	15	15	11	20	20	T	T	T	T	T	T	T	T	T	T	
-	2	4	6	15	15	11	20	20	T	T	T	T	T	T	T	T	T	T	
-	2	4	6	15	15	11	20	20	T	T	T	T	T	T	T	T	T	T	
-	-	4	6	15	15	11	20	20	T	T	T	T	T	T	T	T	T	T	
-	-	2	6	7	10	7	10	12	20	20	50	T	T	20	20	50	T	T	
-	-	-	6	7	10	7	10	12	20	20	50	T	T	20	20	50	T	T	
-	-	-	-	7	10	-	10	12	20	20	50	T	T	20	20	50	T	T	
-	1.2	2	6	7	10	7	8	11	20	20	50	T	T	20	20	50	T	T	
-	-	2	6	7	10	7	8	11	20	20	50	T	T	20	20	50	T	T	
-	-	-	-	7	10	-	8	11	20	20	50	T	T	20	20	50	T	T	
-	-	2	6	7	10	5	10	12	T	T	T	T	T	T	T	T	T	T	
-	-	-	6	7	10	5	10	12	T	T	T	T	T	T	T	T	T	T	
-	-	-	-	7	10	5	10	12	T	T	T	T	T	T	T	T	T	T	
-	-	-	-	5	7.5	-	10	12	T/80	T/80	T/80	T/80	T/80	T/80	T/80	T/80	T/80	T/80	
-	-	-	-	-	7.5	-	-	12	T/80	T/80	T/80	T/80	T/80	T/80	T/80	T/80	T/80	T/80	
-	-	-	-	-	-	-	-	-	-	T/80	T/80	T/80	T/80	-	T/80	T/80	T/80	T/80	
-	-	-	-	3.5	4	-	10	12	T/80	T/80	T/80	T/80	T/80	T/80	T/80	T/80	T/80	T/80	
-	-	-	-	-	4	-	-	12	T/80	T/80	T/80	T/80	T/80	T/80	T/80	T/80	T/80	T/80	
-	-	-	-	-	-	-	-	-	-	T/80	T/80	T/80	T/80	-	T/80	T/80	T/80	T/80	
-	-	-	-	3.5	4	-	10	12	T/80	T/80	T/80	T/80	T/80	T/80	T/80	T/80	T/80	T/80	
-	-	-	-	-	4	-	-	12	T/80	T/80	T/80	T/80	T/80	T/80	T/80	T/80	T/80	T/80	
-	-	-	-	-	-	-	-	-	-	T/80	T/80	T/80	T/80	-	T/80	T/80	T/80	T/80	
-	-	-	-	-	-	-	-	-	-	-	10	15	20	20	-	10	15	20	20
-	-	-	-	-	-	-	-	-	-	-	-	-	20	20	-	-	-	20	20
-	-	-	-	-	-	-	-	-	-	-	-	-	20	20	-	-	-	20	20
-	-	-	-	-	-	-	-	-	-	-	-	-	20	20	-	-	-	20	20
-	-	-	-	-	-	-	-	-	-	-	-	-	20	20	-	-	-	20	20
-	-	-	-	-	-	-	-	-	-	-	-	-	20	20	-	-	-	20	20
-	-	-	-	-	-	-	-	-	-	-	-	-	20	20	-	-	-	20	20
-	-	-	-	-	-	-	-	-	-	-	-	-	20	20	-	-	-	20	20
-	-	-	-	-	-	-	-	-	-	-	-	-	20	20	-	-	-	20	20
-	-	-	-	-	-	-	-	-	-	-	-	-	20	20	-	-	-	20	20
-	-	-	-	-	-	-	-	-	-	-	-	-	20	20	-	-	-	20	20

DISCRIMINATION AND CHARACTERISTICS

DISCRIMINATION CHART, 415 V AC

MC – MO1 WITH ETU15, ETU25



- I_n : Rated current
- I_u : Rated uninterrupted current
- I_s : Setting value, non-delayed short-circuit release

Discrimination

between circuit breakers enables faulty system sections to be shut down. There is discrimination between incoming circuit breaker 1 and outgoing circuit breaker 2 if, in the event of a short-circuit at position 2 **only** the outgoing circuit breaker 2 trips. System sections 3 and 4 remain operational.

Selection:

The outgoing circuit breaker is selective in relation to the incoming circuit breaker providing that the short-circuit current does not exceed the values (I_s in kA) specified in the table. These indications represent the discrimination limit. Both circuit-breakers trip if $I_{sc} > I_s$. With MOs with ETU25, 45, 76 releases, the time-delay t_{sd} must be at least 100 ms higher than the time-delay of the next subordinate levels (2, 3, 4).

Type	MO1 + ETU15 incoming circuit breaker with standard release (A)						MO1 + ETU25 incoming circuit breaker with standard release (V)					
	I_n [A]	630	800	1000	1250	1600	630	800	1000	1250	1600	
	I_u [A]	5040	6400	8000	10000	12800	12600	16000	20000	25000	32000	
	I_{sc} [kA]	50 65	50 65	50 65	50 65	50 65	50 65	50 65	50 65	50 65	50 65	

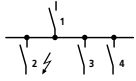
Outgoing circuit breaker	Discrimination limit I_s (kA). Prospective short-circuit current (kA)																					
	I_n [A]	I_{sc} [kA]	B		N		B		N		B		N		B		N					
MC1-A	40	25(50)	5	5	6	6	8	8	12	12	16	16	16	16	T(35)	T(35)	T	T	T	T	T	T
	50	25(50)	5	5	6	6	8	8	12	12	16	16	16	16	T(35)	T(35)	T	T	T	T	T	T
	63	25(50)	5	5	6	6	8	8	12	12	16	16	16	16	T(35)	T(35)	T	T	T	T	T	T
	80	25(50)	5	5	6	6	8	8	12	12	16	16	16	16	T(35)	T(35)	T	T	T	T	T	T
	100	25(50)	5	5	6	6	8	8	12	12	16	16	16	16	T(35)	T(35)	T	T	T	T	T	T
	125	25(50)	5	5	6	6	8	8	12	12	16	16	16	16	T(35)	T(35)	T	T	T	T	T	T
MC2-A	40	100(150)	5	5	6	6	8	8	12	12	20	20	20	20	40	40	T	T	T	T	T	T
	50	100(150)	5	5	6	6	8	8	12	12	20	20	20	20	40	40	T	T	T	T	T	T
	63	100(150)	5	5	6	6	8	8	12	12	20	20	20	20	40	40	T	T	T	T	T	T
	80	100(150)	5	5	6	6	8	8	12	12	20	20	20	20	40	40	T	T	T	T	T	T
	100	100(150)	5	5	6	6	8	8	12	12	20	20	20	20	40	40	T	T	T	T	T	T
	125	25...150	5	5	6	6	8	8	12	12	20	20	20	20	T(40)	T(40)	T	T	T	T	T	T
	160	25...150	5	5	6	6	8	8	12	12	20	20	20	20	T(40)	T(40)	T	T	T	T	T	T
200	25...150	5	5	6	6	8	8	12	12	20	20	20	20	T(40)	T(40)	T	T	T	T	T	T	
250	25...150	5	5	6	6	8	8	12	12	20	20	20	20	T(40)	T(40)	T	T	T	T	T	T	
MC1-M	40	25(50)	5	5	6	6	8	8	12	12	16	16	16	16	T(35)	T(35)	T	T	T	T	T	T
	50	25(50)	5	5	6	6	8	8	12	12	16	16	16	16	T(35)	T(35)	T	T	T	T	T	T
	63	25(50)	5	5	6	6	8	8	12	12	16	16	16	16	T(35)	T(35)	T	T	T	T	T	T
	80	25(50)	5	5	6	6	8	8	12	12	16	16	16	16	T(35)	T(35)	T	T	T	T	T	T
MC2-M	125	25...150	5	5	6	6	8	8	12	12	20	20	20	20	T(40)	T(40)	T	T	T	T	T	T
	160	25...150	5	5	6	6	8	8	12	12	20	20	20	20	T(40)	T(40)	T	T	T	T	T	T
	200	25...150	5	5	6	6	8	8	12	12	20	20	20	20	T(40)	T(40)	T	T	T	T	T	T
MC2-VE	100	50...150	5	5	6	6	8	8	12	12	20	20	20	20	16	16	T	T	T	T	T	T
	160	50...150	5	5	6	6	8	8	12	12	20	20	20	20	16	16	T	T	T	T	T	T
	250	50...150	5	5	6	6	8	8	12	12	20	20	20	20	16	16	T	T	T	T	T	T
MC3-VE(AE)	250	50...150	5	5	6	6	8	8	12	12	12	12	12	12	16	16	20	20	30	30	T	T
	400	50...150	5	5	6	6	8	8	12	12	12	12	12	12	16	16	20	20	30	30	T	T
	630	50...150	5	5	6	6	8	8	12	12	12	12	12	12	16	16	20	20	30	30	T	T
MC4-VE(AE)	63	50...100	5	5	6	6	8	8	12	12	12	12	2	12	16	16	20	20	30	30	32	32
	80	50...100	5	5	6	6	8	8	12	12	12	12	2	12	16	16	20	20	30	30	32	32
	1000	50...100	5	5	6	6	8	8	12	12	12	12	2	12	16	16	20	20	30	30	32	32
	1250	50...100	5	5	6	6	8	8	12	12	12	12	2	12	16	16	20	20	30	30	32	32
	1600	50...100	5	5	6	6	8	8	12	12	12	12	2	12	16	16	20	20	30	30	32	32

Notes: T: Total discrimination

DISCRIMINATION AND CHARACTERISTICS

DISCRIMINATION CHART, 415 V AC

MC – MO1 WITH ETU45, ETU76



- I_r: Rated current
- I_n: Rated uninterrupted current
- I_s: Setting value, not-delayed short-circuit release

Discrimination

between circuit breakers enables faulty system sections to be shut down. There is discrimination between incoming circuit breaker 1 and outgoing circuit breaker 2 if, in the event of a short-circuit at position 2 **only** the outgoing circuit breaker 2 trips. System sections 3 and 4 remain operational.

Selection:

The outgoing circuit breaker is selective in relation to the incoming circuit breaker providing that the short-circuit current does not exceed the values (I_s in kA) specified in the table. These indications represent the discrimination limit. Both circuit-breakers trip if I_{sc,th} > I_s. With MOs with ETU25, 45, 76 releases, the time-delay t_{sd} must be at least 100 ms higher than the time-delay of the next subordinate levels (2, 3, 4).

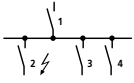
Type	MO1 + ETU45 incoming circuit breaker with standard release (U)					MO1 + ETU76 incoming circuit breaker with digital release (D)									
	I _r =I _n [A]	630	800	1000	1250	1600	630	800	1000	1250	1600				
	I _n [A]	40kA 52kA	40kA 52kA	40kA 52kA	40kA 52kA	40kA 52kA	40kA 52kA	40kA 52kA	40kA 52kA	40kA 52kA	40kA 52kA				
	I _s [kA]	50 65	50 65	50 65	50 65	50 65	50 65	50 65	50 65	50 65	50 65				
		OFF/ON	OFF/ON	OFF/ON	OFF/ON	OFF/ON									
Outgoing circuit breaker		Discrimination limit I _s (kA). Prospective short-circuit current (kA)													
I _r [A]	I _n [kA]	B	N	B	N	B	N	B	N	B	N	B	N	B	N
MC1-A	40 25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	50 25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	63 25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	80 25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	100 25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	125 25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T	T
MC2-A	40 100(150)	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	50 100(150)	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	63 100(150)	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	80 100(150)	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	100 100(150)	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	125 25...150	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	160 25...150	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	200 25...150	T	T	T	T	T	T	T	T	T	T	T	T	T	T
MC1-M	40 25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	50 25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	63 25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	80 25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	100 25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T	T
MC2-M	125 25...150	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	160 25...150	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	200 25...150	T	T	T	T	T	T	T	T	T	T	T	T	T	T
MC2-VE	100 50...150	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	160 50...150	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	250 50...150	T	T	T	T	T	T	T	T	T	T	T	T	T	T
MC3-VE(AE)	250 50...150	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	400 50...150	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	630 50...150	T	T	T	T	T	T	T	T	T	T	T	T	T	T
MC4-VE(AE)	63 50(100)	T/40	T/52	T/40	T/52	T/40	T/52	T/40	T/52	T/40	T/52	T/40	T/52	T/40	T/52
	800 50(100)	T/40	T/52	T/40	T/52	T/40	T/52	T/40	T/52	T/40	T/52	T/40	T/52	T/40	T/52
	1000 50(100)	T/40	T/52	T/40	T/52	T/40	T/52	T/40	T/52	T/40	T/52	T/40	T/52	T/40	T/52
	1250 50(100)	T/40	T/52	T/40	T/52	T/40	T/52	T/40	T/52	T/40	T/52	T/40	T/52	T/40	T/52
	1600 50(100)	T/40	T/52	T/40	T/52	T/40	T/52	T/40	T/52	T/40	T/52	T/40	T/52	T/40	T/52

Notes: T: Total discrimination

DISCRIMINATION AND CHARACTERISTICS

DISCRIMINATION CHART, 415 V AC

MC – MO2 WITH ETU15



- I_n : Rated current
- I_u : Rated uninterrupted current
- I_s : Setting value, non-delayed Short-circuit release

Discrimination

between circuit breakers enables faulty system sections to be shut down. There is discrimination between incoming circuit breaker 1 and outgoing circuit breaker 2 if, in the event of a short-circuit at position 2 **only** the outgoing circuit breaker 2 trips. System sections 3 and 4 remain operational.

Selection:

The outgoing circuit breaker is selective in relation to the incoming circuit breaker providing that the short-circuit current does not exceed the values (I_s in kA) specified in the table. These entries represent the discrimination limit. Both switches trip out with larger short-circuit currents.

Type MO2 + ETU15 incoming circuit breaker with standard release (A) $I_s = 8 \times I_n$

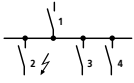
$I_n = I_u$ [A]		800			1000			1250			1600			2000			2500			3200																		
I_s [A]		6400			8000			10000			12800			16000			20000			25600																		
I_{sc} [kA]		55	80	100	55	80	100	55	80	100	55	80	100	55	80	100	55	80	100	55	80	100																
Outgoing circuit breaker		Discrimination limit I_s (kA). Prospective short-circuit current (kA)																																				
MC1-A	I_n [A]	I_u [kA]	B			N			H			B			N			H			B			N			H			B			N			H		
	40		25(50)	6	6	6	8	8	8	10	10	10	16	16	16	T(25)	T(25)	T(25)	T(42)	T(42)	T(42)	T	T	T														
50	25(50)	6	6	6	8	8	8	10	10	10	16	16	16	T(25)	T(25)	T(25)	T(42)	T(42)	T(42)	T	T	T																
63	25(50)	6	6	6	8	8	8	10	10	10	16	16	16	T(25)	T(25)	T(25)	T(42)	T(42)	T(42)	T	T	T																
80	25(50)	6	6	6	8	8	8	10	10	10	16	16	16	T(25)	T(25)	T(25)	T(42)	T(42)	T(42)	T	T	T																
100	25(50)	6	6	6	8	8	8	10	10	10	16	16	16	T(25)	T(25)	T(25)	T(42)	T(42)	T(42)	T	T	T																
120	25(50)	6	6	6	8	8	8	10	10	10	16	16	16	T(25)	T(25)	T(25)	T(42)	T(42)	T(42)	T	T	T																
MC2-A	40	100(150)	6	6	6	8	8	8	10	10	10	20	20	20	30	30	30	55	65	65	T	T	T															
	50	100(150)	6	6	6	8	8	8	10	10	10	20	20	20	30	30	30	55	65	65	T	T	T															
	63	100(150)	6	6	6	8	8	8	10	10	10	20	20	20	30	30	30	55	65	65	T	T	T															
	80	100(150)	6	6	6	8	8	8	10	10	10	20	20	20	30	30	30	55	65	65	T	T	T															
	100	100(150)	6	6	6	8	8	8	10	10	10	20	20	20	30	30	30	55	65	65	T	T	T															
	125	25...150	6	6	6	8	8	8	10	10	10	20	20	20	T(30)	T(30)	T(30)	T(55)	T(65)	T(65)	T	T	T															
	160	25...150	6	6	6	8	8	8	10	10	10	20	20	20	T(30)	T(30)	T(30)	T(55)	T(65)	T(65)	T	T	T															
200	25...150	6	6	6	8	8	8	10	10	10	20	20	20	T(30)	T(30)	T(30)	T(55)	T(65)	T(65)	T	T	T																
250	25...150	6	6	6	8	8	8	10	10	10	20	20	20	T(30)	T(30)	T(30)	T(55)	T(65)	T(65)	T	T	T																
MC1-M	40	25/50	6	6	6	8	8	8	10	10	10	16	16	16	T(25)	T(25)	T(25)	T(42)	T(42)	T(42)	T	T	T															
	50	25/50	6	6	6	8	8	8	10	10	10	16	16	16	T(25)	T(25)	T(25)	T(42)	T(42)	T(42)	T	T	T															
	63	25/50	6	6	6	8	8	8	10	10	10	16	16	16	T(25)	T(25)	T(25)	T(42)	T(42)	T(42)	T	T	T															
	80	25/50	6	6	6	8	8	8	10	10	10	16	16	16	T(25)	T(25)	T(25)	T(42)	T(42)	T(42)	T	T	T															
	100	25/50	6	6	6	8	8	8	10	10	10	16	16	16	T(25)	T(25)	T(25)	T(42)	T(42)	T(42)	T	T	T															
MC2-M	125	25...150	6	6	6	8	8	8	10	10	10	20	20	20	T(30)	T(30)	T(30)	T(55)	T(65)	T(65)	T	T	T															
	160	25...150	6	6	6	8	8	8	10	10	10	20	20	20	T(30)	T(30)	T(30)	T(55)	T(65)	T(65)	T	T	T															
	200	25...150	6	6	6	8	8	8	10	10	10	20	20	20	T(30)	T(30)	T(30)	T(55)	T(65)	T(65)	T	T	T															
MC2-VE	100	50...150	6	6	6	8	8	8	10	10	10	20	20	20	30	30	30	T(55)	T(65)	T(65)	T	T	T															
	160	50...150	6	6	6	8	8	8	10	10	10	20	20	20	30	30	30	T(55)	T(65)	T(65)	T	T	T															
	250	50...150	6	6	6	8	8	8	10	10	10	20	20	20	30	30	30	T(55)	T(65)	T(65)	T	T	T															
MC3-VE(AE)	250	50...150	6	6	6	8	8	8	10	10	10	12	12	12	16	16	16	20	20	20	30	30	30															
	400	50...150	6	6	6	8	8	8	10	10	10	12	12	12	16	16	16	20	20	20	30	30	30															
	630	50...150	6	6	6	8	8	8	10	10	10	12	12	12	16	16	16	20	20	20	30	30	30															
MC4-VE(AE)	630	50(100)	6	6	6	8	8	8	10	10	10	12	12	12	16	16	16	20	20	20	25	25	25															
	800	50(100)	6	6	6	8	8	8	10	10	10	12	12	12	16	16	16	20	20	20	25	25	25															
	1000	50(100)	6	6	6	8	8	8	10	10	10	12	12	12	16	16	16	20	20	20	25	25	25															
	1250	50(100)	6	6	6	8	8	8	10	10	10	12	12	12	16	16	16	20	20	20	25	25	25															
	1650	50(100)	6	6	6	8	8	8	10	10	10	12	12	12	16	16	16	20	20	20	25	25	25															

