



PRODUCT CATALOGUE 2014



Designed for
**EXTREME
CHALLENGES**

Ladies and Gentlemen!

SN PROMET is a Polish company located in Sosnowiec, which has been operating on the market since 1985. The company has considerable expertise in manufacturing details made of plastic and metal, which can be confirmed by numerous certificates. We also have extensive experience in working with Polish and foreign companies. We have extended machine facilities and qualified personnel, enabling us to establish successful collaboration. Our vast experience in installing equipment and a wide range of applied technologies enable us to quickly start new installations, even the most complex. One of the facts that has significantly contributed to our success is the company's structure, which not only includes manufacturing departments, but also our own design office, a technology office, a well-equipped tool shop, and electrical and mechanical service teams. In the interest of providing products of the highest quality, we have established our own laboratory to test the resistance and strength of products. We are a flexible company, geared towards change and innovation. We can help you solve your problems and gain mutual benefits.

Feel invited to work with us!

WE OFFER THE FOLLOWING SERVICES, IN THE SCOPE OF COLLABORATION:

- Designing and manufacturing of tools: blanking dies, sections, injection moulds, and others;
- Machining;
- Cold working operations – die shearing, forming;
- Processing of plastics and thermoplastics on the entrusted injection moulds;
- Ageing of springy elements, made of beryllium copper, inside a vacuum heater.

SERVICES RENDERED BY THE TOOL SHOP:

Manufacturing of tools and instrumentation for injection moulds and blanking dies, for own purposes and when ordered by external clients. Overhauling and regenerating of own instrumentation and instrumentation lent by parties working with us. Equipment: Wire-cut electric discharge machines (EDM), machining centres (CNC), grinding machines, turning lathes, drillers, and our own hardening shop.

PROCESSING OF PLASTICS:

We provide injection moulding of plastics, using professional equipment. Our machine facilities include injection moulding machines manufactured by the following companies: Arburg, Engel, and Formoplast.

PROCESSING OF METALS

a) Machining

We offer the possibility of shaping elements processed with the following machines:

- Automatic lathes with numerical control, in processed diameters from 1mm to 40mm;
- Single-spindle Swiss-type screw machines with cam motion, in processed diameters from 6mm to 10 mm.

SN PROMET offers a wide range of services rendered on all-purpose machine tools, in particular the following: turning, drilling, and milling.

b) Cold working

We are capable of carrying out cold working operations (i.e. die shearing, stamping, and forming), using professional automatic presses, which guarantee high quality and repeatability of manufactured parts. Equipment:

- AZT-type press, Haulick Ross bending and stamping automatic machine – automatic machine for die shearing

In addition, we are capable of rendering services in die shearing, stamping, and forming, using eccentric presses of 6.3-80t in tonnage.

c) Heat treatment

We offer the possibility of achieving the required mechanical properties of materials by using the processes of hardening and ageing. We carry out ageing of springy elements, made of beryllium copper, inside a vacuum heater.

Maximum working temperature: +350°C

Size of charge: depending on weight, size, and shape of a part.

INSTALLATION

We offer installation of products, based on a manual assembly, in bolting, soldering, and assembling operations.

DESIGNING AND TECHNOLOGY

We enable designing, engineering, and developing of manufacturing technologies, and implementing technical solutions in production, as well as starting new processes. When working on new products and instrumentation, we use the following computer-aided design software: Autodesk AutoCad® and Autodesk Inventor®.



We contribute to the State Fund of Rehabilitation of Handicapped People (PFRON)!

As a result of the changes to the Law on Occupational and Social Rehabilitation and Employment of People with Disabilities, introduced on 29th November 2010, nearly 2,000 supported employment enterprises lost the status that gave their contracting parties a right to make contributions to the State Fund of Rehabilitation of Handicapped People (PFRON). This status was retained by just a small number of companies, including Spółdzielnia Niewidomych PROMET (PROMET Co-operative for Visually Impaired), primarily because the company employs a large number of visually impaired people.

When buying products manufactured by SN PROMET, you can make a deduction of 18-25% from payments for the benefit of the State Fund of Rehabilitation of Handicapped People (PFRON),

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CONTROL BUTTONS

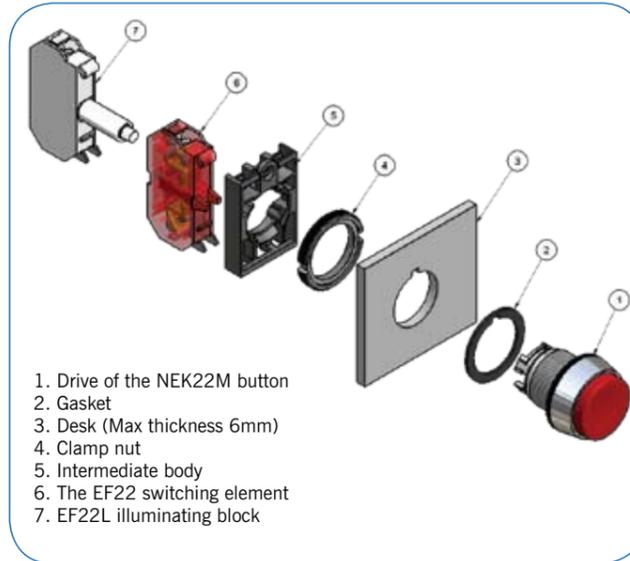
- NEK22M
- NEF22
- NEF30W and NEF30WK
- NEF30
- N Ø38
- ADDITIONAL ACCESSORIES



1.a NEK22M CONTROL BUTTONS

• Purpose

Drives of the NEK22M series control buttons with metal bodies are intended for installation in standardised Ø22.5mm holes, in numerous types of control and signal equipment, or directly into bodies of machines and equipment. They are intended to work with the EF22X and EF22Y switching elements manufactured by SN PROMET, and with the EF22LN backlight block.



1. Drive of the NEK22M button
2. Gasket
3. Desk (Max thickness 6mm)
4. Clamp nut
5. Intermediate body
6. The EF22 switching element
7. EF22L illuminating block

• Design and installation

Drives of the NEK22M button are comprised of the following elements:

- A driver, also referred to as the button drive;
- An intermediate element, also referred to as the intermediate body. Backlit drives are additionally equipped with a backlight element, which is attached to the intermediate elements.

The body of the drive and the gasket are put inside the assembly hole at the front side of the desk. Then, the clamp nut under the desk is tightened all the way, and the drive element is connected to the intermediate body.

A drive of the NEK22M type does not constitute a complete drive button. A complete drive button is comprised of the following:

- A drive of the NEK22M button;
- 1-6 switching elements of the EF22 type, ordered separately (max 4 switching elements, when using backlit buttons and knob- or lock-operated buttons switched separately);
- An all-purpose EF22LN backlight block, if backlit buttons are used.

The EF22 switching element

The EF22 switching elements are intended for control buttons of the NEF22 and NEK22M control buttons. The EF22X switching element has one make contact, while EF22Y one break contact. The body of the switching element has two assembly clips (one permanent and one mobile). The EF22Y switching element meets the requirements concerning effective opening.

The EF22LN backlight block

The EF22LN backlight block is intended for control buttons of the NEF22 and NEK22M control buttons. The body of the backlight block has two assembly clips (one permanent and one mobile).

1.a.1 TECHNICAL DATA

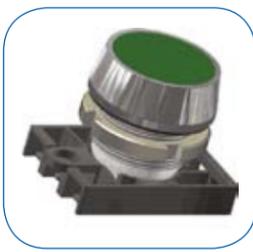
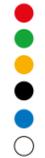
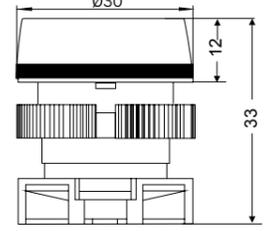
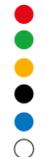
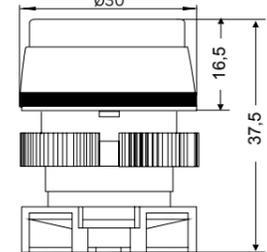
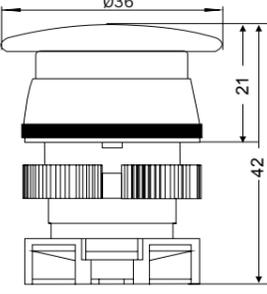
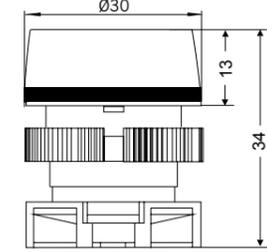
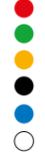
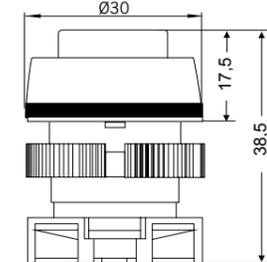
Insulation rated voltage (U _i)	500 V
Rated thermal current (I _{th})	10 A
Rated voltages and switching currents per each utilisation category (U _e / I _e) AC15 DC13	230V/6A, 400V/4A 110V/1A, 220V/0,25A
Rated impulse withstand voltage (U _{imp})	4,000 V
Limited withstand current	1,000 A
Type and the highest rating of protection against the effects of short-circuit currents' impact	gG 6A
Level of environmental pollution	2
Protection class for button drives	IP 55, IP 65, IP 40
Protection class for the part under the desk	IP 20
Mechanical life - For return drives - For knob- and lock-operated drives, and for interlocked drives	10 ⁶ 0.7 x 10 ⁵
Rated frequency of switching	600 switches/h
Cross-sections of terminals	1 or 2 x LY 0,75 - 1,5 mm ² 1 or 2 x DY 1,0 - 1,5 mm ²
Working position	Any
Working temperature	-30°C to +50°C
Travel of effective opening ¹⁾	3 mm
Total travel ¹⁾	4.7 mm
Minimum force for effective opening ¹⁾	1.7 N
Rated voltage of the backlit block (U _e)	24-230 V AC/DC

The product conforms to the following standard: PN-EN 60947-5-1
Emergency interlocked palm drives meet the requirements of the PN-EN 60947-5-5 standard.

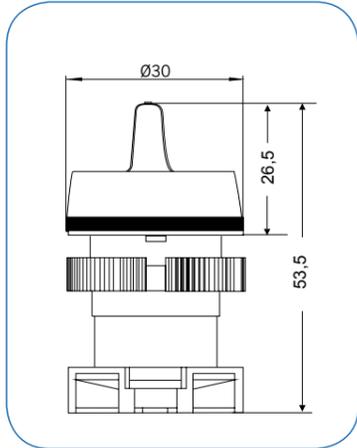
1) The values are applicable to the effective opening of NC switching elements (1NC)

1.a.2 TYPES OF BUTTON DRIVES

• RETURN DRIVES

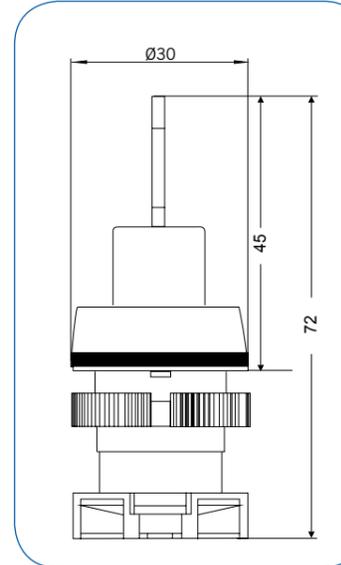
Type	Designation	Colour	Dimensions (mm)	Weight (g)
 Return drive with a covered button IP55 ☼ Backlight available	NEK22M – Kc NEK22M – Kz NEK22M – Kg NEK22M – Ks NEK22M – Kn NEK22M – Kb			38.8
 Return drive with a protruding button IP55 ☼ Backlight available	NEK22M – Wc NEK22M – Wz NEK22M – Wg NEK22M – Ws NEK22M – Wn NEK22M – Wb			42.6
 Return drive with a palm button IP55 ☼ Backlight available	NEK22M – Dc NEK22M – Dz NEK22M – Dg NEK22M – Ds			42.9
 Return drive with a sealed covered button IP65 ☼ Backlight available	NEK22M – UKc NEK22M – UKz NEK22M – UKg NEK22M – UKs NEK22M – UKn NEK22M – UKb			44.6
 Return drive with a protruding sealed button IP65 ☼ Backlight available	NEK22M – UWc NEK22M – UWz NEK22M – UWg NEK22M – UWs NEK22M – UWn NEK22M – UWb			45.5

• KNOB-OPERATED DRIVES



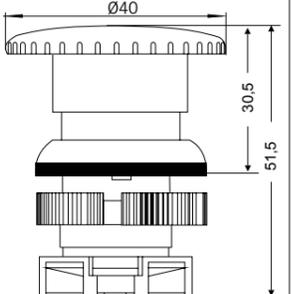
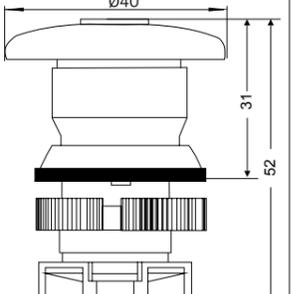
Type	Designation	Colour	Weight (g)
Knob-operated drive 0-I stable, knob's angle of rotation 60° IP55, ✨ Backlight available	NEK22M – Pas NEK22M – Pac NEK22M – Paz NEK22M – Pag NEK22M – Pan	● ● ● ● ●	50.3
Knob-operated drive 0-I Unstable, knob's angle of rotation 60° IP55, ✨ Backlight available	NEK22M – Pbs NEK22M – Pbc NEK22M – Pbz NEK22M – Pbg NEK22M – Pbn	● ● ● ● ●	50.3
Knob-operated drive I-0-II stable, knob's angle of rotation 2x45°, contacts of the switch are switched separately IP55, ✨ Backlight available	NEK22M – Pcs NEK22M – Pcc NEK22M – Pcz NEK22M – Pcg NEK22M – Pcn	● ● ● ● ●	50.3
Knob-operated drive I – 0 ← II Pos. I – stable; pos. II - unstable, knob's angle of rotation: 60° to pos. I, 45° to pos. II, contacts of the switch are switched simultaneously IP55, ✨ Backlight available	NEK22M – Pds NEK22M – Pdc NEK22M – Pdz NEK22M – Pdg NEK22M – Pdn	● ● ● ● ●	50.3
Knob-operated drive I – 0 ← II Pos. I – stable; pos. II - unstable, knob's angle of rotation: 60° to pos. I, 45° to pos. II, contacts of the switch are switched simultaneously IP55, ✨ Backlight available	NEK22M – Pes NEK22M – Pec NEK22M – Pez NEK22M – Peg NEK22M – Pen	● ● ● ● ●	50.3
Knob-operated drive I → 0 ← II Unstable, knob's angle of rotation 2x45°, contacts of the switch are switched separately IP55, ✨ Backlight available	NEK22M – Pfs NEK22M – Pfc NEK22M – Pfz NEK22M – Pfg NEK22M – Pfn	● ● ● ● ●	50.3
Knob-operated drive I – 0 ← II Pos. I – stable; pos. II – unstable, knob's angle of rotation 2x45°, contacts of the switch are switched separately IP55, ✨ Backlight available	NEK22M – Pgs NEK22M – Pgc NEK22M – Pgz NEK22M – Pgg NEK22M – Pgn	● ● ● ● ●	50.3
Knob-operated drive 0 – I – II Stable, knob's angle of rotation 2x45°, contacts of the switch are switched separately IP55, ✨ Backlight available	NEK22M – Phs NEK22M – Phc NEK22M – Phz NEK22M – Phg NEK22M – Phn	● ● ● ● ●	50.3

• LOCK OPERATED DRIVES

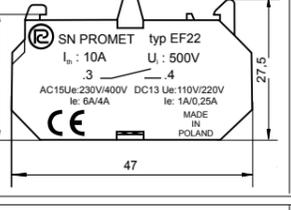
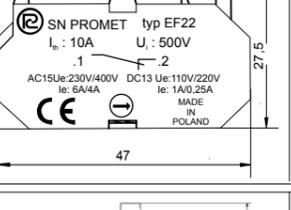
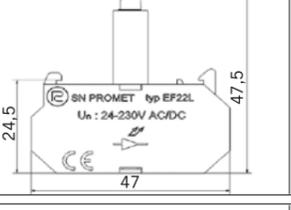
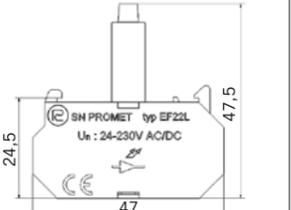


Type	Designation	Weight (g)
Lock-operated drive, 0-I, stable, key's angle of rotation 60° 1 – Removing the key at position 0 2 – Removing the key at position 0 and I IP40	NEK22M – Za1 NEK22M – Za2	81.6
Lock-operated drive, 0 ← I, unstable, key's angle of rotation 60° 1 – Removing the key at position 0 IP40	NEK22M – Zb1	81.6
Lock-operated drive, I-0-II, stable, key's angle of rotation 2x45°, contacts of the switch are switched separately 1 – Removing the key at position 0 2 – Removing the key at position 0 and I 3 – Removing the key at position 0, I and II IP40	NEK22M – Zc1 NEK22M – Zc2 NEK22M – Zc3	81.6
Lock-operated drive, I – 0 ← II, pos. I – stable; pos. II - unstable, key's angle of rotation: 60° to pos. I, 45° to pos. II, contacts of the switch are switched simultaneously 1 – Removing the key at position 0 2 – Removing the key at position 0 and I IP40	NEK22M – Zd1 NEK22M – Zd2	81.6
Lock-operated drive, I → 0 ← II, unstable, key's angle of rotation 2x45°, contacts of the switch are switched separately 1 – Removing the key at position 0 IP40	NEK22M – Ze1	81.6
Lock-operated drive, I – 0 ← II, pos. I – stable; pos. II - unstable, knob's angle of rotation 2x45°, contacts of the switch are switched separately 1 – Removing the key at position 0 2 – Removing the key at position 0 and I IP40	NEK22M – Zf1 NEK22M – Zf2	81.6
Lock-operated drive, I → 0 – II, pos. I – unstable; pos. II – stable, knob's angle of rotation 2x45°, contacts of the switch are switched separately 1 – Removing the key at position 0 IP40	NEK22M – Zg1	81.6
Lock-operated drive, 0-I-II, stable, key's angle of rotation 2x45°, contacts of the switch are switched separately 2 – Removing the key at position 0 and I 3 – Removing the key at position 0, I and II IP40	NEK22M – Zh2 NEK22M – Zh3	81.6
Lock-operated drive, 0 – I ← II, , pos. I – stable; pos. II – unstable, knob's angle of rotation 2x45°, contacts of the switch are switched separately 2 – Removing the key at position 0 and I IP40	NEK22M – Zi2	81.6

EMERGENCY INTERLOCKED PALM BUTTONS

Type	Designation	Colour	Dimensions (mm)	Weight (g)
	NEK22M – DR/Pc	●		90.5
	NEK22M – DRc	●		90.9

SWITCHING ELEMENTS AND BACKLIT BLOCKS

Type	Designation	Colour	Dimensions (mm)	Weight (g)
	EF22X	●		11.0
	EF22Y	●		12.4
	EF22LNc EF22LNz EF22LNg EF22LNn EF22LNb	● ● ● ● ○		11.4
	EF22LBc EF22LBz EF22LBg EF22LBn EF22LBb	● ● ● ● ○		11.4

1a.3 ASSEMBLY AND DISASSEMBLY

Assembly

First, put a screwdriver in the hole located in the lug in the intermediate body, prise slightly and pull the body away from the drive element. Then, undo the clamp nut under the desk to enable putting the drive element into the hole in the desk. The body of the drive and the gasket

are put inside the assembly hole at the front side of the desk. Then, the clamp nut under the desk is tightened all the way, and the drive element is connected to the intermediate body.

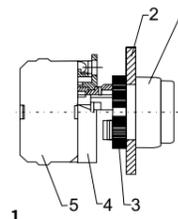


Fig. 1

- Elements of the button:**
1. Drive element
 2. Desk
 3. Clamp nut
 4. Intermediate body
 5. EF22 switching element

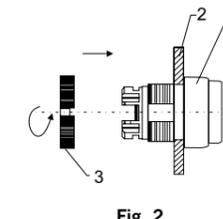


Fig. 2

- Position of the drive element in relation to the desk**
1. Drive element
 2. Desk
 3. Clamp nut

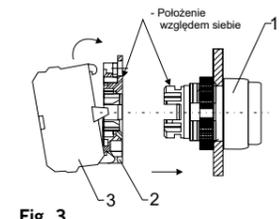


Fig. 3

- Installation of the intermediate body with the drive element**
1. Drive element
 2. Intermediate body
 3. EF22 switching element

Disassembly

In order to disassemble the NEK22M control button, follow the steps described below:

1) Use a flat screwdriver to prise the mobile clip of the switching element, and then pull the switch from the intermediate body (fig. 4).

2) Then, put the screwdriver in the hole located in the lug in the intermediate body, prise slightly and pull the body away from the drive element (fig. 5).

3) Finally, undo the clamp nut to enable removing the drive element from the desk (fig. 6).

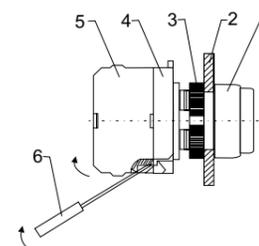


Fig. 4

- Disassembling of the switch from the intermediate body:**
1. Drive element
 2. Desk
 3. Clamp nut
 4. Intermediate body
 5. EF22 switching element
 6. Flat screwdriver

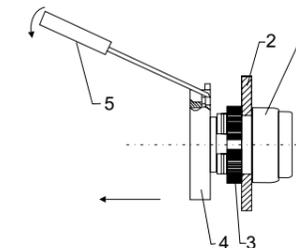


Fig. 5

- Disassembling of the intermediate body:**
1. Drive element
 2. Desk
 3. Clamp nut
 4. Intermediate body
 5. Flat screwdriver

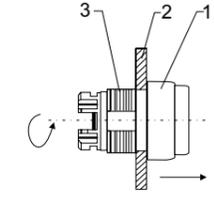
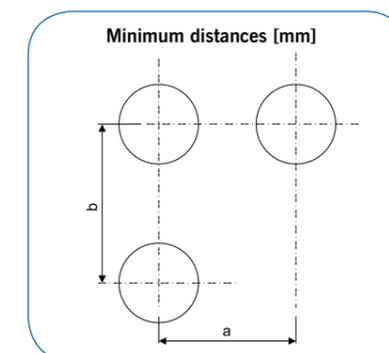
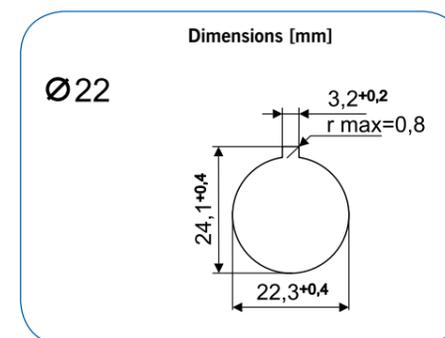


Fig. 6

- Disassembling of the nut:**
1. Drive element
 2. Desk
 3. Clamp nut

1a.4 ASSEMBLY HOLES



a [mm]	b [mm]
30	60

1a.5 CONTROL BUTTONS SELECTION TABLE

Series	Type of drive	Colour	Combination for contacts	Backlight
NEK22M	K	z	EF22X	EF22LNz
Buttons of the NEK22M series, 22mm, with metal bodies	Type of the drive button	Colour of the button	Type of switching element	Backlight blockLED 24-230V AC/DC
K Covered W Protruding UK Sealed, covered UW Sealed, protruding D Palm button DR/P Interlocked palm button, unlocked by rotating the button DR Interlocked palm button, unlocked by extending the button Pa Knob-operated, 0-I, stable Pc Knob-operated, I-0-II, stable Pd Knob-operated, I-0-II, pos. I – stable; pos. II – unstable Pe Knob-operated, I → 0 ← II, unstable Pf Knob-operated, I-0-II, pos. I – stable; pos. II – unstable, Pg Knob-operated, I → 0 ← II, pos. I – unstable, Pos. II – stable Ph Knob-operated, 0-I-II, stable Za Lock-operated, 0-I, stable Zb Lock-operated, 0 ← I, unstable Zc Lock-operated, I-0-II, stable Zd Lock-operated, I-0-II, pos. I – stable; pos. II – unstable, Ze Lock-operated, I → 0 ← II, unstable Zf Lock-operated, I-0-II, pos. I – stable; pos. II – unstable, Zg Lock-operated, I → 0 ← II, pos. I – unstable, pos. II – stable Zh Lock-operated, 0-I-II, stable Zi Lock-operated, I-0-II, pos. I – stable; pos. II – unstable,	K Covered W Protruding UK Sealed, covered UW Sealed, protruding D Palm button DR/P Interlocked palm button, unlocked by rotating the button DR Interlocked palm button, unlocked by extending the button Pa Knob-operated, 0-I, stable Pc Knob-operated, I-0-II, stable Pd Knob-operated, I-0-II, pos. I – stable; pos. II – unstable Pe Knob-operated, I → 0 ← II, unstable Pf Knob-operated, I-0-II, pos. I – stable; pos. II – unstable, Pg Knob-operated, I → 0 ← II, pos. I – unstable, Pos. II – stable Ph Knob-operated, 0-I-II, stable Za Lock-operated, 0-I, stable Zb Lock-operated, 0 ← I, unstable Zc Lock-operated, I-0-II, stable Zd Lock-operated, I-0-II, pos. I – stable; pos. II – unstable, Ze Lock-operated, I → 0 ← II, unstable Zf Lock-operated, I-0-II, pos. I – stable; pos. II – unstable, Zg Lock-operated, I → 0 ← II, pos. I – unstable, pos. II – stable Zh Lock-operated, 0-I-II, stable Zi Lock-operated, I-0-II, pos. I – stable; pos. II – unstable,	c Red z Green g Yellow s Black n Blue b White	EF22X - NO contact EF22Y – NC contact	Backlight block LED 24-230V AC/DC, continuous illumination EF22LNb ○ EF22LNc ● EF22LNg ● EF22LNn ● EF22LNz ● Backlight blocks LED 24-230V AC/DC, flashing EF22LBb ○ EF22LBc ● EF22LBg ● EF22LBn ● EF22LBz ●
		Key removal position		
		1 – Removing the key at position 0 2 – Removing the key at position 0 and I 3 – Removing the key at position 0, I and II		

• SAMPLE ORDER

Control button: NEK22M-Pag +EF22X i EF22Y + EF22LNg

Knob-operated drive, yellow, 0-1 + EF22X and EF22Y switching elements + All-purpose backlight block that operates under 24-230V AC/DC voltage, with a yellow LED, continuous illumination

1.b NEF22 CONTROL BUTTONS

• Purpose

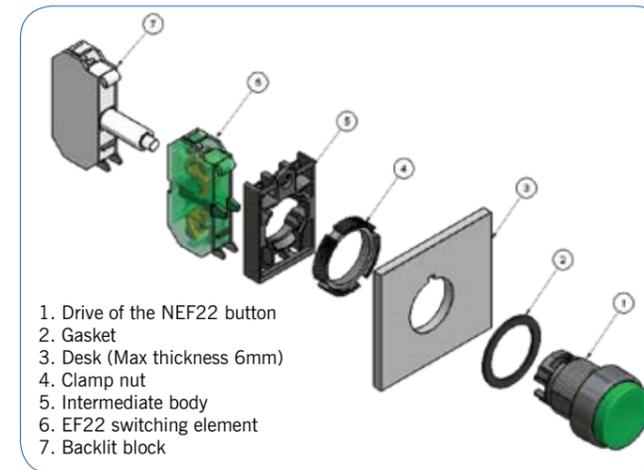
Control drives of the NEK22M series with black plastic bodies are intended for installation in standardised Ø22.5mm holes, in numerous types of control and signal equipment, or directly into bodies of machines and equipment. They are intended to work with the EF22X and EF22Y switching elements manufactured by SN Promet.

• Design and principle of operation

NEF22 drives are comprised of the following elements:
 - A driver, also referred to as the button drive;
 - An intermediate element, also referred to as the intermediate body.
 Backlit drives are additionally equipped with a backlight element, which is attached to the intermediate element.

• Assembly

The body of the drive and the gasket are put inside the assembly hole at the front side of the desk. Then, the clamp nut under the desk is tightened all the way, and the drive element is connected to the intermediate body. A drive of the NEF22 type does not constitute a complete drive button. A complete drive button is comprised of the following:
 - A drive of the NEF22 type;
 - 1-6 switching elements of the EF22 type, ordered separately (max 4 switching elements, when using backlit buttons);
 - An all-purpose EF22L backlit block, if backlit buttons are used.



1b.1 TECHNICAL DATA

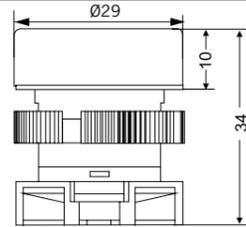
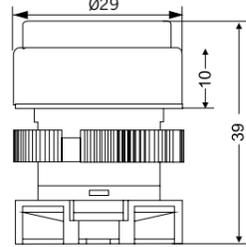
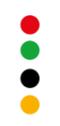
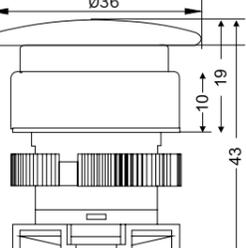
Insulation rated voltage (U _i)	500 V
Rated thermal current (I _{th})	10 A
Rated voltages and switching currents per each utilisation category (U _e / I _e) AC15 DC13	230V/6A, 400V/4A 110V/1A, 220V/0,25A
Rated impulse withstand voltage (U _{imp})	4,000 V
Limited withstand current	1,000 A
Type and the highest rating of protection against the effects of short-circuit currents' impact	gG 6A
Level of environmental pollution	2
Protection class for button drives	IP 65, IP 40
Protection class for the part under the desk	IP 20
Mechanical life - For return drives - For knob- and lock-operated drives, and for interlocked drives	1.2 x 10 ⁶ 0.7 x 10 ⁵
Rated frequency of switching	600 switches/h
Cross-sections of terminals	1 or 2 x LY 0.75 - 1.5 mm ² 1 or 2 x DY 1.0 - 1.5 mm ²
Working position	any
Working temperature	-30°C to +50°C
Travel of effective opening ¹⁾	3 mm
Total travel ¹⁾	4.7 mm
Force of effective opening ¹⁾	1.7 N
Rated voltage of the EF22L backlit block (U _e)	24-230 V AC/DC

The product conforms to the following standard: PN-EN 60947-5-1
 Emergency interlocked palm drives meet the requirements of the PN-EN 60947-5-5 standard.

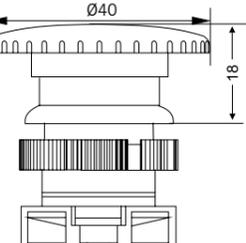
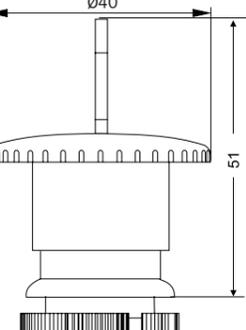
1) The values are applicable to the effective opening of NC switching elements (1NC)

1b.2 TYPES OF BUTTON DRIVES

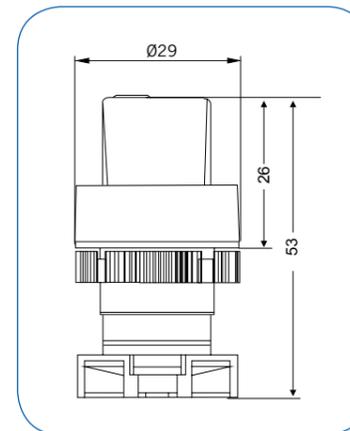
• RETURN DRIVES

Type	Designation	Colour	Dimensions (mm)	Weight (g)
 <p>Drive with a covered button and self-return mechanism IP65</p> <p>☀ Backlight available</p>	NEF22 – Kc NEF22 – Kz NEF22 – Kg NEF22 – Ks NEF22 – Kn NEF22 – Kb			15.5
 <p>Drive with a protruding button and self-return mechanism IP65</p> <p>☀ Backlight available</p>	NEF22 – Wc NEF22 – Wz NEF22 – Wg NEF22 – Ws NEF22 – Wn NEF22 – Wb			16.1
 <p>Drive with a palm button and self-return mechanism IP65</p> <p>☀ Backlight available</p>	NEF22 – Dc NEF22 – Dz NEF22 – Ds NEF22 – Dg			17.9

• EMERGENCY INTERLOCKED PALM BUTTONS

Type	Designation	Colour	Dimensions (mm)	Weight (g)
 <p>Interlocked palm button, unlocked by turning the button IP65</p>	NEF22 – DR/Pc			43.6
 <p>Interlocked palm button, unlocked by turning the key IP65</p>	NEF22 – DR/Zc			62.1

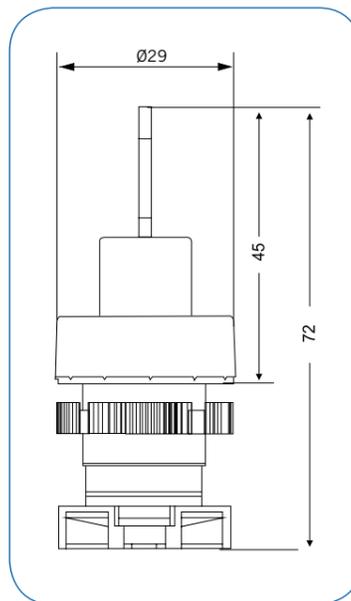
• KNOB-OPERATED DRIVES



Type	Designation	Colour	Weight (g)
<p>Knob-operated drive 0-I stable, knob's angle of rotation 60°</p> <p>IP65, ☀ Backlight available</p>	NEF22 – Pas NEF22 – Pac NEF22 – Paz NEF22 – Pag NEF22 – Pan		20.1
<p>Knob-operated drive 0 ← I Unstable, knob's angle of rotation 60°</p> <p>IP65, ☀ Backlight available</p>	NEF22 – Pbs NEF22 – Pbc NEF22 – Pbz NEF22 – Pbg NEF22 – Pbn		20.1
<p>Knob-operated drive I – 0 – II stable, knob's angle of rotation 2x45°, contacts of the switch are switched separately</p> <p>IP65, ☀ Backlight available</p>	NEF22 – Pcs NEF22 – Pcc NEF22 – Pcz NEF22 – Pcg NEF22 – Pcn		20.1
<p>Knob-operated drive I – 0 – II Pos. I – stable; pos. II - unstable, knob's angle of rotation: 60° to pos. I, 45° to pos. II, contacts of the switch are switched simultaneously</p> <p>IP65, ☀ Backlight available</p>	NEF22 – Pds NEF22 – Pdc NEF22 – Pdz NEF22 – Pdg NEF22 – Pdn		20.1
<p>Knob-operated drive I – 0 – II Pos. I – stable; pos. II - unstable, knob's angle of rotation: 60° to pos. I, 45° to pos. II, contacts of the switch are switched simultaneously</p> <p>IP65, ☀ Backlight available</p>	NEF22 – Pes NEF22 – Pec NEF22 – Pez NEF22 – Peg NEF22 – Pen		20.1
<p>Knob-operated drive I → 0 ← II Unstable, knob's angle of rotation 2x45°, contacts of the switch are switched separately</p> <p>IP65, ☀ Backlight available</p>	NEF22 – Pfs NEF22 – Pfc NEF22 – Pfz NEF22 – Pfg NEF22 – Pfn		20.1
<p>Knob-operated drive I – 0 – II Pos. I – stable; pos. II – unstable, knob's angle of rotation 2x45°, contacts of the switch are switched separately</p> <p>IP65, ☀ Backlight available</p>	NEF22 – Pgs NEF22 – Pgc NEF22 – Pgz NEF22 – Pgg NEF22 – Pgn		20.1
<p>Knob-operated drive I – 0 – II Pos. I – stable; pos. II - unstable, knob's angle of rotation 2x45°, contacts of the switch are switched separately</p> <p>IP65, ☀ Backlight available</p>	NEF22 – Phs NEF22 – Phc NEF22 – Phz NEF22 – Phg NEF22 – Phn		20.1

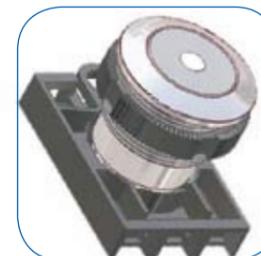
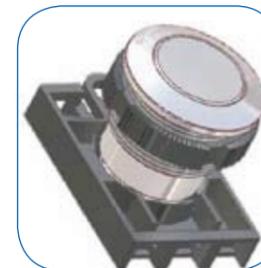


• LOCK-OPERATED DRIVES



Type	Designation	Weight (g)
Lock-operated drive, 0-I, stable, key's angle of rotation 60° 1 - Removing the key at position 0 2 - Removing the key at position 0 and I IP40	NEF22 - Za1 NEF22 - Za2	37.1
Lock-operated drive, 0 ← I, unstable, key's angle of rotation 60° 1 - Removing the key at position 0 IP40	NEF22 - Zb1	37.1
Lock-operated drive, I - 0 - II, stable, key's angle of rotation 2x45°, contacts of the switch are switched separately 1 - Removing the key at position 0 2 - Removing the key at position 0 and I 3 - Removing the key at position 0, I and II IP40	NEF22 - Zc1 NEF22 - Zc2 NEF22 - Zc3	37.1
Lock-operated drive, I - 0 ← II, pos. I - stable; pos. II - unstable, key's angle of rotation: 60° to pos. I, 45° to pos. II, contacts of the switch are switched simultaneously 1 - Removing the key at position 0 2 - Removing the key at position 0 and I IP40	NEF22 - Zd1 NEF22 - Zd2	37.1
Lock-operated drive, I → 0 ← II, , unstable, key's angle of rotation 2x45°, contacts of the switch are switched separately 1 - Removing the key at position 0 IP40	NEF22 - Ze1	37.1
Lock-operated drive, I - 0 ← II, pos. I - stable; pos. II - unstable, knob's angle of rotation 2x45°, contacts of the switch are switched separately 1 - Removing the key at position 0 2 - Removing the key at position 0 and I IP40	NEF22 - Zf1 NEF22 - Zf2	37.1
Lock-operated drive, I → 0 - II, , pos. I - unstable; pos. II - stable, knob's angle of rotation 2x45°, contacts of the switch are switched separately 1 - Removing the key at position 0 IP40	NEF22 - Zg1	37.1
Lock-operated drive, 0 - I - II,, stable, key's angle of rotation 2x45°, contacts of the switch are switched separately 2 - Removing the key at position 0 and I 3 - Removing the key at position 0, I and II IP40	NEF22 - Zh2 NEF22 - Zh3	37.1
Lock-operated drive, 0 - I ← II, pos. I - stable; pos. II - unstable, knob's angle of rotation 2x45°, contacts of the switch are switched separately 2 - Removing the key at position 0 and I IP40	NEF22 - Zi2	37.1

• METAL AND VANDAL-PROOF DRIVES



Type	Designation	Colour	Dimensions (mm)	Weight (g)
Vandal-proof button with self-return mechanism IP65	NEF22-F	metal		49.3
Vandal-proof button with self-return mechanism Backlit IP65	NEF22-FL			49.3

• SWITCHING ELEMENTS AND BACKLIT BLOCKS



Type	Designation	Colour	Dimensions (mm)	Weight (g)
Switching element type EF22 (1NO) IP20	EF22X			11.0
Switching element type EF22 (1NC) With effective opening IP20	EF22Y			12.4
All-purpose LED backlit block operating under 24-230V AC/DC voltage IP20	EF22LNc EF22LNz EF22LNg EF22LNB EF22LNB			11.4
All-purpose LED backlit blocks, flashing light, operates under 24-230V AC/DC voltage IP20	EF22LBc EF22LBz EF22LBg EF22LBn EF22LBb			11.4

1b.3 ASSEMBLY AND DISASSEMBLY

• Assembly

First, put a screwdriver in the hole located in the lug in the intermediate body, prise slightly and pull the body away from the drive element. Then, undo the clamp nut to enable putting the drive element into the hole in the desk. The body of the drive and the gasket

are put inside the assembly hole at the front side of the desk. Then, the clamp nut under the desk is tightened all the way, and the drive element is connected to the intermediate body.

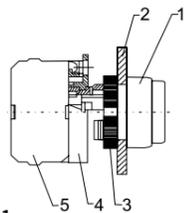


Fig. 1

Elements of the button:

1. Drive element
2. Desk
3. Clamp nut
4. Intermediate body
5. EF22 switching element

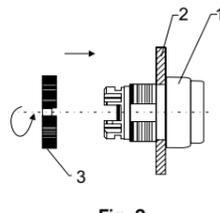


Fig. 2

Position of the drive element in relation to the desk

1. Drive element
2. Desk
3. Clamp nut

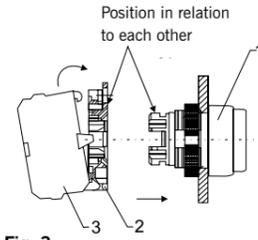


Fig. 3

Installation of the intermediate body with the drive element

1. Drive element
2. Intermediate body
3. EF22 switching element

• Disassembly

In order to disassemble the NEF22 control button, follow the steps described below:

1) Use a flat screwdriver to prise the mobile clip of the switching element, and then pull the switch from the intermediate body (fig. 4).

2) Then, put the screwdriver in the hole located in the lug in the intermediate body, prise slightly and pull the body away from the drive element (fig. 5).

3) Finally, undo the clamp nut to enable removing the drive element from the desk (fig. 6).

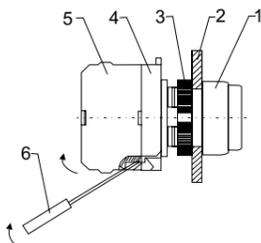


Fig. 4

Disassembling of the switch from the intermediate body:

1. Drive element
2. Desk
3. Clamp nut
4. Intermediate body
5. EF22 switching element
6. Flat screwdriver

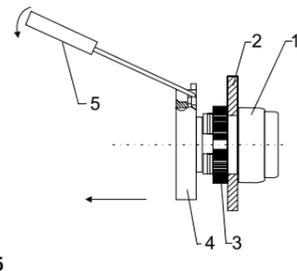


Fig. 5

Disassembling of the intermediate body:

1. Drive element
2. Desk
3. Clamp nut
4. Intermediate body
5. Flat screwdriver

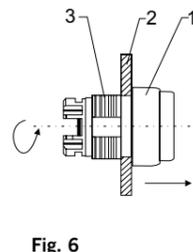
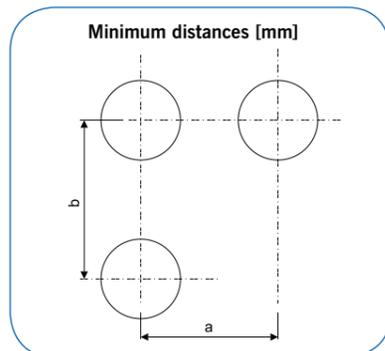
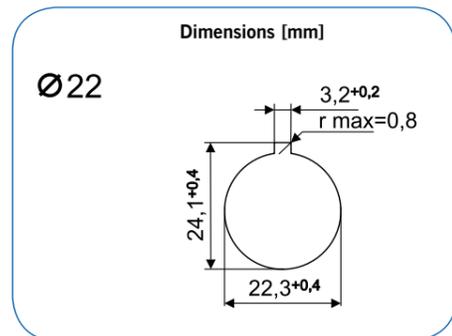


Fig. 6

Disassembling of the nut:

1. Drive element
2. Desk
3. Clamp nut

1b.4 ASSEMBLY HOLES



a [mm]	b [mm]
30	60

1b.5 BUTTON SELECTION TABLE

Series	Type of drive	Colour	Combination for contacts	Backlight
NEF22	K	z	EF22X	EF22LNz
Buttons of the NEF22 series, 22mm, with metal bodies	Type of the drive button	Colour of the button	Type of the switching element	Backlight block LED 24-230V AC/DC
K Covered W Protruding F Vandal-proof FL Vandal-proof, backlit D Palm button DR/P Interlocked palm button, unlocked by turning the button DR/Z Interlocked palm button, unlocked by turning the key Pa Knob-operated, 0-I, stable Pc Knob-operated, I-0-II, stable Pd Knob-operated, I-0-II, pos. I – stable; pos. II – unstable, Pe Knob-operated, I-0-II, unstable Pf Knob-operated, I-0-II, pos. I – stable; pos. II – unstable, Pg Knob-operated, I-0-II, pos. I – unstable, pos. II – stable Ph Knob-operated, 0-I-II, stable	z Red g Green g Yellow s Black n Blue b White	EF22X - NO contact EF22Y - NC contact	Backlight block LED 24-230V AC/DC, continuous illumination EF22LNb ○ EF22LNc ● EF22LNg ● EF22LNn ● EF22LNz ●	Backlight blocks LED 24-230V AC/DC, flashing EF22LBb ○ EF22LBc ● EF22LBg ● EF22LBn ● EF22LBz ●
Key removal position 1 – Removing the key at position 0 2 – Removing the key at position 0 and I 3 – Removing the key at position 0, I and II				
Za Lock-operated, 0-I, stable Zb Lock-operated, 0-I, unstable Zc Lock-operated, I-0-II, stable Zd Lock-operated, I-0-II, pos. I – stable; pos. II – unstable, Ze Lock-operated, I-0-II, unstable Zf Lock-operated, I-0-II, pos. I – stable; pos. II – unstable, Zg Lock-operated, I-0-II, pos. I – unstable, pos. II – stable Zh Lock-operated, 0-I-II, stable Zi Lock-operated, I-0-II, pos. I – stable; pos. II – unstable,				

• SAMPLE ORDER

Control button: NEF22-Pag + EF22X and EF22Y + EF22LNg

Knob-operated drive, yellow, 0-1 + EF22X and EF22Y switching elements + All-purpose backlit block that operates under 24-230V AC/DC voltage, with a yellow LED, continuous illumination

1.c NEF30W and NEF30WK CONTROL BUTTONS

• Purpose

Control drives of the NEF30W series with metal bodies are intended for installation in standardised Ø30.5mm holes, made in desks, control and signal boards, or directly into bodies of machines and equipment. They are intended to work with the WGX and WGY switching elements manufactured in SN Promet.

Control drives of the NEF30WK series with metal bodies are intended for installation in standardised Ø 30.5mm holes, made in control boxes and cabinets. They are intended to work with the WDX and WDY switching elements manufactured by SN Promet, which are fastened onto the DIN35 bus.

• Design and principle of operation

NEF30W drives are comprised of the following elements:

- A drive element;
- An adapter (adjusted to connect to the W type switching elements).

The NEF30W backlit drives are additionally equipped with a backlight element, which is attached to the drive element. The NEF30WK drives only have the drive element.

A drive of the NEF30W type does not constitute a complete drive button. A complete drive button is comprised of the following:

- A driver of the NEF30W or NEF30WK type;
- Switching elements of the W type (ordered separately).

• Assembly

The body of the drive is put inside the assembly hole located under the desk. Then, a sealing ring is installed, and the decorative nickel-plated back nut is tightened all the way. Finally, the clamp nut under the desk is tightened.

Backlit drives are additionally equipped with a flat nut, which is located under the conical back nut. This way, it is possible to replace bulbs, when the back nut has been undone.

1c.1 TECHNICAL DATA

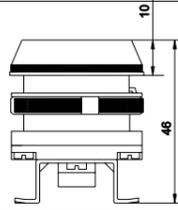
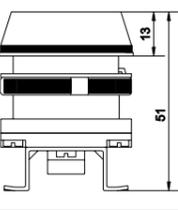
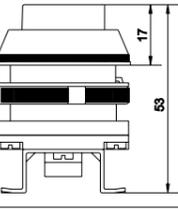
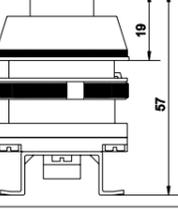
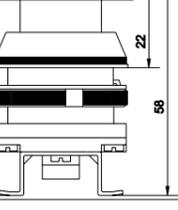
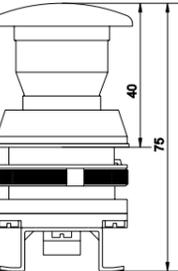
Insulation rated voltage (U_i)	500 V
Rated thermal current (I_{th})	10 A
Rated voltages and switching currents per each utilisation category (U_e / I_e) AC15 DC13	230V/6A, 400V/4A 110V/1A, 220V/0,25A
Rated impulse withstand voltage (U_{imp})	4,000 V
Limited withstand current	1,000 A
Type and the highest rating of protection against the effects of short-circuit currents' impact	gG 10A
Level of environmental pollution	2
Protection class for button drives	IP 55, IP 65
Protection class of the section located under the desk	IP 20
Mechanical life - For return drives - For knob- and lock-operated drives, and for interlocked drives	3 x 10 ⁶ 10 ⁵
Rated frequency of switching - For return buttons - For interlocked buttons	600 switches/h 12 switches/h
Cross-sections of terminals	1 or 2 x LY 0.75 - 1.5 mm ² 1 or 2 x DY 1.0 - 1.5 mm ²
Working position	any
Working temperature	N/2 -15° to +30°C or W/3 -40° to +50°C
Travel of effective opening ¹⁾	2.1 mm
Total travel ¹⁾	5.5 mm
Force of effective opening ¹⁾	2.3 N

The product conforms to the following standard: PN-EN 60947-5-1
Emergency interlocked palm drives meet the requirements of the PN-EN 60947-5-5 standard.

1) The values are applicable to the effective opening of NC switching elements (1NC)

1c.2 TYPES OF BUTTON DRIVES

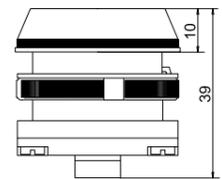
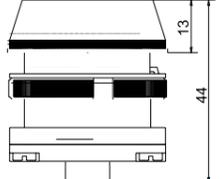
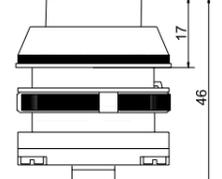
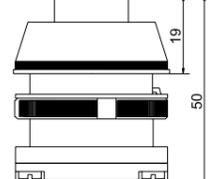
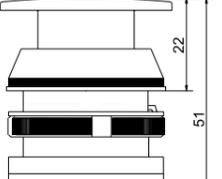
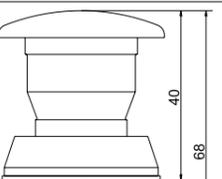
• NEF30W RETURN DRIVES

Type	Designation	Colour	Dimensions (mm)	Weight (g)
 Drive with a covered button IP55	NEF30W – Kc NEF30W – Kz NEF30W – Kg NEF30W – Ks NEF30W – Kn NEF30W – Kb			93
 Drive with a sealed covered button IP65	NEF30W – UKc NEF30W – UKz NEF30W – UKg NEF30W – UKs NEF30W – UKn NEF30W – UKb			107
 Drive with a protruding button IP55	NEF30W – Wc NEF30W – Wz NEF30W – Wg NEF30W – Ws NEF30W – Wn NEF30W – Wb			94
 Drive with a sealed protruding button IP65	NEF30W – UWc NEF30W – UWz NEF30W – UWg NEF30W – UWs NEF30W – UWn NEF30W – UWb			108
 Drive with a palm button IP55	NEF30W – Dc NEF30W – Dz NEF30W – Ds NEF30W – Dg			100
 Drive with a sealed palm button IP65	NEF30W – UDc NEF30W – UDz NEF30W – UDs NEF30W – UDg			130

NOTES: Please order the W type switching elements separately.

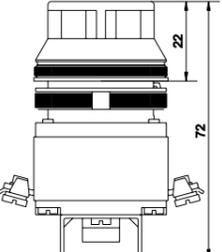
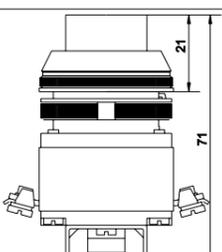
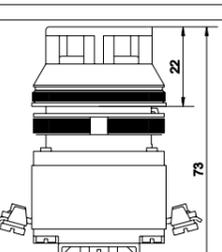
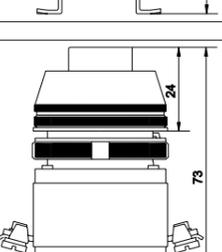


• NEF30WK RETURN DRIVES

Type	Designation	Colour	Dimensions (mm)	Weight (g)
 Drive with a covered button IP55	NEF30WK - Kc NEF30WK - Kz NEF30WK - Kg NEF30WK - Ks NEF30WK - Kn NEF30WK - Kb	● ● ● ● ● ○	 10 39	82
 Drive with a sealed covered button IP65	NEF30WK - UKc NEF30WK - UKz NEF30WK - UKg NEF30WK - UKs NEF30WK - UKn NEF30WK - UKb	● ● ● ● ● ○	 13 44	96
 Drive with a protruding button IP55	NEF30WK - Wc NEF30WK - Wz NEF30WK - Wg NEF30WK - Ws NEF30WK - Wn NEF30WK - Wb	● ● ● ● ● ○	 17 46	83
 Drive with a sealed protruding button IP65	NEF30WK - UWc NEF30WK - UWz NEF30WK - UWg NEF30WK - UWs NEF30WK - UWn NEF30WK - UWb	● ● ● ● ● ○	 19 50	97
 Driver with a palm button IP55	NEF30WK - Dc NEF30WK - Dz NEF30WK - Ds NEF30WK - Dg	● ● ● ●	 22 51	89
 Driver with a sealed palm button IP65	NEF30WK - UDc NEF30WK - UDz NEF30WK - UDs NEF30WK - UDg	● ● ● ●	 40 68	119

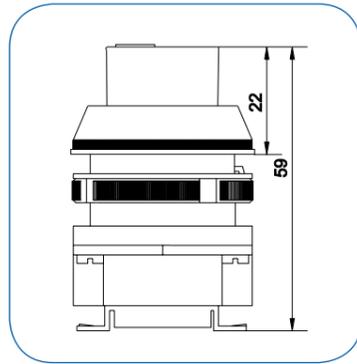
NOTES: Please order the W type switching elements separately.

• NEF30W BACKLIT DRIVES

Type	Designation	Colour	Dimensions (mm)	Weight (g)
 Drive with a covered button Standard back-light, based on the BA9s 24V ² bulb IP55	NEF30W - KLc NEF30W - KLz NEF30W - KLg NEF30W - KLn NEF30W - KLb	● ● ● ● ○	 22 72	143
 Drive with a protruding button Standard back-light, based on the BA9s 24V ² bulb IP55	NEF30W - WLc NEF30W - WLz NEF30W - WLg NEF30W - WLn NEF30W - WLb	● ● ● ● ○	 21 71	133
 Drive with a sealed covered button Standard back-light, based on the BA9s 24V ² bulb IP65	NEF30W - UKLc NEF30W - UKLz NEF30W - UKLg NEF30W - UKLn NEF30W - UKLb	● ● ● ● ○	 22 73	145
 Drive with a sealed protruding button Standard back-light, based on the BA9s 24V ² bulb IP65	NEF30W - UWLc NEF30W - UWLz NEF30W - UWLg NEF30W - UWLn NEF30W - UWLb	● ● ● ● ○	 24 73	135

NOTES:
1. Please order the W type switching elements separately.
2. Standard backlit drives use a 24V bulb (it is also possible to design drives with a 110/230V bulb or 24V AC/DC and 230V AC LEDs).

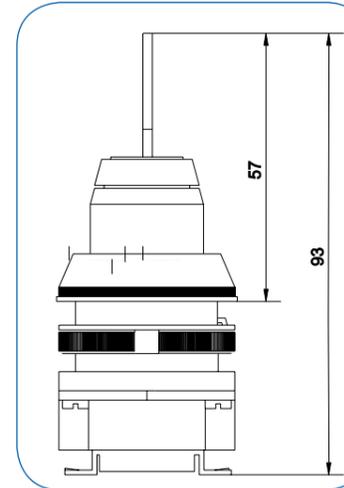
• NEF30W KNOB-OPERATED DRIVES



NOTES: Switching elements of the WG type must be ordered separately.

Type	Designation	Colour	Weight (g)
Knob-operated drive 0-I stable, key's angle of rotation 90° IP56	NEF30W - TPas NEF30W - TPac NEF30W - TPaz NEF30W - TPag NEF30W - TPan	● ● ● ● ●	128
Knob-operated drive 0 ← I Unstable, knob's angle of rotation 90° IP56	NEF30W - TPbs NEF30W - TPbc NEF30W - TPbz NEF30W - TPbg NEF30W - TPbn	● ● ● ● ●	128
Knob-operated drive I - 0 - II, knob's angle of rotation 2x60°, contacts of the switch are switched separately IP56	NEF30W - TPcs NEF30W - TPcc NEF30W - TPcz NEF30W - TPcg NEF30W - TPcn	● ● ● ● ●	130
Knob-operated drive I - 0 ← II Pos. I - stable; pos. II - unstable, knob's angle of rotation 2x60°, contacts of the switch are switched simultaneously IP56	NEF30W - TPds NEF30W - TPdc NEF30W - TPdz NEF30W - TPdg NEF30W - TPdn	● ● ● ● ●	130
Knob-operated drive I → 0 ← II Unstable, knob's angle of rotation 2x60°, contacts of the switch are switched separately IP56	NEF30W - TPes NEF30W - TPeс NEF30W - TPez NEF30W - TPeg NEF30W - TPen	● ● ● ● ●	130
Knob-operated drive I - 0 ← II Pos. I - stable; pos. II - unstable, knob's angle of rotation 2x60°, contacts of the switch are switched separately IP56	NEF30W - TPfs NEF30W - TPfc NEF30W - TPfz NEF30W - TPfg NEF30W - TPfn	● ● ● ● ●	130

• NEF30W LOCK-OPERATED DRIVES



NOTES:
The key can be removed in position "0", exclusively. Please order the W type switching elements separately.

Type	Designation	Weight (g)
Lock-operated drive, 0-I stable, key's angle of rotation 90° IP56, metal	NEF30W - TZaM	128
Lock-operated drive, 0 ← I, unstable, key's angle of rotation 90° IP56, metal	NEF30W - TZbM	128
Lock-operated drive, I - 0 - II, stable, key's angle of rotation 2x60°, contacts of the switch are switched separately IP56, metal	NEF30W - TZcM	130
Lock-operated drive, I - 0 ← II, poz. I stable, pos. II unstable, key's angle of rotation: 60° to pos. I, 45° to pos. II, contacts of the switch are switched simultaneously IP56, metal	NEF30W - TZdM	130
Lock-operated drive, I → 0 ← II, , unstable, key's angle of rotation 2x60°, contacts of the switch are switched separately IP56, metal	NEF30W - TZeM	130
Lock-operated drive, I - 0 ← II, pos. I - stable, pos. II - unstable, key's angle of rotation 2x60°, contacts of the switch are switched separately IP56, metal	NEF30W - TZfM	130

• NEF30W EMERGENCY INTERLOCKED PALM BUTTON



NOTES: Please order the WG type switching elements separately.

Type	Designation	Colour	Dimensions (mm)	Weight (g)
Interlocked palm button, unlocked by turning the button IP55	NEF30W - DR/Pc	●		165

• NEF30WK EMERGENCY INTERLOCKED PALM BUTTON FOR CONTROL BOXES



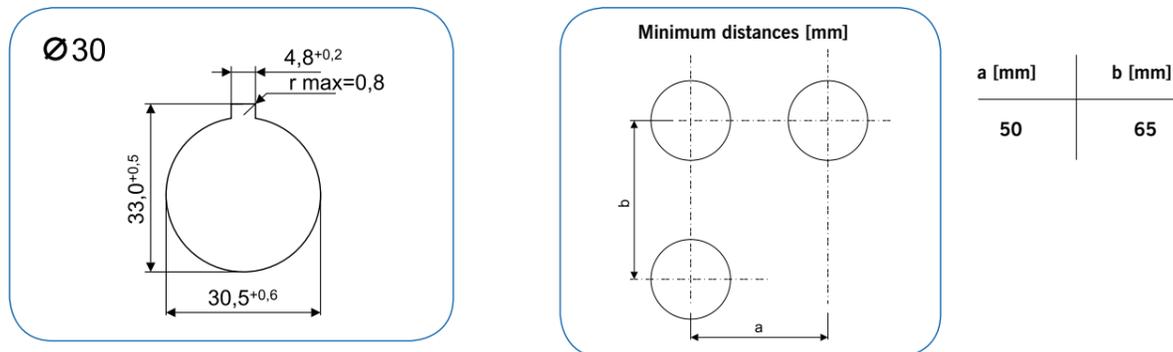
NOTES: Please order the WD type switching elements separately.

