

Description

Single, double and three pole high performance thermal-magnetic circuit breakers with tease-free, trip-free, snap action mechanism and toggle actuation (S-type TM CBE to EN 60 934; also to EN 60 947). Designed for rail, panel or surface mounting. Available with a choice of characteristic curves and optional auxiliary contacts.

Typical applications

Motors, generators, transformers, thyristors and silicon rectifiers.

Interrupting capacity to IEC 60947/EN 60947

AC voltage

Number of poles	Voltage rating	Interrupting capacity I_N 12...125 A	Power factor	Interrupting capacity I_N 7 + 10 A	Power factor
1	AC 240 V	5,000 A	$\cos\varphi = 0.7$	3,500 A	$\cos\varphi = 0.8$
2	AC 240 V	8,000 A	$\cos\varphi = 0.7$	6,000 A	$\cos\varphi = 0.7$
3	3 AC 415 V	5,000 A	$\cos\varphi = 0.7$	3,000 A	$\cos\varphi = 0.85$

DC voltage

Number of poles	Voltage rating	Interrupting capacity $I_N = 12...125$ A	Time constant	Interrupting capacity $I_N = 7 + 10$ A	Time constant
1	DC 110 V	3,000 A	13 ms	3,000 A	L/R = 5 ms
1	DC 110 V	5,000 A	5 ms		
2	DC 110 V	5,000 A	13 ms	3,000 A	L/R = 5 ms
2	DC 110 V	10,000 A	≈ 0 ms		

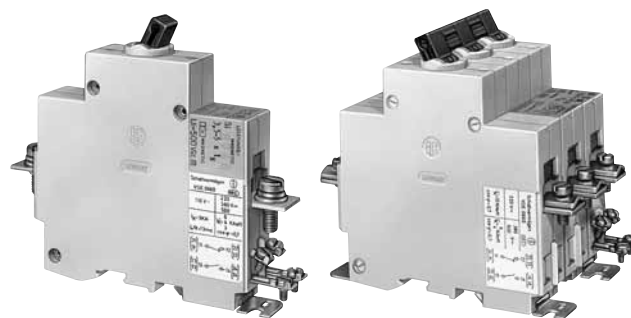
Standard current ratings and typical internal resistance values

Curves 01, 02, 04, 05:

Current rating (A)	Internal resistance (Ω) per pole	Current rating (A)	Internal resistance (Ω) per pole
10	0.033	7	0.033
16	0.015	10	0.015
20	0.010	12	0.015
25	0.0062	16	0.010
32	0.0039	20	0.0062
40	0.0031	25	0.0039
50	0.0022	32	0.0031
63	≤ 0.002	40	0.0022
80	≤ 0.002	50	≤ 0.002
90	≤ 0.002	63	≤ 0.002
100	≤ 0.002	80	≤ 0.002
125	≤ 0.002	100	≤ 0.002

Approvals

Authority	Voltage ratings	Current ratings
UL	AC 277 V	7...125 A (type 520)
UL Canada	AC 277 V	7...125 A (type 520)



410-...

530-...

Technical data

Voltage rating	AC 240 V; 3 AC 415 V; DC 110 V	
Current rating range	10...125 A (EN 60947), curves 01/02/04/05 7...100 A (EN 60898), curves B3/C3/01	
Auxiliary circuit	6 A, AC 240 V or DC 28 V 1 A, DC 110 V	
Typical life	10,000 operations at $1 \times I_N$ 20,000 operations mechanical	
Ambient temperature	-20...+60 °C (-4...+140 °F)	
Insulation co-ordination (IEC 60664 and 60664A)	rated impulse withstand voltage 6 kV	pollution degree 3
Dielectric strength (IEC 60664 and 60664A)	test voltage operating area pole/pole main circuit/aux.circuit aux. circuit 11-12/13-14	AC 3,300 V AC 3,300 V AC 2,200 V AC 1,000 V
Insulation resistance	> 100 MΩ (DC 500 V)	
Degree of protection (IEC 60529/DIN 40050)	operating area IP40 terminal area IP00	
Vibration	curves 02/04/05/B3/C3: 4 g (60-500 Hz), ± 0.30 mm (10-60 Hz) curve 01: 3 g (60-500 Hz), ± 0.23 mm (10-60 Hz) to IEC 60068-2-6, test Fc 10 frequency cycles/axis	
Shock	curves 02, 04, 05, B3, C3: 50 g (11 ms) directions 1, 2, 3, 4, 5 30 g in direction 6 curve 01: 30 g (11 ms) in directions 1, 2, 3, 4, 5 20 g in direction 6 to IEC 60068-2-7, test Ea	
Corrosion	96 hours at 5 % salt mist, to IEC 60068-2-11, test Ka	
Humidity	240 hours at 95 % RH to IEC 60068-2-3, test Ca	
Mass	410 (1-pole): approx. 290 g 520 (2-pole): approx. 580 g 530 (3-pole): approx. 870 g	

Ordering information

Type No.

- 410** single pole (ratings > 125 A: suffix 17015 - parallel connection)
520 double pole
530 three pole

Terminal design - main terminals

K screw terminals

- 10-32 A pressure plate B5-DIN 46288 (curves B3/C3, 7-25 A)
 40-63 A pressure plate B6-DIN 46288 (curves B3/C3, 32-63 A)
 80-125 A terminal screw DIN 46206, sheet 2, form 1, M6 thread

Mounting

- 1** surface mounting
2 rail mounting (DIN EN 50022-35x7.5) or panel mounting
3 rail mounting on G profile (DIN EN 50035-G32) or panel mounting
4 panel mounting with cylinder head screw M3.5
5 mounting brackets

Magnetic trip curves

- 01** 2.1-3 x I_N AC (thyristor and rectifier protection)
02 7-10 x I_N AC (motor and generator protection to EN 60947)
04 3.5-5 x I_N AC (cable protection to EN 60947)
05 4-6 x I_N AC (generator protection to EN 60947)
B3 3-5 x I_N AC (cable protection to EN 60898)
C3 5-10 x I_N AC (cable protection to EN 60898)

Auxiliary contacts optional (terminals M3.5)

Si one each N/O and N/C contact

Si1 one N/C (11,12)

Si2 one N/O (13,14)

2Si two each N/O and N/C (types 520/530)

3Si three N/C, three N/O (type 530)

Current ratings

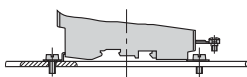
7...125 A

520 - K - 1 - 01 - ... - 10 A ordering example

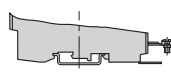
The exact number required can be built up from the table of choices shown above. Ordering references for optional features should be omitted if not required.

Mounting methods

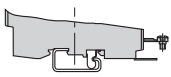
Surface mounting -1



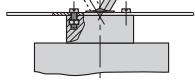
rail mounting (DIN EN 50 022-35x7,5) -2



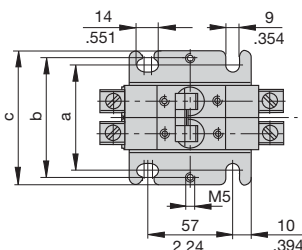
rail mounting on G profile (DIN EN 50 035-G32) -3



panel mounting -4

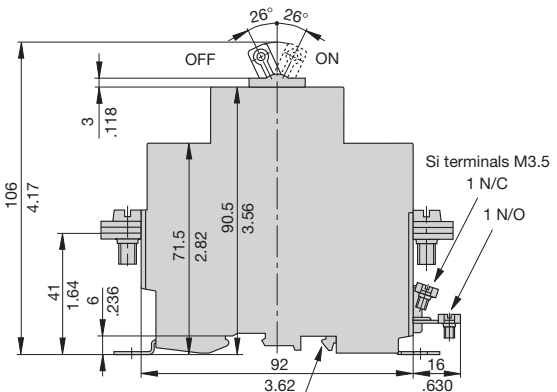


surface mounting with mounting brackets -5



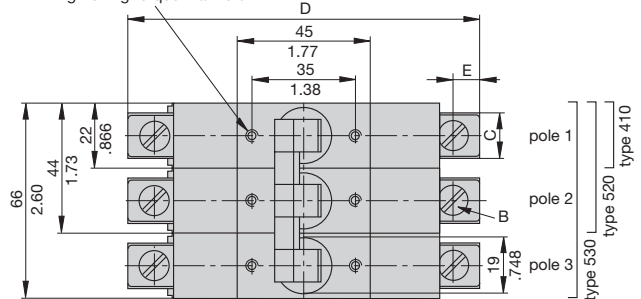
	a		b		c	
	mm	in.	mm	in.	mm	in.
type 410	50	1.97	61.5	2.42	70	2.76
type 520	72	2.84	83.5	3.29	92	3.62
type 530	94	3.70	105.5	4.15	114	4.49

Dimensions

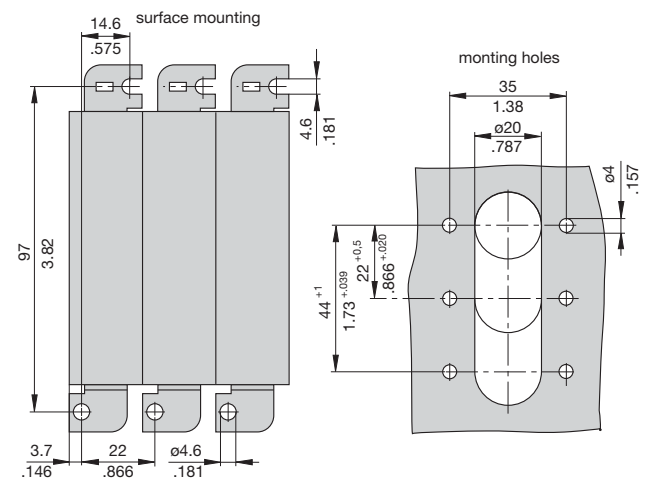


symmetrical rail DIN EN 50022-35x7.5
 G profile rail DIN EN 50035-G32 (not shown)

M3.5 - thread max. 9 mm (.354 in.) deep
 tightening torque max. 0.8 Nm



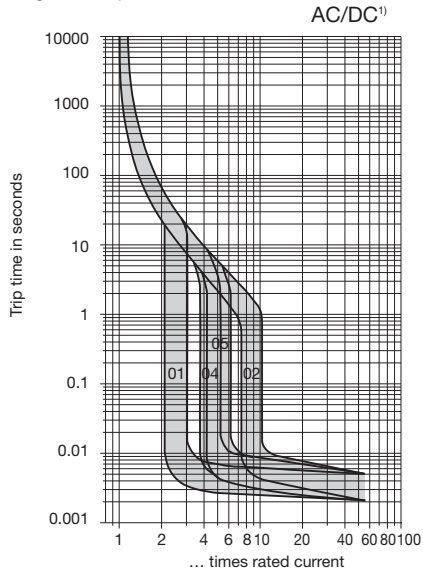
Current rating	Dimensions mm/in.				Terminal	Cross section (see DIN 46288)		Max. tightening torque
	B	C	D	E		with 1 or 2 equal conductors	with 2 different conductors	
≤ 32 A	M5	13 .512	114 4.49	7 .276	pressure plate B5 DIN 46288	2.5 mm ² to 10 mm ²	2.5 mm ² to 10 mm ²	2.0 Nm
≤ 63 A	M6	15.4 .606	120 4.72	9 .354	pressure plate B6 DIN 46288	4 mm ² to 16 mm ²	4 mm ² and 6 mm ² or 6 mm ² to 16 mm ²	2.5 Nm
≤ 125 A	M6	15.4 .606	120 4.72	9 .354	terminal screw			2.5 Nm



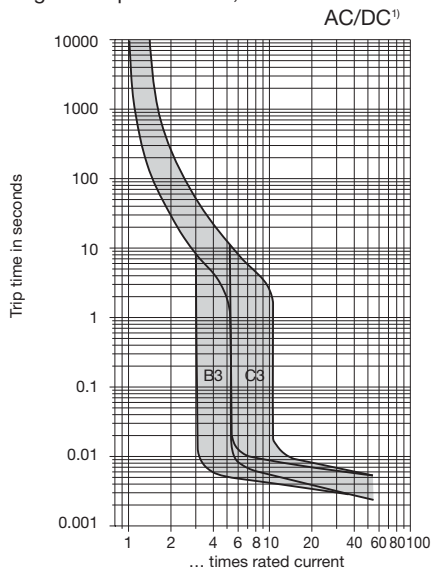
This is a metric design and millimeter dimensions take precedence (mm)
 inch

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

Magnetic trip curves 01,02,04,05



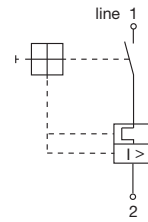
Magnetic trip curves B3,C3



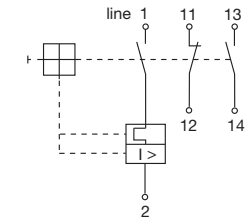
¹) Magnetic tripping currents are increased by 20% on DC supplies.

Internal connection diagrams

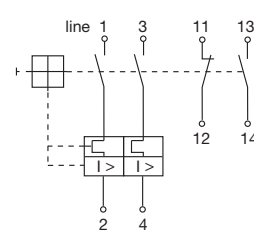
Type 410-K



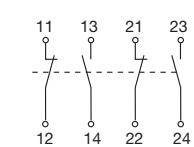
Type 410-K-Si



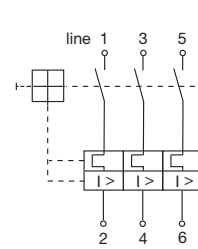
Type 520-K-Si



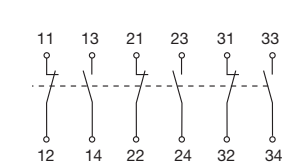
Type 520-K-2Si



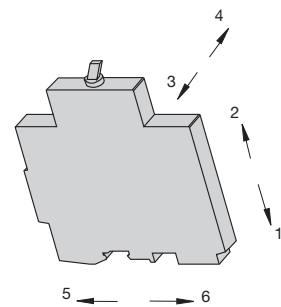
Type 530-K-Si



Type 530-K-3Si

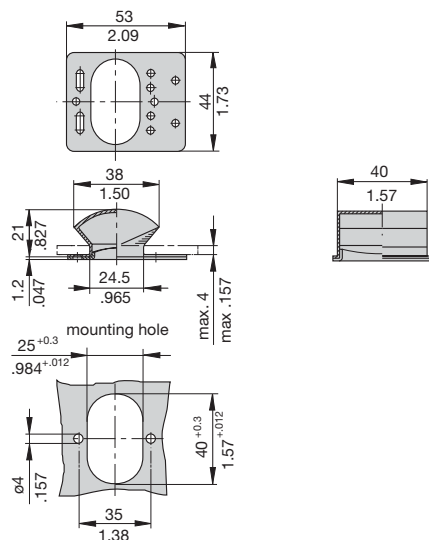


Shock directions

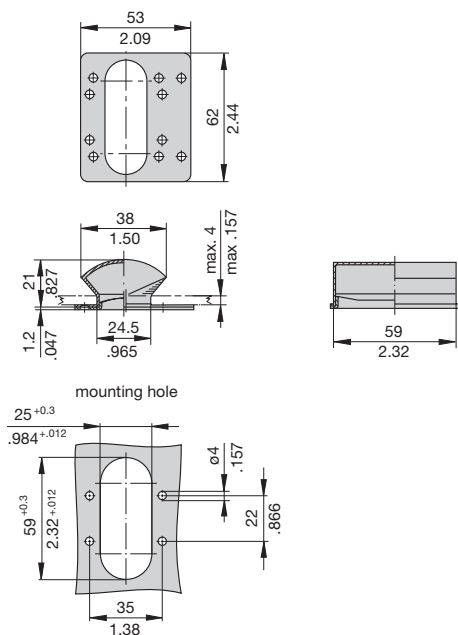


Accessories

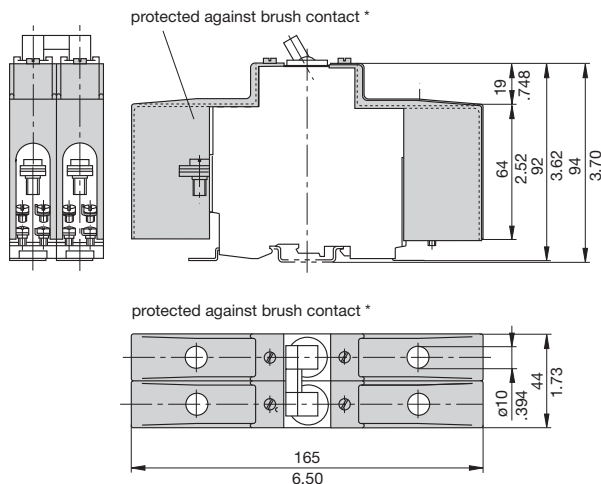
**Splash cover (transparent),
with fixing plate and screws (IP54)
for type 410
X 211 118 01**



**Splash cover (transparent),
with fixing plate and screws (IP54)
for type 520
X 211 119 01**



**Terminal insulation cover for 410/520/530-...
X 211 705 01
(1 set = 2 pcs per pole)**



* to DIN 57106T100/VDE 0106 T100

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

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 high performance thermal circuit breaker with tease-free, trip-free, snap action mechanism and push/pull on/off manual actuation (M-type TO CBE to EN 60934). An indicator band on the push button clearly shows the tripped/off position. Threadneck panel mounted and available in tracked vehicle, aircraft and general purpose versions.

Typical applications

Extra low voltage wiring systems on all types of vehicles for land, sea and air; defence equipment; battery powered machines.

Ordering information

Type No.	
412	threadneck panel mounting
Terminal design	
K14	screw terminals M4 (to aircraft specs.)
K54	screw terminals M4 sealed housing (to vehicle specs.)
Version	
FN2	vehicle application, nickel-plated
LN2	aircraft application, black finish
N2	general application, nickel-plated
Current ratings	
6...25 A	(-FN2)
7.5...35 A	(-LN2/N2)
412 - K14 - LN2 - 10 A ordering example	

Standard current ratings and typical voltage drop values

Current rating (A)	Voltage drop (mV) -LN/N	Voltage drop (mV) -FN	Current rating (A)	Voltage drop (mV) -LN/N	Voltage drop (mV) -FN
6	-	≤ 300	15	≤ 200	≤ 200
7.5	≤ 300	≤ 250	20	≤ 200	≤ 200
8	≤ 250	≤ 200	25	≤ 200	≤ 200
10	≤ 200	≤ 200	30	≤ 200	-
12	≤ 200	≤ 200	35	≤ 200	-
13	≤ 200	≤ 200			

Approvals

Test authority	Voltage ratings	Current ratings
UL	DC 28 V	0.1...35 A



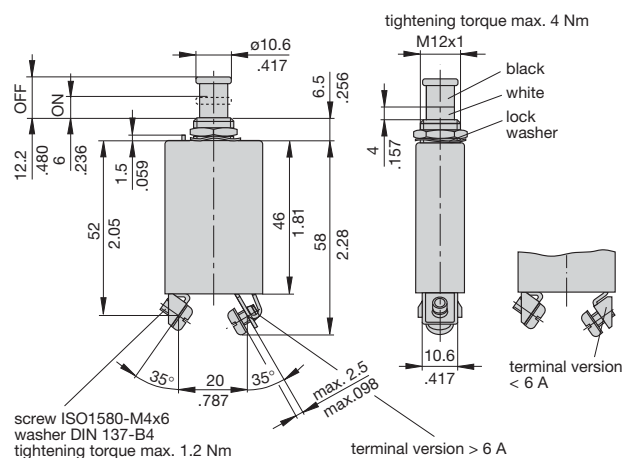
412-...

Technical data

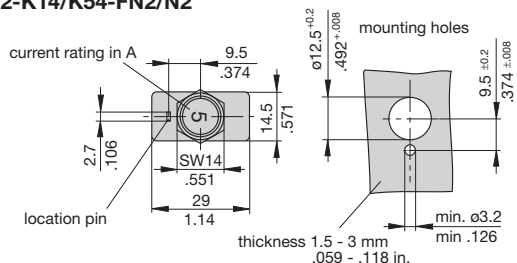
Voltage rating	DC 28 V AC 115 V (400 Hz) upon request	
Current rating range	6...25 A (-FN2) 7.5...35 A (-LN2/-N2), lower current ratings to special order	
Typical life	4,000 operations at 2 x I _N	
Ambient temperature	-55...+75 °C (-67...+167 °F)	
Insulation co-ordination (IEC 60664 and 60664A)	rated impulse withstand voltage 1.5 kV	pollution degree 3
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}	6,000 A	
Interrupting capacity (UL 1077)	6,000 A	
Degree of protection (IEC 60529/DIN 40050)	operating area IP40 terminal area IP00	
Vibration	10 g (56-500 Hz), ± 0.76 mm (10-55 Hz) to VG 95210, sheet 19, MIL-STD-202, meth. 204, IEC 60068-2-6, test Fc	
Shock	25 g (11 ms) to VG 95210, sheet 28, MIL-STD-202, meth. 213, IEC 60068-2-27, test Ea	
Corrosion	96 hours at 5 % salt mist, to VG 95210, sheet 2, MIL-STD-202, meth. 101, IEC 60068-2-11, test Ka	
Humidity	240 hours at 95 % RH to VG 95210, sheet 7, MIL-STD-202, meth. 106, IEC 60068-2-3, test Ca	
Mass	approx. 40 g	

Dimensions

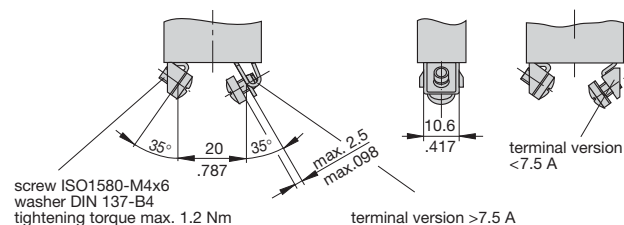
412-K54-FN2/N2



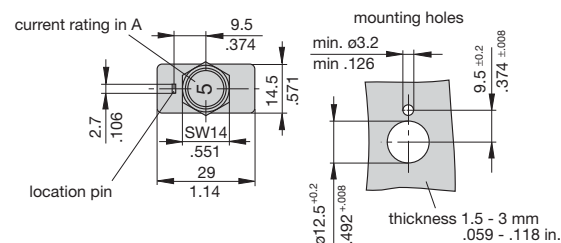
412-K14/K54-FN2/N2



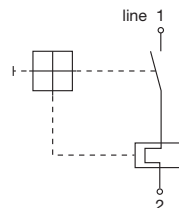
412-K14-LN2



412-K14/K54-LN2

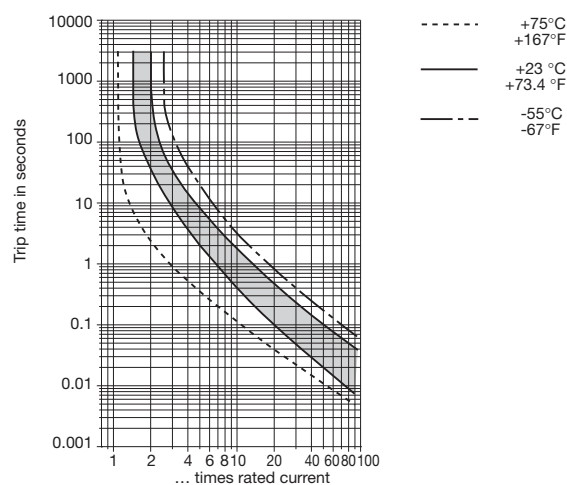


Internal connection diagram

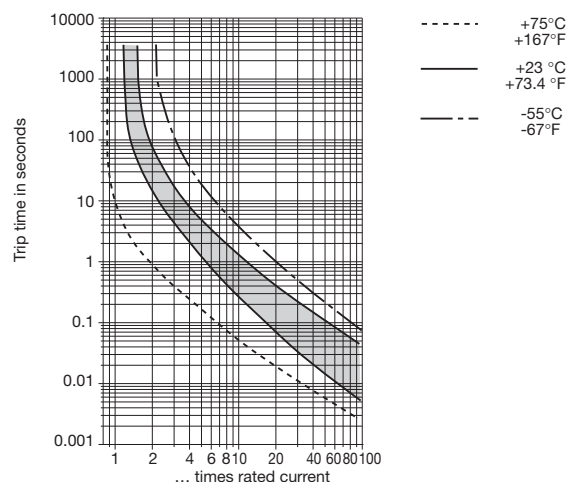


Typical time/current characteristics

412-...-FN2 6...25 A



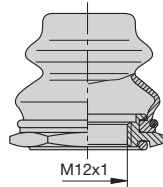
412-...-LN2/-N2 7.5...35 A



Accessories (approved to VG 95345, part 23)

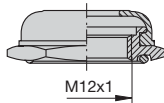
Splash cover /hex nut assembly with O ring (IP66 and IP67)

X 200 801 08 - nickel plated nut M12x1, transparent cover
X 200 801 03 - matt black finish nut M12x1, black cover

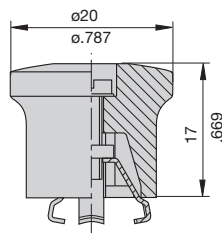


Splash cover black /hex nut assembly with O ring (IP54)

X 200 802 01 - nickel plated nut M12x1
X 200 802 02 - matt black finish nut M12x1



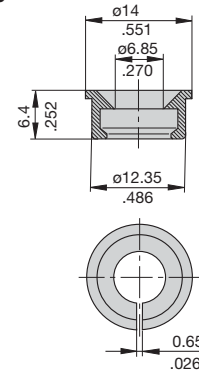
Actuator extension (black) to be fitted on the push button **X 200 803 01**



Accessories

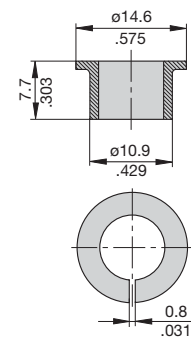
Identification collar to be snapped on the push button

Y 307 004 01 black
Y 307 004 02 white
Y 307 004 03 red
Y 307 004 04 green
Y 307 004 05 blue



Lock out ring to block the push button in OFF position

Y 307 005 01 red
Y 307 005 02 black



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Description

Single pole high performance thermal circuit breaker with tease-free, trip-free, snap action mechanism and push/pull on/off manual actuation (M-type TO CBE to EN 60934). An indicator band on the push button clearly shows the tripped/off position. Threadneck panel mounted and available in tracked vehicle, aircraft and general purpose versions.

Typical applications

Extra low voltage wiring systems on all types of vehicles for land, sea and air; defence equipment; battery powered machines.

Ordering information

Type No.

413 threadneck panel mounting

Terminal design

K14 screw terminals M6 (to aircraft specs.)

K34 reinforced screw terminals M6 (to vehicle specs.)

K54 as K34, but housing sealed

Version

FN2 vehicle application, nickel-plated

LN2 aircraft application, black finish

N2 general application, nickel-plated

Current ratings

30...55 A (-FN2)

30...90 A (-LN2/N2)

413 - K14 - LN2 - 40 A ordering example

Standard current ratings and typical voltage drop values

Current rating (A)	Voltage drop (mV) -LN/N	Voltage drop (mV) -FN	Current rating (A)	Voltage drop (mV) -LN/N	Voltage drop (mV) -FN
30	≤ 250	≤ 250	55	-	≤ 200
35	≤ 250	≤ 250	60	≤ 200	-
40	≤ 200	≤ 200	70	≤ 200	-
45	≤ 200	≤ 200	80	≤ 200	-
50	≤ 200	≤ 200	90	≤ 200	-

Approvals

Test authority	Voltage ratings	Current ratings
UL	DC 28 V	30...90 A
QPL Sweden	DC 28 V	30...50 A



413-...

Technical data

Voltage rating	DC 28 V AC 115 V (400 Hz) upon request	
Current rating range	30...55 A (-FN2) 30...90 A (-LN2/-N2),	
Typical life	2,000 operations at 1 x I _N	
Ambient temperature	-55...+75 °C (-67...+167 °F)	
Insulation co-ordination (IEC 60664 and 60664A)	rated impulse withstand voltage 1.5 kV	pollution degree 3
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}	6,000 A	
Interrupting capacity (UL 1077)	6,000 A	
Degree of protection (IEC 60529/DIN 40050)	operating area IP40 terminal area IP00	
Vibration	10 g (56-500 Hz), ± 0.76 mm (10-55 Hz) to VG 95210, sheet 19, MIL-STD-202, meth. 204, IEC 60068-2-6, test Fc	
Shock	50 g (11 ms) to VG 95210, sheet 28, MIL-STD-202, meth. 213, IEC 60068-2-27, test Ea	
Corrosion	96 hours at 5 % salt mist, to VG 95210, sheet 2, MIL-STD-202, meth. 101, IEC 60068-2-11, test Ka	
Humidity	240 hours at 95 % RH to VG 95210, sheet 7, MIL-STD-202, meth. 106, IEC 60068-2-3, test Ca	
Mass	approx. 65 g	

Internal connection diagram

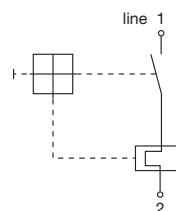
Technical drawing of the SW14 component, showing front and top views with dimensions in inches and millimeters.

Front View Dimensions:

- Current rating in A: 9.5
- Location pin: 2.7
- Pin diameter: .106
- SW14 label: .551
- Pin spacing: .374
- Pin diameter: .32
- Pin spacing: 1.26
- Max. pin length: max. .19
- Max. pin length: max. .748

Top View Dimensions:

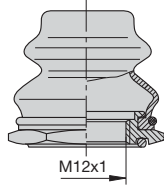
- Mounting holes: 9.5 ± 0.2
- Mounting hole diameter: $\phi 12.5 \pm 0.2$
- Mounting hole diameter: $\phi 9.2 \pm 0.2$
- Mounting hole diameter: $\phi 3.2$
- Mounting hole diameter: min. $\phi 3.2$
- Mounting hole diameter: min. .126
- Thickness: 1.5 - 3 mm
- Thickness: .059 - .118 in.



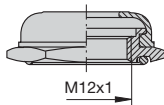
Issue B

Accessories (approved to VG 95345, part 23)

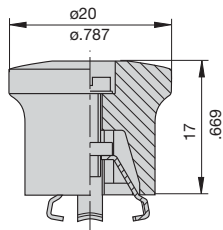
Splash cover /hex nut assembly with O ring (IP66 and IP67)
X 200 801 08 - nickel plated nut M12x1, transparent cover
X 200 801 03 - matt black finish nut M12x1, black cover



Splash cover black /hex nut assembly with O ring (IP54)
X 200 802 01 - nickel plated nut M12x1
X 200 802 02 - matt black finish nut M12x1



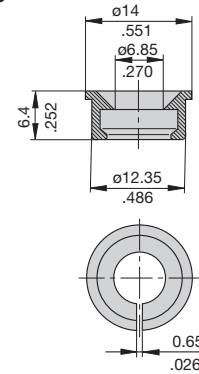
Actuator extension (black)
to be fitted on the push button
X 200 803 01



Accessories

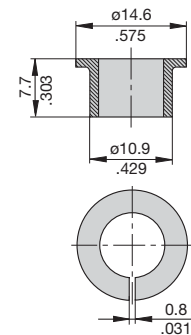
Identification collar to be snapped on the push button

Y 307 004 01 black
Y 307 004 02 white
Y 307 004 03 red
Y 307 004 04 green
Y 307 004 05 blue



Lock out ring to block the push button in OFF position

Y 307 005 01 red
Y 307 005 02 black



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

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 high performance version of type 3200 (section 2) thermal-magnetic circuit breaker with tease-free, trip-free, snap action mechanism and additional manual release (M-type TM CBE to EN 60934). Designed for plug-in mounting with E-T-A sockets 10R or 16. Available with optional silver plated terminal pins for use in corrosive environments. Approved to CBE standard EN 60934 (IEC 60934).

Typical applications

Extra low voltage systems, control equipment.

Ordering information

Type No.

428 plug-in

Current ratings

0.05...25 A

428 - 10 A ordering example

Standard current ratings and typical internal resistance values

Current rating (A)	Internal resistance (Ω)	Current rating (A)	Internal resistance (Ω)
0.05	534	4	0.1407
0.1	149	5	0.1068
0.2	56	6	0.0627
0.3	24.2	7	0.0491
0.4	13.65	8	≤ 0.02
0.5	8.08	10	≤ 0.02
0.6	5.25	12	≤ 0.02
0.8	3.55	14	≤ 0.02
1	2.02	15	≤ 0.02
1.5	0.904	16	≤ 0.02
2	0.514	18	≤ 0.02
2.5	0.36	20	≤ 0.02
3	0.23	25	≤ 0.02

Approvals

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



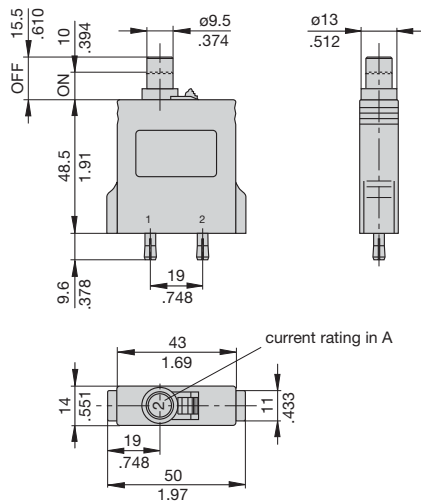
428-...

