



EN Operating instructions.pages 1 to 8
Original

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1. About this document

1.1 Function

These operating instructions provide all the information required for mounting, set-up and commissioning to ensure the safe operation and disassembly of the 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 is used for identifying 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 products described here were developed to adopt control and display functions as part of a complete system 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 products 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 about misuse



In case of inadequate or improper use or manipulations of the component, personal hazards or damage to machinery or plant components cannot be excluded. The relevant requirements of the standard EN ISO 13850 must be observed.

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

These operating instructions apply to the following types and programs:

2.1.1 Device heads of the command devices

Basic component	Description
Pushbuttons and the illuminated pushbuttons:	
EDT.V②	Pushbutton
EDL.V②	Illuminated pushbutton
Indicator light:	
EML.V②	With flat collar
EMLH.V②	With high collar
Mushroom head impact button:	
EDP③.V②	Without latching
EDR③.V②	With latching, turn to unlock
EDRR③.VH②	With latching, turn and pull to unlock
EDRZ③.VH②	With latching, pull to unlock
Selector switch:	
- with 2 positions:	
EWS21④.V	2 maintained positions
EWT21④.V	1 momentary position
- with 3 positions:	
EWS32④.V	3 maintained positions
EWT32④.V	2 momentary positions, left and right
EWTS321④.V	Switching, latching
EWTS32④.V	Latching, switching
Key-operated selector switch:	
- with 2 positions:	
ESS21S⑦.V	2 maintained positions
EST21S⑦.V	1 momentary position
- with 3 positions:	
ESS32S⑥.V	3 maintained positions
EST32S⑥.V	2 momentary positions, left and right
ESST32S⑥.V	Switching, latching
ESTS32S⑥.V	Latching, switching
Blanking plug for command device position:	
BN	Blanking plug

No.	Option	Description
②	Colour of button surface:	
	GB	yellow
	RT	red
	GN	green
	WS	white
	BL	blue
	GR	grey
	BK	black (not for illuminating devices)
③	Head diameter of mushroom head impact button	
	35	35 mm
	40	40 mm
	55	55 mm
④	Toggle length in mm:	
	without	short toggle

No.	Option	Description
	.1	Long toggle
⑥	Key-withdrawal position (3 positions):	
	1	Position left
	2	Position middle
	3	Position right
⑦	Key-withdrawal position (2 positions):	
	1	Position left
	2	Position right

2.1.2 Contact elements of EF contact system

Basic component	Description
EF①①①.③	- with screw terminals Contact element NC
EF0②.③	Contact element NO
EF①①①.③	Double contact element 2 NC
EF0②②.③	Double contact element 2 NO
EF①①②.③	Double contact element NC/NO
EF①①②S.③	Double contact element NC/NO with safety spring
	- with flat plug-in connector
EF①①0F.③	Contact element NC
EF0②F.③	Contact element NO
EF①①0F.③	Double contact element 2 NC
EF0②②F.③	Double contact element 2 NO
EF①①0②F.③	Double contact element NC/NO
EF①①0②SF.③	Double contact element NC/NO with safety spring
	- with cage clamps
EFK①①①.③	Contact element NC
EFK0②.③	Contact element NO
EFK①①①.③	Double contact element 2 NC
EFK0②②.③	Double contact element 2 NO
EFK①①②.③	Double contact element NC/NO

No.	Option	Description
①	1	Normally-closed contact, with approx. contact travel in mm
	2	
	3	
②	1	Normally-open contact, with approx. contact travel in mm
	2	
	3	
③	1	Mounting position on mounting flange / terminal ID
	2	
	3	

2.1.3 Light elements of EF contact system

Basic component	Description
EL①③	Voltage sensor for lamps Ba9S
ELE①③	Voltage sensor for LED Ba9S
ELT③/③	Voltage sender with transformer (primary/secondary)
ELDE.N②③	Light element with screw terminals and integrated LED
ELDEK②③	Light element with cage clamps and integrated LED
ELDE.N-②-②-②-24VDC	3 colour LED module with screw terminals

No.	Option	Description
①	Without	screw terminal
	F	Flat plug-in connector
	K	Cage clamps
②	GB	yellow
	RT	red
	GN	green
	WS	white
	BL	blue
	6	Voltage 6 V
③	without or 24	Voltage 24 V
	48	Voltage 48 V
	230	Voltage 115...230 VAC

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 devices described in these operating instructions are not suitable for emergency stop applications. Emergency stop command devices are described in a separate set of operating instructions.

