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 narrow profile housing, recessed terminals, standard EN rail mounting, and precision CBE performance.
Approved to CBE standard EN 60934 (IEC 60934).

Typical applications

Process control systems, instrumentation, rail vehicles.

Ordering information

Type No.		
201	single pole, rail mounted version	
201-WA	low-resistance version	
	Option	
	2705	fitted with adapter X 200 409 01
	Current ratings	
	0.05...16 A	(type 201)
	0.05...10 A	(type 201-WA)
201 - .. -	- 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 rating (A)	Internal resistance (Ω) 201	201-WA	Current rating (A)	Internal resistance (Ω) 201	201-WA
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	5.7	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			

Approvals

Authority	Voltage ratings	Current ratings
VDE (EN 60 934)	AC 240 V; DC 65 V	0.05...16 A
CSA, UL	AC 250 V; DC 80 V	0.05...16 A
UL	DC 65 V	0.05...25 A

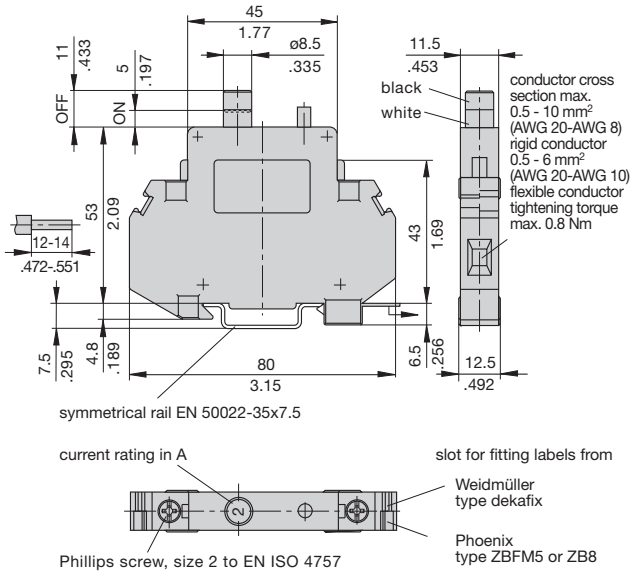
201-... standard type

201-WA-... low-resistance type

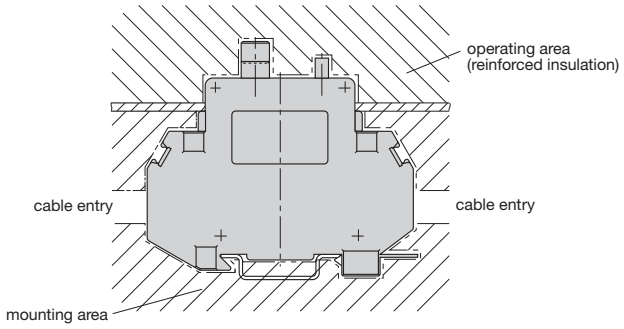
Technical data

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	201: 0.05...16 A 201-WA: 0.05...10 A		
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	pollution degree 2 in operating area	
Dielectric strength (IEC 60664 and 60664A) operating area	test voltage AC 3,000 V		
Insulation resistance	> 100 MΩ (DC 500 V)		
Interrupting capacity I_{cn}	201 0.05...0.8 A 1...2 A 2.5...16 A	201-WA 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 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 IP20		
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 Ka		
Humidity	240 hours at 95 % RH to IEC 60068-2-78, test Cab		
Mass	approx. 60 g		

Dimensions

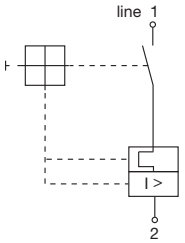


Installation drawing



This is a metric design and millimeter dimensions take precedence ($\frac{mm}{inch}$)

Internal connection diagram

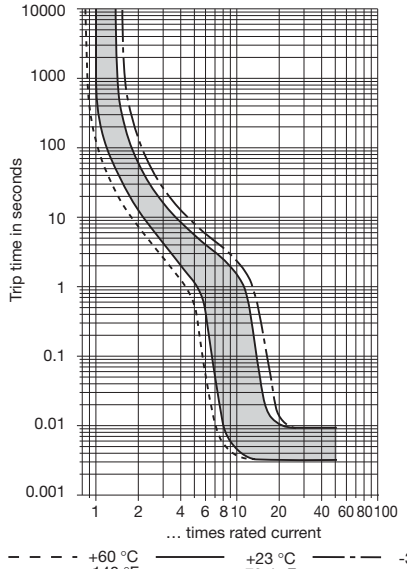


The time/current characteristic curve depends on the ambient temperature prevailing. In order to eliminate nuisance tripping, please multiply the circuit breaker current ratings by the derating factor shown below. See also section 9 – Technical information.

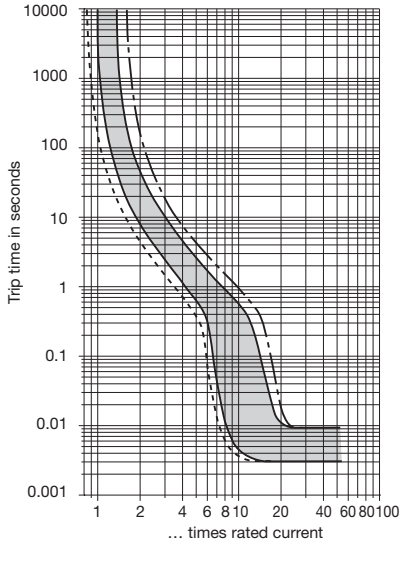
Ambient temperature	°F	-22	-4	+14	+32	+73.4	+104	+122	+140
	°C	-30	-20	-10	0	+23	+40	+50	+60
Derating factor		0.76	0.79	0.83	0.88	1	1.08	1.16	1.24

Typical time/current characteristics

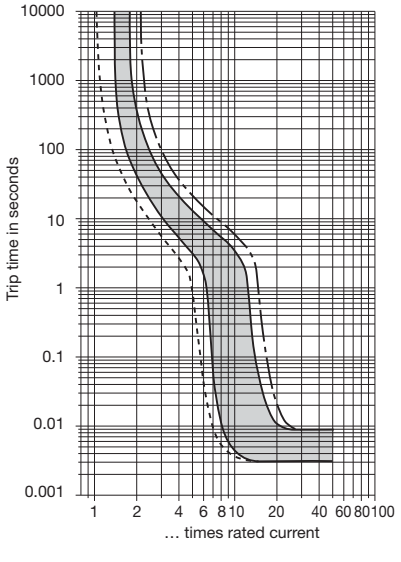
Type 201 0.05...7 A AC/DC [1]



Type 201 8...16 A AC/DC [1]



Type 201-WA 0.05...10 A DC/AC [2]

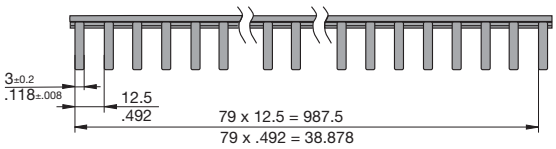


– – – – +60 °C +140 °F ——— +23 °C +73.4 °F —·— -30 °C -22 °F

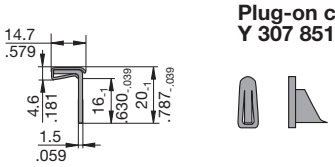
[1] Magnetic tripping currents are increased by 20% on DC supplies.
[2] Magnetic tripping currents are decreased by 20% on AC supplies.

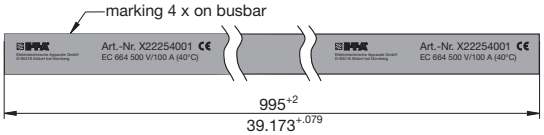
Accessories

Busbar 1-pole, 90°
X 222 540 01
The one metre long busbars can be cut to suitable lengths. Plug-on caps can be fitted on the ends to provide brush contact protection.
I_{max} - busbar 100 A (40°C)

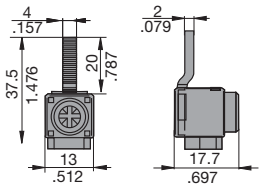


Plug-on cap, 1-pole
Y 307 851 01

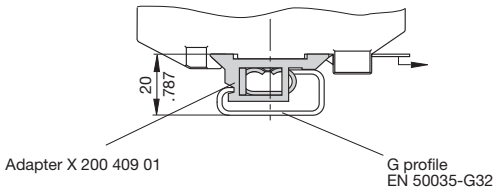




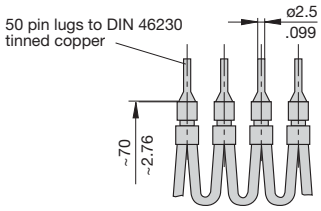
Supply terminal I_{max} 63 A
Y 308 551 01
Max. tightening torque of terminal screw 2 Nm
Max. cable cross section: 25 mm² / single strand
16 mm² / multistrand
with wire end ferrule



Adapter for EN rail 50035-G32 specified as a separate item
X 200 409 01



Connector bus links -K10
X 210 589 01/2.5 mm², (AWG 14) (black) up to 20 A max. load
X 210 589 02/1.5 mm², (AWG 16) (brown) up to 13 A max. load



2

This is a metric design and millimeter dimensions take precedence (mm/inch)

All dimensions without tolerances are for reference only. In the interest of improved design, performance and cost effectiveness the right to make changes in these specifications without notice is reserved.Product markings may not be exactly as the ordering codes. Errors and omissions excepted.

Description

One, two and three pole thermal-magnetic circuit breakers with trip-free mechanism and toggle actuation (S-type TM CBE to EN 60934/IEC 934). Designed for panel or plug-in mounting. Available with auxiliary contacts (1 x N/O, 1 x N/C) for status signalling. Two and three pole models are internally linked to ensure that both/all poles trip in the event of an overload on one pole, even if the actuator is held in the ON position. A choice of characteristic curves further extends the range of applications possibilities for these CBEs. Special auxiliary contact versions for industrial atmosphere and low voltages (e.g. 5 V) available on request.
Approved to CBE standard EN 60934 (IEC 60934).
Suitable for use in distribution rails – see section 7.

Typical applications

Process control equipment, robotics, machine tool control, communications systems, instrumentation, rail vehicles. Special versions, e.g. for aggressive environmental conditions and low voltages (e.g. 5 V) on request.

Ordering information

Type No.
2210 single or multipole thermal-magnetic circuit breaker

Mounting
S socket or panel mounting

Actuator design
2 toggle

Number of poles
1 1-pole protected
2 2-pole protected
3 3-pole protected
5 2-pole, protected on one pole only

Panel mounting
0 without hardware
1 with M3 thread
2 with 6/32 thread

Terminal design (main contacts)
P1 blade terminals 6.3-0.8 (QC .250)

Characteristic curve
F1 fast acting: therm.1.01-1.4xI_N;magn.2-4xI_N DC (DC only)
F2 fast acting: therm.1.01-1.4xI_N; magn.3.5-6.5xI_N AC/ 4.5-8.5xI_N DC
M1 standard delay: therm. 1.01-1.4xI_N; magn. 6-12xI_N AC;7.8-15.6xI_N DC
T1 delayed: therm. 1.01-1.4xI_N; magn. 10-20xI_N AC
T2 thermal only, 1.01-1.4xI_N
M3 standard delay, low resistance: therm.1.4-1.8xI_N; magn. 6-12xI_N AC; 7.8-15.6xI_N DC

Intermediate position
H without intermediate position (standard)
Z with intermediate position

Auxiliary contacts
0 without auxiliary contacts
1 with auxiliary contacts in all poles
2 with auxiliary contacts in pole 1 (only multipole devices)
3 with auxiliary contacts in poles 1 and 3 (≥ 3-pole devices)

Auxiliary contact function (see diagram)
1 one each N/C and N/O (standard)
2 one N/O contact (23/24)
3 one N/C contact (11/12)

Auxiliary contact - terminal design
1 same as main terminals

Current ratings
0.1...25 A

2210 - S 2 1 0 - P1 F1 - H 1 1 1 - 10 A ordering example

Remote trip coil available to special order.

2210-S2..

Technical data

For further details please see chapter: Technical Information

Voltage rating	AC 250 V*; 3 AC 433 V (50-60Hz); DC 65 V (*UL: AC 277 V; DC 65 V)
Current rating range	0.1...25 A for curves M1, T1, T2 0.1...16 A for curves F1, F2, M3
Auxiliary circuit	1 A, AC 240 V/DC 65 V
Typical life	10,000 operations at 1 x I_N, inductive
Ambient temperature	-30...+60 °C (-22...+140 °F) T 60
Insulation co-ordination (IEC 60664 and 60664A)	rated impulse withstand voltage 2.5 kV; pollution degree 2 reinforced insulation in operating area
Dielectric strength (IEC 60664 and 60664A)	test voltage operating area AC 3,000 V main/aux. circuit AC 1,500 V aux. circuit 11-12/23-24 AC 1,000 V pole/pole AC 1,500 V
Insulation resistance	> 100 MΩ (DC 500 V)
Interrupting capacity I_{cn}	0.1...5 A 400 A 6...25 A 800 A curves F1, F2, M1, T1: 0.1...16 A 2,500A (at DC 32 V) curve T2 : 0.1...25 A 15 x I_N curve M3: 0.1...2 A AC 200 A / DC 400 A

Interrupting capacity (UL 1077)

	I_N / U_N	0.1...8 A AC 250 V	10...16 A AC 125 V	20...25 A AC 250 V	0.1...25 A DC 65 V
	1-pole	1,000 A	2,000 A	3,500 A	2,000 A
	2-pole	2,000 A	2,000 A	3,500 A	2,000 A
	3-pole	3AC 250V 2,000 A	3AC 250V 2,000 A	3AC 216V 3,500 A	

Degree of protection (IEC 60529/DIN 40050)	operating area IP30 terminal area IP00
Vibration curve F1: curves M1, M3, T1, T2:	3 g (57-500 Hz), ± 0.23 mm (10-57 Hz) 5 g (57-500 Hz), ± 0.38 mm (10-57 Hz) to IEC 60068-2-6, test Fc 10 frequency cycles/axis
Shock curve F1: curves M1, M3, T1, T2:	25 g (11 ms), directions 1, 2, 3, 4, 5 10 g (11 ms), direction 6 25 g (11 ms), directions 1, 2, 3, 4, 5 20 g (11 ms), direction 6 to IEC 60068-2-27, test Ea
Corrosion	96 hours in 5 % salt mist to IEC 60068-2-11, test Ka
Humidity	240 hours at 95 % RH to IEC 60068-2-78, test Cab
Mass	approx. 50 g per pole

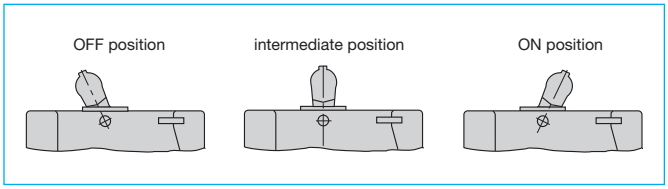
Standard current ratings and typical internal resistance values

Current rating (A)	Internal resistance (Ω) F1 fast acting for DC only	F2 fast acting delay for AC + DC	M1 standard for AC + DC	T1 delayed low resistance nur für AC	M3 standard delay for AC + DC	T2 thermal for AC + DC
0.1	162	162	92	81	42	77
0.2	39.3	39.3	26.1	24.2	11.7	23
0.3	17.5	17.5	11.6	10.4	5.6	10.2
0.4	9.2	9.2	6,6	6.0	2.9	5.7
0.5	6.8	6.8	4,1	3.9	1.75	3.7
0.6	4.2	4.2	3	2.7	1.42	2.6
0.8	2.8	2.8	1.65	1.53	0.75	1.39
1	1.6	1.6	1,10	0.98	0.5	0.9
1.5	0.78	0.78	0.47	0.42	0.22	0.36
2	0.42	0.42	0.28	0.24	0.136	0.19
2.5	0.26	0,26	0.183	0.17	0.083	0.141
3	0.18	0.18	0.124	0.12	0.057	0.091
4	0.12	0.12	0.077	0.073	0.041	0.051
5	0.092	0.092	0.063	0.055	0.032	0.040
6	0.054	0.054	0.045	0.039	0.021	0.027
8	0.025	0.025	≤ 0.02	≤ 0.02	≤ 0.02	≤ 0.02
10	0.022	0.02	≤ 0.02	≤ 0.02	≤ 0.02	≤ 0.02
12	≤ 0.02	≤ 0.02	≤ 0.02	≤ 0.02	≤ 0.02	≤ 0.02
16	≤ 0.02	≤ 0.02	≤ 0.02	≤ 0.02	≤ 0.02	≤ 0.02
20	-	-	≤ 0.02	≤ 0.02	-	≤ 0.02
25	-	-	≤ 0.02	≤ 0.02	-	≤ 0.02

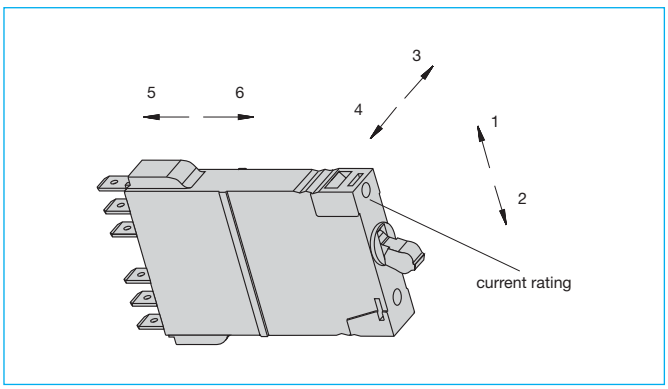
Approvals

Authority	Voltage ratings	Current ratings
GL, VDE (EN 60934)	AC 250 V; DC 65 V; 3 AC 433 V	0.1...25 A
UL, CSA	AC 277 V; DC 65 V; AC 277/480 V	0.1...25 A

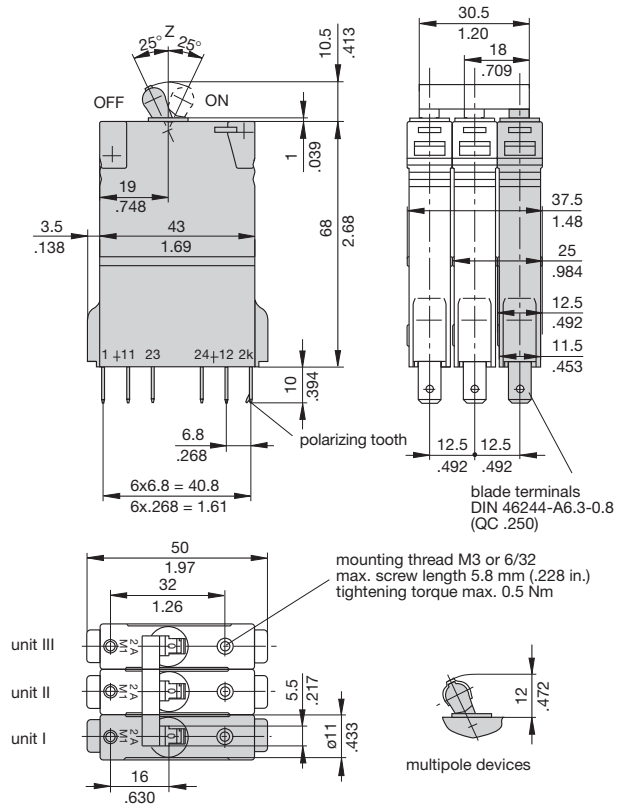
Toggle positions



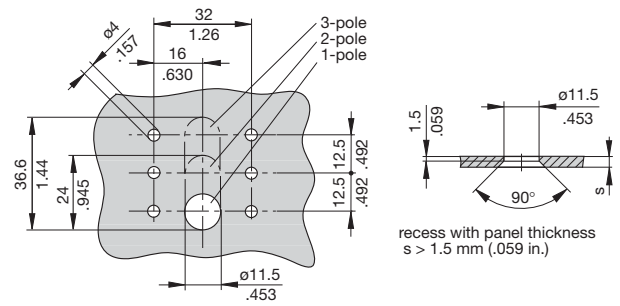
Shock directions



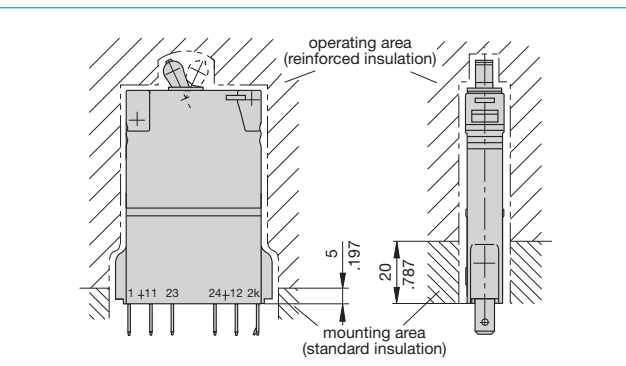
Dimensions



Cut-out dimensions



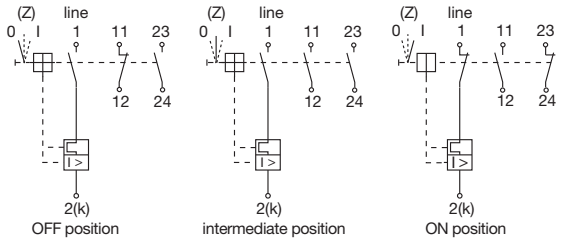
Installation drawing



This is a metric design and millimeter dimensions take precedence ($\frac{mm}{inch}$)

Internal connection diagrams

with auxiliary contact function 1 (one each N/O and N/C)
(...-H111-...) without intermediate position
(...-Z111-...) with intermediate position



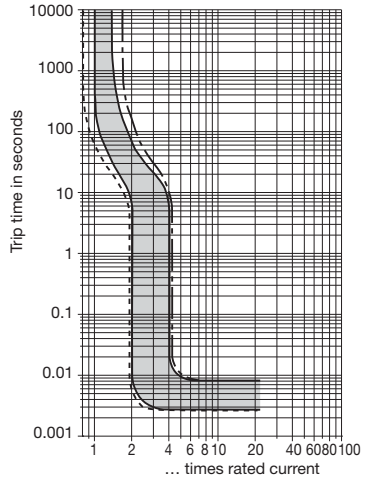
The time/current characteristic curve depends on the ambient temperature prevailing. In order to eliminate nuisance tripping, please multiply the circuit breaker current ratings by the derating factor shown below. See also section 9 – Technical information.

Ambient temperature	°F	-22	-4	+14	+32	+73.4	+86	+104	+122	+140
	°C	-30	-20	-10	0	+23	+30	+40	+50	+60
Derating factor		0.76	0.79	0.83	0.88	1	1.04	1.11	1.19	1.29

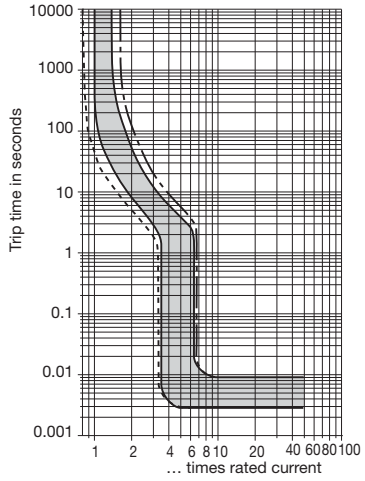
Multipole devices: all poles symmetrically loaded. With single pole overload, thermal tripping will be at max. 1.7 x I_N with curves F1, F2, M1 and T2, and at max. 2.2 x I_N with curve M3.

Typical time/current characteristics

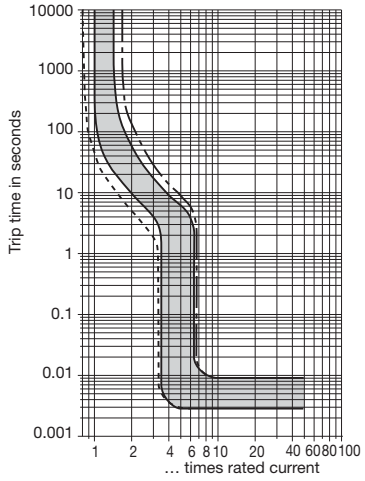
-F1 0.1 ... 16 A DC only

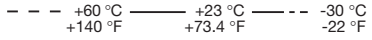


-F2 0.1 ... 7.5 A AC/ DC [1]



-F2 8 ...16 A AC/ DC [1]





[1] Magnetic tripping currents are increased by 30% on DC supplies.

2

Typical time/current characteristics

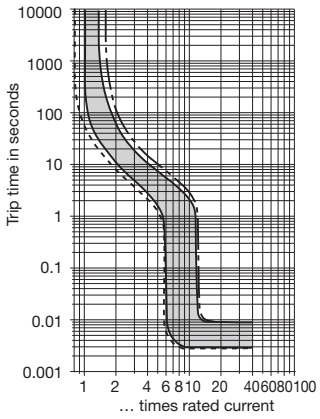
The time/current characteristic curve depends on the ambient temperature prevailing. In order to eliminate nuisance tripping, please multiply the circuit breaker current ratings by the derating factor shown below. See also section 9 – Technical information.

Ambient temperature	°F	-22	-4	+14	+32	+73.4	+86	+104	+122	+140
	°C	-30	-20	-10	0	+23	+30	+40	+50	+60
Derating factor		0.76	0.79	0.83	0.88	1	1.04	1.11	1.19	1.29

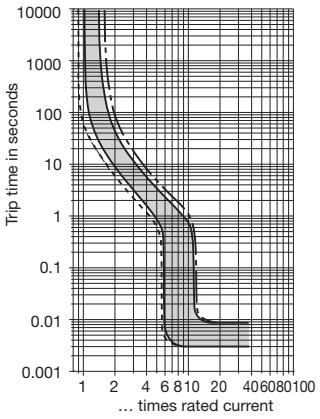
Multi pole devices: all poles symmetrically loaded. With single pole overload, thermal tripping will be at max. 1.7 x I_N with curves F1, F2, M1 and T2, and at max. 2.2 x I_N with curve M3.

[1] Magnetic tripping currents are increased by 30% on DC supplies (curves M1, M3, T1).

