Description

Miniaturised single pole thermal circuit breaker with push-to-reset, tease- free, trip-free, snap action mechanism (R-type TO CBE to EN 60934). Available in versions for PCB or panel mounting, snap-in or threadneck, or as an integral type. Manual release facility optional for type 105.
Approved to CBE standard EN 60934 (IEC 60934). For higher current ratings see type 1140.

Typical applications

Motors, transformers, solenoids, printed circuit boards, hand-held machines and appliances, marine applications, caravans.

Ordering information

Type No.	
104	PCB mounting type (-PR), or integral type (-P30/P10)
105	snap-in panel mounting
106	threadneck panel mounting with hex and knurled nut*
106-M2	threadneck panel mounting 3/8-27UNS with collar, hex nut and knurled nut*

Terminal design

P10	blade terminals A6.3-0.8 (QC .250)
P30	blade terminals A2.8-0.8 (QC .110)
PR	solder terminal pins for PCB mounting (type 104 only)
PR2	PCB mounting (vertical), type 104 only up to 6 A
PR3	PCB mounting (vertical), type 104 only

Shunt terminal (optional)

A3	same as main terminals (up to I_N 6 A/3 A max. load)

Manual release facility (optional)

H	only with type 105

Auxiliary contacts (optional)

Si51	type 104 only

Current ratings

0.05...10 A

106 - P30 - .. - .. - .. - 5 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.

* mounting hardware bulk shipped

Standard current ratings and typical internal resistance values

Current rating (A)	Internal resistance (Ω)	Current rating (A)	Internal resistance (Ω)
0.05	285	1.8	0.28
0.08	134	2	0.25
0.1	81	2.5	0.18
0.2	22	3	0.11
0.3	8.7	3.5	0.076
0.4	5.5	4	0.067
0.5	3.3	4.5	0.051
0.6	2.45	5	≤ 0.05
0.7	1.6	6	≤ 0.05
0.8	1.45	7	≤ 0.05
1	0.9	8	≤ 0.05
1.2	0.6	10	≤ 0.05
1.5	0.4		

104-... 105-... 106-...

Technical data

For further details please see chapter: Technical Information

Voltage rating	AC 240 V; DC 48 V (UL: AC 250 V; DC 48 V)	
Current ratings	0.05...10 A	
Auxiliary circuit	0.5 A, AC 240 V, DC 28 V	
Typical life		
AC 240 V	0.05...8 A	2,000 operations at 1 x I_N, inductive
	0.05...5 A	3,000 operations at 2 x I_N, inductive
	6...8 A:	500 operations at 2 x I_N, inductive
DC 48 V	0.05...8 A	2,000 operations at 1 x I_N, inductive
	0.05...5 A	3,000 operations at 2 x I_N, inductive
	6...8 A:	500 operations at 2 x I_N, inductive
	10 A	200 operations at 1 x I_N, inductive
	10 A	50 operations at 2 x I_N, inductive
Ambient temperature	-20...+60 °C (-4...+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	
Insulation resistance	> 100 MΩ (DC 500 V)	
Interrupting capacity I_{cn}	0.05...8 A > 8...10 A 0.05...10 A	6 x I_N AC 5 x I_N AC 6 x I_N DC
Interrupting capacity (UL 1077)	I_N 0.05...10 A 0.05...10 A	U_N AC 250 V DC 48 V
		2,000 A 200 A
Degree of protection (IEC 60529/DIN 40050)	operating area IP40 terminal area IP00	
Vibration	10 g (57-500 Hz) ± 0.76 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. 10 g	

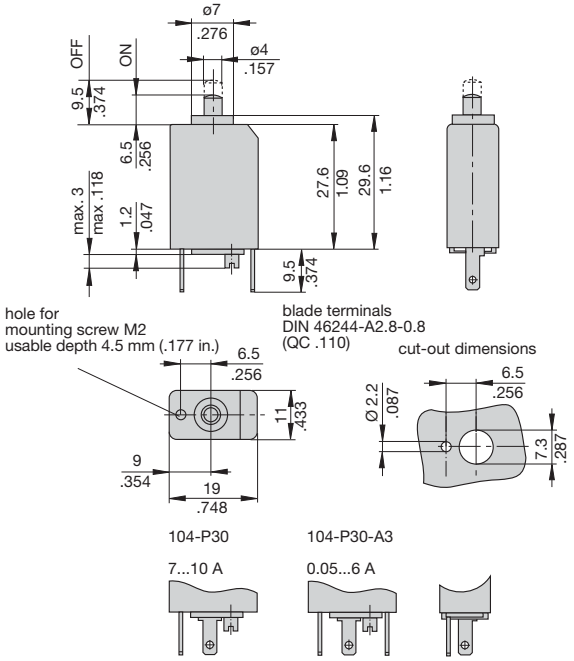
Approvals

Authority	Voltage ratings	Current ratings
VDE, SEV, Kema (EN 60934)	AC 240 V DC 48 V	0.05...8 A 0.05...10 A
CSA, UL	AC 250 V; DC 48 V	0.05...10 A
Circuit breakers with -Si51 not approved		

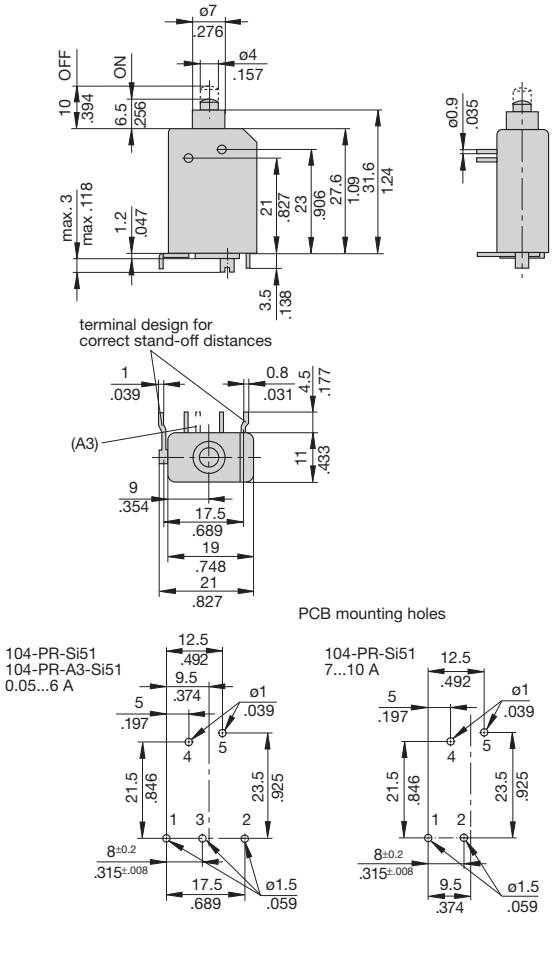
1

Dimensions

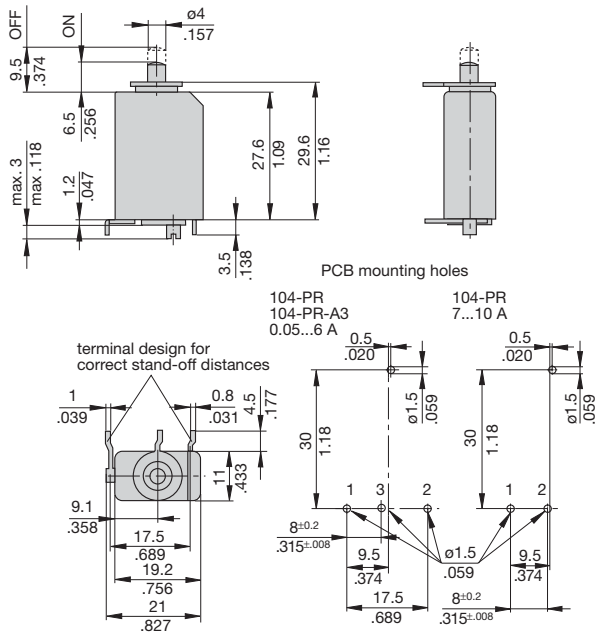
104-P30



104-PR-(A3)-Si51

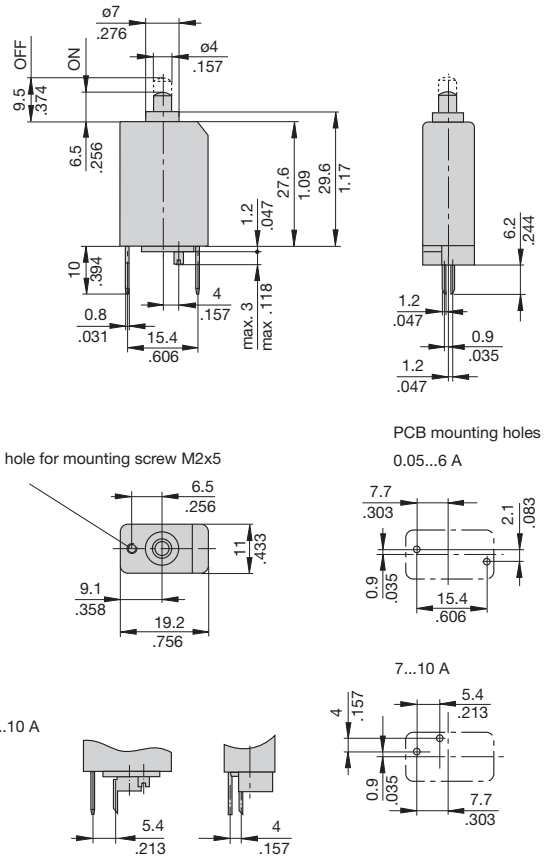


104-PR



104-PR3

0.05...6 A

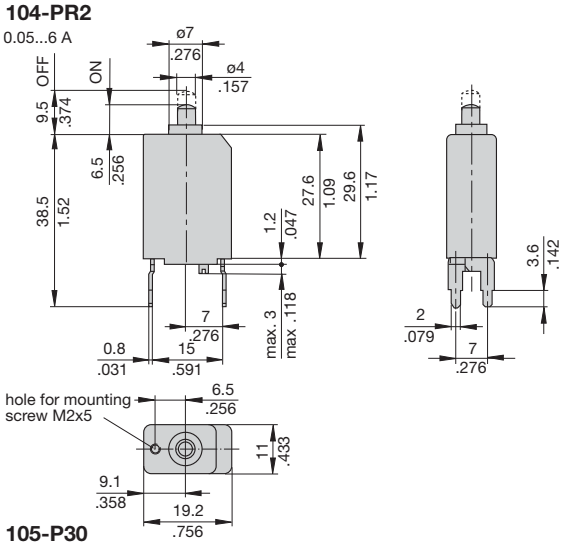


This is a metric design and millimeter dimensions take precedence ($\frac{mm}{inch}$)

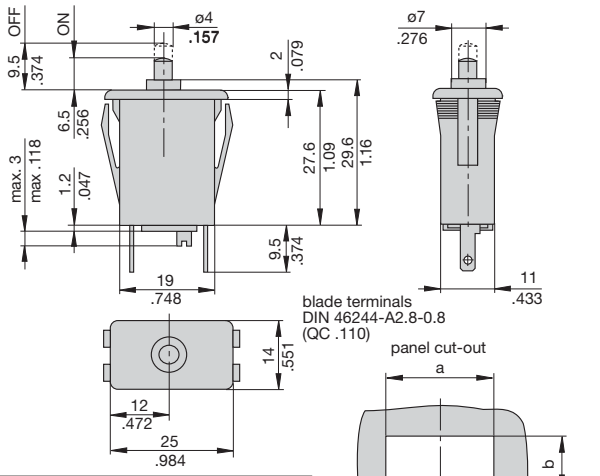
Dimensions

104-PR2

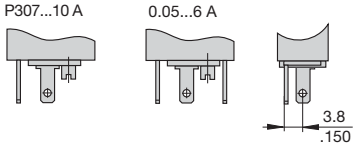
0.05...6 A



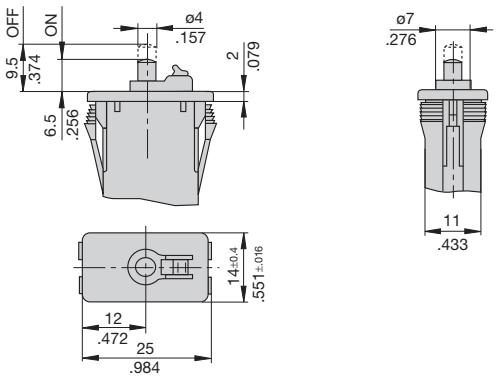
105-P30



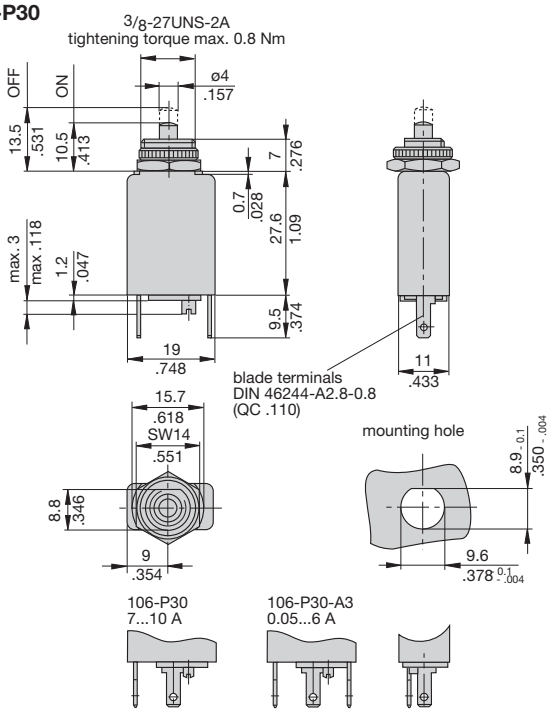
d		a		b
mm	inch	mm	inch	
0.8	.031	21.9	.862	$11.3^{+0.3}$
1.0	.039	22	.866	$.445^{+.012}$
1.5	.059	22.1	.870	
2-3	.079-.118	22.2	.874	



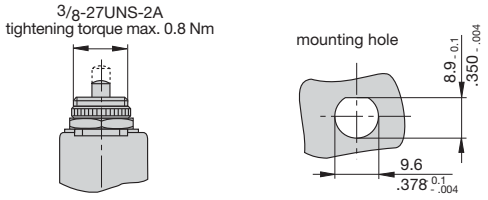
105-P..-H



106-P30

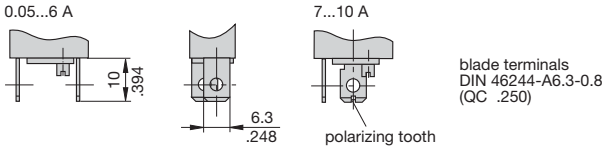


106-M2

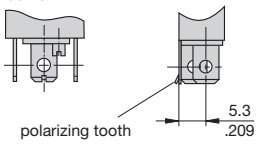


Terminal design

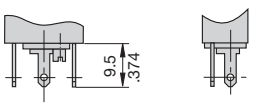
104/105/106-P10



104/105/106-P10-A3



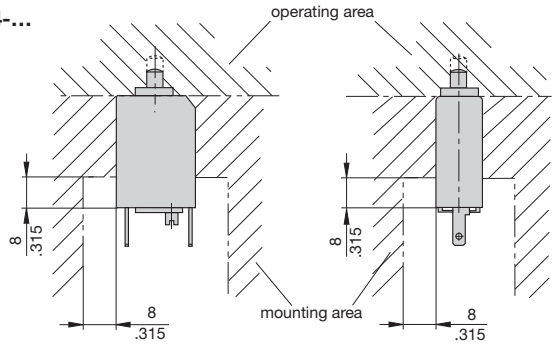
104/105/106-P30-A3



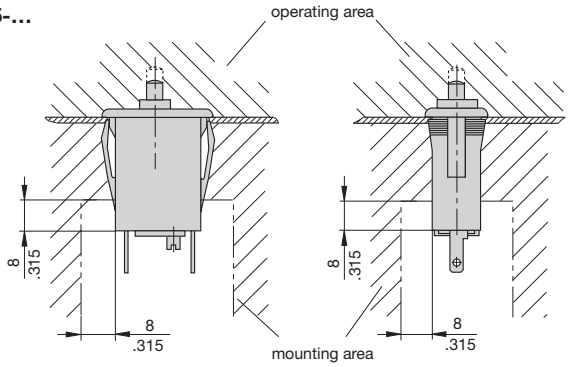
This is a metric design and millimeter dimensions take precedence ($\frac{mm}{inch}$)

Installation drawings

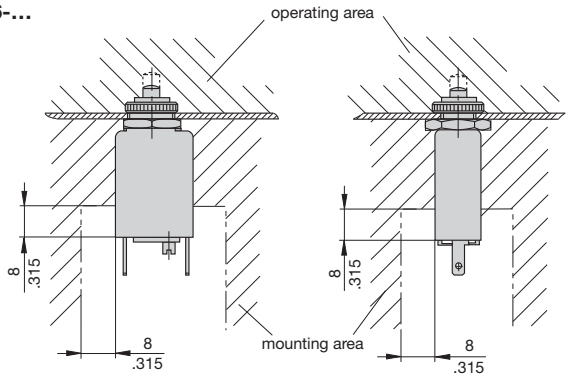
104-...



105-...

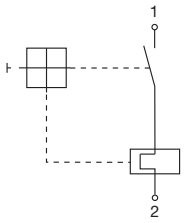


106-...

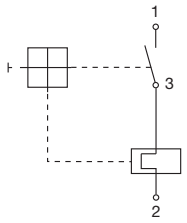


Internal connection diagrams

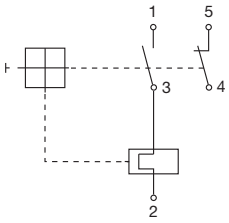
Types 104
105
106



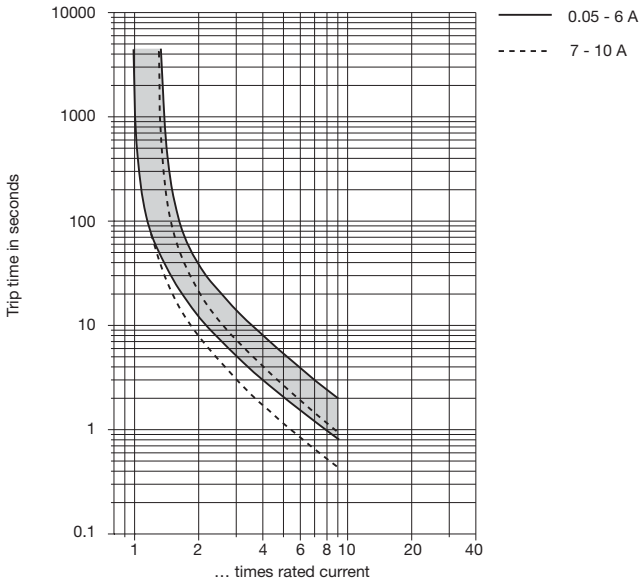
Types 104-...-A3
105-...-A3
106-...-A3



Type 104-...-A3-Si51



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

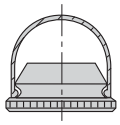


The time/current characteristic curve depends on the ambient temperature prevailing. In order to eliminate nuisance tripping, please multiply the circuit breaker current ratings by the derating factor shown below. See also section 9 – Technical information.

Ambient temperature	°F	-4	+14	+32	+73.4	+104	+122	+140
	°C	-20	-10	0	+23	+40	+50	+60
Derating factor		0.76	0.84	0.92	1	1.08	1.16	1.24

Accessories

Water splash cover (transparent)/knurled nut assembly
(type 106-... only)
X 201 285 01
Degree of protection IP64



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 circuit breaker with push-to-reset, tease-free, trip-free, snap action mechanism (R-type TO CBE to EN 60934; M-type when fitted with optional manual release feature). Available in versions for plug-in or integral mounting, track mounting, or with a frame for snap-in panel mounting. The optional -KF housing is particularly suited to high humidity and other damp conditions.
Approved to CBE standard EN 60934 (IEC 60934).

Typical applications

Motors, transformers, solenoids, battery chargers, extra low voltage systems.

Ordering information

Type No.
127

Mounting options
- leave blank for integral/plug-in option
- **F** for snap-in mounting
- **T11** track mounting with captive stud terminals M4
- **T12** track mounting with screw terminals M4

Terminal design (for use with and without flange -F)
- **P10** blade terminals A6.3-0.8 (QC .250)
- **K10** screw terminals M4x6

Manual release (optional)
- **H** manual release facility

Special housing (optional)
- **KF** for tropical and high humidity conditions (not for -T11 and -T12)

Current ratings
- **0.05...25 A**

127 - F - P10 - H - .. - 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)	Current rating (A)	Internal resistance (Ω)
0.05	280	1.5	0.6
0.08	100	1.8	0.4
0.1	110	2	0.3
0.15	56	2.5	0.2
0.2	29	3	0.1
0.25	18	3.5	0.06
0.3	14	4	0.06
0.35	9.8	4.5	0.05
0.4	7	5	0.05
0.45	5.9	6	0.02
0.5	4.9	7	0.02
0.6	3.4	8	0.02
0.7	2.5	10	< 0.02
0.8	1.8	15	< 0.02
0.9	1.5	16	< 0.02
1	1.2	20	< 0.02
1.2	0.8	25	< 0.02

127-F-...

127-T11-...

Technical data

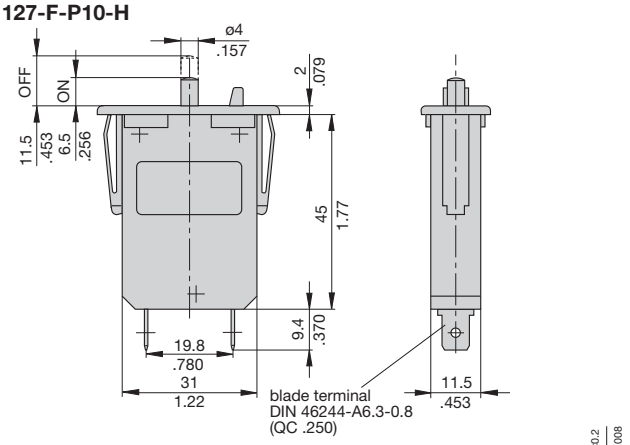
For further details please see chapter: Technical Information		
Voltage rating	AC 250 V; DC 28 V (UL: AC 250 V; DC 50 V)	
Current ratings	0.05...25 A	
Typical life	0.05...16 A 17...25 A	5,000 operations at 2 x I_N, inductive 5,000 operations at 2 x I_N, resistive
Ambient temperature	-20...+60 °C (-4...+140 °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	test voltage AC 3,000 V	
Insulation resistance	> 100 MΩ (DC 500 V)	
Interrupting capacity I_{cn}	type -F: 0.05 ...2.5 A 3...5 A 6...12 A 13...25 A type -T: 0.05...2.5 A 3...5 A 6...25 A	8 x I_N 20 x I_N 200 A 400 A 8 x I_N 20 x I_N 400 A
Degree of protection (IEC 60529/DIN 40050)	operating area IP40 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	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	127-F-..: approx. 24 g 127-T..-: approx. 35 g	

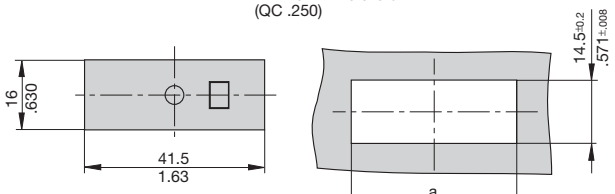
Approvals

Authority	Voltage ratings	Current ratings
VDE (EN 60934)	AC 250 V; DC 28 V	0.05...25 A
CSA, UL	AC 250 V DC 50 V	0.1...20 A 0.1...25 A
CCC	AC 250 V	0.05...25 A
Type 127-T..- without approvals		

Dimensions

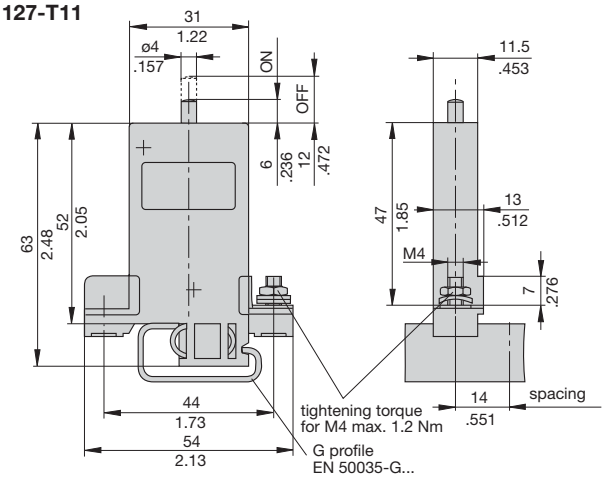
127-F-P10-H



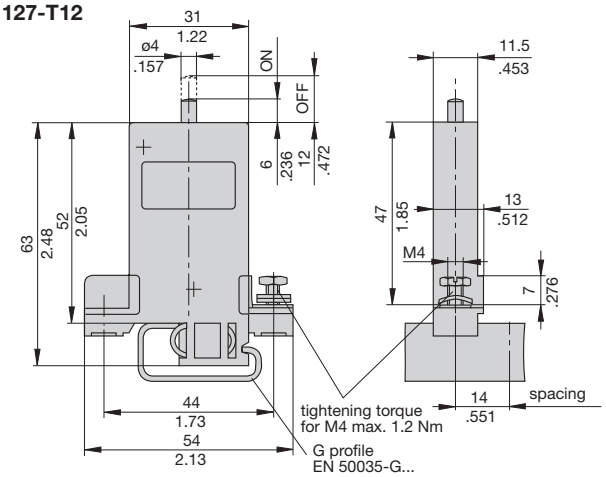


	I		II	
	mm	inch	mm	inch
a	38±0.1	1.50±.004	38.4±0.1	1.51±.004
b	1-2.5	.039-.098	2.6-4	.102-.157

127-T11

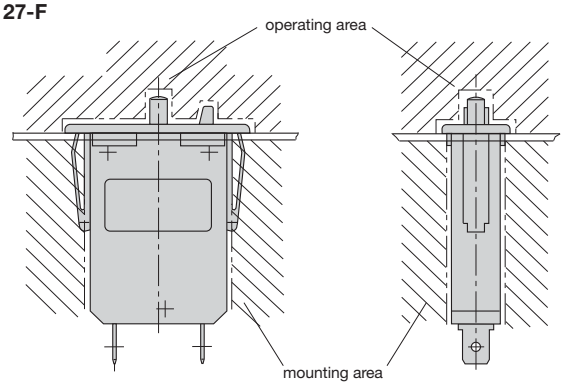


127-T12

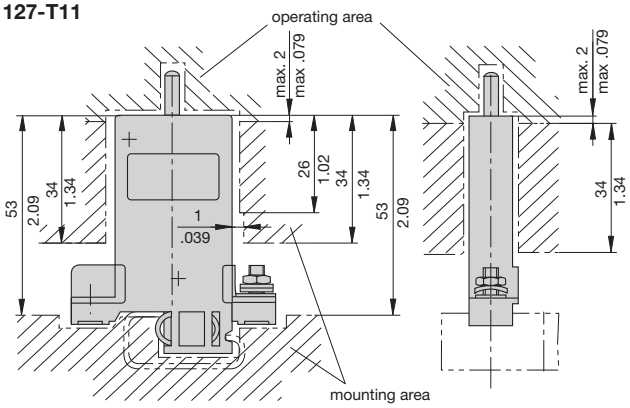


Installation drawings

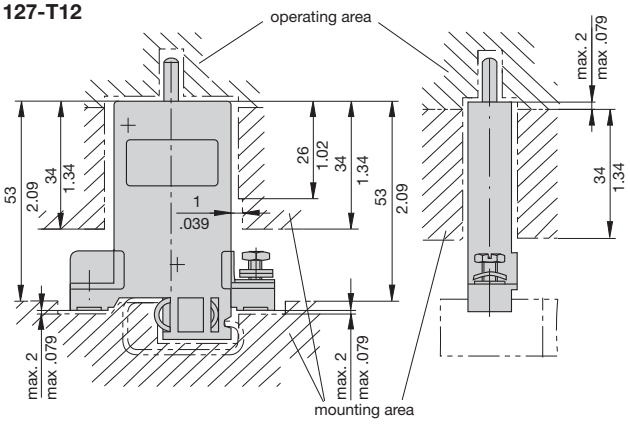
127-F



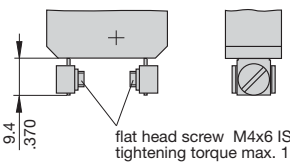
127-T11



127-T12

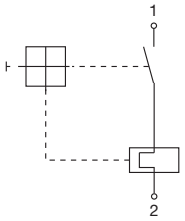


Terminal design 127-F-K10

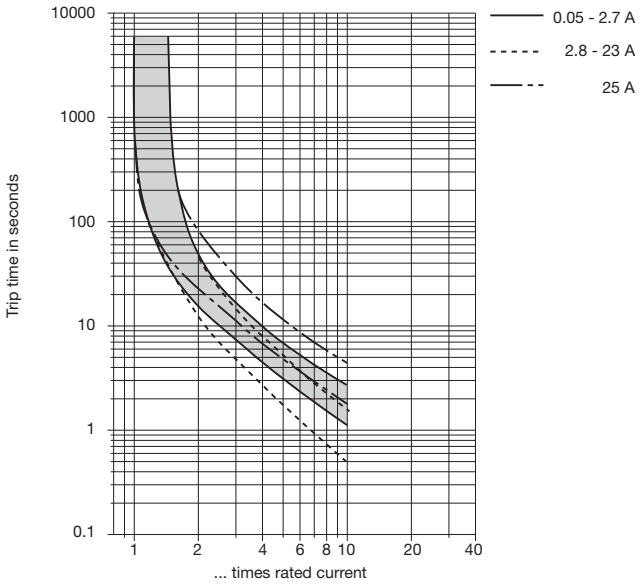


This is a metric design and millimeter dimensions take precedence (mm / inch)

Internal connection diagram



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

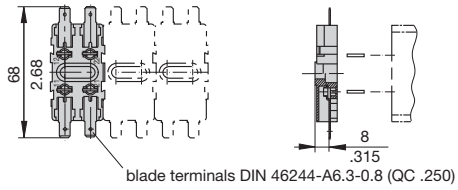


The time/current characteristic curve depends on the ambient temperature prevailing. In order to eliminate nuisance tripping, please multiply the circuit breaker current ratings by the derating factor shown below. See also section 9 – Technical information.

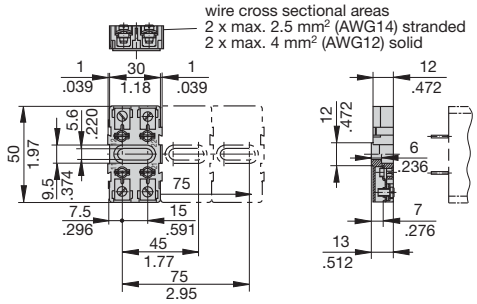
Ambient temperature °F	-4	+14	+32	+73.4	+104	+122	+140
°C	-20	-10	0	+23	+40	+50	+60
Derating factor	0.76	0.84	0.92	1	1.08	1.16	1.24

Accessories

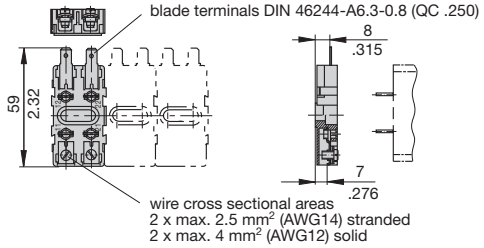
Mounting sockets
10F-P10 (up to 16 A max. load)



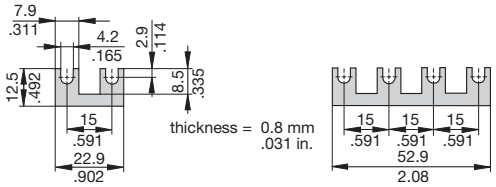
10F-K10 (up to 20 A max. load)



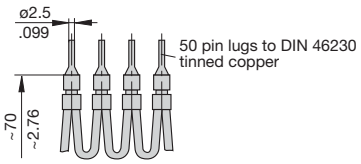
10F-A10 (up to 16 A max. load)



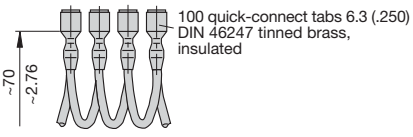
Accessories for sockets (up to 20 A max. load)
2-way bus bar **Y 301 166 02** 4-way bus bar **Y 301 166 01**



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)



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)



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.

Thermal Automotive Circuit Breaker 129-L11-H-KF

Description

Single pole thermal circuit breaker with push-to-reset, tease-free, trip-free, snap action mechanism and separate manual release (M-type TO CBE to EN 60934). Designed for bolt-on mounting with terminal block type 83-P10.

Typical applications

Extra low voltage wiring systems on all types of vehicles and marine craft.

Ordering information

Type No.	
129	base mounting and connection
Terminal design	
L11	90 ° bent terminals
Manual release	
H	manual release facility
Housing	
KF	standard
Current ratings	
3...25 A	

129 - L11 - H - KF - 10 A = ordering example

Standard current ratings and typical internal resistance values

Current rating (A)	Internal resistance (Ω)	Current rating (A)	Internal resistance (Ω)
3	0.1	8	0.02
3.5	0.06	10	< 0.02
4	0.06	12	< 0.02
4.5	0.05	16	< 0.02
5	0.05	20	< 0.02
6	0.02	25	< 0.02
7	0.02		

Approvals

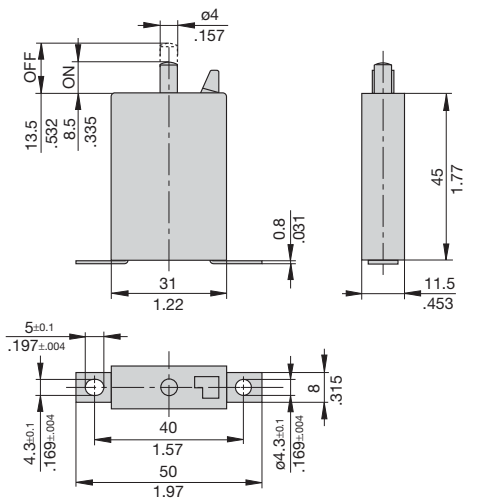
Authority	Voltage rating	Current rating
CSA, UL	AC 250 V DC 50 V	3...20 A 3...25 A
BWB (VG 95345 part 9)	DC 28 V	6...25 A

129-L11-H-KF

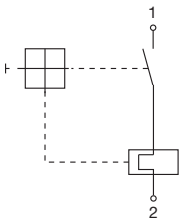
Technical data

Voltage rating	DC 28 V (UL: AC 250 V; DC 50 V)	
Current ratings	3...25 A	
Typical life	5,000 operations at 2 x I_N	
Ambient temperature	-40...+75 °C (-40...167 °F)	
Insulation co-ordination (IEC 60664 and 60664 A)	rated impulse withstand voltage 2.5 kV	pollution degree 2
Dielectric strength (IEC 60664 and 60664A) operating area	test voltage AC 1,500 V	
Insulation resistance	> 100 MΩ (DC 500 V)	
Interrupting capacity I_{cn}	3...5 A 20 x I_N 6...25 A 400 A	
Degree of protection (IEC 60529/DIN 40050)	operating area IP32 terminal area IP00	
Vibration	10 g (55-2,000 Hz) ± 0.76 mm (10-55 Hz) to VG 95210 part 28	
Shock	50 g (11 ms) to VG 95210 part 28	
Corrosion	96 hours at 5 % salt mist, to VG 95210 part 2	
Humidity	240 hours at 95 % RH to VG 95210 part 7	
Mass	approx. 25 g	

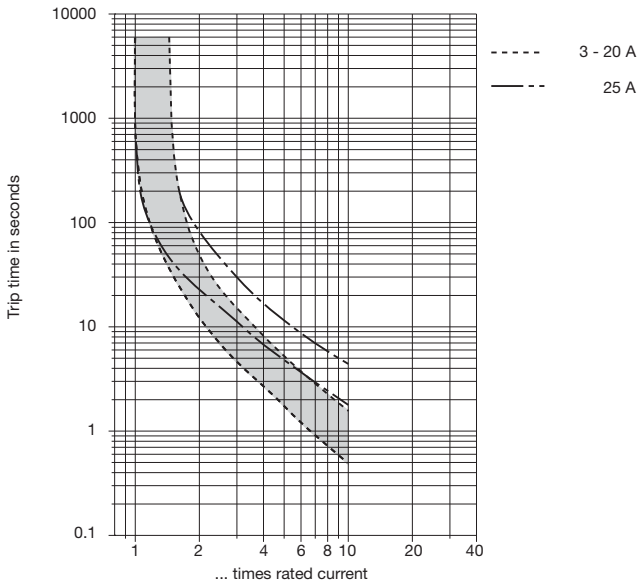
Dimensions



Internal connection diagram



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

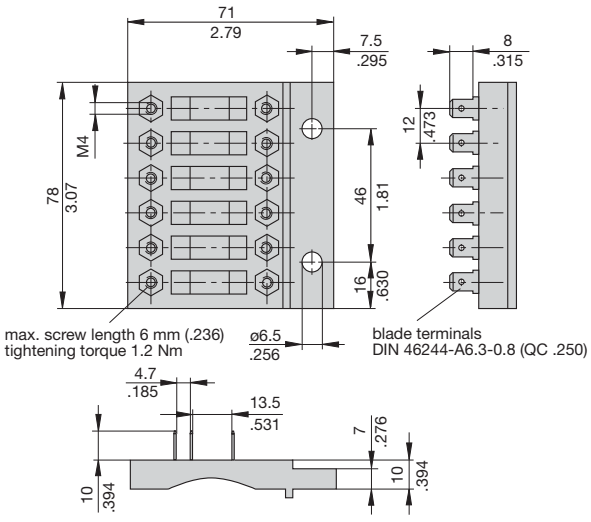


The time/current characteristic curve depends on the ambient temperature prevailing. In order to eliminate nuisance tripping, please multiply the circuit breaker current ratings by the derating factor shown below. See also section 9 – Technical information.

Ambient temp.	°F	-40	-4	+14	+32	+73.4	+104	+122	+140	+167
	°C	-40	-20	-10	0	+23	+40	+50	+60	+75
Derating factor		0,60	0.76	0.84	0.92	1	1.08	1.16	1.24	1,35

Accessories

Mounting block 83-P10



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 circuit breaker with push-to-reset, tease-free, trip-free, snap action mechanism (R-type TO CBE to EN 60934). Available in versions for threadneck panel mounting, plug-in or integral mounting. The optional -KF housing is particularly suited to high humidity and other damp conditions.
Approved to CBE standard EN 60934 (IEC 60934).

Typical applications

Motors, transformers, solenoids, extra low voltage wiring systems.

Ordering information

Type No.
157 threadneck panel mounting*
158 integral or plug-in mounting

Terminal design
P10 blade terminals A6.3-0.8 (QC .250)
K10 screw terminals M4x6

Special housing (optional)
KF for tropical and high humidity conditions

Current ratings
0.05...25 A

157 - P10 - .. - 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.

*mounting hardware bulk shipped

Standard current ratings and typical internal resistance values

Current rating (A)	Internal resistance (Ω)	Current rating (A)	Internal resisance (Ω)
0.05	280	3	0.1
0.08	100	3.5	0.06
0.1	110	4	0.06
0.2	29	4.5	0.05
0.3	14	5	0.05
0.4	7	6	0.02
0.5	4.9	7	0.02
0.6	3.4	8	0.02
0.7	2.5	10	< 0.02
0.8	1.8	12	< 0.02
1	1.2	13	< 0.02
1.2	0.8	15	< 0.02
1.5	0.6	16	< 0.02
1.8	0.2	20	< 0.02
2	0.3	22	< 0.02
2.5	0.2	25	< 0.02

157-...

158-...