Type	Designation	Colour	Dimensions (mm)	Weight (g)
Interlocked palm button, unlocked by turning the button IP55	NEF30WK - DR/Pc	●		157

SWITCHING ELEMENTS OF THE W TYPE

Type	Designation	Colour	Dimensions (mm)
<p>Switching element of the W type, intended for top installation</p> <p>IP20</p> <p>Weight (g) – 23.6g</p> <p>Intended for NEF30W drives</p>	WGX (NO)	●	<p>40, 36, 41, 9.5</p>
<p>Switching element of the W type, intended for top installation</p> <p>IP20</p> <p>Weight (g) - 23.6 g</p>	WGY (NC)	●	
<p>Switching element of the W type, intended for bottom installation</p> <p>IP20</p> <p>Weight (g) - 24.6 g</p> <p>Intended for NEF30WK drives</p>	WDX (NO)	●	
<p>Switching element of the W type, intended for bottom installation</p> <p>IP20</p> <p>Weight (g) - 24.6 g</p>	WDY (NC)	●	

1c.3 ASSEMBLY HOLES



1c.4 CONTROL BUTTONS SELECTION TABLE

Series	Type of drive	Colour	Combination for contacts	Backlight
NEF30W	KL	z	WGX	230V
Buttons of the NEF30W and NEF30WK series, 30mm, with metal bodies	Type of the drive button	Colour of the button	Type of the switching element	Backlight element
<ul style="list-style-type: none"> K Covered W Protruding D Palm button DR/P Interlocked palm button, unlocked by turning UW Sealed, protruding UK Sealed, covered UD Sealed palm button WL Backlit, protruding UWL Sealed, protruding, backlit TPa Knob-operated, 0-I, stable TPb Knob-operated, 0→I, unstable TPc Knob-operated, I-0-II, stable TPd Knob-operated, I-0← II, pos. I – stable; pos. II – unstable TPe Knob-operated, I→ 0← II, unstable TPf Knob-operated, I-0← II, pos. I – stable; pos. II – unstable TZaM Lock-operated, 0-I, stable TZbM Lock-operated, 0→I, unstable TZcM Lock-operated, I-0-II, stable TZdM Lock-operated, I-0← II, pos. I – stable; pos. II – unstable TZeM Lock-operated, I→0← II, unstable TZfM Lock-operated, I-0←II, pos. I – stable; pos. II – unstable 	<ul style="list-style-type: none"> c Red z Green g Yellow s Black n Blue b White 	<p>For NEF30W: WGX – NO contact WGY – NC contact</p> <p>For NEF30WK: WDX – NO contact WDY – NC contact</p>	<p>24V - 24V bulb 110V - 130V bulb 230V - 230V bulb D24V - 24V AC/DC LED D230V - 230V AC LED</p>	

SAMPLE ORDER

Control button: **NEF30W-Wz XY**
 Ordering a drive: **NEF30W-Wz** (A return drive with a green protruding button)

Control button: **NEF30WK – UDc Y**

Ordering a drive: **NEF30WK-UDc** (A return drive with a red sealed palm button)

Ordering switching elements: **WGX** (A switching element of the W type, intended for top installation, NC contact; **WGY** (A switching element of the W type, intended for top installation, NO contact).

Ordering switching elements: **WDY** (A switching element of the W type, intended for bottom installation, NO contact)

1d NEF30 CONTROL BUTTONS

• Purpose

Control buttons of the NEF30 series with metal bodies are intended for installation in standardised Ø30.5mm holes, made in desks, control and signal boards, or directly into bodies of machines and equipment. They are manufactured in two climate designs: N/2 and W/3. Buttons of the NEF30 type feature a modular construction.

• Construction

Each button is comprised of the following:

- A drive element, also referred to as the button drive;
- A switching element comprised of one, two or three switches, which are fastened to the drive.

Backlit buttons are additionally equipped with a backlight element, which is attached to the drive.

• Assembly

NEF30 buttons are installed with clamp nuts and there is no need to uncouple the drive and switches.

The body of the drive is put inside the assembly hole located under the desk. Then, a sealing ring is installed, and the decorative nickel-plated back nut is tightened all the way. Finally, the clamp nut under the desk is tightened.

Backlit buttons are additionally equipped with a flat nut, which is located under the conical back nut. This way, it is possible to replace bulbs, when the back nut has been undone.

Control buttons are delivered as complete products, as ordered.

1d.1 TECHNICAL DATA

Insulation rated voltage (U_i)	500 V
Rated thermal current (I_{th})	10 A
Rated voltages and switching currents per each utilisation category (U_e / I_e) AC15 DC13	230V/6A, 400V/4A 110V/1A, 220V/0,25A
Rated impulse withstand voltage (U_{imp})	2,500 V
Limited withstand current	1,000 A
Type and the highest rating of protection against the effects of short-circuit currents' impact	gG 6A
Level of environmental pollution	2
Protection class for button drives	IP 55, IP 65
Protection class for the part under the desk	IP 20
Mechanical life - For return drives - For knob- and lock-operated drives, and for interlocked drives	3x10 ⁶ 10 ⁴
Rated frequency of switching - For return buttons - For interlocked buttons	600 switches/h 12 switches/h
Cross-sections of terminals	1 or 2 x LY 0.75 - 1.5 mm ² 1 or 2 x DY 1.0 - 1.5 mm ²
Rated voltage of the transformer	230V/24V lub 110V/24V
Rated power of the transformer	2 W
Working position	any
Working temperature	N/2 -15° to +30°C or W/3 -40° to +50°C
Travel of effective opening ¹⁾	2.3 mm
Total travel ¹⁾	5 mm
Force of effective opening ¹⁾	1.9 N
Rated voltage of the EF22L backlit block (U_e)	24-230 V AC/DC

The product conforms to the following standard: PN-EN 60947-5-1
Emergency interlocked palm drives meet the requirements of the PN-EN 60947-5-5 standard.

1) The values are applicable to the effective opening of NC switching elements (1NC)

1d.2 TYPES OF BUTTONS

• RETURN BUTTONS



Type	Designation	Colour	Dimensions (mm)	Weight ¹⁾ (g)
Button with a covered button IP55	NEF30 – Kc... NEF30 – Kz... NEF30 – Kg... NEF30 – Ks... NEF30 – Kn... NEF30 – Kb...	● ● ● ● ● ○		80



Button with a sealed covered button IP65	NEF30 – UKc... NEF30 – UKz... NEF30 – UKg... NEF30 – UKs... NEF30 – UKn... NEF30 – UKb...	● ● ● ● ● ○		94
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Button with a protruding button IP55	NEF30 – Wc... NEF30 – Wz... NEF30 – Wg... NEF30 – Ws... NEF30 – Wn... NEF30 – Wb...	● ● ● ● ● ○		81
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Button with a sealed protruding button IP65	NEF30 – UWc... NEF30 – UWz... NEF30 – UWg... NEF30 – UWs... NEF30 – UWn... NEF30 – UWb...	● ● ● ● ● ○		95
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Button with a palm button IP55	NEF30 – Dc... NEF30 – Dz... NEF30 – Ds... NEF30 – Dg...	● ● ● ●		87
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NOTES: 1. Weights do not include EF30 switching elements. The data concerning switching elements has been provided on page 37.



Button with a sealed palm button IP65	NEF30 – UDc... NEF30 – UDz... NEF30 – UDs... NEF30 – UDg...	● ● ● ●		117

EMERGENCY INTERLOCKED PALM BUTTONS



Type	Designation	Colour	Dimensions (mm)	Weight ¹ (g)
Interlocked palm button, unlocked by turning the button IP55	NEF30 – DR/Pc...	●		152



Interlocked palm button, unlocked by turning the button IP56	NEF30 – DR/c...	●		152



Palm button, sealed, interlocked, unlocked by extending the button IP66	NEF30 – UDRc...	●		150

NOTES: 1. Weights do not include EF30 switching elements. The data concerning switching elements has been provided on page 37.

BACKLIT RETURN BUTTONS



Type	Designation	Colour	Dimensions (mm)	Weight ¹ (g)
Button with a covered button, standard backlight based on a BA9s 24V ² bulb IP55	NEF30 - KLC... NEF30 - KLZ... NEF30 - KLG... NEF30 - KLN... NEF30 - KLB...	● ● ● ● ○		130
	Button with a covered button, LED-based backlight: All-purpose LED module 24-230V AC/DC, IP55	NEF30 - KLDc... NEF30 - KLDz... NEF30 - KLDg... NEF30 - KLDn... NEF30 - KLDb...		



Button with a protruding button, standard backlight based on a BA9s 24V ² bulb IP55	NEF30 - WLC... NEF30 - WLZ... NEF30 - WLG... NEF30 - WLN... NEF30 - WLB...	● ● ● ● ○		120
	Button with a protruding button, LED-based backlight: all-purpose LED module 24-230V AC/DC, IP55	NEF30 - WLDc... NEF30 - WLDz... NEF30 - WLDg... NEF30 - WLDn... NEF30 - WLDb...		



Button with a sealed covered button, standard backlight based on a BA9s 24V ² bulb IP65	NEF30 - UKLC... NEF30 - UKLZ... NEF30 - UKLG... NEF30 - UKLN... NEF30 - UKLB...	● ● ● ● ○		132
	Button with a sealed covered button, LED-based backlight: all-purpose LED module 24-230V AC/DC, IP65	NEF30 - UKLDc... NEF30 - UKLDz... NEF30 - UKLDg... NEF30 - UKLDn... NEF30 - UKLDb...		



Button with a sealed protruding button, standard backlight based on a BA9s 24V ² bulb IP65	NEF30 - UWLC... NEF30 - UWLZ... NEF30 - UWLG... NEF30 - UWLN... NEF30 - UWLB...	● ● ● ● ○		122
	Button with a sealed protruding button, LED-based backlight: all-purpose LED module 24-230V AC/DC IP65	NEF30 - UWLDc... NEF30 - UWLDz... NEF30 - UWLDg... NEF30 - UWLDn... NEF30 - UWLDb...		

NOTES:

- Weights do not include switching elements. The data concerning EF30 switching elements has been provided on page 37.
- NEF30 backlit buttons work with the following bulbs: BA9s 6V, 12V, 24V, 48V – 2W and 130V, 240V – Max 3W, and LED BA9s for 24V AC/DC, 230V AC. Designations of terminals for the backlit element: X1 and X2.
- Backlit driver that use bulbs operating under the rated voltage of 110V (130V) and 230V (240V) are intended only for discontinuous operation.

• BACKLIT RETURN BUTTONS WITH A TRANSFORMER



Type	Designation	Colour	Dimensions (mm)	Weight ¹ (g)
Buton with a covered button, standard backlight based on a BA9s 24V ² bulb IP55	NEF30 - KLTc... NEF30 - KLTz... NEF30 - KLTg... NEF30 - KLTn... NEF30 - KLTb...	● ● ● ● ○		247



Buton with a protruding button, standard backlight based on a BA9s 24V ² bulb IP55	NEF30 - WLTc... NEF30 - WLTz... NEF30 - WLTg... NEF30 - WLTn... NEF30 - WLTb...	● ● ● ● ○		237
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Buton with a sealed covered button, standard backlight based on a BA9s 24V ² bulb IP65	NEF30 - UKLTc... NEF30 - UKLTz... NEF30 - UKLTg... NEF30 - UKLTn... NEF30 - UKLTb...	● ● ● ● ○		249
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Buton with a sealed protruding button, standard backlight based on a BA9s 24V ² bulb IP65	NEF30 - UWLTc... NEF30 - UWLTz... NEF30 - UWLTg... NEF30 - UWLTn... NEF30 - UWLTb...	● ● ● ● ○		239
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NOTES:
1. Weights do not include switching elements. The data concerning EF30 switching elements has been provided on page 37.
2. The NEF30 backlit buttons with a transformer feature luminous elements with a BA9s cap: 24V - 2W bulbs and 24V AC/DC LEDs, and 240V/24V and 110V/24V transformers. These buttons can have one or two EF30 switches.

• KNOB-OPERATED RETURN BUTTONS



Type	Designation	Colour	Dimensions (mm)	Weight ¹ (g)
Knob-operated return button ² 0 - I Knob's angle of rotation 90° IP55	NEF30 - WRc... NEF30 - WRs...	● ●		100

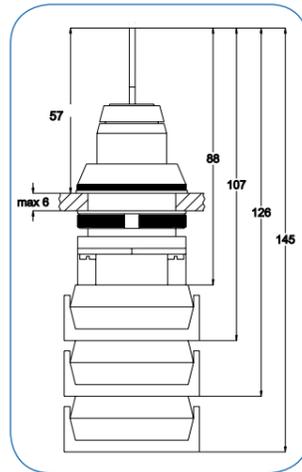
• KNOB-OPERATED BUTTONS



Type	Designation	Colour	Weight ¹ (g)
 Knob-operated button 0-I, stable, key's angle of rotation 90° IP56	NEF30 - TPas... NEF30 - TPac... NEF30 - TPaz... NEF30 - TPag... NEF30 - TPan...	● ● ● ● ●	84.9
 Knob-operated button 0 ← I, unstable, knob's angle of rotation 90° IP56	NEF30 - TPbs... NEF30 - TPbc... NEF30 - TPbz... NEF30 - TPbg... NEF30 - TPbn...	● ● ● ● ●	85.1
 Knob-operated button I - 0 - II, stable, knob's angle of rotation 2x60°, contacts of the switch are switched separately IP56	NEF30 - TPcs... NEF30 - TPcc... NEF30 - TPcz... NEF30 - TPcg... NEF30 - TPcn...	● ● ● ● ●	85.1
 Knob-operated button I - 0 ← II, pos. I - stable; pos. II - unstable, knob's angle of rotation: 2x60°, contacts of the switch are switched simultaneously IP56	NEF30 - TPds... NEF30 - TPdc... NEF30 - TPdz... NEF30 - TPdg... NEF30 - TPdn...	● ● ● ● ●	85.1
 Knob-operated button I → 0 ← II, unstable, knob's angle of rotation 2x60°, contacts of the switch are switched separately IP56	NEF30 - TPes... NEF30 - TPecc... NEF30 - TPez... NEF30 - TPez... NEF30 - TPen...	● ● ● ● ●	85.1
 Knob-operated button I - 0 ← II, pos. I - stable; pos. II - unstable, knob's angle of rotation: 2x60°, contacts of the switch are switched separately IP56	NEF30 - TPfs... NEF30 - TPfc... NEF30 - TPfz... NEF30 - TPfg... NEF30 - TPfn...	● ● ● ● ●	85.1

NOTES:
1. Weights do not include switching elements. The data concerning EF30 switching elements has been provided on page 37.
2. A NEF30-WR button can be activated, either by pressing or turning the button. The button automatically returns to the unforced position, when released.
The button remains in the forced position, if turned clockwise by 90°. To unlock the button, turn it counter-clockwise to the unforced position.

• LOCK-OPERATED BUTTONS



Type	Designation	Colour	Weight ¹ (g)
	Lock-operated button, 0-I, stable, key's angle of rotation 90° NEF30 - TZaM... IP56	metal	115
	Lock-operated button, 0 ← I, unstable, key's angle of rotation 90° NEF30 - TZbM... IP56	metal	115
	Lock-operated button, I - 0 - II, stable, key's angle of rotation 2x60°, contacts of the switch are switched separately NEF30 - TZcM... IP56	metal	117
	Lock-operated button, I - 0 ← II, pos. I - stable; pos. II - unstable, key's angle of rotation 2x60°, contacts of the switch are switched simultaneously NEF30 - TZdM... IP56	metal	117
	Lock-operated button, I → 0 ← II, unstable, key's angle of rotation 2x60°, contacts of the switch are switched separately NEF30 - TZeM... IP56	metal	117
	Lock-operated button, I - 0 ← II, pos. I - stable, pos. II - unstable, key's angle of rotation 2x60°, contacts of the switch are switched separately NEF30 - TZfM... IP56	metal	117

NOTES:

- Weights do not include switching elements. The data concerning EF30 switching elements has been provided on page 37.
- The key can be removed at position "0", exclusively.

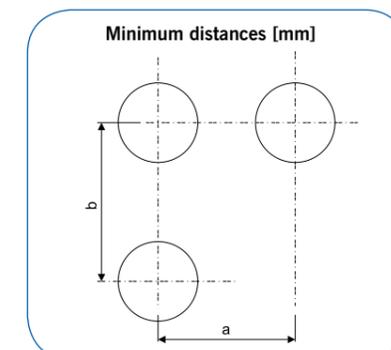
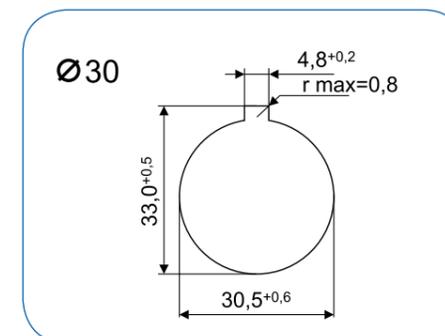


Type	Designation	Colour	Dimensions (mm)	Weight ¹ (g)
Lock-operated button, I-0-II, stable, key's angle of rotation 2x90° The key can be removed at any position IP55	NEF30 - Z...	●		151
Lock-operated button, 0 - I, key's angle of rotation 90° The key can be removed at position "0", exclusively IP56	NEF30 - B...	metal		151

NOTES:

- Weights do not include switching elements. The data concerning EF30 switching elements has been provided on page 37.
- The lock installed in NEF30-Z buttons makes it possible to lock contacts in the unforced position, by turning the key counter-clockwise to position "I", or in the forced position, by pressing the button and turning the key clockwise to position "II". When the key has been removed at position "0", the button operates as a return button. The key can be removed at any of the three positions.
- If a NEF30-B button is turned clockwise to position "I", the key is locked in the forced position. To unlock, turn the key counter-clockwise to position "0". The key can be removed at position "0", exclusively.

1d.3 ASSEMBLY HOLES



a [mm]	b [mm]
50	65

1d.4 SELECTION TABLE FOR NEF30 CONTROL BUTTONS

Series	Type of drive	Colour	Combination for contacts	Backlight	Climatic design
NEF30	KL	z	2XY	24V	W3
Buttons of the NEF30 series, 30mm, with metal bodies	Type of the drive button	Colour of the button	Type of the switching element	Backlight element	
K Covered W Protruding DR/P Interlocked palm button, unlocked by turning UW Sealed, protruding UK Sealed, covered UD Sealed palm button UDR Interlocked sealed palm button DR Interlocked palm button WR Knob-operated return button TPa Knob-operated, 0-I, stable TPb Knob-operated, 0→I, unstable TPc Knob-operated, I-O-II, stable TPd Knob-operated, I-O-II, pos. I – stable; pos. II – unstable TPe Knob-operated, I→O-II, unstable TPf Knob-operated, I-O-II, pos. I – stable; pos. II – unstable TZaM Lock-operated, 0-I, stable TZbM Lock-operated, 0→I, unstable TZcM Lock-operated, I-O-II, stable TZdM Lock-operated, I-O-II, pos. I – stable; pos. II – unstable TZeM Lock-operated, I→O-II, unstable TZfM Lock-operated, I-O-II, pos. I – stable; pos. II – unstable B Lock-operated, metal Z Lock-operated, key removed at any position KL Covered, backlit KLD Covered, backlit with a LED module UKL Covered, backlit, sealed UKLD Covered, backlit with a LED module, sealed KLT Covered, backlit, with a transformer UKLT Covered, sealed, backlit, with a transformer WL Backlit, protruding WLD Protruding, backlit with a LED module UWL Protruding, backlit, sealed UWLD Protruding, backlit with a LED module, sealed WLT Protruding, backlit, with a transformer UWLT Protruding, sealed, backlit, with a transformer	c Red z Green g Yellow s Black n Blue b White	X - NO contact Y - NC contact XY - 1NO+1NC 2X - 2NO 2Y - 2NC . . . 3X3Y - 3NO+3NC . . 6X - 6NO 6Y - 6NC	W3 – Special version (tropical climate) N2 – Standard version (moderate climate) 24V – 24V bulb 110V – 110V bulb 230V – 230V bulb D24V – LED D230V – LED		

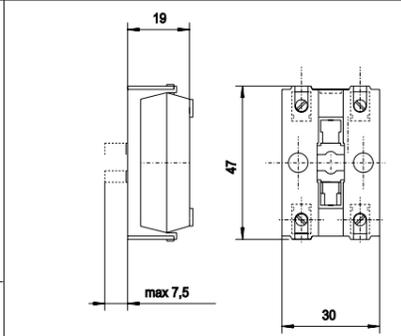
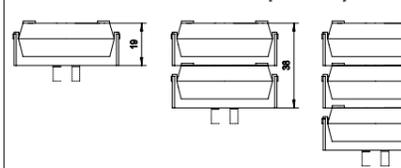
SAMPLE ORDER

Control button: **NEF30 - KLTz 2XY/230V**
 A button with a covered button, backlit, with a transformer; a switch with two NC circuits and one NO circuit, primary voltage of the transformer: 230V.
 Control button in the W/3 design:
 NEF30 - KLTz 2XY/230V W/3

Important:

SN Promet also manufactures control buttons of the NEF type. The drives applied in NEF control buttons are the same as the ones applied in NEF30 buttons. The NEF control buttons that have 1 double-break change-over contact (NC and NO) are marked as NEF...11, while buttons with two change-over contacts are marked as NEF...22.

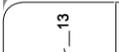
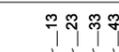
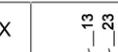
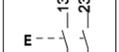
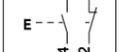
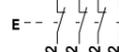
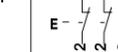
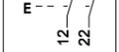
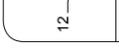
SWITCHING ELEMENTS OF THE EF30 TYPE

Description	Designation	Dimensions (mm)	Weight (g)
 Switching element of the EF30 type IP20	X		With screws: 19,9
	Y		
	XY		
	2X		
	2Y		

Designs for button types:

NEF30-TPc, NEF30-TPe, NEF30-TPf, NEF30-TZc, NEF30-TZe, NEF30-TZf

Standard designs

Diagram	Type	Diagram	Type	Diagram	Type
	X		4X		6X
	2X		2X2Y		3X3Y
	XY		4Y		6Y
	2Y				
	Y				

Special designs

Diagram	Type	Diagram	Type	Diagram	Type
	3XY		5XY		
	X3Y		4X2Y		
	2X4Y		X5Y		

NOTES:

1. It is possible to purchase only EF30 switching elements. When ordering, please provide the name (EF30 switching element) and type (X, Y, XY, 2X, 2Y).

1e Ø38 CONTROL BUTTONS OF THE N TYPE

1e.1 TYPES OF BUTTONS

Type	Type of switch	Colour	Dimensions (mm)	Weight (g)
	Designation			
	N1 - 1KPc N1 - 1KPz N1 - 1KPg N1 - 1KPn N1 - 1KPs	N2 - 1KPc N2 - 1KPz N2 - 1KPg N2 - 1KPn N2 - 1KPs		N1: 65 N2: 80
	N1 - 1WPc N1 - 1WPz N1 - 1WPg N1 - 1WPn N1 - 1WPs	N2 - 1WPc N2 - 1WPz N2 - 1WPg N2 - 1WPn N2 - 1WPs		N1: 65 N2: 85
	N1 - 1DPc N1 - 1DPz N1 - 1DPg N1 - 1DPn N1 - 1DPs	N2 - 1DPc N2 - 1DPz N2 - 1DPg N2 - 1DPn N2 - 1DPs		N1: 70 N2: 90
	N1 - 1UPc N1 - 1UPz N1 - 1UPg N1 - 1UPn N1 - 1UPs	N2 - 1UPc N2 - 1UPz N2 - 1UPg N2 - 1UPn N2 - 1UPs		N1: 75 N2: 95
		N5 - 1c N5 - 1z N5 - 1g N5 - 1n		125

1e.2 TECHNICAL DATA

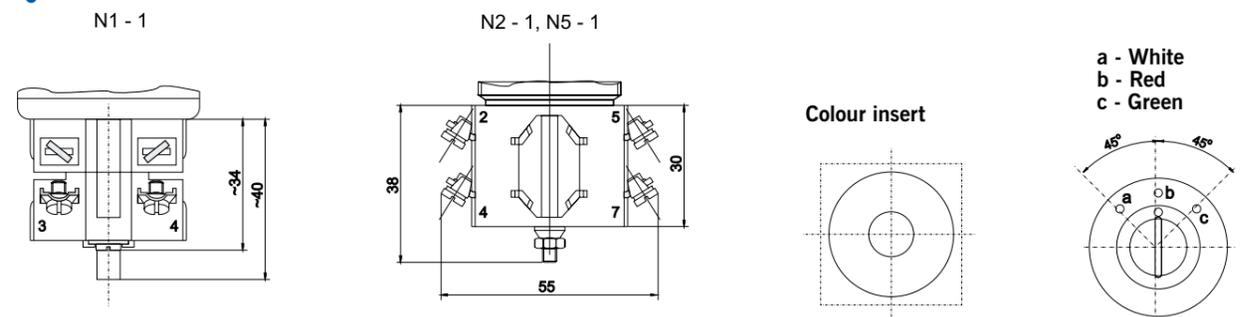
Insulation rated voltage (U _i)	500 V
Rated thermal current (I _{th})	10 A
Rated voltages and switching currents per each utilisation category (U _e /I _e) AC15 DC13	230V/6A, 400V/4A, 500V/2,5A 24V/4A, 110V/1A, 220V/0,25A
Limited withstand current (U _{imp})	2,500 V
Limited withstand current	1,000 A
Type and the highest rating of protection against the effects of short-circuit currents' impact	Bi-Wtz 10A
Level of environmental pollution	2
Protection class for button drives	IP 30, IP 56
Protection class for the part under the desk	IP 00
Mechanical life	1,2x10 ⁶
Rated frequency of switching	600 switches/h
Cross-sections of terminals	1 or 2 x LY 0,75 - 1,5 mm ² 1 or 2 x DY 1,0 - 1,5 mm ²
Working position	any
Working temperature	N/2 -15° to +30°C or W/3 -40° to +50°C

The product conforms to the following standard: PN-EN 60947-5-1

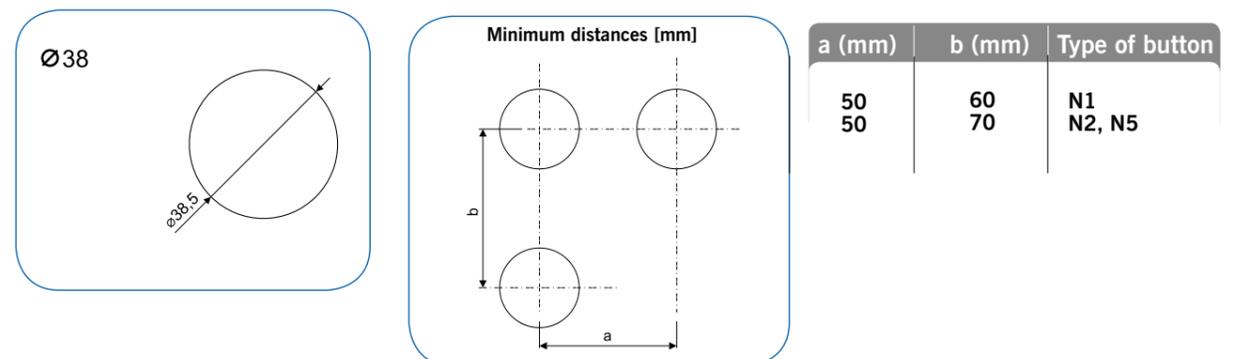
* Buttons of the N5 type feature a lock inside the button, which makes it possible to lock NO or NC contacts using a key. When the key is removed, while the point on the lock's ring is situated directly opposite the "red" point, contacts are interlocked in the unforced position. The button is unlocked, when the key is put into the lock. When the button (lock) is pressed all the way, contacts are switched, and the lock can be switched in the left or right direction

– marked by white and green, respectively. The button is not interlocked if the key is removed at the left position (white). In this position, the N5 button operates as a return button (N1, N2), i.e. the button can be pressed (together with the lock), without the need to use the key.

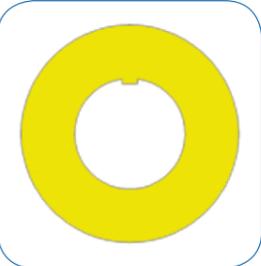
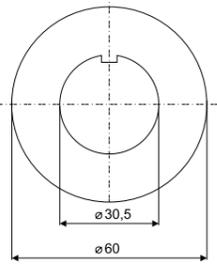
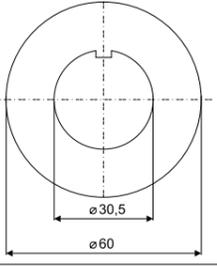
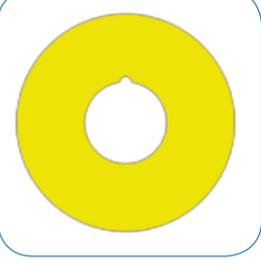
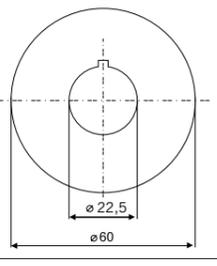
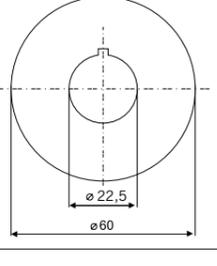
SWITCHING ELEMENTS



ASSEMBLY HOLES



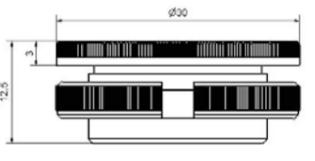
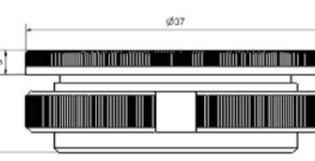
• YELLOW RINGS TO MARK EMERGENCY BUTTONS

Designation	Description	Dimensions
 WO-PIERŚC.ŻÓLTE DR	Yellow rings (max 30mm in diameter), intended for the NEF30 and NEF30W buttons.	 ø30,5 ø60
 WO-PIERŚC.ŻÓLTE DR STOP	Yellow rings (max 30mm in diameter), intended for the NEF30 and NEF30W buttons. They include a STOP-AWARIA (STOP-FAILURE) inscription.	 ø30,5 ø60
 WO-PIERŚC.ŻÓLTE DR/P22	Yellow rings (max 22mm in diameter), intended for the NEF22, NEK22M, and P22 buttons.	 ø22,5 ø60
 WO-PIERŚC.ŻÓLTE DR STOP/FI22	Yellow rings (max 22mm in diameter), intended for the NEF22, NEK22M, and P22 buttons. They include a STOP-AWARIA (STOP-FAILURE) inscription.	 ø22,5 ø60

Important: It is also possible to make special inscriptions on the ring, as requested by the client.

• HOLE STOPPERS



Designation	Description	Overall dimensions
WO-ZAŚLEPKA 22	A metal stopper for Ø22mm holes.	 ø30 12,5
WO-ZAŚLEPKA 30	A metal stopper for Ø30mm holes.	 ø37 12,5

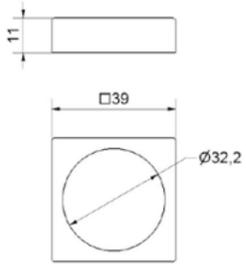
• ASSEMBLY WRENCHES



Designation	Description
WO-KLUCZ NEF22	An assembly wrench for Ø22 mm holes.
WO-KLUCZ NEF30	An assembly wrench for Ø30 mm holes.

• SQUARE COVER PLATE FOR INDICATORS OF THE NEF30 SERIES



Designation	Description	Overall dimensions
WO - NAKŁADKA NEF30	Square cover plate for indicators of the NEF30 series.	 11 □39 ø32,2



SIGNAL LAMPS

- Ø 22 BULB AND LED
- Ø 30 BULB AND LED

The NEF30-L and D30 series Ø30 signal lamps (two metal bodies), the L22 and D22 series Ø22 signal lamps (two plastic bodies), as well as the NEK22M series signal lamps (metal body) are installed in standardized assembly holes, i.e. Ø30.5mm and Ø22.5mm, respectively, which are drilled in panels, control and signal boards, or directly in bodies of equipment and machines. These devices can be used in various climatic zones. They can be installed in any position and used under roof cover if applied in industrial environments (pollution level 2).

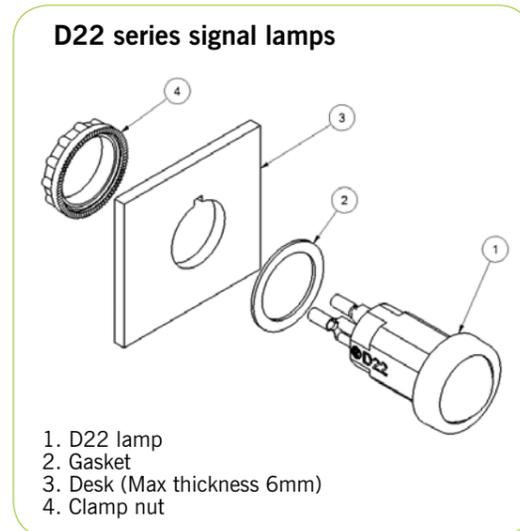
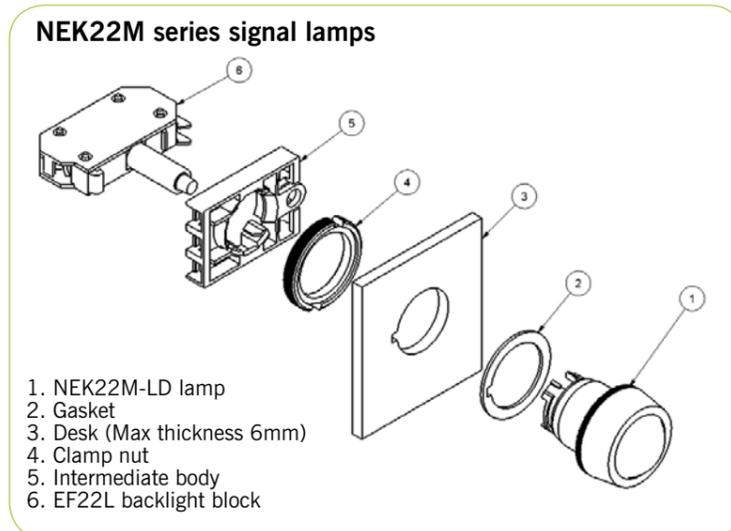
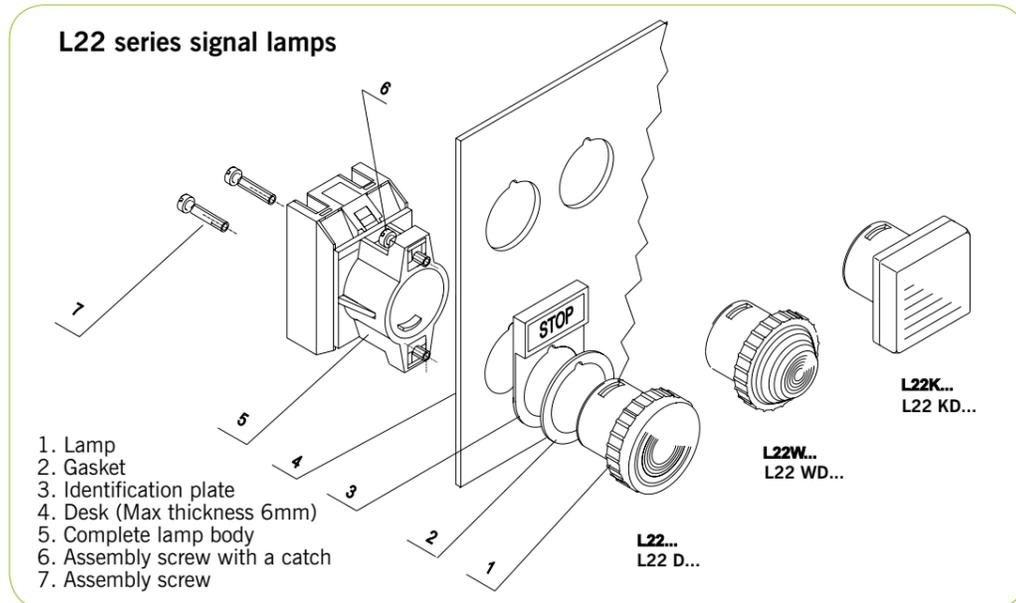
In relation to the type of luminous element, lamps can be divided into:

- Lamps with bulbs;
- Lamps with LEDs.

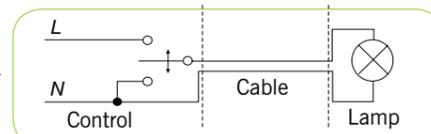
Signal lamps are provided as complete products, according to clients' orders.

2a Ø22 SIGNAL LAMPS

• Construction



Important:
If the power cord is long (above 15-20m), the lamp may glow after power shutdown because of the capacitance of the power cord in relation to other conductors that operate under alternating voltage and run in the vicinity of the power cord. In the case of long power cords, it is advised to control the lamp in the manner demonstrated in the figure, using a change-over contact.



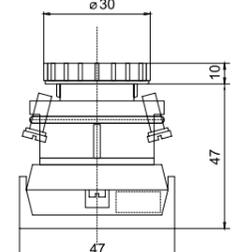
2a.1 TECHNICAL DATA

Insulation rated voltage (U_i)	250 V
Type of luminous element	All-purpose LED module BA9s LEDs BA9s bulbs
Rated voltage (U_e)	BA9s bulb: 6V, 12V, 24V, 48V, 130V, 230V BA9s LED: 24V AC/DC, 230V AC All-purpose LED module: 24-230V AC/DC
Luminous intensity of lamps: - Lamps with bulbs - Lamps with LEDs	100-400 mcd 1,000 mcd
Frequency of flashing for flashing lamps	1.4 - 2.8 Hz
Protection class - Section over the desk: - Section under the desk:	IP 66/67 { L22, NEK22MLD: IP20 D22, D22M: IP00
Maximum thickness of desk	6 mm
Ambient temperature for a given design	N/2: -15 to +30°C W/3: -30 to +50°C
Type of operation: - For lamps with bulbs - For lamps with LEDs	Discontinuous (bulbs can operate continuously, if their capacity is not higher than 2W) Continuous
Cross-sections of terminals	1x or 2x LY 0.75 - 1.5 mm ² 1x or 2x DY 1 - 1.5 mm ²

The product conforms to the following standard: IEC 60947-5-1

2a.2 TYPES OF Ø22 SIGNAL LAMPS

• LAMPS WITH BULBS

Type	Designation	Colour	Rated voltage	Dimensions (mm)	Weight (g)
 Lamp with bulb and a flat lens IP66/67 Type of cap: BA9s ¹⁾	L22c... L22z... L22g... L22n... ²⁾ L22b...		6V, 12V 24V, 48V 110V, 230V		40



Type	Designation	Colour	Rated voltage	Dimensions (mm)	Weight (g)
Lamp with a conical lens IP66/67 Type of cap: BA9s ¹⁾	L22Wc... L22Wz... L22Wg... L22Wn... ²⁾ L22Wb...	● ● ● ● ○	6V, 12V 24V, 48V 110V, 230V		39



Type	Designation	Colour	Rated voltage	Dimensions (mm)	Weight (g)
Lamp with an elliptic lens IP66/67 Type of cap: BA9s ¹⁾	L22Gc... L22Gz... L22Gg... L22Gn... ²⁾ L22Gb...	● ● ● ● ○	6V, 12V, 24V		42

Comments:

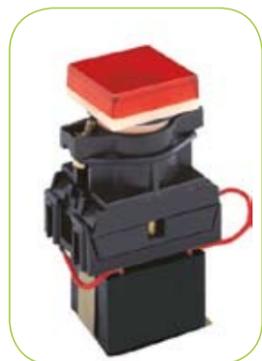
¹⁾ It is possible to use a LED with a BA9s cap (for 24V AC/DC and 230V AC).

²⁾ It is recommended to use LED backlight if the colour blue is used.

LAMPS WITH BULB AND TRANSFORMER



Type	Designation	Colour	Rated voltage	Dimensions (mm)	Weight (g)
Lamp with a flat lens and a transformer IP66/67 Type of cap: BA9s 24V, 2W	L22Tc... L22Tz... L22Tg... L22Tn... ²⁾ L22Tb...	● ● ● ● ○	230V AC 110V AC		142



Type	Designation	Colour	Rated voltage	Dimensions (mm)	Weight (g)
Lamp with a flat square lens and a transformer IP66/67 Type of cap: BA9s 24V, 2W	L22Kt... L22Kz... L22Kg... L22Kn... ²⁾ L22Kb...	● ● ● ● ○	230V AC 110V AC		144



Type	Designation	Colour	Rated voltage	Dimensions (mm)	Weight (g)
Lamp with a conical cap and a transformer IP66/67 Type of cap: BA9s 24V, 2W	L22WTc... L22WTz... L22WTg... L22WTn... ²⁾ L22WTb...	● ● ● ● ○	230V AC 110V AC		141



Type	Designation	Colour	Rated voltage	Dimensions (mm)	Weight (g)
Lamp with an elliptic cap and a transformer IP66/67 Type of cap: BA9s 24V, 2W	L22GTc... L22GTz... L22GTg... L22GTn... ²⁾ L22GTb...	● ● ● ● ○	230V AC 110V AC		145

TWO-COLOUR LAMPS WITH LEDs

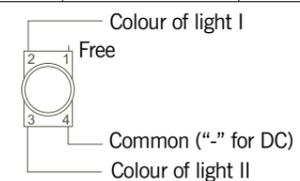


Type	Designation	Colour	Rated voltage	Dimensions (mm)	Weight (g)
Two-colour lamp with a colourless conical lens IP66/67 All-purpose LED module	L22WDcz L22WDgc L22WDgz	● ● ● ● ● ●	24V ÷ 230V AC/DC		41

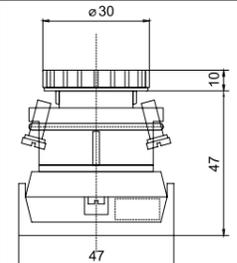
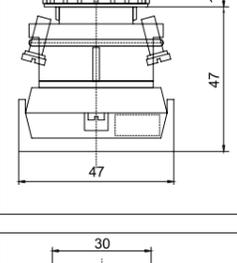
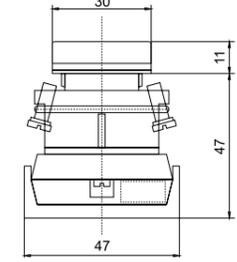
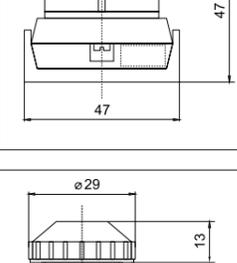
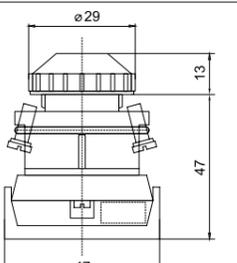
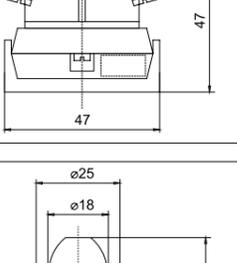
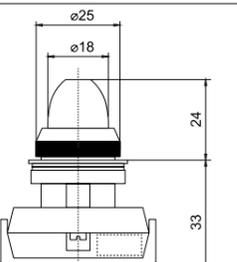
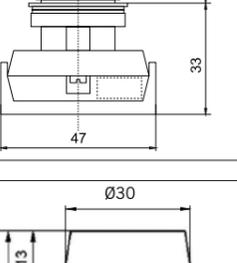
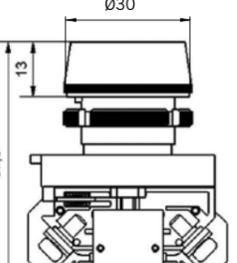
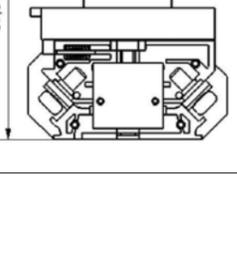


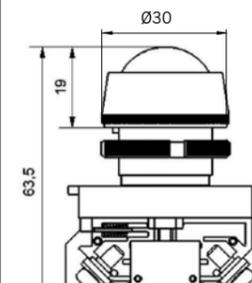
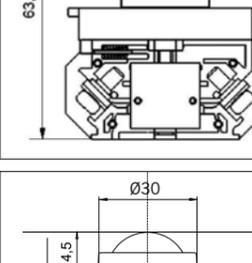
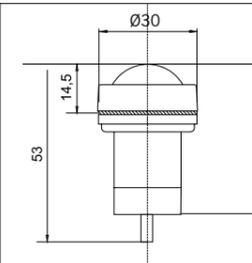
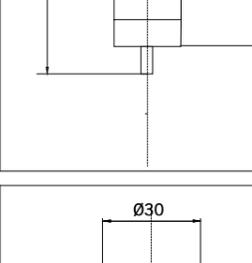
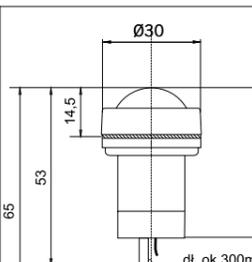
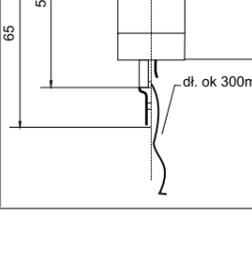
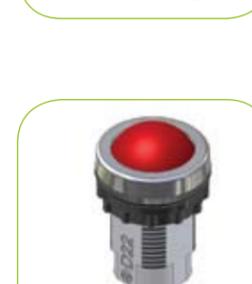
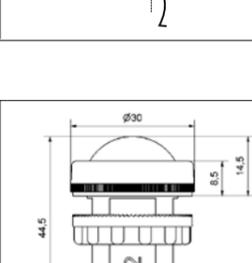
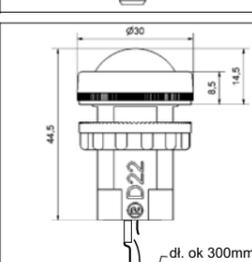
Type	Designation	Colour	Rated voltage	Dimensions (mm)	Weight (g)
Two-colour lamp with a colourless elliptic lens IP66/67 All-purpose LED module	L22GDcz L22GDgc L22GDgz	● ● ● ● ● ●	24V ÷ 230V AC/DC		42

Important: Lamp connection diagram:



LAMPS WITH LEDs, CONTINUOUS ILLUMINATION, FLASHING

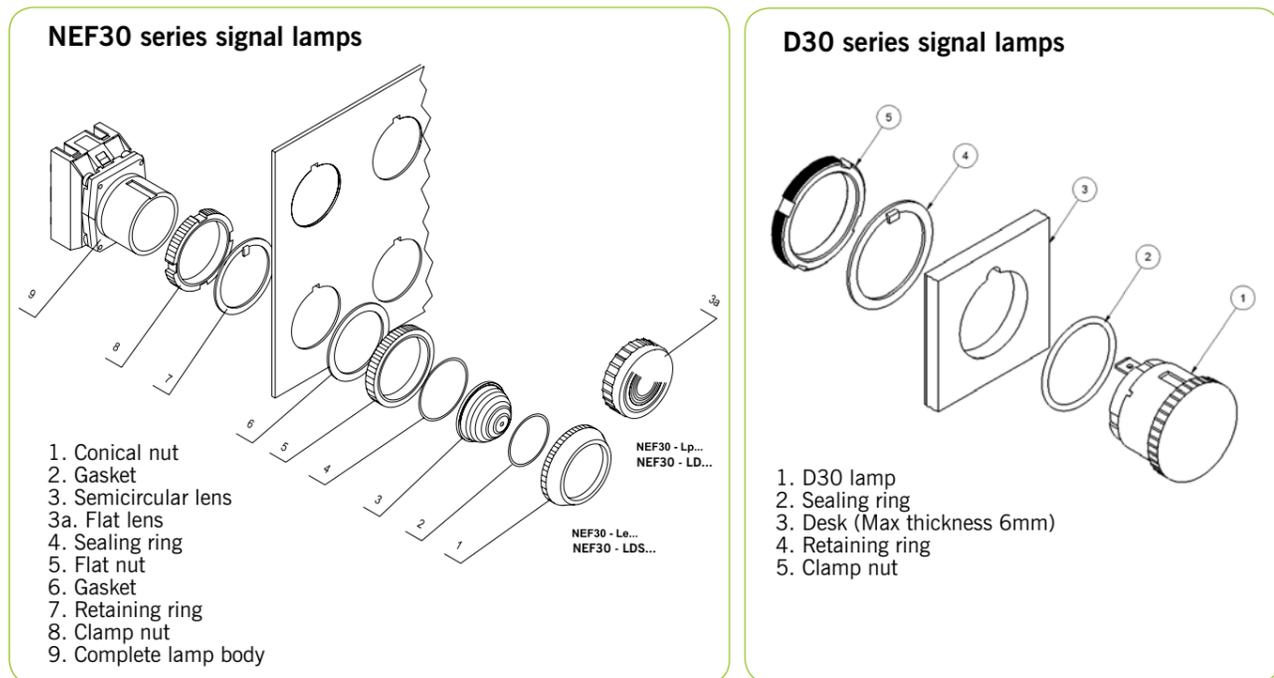
Type	Designation	Colour	Rated voltage	Dimensions (mm)	Weight (g)
 With screw terminals, continuous illumination, IP66/67 All-purpose LED module	L22Dc	●	24V ÷ 230V AC/DC		42
	L22Dz L22Dg L22Dn L22Db	● ● ● ○			
With screw terminals, flashing IP66/67 All-purpose LED module	L22DBc	●	24V ÷ 230V AC/DC		44
	L22DBz L22DBg L22DBn L22DBb	● ● ● ○			
 With screw terminals, continuous illumination IP66/67 All-purpose LED module	L22Kdc	●	24V ÷ 230V AC/DC		44
	L22Kdz L22Kdg L22Kdn L22Kdb	● ● ● ○			
With screw terminals, flashing IP66/67 All-purpose LED module	L22KDBc	●	24V ÷ 230V AC/DC		41
	L22KDBz L22KDBg L22KDBn L22KDBb	● ● ● ○			
 With screw terminals, continuous illumination IP66/67 All-purpose LED module	L22Wdc	●	24V ÷ 230V AC/DC		41
	L22Wdz L22Wdg L22Wdn L22Wdb	● ● ● ○			
With screw terminals, flashing IP66/67 All-purpose LED module	L22WDBc	●	24V ÷ 230V AC/DC		40
	L22WDBz L22WDBg L22WDBn L22WDBb	● ● ● ○			
 With screw terminals, continuous illumination IP66/67 All-purpose LED module	L22Gdc	●	24V ÷ 230V AC/DC		40
	L22Gdz L22Gdg L22Gdn L22Gdb	● ● ● ○			
With screw terminals, flashing IP66/67 All-purpose LED module	L22GDBc	●	24V ÷ 230V AC/DC		52
	L22GDBz L22GDBg L22GDBn L22GDBb	● ● ● ○			
 Flat lens, with screw terminals, continuous illumination IP66/67 All-purpose LED module	NEK22M Ldc	●	24V ÷ 230V AC/DC		52
	NEK22M LDz NEK22M LDg NEK22M LDn NEK22M LDb	● ● ● ○			
With screw terminals, flashing IP66/67 All-purpose LED module	NEK22M LDBc	●	24V ÷ 230V AC/DC		52
	NEK22M LDBz NEK22M LDBg NEK22M LDBn NEK22M LDBb	● ● ● ○			

Type	Designation	Colour	Rated voltage	Dimensions (mm)	Weight (g)
 With screw terminals, continuous illumination, convex lens IP66/67 All-purpose LED module	NEK22M LDSc	●	24V ÷ 230V AC/DC		55
	NEK22M LDSz NEK22M LDSg NEK22M LDSn NEK22M LDSb	● ● ● ○			
With screw terminals, flashing, convex lens IP66/67 All-purpose LED module	NEK22M LDSBc	●	24V ÷ 230V AC/DC		19
	NEK22M LDSBz NEK22M LDSBg NEK22M LDSBn NEK22M LDSBb	● ● ● ○			
 With sleeve terminals, continuous illumination, convex lens IP66/67 All-purpose LED module	D22Sc	●	24V ÷ 230V AC/DC		19
	D22Sz D22Sg D22Sn D22Sb	● ● ● ○			
With sleeve terminals, flashing, convex lens IP66/67 All-purpose LED module	D22SBc	●	24V ÷ 230V AC/DC		20
	D22SBz D22SBg D22SBn D22SBb	● ● ● ○			
 With terminals, continuous illumination, convex lens IP66/67 All-purpose LED module	D22Pc	●	24V ÷ 230V AC/DC		20
	D22Pz D22Pg D22Pn D22Pb	● ● ● ○			
With terminals, flashing, convex lens IP66/67 All-purpose LED module	D22PBc	●	24V ÷ 230V AC/DC		20
	D22PBz D22PBg D22PBn D22PBb	● ● ● ○			
 Lamp with a metal nut, continuous illumination, with sleeve terminals IP66/67 All-purpose LED module	D22MSc	●	24V ÷ 230V AC/DC		80
	D22MSz D22MSg D22MSn D22MSb	● ● ● ○			
 Lamp with a metal nut, continuous illumination, with terminals IP66/67 All-purpose LED module	D22MPc	●	24V ÷ 230V AC/DC		80
	D22MPz D22MPg D22MPn D22MPb	● ● ● ○			



2b Ø30 SIGNAL LAMPS

• Construction



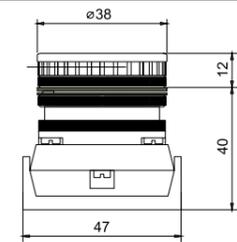
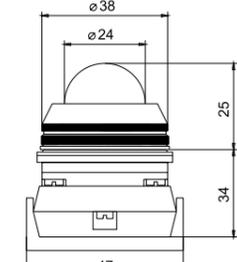
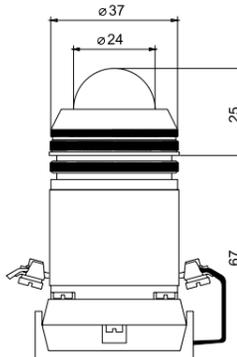
2b.1 TECHNICAL DATA

Insulation rated voltage (U _i)	250 V
Type of luminous element	All-purpose LED module BA9s LEDs BA9s and BA7s bulbs
Rated voltage (U _e)	BA9s bulb: 6V, 12V, 24V, 48V, 130V, 230V LED BA9s - 24V AC/DC, 230V AC All-purpose LED module: 24-230V AC/DC
Luminous intensity of lamps: - Lamps with bulbs - Lamps with LEDs	100-400 mcd 1,000 mcd
Frequency of flashing for flashing lamps	1.4 - 2.8 Hz
Protection class - Section over the desk: - Section under the desk:	IP66/67 NEF30-L: IP20, D30: IP00
Maximum thickness of desk	6 mm
Ambient temperature for a given design	N/2: -15 to +30°C W/3: -30 to +50°C
Type of operation: - For lamps with bulbs - For lamps with LEDs	Discontinuous (bulbs can operate continuously if their capacity is not higher than 2W) Continuous
Cross-sections of terminals	1x or 2x LY 0.75 - 1.5 mm ² 1x or 2x DY 1 - 1.5 mm ²

The product conforms to the following standard: IEC 60947-5-1

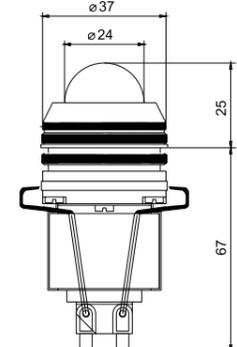
2b.2 TYPES OF Ø30 SIGNAL LAMPS

• LAMPS WITH BULBS

Type	Designation	Colour	Rated voltage	Dimensions (mm)	Weight (g)
 Lamp with a flat lens IP66/67 Type of cap: BA9s ¹⁾	NEF30-Lpc... NEF30-Lpz... NEF30-Lpg... NEF30-Lpn... ²⁾ NEF30-Lpb...	● Red ● Green ● Yellow ● Blue ○ White	6V, 12V 24V, 48V 110V, 230V		99
 Lamp with a spherical lens IP66/67 Type of cap: BA9s ¹⁾	NEF30-Lec... NEF30-Lez... NEF30-Leg... NEF30-Len... ²⁾ NEF30-Leb...	● Red ● Green ● Yellow ● Blue ○ White	6V, 12V 24V, 48V 110V, 230V		102
 Lamp with self-management, spherical lens IP66/67 Type of cap: BA9s ¹⁾	NEF30-LCc... NEF30-LCz... NEF30-LCg... NEF30-LCn... ²⁾ NEF30-LCb...	● Red ● Green ● Yellow ● Blue ○ White	6V, 12V 24V, 48V 110V, 230V		145

Important:
¹⁾ It is possible to use an LED with a BA9s cap (for 24V AC/DC and 230V AC).
²⁾ It is recommended to use LED backlight if the colour blue is used.

• LAMPS WITH BULB AND TRANSFORMER

Type	Designation	Colour	Rated voltage	Dimensions (mm)	Weight (g)
 Lamp with bulb and a transformer 230V/6V 110V/6V Spherical lens IP66/67 Type of cap: BA7s 6V, 0.6W	NEF30-LStc NEF30-LStz NEF30-LStg NEF30-LStn NEF30-LStb	● Red ● Green ● Yellow ● Blue ○ White	230V AC 110V AC		201



Type	Designation	Colour	Rated voltage	Dimensions (mm)	Weight (g)
Lamp with a bulb and a transformer 230V/24V 110V/24V Flat lens IP66/67 Type of cap: BA9s 24V, 2W	NEF30-LpTc... NEF30-LpTz... NEF30-LpTg... NEF30-LpTn... NEF30-LpTb...	● ● ● ● ○	230V AC 110V AC		201



Type	Designation	Colour	Rated voltage	Dimensions (mm)	Weight (g)
Lamp with a bulb and a transformer 230V/24V 110V/24V Spherical lens IP66/67 Type of cap: BA9s 24V, 2W	NEF30-LeTc... NEF30-LeTz... NEF30-LeTg... NEF30-LeTn... NEF30-LeTb...	● ● ● ● ○	230V AC 110V AC		204

LAMPS WITH LEDS, CONTINUOUS ILLUMINATION, FLASHING



Type	Designation	Colour	Rated voltage	Dimensions (mm)	Weight (g)
With screw terminals, continuous illumination, IP66/67 All-purpose LED module	NEF30-LDc NEF30-LDz NEF30-LDg NEF30-LDn NEF30-LDb	● ● ● ● ○	24V ÷ 230V AC/DC		97
With screw terminals, flashing IP66/67 All-purpose LED module	NEF30-LDBc NEF30-LDBz NEF30-LDBg NEF30-LDBn NEF30-LDBb	● ● ● ● ○			



Type	Designation	Colour	Rated voltage	Dimensions (mm)	Weight (g)
With screw terminals, continuous illumination IP66/67 All-purpose LED module	NEF30-LDSc NEF30-LDSz NEF30-LDSg NEF30-LDSn NEF30-LDSb	● ● ● ● ○	24V ÷ 230V AC/DC		102
With screw terminals, flashing IP66/67 All-purpose LED module	NEF30-LDSBc NEF30-LDSBz NEF30-LDSBg NEF30-LDSBn NEF30-LDSBb	● ● ● ● ○			



Type	Designation	Colour	Rated voltage	Dimensions (mm)	Weight (g)
With sleeve terminals, continuous illumination IP66/67 All-purpose LED module	D30c D30z D30g D30n D30b	● ● ● ● ○	24V ÷ 230V AC/DC		42
With sleeve terminals, flashing IP66/67 All-purpose LED module	D30Bc D30Bz D30Bg D30Bn D30Bb	● ● ● ● ○			

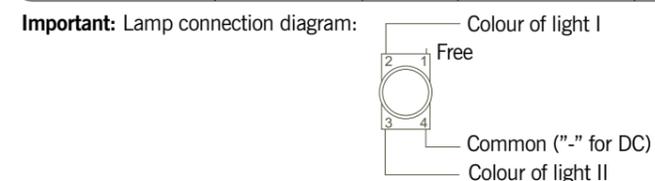


Type	Designation	Colour	Rated voltage	Dimensions (mm)	Weight (g)
With sleeve terminals, continuous illumination IP66/67 All-purpose LED module	D30Sc D30Sz D30Sg D30Sn D30Sb	● ● ● ● ○	24V ÷ 230V AC/DC		59
With sleeve terminals, flashing IP66/67 All-purpose LED module	D30SBc D30SBz D30SBg D30SBn D30SBb	● ● ● ● ○			

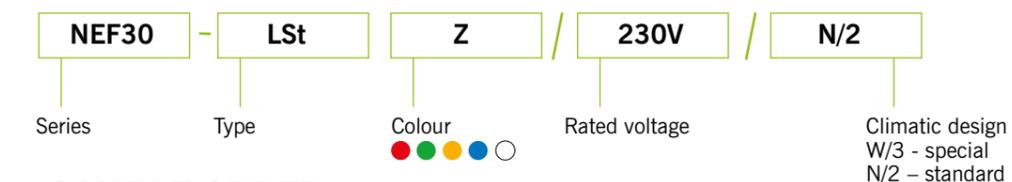
TWO-COLOUR LAMPS WITH LEDS



Type	Designation	Colour	Rated voltage	Dimensions (mm)	Weight (g)
Two-colour lamp, colourless spherical lens IP66/67 All-purpose LED module	NEF30-LDScz NEF30-LDSgc NEF30-LDSgz	● ● ● ● ● ●	24V ÷ 230V AC/DC		102



2a.3 METHOD OF ORDERING



SAMPLE ORDER

Signal lamp: NEF30 - LStz/230V

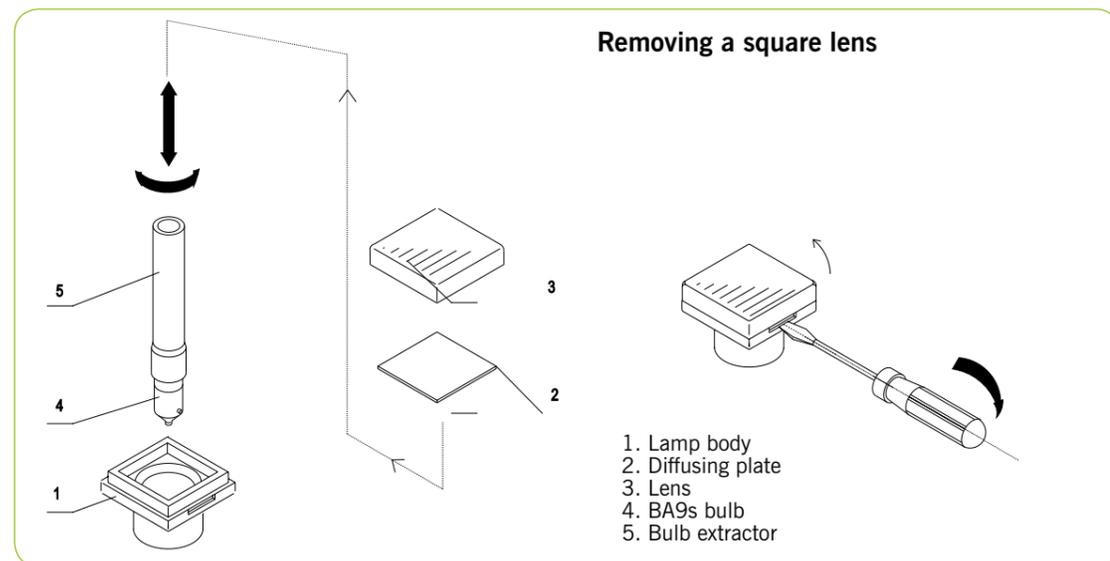
Ø30 signal lamp of the NEF30-LSt series, with a bulb and a transformer, green lens, primary voltage of the transformer: 230V, standard design

2c REPLACEMENT OF BULBS

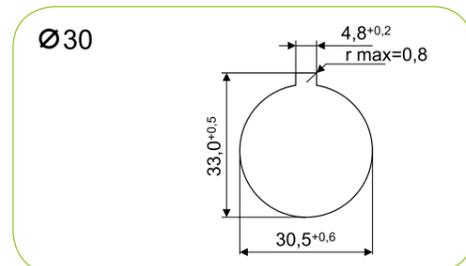
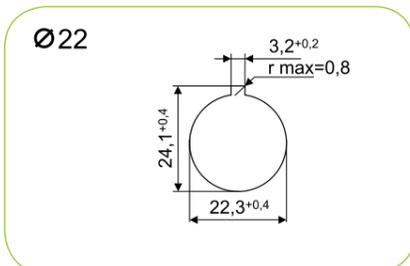


It is not necessary to remove the lamp to replace a defective bulb. Remove or unscrew the lens (in Ø22 lamps) or undo the conical nut (in Ø30 lamps). It is easier to replace a bulb if using the bulb extractor shown in item 5 in the figure below.

