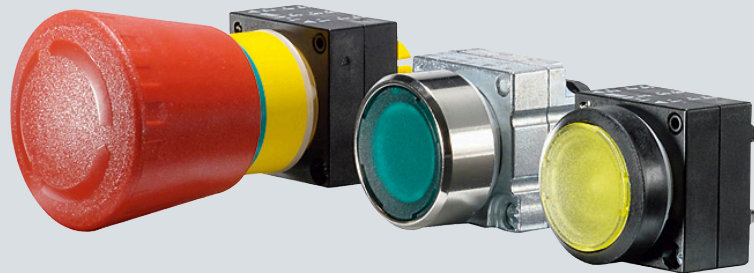


# Commanding and Signaling Devices

Pushbuttons and Indicator Lights • Consoles •  
Switches • Signaling Columns

Reference Manual • April 2009



Low-Voltage Controls and Distribution

**SIEMENS**



# Commanding and Signaling Devices



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# Commanding and Signaling Devices

## Introduction

### Overview



3SB2

3SB30, 3SB32

3SB31, 3SB33

3SB35, 3SB36

#### Pushbuttons and indicator lights

##### Designs

	3SB2	3SB30, 3SB32	3SB31, 3SB33	3SB35, 3SB36
Nominal diameter	16 mm	22 mm	26 mm × 26 mm	22 mm
Version	Plastic, round	Plastic, round	Plastic, square	Metal, round

##### Actuators

Pushbuttons and switches	✓ <sup>1)</sup>	✓	✓	✓
Illuminated pushbuttons and switches	✓ <sup>1)</sup>	✓	✓	✓
Mushroom pushbuttons	--	✓	--	✓
Push-pull buttons	--	✓	--	✓
EMERGENCY-STOP mushroom pushbuttons	✓	✓	✓	✓
Selector switches	✓	✓	✓	✓
Key-operated switches	✓	✓	✓	✓

##### Special actuators

Coordinate switches	--	✓	--	--
Twin pushbuttons	--	✓	--	--
Potentiometer drives	--	✓	--	--

##### Indicators

Indicator lights	✓	✓	✓	✓
Acoustic signaling devices	--	✓	--	--

##### Contact blocks

Single-pole	✓	✓	✓	✓
Two-pole	✓	✓	✓	✓

##### Lampholders

Wedge bases	✓	✓ (with solder connections)	✓ (with solder connections)	✓ (with solder connections)
BA 9s bases	--	✓	✓	✓
With integrated LED	--	✓	✓	✓

##### Terminals

Plug-in connection	✓	--	--	--
Screw terminals	--	✓	✓	✓
Spring-type terminals	--	✓	✓	✓
Solder pins	✓	✓	✓	✓
AS-Interface	--	✓	✓	✓

#### AS-Interface solutions

For AS-Interface solutions, see Catalog IK PI "Industrial Communication".

#### AS-Interface EMERGENCY-STOP according to ISO 13850

Using a special F adapter, EMERGENCY-STOP devices according to ISO 13850 can be directly connected through the standard AS-Interface with safety-oriented communication.

#### AS-Interface enclosures and front panel modules

For customized enclosures with connection to AS-Interface, see Catalog IK PI.

For front panel modules with one 4I/4O slave for connection of four 3SB3 control devices, see Catalog IK PI.

- ✓ Standard
- Not available
- Optional
- <sup>1)</sup> Only pushbuttons, no pushbutton switches.



	3SB38	3SB38 6	3SE7, 3SF2	3SE29
	Enclosures	Two-hand oper. consoles	Cable-operated switches	Foot switches
<b>Enclosure</b>				
Plastic	✓	✓	--	✓
Metal	✓	✓	✓	✓
<b>Actuators</b>				
Pushbuttons and switches	✓	✓	--	✓
Illuminated pushb. and switches	✓	✓	--	--
Mushroom pushbuttons	✓	✓	--	--
Push-pull buttons	✓	--	--	--
EMERG.-STOP mushroom pushb.	✓	✓	✓	--
Selector switches	✓	--	--	--
Key-operated switches	✓	--	--	--
Bowden wires	--	--	✓	--
<b>Indicators</b>				
Indicator lights	✓	--	✓	--
Acoustic signaling devices	✓	--	--	--
<b>Contact blocks</b>				
Single-pole	✓	✓	--	--
Two-pole	--	✓	✓	✓
Three-pole	--	--	--	✓
Four-pole	--	--	✓	✓
<b>Terminals</b>				
Screw terminals	✓	✓	✓	✓
Spring-type terminals	✓	☐	--	--
Molded cables	--	--	--	✓
Plug-in connection	--	☐	☐	☐
AS-Interface	✓	☐	--	--



	8WD42, 8WD44	8WD53
	Signaling columns	Integrated signal lamps
<b>Enclosure</b>		
Plastic	✓	✓
Metal	--	--
<b>Lights</b>		
Incandescent lamps	✓	✓
LEDs	✓	✓
Flashlight	✓	✓
<b>Terminals</b>		
Screw terminals	✓	✓
Spring-type terminals	✓	--
AS-Interface	✓	--

# 3SB2 Pushbuttons and Indicator Lights, 16 mm

## General data

### Overview

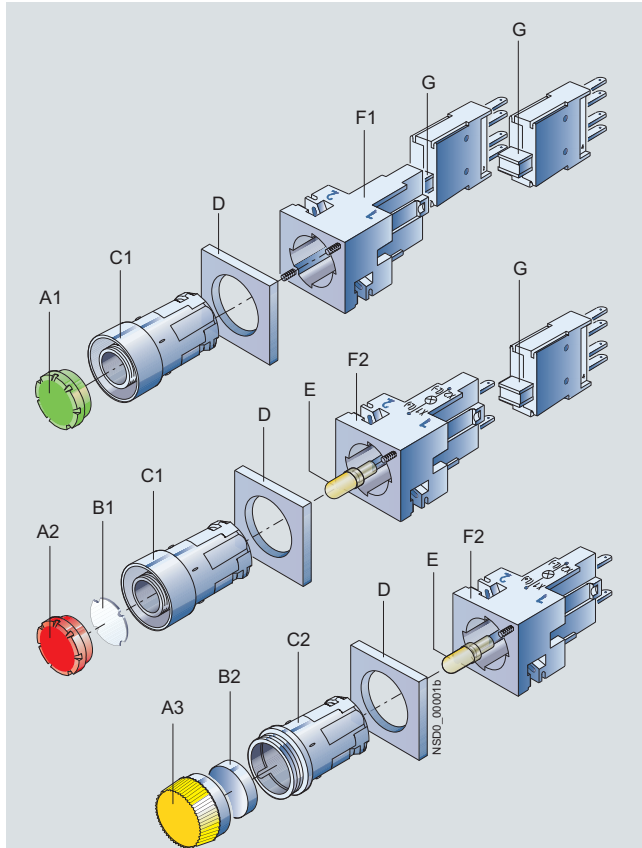
The 3SB2 pushbuttons and indicator lights are provided for front plate mounting and rear connection with flat connectors. For use on printed circuit boards, contact blocks and lampholders with solder pins are also available.

### Standards

IEC 60947-5-1, EN 60947-5-1 (VDE 0660 Part 200),

IEC 60947-5-5, EN 60947-5-5 (VDE 0660 Part 210) for EMERGENCY-STOP mushroom pushbuttons.

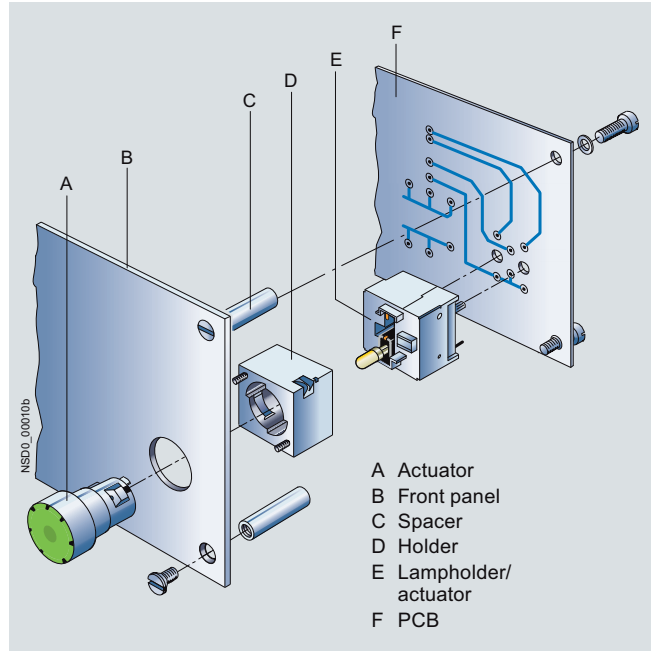
### Version with flat connector



- A1 Illuminated pushbutton, flat
- A2 Pushbutton, flat
- A3 Screw lens for indicator light
- B1 Insert label for inscription
- B2 Insert cap for inscription
- C1 Collar with extruded front ring
- C2 Collar for indicator light
- D Frame for square design
- E Wedge-Base lamps W2 x 4.6 d
- F1 Holder
- F2 Lampholder with holder
- G Contact blocks (1 NO or 1 NC) for snapping on to holder and/or lampholder

### For PCB mounting

For use on printed circuit boards, special contact blocks and lampholders for soldering into the printed circuit board are available. For this purpose, the blocks are fitted with 0.8 mm x 0.8 mm solder pins of length 3.5 mm.



- A Actuator
- B Front panel
- C Spacer
- D Holder
- E Lampholder/actuator
- F PCB

## Design

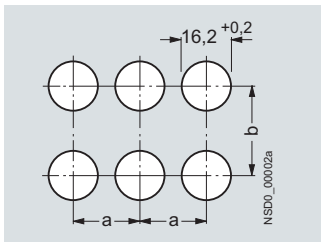
### Design versions

Two design versions can be mounted:

- Round design: The 3SB2 pushbuttons and indicator lights are assembled with the modules – actuator, holder, contact block and lampholder. Depending on the specific application, various versions can be assembled. Complete units are offered for the most commonly used applications.
- Square design: With square, black frames the round units can be given a square look. The frames are inserted underneath the round actuators. Further mounting is the same as for the round version.

### Mounting and fixing

Mounting dimensions according to EN 50007 (not applicable to EMERGENCY-STOP mushroom pushbuttons):



Minimum spacing	a	b
Round version	19	19
Square version without inscription label	21	21
Round and square version with inscription label	21	32
For 2 selector switches with 3 switch positions, latching, side by side	21	21

For mounting, the actuator or the lens assembly is inserted from the front into the hole in the front plate. Four small nubs ensure a secure fitting in the hole. The holder is plugged on the actuator or the lens assembly from behind and automatically snaps into place. The module is screwed down tightly with 2 screws on the holder and thus levels panel thickness from 1 to 6 mm.

One or two contact blocks can be mounted on the holder. They are inserted into the holder with slide slots and held down with two snap brackets.

If a command position is fitted with an indicator light or illuminated pushbutton, a lamp socket with lampholder must be used instead of a holder. It is suitable for incandescent lamps or LEDs with bases of type W2 x 4.6d.

### Terminals

The contact blocks and the lampholder are equipped with flat connectors acc. to IEC 60760 which can also be used as solder connections.

To permit through-connection, all terminals are provided with two tabs.

### For PCB mounting

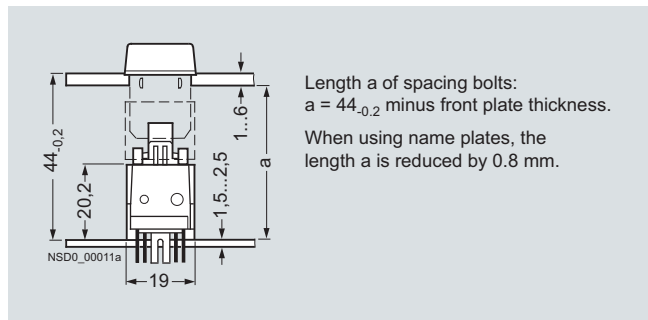
The command position comprises the actuator, e. g. 3SB2 pushbutton, illuminated pushbutton or indicator light, which is mounted in the front plate, and a contact block and a lampholder which are soldered to the PCB. For this purpose, the contact blocks and lampholders are fitted with 0.8 mm x 0.8 mm solder pins of length 3.5 mm.

### Mounting and fixing

Mounting dimensions according to EN 50007.

The actuators are mounted in the same way as 3SB2 front plate mounting devices.

The contact blocks and lampholders are plugged into the printed circuit board by means of their solder pins and can be flow-soldered. After soldering, the devices must be flush with the board and perpendicular to it. The printed circuit board must be supported on spacing bolts so that it cannot sag or bend more than 0.1 mm.



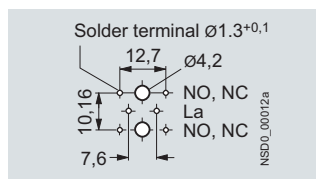
Length a of spacing bolts:  
 $a = 44_{-0.2}$  minus front plate thickness.  
 When using name plates, the length a is reduced by 0.8 mm.

Illuminated pushbutton with solder pin connection

To avoid bending the PCB when the pushbuttons are operated, sufficient spacing bolts must be provided as shown in the table below:

PCB thickness	Max. distance between spacing bolts
1.5 mm	80 mm
2.5 mm	150 mm
When using EMERGENCY-STOP pushbuttons	always 50 mm

These details are based on epoxy resin glass fiber mat.



Solder pin spacing

# 3SB2 Pushbuttons and Indicator Lights, 16 mm

## General data

### Technical specifications

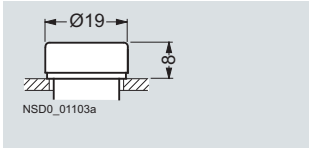
Type	3SB2	
<b>Contact blocks and lampholders</b>		
<b>Standards</b>	IEC 60947-5-1, EN 60947-5-1 IEC 60947-5-5, EN 60947-5-5	
<b>Rated insulation voltage <math>U_i</math></b>	V	250
<b>Conventional thermal current <math>I_{th}</math></b>	A	10
<b>Rated operational current <math>I_e</math> at rated operational voltage <math>U_e</math></b>		
• Alternating current AC-12 - At $U_e = 230$ V	A	10
• Alternating current AC-15 - At $U_e = 24$ V	A	4
- At $U_e = 60$ V	A	4
- At $U_e = 110$ V	A	4
- At $U_e = 230$ V	A	4
• Direct current DC-12 - At $U_e = 24$ V	A	6
- At $U_e = 60$ V	A	5
- At $U_e = 110$ V	A	2.5
- At $U_e = 230$ V	A	1
• Direct current DC-13 - At $U_e = 24$ V	A	3
- At $U_e = 60$ V	A	1.5
- At $U_e = 110$ V	A	0.7
- At $U_e = 230$ V	A	0.3
<b>Contact stability</b>		
• Test voltage/test current	5 V/1 mA	
<b>Lamps</b>		
• Bases	Wedge base W2 × 4.6 d	
• Rated voltage	V	6, 12, 24, 30, 48, 60
• Rated power, max.	W	1
<b>Short-circuit protection</b> weld-free acc. to IEC 60947-5-1		
• DIAZED fuse links, operational class gL/gG	10 A TDz, 16 A Dz	
• Miniature circuit breaker with C characteristic acc. to IEC 60898	10 A	
<b>Electrical endurance</b>		
• For operational class AC-15 with 3RT10 15 to 3RT10 26 contactors	10 × 10 <sup>6</sup> operating cycles	
<b>Mechanical endurance</b>		
	10 × 10 <sup>6</sup> operating cycles	
<b>Degree of protection</b> acc. to IEC 60529		
• Connection of contact blocks and lampholders behind the front panel	IP00	
• Contact chambers of the contact blocks behind the front panel	IP40	
<b>Finger-safe</b> acc. to EN 50274 and BGV A3		
	With voltages > 50 V AC or 120 V DC, insulation sleeves must be fitted to the unassigned tab connections.	
<b>Connection</b>		
• Plug-in connection with flat connectors for plug-in sleeves acc. to IEC 60760	Flat connector 2 × 2.8/0.8 mm	
<b>Data acc. to UL and CSA</b>		
<b>Rated voltage</b>		
• Contact blocks	V	250 AC
• Indicator light (lamp with wedge base W2 × 4.6 d)	V	60; 1 W
<b>Uninterrupted current</b>	A	5
<b>Switching capacity</b>	B 300, R 300	
<b>Actuators and indicators</b>		
<b>Mechanical endurance</b>		
• Pushbuttons	10 × 10 <sup>6</sup> operating cycles	
• Actuators, rotary or latching	3 × 10 <sup>5</sup> operating cycles	
• Illuminated pushbuttons	3 × 10 <sup>6</sup> operating cycles	
<b>Climatic withstand capability</b>		
	Climate-proof; suitable for marine applications	
<b>Ambient temperature</b>		
• During operation, non-illuminated devices and complete with LED	°C	-25 ... +70
• During operation, devices with incandescent lamp	°C	-25 ... +60
• During storage, transport	°C	-40 ... +80
<b>Degree of protection</b> acc. to IEC 60529		
• Actuators and indicators	IP65	
• Actuators and indicators with protective cap	IP67	
<b>Protective measures</b>		
• For mounting in metal front plates and enclosures	The actuators and lens assemblies must not be included in the protective measures.	
• For fitting into enclosures with total insulation	The protective measure "Total insulation" is retained.	
<b>Shock resistance</b> acc. to IEC 60068-2-27		
• Shock amplitude		≤50 g
• Shock duration	ms	11
• Shock form		Half-sine



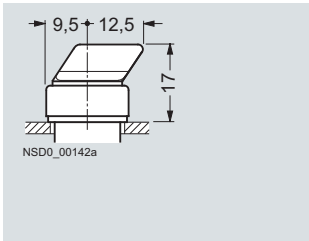
## Dimensional drawings

### Actuators

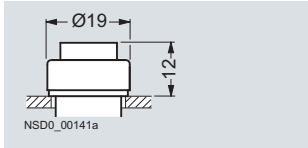
**Pushbutton or illuminated pushbutton with flat button**



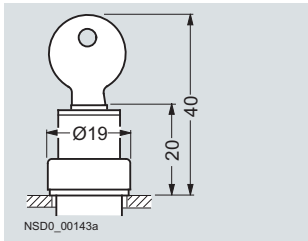
**Selector switch**



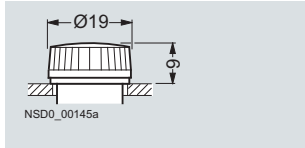
**Pushbutton or illuminated pushbutton with raised button**



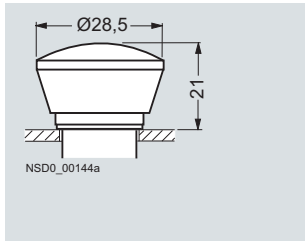
**CES key-operated switch**



**Indicator light**

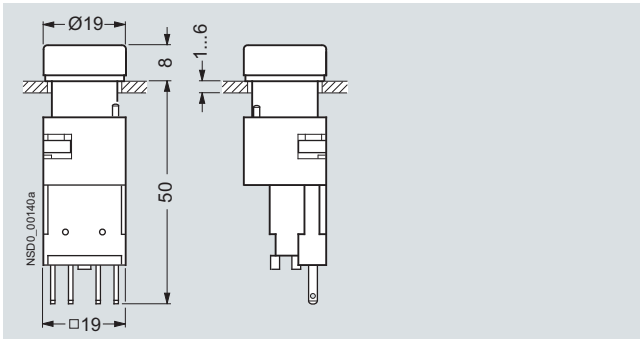


**EMERGENCY-STOP mushroom pushbutton acc. to ISO 13850**



### Contact blocks with flat connector

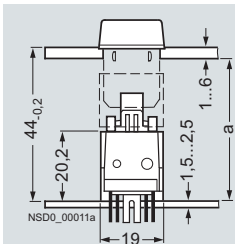
**Pushbutton and contact block with holder for front panel mounting**



### Contact blocks with solder pins for use on printed circuit boards

**Illuminated pushbutton**

with contact block and lampholder with solder pins



Length **a** of spacing bolts:  
**a** = 44<sub>-0,2</sub> minus front panel thickness.

