

**Spring-return joystick switches,
Maintained joystick switches,
Maintained/spring-return joystick switches**
Catalogue K/05



SCHMERSAL



Caution!

The devices in this delivery range are not intended for the private consumer, i.e. they are not consumer products in the sense of the European Directives (in Germany in the Sense of § 5 GPSG, the Equipment and Product Safety Act) or other national statutory regulations.

The assembly and commissioning of the devices require personnel who have appropriate knowledge of basic electronics or have been instructed accordingly.

Technical modifications and errors reserved. The data quoted in this list are carefully checked typical series values.

Or as the old Greeks knew already:

By no means did the gods reveal all things to mortals from the beginning, but in time, by searching, we discover better.

Xenophanes
(Greek philosopher, born 580/577 B.C.)

Descriptions of the control contexts, details on external controls, installation and operating information or suchlike are given to the best of our knowledge. This does not mean however that any assured properties or other claims under liability law that extend beyond the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry" may be derived.

The user is not absolved of his obligation to examine our information and recommendations before using them for his own purposes. We trust you understand and will heed this information.

Spring-return joystick switches, Maintained joystick switches, Maintained/spring-return joystick switches

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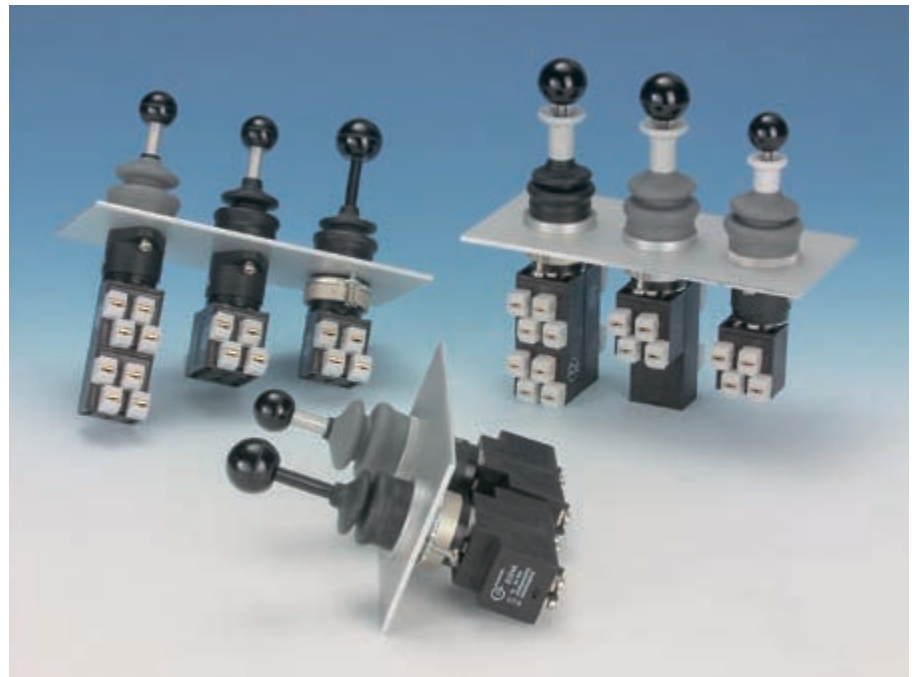
Product overview						
Type	Directions of actuation	Switching contacts for each direction of actuation	Device installation diameter 22.3 mm without blocking ring see page	Device installation diameter 22.3 mm with blocking ring see page	Device installation diameter 30.5 mm without blocking ring see page	Device installation diameter 30.5 mm with blocking ring see page
Spring-return joystick switches	2	1	10	22	38	50
		2	12 + 14	24 + 26	40 + 42	52 + 54
		4	16	28	44	56
	3 and/or 4	1	14	26	42	54
	4	2	16	28	44	56
Maintained joystick switches	2	1	10	22	38	50
		2	12 + 14	24 + 26	40 + 42	52 + 54
		4	16	28	44	56
	3 and/or 4	1	14	26	42	54
	4	2	16	28	44	56
Maintained/spring-return joystick switches	2	1	20	32	48	60
	4	1	21	33	49	61
Spring-return joystick switches with analog output	1		34	36	62	64
	2		34	36	62	64

Spring-return joystick switches, Maintained joystick switches, Maintained/spring-return joystick switches

Spring-return joystick switches, maintained joystick switches and maintained/spring-return joystick switches belong to the group of special device designs in the Elan product range of control and indicator devices (see also "Control Devices and Indicator Lights for Heavy-Duty-Applications" page 71 and following pages).

Spring-return joystick switches, maintained joystick switches and maintained/spring-return joystick switches – optionally for 22.3 mm or 30.5 mm installation diameters – consist of an actuating head with actuating lever movable in up to 4 directions, and the appertaining contact elements.

The movement of an actuating lever is transmitted in the actuating head through special switching curves to a linear movement and passed on through plungers in the contact elements (at the bottom of the devices) and processed there to digital or analog switching outputs.



Front protection class

Actuating head and contact elements are supplied as a complete device. The actuating heads' protection class corresponds to IP 65 and IP 67 in accordance with EN 60 529.

Protection class IP 69K

Some device designs (= designs with thick-wall silicone bellows, see loc. cit.) also meet the protection class requirements IP 69K in accordance with DIN 40 050 Part 9 (1983).

Types of devices

While in **spring-return joystick switches** the actuating lever is automatically reset by spring force into the basic position after a switching movement, in **maintained joystick switches** the actuating lever locks into the actuated position. It is reset into the basic position by spring force too but only when the actuating lever is touched lightly.

Maintained/spring-return joystick switches – a special feature in the Elan delivery range – form a combination of momentary and latching action, i.e. in one direction of movement the devices correspond to spring-return joystick switches and in the other direction of movement to maintained joystick switches.

As regards the mode of operation, the spring-return joystick switches, maintained joystick switches and maintained/spring-return joystick switches are not devices with joystick action.

Protection against unintentional actuation

As a protection against unintentional actuation from the basic position, all devices are available with additional mechanical blocking. The block's retention force is approx. 100 N in devices for installation diameter 22.3 mm and approx. 200 N in devices for installation diameter 30.5 mm.



Protection class test IP 69K: in addition to the test for dust proofness, the test for IP 69K (originally intended as the protection class test for road vehicle construction) specially simulates the resistance to high-pressure cleaning of devices by splashing the tested devices at approx. 5 revolutions per minute under high pressure (approx. 100 bar) with an 80 °C -hot jet of water without causing any damage.



Application

Compared to goods on offer in general, Elan devices are distinguished by their optimised sturdiness, construction size and functionality for applications in the construction of machinery and commercial vehicles.



Typical applications include machinery in the food industry or process engineering but also tail lifts in commercial vehicles, lifting work platforms, airport tugs and apron vehicles.

In contrast to the smaller devices, these devices are particularly suitable for rough industrial applications including outdoor use. Compared to multifunctional devices, familiar for example in crane controls and forklift trucks, they are of a much smaller construction – with limited functionality.



Information on applications:

As the constructions for 30.5 mm installation diameter allow more generously sized designs in the components used, these devices are recommended in particular for applications that have to satisfy the highest reliability requirements on account of their functional and environmental stresses.



Sealing bellows

Bellow material	NBR standard (1) (WKT-19)	NBR standard (2) (WKT-19.4)	Silicone standard (WKT-19.3)	Silicone thick-walled (WKT-26)
Material thickness	approx. 1 mm	approx. 1 mm	approx. 1 mm	approx. 2 mm
Material properties	rupture proof	rupture proof	rupture proof*	rupture proof
Protection class (front)	IP 65/IP 67	IP 65/IP 67	IP 65/IP 67	IP 67/IP 69K
Ambient temperature	-25 ... +80 °C	-25 ... +80 °C	-40 ... +80 °C	-40 ... +80 °C
Mechanical service life	1 x 10 ⁶	0,5 x 10 ⁶	0,3 x 10 ⁶	0,5 x 10 ⁶
UV/ozone resistance	–	+	++	++
“Outdoor” suitability	–	+	++	++
Comments	* to a certain degree			⚠ Only suitable for spring-return joystick switches without mechanical lock

– = not suitable; + = suitable; ++ = very good

„Outdoor“ applications

In devices with cryogenic fitness (–40 °C) that are preferably suitable for „outdoor“ applications special grease is put on the device plungers (both in the actuating heads as well as in the contact elements).

This additional measure prevents condensation water freezing (with the resulting risk of blocked actuating plungers) if the devices are exposed during use to temperature changes around the freezing point.

Resistance of the sealing bellows

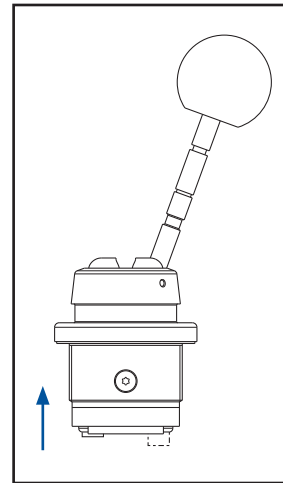
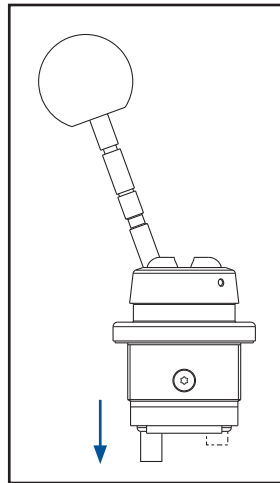
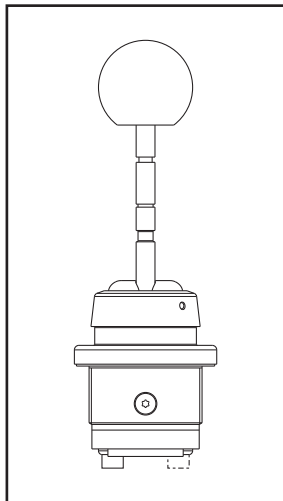
NBR	
Weather, fuel, oil, solvent	good to a certain degree
Acids	satisfactory
Silicone	
Weather, ozone	excellent
Food	physiologically safe
Solvent, chemicals	good to satisfactory

Mode of operation

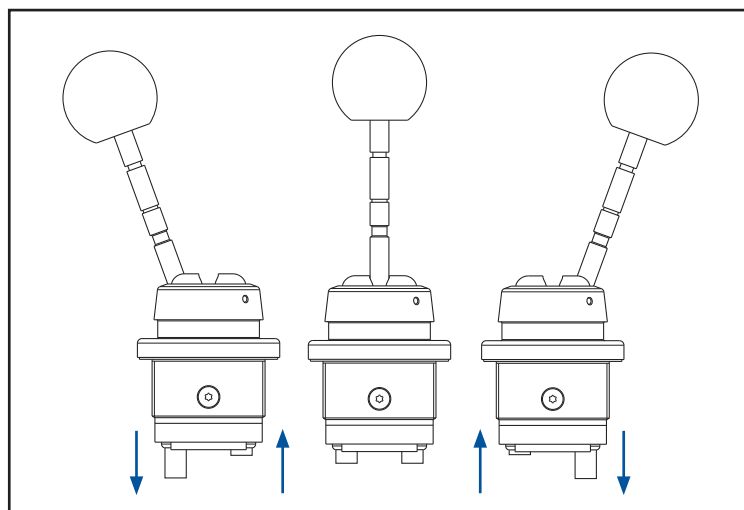
The spring-return joystick switches, maintained joystick switches and maintained/spring-return joystick switches generate digital switching signals on the basis of electromechanical principles of action in the end position for each direction of actuation, designed optionally as NC and/or NO contacts depending on the selected contact elements. A contact element consists here of two galvanically isolated switching contacts in each case.

Devices with analog outputs: see loc. cit.

To generate switching signals one or two plungers in the device heads act on the electromechanical contact elements. The interaction is designed in such a way that the contact bridges in the contact element in the basic position (the devices' position when not actuated) are under initial tension by spring force.

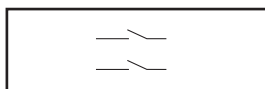


- ▼ If the actuating lever is now moved in the direction of the end position, one of the actuating head plungers moves further forward by means of the actuating force against the force of the contact element's resetting spring, i.e. a positive formfitted forward movement arises that closes or opens the switching contacts – in each case depending on the contact elements.
- ▼ If on the other hand the actuating lever moves in the direction of the other end position, this actuating head-plunger retracts, resulting in a negative force-fitted lifting movement, which closes or opens the other of the two switching contacts – depending on the contact elements.
- In 2-plunger device head designs the plungers' movements are inverted, i.e. one plunger moves further out (and performs a formfitted positive movement) while the other plunger retracts (and performs a forcefitted negative movement).
- Each of the plungers can act optionally either on one contact element or on two (arranged one under the other). This means that depending on the fitted contact elements up to 4 switching signals are possible for each direction of movement.

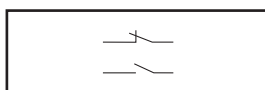


In the product range there are three types of contact elements available, which – with due consideration to the contact bridge initial tension (see page 4) – generate the following switching signals in each case:

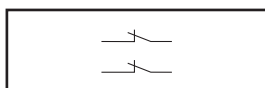
- 2 NO contacts,



- 1 NC/1 NO contact,



- 2 NC contacts.



Safety note

Switching contacts, which are opened by the described positive formfitted forward movement, correspond in their safety quality to positively opening contacts in conformance to IEC EN 60947-1-1 or control category 1 under EN 954-1. All other switching signals correspond to control category B in accordance with EN 954-1 and may only be used for operational control signals. Additional measures in the sense of EN 60204-1 number 9.4 (control functions in case of a fault) might be necessary.



Product overview

Type	Directions of actuation	Switching contacts for each direction of actuation	Device installation diameter 22.3 mm without blocking ring see page	Device installation diameter 22.3 mm with blocking ring see page	Device installation diameter 30.5 mm without blocking ring see page	Device installation diameter 30.5 mm with blocking ring see page
Spring-return joystick switches	2	1	10	22	38	50
		2	12 + 14	24 + 26	40 + 42	52 + 54
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Maintained/spring-return joystick switches	2	1	20	32	48	60
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Spring-return joystick switches with analog output	1		34	36	62	64
	2		34	36	62	64

Devices for 22.3 mm and 30.5 mm installation diameters

With reference to IEC 60947-1 and IEC 60947-5-1 the devices are offered with the option of 22.3 mm or 30.5 mm installation diameter (with a mounting grid to other control and indicator devices of 40 x 55-mm and – from spring-return joystick switches/maintained joystick switches to spring-return joystick switches/maintained joystick switches – of 80 x 80 mm

In all devices the maximum switching angle is approx. 20°.

The permissible front plate thickness in devices for installation diameter 22.3 mm is in the range of 1.5 ... 6 mm and in devices for installation diameter 30.5 mm in a range of 1.5 ... 10 mm.

See also: Assembly information (page 9).



Protection against unintentional actuation

All devices have an additional mechanical lock as protection against unintentional actuation when in basic position. The lock's retention force is approx. 100 N in devices for installation diameter 22.3 mm and approx. 200 N in devices for installation diameter 30.5 mm.

Hereinafter the delivery designs with and without lock for protection against unintentional actuation will be referred to in brief as delivery designs/devices with/without blocking ring.



Caution: Lever actuation is not possible until a blocking ring – arranged and ergonomically formed over the actuating lever – is moved manually (with two fingers of the actuating hand) > 5 mm upwards. The ring is reset in the blocking position by spring force.

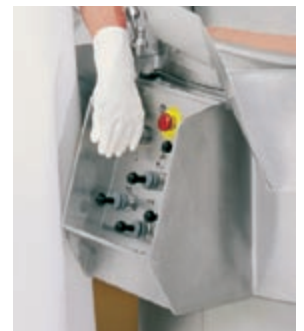
Materials used

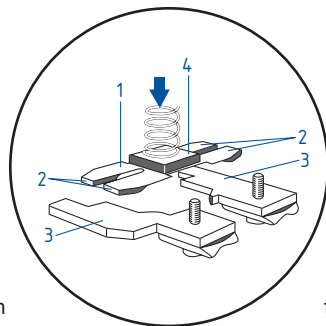
The requirement for a robust design of the actuating heads is also met by the use of the following materials:

- Bezels: aluminium pivoted parts, anodised;
- Device ring, switching curves, inside device mechanism: glass fibre reinforced and non-reinforced industrial plastics (PA, POM), stainless steel;
- Actuating lever: stainless steel (aluminium ring depending on the device design);
- Actuator balls: Duroplast;
- Sealing bellows: See page 3

For special applications there are alternative device designs with V2A bezels and anodised aluminium device rings available (only for devices for installation diameter 30.5 mm, see product tables).

The switching contacts – designed as momentary contacts – are designed in a housing of flame-retardant, self-extinguishing and glass fibre reinforced polyamide with protection class IP 20 (without terminals, see also “Connection technology/contact protection”).





Contact system

The special design feature of the contact system is the mode of operation on the basis of what is referred to as the Elan four-way contacts, i.e. the contacts are double interlocking (1) and designed with 4 contact making points (2) each, which are parallel (as twin contacts) and also cross operating (as H bridge).

The resulting contacting factor of 4 – in conjunction with a high specific contact pressure – assures the highest reliability in perfect contact making.

Micro movements in the spring contact bridge on the stationary contact making points that have the effect of self-cleaning also assure the long-term functioning of this property, which is particularly important in electronic control circuits.

The contacts' lower switching capacity is 24 VDC/5 mA and the upper switching capacity in AC-15-operation is 230 V/6 A.

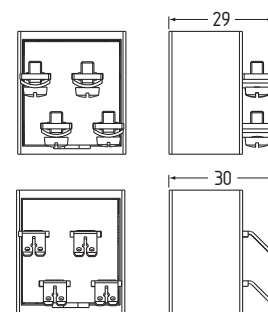
The fixed contacts (3) are made of silver-plated brass material and the contact bridge of band welded spring bronze. The contact points consist of fine silver and are accordingly particularly suitable for switching smaller currents. As protection against corrosion all contact parts are gold-flashed also.

The switching contacts are galvanically isolated from each other (4), i.e. the contact elements can also be used in circuits with different voltage potential.

Positively opening contacts: See safety information (page 5).

Connection technology/ Protection against accidental contact

The devices are optionally supplied with open self-lifting screw terminals M 3.5 (with contact protection) or flat-pin plug connections 1 x 6.3 x 0.8 mm (or 2 x 2.8 x 0.8 mm) (without contact protection).



Caution:

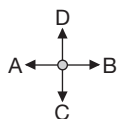
- If operating the devices with shock-hazard voltage (see EN DIN 50274 or VDE 0660 Part 514), additional measures are essential for protection against accidental contact. For this purpose slip-on (natural-coloured) shock-hazard protection caps are included in the scope of supply for the screw terminals.
- in the case of flat-pin plugs, you must either use commercially available insulated flat-pin plugs or take other protective measures.
- When fitted, actuating heads and contact elements are insulated from the front plate.
- Additional grounding is necessary for devices with metal housing (option as part of the delivery range for 30.5 mm installation diameter).

Terminal markings

The devices are provided with stickers – on the side on the contact elements – that indicate the function of the switching contacts in the basic position (in the non actuated position of the device lever).

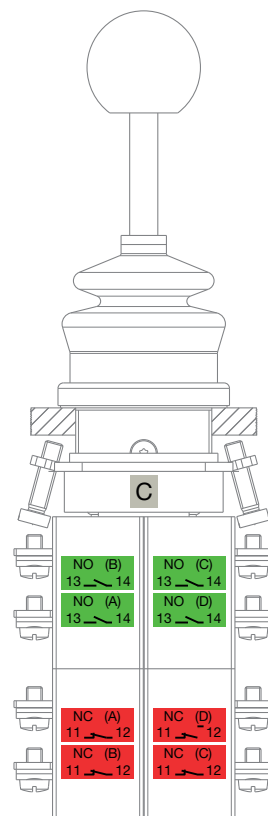
NO contacts (contact marking 13/14) are in this case "green" and NC contacts (contact marking 11/12) have "red" shading. The upper contact marking refers to the upper switching contact and the lower contact marking to the lower switching contact for each contact element.

To determine which switching contacts act in the respective direction of actuation, the switching direction is marked A, B, C and D on the device ring with reference to the following diagram.



Corresponding to this the switching direction marking A, B, C and D is found on the stickers and it is mandatory to place these at the letter C on the device ring as the proper assembly position.

For production technology reasons the contact sequence marking on multi-way devices in accordance with IEC 60947-1 (13/14, 23/24 and following pages, 11/12, 21/22 and following pages) is not possible or only possible on request.



Spring-return joystick switches with analog outputs

Circuitry version

Spring-return joystick switches with analog switching elements generate an output signal of 0.7 VDC (at approx. 3° switching angle) to 10 VDC at approx. 17° switching angle, depending on the actuating levers' switching angle (lifting).

At approx. 1.1 VDC (= approx. 5° switching angle) a digital switching signal that is 0.4 V under the respective operating voltage is provided in addition and this can be used for example to activate lower ranking consumers.

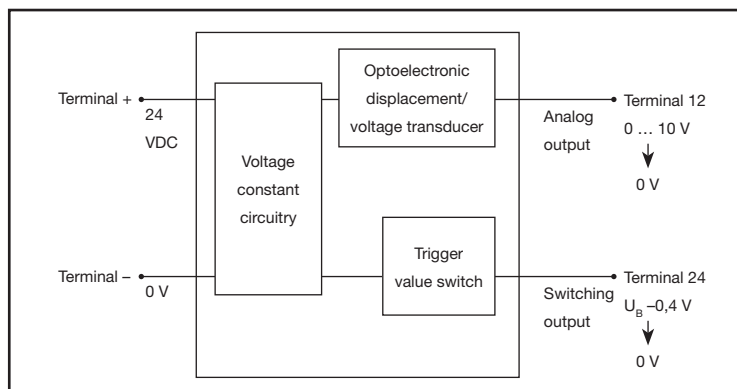
With respect to the „Mode of operation“ description (see page 4) only the 2-plunger device head designs are used exclusively for the spring-return joystick switches with analog outputs. In this case the positive lifting movement is used to generate the analog signal.

The delivery range of this version of device is limited to two switching directions either with two analog outputs or to one analog output and one switching signal (other versions on request).

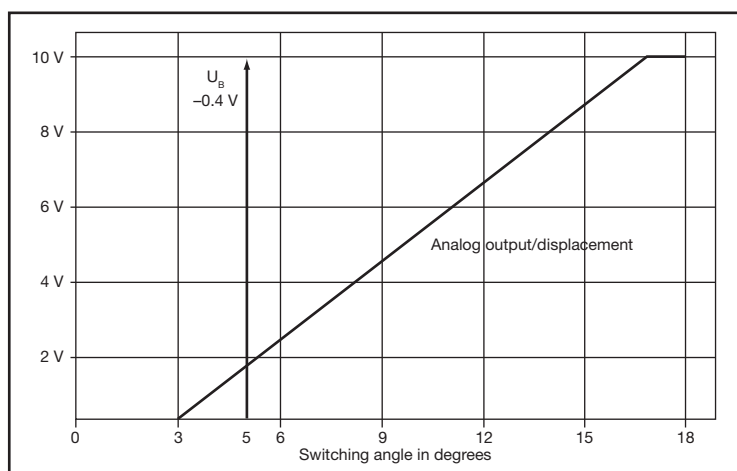


Electrical performance

The analog element's circuitry is in a housing – also made of glass fibre reinforced polyamide with protection class IP 40 (terminals have protection class IP 00). The analog output is generated on an optoelectronic basis. The switching signal is generated from the analog output through a trigger value switching. The connections are provided by 4 screw terminals located at the bottom.



Block diagram
joystick with
analog output



Voltage diagram

Assembly information

For design reasons there is a difference between the assembly of devices for 22.3 mm with and without blocking ring and for 30.5 mm.

Devices for installation diameter 22.3 mm (without blocking ring) are supplied pre-assembled in the form of what is known as a basic device (1) – consisting of the contact element(s) and the actuating head mechanism in one part – and the spring return joystick handle (2) – consisting of the device knob with sealing bellows, actuator ball and knurled nut including sealing.

The basic device (1) is inserted from the rear of the front plate into the installation diameter and tightened securely by means of the knurled nut (3) on the front of the assembly (2). Both the knurled nut and also the ball (4) must be unscrewed at the same time.

First, the fixing screws on the basic device (5) must be twisted back until flush so that the maximum front plate thickness of 6 mm is available. The fixing screws serve in this case exclusively as an anti-twist lock and must therefore be tightened evenly (lightly) after assembling the device.

The assembly is somewhat different for devices for installation diameter 22.3 mm with blocking ring (including actuator ball):

Here the scope of supply consists of – in addition to the basic device (1) – the knurled nut (2) and the sealing bellows (3) as individual parts.

The basic device (1) is inserted from the rear of the front plate into the installation diameter and tightened in front with the knurled nut (2).

First, the fixing screws (4) on the basic device are twisted back until flush so that there is a maximum front plate thickness of 6 mm. The fixing screws serve in this case exclusively as an anti-twist lock and are therefore tightened evenly (lightly) after assembling the device.

After these assembly steps the sealing bellows (3), which has talcum powder inside, is pulled by means of the ball handle into the grooves provided for it in the control lever and tightened in the knurled nut.

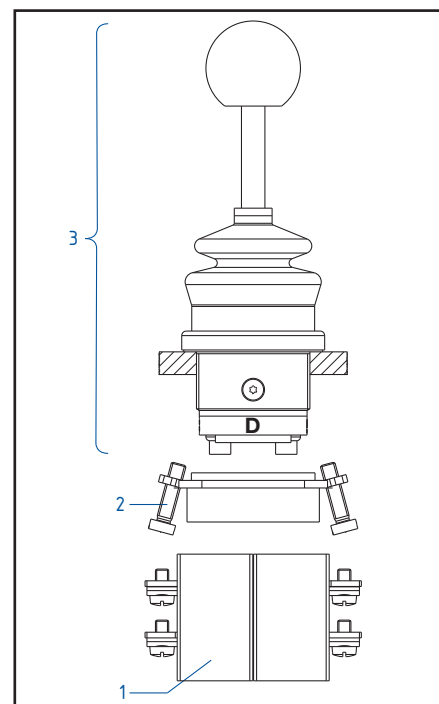
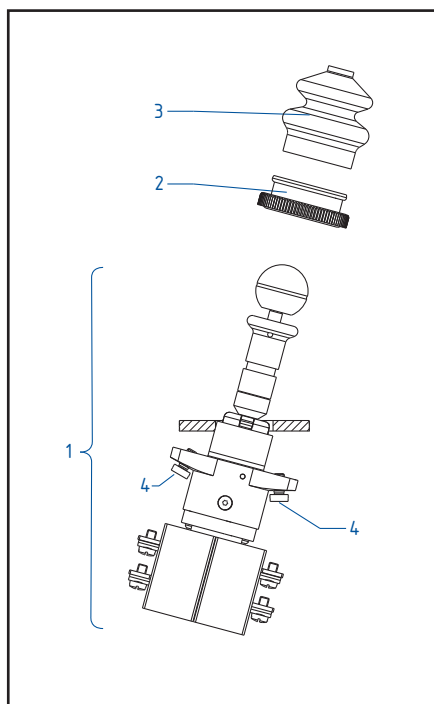
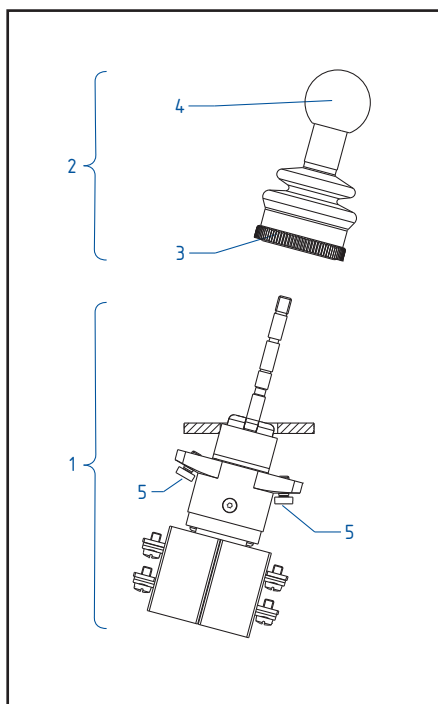
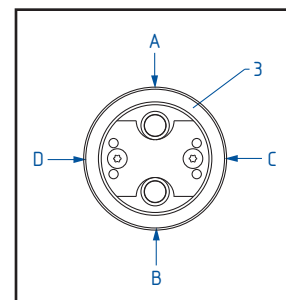
Devices for installation diameter 30.5 mm are supplied complete in an assembly but the contact elements (1) and the assembly flange (2) must be dismantled before assembly.

The actuating head (3) is then fastened to the assembly flange (2) – as with commercially available control devices – (on request: with an M30 nut).

The loosened contact elements (1) are then screwed on again. Make sure the assembly position of the contact elements is correct (i.e. it is mandatory to match the switching direction marking A, B, C and D on the stickers to the letter C on the device ring, see page 7).

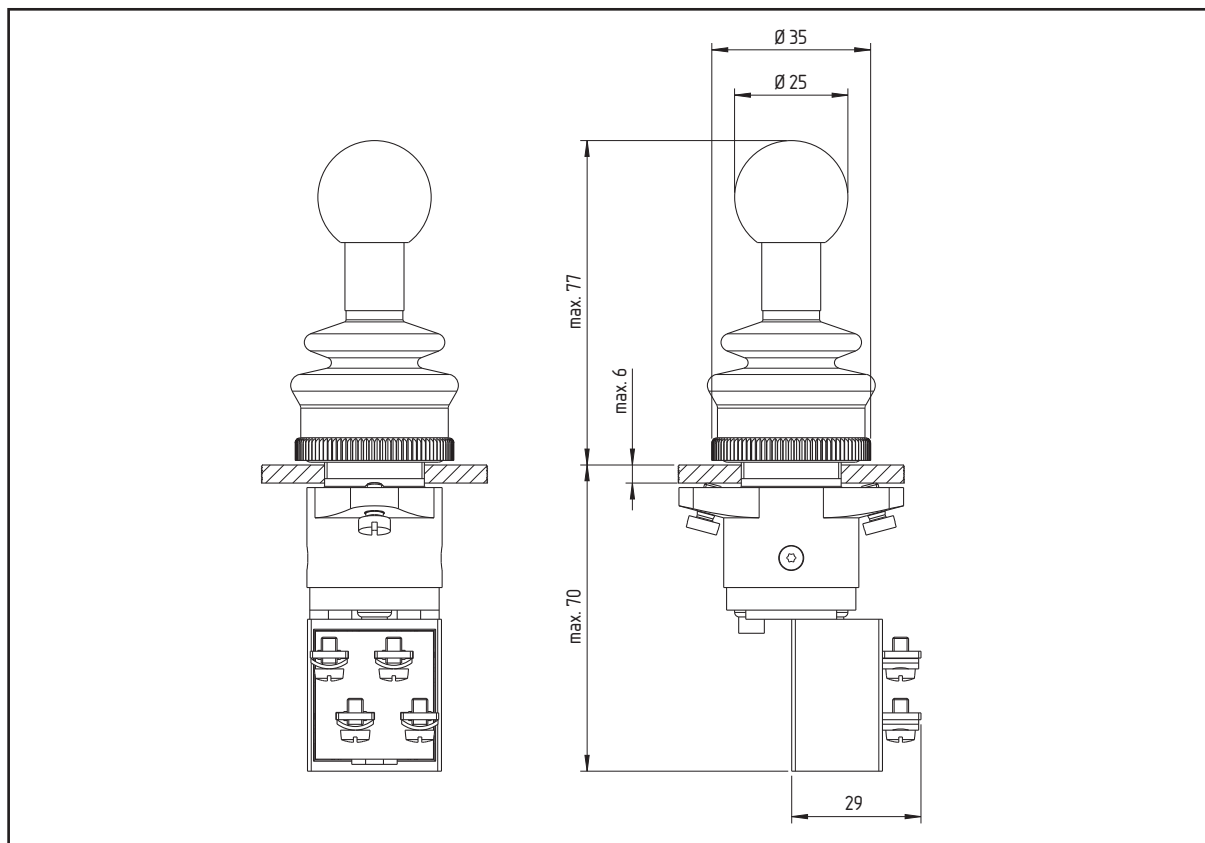


Caution: Damaged sealing bellows can impair the device's correct functioning and must therefore be replaced as quickly as possible (see page 66, spare parts).



