



EN Operating instructions.pages 1 to 8
Original

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1. About this document

1.1 Function

This operating instructions manual provides all the information required for the mounting, set-up and commissioning to ensure the safe operation and disassembly of the safety switchgear. The operating instructions must be available in a legible condition and a complete version in the vicinity of the device.

1.2 Target group: authorised qualified personnel

All operations described in this operating instructions manual must be carried out by trained specialist personnel, authorised by the plant operator only.

Please make sure that you have read and understood these operating instructions and that you know all applicable legislations regarding occupational safety and accident prevention prior to installation and putting the component into operation.

The machine builder must carefully select the harmonised standards to be complied with as well as other technical specifications for the selection, mounting and integration of the components.

1.3 Explanation of the symbols used



Information, hint, note:
This symbol is used for identifying useful additional information.



Caution: Failure to comply with this warning notice could lead to failures or malfunctions.
Warning: Failure to comply with this warning notice could lead to physical injury and/or damage to the machine.

1.4 Appropriate use

The products described here were developed as part of a general system or machine to assume responsibility for non-safety-related control functions. It is the responsibility of the manufacturer of a machine or plant to ensure the correct functionality of the entire machine or plant.

The product must be exclusively used in accordance with the versions listed below or for the applications authorised by the manufacturer. Detailed information regarding the range of applications can be found in the chapter "Product description".

1.5 General safety instructions

The user must observe the safety instructions in this operating instructions manual, the country specific installation standards as well as all prevailing safety regulations and accident prevention rules.



Further technical information can be found in the Schmersal catalogues or in the online catalogue on the Internet: www.schmersal.net.

The information contained in this operating instructions manual is provided without liability and is subject to technical modifications.

There are no residual risks, provided that the safety instructions as well as the instructions regarding mounting, commissioning, operation and maintenance are observed.

1.6 Warning about misuse



In case of inadequate or improper use or manipulations of the component, personal hazards or damage to machinery or plant components cannot be excluded.

1.7 Exclusion of liability

We shall accept no liability for damages and malfunctions resulting from defective mounting or failure to comply with this operating instructions manual. The manufacturer shall accept no liability for damages resulting from the use of unauthorised spare parts or accessories.

For safety reasons, invasive work on the device as well as arbitrary repairs, conversions and modifications to the device are strictly forbidden; the manufacturer shall accept no liability for damages resulting from such invasive work, arbitrary repairs, conversions and/or modifications to the device.

2. Product description

2.1 Ordering code

These operating instructions apply to the following types and programs:

①-②-③-④-⑤-⑥	Position	Function	Description
①	RK		Robust joystick switch
	NK		Food contact and hygienic joystick switch
②	T		Button
	S		Switch
	TS		Button and switch (spec.no. indicates switch and button positions)
③	21		2 switch positions with 1 NO contact each
	41		4 switch positions with 1 NO contact each
	22		2 switch positions with 2 NO contacts each
	42		4 switch positions with 2 NO contacts each
④	1ST5		1 connector, M12, 5-pin
	1ST8		1 connector, M12, 8-pin
	2ST8		2 connectors, M12, 8-pin
⑤	2		With additional sealing element
	1		Without additional sealing element
⑥	2927-1		Buttons in position B or BCD; switches in position A
	2927-2		Buttons in position CD; switches in position AB
	2927-3		Buttons in position D; switches in position ABC
	2976		Stainless steel actuator V4A; optimised for knee actuation



Not all options and selections described in the ordering code can actually be manufactured and supplied.

2.2 Special versions

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

2.3 Purpose

The joysticks described here are designed to be mounted in control panels or assembly housings. The joysticks are only suitable for processing operation-relevant signals for purposes of machine control.

Exposed parts, particularly seals, can be damaged from chemicals, oils, grease and cleaning agents. Defective devices must be renewed without delay. Instructions on how to do this can be found in the removal and disposal sections.



