SCHMERSAL

EN Operating instructions . . . . . .pages 1 to 6
Original

Content

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 control panel. 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.

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1.6 Warning about misuse

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:

BDF40-①-②-③-④-⑤-⑥-⑦

No.	Option	Description	
Connection technology			
①	ST	Connector M12, 12-pole	
Contact configuration:			
②	10	with emergency-stop:	2 NC contacts at mounting position 1 and 1 NO contact at mounting position 2 … 4
		without emergency-stop: mounting position 1 … 4	1 NO contact at
Mounting position 1			
③	NH	Emergency stop pushbutton	
	LT	Illuminated pushbutton / pushbutton	
	LM	Indicator light / blanking plug	
Mounting position 2			
④	LT	Illuminated pushbutton / pushbutton	
	LM	Indicator light / blanking plug	
Mounting position 3			
⑤	LT	Illuminated pushbutton / pushbutton	
	LM	Indicator light / blanking plug	
Mounting position 4			
⑥	LT	Illuminated pushbutton / pushbutton	
	LM	Indicator light / blanking plug	
Customised special version:			
⑦	XXXX	Placeholder	

The scope of delivery includes one supply kit BDF40-DHS-PBC-DT and BDF40-DHS-PBC-LT.

In accordance with the Machinery Directive, the type plate of safety components is type plate labelled "Safety component".

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

2.2 Actuator overview

NH emergency stop impact button
- Release by turning
- 2 NC contacts

LT Illuminated pushbutton / pushbutton [1)]
- Clip-on caps
- 1 NO contact
- LED lighting white

LM Indicator light / blanking plug [2)]
- Clip-on caps
- LED lighting white

[1)] Depending on the cap version fitted

[2)] The blanking plug is made by fitting the black cap version.

2.3 Overview accessories

Material short text	Description
MS-BDF40-NHK	Protective collar for emergency stop
KA-0980	5 metre connecting cable M12, 12-pole
BDF40-DHS-PBC-DT	Pushbutton all cap colours, 1 piece each
BDF40-DHS-PBC-LT	Illuminated pushbutton all cap colours, 1 piece each
Pushbutton cap, 5 pieces, unmixed	
BDF40-DHS-PBC-DT-RD	red
BDF40-DHS-PBC-DT-YE	yellow
BDF40-DHS-PBC-DT-GN	green
BDF40-DHS-PBC-DT-BU	blue
BDF40-DHS-PBC-DT-WH	white
BDF40-DHS-PBC-DT-BK	black
Illuminated pushbutton cap, transparent, 5 pieces, unmixed	
BDF40-DHS-PBC-LT-RD	red
BDF40-DHS-PBC-LT-YE	yellow
BDF40-DHS-PBC-LT-GN	green
BDF40-DHS-PBC-LT-BU	blue
BDF40-DHS-PBC-LT-WH	white

2.4 Special versions

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

2.5 Purpose

The control panel is designed for installation next to safety guards and covers of a machine or system. The mounting width of 40 mm makes it suitable for mounting on profile systems with a width of 40 mm. The control panel can also be combined with solenoid interlocks of type AZM40 by using the mounting kits provided for this purpose.
Thanks to the integrated emergency stop and flexibly selectable coloured pushbutton caps, a wide range of functions such as emergency stop, start, stop, reset or the display of machine or system faults can be mapped.

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.

2.6 Technical data

Standards:	EN 60947-5-1, EN 60947-5-5 , EN ISO 13850
Material of the enclosure:	glass-fibre reinforced thermoplastic, self-extinguishing
Degree of protection:	IP65
Cable entry:	Connector plug M12, 12-pole, A-coded
Ambient temperature:	-25 °C … +65 °C
Storage and transport temperature:	-25 °C … +65 °C
Climatic resistance:	to DIN EN 60068 Part 2 - 30
Overvoltage category:	II
Degree of contamination:	2
Utilisation category:	DC-13
Rated operating current/voltage I_e/U_e:	0.1 A / 24 VDC
Max. fuse rating:	500 mA, FF
Rated insulation voltage U_i:	24 VDC
Rated impulse withstand voltage U_{imp}:	250 V
Actuating force:	
- Emergency stop:	max .100 N
- Illuminated pushbutton/pushbutton (at stroke end):	max. 10 N
Switch travel:	
- Emergency stop:	3.5 mm
- Illuminated pushbutton/pushbutton:	1 mm
Mechanical life:	
- Emergency stop:	50,000 operations
- Illuminated pushbutton/pushbutton:	1,000,000 operations
Switching frequency:	
- Emergency stop	100/h
- Illuminated pushbutton/pushbutton:	1000/h
Resistance to shock (Amplitude semi-sinusoidal):	15 g / 11 ms
Resistance to vibration:	5 g,10 … 500 Hz
Bounce duration:	< 2 ms at 100 mm/s actuating speed
LED power consumption (operating elements)	10 mA