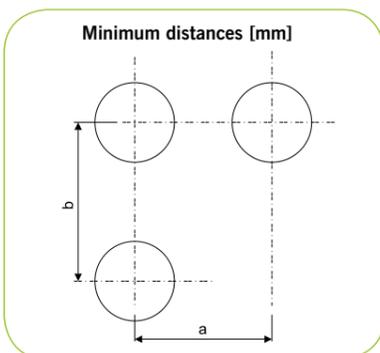
The bulb extractor is used to pull out and put in BA9s and BA7s bulbs. The figure below demonstrates the method of replacing a bulb, as illustrated with an example of an L22-K signal lamp.



2d ASSEMBLY HOLES



ASSEMBLY IN GROUPS



Assembly hole	a (mm)	b (mm)	Type of apparatus
Ø 22	30	60	L22, D22 NEK22M
	30	65	
Ø 30	50	65	NEF30, D30

2e LIGHT SOURCES

Type Light sources	Rated voltage	Power	Purpose
BULBS			
BA9s	6V, 12V, 24V	2W	Backlit buttons: NEF30, NEF30W Signal lamps: NEF30-L, L22
BA9s	48V	2W	Backlit buttons: NEF30, NEF30W Signal lamps: NEF30-L, L22
BA9s	130V, 230V	2,4 ...3W	Backlit buttons: NEF30, NEF30W Signal lamps: NEF30-L, L22
BA7s	6V 24V	0,6W 2W	Signal lamps: NEF30-LSt
LEDs			
LED With a BA9s cap	24V AC/DC 230V AC	0,5W 0,7W	Backlit buttons: NEF30, NEF30W Signal lamps: NEF30-L, L22
All-purpose backlight block	24-230V AC/DC	0,5W	Button drives: NEF22, NEK22M, NEF30 Signal lamps: NEK22M-LD, NEK22M-LDS, D22, D30 Indicators: NEF22, NEK22M, NEF30





ALL-PURPOSE LED INDICATORS AND DIGITAL METERS

- NEF22
- NEK22M
- NEF30
- NEF30-MC DIGITAL METER

Signal indicators constitute a special type of signal lamp. Luminous elements are based on LEDs, which feature high durability and low energy consumption. In comparison to basic lamps, indicators differ by using several LEDs that are illuminated in groups and produce certain signs, as adopted in electrical engineering and automatics. In addition, the use of an all-purpose current stabilisation module for LEDs makes it possible for indicators to work under any voltage within the 24-230V AC/DC range (the only exception being the phase presence indicator that requires 230V AC/DC voltage).

• Purpose

The NEF22 and NEK22M indicators are intended for building in standardised Ø22.5mm holes – while NEF30 require Ø30.5mm holes – drilled in various types of control and signal equipment, or directly into bodies of machines and equipment.

• Installation of NEF22 and NEK22M indicators

The indicator (1) must be put inside a hole in the desk (2), and then a clamp nut (3) must be screwed on to the part under the desk, so as to immobilise the indicator (see fig. 2). Then, connect the indicator's pin (4) to the socket located in the luminous element (4, fig. 3). Next, snap the intermediate element with the luminous element onto the indicator (see fig. 3).

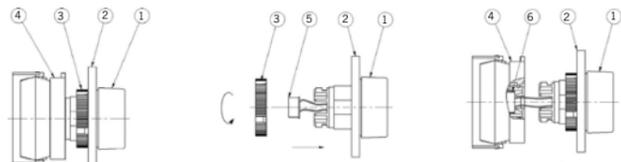


Fig. 1
Elements of the indicator

Fig. 2
Installation of the indicator on the desk

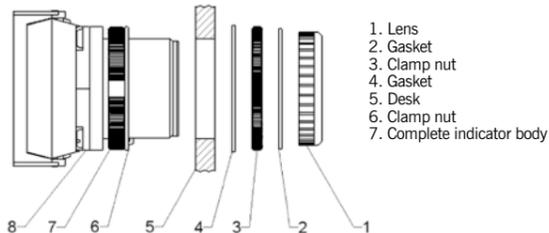
Fig. 3
Installation of the indicator with the luminous element

1. Indicator
2. Desk
3. Clamp nut
4. The intermediate body with the luminous element.
5. Plug for the luminous element.
6. Connecting the plug with the socket on the luminous element
7. Flat screwdriver

• Installation of NEF30 indicators

The installation of the indicator in an assembly hole has been illustrated in fig. 1

Fig. 1
Installation of the NEF30 indicator



1. Lens
2. Gasket
3. Clamp nut
4. Gasket
5. Desk
6. Clamp nut
7. Complete indicator body
8. Retaining ring

Put the indicator's body (8) with the clamp nut (7) and the retaining ring (6) into the assembly hole under the desk (5). Then, install the wider gasket (4), screw on the flat nut (3), apply another gasket (2), and screw on the lens (1). Finally, screw on the clamp nut (7) under the desk.

When the indicator has been installed in the assembly hole, apply the square cover plate on the lens (fig. 2).

All signal indicators can be applied in difficult industrial conditions. Bodies of the NEF30 and NEK22M indicators are made of metal, while bodies of the NEF22 indicators are plastic. The lens is made of transparent polycarbonate, which is a material resistant to mechanical impacts and flame retardant.

• Design and principle of operation

The NEF22 and NEK22M have a modular structure and are comprised of the following elements:

- The part located over the desk, also referred to as the indicator;
- The part located under the desk that includes the intermediate body and the luminous element.

• Disassembly

In order to disassemble the NEF22 and NEK22M indicators, follow the steps described below:

- 1) First, put a flat screwdriver (5) in the hole located in the lug of the intermediate body (4), prise slightly and bend the body away from the indicator (fig. 4).
- 2) Then, disconnect the indicator's plug from the socket located in the luminous element.
- 3) Finally, undo the clamp nut (3) to enable removing the indicator (1) from the desk (2) (fig. 5).

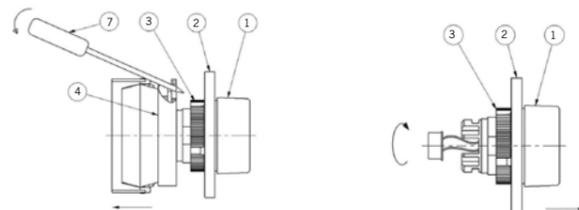


Fig. 4
Disassembling of the luminous element from the indicator

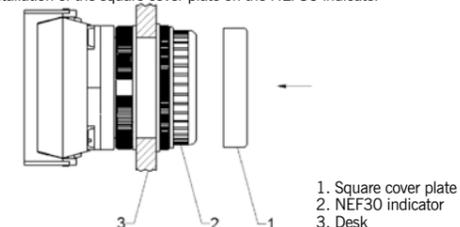
Fig. 5
Disassembling of the indicator from the desk

NEW!

• Square cover plates for indicators of the NEF30 series

IMPORTANT: When ordering the cover plate, use the WO-NAKŁADKA NEF 30 symbol for reference. Dimensions of the cover plate have been provided on page 43.

Fig. 2
Installation of the square cover plate on the NEF30 indicator



1. Square cover plate
2. NEF30 indicator
3. Desk

3a.1 TYPES OF INDICATORS

• POSITION INDICATORS

They are used in automatic systems and power engineering systems for commercial applications, and particularly for signalling positions of contacts in switches, disconnecting switches, etc., in synoptic boards of hydraulic and pneumatic systems, and of steam networks, to signal

positions of valves or bolts. The luminous element in a position indicator is comprised of 10 LEDs, arranged in the shape of two perpendicular beams. Depending on the colour of LEDs, the indicators come in a number of versions.

Ø 30 mm	Designation	Ø 22 mm	Designation	Ø 22 mm	Designation	Colour
	NEF30WPcz NEF30WPgz NEF30WPcg NEF30WPg NEF30WPz NEF30WPc		NEF22WPcz NEF22WPgz NEF22WPcg NEF22WPg NEF22WPz NEF22WPc		NEK22MWPcz NEK22MWPgz NEK22MWPcg NEK22MWPg NEK22MWPz NEK22MWPc	

Weight (g) 90.2

39.2

60.7

• PHASE PRESENCE INDICATOR

They are used in three-phase current circuits. They indicate the presence of voltage in each of the three phases. Signal elements are comprised of three LEDs that signal the correctness of operation for

each of the three phases: yellow (L1) – phase 1; green (L2) – phase 2, and red (L3) – phase 3.

Ø 30 mm	Designation	Ø 22 mm	Designation	Ø 22 mm	Designation	Colour
	NEF30WF		NEF22WF		NEK22MWF	

Weight (g) 93.1

39.4

60.7

• EARTHING INDICATORS

They can be used to signal the status of an earthing switch and to indicate, whether a particular electric circuit is earthed.

Yellow LEDs are arranged in such way that they make the symbol of earthing.

Ø 30 mm	Designation	Ø 22 mm	Designation	Ø 22 mm	Designation	Colour
	NEF30WUc NEF30WUg NEF30WUz		NEF22WUc NEF22WUg NEF22WUz		NEK22MWUc NEK22MWUg NEK22MWUz	

Weight (g) 89.5

37.7

60.7

• SWITCH POSITION INDICATORS

They are used to signal the status of position for switches, cut off switches, disconnecting switches, etc. The indicator has a masking plate

under the transparent lens. The plate contains a conventional symbol of the indicator's contact and three LEDs, each in different colour.

Ø 30 mm	Designation	Ø 22 mm	Designation	Ø 22 mm	Designation	Colour
	NEF30WPW		NEF22WPW		NEK22MWPW	

Weight (g) 92.6

40.9

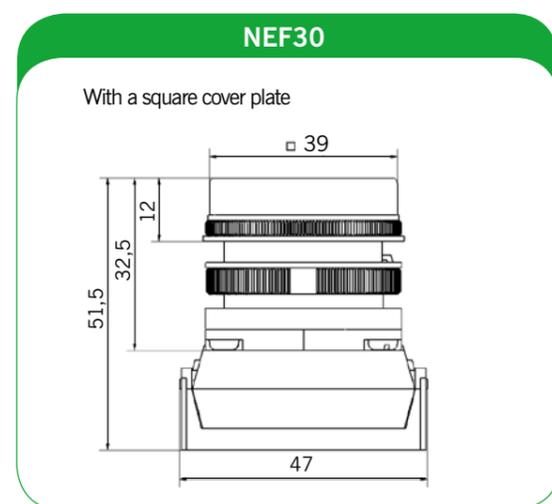
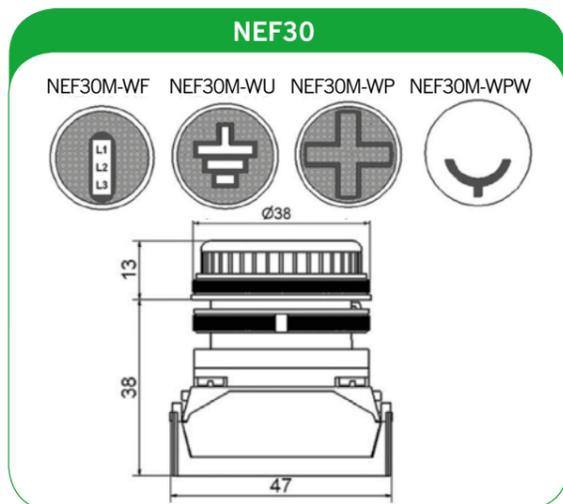
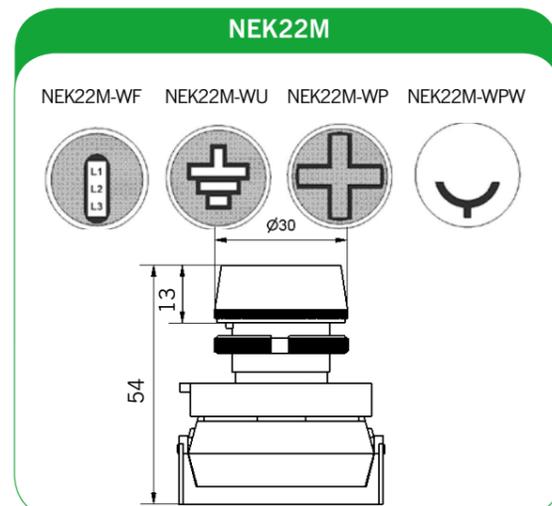
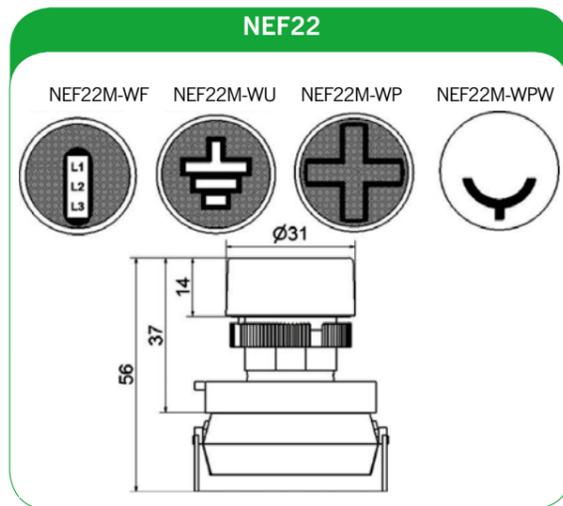
60.7

3a.2 TECHNICAL DATA

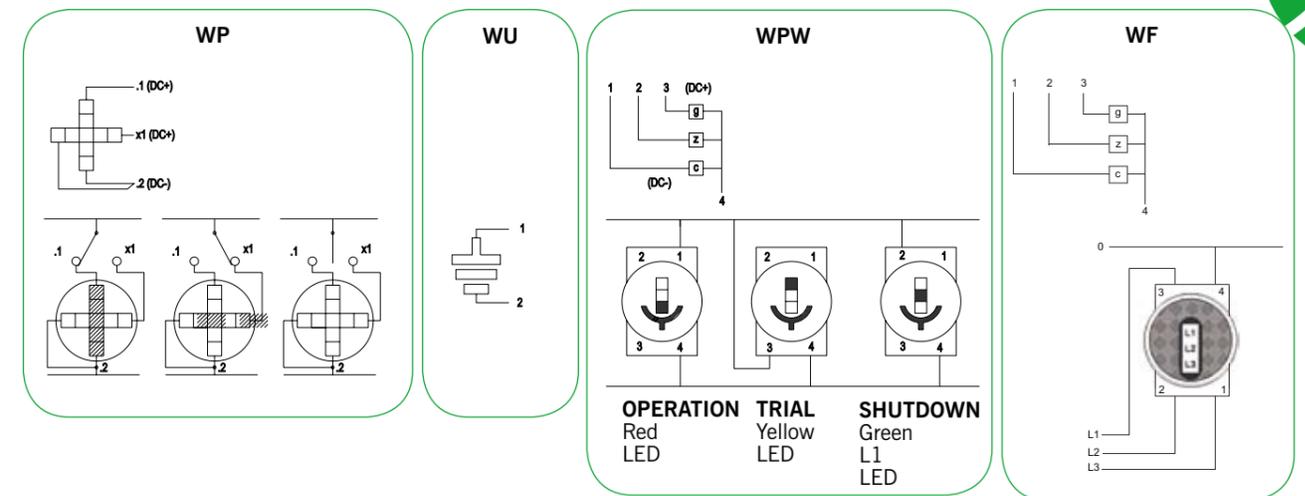
Insulation rated voltage (U _i) for the NEF22WF, NEK22MWF, NEF30WF	250 V 500 V
Rated voltage (U _e) for the NEF22WF, NEK22MWF, NEF30WF	24 ÷ 230V AC/DC 230V AC
Type of luminous element	LED
Luminous intensity	1,000 mcd
Maximum thickness of desk	4 mm
Protection class - Section over the desk - Section under the desk	IP65 IP20
Ambient temperature for a particular design	N2 -15 to +30°C W3 -30 to +50°C

The product conforms to the following standard: IEC 60947-5-1

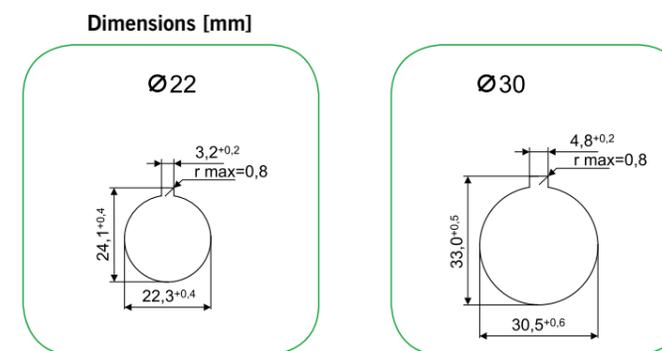
3a.3 OVERALL DIMENSIONS



3a.4 CIRCUIT DIAGRAMS

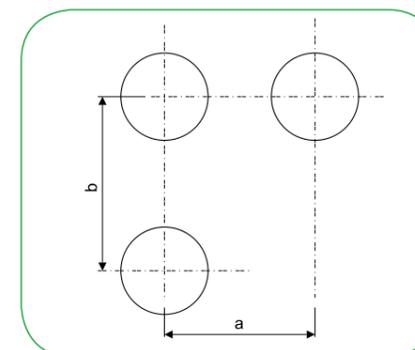


3a.5 ASSEMBLY HOLES



ASSEMBLY IN GROUPS

Minimum distances [mm]



Assembly hole	a (mm)	b (mm)	Type of device
Ø 22 (NEF22)	30	65	NEF22, NEF22M
Ø 30 (NEF30)	50	65	NEF30



3b PANEL-MOUNTED DIGITAL METER NEF30-MC



Purpose

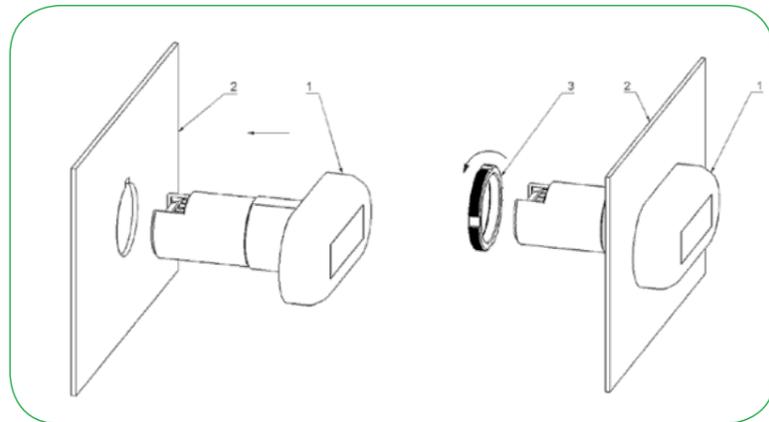
NEF30-MC digital meters constitute a development of the NEF30 series that has so far included control buttons, lamps and signal indicators. All NEF30-MC indicators feature the same characteristics: the possibility of installing in a standardised Ø 30.5mm hole, and a wide range of supply voltage – 24÷230V AC/DC.

Their design has been coordinated with other devices of the NEF30 series. They have been adapted to be used together with NEF30 devices, as panel-mounted meters for industrial applications. The meter has two programming buttons (their functions depend on the meter's version), which are accessible, after removing the front cover.

Method of installation

Put the digital meter (1) inside the assembly hole at the front side of the desk (2). Then, tighten the clamp nut (3) under the desk.

- 1. NEK30-MC digital meter
- 2. Desk
- 3. Clamp nut



3b.1 TYPES OF METERS



Designation	Description
NEF30-MC-VAC 300V AC voltmeter	The NEF30-MC-VAC meter is a voltmeter, intended primarily to monitor voltage in a 230V AC power network. Measuring range: 3-250-300V AC. It is possible to provide a three- or four-digit display. Switching – by the user or the installer, using one of the programming buttons (the other one is not used). Settings are stored in a non-volatile memory. The basic working mode is a three-digit display. In the case of a four-digit display, the fourth digit (after the decimal point) is interpolated, i.e. it comes from the average value of 64 measurements, calculated to a higher accuracy, than the accuracy of a single measurement.



NEF30-MC-AAC 1A AC ammeter	The NEF30-MC-AAC meter is used to measure alternating current, within the range of 1A, either directly or from a measuring transformer. If a measuring transformer is used, it is possible to program any conversion factor for indications, by entering the maximum value of indication that corresponds to 1A current, at the inlet to the meter, using programming buttons.
---------------------------------------	--

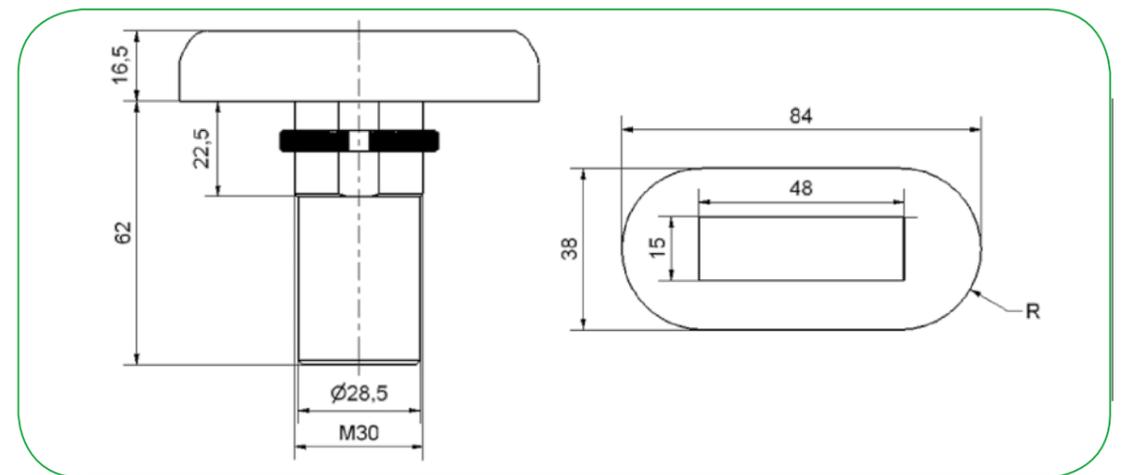
NEF30-MC-A 5A AC - 5A AC ammeter	The NEF30-MC-A 5A AC meter is used to measure alternating current, within the range of 5A, either directly or from a measuring transformer. If a measuring transformer is used, it is possible to program any conversion factor for indications, by entering the maximum value of indication that corresponds to 5A current, at the inlet to the meter, using programming buttons.
---	--

3b.1 TECHNICAL DATA

Supply voltage	24 ÷ 230V AC/DC*
Cross-sections of feeder cables	0.75 – 1.5 mm ² LY 1 – 1.5 mm ² DY
Electromagnetic compatibility acc. to	PN-EN 61000-6-2 PN-EN 61000-6-4
Installation category	III
Operating voltage in relation to ground	300V AC
Basic accuracy	0.5% of the range + 1 digit
Display	4 digit LED, height 10mm
Safety acc. to	PN-EN 61010-1

*) Any voltage supply within the indicated range, no switching or changing settings

3b.2 OVERALL DIMENSIONS





CONTROL BOXES

- KM
- KP
- K
- KS



4.a KM TYPE CONTROL BOXES

The KM type control boxes can have Ø22mm and Ø30mm signal lamps or control buttons, manufactured by SN PROMET. In addition to standard designs, it is also possible to design customized control boxes, according to individual requirements of clients. Control boxes should have signal lamps and buttons, in conformance with the catalogues of respective products published by SN PROMET.

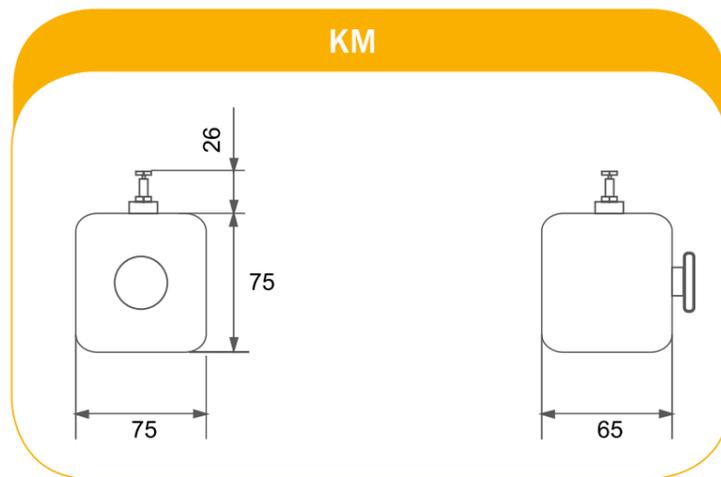
Control boxes have grey or yellow enclosures, made of ABS. In the standard design, each control box has one cable gland, according to the type specified in the table. Upon request, we can provide the control box with a second cable gland, located on the opposite wall of the enclosure. Control boxes can have identification plates that provide information about functions of signal lamps and buttons. We are also capable of carrying out electrical systems, inside control boxes.

4a.1 TECHNICAL DATA

Protection class	Without additional accessories With additional accessories	IP 67 Depending on accessories
Working temperature	Without additional accessories	From -40° to +80°C
Fire resistance		UL94-HB
Colour of enclosure		Grey Yellow
Maximum number of switching circuits	NEF30: NEF22 and NEK22M:	2 3
Maximum size of cable gland		Dp 16; Dp 13,5; Dp 11
Installation		4 x M4 screws

The product conforms to the following standard IEC 60947-5-1

4a.2 OVERALL DIMENSIONS



4a.2 STANDARD DESIGNS AND METHOD OF ORDERING



Type of control box	Diagram	Control buttons	Cable gland	Colour
KM-S1		NEF22-DRPc XY	Dp11	Yellow
KM-S11		NEF22-DRPc Y	Dp11	Yellow
KM-S2		NEF22-Kc XY	Dp11	Grey
KM-S12		NEF22-Kc Y	Dp11	Grey
KM-S3		NEF22-Kz XY	Dp11	Grey
KM-S13		NEF22-Kz X	Dp11	Grey
KM-S4		NEF22-Dc XY	Dp11	Grey
KM-S14		NEF22-Dc Y	Dp11	Grey
KM-S5		NEF22-Dz XY	Dp11	Grey
KM-S15		NEF22-Dz X	Dp11	Grey
KM-S16		NEF22-Wc Y	Dp11	Grey
KM-S17		NEF22-Pas X	Dp11	Grey
KM-S18		NEF22-Za1 X	Dp11	Grey
KM-S6		NEF30-DR/P XY	Dp11	Yellow



4.b KP TYPE CONTROL BOXES

Control boxes are equipped with all types of Ø22mm and Ø30mm signal lamps and/or control buttons, manufactured by SN PROMET. Enclosures of control boxes are made of ABS and can be manufactured in grey or yellow colour. Control boxes are intended for installation in closed rooms, which are free of

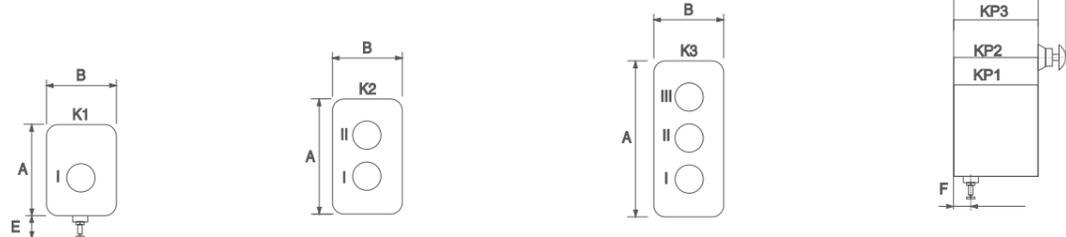
chemically active substances, or in open air (under cover). We are capable of carrying out electrical systems, inside control boxes. Control boxes can have identification plates that provide information about functions of signal lamps and buttons.

4b.1 TECHNICAL DATA

Protection class of control box	Without additional accessories Control box with additional accessories	IP 67 Depending on accessories
Working temperature	-40°C to +60°C	
Fire resistance	UL94 - HB	
Colour of enclosure	Grey, yellow	
Maximum number of current circuits	dla NEF30 dla NEF22, NEK22M i NEF30W	4 3
Size of cable gland	Dp11, Dp 13,5 , Dp16	
Installation	4 x M4 screws	
Arrangement of assembly holes	KP1 KP2 KP3	70x64 100x64 150x64

The product conforms to the following standard: IEC 60947-5-1

4b.2 OVERALL DIMENSIONS



Type of control box	Dimensions in mm					
	A	B	C	D	E	F
KP-1	110	80	78	<120	>28	24
KP-2	140	80	78	<120	>28	24
KP-3	190	80	78	<120	>28	24

4b.3 STANDARD DESIGNS AND METHOD OF ORDERING

Type of control box	Diagram	Control buttons	Signal lamp	Cable gland	Colour
		NEF30-DRcXY	-	Dp11	Grey
		NEF30-DcXY	-	Dp11	Grey
		NEF30-DR/PcXY	-	Dp11	Yellow
		NEF30-DR/PcXY	-	Dp11	Grey
		NEF30-UKzX NEF30-UWcY	-	Dp11	Grey
		NEF30-DRcY	NEF30-Leg	Dp11	Grey
		NEF22-Kz X NEF22-Kc Y	-	Dp11	Grey
		NEF22-Kz X NEF22-Wc Y	-	Dp11	Grey



Type of control box	Diagram	Control buttons	Signal lamp	Cable gland	Colour
		NEF22-Kz X NEF22-DRPc Y	-	Dp11	Grey
		NEF22-Kz X	L22Dc 24-230V	Dp11	Grey
		NEF22-Kz X	L22Dz 24-230V	Dp11	Grey
		NEF22-Kz X NEF22-Kc Y NEF22-DRPc Y	-	Dp11	Grey
		NEF22-Kz X NEF22-Kc Y	L22Dz 24-230V	Dp11	Grey
		NEF22-Kz X NEF22-Kc Y	L22Dc 24-230V	Dp11	Grey
		NEF22-Kz X NEF22-Kc Y	L22Db 24-230V	Dp11	Grey
		NEF22-Kz X NEF22-Kc Y NEF22-Kz X	-	Dp11	Grey
		NEF22-Kz X NEF22-Kz X NEF22-Kc Y	-	Dp11	Grey

4.c K TYPE CONTROL BOXES

The K type control boxes can have Ø22mm and Ø30mm signal lamps and/or control buttons, manufactured by SN PROMET. In addition to standard designs, it is also possible to design customized control boxes, according to individual requirements of clients. Control boxes should have signal lamps and buttons, in conformance with the catalogues of respective products published by SN PROMET.

In the standard design, each control box has one cable gland, according to the type specified in the table. Upon request, we can provide the control box with a second cable gland, located on the opposite wall of the enclosure. Control boxes can have identification plates that provide information about functions of signal lamps and buttons. Enclosures of control boxes are made of ABS or PC. We are also capable of carrying out electrical systems, inside control boxes.

4c.1 TECHNICAL DATA

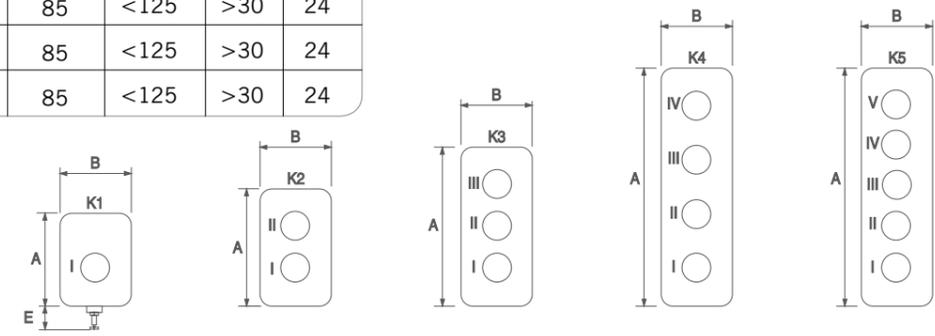
Protection class of control box	Without additional accessories Control box with additional accessories	IP 67 Depending on accessories
Working temperature	Without accessories	From -40° to +80°C
Fire resistance	ABS: PC:	UL94 - HB UL94 - 5V
Colour of enclosure	Grey Yellow – K1 and K2 only	
Maximum number of switching circuits	K1, K2 for NEF30 K3, K4, K5 for NEF30 K1 ... K5 for NEF22 and NEK22M	2 (X, Y, XY, 2X, 2Y) 4 (XY, 2X, 2Y, 2X2Y, 3XY, X3Y, 4X, 4Y) 3 (X, Y, XY, 2X, 2Y, 3X, 3Y, 2XY, X2Y)
Maximum size of cable gland	Dp 16	
Installation	4 x M4 screws	
Arrangement of assembly holes	K1 K2 K3 K4, K5	90x60 120x60 150x60 210x60

The product conforms to the following standard: IEC 60947-5-1

4c.2 OVERALL DIMENSIONS



Type of control box	Dimensions in mm					
	A	B	C	D	E	F
K-1	110	80	65	<105	>30	24
K-2	140	80	65	<105	>30	24
K-3	170	80	85	<125	>30	24
K-4	230	80	85	<125	>30	24
K-5	230	80	85	<125	>30	24



4c.3 METHOD OF ORDERING

Empty control box + accessories

Control box	K1 - □ □
Control box	K2 - □ □+ □ □
Control box	K3 - □ □+ □ □+ □ □
Control box	K4 - □ □+ □ □+ □ □+ □ □
Control box	K5 - □ □+ □ □+ □ □+ □ □+ □ □

Types of control buttons or signal lamps must be according to appropriate SN PROMET catalogues.

• Sample order

The control box K4-NEF30-Kz2X + NEF30-KcXY + NEF30-Lec 230V + NEF30-Ps2X2Y

4.d KS TYPE CONTROL BOXES

• Purpose

The KS type control boxes are intended for the controlling of telephers, machine tools, remotely controlled machines and equipment, and other electric circuits that operate under the maximum switching voltage of 400V, 50/60Hz (AC) or 220V (DC).

• Design and principle of operation

The design of control boxes is based on a segment structure, which enables increasing the amount of specific control elements. Each individual element is further divided into:

- Signalling and emergency elements;
- START and STOP elements of a switch;
- Control elements for primary movements;
- Control elements for auxiliary movements.

Signalling elements are equipped with a signal lamp and sound signal buttons.

Other elements have two control buttons that are inter-locked mechanically, which – when pressed – act on miniature switches and make them stroke. Depending on individual needs, control boxes may have the following types of buttons:

- Single-stage buttons for a single control speed;
- Two-stage buttons for two control speeds operated with one button;
- Single-stage buttons for direct controlling of motors with two miniature switches, simultaneously;
- Emergency control buttons (interlocked palm buttons);
- Control buttons with a self-locking knob-operated drive.

IMPORTANT!

Item 1.2.4.3 "Emergency stop" of the 2006/42/EC Machinery Directive reads as follows: "Machinery must be fitted with one or more emergency stop devices to enable actual or impending danger to be averted."

• Storage

- Store in packaging, in closed rooms, at a temperature from + 5°C to +35°C, at the relative humidity of up to 70%, in an atmosphere free of chemically active gases and substances.

• Climatic design

Control boxes can be delivered in the following climatic designs:
- standard (for moderate climate);
- special (for tropical climate).

An example of such a device can be the KS box equipped with an emergency control button (interlocked palm button).

The enclosure of the box has been made from yellow insulating material that provides high dielectric and mechanic resistances (high-impact polystyrene). The top side of the box has a cover with a cable gland, intended to provide an output for and seal a sheathed wire. Under the cable gland, there is a terminal for the wire, and the external side of the cover contains a grip to suspend the box on an external suspension strand. It is possible to install 1 x LM-1 miniature switch or a set of 2 x LM-1 miniature switches, and a patent lock with a key (it protects the box against unauthorised people), in the bottom cover. The key of the lock has two positions:

"O" – The system is OFF.
"I" – The system is ON.

The key can be removed in position "O", exclusively. The supporting structure inside the box has two M5 screws. The M5 screw located on the left is used to connect a protective conduit, while the other to fasten the current-carrying conductor of the sheathed wire.

The same supporting structure contains a socket for the signal lamp and MPO-B miniature switches (snap action). The colours of signal lamps and the number of miniature switches depend on the type of function for the box.

• Transporting of products

- Use only covered means of transport.

4d.1 TECHNICAL DATA

Rated insulation voltage U_i	V	400 50-60 Hz
Rated switching voltage U_e	V	400 50-60 Hz
Rated impulse withstand voltage U_{imp}	kV	2.5
Signalling voltage - Bulb - LED	V V	12, 24 AC/DC 24 AC/DC, 230 AC
Type of cap for the signalling element	-	BA9s
Rated thermal current I_{the}	A	10
Rated switching current I_e Utilisation category	AC4 $U_e = 400 V$ AC15 $U_e = 400 V$ DC13 $U_e = 220 V$	A A A
Electrical endurance	AC4 $U_e = 400 V$ $I_e = 2A$ AC15 $U_e = 400 V$ $I_e = 1A$ DC13 $U_e = 220 V$ $I_e = 0,16A$	sw. sw. sw.
Rated frequency of switching	Switches/h	600
Mechanical life	switches	1×10^6
Ambient temperature	°C	-20 to +70
Protection class	-	IP 65
Cross-sections of terminals	- Cord - Wire	mm ² 1 or 2 x 0.5 - 0.75 1 or 2 x 0.5 - 1
Diameter of connecting cable Push screws	mm	10-30
Push screws	- Main circuits - Protective terminal	- -
Maximum force acting on the button	N	30
Type of material - 825 high-impact polystyrene	Impact resistance of samples with a notch, acc. to CHARPY – Min. 6.5kJ/m ²	

The product conforms to the following standard: IEC 60947-5-1

• Working conditions

Control boxes can be installed in closed rooms that are free from explosive dusts, gases, and vapours, both flammable and chemically active.

They can also be installed in the open air, in which case they must be protected from the direct impact of atmospheric precipitation. The level of intensity for mechanical hazards:

3.5gn - At continuous acceleration and sinusoidal oscillations with the frequency of 5-50Hz

10gn - During vibrations

Height of operation: Not higher than 2,000m above the sea level. Control boxes can work at any position.

• Climatic conditions

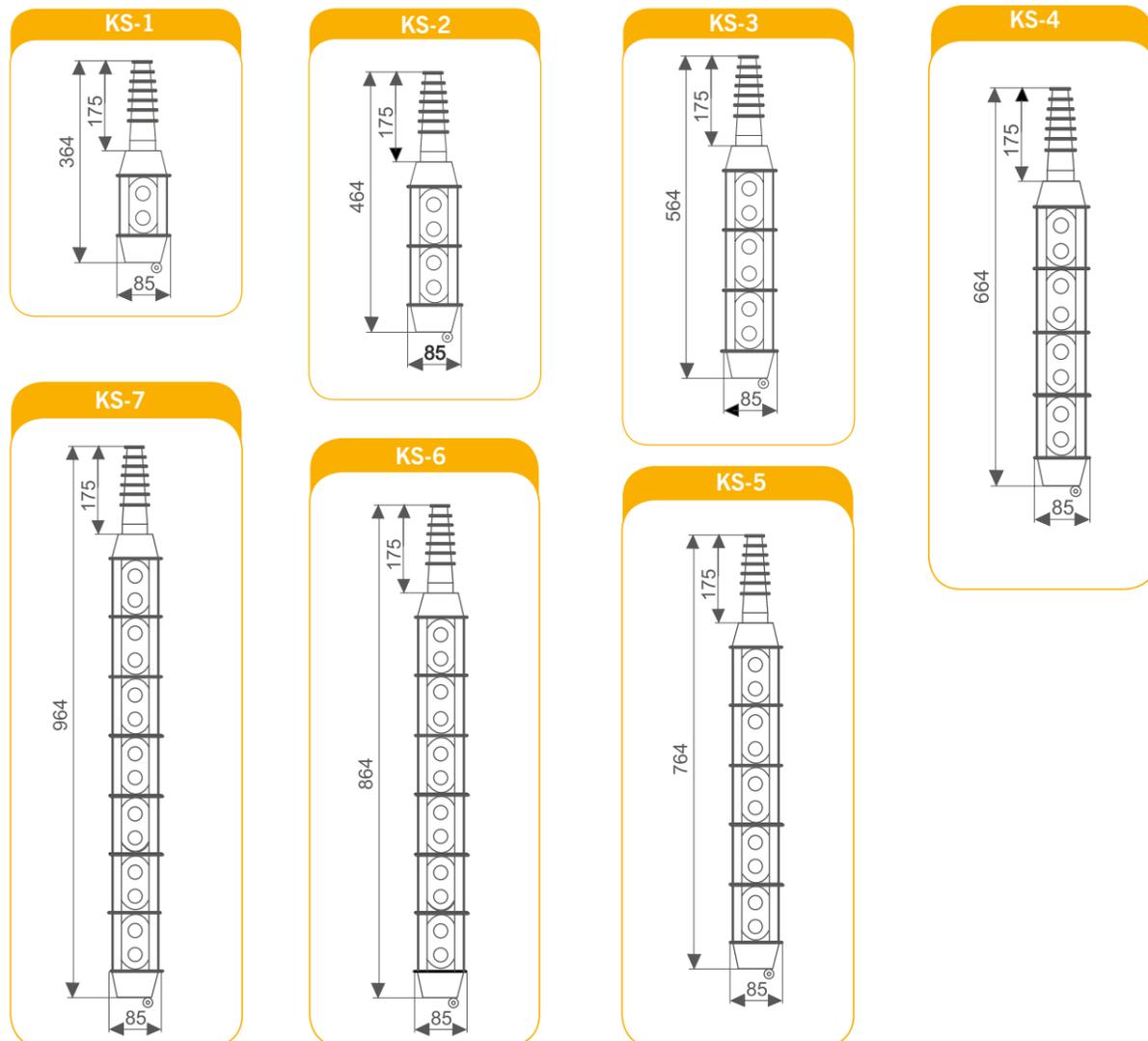
Design	Relative humidity of air	
	%	At the temp. of °C
For moderate climate (standard)	50	+40
	95	+20
For tropical climate (special)	75	+40
	80	+35

4d.2 THE RANGE OF KS CONTROL BOXES

Type of control box	Type	Weight (kg)	
		Two stage boxes, no lock	One-stage boxes, no lock
KS-1	Single-element control box	0.57	0.55
KS-2	Double-element control box	0.82	0.78
KS-3	Three-element control box	1.09	1.03
KS-4	Four-element control box	1.43	1.35
KS-5	Five-element control box	1.72	1.62
KS-6	Six-element control box	1.97	1.85
KS-7	Seven-element control box	2.39	2.25

Important: Add the following to the weight provided above:
 - 0.05kg for a patent lock with 1 LM-1 switch.
 - 0.065 kg for a patent lock with 2 LM-1 switches.

4d.3 OVERALL DIMENSIONS



4d.4 DESIGNS OF CONTROL BOXES

Standard designs

Type of control box	Description	
KS-1	KS - 1	1 2 35 X X X X X
KS-2	KS - 2	1 2 45 35 X X X X X
KS-21	KS - 2	1 2 21 35 X X X X X
KS-3	KS - 3	1 2 21 45 35 X X X
KS-31	KS - 3	1 2 21 55 35 X X X
KS-4	KS - 4	1 2 21 55 45 35 X X
KS-5	KS - 5	1 2 21 55 45 35 75 X
KS-6	KS - 6	1 2 21 55 45 35 75 65
KS-7	KS - 7	1 2 058S 21 55 45 35 75 65

Special designs (incl. wiring system)

Type of control box	Description	
KS-11	KS - 1	0 2 33 X X X X X
KS-12a	KS - 1	0 2 35 X X X X X
KS-13	KS - 1	1 2 33 X X X X X
KS-14	KS - 1	2 2 35 X X X X X
KS-23	KS - 2	0 2 33 43 X X X X X
KS-24a	KS - 2	0 2 35 43 X X X X X
KS-29	KS - 2	1 2 33 43 X X X X X
KS-291	KS - 2	2 2 35 43 X X X X X

4d.5 CODE NUMBERS FOR THE ORDERING OF COMPLETE CONTROL BOXES



SIGNALLING ELEMENTS

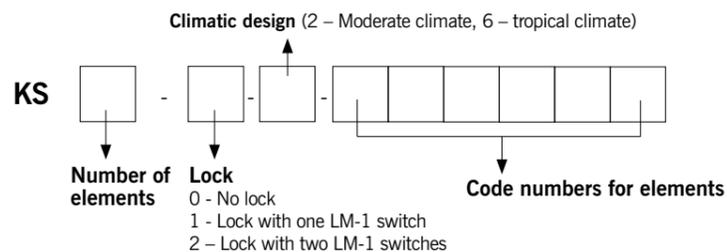
Control boxes with signalisation are installed in such a way that the signalling element is always in the first position, behind the top cover.

	12V/24V bulb		LED 230V		LED 24V		No lamp
No. of electric diagram	1 2	1 2	1 2	1 2	1 2	1 2	2
Code number for ordering/ Colour of lamp	05 ● 06 ● 07 ●	15 ● 16 ● 17 ●	S05 ● S06 ● S07 ●	S15 ● S16 ● S17 ●	S051 ● S061 ● S071 ●	S151 ● S161 ● S171 ●	18

CONTROLLING AND SIGNALLING ELEMENTS

	Bulb 12V/24V			LED 230V			LED 24V		No lamp	
No. of electric diagram	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	2	
Code number for ordering/ Colour of lamp	050 ● 060 ● 070 ●	054S ● 064S ● 074S ●	056 ● 066 ● 076 ●	S51 ● S61 ● S71 ●	S55S ● 065S ● 075S ●	057 ● 067 ● 077 ●	0551S ● 0651S ● 0751S ●	0571 ● 0671 ● 0771 ●	058S 059S	0582S 0591

METHOD OF ORDERING



Important: Upon request, SN PROMET will send the client an Order Code Sheet, which must be filled in and sent directly to the Sales Department of the manufacturer.

Sample: Three-element KS-3 control box with a patent lock, moderate climate design.

Element I – Safety button, red, interlocked, palm button.
Element II – Lifting and lowering; two-stage buttons for two control speeds operated with one button
Element III – Forward/return bridge travel mechanism; two-stage buttons for two control speeds operated with one button

CONTROL ELEMENTS FOR THE PRIMARY AND AUXILIARY MOVEMENTS

No. of electric diagram, acc. to the table on p. 80

Graphic symbol

Code number of the element for ordering

Important: When ordering signalling and controlling-sig-nalling elements, provide the value of signalling voltage.

3 052	3 053	3 21	5 22	3 23	5 24	2 25S
3 31	5 32	3 33	5 34	3 35	5 36	4 37
3 41	5 42	3 43	5 44	3 45	5 46	4 47
3 51	5 52	3 53	5 54	3 55	5 56	4 57
3 61	5 62	3 63	5 64	3 65	5 66	4 67
3 71	5 72	3 73	5 74	3 75	5 76	4 77

GRAPHIC SYMBOLS FOR CONTROL BUTTONS AND SIGNAL LAMPS

SIGNALLING ELEMENTS

Signal lamp with a bulb	
Signal lamp with a LED	
Sound signal button	
Main switch	START START STOP STOP
Palm button	
Emergency control button (Interlocked palm button)	
Button with a self-locking knob-operated drive	
Button with a knob-operated drive	

CONTROL ELEMENTS

Control		One control speed Multi-stage buttons		Two control speeds Two-stage buttons
		Slow	Fast	
Lifting mechanism	Up			
	Down			
Bridge travel mechanism	Right			
	Left			
Carriage travel mechanism	Forward			
	Backward			
Mechanism for the change of reach	Larger			
	Smaller			
Slewing mechanism	Right			
	Left			

4d.6 ELECTRIC DIAGRAMS

Diagram No.	Diagram	Legend to diagram
1		Signal lamp (Colour of lamp: red, green, colourless)
2		Button for sound and emergency signals
3		Mutually inter-locked single-stage buttons for a single control speed
4		Mutually inter-locked two-stage buttons for two control speeds operated with one button
5		Mutually inter-locked single-stage buttons for direct and simultaneous controlling of two miniature switches
6		A set of switches with a patent lock

INDICATORS

Code No. for ordering	Code No. for ordering	Code No. for ordering
71-038 016	71-038 076	71-038 136
71-038 026	71-038 086	71-038 146
71-038 036	71-038 096	71-038 156
71-038 046	71-038 106	71-038 166
71-038 056	71-038 116	71-038 176
71-038 066	71-038 126	71-038 186
71-038 206	71-038 226	71-038 196
71-038 216	71-038 236	

SAMPLE ORDER

Miniature switch of the MP 0-B type, moderate climate design:
- Miniature switch: 59-191 012

4d.7 SPARE PARTS

	Name of spare part	Code No. for ordering	Weight (kg)
	MP 0-B miniature switch	WO- 59- 191 01 □**	0.016
	Cotter pin to MP 0-B	TK - 63.00.26	0.0001
	Complete body for the control box element	WO - 513 □ □ *	0.145
	Cable gland – seal	TK - 61.10.01	0.047
	Top cover assembly	WO - 61.10.00B	0.1181
	Bottom cover assembly, without the lock	WO - 63.00.01A	0.118
	Bottom cover assembly with lock	WO-63.10.00	0,118
	Bottom cover assembly with a shield for the key	WO - 63.10.00 A	0.130
	Seal for the body element	WO - 16 - 012102	0.025
	Band clip with stoppers	TK - 610015	0.0018
	Indicator shield	TK - 612103	0.0005
	Rubber gasket for button	TK - 612101	0.0046
	EF30 KS XY switch	WO-ŁEF-KS-XY + screws	0.0262

*) Fill in according to the information provided on pages 78 and 79.

***) Provide information about climatic design: - For moderate climate: [2], For tropical climate: [6]



MINIATURE SWITCHES AND LIMIT SWITCHES

- LM
- MP 0
- LK
- 52
- AM-1z
- 83 135, 83 136, 83 138
83 140, 83 758
- 83 132, 83 133, 83 400
83 544, 83 545, 83 546
- Z
- MJ

5.a LM MINIATURE SWITCHES AND LIMIT SWITCHES

• Purpose

Miniature position switches (limit switches) are intended to operate as part of various auxiliary circuits of control, signalling, measuring, and monitoring systems. The following factors are decisive, when selecting the appropriate type of a position switch:

- Place of installation (the required protection class);
- The shape and travelling method of control elements that operate the switch;
- Electrical parameters of a circuit;
- Mechanical parameters of the switch.

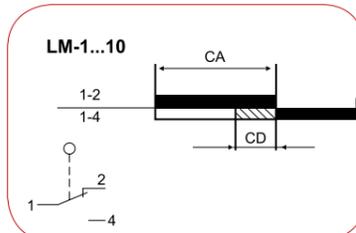
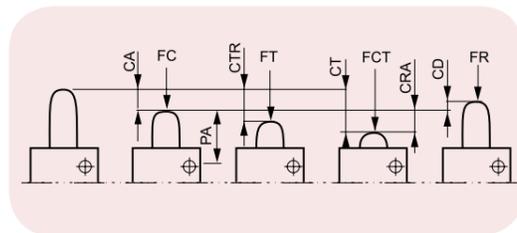
The LM miniature position switches are manufactured according to two climatic designs:

- Standard – for moderate climate 2;
- Special – for tropical climate 6.

• Design and principle of operation

Each position switch is comprised of a drive part and a contact-based connection element. Each drive can be made according to one of the following designs: basic, lever-based, telescopic, or pusher-based. The contact element contains a change-over contact (NC+NO). The contacts applied in switches are contacts that operate in a step-like manner (snap action). The figure below specifies characteristic positions and paths travelled by drive elements and forces required to switch-over contacts in a particular switch.