Technical data

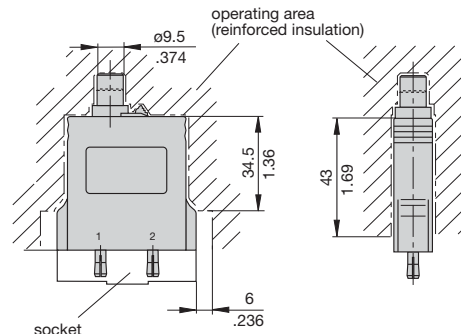
For further details please see chapter: Technical Information

Voltage rating	AC 250 V (50/60 Hz); DC 28 V	
Current rating range	0.05...25 A	
Typical life	2,000 operations at $1 \times I_N$, inductive 4,000 operations at $1 \times I_N$, 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) operating area	test voltage AC 3,000 V	
Insulation resistance	> 100 M Ω (DC 500 V)	
Interrupting capacity I_{cn}	0.05...5 A 400 A 5.5...7.5 A 750 A 8...25 A 1,500 A (with back-up fuse NH 40 A to IEC 60269/VDE 0636)	
Degree of protection (IEC 60529/DIN 40050)	operating area IP40 terminal area IP00	
Vibration	5 g (57-500 Hz), ± 0.38 mm (10-57 Hz) to IEC 60068-2-6, test Fc 10 frequency cycles/axis	
Shock	25 g (11 ms) to IEC 60068-2-27, test Ea	
Corrosion	96 hours at 5 % salt mist to IEC 60068-2-11, test Ka	
Humidity	240 hours at 95 % RH to IEC 60068-2-3, test Ca	
Mass	approx. 50 g	

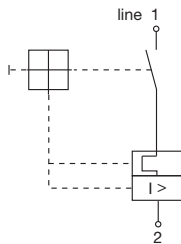
Dimensions



Installation drawing



Internal connection diagram

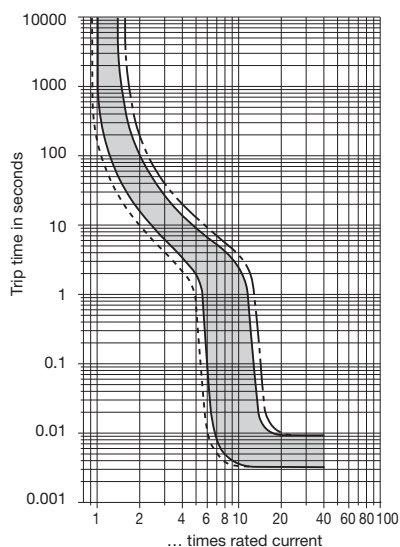


This is a metric design and millimeter dimensions take precedence ($\frac{\text{mm}}{\text{inch}}$)

Typical time/current characteristics

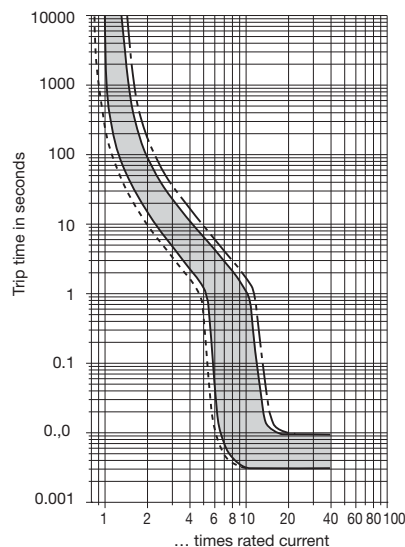
0.05 ... 7 A

AC/DC ¹⁾



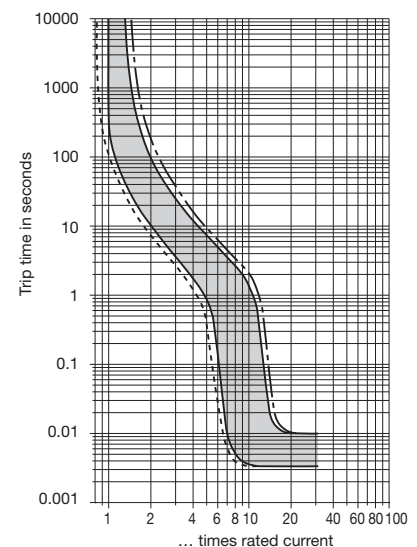
8 ... 16 A

AC/DC ¹⁾



18 ... 25 A (for $I_N \geq 20$ A 50% ON duty/30 minutes)

AC/DC ¹⁾

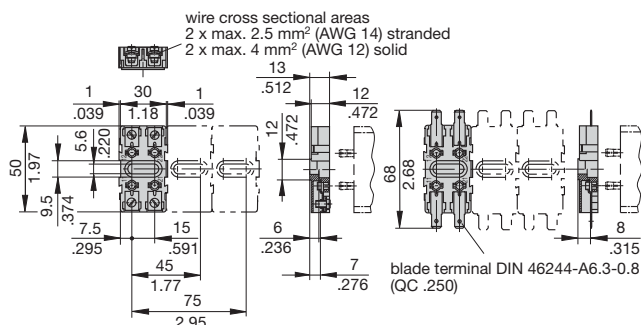


--- +60 °C --- +23 °C --- -30 °C
--- +140 °F --- +73.4 °F --- -22 °F

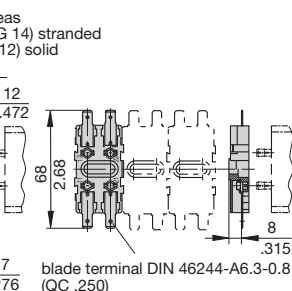
¹⁾ Magnetic tripping currents are increased by 20% on DC supplies.

Accessories

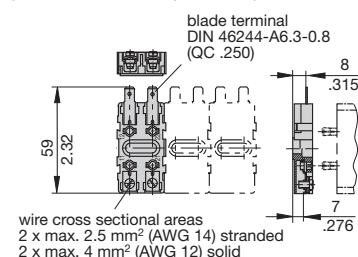
Sockets 10R-K10 (continuous load up to 20 A)



10R-P10 (continuous load up to 16 A)

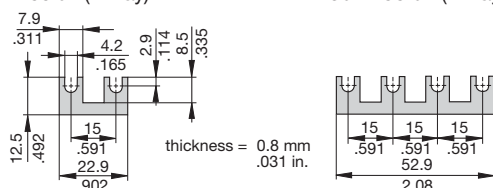


10R-A10 (continuous load up to 16 A)

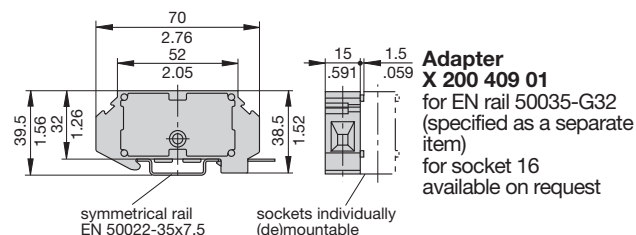


Bus bars for sockets 10-.... (continuous load up to 20 A)

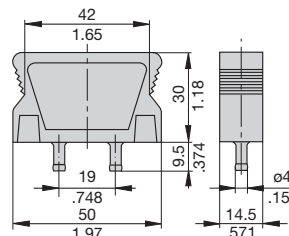
Y 301 166 02 (2-way) **Y 301 166 01** (4-way)



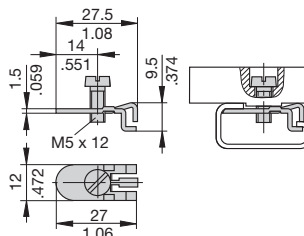
Socket 16 (continuous load up to 16 A)



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

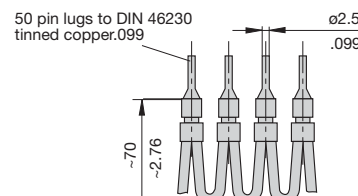


Terminal for mounting rack X 200 800 01 for socket 10R, 10F on EN rail 50 035-G32



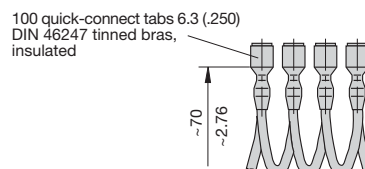
Connector bus links -K10

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



Connector bus links -P10

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



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

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 high performance thermal-magnetic circuit breaker with tease-free, trip-free, snap action mechanism and toggle actuation (S-type TM CBE to EN 60934). Options include auxiliary contacts, a moulded flame retardant enclosure for added environmental protection, and remote operation - disconnection only, or disconnection and re-connection. Now also available in an IP65 housing (see E-1032, page 269).

Typical applications

Battery and cable protection for all types of vehicles (including rail vehicles and boats), battery powered systems.

Ordering information

Type No.

437 single pole, toggle actuator (2-pole upon request)

Enclosure design (optional)

- B3** moulded, high environmental protection degree, without operating knob
- B31** moulded, high environmental protection degree, with operating knob
- B35** as B31, but for remote disconnection and re-connection facility
- C3** housing without operating knob, single pole, IP65

Terminal design

- K12** flat screw terminals M10, for enclosure B3, B31 or B35
- K60** flat screw terminals DIN 46206, sheet 2, form 1, thread M10
- K71** compulsory and only for C3 housing

Mounting

- 1** lugs
- 2** compulsory and only for C3 housing
- 5** brackets

Characteristic curve

- 06** fast trip
- 07** delayed trip

Auxiliary contacts (blade terminals 6.3x08)

- Si** one each N/O and N/C
- Si01** one N/C (11/12), two N/O (13/14 + 23/24)
- Si2** one N/O (13/14)
- 2Si2** two N/O

Remote trip (optional)

- FA** electrical remote disconnection
- FC** electrical remote disconnection (FA) and re-connection (FE)
- BC-FA** electrical remote disconnection (FA) and manual/remote re-connection not for enclosure B and C

Coil voltage

- 12** DC 12 V
 - 24** DC 24 V
- (higher voltage ratings upon request)

Current ratings

40...240 A

Voltage ratings

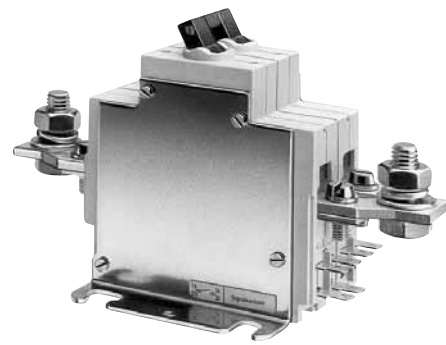
- (blank) ≤ DC 110 V
- B** > DC 110 V

437 - ... - K60 - 5 - 06 - 2Si2 - FA 24 - 50A - ... 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)
40	< 0.003	120	≤ 0.002
50	< 0.002	160	≤ 0.001
63	≤ 0.002	200	≤ 0.001
80	≤ 0.002	240	≤ 0.001
100	≤ 0.002		



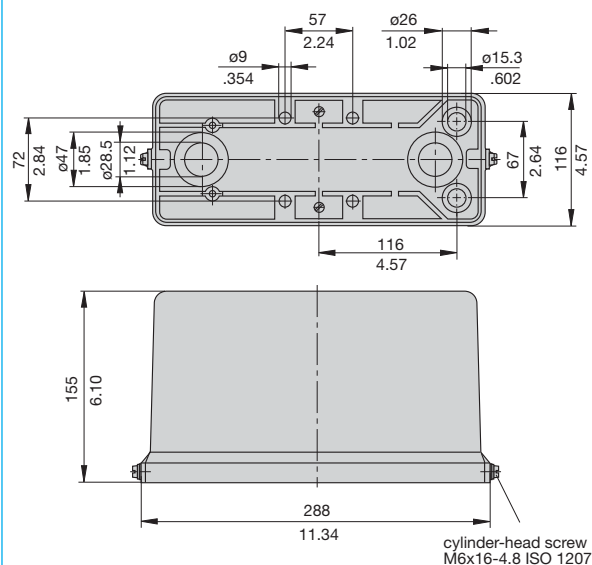
437-...

Technical data

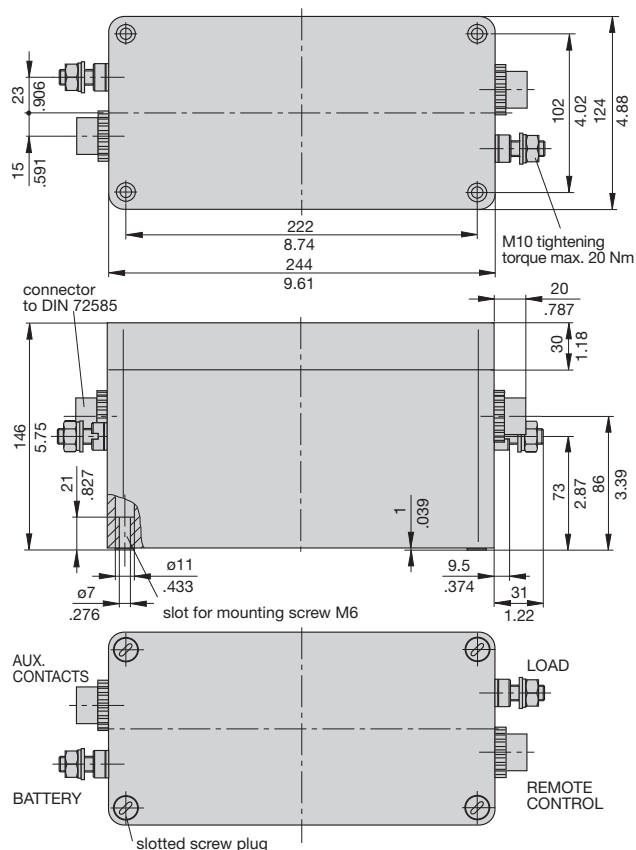
Voltage rating	DC 144 V (higher voltage ratings upon request)	
Current rating range	40...240 A (higher current ratings upon request)	
Auxiliary contact rating	6 A max. at DC 28 V 0.2 A at DC 180 V	
Electrical remote disconnection (-FA)	operating voltage DC 12 V or DC 24 V operating current approx. 18 A or 12 A max. pulse time 10 ms < t _{ON} < 20 ms / t _{OFF} > 10 s switching time < 20 ms	
Electrical remote re-connection (-FC)	operating voltage DC 12 V or DC 24 V operating current approx. 30 A or 15 A max. pulse time 0.1 s < t _{ON} < 1.2 s / t _{OFF} > 60 s switching time < 100 ms	
Typical life	3,000 operations at 240 A, DC 180 V 10,000 operations at 240 A, DC 28 V 20,000 operations mechanical	
Ambient temperature	-40...+60 °C (-40...+140 °F)	
Insulation co-ordination (IEC 60664 and 60664 A)	rated impulse withstand voltage 6 kV	pollution degree 3
Dielectric strength (IEC 60664 and 60664 A)	test voltage operating area AC 3,300 V main to aux. circuit AC 2,200 V aux. circuits 11-12 to 13-14 AC 1,000 V	
Insulation resistance	> 100 MΩ (DC 500 V)	
Interrupting capacity I _{cn}	2,000 A at DC 180 V; L/R = 0 ms 10,000 A at DC 28 V; L/R = 0 ms 7,500 A at DC 28 V; L/R = 13 ms	
Degree of protection (IEC 60529/DIN 40050)	operating area IP40, terminal area IP00 with enclosure B IP54 with enclosure C IP65	
Vibration	curve 06: 3 g (60-500 Hz), ± 0.23 mm (10-60 Hz) curve 07: 4 g (60-500 Hz), ± 0.30 mm (10-60 Hz) to IEC 60068-2-6, test Fc, 10 frequency cycles/axis	
Shock	curve 06: 20 g (11 ms), to IEC 60068-2-27, test Ea curve 07: 25 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 60068-2-3, test Ca	
Mass	approx. 900 g base unit + approx. 400 g remote disconnection + approx. 100 g remote re-connection + approx. 750 g B housing + approx. 1,000 g C housing	

Dimensions

Moulded enclosure IP54 -B3

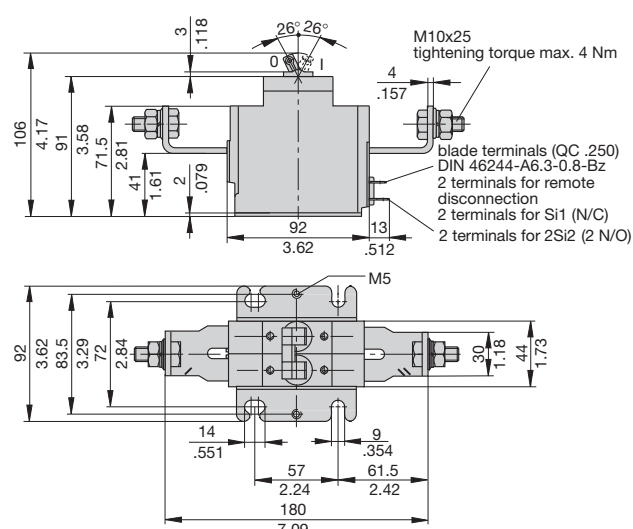


Moulded enclosure IP65 -C3

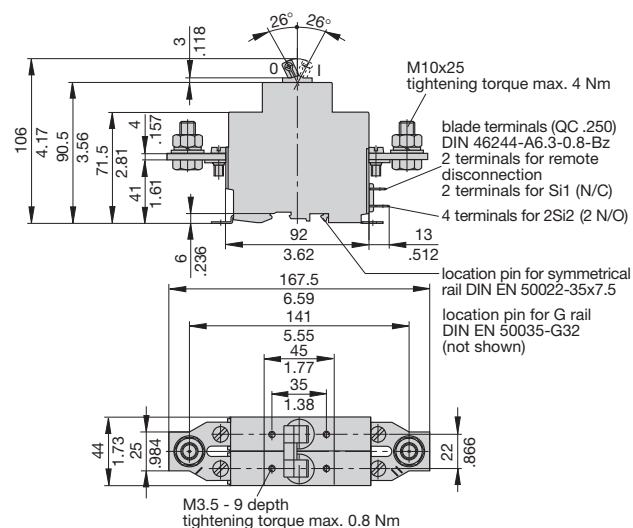


Dimensions

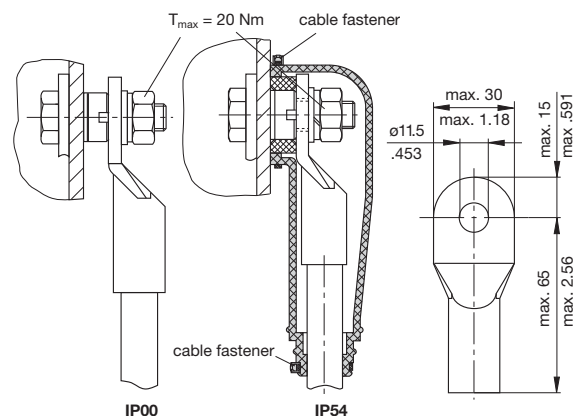
437-K12-5-Si-...-FA



437-K60-1-...-FA



Terminals with housing C3

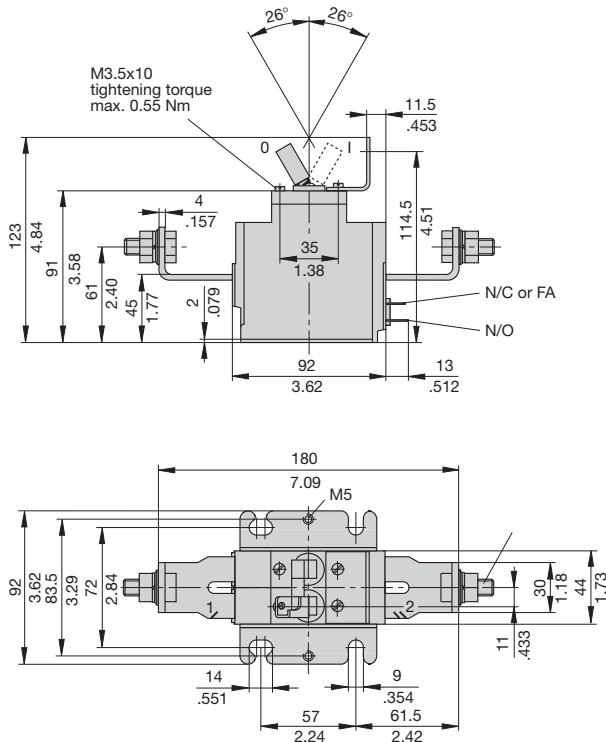


Rubber caps and cable fasteners are supplied with the product.

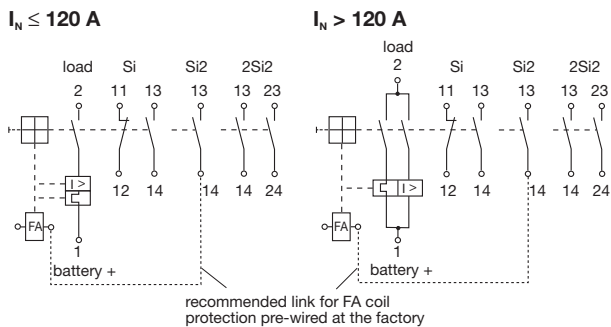
This is a metric design and millimeter dimensions take precedence ($\frac{\text{mm}}{\text{inch}}$)

Dimensions

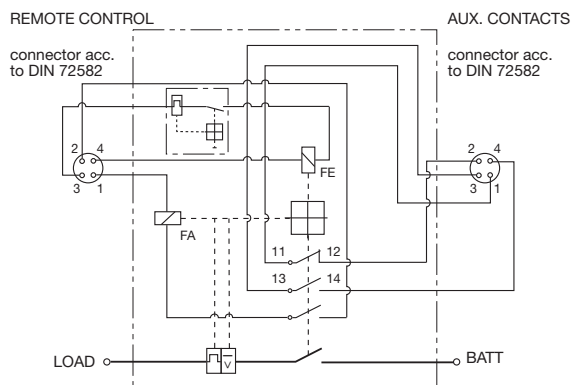
437-K12-...-BC-FA..



Internal connection diagram



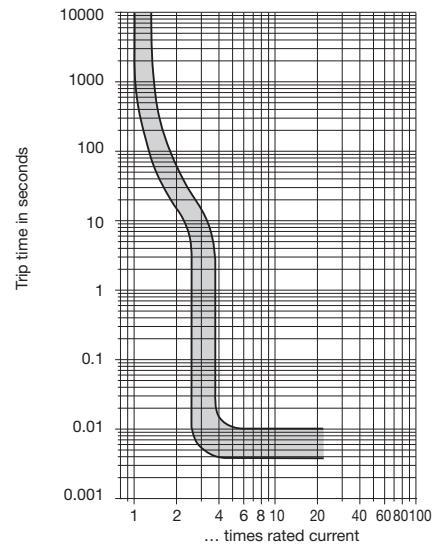
for housing C3



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

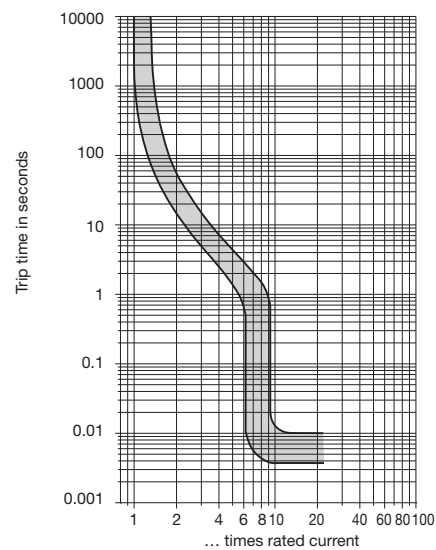
Curve 06 (fast trip)

DC



Curve 07 (delayed trip)

DC



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

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Description

Single pole thermal-magnetic circuit breakers with tease-free, trip-free, press-to-reset snap action mechanism and special dual button manual release which avoids the danger of unintended disconnection (M-type TM CBE to EN 60934). Surface mounted, compact design available with fast acting, standard and delayed switching characteristics. Options include auxiliary contact and remote electrical disconnection.

Typical applications

Heavy duty vehicles, battery systems, process control.

Ordering information

Type No.

- 446** single pole base mounting, fast characteristic curve
- 447** single pole base mounting, medium delay characteristic curve
- 449** single pole base mounting, delayed characteristic curve

Terminal design, mounting

- K** screw terminals M12, insertion nuts M8
- S** screw terminals M12, insertion nuts 5/16-18

Manual release

- H** standard

Version

- N** general application (type 446 only)
- FN** general application (types 447 and 449 only)

Auxiliary contacts (optional)

- Si** 2 electrically separate auxiliary contacts with screw terminals M3.5 and blade terminals DIN 46244-C-MS-S

Remote trip (optional for types 447 and 449)

- FA12** DC 12 V coil voltage
- FA24** DC 24 V coil voltage

Current ratings

- 30...400 A** type 446
- 100...400 A** type 447
- 125...500 A** type 449

447 - K - H - FN - ... - ... - 400 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)
Type 446	30	0.006	Type 447	
	40	0.0048	100	< 0.002
	50	0.0038	125	< 0.001
	60	0.0028	160	< 0.001
	70	0.0025	225	< 0.001
	80	0.0023	300	< 0.001
	90	0.0019	400	< 0.001
	100	0.0016	Type 449	
	125	< 0.001	125	< 0.001
	150	< 0.001	160	< 0.001
	170	< 0.001	225	< 0.001
	200	< 0.001	315	< 0.001
	225	< 0.001	350	< 0.001
	250	< 0.001	400	< 0.001
	300	< 0.001	500	< 0.001
	350	< 0.001	only with 50 % ON duty	
	400	< 0.00		

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.



446-... 447-... 449-...

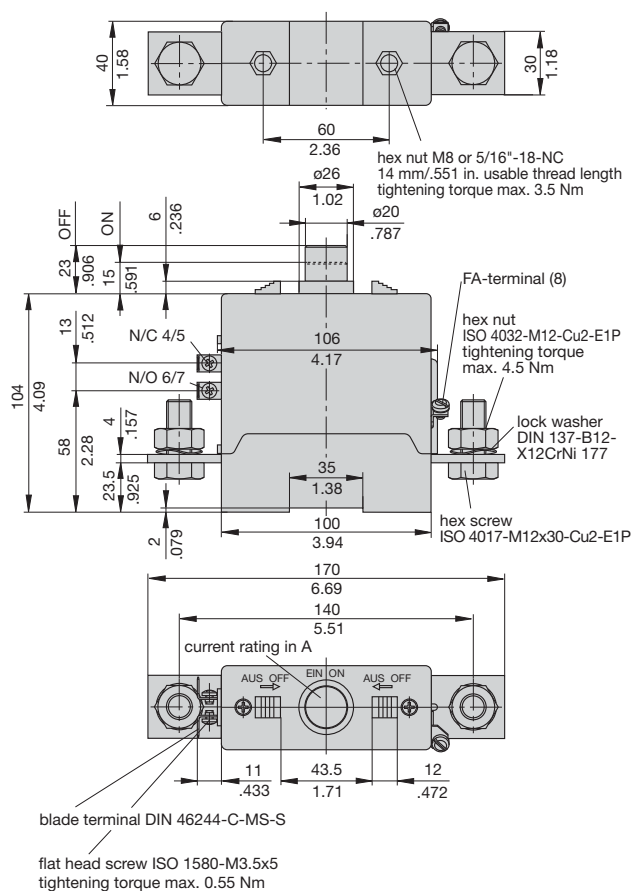
Technical data

Voltage rating	DC 28 V	
Current rating range	type 446: 30...400 A type 447: 100...400 A type 449: 125...500 A	
Auxiliary circuit	10 A	
Electrical remote disconnection (-FA)	operating voltage DC 12 V or DC 24 V operating current approx. 18 A or 12 A max. pulse time 10 ms < t _{ON} < 20 ms / t _{OFF} > 10 s switching time < 20 ms	
Typical life	1,000 operations at I _N 2,000 operations mechanical	
Ambient temperature	-55...+75 °C (-67...+167 °F)	
Insulation co-ordination (IEC 60664 and 60664A)	rated impulse withstand voltage 1.5 kV	pollution degree 3
Dielectric strength (IEC 60664 and 60664A)	test voltage AC 1,500 V	operating area main circuit to auxiliary contacts AC 1,500 V
Insulation resistance	> 100 MΩ (DC 500 V)	
Interrupting capacity I _{cn}	10,000 A	
Degree of protection (IEC 60529/DIN 40050)	operating area IP40 terminal area IP00	
Vibration	to VG 95210, sheet 19, IEC 60068-2-6, test Fc: without aux. contacts: 10 g (56-500 Hz), ± 0.76 mm (10-55 Hz) with auxiliary contacts: 4 g (56-500 Hz), ± 0.30 mm (10-56 Hz)	
Shock	to VG 95210, sheet 28, IEC 60068-2-27, test Ea: without aux. contacts: 50 g (11 ms) with auxiliary contacts: 20 g (11 ms)	
Corrosion	96 hours at 5 % salt mist to VG 95210, sheet 2, IEC 60068-2-11, test Ka	
Humidity	240 hours at 95 % RH to VG 95210, sheet 7, IEC 60068-2-3, test C	
Mass	approx. 850 g	

Approvals

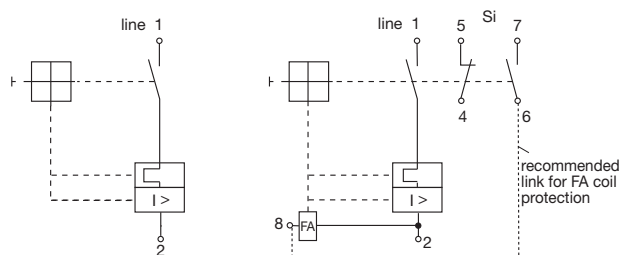
Authority	Voltage ratings	Current ratings
Type 446: UL	DC 28 V	30...400 A
Type 447: UL	DC 28 V	100...400 A
QPL Sweden	DC 28 V	125...400 A
Type 449: UL	DC 28 V	125...350 A
VG 95345, part 15	DC 28 V	125...500 A

Dimensions

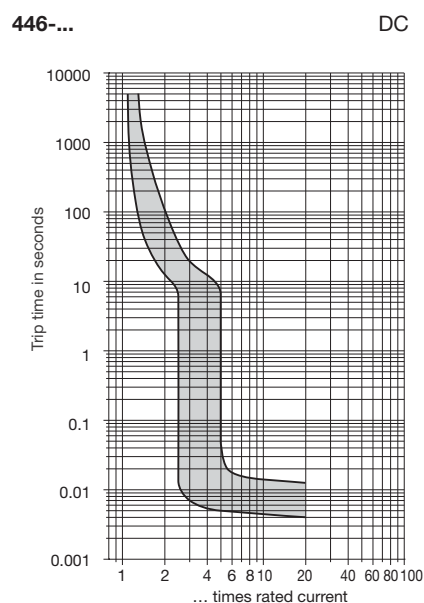


This is a metric design and millimeter dimensions take precedence ($\frac{\text{mm}}{\text{inch}}$)

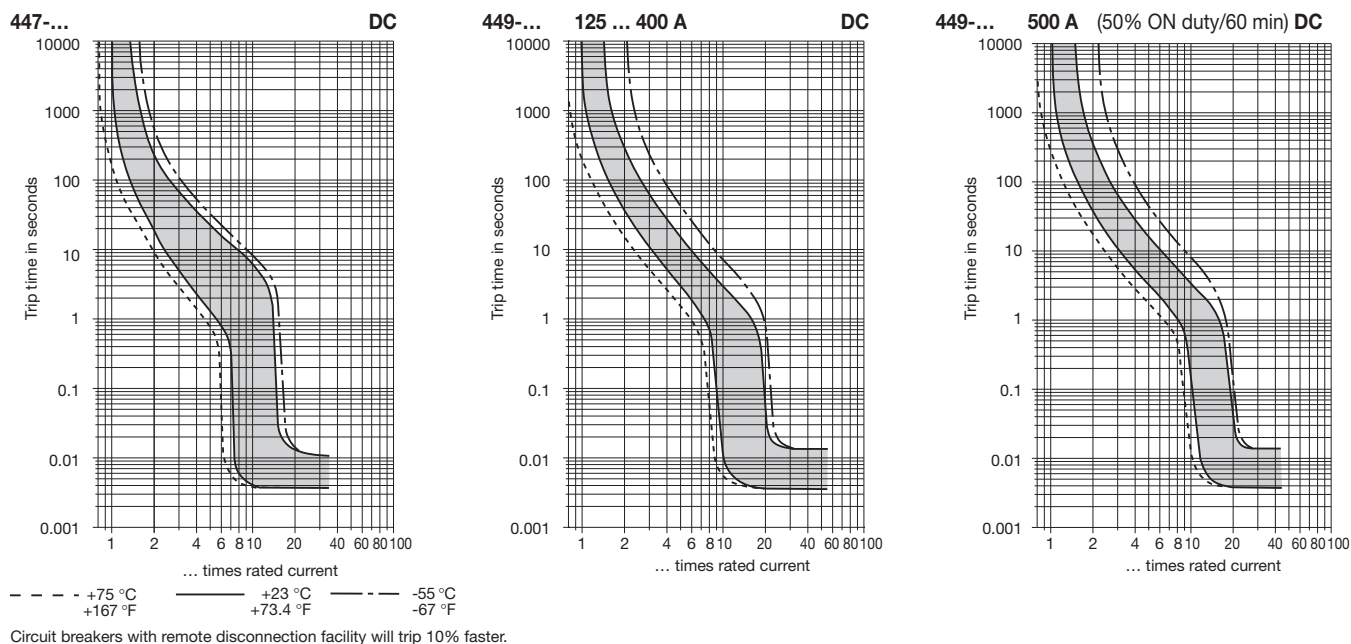
Internal connection diagrams



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



Typical time/current characteristics



Description

Single pole high performance thermal-magnetic circuit breaker, with tease-free, trip-free, snap action mechanism and push/pull on/off actuation (M-type TM CBE to EN 60934). An indicator band on the push button clearly shows the tripped/off position. Threadneck panel mounted in tracked vehicle and aircraft/general purpose versions, with optional fast acting magnetic characteristics and auxiliary contacts.

Typical applications

Extra low voltage wiring systems on all types of vehicle for land, sea and air; defence equipment; battery powered machines.