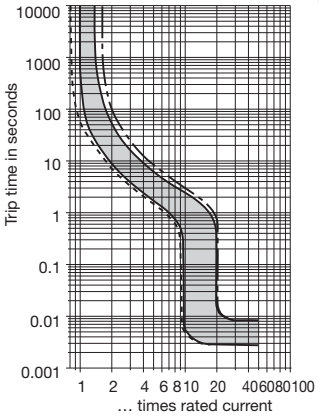
-M1 0.1 ... 6 A AC/DC [1]



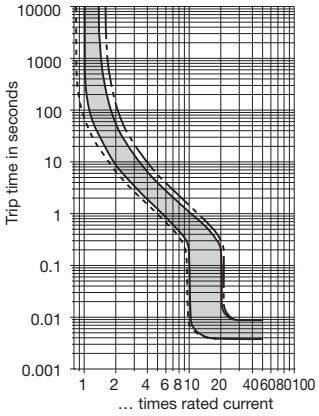
-M1 8 ... 32 A AC/DC [1]



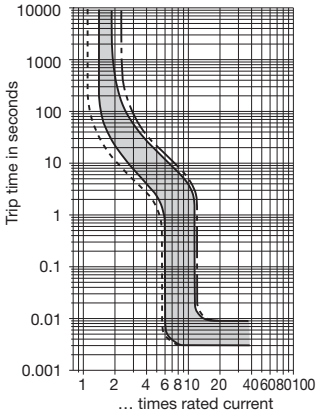
-T1 0.1 ... 6 A AC only



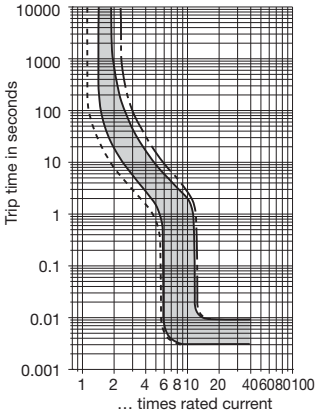
-T1 8 ... 32 A AC only



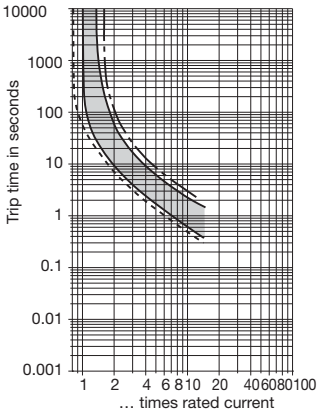
-M3 0.1 ... 5 A AC/DC [1]



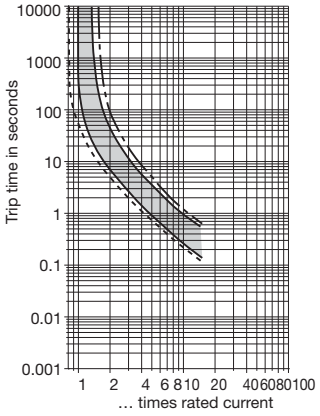
-M3 6 ... 16 A AC/DC [1]



-T2 0.1 ... 6 A AC/DC



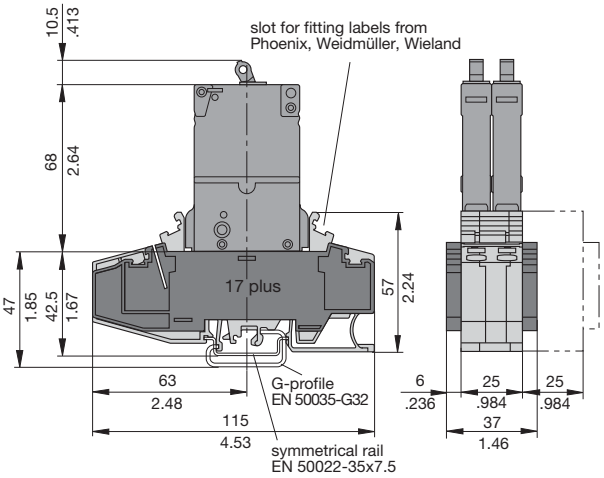
-T2 8 ... 32 A AC/DC

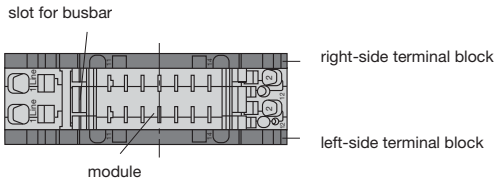


+60 °C +140 °F — +23 °C +73.4 °F — -30 °C -22 °F

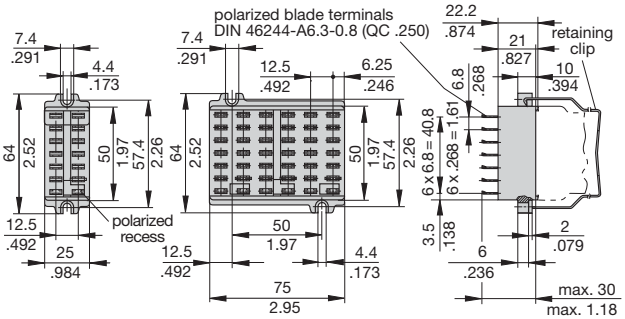
Accessories

Module 17plus
For technical data see section 7 - Power distribution systems

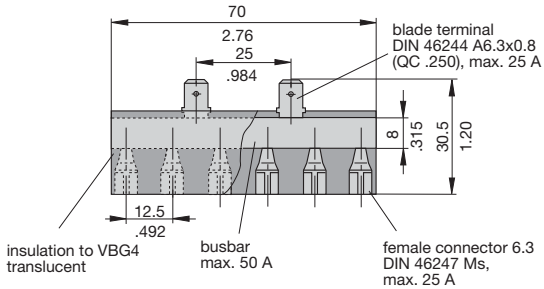




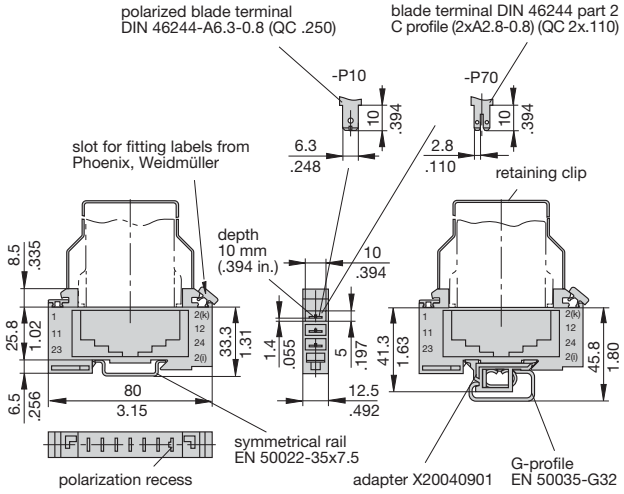
2-way mounting socket **23-P10-Si**
6-way mounting socket **63-P10-Si**
(up to 16 A max. load)
(retaining clip Y 302 974 01 available on request)



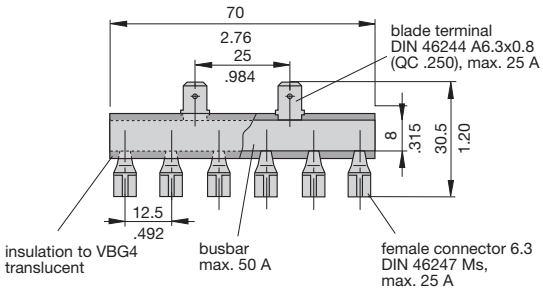
Bus bar 50 A, 6-way, for type 63-P10-Si socket
X 221 760 11



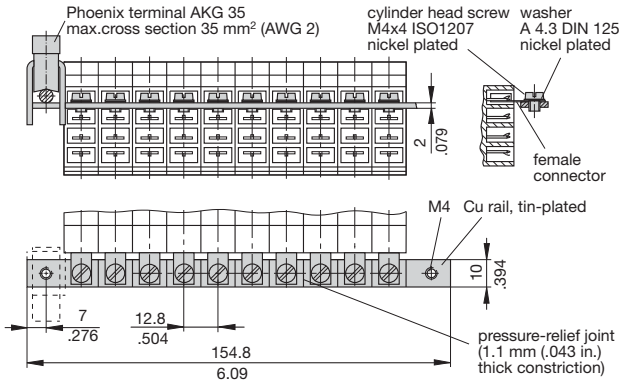
Single mounting sockets (with adapter)
(up to 16 A max. load)
17-P10-Si **17-P10-Si-20025**
17-P70-Si **17-P70-Si-20025**
(retaining clip Y 302 974 21 available on request)



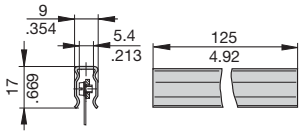
Bus bar 50 A (6-way) for type 17-P10-Si socket
X 221 760 01



Bus bar (10-way) (supplied as a complete package)
for type 17 socket
(for max. 100 A continuous load),
more positions available on request
X 211 157 01 with terminal
X 211 157 02 without terminal



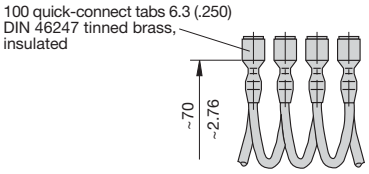
Insulating sleeving for bus bar (10-way)
Y 303 824 01



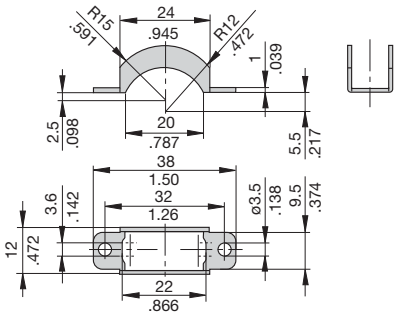
This is a metric design and millimeter dimensions take precedence ($\frac{mm}{inch}$)

Accessories

Connector bus links -P10
X 210 588 01/ 1.5 mm², (AWG 16), brown (up to 13 A max. load)
X 210 588 02/ 2.5 mm², (AWG 14), black (up to 20 A max. load)
X 210 588 03/ 2.5 mm², (AWG 14), red (up to 20 A max. load)
X 210 588 04/ 2.5 mm², (AWG 14), blue (up to 20 A max. load)

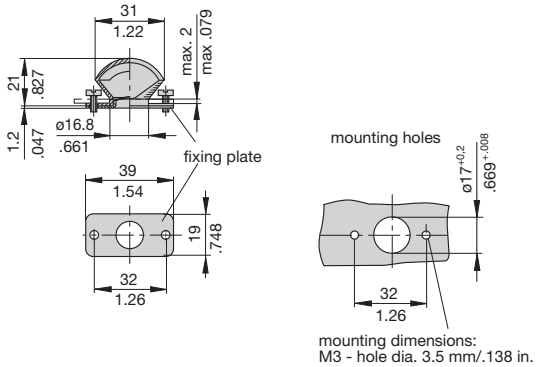


Toggle guard for 1-pole units, black
X 221 617 01

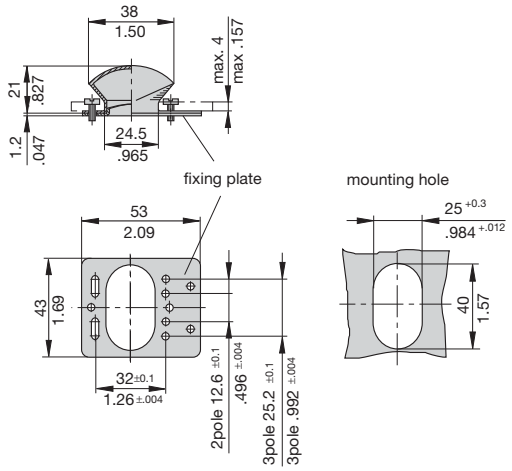


For front panel mounting.

Splash cover (transparent)
with fixing plate and screws (IP54)
for type 2210-S211-... (1-pole)
X 211 117 02



Splash cover (transparent)
with fixing plate and screws (IP54)
for type 2210-S221-... (2-pole) and
type 2210-S231-... (3-pole)
X 211 118 01



This is a metric design and millimeter dimensions take precedence ($\frac{mm}{inch}$)

All dimensions without tolerances are for reference only. In the interest of improved design, performance and cost effectiveness the right to make changes in these specifications without notice is reserved.Product markings may not be exactly as the ordering codes. Errors and omissions excepted.

Description

Single pole thermal-magnetic circuit breaker with trip-free mechanism and toggle actuation. Two-chamber construction with cascade contact arrangement to provide high voltage DC capability and high switching performance.
Designed for plug-in mounting in distribution rail X2210-S0606J (see section 7) or terminal blocks 23-P10-Si-202005 and 63-P10-Si-202005. Approved to CBE standard EN 60934 (IEC 60934).

Typical applications

Communications systems, power supplies, process control equipment.

Ordering information

Type No.		
2210	thermal-magnetic circuit breaker, toggle operated	
	Mounting	
	S291	socket or panel mounting with M3 thread
	Terminal design	
	P9	blade terminals, for distribution rails X2210-S.. and X2210-K..
	Characteristic curve	
	M2	medium delay
	Style	
	410033	single pole with two chambers (one chamber protected only), 1 break contact Si1
	Current ratings	
	1...25 A	

2210 - S291 - P9 M2 - 410033 - 10 A ordering example

Standard current ratings and typical internal resistance values

Current rating (A)	Internal resistance (Ω)
1	1.10
2	0.25
3	0.13
4	0.07
6	0.04
8	0.02
10	0.02
16	< 0.02
25*	< 0.02

*80% I_N continuous load

Approvals

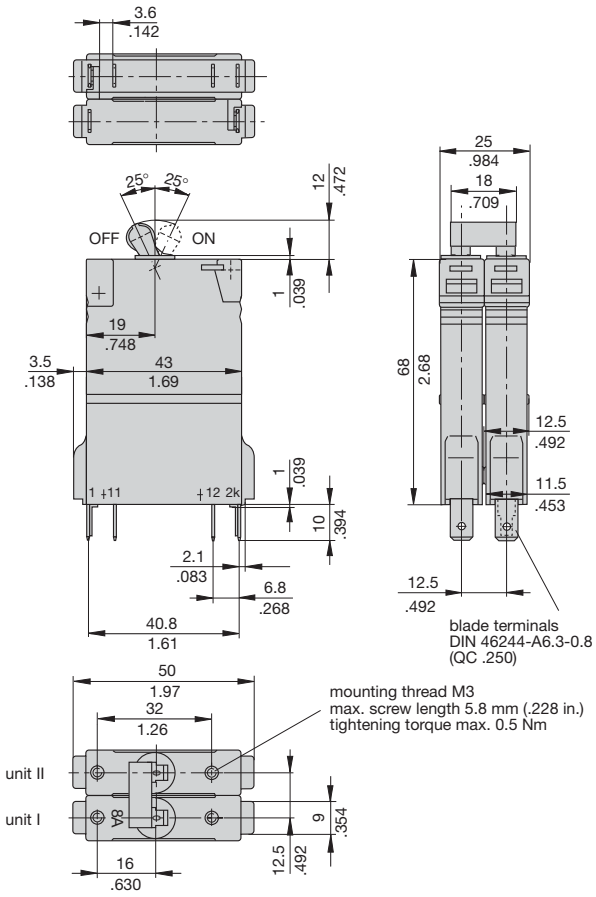
Authority	Voltage ratings	Current ratings
GL, VDE (EN 60934)	AC 250 V; DC 65 V	1...25 A

2210-S291-P9M2-410033-...A

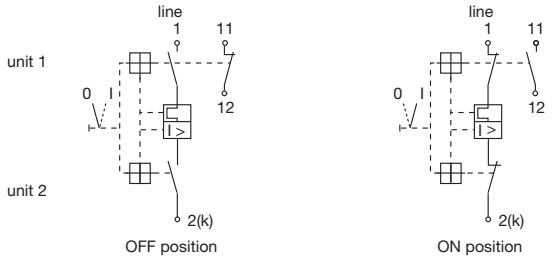
Technical data

Voltage rating	AC 250 V; DC 65 V
Current rating range	1...25 A
Auxiliary circuit	1 A, AC 240 V/DC 65 V
Typical life	> 10,000 operations at 1 x I_N > 20,000 operations mechanical
Ambient temperature	-30°C...+60 °C (-22...+140 °F)
Insulation co-ordination (IEC 60664 and 60664A)	rated impulse withstand voltage 2.5 kV; pollution degree 2 reinforced insulation in operating area
Dielectric strength (IEC 60664 and 60664A) operating area main to aux. circuit	test voltage AC 3,000 V AC 1,500 V
Insulation resistance	> 100 MΩ (DC 500 V)
Interrupting capacity I_{cn}	AC 250 V 1,000 A cosφ = 0.8 DC 65 V 2,000 A L/R = 4 ms
Degree of protection (IEC 60529/DIN 40050)	operating area IP30 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 (11ms) directions 1, 2, 3, 4, 5 20 g (11 ms) direction 6 to IEC 60068-2-27, test Ea
Corrosion	96 hours in 5 % salt mist to IEC 60068-2-11, test Ka
Humidity	240 hours at 95 % RH to IEC 60068-2-78, test Cab
Mass	approx. 80 g

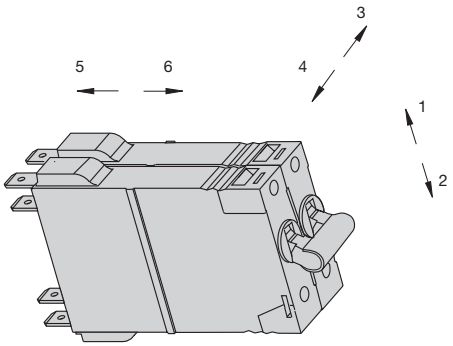
Dimensions



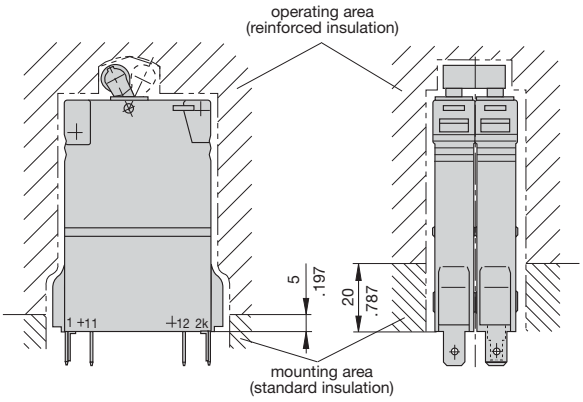
Internal connection diagrams



Shock directions



Installation drawing



Typical time/current characteristics

See page **2** - 21.

This is a metric design and millimeter dimensions take precedence ($\frac{mm}{inch}$)

All dimensions without tolerances are for reference only. In the interest of improved design, performance and cost effectiveness the right to make changes in these specifications without notice is reserved.Product markings may not be exactly as the ordering codes. Errors and omissions excepted.

Description

Single pole thermal-magnetic circuit breaker with trip-free mechanism and toggle actuation. Two-chamber construction with cascade contact arrangement to provide high voltage DC capability and high switching performance.
Designed for plug-in mounting in distribution rail X2210-S0606J (see section 7) or terminal blocks 23-P10-Si-202005 and 63-P10-Si-202005. Approved to CBE standard EN 60934 (IEC 60934).

Typical applications

Communications systems, power supplies, process control equipment.

Ordering information

Type No.		
2210	thermal-magnetic circuit breaker, toggle operated	
	Mounting	
	S291	socket or panel mounting with M3 thread
	Terminal design	
	P9	blade terminals, for distribution rails X2210-S.. and X2210-K..
	Characteristic curve	
	M2	medium delay
	Style	
	410005	single pole with two chambers (protected), 1 break contact Si1
	Current ratings	
	0.4...25 A	

2210 - S291 - P9 M2 - 410005 - 10 A ordering example

Standard current ratings and typical internal resistance values

Current rating (A)	Internal resistance (Ω)	Current rating (A)	Internal resistance (Ω)
0.4	6.87	6	0.09
0.65	2.96	8	0.03
1	1.84	10	0.03
1.6	0.75	12	0.02
2	0.50	16	< 0.02
2.5	0.35	20*	< 0.02
3	0.25	25*	< 0.02
4	0.15	*80 % I_N continuous load	

Approvals

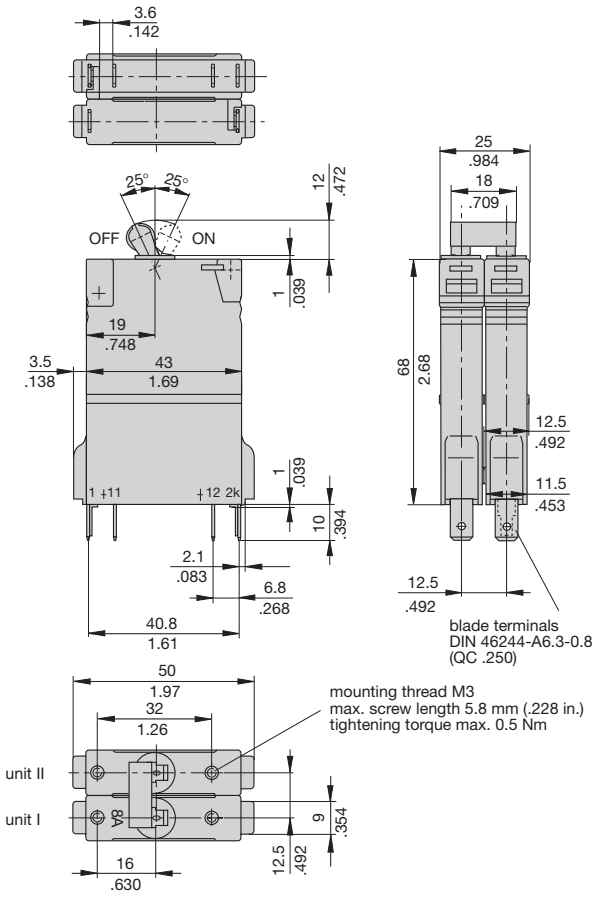
Authority	Voltage ratings	Current ratings
GL, VDE (EN 60934)	AC 250 V; DC 65 V	0.4...25A

2210-S291-P9M2-410005-...A

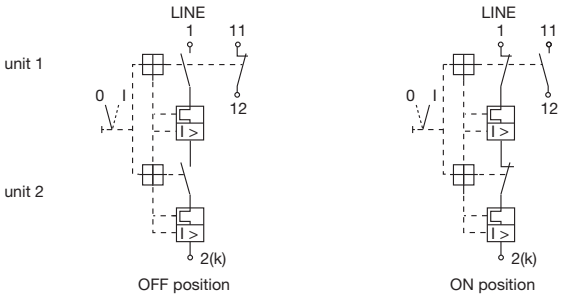
Technical data

Voltage rating	AC 250 V; DC 65 V
Current rating range	0.4...25 A
Auxiliary circuit	1 A, AC 240 V/DC 65 V
Typical life	> 10,000 operations at 1 x I_N > 20,000 operations mechanical
Ambient temperature	-30°C...+60 °C (-22...+140 °F)
Insulation co-ordination (IEC 60664 and 60664A)	rated impulse withstand voltage 2.5 kV; pollution degree 2; reinforced insulation in operating area
Dielectric strength (IEC 60664 and 60664A) operating area main to aux. circuit	test voltage AC 3,000 V; AC 1,500 V
Insulation resistance	> 100 MΩ (DC 500 V)
Interrupting capacity I_{cn}	AC 250 V cosφ = 0.8 0.4...1 A self-limiting 1.6...25 A 2,000 A DC 65 V L/R = 4 ms 0.4...4 A self-limiting 6...25 A 3,500 A
Degree of protection (IEC 60529/DIN 40050)	operating area IP30 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 (11ms) directions 1, 2, 3, 4, 5 20 g (11 ms) direction 6 to IEC 60068-2-27, test Ea
Corrosion	96 hours in 5 % salt mist to IEC 60068-2-11, test Ka
Humidity	240 hours at 95 % RH to IEC 60068-2-78, test Cab
Mass	approx. 80 g

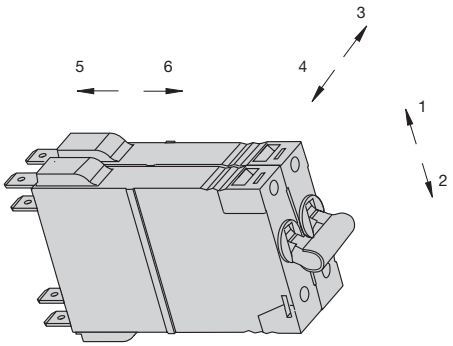
Dimensions



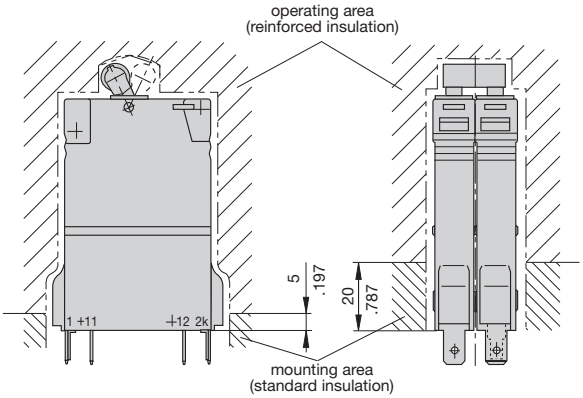
Internal connection diagrams



Shock directions



Installation drawing



Selective back-up fuses

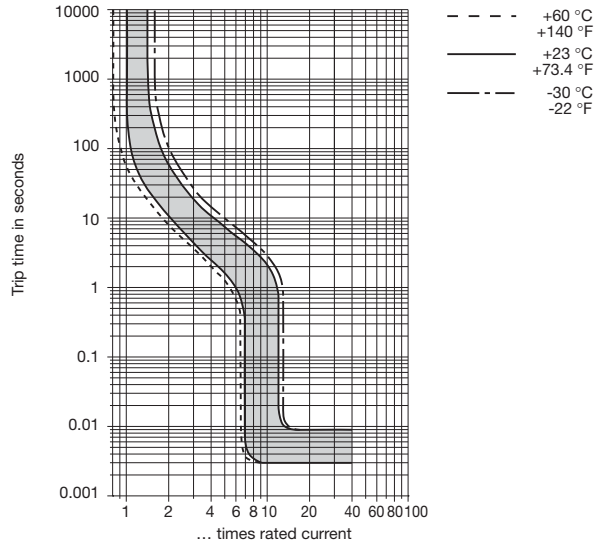
Voltage rating	Interrupting capacity	Selective to	
		NH fuse rating	Current rating of 2210-S291-P2M2-410005
60 V DC	3,500 A	35 A	≤ 6 A
		50 A	≤ 12 A
		63 A	≤ 20 A
		80 A	≤ 25 A
		100 A	≤ 25 A
250 V AC	2,000 A	35 A	≤ 3 A
		50 A	≤ 8 A
		63 A	≤ 20 A
		80 A	≤ 25 A
		100 A	≤ 25 A

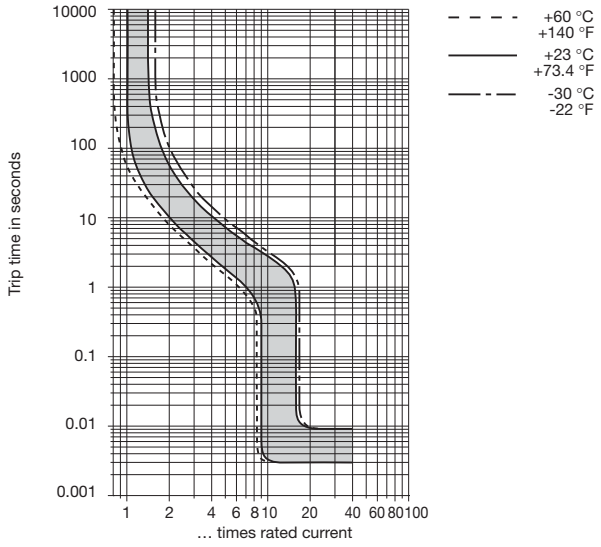
NH fuse according to VDE 0636, part 21 (IEC 269)

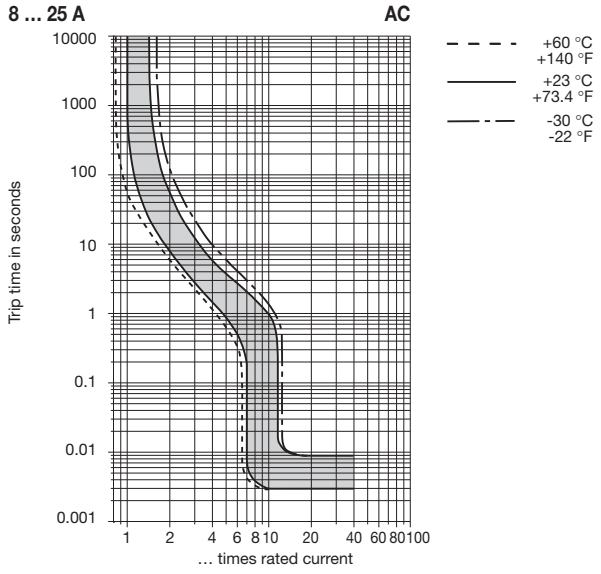
NH fuse = low voltage power fuse

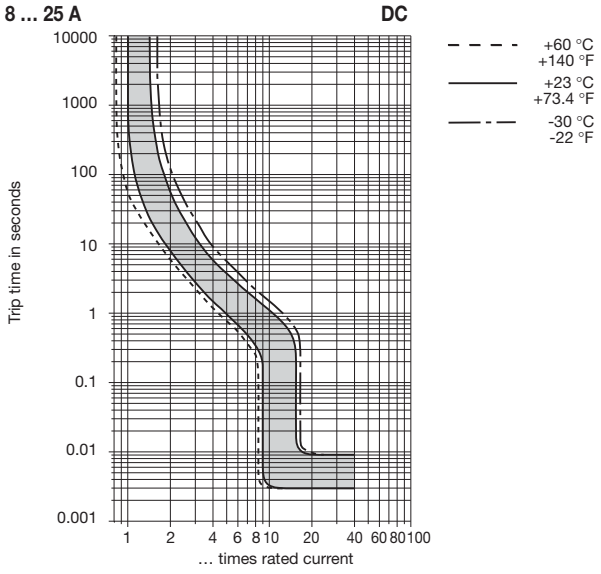
This is a metric design and millimeter dimensions take precedence ($\frac{mm}{inch}$)

Typical time/current characteristics







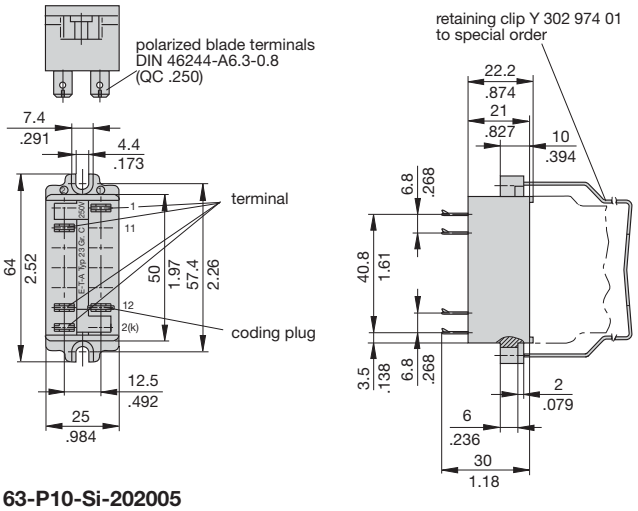


The time/current characteristic curve depends on the ambient temperature prevailing. In order to eliminate nuisance tripping, please multiply the circuit breaker current ratings by the derating factor shown below. See also section 9 – Technical information.