The devices described here are designed to be mounted in control panels or assembly housings. The command devices are only suitable for processing operation-relevant signals for purposes of machine control.

If sealing elements or dust protection membranes are not closed they could be damaged by cleaning agents and permanent UV exposure.

2.4 Technical data

Command and signalling devices:

General technical data:

Design:	round
Installation diameter:	30.5 mm
Spacing:	40 × 50 mm,
- selector switch, mushroom head impact button with latching:	60 × 60 mm
Front plate thickness:	1 ... 6 mm
- with identification label:	1...5 mm
Mounting position:	any
Switching frequency:	1,000/h
Actuating stroke:	4 mm ... 5 mm
Actuating force:	
- Pushbutton:	approx. 1.5 N
- Pushbutton with diaphragm:	approx. 2.0 N
- Illuminated pushbutton:	approx. 1.5 N
- Mushroom head impact button:	approx. 2.0 N
- Key-operated selector switch:	approx. 0.2 N
- Spring-return rotary selector switch/maintained spring-return rotary selector switch:	approx. 0.2 N
Mechanical life:	
- Push button:	1 x 10 ⁶ switching cycles
- Illuminated push button:	1 x 10 ⁶ switching cycles
- Palm button with detent:	1 x 10 ⁵ switching cycles
- Palm button without detent:	1 x 10 ⁶ switching cycles
- Key selector switch/button/selector switch:	1 x 10 ⁵ switching cycles
- Selector switch/button/selector switch/key switch:	3 x 10 ⁵ switching cycles
Calotte/collar material:	Glass and plastic
Front ring material:	Aluminium anodised
Button material:	Aluminium, anodised
Selector switch grip material:	Plastic
Degree of protection:	IP65
Ambient temperature:	-25°C ... + 75°C
- Selector switch, key-operated selector switch:	0°C ... +75°C
Fixing with mounting flange:	ELM, EFM
Max. tightening torque of mounting flange:	0.6 Nm
Resistance to shocks to EN 60068-2-27:	< 50 g
Resistance to vibration in accordance with EN 60068-2-6:	5 g

Device designation:

- Designation labels:

Laser-etched or engraved

- Symbols:

Printed, laser-etched or engraved

Contact/light element:

General technical data:

Standards:	EN 60947-5-1
Switching frequency:	1,200/h
Mechanical life:	10,000,000 operations
Resistance to shock:	30 g / 18 ms
Resistance to vibration:	20 g/10 ... 150 Hz
Switching points:	depending on contact element used
- NC contact:	ca. 1 mm ... 3 mm
- NO contact:	ca. 2 mm ... 4 mm
Switching system:	Slow action, NC contacts with positive break
Contact types:	with galvanically separated contact bridges
Thermal test current I _{the} :	
- EF contact elements:	10 A
Max. fuse rating:	
- EF contact elements:	10 A gG
Suitable low voltage:	
- EF contact elements:	5 VDC / 3.2 mA
Utilisation category:	
- EF contact elements:	AC-15: 250 V / 8 A DC-13: 24 V / 5 A
Rated insulation voltage U _i :	400 V
Rated impulse withstand voltage U _{imp} :	4 kV
Degree of pollution:	3
Overvoltage category:	III
Climatic resistance to EN 60068:	Part 2-30
Temperature range:	-25 °C ... + 60 °C
Proof of positive opening:	2.5 kV impulse voltage
Positive break travel:	approx. 2 mm after the opening point
Actuating force at end of stroke:	approx. 8 ... 15 N, depending on contact element used
Connection:	Screw terminals Plug-in terminals Cage Clamp connection
Cable section:	
- single-strand wire:	2 x (0.5 ... 2.5 mm ²)
- multi-strand wire with conductor ferrules with protective collar:	2 x (0.5 ... 1.5 mm ²)
- Flat plug-in connector:	6.3 mm x 0.8 mm / 2 x 2.8 mm x 0.8 mm
Tightening torque for the connecting screw:	max. 1 Nm
Material:	
- enclosure:	plastic, glass-fibre reinforced thermoplastic, self-extinguishing
- contacts:	fine silver, spring bronze or brass carrier
Degree of protection:	
- Wiring compartments:	IP40
- Terminals:	IP20
	(with plug-in connector depending on the connector plug used)
Approvals:	cULus (save cage clamp connection)

3. Mounting

3.1 General mounting instructions for E.V programme

1. Mount control elements with retaining ring and mounting flange by tightening both screws of mounting flange using size 2 slot screwdriver (see fig. 1)

i When tightening the screws, ensure the mounting flange is screwed on evenly and does not move.

