

Type 8798 Remote Sensor

Système de mesure de déplacement linéaire et rotatif pour régulateur de position
Rotativer und linearer Wegaufnehmer für Stellungsregler
Rotating and linear position measuring system for position controllers



Operating Instructions

Bedienungsanleitung
Manuel d'utilisation

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1 OPERATING INSTRUCTIONS

The operating instructions describe the entire life cycle of the device. Keep these instructions in a location which is easily accessible to every user, and make these instructions available to every new owner of the device.

Important Safety Information.

Read the operating instructions carefully and thoroughly. Study in particular the chapters entitled "[Basic safety instructions](#)" and "[Authorized use](#)".

- ▶ The operating instructions must be read and understood.

1.1 Symbols



DANGER!

Warns of an immediate danger.

- ▶ Failure to observe the warning will result in a fatal or serious injury.



WARNING!

Warns of a potentially dangerous situation.

- ▶ Failure to observe the warning may result in serious injuries or death.



CAUTION!

Warns of a possible danger.

- ▶ Failure to observe this warning may result in a moderate or minor injury.

NOTE!

Warns of damage to property.

- ▶ Failure to observe the warning may result in damage to the device or the equipment.



Indicates important additional information, tips and recommendations.



Refers to information in these operating instructions or in other documentation.

- ▶ Designates an instruction to prevent risks.
- Designates a procedure which you must carry out.

1.2 Definition of term / abbreviation

The term "device" used in these instructions always stands for the Remote Sensor Type 8798.

In these instructions, the abbreviation "Ex" always refers to "potentially explosive atmosphere".

2 AUTHORIZED USE

Non-authorized use of the Remote Sensor may be dangerous to people, nearby equipment and the environment.

The device is designed to be mounted on pneumatic actuators for measuring distance on control valves. Operation is possible only in combination with position controllers.

- ▶ Do not expose the device to direct sunlight.
- ▶ Use according to the authorized data, operating conditions and conditions of use specified in the contract documents and operating instructions. These are described in the chapter entitled "[6 Technical data](#)".
- ▶ The device may be used only in conjunction with third-party devices and components recommended and authorized by Bürkert.
- ▶ In view of the large number of options for use, it is essential prior to installation to study and, if necessary, to test whether the Remote Sensor is suitable for the specific application case.
- ▶ Correct transportation, correct storage and installation and careful use and maintenance are essential for reliable and faultless operation.
- ▶ Use the device only as intended.

2.1 Restrictions

If exporting the system/device, observe any existing restrictions.

3 BASIC SAFETY INSTRUCTIONS

These safety instructions do not make allowance for any

- contingencies and events which may arise during the installation, operation and maintenance of the devices.
- local safety regulations – the operator is responsible for observing these regulations, also with reference to the installation personnel.



DANGER!

Risk of injury from high pressure in the equipment/device.

- ▶ Before working on equipment or device, switch off the pressure and deaerate/drain lines.

Risk of electric shock.

- ▶ Before working on equipment or device, switch off the power supply and secure to prevent reactivation.
- ▶ Observe applicable accident prevention and safety regulations for electrical equipment.



WARNING!

General hazardous situations.

To prevent injury, ensure that:

- ▶ In potentially explosive atmosphere the Remote Sensor Type 8798 may be used only according to the specification on the separate Ex type label. For use observe the additional instructions enclosed with the device together with safety instructions for the potentially explosive atmosphere.
- ▶ Devices without a separate Ex type label may not be used in a potentially explosive atmosphere.
- ▶ Do not supply the medium connectors of the system with aggressive or flammable media.
- ▶ Do not supply the medium connectors with any liquids.
- ▶ When unscrewing and screwing in the body casing or the transparent cap, do not hold the actuator of the process valve but the connection housing of Type 8798.
- ▶ Do not physically stress the housing (e.g. by placing objects on it or standing on it).
- ▶ Do not make any external modifications to the device housings. Do not paint the housing parts or screws.
- ▶ The system cannot be activated unintentionally.
- ▶ Installation and repair work may be carried out by authorized technicians only and with the appropriate tools.
- ▶ The device may be operated only when in perfect condition and in consideration of the operating instructions.

- ▶ After an interruption in the power supply or pneumatic supply, ensure that the process is restarted in a defined or controlled manner.
- ▶ The general rules of technology apply to application planning and operation of the device.

NOTE!

Electrostatic sensitive components / modules.

The device contains electronic components which react sensitively to electrostatic discharge (ESD). Contact with electrostatically charged persons or objects is hazardous to these components. In the worst case scenario, they will be destroyed immediately or will fail after start-up.

- ▶ Observe the requirements in accordance with EN 61340-5-1 to minimize or avoid the possibility of damage caused by sudden electrostatic discharge.
- ▶ Also ensure that you do not touch electronic components when the power supply voltage is present.

4 GENERAL INFORMATION

4.1 Contact addresses

Germany

Bürkert Fluid Control Systems
Sales Center
Christian-Bürkert-Str. 13-17
D-74653 Ingelfingen
Tel. + 49 (0) 7940 - 10 91 111
Fax + 49 (0) 7940 - 10 91 448
E-mail: info@burkert.com

International

Contact addresses can be found on the final pages of the printed operating instructions.

And also on the Internet at: www.burkert.com

4.2 Warranty

The warranty is only valid if the Remote Sensor Type 8798 is used as intended in accordance with the specified application conditions.

4.3 Information on the internet

The operating instructions and data sheets for Type 8798 can be found on the Internet at: www.burkert.com

5 SYSTEM DESCRIPTION

5.1 General description

The Remote Sensor Type 8798 is a digital non-contact position sensor for use on pneumatically actuated variable speed drives. This Remote Sensor is used in combination with the positioners (remote design) Type 8791 and Type 8792/8793. The Remote Sensor cannot be used as a stand-alone device. Its main task is to measure the position of a pneumatically actuated control valve.

5.1.1 Features

Designs

The Remote Sensor is available as a linear and rotating position sensor to be able to record the position of stroke and swivel actuators.

Position sensor

Robust, non-contact and wear-free position sensor that is connected to the position controller via a circular line for supply and serial data transmission.

Display

Display of operating modes via 2 LEDs.

5.1.2 Combination with valve types and mounting versions

The Remote Sensor Type 8798 can be mounted on different control valves. For example on valves with piston or membrane actuator. The actuators can be single-acting or double-acting.

Linear Remote Sensor

This linear Remote Sensor can be fitted to Bürkert process valves of the following types: 2103, 2300, 2301, 26xx and 27xx.



Fig. 1: Linear Remote Sensor

Rotating Remote Sensor

This rotating Remote Sensor can be fitted to push actuators according to NAMUR recommendation (DIN IEC 534 T6) or to swivel actuators according to VDI/VDE 3845.