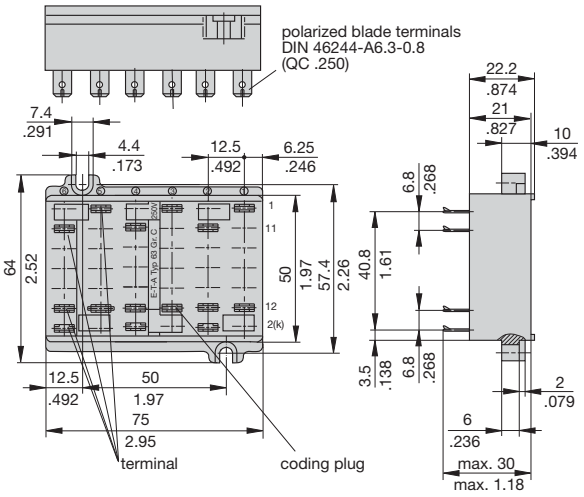
Ambient temperature	°F	-22	-4	+14	+32	+73.4	+86	+104	+122	+140
	°C	-30	-20	-10	0	+23	+30	+40	+50	+60
Derating factor		0.76	0.79	0.83	0.88	1	1.04	1.11	1.19	1.29

Accessories

Mounting sockets
23-P10-Si-202005



63-P10-Si-202005



Distribution rail X2210-S06... see section 7.

This is a metric design and millimeter dimensions take precedence ($\frac{mm}{inch}$)

All dimensions without tolerances are for reference only. In the interest of improved design, performance and cost effectiveness the right to make changes in these specifications without notice is reserved.Product markings may not be exactly as the ordering codes. Errors and omissions excepted.

Description

One, two and three pole thermal-magnetic circuit breakers with trip-free mechanism and toggle actuation (S-type TM CBE to EN 60934/IEC 934). Featuring a combi-foot design for both symmetric and asymmetric rail mounting. Available with auxiliary contact (1 x N/O or 1 x N/C) for status signalling. Two and three pole models are internally linked to ensure that both/all poles trip in the event of an overload on one pole, even if the actuator is held in the ON position. This CBE can be supplied in current ratings up to 32 A with a choice of characteristic curves. All screw terminals are recessed for safety. Approved to CBE standard EN 60934 (IEC 60934).

Typical applications

Process control equipment, robotics, machine tool control, communications systems, instrumentation.

Ordering information

Type No.

2210 single and multipole thermal-magnetic circuit breaker

Mounting

T rail mounting

Actuator design

2 toggle

Number of poles

1 single pole protected
2 2-pole protected
3 3-pole protected
5 2-pole, protected on one pole only

Accessories

0 without accessories

Terminal design (main contacts)

K0 screw terminals

Characteristic curve

F1 fast acting: therm.1.01-1.4xI_N; magn.2-4xI_N DC (DC only)
F2 fast acting: therm.1.01-1.4xI_N; magn.3,5-6,5xI_N AC/4,5-8,5xI_N DC
M1 standard delay: therm. 1.01-1.4xI_N; magn. 6-12xI_N AC, 7.8-15.6xI_N DC
T1 delayed: therm. 1.01-1.4xI_N; magn. 10-20xI_N AC
T2 thermal only, 1.01-1.4xI_N
M3 standard delay, low resistance: therm. 1.4-1.8xI_N; magn. 6-12xI_N AC, 7.8-15.6xI_N DC

Auxiliary contact design

H without intermediate position

Auxiliary contacts

0 without auxiliary contacts
1 with auxiliary contacts
2 auxiliary contacts on pole 1 only (multipole devices)
3 auxiliary contacts on pole 1 and 3 (3-pole devices)

Auxiliary contact function (see diagrams)

2 1 N/O contact
3 1 N/C contact

Auxiliary contact - terminal design

1 screw terminals

Current ratings

0.1...32 A

2210 - T 2 1 0 - K0 M1- H 1 2 1 - 10 A ordering example

Approvals

Authority	Voltage ratings	Current ratings
GL, VDE (EN 60934)	3 AC 433 V; AC 250 V; DC 65 V	0.1...32 A
UL, CSA	3 AC 480 V; AC 277 V; AC 277/480 V; DC 65 V	0.1...32 A

2210-T2..

1-pole 3-pole

Technical data

For further details please see chapter: Technical Information

Voltage rating	AC 250 V; 3 AC 433 V (50/60 Hz); DC 65 V (UL: AC 277/480 V; DC 65 V)	
Current rating range	0.1...32 A for curves M1, T1, T2 0.1...16 A for curves F1, F2, M3	
Auxiliary circuit	1 A, AC 240 V / DC 65 V	
Typical life		
3 AC 433 V; AC 250 V:	0.1...25 A 10,000 operations at 1 x I_N, inductive	
DC 65 V:	0.1...32 A 10,000 operations at 1 x I_N, inductive	
3 AC 433 V; AC 250 V:	32 A 10,000 operations at 1 x I_N, resistive	
Ambient temperature	-30...+60 °C (-22...+140 °F) T 60	
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	AC 3,000 V	
main/aux. circuit	AC 3,000 V	
pole/pole	AC 1,500 V	
Insulation resistance	> 100 MΩ (DC 500 V)	
Interrupting capacity I_{cn}	0.1...5 A 6...32 A	400 A 800 A
curves F1, F2, M1, T1:	0.1...16 A	2,500 A (at DC 32 V)
curve T2 :	0.1...32 A	15 x I_N
curve M3:	0.1...2 A	AC 200A /DC 400A

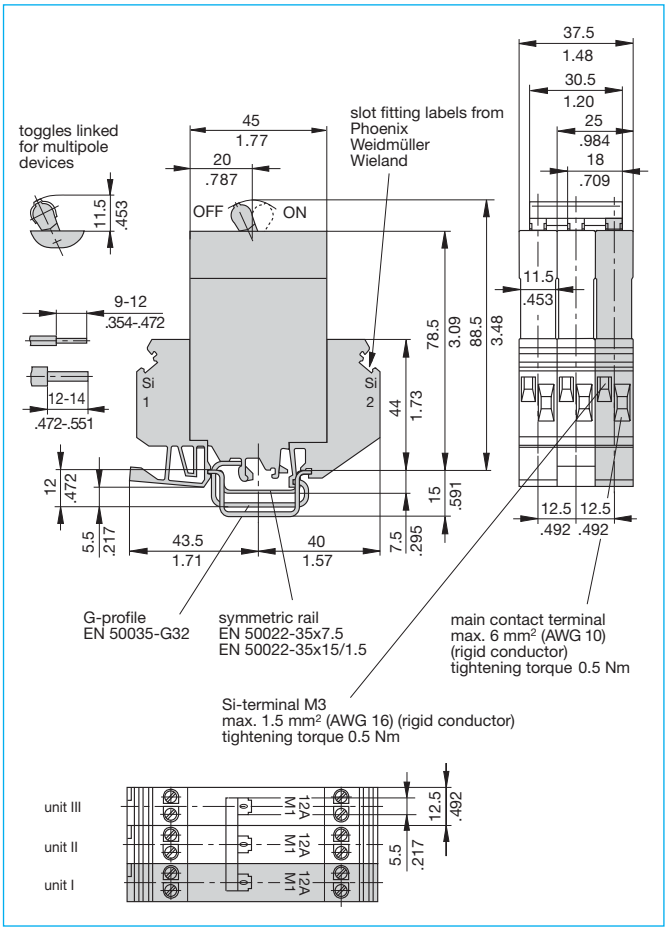
Interrupting capacity (UL 1077)	I_N	0.1...16 A	20...32 A
	1- + 2-pole	AC 277 V /5,000 A	AC 277 V /2,000 A
	3-pole	3 AC 480 V /5,000 A	3 AC 480 V /2,000 A
	1- + 2-pole	DC 65 V /2,000 A	DC 65 V /2,000 A

Degree of protection (IEC 60529/DIN 40050)	operating area IP30 terminal area IP20	
Vibration		
curve F1:	3 g (57-500 Hz), ± 0.23 mm (10-57 Hz)	
curves M1, M3, T1, T2:	5 g (57-500 Hz), ± 0.38 mm (10-57 Hz) to IEC 60068-2-6, test Fc 10 frequency cycles/axis	
Shock		
curve F1:	25 g (11 ms), directions 1, 2, 3, 4, 5 10 g (11 ms), direction 6	
curves M1, M3, T1, T2:	25 g (11 ms), directions 1, 2, 3, 4, 5 20 g (11 ms), direction 6 to IEC 60068-2-27, test Ea	
Corrosion	96 hours at 5 % salt mist to IEC 60068-2-11, test Ka	
Humidity	240 hours at 95 % RH to IEC 60068-2-78, test Cab	
Mass	approx. 60 g per pole	

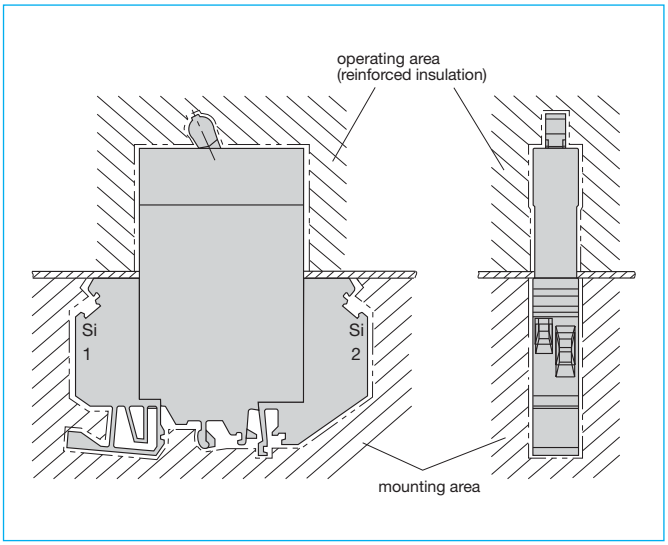
Standard current ratings and typical internal resistance values

Current rating (A)	Internal resistance (Ω) F1 fast acting for DC only	F2 fast acting delay for AC + DC	M1 standard for AC + DC	T1 delayed low resistance nur für AC	M3 standard delay for AC + DC	T2 thermal for AC + DC
0.1	162	162	92	81	42	77
0.2	39.3	39.3	26.1	24.2	11.7	23
0.3	17.5	17.5	11.6	10.4	5.6	10.2
0.4	9.2	9.2	6,6	6.0	2.9	5.7
0.5	6.8	6.8	4,1	3.9	1.75	3,7
0.6	4.2	4.2	3	2.7	1.42	2.6
0.8	2.8	2.8	1.65	1.53	0.75	1.39
1	1.6	1.6	1,10	0.98	0.5	0.9
1.5	0.78	0.78	0.47	0.42	0.22	0.36
2	0.42	0.42	0.28	0.24	0.136	0.19
2.5	0.26	0,26	0.183	0.17	0.083	0.141
3	0.18	0.18	0.124	0.12	0.057	0.091
4	0.12	0.12	0.077	0.073	0.041	0.051
5	0.092	0.092	0.063	0.055	0.032	0.040
6	0.054	0.054	0.045	0.039	0.021	0.027
8	0.025	0.025	≤ 0.02	≤ 0.02	≤ 0.02	≤ 0.02
10	0.022	0.02	≤ 0.02	≤ 0.02	≤ 0.02	≤ 0.02
12	≤ 0.02	≤ 0.02	≤ 0.02	≤ 0.02	≤ 0.02	≤ 0.02
16	≤ 0.02	≤ 0.02	≤ 0.02	≤ 0.02	≤ 0.02	≤ 0.02
20	-	-	≤ 0.02	≤ 0.02	-	≤ 0.02
25	-	-	≤ 0.02	≤ 0.02	-	≤ 0.02
32	-	-	≤ 0.02	≤ 0.02	-	≤ 0.02

Dimensions



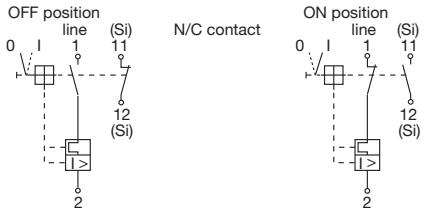
Installation drawing



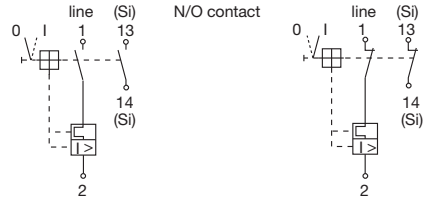
This is a metric design and millimeter dimensions take precedence (mm/inch)

Internal connection diagrams

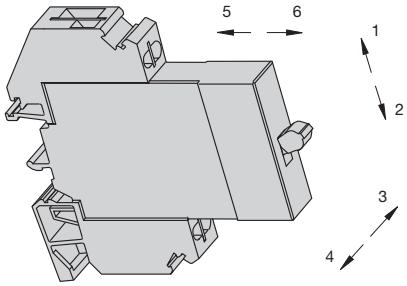
...-H131-...



...-H121-...

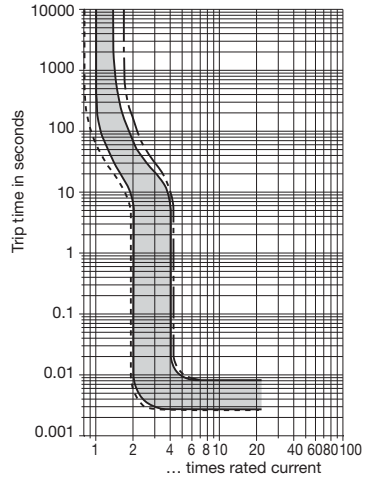


Shock directions

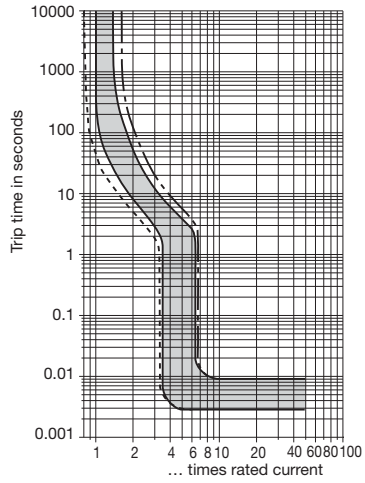


Typical time/current characteristics

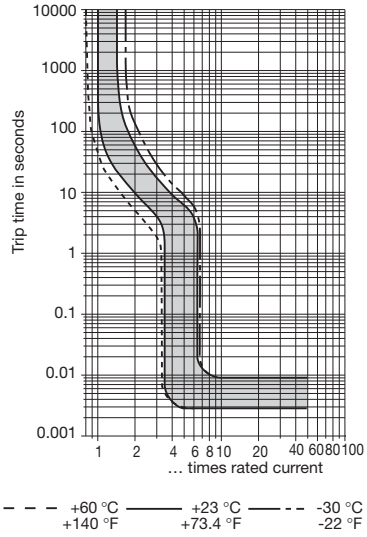
-F1 0.1 ... 16 A DC only



-F2 0.1 ... 7.5 A **AC/ DC** [1]



-F2 8 ...16 A **AC/ DC** [1]



[1] Magnetic tripping currents are increased by 30% on DC supplies.

2

Typical time/current characteristics

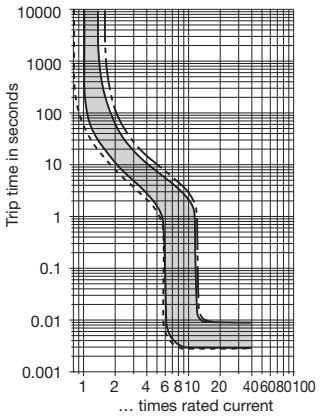
The time/current characteristic curve depends on the ambient temperature prevailing. In order to eliminate nuisance tripping, please multiply the circuit breaker current ratings by the derating factor shown below. See also section 9 – Technical information.

Ambient temperature	°F	-22	-4	+14	+32	+73.4	+86	+104	+122	+140
	°C	-30	-20	-10	0	+23	+30	+40	+50	+60
Derating factor		0.76	0.79	0.83	0.88	1	1.04	1.11	1.19	1.29

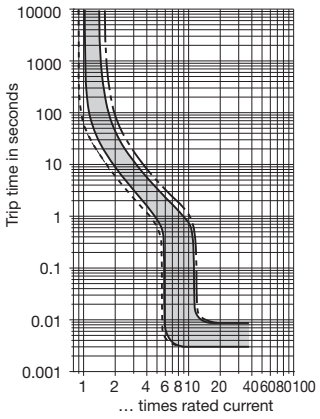
Multi pole devices: all poles symmetrically loaded. With single pole overload, thermal tripping will be at max. 1.7 x I_N with curves F1, F2, M1 and T2, and at max. 2.2 x I_N with curve M3.

[1] Magnetic tripping currents are increased by 30% on DC supplies.

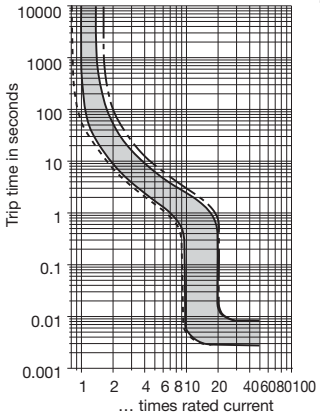
-M1 0.1 ... 6 A **AC/DC [1]**



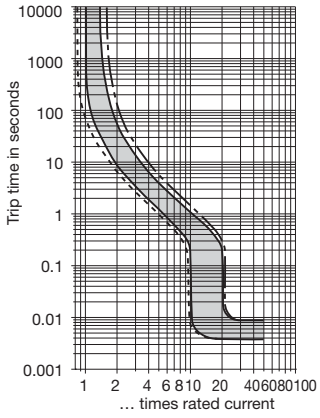
-M1 8 ... 32 A **AC/DC [1]**



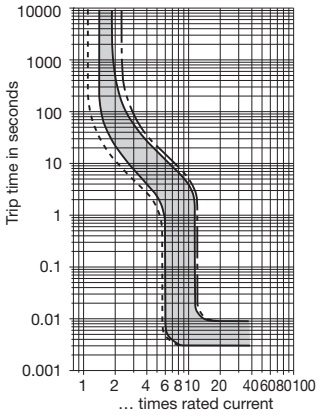
-T1 0.1 ... 6 A **AC only**



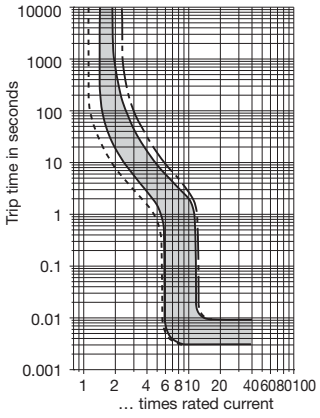
-T1 8 ... 32 A **AC only**



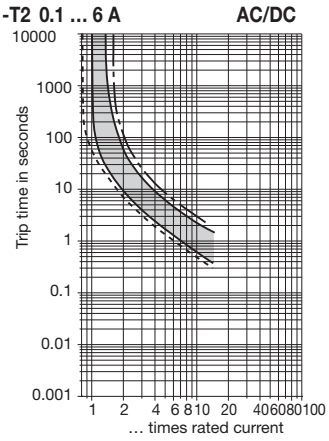
-M3 0.1 ... 5 A **AC/DC [1]**



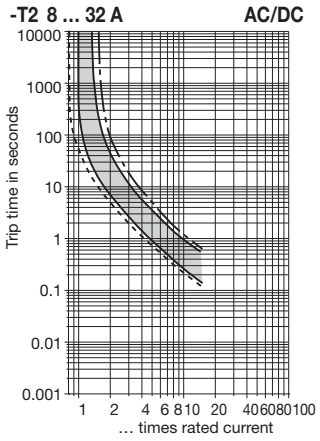
-M3 6 ... 16 A **AC/DC [1]**



-T2 0.1 ... 6 A **AC/DC**



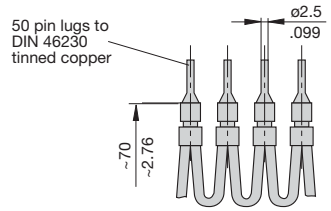
-T2 8 ... 32 A **AC/DC**



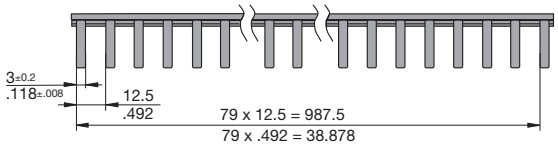
+60 °C +140 °F — +23 °C +73.4 °F — -30 °C -22 °F

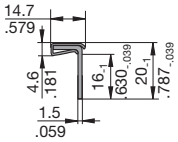
Accessories

Connector bus links -K10
X210 589 01/2.5 mm², (AWG 14) (black) up to 20 A max. load
X210 589 02/1.5 mm², (AWG 16) (brown) up to 13 A max. load



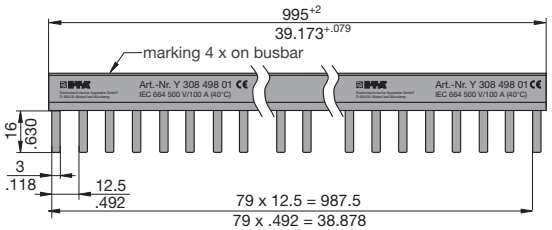
Busbar 1-pole, 90°
X 222 540 01
The one metre long busbars can be cut to suitable lengths. Plug-on caps can be fitted on the ends to provide brush contact protection.
I_{max} - busbar 100 A (40°C)

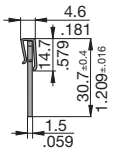




Plug-on cap, 1-pole
Y 307 851 01

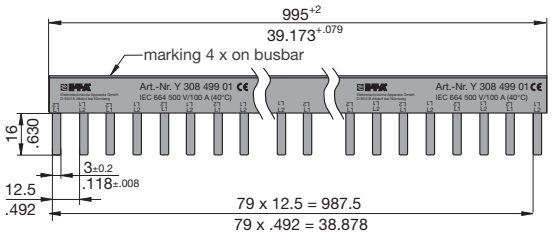
Busbar 1-pole
Y 308 498 01
I_{max} - busbar 100 A (40°C)

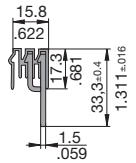




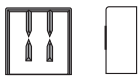
Plug-on cap, 1-pole
Y 307 851 01

Busbar 2-pole
Y 308 499 01
I_{max} - busbar 100 A (40°C)

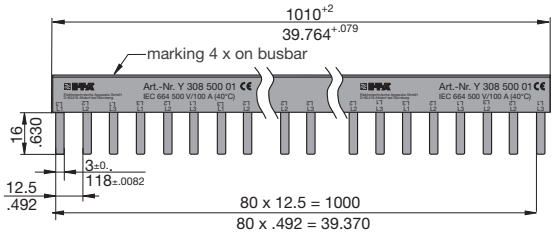


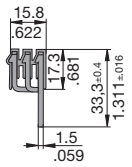


Plug-on cap, busbar 2/3-pole
Y 308 506 01

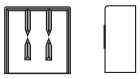


Busbar 3-pole
Y 308 500 01
I_{max} - busbar 100 A (40°C)

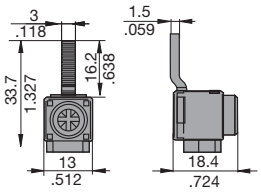


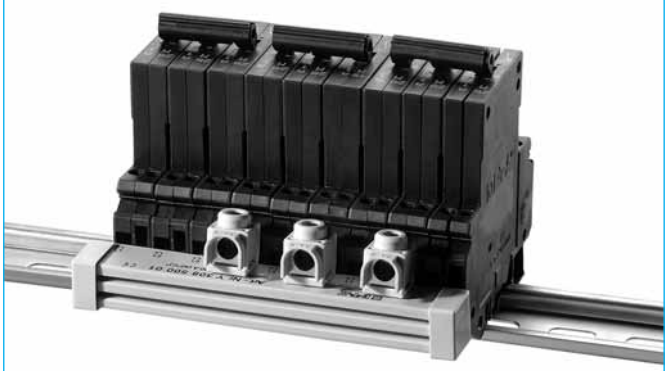


Plug-on cap, busbar 2/3-pole
Y 308 506 01



Supply terminal
Y 308 503 01
I_{max} 63 A with 1-pole busbar,
50 A with multipole busbar
Max. tightening torque of terminal screw 2 Nm
Max. cable cross section: 25 mm² / single strand
16 mm² / multistrand
with wire end ferrule





Caution:
When using multipole busbars please leave at least one pole's width between two adjacent line entry terminals.

This is a metric design and millimeter dimensions take precedence ($\frac{mm}{inch}$)

All dimensions without tolerances are for reference only. In the interest of improved design, performance and cost effectiveness the right to make changes in these specifications without notice is reserved.Product markings may not be exactly as the ordering codes. Errors and omissions excepted.

Description

Miniaturised single pole thermal-magnetic circuit breakers with trip-free mechanism and toggle actuation (S-type TM CBE to EN 60934). Two designs provide the option of either printed circuit board or threadneck panel mounting. A separate shunt tap terminal and auxiliary contacts are available. Fast acting, medium or long delay characteristics can be specified for both models.
Suitable for use in distribution rails – see section 7.
Complies with CBE standard EN 60934 (IEC 60935).

Typical applications

Control equipment, communications systems, instrumentation.
Suitable for mounting on Euro cards.

2215-L1..

2215-G1...