Spring-return joystick switches, Maintained joystick switches*

- For installation diameter 22.3 mm
- Design without blocking ring to protect against unintentional actuation
- 2 directions of actuation/1 switching signal each



Not illustrated: designs with flat-pin plug connections (see page 7, installed width 29 + 1 mm)

Cross references:

- Functional description:
see pages 2 and 4 and following pages
- Sealing bellows:
see page 3
- Technical data:
see page 68
- Terminal markings:
see page 7
- Assembly information:
see page 9
- Spare parts: see page 66

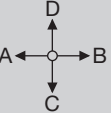
Additional information:

- Thick-walled silicone bellows: protection class IP 69K

Options (on request):

- Other actuator (instead of the ball)
- Shorter actuating levers

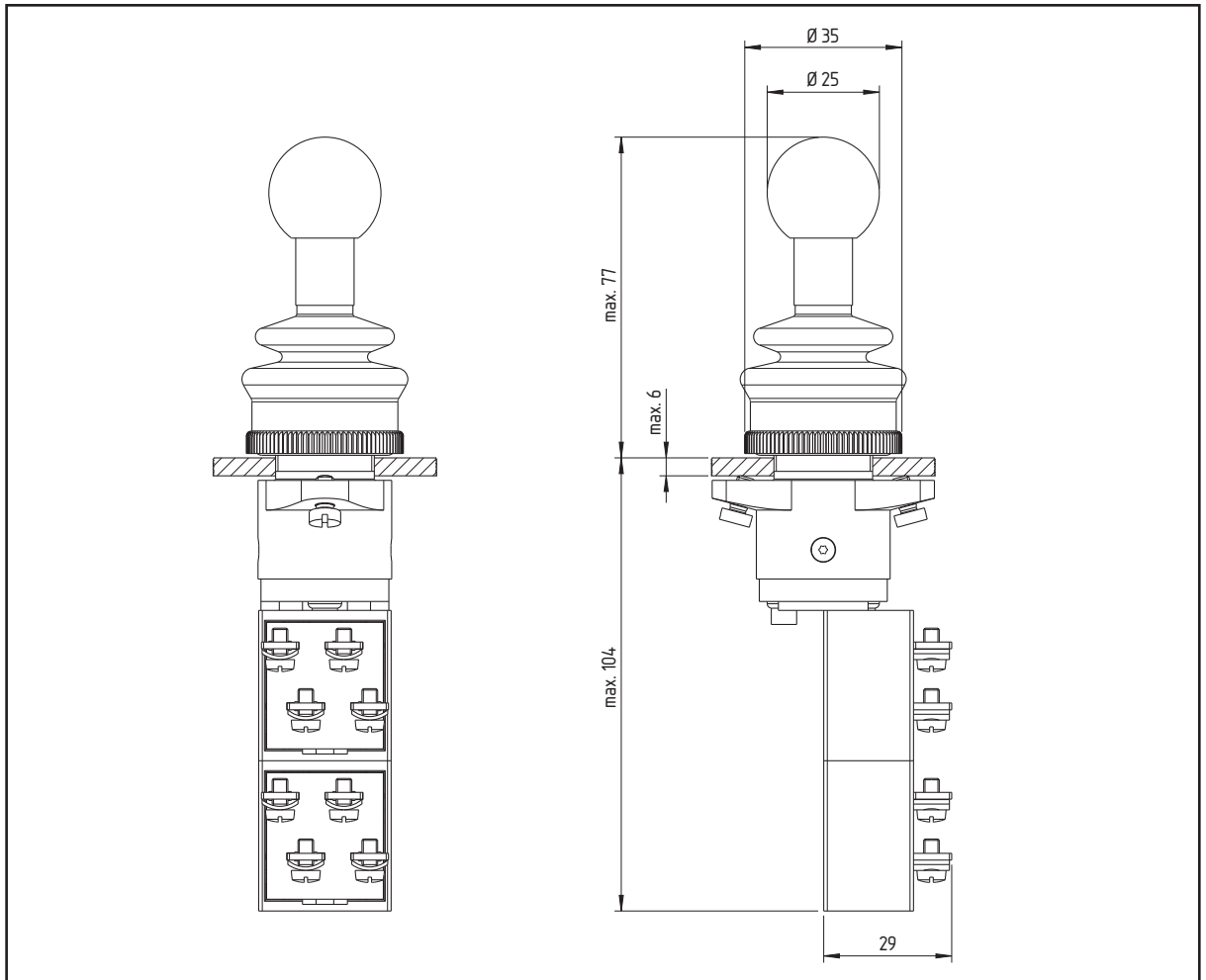
* Maintained/spring-return joystick switches: see pages 20/21
Spring-return joystick switches with analog output: see pages 34/35

Switching position, quantity, contacts		Sealing bellow	Connection technology		Flat-pin plugs	
			Screw terminals			
			Type	Order number	Type	Order number
Spring-return joystick switches						
1 NO  1 NO	Standard	MKTA32	021 5048	MKTAF32	021 6125	
	dto., UV/ozone-resistant	MKTA32/WKT-19.4	021 6026	MKTAF32/WKT-19.4	021 6126	
	Silicone	MKTA32/WKT-19.3	021 6027	MKTAF32/WKT-19.3	021 6127	
	dto., thick-walled	MKTA32/WKT-26	021 6028	MKTAF32/WKT-26	021 6128	
1 NC  1 NC	Standard	MKTA32/401	021 6030	MKTAF32/401	021 6130	
	dto., UV/ozone-resistant	MKTA32/401/WKT-19.4	021 6031	MKTAF32/401/WKT-19.4	021 6131	
	Silicone	MKTA32/401/WKT-19.3	021 6032	MKTAF32/401/WKT-19.3	021 6132	
	dto., thick-walled	MKTA32/401/WKT-26	021 6033	MKTAF32/401/WKT-26	021 6133	
Maintained joystick switches						
1 NO  1 NO	Standard	MKSA32	021 5000	MKSAF32	021 5001	
	dto., UV/ozone-resistant	MKSA32/WKT-19.4	021 6270	MKSAF32/WKT-19.4	021 6370	
	Silicone	MKSA32/WKT-19.3	021 6271	MKSAF32/WKT-19.3	021 6371	
1 NC  1 NC	Standard	MKSA32/401	021 6272	MKSAF32/401	021 6372	
	dto., UV/ozone-resistant	MKSA32/401/WKT-19.4	021 6273	MKSAF32/401/WKT-19.4	021 6373	
	Silicone	MKSA32/401/WKT-19.3	021 6274	MKSAF32/401/WKT-19.3	021 6374	

○ Position of reset; ◀●/▶ momentary action position; ● latching position; NO = normally open contact; NC = normally closed contact

Spring-return joystick switches, Maintained joystick switches*

- For installation diameter 22.3 mm
- Design without blocking ring to protect against unintentional actuation
- 2 directions of actuation/2 switching signals each



Not illustrated: designs with flat-pin plug connections (see page 7, installed width 29 + 1 mm)

Cross references:

- Functional description:
see pages 2 and 4 and following pages
- Sealing bellows:
see page 3
- Technical data:
see page 68
- Terminal markings:
see page 7
- Assembly information:
see page 9
- Spare parts: see page 66

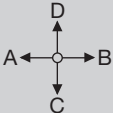
Additional information:

- Thick-walled silicone bellows: protection class IP 69K

Options (on request):

- Other actuator (instead of the ball)
- Shorter actuating levers
- Other contact configuration

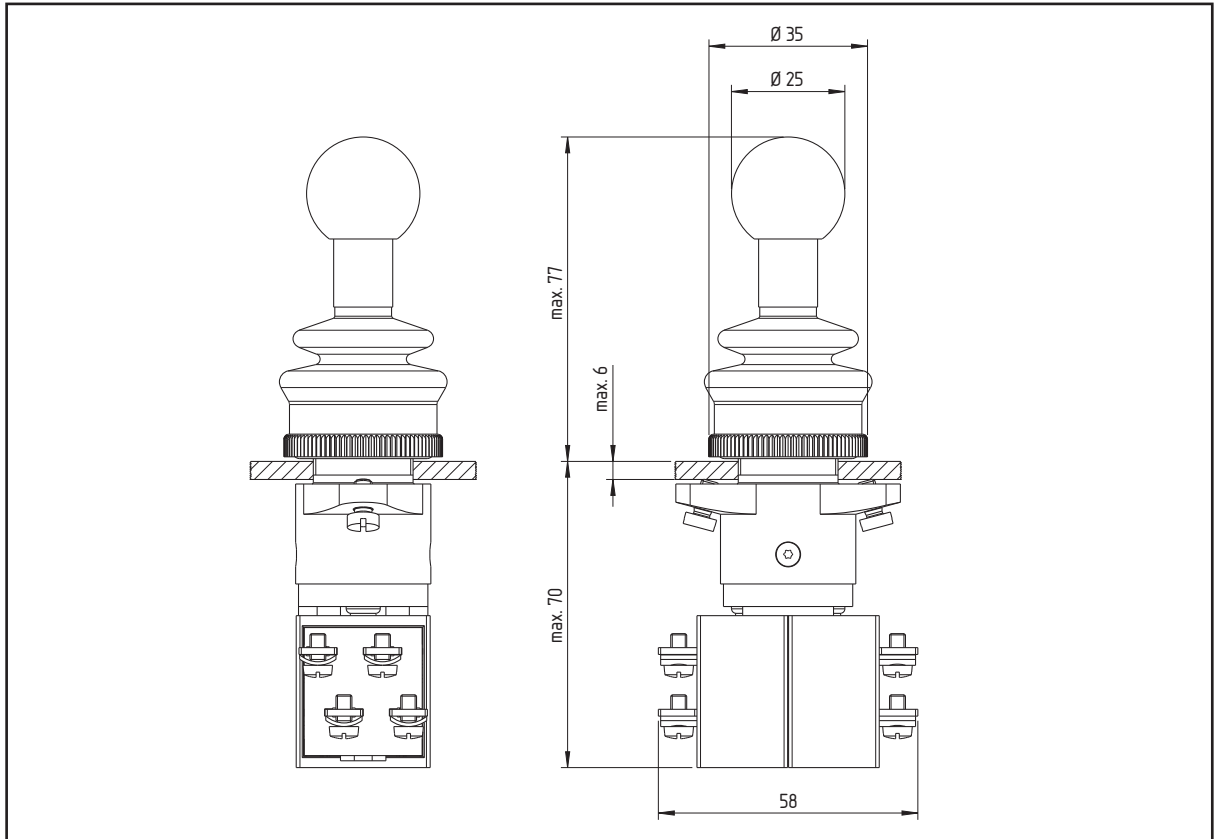
* Maintained/spring-return joystick switches: see pages 20/21
Spring-return joystick switches with analog output: see pages 34/35

Switching position, quantity, contacts		Sealing bellow	Connection technology		Flat-pin plugs	
			Screw terminals			
			Type	Order number	Type	Order number
Spring-return joystick switches						
2 NO 		Standard	MKTB32	021 5049	MKTBF32	021 6145
		dto., UV/ozone-resistant	MKTB32/WKT-19.4	021 6046	MKTBF32/WKT-19.4	021 6146
		Silicone	MKTB32/WKT-19.3	021 6047	MKTBF32/WKT-19.3	021 6147
		dto., thick-walled	MKTB32/WKT-26	021 6048	MKTBF32/WKT-26	021 6148
1 NC/ 1 NO 		Standard	MKTB32/1x401	021 5051	MKTBF32/1x401	021 6150
		dto., UV/ozone-resistant	MKTB32/1x401/WKT-19.4	021 6051	MKTBF32/1x401/WKT-19.4	021 6151
		Silicone	MKTB32/1x401/WKT-19.3	021 6052	MKTBF32/1x401/WKT-19.3	021 6152
		dto., thick-walled	MKTB32/1x401/WKT-26	021 6053	MKTBF32/1x401/WKT-26	021 6153
Maintained joystick switches						
2 NO 		Standard	MKSB32	021 6280	MKSBF32	021 6380
		dto., UV/ozone-resistant	MKSB32/WKT-19.4	021 6281	MKSBF32/WKT-19.4	021 6381
		Silicone	MKSB32/WKT-19.3	021 6282	MKSBF32/WKT-19.3	021 6382
1 NC/ 1 NO 		Standard	MKSB32/1x401	021 6285	MKSBF32/1x401	021 6385
		dto., UV/ozone-resistant	MKSB32/1x401/WKT-19.4	021 6286	MKSBF32/1x401/WKT-19.4	021 6386
		Silicone	MKSB32/1x401/WKT-19.3	021 6287	MKSBF32/1x401/WKT-19.3	021 6387

○ Position of reset; ◀●/▶ momentary action position; ● latching position; NO = normally open contact; NC = normally closed contact

Spring-return joystick switches, Maintained joystick switches*

- For installation diameter 22.3 mm
- Design without blocking ring to protect against unintentional actuation
- 2 (3, 4) directions of actuation/2 (1) switching signal(s) each



Not illustrated: designs with flat-pin plug connections (see page 7, installed width 29 + 1 mm)

Cross references:

- Functional description:
see pages 2 and 4 and following pages
- Sealing bellows:
see page 3
- Technical data:
see page 68
- Terminal markings:
see page 7
- Assembly information:
see page 9
- Spare parts: see page 66

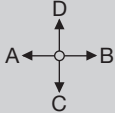
Additional information:

- Thick-walled silicone bellows: protection class IP 69K

Options (on request):

- Other actuator (instead of the ball)
- Shorter actuating levers
- Other contact configuration

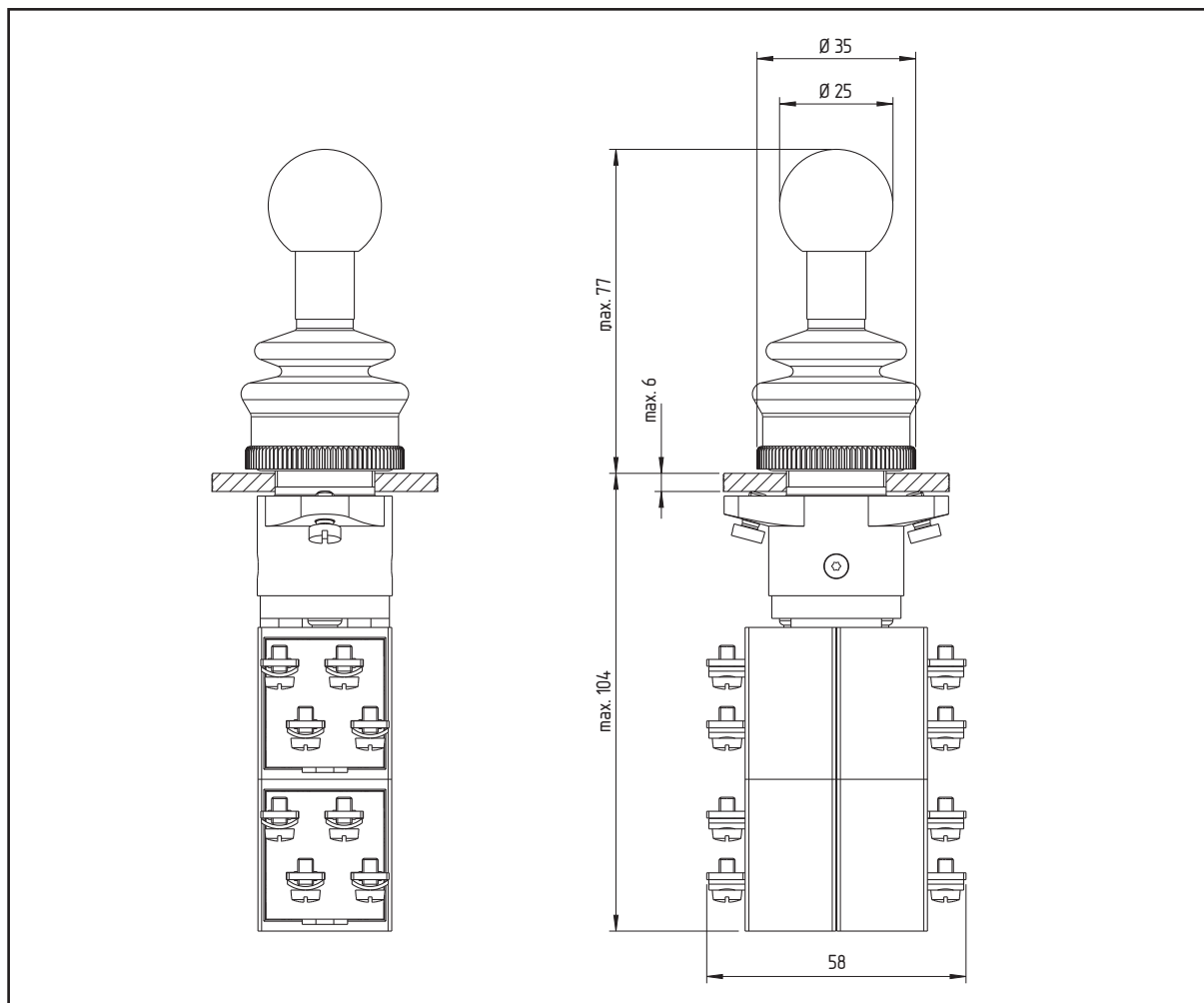
* Maintained/spring-return joystick switches: see pages 20/21
Spring-return joystick switches with analog output: see pages 34/35

Switching position, quantity, contacts		Sealing bellow	Connection technology		Flat-pin plugs	
			Screw terminals			
			Type	Order number	Type	Order number
Spring-return joystick switches						
2 NO  2 NO		Standard	MKTC32	021 5055	MKTCF32	021 5058
		dto., UV/ozone-resistant	MKTC32/WKT-19.4	021 6066	MKTCF32/WKT-19.4	021 6166
		Silicone	MKTC32/WKT-19.3	021 6067	MKTCF32/WKT-19.3	021 6167
		dto., thick-walled	MKTC32/WKT-26	021 6068	MKTCF32/WKT-26	021 6168
1 NO  1 NO 1 NO		Standard	MKTC42	021 6070	MKTCF42	021 6170
		dto., UV/ozone-resistant	MKTC42/WKT-19.4	021 6071	MKTCF42/WKT-19.4	021 6171
		Silicone	MKTC42/WKT-19.3	021 6072	MKTCF42/WKT-19.3	021 6172
		dto., thick-walled	MKTC42/WKT-26	021 6073	MKTCF42/WKT-26	021 6173
1 NO  1 NO 1 NO		Standard	MKTC52	021 6075	MKTCF52	021 6175
		dto., UV/ozone-resistant	MKTC52/WKT-19.4	021 6076	MKTCF52/WKT-19.4	021 6176
		Silicone	MKTC52/WKT-19.3	021 6077	MKTCF52/WKT-19.3	021 6177
		dto., thick-walled	MKTC52/WKT-26	021 6078	MKTCF52/WKT-26	021 6178
1 NC  1 NC 1 NC		Standard	MKTC52/2x401	021 6080	MKTCF52/2x401	021 6180
		dto., UV/ozone-resistant	MKTC52/2x401/WKT-19.4	021 6081	MKTCF52/2x401/WKT-19.4	021 6181
		Silicone	MKTC52/2x401/WKT-19.3	021 6082	MKTCF52/2x401/WKT-19.3	021 6182
		dto., thick-walled	MKTC52/2x401/WKT-26	021 6083	MKTCF52/2x401/WKT-26	021 6183
Maintained joystick switches						
2 NO  2 NO		Standard	MKSC32	021 5008	MKSCF32	021 6500
		dto., UV/ozone-resistant	MKSC32/WKT-19.4	021 6401	MKSCF32/WKT-19.4	021 6501
		Silicone	MKSC32/WKT-19.3	021 6402	MKSCF32/WKT-19.3	021 6502
1 NO  1 NO 1 NO		Standard	MKSC42	021 5017	MKSCF42	021 5019
		dto., UV/ozone-resistant	MKSC42/WKT-19.4	021 6405	MKSCF42/WKT-19.4	021 6505
		Silicone	MKSC42/WKT-19.3	021 6406	MKSCF42/WKT-19.3	021 6506
1 NO  1 NO 1 NO		Standard	MKSC52	021 5012	MKSCF52	021 5013
		dto., UV/ozone-resistant	MKSC52/WKT-19.4	021 6407	MKSCF52/WKT-19.4	021 6507
		Silicone	MKSC52/WKT-19.3	021 6408	MKSCF52/WKT-19.3	021 6508
1 NC  1 NC 1 NC		Standard	MKSC52/2x401	021 6410	MKSCF52/2x401	021 6510
		dto., UV/ozone-resistant	MKSC52/2x401/WKT-19.4	021 6411	MKSCF52/2x401/WKT-19.4	021 6511
		Silicone	MKSC52/2x401/WKT-19.3	021 6412	MKSCF52/2x401/WKT-19.3	021 6512

○ Position of reset; ◀●/▶ momentary action position; ● latching position; NO = normally open contact; NC = normally closed contact

Spring-return joystick switches, Maintained joystick switches*

- For installation diameter 22.3 mm
- Design without blocking ring to protect against unintentional actuation
- 2 (4) directions of actuation/4 (2) switching signals each



Not illustrated: designs with flat-pin plug connections (see page 7, installed width 29 + 1 mm)

Cross references:

- Functional description: see pages 2 and 4 and following pages
- Sealing bellows: see page 3
- Technical data: see page 68
- Terminal markings: see page 7
- Assembly information: see page 9
- Spare parts: see page 66

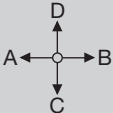
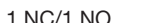
Additional information:

- Thick-walled silicone bellows: protection class IP 69K

Options (on request):

- Other actuator (instead of the ball)
- Shorter actuating levers
- Devices with 3 directions of actuation
- Other contact configuration

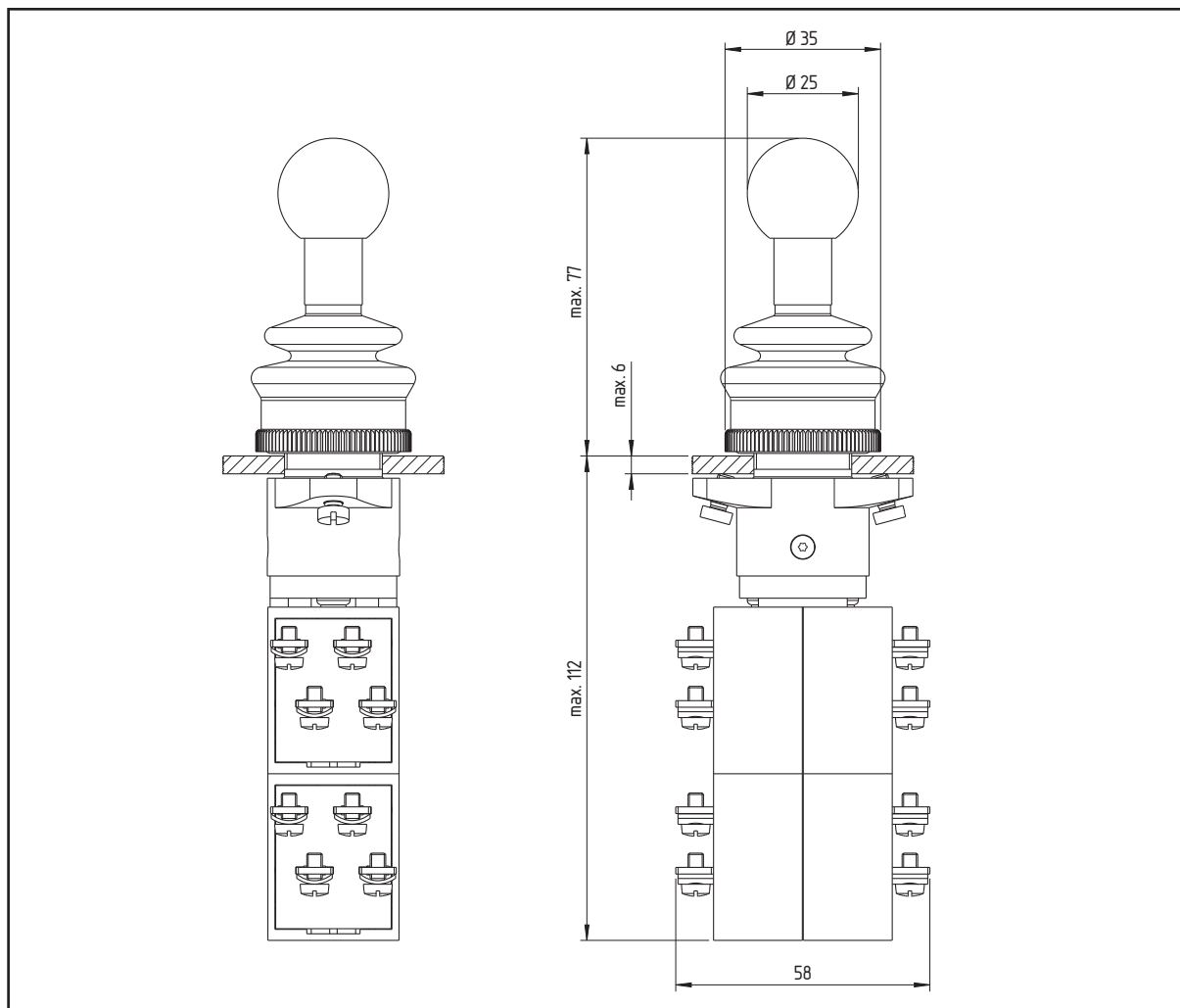
* Maintained/spring-return joystick switches: see pages 20/21
Spring-return joystick switches with analog output: see pages 34/35

Switching position, quantity, contacts		Sealing bellow	Connection technology		Flat-pin plugs	
			Screw terminals			
			Type	Order number	Type	Order number
Spring-return joystick switches						
 4 NO		Standard	MKTE32	021 5059	MKTEF32	021 6300
		dto., UV/ozone-resistant	MKTE32/WKT-19.4	021 6201	MKTEF32/WKT-19.4	021 6301
		Silicone	MKTE32/WKT-19.3	021 6202	MKTEF32/WKT-19.3	021 6302
		dto., thick-walled	MKTE32/WKT-26	021 6203	MKTEF32/WKT-26	021 6303
 2 NO		Standard	MKTE52	021 5070	MKTEF52	021 5063
		dto., UV/ozone-resistant	MKTE52/WKT-19.4	021 6205	MKTEF52/WKT-19.4	021 6305
		Silicone	MKTE52/WKT-19.3	021 6206	MKTEF52/WKT-19.3	021 6306
		dto., thick-walled	MKTE52/WKT-26	021 6207	MKTEF52/WKT-26	021 6307
 1 NC/1 NO		Standard	MKTE52/206	021 6210	MKTEF52/206	021 6310
		dto., UV/ozone-resistant	MKTE52/206/WKT-19.4	021 6211	MKTEF52/206/WKT-19.4	021 6311
		Silicone	MKTE52/206/WKT-19.3	021 6212	MKTEF52/206/WKT-19.3	021 6312
		dto., thick-walled	MKTE52/206/WKT-26	021 6213	MKTEF52/206/WKT-26	021 6313
 1 NC/1 NO		Standard	MKTE52/2x401	021 5072	MKTEF52/2x401	021 6315
		dto., UV/ozone-resistant	MKTE52/2x401/WKT-19.4	021 6216	MKTEF52/2x401/WKT-19.4	021 6316
		Silicone	MKTE52/2x401/WKT-19.3	021 6217	MKTEF52/2x401/WKT-19.3	021 6317
		dto., thick-walled	MKTE52/2x401/WKT-26	021 6218	MKTEF52/2x401/WKT-26	021 6318
Maintained joystick switches						
 4 NO		Standard	MKSE32	021 6435	MKSEF32	021 6535
		dto., UV/ozone-resistant	MKSE32/WKT-19.4	021 6436	MKSEF32/WKT-19.4	021 6536
		Silicone	MKSE32/WKT-19.3	021 6437	MKSEF32/WKT-19.3	021 6537
 2 NO		Standard	MKSE52	021 6440	MKSEF52	021 6540
		dto., UV/ozone-resistant	MKSE52/WKT-19.4	021 6441	MKSEF52/WKT-19.4	021 6541
		Silicone	MKSE52/WKT-19.3	021 6442	MKSEF52/WKT-19.3	021 6542
 1 NC/1 NO		Standard	MKSE52/206	021 6445	MKSEF52/206	021 6545
		dto., UV/ozone-resistant	MKSE52/206/WKT-19.4	021 6446	MKSEF52/206/WKT-19.4	021 6546
		Silicone	MKSE52/206/WKT-19.3	021 6447	MKSEF52/206/WKT-19.3	021 6547
 1 NC/1 NO		Standard	MKSE52/2x401	021 6450	MKSEF52/2x401	021 6550
		dto., UV/ozone-resistant	MKSE52/2x401/WKT-19.4	021 6451	MKSEF52/2x401/WKT-19.4	021 6551
		Silicone	MKSE52/2x401/WKT-19.3	021 6452	MKSEF52/2x401/WKT-19.3	021 6552

○ Position of reset; ◀●▶ momentary action position; ● latching position; NO = normally open contact; NC = normally closed contact

Spring-return joystick switches, Maintained joystick switches*

- For installation diameter 22.3 mm
- Design without blocking ring to protect against unintentional actuation
- 2 (4) directions of actuation/4 (2) switching signals each



Cross references:

- Functional description: see pages 2 and 4 and following pages
- Sealing bellows: see page 3
- Technical data: see page 68
- Terminal markings: see page 7
- Assembly information: see page 9
- Spare parts: see page 66

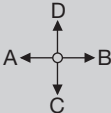
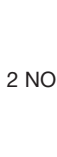
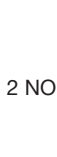
Additional information:

- Thick-walled silicone bellows: protection class IP 69K
- Option of flat plug connections not possible.

