

Emergency-stop
Switching system

The double-break switching system can be supplied for the following switching functions:

1 Normally closed, 2 Normally closed, 1 Normally closed + 1 Normally open.

The Normally closed contacts have forced opening according to EN IEC 60947-5-1

Material
Connection cable

Polyvinylchloride (PVC), operating temperature up to +65 °C

Mushroom-head cap

Polybutylenterephthalate (PBT), as per UL 94 V0 (red items)

Actuator housing

Polyamide (PA 66), as per UL 94 V0, Flat ribbon cable-cover
Polyamide (PA 6.6), as per UL 94 V0

Material of contact

Silver alloy gold plated

Mechanical characteristics
Front panel thickness

Standard 1 ... 4 mm
with EMERGENCY-STOP protective shroud Part No. 84-902
1 ... 3 mm

Mounting cut-outs

Ø22.5 mm as per EN IEC 60947-5-1 with anti-twist device

Terminals

Soldering terminals 2.8 x 0.5 mm (solderable), CuSn6 tin-plated
Flat ribbon cable 2-, 4-, or 6-poles 0.35 mm² (AWG 22)

Tightening torque

Fixing nut 80 Ncm

Actuating force

22 N ±4 N

Actuating travel

approx. 4 mm to release the internal operation part

Mechanical lifetime

≥ 50 000 cycles of operations

Electrical characteristics
Standards

The devices comply with: EN IEC 60947-5-1, EN IEC 60947-5-5 (EMERGENCY-STOP), DIN EN ISO 13850, EN IEC 60204

Illumination

LED red with pole reversal, constant current source
Operation Voltage 5 VDC ... 30 VDC
Current consumption 9.7 mA ... 12.4 mA

Rated Operational Voltage U_e

250 VAC, as per EN IEC 60947-1

Rated Insulation Voltage U_i

250 V, as per EN IEC 60947-1

Rated Impulse Withstand Voltage U_{imp}

2.5 kV, as per EN IEC 60947-1

Contact resistance

New state ≤ 50 mΩ, as per DIN IEC 60512-2-3

Isolation resistance

> 10¹¹ Ω between the open contacts at 500 VDC, as per DIN IEC 60512-3-1

Electrical life

≥ 50 000 cycles of operations (inductive cosφ 0.4), as per EN IEC 60947-5-1

Voltage	120 VAC	240 VAC	125 VDC	250 VDC
Current	3 A	1.5 A	0.55 A	0.27 A

Reduced load ≥ 50 000 cycles of operations (resistive)

Voltage	1 VAC/DC	42 VAC/DC
Current	100 mA	200 mA

Conventional free air thermal current I_{th}

5 A, as per EN IEC 60947-5-1

the maximum current in continuous operation and at ambient temperature must not exceed the quoted maximum values.

Switch rating

Switch rating AC with silver contact (gold plated), service category AC-15, as per EN IEC 60947-5-1

Voltage	120 VAC	240 VAC
Current	3 A	1.5 A

Switch rating DC for silver contact (gold plated), service category DC-13, as per EN IEC 60947-5-1

Voltage (VDC)	12 VDC	24 VDC	48 VDC	60 VDC	125 VDC	250 VDC
Current Plug	5 A	4 A	2.1 A	1.7 A	0.55 A	0.27 A
Current Cable	3 A	3 A	2.1 A	1.7 A	0.55 A	0.27 A

Recommended minimum operational data

Silver contacts (gold plated)

Voltage	1 VAC/DC
Current	1 mA

Electric strength

500 VAC, 50 Hz, 1 min, as per DIN IEC 60512-2

Rated conditional short-circuit current

1000 A, type of short-circuit unit 6 A gG, as per EN IEC 60947-5-1

Protection class

Class II, as per EN IEC 60947-5

Emergency-stop**Overvoltage category**

II, as per EN IEC 60947-1

Degree of pollution

3, as per EN IEC 60947-1

Environmental conditions**Storage temperature**

-25 °C ... +80 °C

Operating temperature

-25 °C ... +65 °C

Front protection

IP 65, as per EN IEC 60529

Shock resistance

(semi-sinusoidal)

max. 150 m/s², pulse width 11 ms, 3-axis,
as per EN IEC 60068-2-27

Vibration resistance

(sinusoidal)

max. 50 m/s² at 10 Hz ... 500 Hz, 10 cycles, 3-axis,
as per EN IEC 60068-2-6

Climate resistance

Damp heat, cyclic

96 hours, +25 °C/97 %, +55 °C/93 % relative humidity,
as per EN IEC 60068-2-30

Damp heat, steady

56 days, +40 °C/93 % relative humidity,
as per EN IEC 60068-2-78

Dry heat

96 hours, +70 °C, as per EN IEC 60068-2-2

Low temperature

96 hours, -40 °C, as per EN IEC 60068-2-1

Saline mist

96 Stunden, +35 °C in chemical solution NaCl,
as per EN IEC 60068-2-11

Approvals**Approbations**

CB (IEC 60947)

UL

NFF

Declaration of conformity

CE

Switching element illuminated pushbutton**Switching system**

Short-travel switching system with 2 independent contact points and tactile operation.