Notes: T: Total discrimination

DISCRIMINATION AND CHARACTERISTICS

DISCRIMINATION CHART, 415 V AC

MC – MO2(3) WITH ETU25



- I_n : Rated current
- I_u : Rated uninterrupted current
- I_s : Setting value, non-delayed Short-circuit release

Discrimination

between circuit breakers enables faulty system sections to be shut down. There is discrimination between incoming circuit breaker 1 and outgoing circuit breaker 2 if, in the event of a short-circuit at position 2 **only** the outgoing circuit breaker 2 trips. System sections 3 and 4 remain operational.

Selection:

The outgoing circuit breaker is selective in relation to the incoming circuit breaker providing that the short-circuit current does not exceed the values (I_s in kA) specified in the table. These indications represent the discrimination limit. Both circuit-breakers trip if $I_{sc} > I_s$. With MOs with ETU25, 45, 76 releases, the time-delay t_{sd} must be at least 100 ms higher than the time-delay of the next subordinate levels (2, 3, 4).

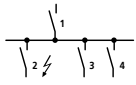
Type	MO2 + ETU25 incoming circuit breaker with selective release (V) $I_{max} = 50$ kA												MO3											
I_n, I_u [A]	800			1000			1250			1600			2000			2500			3200			4000	5000	6300
I_s [A]	16000			20000			25000			20000			40000			50000			50000			50000		
I_s [kA]	55	80	100	55	80	100	55	80	100	55	80	100	55	80	100	55	80	100	55	80	100	100	100	100
Outgoing circuit breaker	Discrimination limit I_s (kA). Prospective short-circuit current (kA)																							
I_n [A] I_u [kA]	B	N	H	B	N	H	B	N	H	B	N	H	B	N	H	B	N	H	B	N	H	B	N	H
MC1-A																								
40 25(50)	T(35)	T(35)	T(35)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
50 25(50)	T(35)	T(35)	T(35)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
63 25(50)	T(35)	T(35)	T(35)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
80 25(50)	T(35)	T(35)	T(35)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
100 25(50)	T(35)	T(35)	T(35)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
125 25(50)	T(35)	T(35)	T(35)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
MC2-A																								
40 100(150)	40	40	40	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
50 100(150)	40	40	40	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
63 100(150)	40	40	40	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
80 100(150)	40	40	40	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
100 100(150)	40	40	40	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
125 25...150	T(40)	T(40)	T(40)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
160 25...150	T(40)	T(40)	T(40)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
200 25...150	T(40)	T(40)	T(40)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
250 25...150	T(40)	T(40)	T(40)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
MC1-M																								
40 25(50)	T(35)	T(35)	T(35)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
50 25(50)	T(35)	T(35)	T(35)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
63 25(50)	T(35)	T(35)	T(35)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
80 25(50)	T(35)	T(35)	T(35)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
100 25(50)	T(35)	T(35)	T(35)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
MC2-M																								
125 25...150	T(40)	T(40)	T(40)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
160 25...150	T(40)	T(40)	T(40)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
200 25...150	T(40)	T(40)	T(40)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
MC2-VE																								
100 50...150	16	16	16	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
160 50...150	16	16	16	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
250 50...150	16	16	16	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
MC3-VE(AE)																								
250 50...150	16	16	16	20	20	20	30	30	30	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
400 50...150	16	16	16	20	20	20	30	30	30	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
630 50...150	16	16	16	20	20	20	30	30	30	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
MC4-VE(AE)																								
630 50...100	16	16	16	20	20	20	30	30	30	32	32	32	40	40	40	T(50)	T(50)	T(50)	T(50)	T(50)	T(50)	T(50)	T(50)	T(50)
800 50...100	16	16	16	20	20	20	30	30	30	32	32	32	40	40	40	T(50)	T(50)	T(50)	T(50)	T(50)	T(50)	T(50)	T(50)	T(50)
1000 50...100	16	16	16	20	20	20	30	30	30	32	32	32	40	40	40	T(50)	T(50)	T(50)	T(50)	T(50)	T(50)	T(50)	T(50)	T(50)
1250 50...100	16	16	16	20	20	20	30	30	30	32	32	32	40	40	40	T(50)	T(50)	T(50)	T(50)	T(50)	T(50)	T(50)	T(50)	T(50)
1650 50...100	16	16	16	20	20	20	30	30	30	32	32	32	40	40	40	T(50)	T(50)	T(50)	T(50)	T(50)	T(50)	T(50)	T(50)	T(50)

Notes: T: Total discrimination

DISCRIMINATION AND CHARACTERISTICS

DISCRIMINATION CHART, 415 V AC

MC – MO2(3) WITH ETU45



- I_n: Rated current
- I_u: Rated uninterrupted current
- I_s: Setting value, non-delayed Short-circuit release

Discrimination

between circuit breakers enables faulty system sections to be shut down. There is discrimination between incoming circuit breaker 1 and outgoing circuit breaker 2 if, in the event of a short-circuit at position 2 **only** the outgoing circuit breaker 2 trips. System sections 3 and 4 remain operational.

Selection:

The outgoing circuit breaker is selective in relation to the incoming circuit breaker providing that the short-circuit current does not exceed the values (I_s in kA) specified in the table. These indications represent the discrimination limit. Both circuit-breakers trip if I_{sc} > I_s. With MOs with ETU25, 45, 76 releases, the time-delay t_{sd} must be at least 100 ms higher than the time-delay of the next subordinate levels (2, 3, 4).

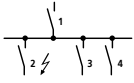
Type **MO2 (3) + ETU45 incoming circuit breaker with universal release (U) I_s = 0,8 x I_n(= 0,8 x I_u)**

I _n =I _u [A]	800	1000	1250	1600	2000	2500	3200	4000 5000 6300											
I _n [A]	44kA 64kA 80kA	44kA 64kA 80kA	44 kA 64kA 80kA	44kA 64kA 80kA	44kA 64kA 80kA	44kA 64kA 80kA	44kA 64kA 80kA	80kA											
I _{sc} [kA]	55 80 100	55 80 100	55 80 100	55 80 100	55 80 100	55 80 100	55 80 100	100 100 100											
	OFF/ON	OFF/ON	OFF/ON	OFF/ON	OFF/ON	OFF/ON	OFF/ON	OFF/ON											
Outgoing circuit breaker		Discrimination limit I _s (kA). Prospective short-circuit current (kA)																	
I _n [A]	I _{sc} [kA]	B	N	H	B	N	H	B	N	H	B	N	H	B	N	H	B	N	H
MC1-A																			
40	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
50	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
63	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
80	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
100	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
125	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
MC2-A																			
40	100(150)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
50	100(150)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
63	100(150)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
80	100(150)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
100	100(150)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
125	25...150	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
160	25...150	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
200	25...150	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
250	25...150	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
MC1-M																			
40	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
50	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
63	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
80	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
100	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
MC2-M																			
125	25...150	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
160	25...150	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
200	25...150	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
MC2-VE																			
100	50...150	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
160	50...150	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
250	50...150	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
MC3-VE(AE)																			
250	50...150	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)
400	50...150	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)
630	50...150	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)
MC4-VE(AE)																			
630	50(100)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)
800	50(100)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)
1000	50(100)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)
1250	50(100)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)
1650	50(100)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)

Notes: T: Total discrimination

DISCRIMINATION TABLE, 415 V AC

MC – MO2 WITH ETU76



- I_n : Rated current
- I_u : Rated uninterrupted current
- I_s : Setting value, non-delayed Short-circuit release

Discrimination

between circuit breakers enables faulty system sections to be shut down. There is discrimination between incoming circuit breaker 1 and outgoing circuit breaker 2 if, in the event of a short-circuit at position 2 **only** the outgoing circuit breaker 2 trips. System sections 3 and 4 remain operational.

Selection:

The outgoing circuit breaker is selective in relation to the incoming circuit breaker providing that the short-circuit current does not exceed the values (I_s in kA) specified in the table. These indications represent the discrimination limit. Both circuit-breakers trip if $I_{sc} > I_s$. With MOs with ETU25, 45, 76 releases, the time-delay t_{sd} must be at least 100 ms higher than the time-delay of the next subordinate levels (2, 3, 4).

Type **MO2 + ETU76 incoming circuit breaker with digital release (D) $I_s = 0,8 \times I_u (= 0,8 \times I_n)$**

$I_n = I_u$ [A]	800			1000			1250			1600		
I_s [A]	44000	64000	80000	44000	64000	80000	44000	64000	80000	44000	64000	80000
I_{sc} [kA]	55	80	100	55	80	100	55	80	100	55	80	100

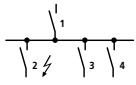
Outgoing circuit breaker	I_n [A]	I_{sc} [kA]	Discrimination limit I_s (kA). Prospective short-circuit current (kA)												
			B	N	H	B	N	H	B	N	H	B	N	H	
MC1-A	40	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T
	50	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T
	63	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T
	80	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T
	100	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T
	125	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T
MC2-A	40	100(150)	T	T	T	T	T	T	T	T	T	T	T	T	T
	50	100(150)	T	T	T	T	T	T	T	T	T	T	T	T	T
	63	100(150)	T	T	T	T	T	T	T	T	T	T	T	T	T
	80	100(150)	T	T	T	T	T	T	T	T	T	T	T	T	T
	100	100(150)	T	T	T	T	T	T	T	T	T	T	T	T	T
	125	25...150	T	T	T	T	T	T	T	T	T	T	T	T	T
	160	25...150	T	T	T	T	T	T	T	T	T	T	T	T	T
	200	25...150	T	T	T	T	T	T	T	T	T	T	T	T	T
MC1-M	40	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T
	50	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T
	63	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T
	80	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T
	100	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T
MC2-M	125	25...150	T	T	T	T	T	T	T	T	T	T	T	T	T
	160	25...150	T	T	T	T	T	T	T	T	T	T	T	T	T
	200	25...150	T	T	T	T	T	T	T	T	T	T	T	T	T
MC2-VE	100	50...150	T	T	T	T	T	T	T	T	T	T	T	T	T
	160	50...150	T	T	T	T	T	T	T	T	T	T	T	T	T
	250	50...150	T	T	T	T	T	T	T	T	T	T	T	T	T
MC3-VE(AE)	250	50...150	T	T	T	T	T	T	T	T	T	T	T	T	T
	400	50...150	T	T	T	T	T	T	T	T	T	T	T	T	T
	630	50...150	T	T	T	T	T	T	T	T	T	T	T	T	T
MC4-VE(AE)	63	50(100)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45
	800	50(100)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45
	1000	50(100)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45
	1250	50(100)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45
	1600	50(100)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	45

Notes: T: Total discrimination

DISCRIMINATION AND CHARACTERISTICS

DISCRIMINATION TABLE, 415 V AC

MC – MO2(3) WITH ETU76



- I_n : Rated current
- I_u : Rated uninterrupted current
- I_s : Setting value, non-delayed Short-circuit release

Discrimination

between circuit breakers enables faulty system sections to be shut down. There is discrimination between incoming circuit breaker 1 and outgoing circuit breaker 2 if, in the event of a short-circuit at position 2 **only** the outgoing circuit breaker 2 trips. System sections 3 and 4 remain operational.

Selection:

The outgoing circuit breaker is selective in relation to the incoming circuit breaker providing that the short-circuit current does not exceed the values (I_s in kA) specified in the table. These indications represent the discrimination limit. Both circuit-breakers trip if $I_{sc} > I_s$. With MOs with ETU25, 45, 76 releases, the time-delay t_{sd} must be at least 100 ms higher than the time-delay of the next subordinate levels (2, 3, 4).

Type **MO2 (3) + ETU76 incoming circuit breaker with digital release (D) $I_s = 0,8 \times I_u (= 0,8 \times I_n)$**

$I_n = I_u$ [A]	2000			2500			3200			4000	5000	6300
I_s [kA]	44000	64000	80000	44000	64000	80000	44000	64000	80000	80000	80000	80000
I_u [kA]	55	80	100	55	80	100	55	80	100	100	100	100

Outgoing circuit breaker			Discrimination limit I_s (kA). Prospective short-circuit current (kA)												
I_n [A]	I_u [kA]		B	N	H	B	N	H	B	N	H	B	N	H	
MC1-A	40	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	
	50	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	
	63	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	
	80	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	
	100	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	
	125	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	T
MC2-A	40	100(150)	T	T	T	T	T	T	T	T	T	T	T	T	
	50	100(150)	T	T	T	T	T	T	T	T	T	T	T	T	
	63	100(150)	T	T	T	T	T	T	T	T	T	T	T	T	
	80	100(150)	T	T	T	T	T	T	T	T	T	T	T	T	
	100	100(150)	T	T	T	T	T	T	T	T	T	T	T	T	
	125	25...150	T	T	T	T	T	T	T	T	T	T	T	T	T
	160	25...150	T	T	T	T	T	T	T	T	T	T	T	T	T
MC1-M	40	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	
	50	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	
	63	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	
	80	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	
	100	25(50)	T	T	T	T	T	T	T	T	T	T	T	T	
MC2-M	125	25...150	T	T	T	T	T	T	T	T	T	T	T	T	
	160	25...150	T	T	T	T	T	T	T	T	T	T	T	T	
	200	25...150	T	T	T	T	T	T	T	T	T	T	T	T	
MC2-VE	100	50...150	T	T	T	T	T	T	T	T	T	T	T	T	
	160	50...150	T	T	T	T	T	T	T	T	T	T	T	T	
	250	50...150	T	T	T	T	T	T	T	T	T	T	T	T	
MC3-VE(AE)	250	50...150	T	T	T	T	T	T	T	T	T	T	T	T	
	400	50...150	T	T	T	T	T	T	T	T	T	T	T	T	
	630	50...150	T	T	T	T	T	T	T	T	T	T	T	T	
MC4-VE(AE)	63	50(100)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	T(80)	T(80)	T(80)	
	800	50(100)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	T(80)	T(80)	T(80)	
	1000	50(100)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	T(80)	T(80)	T(80)	
	1250	50(100)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	T(80)	T(80)	T(80)	
	1600	50(100)	45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	T(80)	T(80)	T(80)	
			45	T(64)	T(80)	45	T(64)	T(80)	45	T(64)	T(80)	T(80)	T(80)	T(80)	

Notes: T: Total discrimination

LINE PROTECTION, BACKUP PROTECTION

MC1, MC2, MC3, BM

Protection of PVC-insulated cables against thermal overload in the event of short-circuit

VDE 0100 Part 430 specifies that all cables and lines must be protected in the event of a circuit overload or short-circuit.