Safety classification emergency stop

Standards:	EN ISO 13849-1
B_{10D}:	100,000
Mission time:	20 years

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

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

3. Assembly

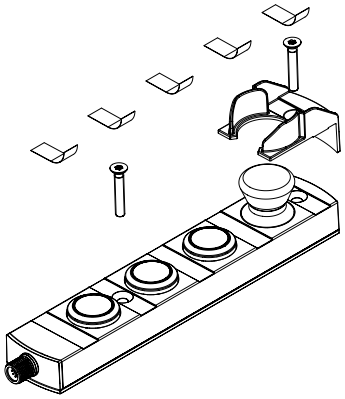
3.1 General mounting instructions

Two fixing holes for M5 fixing screws are provided for fixing the control panel. The fixing screws must be tightened to a tightening torque of 2.5 Nm. The installation position must be selected so that ergonomic operation of the control devices is possible. For control panels with emergency stop devices, it must also be ensured that the emergency stop is clearly visible and accessible.
The optional protective collar MS-BDF40-NHK must be attached to the upper fastening screw of the control panel.

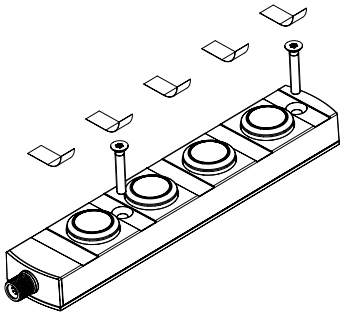
Please observe the relevant requirements of the standards EN ISO 12100, EN ISO 14119 and EN ISO 14120.

Mounting with emergency stop and protective collar

The screw length required for mounting the protective collar must be adjusted by 2 mm according to the thickness of the protective collar.



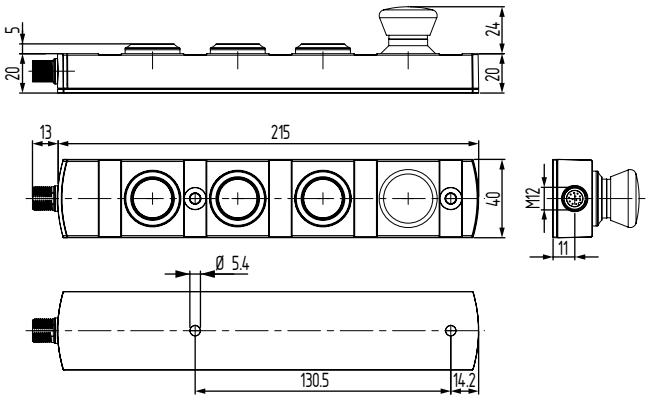
Mounting without emergency stop



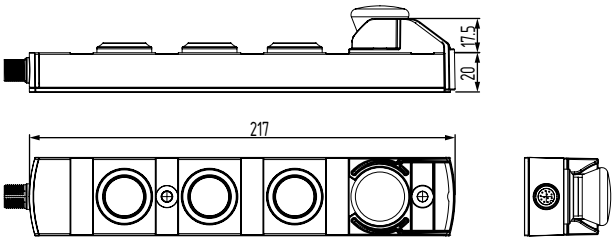
3.2 Dimensions

All measurements in mm.

Dimensions without protective collar



Dimensions with protective collar



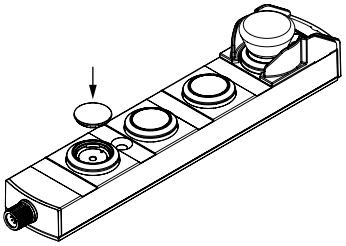
Using the protective collar (MS-BDF40-NHK) increases the overall length by approx. 2 mm.

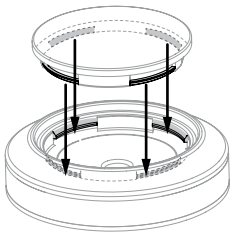
3.3 Fitting the colour cover caps for illuminated and non-illuminated devices

The colour cover caps are only suitable for one-off installation. Disassembly of the caps could cause damages to the component.
The caps must be mounted immediately after unpacking the control panel, in order to avoid soiling of the inner pushbutton compartment by gross dirt particles / dust.

The colour cover caps are fitted as follows:
1. Remove the colour cover caps from the supply kit
2. The four locking latches on the colour cover cap must be positioned over the cut-outs in the plunger
3. Press on the colour cover caps, "clicks" when snapped into place
4. Check the smooth actuation of the pushbutton
5. Repeat the process for all other buttons and indicator lights

After fitting the colour cover caps, check that the caps are seated correctly and that the buttons move easily. The button must return autonomously from the actuated to the non-actuated state and the cap must be at the same height as the component edging. For indicator lights and dummy closures, only the height distance to the device surround needs to be checked.





