

Moulded Case Circuit Breaker Type A, 3-pole, 150kA, 160A

Size type 2, Rated current 160A, Poles 3, IP Rating IP20, Short circuit switching capacity 150kA, Tripping Unit A thermo-magnetic protection for system and line



Technical Data

Net width (mm)	105,00
Net height (mm)	184,00
Net weight (kg)	2,35
EAN	9004840262001
Power loss (W)	40,00
Min. ambient temperature (°C)	-25
Max. ambient temperature (°C)	60
Standard	IEC EN 60947 VDE 0660
Device category	circuit breaker
Rated current (A)	160
Rated voltage	< 690VAC
Short circuit switching capacity (kA)	150
Size type	2
Tripping Unit	A thermo-magnetic protection for system and line
Poles	3

Technical Data - continued

Short circuit current	160A
Protection against direct contact	finger-proof and back-of-hand-proof according to VDE 0106 Part 100
Climatic proofing	Damp heat, constant, to IEC 60068-2-78 Damp heat, cyclic, to IEC 60068-2-30
Mech. shock resistance Half-sinusoidal shock 10ms	20 (Halbsinusstoß 20 ms)
IP Rating	IP20
Rated insulation voltage [Ui] (V)	1000
Mechanical durability	20000 operation cycles
Electrical endurance (Operation cycle)	10000
Terminal type	Screw terminal
Rated short-time withstand current Icw	1,9kA

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, ciclical 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

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Mounting position	vertical and 90° in all directions
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Direction of power supply	any
Degree of protection	
Device	in region of component patts: IP20 (basic degree of protection)
Housing	with insulating surround: IP40 with door coupling roatry handle: IP66
Connectors	Tunnel terminal: IP10 Phase isolator and strip terminal: IP00

DIELECTRIC STRENGTH OF MCCB - MC2

	Max. rated uninterrupted current 250A		
	MC2 - 25kA	MC2 - 50kA	MC2 - 100kA
Rated impulse withstand voltage U_{imp}			
Main circuits	8000V	8000V	8000V
Auxiliary circuits	6000V	6000V	6000V
Rated operational voltage U_e	690V AC	690V AC	690V AC
Rated operational voltage breaking via 3 conductors	-	750V DC ¹⁾	750V DC ¹⁾
Surge protection/ pollution degree	III/3	III/3	III/3
Rated insulation voltage U_i	1000V ²⁾	1000V	1000V
Range of application in IT networks	440V	690V	690V

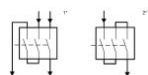
Note:

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

MC1: 1,25

Setting for I_i at DC = setting I_i AC/correction factor DC

Value applies to 3-pole protection devices with thermomagnetic release MC1



1 * Breaking one pole via two circuits in series

2 * Breaking one pole via three circuits in series

BREAKING CAPACITY - MC2

Max. rated uninterrupted current

MC2 - 25kA MC2 - 50kA MC2 - 150kA

Rated short-circuit breaking capacity values I_{cm}

240V	63kA	187kA	330kA
400/415V	53kA	105kA	330kA
440V	53kA	74kA	286kA
525V	-	53kA	105kA
690V	-	40kA	40kA

Rated short-circuit breaking capacity value I_{cn}/I_{cs}

I_{cu} meets IEC/EN 60947	240V 50/60 Hz	30kA	85kA	150kA
Breaking sequence O-t-CO	400/415V 50/60Hz	25kA	50kA	150kA
	440V 50/60Hz	25kA	35kA	130kA
	525V 50/60Hz	-	25kA	50kA
	690V 50/60Hz	-	20kA	20kA
	500V DC	-	30kA	60kA
	750V DC	-	30kA	60kA
I_{cs} meets IEC/EN 60947	240V 50/60Hz	30kA	85kA	150kA
Breaking sequence O-t-CO-t-CO	400/415V 50/60Hz	25kA	50kA	150kA
	440V 50/60Hz	18,5kA	35kA	130kA
	525V 50/60Hz	-	25kA	37,5kA
	690V 50/60Hz	-	5kA	5kA