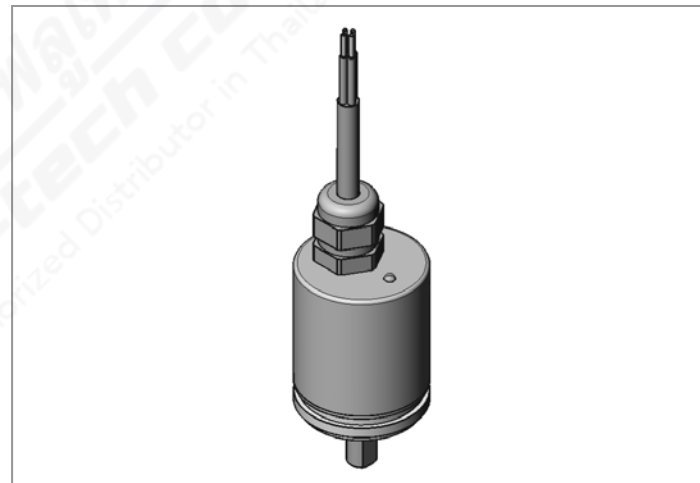


Fig. 2: Rotating Remote Sensor

6 TECHNICAL DATA

6.1 Conformity

In accordance with the EU Declaration of conformity, the Remote Sensor Type 8798 is compliant with the EU Directives.

6.2 Standards

The applied standards on the basis of which compliance with the EU Directives is confirmed are listed in the EU type examination certificate and/or the EU Declaration of Conformity.

6.3 Licenses

The product is approved for use in zone 2 and 22 in accordance with ATEX directive 2014/34/EU category 3GD.



Observe instructions on operation in a potentially explosive atmosphere (Ex area). Observe the ATEX additional instructions.

The product is cULus approved. Instructions for use in the UL area see chapter [“6.9 Electrical data”](#).

6.4 Operating conditions



WARNING!

Solar radiation and temperature fluctuations may cause malfunctions or leaks.

- ▶ If the device is used outdoors, do not expose it unprotected to the weather conditions.
- ▶ Ensure that the permitted ambient temperature does not exceed the maximum value or drop below the minimum value.

Ambient temperature: -25 °C – +80 °C

Degree of protection:

Evaluated by the manufacturer:	Evaluated by UL:
IP65 / IP67 according to EN 60529 ¹⁾	UL Type 4x Rating indoor only ¹⁾

Operating altitude up to 2000 m above sea level

Relative air humidity max. 90% at 55 °C
(non condensing)

¹⁾ *Only if cables, plugs and sockets have been connected correctly and in compliance with the exhaust air concept, see chapter [“9.4 Pneumatic connection”](#).*

6.5 Mechanical data

Dimensions: See data sheet

Housing material:	Linear Remote Sensor: exterior: PPS, PC, VA,
	Rotating Remote Sensor: exterior: Chrome-plated steel, stainless steel, aluminum
Sealing material:	Linear Remote Sensor: exterior: EPDM inside: NBR
	Rotating Remote Sensor: exterior: Neoprene, PVC inside: NBR
Area covered by the measurement sensor:	Linear: 0 – 45 mm
	Rotating 0° – 360°

6.6 Pneumatic data

Only if installed on process valves with internal air supply
Type 2103, 2300 and 2301

Temperature range of compressed air: see the process valve operating instructions

Pressure range: 0 – 7 bar

Connections: Plug-in hose connector Ø 6mm / 1/4"
Socket connection G1/8

6.7 Type label (example)

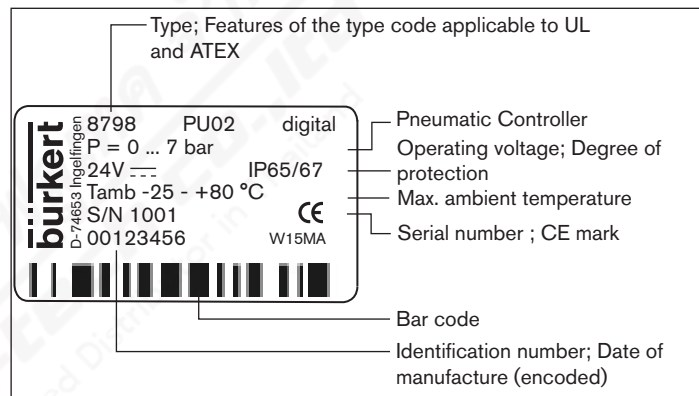


Fig. 3: Example of type label; linear Remote Sensor

	Resolution		Electrical configuration	
	Wire colors			
Operating voltage	ST/MT bits:	14/00	S+(DCin)	BN
	supply:	10-30 VDC	S-(GND)	WH
	(class2 only)	50 mA	A(Data+)	GY
	I/F:	custom	B(Data-)	PK
	release:	1.00	shield	BK
Serial number	10380000AA		Type 8798 - ID 00211536	

Fig. 4: Example of type label; rotating Remote Sensor

6.8 UL additional label (example)

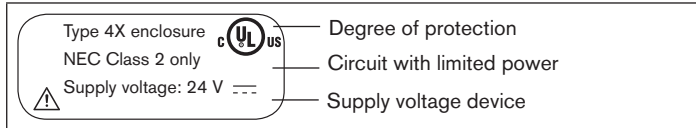


Fig. 5: UL additional label (example)

6.9 Electrical data



WARNING!

Only circuits with limited power may be used for UL approved components according to "NEC Class 2".

Power consumption: Linear Remote Sensor: < 0.3 W

Rotating Remote Sensor: < 0.8 W

Protection class: 3 as per DIN EN 61140 (VDE 0140-1)

Communication: via serial interface RS485 (included in the supply cable)

Connections: Linear Remote Sensor:
Round cable 10 m
Rotating Remote Sensor:
Round cable 2 m shielded (maximum extension 10 m)

Supply voltage: (via the positioner Type 8791 or Type 8792/8793)
Linear Remote Sensor:
24 V DC $\pm$ 10 %
Rotating Remote Sensor:
10 – 30 V DC
For UL devices: use „NEC Class 2“ power supply

7 CONTROL AND DISPLAY ELEMENTS

Special operation of this Remote Sensor is not necessary. The necessary settings are made on the positioner Type 8791 or Type 8792/8793 (see relevant chapter of the positioner operating instructions).

7.1 Display elements of the linear Remote Sensor

2 LEDs, which are also visible from outside through the transparent cap, display the sensor mode.

Status LED green	Status LED red	Display	Remedial action
off	off	No operating voltage	Check the supply voltage of positioner Type 8791, Type 8792/8793. Check the cable connection configuration.
flashing	on	Sensor is operated outside the coverage area.	Check adaption to actuator; the puck on the switch spindle must not exceed the sensor surface.
flashing	off	Sensor is in operation and sending position value	

Tab. 1: LED display elements; linear Remote Sensor



Fig. 6: LED display elements; linear Remote Sensor

7.2 Display elements of the rotating Remote Sensor

An LED on the upper side of the sensor housing is used to indicate the sensor mode.

