



**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](http://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 improper use or manipulation of the safety switchgear, personal hazards or damages 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

This operating instructions manual applies to the following types:

**BDF200-①-②-③-④-⑤-⑥-⑦**

No.	Option	Description
①	NH NHK	Emergency stop without protective collar Emergency stop latching pushbutton with protective collar
	...	Operating element at position 1
②	20	with emergency stop: 2 NO contacts at position 2 - 4 without emergency stop: 2 NO contacts at position 1 - 4
	11	with emergency stop: 1 NO / 1 NC contact at position 2 - 4 without emergency stop: 1 NO / 1 NC contact at position 1 - 4
	10	with emergency stop: 1 NO contact at position 2 - 4 without emergency stop: 1 NO contact at position 1 - 4
③	...	Operating element at position 2
④	...	Operating element at position 3
⑤	...	Operating element at position 4
⑥		without indicator lamp
	G24	with indicator lamp, red (only for contact variant -10)
⑦	2875	Pushbutton caps for pushbuttons and illuminated pushbuttons included in the kit
	2920	Custom wiring with M12 connector, 12-pole
	2977	Custom wiring with M12 connector, 12-pole
	3029	Custom wiring with M12 connector, 12-pole
	3029-1	Custom wiring with M12 connector, 12-pole
	3095	Custom wiring with M12 connector, 12-pole
	3096	Custom wiring with M12 connector, 12-pole



Unused positions are labelled "B" and are sealed with a blanking plug in factory.  
The operating elements can only be retrofitted at the factory.



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 realised correctly, the safety function and therefore the compliance with the Machinery Directive is maintained.

### 2.2 Actuator overview

#### Emergency stop pushbutton

- without protective collar: ordering suffix **NH**
- with protective collar: ordering suffix **NHK**
- Pull to reset
- 1 NO contact / 2 NC contacts or 2 NC contacts

#### Illuminated pushbutton LT

- with concave button or without fitted button cap when the type designation ends with -2875.
- 2 NO contacts, 1 NO contact / 1 NC contact or 1 NO contact

#### Pushbutton DT

- with concave button
- 2 NO contacts, 1 NO contact / 1 NC contact or 1 NO contact

#### Illuminated signal LM

#### Blanking plug B

#### Mushroom push button PT

- without latching
- 2 NO contacts, 1 NO contact / 1 NC contact or 1 NO contact

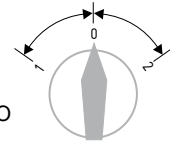
#### selector switches WS20, WS21, SWS20

- 1 latched position
- 2 NO contacts, 1 NO contact / 1 NC contact or 1 NO contact



#### Selector switches WS30, WS31

- 2 latched positions to the left/right of the zero position
- 1 NO contact for each switching position for version -20 or 1 NC contact (position 1) and 1 NO contact (position 2) for version -11



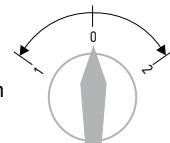
#### WT20, WT21, SWT20 (key-operated) selector switches

- 1 touch position and automatic return to the zero position
- 2 NO contacts, 1 NO contact / 1 NC contact or 1 NO contact



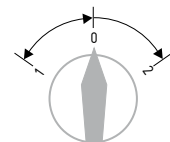
#### Selector switches WT30, WT31

- 2 touch positions to the left/right of the zero position and automatic return to the zero position
- 1 NO contact for each switching position for version -20 or 1 NC contact (position 1) and 1 NO contact (position 2) for version -11



#### Selector switches WTS30, WTS31

- 1 touch position right and automatic return to the zero position and 1 latched position left of the zero position
- 1 NO contact for each switching position for version -20 or 1 NC contact (position 1) and 1 NO contact (position 2) for version -11



### 2.3 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.

### 2.4 Purpose

The modular BDF200 control panel is installed on the safety guard of a machine or plant. It enables the operator to activate for instance the emergency stop, start/stop and reset functions.