Overload protection is realised with MC circuit breakers using the adjustable, current-dependent, time-delayed

overload release.

Protection in the event of a short-circuit is provided using the adjustable instantaneous releases which open the main contact in less than 25 ms.

The low total disconnecting time restricts

the temperature rise of the cable to a minimum.

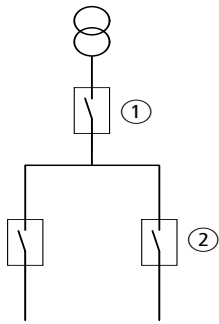
The table indicates the minimum conductor cross-section reliably protected by circuit breakers during a short-circuit.

(Operating voltage $U_N = 415\text{ V}$)

	Minimum protected cross-section mm ² Cu
MC1.{-4}...20	6
MC1.{-4}...25 – 160	10
MC2.{-4}...20 – 250	10
MC3.{-4}...250 – 630	16
MC4.{-4}...630 – 1600	95

Back-up protection

between incoming circuit breaker MC(N)(H) and outgoing circuit breaker MC-B(N)(H)



Outgoing circuit breaker ②		Incoming circuit breaker ①											
		MC1 I _{bis} 160 A			MC2 I _{bis} 250 A			MC3 I _{bis} 630 A					
	I _{cu(415 V)}	I _n	I _{cu(415 V)}	I _{cu(415 V)}	I _{cu(415 V)}	I _{cu(415 V)}	I _{cu(415 V)}	I _{cu(415 V)}	I _{cu(415 V)}	I _{cu(415 V)}	I _{cu(415 V)}	I _{cu(415 V)}	I _{cu(415 V)}
MC1B 25 kA	up to 160 A	25	36	50	100	25	36	50	100	50	100	50	100
MC1N 50 kA	up to 160 A	–	–	50	100	–	–	–	100	50	100	–	–
MC1H 100 kA	up to 160 A	–	–	–	100	–	–	–	100	–	–	–	–
MC2B 25 kA	up to 250 A	25	36	50	100	25	36	50	150	50	150	50	150
MC2N 50 kA	up to 250 A	–	–	50	100	–	–	50	150	50	150	–	–
MC2H 150 kA	up to 250 A	–	–	–	–	–	–	–	150	–	–	–	–
MC3N 50 kA	up to 630 A	–	–	–	–	–	–	–	–	–	–	50	150
MC3H 150 kA	up to 630 A	–	–	–	–	–	–	–	–	–	–	–	150

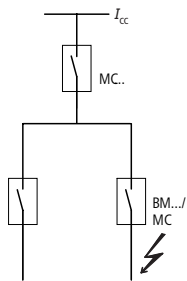
Where the prospective fault current at the point of installation of circuit breakers is very high, the standard approach is to use MC.N(H) high-performance circuit breakers. An attractively priced alternative is to fit a current-limiting high-performance circuit-breaker MC.N(H) at the point in the network upstream of standard circuit breakers

MC.B(C)(N) if the switching capacity of the MC.B(C)(N) is not sufficient at this point in the network.

The table indicates which current-limiting circuit breaker MC.B(C)(N) in combination with MC.B(C)(N) can provide reliable protection at network locations with high short-circuit capacities.

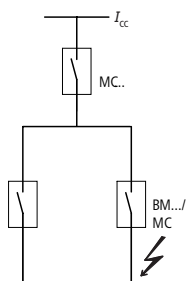
The discrimination limit is determined by the response value of the non-delayed short-circuit release in the incoming circuit breaker. This is sufficient for many applications.

between incoming circuit breaker MC1.A and outgoing circuit breaker BM-B(C)



Outgoing circuit breaker	Incoming circuit breaker MC2(B)-A	MC1(N)(H)-A
BM-B(C).		
0.5 – 16	25 kA	30 kA
20 – 40	20 kA	20 kA
50, 63	15 kA	15 kA

between incoming circuit breaker MC2A... and outgoing circuit breaker BM-B(C)

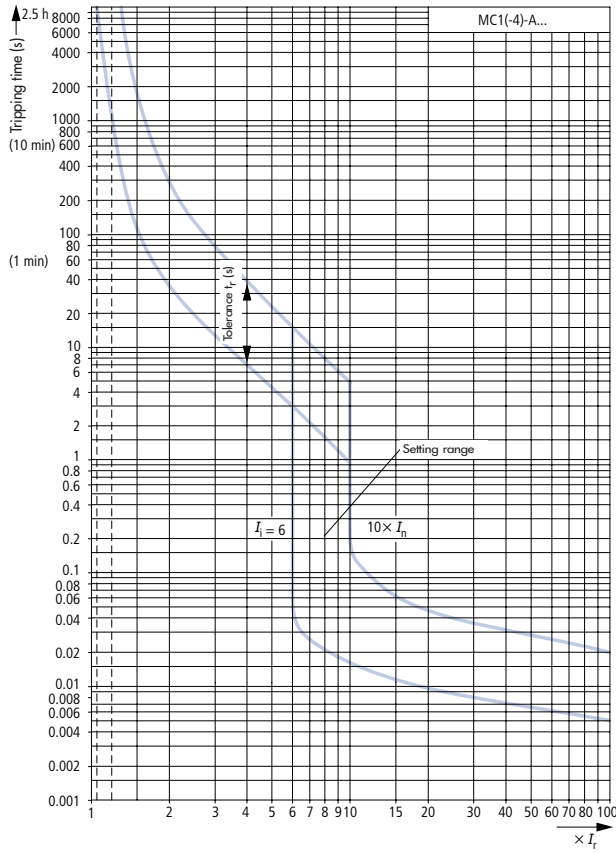


Outgoing circuit breaker	Incoming circuit breaker MC2B-A	MC2(N)(H)-A
BM-B(C).		
0.5 – 10	25 kA	50 kA
13 – 32	25 kA	30 kA
40 – 63	20 kA	20 kA

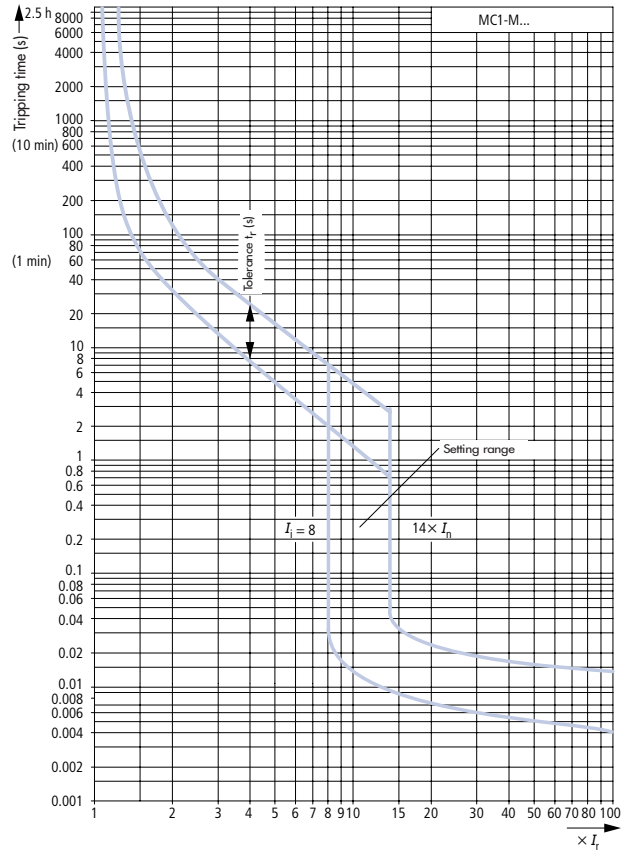
TRIPPING CHARACTERISTICS: FRAME SIZE 1, 2

MC1

System and line protection

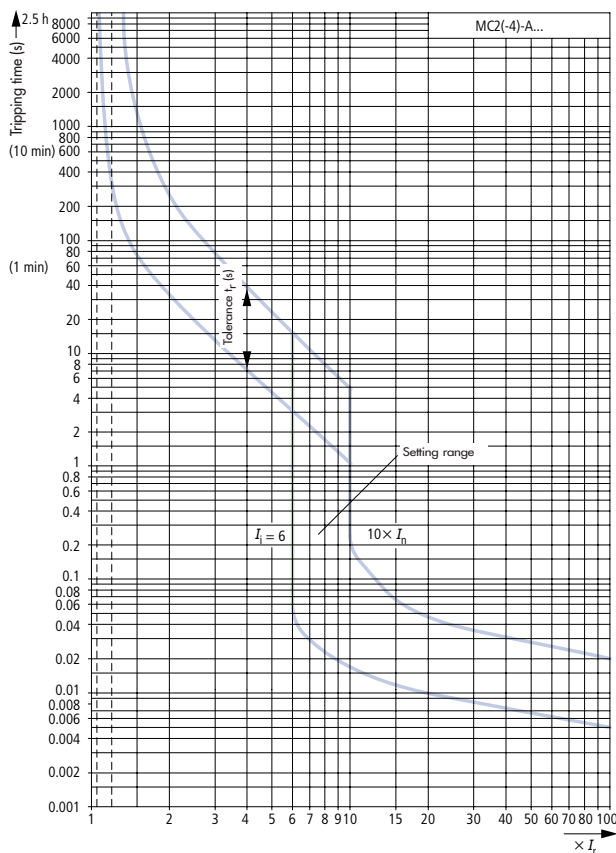


Motor contactor

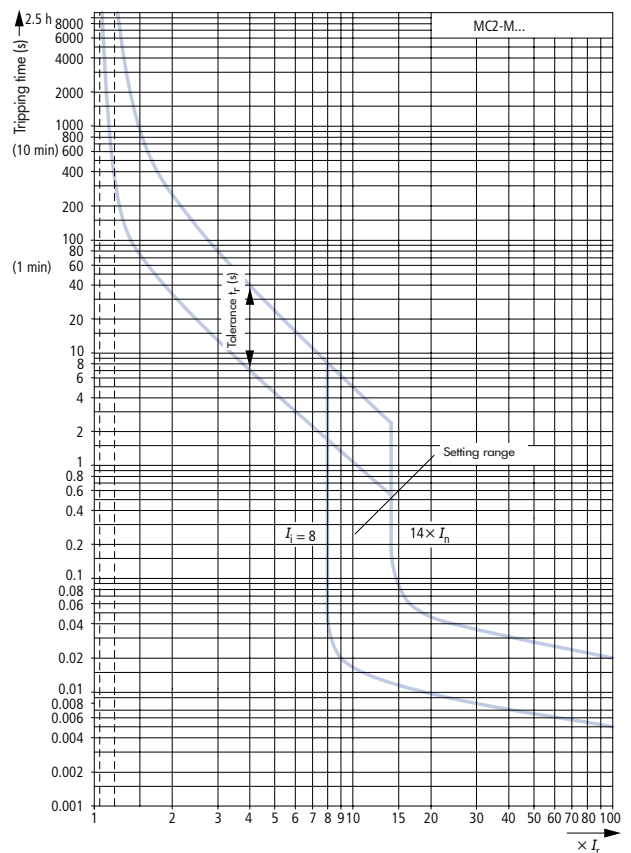


MC2

System and line protection



Motor contactor

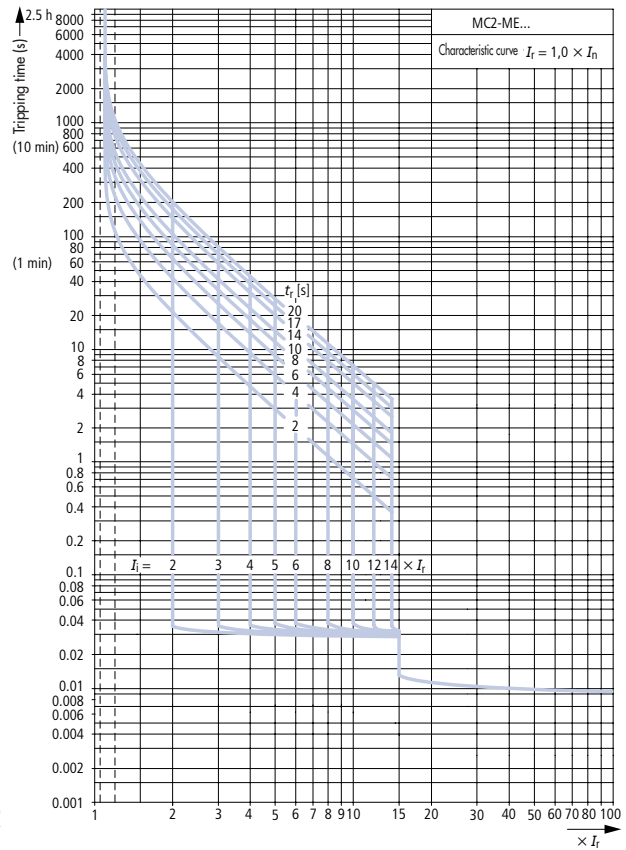
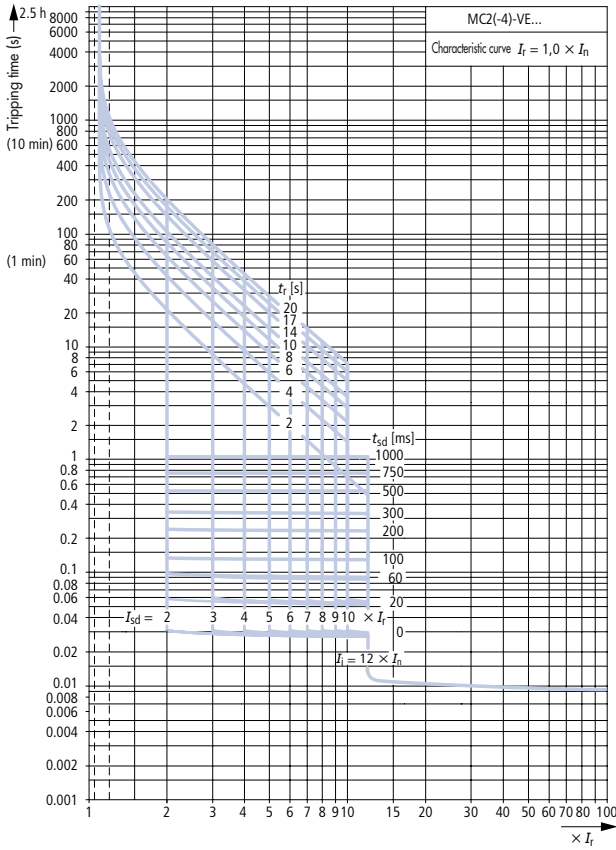


TRIPPING CHARACTERISTICS: FRAME SIZE 2, 3

MC2

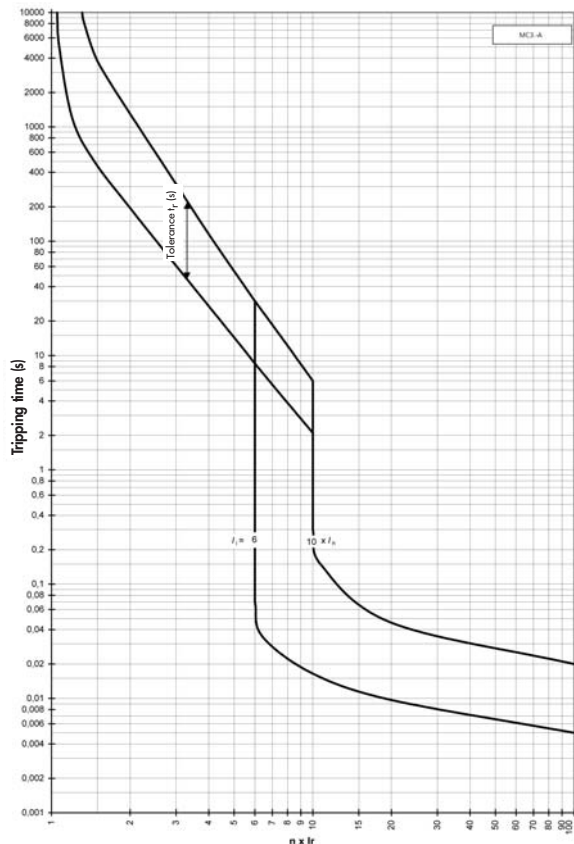
System and line protection, selective and generator protection