Options (on request):

- Other actuator (instead of the ball)
- Shorter actuating levers
- Devices with 3 directions of actuation
- Other contact configuration

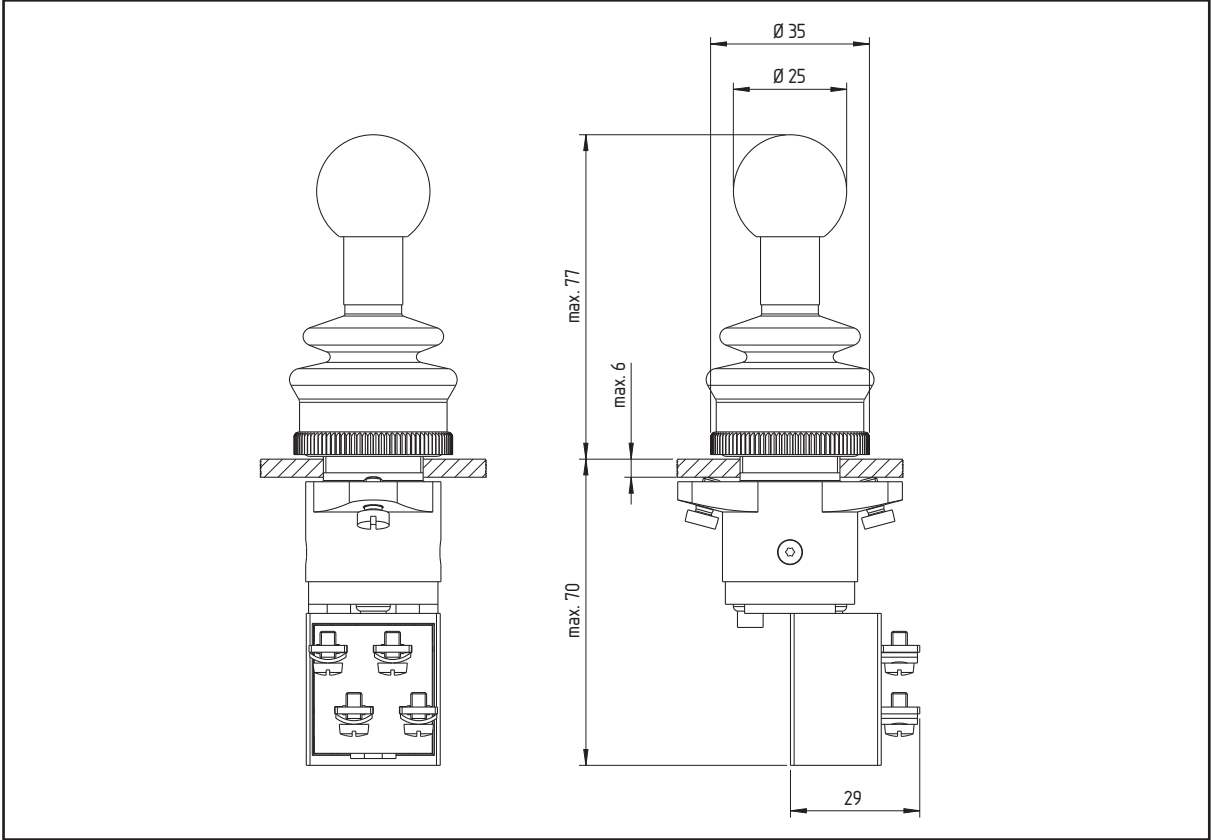
* Maintained/spring-return joystick switches: see pages 20/21
Spring-return joystick switches with analog output: see pages 34/35

Switching position, quantity, contacts		Sealing bellows	Connection technology Screw terminals	
			Type	Order number
Spring-return joystick switches				
		Standard	MKTE32/404	021 6240
		dto., UV/ozone-resistant	MKTE32/404/WKT-19.4	021 6241
		Silicone	MKTE32/404/WKT-19.3	021 6242
		dto., thick-walled	MKTE32/404/WKT-26	021 6243
		Standard	MKTE32/800	021 6245
		dto., UV/ozone-resistant	MKTE32/800/WKT-19.4	021 6246
		Silicone	MKTE32/800/WKT-19.3	021 6247
		dto., thick-walled	MKTE32/800/WKT-26	021 6248
		Standard	MKTE52/206.1	021 6250
		dto., UV/ozone-resistant	MKTE52/206.1/WKT-19.4	021 6251
		Silicone	MKTE52/206.1/WKT-19.3	021 6252
		dto., thick-walled	MKTE52/206.1/WKT-26	021 6253
Maintained joystick switches				
		Standard	MKTE321/404	021 6255
		dto., UV/ozone-resistant	MKTE321/404/WKT-19.4	021 6256
		Silicone	MKTE321/404/WKT-19.3	021 6257
		Standard	MKTE321/800	021 6260
		dto., UV/ozone-resistant	MKTE321/800/WKT-19.4	021 6261
		Silicone	MKTE321/800/WKT-19.3	021 6262
		Standard	MKTE521/206.1	021 6265
		dto., UV/ozone-resistant	MKTE521/206.1/WKT-19.4	021 6266
		Silicone	MKTE521/206.1/WKT-19.3	021 6267

○ Position of reset; ◀●▶ momentary action position; ● latching position; NO = normally open contact; NC = normally closed contact

Maintained/spring-return joystick switches

- For installation diameter 22.3 mm
- Design without blocking ring to protect against unintentional actuation
- 2 directions of actuation/1 switching signal each



Not illustrated: designs with flat-pin plug connections (see page 7, installed width 29 + 1 mm)

Cross references:

- Functional description: see pages 2 and 4 and following pages
- Sealing bellows: see page 3
- Technical data: see page 68
- Terminal markings: see page 7
- Assembly information: see page 9
- Spare parts: see page 66

Options (on request):

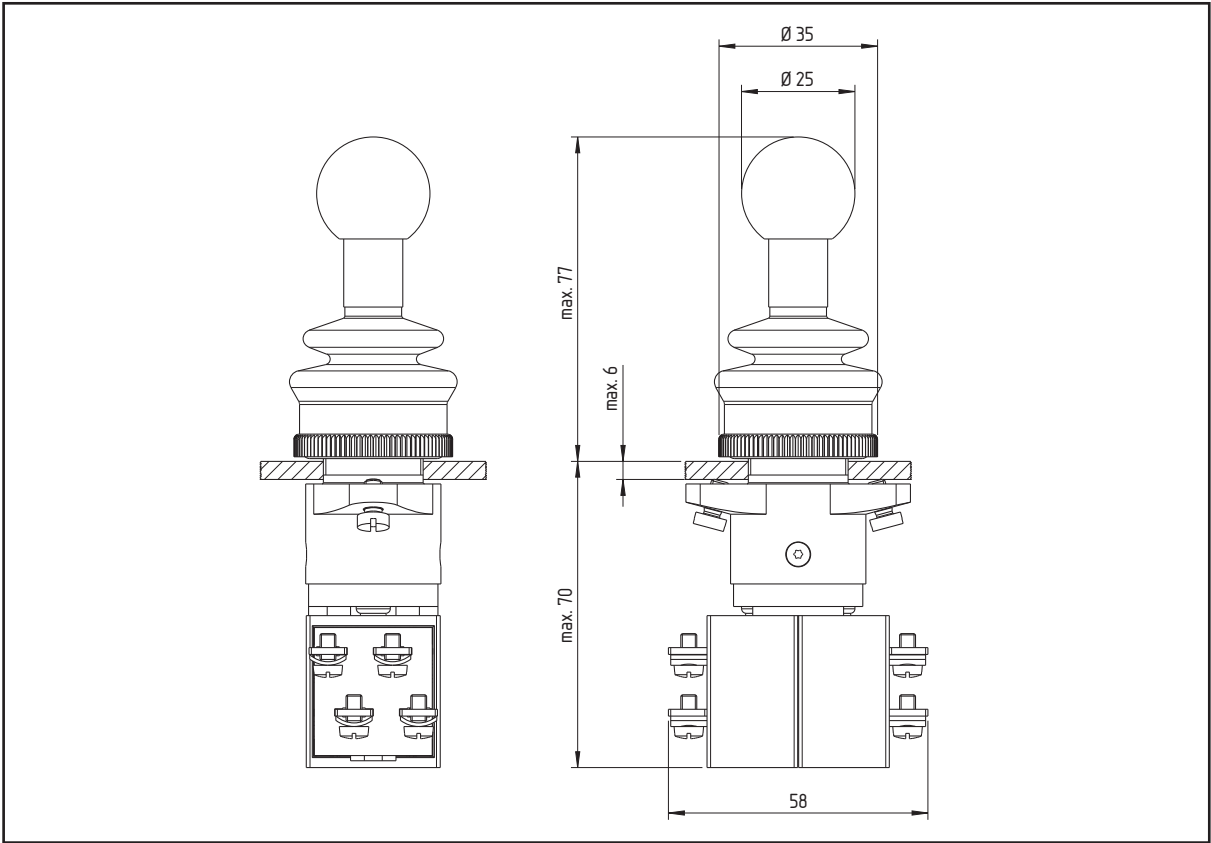
- Other actuator (instead of the ball)
- Shorter actuating levers
- Other contact configuration

Switching position, quantity, contacts		Sealing bellow	Connection technology		Flat-pin plugs	
			Screw terminals			
			Type	Order number	Type	Order number
Maintained/spring-return joystick switches						
1 NO  1 NO		Standard	MK TSA32	021 6605	MK TSAF32	021 6705
		dto., UV/ozone-resistant	MK TSA32/WKT-19.4	021 6606	MK TSAF32/WKT-19.4	021 6706
		Silicone	MK TSA32/WKT-19.3	021 6607	MK TSAF32/WKT-19.3	021 6707

○ Position of reset; ◀●/▶ momentary action position; ● latching position; NO = normally open contact; NC = normally closed contact

Maintained/spring-return joystick switches

- For installation diameter 22.3 mm
- Design without blocking ring to protect against unintentional actuation
- 4 directions of actuation/1 switching signal each



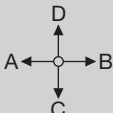
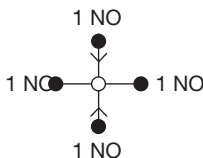
Not illustrated: designs with flat-pin plug connections (see page 7, installed width 29 + 1 mm)

Cross references:

- Functional description: see pages 2 and 4 and following pages
- Sealing bellows: see page 3
- Technical data: see page 68
- Terminal markings: see page 7
- Assembly information: see page 9
- Spare parts: see page 66

Options (on request):

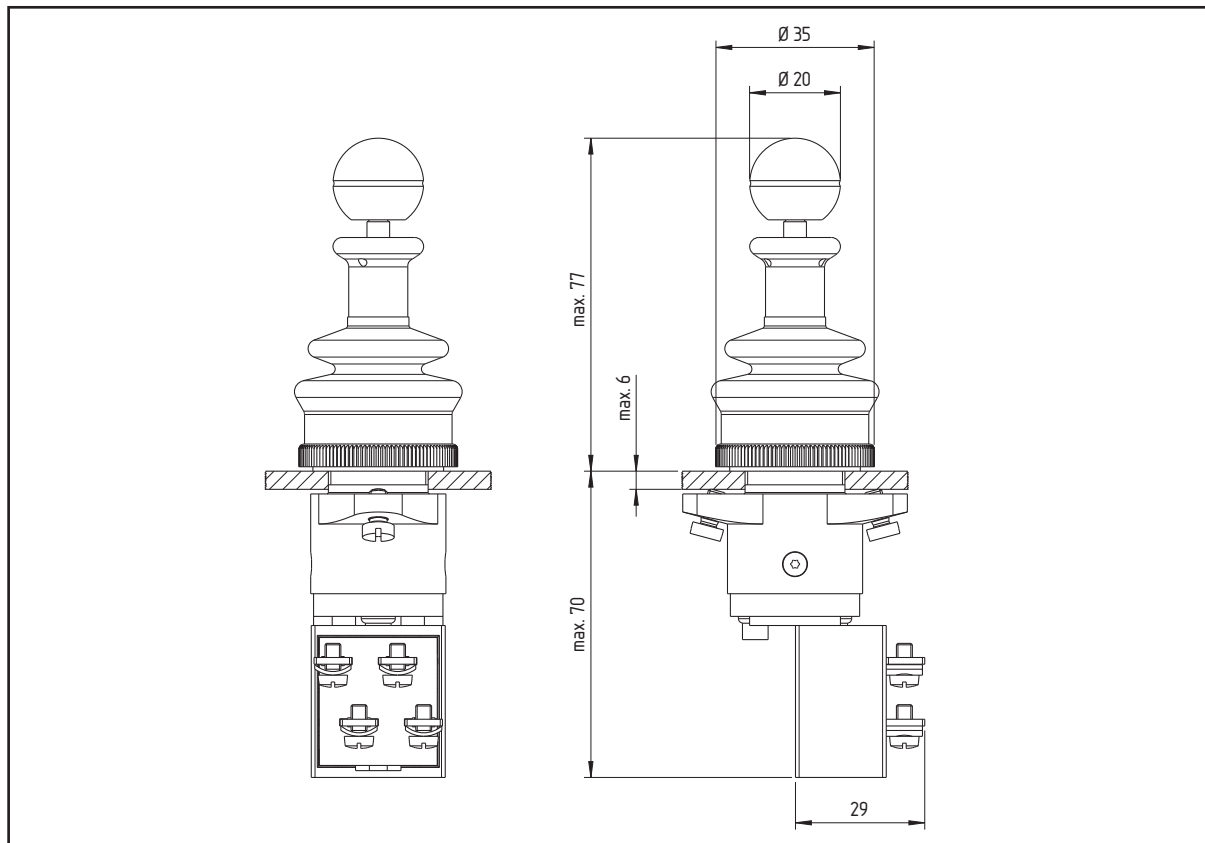
- Other actuator (instead of the ball)
- Shorter actuating levers
- Other contact configuration

Switching position, quantity, contacts		Sealing bellow	Connection technology		Flat-pin plugs	
			Screw terminals			
			Type	Order number	Type	Order number
Maintained/spring-return joystick switches						
		Standard	MKTSC52.2	0216610	MKTSCF52.2	0216710
		dto., UV/ozone-resistant	MKTSC52.2/WKT-19.4	0216611	MKTSCF52.2/WKT-19.4	0216711
		Silicone	MKTSC52.2/WKT-19.3	0216612	MKTSCF52.2/WKT-19.3	0216712

○ Position of reset; ◀/▶ momentary action position; ● latching position; NO = normally open contact; NC = normally closed contact

Spring-return joystick switches, Maintained joystick switches*

- For installation diameter 22.3 mm
- Design with blocking ring to protect against unintentional actuation
- 2 directions of actuation/1 switching signal each



Not illustrated: designs with flat-pin plug connections (see page 7, installed width 29 + 1 mm)

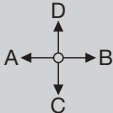
Cross references:

- Functional description:
see pages 2 and 4 and following pages
- Sealing bellows:
see page 3
- Technical data:
see page 68
- Terminal markings:
see page 7
- Assembly information:
see page 9
- Spare parts: see page 66

Options (on request):

- Other actuator (instead of the ball)

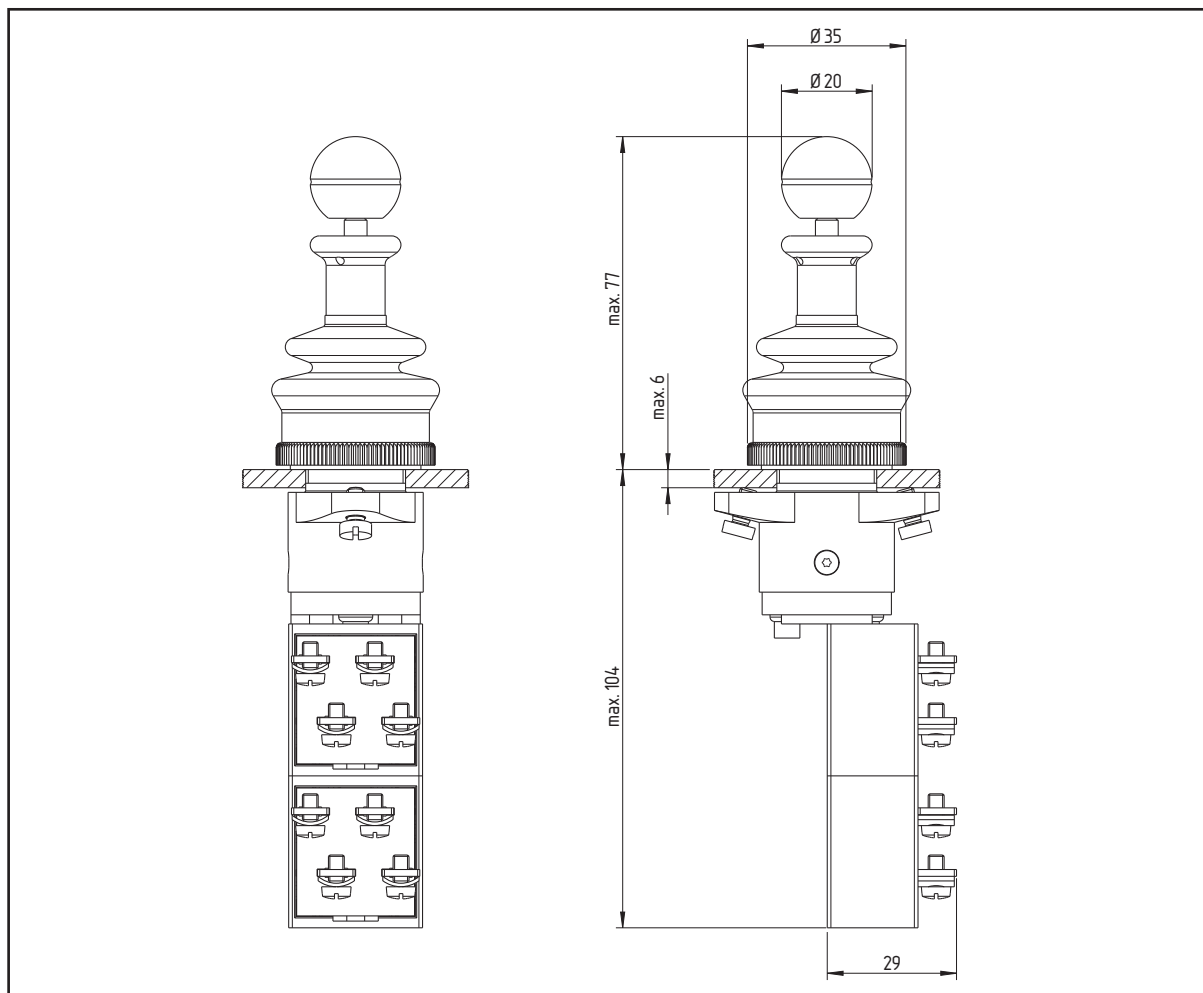
* Maintained/spring-return joystick switches: see pages 32/33
Spring-return joystick switches with analog output: see pages 36/37

Switching position, quantity, contacts		Sealing bellow	Connection technology		Flat-pin plugs	
			Screw terminals			
			Type	Order number	Type	Order number
Spring-return joystick switches						
1 NO  1 NO	Standard	MKTA321	021 5050	MKTAF321	021 5052	
	dto., UV/ozone-resistant	MKTA321/WKT-19.4	021 5047	MKTAF321/WKT-19.4	021 6135	
	Silicone	MKTA321/WKT-19.3	021 6036	MKTAF321/WKT-19.3	021 6136	
1 NC  1 NC	Standard	MKTA321/401	021 6040	MKTAF321/401	021 6140	
	dto., UV/ozone-resistant	MKTA321/401/WKT-19.4	021 6041	MKTAF321/401/WKT-19.4	021 6141	
	Silicone	MKTA321/401/WKT-19.3	021 6042	MKTAF321/401/WKT-19.3	021 6142	
Maintained joystick switches						
1 NO  1 NO	Standard	MKSA321	021 5011	MKSAF321	021 5006	
	dto., UV/ozone-resistant	MKSA321/WKT-19.4	021 6275	MKSAF321/WKT-19.4	021 6375	
	Silicone	MKSA321/WKT-19.3	021 6276	MKSAF321/WKT-19.3	021 6376	
1 NC  1 NC	Standard	MKSA321/401	021 6277	MKSAF321/401	021 6377	
	dto., UV/ozone-resistant	MKSA321/401/WKT-19.4	021 6278	MKSAF321/401/WKT-19.4	021 6378	
	Silicone	MKSA321/401/WKT-19.3	021 6279	MKSAF321/401/WKT-19.3	021 6379	

○ Position of reset; ◀●/●▶ momentary action position; ● latching position; NO = normally open contact; NC = normally closed contact

Spring-return joystick switches, Maintained joystick switches*

- For installation diameter 22.3 mm
- Design with blocking ring to protect against unintentional actuation
- 2 directions of actuation/2 switching signals each



Not illustrated: designs with flat-pin plug connections (see page 7, installed width $29 + 1$ mm)

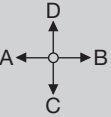
Cross references:

- Functional description:
see pages 2 and 4 and following pages
- Sealing bellows:
see page 3
- Technical data:
see page 68
- Terminal markings:
see page 7
- Assembly information:
see page 9
- Spare parts: see page 66

Options (on request):

- Other actuator (instead of the ball)
- Other contact configuration

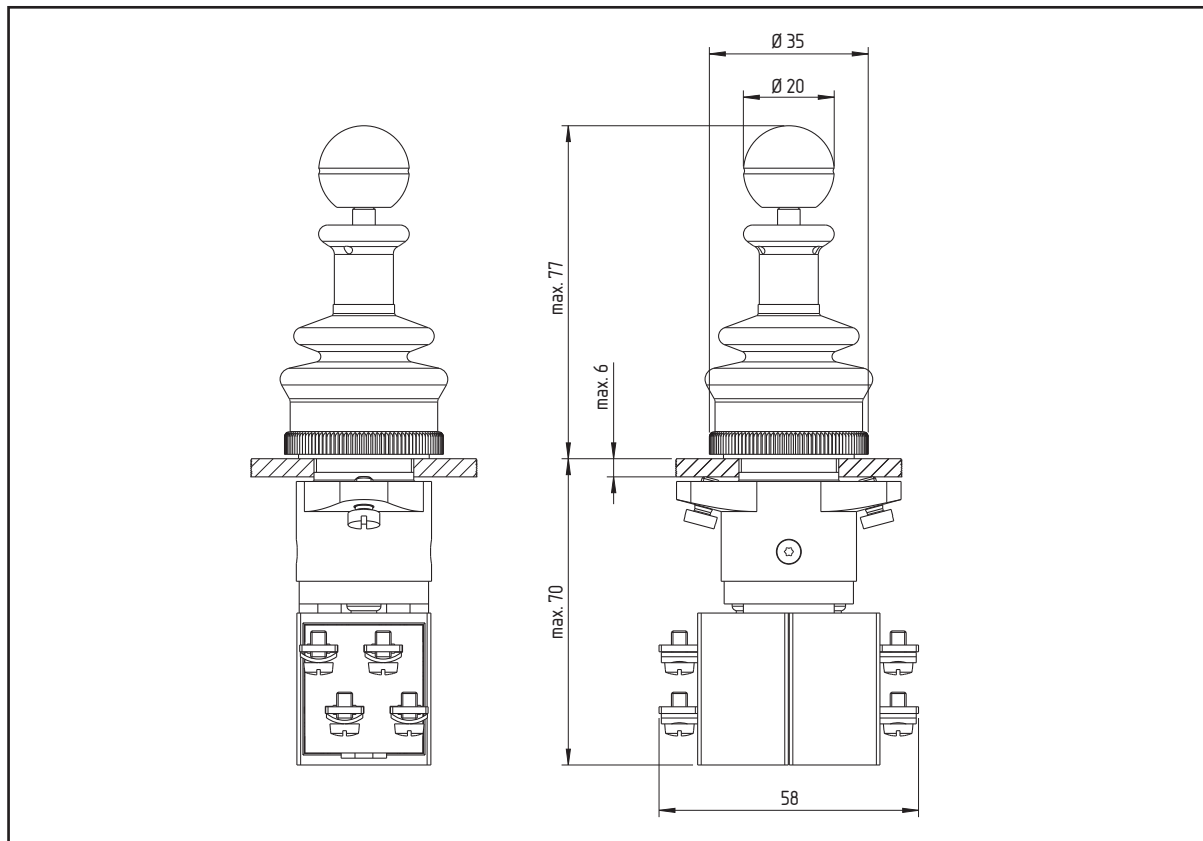
* Maintained/spring-return joystick switches: see pages 32/33
Spring-return joystick switches with analog output: see pages 36/37

Switching position, quantity, contacts		Sealing bellow	Connection technology		Flat-pin plugs	
			Screw terminals			
			Type	Order number	Type	Order number
Spring-return joystick switches						
2 NO  2 NO		Standard	MKTB321	021 6055	MKTBF321	021 6155
		dto., UV/ozone-resistant	MKTB321/WKT-19.4	021 6056	MKTBF321/WKT-19.4	021 6156
		Silicone	MKTB321/WKT-19.3	021 6057	MKTBF321/WKT-19.3	021 6157
1 NC/ 1 NO  1 NC/ 1 NO		Standard	MKTB321/1x401	021 6060	MKTBF321/1x401	021 6160
		dto., UV/ozone-resistant	MKTB321/1x401/WKT-19.4	021 6061	MKTBF321/1x401/WKT-19.4	021 6161
		Silicone	MKTB321/1x401/WKT-19.3	021 6062	MKTBF321/1x401/WKT-19.3	021 6162
Maintained joystick switches						
2 NO  2 NO		Standard	MKSB321	021 6290	MKSBF321	021 6390
		dto., UV/ozone-resistant	MKSB321/WKT-19.4	021 6291	MKSBF321/WKT-19.4	021 6391
		Silicone	MKSB321/WKT-19.3	021 6292	MKSBF321/WKT-19.3	021 6392
1 NC/ 1 NO  1 NC/ 1 NO		Standard	MKSB321/1x401	021 6295	MKSBF321/1x401	021 6395
		dto., UV/ozone-resistant	MKSB321/1x401/WKT-19.4	021 6296	MKSBF321/1x401/WKT-19.4	021 6396
		Silicone	MKSB321/1x401/WKT-19.3	021 6297	MKSBF321/1x401/WKT-19.3	021 6397

○ Position of reset; ◀●/●▶ momentary action position; ● latching position; NO = normally open contact; NC = normally closed contact

Spring-return joystick switches, Maintained joystick switches*

- For installation diameter 22.3 mm
- Design with blocking ring to protect against unintentional actuation
- 2 (3, 4) directions of actuation/2 (1) switching signal(s) each



Not illustrated: designs with flat-pin plug connections (see page 7, installed width 29 + 1 mm)

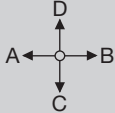
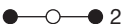
Cross references:

- Functional description:
see pages 2 and 4 and following pages
- Sealing bellows:
see page 3
- Technical data:
see page 68
- Terminal markings:
see page 7
- Assembly information:
see page 9
- Spare parts: see page 66

Options (on request):

- Other actuator (instead of the ball)
- Other contact configuration

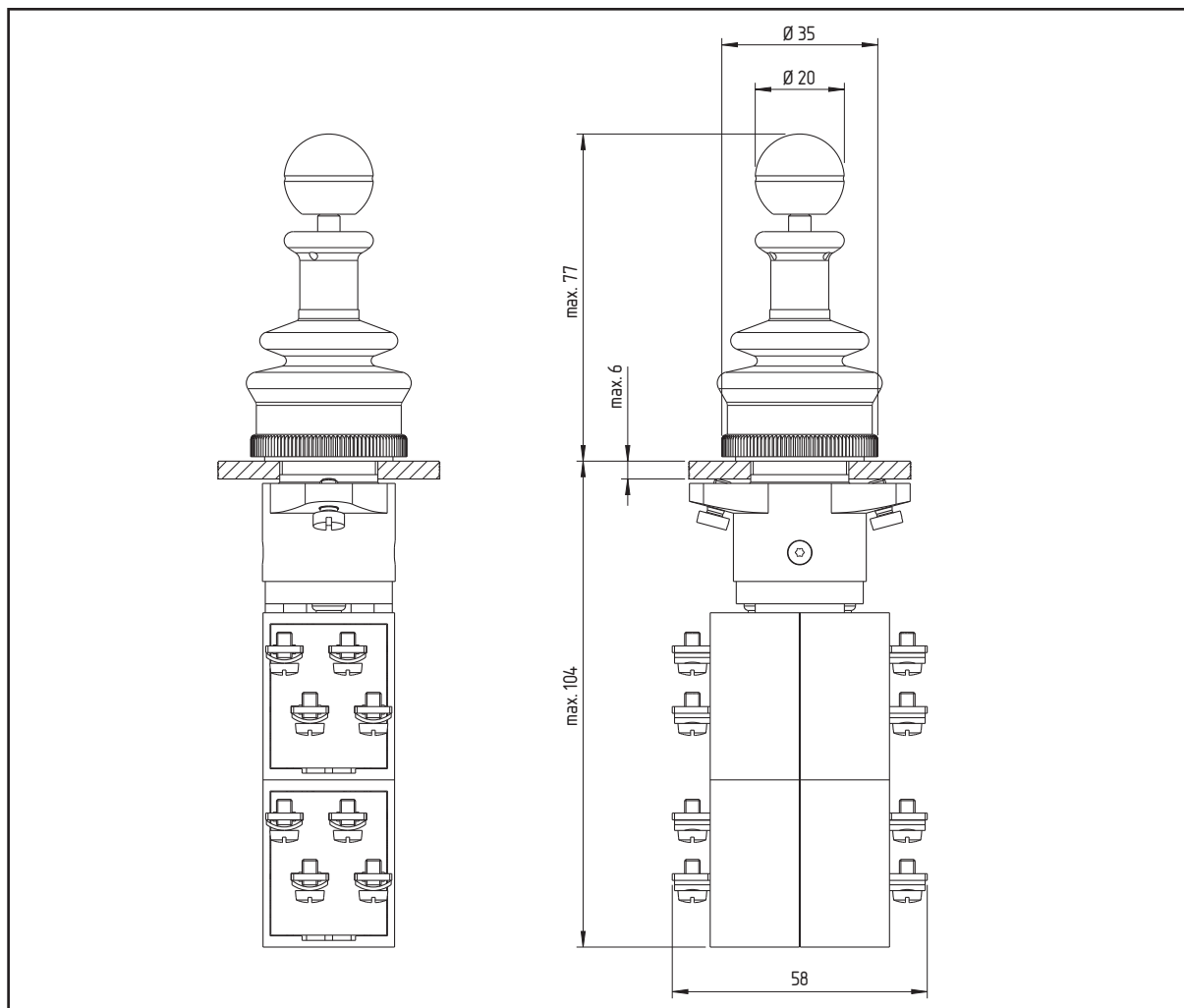
* Maintained/spring-return joystick switches: see pages 32/33
Spring-return joystick switches with analog output: see pages 36/37