When using name plates, the length **a** is reduced by 0.8 mm.

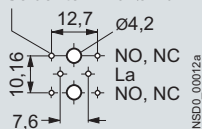
To avoid bending of the PCB when the actuator is operated, sufficient spacing bolts must be provided spaced as shown in the table below:

PCB thickness	Max. distance between spacing bolts
1.5 mm	80 mm
2.5 mm	150 mm
When using EMERGENCY-STOP pushbuttons generally 50 mm	

These details are based on epoxy resin glass fiber mat.

#### Solder pin spacing

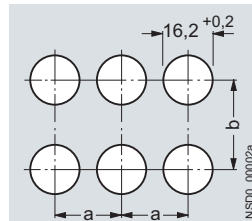
Solder terminal  $\varnothing 1.3^{+0,1}$



### Mounting dimensions

**Contact blocks and indicator lights**

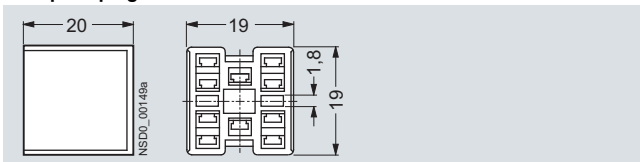
(except EMERGENCY-STOP mushroom pushbuttons)



Minimum spacing	a	b
Round version	19	19
Square version without inscription label	21	21
For round and square versions with inscription label	21	32
For 2 selector switches and 3 switch positions, maintained contact, side by side	21	21

### Accessories

**Complete plug**

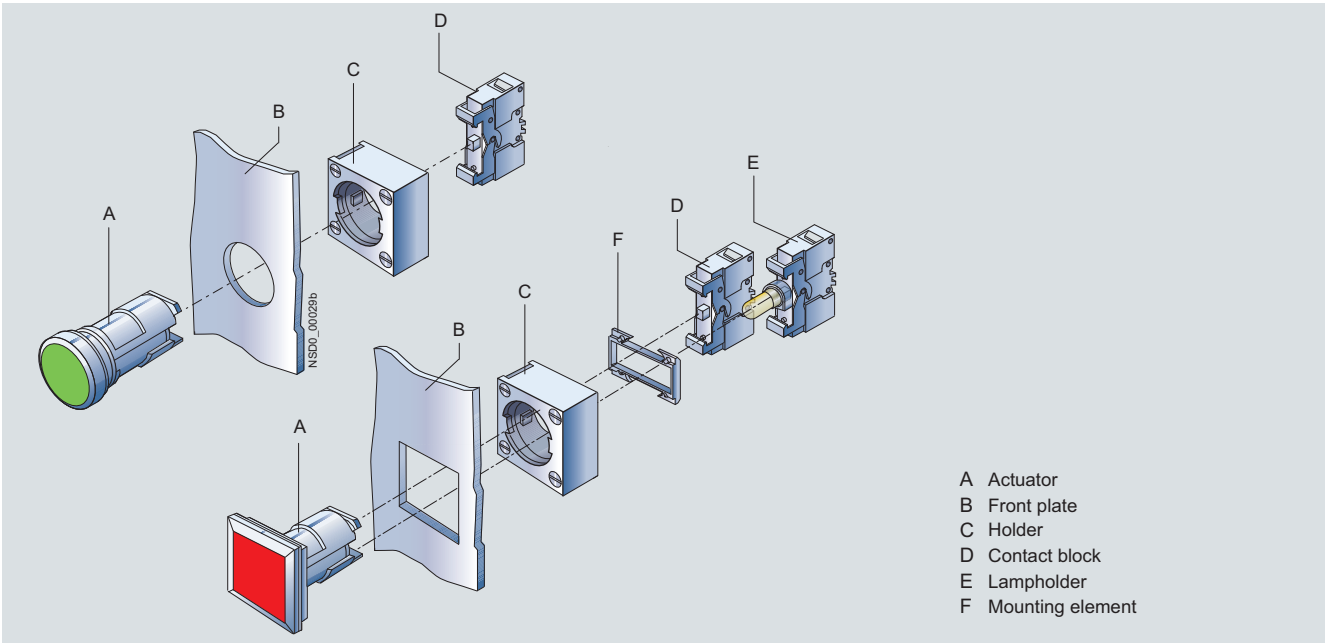


# 3SB3 Pushbuttons and Indicator Lights, 22 mm

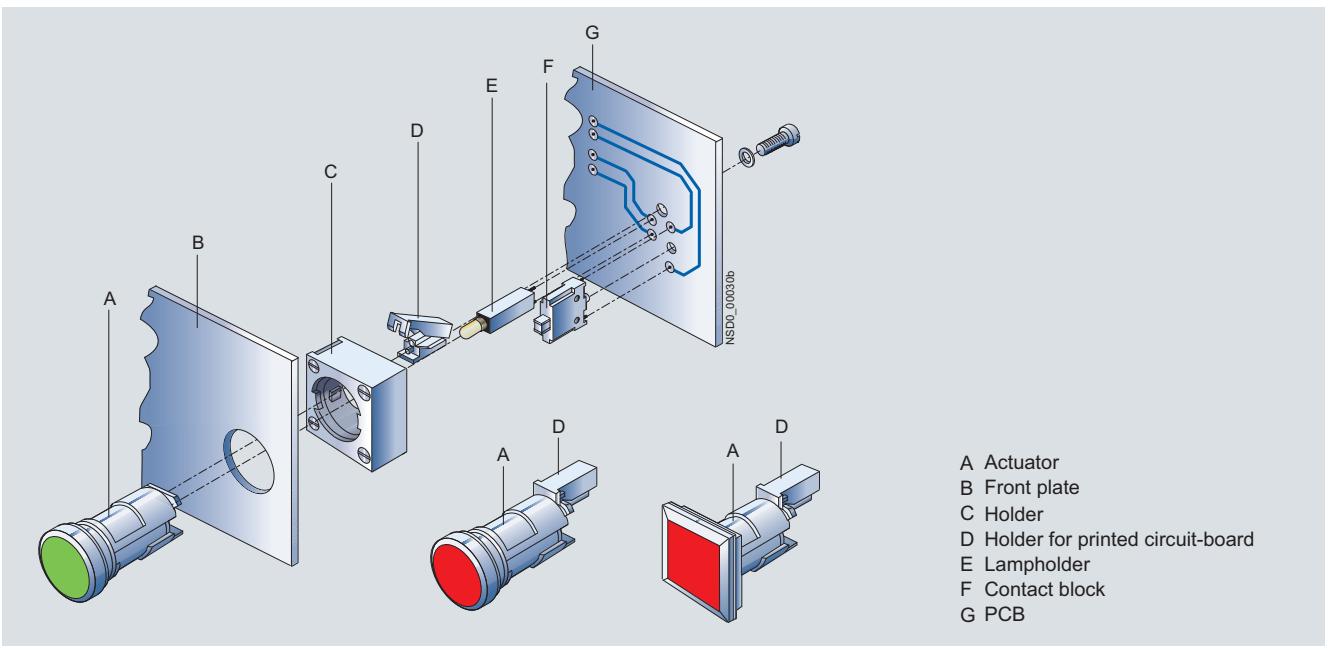
## General data

### Overview

#### Front plate mounting



#### Use on printed circuit boards



# 3SB3 Pushbuttons and Indicator Lights, 22 mm

## General data

### Design

The 3SB3 series is a modular range of commanding and signaling devices for front panel mounting and rear conductor connection. As an alternative, individual elements can also be supplied for use on printed circuit boards. Complete units are offered for the most commonly used applications.



The 3SB3 series is available:

- Made of molded plastic in flat, round and square design
- Made of metal in round design.

The devices are of modern industrial design and can be mounted rapidly by a single person. The operating surfaces of the pushbuttons and illuminated pushbuttons are concave. The lenses of the indicator lights are convex.

The metal version with a high degree of protection according to IP67 and NEMA 4 is available for the world market.

One command point comprises:

- An actuator or lens assembly in front of the control panel
- A holder for mounting behind the control panel
- Up to 3 contact blocks and/or 1 lampholder behind the control panel
- A comprehensive range of accessories for inscription

Two contact blocks can be snapped onto the actuator in the standard version.

When three contact blocks or illuminated actuators are required, an additional holder must be plugged onto the actuator from the rear.

- 3SB39 01-0AB holder for 3 contact blocks or for 2 contact blocks and 1 lampholder
- 3SB39 01-0AC holder with pressure plates for actuating a central contact block when using a selector switch, key-operated switch and twin pushbutton with 3 contact blocks.

For illuminated pushbuttons, illuminated switches and illuminated selector switches the holder is included in the scope of supply as standard.

### Standards

IEC 60947-1, EN 60947-1.

IEC 60947-5-1, EN 60947-5-1,

IEC 60947-5-5, EN 60947-5-5  
for EMERGENCY-STOP mushroom pushbuttons.




**"Intrinsic safety" type of protection EEx i according to ATEX directive 94/9/EC**

The pushbuttons and indicator lights in round design can also be used in hazardous areas. The 3SB34 ..-0. contact blocks and the 3SB34 ..-1A lampholders (with 3SB39 01-1.A LED lamp) with screw terminals or spring-type terminals can be used.

See Catalog LV 1, Chapter 20 "Appendix" --> "Standards and approvals" --> "Type overview of approved devices for potentially explosive areas (ATEX explosion protection)".

### Connection methods

The devices are available with screw terminals (box terminals), spring-type terminals or solder pins.

-  Screw terminals
-  Spring-type terminals
-  Solder pin connections

These connections are indicated in the Technical specifications by orange backgrounds.

# 3SB3 Pushbuttons and Indicator Lights, 22 mm

## General data

### Design

#### Holder

The holders are used for mounting the actuating or signaling elements and are plugged into the rear of the front plate.

The holder for the round versions is set to a control panel thickness of 1 to 4 mm when delivered and is placed in the direction of the arrow  $\uparrow$  1–4 mm  $\uparrow$  on the actuator/indicator from the back. The fixing screw is located underneath, on the right.

For a switchboard thickness of 3 to 6 mm, the holder is reversed and mounted in the direction of the arrow  $\uparrow$  3–6 mm  $\uparrow$  and the fixing screw is located on the upper right. In this case, the fixing screw must be rotated anticlockwise to its limit before mounting the holder.

The control panel thickness of 1 to 4 mm can be compensated with the holder for the square version.

When label holders, protective caps or similar accessories are used, the greatest permissible control panel thickness must be reduced by the wall thickness of the accessory part.

#### Contact blocks and lampholders

The contact blocks are fitted with a slow-action contact (1 NO contact or 1 NC contact) with double operating contacts. These ensure a high switching reliability even with small voltages and currents, such as 5 V/1 mA. They are suitable for use in solid-state systems as well as conventional controls.

The switch contacts of the NC contact are positively driven.

For illuminated elements, lampholders with an integrated LED or with a base for replaceable bulbs can be supplied.

Contact blocks and lampholders feature terminal designations according to EN 50013.

#### Mounting

The 3SB3 devices can be easily and quickly mounted:

- Actuators or indicator lights are positioned in the opening of the front panel from the front
- Position the holder from the rear
- Tighten the screw on the holder
- Snap on the contact block or the lampholder directly onto the actuator from the back

#### Connection methods

The following devices are available:

- Screw terminal (box terminals)
- Spring-type terminals or
- Solder connections (0.8 mm × 0.8 mm solder pins)

The devices with screw terminals have open terminals, screws that cannot be lost, funnel-shaped cable entries and screwdriver fed openings, all of which saves time when connecting and enables the use of motorized screwdrivers.

The devices with spring-type terminals can be connected quickly and tightly, and when single-pole blocks are used the command point can be butt-mounted.

#### Inscriptions

Direct inscription using a laser or by means of insert labels or name plates.

For applications requiring less robustness there is the Label Designer software and corresponding labels. The user can use these to create his own inscriptions with text or symbols.




#### Enclosure

Plastic and metal enclosures with 1, 2, 3, 4 or 6 command points are available for the round design. Enclosures with more than 6 command points can be supplied upon request. They are suitable for the round and square design.

### Contact assignment

	For one contact block with 2 contacts, e. g. 1 NO + 1 NC	For two contact blocks with 1 contact each, e. g. 1 NO, 1 NC	For 2 contact blocks with 2 contacts each, e. g. 1 NO + 1 NC, 1 NO + 1 NC	For one contact block with 2 contacts, e. g. 1 NO + 1 NC and one lampholder
Holder	1 - 4 mm			
<ul style="list-style-type: none"> <li>• Fixing depth</li> <li>• Depth for contact blocks with 1 contact</li> <li>• Depth for contact blocks with 2 contacts</li> </ul>				
Holder for 3 elements				
Contact blocks, lampholders				

### Technical specifications

Type		3SB34 00-0, 3SB34 20-0	3SB14 00-0J	3SB34 00-1, 3SB34 20-1	3SB34 03-0, 3SB34 23-0	3SB34 03-1, 3SB34 23-1	3SB34 11-0	3SB34 11-1
<b>Contact blocks and lampholders</b>								
<b>Standards</b>		IEC 60947-5-1, IEC 60947-5-5, EN 60947-5-1, EN 60947-5-5						
<b>Connection type</b>		 Screw terminals			 Spring-type terminals		 Solder pins	
<b>Rated insulation voltage <math>U_i</math></b>	V	400		250	400		250	60
For degree of pollution acc. to IEC 60947-1		Class 3			Class 3		Class 3	
<b>Rated impulse withstand voltage <math>U_{imp}</math></b>	kV	4		4	4	4	4	1.5
<b>Conventional thermal current <math>I_{th}</math></b>	A	10		--	10	--	10	--
<b>Rated operational current <math>I_e</math> for rated operational voltage <math>U_e</math></b>								
• Alternating current 50/60 Hz, AC-12								
- At $U_e = 24$ V	A	10		--	10	--	10	--
- At $U_e = 48$ V	A	10		--	10	--	10	--
- At $U_e = 110$ V	A	10		--	10	--	10	--
- At $U_e = 230$ V	A	10		--	10	--	10	--
- At $U_e = 400$ V	A	10		--	10	--	--	--
• Alternating current 50/60 Hz, AC-15								
- At $U_e = 24$ V	A	6		--	6	--	4	--
- At $U_e = 48$ V	A	6		--	6	--	4	--
- At $U_e = 110$ V	A	6		--	6	--	4	--
- At $U_e = 230$ V	A	6		--	6	--	4	--
- At $U_e = 400$ V	A	3	4	--	3	--	--	--
• Direct current DC-12								
- At $U_e = 24$ V	A	10	10	--	10	--	10	--
- At $U_e = 48$ V	A	5	--	--	5	--	5	--
- At $U_e = 110$ V	A	2.5	2	--	2.5	--	2.5	--
- At $U_e = 230$ V	A	1	0.5	--	1	--	1	--
• Direct current DC-13								
- At $U_e = 24$ V	A	3	5	--	3	--	3	--
- At $U_e = 48$ V	A	1.5	--	--	1.5	--	1.5	--
- At $U_e = 110$ V	A	0.7	0.5	--	0.7	--	0.7	--
- At $U_e = 230$ V	A	0.3	0.2	--	0.3	--	0.3	--
<b>Contact stability</b>								
• Test voltage	V	5		--	5	--	5	--
• Test current	mA	1		--	1	--	1	--
<b>Lampholders</b>		--		BA 9s	--	BA 9s	--	Wedge bases
<b>Lamps</b>		--		Incandescent lamps, glow lamps and LED lamps	--	Incandescent lamps, glow lamps and LED lamps	--	Incandescent lamps and LED lamps
<b>Short-circuit protection, weld-free, acc. to IEC 60947-5-1</b>								
• DIAZED fuse links, operational class gG acc. to IEC 60269-3-1		Dz10 A						
• DIAZED fuse links, quick acc. to DIN VDE 0635		Dz 16 A						
• Miniature circuit breaker with C characteristic acc. to IEC 60898	A	10						
<b>Mechanical endurance</b>		$10 \times 10^6$ operating cycles						
<b>Electrical endurance</b>		$10 \times 10^6$ operating cycles						
• For operational class AC-15 with 3RT10 15 to 3RT10 26 contactors		$10 \times 10^6$ operating cycles						
• With operational class DC-12, DC-13		With direct current, the contact endurance depends not only on the breaking current but also on the operational voltage, the circuit inductance and the speed of switching.						
<b>Switching frequency</b>	1/h	1000 operating cycles						
<b>Degree of protection acc. to IEC 60529</b>								
• Terminals		IP20				IP40		--
• Contact chambers		IP40			--	IP40		--
<b>Touch protection acc. to EN 50274 and BGV A3</b>		Finger-safe			Finger-safe		--	
<b>Conductor cross-sections<sup>1)</sup></b>								
• Finely stranded, without end sleeves	mm <sup>2</sup>	--			2 × (0.25 ... 1.5)		--	
• Finely stranded, with end sleeves acc. to DIN 46228	mm <sup>2</sup>	2 × (0.5 ... 1.5)			2 × (0.25 ... 0.75)		--	
• Solid	mm <sup>2</sup>	2 × (1 ... 1.5)			2 × (0.25 ... 1.5)		--	
• Solid, with end sleeves acc. to DIN 46228	mm <sup>2</sup>	2 × (0.5 ... 0.75)			--		--	
• AWG cables, solid or stranded		2 × AWG 18 ... 14			2 × AWG 24 ... 16		--	
<b>Tightening torque, terminal screw</b>	Nm	0.8			--		--	
<b>Solder pins</b>	mm <sup>2</sup>	--			--		0.8 × 0.8	

1) For standard screwdriver size 2 or Pozidriv 2.