• Diagram of positions, force, and travel of a drive element



Legend:

PA – The position after switching over a switch
 FC – The force required to switch over
 FR – The force required to switch back
 FT – The force after switching
 FCT – The force after complete switching over
 CA – The travel required to switch over
 CTR – Operational travel
 CD – Differential travel
 CRA – The travel after switching over
 CT – Total travel

5a.1 TECHNICAL DATA

Rated insulation voltage U_i		400V
Rated continuous current I_u		16A – Basic 6A – In an enclosure
Rated switched currents I_e	AC 15 - U_e 110V/230V/400V DC 13 - U_e 48V/110V/220V	1A 0.25A
Limited withstand current		1000A
Type and the highest rating of a safety device that protects against the effects of short-circuit current impact		Bi - Wts 16A
Speed of the drive element		$2 \times 10^{-4} \dots 0.2$ m/s
Frequency of switching per hour		1,200 switches/h
Mechanical life (in cycles)	LM - 1	5×10^6
Type of terminals		Screw type
Cross-sections of conductors	- Wire - Cord	1×0.5 to 1.0 mm^2 1×0.5 to 0.75 mm^2
Type of stuffing-box (LM-10 switch)		Dp11 (Max diameter of cable – 7mm)
Ambient temperature	- No enclosure - In an enclosure	-25 to +85 °C -25 to +65 °C
Protection class	- Body of a switch - Terminals - Switch in an enclosure	IP 40 IP 00 IP 56

The product conforms to the following standard: IEC 60947

5a.2 TYPES OF SWITCHES



Type of switch	Description	Forces and travels				Climatic design	Catalogue No.	Weight (kg)
		FC max	CA max	CT mm	CD max			
LM-1	Basic switch	1.63.5	0.51.2	min. 1.4	0.2	standard	59-291 002	0.018
						special	59-291 006	



Type of switch	Description	Forces and travels		Climatic design	Catalogue No.	Weight (kg)
		FC max	CA max			
LM-1D	Switch with a flat lever	1.6	3.5	standard	59-281 012	0.025
				special	59-281 016	



Type of switch	Description	Forces and travels		Climatic design	Catalogue No.	Weight (kg)
		FC max	CA max			
LM-1DK	Switch with a lever with the end deflected at 90°	1.6	3.5	standard	59-281 022	0.025
				special	59-281 026	



Type of switch	Description	Forces and travels		Climatic design	Catalogue No.	Weight (kg)
		FC max	CA max			
LM-1DR	Switch with a lever and a roll	3.2	2	standard	59-281 032	0.026
				special	59-281 036	



Type of switch	Description	Forces and travels		Climatic design	Catalogue No.	Weight (kg)
		FC max	CA max			
LM-1P	Switch with a pusher-based drive	8	3.5	standard	59-281 072	0.079
				special	59-281 076	



Type of switch	Description	Forces and travels		Climatic design	Catalogue No.	Weight (kg)
		FC max	CA max			
LM-1PS	Switch with a sealed pusher-based drive	8	3.5	standard	59-281 082	0.082
				special	59-281 086	

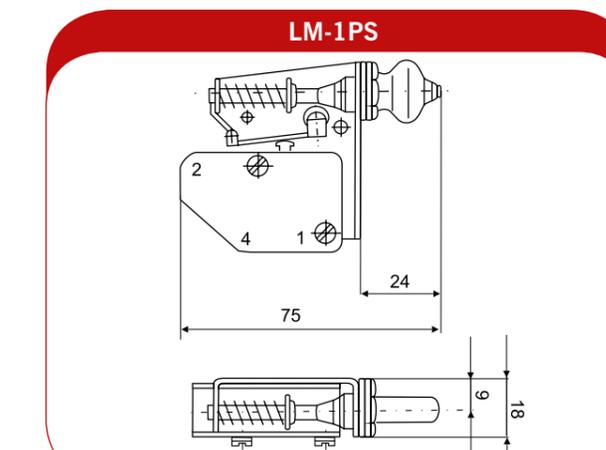
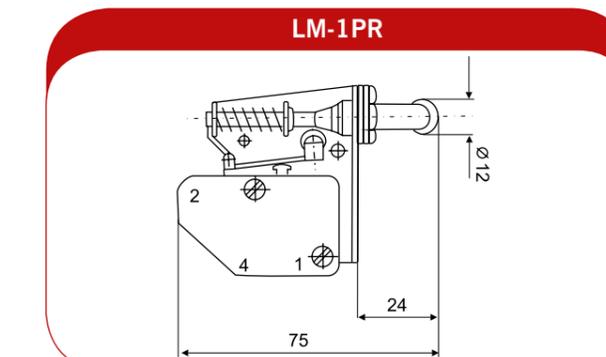
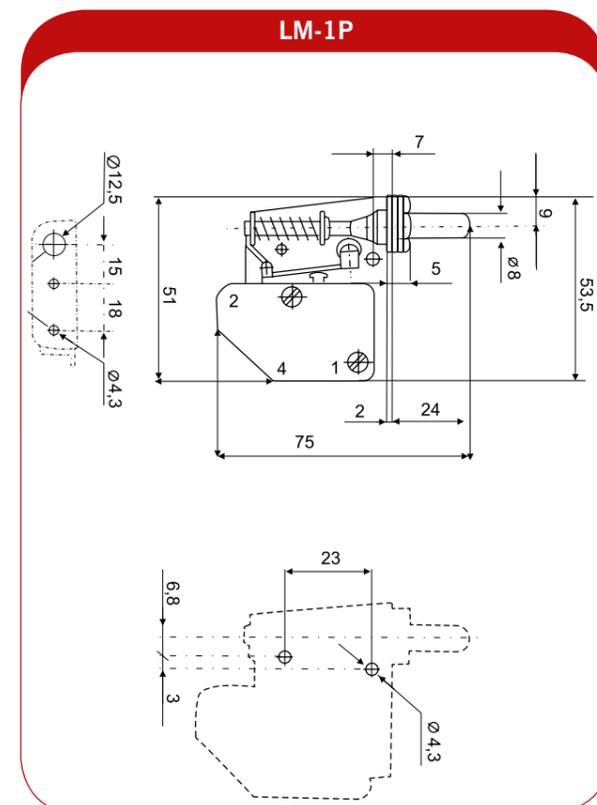
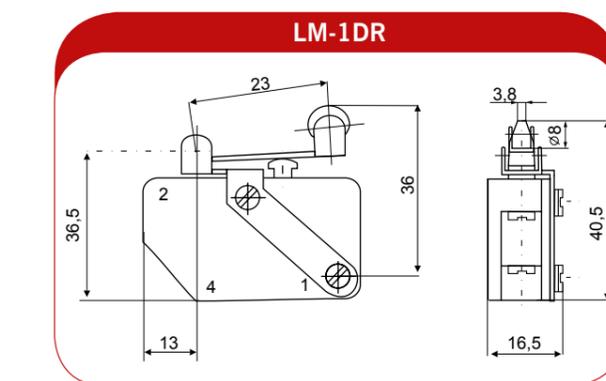
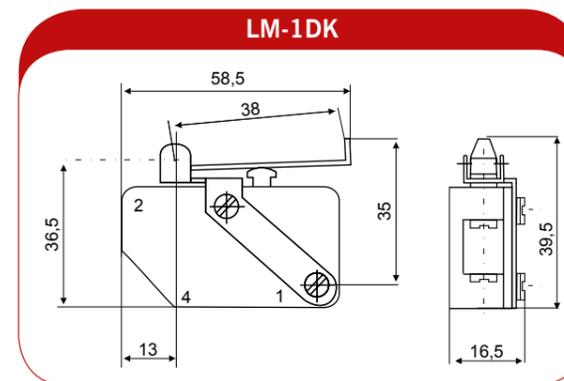
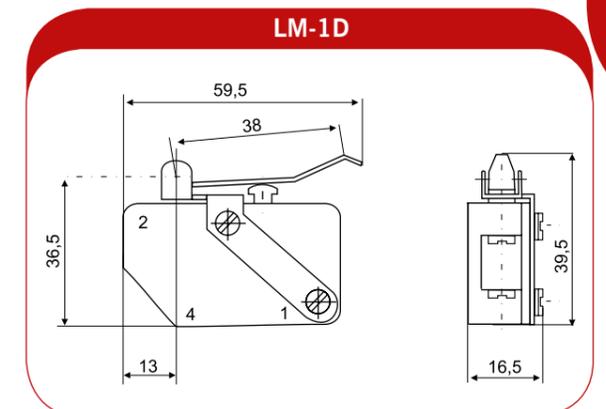
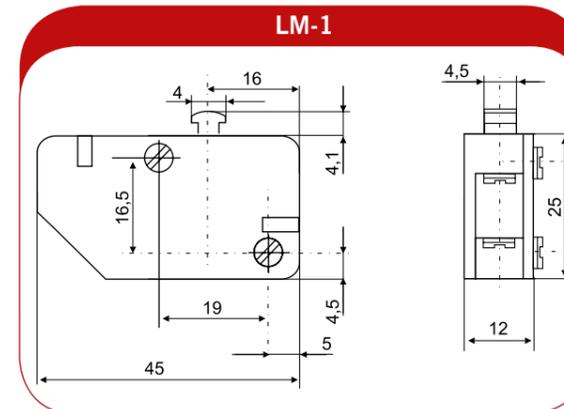


Type of switch	Description	Forces and travels		Climatic design	Catalogue No.	Weight (kg)
		FC max	CA max			
LM-1PR	Switch with a pusher-based drive and a roll	8	3.5	standard	59-281 092	0.077
				special	59-281 096	



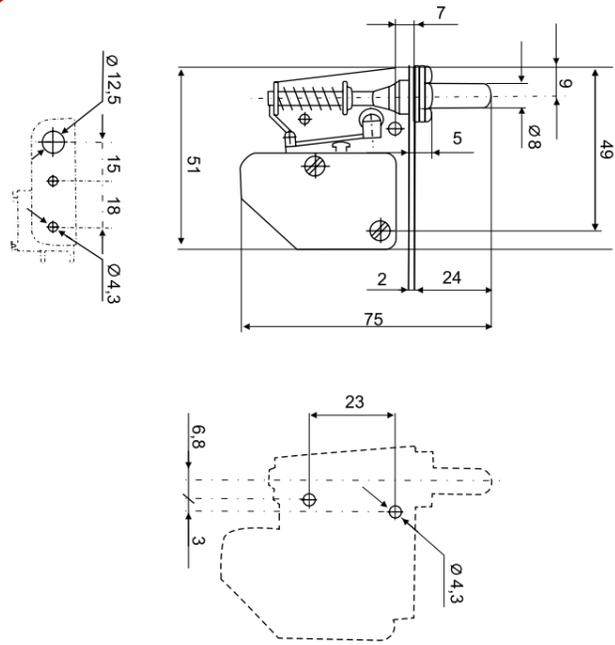
Type of switch	Description	Forces and travels		Climatic design	Catalogue No.	Weight (kg)
		FC max	CA max			
	A set of two switches with a pusher-based drive	12	4	standard	59-281 142	0.1
				special	59-281 146	
	A set of two switches with a pusher-based drive and a roll	12	4	standard	59-281 152	0.1
				special	59-281 156	
	Switch with a pusher-based drive, in an enclosure	8	1.6	standard	59-251 012	0.139
				special	59-251 016	
	Switch with a pusher-based drive and a roll, in an enclosure	8	1.6	standard	59-251 082	0.141
				special	59-251 086	
	Switch with a pusher-based drive and a transverse roll, in an enclosure	8	1.6	standard	59-251 092	0.141
				special	59-251 096	
	Switch with a flat lever drive, in an enclosure	3.5	14	standard	59-251 022	0.204
				special	59-251 026	
	Switch with a flat lever drive and a roll, in an enclosure	6.5	4	standard	59-251 032	0.176
				special	59-251 036	
	Switch with an angle lever drive and a roll, in an enclosure	6.5	4	standard	59-251 042	0.186
				special	59-251 046	

5a.3 DIMENSIONAL DRAWINGS

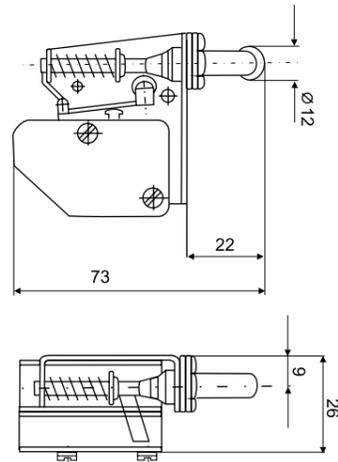




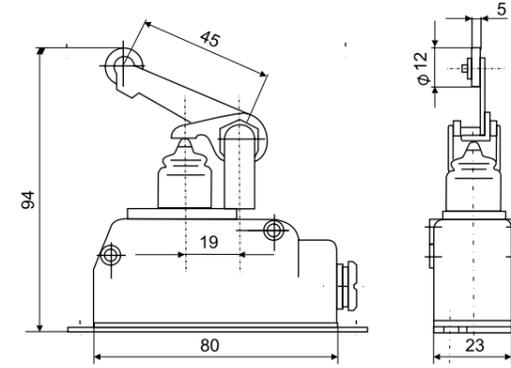
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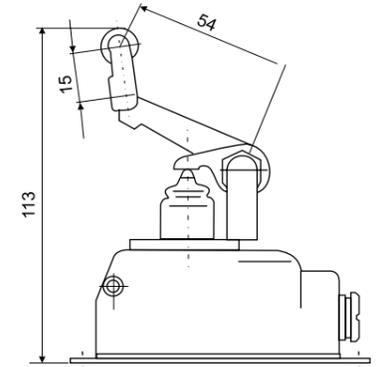
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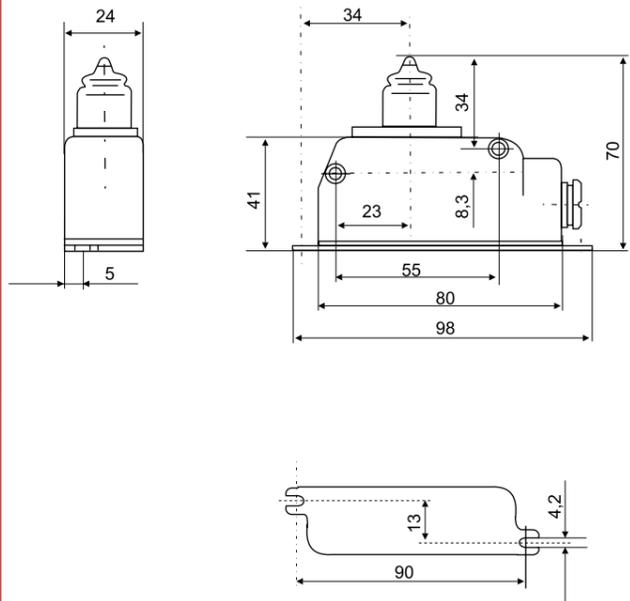
LM-10DR



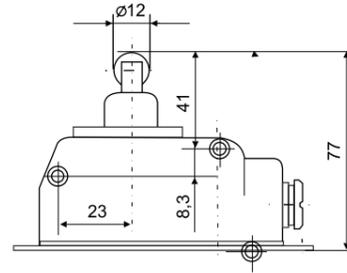
LM-10W



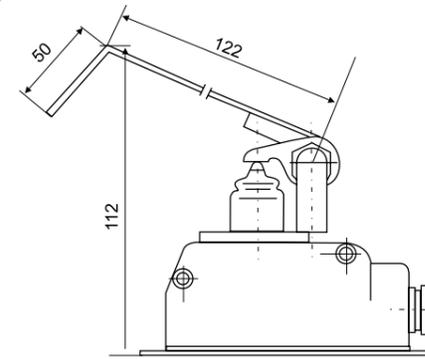
LM-10



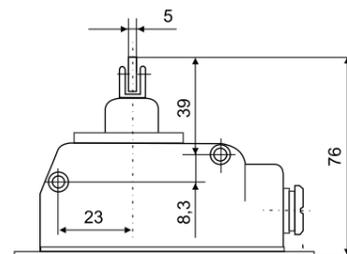
LM-10R



LM-10D



LM-10K



5.b MP 0 MINIATURE SWITCHES AND LIMIT SWITCHES

• Purpose

Miniature position switches are intended to operate as part of various auxiliary circuits of control, signalling, measuring, and monitoring systems. The following factors are decisive when selecting the appropriate type of a position switch:

- Place of installation (the required protection class);
- The shape and travelling method of control elements that operate the switch;
- Electrical parameters of a circuit;
- Mechanical parameters of the switch.

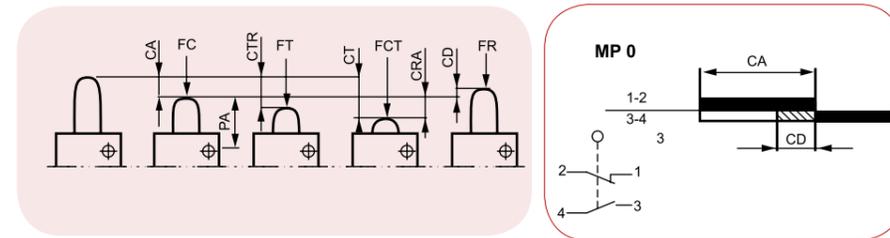
The MP 0 miniature position switches are manufactured according to two climatic designs:

- Standard: for moderate climate 2;
- Special: for tropical climate 6.

• Design and principle of operation

Each position switch is comprised of a drive part and a contact-based connection element. Each drive can be made according to one of the following designs: basic, lever-based, telescopic, or pusher-based. The contact element contains a double-break change-over contact (NC+NO). The contacts of switches operate in a step-like manner (snap action). The figure below specifies characteristic locations and sections travelled by drive elements, and forces required to switch over contacts in a particular switch.

• Diagram of location, force, and travel of a drive element



Legend:

PA – The position after switching over a switch
 FC – The force required to switch over
 FR – The force required to switch back
 FT – The force after switching
 FCT – The force after complete switching over
 CA – The travel required to switch over
 CTR – Operational travel
 CD – Differential travel
 CRA – The travel after switching over
 CT – Total travel

5b.1 TECHNICAL DATA

Rated insulation voltage U_i		400V
Rated continuous current I_U		10A
Rated switched currents I_e	AC 15 - U_e 110V/230V/400V DC 13 - U_e 48V/110V/220V	2.5A/2.5A/1.6A 1.5A/0.25A/0.16A
Limited withstand current		1000A
Type and the highest rating of a safety device that protects against the effects of short-circuit current impact		Bi - Wts 10A
Speed of the drive element		$17 \times 10^{-6} \dots 1$ m/s
Frequency of switching per hour		3.600 switches/h
Type of terminals	- MP 0, MP 0-S - MP 0-1, MP 0-2, MP 0-3	To be burnt on
	- MP 0-B, MP 0-4, MP 0-5, MP 0-5W	Screwed
Cross-sections of conductors	- MP 0, MP 0-S - MP 0-1, MP 0-2, MP 0-3	max 1.5 mm ²
	- MP 0-B, MP 0-4, MP 0-5, MP 0-5W	Cord 0.75 mm ² Wire 1 mm ²
Maximum diameter of cable	- MP 0-4, MP 0-5	9 mm
Ambient temperature		-25 to +40 °C
Protection class	- Body of a switch - Terminals - Switch in an enclosure	IP 40 IP 00 IP 44

The product conforms to the following standard: IEC 60947-5-1

5b.2 TYPES OF SWITCHES

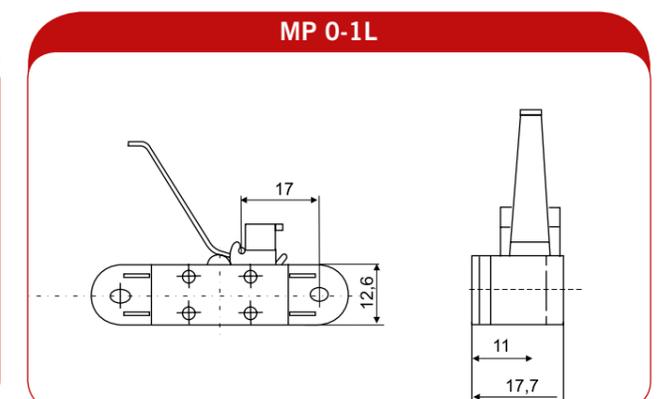
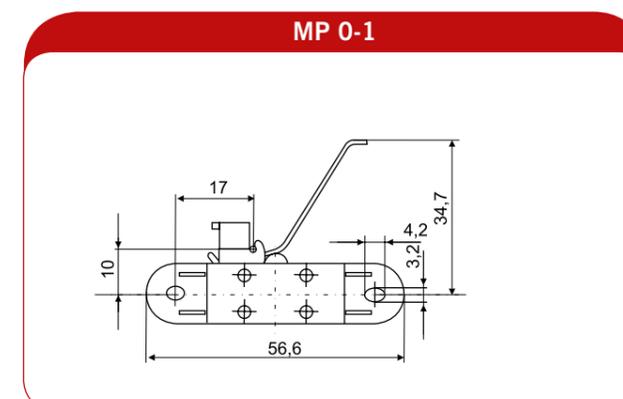
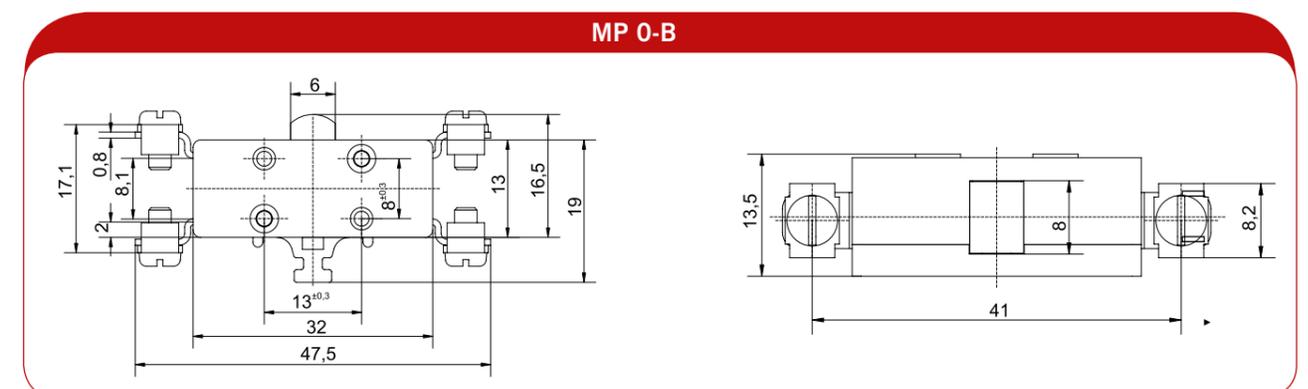
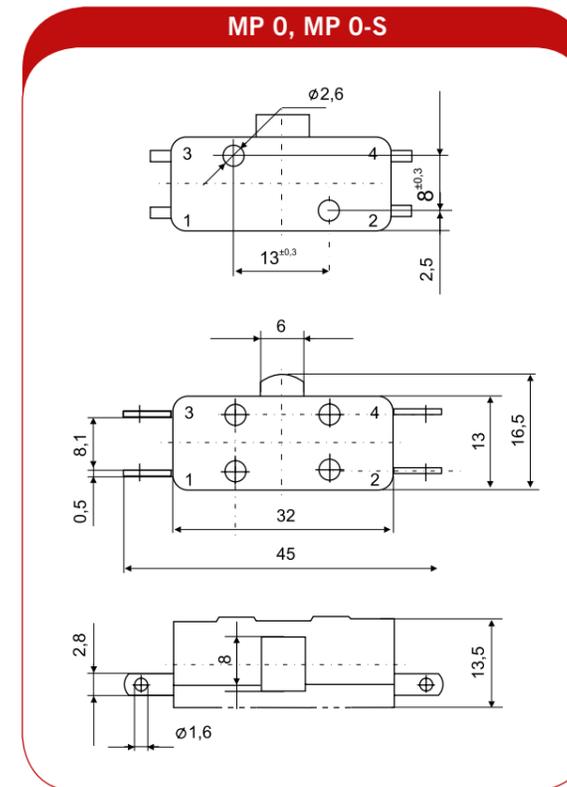
Type of switch	Description	Forces and travels				Climatic design	Catalogue No.	Weight (kg)
		FC max	CA max	CT mm	CD max			
	Basic switch	4	1.8	2.1	0.7 ±0.3	standard	59-192 002	0.0064
						special	59-192 006	
	Basic switch applied in KS type control boxes	4.5	-	-	-	standard	59-191 002	0.016
						special	59-191 006	
	Special switch with reduced force required to switch over	3.2	1.8	2.1	0.7 ±0.3	standard	59-196 002	0.0064
						special	59-196 006	

Type of switch	Description	Forces and travels			Climatic design	Catalogue No.	Weight (kg)
		FC max	CA max	CT mm			
	Switch with a lever-based drive and a right lever	3	6.5	7.5	standard	59-182 012	0.016
					special	59-182 016	
	Switch with a lever-based drive and a left lever	3	6.5	7.5	standard	59-182 022	0.016
					special	59-182 026	
	Switch with a lever-based drive, and with a right lever and a roll	3	6.5	7.5	standard	59-182 032	0.017
					special	59-182 036	
	Switch with a lever-based drive, and with a left lever and a roll	3	6.5	7.5	standard	59-182 042	0.017
					special	59-182 046	

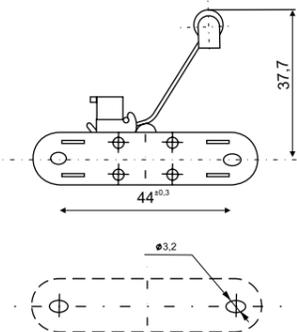


Type of switch	Description	Forces and travels			Climatic design	Catalogue No.	Weight (kg)
		FC max	CA max	CT mm			
	Switch with a telescopic drive	13	4	6	standard	59-182 082	0.036
					special	59-182 086	
	Switch with a telescopic drive and a lever with a roll	9	6.5	11	standard	59-182 092	0.055
					special	59-182 096	
	Switch with a telescopic drive and an angle lever with a roll	9	6,5	11	standard	59-182 102	0.064
					special	59-182 106	
	Switch in an enclosure, with a telescopic drive	13	4	6	standard	59-182 012	0.094
					special	59-182 016	
	Switch in an enclosure, with a telescopic drive and a lever with a roll	9	6.5	11	standard	59-152 022	0.115
					special	59-152 026	
	Switch in an enclosure, with a telescopic drive and an angle lever with a roll	9	6.5	11	standard	59-152 032	0.123
					special	59-152 036	

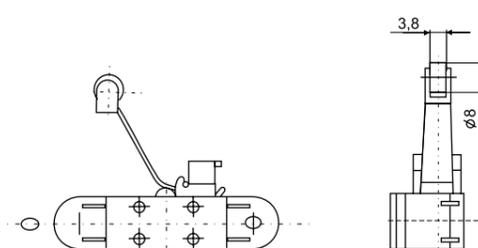
5b.3 DIMENSIONAL DRAWINGS



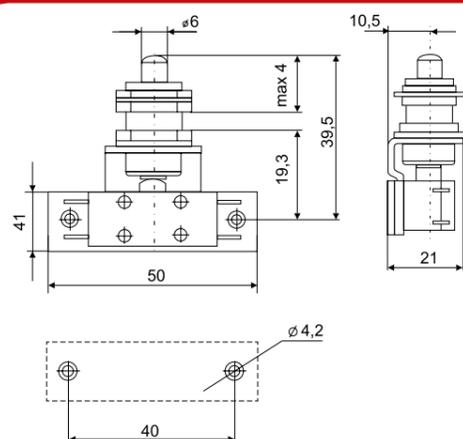
MP 0-1R



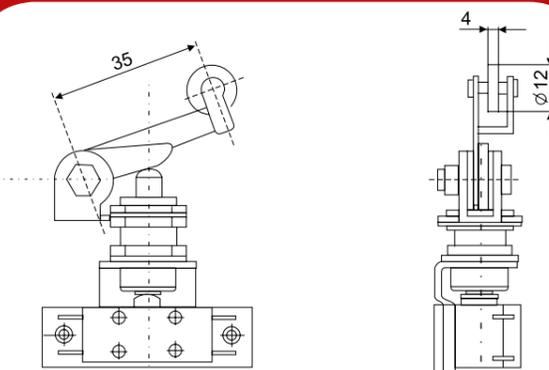
MP 0-1RL



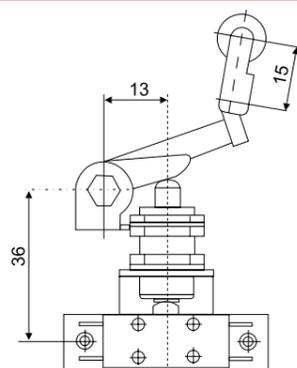
MP 0-2



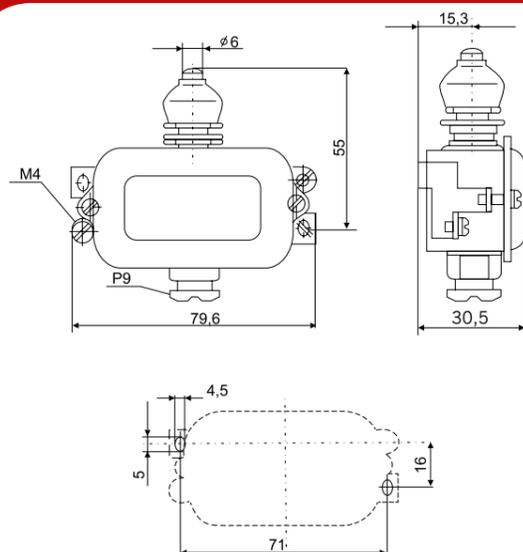
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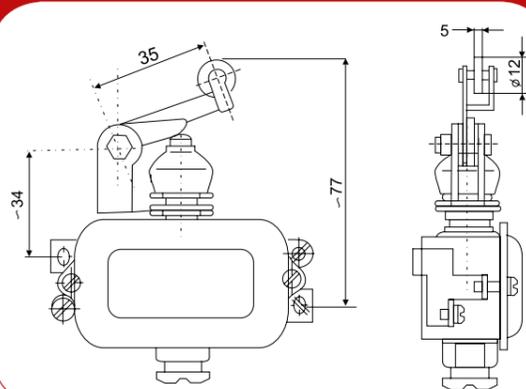
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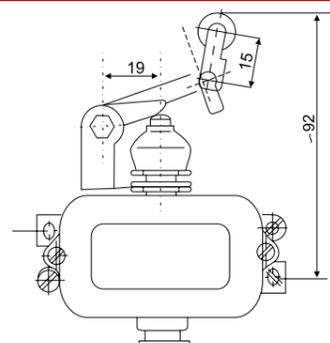
MP 0-4



MP 0-5



MP 0-5W



5.c LK LIMIT SWITCHES

• Purpose

Limit switches are controlled with an appropriate drive element. The position and speed of movement corresponding to mobile contacts, and the time needed to switch them over, depend on the position and speed of travel corresponding to the drive element that acts on the pusher with an appropriate force. This way, appropriate contacts of the switch are either closed or opened. The arrangement of mobile contacts is not stable, which means that they automatically return to their home position, once the force acting on the pusher disappears.

Limit switches are intended to be used in automated drive systems and control, monitoring, and measuring circuits that operate under alternating and direct currents.

• Installation of switches

The LK-1 and LK-2 switches are mounted to the foundation with 4 x M4 screws, while the LK-10 and LK-20 switches require only two M4 screws.

NEW! - PULL CORD SWITCHES

• Purpose

The LK-30 and LK-40 pull cord switches enable stopping of the device they work with. They meet the requirements of PN-EN 60947-5-1. The minimum length of the cord is 2m, while the maximum length 25m. All other available lengths depend on ambient temperature (Fig. 1).

• Design and principle of operation

NO and NC mobile contacts and the body of a pull cord switch are installed inside a metal enclosure that provides IP65 protection class. Pull cord switches have an additional protective contact, which is located inside the metal enclosure.

• Installation of switches

A complete pull cord switch is comprised of a switch with a turnbuckle and a thimble (1); a spring with a small chain, a thimble, and a ring (2); a cord with the diameter equal to a wire with covering 3 (3); and with bushes (4) – if the cord's length exceeds 3m. All of the afore-mentioned details are available separately. The cord that has the length corresponding to Fig. 1 must be installed according to the enclosed instructions. Assembly diagrams have been presented in Figs. 2 and 3.

• Principle of operation

In order to prepare a pull cord switch for operation: use the turnbuckle to tighten the cord (which has been previously connected to the ring of the switch), until the cord has been properly tensioned (the notch on the mandrel with the ring must be adjacent to the surface of the cover from which it protrudes, while the cord must be tensioned to the position parallel to the mandrel). This way the switch is ready for

• Design and principle of operation

Switches of the LK-1 and LK-2 series have no enclosures, but there are NO and NC mobile contacts installed inside their plastic bodies. The connection clamps located on switches of that type make it possible to connect power cords with the cross-section from 1.5 to 4.0mm² (for single-wire cord, and from 1.0 to 2.5mm² (for multi-wire cords).

Switches of the LK-10 and LK-20 series have a metal enclosure that contains NO and NC mobile contacts and the body of the switch – the enclosure provides IP 65 protection class for contacts. The connection clamps located on switches of that type make it possible to connect power cords with the cross-section from 1.5 to 4.0mm² (for single-wire cord, and from 1.0 to 2.5mm² (for multi-wire cords).

Switches have an additional protective contact, which is located inside the metal enclosure.

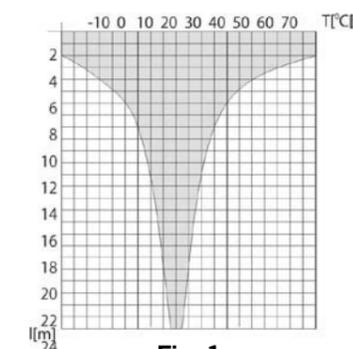


Fig. 1

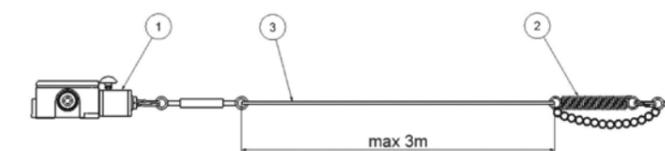


Fig. 2 The LK-30 pull cord switch with a cord, without bushes.

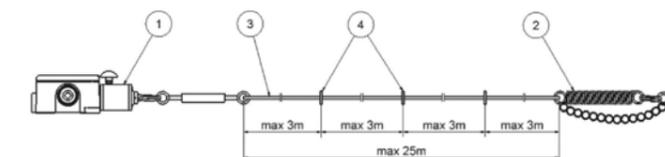


Fig. 3 The LK-30 pull cord switch with a cord, with bushes.

operation. In order to activate the switch, pull the cord using appropriate force, until resistance is found. This way, contacts will be switched over and the switches will be locked in the activation position. In order to return the LK-30 pull cord switch to the working condition, pull the blue lock and repeat the actions described above, to reset the switch. In the case of the LK-40 switch, pulling the cord with appropriate strength is enough to switch the contact over and start the switch.

5c.1 TECHNICAL DATA

Rated insulation voltage U_i		500V
Rated switching voltage U_e		500V AC 220V DC
Rated continuous current I_u		16A
Rated switched currents I_e	AC 15 - U_e 500V DC 13 - U_e 220V	4A 0.5A
Rated impulse withstand voltage U_{imp}		6kV
Type and the highest rating of a safety device that protects against the effects of short-circuit current impact		fuse-element gG16A
Mechanical life (cycles)	LK-1, LK-2 } LK-10, LK-20 } LK-30 LK-40	3x10 ⁶ 0.8x10 ⁴ 0.35x10 ⁵
Electrical endurance (switching)	LK-1, LK-2, LK-10, LK-20 AC 15 $U_e = 500V$ $I_e = 4A$ DC 13 $U_e = 220V$ $I_e = 0,5A$ LK-30 LK-40	7x10 ⁵ 1x10 ⁵ 0.8x10 ⁴ 0.35x10 ⁵
Limited withstand current		1000 A
Force required to switch over [N]	LK-1, LK-2 LK-10, LK-20 LK-30, LK-40	max14.7±2.3N max23±5N min 165N
Force required to unlock [N]	LK-30	110N
Rated frequency of switching per hour Cross-		300 switches/h
Sections of conductors	- Multi-wire - Single-wire	1,0 - 2,5 mm ² 1,5 - 4 mm ²
Speed of the drive element		0,1 to 5 m/s
Ambient temperature		-25 to +40 °C
Protection class - Body of a switch	- LK-1, LK-2 - LK-10, LK-20, LK-30, LK-40	IP 00 IP 56
- Terminals	- LK-1, LK-2 - LK-10, LK-20, LK-30, LK-40	IP 00 IP 56
Travel of effective opening	LK-30, LK-40	min. 4.3 mm max. 6.5 mm

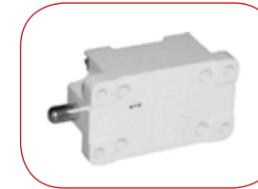
The product conforms to the following standard: IEC 60947-5-1

- Working conditions

Design	Relative humidity of air	
	[%]	Temperature [K]
Moderate climate (standard)	50	+313
	90	+293
tropical climates (special)	50-70	+313
	100	+303

Switches of the LK series are designed to work in an environment free of gases and vapours that are electrically conducting, flammable, explosive, or chemically active. Height of installation: up to 2,000 metres above seal level. Switches can operate in any working positions.

5c.2 TYPES OF SWITCHES



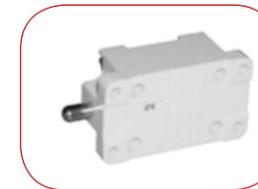
Type of switch	Description	Climatic design	Catalogue No.	Weight (kg)
LK-1	NC/NO limit switch ¹⁾	standard	59-391 012	0.052
		special	59-391 016	



LK-1R	NC/NO limit switch ¹⁾ with a pusher and a roll parallel to the plane of installation	standard	59-391 032	0.055
		special	59-391 036	



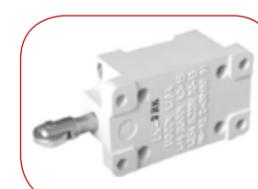
LK-1RK	NC/NO limit switch ¹⁾ with a pusher and a roll that has its axis perpendicular to the plane of installation	standard	59-391 052	0.055
		special	59-391 056	



LK-2	NO/NC limit switch ¹⁾	standard	59-391 022	0.052
		special	59-391 026	



LK-2R	NO/NC limit switch ¹⁾ with a pusher and a roll parallel to the plane of installation	standard	59-391 042	0.055
		special	59-391 046	



LK-2RK	NO/NC limit switch ¹⁾ with a pusher and a roll perpendicular to the plane of installation	standard	59-391 062	0.055
		special	59-391 066	

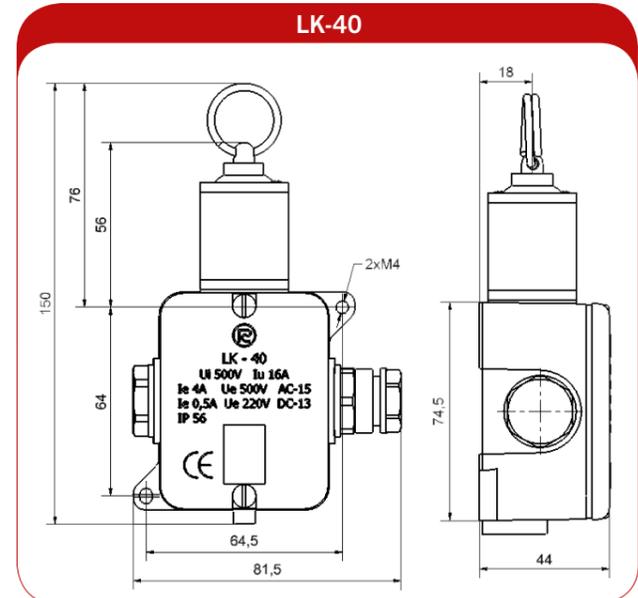
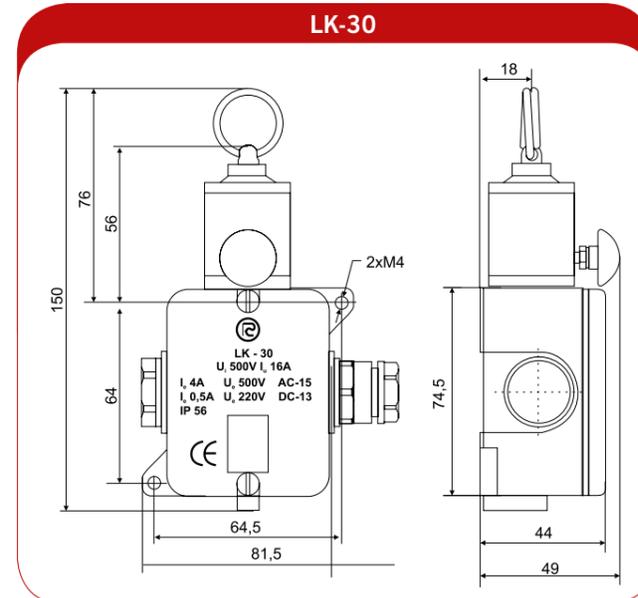
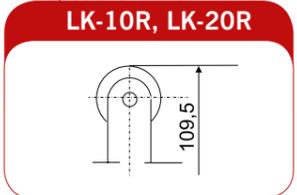
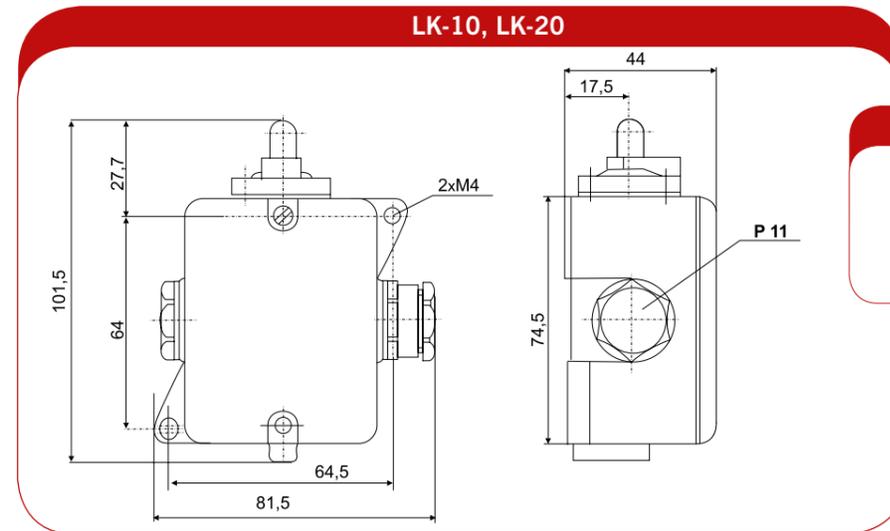
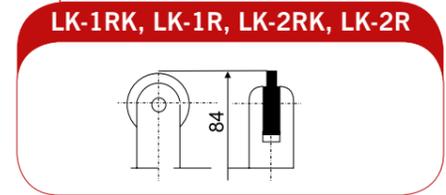
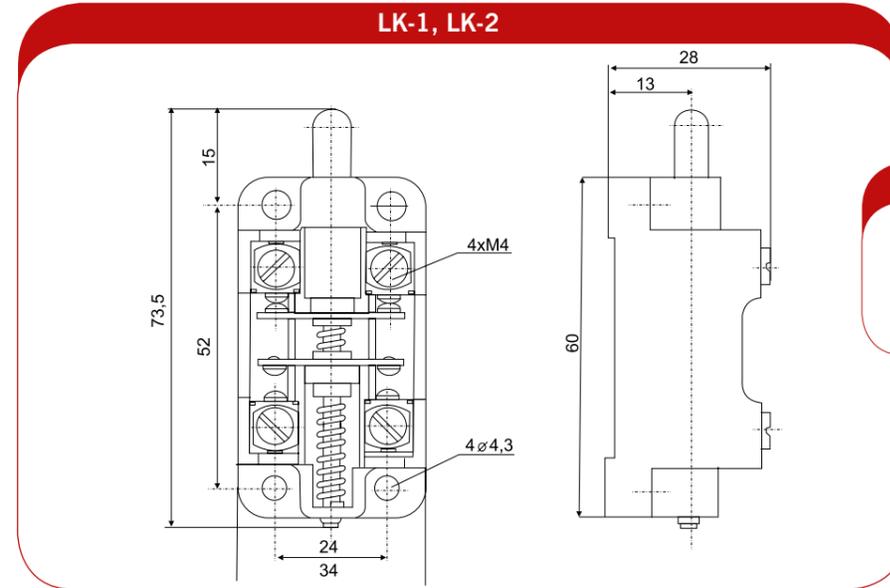
¹⁾ There are contacts that feature a close relationship between the sequences of their switching over, in the function of travel of the drive element. In the case of the NC/NO contact (non-overlay), the NC contact is the first to be opened, when the drive element is in travel. There is an area in which both contacts are open. The NO/NC contact (overlay) operates according to the principle that the first to close is the NO contact, when the drive element is in travel. Both contacts are closed along a certain section of travel of the drive element.



Type of switch	Description	Climatic design	Catalogue No.	Weight (kg)
LK-10	NC/NO limit switch ¹⁾ in a metal enclosure	standard	59-351 012	0.225
		special	59-351 016	
LK-10R	NC/NO limit switch ¹⁾ in a metal enclosure, with a pusher and a roll	standard	59-351 032	0.228
		special	59-351 036	
LK-20	NO/NC limit switch ¹⁾ in a metal enclosure	standard	59-351 022	0.225
		special	59-351 026	
LK-20R	NO/NC limit switch ¹⁾ in a metal enclosure, with a pusher and a roll	standard	59-351 042	0.226
		special	59-351 046	
LK-30	NC/NO pull cord switch with a mechanical lock	standard	59-353 012	0.266
		special	59-353 016	
LK-40	NC/NO pull cord switch	standard	59-354 012	0.256
		special	59-354 016	

¹⁾ There are contacts that feature a close relationship between the sequences of their switching over, in the function of travel of the drive element. In the case of the NC/NO contact (non-overlay), the NC contact is the first to be opened, when the drive element is in travel. There is an area in which both contacts are open. The NO/NC contact (overlay) operates according to the principle that the first to close is the NO contact, when the drive element is in travel. Both contacts are closed along a certain section of travel of the drive element.

5c.3 DIMENSIONAL DRAWINGS



5.d MINIATURE SWITCHES OF THE 52 SERIES

• Purpose

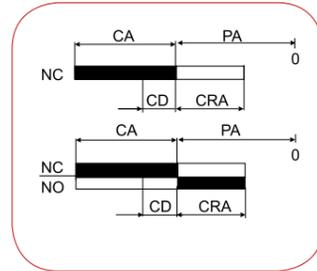
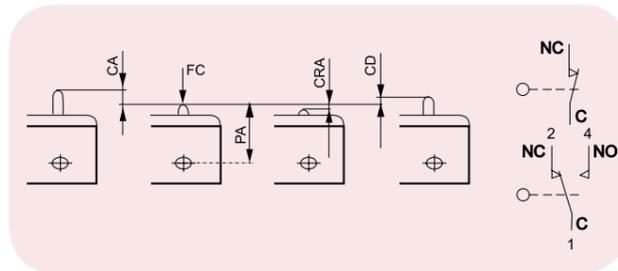
Miniature switches of the 52 series are intended to be used in various automated auxiliary circuits of control, signalling, monitoring, and measuring systems. The following factors are decisive when selecting the proper version of a 52 series switch:

- Type of circuit (NO, change-over);
- Type of connecting clamps;
- Type of control elements that operate the switch (the shape and method of travel);
- Mechanical and electrical parameters of the switch.

• Design and principle of operation

Miniature switches of the 52 series are a group of switches with mobile contacts that operate in a step-like manner (snap action). They feature various types of drive elements, connecting clamps, and repeatability of performance parameters.

• Diagram of location, force, and travel of a drive element



Legend:

PA – The position after switching over a switch
 FC – The force required to switch over
 CA – The travel required to switch over
 CD – Differential travel
 CRA – The travel after switching over

5d.1 TECHNICAL DATA

Rated insulation voltage U_i		400V
Rated switching voltage U_e	AC 15 AC 13 DC 13	400V 50-60Hz 230V 50-60Hz 220V
Rated continuous current I_u		16A
Rated switched currents I_e	AC 15 - U_e 400V, 50Hz DC 13 - U_e 220V	2A 0.2A
Minimum switching voltage U_e		10V
Minimum switching current I_u		20mA
Mechanical life (cycles)		1×10^6
Electrical endurance (switching)	AC 15 DC 13	0.2×10^6 0.125×10^6
Minimum speed of drive element		17 μ m/s
Maximum speed of drive element		1 m/s
Maximum speed of drive element		120 switches/h
Cross-sections of conductors		1-2.5 mm ²
Ambient temperature		-25 to +55 °C

Protection class	- Body of a switch - Terminals	IP 40 IP 00
Level of environmental pollution		3

The product conforms to the following standard: IEC 60947-5-1

The driving force's direction of action should correspond to the direction of movement of the drive element – deflections have been specified in the table below:

Type of the drive element	In any plane	To the plane in which the lever moves or the roll rotates	
		In parallel	Perpendicularly
Pin and telescopic pushers Without a roll	5°	-	-
Telescopic pushers with a roll	-	±30°	±5°
Flat levers of levers with a roll	-	±45°	±5°

• The forces and travels of switches in the standard design, 5211-... (with a NO/NC circuit)

Type of drive element	Variation	Catalogue No.	Forces and travels				
			PA	CA	CRA	CD	FC
Pin pusher	Steel	5211-_00	18.2±0.5	0.1-0.6	min.0.15	max.0.1	2.5-4.5
	Plastic	5211-_10					
Telescopic pusher	Short	5211-_20	21±1	max.0.8	min.1.4	0.04-0.1 max.0.02	max.6.5
	Short	5211-_20/02					
	Long	5211-_30	49.5±1.2	0.1-0.6	min.3.5	max.0.1	2.5-4.5
	With a crosswise roll	5211-_40					
With a longitudinal roll	5211-_50						
Flat lever with the radius of:	R = 65.3 mm	5211-_01	19±2	max.13	min.1.7	max.2	0.2-0.6
	R = 53.3 mm	5211-_02	19±3	max.10	min.1.3	max.1.6	0.3-0.7
	R = 39.3 mm	5211-_05		max.8	min.1	max.1.2	0.4-1
Lever with a roll (long the lever) with the radius of:	R = 25.6 mm	5211-_03	30.5±2	max.6	min.0.7	max.0.8	0.5-1.3
	R = 51.3 mm	5211-_04		max.10	min.1.2	max.1.5	0.3-0.7
	R = 37.2 mm	5211-_05		max.8	min.1	max.1.2	0.4-1
Lever with a roll (across the lever) with the radius of:	R = 36.8 mm	5211-_07	30.5±2	max.8	min.2	max.1.2	0.4-1

Important:

The catalogue No. of a switch must be provided together with the code number of terminals:

- 2 – Sleeve terminal
- 4 – Screw terminal
- 5 – Side terminal



TYPES OF TERMINALS

Description	Appearance	Dimensions	Symbol
6.3 sleeve terminal (sleeve joints)			2
M3 side screw terminal			5
M3 screw terminal			4

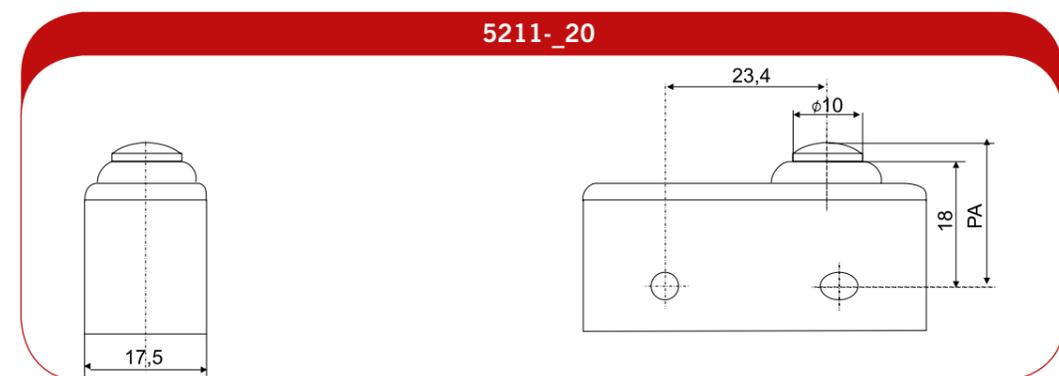
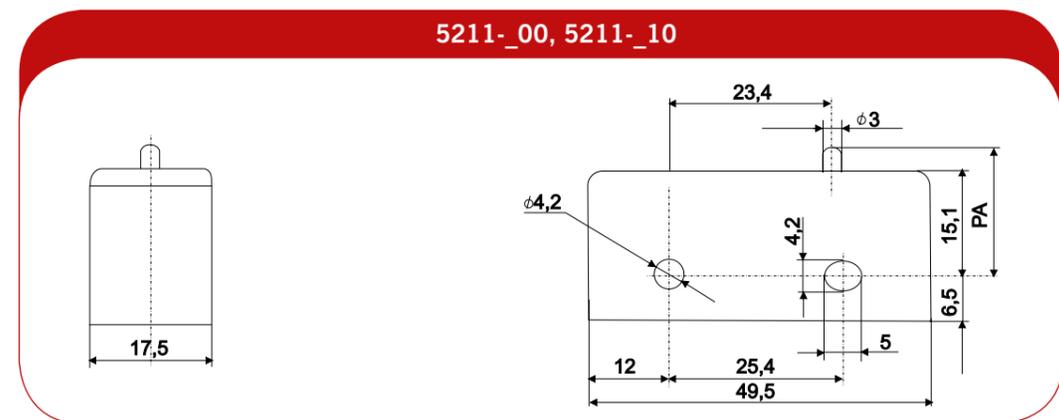
5d.2 TYPES OF SWITCHES

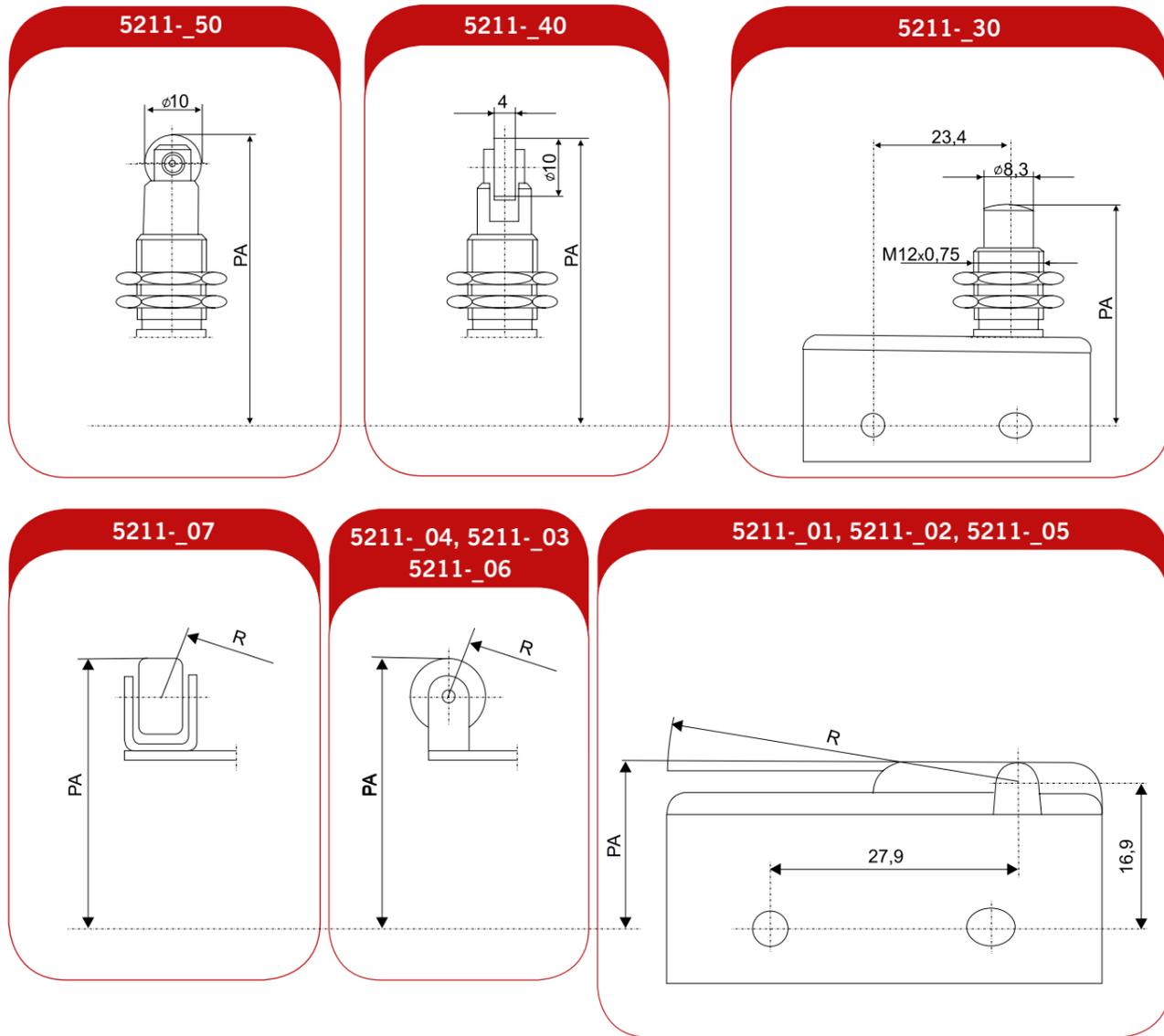
Description	Type of terminals	Catalogue No.	Weight (kg)
Switch with a steel pin pusher	Sleeve joints Screws Side screws	5211-200 5211-400 5211-500	0.0225
Switch with a plastic pin pusher	Sleeve joints Screws Side screws	5211-210 5211-410 5211-510	0.0225
Switch with a short telescopic pusher	Sleeve joints Screws Side screws	5211-220 5211-420 5211-520	0.0225
Switch with a short telescopic pusher, with reduced differential travel	Sleeve joints Screws Side screws	5211-220/02 5211-420/02 5211-520/02	0.0225
Switch with a long telescopic pusher	Sleeve joints Screws Side screws	5211-230 5211-430 5211-530	0.0225
Switch with a telescopic pusher and with a crosswise roll	Sleeve joints Screws Side screws	5211-240 5211-440 5211-540	0.044
Switch with a telescopic pusher and with a longitudinal roll	Sleeve joints Screws Side screws	5211-250 5211-450 5211-550	0.044

Description	Radius of lever	Type of terminals	Catalogue No.	Weight (kg)
Switch with a flat lever	65.3 53.3 39.3	Sleeve joints	5211-201 5211-202 5211-205	0.0305 0.0300 0.0290
	65.3 53.3 39.3	Screws	5211-401 5211-402 5211-405	0.0305 0.0300 0.0290
	65.3 53.3 39.3	Side screws	5211-501 5211-502 5211-505	0.0305 0.0300 0.0290
Miniature switch with a roll running along the lever	25.6 51.3 37.2	Sleeve joints	5211-203 5211-204 5211-206	0.0310 0.0320 0.0310
	25.6 51.3 37.2	Screws	5211-403 5211-404 5211-406	0.0310 0.0320 0.0310
	25.6 51.3 37.2	Side screws	5211-503 5211-504 5211-506	0.0310 0.0320 0.0310
Miniature switch with a roll running across the lever	36.8	Sleeve joints Screws Side screws	5211-207 5211-407 5211-507	0.0310



5d.3 DIMENSIONAL DRAWINGS

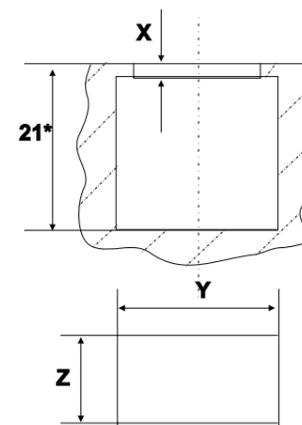




5e.1 TECHNICAL DATA

Rated insulation voltage U_i	250V
Rated switching voltage U_e	230V 50Hz
Rated switched currents I_M, I_R	6A, 4A
Electrical endurance (cycles)	50×10^3
Rated frequency of switching per hour	1,800 switches/h
Ambient temperature	-5 to +85 °C
Connection clamps of terminals	4.8 mm
Protection class - of the body - of terminals	IP40 IP00

The product conforms to the following standard: IEC 61058-1



x - Thickness of the front mounting plate
21* - The depth of the pocket does not include the size of the sleeve

X	Y	Z
0.8-1.3	19.2 + 0.1	13.4 + 0.1
1.3-2	19.4 + 0.1	13.4 + 0.1
2-3.2	19.4 + 0.1	13.4 + 0.1

5e.2 TYPES OF SWITCHES

5.e SWITCHES OF THE AM-1z SERIES FOR BUILDING IN

• Purpose

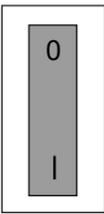
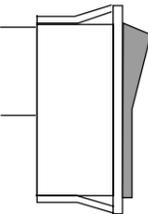
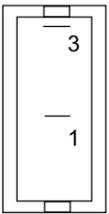
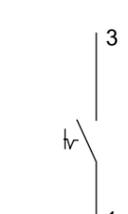
Switches of the AM-1z series for building are a group of switches with mobile contacts that operate in a step-like manner (snap action). The switches are comprised of a plastic body that contains built-in mobile contacts. The control element is a cradle button. Considering the method of operation of the drive mechanism, switches of the AM-1z series are bistable. The switching over of the control element to the end position, in a bistable switch, results in the closing of a contact. When the external force acting on the button disappears, the position of the drive element remains the same.

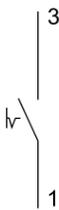
• Design and principle of operation

Switches of the AM-1z series for building in are intended to be used in electrical circuits of consumer equipment and machines of class II, in air-conditioned closed rooms that are not exposed to dripping, splashing, or streaming water, and where there is no condensation of water that results from temperature fluctuations.

• Installation of switches

It is required to use 4.8 mm sleeve clamps to connect external conductors of the main and auxiliary circuits. Switches have snap fasteners that enable robust fastening in assembly holes with a pocket of an appropriate shape and dimensions (see the figure below).

Type of switch	Description	General appearance and position of sleeve clamps	Electrical diagram
	AM-1z Unipolar bistable push button switch	  	

Type of switch	Description	Catalogue No.	Colour of body	Colour of push button	Electrical diagram
AM-1z	Unipolar bistable push button switch	59-391100	●	●	
		59-391110	●	●	
		59-397000	○	●	
		59-325000	○	○	
		59-326000	●	●	
		59-391000	●	●	

5.f MINIATURE AND LIMIT SWITCHES OF THE 83 135, 83 136, 83 138, 83 140, and 83 758 SERIES

• Purpose

Limit switches are controlled with an appropriate drive element. The position and speed of movement corresponding to mobile contacts, and the time needed to switch them over, depend on the position and speed of travel corresponding to the drive element that acts on the pusher with an appropriate force. This way, appropriate contacts of the switch are either closed or opened. The arrangement of mobile contacts is not stable, which means that they automatically return to their home position, once the force acting on the pusher disappears.

Limit switches are intended to be used in automated drive systems and control, monitoring, and measuring circuits that operate under alternating and direct currents.

• Installation of switches

Switches of the 83 135 and 83 136 types are mounted to the foundation with 4 x M4 screws.



NEW!

MINIATURE SWITCHES OF THE 83138 TYPE

• Purpose, design, and assembly

Miniature switches of type 83 138 are intended to be used in automated drive systems and control, monitoring, and measuring circuits that operate under alternating and direct currents. These switches are controlled with an appropriate drive element. The position and speed of movement corresponding to mobile contacts, and the time needed to switch them over, depend on the position and speed of travel corresponding to the drive element that acts on the pusher with an appropriate force. This way, appropriate contacts of the switch are either closed or opened. The arrangement of mobile contacts is not stable, which means that they automatically return to their home position, once the force acting on the pusher disappears.

Switches of type 83 138 have a plastic body that contains NC and NO mobile contacts. These switches have M3 screw connection clamps with flat washers. In order to install a switch, tighten it to the foundation with two plastic M4 screws that are delivered with the switch. It is not acceptable to use screws made of a different material.

• Design and principle of operation

Single-module switches of the 83 135 series have no enclosures, but there are NO and NC mobile contacts installed inside their plastic bodies. Switches of the 83 135 series have M4 screw connection clamps with serrated lock washers (WW4).

Double-module switches of the 83 136 series have no enclosures, but there are 2NO and 2NC mobile contacts installed inside their plastic bodies. Switches of the 83 136 series have M3 screw connection clamps with serrated lock washers (WW3).

Switches of the 83 758 series have a metal body, inside which there is either 83 135 or 83 136 switch. It is possible to attach replaceable heads or drive levers to the body. Switches of the 83 758 series have replaceable heads and drive levers. Bodies of switches have a protective clamp with a head and a M4 screw, placed inside the metal enclosure.

Bodies of the 83 758-0 series have M4 screw connection clamps with serrated lock washers (WW4). Bodies of the 83 758-3 series have M3 screw connection clamps with serrated lock washers (WW3).

MINIATURE SWITCHES OF THE 83138.1 TYPE

• Purpose, design, and assembly

Miniature switches of type 83138.1 with a telescopic button are intended to be used in automated drive systems and control, monitoring, and measuring circuits that operate under alternating and direct currents. These switches are controlled with an appropriate drive element. The position and speed of movement corresponding to mobile contacts, and the time needed to switch them over, depend on the position and speed of travel corresponding to the drive element that acts on the pusher with an appropriate force. This way, appropriate contacts of the switch are either closed or opened. The arrangement of mobile contacts is not stable, which means that they automatically return to their home position, once the force acting on the pusher disappears.

Switches of type 83138.1 have a plastic body that contains NC and NO mobile contacts. These switches have M3 screw connection clamps with flat washers. In order to install a switch, put it inside an Ø12 hole or a threaded M12x0.75 hole in the panel, and tighten it. Additionally, the switch can be secured with two M3x10 screws, to protect it against unnecessary movements.

