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E-T-A® Thermal-Magnetic Circuit Breakers 3500/4000

Description

Single pole thermal-magnetic circuit breaker with tease-free, trip-free, snap action mechanism and two button operation (M-type TM CBE to EN 60934). Featuring a flange for panel mounting, and optional auxiliary contacts and unprotected shunt tap terminal. Type 4000 offers lower internal resistance values and is fitted as standard with auxiliary contacts and an intermediate reset position in which all contacts are isolated.

Approved to CBE standard EN 60934 (IEC 60934).

Typical applications

Control systems, instrumentation, medical equipment, machine tools, robotics, communications systems.

Ordering information

Type No.	
3500	standard version
4000	low resistance version
Mounting (optional)	
F11	flange with additional M3 insertion nuts
Terminal design	
P10	blade terminals 6.3-0.8 (QC .250), tinned
K20	screw terminals M3.5x5.5 with clamp (not with -Si or type 4000)
Shunt terminal (optional)	
A3	same as main terminals (up to $I_N = 7$ A, max. load 5 A)
Auxiliary contacts (optional with type 3500)	
Si	auxiliary contacts, silver plated terminals one each N/O and N/C
ZR-Si	auxiliary contacts with intermediate position (standard with type 4000)
Current ratings	
0.05...16 A	(type 3500)
0.05...10 A	(type 4000)
3500 - .. - P10 - A3 - Si - 10 A	ordering example

The exact part number required can be built up from the table of choices shown above. Ordering references for optional features should be omitted if not required.

Standard current ratings and typical internal resistance values

Current ratings (A)	Internal resistance (Ω)		Current ratings (A)	Internal resistance (Ω)	
	3500	4000		3500	4000
0.05	447	211	3	0.19	0.054
0.1	131	48	4	0.090	0.035
0.2	40	12.4	5	0.061	0.025
0.3	19.3	5.4	6	0.041	≤ 0.02
0.4	10.4	3.1	7	0.034	≤ 0.02
0.5	7.1	2.0	8	≤ 0.02	≤ 0.02
0.6	4.3	1.32	10	≤ 0.02	≤ 0.02
0.8	2.5	0.76	12	≤ 0.02	
1	1.67	0.49	14	≤ 0.02	
1.5	0.61	0.21	15	≤ 0.02	
2	0.38	0.101	16	≤ 0.02	
2.5	0.24	0.078			



3500
standard type

4000
low-resistance type

Technical data

For further details please see chapter: Technical Information

Voltage rating	AC 240 V, 50/60 Hz; DC 65 V (UL: AC 250 V; DC 80 V)		
Current rating range	3500: 0.05...16 A 4000: 0.05...10 A		
Auxiliary circuit	1 A, AC 240 V / DC 65 V		
Typical life	5,000 operations at 1 x I _N , inductive 5,000 operations at 2 x I _N , resistive		
Ambient temperature	-30...+60 °C (-22...+140 °F)		
Insulation co-ordination (IEC 60664 and 60664 A)	rated impulse withstand voltage 2.5 kV reinforced insulation in operating area	pollution degree 2	
Dielectric strength (IEC 60664 and 60664A)	test voltage operating area main/aux. circuit aux. circuit 4-5/6-7		
Insulation resistance	> 100 MΩ (DC 500 V)		
Interrupting capacity I _{cn}	3500 0.05...0.8 A 1...2 A 2.5...16 A	4000 0.05...0.2 A 0.3...2 A 2.5...10 A	self-limiting 200 A 400 A
Interrupting capacity (UL 1077)	I _N 0.05...16 A type 3500: 0.05...16 A	U _N AC 250 V DC 80 V	1,000 A 1,000 A
Degree of protection (IEC 60529/DIN 40050)	operating area IP40 terminal area IP00		
Vibration	5 g (57-500 Hz), ±0.38 mm (10-57 Hz) to IEC 60068-2-6, test Fc 10 frequency cycles/axis		
Shock	25 g (11 ms) to IEC 60068-2-27, test Ea		
Corrosion	96 hours at 5 % salt mist to IEC 60068-2-11, test Ca		
Humidity	240 hours at 95 % RH to IEC 60068-2-3, test Ca		
Mass	approx. 40 g		

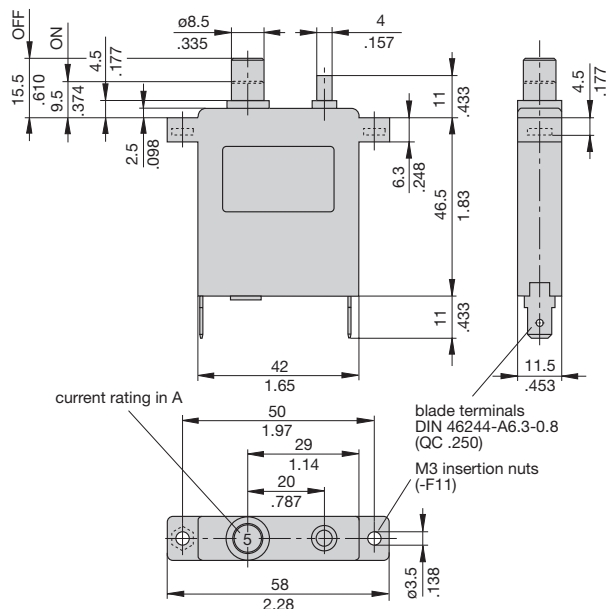
Approvals

Authority	Voltage ratings	Current ratings
3500:		
VDE (EN 60934)	AC 240 V; DC 65 V	0.05...16 A
CSA, UL	AC 250 V; DC 80 V	0.05...16 A
4000:		
VDE (EN 60934)	AC 240 V; DC 65 V	0.05...10 A
CSA	AC 250 V	0.05...10 A