Switching position, quantity, contacts		Sealing bellow	Connection technology		Flat-pin plugs	
			Type	Order number	Type	Order number
Spring-return joystick switches						
 2 NO	Standard	MKTC321	021 5060	MKTCF321	021 5061	
	dto., UV/ozone-resistant	MKTC321/WKT-19.4	021 5099	MKTCF321/WKT-19.4	021 6185	
	Silicone	MKTC321/WKT-19.3	021 6086	MKTCF321/WKT-19.3	021 6186	
 1 NO	Standard	MKTC421	021 5091	MKTCF421	021 5085	
	dto., UV/ozone-resistant	MKTC421/WKT-19.4	021 6090	MKTCF421/WKT-19.4	021 6190	
	Silicone	MKTC421/WKT-19.3	021 6091	MKTCF421/WKT-19.3	021 6191	
 1 NO  1 NO 1 NO	Standard	MKTC521	021 5074	MKTCF521	021 5079	
	dto., UV/ozone-resistant	MKTC521/WKT-19.4	021 6007	MKTCF521/WKT-19.4	021 6193	
	Silicone	MKTC521/WKT-19.3	021 6094	MKTCF521/WKT-19.3	021 6194	
 1 NC  1 NC 1 NC	Standard	MKTC521/2x401	021 6096	MKTCF521/2x401	021 6196	
	dto., UV/ozone-resistant	MKTC521/2x401/WKT-19.4	021 6097	MKTCF521/2x401/WKT-19.4	021 6197	
	Silicone	MKTC521/2x401/WKT-19.3	021 6098	MKTCF521/2x401/WKT-19.3	021 6198	
Maintained joystick switches						
 2 NO	Standard	MKSC321	021 5009	MKSCF321	021 6516	
	dto., UV/ozone-resistant	MKSC321/WKT-19.4	021 6001	MKSCF321/WKT-19.4	021 6516	
	Silicone	MKSC321/WKT-19.3	021 6417	MKSCF321/WKT-19.3	021 6517	
 1 NO 1 NO	Standard	MKSC421	021 5010	MKSCF421	021 6520	
	dto., UV/ozone-resistant	MKSC421/WKT-19.4	021 6421	MKSCF421/WKT-19.4	021 6521	
	Silicone	MKSC421/WKT-19.3	021 6422	MKSCF421/WKT-19.3	021 6522	
 1 NO  1 NO 1 NO	Standard	MKSC521	021 5015	MKSCF521	021 5018	
	dto., UV/ozone-resistant	MKSC521/WKT-19.4	021 6425	MKSCF521/WKT-19.4	021 6525	
	Silicone	MKSC521/WKT-19.3	021 6426	MKSCF521/WKT-19.3	021 6526	
 1 NC  1 NC 1 NC	Standard	MKSC521/2x401	021 6430	MKSCF521/2x401	021 6530	
	dto., UV/ozone-resistant	MKSC521/2x401/WKT-19.4	021 6431	MKSCF521/2x401/WKT-19.4	021 6531	
	Silicone	MKSC521/2x401/WKT-19.3	021 6432	MKSCF521/2x401/WKT-19.3	021 6532	

○ Position of reset; ◀●/▶ momentary action position; ● latching position; NO = normally open contact; NC = normally closed contact

Spring-return joystick switches, Maintained joystick switches*

- For installation diameter 22.3 mm
- Design with blocking ring to protect against unintentional actuation
- 2 (4) directions of actuation/4 (2) switching signals each



Not illustrated: designs with flat-pin plug connections (see page 7, installed width $29 + 1$ mm)

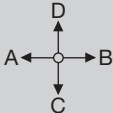
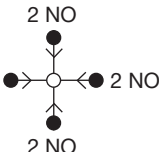
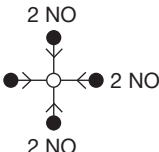
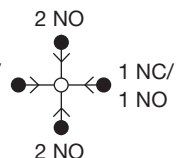
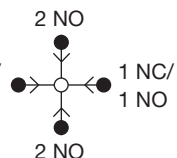
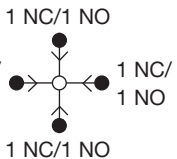
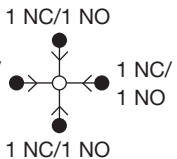
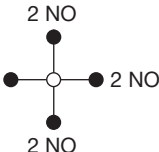
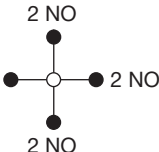
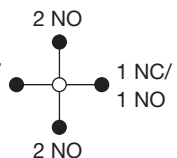
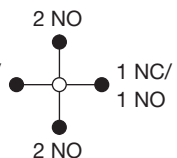
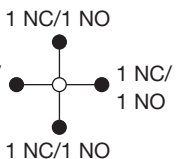
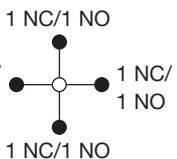
Cross references:

- Functional description: see pages 2 and 4 and following pages
- Sealing bellows: see page 3
- Technical data: see page 68
- Terminal markings: see page 7
- Assembly information: see page 9
- Spare parts: see page 66

Options (on request):

- Other actuator (instead of the ball)
- Devices with 3 directions of actuation
- Other contact configuration

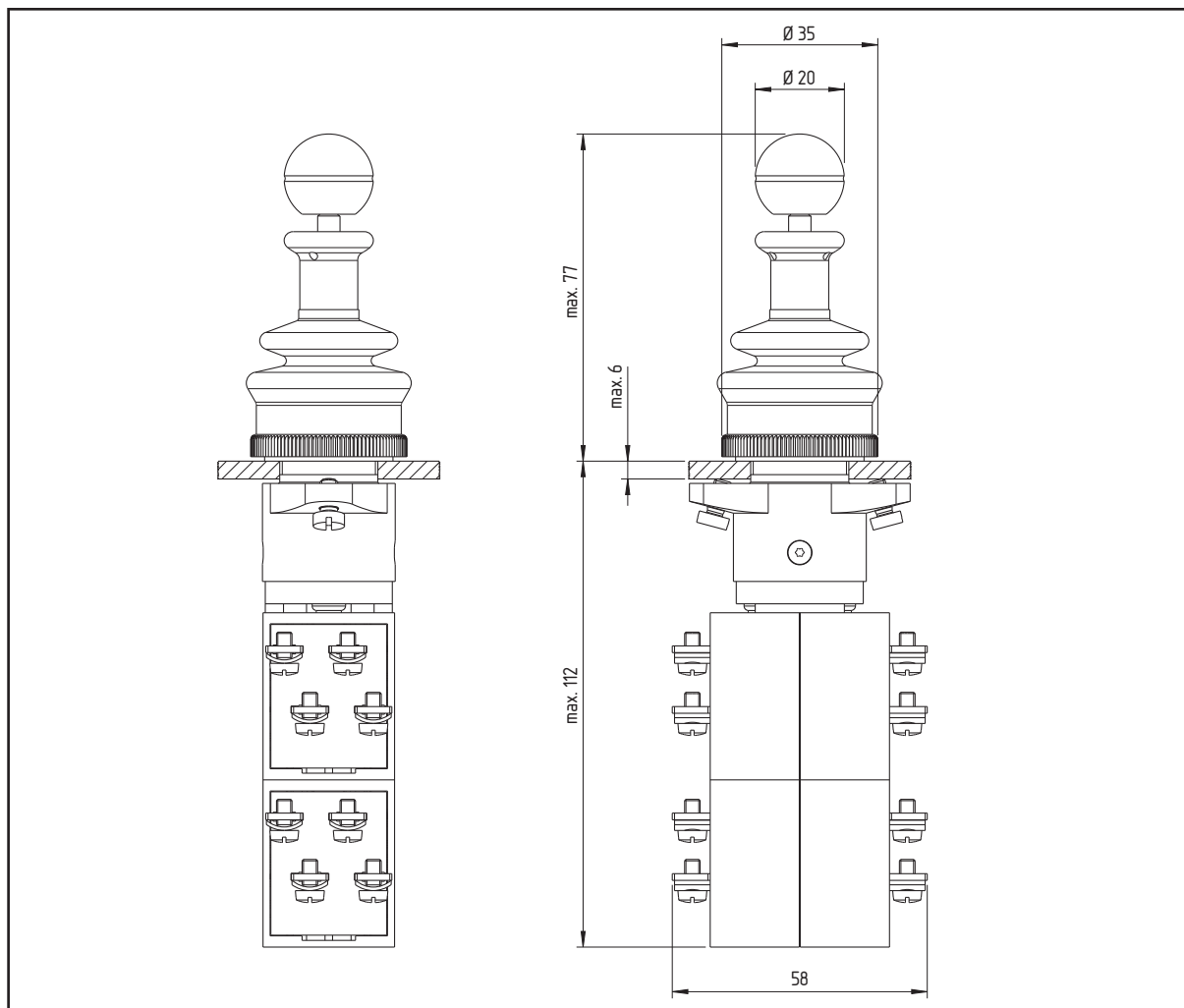
* Maintained/spring-return joystick switches: see pages 32/33
Spring-return joystick switches with analog output: see pages 36/37

Switching position, quantity, contacts		Sealing bellow	Connection technology		Flat-pin plugs	
			Screw terminals			
			Type	Order number	Type	Order number
Spring-return joystick switches						
4 NO 		Standard	MKTE321	021 6220	MKTEF321	021 6320
		dto., UV/ozone-resistant	MKTE321/WKT-19.4	021 6221	MKTEF321/WKT-19.4	021 6321
		Silicone	MKTE321/WKT-19.3	021 6222	MKTEF321/WKT-19.3	021 6322
2 NO 		Standard	MKTE521	021 5079	MKTEF521	021 6325
		dto., UV/ozone-resistant	MKTE521/WKT-19.4	021 6226	MKTEF521/WKT-19.4	021 6326
		Silicone	MKTE521/WKT-19.3	021 6227	MKTEF521/WKT-19.3	021 6327
1 NC/ 1 NO 		Standard	MKTE521/206	021 6230	MKTEF521/206	021 6330
		dto., UV/ozone-resistant	MKTE521/206/WKT-19.4	021 6231	MKTEF521/206/WKT-19.4	021 6331
		Silicone	MKTE521/206/WKT-19.3	021 6232	MKTEF521/206/WKT-19.3	021 6332
1 NC/ 1 NO 		Standard	MKTE521/2x401	021 6235	MKTEF521/2x401	021 6335
		dto., UV/ozone-resistant	MKTE521/2x401/WKT-19.4	021 6236	MKTEF521/2x401/WKT-19.4	021 6336
		Silicone	MKTE521/2x401/WKT-19.3	021 6237	MKTEF521/2x401/WKT-19.3	021 6337
Maintained joystick switches						
4 NO 		Standard	MKSE321	021 6455	MKSEF321	021 6555
		dto., UV/ozone-resistant	MKSE321/WKT-19.4	021 6456	MKSEF321/WKT-19.4	021 6556
		Silicone	MKSE321/WKT-19.3	021 6457	MKSEF321/WKT-19.3	021 6557
2 NO 		Standard	MKSE521	021 5024	MKSEF521	021 6560
		dto., UV/ozone-resistant	MKSE521/WKT-19.4	021 6461	MKSEF521/WKT-19.4	021 6561
		Silicone	MKSE521/WKT-19.3	021 6462	MKSEF521/WKT-19.3	021 6562
1 NC/ 1 NO 		Standard	MKSE521/206	021 6465	MKSEF521/206	021 6565
		dto., UV/ozone-resistant	MKSE521/206/WKT-19.4	021 6466	MKSEF521/206/WKT-19.4	021 6566
		Silicone	MKSE521/206/WKT-19.3	021 6467	MKSEF521/206/WKT-19.3	021 6567
1 NC/ 1 NO 		Standard	MKSE521/2x401	021 6470	MKSEF521/2x401	021 6570
		dto., UV/ozone-resistant	MKSE521/2x401/WKT-19.4	021 6471	MKSEF521/2x401/WKT-19.4	021 6571
		Silicone	MKSE521/2x401/WKT-19.3	021 6472	MKSEF521/2x401/WKT-19.3	021 6572

○ Position of reset; ◀●▶ momentary action position; ● latching position; NO = normally open contact; NC = normally closed contact

Spring-return joystick switches, Maintained joystick switches*

- For installation diameter 22.3 mm
- Design with blocking ring to protect against unintentional actuation
- 2 (4) directions of actuation/4 (2) switching signals each



Cross references:

- Functional description:
see pages 2 and 4 and following pages
- Sealing bellows:
see page 3
- Technical data:
see page 68
- Terminal markings:
see page 7
- Assembly information:
see page 9
- Spare parts: see page 66

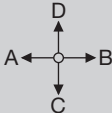
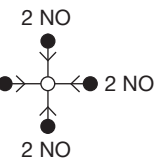
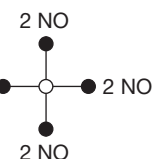
Additional information:

- Flat plug connections not possible

Options (on request):

- Other actuator (instead of the ball)
- Devices with 3 directions of actuation
- Other contact configuration

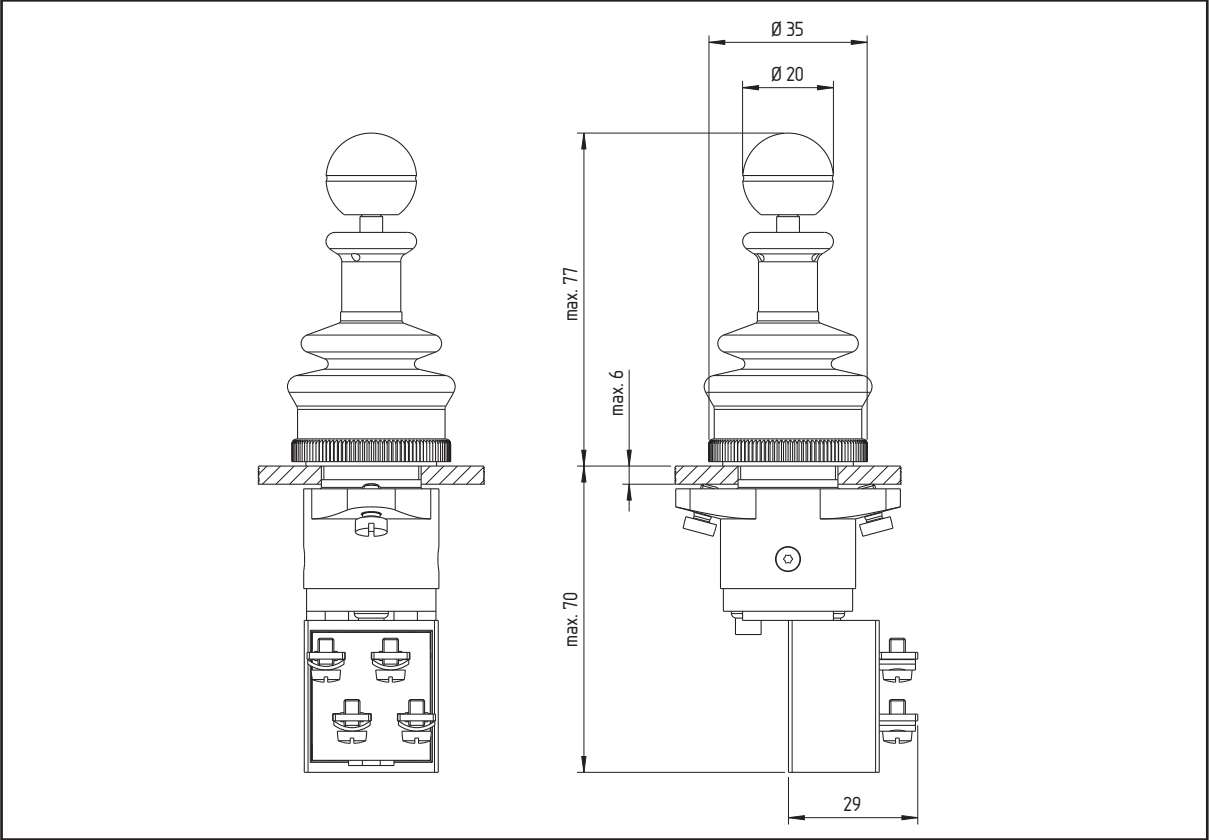
* Maintained/spring-return joystick switches: see pages 32/33
Spring-return joystick switches with analog output: see pages 36/37

Switching position, quantity, contacts		Sealing bellow	Connection technology Screw terminals	
			Type	Order number
Spring-return joystick switches				
 4 NC 4 NO		Standard	MKTE321/404	021 6255
		dto., UV/ozone-resistant	MKTE321/404/WKT-19.4	021 6256
		Silicone	MKTE321/404/WKT-19.3	021 6257
 4 NC 4 NC		Standard	MKTE321/800	021 6260
		dto., UV/ozone-resistant	MKTE321/800/WKT-19.4	021 6261
		Silicone	MKTE321/800/WKT-19.3	021 6262
		Standard	MKTE521/206.1	021 6265
		dto., UV/ozone-resistant	MKTE521/206.1/WKT-19.4	021 6266
		Silicone	MKTE521/206.1/WKT-19.3	021 6267
Maintained joystick switches				
 4 NC 4 NO		Standard	MKSE321/404	021 6490
		dto., UV/ozone-resistant	MKSE321/404/WKT-19.4	021 6491
		Silicone	MKSE321/404/WKT-19.3	021 6492
 4 NC 4 NC		Standard	MKSE321/800	021 6495
		dto., UV/ozone-resistant	MKSE321/800/WKT-19.4	021 6496
		Silicone	MKSE321/800/WKT-19.3	021 6497
		Standard	MKSE521/206.1	021 6600
		dto., UV/ozone-resistant	MKSE521/206.1/WKT-19.4	021 6601
		Silicone	MKSE521/206.1/WKT-19.3	021 6602

○ Position of reset; ◀●/▶ momentary action position; ● latching position; NO = normally open contact; NC = normally closed contact

Maintained/spring-return joystick switches

- For installation diameter 22.3 mm
- Design with blocking ring to protect against unintentional actuation
- 2 directions of actuation/1 switching signal each



Not illustrated: designs with flat-pin plug connections (see page 7, installed width 29 + 1 mm)

- Cross references:**

 - Functional description: see pages 2 and 4 and following pages
 - Sealing bellows: see page 3
 - Technical data: see page 68
 - Terminal markings: see page 7
 - Assembly information: see page 9
 - Spare parts: see page 66
- Options (on request):**

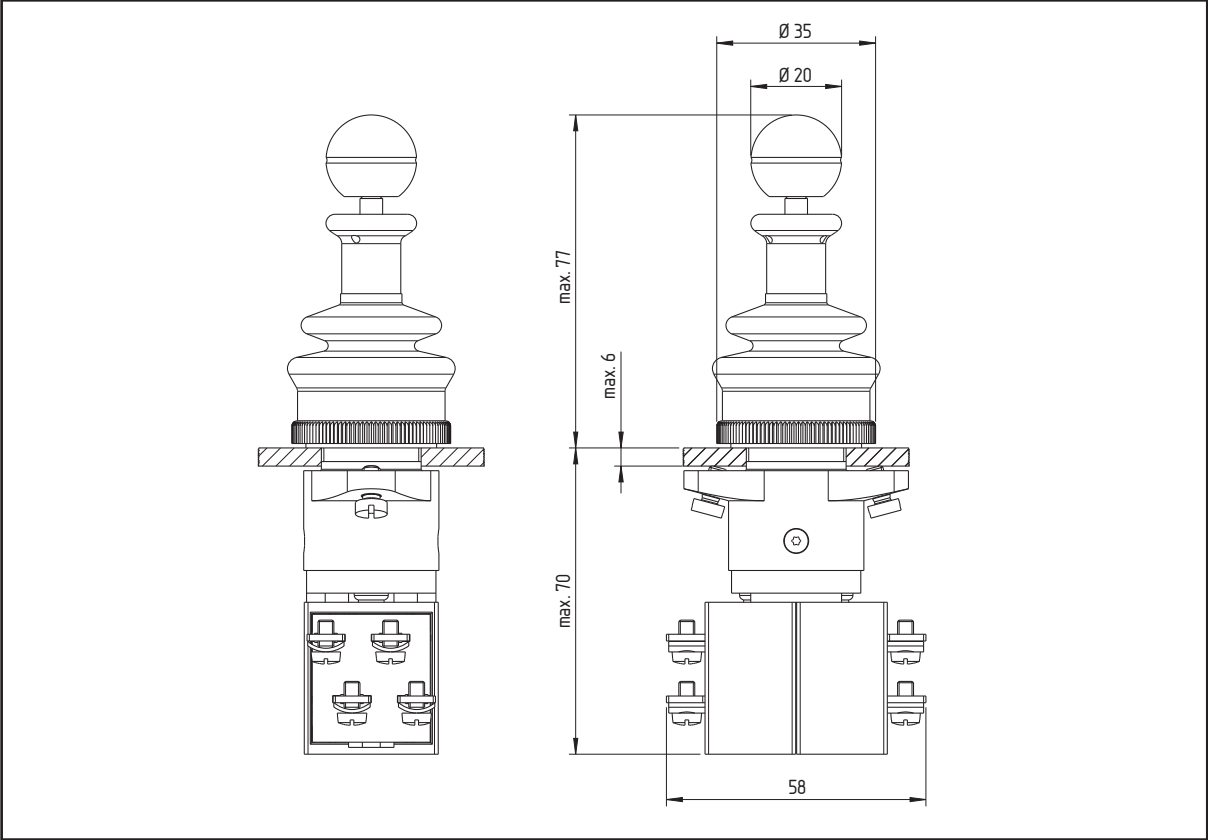
 - Other actuator (instead of the ball)
 - Other contact configuration

Switching position, quantity, contacts		Sealing bellow	Connection technology		Flat-pin plugs	
			Screw terminals			
			Type	Order number	Type	Order number
Maintained/spring-return joystick switches						
1 NO  1 NO		Standard	MK TSA321	021 6615	MK TSAF321	021 6715
		dto., UV/ozone-resistant	MK TSA321/WKT-19.4	021 6616	MK TSAF321/WKT-19.4	021 6716
		Silicone	MK TSA321/WKT-19.3	021 6617	MK TSAF321/WKT-19.3	021 6717

○ Position of reset; ◀●/▶ momentary action position; ● latching position; NO = normally open contact; NC = normally closed contact

Maintained/spring-return joystick switches

- For installation diameter 22.3 mm
- Design with blocking ring to protect against unintentional actuation
- 4 directions of actuation/1 switching signal each

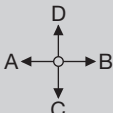
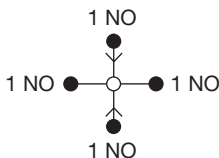


Not illustrated: designs with flat-pin plug connections (see page 7, installed width 29 + 1 mm)

- Cross references:**

 - Functional description: see pages 2 and 4 and following pages
 - Sealing bellows: see page 3
 - Technical data: see page 68
 - Terminal markings: see page 7
 - Assembly information: see page 9
 - Spare parts: see page 66
- Options (on request):**

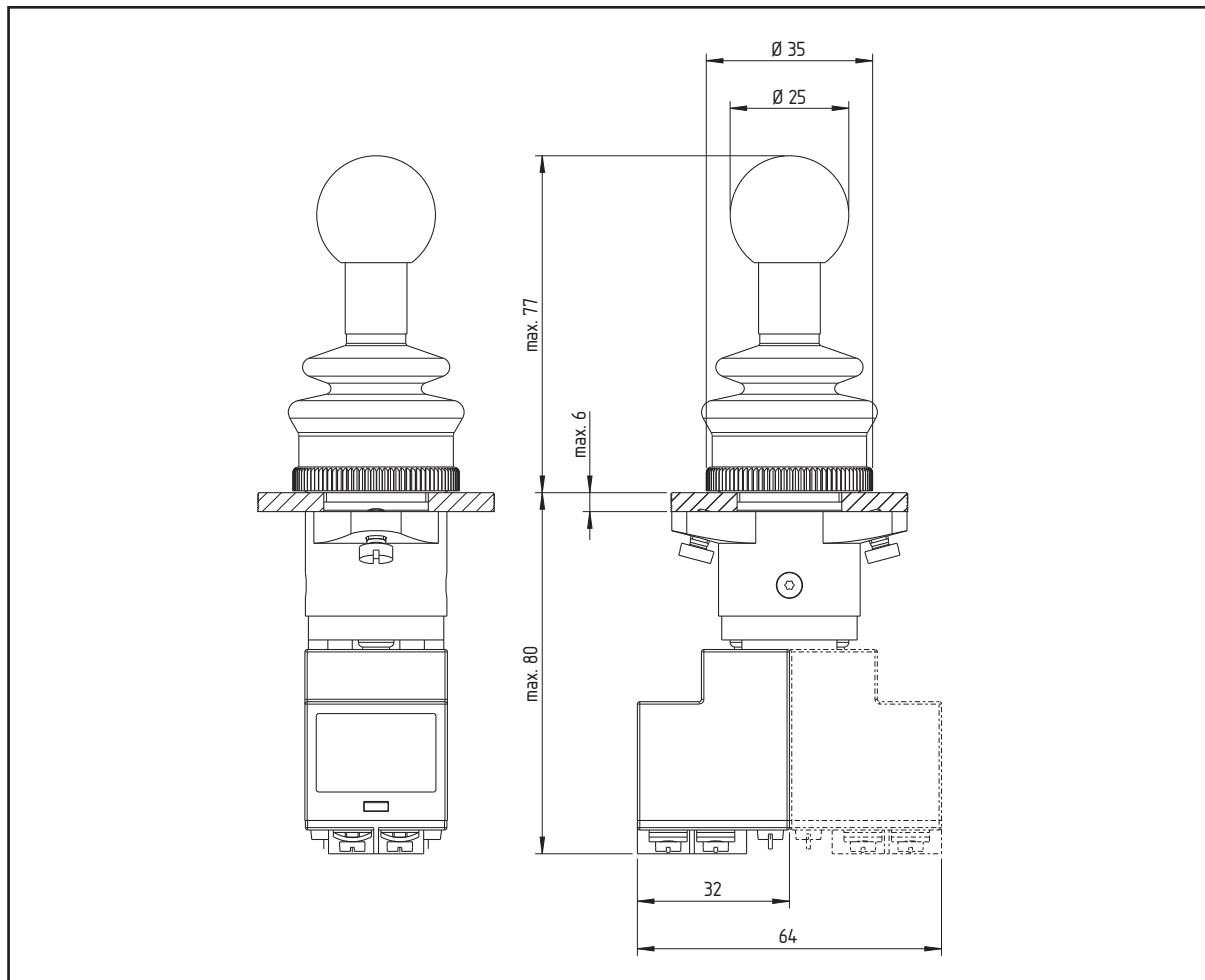
 - Other actuator (instead of the ball)
 - Devices with 3 directions of actuation
 - Other contact configuration

Switching position, quantity, contacts		Sealing bellow	Connection technology		Flat-pin plugs	
			Type	Order number	Type	Order number
Maintained/spring-return joystick switches						
	Standard	MKTSC521.2	021 6620	MKTSF521.2	021 6720	
	dto., UV/ozone-resistant	MKTSC521.2/WKT-19.4	021 6621	MKTSF521.2/WKT-19.4	021 6721	
	Silicone	MKTSC521.2/WKT-19.3	021 6622	MKTSF521.2/WKT-19.3	021 6722	

○ Position of reset; ◀●▶ momentary action position; ● latching position; NO = normally open contact; NC = normally closed contact

Spring-return joystick switches with analog output

- For installation diameter 22.3 mm
- Design without blocking ring to protect against unintentional actuation
- Devices with analog output



Cross references:

- Functional description: see pages 2 and 4 and following pages
- Sealing bellows: see page 3
- Technical data: see page 68
- Terminal markings: see page 7
- Assembly information: see page 9
- Spare parts: see page 66

Additional information:

- Flat plug connections not possible

Options (on request):

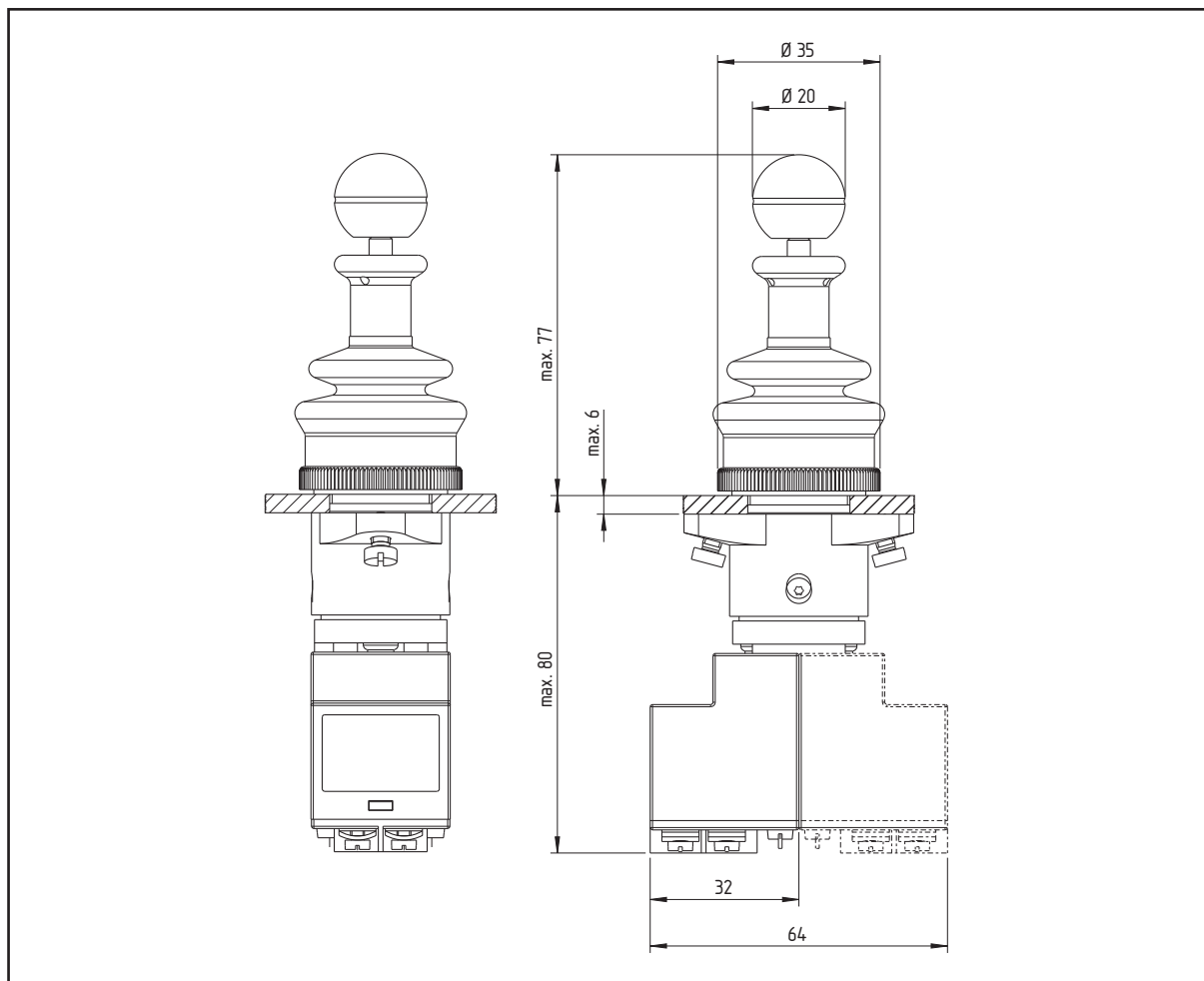
- Other actuator (instead of the ball)
- Other sealing bellows
- 1 x switching signal (instead of 1 x analog output)

Switching position, quantity, contacts		Sealing bellows	Connection technology	
			Screw terminals	
			Type	Order number
Spring-return joystick switches				
1 x 0.7–10 VDC		UV/ozone-resistant (WKT-19.4)	MKTA22/EO24AK	021 6810
1 x 0.7–10 VDC		UV/ozone-resistant (WKT-19.4)	MKTC32/EO24AK	021 6815