3.4 Inscription plates

The individual devices are labelled using a commercially available labelling device, e.g. P-Touch with a 10 mm wide labelling tape. The labelling tape is used to cover the mounting screws of the control panel.

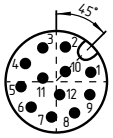
Do not use colourless tape. Preferably a black tape with white lettering should be used. For control panels equipped with an E-STOP protective collar, the tape colour can also be yellow with black lettering.

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.

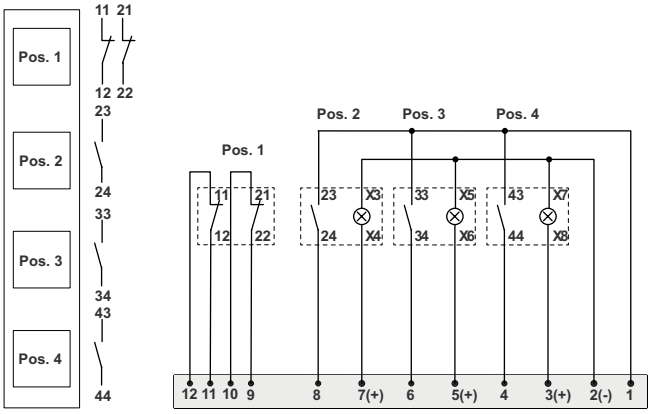
The electrical connection is made via a 12-pole M12 plug. The plug must be tightened with a tightening torque of 0.4 Nm.



1) brown (BN)
2) blue (BU)
3) white (WH)
4) green (GN)
5) pink (PK)
6) yellow (YE)
7) black (BK)
8) grey (GY)
9) red (RD)
10) violet (VT)
11) grey/pink (GY/PK)
12) red/blue (RD/BU)

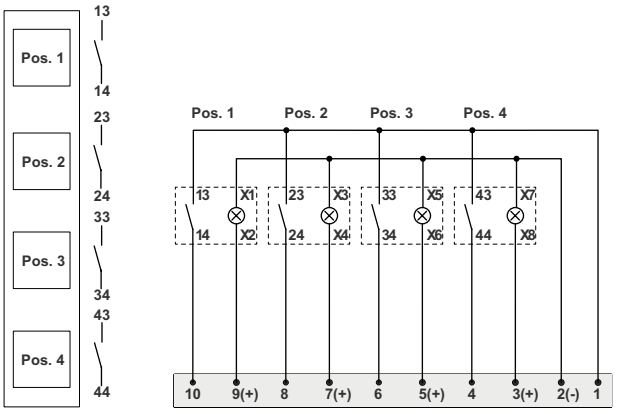
4.2 Pin assignment with emergency stop

2 NC contacts for emergency stop at position 1
1 NO contacts for operating elements at position 2 … 4



4.3 Pin assignment without emergency stop

1 NO contacts for operating elements at position 1 … 4



5. Set-up and maintenance

5.1 Functional testing

The function of the component must be tested.
The following conditions must be previously checked and met:
1. The installation is executed according to the instructions
2. The connection is executed correctly
3. The cable is connected correctly
4. Check that the pushbuttons and illuminated pushbuttons are seated correctly and move smoothly

5.2 Maintenance

In case of correct installation in accordance with the instructions described above, the component requires little maintenance. For use in extreme conditions, we recommend routine maintenance including the following steps:
1. Check the correct fixing of the control panel
2. Remove particles of dust and soiling
3. Check the integrity of the connections
4. Check the smooth operation of the pushbuttons and illuminated pushbuttons

Damaged or defective components must be replaced.

6. Disassembly and disposal

6.1 Disassembly

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

6.2 Disposal

The control panel 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

SCHMERSAL

Original

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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: BDF40

Type: See ordering code

Description of the component: Control Panel

Relevant Directives:

Machinery Directive [1]	2006/42/EC
Low Voltage Directive [2]	2014/35/EU
RoHS-Directive	2011/65/EU

Affixing of the CE conformity mark:

[1] for safety components, whose type plate is labelled "safety component" for device versions with emergency-stop function
[2] for switchgear without safety function

Applied standards:

EN 60947-5-1:2017
EN 60947-5-5:1997 + A1:2005 + A11:2013 + A2:2017
EN ISO 13850:2015

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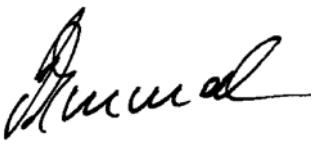
Place and date of issue: Wuppertal, 29. January 2024



Authorised signature
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BDF40-A-EN

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

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