Technical data

For further details please see chapter: Technical Information

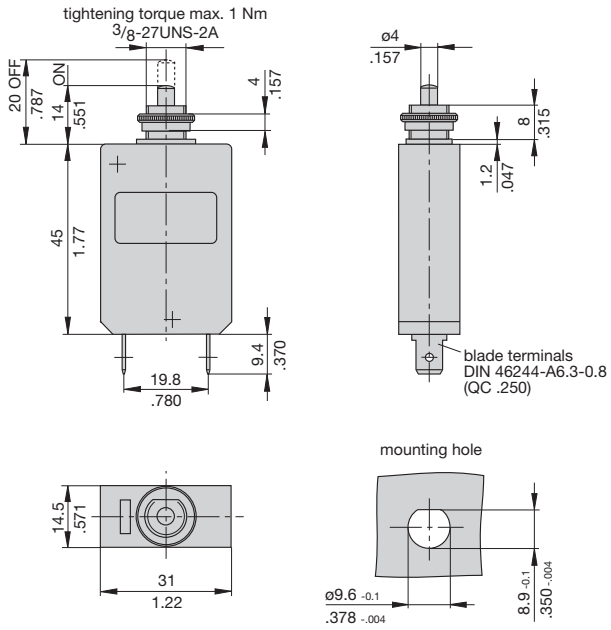
Voltage rating		AC 250 V; DC 28 V (UL: AC 250 V; DC 50 V)
Current ratings		0.05...25 A
Typical life	0.05...16 A 17...25 A	5,000 operations at 2 x I_N, inductive 5,000 operations at 2 x I_N, resistive
Ambient temperature		-20...+60 °C (-4...+140 °F)
Insulation co-ordination (IEC 60664 and 60664 A)	rated impulse withstand voltage 2.5 kV reinforced insulation in operating area	pollution degree 2
Dielectric strength (IEC 60664 and 60664A) operating area	test voltage AC 3,000 V	
Insulation resistance		> 100 MΩ (DC 500 V)
Interrupting capacity I_{cn}	0.05...2.5 A 3...5 A 6...12 A 13...25 A	8 x I_N 20 x I_N 200 A 400 A
Degree of protection (IEC 60529/DIN 40050)	operating area IP40 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	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. 24 g	

Approvals

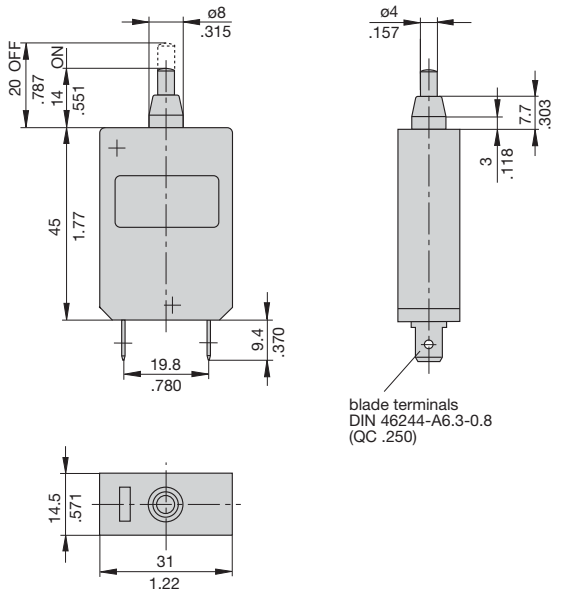
Authority	Voltage ratings	Current ratings
VDE (EN 60934)	AC 250 V; DC 28 V	0.05...25 A
CSA, UL	AC 250 V	0.1...16 A
CCC	AC 250 V	0.05...25 A

Dimensions

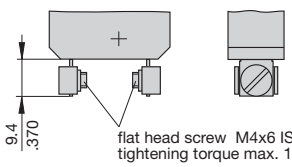
157-P10



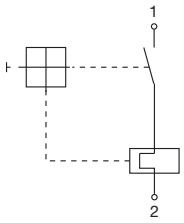
158-P10



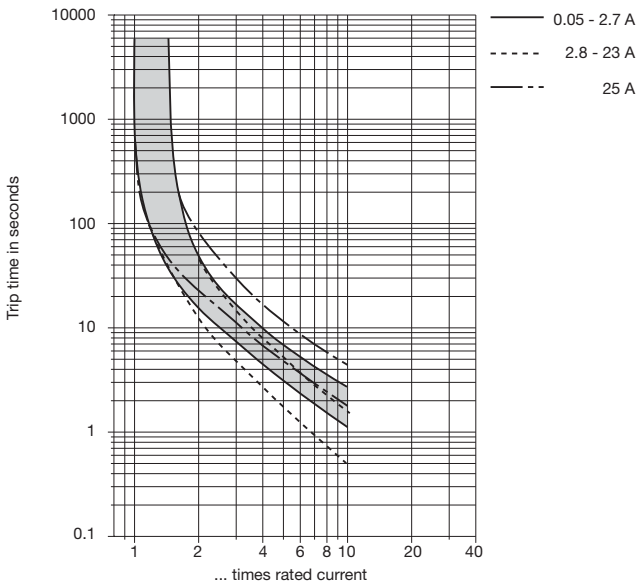
157/158-K10



Internal connection diagram



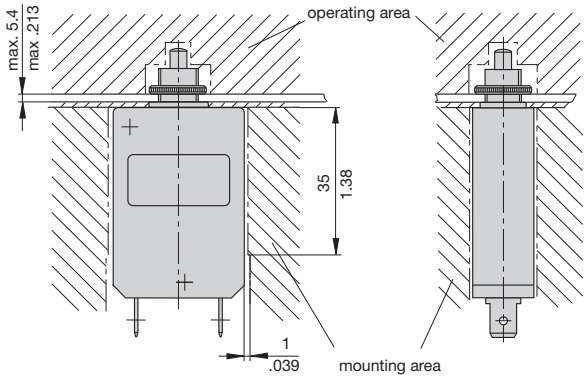
Typical time/current characteristics at +23 °C/+73.4 °F



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	-4	+14	+32	+73.4	+104	+122	+140
	°C	-20	-10	0	+23	+40	+50	+60
Derating factor		0.76	0.84	0.92	1	1.08	1.16	1.24

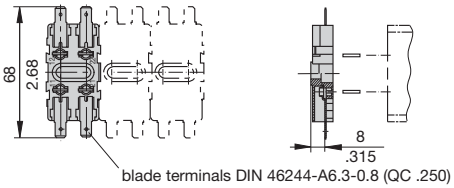
Installation drawings



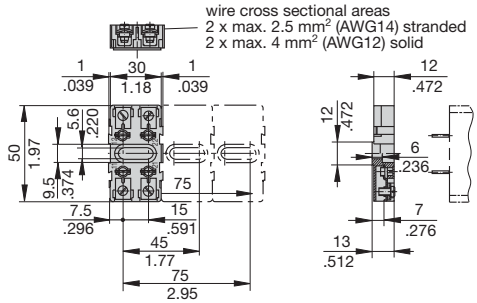
This is a metric design and millimeter dimensions take precedence (mm / inch)

Accessories

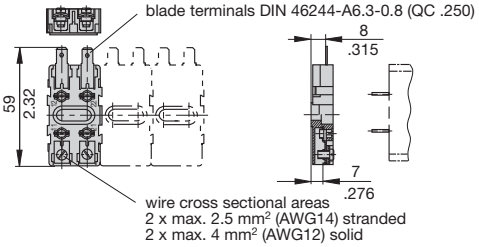
Mounting sockets
10F-P10 (up to 16 A max. load)



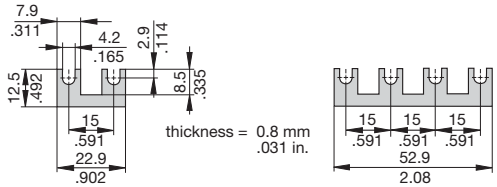
10F-K10 (up to 20 A max. load)



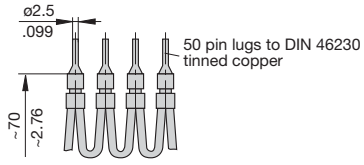
10F-A10 (up to 16 A max. load)



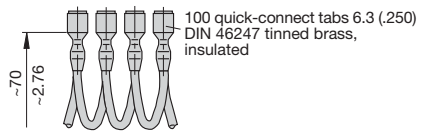
Accessories for sockets (up to 20 A max. load)
2-way bus bar **Y 301 166 02** 4-way bus bar **Y 301 166 01**



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)

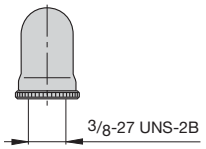


Connector bus links -P10
X 210 588 01/ 1.5 mm² (AWG 16), brown (up to 13 A max. load)
X 210 588 02/ 2.5 mm² (AWG 14), black (up to 20 A max. load)
X 210 588 03/ 2.5 mm² (AWG 14), red (up to 20 A max. load)
X 210 588 04/ 2.5 mm² (AWG 14), blue (up to 20 A max. load)

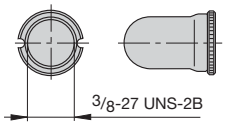


Accessories for type 157-...

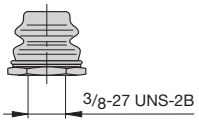
Front panel water splash cover, transparent Y 300 538 01 and knurled nut Y 300 628 01
X 200 799 01 (bonded to nut) (IP64)



Front panel water splash cover, transparent with special knurled nut
X 200 798 02 (bonded to nut) (IP64)



Splash cover (black) with hex nut (IP64)
X 210 739 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 switch/thermal circuit breaker with push-push or push-to-reset actuation (S-type TO or R-type TO CBE to EN 60934) and tease-free, trip-free, snap action mechanism. Designed for snap-in panel mounting utilising round hole or industry standard fuse-holder cut-out dimensions. Featuring an ergonomically styled two colour actuator with indicator band clearly showing the tripped/OFF position.
Approved to CBE standard EN 60934 (IEC 60934).

Typical applications

Motors, transformers, solenoids, extra low voltage systems, household and office machines, instrumentation, marine applications, mobile homes.

Ordering information

Type No.

1110 snap in panel mounting

Mounting

F1 panel thickness 0.8...1.6 mm (.031 -.063 in)
F2 panel thickness 1.8...3 mm (.071-.118 in)

Number of poles

1 1-pole protected

Actuator style

2 black push button/white indicator ring, standard push-push function
B black push button/white indicator ring, standard push-to-reset function
Other indicator ring colours are available to special order

Terminal design

P1 blade terminals A6.3-0.8 (QC .250)

Characteristic curve

M1 medium delay

Current ratings

0.05...16A

1110 - F1 1 2 - P1 M1 - 0.05 A = ordering example

Standard current ratings and typical internal resistance values

Current rating (A)	Internal resistance (Ω)	Current rating (A)	Internal resistance (Ω)
0.05	442	2	0.25
0.08	173	2.5	0.19
0.1	110	3	0.12
0.2	27.8	3.5	0.09
0.3	12.4	4	0.07
0.4	7.0	5	0.05
0.5	4.5	6	0.04
0.6	3.1	7	≤ 0.02
0.7	2.3	8	≤ 0.02
0.8	1.7	10	≤ 0.02
1	1.1	12	≤ 0.02
1.2	0.71	15	≤ 0.02
1.5	0.41	16	≤ 0.02
1.8	0.38		

1110-F1..

Technical data

For further details please see chapter: Technical Information			
Voltage rating	AC 250 V; DC 28 V (UL: AC 250 V; DC 50 V)		
Current rating	0.05...16 A		
Typical life for S-type 0.05...10 A 12...16 A for actuator style B: 0.05...10 A	AC + DC 10,000 operations at 1 x I_N, inductive 6,000 operations at 1 x I_N, inductive 200 operations at 2 x I_N, inductive		
Ambient temperature	-20...+60 °C (-4...+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	test voltage AC 3,000 V		
Insulation resistance	> 100 MΩ (DC 500 V)		
Interrupting capacity I_{cn}	AC 250 V: DC 28 V:	0.05...16 A 0.05...6 A 7...10 A 12...16 A	8 x I_N 10 x I_N 200 A 300 A
Interrupting capacity (UL 1077/EN60934 PC 1)	I_N 0.05...6 A 7...16 A 0.05...16 A	U_N AC 250 V AC 125 V DC 50 V	 1,000 A 1,000 A 1,000 A
Degree of protection (IEC 60529/DIN 40050)	operating area IP40 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. 12 g		

Approvals

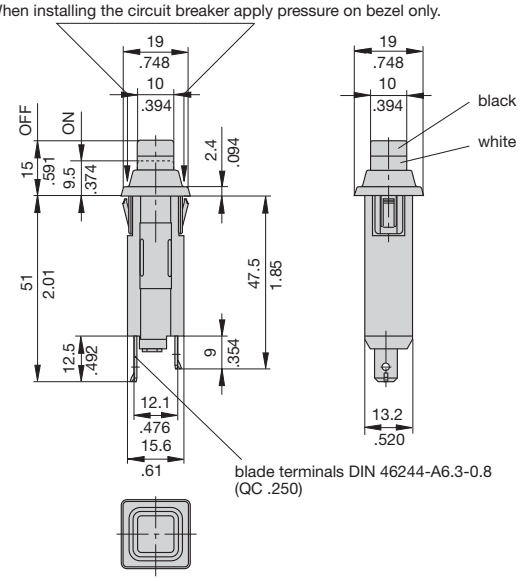
Authority	Voltage ratings	Current ratings
for S-type:		
UL	AC 250 V AC 125 V DC 50 V	0.05...6 A 7...16 A 0.05...16 A
CSA	AC 250 V; DC 50 V	0.05...16 A
VDE	AC 250 V; DC 28 V	0.05...10 A

1

Dimensions

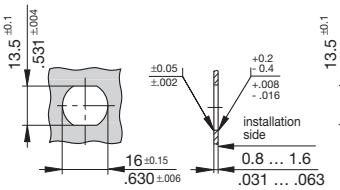
1110-F1.. / -F2..

When installing the circuit breaker apply pressure on bezel only.



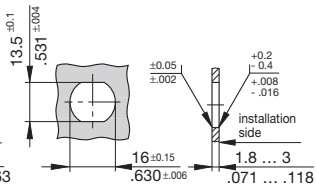
Panel cut out

1110-F1..-P.M1-...A



insertion force ≤ 20 N, removal force ≥ 120 N

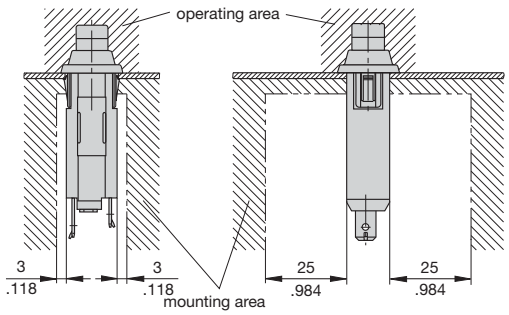
1110-F2..-P.M1-...A



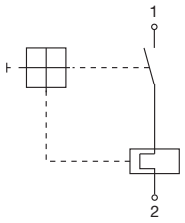
insertion force ≤ 40 N, removal force ≥ 120 N

Installation drawing

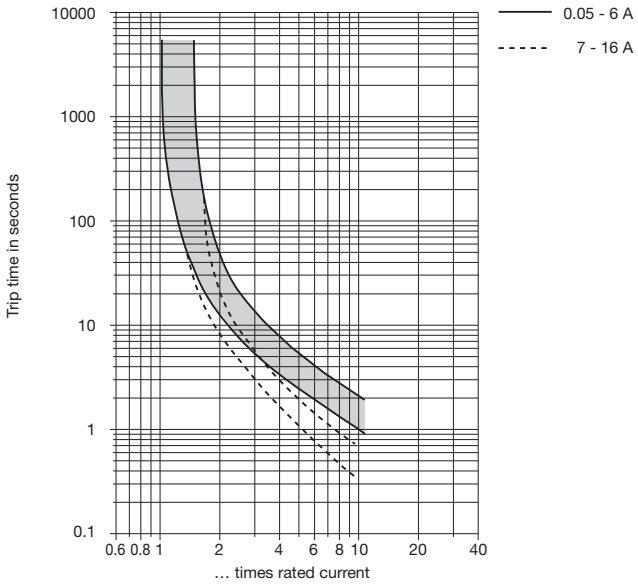
When installing the circuit breaker apply pressure on bezel only.



Internal connection diagram



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



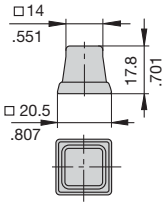
The time/current characteristic curve depends on the ambient temperature prevailing. In order to eliminate nuisance tripping, please multiply the circuit breaker current ratings by the derating factor shown below. See also section 9 – Technical information.

Ambient temperature	°F	-4	+14	+32	+73.4	+104	+122	+140
	°C	-20	-10	0	+23	+40	+50	+60
Derating factors		0.76	0.84	0.92	1	1.08	1.16	1.24

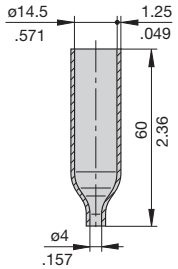
Accessories - Water splash covers (transparent)

Push button splash cover transparent
Y 304 745 01 (IP64)

When using splash cover please note that the max. panel thickness is reduced by 0.5 mm/0.02 in.



Terminal shroud
Y 305 602 01 (IP64)



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.

E-T-A Thermal Circuit Breaker 1120

Description

Double pole combined circuit breaker and ON/OFF switch with rocker actuation. Specially suited to single-phase applications. Snap-in front panel mounting. Thermal positively trip free mechanism ensures reliable overcurrent protection and safe physical isolation of the load circuit. Attractively styled, with rocker illumination optional. The status of the switching contacts is shown by the position of the rocker actuator.
For high volume requirements customer-specific designs can be offered for the front bezel and the rocker.
It meets the requirements of the CBE standard EN 60934 (IEC 60934): S type, TO.
Meets the requirements regarding fire resistance of EN 60335-1 : 2007-02 Safety of household and similar electrical appliances.

Minimum ordering quantities apply!

1120-..

without water splash protection | with water splash protection

Typical applications

Electrical motors, household appliances, office equiment, garden and hobby tools, power supplies, charging rectifiers, cable extension reels, multiple socket outlets.

Variants/Options

Type No.
1120 thermal circuit breaker

Configuration
F snap-in panel mounting

Size of frame
1 panel thickness 1 - 2.5 mm (without water splash protection)
2 panel thickness 1 - 2 mm (with water splash protection)

Number of poles
0 double pole without protection
5 double pole, one pole thermally protected

Design
0 standard
1 with water splash protection

Terminal design
P1 blade terminals 6.3x0.8
P2 blade terminals 6.3x0.8, 90° angled

Characteristic curve
Q0 without
T1 thermal

Actuator style
U rocker (momentary switch)
W rocker (latching switch)

Actuator colour
A black opaque
B white opaque
E blue opaque
C red translucent
D green translucent
F blue translucent
other colours upon request

Actuator markings
00 "I" and "O" moulded in

Illumination
0 without illumination
B filament bulb

Illumination voltage range
0 without illumination
3 AC 90 V - 140 V
4 AC 185 V - 275 V
DC illumination upon request

Current ratings
3...16 A

1120 - F 1 5 0 - P1 T1 - W B 00 0 0 - 10 A ordering example

Technical data

Voltage rating	AC 240 V; DC 32 V DC 50 V (only double pole)
Current ratings	3...16 A
Typical life	20,000 operations at I_N, inductive
Ambient temperature	-20 °C...+60 °C
Insulation co-ordination (IEC 60664-1)	2,5 kV/2 reinforced insulation in operating area
Dielectric strength operating area terminal area pole/pole	 test voltage AC 3,000 V test voltage AC 1,500 V test voltage AC 1,500 V
Insulation resistance	> 100 MΩ (DC 500 V)
Switching capacity I_{cn}	AC 240 V: 200 A, 1 and 2 pole DC 50 V: 200 A, 2 pole DC 32 V: 200 A, 1 and 2 pole
Switching capacity (UL 1077)	AC 277 V: 3,500 A, 1 and 2 pole DC 50 V: 2,000 A, 2 pole DC 32 V: 2,000 A, 1 and 2 pole
Degree of protection (IEC 60529)	 operating area IP40 with water splash protection IP66 terminal area IP00
Vibration	8 g (57-500 Hz), ± 0,61 mm (10-57 Hz) test to IEC 60068-2-6, test Fc, 10 frequency cycles/axis
Shock	20 g (11 ms) test to IEC 60068-2-27, test Ea
Corrosion	48 hrs in 5% salt mist, test to IEC 60068-2-11,test Ka
Humidity	96 hrs in 95% RH, test to IEC 60068-2-3, test Cab
Mass	approx. 20 g

Illumination voltage/power consumption

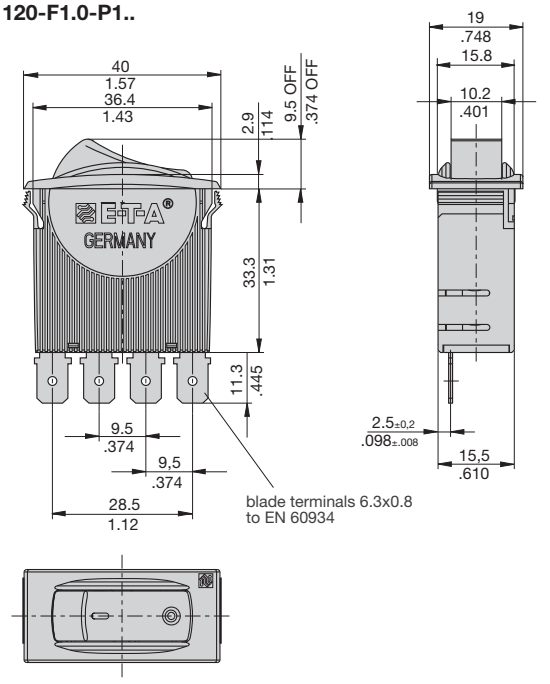
operating voltage	filament/neon
AC 115 V	< 1,5 mA
AC 230 V	< 1,5 mA

Approvals

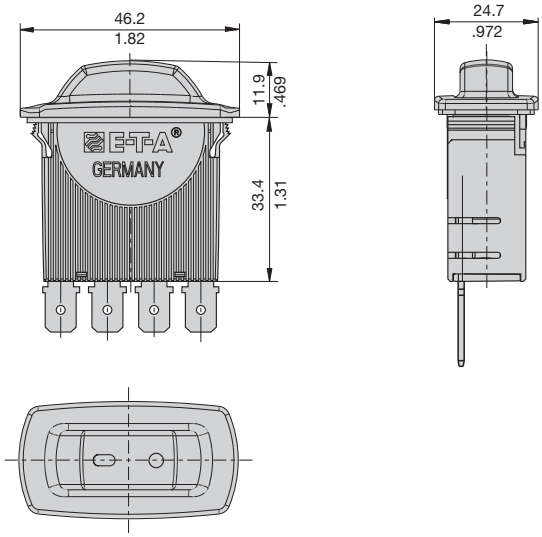
Authority	Voltage ratings	Current ratings
VDE (EN 60934)	AC 240 V, DC 32 V DC 50 V	3...16 A 1 + 2 pole 3...16 A 2 pole
UL, CSA, CCC	AC 277 V, DC 32 V DC 50 V	3...16 A 1 + 2 pole 3...16 A 2 pole

Dimensions single pole

1120-F1.0-P1..

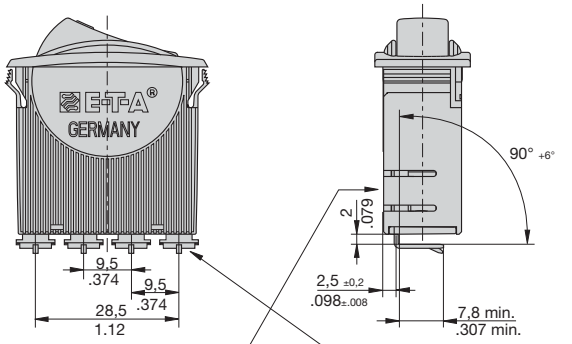


1120-F2.1-P1..



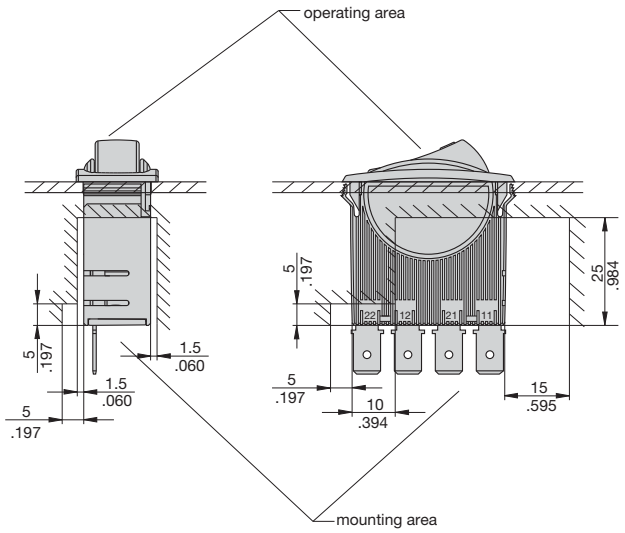
Dimensions double pole

1120-F...-P2

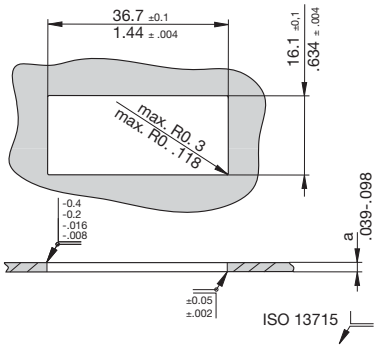


Applicable for nominal dimensions without direct tolerance indication:
DIN ISO 286 ± IT13

Installation drawing



Cut-out dimensions

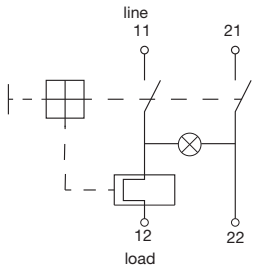


version	dimension “a”
1120-F1..-...	1 - 2.5 mm/ .039-.098
1120-F2..-...	1 - 2 mm/

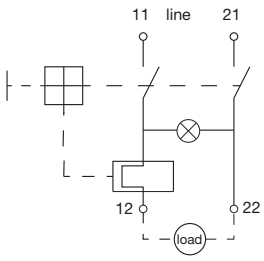
Applicable for nominal dimensions without direct tolerance indication:
DIN ISO 286 ± IT13

Internal connection diagrams

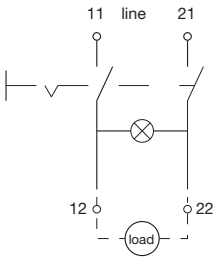
single pole connection
AC 240 V, DC 32 V



AC 240 V, DC 50 V
double pole
one pole thermally protected

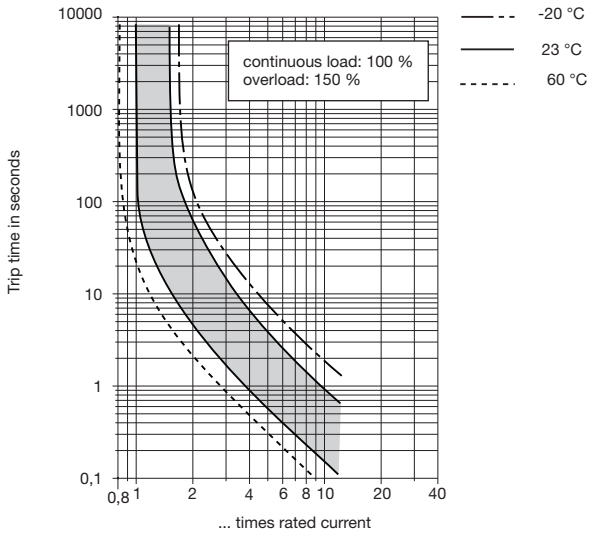


double pole
without protection

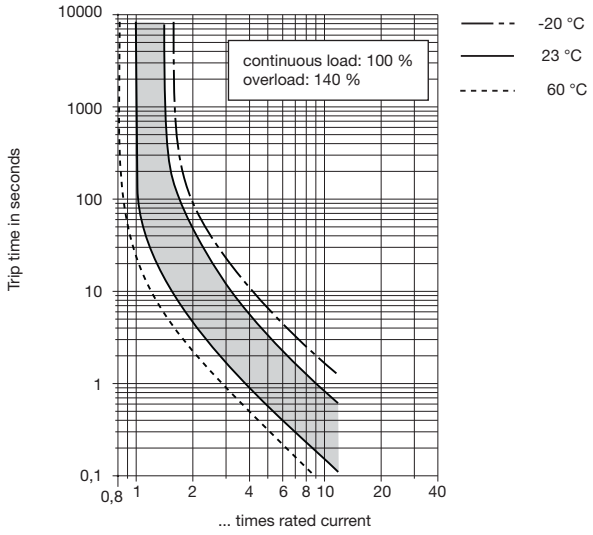


T1 - thermal characteristic curve

3 ... 6 A



8 ... 16 A



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 °C	-20	-10	0	+23	+ 40	+50	+60
Derating factor	0,84	0,88	0,92	1	1,08	1,14	1,23

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 circuit breaker with push-to-reset tease-free, trip-free, snap action mechanism (R-type TO CBE to EN 60934). Available in versions for panel mounting, snap-in or threadneck, or as an integral type. For lower current ratings see types 104, 105, 106. Approved to CBE standard EN 60934 (IEC 60934).

Typical applications

Motors, transformers, solenoids, hand-held machines and appliances.

Ordering information

Type No.

1140 single pole thermal circuit breaker

Mounting

- **E2** integral mounting
- **F1** snap-in panel mounting
- **G1** threadneck panel mounting 3/8-27UNS with hex nut and knurled nut*
- **G4** threadneck panel mounting 3/8-27UNS with knurled nut*

Number of poles

- **1** 1-pole protected

Actuator style

- **1** black push button (standard)

Terminal design

- **P1** blade terminals A6.3-0.8 (QC .250)

Characteristic curve

- **M1** medium delaye

Current ratings

- **3.5...16 A**

1140 - F1 1 1 - P1 M1 - 10 A = ordering example

*mounting hardware bulk shipped

Standard current ratings and typical internal resistance values

Current rating (A)	Internal resistance (Ω)	Current rating (A)	Internal resistance (Ω)
3.5	0.06	10	< 0.02
4	0.04	12	< 0.02
5	0.03	13	< 0.02
6	0.02	15	< 0.02
7	< 0.02	16	< 0.02
8	< 0.02		

Approvals

Authority	Voltage ratings	Current ratings
VDE	AC 240 V; DC 48 V	3.5...16 A
CSA, UL	AC 250 V; DC 50 V	3.5...16 A
Kema (EN 60934)	AC 240 V; DC 48 V	3.5...16 A

1140-E... **1140-F...** **1140-G.1.**

Technical data

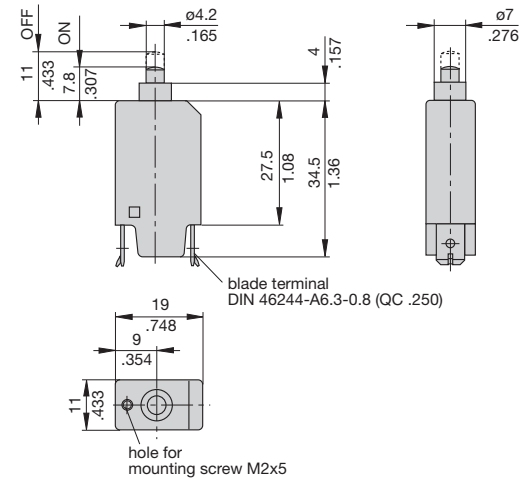
For further details please see chapter: Technical Information

Voltage rating		AC 240 V; DC 48 V (UL: AC 250 V; DC 50 V)
Current ratings		3.5...16 A
Typical life AC + DC	3.5...8 A	200 operations at 2 x I_N, inductive 1,000 operations at 2 x I_N, resistive
	9...16 A	100 operations at 2 x I_N, inductive
Ambient temperature		-20...+60 °C (-4...+140 °F) T 60
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	
Insulation resistance	> 100 MΩ (DC 500 V)	
Interrupting capacity I_{cn}	3.5...8 A 10...16 A	8 x I_N 120 A
Interrupting capacity (UL 10777)	I_N 3.5...16 A 3.5...7A 8...16 A	U_N DC 50 V AC 250 V AC 250 V	200 A 1,000 A 2,000 A
Degree of protection (IEC 60529/DIN 40 050)	operating area IP40 terminal area IP00	
Vibration	10 g (57-500 Hz) ± 0.76 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. 10 g	

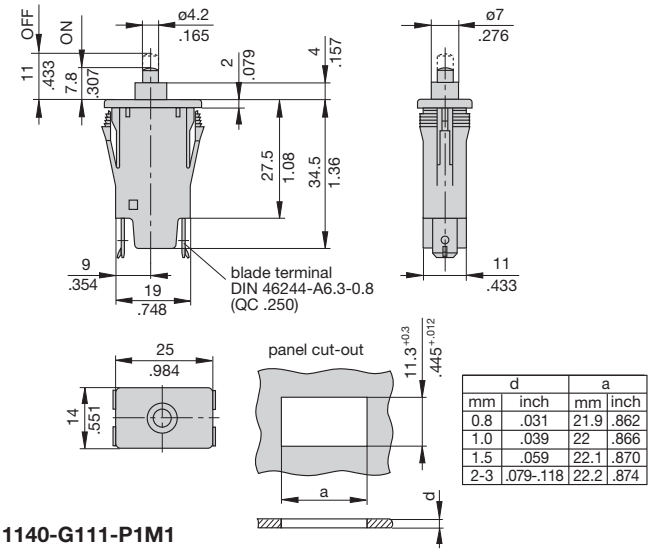
1

Dimensions

1140-E211-P1M1

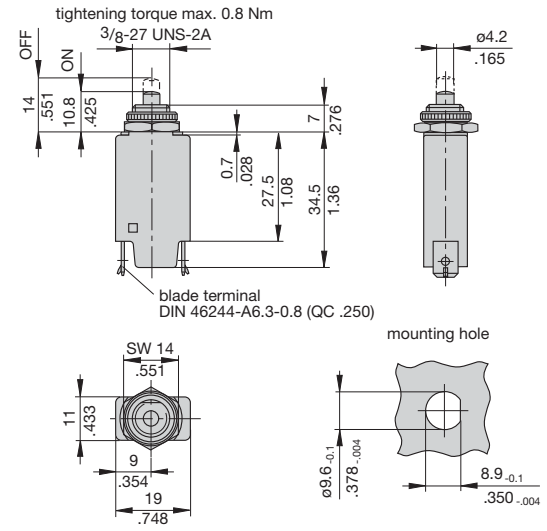


1140-F111-P1M1



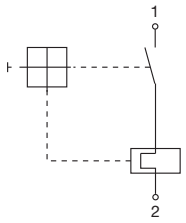
d		a	
mm	inch	mm	inch
0.8	.031	21.9	.862
1.0	.039	22	.866
1.5	.059	22.1	.870
2-3	.079-.118	22.2	.874

1140-G111-P1M1



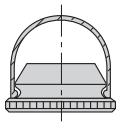
This is a metric design and millimeter dimensions take precedence ($\frac{mm}{inch}$)

Internal connection diagram

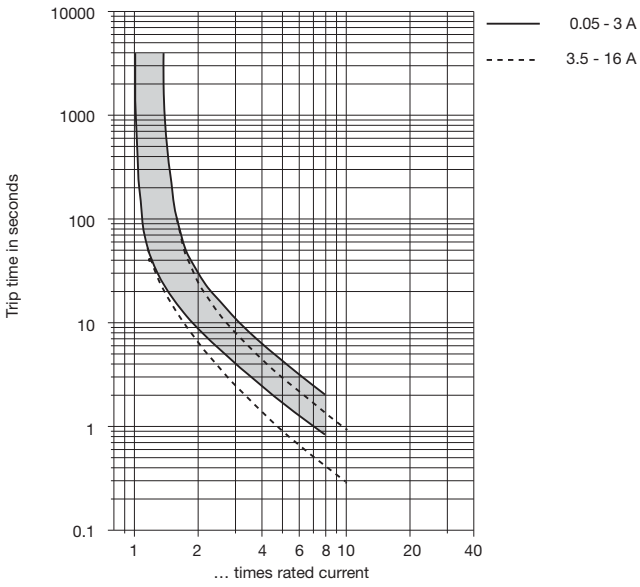


Accessory

Water splash cover/knurled nut assembly, transparent X 201 285 01 (IP64)



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

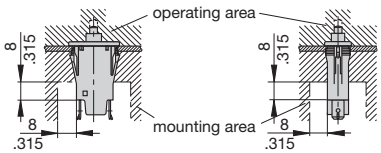


The time/current characteristic curve depends on the ambient temperature prevailing. In order to eliminate nuisance tripping, please multiply the circuit breaker current ratings by the derating factor shown below. See also section 9 – Technical information.

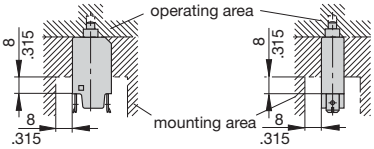
Ambient temperature	°F	-4	+14	+32	+73.4	+104	+122	+140
	°C	-20	-10	0	+23	+40	+50	+60
Derating factor		0.76	0.84	0.92	1	1.08	1.16	1.24

Installation drawings

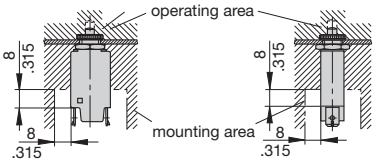
1140-F...



1140-E...



1140-G...



Description

Miniaturised double pole thermal circuit breaker with push-to-reset tease-free, trip-free, snap action mechanism (R-type TO CBE to EN 60934). Threadneck panel mounting. Suitable for line and neutral switching - the thermal actuator operating on one pole simultaneously opens both poles under overload conditions. Approved to CBE standard EN 60934 (IEC 60934).

Typical applications

Motors, transformers, solenoids, hand-held machines and appliances. Especially suited to AC duties where the correct orientation of line/ neutral is not known/cannot be guaranteed.

Ordering information

Type No.
1140 double pole threadneck panel mounting
Mounting
G1 threadneck panel mounting 3/8-27UNS, with hex nut and knurled nut*
G4 threadneck panel mounting 3/8-27UNS, with knurled nut*
Number of poles
5 double pole, 1-pole protected
Actuator style
1 black push button (standard)
Terminal design
P7 blade terminals DIN 46244-C (QC 2x.110)
Characteristic curve
M1 medium delay
Current ratings
0,05...16 A

1140 - G1 5 1 - P7 M1 - 16 A ordering example

*mounting hardware bulk shipped

Standard current ratings and typical internal resistance values

Current rating (A)	Internal resistance (Ω)	Current rating (A)	Internal resistance (Ω)
0.05	345	1.8	0.3
0.06	240	2	0.3
0.08	142	2.5	0.2
0.1	88	3	0.1
0.2	24	3.5	0.08
0.3	9.9	4	0.07
0.4	5.9	5	0.05
0.5	3.7	6	0.04
0.6	2.2	7	< 0.02
0.7	1.9	8	< 0.02
0.8	1.4	10	< 0.02
1	0.9	12	< 0.02
1.2	0.6	15	< 0.02
1.5	0.5	16	< 0.02

Approvals

Authority	Voltage ratings	Current ratings
VDE	AC 240 V; DC 48 V	0.05...16 A
CSA, UL	AC 250 V; DC 50 V	0.05...16 A
Kema (EN 60934)	AC 240 V; DC 48 V	0.05...16 A

1140-G.5

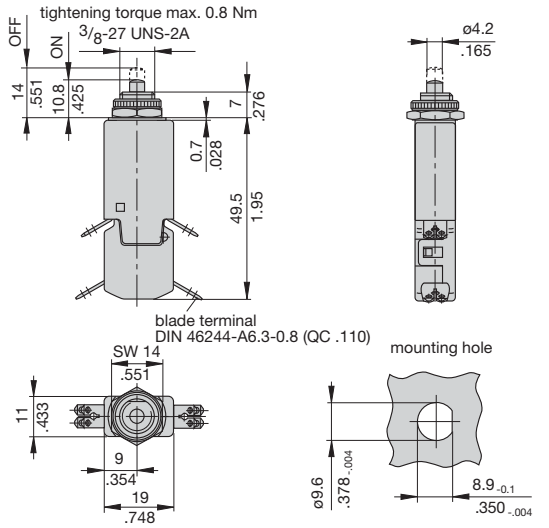
Technical data

For further details please see chapter: Technical Information

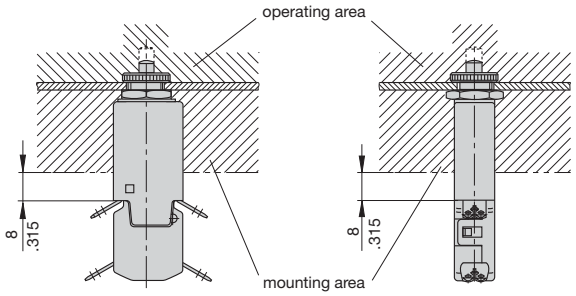
Voltage rating		AC 240 V; DC 48 V (UL: AC 250 V; DC 50 V)
Current ratings		0.05...16 A
Typical life AC + DC	0.05...3 A	300 operations at 2 x I_N, inductive 3,000 operations at 2 x I_N, resistive
	3.5...8 A	200 operations at 2 x I_N, inductive 1,000 operations at 2 x I_N, resistive
	9...16 A	100 operations at 2 x I_N, inductive
Ambient temperature		-20...+60 °C (-4...+140 °F) T 60
Insulation co-ordination (IEC 60664 and 606664 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	test voltage AC 3,000 V AC 1,500 V	
Insulation resistance		> 100 MΩ (DC 500 V)
Interrupting capacity I_{cn}	0.05...3 A 3.5...8 A 10...16 A	6 x I_N 8 x I_N 120 A
Interrupting capacity (UL 1077)	I_N 0.05...16 A 0.05...7 A 8...16 A	U_N DC 50 V AC 250 V AC 250 V	200 A 1,000 A 2,000 A
Degree of protection (IEC 60529/DIN 40 050)	operating area IP40 terminal area IP00	
Vibration	10 g (57-500 Hz) ± 0.76 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. 13 g	

Dimensions

1140-G15...

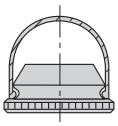


Installation drawing

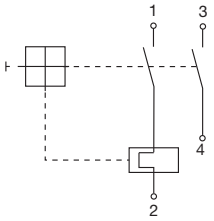


Accessories

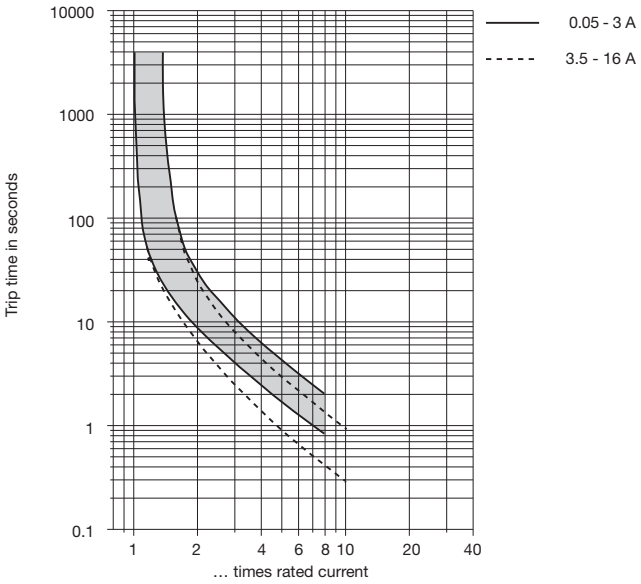
Water splash cover/knurled nut assembly, transparent
X 201 285 01 (IP64)



Internal connection diagram



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



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	-4	+14	+32	+73.4	+104	+122	+140
°C	-20	-10	0	+23	+40	+50	+60
Derating factor	0.76	0.84	0.92	1	1.08	1.16	1.24

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.

Thermal Automotive Circuit Breaker 1160-...

Description

Thermal circuit breaker, with controlled self-resetting mechanism, specially suited to installation in inaccessible locations. Under overload conditions the circuit breaker contacts will open to protect the load circuit. A low current excitation circuit ensures that the contacts remain open thereby avoiding the hazards of automatic reset operation. The circuit breaker is reset by switching off the supply circuit for a short period. Class 2 device, contacts stay open until voltage is removed. Type II to SAE J 553.

Typical applications

Automotive and marine extra low voltage wiring systems and components, battery powered appliances.

1160-...

Ordering information

Type No.	
1160	single pole plug-in type
Design standard	
02	standard version 12 V
Current ratings	
12, 15, 20, 30 A	
1160 - 02 - 12A	ordering example

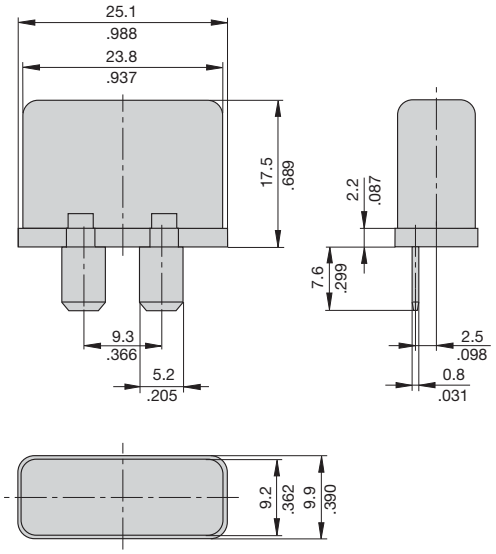
Standard current ratings and typical voltage drop values

Current rating (A)	Voltage drop (mV)
12	< 150
15	< 150
20	< 150
30	< 150

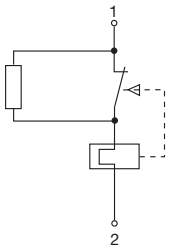
Technical data

Voltage rating	DC 12 V
Current ratings	12...30 A
Typical life	300 operations at 2 x I_N
Ambient temperature	-30...+60 °C (-22...+140 °F)
Holding current	< 0.6 A
Reset time at 23°C after 5 s of load with U_N	< 35 sec
Interrupting capacity (o-o-o)	200 A, L/R = 2.5 ms
Degree of protection (IEC 60529/DIN 40050)	housing area IP54 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. 6 g

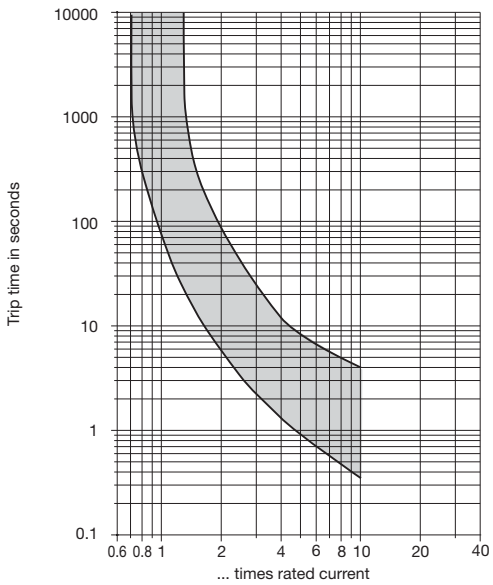
Dimensions



Internal connection diagram



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



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	-4	+14	+32	+73.4	+104	+122	+140
	°C	-20	-10	0	+23	+40	+50	+60
Derating factor		0.76	0.84	0.92	1	1.08	1.16	1.24

Accessories

Sockets available to special order.