Ordering information

Type No.
2215 single pole thermal-magnetic circuit breaker
Mounting
G1 threadneck panel mounting
L1 PCB mounting
Number of poles
1 1-pole protected
Mounting hardware
0 without accessories
1 2 hex nuts 1/4"-40 UNS-2A, serrated washer, location pin (-G1 only)
Terminal design (main contacts)
P1 blade terminals 6.3-0.8, without shunt terminal
B1 blade terminals 6.3-0.8, with shunt terminal
L1 solder pins, without shunt terminal
M1 solder pins, with shunt terminal
Characteristic curve
F1 fast acting:1.01-1.4xI_N; magn.2-4xI_N DC (DC only)
M1 standard delay: therm. 1.01-1.4xI_N; magn. 4.5-10.5xI_N DC; magn. 3.5-8xI_N AC
T1 delayed: therm. 1.01-1.4xI_N; DC magn. 8-17xI_N DC, 6-13xI_N AC
T3 delayed: therm.1.01-1.4xI_N; magn.13-20xI_N DC magn. 9.5-15.5xI_N AC
Auxiliary contacts
S0 without auxiliary contact
S1 with auxiliary contact (change over)
Auxiliary contact - terminal design
1 blade terminals 6.3x0.8 (QC .250)
2 solder pins
Current ratings
0.05...10 A

2215 - G1 1 1 - P1 F1 - S1 1 - 0.5 A ordering example

Standard current ratings and typical internal resistance values

Current ratings (A)	Internal resistance (Ω)	Current ratings (A)	Internal resistance (Ω)
0.05	440	1.5	0.55
0.1	108	2	0.34
0.2	29.9	2.5	0.21
0.3	14.2	3	0.15
0.4	7.9	4	0.084
0.5	5.0	5	0.057
0.6	3.5	6	0.043
0.8	1.8	8	≤ 0.02
1	1.2	10	≤ 0.02

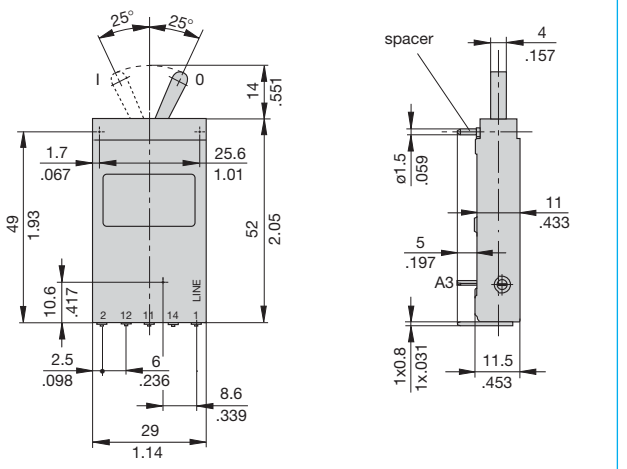
Technical data

Voltage rating	AC 250 V (50/60 Hz); DC 50 V (UL: AC 250 V; DC 75 V)
Current rating range	0.05...10 A (higher current ratings to special order)
Auxiliary circuit	1 A, AC 250 V/DC 28 V
Typical life	10,000 operations at 1 x I_N
Ambient temperature	-30...+60 °C (-22...+140 °F)
Insulation co-ordination (IEC 60664 and 60664 A)	rated impulse withstand voltage 2.5 kV; pollution degree 2 reinforced insulation in operating area
Dielectric strength IEC 60664 and 60664A) operating area main/aux. circuit	test voltage AC 3,000 V AC 1,500 V
Insulation resistance	> 100 MΩ (DC 500 V)
Interrupting capacity I_{cn}	300 A
Interrupting capacity (UL 1077)	I_N / U_N: 0.05 A / AC 250 V / 200 A 0.1...6 A / AC 250 V / 1,000 A 8...10 A / AC 250 V / 2,000 A 0.05...10 A / DC 50 V / 1,000 A 0.05...10 A / DC 75 V / 800 A
Degree of protection (IEC 60529/DIN 40050)	operating area IP30 terminal area IP00
Vibration curve F1: curves M1, T1, T3:	 6 g (57-500 Hz), ± 0.46 mm (10-57 Hz) 8 g (57-500 Hz), ± 0.61 mm (10-57 Hz) to IEC 60068-2-6, test Fc 10 frequency cycles/axis
Shock curves F1, M1, T1, T3: curve F1: curves M1, T1, T3:	 30 g (11 ms), directions 1, 2, 3, 4, 5, 10 g (11 ms), direction 6 15 g (11 ms), direction 6 to IEC 60068-2-27, test Ea
Corrosion	96 hours at 5 % salt mist to IEC 60068-2-11, test Ka
Humidity	240 hours at 95 % RH to IEC 60068-2-78, test Cab
Mass	approx. 25 g

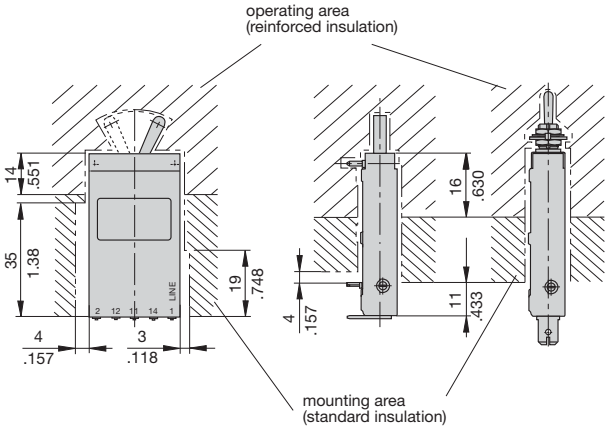
Approvals

Authority	Voltage ratings	Current ratings
UL	AC 250 V DC 75 V	0.05...10 A 0.05...20 A
CSA	AC 250 V; DC 48 V	0.05...10 A

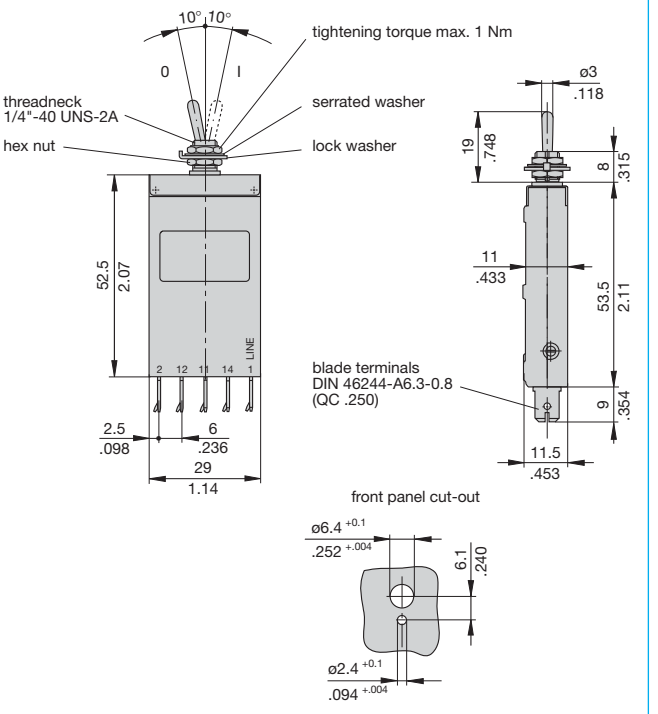
Dimensions 2215-L1..



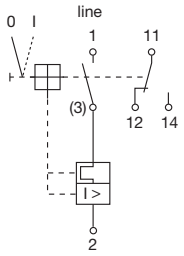
Installation drawing



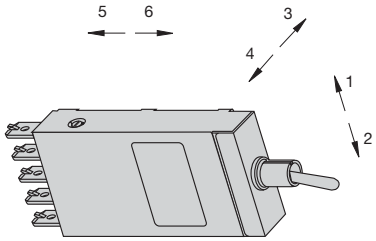
Dimensions 2215-G1..



Internal connection diagram



Shock directions



This is a metric design and millimeter dimensions take precedence ($\frac{mm}{inch}$)

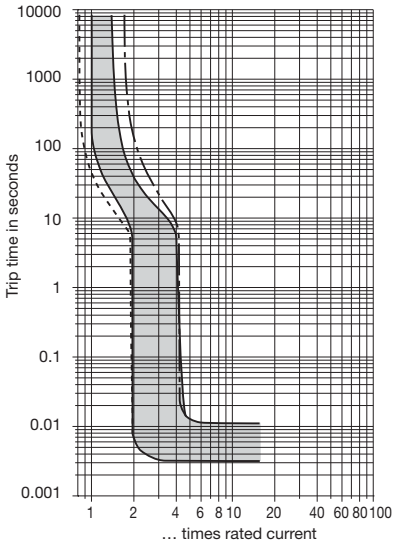
Typical time/current characteristics

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.

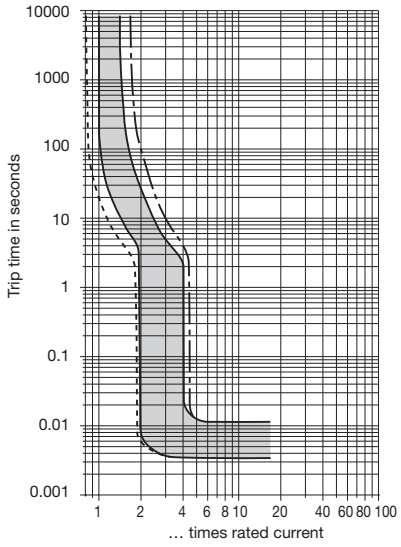
0.05...10 A:

Ambient temperature	°F	-22	-4	+14	+32	+50	+73.4	+86	+104	+122	+140
	°C	-30	-20	-10	0	+10	+23	+30	+40	+50	+60
Derating factor		0.76	0.79	0.83	0.88	0.93	1	1.04	1.11	1.19	1.29

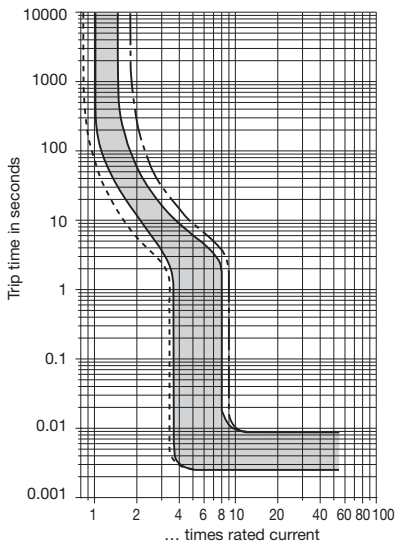
-F1 0.05 ... 6 A **DC only**



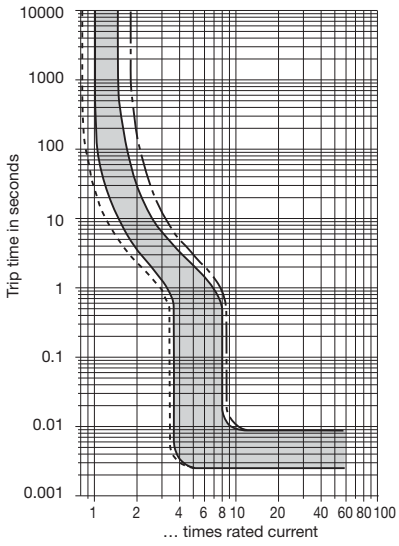
-F1 8 ... 10 A **DC only**



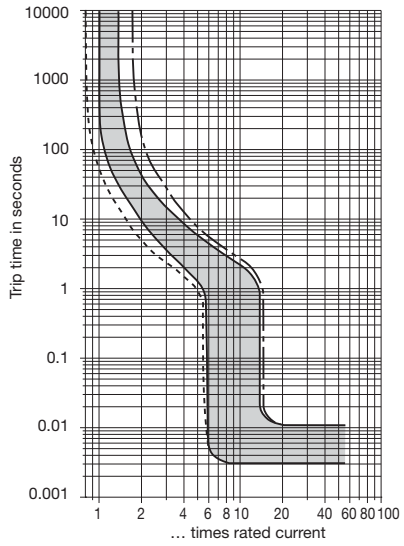
-M1 0.05 ... 6 A **AC/DC [1]**



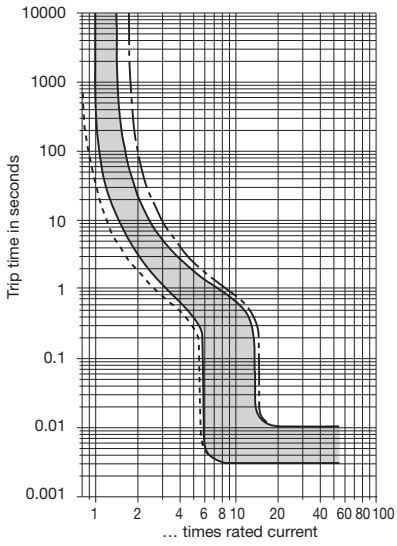
-M1 8 ... 10 A **AC/DC [1]**



-T1 0.05 ... 6 A **AC/DC [1]**



-T1 8 ... 10 A **AC/DC [1]**



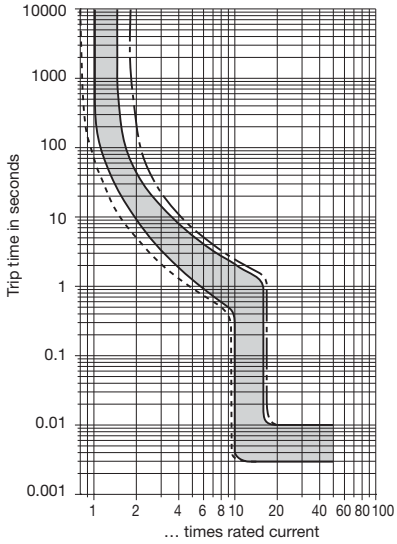
+60 °C +140 °F — +23 °C +73.4 °F — -30 °C -22 °F

[1] Magnetic tripping currents are increased by 30% on DC supplies (curve M1 and T1).

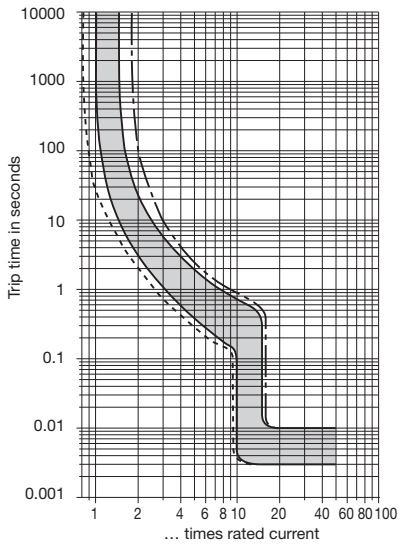
2

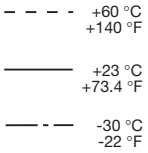
Typical time/current characteristics

-T3 0.05 ... 6 A **AC/DC** [1]



-T3 8 ... 10 A **AC/DC** [1]





[1] Magnetic tripping currents are increased by 30% on DC supplies.

2

All dimensions without tolerances are for reference only. In the interest of improved design, performance and cost effectiveness the right to make changes in these specifications without notice is reserved.Product markings may not be exactly as the ordering codes. Errors and omissions excepted.

Description

Miniaturised two pole thermal-magnetic circuit breakers with trip-free mechanism and toggle actuation (S-type TM CBE to EN 60934). Fitted with panel mounting flange and push-on termination, also suitable for mounting on Euro Cards. Available with auxiliary contacts and a choice of fast, medium or long delay characteristics.
Complies with CBE standard EN 60934 (IEC 60934).

Typical applications

Control equipment, communications systems, instrumentation.

Ordering information

Type No.
2215 double pole thermal-magnetic circuit breaker
Mounting
F1 flange mounting, with M3 mounting thread
Number of poles
2 2-pole protected
5 2-pole, protected on one pole only
Accessories
0 without
Terminal design (main contacts)
P1 blade terminals 6.3x0.8mm (QC .250) without shunt terminal
Characteristic curve
F1 fast acting:1.01-1.4xI_N; magn.2-4xI_N DC (DC only)
M1 standard delay: therm. 1.01-1.4xI_N; magn.4.5-10.5xI_N DC; magn.3.5-8xI_N AC
T1 delayed: therm. 1.01-1.4xI_N; magn. 8-17xI_N DC; magn. 6-13xI_N AC
T3 delayed: therm.1.01-1.4xI_N; magn.13-20xI_N DC magn. 9.5-15.5xI_N AC
Auxiliary contacts
S0 without auxiliary contacts
S1 with auxiliary contacts (change over)
S2 with auxiliary contact on pole 1 only
Auxiliary contact - terminal design
1 blade terminals 6.3x0.8
Current ratings
0.05...10 A

2215 - F1 2 0 - P1 F1 - S1 1 - 0.5 A ordering example

Standard current ratings and typical internal resistance values

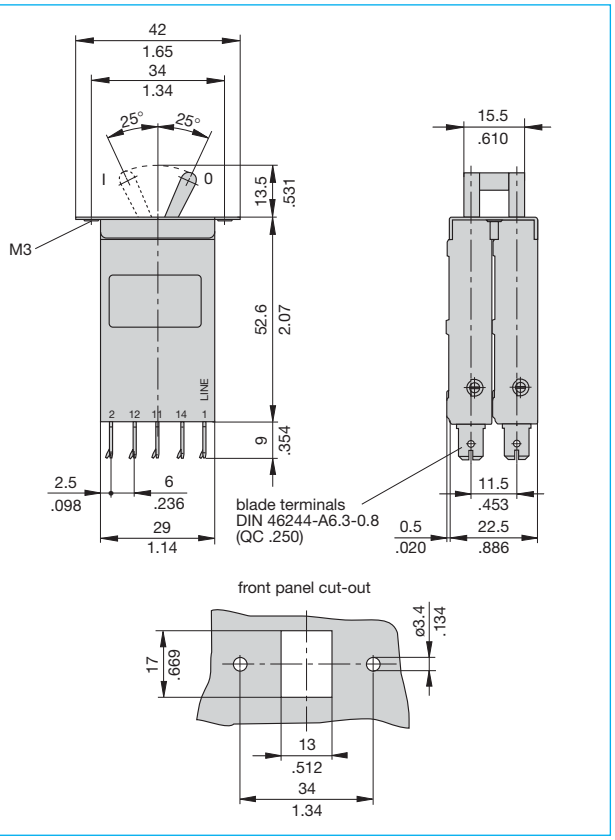
Current ratings (A)	Internal resistance per pole (Ω)	Current ratings (A)	Internal resistance per pole (Ω)
0.05	440	1.5	0.55
0.1	108	2	0.34
0.2	29.9	2.5	0.21
0.3	14.2	3	0.15
0.4	7.9	4	0.096
0.5	5.0	5	0.069
0.6	3.5	6	0.055
0.8	1.8	8	≤ 0.02
1	1.2	10	≤ 0.02

2215-F1...

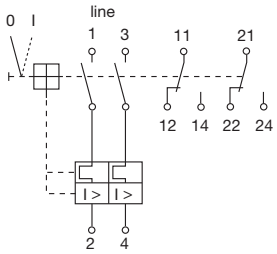
Technical data

Voltage rating	AC 250 V (50/60 Hz); DC 50 V (UL: AC 250 V; DC 75 V) (higher DC voltage to special order)
Current rating range	0.05...10 A
Auxiliary circuit	1 A, AC 250 V/DC 28 V resistive load
Typical life	10,000 operations at 1 x I_N
Ambient temperature	-30...+60 °C (-22...+140 °F)
Insulation co-ordination (IEC 60664 and 60664 A)	rated impulse withstand voltage 2.5 kV; pollution degree 2 reinforced insulation in operating area
Dielectric strength (IEC 60664 and 60664A) operating area pole/pole main/aux. circuit	test voltage AC 3,000 V AC 1,500 V AC 1,500 V
Insulation resistance	> 100 MΩ (DC 500 V)
Interrupting capacity Icn	600 A
Degree of protection (IEC 60529/DIN 40050)	operating area IP30 terminal area IP00
Vibration curve F1: curves M1, T1, T3:	6 g (57-500 Hz), ± 0.46 mm (10-57 Hz) 8 g (57-500 Hz), ± 0.61 mm (10-57 Hz) to IEC 60068-2-6, test Fc 10 frequency cycles/axis
Shock curves F1, M1, T1, T3: curve F1: curves M1, T1, T3:	30 g (11 ms), directions 1, 2, 3, 4, 5 10 g (11 ms), direction 6 15 g (11 ms) direction 6 to IEC 60068-2-27, test Ea
Corrosion	96 hours at 5 % salt mist to IEC 60068-2-11, test Ka
Humidity	240 hours at 95 % RH to IEC 60068-2-78, test Cab
Mass	approx. 50 g

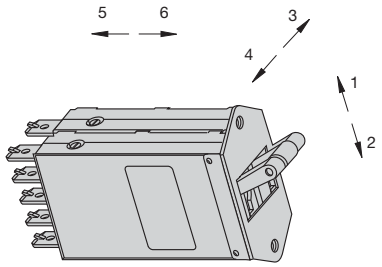
Dimensions 2215-F1...



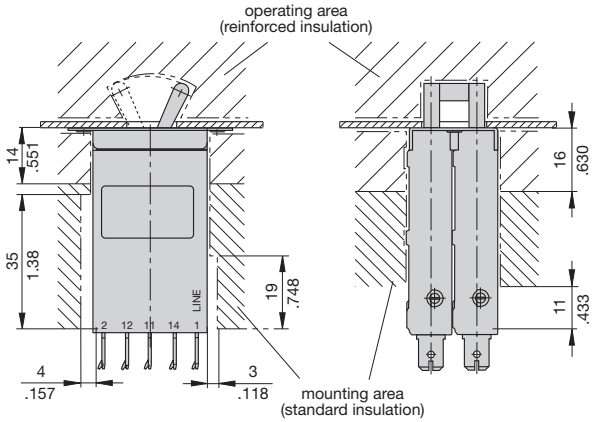
Internal connection diagram



Shock directions



Installation drawing



This is a metric design and millimeter dimensions take precedence ($\frac{mm}{inch}$)

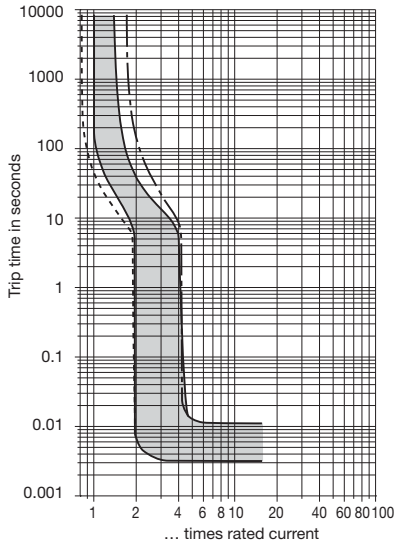
Typical time/current characteristics

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.

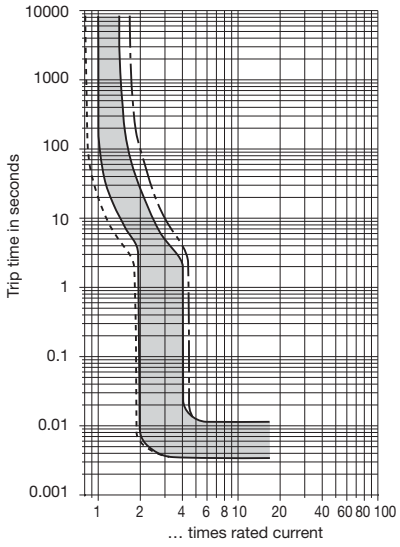
0.05...10 A:

Ambient temperature °F	-22	-4	+14	+32	+50	+73.4	+86	+104	+122	+140
°C	-30	-20	-10	0	+10	+23	+30	+40	+50	+60
Derating factor	0.76	0.79	0.83	0.88	0.93	1	1.04	1.11	1.19	1.29

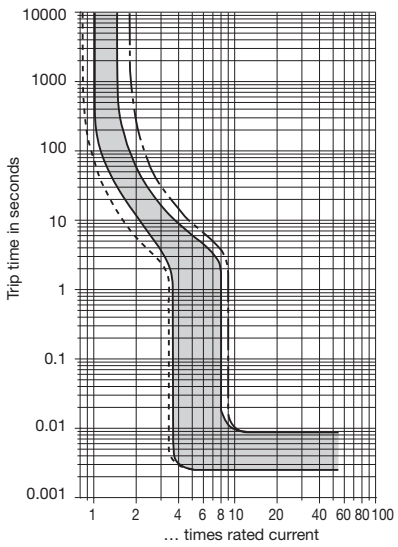
-F1 0.05 ... 6 A **DC only**



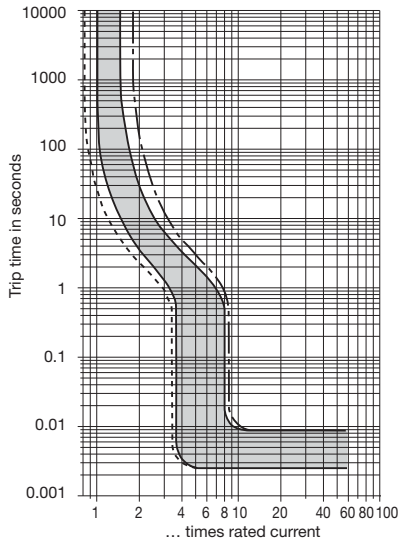
-F1 8 ... 10 A **DC only**



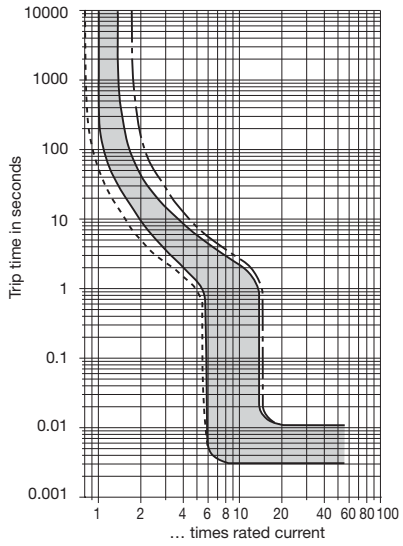
-M1 0.05 ... 6 A **AC/DC [1]**



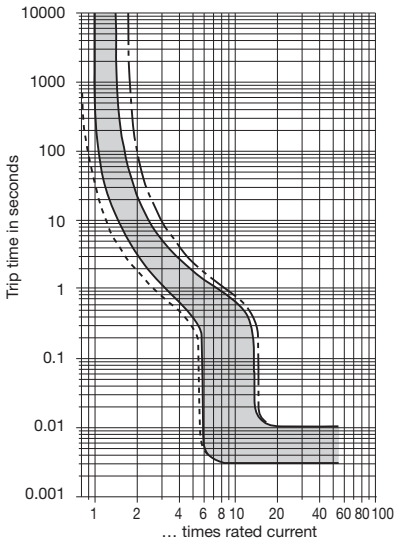
-M1 8 ... 10 A **AC/DC [1]**



-T1 0.05 ... 6 A **AC/DC [1]**



-T1 8 ... 10 A **AC/DC [1]**



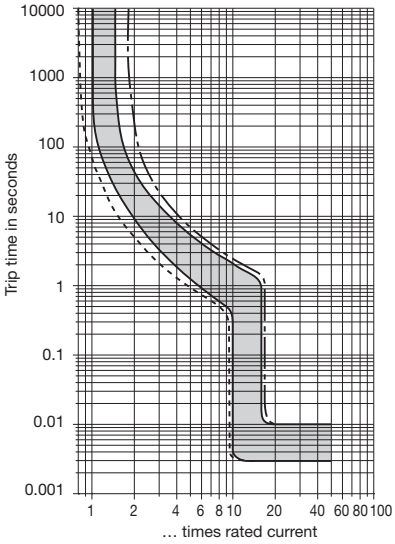
+60 °C +140 °F — +23 °C +73.4 °F — -30 °C -22 °F

[1] Magnetic tripping currents are increased by 30% on DC supplies (curve M1 and T1).