# 3SB3 Pushbuttons and Indicator Lights, 22 mm

## General data

Type	3SB34 00-0, 3SB34 20-0	3SB34 00-1, 3SB34 20-1	3SB34 03-0, 3SB34 23-0	3SB34 03-1, 3SB34 23-1	3SB34 11-0	3SB34 11-1
<b>Data acc. to UL and CSA</b>						
<b>Rated operational voltage</b>	V AC 300	--	300	--	300	--
<b>Conventional thermal current (uninterrupted current)</b>	A 10	--	10	--	10	--
<b>Switching capacity</b>	A 300, R 300, A 600 same polarity					
<b>Rated voltage (lamps)</b>						
• Lamp with BA 9s base	V AC --	125	--	125	--	--
• Lamp with wedge base	V AC --	60	--	60	--	60
• Lampholders with integrated LED	V --	24 AC/DC, 110 AC, 230 AC	--	24 AC/DC, 110 AC, 230 AC	--	--
<b>Rated power (lamps)</b>	W --	2.5	--	2.5	--	1

Type	3SB30, 3SB32, (3SB31)	3SB31, 3SB33	3SB35, 3SB36
<b>Actuators and indicators</b>			
<b>Enclosure material</b>	Plastic		Metal
<b>Design</b>	Round	Square	Round
<b>Terminal designation</b> acc. to EN 50013	Identification number on the holder, function digit on the contact block		
<b>Device identification</b>	Snap-on label		
<b>Tightening torques</b>			
• Screw on holder	Nm Max. 1		
<b>Mechanical endurance</b>			
• Pushbuttons	10 × 10 <sup>6</sup> operating cycles		
• Illuminated pushbuttons	3 × 10 <sup>6</sup> operating cycles		
• Actuators, rotary or maintained contact	3 × 10 <sup>5</sup> operating cycles		
• Key-operated switch with key monitoring	1 × 10 <sup>5</sup> operating cycles		
<b>Switching frequency</b>	1/h	1000 operating cycles	
<b>Climatic withstand capability</b> acc. to EN ISO 6270-2	Climate-proof KTW24; suitable for marine applications		
<b>Ambient temperature</b>			
• During operation, non-illuminated and with LED	°C	-25 ... +70	
• During operation, devices with incandescent lamp	°C	-25 ... +60	
• During storage, transport	°C	-40 ... +80	
<b>Degree of protection</b> acc. to IEC 60529			
• Actuators and indicators, standard	IP66	IP65	IP67 and NEMA Type 4
- With protective caps	IP67	IP67	--
• Key-operated switch with key monitoring	IP54	--	--
• Twin pushbuttons (3SB31)	IP65	--	--
<b>Protective measures</b>	Protective measures are met automatically when the actuators and lens assemblies are mounted on metal front plates and enclosures.  When mounted in insulated enclosures, the "total insulation" protective measures are met.		Grounding is necessary for operation with protective extra-low voltage (PELV).
<b>Shock resistance</b> acc. to IEC 60068-2-27 For half-sine shock type, 11 ms shock duration			
• Devices without incandescent lamp	≤50 g		
• Devices with incandescent lamp	≤30 g		
<b>Vibration resistance</b> acc. to IEC 60068-2-6			
• Acceleration at frequency 20 ... 200 Hz	5 g		

Type	3SB38 0.-0, 3SB38 0.-1	--	3SB38 0.-2, 3SB38 0.-3
<b>Enclosure</b>			
<b>Enclosure material</b>	Plastic		Metal
<b>Actuators and indicators</b>	Plastic, round		Metal, round
<b>Degree of protection</b> acc. to IEC 60529	IP65		IP67 and NEMA Type 4
<b>Resistance to extreme climates</b> acc. to DIN 50017	KTW 24		KTW 24

### Overview



Enclosed pushbuttons and indicator lights are used as hand operated control devices for separately allocated control units and cabinets. The devices are suitable for use in any climate.

Enclosures with handle are available for suspension (e. g. for crane control units).

The enclosed pushbuttons and indicator lights are available with conventional controls as well as for connection to the AS-Interface bus system.

The following versions are available:

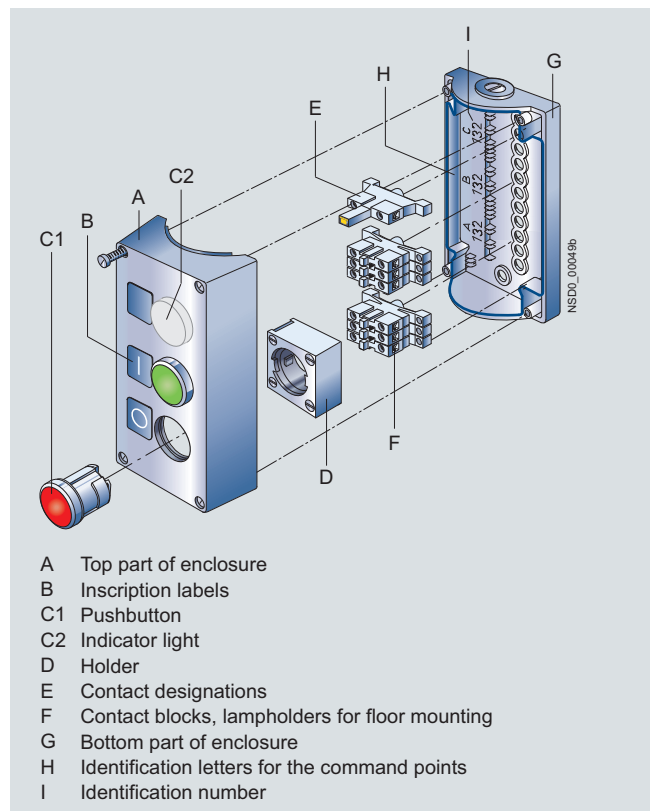
- Enclosure with standard fittings with 1 to 3 command points
- Enclosure with customized equipment with 1 to 6 command points
- Empty enclosures (individual parts must be ordered separately).

#### Customer-specific enclosures

On request enclosures with more than 6 command points can also be supplied with AS-Interface connection.

For fully equipped AS-Interface enclosures, see Catalog IK PI.

#### Enclosures with standard fittings



- A Top part of enclosure
- B Inscription labels
- C1 Pushbutton
- C2 Indicator light
- D Holder
- E Contact designations
- F Contact blocks, lampholders for floor mounting
- G Bottom part of enclosure
- H Identification letters for the command points
- I Identification number

#### Standards

IEC 60947-5-1 (VDE 0660 Part 200).

## Enclosures

### General data

#### Design

##### *Enclosure*

Plastic and metal enclosures with 1, 2, 3, 4 or 6 command points are available. The mounting holes are located external to the terminal compartment.

Cable routing: on the top and bottom narrow ends of the enclosure for an M20 or M25 metric cable gland.

Enclosure color:

- Cover: RAL 7035 (light gray),
- For EMERGENCY-STOP: RAL 1004 (yellow),
- Base: RAL 9005 (black).

The plastic enclosures comply with the "total insulation" protective measure.

##### *Actuators*

Round actuators and lens assemblies for a nominal diameter of 22 mm can be used.

The actuators are fitted through the hole in the cover of the enclosure and are connected to the holder supplied with the actuator and secured in position.

Plastic enclosures are equipped as standard with actuators and indicators made of plastic, metal enclosures are equipped with actuators and indicators made of metal.

##### *Contact blocks and lampholders*

Contact blocks and lampholders for floor mounting are snapped into the bottom part of the enclosure. For each command points, the following components can be fitted:

- 3 contact blocks or
- 2 contact blocks + 1 lampholder or lampholder with integrated voltage reducer.

The contact blocks have moving double-break contacts and therefore a high contact stability, i. e. they are also suitable for operation in solid-state controls. Function numbering is shown on the contact block.

Single-pole contact blocks and lampholders for front plate mounting can also be used.



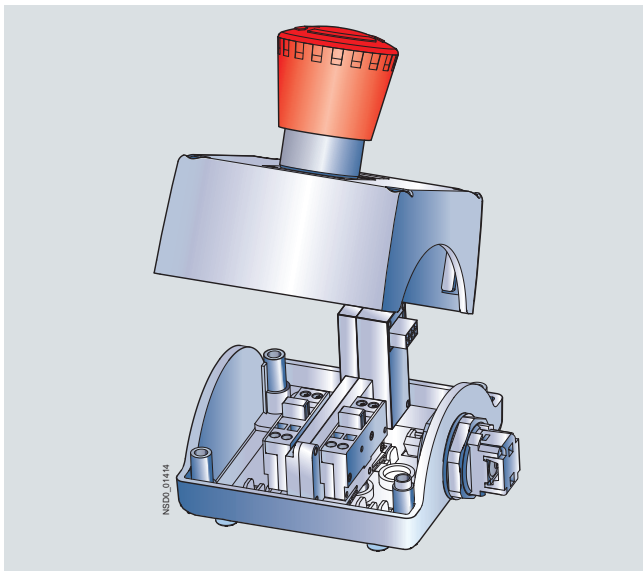
# 3SB3 Pushbuttons and Indicator Lights, 22 mm AS-Interface Enclosures

General data

## Overview



Distributed command devices of the 3SB3 series can be quickly connected to the AS-Interface using AS-Interface enclosures. Using suitable components you can make your own enclosures with integrated AS-Interface or flexibly modify existing enclosures.



EMERGENCY-STOP enclosures

### Equipment

The enclosures with integrated AS-Interface are equipped with contact blocks and LED lampholders with spring-type connections from the 3SB3 series along with the slave(s) required to connect the contact blocks and lampholders to AS-Interface.

AS-Interface modules, cable sets and a connection element are required in addition to connect the contact blocks and LED lampholders.

### Installation of AS-Interface slaves

The following slave types are available for connecting the command points:

- Slave in A/B technology with 4 inputs and 3 outputs
- Slave with 4 inputs and 4 outputs
- F slave with 2 safe inputs for EMERGENCY-STOP

The following table shows the maximum number of equippable slaves:

Enclosures for	Number of slaves for enclosures without EMERGENCY STOP	Number of slaves for enclosures with EMERGENCY STOP
1 command point	Not available	1x F slave
2 command points	1 x slave 4I/4O or 4I/3O	Not available
3 command points	1 x slave 4I/4O or 4I/3O	1 x slave 4I/4O or 4I/3O + 1 x F slave
4 command points	2 x slave 4I/4O or 4I/3O <sup>1)</sup>	2 x slave 4I/4O or 4I/3O + 1 x F slave <sup>1)</sup>
6 command points	2 x slave 4I/4O or 4I/3O	2 x slave 4I/4O or 4I/3O + 1 x F slave

1) For metal enclosures with 4 command points, only 1 x slave 4I/4O or 4I/3O is possible.

### Connection

One set of links is required in each case to connect a slave to contact blocks, to lampholders and to the connection element.

The connection elements are mounted in the front-end cable glands and are used for connection of the AS-Interface or for bringing unused inputs or outputs out of the enclosure.

For connection to the AS-Interface bus there is a choice of the following options:

- Terminal for shaped AS-Interface cable. The cable is contacted by the insulation piercing method and routed past the enclosure on the outside (possible only with plastic enclosure).
- Cable gland for the shaped AS-Interface cable or round cable. The cable is routed into the enclosure (preferable for metal enclosure).
- Connection using M12 plug.

If less than all inputs/outputs of the installed slaves in an enclosure are used for connecting the command devices, free inputs and outputs can be routed on request to the outside through an M12 socket on the top or bottom side of the enclosure.

To supply inputs with power, the S+ connection of the must be assigned to the socket, for outputs the OUT- connection must be assigned.

Addressing is performed using the AS-Interface connections or the integrated addressing socket. An external power supply is not required.

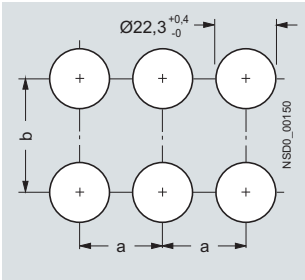
# 3SB3 Pushbuttons and Indicator Lights, 22 mm

## Project planning aids

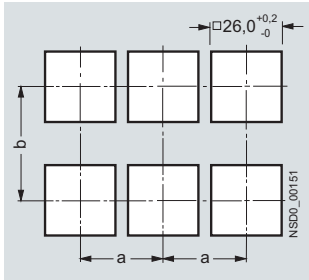
### Dimensional drawings

#### Mounting dimensions

##### Round version



##### Square version



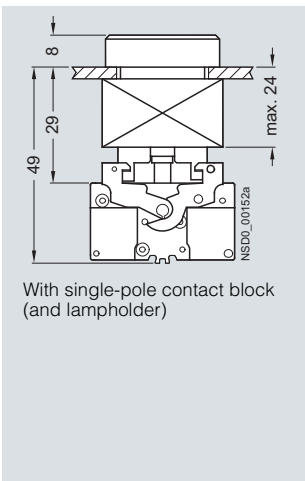
##### Minimum spacing

	a	b
Contact blocks (1 contact) and lampholder		
• For front plate mounting, with screw terminals	30 <sup>1)</sup>	45
• For front plate mounting, with spring-type terminals	30 <sup>1)</sup>	30 <sup>1)</sup>
• For use on PCB, with solder pin connections	30 <sup>1)</sup>	30 <sup>1)</sup>
Contact blocks with 2 contacts		
• For front plate mounting	30 <sup>1)</sup>	50
When using holders for inscription labels		
• 12.5 mm × 27 mm	30 <sup>1)</sup>	45 <sup>2)</sup>
• 27.0 mm × 27 mm	30 <sup>1)</sup>	60

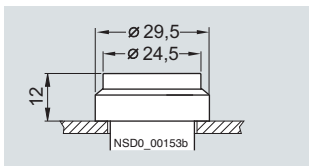
1) For mushroom pushbutton, EMERGENCY-STOP and push-pull button:  
Note mushroom diameter d = 40 mm or 60 mm.  
2) 60 mm with contact blocks having two contacts.

#### Molded-plastic version, round

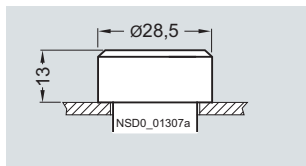
**Pushbutton, pressure switch, illuminated pushbutton or illuminated pressure switch with flat button**



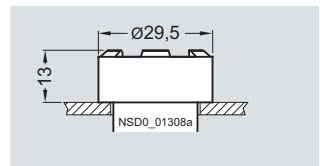
**Pushbutton or illuminated pushbutton with raised button**



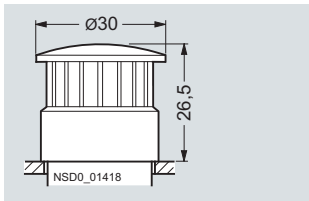
**Pushbutton with raised front ring**



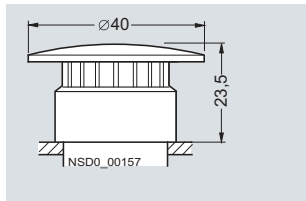
**Pushbutton with raised front ring, castellated**



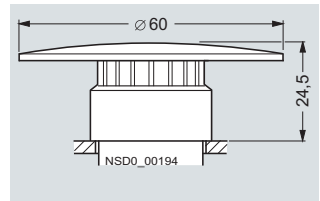
**Mushroom pushbutton, illuminated mushroom pushbutton, push-pull button or illuminated push-pull button, <math>\varnothing 30</math> mm**



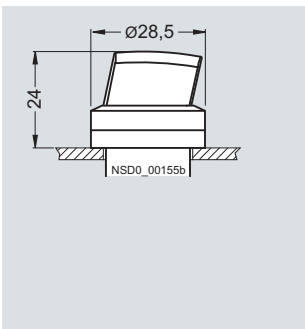
**Mushroom pushbutton, illuminated mushroom pushbutton, push-pull button or illuminated push-pull button, <math>\varnothing 40</math> mm**



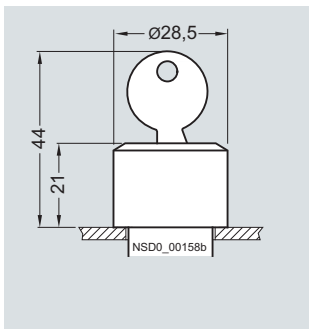
**Mushroom pushbutton, illuminated mushroom pushbutton, push-pull button or illuminated push-pull button, <math>\varnothing 60</math> mm**



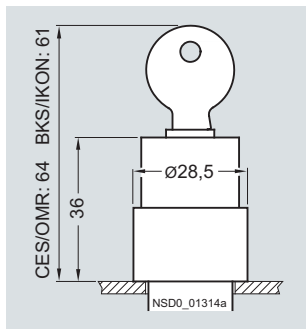
**Selector switch or illuminated selector switch**



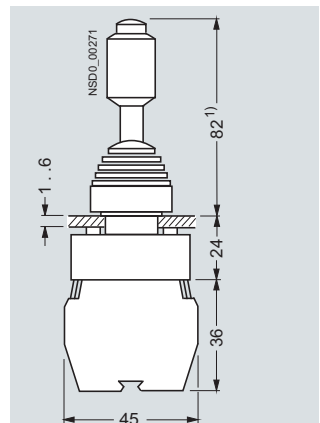
**RONIS key-operated switch**



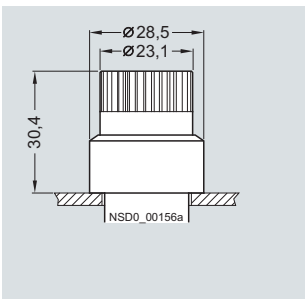
**BKS, CES, O.M.R. key-operated switch**



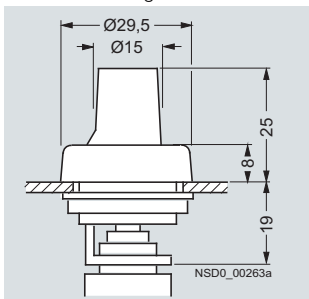
**Coordinate switch**



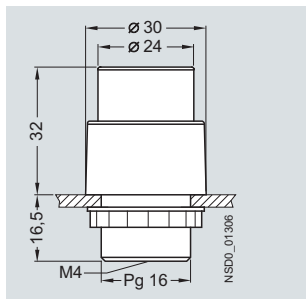
**Pushbutton with raised button, latchable**



**Potentiometer drive with shaft <math>\varnothing 6</math> mm, 30 ... 32 mm long**



**Pushbutton with extended stroke**



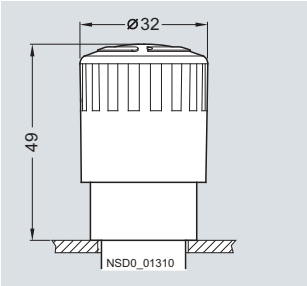
1) 82 with mechanical interlock, 77 without mechanical interlock.