E-T-A® Thermal-Magnetic Circuit Breakers 3500/4000

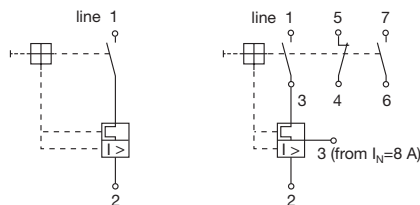
Dimensions

Version -P10

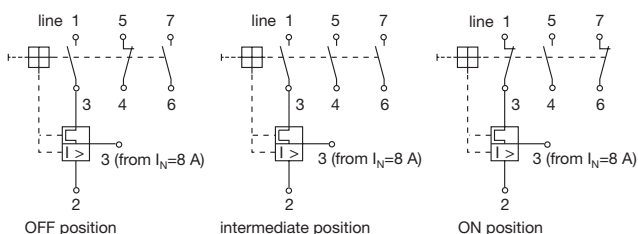


Internal connection diagrams

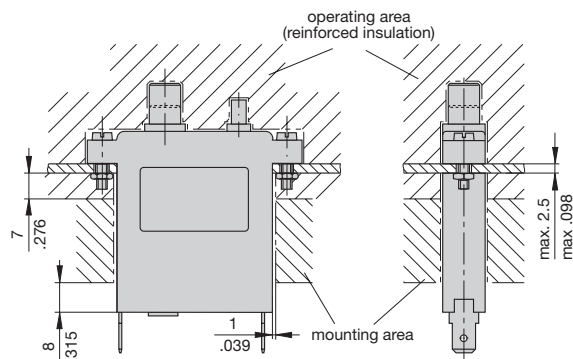
with shunt terminal (-A3) and auxiliary contacts (-Si)



Switching position with intermediate position and auxiliary contacts (-ZR-Si)

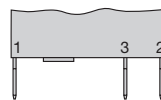


Installation drawing

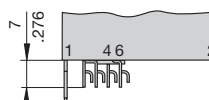


Terminal design

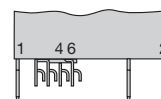
-P10-A3



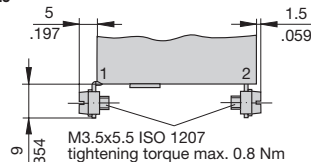
-P10-Si



-P10-A3-Si

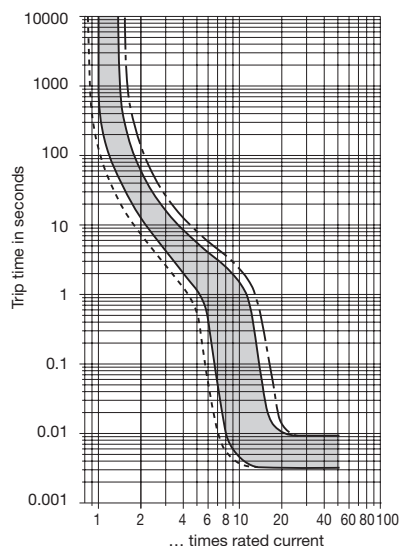


-K20

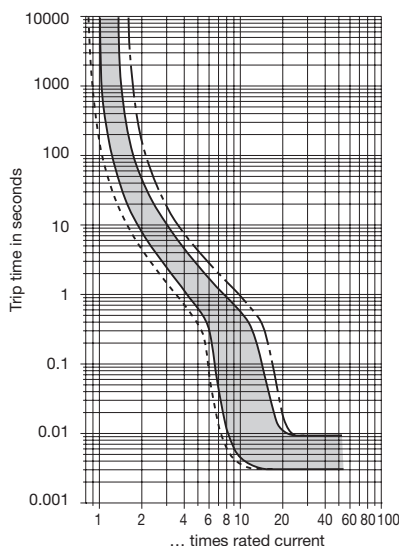


Typical time/current characteristics

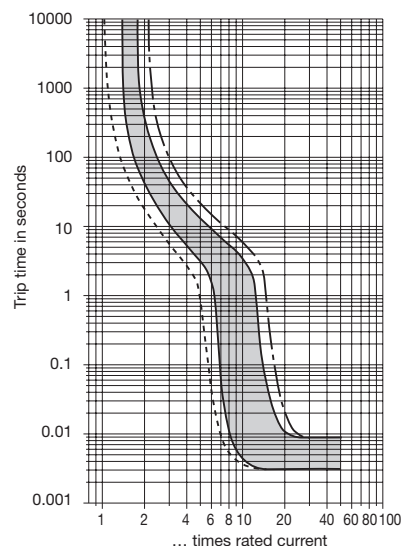
3500 0.05 ... 7 A AC ¹⁾



3500 8 ... 16 A AC ¹⁾



4000 0.05 ... 10 A DC ²⁾



- ¹⁾ Magnetic tripping currents are increased by 20% on DC supplies.
²⁾ Magnetic tripping currents are decreased by 20% on AC supplies.