Motor contactor



MC3

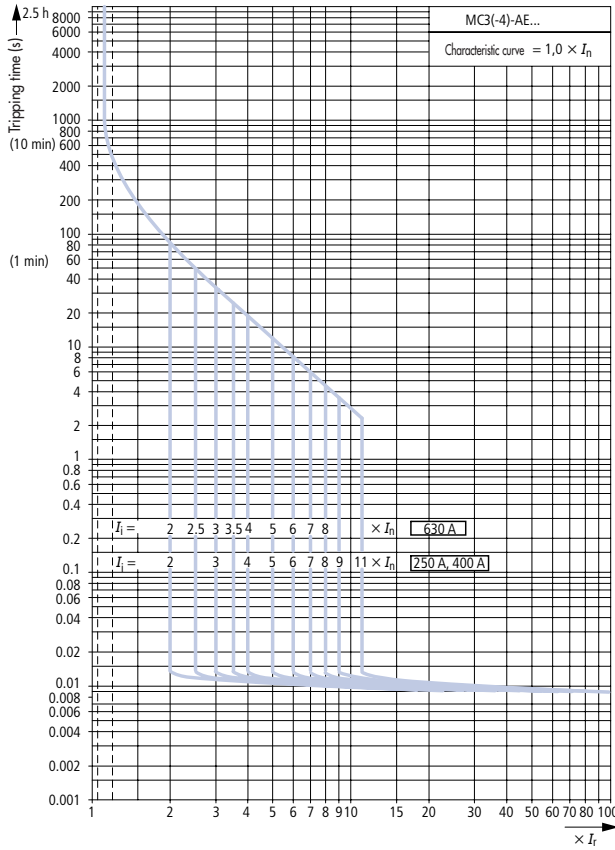
Tripping characteristic curve



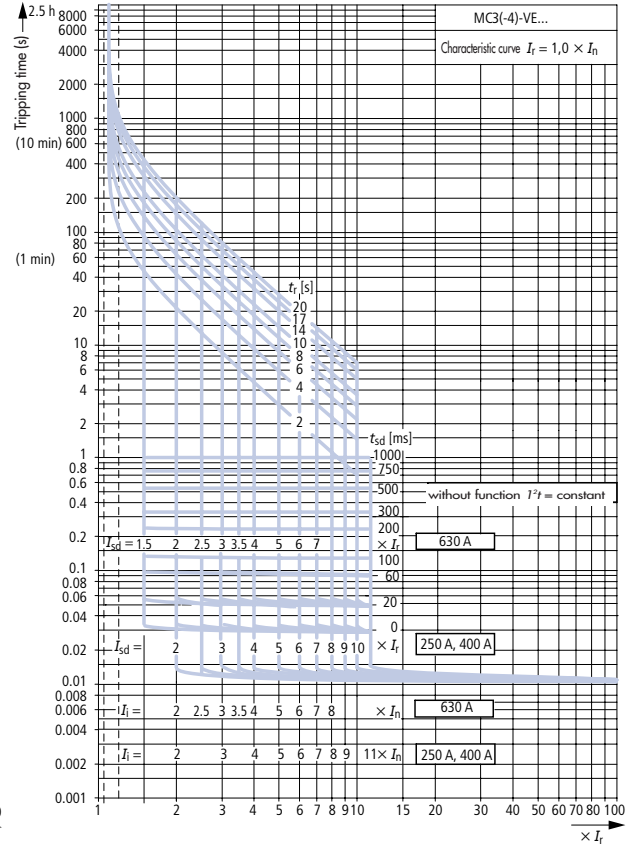
TRIPPING CHARACTERISTICS: FRAME SIZE 3

MC3

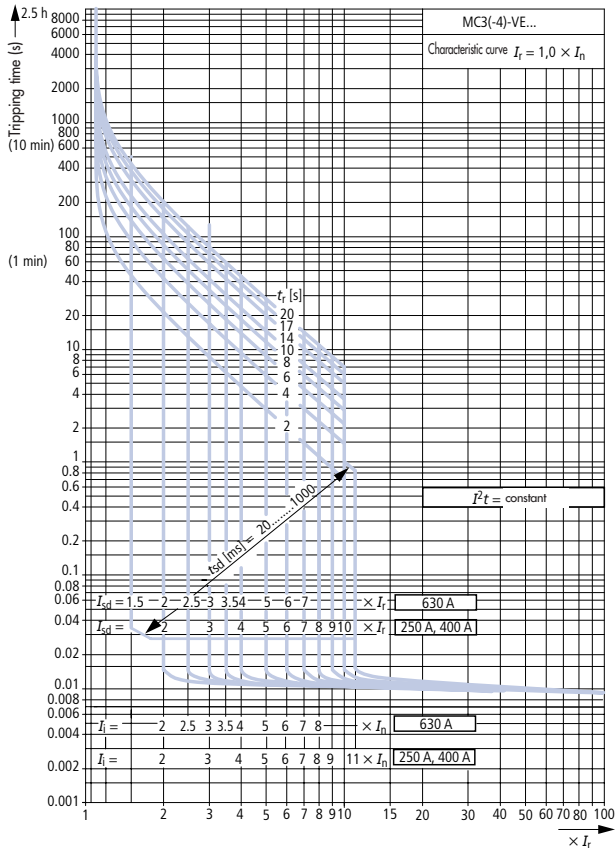
System and line protection



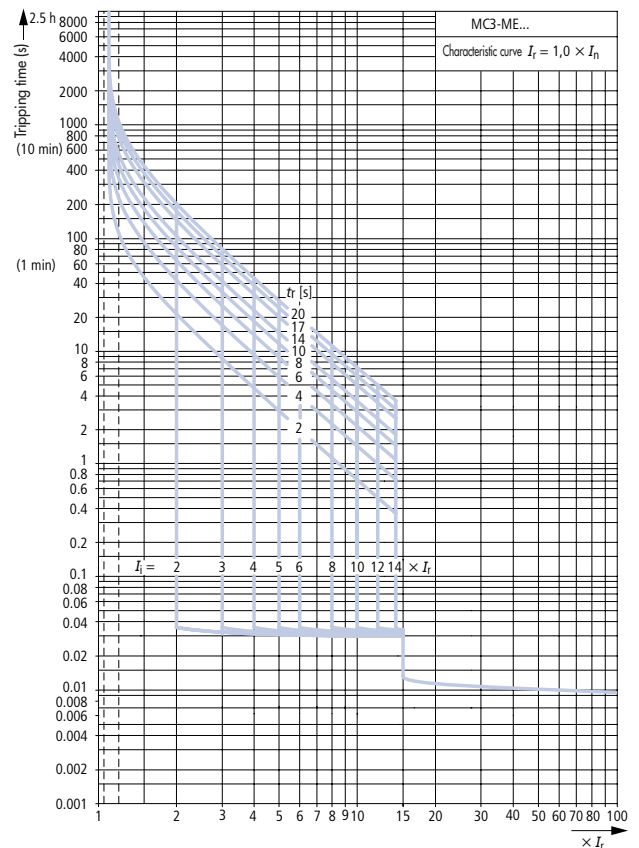
System and line protection, selective and generator protection



System and line protection, selective and generator protection



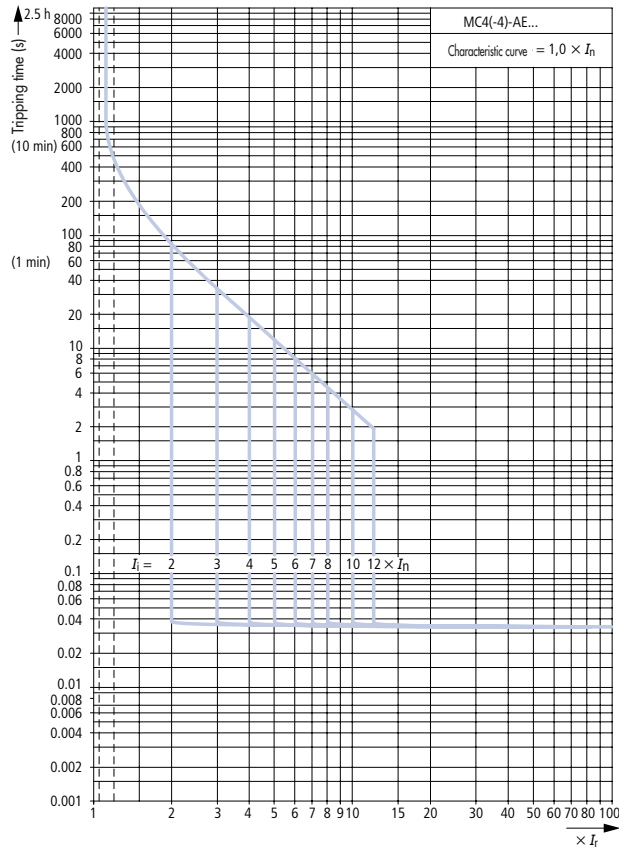
Motor contactor



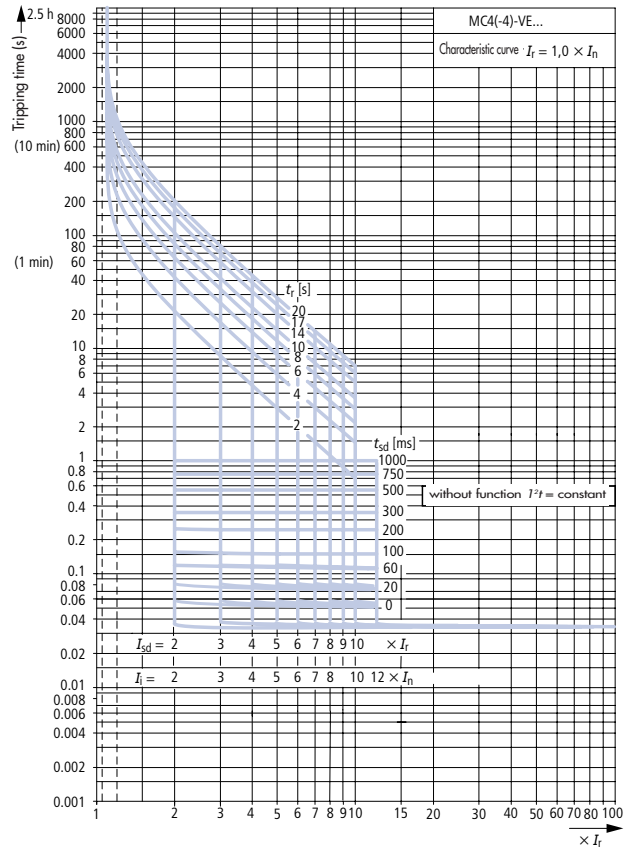
TRIPPING CHARACTERISTICS: FRAME SIZE 4

MC4

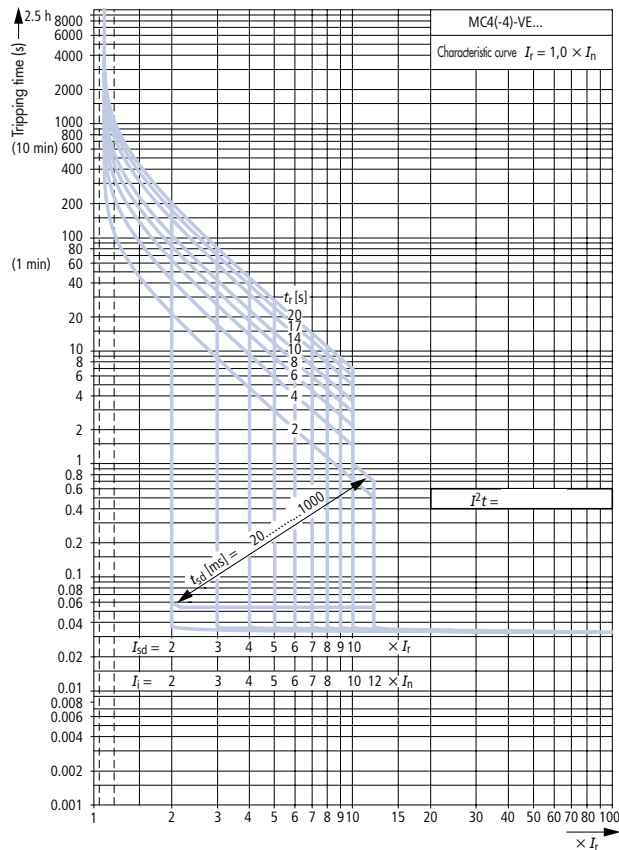
System and line protection



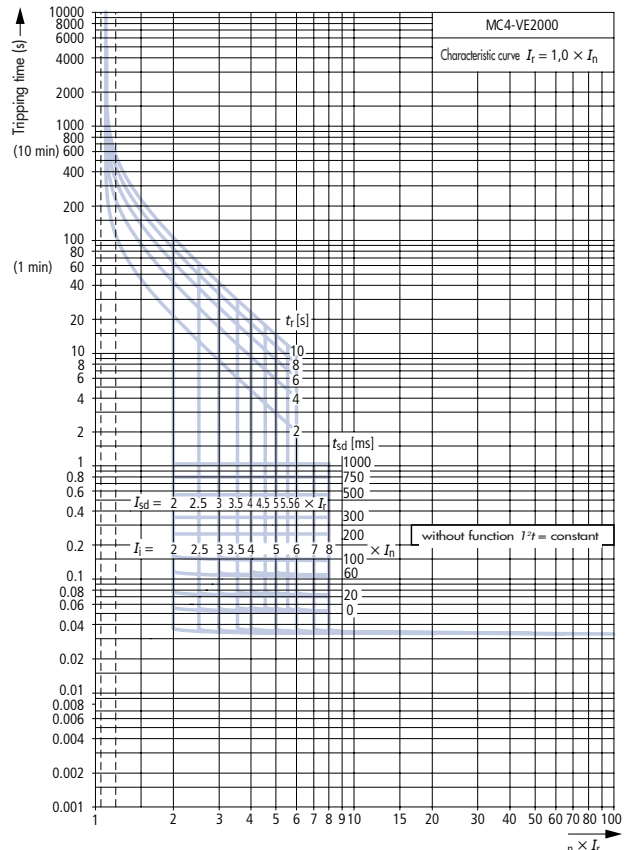
System and line protection, selective and generator protection



System and line protection, selective and generator protection



System and line protection, selective and generator protection

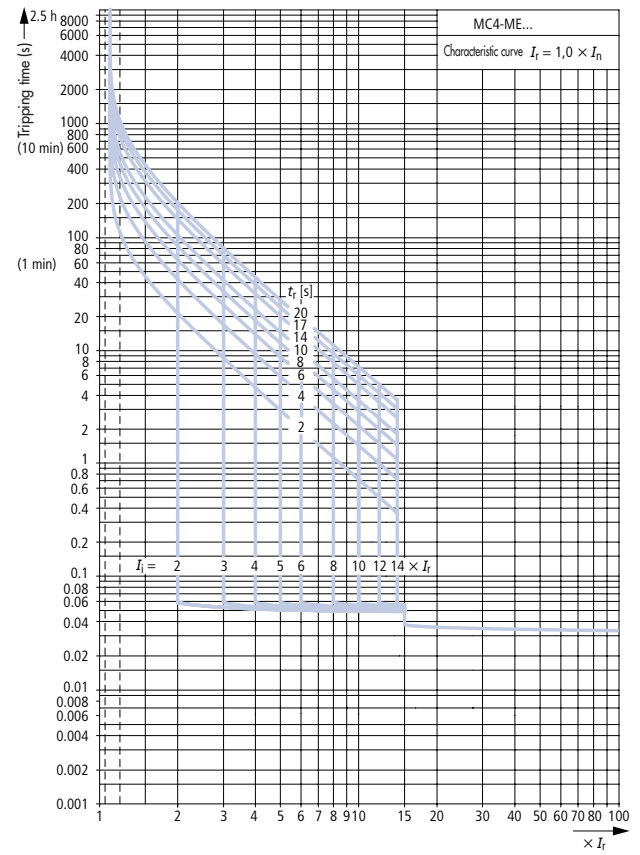
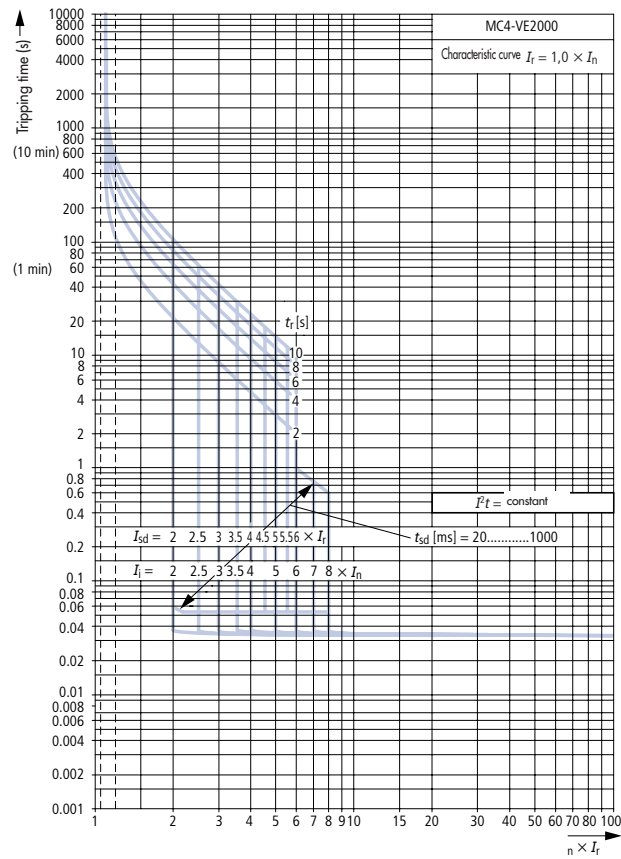