# 3SB3 Pushbuttons and Indicator Lights, 22 mm

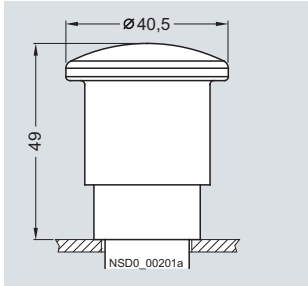
## Project planning aids

### Molded-plastic version, round

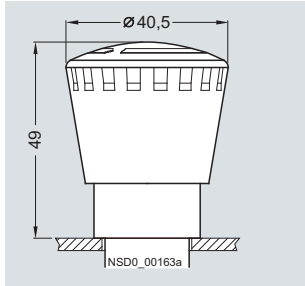
**EMERGENCY-STOP mushroom pushbutton,**  
 Ø 32 mm, with rotate-to-unlatch mechanism



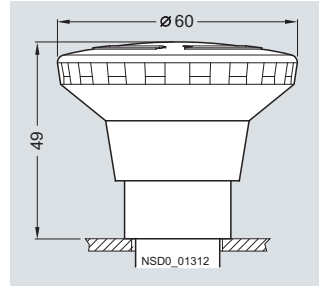
**EMERGENCY-STOP mushroom pushbutton,**  
 Ø 40 mm, with pull-to-unlatch mechanism



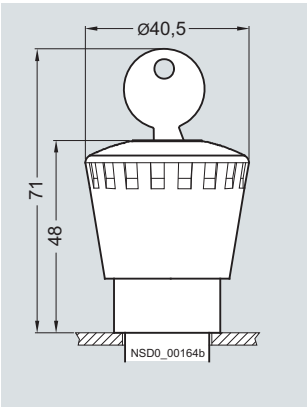
**EMERGENCY-STOP mushroom pushbutton,**  
 Ø 40 mm, with rotate-to-unlatch mechanism



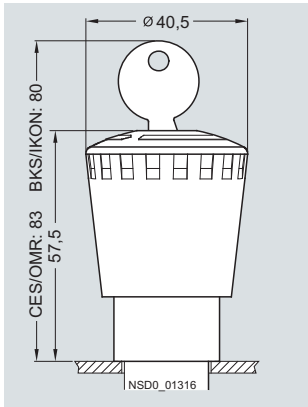
**EMERGENCY-STOP mushroom pushbutton,**  
 Ø 60 mm, with rotate-to-unlatch mechanism



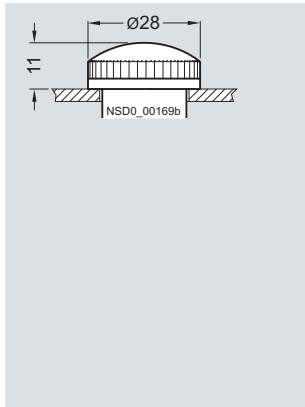
**EMERGENCY-STOP mushroom pushbutton**  
 with RONIS lock



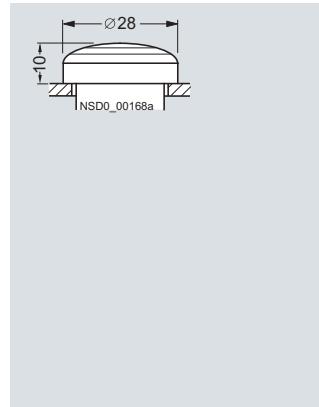
**EMERGENCY-STOP mushroom pushbutton**  
 with BKS, CES, O.M.R. lock



**Indicator light**

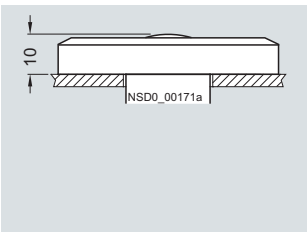


**Acoustic signaling device**

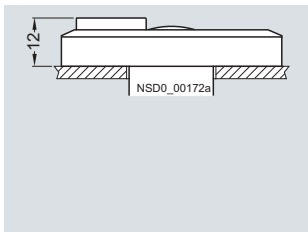


### Twin pushbutton (round feed-through opening)

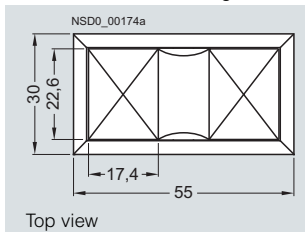
**Twin pushbutton**  
 with flat buttons



**Twin pushbutton**  
 with raised buttons

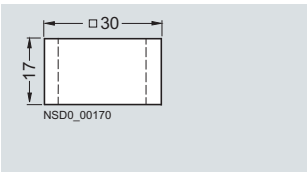


**Twin pushbutton**  
 with or without indicator light

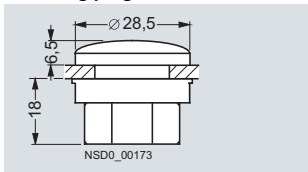


### Accessories for plastic version, round

**Holder**



**Blanking plug**

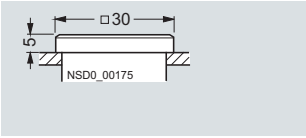


# 3SB3 Pushbuttons and Indicator Lights, 22 mm

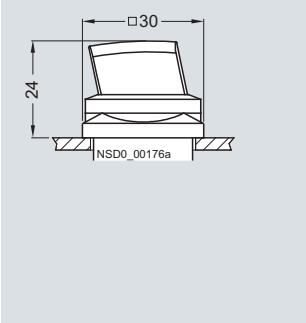
## Project planning aids

### Plastic version, square 26 mm x 26 mm

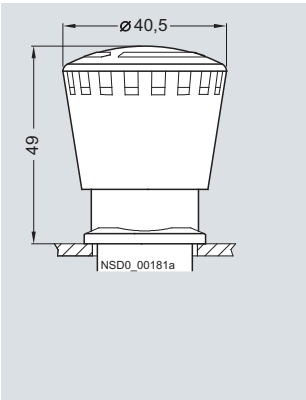
**Pushbutton, pressure switch, illuminated pushbutton or illuminated pressure switch with flat button**



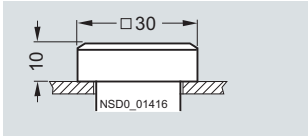
**Selector switch or illuminated selector switch**



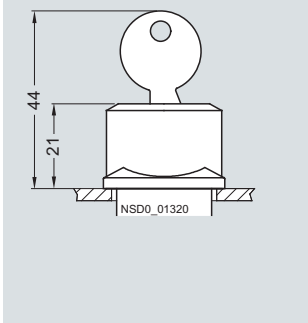
**EMERGENCY-STOP mushroom pushbutton with rotate-to-unlatch mechanism**



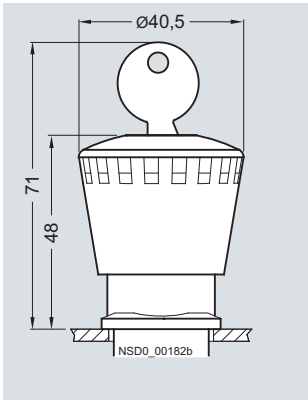
**Pushbutton with raised front ring**



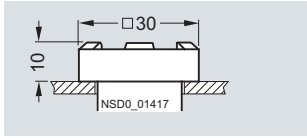
**RONIS key-operated switch**



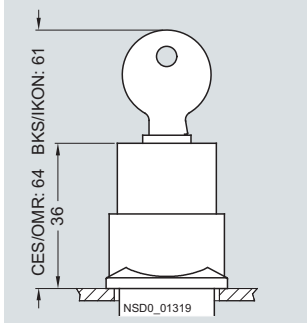
**EMERGENCY-STOP mushroom pushbutton with RONIS lock**



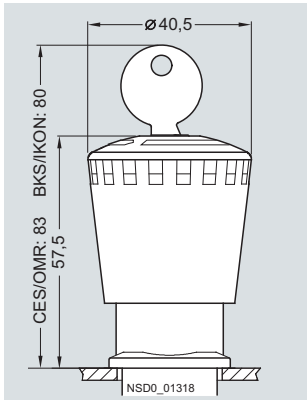
**Pushbutton with raised front ring, castellated**



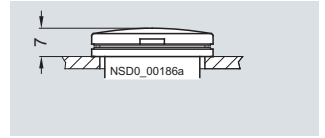
**CES, BKS, O.M.R. key-operated switch**



**EMERGENCY-STOP mushroom pushbutton with BKS, CES, O.M.R. lock**

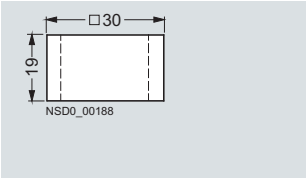


**Indicator light**

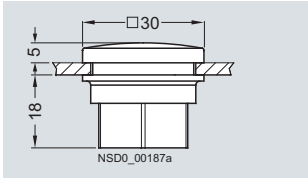


### Accessories for plastic version, square

**Holder**



**Blanking plug**

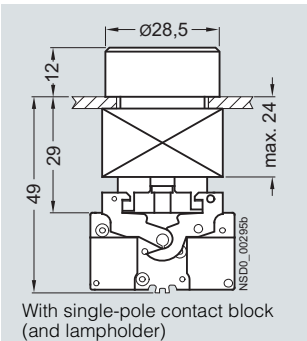


# 3SB3 Pushbuttons and Indicator Lights, 22 mm

## Project planning aids

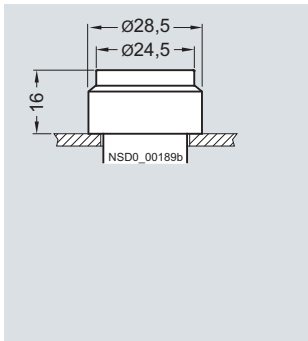
### Metal version, round

**Pushbutton or illuminated pushbutton with flat button**

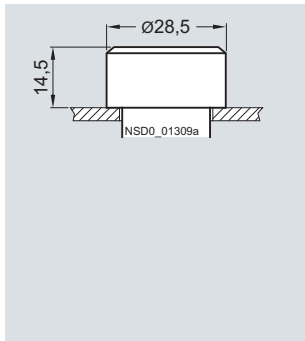


With single-pole contact block (and lampholder)

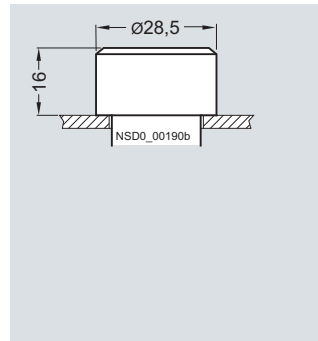
**Pushbutton or illuminated pushbutton with raised button**



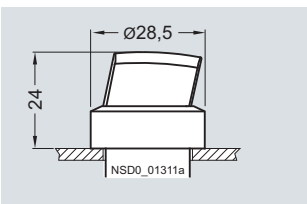
**Pushbutton or illuminated pushbutton, latching, with flat button**



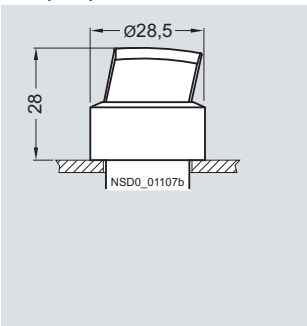
**Pushbutton with raised front ring**



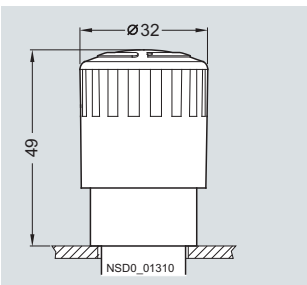
**Selector switch or illuminated selector switch, standard**



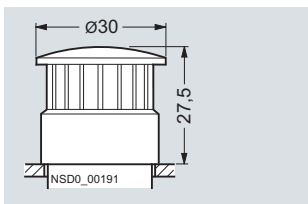
**Selector switch or illuminated selector switch, heavy duty**



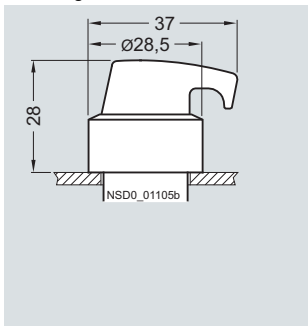
**EMERGENCY-STOP mushroom pushbutton, Ø 32 mm, with rotate-to-unlatch mechanism**



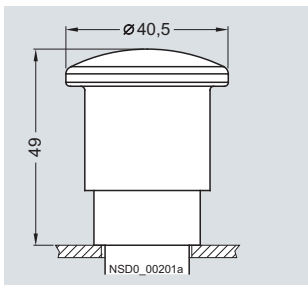
**Mushroom pushbutton, illuminated mushroom pushbutton, push-pull button or illuminated push-pull button, Ø 30 mm**



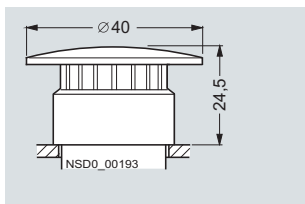
**Selector switch or illuminated selector switch, with long handle**



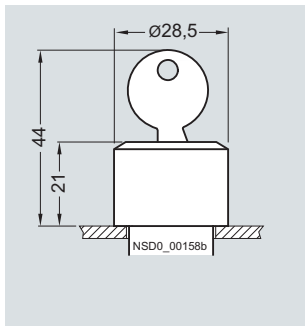
**EMERGENCY-STOP mushroom pushbutton, Ø 40 mm, with pull-to-unlatch mechanism**



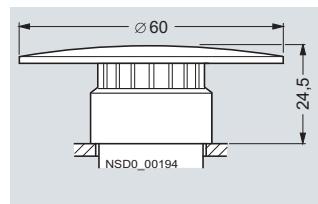
**Mushroom pushbutton, illuminated mushroom pushbutton, push-pull button or illuminated push-pull button, Ø 40 mm**



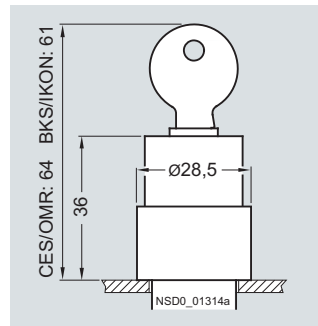
**RONIS key-operated switch**



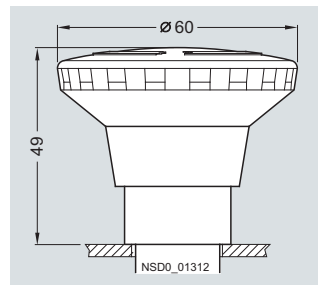
**Mushroom pushbutton, illuminated mushroom pushbutton, push-pull button or illuminated push-pull button, Ø 60 mm**



**BKS, CES, O.M.R. key-operated switch**



**EMERGENCY-STOP mushroom pushbutton, Ø 60 mm, with rotate-to-unlatch mechanism**

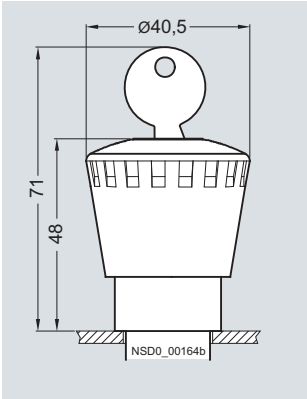


# 3SB3 Pushbuttons and Indicator Lights, 22 mm

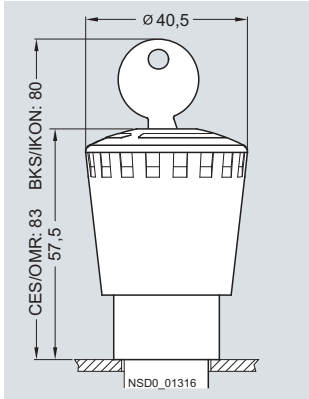
## Project planning aids

### Metal version, round

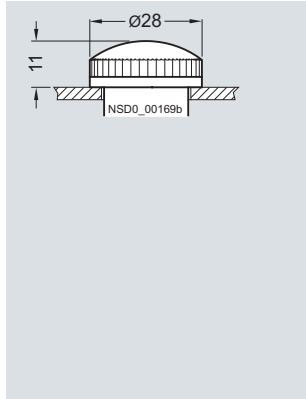
**EMERGENCY-STOP mushroom pushbutton**  
with RONIS lock



**EMERGENCY-STOP mushroom pushbutton**  
with BKS, CES, O.M.R. lock

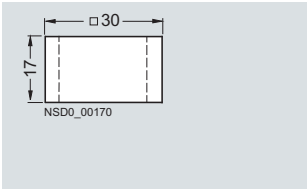


**Indicator light**

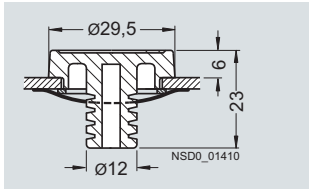


### Accessories for metal version, round

**Holder**



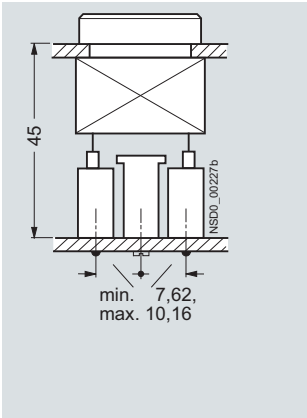
**Blanking plug**



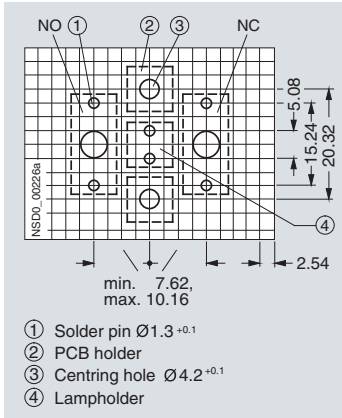
### Contact blocks and lampholders

Blocks with solder pins, for use on PCB

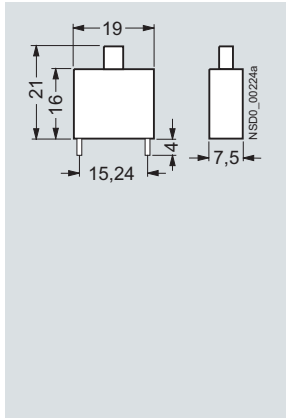
**Pushbutton with contact block with 1 contact and PCB holder**



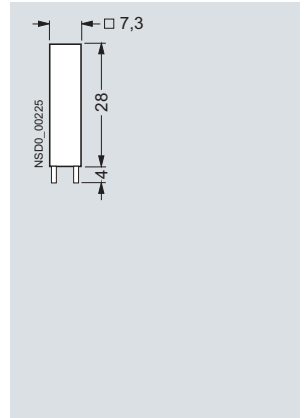
**Solder pin spacing**



**Contact block with 1 contact**



**Lampholder Wedge base W2 x 4.6 d**



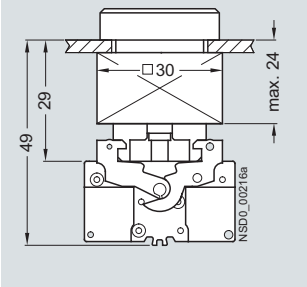
# 3SB3 Pushbuttons and Indicator Lights, 22 mm

## Project planning aids

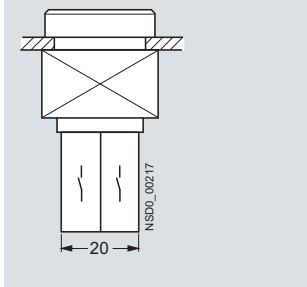
### Contact blocks and lampholders

Blocks with screw terminals for front plate mounting

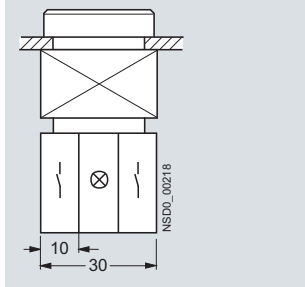
**Pushbutton or illuminated pushbutton with contact blocks with 1 contact**



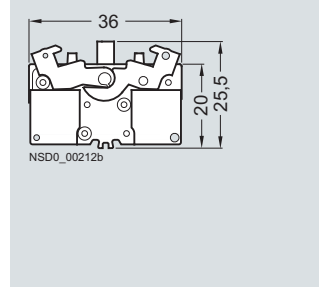
**Pushbutton with contact blocks with 1 contact**



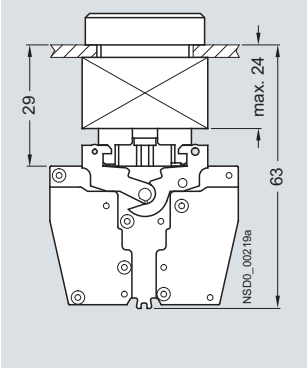
**Illuminated pushbutton with contact blocks with 1 contact and lampholder**