○ Position of reset; ◐/● momentary action position; ● latching position

Spring-return joystick switches with analog output

- For installation diameter 22.3 mm
- Design with blocking ring to protect against unintentional actuation
- Devices with analog output



Cross references:

- Functional description: see pages 2 and 4 and following pages
- Sealing bellows: see page 3
- Technical data: see page 68
- Terminal markings: see page 7
- Assembly information: see page 9
- Spare parts: see page 66

Additional information:

- Flat plug connections not possible

Options (on request):

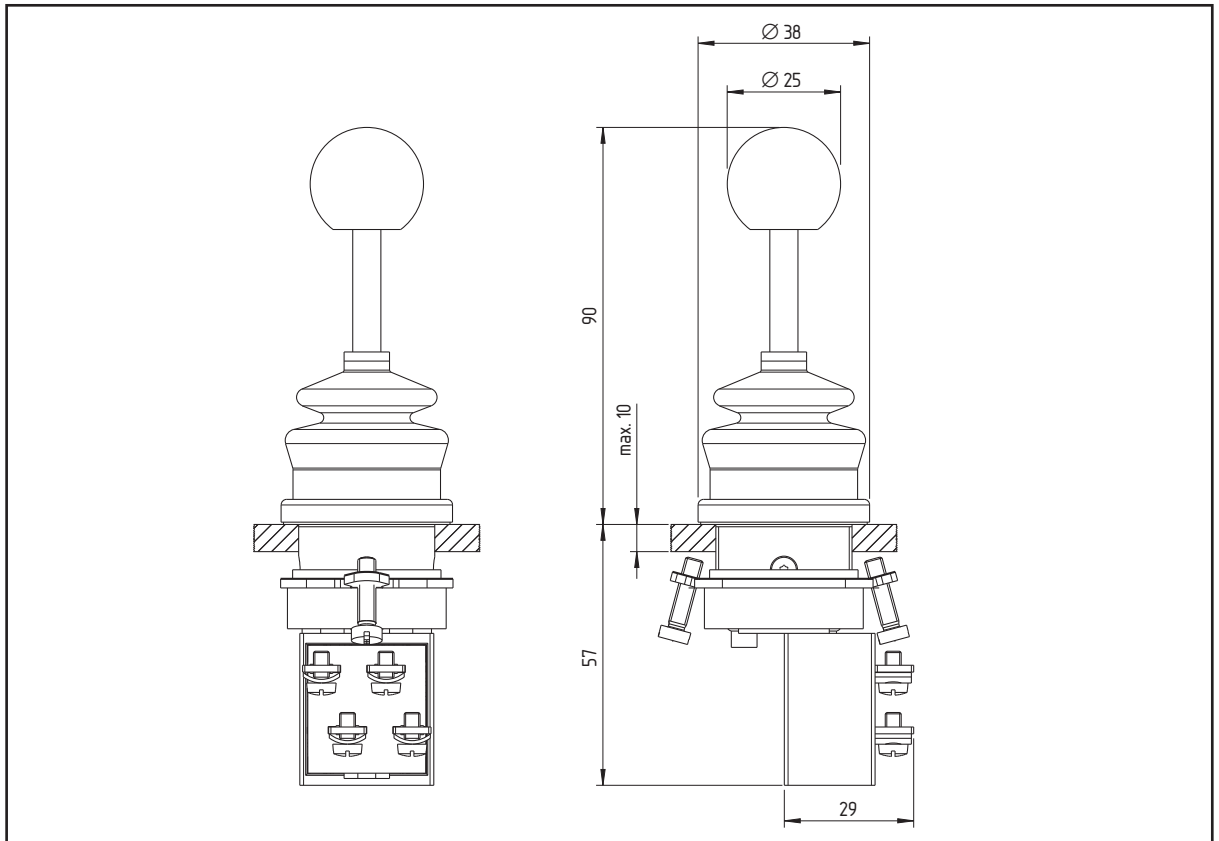
- Other actuator (instead of the ball)
- Sealing bellows made of NBR and silicone (thin-walled)
- 1 x switching signal (instead of 1 x analog output)

Switching position, quantity, contacts		Sealing bellows	Connection technology	
			Screw terminals	
			Type	Order number
Spring-return joystick switches				
1 x 0.7–10 VDC		UV/ozone-resistant (WKT-19.4)	MKTA221/EO24AK	021 6820
1 x 0.7–10 VDC		UV/ozone-resistant (WKT-19.4)	MKTC321/EO24AK	021 6825

○ Position of reset; ◐ momentary action position; ● latching position

Spring-return joystick switches, Maintained joystick switches*

- For installation diameter 30.5 mm
- Design without blocking ring to protect against unintentional actuation
- 2 directions of actuation/1 switching signal each



Not illustrated: designs with flat-pin plug connections (see page 7, installed width 29 + 1 mm)

Cross references:

- Functional description: see pages 2 and 4 and following pages
- Sealing bellows: see page 3
- Technical data: see page 68
- Terminal markings: see page 7
- Assembly information: see page 9
- Spare parts: see page 66

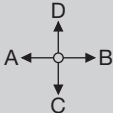
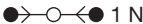
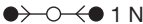
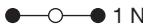
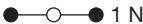
Additional information:

- Thick-walled silicone bellows: Protection class IP 69K

Options (on request):

- Other actuator (instead of the ball)
- Shorter actuating levers
- Metal housing (not fully-insulated)
- V2A bezel
- Secured with M30 nut/ser-rated lock washer, see page 66

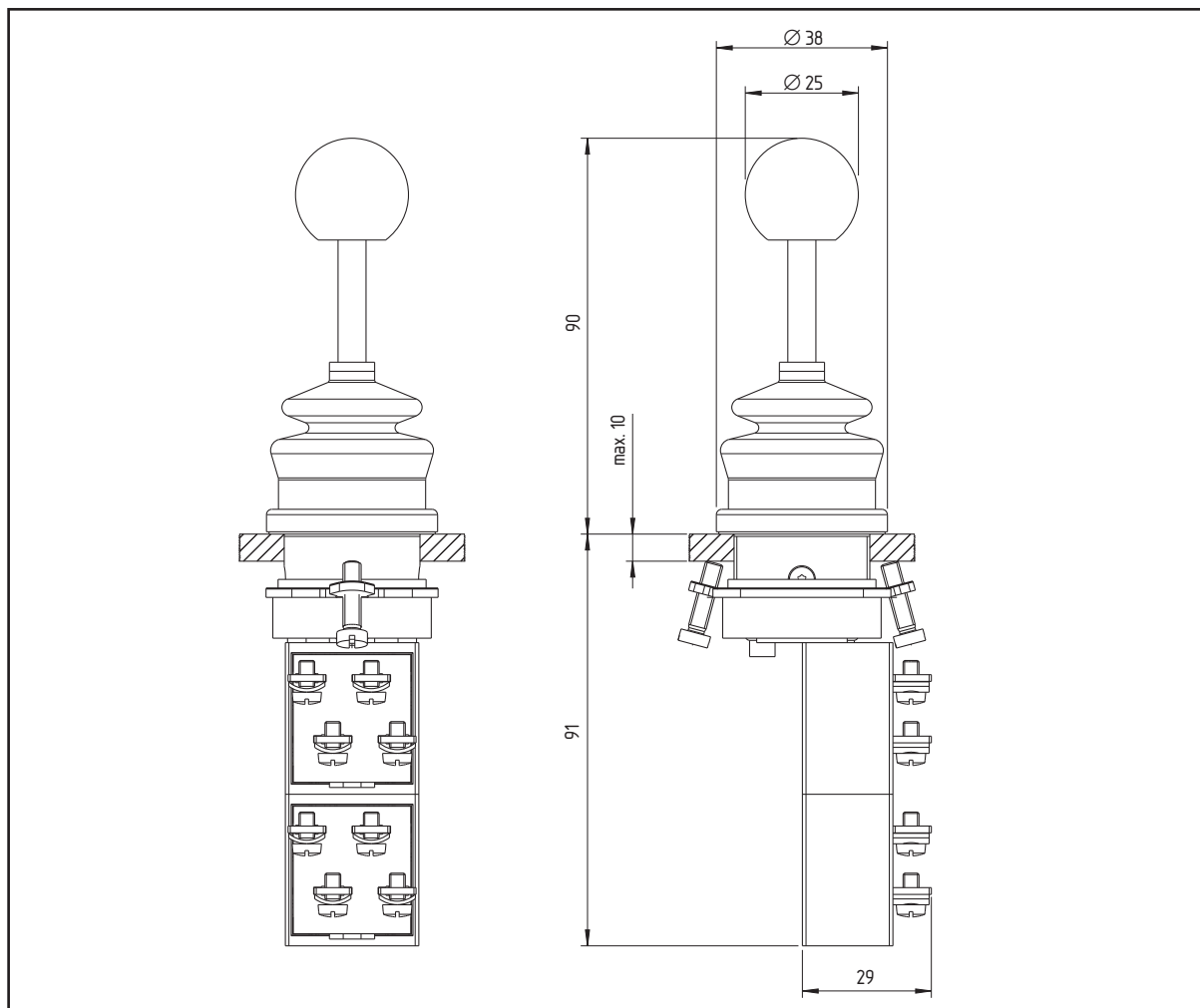
* Maintained/spring-return joystick switches: see pages 48/49
Spring-return joystick switches with analog output: see pages 62/63

Switching position, quantity, contacts		Sealing bellow	Connection technology		Flat-pin plugs	
			Screw terminals			
			Type	Order number	Type	Order number
Spring-return joystick switches						
1 NO  1 NO		Standard	WKTA32	043 0013	WKTAF32	043 3800
		dto., UV/ozone-resistant	WKTA32/WKT-19.4	043 0016	WKTAF32/WKT-19.4	043 3801
		Silicone	WKTA32/WKT-19.3	043 3702	WKTAF32/WKT-19.3	043 3802
		dto., thick-walled	WKTA32/WKT-26	043 3703	WKTAF32/WKT-26	043 3803
1 NC  1 NC		Standard	WKT32/401	043 3705	WKTF32/401	043 3805
		dto., UV/ozone-resistant	WKT32/401/WKT-19.4	043 3706	WKTF32/401/WKT-19.4	043 3806
		Silicone	WKT32/401/WKT-19.3	043 3707	WKTF32/401/WKT-19.3	043 3807
		dto., thick-walled	WKT32/401/WKT-26	043 3708	WKTF32/401/WKT-26	043 3808
Maintained joystick switches						
1 NO  1 NO		Standard	WKSA32	043 0650	WKSAF32	043 4055
		dto., UV/ozone-resistant	WKSA32/WKT-19.4	043 0652	WKSAF32/WKT-19.4	043 4056
		Silicone	WKSA32/WKT-19.3	043 3957	WKSAF32/WKT-19.3	043 4057
1 NC  1 NC		Standard	WKSA32/401	043 3960	WKSF32/401	043 4060
		dto., UV/ozone-resistant	WKSA32/401/WKT-19.4	043 3961	WKSF32/401/WKT-19.4	043 4061
		Silicone	WKSA32/401/WKT-19.3	043 3962	WKSF32/401/WKT-19.3	043 4062

○ Position of reset; ◀●/▶ momentary action position; ● latching position; NO = normally open contact; NC = normally closed contact

Spring-return joystick switches, Maintained joystick switches*

- For installation diameter 30.5 mm
- Design without blocking ring to protect against unintentional actuation
- 2 directions of actuation/2 switching signals each



Not illustrated: designs with flat-pin plug connections (see page 7, installed width 29 + 1 mm)

Cross references:

- Functional description: see pages 2 and 4 and following pages
- Sealing bellows: see page 3
- Technical data: see page 68
- Terminal markings: see page 7
- Assembly information: see page 9
- Spare parts: see page 66

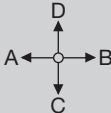
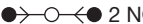
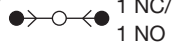
Additional information:

- Thick-walled silicone bellows: Protection class IP 69K

Options (on request):

- Other actuator (instead of the ball)
- Shorter actuating levers
- Metal housing (not fully-insulated)
- V2A bezel
- Secured with M30 nut/ser-rated lock washer, see page 66
- Other contact configurations

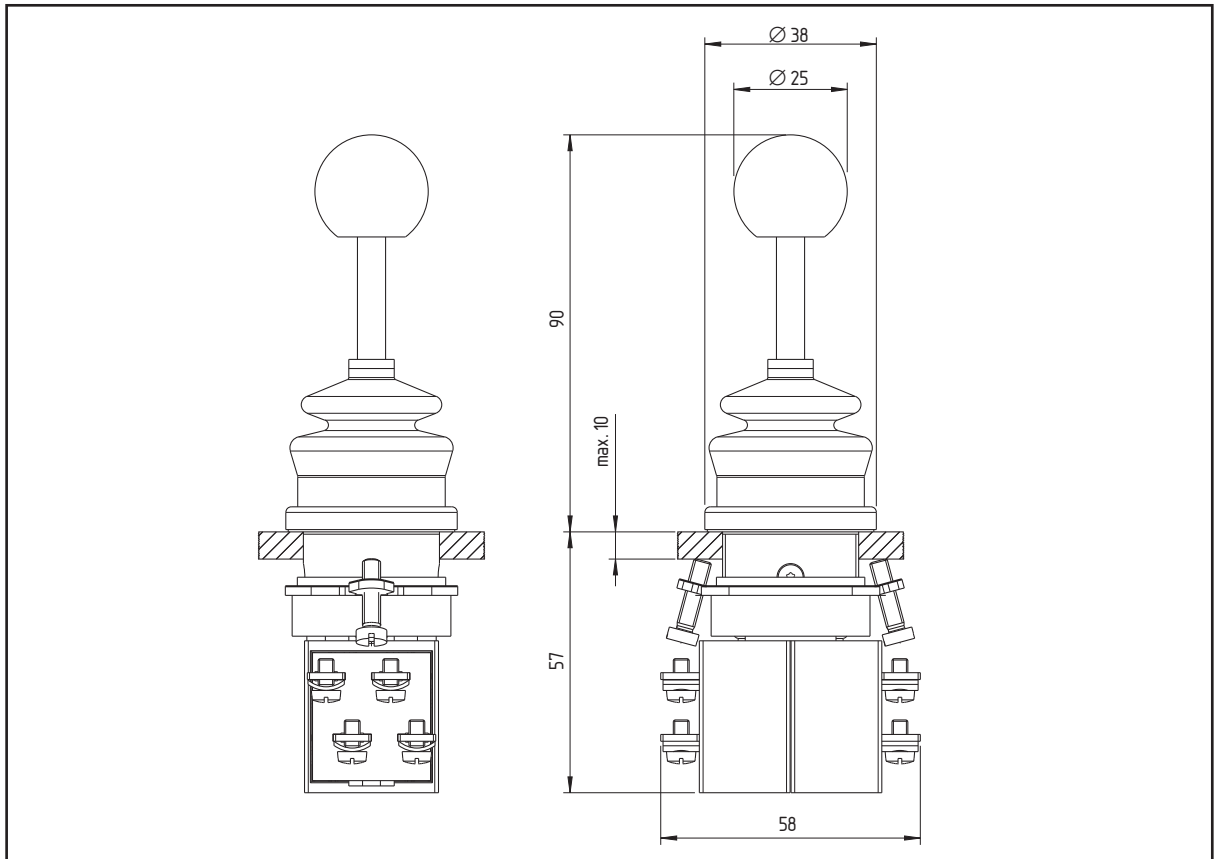
* Maintained/spring-return joystick switches: see pages 48/49
Spring-return joystick switches with analog output: see pages 62/63

Switching position, quantity, contacts		Sealing bellow	Connection technology Screw terminals		Flat-pin plugs	
			Type	Order number	Type	Order number
Spring-return joystick switches						
2 NO 		Standard	WKTB32	043 0056	WKTBF32	043 3820
		dto., UV/ozone-resistant	WKTB32/WKT-19.4	043 3721	WKTBF32/WKT-19.4	043 3821
		Silicone	WKTB32/WKT-19.3	043 3722	WKTBF32/WKT-19.3	043 3822
		dto., thick-walled	WKTB32/WKT-26	043 3723	WKTBF32/WKT-26	043 3823
1 NC/ 1 NO 		Standard	WKTB32/1x401	043 3725	WKTBF32/1x401	043 3825
		dto., UV/ozone-resistant	WKTB32/1x401/WKT-19.4	043 3726	WKTBF32/1x401/WKT-19.4	043 3826
		Silicone	WKTB32/1x401/WKT-19.3	043 3727	WKTBF32/1x401/WKT-19.3	043 3827
		dto., thick-walled	WKTB32/1x401/WKT-26	043 3728	WKTBF32/1x401/WKT-26	043 3828
Maintained joystick switches						
2 NO 		Standard	WKSB32	043 0706	WKSBF32	043 4070
		dto., UV/ozone-resistant	WKSB32/WKT-19.4	043 3971	WKSBF32/WKT-19.4	043 4071
		Silicone	WKSB32/WKT-19.3	043 3972	WKSBF32/WKT-19.3	043 4072
1 NC/ 1 NO 		Standard	WKSB32/1x401	043 3975	WKSBF32/1x401	043 4075
		dto., UV/ozone-resistant	WKSB32/1x401/WKT-19.4	043 3976	WKSBF32/1x401/WKT-19.4	043 4076
		Silicone	WKSB32/1x401/WKT-19.3	043 3977	WKSBF32/1x401/WKT-19.3	043 4077

○ Position of reset; ◀●/▶ momentary action position; ● latching position; NO = normally open contact; NC = normally closed contact

Spring-return joystick switches, Maintained joystick switches*

- For installation diameter 30.5 mm
- Design without blocking ring to protect against unintentional actuation
- 2 (3, 4) directions of actuation/2 (1) switching signal(s) each



Not illustrated: designs with flat-pin plug connections (see page 7, installed width 29 + 1 mm)

Cross references:

- Functional description: see pages 2 and 4 and following pages
- Sealing bellows: see page 3
- Technical data: see page 68
- Terminal markings: see page 7
- Assembly information: see page 9
- Spare parts: see page 66

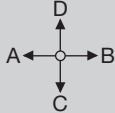
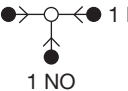
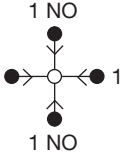
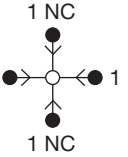
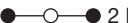
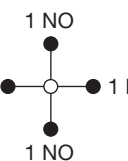
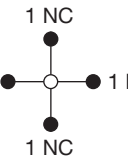
Additional information:

- Thick-walled silicone bellows: Protection class IP 69K

Options (on request):

- Other actuator (instead of the ball)
- Shorter actuating levers
- Metal housing (not fully-insulated)
- V2A bezel
- Secured with M30 nut/ser-rated lock washer, see page 66
- Other contact configurations

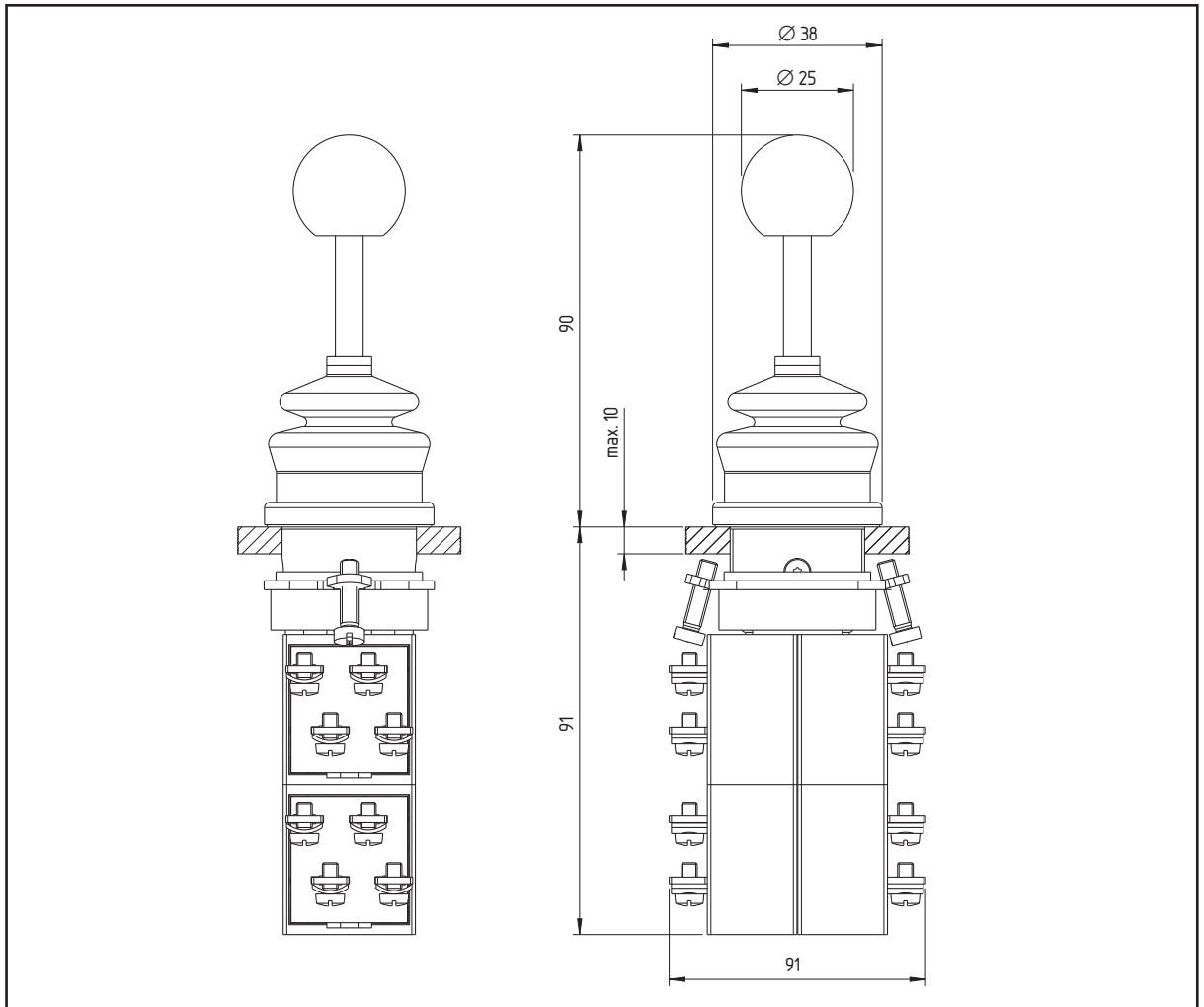
* Maintained/spring-return joystick switches: see pages 48/49
Spring-return joystick switches with analog output: see pages 62/63

Switching position, quantity, contacts		Sealing bellow	Connection technology		Flat-pin plugs	
			Screw terminals			
			Type	Order number	Type	Order number
Spring-return joystick switches						
 2 NO	Standard	WKTC32	0430072	WKTCF32	0433840	
	dto., UV/ozone-resistant	WKTC32/WKT-19.4	0433741	WKTCF32/WKT-19.4	0433841	
	Silicone	WKTC32/WKT-19.3	0433742	WKTCF32/WKT-19.3	0433842	
	dto., thick-walled	WKTC32/WKT-26	0433743	WKTCF32/WKT-26	0433843	
 1 NO	Standard	WKTC42	0430102	WKTCF42	0433850	
	dto., UV/ozone-resistant	WKTC42/WKT-19.4	0433751	WKTCF42/WKT-19.4	0433851	
	Silicone	WKTC42/WKT-19.3	0433752	WKTCF42/WKT-19.3	0433852	
	dto., thick-walled	WKTC42/WKT-26	0433753	WKTCF42/WKT-26	0433853	
 1 NO	Standard	WKTC52	0430153	WKTCF52	0430170	
	dto., UV/ozone-resistant	WKTC52/WKT-19.4	0430154	WKTCF52/WKT-19.4	0433855	
	Silicone	WKTC52/WKT-19.3	0433756	WKTCF52/WKT-19.3	0433856	
	dto., thick-walled	WKTC52/WKT-26	0433757	WKTCF52/WKT-26	0433857	
 1 NC	Standard	WKTC52/2x401	0433760	WKTCF52/2x401	0433860	
	dto., UV/ozone-resistant	WKTC52/2x401/WKT-19.4	0433761	WKTCF52/2x401/WKT-19.4	0433861	
	Silicone	WKTC52/2x401/WKT-19.3	0433762	WKTCF52/2x401/WKT-19.3	0433862	
	dto., thick-walled	WKTC52/2x401/WKT-26	0433763	WKTCF52/2x401/WKT-26	0433863	
Maintained joystick switches						
 2 NO	Standard	WKSC32	0430724	WKSCF32	0434090	
	dto., UV/ozone-resistant	WKSC32/WKT-19.4	0433991	WKSCF32/WKT-19.4	0434091	
	Silicone	WKSC32/WKT-19.3	0433992	WKSCF32/WKT-19.3	0434092	
 1 NO	Standard	WKSC42	0430757	WKSCF42	0434095	
	dto., UV/ozone-resistant	WKSC42/WKT-19.4	0433996	WKSCF42/WKT-19.4	0434096	
	Silicone	WKSC42/WKT-19.3	0433997	WKSCF42/WKT-19.3	0434097	
 1 NO	Standard	WKSC52	0430803	WKSCF52	0434200	
	dto., UV/ozone-resistant	WKSC52/WKT-19.4	0434101	WKSCF52/WKT-19.4	0434201	
	Silicone	WKSC52/WKT-19.3	0434102	WKSCF52/WKT-19.3	0434202	
 1 NC	Standard	WKSC52/2x401	0434105	WKSCF52/2x401	0434205	
	dto., UV/ozone-resistant	WKSC52/2x401/WKT-19.4	0434106	WKSCF52/2x401/WKT-19.4	0434206	
	Silicone	WKSC52/2x401/WKT-19.3	0434107	WKSCF52/2x401/WKT-19.3	0434207	

○ Position of reset; ◀●/▶ momentary action position; ● latching position; NO = normally open contact; NC = normally closed contact

Spring-return joystick switches, Maintained joystick switches*

- For installation diameter 30.5 mm
- Design without blocking ring to protect against unintentional actuation
- 2 (4) directions of actuation/4 (2) switching signals each



Not illustrated: designs with flat-pin plug connections (see page 7, installed width 29 + 1 mm)

Cross references:

- Functional description: see pages 2 and 4 and following pages
- Sealing bellows: see page 3
- Technical data: see page 68
- Terminal markings: see page 7
- Assembly information: see page 9
- Spare parts: see page 66

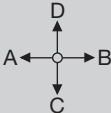
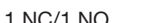
Additional information:

- Thick-walled silicone bellows: Protection class IP 69K

Options (on request):

- Other actuator (instead of the ball)
- Shorter actuating levers
- Metal housing (not fully-insulated)
- V2A bezel
- Secured with M30 nut/ser-rated lock washer, see page 66
- Devices with 3 directions of actuation
- Other contact configurations

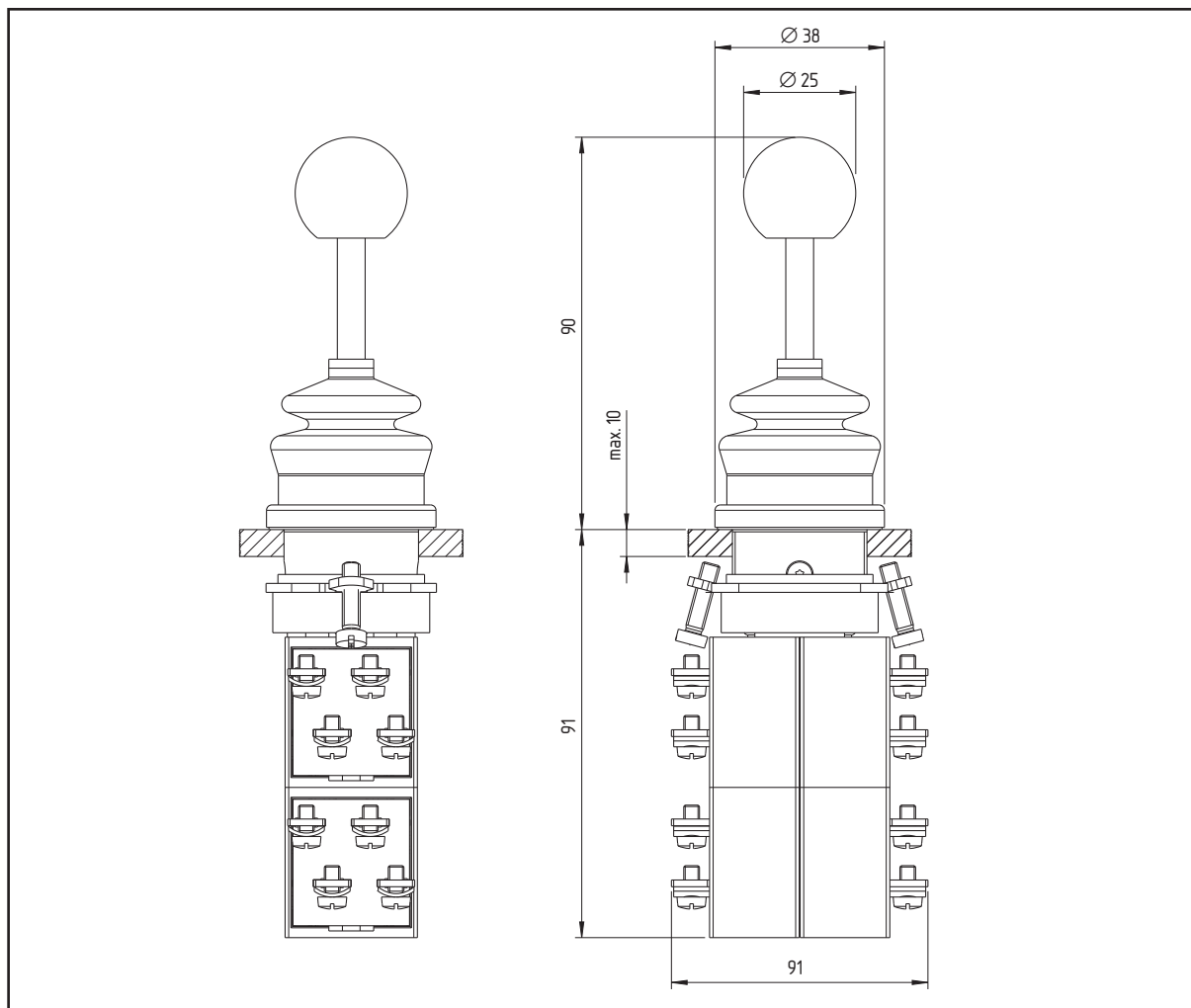
* Maintained/spring-return joystick switches: see pages 48/49
Spring-return joystick switches with analog output: see pages 62/63