Any influence from external magnetic fields must be prevented by the operator.

2.4 Technical data

Standards:	IEC 60947-1, IEC 60947-5-1
Rated operating voltage U_e :	max. 30 VDC
Operating current I_e :	max. 0.3 A
Rated insulation voltage U_i :	30 V
Rated impulse withstand voltage U_{imp} :	0.5 kV
Degree of pollution:	2
Protection class:	II x
Switching capacity:	max. 7.2 W
Total actuating travel / switching angle:	20°
Switching point:	13° ±4°
Actuating frequency:	1200/h
Mechanical life:	
- 4 spring return positions:	1 x 10 ⁶
- Per spring return position:	2.5 x 10 ⁶
- With latching switch positions, the mechanical life is reduced.	
Ambient temperature:	-40°C ... + 80°C
- Temperature changes:	max. 10°C / minute
Storage and transport temperature:	-40 °C ... 80 °C
Resistance to shock:	30 g / 11 ms
Continuous shock:	10 g / 16 ms
Protection class:	
- Front:	IP65, IP67, IP69/IP69K
- Contact chamber:	IP67 (with connector; e.g. Phoenix contact)
- Switch rod area:	IP30
Construction size:	
- In front of front plate:	Ø 45 mm; height up to max. 85 mm
- Behind front plate:	80 x 80 x 39 mm plus connector allowance
Spacing:	90 x 90 mm
Switch functions:	2 ... 4 switching directions
Type of switching functions:	Buttons or switches
Number of reed contacts per switching direction:	1 ... 2

Connection:	Connector M12, 5- or 8-pin
Number of terminals:	1 ... 2
Type of contact:	NO contacts, shape A
- 5-pin connector:	without galvanic isolation
- 8-pin connector:	with galvanic isolation
Front plate thickness:	1.5 ... 6 mm
Securing tool:	Box spanner AF41
Mechanical data at room temperature in new state:	
- Mechanical strength:	>200 N
- Actuating force:	<20 N
- Latching force:	approx. 5 N
Different actuating and latching forces must be taken into account throughout the service life.	
Safety functions:	None (no automatic opening contacts, no safety switching element)
Switching principle:	magnetic
Utilisation category:	DC-12
Protective wiring:	none
Max. fuse rating:	0.5 A FF
Required short-circuit current:	100 A



Ambient: 60 °C; 24VDC, 0.3A

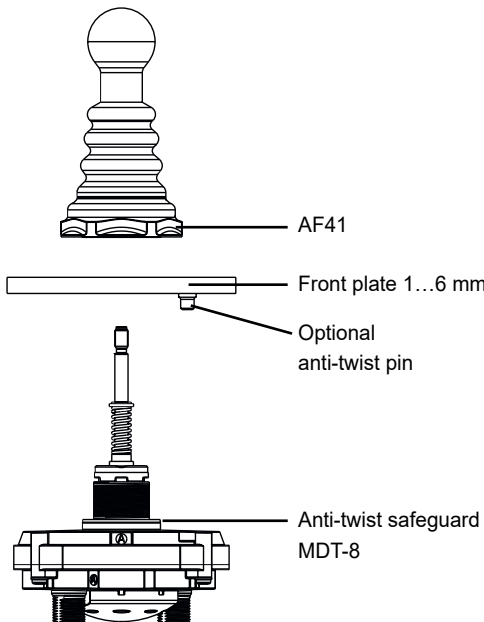


Actuation not permissible if ice has formed on actuator. To prevent damage to actuator, it must be allowed to thaw first. If the sealing is damaged, ice could form inside the device and prevent switching. In this case, observe Chapter 5.2 Maintenance.

3. Mounting

3.1 General mounting instructions

For assembly use a mounting hole 22.3 mm. The joystick must be assembled from the backside of the mounting hole. Mount the handle by pushing and turning on the handle ball. Screw the handle hand-tight onto the front plate. A pipe wrench AF41 is used to mount the boot assembly with a final tightening torque of 5 Nm.