Maximum HBC fuse $\leq 1600A$

355A gG/gL

Utilization category to IEC/EN 60947-2

A A A

Rated short-time withstand current I_{cw}

$t = 0,3s$	-	1,9kA	1,9kA
$t = 1s$	-	1,9kA	1,9kA

Rated making and breaking capacity I_e

Rated operating current	AC-1	400/415V 50/60Hz	300A	300A	300A
		690V 50/60Hz	250A	250A	250A
	AC-3	400/415V 50/60Hz	300A	300A	300A
		690V 50/60Hz	250A	250A	250A
	DC-1	500V DC with thermal release	-	250A	250A
		750V DC with thermal release	-	250A	250A
	DC-3	500V DC with thermal release	-	250A	250A
		750V DC with thermal release	-	250A	250A

LIFETIME - MC2

		Max. rated uninterrupted current		
		MC2 - 25kA	MC2 - 50kA	MC2 - 150kA
Service life, mechanical (operations)		20000	20000	20000
Maximum operating cycles		120 S/h	120 S/h	120 S/h
Service life, electrical				
AC-1	400/415V 50/60Hz	10000 ¹⁾	10000	10000
	690V 50/60Hz	-	7500	7500
AC-3	400/415V 50/60Hz	6500 ²⁾	6500	6500
	690V 50/60Hz	-	5000	5000
DC-1	500V with thermal release	-	7500	7500
	750V with thermal release	-	7500	7500
DC-3	500V with thermal release	-	3000	3000
	750V with thermal release	-	3000	3000
Current heat loss per pole at I_N ¹⁾		19kW	19kW	19kW
Total disconnecting time at short-circuit		<10ms	<10ms	<10ms

¹⁾ The current heat loss per pole ratings refer to the maximum current rating for the particular frame size.

WEIGHT - MC1

Response times for the overload release at temperatures diverging from the reference temperature (40°)

Device type

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°)

MC1 - 15...80	1,14	1,07	1	0,93	0,86	0,83	0,79
MC1 - 90...125	1,14	1,07	1	0,93	0,86	0,83	0,79
MC1 - 160	1,08	1,04	1	0,96	0,92	0,90	0,88
MC2 - 15...200	1,04	1,02	1	0,98	0,96	0,95	0,94
MC2 - 20...200 with plug-in technology	1,04	1,02	1	0,98	0,96	0,95	0,94
MC2 - 250 with plug-in technology	1,04	1,02	1	0,98	0,96	0,95	0,94
MC3 - 250...500	1,12	1,06	1	0,94	0,88	0,85	0,85
MC3 - 250...500 with withdrawable units	1,06	1	0,94	0,88	0,82	0,79	0,79

Short-circuit/motor contactor

reference temperature 40°C

MC1 - 40...80	1	0,98	0,95	0,93	0,90	0,89	0,88
MC1 - 100	1	0,98	0,95	0,93	0,90	0,89	0,88
MC2 - 20...200	1	0,98	0,96	0,94	0,92	0,91	0,90
MC2 - 20...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 - 100A 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 $I_r = 100A \times 0.86 = 86A$ must be taken account above the temperature coefficients. In other words, at an ambient temperature of 60°C, the MC1 - 100A would trips as if it were set to 86A.

Reducing rated operational voltage (derating) under special ambient conditions (to IEC947)

Device type

Derating-coefficient

20°C | 30°C | 40°C | 50°C | 60°C | 65°C | 70°C

Thermomagnetic release (Typ A)

System protection

reference temperature 40°C

MC1 - 15...80	1	1	1	1	1	1	1
MC1 - 90...125	1	1	1	1	0,86	0,83	0,8
MC1 - 160	1	1	1	0,95	0,9	0,85	0,8
MC2 - 15...200	1	1	1	1	1	1	1
MC2 - 250	1	1	1	1	0,9	0,85	0,8
MC2 - 20...200 with plug-in technology	1	1	1	1	1	1	1
MC2 - 250 with plug-in technology	1	0,97	0,92	0,87	0,81	-	-
MC3 - 250...500	1	1	1	0,94	0,88	0,85	0,85
MC3 - 250...500 with withdrawable units	1	1	0,94	0,88	0,82	0,79	0,79

Short-circuit/motor contactor

reference temperature 40°C

MC1 - 40...80	1	1	1	1	1	1	1
MC1 - 100	1	1	1	1	0,86	0,83	0,8
MC2 - 20...200	1	1	1	1	1	1	1
MC2 - 20...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 - 250A is to be used under an ambient operating temperature of 65°C.