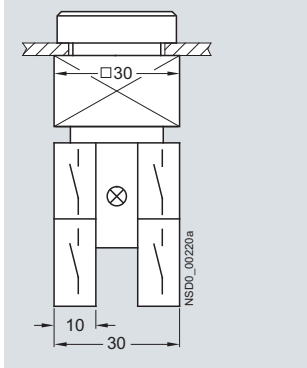
**Contact block with 1 contact**



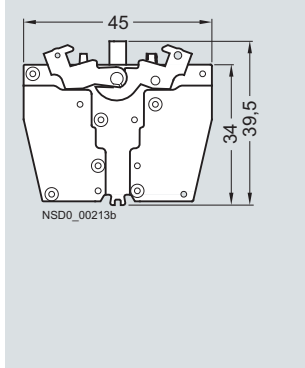
**Pushbutton or illuminated pushbutton with contact blocks with 2 contacts**



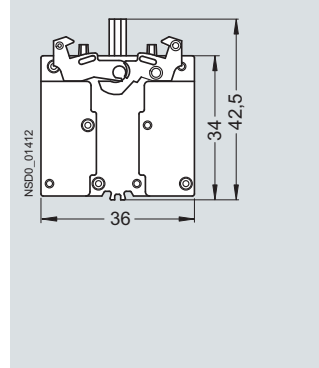
**Illuminated pushbutton with contact blocks with 2 contacts and lampholder**



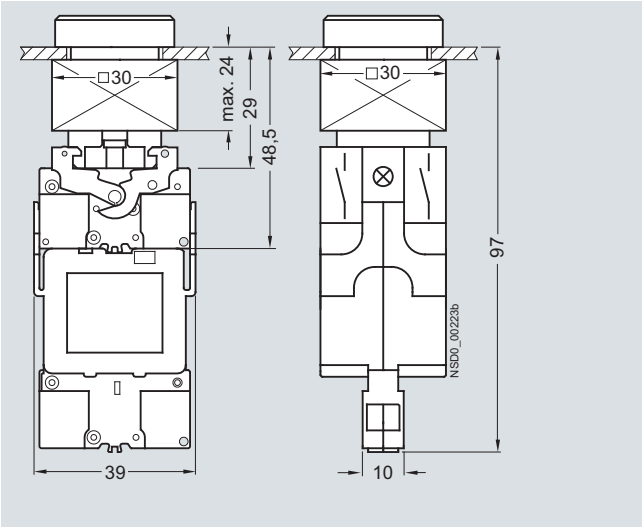
**Contact block with 2 contacts, diode element**



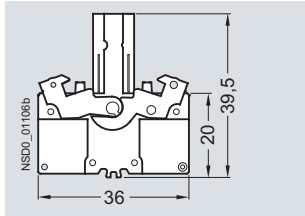
**Contact block with 1 contact and mounting monitoring contact**



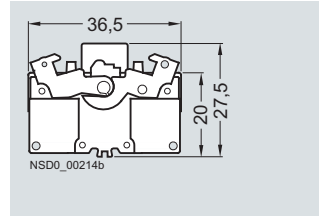
**Illuminated pushbutton with contact blocks with 1 contact and lampholder with snapped-on transformer**



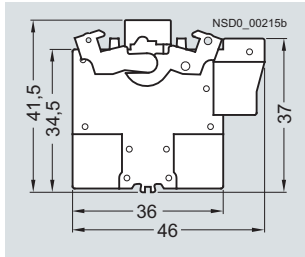
**Lampholder with integrated LED**



**BA 9s lampholder without or with integrated voltage reducer**



**BA 9s lampholder with separate lamp test function**



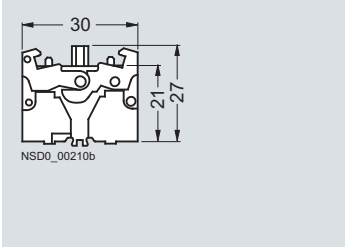
# 3SB3 Pushbuttons and Indicator Lights, 22 mm

## Project planning aids

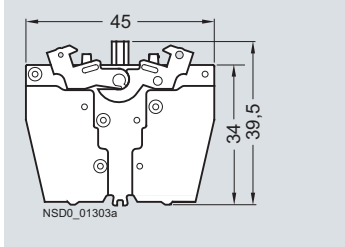
### Contact blocks and lampholders

Blocks with spring-type terminals for front plate mounting

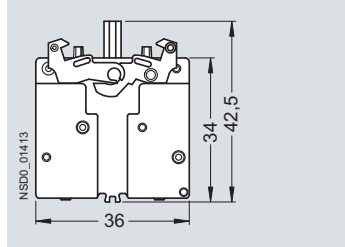
**Contact block with 1 contact**



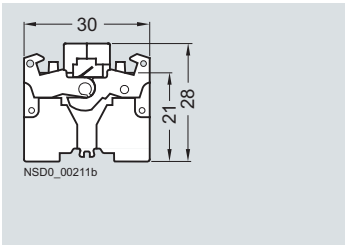
**Contact block with 2 contacts**



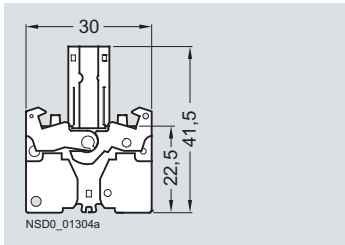
**Contact block with 1 contact and mounting monitoring contact**



**BA 9s lampholder**

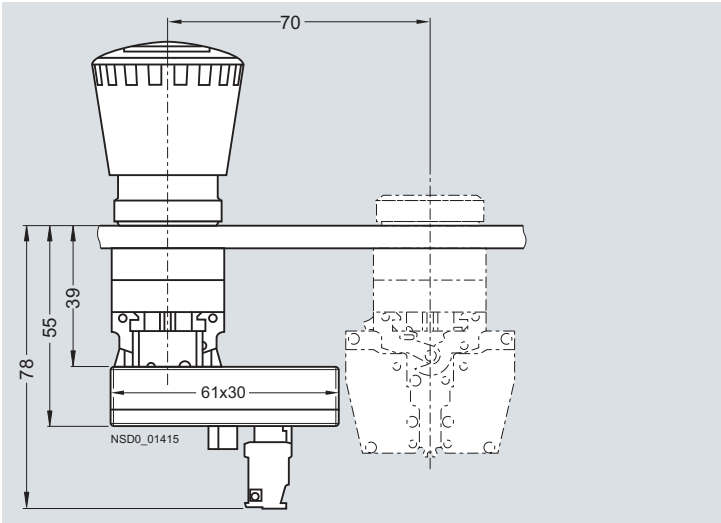


**Lampholder with integrated LED**

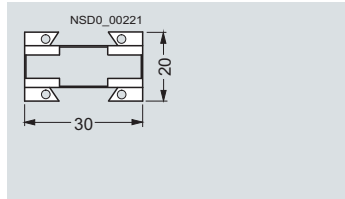


### AS-Interface F adapter · Holder for mounting 3 elements

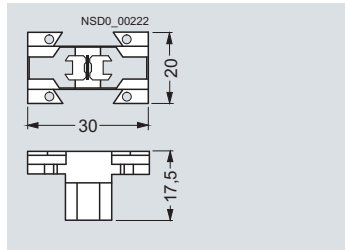
**AS-Interface F adapter for EMERGENCY-STOP mushroom pushbuttons**



**Holder for pushbuttons**

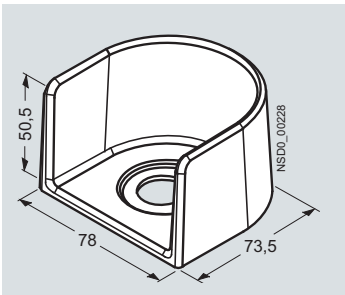


**Holder for selector switch, key-operated switch and twin pushbutton, with pressure plate**

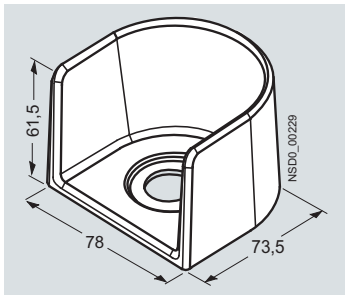


### Accessories for front plates

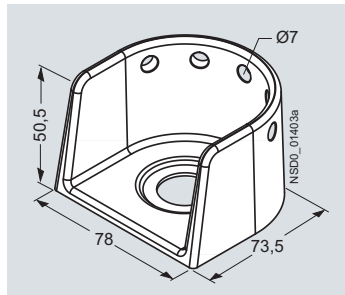
**3SB39 21-0AK, -0AP protective collar**  
For EMERGENCY-STOP mushroom pushbuttons without lock  
For front plate mounting<sup>1)</sup>



**3SB39 21-0AX protective collar**  
For EMERGENCY-STOP mushroom pushbuttons with lock  
For front plate mounting<sup>1)</sup>



**3SB39 21-0CG protective collar**  
For mushroom pushbuttons, for 5 padlocks  
For front plate mounting<sup>1)</sup>

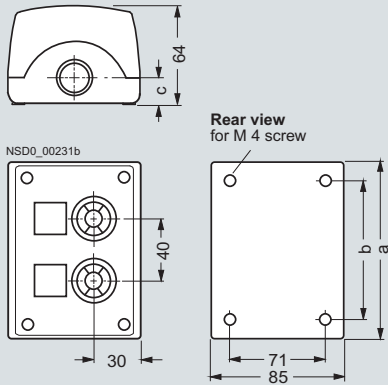


1) Can be used with a front plate thickness up to 4 mm.



## Enclosures

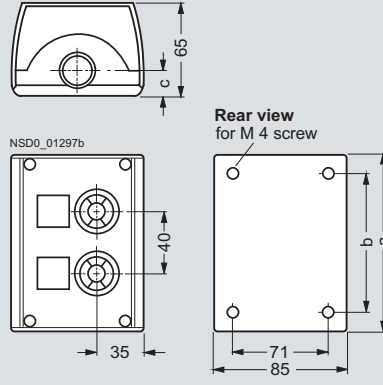
**Enclosure without protective collar, plastic**



top and bottom with knockouts for one gland each

Number of command points	Length a	Distance b	Distance c
1	85	54	17.5
2	114	83	17.5
3	154	123	17.5
4	194	163	17.5
6	280	249	20.5

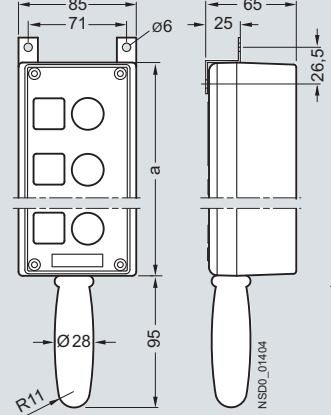
**Enclosure without protective collar, metal**



top and bottom with opening for one gland each

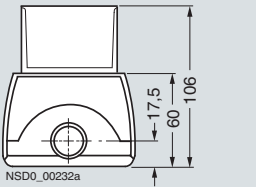
Number of command points	Length a	Distance b	Distance c
1	85	54	21
2	114	83	21
3	154	123	21
4	194	163	21
6	280	249	21

**Enclosure with handle, metal**



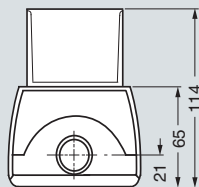
Number of command points	Length a
1	84
2	113
3	154
4	193
6	280

**Enclosure with protective collar, plastic**



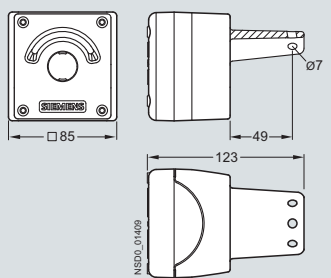
top and bottom with knockouts for one gland each

**Enclosure with protective collar, metal**



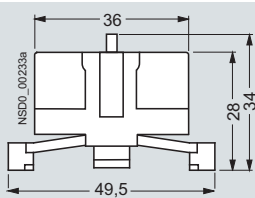
top and bottom with opening for one gland each

**Enclosure with protective collar for 3 padlocks, metal**

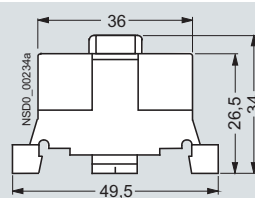


## Blocks with screw terminals for floor mounting

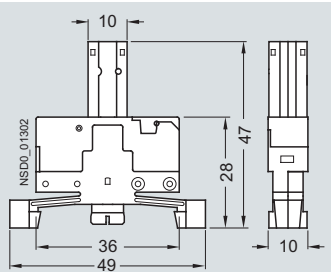
**Contact block with 1 contact**



**BA 9s lampholder without or with integrated voltage reducer**

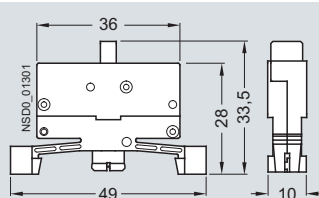


**Lampholder with integrated LED**

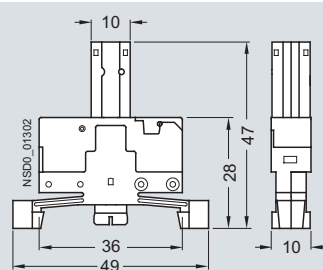


## Blocks with spring-type terminals, for floor mounting

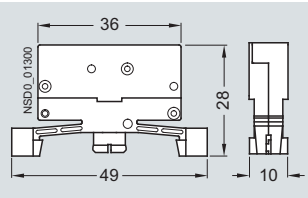
**Contact block with 1 contact**



**Lampholder with integrated LED**



**Fixpoint terminal**

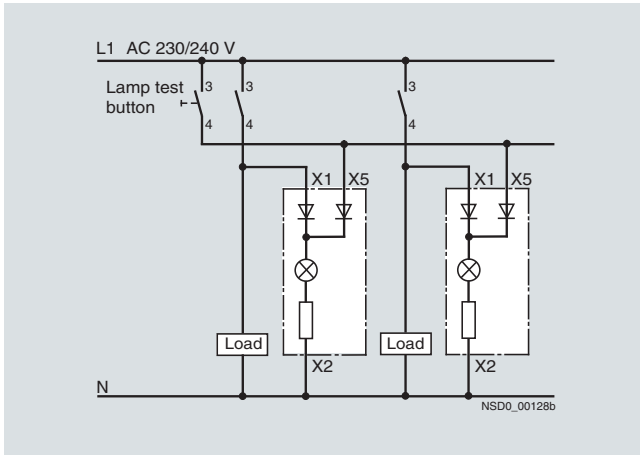


# 3SB3 Pushbuttons and Indicator Lights, 22 mm

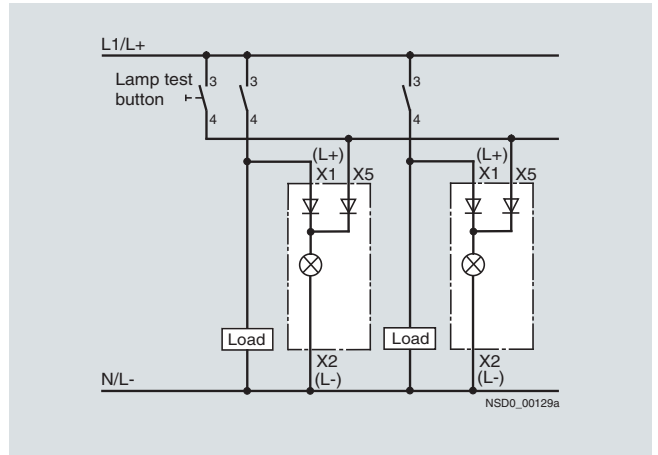
## Project planning aids

### Schematics

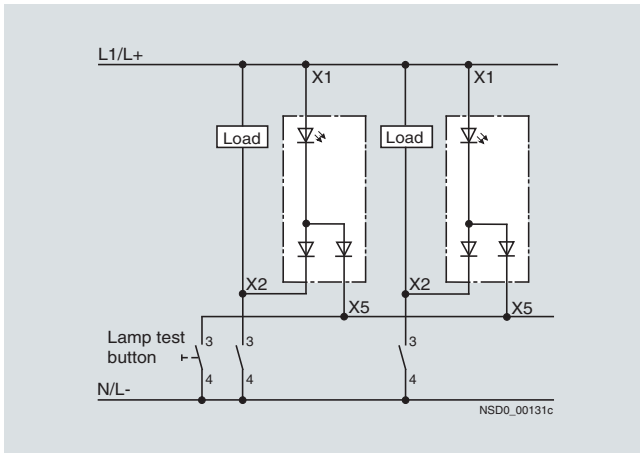
#### Application examples of test circuits



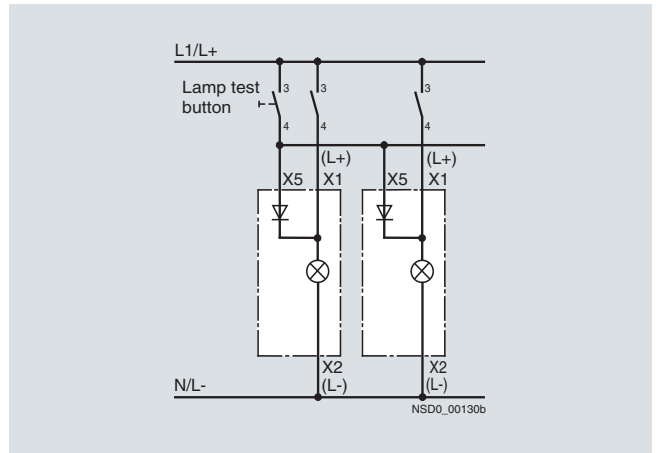
3SB34 00-1F lampholder  
incl. 130 V incandescent lamp



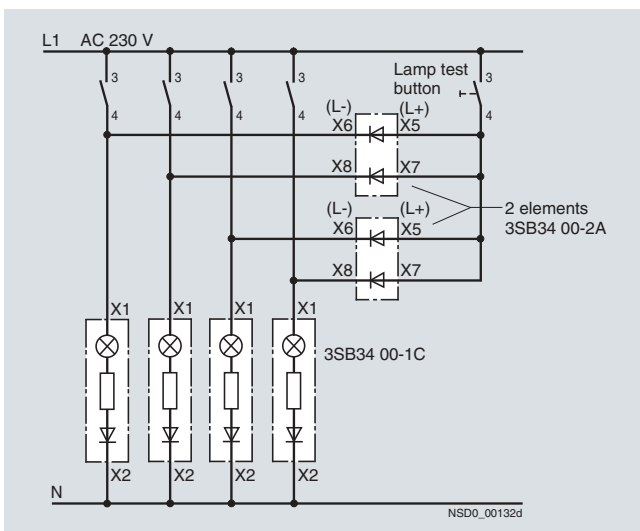
3SB34 00-1G lampholder  
for incandescent lamps, maximum 2.6 W or LED lamps, AC/DC



3SB34 00-1L lampholder  
for incandescent lamps, maximum 2.6 W or LED lamps, AC or DC



3SB34 00-1H lampholder  
for incandescent lamps, maximum 2.6 W or glow lamps, AC



Example for lamp test circuit with 3SB34 00-2A element

#### Application examples for 3SB34 00-2A diode elements

- Lamp test circuit
- Interference suppression
- Limiting voltage peaks
- Limiting DC coils
- Diode gates
- Rectifier circuits

The diode element contains two 1N 4007 diodes. The element can be snapped onto the holder as required.

