

Moulded Case Circuit Breaker Type AE, 4-pole, 150kA, 400A

Size type 3, Rated current 400A, Poles 4, IP Rating IP20, Short circuit switching capacity 150kA, Tripping Unit AE electronic protection for system and line



Technical Data

Net width (mm)	185,00
Net height (mm)	275,00
Net weight (kg)	7,50
EAN	9004840386332
Power loss (W)	48,00
Min. ambient temperature (°C)	-25
Max. ambient temperature (°C)	60
Standard	IEC EN 60947 VDE 0660
Device category	circuit breaker
Rated current (A)	400
Rated voltage	< 690VAC
Short circuit switching capacity (kA)	150
Size type	3
Tripping Unit	AE electronic protection for system and line
Poles	4

Technical Data - continued

Short circuit current	400A
Protection against direct contact	finger- und handrückensicher 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)	1000
Mechanical durability	20000 operation cycles
Electrical endurance (Operation cycle)	10000
Terminal type	Screw terminal
Rated short-time withstand current Icw	3,3kA

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

Datei Tabelle: Moulded Case Circuit Breaker Type AE, 4-pole, 150kA, 400A

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

DIELECTIC STRENGTH OF MCCB - MC3

	Max. rated uninterrupted current 630A		
	MC3 - 36kA	MC3 - 50kA	MC3 - 150kA
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	690V	690V	690V

Notes:

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

MC3: 1,35

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

Value applies to 3-pole protection devices with thermomagnetic release MC3



1 * Breaking one pole via two circuits in series

2 * Breaking one pole via three circuits in series

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

BREAKING CAPACITY - MC3

		Max. rated uninterrupted current 630A		
		MC3 - 36kA	MC3 - 50kA	MC3 - 150kA
Rated short-circuit breaking capacity values I_{cm}				
240V		121kA	187kA	330kA
400/415V		76kA	105kA	330kA
440V		63kA	74kA	286kA
525V		24kA	53kA	143kA
690V		14kA	40kA	40kA
Rated short-circuit breaking capacity value I_{cn}/I_{cs}				
I_{cu} meets IEC/EN 60947 Breaking sequence O-t-CO	240V 50/60 Hz	55kA	85kA	150kA
	400/415V 50/60Hz	36kA	50kA	150kA
	440V 50/60Hz	30kA	35kA	130kA
	525V 50/60Hz	12kA	25kA	65kA
	690V 50/60Hz	8kA	20kA	35kA
	500V DC	-	30kA	70kA
	750V DC	-	30kA	70kA
I_{cs} meets IEC/EN 60947 Breaking sequence O-t-CO-t-CO	240V 50/60Hz	55kA	50kA	150kA
	400/415V 50/60Hz	36kA	50kA	50kA
	440V 50/60Hz	22,5kA	35kA	130kA
	525V 50/60Hz	9kA	13kA	33kA
	690V 50/60Hz	4kA	5kA	9kA
Maximum HBC fuse $\leq 1600A$		MC3-...250, 400: 400A gG/gL MC3-...630: 630A gG/gL		
Utilization category to IEC/EN 60947-2		A	A	A
Rated short-time withstand current I_{cw}				
$t = 0,3s$		3,3kA	3,3kA	3,3kA
$t = 1s$		3,3kA	3,3kA	3,3kA
Rated making and breaking capacity I_e				
Rated operating current	AC-1	400/415V 50/60Hz	500A	630A
		690V 50/60Hz	500A	630A
	AC-3	400/415V 50/60Hz	450A	450A
		690V 50/60Hz	450A	450A
	DC-1	500V DC with thermal release	-	500A
		750V DC with thermal release	-	500A
	DC-3	500V DC with thermal release	-	500A
		750V DC with thermal release	-	500A

LIFETIME - MC3

Max. rated uninterrupted current 630A			
	MC3 - 36kA	MC3 - 50kA	MC3 - 150kA
Service life, mechanical (operations)	15000	15000	15000
Maximum operating cycles	60 S/h	60 S/h	60 S/h
Service life, electrical			
AC-1 400/415V 50/60Hz	5000	5000	5000
690V 50/60Hz	3000	3000	3000
AC-3 400/415V 50/60Hz	2000	2000	2000
690V 50/60Hz	2000	2000	2000
DC-1 500V with thermal release	-	5000	5000
750V with thermal release	-	5000	5000
DC-3 500V with thermal release	-	2000	2000
750V with thermal release	-	2000	2000
Current heat loss per pole at I_u ¹⁾	31W	31W	31W
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 [Ohm]	P [W]	R [Ohm]	P [W]	R [Ohm]	P [W]	R [Ohm]	P [W]	R [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

				MC3	I _n ¹⁾
Standard equipment				Screw connection	-
Accessories				Box terminal Tunnel terminals Rear-side connection	
Cu-conductors, Cu-cable					
Box terminal	solid			2 x 16mm ²	500A
	stranded			1 x (35 - 240)mm ²	
				2 x (25 - 120)mm ²	
Tunnel terminal	solid			-	-
	stranded	1-hole		1 x (25-185)mm ²	350A
		2-hole		1 x (50 - 240)mm ²	630A
				2 x (50 - 240)mm ²	2 x 185A
		4-hole		-	-
Screw connection and Rear-side connection					
directly on switch	solid			1 x 16mm ²	630A2 x 185A
				2 x 16mm ²	
	stranded			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 extension				2 x 300mm ²	630A2x185
Al-conductors, Al-cable					
Tunnel terminal	solid			1 x 16mm ²	350A
	stranded	1-hole		1 x (25 - 185) ²⁾ mm ²	
		2-hole		1 x (50 - 240)mm ²	630A
				2 x (50-240)mm ²	
		4-hole		-	-
Screw connection and Rear-side connection					
directly on switch	solid			1 x 16mm ²	400A
				2 x (10 - 16)mm ²	
	stranded			1 x (25 - 120)mm ²	
				2 x (25 - 120)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.	6 x 16 x 0,8mm	630A
			max.	10 x 24 x 1,0mm	
				+5 x 24 x 1,0mm	
				(2x) 8 x 24 x1,0mm	
Flat conductor terminal, basic			min.	-	-
			max.	-	-