TRIPPING CHARACTERISTICS: FRAME SIZE 4

MC4

System and line protection, selective and generator protection

Motor contactor

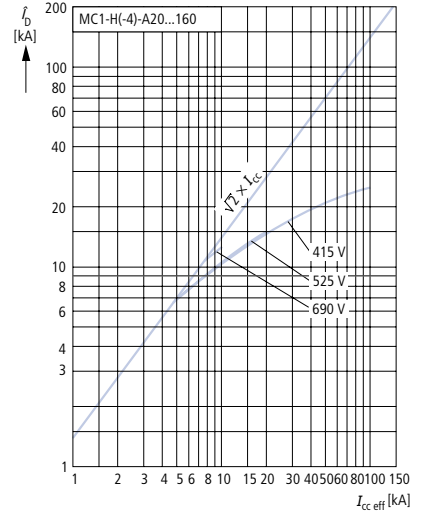
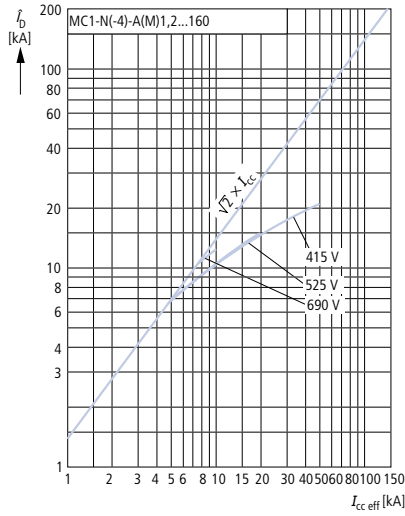
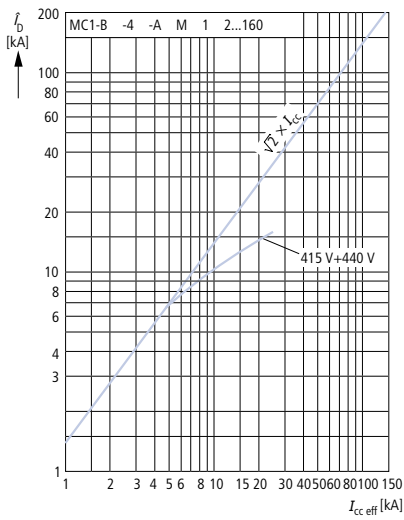


DISCRIMINATION AND CHARACTERISTICS

LET-THROUGH CURRENT: FRAME SIZE 1

MC1

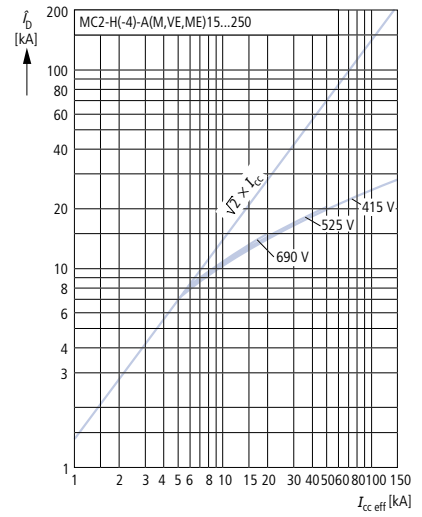
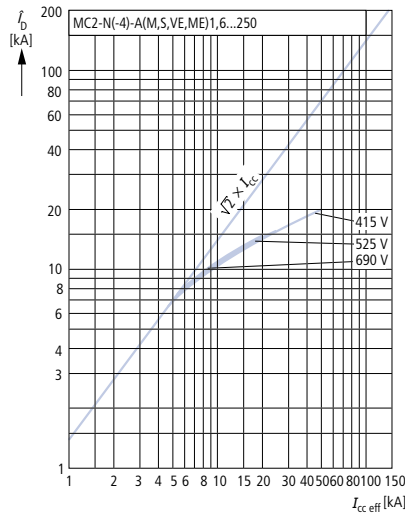
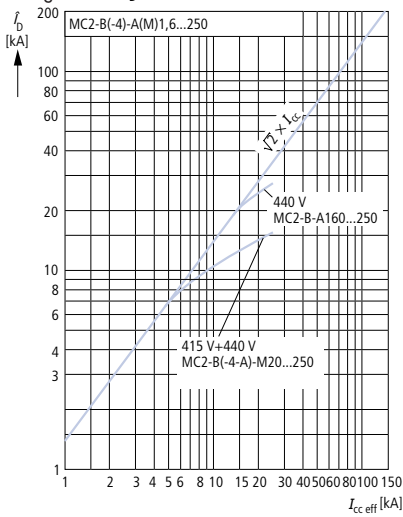
Let-through current \hat{i}_D



LET-THROUGH CURRENT: FRAME SIZE 2

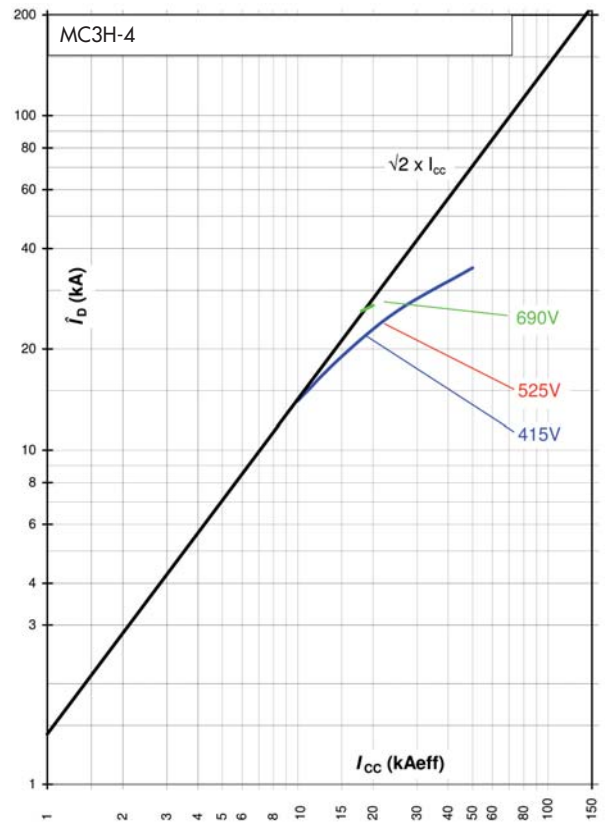
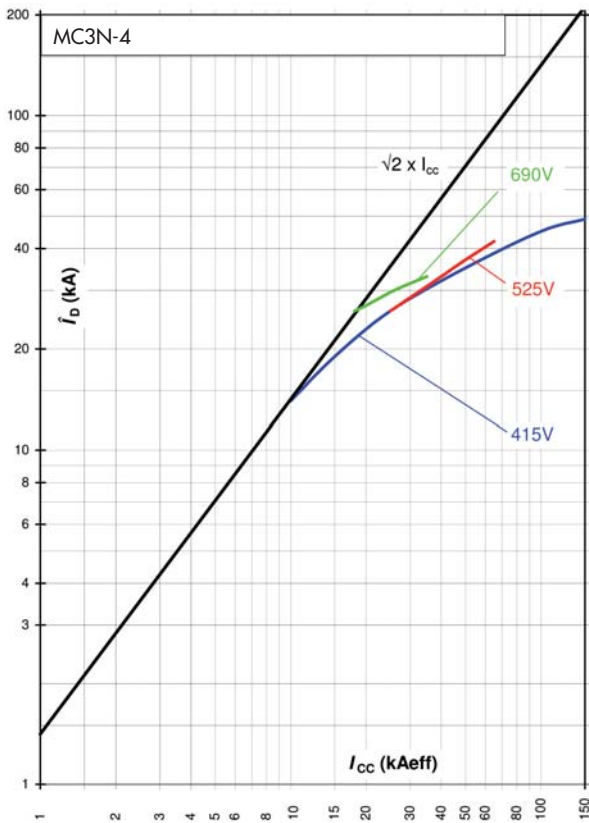
MC2

Let-through current \hat{i}_D

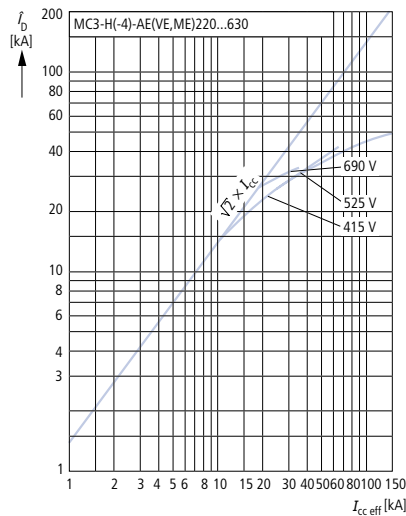
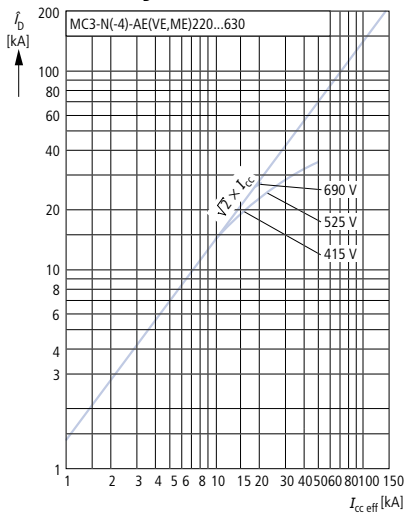


LET-THROUGH CURRENT: FRAME SIZE 3

MC3



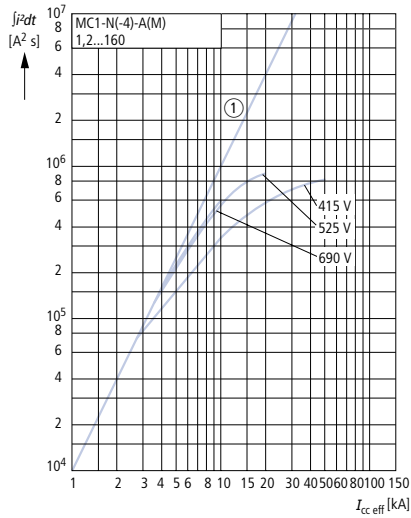
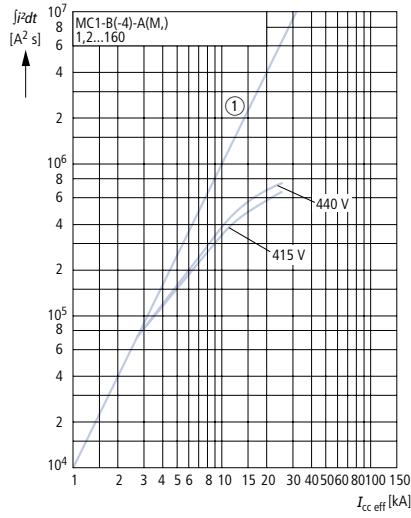
Let-through current i_D



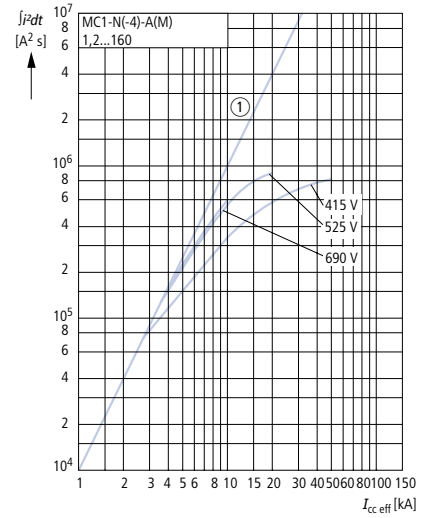
LET-THROUGH ENERGY: FRAME SIZE 1

MC1

Let-through energy I^2t



① 1 Half wave

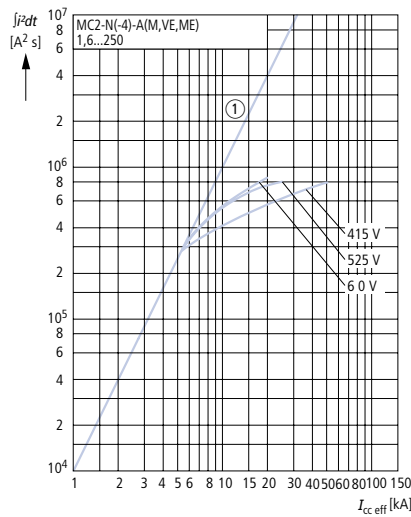
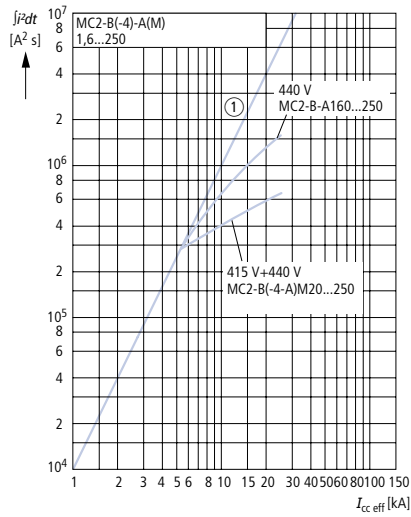


① 1 Half wave

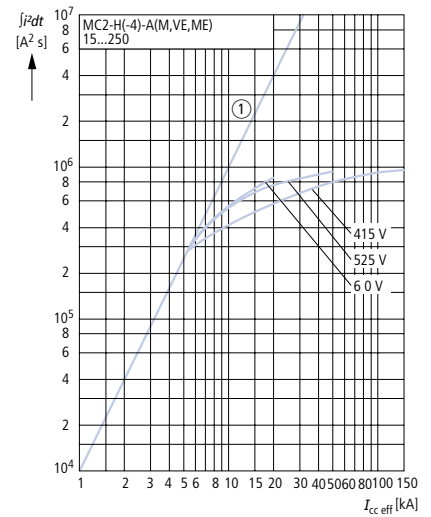
LET-THROUGH ENERGY: FRAME SIZE 2

MC2

Let-through energy I^2t

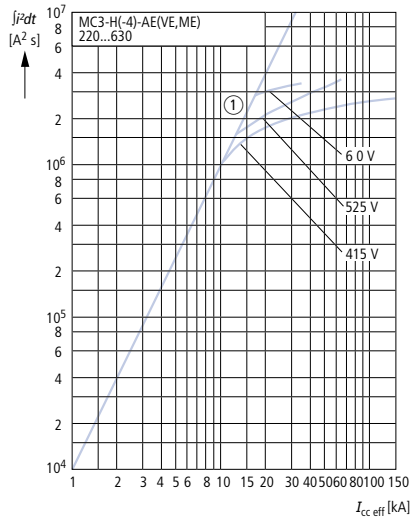
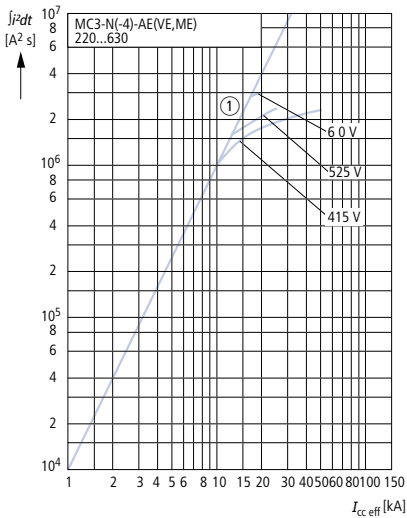
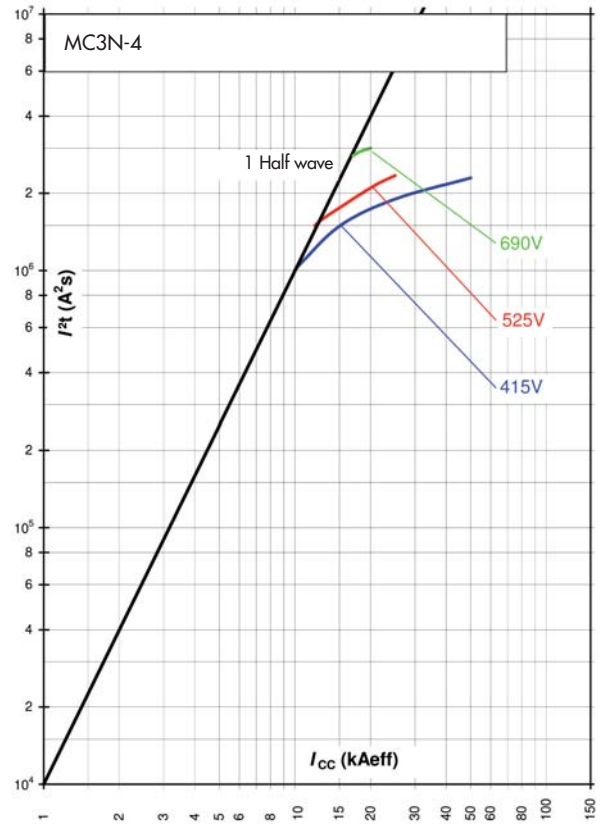
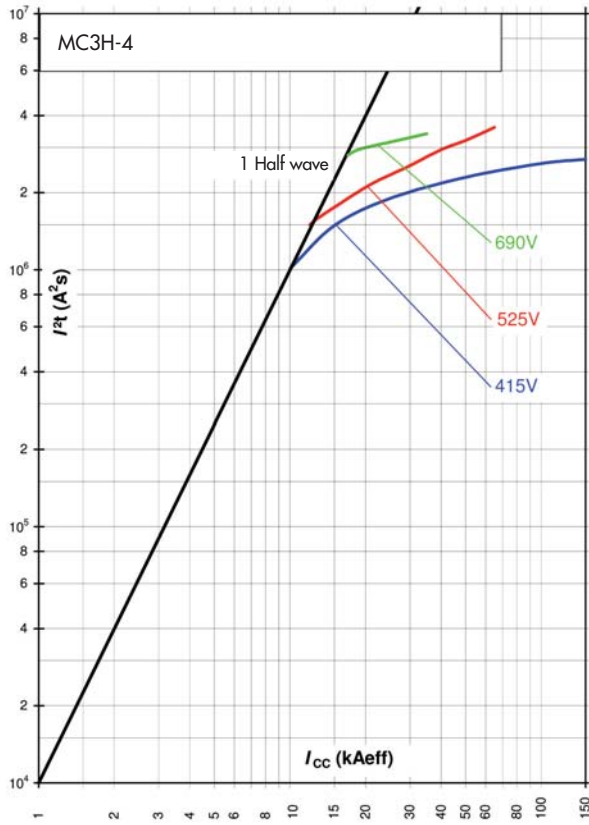