Status LED	Display	Remedial action
off	No operating voltage	Check supply voltage, connection.
on (green)	Ready for operation	-
on (red)	Starting phase (during the acceleration phase – booting)	-
	Sensor error	Switch off the operating voltage and switch it on again. The sensor is defective if the display continues to show “Sensor error”.

Tab. 2: LED display elements; rotating Remote Sensor

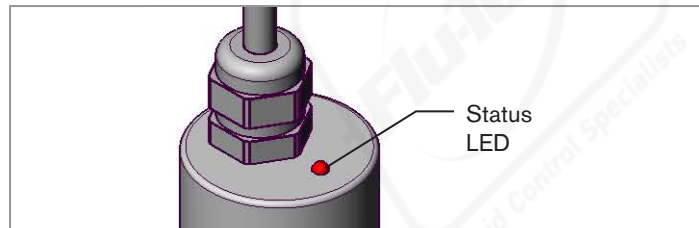


Fig. 7: LED display elements; rotating Remote Sensor

8 INSTALLATION

8.1 Safety instructions



DANGER!

Risk of injury from high pressure in the equipment/device.

- ▶ Before working on equipment or device, switch off the pressure and deaerate/drain lines.

Risk of electric shock.

- ▶ Before working on equipment or device, switch off the power supply and secure to prevent reactivation.
- ▶ Observe applicable accident prevention and safety regulations for electrical equipment.



WARNING!

Risk of injury from improper installation.

- ▶ Installation may be carried out by authorized technicians only and with the appropriate tools.

Risk of injury from unintentional activation of the system and an uncontrolled restart.

- ▶ Secure system from unintentional activation.
- ▶ Following assembly, ensure a controlled restart.

8.2 Installation of the linear Remote Sensor Type 8798

8.2.1 Attachment to process valves with internal air supply (series 2103, 2300 and 2301)

NOTE!

When mounting on process valves with a welded body, follow the installation instructions in the operating instructions for the process valve.

Procedure:

1. Install switch spindle

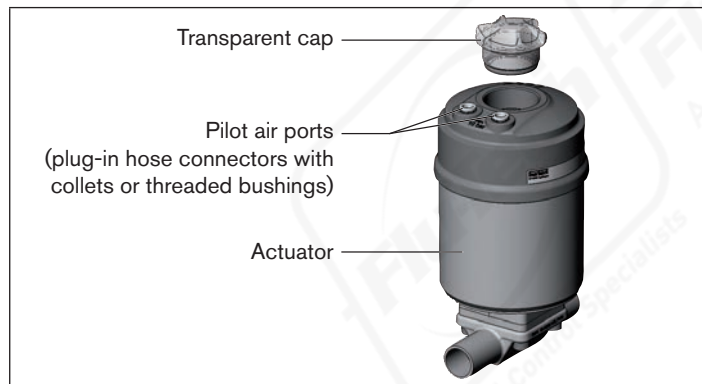


Fig. 8: Installation of linear Remote Sensor, series 2103, 2300 and 2301

- Unscrew the transparent cap on the actuator and unscrew the position display (yellow cap) on the spindle extension (if present).
- For version with plug-in hose connector, remove the collets (white nozzles) from both pilot air ports (if present).

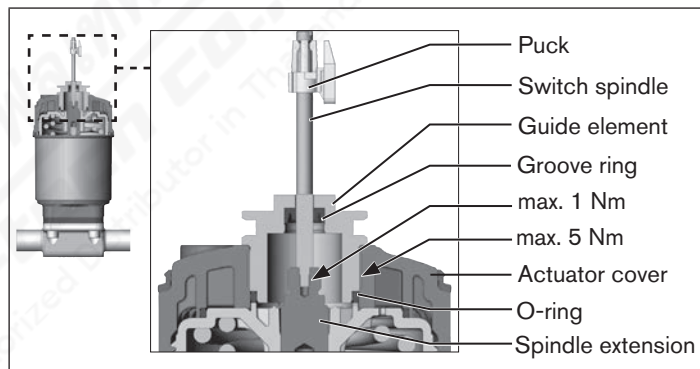


Fig. 9: Installation of the switch spindle, series 2103, 2300 and 2301

NOTE!

Improper installation may damage the groove ring in the guide element.

The groove ring is already be pre-assembled in the guide element and must be "locked into position" in the undercut.

- When installing the switch spindle, do not damage the groove ring.

- Push the switch spindle through the guide element.

NOTE!

Screw locking paint may contaminate the groove ring.

- Do not apply any screw locking paint to the switch spindle.

- To secure the switch spindle, apply some screw locking paint (Loctite 290) in the tapped bore of the spindle extension in the actuator.
- Check that the O-ring is correctly positioned.
- Screw the guide element to the actuator cover (maximum torque: 5 Nm).
- Screw switch spindle onto the spindle extension. To do this, there is a slot on the upper side (maximum torque: 1 Nm).
- Push puck onto the switch spindle and lock into position.

2. Install sealing rings

- Pull the form seal onto the actuator cover (smaller diameter points upwards).
- Check that the O-rings are correctly positioned in the pilot air ports.



When the Remote Sensor is being installed, the collets of the pilot air ports must not be fitted to the actuator.

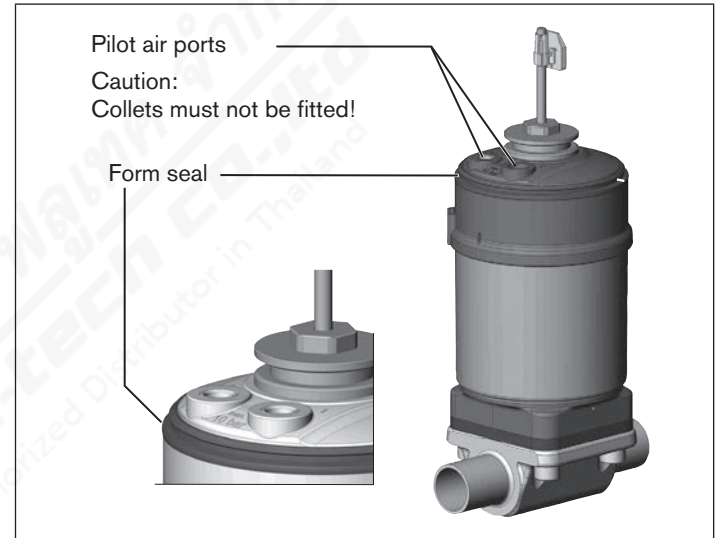


Fig. 10: Installation of the sealing rings, series 2103, 2300 and 2301

3. Install linear Remote Sensor

- Align the puck and the Remote Sensor in such a way that
1. the puck engages in the guide rail of the Remote Sensor and
 2. the connection pieces of the Remote Sensor engage in the pilot air ports of the actuator (see "Fig. 12")