How much is the permissible Rated operational voltage I_e ? At 65°C, the derating coefficient is 0.85, in other words $I_e = 250A \times 0,85 = 212,5A$. In other words, the MC2 . 250A may be operated at a maximum $I_e = 215.5A$ under an ambient temperature of 65°C.

ACTIVE POWER DISSIPATION

I_n [A]	MC1 - Circuit breaker				MC2 - Circuit breaker				MC3 - Circuit breaker	
	System protection		Motor contactor		System protection		Motor contactor		System protection	
	P [W]	R [μ Ohm]	P [W]	R [μ Ohm]	P [W]	R [μ Ohm]	P [W]	R [μ Ohm]	P [W]	R [μ Ohm]
20	9.8	8180	-	-	5.1	4250	5.1	4250	-	-
25	8.8	4680	-	-	8	4250	8	4250	-	-
26	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-
32	9.3	3030	-	-	9.6	3140	9.6	3140	-	-
33	-	-	-	-	-	-	-	-	-	-
35	-	-	-	-	-	-	-	-	-	-
40	10.7	2220	13.5	2810	13.4	2800	13.4	2800	-	-
45	-	-	-	-	-	-	-	-	-	-
50	13.5	1760	14.1	1880	17	2270	17	2270	-	-
60	-	-	-	-	-	-	-	-	-	-
63	14.2	1190	14.9	1250	20.2	1700	20.2	1700	-	-
70	-	-	-	-	-	-	-	-	-	-
80	16.3	850	20.8	1085	20.5	1070	20.5	1070	-	-
90	-	-	-	-	-	-	-	-	-	-
100	21.9	730	23.9	795	25.7	855	25.7	855	-	-
110	-	-	-	-	-	-	-	-	-	-
125	26.7	570	-	-	27.6	589	27.6	589	-	-
150	-	-	-	-	-	-	-	-	-	-
160	36.1	470	-	-	38.4	500	38.4	500	-	-
175	-	-	-	-	-	-	-	-	-	-
200	-	-	-	-	48	400	48	400	-	-
225	-	-	-	-	-	-	-	-	-	-
250	-	-	-	-	58.1	310	-	-	68	364
300	-	-	-	-	83.7	310	-	-	79	256
400	-	-	-	-	-	-	-	-	72	151
500	-	-	-	-	-	-	-	-	93	124

CONNECTION CROSS SECTIONS

			MC2	I _n ¹⁾
Standard equipment			Screw connection	-
Accessories			Box terminal	
			Tunnel terminals	
			Rear-side connection	
Cu-conductors, Cu-cable				
Box terminal	solid		1 x (10 - 16)mm ²	300A
			2 x (4 - 16)mm ²	
	stranded		1 x (25 - 185)mm ²	
			2 x (25 - 70)mm ²	
Tunnel terminal	solid		1 x 16mm ²	300A
	stranded	1-hole	1 x (25-185)mm ²	
		2-hole	-	-
		4-hole	-	-
Screw connection and rear-side connection				
directly on switch	solid		1 x (4 - 16)mm ²	300A
			2 x (4 - 16)mm ²	
	stranded		1 x (25 - 185)mm ²	
			2 x (25 - 70)mm ²	
Module plate	1-hole	min.	-	-
		max.	-	-
Moudle plate	2-hole	min.	-	-
		max.	-	-
Connection extension			-	-
Al-conductors, Al-cable				
Tunnel terminal	solid		1 x 16mm ²	250A
	stranded	1-hole	1 x (25 - 185)mm ²	
		2-hole	-	-
			-	-
	4-hole	-	-	
Screw connection and rear-side connection				
directly on switch	solid		1 x (10 - 16)mm ²	250A
			2 x (10 - 16)mm ²	
	stranded		1 x (25 - 50)mm ²	
			2 x (25 - 50)mm ²	
Module plate	1-hole	min.	-	-
		max.	-	-
Module plate			2-hole	-
Connection extension			-	-
Cu-strip (number of segments x width x segment thickness)				
Box terminal		min.	2 x 9 x 0,8mm	300A
		max.	10 x 16 x 0,8(2 x) 8 x 15,5 x 0,8	
Flat conductor terminal, basic		min.	-	-
		max.	-	-
Module plate			1-hole	-

