



EN Operating instructions. pages 1 to 6
Original

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1. About this document


1.1 Function
This operating instructions manual provides all the information you need for the mounting, set-up and commissioning to ensure the safe operation and disassembly of the safety switchgear. The operating instructions must be available in a legible condition and a complete version in the vicinity of the device.


1.2 Target group: authorised qualified personnel
All operations described in this operating instructions manual must be carried out by trained specialist personnel, authorised by the plant operator only.

Please make sure that you have read and understood these operating instructions and that you know all applicable legislations regarding occupational safety and accident prevention prior to installation and putting the component into operation.

The machine builder must carefully select the harmonised standards to be complied with as well as other technical specifications for the selection, mounting and integration of the components.

1.3 Explanation of the symbols used

 **Information, hint, note:**
This symbol indicates useful additional information.

 **Caution:** Failure to comply with this warning notice could lead to failures or malfunctions.
Warning: Failure to comply with this warning notice could lead to physical injury and/or damage to the machine.

1.4 Appropriate use


The Schmersal range of products is not intended for private consumers.

The products described in these operating instructions are developed to execute safety-related functions as part of an entire plant or machine. It is the responsibility of the manufacturer of a machine or plant to ensure the correct functionality of the entire machine or plant.

The safety switchgear must be exclusively used in accordance with the versions listed below or for the applications authorised by the manufacturer. Detailed information regarding the range of applications can be found in the chapter "Product description".

1.5 General safety instructions


The user must observe the safety instructions in this operating instructions manual, the country specific installation standards as well as all prevailing safety regulations and accident prevention rules.

 Further technical information can be found in the Schmersal catalogues or in the online catalogue on the Internet: products.schmersal.com.

The information contained in this operating instructions manual is provided without liability and is subject to technical modifications.

There are no residual risks, provided that the safety instructions as well as the instructions regarding mounting, commissioning, operation and maintenance are observed.

1.6 Warning against improper use

 In case of improper use or manipulation of the safety switchgear, personal hazards or damages to machinery or plant components cannot be excluded.

1.7 Exclusion of liability

We shall accept no liability for damages and malfunctions resulting from defective mounting or failure to comply with this operating instructions manual. The manufacturer shall accept no liability for damages resulting from the use of unauthorised spare parts or accessories.

For safety reasons, invasive work on the device as well as arbitrary repairs, conversions and modifications to the device are strictly forbidden, the manufacturer shall accept no liability for damages resulting from such invasive work, arbitrary repairs, conversions and/or modifications to the device.

2. Product description

2.1 Ordering code

This operating instructions manual applies to the following types:

EX-RD ^{①②③④}		Emergency stop command device
No.	Option	Description
①	R	Latching
②	Z	Release by pulling only
③	45	Head diameter 45 mm
④	RT	Red colour

EX-R ^①		Contact element
No.	Option	Description
①	F10	Contact element with screw connection, 1 NO contact, contact label 3, 4
	F03	Contact element with screw connection, 1 NC contact, contact label 1, 2



Only if the information described in this operating instructions manual are realised correctly, the safety function and therefore the compliance with the Machinery Directive and the Explosion Protection Directive is maintained.

2.2 Special versions

For special versions, which are not listed in the order code below 2.1, these specifications apply accordingly, provided that they correspond to the standard version.

2.3 Purpose

The EX-RDRZ45 RT series emergency stop command devices are designed for use in emergency stop circuits to EN ISO 13850.

The emergency stop command devices in the EX-RDRZ45RT series are constructed as category 2 equipment designed for use in gas hazardous areas of zone 1 and 2; and dust hazardous areas of Zone 21 and 22.

Mounting box, 1 control unit: EX-RCB11...

Mounting box, 3 control units: EX-RCB33...

Mounting box, 5 control units: EX-RCB55...

When installing multiple devices into an assembly housing from another manufacturer, the resulting weakening of the housing structure must be taken into account.