Guarantees reliable switching even of very light loads.

Fitted with 1 normally open contact.

Material**Connection cable**

Polyvinylchloride (PVC), short-time heat-resistant up to 105 °C

Material of contact

Silver alloy gold plated

Switching element

Thermoplastic polyester (PET, PBT), as per UL 94 V0 and Polyacetale (POM), as per UL 94 HB

Mechanical characteristics**Terminals**

Plug-in terminals 2.8 x 0.8 mm (solderable)

Flat ribbon cable 0.5 mm²

PCB terminal

Actuating force

4.0N ±0.2N (measured at the lens)

Actuating travel

~0.5 mm

Rebound time

≤ 1 ms

Resistance to heat of soldering

260 °C, 5 s (PCB assembly)

350 °C, 10 s (when using a soldering iron)

as per EN IEC 60068-2-20

Mechanical lifetime

≥ 1 million cycles of operations

Electrical characteristics**Illumination**

Single-Chip LED, green, orange, red, yellow, white and blue

Operation Voltage 12 VDC 24 VDC

Current consumption 10 mA 10 mA

Contact resistance

Starting value (initial) ≤ 100 mΩ, as per DIN IEC 60512-2

Isolation resistance

≥ 1 GΩ between all terminals at 100 VDC,

as per DIN IEC 60512-3-1

Electrical life

as per EN IEC 60512-5

5 million cycles of operation 24 VAC, 50 mA at 480 Ω

5 million cycles of operation 24 VAC, 100 mA at 240 Ω

2 million cycles of operation 42 VAC, 50 mA at 840 Ω

2 million cycles of operation 42 VAC, 100 mA at 420 Ω

300 000 cycles of operation 42 VAC, 100 mA at cosφ 0.4

250 000 cycles of operation 42 VAC, 200 mA at cosφ 0.395

1 million cycles of operation 12 VDC, 250 mA at 48 Ω

1 million cycles of operation 24 VDC, 50 mA at 480 Ω

1 million cycles of operation 24 VDC, 100 mA at 240 Ω

5 million cycles of operation 42 VDC, 25 mA at 1680 Ω

1.5 million cycles of operation 42 VDC, 50 mA at 840 Ω

100 000 cycles of operation 42 VDC, 100 mA at 420 Ω

500 000 cycles of operation 24 VDC, 200 mA at L/R = 30 ms

300 000 cycles of operation 42 VDC, 100 mA at L/R = 30 ms

100 000 cycles of operation 42 VDC, 200 mA at L/R = 30 ms

Switch rating

Voltage 50 mVAC/DC ... 42 VAC/DC

Current 10 µA ... 100 mA

Power max. 2W

Electric strength

500 VAC, 50 Hz, 1 min, as per DIN IEC 60512-2

Environmental conditions**Storage temperature**

-40 °C ... +85 °C

Operating temperature

-25 °C ... +70 °C

Protection degree

Back protection:

IP 40, standard version

IP 67, fully sealed version, with mounted actuator only.

Shock resistance

(semi-sinusoidal)

max. 100 m/s², pulse width 11 ms, 3-axis,

as per EN IEC 60068-2-27

Vibration resistance

(sinusoidal)

max. 50 m/s² at 10 Hz ... 500 Hz, 10 cycles, 3-axis,

as per EN IEC 60068-2-6

Actuator**Material****Lens**

Polycarbonate (PC), as per UL 94 V2 or Aluminium anodised

Actuator housing

Polyetherimid (PEI), as per UL 94 V0 or Aluminium anodised

Mechanical characteristics**Mounting cut-outs**

Ø 22.5 mm and Ø 30.5 mm

Tightening torque

Fixing nut max. 80 Ncm

Actuating force

4.0 N ± 0.2 N (measured at the lens)

Actuating travel

Total switching travel 1.2 mm

Mechanical lifetime

≥ 1 million cycles of operations

Electrical characteristics**Electrostatic breakdown value**

Plastic case ≥ 15 kV

Aluminium case ≥ 5 kV

as per IEC 61000-4-2, mounted in plastic front panel

Environmental conditions**Storage temperature**

-40 °C ... +85 °C

Operating temperature

-25 °C ... +70 °C

Front protection

IP 67 and IP40, as per EN IEC 60529

Climate resistance

Damp heat, cyclic

96 hours, +25 °C/97 %, +55 °C/93 % relative humidity, as per EN IEC 60068-2-30

Damp heat, state

56 days, +40 °C/93 % relative humidity, as per EN IEC 60068-2-78

Rapid change of temperature

100 cycles, -40 °C ... +80 °C, as per EN IEC 60068-2-14

Approvals**Approbations**

EBC

NFF

Declaration of conformity

CE

TSI/PRM

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Declaration of conformity

CE

TSI/PRM

Lens plastic with symbols

Chemical and mechanical tests

1. Wipe resistance according to EN 61058-1 section 8.9
(Petrol/gasoline, distilled water, diluted alcohol)
2. Graffiti-Killer Test
3. Railway cleaning agents (Walo)
4. Damp/dry heat durability
5. UV test according to EN 60068-2-5 / 56 days
6. Mechanical life time 2 Mio. Operations (abrasive test)