LIMIT SWITCHES OF THE 83758 52 TYPE

• Purpose, design, and assembly

Switches of type 83758 52 are intended to be used in automated drive systems and control, monitoring, and measuring circuits that operate under alternating and direct currents. Switches of the 83758 52 series have a metal body that contains an 83138 switch (3NO, 3NC, 2NO+1NC or 2NC+1NO contacts). These switches have replaceable heads and drive levers. The heads can be installed in four positions at every 90°, around the vertical axis. The drive levers that work with revolving heads can be placed at any position on the spindle. Bodies of switches have a protective clamp with a head and a M4 screw, placed inside the metal enclosure.

NEW!

The body with the proper revolving head should operate correctly, when the direction of the driving force acting on:

- The pusher without a roll – is deflected from the longitudinal axis of the pusher by no more than 15° (in any plane);
- The pusher with a roll – is perpendicular to the roll's axis of rotation, and the deflection does not exceed 30° from the longitudinal axis of the pusher and in the plane of roll's rotation;
- The lever – matches the direction of the lever's rotation, when the deflection does not exceed 30° from the longitudinal axis of the pusher, in the plane of the pusher's travel.

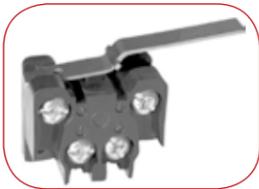
Switches of the 83758 52 series are mounted to the foundation with 2 x M5 screws.

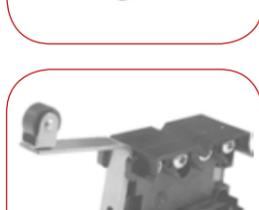
5f.1 TECHNICAL DATA

	83 135	83 136	83 140	83 138	83 758 02	83 758 32	83 758 52
Rated voltage U_i	400V						
Rated switching voltage U_e AC-15 DC-13	400V 50Hz 220=		300V 50-60 Hz 220=	400V 50Hz 220=	300V 50-60 Hz 220=		
Rated continuous current I_u (I_{th})	16A		-	10A	16A	10A	10A
Rated switched currents: I_{AC15} U_e 400V, 50-60Hz I_{DC13} U_e 220V	6A 0.25A	2.5A 0.16A	AC1-10A 0.6A	2.5A 0.25A	6A 0.25A	2.5A 0.16A	2.5A 0.25A
Type of fuse-element	Bi-Wts 16A		Bi-Wts 10A	Bi-Wts 16A			Bi-Wts 10A
Limited withstand current	1000A						
Mechanical life of: - Switches without an additional drive - Switches with a telescopic pusher - Switches with a lever-based drive - Switches with an already installed driving head, controlled with a telescopic pusher - Switches with an already installed revolving driving head	5x 3x 4x } 10^6			5x 10^6	3x 10^6 2x 10^6		
Electrical endurance: AC15 DC13	0.25x 10^6 0.20x 10^6	0.10x 10^6 0.10x 10^6	AC1-3.0x 10^6 0.3x 10^6	0.1x 10^6	0.25x 10^6	0.1x 10^6	
Max force required to switch over	4.5	6	1.3	6	20 or 0.2Nm for revolving heads		
Rated frequency of switching [switches/h]	3,600		60	3,600	1,200		
Speed of the drive element [m/s]	17x 10^{-6} ...1			1	10 ⁻⁴ ...1 pusher 10 ⁻³ ...1 revolving lever		
Cross-section of single-wire terminals [mm]	1.0-2.5		0.75-1.5	1.0-2.5	1.0-1.5	0.75-1.5	
Ambient temperature - In moderate climate [°C]	-25 to+40		-25 to+70		-25 to+40		
Protection class: - Body - Terminals	IP 40 IP 00			IP 65 IP 65			
Type of gland	-			Dp 13.5			

The product conforms to the following standard: IEC 60947-5-1 IEC 60947-5-1

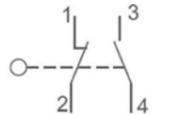
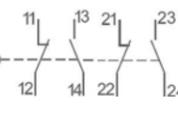
5f.2 TYPES OF SWITCHES

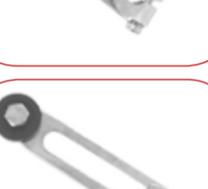
Type of switch	Description	Catalogue No.	Weight (g)
	Basic miniature switches with two current circuits and a double-break change-over contact of the same polarity; with four connection clamps controlled with a plastic pusher (it has two stable positions).	59-794012	26.5
	Basic miniature switches with two current circuits and a double-break change-over contact of the same polarity, with four connection clamps controlled with a plastic pusher.	59-791012	26.0
	Basic miniature switches with an additional drive (telescopic pusher), with two current circuits and a double-break change-over contact of the same polarity, with four connection clamps.	59-782022	70.0
	Basic miniature switches with an additional drive (an angled lever), with two current circuits and a double-break change-over contact of the same polarity, with four connection clamps.	59-781012	30.0
	Miniature switches with an additional drive (an angled lever and a roll in the axis of the lever), with two current circuits and a double-break change-over contact of the same polarity, with four connection clamps.	59-781032	32.0
	Miniature switches with an additional drive (an angled lever and a roll in the axis of the lever), with two current circuits and a double-break change-over contact of the same polarity, with four connection clamps.	59-781052	28.5
	Miniature switches with an additional drive (an angled lever and a roll in the axis of the lever), with two current circuits and a double-break change-over contact of the same polarity, with four connection clamps.	59-781072	32.0

Type of switch	Description	Catalogue No.	Weight (g)
	Basic miniature switches with two connection elements (switches) A & B that interact with one another after an appropriate delay, controlled with a plastic pusher. Basic miniature switches with two current circuits and a double-break change-over contact of the same polarity, with four connection clamps.	59-792012	38.0
	Miniature switches with a plastic pusher of a reduced length, with two connection elements (switches) A & B that interact with one another after an appropriate delay, controlled with a short plastic pusher. Connection elements with two current circuits and a double-break change-over contact of the same polarity, with four connection clamps (used in metal enclosures).	59-792012	38.0
	Miniature switches with an additional drive (a telescopic pusher), with two connection elements (switches) A & B that interact with one another after an appropriate delay, controlled with a plastic pusher. Connection elements with two current circuits and a double-break change-over contact of the same polarity, with four connection clamps.	59-782012	75.0
	Miniature switches with an additional drive (an angled lever), with two connection elements (switches) A & B that interact with one another after an appropriate delay, controlled with an angled lever. Connection elements with two current circuits and a double-break change-over contact of the same polarity, with four connection clamps.	59-781022	43.0
	Miniature switches with an additional drive (an angled lever with a roll in the axis of the lever), with two connection elements (switches) A & B that interact with one another after an appropriate delay, controlled with an angled lever with a roll in the axis of the lever. Connection elements with two current circuits and a double-break change-over contact of the same polarity, with four connection clamps.	59-781042	44.5
	Miniature switches with an additional drive (a straight lever with a roll in the axis of the lever), with two connection elements (switches) A & B that interact with one another after an appropriate delay, controlled with a straight lever with a roll in the axis of the lever. Connection elements with two current circuits and a double-break change-over contact of the same polarity, with four connection clamps.	59-781062	41.0
	Miniature switches with an additional drive (an angled lever with a roll in the axis of the lever), with two connection elements (switches) A & B that interact with one another after an appropriate delay, controlled with an angled lever with a roll in the axis of the lever. Connection elements with two current circuits and a double-break change-over contact of the same polarity, with four connection clamps.	59-781082	45.0

Type of switch	Description	Catalogue No.	Weight (g)
	83 138 Miniature switches with three (3) circuits, slow response, with a plastic pusher. Available in four contact arrangements (3X, 3Y, 2XY, and 2YX).	83 138 3X 83 138 3Y 83 138 2XY 83 138 2YX	34.5
	83 138.1 Miniature switches with three (3) circuits, slow response, with a telescopic drive. Available in four contact arrangements (3X, 3Y, 2XY, and 2YX).	83 138.1 3X 83 138.1 3Y 83 138.1 2XY 83 138.1 2YX	67.5

COMPONENT SETS FOR LIMIT SWITCHES IN A METAL ENCLOSURE

Type of switch	Description	Catalogue No.	Weight (g)
	83 758 02 Body of a limit switch, equipped with an 83 135 miniature switch	 56-503012	350
	83 758 32 Body of a limit switch, equipped with an 83 136.3 miniature switch	 56-503022	370
	83 758 52 Body of a limit switch, equipped with an 83 138 miniature switch	56-83758-52 2XY 56-83758-52 2YX 56-83758-52 3X 56-83758-52 3Y	370
	81 050 02 Driving head with a return force, controlled with a vertical pusher	56-519032	180
	81 080 02 Driving head with a return force, controlled with a vertical pusher, intended for 83 758 52 bodies	56-81080-02	180
	81 050 12 Driving head with a return force, controlled with a vertical pusher and a roll	56-519042	190
	81 080 12 Driving head with a return force, controlled with a vertical pusher and a roll, intended for 83 758 52 bodies	56-81080-12	190

	81 050 22 Driving head with a return force, controlled with a side pusher	56-519012	220
	81 080 22 Driving head with a return force, controlled with a side pusher, intended for 83 758 52 bodies	56-81080-22	220
	81 050 32 Driving head with a return force, controlled with a side pusher and a horizontal roll	56-519022	240
	81 080 32 Driving head with a return force, controlled with a side pusher and a horizontal roll, intended for 83 758 52 bodies	56-81080-32	240
	81 050 42 Driving head with a return force, controlled with a side pusher and a vertical roll	56-519092	240
	81 080 42 Driving head with a return force, controlled with a side pusher and a vertical roll, intended for 83 758 52 bodies	56-81080-42	240
	81 050 52 Revolving head with a spindle, with a return force, and a left-sided direction of operation	56-519052	240
	81 080 52 Revolving head with a spindle, with a return force, and a left-sided, intended for 83 758 52 bodies	56-81080-52	240
	81 050 62 Revolving head with a spindle, with a return force, and a right-sided direction of operation	56-519062	240
	81 080 62 Revolving head with a spindle, with a return force, and a right-sided, intended for 83 758 52 bodies	56-81080-62	240
	81 050 72 Revolving head with a spindle, with a return force, and a left- and right-sided direction of operation	56-519072	240
	81 080 72 Revolving head with a spindle, with a return force, and a left- and right-sided, intended for 83 758 52 bodies	56-81080-72	240
	81 050 82 Revolving head with a spindle, without a return force; right-side: actuation, left-side: disconnection	56-519052	250
	81 080 82 Revolving head with a spindle, without a return force; right-side: actuation, left-side: disconnection; intended for 83 758 52 bodies	56-81080-82	250
	79 210 371.2 Straight lever with a roll	56-514352	45
	79 210 372.2 Straight lever with a roll, adjustable length	56-514312	65



Type	Description	Catalogue No.	Weight (g)
79 210 373.2	Two-arm lever with rolls	56-514332	80

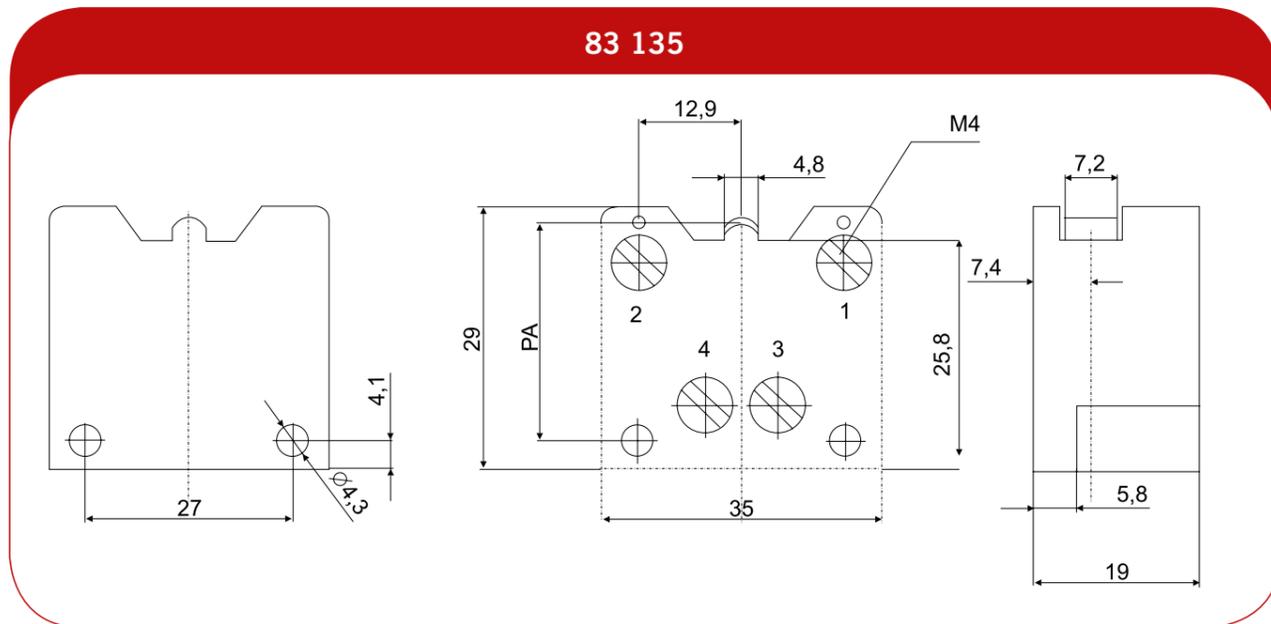


79 210 375.2	Lever with a spring	56-514282	45
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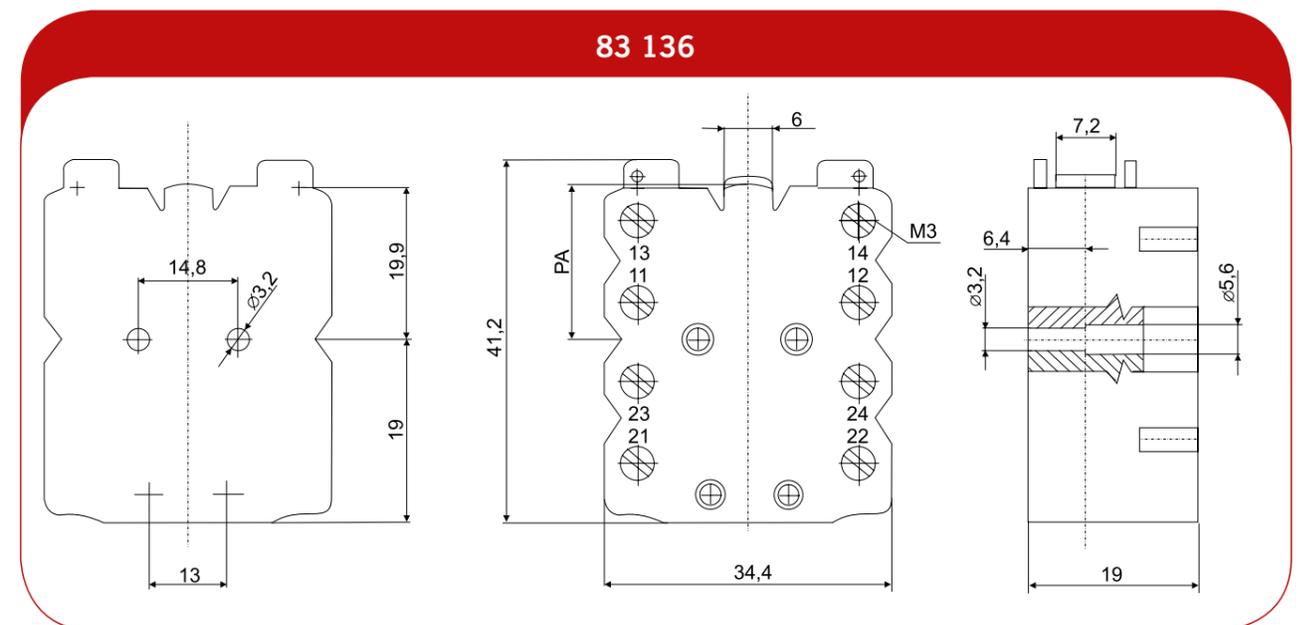
79 210 393.2	Straight lever (bar type)	56-514292	40
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5f.3 DIMENSIONAL DRAWINGS



Type of switch	Position of operation	Force required to switch over	Force required to switch back	Permissible driving force	Travel required to switch over	Travel after switching over	Travel needed to switch back
	PA [mm]	FC [N]	FR [N]	FFC [N]	CA [mm]	CRA [mm]	CD [mm]
83 135	22,8 ^{±0.3}	max. 4.5	min. 1	max. 20	max. 1.4	min. 0.8	0,6 ^{±0.25}

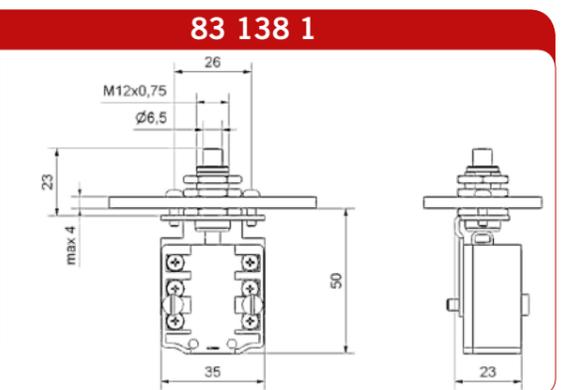
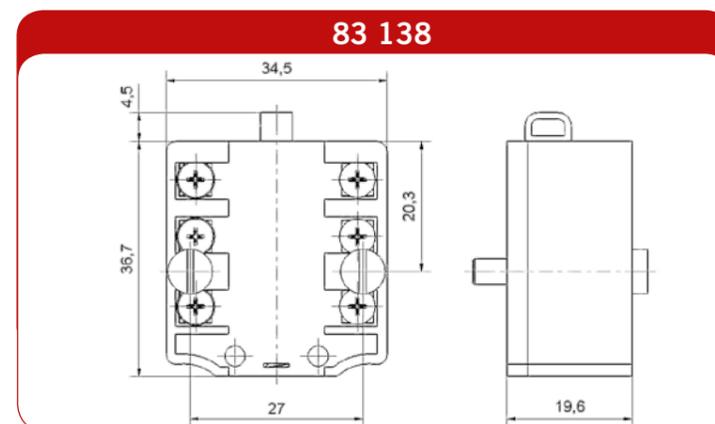
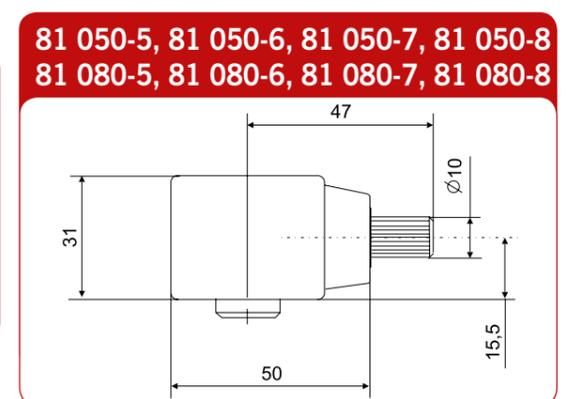
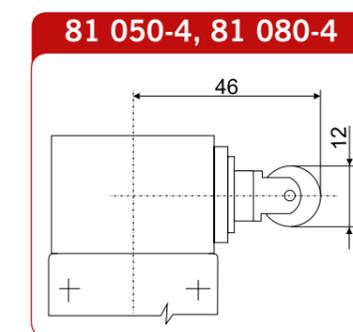
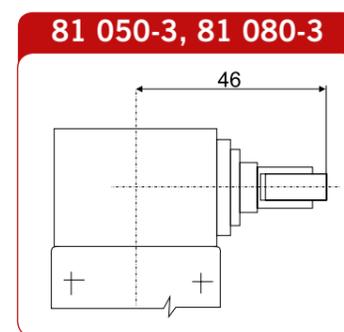
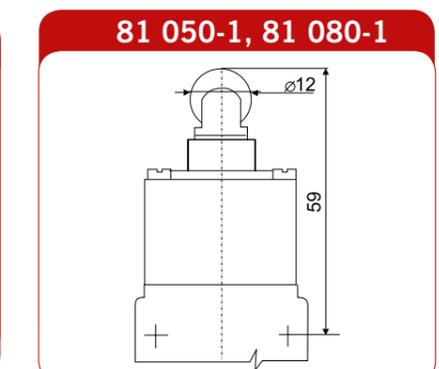
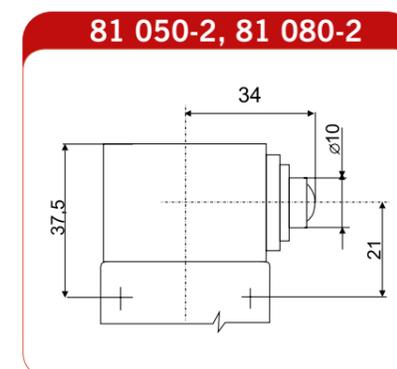
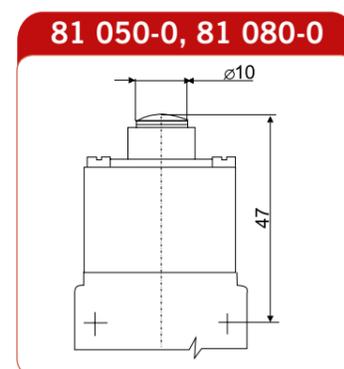
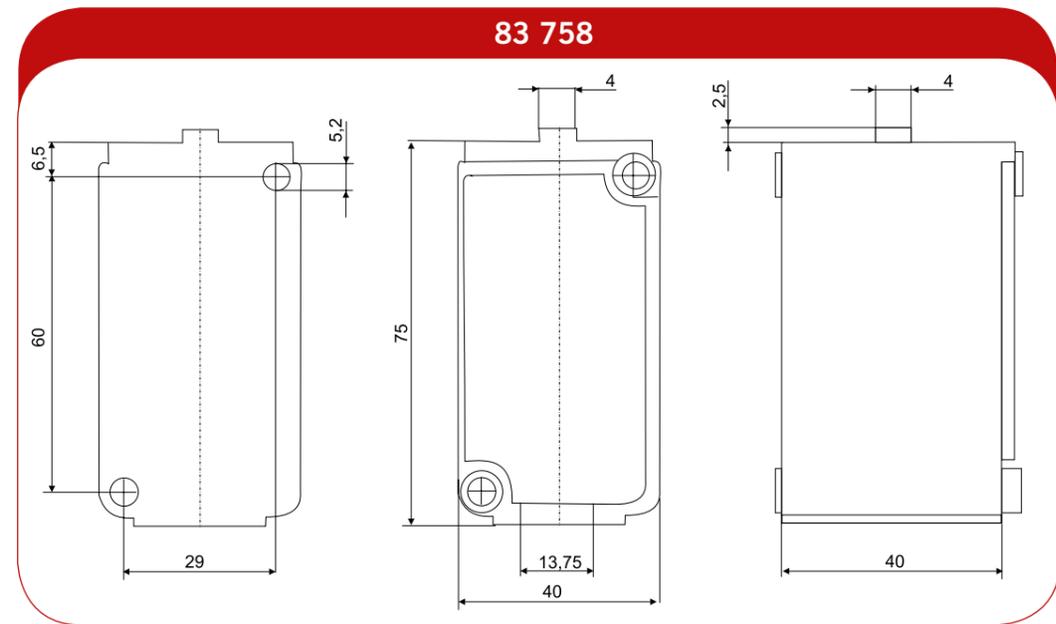
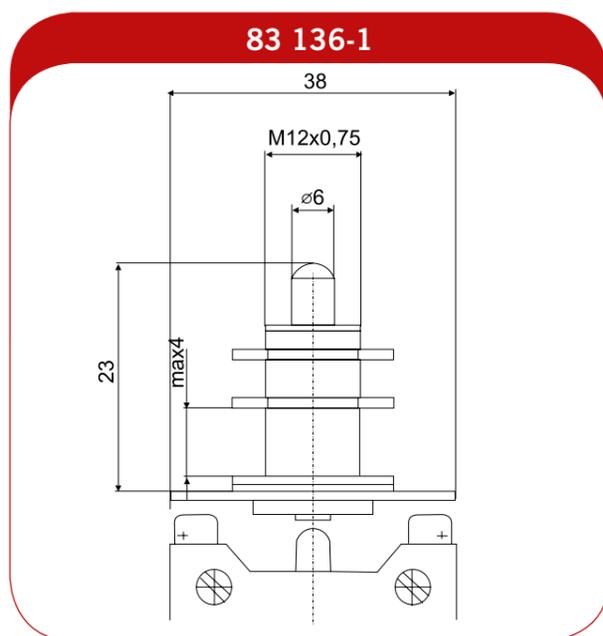
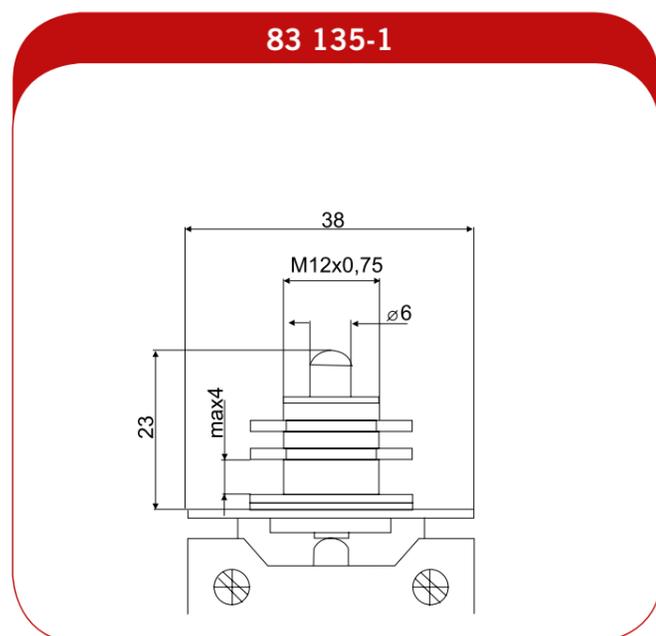
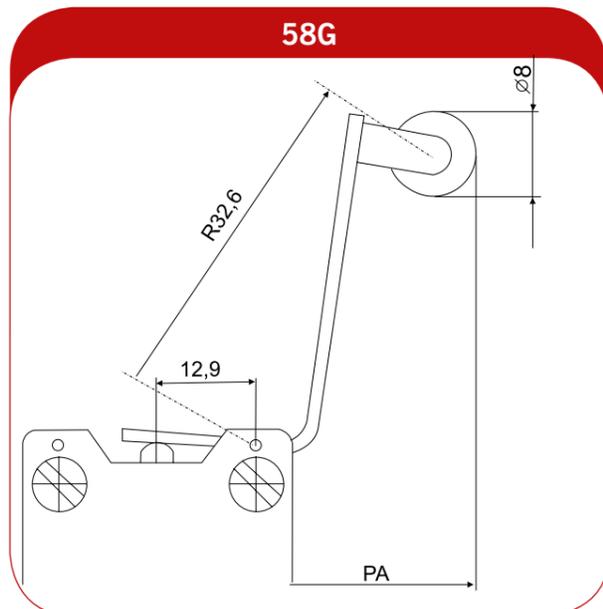
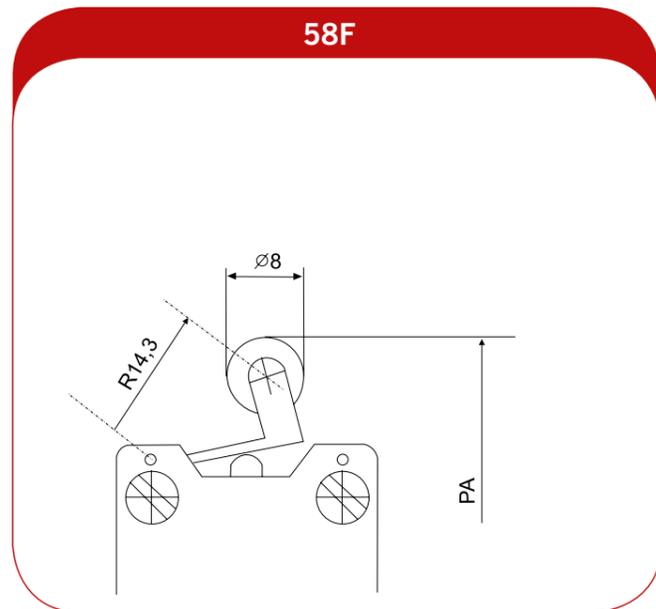
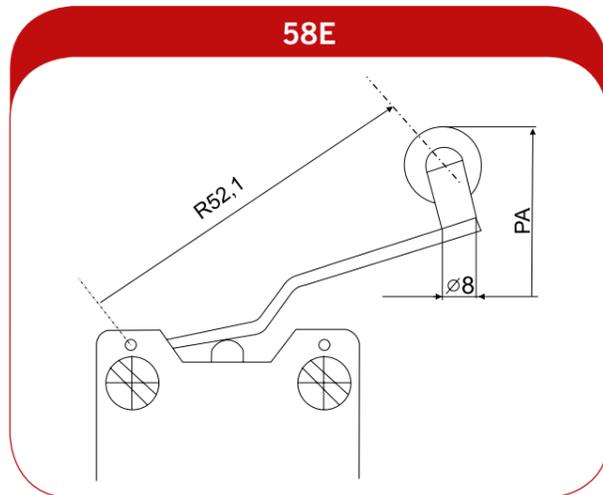
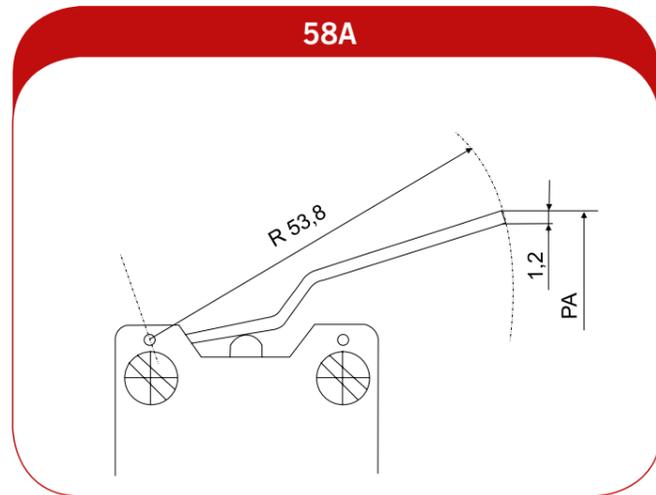
Typ łącznika	Długość czynna dźwigni [mm]	Długość do przestawienia CA [mm]	Położenie działania PA [mm]	Siła do zadziałania FC [N]
83 135 58A	53,8	7,2	30,1 ^{±1.1}	1,1
83 135 58E	52,1	6,8	42,5 ^{±0.7}	1,15
83 135 58F	14,3	1,7	17,1 ^{±0.6}	4,5
83 135 58G	32,6	4,1	32,5 ^{±0.2}	1,9
83 135 1	-	2 ^{±1}	-	11

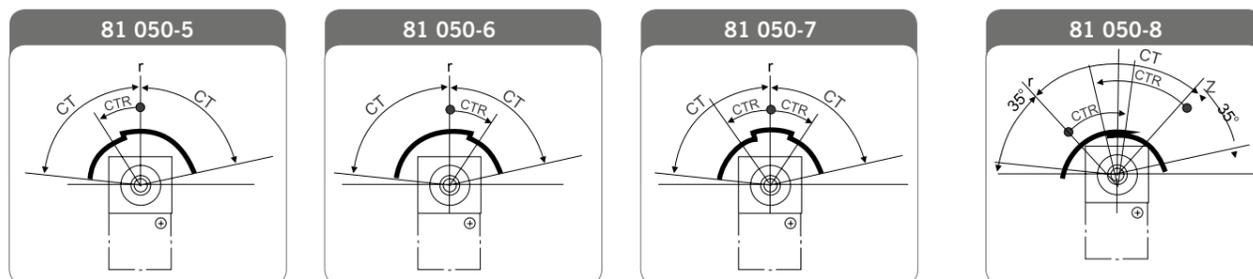
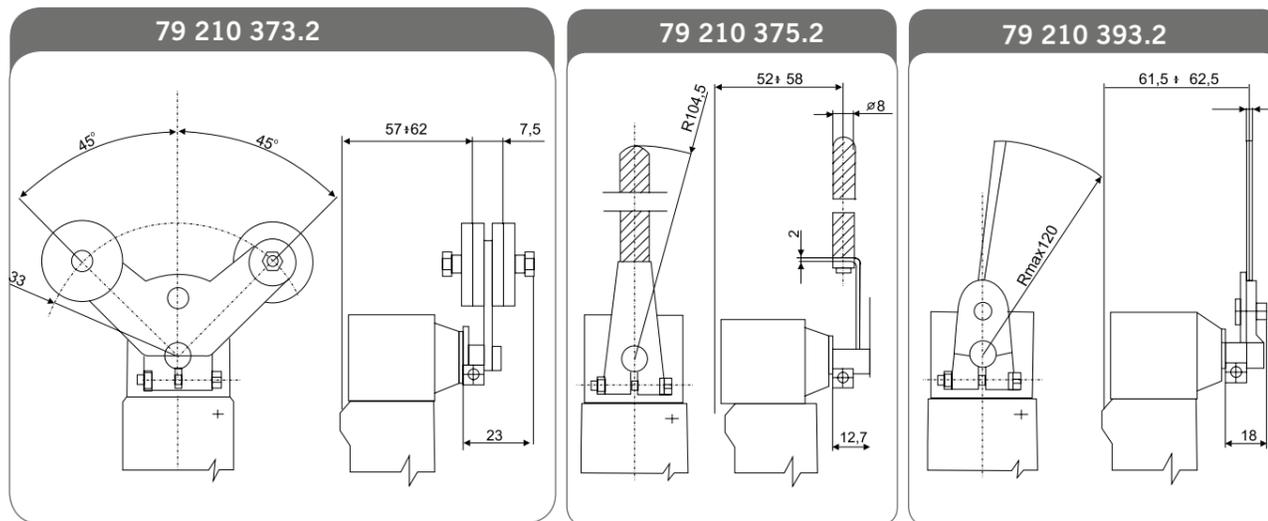
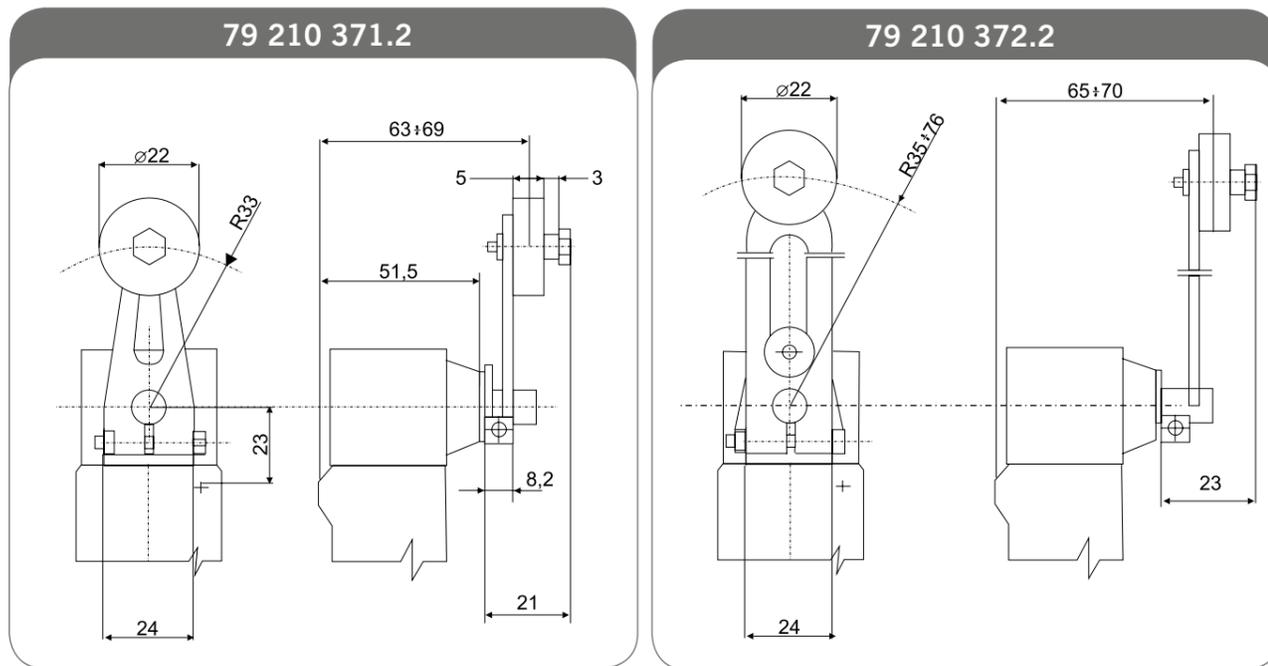


Type of switch	Position of operation	Force required to switch over	Force required to switch back	Permissible driving force	Travel required to switch over	Travel after switching over	Travel needed to switch back
	PA [mm]	FC [N]	FR [N]	FFC [N]	CA [mm]	CRA [mm]	CD [mm]
83 136	19.6 ^{±0.4}	max. 6	min. 1	max. 20	max. 1.5	min. 0.4	0.6 ^{±0.2}

Type of switch	Active length of lever [mm]	Travel To switch over CA [mm]	Position of operation PA [mm]	Force needed to activate FC [N]
83 136 58A	53.8	6.3	25.3 ^{±1.1}	1.45
83 136 58E	52.1	6	37.2 ^{±1.0}	1.5
83 136 58F	14.3	4.5	29.8 ^{±0.25}	6.0
83 136 58G	32.6	3.6	23.2 ^{±0.4}	2.5
83 136 1	-	2 ^{±1}	-	11

Types of additional drives





CT – Total travel
 CTR – Operational travel
 r – NO contacts
 z – NC contacts

5.g MINIATURE SWITCHES OF THE 83 132, 83 133, 83 400, 83 544, 83 545, AND 83 546 SERIES

• Purpose

Miniature limit switches are controlled with an appropriate drive element. The position and speed of movement corresponding to mobile contacts, and the time needed to switch them over, depend on the position and speed of travel corresponding to the drive element that acts on the pusher with an appropriate force. This way, appropriate contacts of the switch are either closed or opened. The arrangement of mobile contacts is not stable, which means that they automatically return to their home position, once the force acting on the pusher disappears.

Miniature limit switches with manual drive are intended to be used in automated drive systems and control, monitoring, and measuring circuits that operate under alternating and direct currents.

Miniature limit switches with manual drive feature the following primary qualities:

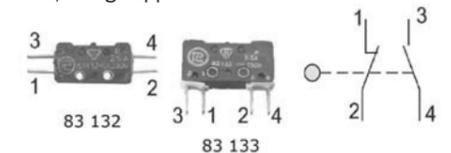
- Compact size;
- Small force required to control;
- High repeatability of parameters;
- High electrical and mechanical endurance;
- A variety of available drives.

• Design and principle of operation

Switches of the 83 132 series have no enclosures, but there are NO or NC mobile change-over contacts installed inside their plastic bodies. Switches of the 83 132 series have the L1 soldered terminals running in parallel to the longitudinal axis of the drive element. The terminals make it possible to connect conductors with the maximum cross section of 1mm². Switches of the 83 133 series have no enclosure, but they have plastic bodies that contain NC and NO mobile change-over contacts. Switches of the 83 133 series have the L1 soldered terminals of the LO terminals for printed circuits that run perpendicularly to the longitudinal axis of the drive element.

• Installation of switches

Bodies of the 83 132 and 83 133 switches have two sleeves intended for M2 screws, which make it possible to fix switches to the foundation, using support structures.



5g.1 TECHNICAL DATA

	83 132	83 133	83 400
Rated insulation voltage U _i	250V		
Rated switching voltage U _e AC-15 DC-13	230V 50...60Hz 220V=		
Rated continuous current I _u	6A		
Rated switched currents: - For double-break switches I _u /AC15 U _e 230V, 50-60Hz I _u /DC13 U _e 220V=	2.5A 0.3A		
Rated limited withstand current When working with a Bi-Wts fuse that operates under the rated current of 16A	1000A		
Mechanical life: - For single- and double-break switches without an additional drive - For single- and double-break switches with an additional drive - For switches of the 83 400 and 83 401 series - For switches of the 83402 and 83403 series	1x10 ⁷	0.5x10 ⁷	9x10 ⁶ 8x10 ⁶
Electrical endurance: - For double-break switches: AC15 DC13	85x10 ³ 30x10 ³		
Rated frequency of switching [switches/h]	3.600		1.200
Speed of the drive element [m/s]	17x10 ⁻⁶ ...1		
Cross-section of terminals [mm ²]	0.75-1.5		
Ambient temperature - In moderate climate	-25 to +40		
Protection class - Of the body - Of terminals	IP 40 IP 00		IP 65 IP 65

The product conforms to the following standard: IEC 60947-5-1

• FORCES AND TRAVELS OF MINIATURE SWITCHES

Basic miniature switches

Type of switch	Position of operation	Force required to switch over	Force required to switch back	Permissible driving force	Travel required to switch over	Travel after switching over	Differential travel
	PA [mm]	FC [N]	FR [N]	FFC [N]	CA [mm]	CRA [mm]	CD [mm]
83 132 83 133	7.7 ^{+0.2}	max 1.6	min 0.4	max 10	max 0.7	min 0.3	0.35 ^{+0.1}

Miniature switches with additional drives

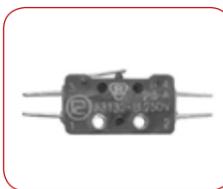
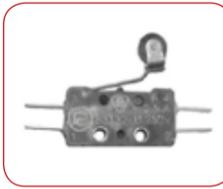
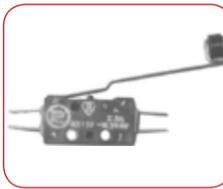
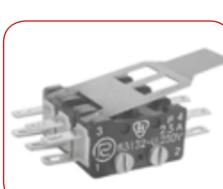
Type of switch	Active length of lever	Travel to switch over	Position of operation	Force needed to activate
	[mm]	CA [mm] max	PA [mm]	FC [N] max
83 132 54A 83 133 54A	7.7 ^{±0.2}	1.1	8.2 ^{±0.8}	1.55
	14.75 ^{±0.3}	2.15	9.5 ^{±0.8}	0.8
	35.75 ^{±0.5}	5.15	10 ^{±1.5}	0.34
83 132 54E 83 133 54E	7.5 ^{±0.2}	1.1	14.7 ^{±0.8}	1.6
	14.1 ^{±0.3}	2.05	15.6 ^{±0.8}	0.8
	34.4 ^{±0.5}	5.4	15.6 ^{±1.5}	0.34
83 132 54K 83 133 54K	9.3 ^{±0.3}	1.35	14.7 ^{±0.8}	1.6
	15.4 ^{±0.3}	2.3	15.6 ^{±0.8}	0.75
	35 ^{±0.5}	5.05	16.1 ^{±1.4}	0.33

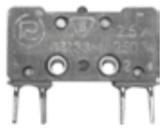
Sets of switches

83 132 54A2 83 133 54A2	30 ^{±0.5}	4.3	10.65 ^{±2.8}	0.8
83 132 54A3 83 133 54A3	30 ^{±0.5}	4.3	10.65 ^{±2.8}	1.2

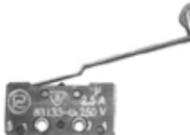
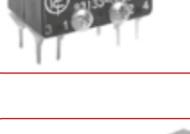
5g.2 TYPES OF SWITCHES

Type of switch	Description	Catalogue No.	Weight (g)
	Basic switch with a double-break change-over contact of the same polarity, with four terminals running perpendicularly to the longitudinal axis of the drive element; with sleeves in assembly holes, and with gold-flashed terminals.	59-691012	1.9
	Basic contact..., with silver-plated terminals	59-691101	1.9

Type of switch	Description	Length of lever	Catalogue No.	Weight (g)
	83 132 54 AR-7.7	7.7	59-681112	2.1
	83 132 54 AR-14.75	14.75	59-681122	2.15
	83 132 54 AR-35.75	35.75	59-681132	2.3
	83 132s 54 AR-7.7	7.7	59-682711	2.1
	83 132s 54 AR-14.75	14.75	59-682721	2.15
	83 132s 54 AR-35.75	35.75	59-682731	2.3
	83 132 54 ER-7.5	7.5	59-681312	2.3
	83 132 54 ER-14.1	14.1	59-681322	2.4
	83 132 54 ER-34.4	34.4	59-681332	2.5
	83 132s 54 ER-7.5	7.5	59-682911	2.3
	83 132s 54 ER-14.1	14.1	59-682921	2.4
	83 132s 54 ER-34.4	34.4	59-682931	2.5
	83 132 54 KR-9.3	9.3	59-681512	2.3
	83 132 54 KR-15.4	15.4	59-681522	2.4
	83 132 54 KR-35.0	35.0	59-681532	2.7
	83 132s 54 KR-9.3	9.3	59-684111	2.3
	83 132s 54 KR-15.4	15.4	59-684121	2.4
	83 132s 54 KR-35.0	35.0	59-684131	2.7
83 132 54 A2	A set of two switches type 83 132, controlled with a flat lever, with gold-flashed terminals	30	59-601012	5.8
83 132s 54 A2	A set of two switches type 83 132s..., with silver-plated terminals	30	59-601051	5.8
83 132 54 A3	A set of three switches type 83 132, controlled with a flat lever, with gold-flashed terminals	30	59-601032	8.7
83 132s 54 A3	A set of three switches type 83 132s..., with silver-plated terminals	30	59-601071	8.7

Type of switch	Description	Catalogue No.	Weight (g)
 83 133	Basic miniature switch with a double-break change-over contact of the same polarity, with four terminals running in parallel to the longitudinal axis of the drive element, and with sleeves in assembly holes - with the L1 soldered terminals, and with gold-flashed terminals	59-691022	2.1
83 133s	Basic miniature switch..., with silver-plated terminals	59-691111	2.1
 83 133 (LO)	Basic miniature switch with a double-break change-over contact of the same polarity, with four terminals running in parallel to the longitudinal axis of the drive element, and with sleeves in assembly holes - with terminals for the LO printed circuits, and with gold-flashed terminals	59-691032	2.1
83 133 (LO)s	Basic miniature switch..., with silver-plated terminals	59-691091	2.1

Type of switch	Description	Length of lever	Catalogue No.	Weight (g)
 83 133 54 AR-7.7	Switches type 83 133, controlled with a flat lever, with the L1 soldered terminals, and with gold-flashed terminals	7.7	59-681212	2.3
83 133 54 AR-14.75		14.75	59-681222	2.35
83 133 54 AR-35.75		35.75	59-681232	2.55
 83 133s 54 AR-7.7	Switches type 83 133s..., with silver-plated terminals	7.7	59-682811	2.3
83 133s 54 AR-14.75		14.75	59-682821	2.35
83 133s 54 AR-35.75		35.75	59-682831	2.55
 83 133 (LO) 54 AR-14.75	Switches type 83 133, controlled with a flat lever, with the LO terminals for printed circuits, and with gold-flashed terminals	14.75	59-6860222	2.55
83 133 (LO) 54 AR-35.75		35.75	59-6860432	2.5
 83 133s (LO) 54 AR-7.7	Switches type 83 133s..., with silver-plated terminals	7.7	59-6860511	2.3
83 133s (LO) 54 AR-14.75		14.75	59-6860621	2.35
83 133s (LO) 54 AR-35.75		35.75	59-6860831	2.55
 83 133 54 ER-7.5	Switch type 83 133, controlled with a flat lever and a roll located in the axis of the lever; with the L1 soldered terminals, and with gold-flashed terminals	7.5	59-681412	2.5
83 133 54 ER-14.15		14.1	59-681422	2.6
83 133 54 ER-34.4		34.4	59-681432	2.9
 83 133s 54 ER-7.5	Switches type 83 133s..., with silver-plated terminals	7.5	59-684011	2.5
83 133s 54 ER-14.1		14.1	59-684021	2.6
83 133s 54 ER-34.4		34.4	59-684031	2.9

Type of switch	Description	Length of lever	Catalogue No.	Weight (g)
 83 133 (LO) 54 ER-14.1	Switch type 83133, controlled with a flat lever and a roll located in the axis of the lever; with the LO terminals for printed circuits, and with gold-flashed terminals	14.1	59-6862622	2.6
83 133 (LO) 54 ER-34.4		34.4	59-6862732	2.9
 83 133s (LO) 54 ER-14.1	Switches type 83 133s..., with silver-plated terminals	14.1	59-6863021	2.6
83 133s (LO) 54 ER-34.4		34.4	59-6863131	2.9
 83 133 54 KR-9.3	Switch type 83 133, controlled with a flat lever and a roll running across the axis of the lever; with the L1 soldered terminals, and with gold-flashed terminals	9.3	59-681612	2.5
83 133 54 KR-15.4		15.4	59-681622	2.6
83 133 54 KR-35.0		35.0	59-681632	2.9
 83 133s 54 KR-9.3	Switches type 83 133s..., with silver-plated terminals	9.3	59-684211	2.5
83 133s 54 KR-15.4		15.4	59-684221	2.6
83 133s 54 KR-35.0		35.0	59-684231	2.9
 83 133 54 (LO) KR-15.4	Switch type 83 133, controlled with a flat lever and a roll running across the axis of the lever; with the LO terminals for printed circuits, and with gold-flashed terminals	15.4	59-6865022	2.6
 83 133s (LO) 54 KR-9.3	Switches type 83 133s..., with silver-plated terminals	9.3	59-6865211	2.5
83 133s (LO) 54 KR-15.4		15.4	59-6865321	2.6
83 133s (LO) 54 KR-35.0		35.0	59-6865431	2.9
 83 133 54 A2	A set of two switches type 83 133, controlled with a flat lever, and with gold-flashed terminals	30	59-601022	6.2
 83 133s 54 A2	A set of two switches type 83 133s..., with silver-plated terminals	30	59-601061	6.2
 83 133 (LO) 54 A2	A set of two switches type 83 133, controlled with a flat lever, and with gold-flashed terminals	30	59-612892	6.2
 83 133s (LO) 54 A2	A set of two switches type 83 133s..., with silver-plated terminals	30	59-612731	6.2
 83 133 54 A3	A set of three switches type 83 133, controlled with a flat lever, and with gold-flashed terminals	30	59-601042	8.9
 83 133s 54 A3	A set of three switches type 83 133s..., with silver-plated terminals	30	59-601081	8.9

Important:

All switches of the 83 133 type with additional 54A, 54E, and 54K drives, as well as sets of 83 133 switches can be designed to include terminals for printed circuits. In this case, add the symbol corresponding to the terminals for printed circuits (LO) after the name of the switch. All switches of the 83 132 and 83 133 series are available in a special design with single NC or NO contacts. In this case, add the symbol corresponding to a NC contact ("z") or a NO contact ("r"), when specifying the type of switch. For example: 83 133z54A3, i.e. three switches with the 83 133z NC contact controlled with a flat lever.

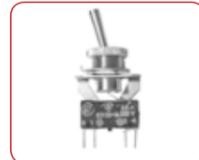
• MINIATURE SWITCHES OF THE 83 544, 83 545, AND 83 546 SERIES, WITH MANUAL DRIVE

Type of switch	Description	Catalogue No.	Weight (g)
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Miniature switches type 83 544 with the M12x0.75 sleeve to be fixed on a support structure, actuated in series



83 544-02	Double-circuit NO/NC switch with a drive lever, equipped with switch type 83 132, with gold-flashed terminals	59-604012	17
83 544-02s	Double-circuit NO/NC limit switch..., with silver-plated terminals	59-604051	17



83 544-03	Double-circuit NO/NC switch with a drive lever, equipped with switch type 83 133, with gold-flashed terminals	59-604022	17
83 544-03s	Double-circuit NO/NC limit switch..., with silver-plated terminals	59-604061	17



83 544-03(LO)	Double-circuit NO/NC switch with a drive lever, equipped with switch type 83 133, with the LO terminals for printed circuits, and with gold-flashed terminals	59-604252	17
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83 544-3	Four-circuit NO/NC switch with a drive lever, equipped with two switches type 83 132, with gold-flashed terminals	59-604032	20
83 544-03s	Four-circuit NO/NC switch..., with silver-plated terminals	59-604071	20



83 544-6	Six-circuit NO/NC switch with a drive lever, equipped with three switches type 83 132, with gold-flashed terminals	59-604042	23.5
83 544-6s	Six-circuit NO/NC switch..., with silver-plated terminals	59-604081	23.5

Miniature switches type 83 545 with the M12x0.75 sleeve to be fixed on a support structure, actuated in parallel



83 545-32	Four-circuit NO/NC switch with a drive lever, equipped with two switches type 83 132, actuated in parallel, with gold-flashed terminals	59-602012	24
83 545-32s	Four-circuit NO/NC switch..., with silver-plated terminals	59-602071	24



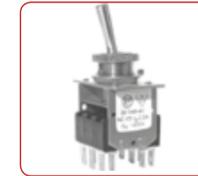
83 545-62	Six-circuit NO/NC switch with a drive lever, equipped with three switches type 83 132, actuated in parallel, with gold-flashed terminals	59-602022	27
83 545-62s	Six-circuit NO/NC switch..., with silver-plated terminals	59-602081	27



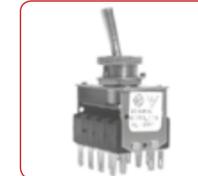
Type of switch	Description	Catalogue No.	Weight (g)
83 545-92	Eight-circuit NO/NC switch with a drive lever, equipped with four switches type 83 132, actuated in parallel, with gold-flashed terminals	59-602032	30
83 545-92s	Eight-circuit NO/NC switch..., with silver-plated terminals	59-602091	29



83 545-33	Four-circuit NO/NC switch with a drive lever, equipped with two switches type 83 133, actuated in parallel, with gold-flashed terminals	59-602042	25
83 545-33s	Four-circuit NO/NC switch..., with silver-plated terminals	59-602101	25



83 545-63	Six-circuit NO/NC switch with a drive lever, equipped with three switches type 83 133, actuated in parallel, with gold-flashed terminals	59-602052	27.5
83 545-63s	Six-circuit NO/NC switch..., with silver-plated terminals	59-602111	27

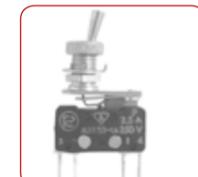


83 545-93	Eight-circuit NO/NC switch with a drive lever, equipped with four switches type 83 133, actuated in parallel, with gold-flashed terminals	59-602062	30.5
83 545-93s	Eight-circuit NO/NC switch..., with silver-plated terminals	59-602121	30

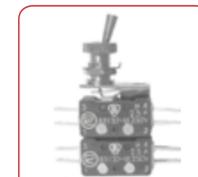
Miniature switches type 83 546 with the M6x0.75 sleeve to be fixed on a support structure, actuated in series



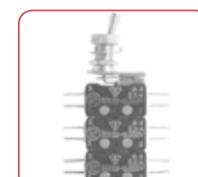
83 546-02	Double-circuit NO/NC switch with a drive lever, equipped with switch type 83 132, and with gold-flashed terminals	59-603012	8
83 546-02s	Double-circuit NO/NC limit switch..., with silver-plated terminals	59-603051	8



83 546-03	Double-circuit NO/NC switch with a drive lever, equipped with switch type 83 133, and with gold-flashed terminals	59-603022	8
83 546-03s	Double-circuit NO/NC limit switch..., with silver-plated terminals	59-603061	8



83 546-3	Four-circuit NO/NC switch with a drive lever, equipped with two switches type 83 132, actuated in parallel, with gold-flashed terminals	59-603032	11.5
83 546-3s	Four-circuit NO/NC switch..., with silver-plated terminals	59-603071	11



83 546-6	Six-circuit NO/NC switch with a drive lever, equipped with three switches type 83 132, actuated in parallel, with gold-flashed terminals	59-603042	15
83 546-6s	Six-circuit NO/NC switch..., with silver-plated terminals	59-603081	14

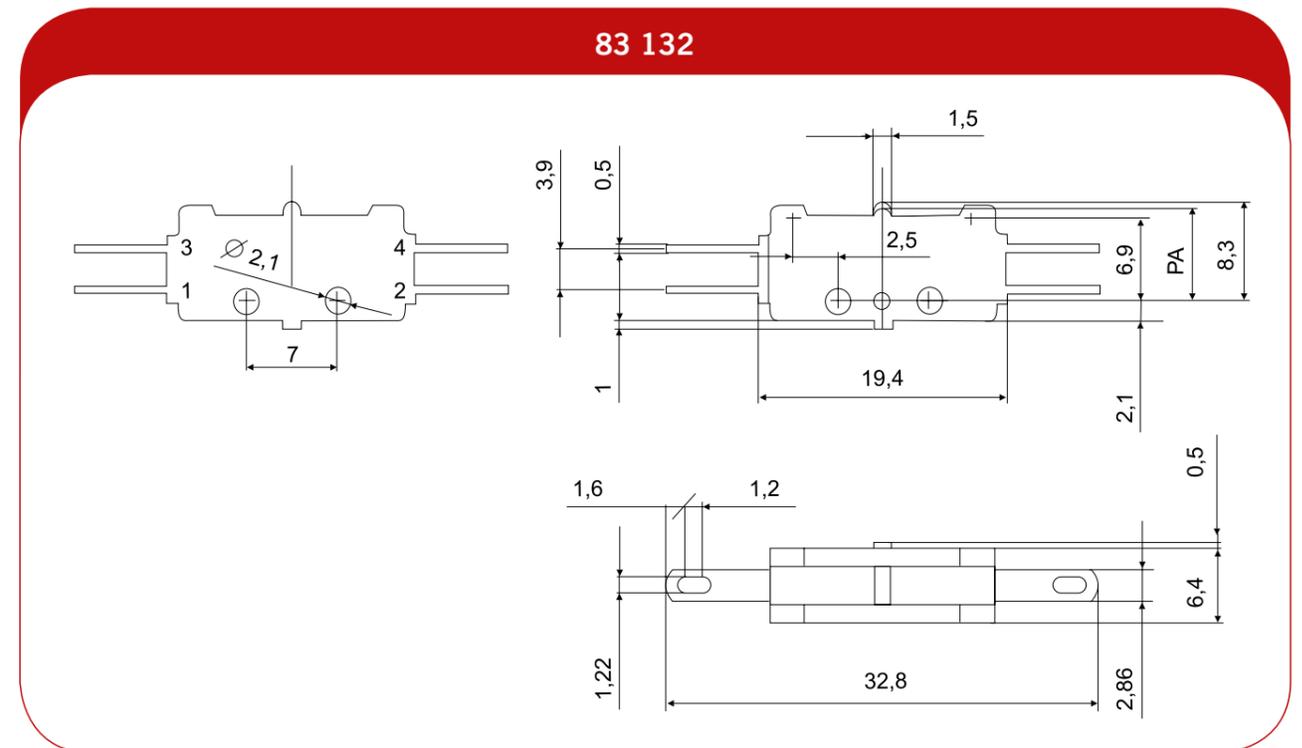
Important: All switches of the 83 544, 83 545, and 83 546 series are available in a special design with single NC or NO contacts. In this case, add the symbol of a NC contact (z) or a NO contact (r) to the type of switch, e.g. 83 546-02z, i.e. a single-circuit NC switch with a drive lever, equipped with a miniature switch type 83 132z.