Gas atmospheres

Please use the control devices and indicator lights in conjunction with equipment of the appropriate "intrinsic safe" ignition protection type, which is authorised for the corresponding field of application:

Zone 1: intrinsically safe current circuits of category ia or ib

Zone 2: intrinsically safe current circuits of category ia, ib or ic

Dust atmospheres

For Zone 21 and 22, the installation of the cables or wires is realised with the appropriate ignition protection type (e.g. dust ignition protection by enclosure, EN 60079-31). No intrinsically safe current circuits are required.



The installation and maintenance requirements to the standard series 60079 must be met.

Especially the capacitive and inductive parts of the intrinsically safe current circuit must be observed. For non-linear current circuits, Appendix A to EN 60079-11 (assessment of intrinsically safe current circuits) must be included in the overall assessment.

For intrinsically safe current circuits with protection level ib, a safety coefficient of 1.5 must be included in the calculations, in accordance with EN 60079-11 paragraph 5.3.



During installation in intrinsically safe current circuits (Ex i), it must be borne in mind that the device may only be connected to a single, approved electrical apparatus (e.g. SRB 200EXi-..., barrier, isolated switch amplifier). The safety data of both devices must be compared.



The user must evaluate and design the safety chain in accordance with the relevant standards and the required safety level.



The entire concept of the control system, in which the safety component is integrated, must be validated to the relevant standards.

Conditions for safe operation

The command devices are suitable for mounting in the installation housings of the type EX-RCB... (brand: Schmersal) or another enclosure suitable for the zone. Alternatively operating panels (material: stainless steel or metal with painted surface) can be used. These enclosures must meet the requirements of IP65 or higher to EN 60529 as well as the test criteria to EN IEC 60079-0 paragraph 26.4. The presence of small dust particles inside of the dust-proof IP65 enclosure must be excluded.

The specifications in the operating instructions manual or in the technical data of the EU-Type Examination Certificate regarding the maximum impact energy must be observed. Due to the specific impact energy, the components must be fitted with a protection against mechanical stresses.

The EX-RDRZ, the EX-RCB housing and the cable entries have different permissible ambient temperatures. The ambient temperature range of the assembly concerned results from the range of the most critical individual module. To this effect, the operating manuals or the tables in appendix to the EU-Type Examination Certificate must be respected and observed.

In accordance with point 29.7 of EN IEC 60079-0, the unused marking of the ignition protection type must be made unrecognisable with a permanent marker when installing equipped enclosures.

2.4 Technical data

EX-R command and signalling devices:

Marking in accordance with the ATEX Directive: Ⓜ II 2G

Ⓜ II 2D

Marking in accordance with standards: Ex eb IIC Gb, Ex tb IIIC Db

Applied standards: EN 60947-5-1, EN 60947-5-5, EN 60947-1

- ATEX: EN IEC 60079-0, EN IEC 60079-7, EN 60079-31

- IECEx: IEC 60079-0, IEC 60079-7, IEC 60079-31

Certificate numbers:

- ATEX: TÜV 22 ATEX 8490 U

- IECEx: IECEx TUR 22.0030 U

Ambient temperature: -20 ... +55 °C

General technical data:

Design: round

Installation diameter: 22.3 mm

Grid dimensions: 50 × 60 mm

Front plate thickness: 1 ... 6 mm

With identification label: 1 ... 5 mm

Mounting position: random

Switching frequency: 600 / h

Actuating force: 25 N

Mechanical life (operations): 1 × 10⁵

Materials: Front-ring brass, chromium-plated

Emergency stop label (yellow): PVC film

Device head: brass coated

Fixing: With mounting flange,

Tightening torque: 2 Nm

Shock resistance to EN 60068-2-27: < 50 g

Resistance to vibrations to EN 60068-2-6: 5 g

EX-R Contact elements:

EX-relevant data:

Marking in accordance with the ATEX Directive:	Ⓔ II 2G
Marking in accordance with standards:	Ex ib IIC Gb
Applied standards	EN 60947-5-1, EN 60947-5-5, EN 60947-1
- ATEX:	EN IEC 60079-0, EN 60079-11
- IECEX:	IEC 60079-0, IEC 60079-11
Certificate numbers:	
- ATEX:	TÜV 22 ATEX 8851 U
- IECEX:	IECEX TUR 22.0031 U
Ambient temperature:	-20 ... +55 °C



Note external heat and/or cold source.