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.

### 2.5 Technical Data

Standards:	EN 60947-5-1, EN 60947-5-5
Material of the enclosure:	glass-fibre reinforced thermoplastic, self-extinguishing
Degree of protection:	IP65
Cable entry:	1x M20
Cable cross-section of the cable glands:	Ø 6...13 mm
Ambient temperature:	-25 °C ... 65 °C
Climatic resistance:	to DIN EN 60068 Part 2 - 30
Overvoltage category:	
- Screw terminal connection:	III
- M12 connector, 12-pole:	II
Degree of pollution:	3
Material of the contacts:	AgNi 10, gold-plated
Rated operating current/voltage $I_e/U_e$ :	
- Screw terminal connection:	AC-15: 2 A / 24 VAC DC-13: 1 A / 24 VDC
- M12 connector, 12-pole:	AC-15: 1.5 A / 24 VAC DC-13: 1 A / 24 VDC
Thermal test current $I_{the}$ :	2.5 A
Max. fuse rating:	2.5 A slow blow
Contact system:	Cross-Point system
Contact force:	0.5 N per contact point = 1 N per contact
Switching of low voltages:	min. 5 V / 1 mA
Switching frequency:	1,200 / h
Rated insulation voltage $U_i$ :	
- Screw terminal connection:	250 V
- M12 connector, 12-pole:	30 V
Rated impulse withstand voltage $U_{imp}$ :	
- Screw terminal connection:	2.5 kV
- M12 connector, 12-pole:	0.8 kV
Bounce duration:	< 2 ms at 100 mm/s actuating speed
Mechanical life:	command devices: 1 million operations Rotary switch: 30,000 operations Emergency stop: 100,000 operations
Switch travel:	approx. 3 mm
Resistance to shock:	100 g / 6 ms
Resistance to vibration:	20 g, 10 ... 100 Hz
Wiring configuration:	to EN 60947-1
Actuating force at stroke end (1 NC/1 NO):	8 N
Lamp socket:	BA5S, LED, max. length 17 mm
LED change:	from front
LED power consumption (operating elements):	16 mA
Power consumption indicator lamp, red:	20 mA



Input Terminal wire size AWG 14-22 TQ Lb In. 2-4  
For use in NFPA79, Industrial Machinery, only.  
The power-source has to be an isolated secondary source limited by a listed fuse rated 3 A min. 24 VAC/DC.

### Safety classification emergency stop

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

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

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

## 3. Mounting

### 3.1 General mounting instructions

For the correct fixing of the BDF200 control panel, the device is provided with two mounting holes for M5 screws. Any mounting position.

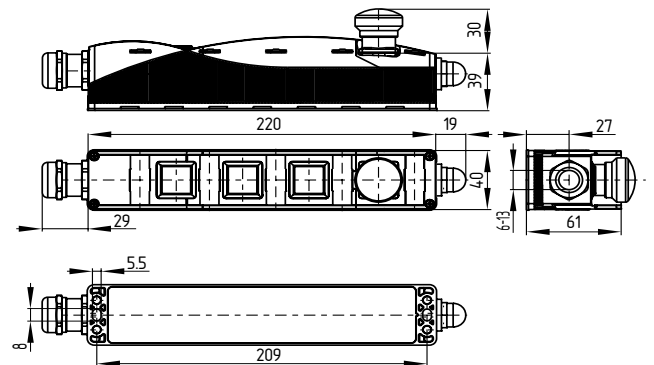


Please observe the remarks of the standards EN ISO 12100, EN ISO 14119 and EN ISO 14120.