Ordering information

Type No.			
452	standard delay curve		
452-2	fast trip curve		
Terminal design			
K14	screw terminals M6		
K34	screw terminals M6, reinforced		
Version			
FN2	vehicle application		
LN2	aircraft/general application		
Auxiliary contacts			
(blank)	without auxiliary contacts		
S1	with auxiliary contact (connector EN 3155-016M2018 (NC))		
S5	as S1, but with polarized auxiliary contact (NC)		
Current ratings			
50...100 A			
452 - K14 - LN2 - S1 - 80 A	ordering example		

Standard current ratings and typical volt drop values

Current rating (A)	Volt drop (mV)	Current rating (A)	Volt drop (mV)
50	90	80	92
60	85	90	100
70	85	100	100
75	90		

Approvals (without auxiliary contacts)

Authority	Voltage ratings	Current ratings
VG 95345, part 17	DC 28 V	60...100 A
QPL, Canada	DC 28 V	60...100 A
QPL, Sweden	DC 28 V	60...100 A (452-K34-FN)
UL	DC 28 V; DC 72 V	50...125 A

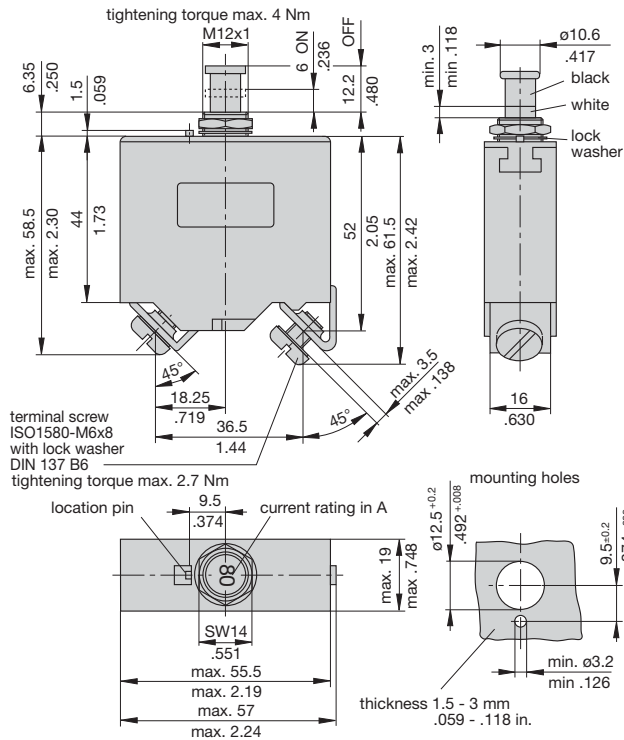


Technical data

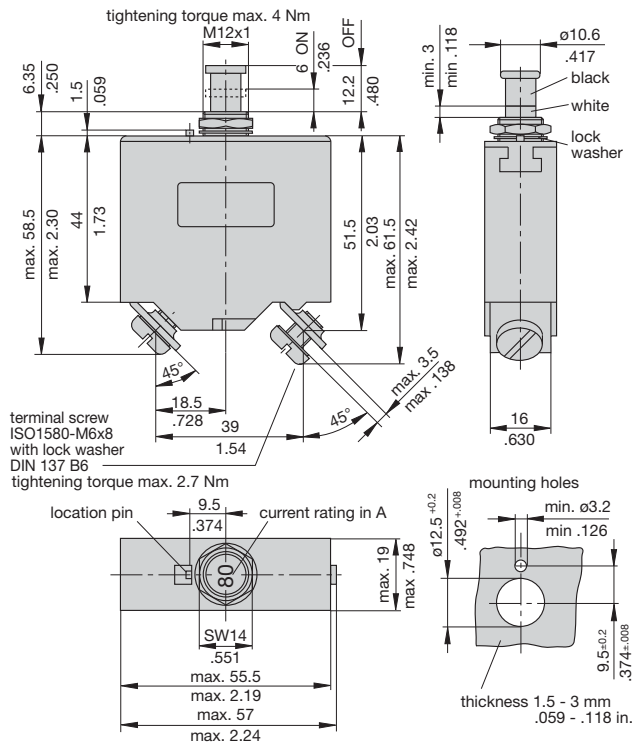
Voltage rating	DC 28 V	
Current rating range	50...100 A	
Auxiliary circuit	0.5 A, DC 28 V	
Typical life	2,500 operations at I_N	
Ambient temperature	-55...+75 °C (-67...+167 °F)	
Insulation co-ordination (IEC 60664 and 60664A)	rated impulse withstand voltage 1.5 kV	pollution degree 3
Dielectric strength (IEC 60664 and 60664A) operating area	test voltage AC 1,500 V	
Insulation resistance	> 100 MΩ (DC 500 V)	
Interrupting capacity I_{cn}	6,000 A	
Degree of protection (IEC 60529/DIN 40050)	operating area IP40 terminal area IP00	
Vibration	10 g (55-2000 Hz), ± 0.76 mm (10-55 Hz) to VG 95210, sheet 19, IEC 60068-2-6, test Fc	
Shock	50 g (11 ms) to VG 95210, sheet 28, IEC 60068-2-27, test Ea	
Corrosion	96 hours at 5 % salt mist to VG 95210, sheet 2, IEC 60068-2-11, test Ka	
Humidity	240 hours at 95 % RH to VG 95210, sheet 7, IEC 60068-2-3, test C	
Explosion	to VG 95210, sheet 10, MIL-STD-202, meth. 109	
Mass	approx. 122 g without auxiliary contact approx. 126 g with auxiliary contact	

Dimensions 452-K...-....

452-K34-FN2 (VG 95345 T17)

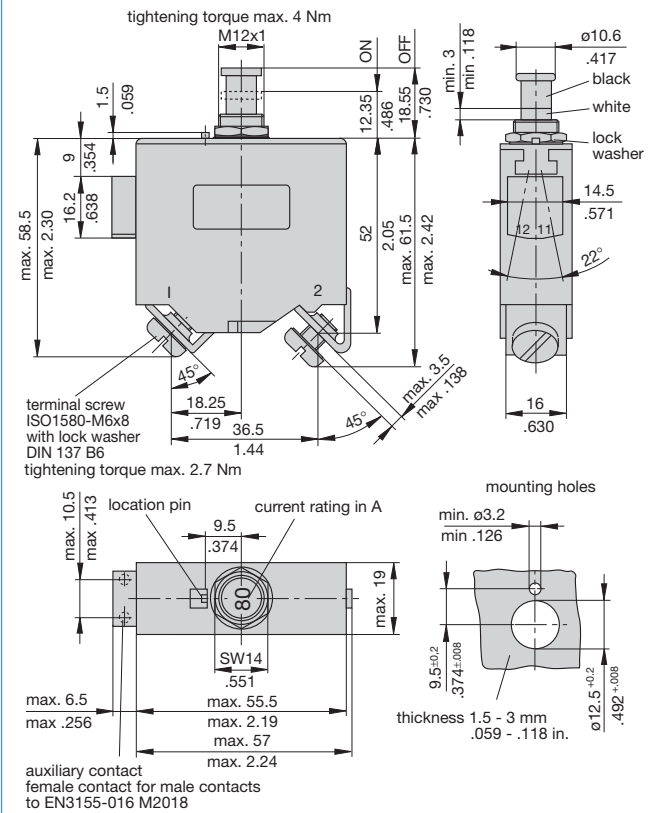


452-K14-LN2 (VG 95345 T17)

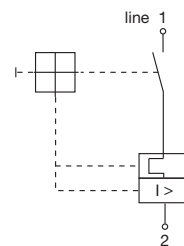


Dimensions 452-K...-S.

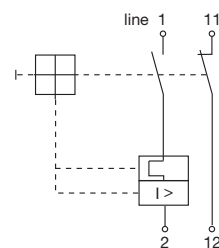
452-K34-LN2-S1 (VG 95345 T17) 452-K34-LN2-S5



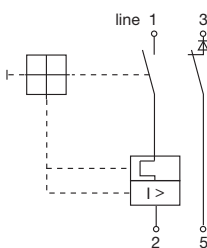
Internal connection diagram



with auxiliary contact -S1



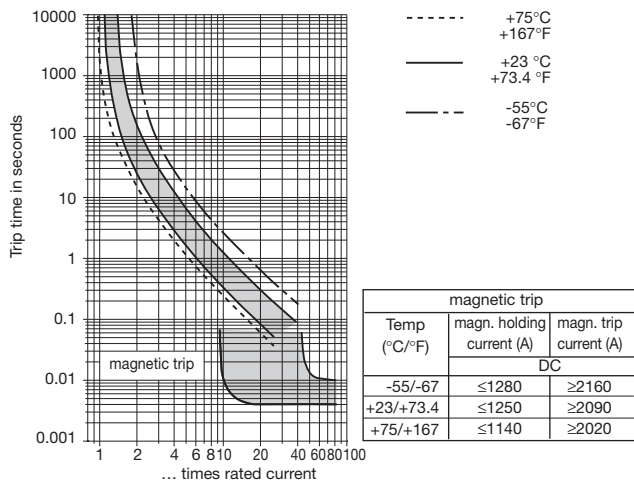
with polarized auxiliary contact -S5



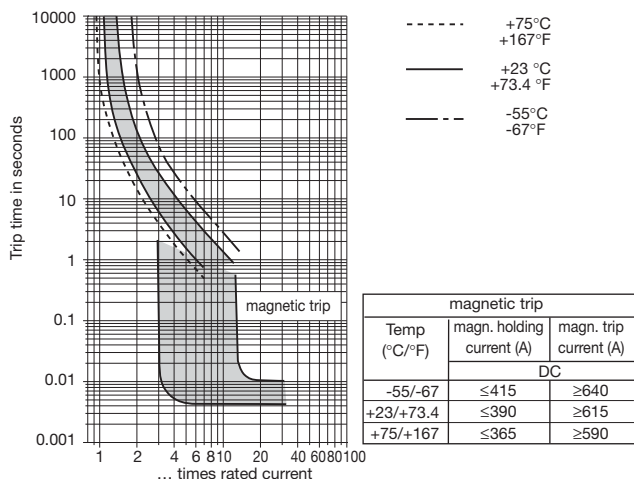
This is a metric design and millimeter dimensions take precedence (mm)
inch

Typical time/current characteristics

452-... (standard delay)



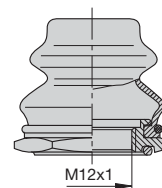
452-2-... (fast trip)



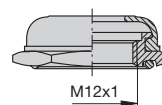
Characteristic curves for AC to special order.

Accessories (approved to VG 95345, part 23)

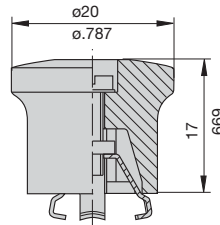
Splash cover/hex nut assembly with O ring (IP66 and IP67)
X 200 801 08 nickel plated nut, transparent cover
X 200 801 03 matt black finish nut, black cover



Splash cover/hex nut assembly with O ring (IP54)
X 200 802 01 nickel plated nut
X 200 802 02 matt black finish nut



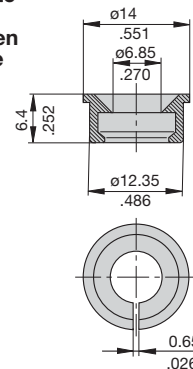
Actuator extension (black)
 to be fitted on the push button
X 200 803 01



Accessories

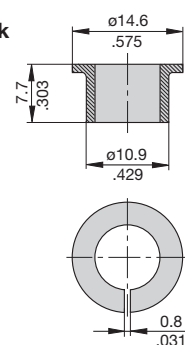
Identification collar to be snapped on the push button

Y 307 004 01 black
Y 307 004 02 white
Y 307 004 03 red
Y 307 004 04 green
Y 307 004 05 blue



Lock out ring to block the push button in OFF position

Y 307 005 01 red
Y 307 005 02 black



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

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

Description

Single pole compact high performance thermal circuit breaker with tease-free, trip-free, snap action mechanism and push/pull on/off manual actuation (M-type TO CBE to EN 60934). An indicator band on the push button clearly shows the tripped/off position. Threadneck panel mounted in tracked vehicle and aircraft/general purpose versions, with optional auxiliary contacts.

Typical applications

Extra low voltage wiring systems on all types of vehicles for land, sea and air, battery powered machines, process control.

Ordering information

Type No.

482 single pole thermal circuit breaker

Mounting

G threadneck panel mounting

Threadneck design

1 M 12x1 nickel plated

2 M 12x1 black

3 15/32-UN-2A black

6 M12x1x8 black, without locating pin, push button marking as with 482-G2..

7 M12x1x6,4 black, without locating pin, push button marking as with 482-G1..

Hardware - washer for threadneck

0 without hardware

1 corrugated washer 12/15, fitted

2 serrated lock washer 12/15, fitted (MS 35333-136)

3 serrated lock washer 12/15, bulk shipped (MS 35333-136)

Hardware - hex nut for threadneck

0 without hardware

1 hex nut M12x1 nickel plated

2 hex nut M12x1 black

3 hex nut 15/32-UN-2B black, fitted

4 hex nut 15/32-UN-2B black, bulk shipped

Terminal design (main terminals)

K1 screw terminals with metric thread M4

J1 screw terminals with inch thread 8-32-UNC-2B

R1 round connector ø6

Characteristic curve

M1 thermal 1.15-1.4 I_N

Terminal screws

A flat head screw M4x6, ISO 1580, fitted

B Phillips screw 8-32UNC-2Ax6 (MS 51957-41), fitted

F Phillips screw M4x6 (ISO 7045), bulk shipped

H socket head cap screw M4x6 (DIN 7984), fitted

K hex screw 8-32UNC-3Ax7.6 fitted

Terminal washers

0 without lock washer

1 lock washer DIN 137-B4, fitted

2 lock washer 4.3, fitted, MS 35338-137

3 lock washer 4.3, bulk shipped (MS 35338-137)

5 lock washer 4.3/9, fitted

6 lock washer DIN 137-B4, bulk shipped

Auxiliary contact

S0 without auxiliary contacts

S1 with auxiliary contact (NC)

S5 with polarized aux. contact (NC)

Barrier

(blank) without barrier

T with barrier, 31 mm wide

Current ratings

0.1...50 A

482 - G 1 1 1 - K1 M1 - A 1 S1 . - 10 A ordering example

Previous ordering codes:

482-N-MS = 482-G111-K1M1-A1S0-...A

482-MS = 482-G212-K1M1-A1S0-...A



without aux. contacts

482

with aux. contacts

Technical data

Voltage rating	AC 115 V (400 Hz); DC 28 V AC 230 (50/60 Hz) to special order		
Current rating range	0.1...50 A		
Auxiliary circuit	0.5 A, DC 28 V		
Typical life	10,000 operations mechanical 5,000 operations at I _N		
Ambient temperature	-55...+75 °C (-67...+167 °F)		
Insulation co-ordination (IEC 60664 and 60664A)	rated impulse withstand voltage 1.5 kV	pollution degree 3	
Dielectric strength (IEC 60664 and 60664A)	test voltage operating area main to aux. circuit	AC 1,500 V AC 1,500 V	
Insulation resistance	> 100 MΩ (DC 500 V)		
Interrupting capacity I _{cn}	0.1...2.5 A 3...3.5 A 4...7 A 7.5...50 A 35...50 A	15 x I _N 250 A DC / 150 A AC 500 A 6,000 A DC / 1,000 A AC with auxiliary contact: 3,000 A DC / 1,000 A AC	
Interrupting capacity (UL 1077)	I _N 0.1...50 A	U _N DC 72 V	5,000 A
Degree of protection (IEC 60529/DIN 40050)	operating area IP40 terminal area IP00		
Vibration	10 g (55-2000 Hz), ± 0.76 mm (10-55 Hz) to VG 95210, sheet 19/IEC 60068-2-6, test Fc		
Shock	50 g (11 ms) to VG 95210, sheet 28/IEC 60068-2-27, test Ea		
Corrosion	48 hours at 5 % salt mist to VG 95210, sheet 2/IEC 60068-2-11, test Ka		
Humidity	240 hours at 95 % RH to VG 95210, sheet 7/IEC 60068-2-3, test C		
Explosion	to VG 95210, sheet 10/MIL-STD-202, meth. 109		
Mass	approx. 43 g without auxiliary contact approx. 46 g with auxiliary contact		

Approvals

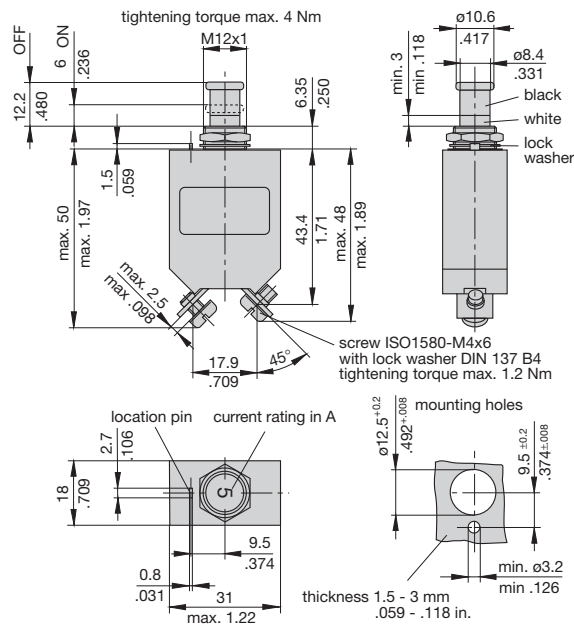
Authority	Voltage ratings	Current ratings
VG 95345 T21	DC 28 V	0.1...50 A
QPL, Canada	DC 28 V	0.5...35 A
UL, CSA	DC 72 V	0.1...50 A
TÜV	DC 72 V	0.1...50 A

Standard current ratings and typical volt drop values

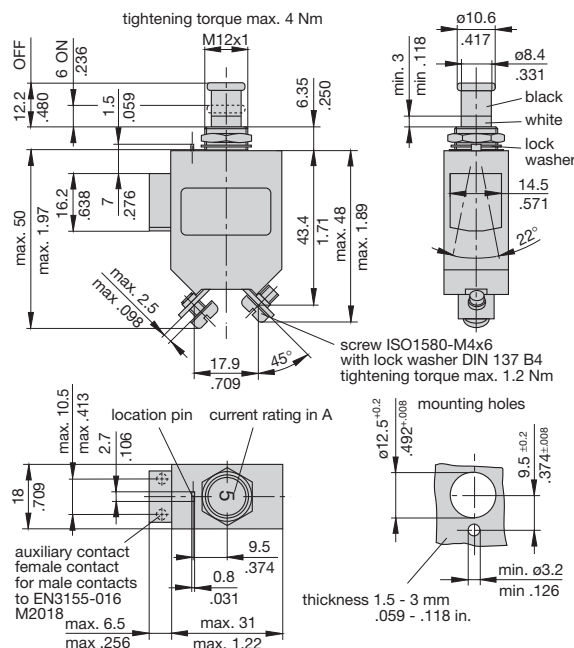
Current rating (A)	Volt drop (mV)	Current rating (A)	Volt drop (mV)
0.1	16,000	5	350
0.2	8,000	7.5	230
0.5	3,000	10	< 200
0.8	2,000	15	< 200
1	1,500	20	< 200
1.2	1,200	25	< 200
1.5	1,000	30	< 200
1.8	850	35	< 200
2	800	40	< 200
2.5	700	45	< 200
3	600	50	< 200
4	430		

Dimensions 482-G1...

482-G111-K1M1-A1S0 (VG 95345 T21)

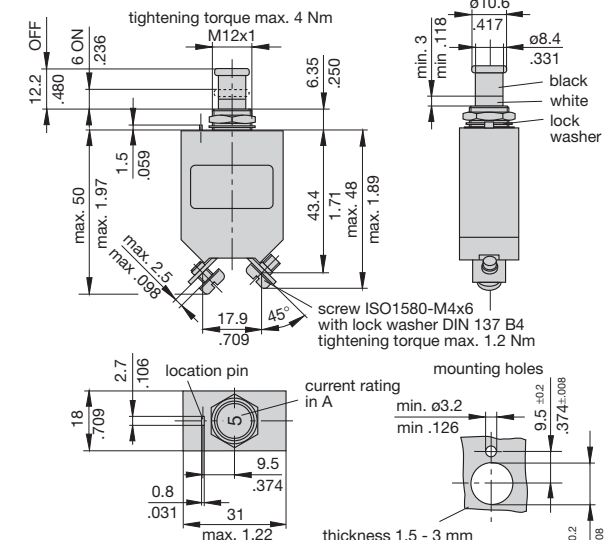


482-G111-K1M1-A1S1 (VG 95345 T21)
482-G111-K1M1-A1S5

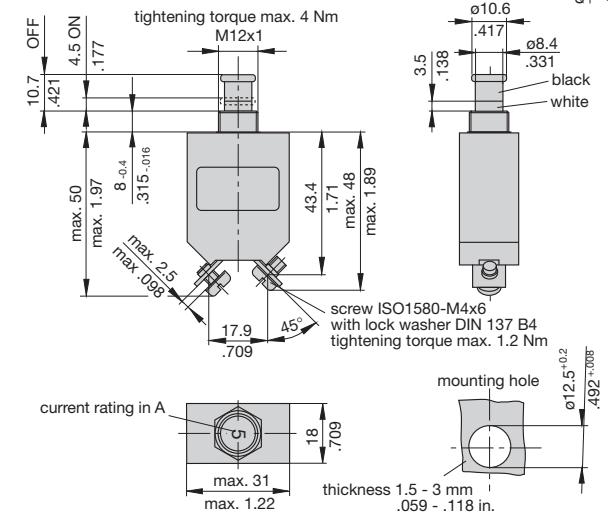


Dimensions 482-G2../-G6../-G7...

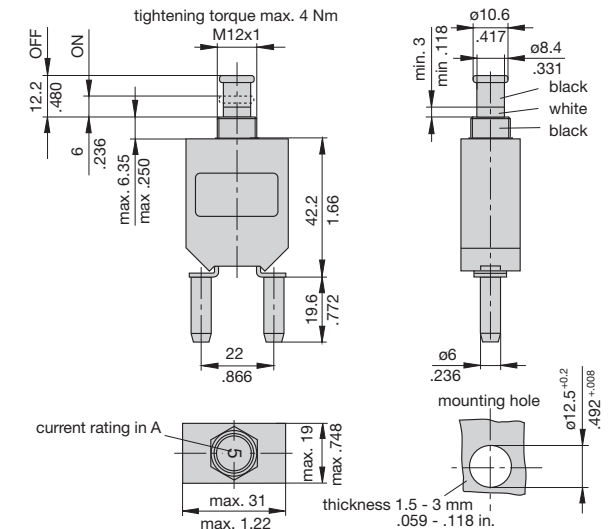
482-G212-K1M1-A1S0 (VG 95345 T21)



482-G600-K1M1-A1S0



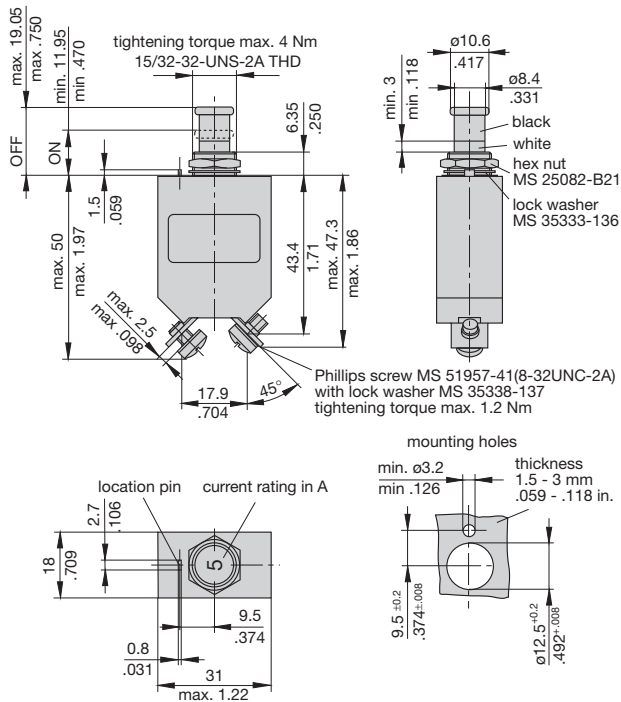
482-G700-R1M1-Z0S0



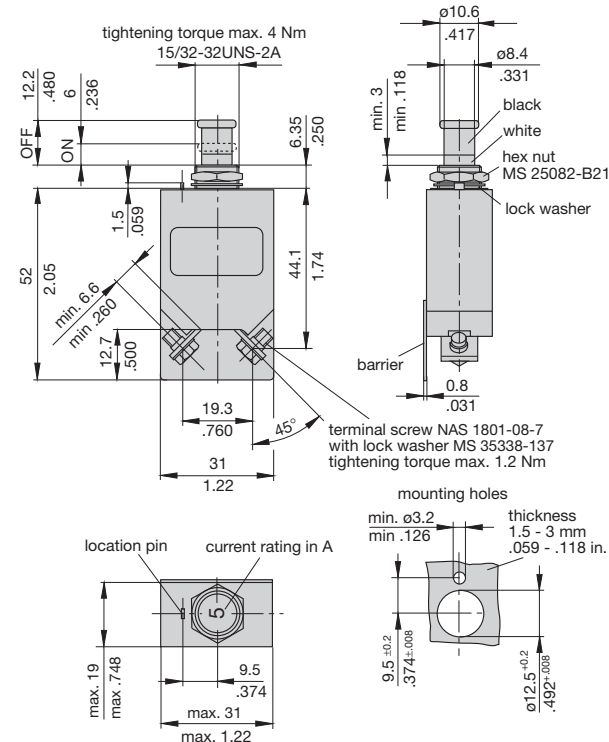
This is a metric design and millimeter dimensions take precedence ($\frac{\text{mm}}{\text{inch}}$)

Dimensions 482-G3...

482-G323-J1M1-B2 (MS 25 244)

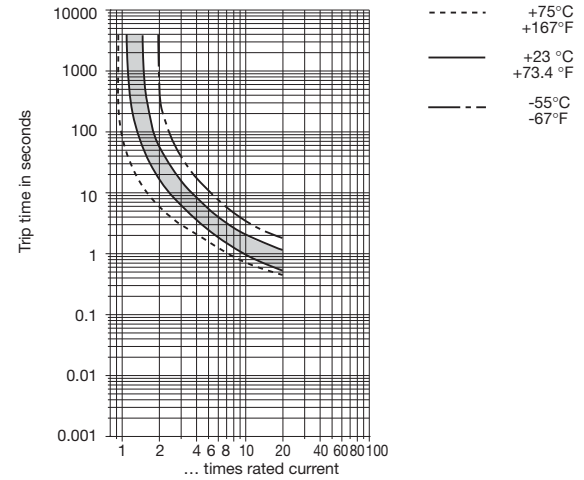


482-G323-J2...-E3S0T

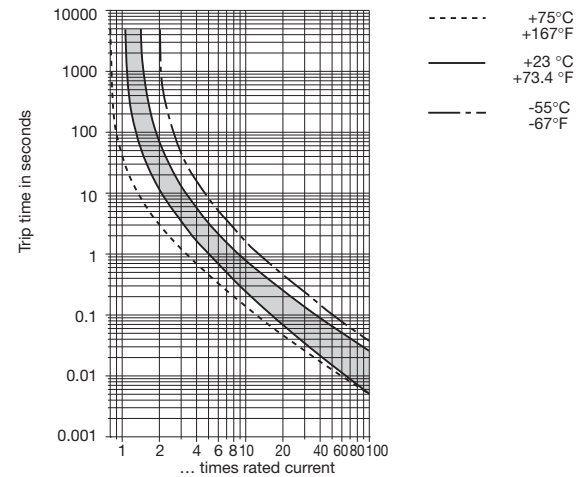


Typical time/current characteristics

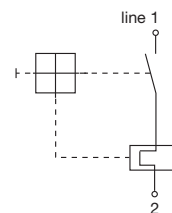
0.1...2.5 A



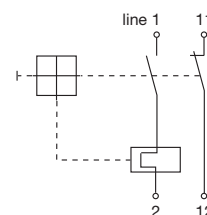
3...50 A



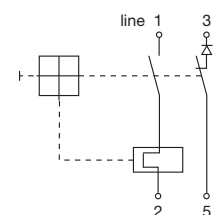
Internal connection diagrams



with auxiliary contact



with polarized auxiliary contact



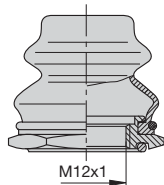
This is a metric design and millimeter dimensions take precedence (mm/inch)

Accessories (approved to VG 95345, part 23)

Splash cover /hex nut assembly with O ring (IP66 and IP67)

X 200 801 08 - nickel plated nut M12x1, transparent cover

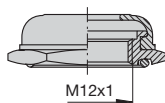
X 200 801 03 - matt black finish nut M12x1, black cover



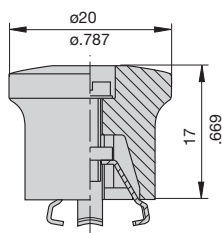
Splash cover black /hex nut assembly with O ring (IP54)

X 200 802 01 - nickel plated nut M12x1

X 200 802 02 - matt black finish nut M12x1



Actuator extension (black) to be fitted on the push button X 200 803 01



Accessories

Identification collar to be snapped on the push button

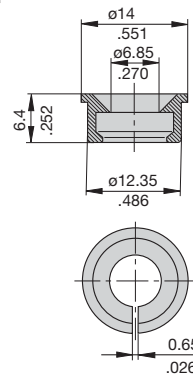
Y 307 004 01 black

Y 307 004 02 white

Y 307 004 03 red

Y 307 004 04 green

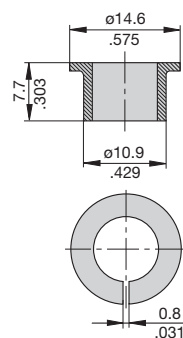
Y 307 004 05 blue



Lock out ring to block the push button in OFF position

Y 307 005 01 red

Y 307 005 02 black



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

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, miniaturised, aircraft style thermal circuit breaker with tease-free, trip-free, snap action mechanism and push/pull on/off manual actuation (M-type TO CBE to EN 60934). An indicator band on the push button clearly shows the tripped/off position. Threadneck panel mounted, available in metric and US (MS 3320) configurations. Advanced two-chamber design contributes to fail-safe operation. Temperature compensated from -55° to +125 °C, with optional auxiliary contacts, and fully approved for use on a wide range of aircraft and equipment. Full specification ensures suitability for the most demanding applications. For three pole version see type 583.

Typical applications

Aircraft systems and equipment (fixed wing and helicopters); other extra low voltage wiring applications; defence equipment; communications systems.

Standard current ratings and typical volt drop values

Current rating (A)	Volt drop (mV)	Current rating (A)	Volt drop (mV)
1	750	10	190
2	520	15	190
2.5	400	20	200
3	360	25	170
4	350	30	160
5	260	35	150
7.5	230		

Approvals

Authority	Voltage ratings	Current ratings
LN 29886		
VG 95345 T06		
MS 3320, MS 3320 V		
QPL		
UL	AC 250 V, 50/60 Hz DC 75 V	1...25 A 1...35 A



without auxiliary contact **483-...** with auxiliary contact

Technical data

Voltage rating	AC 115 V (400 Hz); DC 28 V (higher voltage ratings upon request)	
Current rating range	1...35 A	
Auxiliary circuit	0.5 A, DC 28 V	
Typical life	20,000 operations mechanical or 10,000 operations at I _N (≤ 25 A) 5,000 operations at I _N (30 + 35 A)	
Ambient temperature	-55...+125 °C (-67...+257 °F)	
Insulation co-ordination (IEC 60664 and 60664A)	rated impulse withstand voltage 1.5 kV	pollution degree 3
Dielectric strength (IEC 60664 and 60664A) operating area main to aux. circuit	test voltage AC 1,500 V AC 1,500 V	
Insulation resistance	> 100 MΩ (DC 500 V)	
Interrupting capacity I _{cn}	AC 115 V (400 Hz): ≤ 4 A 1,000 A 5 A 2,000 A 7.5...35 A 2,500 A DC 28 V: 1...25 A 6,000 A 30 + 35 A 4,000 A	
Degree of protection (IEC 60529/DIN 40050)	operating area IP40 terminal area IP00	
Vibration (sinusoidal)	15 g (70-2000 Hz), ± 0.76 mm (5-70 Hz) to VG 95210, sheet 19, IEC 60068-2-6, test Fc/ISO 7137	
Vibration (random)	16.4 g rms, 0.2 g ² /Hz ± 1.5 dB to VG 95210, sheet 29, ISO 7137	
Acceleration	17 g, to ISO 2669	
Shock	75 g (11 ms) to VG 95210, sheet 28, IEC 60068-2-27, test Ea/ISO 7137	
Corrosion	96 hours at 5 % salt mist, severity A 48 hours at 20 % salt mist, severity B to VG 95210, sheet 2, IEC 60068-2-11, test Ka/ISO 7137	
Humidity	240 hours at 95 % RH, to VG 95210, sheet 7, IEC 60068-2-3, test C/ISO 7137	
Explosion	to VG 95210, sheet 10, MIL-STD-202, meth. 109	
Altitude	≤ 25,000 m above sea level	
Mass	max. 29 g with auxiliary contact max. 25 g without auxiliary contact	
Weight reduction through aluminium threadneck: approx. 3 g		

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.

Ordering information

Type No.