① 1 Half wave



LET-THROUGH ENERGY: FRAME SIZE 3

MC3



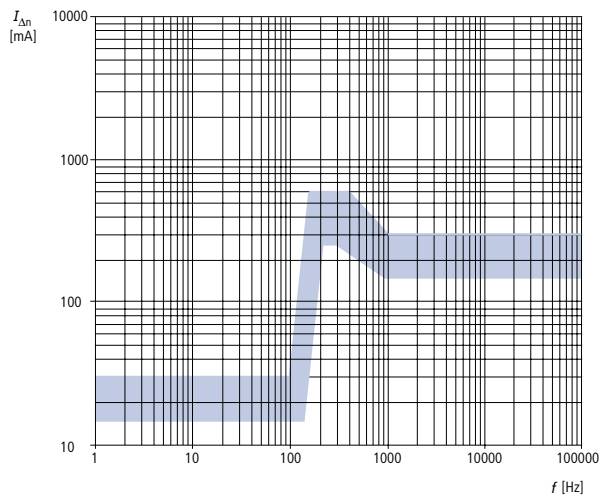
RESIDUAL-CURRENT RELEASE FREQUENCY RESPONSE: FRAME SIZE 2

MC2-4-XFIA

Frequency response

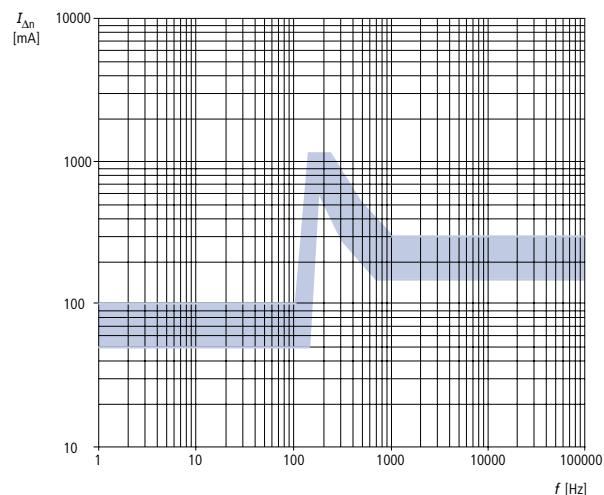
MC2-4-XFIA30

30 mA



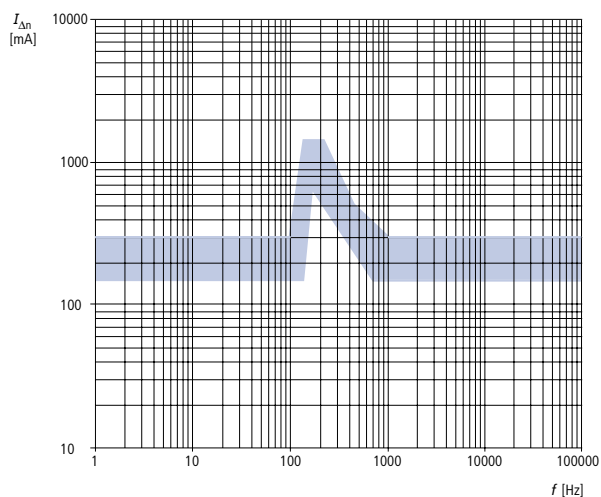
MC2-4-XFIA

100 mA

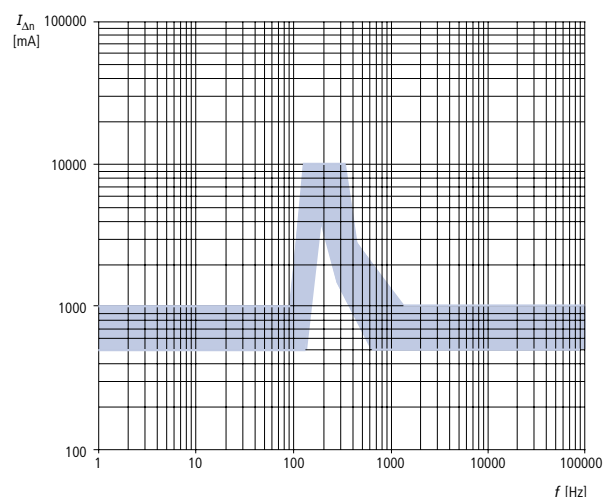


MC2-4-XFIA

300 mA



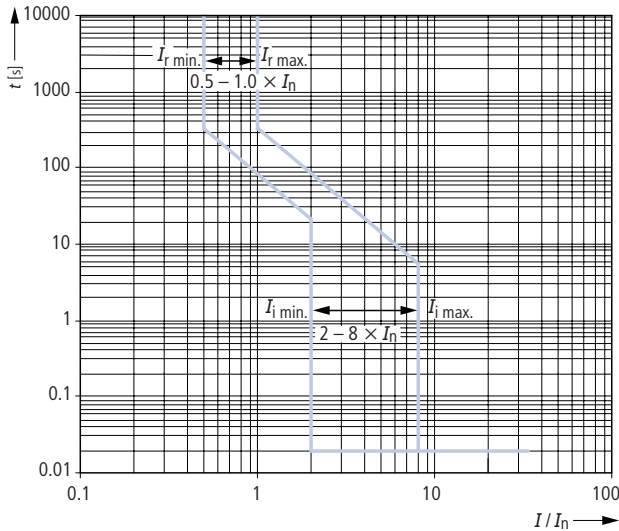
1000 mA



MO WITH ETU15, 25

TRIPPING CHARACTERISTICS FOR MO SYSTEM PROTECTION WITH ETU15

L-, I release



The following characteristic curves each show the largest and smallest setting value in the respective protection range. To obtain a complete release-characteristic, combine the relevant sections of the characteristic curve.

The characteristics show the behaviour of the overcurrent release when activated by a current which was already present before the trigger. If the overcurrent release occurs immediately after the switch-on meaning that the overcurrent release remains unreleased, the opening time will increase up to 15ms depending on the size of the overcurrent. For determining total disconnecting times of the CBs, around 15ms should be added to the opening times as displayed to account for the arcing duration.

The displayed characteristic curves apply for ambient operating temperature at the switch of $-5 \dots +55 \text{ }^\circ\text{C}$. The release can be operated at temperatures between $-20 \dots +70 \text{ }^\circ\text{C}$ (with LCD display up to $55 \text{ }^\circ\text{C}$). An extended tolerance range can be used at these temperatures.

Tolerances for setting currents

L:	Release between 1.05 and 1.2 x I
S:	-0 % +20 %
I:	-0 % +20 %
G:	-0 % +20 %

Tolerances for the tripping times

L:	-20% +0 %
S:	-0 ms +60 ms
I:	< 50 ms
G:	-0 ms +60 ms

TRIPPING CHARACTERISTICS FOR MO SELECTIVE PROTECTION WITH ETU15

L-, S-, I release

N release with option + MO-XT

G release with option + MO-XT

Earth fault release

¹⁾ MO1-...: 100 - 1200 A

MO2-...: 100 - 1200 A

MO3-...: 400 - 1200 A

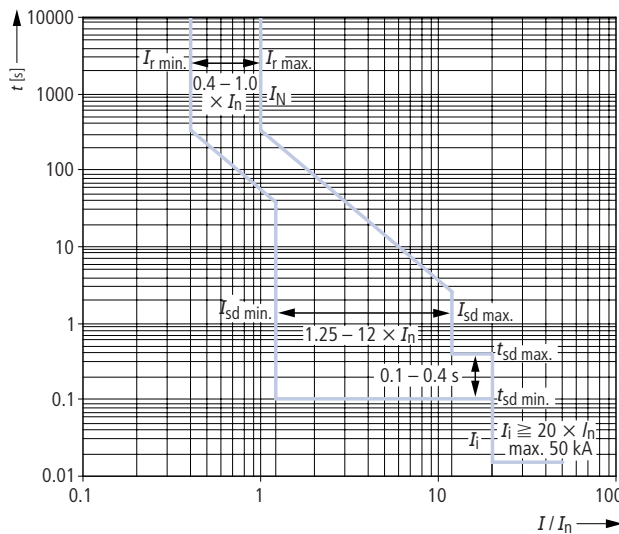
L = Current-dependent delayed overload release

N/O = Short time-delayed short-circuit release

I = Non-delayed short-circuit release

N = Neutral conductor overload release

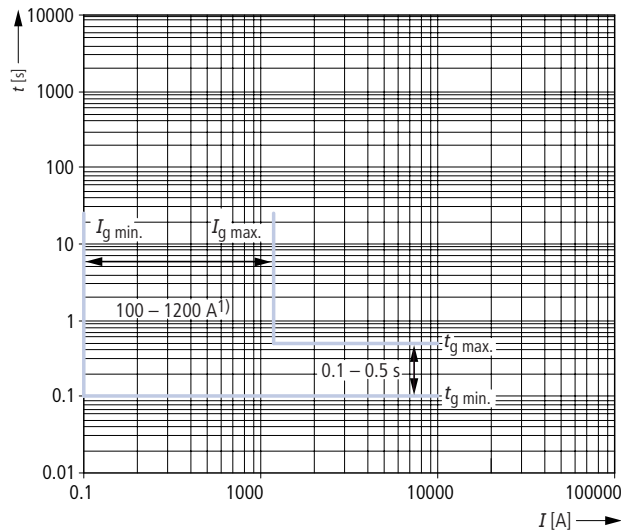
G = Earth fault release



MO WITH ETU25, 45, 76

MO EARTH FAULT RELEASE MO WITH ETU25

G release with option



¹⁾ MO1-...: 100 - 1200 A
MO2-...: 100 - 1200 A
MO3-...: 400 - 1200 A

The following characteristic curves each show the largest and smallest setting value in the respective protection range. To obtain a complete release-characteristic, combine the relevant sections of the characteristic curve.

The characteristics show the behaviour of the overcurrent release when activated by a current which was already present before the trigger. If the overcurrent release occurs immediately after the switch-on meaning that the overcurrent release remains unreleased, the opening time will increase up to 15ms depending on the size of the overcurrent. For determining total disconnecting times of the CBs, around 15ms should be added to the opening times as displayed to account for the arcing duration.

The displayed characteristic curves apply for ambient operating temperature at the switch of $-5 \dots +55 \text{ }^\circ\text{C}$. The release can be operated at temperatures between $-20 \dots +70 \text{ }^\circ\text{C}$ (with LCD display up to $55 \text{ }^\circ\text{C}$). An extended tolerance range can be used at these temperatures.

Tolerances for setting currents

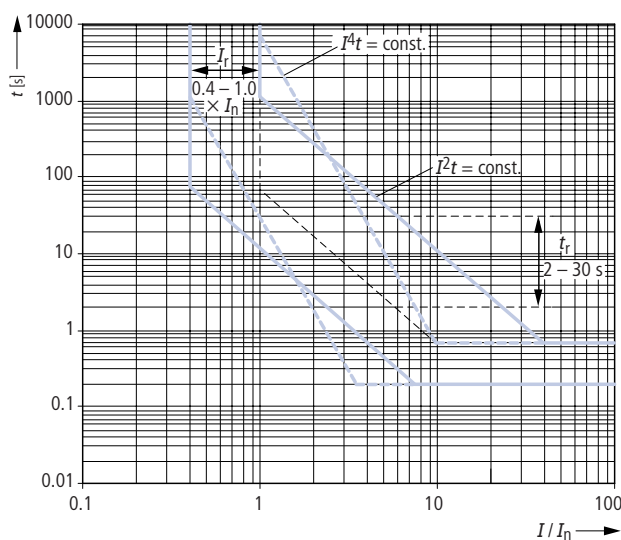
L:	Release between 1.05 and 1.2 x I
S:	-0 % +20 %
I:	-0 % +20 %
G:	-0 % +20 %

Tolerances for the tripping times

L:	-20% +0 %
S:	-0 ms +60 ms
I:	< 50 ms
G:	-0 ms +60 ms

TRIPPING CHARACTERISTICS FOR MO UNIVERSAL PROTECTION WITH ETU45, 76

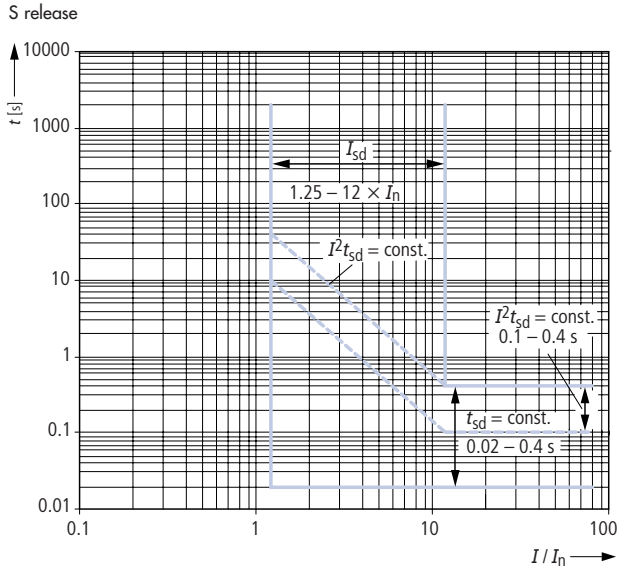
L release



- L = Current-dependent delayed overload release
- N/O = Short time-delayed short-circuit release
- I = Non-delayed short-circuit release
- N = Neutral conductor overload release
- G = Earth fault release

MO WITH ETU45, 76

TRIPPING CHARACTERISTICS FOR MO UNIVERSAL PROTECTION WITH ETU45



The characteristic curves apply for a circuit breaker MO2M..., 440 V, with earth-fault protection module

The following characteristic curves each show the largest and smallest setting value in the respective protection range. To obtain a complete release-characteristic, combine the relevant sections of the characteristic curve.

The characteristics show the behaviour of the overcurrent release when activated by a current which was already present before the trigger. If the overcurrent release occurs immediately after the switch-on meaning that the overcurrent release remains unreleased, the opening time will increase up to 15ms depending on the size of the overcurrent. For determining total disconnecting times of the CBs, around 15ms should be added to the opening times as displayed to account for the arcing duration.

The displayed characteristic curves apply for ambient operating temperature at the switch of $-5 \dots +55 \text{ }^\circ\text{C}$. The release can be operated at temperatures between $-20 \dots +70 \text{ }^\circ\text{C}$ (with LCD display up to $55 \text{ }^\circ\text{C}$). An extended tolerance range can be used at these temperatures.