Mounting position:	random
Number of:	max. 2 (Pos. 2, 3)

Dust Ex-zones:

Voltage U:	250 V
Current I:	5 A
Power P:	max. 1,500 W

Intrinsically safe to EN 60079-11:

Voltage U _i :	250 V
Current I _i :	Ex ib: 3.3 A, Ex ic: 5 A (internal current limitation 30 mA)

Power P _i :	not relevant
Capacity C _i :	typ. 0
Inductivity L _i :	typ. 0
Overvoltage category:	III

Resistance to pressure shocks to EN 60079-11, paragraph 10.3:
safe separation against earth;
Connection of the cables in case of multiple or different
Ex-i current circuits: use conductor ferrules with protective collar.
Bare wires must not protrude beyond the clamping disc.

General technical data:

Switching frequency:	1,200 / h
Switching points:	NC contact: approx. 1 mm NO contact: approx. 2.5 mm
Contact reliability:	5 VDC / 1 mA
Proof of positive opening:	2.5 kV impulse voltage
Positive opening path:	approx. 2 mm after achieving opening point
Actuating force at stroke end:	typ. 4.5 N
Connection:	screw terminals
Cable section:	single-strand wire: 2 × (0.5 ... 2.5 mm ²) multi-strand wire with conductor ferrules with protective collar: 2 × (0.5 ... 1.5 mm ²)
Tightening torque for the connecting screws:	max. 1 Nm

For Ex-R control devices with contact element EX-R in EX-RCB enclosure:

Marking in accordance with the ATEX Directive:	Ⓔ II 2GD
Marking in accordance with standards:	Ex ib IIC T4 Gb Ex tb IIIC T110°C Db
Applied standards:	EN 60947-5-1, EN 60947-5-5, EN 60947-1
- ATEX:	EN IEC 60079-0, EN 60079-11, EN 60079-31
- IECEX:	IEC 60079-0, IEC 60079-11, IEC 60079-31
Certificate numbers:	
- ATEX:	TÜV 23 ATEX 8990 X
- IECEX:	IECEX TUR 23.0020 X
Ambient temperature:	-20 ... +55 °C



Note external heat and/or cold source.

Degree of protection to EN 60529:	IP65
Verified impact energy according to EN IEC 60079-0:	4 J

2.5 Safety classification

Standards:	EN ISO 13849-1
B _{10D} (NC contact):	100,000
Mission time:	20 years

$$MTTF_D = \frac{B_{10D}}{0,1 \times n_{op}} \quad n_{op} = \frac{d_{op} \times h_{op} \times 3600 \text{ s/h}}{t_{cycle}}$$

(Determined values can vary depending on the application-specific parameters h_{op} , d_{op} and t_{cycle} as well as the load.)



If multiple safety components are wired in series, the Performance Level to EN ISO 13849-1 will be reduced due to the restricted error detection under certain circumstances.

3. Mounting

3.1 General mounting instructions



The installation may only be carried out with the system de-energised and by authorised personnel.



Before assembly, check the mounting flange to ensure that the four rubber tappets are present (see figure 1).

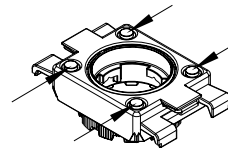


Fig. 1

- Assembly of the head of the emergency stop device and mounting flange by turning the RMW mounting tool to the right (Fig. 2):
 - Actuating head
 - Mounting flange
- Opening the contact fitting (see Fig. 3)
- Preliminary fitting of the contact elements onto the contact carrier (see Fig. 4): only the outward positions may be equipped*:
 - contact carrier

Prior to the assembly of the contact elements onto the contact carrier, the two plunger segments must be fitted onto the central contact element through simple insertion in the trapezoid groovings to the left and the right.



The contact elements must only be fitted in the outmost position of the contact carrier, so that in case of voltages > 150 V the necessary air clearances and creepage distances are ensured.