Switching position, quantity, contacts		Sealing bellow	Connection technology		Flat-pin plugs	
			Screw terminals			
			Type	Order number	Type	Order number
Spring-return joystick switches						
	Standard	WKTE32	043 3785	WKTEF32	043 3885	
	dto., UV/ozone-resistant	WKTE32/WKT-19.4	043 3786	WKTEF32/WKT-19.4	043 3886	
	Silicone	WKTR32/WKT-19.3	043 3787	WKTEF32/WKT-19.3	043 3887	
	dto., thick-walled	WKTE32/WKT-26	043 3788	WKTEF32/WKT-26	043 3888	
	Standard	WKTE52	043 0251	WKTEF52	043 0253	
	dto., UV/ozone-resistant	WKTE52/WKT-19.4	043 3790	WKTEF52/WKT-19.4	043 3890	
	Silicone	WKTE52/WKT-19.3	043 3791	WKTEF52/WKT-19.3	043 3891	
	dto., thick-walled	WKTE52/WKT-26	043 3792	WKTEF52/WKT-26	043 3892	
	Standard	WKTE52/206	043 3795	WKTEF52/206	043 3895	
	dto., UV/ozone-resistant	WKTE52/206/WKT-19.4	043 3796	WKTEF52/206/WKT-19.4	043 3896	
	Silicone	WKTE52/206/WKT-19.3	043 3797	WKTEF52/206/WKT-19.3	043 3897	
	dto., thick-walled	WKTE52/206/WKT-26	043 3798	WKTEF52/206/WKT-26	043 3898	
	Standard	WKTE52/2x401	043 0254	WKTEF52/2x401	043 4000	
	dto., UV/ozone-resistant	WKTE52/2x401/WKT-19.4	043 3901	WKTEF52/2x401/WKT-19.4	043 4001	
	Silicone	WKTE52/2x401/WKT-19.3	043 3902	WKTEF52/2x401/WKT-19.3	043 4002	
	dto., thick-walled	WKTE52/2x401/WKT-26	043 3903	WKTEF52/2x401/WKT-26	043 4003	
Maintained joystick switches						
	Standard	WKSE32	043 4130	WKSEF32	043 4230	
	dto., UV/ozone-resistant	WKSE32/WKT-19.4	043 4131	WKSEF32/WKT-19.4	043 4231	
	Silicone	WKSE32/WKT-19.3	043 4132	WKSEF32/WKT-19.3	043 4232	
	Standard	WKSE52	043 0901	WKSEF52	043 4235	
	dto., UV/ozone-resistant	WKSE52/WKT-19.4	043 4136	WKSEF52/WKT-19.4	043 4236	
	Silicone	WKSE52/WKT-19.3	043 4137	WKSEF52/WKT-19.3	043 4237	
	Standard	WKSE52/206	043 4140	WKSEF52/206	043 4240	
	dto., UV/ozone-resistant	WKSE52/206/WKT-19.4	043 4141	WKSEF52/206/WKT-19.4	043 4241	
	Silicone	WKSE52/206/WKT-19.3	043 4142	WKSEF52/206/WKT-19.3	043 4242	
	Standard	WKSE52/2x401	043 4145	WKSEF52/2x401	043 4245	
	dto., UV/ozone-resistant	WKSE52/2x401/WKT-19.4	043 4146	WKSEF52/2x401/WKT-19.4	043 4246	
	Silicone	WKSE52/2x401/WKT-19.3	043 4147	WKSEF52/2x401/WKT-19.3	043 4247	

○ Position of reset; ◀●▶ momentary action position; ● latching position; NO = normally open contact; NC = normally closed contact

Spring-return joystick switches, Maintained joystick switches*

- For installation diameter 30.5 mm
- Design without blocking ring to protect against unintentional actuation
- 2 (4) directions of actuation/4 (2) switching signals each



Cross references:

- Functional description: see pages 2 and 4 and following pages
- Sealing bellows: see page 3
- Technical data: see page 68
- Terminal markings: see page 7
- Assembly information: see page 9
- Spare parts: see page 66

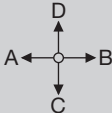
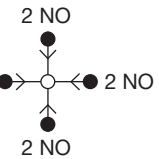
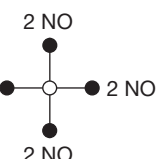
Additional information:

- Thick-walled silicone bellows: Protection class IP 69K
- Flat plug connections not possible

Options (on request):

- Other actuator (instead of the ball)
- Shorter actuating levers
- Metal housing (not fully-insulated)
- V2A bezel
- Secured with M30 nut/ser-rated lock washer, see page 66
- Devices with 3 directions of actuation
- Other contact configurations

* Maintained/spring-return joystick switches: see pages 48/49
Spring-return joystick switches with analog output: see pages 62/63

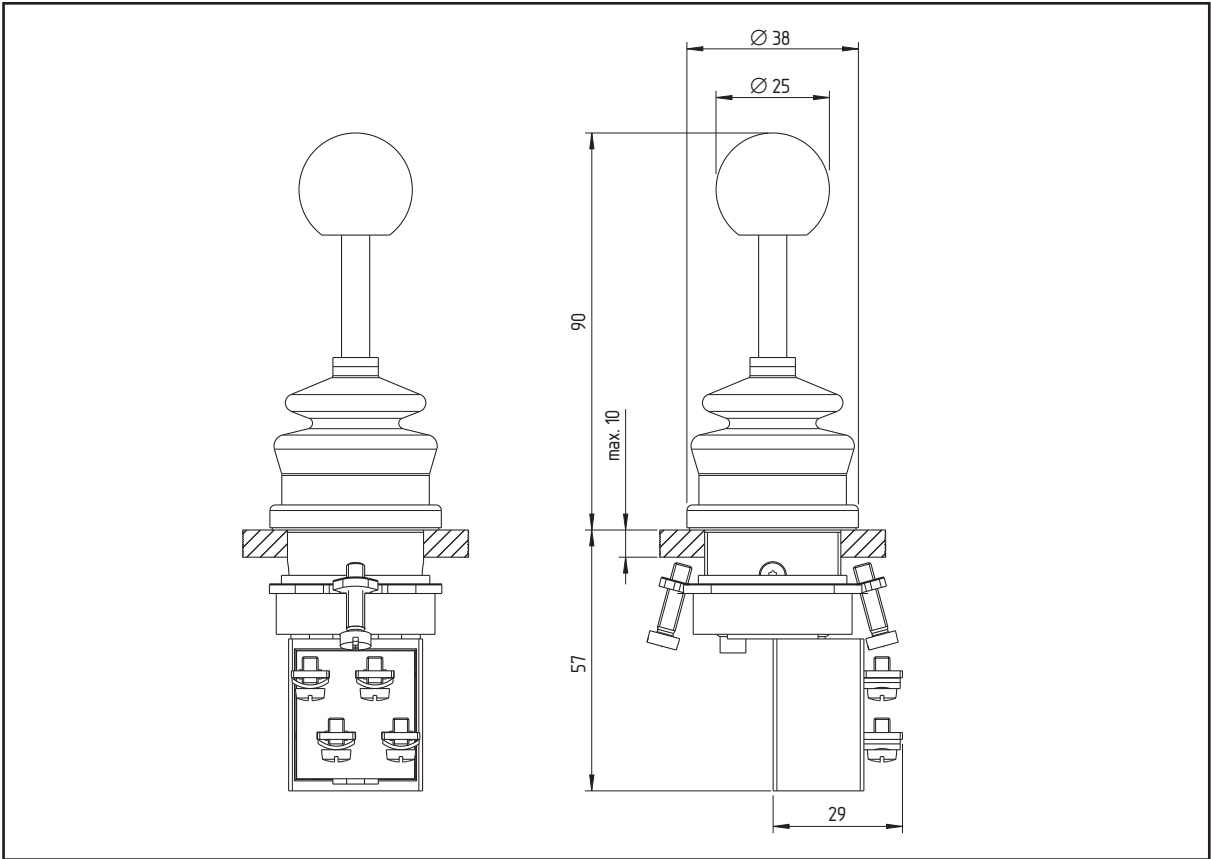
Switching position, quantity, contacts		Sealing bellow	Connection technology Screw terminals	
			Type	Order number
Spring-return joystick switches				
	Standard	WKTE32/404	043 3925	
	dto., UV/ozone-resistant	WKTE32/404/WKT-19.4	043 3926	
	Silicone	WKTE32/404/WKT-19.3	043 3927	
	dto., thick-walled	WKTE32/404/WKT-26	043 3928	
	Standard	WKTE32/800	043 3930	
	dto., UV/ozone-resistant	WKTE32/800/WKT-19.4	043 3931	
	Silicone	WKTE32/800/WKT-19.3	043 3932	
	dto., thick-walled	WKTE32/800/WKT-26	043 3933	
	Standard	WKTE52/206.1	043 3935	
	dto., UV/ozone-resistant	WKTE52/206.1/WKT-19.4	043 3936	
	Silicone	WKTE52/206.1/WKT-19.3	043 3937	
	dto., thick-walled	WKTE52/206.1/WKT-26	043 3938	
Maintained joystick switches				
	Standard	WKSE32/404	043 4170	
	dto., UV/ozone-resistant	WKSE32/404/WKT-19.4	043 4171	
	Silicone	WKSE32/404/WKT-19.3	043 4172	
	Standard	WKSE32/800	043 4175	
	dto., UV/ozone-resistant	WKSE32/800/WKT-19.4	043 4176	
	Silicone	WKSE32/800/WKT-19.3	043 4177	
	Standard	WKSE52/206.1	043 4180	
	dto., UV/ozone-resistant	WKSE52/206.1/WKT-19.4	043 4181	
	Silicone	WKSE52/206.1/WKT-19.3	043 4182	

○ Position of reset; ◀●/▶ momentary action position; ● latching position; NO = normally open contact; NC = normally closed contact

○ Position of reset; ◀/▶ momentary action position; ● latching position; NO = normally open contact; NC = normally closed contact

Maintained/spring-return joystick switches

- For installation diameter 30.5 mm
- Design without blocking ring to protect against unintentional actuation
- 2 directions of actuation/1 switching signal each



Not illustrated: designs with flat-pin plug connections (see page 7, installed width 29 + 1 mm)

Cross references:

- Functional description: see pages 2 and 4 and following pages
- Sealing bellows: see page 3
- Technical data: see page 68
- Terminal markings: see page 7
- Assembly information: see page 9
- Spare parts: see page 66

Options (on request):

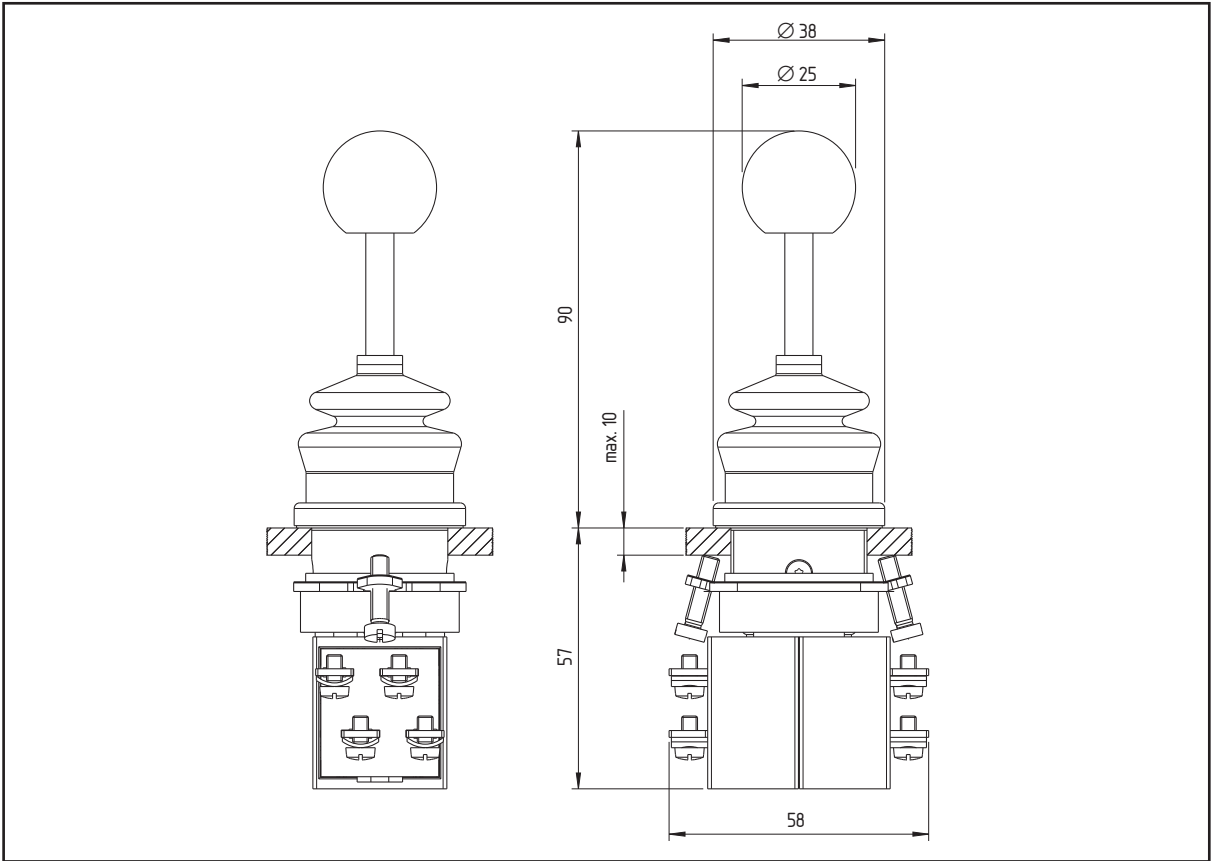
- Other actuator (instead of the ball)
- Shorter actuating levers
- Metal housing (not fully-insulated)
- V2A bezel
- Secured with M30 nut/serrated lock washer, see page 66
- Other contact configurations

Switching position, quantity, contacts		Sealing bellow	Connection technology		Flat-pin plugs	
			Screw terminals			
			Type	Order number	Type	Order number
Maintained/spring-return joystick switches						
1 NO  1 NO		Standard	WK TSA32	043 1303	WK TSAF32	043 4400
		dto., UV/ozone-resistant	WK TSA32/WKT-19.4	043 4301	WK TSAF32/WKT-19.4	043 4401
		Silicone	WK TSA32/WKT-19.3	043 4302	WK TSAF32/WKT-19.3	043 4402

○ Position of reset; ◀●/▶ momentary action position; ● latching position; NO = normally open contact; NC = normally closed contact

Maintained/spring-return joystick switches

- For installation diameter 30.5 mm
- Design without blocking ring to protect against unintentional actuation
- 4 directions of actuation/1 switching signal each



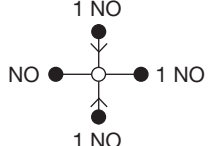
Not illustrated: designs with flat-pin plug connections (see page 7, installed width 29 + 1 mm)

Cross references:

- Functional description: see pages 2 and 4 and following pages
- Sealing bellows: see page 3
- Technical data: see page 68
- Terminal markings: see page 7
- Assembly information: see page 9
- Spare parts: see page 66

Options (on request):

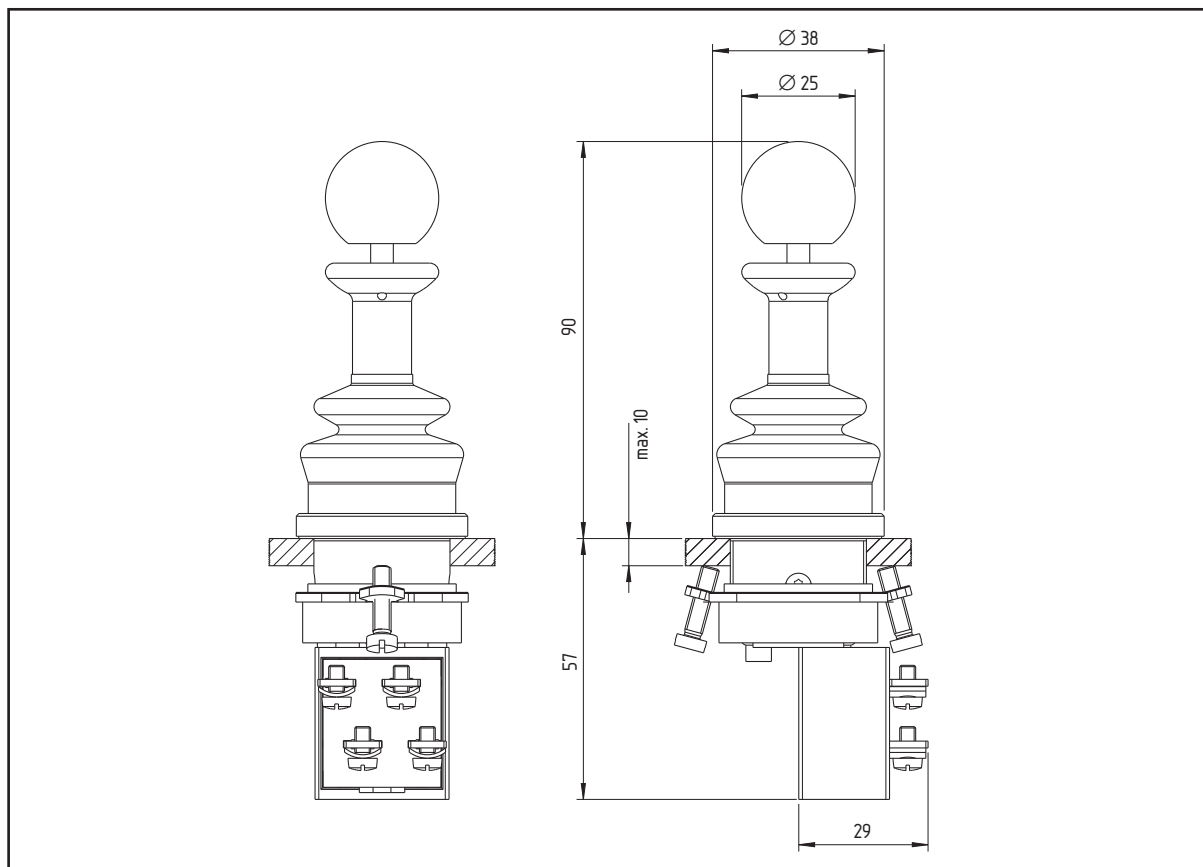
- Other actuator (instead of the ball)
- Shorter actuating levers
- Metal housing (not fully-insulated)
- V2A bezel
- Secured with M30 nut/ser-rated lock washer, see page 66
- Devices with 3 directions of actuation
- Other contact configurations

Switching position, quantity, contacts		Sealing bellow	Connection technology		Flat-pin plugs	
			Screw terminals			
			Type	Order number	Type	Order number
Maintained/spring-return joystick switches						
		Standard	WKTSC52.2	043 2008	WKTSCF52.2	043 4405
		dto., UV/ozone-resistant	WKTSC52.2/WKT-19.4	043 4306	WKTSCF52.2/WKT-19.4	043 4406
		Silicone	WKTSC52.2/WKT-19.3	043 4307	WKTSCF52.2/WKT-19.3	043 4407

○ Position of reset; ◀●▶ momentary action position; ● latching position; NO = normally open contact; NC = normally closed contact

Spring-return joystick switches, Maintained joystick switches*

- For installation diameter 30.5 mm
- Design with blocking ring to protect against unintentional actuation
- 2 directions of actuation/1 switching signal each



Not illustrated: designs with flat-pin plug connections (see page 7, installed width 29 + 1 mm)

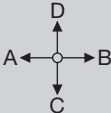
Cross references:

- Functional description: see pages 2 and 4 and following pages
- Sealing bellows: see page 3
- Technical data: see page 68
- Terminal markings: see page 7
- Assembly information: see page 9
- Spare parts: see page 66

Options (on request):

- Other actuator (instead of the ball)
- Metal housing (not fully-insulated)
- V2A bezel
- Secured with M30 nut/ser-rated lock washer, see page 66

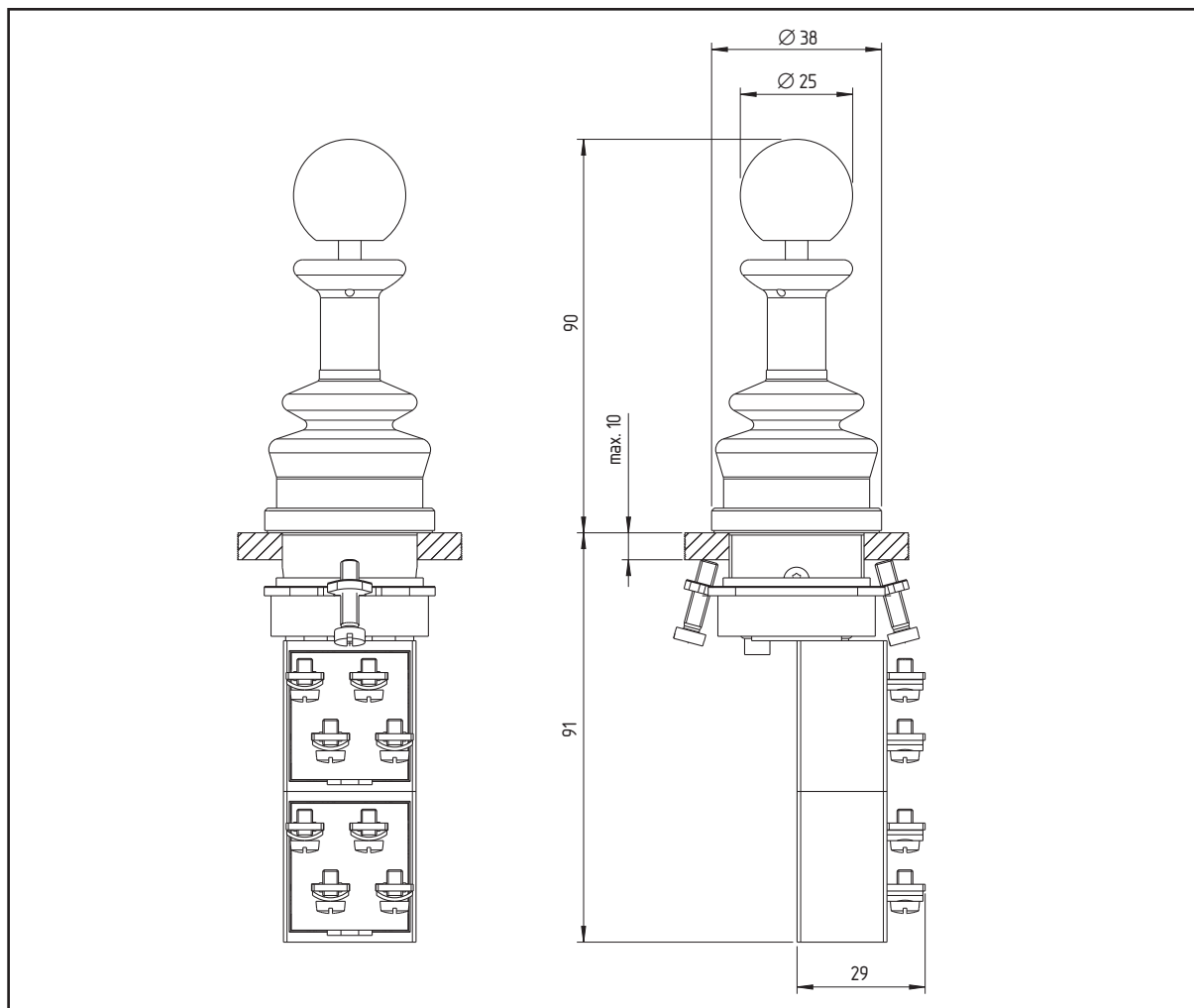
* Maintained/spring-return joystick switches: see pages 60/61
Spring-return joystick switches with analog output: see pages 64/65

Switching position, quantity, contacts		Sealing bellow	Connection technology		Flat-pin plugs	
			Screw terminals			
			Type	Order number	Type	Order number
Spring-return joystick switches						
1 NO   1 NO		Standard	WKTA321	043 0014	WKTAF321	043 3810
		dto., UV/ozone-resistant	WKTA321/WKT-19.4	043 1025	WKTAF321/WKT-19.4	043 3811
		Silicone	WKTA321/WKT-19.3	043 3712	WKTAF321/WKT-19.3	043 3812
1 NC   1 NC		Standard	WKTA321/401	043 3715	WKTAF321/401	043 3815
		dto., UV/ozone-resistant	WKTA321/401/WKT-19.4	043 3716	WKTAF321/401/WKT-19.4	043 3816
		Silicone	WKTA321/401/WKT-19.3	043 3717	WKTAF321/401/WKT-19.3	043 3817
Maintained joystick switches						
1 NO   1 NO		Standard	WKSA321	043 1001	WKSAF321	043 1005
		dto., UV/ozone-resistant	WKSA321/WKT-19.4	043 1030	WKSAF321/WKT-19.4	043 4065
		Silicone	WKSA321/WKT-19.3	043 3966	WKSAF321/WKT-19.3	043 4066
1 NC   1 NC		Standard	WKSA321/401	043 3967	WKSAF321/401	043 4067
		dto., UV/ozone-resistant	WKSA321/401/WKT-19.4	043 3968	WKSAF321/401/WKT-19.4	043 4068
		Silicone	WKSA321/401/WKT-19.3	043 3969	WKSAF321/401/WKT-19.3	043 4069

○ Position of reset; ◀●/●▶ momentary action position; ● latching position; NO = normally open contact; NC = normally closed contact

Spring-return joystick switches, Maintained joystick switches*

- For installation diameter 30.5 mm
- Design with blocking ring to protect against unintentional actuation
- 2 directions of actuation/2 switching signals each



Not illustrated: designs with flat-pin plug connections (see page 7, installed width 29 + 1 mm)

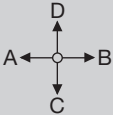
Cross references:

- Functional description: see pages 2 and 4 and following pages
- Sealing bellows: see page 3
- Technical data: see page 68
- Terminal markings: see page 7
- Assembly information: see page 9
- Spare parts: see page 66

Options (on request):

- Other actuator (instead of the ball)
- Shorter actuating levers
- Metal housing (not fully-insulated)
- V2A bezel
- Secured with M30 nut/ser-rated lock washer, see page 66
- Other contact configurations

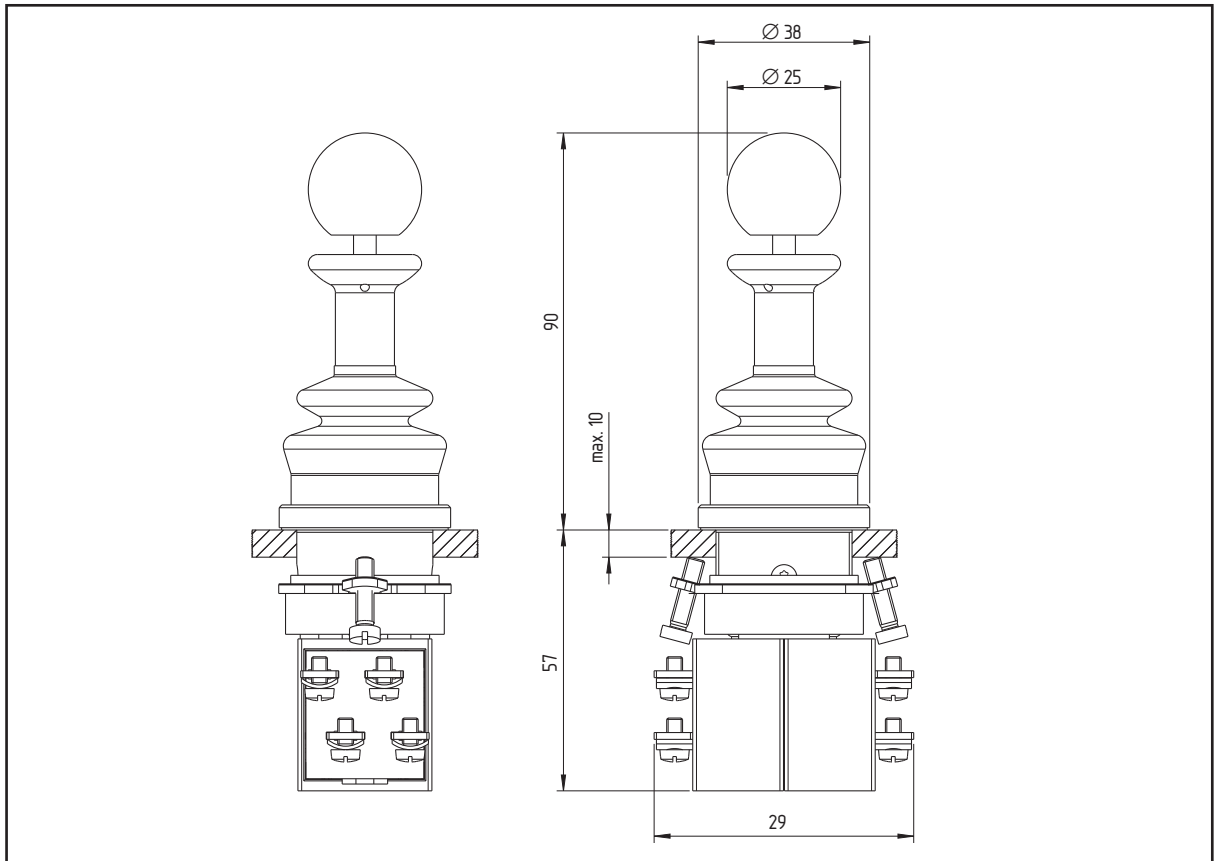
* Maintained/spring-return joystick switches: see pages 60/61
Spring-return joystick switches with analog output: see pages 64/65

Switching position, quantity, contacts		Sealing bellow	Connection technology		Flat-pin plugs	
			Screw terminals			
			Type	Order number	Type	Order number
Spring-return joystick switches						
2 NO 		Standard	WKTB321	043 0358	WKTBF321	043 3830
		dto., UV/ozone-resistant	WKTB321/WKT-19.4	043 3731	WKTBF321/WKT-19.4	043 3831
		Silicone	WKTB321/WKT-19.3	043 3732	WKTBF321/WKT-19.3	043 3832
1 NC/ 1 NO 		Standard	WKTB321/1x401	043 3735	WKTBF321/1x401	043 3835
		dto., UV/ozone-resistant	WKTB321/1x401/WKT-19.4	043 3736	WKTBF321/1x401/WKT-19.4	043 3836
		Silicone	WKTB321/1x401/WKT-19.3	043 3737	WKTBF321/1x401/WKT-19.3	043 3837
Maintained joystick switches						
2 NO 		Standard	WKSB321	043 1052	WKSBF321	043 4080
		dto., UV/ozone-resistant	WKSB321/WKT-19.4	043 3981	WKSBF321/WKT-19.4	043 4081
		Silicone	WKSB321/WKT-19.3	043 3982	WKSBF321/WKT-19.3	043 4082
1 NC/ 1 NO 		Standard	WKSB321/1x401	043 3985	WKSBF321/1x401	043 4085
		dto., UV/ozone-resistant	WKSB321/1x401/WKT-19.4	043 3986	WKSBF321/1x401/WKT-19.4	043 4086
		Silicone	WKSB321/1x401/WKT-19.3	043 3987	WKSBF321/1x401/WKT-19.3	043 4087

○ Position of reset; ◀●/▶ momentary action position; ● latching position; NO = normally open contact; NC = normally closed contact

Spring-return joystick switches, Maintained joystick switches*

- For installation diameter 30.5 mm
- Design with blocking ring to protect against unintentional actuation
- 2 (3, 4) directions of actuation/2 (1) switching signal(s) each



Not illustrated: designs with flat-pin plug connections (see page 7, installed width 29 + 1 mm)

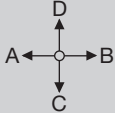
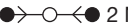
Cross references:

- Functional description: see pages 2 and 4 and following pages
- Sealing bellows: see page 3
- Technical data: see page 68
- Terminal markings: see page 7
- Assembly information: see page 9
- Spare parts: see page 66

Options (on request):