Only fit onto clean, grease-free surface! When installing the joystick switch, ensure that the surface is flat and that there are no weld seams or bend radii of 100 mm around the joystick switch. Otherwise, the leak-tightness and hygiene properties of the device could be compromised.



As an optional anti-twist guard and for component orientation, a pin (see Chapter 3.3) can be placed on the front plate.

3.2 Special assembly instructions for hygienic applications

For hygiene-related devices of the NK series, which are mounted and can be used in water splash areas or non-food areas, the following additional requirements with regard to the installation are to be observed:

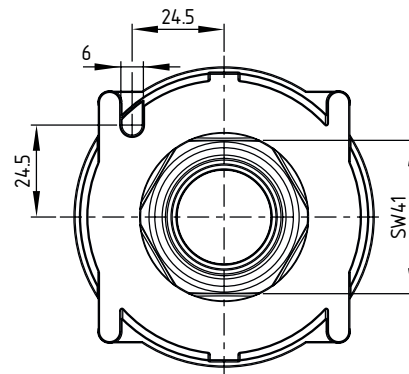
1. The devices must be arranged in such a way that cleaning with a cloth is possible in each position and also in actuated state of the switch. It is therefore recommended to maintain a distance of 100 mm from mounting hole to mounting hole in order to ensure the normative distance of > 20 mm.
2. If the device is connected from one or more sides to a housing wall, a radius of 120 mm from the centre of the mounting hole must be adhered to so that the device can be cleaned from all sides using a cloth and can be checked from all sides for damage.



Please observe the relevant applicable standards and their engineering principles regarding this.

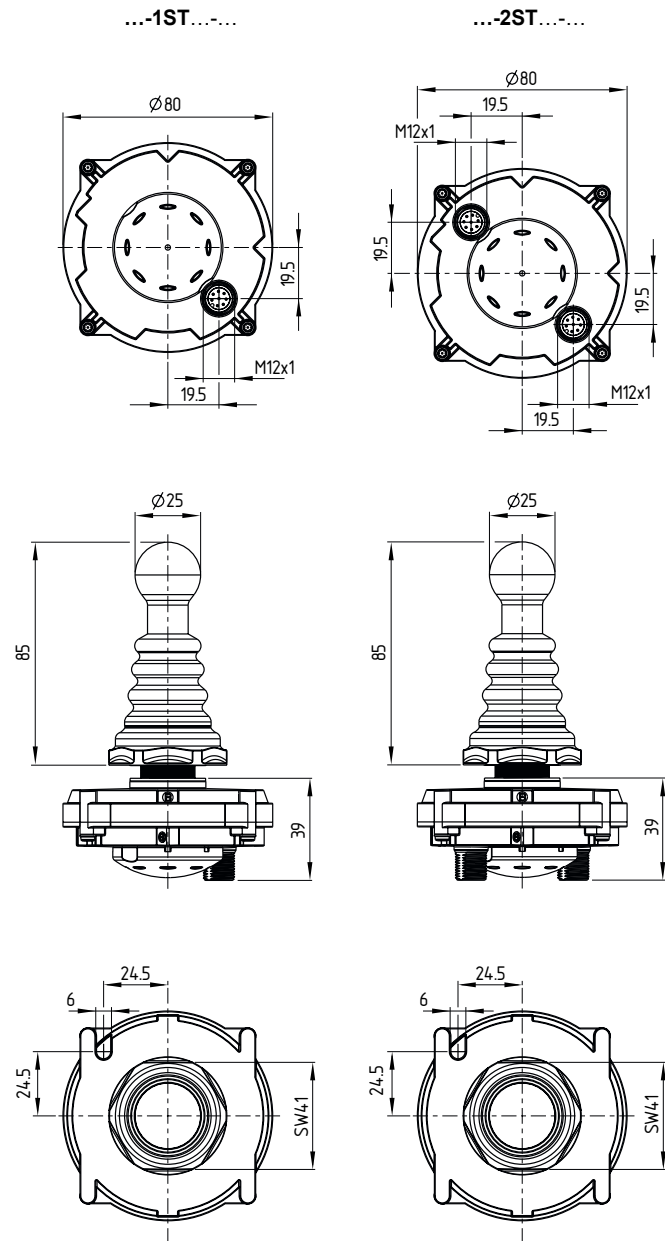
3.3 Mounting instructions for optional anti-twist guard / component orientation

