

Data Sheet for Article: MC416332--

Moulded Case Circuit Breaker Type AE, 3-pole, 85kA, 1600A

Size type 4, Rated current 1600A, Poles 3, IP Rating IP20, Short circuit switching capacity 85kA, Tripping Unit AE electronic protection for system and line



Technical Data

Net width (mm)	210,00
Net height (mm)	401,00
Net weight (kg)	21,00
EAN	9004840263183
Power loss (W)	284,00
Min. ambient temperature (°C)	-25
Max. ambient temperature (°C)	60
Standard	IEC EN 60947 VDE 0660
Device category	circuit breaker
Rated current (A)	1600
Rated voltage	< 690VAC
Short circuit switching capacity (kA)	85
Size type	4
Tripping Unit	AE electronic protection for system and line
Optional Accessories	MC496193--;MC496221--;MM216376--;MM216378--;MC496685--

Technical Data - continued

Poles	3
Short circuit current	1600A
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 I _{cw}	19,2kA

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

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Max. rated uninterrupted current 1600A

	MC4 - 50kA	MC4 - 85kA
Rated impulse withstand voltage U _{imp}		
Main circuits	8000V	8000V
Auxiliary cricuits	6000V	6000V
Rated operational voltage U _e	690V AC	690V AC
Rated operational voltage breaking via 3 conductors	-	-
Surge protection/pollution degree	III/3	III/3
Rated insulation voltage U _i	1000V	1000V
Range of application in IT networks	525V	525V

BREAKING CAPACITY - MC4

Max. rated uninterrupted current 1600A

MC4 - 50kA

MC4 - 85kA

Rated short-circuit breaking capacity values I_{cm}

240V	105kA	275kA
400/415V	105kA	187kA
440V	74kA	187kA
525V	53kA	143kA
690V	40kA	105kA

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

I_{cu} meets IEC/EN 60947 Breaking sequence O-t-CO	240V 50/60Hz	50kA	125kA
	400/415V 50/60Hz	50kA	85kA
	440V 50/60Hz	35kA	85kA ¹⁾
	525V 50/60Hz	25kA	65kA
	690V 50/60Hz	20kA	50kA
	500V DC	-	-
I_{cs} meets IEC/EN 60947 Breaking sequence O-t-CO-t-CO	750V DC	-	-
	240V 50/60Hz	37kA	63kA
	400/415V 50/60Hz	37kA	43kA
	440V 50/60Hz	26kA	43kA
	525V 50/60Hz	19kA	49kA
	690V 50/60Hz	15kA	37kA

Maximum HBC fuse $\leq 1600A$

MC4-...630...1250: 2x630A gG/gL

MC4-...1600: 2x800A gG/gL

MC4-2000A: 2x1000A gG/gL

Utilization category to IEC/EN 60947-2

B (bei 2000A: A)

B (bei 2000A: A)

Rated short-time withstand current I_{cw}

$t = 0,3s$	19,2kA	19,2kA
$t = 1s$	19,2kA	19,2kA

Rated making and breaking capacity I_e

Rated operating current	AC-1	400/415V 50/60Hz	1600A	1600A
		690V 50/60Hz	1600A	1600A
	AC-3	400/415V 50/60Hz	1600A ²⁾	1600A ²⁾
		690V 50/60Hz	1600A ²⁾	1600A ²⁾
	DC-1	500V DC with thermal release	-	-
		750V DC with thermal release	-	-
	DC-3	500V DC with thermal release	-	-
		750V DC with thermal release	-	-

¹⁾ higher switching capacity on request

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

LIFETIME - MC4

		Max. rated uninterrupted current 2000A	
		MC4 - 50kA	MC4 - 85kA
Service life, mechanical (operations)		10000	10000
Maximum operating cycles		60S/h	60S/h
Service life, electrical			
	AC-1 400/415V 50/60Hz	3000	3000
	690V 50/60Hz	2000	2000
AC-3	400/415V 50/60Hz	2000	2000
	690V 50/60Hz	1000	1000
DC-1	500V with thermal release	-	-
	750V with thermal release	-	-
DC-3	500V with thermal release	-	-
	750V with thermal release	-	-
Current heat loss per pole at I_u ¹⁾		97W (2000A)	97W (2000A)
Total disconnecting time at short-circuit		<25ms ≤415V; <35ms >415V;	<25ms ≤415V; <35ms >415V

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°C)

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°C)						
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 $I_e = 212,5A$ under an ambient temperature of 65°C.