- Other actuator (instead of the ball)
- Metal housing (not fully-insulated)
- V2A bezel
- Secured with M30 nut/ser-rated lock washer, see page 66
- Other contact configurations

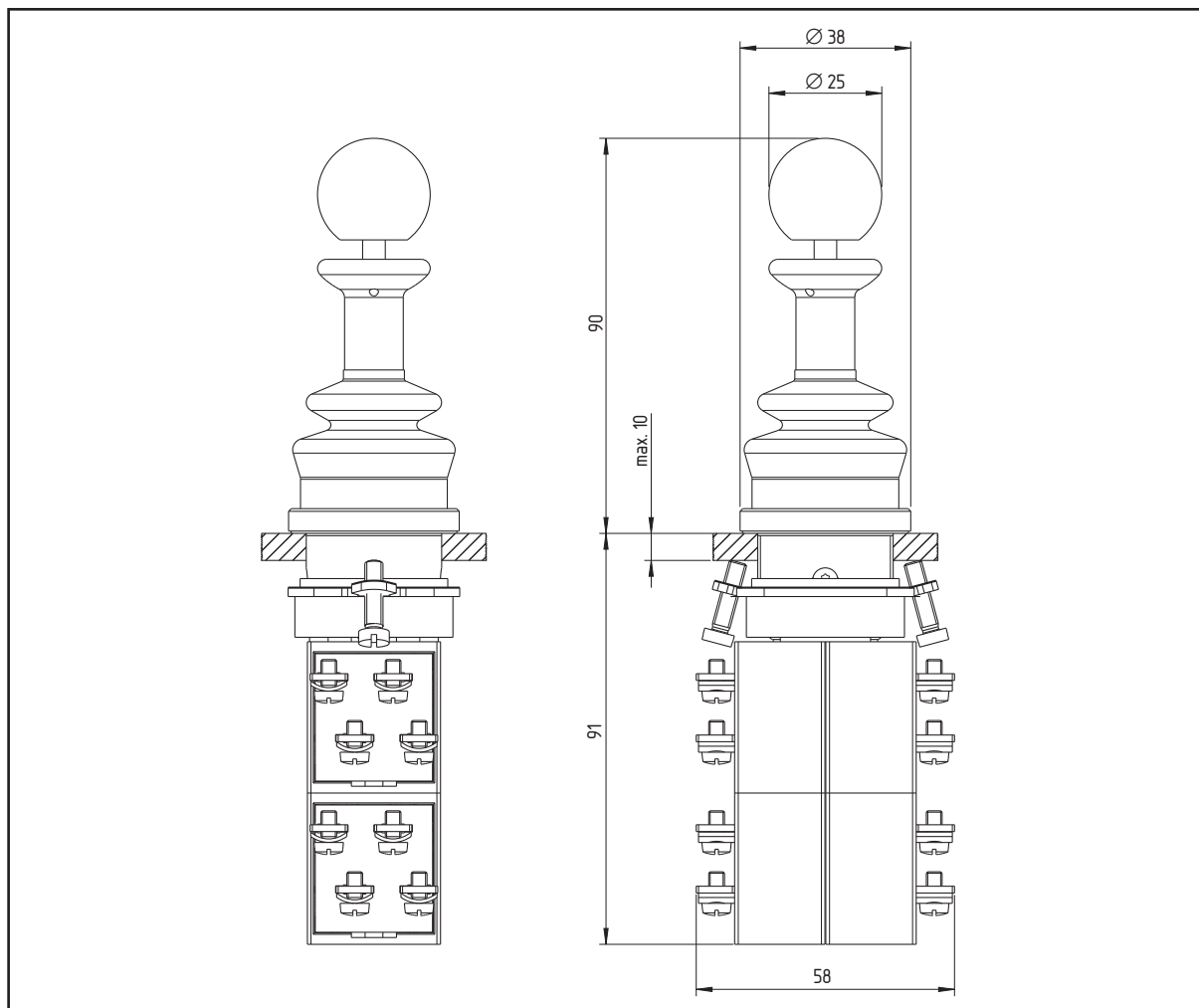
* Maintained/spring-return joystick switches: see pages 60/61
Spring-return joystick switches with analog output: see pages 64/65

Switching position, quantity, contacts		Sealing bellow	Connection technology		Flat-pin plugs	
			Type	Order number	Type	Order number
Spring-return joystick switches						
 2 NO	Standard	WKTC321	043 0099	WKTCF321	043 3865	
	dto., UV/ozone-resistant	WKTC321/WKT-19.4	043 3766	WKTCF321/WKT-19.4	043 3866	
	Silicone	WKTC321/WKT-19.3	043 3767	WKTCF321/WKT-19.3	043 3867	
 1 NO 1 NO	Standard	WKTC421	043 0404	WKTCF421	043 3870	
	dto., UV/ozone-resistant	WKTC421/WKT-19.4	043 3771	WKTCF421/WKT-19.4	043 3871	
	Silicone	WKTC421/WKT-19.3	043 3772	WKTCF421/WKT-19.3	043 3872	
 1 NO 1 NO 1 NO	Standard	WKTC521	043 0455	WKTCF521	043 3875	
	dto., UV/ozone-resistant	WKTC521/WKT-19.4	043 1020	WKTCF521/WKT-19.4	043 3876	
	Silicone	WKTC521/WKT-19.3	043 3777	WKTCF521/WKT-19.3	043 3877	
 1 NC 1 NC 1 NC	Standard	WKTC521/2x401	043 3780	WKTCF521/2x401	043 3880	
	dto., UV/ozone-resistant	WKTC521/2x401/WKT-19.4	043 3781	WKTCF521/2x401/WKT-19.4	043 3881	
	Silicone	WKTC521/2x401/WKT-19.3	043 3782	WKTCF521/2x401/WKT-19.3	043 3882	
Maintained joystick switches						
 2 NO	Standard	WKSC321	043 1095	WKSCF321	043 4210	
	dto., UV/ozone-resistant	WKSC321/WKT-19.4	043 4111	WKSCF321/WKT-19.4	043 4211	
	Silicone	WKSC321/WKT-19.3	043 4112	WKSCF321/WKT-19.3	043 4212	
 1 NO 1 NO	Standard	WKSC421	043 1109	WKSCF421	043 4215	
	dto., UV/ozone-resistant	WKSC421/WKT-19.4	043 1015	WKSCF421/WKT-19.4	043 4216	
	Silicone	WKSC421/WKT-19.3	043 4117	WKSCF421/WKT-19.3	043 4217	
 1 NO 1 NO 1 NO	Standard	WKSC521	043 1150	WKSCF521	043 4220	
	dto., UV/ozone-resistant	WKSC521/WKT-19.4	043 4121	WKSCF521/WKT-19.4	043 4221	
	Silicone	WKSC521/WKT-19.3	043 4122	WKSCF521/WKT-19.3	043 4222	
 1 NC 1 NC 1 NC	Standard	WKSC521/2x401	043 4125	WKSCF521/2x401	043 4225	
	dto., UV/ozone-resistant	WKSC521/2x401/WKT-19.4	043 4126	WKSCF521/2x401/WKT-19.4	043 4226	
	Silicone	WKSC521/2x401/WKT-19.3	043 4127	WKSCF521/2x401/WKT-19.3	043 4227	

○ Position of reset; ◀●/▶ momentary action position; ● latching position; NO = normally open contact; NC = normally closed contact

Spring-return joystick switches, Maintained joystick switches*

- For installation diameter 30.5 mm
- Design with blocking ring to protect against unintentional actuation
- 2 (4) directions of actuation/4 (2) switching signals each



Not illustrated: designs with flat-pin plug connections (see page 7, installed width 29 + 1 mm)

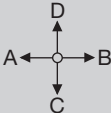
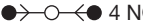
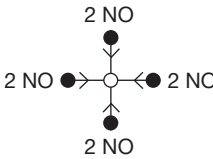
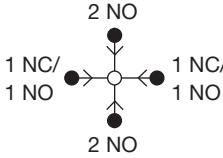
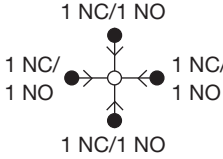
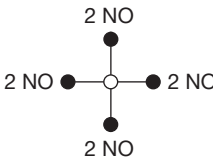
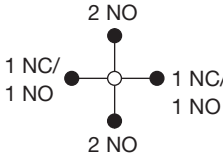
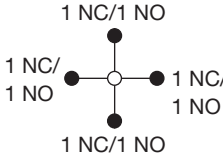
Cross references:

- Functional description: see pages 2 and 4 and following pages
- Sealing bellows: see page 3
- Technical data: see page 68
- Terminal markings: see page 7
- Assembly information: see page 9
- Spare parts: see page 66

Options (on request):

- Other actuator (instead of the ball)
- Shorter actuating levers
- Metal housing (not fully-insulated)
- V2A bezel
- Secured with M30 nut/ser-rated lock washer, see page 66
- Devices with 3 directions of actuation
- Other contact configurations

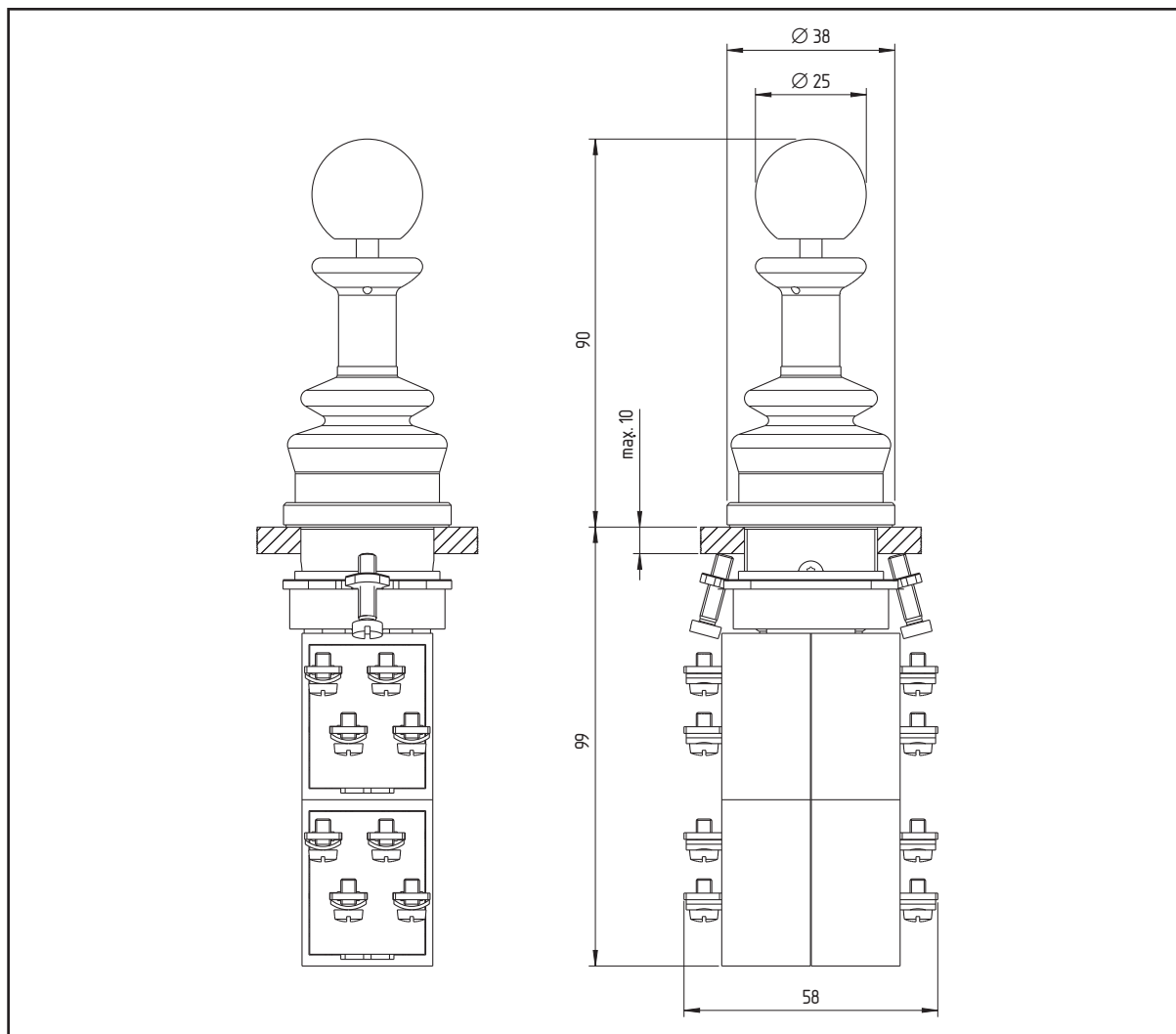
* Maintained/spring-return joystick switches: see pages 60/61
Spring-return joystick switches with analog output: see pages 64/65

Switching position, quantity, contacts		Sealing bellow	Connection technology		Flat-pin plugs	
			Screw terminals			
Type						
Order number						
Type						
Order number						
Spring-return joystick switches						
 4 NO	Standard	WKTE321	043 3905	WKTEF32,1	043 4005	
	dto., UV/ozone-resistant	WKTE321/WKT-19.4	043 3906	WKTEF321/WKT-19.4	043 4006	
	Silicone	WKTE321/WKT-19.3	043 3907	WKTEF321/WKT-19.3	043 4007	
	Standard	WKTE521	043 0552	WKTEF521	043 4010	
	dto., UV/ozone-resistant	WKTE521/WKT-19.4	043 3911	WKTEF521/WKT-19.4	043 4011	
	Silicone	WKTE521/WKT-19.3	043 3912	WKTEF521/WKT-19.3	043 4012	
	Standard	WKTE521/206	043 3915	WKTEF521/206	043 4015	
	dto., UV/ozone-resistant	WKTE521/206/WKT-19.4	043 3916	WKTEF521/206/WKT-19.4	043 4016	
	Silicone	WKTE521/206/WKT-19.3	043 3917	WKTEF521/206/WKT-19.3	043 4017	
	Standard	WKTE521/2x401	043 3920	WKTEF521/2x401	043 4020	
	dto., UV/ozone-resistant	WKTE521/2x401/WKT-19.4	043 3921	WKTEF521/2x401/WKT-19.4	043 4021	
	Silicone	WKTE521/2x401/WKT-19.3	043 3922	WKTEF521/2x401/WKT-19.3	043 4022	
Maintained joystick switches						
 4 NO	Standard	WKSE321	043 4150	WKSEF321	043 4250	
	dto., UV/ozone-resistant	WKSE321/WKT-19.4	043 4151	WKSEF321/WKT-19.4	043 4251	
	Silicone	WKSE321/WKT-19.3	043 4152	WKSEF321/WKT-19.3	043 4252	
	Standard	WKSE521	043 1257	WKSEF521	043 4255	
	dto., UV/ozone-resistant	WKSE521/WKT-19.4	043 4156	WKSEF521/WKT-19.4	043 4256	
	Silicone	WKSE521/WKT-19.3	043 4157	WKSEF521/WKT-19.3	043 4257	
	Standard	WKSE521/206	043 4160	WKSEF521/206	043 4260	
	dto., UV/ozone-resistant	WKSE521/206/WKT-19.4	043 4161	WKSEF521/206/WKT-19.4	043 4261	
	Silicone	WKSE521/206/WKT-19.3	043 4162	WKSEF521/206/WKT-19.3	043 4262	
	Standard	WKSE521/2x401	043 4165	WKSEF521/2x401	043 4265	
	dto., UV/ozone-resistant	WKSE521/2x401/WKT-19.4	043 4166	WKSEF521/2x401/WKT-19.4	043 4266	
	Silicone	WKSE521/2x401/WKT-19.3	043 4167	WKSEF521/2x401/WKT-19.3	043 4267	

○ Position of reset; ◀●▶ momentary action position; ● latching position; NO = normally open contact; NC = normally closed contact

Spring-return joystick switches, Maintained joystick switches*

- For installation diameter 30.5 mm
- Design with blocking ring to protect against unintentional actuation
- 2 (4) directions of actuation/4 (2) switching signals each



Cross references:

- Functional description: see pages 2 and 4 and following pages
- Sealing bellows: see page 3
- Technical data: see page 68
- Terminal markings: see page 7
- Assembly information: see page 9
- Spare parts: see page 66

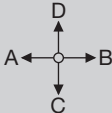
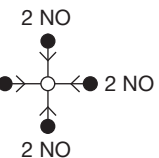
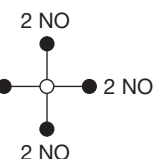
Additional information:

- Flat plug connections not possible

Options (on request):

- Other actuator (instead of the ball)
- Metal housing (not fully-insulated)
- V2A bezel
- Secured with M30 nut/ser-rated lock washer, see page 66
- Devices with 3 directions of actuation
- Other contact configurations

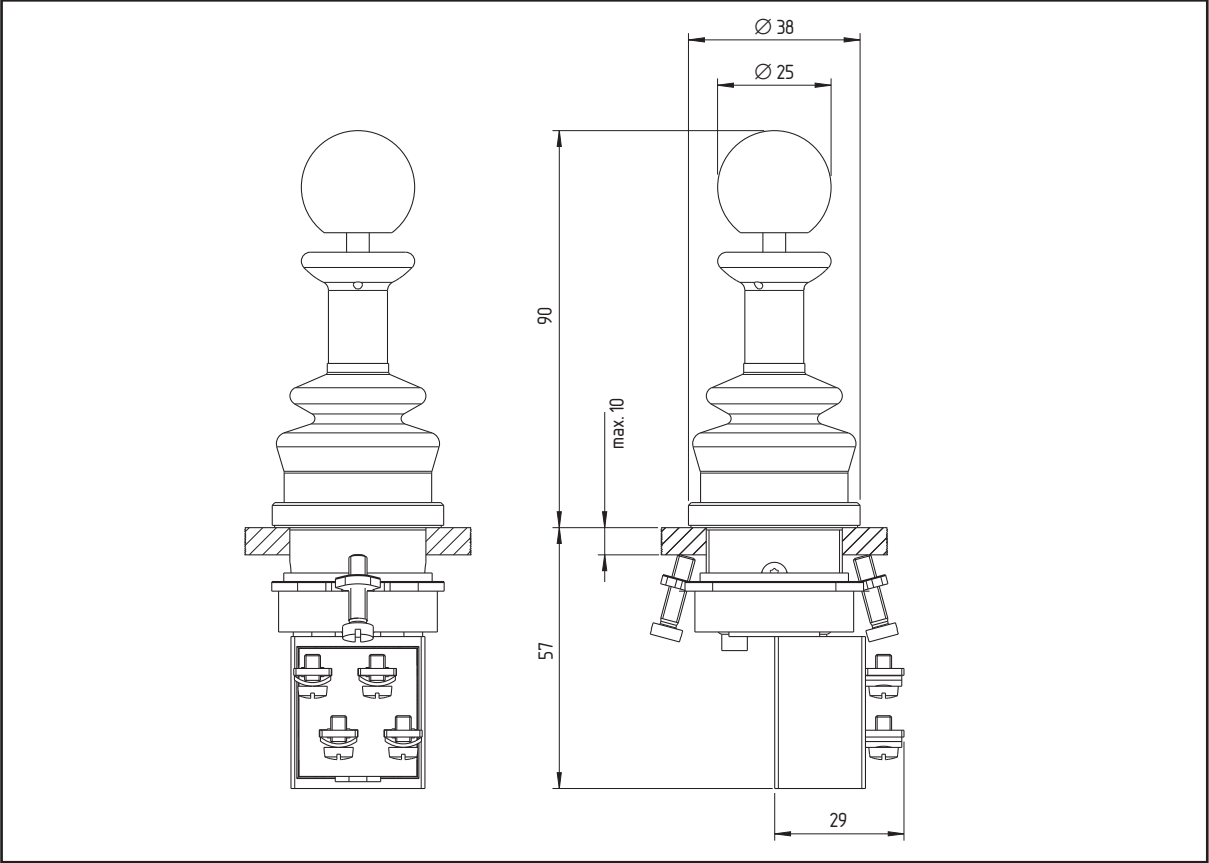
* Maintained/spring-return joystick switches: see pages 60/61
Spring-return joystick switches with analog output: see pages 64/65

Switching position, quantity, contacts		Sealing bellow	Connection technology Screw terminals	
			Type	Order number
Spring-return joystick switches				
4 NC  4 NO		Standard	WKTE321/404	043 3940
		dto., UV/ozone-resistant	WKTE321/404/WKT-19.4	043 3941
		Silicone	WKTE321/404/WKT-19.3	043 3942
4 NC  4 NC		Standard	WKTE321/800	043 3945
		dto., UV/ozone-resistant	WKTE321/800/WKT-19.4	043 3946
		Silicone	WKTE321/800/WKT-19.3	043 3947
		Standard	WKTE521/206.1	043 3950
		dto., UV/ozone-resistant	WKTE521/206.1/WKT-19.4	043 3951
		Silicone	WKTE521/206.1/WKT-19.3	043 3952
Maintained joystick switches				
4 NC  4 NO		Standard	WKSE321/404	043 4185
		dto., UV/ozone-resistant	WKSE321/404/WKT-19.4	043 4186
		Silicone	WKSE321/404/WKT-19.3	043 4187
4 NC  4 NC		Standard	WKSE321/800	043 4190
		dto., UV/ozone-resistant	WKSE321/800/WKT-19.4	043 4191
		Silicone	WKSE321/800/WKT-19.3	043 4192
		Standard	WKSE521/206.1	043 4195
		dto., UV/ozone-resistant	WKSE521/206.1/WKT-19.4	043 4196
		Silicone	WKSE521/206.1/WKT-19.3	043 4197

○ Position of reset; ◀●/●▶ momentary action position; ● latching position; NO = normally open contact; NC = normally closed contact

Maintained/spring-return joystick switches

- For installation diameter 30.5 mm
- Design with blocking ring to protect against unintentional actuation
- 2 directions of actuation/1 switching signal each



Not illustrated: designs with flat-pin plug connections (see page 7, installed width 29 + 1 mm)

Cross references:

- Functional description: see pages 2 and 4 and following pages
- Sealing bellows: see page 3
- Technical data: see page 68
- Terminal markings: see page 7
- Assembly information: see page 9
- Spare parts: see page 66

Options (on request):

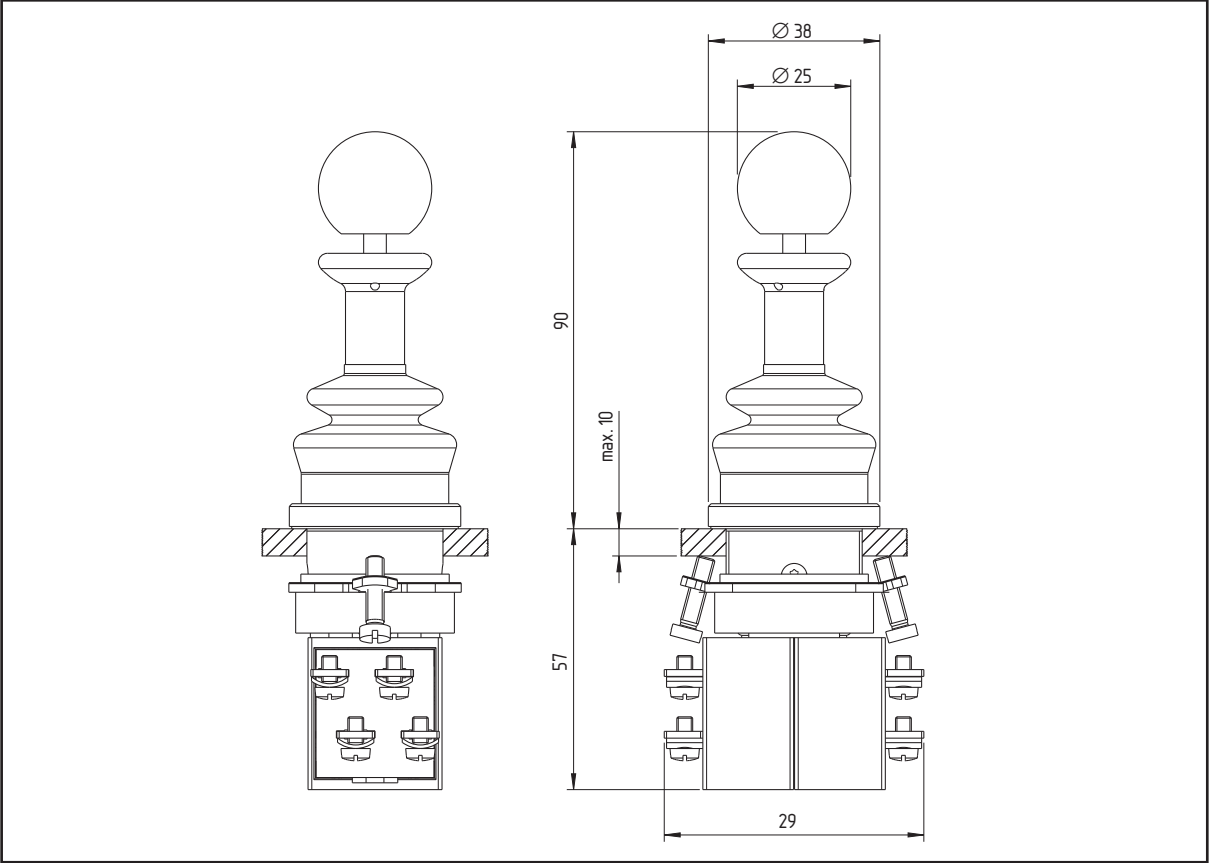
- Other actuator (instead of the ball)
- Metal housing (not fully-insulated)
- V2A bezel
- Secured with M30 nut/ser-rated lock washer, see page 66
- Other contact configurations

Switching position, quantity, contacts		Sealing bellow	Connection technology		Flat-pin plugs	
			Screw terminals			
			Type	Order number	Type	Order number
Spring-return joystick switches						
1 NO  1 NO	Standard	WK TSA321	043 1354	WK TSAF321	043 4410	
	dto., UV/ozone-resistant	WK TSA321/WKT-19.4	043 4311	WK TSAF321/WKT-19.4	043 4411	
	Silicone	WK TSA321/WKT-19.3	043 4312	WK TSAF321/WKT-19.3	043 4412	

○ Position of reset; ◀●/▶ momentary action position; ● latching position; NO = normally open contact; NC = normally closed contact

Maintained/spring-return joystick switches

- For installation diameter 30.5 mm
- Design with blocking ring to protect against unintentional actuation
- 4 directions of actuation/1 switching signal each



Not illustrated: designs with flat-pin plug connections (see page 7, installed width 29 + 1 mm)

Cross references:

- Functional description: see pages 2 and 4 and following pages
- Sealing bellows: see page 3
- Technical data: see page 68
- Terminal markings: see page 7
- Assembly information: see page 9
- Spare parts: see page 66

Options (on request):

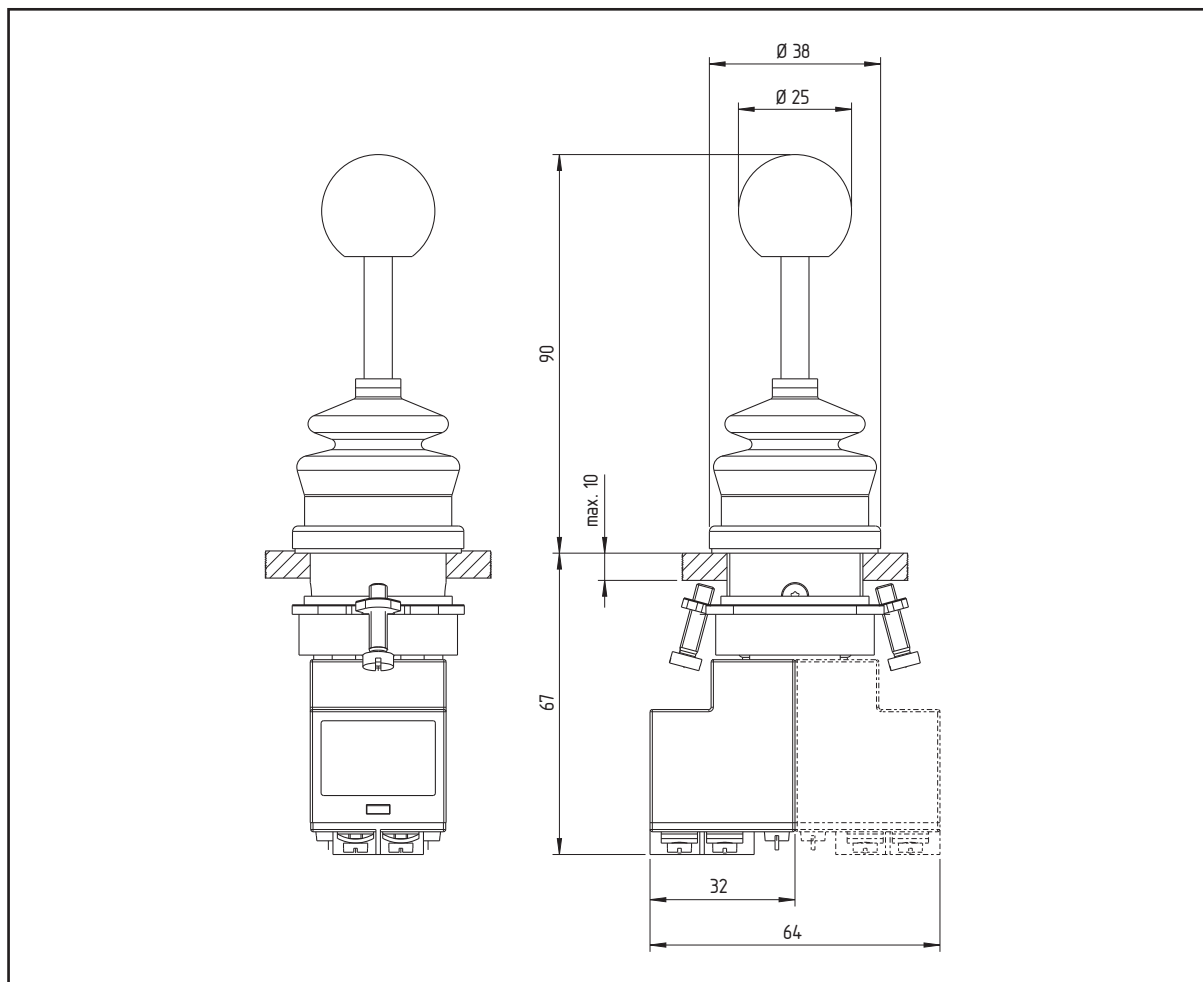
- Other actuator (instead of the ball)
- Metal housing (not fully-insulated)
- V2A bezel
- Secured with M30 nut/ser-rated lock washer, see page 66
- Devices with 3 directions of actuation
- Other contact configurations

Switching position, quantity, contacts		Sealing bellow	Connection technology		Flat-pin plugs	
			Screw terminals			
			Type	Order number	Type	Order number
Spring-return joystick switches						
		Standard	WKTSC521.2	043 2202	WKTSF521.2	043 4415
		dto., UV/ozone-resistant	WKTSC521.2/WKT-19.4	043 4316	WKTSF521.2/WKT-19.4	043 4416
		Silicone	WKTSC521.2/WKT-19.3	043 4317	WKTSF521.2/WKT-19.3	043 4417

○ Position of reset; ◀●▶ momentary action position; ● latching position; NO = normally open contact; NC = normally closed contact