#### Notes on using the lampholders with separate lamp test function

For connecting inductive loads in parallel (e. g. contactors), overvoltage damping is necessary.

The 3SB34 00-1H element is not suitable for operation with a parallel load.

# 3SB3 Two-Hand Operation Consoles

Plastic and metal enclosures

## Overview



Two-hand operation console with metal enclosure

The two-hand operation consoles are required for use with machines and systems that have hazardous areas, in order to direct both hands of the operator to one position.

### Standards

The two-hand operation consoles comply with the requirements of EN 574.

For technical specifications, see 3SB3 Pushbuttons.

## Design

### Equipment

The two-hand operation consoles are pre-equipped with 3SB3 command devices. In the case of plastic enclosures the command points are equipped as standard with actuators and indicators made of plastic, in the case of metal enclosures they are equipped with actuators and indicators made of metal.

The standard equipment comprises:

- 2 black mushroom pushbuttons, Ø 40 mm, 1 NO + 1 NC, Order No. 3SB30 00-1GA11 or 3SB35 00-1GA11
- 1 red EMERGENCY-STOP mushroom pushbutton according to EN ISO 13850, Ø 40 mm, with positive latching, 2 NC, Order No. 3SB30 00-1HA20 or 3SB35 00-1HA20

The metal version is also available as an unequipped empty enclosure.

The plastic version can be retrofitted with up to 8 customized command points. The surface of the console has premachined breaking points for this purpose.

### Mounting

The two-hand operation consoles can be mounted either on the stand available or directly on the machine by means of the holes in the rear panel.

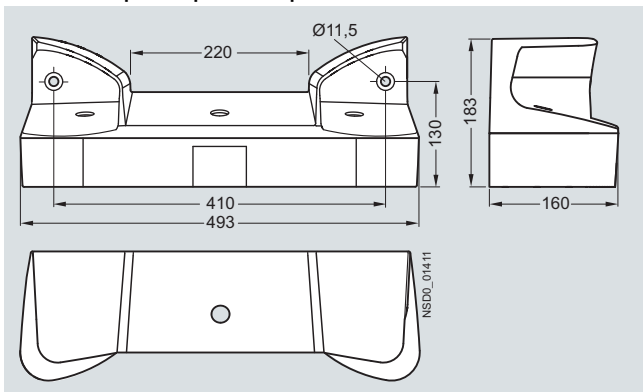
## Function

The control command is given by pressing the two mushroom pushbuttons on the sides simultaneously (within 0.5 s of each other) and must be maintained for as long as a hazard exists.

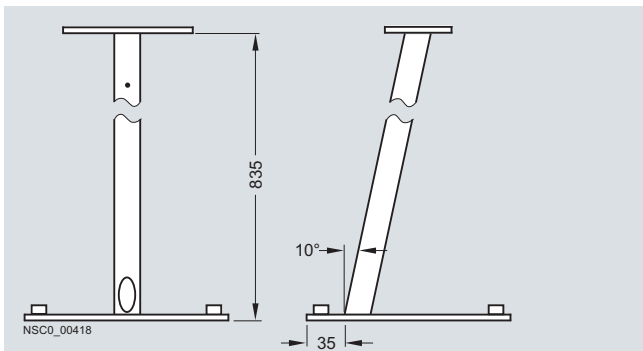
For evaluation of the control commands, the associated 3TK28 34 press control devices are offered as two-hand control devices and the 3TK28 35 is offered as a slowing down test apparatus in relay design (see Safety Relays in Chapter 7).

## Dimensional drawings

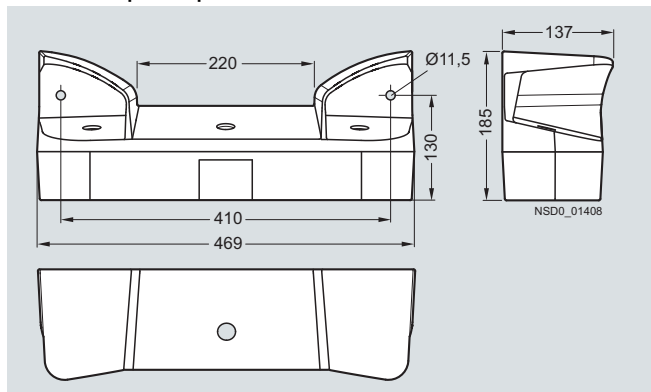
### 3SB38 63-1 operator panel with plastic enclosure



### 3SB39 01-0AQ3 stand



### 3SB38 63-4 operator panel with metal enclosure



# 3SE7 Cable-Operated Switches

## Metal enclosures

### Overview



SIRIUS cable-operated switches (trip-wire switches) are used for monitoring or for EMERGENCY-STOP devices on particularly endangered system sections.

As the effective range of a cable-operated switch is only limited by the length of the trip-wire, large systems can also be protected. Cable-operated switches (requiring pulling at both ends) and conveyor belt unbalance trackers are used primarily for monitoring very long belt systems.

### Standards

The switches are equipped with positive latching and positive NC contacts and are thus suitable for operation in EMERGENCY-STOP devices in accordance with EN ISO 13850.

### Design

The switches for wire lengths up to 50 m are available with 1 NO + 1 NC or 2 NC contacts and for up to 75 m with 1 NO + 3 NC contacts. The switches for wire lengths of 2 × 75 m and the conveyor belt unbalance trackers are supplied with 2 NO + 2 NC contacts.

The cable-operated switch and the conveyor belt unbalance tracker can also be supplied with a factory-fitted LED (red, 24 V DC). This light in innovative on-board chip technology allows the operating state of the switch to be visible at a distance of at least 50 m.

### Function

The NC contacts of the cable-operated switch and the conveyor belt unbalance tracker are positive opening.

Cable-operated switches with one-side operation are held in free position by the pre-tension on the turnbuckle.

In the 3SE7 140 and 3SE7 150 cable-operated switches, both switching contacts are available for wire-break/wire-pull signaling. The NO contact can be used, for example, for signaling purposes.

On switches with interlocking, with a pretensioned wire, the locking must be deactivated beforehand in order to return the cable-operated switch to its original position.

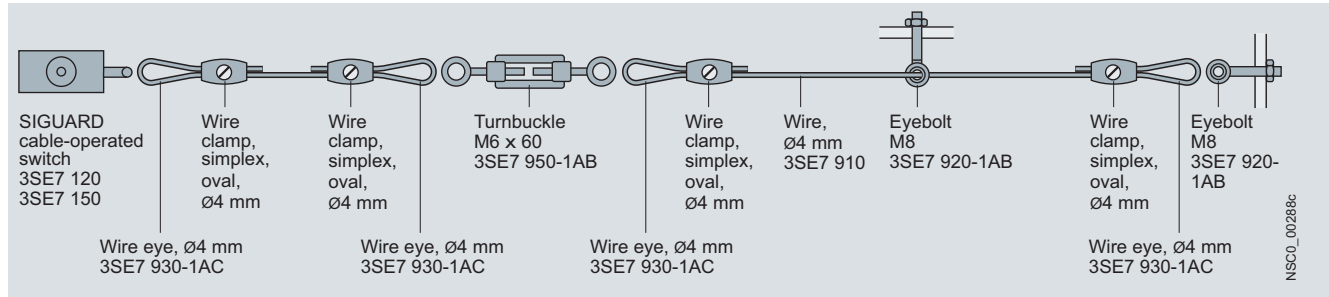
### Technical specifications

Type		3SE7 120	3SE7 150	3SE7 140	3SE7 141	3SE7 160	3SE7 310
<b>General data</b>							
Standards		IEC 60947-5-1, EN 60947-5-1; IEC 60204-1, EN 60204-1; EN ISO 13850					
Approvals		UL/CSA					
Electrical design		Contacts electrically isolated from each other					
Electrical load		• At AC-15 400 V AC, 6 A		250 V AC, 2 A		400 V AC, 6 A	
		• Min. 24 V AC/DC, 10 mA					
Short-circuit protection	A	6 (slow)					
Mechanical endurance		> 1 million operating cycles					
Contact material		Fine silver					
Operation		By pulling or breaking of the wire					
Wire length, maximum	m	10	25	50	75	2 × 75	–
Distance between wire supports, max.	m	2.5	3	5			–
<b>Enclosure</b>							
Enclosure material		GD Al alloy, coated (color), dark black RAL 9005					
Cover		Shock-resistant thermoplast					
Degree of protection acc. to EN 60529		IP65			IP67	IP65	
Ambient temperature	°C	–25 ... +70					
Mounting		Designed for M5					
Fixing spacing	mm	30 and 40					
Cable entry		2 × (M20 × 1.5)		1 × (M16 × 1.5)	3 × (M20 × 1.5)	2 × (M25 × 1.5)	
Connection type		Screw terminals M3.5, self-lifting clamp terminal					

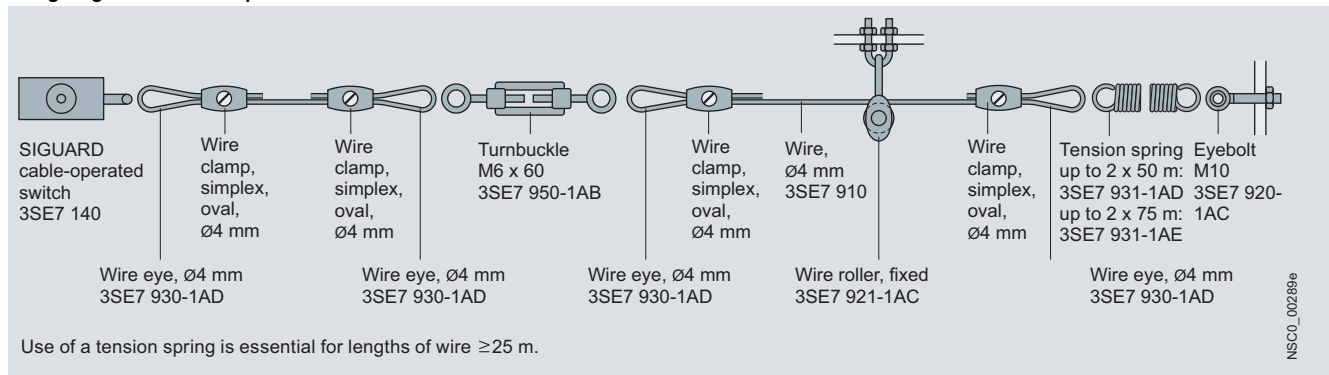
### Configuration

#### Mounting and fixing the wire

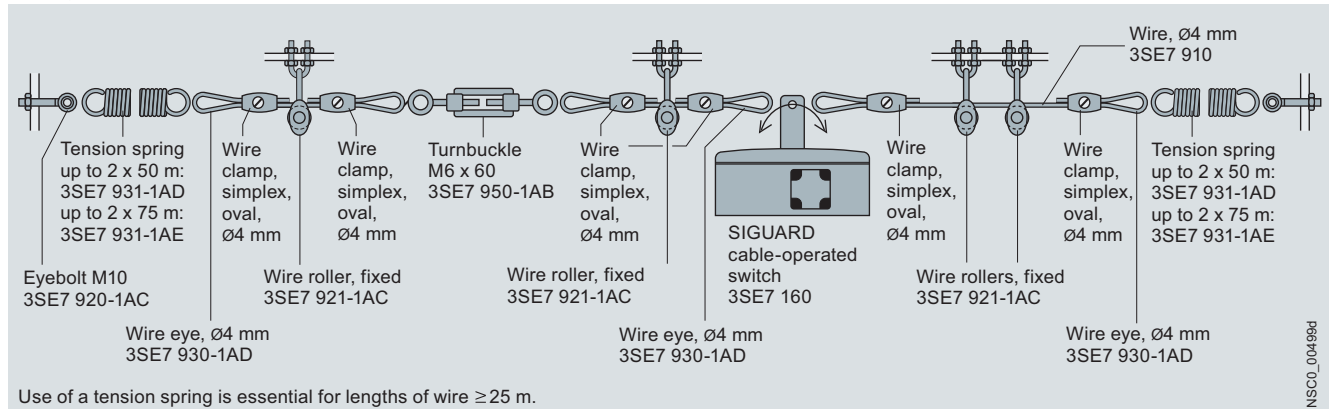
##### Short lengths of the wire up to 25 m



##### Long lengths of the wire up to 50 m



##### Pulling from both sides up to 2 x 75 m



#### Preloading and actuating forces

The values quoted apply to switch mounting at an ambient temperature of 20 °C. No allowance is made for lengthening of the wire through stretching and deformation of the wire eye.

Type	Preloading force N	Operating distance cm	Actuating force <sup>1)</sup> N	Max. wire length m
3SE7 120	55	11	6	10
3SE7 150	200	11	25	25
3SE7 140	295 ... 390	13	38 ... 60	50
3SE7 141	100	20 ... 22	28 ... 34	75
3SE7 160	--	32 ... 40	45 ... 85	2 x 75

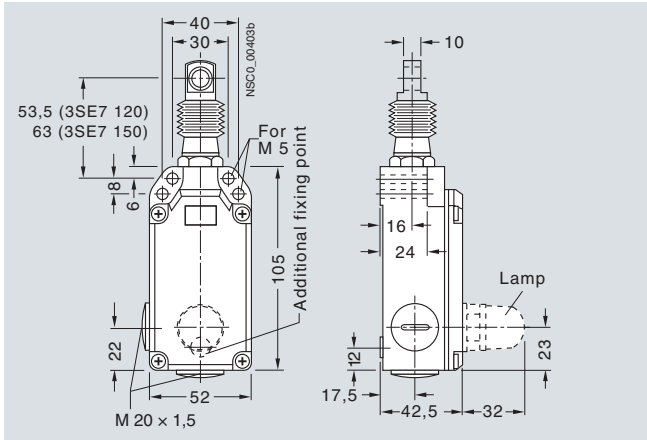
1) The actuating forces quoted are only guide values because the spring forces are subject to tolerances.

# 3SE7 Cable-Operated Switches

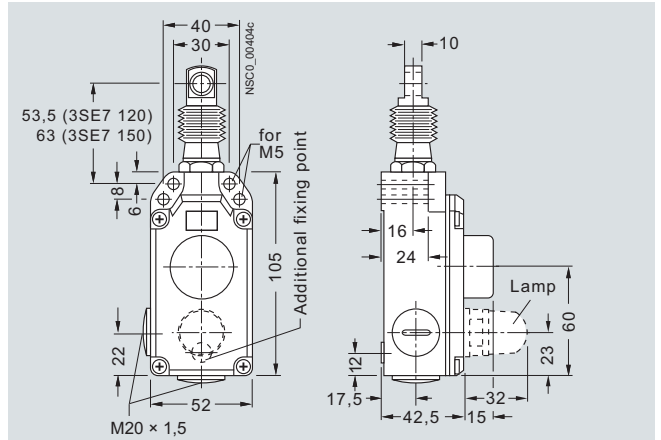
## Metal enclosures

### Dimensional drawings

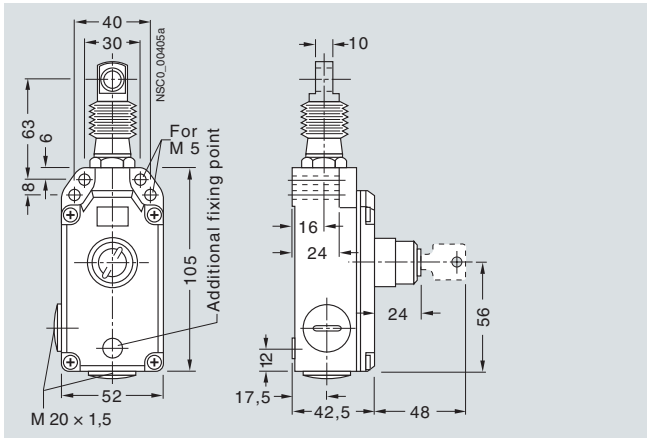
**3SE7 120-2DD.., 3SE7 150-2DD..**  
without latching



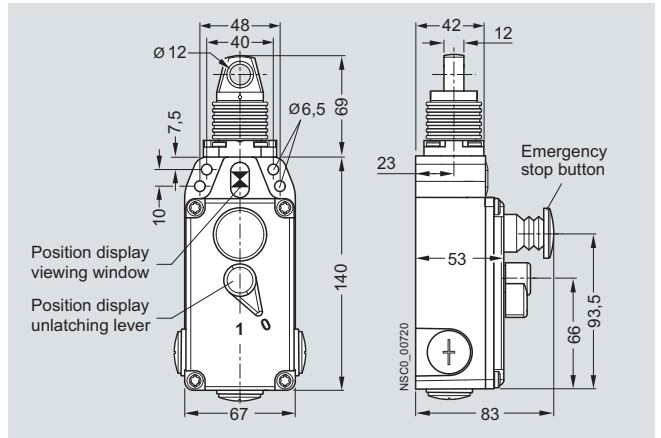
**3SE7 120-1B..., 3SE7 150-1B...**  
with latching and button reset



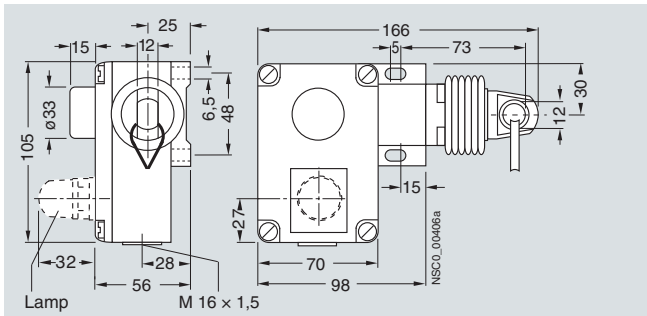
**3SE7 150-1CD..**  
with latching, button reset and key unlatching



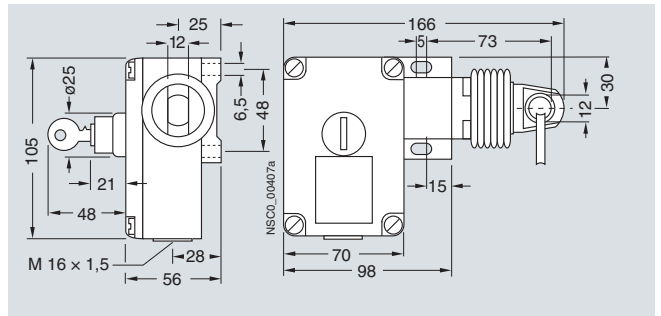
**3SE7 141-1EG..**  
with EMERGENCY STOP and rotate-to-unlatch mechanism



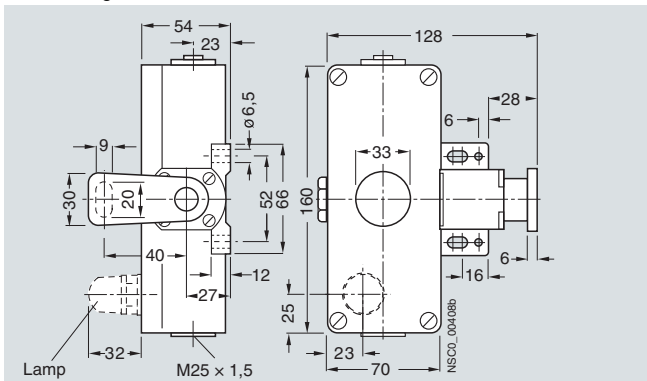
**3SE7 140-1B...**  
with latching and button reset



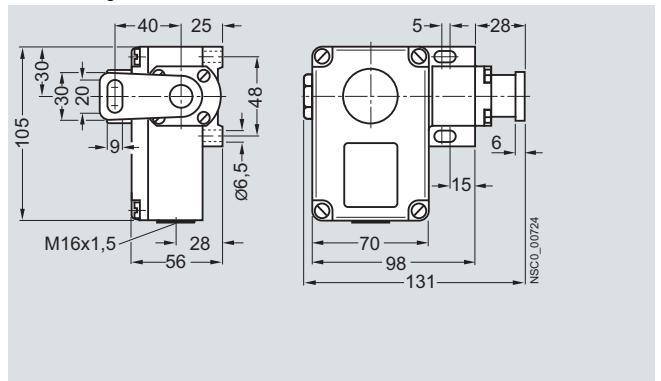
**3SE7 140-1CD..**  
with latching, button reset and key unlatching



**3SE7 160-1AE..**  
with latching and button reset



**3SE7 160-1BD..**  
with latching and button reset

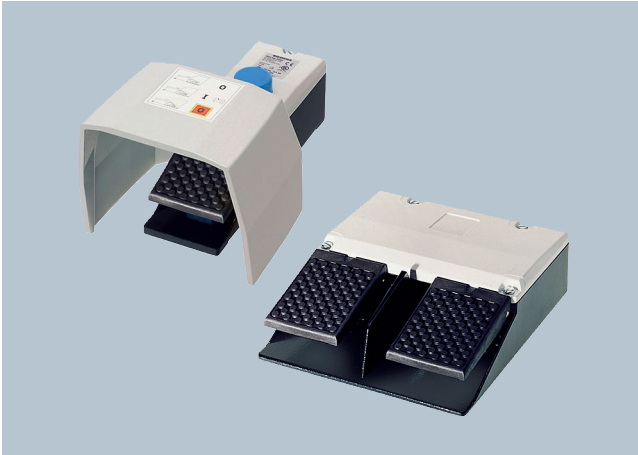




# 3SE2, 3SE3 Foot Switches

## Plastic and metal enclosures

### Overview



Foot switches with metal enclosures

The 3SE2 9 and 3SE3 9 foot switch range encompasses versions in a metal enclosure for rugged applications as well as

versions with plastic enclosure. The devices can be supplied with or without a cover and have fixing holes for them to be screwed to the floor.