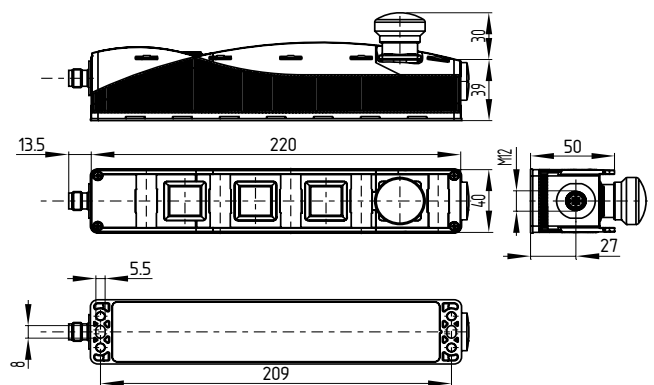
### 3.2 Dimensions

All measurements in mm.

BDF200 with cable entry



BDF200 with M12 connector, 12-pole



### 3.3 Mounting of the pushbutton and illuminated pushbutton caps for option -2875



The caps for the pushbuttons and illuminated pushbuttons are only suitable for a one-time mounting. 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 caps for the pushbuttons and illuminated pushbuttons are mounted in the following manner:

1. Take the pushbutton or illuminated pushbutton cap as well as the rubber disk out of the kit
2. Take the control panel out of the protective packaging
3. Place the rubber disk on the pushbutton surface
4. Install the pushbutton or illuminated pushbutton cap onto that
5. Press the cap firmly, it will "click" when it engages.
6. Check the smooth actuation of the pushbutton
7. Repeat this procedure for all other pushbuttons



After the pushbutton or illuminated pushbutton cap is mounted, the proper fitting and the smooth actuation of the pushbutton must be checked. 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.

### 3.4 Mounting ramp edge

Remove the cover of the enclosure a and b (screws: Torx 10).



When opening the enclosure cover, please avoid damage to the connecting cables.



#### Caution!

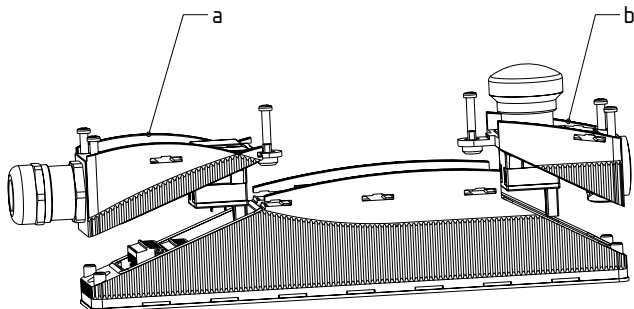
Do not touch electrostatically loaded elements.  
Do not touch the printed circuit board.

Use 2 x M5 cylindrical screws ISO 4762 (DIN 912) for the assembly.



When closing the enclosure cover, please observe that the individual cables are not caught between the actuator and the contact element.

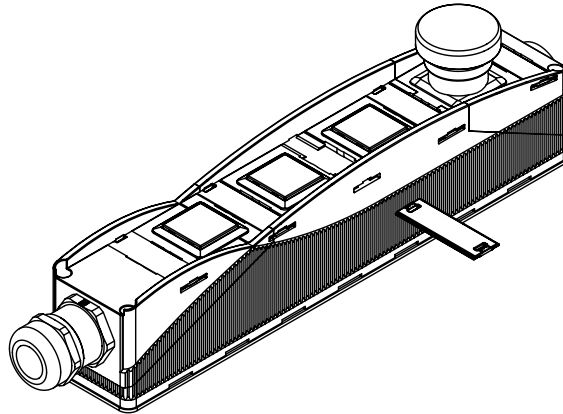
After fitting, the cover screws must be tightened with a tightening torque of 0.7 ... 0.8 Nm.



When closing the enclosure cover, ensure that the emergency stop module is flush with the bottom section and that the cover screws are screwed in as far as they will go. The emergency stop safety function must be checked by an appointed safety technician / safety representative once successfully installed.

### 3.5 Inscription plates

The marking on the inscription plates (included in delivery) is carried out by colour change by laser. The effects of heat may change the colour of the surface.



It must be ensured that the top is inscribed.