483 single pole, with temperature compensation

Mounting

G threadneck panel mounting, standard

L threadneck panel mounting, extended push button

V threadneck panel mounting, high vibration performance

Threadneck design

1 M12x1x6.4x8.8 dia. with mounting plate (aux. contact version)

2 15/32-32UNx6.4x7.8 dia. (without aux. contact)

3 MJ12x6.4x8.8 dia. (without aux. contact)

4 M12x1x6.4x8.8 dia. (without aux. contact)

5 7/16-32UNx6.4x7.8 dia. (without aux. contact)

6 M12x1x9.4x8.8 dia. (without aux. contact)

7 7/16-32 UNx6.4x7.8 dia. with mounting plate (aux. contact version)

8 as 483-G1...but with aluminium threadneck (only mounting -G and aux. contact versions S1, S5)

Hardware for threadneck (washers)

0 without hardware

1 wave washer 12/15 - mounted

2 mounted washer 12.1/17.2 - mounted

3 mounted washer 11.3/14.9 - mounted (threadneck design 5, 7 only)

4 mounted washer 12/15 - mounted

5 tooth washer 12.1/17.2, bulk shipped

Hardware for threadneck (nuts)

0 without hardware

1 hex nut M12x1 (threadneck design 1, 4, 6 only)

2 hex nut 15/32-32UN (threadneck design 2 only)

3 hex nut 7/16-32UN (threadneck design 5, 7 only)

4 hex nut M12x1, aluminium, fitted (threadneck design 8 only)

5 hex nut MJ12x1 (only with threadneck design 3)

6 hex nut M12x1, bulk shipped (threadneck design 1, 4, 6)

Terminal design (main terminals)

K screws terminals with metric thread

1 K14 (M4, MJ4)

J screw terminals with inch thread

1 J14 (8-32UNC-2B)

2 J17 (8-32UNC-2B)

3 J25 (6-32UNC-2B)

Characteristic curve

M1 thermal, 1.15-1.38 I_N

Terminal screws

A Phillips screw M4x6

B Phillips screw 8-32UNC-2Ax6 (MS 51957-41)

C Phillips screw 6-32UNC-2Ax6 (MS 51957-26)

D slotted flat head screw M4x6

E hex screw with Phillips head 8-32UNC-3A-9.5

K hex screw with Phillips head 8-32UNC-3Ax7.6

L Phillips screw MJ4x6

M as "K" but bulk shipped

Z without accessories

Terminal washers

0 without lock washer

1 lock washer B4

2 lock washer 4.3 (MS 35338-137)

3 lock washer B4 and washer 4.4/9.5

4 lock washer 3.7 (MS 35338-136)

5 lock washer 4.3/9

Auxiliary contact

S0 without auxiliary contact

S1 with auxiliary contact (N/C) connector to EN3155-016M2018, size 20

S5 with polarized auxiliary contact (N/C)

Barrier

Z without barrier (standard)

Colour of the push button

blank: black (standard) (e. g. 7.5)

A green (e. g. 7.5)

G green, marking to EN (e. g. 7 1/2)

N black, marking to EN (e. g. 7 1/2)

Current ratings

1...35 A

483 - G 4 1 1 - K 1 M1 - A 1 S0 Z . - 5 A ordering example

Ordering information for approved devices

483-G411-K1M1-A1S0ZN

Metric threadneck M12x1 and terminal design -K14 (M4x6), listed by the German Materialamt der Bundeswehr to VG 95345 T06.

483-G111-K1M1-A1S1ZN

Metric threadneck M12x1 and terminal design -K14 (M4x6) and auxiliary contact -Si, listed by the German Materialamt der Bundeswehr to VG 95345 T06.

483-G533-J1M1-B2S0ZN (MS 3320)

Threadneck size 7/16-32UNSx6.4 and terminal design -J14 (inch thread 8-32), approved to MS 3320.

483-V533-J1M1-B2S0ZN (MS 3320-V)

Threadneck size 7/16-32UNSx6.4 and terminal design -J14 (inch thread 8-32), approved to MS 3320-V.

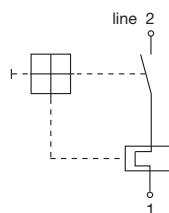
483-G533-J3M1-C4S0Z

Threadneck size 7/16-32UNSx6.4 and terminal design -J25 (inch thread 6-32), listed by the German Materialamt der Bundeswehr to VG 95345, part 6.

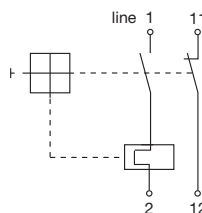
483-G814-K1M1-A1S1ZN

Aluminium threadneck M12x1x6.4x8.8 dia.

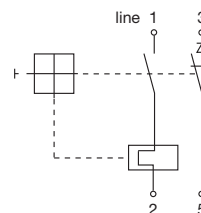
Internal connection diagrams



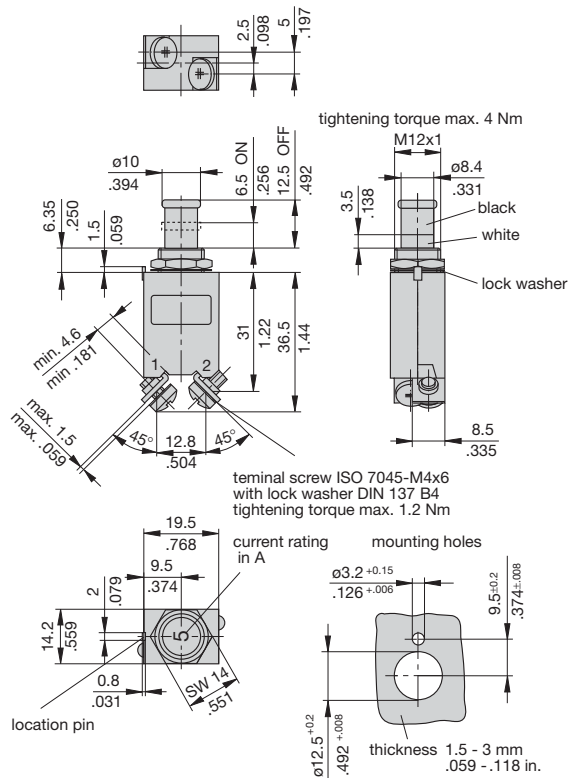
with auxiliary contact



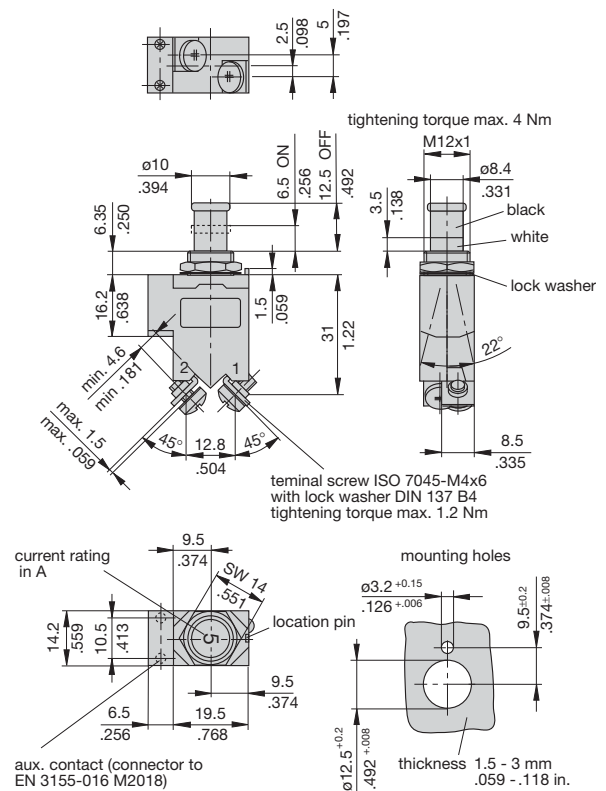
with polarized auxiliary contact



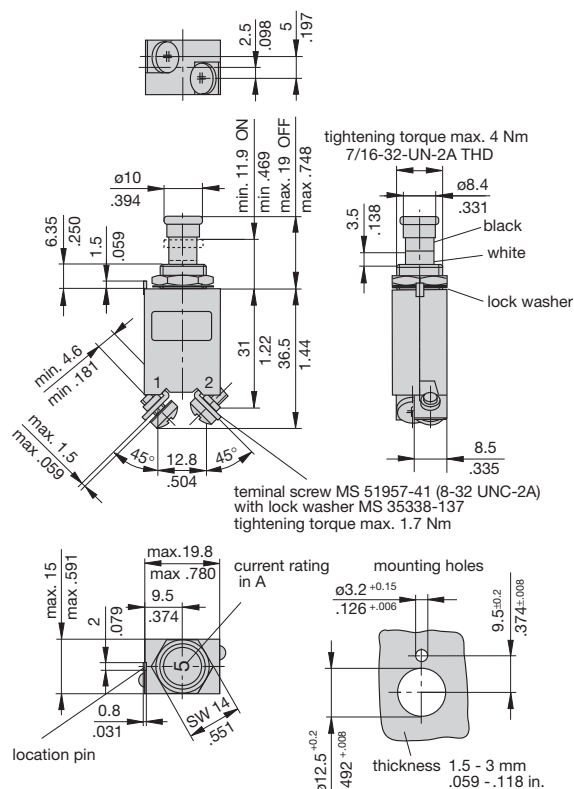
Dimensions 483-G411-K1M1-A1S0ZN (VG 95345 T06)



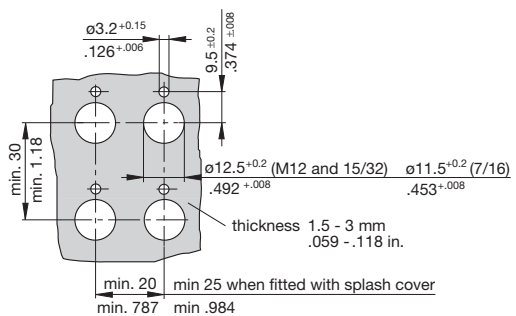
Dimensions 483-G111-K1M1-A1S1ZN (VG 95345 T06)



Dimensions 483-G533-J1M1-B2S0ZN (MS 3320)



Mounting



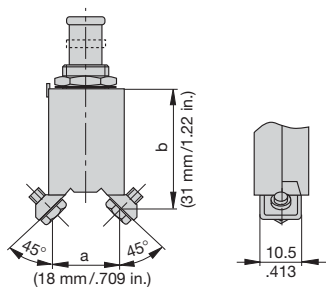
This is a metric design and millimeter dimensions take precedence (mm)
inch

Other main terminal and threadneck designs

Terminal design -J2

Terminal distances to:

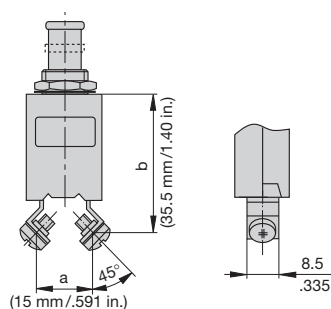
MS 14 105 (a, b)
MS 14 153 (a, b)
MS 22 073 (a)
MS 22 074 (a)
MS 25 244 (a)
MS 25 373 (a, b)



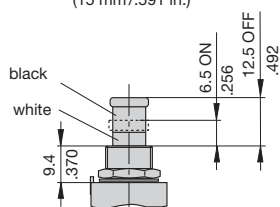
Terminal design -J3

Terminal distances to:

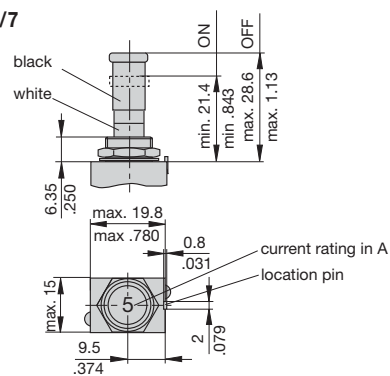
MS 26 574 (a, b)



Mounting -G6



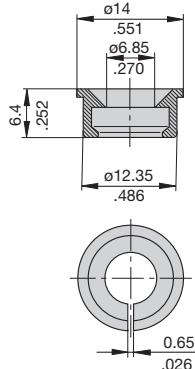
Mounting -L2/5/7



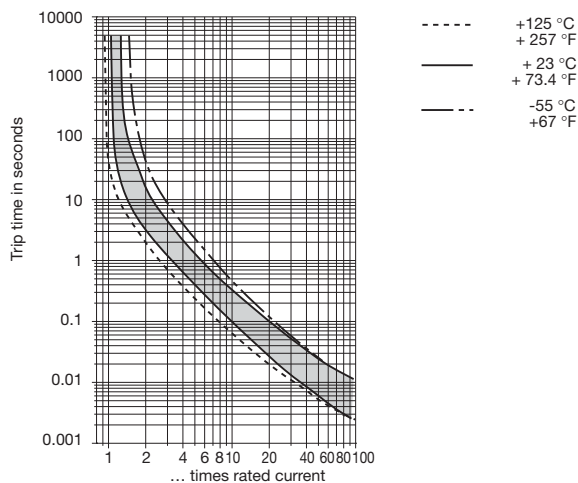
Accessories

Identification collar to be snapped on the push button

Y 307 004 01 black
Y 307 004 02 white
Y 307 004 03 red
Y 307 004 04 green
Y 307 004 05 blue



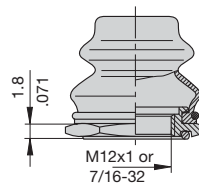
Typical time/current characteristics



Accessories

Splash cover/hex nut assembly with O ring (IP66 and IP67)
(approved to VG 95345, T23)

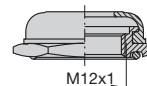
X 200 801 08 nickel plated nut, transparent cover
X 200 801 03 matt black finish nut, black cover
X 200 801 09 matt black finish nut 7/16-32, black cover



Splash cover/hex nut assembly with O ring (IP54)

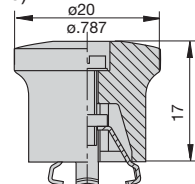
(approved to VG 95345, T23)

X 200 802 01 nickel plated nut
X 200 802 02 matt black finish nut



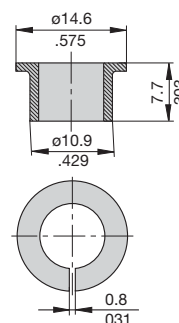
Actuator extension (black) to be fitted on the push button
(approved to VG 95345, T23)

X 200 803 01



Lock out ring to block the push button in OFF position

Y 307 005 01 red
Y 307 005 02 black



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

Description

Single pole, miniaturised thermal circuit breaker with trip-free mechanism and push/pull on/off manual actuation (M-type TO CBE to EN 60934). Threadneck panel mounted, temperature-compensated, with optional auxiliary contacts. Fully approved for commercial aircraft and similar requirements.

Typical applications

Extra low voltage wiring systems on all types of vehicles for land, sea and air.

Ordering information

Type No.

4120 single pole, with temperature compensation

Mounting

G threadneck panel mounting

L threadneck panel mounting, extended push button

Threadneck design

1 M12x1x6.3 (aluminium)

2 7/16-32 UNx6.3 (aluminium)

Number of poles

1 1-pole, thermally protected

Hardware for threadneck

0 without hardware

1 hex nut M12x1, corrugated washer 12/15, fitted

2 hex nut M12x1 (aluminium), serrated lock washer 12.1/17.2, fitted

3 hex nut M12x1 (aluminium), serrated lock washer 12.1/17.2, bulk shipped

4 hex nut 7/16-32UN (aluminium), serrated lock washer 11.3/14.9, fitted

Terminal design (main terminals)

K1 screw terminals with metric thread K14 (M4)

J1 screw terminals with inch thread J14 (8-32UNC-2B)

J2 screw terminals with inch thread J17 (8-32UNC-2B)

J3 screw terminals with inch thread J25 (6-32UNC-2B)

P1 blade terminals 6.3x0.8, DIN 46244, silver-plated

Characteristic curve

M1 thermal, 1.15 - 1.38 I_N

Terminal screws

A Phillips screw M4x6, fitted

B Phillips screw 8-32UNC-2Ax6, fitted

C Phillips screw 6-32UNC-2Ax6 (MS 51957-26)

D slotted flat head screw M4x6, fitted

K hex screw with Phillips head 8-32UNC-3Ax7.6, fitted

M hex screw with Phillips head 8-32UNC-3Ax7.6, bulk shipped

Z without terminal hardware

Terminal washers

0 without lock washer

1 wave washer B4, fitted

2 lock washer 4.3, fitted

4 lock washer 3.7 (MS 35338-136)

5 lock washer 4.3/9, fitted

6 lock washer 4.3/9, bulk shipped

Auxiliary contact

S0 without auxiliary contact

S1 with auxiliary contact (connector EN 3155-016M2018) (NC)

S5 with polarized auxiliary contact (NC)

Barrier

Z without barrier

U with barrier (19.5 wide)

Colour of the push button

G green to EN (e. g. 2 1/2)

N black to EN (e. g. 2 1/2)

S black, with white marking (e. g. 2.5)

X black, without marking

Current ratings

1...25 A

4120 - G 1 1 - 1 - K1 M1 - A 1 S0 Z N - 10 A ordering example



4120-...

Technical data

Voltage rating	AC 115 V (400 Hz); DC 28 V	
Current rating range	1...25 A (0.5 A upon request)	
Auxiliary circuit	1 A, DC 28 V (0.5 A upon request)	
Typical life	20,000 operations mechanical, or 5,000 operations at 1 x I _N	
Ambient temperature	-55°C ...+125°C (-67...+257 °F)	
Insulation co-ordination (IEC 60664 and 60664A)	rated impulse withstand voltage	pollution degree 3
	1.5 kV	
Dielectric strength (IEC 60664 and 60664A)	test voltage	
	operating area	AC 1,500 V
	main to aux. circuit	AC 1,500 V
Insulation resistance	> 100 MΩ (DC 500 V)	
Interrupting capacity I _{cn}	AC 115 V (400 Hz):	1...4 A 1,000 A
		5...25 A 2,000 A
		1...25 A 6,000 A
Degree of protection (IEC 60529/DIN 40050)	operating area IP40	
	terminal area IP00	
Vibration (sinusoidal)	10 g (57-2000 Hz), ± 0.76 mm (5-57 Hz) to ISO 7137, EN 2350 para. 5.3.1	
Vibration	1...2.5 A: 0.04 g ² /Hz ± 1.5 dB; 7.3 g eff 3...20 A: 0.06 g ² /Hz ± 1.5 dB; 9 g eff to ISO 7137, EN 2350 para. 5.3.1	
Acceleration	17 g, to ISO 2669, EN 2350 para. 5.3.3	
Shock	50 g (11 ms), to ISO 7137, EN 2350 para. 5.3.2	
Corrosion	48 hours at 5 % salt mist to ISO 7137, EN 2350 para. 5.4.2	
Humidity	240 hours at 95 % RH, to ISO 7137, EN 2350 para. 5.4.3	
Explosion	to VG 95210, sheet 10	
Altitude	≤ 22,000 m above sea level	
Mass	approx. 20.6 g with terminal screws, without -Si	
	approx. 24.6 g with terminal screws, with -Si	

Standard current ratings and typical volt drop values

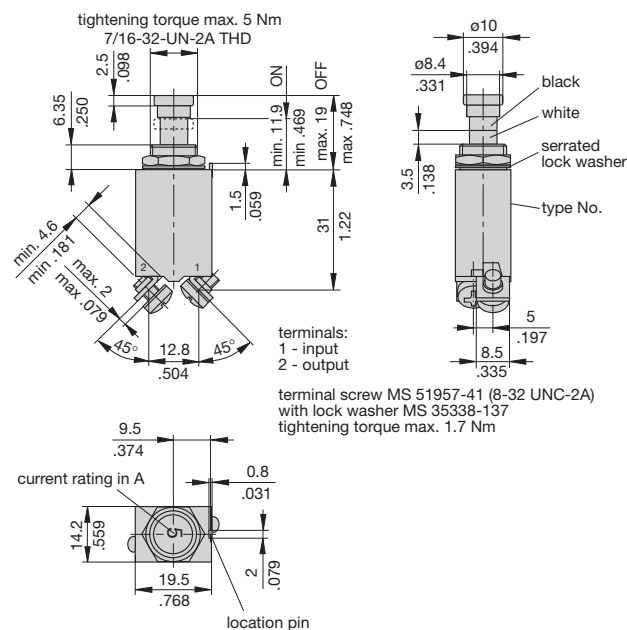
Current rating (A)	Volt drop (mV)	Current rating (A)	Volt drop (mV)
1	1100	7.5	250
2	550	10	230
2.5	460	15	200
3	440	20	190
4	380	25	190
5	260		

Approvals (configurations)

Authority	Voltage ratings	Current ratings
EN 2495		
EN 3773		
EN 2995		
MS 3320		
QPL		
VG 95345 T06	DC 28 V; AC 115 V	0.5...20 A
BWB (to VG 95345, part 6)		
UL 1077	DC 50 V	0.5...25 A

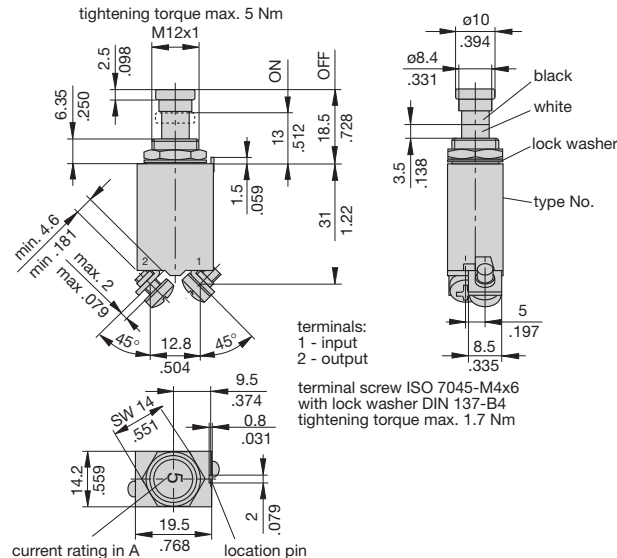
Dimensions 4120-...

4120-G214-J1M1-B2S0ZN (MS 3320)

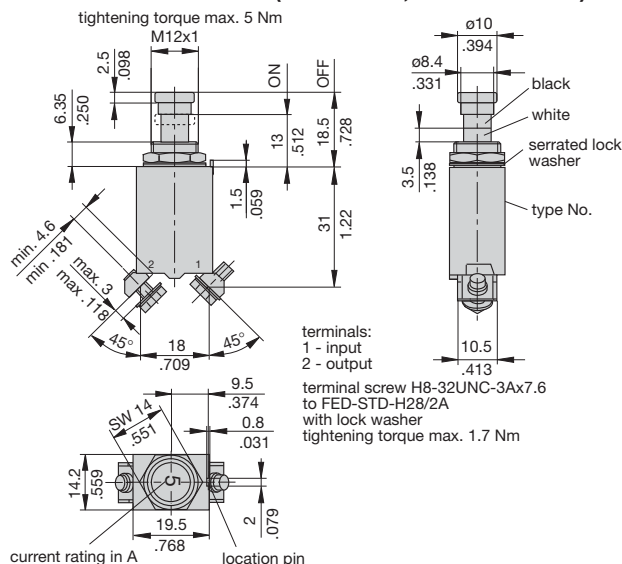


Dimensions 4120-G1..

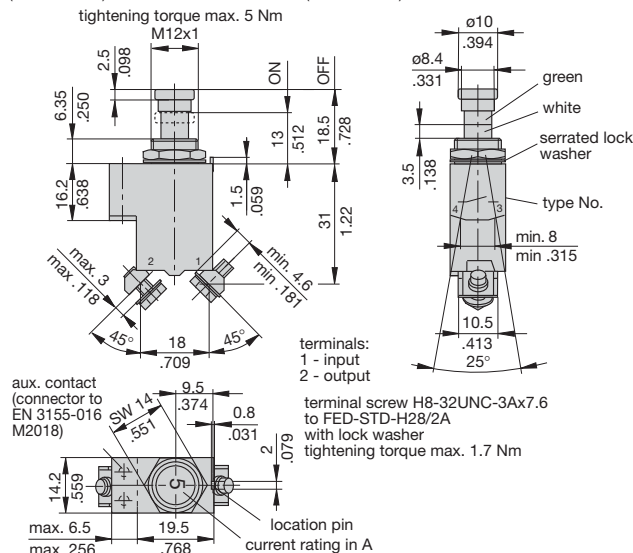
4120-G111-K1M1-A1S0ZN (EN2495-...M) (VG95345 T06)



4120-G11-J2M1-K5S0ZN (EN2495-...U, EN3773-004 D...)



4120-G112-J2M1-K5S1ZG - 4120-G112-J2M1-K5S5ZG (EN2995-004) (EN2995-005)

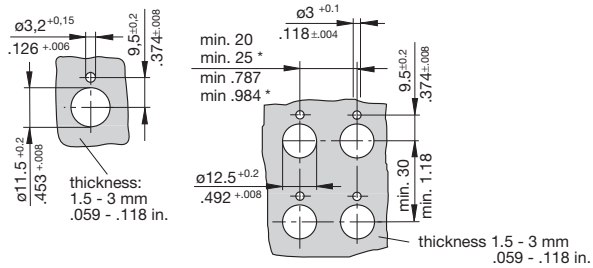


This is a metric design and millimeter dimensions take precedence (mm) inch

Mounting holes

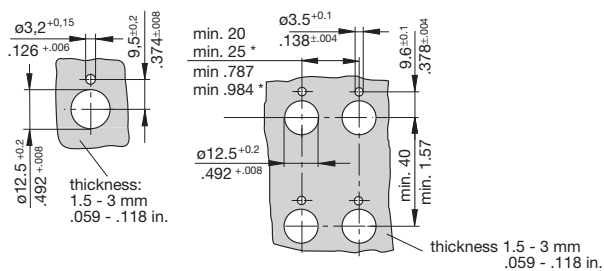
4120-G2...

mounting holes S0



4120-G1...

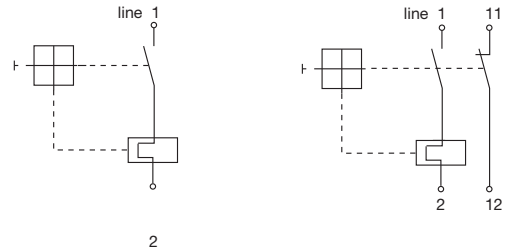
mounting holes S1 or S5



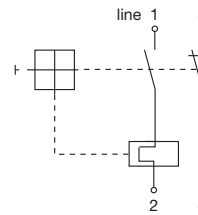
* min. 25 mm / .984 in. when fitted with splash cover

Internal connection diagram

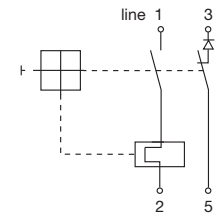
with auxiliary contact
VG 95345 T06



with auxiliary contact
EN 2995-004



with polarized auxiliary contact
EN 2995-005

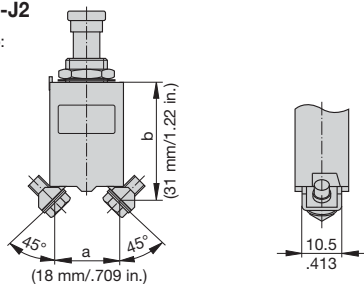


Other terminal designs

Terminal design -J2

Terminal distances to:

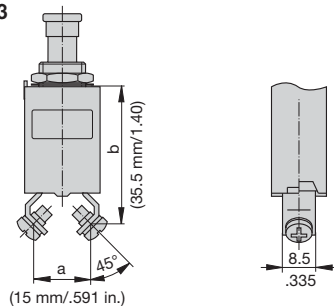
- MS 14 105 (a, b)
- MS 14 153 (a, b)
- MS 22 073 (a)
- MS 22 074 (a)
- MS 25 244 (a)
- MS 25 373 (a, b)



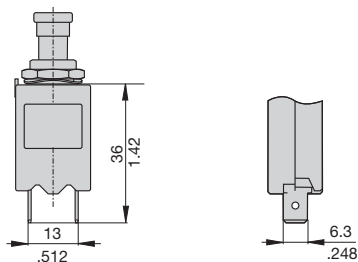
Terminal design -J3

Terminal distances to:

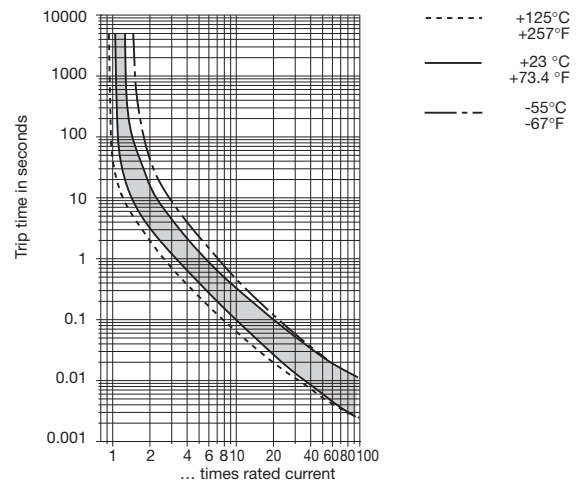
- MS 26 574 (a, b)



Terminal design -P1



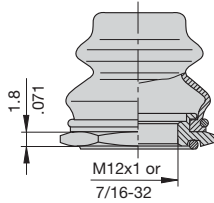
Typical time/current characteristics



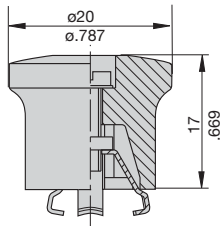
This is a metric design and millimeter dimensions take precedence ($\frac{\text{mm}}{\text{inch}}$)

Accessories (approved to VG 95 345, part 23)

Splash cover/hex nut assembly with O ring (IP66 and IP67)
X 200 801 08 nickel plated nut, transparent cover
X 200 801 03 matt black finish nut, black cover
X 200 801 09 matt black finish nut 7/16-32, black cover



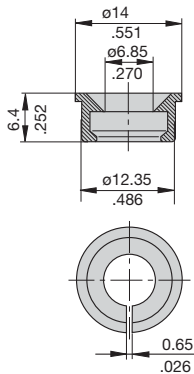
Actuator extension (black) to be fitted on the push button
X 200 803 01



Accessories

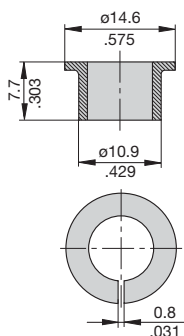
Identification collar to be snapped on the push button

Y 307 004 01 black
Y 307 004 02 white
Y 307 004 03 red
Y 307 004 04 green
Y 307 004 05 blue



Lock out ring to block the push button in OFF position

Y 307 005 01 red
Y 307 005 02 black



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

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 trip-free mechanism, push/pull on/off manual actuation (M-type TO CBE to EN 60934) and temperature compensation. An indicator band on the push button clearly shows the tripped/off position. Threadneck panel mounted, available in metric and US configurations. The robust design makes type 4140 suitable for extremely harsh conditions.

Typical applications

Land vehicles, aircraft, watercraft, special vehicles.

Ordering information

Type No.