Depending on the particular application, the switches can be ordered in latching or momentary-contact versions.

#### Safety foot switches

The single-pedal safety foot switches according to EN ISO 13850 lock on actuation. After eliminating the hazard, the machine can only be restarted after manually releasing the switch. A pushbutton on the top of the enclosure is used for this purpose. The devices are supplied with a cover.

#### Version with plastic enclosure

For operation in less harsh environments, momentary-contact pedal switches with plastic enclosures are available. They are supplied in single-pedal and two-pedal versions, the single-pedal version is also available with a cover. The momentary-contact pedal switch has one microswitch (changeover contact) per actuating pedal.

### Technical specifications

Type		3SE29	3SE39
<b>Metal and plastic enclosures</b>			
<b>Standards</b>		IEC 60947-5-1	IEC 60947-5-1
<b>Electrical load</b>			
• At AC-15, 400 V	A	16 6 A for 3SE2903-1....	–
• At 250 V AC	A	–	5
<b>Short-circuit protection</b>	A	16 (slow)	5 (slow)
	A	6 (slow) for 3SE2903-1....	
<b>Mechanical endurance</b>		> 10 <sup>6</sup> operating cycles	> 10 <sup>6</sup> operating cycles
<b>Material</b>			
• Enclosure		Aluminum casting	Impact-resistant thermoplast, self-extinguishing acc. to UL 94 VO
• Cover		Thermoplast	–
• Guard hood		Aluminum casting	Metal
<b>Degree of protection</b>		IP65	IP65
<b>Ambient temperature</b>	°C	-25 ... +80	-10 ... +75
<b>Connection</b>		Cable entry, metric	Cable AWG20, UL Style 2464, length 3 m

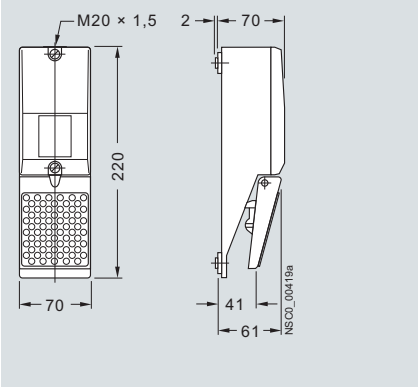


### Dimensional drawings

#### Metal enclosures

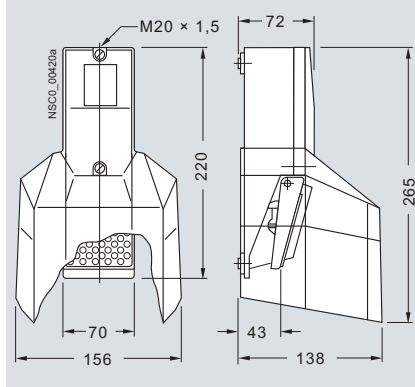
**3SE2 902-0AB20, 3SE3 903-1AB20, 3SE2 912-2AB20**

momentary-contact foot switch/switch, one pedal, without cover



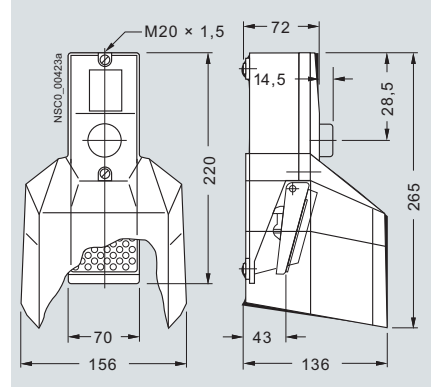
**3SE2 902-0AA20, 3SE3 903-1AA20, 3SE2 912-2AA20**

momentary-contact foot switch/switch, one pedal, with cover



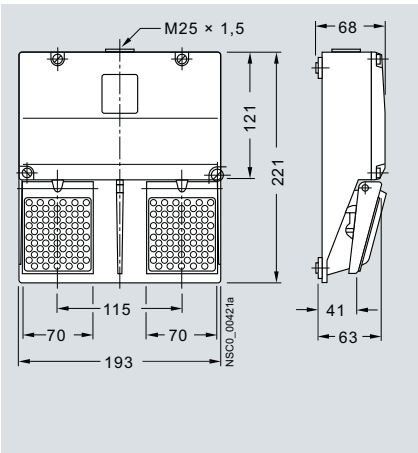
**3SE2 924-3AA20**

safety foot switch with interlock



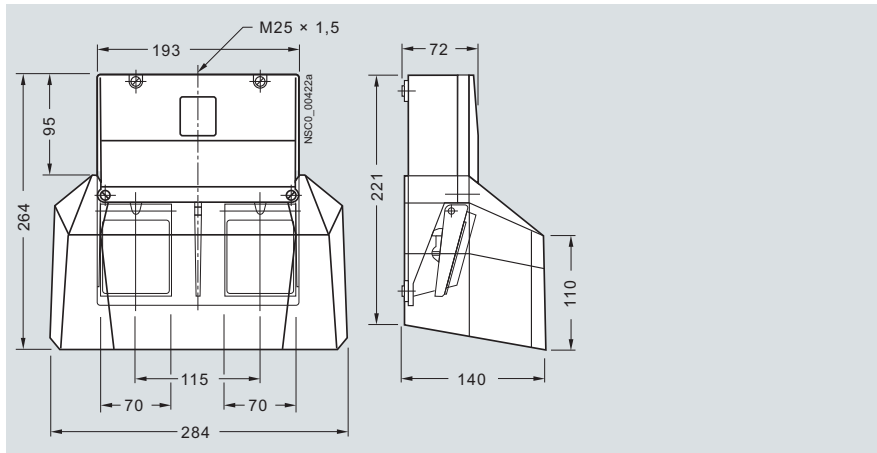
**3SE2 932-0AB20, 3SE2 932-1AB20**

momentary-contact foot switch, two pedals, without cover



**3SE2 932-0AA20, 3SE2 932-1AA20**

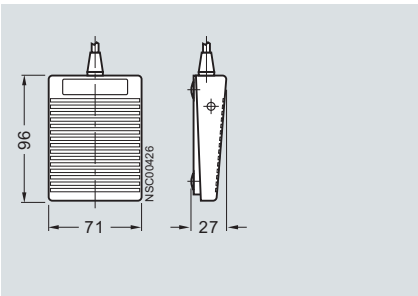
momentary-contact foot switch, two pedals, with cover



#### Plastic enclosures

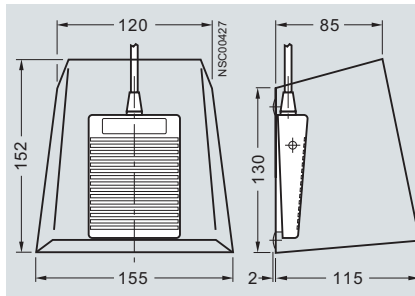
**3SE3 902-4CB20**

momentary-contact pedal switch, one pedal, without cover



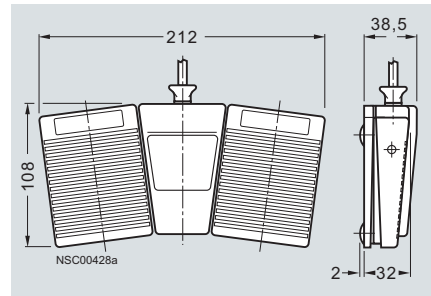
**3SE3 902-4CA20**

momentary-contact pedal switch, one pedal, with cover



**3SE3 934-5CB20**

momentary-contact pedal switch, two pedals, without cover

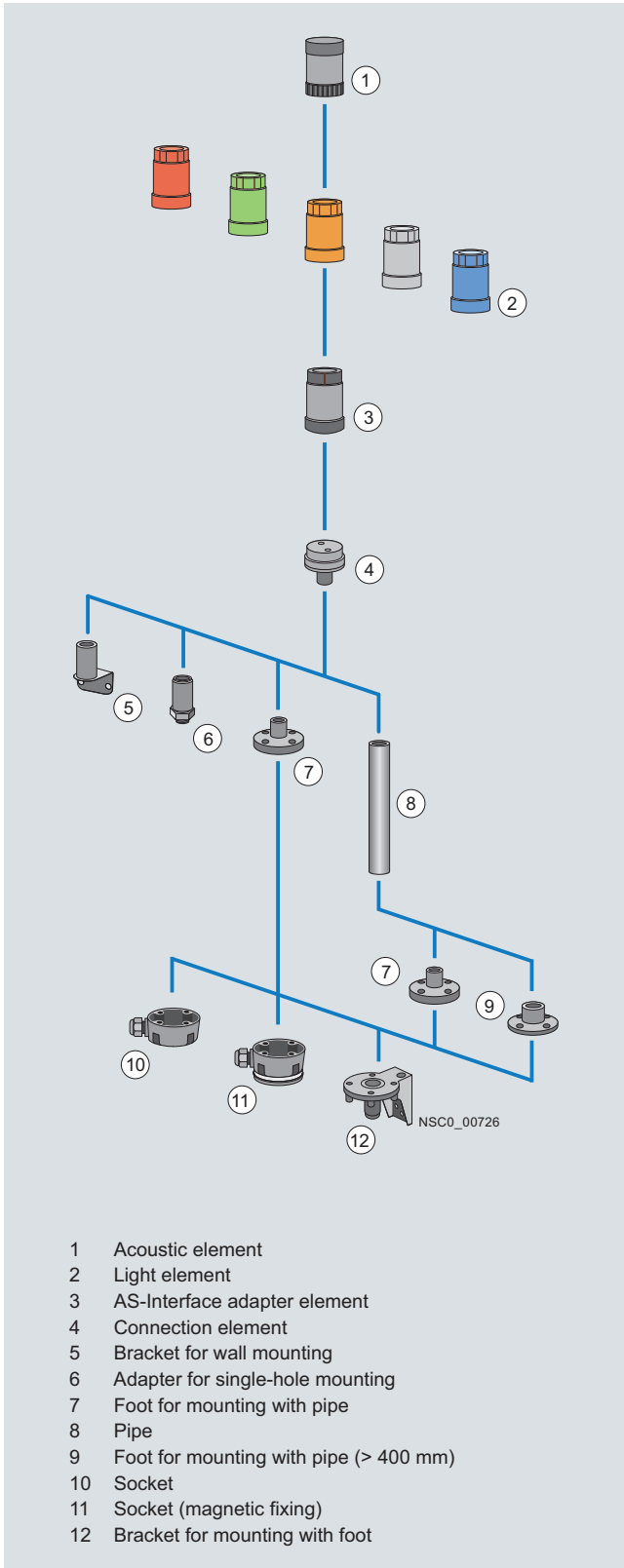


# 8WD4 Signaling Columns

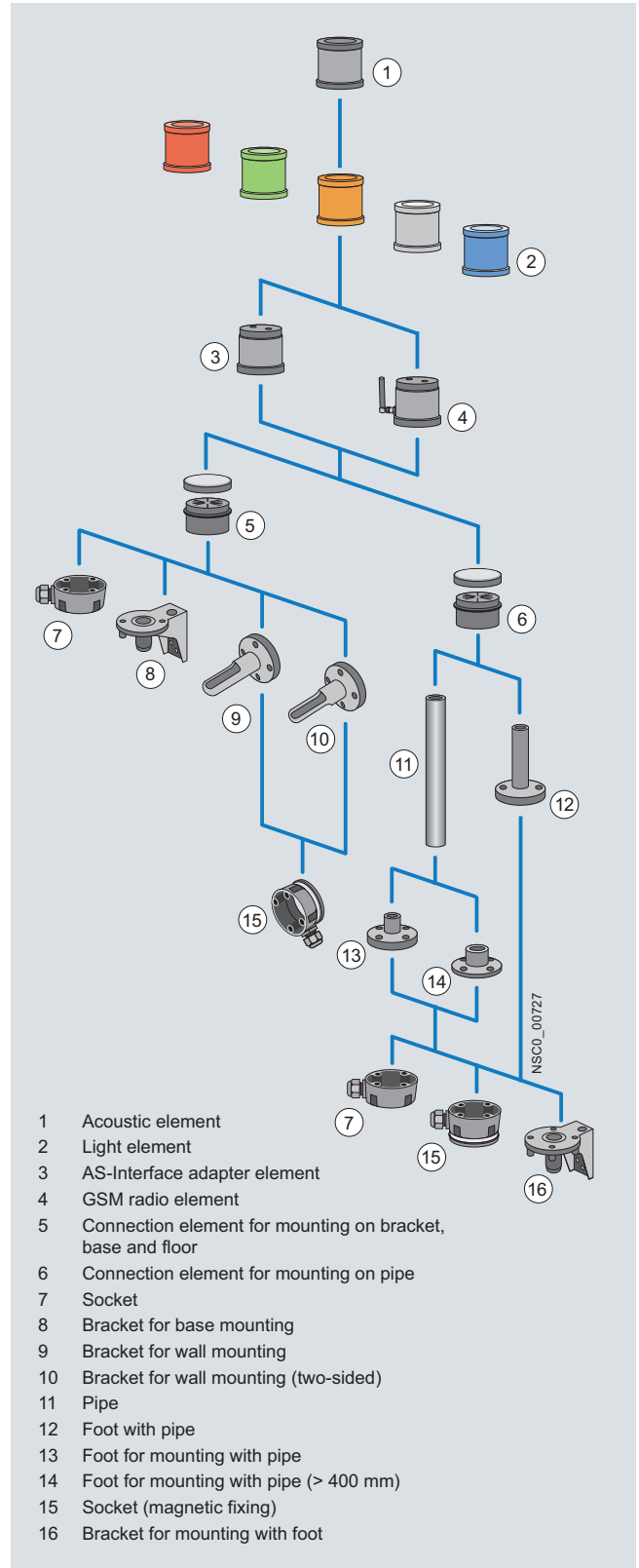
## General data

### Overview

The 8WD4 signaling columns are flexible in design and versatile in use.



8WD42 signaling columns (width 50 mm) with up to 4 elements



8WD44 signaling columns (width 70 mm) with up to 5 elements

Two product series are available:

- 8WD42
  - Thermoplast enclosure, diameter 50 mm
  - Degree of protection IP54
  - Up to 4 elements can be mounted
- 8WD44
  - Thermoplast enclosure, diameter 70 mm
  - Advanced design and significantly improved illumination
  - Fast and flexible connection using spring-type terminals
  - Integrated degree of protection IP65
  - Up to 5 elements can be mounted



Signaling columns, mounting examples

The illustrated examples are from the left:

- 8WD42: Cover (no No.), 4 light elements ②, connection element ④, pipe ⑧, foot ⑦
- 8WD44: Cover (no No.), acoustic element ①, 2 light elements ②, connection element ⑥, foot with pipe ⑫
- 8WD44: Cover (no No.), 4 light elements ②, GSM radio element ④, connection element ⑤, bracket for wall mounting ⑨
- 8WD44: Cover (no No.), 3 light elements ②, AS-Interface adapter element ③, connection element ⑥, foot with pipe ⑫

*Note: The cover is supplied with the connection element.*

## Design

8WD4 signaling columns can be combined as required as modular components and are available in two diameters, 50 mm and 70 mm.

### Signaling elements

The separate signaling elements are mechanically joined with a bayonet mechanism for electrical reliability and vibration resistance. Tools are not required. Up to five signaling elements (four in the case of 8WD42) can be connected to one connection element. The bracket for two-sided mounting permits, in the case of the 8WD44 signaling columns, the installation of two connection elements and therefore up to ten signaling elements in a single location.

Signaling elements are available in the following versions:

- Continuous light element (incandescent lamp, LED)
- Blinklight element (incandescent lamp, LED)
- Flashlight element
- Rotating-beacon element (LED)
- Buzzer element
- Siren element

The tone of the buzzer element can be altered as desired between a pulsating and a continuous tone by means of a wire bridge in the buzzer element.

The amplification of the siren element can be selected in the 100 dB version via an integrated potentiometer. It is possible to set 8 sounds using a DIP switch.

### Mounting

#### Floor mounting

The 8WD42 signaling columns are mounted on the floor with a 8WD42 08-0DE plastic foot.

The 8WD44 signaling columns can be directly screwed onto the connection element for floor mounting.

#### Pipe mounting

Pipes are available in various lengths from 150 mm to 1000 mm. A special molded foot is recommended for pipes of more than 500 mm in length to improve stability.

#### Angle mounting

The supplementary component for mounting at a 90° angle, e. g. to walls, is directly attached to the connection element. A special connection element for angle mounting is required for the 8WD44 signaling columns.

#### Single-hole mounting

The 8WD42 signaling columns can be fixed using a drilled hole using the adapter for single-hole mounting. It is screwed in place from below.

#### Magnetic fixing

The adapter with the sideways cable outlet can also be ordered with magnetic fixing as a special version. This offers easy, flexible mounting on metal plates or panels which is also extremely resistant to shocks.