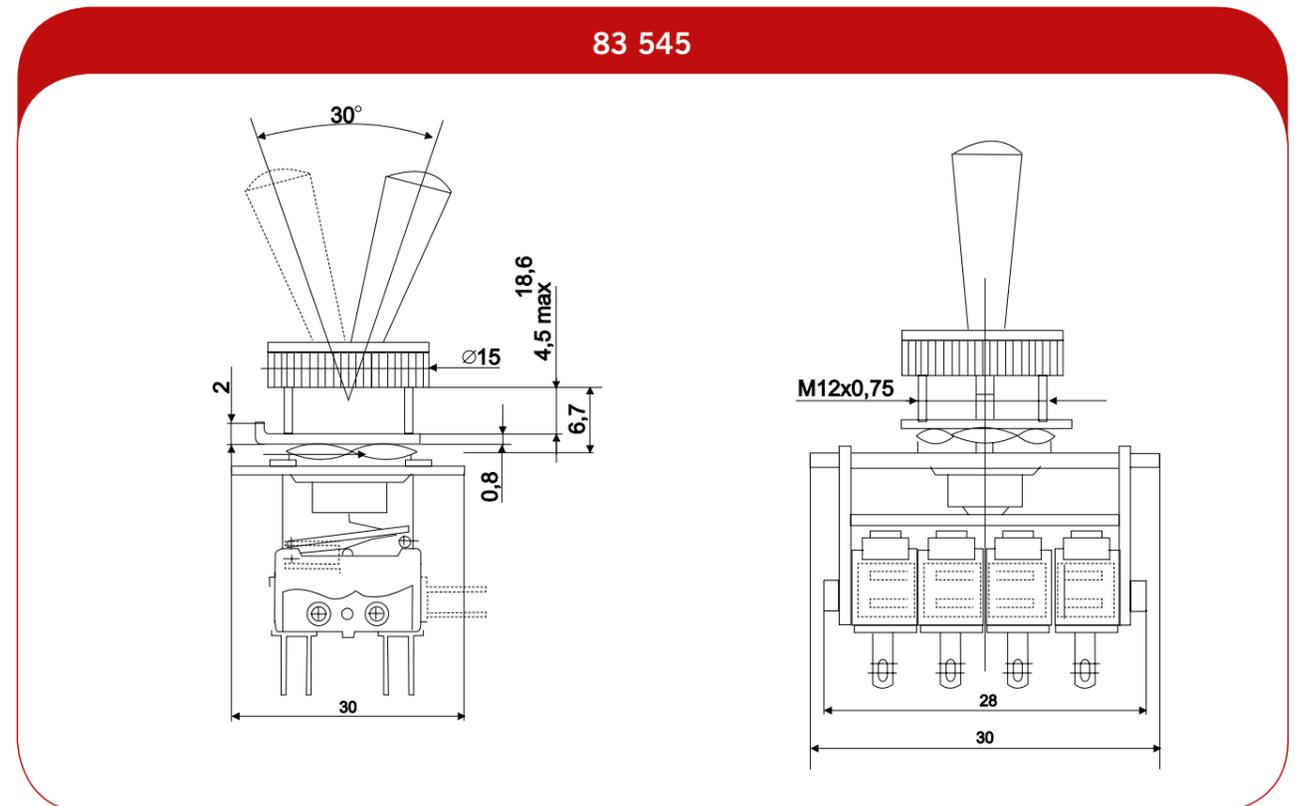
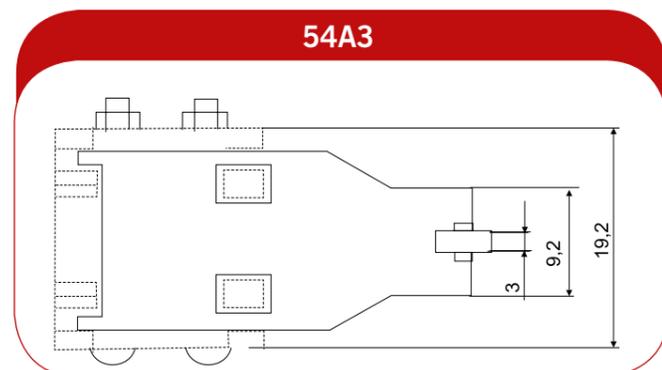
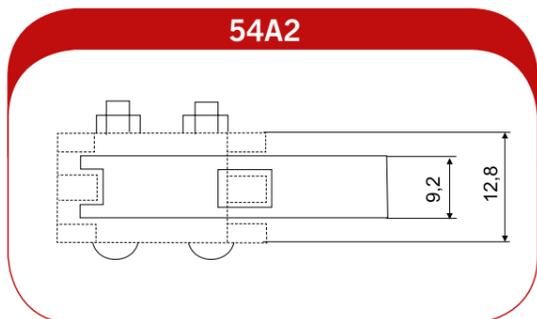
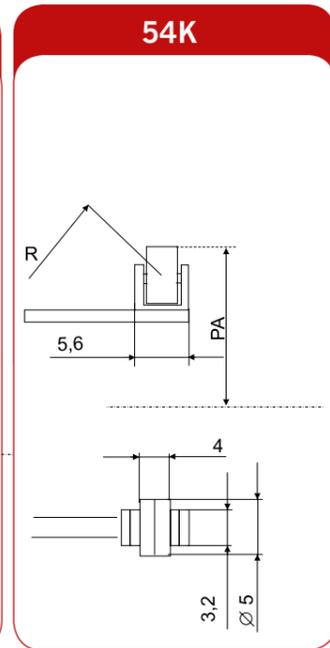
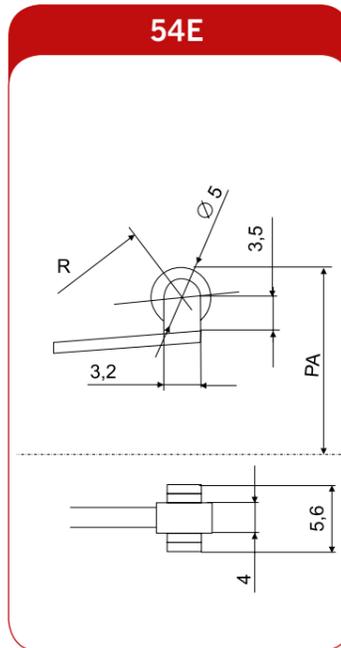
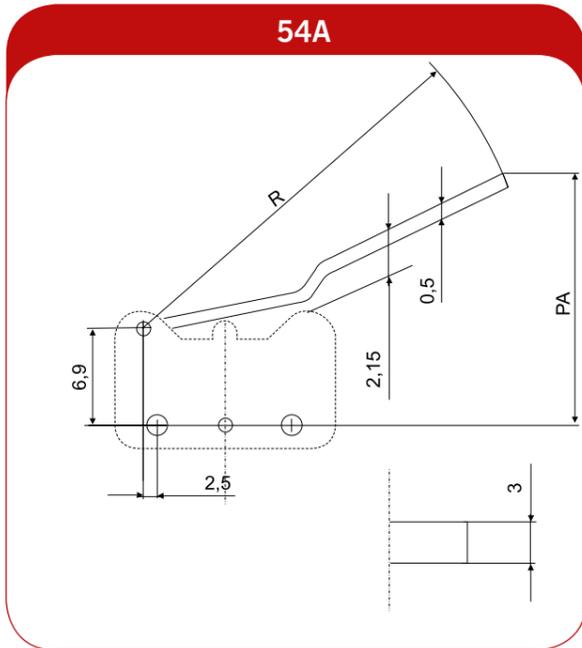
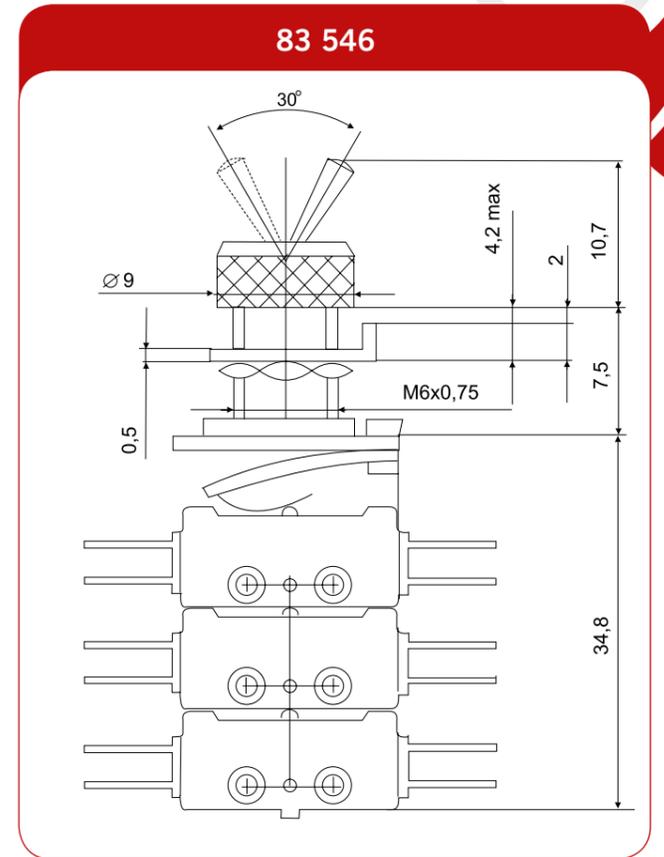
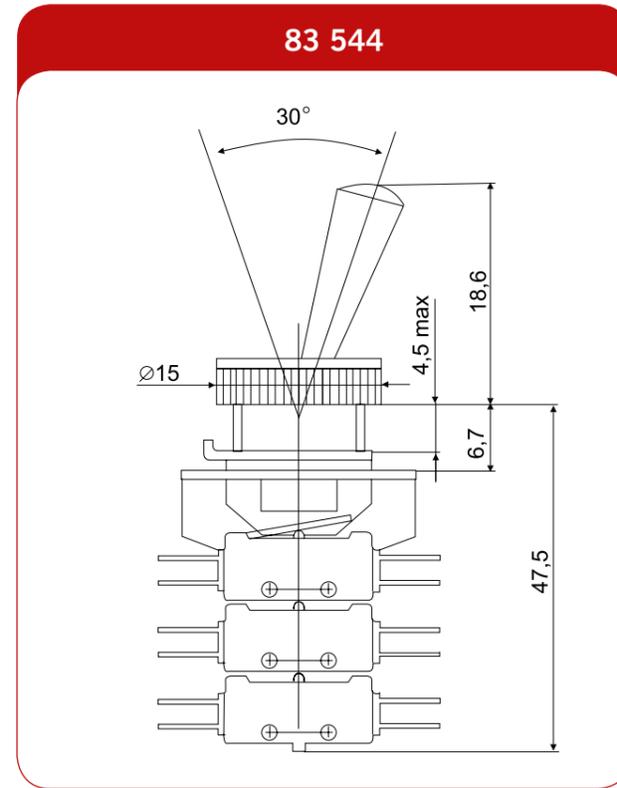
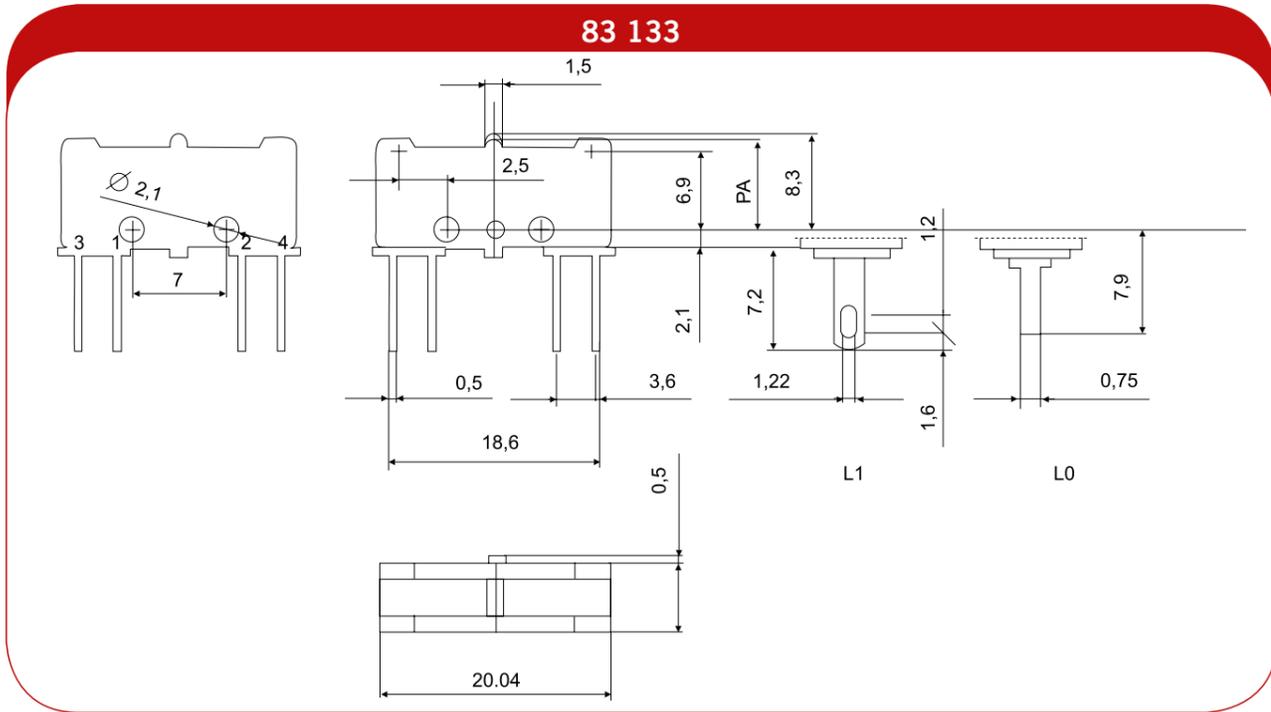
LIMIT SWITCHES OF THE 83 400, 83 401, AND 83 402 SERIES, IN AN ENCLOSURE

Type of switch	Description	Catalogue No.	Weight (g)
	Switch type 83 133, in an insulated enclosure, with a vertical head, a pusher with a ball, and with gold-flashed terminals	59-651056	45.8
83 400s	Switch type 83 133s..., with silver-plated terminals	59-651201	45.8
	Switch type 83 133, in an insulated enclosure, with a vertical head, a pusher with a ball, and with gold-flashed terminals	59-651046	46.3
83 401s	Switch type 83 133s..., with silver-plated terminals	59-651191	46.3
	Switch type 83 133, in an insulated enclosure, with a double-sided revolving head, and with gold-flashed terminals	59-651016	61.5
83 402-0s	Switch type 83 133s..., with silver-plated terminals	59-651161	61.5
	Switch type 83 133, in an insulated enclosure, with a left-sided revolving head, and with gold-flashed terminals	59-651026	61.5
83 402-1s	Switch type 83 133s..., with silver-plated terminals	59-651171	61.5
	Switch type 83 133, in an insulated enclosure, with a right-sided revolving head, and with gold-flashed terminals	59-651036	62
83 402-2s	Switch type 83 133s..., with silver-plated terminals	59-651181	62
	Switch type 83 133, in an insulated enclosure, with a revolving head, with a left- and right-sided adjustable lever, and with gold-flashed terminals	59-651376	107
83 403-01s	Switch type 83 133s..., with silver-plated terminals	59-651411	107
	Switch type 83 133, in an insulated enclosure, with a revolving head, with a left- and right-sided two-arm lever, and with gold-flashed terminals	59-651386	109
83 403-02s	Switch type 83 133s..., with silver-plated terminals	59-651421	109

Type of switch	Description	Catalogue No.	Weight (g)
	Switch type 83 133, in an insulated enclosure, with a revolving head, with a lever and a left- and right-sided extension arm, and with gold-flashed terminals	59-651396	93
83 403-03s	Switch type 83 133s..., with silver-plated terminals	59-651431	93
	Switch type 83 133, in an insulated enclosure, with a revolving head, with a left- and right-sided flexible lever, and with gold-flashed terminals	59-651406	98.5
83 403-04s	Switch type 83 133s..., with silver-plated terminals	59-651441	98.5

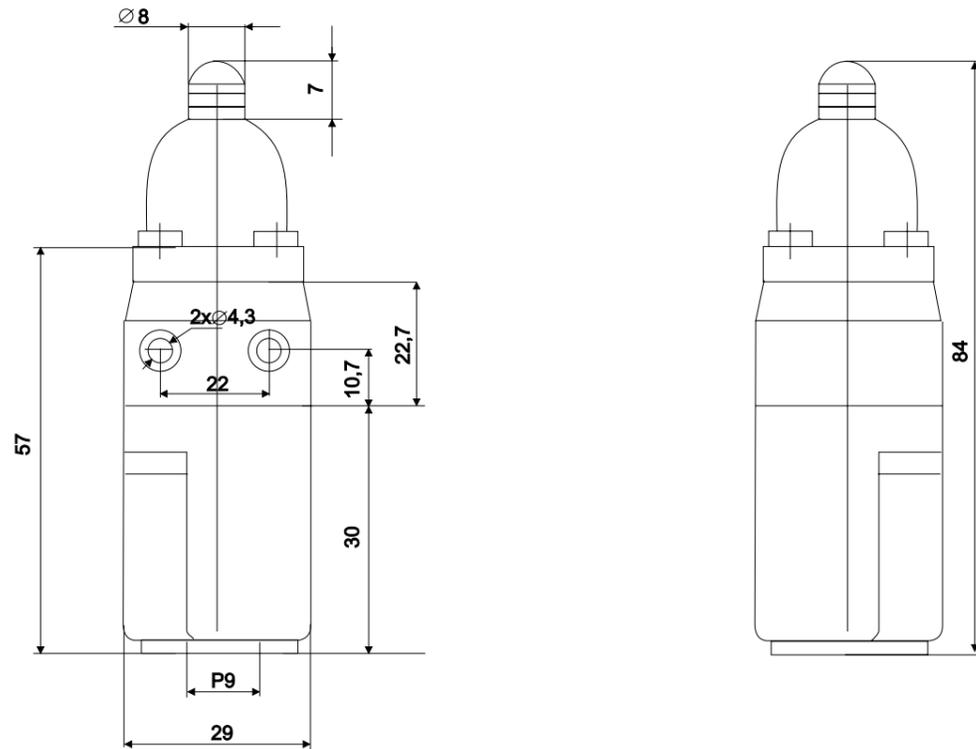
5g.3 DIMENSIONAL DRAWINGS



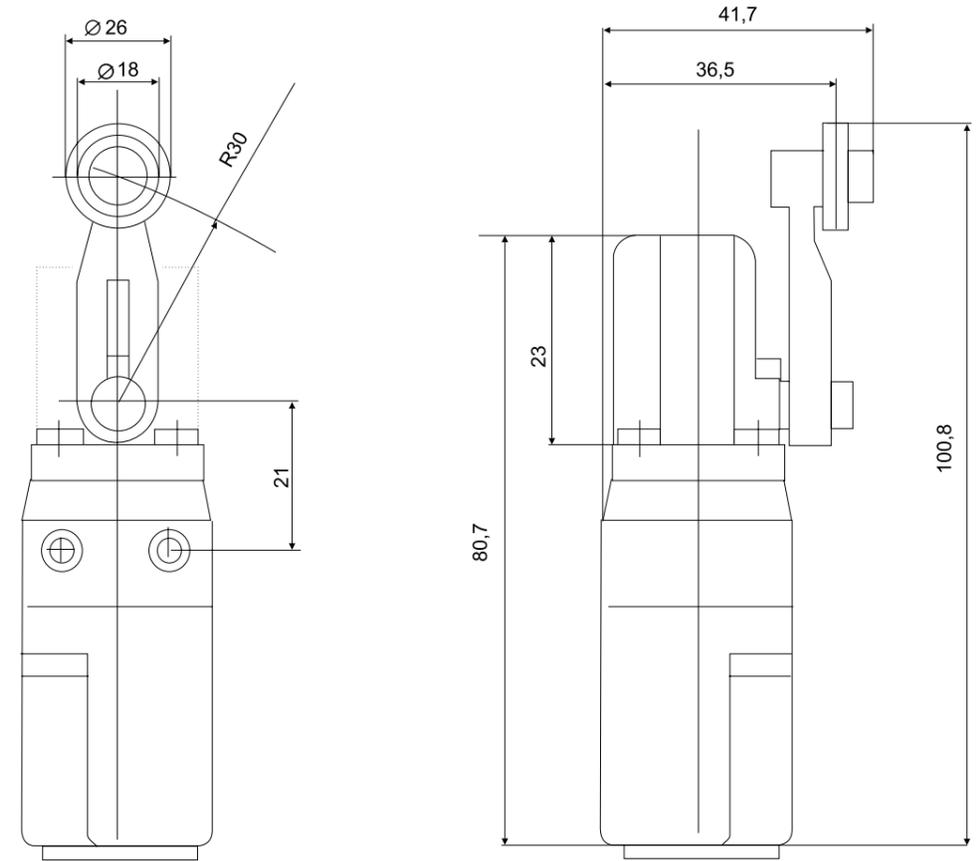




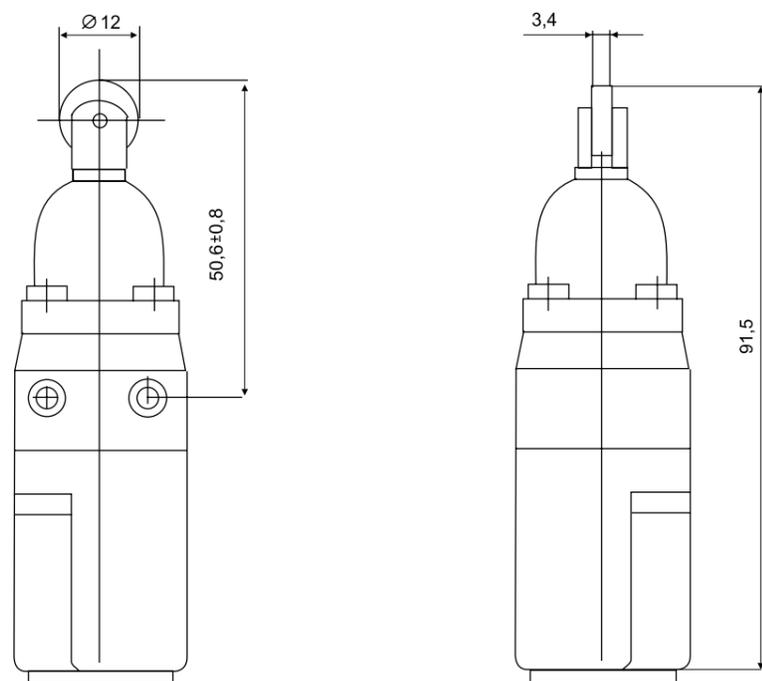
83 400



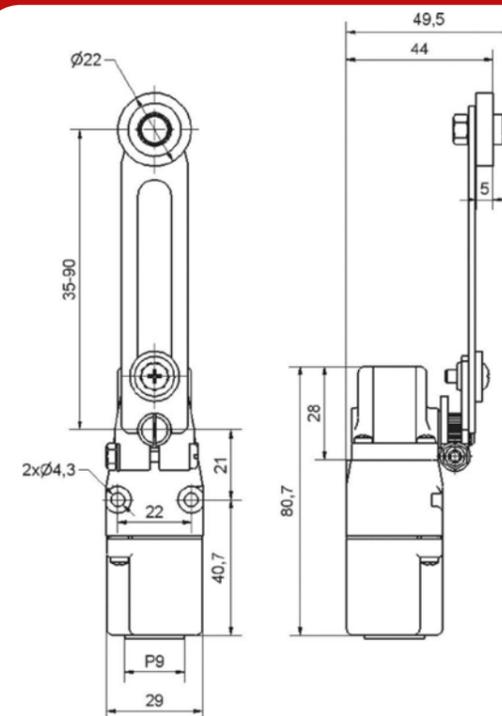
83 402



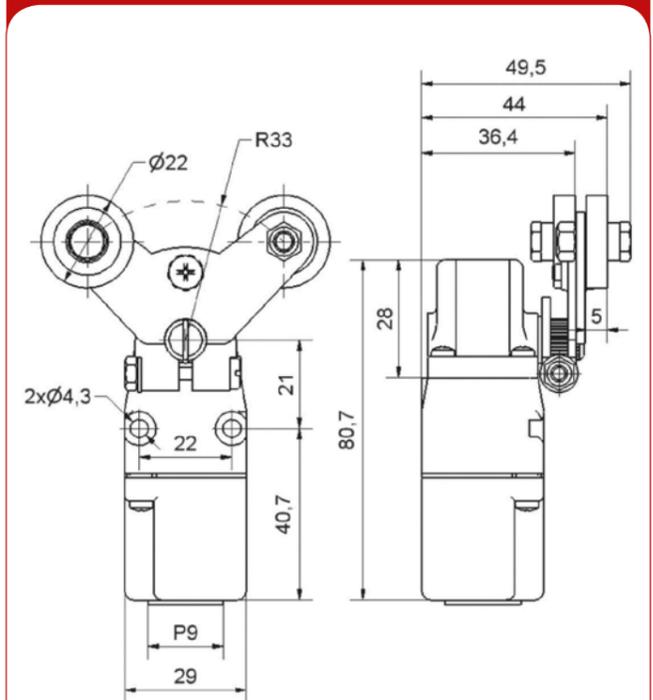
83 401



83 403 01, 83 403 01s

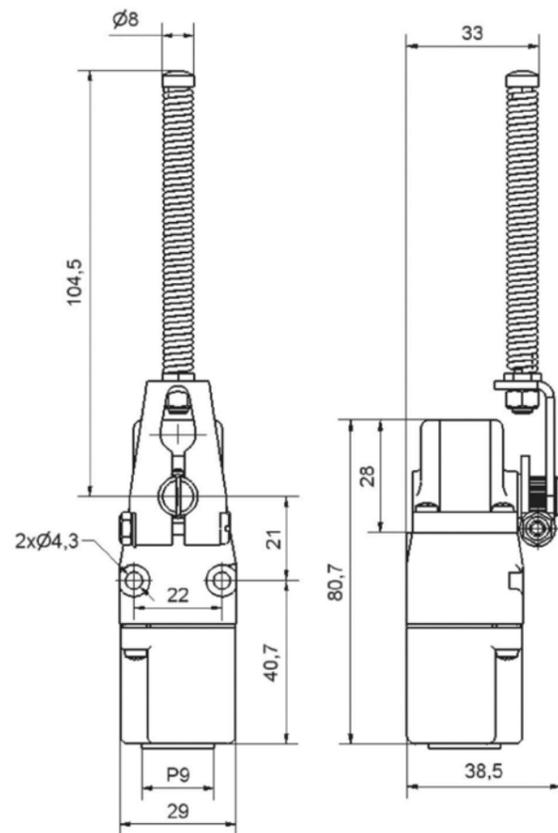


83 403 02, 83 403 02s

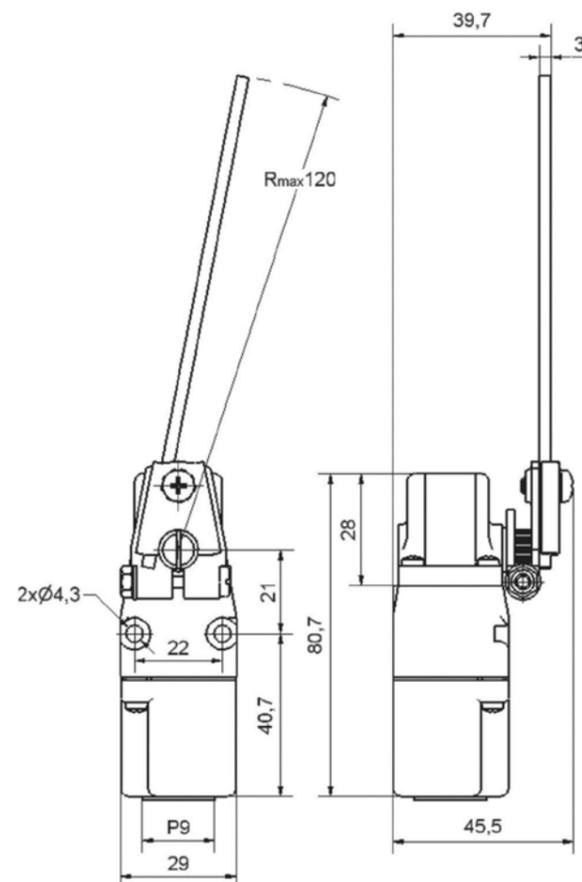




83 403 03, 83 403 03s



83 403 04, 83 403 04s



5.h Z and ZP-1 and Zcm2 and ZP1cm2 LEVER SWITCHES

• Purpose

The Z and ZP-1, and Zcm2 and ZP1cm2 lever switches are intended to operate in control desks and cabinets, as actuating and de-actuating elements for various types of electrical equipment that work under alternating or direct current. Lever switches of the Z and Zcm2 types have two stable positions. Lever switches of the ZP-1 and ZP1cm2 lever switches have two return springs, which ensure an automatic return of the lever and mobile contact to their home positions, when the force acting on the lever disappears. The switch is actuated and de-actuated with a tilt lever, which moves the double-break mobile contact that activates/deactivates the circuit, in a snap manner. Lever switches are designed without enclosures. On individual requests, it is possible to manufacture multiple switches in the form of plates that can (for example) include between ten and twenty switches, one next to another.

• Installation

Switches of the Z, ZP-1, Zcm2, and Zp1cm2 series can be installed on a plate, behind boards, using two 15 mm-long M4 screws. When the screws have been tightened, the head of the screw must be staked to secure it against unscrewing. It is possible to fix the switches with pins, which are installed in side holes of 6.5 mm in diameter. In the case that there is a larger number of switches installed one next to another, it is required to additionally fix them with steel bars that run through 6.5 mm-wide side holes.

5h.1 TECHNICAL DATA

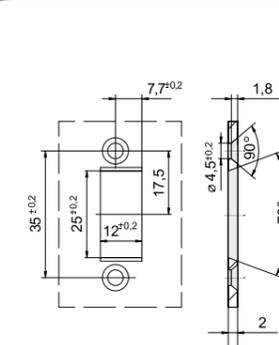
Rated insulation voltage	250V
Rated voltage and rated switching current - For AC 12 alternating current - For DC 12 direct current	230V / 4A 110V / 6A
Mechanical life	10 ⁵
Electrical endurance: AC DC	5000 2500
Frequency of switching	120 switches/h
Rated impulse withstand voltage U _{imp}	4 kV
Type and highest rating of short-circuit protection	6A fast-acting fuse-element
Ambient temperature	- 40°C to+ 35°C
Weight	Z 0.075kg/ (±) 5% ZP - 1 0.076kg/ (±) 5% Zcm2 0.092kg/(±) 5% ZP1cm2 0.093kg/(±) 5%
Dimensions	Z 50 x 80 x 25 mm ZP - 1 50 x 80 x 35 mm Zcm2 72 x 80 x 25 mm ZP1cm2 72 x 80 x 35 mm

In conformance with the PN-EN 60947-1:2002+A2 and PN-EN 60947-5-1 standards.

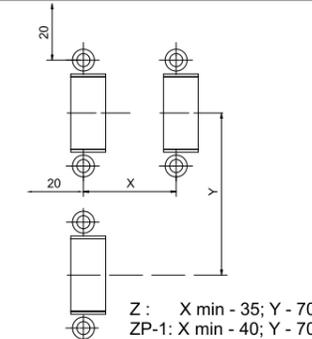
Z and ZP-1



Assembly hole



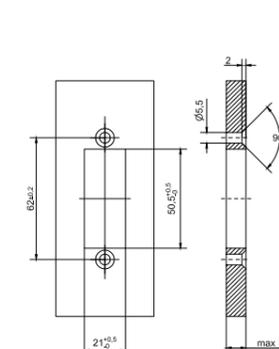
Spacing of assembly holes



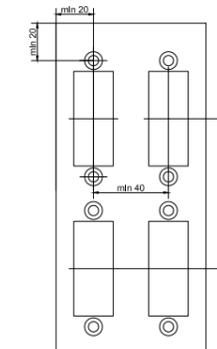
Zcm2 and ZP1cm2



Assembly hole



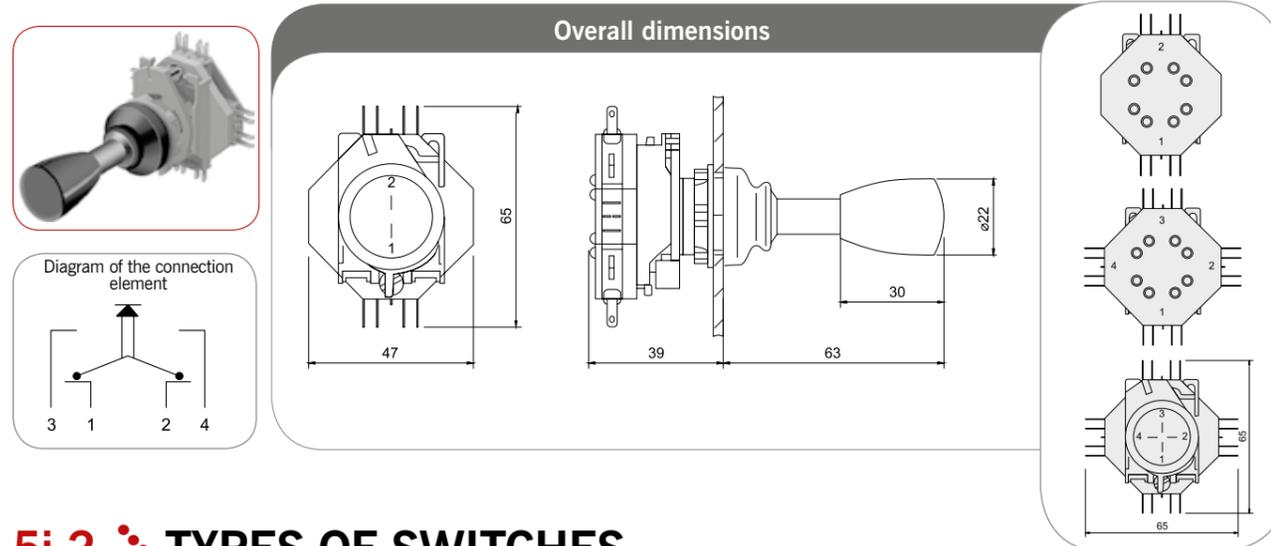
Spacing of assembly holes



5.i MJ JOYSTICK SWITCH

5i.1 TECHNICAL DATA

Design	Modular; the drive and switching parts are separable
Operation	2-, 4-, and 8-directional; joystick deflects by approx. 12°
Assembly position	Any
Working temperature	-25° to +70°C
Protection class for the part located over the desk	IP65
Mechanical life	2x10 ⁶ activations in each direction
Switching element	Double-break change-over contact, self-cleaning, AgNi contacts with 2µm Au coating; 2.8x0.5 mm combined external terminals for soldering or connecting flat connectors.
Max cross-section of conductor	1 mm ²
Rated switched currents	AC: 250V/ 6A cos (fi)= 0,7- 0,8 DC: 250V/0.5A DC: 110V/2A DC:75V/5A
Assembly hole	ø22
Colour of the drive part	Black



5i.2 TYPES OF SWITCHES

Type of switch	Description	Contacts	Operation
MJ2	2-position, return joystick switch	2x (1NC+ 1NO)	
MJ4	4-position, return joystick switch	4x(1NC+1NO)	
MJ8	8-position, return joystick switch (multi-directional, no guiding of joystick)	4 x (1NC+1NO)	



CAM SWITCHES

- TS
- S10J, S16J and S25J
- S32J and S63J
- S100J and S160J

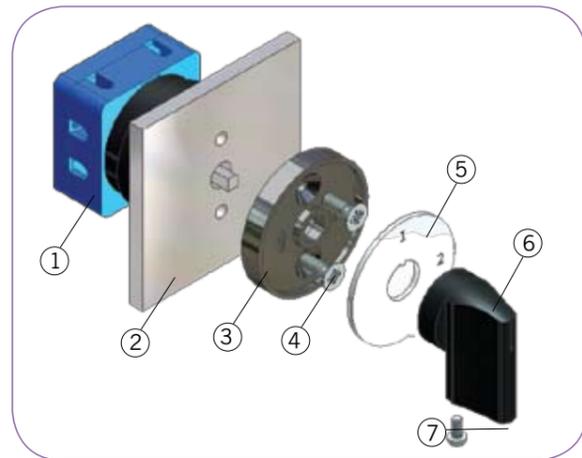
NEW!

6.a TS SERIES CAM SWITCHES

The TS series cam switches is a brand new family of cam switches that operate under the maximum switching current of 10A. The switches feature a compact size, state-of-the-art look (in the form of a circular disc), and an ergonomic knob. Considering the method of assembly, these switches have been designed for installation on a control panel. The use of a modular structure and a single cam installed in the chamber designed for two pairs of contacts made it possible to develop a switch that controls the most popular and essential switching programmes, i.e.:

- 0-1
- 0-1-2
- 1-0-2
- 1-2
- L-0-P

• Design and assembly



1. Chamber for contacts
2. Panel
3. Front disc
4. M4x12 mounting screws
5. Plate
6. Knob
7. M3x6 screw that secures the knob

Cam switches can be designed in two colour versions:

- With a black knob and black front disc;
- With a red knob and a yellow front disc.

The focusing on standard switching programmes and a lot production of switches allows us to offer short deadlines for delivering switches to clients.

The TS series cam switches may have been designed in such a way that they can be installed in previously arranged assembly holes.



6a.1 TECHNICAL DATA

Rated insulation voltage U_i	400V
Rated impulse withstand voltage U_{imp}	4kV
Rated thermal current I_{th}	10A
Utilisation category AC-23A – Commutation of motors and loads	
1-pole	
- Rated switching current I_e	6.3A
- Rated switching voltage U_e	240V
- Rated operating power P_e	1.7kW
3-pole	
- Rated switching current I_e	6.6A
- Rated switching voltage U_e	400V
- Rated operating power P_e	3kW
Utilisation category DC-22A – Shunt motors	
- Rated switching current I_e	0.2A
- Rated switching voltage U_e	220V
Rated short circuit current I_{cw}	80A
Rated short circuit making capacity I_{cm}	112.8A
Cross-section of connected conductors mm^2	0.75-1.5
Protection class for the contact section	IP20
Protection class for the section located over the desk	IP40
Ambient temperature $^{\circ}C$	-30 to +55

6a.2 TYPES OF TS CAM SWITCHES



Designation	Circuit diagram	Plate
TS-01-1-1 A60		
TS-01-2-1 A60		
TS-01-3-2 A60		
TS-01-1-1 A90		
TS-01-2-1 A90		
TS-01-3-2 A90		
TS-02-2-1 A60		
TS-02-2-1 C60		
TS-02-2-1 C90		
TS-12-2-1 A60		

Designation	Circuit diagram	Plate
TS-12-4-2 A60		
TS-12-2-1 A90		
TS-12-4-2 A90		
TS-LP-5-3 C60		

6a.3 OVERALL DIMENSIONS

Switches with a circular front panel

Making holes for a frontal assembly

L	with 1 chamber	with 2 chambers	with 3 chambers
	32,1mm	44,3mm	56,5mm

Switches with an adapter and a square-shaped front panel

Making holes in the front panel for a frontal assembly, in the previously made holes in the desk

L	with 1 chamber	with 2 chambers	with 3 chambers
	37,6mm	49,8mm	62mm

6a.4 ORDERING

The TS series cam switches must be ordered according to the specific types that correspond to the specific circuit diagrams.

In the case of a 3-pole switch with the 0-1 position, the knob's turning angle of 60°, and with a black knob, the corresponding code is **TS-01-3-2 A60**.

In the case of a 3-pole switch with the 0-1 position, the knob's turning angle of 90°, and with a red knob and a yellow plate, the corresponding code is **TS-01-3.2 A90R**.

In the case of a 1-pole switch with the 1-2 position, the knob's turning angle of 60°, and with a red knob and a square-shaped front panel that has 4 assembly holes, arranged a distance of 36mm from each centre of the hole, or a red knob and a yellow front panel, the corresponding code is **TS-12-1-1 A60R-k36**.

6a.5 SELECTION TABLE FOR TS SWITCHES

TS	-	12	-	1	-	1		A60	-	R	-	K	
Cam switches of the TS series		Range of knob positions		Number of current chambers 1 ÷ 5		Number of contact chambers 1 ÷ 3		Type of plate		Colour of switch		Shape of plate	
		01 02 12 LP						A60 - 60°		C60 - 60°		No designation - - black plate and black knob R - Yellow plate and red knob	No designation - - Round plate K - Square plate
								A90 - 90°		C90 - 90°			

Important: It is possible to order TS switches in KM and KP control boxes.

6.b S...J SERIES CAM SWITCHES

- Switching currents: 10, 16, 25, 32, 63, 100, and 160A.
- Up to 12 contact chambers (24 pairs of contacts).
- Three groups according to overall dimensions: 10, 16, 25 and 32, 36 and 100, and 160.
- All terminals and internal connections are protected (IP20).
- Possible to obtain the IP65 protection class, provided that G seals have been installed.
- Compact size and unique design.
- High mechanical and electrical lives.
- Conforms to EN 947-3, (EN 60 947-3, IEC 60 947-3), EN 60 204-7, and VDE 0660.

6b.1 TECHNICAL DATA

Type of switch	S10J	S16J	S25J	S32J	S63J	S100J	S160J	
Rated insulation voltage U_i, V*	690**	690**	690**	690	690	690	690	
Rated impulse withstand voltage U_{imp}, kV	4	4	4	6	6	6	6	
Rated thermal current I_{th}, A	10	20	25	40	63	100	160	
Rated switching current I_e, A For utilization categories: AC-21A – Resistive loads AC-1 – Slightly inductive loads	10	16	25	32	60	100	150	
Rated operational power, kW AC-3 – Squirrel-cage motors Starting up and shutting down of motors in operation 1-phase: 220-240V 3-phase: 220-240V 380 -400V 500V	1.5/8.5 2.5 3.5/6.3 3.5	1.7/9.6 3 4/7.2 4	2.6/14.7 4.5 7.5/13.5 7.5	4/22.7 7 12/21.6 12	5/28,4 8,5 15/27 15	10/56.8 17 30/54 30	13/73.8 23 40/72 40	
AC-23A - Commutation of motors and highly inductive loads 1-phase: 220-240V 3-phase: 220-240V 380 -400V 500V	1.7/9.6 3 6/10.8 6	2.3/13 4 7.5/13.5 7.5	3/17 5.5 11/19.8 11	5/28.4 8 15/27 15	10/56.8 17 30/54 30	13/73.8 23 40/72 40	18/102 30 55/99 55	
DC rated switching current I_e, A (With a single switching terminal; DC - 21A / DC - 22A; Resistive load / Shunt motors)	24V 48V 110V 220V	10/8 6/4 1/0.3 0.3/0.2	16/8 6/4 1/0.3 0.3/0.2	25/8 6/4 1/0.3 1/0.4	32/12 25/10 4/3 1/0.4	63/25 25/16 4/3 1/0.4	100/32 32/20 5/4 1.2/0.5	150/63 32/20 5/4 1.2/0.5
Mechanical life (cycles)	10^6	10^6	10^6	3×10^5	3×10^5	3×10^5	10^5	
Cross-section of connected conductors, mm²	0.75-1.5	1-2.5	1.5-4	2.5-6	6-16	16-35	16-50***	
Type of terminals	M4	M4	M4	M5	M5	M6x0.7	M6x0.7	
Protection class of the contact section	IP20							

Type of switch	S10J	S16J	S25J	S32J	S63J	S100J	S160J
Protection class of the section located over the desk	No sealing IP40		With sealing IP65			In an enclosure IP65	
Ambient temperature °C	-30 to +55						

The product conforms to the following standards: PN-EN 60947-1 and PN-EN 60947-3

* In reality, the level of environmental pollution is 3 if a particular network has a neutral earth conductor, overvoltage category III, and level of environmental pollution 2, and $U_i=500$.

** The U value is reduced to 400V if the switch operates as a main switch (S-JU designs).

*** The maximum cross-section is 70mm² for a single Cu conductor.

6b.2 SAMPLE ORDER

S16J VDG 2203X C6 R/ 02

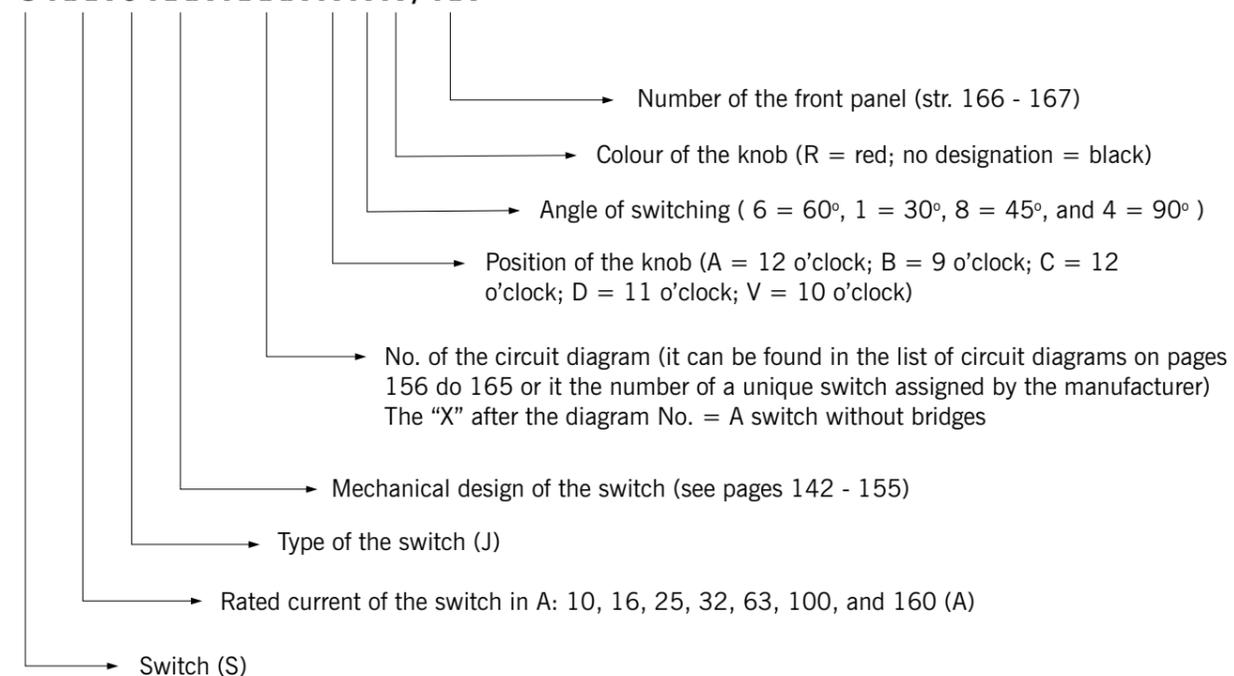
The example has been based on the following switch:

- A cam switch that operates under the rated switching current of 16A.
- With an automatic return (V), with a front panel (D), and an IP65 sealing (G).
- A 3-position switch (2203) without internal bridges (X).
- The basic position of the knob: C (on 12 o'clock), angle of switching: 60° (6).
- A red knob (R).
- A front panel 02.

When specifying the type of switch, it is required to use the basic catalogue with mechanical designs and electric diagrams. In the case of non-standard versions of switches, it is required to fill in the "Ordering Sheet" and send it to the manufacturer. Should the ordering form not specify the position of the knob, the angle of switching or a front panel, then they will be by default specified as: the knob position A (12 o'clock), and the angle of switching 60° or a different one, in relation to a specific switching programme. If a particular mechanical design requires a front panel to be installed, such a panel must be specified (designation of type, after the vertical dividing slash).

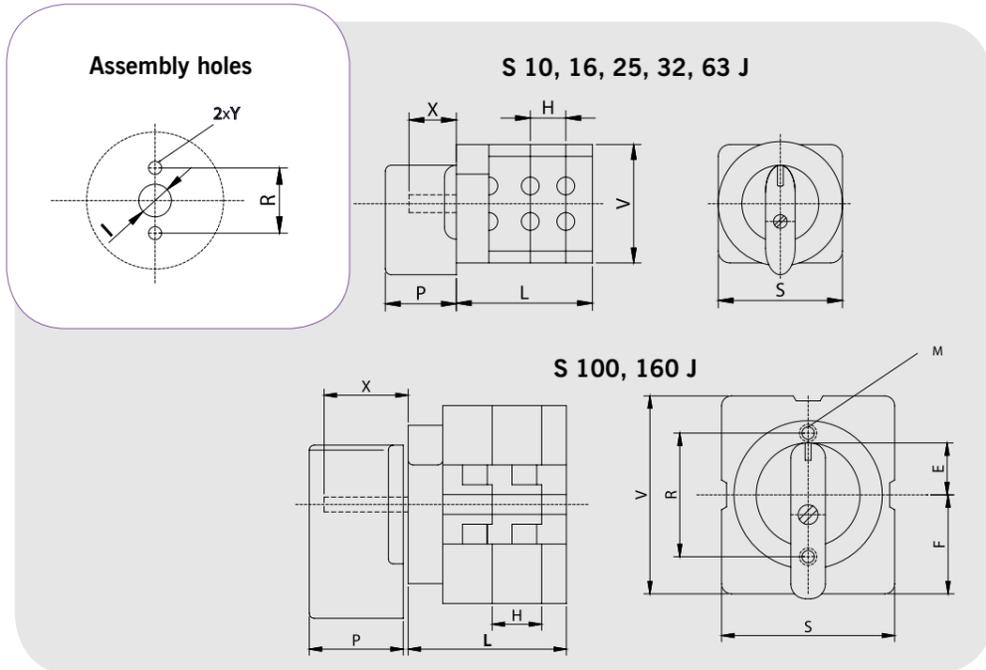
6b.3 DESIGNATION PATTERN

S XXX J XXX XXXX X X X / XX



6b.4 TYPES OF S...J SERIES CAM SWITCHES

S...J Desk switch, no front panel and plate



Type	E	F	G	H	I	M	P	R	S	U	X	Y
S 10, 16, 25 J	14	24	1,5	13,5	9	M4	24	30	43	43	19	4,2
S 32, 63 J	22	46	2	18,5	10	M5	35	50	66	66	34,5	5,4
S 100, 160 J	22	46	2	21	10	M5	35	50	77	85	34,5	5,4

Type	L – Depending on the number of contact chambers											
	1	2	3	4	5	6	7	8	9	10	11	12
S 10, 16, 25 J	33,5	47	60,5	74	87,5	101	114,5	128	141,5	155	168,5	182
S 32, 63 J	42	60,5	79	97,5	116	134,5	153	171,5	190	208,5	227	245,5
S 100, 160 J	45	66	87	108	129	150	171	192	213	234	255	276

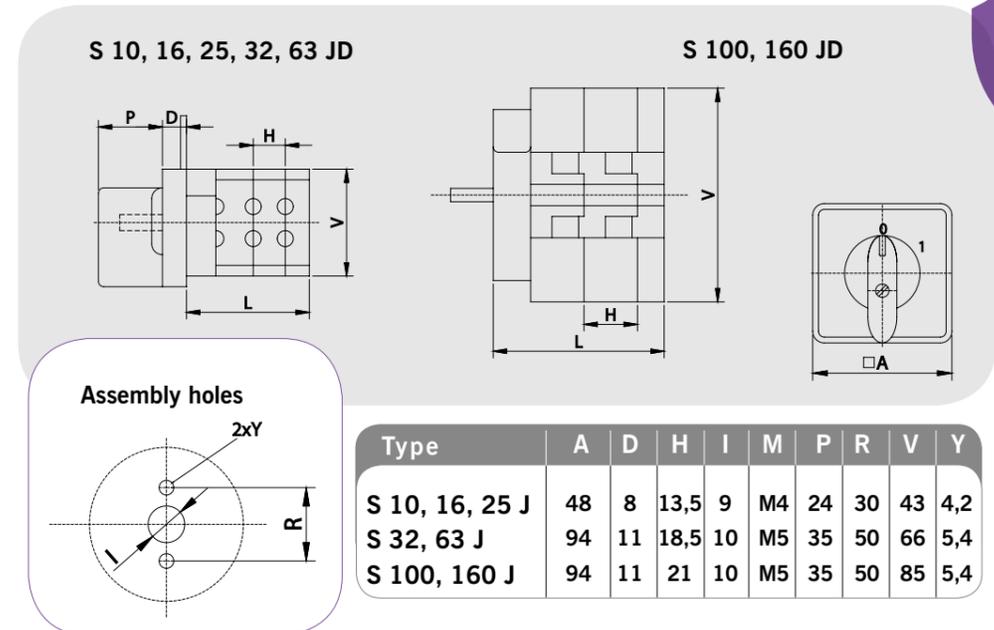
* L - Depth of the switch

Sample designs for S...J series switches



Type	Function	Ampere value	Electrical diagram
S10J2201 C6 S16J2201 C6 S25J2201 C6 S32J2201 C6 S63J2201 C6 S100J2201 C6 S160J2201 C6	Switch 1-0-2 1-phase	10A 16A 25A 32A 63A 100A 160A	
S10J2203 C6 S16J2203 C6 S25J2203 C6 S32J2203 C6 S63J2203 C6 S100J2203 C6 S160J2203 C6	Switch 1-0-2 3-phase	10A 16A 25A 32A 63A 100A 160A	

S...JD Desk switch, with a front panel and a plate



Type	L – Depending on the number of contact chambers											
	1	2	3	4	5	6	7	8	9	10	11	12
S 10, 16, 25 J	33,5	47	60,5	74	87,5	101	114,5	128	141,5	155	168,5	182
S 32, 63 J	42	60,5	79	97,5	116	134,5	153	171,5	190	208,5	227	245,5
S 100, 160 J	45	66	87	108	129	150	171	192	213	234	255	276

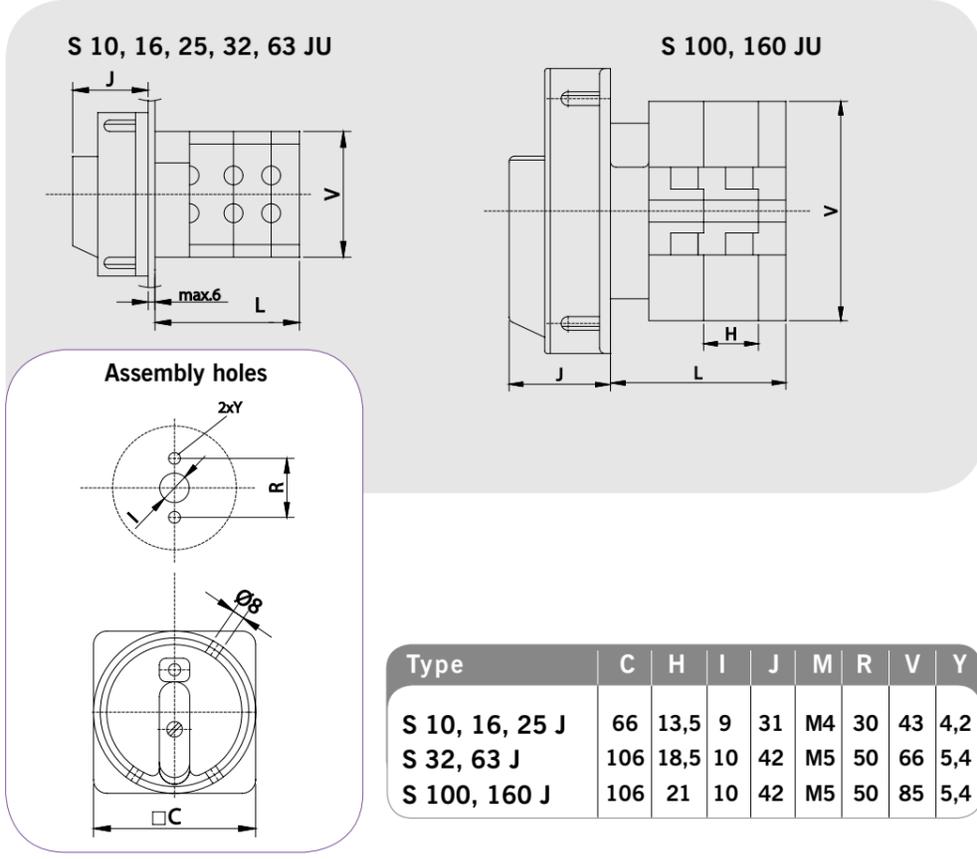
*L – Depth of the switch

Sample designs for S...JD series switches



Type	Function	Ampere value	Electrical diagram
S10JD1101 A6 S16JD1101 A6 S25JD1101 A6 S32JD1101 A6 S63JD1101 A6 S100JD1101 A6 S160JD1101 A6	Switch 0-1 1-phase	10A 16A 25A 32A 63A 100A 160A	
S10JD1102 A6 S16JD1102 A6 S25JD1102 A6 S32JD1102 A6 S63JD1102 A6 S100JD1102 A6 S160JD1102 A6	Switch 0-1 2-phase	10A 16A 25A 32A 63A 100A 160A	
S10JD1103 A6 S16JD1103 A6 S25JD1103 A6 S32JD1103 A6 S63JD1103 A6 S100JD1103 A6 S160JD1103 A6	Switch 0-1 3-phase	10A 16A 25A 32A 63A 100A 160A	

S...JU A switch that can be locked with three padlocks (Ø 5-8mm)
- To be applied as a main switch or an emergency switch.



Type	C	H	I	J	M	R	V	Y
S 10, 16, 25 J	66	13,5	9	31	M4	30	43	4,2
S 32, 63 J	106	18,5	10	42	M5	50	66	5,4
S 100, 160 J	106	21	10	42	M5	50	85	5,4

Type	L – Depending on the number of contact chambers											
	1	2	3	4	5	6	7	8	9	10	11	12
S 10, 16, 25 J	33,5	47	60,5	74	87,5	101	114,5	128	141,5	155	168,5	182
S 32, 63 J	42	60,5	79	97,5	116	134,5	153	171,5	190	208,5	227	245,5
S 100, 160 J	45	66	87	108	129	150	171	192	213	234	255	276

* L – Depth of the switch

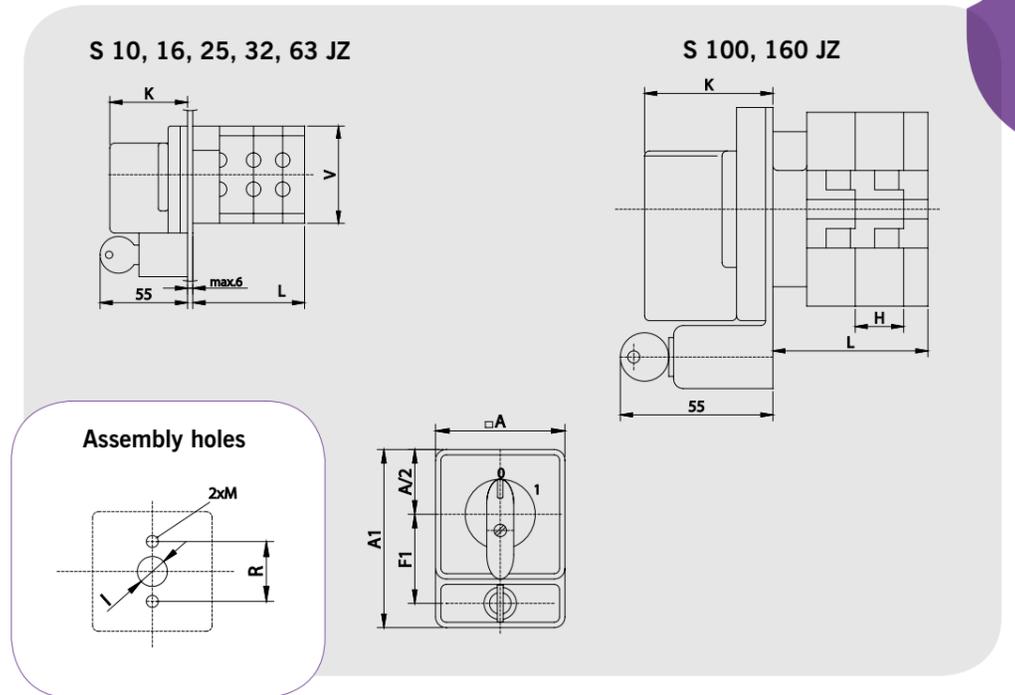
The S...JGU version – A switch with additional sealing, up to IP65.

Sample designs for S...JU series switches



Type	Function	Ampere Value	Electrical diagram
S10JU1103 A6R S16JU1103 A6R S25JU1103 A6R S32JU1103 A6R S63JU1103 A6R S100JU1103 A6R S160JU1103 A6R	3-phase	10A 16A 25A 32A 63A 100A 160A	
Switches with additional sealing			
S10JGU1103 A6R S16JGU1103 A6R S25JGU1103 A6R S32JGU1103 A6R S63JGU1103 A6R S100JGU1103 A6R S160JGU1103 A6R	3-phase	10A 16A 25A 32A 63A 100A 160A	

S...JZ A desk switch that can be blocked with a lock



Type	A	A1	F1	H	I	K	M	R	V
S 10, 16, 25 J	48	72	35	13,5	9	35	M4	30	43
S 32, 63 J	94	119	58	18,5	10	50	M5	50	66
S 100, 160 J	94	119	58	21	10	50	M5	50	85

Type	L – Depending on the number of contact chambers											
	1	2	3	4	5	6	7	8	9	10	11	12
S 10, 16, 25 J	33,5	47	60,5	74	87,5	101	114,5	128	141,5	155	168,5	182
S 32, 63 J	42	60,5	79	97,5	116	134,5	153	171,5	190	208,5	227	245,5
S 100, 160 J	45	66	87	108	129	150	171	192	213	234	255	276

* L – Depth of the switch

The S...JZG version – A switch with additional sealing, up to IP65

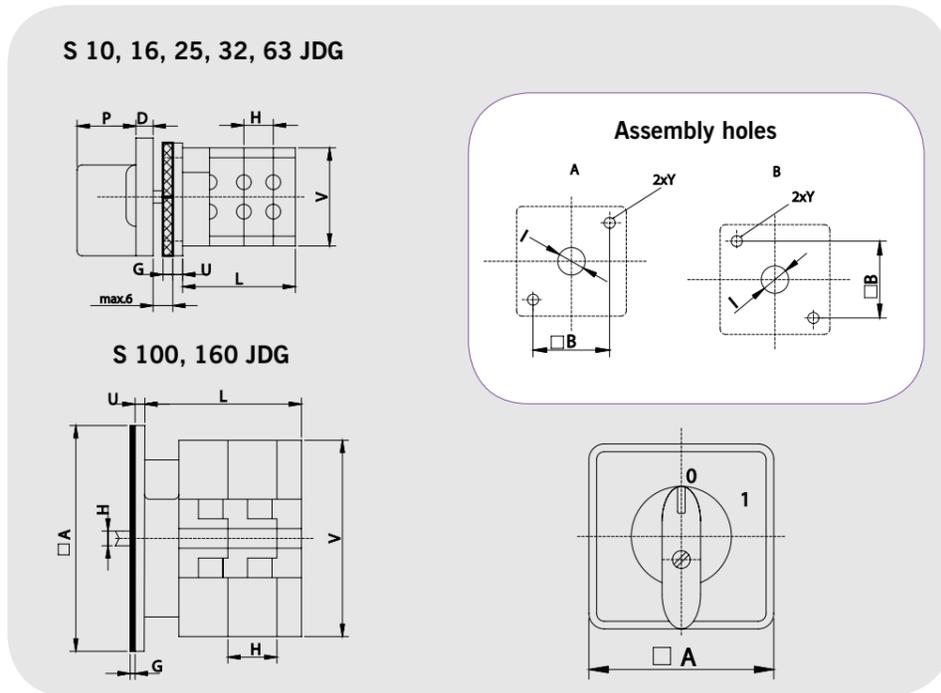
Important: The switch can be locked in one selected position: in the case of a 0-1 switch, it can be locked either at position 0 or position 1.