4140 High performance thermal circuit breaker with temperature compensation

Mounting

G threadneck panel mounting

Threadneck design

- 1** M12x0.75x7 alu, blackened, 1 location pin
- 3** 7/16-32UNx7 alu, blackened, 1 location pin

Number of poles

- 1** 1-pole, protected

Hardware for threadneck

- 0** without hardware
- 2** hex nut M12x0.75, alu, serrated lock-washer 12.1/17.2, fitted
- 3** hex nut M12x0.75, alu, serrated lock-washer 12.1/17.2, supplied separately
- 4** hex nut 7/16-32UN, alu, toothed lock-washer 11.3/14.9, fitted
- 5** hex nut 7/16-32UN, alu, toothed lock-washer 11.3/14.9, supplied separately

Terminal design (main terminals)

- J1** screw terminals with inch thread (8-32UNC-2B)

Characteristic curve

- M1** thermal 1.1-1.45 x I_N

Terminal screws

- B** Phillips cylinder head screw 8-32UNC-2Ax6
- K** hex screw with Phillips head 8-32UNC-3Ax7.6, fitted
- M** hex screw with Phillips head 8-32UNC-3Ax7.6, supplied separately
- Z** without accessories

Terminal washers

- 0** without lock washer
- 5** lock washer 4.3/9 fitted
- 6** lock washer 4.3/9 supplied separately

Auxiliary contact

- S0** without auxiliary contact
- S1** with aux. contact (N/C) (female contact for male contacts to EN3155-016M2018)
- S5** as S1 but polarized

Barrier

- T** with barrier

Colour of the push button

- G** green
- N** black

Current ratings

- 20...50 A**

4140 - G 1 1 3 - J1 M1 - M 6 S5 T G - 20 A ordering example



without auxiliary contact



with auxiliary contact

4140

Technical data

Voltage rating	AC 115 V (400 Hz); DC 28 V	
Current rating range	20...50 A	
Auxiliary circuit	0.5 A, DC 28 V	
Typical life	5,000 operations mechanical and 2,500 operations at I _N	
Ambient temperature	-55...+125 °C (-67...+257 °F)	
Temperature compensation	-55...+90 °C (-67...+194 °F)	
Insulation co-ordination (IEC 60664)	rated impulse withstand voltage 1.5 kV	pollution degree 3
Dielectric strength	test voltage operating area AC 1,500 V main to aux. circuit AC 1,500 V	
Insulation resistance	> 100 MΩ (DC 500 V)	
Interrupting capacity I _{cn}	AC 115 V (400 Hz): 1,500 A DC 28 V: 4,000 A	
Degree of protection (IEC 60529)	operating area IP40 terminal area IP00	
Vibration (sinusoidal)	± 0.76 mm (5-80 Hz) 10 g (80-500 Hz), 5 g (500-2000 Hz) to EN 2350 para 5.3.1 and ISO 7137	
Vibration (random)	0.04 g ² /Hz (40-500 Hz) 5.8 g rms (10-2000 Hz) to ISO 7137	
Acceleration	17 g, to EN 2350, para 5.3.3 and ISO 2669	
Shock	50 g (11 ms), to EN 2350 para 5.3.2 and ISO 7137	
Corrosion	48 hours at 5 % salt mist to EN 2350 para 5.4.2 and ISO 7137	
Humidity	48 hours at 95 % RH, to EN 2350 para 5.4.3 and ISO 7137	
Altitude	≤ 15,000 m above sea level	
Mass	ca. 57 g with accessories and without auxiliary contact ca. 60 g with accessories and with auxiliary contact	

Standard current ratings and typical volt drop values

Current rating (A)	Volt drop per pole (mV)
20	150
25	150
30	150
35	150
40	120
45	120
50	120

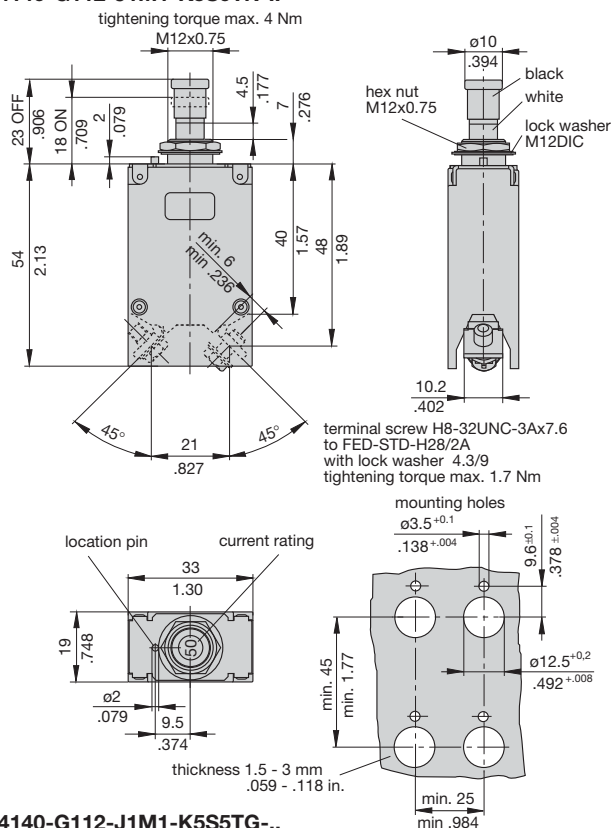
Approvals

ASNE 0732-005 / prEN 3661-005

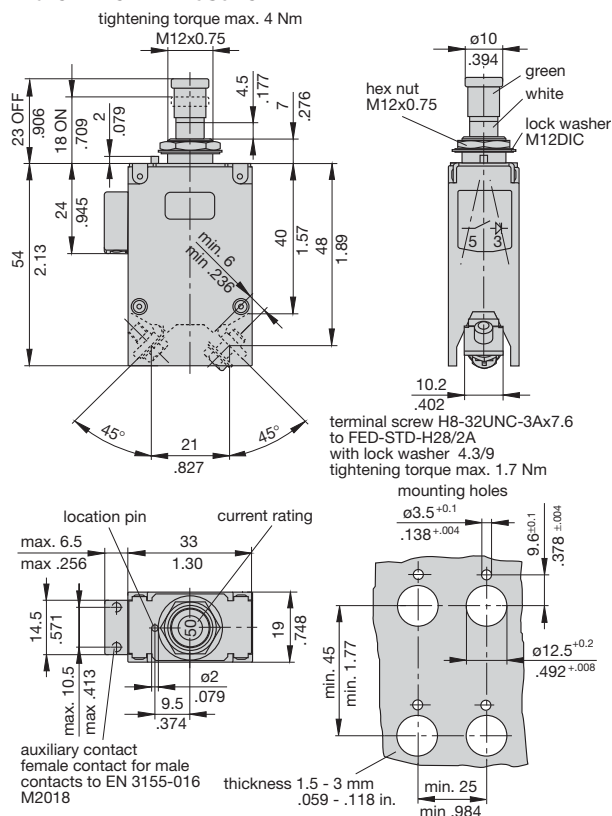
NSA 931321 / prEN2794-004

Dimensions

4140-G112-J1M1-K5S0TN-..

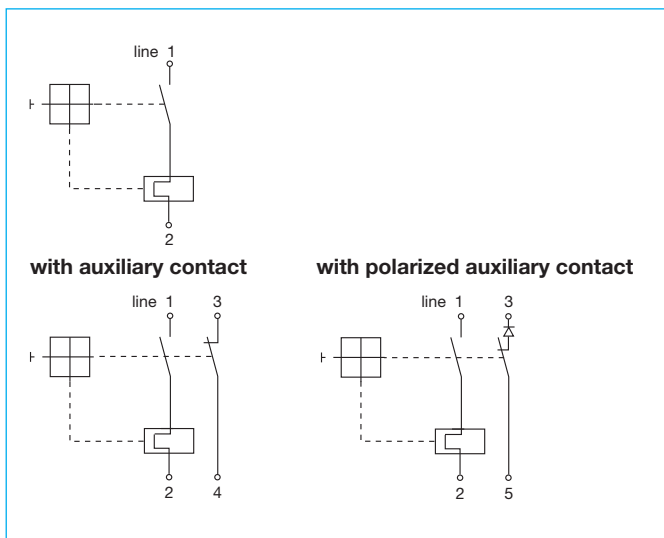


4140-G112-J1M1-K5S5TG-..

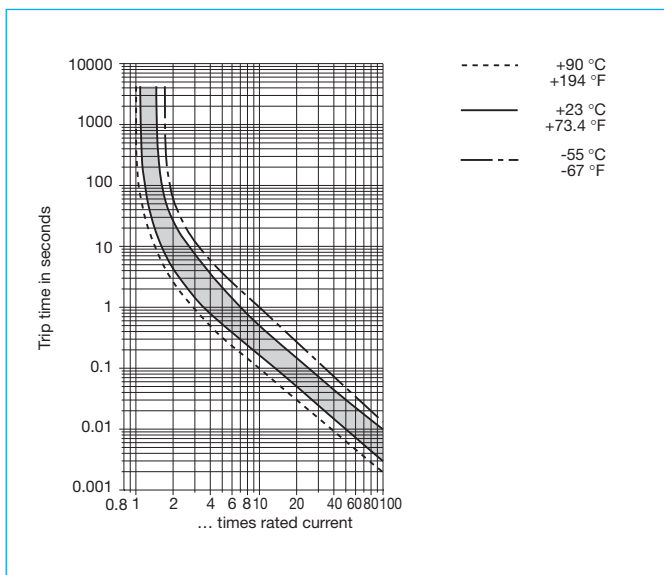


This is a metric design and millimeter dimensions take precedence (mm)
inch

Internal connection diagrams



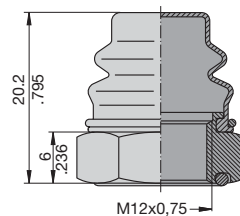
Typical time/current characteristics



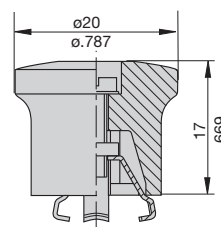
Accessories

Splash cover/hex nut assembly with O ring (IP66 and IP67)
X 200 801 15 black chromated nut M12x0.75x6, black cover

Splash cover/hex nut assembly with O ring (IP66 and IP67)
X 200 801 16 black chromated nut 7/16-32UNx6, black cover

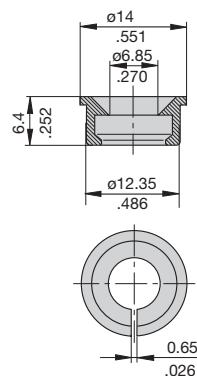


Actuator extension (black) to be fitted on the push button
X 200 803 01 (approved to VG 95345, part 23)



Identification collar to be snapped on the push button

Y 307 004 01 black
Y 307 004 02 white
Y 307 004 03 red
Y 307 004 04 green
Y 307 004 05 blue



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

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 remote control circuit breaker (RCCB), temperature compensated, either with or without auxiliary contacts, and featuring a bimetal actuator which trips the circuit breaker mechanism within a specified time under overcurrent conditions. The switching contact latching system is operated by a bi-stable linear motor controlled by electronic circuitry incorporated within the device. Remote control is achieved through the use of a conventional single pole manually operated aircraft style thermal circuit breaker which connects the control input of the RCCB to ground.

With the control circuit breaker (ICU) in the ON position, the RCCB will switch on. When the control circuit breaker is switched off, the RCCB will change to the OFF condition. If power is applied to a previously de-energised RCCB, the device will adopt the same switching status as the control circuit breaker.

If the RCCB trips thermally in the event of a load circuit fault, the electronic circuitry will also cause the control circuit breaker to trip, thereby providing a visual indication through the position of the circuit breaker actuator.

Approved to MIL-PRF-83383.

Typical applications

Aircraft electrical systems and equipment, and other high performance applications.

Ordering information

Type No.

4930 single pole remote control circuit breaker (RCCB)

Variation

- 01** standard, with auxiliary contacts
- 02** with modified terminal barrier and auxiliary contacts
- 03** standard, without auxiliary contacts
- 04** with modified terminal barrier but without auxiliary contacts

Current ratings

5...100 A

4930 - 01 - 5 A ordering example

I _N /A	E-T-A part number	MIL part number	E-T-A part number	MIL part number
5	4930-01-5A	M83383/02-01	4930-03-5A	M83383/01-01
7.5	4930-01-7.5A	M83383/02-02	4930-03-7.5A	M83383/01-02
10	4930-01-10A	M83383/02-03	4930-03-10A	M83383/01-03
15	4930-01-15A	M83383/02-04	4930-03-15A	M83383/01-04
20	4930-01-20A	M83383/02-05	4930-03-20A	M83383/01-05
25	4930-01-25A	M83383/02-06	4930-03-25A	M83383/01-06
35	4930-01-35A	M83383/02-07	4930-03-35A	M83383/01-07
40	4930-01-40A	M83383/02-08	4930-03-40A	M83383/01-08
50	4930-01-50A	M83383/02-09	4930-03-50A	M83383/01-09
60	4930-01-60A	M83383/02-10	4930-03-60A	M83383/01-10
75	4930-01-75A	M83383/02-11	4930-03-75A	M83383/01-11
80	4930-01-80A	M83383/02-12	4930-03-80A	M83383/01-12
100	4930-01-100A	M83383/02-13	4930-03-100A	M83383/01-13

Approvals

MIL-PRF-83383



4930 (RCCB)

Technical data (T_A = 25 °C, U_e = DC 28 V or AC 115V/400 Hz)

Operating data LINE	(see also MIL-PRF-83383)
Voltage ratings U _e (operating voltage range)	AC 115 V 400 Hz (AC 104...126 V); DC 28 V (DC 18...36 V)
Current rating range I _N	5...100 A (see ordering information)
Bias current	typically 2.5 mA at DC 28 V typically 25 mA at AC 115 V
Switching current/ switching period for internal linear motor	typically 3.4 A / 28 ms at DC typically 2.8 A / 17 ms at AC
Optical indication ON/OFF	status indicator (near terminal A1)
Load circuit LOAD	
Current rating range I _N	5...100 A (see ordering information)
Interrupting capacity	DC 28 V: 6,000 A AC 115 V 400 Hz: 3,600 A
Voltage drop at I _N	see table 1 (standard current ratings and typical voltage drop values)
Overload disconnection	see table 2 (typical time/current characteristics)
Trip limits	see table 2
Control circuit ICU	
ICU	Indicator/Control Unit thermal circuit breaker 0.5 A
Trigger current for ICU ("TRIP FREE"-mode) / duration	approx. 3.2 A / 5 s max
Control voltage U _{ICU} RCCB "OFF" (ICU open)	Limits: U _{ICU} > typ. 2 V (> 1.5 V between -54...+71 °C / -65...+160 °F)
RCCB "ON" (ICU closed)	U _{ICU} < typ. 0.6 V (< 0.2 V between -54...+71 °C / -65...+160 °F)
Control current I _{ICU}	typically 0.4 mA
Additional control units	one relay contact or one ON/OFF switch is applicable (see application note ICU)
ON/OFF-cycling time (e. g. additional relay contact in ICU circuit)	ON > 80 ms / OFF > 80 ms
Signal output AUX	
Auxiliary contacts	change over contacts S1 - S2 is open, when RCCB main contact is open
Voltage ratings	DC 28 V, AC 115 V (400 Hz)
Current ratings	resistive load: 3 A / inductive load 1.5 A lamp load: 0.5 A

Technical data ($T_A = 25^\circ\text{C}$, $U_e = \text{DC } 28 \text{ V}$ or $\text{AC } 115\text{V}/400 \text{ Hz}$)

General data

Typical life endurance	50,000 operations at I_N (inductive or resistive)
Ambient temperature	$-54\dots+71^\circ\text{C}$ ($-65\dots+160^\circ\text{F}$)
Dielectric strength (IEC 60664 and 60664A)	test voltage between main terminals AC 1,500 V main terminal to mounting area AC 1,500 V
Insulation resistance	$> 100 \text{ M}\Omega$ (DC 500 V)
Vibration (sinusoidal)	10 g (55-2000 Hz), $\pm 0.76 \text{ mm}$ (10-55 Hz) to MIL-STD 202, method 204, condition C
Vibration (random)	10-2000 Hz 0.15 g^2/Hz , rms value 13.5 g; 5 h/axis loaded with $0.9 I_N$
Shock	25 g (11 ms, half sinusoidal) to MIL-STD 202, method 213, condition J ISO 7137 (RTCA/DO-160 C, part 7)
Corrosion	48 hours at 5 % salt mist to MIL-STD 202, method 101, condition B ISO 7137 (RTCA/DO-160 C, part 14, category S)
Humidity	240 hours at 95 % RH to MIL-STD 202, method 106/ISO 7137 (RTCA/DO-160 C, part 6, category B)
Sand and dust	to MIL-STD 202, method 110, test condition A
Fungus	to MIL-STD 810 D, method 508.3, 28 days
Altitude	$\leq 15,000 \text{ m}$ above sea level
EMI requirements	to MIL-STD 461, class 1 D
Mass	5...25 A approx. 315 g 35...100 A approx. 319 g
Dimensions	max. 82.55 x 31.9 x 108.2 mm (max. 3.25 x 1.256 x 4.26 inch)
Terminals, connections	see table 3

Table 1

Standard current ratings and typical voltage drop values

Current ratings (A)	Voltage drop at rated current (mV)	Current ratings (A)	Voltage drop at rated current (mV)
5	450	40	225
7.5	360	50	225
10	347	60	225
15	225	75	225
20	225	80	225
25	225	100	225
35	225		

Table 2

Typical time/current characteristics

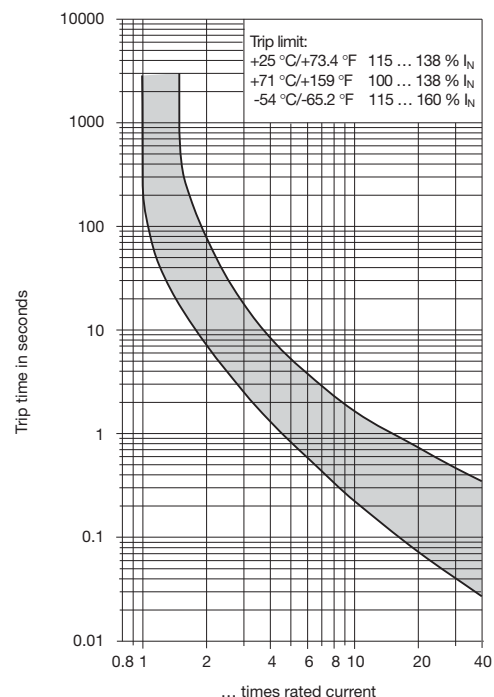


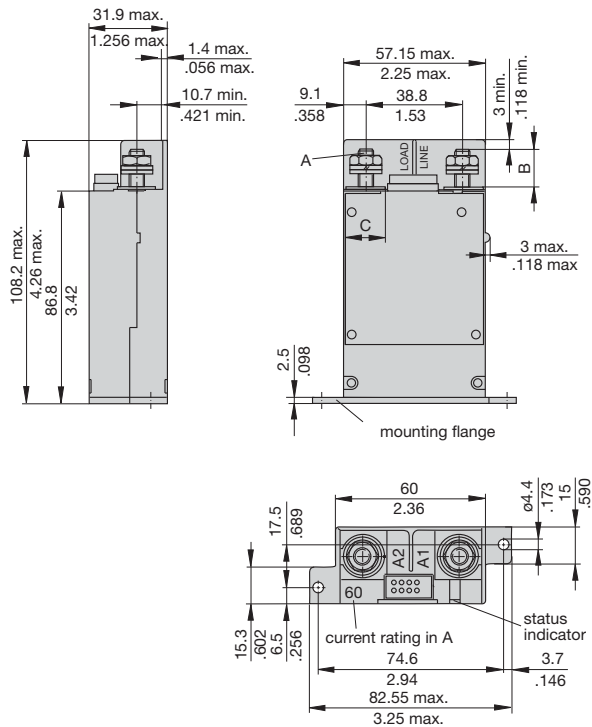
Table 3

Terminals, connections

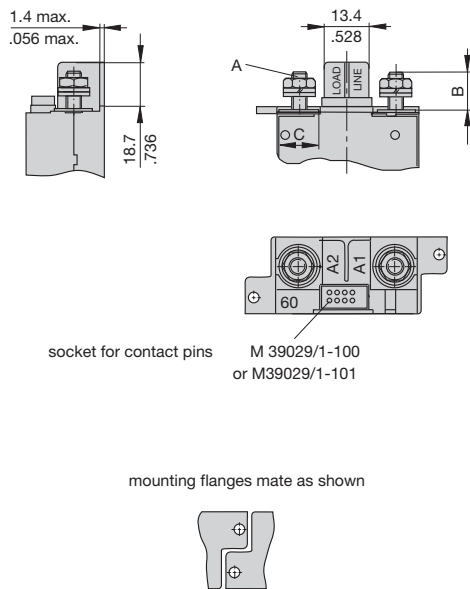
Current rating (A)	5...25	35...100
Thread A	0.190-32 UNF-2A	0.250-28 UNF-2A
Mounting torque	2 Nm	4.1 Nm
B (mm/in.)	12.7/.500	15.5/.610
C (mm/in.)	12.7/.500	15.5/.610
Nut	AN315-3R	AN315-4R
Lock washer	MS 35338-43	MS 35338-44
Flat washer	NAS 1149F0322P	NAS 1149F0463P

Dimensions

Type 4930-01 (M 83383/02) -03 (M 83383/01)

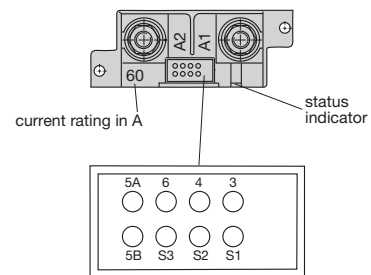


Type 4930-02/ -04



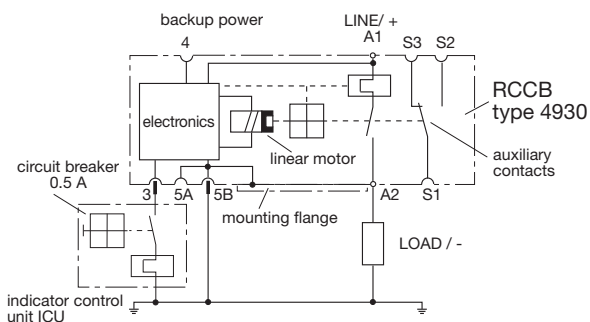
Terminal configuration

Pin no.	Terminal	Description
A1	LINE	power supply DC 28 V, AC 115 V / 400 Hz
A2	LOAD	load is connected to ground GND
3	ICU	control input, when grounded, RCCB = "ON"
4	Backup power	AC 115 V / 400 Hz (same AC phase as LINE) or DC 28 V
5A, 5B	GND	ground potential
6		not connected
S1, S2, S3	AUX	auxiliary change over contacts

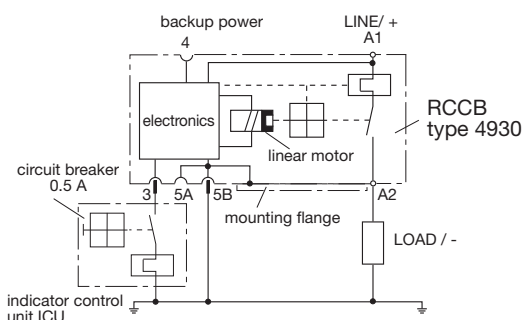


Internal Connection diagrams

Type 4930-01/ -02 (with auxiliary contacts)

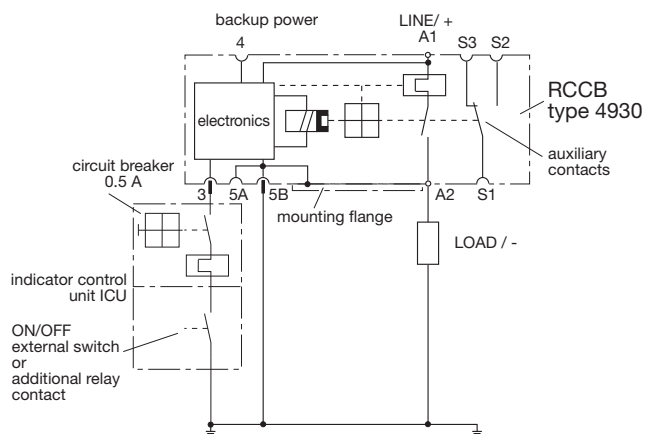


Type 4930-03/ -04 (without auxiliary contacts)



Application note (ICU)

Type 4930-01/ -02 (with auxiliary contacts)



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

Three pole, aircraft style thermal circuit breaker with trip-free mechanism and push/pull on/off manual actuation. An indicator band on the push button clearly shows the tripped/off position. Threadneck panel mounted, available in metric and US configurations. Temperature compensated, with optional auxiliary contacts. The robust design is well suited to extremely harsh conditions. In the event of an overload in one, two or three phases all three poles will be disconnected.

Typical applications

Land vehicles, aircraft, watercraft, special vehicles.

Ordering information

Type No.

5140 High performance thermal circuit breaker with temperature compensation

Mounting

G threadneck panel mounting

Threadneck design

1 M12x0.75x7 alu, blackened, 1 location pin

2 M12x0.75x7 alu, blackened, 2 location pins

3 7/16-32UNx7 alu, blackened, 1 location pin

4 7/16-32UNx7 alu, blackened, 2 location pins

Number of poles

3 3-pole, protected

Hardware for threadneck

0 without hardware

2 hex nut M12x0.75, alu, serrated lock-washer 12.1/17.2, mounted

3 hex nut M12x0.75, alu, serrated lock-washer 12.1/17.2, bulk

4 hex nut 7/16-32UN, alu, toothed lock-washer 11.3/14.9, mounted

5 hex nut 7/16-32UN, alu, toothed lock-washer 11.3/14.9, bulk

Terminal design (main terminals)

J1 screw terminals with inch thread (8-32UNC-2B)

J2 screw terminals with inch thread (8-32UNC-2B) on one side, busbar terminals on other side, with hole bent at 60 °

J3 screw terminals with inch thread (8-32UNC-2B) on one side, busbar terminals on other side, with hole bent at 40 °

Characteristic curve

M1 thermal 1.1-1.45 I_N

Terminal screws

B Phillips cylinder head screw 8-32UNC-2Ax6

K hex screw with Phillips head 8-32UNC-3Ax7.6, mounted

M hex screw with Phillips head 8-32UNC-3Ax7.6, bulk

Z without accessories

Terminal washers

0 without lock washer

5 lock washer 4.3/9 mounted

6 lock washer 4.3/9 bulk

Auxiliary contact

S0 without auxiliary contact

S1 with aux. contact (N/C) (female contact for male contacts to EN3155-016M2018)

S5 as S1 but polarized

Barrier

T with barrier

Colour of the push button

G green

N black

Current ratings

20...50 A

5140 - G 1 3 3 - J1 M1 - M 6 S5 T G - 20 A ordering example



Technical data

Voltage rating	3 AC 200 V (400 Hz); DC 28 V	
Current rating range	20...50 A	
Auxiliary circuit	0.5 A, DC 28 V	
Typical life	5,000 operations mechanical and 2,500 operations at I _N	
Ambient temperature	-55...+125 °C (-67...+257 °F)	
Temperature compensation	-55...+90 °C (-67...+194 °F)	
Insulation co-ordination (IEC 60664)	rated impulse withstand voltage 1.5 kV	pollution degree 3
Dielectric strength	test voltage operating area AC 1,500 V pole/pole AC 1,500 V main to aux. circuit AC 1,500 V	
Insulation resistance	> 100 MΩ (DC 500 V)	
Interrupting capacity I _{cn}	2,000 A	
Degree of protection (IEC 60529)	operating area IP40 terminal area IP00	
Vibration (sinusoidal)	± 0.76 mm (5-80 Hz) 10 g (80-500 Hz), 5 g (500-2000 Hz) to EN 2350 Abschn. 5.3.1 and ISO 7137	
Vibration (random)	0.04 g ² /Hz (40-500 Hz) 5.8 g rms (10-2000 Hz) to ISO 7137	
Acceleration	17 g, to EN 2350, para 5.3.3 and ISO 2669	
Shock	50 g (11 ms), to EN 2350 para 5.3.2 and ISO 7137	
Corrosion	48 hours at 5 % salt mist to EN 2350 para 5.4.2 and ISO 7137	
Humidity	48 hours at 95 % RH, to EN 2350 para 5.4.3 and ISO 7137	
Altitude	≤ 15,000 m above sea level	
Mass	ca. 144 g	with accessories and without auxiliary contact
	ca. 150 g	with accessories and with auxiliary contact

Standard current ratings and typical volt drop values

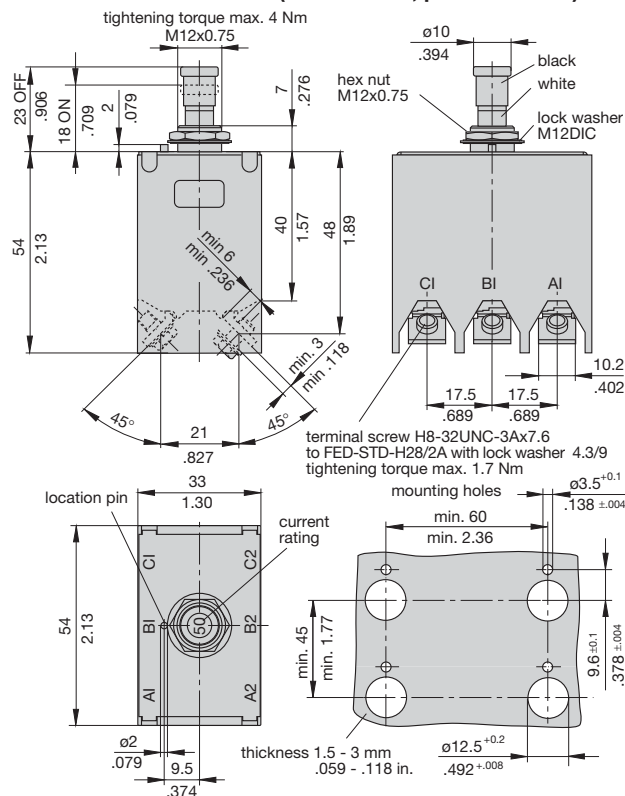
Current rating (A)	Volt drop per pole (mV)
20	150
25	150
30	150
35	150
40	120
45	120
50	120

Approvals

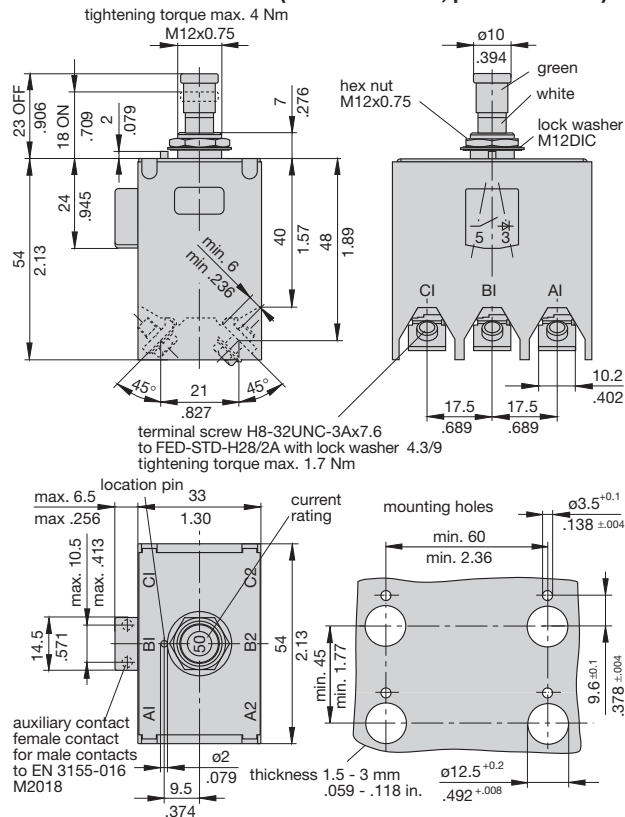
ASNE 0459
 NSA 931323 / prEN2665-004
 ASNE 0733-005 / prEN 3662-005
 ASNE 0733-006 / prEN 3662-006

Dimensions

5140-G132-J1M1-K5S0TN (NSA 931 323; prEN 2665-004)



5140-G132-J1M1-K5S5TG (ASNE 0733-005; prEN 3662-005)

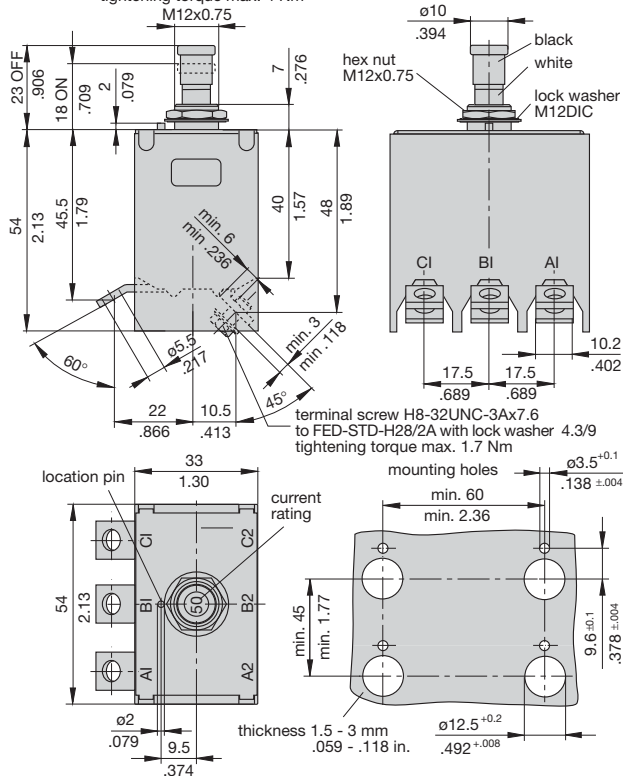


This is a metric design and millimeter dimensions take precedence (mm/inch)

Dimensions

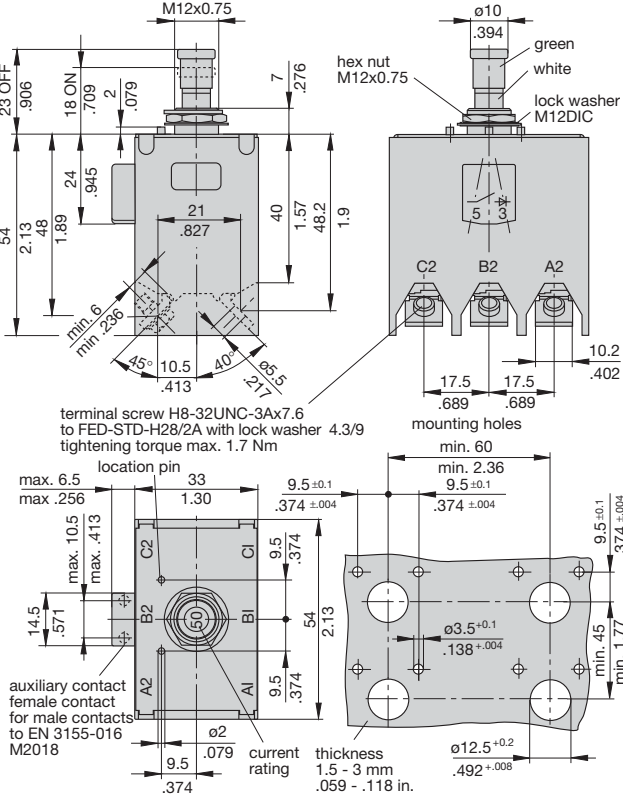
5140-G132-J2M1-K5S0TN (ASNE 0459)

tightening torque max. 4 Nm



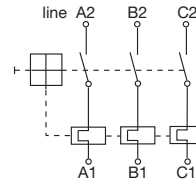
5140-G232-J3M1-K5S5TG (ASNE 0733-006; prEN 3662-006)

tightening torque max. 4 Nm

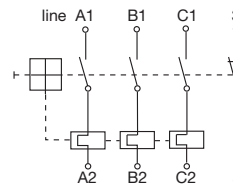


Internal connection diagrams

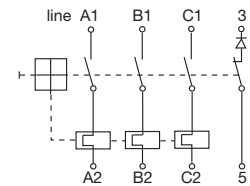
without auxiliary contact



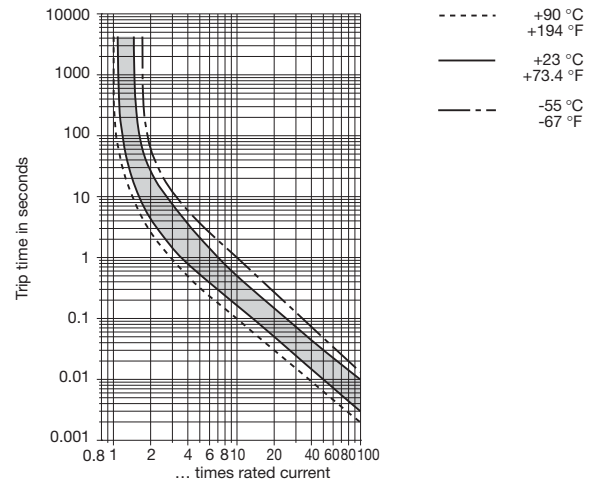
with auxiliary contact



with polarized auxiliary contact



Typical time/current characteristics

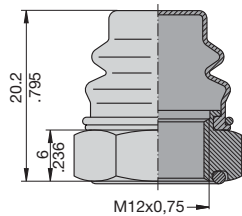


This is a metric design and millimeter dimensions take precedence (mm/inch)

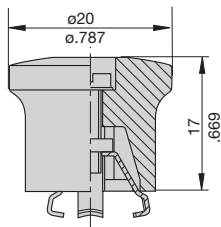
Accessories

Splash cover/hex nut assembly with O ring (IP66 and IP67)
X 200 801 15 black chromated nut M12x0.75x6, black cover

Splash cover/hex nut assembly with O ring (IP66 and IP67)
X 200 801 16 black chromated nut 7/16-32UNx6, black cover

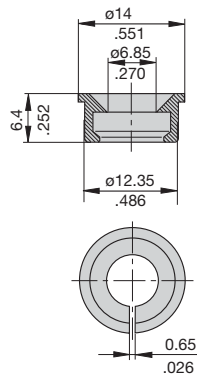


Actuator extension (black) to be fitted on the push button
X 200 803 01 (approved to VG 95345, part 23)



Identification collar to be snapped on the push button

Y 307 004 01 black
Y 307 004 02 white
Y 307 004 03 red
Y 307 004 04 green
Y 307 004 05 blue



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

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

Three pole, miniaturised, aircraft style thermal circuit breaker with tease-free, trip-free, snap action mechanism and push/pull on/off manual actuation (M-type TO CBE to EN 60934). An indicator band on the push button clearly shows the tripped/off position. Threadneck panel mounted, available in metric and US (AS 14154) configurations. Advanced two-chamber design minimises contact contamination to provide fail-safe operation. Temperature compensated with optional auxiliary contacts, and fully approved for use on a wide range of aircraft and equipment. For single pole version see type 483.