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

Compact single pole thermal circuit breaker with push-to-reset, tease free, trip free, snap action mechanism and separate (colour coded) manual release. Combining full feature circuit breaker protection and convenience with low cost of ownership benefits. Fitted with blade terminals for plug-in mounting.
Type III to SAE J 553.
Version 1176 is available especially for the automotive industry (current ratings correspond to those of blade fuses).

Typical applications

Extra low voltage wiring systems on all types of vehicles and marine craft.

1170-...

Ordering information

Type No.		
1170	plug-in	
	Design standard	
	21	blade terminals for automotive fuse blocks (standard) with retaining clips
	22	blade terminals for automotive fuse blocks, without retaining clips
	Current ratings	
	3...25 A	

1170 - 21 - 15 A ordering example

Standard current ratings, typical voltage drop values and actuator colours (manual release)

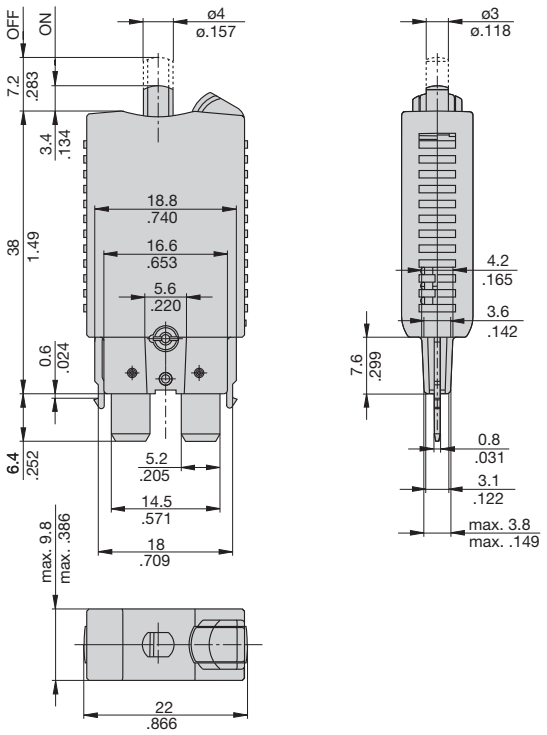
Current rating (A)	Voltage drop (mV)	Actuator colour	
3	< 300	violet	(approximating RAL 4008)
4	< 300	pink	(approximating RAL 3015)
5	< 300	orange-brown	(approximating RAL 8023)
6	< 150	mossy-green	(approximating RAL 6005)
7.5	< 150	hazel	(approximating RAL 8011)
8	< 150	honey	(approximating RAL 1005)
10	< 150	red	(approximating RAL 3020)
15	< 150	blue	(approximating RAL 5012)
20	< 150	yellow	(approximating RAL 1018)
25	< 150	pearl	(approximating RAL 1013)

Technical data

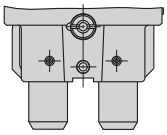
Voltage rating	DC 28 V
Current ratings	3...25 A (30 A upon request)
Typical life	at rated current: 3...25 A 6,000 operations at I_N 3...20 A 3,000 operations at 2 x I_N 25 A 1,000 operations at 2 x I_N
Ambient temperature	-40...+85 °C (-40...+185 °F)
Interrupting capacity I_{cn}	400 A
Ultimate short-circuit breaking capacity	≥ 1 break operation at 2,000 A
Degree of protection (IEC 60529/DIN 40050)	operating area IP40 terminal area IP00
Vibration	10 g (57-500 Hz)± 0.76 mm (10-57 Hz), to IEC 60068-2-6, test Fc, 10 frequency cycles/axis
Shock	50 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. 13 g

Dimensions

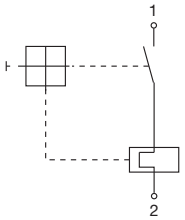
1170-21



1170-22

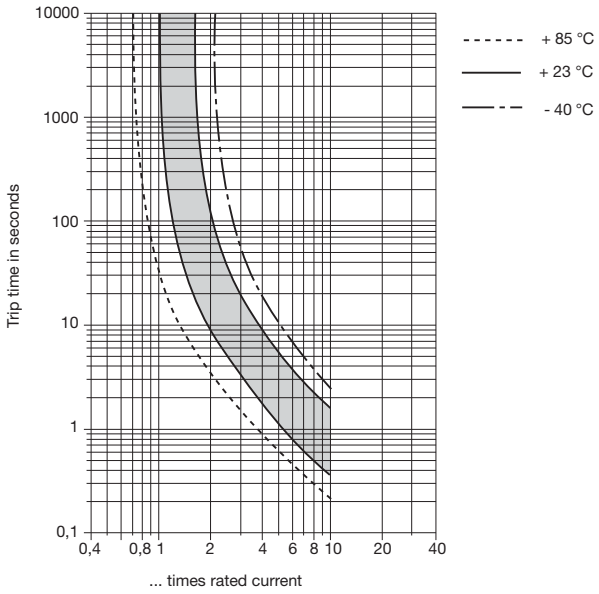


Internal connection diagram



Typical time/current characteristics at +23°C7+73.4°F

3 ... 25 A



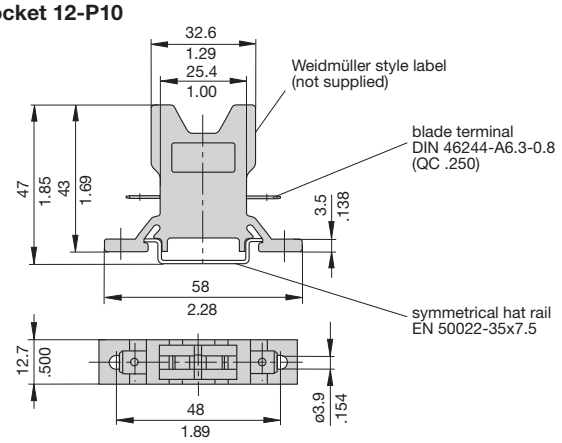
The time/current characteristic curve depends on the ambient temperature prevailing. In order to eliminate nuisance tripping, please multiply the circuit breaker current ratings by the derating factor shown below. See also section 9 – Technical information.

Ambient temperature °F	-40	-22	-4	+14	+32	+50
Ambient temperature °C	-40	-30	-20	-10	0	+10
Derating factor	0,77	0,80	0,84	0,89	0,94	0,96
Ambient temperature °F	+73.4	+104	+122	+140	+158	+185
Ambient temperature °C	+23	+40	+50	+60	+70	+85
Derating factor	1	1,08	1,16	1,24	1,33	1,42

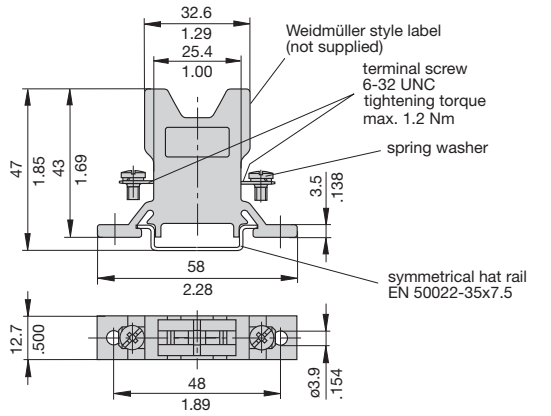
This is a metric design and millimeter dimensions take precedence ($\frac{mm}{inch}$)

Accessories

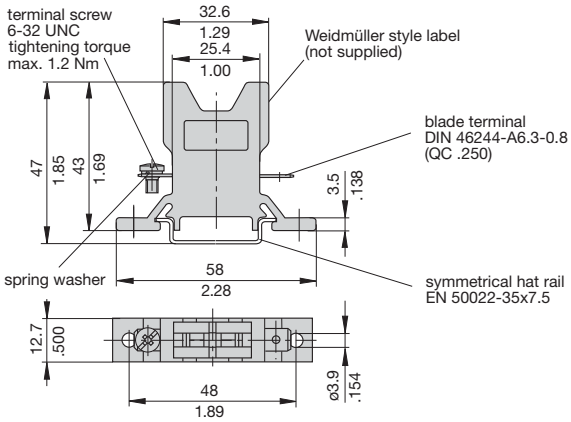
Socket 12-P10



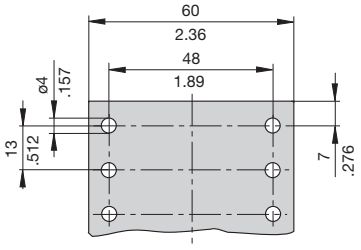
Socket 12-J20



Socket 12-A10



Dimensions for surface mounting



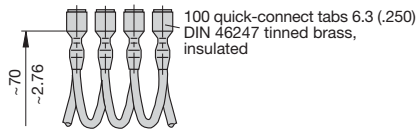
Other sockets available to special order
Labels: Weidmüller, D-33102 Paderborn

Ordering information Mounting socket 12

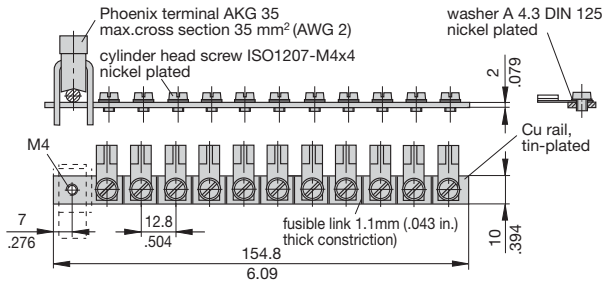
Type No.		
12	Mounting socket	
	Terminal design	
	P10	blade terminals A6.3-0.8 (QC .250)
	J20	screw terminals 6-32 UNC
	A10	1 blade terminal A6.3-0.8 (QC .250)/1 screw terminal 6-32 UNC
		Version
		(blank) single socket
		20 two-way
		30 three-way
		40 four-way
		60 six-way
12 - P10 - 20		ordering example

Accessories for mounting socket 12

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)



Bus bar (supplied as a complete package)
(up to 100 A max. load)
X 211 157 01 with terminal
X 211 157 02 without terminal



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

Miniaturised single pole thermal circuit breaker with switching function optional (push-push actuation). Reliable snap-acting and trip-free mechanism. Approved to CBE standard EN/IEC 60934. S-type, TO. Blade terminals fitting into sockets for rail mounting.

Typical applications

Protection of loads in power distribution systems in control cabinets and process control.

Ordering information

Type No.	
1180	single pole thermal circuit breaker, plug-in mounting
Versions	
01	with switching function, without label
02	reset function only, without label
Current rating range	
0.1...10 A	

1180 - 01 - 1 A ordering example

Standard current ratings and typical internal resistance values

Current rating (A)	Internal resistance (Ω)	Current rating (A)	Internal resistance (Ω)
0.1	81	2	0.25
0.2	22	2.5	0.18
0.25	14	3	0.11
0.3	8.7	3.5	0.08
0.4	5.5	4	0.07
0.5	3.4	5	≤ 0.05
0.6	2.5	6	≤ 0.05
0.7	1.7	7	≤ 0.05
0.8	1.5	8	≤ 0.05
1	0.9	10	≤ 0.05
1.5	0.4		

Approvals

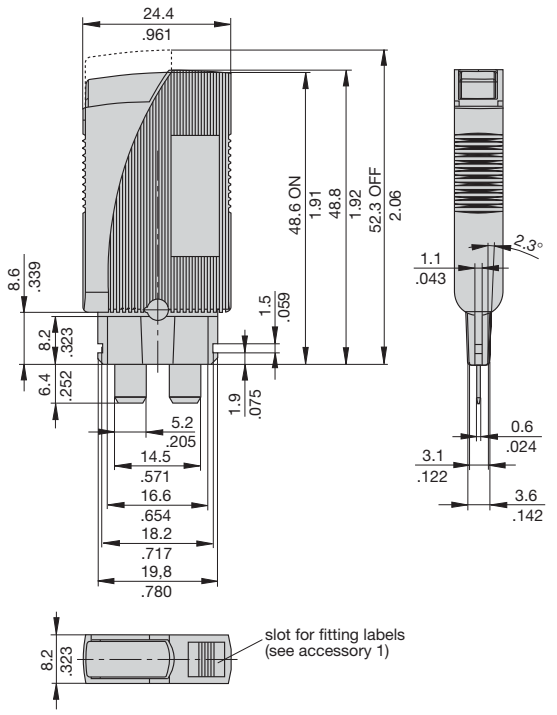
Authority	Voltage rating	Current ratings
VDE	AC 250 V; DC 65 V	0.1...10 A
UL	AC 250 V; DC 72 V	0.1...10 A
CSA	AC 250 V; DC 72 V	0.1...10 A

1180-...

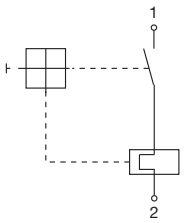
Technical data

Voltage rating	AC 250 V; DC 65 V (UL, UL Canada: AC 250 V; DC 72 V)
Current ratings	0.1...10 A
Typical life	6,000 operations at 1 x I_N (low-inductance) 3,000 operations at 1 x I_N (inductive) 500 operations at 2 x I_N (inductive)
Ambient temperature	-20...+60 °C (T 60) -4...+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 installation area	test voltage AC 3,000 V AC 1,500 V
Insulation resistance	> 100 MΩ (DC 500 V)
Interrupting capacity I_{cn}	0.1...5 A 6 x I_N 6...10 A 8 x I_N
Interrupting capacity (UL 1077)	AC 250 V: 2,000 A DC 65 V: 200 A
Degree of protection (IEC 60529/DIN 40050)	operating area IP40 terminal area IP00
Vibration without terminal block	5 g (57-500 Hz) ± 0.38 mm (10-57 Hz) to IEC 60068-2-6, test Fc, 10 frequency cycles/axis and to EN 50155
Shock without terminal block	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. 15 g

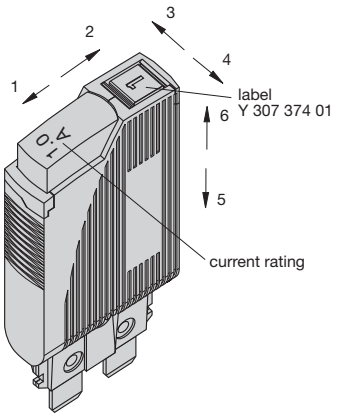
Dimensions



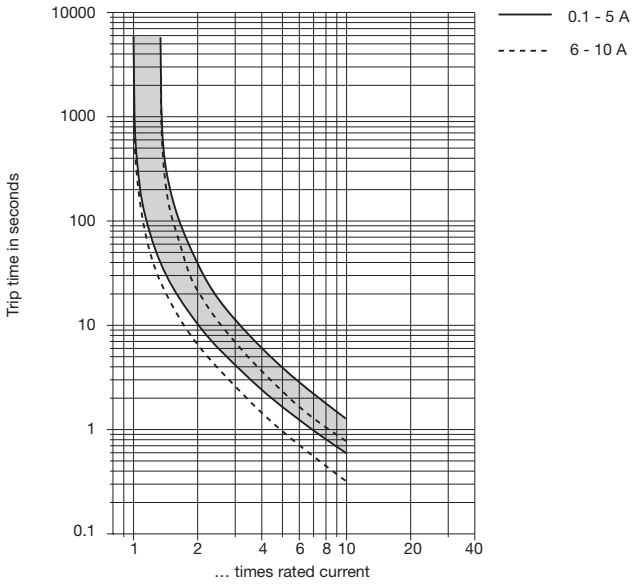
Internal connection diagram



Shock directions



Typical time/current characteristics at +23 °C7+73.4 °F



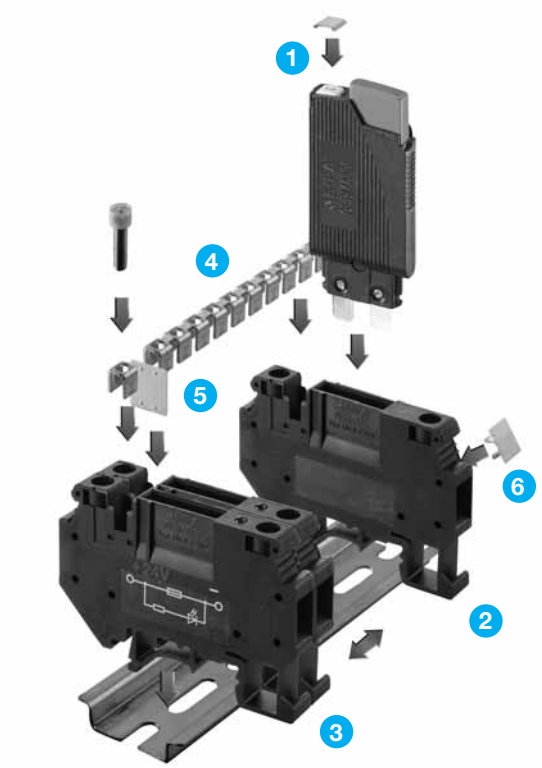
The time/current characteristic curve depends on the ambient temperature prevailing. In order to eliminate nuisance tripping, please multiply the circuit breaker current ratings by the derating factor shown below. See also section 9 – Technical information.

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

Note: When several devices are mounted together, each device should only carry 80 % of its rating or it must be overrated accordingly.

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

Accessories - Terminal block with screw terminals



1 Label for circuit breaker 1180, surface for marking 4.5 x 5 mm
(packaging quantity 120 pcs)
Y 307 374 01

2 Terminal block for DIN rail mounting, with screw terminals
up to 6 mm² conductor, width 8.2 mm,
dimensions 64 x 42.5 x 8.2 mm,
headroom over the upper rail edge with circuit breaker fitted (OFF position) 84 mm.
Approvals: UL 300 V / 30 A / AWG 26-8
X 222 233 01

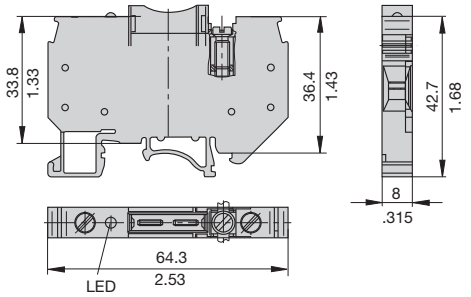
3 Terminal block for DIN rail mounting see item 2,
but with LED DC 24 V (lighted after tripping);
current rating LED 2 mA
X 222 233 02

4 Bus connection for potential bridging of several terminal blocks see item 2 and 3 (10-pole, separable, mounting hardware included), max. current rating 34 A
X 222 232 01

5 Insulation barriers for insertion between two circuits
(packaging quantity 10 pcs)
Y 307 373 01

6 Label for terminal block, see item 2 and 3,
surface for marking 8 x 10 mm
(packaging quantity 10 pcs)
Y 307 375 01

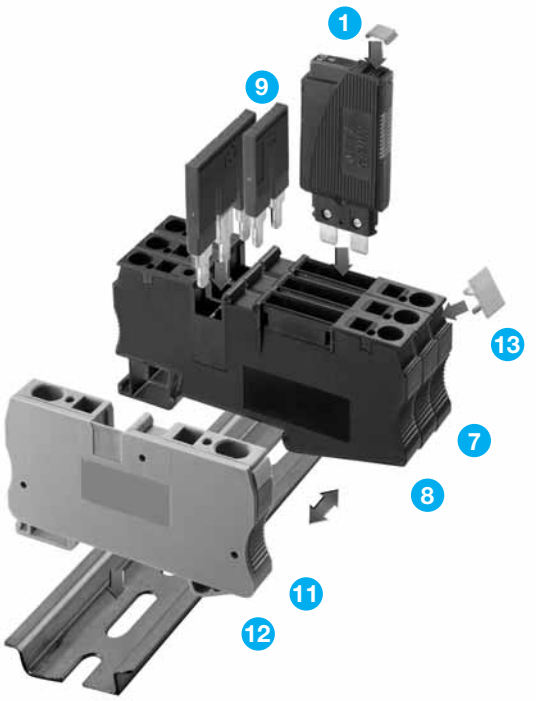
Dimensions X 222 233 02



Vibration	**with terminal block X 222 233 01 and X 222 233 02** 5 g (57-500 Hz), ± 0.38 mm (10-57 Hz) to IEC 60068-2-6, test Fc, 10 frequency cycles/axis and EN 50155
Shock	**with terminal block X 222 233 01 and X 222 233 02** 25 g (11 ms) to IEC 60068-2-27, test Ea

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

Accessories - Terminal block with spring-loaded terminals



1 **Label** for circuit breaker 1180, surface for marking 4.5 x 5 mm (packaging quantity 120 pcs)
Y 307 374 01

7 **Terminal block** for DIN rail mounting, with spring-loaded terminals up to 4 mm² conductor, width 8.2 mm, dimensions 68.5 x 36.5 x 8.2 mm, headroom over the upper rail edge with circuit breaker fitted (OFF position) 82 mm.
UL approval pending.
X 222 316 01

8 **Terminal block** for DIN rail mounting see item 7, but with LED DC 24 V (lighted after tripping); current rating LED 2 mA
X 222 315 02

9 **Jumper 2pole,** max. current rating 32 A for terminal blocks items 7 and 8 and feed supply terminal item 11.
X 222 318 01

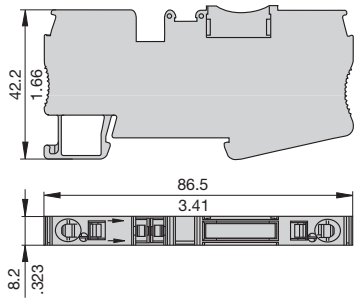
10 **Jumper 3pole,** max. current rating 32 A for terminal blocks items 7 and 8 and feed supply terminal item 11.
X 222 318 02

11 **Feed supply terminal** with spring-loaded terminals up to 6 mm² conductor, width 8.2 mm, suitable for use with jumpers items 9 and 10 (power distribution).
X 222 317 01

12 **Cover** for feed supply terminal item 11 for closing the open side at the end of an assembly.
Y 307 507 01

13 **Label** for terminal block items 7 and 8, and feed supply terminal item 11, surface for marking 7.5 x 5 mm (packaging quantity 50 pcs)
Y 307 508 01

Dimensions X 222 316 01



Vibration	**with terminal blocks X 222 316 01 and X 222 315 02** vibration axis 3-4: 3 g (57-500 Hz), ± 0.38 mm (10-57 Hz) other axes: 5 g (57-500 Hz), ± 0.38 mm (10-57 Hz) to IEC 60068-2-6, test Fc, 10 frequency cycles/axis and EN 50155
Shock	**with terminal blocks X 222 316 01 and X 222 315 02** 25 g (11 ms) to IEC 60068-2-27, test Ea

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 rocker switch/thermal circuit breaker combining ON/OFF switching and extremely fast overload performance in a single component (S-type TO CBE to EN 60934/IEC 934). Under overload conditions an internal neon (filament bulb for low voltages) illuminates to give a clear signal of the tripped status of the mechanism and thereby the cause of power interruption, suffix -B. Alternatively the illumination can be conventionally wired to indicate the ON status of the device, suffix -E. Returning the rocker switch through the OFF position and back ON will reset the mechanism and restore the supply. Largely temperature-insensitive. Complies with CBE standard EN 60934 (IEC 60934).

Typical applications

Motors, transformers, solenoids, PCBs, hand-held machines, appliances, instrumentation.

Ordering information

Type No.
1410 snap-in panel mounting type
Mounting
F snap-in panel mounting
Size of frame
1 to fit mounting cut-out 28 x 12.7 mm (1.1 x .5 in)
Number of poles
1 single pole, thermally protected
Accessories
0 without accessories
Terminal design
P1 blade terminals 2.8-0.8 (QC .110/2x.110) silver-plated
Characteristic curve
F1 fast acting
Actuator style
W rocker, rounded profile
Actuator colour
02 white opaque
14 red translucent
15 orange translucent
19 green translucent
Actuator markings
Q I and O
Trip/ON illumination (optional)
B illuminated when tripped
E illuminated when ON
Illumination voltage range (optional)
2 20-28 V marked 24 V 35 mA
3 90-140 V marked 115 V < 1 mA
4 185-275 V marked 230 V < 1 mA
Current ratings
0.63...10 A

1410 - F 1 1 0 - P1 F1 - W 14 Q E 3 - 2 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.

1410-F1..

Technical data

Voltage rating	AC 240 V; DC 28 V (DC 50 V upon request) (UL: AC 250 V; DC 48)
Current rating range	0.63...10 A
Typical life circuit 1-3 protection circuit 1-2	 30,000 operations for $I_N \leq 6.3$ A AC/DC 10,000 operations for $I_N > 6.3$ A AC 3,000 operations for $I_N > 6.3$ A DC 300 break operations at 2 x I_N
Ambient temperature	-20...+70 °C (-4...+158 °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
Insulation resistance	> 100 MΩ (DC 500 V)
Interrupting capacity I_{cn}	0.63...2 A 12 x I_N 2.5...8 A 8 x I_N, AC max. 50 A 10 A 6 x I_N 3.15...10 A 10 x I_N, DC
Interrupting capacity (UL 1077)	0.63...10 A 2,000 A AC 250 V 0.63...8 A 200 A DC 50 V 0.63...5 A 200 A DC 60 V
Degree of protection (IEC 60529/DIN 40050)	operating area IP30 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	20 g (11 ms) to IEC 60068-2-27, test Ea
Corrosion	48 hours at 5 % salt mist, to IEC 60068-2-11, test Ka
Humidity	96 hours at 95 % RH to IEC 60068-2-78, test Cab
Mass	approx. 9 g

Standard current ratings and typical internal resistance values

Current rating (A)	Internal resistance (Ω)	Current rating (A)	Internal resistance (Ω)
0.63	1.8	3.15	< 0.12
0.8	1.7	4	< 0.1
1	1.3	5	< 0.1
1.5	< 1	6.3	< 0.1
1.8	< 1	8	< 0.1
2	< 1	10	< 0.1
2.5	< 0.15		

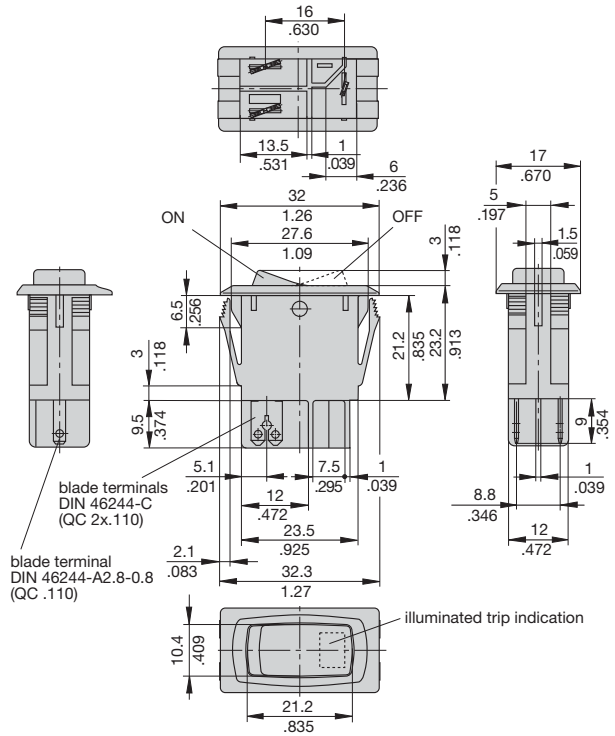
Approvals

Authority	Voltage ratings	Current ratings
UL, CSA	AC 250 V	0.63...10 A
	DC 50 V	0.63...8 A
UL	DC 60 V	0.63...5 A

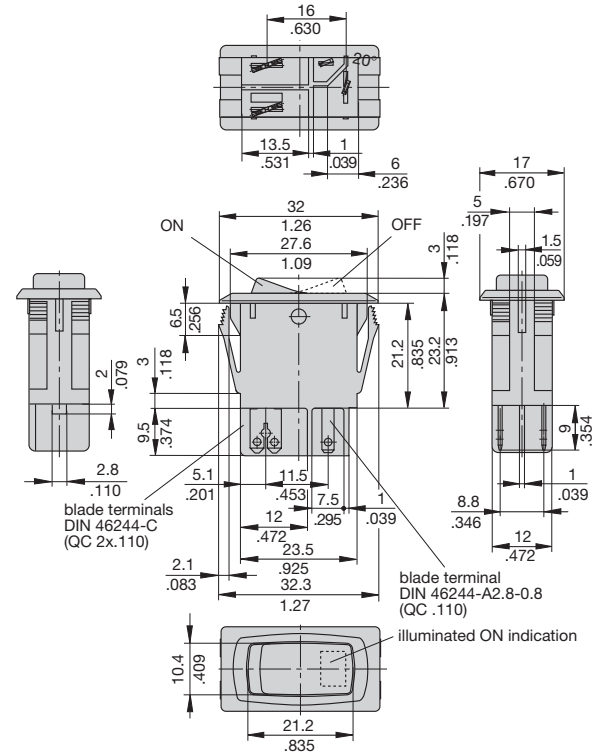
1

Dimensions

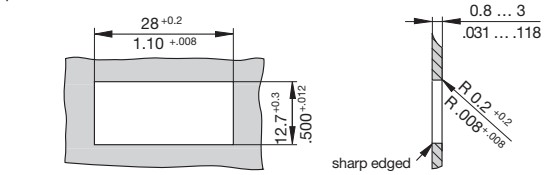
1410-F...-....-....B.



1410-F...-....-....E.

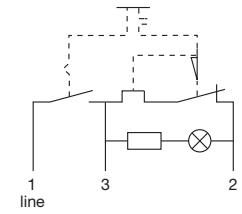


panel cut-out



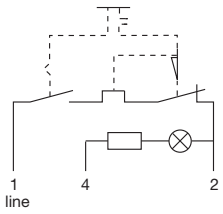
Internal connection diagrams

1410-F...-....-....B.

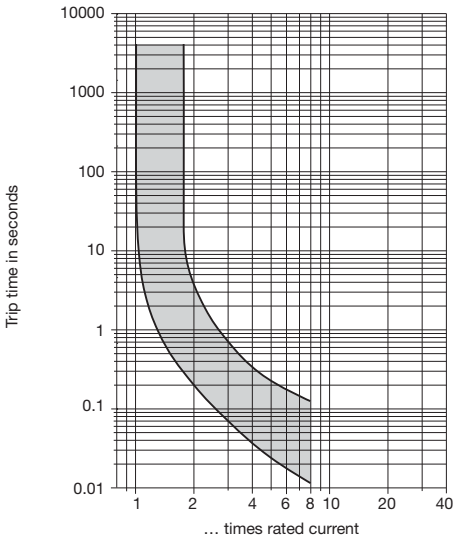


lamp current:
24 V = 35 mA
115 V < 1 mA
230 V < 1 mA

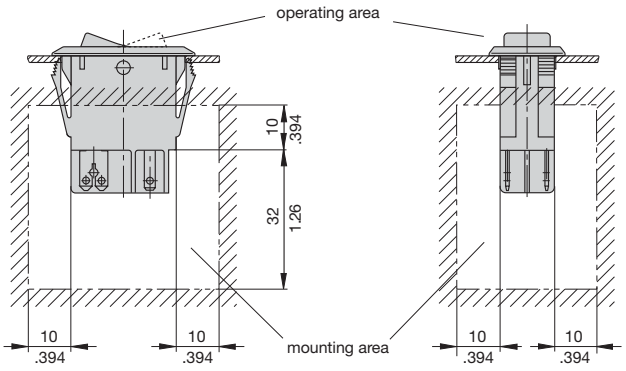
1410-F...-....-....E.



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



Installation drawing



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

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E-T-A Thermal Overcurrent Circuit Breaker 1410-L1/L4

Description

Single pole press-to-reset thermal circuit breaker with extremely fast overload switching performance (R-type TO CBE to EN 60934). Miniaturised construction minimises PCB real estate required. PCB mounting or integral mounting. Largely temperature-insensitive.

Typical applications

Motors, transformers, solenoids, PCBs, hand-held machines, appliances, instrumentation.

Ordering information

Type No.
1410 single pole circuit breaker
Configuration
L integral mounting or PCB mounting
Mounting
1 footprint 16.3x4.6
4 footprint 17.5x4.6
Number of poles
1 1-pole, thermally protected
Hardware
0 without
Terminal design
L1 solder pins 1.8x0.8 silver-plated (-L1 only)
P3 blade terminals DIN 46244-A4.8-0.5 silver-plated (only -L4)
P4 blade terminals DIN 46244-A4.8-0.8 silver-plated (only -L4)
Characteristic curve
F1 fast acting
Actuator
S reset button (1410-L1)
E round reset slide (1410-L4)
Actuator colour
01 black (for -L1)
03 white-yellow (for -L4)
04 red (for -L4)
Current ratings
0.63...10 A

1410 - L 1 1 0 - L1 F1 - S 01 - 0.8 A ordering example

*mounting hardware bulk shipped

Standard current ratings and typical internal resistance values

Current rating (A)	Internal resistance (Ω)	Current rating (A)	Internal resistance (Ω)
0.63	1.8	3.15	< 0.12
0.8	1.7	4	< 0.1
1	1.3	5	< 0.1
1.5	< 1	6.3	< 0.1
1.8	< 1	8	< 0.1
2	< 1	10	< 0.1
2.5	< 0.15		

Approvals

Authority	Voltage rating	Current ratings
VDE	AC 240 V DC 50 V DC 28 V	0.63...10 A 0.63...2 A 2.5...10 A
UL, CSA	AC 250 V; DC 50 V	0.63...10 A

1410-L1...

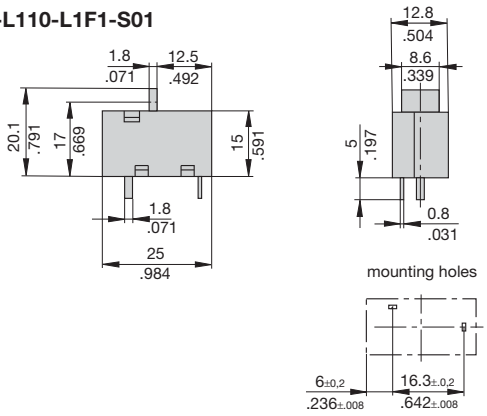
1410-L4...

Technical data

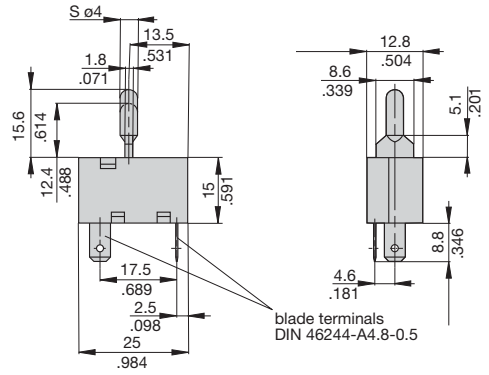
For further details please see chapter: Technical Information	
Voltage rating	AC 240 V; DC 28 V (UL: AC 250 V; DC 50 V)
Current rating range 1-2	0.63...10 A
Typical life AC 240 V: 0.63...2.25 A 2.5...10 A DC 50 V: 0.63...2.25 A DC 28 V: 2.5...10 A	 500 break operations at 2 x I_N, inductive 500 break operations at 2 x I_N, resistive 500 break operations at 2 x I_N, inductive 500 break operations at 2 x I_N, inductive
Ambient temperature	-20...+70 °C (-4...+158 °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 1,500 V
Insulation resistance	> 100 MΩ (DC 500 V)
Interrupting capacity I_{cn} (o-o-o)	0.63...2 A 12 x I_N 2.5...8 A 8 x I_N, AC max. 50 A 10 A 6 x I_N, AC 3.15...10 A 10 x I_N, DC
Interrupting capacity (UL 1077)	0.63...10 A 2,000 A AC 250 V 0.63...10 A 200 A DC 50 V
Degree of protection (IEC 60529/DIN 40050)	operating area IP40 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	20 g (11 ms) to IEC 60068-2-27, test Ea
Corrosion	48 hours at 5 % salt mist, to IEC 60068-2-11, test Ka
Humidity	96 hours at 95 % RH to IEC 60068-2-78, test Cab
Mass	approx. 5 g

Dimensions

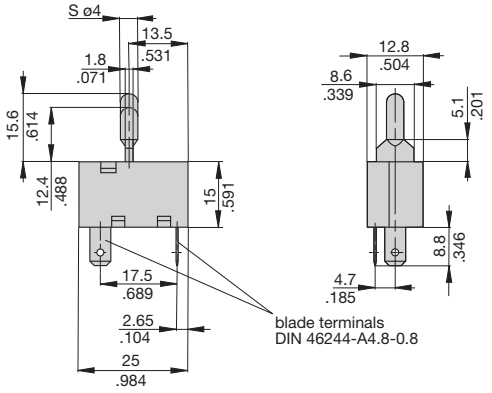
1410-L110-L1F1-S01



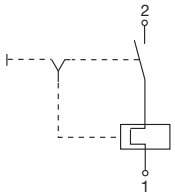
1410-L410-P3F1-E...



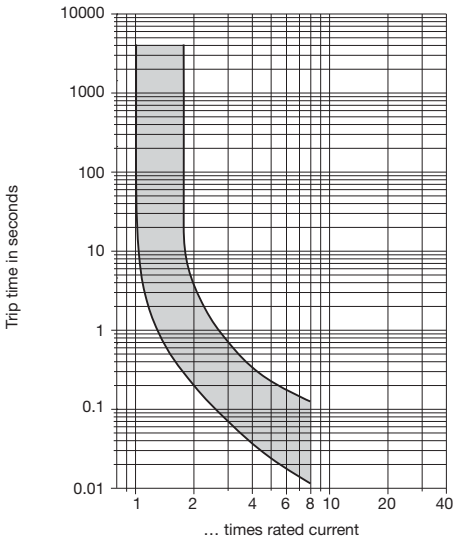
1410-L410-P4F1-E...



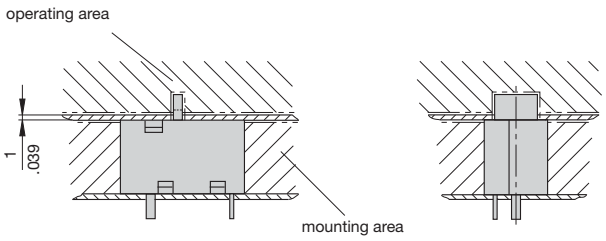
Internal connection diagram



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



Installation drawings



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 press-to-reset thermal circuit breaker with extremely fast overload switching performance (R-type TO CBE to EN 60934). Single hole threadneck, PCB or integral mounting with a choice of designs. Miniaturised construction minimises PCB real estate required. Type 1410-L2 and 1410-G1 versions feature changeover contacts suitable for providing status output signals. Largely temperature-insensitive.

Typical applications

Motors, transformers, solenoids, PCBs, hand-held machines, appliances, instrumentation.