The time/current characteristic curve depends on the ambient temperature prevailing. In order to eliminate nuisance tripping, please multiply the circuit breaker current ratings by the derating factor shown below. See also section 9 – Technical information.

Ambient temperature °F	-22	-4	+14	+32	+73.4	+104	+122	+140
°C	-30	-20	-10	0	+23	+40	+50	+60
Derating factor	0.76	0.79	0.83	0.88	1	1.08	1.16	1.24

E-T-A® Thermal-Magnetic Circuit Breakers 3500/4000

Special version 3500-...-2100

Single pole thermal-magnetic overcurrent circuit breaker with slow magnetic trip curve, suitable for high inrush currents (up to $12 \times I_N$). Suffix -2100 is also available for types 3400 and 3600. Enquire for further details.

Typical applications

Industrial control systems, telecommunications, etc.

Standard current ratings and typical internal resistance values

Current rating (A)	Internal resistance (Ω)	Current rating (A)	Internal resistance (Ω)
0.06	292	3	0.18
0.1	165	4	0.11
0.2	41.7	5	0.067
0.3	19.7	6	0.052
0.4	12.1	7	0.035
0.5	7.9	8	0.031
0.6	5.5	10	0.022
0.8	2.6	12	≤ 0.02
1	1.88	14	≤ 0.02
1.5	0.77	15	≤ 0.02
2	0.42	16	≤ 0.02
2.5	0.24		

Special version 3500-...-2350

Single pole thermal-magnetic circuit breaker suitable for high ambient temperatures. The special rating of the circuit breaker allows resetting at no load in ambient temperatures up to $+80^\circ\text{C}$. Suffix -2350 is also available for types 3400 and 3600. Enquire for further details.

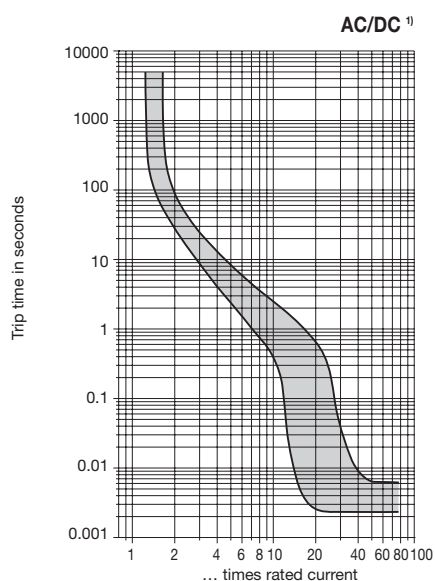
Typical applications

Industrial control systems.

Standard current ratings and typical internal resistance values

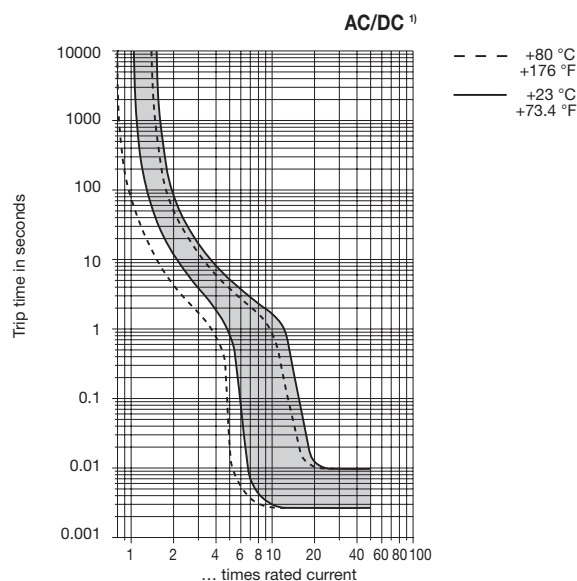
Current rating (A)	Internal resistance (Ω)	Current rating (A)	Internal resistance (Ω)
0.05	583	2.5	0.42
0.1	167	3	0.21
0.2	49.9	4	0.13
0.3	23.1	5	0.11
0.4	12.8	6	0.056
0.5	8.7	10	0.022
0.8	3.45	12	≤ 0.02
1	2.3	15	≤ 0.02
1.5	0.89	16	≤ 0.02
2	0.48		

Typical time/current characteristics at $+23^\circ\text{C}$



¹⁾ Magnetic tripping currents are increased by 20% on DC supplies.

Typical time/current characteristics



¹⁾ Magnetic tripping currents are increased by 20% on DC supplies.