## 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 cable entry is realised by a metric M20 x 1.5 gland (included in delivery, tightening torque of connecting piece 4.0 Nm; tightening torque of cap nut 3.0 Nm). This gland must be dimensioned by the user so that it is suitable for the cable used.

The maximum cable section is 16 x 0.5 mm<sup>2</sup>, incl. conductor ferrules.

Settle length x of the conductor: 7 mm



If a connector plug is installed instead of a cable entry, the connector must be tightened with a torque of 1.2 Nm.

Wiring examples: see appendix

### 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 correctly executed and connected.
4. For the types with extension ...-2875, the proper fitting and the smooth operation of the pushbuttons must be checked after the installation of the pushbutton and illuminated pushbutton caps

#### 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 cable entry and connections
4. For the types with extension ...-2875, the smooth operation of the pushbuttons and the illuminated pushbuttons must be checked.

**Damaged or defective components must be replaced.**

### 6. Disassembly and disposal

#### 6.1 Disassembly

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

#### 6.2 Disposal

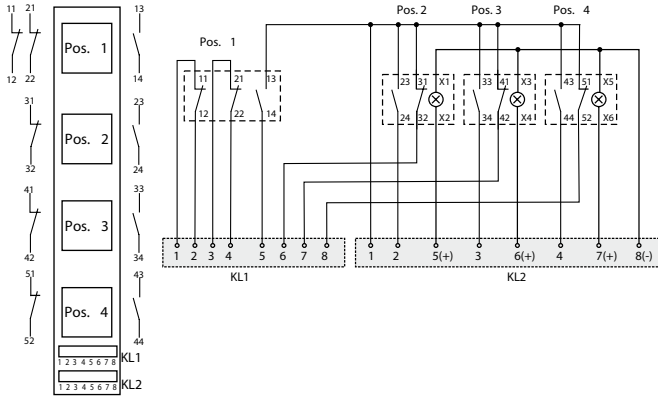
The product must be disposed of in an appropriate manner in accordance with the national prescriptions and legislations.

### 7. Appendix

#### 7.1 Pin configuration

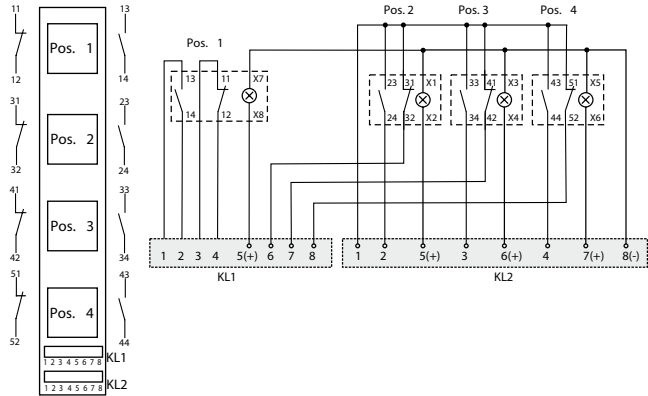
##### BDF200-NH-11-...

1 NO contact / 2 NC contacts for emergency stop at position 1  
 1 NO contact / 1 NC contact for operating elements at position 2 - 4



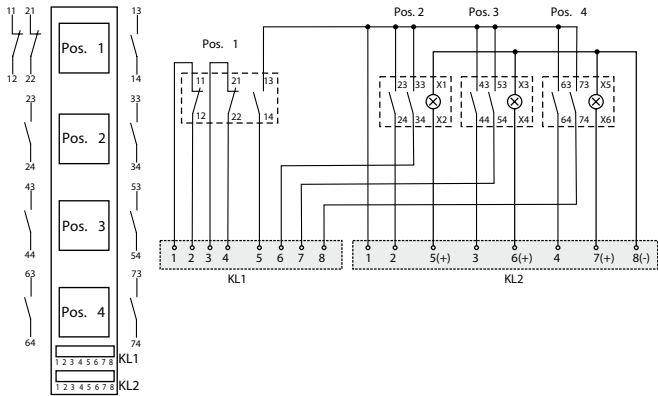
##### BDF200-...-11-...