Ordering information

Type No.
1410 single pole circuit breaker
Configuration
L PCB mounting or integral mounting
G threadneck panel mounting or PCB mounting
Mounting
1 threadneck 3/8-27UNS-2A (1410-G)
2 PCB 10.15x7.62 (1410-L)
3 PCB 10.15without shunt terminal (1410-L)
Number of poles
1 1-pole, thermally protected
Hardware
0 without
1 with hexnut and knurled nut (only1410-G)
> 5 pcs hexnut and knurled nut bulk shipped
2 without hexnut and knurled nut and without shunt terminal (only 1410-G)
4 with hexnut and knurled nut, without shunt terminal (only 1410-G)
8 with actuator guard and marking CB.. (only 1410-G)
Terminal design
L2 solder pins 1x0.8 silver-plated
P2 blade terminals DIN 46244-A2.8-0.8 silver-plated (only -G)
P3 blade terminals DIN 46244-A4.8-0.5 silver-plated (only -G)
Characteristic curve
F1 fast acting
Actuator
B flat reset-slide (only 1410-G)
S reset slide/button
Actuator colour
01 black (for -G1..)
02 white (for -L2..)
04 red (for 1410-G..-...B)
Current ratings
0.63...10 A

1410 - L 2 1 0 - L2 F1 - S 02 - 0.8 A ordering example

*mounting hardware bulk shipped

Standard current ratings and typical internal resistance values

Current rating (A)	Internal resistance (Ω)	Current rating (A)	Internal resistance (Ω)
0.63	1.8	3.15	< 0.12
0.8	1.7	4	< 0.1
1	1.3	5	< 0.1
1.5	< 1	6.3	< 0.1
1.8	< 1	8	< 0.1
2	< 1	10	< 0.1
2.5	< 0.15		

1410-L2... **1410-G1...**

Technical data

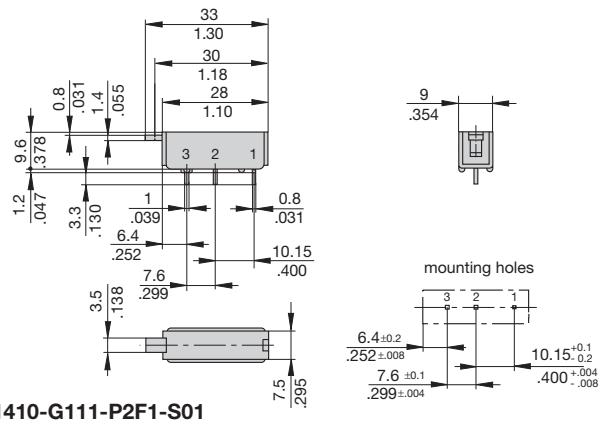
For further details please see chapter: Technical Information	
Voltage rating	AC 240 V; DC 28 V (UL: AC 250 V; DC 50 V)
Current rating range 1-2	0.63...10 A
Auxiliary circuit 1-3	0.2 x I_N max. 1 A, AC 250 V
Typical life AC 240 V: 0.63...2.25 A 2.5...10 A DC 50 V: 0.63...2.25 A DC 28 V: 2.5...10 A	 500 break operations at 2 x I_N, inductive 500 break operations at 2 x I_N, resistive 500 break operations at 2 x I_N, inductive 500 break operations at 2 x I_N, inductive
Ambient temperature	-20...+70 °C (-4...+158 °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 1,500 V
Insulation resistance	> 100 MΩ (DC 500 V)
Interrupting capacity I_{cn} (o-o-o)	0.63...2 A 12 x I_N 2.5...8 A 8 x I_N, AC max. 50 A 10 A 6 x I_N, AC 3.15...10 A 10 x I_N, DC
Interrupting capacity (UL 1077)	0.63...10 A 2,000 A AC 250 V 0.63...10 A 200 A DC 50 V
Degree of protection (IEC 60529/DIN 40050)	operating area IP40 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	20 g (11 ms) to IEC 60068-2-27, test Ea
Corrosion	48 hours at 5 % salt mist, to IEC 60068-2-11, test Ka
Humidity	96 hours at 95 % RH to IEC 60068-2-78, test Cab
Mass	approx. 5 g

Approvals

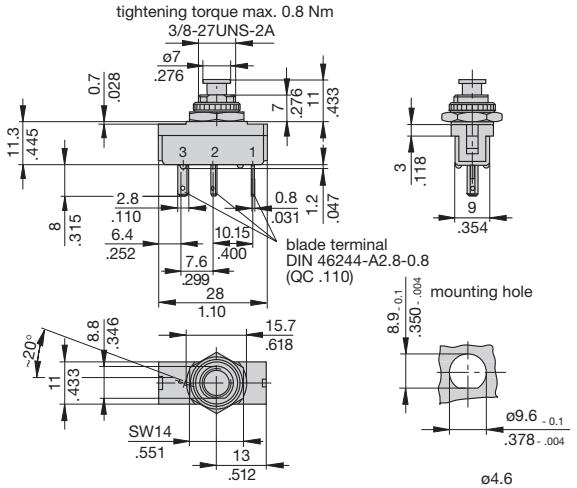
Authority	Voltage rating	Current ratings
VDE	AC 240 V DC 50 V DC 28 V	0.63...10 A 0.63...2 A 2.5...10 A
UL, CSA	AC 250 V; DC 50 V	0.63...10 A

Dimensions

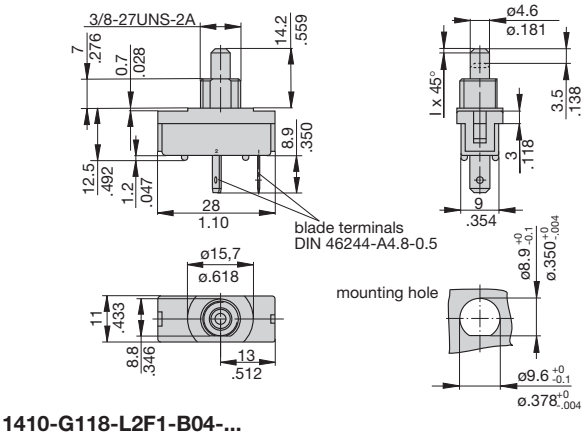
1410-L210-L2F1-S02



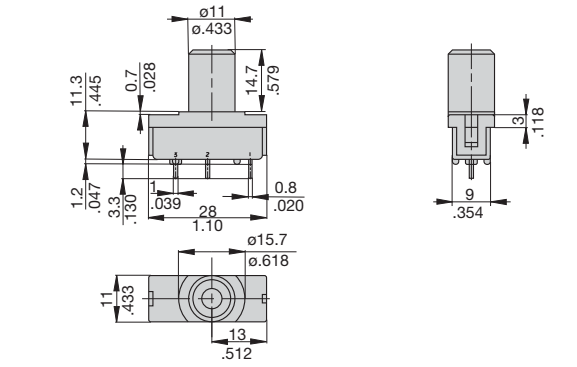
1410-G111-P2F1-S01



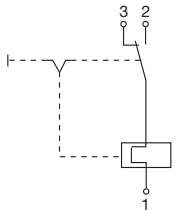
1410-G114-P3F1-B04-...



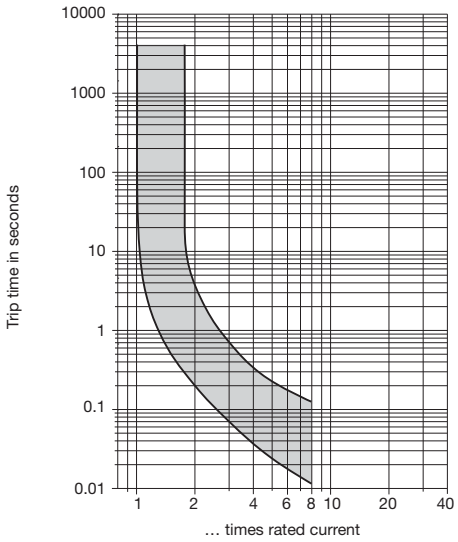
1410-G118-L2F1-B04-...



Internal connection diagram

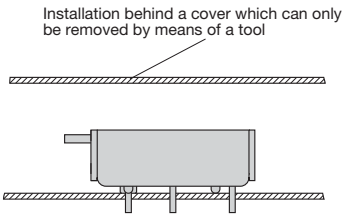


Typical time/current characteristics at +23 °C/+73.4 °F

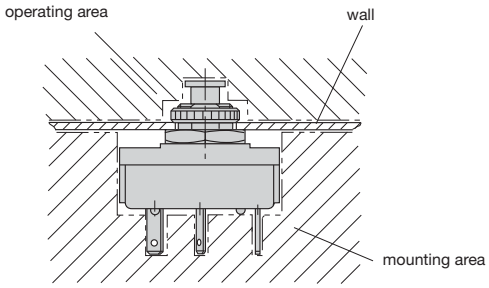


Installation drawings

1410-L2..



1410-G...



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

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Thermal Automotive Circuit Breaker 1610-...

Description

Miniaturised single pole press-to-reset cycling trip free thermal circuit breaker designed for automotive fuse block installation.
Extends the benefits of circuit breaker performance and convenience to applications which are cost critical. Colour-coded housing caps or manual release buttons available.

Version 1616 is available especially for the automotive industry (current ratings correspond to those of blade fuses).

Typical applications

Extra low voltage wiring systems on all types of vehicles and marine craft.

Ordering information

Type No.	
1610	single pole automotive circuit breaker
Voltage rating	
21	DC 28 V
H2	DC 28 V, with manual release facility (type III to SAE J 553)
92	DC 12 V, autoreset (type I to SAE J 553)
Current ratings	
5 6 8 10 15 20 25 30 A	

1610 - 21 - 8 A ordering example

Current ratings, typical voltage drop values and colour coding

Current rating (A)	Voltage drop (mV)	Actuator colour manual release (1610-H2) or housing cap colour (1610-21)
5	< 150	light-brown
6	< 150	green
8	< 150	honey
10	< 150	red
15	< 150	blue
20	< 150	yellow
25	< 150	pearl
30	< 150	light-green

Homologations

Homologation	
UL 1500	Ignition Protected

1610-21

1610-H2

1610-92

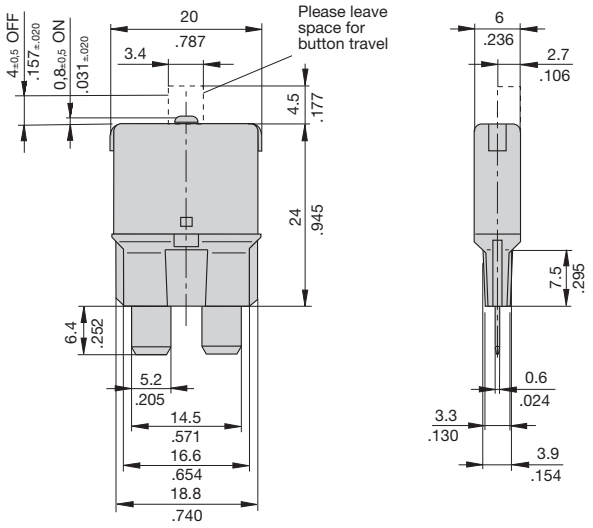
Technical data

Voltage rating	1610-92: DC 12 V 1610-21/1610-H2: DC 32 V
Current ratings	5...30 A
Service short-circuit breaking capacity	300 operations at ≤ 50 A
Reset period for 1610-92 (at 23 °C)	≤ 15 s
Ambient temperature	-40...+85 °C (-40...+185 °F)
Degree of protection (IEC 60529/DIN 40050)	operating area IP30 (-21/-H2) operating area IP54 (-92) terminal area IP00
Ultimate short-circuit breaking capacity	≥ 3 break operations at 150 A, or ≥ 1 break operation at 2,000 A
Vibration (with mounting socket 12)	10 g (57-500 Hz) ± 0.38 mm (10-57 Hz) to IEC 60068-2-6, test Fc 10 frequency cycles/axis
Shock (with mounting socket 12)	50 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. 5 g

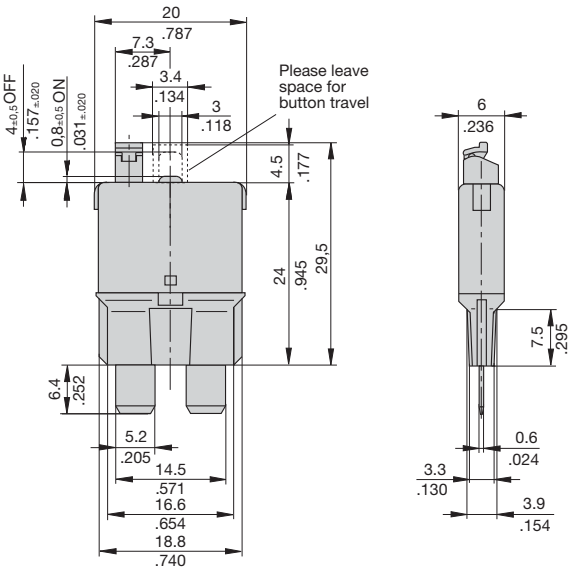
N.B.
It is good practice to switch off the vehicle's ignition system before re-setting the circuit breaker.
Free travel of the actuator must be ensured.

Dimensions

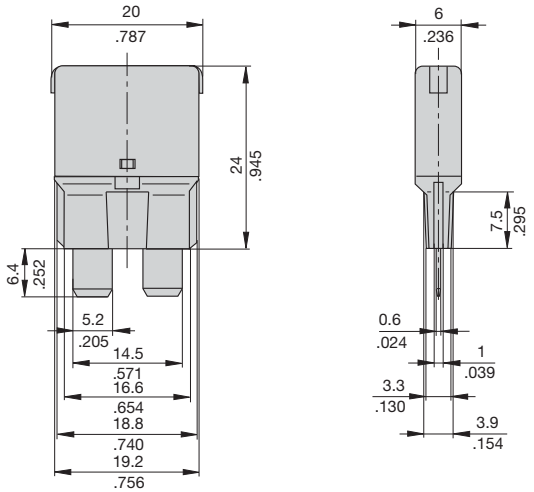
1610-21



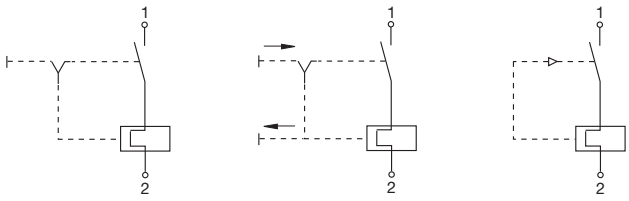
1610-H2



1610-92

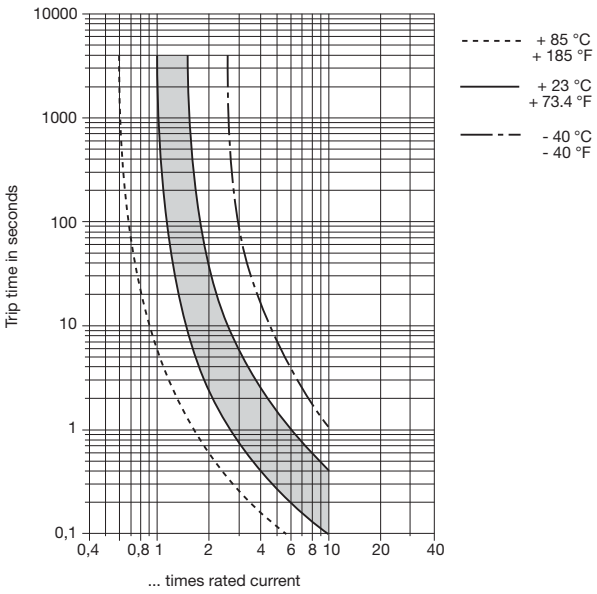


Internal connection diagrams



Typical time/current characteristic curve

5 ... 30 A



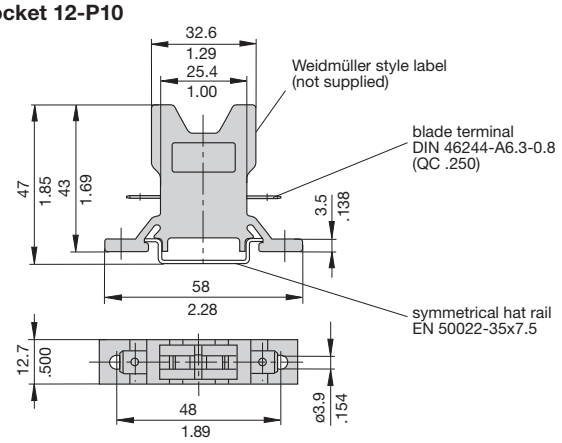
The time/current characteristic curve depends on the ambient temperature prevailing. In order to eliminate nuisance tripping, please multiply the circuit breaker current ratings by the derating factor shown below. See also section 9 – Technical information.

Ambient temperature	°F	-40	-22	-4	+14	+32	+50
	°C	-40	-30	-20	-10	0	10
Derating factor		0,73	0,78	0,82	0,86	0,91	0,95
Ambient temperature	°F	+73.4	+104	+122	+140	+158	+185
	°C	23	40	50	60	70	85
Derating factor		1	1,09	1,16	1,25	1,33	1,43

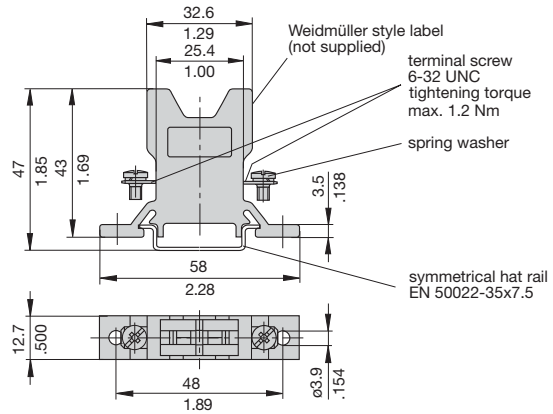
This is a metric design and millimeter dimensions take precedence ($\frac{mm}{inch}$)

Accessories

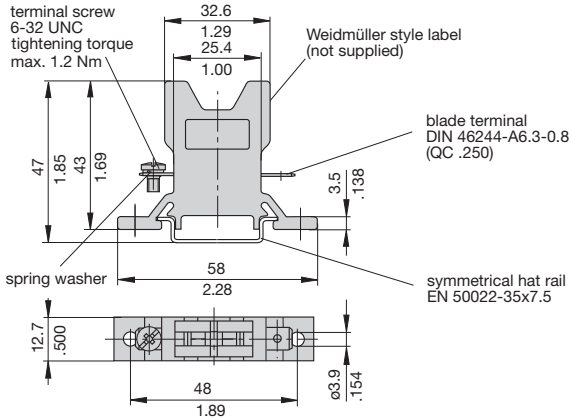
Socket 12-P10



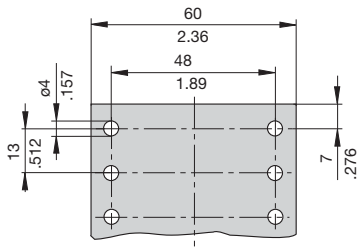
Socket 12-J20



Socket 12-A10



Dimensions for surface mounting



Other sockets available to special order
Labels: Weidmüller, D-33102 Paderborn

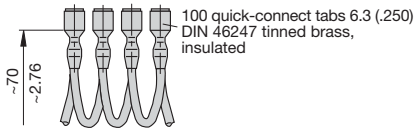
Ordering information Mounting socket 12

Type No.		
12	Mounting socket	
	Terminal design	
	P10	blade terminals A 6.3-0.8 (QC .250)
	J20	screw terminals 6-32 UNC
	A10	1 blade terminal A6.3-0.8 (QC .250) / 1 screw terminal 6-32 UNC
		Version
		(blank) single socket
		20 two-way
		30 three-way
		40 four-way
		60 six-way
12 -	P10 -	20 ordering example

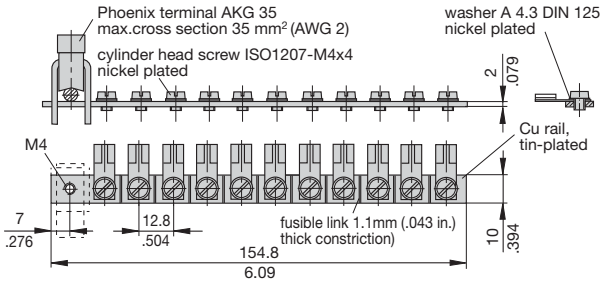
Labels: Weidmüller, D-33102 Paderborn

Accessories for mounting socket 12

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)



Bus bar (supplied as a complete package)
(up to 100 A max. load)
X 211 157 01 with terminal
X 211 157 02 without terminal



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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

Very cost effective design to meet international requirements. No exposed metal parts which are, or could become, current-carrying except for terminals. R-type TO CBE to EN 60934.

- Manual reset, cycling trip free mechanism
- Extremely small and lightweight
- UL, CSA, VDE and EN 60934 (IEC 60934) approved

Typical applications

Battery chargers, consumer products, power supplies, motors.

Ordering information

Type No.						
1658	single pole thermal circuit breaker					
	Threadneck design					
	G21	manual reset type, 3/8"-27 threadneck				
	G41	manual reset type, 7/16"-28 threadneck				
	A21	auto reset type, 3/8"-27 threadneck				
	A41	auto reset type, 7/16"-28 threadneck				
	A00	auto reset type, without threadneck				
	F01	snap in				
		Hardware				
		00	no hardware			
		01	one PAL nut, bulk			
		02	one PAL nut, one knurled nut, bulk			
		03	one PAL nut mounted			
		04	one PAL nut, one knurled nut, mounted			
		05	one PAL nut mounted, one knurled nut, bulk			
		06	one knurled nut, bulk			
		07	one hex nut, bulk			
		08	two hex nuts, bulk			
			Terminals			
			P10	blade terminals A6.3-0.8 (QC .250)		
			P13	blade terminals A6.3-0.8 (QC .250), 90°		
			S80	straight screw terminals*		
			S83	90° bent screw terminals*		
				Current ratings		
				5 ...30 A		
1658 -	G21 -	02 -	P10 -	5 A	Ordering example	

* Screws and lock washers bulk shipped

Standard current ratings and typical voltage drop values

Current rating (A)	Voltage drop (mV)	Current rating (A)	Voltage drop (mV)
5	≤ 150	12	≤ 140
6	≤ 150	15	≤ 240
7	≤ 150	16	≤ 240
8	≤ 150	20	≤ 240
9	≤ 150	25	≤ 240
10	≤ 140	30	≤ 240

Approvals

Authority	Voltage rating	Current ratings	
VDE (EN 60934)	AC 240 V; DC 28 V	5...25 A	
UL	AC 240 V	5...16 A	1658-G../F..
	AC 120 V	18...30 A	1658-G../F..
	AC 120 V	5...30 A	1658-A...
	DC 32 V	5...30 A	1658-G../F..
	DC 28 V	5...30 A	1658-A..

1658-...

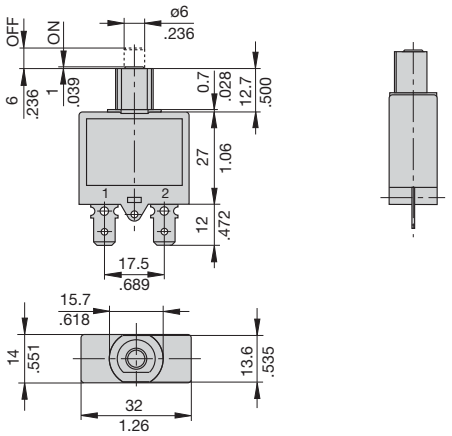
Technical data

For further details please see chapter: Technical Information		
Voltage rating	AC 240 V; DC 28 V	
Current ratings	5...30 A	
Typical life AC + DC	5...16 A	1,000 operations at 2 x I_N, inductive
	17...25 A	1,000 operations at 2 x I_N, resistive
Ambient temperature	-20...+60 °C (-4...+140 °F), ≤ 7 A max. +40 °C (+104 °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	test voltage AC 3,000 V	
Insulation resistance	> 100 MΩ (DC 500 V)	
Interrupting capacity I_{cn}	5...7 A	180 A
	8...30 A	200 A

Interrupting capacity (UL 1077/EN 60934 PC1)	I_N	U_N	
	5...16 A	AC 240 V	2,000 A
	18...30 A	AC 120 V	2,000 A
	5...30 A	DC 32 V	2,500 A
	5...30 A	DC 28 V	2,000 A (1658-A..)

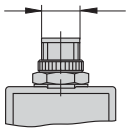
Degree of protection (IEC 60529/DIN 40050)	operating area IP40 terminal area IP00	
Vibration	8 g (57-500 Hz) ± 0.61 mm (10-57 Hz), to IEC 60068-2-6, test Fc, 10 frequency cycles/axis	
Shock	30 g (11 ms) to IEC 60068-2-27, test Ea	
Corrosion	96 hours at 5 % salt mist, to IEC 60068-2-11, test Ka	
Humidity	240 hours at 95 % RH to IEC 60068-2-78, test Cab	
Mass	approx. 16 g	

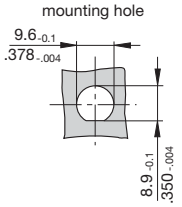
Dimensions



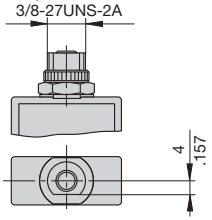
A00

A21 tightening torque max. 0.8 Nm
3/8-27UNS-2A

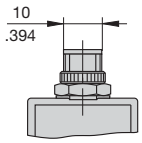


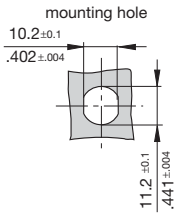


G21 tightening torque max. 0.8 Nm
3/8-27UNS-2A

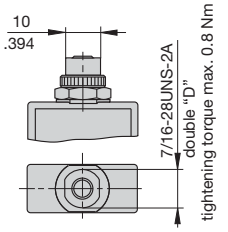


A41

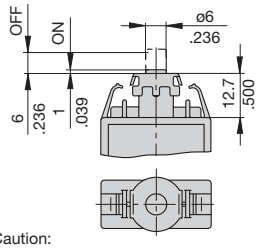




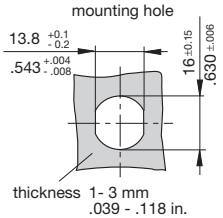
G41



F01



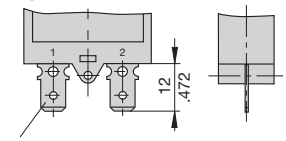
Caution:
Please keep a tight grip on the unit while removing the female connectors.



See ordering information for mounting hardware.

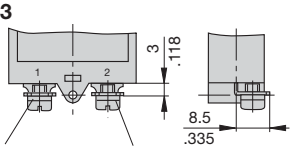
Terminal design

P10



blade terminals DIN 46244-A6.3-0.8 (QC .250)

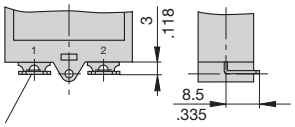
S83



terminal screw 6-32 UNC

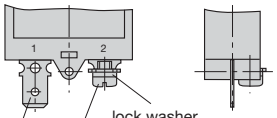
lock washer

P13



blade terminals DIN 46244-A6.3-0.8 (QC .250) angled 90°

P10-S83

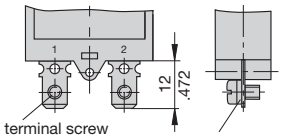


lock washer

terminal screw 6-32 UNC

blade terminals DIN 46244-A6.3-0.8 (QC .250)

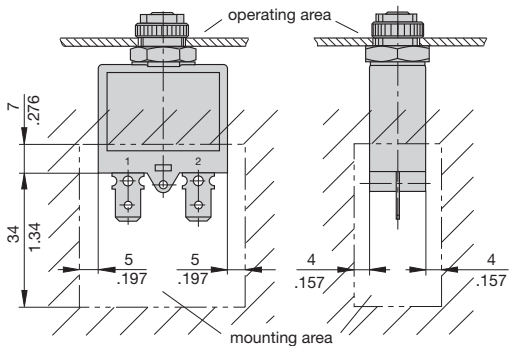
S80



terminal screw 6-32 UNC

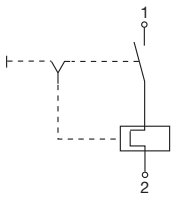
lock washer

Installation drawing

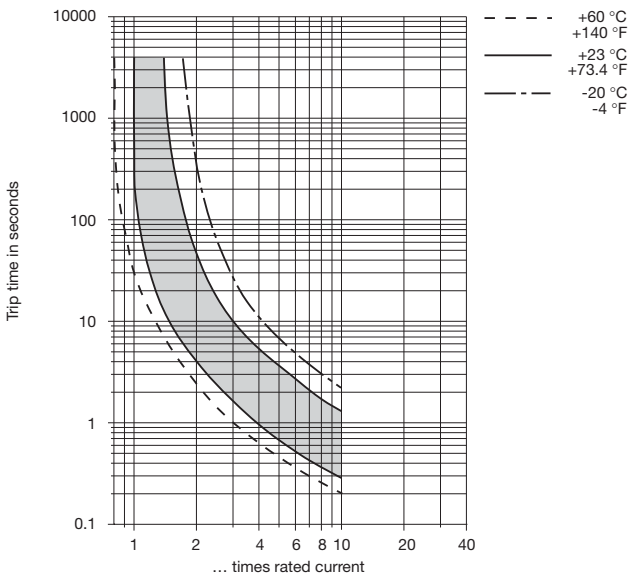


This is a metric design and millimeter dimensions take precedence ($\frac{mm}{inch}$)

Internal connection diagram



Typical time/current characteristics

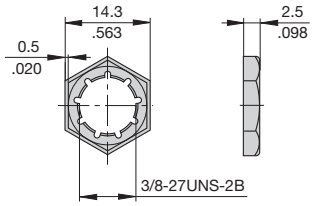


The time/current characteristic curve depends on the ambient temperature prevailing. In order to eliminate nuisance tripping, please multiply the circuit breaker current ratings by the derating factor shown below. See also section 9 – Technical information.

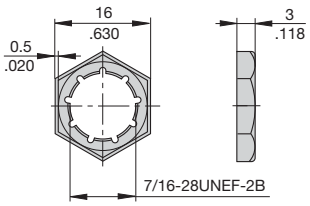
Ambient temperature	°F	-4	+14	+32	+73.4	+104	+122	+140
	°C	-20	-10	0	+23	+40	+50	+60
Derating factor	I_N > 7A	0.83	0.85	0.9	1	1.1	1.18	1.25
	I_N ≤ 7A	0.74	0.76	0.82	1	1.23	-	-

Accessories

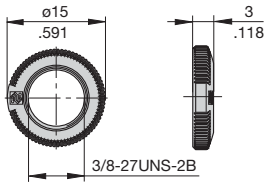
Mounting nut 3/8", 27-thread
Y306 671 01



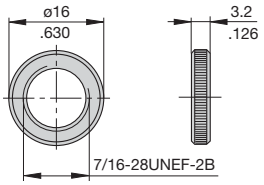
Mounting nut 7/16", 28-thread
Y303 200 01



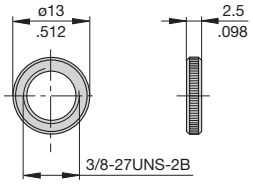
Knurled nut 3/8", 27-thread plastic (standard)
Y307 117 02



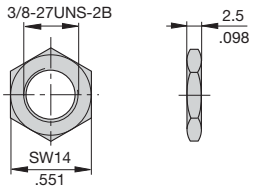
Knurled nut 7/16", 28-thread nickel-plated brass
Y302 294 03



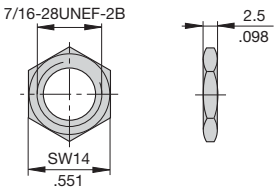
Knurled nut 3/8", 27-thread nickel-plated brass
Y300 190 03



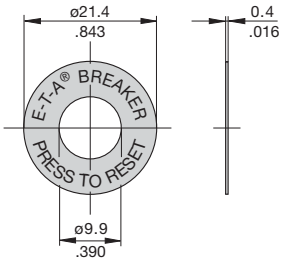
Hex nut 3/8", 27-thread nickel-plated brass
Y300 192 01



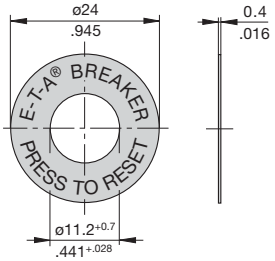
Hex nut 7/16", 28-thread nickel-plated brass
Y302 295 01



Press to Reset Plate for 3/8" thread, aluminium
Y 301 059 02



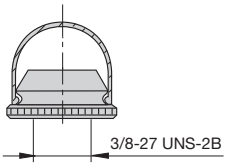
Press to Reset Plate for 7/16" thread, aluminium
Y 302 732 01



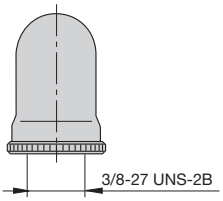
This is a metric design and millimeter dimensions take precedence (mm / inch)

Accessories

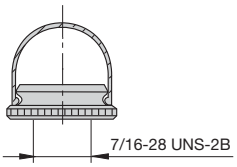
Reset button seal for 3/8", 27-thread,
short
X201 285 01



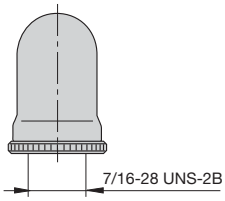
long
X200 799 01



Reset button seal for 7/16", 28-thread,
short
X222 119 01



long
X222 119 02



Description

An extremely versatile range of rocker switch/thermal circuit breakers (S-type TO CBE to EN 60934 with trip free mechanism) offering the choice of single pole, double pole with single pole protection, and double pole with protection on both poles. Designed for snap-in panel mounting with versions available for three different panel cut-out sizes. Illumination is optional and there is a range of colours and markings for the rocker. Under overload conditions the rocker returns to the OFF position. 6-way frame for 3120-F5 available upon request.
Any one of the following additional function modules can be supplied factory fitted to the rear of the switch/circuit breaker.

- Under voltage release coil (for double pole versions only).
- Magnetic trip coil for short circuit protection.
- Magnetic trip coil for remote relay trip.
- Auxiliary contacts for status signalling.
- Mechanical slide interlock.

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.

Typical applications

Motors, transformers, solenoids, extra low voltage wiring systems, office machines, electro-medical equipment, power supplies, communications systems, medical equipment to EN 60601.

Standard current ratings and typical internal resistance values

Current rating (A)	Internal resistance per pole (Ω)	Current rating (A)	Internal resistance per pole (Ω)
0.1	94	4	0.0435
0.2	24	4.5	0.0435
0.3	12	5	0.0325
0.4	5.30	6	0.0215
0.5	4.20	7	0.0165
0.6	2.90	8	0.0165
0.8	1.50	10	< 0.02
1	0.9	12	< 0.02
1.2	0.80	14	< 0.02
1.5	0.45	15	< 0.02
2	0.27	16	< 0.02
2.5	0.0785	18	< 0.02
3	0.0595	20	< 0.02
3.5	0.0565		

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

Approvals

Authority	Voltage ratings	Current ratings
VDE (EN 60934)	AC 240 V; DC 28 V DC 50 V DC 50 V	0.1...20 A 0.1...20 A 2-pole 0.1...10 A 1-pole
UL, CSA	AC 250 V; DC 50 V	0.1...20 A
CCC	AC 250 V; DC 50 V	0.1...20 A

3120-F...

Technical data

For further details please see chapter: Technical Information

Voltage rating	AC 240 V; DC 50 V (AC 415 V to special order) (UL: AC 250 V; DC 50 V)	
Current ratings	0.1...20 A (up to 30 A to special order, single pole only)	
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 415 V:	0.1...16 A	10,000 operations at 1 x I_N, inductive
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	
between poles (2-pole)	AC 1,500 V	
Insulation resistance	> 100 MΩ (DC 500 V)	
Interrupting capacity I_{cn}	0.1...2 A 10 x I_N 2.5...20 A 250 A 2-pole, or 150 A 1-pole	

Interrupting capacity (UL 1077)	I_N	U_N	2-pole
	0.1...2 A	AC 250 V	200 A
	2.5...3 A	AC 250 V	1,000 A
	3.5...8 A	AC 250 V	2,000 A
	9...16 A	AC 250 V	3,500 A
	18...20 A	AC 250 V	5,000 A
	0.1...20 A	DC 50 V	1,000 A

Degree of protection (IEC 60529/DIN 40050)	operating area IP40 (IP54 with water splash protection) 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. 33 g (double pole) approx. 27 g (single pole)	

Ordering information

Type No.

3120 rocker switch/circuit breaker

Mounting

F snap in frame

Size of frame	panel thickness
3 to fit mounting cut-out 50.5 x 21.5 mm	1-6.35 mm (.039-.250 in)
5 to fit mounting cut-out 44.5 x 22 mm	1-4 mm (.039-.157 in)
6 to fit mounting cut-out 45 x 33.7 mm	1.2-2.4 mm (.047-.094 in)

Number of poles

- **0** 2-pole, unprotected, switch only
- **1** 1-pole, thermally protected
- **2** 2-pole, thermally protected
- **5** 2-pole, thermally protected on one pole only (terminals 11,12k,12i)
- **6** 1-pole, unprotected, switch only

Mounting frame design

- **1** collar height 1 mm
- **3** collar height 9 mm
- **4** collar height 2 mm with water splash protection (IP54), not with -F6...
- **U** with water splash protection and actuator guard

Terminal configuration

- **P7** blade terminals 2x2.8x0.8 mm (QC 2x.110) (terminals 12(k), 22(k), 11, 21), not for under voltage module, not for switch
- **H7** 12(k), 22(k): blade terminals 2x2.8-0.8 (QC 2x.110) 11, 21: terminal screws, not for switch
- **N7** as P7, but including shunt terminals 12(i) and 22(i) as blade terminals 2x2.8x0.8 mm (QC 2x.110) not for under voltage module
- **G7** as H7, but including shunt terminals 12(i) and 22(i) as blade terminals 2x2.8x0.8 mm (QC 2x.110)

Characteristic curve

- **T1** thermal, 1.01-1.4 x I_N
- **Q1** switch only

Actuator style

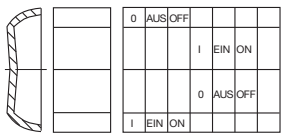
- **W** rocker
- **U** momentary switch

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

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...20 A

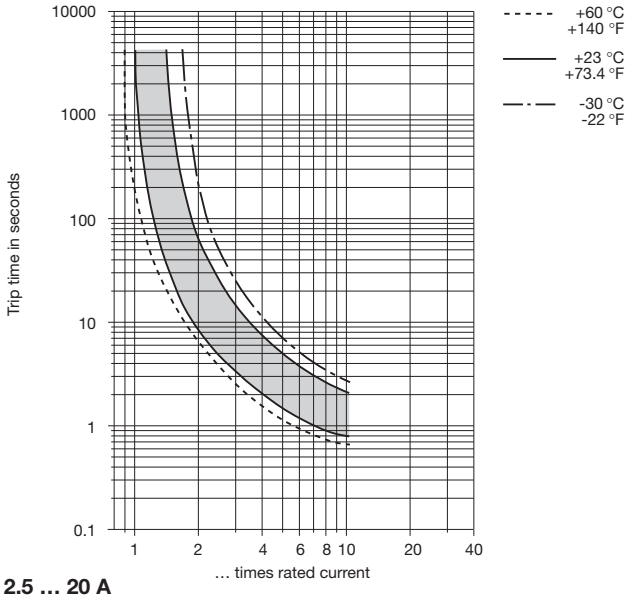
3120 - F 3 2 1 - N7 T1 - W 14 A R 4 - 10 A	ordering example
3120 - F . 0 . - N7 Q1 - W .. . . . - 20 A	(switch only)

N.B.
Switch only versions must be specified with -N7 or -G7 terminals.
Terminals 12(k) and 22(k) are not fitted.

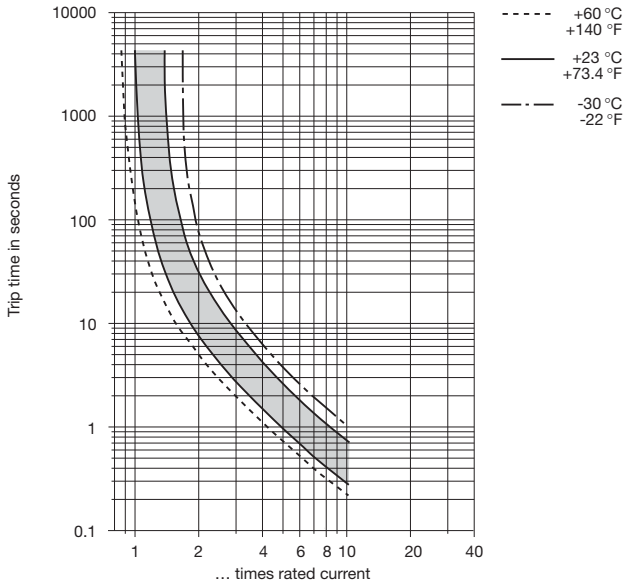
Typical time/current characteristics

single or double pole load

0.1 ... 2 A



2.5 ... 20 A

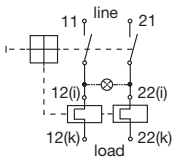


The time/current characteristic curve depends on the ambient temperature prevailing. In order to eliminate nuisance tripping, please multiply the circuit breaker current ratings by the derating factor shown below. See also section 9 – Technical information.

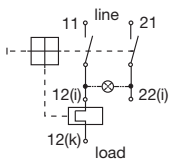
Ambient temperature	°F	-22	-4	+14	+32	+73.4	+104	+122	+140
	°C	-30	-20	-10	0	+23	+40	+50	+60
Derating factor		0.8	0.76	0.84	0.92	1	1.08	1.16	1.24

Internal connection diagrams

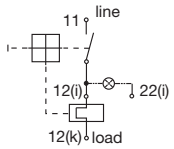
2-pole,
thermally protected on both poles



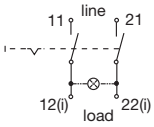
2-pole,
thermally protected on one pole only



1-pole,
thermally protected

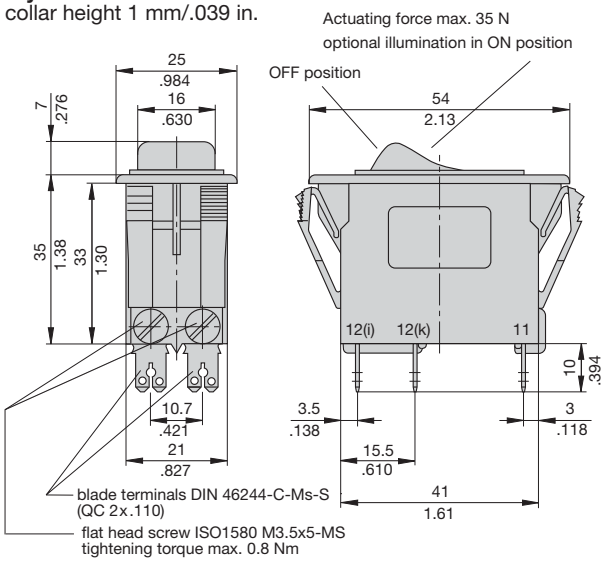


2-pole,
unprotected

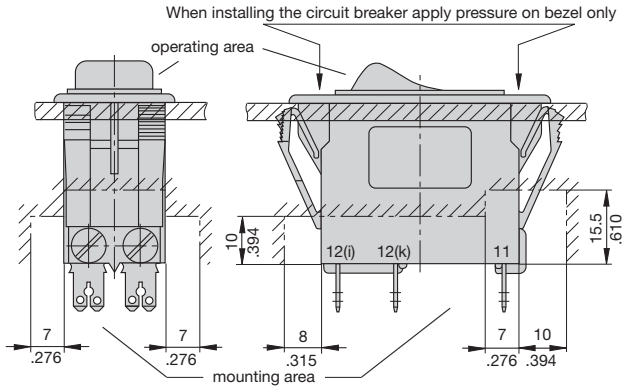


Dimensions

Style F3.1
collar height 1 mm/.039 in.



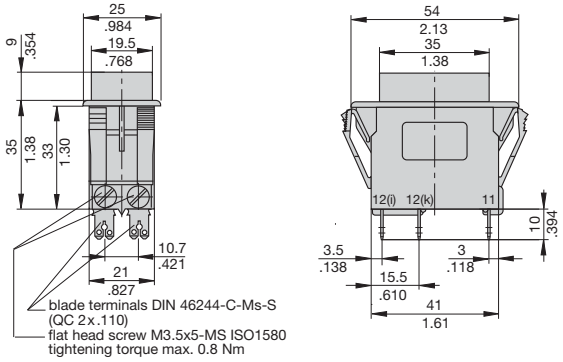
Installation drawing



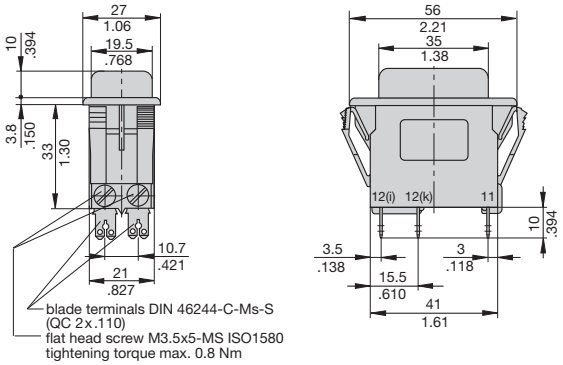
This is a metric design and millimeter dimensions take precedence ($\frac{mm}{inch}$)

Mounting style variants

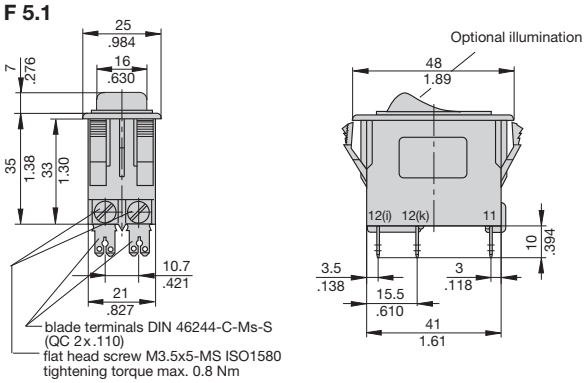
Style F 3.3 collar height 9 mm (.354 in.)