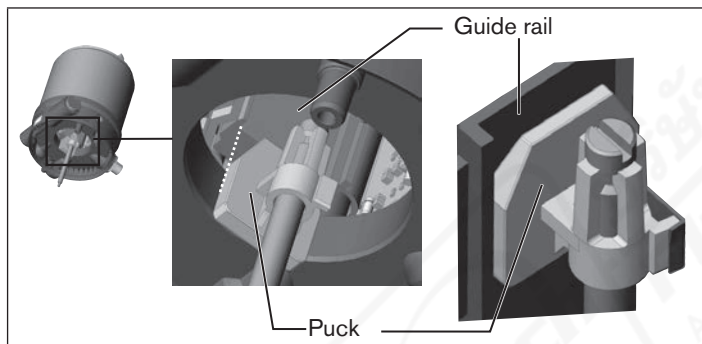


Fig. 11: Aligning the puck

- Push the Remote Sensor without turning it onto the actuator until no gap is visible on the form seal.

NOTE!

Too high torque when screwing in the fastening screw does not ensure degree of protection IP65 / IP67.

- ▶ The fastening screws may be tightened to a maximum torque of 1.5 Nm only.

- Attach the Remote Sensor to the actuator using the two side fastening screws. In doing so, tighten the screws only hand-tight (max. torque: 1.5 Nm).

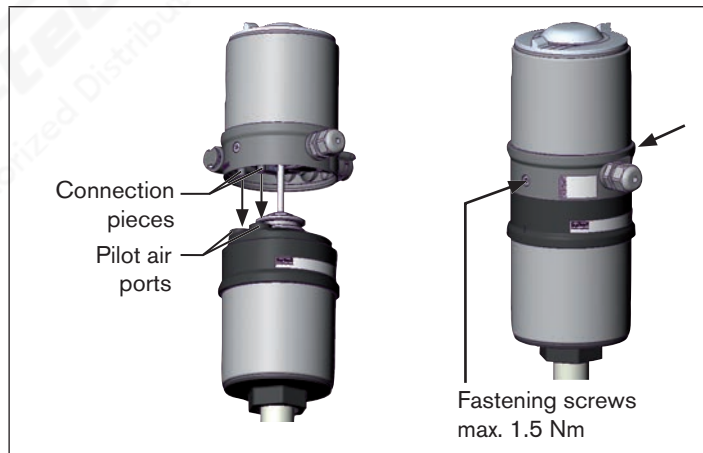


Fig. 12: Installation of linear Remote Sensor, series 2103, 2300 and 2301

8.2.2 Attachment to process valves to series 26xx and 27xx

Procedure:

1. Install switch spindle

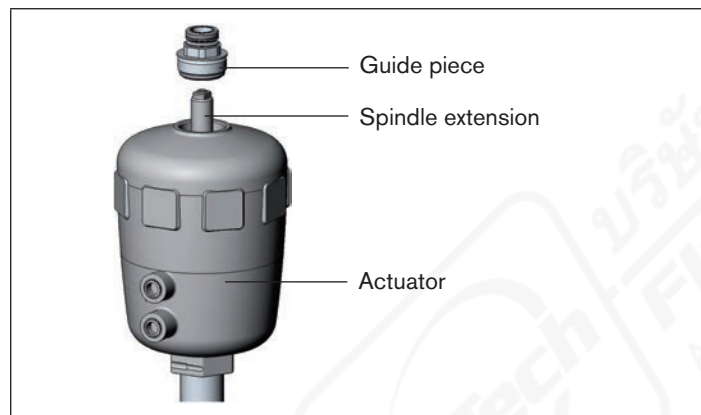


Fig. 13: Installing the switch spindle, series 26xx and 27xx - 1

- Unscrew the already fitted guide piece from the actuator (if present).
- Remove intermediate ring (if present).
- Press the O-ring downwards into the cover of the actuator.

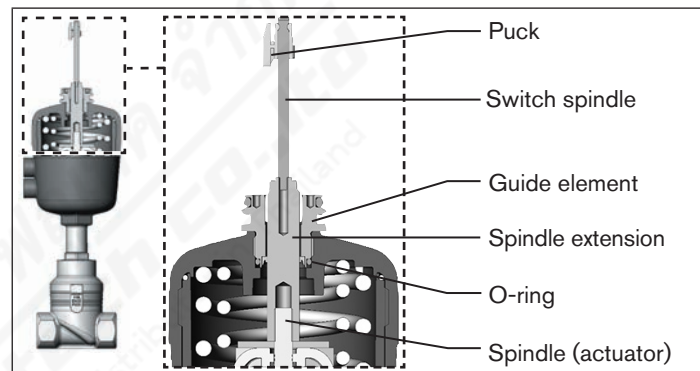


Fig. 14: Installing the switch spindle, series 26xx and 27xx - 2

- Actuator size 125 and bigger:
remove existing spindle extension and replace with the new one.
To do this, apply some screw locking paint (Loctite 290) in the tapped bore of the spindle extension.
- Screw the guide element into the cover of the actuator using a face wrench²⁾ (torque: 8.0 Nm).
- To secure the switch spindle, apply some screw locking paint (Loctite 290) to the thread of the switch spindle.
- Screw the switch spindle onto the spindle extension. To do this, there is a slot on the upper side (maximum torque: 1 Nm).
- Push the puck onto the switch spindle until it engages.

²⁾ journal Ø: 3 mm; journal gap: 23.5 mm

2. Install linear Remote Sensor

- Push the Remote Sensor onto the actuator. The puck must be aligned in such a way that it is inserted into the guide rail of the Remote Sensor.

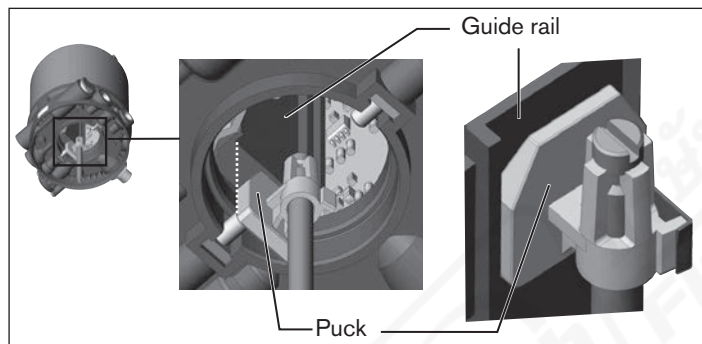


Fig. 15: Aligning the puck

- Press the Remote Sensor all the way down as far as the actuator and turn it into the required position.