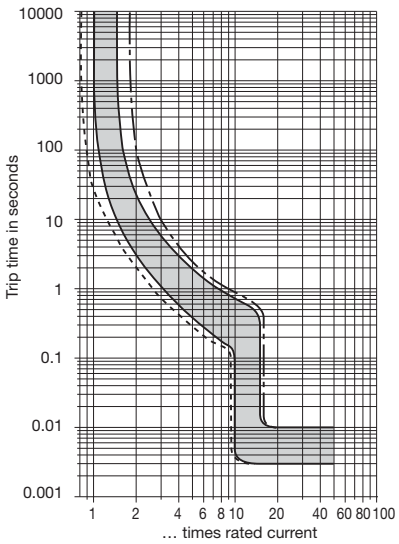
2

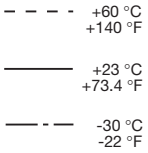
Typical time/current characteristics

-T3 0.05 ... 6 A **AC/DC [1]**



-T3 8 ... 10 A **AC/DC [1]**





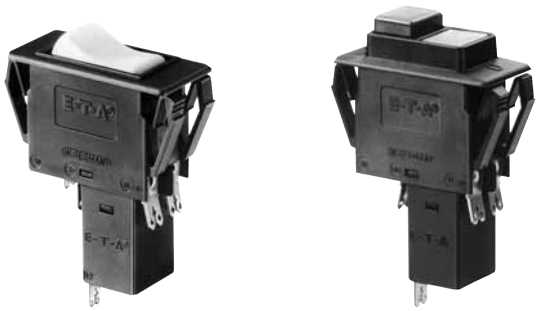
[1] Magnetic tripping currents are increased by 30% on DC supplies.

2

Description

Single or two pole rocker switch/thermal-magnetic circuit breaker with trip-free mechanism (S-type TM CBE to EN 60934). The addition of a magnetic tripping module to the type 3120 range described in catalogue section 1 extends the choices available to include single pole with thermal-magnetic protection; double pole switching with thermal-magnetic protection on one pole, thermal protection on the other; double pole switching with thermal-magnetic protection on one pole only. All are offered with rocker switch or push button control - two buttons for ON/OFF or one button press-to-reset only, in designs to suit one of three different panel cut-out sizes. Illumination is optional. Approved to CBE standard EN 60934 (IEC 60934).

Meets the requirements regarding fire resistance of EN 60335-1 : 2007-02 Safety of household and similar electrical appliances.



3120-...-M...

Typical applications

Motors, machine tools, office equipment, appliances.

Standard current ratings and typical internal resistance values

Current ratings (A)	Internal resistance per pole (Ω) thermal-magn.	thermal
0.1	165	94
0.2	42.5	24
0.3	20.2	12
0.4	9.7	5.40
0.5	7.17	4.30
0.6	4.9	3
0.8	2.65	1.50
1	1.49	0.9
1.2	1.25	0.7
1.5	0.74	0.45
2	0.49	0.29
2.5	0.20	0.0785
3	0.14	0.0595
3.5	0.114	0.0565
4	0.092	0.0435
5	0.06	0.0325
6	0.043	0.0215
7	0.030	0.0215
8	0.029	0.02
10	0.021	0.02
12	< 0.02	< 0.02
14	< 0.02	< 0.02
15	< 0.02	< 0.02
16	< 0.02	< 0.02

Illumination voltage / Power consumption

Operating voltage	Power consumption Y + R	G	T
6 V	2 mA	3.6 mA	4.9 mA
12 V	2 mA	3.5 mA	4.9 mA
24 V	2 mA	3.5 mA	4.9 mA
48 V	2 mA	3.5 mA	4.9 mA
115 V	0.9 mA	2.8 mA	2.2 mA
230 V	0.9 mA	2.8 mA	2.2 mA

Technical data

For further details please see chapter: Technical Information		
Voltage rating	AC 240 V (50/60 Hz); DC 50 V	
Current ratings	0.1...16 A	
Typical life	**1-pole**	
AC 240 V:	0.1...20 A	30,000 operations at 1 x I_N, inductive
DC 50 V:	0.1...4 A	30,000 operations at 1 x I_N, inductive
	4.5...16 A	30,000 operations at 1 x I_N, resistive
DC 28 V:	4.5...20 A	30,000 operations at 1 x I_N, inductive
	2-pole	
AC 240 V:	0.1...16 A	50,000 operations at 1 x I_N, inductive
	17...20 A	30,000 operations at 1 x I_N, inductive
DC 50 V:	0.1...16 A	50,000 operations at 1 x I_N, inductive
	17...20 A	10,000 operations at 1 x I_N, inductive
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	AC 3,000 V	
current path/current path	AC 1,500 V	
Insulation resistance	> 100 MΩ (DC 500 V)	
Interrupting capacity I_{cn}	0.1...2 A	100 x I_N
	2.5...16 A	250 A 2-pole
		150 A 1-pole
Interrupting capacity (UL 1077)	I_N	U_N
	0.1...4 A	AC 250 V 200 A
	5...10 A	AC 250 V 2,000 A
	12...14 A	AC 125 V 1,000 A
Degree of protection (IEC 60529/DIN 40050)	operating area IP40 (with water splash protection IP54) terminal area IP00	
Vibration	8 g (57-500 Hz) ± 0.61 mm (10-57 Hz) to IEC 60068-2-6, test Fc 10 frequency cycles/axis	
Shock	30 g (11 ms) to IEC 60068-2-27, test Ea	
Corrosion	96 hours at 5 % salt mist to IEC 60068-2-11, test Ka	
Humidity	240 hours at 95 % RH to IEC 60068-2-78, test Cab	
Mass	approx. 53 g (2-pole) approx. 50 g (1-pole)	

Ordering information

Type

3120 rocker switch/circuit breaker

Mounting

F snap-in frame

Size of frame	panel thickness
3 to fit in cut-out 50.5 x 21.5 mm	1 - 6.35 mm (.039-.250 in)
5 to fit in cut-out 44.5 x 22 mm	1 - 4 mm (.039-.157 in)
6 to fit in cut-out 45 x 33.7 mm	1.2 - 2.4 mm (.047-.091 in)

Number of poles

- **1** 1-pole, thermal-magnetic protection
- **2** 2-pole, thermal-magnetic protection on one pole, thermally protected on the other pole
- **5** 2-pole, thermal-magnetic protection on one pole, unprotected on the other pole

Mounting frame design

- **1** collar height 1 mm (.039 in)
- **3** collar height 9 mm (.354 in) (with safety frame)
- **4** collar height 2 mm (.079 in) with water splash protection (IP54) (not with -F6 frame)
- **U** with water splash protection and actuator guard

Terminal configuration

- **P7** blade terminals 2x2.8-0.8 mm (QC 2x.110) (terminals 12(k), 22(k), 11, 21)
- **H7** 12(k), 22(k): blade terminals 2x2.8-0.8 (QC 2x.110) 11, 21: terminal screws M3.5, blade terminals 2x2.8-0.8 (QC 2x.110)
- **N7** as P7, but shunt terminals (12(i) and 22(i)) are blade terminals 2x2.8-0.8 (QC 2x.110)
- **G7** as H7, but shunt terminals (12(i) and 22(i)) are blade terminals 2x2.8-0.8 (QC 2x.110)

Characteristic curve

- **M1** standard delay, therm. 1.01-1.4 x I_N; magn. 4-9 x I_N AC

Switch style

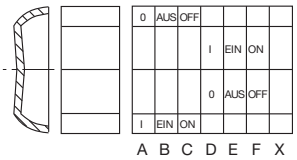
- **W** rocker

Switch colour designation

OPAQUE	TRANSLUCENT (for illuminated versions)
01 black	**12** white
02 white	**14** red
04 red	**15** orange
	16 sky blue
	19 green

Rocker markings

- **A**
- **B**
- **C**
- **D**
- **E**
- **F**
- **X**



X = without marking

Rocker illumination (optional)

- **G** green LED
- **Y** yellow LED
- **R** red LED
- **T** blue LED

Illumination voltage range (= operating voltage)

0	0 - 4 V	AC/DC
1	10 - 14 V	AC/DC
2	20 - 28 V	AC/DC
3	90 - 140 V	AC
4	185 - 275 V	AC
5	42 - 54 V	AC/DC

Current ratings

0.1...16 A

3120 - F 3 2 1 - N7 M1 - W 12 A R 4 - 10 A rdering 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.

Ordering information

Type

3120 push button switch/circuit breaker

Mounting

F snap-in frame

Size of frame

- **2** special frame for fitting splash cover
- **3** to fit in cut-out 50.5 x 21.5 mm panel thickness 1 - 6.35 mm

Number of poles

- **1** 1-pole, thermal-magnetic protection
- **2** 2-pole, thermal-magnetic protection on one pole, thermally protected on the other pole
- **5** 2-pole, thermal-magnetic protection on one pole, unprotected on the other pole

Mounting frame design

- **F** frame with two push buttons
- **G** frame with one push button

Terminal configuration

- **P7** blade terminals 2x2.8-0.8 mm (QC 2x.110) (terminals 12(k), 22(k), 11, 21)
- **H7** 12(k), 22(k): blade terminals 2x2.8-0.8 (QC 2x.110) 11, 21: terminal screws M3.5, blade terminals 2x2.8-0.8 (QC 2x.110)
- **N7** as P7, but shunt terminals (12(i) and 22(i)) are blade terminals 2x2.8-0.8 (QC 2x.110)
- **G7** as H7, but shunt terminals (12(i) and 22(i)) are blade terminals 2x2.8-0.8 (QC 2x.110)

Characteristic curve

- **M1** standard delay, therm. 1.01-1.4 x I_N; magn. 4-9 x I_N AC

Switch style/colour

- **D** 1 push button (reset only)
  - **01X** black
  - **04X** red
  - **12X** white translucent
  - **19X** green translucent
- **S** 2 push buttons ON/OFF
  - **GRX** green translucent/red
  - **WRX** white translucent/red
  - **WBX** white translucent/black

Push button illumination (optional)

- **G** green LED, AC/DC
- **Y** yellow LED, AC/DC
- **R** red LED, AC/DC

Illumination voltage range (= operating voltage)

0	0 - 4 V	AC/DC
1	10 - 14 V	AC/DC
2	20 - 28 V	AC/DC
3	90 - 140 V	AC
4	185 - 275 V	AC
5	42 - 54 V	AC/DC

Current ratings

0.1...16 A

3120 - F 3 2 F - N7 M1- S GRX G 4 - 10 A ordering example

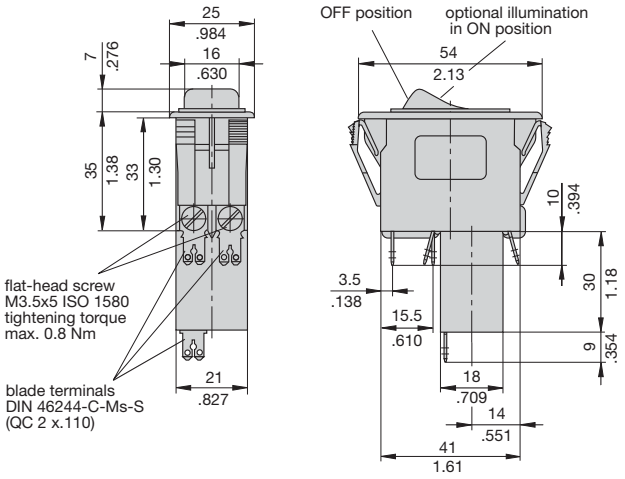
Approvals

Authority	Voltage ratings	Current ratings
VDE (EN 60934)	AC 240 V; DC 28 V	0.1...16 A
	DC 50 V	0.1...16 A double pole
	DC 50 V	0.1...10 A single pole
CSA, UL	AC 250 V	0.1...10 A
	AC 125 V	0.1...16 A
CCC	AC 250 V; DC 50 V	0.1...20 A

All dimensions without tolerances are for reference only. In the interest of improved design, performance and cost effectiveness the right to make changes in these specifications without notice is reserved.Product markings may not be exactly as the ordering codes. Errors and omissions excepted.

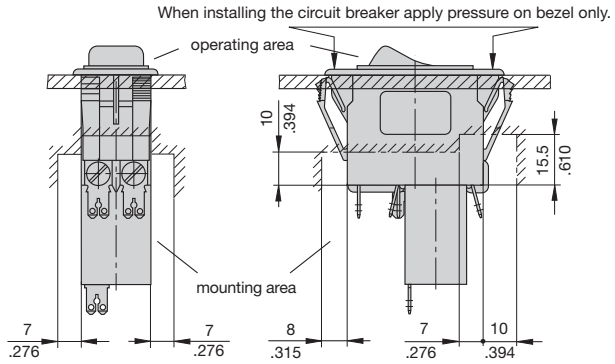
Dimensions

Mounting style -F3.1, with rocker – Collar height 1 mm



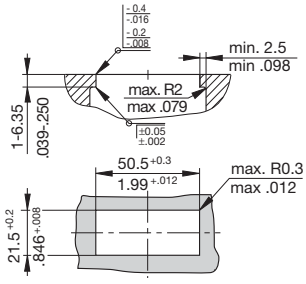
Installation drawing

Required safety distances for rocker and push button

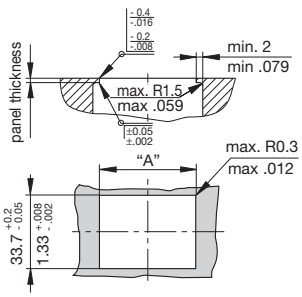


Cut-out dimensions

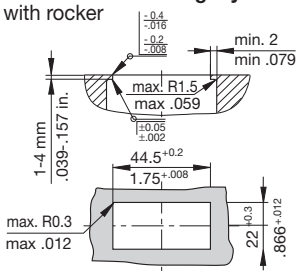
Cut-out for mounting style -F3
with rocker and push button



Cut-out for mounting style -F6
with rocker



Cut-out for mounting style -F5
with rocker

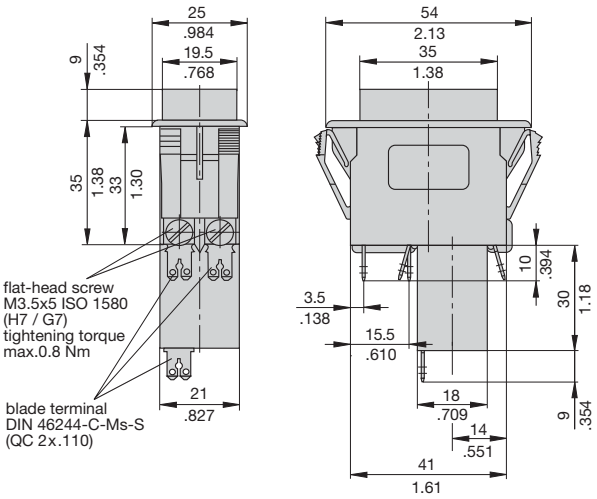


panel thickness	mm	1.2 +0.4	1.6 +0.8	2.4 +1
	inch	.047 +.016	.063 +.031	.094 +.039
dimension "A"	mm	45 +0.2 -0.05	45 +1.1 -0.05	45 +2.2 -0.05
	inch	1.77 +.008 -.002	1.77 +.043 -.002	1.77 +.087 -.002

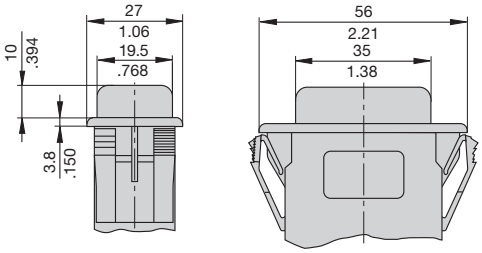
Edges of working parts: ISO 13715

Mounting frame variants

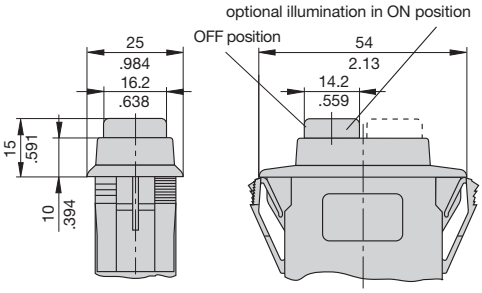
Mounting style F3.3 with rocker
collar height 9 mm (.354 in.)



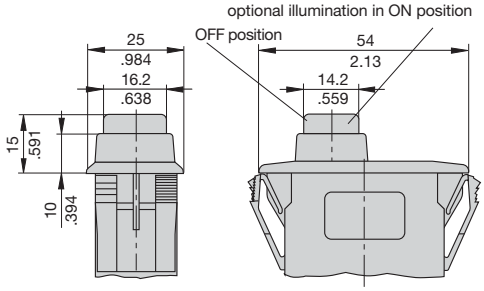
Mounting style F3.4 with rocker
collar height 2 mm (.079 in.), with water splash protection



Mounting style F3.F-...-S-...
with 2 push buttons



Mounting style F3.G-...-D-...
with 1 push button

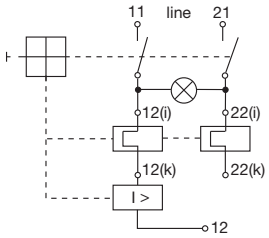


For mounting styles -F2.., -F5.., -F6.. please see section 1.

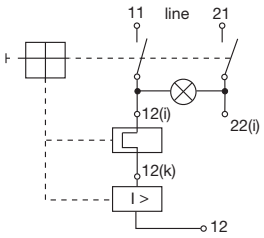
This is a metric design and millimeter dimensions take precedence (mm / inch)

Internal connection diagrams

therm.-magn. protection on one pole
thermally protected on the other pole



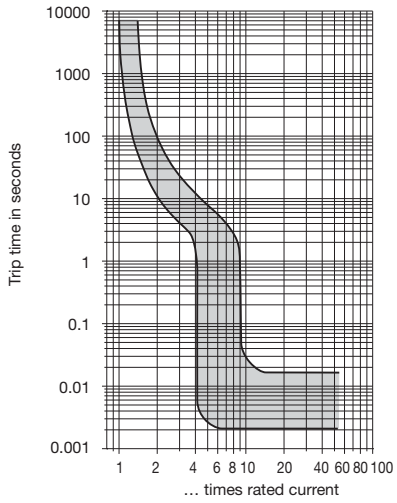
therm.-magn. protection on one pole
unprotected on the other pole



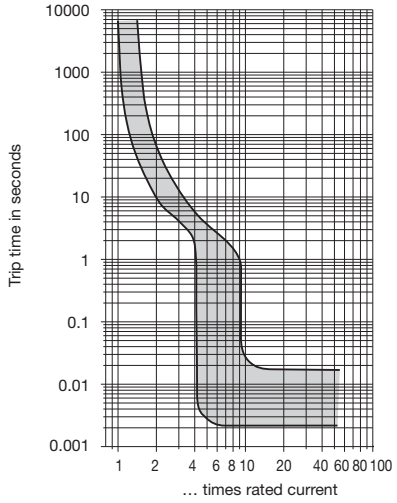
Typical time/current characteristics at +23°C/+73.4°F

Single or double pole load

0.1 ... 2 A **AC/DC** [1]



2.5 ... 16 A **AC/DC** [1]



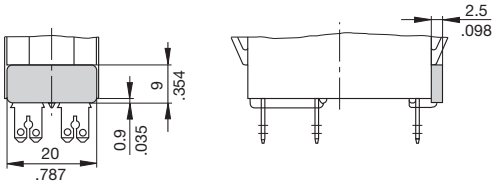
[1] Magnetic tripping currents are increased by 25% on DC supplies.

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	0.8	0.76	0.84	0.92	1	1.08	1.16	1.24

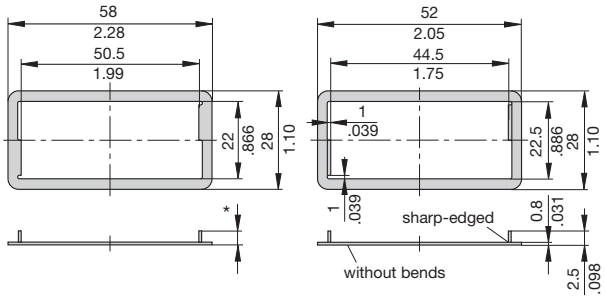
Accessories

Insulated cover
Y 303 068 01



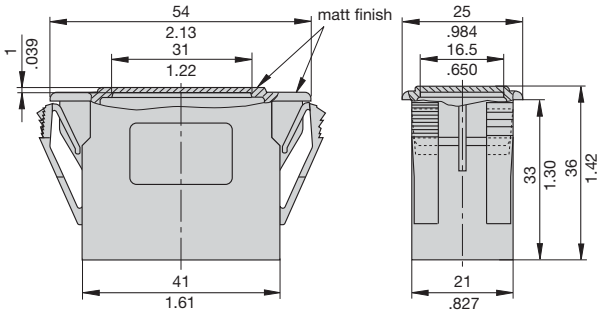
Spacer for 3120-F3...
Y 303 675 01/02

Spacer for 3120-F5...
Y 303 676 01

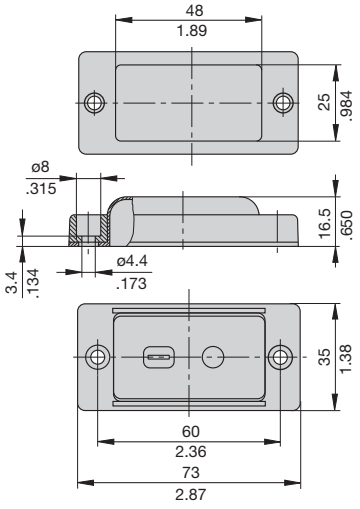


* Y 303 675 01 suitable for panel thickness < 2 mm (.079 in)
* Y 303 675 02 suitable for panel thickness < 4 mm (.157 in)

Blanking piece in -F3... size mounting frame
Y 303 885 31



Separate water splash cover, transparent (IP66)
for use with -F5.. size mounting frames
X 221 619 01



This is a metric design and millimeter dimensions take precedence ($\frac{mm}{inch}$)

Description

Single or two pole rocker switch/thermal-magnetic circuit breaker with trip-free mechanism (S-type TM CBE to EN 60934). The addition of a magnetic tripping module to the type 3120 range described in catalogue section 1 extends the choices available to include single pole with thermal-magnetic protection; double pole switching with thermal-magnetic protection on one pole, thermal protection on the other; double pole switching with thermal-magnetic protection on one pole only. All are offered with rocker switch actuation. Illumination is optional.

Approved to CBE standard EN 60934 (IEC 60934).
Meets the requirements regarding fire resistance of EN 60335-1 : 2007-02 Safety of household and similar electrical appliances.

3120-F7..-M1..

Typical applications

Motors, machine tools, office equipment, appliances.

Standard current ratings and typical internal resistance values

Current ratings (A)	Internal resistance per pole (Ω) thermal-magn.	thermal
0.1	165	94
0.2	42.5	24
0.3	20.2	12
0.4	9.7	5.40
0.5	7.17	4.30
0.6	4.9	3
0.8	2.65	1.50
1	1.49	0.9
1.2	1.25	0.7
1.5	0.74	0.45
2	0.49	0.29
2.5	0.20	0.0785
3	0.14	0.0595
3.5	0.114	0.0565
4	0.092	0.0435
5	0.06	0.0325
6	0.043	0.0215
7	0.030	0.0215
8	0.029	0.02
10	0.021	0.02
12	< 0.02	< 0.02
14	< 0.02	< 0.02
15	< 0.02	< 0.02
16	< 0.02	< 0.02

Illumination voltage / Power consumption

Operating voltage	Power consumption LED
6 V	4.9 mA
12 V	4.9 mA
24 V	4.9 mA
48 V	4.9 mA
115 V	2.2 mA
230 V	2.2 mA

Technical data

For further details please see chapter: Technical Information		
Voltage rating	AC 240 V, 50/60 Hz; DC 50 V	
Current ratings	0.1...16 A	
Typical life	**1-pole**	
AC 240 V:	0.1...20 A	30,000 operations at 1 x I_N, inductive
DC 50 V:	0.1...4 A	30,000 operations at 1 x I_N, inductive
	4.5...16 A	30,000 operations at 1 x I_N, resistive
DC 28 V:	4.5...20 A	30,000 operations at 1 x I_N, inductive
	2-pole	
AC 240 V:	0.1...16 A	50,000 operations at 1 x I_N, inductive
	17...20 A	30,000 operations at 1 x I_N, inductive
DC 50 V:	0.1...16 A	50,000 operations at 1 x I_N, inductive
	17...20 A	10,000 operations at 1 x I_N, inductive
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	AC 3,000 V	
current path/current path	AC 1,500 V	
Insulation resistance	> 100 MΩ (DC 500 V)	
Interrupting capacity I_{cn}	0.1...2 A	100 x I_N
	2.5...16 A	250 A 2-pole
		150 A 1-pole
Interrupting capacity (UL 1077)	I_N	U_N
	0.1...4 A	AC 250 V 200 A
	5...10 A	AC 250 V 2,000 A
	12...14 A	AC 125 V 1,000 A
Degree of protection (IEC 60529/DIN 40050)	operating area IP40 (with water splash protection IP54) terminal area IP00	
Vibration	8 g (57-500 Hz) ± 0.61 mm (10-57 Hz) to IEC 60068-2-6, test Fc 10 frequency cycles/axis	
Shock	30 g (11 ms) to IEC 60068-2-27, test Ea	
Corrosion	96 hours at 5 % salt mist to IEC 60068-2-11, test Ka	
Humidity	240 hours at 95 % RH to IEC 60068-2-78, test Cab	
Mass	approx. 53 g (2-pole) approx. 50 g (1-pole)	

Ordering information

Type

3120 rocker switch/circuit breaker

Mounting

F snap-in frame

Size of frame	panel thickness
7 to fit in cut-out 44.5 x 22 mm	1 - 4 mm (.039-.157 in)

Number of poles

- **1** 1-pole, thermal-magnetic protection
- **2** 2-pole, thermal-magnetic protection on one pole, thermally protected on the other pole
- **5** 2-pole, thermal-magnetic protection on one pole, unprotected on the other pole

Mounting frame design

- **N** new design, grey
- **P** snap-on actuator guard grey
- **Q** snap-on splash cover grey
- **R** new design, black
- **S** snap-on actuator guard black
- **T** snap-on splash cover black

Terminal configuration

- **P7** blade terminals 2x2.8-0.8 mm (QC 2x.110) (terminals 12(k), 22(k), 11, 21)
- **H7** 12(k), 22(k): blade terminals 2x2.8-0.8 (QC 2x.110) 11, 21: terminal screws M3.5, blade terminals 2x2.8-0.8 (QC 2x.110)
- **N7** as P7, but shunt terminals (12(i) and 22(i)) are blade terminals 2x2.8-0.8 (QC 2x.110)
- **G7** as H7, but shunt terminals (12(i) and 22(i)) are blade terminals 2x2.8-0.8 (QC 2x.110)

Characteristic curve

- **M1** standard delay, therm. 1.01-1.4 x I_N; magn. 4-9 x I_N AC

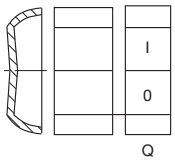
Betätigungselement

- **A** Switch style

Switch colour designation

OPAQUE	TRANSLUCENT (for illuminated versions)
20 blue	**30** blue
26 sky blue	**36** sky blue

Rocker markings



Q

- **Q** permanently raised marking

Rocker illumination

- **T** LED, blue

Illumination voltage range (= operating voltage)

- **0** 4 - 7 V
- **1** 10 - 14 V
- **2** 20 - 28 V
- **3** 90 - 140 V
- **4** 185 - 275 V
- **5** 42 - 54 V AC/DC

Current ratings

- **0.1...16 A**

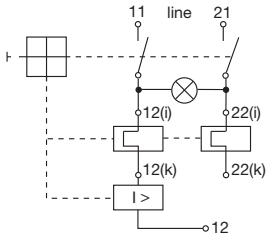
3120 - F 7 2 N - N7 M1- A 30 Q T 4 - 10 A ordering example

Approvals

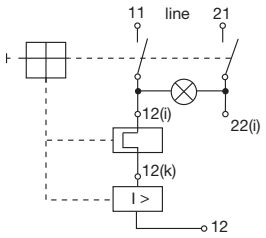
Authority	Voltage ratings	Current ratings
VDE (EN 60934)	AC 240 V; DC 28 V	0.1...16 A
	DC 50 V	0.1...16 A double pole
	DC 50 V	0.1...10 A single pole
CSA, UL	AC 250 V	0.1...10 A
	AC 125 V	0.1...16 A
CCC	AC 250 V; DC 50 V	0.1...20 A

Internal connection diagrams

therm.-magn. protection on one pole thermally protected on the other pole



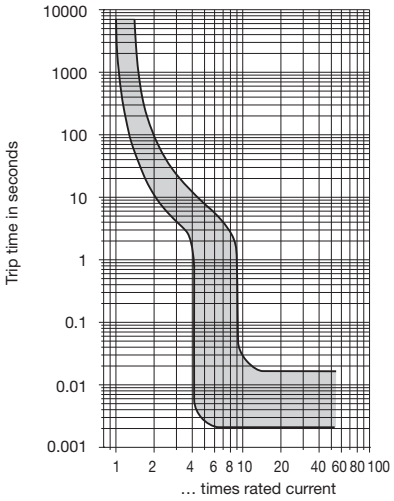
therm.-magn. protection on one pole unprotected on the other pole



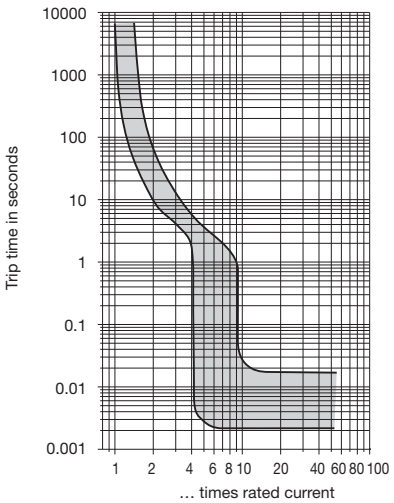
Typical time/current characteristics at +23°C/+73.4°F

Single or double pole load

0.1 ... 2 A **AC/DC** [1]



2.5 ... 16 A **AC/DC** [1]



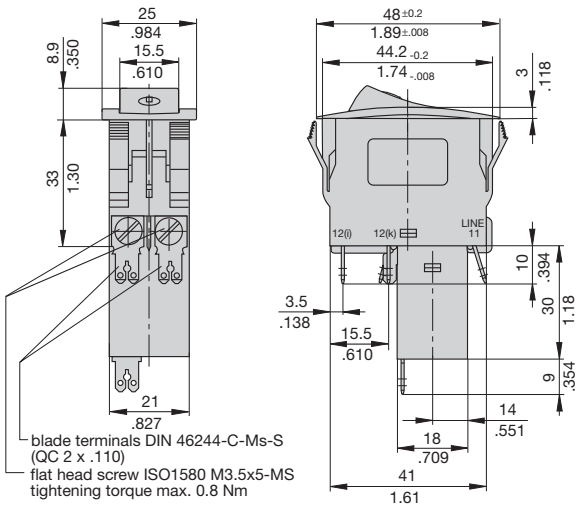
[1] Magnetic tripping currents are increased by 25% on DC supplies.