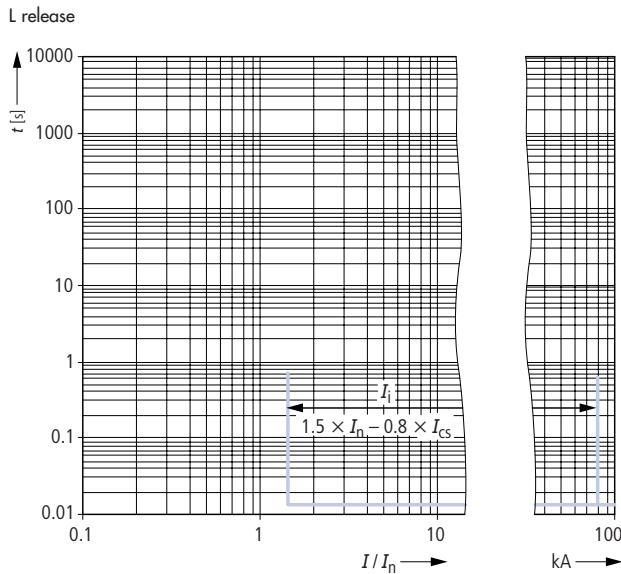
Tolerances for setting currents

L:	Release between 1.05 and $1.2 \times I$
S:	-0 % +20 %
I:	-0 % +20 %
G:	-0 % +20 %

Tolerances for the tripping times

L:	-20% +0 %
S:	-0 ms +60 ms
I:	< 50 ms
G:	-0 ms +60 ms

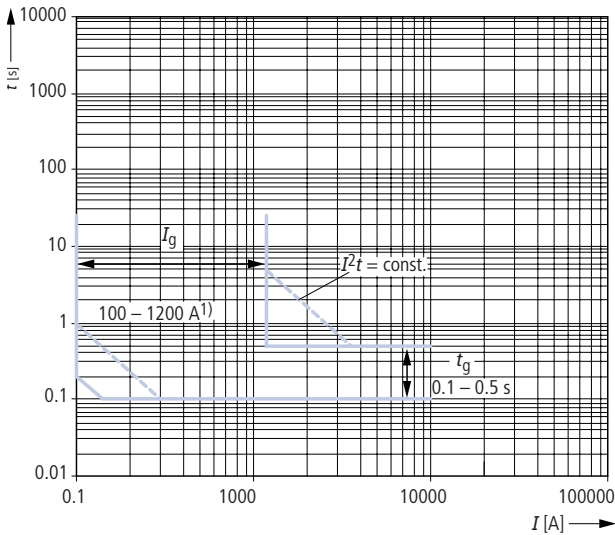
TRIPPING CHARACTERISTICS FOR MO UNIVERSAL PROTECTION WITH ETU45, 76



MO WITH ETU76

MO EARTH FAULT RELEASE MO WITH ETU76

G release with option



¹⁾ MO1-...: 100 – 1200 A
MO2-...: 100 – 1200 A
MO3-...: 400 – 1200 A

The characteristic curves apply for a circuit breaker MO2M-..., 440 V, with earth-fault protection module

The following characteristic curves each show the largest and smallest setting value in the respective protection range. To obtain a complete release-characteristic, combine the relevant sections of the characteristic curve.

The characteristics show the behaviour of the overcurrent release when activated by a current which was already present before the trigger. If the overcurrent release occurs immediately after the switch-on meaning that the overcurrent release remains unreleased, the opening time will increase up to 15ms depending on the size of the overcurrent. For determining total disconnecting times of the CBs, around 15ms should be added to the opening times as displayed to account for the arcing duration.

The displayed characteristic curves apply for ambient operating temperature at the switch of $-5 \dots +55 \text{ }^\circ\text{C}$. The release can be operated at temperatures between $-20 \dots +70 \text{ }^\circ\text{C}$ (with LCD display up to $55 \text{ }^\circ\text{C}$). An extended tolerance range applies at these temperatures.

Tolerances for setting currents

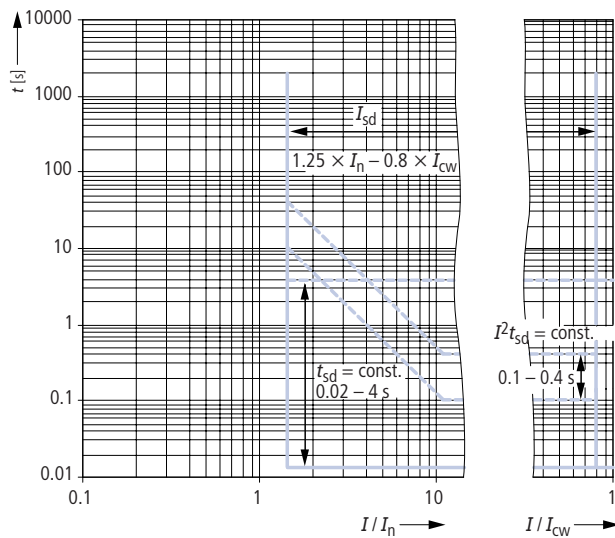
L:	Release between 1.05 and 1.2 x I.
S:	-0 % +20 %
I:	-0 % +20 %
G:	-0 % +20 %

Tolerances for the tripping times

L:	-20% +0 %
S:	-0 ms +60 ms
I:	< 50 ms
G:	-0 ms +60 ms

DIGITAL TRIPPING CHARACTERISTIC MO WITH ETU76

S release



- L = Current-dependent delayed overload release
- N/O= Short time-delayed short-circuit release
- I = Non-delayed short-circuit release
- N = Neutral conductor overload release
- G = Earth fault release

The characteristic curves apply for a circuit breaker MO2M-..., 440 V, with earth-fault protection module

L-, I release see universal release



"The essence of being is number."

Pythagoras

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MC1B-A160	MC116131	8	MC1N-A40	MC140231	8	MC2/3-XU24AC	MC299491	33,50
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MC1B-A25	MC125131	8	MC1N-A63	MC163231	8	MC2/3-XU380-440AC	MC299501	33,50
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MC1B-A80	MC180131	8	MC1N-M63	MC163236	10	MC2-250-XKC	MC292244	38
MC1B-M100	MC110136	10	MC1N-M80	MC180236	10	MC2-4-160-XKC	MC296755	38
MC1B-M40	MC140136	10	MC1-N-XFI300R	MC194604	12	MC2-4-250-XKC	MC296756	38
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MC2-4-XIPK	MC296744	40	MC2N-4-A250	MC225241	25	MC3/4-XMVR	MC394546	53,71
MC2-4-XKA	MC291458	38	MC2N-4-A300	MC230241	25	MC3/4-XMVRL	MC394551	53,71
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MC2-4-XKS	MC296750	38	MC2N-4-VE160	MC216243	27	MC3/4-XV4	MC391234	54,73
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MO216348	MO2N-4-1600	173	MO225347	MO2N-4-2500	172	MO800B20		183
MO220231	MO2B-2000	161	MO225348	MO2N-4-2500	173	MO800B25		183
MO220232	MO2B-2000	160	MO232331	MO2N-3200	161	MO800B32		183
MO220233	MO2B-2000	162	MO232332	MO2N-3200	160	MO800B40		183
MO220234	MO2B-2000	163	MO232333	MO2N-3200	162	MO800B50		183
MO220235	MO2B-2000	170	MO232334	MO2N-3200	163	MO800B63		183
MO220236	MO2B-2000	171	MO232335	MO2N-3200	170	MO800C01		188
MO220237	MO2B-2000	172	MO232336	MO2N-3200	171	MO800C11		188
MO220238	MO2B-2000	173	MO232337	MO2N-3200	172	MO800C12		188
MO220241	MO2B-4-2000	161	MO232338	MO2N-3200	173	MO800C20		188
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MO220338	MO2N-2000	173	MO340437	MO3H-4000	175	MO800R60		186
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MO220343	MO2N-4-2000	162	MO340442	MO3H-4-4000	164	MO800R81		187
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MO225231	MO2B-2500	161	MO340448	MO3H-4-4000	175	MO800S08		186
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MO225247	MO2B-4-2500	172	MO363436	MO3H-6300	174	MO814R10		193
MO225248	MO2B-4-2500	173	MO363437	MO3H-6300	175	MO814R21		192
MO225331	MO2N-2500	161	MO363441	MO3H-4-6300	164	MO820F23		185
MO225332	MO2N-2500	160	MO363442	MO3H-4-6300	164	MO820R20		193
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MO225334	MO2N-2500	163	MO363446	MO3H-4-6300	174	MO824R10		193
MO225335	MO2N-2500	170	MO363447	MO3H-4-6300	175	MO824R21		192
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MO900BA31		186	MO90AJ03		188	MO90BA85		187
MO90AA11		185	MO90AJ06		188	MO90BA86		187
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MO216348	MO2N-4-1600	173	MO225347	MO2N-4-2500	172	MO800B20		183
MO220231	MO2B-2000	161	MO225348	MO2N-4-2500	173	MO800B25		183
MO220232	MO2B-2000	160	MO232331	MO2N-3200	161	MO800B32		183
MO220233	MO2B-2000	162	MO232332	MO2N-3200	160	MO800B40		183
MO220234	MO2B-2000	163	MO232333	MO2N-3200	162	MO800B50		183
MO220235	MO2B-2000	170	MO232334	MO2N-3200	163	MO800B63		183
MO220236	MO2B-2000	171	MO232335	MO2N-3200	170	MO800C01		188
MO220237	MO2B-2000	172	MO232336	MO2N-3200	171	MO800C11		188
MO220238	MO2B-2000	173	MO232337	MO2N-3200	172	MO800C12		188
MO220241	MO2B-4-2000	161	MO232338	MO2N-3200	173	MO800C20		188
MO220242	MO2B-4-2000	160	MO232341	MO2N-4-3200	161	MO800C26		188
MO220243	MO2B-4-2000	162	MO232342	MO2N-4-3200	160	MO800C27		188
MO220244	MO2B-4-2000	163	MO232343	MO2N-4-3200	162	MO800F31		184
MO220245	MO2B-4-2000	170	MO232344	MO2N-4-3200	163	MO800K01		185
MO220246	MO2B-4-2000	171	MO232345	MO2N-4-3200	170	MO800K07		188
MO220247	MO2B-4-2000	172	MO232346	MO2N-4-3200	171	MO800K10		185
MO220248	MO2B-4-2000	173	MO232347	MO2N-4-3200	172	MO800K13		185
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MO220332	MO2N-2000	160	MO340431	MO3H-4000	164	MO800R16		188
MO220333	MO2N-2000	162	MO340432	MO3H-4000	164	MO800R30		187
MO220334	MO2N-2000	163	MO340433	MO3H-4000	165	MO800R50		187
MO220335	MO2N-2000	170	MO340434	MO3H-4000	165	MO800R55		187
MO220336	MO2N-2000	171	MO340435	MO3H-4000	174	MO800R56		187
MO220337	MO2N-2000	172	MO340436	MO3H-4000	174	MO800R57		187
MO220338	MO2N-2000	173	MO340437	MO3H-4000	175	MO800R60		186
MO220341	MO2N-4-2000	161	MO340438	MO3H-4000	175	MO800R61		186
MO220342	MO2N-4-2000	160	MO340441	MO3H-4-4000	164	MO800R68		186
MO220343	MO2N-4-2000	162	MO340442	MO3H-4-4000	164	MO800R81		187
MO220344	MO2N-4-2000	163	MO340443	MO3H-4-4000	165	MO800R85		187
MO220345	MO2N-4-2000	170	MO340444	MO3H-4-4000	165	MO800R86		187
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MO220347	MO2N-4-2000	172	MO340446	MO3H-4-4000	174	MO800S03		186
MO220348	MO2N-4-2000	173	MO340447	MO3H-4-4000	175	MO800S07		186
MO225231	MO2B-2500	161	MO340448	MO3H-4-4000	175	MO800S08		186
MO225232	MO2B-2500	160	MO350431	MO3H-5000	164	MO800S09		186
MO225233	MO2B-2500	162	MO350432	MO3H-5000	164	MO800S24		188
MO225234	MO2B-2500	163	MO350435	MO3H-5000	174	MO800S25		188
MO225235	MO2B-2500	170	MO350436	MO3H-5000	174	MO800S30		187
MO225236	MO2B-2500	171	MO350437	MO3H-5000	175	MO800S33		186
MO225237	MO2B-2500	172	MO350441	MO3H-4-5000	164	MO800S55		187
MO225238	MO2B-2500	173	MO350442	MO3H-4-5000	164	MO800S71		186
MO225241	MO2B-4-2500	161	MO350445	MO3H-4-5000	174	MO800S75		186
MO225242	MO2B-4-2500	160	MO350446	MO3H-4-5000	174	MO800S76		186
MO225243	MO2B-4-2500	162	MO350447	MO3H-4-5000	175	MO800T40		192
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MO225246	MO2B-4-2500	171	MO363435	MO3H-6300	174	MO810R21		192
MO225247	MO2B-4-2500	172	MO363436	MO3H-6300	174	MO814R10		193
MO225248	MO2B-4-2500	173	MO363437	MO3H-6300	175	MO814R21		192
MO225331	MO2N-2500	161	MO363441	MO3H-4-6300	164	MO820F23		185
MO225332	MO2N-2500	160	MO363442	MO3H-4-6300	164	MO820R20		193
MO225333	MO2N-2500	162	MO363445	MO3H-4-6300	174	MO820R21		192
MO225334	MO2N-2500	163	MO363446	MO3H-4-6300	174	MO824R10		193
MO225335	MO2N-2500	170	MO363447	MO3H-4-6300	175	MO824R21		192
MO225336	MO2N-2500	171	MO800B02		183	MO830F23		185
MO225337	MO2N-2500	172	MO800B03		183	MO830R20		193
MO225338	MO2N-2500	173	MO800B04		183	MO830R21		192
MO225341	MO2N-4-2500	161	MO800B05		183	MO834R10		193
MO225342	MO2N-4-2500	160	MO800B06		183	MO834R21		192
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MO2N-1600	MO216337	172	MO2B-2500	MO225232	160	MO2N-4-3200	MO232345	170
MO2N-1600	MO216338	173	MO2B-2500	MO225233	162	MO2N-4-3200	MO232346	171
MO2N-4-1600	MO216341	161	MO2B-2500	MO225234	163	MO2N-4-3200	MO232347	172
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MO2N-4-1600	MO216343	162	MO2B-2500	MO225236	171	MO3H-4000	MO340431	164
MO2N-4-1600	MO216344	163	MO2B-2500	MO225237	172	MO3H-4000	MO340432	164
MO2N-4-1600	MO216345	170	MO2B-2500	MO225238	173	MO3H-4000	MO340433	165
MO2N-4-1600	MO216346	171	MO2B-4-2500	MO225241	161	MO3H-4000	MO340434	165
MO2N-4-1600	MO216347	172	MO2B-4-2500	MO225242	160	MO3H-4000	MO340435	174
MO2N-4-1600	MO216348	173	MO2B-4-2500	MO225243	162	MO3H-4000	MO340436	174
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MO2B-2000	MO220232	160	MO2B-4-2500	MO225245	170	MO3H-4000	MO340438	175
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MO2B-2000	MO220234	163	MO2B-4-2500	MO225247	172	MO3H-4-4000	MO340442	164
MO2B-2000	MO220235	170	MO2B-4-2500	MO225248	173	MO3H-4-4000	MO340443	165
MO2B-2000	MO220236	171	MO2N-2500	MO225331	161	MO3H-4-4000	MO340444	165
MO2B-2000	MO220237	172	MO2N-2500	MO225332	160	MO3H-4-4000	MO340445	174
MO2B-2000	MO220238	173	MO2N-2500	MO225333	162	MO3H-4-4000	MO340446	174
MO2B-4-2000	MO220241	161	MO2N-2500	MO225334	163	MO3H-4-4000	MO340447	175
MO2B-4-2000	MO220242	160	MO2N-2500	MO225335	170	MO3H-4-4000	MO340448	175
MO2B-4-2000	MO220243	162	MO2N-2500	MO225336	171	MO3H-5000	MO350431	164
MO2B-4-2000	MO220244	163	MO2N-2500	MO225337	172	MO3H-5000	MO350432	164
MO2B-4-2000	MO220245	170	MO2N-2500	MO225338	173	MO3H-5000	MO350435	174
MO2B-4-2000	MO220246	171	MO2N-4-2500	MO225341	161	MO3H-5000	MO350436	174
MO2B-4-2000	MO220247	172	MO2N-4-2500	MO225342	160	MO3H-5000	MO350437	175
MO2B-4-2000	MO220248	173	MO2N-4-2500	MO225343	162	MO3H-4-5000	MO350441	164
MO2N-2000	MO220331	161	MO2N-4-2500	MO225344	163	MO3H-4-5000	MO350442	164
MO2N-2000	MO220332	160	MO2N-4-2500	MO225345	170	MO3H-4-5000	MO350445	174
MO2N-2000	MO220333	162	MO2N-4-2500	MO225346	171	MO3H-4-5000	MO350446	174
MO2N-2000	MO220334	163	MO2N-4-2500	MO225347	172	MO3H-4-5000	MO350447	175
MO2N-2000	MO220335	170	MO2N-4-2500	MO225348	173	MO3H-6300	MO363431	164
MO2N-2000	MO220336	171	MO2N-3200	MO232331	161	MO3H-6300	MO363432	164
MO2N-2000	MO220337	172	MO2N-3200	MO232332	160	MO3H-6300	MO363435	174
MO2N-2000	MO220338	173	MO2N-3200	MO232333	162	MO3H-6300	MO363436	174
MO2N-4-2000	MO220341	161	MO2N-3200	MO232334	163	MO3H-6300	MO363437	175
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MO2N-4-2000	MO220346	171	MO2N-4-3200	MO232341	161	MO3H-4-6300	MO363447	175
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MO800B03	MO90AA52	183	MO800R86	MO90BA86	187	MO89045D		180
MO800B04	MO90AA53	183	MO800S01	MO90BA36	186	MO89045G		180
MO800B05	MO90AA54	183	MO800S03	MO90BA38	186	MO890550		181
MO800B06	MO90AA55	183	MO800S07	MO90BA41	186	MO89055G		181
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MO800B12	MO90AA58	183	MO800S24	MO90BA72	188	MO890B00	MO90AD01	190
MO800B16	MO90AA61	183	MO800S25	MO90AJ06	188	MO890B00	MO90AD01	190
MO800B20	MO90AA62	183	MO800S30	MO90BB13	187	MO890C00	MO90AD02	190
MO800B25	MO90AA63	183	MO800S33	MO90BA71	186	MO890C00	MO90AD02	190
MO800B32	MO90AA64	183	MO800S55	MO90BB21	187	MO890D00	MO90AD03	190
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MO800B50	MO90AA66	183	MO800S75	MO90BA76	186	MO890E00	MO90AD04	190
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MO800C01	MO90AH07	188	MO800T40	MO90AP01	192	MO890F00	MO90AD05	190
MO800C11	MO90AJ02	188	MO810F23	MO90AA11	185	MO890F00	MO90AD05	190
MO800C12	MO90AJ03	188	MO810R20	MO90AS32	193	MO890G00	MO90AD06	190
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General Terms of Delivery