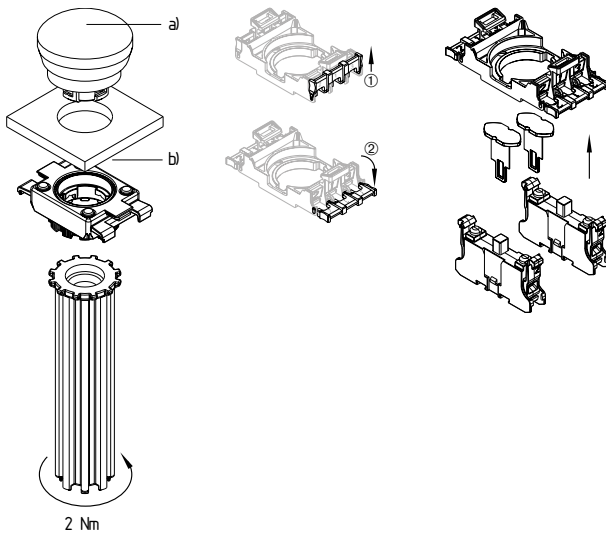


Fig. 2 Fig. 3 Fig. 4

4. Closing and pressing down the contact fitting (see Fig. 5): the contact fittings to the left and the right are folded up 90° and then pressed down until they engage. In this way, the contact elements are additionally mechanically secured to the contact carrier.
5. Assembly of the pre-assembled contact carrier onto the mounting flange (see Fig. 6): engage the contact carrier on one side of the mounting flange. Then repeat this process on the opposite side.
6. After the contact carrier is snapped onto the mounting flange, the contact lugs are automatically additionally fixed (Fig. 7). This precludes incorrect assembly. The correct assembly should be checked once more.

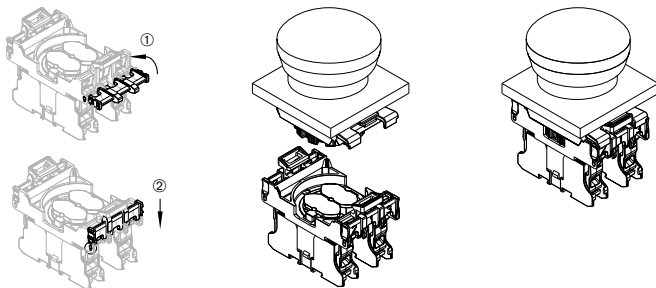


Fig. 5 Fig. 6 Fig. 7

! Only fit onto clean, grease-free surface!
After assembly of the contact elements, both contact lugs (to the left and the right of the contact elements) must be folded up 90° and then pressed down until they engage. To ensure a smooth disassembly of the contact carrier, we recommend using a slot screwdriver of 5.5 mm wide.

3.2 Dimensions

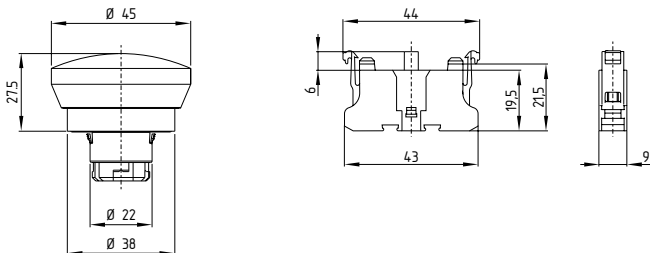


Fig. 8: Emergency stop command device

Fig. 9: Contact element EX-RF

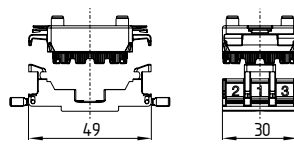


Fig. 10: Mounting flange EX-RLM

4. Electrical connection

4.1 General information for electrical connection

! The electrical connection may only be carried out by authorised personnel in a de-energised condition.

! Only use Ex cable glands and Ex screw plugs with integrated or associated seal approved for the corresponding field of application. The EX cable glands must be fitted in accordance with the applicable operating instructions manual. Cable glands are only authorised for permanent cables. The constructor must provide the necessary strain relief. Unused cable entries must be sealed by means of Ex approved locking screws. Cable glands and locking screws are not included in delivery.