Sample designs for S...JZ series switches



Type	Function	Ampere value	Electrical diagram
S10JZ9151 C6 S16JZ9151 C6 S25JZ9151 C6 S32JZ9151 C6 S63JZ9151 C6 S100JZ9151 C6 S160JZ9151 C6	3-phase reverse switch (for asynchronous motors)	10A 16A 25A 32A 63A 100A 160A	

S...JDG A desk switch, sealed, with a front panel and a plate (IP65)



Type	A	B	D	G	H	I	M	P	U	V	Y
S 10, 16, 25 J	48	36	8	1,5	13,5	9	M4	24	5,5	43	4,2
S 32, 63 J	94	75	11	2	18,5	10	M5	35	7,5	66	5,4
S 100, 160 J	94	75	11	2	21	10	M5	35	7,5	85	5,4

Type	L – Depending on the number of contact chambers											
	1	2	3	4	5	6	7	8	9	10	11	12
S 10, 16, 25 J	33,5	47	60,5	74	87,5	101	114,5	128	141,5	155	168,5	182
S 32, 63 J	42	60,5	79	97,5	116	134,5	153	171,5	190	208,5	227	245,5
S 100, 160 J	45	66	87	108	129	150	171	192	213	234	255	276

* L – Depth of the switch

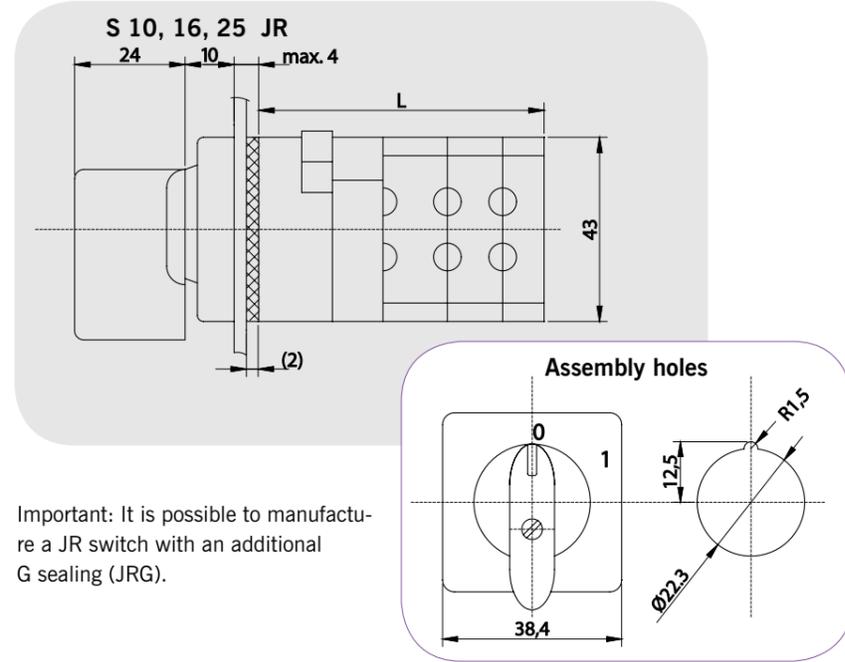
The switches are also available in the JG... version with sealing (IP65), and without a front panel and a plate.

Sample designs for S...JDG series switches

Type	Function	Ampere value	Electrical diagram
S10JDG2251 A6 S16JDG2251 A6 S25JDG2251 A6 S32JDG2251 A6 S63JDG2251 A6 S100JDG2251 A6 S160JDG2251 A6	Switch 1-2 pole	10A 16A 25A 32A 63A 100A 160A	

S...JR A desk switch, to be installed in a Ø22mm hole

- A quick-fastening mechanism
- The switch is available in 10A, 16A, and 25A current versions

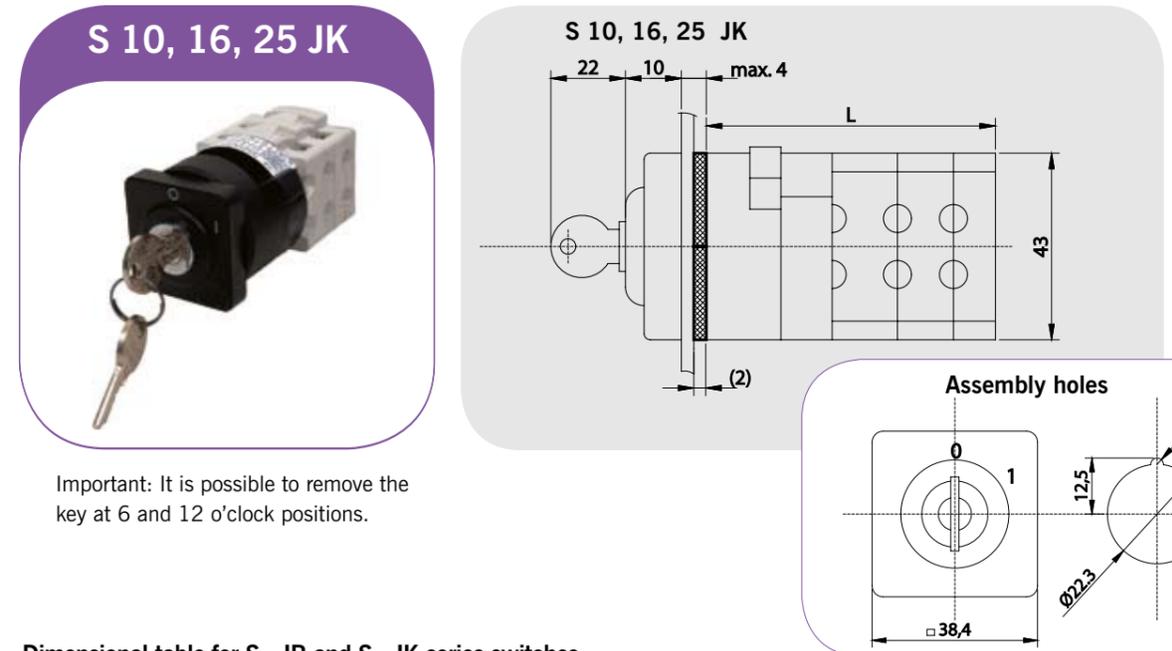


Important: It is possible to manufacture a JR switch with an additional G sealing (JRG).



S...JK A desk switch with a key, to be installed in a Ø22mm hole

- A quick-fastening mechanism
- The switch is available in 10A, 16A, and 25A current versions



Important: It is possible to remove the key at 6 and 12 o'clock positions.

Dimensional table for S...JR and S...JK series switches:

NUMBER OF CONTACT CHAMBERS	1	2	3	4	5	6	7	8	9	10	11	12
L (mm)	54,5	68	81,5	95	108,5	122	135,5	149	162,5	176	189,5	203

S...JVD A desk switch with a self-restoring mechanism

- It can have one or two return positions.
- The maximum available return angle is 120°.
- It is required to specify return positions, when ordering the switch.
- The switch is available in 10A, 16A, and 25A current versions.

S 10, 16, 25 JVD

S 10, 16, 25 JVD

NUMBER OF CONTACT CHAMBERS	1	2	3	4	5	6	7	8	9	10	11	12
L (mm)	47	60,5	74	87,5	101	114,5	128	141,5	155	168,5	182	195,5

S...JLS A switch with an adapter to be installed on a TH 35-7.5 bus

- The switch is available in 10A, 16A, and 25A current versions.
- It is possible to manufacture a S...JL switch with a knob and without a front panel.

S 10, 16, 25 JLS

S 10, 16, 25 JLS

NUMBER OF CONTACT CHAMBERS	1	2	3	4	5	6	7	8	9	10	11	12
L (mm)	39	52,5	66	79,5	93	106,5	120	133,5	147	160,5	174	187,5

S...JLD A switch with an adapter to be installed on a TH 35-7.5 bus, with a front panel and a plate

S 10, 16, 25 JLD

S 32, 63 JLD

S 100, 160 JLD

S 10, 16, 25, 32, 63 JLD

S 100, 160 JLD

Type	A	B2	D	D2	H	P	U	U1	U2	V	Y
S 10, 16, 25 J	48	73	8	14	13,5	24	5,5	5,5	10,5	43	4,2
S 32, 63 J	94	110	11	16	18,5	35	7,5	6,5	12	66	5,4
S 100, 160 J	94	110	11	16	21	35	7,5	6,5	12	85	5,4

Type	L – Depending on the number of contact chambers											
	1	2	3	4	5	6	7	8	9	10	11	12
S 10, 16, 25 J	33,5	47	60,5	74	87,5	101	114,5	128	141,5	155	168,5	182
S 32, 63 J	42	60,5	79	97,5	116	134,5	153	171,5	190	208,5	227	245,5
S 100, 160 J	45	66	87	108	129	150	171	192	213	234	255	276

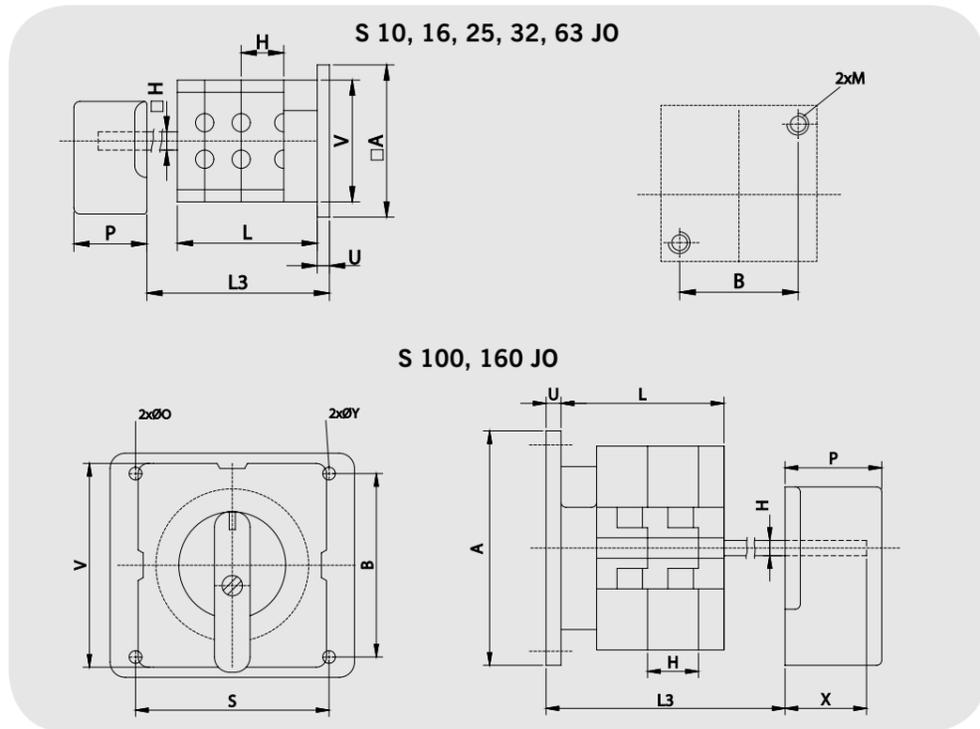
* L – Depth of the switch

Sample designs for S...JLD series switches



Type	Function	Ampere value	Electrical diagram
S10JLD1103 A6 S16JLD1103 A6 S25JLD1103 A6 S32JLD1103 A6 S63JLD1103 A6 S100JLD1103 A6 S160JLD1103 A6	0-1 3-phase	10A 16A 25A 32A 63A 100A 160A	

S...JO A switch with rear fastening, no front panel and plate



Type	A	B2	H	M	O	P	S	U	V	X	Y
S 10, 16, 25 J	48	36	13,5	M4	3	24	43	5,5	43	19	4,2
S 32, 63 J	94	75	18,5	M5	4	35	66	7,5	66	34,5	5,4
S 100, 160 J	94	75	21	M5	4	35	77	7,5	85	34,5	5,4

Type	L – Depending on the number of contact chambers											
	1	2	3	4	5	6	7	8	9	10	11	12
S 10, 16, 25 J	33,5	47	60,5	74	87,5	101	114,5	128	141,5	155	168,5	182
S 32, 63 J	42	60,5	79	97,5	11	134,5	153	171,5	190	208,5	227	245,5
S 100, 160 J	45	66	87	108	129	150	171	192	213	234	255	276

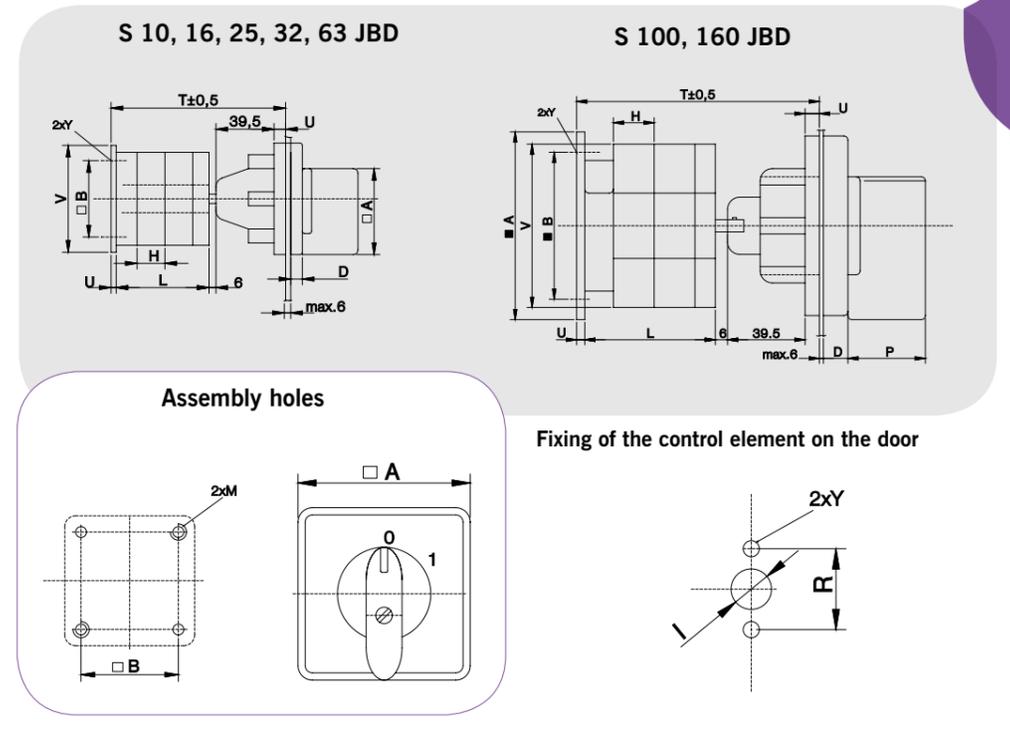
* L – Depth of the switch

Type	L3 – Depending on the number of contact chambers											
	1	2	3	4	5	6	7	8	9	10	11	12
S 10, 16, 25 J	62	62	76	130	130	130	130	197,5	197,5	197,5	197,5	197,5
S 32, 63 J	115	115	115	115	172	172	172	256	256	256	298	298
S 100, 160 J	115	115	115	172	172	172	256	256	256	256	298	298

Sample designs for S...JO series switches

Type	Function	Ampere value	Electrical diagram
S10JO1101 A6 S16JO1101 A6 S25JO1101 A6 S32JO1101 A6 S63JO1101 A6 S100JO1101 A6 S160JO1101 A	0-1 1-phase	10A 16A 25A 32A 63A 100A 160A	

S...JBD A switch with rear fastening
- With a knob, front panel, and plate (all mounted on the door)



Type	A	B	D	H	I	M	P	R	U	V	Y
S 10, 16, 25 J	48	36	8	13,5	9	M4	24	30	5,5	43	4,2
S 32, 63 J	94	75	11	18,5	10	M5	35	50	7,5	66	5,4
S 100, 160 J	94	75	11	21	10	M5	35	50	7,5	85	5,4

Type	L – Depending on the number of contact chambers											
	1	2	3	4	5	6	7	8	9	10	11	12
S 10, 16, 25 J	33,5	47	60,5	74	87,5	101	114,5	128	141,5	155	168,5	182
S 32, 63 J	42	60,5	79	97,5	11	134,5	153	171,5	190	208,5	227	245,5
S 100, 160 J	45	66	87	108	129	150	171	192	213	234	255	276

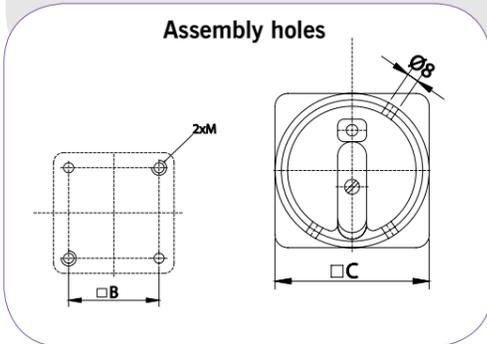
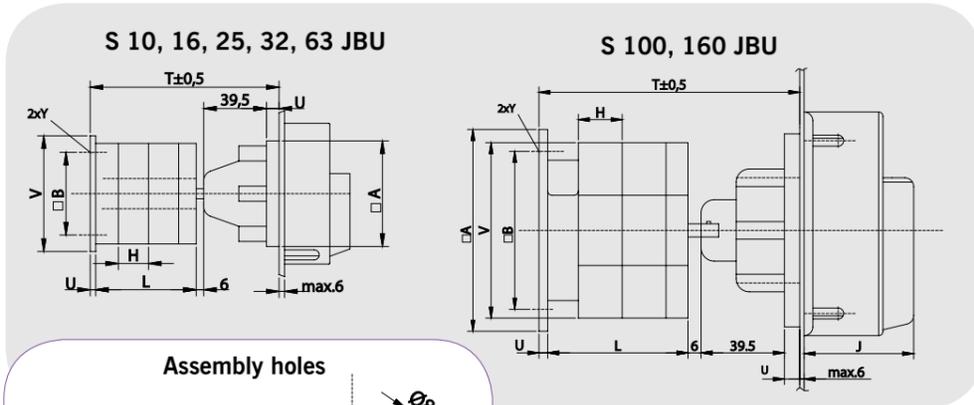
* L – Depth of the switch

Type	T – Depending on the number of contact chambers											
	1	2	3	4	5	6	7	8	9	10	11	12
S 10, 16, 25 J	90	103,5	117	130,5	144	157,5	171	184,5	198	211,5	225	238,5
S 32, 63 J	102,5	121	139,5	158	176,5	195	213,5	232	250,5	269	287,5	306
S 100, 160 J	105	126	147	168	189	210	231	252	273	294	315	336

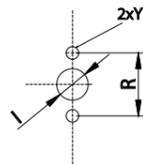
Sample designs for S...JBD series switches

Type	Function	Ampere value	Electrical diagram
S10JBD8357 C8 S16JBD8357 C8 S25JBD8357 C8 S32JBD8357 C8 S63JBD8357 C8 S100JBD8357 C8 S160JBD8357 C8	Switch for voltmeters	10A 16A 25A 32A 63A 100A 160A	

S...JBU A switch with rear fastening
 - It can be locked with three padlocks (Ø 5-8mm)
 - With a knob and a plate mounted on the door



Fixing of the control element on the door



Type	A	B	C	H	I	J	M	R	U	V	Y
S 10, 16, 25 J	48	36	66	13,5	9	31	M4	30	5,5	43	4,2
S 32, 63 J	94	75	106	18,5	10	42	M5	50	7,5	66	5,4
S 100, 160 J	94	75	106	21	10	42	M5	50	7,5	85	5,4

Important: It is possible to manufacture any length of the switch's axis, longer than the „L” length.

Type	L – Depending on the number of contact chambers											
	1	2	3	4	5	6	7	8	9	10	11	12
S 10, 16, 25 J	33,5	47	60,5	74	87,5	101	114,5	128	141,5	155	168,5	182
S 32, 63 J	42	60,5	79	97,5	11	134,5	153	171,5	190	208,5	227	245,5
S 100, 160 J	45	66	87	108	129	150	171	192	213	234	255	276

* L – Depth of the switch

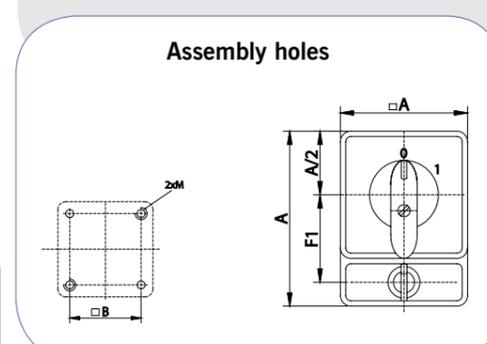
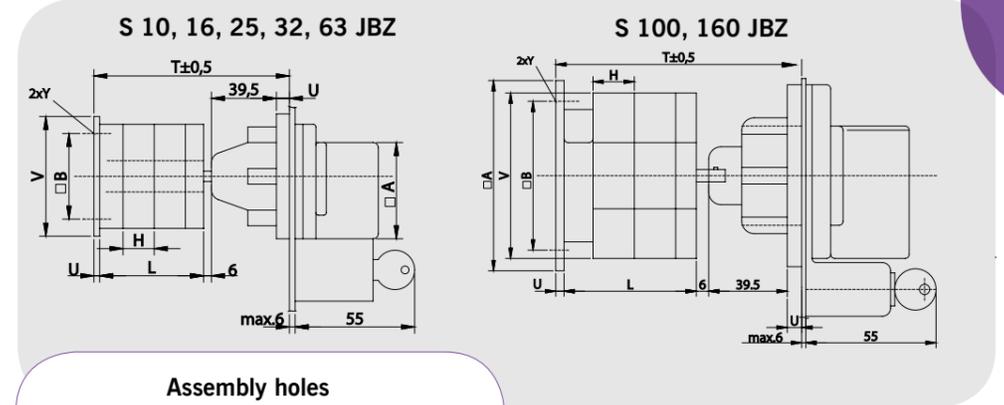
Type	T – Depending on the number of contact chambers											
	1	2	3	4	5	6	7	8	9	10	11	12
S 10, 16, 25 J	90	103,5	117	130,5	144	157,5	171	184,5	198	211,5	225	238,5
S 32, 63 J	102,5	121	139,5	158	176,5	195	213,5	232	250,5	269	287,5	306
S 100, 160 J	105	126	147	168	189	210	231	252	273	294	315	336

Sample designs for S...JBU series switches

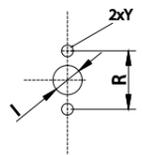


Type	Function	Ampere value	Electrical diagram
S10JBU2253 A6R S16JBU2253 A6R S25JBU2253 A6R S32JBU2253 A6R S63JBU2253 A6R S100JBU2253 A6R S160JBU2253 A6R	1-2 3-pole	10A 16A 25A 32A 63A 100A 160A	

S...JBZ A switch with rear fastening
 - The initial position is blocked with a lock
 - With a knob and a plate mounted on the door



Fixing of the control element on the door



Type	A	B	F1	H	I	M	R	U	V	Y
S 10, 16, 25 J	48	36	35	13,5	9	M4	30	5,5	43	4,2
S 32, 63 J	94	75	58	18,5	10	M5	50	7,5	66	5,4
S 100, 160 J	94	75	58	21	10	M5	50	7,5	85	5,4

Important: It is possible to manufacture any length of the switch's axis, longer than the „L” length.

Type	L – Depending on the number of contact chambers											
	1	2	3	4	5	6	7	8	9	10	11	12
S 10, 16, 25 J	33,5	47	60,5	74	87,5	101	114,5	128	141,5	155	168,5	182
S 32, 63 J	42	60,5	79	97,5	11	134,5	153	171,5	190	208,5	227	245,5
S 100, 160 J	45	66	87	108	129	150	171	192	213	234	255	276

* L – Depth of the switch

Type	T – Depending on the number of contact chambers											
	1	2	3	4	5	6	7	8	9	10	11	12
S 10, 16, 25 J	90	103,5	117	130,5	144	157,5	171	184,5	198	211,5	225	238,5
S 32, 63 J	102,5	121	139,5	158	176,5	195	213,5	232	250,5	269	287,5	306
S 100, 160 J	105	126	147	168	189	210	231	252	273	294	315	336

Sample designs for S...JBZ series switches



Type	Function	Ampere value	Electrical diagram
S10JBZ9551 A6 S16JBZ9551 A6 S25JBZ9551 A6 S32JBZ9551 A6 S63JBZ9551 A6 S100JBZ9551 A6 S160JBZ9551 A6	Switch Y-Δ	10A 16A 25A 32A 63A 100A 160A	

SWITCHES IN ENCLOSURES

S...JPD A switch in an IP65 enclosure, with a front panel and a plate
 - Fixed to the cover: - With 2 x M4 bolts (S10, 16, 25)
 - With 2 x M5 bolts (S10, 64, 100)

S...JP A switch in an IP65 enclosure, without a front panel and a plate
 - Designations provided on the enclosure
 - Contains two cable glands in the following sizes: Pg16 (for S10 and S16), Pg21 (for S25 and S32), Pg29 (for S63 and S100), and Pg36 (for S160)



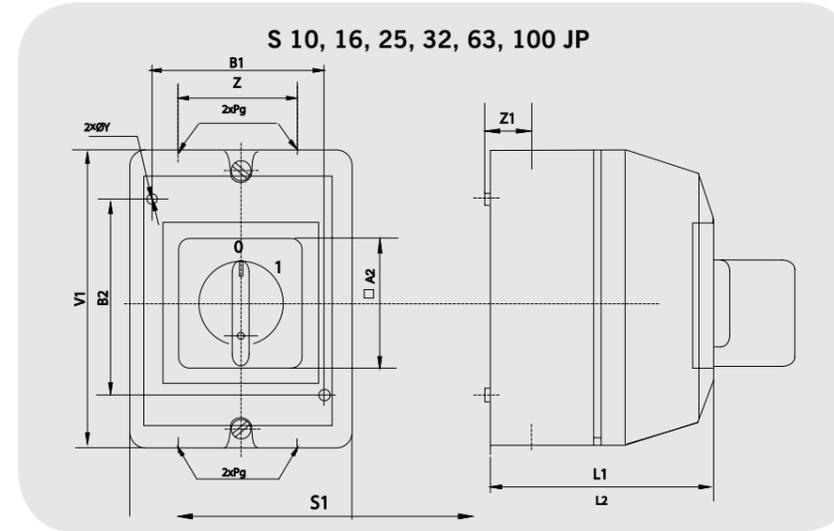
S...JPU A switch in an IP65 enclosure
 - It can be locked with three padlocks (Ø 5-8mm)



S...JPZ A switch in an IP65 enclosure
 - The initial position is blocked with a lock

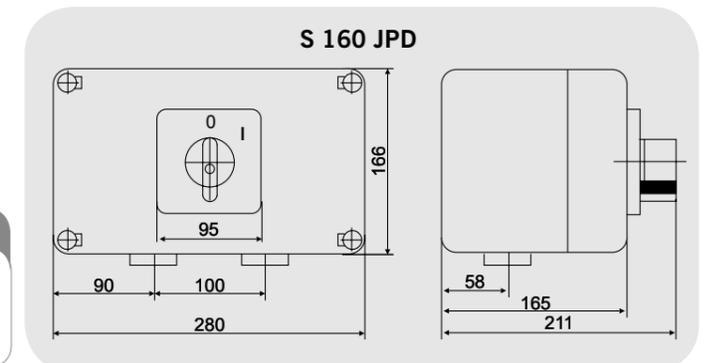


TECHNICAL DRAWINGS



Type	A	B1	B2	S1	V1	Y	Z	Z1
S 10, 16, 25 J	48	66	79	87	111	4,2	46	22
S 32, 63 J	94	110	110	140	160	5,4	74	30
S 100, 160 J	94	110	110	140	160	5,4	74	30

Type	Maximum number of contacts
S 10, 16, 25 J	14
S 32, 63 J	8
S 100, 160 J	8



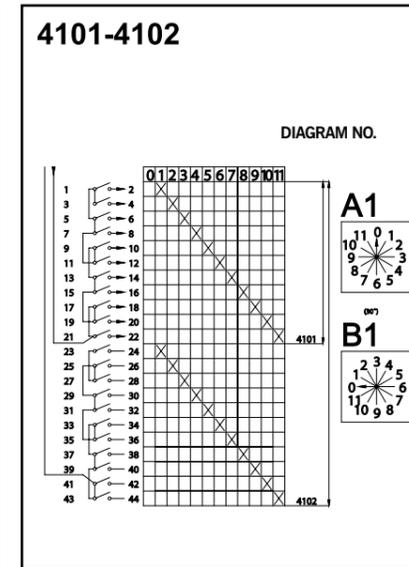
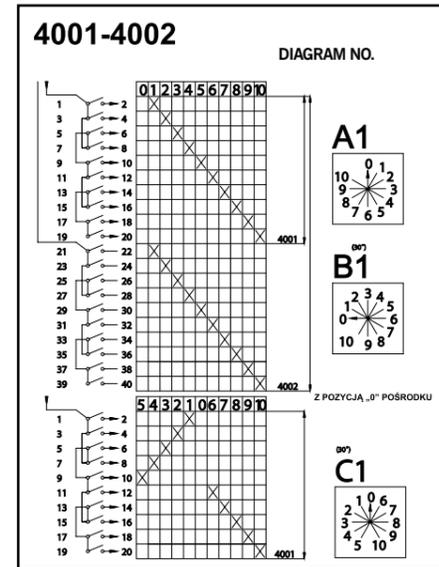
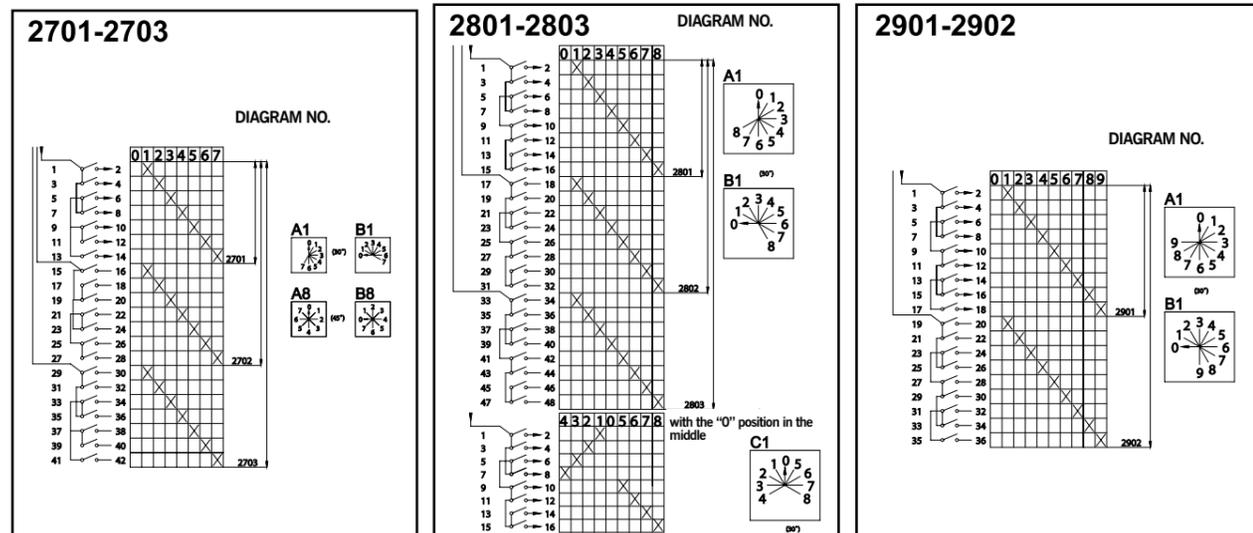
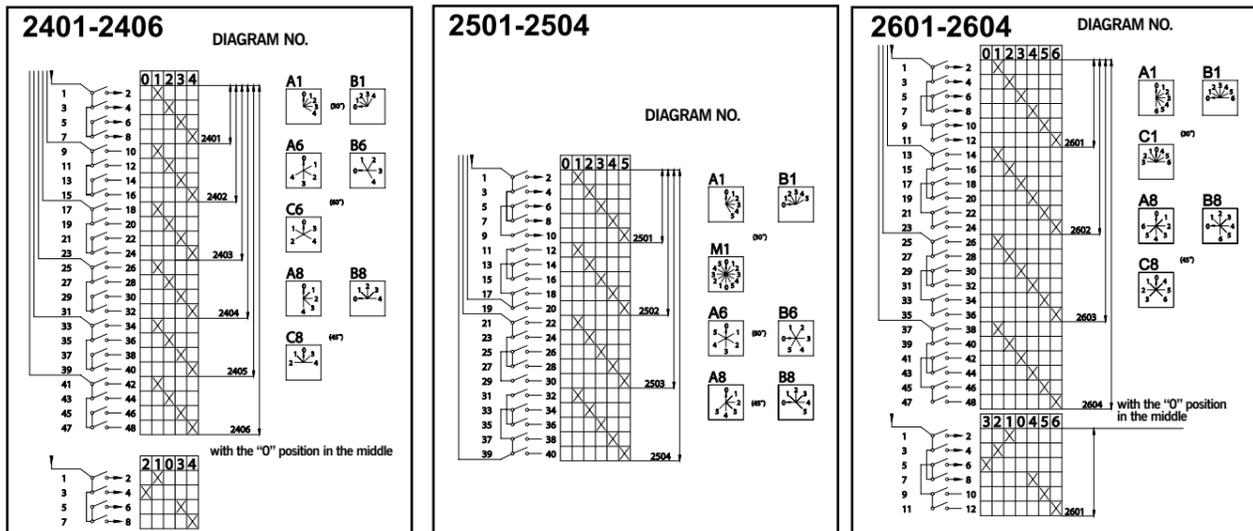
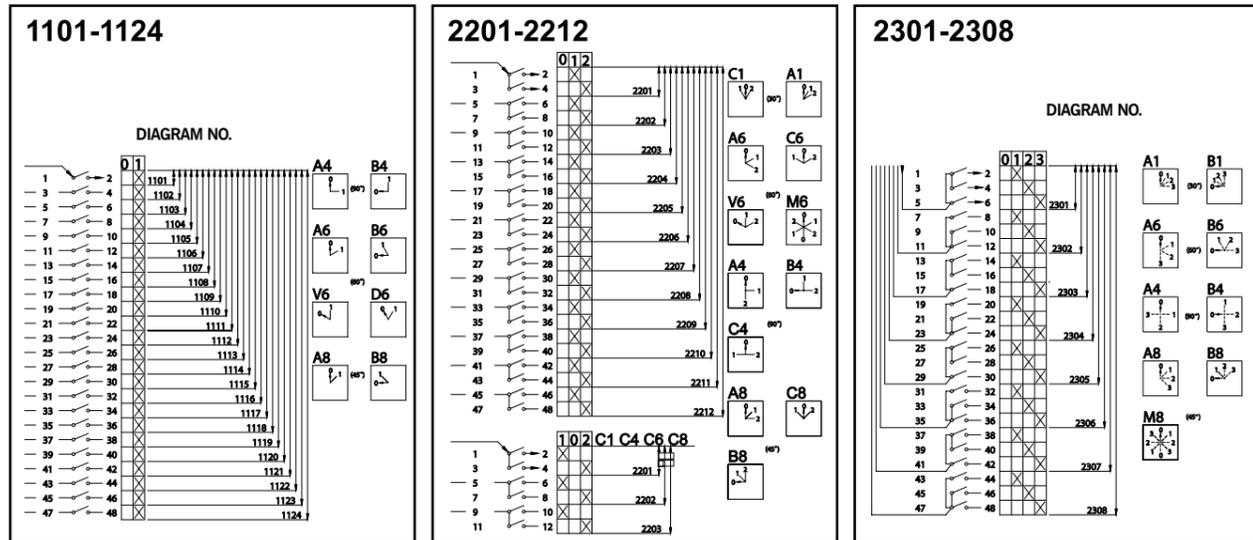
Sample designs for switches in enclosures

Type	Function	Ampere value	Electrical diagram
S10JPD1103 A6 S16JPD1103 A6 S25JPD1103 A6 S32JPD1103 A6 S63JPD1103 A6 S100JPD1103 A6 S160JPD1103 A6	0-1 3-phase	10A 16A 25A 32A 63A 100A 160A	
S10JPU2301 A6R S16JPU2301 A6R S25JPU2301 A6R S32JPU2301 A6R S63JPU2301 A6R S100JPU2301 A6R S160JPU2301 A6R	0-1-2-3 1-pole	10A 16A 25A 32A 63A 100A 160A	
S10JPZ1101 A6 S16JPZ1101 A6 S25JPZ1101 A6 S32JPZ1101 A6 S63JPZ1101 A6 S100JPZ1101 A6 S160JPZ1101 A6	0-1 1-phase	10A 16A 25A 32A 63A 100A 160A	

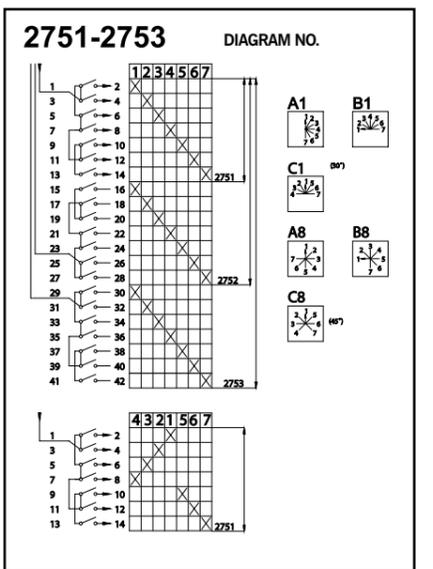
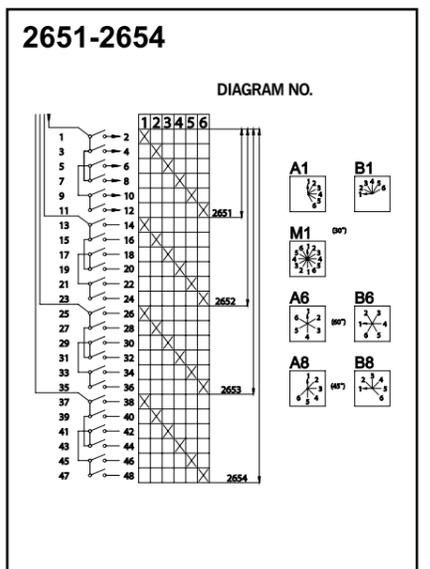
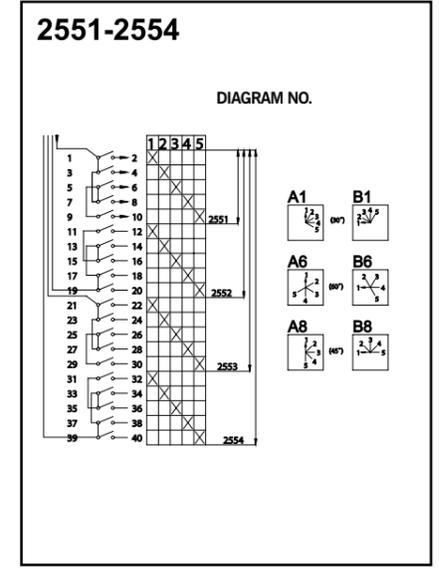
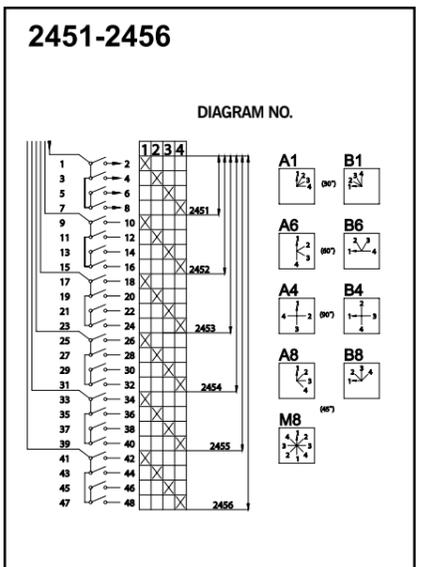
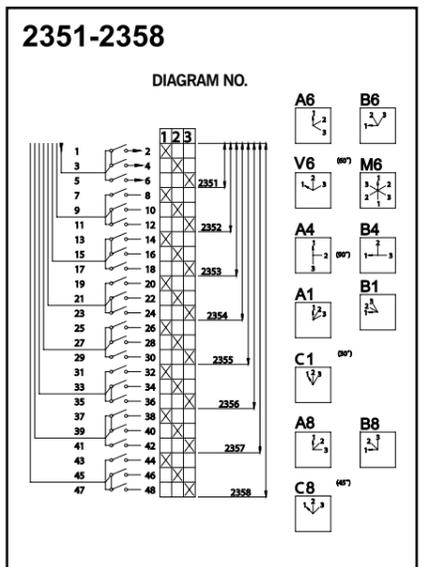
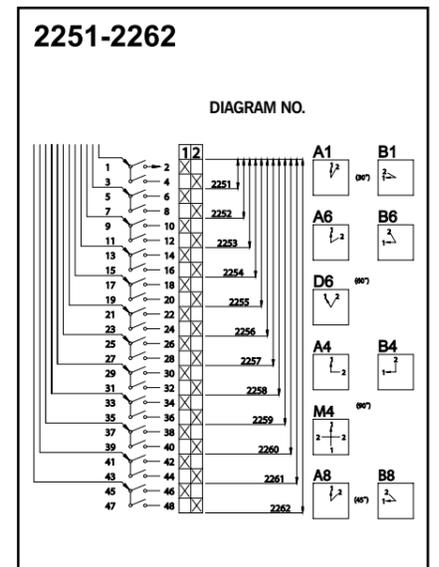


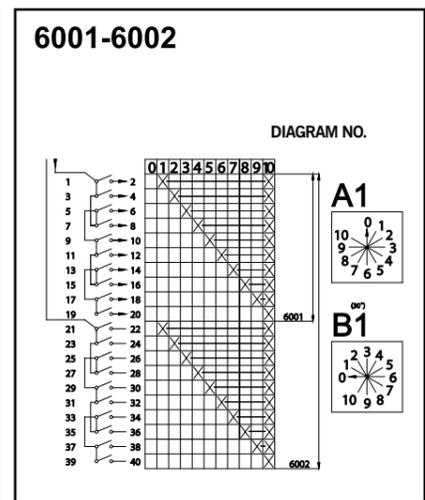
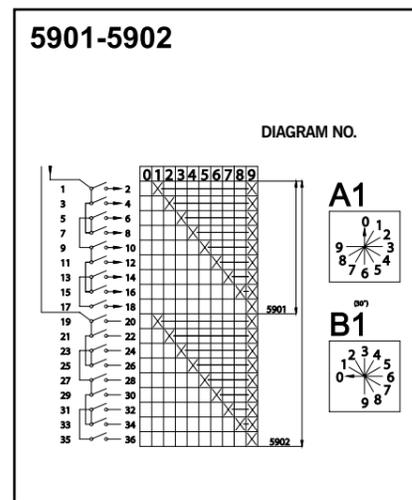
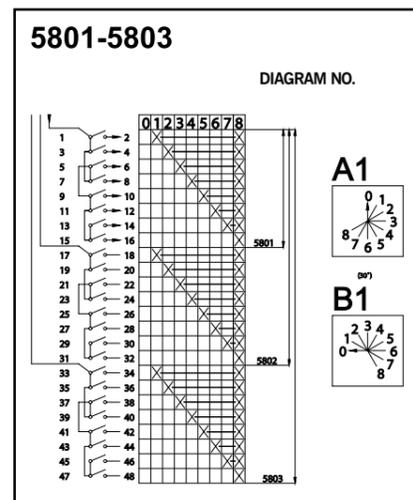
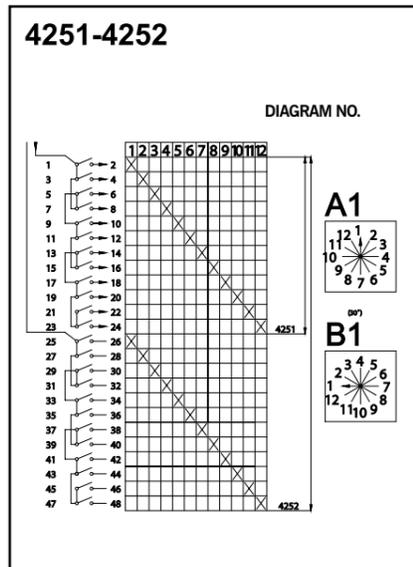
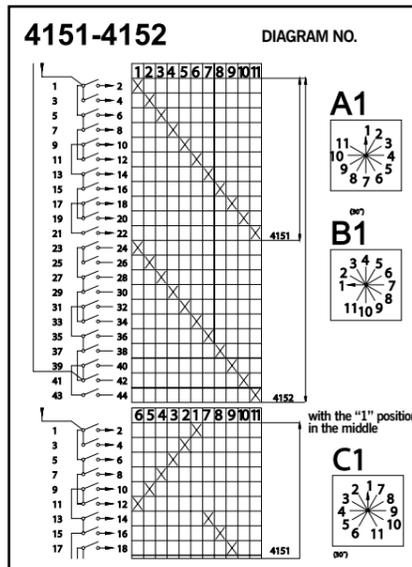
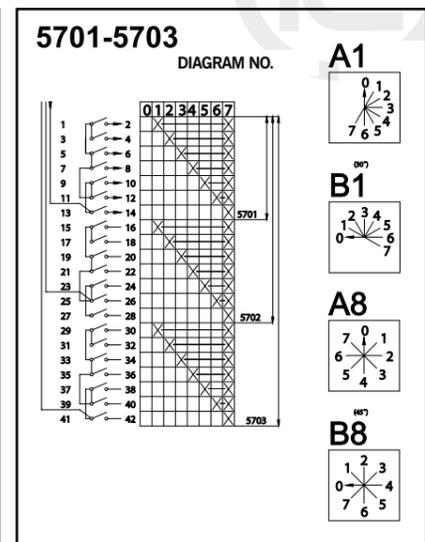
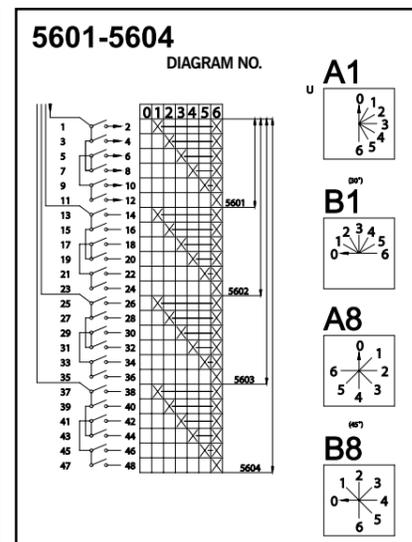
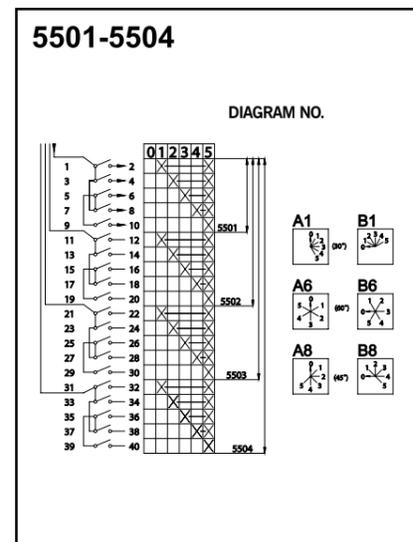
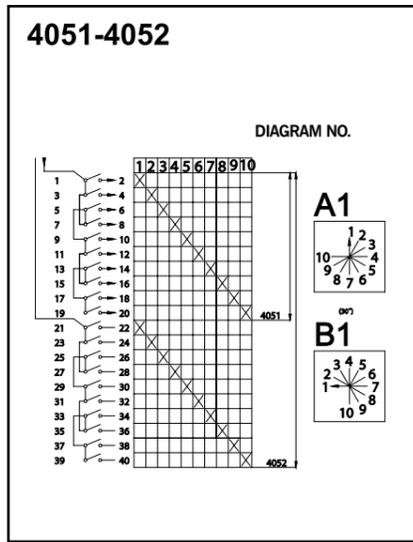
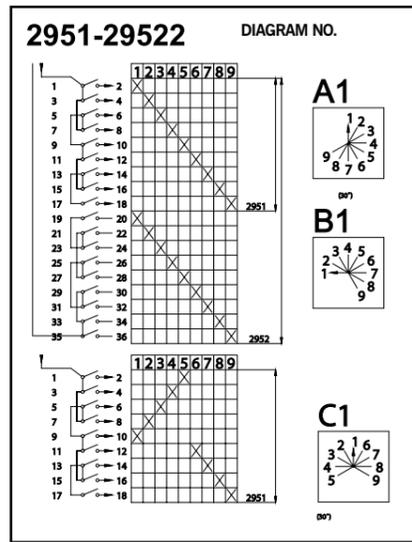
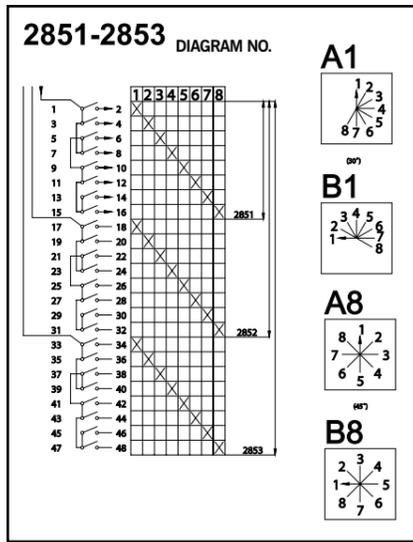
6b.5 STANDARD CIRCUIT DIAGRAMS

BREAKER SWITCHES AND MULTI-STAGE SWITCHES WITH THE "0" POSITION

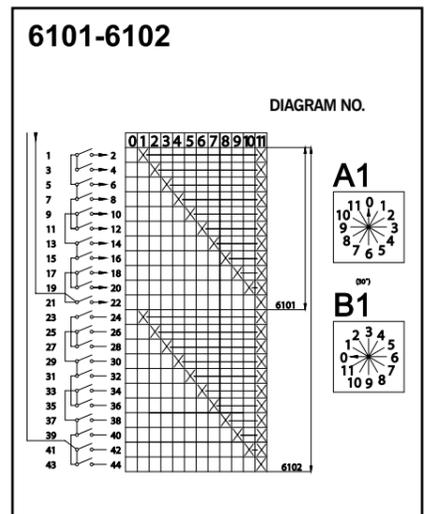
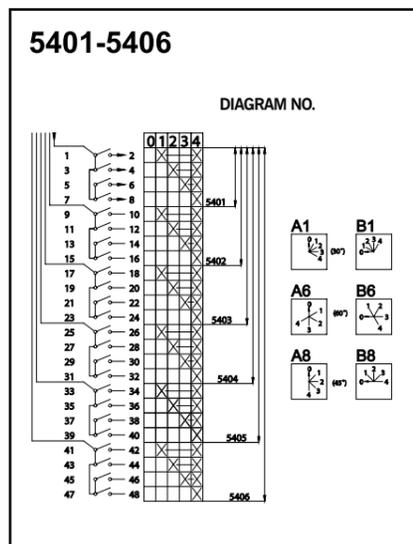
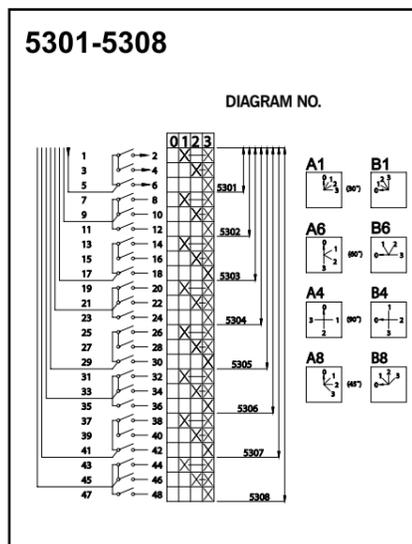
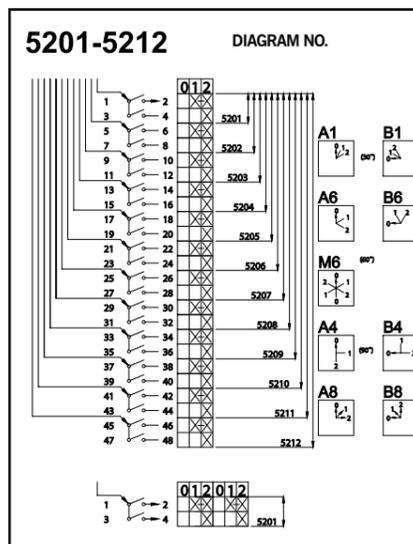


BREAKER SWITCHES AND MULTI-STAGE SWITCHES WITHOUT THE "0" POSITION

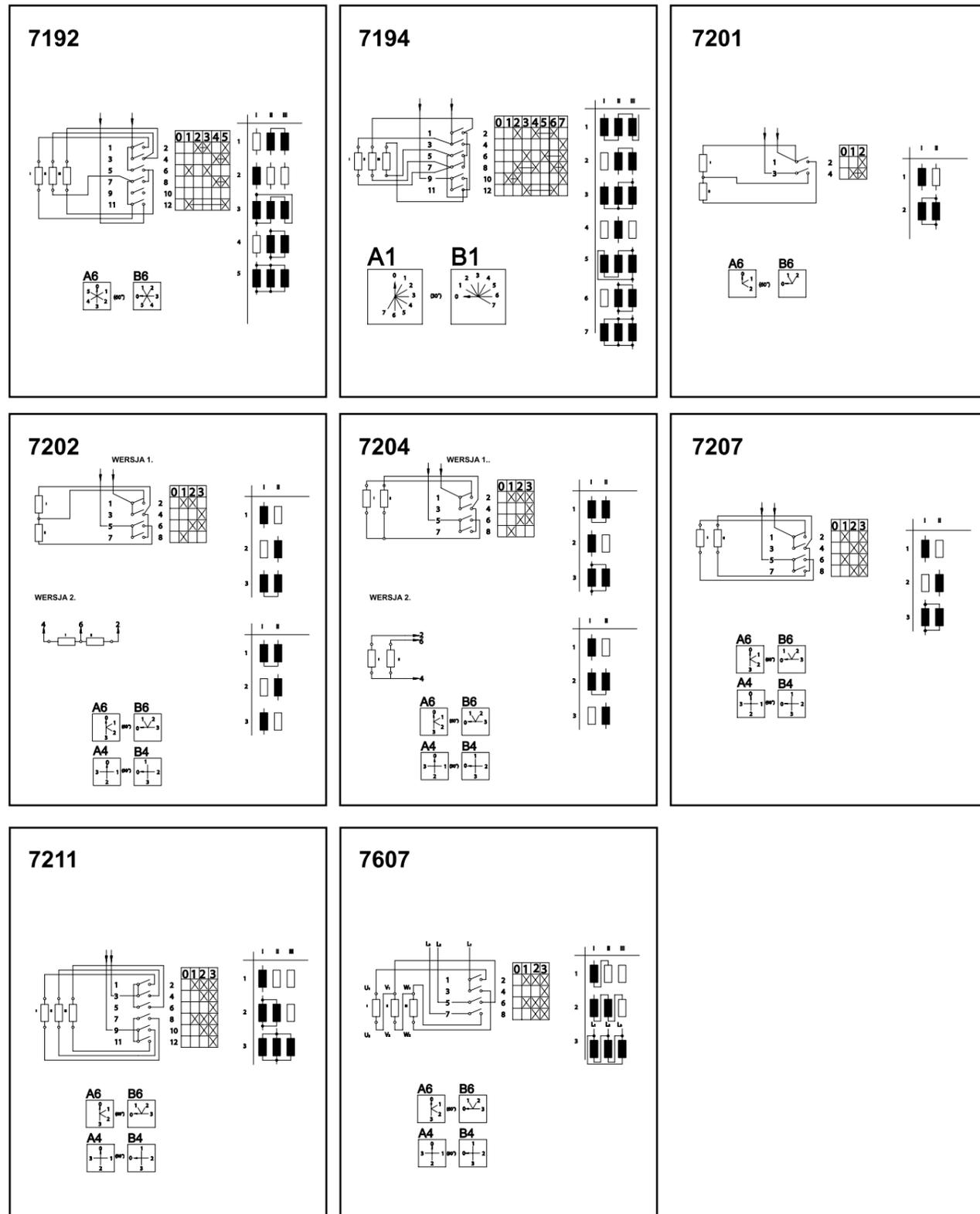




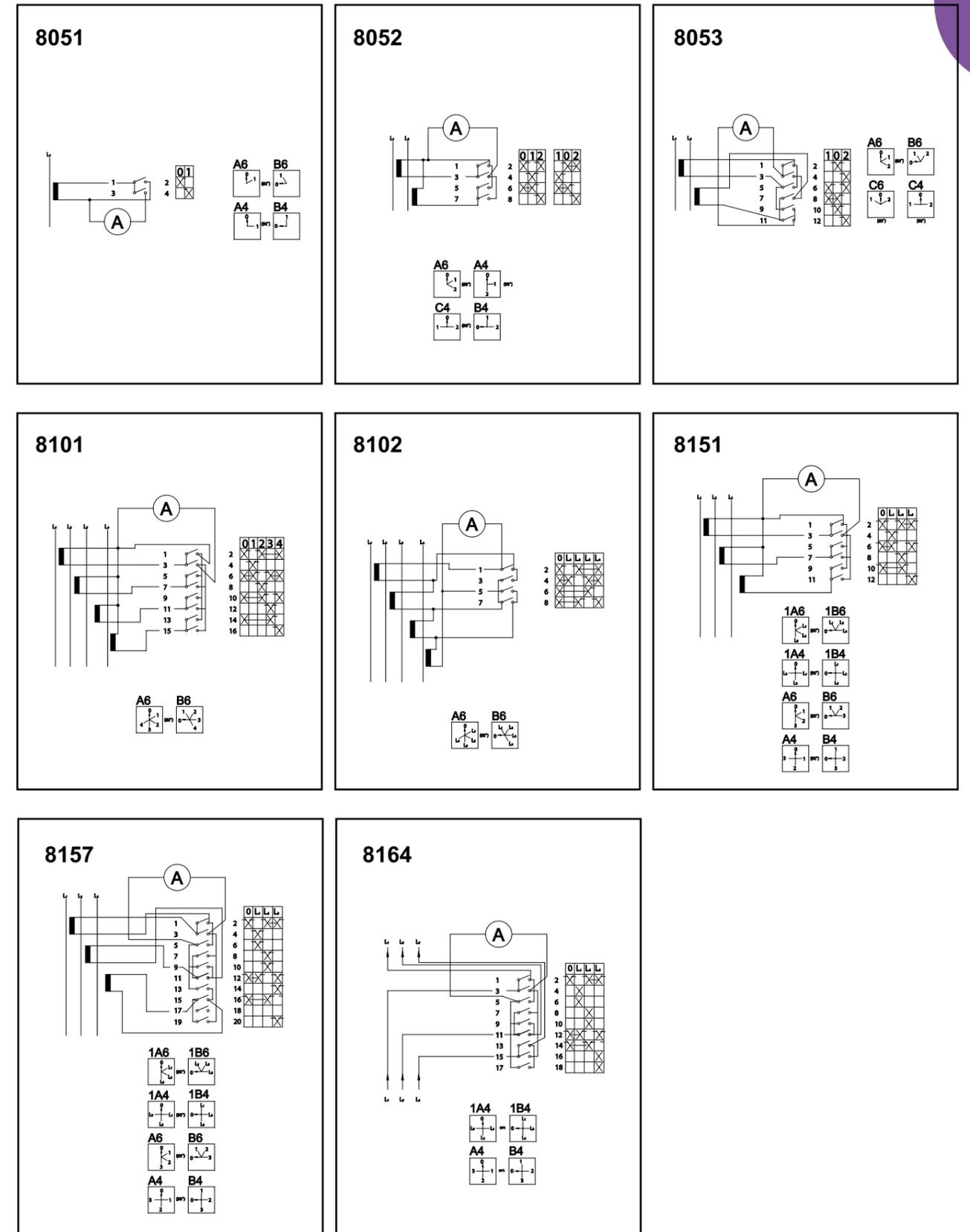
MULTI-STAGE SWITCHES WITHOUT INTERRUPTING CONNECTION AND WITH THE "0" POSITION

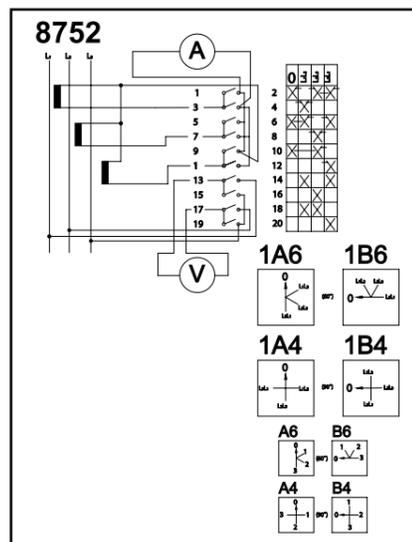
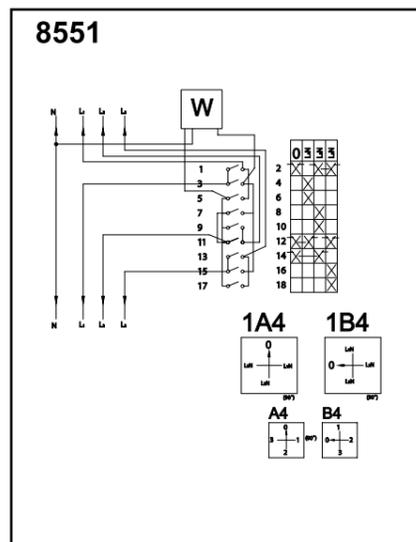
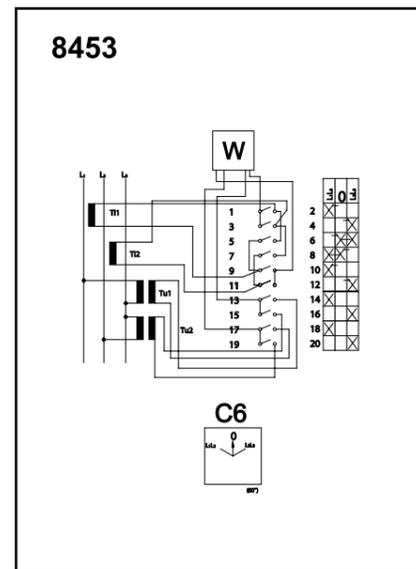
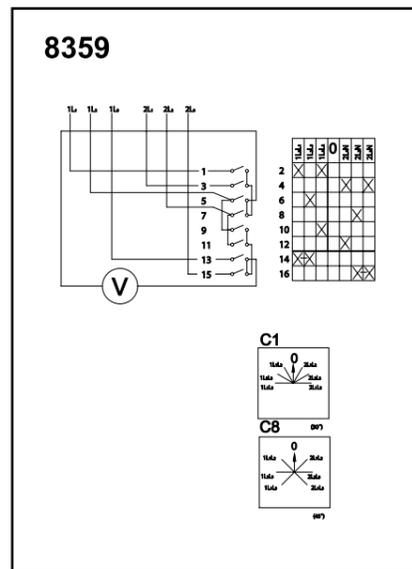
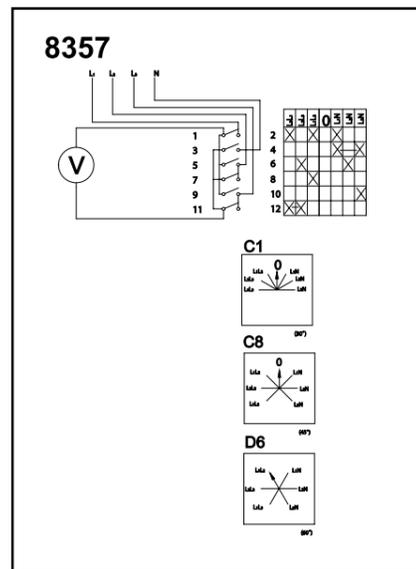
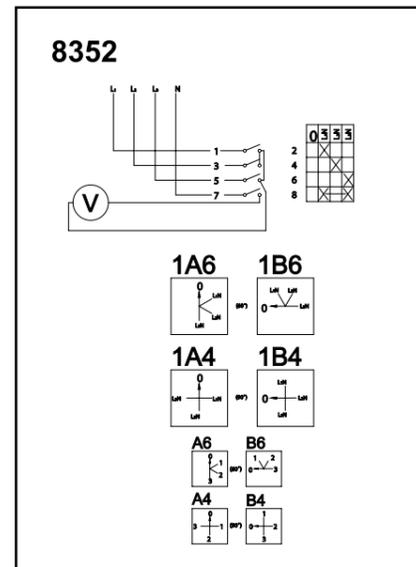
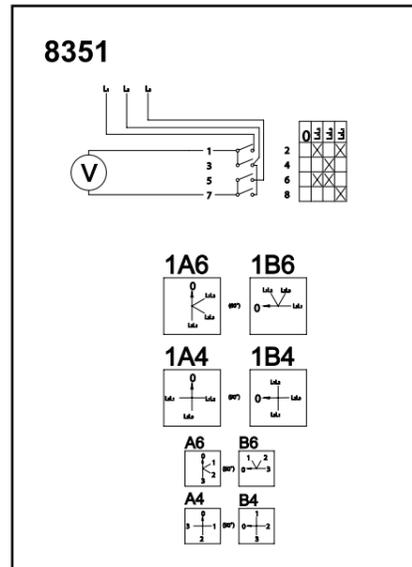
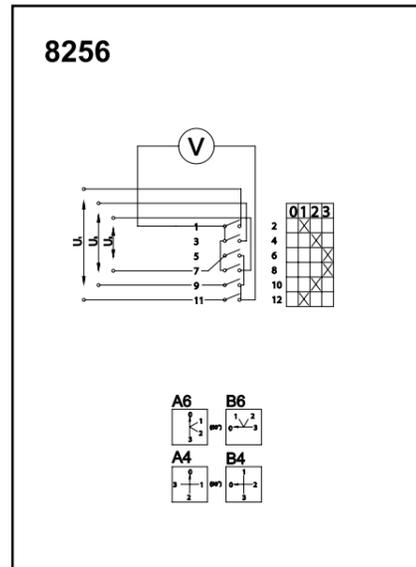