2. Mount contact elements of EF contact system by snapping on in positions 1 to 3 to mounting flange (see Fig. 2). Middle position (pos. 3) is reserved for mounting lighting elements on devices with lights (see fig. 3).

i On devices with lights, no plunger segments may be installed in the mounting flange. If using contact and light elements on the mounting flange, the light element must be mounted first and in the middle position (pos. 3).

! Contact elements of the EF contact system must be fitted in the second locking position and must, therefore, lie flush on the mounting flange after fitting.

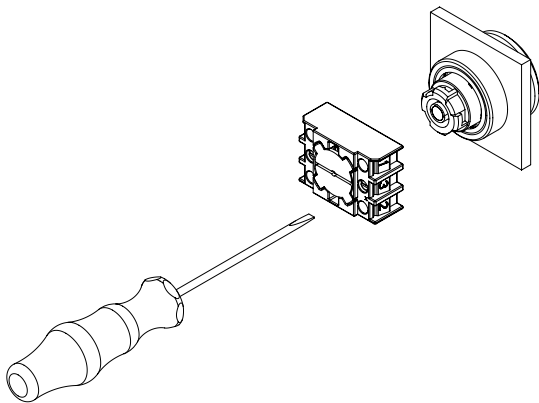


Fig. 1

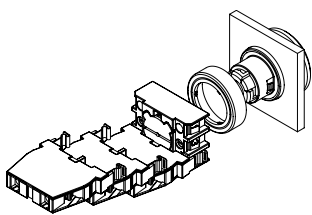


Fig. 2

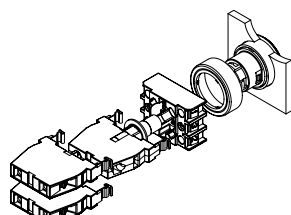


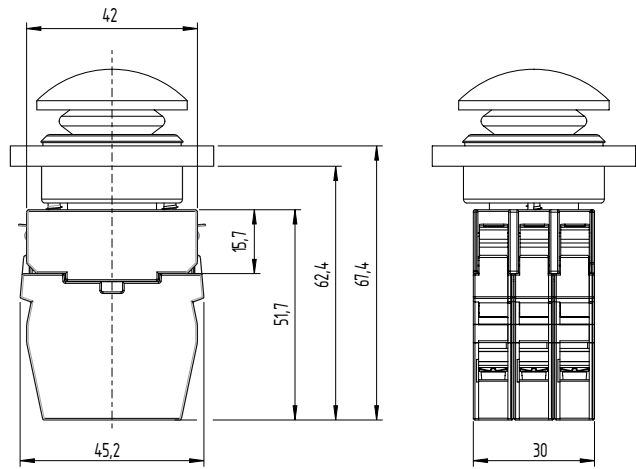
Fig. 3

! Only fit onto clean and grease-free surface!

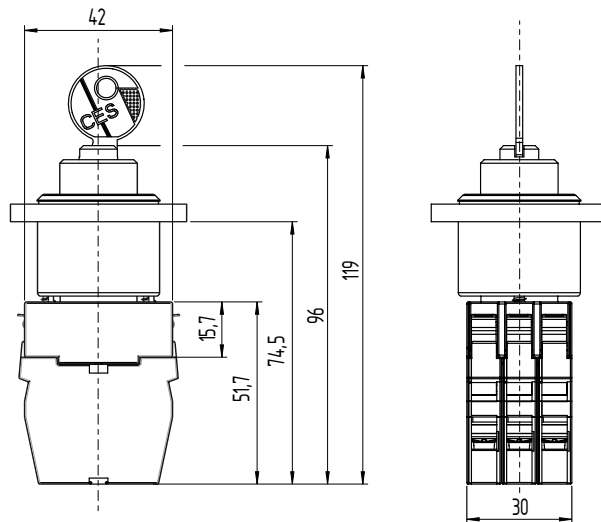
3.2 Dimensions

All measurements in mm.