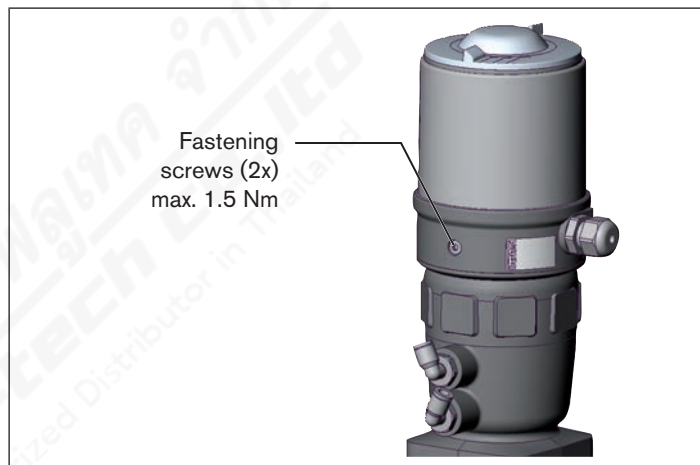


Fig. 16: Installing the linear Remote Sensor

NOTE!

Too high torque when screwing in the fastening screw does not ensure degree of protection IP65 / IP67.

- The fastening screws may be tightened to a maximum torque of 1.5 Nm only.

- Attach the Remote Sensor to the actuator using the two side fastening screws. In doing so, tighten the fastening screws hand-tight only (maximum torque: 1.5 Nm).

8.2.3 Rotating the actuator module



The actuator module (Remote Sensor and actuator) can be rotated for straight seat valves and angle seat valves belonging to series 2300, 2301 and 27xx only.

The position of the connections can be aligned steplessly by rotating the actuator module (Remote Sensor and actuator) through 360°.



Only the entire actuator module can be rotated. The Remote Sensor cannot be rotated contrary to the actuator. The process valve must be in the open position for alignment of the actuator module.



DANGER!

Risk of injury from high pressure in the equipment/device.

- Before working on equipment or device, switch off the pressure and deaerate/drain lines.

Procedure:

- Clamp valve body in a holding device (only required if the process valve has not yet been installed).
- Control function A: Open process valve.
- Using a suitable open-end wrench, counter the wrench flat on the pipe.

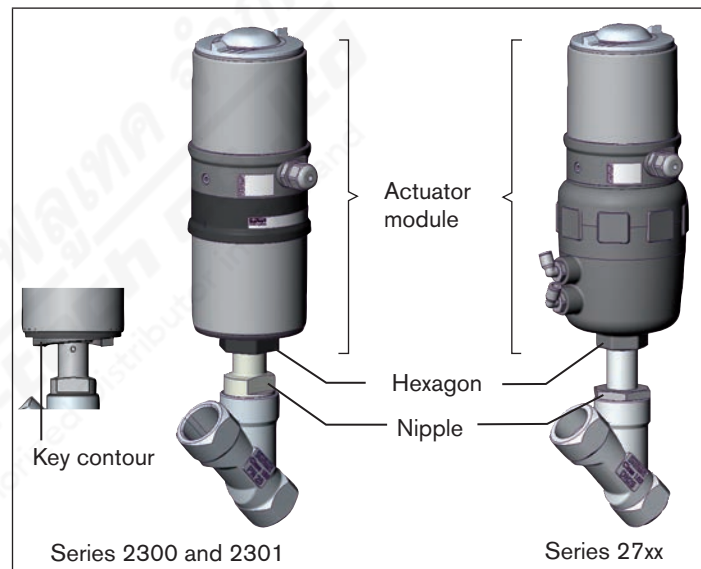


Fig. 17: Rotating the actuator module

- Series 2300 and 2301 with key contour:
Fit special key³⁾ exactly in the key contour on the underside of the actuator.
- Series 2300, 2301 and 27xx with hexagon:
Place suitable open-end wrench on the hexagon of the actuator.

³⁾ The special key (665702) is available from your Bürkert sales office.



WARNING!

Risk of injury from discharge of medium and pressure.

If the direction of rotation is wrong, the housing interface may become detached.

- ▶ Rotate the actuator module in the specified direction only (series 2300 and 2301 or 27xx, see "Fig. 18").

- Series 2300, 2301 and 27xx with hexagon:
Rotate counter-clockwise (as seen from below) to bring the actuator module into the required position.
- Series 2300 and 2301 with key contour:
Rotate clockwise (as seen from below) to bring the actuator module into the required position.

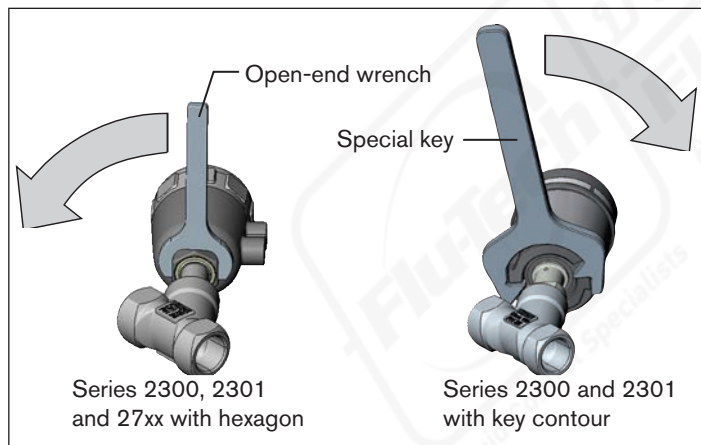


Fig. 18: Rotating with special key / open-end wrench

8.2.4 Rotating the linear Remote Sensor for process valves belonging to series 26xx and 27xx

If the connecting cable cannot be fitted properly following installation of the process valve, the Remote Sensor can be rotated contrary to the actuator.

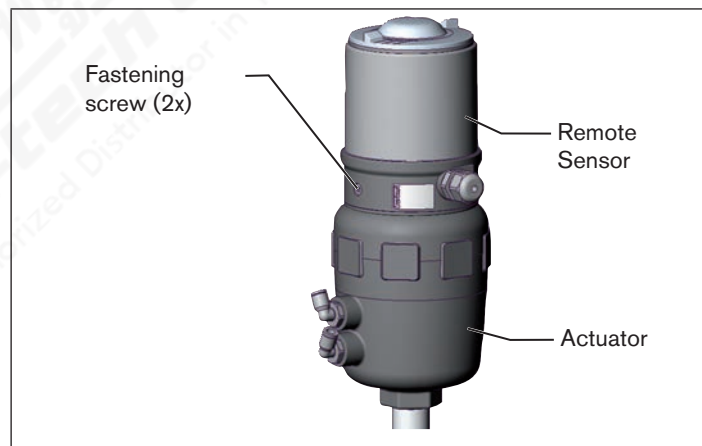


Fig. 19: Rotating the linear Remote Sensor, series 26xx and 27xx

Procedure:

- Loosen the fastening screws countersunk in the side of the housing (hexagon socket wrench size 2.5).
- Rotate the Remote Sensor into the required position.