Module plate	1-hole	-	-
Screw connection and Rear-side connection			
Cu-strip, with holes		min.	6 x 16 x 0,8mm
		max.	10 x 32 x 1,0mm
			+5 x 32 x 1,0mm
Connection extension			(2x) 10 x 50 x 1,0mm
Cu-rail (width x thickness)			
Screw connection and Rear-side connection			
Screw connection		M10	-
directly on switch		min.	20 x 5mm
		max.	30 x 10mm
			+30 x 5mm
Module plate	1-hole	min.	-
		max.	-
Module plate	2-hole	-	-
Connection extension		min.	-
		max.	2 x (10 x 50)

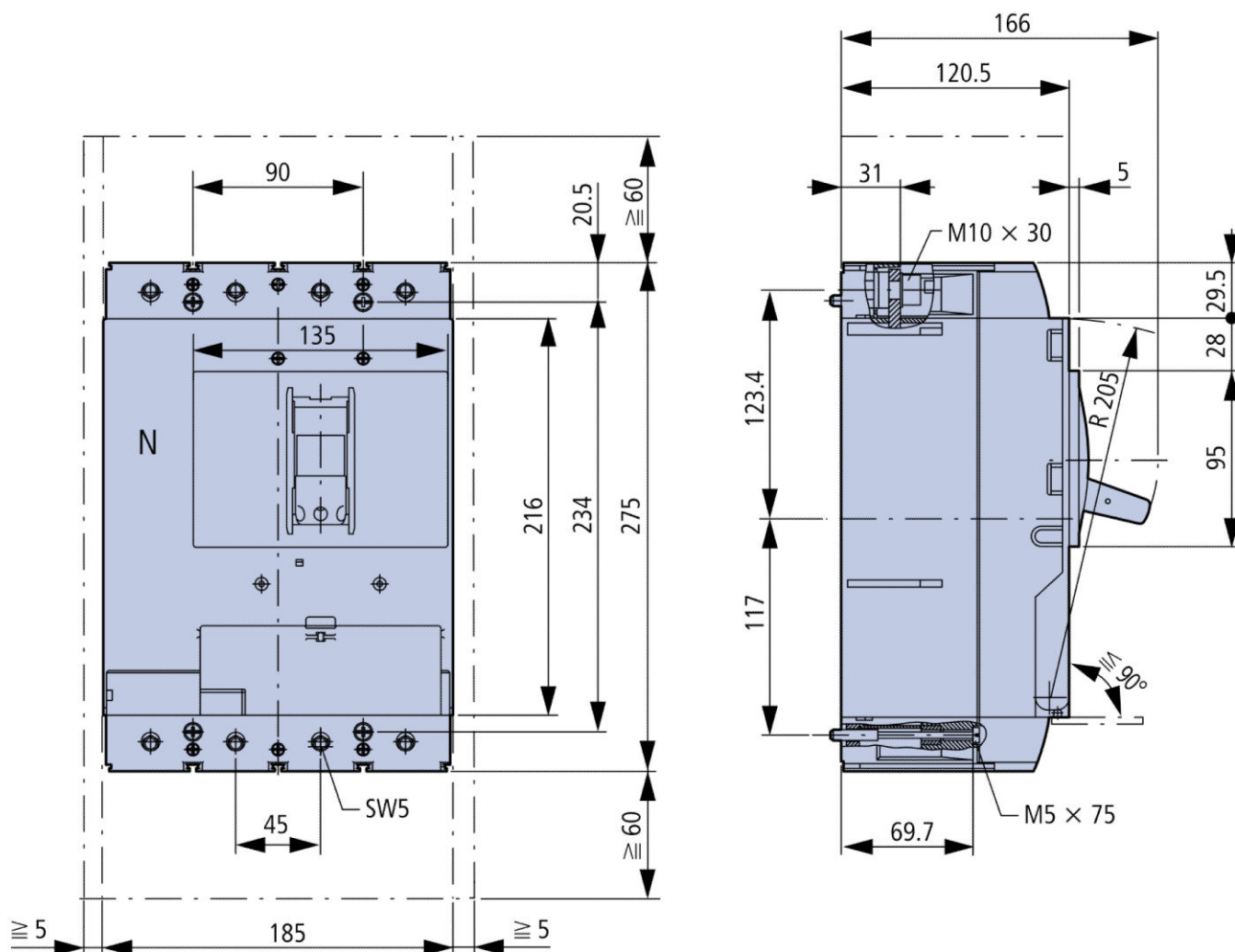
630A

630A

630A 10 x 40

- 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 purpose of orientation. The design standards which apply in each case must be observed.
- 2) Depending on the cable manufacturer up to 240mm² can be connected.

Dimensioned drawing: Moulded Case Circuit Breaker Type AE, 4-pole, 150kA, 400A



DESCRIPTION	Order No.
Moulded Case Circuit Breaker Type AE, 4-pole, 150kA, 400A	
Size type 3, Rated current 400A, Poles 4, IP Rating IP20, Short circuit switching capacity 150kA, Tripping Unit AE electronic protection for system and line	MC340342