issued by the Austrian Electrical and Electronics Industry Association

1. Scope

1.1 These General Terms shall govern legal transactions between business enterprises, namely the delivery of commodities and, mutatis mutandis, the rendering of services. Software transactions are with precedence governed by the Software Conditions issued by the Austrian Electrical and Electronics Industry Association, assembly work by the Terms and Conditions for Assembly Work issued by the Austrian Power Current and Light Current Engineering Industry and/or (where applicable) the Terms and Conditions for the Assembly of Electrical Equipment used in Medicine issued by the Austrian Electrical and Electronics Industry (the current versions are available at www.feei.at).

1.2 Any departure from the terms and conditions mentioned in 1.1 above shall be valid only if expressly accepted in writing by Seller.

2. Submission of offers

2.1 Seller's offers shall be deemed offers without engagement.

2.2 Tender documents and project documentation must not be duplicated nor made available to third parties without the permission of Seller. They may be claimed back at any time and shall be returned to Seller immediately if the order is placed elsewhere.

3. Conclusion of contract

3.1 The contract shall be deemed concluded upon written confirmation by Seller of an order received or upon dispatch of a delivery.

3.2 Particulars appearing in catalog, folders etc. as well as any oral or written statements shall only be binding if Seller makes express reference to them in the confirmation of the order.

3.3 Subsequent amendments of or additions to the contract shall be subject to written confirmation.

4. Prices

4.1 Prices shall be quoted ex works or ex Seller's warehouse without VAT, packing and packaging, loading, disassembly, take-back and proper recycling and disposal of waste electrical and electronic equipment for commercial purposes as defined by the Ordinance Regulating the Handling of Waste Electrical Equipment. Buyer shall be liable for any and all charges, taxes or other duties levied in respect of delivery. If the terms of delivery include transport to a destination designated by Buyer, transport costs as well as the cost of any transport insurance desired by Buyer shall be borne by the latter. Delivery does not, however, include unloading and subsequent handling. Packaging materials will be taken back only by express agreement.

4.2 Seller reserves the right to modify prices if the order placed is not in accordance with the offer submitted.

4.3 Prices are based on costs obtaining at the time of the first quotation. In the event that the costs have increased by the time of delivery, Seller shall have the right to adjust prices accordingly.

4.4 In carrying out repair orders, Seller shall provide all services deemed expedient and shall charge Buyer for the same on the basis of the work input and/or expenditures required. The same holds for any services or additional services the expediency of which becomes apparent only as the repair order is executed. In such an event special notification of Buyer shall not be required.

4.5 Expenses for estimates of costs of repair and maintenance or for expert valuations shall be invoiced to Buyer.

5. Delivery

5.1 The period allowed for delivery shall commence at the latest of the following dates:

- a) the date of order confirmation by Seller;
- b) the date of fulfillment by Buyer of all the conditions, technical, commercial and other, for which he is responsible;
- c) the date of receipt by Seller of a deposit or security due before delivery of the goods in question.

5.2 Buyer shall obtain whatever licences or approvals may be required from authorities or third parties for the construction of plant and equipment. If the granting of such licences or approvals is delayed for any reason the delivery period shall be extended accordingly.

5.3 Seller may carry out, and charge Buyer for, partial or advance deliveries. If delivery on call is agreed upon, the commodity shall be deemed called off at the latest one year after the order was placed.

5.4 In case of unforeseeable circumstances or circumstances beyond the parties control, such as all cases of force majeure, which impede compliance with the agreed period of delivery, the latter shall be extended in any case for the

duration of such circumstances; these include in particular armed conflicts, official interventions and prohibitions, delays in transport or customs clearance, damages in transit, energy shortage and raw materials scarcity, labor disputes, and default on performance by a major component supplier who is difficult to replace. The aforesaid circumstances shall be deemed to prevail irrespective of whether they affect Seller or his subcontractor(s).

5.5 If a contractual penalty for default of delivery was agreed upon by contracting parties when the contract was concluded, it shall be executed as follows, and any deviations concerning individual items shall not affect the remaining provisions: Where delay in performance can be shown to have occurred solely through the fault of Seller, Buyer may claim for each completed week of delay an indemnity of at most one half of one per cent, a total of no more than 5 %, however, of the value of that part of the goods to be delivered which cannot be used on account of Seller's failure to deliver an essential part thereof, provided the Buyer has suffered a damage to the aforesaid extent. Assertion of rights of damages exceeding this extent is precluded.

6. Passage of risk and Place of performance

6.1 Enjoyment and risk shall pass to Buyer at the time of departure of the goods ex works or ex warehouse regardless of the terms of quotation (such as carriage paid, C.I.F. etc.) agreed upon. This provision also includes the case of shipment being effected, organised and supervised by Seller and the case of delivery being made in connection with assembly work to be undertaken by Seller.

6.2 For services the place of performance shall be the place at which the service is rendered; the risk in respect of such services or any part thereof that may have been agreed upon shall pass to Buyer at the time the services have been rendered.

7. Payment

7.1 Unless otherwise agreed, one third of the purchase price shall fall due at the time of receipt by Buyer of the order confirmation of Seller, one third after half the delivery period has elapsed and the balance at the time of delivery. Irrespective thereof the turnover tax comprised in the amount of the invoice shall be paid within 30 days of the invoice date.

7.2 In the case of part settlements the individual part payments shall fall due upon receipt of the respective invoices. The same shall apply to amounts invoiced for additional deliveries or resulting from additional agreements beyond the scope of the original contract, irrespective of the terms of payment agreed upon for the principal delivery.

7.3 Payment shall be made without any discount free Seller's domicile in the agreed currency. Drafts and checks shall be accepted on account of payment only, with all interest, fees and charges in connection therewith (such as collection and discounting charges) to be borne by Buyer.

7.4 Buyer shall not be entitled to withhold or offset payment on the grounds of any warranty claims or other counterclaims.

7.5 Payment shall be deemed to have been effected on the date at which the amount in question is at Seller's disposal.

7.6 If Buyer fails to meet the terms of payment or any other obligation arising from this or other transactions, Seller may without prejudice to his other rights

- a) suspend performance of his own obligations until payments have been made or other obligations fulfilled, and exercise his right to extend the period of delivery to a reasonable extent,
- b) call in debts arisen from this or any other transactions and charge default interest amounting to 1.25 % per month plus turnover tax for these amounts beginning with the due dates, unless Seller proves costs exceeding this.

In any case Seller has the right to invoice all expenses arising prior to a lawsuit, especially reminder charges and lawyer's fees.

7.7 Discounts or bonuses are subject to complete payment in due time.

7.8 Seller retains title to all goods delivered by him until receipt of all amounts invoiced including interests and charges.

Buyer herewith assigns his claim out of a resale of conditional commodities, even if they are processed, transformed or combined with other commodities, to Seller to secure the latter's purchase money claim. In the case of resale granting respite Buyer shall have the power of disposal of the product under retention of ownership only with the proviso that upon reselling Buyer notifies the secondary buyer of the assignment for security or enters the assignment in his account books. Upon request Buyer has to notify the assigned claim and the debtor thereof to Seller, and to make all information and material required for his debt collection available and to notify the assignment to the third-party debtor. If the goods are attached or otherwise levied upon, Buyer shall draw attention to Seller's title and immediately inform Seller of the attachment or levy.

GENERAL TERMS OF DELIVERY

- 8. Warranty and acceptance of obligation to repair defects**
- 8.1 Once the agreed terms of payment have been complied with, Seller shall, subject to the conditions hereunder, remedy any defect existing at the time of acceptance of the article in question whether due to faulty design, material or manufacture, that impairs the functioning of said article. From particulars appearing in catalogues, folders, promotional literature as well as written or oral statements which have not been included in the agreement no warranty obligations may be deduced.
- 8.2 Unless special warranty periods operate for individual items the warranty period shall be 12 months. These conditions shall also apply to any goods supplied, or services rendered in respect of goods supplied, that are firmly attached to buildings or the ground. The warranty period begins at the point of passage of risk acc. to paragraph 6.
- 8.3 The foregoing warranty obligations are conditional upon the Buyer giving immediate notice in writing of any defects that have occurred and such notice reaching the Seller. Buyer shall prove immediately the presence of a defect, in particular he shall make available immediately to Seller all material and data in his possession. Non-observance of Buyer's obligation to give immediate notice of the defect invalidates the right of claiming consequential harm caused by a defect. Upon receipt of such notice Seller shall, in the case of a defect covered by the warranty under 8.1 above, have the option to replace the defective goods or defective parts thereof or else to repair them on Buyer's premises or have them returned for repair, or to grant a fair and reasonable price reduction.
- 8.4 Any expenses incurred in connection with rectifying defects (e. g. expenses for assembly and disassembly, transport, waste disposal, travel and site-to-quarters time) shall be borne by Buyer. For warranty work on Buyer's premises Buyer shall make available free of charge any assistance, hoisting gear, scaffolding and sundry supplies and incidentals that may be required. Replaced parts shall become the property of Seller.
- 8.5 If an article is manufactured by Seller on the basis of design data, design drawings, models or other specifications supplied by Buyer, Seller's warranty shall be restricted to non-compliance with Buyer's specifications.
- 8.6 Seller's warranty obligation shall not extend to any defects due to assembly and installation work not undertaken by Seller, inadequate equipment, or due to non-compliance with installation requirements and operating conditions, overloading of parts in excess of the design values stipulated by Seller, negligent or faulty handling or the use of inappropriate materials, nor for defects attributable to material supplied by Buyer. Nor shall Seller be liable for damage due to acts of third parties, atmospheric discharges. Excess voltage and chemical influences. The warranty does not cover the replacement of parts subject to natural wear and tear. Seller accepts no warranty for the sale of used goods.
- 8.7 The warranty shall lapse immediately if, without written consent of Seller, Buyer himself or a third party not expressly authorised undertakes modifications or repairs on any items delivered.
- 8.8 Claims acc. to § 933b ABGB are struck by the statute of limitation with lapse of the period mentioned under point 8.2.
- 8.9 The provisions of sub-paragraphs 8.1 to 8.7 shall apply, mutatis mutandis, to all cases where the obligation to repair defects has to be accepted for other reasons laid down by law.
- 9. Withdrawal from contract**
- 9.1 Buyer may withdraw from the contract only in the event of delays caused by gross negligence on the part of Seller and only after a reasonable period of grace has elapsed. Withdrawal from contract shall be notified in writing by registered mail.
- 9.2 Irrespective of his other rights Seller shall be entitled to withdraw from the contract
- a) if the execution of delivery or the inception or continuation of services to be rendered under the contract is made impossible for reasons within the responsibility of Buyer and if the delay is extended beyond a reasonable period of grace allowed;
 - b) if doubts have arisen as to Buyer's creditworthiness and if same fails, on Seller's request, to make an advance payment or to provide adequate security prior to delivery, or
 - c) if, for reasons mentioned in 5.4, the period allowed for delivery is extended by more than half of the period originally agreed or by at least 6 months.
- 9.3 For the reasons given above withdrawal from the contract shall also be possible in respect of any outstanding part of the delivery or service contracted for.
- 9.4 If bankruptcy proceedings are instituted against any contracting party or an application for bankruptcy proceedings against that party is not granted for insufficiency of assets, the other party may withdraw from the contract without allowing a period of grace.
- 9.5 Without prejudice to Seller's claim for damages including expenses arising prior to a lawsuit, upon withdrawal from contract any open accounts in respect of deliveries made or services rendered in whole or in part shall be settled according to contract This provision also covers deliveries or services not yet accepted by Buyer as well as any preparatory acts performed by Seller. Seller shall, however, have the option alternatively to require the restitution of articles already delivered.
- 9.6 Withdrawal from contract shall have no consequences other than those stipulated above.
- 9.7 The assertion of claims on the ground of *laesio enormis*, error, or lapse of purpose by the Buyer is excluded.
- 10. Disposal of waste electrical and electronic equipment**
- 10.1 The Buyer of electrical/electronic equipment for commercial purposes, incorporated in Austria, is responsible for the financing of the collection and treatment of waste electrical and electronic equipment as defined by the Ordinance Regulating the Handling of Waste Electrical Equipment, if he is himself the user of the electrical/electronic equipment. If the Buyer is not the end user, he shall transfer the full financial commitment to his customer by agreement and furnish proof thereof to the Seller.
- 10.2 The Buyer incorporated in Austria shall ensure that the Seller is provided with all information necessary to meet the Seller's obligations as manufacturer/importer, particularly according to §§ 11 and 24 of the Ordinance Regulating the Handling of Waste Electrical Equipment and the Waste Management Act.
- 10.3 The Buyer incorporated in Austria is liable vis-à-vis the Seller for any damage and other financial disadvantages incurred by Seller due to Buyer's failure to meet or fully meet his financing commitment or any other obligations according to Article 10. The Buyer shall bear the burden of proof of performance of this obligation.
- 11. Seller's liability**
- 11.1 Outside the scope of the Product Liability Act, Seller shall be liable only if the damage in question is proved to be due to intentional acts or acts of gross negligence, within the limits of statutory provisions. Seller shall not be liable for damage due to acts of ordinary negligence nor for consequential damages or damages for pure economic loss, loss of profits, loss of savings or interest or damage resulting from third-party claims against buyer.
- 11.2 Seller shall not be liable for damages in case of non-compliance with instructions for assembly, commissioning and operation (such as are contained in instructions for use) or non-compliance with licensing requirements.
- 11.3 Claims that exceed the contractual penalties that were agreed on are excluded from the respective title.
- 12. Industrial property rights and copyrights**
- 12.1 Buyer shall indemnify Seller and hold him harmless against any claims for any infringement of industrial property rights raised against him if Seller manufactures an article pursuant to any design data, design drawings, models or other specifications made available to him by Buyer.
- 12.2 Design documents such as plans and drawings and other technical specifications as well as samples, catalogues, prospectuses, pictures and the like shall remain the intellectual property of Seller and are subject to the relevant statutory provisions governing reproduction, imitation, competition etc. The provisions of 22 above shall also cover design documents.
- 13. General**
- Should individual provisions of the contract or of these provisions be invalid the validity of the other provisions shall not be affected. The invalid provision shall be replaced by a valid one, which comes as close to the target goal as possible.
- 14. Jurisdiction and applicable law**
- Any litigations arising under the contract including litigations over the existence or non-existence thereof shall fall within the exclusive jurisdiction of the competent court at Seller's domicile; the competent court of the Bezirksgericht Innere Stadt, Vienna, shall have exclusive jurisdiction if Seller is domiciled in Vienna. The contract is subject to Austrian law excluding the referral rules. Application of the UN Convention on Contracts for the International Sale of Goods is renounced.

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