1 NO contact / 1 NC contact for operating elements at position 1 - 4



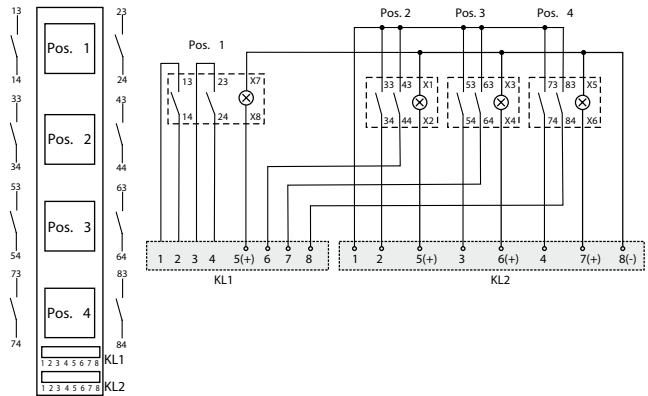
##### BDF200-NH-20-...

1 NO contact / 2 NC contacts for emergency stop at position 1  
 2 NO contacts for operating elements at position 2 - 4



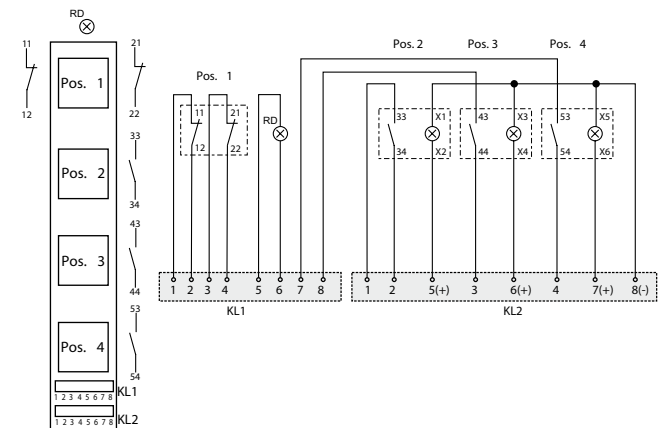
##### BDF200-...-20-...

2 NO contacts for operating elements at position 1 - 4



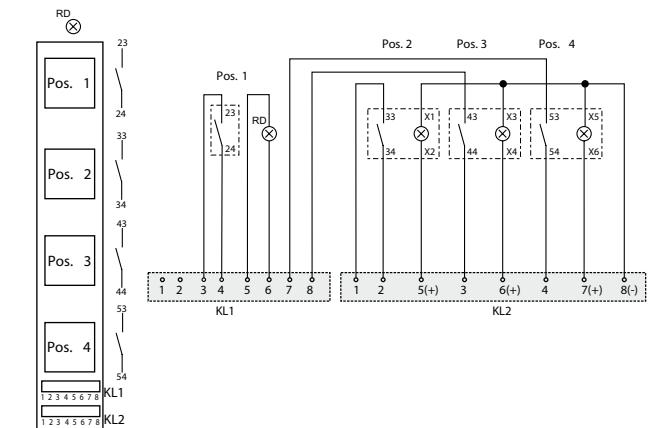
##### BDF200-NH-10-...