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	0.8	0.76	0.84	0.92	1	1.08	1.16	1.24

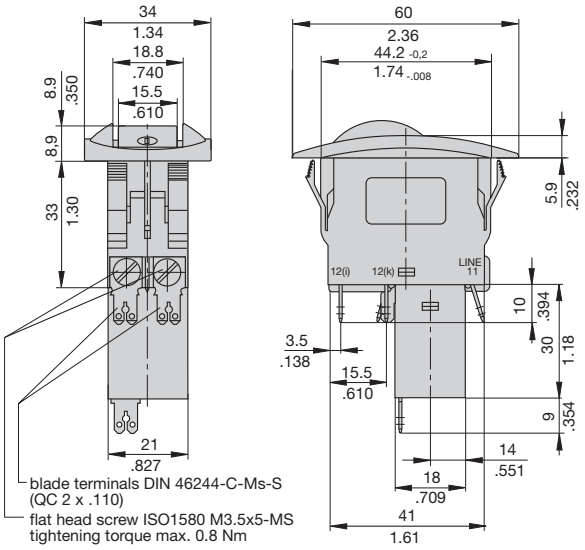
Dimensions

Mounting style -F7.N and -F7.R



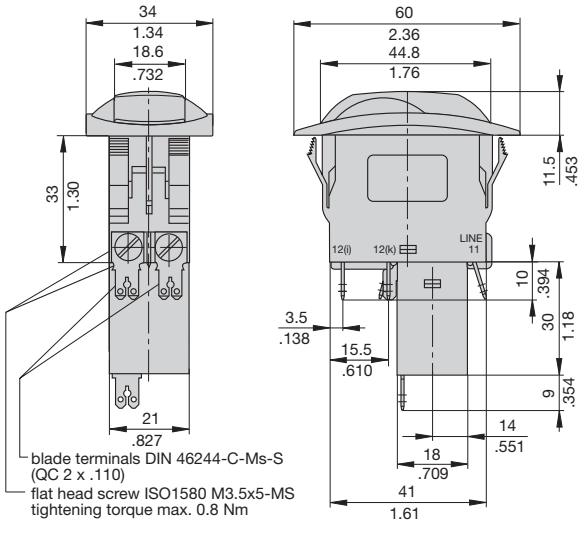
blade terminals DIN 46244-C-Ms-S
(QC 2 x .110)
flat head screw ISO1580 M3.5x5-MS
tightening torque max. 0.8 Nm

Mounting style -F7.P and -F7.S



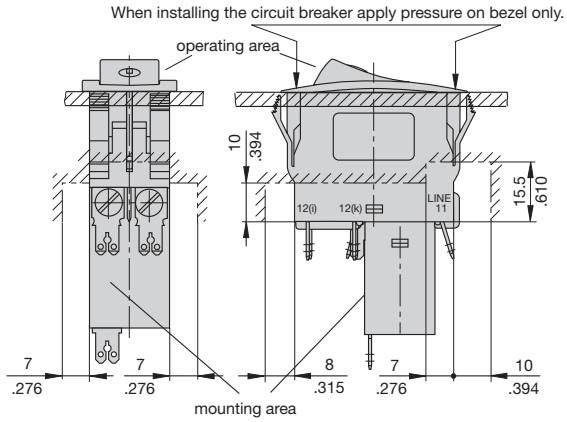
blade terminals DIN 46244-C-Ms-S
(QC 2 x .110)
flat head screw ISO1580 M3.5x5-MS
tightening torque max. 0.8 Nm

Mounting style -F7.Q and -F7.T

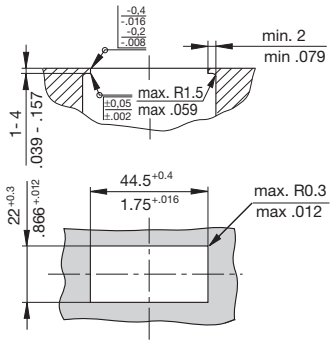


blade terminals DIN 46244-C-Ms-S
(QC 2 x .110)
flat head screw ISO1580 M3.5x5-MS
tightening torque max. 0.8 Nm

Installation drawing



Cut-out dimensions

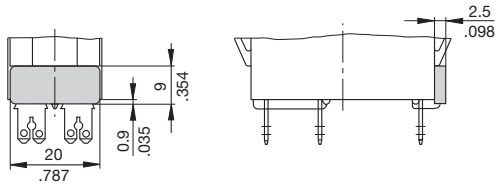


Edges of working parts: ISO 13715

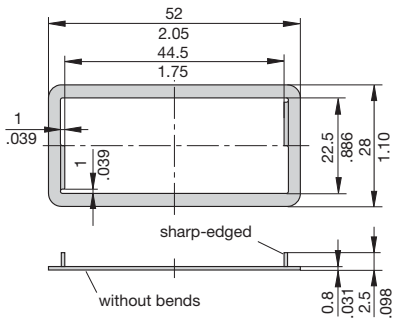
This is a metric design and millimeter dimensions take precedence (mm / inch)

Accessories

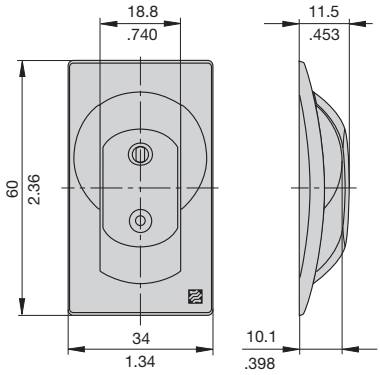
Insulated cover
Y 303 068 01



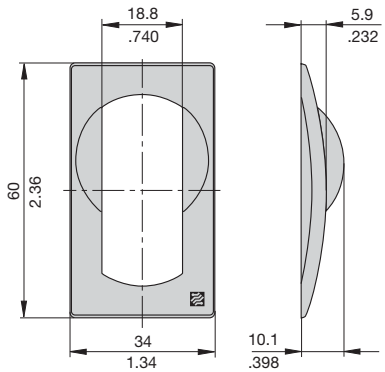
Spacer for 3120-F7...
Y 303 676 01



Translucent water splash cover (IP54)
X 222 143 01
Consisting of
- Y 307 097 01 snap-on frame with actuator guard
- Y 307 096 01 soft plastic cover



Snap-on frame with actuator guard (can be snapped on as switch-on protection or switch-off protection)
Y 307 097 01



This is a metric design and millimeter dimensions take precedence ($\frac{mm}{inch}$)

All dimensions without tolerances are for reference only. In the interest of improved design, performance and cost effectiveness the right to make changes in these specifications without notice is reserved.Product markings may not be exactly as the ordering codes. Errors and omissions excepted.

Description

Single pole thermal-magnetic circuit breaker with tease-free, trip-free, press-to-reset, snap action mechanism and additional manual release (M-type TM CBE to EN 60934). Designed for plug-in mounting with E-T-A sockets 10 and 16.
Approved to CBE standard EN 60934 (IEC 60934).

Typical applications

Control equipment, extra-low voltage wiring systems and components.

Ordering information

Type No.	
3200	plug-in
	Current ratings
	0.05...25 A

3200 - 5 A ordering example

Standard current ratings and typical internal resistances

Current rating (A)	Internal resistance (Ω)	Current rating (A)	Internal resistance (Ω)
0.05	534	4	0.141
0.1	149	5	0.107
0.2	56	6	0.060
0.3	24.2	7	0.049
0.4	13.6	8	< 0.02
0.5	8.1	10	< 0.02
0.6	5.25	12	< 0.02
0.8	3.55	14	< 0.02
1	2.02	15	< 0.02
1.5	0.90	16	< 0.02
2	0.51	18	< 0.02
2.5	0.36	20	< 0.02
3	0.23	25	< 0.02

Approvals

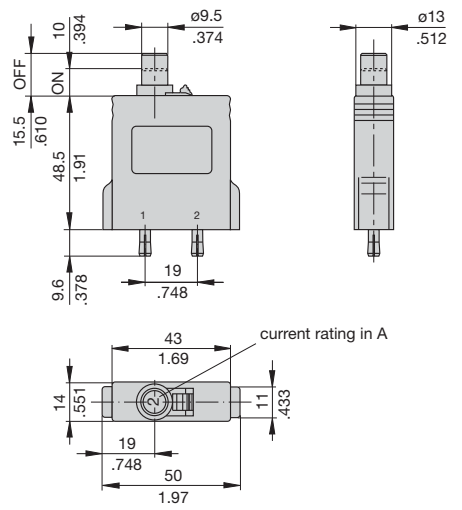
Authority	Voltage ratings	Current ratings
VDE (EN 60934)	AC 240 V; DC 28 V	0.05...25 A
CSA	AC 250 V; DC 28 V	0.05...15 A

3200-...

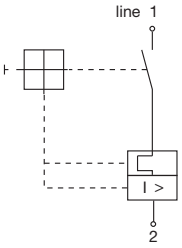
Technical data

For further details please see chapter: Technical Information	
Voltage rating	AC 240 V, 50/60 Hz; DC 28 V
Current ratings	0.05...25 A
Typical life	500 operations at 1 x I_N, inductive 4,000 operations at 1 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; pollution degree 2 reinforced insulation in operating area
Dielectric strength (IEC 60664 and 60664A) operating area	test voltage AC 3,000 V double insulation
Insulation resistance	> 100 MΩ (DC 500 V)
Interrupting capacity I_{cn}	0.05...0.8 A self-limiting 1...2 A 200 A 2.5...25 A 400 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 Ka
Humidity	240 hours at 95 % RH to IEC 60068-2-78, test Cab
Mass	approx. 50 g

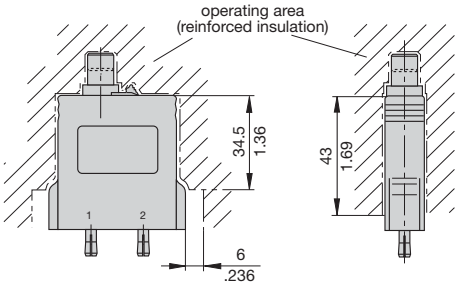
Dimensions



Internal connection diagram



Installation drawing

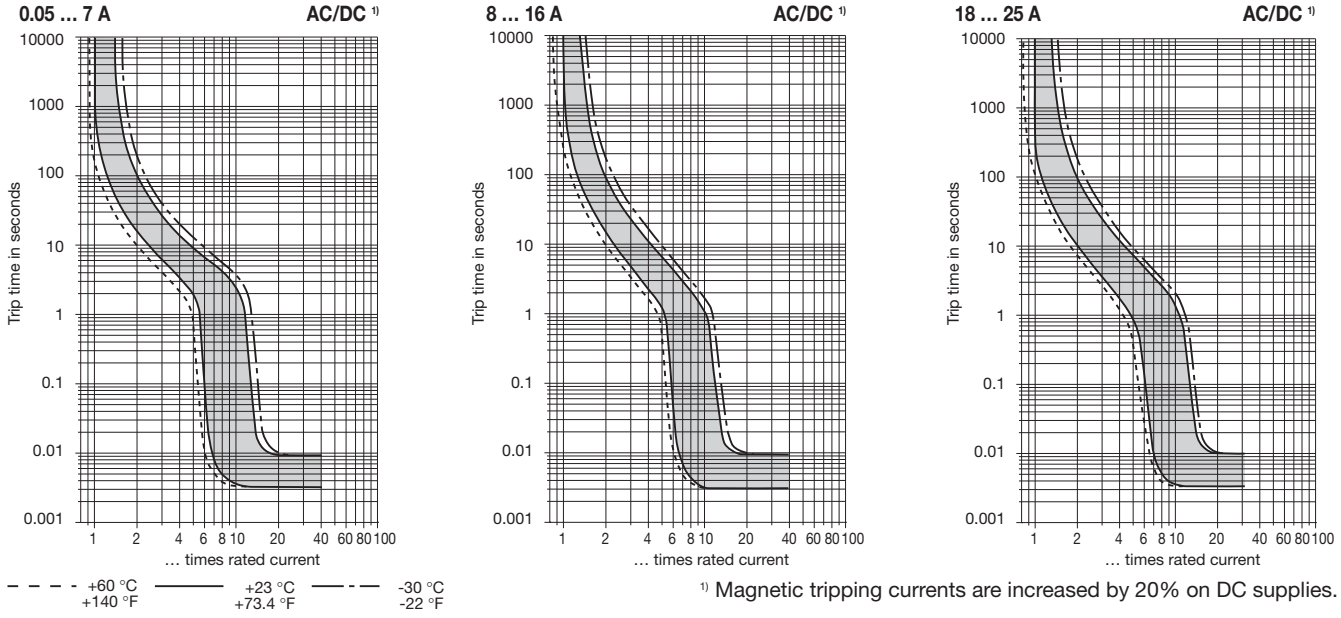


This is a metric design and millimeter dimensions take precedence ($\frac{mm}{inch}$)

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

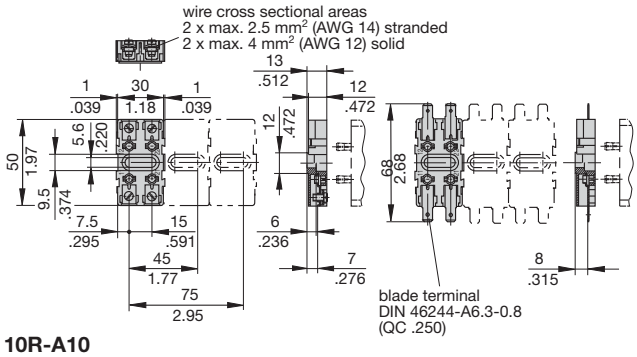
Typical time/current characteristics



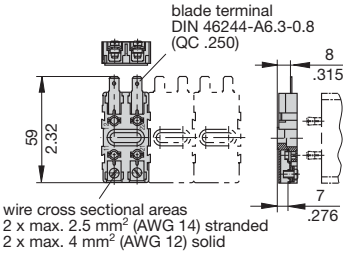
1) Magnetic tripping currents are increased by 20% on DC supplies.

Accessories

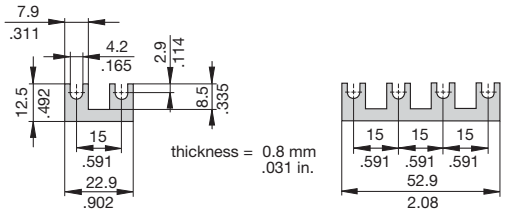
Sockets 10R-K10 **10R-P10**



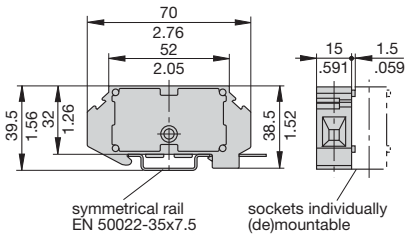
10R-A10



Bus bars for sockets 10... (up to 20 A max. load)
Y 301 166 02, 2-way **Y 301 166 01,** 4-way

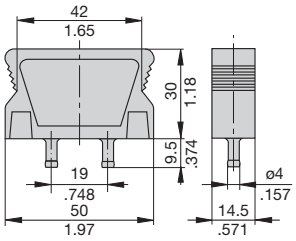


Socket 16
(up to 16 A max. load)

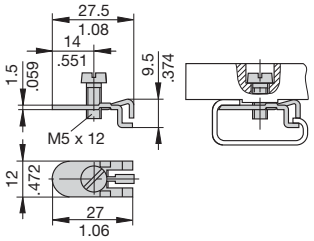


Adapter
for socket 16
X 200 409 01
for track mounting
to EN 50035-G32
(G profile)
on request

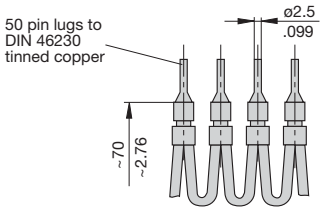
Blanking plug
Y 301 477 01
for sockets 10R-P10/K10/A10



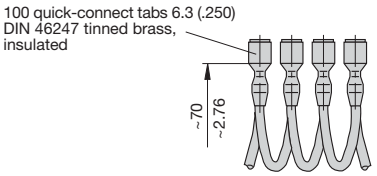
Terminal for mounting rack
(DIN/EN 50 035-G32)
X 200 800 01
for sockets 10R



Connector bus links -K10
X 210 589 01/ 2.5 mm², (AWG 14) (black) up to 20 A max. load
X 210 589 02/ 1.5 mm², (AWG 16) (brown) up to 13 A max. load
for sockets 10R-P10, 10R-A10 and 16



Connector bus links -P10
X 210 588 01/ 1.5 mm², (AWG 16) (brown) up to 13 A max. load
X 210 588 02/ 2.5 mm², (AWG 14) (black) up to 20 A max. load
X 210 588 03/ 2.5 mm², (AWG 14) (red) up to 20 A max. load
X 210 588 04/ 2.5 mm², (AWG 14) (blue) up to 20 A max. load
for sockets 10R-P10, 10R-A10



2

This is a metric design and millimeter dimensions take precedence (mm / inch)

All dimensions without tolerances are for reference only. In the interest of improved design, performance and cost effectiveness the right to make changes in these specifications without notice is reserved.Product markings may not be exactly as the ordering codes. Errors and omissions excepted.

Description

Single pole thermal-magnetic circuit breakers with tease-free, trip-free, press-to-reset, snap action mechanism (R-type TM CBE to EN 60934; M-type with manual release (-H). Available with fast acting and standard magnetic tripping characteristics - types 3300 and 3400 - both with threadneck panel mounting. Options include auxiliary contacts, a separate shunt tap terminal (-A3), and pull-to-trip manual release (-H). Approved to CBE standard EN 60934 (IEC 60934).

Typical applications

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

Ordering information

Type No.
- **3300** fast acting
- **3400** standard delay

Mounting
- **iG2** moulded threadneck M12x1 (bulk-shipped), not with -H;
- **...** leave blank for metal threadneck, required for -H

Terminal design
- **P10** blade terminals 6.3-0.8 (QC .250)
- **K20** screw terminals M3.5x5.5 with clamp (not for -Si and -A3)

Shunt terminal (optional)
- **A3** same as main terminals, up to I_N=7 A max. load 5 A

Manual release (optional)
- **H** manual release facility (pull), without reinforced insulation in operating area, for M12x1 metal threadneck only. Metal threadneck version for -H is not approved.

Auxiliary contacts (optional)
- **Si** with silver-plated solder terminals (N/O and N/C)

Push button marking (optional)
- **1** without

Current ratings
- **0.05...16 A**

3400 - iG2 - P10 - .. - .. - Si - .. - 10 A ordering example, without manual release and with moulded threadneck

3400 - ... - P10 - .. - H - Si - .. - 10 A ordering example, with manual release and metal threadneck

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) 3300	3400	Current ratings (A)	Internal resistance (Ω) 3300	3400
0.05	447	211	3	0.18	0.19
0.1	131	131	4	0.109	0.090
0.2	41	40	5	0.066	0.061
0.3	19.6	19.3	6	0.046	0.041
0.4	10.4	10.4	7	0.032	0.034
0.5	7.2	7.1	8	0.02	≤ 0.02
0.6	4.8	4.3	10	≤ 0.02	≤ 0.02
0.8	2.5	2.5	12	≤ 0.02	≤ 0.02
1	1.93	1.67	13	≤ 0.02	≤ 0.02
1.5	0.81	0.61	14	≤ 0.02	≤ 0.02
2	0.44	0.38	15	≤ 0.02	≤ 0.02
2.5	0.27	0.24	16	≤ 0.02	≤ 0.02

3300 fast acting **3400** standard delay

Technical data

For further details please see chapter: Technical Information

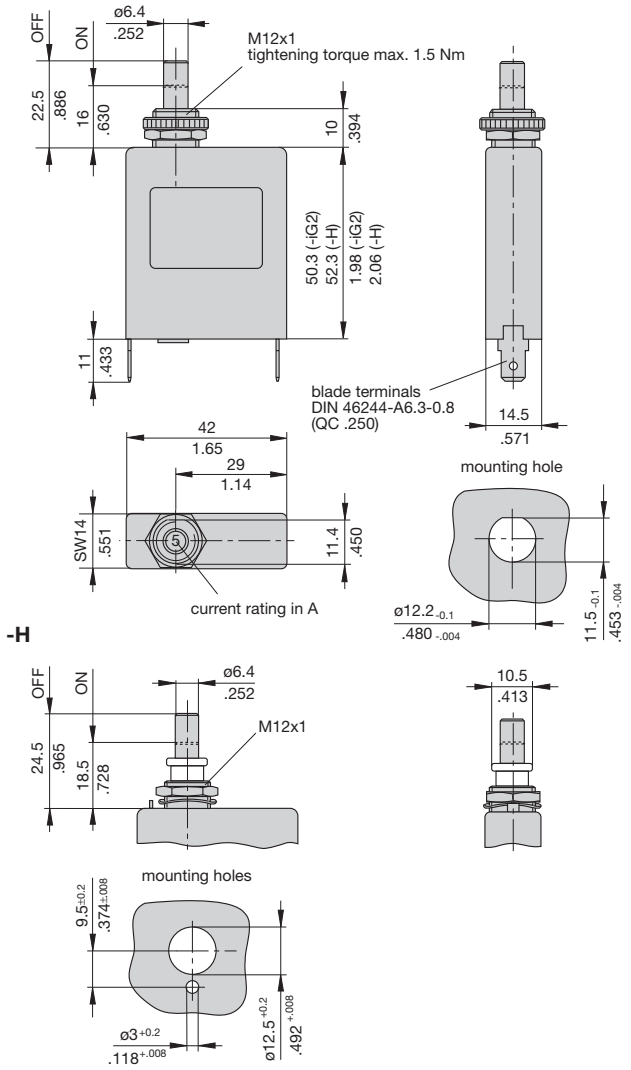
Voltage rating	AC 240 V, 50/60 Hz; DC 65 V (UL: AC 250 V; DC 80 V)
Current ratings	0.05...16 A
Auxiliary circuit	1 A, AC 240 V / DC 65 V
Typical life with -H:	5,000 operations at 1 x I_N, inductive 5,000 operations at 2 x I_N, resistive
without -H: 0.05...8 A	5,000 operations at 2 x I_N, inductive
> 8 A	1,500 operations at 2 x I_N, inductive
Ambient temperature	-30...+60 °C (-22...+140 °F)
Insulation co-ordination (IEC 60664 and 60664 A) operating area	rated impulse withstand voltage 2.5 kV; pollution degree 2; reinforced insulation in operating area
Dielectric strength (IEC 60664 and 60664A) operating area	test voltage AC 3,000 V double insulation
main circuit/aux. circuit	AC 1,500 V
aux. circuit 4-5/6-7	AC 840 V
Insulation resistance	> 100 MΩ (DC 500 V)
Interrupting capacity I_{cn}	0.05...0.8 A self-limiting 1...2 A 200 A 2.5...16 A 400 A
Interrupting capacity (UL 1077)	I_N / U_N 0.05...16 A AC 250 V 1,000 A 0.05...16 A DC 80 V 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 Ka
Humidity	240 hours at 95 % RH, to IEC 60068-2-78, test Cab
Mass	3300: approx. 55 g 3400: approx. 50 g

Approvals

Authority	Voltage ratings	Current ratings
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
UL: only type 3400	DC 65 V	0.05...25 A