The optional anti-twist guard / component orientation is realised by a weld-on stud measuring $\varnothing 5 \times 6$ mm. The weld-on stud must be located at a distance of 24.5 x 24.5 mm (see figure) from the centre of the installation hole.

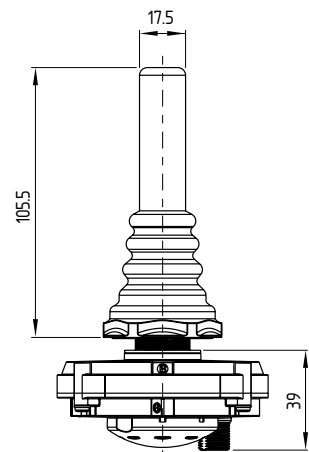


3.4 Dimensions

All measurements in mm.



Stainless steel actuator V4A

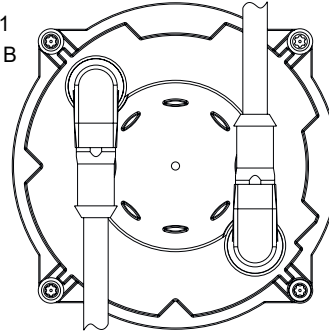


4. Electrical connection

4.1 General information for electrical connection

The electrical connection is via either one or two M12 connector(s) with 5-pins or 8-pins. The connectors are A-coded and the orientation is selected so that the wires with an angle connector run parallel over the device.

Connector 1
in direction B



Connector 2
in direction A



The tightening torque for M12 connectors is 0.4 Nm. Details from the connector manufacturer must be observed.



The pre-wired cable is to be fitted with a cable guide / retainer at a distance of no more than 200 mm.



The electrical connection may only be carried out by authorised personnel in a de-energised condition.

4.2 Terminal assignment, one reed contact per switching direction

M12, 5-pin

Position/ Direction	Connector 5-pin		1x 5-pin	Pin assignment of connector
	Pin	Reed contact		
A	3	1		
	5 (+)			
B	1	2		
	5 (+)			
C	2	3		
	5 (+)			
D	4	4		
	5 (+)			

M12, 8-pin

Position/ Direction	Connector 8-pin		1x 8-pin	Pin assignment of connector
	Pin	Reed contact		
A	2 (+)	1		
	4			
B	6 (+)	2		
	7			
C	1 (+)	3		
	5			
D	8 (+)	4		
	3			

4.3 Terminal assignment, two reed contacts per switching direction

2x M12 8-pin

Position/ Direction	Connector 1		2x 8-pin	Pin assignment of connector
	Pin	Reed contact		
A	2 (+)	1.1		
	4			
B	6 (+)	1.2		
	7			
C	1 (+)	1.3		
	5			
D	8 (+)	1.4		
	3			

Position/ Direction	Connector 2	
	Pin	Reed contact
A	8 (+)	2.1
	3	
B	1 (+)	2.2
	5	
C	2 (+)	2.3
	4	
D	6 (+)	2.4
	7	

5. Set-up and maintenance

5.1 Functional testing

The function of the component must be tested.

The following conditions must be previously checked and met:

1. Correct fixing of the fitted component
2. Check the integrity of the connections
3. Check joystick switch / boot assembly for damage

5.2 Maintenance

A regular visual inspection and functional test, including the following steps, is recommended:

1. Switch / button actuation in all switching directions
2. Visual check of the boot assembly for damage
3. Check the integrity of the connections



Damaged or defective components must be replaced. Should there be any water ingress in the device, the device must be allowed to dry before the actuator is renewed.