Screw connection and rear-side connection

Cu-strip, with holes	min.	2 x 16 x 0,8	300A
	max.	10 x 24 x 0,8	
Connection extension		-	-

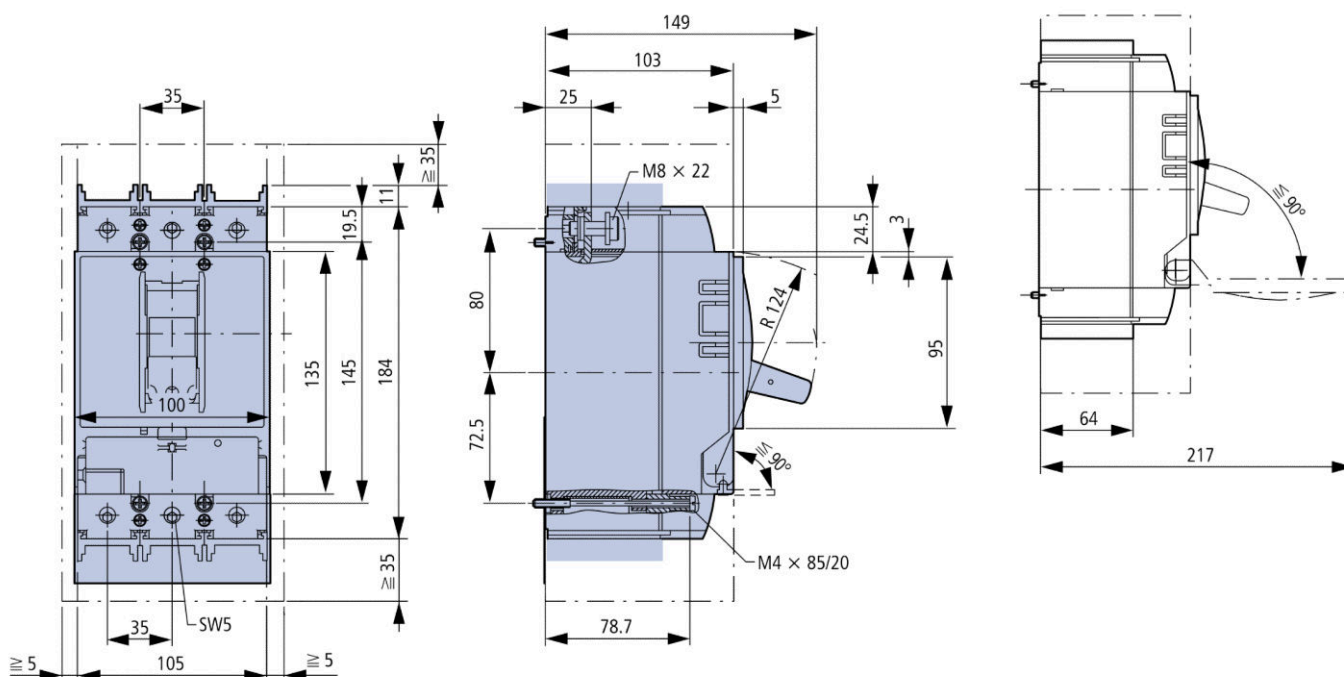
Cu-rail (width x thickness)

Screw connection and rear-side connection

Screw connection		M8	-
directly on switch	min.	16 x 5mm	300A
	max.	24 x 8mm	
Module plate 1-hole	min.	-	-
	max.	-	-
Module plate 2-hole	min.	-	-
	max.	-	-
Connection extension	min.	-	-
	max.	-	-

Note: 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.

Dimensioned drawing: Moulded Case Circuit Breaker Type A, 3-pole, 150kA, 160A



DESCRIPTION	Order No.
Moulded Case Circuit Breaker Type A, 3-pole, 150kA, 160A Size type 2, Rated current 160A, Poles 3, IP Rating IP20, Short circuit switching capacity 150kA, Tripping Unit A thermo-magnetic protection for system and line	MC216331