EF contact system (latched pushbuttons, pushbuttons, illuminated pushbutton, indicator lights, selector switches)



EF contact system (key-operated selector switches)



Mounting flange and blanking plug

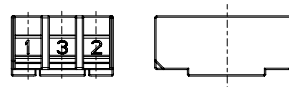


Fig. 4
ELM / EFM

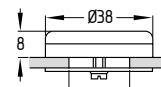


Fig. 5
blanking plug

i The bevel on the mounting flange is indicated by position 1.

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.



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

The clamping screws of the connecting cable must be tightened with 1 Nm tightening torque.

Settle length x of the conductor:

- on cage clamp connections of type s or f: 5 ... 6 mm
- on screw terminals: 7 mm



5. Set-up and maintenance

5.1 Functional testing

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

1. Correct fixing of the fitted component
2. Check the integrity of the connections
3. Check the 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 command device and the contact element
2. Remove particles of dust and soiling
3. Check the integrity of the connections

Damaged or defective components must be replaced.

6. Disassembly and disposal



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

6.1 Disassembly

1. Removal of the EF contact elements is carried out with the aid of a size 2 slot screwdriver (see fig. 6).



With the light element mounted, the contact elements at pos. 1 and pos. 2 must be removed first. The light element is then removed.

2. Removal of the mounting flange is carried out by loosening the screws on the mounting flange. The mounting flange is then turned approx. 45° in anti-clockwise direction and removed (see fig. 7).

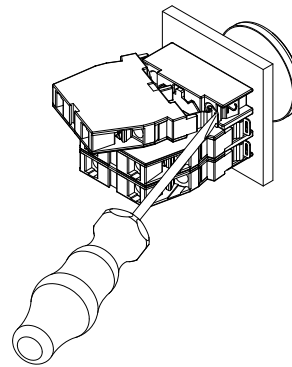


Fig. 6

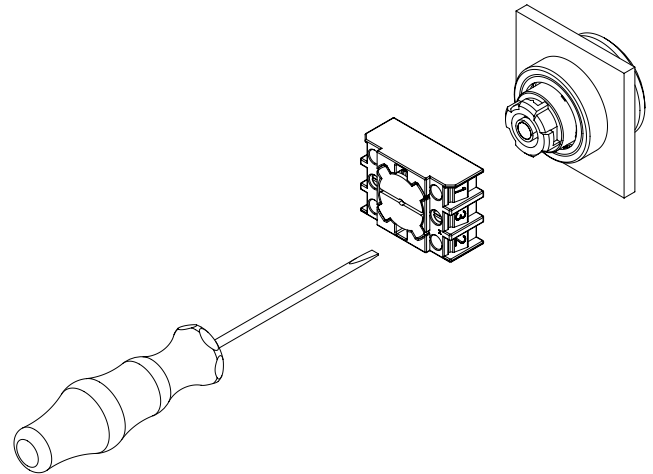

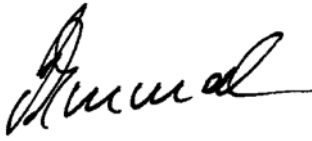


Fig. 7

6.2 Disposal

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

7. EU Declaration of conformity

EU Declaration of conformity		
Original	K.A. Schmersal GmbH & Co. KG Möddinghofe 30 42279 Wuppertal Germany Internet: www.schmersal.com	
We hereby certify that the hereafter described components both in their basic design and construction conform to the applicable European Directives.		
Name of the component:	E.V-Programm	
Type:	See ordering code	
Description of the component:	Command and signalling devices optionally as illuminated signalling devices, Push, illuminated, palm buttons and switches, Selector switches and buttons, key selector switches and key selector buttons in conjunction with contact element EF or light elements and voltage senders EL*	
Relevant Directives:	Low Voltage Directive	2014/35/EU
	EMC-Directive *	2014/30/EU
	RoHS-Directive	2011/65/EU
Applied standards:	EN 60947-5-1:2017	
Place and date of issue:	Wuppertal, 28 September 2020	
E.V-Programm-A-DE		
	Authorised signature Philip Schmersal Managing Director	



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