5.3 Cleaning and care

Certified cleaners and care products along with their main ingredients can be gleaned from the list at the end of the chapter. The cleaning agents have been tested in a standardised Ecolab procedure or in an alternative Storage test. With these tests, no 100% guarantee is given that the device will not be exposed to damage during its service life from the cleaners that are used. A change in colour to the parts is no indication of a quality defect.

If other cleaners are used with the same or similar ingredients, no liability will be accepted for damage to the device. Responsibility for this lies solely with the operator of the machine or plant system. The same applies to mixtures of different cleaners, irrespective of whether they are listed or not or whether the cleaners have similar ingredients. This also applies to incomplete removal of cleaning agents after the cleaning stage.



During the course of cleaning, the boot assembly should be checked before and after cleaning for damage and renewed if necessary.



The device should only be cleaned at temperatures below 80°C. Observe temperature change specification.

Product	Description	Concentration	PH value (1%)	Main ingredients
Topactive 500	Foam cleaner, acidic	5 %	1.7 - 2.1	Phosphoric acid, surfactant
Aciplusfoam VF59	Foam cleaner, acidic	5 %	2	Phosphoric acid, surfactant, nitric acid
P3- Topactive DES	Foam cleaner, acidic	3 %	3.2 - 3.6	Hydrogen peroxide, acetic acid, peracetic acid, surfactants
cd water	Completely desalinated water	100 %	5 - 6	Demineralised water
P3- Alcodes	Acetic acid, alkylamine oxide	100 %	6.8 - 7.8	Ethanol
P3- Topax 990	Disinfectant, neutral	3 %	7.4 - 8.4	Acetic acid, alkylamine oxide
Tego 2000 VT25	Disinfectant, neutral	1 %	8	Amphotenside
Divodes FG VT29	Disinfectant, neutral	100 %	8.8	Alcohol
P3- Topax 66	Foam cleaner, alkaline	3 %	11.6 - 12	Surfactants, phosphonates, sodium hypochlorite
Oxofoam VF5	Foam cleaner, chlorine-alkaline	5 %	12.7	Potash, surfactant, sodium hypochlorite
Powerfoam VF4	Foam cleaner, highly alkaline	5 %	12.8	Caustic soda, EDTA, surfactant
Topactive 200	Foam cleaner, alkaline	5 %	12.8 - 13.2	Ethanol, sodium hydroxide, potassium hydroxide, surfactants

6. Disassembly and disposal



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


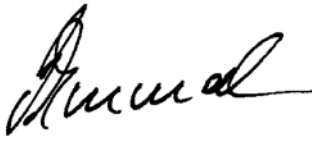
6.1 Disassembly

Removal is carried out by loosening the M12 connector. The handle is then removed using a pipe wrench AF41 whereupon the joystick switch can be taken off.

6.2 Disposal

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

7. EU Declaration of conformity

EU Declaration of conformity		
Original	K.A. Schmersal GmbH & Co. KG Möddinghofe 30 42279 Wuppertal Germany Internet: www.schmersal.com	
We hereby certify that the hereafter described components both in their basic design and construction conform to the applicable European Directives.		
Name of the component:	RK / NK	
Type:	See ordering code	
Description of the component:	Joystick switch	
Relevant Directives:	Low Voltage Directive RoHS-Directive	2014/35/EU 2011/65/EU
Applied standards:	DIN EN 60947-1:2015 DIN EN 60947-5-1:2010	
Place and date of issue:	Wuppertal, november 8, 2016	
		
	Authorised signature Philip Schmersal Managing Director	

RK_NK-A-EN



The currently valid declaration of conformity can be downloaded from the internet at www.schmersal.net.