Typical applications

Aircraft systems and equipment (fixed wing and helicopters); other extra low voltage wiring applications; defence equipment; communications systems.

Standard current ratings and typical volt drop values

Current rating (A)	Volt drop per pole (mV)	Current rating (A)	Volt drop per pole (mV)
1	750	7.5	230
2	520	10	190
2.5	400	15	190
3	360	20	200
4	350	25	170
5	260	30	160

Approvals

Approvals:

LN 29887

VG 95345, part 11

prEN 2996

AS 14154

QPL



without auxiliary contact

583-...

with auxiliary contact

Technical data

Voltage rating	3 AC 200 V (400 Hz); DC 28 V	
Current rating range	1...30 A	
Auxiliary circuit	0.5 A, DC 28 V	
Typical life	20,000 operations mechanical 10,000 operations at I_N (≤ 25 A) 4,000 operations at I_N (30 A)	
Ambient temperature	-55...+125 °C (-67...+257 °F) ≤ 15 A -55...+90 °C (-67...+194 °F) > 15 A	
Insulation co-ordination (IEC 60664 and 60664A)	rated impulse withstand voltage 1.5 kV	pollution degree 3
Dielectric strength (IEC 60664 and 60664A)	test voltage operating area pole/pole main to aux. circuit	AC 1,500 V AC 1,500 V AC 1,500 V
Insulation resistance	> 100 M Ω (DC 500 V)	
Interrupting capacity I_{cn}	3 AC 200 V (400 Hz): ≤ 4 A 1,000 A 5 A 2,000 A 7.5...25 A 2,500 A 30 A 1,500 A DC 28 V: 1...25 A 6,000 A 30 A 4,000 A	
Degree of protection (IEC 60529/DIN 40050)	operating area IP40 terminal area IP00	
Vibration (sinusoidal)	10 g (57-2000 Hz), ± 0.76 mm (5-57 Hz) to VG 95210, sheet 19, IEC 60068-2-6, test Fc, ISO 7137	
Vibration (random)	16.4 g rms, 0.2 g ² Hz ± 1.5 dB, to VG 95210, sheet 29, IEC 60068-2-6, test Fc, ISO 7137	
Acceleration	17 g, to ISO 2669	
Shock	50 g (11 ms), to VG 95210, sheet 28, IEC 60068-2-27, test Ea, ISO 7137	
Corrosion	96 hours at 5 % salt mist 48 hours at 20 % salt mist to VG 95210, sheet 2, IEC 60068-2-11, test Ka, ISO 7137	
Humidity	240 hours at 95 % RH, to VG 95210, sheet 7, IEC 60068-2-3, test C/ISO 7137	
Explosion	to VG 95210, sheet 10, MIL-STD-202, meth. 109	
Altitude	$\leq 25,000$ m above sea level	
Mass	max. 67 g with auxiliary contact max. 63 g without auxiliary contact	

Mass reduction through aluminium threadneck approx. 3 g

Ordering information

Type No.

583 three pole, with temperature compensation

Mounting

G threadneck panel mounting

Threadneck design

- 1** M12x1x6.4x8.8 dia. with mounting plate (aux. contact version)
- 2** 15/32-32UNx6.4x7.8 dia. (only without aux. contact)
- 3** MJ12x1x6.4x8.8 dia. (only without aux. contact)
- 4** M12x1x6.4x8.8 dia. (only without aux. contact)
- 5** 7/16-32UNx6.4x7.8 (only without aux. contact)
- 6** M12x1x9.4x8.8 dia. (without aux. contact)
- 7** 7/16-32 UNx6.4x7.8 dia. with mounting plate (aux.contact version)
- 8** M12x1x6.4x8.8 with mounting plate, aluminium threadneck
- 9** M12x1x6.4x8.8, aluminium threadneck

Hardware for threadneck (washers)

- 0** without hardware
- 1** corrugated washer 12/15, fitted
- 2** serrated lock washer 12.1/17.2, fitted
- 3** serrated lock washer 11.3/14.9, fitted
- 4** serrated lock washer 12/15, fitted

Hardware for threadneck (nuts)

- 0** without hardware
- 1** hex nut M12x1
- 2** hex nut 15/32-32UN
- 3** hex nut 7/16-32UN
- 5** hex nut MJ12x1 (only with threadneck design 3)

Terminal design (main terminals)

K screw terminals with metric thread

- 1** K14 (M4, MJ4)

J screw terminals with inch thread

- 1** J14 (8-32UNC-2B)
- 2** J17 (8-32UNC-2B)
- 3** J25 (6-32UNC-2B)

Characteristic curve

M1 thermal, 1.15-1.38 I_N

Terminal screws

- A** Phillips screw M4x6
- B** Phillips screw 8-32UNC-2Ax6 (MS 51957-41)
- C** Phillips screw 6-32UNC-2Ax6 (MS 51957-41)
- D** slotted flat head screw M4x6
- E** hex screw with Phillips head 8-32UNC-3Ax9.5
- K** hex screw with Phillips head 8-32UNC-3Ax7.6
- L** Phillips screw MJ4x6
- Z** without accessories

Terminal washers

- 0** without lock washer
- 1** lock washer B4
- 2** lock washer 4.3 (MS 35338-137)
- 3** lock washer B4 and washer 4.4/9.5
- 4** lock washer 3.7 (MS 35338-136)
- 5** lock washer 4.3/9

Auxiliary contact

- S0** without auxiliary contact
- S1** with auxiliary contact (N/C) (connector to EN 3155-016M2018, size 20)
- S5** with polarized auxiliary contact (N/C)

Barrier

- T** barrier 25.5 mm wide, 37.7 mm long (-S0 only)
- U** barrier 19.5 mm wide, 37.7 mm long
- V** barrier 25.5 mm wide, 37.7 mm long, colour marking between the terminals (-S0 only)
- X** barrier 19.5 mm wide, 34.1 mm long

Colour of the push button

- (blank) black (standard) (e.g. 7.5)
- A** green (e.g. 7.5)
- G** green to EN (e.g. 7 1/2)
- N** black to EN (e.g. 7 1/2)

Current ratings

1...30 A

583 - G 4 1 1 - K 1 M1 - A 1 S0 T . - 5 A ordering example

Ordering information for approved devices

583-G411-K1M1-A1S0TN (583-96-TC-K14)

Metric threadneck M12x1 and terminal design -K14 (M4x6), listed by the German Materialamt der Bundeswehr to VG 95345 T11.

583-G111-K1M1-A1S1UN

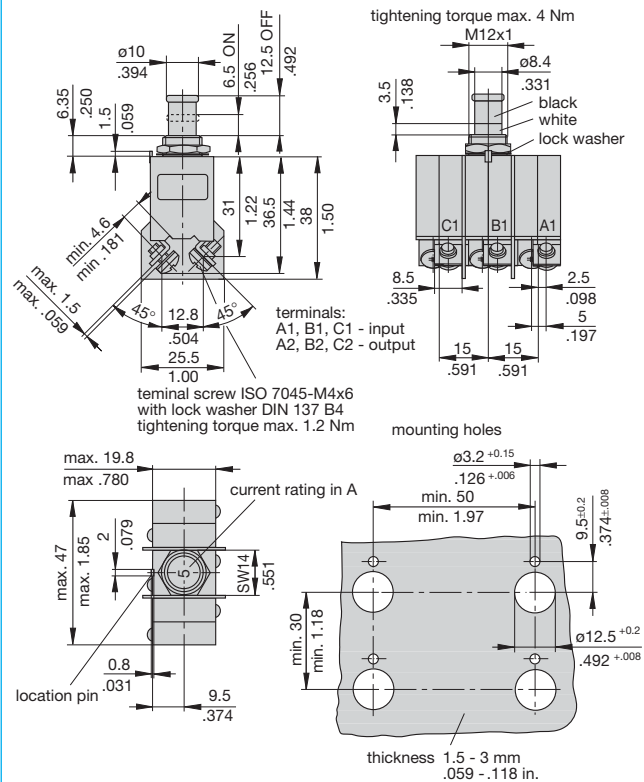
Metric threadneck M12x1 and terminal design -K14 (M4x6) with auxiliary contact -Si, listed by the German Materialamt der Bundeswehr to VG 95345 T11.

583-G533-J1M1-B2S0XN (AS 14154)

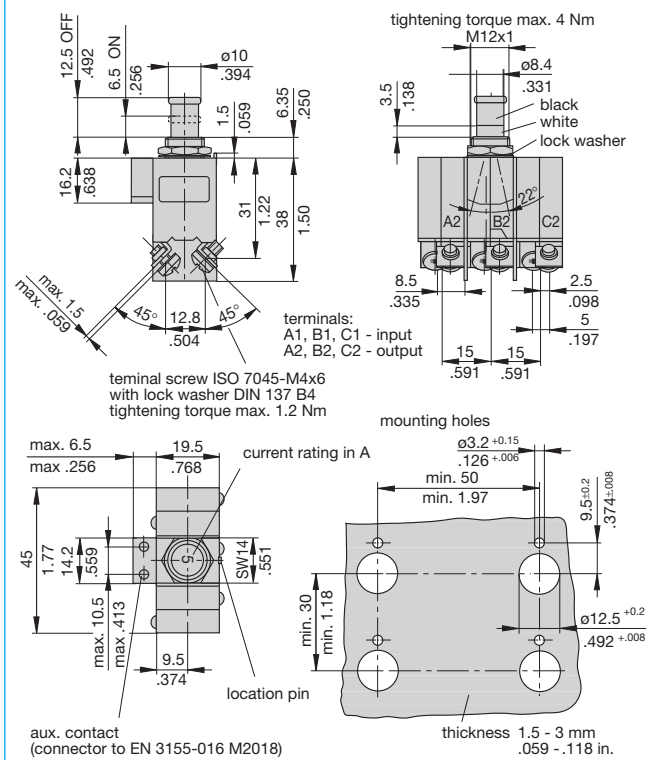
Threadneck size 7/16-32UNSx6.4 and terminal design -J14 (inch thread 8-32), approved to AS 14154.

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

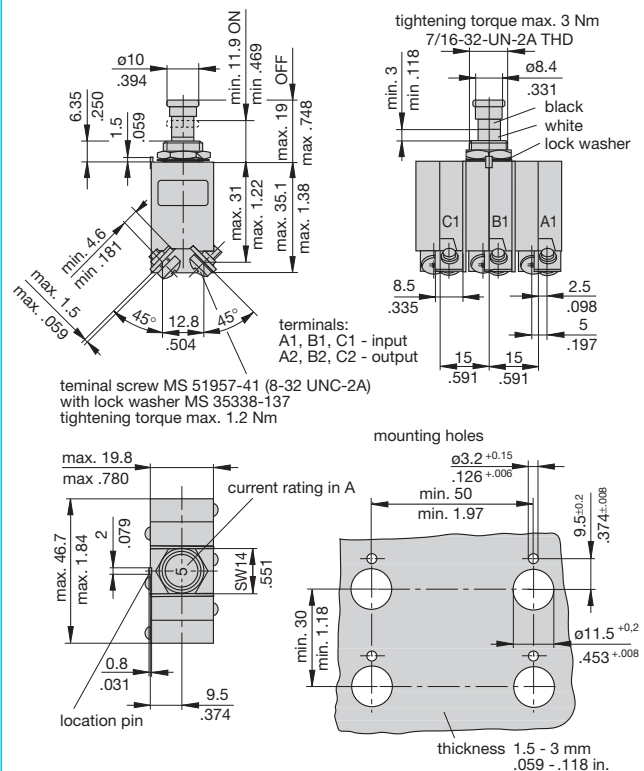
Dimensions 583-G411-K1M1-A1S0TN (VG 95345 T11)



Dimensions 583-G111-K1M1-A1S1UN (VG 95345 T11)



Dimensions 583-G533-J1M1-B2S0XN (AS14154)

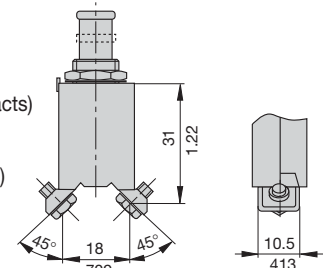


Other main terminal and threadneck designs

terminal design -J2

recommended barrier:

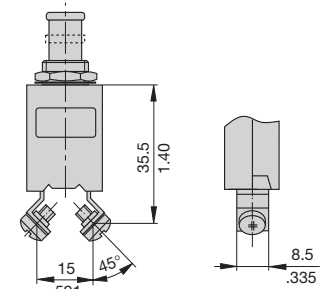
- T or -X
for -S0
(without auxiliary contacts)
- U or -X
for -S1 or -S5
(with auxiliary contacts)



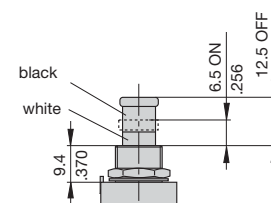
terminal design -J3

recommended barrier:

- T for -S0
(without auxiliary contacts)
- U for -S1 or -S5
(with auxiliary contacts)

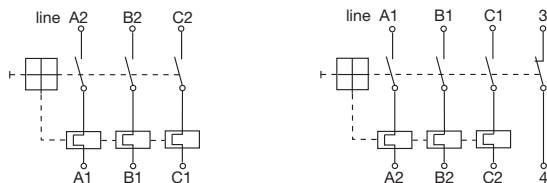


mounting -G6

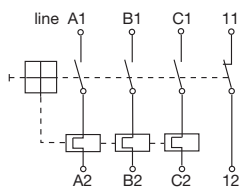


Internal connection diagrams

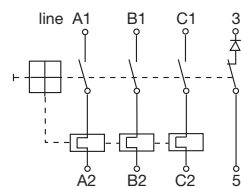
with auxiliary contact
EN 2996-004



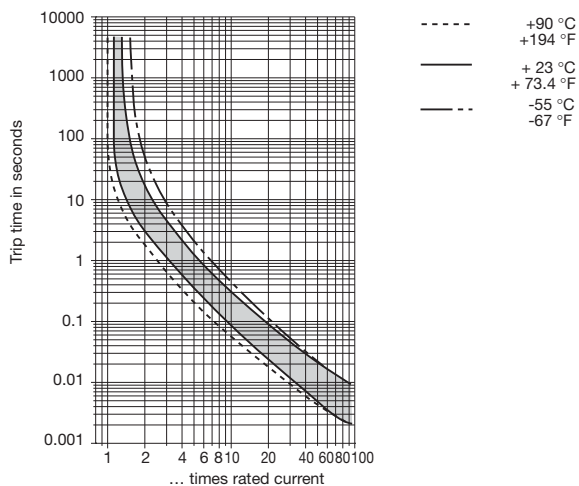
with auxiliary contact
VG 95345 T11



with polarized auxiliary contact
EN 2996-005



Typical time/current characteristics



Accessories

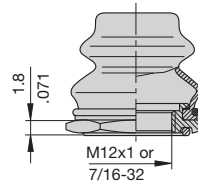
Splash cover/hex nut assembly with O ring (IP66 and IP67)

(approved to VG 95345, part 23)

X 200 801 08 nickel plated nut, transparent cover

X 200 801 03 matt black finish nut, black cover

X 200 801 09 matt black finish nut 7/16-32, black cover

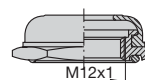


Splash cover black/hex nut assembly with O ring (IP54)

only for threadneck nut M12 (to VG 95345, sheet 23)

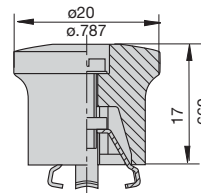
X 200 802 01 nickel plated nut

X 200 802 02 matt black finish nut



Actuator extension (black) to be fitted on the push button
(approved to VG 95345, T23)

X 200 803 01



Identification collar to be snapped on the push button

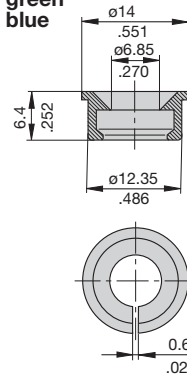
Y 307 004 01 black

Y 307 004 02 white

Y 307 004 03 red

Y 307 004 04 green

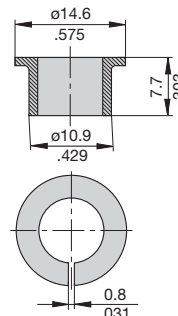
Y 307 004 05 blue



Lock out ring to block the push button in OFF position

Y 307 005 01 red

Y 307 005 02 black



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

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Description

Single, two and three pole isolators to EN 60947 / IEC 60947 with toggle actuation. Designed for rail, panel or surface mounting. Options include auxiliary contacts and remote electrical disconnection. For circuit breaker versions see types 410, 520, 530.

Typical applications

Control systems, industrial equipment.

Ordering information

Type No.

911 single pole switch

912 double pole switch

913 three pole switch

Terminal design

K main terminal

up to 32 A: pressure plate B5-DIN 46288

up to 63 A: pressure plate B6-DIN 46288

up to 125 A: terminal screws DIN 46206, sheet 2, form 1, thread M6

Mounting

1 surface mounting

2 rail or panel mounting (rail DIN EN 50022-35x7.5)

3 rail or panel mounting (rail DIN EN 50035-G32)

4 panel mounting only

5 mounting brackets – surface mounting

Auxiliary contacts (terminals M3.5 or blade terminals (-FA))

Si one each N/O and N/C (not for 911-FA)

Si1 one N/C (11,12) (not for 911-FA)

Si2 one N/O (13,14)

2Si two each N/O and N/C – types 912, 913 only (not for 912-FA)

3Si three each N/O and N/C – type 913 only (not for 913-FA)

Remote trip (optional)

FA 12 remote disconnection, for DC 12 V

FA 24 remote disconnection, for DC 24 V

Current ratings

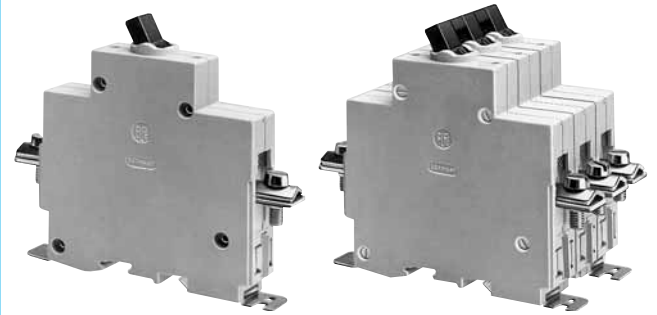
32, 63, 125 A

911 - K - 1 - Si - ... - 63 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)	
32	≤ 0.002	per pole
63	≤ 0.002	per pole
125	≤ 0.002	per pole



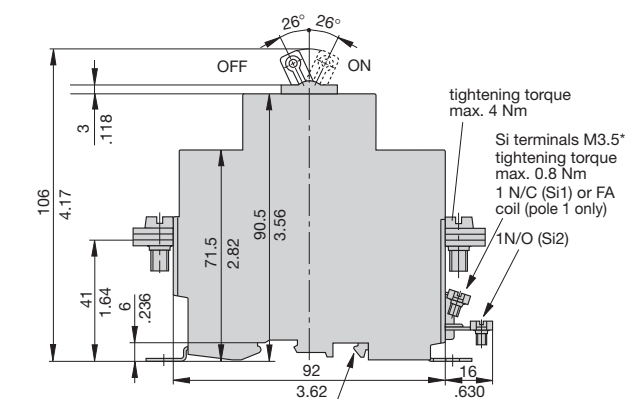
911-K

913-K

Technical data

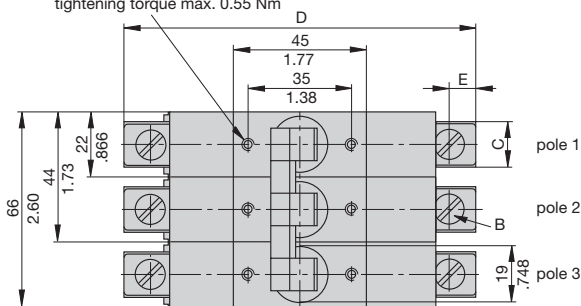
Voltage rating	AC 240 V; 3 AC 415 A; 3 AC 500 V; DC 110 V	
Current rating range	32 A, 63 A, 125 A	
Auxiliary contact rating	6 A at AC 240 V or DC 28 V; 1 A at DC 110 V	
Electrical remote disconnection (FA)	operating voltage DC 12 V or DC 24 V operating current approx. 18 A or 12 A max. pulse time 10 ms < t_{ON} < 20 ms / t_{OFF} > 10 s switching time < 20 msec	
Typical life	10,000 operations at I_N 20,000 operations mechanical	
Ambient temperature	-40...+75 °C (-40...+167 °F)	
Insulation co-ordination (IEC 60664 and 60664A)	rated impulse withstand voltage 6 kV	pollution degree 3
Dielectric strength (IEC 60664 and 60664A)	test voltage operating area AC 3,300 V pole/pole AC 3,300 V main to aux. circuit AC 2,200 V aux. circuit 11-12 to 13-14 AC 1,000 V	
Insulation resistance	> 100 M Ω (DC 500 V)	
Short-circuit protection	back up fuse max. 125 A	
Degree of protection (IEC 60529/DIN 40050)	operating area IP40 terminal area IP00	
Vibration	5 g (57-200 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 60068-2-3, test Ca	
Mass	approx. 220 g single pole approx. 440 g double pole approx. 660 g three pole	

Dimensions

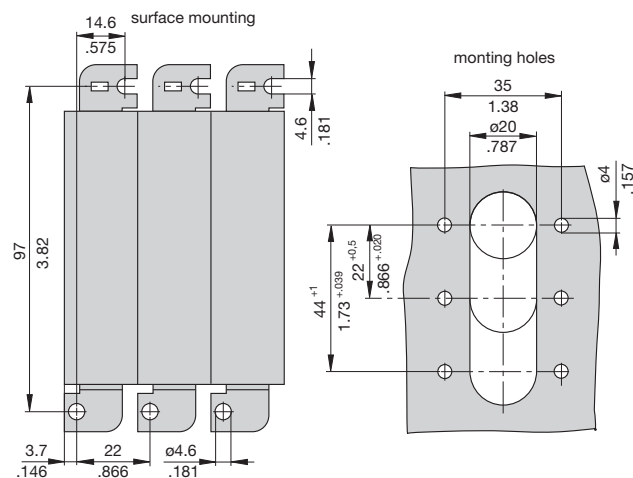


symmetrical rail DIN EN 50022-35x7.5
G profile rail DIN EN 50035-G32 (not shown)

M3.5 - thread max. 9 mm (.354 in.) deep
tightening torque max. 0.55 Nm

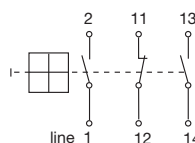


Current rating	Dimensions mm/in.				Terminal	Cross section (see DIN 46288)		Max. tightening torque
	B	C	D	E		with 1 or 2 equal conductors	with 2 different conductors	
≤ 32 A	M5	13 .512	114 4.49	7 .276	pressure plate B5 DIN 46288	2.5 mm ² to 10 mm ²	2.5 mm ² to 10 mm ²	2.0 Nm
≤ 63 A	M6	15.4 .606	120 4.72	9 .354	pressure plate B6 DIN 46288	4 mm ² to 16 mm ²	4 mm ² and 6 mm ² or 6 mm ² to 16 mm ²	2.5 Nm
≤ 125 A	M6	15.4 .606	120 4.72	9 .354	terminal screw			2.5 Nm

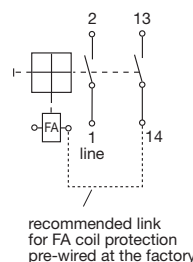


Internal connection diagrams

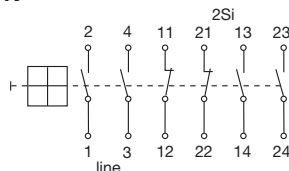
911



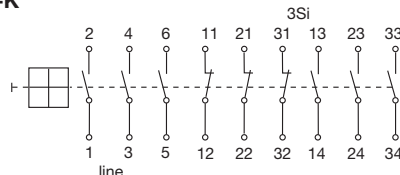
911-...-FA



912-K

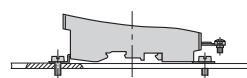


913-K

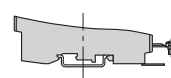


Mounting method

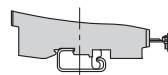
Surface mounting suffix: -1



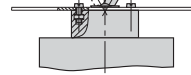
Rail mounting (EN 50022-35x7.5) suffix: -2



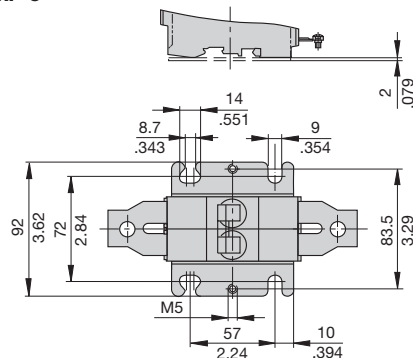
Rail mounting (EN 50035-G32) suffix: -3



Panel mounting suffix: -4



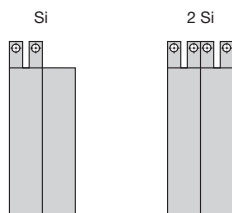
Mounting brackets - surface mounting suffix: -5



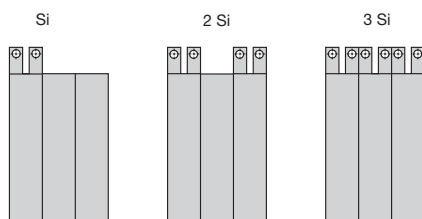
Covers, labels, sealing screws etc. can be fitted on the front of the housing.

Auxiliary contact arrangement with multipole switches

double pole devices



three pole devices

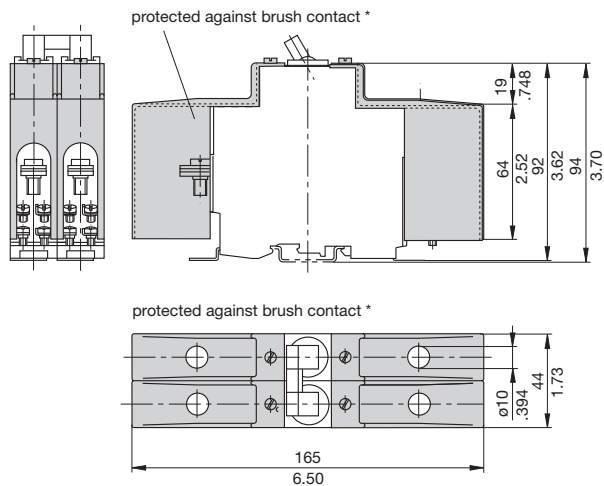


Accessories

Terminal insulation cover

X 211 705 01

(1 set = 2 pcs per pole)

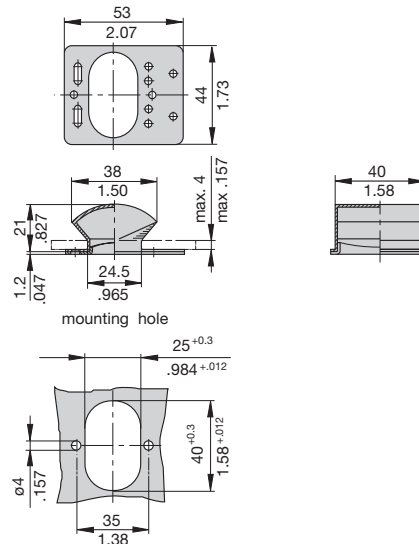


* to DIN 57106T100/VDE 0106 T100

Accessories

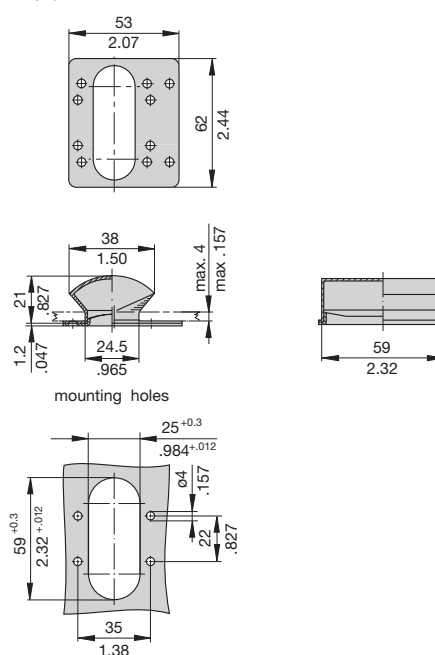
For series 911 ≤ 125 A

Water splash cover translucent with fixing plate and screws (IP54)
X 211 118 01



For series 911 - 240 A and 912

Water splash cover translucent with fixing plate and screws (IP54)
X 211 119 01



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

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 or two pole isolation switches to IEC 60947/EN 60947 with toggle actuation. Options include auxiliary contacts, a moulded flame retardant enclosure for added environmental protection (with or without rotary action external operating knob), and remote operation - disconnection only, or disconnection and re-connection. A version for use in hazardous areas (e.g. petroleum and chemical tankers) is available to special order.

Typical applications

Vehicles of all types (including tankers), boats, battery powered systems.

Ordering information

Type No.

921	single pole switch
922	double pole switch

Enclosure design (optional)

B3	without external operating knob, for use only with single pole devices
B31	with external operating knob, for use only with single pole devices
B32	without external operating knob, for use only with double pole devices
B33	with external operating knob, for use with double pole devices
B34	with external operating knob, for use only with double pole devices with remote-re-connection facility
B35	with external operating knob, for use only with single pole devices with remote-re-connection facility
C3	without external operating knob, 1-pole, IP65
C32	without external operating knob, 2-pole, IP65

Terminal design

K12	for single pole version, enclosures B3, B31, B35
K60	for single pole version
K61	for double pole version
K62	for double pole version
K71	compulsory and only for C3 housing
K72	for double pole version, enclosures B32, B33, B34
K76	compulsory and only for C32 housing

Mounting

2	compulsory and only for C3 and C32 housing
5	mounting brackets - surface mounting

Auxiliary contacts (blade terminals 6.3x0.8)

Si2	one N/O
Si01	one N/C, two N/O
2Si2	two N/O
Si10	one each N/O and N/C

Remote operation

FA	remote disconnection
FC	electrical remote disconnection (FA) and re-connection (FE)
BC-FA	electrical remote disconnection and manual remote re-connection (not for enclosure -B.. or -C..)

Coil voltage

12	AC/DC 12 V
24	AC/DC 24 V

Current ratings

240 A	type 921
120 A	type 922

921 - ... - K60 - 5 - Si2 - FA 24 - 240 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.