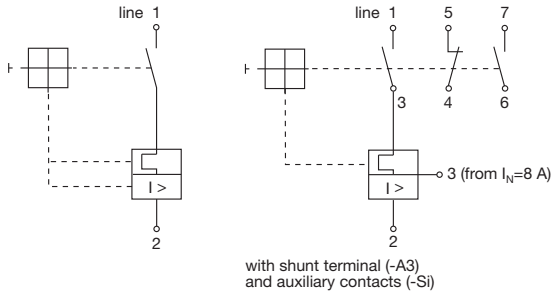
Dimensions

-iG2-P10

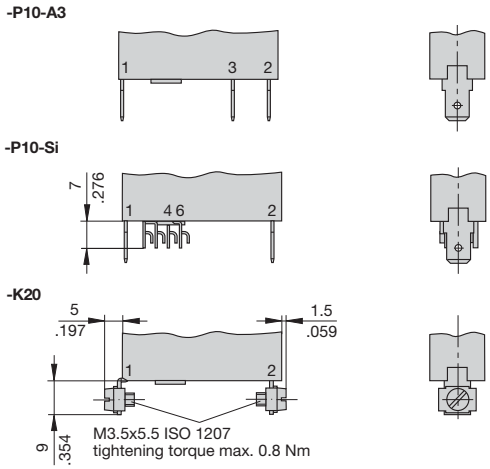


-H

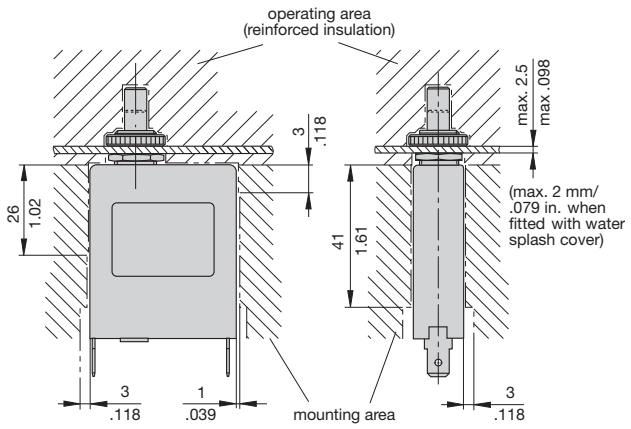
Internal connection diagrams



Terminal design



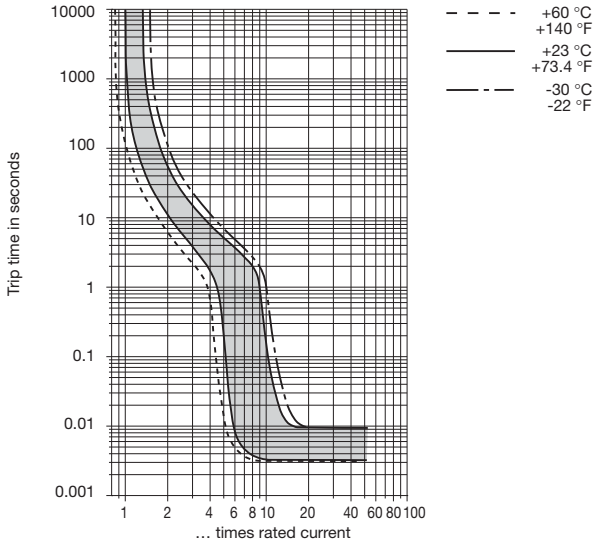
Installation drawing



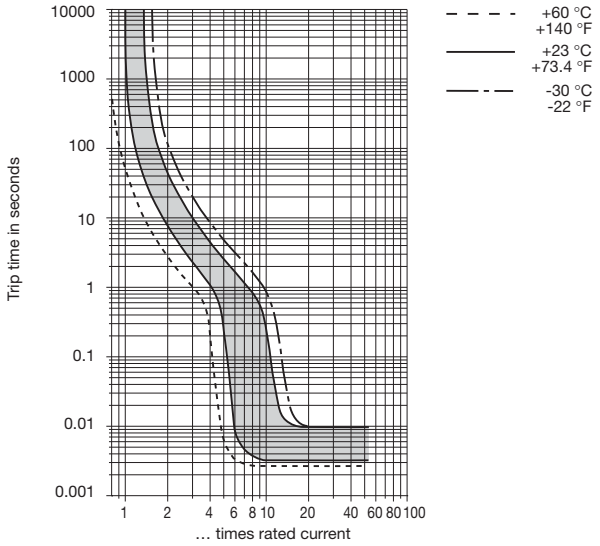
This is a metric design and millimeter dimensions take precedence ($\frac{mm}{inch}$)

Typical time/current characteristics

Type 3300 0.05 ... 7 A **AC/DC** [1]

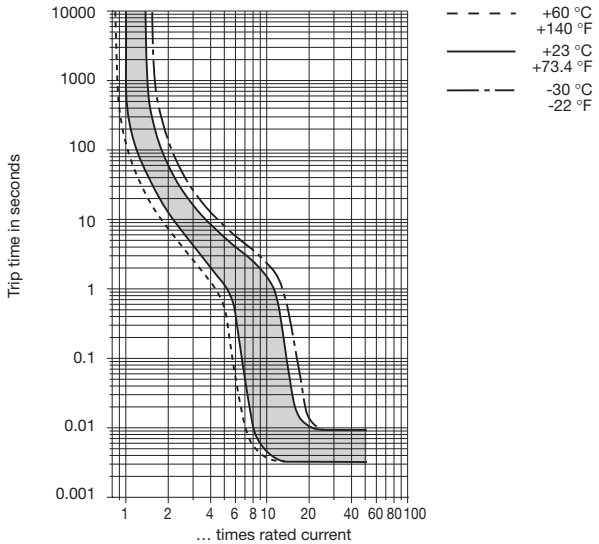


Type 3300 8 ... 16 A **AC/DC** [1]

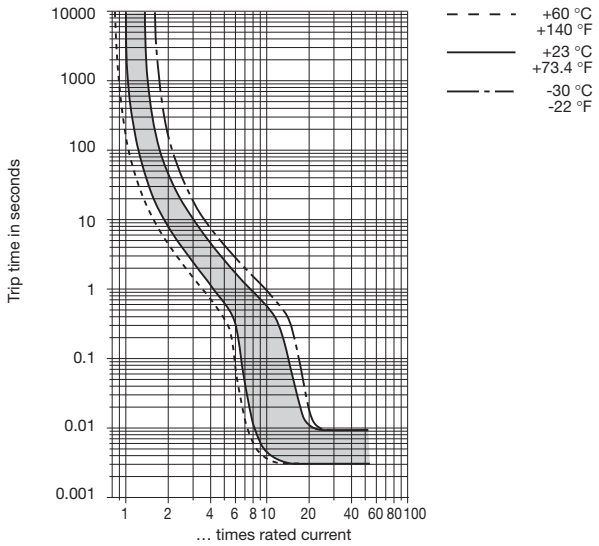


[1] Magnetic tripping currents are increased by 20% on DC supplies.

Type 3400 0.05 ... 7 A **AC/DC** [1]



Type 3400 8 ... 16 A **AC/DC** [1]

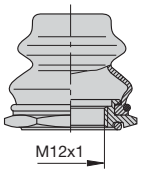


[1] Magnetic tripping currents are increased by 20% on DC supplies.

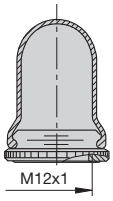
Accessories

For push buttons with M12 moulded threadneck (-iG2)
(not with manual release -H)

Hex nut with splash cover
X 201 296 01 black (IP64)
X 200 801 08 transparent, with O-ring (IP66 and IP67)



Water splash cover, transparent with knurled nut
X 210 663 01 (IP64)



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

All dimensions without tolerances are for reference only. In the interest of improved design, performance and cost effectiveness the right to make changes in these specifications without notice is reserved.Product markings may not be exactly as the ordering codes. Errors and omissions excepted.

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.

3500 standard type
4000 low-resistance type

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) 3500	4000	Current ratings (A)	Internal resistance (Ω) 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			

Technical data

For further details please see chapter: Technical Information

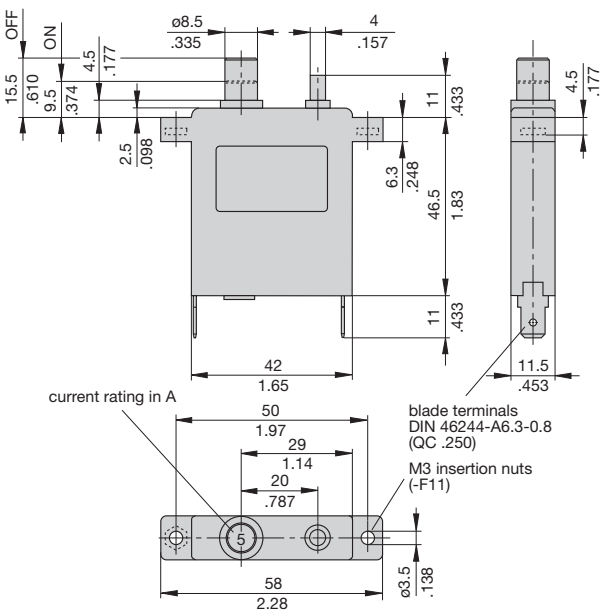
Voltage rating	AC 240 V, 50/60 Hz; DC 65 V (UL: AC 250 V; DC 80 V)
Current rating range	3500: 0.05...16 A 4000: 0.05...10 A
Auxiliary circuit	1 A, AC 240 V / DC 65 V
Typical life	5,000 operations at 1 x I_N, inductive 5,000 operations at 2 x I_N, resistive
Ambient temperature	-30...+60 °C (-22...+140 °F)
Insulation co-ordination (IEC 60664 and 60664 A)	rated impulse withstand voltage 2.5 kV; pollution degree 2 reinforced insulation in operating area
Dielectric strength (IEC 60664 and 60664A) operating area main/aux. circuit aux. circuit 4-5/6-7	test voltage AC 3,000 V AC 1,500 V AC 840 V
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) type 3500:	I_N 0.05...16 A; U_N AC 250 V; 1,000 A 0.05...16 A DC 80 V 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 Ka
Humidity	240 hours at 95 % RH to IEC 60068-2-78, test Cab
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
UL	DC 65 V	0.05...25 A
4000:		
VDE (EN 60934)	AC 240 V; DC 65 V	0.05...10 A
CSA	AC 250 V; DC 80 V	0.05...10 A

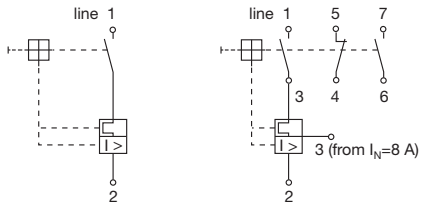
Dimensions

Version -P10

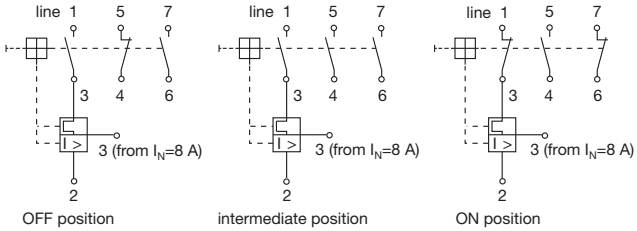


Internal connection diagrams

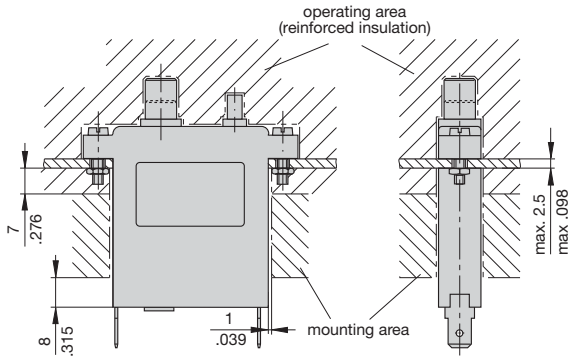
with shunt terminal (-A3) and auxiliary contacts (-Si)



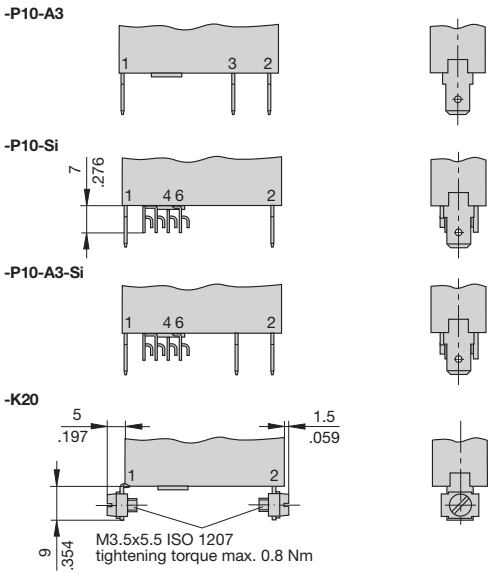
Switching position with intermediate position and auxiliary contacts (-ZR-Si)



Installation drawing



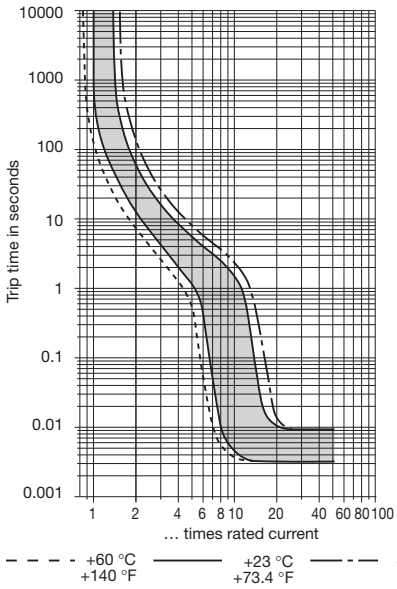
Terminal design



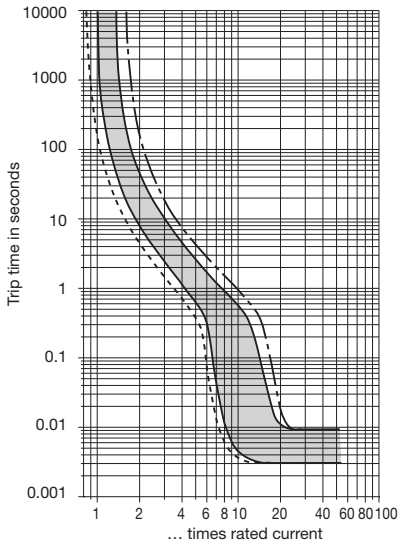
This is a metric design and millimeter dimensions take precedence ($\frac{mm}{inch}$)

Typical time/current characteristics

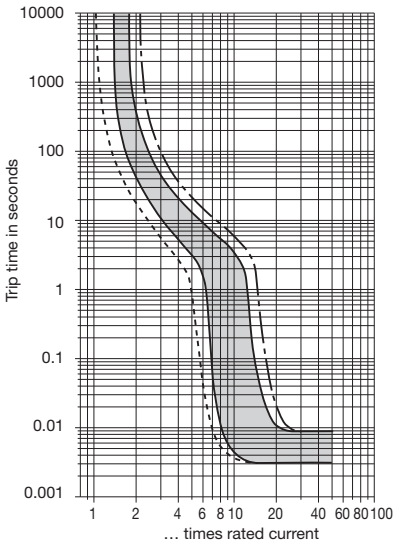
3500 0.05 ... 7 A **AC [1]**



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

Special version 3500-...-2100

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

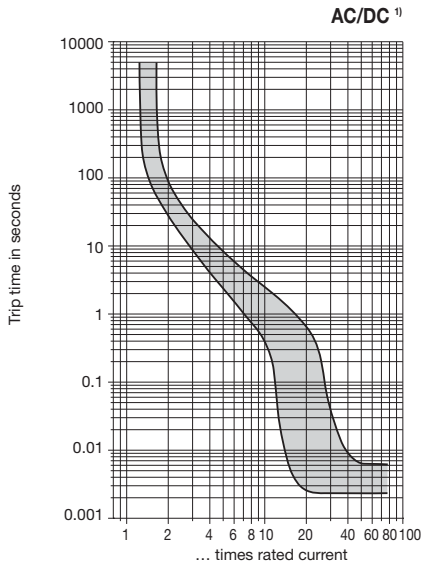
Typical applications

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		

Typical time/current characteristics at +23 °C



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

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 °C.
Suffix -2350 is also available for types 3400 and 3600.
Enquire for further details.

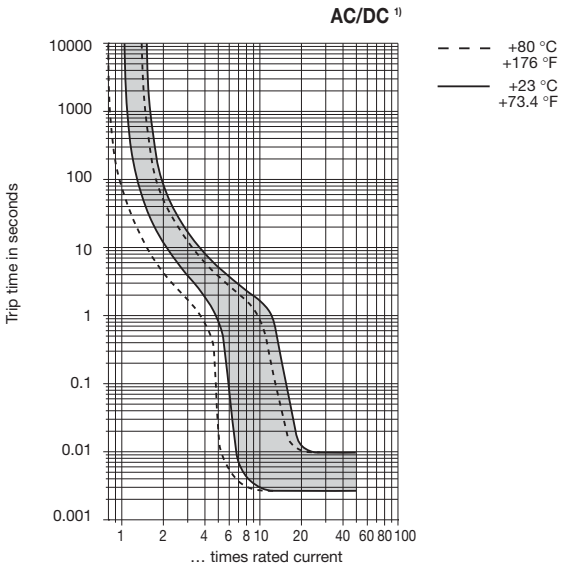
Typical applications

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



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

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). Designed for plug-in mounting with E-T-A sockets 17-P10-Si, 23-P10-Si, 63-P10-Si; or panel mounting using E-T-A clips. Featuring an unprotected shunt tap terminal and optional auxiliary contacts. Type 3900 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

Process control systems, instrumentation, communications systems, rail vehicles.

Ordering information

Type No.		
3600	standard version with shunt tap terminal -3	
3900	low-resistance version	
	Terminal design	
	P10	blade terminals 6.3-0.8 (QC .250)
		Auxiliary contacts (3900: intermediate position as standard)
		Si with blade terminals 6.3-08,one each NO/NC,
		Si60 special auxiliary contact (only 3900) 1 NO, closed in the intermediate and ON position
		ZR-Si auxiliary contacts with intermediate position (only 3600)
		ZR-Si60 special auxiliary contact (only 3600) 1 NO, closed in the intermediate and ON position
		Si3-R special auxiliary contacts, 2 NC contacts with reset button (not approved)
		Current ratings
		0.05...16 A (type 3600)
		0.05...10 A (type 3900)
3600 - P10 - 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 rating (A)	Internal resistance (Ω) 3600	3900	Current rating (A)	Internal resistance (Ω) 3600	3900
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			

3600 standard type **3900** low-resistance type

2

Technical data

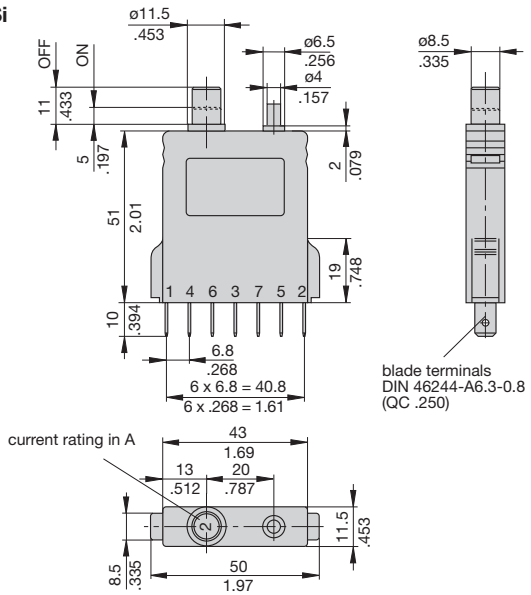
For further details please see chapter: Technical Information			
Voltage rating	AC 240 V, 50/60 Hz; DC 65 V (UL: AC 250 V; DC 65 V)		
Current rating range	3600: 0.05...16 A 3900: 0.05...10 A		
Auxiliary circuit	1 A, AC 240 V / DC 65 V		
Typical life	5,000 operations at 1 x I_N, inductive 5,000 operations 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) operating area main/aux. circuit aux. circuit 4-5/6-7	test voltage AC 3,000 V AC 1,500 V AC 840 V		
Insulation resistance	>100 MΩ (DC 500 V)		
Interrupting capacity I_{cn}	3600 0.05...0.8 A 1...2 A 2.5...16 A	3900 0.05...0.2 A 0.3...2 A 2.5...10 A	self-limiting 200 A 400 A
Interrupting capacity (UL 1077) type 3600:	I_N 0.05...16 A 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 Ka		
Humidity	240 hours at 95 % RH to IEC 60068-2-78, test Cab		
Mass	approx. 45 g		

Approvals

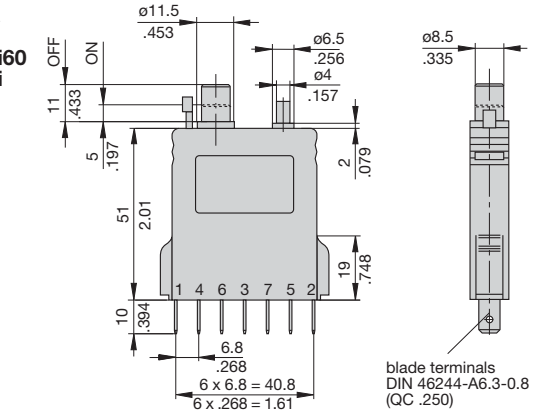
Authority	Voltage ratings	Current ratings
3600:		
VDE (EN 60934)	AC 240 V; DC 65 V	0.05...16 A
CSA/UL	AC 250 V; DC 80 V	0.05...16 A
UL	DC 65 V	0.05...25 A
3900:		
VDE (EN 60934)	AC 240 V; DC 65 V	0.05...10 A

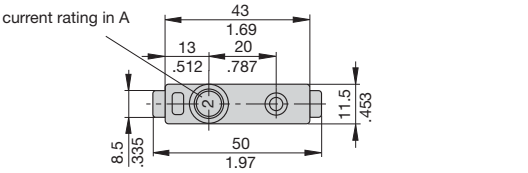
Dimensions

-P10-Si



-Si3-R
-Si60
-ZR-Si60
-ZR-Si

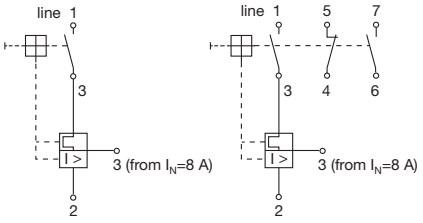




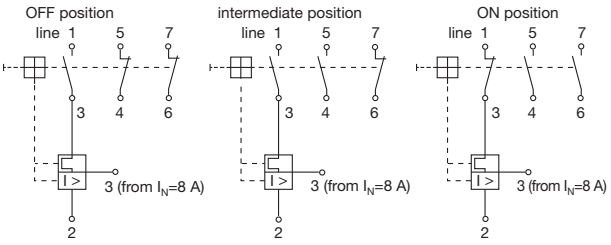
Intermediate position: Holding down reset button and actuating manual release simultaneously.

Internal connection diagrams

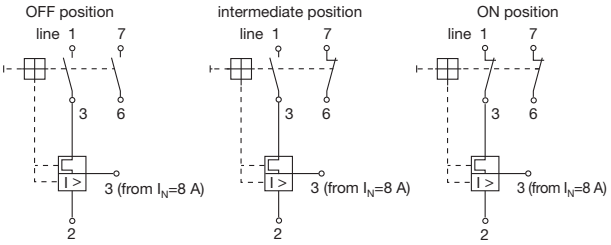
with shunt terminal (standard) and auxiliary contacts (-Si) only 3600



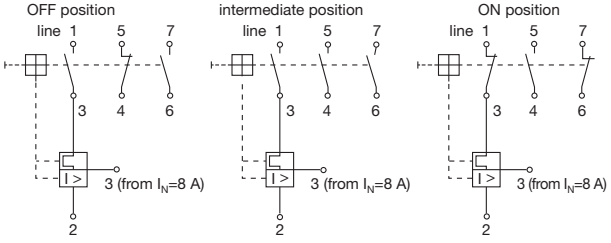
Switching position with auxiliary contacts and reset button (-Si3-R)



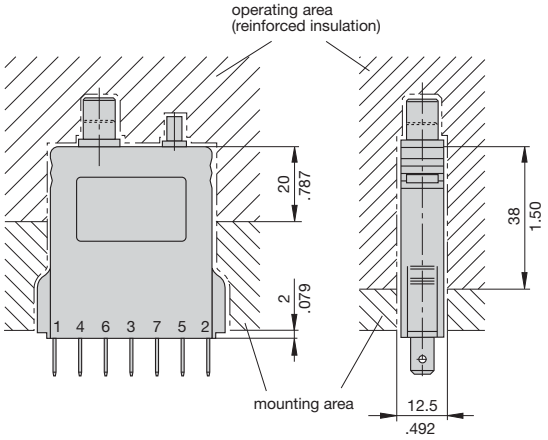
Switching position with special auxiliary contact (-Si60, -ZR-Si60)



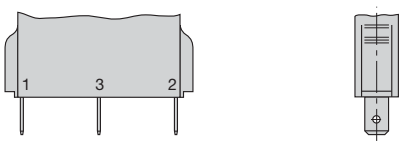
Switching position with intermediate position and auxiliary contacts (3600: -ZR-Si, 3900: -Si)



Installation drawing

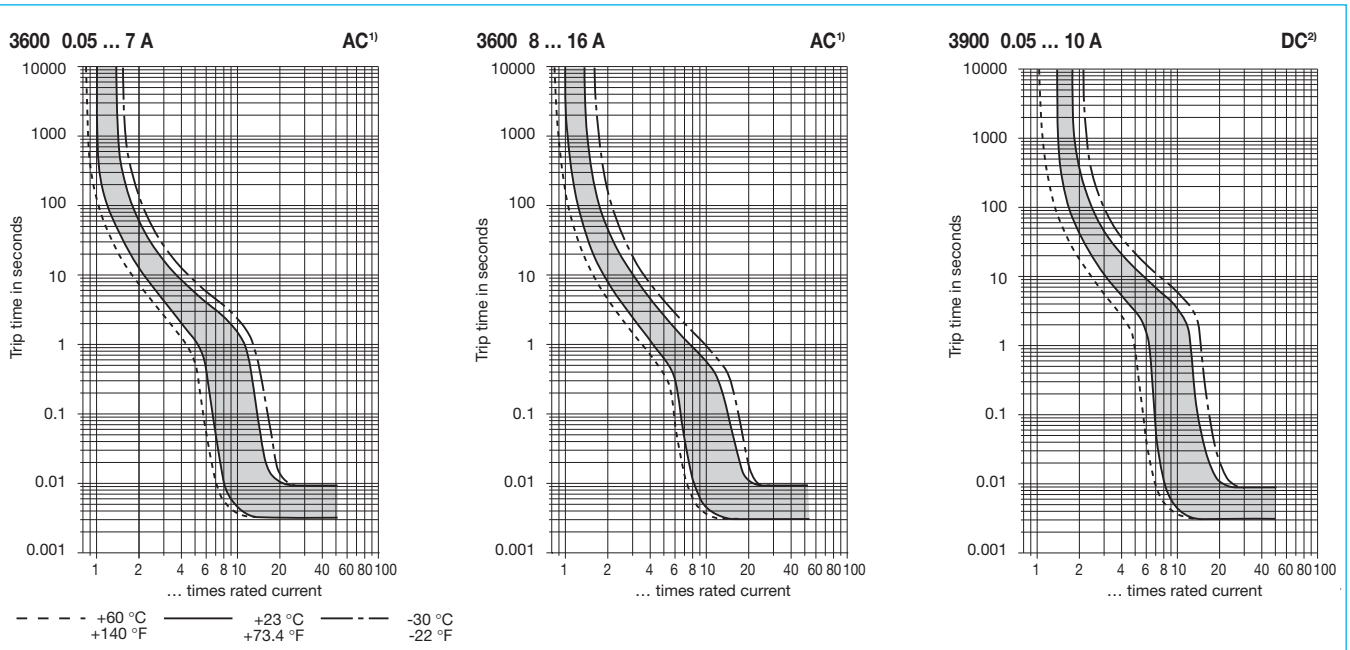


Terminal design -P10



This is a metric design and millimeter dimensions take precedence ($\frac{mm}{inch}$)

Typical time/current characteristics



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

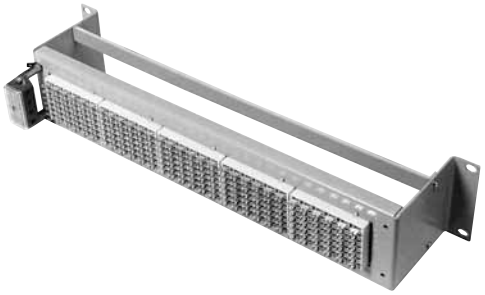
The time/current characteristic curve depends on the ambient temperature prevailing. In order to eliminate nuisance tripping, please multiply the circuit breaker current ratings by the derating factor shown below. See also section 9 – Technical information.

