

Moulded Case Circuit Breaker Type M, 3-pole, 100kA, 40A

Motor-protection, Size type 1, Rated current 40A, Poles 3, IP Rating IP20, Short circuit switching capacity 100kA, Tripping Unit A thermo-magnetic protection for motor



Technical Data

Net width (mm)	90,00
Net height (mm)	145,00
Net weight (kg)	1,05
EAN	9004840578997
Power loss (W)	13,50
Min. ambient temperature (°C)	-25
Max. ambient temperature (°C)	60
Standard	IEC EN 60947
Device category	circuit breaker
Rated current (A)	40
Rated voltage	< 690VAC
Short circuit switching capacity (kA)	100
Size type	1
Tripping Unit	A thermo-magnetic protection for motor
Poles	3
Short circuit current (A)	40A

Technical Data - continued

Protection against direct contact	finger- und handrücksicher nach VDE 0106 Teil 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)	690
Mechanical durability	20000 operation cycles
Electrical endurance (Operation cycle)	10000
Terminal type	Frame clamp

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
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 - MC1

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 part: 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

DIELECTRIC STRENGTH OF MCCB - MC1

	Max. rated uninterrupted current 160A		
	MC1 - 25kA	MC1 - 50kA	MC1 - 100kA
Rated impulse withstand voltage U_{imp}			
Main circuits	6000V	6000V	6000V
Auxiliary circuits	6000V	6000V	6000V
Rated operational voltage U_e	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

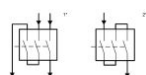
Notes:

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

MC1: 1,25

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

vvalue applies to 3-pole protection devices with themomagnetic release MC1



1 * Breaking one pole via two circuits in series

2 * Breaking one pole via three circuits in series

BREAKING CAPACITY - MC1

Max. rated uninterrupted current 160A

MC1 - 25kA MC1 - 50kA MC1 - 100kA

Rated short-circuit breaking capacity values I_{cm}

240V	63kA	187kA	220kA
400/415V	53kA	105kA	220kA
440V	53kA	74kA	154kA
525V	-	40kA	40kA
690V	-	17kA	17kA

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

I_{cu} meets IEC/EN 60947	240V 50/60 Hz	30kA	85kA	100kA
Breaking sequence O-t-CO	400/415V 50/60Hz	25kA	50kA	100kA
	440V 50/60Hz	25kA	35kA	70kA
	525V 50/60Hz	-	20kA	20kA
	690V 50/60Hz	-	10kA	10kA
	500V DC	-	15kA	30kA
	750V DC	-	-	-
I_{cs} meets IEC/EN 60947	240V 50/60Hz	30kA	85kA	100kA
Breaking sequence O-t-CO-t-CO	400/415V 50/60Hz	25kA	50kA	50kA
	440V 50/60Hz	18,5kA	35kA	35kA
	525V 50/60Hz	-	10kA	10kA
	690V 50/60Hz	-	7,5kA	7,5kA

Maximum HBC fuse $\leq 1600A$

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_{cw}

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

Rated making and breaking capacity I_e

Rated operating current	AC-1	400/415V 50/60Hz	160A	160A	160A
		690V 50/60Hz	160A	160A	160A
	AC-3	400/415V 50/60Hz	160A	160A	160A
		690V 50/60Hz	160A	160A	160A
	DC-1	500V DC with thermal release	-	125A	125A
		750V DC with thermal release	-	-	-
	DC-3	500V DC with thermal release	-	125A	125A
		750V DC with thermal release	-	-	-

LIFETIME - MC1

		Max. rated uninterrupted current 160A		
		MC1 - 25kA	MC1 - 50kA	MC1 - 100kA
Service öife, 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	7500	10000	10000
	690V 50/60Hz	-	7500	7500
AC-3	400/415V 50/60Hz	-	7500	7500
	690V 50/60Hz	-	5000	5000
DC-1	500V with thermal release	-	10000	10000
	750V with thermal release	-	-	-
DC-3	500V with thermal release	-	5000	5000
	750V with thermal release	-	-	-
Current heat loss per pole at I_u ¹⁾		16,7W	16,7W	16,7W
Total disconnecting time at short-circuit		<10ms	<10ms	<10ms

¹⁾ The current hest 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.