CONNECTION CROSS SECTIONS

			MC4	I _n ¹⁾
Standard equipment			Screw connection	-
Accessories			Tunnel terminals	
			Rear-side connection	
			Strip terminal	
Cu-conductors, Cu-cable				
Box terminal	solid		-	-
	stranded		-	-
Tunnel terminal	solid		-	-
	stranded	1-hole	-	-
		2-hole	-	-
		4-hole	4 x (50 - 240)mm ²	1400A
Screw connection and Rear-side connection				
directly on switch	solid		-	-
	stranded		1 x (120 - 185)mm ² 4 x (50 - 185)mm ²	1250A
Module plate	1-hole	min.	1 x (120 - 300)mm ²	1000A
		max.	2 x (95 - 300)mm ²	
Module plate	2-hole	min.	2 x (95 - 185)mm ²	1400A
		max.	4 x (35 - 185)mm ²	-
Connection extension			4 x 300mm ² 6 x (95 - 240)mm ²	1600A 4 x 240A
Al-conductors, Al-cable				
Tunnel terminal	solid		-	-
	stranded	1-hole	-	-
		2-hole	-	-
		4-hole	4 x (50 - 240) mm ²	1400A
Screw connection and Rear-side connection				
directly on switch	solid		-	-
	stranded		-	
Module plate	1-hole	min.	1 x (185-240)mm ²	upon request
		max.	2 x (70-185)mm ²	upon request
Module plate	2-hole		4 x 50mm ²	-
Connection exstension			2 x 240mm ² 6 x (70 - 240)mm ²	upon request
Cu-strip (number of segments x width x segment thickness)				
Box terminal	min.		-	-
	max.		-	-
Flat conductor terminal, basic	min.		6 x 16 x 0,8mm	1100A
	max.		(2x) 10 x 32 x 1,0mm	
Module plate	1-hole		(2x) 10 x 50 x 1,0mm	1250A (2x) 10 x 40 x 1,0
Screw connection and Rear-side connection				
Cu-strip, with holes	min.		(2x) 10 x 50 x 1,0mm	1600A
	max.		(2x) 10 x 50 x 1,0mm	
Connection extension			(2x) 10 x 80 x 1,0mm	1600A