921
single pole

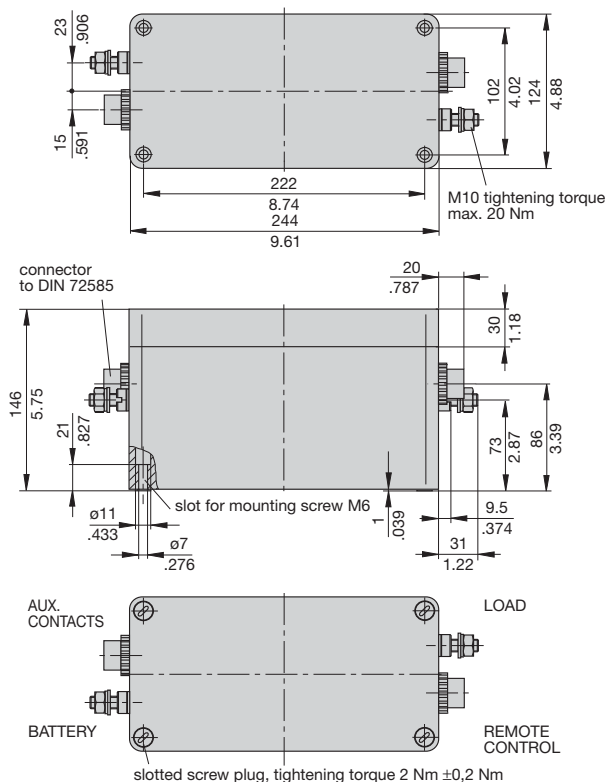
922
double pole

Technical data

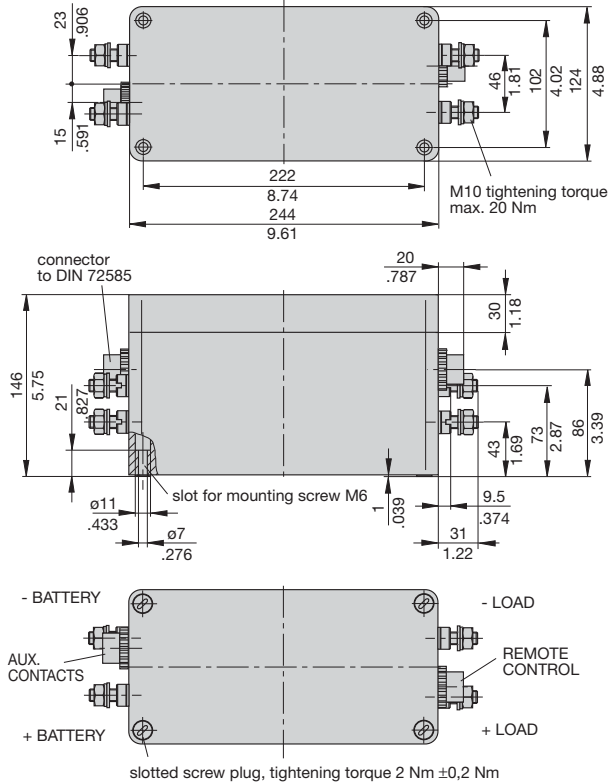
Voltage rating	DC 12 V; DC 24 V	
Current rating range	240 A type 921, single pole 120 A type 922, double pole	
Auxiliary contact rating	6 A at DC 24 V 1 A at DC 110 V	
Electrical remote disconnection (-FA):	operating voltage DC 12 V or DC 24 V operating current approx. 18 A or approx. 12 A max. pulse time 10 ms < t _{ON} < 20 ms / t _{OFF} > 10 s switching time < 20 ms	
Electrical remote re-connection (-FE):	operating voltage DC 12 V or DC 24 V operating current approx. 30 A or approx. 15 A max. pulse time 0.1 s < t _{ON} < 1.2 s / t _{OFF} > 60 s switching time < 100 ms	
Typical life	10,000 operations at I _N 20,000 operations mechanical	
Ambient temperature	-40...+75 °C (-40...+167 °F)	
Insulation co-ordination (IEC 60664 and 60664A)	rated impulse withstand voltage 6 kV	pollution degree 3
Dielectric strength (IEC 60664 and 60664A)	test voltage operating area pole/pole main to aux. circuit aux. circuits 11-12 to 13-14	AC 3,300 V AC 3,300 V AC 2,200 V AC 1,000 V
Insulation resistance	> 100 MΩ (DC 500 V)	
Switching capacity	Type 921 2,500A for 1s at +23°C 600A for 1min at +23°C 600A for 2min at -23°C 600A for 90s at 0°C	Type 922 1,500A for 1s at +23°C 600A for 30s at +23°C 600A for 1min at -23°C 600A for 45s at 0°C
Degree of protection (IEC 529/DIN 40050)	operating area IP40 terminal area IP00 IP54 with enclosure -B.. IP65 with enclosure -C..	
Vibration	5 g (57-200 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 60068-2-3, test Ca	
Mass	approx. 900 g base unit + approx. 400 g remote disconnection + approx. 100 g remote re-connection + approx. 750 g B housing + approx. 1,000 g C housing	

Dimensions

Moulded enclosure IP 65 -C3

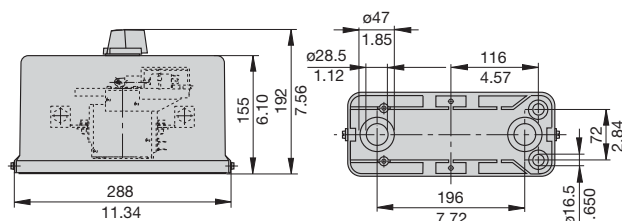


Moulded enclosure IP 65 -C32

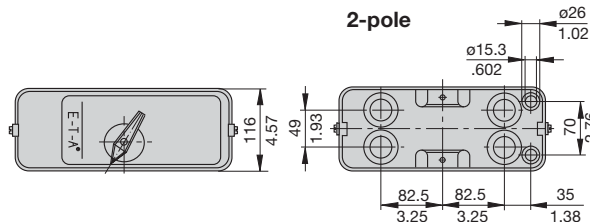


Moulded enclosure IP54 -B3

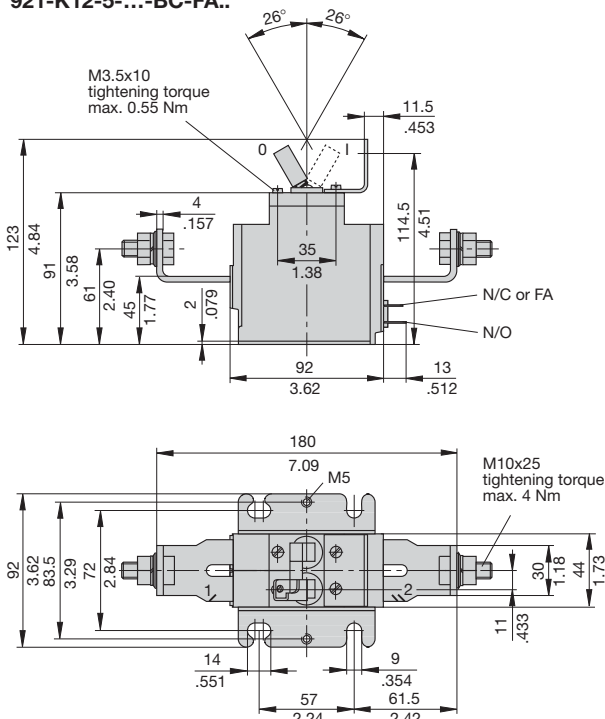
1-pole



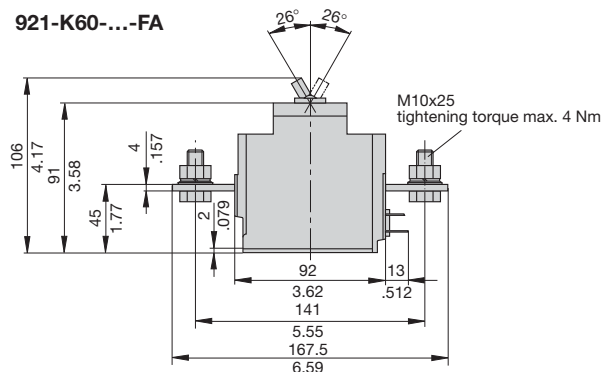
2-pole



921-K12-5-...-BC-FA..



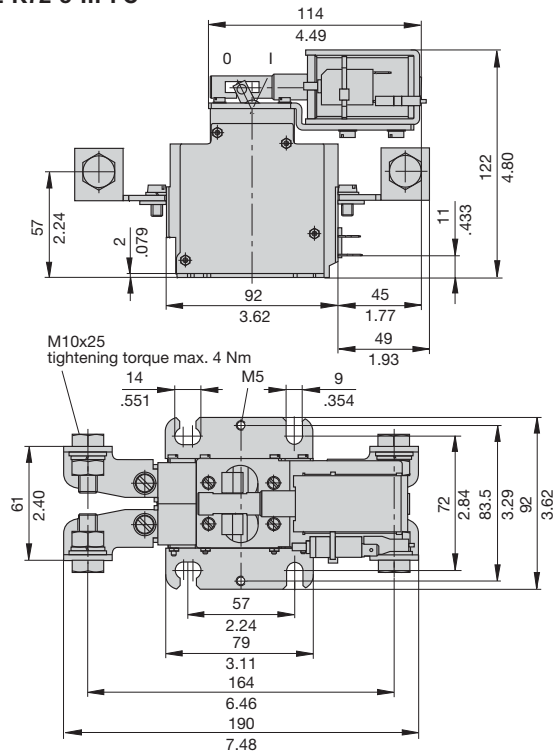
921-K60-...-FA



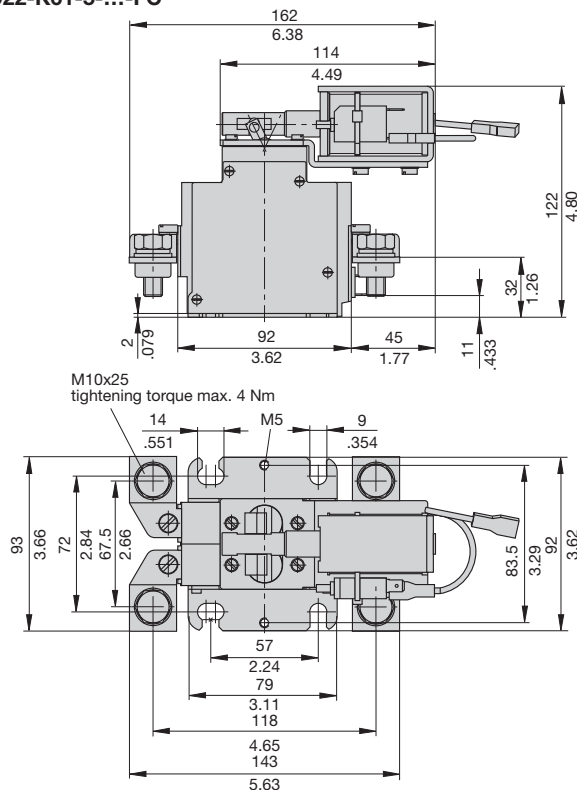
This is a metric design and millimeter dimensions take precedence (mm)
inch

Dimensions types 922

922-K72-5-...-FC

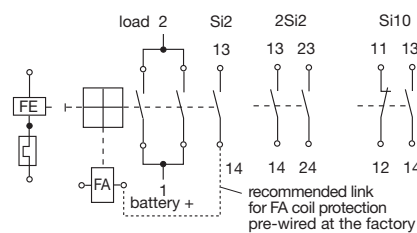


922-K61-5-...-FC

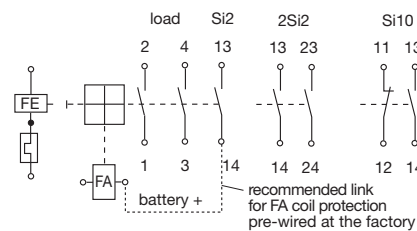


Internal connection diagrams

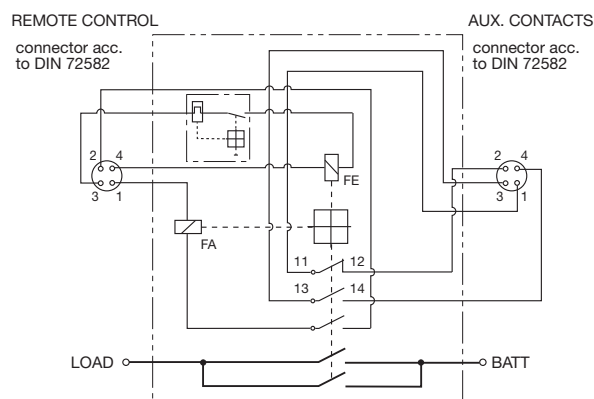
921



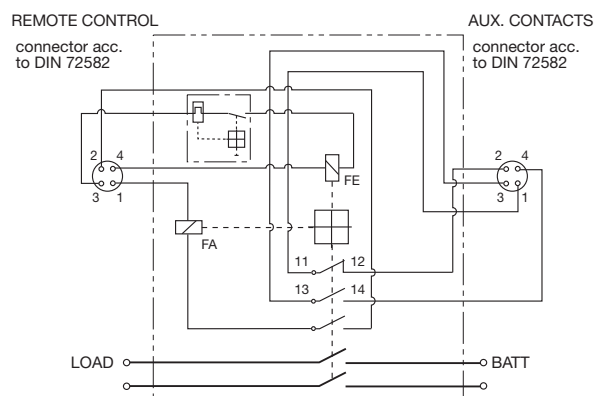
922



921-C3-...

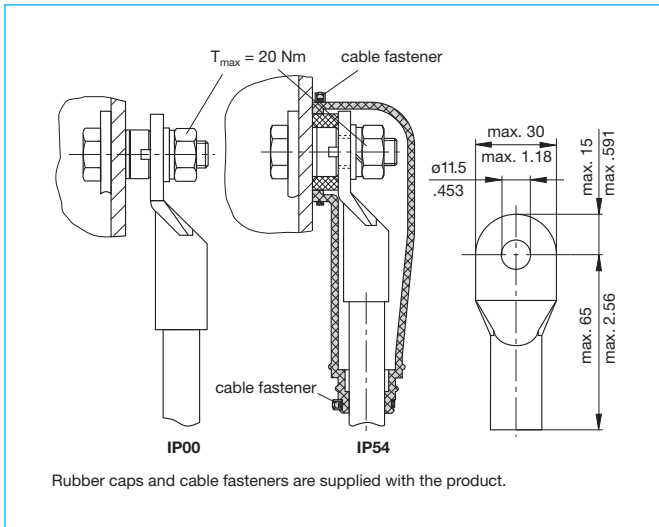


922-C32-...

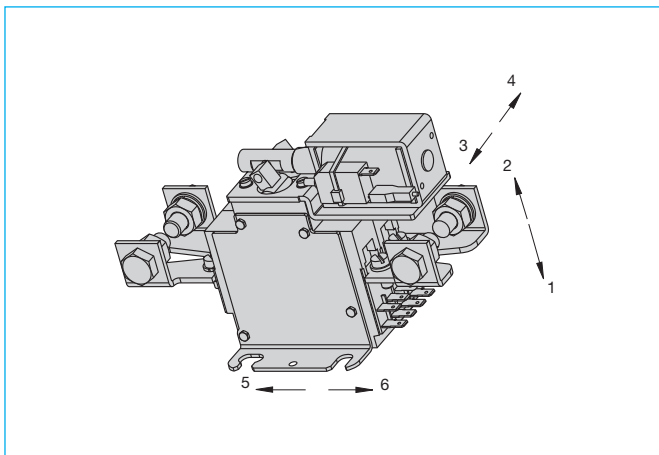


This is a metric design and millimeter dimensions take precedence (mm/inch)

Terminals with housing C3.



Shock directions



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

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, miniaturised aircraft simulator switch with extremely fast magnetic trip time. Blade, screw and wire wrap terminals. Aircraft style threadneck and push/pull button with white trip indicator ring. Current rating marked on the push button according to customer's request by adhesive labels or marking inserts.

Typical applications

Simulators.

Ordering information

Type No.

9510 switch with magnetic instantaneous trip for flight simulators

Mounting method and style

G threadneck mounting with standard push button

L threadneck mounting with long push button

Threadneck design

1 M12x1x6.3

2 7/16-32UNx6.3

Number of poles

1 single pole

Accessories for threadneck

0 without accessories

1 hex nut M12x1, aluminium, lock washer $\phi 12/\phi 15$ (crinkle) fitted

2 hex nut M12x1, aluminium, serrated lock washer $\phi 12.1/\phi 17.2$, fitted

3 hex nut 7/16-32UN, aluminium, toothed washer $\phi 11.3/\phi 14.9$, fitted (MS 3533-141)

9 front plate with mounting thread 6-32UNC-2B for threadneck 7/16-32 UN, threaded sleeve 7/16-32 UN

Terminal configuration

J screw terminals with inch thread

1 6-32UNC-2B, silver plated bent 45° inwards

3 6-32UNC-2B, silver plated, with socket, bent 45° inwards

P blade terminals

1 A6.3x0.8 DIN 46244, silver plated

W wire wrap terminal

4 pin size 1.2x1.2 EN 60352-1, gold plated, with socket

Z 0 without terminals

Rated voltage

F0 DC 24 V

F1 DC 28 V

F2 DC 48 V

F4 DC 12 V

Accessories (terminal screws)

B Phillips screw 6-32UNC-2Ax4.8 fitted (MS 51957-25)

Z without accessories

Accessories (terminal washers)

0 without accessories

2 3.6 split washer fitted (MS 35338-136)

Internal circuit

R2 with logic diode, contacts gold plated

Colour of the push button

S black

G green

A green, for marking insert

B black, for marking insert

0 without marking

1 hot-stamped marking, can be read when locating pin is above

2 hot-stamped marking, can be read when locating pin is at the bottom

9 without marking insert

Current ratings

0.5...150 A

9510 - G 1 1 1 - J 1 F1 - B 0 R 2 S 0 - 10 A ordering example



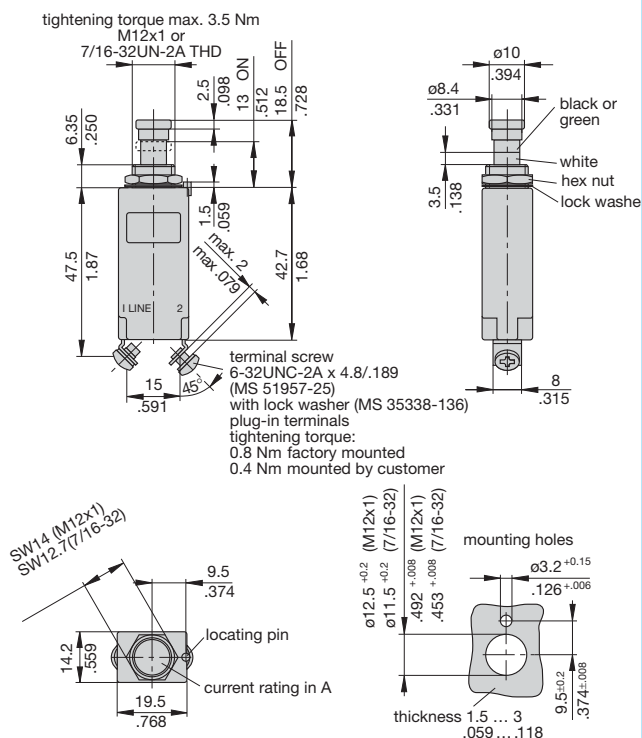
9510-...

Technical data

Voltage rating	DC 12 V	DC 24 V	DC 28 V	DC 48 V
Trip current	< 450 mA	< 160 mA	< 200 mA	< 340 mA
Trip time	< 25 ms	< 25 ms	< 25 ms	< 20 ms
Min. switching voltage	at +23 °C/+73.4 °F DC 25 V at +60 °C/+140 °F DC 28 V			
Internal resistance	157 Ω			
Typical life	10,000 operations at DC 24, 28 or 48 V			
Temperature range	-30...+60 °C (-22...+140 °F)			
Insulation resistance	> 100 M Ω (DC 500 V)			
Degree of protection (IEC 60529)	operating area IP40 terminal area IP00			
Vibration (sinusoidal)	3 g (57-500 Hz), ± 0.23 mm (10-57 Hz) to DIN IEC 60068-2-6, test Fc 10 cycles/frequency axis			
Shock	5 g (11 ms), to DIN IEC 60068-2-27, test Ea			
Humidity	240 hours at 95 % RH, 40 °C to DIN IEC 60068-2-3, test Ca			
Mass	23 g without hardware 26 g with hardware			

Dimensions

9510-G...-J1...-B2....

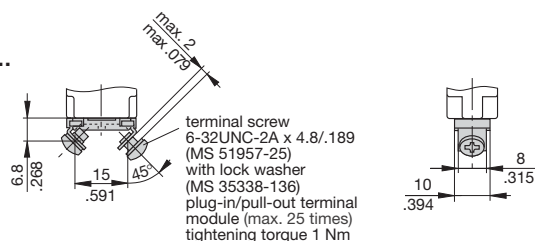


Other main terminal designs

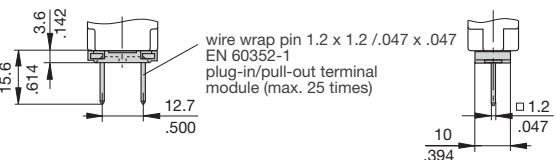
-P1...



-J3...

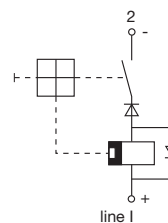


-W4...



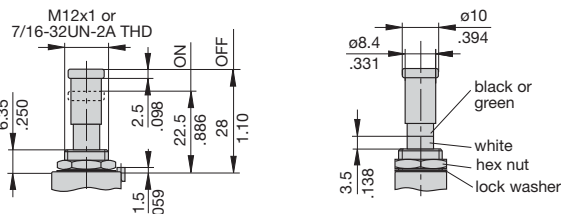
Internal connection diagram

internal circuit R 2

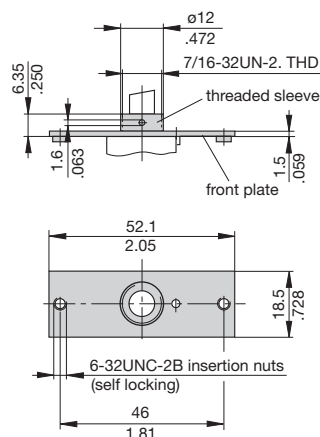


Other threadneck designs

-L...



-G219 -L219



Accessories

Label (black) for push/pull button (S0 or G0)

Part number	Rated current (A)
Y 307 082 01	0.5
Y 307 082 02	1/2
Y 307 082 03	1
Y 307 082 04	1.5
Y 307 082 05	1 1/2
Y 307 082 06	2
Y 307 082 07	3
Y 307 082 08	5
Y 307 082 09	7.5
Y 307 082 10	7 1/2
Y 307 082 11	10
Y 307 082 12	15
Y 307 082 13	20
Y 307 082 14	25
Y 307 082 15	30
Y 307 082 16	35
Y 307 082 17	6
Y 307 082 18	40
Y 307 082 19	50
Y 307 082 20	60
Y 307 082 21	70
Y 307 082 22	75
Y 307 082 23	80
Y 307 082 24	90
Y 307 082 25	100
Y 307 082 26	120
Y 307 082 27	125
Y 307 082 28	150
Y 307 082 29	2.5
Y 307 082 30	2 1/2
Y 307 082 31	7

Plug-in screw terminal,

bent at 45° inwards (2 pcs needed per unit)

Y 307 187 02 terminal silver plated

Y 304 508 02 Phillips screw 6-32 UNC-2Ax4.8 (MS 51957-25)

Y 304 509 01 split washer (MS 35338-36)

Plug-in blade terminal (2 pcs needed per unit)

Y 307 202 02 P10 terminal silver plated

Plug-in/pull-out screw terminals with socket,

bent at 45° inwards

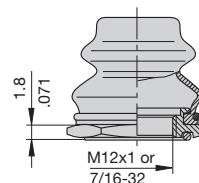
X 222 173 11 terminals silver plated

Plug-in/pull-out wire wrap terminals with socket

X 222 174 12 terminals gold plated

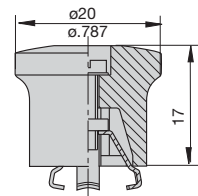
Splash cover/hex nut assembly with O ring (IP66 and IP67) (approved to VG 95345, part 23)

X 200 801 03 matt black finish nut M12x1.8, black cover
X 200 801 08 nickel plated nut M12x1.8, transparent cover
X 200 801 09 matt black finish nut 7/16-32x1.8, black cover
X 200 801 10 matt black finish nut 7/16-32x1.8, transparent cover



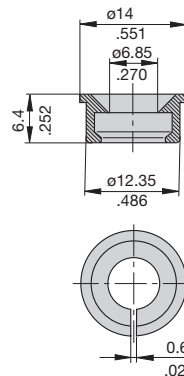
Actuator extension (black) to be fitted on the push button (approved to VG 95345, T23)

X 200 803 01



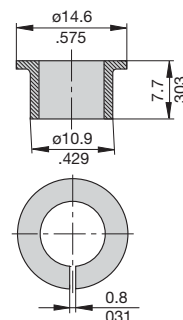
Identification collar to be snapped on the push button

Y 307 004 01 black
Y 307 004 02 white
Y 307 004 03 red
Y 307 004 04 green
Y 307 004 05 blue



Lock out ring to block the push button in OFF position

Y 307 005 01 red
Y 307 005 02 black



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

Accessories

Hex nut M12x1
Y 300 116 04

Hex nut 7/16-32
Y 304 506 03

Lock washer Ø12 / Ø15
Y 300 118 03

Serrated lock washer Ø12.1 / Ø17.2
Y 302 911 01

Toothed washer Ø11.3 / Ø14.9 (MS 35333-141)
Y 304 507 01

**Front plate with mounting thread 6-32UNC-2B
for threadneck 7/16-32UN**
Y 301 516 21

Threaded sleeve
Y 307 281 02

Extracting tool of marking insert
Y 307 301 01

Marking inserts (push button configuration A or B)

hot stamped black	green	current rating (A)
Y 307 280 01	Y 307 280 02	without
X 222 175 01	X 222 176 01	0.5
X 222 175 02	X 222 176 02	1/2
X 222 175 03	X 222 176 03	1
X 222 175 04	X 222 176 04	1.5
X 222 175 05	X 222 176 05	1 1/2
X 222 175 06	X 222 176 06	2
X 222 175 07	X 222 176 07	3
X 222 175 08	X 222 176 08	5
X 222 175 09	X 222 176 09	7.5
X 222 175 10	X 222 176 10	7 1/2
X 222 175 11	X 222 176 11	10
X 222 175 12	X 222 176 12	15
X 222 175 13	X 222 176 13	20
X 222 175 14	X 222 176 14	25
X 222 175 15	X 222 176 15	30
X 222 175 16	X 222 176 16	35
X 222 175 17	X 222 176 17	6
X 222 175 18	X 222 176 18	40
X 222 175 19	X 222 176 19	50
X 222 175 20	X 222 176 20	60
X 222 175 21	X 222 176 21	70
X 222 175 22	X 222 176 22	75
X 222 175 23	X 222 176 23	80
X 222 175 24	X 222 176 24	90
X 222 175 25	X 222 176 25	100
X 222 175 26	X 222 176 26	120
X 222 175 27	X 222 176 27	125
X 222 175 28	X 222 176 28	150
X 222 175 29	X 222 176 29	2.5
X 222 175 30	X 222 176 30	2 1/2
X 222 175 31	X 222 176 31	7

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

The battery master switch E-1032-... allows remotely controlled connection and disconnection of the battery. In the event of reverse connection the battery will be disconnected from the vehicle electrical system.

Typical applications

Commercial vehicles

Ordering information

Type No.	
E-1032	
Version	
NA1	single pole
NA2	double pole
Enclosure	
C	with moulded enclosure IP65
Isolation switch	
921	single pole switch
922	double pole switch
Voltage rating	
DC 24 V	
DC 12 V	
Variant No.	
	e.g. special versions, mounting plate. Designation determined by manufacturer
E-1032 - NA1 - C 921 - DC 24 V - ...	ordering example



E-1032

Technical data

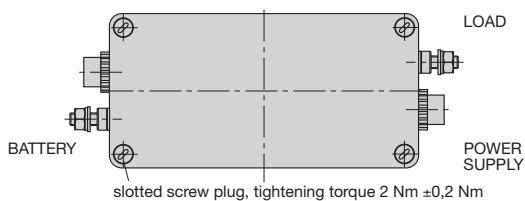
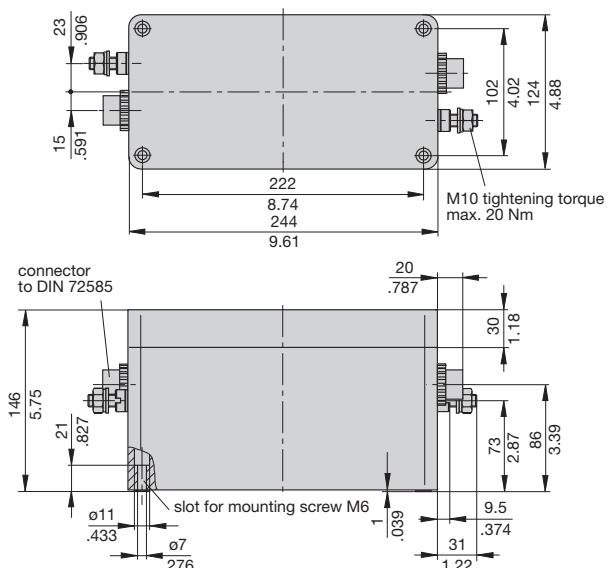
Voltage rating	DC 24 V	DC 12 V
Voltage rang	ON 18 - 32 V OFF 15 - 32 V	9 - 16 V 8.5 - 16 V
	The switching function is no longer ensured when the voltage falls below the minimum values. The switch will not change its position when the voltage falls down to 0 V (automatic locking).	
Current ratings	240 A single pole 120 A double pole	
Overload capacity	2,500 A for 1 s at 23 °C, single pole 1,500 A for 1 s at 23 °C, double pole	
Current consumption of the electronics	≤ 15 mA (with the control circuit connected)	
Switching current at U _N	DC 24 V: ON approx. 15A/100 ms OFF approx. 12A/100 ms	DC 12 V: approx. 20A/100 ms approx. 10A/100 ms
Control circuit	4 - 6 mA ON	
Control switch (accessory)	with coding resistance DC 24 V: 1 kΩ DC 12 V: 330 Ω without coding resistance to ADR for external actuation	
Temperature range	-40...+75 °C (-40...+167 °F)	
Reverse polarity protection	If polarized incorrectly, the Master Switch will switch off immediately, disconnecting the entire vehicle electrical system. After approx. 30 s the circuit breaker of the ON coil will trip.	
Resettability	When the Battery Master Switch is mechanically switched off, it will be reset immediately by the electronics.	
Typical life	10,000 operations at I _N 20,000 operations, mechanical	
Degree of protection IEC 60529/DIN40050)	housing IP65 terminal studs with rubber cap IP54	
Vibration	5 g (57-200 Hz), ± 0.38 mm (10-57 Hz) to IEC 60068-2-6, test Fc, 10 frequency cycles/axis	
Shock	25 g (11 ms) direction 1, 2, 3, 4 15 g (11 ms) direction 5, 6 to IEC 60068-2-27, test Ea	
Corrosion	96 h at 5 % salt mist, to IEC 60068-2-11, test Ka	
Humidity	240 h at 95 % RH, to IEC 60068-2-78, test Cab	
Terminals		
Main terminals	blade terminals with cable lugs for M10 terminal studs	
Control cable	connector to DIN 72585	

Technical data

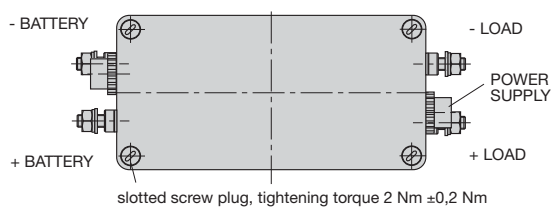
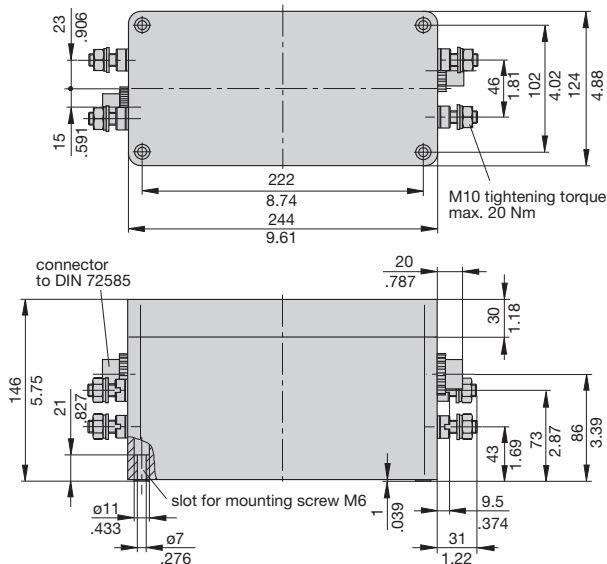
Auxiliary contact for auxiliary relay	max. 6 A (circuit not protected)
Mass	single pole: approx. 3,500 g with enclosure, double pole: approx. 3,700 g with enclosure,

Dimensions

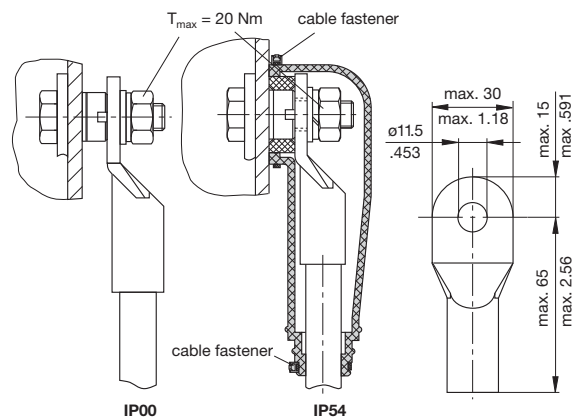
E-1032-NA1-... 1 pole



E-1032-NA2-... 2 pole

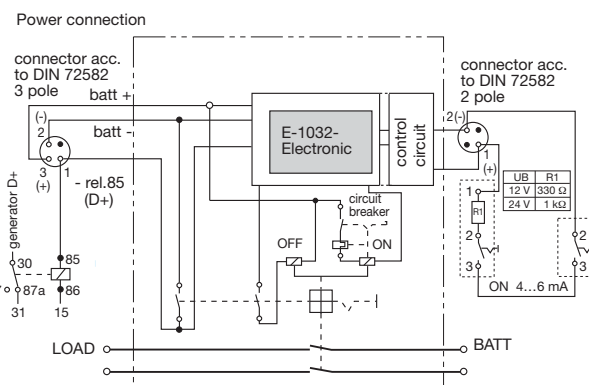


Rubber cap

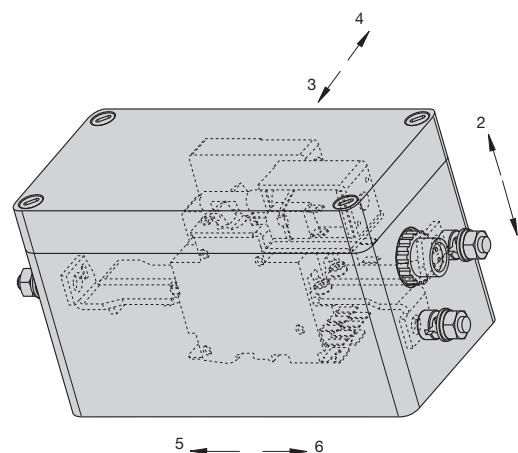


Rubber caps and cable fasteners are supplied with the product.