## General data

### Connections

The signaling elements are wired up using the screw terminals in the connection element, screw terminals on the 8WD42 and screw or spring-type terminals on the 8WD44.

### Cable outlet

The connecting cables can be guided either downwards or sideways through the cable gland using an adapter that can be screwed under the foot. This makes wiring easier if there is no access from below.

### Connection to AS-Interface



#### 8WD42:

The two-wire bus cable is fixed to the screw terminals in the connection element. The adapter element must be the first module to be positioned on the connection element. A maximum of 4 signaling elements can then be mounted on it.

The 8WD42 28-0BB adapter element is a standard slave.

#### 8WD44:

The two-wire bus cable is fixed to the screw or spring-type terminals in the connection element. The adapter element must be the first module to be positioned on the connection element. The signaling elements can then be mounted on it.

The 8WD44 28-0BE adapter element is a standard slave. A maximum of 4 signaling elements can be mounted on it.

The 8WD44 28-0BD adapter element with A/B technology enables the connection of up to 62 slaves on one AS-Interface system. The addressing socket provides user-friendly parameterization of the AS-Interface elements. A maximum of 3 signaling elements can be mounted on this element.

## Function

### GSM radio elements

Downtimes can be minimized with the 8WD44 GSM radio element. Faults are signaled within seconds over a mobile phone from any place at any time.

The radio element is integrated below the light elements in the signaling column and can be quickly commissioned and easily operated:

- Insert SIM card in the radio element
- Call the radio element with the receiver's mobile phone
- Start the monitoring

Each module can have up to three different call numbers. In addition to using the SMS function the receiver can obtain information about the current state of the machines or plants by call, fax or e-mail service (through the provider) or he can perform remote diagnostics by mobile phone.

The alarm function of the radio element can be switched on or off at any time:

- By calling the radio element
- By sending an SMS with the corresponding commands
- By operating an input in "External Control" mode

The radio elements can also be connected to an AS-Interface module with an external power supply.

### Technical specifications

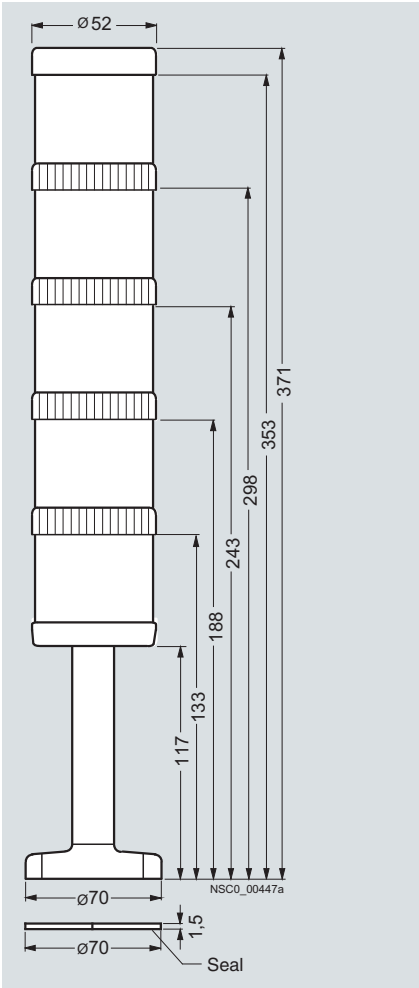
Type		8WD42	8WD44
<b>General data</b>			
<b>Approvals</b>		UL, CSA	
<b>Light and acoustic elements</b>			
<b>Rated voltage, power consumption</b>			
Light elements with incandescent lamp		(AC values for 50/60 Hz)	(AC values for 50/60 Hz)
• Continuous light		12 V, 24 V, 115 V, 230 V AC/DC	12 V, 24 V, 115 V, 230 V AC/DC
• Blinklight		24 V AC/DC/125 mA; 115 V AC/20 mA; 230 V AC/15 mA	24 V AC/DC/125 mA; 115 V AC/20 mA; 230 V AC/15 mA
• Flashlight		--	24 V DC/125 mA; 115 V AC/20 mA; 230 V AC/35 mA
• Max. inrush current, blinklight/flashlight		--	500 mA
Light elements with integrated LED			
• Continuous light		24 V AC/DC/60 mA	24 V AC/DC/45 mA; 115 V AC/DC/25 mA; 230 V AC/25 mA
• Blinklight		--	24 V AC/DC/40 mA
• Rotating light		--	24 V AC/DC/70 mA
Acoustic elements			
• Buzzer element (tone: pulsating or continuous, 85 dB)		24 V AC/DC/25 mA; 115 V AC/DC/25 mA; 230 V AC/25 mA	24 V AC/DC/25 mA; 115 V AC/DC/25 mA; 230 V AC/25 mA
• Siren element (8 tones + amplification can be set, 100 dB)		--	24 V AC/DC/80 mA; 115 V AC/30 mA; 230 V AC/16 mA
• Siren element (108 dB)		--	24 V DC/100 mA
GSM radio elements		--	24 V DC (controlled $\pm 15\%$ )/50 mA, transient 450 mA
<b>Power consumption</b>			
• Incandescent lamps, base BA 15d	W	Max. 5	7
• Flashlight, flash energy	Ws	--	2
<b>Endurance</b>			
• Flashlight		4 x 10 <sup>6</sup> flashes	4 x 10 <sup>6</sup> flashes
<b>AS-Interface adapter elements</b>			
<b>IO code/ID code</b>		8/F	8/E
<b>Power supply</b>			
• Operational voltage	V	Through bus cable 18.5 V ... 31.6	Through bus cable 18.5 V ... 31.6
• Power consumption $I_{\max}$	mA	50	100
<b>Protective measures</b>			
• Watchdog		✓	✓
• Short-circuit/overload protection		External back-up fuse M 1.6 A	✓
• Reverse polarity protection		✓	✓
• Induction protection		Does not apply	✓
<b>Outputs</b>			
• Load voltage		4 relay outputs	3 solid-state outputs
		External auxiliary voltage	Through bus cable or external auxiliary voltage, switch-selectable
	V	0 ... 30 DC	
	V	0 ... 230 AC	
• Current carrying capacity $\Sigma I_{\max}$			
- With external auxiliary voltage	A	1.5	0.3
- Without external auxiliary voltage	A	--	0.2
<b>Operating temperature</b>	°C	-20 ... +50	-30 ... +50
<b>Enclosure</b>			
<b>Enclosure material</b>		Thermoplast (polyamide), impact-resistant, black	Thermoplast (polyamide), impact-resistant, black
<b>Light elements, GSM radio element</b>		Thermoplast (polycarbonate)	Thermoplast (polycarbonate)
<b>Mounting</b>			
• Horizontal (for floor mounting, foot with 25 mm Ø pipe)		✓	✓
• Horizontal (single-hole mounting)		✓	--
• Vertical with bracket		✓	✓
<b>Degree of protection</b>			
• Light elements		IP54	IP65 (seal premounted with every module)
• Acoustic elements, AS-i adapter elements		IP54	IP65
<b>Operating temperature</b>	°C	-20 ... +50	-20 ... +50
<b>Connection</b>			
• Conductor cross-sections	mm <sup>2</sup>	M3 screw terminals Max. 2.5	Spring-type terminals Max. 2.5
• Tightening torque	Nm	Max. 0.5	--

# 8WD4 Signaling Columns

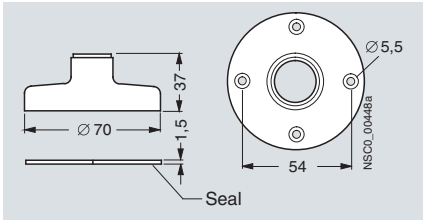
## 8WD42 signaling columns, 50 mm diameter

### Dimensional drawings

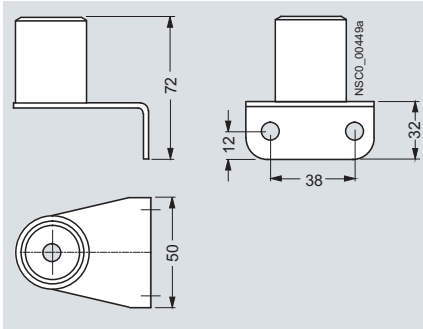
Signaling column (4-tier)



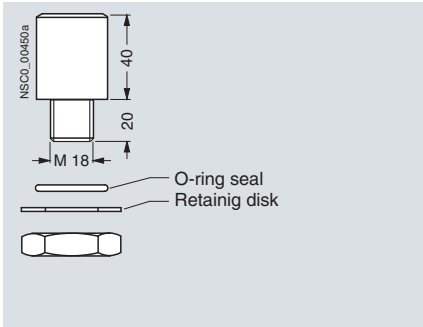
Foot



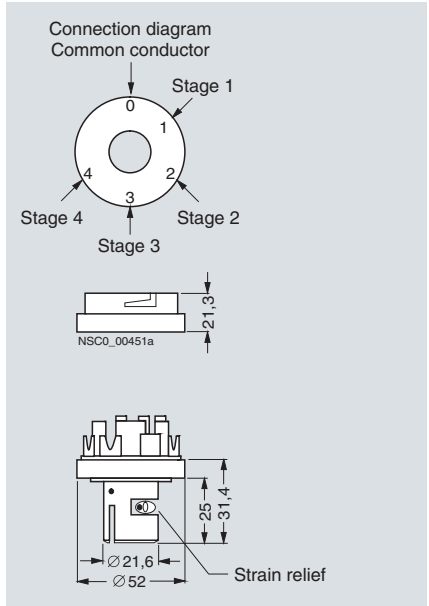
Bracket for wall mounting



Adapter for single-hole mounting



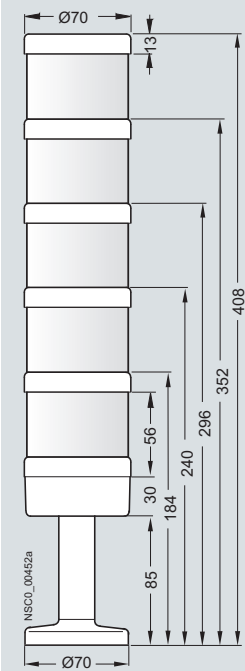
Connection element



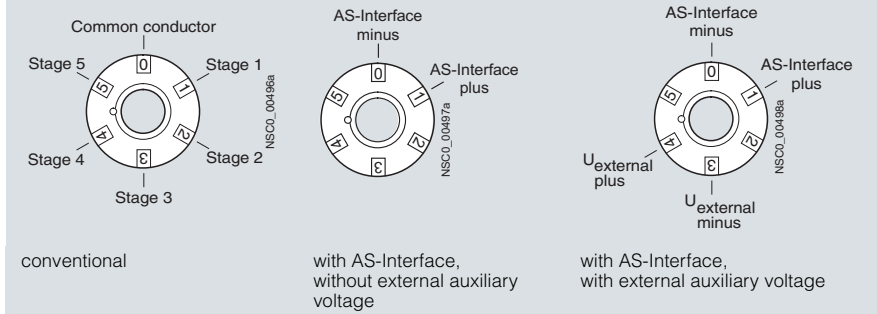
1) For horizontal mounting, only 1 element is recommended.

### Dimensional drawings

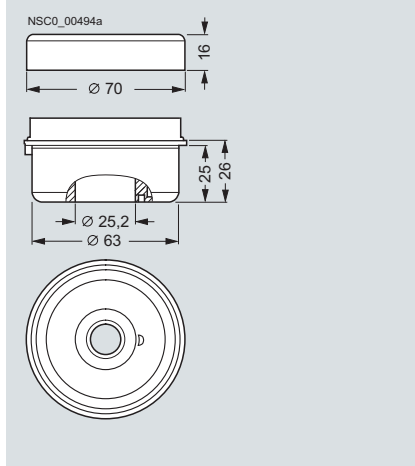
#### Signaling column (5-tier)



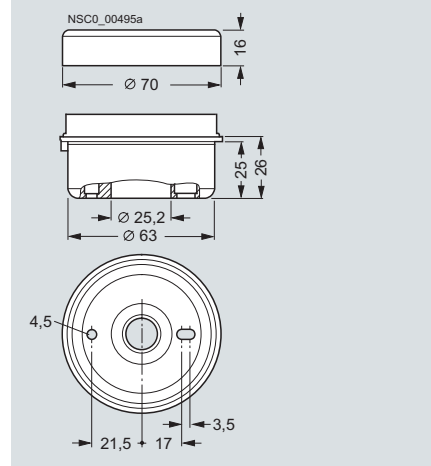
#### Connection elements



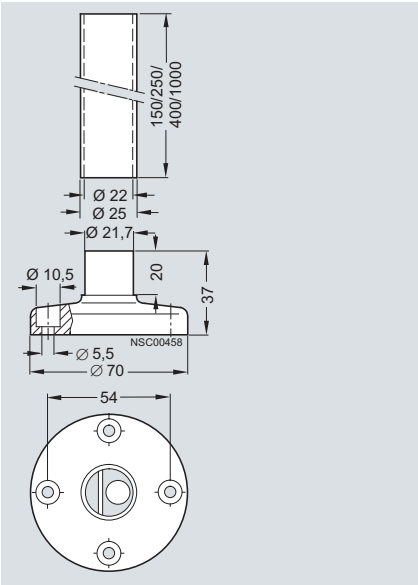
#### Connection element with cover for mounting on pipes



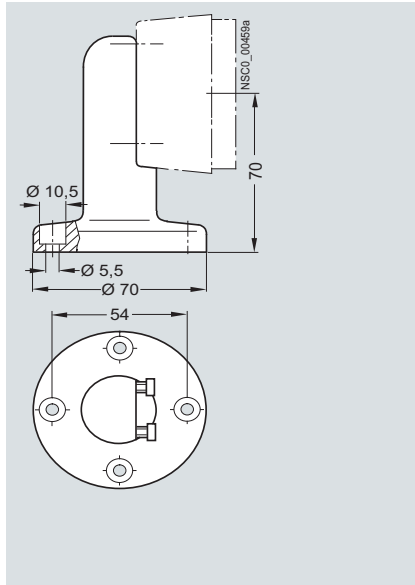
#### Connection element with cover for floor/angle mounting



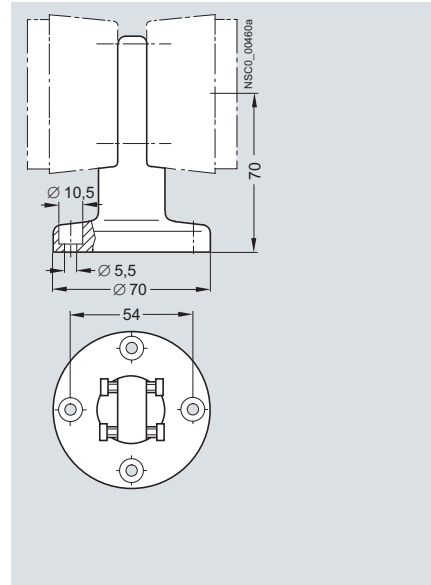
#### Foot with pipe



#### Bracket for single-sided mounting



#### Bracket for double-sided mounting



# 8WD5 Integrated Signal Lamps

## 8WD53 integrated signal lamps, 70 mm diameter

### Overview



#### Features:

- Thermoplast enclosure, diameter 70 mm
- Degree of protection IP65
- Rated voltage 24 V, 115 V, 230 V AC/DC

### Design

8WD53 integrated signal lamps can be mounted directly at any point of the machine for the purpose of giving visual signals. They are mounted by means of a Pg 29 screw base with nut.

All integrated signal lamps have a high degree of protection IP65 and are made of a material highly resistant to impact.

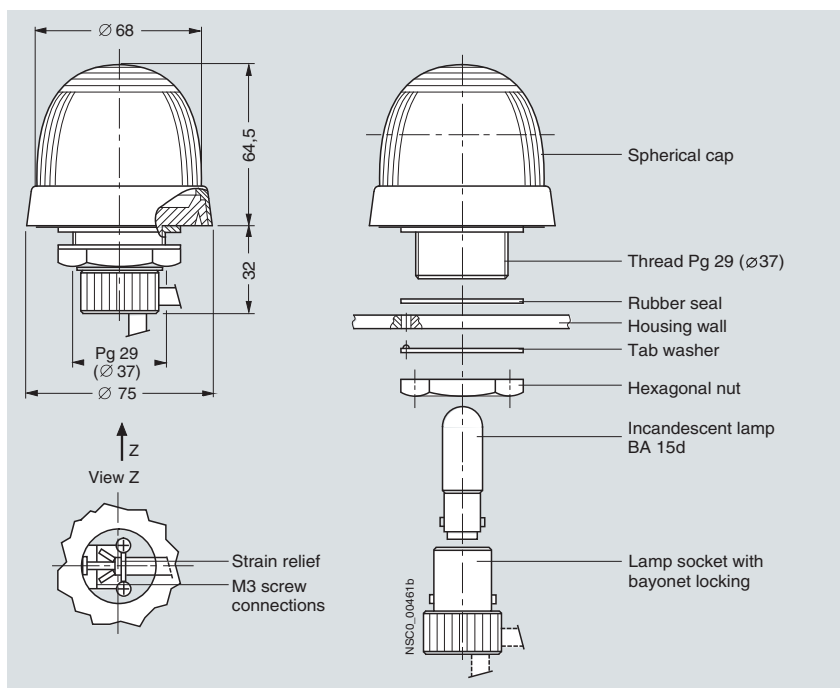
The special shape of the integrated signal lamps means that the light is emitted optimally in every direction (to the sides and upwards). Continuous lights (with incandescent lamp or LED) and single-flash lights are available in the following colors: red, green, yellow, clear and blue.

The LED versions of the integrated signal lamps offer a considerably longer endurance than the incandescent lamp versions. LED lights are available as a continuous light, repeated-flash light and rotating light.

### Technical specifications

Type	8WD54	
<b>General data</b>		
<b>Approvals</b>	UL, CSA	
<b>Rated voltage</b> (AC values at 50 Hz)		
• Continuous light, BA 15d (incandescent lamp)	24 V, 115 V, 230 V AC/DC; 5 W	
• Continuous light, BA 15d (LED)	24 V, 115 V, 230 V AC/DC	
• Single-flash light	24 V AC/DC/ 125 mA; 115 V AC/ 20 mA; 230 V AC/ 15 mA	
• Lights with integrated LED	24 V AC/DC/70 mA	
<b>Single-flash light</b> , flash energy at 1 Hz	Ws	2
<b>LED lights</b>		
• Blinklight lamp, flash frequency	Hz	Approx. 1
• Rotating light, rotating frequency	min <sup>-1</sup>	Approx. 120
<b>Inrush current</b>		
• LED light	A	< 0.5
• Single-flash light	A	< 0.5
<b>Enclosure</b>		
<b>Enclosure material</b>	PC/ABS cover impact-resistant, black	
<b>Spherical cap</b>	Thermoplast (polycarbonate), impact-resistant up to 20 years	
<b>Mounting</b>	Ø 37 mm hole (Pg 29)	
<b>Degree of protection</b>	IP65	
<b>Ambient temperature</b>		
• Continuous light (incandescent lamp)	°C	-20 ... +60
• Single-flash light, LED	°C	-20 ... +50
<b>Cable connection</b>	Radial or axial	

### Dimensional drawings





## Get more information

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Siemens AG  
Industry Sector  
Low Voltage Controls and Distribution  
Postfach 48 48  
90026 NÜRNBERG  
GERMANY

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