SWITCHES INTENDED FOR SWITCHING RESISTANCE

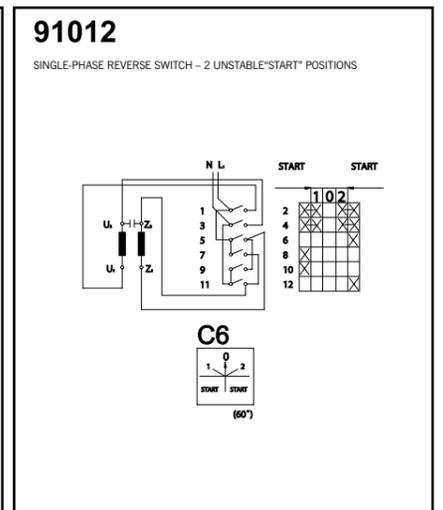
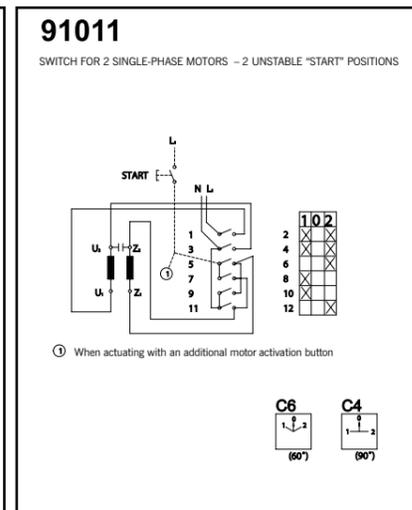
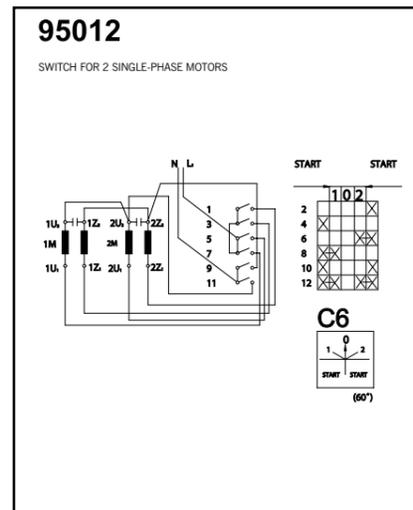
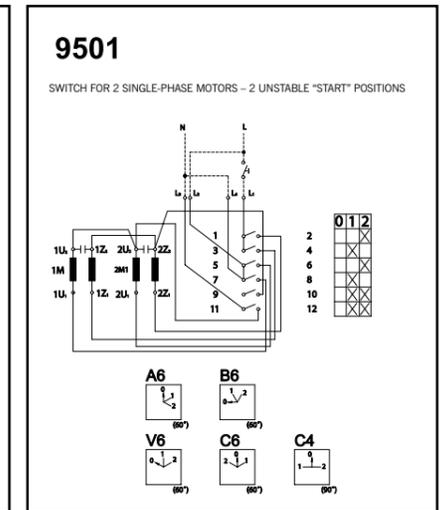
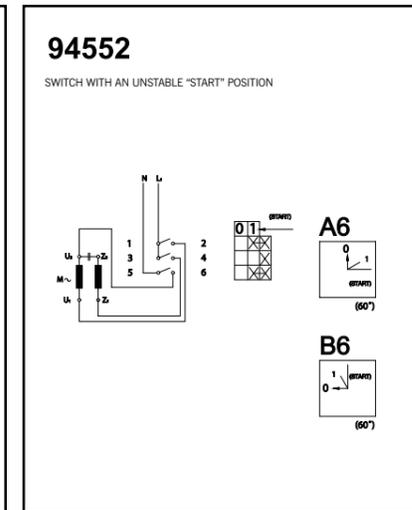
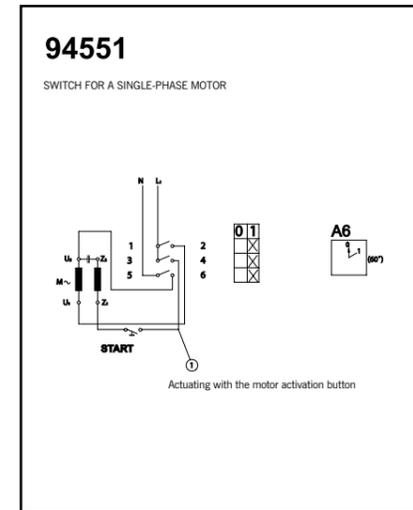
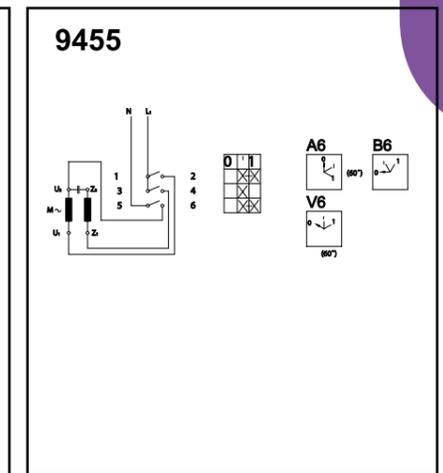
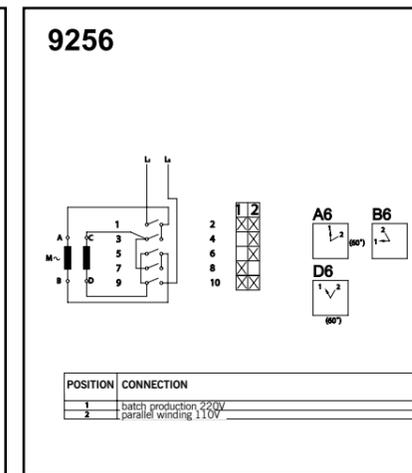
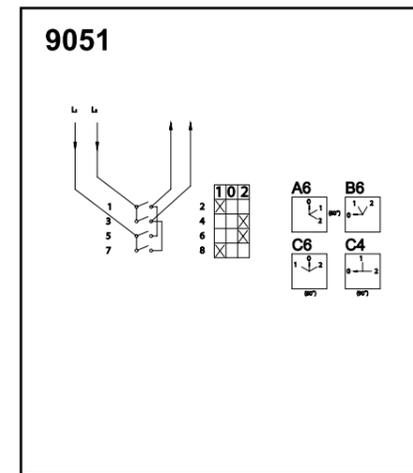


SWITCHES FOR MEASURING INSTRUMENTS: AMMETERS, VOLTMETERS, AND WATTMETERS

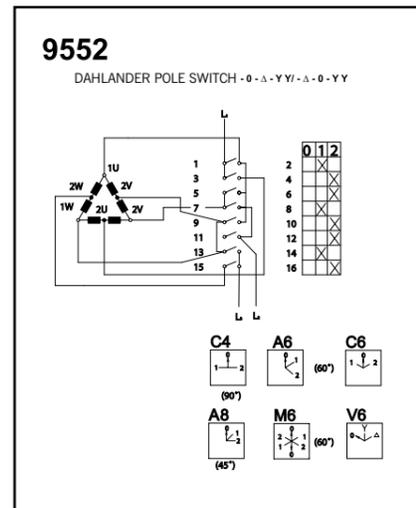
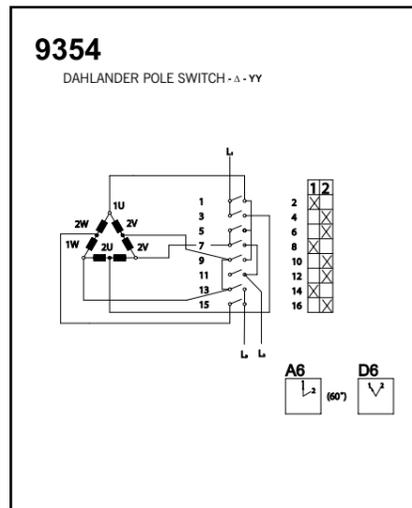
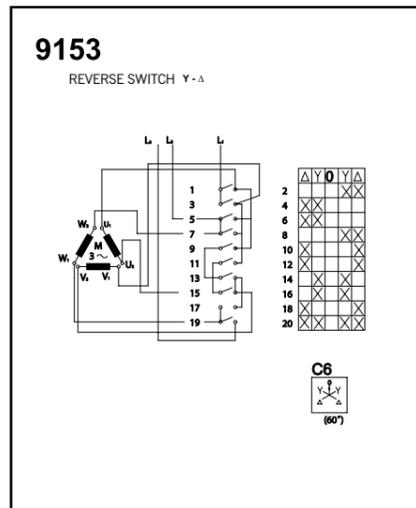
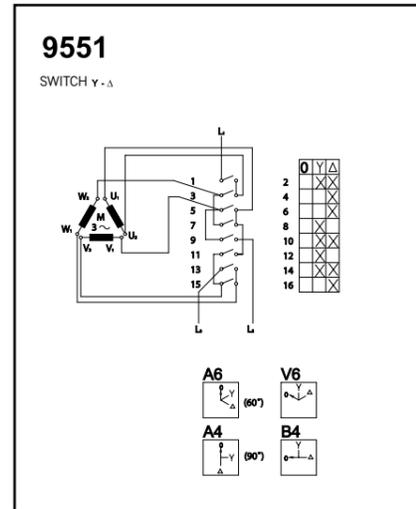
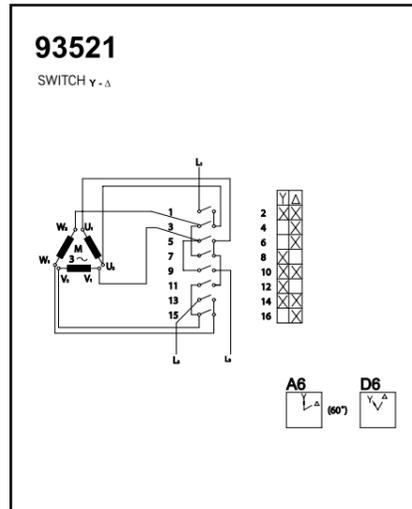
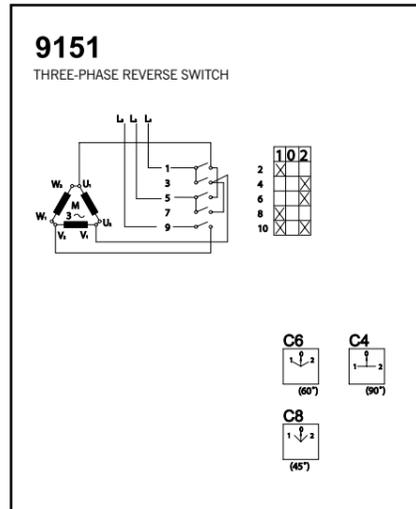




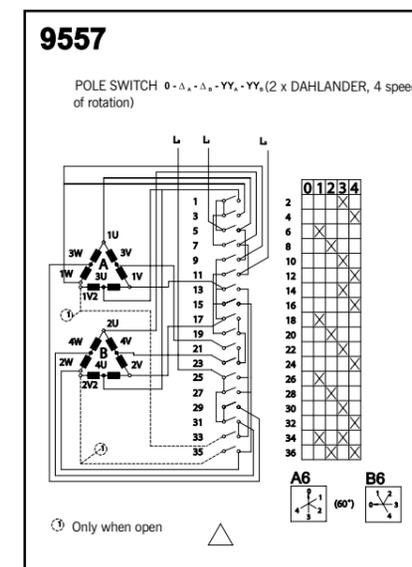
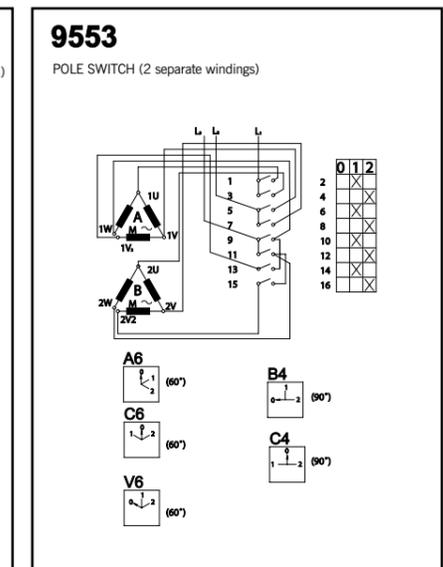
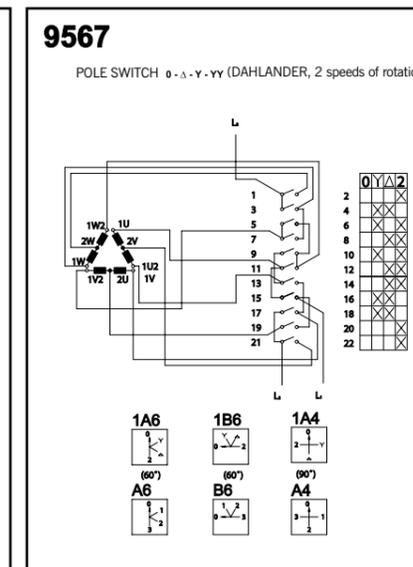
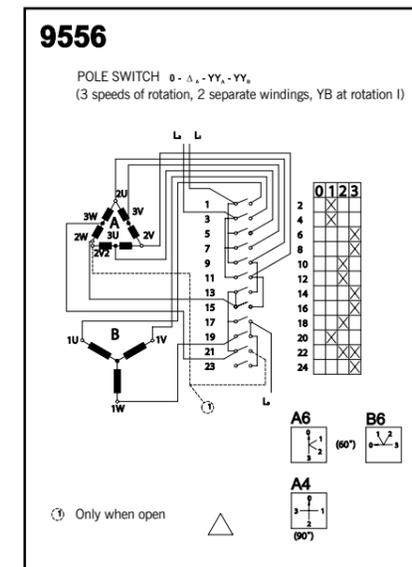
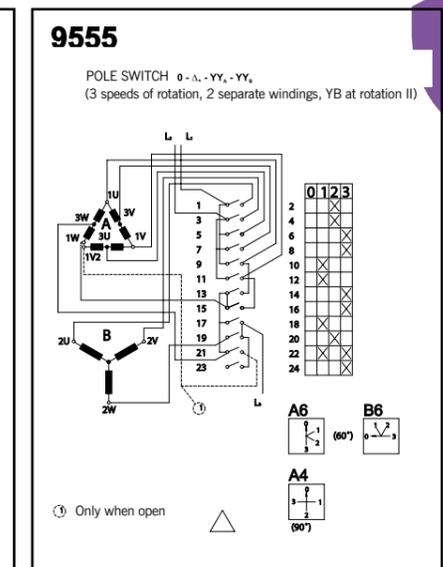
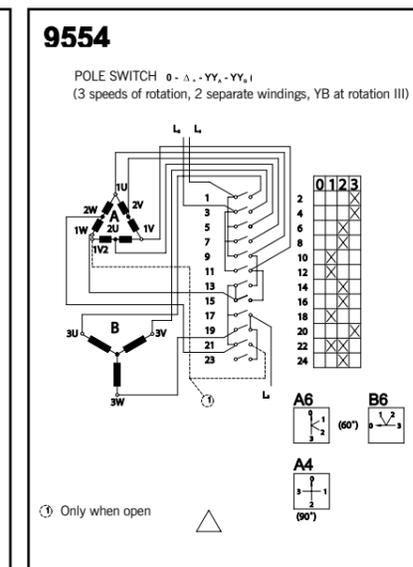
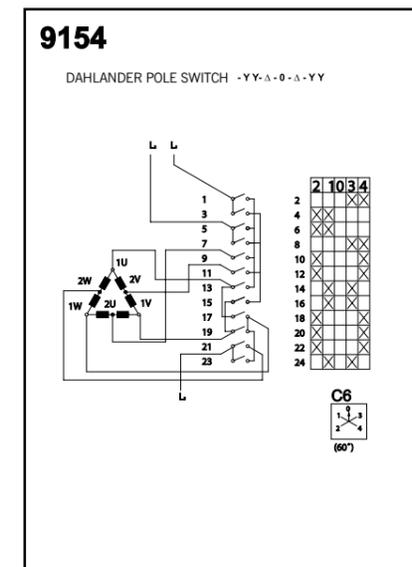
SWITCHES FOR SINGLE-PHASE MOTORS



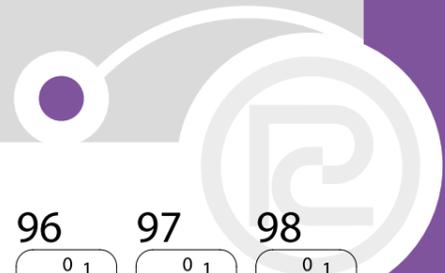
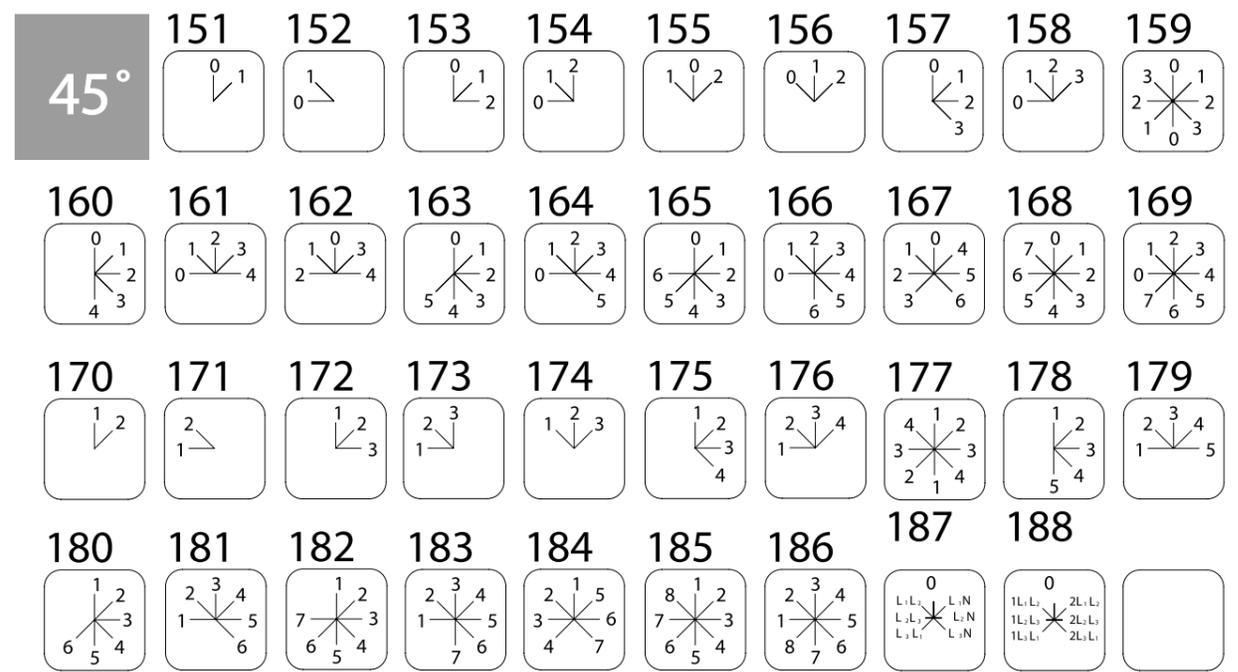
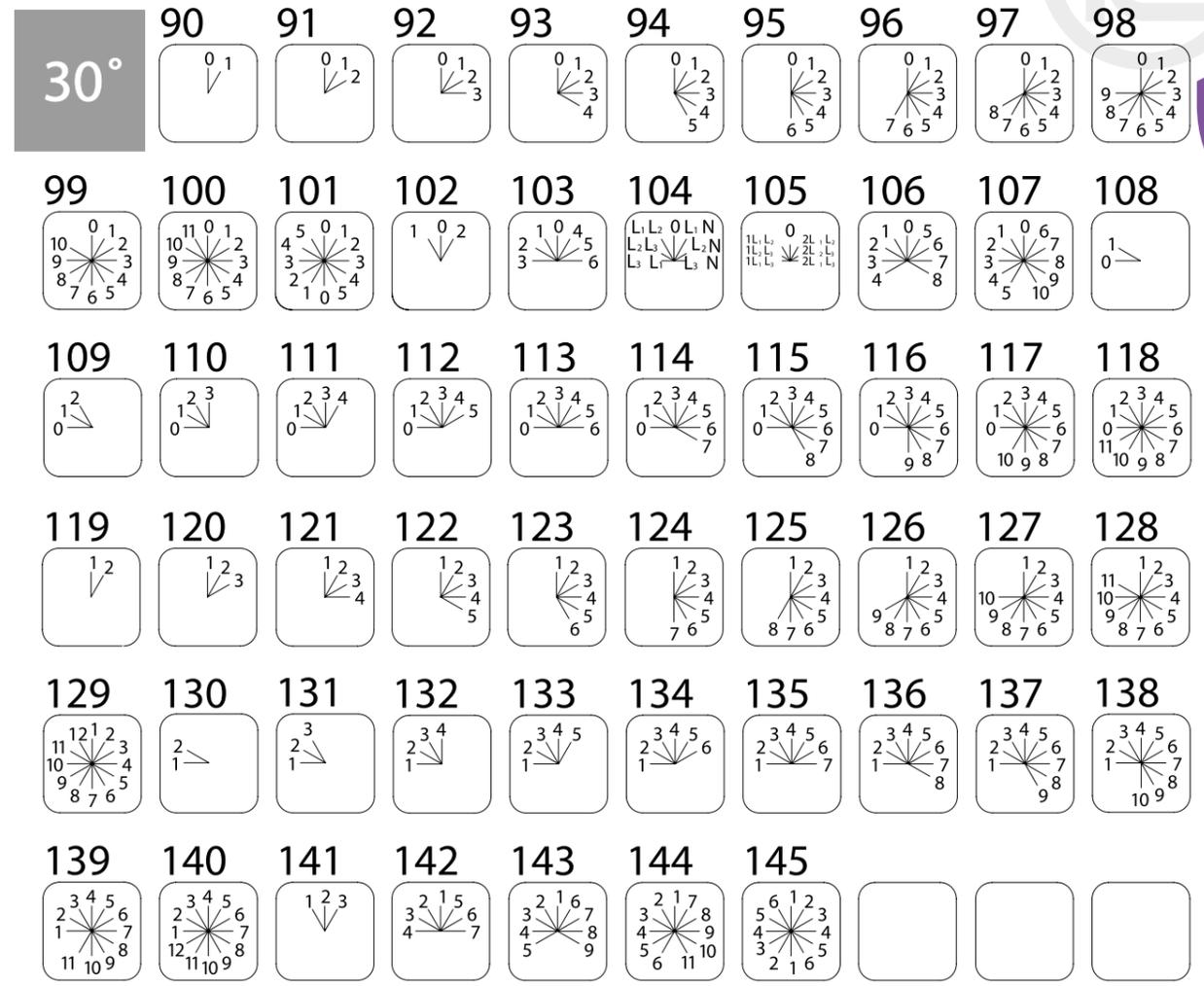
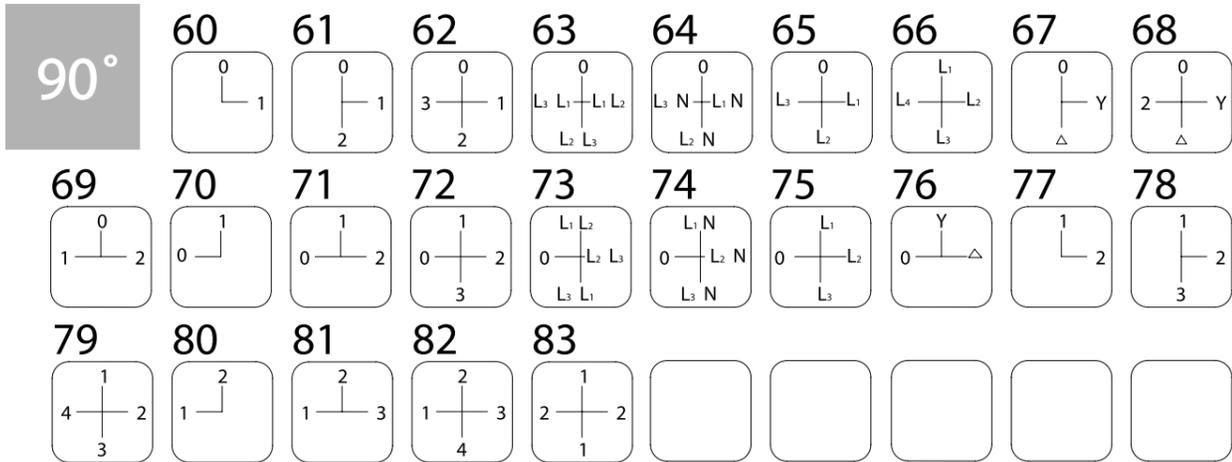
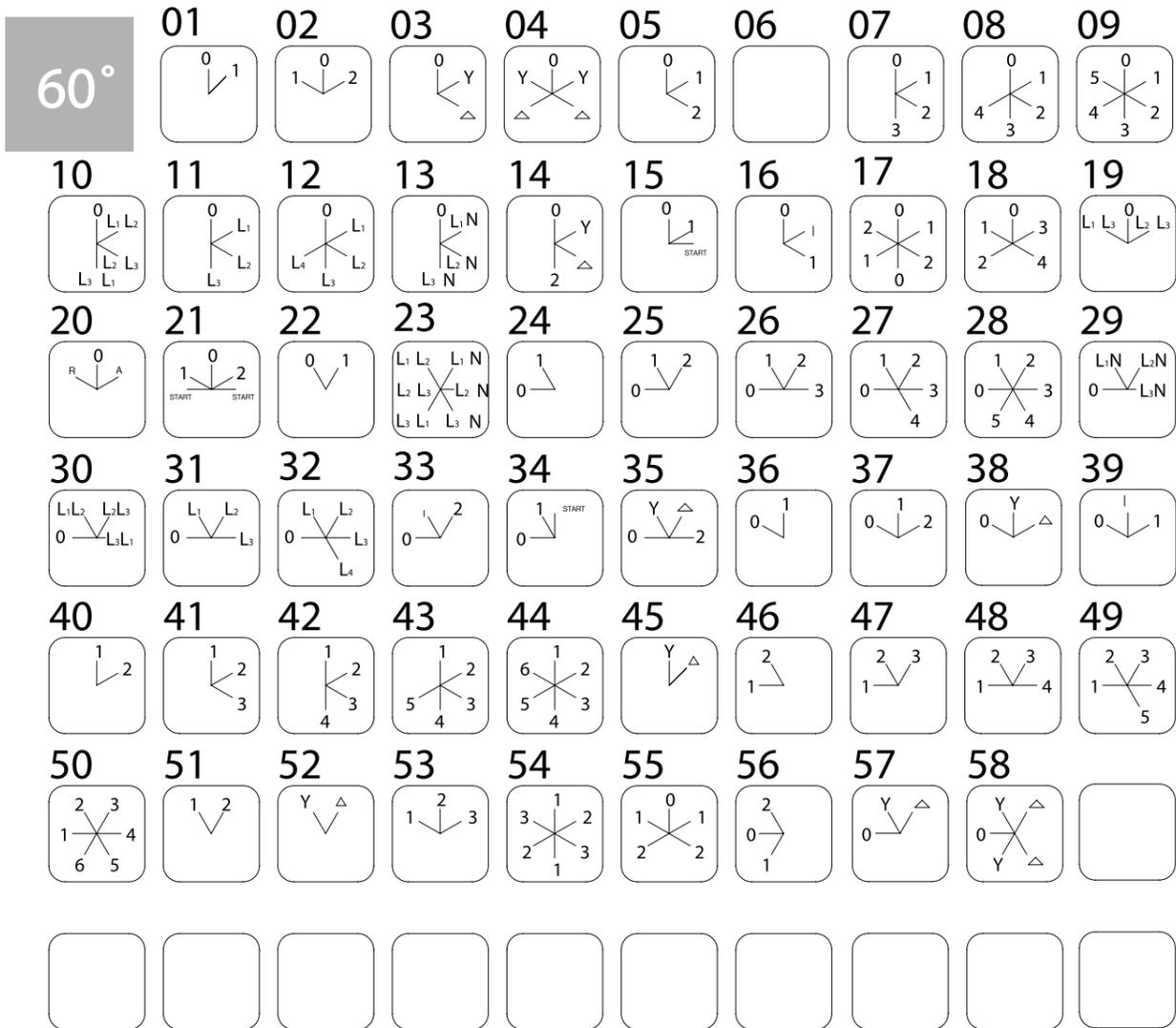
SWITCHES FOR THREE-PHASE ASYNCHRONOUS MOTORS



SWITCHES FOR THREE-PHASE ASYNCHRONOUS MOTORS



6b.6 TYPES OF FRONT PANELS





6b.7 ORDERING SHEET

SPÓŁDZIELNIA NIEWIDOMYCH PROMET
 ul. Lipowa 11
 41-200 Sosnowiec
 tel. 032/26-98-181; fax . 032/26-98-139
 e-mail: handel@sn-promet.com.pl

CAM SWITCH
 S10, 16, 25, 32, 63, 100, 160J

CURRENT	A
VOLTAGE	V
POWER	kW
UTILISATION CATEGORY	
NUMBER OF ITEMS	

ORDERING PARTY

Current (10, 16, 25, 32, 63, 100, 160)

60°

90°

30°

45°

TYP S J

TYPES OF DESIGN

V	Drive with automatic reset
LS	Installed on bus with front cover
LD	Installed on bus with front plate
O	Installed on the bottom
R	Installed in a hole, diam. 22 with a knob
K	Installed in a hole, diam. 22 with a key
B	Bottom installation, knob on the door
P	In a box
D	With a front panel
U	Knob locked with a paddock
Z	Knob blocked with a lock
G	Sealed / IP 65/

DIAGRAM NO.

Knob Colour
R = Red

No. of front

Position of knob Angle of rotation

A	↙	
B	↘	
C	↖	
D	↗	
M	↑	360°
V	↖	60°
	↗	4
	↘	90°
	↙	1
	↖	30°
	↗	8
	↘	45°

DESIGNATION OF CONTACTS	SWITCHING PROGRAMME	
	DESIGNATION ON PLATE	
1. 1 0 2		
2. 3 0 4		
3. 5 0 6		
4. 7 0 8		
5. 9 0 10		
6. 11 0 12		
7. 13 0 14		
8. 15 0 16		
9. 17 0 18		
10. 19 0 20		
11. 21 0 22		
12. 23 0 24		
13. 25 0 26		
14. 27 0 28		
15. 29 0 30		
16. 31 0 32		
17. 33 0 34		
18. 35 0 36		
19. 37 0 38		
20. 39 0 40		
21. 41 0 42		
22. 43 0 44		
23. 45 0 46		
24. 47 0 48		

Sample connections

Sample connections	1	0	2	
1. 2	X			Contact closed
3. 4	X			Impulse contact
5. 6	X	X		Continuous connection
7. 8	X	X		Switching over
9. 10	X		X	Uninterruptible
11. 12	X	X	X	Switching with interruption

6b.8 CONFIGURATOR

We have created the Cam Switch Configurator to help you choose the proper switching programme and a specific type of cam switch.

Visit the application at www.sn-promet.pl



• FIRE AND ALARM SYSTEM COMPONENTS

- “BREAK GLASS” TYPE BUTTONS
 - MANUAL FIRE ALARM CALL POINT
 - PD SMOKE VENT BUTTON
 - LOCK BUTTONS
- SPD OPTICAL SMOKE DETECTORS

7.a MANUAL FIRE ALARM CALL POINT



The Manual Fire Alarm Call Point is a type A call point with direct activation. In terms of its electric system, it can be categorised as a regular switch with passive electrical components that operate in an alarm condition circuit.

In the version with a signalling system, the breaking of a glass panel activates an LED, which signifies alarm condition. The connection unit contains two contacts: one NC (Y) and one NO (X), or two NC contacts (Y). The Y (NC) contact is open in the detection status, and closed in the alarm status. The X (NO) contact operates the other way round.

Types of manual fire alarm call points have been specified below. External conductors are connected to a 4-way/6-way threaded tube coupling.

The activating of the ROP-AM type manual fire alarm call point is done with a small hammer, which is an integral part of this fire alarm call point.

The activating of the ROP-AD type manual fire alarm call point is done with any hard object that is capable of breaking the glass.

• Testing of a MANUAL FIRE ALARM CALL POINT

- The alarm status can be simulated in the following way:
- Undo the two collar bolts with triangular heads, and remove the front panel.
 - Undo the two sheet-metal screws that fasten the glass panel, and then remove the glass panel.

This method enables the testing of a manual fire alarm call point, without breaking the glass panel. The ROP-A type manual fire alarm call point is additionally equipped with a special spanner for collar bolts.

7.b PD SMOKE VENT BUTTONS



The II PD type manual smoke vent button is intended for the controlling of smoke dampers, providing a simultaneous local 1- or 3-LED light signalling, depending on design.

In the case of a 1-LED signalling, activating the button makes the LED flash red, while pressing the button on a 3-LED signalling system makes the LEDs emit continuous light and indicate the following: detection (green), failure (yellow), and activation (red). The button is equipped with passive electronic components.

The button meets the requirements regarding products intended to ensure public safety or to protect health, life and property (Journal of Laws 2007, No. 143, item 1002; Journal of Laws 2010, No. 85, item 553), and is in accordance with Directive 93/68/EEC of 22nd June 1993.

7.c PB LOCK BUTTONS



The lock buttons with a glass panel are intended for industrial halls and public utility buildings. They can also be used outside, under a cover, so as to ensure they are protected from the direct impact of rain and snow.

Lock buttons have been designed in two versions, each for a specific purpose, i.e. flush-mounted and surface-mounted. In terms of the electric system, they can be categorised as regular switches with passive electrical components that operate in an alarm condition circuit.

NEW!

6-way lock buttons (3X3Y)

• Activating and cancelling

The activating of a "break glass" type button is done by breaking the glass panel. Cancelling is possible, when the damaged (broken) glass panel has been replaced with a new one.

Carry out the following to replace the glass panel:

- Undo the two collar bolts with triangular heads, and remove the front panel.
- Undo the two sheet-metal screws that fasten the glass panel.
- Remove glass residues and install a new glass panel.

• Method of installation

The rear side of the enclosure for a "break glass" type button contains two hole plugs (under screw shields), intended for 4.1 mm assembly openings. The two hole plugs must be forced open. When installed, cover the screws with shields.

• Spare parts

SN PROMET offers the following products:

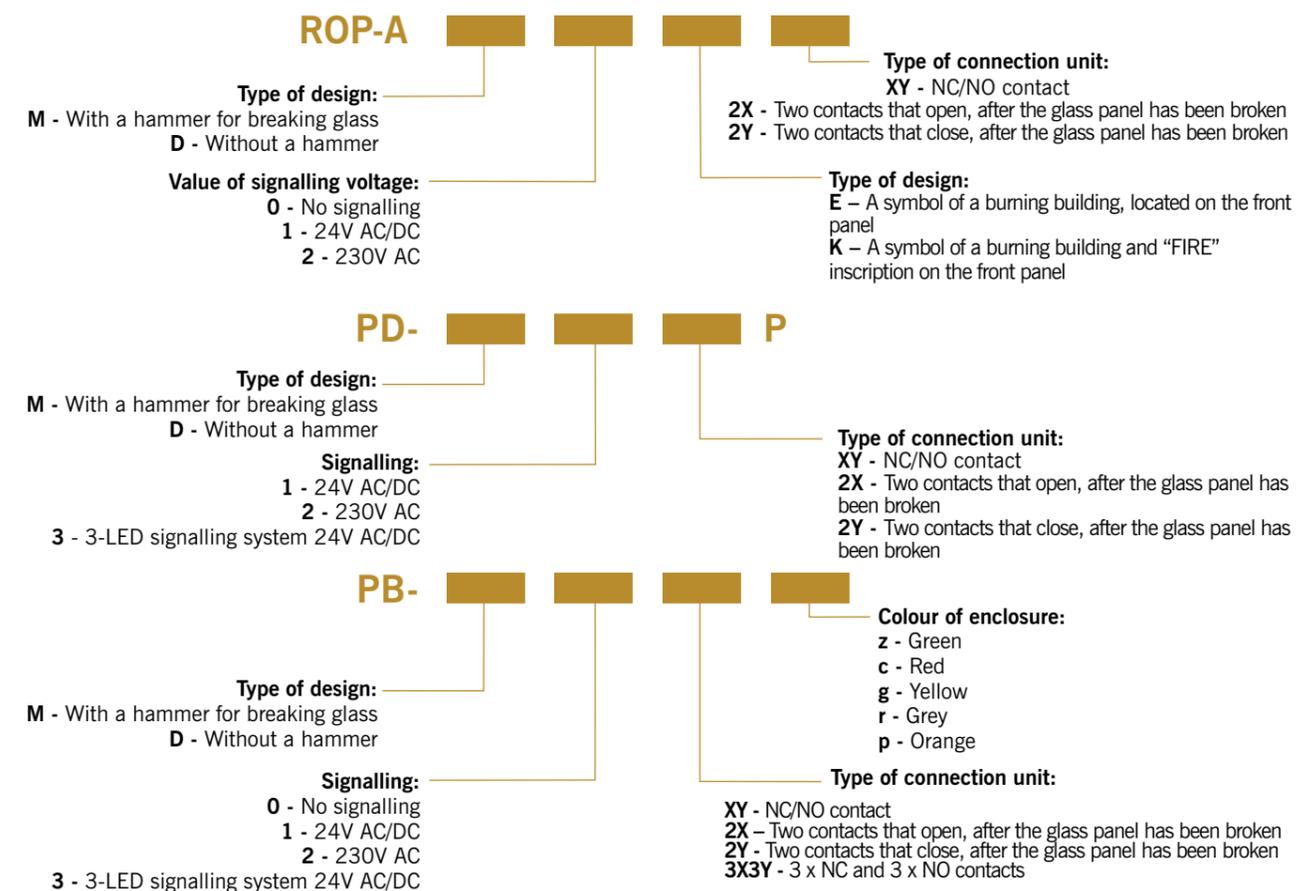
- A complete set of glass panels;
- A hammer;
- A spanner with a pin (for service purposes).

7.1 TECHNICAL DATA

	PB-M/D 0/1/2 3X3Y	
Insulation rated voltage (U _i)	500 V	250 V
Rated switching currents (I _e)	AC15 U _e 230V/400V DC13 U _e 24V/110V/220V	6A/4A 4A/1A/0.25A
Signalling rated voltage (U _s)	24V AC, DC 230V AC	
Maximum effective resistance of contacts	10 mΩ	
Cross-section of the connected external	0.28 ... 1.5 mm ²	
Conductors Protection class	IP 54	
Range of working temperatures	-30°C to +70°C	
Weight of ROP-A M	273.9 g	

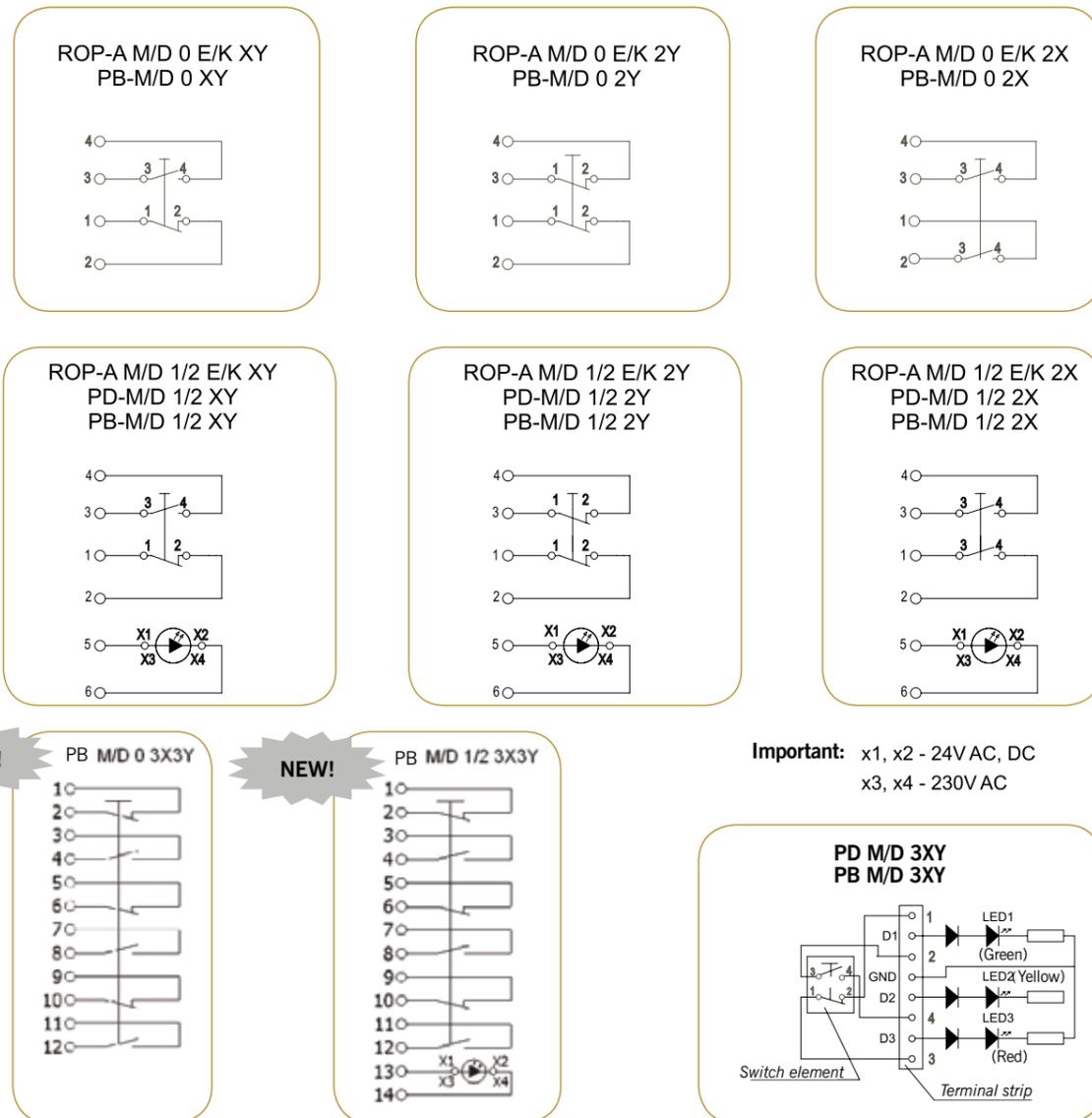
The product conforms to the following standards: ROP-A PN-EN 54-11; II PD is in accordance with Directive 98/68/EEC, while PB conforms to PN-EN 60947-5-1

7.2 TYPES OF "BREAK GLASS" BUTTONS

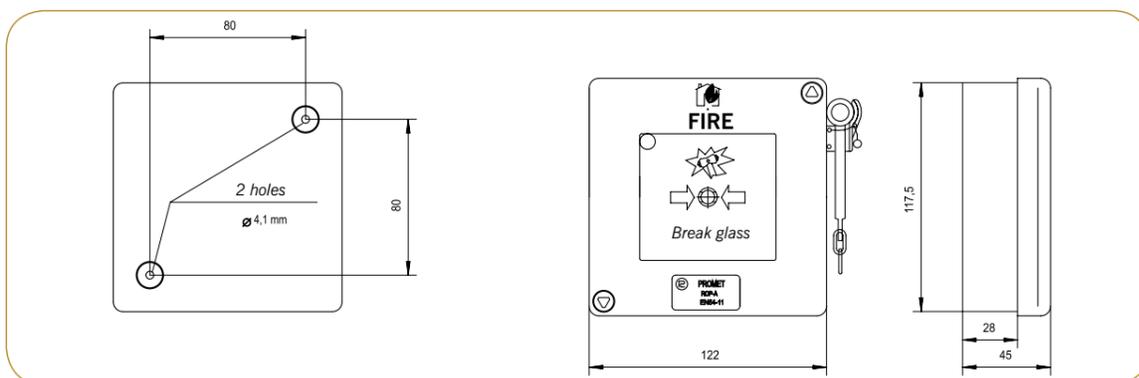




7.3 CIRCUIT DIAGRAMS



7.4 OVERALL DIMENSIONS



7.d SPD OPTICAL SMOKE DETECTORS

• Purpose

SPD type optical point smoke detectors are intended for detecting visible smoke that accompanies fire in closed rooms, in various types of buildings and structures, and transferring this signal to a cooperating fire alarm control panel. The detector has been designed for an uninterrupted 24-hour operation. The SPD-3.1M detector has been designed to work with fire alarm control panels or fire/bur-

glary control panels, using a two-conductor direct current detection circuit that operates under the rated supply voltage of 12/24V. The SPD-3.2 detector has been designed to work with fire alarm control panels or fire/burglary control panels, using a 4-conductor direct current detection circuit that operates under the rated supply voltage of 12V.

• Design and principle of operation

The detector operates according to the principle of controlling the optical density in the surrounding. The detector is comprised of a proper detector and a socket. The detector is connected to the socket with a 4-contact connector. The plastic enclosure for the connector contains an optical system and an electronic block that processes signals and controls status signals. When there is no smoke in the optical system's detection area, the detector connected to a fire alarm control panel will remain in the stand-by mode. This mode is indicated by red flashing of the optical signalling device.

When smoke is detected in the optical system's detection area, the electronic systems generates a "FIRE" signal, in the form of a sudden change of internal resistance, which is translated into an increase of current in the detection circuit. In the FIRE mode, the red optical signalling device emits continuous light. When power has been disconnected for at least 3s and then reconnected, detectors return to the stand-by mode (Reset). Place a protective cap on the detector's body, in order to protect the optical system of the detector against dirt, during transport and assembly work. When installing or removing detectors, follow the rules related to working at heights.

• Arrangement and assembly

When arranging detectors, select locations that ensure the following:

- Minimum vibrations of building structures;
- Minimum lighting;
- Maximum distance to sources of electromagnetic interferences (wiring system, etc.), infrared radiations (thermal devices);
- No possibility of water falling on the detector's body or leaking from the rosette's side;
- No gases, vapours, or aerosols that can cause corrosion.

Detectors are connected to the detection circuit, using sockets. The sockets are mounted in the same locations where detectors were installed, using two ø6x25mm wall bolts and two ø3x30mm self-tapping screws. The distance between centres of holes should be 70±0.2 mm.

7d.1 TYPES OF DETECTORS



SPD-3.1M It is a standard detector, used in detection circuits that operate under the rated voltage of 12V or 24V.

SPD-3.2 It is a detector with a relay output and an NC contact.

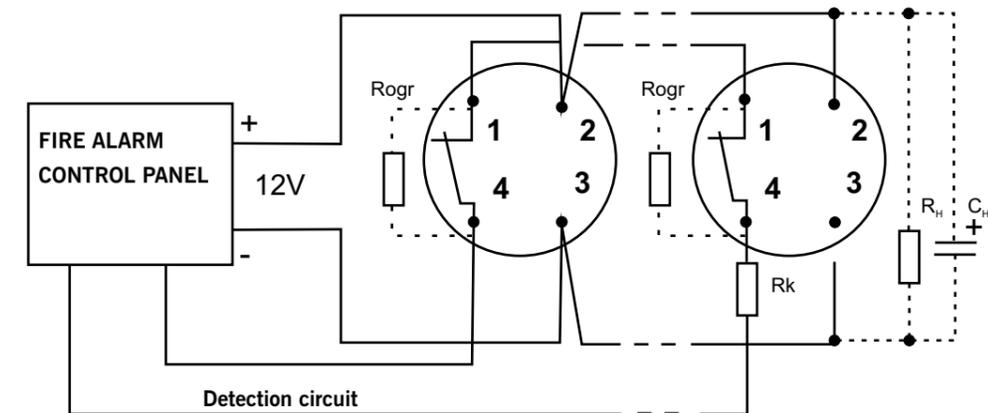
Features of SPD detectors:

- Operates using dispersed light;
- Conventional (non-addressable);
- Disengageable;
- Intended for operation in conventional detection circuits of fire alarm control panels (they can also operate as part of the so-called side lines of digital control panels);
- The detector has an EC Certificate of Conformity No. 1438/CPD/0077, issued by CNBOP (Scientific and Research Centre for Fire Protection) in Jozefow, which confirms that the detector meets the requirements of the PN-EN 54-7 standard.

7d.2 TECHNICAL DATA

Sensitivity	0.05-0.2 dB/m
Inertia	10 s ≤
Range of supply voltage	10-30 V
Method of forming an output signal	Contactless
Method of connecting a fire alarm control panel	conductor signalling line
Detection current	0.095 mA
Alarm current	6-30 mA
Internal resistance in the alarm condition (under current input of 20mA)	500 Ω
Overall dimensions	Ø100x48 mm
Weight	0.15 kg
Range of working temperatures	-30 to +55 C°
Average lifetime approx.	10 years

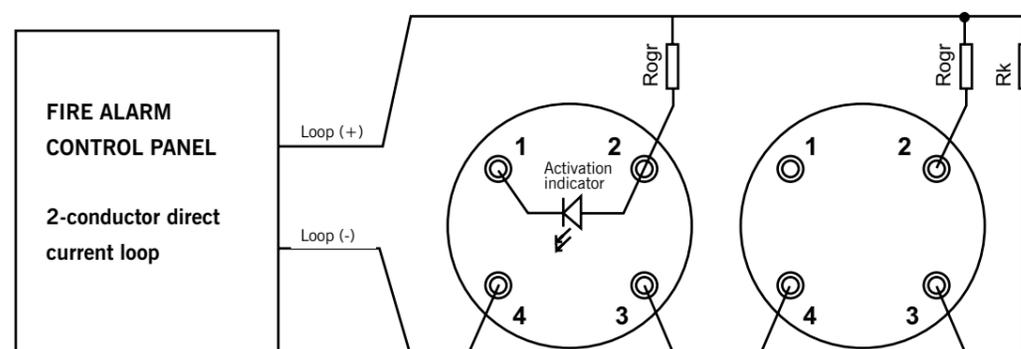
A circuit diagram for SPD-3.2 detectors installed in a fire alarm control panel:



The values of Rogr and Rk resistors must be selected according to the requirements specified in the documentation for the fire alarm control panel. It is recommended to install an RH=3kOhm resistor and a CH=22mkFh16V condenser in order to increase resistance to interference.

7d.3 CIRCUIT DIAGRAMS

A circuit diagram for SPD-3.1M detectors installed in a fire alarm control panel, including a direct current signalling loop.



The values of Rogr and Rk resistors must be selected according to the requirements specified in the documentation for the fire alarm control panel. Recommended values for resistors:
 Loops working under the voltage of 24V: Rk=2.4-3.9kOm, Rogr=1.5-3kOm;
 Loops working under the voltage of 12V: Rk=1.2-2kOm, Rogr=0.68-1.5kOm.



 **QUICK GUIDE**

8a IP PROTECTION CLASSES

According to PN-EN 60529, an IP code is a system of symbols that indicate the class of protection provided by enclosures against access to hazardous parts, penetration of solid foreign bodies, ingress of water, as well as a system that provides additional information regarding such protection.

• THE FIRST SYMBOL (IPX0): PROTECTION AGAINST SOLID BODIES:

	Protection of equipment Against penetration of solid bodies	Protection of people Against access to hazardous parts
0	 No protection	No protection
1	 Diameter > 50 mm	With the back of the hand
2	 Diameter > 12.5 mm	With a finger
3	 Diameter > 2.5 mm	With a tool
4	 Diameter > 1 mm	With a wire
5	 Limited protection against dust	With a wire
6	 Dustproof protection	With a wire

• THE SECOND SYMBOL (IPXX): PROTECTION AGAINST INGRESS OF WATER:

	Protection of equipment Against ingress of water
0	 No protection
1	 Dripping in the vertical direction
2	 Dripping (the enclosure is deflected up to 150 to each side)
3	 Sprayed
4	 Splashed
5	 Poured as a stream
6	 Poured as a strong stream
7	 When immersed for a short time
8	 When immersed permanently
9	 Poured as a stream under pressure [80-100(bar)], according to DIN 40050

8b PROTECTION CLASS

Protection class is one of the four classes used to divide electrical appliances into categories, depending on the type of electric shock protection applied in a particular device. There are the following protection classes: 0, I, II, and III.

Class 0 appliances only provide protection against direct touch. They feature only basic insulation against electric shock and they do not have a terminal for protective earth. Such appliances can only be used if there is absolutely no risk that any person will have a simultaneous contact with the appliance and earth potential, or when such contact is sporadic.

Class I appliances provide protection against direct touch, by using protective terminals connected to PE or PEN conductors, or to earthing.

That way, it was possible to achieve the following:

- Quick activation of appropriate protections and power shut-down;
- Reduce contact voltage to the levels regarded as safe, in given environmental conditions.

A Class II appliance provides basic protection and additional protection, by using double or reinforced insulation – it is technically unlikely to damage such insulation under normal conditions of use. Such appliances do not require protective terminals or conductors.

Class III appliances provide protection against electric shock, because they operate under safe low voltages (SELV – Safety Extra-Low Voltage or PELV – Protection Extra-Low Voltage) that do not exceed 50V (AC) or 120V (DC).

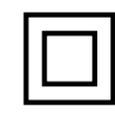
• SYMBOLS FOR PROTECTION CLASSES

- Class 0: No symbol

- Class I:



- Class II:



- Class III:



8c UTILISATION CATEGORIES

Utilization category is a set of specific requirements regarding conditions that must be met by a switch to perform its functions. Such requirements are considered representative, in the context of practical purposes. Specific requirements may for example refer to the values of making currents (if

present), breaking currents, and other characteristic quantities, as well as circuits corresponding to such quantities, and conditions of use and behaviour.

Type of current	Utilisation category	Typical application	Appropriate product standard
Alternating current	AC-1	Connecting non-inductive loads or loads of small inductance, resistance furnaces	PN-EN 60947-4-1
	AC-3	Connecting of squirrel-cage motors: start-up, shutting down running motors	
	AC-15	Controlling of electromagnets (> 72VA)	PN-EN 60947-5-1
	AC-21	Connecting resistance loads, including moderate overloads	PN-EN 60947-3
	AC-23	Connecting engine loads or other loads of great inductance	
Direct current	DC-13	Controlling of electromagnets	PN-EN 60947-5-1
	DC-21	Connecting resistance loads, including moderate overloads	PN-EN 60947-3
	DC-22	Connecting mixed resistance and reactive loads, connecting with moderate overloads (e.g. shunt motors)	



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