Internal connection diagrams



Shock directions

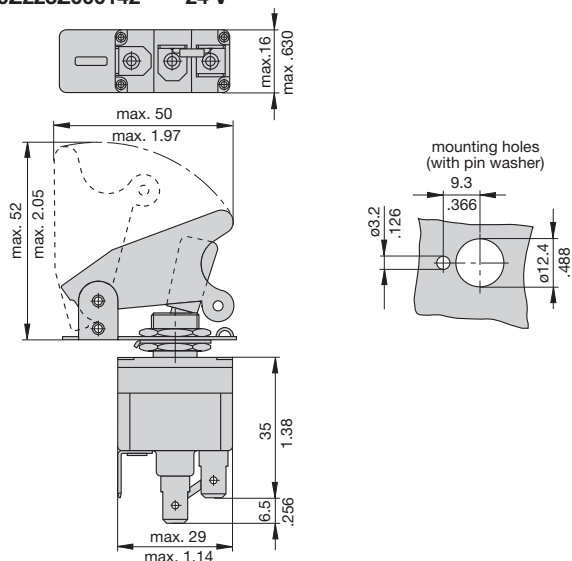


Please follow the instructions for installation

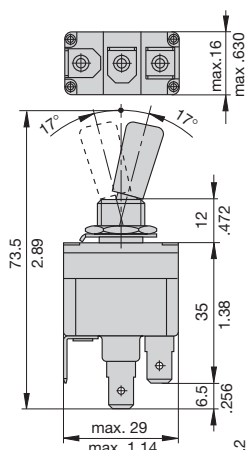
This is a metric design and millimeter dimensions take precedence (mm)

Accessories

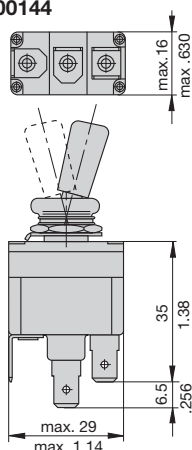
ADR switch with safety cover 0Z223Z000141 12 V 0Z223Z000142 24 V



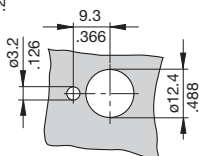
ADR switch without rubber boot 0Z223Z000143



ADR switch with rubber boot (IP54 in operating area) 0Z223Z000144



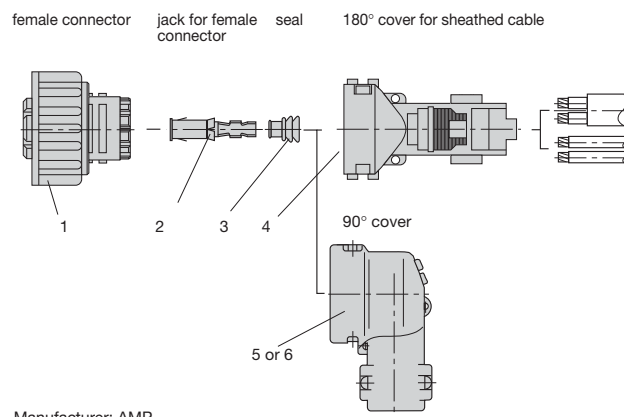
mounting holes
(with pin washer)



Standard connector set OZ112Z000179, comprising:

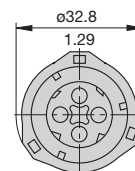
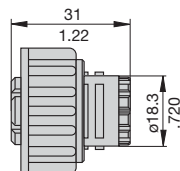
(AMP-parts) suitable for single/double pole Battery Master Switch E-1032-..., DC 12 V and DC 24 V

Quantity	Designation	Ref. No.
1	female connector, 3-pole	X 221 378 01
1	female connector, 2-pole	X 221 378 02
5+1 replacem.	jack for female connector	Y 306 501 01
5+1 replacem.	seal	Y 306 502 01
2	90 ° cover corrugated conduit NW 10	Y 306 499 01

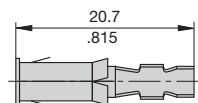


Manufacturer: AMP

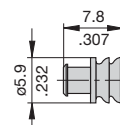
1. Female connector SW X 221 378 02 2-way X 221 378 01 3-way X 221 378 03 4-way



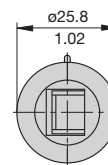
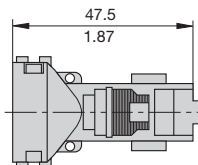
2. Jack for female connector Y 306 501 01



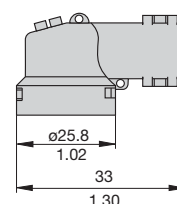
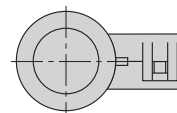
3. Seal Y 306 502 01



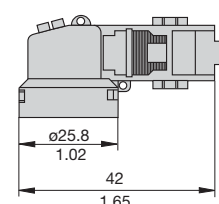
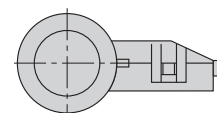
4. 180° cover for sheathed cable Y 306 500 01



5. 90° cover for corrugated conduit NW10 Y 306 499 01



6. 90° cover for sheathed cable Y 306 499 02



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

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 circuit breaker type 437 or single/two pole isolation switches types 921/922 featuring an additional electronic function module which limits the duration of the supply to the remote disconnect and reconnect coils, avoiding damage in the event of unusual operating circumstances. Available with undervoltage monitoring option to protect batteries from the effects of deep discharge, status output for undervoltage, auto reset feature.

Typical applications

Battery and cable protection for all types of vehicle (including electric), battery powered systems.

Ordering information

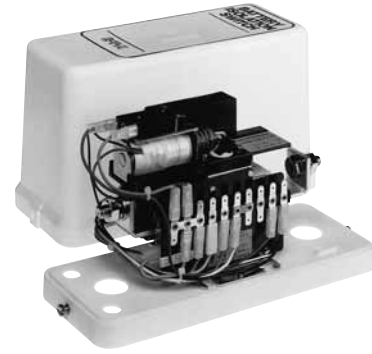
Type No.

E-1073	control unit for types 921/922 and 437 with remote control
Voltage rating	
0	DC 12 V
1	DC 24 V
Control mode	
1	ON/OFF control input
00	without additional function
02	with undervoltage protection and status output
12	with autoreset, undervoltage protection and status output (921/922 only)
2	ON and OFF buttons
33	with control current supply and ON/OFF test input
Circuit Breaker/Isolation Switch	
437	single pole circuit breaker (2-pole upon request)
921	single pole battery isolation switch
922	double pole battery isolation switch
Enclosure design (optional)	
blank = without housing	
B3	moulded housing, for use with single pole devices
B32	moulded housing, for use with double pole device
B34	moulded housing, external operating knob, for use with double pole devices (not with auto reset)
B35	moulded housing, external operating knob, for use with single pole devices (not with auto reset)
Terminal design	
K12	flat screw terminals angled 90°, for single pole version
K60	straight flat screw terminals, for single pole version, without housing
K72	flat screw terminals angled 90°, for double pole version
Characteristic curve (type 437 only)	
06	fast magnetic trip
07	delayed magnetic trip (standard)
Auxiliary contacts	
Si01	one N/C, two N/O (one N/C, one N/O with autoreset option)
Current ratings	
437:	40, 50, 63, 80, 100, 120, 160, 200, 240A
921:	240 A
922:	120 A
E-1073 - 1 1 02 - 437 - B3 - K12 - 07 - Si01 - 240 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.

Technical data of switch or circuit breaker

see types 437, 921 or 922



E-1073-437

Technical data – Electronic module

Voltage rating	DC 12 V	DC 24 V
Voltage rating range	ON 10.3 - 16 V OFF 9 - 16 V	18 - 32 V 16 - 32 V
Correct switching performance is not guaranteed if the voltage falls below the minimum value.		
Temperature range electronic control unit	-40...+80 °C (-40...+176 °F)	
Operating current	ON approx. 30 A OFF approx. 10 A	approx. 15 A approx. 20 A
Excitation time	ON typically 100 ms OFF typically 20 ms	
Switching frequency	0.1 Hz max.	
Power consumption of electronic control unit	typically < 1 mA (when switched off or button operated)	
Control inputs	E-1073-1...: »E/A« (ON/OFF), »U-AUS« (undervoltage protection OFF), »A-W« (auto reset) E-1073-2...: »T-EIN« (button ON), »T-AUS« (button OFF) max. 32 V voltage ON (high) > 8 V OFF (low) < 3 V power consumption DC 12 V: typically 1 mA DC 24 V: typically 5 mA	
EMC	according to DIN 40839/ISO 7637	
Reverse polarity protection	If polarized incorrectly, the Battery Isolation Switch will operate immediately. The circuit breaker will trip after a few seconds.	
Undervoltage protection switching thresholds	optional with E-1073-1... DC 12 V: 11.0 V ± 0.2 V DC 24 V: 22.8 V ± 0.2 V hysteresis typically 0.5 V trip time typically 40 sec	
Undervoltage status output transistor output current load	»UST«, optional with E-1073-1... minus switching corresponding to 2 W lamp load, short-circuit proof	
Automatic reset »A-W«, (optional with E-1073-1..., with series 921/922 only)	Reset after mechanical disconnection is provided by the integral electronic control after approx. 100 ms.	
Control current supply »+US2«, with E-1073-2... for T-EIN/T-AUS	May be connected to 20 control inputs. Noise-voltage proof, short-circuit proof	
Terminals control terminals	blade terminals 6.3x0.8 mm	
Mass, with circuit breaker or isolation switch	approx. 2,000 g without enclosure approx. 2,500 g with enclosure	

Features

- Multiple functions in one unit
 - High performance circuit breaker providing battery and cable protection from overloads and short-circuits.
 - Master switch for ON/OFF operation
 - Electrical remote control
 - Undervoltage protection with status output
 - Auxiliary contacts (e.g. for generator disconnection)
 - Active reverse polarity protection of the entire vehicle electrical system
- Current ratings to 240 A (higher voltage ratings to special order)
- Closed-circuit current consumption < 1 mA

Technical description

E-T-A circuit breaker/battery isolation switches combined with electronic control unit E-1073 will meet a wide range of requirements.

Circuit breaker/battery isolation switches

The main switching contacts will open the plus, the minus or both poles according to model and application.

● Series E-1073-....437

Single pole thermal-magnetic circuit breaker for current ratings up to 240 A, to protect the vehicle electrical system from overloads and short circuits.

● Series E-1073-....921

Single pole battery isolation switch for current ratings up to 240 A.

● Series E-1073-....922

Double pole battery isolation switch for current ratings up to 120 A.

Electronic control unit

An electronic control unit enables the basic on/off function and two additional functions. The system voltage is connected across terminals +UB/-UB to provide the supply to the control unit and a feed is taken from +US1 for the remotely sited operating switch(es). The quiescent current drain is typically less than 1 mA, with a short duration excursion during excitation of the ON/OFF coils.

Basic function

Switch ON/OFF

Operation of the ON control switch will energise the switch-on coil for approximately 100 ms causing the main switching contacts to latch closed. Operation of the OFF control switch will cause the disconnect coil to trigger the release of the switching mechanism within approximately 20 ms. Both coil circuits are current limited to prevent damage through overheating.

Manual operation

An optional external operating knob is available to provide manual control in addition to electrical ON/OFF operation.

Reverse polarity protection

In the event of reverse polarity connection, the electronic control unit will immediately operate the battery switch to isolate the entire electrical system. The circuit breaker will trip after a short delay to protect the operating coils and must be re-set once the fault has been corrected.

Control functions

Type 1 E-1073-.1.. with ON/OFF switch

ON/OFF control switch input (»E/A«)

The battery isolation switch can be operated on or off by an external control switch to plus.

Undervoltage protection (optional)

This optional feature protects the battery from deep discharge should electrical loads be left on.

The battery is automatically disconnected whenever the voltage falls below a critical value for more than 40 s. The unit is reset by operation of the control switch. Sustained undervoltage after reconnection causes the unit to disconnect again after approx. 40 s.

Overriding the undervoltage protection (»U-AUS«)

Undervoltage protection may be overridden if required by connecting control output »U-AUS« to plus terminal or terminal 15.

Undervoltage status output (»UST«)

Undervoltage is signalled immediately via the minus-switching, short-circuit proof transistor output (2 W lamp load).

Auto reset (»A-W«), optional with series 921 and 922

Immediate reset after unwanted mechanical disconnection (e.g. upon excessive vibration) is provided by the integral electronic control.

Type 2 E-1073-.2.. with ON/OFF button

ON/OFF control inputs (»T-ON/T-OFF«)

ON/OFF function is provided by two external switches with a central control function, i.e. several systems can be operated simultaneously.

Additional control current supply (»+US2«)

If several circuit breakers/battery isolation switches are operated in parallel, switches can be supplied with control current from any of the electronic control units available. This power source is short-circuit proof, protected from noise voltages and will operate for 20 inputs.

Additional control input »ON/OFF Test« (»E/A«)

This control input can be used for maintenance purposes. The battery isolation switch is switched on when plus voltage is applied, and switched off when plus voltage is removed.

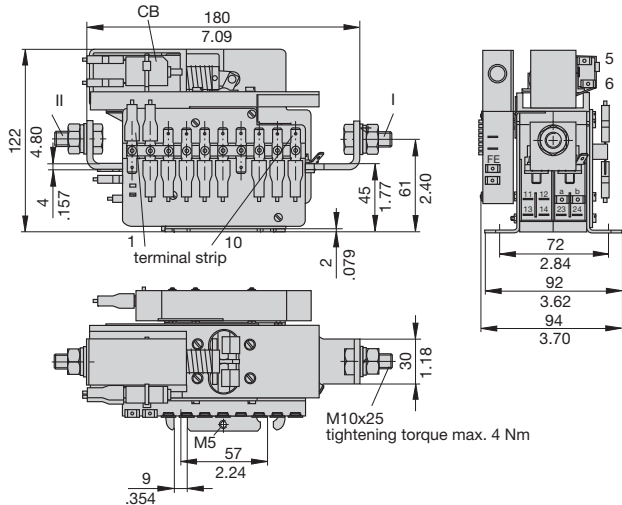
Note

The circuit breaker should be in the OFF condition when connecting or replacing the battery.

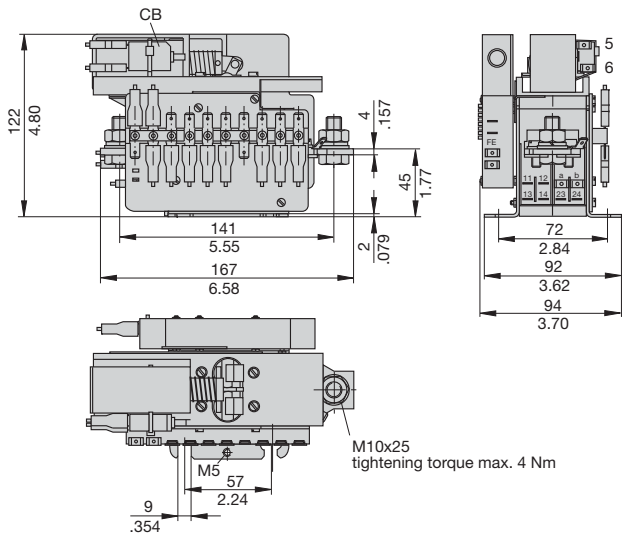
Observe instructions for installation!

Dimensions

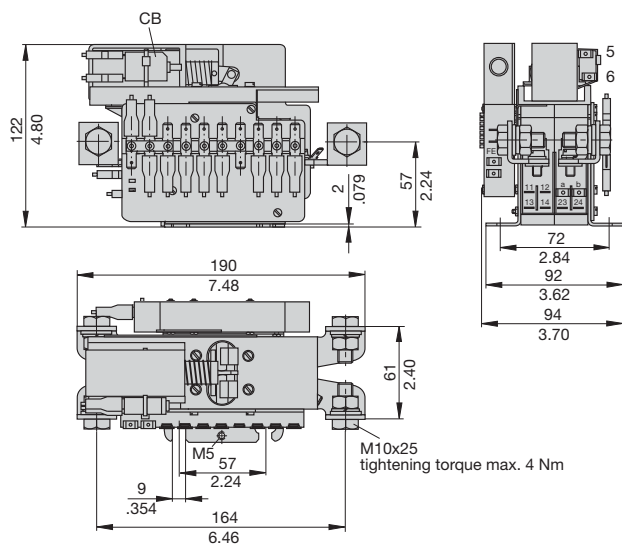
E-1073-...-437/-921-...-K12-...



E-1073-...-437/-921-...-K60-...

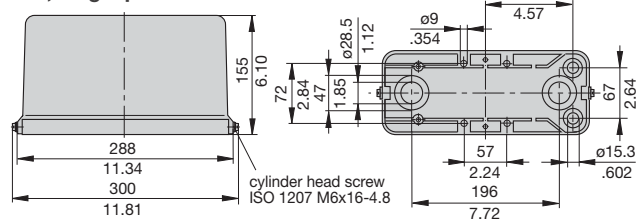


E-1073-...-922-...-K72-...

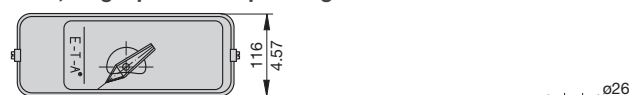


Dimensions – Enclosures

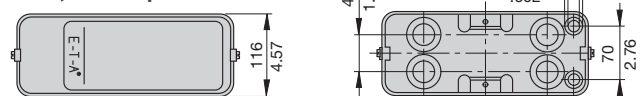
-B3, single pole



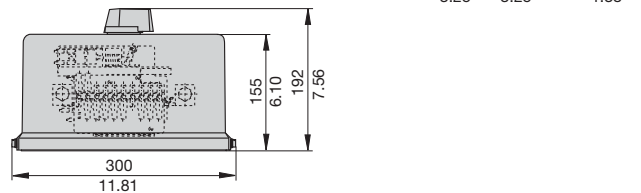
-B35, single pole with operating knob



-B32, double pole

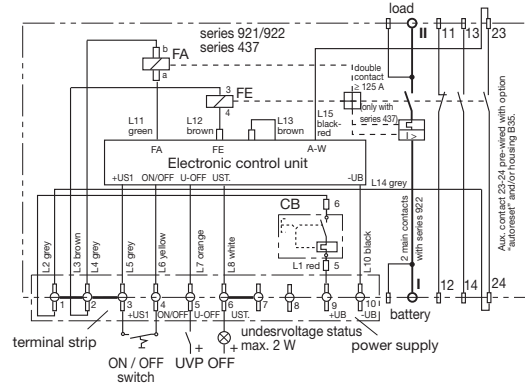


-B34, double pole with operating knob

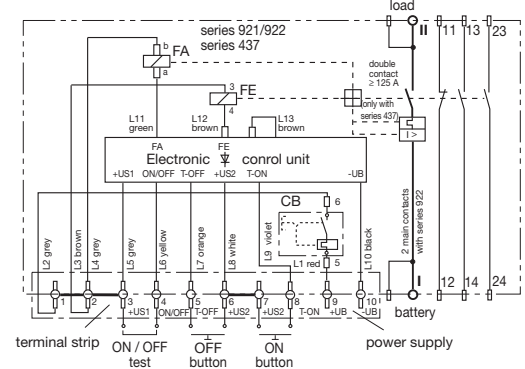


Connection diagrams

E-1073-.1...-437/-921/-922 control function ON/OFF switch



E-1073-.2...-437/-921/-922 control function ON/OFF button



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

Typical applications

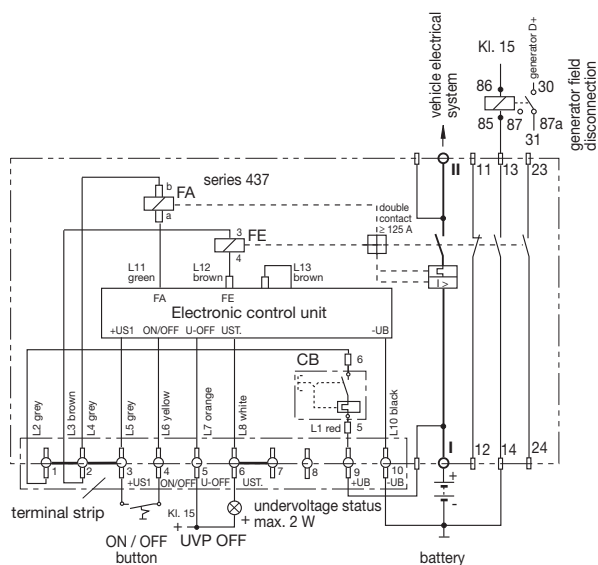
For road vehicles, e.g. buses and coaches

Series E-1073-1102-437-B3-K12-07-Si01-240 A

In this application, the E-T-A combined battery switch/circuit breaker has several functions:

- High performance circuit breaker rated at 240 A, providing battery and cable protection from overloads and short circuits.
- Isolation switch, for ON/OFF operation (e.g. for main system disconnection).
- Remote control via external, low-current circuit.
- Undervoltage protection from battery deep discharge should electrical loads be left on.
- Early under voltage signalisation via a warning lamp (undervoltage status output), located as required.
- Undervoltage operation can be overridden if required.
- Auxiliary contact to disconnect the generator field.
- Reverse polarity protection through immediate disconnection of the entire vehicle electrical system if the battery is incorrectly connected.

These functions allow the number of components and cables required to be reduced, with significant space and weight saving benefits.



For rail vehicles, e.g. underground carriages

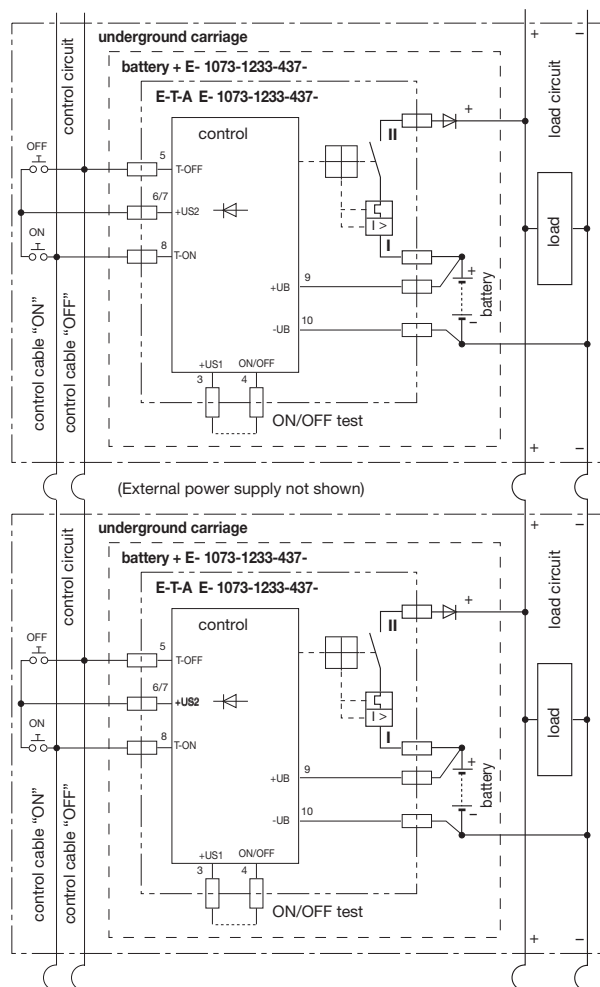
Series E-1073-1233-437-K60-06-Si01-200 A

In this application, the E-T-A combined battery switch/circuit breaker has two functions:

- High performance circuit breaker providing battery and cable protection from overloads and short circuits.
- Isolation switch between battery and loads.

In this application, an ON/OFF remote control switch can be provided in both the first and last carriages. This will enable all batteries to be disconnected from the power distribution system by the operation of one control, irrespective of its location. In the same way, all batteries can be re-connected by the operation of a single control switch.

This is extremely helpful during coupling/de-coupling of carriages for example. In addition the E/A test input permits the operation of individual battery switch/circuit breakers during maintenance.



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

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

Monostable power relay for single pole disconnection with a variety of versions available. Due to the possible combinations of the different configurations as well as due to different modes of mounting the power relay D1 is suitable for many applications.

Typical applications

Commercial vehicles, agricultural engines, watercraft, construction vehicles, motor homes and industrial trucks.



PR60

Technical data

Current rating	100 A, 200 A, 300 A		
Coil data			
Rated voltage	DC 12 V	DC 24 V	DC 48 V
Operating voltage	9...16 V	18...32 V	36...54 V
Max. starting voltage (entire temperature range)	9 V	14 V	36 V
Isolating voltage	≤ 2 V	≤ 4 V	≤ 8 V
Coil current	1 A	0,4 A	0,2 A
Coil power	approx. 10 W / 7 W upon request	approx. 10 W	approx. 10 W
Ambient temperature	-40 °C...+85 °C		
Protection class			
interior	IP67 (0.2 bar: 1 min) to IEC 529 and IP6K9K to DIN 40050 part 9 and IEC 529		
terminals	IP00 to IEC 529		
Vibration	5 g (50-2000 Hz)		
Shock	10 g (11 msec)		
Resistance to	oil, fuel, hydraulic fluids		
Housing	galvanized steel, tin-plated or lacquered optional		
Mounting method	side mount, optionally large or small foot mount		
Options	special version with suppressor diode and/or blow magnet		
Terminal thread	100 A: M8 200 A: M8 or M10 300 A: M10		
Mounting position	any		
Switching element	contacts AgSnO		
Min. insulation resistance	100 MΩ		
Insulation resistance after load	50 MΩ		
High voltage resistance	1,050 V for 1 min		
Max. initial contact voltage drop	150 mV		
Contact voltage drop after endurance	175 mV		
ON duty	100 %		
Overload	100 A: 800 A for 1 s, 200 A for 20 s 200 A: 1 600 A for 1 s, 400 A for 20 s 300 A: 2 400 A for 1 s, 600 A for 20 s		
Typical life			
rated load Ω	75,000 cycles (at DC 28 V)		
mechanically	1,500,000 cycles		
Starting time incl. bounce duration	max. 40 ms		
Bounce duration	max. 5 ms		
Release time	max. 20 ms (without suppressor diode)		
Cable cross section at rated load	100 A: min. 50 mm ² 200 A: min. 70 mm ² 300 A: min. 95 mm ²		
Mass	approx. 810 g (side mount, small foot mount) approx. 935 g (large foot mount)		

Ordering information

Type no.

PR60

Contact type

1 make contact

2 break contact

Coil resistance

1 12 V

2 24 V

3 48 V

Current rating

1 100 A

2 200 A

3 300 A (only for make contacts)

Design of main terminals

1 M8 (for current ratings 100 A and 200 A)

2 M10 (for current ratings 200 A and 300 A)

Contact design

2 AgSnO (standard)

Options

0 without

2 suppressor diode

3 blow magnet, recommended for voltages ≥ 40 V

4 suppressor diode and blow magnet

other suppressor circuits of coil terminals upon request

Housing

1 galvanised steel (standard)

2 tin-plated

3 lacquered (upon request)

Mounting method

1 side mount (standard)

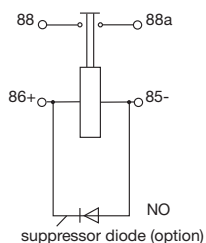
2 small foot mount

3 large foot mount

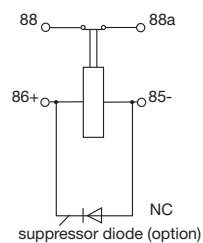
PR60 - 1 2 2-2 2 0-1 1 ordering example

Schematic diagram

make-contact

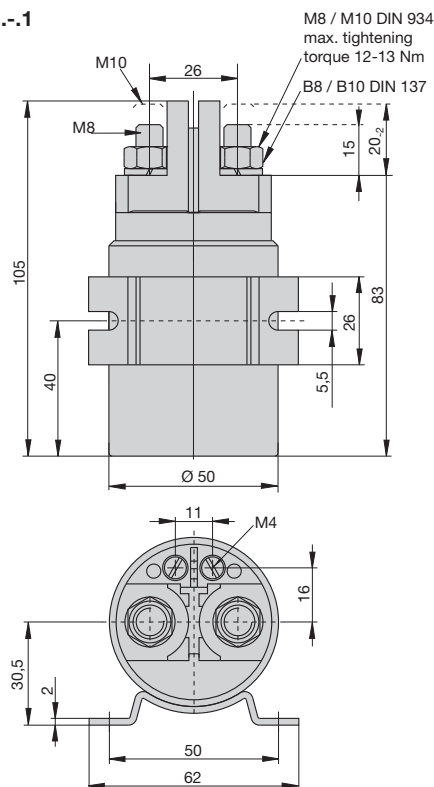


break-contact

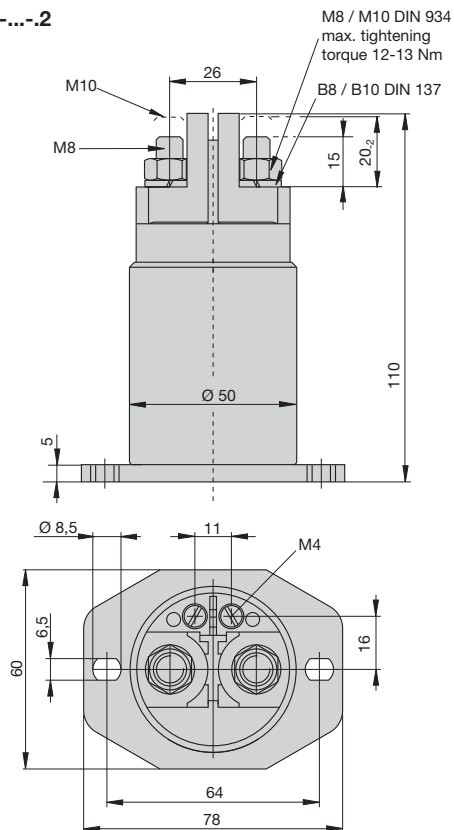


Dimensions

PR60-...-...-1



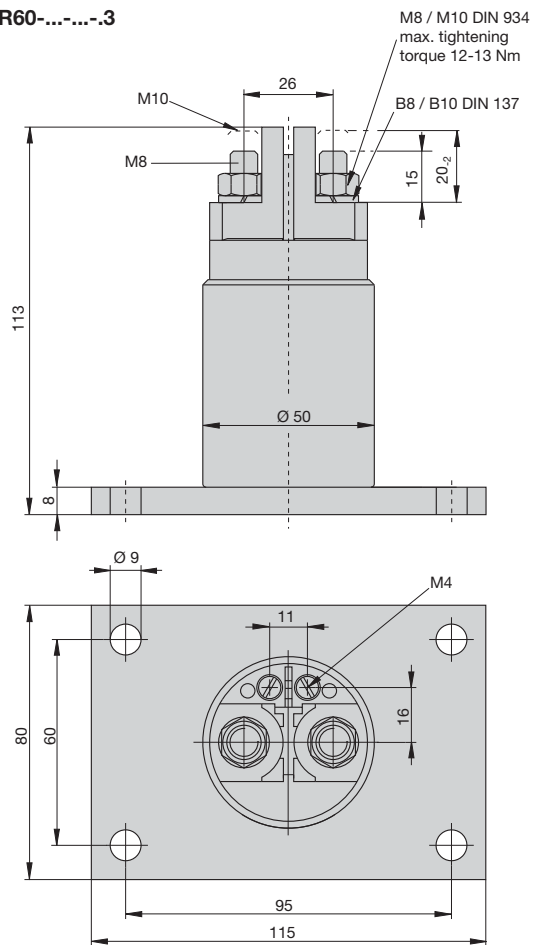
PR60-...-...-2



Current rating 100 A: terminal thread M8
 Current rating 200 A: terminal thread M8 or M10
 Current rating 300 A: terminal thread M10
 Nominal dimensions without direct tolerance indication: IT 14 DIN ISO 286

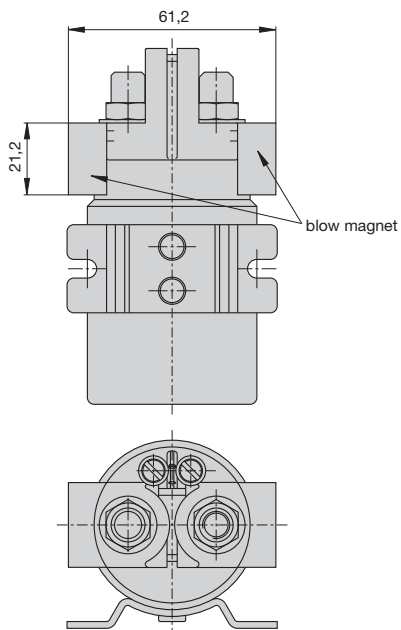
Dimensions

PR60-...-...-3



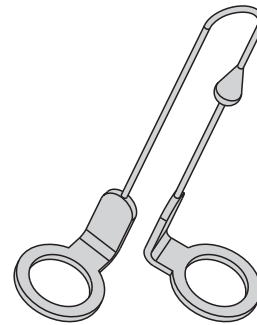
Current rating 100 A: terminal thread M8
Current rating 200 A: terminal thread M8 or M10
Current rating 300 A: terminal thread M10
Nominal dimensions without direct tolerance indication: IT 14 DIN ISO 286

PR60-...-..3-.. with blow magnet



Accessories

Suppressor diode
X 223 02 901



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