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

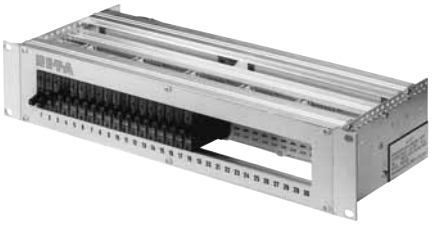
Accessories

Module 17plus
Modular power distribution system for circuit breakers 2210-S, 3600 or 3900.
For technical details see product group 7.

Power-D-Box with sockets
accommodating up to 30 E-T-A thermal-magnetic circuit breakers type 3600-P10-Si or 3900-P10-Si.
For technical data see product group 7.

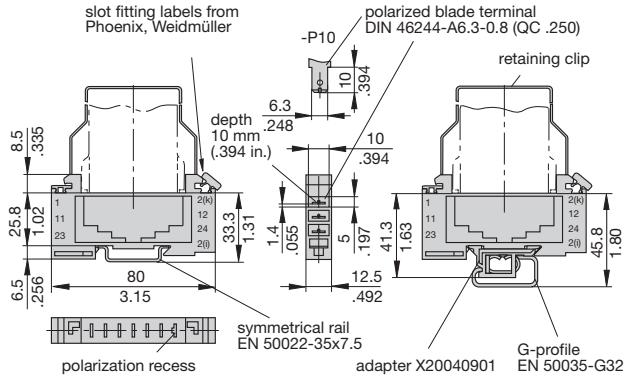


Power-D-Box with sockets pre-wired 19BGT2 2U
for 18, 24 or 30 circuits.
For technical data see product group 7.

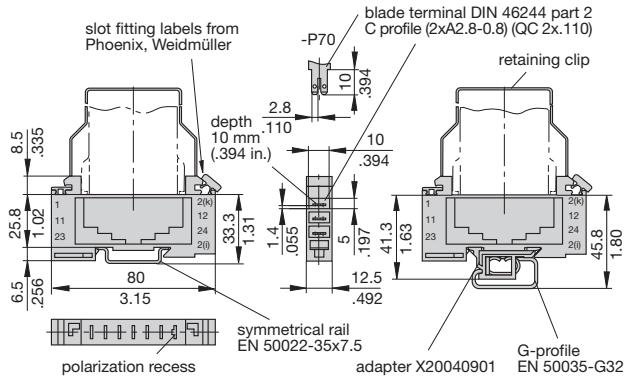


Accessories

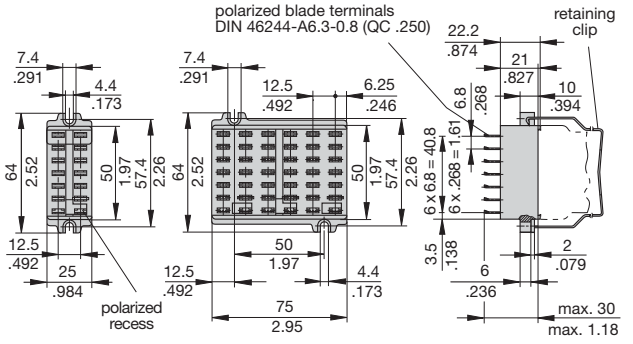
Sockets
17-P10-Si **17-P10-Si-20025**
(up to 16 A max. load) mounted with adapter
Retaining clip Y 300 581 11 to special order.



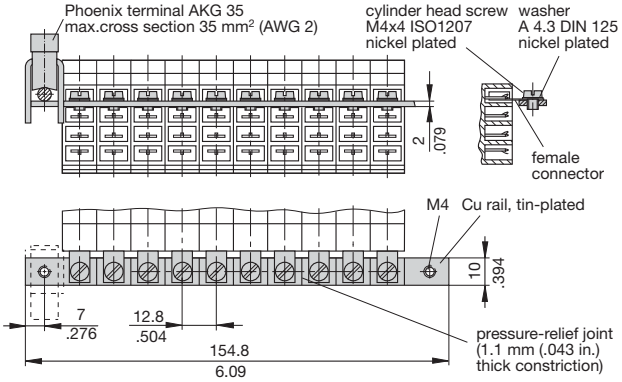
Sockets
17-P70-Si **17-P70-Si-20025**
(up to 16 A max. load) mounted with adapter
Retaining clip Y 300 581 11 to special order.



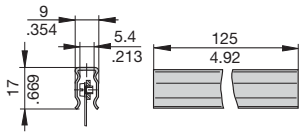
Sockets
23-P10-Si **63-P10-Si**
(up to 16 A max. load)
Retaining clip Y 300 581 03 to special order.



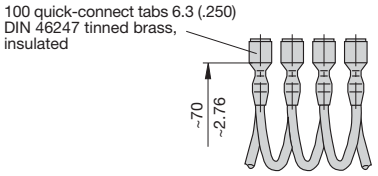
Bus bar (10-way) (supplied as a complete package)
for socket 17 (for max. 100 A continuous load)
X 211 157 01 with terminal
X 211 157 02 without terminal
(more positions available on request)



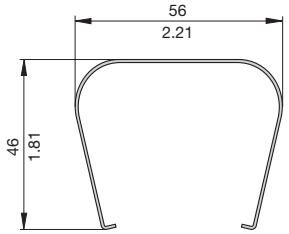
Insulate sleeving for bus bar
Y 303 824 01



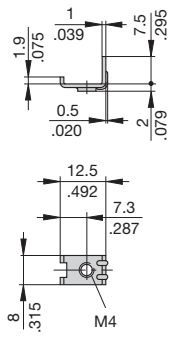
Connector bus links -P10
X 210 588 01/ 1.5 mm² (AWG 16), brown up to 13 A max. load
X 210 588 02/ 2.5 mm² (AWG 14), black up to 20 A max. load
X 210 588 03/ 2.5 mm² (AWG 14), red up to 20 A max. load
X 210 588 04/ 2.5 mm² (AWG 14), blue up to 20 A max. load



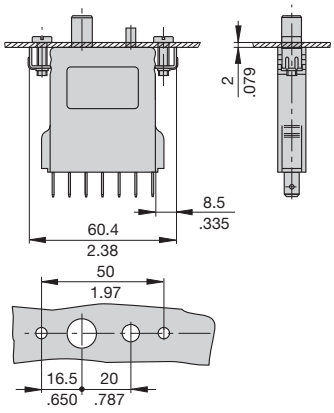
Extraction tool
Y 301 398 02



Mounting clip
Y 300 504 02
(2 pcs needed per unit)



Installation drawing with mounting clips Y 300 504 02



This is a metric design and millimeter dimensions take precedence ($\frac{mm}{inch}$)

All dimensions without tolerances are for reference only. In the interest of improved design, performance and cost effectiveness the right to make changes in these specifications without notice is reserved.Product markings may not be exactly as the ordering codes. Errors and omissions excepted.

Description

Single, double and three pole thermal-magnetic circuit breakers with high rupture capacity to UL 489 (5 kA), EN/IEC 60934 (6kA) and UL 1077 (5 kA). With toggle actuation, positively trip-free mechanism, a choice of characteristic curves and a wide range of current ratings in finely graded steps from 0.1 A through 32 A. Auxiliary contacts (make or break contacts) are optionally available. Track-mountable design, width only 12.5 mm. Ease of wiring by means of an integral busbar concept: line entry busbar LINE+ and signal busbars/signal jumpers.

Typical applications

Protection of power supplies, equipment and cables in centralised control systems and in decentralised installations serving automation, petro-chemical, power plant, steel industry and similar industrial applications.

Ordering Information

Type number

4220 thermal-magnetic high performance circuit breaker

Mounting

T1 track-mounting

Number of poles

1 single pole
2 double pole
3 three pole

Additional feature

0 without actuator guard
1 with actuator guard

Main terminals

K0 screw terminals 16 mm² / 10 mm²

Characteristic curve

F1 thermal-magnetic, extremely fast, DC
F2 thermal-magnetic, fast, AC/DC
M1 thermal-magnetic, medium delay, AC/DC
T1 thermal-magnetic, long delay, AC/DC

Auxiliary contacts

H0 without
H1 with auxiliary contacts in all poles
H2 with auxiliary contacts only in pole 1 (2-pole plus)
H3 with auxiliary contacts only in poles 1+3 (3-pole plus)
H4 with auxiliary contacts only in pole 2 (3-pole plus)
H5 with auxiliary contacts only in the last pole
H6 with auxiliary contacts only in poles 1+2 (3-pole plus)

Auxiliary contact function

0 without
2 make contact (N/O)
3 break contact (N/C)
A pole 1 make contact, all other poles break contacts (2-pole plus)
B poles 1+2 make contacts, other poles break contacts (3-pole plus)
C pole 1 break contact, other poles make contacts (2-pole plus)

Auxiliary contacts – terminal design

0 without
1 screw terminals 1 mm²

Voltage rating

A ≤ AC 277 V or ≤ DC 60 V

Current rating range

0.1...32 A

Approval logo

V UL 489

4220 - T1 1 0 - K0 M1- H1 2 1 - A - 10 A -V ordering example

4220-T...

single pole three pole

Technical data

For further details please see catalogue section: Technical Information

Voltage rating		3 AC 415 V; 3 AC 480 V; AC 277 V; AC 240 V; AC 120 V; DC 60 V
Current rating range		0.1...32 A
Auxiliary circuit		DC 10 - 30 V, 10 - 500 mA
Typical life		
IEC 60934	3 AC 415 V	1,000 cycles at 1 x I_N, inductive load
	AC 240 V:	6,000 cycles at 1 x I_N, inductive load
	DC 60 V:	6,000 cycles at 1 x I_N, resistive load
UL 489	AC 120 V:	6,000 cycles at 1 x I_N, inductive load
UL 1077	3 AC 415 V	3,000 cycles at 1 x I_N, inductive load
	AC 277 V:	6,000 cycles at 1 x I_N, inductive load
	DC 60 V:	6,000 cycles at 1 x I_N, resistive load
Ambient temperature		-30...+60°C (-22...+140°F, T60)
Storage temperature		-40 … 60°C (-40 … +140°F)
Insulation co-ordination		IEC 60664 2,5 kV / 2 re-inforced insulation in the operating area
Dielectric strength		IEC 60934
operating area		test voltage AC 3,000 V (reinforced insulation)
pole to pole		test voltage AC 1,500 V
main circuit to auxiliary circuit		test voltage AC 1,500 V
open main circuit		test voltage AC 1,500 V
open auxiliary circuit		test voltage AC 250 V
Insulation resistance		> 100 MΩ (DC 500 V)
Interrupting capacity I_{nc} PC1 IEC 60934		AC 240 V, 6,000 A DC 60 V, 6,000 A
Interrupting capacity UL 489		AC 120 V, 5,000 A
Interrupting capacity UL 1077		AC 277 V, 5,000 A DC 60 V, 5,000 A
Protection class (IEC 60529)		operating area IP30 terminal area IP00
Vibration (sinusoidal)		± 0.38 mm (10-57 Hz), 5 g (57-500 Hz) test to IEC 60068-2-6, test Fc, 10 frequency cycles/axis
Shock		25 g (11 ms) test to IEC 60068-2-27, test Ea
Corrosion		96 hrs in 5% salt mist, test to IEC 60068-2-11,test Ka
Humidity		240 hrs in 95% RH, to IEC 60068-2-78, test Cab
Housing material		moulded material
Mounting		on symmetrical rail to EN 50022-35x7.5
Mounting dimension (w x h x d)		12.5 x 89.3 x 87.1

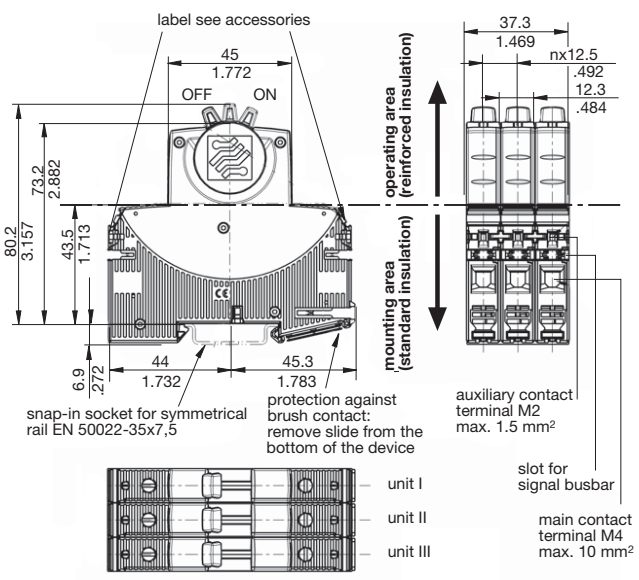
Technical data

LINE terminal	(LINE and/or DC+)	
screw terminals		M5
max. cable cross section		
flexible with wire end ferrule w/wo plastic sleeve		1 – 16 mm²
multi-lead connection (2 identical cables)		
flexible with wire end ferrule without plastic sleeve		1 – 6 mm²
flexible with TWIN wire end ferrule with plastic sleeve		0.75 – 10 mm²
wire stripping length		14 mm
tightening torque		2.5 – 3 Nm
LOAD terminal		
screw terminals		M4
max. cable cross section		
flexible with wire end ferrule w/wo plastic sleeve		0.5 – 10 mm
multi-lead connection (2 identical cables)		
flexible with wire end ferrule without plastic sleeve		0.5 – 2.5 mm²
flexible with TWIN wire end ferrule with plastic sleeve		0.5 – 6 mm²
wire stripping length		10 mm
tightening torque		1.2 – 1.4 Nm
Auxiliary contact terminals		
screw terminals		M2
max. cable cross section		
flexible with wire end ferrule w/wo plastic sleeve		0.25 – 0.75 mm²
multi-lead connection (2 identical cables)		
flexible with wire end ferrule without plastic sleeve		0.25 – 0.34 mm²
wire stripping length		6 mm
tightening torque		0.22 – 0.25 Nm
Mass	approx. 90 g per pole with aux. contact	

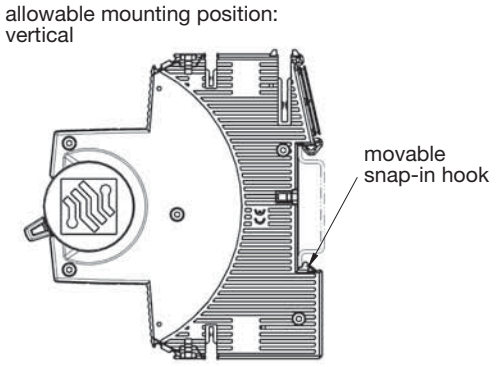
Current ratings and typical internal resistance values

Current rating (A)	Internal resistance per pole (Ω) trip curve **F1** fast DC only	trip curve **F2** fast AC + DC	trip curve **M1** medium delay AC + DC	trip curve **T1** long delay AC + DC
0.1	166	148	122	104
0.2	45	41	34	29
0.3	19	17	14	12
0.4	12	11	7.9	7.3
0.5	6.8	5.6	4.7	4.2
0.6	4.9	4.5	3.7	3.4
0.8	2,9	2.7	2.1	1.7
1	1.8	1.6	1.3	1.1
1.5	0.93	0.76	0.62	0.58
2	0.47	0.40	0.34	0.31
2.5	0.30	0.27	0.23	0.21
3	0.22	0.20	0.17	0.15
3,5	0.17	0.16	0.13	0.12
4	0.11	0.11	0.084	0.077
5	0.086	0.082	0.066	0.062
6	0.064	0.062	0.053	0.049
8	0.029	0.026	≤ 0.02	≤ 0.02
10	≤ 0.022	≤ 0.02	≤ 0.02	≤ 0.02
12	≤ 0.02	≤ 0.02	≤ 0.02	≤ 0.02
15	≤ 0.02	≤ 0.02	≤ 0.02	≤ 0.02
16	≤ 0.02	≤ 0.02	≤ 0.02	≤ 0.02
18	≤ 0.02	≤ 0.02	≤ 0.02	≤ 0.02
20	≤ 0.02	≤ 0.02	≤ 0.02	≤ 0.02
25	≤ 0.02	≤ 0.02	≤ 0.02	≤ 0.02
32	≤ 0.02	≤ 0.02	≤ 0.02	≤ 0.02

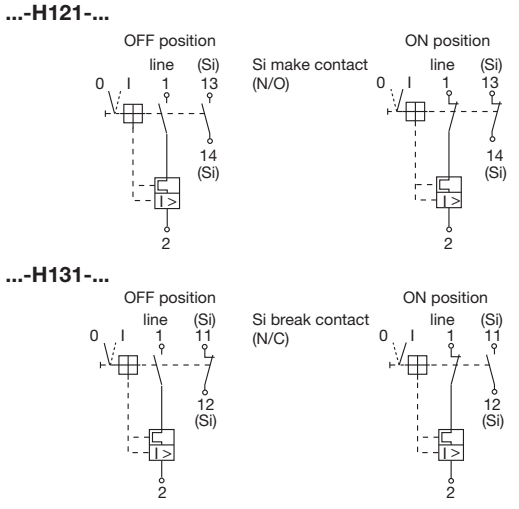
Dimensions



Installation drawing



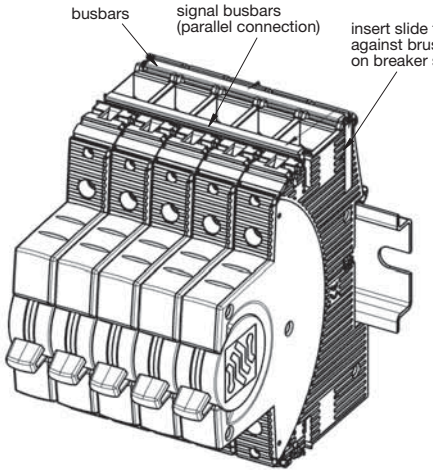
Internal connection diagrams



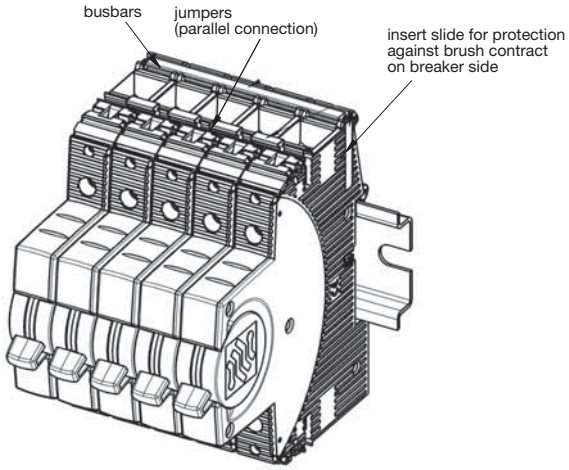
This is a metric design and millimeter dimensions take precedence (mm/inch)

Termination examples

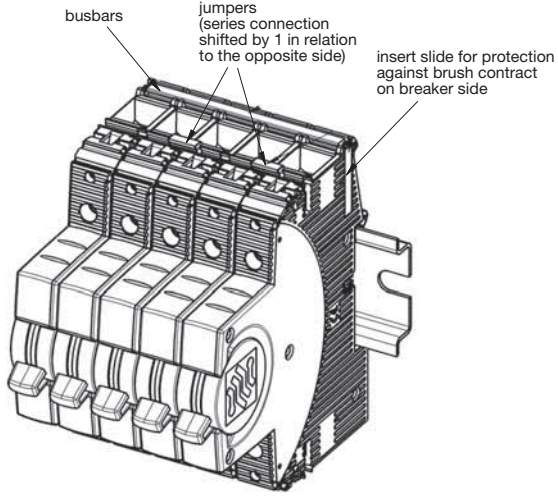
4220-T with busbars and signal busbars (auxiliary contacts connected in parallel)



4220-T with busbars and jumpers (auxiliary contacts connected in parallel)



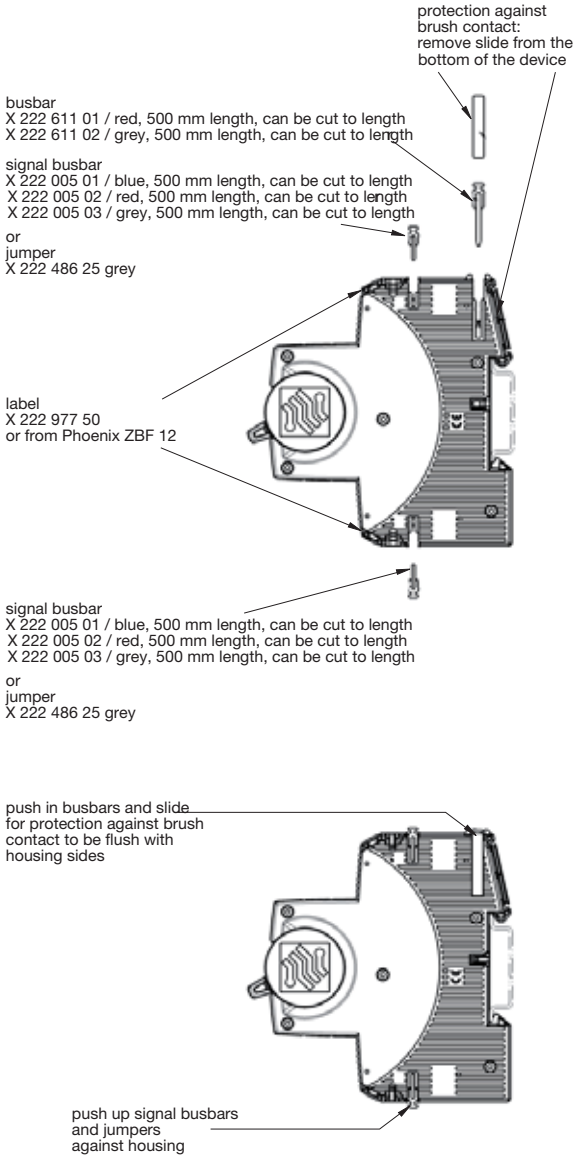
4220-T with busbars and signal busbars (auxiliary contacts connected in serie)



Busbars, signal busbars and jumpers: see accessories

Accessories

Description	Part number
busbar red, 500 mm length, can be cut to length	X 222 611 01
busbar grey, 500 mm length, can be cut to length	X 222 611 02
signal busbar blue, 500 mm length, can be cut to length	X 222 005 01
signal busbar red, 500 mm length, can be cut to length	X 222 005 02
signal busbar grey, 500 mm length, can be cut to length	X 222 005 03
signal busbar grey (packing unit 25 pcs)	X 222 486 25
Label (packing unit 50 pcs) or from Phoenix ZBF 12	X 222 977 50



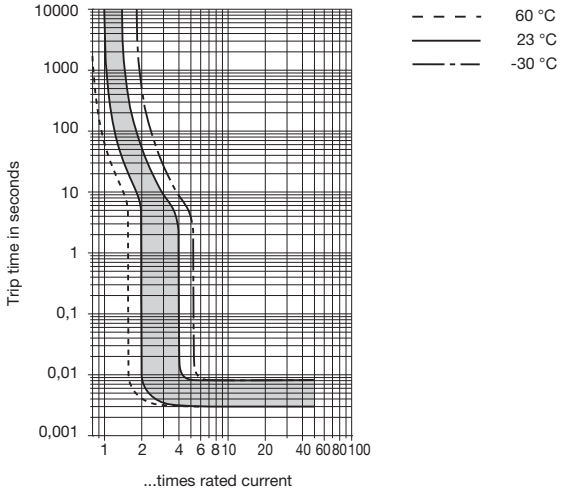
This is a metric design and millimeter dimensions take precedence ($\frac{mm}{inch}$)

Typical time/current characteristics

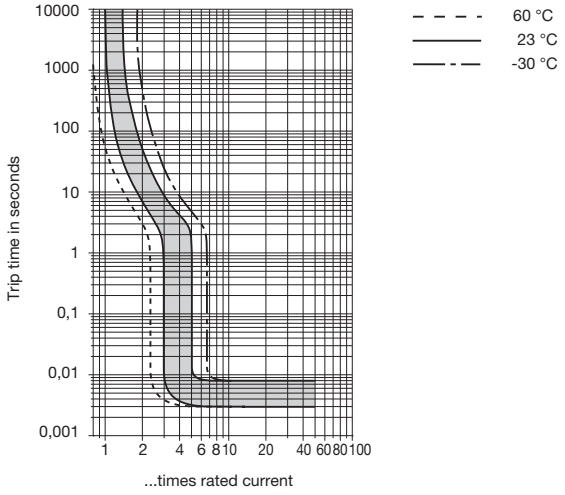
The time/current characteristic curve depends on the ambient temperature prevailing. In order to eliminate nuisance tripping, please multiply the circuit breaker current ratings by the derating factor shown below.

Ambient temperature	°F	-22	-4	+14	+32	+50	+73.4	+86	+104	+122	+140
	°C	-30	-20	-10	0	+10	+23	+30	+40	+50	+60
Derating factor		0,76	0,79	0,83	0,88	0,93	1	1,04	1,12	1,22	1,35

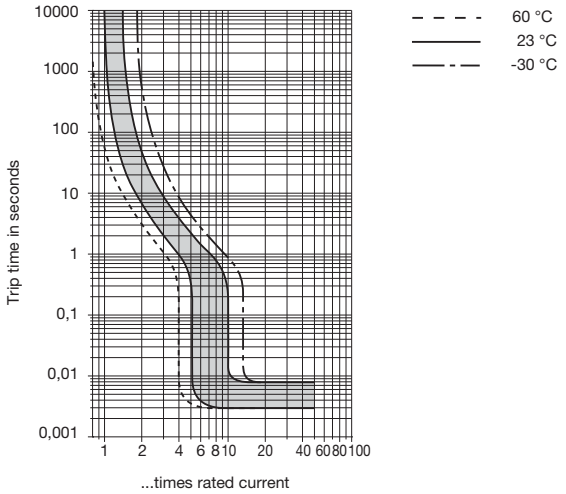
F1 thermal, magnetic fast (DC)



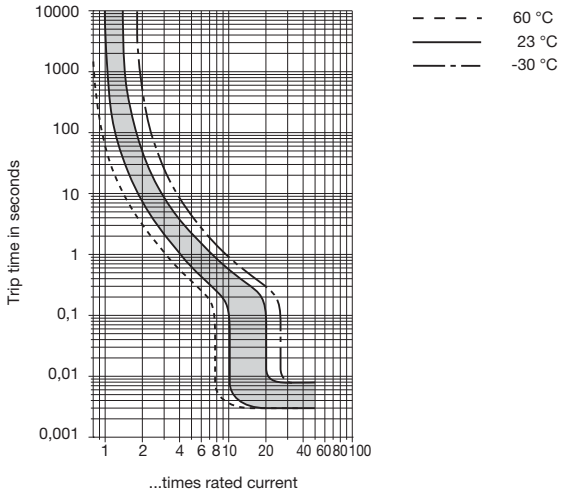
F2 thermal, magnetic fast (AC/DC)



M1 thermal, magnetic medium delay (AC/DC)



T1 thermal, magnetic long delay (AC/DC)



Magnetic tripping currents are increased by 30 % on DC supplies.

When several devices are mounted together, an air gap between each is recommended. If this is not possible, each device should carry only 80 % of its rating.

Approvals

Test authority	Voltage ratings	Current ratings
UL 489	AC 120 V	0.1...32 A
VDE IEC 60934	AC 240 V; DC 60 V	0.1...32 A
UL 1077	AC 277 V; DC 60 V	0.1...32 A