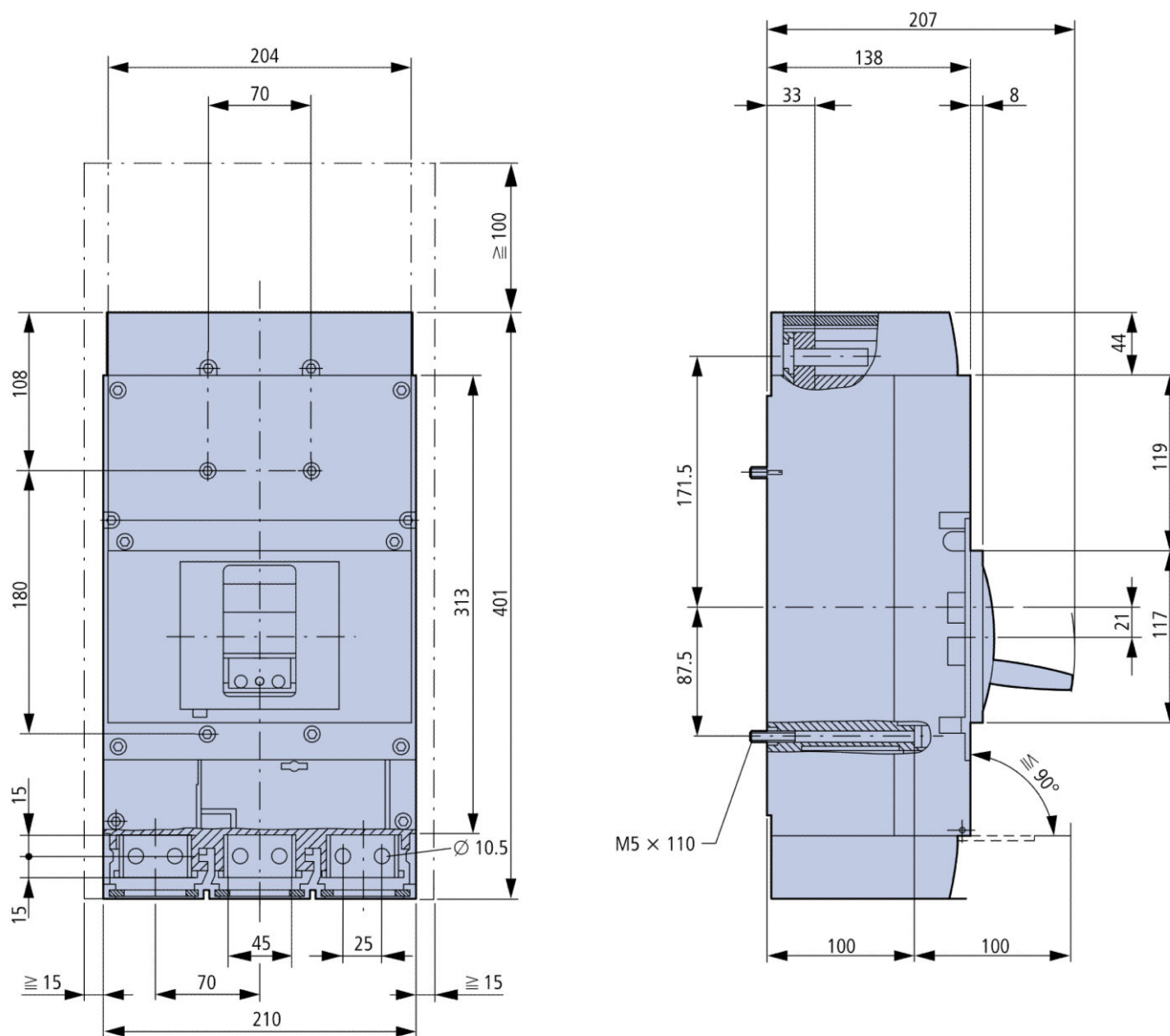
Cu-rail (width x thickness)

Screw connection and Rear-side connection

Screw connection		M10	-
directly on switch	min.	25 x 5mm	1600A
	max.	2 x (50 x 10)mm	
		2 x (80 x 10)mm	
Module plate	1-hole	min.	1250A
		max.	2x (40 x 10)
Module plate	2-hole	min.	1600A
		max.	1600A2 x (50 x 10)
Connection extension	min.	60 x 10mm	1600A2 x (50 x 10)
	max.	2 x (80 x 10)mm	

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 with apply in each case must be observed.

Dimensioned drawing: Moulded Case Circuit Breaker Type AE, 3-pole, 85kA, 1600A



Article Table

DESCRIPTION	Order No.
Moulded Case Circuit Breaker Type AE, 3-pole, 85kA, 1600A	
Size type 4, Rated current 1600A, Poles 3, IP Rating IP20, Short circuit switching capacity 85kA, Tripping Unit AE electronic protection for system and line	MC416332
Optional Accessories	
Under Voltage Release 208-240VAC for MC4	
Accessories Undervoltage release, Size type 4	MC496193
Under Voltage Release + 2 Early-make Contacts, 230VAC, MC4	
Accessories Undervoltage release, Size type 4	MC496221
NO contact block front mount	
Make-up Contacts, Version Screw terminal, Illumination No, IP Rating IP20, Series MM	MM216376
NC contact block front mount	
Make-up Contacts, Version Screw terminal, Illumination No, IP Rating IP20, Series MM	MM216378
Remote Operator 208-240V AC for MC4 synchr., interlock	
Accessories Motor operator, Size type 4, lockable	MC496685