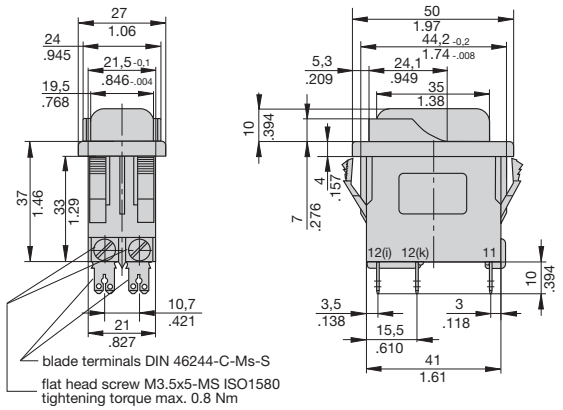
Style F 3.4
collar height 2 mm (.079 in.), with water splash protection



Style F 5.1



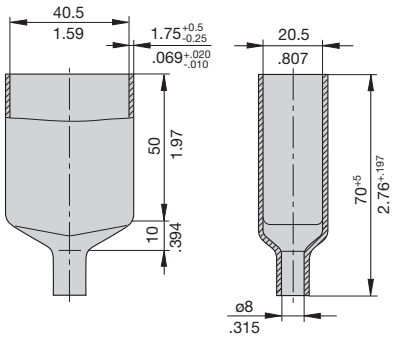
Style F 5.U
with water splash protection (IP54) and actuator guard



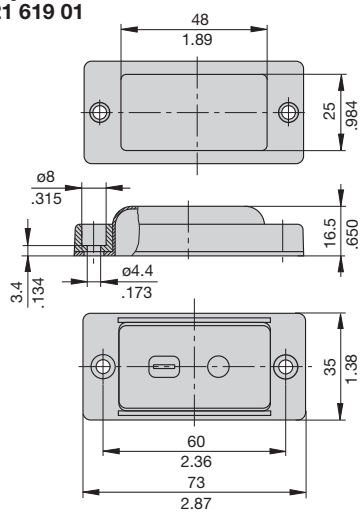
Dimension diagram for style F6 is available on request.

Accessories

Rear terminal shroud black (IP64)
Y 304 275 01

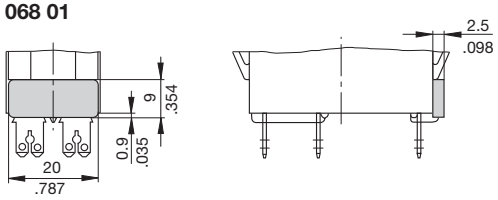


Water splash cover, transparent (IP66)
for style -F5..
X 221 619 01

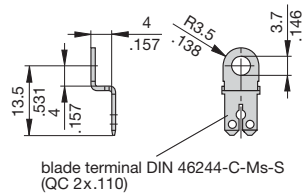


6-way frame for 3120-F5... upon request

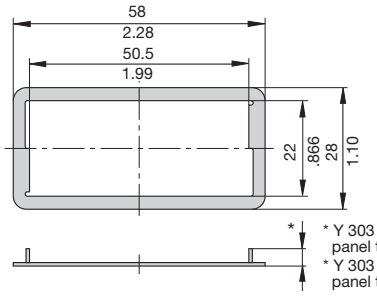
Insulated cover
Y 303 068 01



Terminal adapter
Y 303 862 01

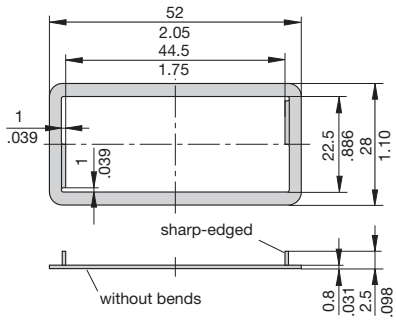


Spacer for 3120-F3...
Y 303 675 01/02

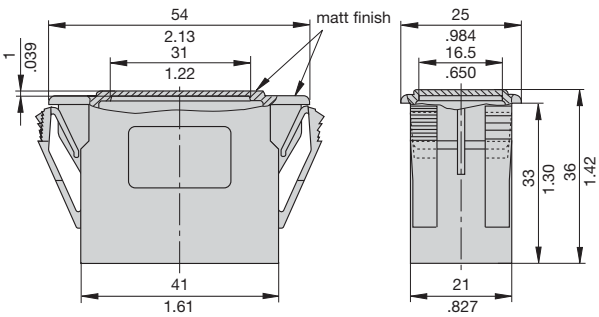


* Y 303 675 01 suitable for panel thickness < 2 mm (.079 in)
* Y 303 675 02 suitable for panel thickness < 4 mm (.157 in)

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

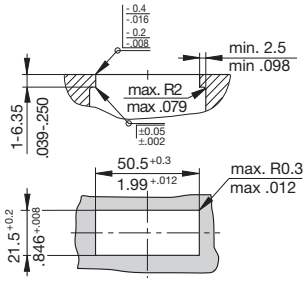


Blanking piece in -F3 frame
Y 303 885 31

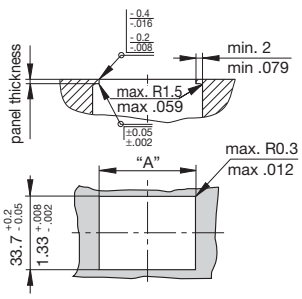


Cut-out dimensions

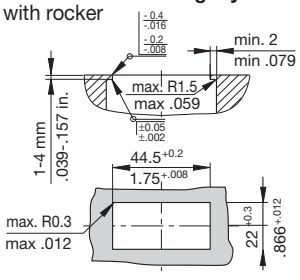
Cut-out for mounting style -F3
with rocker and push button



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

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

E-T-A's proven type 3120 in a new attractive styling (S-type TO CBE to EN 60934 with trip free mechanism) offering the choice of single pole, double pole with single pole protection, and double pole with protection on both poles. Designed for snap-in panel mounting with illumination as an option. Under overload conditions the rocker returns to the OFF position.
Any one of the following additional function modules can be supplied factory fitted to the rear of the switch/circuit breaker.

- Under voltage release coil (for double pole versions only).
- Magnetic trip coil for short circuit protection.
- Magnetic trip coil for remote relay trip.
- Auxiliary contacts for status signalling.
- Mechanical slide interlock.

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.

Available accessories: water splash protection and actuator guard to prevent inadvertent operation.

3120-F7..

Typical applications

Motors, transformers, solenoids, extra low voltage wiring systems, office machines, electro-medical equipment, power supplies, communications systems, boating.

Standard current ratings and typical internal resistance values

Current rating (A)	Internal resistance per pole (Ω)	Current rating (A)	Internal resistance per pole (Ω)
0.1	94	4	0.0435
0.2	24	4.5	0.0435
0.3	12	5	0.0325
0.4	5.30	6	0.0215
0.5	4.20	7	0.0165
0.6	2.90	8	0.0165
0.8	1.50	10	< 0.02
1	0.9	12	< 0.02
1.2	0.80	14	< 0.02
1.5	0.45	15	< 0.02
2	0.27	16	< 0.02
2.5	0.0785	18	< 0.02
3	0.0595	20	< 0.02
3.5	0.0565		

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

Approvals

Authority	Voltage ratings	Current ratings
VDE (EN 60934)	AC 240 V; DC 28 V DC 50 V DC 50 V	0.1...20 A 0.1...20 A 2-pole 0.1...10 A 1-pole
UL, CSA	AC 250 V; DC 50 V	0.1...20 A
CCC	AC 250 V; DC 50 V	0.1...20 A

Technical data

For further details please see chapter: Technical Information

Voltage rating	AC 240 V; DC 50 V (AC 415 V to special order) (UL: AC 250 V; DC 50 V)	
Current ratings	0.1...20 A (up to 30 A to special order, single pole only)	
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 415 V:	0.1...16 A	10,000 operations at 1 x I_N, inductive
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) operating area between poles (2-pole)	test voltage AC 3,000 V AC 1,500 V	
Insulation resistance	> 100 MΩ (DC 500 V)	
Interrupting capacity I_{cn}	0.1...2 A 10 x I_N 2.5...20 A 250 A 2-pole, or 150 A 1-pole	

Interrupting capacity (UL 1077)	I_N	U_N	2-pole
	0.1...2 A	AC 250 V	200 A
	2.5...3 A	AC 250 V	1,000 A
	3.5...8 A	AC 250 V	2,000 A
	9...6 A	AC 250 V	3,500 A
	18...20 A	AC 250 V	5,000 A
	0.1...20 A	DC 50 V	1,000 A

Degree of protection (IEC 60529/DIN 40050)	operating area IP40 (IP54 with water splash protection) 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. 33 g (double pole) approx. 27 g (single pole)	

Ordering information

Type No.

3120 rocker switch/circuit breaker

Mounting

F snap in frame

Size of frame **panel thickness**

7 to fit mounting cut-out 44.5x22 mm (1.75x.866 in) 1-4 mm (.039-.157 in)

Number of poles

0 2-pole, unprotected, switch only
1 1-pole, thermally protected
2 2-pole, thermally protected
5 2-pole, thermally protected on one pole only (terminals 11,12k,12i)
6 1-pole, unprotected, switch only

Mounting frame design

N grey frame
P snap-on actuator guard grey
Q snap-on water splash cover grey
R black frame
S snap-on actuator guard black
T snap-on water splash cover black

Terminal configuration

P7 blade terminals 2x2.8x0.8 mm (QC 2x.110) (terminals 12(k), 22(k),11, 21), not for under voltage module, not for switch
H7 12(k), 22(k): blade terminals 2x2.8-0.8 (QC 2x.110) 11, 21: terminal screws, not for switch
N7 as P7, but including shunt terminals 12(i) and 22(i) as blade terminals 2x2.8x0.8 mm (QC 2x.110) not for under voltage module
G7 as H7, but including shunt terminals 12(i) and 22(i) as blade terminals 2x2.8x0.8 mm (QC 2x.110)

Characteristic curve

T1 thermal, 1.01-1.4 x I_N
Q1 switch only

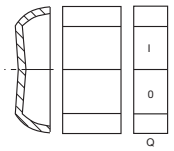
Actuator style

A rocker

Switch colour designation

opaque		translucent	
20	blue	**30**	blue
26	sky blue	**36**	sky blue

Rocker markings



Q "I" and "0" moulded in

Push button illumination (optional)

T blue LED

Illumination voltage range (optional)

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...20 A

3120 - F 7 2 N - N7 T1 - A 30 Q T 4 - 10 A ordering example

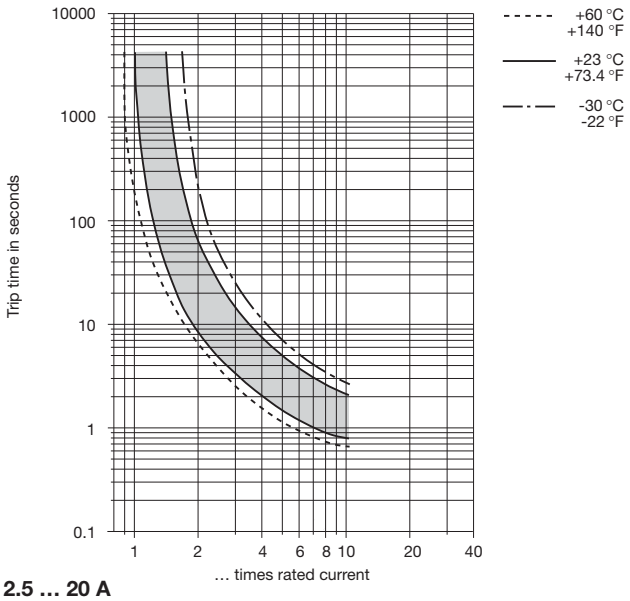
3120 - F . 0 N - N7 Q1 -A 30 Q T 4 - 20 A (switch only)

N.B.
Switch only versions must be specified with -N7 or -G7 terminals.
Terminals 12(k) and 22(k) are not fitted.

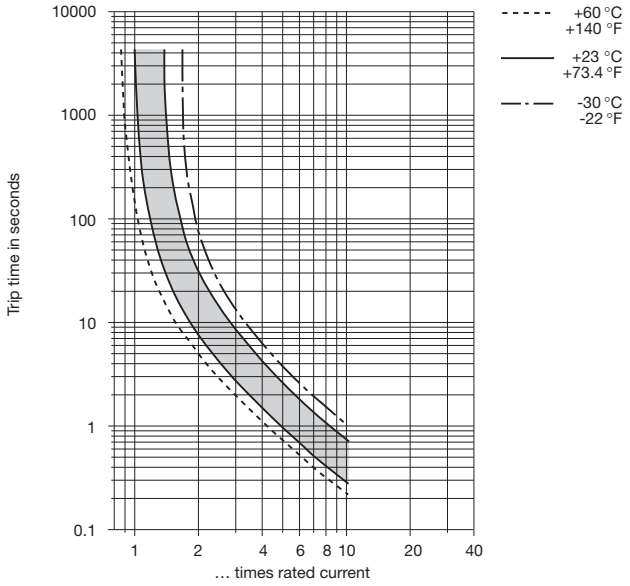
Typical time/current characteristics

single or double pole load

0.1 ... 2 A



2.5 ... 20 A

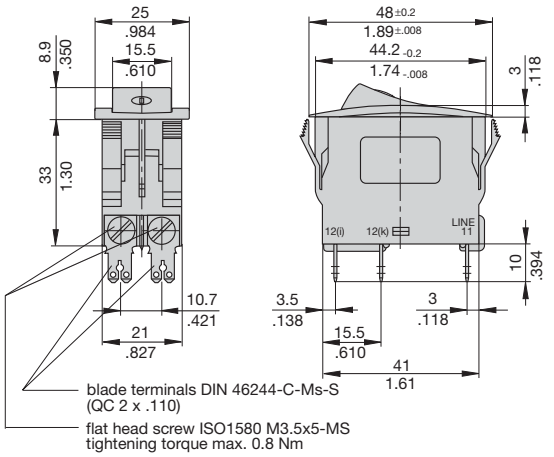


The time/current characteristic curve depends on the ambient temperature prevailing. In order to eliminate nuisance tripping, please multiply the circuit breaker current ratings by the derating factor shown below. See also section 9 – Technical information.

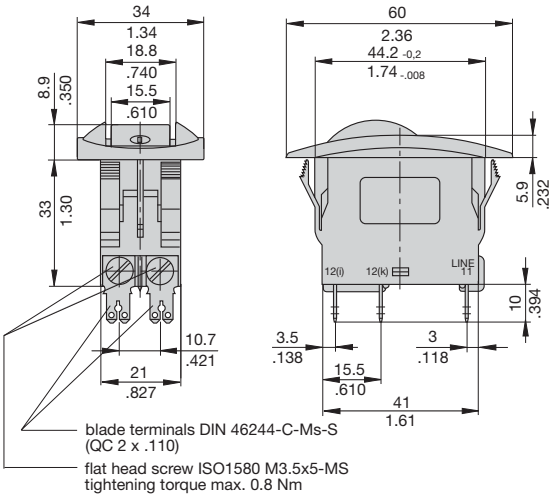
Ambient temperature °F	-22	-4	+14	+32	+73.4	+104	+122	+140
°C	-30	-20	-10	0	+23	+40	+50	+60
Derating factor	0.8	0.76	0.84	0.92	1	1.08	1.16	1.24

Dimensions

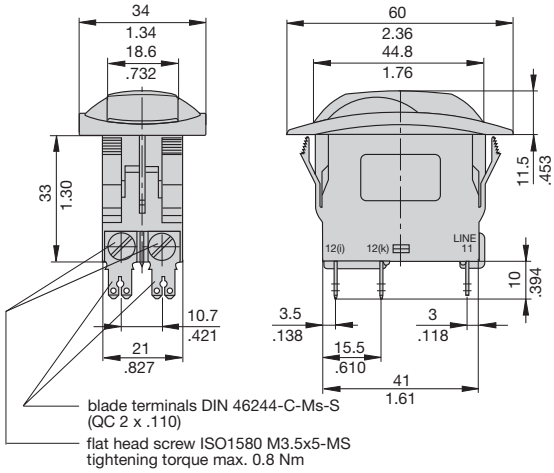
Style -F7.N and F7.R



Style -F7.P and F7.S

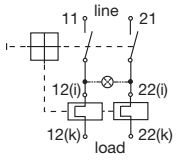


Style -F7.Q and F7.T

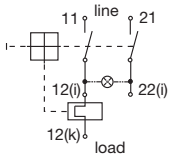


Internal connection diagrams

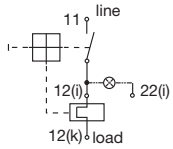
2-pole,
thermally protected on both poles



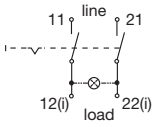
2-pole,
thermally protected on one pole only



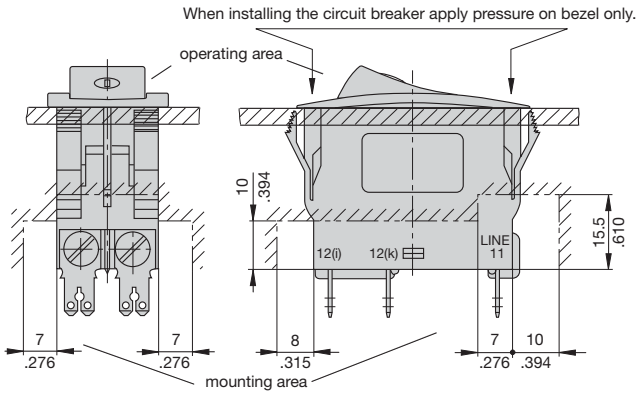
1-pole,
thermally protected



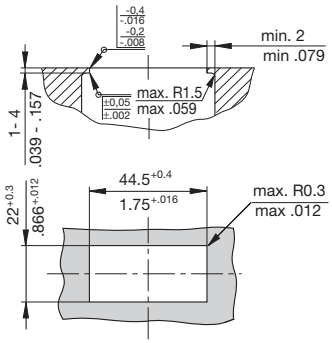
2-pole,
unprotected



Installation drawing



Panel cut-out

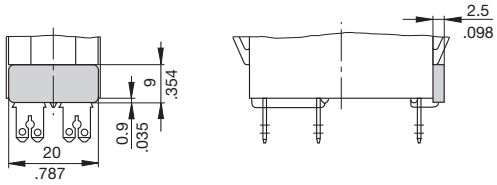


Edges of working parts: ISO 13715

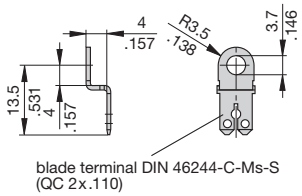
This is a metric design and millimeter dimensions take precedence (mm / inch)

Accessories

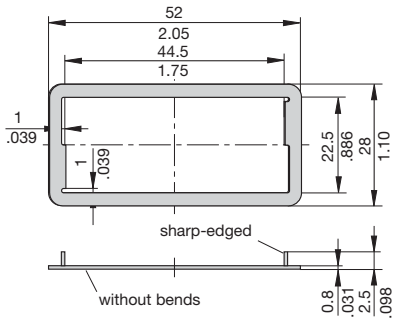
Insulated cover
Y 303 068 01



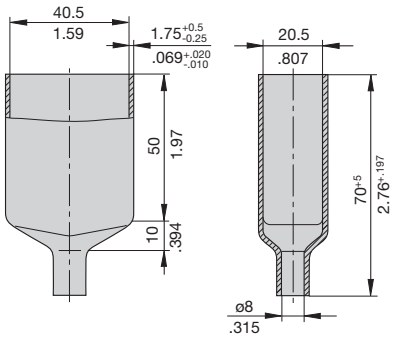
Terminal adapter
Y 303 862 01



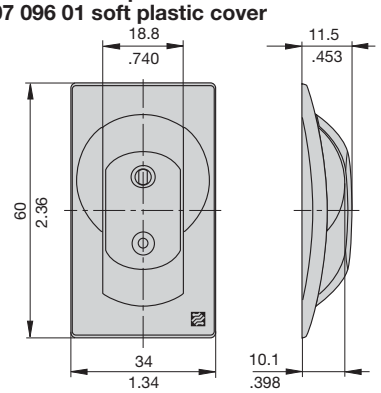
Spacer
Y 303 676 01



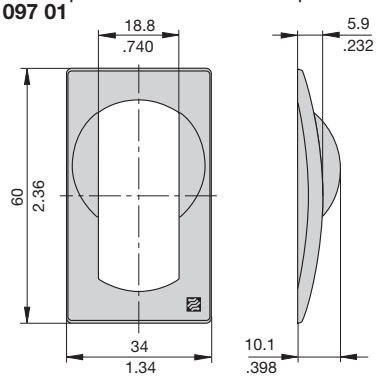
Rear terminal shroud black (IP64)
Y 304 275 01



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 (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

Switch/thermal trip free circuit breaker (S-type TO CBE to EN 60934) with standard isolator style two button operation. Single button press-to-reset version also available. Both types can be supplied in single pole configuration only, in double pole with single pole protection, and in double pole with protection on both poles. Designed for snap-in panel mounting. There is a choice of push button colour combinations and illumination is optional.
Any one of the following additional function modules can be supplied factory fitted to the rear of the switch/circuit breaker:

- Under voltage release coil (for double pole versions only).
- Magnetic trip coil for short circuit protection.
- Magnetic trip coil for remote relay trip.
- Auxiliary contacts for status signalling.
- Mechanical slide interlock.

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-F...

Typical applications

Motors, transformers, solenoids, extra low voltage wiring systems, office machines, electro-medical equipment, power supplies, communications systems, industrial controls.

Standard current ratings and typical internal resistance values

Current rating (A)	Internal resistance per pole (Ω)	Current rating (A)	Internal resistance per pole (Ω)
0.1	94	4	0.0435
0.2	24	4.5	0.0435
0.3	12	5	0.0325
0.4	5.30	6	0.0215
0.5	4.20	7	0.0165
0.6	2.90	8	0.0165
0.8	1.50	10	< 0.02
1	0.9	12	< 0.02
1.2	0.80	14	< 0.02
1.5	0.45	15	< 0.02
2	0.27	16	< 0.02
2.5	0.0785	18	< 0.02
3	0.0595	20	< 0.02
3.5	0.0565		

Illumination voltage/power consumption

operating voltage	power consumption Y + R	G
6 V	2 mA	3.6 mA
12 V	2 mA	3.5 mA
24 V	2 mA	3.5 mA
48 V	2 mA	3.5 mA
115 V	0.9 mA	2.8 mA
230 V	0.9 mA	2.8 mA

Approvals

Authority	Voltage ratings	Current ratings
VDE (EN 60934)	AC 240 V; DC 28 V DC 50 V DC 50 V	0.1...20 A 0.1...20 A 2-pole 0.1...10 A 1-pole
UL, CSA	AC 250 V; DC 50 V	0.1...20 A
CCC	AC 250 V; DC 50 V	0.1...20 A

Technical data

For further details please see chapter: Technical Information

Voltage rating	AC 240 V; DC 50 V (AC 415 V to special order) (UL: AC 250 V; DC 50 V)	
Current ratings	0.1...20 A (up to 30 A to special order, single pole only)	
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 415 V:	0.1...16 A	10,000 operations at 1 x I_N, inductive
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	
between poles (2-pole)	AC 1,500 V	
Insulation resistance	> 100 MΩ (DC 500 V)	
Interrupting capacity I_{cn}	0.1...2 A 10 x I_N 2.5...20 A 250 A 2-pole, or 150 A 1-pole	

Interrupting capacity (UL 1077)	I_N	U_N	2-pole
	0.1...2 A	AC 250 V	200 A
	2.5...3 A	AC 250 V	1,000 A
	3.5...8 A	AC 250 V	2,000 A
	9...16 A	AC 250 V	3,500 A
	18...20 A	AC 250 V	5,000 A
	0.1...20 A	DC 50 V	1,000 A

Degree of protection (IEC 60529/DIN 40050)	operating area IP40 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. 33 g (double pole) approx. 27 g (single pole)	

Ordering information

Type No.

3120 push button switch/circuit breaker

Mounting

F snap in frame

Size of frame

2 flange mounting, special frame for fitting splash cover

3 to fit mounting cut-out 50.5 x 21.5 mm (1.99 x 8.47 in) panel thickness 1 - 6.35 mm (.039 - .250 in)

Number of poles

0 2-pole, unprotected, switch only

1 1-pole, thermally protected

2 2-pole, thermally protected

5 2-pole, thermally protected on one pole only (terminals 11,12k,12i)

6 1-pole, unprotected, switch only

Mounting frame design

F with 2 push buttons

G with 1 push button (switch-on only)

Terminal configuration

P7 blade terminals 2x2.8x0.8 mm (QC 2x.110) (terminals 12(k), 22(k), 11, 21), not for under voltage module, not for switch

H7 12(k), 22(k): blade terminals 2x2.8-0.8 (QC 2x.110) 11, 21: terminal screws, not for switch

N7 as P7, but including shunt terminals 12(i) and 22(i) as blade terminals 2x2.8x0.8 mm (QC 2x.110) not for under voltage module

G7 as H7, but including shunt terminals 12(i) and 22(i) as blade terminals 2x2.8x0.8 mm (QC 2x.110)

Characteristic curve

T1 thermal, 1.01-1.4 I_N

Q1 switch only, only for N7 or G7 terminals

Switch style/colour

D 1 push button (re-set only)

Z 1 push button (momentary switch)

- **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 (optional)

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...20 A

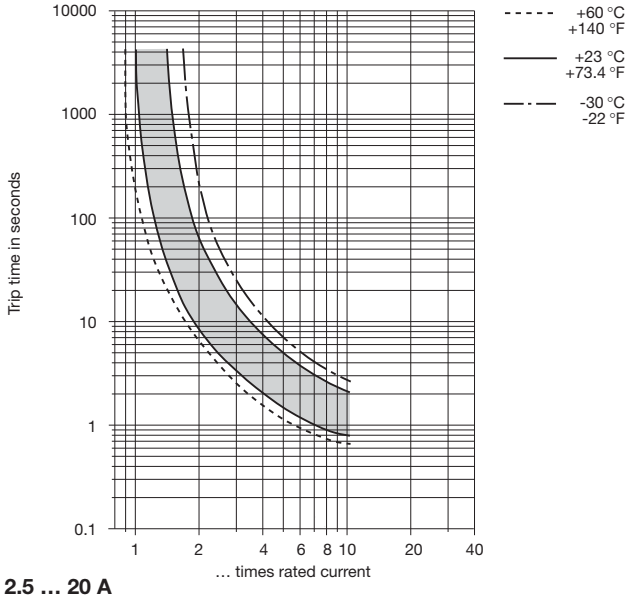
3120 - F 3 2 F - N7 T1 - S GRX G 4 - 10 A	ordering example
3120 - F 3 0 F - N7 Q1 - S ... . . - 20 A	switch only

N.B.
Switch only versions must be specified with -N7 or -G7 terminals.
Terminals 12(k) and 22 (k) are not fitted.

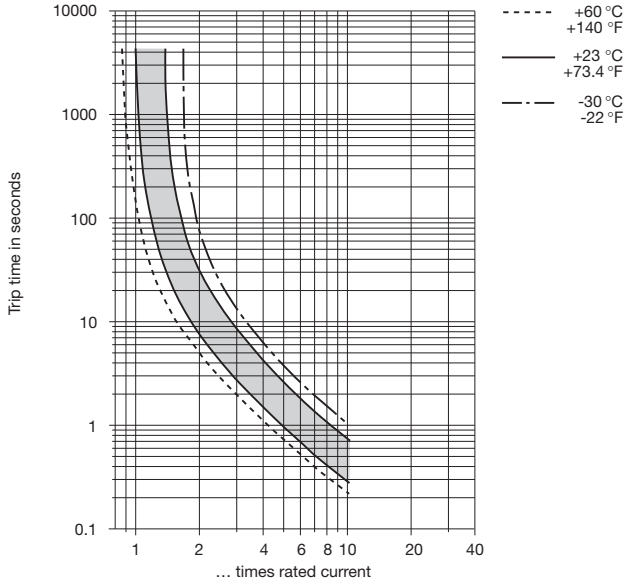
Typical time/current characteristics

single or double pole load

0.1 ... 2 A



2.5 ... 20 A

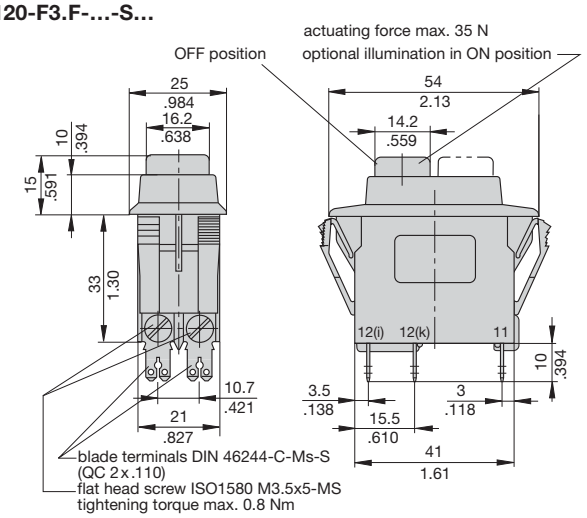


The time/current characteristic curve depends on the ambient temperature prevailing. In order to eliminate nuisance tripping, please multiply the circuit breaker current ratings by the derating factor shown below. See also section 9 – Technical information.

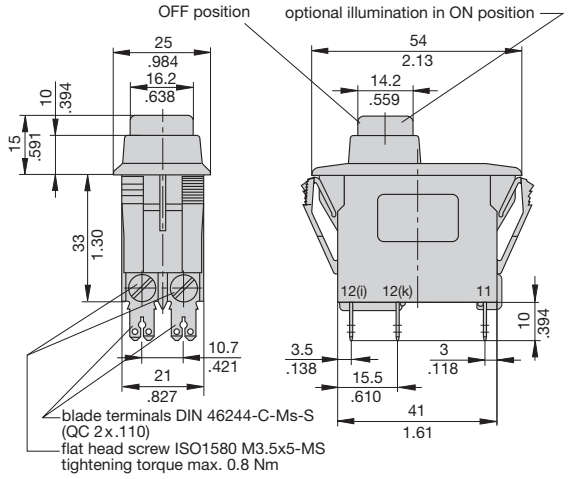
Ambient temperature °F	-22	-4	+14	+32	+73.4	+104	+122	+140
°C	-30	-20	-10	0	+23	+40	+50	+60
Derating factor	0.8	0.76	0.84	0.92	1	1.08	1.16	1.24

Dimensions

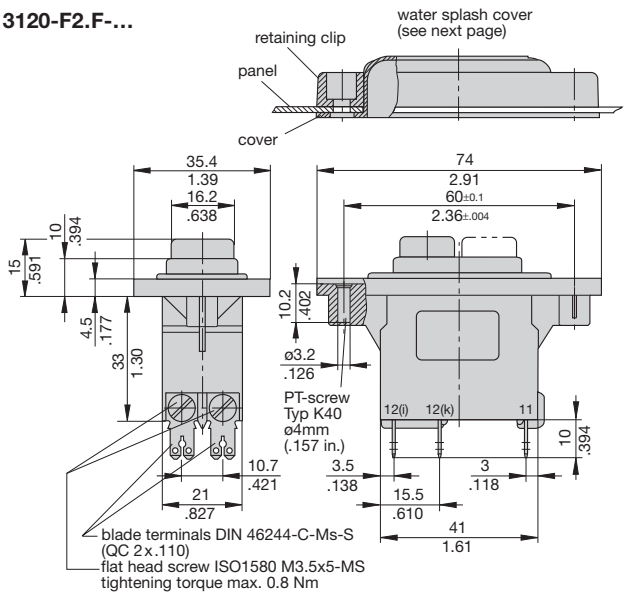
3120-F3.F-...-S...



3120-F3.G-...-D...

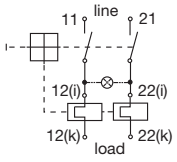


3120-F2.F-...

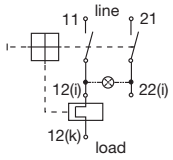


Internal connection diagrams

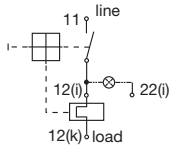
2-pole,
thermally protected on both poles



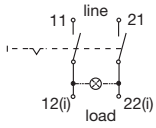
2-pole,
thermally protected on one pole only



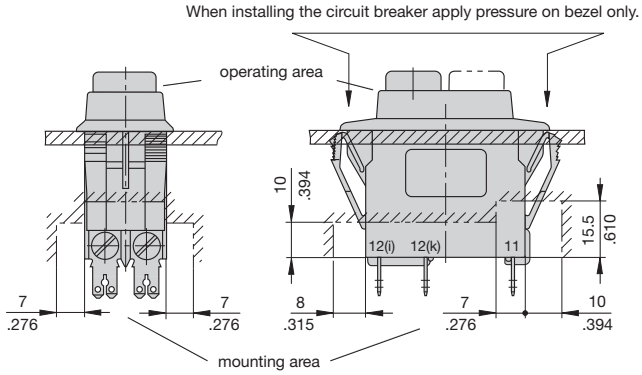
1-pole,
thermally protected



2-pole,
unprotected

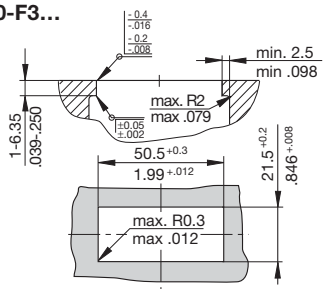


Installation drawing

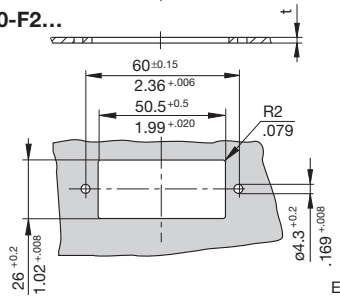


Panel cut-out

3120-F3...



3120-F2...



t: metal min. 2 mm (.079 in.)
plastic min. 3 mm (.118 in.)

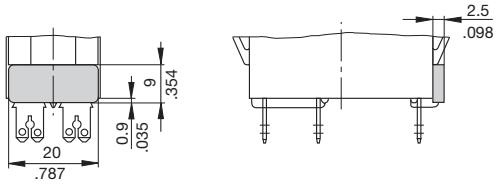
Edges of working parts: ISO 13715

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

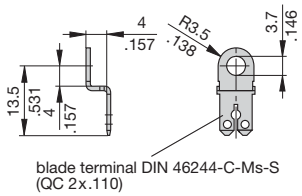
Accessories

1

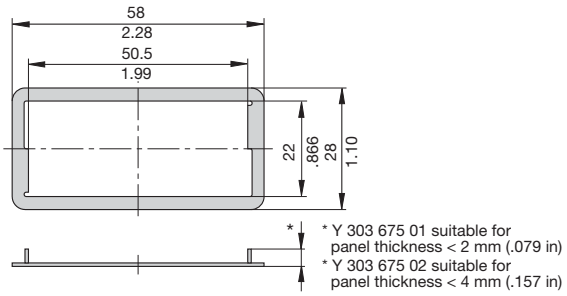
Insulated cover
Y 303 068 01



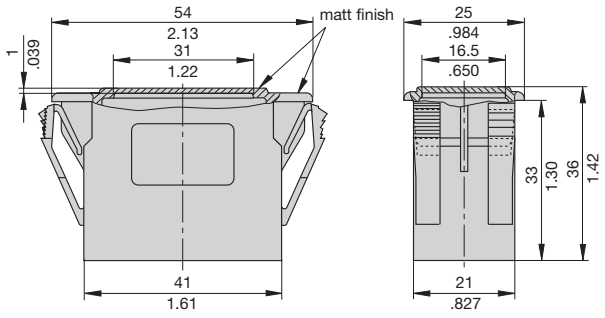
Terminal adapter
Y 303 862 01



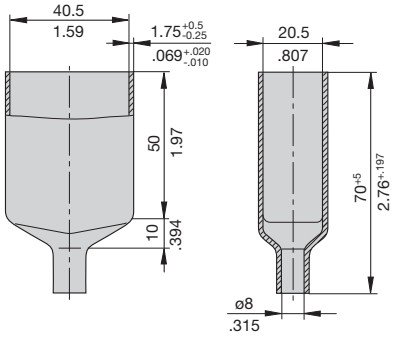
Spacer for 3120-F3...
Y 303 675 01/02



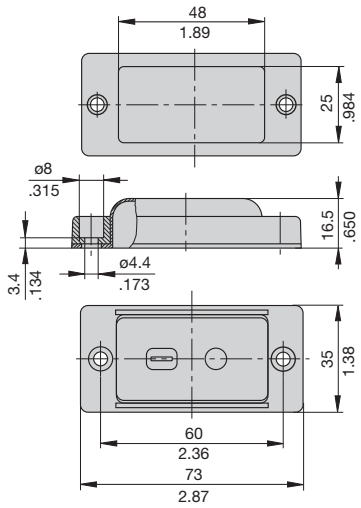
Blanking piece in -F3 frame
Y 303 885 31



Rear terminal shroud black (IP64)
Y 304 275 01



Water splash cover, transparent (IP66) **for style 3120-F2.F-...**
X 221 619 01
consisting of
- retaining clip Y 306 551 01
- cover Y 306 001 01



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Description

A module supplied factory fitted to type 3120-F to provide electrically separate changeover contacts which operate as the main contacts open/close. Ideally suited to status signalling and sequence switching.

Typical applications

Monitoring of the switching position of the circuit breaker or any connected load.

Ordering information

Type No.

X3120 Module for type 3120 and type 3140

Function

S auxiliary contact module

Contact configuration

0 change-over contact

Terminal design

1 blade terminals 2.8 x 0.5 (QC .110), silver plated

Contact rating

	AC		DC (not approved)	
	Voltage rating	Current rating	Voltage rating	Current rating
			12 V	0.1...4 A
			24 V	0.1...4 A
A	10 V-250 V	0.1...4 A	60 V	0.1...1 A
			110 V	0.1...0,5 A
			220 V	0.1...0.25 A
B	5 V-250 V	0.05...1 A	5 V-250 V	0.05...1 A

Supply condition

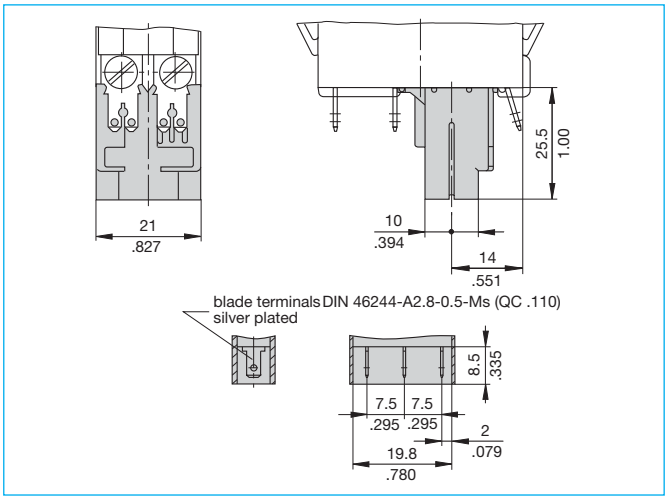
M module mounted to circuit breaker 3120-...

X3120 - S 0 1 A M ordering example

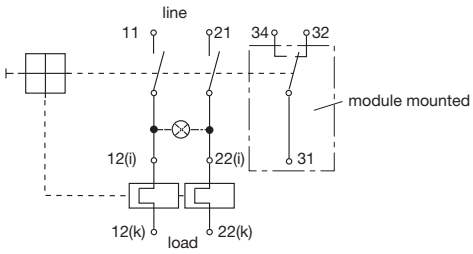
Approvals (complete circuit breaker/module assembly)

Authority	Voltage ratings	Current ratings
VDE (EN 60934)	AC 250 V; DC 28 V	0.05...4 A
UL, CSA	AC 250 V	0.05...4 A

Dimensions



Internal connection diagram



Technical data

Voltage rating	AC 250 V; DC 220 V
Current rating	0.1...4 A / 0.05...1 A
Typical life	50,000 operations
Ambient temperature	-30...+60 °C (-22...+140 °F)
Dielectric strength (IEC 60664 and 60664A) between main and auxiliary circuit	test voltage AC 3,000 V
Insulation resistance	> 100 MΩ (DC 500 V)
Vibration	6 g (type X3120-S...A) 8 g (type X3120-S...B) (57-500 Hz), ± 0.46 mm (10-57 Hz) to IEC 60068-2-6, test Fc 10 frequency cycles/axis
Shock	15 g (11 ms), type X3120-S...A 20 g (11 ms), type X3120-S...B 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. 38 g (complete assembly)

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.

1

Description

A module suitable for all double pole versions of type 3120-F to trip the main switch/circuit breaker mechanism in the event of loss of voltage. When the voltage is restored the rocker switch must be reset to reconnect the load, thereby avoiding the safety hazards associated with automatic re-starting of machinery.
Note: Basic unit 3120-...-H7 or -G7: screw terminals necessary.

Typical applications

Machines such as power tools, industrial equipment and domestic appliances where automatic restart after restoration of power could be dangerous (EC Machinery Directive).

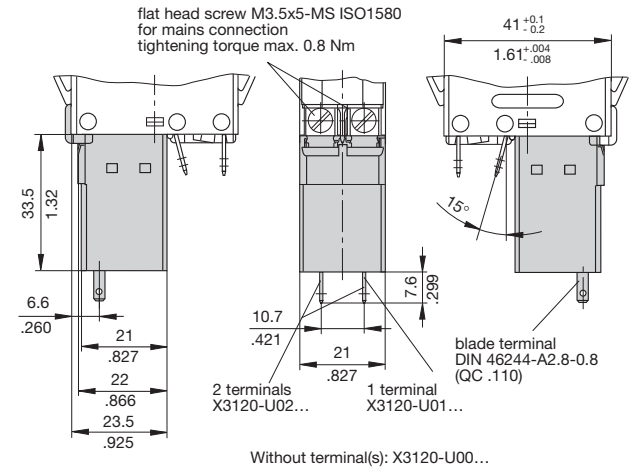
Ordering information

Type No.					
X3120	Module for type 3120				
	Function				
	U	undervoltage release module			
		Terminal design			
		00	standard (without separate connections)		
		01	1 blade terminal 2.8x0.8 (QC .110)		
		02	2 blade terminals 2.8x0.8 (QC .110)		
			Voltage ratings		
			00	AC 230/240 V 50/60 Hz	
			01	AC 120 V 50/60 Hz	
			02	AC 100 V 50/60 Hz	
			03	DC 24 V	
				Assembly status	
				M	module mounted to the circuit breaker 3120
X3120	-U	00	00	M	ordering example

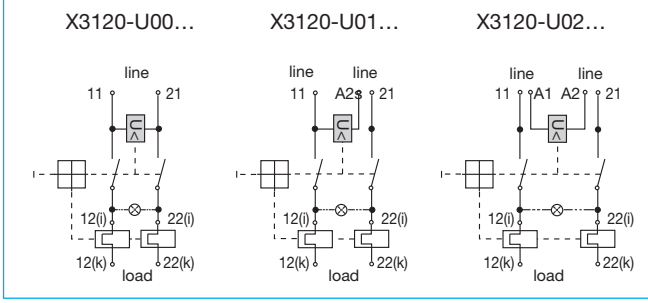
Approvals (complete circuit breaker/module assembly)

Authority	Voltage ratings
VDE (EN 60934)	AC 100...240 V; DC 24 V
UL, CSA	AC 100...240 V; DC 24 V

Dimensions



Internal connection diagrams



Technical data

Voltage ratings	AC 100; 120 V; 230/240 V 50/60 Hz DC 24 V
Voltage tolerance	+10%/-15%
Current consumption	approx. 2.5 mA
Typical life	20,000 operations
Release values	0.2 x U_N < U < 0.7 x U_N (at a rated voltage of AC 100 V the device may release at 70 V and must release at 20 V)
Release delay	t < 20 ms
Latch-in values	≥ 85 % U_N
Ambient temperature	-30...+60 °C (-22...+140 °F)
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	48 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 (complete assembly)

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

A module which adds remote trip capability to all versions of type 3120-F. A voltage applied across the coil, by means of an external sensor for example, will cause disconnection of the main switch/circuit breaker mechanism.