2 NC contacts for emergency stop at position 1 and indicator lamp (red)  
 1 NO contact for operating elements at position 2 - 4 and indicator lamp (red)

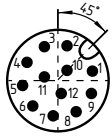


##### BDF200-...-10-...

1 NO contact for operating elements at position 1 - 4 and indicator lamp (red)



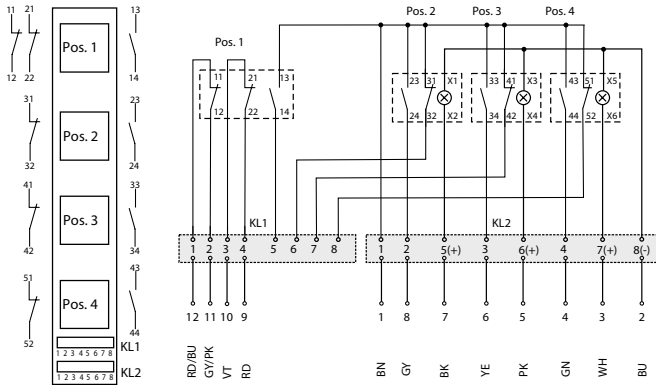
### 7.2 Custom wiring with M12 connector, 12-pole



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

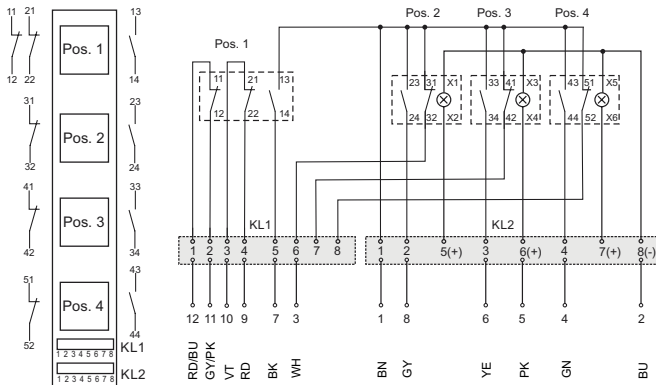
#### BDF200-NH-11-...2920

- 2 NC contacts for emergency stop at position 1
- 1 NO contact for operating elements at position 2 - 4
- LED connection at position 2 - 4



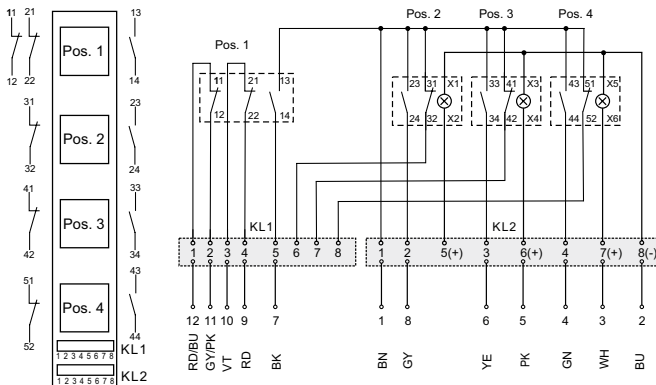
#### BDF200-NH-11-...3029

- 1 NO contact / 2 NC contacts for emergency stop at position 1
- 1 NO contact / 1 NC contact for operating elements at position 2
- 1 NO contact for operating elements at position 3 + 4
- LED connection at position 3



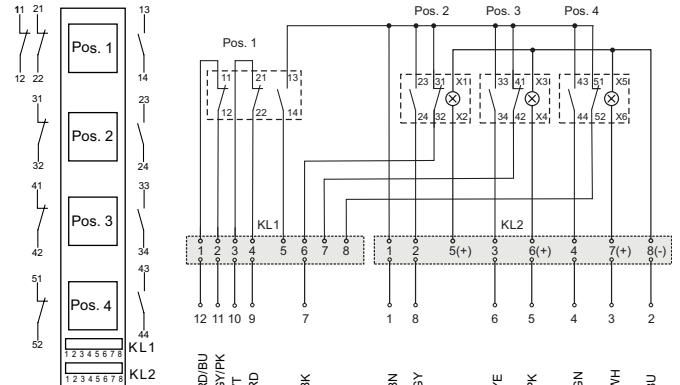
#### BDF200-NH-11-...3029-1

- 1 NO contact / 2 NC contacts for emergency stop at position 1
- 1 NO contact for operating elements at position 2 - 4
- LED connection at position 3 + 4