NOTE!

Too high torque when screwing in the fastening screw does not ensure degree of protection IP65 / IP67.

- ▶ The fastening screw may be tightened to a maximum torque of 1.5 Nm only.

- Tighten the fastening screws hand-tight only (maximum torque: 1.5 Nm).

8.3 Installation of the rotating Remote Sensor Type 8798



DANGER!

Risk of injury from high pressure in the equipment/device.

- ▶ Before working on equipment or device, switch off the pressure and deaerate/drain lines.

Risk of electric shock.

- ▶ Before working on equipment or device, switch off the power supply and secure to prevent reactivation.
- ▶ Observe applicable accident prevention and safety regulations for electrical equipment.



WARNING!

Risk of injury from improper installation.

- ▶ Installation may be carried out by authorized technicians only and with the appropriate tools.

Risk of injury from unintentional activation of the system and an uncontrolled restart.

- ▶ Secure system from unintentional activation.
- ▶ Following assembly, ensure a controlled restart.

8.3.1 Basic installation

Before attaching the rotating sensor to the respective actuator, it is assembled as described in the following.

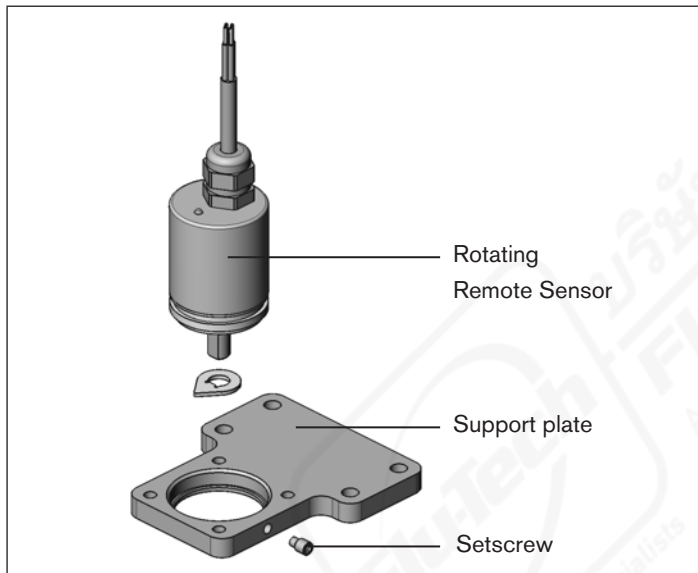


Fig. 20: Fit sensor on support plate

- Insert the rotating Remote Sensor into the opening of the support plate until it reaches the stop point.
- Attach Remote Sensor with the lateral setscrew.

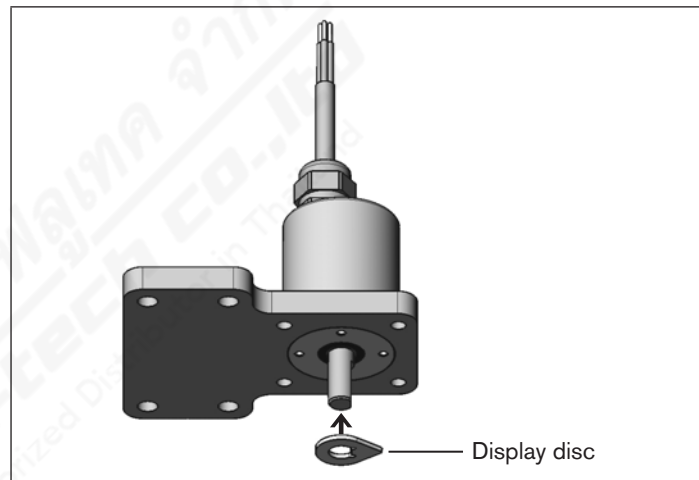


Fig. 21: Install display disc

- Attach display disc to the shaft of the rotating Remote Sensor.

8.3.2 Attachment to a proportional valve with swivel actuator

The shaft of the rotating Remote Sensor is directly coupled to the shaft of the swivel actuator.

Mounting kit on swivel actuator (order no. 787338, can be purchased as an accessory from Bürkert):

Part no.	Quantity	Name
1	1	Adapter
2	2	Setscrew DIN 913 M4 x 10
3	4	Cheese-head screw DIN 933 M6 x 12
4	4	Circlip B6
5	2	Hexagon nut DIN 985 M4

Tab. 3: Mounting kit to swivel actuator for rotating Remote Sensor

Other accessories:

The assembly bridge with fastening screws (in accordance with VDI/VDE 3845) can be purchased from Bürkert, quoting order no. 770294.

Procedure:

- Perform basic installation
(for a description, refer to chapter "8.3.1").

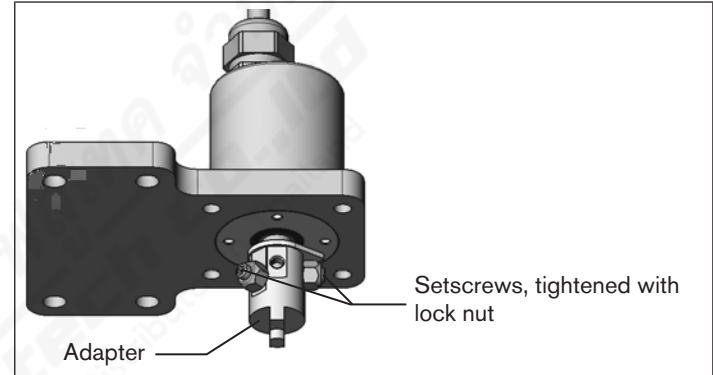


Fig. 22: Fitting the adaptor

- Fit adaptor to the shaft of the rotating Remote Sensor and attach with 2 setscrews (see "Fig. 22").

Anti-twist safeguard:



Note the flat side of the shaft.

As an anti-twist safeguard, one of the setscrews shall rest on the flat side of the shaft.

- Tighten the setscrews with the lock nuts.
- Assemble the multi-part assembly bridge suitable for the actuator.
- Screw the support plate of the rotating Remote Sensor on the assembly bridge, using 4 cheese-head screws and circlips. (Refer to "Fig. 23").

→ Screw assembly bridge on the swivel actuator, using 4 cheese-head screws and circlips (refer to “Fig. 23”).