Typical applications

Electrical monitoring of safety systems, remote trip.

Ordering information

Type No.	
X3120	Module for type 3120
Function	
M	magnetic relay trip module
Style	
2	magnetic remote trip coil
Terminal design	
P7	blade terminals 2x2.8x0.8 (QC 2x.110) tin plated
Supply condition	
M	module mounted to the circuit breaker
Voltage ratings	
AC 12, 24, 48, 60, 120, 220, 230, 240 V	
DC 12, 24 V	

X3120 - M 2 P7 M - 12 V ordering example

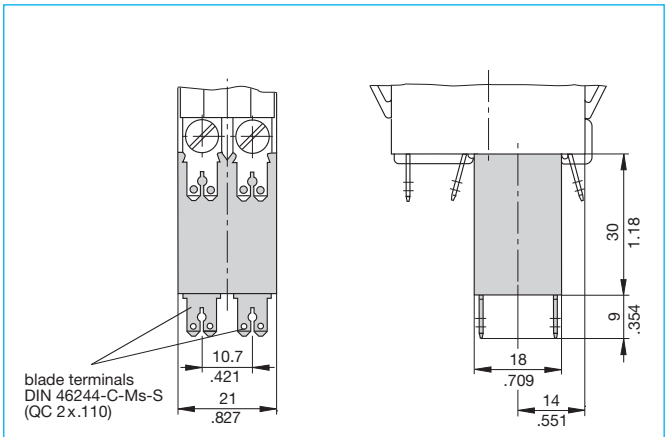
Standard voltage ratings and typical internal resistance values

Voltage rating (V)	Internal resistance per pole (Ω)	Voltage rating (V)	Internal resistance per pole (Ω)
12 V AC/DC	0.78	120 V AC	71.0
24 V AC/DC	3.3	220 V AC	312
48 V AC	11.9	230 V AC	312
60 V AC	18.5	240 V AC	312

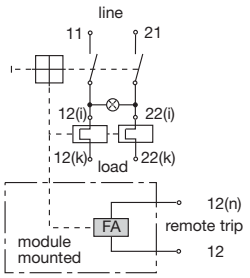
Approvals (complete circuit breaker/module assembly)

Authority	Voltage ratings
VDE (EN 60934)	AC 12...240 V; DC 12...24 V
UL, CSA	AC 12...240 V; DC 12...24 V

Dimensions



Internal connection diagram



Technical data

Voltage ratings	AC 12...240 V; DC 12...24 V
Power consumption	approx. 200 W
Pulse operation	20 ms < t_{ON} < 100 ms/t_{OFF} > 10 sec
Release delay	t < 20 ms
Typical life	50,000 operations at U_N
Ambient temperature	-30...+60 °C (-22...+140 °F)
Dielectric strength (IEC 60664 and 60664A) between main circuit and trip coil circuit	test voltage AC 3,000 V
Insulation resistance	> 100 MΩ (DC 500 V)
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 (complete assembly)

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.

1

Description

Suitable for use with all type 3120-F versions, this module provides a mechanical safety interlock which, according to the option specified, prevents the main switch/circuit breaker mechanism from being reset/switched on. The actuator is intended for use with interlock systems to ensure that machinery cannot be operated without covers and safety guards in place, for instance.

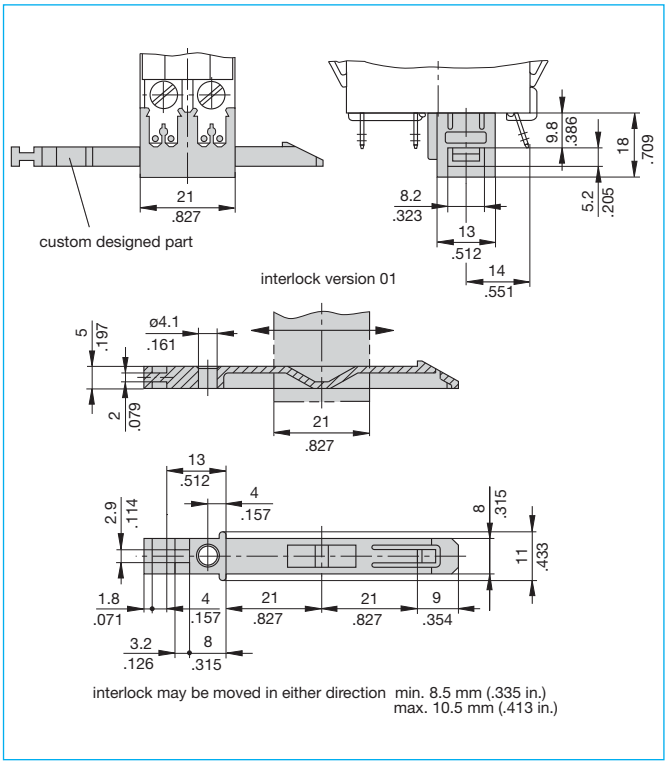
Typical applications

Mechanical monitoring of safety systems, e. g. for garden shredders.

Ordering information

Type No.							
X3120	Module for type 3120-F						
	Function						
	V	mechanical slide interlock module					
		Module operation					
		1	3120 can only be switched on without the interlock fitted				
			Interlock design				
			00	without interlock			
			01	interlock version 01 (see dimension diagram)			
				Delivery condition of interlock			
				L	interlock supplied separately with the module		
				M	module factory-fitted with the interlock in its centre position		
				O	module supplied without interlock		
					Operating direction of interlock		
					0	without interlock, or interlock supplied separately	
					1	interlock operated from the side near terminals 11, 12k, 12i of the 3120-...	
					2	interlock operated from the side near terminals 21, 22k, 22i of the 3120-...	
						Assembly status	
						L	module supplied separately
						M	module mounted to the circuit breaker
X3120 -	V	1	00	0	0	M	ordering example

Dimensions



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.

E-T-A Thermal Overcurrent Circuit Breaker 3130

Description

Single, two and three pole rocker switch/thermal trip free circuit breakers (S-type TO CBE to EN 60934) of compact design for snap-in panel mounting. Available either with protection on one/both/all poles or, in the case of the double pole version, protection on one pole only. Illumination is optional and there is a choice of rocker colours.
Approved to CBE standard EN 60934 (IEC 60934).

Typical applications

Motors, transformers, solenoids, household and office machines, electrical tools, mobile homes, boating, construction vehicles, medical equipment to EN 60601.

Standard current ratings and typical internal resistance values

Current rating (A)	Internal resistance per pole (Ω)	Current rating (A)	Internal resistance per pole (Ω)
0.1	94	4	0.0435
0.2	24	5	0.0325
0.3	12	6	0.0215
0.4	5.30	7	0.0165
0.5	4.20	8	0.0165
0.8	1.50	10	< 0.02
1	0.9	12	< 0.02
1.2	0.80	14	< 0.02
1.5	0.45	15	< 0.02
2	0.27	16	< 0.02
2.5	0.0785	18	< 0.02
3	0.0595	20	< 0.02
3.5	0.0565		

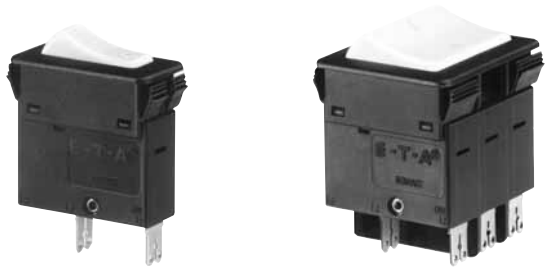
Illumination voltage/power consumption

operating voltage	power consumption	
	filament/neon (B)	**LED** (G, R, Y)
6 V	60 mA	9 mA
12 V	20 mA	9 mA
24 V	20 mA	9 mA
48 V	20 mA	1.5 mA
115 V	< 1.5 mA	< 1 mA*
230 V	< 1.5 mA	< 1 mA*
415 V	< 1 mA	not available

* single pole version only

Approvals

Authority	Voltage rating	Current rating	
VDE (EN 60934)	AC 240/415 V	0.1...20 A	single pole
		0.1...16 A	multipole
	DC 50 V	0.1...8 A	single pole
		0.1...16 A	multipole
	DC 28 V	0.1...20 A	single pole
UL, CSA	AC 250 V; DC 50 V	0.1...16 A	1- and 2- pole
	3 AC 250 V	0.1...12 A	3-pole



3130

1-pole 3-pole

Technical data

For further details please see chapter: Technical Information		
Voltage rating	AC 240 V; 3 AC 415 V; DC 50 V (UL: AC 250 V; 3 AC 250 V; DC 50 V)	
Current ratings	0.1...20 A 1-pole 0.1...16 A 2- and 3-pole	
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
DC 50 V:	0.1...16 A	50,000 operations at 1 x I_N, inductive
	3-pole	
3 AC 415 V:	0.1...16 A	30,000 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	10 x I_N
	2.5...20 A	150 A 1-pole
	2.5...16 A	250 A 2-pole
	2.5...12 A	150 A 3-pole
	14 + 16 A	130 A 3-pole
Interrupting capacity (UL 1077)	I_N	0.1...12 A 14...16 A
	1- + 2-pole	AC 250V/3500A AC 250V/3500A
	3-pole	3AC 250V/5000A
	1- + 2-pole	DC 50V/2000A DC 50V/2000A
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	1-pole: 25 g (11 ms) 2 + 3-pole: 20 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 (three pole) approx. 31 g (double pole) approx. 17 g (single pole)	

Ordering information - 1-pole

Type No.

3130 rocker switch/circuit breaker

Mounting

F snap in frame

Frame

1 standard

3 special single pole version

Number of poles

1 single pole, thermally protected

A 1-pole, unprotected**

Frame mounting

0 panel thickness 1-2.5 mm (.039-.099 in) (only 3130-F1..-...)

1 panel thickness 1.5-3.2 mm (.059-.126 in)(only 3130-F3.1-...)

Terminal design

P7 blade terminals DIN 46244-C-Ms-S (QC 2x.110)

H7 for terminals 1.1, 2.1 3.1 terminal screws M 3.5 for terminals 1.2, 2.2, 3.1 blade terminals (QC 2x.110)

N7 blade terminals (QC 2x.110), with shunt terminal

Characteristic curve

T1 thermal, 1.05-1.4 I_N

Q1 switch, only with terminal design -N7

Switch style

W rocker

U momentary switch function

Switch colour designation

	opaque		translucent
01	black	**12**	white
02	white	**14**	red
04	red	**19**	green
09	green	**29**	black, rocker with green dot

Rocker markings

A dot (ON position, only with switch colour designation 29)

Q "I" and "O" moulded in

Rocker illumination (optional)

. **12**	**Q**	**Y**	white rocker, yellow LED, AC/DC
. **14**	**Q**	**R**	red rocker, red LED, AC/DC
. **19**	**Q**	**Y**	green rocker, yellow LED, AC/DC
. **29**	**A**	**G**	black rocker with dot, green LED

Illumination voltage range* (optional)

1	4 - 7 V	(G,R,Y)
2	10 - 14 V	(G,R,Y)
3	20 - 28 V	(G,R,Y)
4	42 - 54 V	(R,Y)
6	90 - 140 V	(R,Y)
7	185 - 275 V	(R,Y)
X	LED, DC 8 - 10 mA ***	

Current ratings

0.1...20 A

3130 - F 1 1 0 - P7 T1 - W 12 Q Y 7 - 5 A ordering example

* N/A for non-illuminated version

** unprotected poles have to ordered with terminal design N7

*** without series resistor and diode, to be selected by customer.
Recommendation:
4-7 V Rv 0.43 kΩ
10-14 V Rv 1.1 kΩ
20-28 V RV 2.7 kΩ
diode 1N4007

Ordering information - multipole

Type No.

3130 rocker switch/circuit breaker multipole

Mounting

F snap in frame

Frame

1 standard

Number of poles

2 2-pole, thermally protected

3 3-pole, thermally protected

5 2-pole, thermally protected on one pole only

6 3-pole, thermally protected on two poles only

B 2-pole, unprotected**

C 3-pole, unprotected**

Frame mounting

0 panel thickness 1-2.5 mm (.039-.099 in) (only 3130-F1..-...)

Terminal design

P7 blade terminals DIN 46244-C-Ms-S (QC 2x.110)

H7 for terminals 1.1, 2.1 3.1 terminal screws M 3.5; for terminals 1.2, 2.2, 3.1 blade terminals (QC 2x.110)

N7 blade terminals DIN 46244-C-Ms-S (QC 2x.110), with shunt terminal

Characteristic curve

T1 thermal, 1.05-1.4 I_N

Q1 switch, only with terminal design -N7

Switch style

W rocker

U momentary switch function

Switch colour designation

	opaque		translucent
01	black	**12**	white
02	white	**14**	red
04	red	**19**	green
09	green		

Rocker markings

Q "I" and "O" moulded in

Rocker illumination (optional)

B filament (≤ AC/DC 48 V), neon (≥ AC 115 V)

G green LED, DC

R red LED, DC

Y yellow LED, DC

Illumination voltage range* (optional)

1	4 - 7 V	(B,G,R,Y)
2	10 - 14 V	(B,G,R,Y)
3	20 - 28 V	(B,G,R,Y
4	42 - 54 V	(B,R,Y
6	90 - 140 V	(B)
7	185 - 275 V	(B)
8	320 - 450 V	(B)

Current ratings

0.1...16 A

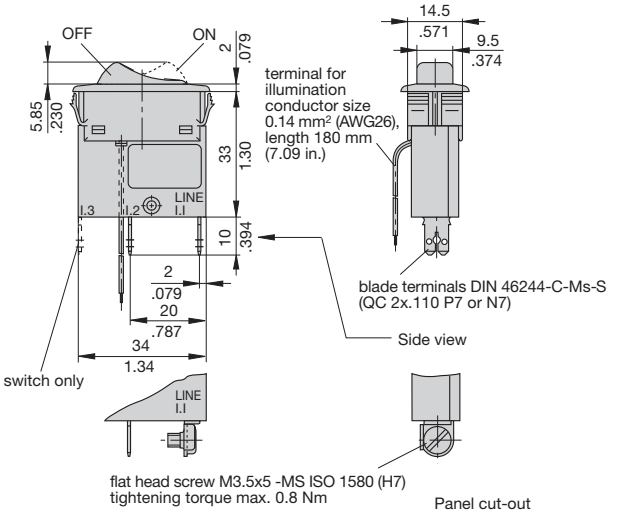
3130 - F 1 3 0 - P7 T1 - W 12 Q B 7 - 5 A ordering example

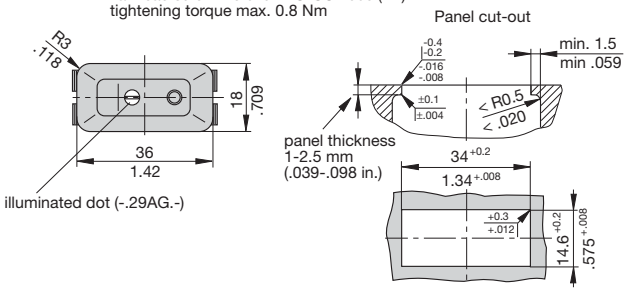
* N/A for non-illuminated version

** unprotected poles have to ordered with terminal design N7

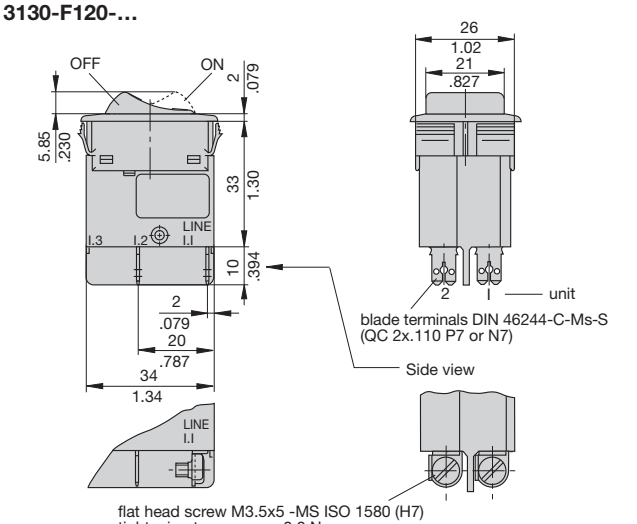
Dimensions

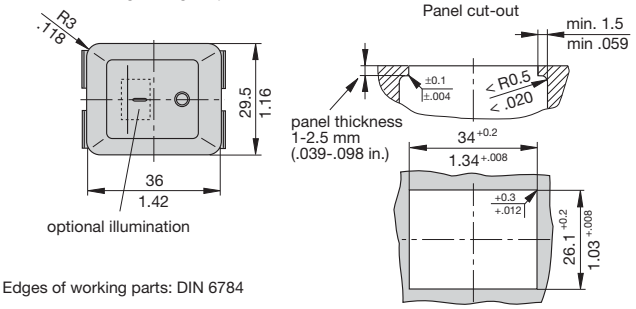
3130-F110-...



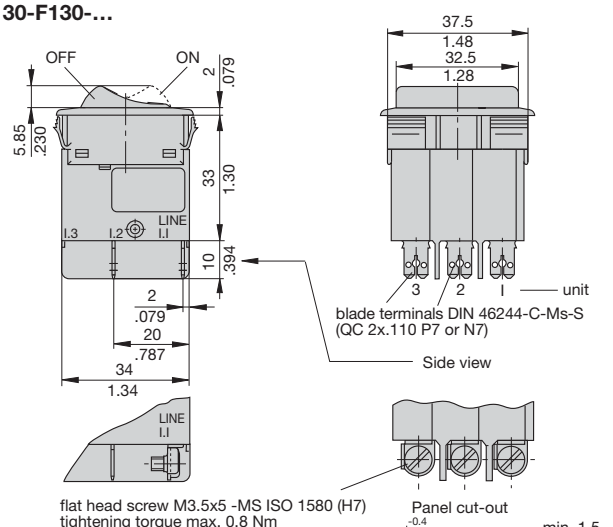


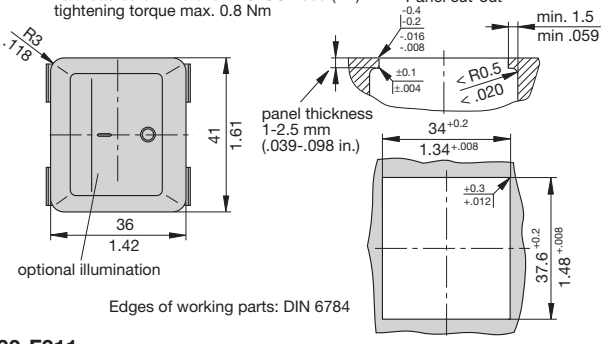
3130-F120-...



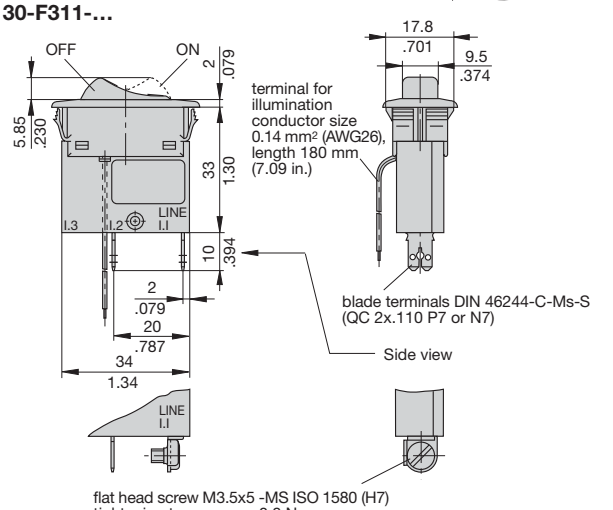


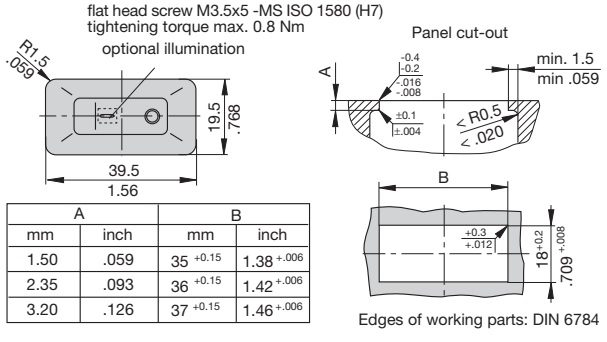
3130-F130-...





3130-F311-...



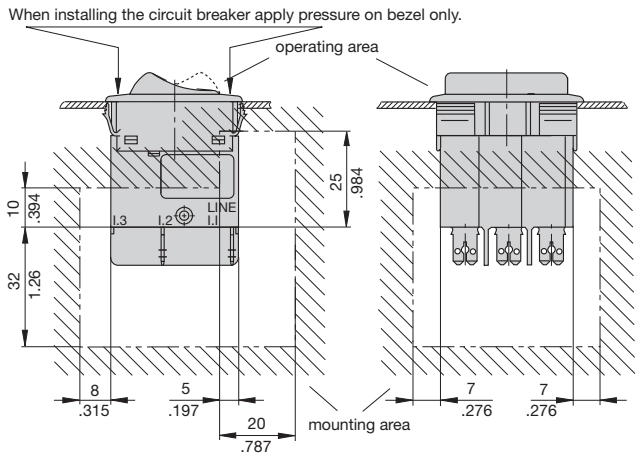


A		B	
mm	inch	mm	inch
1.50	.059	35 +0.15	1.38 +.006
2.35	.093	36 +0.15	1.42 +.006
3.20	.126	37 +0.15	1.46 +.006

Edges of working parts: DIN 6784

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

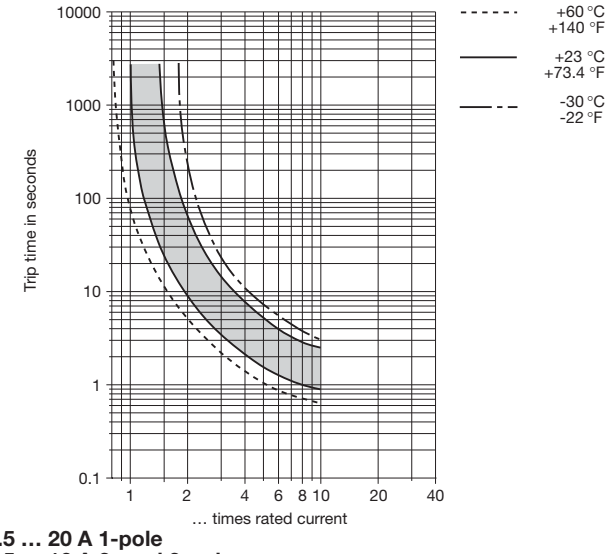
Installation drawing 3130-F1...



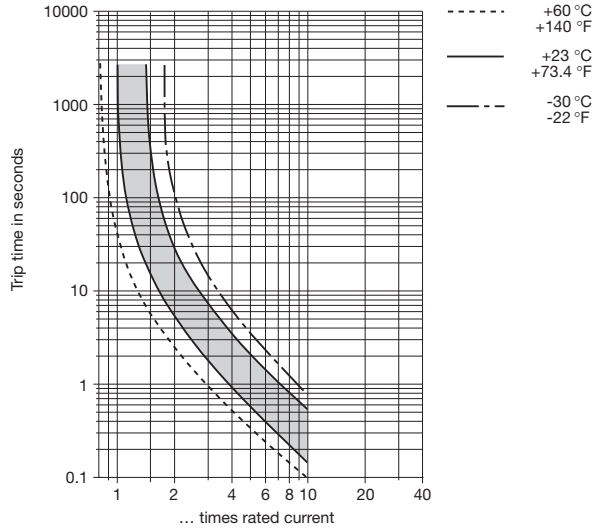
Typical time/current characteristics

Multipole types: all poles symmetrically loaded.
With single pole overload, thermal tripping will be at approx. 1.54 x I_N with 2-pole devices and at approx. 1.68 x I_N with 3-pole devices.

0.1 ... 2 A

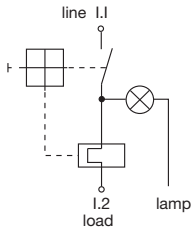


2.5 ... 20 A 1-pole
2.5 ... 16 A 2- and 3-pole

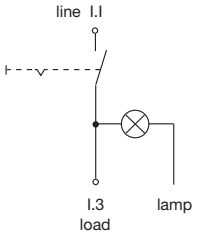


Internal connection diagrams

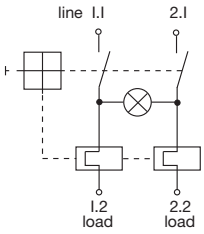
1-pole



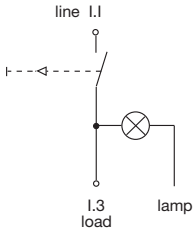
1-pole switch



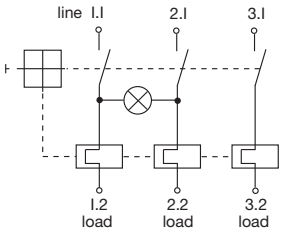
2-pole



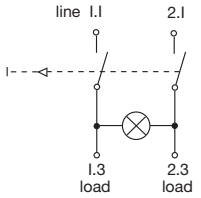
1-pole momentary switch



3-pole

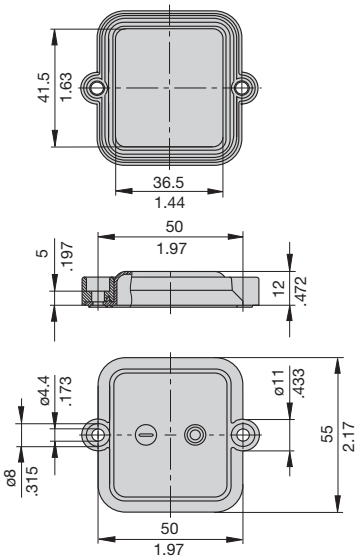


2-pole momentary switch



Accessories 3130-F130-...

Splash cover, transparent, for 3-pole version
X 221 258 01 (IP54), comprising bezel Y 306 109 01
and transparent cover Y 306 108 01



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	0.8	0.76	0.84	0.92	1	1.08	1.16	1.24

E-T-A Thermal Overcurrent Circuit Breaker 3130

Description

Single pole rocker switch/thermal trip free circuit breakers (S-type TO CBE to EN 60934) of compact design for snap-in panel mounting. Available either with protection on one/both/all poles or, in the case of the double pole version, protection on one pole only. Illumination is optional and there is a choice of rocker colours.
Approved to CBE standard EN 60934 (IEC 60934).

Typical applications

Motors, transformers, solenoids, household and office machines, electrical tools, mobile homes, boating, construction vehicles, medical equipment to EN 60601.

Standard current ratings and typical internal resistance values

Current rating (A)	Internal resistance per pole (Ω)	Current rating (A)	Internal resistance per pole (Ω)
0.1	94	4	0.0435
0.2	24	5	0.0325
0.3	12	6	0.0215
0.4	5.30	7	0.0165
0.5	4.20	8	0.0165
0.8	1.50	10	< 0.02
1	0.9	12	< 0.02
1.2	0.80	14	< 0.02
1.5	0.45	15	< 0.02
2	0.27	16	< 0.02
2.5	0.0785	18	< 0.02
3	0.0595	20	< 0.02
3.5	0.0565		

Illumination voltage/power consumption

operating voltage	power consumption	
	filament/neon (B)	**LED** (G, R, Y)
6 V	60 mA	9 mA
12 V	20 mA	9 mA
24 V	20 mA	9 mA
48 V	20 mA	1.5 mA
115 V	< 1.5 mA	< 1 mA
230 V	< 1.5 mA	< 1 mA

Approvals

Authority	Voltage rating	Current rating
VDE (EN 60934)	AC 240/415 V DC 50 V DC 28 V	0.1...20 A 0.1...8 A 0.1...20 A
UL, CSA	AC 250 V, DC 50 V	0.1...16 A

3130
water splash protected (IP 66)

Technical data

For further details please see chapter: Technical Information		
Voltage rating	AC 240 V; DC 50 V (UL: AC 250 V; DC 50 V)	
Current ratings	0.1...20 A	
Typical life		
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
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 current path/current path	test voltage AC 3,000 V AC 1,500 V	
Insulation resistance	> 100 MΩ (DC 500 V)	
Interrupting capacity I_{cn}	0.1...2 A 2.5...20 A	10 x I_N 150 A
Interrupting capacity (UL 1077)	0.1...12 A AC 250 V/3,500 A DC 50 V/2,000 A	14...16 A AC 250 V/3,500 A DC 50 V/2,000 A
Degree of protection (IEC 60529/DIN 40050)	operating area IP66 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. 17 g	

Ordering information - IP66

Type No.		
3130	rocker switch/circuit breaker	
	Mounting	
	F	snap in frame
	Frame	
	2	splash water protected
	Number of poles	
	1	single pole, thermally protected
	A	1-pole, unprotected **
	Frame mounting	
	2	panel thickness 2-3.5 mm
	Terminal design	
	P7	blade terminals DIN 46244-C-Ms-S (QC 2x.110)
	H7	for terminals 1.1 terminal screws M 3.5 for terminals 1.2 2 x .110 blade terminals
	N7	blade terminals DIN 46244-C-Ms-S (QC 2x.110), with shunt terminal or for switch only
	Characteristic curve	
	T1	thermal, 1.05-1.4 I_N
	Q1	switch, only with terminal design -N7
	Switch style	
	S 00	without actuator rocker X 222 420 .. must be ordered separately. Available symbols see following pages.
	S	rocker
	P	momentary switch
	Switch colour designation (not S00)	
	opaque / translucent	
	01 black / 12 white	
	02 white / 14 red	
	04 red / 19 green	
	09 green	
	Switch markings	
	0	without actuator
	Q	"I" and "O" moulded in
	Switch illumination	
.	12 Q Y	white rocker, yellow LED, AC/DC
.	14 Q R	red rocker, red LED, AC/DC
.	19 Q Y	green rocker, yellow LED, AC/DC
S	00 0 Y	without rocker, LED yellow, AC/DC
	Illumination voltage range*	
	1	4 - 7 V (R,Y)
	2	10 - 14 V (R,Y)
	3	20 - 28 V (R,Y)
	4	42 - 54 V (R,Y)
	6	90 - 140 V (R,Y)
	7	185 - 275 V (R,Y)
	X	LED, DC 8-10 mA ***
	Current ratings	
	0.1...20 A	

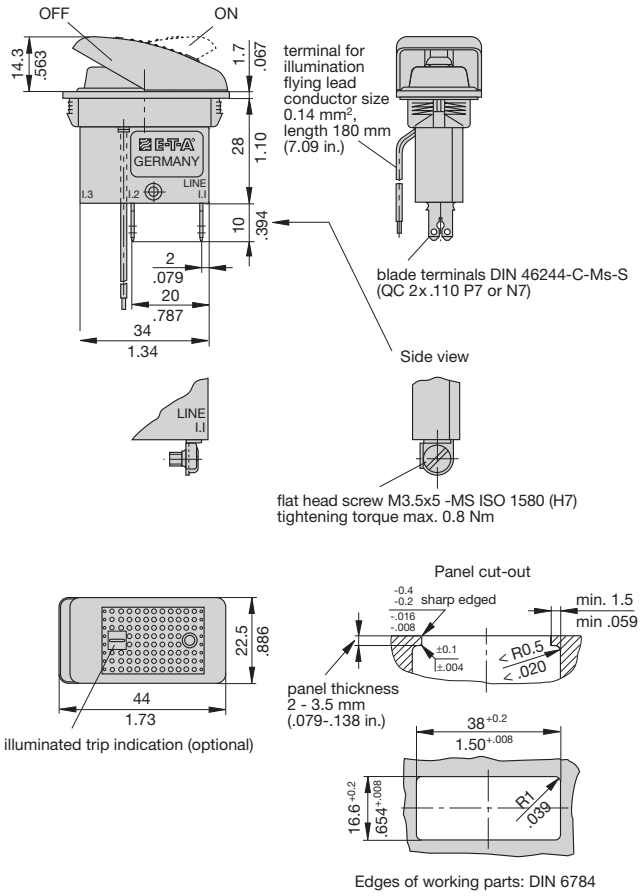
3130 F 2 1 2 - P7 T1 - S 12 Q Y 7 - 5 A ordering example

* N/A for non-illuminated version

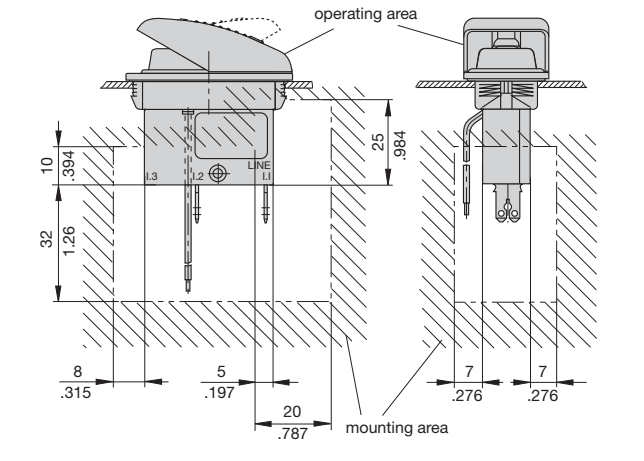
** unprotected poles have to ordered with terminal design N7

*** without series resistor and diode, to be selected by customer.
Recommendation:
4-7 V Rv 0,43 kΩ
10-14 V Rv 1,1 kΩ
20-28 V RV 2,7 kΩ
diode 1N4007

Dimensions 3130-F212-...



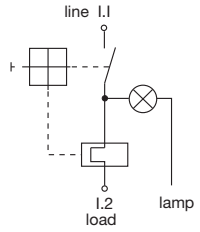
Installation drawing 3130-F212-...



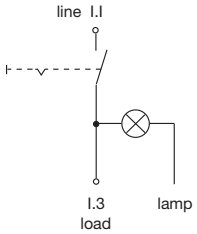
This is a metric design and millimeter dimensions take precedence (mm / inch)

Internal connection diagrams

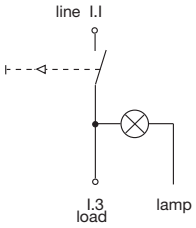
1-pole



1-pole switch

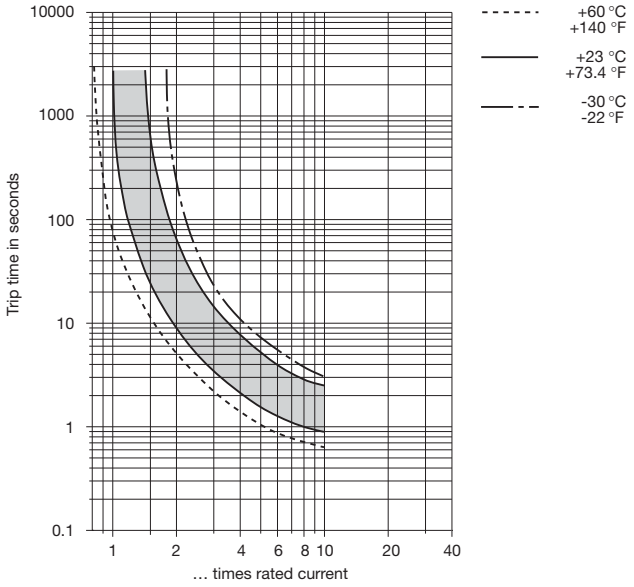


1-pole momentary switch

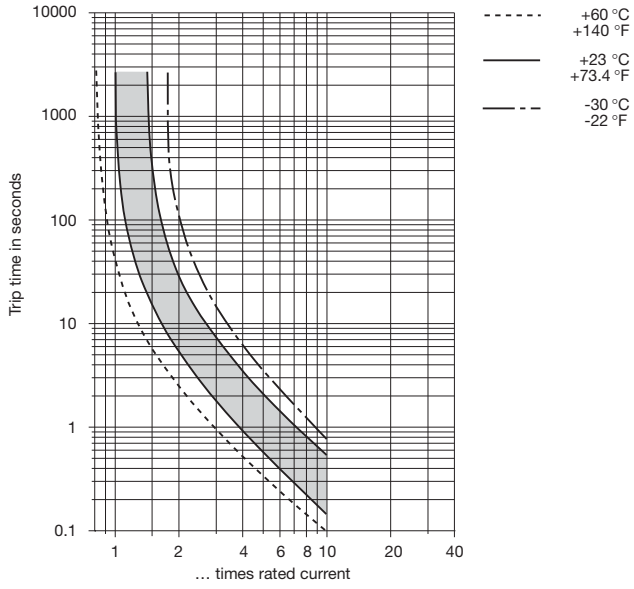


Typical time/current characteristics

0.1 ... 2 A



2.5 ... 20 A



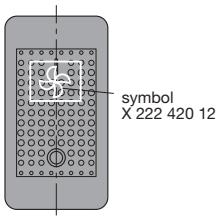
The time/current characteristic curve depends on the ambient temperature prevailing. In order to eliminate nuisance tripping, please multiply the circuit breaker current ratings by the derating factor shown below. See also section 9 – Technical information.

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

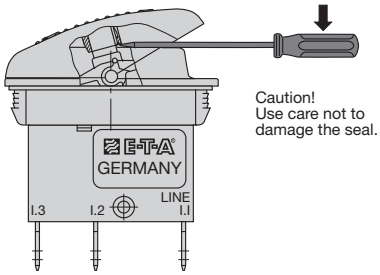
This is a metric design and millimeter dimensions take precedence ($\frac{mm}{inch}$)

Accessories

Rocker
X 222 420 ..



How to exchange rockers



Symbols/legends available

Interior light		X 222 420 01
Anchor light		X 222 420 02
Cockpit light		X 222 420 03
Navigation light		X 222 420 04
VHF radio		X 222 420 05
Refrigerator		X 222 420 06
Anchor		X 222 420 07
Windshield wiper		X 222 420 08
Bilge pump		X 222 420 09
Potable water		X 222 420 10
Horn		X 222 420 11
Ventilation fan		X 222 420 12
Panel light		X 222 420 13

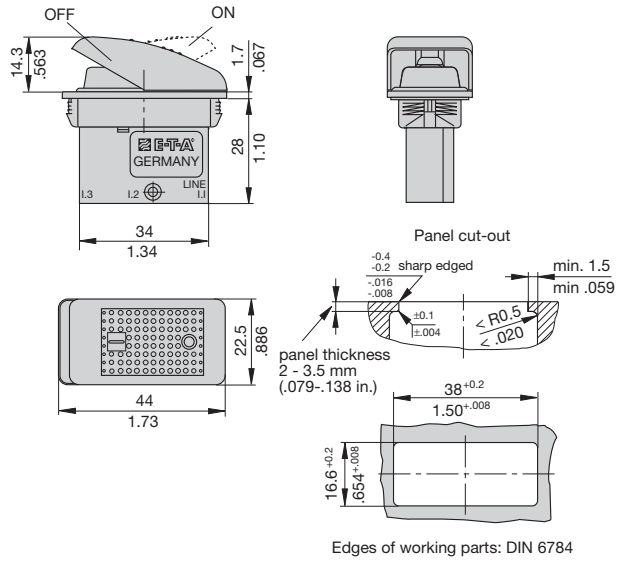
Symbols/legends available

Navigation instruments		X 222 420 14
Music		X 222 420 15
Heating		X 222 420 16
Shower pump		X 222 420 17
		X 222 420 18
Icebox		X 222 420 19
Water for windshield wiper		X 222 420 20
Weigh anchor		X 222 420 21
Drop anchor		X 222 420 22
Search light		X 222 420 23
Autopilot		X 222 420 24
Trim flaps		X 222 420 25
Mast lift		X 222 420 26
Navigation lights (sailing ship)		X 222 420 27
Cockpit light (sailing ship)		X 222 420 28
Deck light (sailing ship)		X 222 420 29
Anchor light (sailing ship)		X 222 420 30

Further symbols upon request.

S00 switch style:
white translucent rocker coated with black lacquer
with laser marked symbols that appear in white translucent.

Blanking piece (black)
3130-387012



Edges of working parts: DIN 6784

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

Combination of single pole circuit breaker and ON/OFF switch with soft-touch rocker actuation. Contoured rockers are available with a choice of colours and legends, with optional illumination. The 3131 is sealed to provide IP66 rated front of panel water splash protection. It meets the requirements of circuit breaker standard EN 60934 (IEC 60934): S type, TO.

Typical applications

Motor protection, transformer protection, household appliances and office equipment, electrical tools, mobile homes, watercraft, construction vehicles, medical equipment.