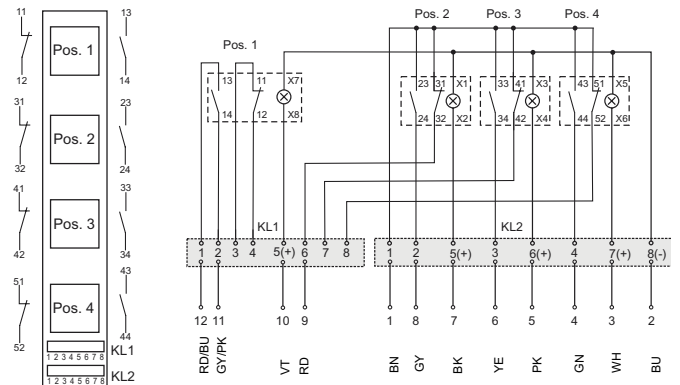
#### BDF200-NH-11-...3096

- 2 NC contacts for emergency stop at position 1
- 1 NO contact / 1 NC contact for operating elements at position 2
- 1 NO contact for operating elements at position 3 + 4
- LED connection at position 3 + 4



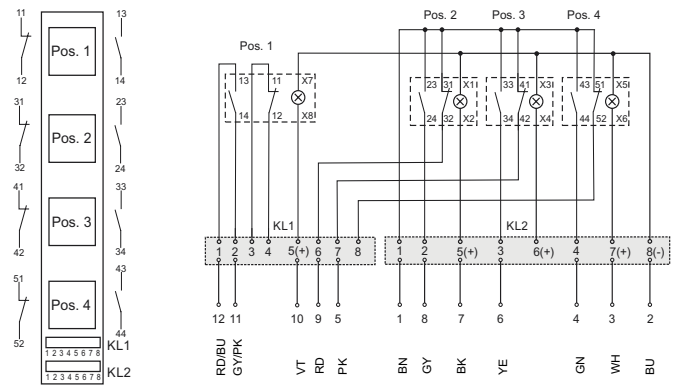
#### BDF200-LT-11-...2977

- 1 NO contact / 1 NC contact for operating elements at position 2
- 1 NO contact for operating elements at position 1, 3 + 4
- LED connection at position 1 - 4


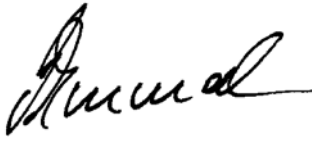


#### BDF200-LT-11-...3095

- 1 NO contact / 1 NC contact for operating elements at position 2 + 3
- 1 NO contact for operating elements at position 1 + 4
- LED-Anschluss an Position 1, 2 + 4



8. EU Declaration of conformity

<b>EU Declaration of conformity</b>		
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.		
<b>Name of the component:</b>	BDF200	
<b>Type:</b>	See ordering code	
<b>Description of the component:</b>	Control Panel	
<b>Relevant Directives:</b>	Machinery Directive <sup>1)</sup> RoHS-Directive	2006/42/EC 2011/65/EU
<b>Affixing of the CE conformity mark:</b>	<sup>1)</sup> for safety components, whose type plate is labelled "safety component" for device versions with emergency-stop function	
<b>Applied standards:</b>	EN 60947-5-1:2017 EN 60947-5-5:1997 + A1:2005 + A11:2013 + A2:2017 EN ISO 13850:2015	
<b>Person authorised for the compilation of the technical documentation:</b>	Oliver Wacker Möddinghofe 30 42279 Wuppertal	
<b>Place and date of issue:</b>	Wuppertal, May 5, 2020	
		
	Authorised signature <b>Philip Schmersal</b> Managing Director	

BDF200-F-DE



The currently valid declaration of conformity can be downloaded from the internet at [products.schmersal.com](http://products.schmersal.com).