Settle length x of the conductor: 7 mm



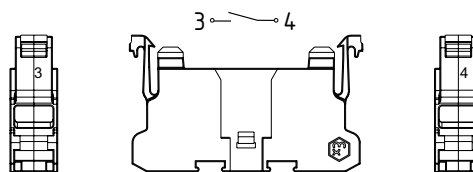
After wiring, the contact elements incl. enclosure must be cleaned (i.e. remove excess cables etc.).

The fixing screws of the contact element must be tightened with 1 Nm tightening torque.

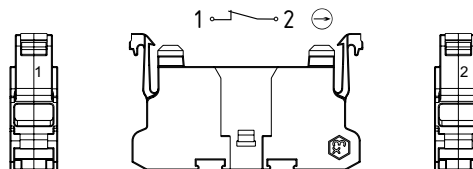
4.2 Contact variants

Contact assignment as per the contact numbering

EX-RF 03: 1 NO



EX-RF 10: 1 NC



! At least one contact with positive break must be integrated in the safety circuit.

5. Set-up and maintenance

5.1 Functional testing

The safety function of the safety components must be tested. The following conditions must be checked and met:

1. Correct fixing of the fitted component
2. Check the integrity of the cable entry and connections
3. Check the emergency stop command device for damage.

5.2 Maintenance

A regular visual inspection and functional test, including the following steps, is recommended:

1. Check the correct fixing of the emergency stop command device and the contact element
2. Remove particles of dust and soiling
3. Check cable entry and connections

Damaged or defective components must be replaced.

6. Disassembly and disposal

6.1 Disassembly

1. Disassembly of the contact carrier from the mounting flange (see Fig. 11):
 Insert the screwdriver in the latch of the mounting flange. Slightly move the screwdriver in the direction of the contact element to press the latch outwards. In this way, the contact carrier is released from the mounting flange. Then repeat this process on the opposite side.
2. Contact carrier disassembled and opening the contact lugs (see Fig. 12): lift both contact lugs to release them from the catch mechanism and then fold them 90° up. After that, the contact or light elements can be disassembled.
3. Disassembling the contact elements from the contact carrier (see Fig. 13): insert the screwdriver in the latch of the contact element. Slightly move the screwdriver in the direction of the contact element to press the latch outwards. The contact element is released from the contact carrier.



The devices must be disassembled in a de-energised condition only.

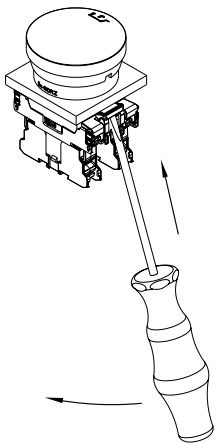


Fig. 11

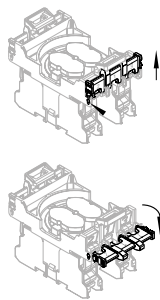


Fig. 12

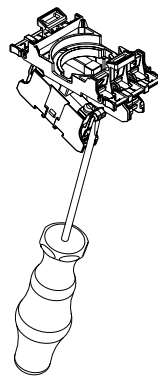


Fig. 13

6.2 Disposal



The switchgear must be disposed of in an appropriate manner in accordance with the national prescriptions and legislations.

7. Declaration of conformity

We hereby certify that the hereafter described components both in their basic design and construction conform to the applicable European Directives.

Relevant Directives:

2006/42/EC
 2014/34/EU
 2011/65/EU

Applied standards:

EN IEC 60079-0:2018
 EN IEC 60079-7:2015 + A1:2018
 EN 60079-11:2012
 EN 60079-31:2014

Notified body for Type Examination:



TÜV Rheinland
 Industrie-Service GmbH
 Am Grauen Stein
 51105 Köln
 ID n°: 0035

Type Examination Certificate:

TÜV 22 ATEX 8490 U
 (EX-R command and signalling devices)
 TÜV 22 ATEX 8851 U
 (EX-R contact elements)
 TÜV 23 ATEX 8990 X
 (EX-R command and signalling devices with EX-R contact elements in EX-RCB enclosure)



The currently valid declaration of conformity can be downloaded from the internet at products.schmersal.com.

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