Current ratings and typical internal resistance values

Current rating (A)	Internal resistance (Ω)	Current rating (A)	Internal resistance (Ω)
0.1	94	4	0.0435
0.2	24	5	0.0325
0.3	12	6	0.0215
0.4	5.30	7	0.0165
0.5	4.20	8	0.0165
0.8	1.50	10	< 0.02
1	0.9	12	< 0.02
1.2	0.80	14	< 0.02
1.5	0.45	15	< 0.02
2	0.27	16	< 0.02
2.5	0.0785	18	< 0.02
3	0.0595	20	< 0.02
3.5	0.0565		

Illumination voltage / power consumption

Operating voltage	Power consumption (LED)	
	Y = yellow	T = blue
12 V	10 mA	10 mA
24 V	10 mA	10 mA
115 V	< 1 mA	-
230 V	< 1 mA	-

Approvals

Authority	Voltage rating	Current rating
UL 1500	Ignition Protected	
UL 1077	AC 250 V; DC 32 V	0.1...20 A
VDE (EN 60934)	AC 240 V; DC 32 V	0.05...20 A

3131
Circuit breaker

Technical data

For further details please see chapter: Technical Information	
Voltage rating	AC 240 V; DC 28 V
Current rating range	0.1...20 A
Typical life	0.1...20 A 30,000 operations at 1 x I_N, inductive
Ambient temperature	-20...+60 °C (-4...+140 °F)
Insulation co-ordination (IEC 60664)	2.5 kV/2 re-inforced insulation in the operating area
Dielectric strength operating area current path/current path	 test voltage AC 3,000 V test voltage AC 1,500 V
Insulation resistance	> 100 MΩ (DC 500 V)
Interrupting capacity I_{cn}	0.1...2 A 10 x I_N 2.5...20 A 150 A
Interrupting capacity (UL 1077)	0.1...16 A: AC 240 V 3,000 A DC 32 V 2,500 A
Protection class (IEC 60529)	operating area IP66 terminal area IP00
Vibration	5 g (57-500 Hz) ± 0.38 mm (10-57 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 hours at 5 % salt mist, test to IEC 60068-2-11,test Ka
Humidity	240 hours at 95 % RH, test to IEC 60068-2-78, test Cab
Mass	approx. 30 g

Ordering Information

Type number

3131 single pole thermal circuit breaker or switch

Function

A circuit breaker single pole, latching switch

C circuit breaker single pole, momentary switch

Mounting

F flange mounting

Accessories

1 with sealing IP66

Terminal design

H terminal 1: screws M3.5x5 ISO 1580 (DIN 85)
terminal 2: blade terminal for 1x6.3x0.8 mm or 2x2.8x0.8 EN 60934 connectors

N terminals 1,2 and 4: blade terminal for 1x6.3x0.8 mm or 2x2.8x0.8 EN 60934 connectors

P terminals 1 and 2: blade terminal for 1x6.3x0.8 mm or 2x2.8x0.8 EN 60934 connectors

Characteristic curve

T thermal 1.0 – 1.4 times rated current

Q switch only

Actuator style

0 without actuator
rocker X3131-W... must be ordered separately

Actuator colour

0 without actuator

Rocker legends

00 without

Rocker marking

0 without

Orientation

0 without

Illumination

0 without

1 illuminated when in position 1 (ON)

3 as 1, with dimmed illumination of window 1

Type of illumination

0 without illumination

T blue LED

Y yellow LED

Illumination voltage range

0 without illumination

2 10 - 14 V DC

3 20 - 32 V DC

6 90 - 140 V AC

7 185 - 275 V AC

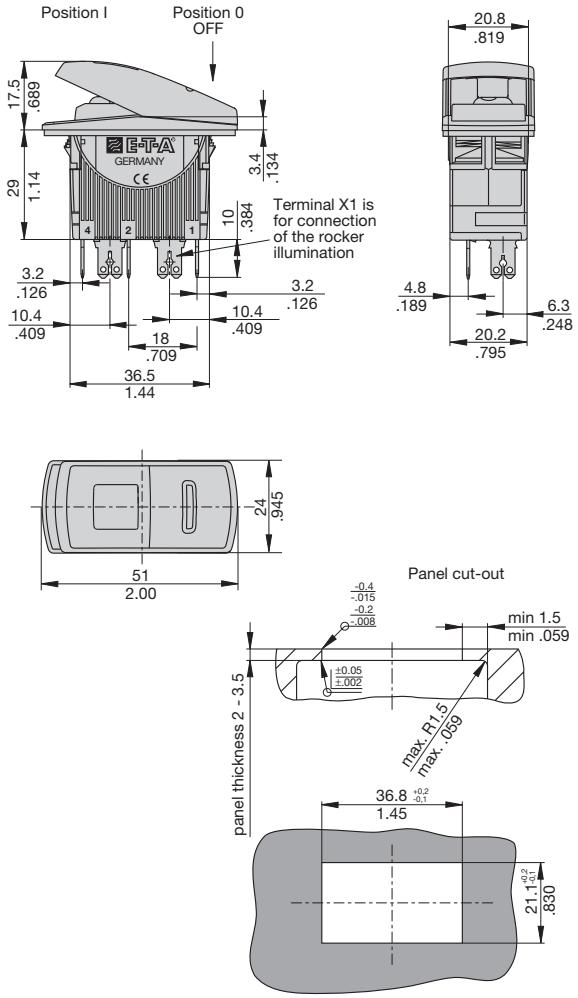
Current ratings

0.1...20 A

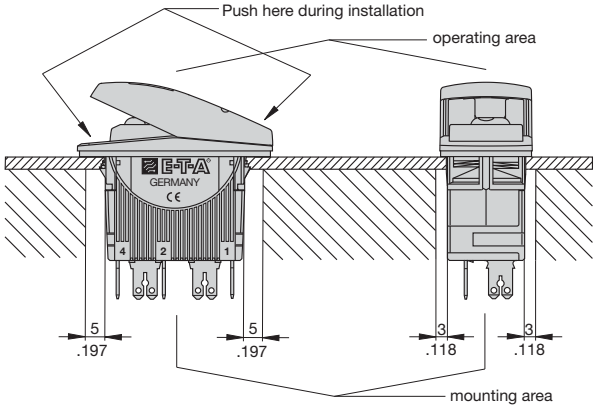
3131 - A F 1 P T - 0 0 00 0 0 - 1 Y 3 - 10A ordering example

3131 - . . . N Q - 0 0 00 0 0 - . . . - 20A switch

Dimensions



Installation drawing

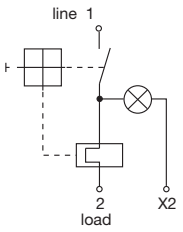


This is a metric design and millimeter dimensions take precedence (mm / inch)

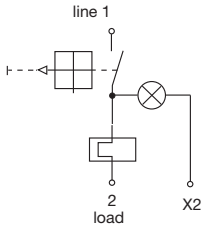
Internal connection diagrams

circuit breaker

1-pole switch

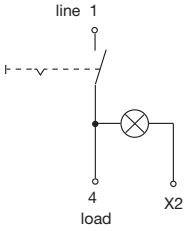


1-pole momentary switch

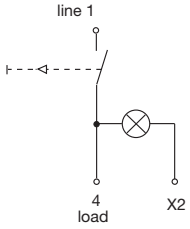


switch

1-pole switch

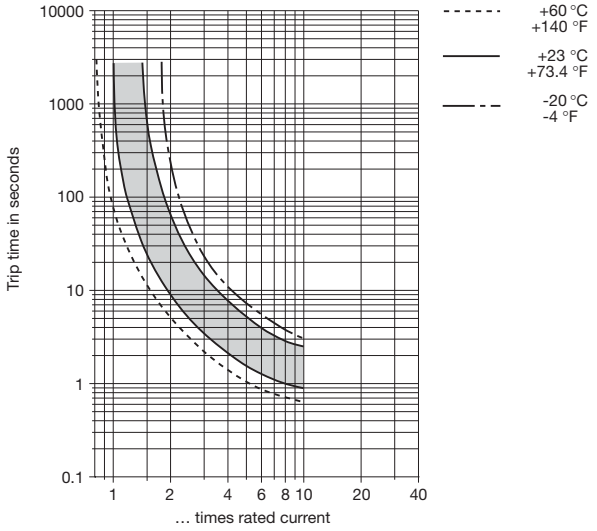


1-pole momentary switch

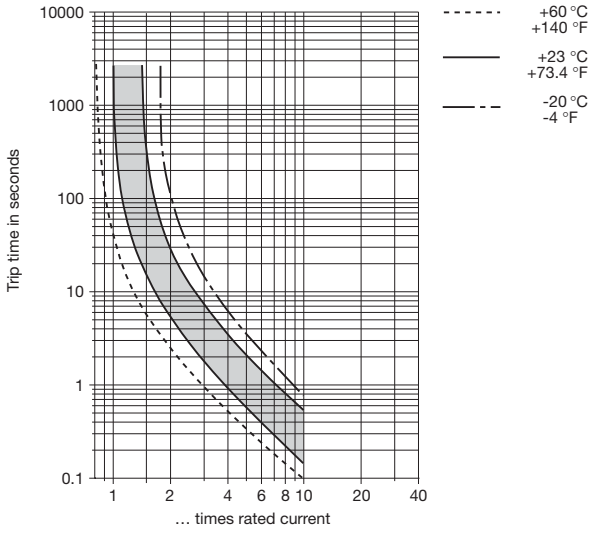


Typical time/current characteristics

0.1 ... 2 A



2.5 ... 20 A



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.

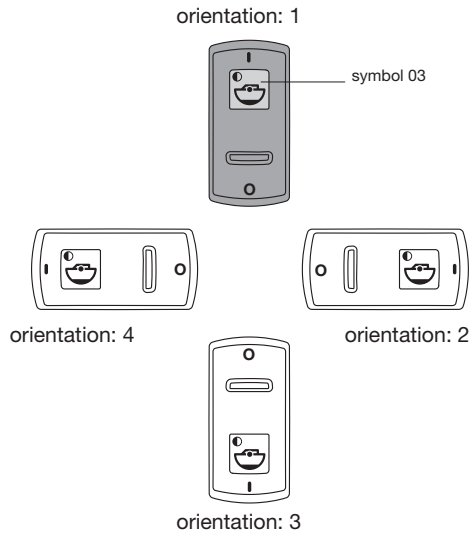
Ambient temperature °F	-4	+14	+32	+73.4	+104	+122	+140
°C	-20	-10	0	+23	+40	+50	+60
Derating factor	0.84	0.88	0.92	1	1.08	1.14	1.23

List of available legends

	Ordering information
Interior light	01
Anchor light	02
Cockpit light	03
Navigation light	04
UKW-radio	05
Refrigerator	06
Anchor	07
Windshield wiper	08
Bilge pump	09
Potable water	10
Horn	11
Ventilation fan	12
Panel light	13
Navigation instruments	14
Music	15
Heating	16
Shower pump	17
Icebox	19
Screenwash	20
Search light	23
Autopilot	24
Trim tabs	25
Mast lift	26

	Ordering information
Navigation light (sailing ship)	27
Cockpit light (sailing ship)	28
Deck light (sailing ship)	29
Anchor light (sailing ship)	30
Toilet	31
Outlet	41

Further symbols upon request



Ordering Information X3131-...

Type number
X3131 module for type 3131

Actuator style
W rocker soft-touch, two illumination windows

Actuator colour
A blue / white translucent
B black / white translucent
C skyblue / white translucent

Rocker legends
00 without
... see separate survey of legends

Rocker marking
0 without
A I and 0

Orientation
0 without orientation
1 orientation 1 (standard)
2 orientation 2
3 orientation 3
4 orientation 4

X3131 - W A 01 0 1 ordering example

Description

Single pole three-position switch with latching or momentary switch functions. Featuring a soft-touch contoured rocker actuator with optional illumination. The 3131 ist sealed to provide IP66 rated front of panel water splash protection.

Typical applications

Household appliances, electrical tools, mobile homes, watercraft, construction vehicles, medical equipment

Ordering Information

Type number

3131 Single pole switch (3 positions)

Function

B 3-position switch single pole, switching function
D 3-position switch single pole, momentary switch function
E latching switch under window 1, momentary switch under window 2
F momentary switch under window 1, latching switch under window 2

Mounting

F flange mounting

Accessories

1 with sealing IP66

Terminal design

N blade terminals 2x2.8x0.8 EN 60934

Characteristic curve

Q switch only,

Actuator style

0 without actuator
rocker X3131-W... must be ordered separately

Actuator colour

0 without actuator

Rocker legends

00 without

Rocker marking

0 without

Orientation

0 without

Illumination

0 without
2 two LEDs, full illumination in position 1 and 2, dimmed illumination in position 0

Type of illumination

0 without illumination
T blue LED
Y yellow LED

Illumination voltage range

0 without illumination
2 10 - 14 V DC
3 20 - 32 V DC

Current ratings

20 A

3131 - B F 1 N Q - 0 0 00 0 0 - 2 Y 3 - 20A ordering example

Illumination voltage / power consumption

Operating voltage	Power consumption LED
12 V	10 mA
24 V	10 mA

3131
Three-position switch

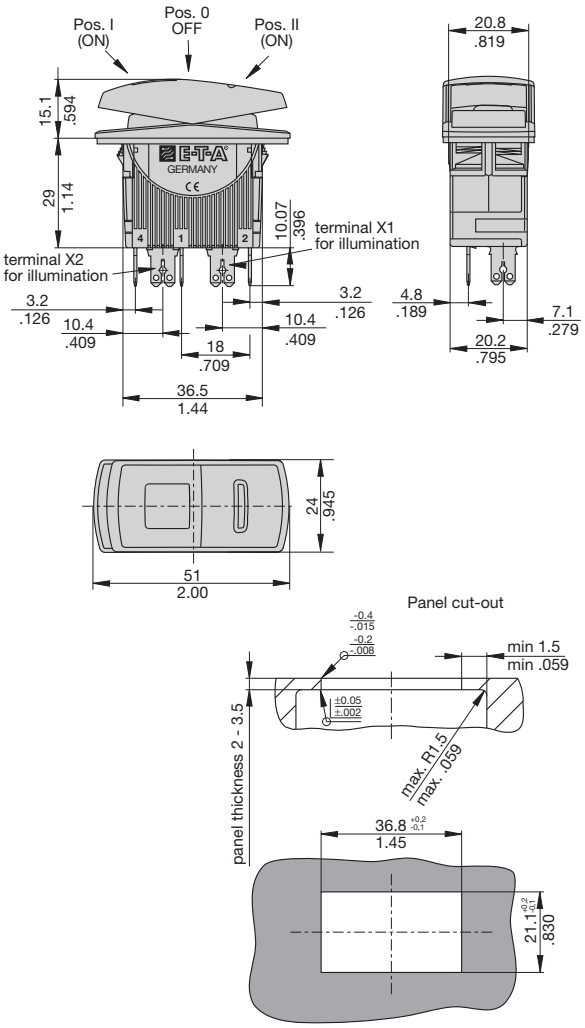
Technical data

For further details please see chapter: Technical Information	
Voltage rating	DC 32 V
Current rating	20 A
Typical life	30,000 operations at 1 x I_N, inductive
Ambient temperature	-20...+60 °C (-4...+140 °F)
Insulation co-ordination (IEC 60664)	2.5 kV/2 re-inforced insulation in the operating area
Dielectric strength operating area current path/current path	 test voltage AC 3,000 V test voltage AC 1,500 V
Insulation resistance	> 100 MΩ (DC 500 V)
Protection class (IEC 60529)	operating area IP66 terminal area IP00
Vibration	5 g (57-500 Hz) ± 0.38 mm (10-57 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 hours at 5 % salt mist, test to IEC 60068-2-11,test Ka
Humidity	240 hours at 95 % RH, test to IEC 60068-2-78, test Cab
Mass	approx. 30 g

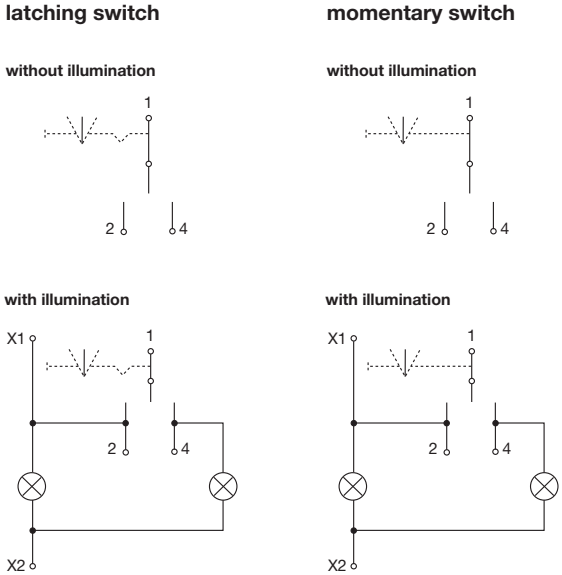
Approvals

Authority	
UL 1500	Ignition Potected

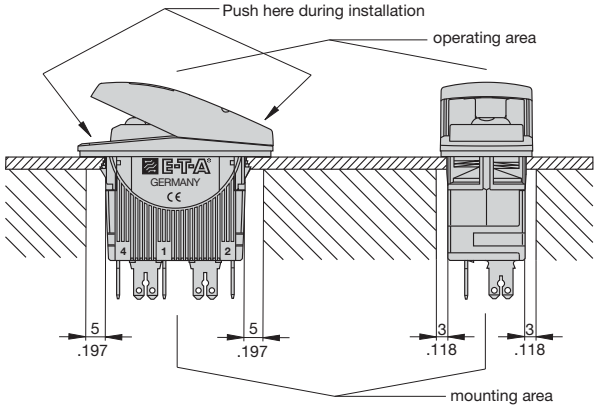
Dimensions



Internal connection diagrams



Installation drawing

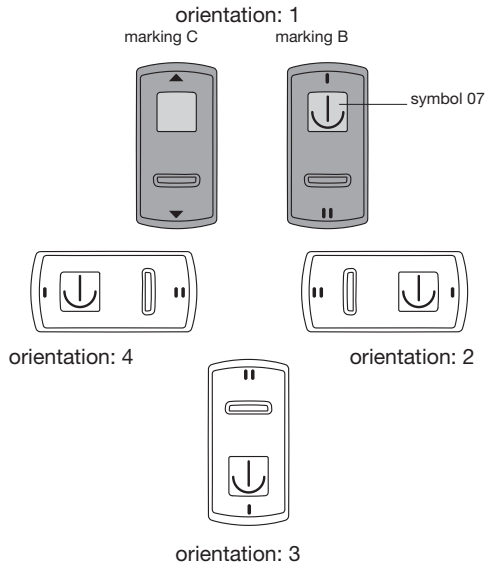


This is a metric design and millimeter dimensions take precedence (mm/inch)

List of available legends

		Ordering informtion
Anchor		07
Windshield wiper		08
Bilge pump		09
Ventilation fan		12
Trim tabs		25
Mast lift		26

Further symbols upon request



Ordering Information X3131-...

Type number						
X3131	module for type 3131					
	Actuator style					
	W	rocker soft-touch, two illumination windows				
		Actuator colour				
		A	blue / white translucent			
		B	black / white translucent			
		C	skyblue / white translucent			
			Rocker legends			
			00	without		
			...	see separate survey of legends		
				Rocker marking		
				0	without	
				B	I and II	
				C	◀ and ▶ (orientation 1 only)	
					Orientation	
					0	without orientation
					1	orientation 1 (standard)
					2	orientation 2
					3	orientation 3
					4	orientation 4
X3131 -	W	A	07	0	1	ordering example

1

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.

E-T-A Thermal Overcurrent Circuit Breaker 3140

Description

Four pole switch or three pole switch/thermal circuit breaker (S-type TO CBE to EN 60934) with trip-free mechanism and red/green two button operation. Designed for snap-in panel mounting. Integral splash water protection to meet protection degree IP 66 in the operating area (option). Optional with under voltage release module and auxiliary contact module. Complies with CBE standard EN 60934 (IEC 60934).

Typical applications

High-pressure cleaners, shredders, pumps, power saws, electric tools, motors, processing systems.

Ordering information

Type No.
3140 four pole switch or three pole switch/circuit breaker

Mounting
F snap in frame

Frame
1 standard
2 splash water protected version

Number of poles
3 3-pole, thermally protected
7 4-pole, thermally protected on 3 poles only
C 3-pole, unprotected, switch only
D 4-pole, unprotected, switch only

Frame mounting
0 panel thickness 1-6.35 mm (.04-.25 in)

Terminal design
P7 blade terminals 2x2.8x0.8 mm (QC 2x.110), DIN 46244-C
N7 as P7, but with shunt terminal
H7 as P7, but for terminals x.1 terminal screws M3.5 (required with X3140 fitted)
G7 as H7, but with shunt terminal

Characteristic curve
T1 thermal
Q1 switch only (10,000 operations)*

Switch style
S 2 push buttons (ON/OFF)

Switch colour
GRX green/red

Current rating range
0.1...16 A

3140 - F 1 3 0 - P7 T1 - S GRX - 10 A ordering example

* only with terminal design N7 or G7

Standard current ratings and typical internal resistance values

Current rating (A)	Internal resistance per pole (Ω)	Current rating (A)	Internal resistance per pole (Ω)
0.1	94	3.5	0.0595
0.2	24	4	0.0435
0.3	12	4.5	0.0325
0.4	5.30	5	0.0325
0.5	4.20	6	0.0215
0.6	2.90	7	0.0165
0.8	1.50	8	0.0125
1	0.9	10	< 0.02
1.2	0.80	12	< 0.02
1.5	0.45	14	< 0.02
2	0.27	15	< 0.02
2.5	0.0785	16	< 0.02
3	0.0595		

3140

Technical data

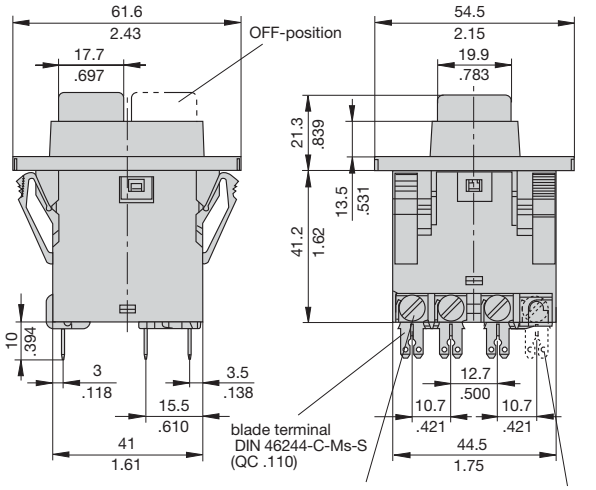
For further details please see chapter: Technical Information		
Voltage rating	3 AC 415 V; DC 50 V	
Current rating range	0.1...16 A	
Typical life	**3-pole**	
3 AC 415 V: 0.1...14 A	10,000 operations at 1 x I_N, inductive	
15...16 A	10,000 operations at 1 x I_N, resistive	
	4-pole	
3 AC 415 V 0.1...14 A	10,000 operations at 1 x I_N, inductive	
15...16 A	10,000 operations at 1 x I_N, resistive	
Ambient temperature	-30...+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)	test voltage	
operating area	AC 3,000 V	
between poles (3-pole)	AC 1,500 V	
Insulation resistance	> 100 MΩ (DC 500 V)	
Interrupting capacity I_{cn}	0.1...2 A	10 x I_N
	2.5...16 A	150 A
Interrupting capacity (UL 1077)	I_N 0.1...16 A	U_N AC 250 V 3- and 4-pole 5,000 A
Degree of protection (IEC 60529/DIN 40050)	operating area IP40 (IP66 with water splash protection) 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	20 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. 68	

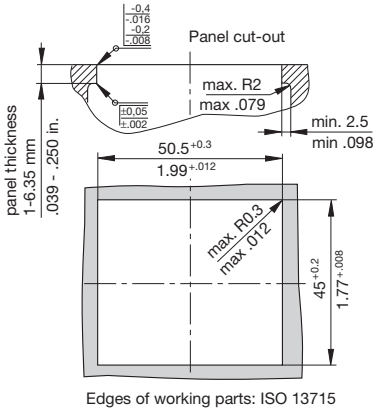
Approvals

Authority	Voltage ratings	Current ratings
VDE (EN 60934)	3 AC 415 V	0.1...16 A 3 + 4-pole
UL	AC 250 V	0.1...16 A 3 + 4-pole
CCC	3 AC 415 V	0.1...16 A 3 + 4-pole

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.

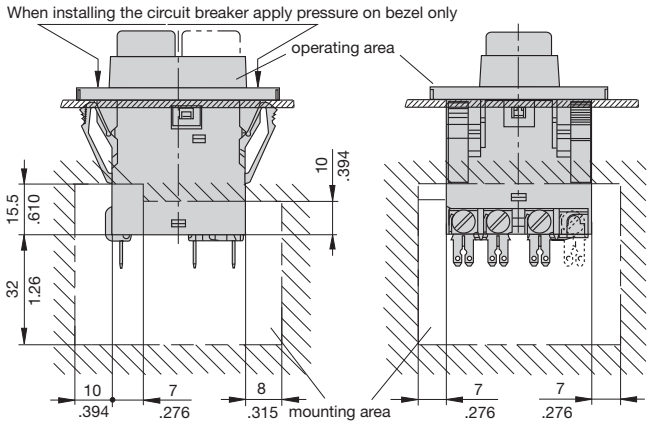
Dimensions



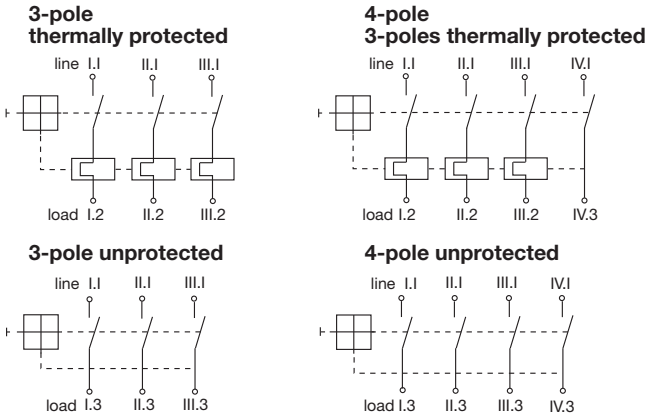


Edges of working parts: ISO 13715

Installation drawing

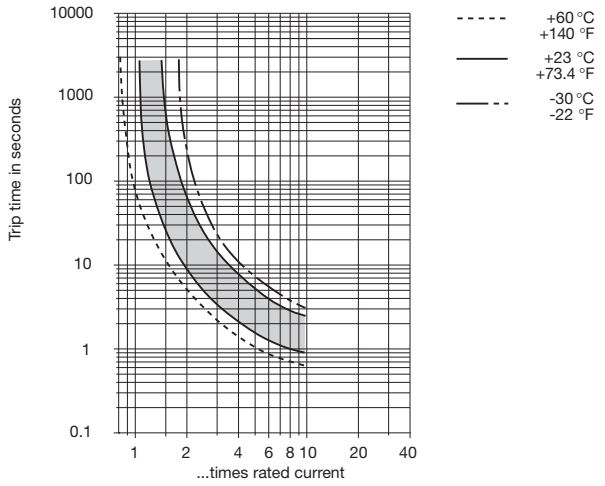


Internal connection diagrams

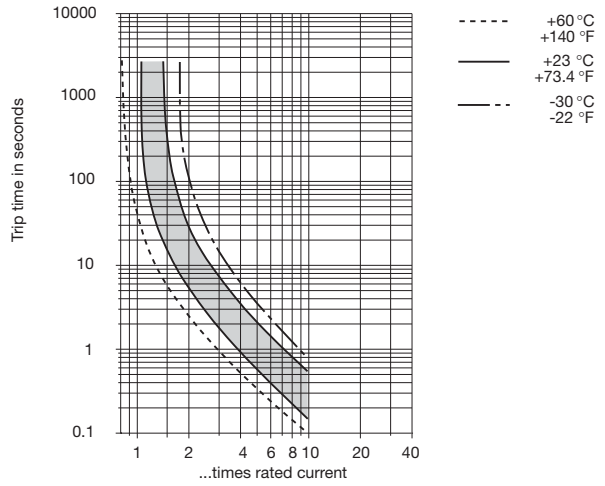


Typical time/current characteristics

0.1 ... 2 A



2.5 ... 16 A



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

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

Description

A module suitable for all versions of type 3140 to trip the main switch/ circuit breaker mechanism in the event of loss of voltage of the connected phases. When the voltage is restored the switch must be reset to reconnect the load, thereby avoiding the safety hazards associated with automatic re-starting of machinery.
Note: Basic unit 3140-... must be fitted with -H7 or -G7 screw terminals.

Typical applications

Machines such as power tools, industrial equipment and domestic appliances where automatic restart after restoration of power could be dangerous (EU Machinery Directive).

Ordering information

Type No.					
X3140	Module for type 3140				
	Function				
	U	undervoltage release module			
		Terminal design			
		00	standard (without separate connections)		
		01	one blade terminal 2.8x0.8 (QC .110)		
		02	two blade terminals 2.8x0.8 (QC .110)		
		03	as 01, with flying lead 0.5 mm² (l = 250 mm) and female connector 6.3x1 DIN 46247-MS		
			Voltage ratings		
			00	AC 400 V 50/60 Hz	
			03	DC 24 V	
			09	AC 230 / 240 V 50/60 Hz	
				Assembly status	
				M	module mounted to the circuit breaker
X3140 -	U	00	00	M	ordering example

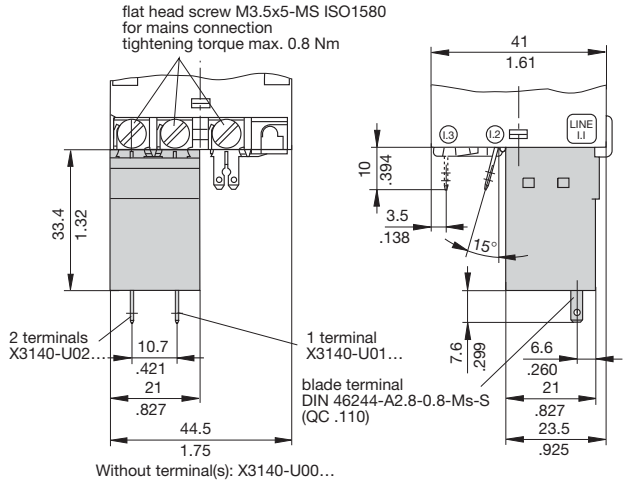
Technical data

Voltage ratings	AC 400 V 50/60 Hz; AC 230 V; DC 24 V
Voltage tolerance	+10%/-15%
Current consumption	approx. 2.0 mA
Release values	0.2 x U_N < U < 0.7 x U_N (at a rated voltage of AC 400 V the device may release at 280 V and must release at 80 V)
Release delay	t < 20 ms
Latch-in values	≥ 85 % U_N
Ambient temperature	-30...+60 °C (-22...+140 °F)
Vibration	5 g (57-500 Hz) ± 0.38 mm (10-57 Hz) to IEC 60068-2-6, test Fc 10 frequency cycles/axis
Shock	20 g (11 ms) to IEC 60068-2-27, test Ea
Corrosion	48 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. 90 g (complete assembly)

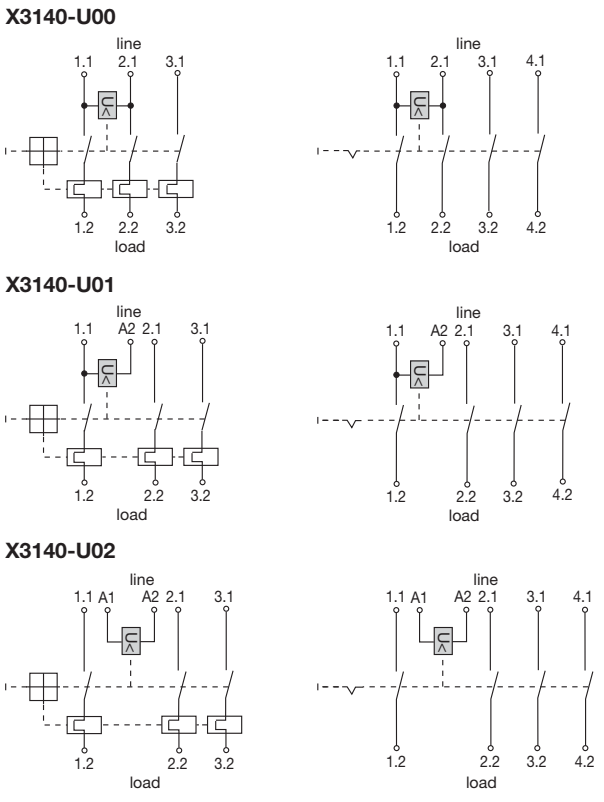
Approvals (complete circuit breaker/module assembly)

Authority	Voltage ratings
VDE (EN 60934)	AC 400 V; AC 230/240 V; DC 24 V

Dimensions



Internal connection diagrams



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.

1

Description

A module supplied factory fitted to type 3140-F to provide electrically separate changeover contacts which operate as the main contacts open/close. Ideally suited to status signalling and sequence switching.

Typical applications

Monitoring of the switching position of the circuit breaker or any connected load.

Ordering information

Type No.									
X3120	Module for type 3120 and type 3140								
	Function								
	S	auxiliary contact module							
		Contact configuration							
		0	change-over contact						
			Terminal design						
			1	blade terminals 2.8 x 0.5 (QC .110), silver plated					
				Contact rating					
				AC			DC (not approved)		
				Voltage rating		Current rating	Voltage rating	Current rating	
							12 V	0.1...4 A	
							24 V	0.1...4 A	
				A	10 V-250 V	0.1...4 A	60 V	0.1...1 A	
							110 V	0.1...0,5 A	
							220 V	0.1...0,25 A	
				B	5 V-250 V	0,05...1 A	5 V-250 V	0.05...1 A	
					Assembly status				
					M	module mounted to circuit breaker 3140-...			
X3120 -	S	0	1	A	M	ordering example			

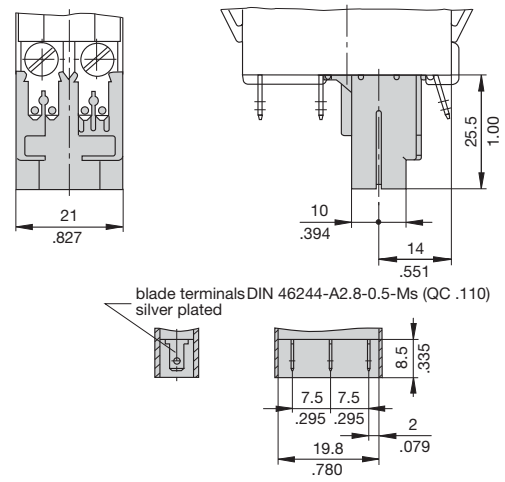
Technical data

Voltage rating	AC 250 V; DC 220 V
Current rating	0.1...4 A / 0.05...1 A
Typical life	50,000 operations
Ambient temperature	-30...+60 °C (-22...+140 °F)
Dielectric strength (IEC 60664 and 60664A) between main and auxiliary circuit	test voltage AC 3,000 V
Insulation resistance	> 100 MΩ (DC 500 V)
Vibration	6 g (type X3120-S...A) 8 g (type X3120-S...B) (57-500 Hz) ± 0.46 mm (10-57 Hz) to IEC 60068-2-6, test Fc 10 frequency cycles/axis
Shock	15 g (11 ms), type X3120-S...A 20 g (11 ms), type X3120-S...B 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. 38 g (complete assembly)

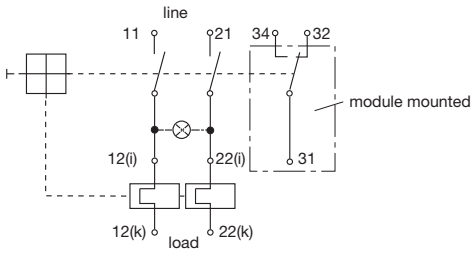
Approvals (complete circuit breaker/module assembly)

Authority	Voltage ratings	Current ratings
VDE (EN 60934)	AC 250 V; DC 28 V	0.05...4 A
UL, CSA	AC 250 V	0.05...4 A

Dimensions



Internal connection diagram



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

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E-T-A Thermal Overcurrent Circuit Breaker 2-4100-...

Description

Single pole thermal circuit breaker with push-to-reset, tease-free, trip-free, snap action mechanism (R-type TO CBE to EN 60934). Options include an additional unprotected circuit tap (-A3) and -KF housing particularly suited to high humidity and other damp conditions.
Designed for threadneck panel mounting.
Approved to CBE standard EN 60934 (IEC 60934).

Typical applications

Motors, transformers, solenoids, hand tools, appliances.

Ordering information

Type No.

2-4100 threadneck panel mounting (hardware bulk shipped)

Terminal design

- **L10** solder terminals
- **P10** blade terminals A6.3-0.8 mm (QC .250)
- **P50** blade terminals A4.8-0.8 mm (QC .190)

Shunt terminal (optional)

- **A3** shunt terminal (3 A max. load)

Current ratings

- **0.05...10 A**

2-4100 - L10 - .. - .. - 5 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

Currrent rating (A)	Internal resistance (Ω)	Current rating (A)	Internal resistance (Ω)
0.05	322	1.8	0.34
0.08	125	2	0.29
0.1	101	2.5	0.18
0.2	25	3	0.14
0.3	11	3.5	0.1
0.4	6.3	4	0.08
0.5	4.1	4.5	0.069
0.6	2.8	5	0.053
0.7	2.1	6	< 0.05
0.8	1.6	7	< 0.05
1	0.97	8	< 0.05
1.2	0.66	10	< 0.05
1.5	0.4		

Approvals

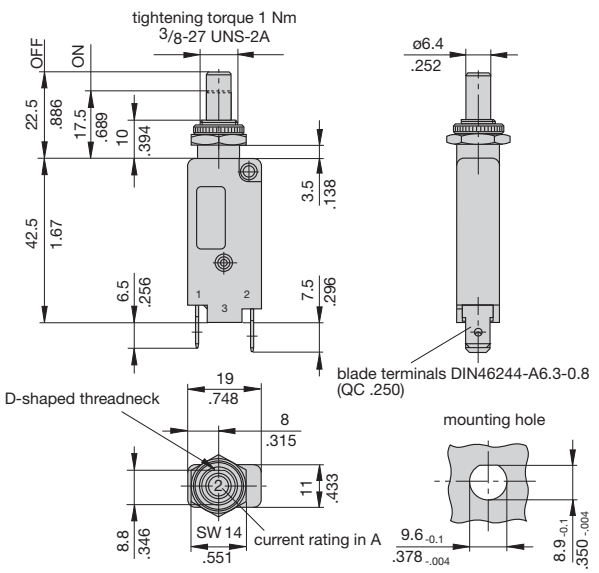
Authority	Voltage rating	Current rating
VDE (EN 60934)	AC 250 V; DC 28 V	0.05...10 A
CSA	AC 250 V	0.05...3.5A
UL	AC 250 V	0.05... 5 A
-A3 versions are not UL approved		

2-4100-...

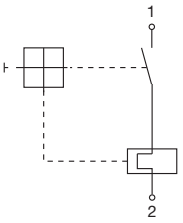
Technical data

For further details please see chapter: Technical Information		
Voltage rating	AC 250 V; DC 28 V	
Current rating range	0.05...10 A	
Typical life AC 250 V / DC 28 V: DC 28 V: 0.05...10 A	 2,000 operations at 2 x I_N, resistive 1,000 operations at 2 x I_N, inductive	
Ambient temperature	-20...+60 °C (-4...+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 60664 A) operating area	test voltage AC 3,000 V	
Insulation resistance	> 100 MΩ (DC 500 V)	
Interrupting capacity I_{cn}	0.05...2 A 2.5...6 A 7...10 A	10 x I_N 8 x I_N 6 x I_N
Interrupting capacity (UL 1077)	I_N 0.05...4.5 A 5 A	U_N AC 250 V AC 250 V
		200 A 1,000 A
Degree of protection (IEC 60529/DIN 40050)	operating area IP40 terminal area IP00	
Vibration	10 g (57-500 Hz) ± 0.76 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. 15 g	

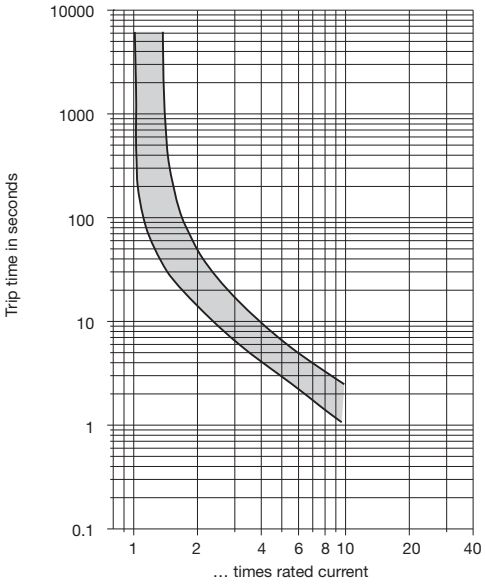
Dimensions



Internal connection diagram



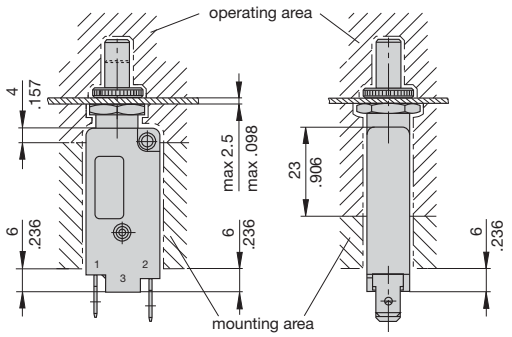
Typical time/current characteristics at +23 °C/+73.4 °F



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.

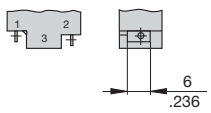
Ambient temperature °F	-4	+14	+32	+73.4	+104	+122	+140
°C	-20	-10	0	+23	+40	+50	+60
Derating factor	0.76	0.84	0.92	1	1.08	1.16	1.24

Installation drawing

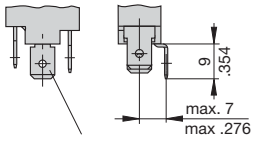


Terminal design

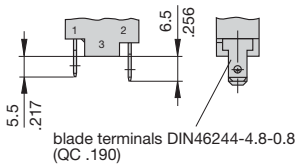
-L10



-P10-A3

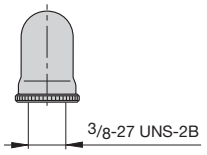


-P50

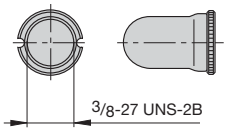


Accessories

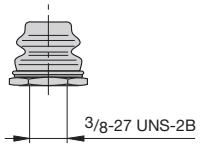
Water splash cover, transparent Y 300 538 01, bonded to knurled nut Y 300 628 01 X 200 799 01 (IP64)



Water splash cover, transparent bonded to special knurled nut X 200 798 02 (IP64)



Hex nut with splash cover, black X 210 739 01 (IP64)
Water splash cover, transparent with hex nut X 201 296 03 (IP64)



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

Description

Single pole high performance thermal circuit breaker, with push-to-reset tease free, trip-free snap action mechanism (R-type TO CBE to EN 60934). Designed for threadneck panel mounting and for applications with a high fault current switching requirement.
Approved to CBE standard EN 60934 (IEC 60934).

Typical applications

Motors, transformers, solenoids, battery chargers, power supplies, appliances, machinery, extra low voltage systems.

Ordering information

Type No.
4130 single pole thermal circuit breaker
Mounting
G threadneck panel mounting
Threadneck design
2 M12x1, knurled nut (bulk shipped)
4 M12x1, hex nut and knurled nut (bulk shipped)
Number of poles
1 single pole, thermally protected
Actuator configuration
1 black push button
Terminal design
K4 terminal M6x8
screw and washer bulk shipped
Characteristic curve
M1 medium delay
Current ratings
20... 70 A

4130 - G 2 1 1 - K4 M1 - 20 A ordering example

Standard current ratings and typical internal resistance values

Current rating (A)	Internal resistance (Ω)	Current rating (A)	Internal resistance (Ω)
20	< 0.02	40	< 0.01
25	< 0.02	50	< 0.01
30	< 0.02	60	< 0.01
35	< 0.02	70	< 0.01

Approvals

Authority	Voltage ratings	Current ratings
VDE (EN 60934)	AC 240 V; DC 50 V	20...70 A
UL	AC 240 V; AC 120 V; DC 50 V	20...80 A

4130-...