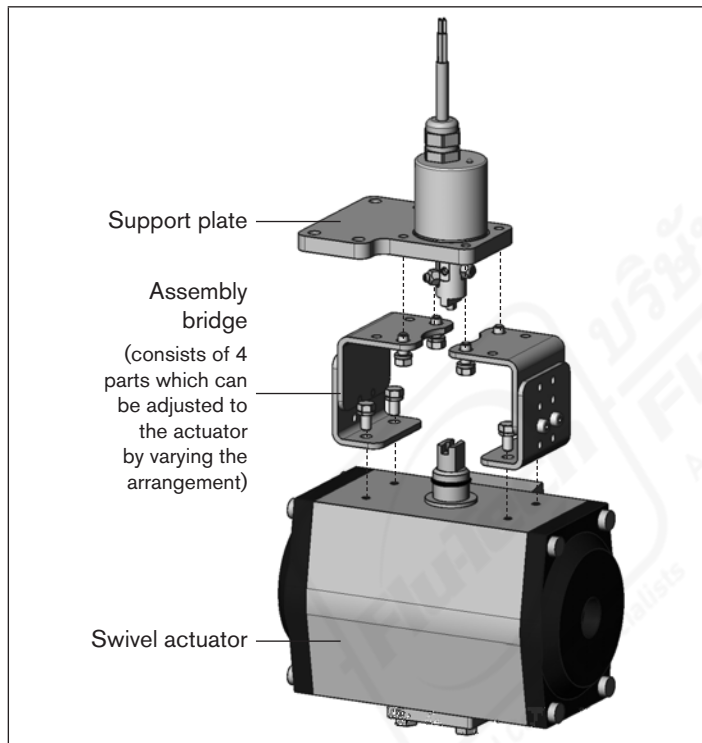


Fig. 23: Fitting the rotating Remote Sensor to a swivel actuator

Measurement range of the rotating Remote Sensor:

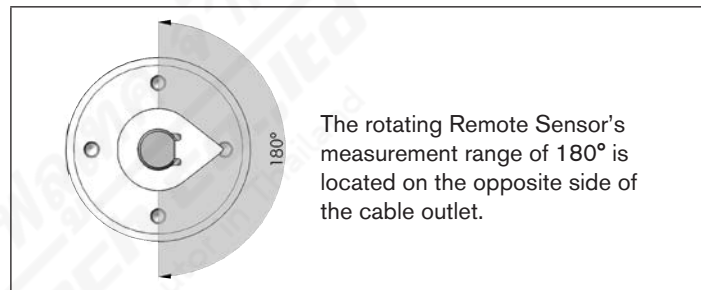


Fig. 24: Measurement range of the rotating Remote Sensor



If the *X.TUNE ERROR 5* message is indicated on the graphics display of the position controller after the *X.TUNE* function starts, the sensor is not correctly aligned with the shaft of the actuator.

- ▶ Check the alignment. The zero crossing of the sensor must not be exceeded.
- ▶ Then repeat the *X.TUNE* function.

8.3.3 Attachment to a proportional valve with push actuator according to NAMUR

The valve position is transferred to the shaft of the rotating Remote Sensor via a lever (according to NAMUR).

Depending on the stroke range, a short or long lever is required for the installation (refer to "Tab. 4")

Attachment kit for push drives (serial no. 787 215):

(Can be purchased as an accessory from Bürkert).

Part no.	Quantity	Name
1	1	NAMUR mounting bracket IEC 534
2	1	Hoop
3	2	Clamping piece
4	1	Driver pin
5	1	Conical roller
6a	1	NAMUR lever for stroke range 3 – 35 mm
6b	1	NAMUR lever for stroke range 35 – 130 mm
7	2	U-bolt
8	4	Hexagon bolt DIN 933 M8 x 20
9	2	Hexagon bolt DIN 933 M8 x 16
10	6	Circlip DIN 127 A8
11	6	Washer DIN 125 B8,4
12	2	Washer DIN 125 B6,4
13	1	Spring VD-115E 0,70 x 11,3 x 32,7 x 3,5
14	1	Spring washer DIN 137 A6
15	1	Locking washer DIN 6799 - 3,2

Part no.	Quantity	Name
16	3	Circlip DIN 127 A6
17	3	Hexagon bolt DIN 933 M6 x 25
18	1	Hexagon nut DIN 934 M6
19	1	Square nut DIN 557 M6
21	4	Hexagon nut DIN 934 M8
22	1	Guide washer 6,2 x 9,9 x 15 x 3,5

Tab. 4: Mounting kit to push actuator for rotating Remote Sensor

Procedure:

- Perform basic installation (for a description, refer to chapter "8.3.1").
- Using the clamping pieces ③, hexagon bolts ⑰ and circlips ⑱ attach the hoop ② to the actuator spindle.

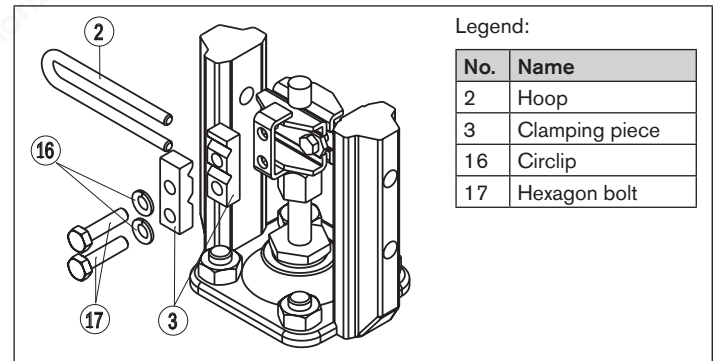


Fig. 25: Attaching the hoop

- Assemble lever (if not pre-assembled) (see “Fig. 26”).
Depending on the stroke range, a short or long lever is required for the installation (refer to “Tab. 4”)

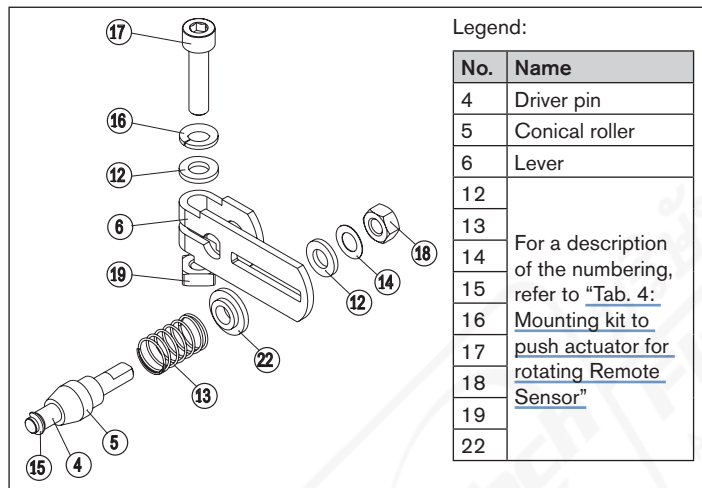


Fig. 26: Assembling the lever

! The gap between the driver pin and the shaft should be the same as the actuator stroke. As a result, the lever has a swivel range of 60°.