Spring-return joystick switches with analog output

- For installation diameter 30.5 mm
- Design without blocking ring to protect against unintentional actuation
- Devices with analog output



Cross references:

- Functional description: see pages 2 and 4 and following pages
- Sealing bellows: see page 3
- Technical data: see page 68
- Terminal markings: see page 7
- Assembly information: see page 9
- Spare parts: see page 66

Additional information:

- Flat plug connections not possible

Options (on request):

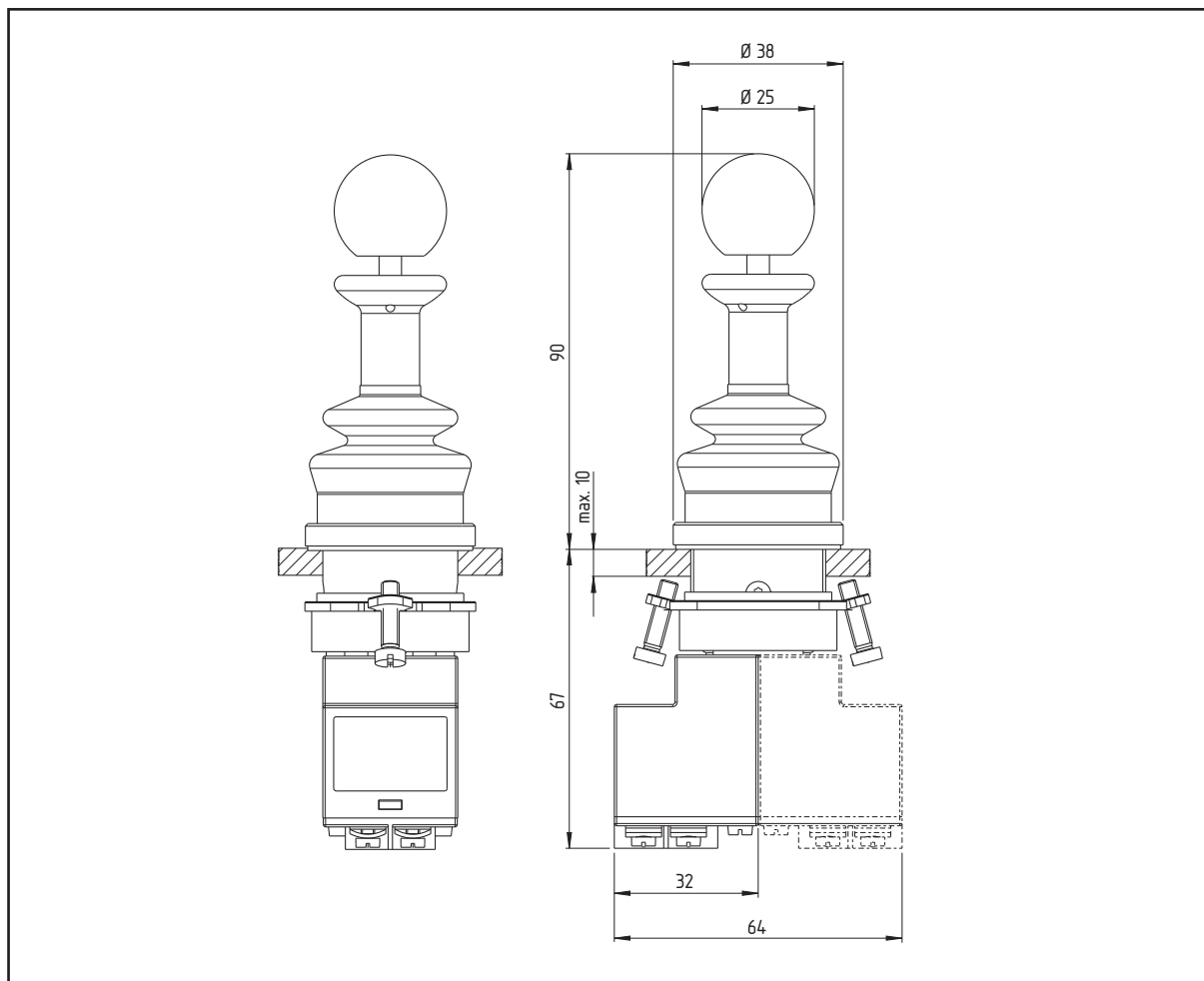
- Other actuator (instead of the ball)
- Metal housing (not fully-insulated)
- V2A bezel
- Secured with M30 nut/ser-rated lock washer, see page 66
- Other sealing bellows
- 1 x switching signal (instead of 1 x analog output)

Switching position, quantity, contacts		Sealing bellows	Connection technology	
			Screw terminals	
			Type	Order number
Spring-return joystick switches				
1 x 0.7–10 VDC		UV/ozone-resistant (WKT-19.4)	WKTA22/EO24AK	043 4510
1 x 0.7–10 VDC		UV/ozone-resistant (WKT-19.4)	WKTC32/EO24AK	043 4515

○ Position of reset; ◐/◑ momentary action position; ● latching position

Spring-return joystick switches with analog output

- For installation diameter 30.5 mm
- Design with blocking ring to protect against unintentional actuation
- Devices with analog output



Cross references:

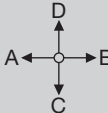
- Functional description: see pages 2 and 4 and following pages
- Sealing bellows: see page 3
- Technical data: see page 68
- Terminal markings: see page 7
- Assembly information: see page 9
- Spare parts: see page 66

Additional information:

- Flat plug connections not possible

Options (on request):

- Other actuator (instead of the ball)
- Metal housing (not fully-insulated)
- V2A bezel
- Secured with M30 nut/ser-rated lock washer, see page 66
- Other sealing bellows
- 1 x switching signal (instead of 1 x analog signal)

Switching position, quantity, contacts		Sealing bellow	Connection technology Screw terminals	
			Type	Order number
Spring-return joystick switches				
1 x 0.7–10 VDC		UV/ozone-resistant (WKT-19.4)	WKTA221/EO24AK	043 4520
1 x 0.7–10 VDC		UV/ozone-resistant (WKT-19.4)	WKTC321/EO24AK	043 4525

○ Position of reset; ◐/◑ momentary action position; ● latching position

	Type series MK... (installation-Ø 22.3 mm)		Type series WK... (installation-Ø 30.5 mm)	
	Type	Order number	Type	Order number
Sealing bellows:				
– Standard	MKT-U1*	021 6007	On request	
– UV- and ozone-resistant	MKT-U1/WKT-19.4*	021 6009	On request	
– Silicone	MKT-U1/WKT-19.3*	021 6012	On request	
– Silicone thick-walled	MKT-U1/WKT-26*	021 6015	On request	
Assembly flange			MF15	071 7100
Locking nut with serrated lock washer			MU/FS30	071 7851
Replacement contacts	On request		On request	
Analog elements with fixing screws	EO24AK		EO24AK	

* only applies to devices without blocking ring (for devices with blocking ring: on request)



Actuating elements		
Type series	MK...	WK...
Standards (where applicable)	IEC EN 60947-1 (DIN VDE 0660 Part 100), IEC EN 60947-5-1 (VDE 0660 Part 200)	see left (type series MK...)
CE conformity	in accordance with Directive 89/336/EEC	see left (type series MK...)
Installation- $\varnothing$ (in accordance with IEC EN 60947-1)	22.3 mm + 0.4 mm	30.5 mm + 0.5 mm
Front plate thickness	1.5 ... 6 mm	1.5 ... 10 mm
Mounting grid	80 x 80 mm	see left (type series MK...)
Fastening means	knurled nut	Assembly flange MF15***
Max. torque for fixing screws	./.	approx. 0.6 Nm
Temperature range	– –25 °C ... +80 °C with NBR bellows – –40 °C ... +80 °C with silicone bellows	see left (type series MK...)
Protection class	IP 67 in accordance with EN DIN 60529, IP 69K in accordance with DIN 40050 Part 9 (high-pressure jet proof) for devices with thick-wall silicone lining	see left (type series MK...)
Type of sealing	sealing bellows	see left (type series MK...)
Full insulation	yes	yes*
Materials	aluminium anodised, PA GV, POM, Silicone, NBR, Duroplast; stainless steel plastics: fibreglass reinforced, self-extinguishing	Plastic housing** see left (type series MK...)
Bezel design	turned part, aluminium anodised	Metal bezel
Actuating force	approx. 11 N	see left (type series MK...)

* excepted special design with metal housing

** Metal housing: on request

*** M30 nut/serrated lock washer: on request

Contact elements ENA	
Rated insulation voltage U_i	440 V, test voltage in accordance with EN 60947-1 Table 12 A: 1,890 V
Rated operational current I_e depending on the utilisation category and test voltage	8 A, AC-15, 250 VAC 5 A, DC-13, 24 VDC
Thermal nominal current I_{th} (in air)	10 A
Short-circuit protection in accordance with EN 60269-1	gG 10 A slow blowing
Airgap creepage in accordance with EN DIN 60664-1	4 kV/3
Galvanic isolation of the contact bridge	yes
Proof of the positive opening	2.5 kV surge voltage
Travel for positive opening	approx. 2 mm after reaching the opening point
Switching of small loads	24 V, 5 mA
Switching frequency	1,200 c.p.h.
Climatic proofing in accordance with IEC EN 60068	Part 2-20
Installation position	any position

Contact elements ENA (continued)

Mechanical service life in accordance with IEC EN 60947-5-1 (VDE 0660 Part 200)	10 x 10 ⁶ operations
Shock resistance	110 g/4 ms – 30 g/18 ms, no bouncing
Vibration immunity	> 20 g/10 ... 200 Hz
Bouncing time (100 mm/s)	< 5 ms
Housing material	PA GV; plastics: fibreglass reinforced, self-extinguishing
Terminal markings	in accordance with IEC 60947-1 (VDE 0660 Part 100)
Protection class	IP 40
Contact pieces, connection pieces	fine silver, spring bronze or brass carrier
Contact protection	see page 7
Connections	see page 7

Analog element EO24AK

Standards (where applicable)	IEC EN 60947-5-1, IEC 61000-6-2, IEC 61000-6-3
Connection voltage U _B	12 ... 24 VDC (+10%)
Leakage current	25 mA
Analog output: – output signal U _L – output signal U _H – switching current max. – tolerance displacement/analog voltage	0 VDC 10.0 VDC 25 mA, not short-circuit proof ±5%
Switching output: – output signal – switching current max.	U _B –0.4 V when analog output is exceeding approx. 1.1 VDC 50 mA, short-circuit proof
Contact system	wear-free optoelectronic displacement/voltage transducer
Climatic proofing in accordance with DIN EN 60068	Part 2-30
Temperature range	–20 °C ... +75 °C
Installation position	any position
Mechanical service life	10 x 10 ⁶
Shock resistance	30 g/18 msec.
Vibration immunity	5 g/10 ... 500 Hz
Connections	with self-lifting terminals and M 3.5 connection screws for wire gauges 0.5 ... 2.5 mm ² to 2 x 2.5 mm ² , with wire end ferrules max. 2 x 1.5 mm ²
Terminal marking	operating voltage ± – analog output 12 – switching output 24
Protection class	IP 40



Control devices and indicator lights for heavy-duty applications

Product overview





This overview presents control devices and indicator lights for 22.3 mm installation diameter devices, which are particularly suitable for heavy-duty applications, i.e. for applications with special strains or functional requirements for the devices. Therefore, this also includes customised device developments.

In this way Elan continues its many years of company tradition as a specialist in the area of industrial control devices and indicator lights.

While historically the particular requirements of machine tool construction in relation to sturdiness (up to resistance to glowing chips), precision and reliability were the criteria for functionality, today special requirements from all areas of machinery and control construction (to some degree identical) form the framework for construction and development at Elan. The claim to be specialist always involves offering devices that are distinguishable from the standard in terms of mechanical, electrical and/or functional features.

With these considerations in mind, the following are available as complete ranges with all commercially available types of devices:



1. Control devices and indicator lights for applications under more difficult operating conditions (Type series E)



2. Control devices and indicator lights with protection class IP 67/IP69 K (high-pressure cleaner proof) for hygiene-critical applications (Type series N)



3. Control devices and indicator lights with protection class IP 67/IP 69 K (high-pressure cleaner proof) for the other industrial applications (Type series E...O)

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In addition to the delivery ranges, Elan still offers various device groups and individual devices (see page 76 and following pages), which are also built and developed for applications with special strains or functional requirements.

Control devices and indicator lights for applications under more difficult operating conditions (type series E)



Example of a customised version
(D-30)

- At high levels of mechanical strain by the operator, during exposure to shock or vibration
- At increased availability or MTTF demands, for example in (own) special machinery construction, in traffic technology, for life cycle cost considerations and suchlike

Special design features

- Robust designs
 - due to metal bezels and metal buttons
 - due to glass lens covers in illuminated pushbuttons and indicator lights
- Bellows-type seals
- Protection class $\geq$ IP 65 (IP 67 on request)
- ... -40°C versions on request



- A choice of three connection techniques (screw terminals, flat-pin plugs and WAGO Cage Clamp®)
- Contact and light elements system EF/EL (see page 74)

As an alternative to glove operation: D-30 devices (front design as before but with a bezel height of 5 mm, other contact and light element system)



Typical applications

- Where temperature effects are increased, for example on glass and casting machines
- Where aggressive cooling and cleaning agents take effect, for example on machine tools or printing presses

Command devices and indicator lights with protection class IP 67/IP 69K (resistant to high-pressure cleaners) for hygiene-critical applications (N series)

Typical applications

- Food-processing machinery for processing raw goods such as meat, fish and poultry, raw eggs or milk.
- Other machines in the food-processing industry with special requirements in terms of cleaning capabilities or hygiene-conform design, for example to prevent the risk of cross contamination



Special design features

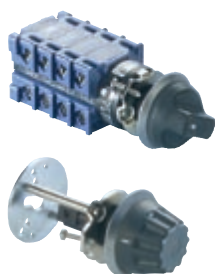
- Protection class for front side: IP 67, IP 69 K
- Special seals close the gaps between the fixed and moving device parts
- Special shapes (smooth surfaces, without corners or edges) make it easy to clean the devices
- Selection of materials (for example, resistant to smoke resin remover) and colouring to suit the respective application
- Illuminated devices with "super bright" multiple LEDs as illuminants
- Contact and light elements optionally with screw terminals, flat-pin plugs or cage clamp terminals (WAGO Cage Clamp®)
- EF/EL contact and light elements (see page 74)



Hygiene



design award
winner
2003



Adapter bracket for contact makers with protection class IP 67:

- for SEK position switches (with momentary contacts, 2-way, 2 NC contacts, 2 NO contacts, NC/NO combination and SEPK (with spring function 1 NC/1 NO))
- For pushbuttons, mushroom buttons, single-plunger selector switches / selector buttons

Command devices and indicator lamps with protection class IP 67/IP 69K (resistant to high-pressure cleaners) for other industrial applications (E...O series)



Typical applications

- Inputting commands during external use, for example on industrial vehicles,
- Clean-room machines and similar applications
- On-deck applications in sea-going vessels

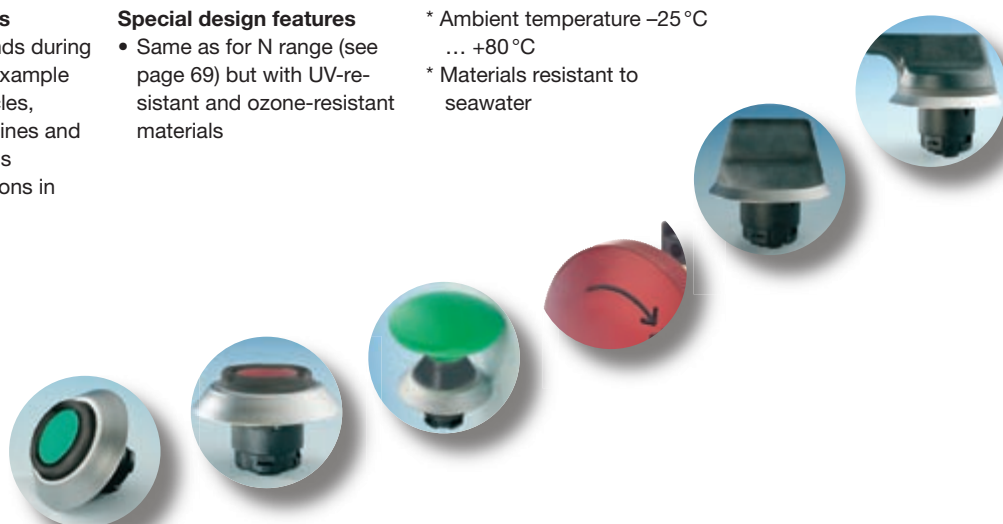
Special design features

- Same as for N range (see page 69) but with UV-resistant and ozone-resistant materials

* Ambient temperature -25°C

... $+80^{\circ}\text{C}$

* Materials resistant to seawater



EF/EL contact and light element system

Special design features

All elements in the EF/EL systems have the following special design features:

- A self-cleaning contact bridge system, known as Elan four-way system, which is particularly suitable for low-voltage and has a lower switching capacity of 5 VDC/3.2 mA (max 400 VAC/8 A). It is designed in the form of a bent twin contact bridge, with parallel and also crosswise operation

- Robust element mounting by means of snap-on stainless steel springs
- NC contacts with positive openings in conformance to EN 60947-1-5
- Galvanically isolated contact circuits in 2-way elements
- High resistance to shock and vibrations, in particular in cage clamp terminals (WAGO Cage Clamp®, see page 75)
- Complete terminal markings visible at a glance in conformance to EN 50005 and EN 50013 with a complete function code number and sequence number. The function code number identifies the NC or NO contact, the sequence number specifies the quantity and the order of the contacts on the complete switching device.



EF/EL contact and light element system (continuation)

Connection systems

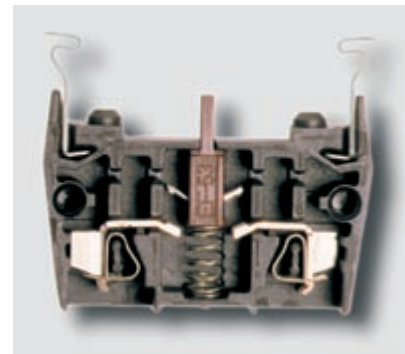
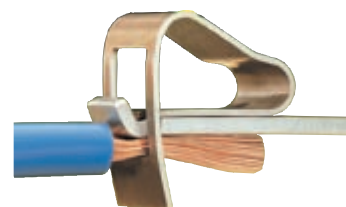
The EF/EL system offers a choice of the following connection systems:

- screw terminals (1-way/2-way elements)
- flat-pin plugs (1-way/2-way elements)
- WAGO Cage Clamp® terminals (1-way elements).

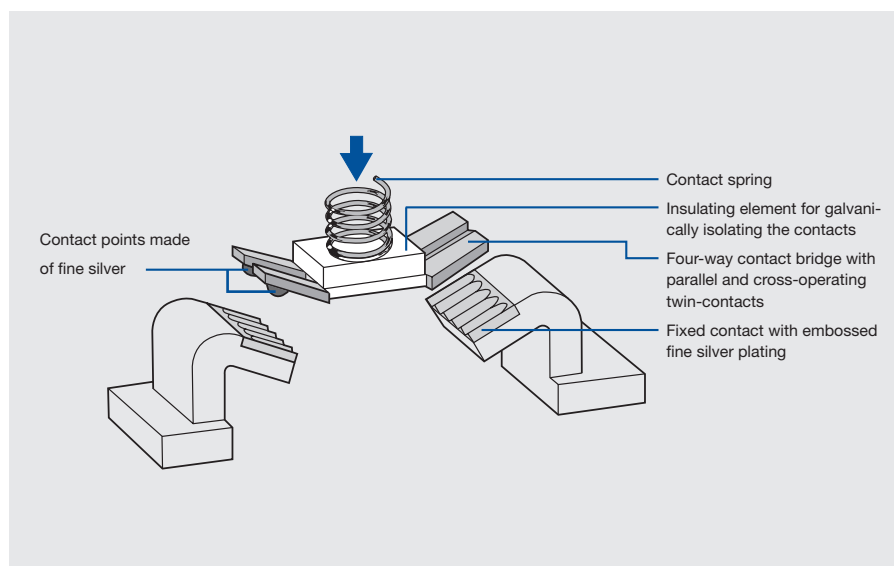


Connection system: WAGO Cage Clamp® terminals

The Elan standard range includes contact and light elements with cage clamp terminals because this connection system not only offers the advantage of saving on wiring time but also a high degree of protection against cable connections becoming loose, even under the effects of strong vibrations.

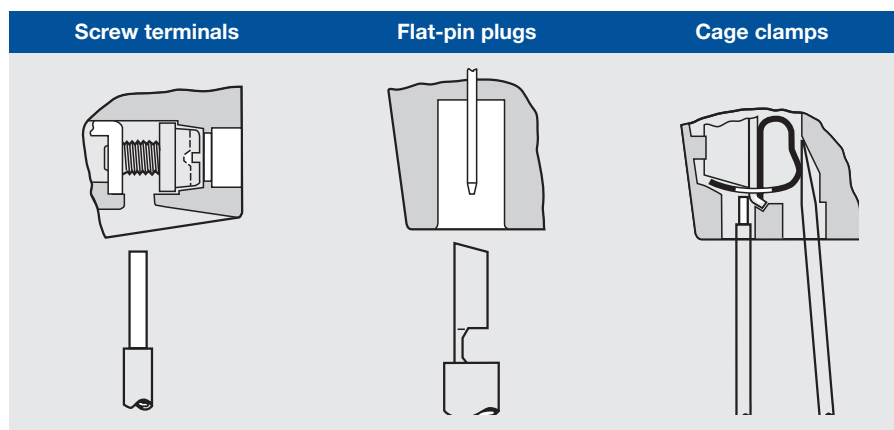


Above: Cage clamps
(WAGO Cage Clamp®)



Elan four-way system:

The statistical probability of maloperation of the Elan four-way contact system is 0.5 ppm. A variety of special design features (namely the choice of materials and the multi-embossed and angular surface areas of the contacts) provide a high specific contact pressure which together with a micro-movement assures the continuous self-cleaning of the contacts during actuation and reliably eliminates oxide and dirt particles even with the smallest of currents and voltages.



Two-slotted screws:

Conductor cross-sections 2 x 0.5 ... 2.5 mm², with wire end ferrule max. 1.5 mm² (automatic screwing is possible). The connection screws (recessed head) are sealed on delivery.

Flat-pin plugs:

Standard commercially available flat-pin plugs 6.3 x 0.8 mm or 2 x 2.8 mm x 0.8 mm.

WAGO Cage Clamp® terminals:

Conductor cross-sections 2 x 0.08 mm² ... 1.5 mm², splice protection not necessary but possible.

Command devices with personal protection function



Command devices with personal protection function include mainly

- robust versions of emergency-stop command devices
- the same for increased safety requirements
- emergency-stop command devices with key unlocking and
- consent switches

Robust versions of emergency-stop command devices

Special design features

- robust anodised aluminium version of command buttons
- front construction height 29 mm
- mushroom diameters in a choice of 38.5 mm, 49 mm, 70 mm
- protection class IP 65

The same applies to the increased safety requirements (EDRR series)

- Positive locking actuator locking feature in addition to non-positive locking in conformance to EN 418, i.e. additional security against unintentional unlocking and during increased shock strains ($\leq 100 \text{ g/4 ms}$)

Emergency-stop command devices with key unlocking (EDRRS series)

Special design features

- The same as for the EDRR series but with mushroom diameters 38.5 mm and protection class IP 65

Consent switches

Although the range of applications for consent switches is relatively clear, there is no universal solution because functional and ergonomic requirements in particular can differ from case to case or the emphasis on one or the other may vary.

With this in mind, Elan offers a variety of solutions for „consent operation“.

There is a choice of consent switches in diverse versions

- as grip switches
- fitted into mobile control housing, with a choice of additional functionalities
- as “stand alone” versions

As a rule, these are what are referred to as 3-stage devices.



Command devices with ASI safety at-work interface, for example for:

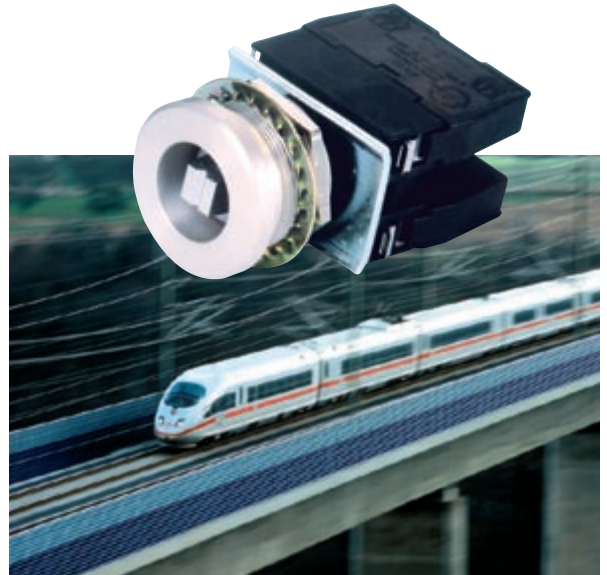
- emergency-stop command devices
- reset/restarting buttons
- command boxes
- a choice of ASI flat-cable connection, flange plug (M12 x 1) or screwed cable gland (M16 x 1.5)



Maintained or spring-return selector switches with square/triangular actuators

Instead of a grip as in standard commercially available maintained or spring-return selector switches, these device versions are actuated by means of a square tool (or on request – a triangular tool). They are familiar as „train-guard switches“ because this kind of device is used to close railway carriages.

This tool aids in ensuring that the devices cannot be actuated at will. Compared to the key-operated maintained or spring-return selector switches the advantage of these switches is that they are less sensitive to ambient influences, such as dust, dirt etc.



Die-cast two-hand control panels

Special design features

- Ergonomically designed arrangement or integration of the actuators
- Support surface, designed as a kind of support for the wrist when actuating mushroom buttons
- Possibility of fitting up to 8 command and signalling devices in addition to an emergency-stop command device in the central part of the desk.
- Terminal strip assembly is possible in the inside
- Consoles on stands and options of with/without
 - spacing ring
 - height adjustment
 - foot operation
 - castors
- Two-part housing, folding with strap hinges and additional mounting brackets for holding the bottom part of the console
- Outlets that can be knocked out for screwed cable glands
- Console surface impact-proof and scratch-resistant, powder-coated, resistant to many chemical influences
- Customised supply versions



Example of an "SEPG05...3" two-hand control panel in a customised version with integrated control and with central part.

Actuators for two-hand operation

Mushroom button (ADP55/3SW..) type with shortened actuating stroke and minimised actuating forces

- Ergonomic construction, 55 mm actuation surface, 22.3 mm mounting hole
- Actuation forces (depending on the necessary shock resistance) 10.5 N (≤ 35 g), option of 7 N (≤ 18 g)
- Easy-to-grip plastic surface
- Actuating stroke only 3 mm
- Protection class IP 65



Touch sensor button (BWT... type, BG-tested)

- Ergonomic construction, 55 mm actuation surface, 22.3 mm mounting hole
- Actuation forces (depending on the necessary shock resistance) 10.5 N (< 35 g), option of 7 N (< 18 g)
- Easy-to-grip plastic surface
- Actuating stroke only 3 mm
- Protection class IP 65



Mushroom button (type EDP...) in conventional version for special applications

- ergonomic construction, choice of 42 mm or 55 mm actuation surface, 22.3 mm-diameter mounting hole
- robust metal versions
- for heavy-duty applications
- protection class IP 65
- contact elements with safety springs on request



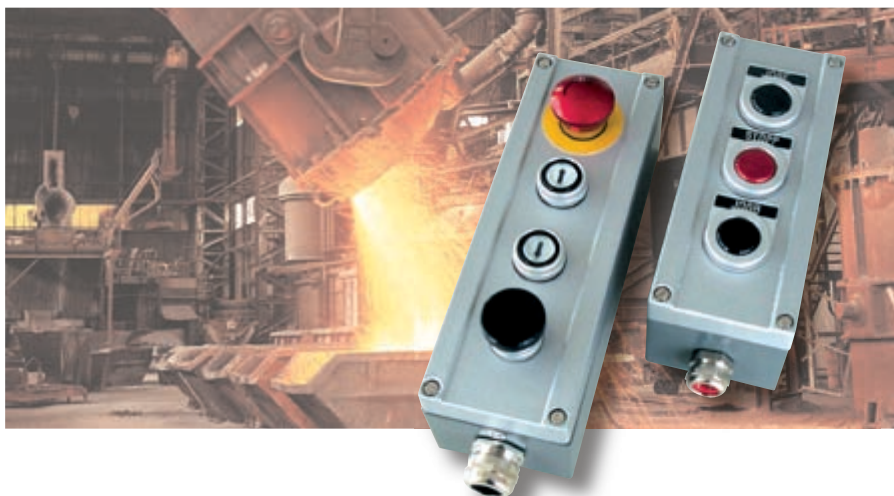
On the right: stand in the form of a folded sheet-metal panel design with spacer ring, carry/pull fixture, height adjustment and mounting facility for single or double-pedal footswitches.



Attachment housing

Special design features

- Robust aluminium cast versions
- Protection class IP 67, if required with a hole for draining moisture condensation
- Component mounting to suit customers wishes



Customer-specific versions

Example 1

- Display and actuators for forklift trucks
- Ordered by Jungheinrich AG



Example 2

- Command devices and light indicators for keyboard-like device arrangements with direct printed circuit board connection
- Grid measurement 25 x 25 mm
- 33 mm installed width

- Easy to install, time-saving
- Protection class IP 65
- Contacts suitable for very low voltages
- Large diversity in versions
- Fibreglass-reinforced plastic versions
- Idea from M.A.N. Roland Druckmaschinen AG, Augsburg



Devices with 30.5 mm mounting holes



Analogue button (DA... series)

- Analogue switching signal 0.7 VDC ... 10 VDC depending on the 6 mm actuating stroke
- Upstream digital switching signal 24 VDC
- Mounting diameter D-30

Vandal-proof versions (model E...V)

- Product range: push-buttons, illuminated push-buttons, indicator lights
- Flush mounting (total height of front panel: 2.5 mm)





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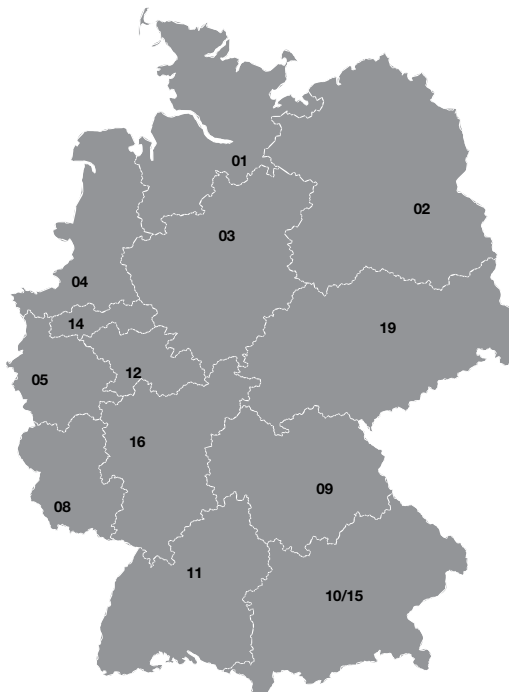
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