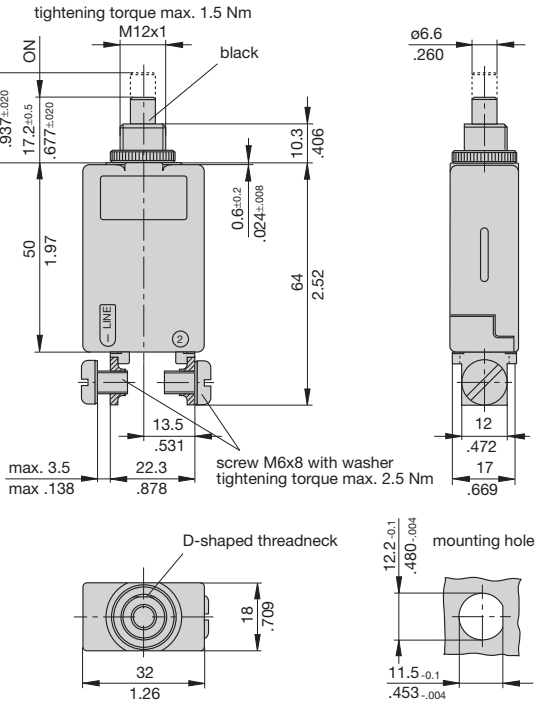
Technical data

For further details please see chapter: Technical Information

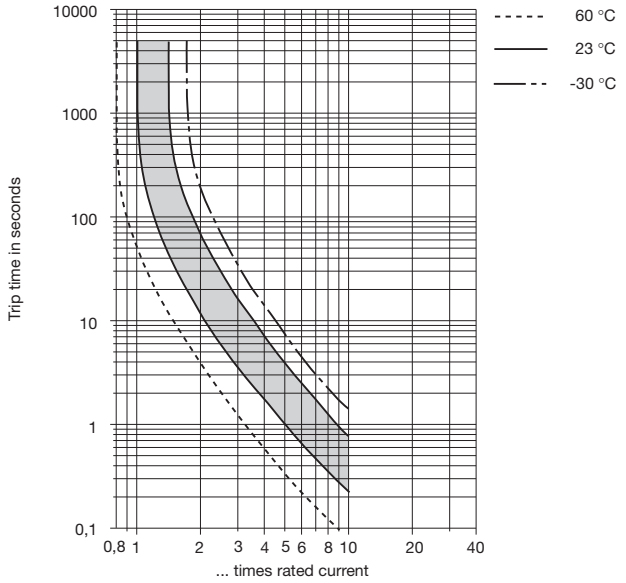
Voltage rating	AC 240 V; DC 50 V	
Current rating range	20...70 A	
Typical life AC 240 V: 20...70 A DC 50 V: 20...80 A	100 operations at 2 x I_N, inductive 500 operations at 2 x I_N, resistive 500 operations at 2 x I_N, inductive	
Ambient temperature	-30...+60 °C (-22...+140 °F)	
Insulation co-ordination (IEC 60664)	rated impulse withstand voltage 2.5 kV (reinforced insulation in the mounting area)	pollution degree 2
Dielectric strength operating area	test voltage AC 3,000 V	
Insulation resistance	> 100 MΩ (DC 500 V)	
Interrupting capacity I_{cn}	800 A	
Interrupting capacity (UL 1077)	I_N 20...70 A 20...60 A 70 A 20...50 A 60...70 A	U_N AC 240 V AC 120 V AC 120 V DC 50 V DC 50 V
		1,000 A 3,500 A 2,000 A 3,500 A 2,000 A
Degree of protection (IEC 60529/DIN 40050)	operating area IP40 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	25 g (11 ms) to IEC 60068-27, 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. 55 g	

1

Dimensions



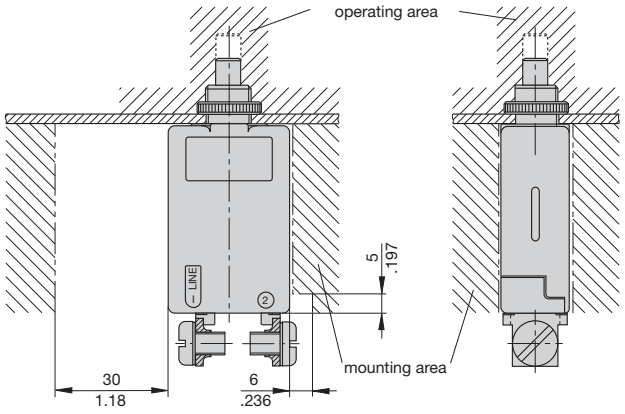
Typical time/current characteristics



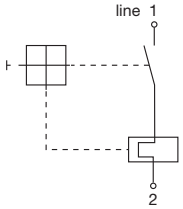
The time/current characteristic curve depends on the ambient temperature prevailing. In order to eliminate nuisance tripping, please multiply the circuit breaker current ratings by the derating factor shown below. See also section 9 – Technical information.

Ambient temperature	°F	-22	-4	+14	+32	+73.4	+104	+122	+140
	°C	-30	-20	-10	0	+23	+40	+50	+60
Derating factor		0.68	0.76	0.84	0.92	1	1.08	1.16	1.24

Intstallation drawing



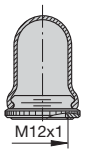
Internal connection diagram



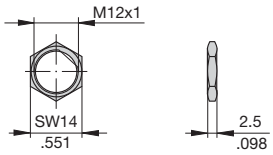
Accessories

Hex nut with splash cover, black
X 201 296 01 without O ring (IP64)
X 200 801 03 with O ring (IP66 /IP67)
Hex nut with splash cover, transparent
X 200 801 08 with O ring (IP66/IP67)

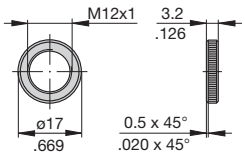
Water splash cover, transparent with knurled nut and O ring (IP64)
X 210 663 01



Separate hardware
Hex nut Y 300 116 02



Knurled nut
Y 302 065 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 circuit breaker with press-to-reset, tease-free, trip-free, snap action mechanism. Type 2-5000 is available with optional manual release (-H), type 2-5700 can be supplied as a push-push switch/circuit breaker (R-type TO CBE to EN 60934 in press-to-reset configuration; M-type when fitted with manual release -H; S-type with push-push operation). Fitted with flange or threadneck for panel mounting. Options include an additional unprotected circuit tap (-A3). Approved to CBE standard EN 60934 (IEC 60934).

Typical applications

Motors, transformers, solenoids, battery chargers, power supplies, appliances, machinery, extra low voltage systems.

2-5000-...

2-5700-...

Ordering information

Type No.	
2-5000	flange mounting
2-5700	threadneck panel mounting (hardware bulk shipped)
	Threadneck design – type 2-5700 only
iG1	moulded threadneck 3/8"-27UNS-2A
iG2	moulded threadneck M12x1
	Terminal design
P10	blade terminals 6.3-0.8 mm (QC .250)
K10	screw terminals M4x6
	Shunt terminal (optional) -P10 only
A3	shunt terminal (up to I_N 2.5 A/6 A max. load)
	Manual release (optional)
H	manual release facility (type 2-5000 only)
DD	push to release/push to reset (type 2-5700 only)
	Current ratings
	0.05...25 A

2-5700 - iG1 - P10 - .. - DD - 8 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)	Current rating (A)	Internal resistance (Ω)
0.05	280	3	0.1
0.08	100	3.5	0.06
0.1	110	4	0.06
0.2	29	4.5	0.05
0.3	14	5	0.05
0.4	7	6	0.02
0.5	4.9	7	0.02
0.6	3.4	8	0.02
0.7	2.5	10	< 0.02
0.8	1.8	12	< 0.02
1	1.2	13	< 0.02
1.2	0.8	15	< 0.02
1.5	0.6	16	< 0.02
1.8	0.4	20	< 0.02
2	0.3	22	< 0.02
2.5	0.2	25	< 0.02

Technical data

For further details please see chapter: Technical Information	
Voltage rating	AC 250 V; DC 28 V (UL: AC 250 V; DC 50 V)
Current rating range	0.05...25 A
Typical life	AC 250 V / DC 28 V: 0.05...16 A 5,000 operations at 2 x I_N, inductive 17...25 A 5,000 operations at 2 x I_N, resistive
Ambient temperature	-20...+60 °C (-4...+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
Insulation resistance	> 100 MΩ (DC 500 V)
Interrupting capacity I_{cn}	0.05...2.5 A 8 x I_N 3...5 A 20 x I_N 6...12 A 200 A (higher interrupting capacity available to special order) 13...25 A 400 A
Interrupting capacity (UL 1077)	I_N U_N 0.05...20 A AC 250 V 2,000 A 0.05...25 A DC 50 V 2,000 A (higher values upon request)
Degree of protection (IEC 60529/DIN 40050)	operating area IP40 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	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. 29 g

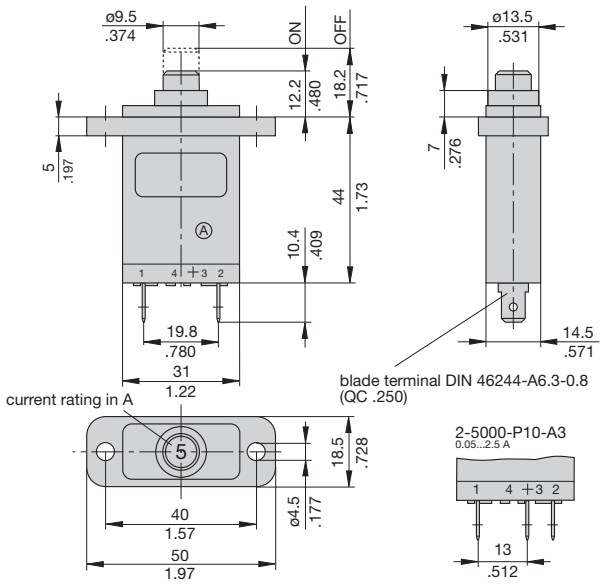
Approvals

Authority	Voltage ratings	Current ratings
VDE (EN 60934)	AC 250 V; DC 28 V	0.05...25 A
CSA/ UL	AC 250 V; DC 50 V	0.05...20 A
CCC	AC 250 V	0.05...25 A
SEV	AC 250 V; DC 28 V	0,05...25 A

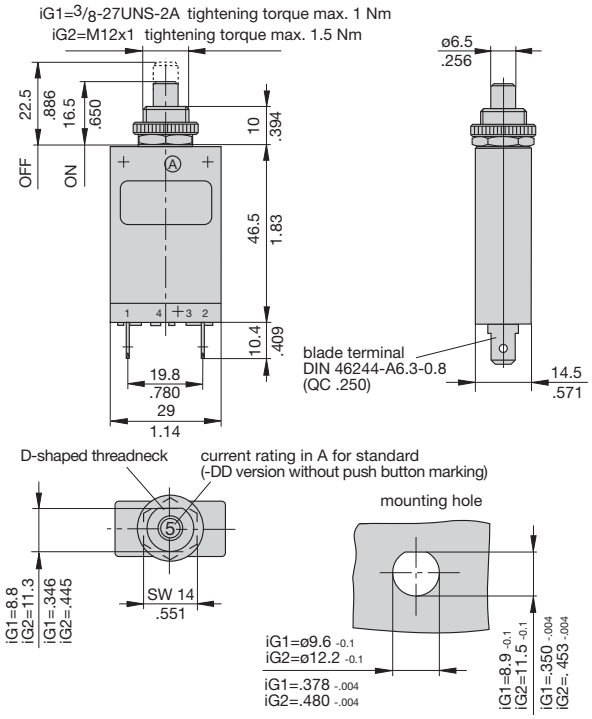
1

Dimensions

2-5000-P10

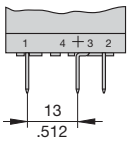


2-5700-P10

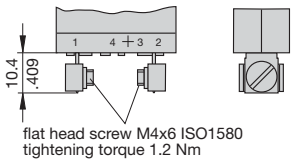


Terminal design

-P10-A3
0.05...2.5 A

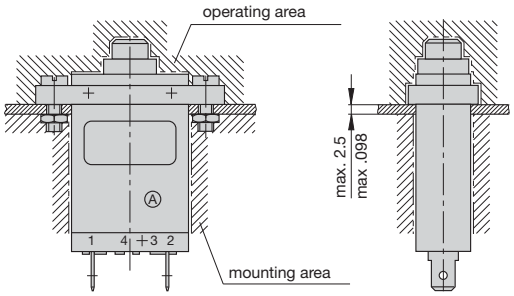


-K10

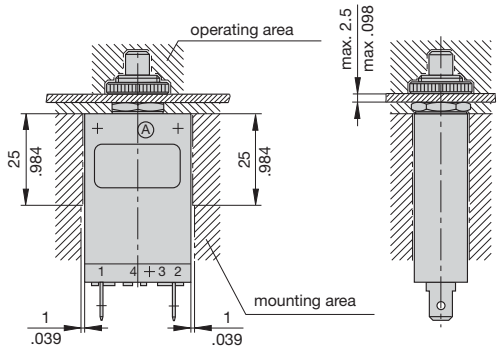


Installation drawings

2-5000-P10



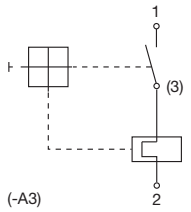
2-5700-P10



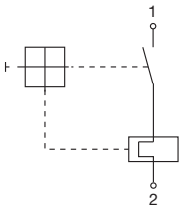
This is a metric design and millimeter dimensions take precedence (mm/inch)

Internal connection diagrams

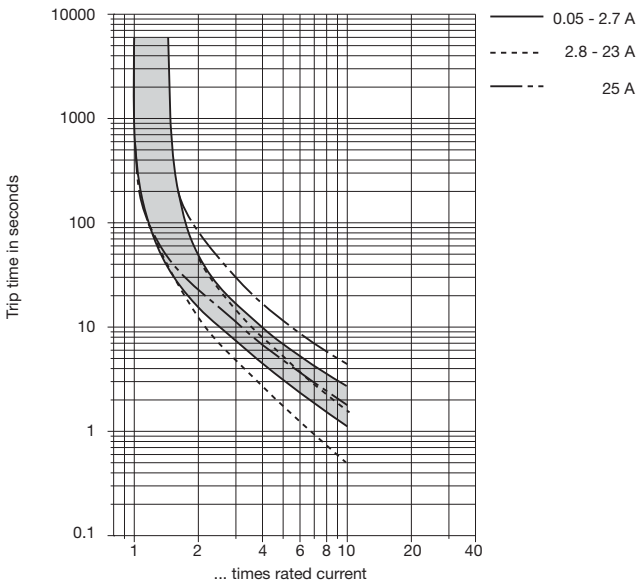
0.05 ... 2.5 A
(with or without shunt terminal)



3 ... 25 A
(without shunt terminal)



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



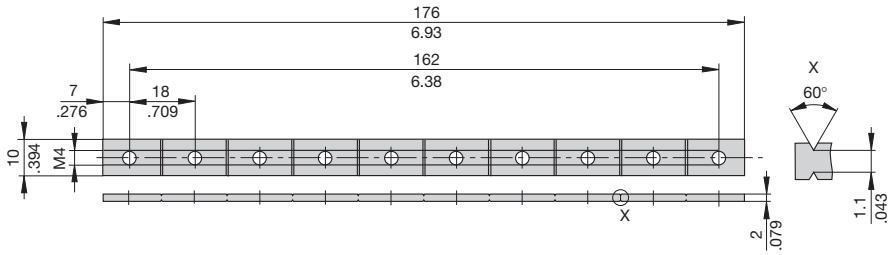
The time/current characteristic curve depends on the ambient temperature prevailing. In order to eliminate nuisance tripping, please multiply the circuit breaker current ratings by the derating factor shown below. See also section 9 – Technical information.

Ambient temperature °F	-4	+14	+32	+73.4	+104	+122	+140
°C	-20	-10	0	+23	+40	+50	+60
Derating factor	0.76	0.84	0.92	1	1.08	1.16	1.24

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

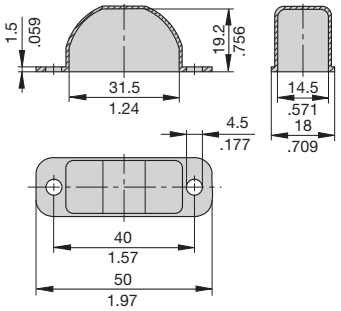
Accessories for types 2-5000 and 2-5700 with screw terminals -K10

Bus bar
Y 303 563 01

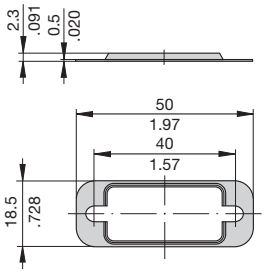


Accessories for type 2-5000-...

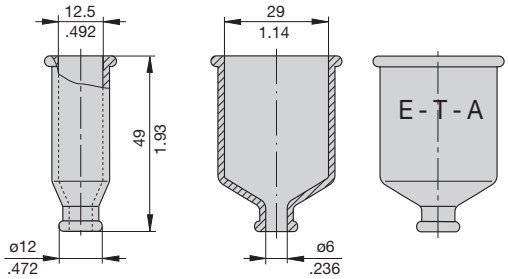
Water splash cover, transparent for push button (IP64)
Y 300 728 01



Fixing plate
Y 301 056 02



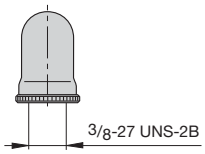
Rear terminal shroud, transparent (IP64)
Y 300 476 01



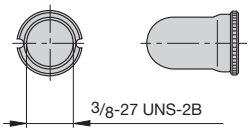
Accessories for type 2-5700-...

With 3/8" threadneck (-iG1)

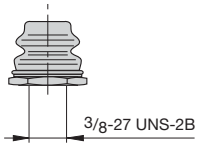
Water splash cover, transparent Y 300 538 01 and knurled nut Y 300 628 01
X 200 799 01 (IP64)



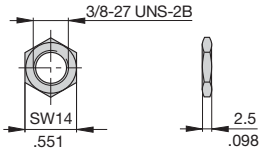
Water splash cover, transparent with special knurled nut
X 200 798 02 (IP64)



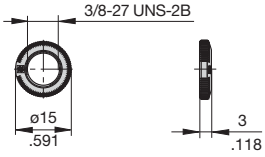
Hex nut with splash cover black without O ring
X 210 739 01 (IP64)
transparent splash cover
X 201 296 03 (IP64)



Separate hardware
Hex nut
Y 300 192 01



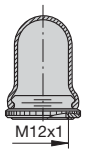
Knurled nut
Y 307 117 02



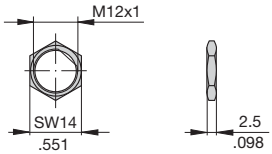
With M12 threadneck (-iG2)

Hex nut with splash cover, black
X 201 296 01 without O ring (IP64)
X 200 801 03 with O ring
(IP66 and IP67)
Hex nut with splash cover, transparent
X 200 801 08 with O ring
(IP66 and IP67)

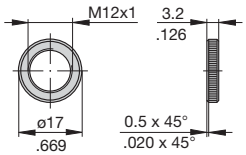
Water splash cover, transparent with knurled nut and O ring
X 210 663 01 (IP64)



Hex nut
Y 300 116 02



Knurled nut
Y 302 065 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.

E-T-A Thermal Automotive Circuit Breaker 2-5200-...

Description

Single pole thermal circuit breaker with push-to-reset, tease-free, trip-free, snap action mechanism (R-type TO CBE to EN 60934; M-type when fitted with optional manual release feature). Designed for plug-in mounting with E-T-A sockets 10 and 16.

Typical applications

Extra low voltage wiring systems and components.

Ordering information

Type No.	
2-5200	plug-in
	Manual release (optional)
H	manual release facility
	Current ratings
	0.05...16 A

2-5200 - H - .. - 5 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)	Current rating (A)	Internal resistance (Ω)
0.05	280	2.5	0.2
0.08	100	3	0.1
0.1	110	3,5	0.065
0.2	29	4	0.065
0.3	14	4.5	0.05
0.4	7	5	0.05
0.5	4.9	6	0.02
0.6	3.4	7	0.02
0.7	2.5	8	< 0.02
0.8	1.8	10	< 0.02
1	1.2	12	< 0.02
1.2	0.84	13	< 0.02
1.5	0.6	15	< 0.02
1.8	0.4	16	< 0.02
2	0.25		

Approvals

Authority	Voltage ratings	Current ratings
UL	AC 250 V; DC 50 V	0.05...20 A

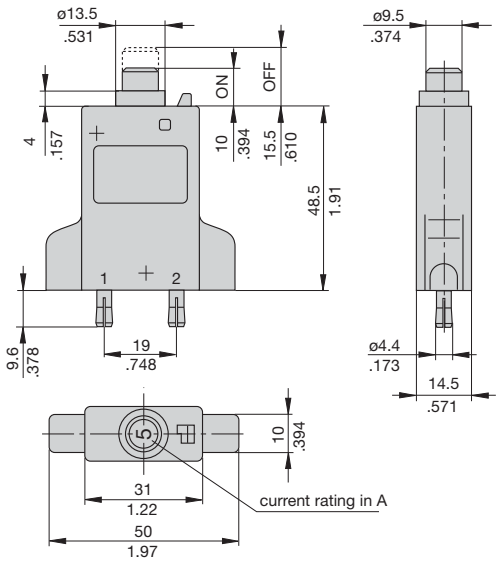
2-5200-...

Technical data

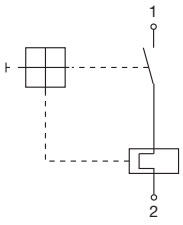
For further details please see chapter: Technical Information		
Voltage rating	DC 28 V (UL: AC 250; DC 50 V)	
Current rating range	0.05...16 A (up to 25 A to special order)	
Typical life 0.05...16 A	AC 250 V / DC 28 V: 5,000 operations at 2 x I_N, inductive	
Ambient temperature	-20...+60 °C (-4...+140 °F)	
Insulation co-ordination (IEC 60664 and 60664 A)	rated impulse withstand voltage 2.5 kV	pollution degree 2
Dielectric strength (IEC 60664 and 60664A) operating area	test voltage AC 1,500 V	
Insulation resistance	> 100 MΩ (DC 500 V)	
Interrupting capacity I_{cn}	0.05...2.5 A 3...5 A 6...16 A (25 A)	8 x I_N 20 x I_N 400 A
Degree of protection (IEC 60529/DIN 40050)	operating area IP40 terminal area IP00	
Vibration	8 g (57 to 500 Hz) ± 0.61 mm, (10-57 Hz), to IEC 60068-2-6, test Fc,	
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. 35 g	

1

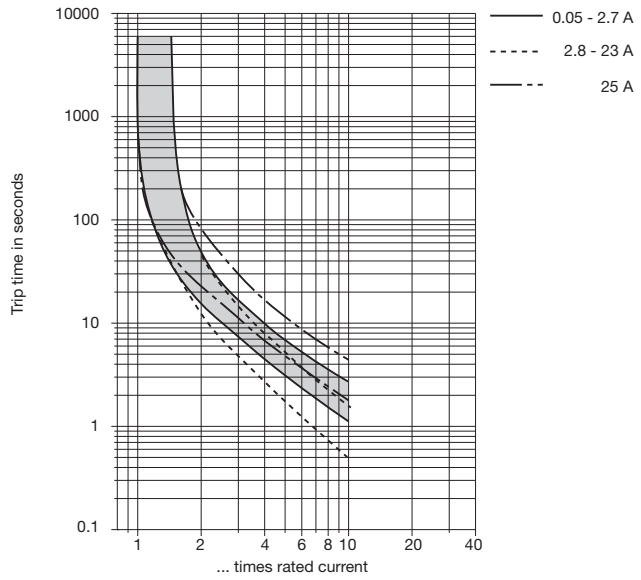
Dimensions



Internal connection diagram



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

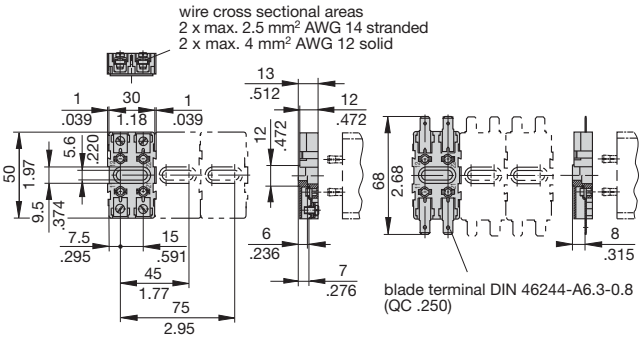


The time/current characteristic curve depends on the ambient temperature prevailing. In order to eliminate nuisance tripping, please multiply the circuit breaker current ratings by the derating factor shown below. See also section 9 – Technical information.

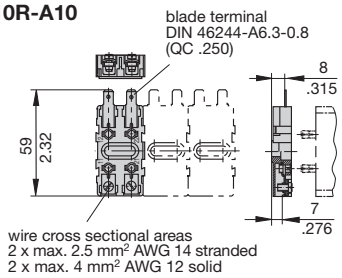
Ambient temperature °F	-4	+14	+32	+73.4	+104	+122	+140
°C	-20	-10	0	+23	+40	+50	+60
Derating factor	0.76	0.84	0.92	1	1.08	1.16	1.24

Accessories

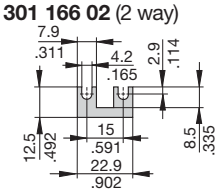
Sockets 10R-K10 **10R-P10**



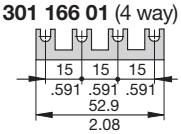
10R-A10



Bus bar for sockets 10...
Y 301 166 02 (2 way)

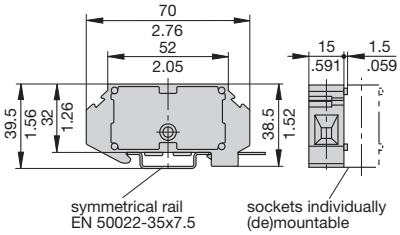


Y 301 166 01 (4 way)



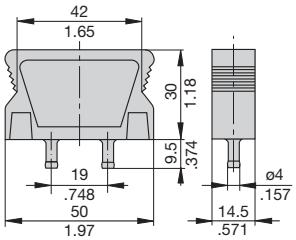
thickness = 0.8 mm
.031 in.

Socket 16
(up to 16 A max. load)

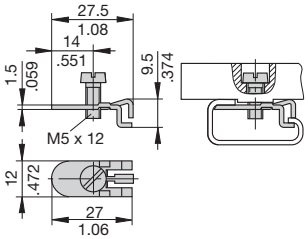


Adapter for EN rail 50035-G32 (specified as a separate item)
X 200 409 01
for socket 16 available on request

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

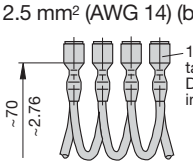


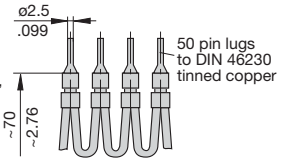
Terminal for mounting rack
X 200 800 01
for sockets 10R, 10F on EN rail 50 035-G32



Connector bus links -P10
X 210 588 01/
1.5 mm² (AWG 16) (brown)
X 210 588 02/
2.5 mm² (AWG 14) (black)
X 210 588 03/
2.5 mm² (AWG 14) (red)
X 210 588 04/
2.5 mm² (AWG 14) (blue)

Connector bus links -K10
X 210 589 01/
2.5 mm² (AWG 14) (black)
X 210 589 02/
1.5 mm² (AWG 16) (brown)





1.5 mm² - up to 13 A max. load
2.5 mm² - up to 20 A max. load

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

Description

Single pole thermal circuit breakers with push-to-reset, tease-free, trip-free, snap action mechanism (R type TO CBE to EN 60934; M-type when fitted with manual release features/type 2-6200 only).
Featuring auxiliary contacts (1 x N/C; 1 x N/O) as standard. Options include manual release (type 2-6200 only), an additional unprotected circuit tap (-A3) and a centre reset position in which all contacts are open (-ZR: type 2-6200-H only).
Approved to CBE standard EN 60934 (IEC 60934).

Typical applications

Motors, transformers, solenoids, controls for oil and gas boilers.

Ordering information

Type No.
2-6200 flange mounting, with auxiliary contacts
2-6400 threadneck panel mounting, with auxiliary contacts
mounting hardware bulk shipped

Mounting (type 2-6400 only)
iG1 moulded threadneck 3/8-27UNS-2A
iG2 moulded threadneck M12x1

Terminal design - main circuit
L10 solder terminals
P10 blade terminals A6.3-0.8 mm (QC .250)

Shunt terminal (optional)
A3 shunt terminal same as main terminal (up to 7/5 A max. load; up to 16 A/10 A max. load)

Manual release (optional)
H manual release facility (type 2-6200 only)

Intermediate position (optional)
ZR intermediate position (type 2-6200-H only)

Auxiliary contacts (standard)
Si N/O and N/C contacts, solder terminals

Current ratings
0.05...16 A

2-6200 - .. - P10 - .. - .. - .. - Si - 8 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)	Current rating (A)	Internal resistance (Ω)
0.05	257	2	0.30
0.08	138	2.5	0.20
0.1	90	3	0.12
0.2	32.2	3,5	0.10
0.3	14.6	4	0.07
0.4	8.4	4.5	0.056
0.5	5.15	5	0.046
0.6	3.82	6	0.035
0.7	2.80	7	0.03
0.8	2.15	8	< 0.02
1	1.42	10	< 0.02
1.2	0.96	12	< 0.02
1.5	0.51	15	< 0.02
1.8	0.40	16	< 0.02

2-6200-...

2-6400-...

Technical data

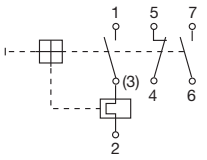
For further details please see chapter: Technical Information	
Voltage rating	AC 250 V; DC 28 V
Current rating range	0.05...16 A
Auxiliary circuit	1 A, AC 250 V/DC 28 V
Typical life 0.05...16 A	AC 250 V / DC 28 V: 5,000 operations at 2 x I_N, inductive
Ambient temperature	-20...+60 °C (-4...+140 °F)
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 circuit to aux. circuit aux. circuit 4-5 to 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}	10 x I_N
Interrupting capacity (UL 1077)	I_N / U_N: 0.05...4.5 A AC 250 V 200 A 5...7 A AC 250 V 1,000 A 8...15 A AC 250 V 2,000 A 16 A AC 250 V 3,500 A
Degree of protection (IEC 60529/DIN 40050)	operating area IP40 terminal area IP00
Vibration	10 g (57-500 Hz) ± 0.76 mm (10-57 Hz), to IEC 60068-2-6, test Fc, 10 frequency cycles/axis
Shock	40 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. 25 g

Approvals

Authority	Voltage ratings	Current ratings
VDE (EN 60934)	AC 250 V; DC 28 V	0.05...16 A
CSA/ UL	AC 250 V; DC 28 V	0.05...16 A

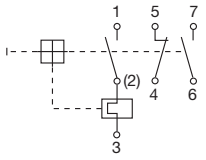
Internal connection diagrams

0.05 ... 7 A



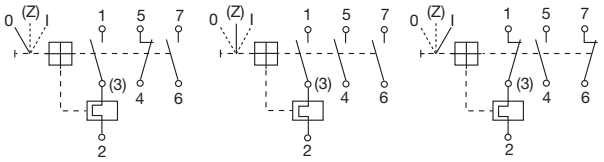
(-A3)

8 ... 16 A



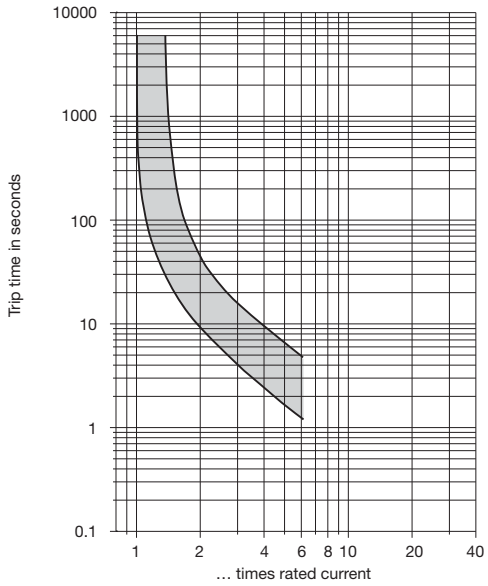
(-A3)

2-6200-...-ZR



OFF position | intermediate position | ON position

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

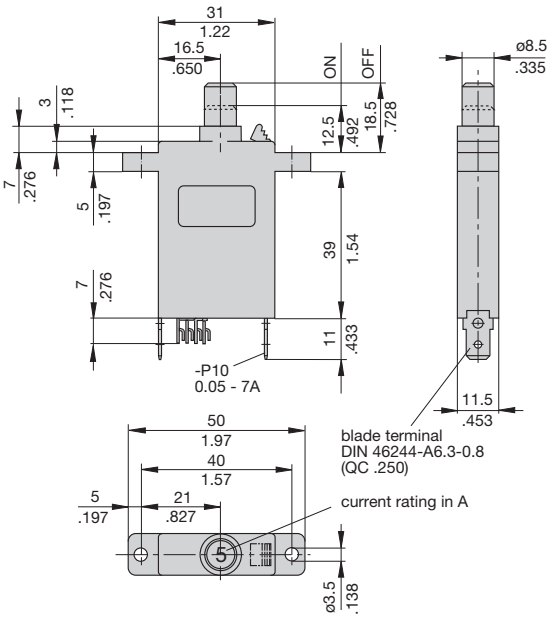


The time/current characteristic curve depends on the ambient temperature prevailing. In order to eliminate nuisance tripping, please multiply the circuit breaker current ratings by the derating factor shown below. See also section 9 – Technical information.

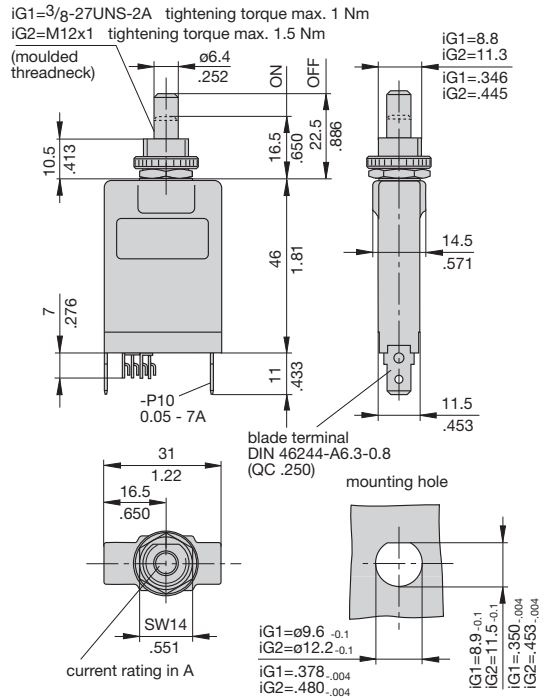
Ambient temperature °F	-4	+14	+32	+73.4	+104	+122	+140
°C	-20	-10	0	+23	+40	+50	+60
Derating factor	0.76	0.84	0.92	1	1.08	1.16	1.24

Dimensions

2-6200-...



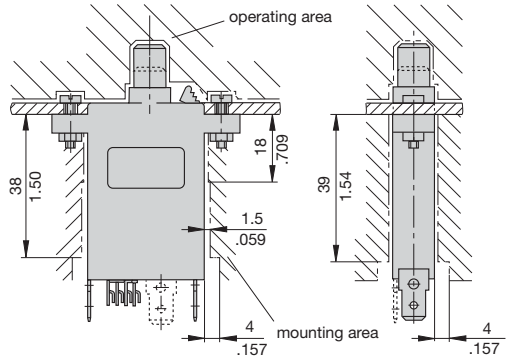
2-6400-...



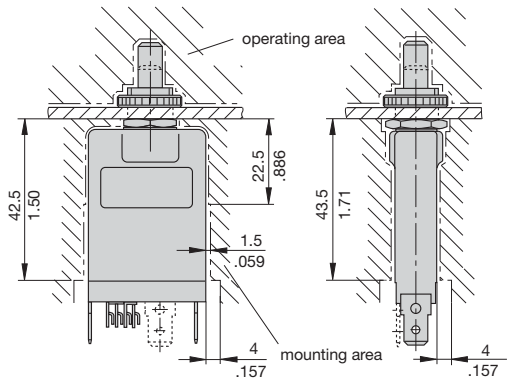
This is a metric design and millimeter dimensions take precedence (mm / inch)

Installation drawings

2-6200-...



2-6400-...

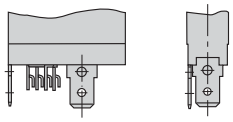


Terminal design

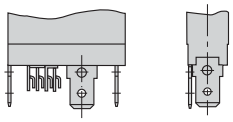
-P10 0.05...7 A

See dimension diagram.

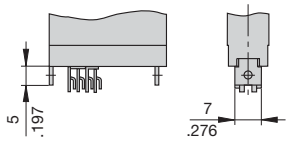
-P10 8...16 A



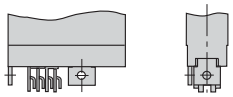
-P10-A3 0.05...16 A



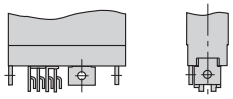
-L10 0.05...7 A



-L10 8...16 A



-L10-A3 0.05...16 A

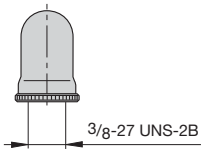


This is a metric design and millimeter dimensions take precedence ($\frac{mm}{inch}$)

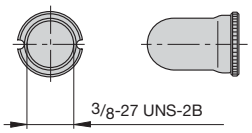
Accessories for type 2-6400-...

With 3/8" threadneck (-iG1)

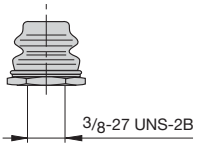
Water splash cover, transparent Y 300 538 01 and knurled nut Y 300 628 01
X 200 799 01 (IP64)



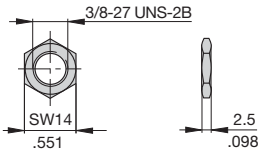
Water splash cover, transparent with special knurled nut
X 200 798 02 (IP64)



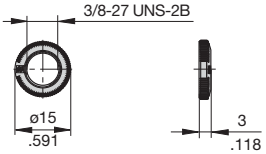
Hex nut with splash cover black without O ring
X 210 739 01 (IP64)
transparent splash cover
X 201 296 03 (IP64)



Separate hardware
Hex nut
Y 300 192 01



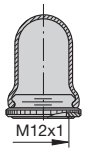
Knurled nut
Y 307 117 02



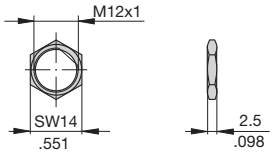
With M12 threadneck (-iG2)

Hex nut with splash cover, black
X 201 296 01 without O ring (IP64)
X 200 801 03 with O ring
(IP66 and IP67)
Hex nut with splash cover, transparent
X 200 801 08 with O ring
(IP66 and IP67)

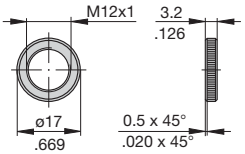
Water splash cover, transparent with knurled nut and O ring
X 210 663 01 (IP64)



Hex nut
Y 300 116 02



Knurled nut
Y 302 065 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

Bimetal operated single pole motor protection control with automatic reset actuation, small physical size, reliable snap-action mechanism.

Caution: In specifying this product, care should be taken to ensure that automatic motor re-start does not represent a safety hazard.

Typical applications

Motors, transformers, extra low voltage wiring.

Ordering information

Type No.	
2-6500	surface type with flange
	Terminal design
	P10 blade terminals 6.3-0.8 (QC .250)
	Shunt terminal (optional)
	A3 blade terminals or solder terminals; max. load 5 A
	Current ratings
	0.1...10 A
2-6500 - P10 - ... - 6 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)	Current rating (A)	Internal resistance (Ω)
0.1	140	2	0.47
0.2	47.5	2.5	0.33
0.3	20.5	3	0.212
0.4	11.4	3.5	0.155
0.5	7.25	4	0.107
0.6	5.35	4.5	0.095
0.7	3.8	5	0.072
0.8	2.95	6	0.054
1	1.92	7	0.032
1.2	1.32	8	0.02
1.5	0.85	9	< 0.02
1.8	0.59	10	< 0.02

Approvals

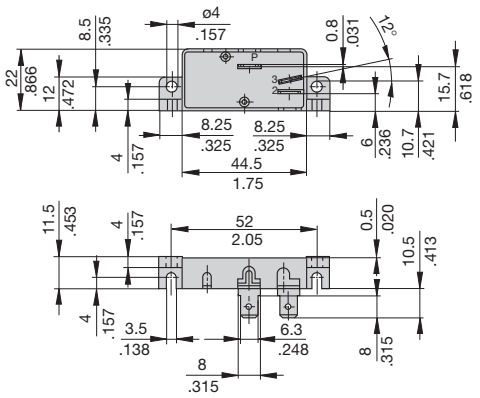
Authority	Voltage rating	Current rating
UL	AC 250 V; DC 28 V	0.1...10 A

2-6500-...

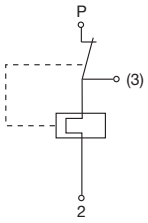
Technical data

Voltage rating	AC 250 V (50/60 Hz); DC 28 V
Current ratings	0.1...10 A (up to 15 A upon request)
Typical life	100,000 operations at 2 x I_N Protection is ensured for 18 days of continuous locked rotor condition with $I_k \leq 6 \times I_N$, max. 30 A (unsupervised duty)
Ambient temperature	-10...+60 °C (-10...+140 °F)
Insulation co-ordination (IEC 60664 and 60664 A)	rated impulse withstand voltage 2.5 kV; pollution degree 3
Dielectric strength (IEC 60664 and 60664A)	test voltage AC 2,000 V
Insulation resistance	> 100 MΩ (DC 500 V)
Interrupting capacity	8 x I_N (co-co-co)
Reset time at 23 °C	≥ 30 sec ≤ 70 sec
Degree of protection (IEC 60529/DIN 40050)	housing 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	15 g (11 ms) test to IEC 60068-2-27, test Ea
Corrosion	48 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. 20 g

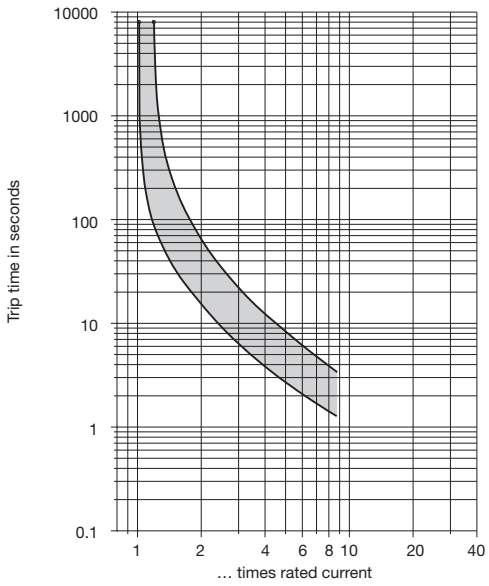
Dimensions



Internal connection diagram



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



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	+14	+32	+50	+73.4	+861	+104	+122	+140
	°C	-10	0	+10	+23	+30	+40	+50	+60
Derating factor		0.84	0.92	1	1	1	1.08	1.16	1.24

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.