CONNECTION CROSS SECTIONS

			MC1	I _n ¹⁾		
Standard equipment			Box terminal	-		
Accessories			Screw connection			
			Tunnel terminals			
			Rear-side connection			
Cu-conductors, Cu-cable						
Box terminal	solid		1 x (10 - 16)mm ²	160A		
			2 x (6 - 16)mm ²			
	stranded		1 x (25 - 70) ² mm ²	160A		
			2 x (6 - 25)mm ²			
Tunnel terminal	solid		1 x 16mm ²	160A		
		stranded	1-hole	1 x (25-95)mm ²	160A	
			2-hole	-	-	
			4-hole	-	-	
Screw connection and rear - side connecntion						
directly on switch	solid		1 x (10 - 16)mm ²	160A		
			2 x (6 - 16)mm ²			
	stranded		1 x (25 - 70) ² mm ²	160A		
			2 x 25mm ²			
Module plate	1-hole	min.	-	-		
		max.	-	-		
Module plate	2-hole	min.	-	-		
		max.	-	-		
Connection extension			-	-		
Al-conductors, Al-cable						
Tunnel terminal	solid		1 x 16mm ²	160A		
		stranded	1-hole		1 x (25 - 95)mm ²	
			2-hole		-	-
					-	-
		4-hole	-	-		
Screw connection and rear - side connection						
directly on switch	solid		1 x (10-16)mm ²	160A		
			2 x (10-16)mm ²			
	stranded		1 x (25-35)mm ²	160A		
			2 x (25-35)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	160A		
		max.	9 x 9 x 0,8mm			
Flat conductor terminal, basic		min.	-	-		
		max.	-	-		
Module plate	1-hole		-	-		
Screw connection and rear - side connection						

Cu strip, with holes	min.	-	-
	max.	-	-
Connection extension		-	-

Cu-rail (width x thickness)

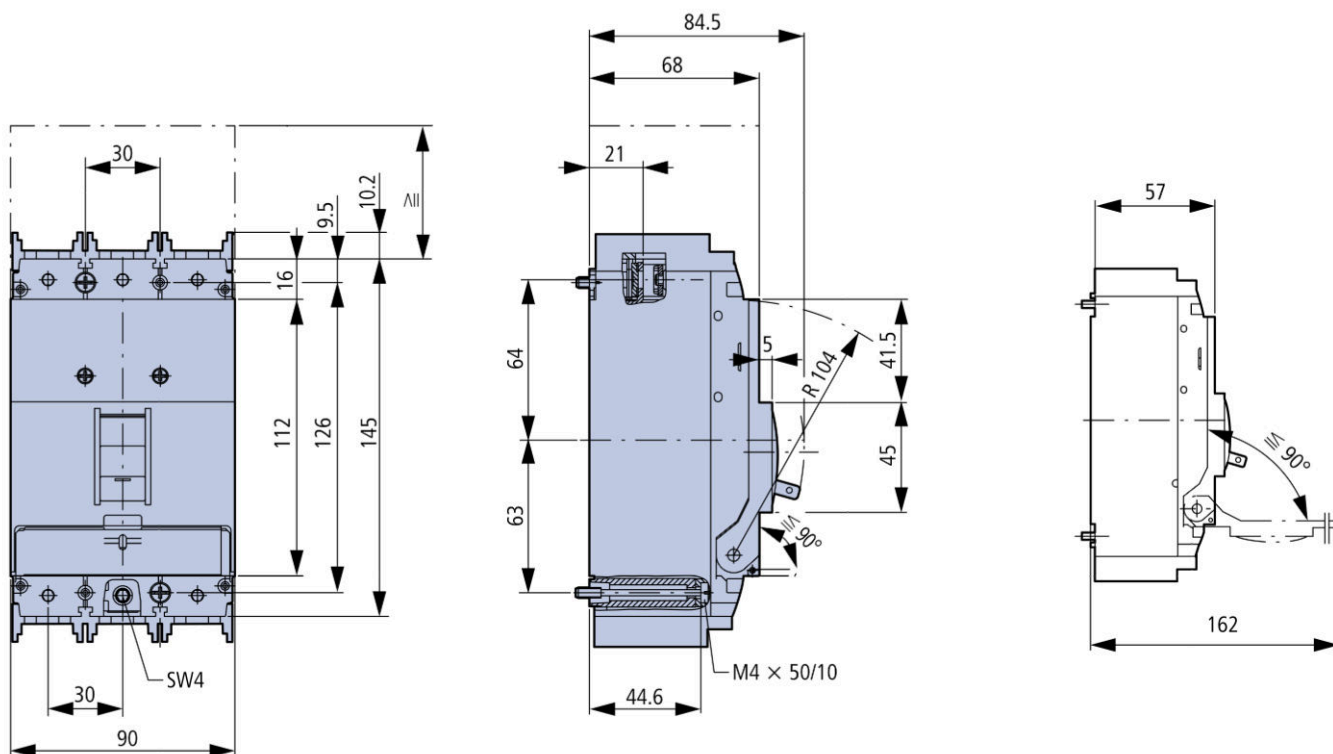
Screw connection and rear-side connection

screw connection		M6	-
directly on switch	min.	12 x 5mm	160A
	max.	16 x 5mm	
Module plate 1-hole	min.	-	-
	max.	-	-
Module plate 2-hole	min.	-	-
	max.	-	-
Connection extension	min.	-	-
	max.	-	-

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 95mm² can be connected.

Dimensioned drawing: Moulded Case Circuit Breaker Type M, 3-pole, 100kA, 40A



DESCRIPTION	Order No.
Moulded Case Circuit Breaker Type M, 3-pole, 100kA, 40A Motor-protection, Size type 1, Rated current 40A, Poles 3, IP Rating IP20, Short circuit switching capacity 100kA, Tripping Unit A thermo-magnetic protection for motor	MC140336