Swivel range of the lever:

To ensure that the position sensor operates at a good resolution, the swivel range of the lever must be at least 60°.

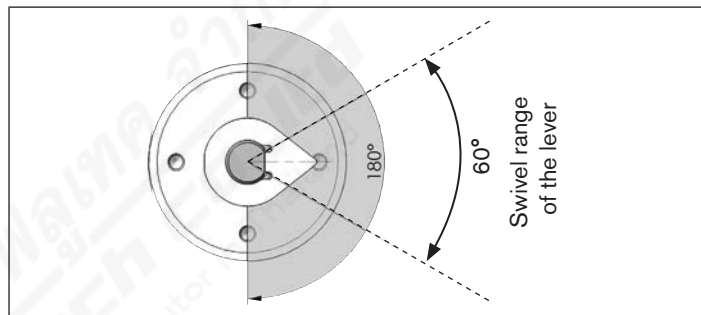


Fig. 27: Swivel range of the lever

- Attach lever to the shaft of the rotating Remote Sensor and tighten.
- Attach mounting bracket ① with hexagon bolts ⑨, circlips ⑩ and washers ⑪ to the support plate of the Remote Sensor (refer to “Fig. 28”).
- To determine the correct position, hold the rotating Remote Sensor to the actuator.

! The conical roller ⑤ on the lever ⑥ of the position sensor must be able to move freely in the hoop (refer to “Fig. 25: Attaching the hoop”) along the entire stroke range of the actuator.

At 50% stroke the lever position should be approximately horizontal (see “Aligning lever mechanism:”, page 28).

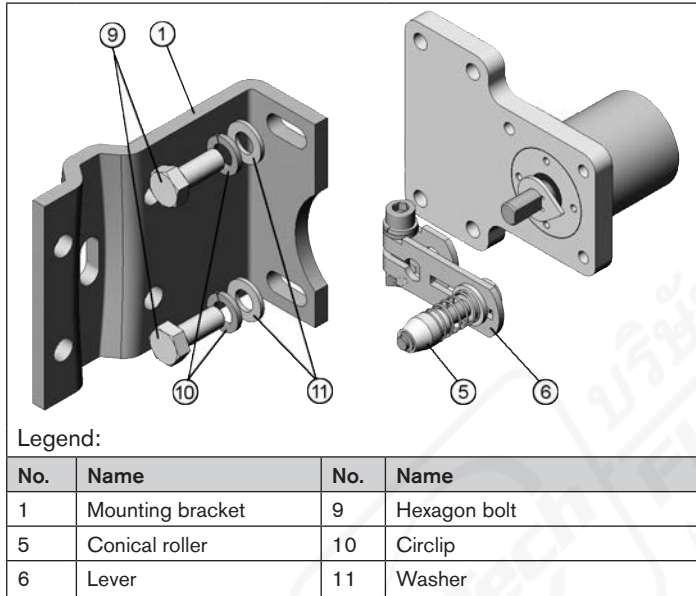


Fig. 28: Attachment to a proportional valve with push drives according to NAMUR

Attaching the rotating Remote Sensor with mounting bracket for push actuators with cast frame:

→ Attach mounting bracket (1) to cast frame with one or several hexagon bolts (8), circlips (10) and washers (11) (refer to "Fig. 29").

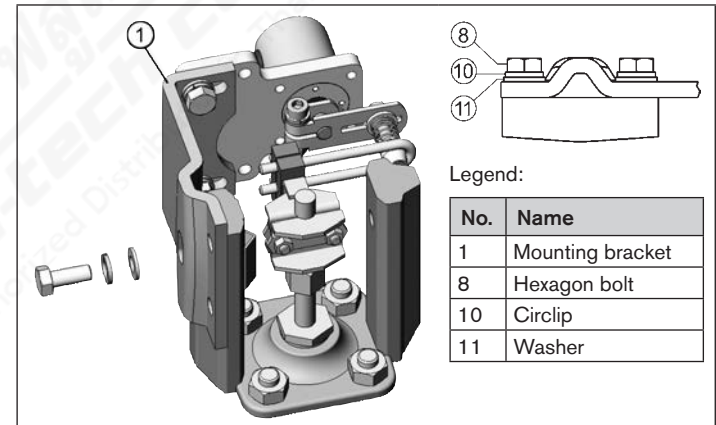


Fig. 29: Fit mounting bracket to cast frame

Attaching the rotating Remote Sensor with mounting bracket for push actuators with columnar yoke:

- Attach mounting bracket to the columnar yoke with the U-bolt ⑦, circlips ⑩, washers ⑪ and hexagon nuts ⑫ (see "Fig. 30").

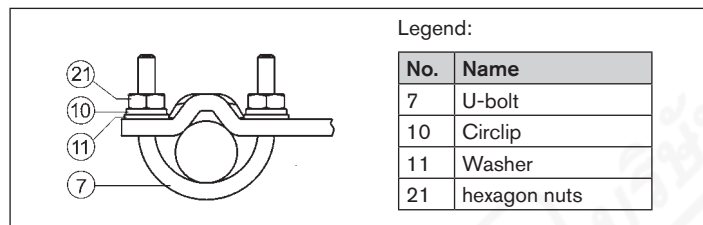


Fig. 30: Fit mounting bracket to columnar yoke

Aligning lever mechanism:

! The lever mechanism cannot be correctly aligned until the device has been connected electrically and pneumatically.

- Move the actuator in manual mode to half stroke (according to the scale on the actuator).
- Adjust the height of the position sensor until the lever is horizontal.
- Fix the position sensor in this position on the actuator.

9 FLUID INSTALLATION

The dimensions of the Remote Sensor and the different complete device models, consisting of Remote Sensor, actuator and valve, can be found in the relevant data sheets.

9.1 Safety instructions



DANGER!

Risk of injury from high pressure in the equipment/device.

- Before working on equipment or device, switch off the pressure and deaerate/drain lines.

Risk of electric shock.

- Before working on equipment or device, switch off the power supply and secure to prevent reactivation.
- Observe applicable accident prevention and safety regulations for electrical equipment.



WARNING!

Risk of injury from improper installation.

- Installation may be carried out by authorized technicians only and with the appropriate tools.

Risk of injury from unintentional activation of the system and an uncontrolled restart.

- Secure system from unintentional activation.
- Following installation, ensure a controlled restart.

9.2 Installing the process valve

Thread type and dimensions can be found in the corresponding data sheet.

- Connect the valve according to the operating instructions for the valve.

9.3 Installation of positioner Type 8791, Type 8792/8793

- Connect the positioner according to the operating instructions of Type 8791 or Type 8792/8793.

9.4 Pneumatic connection

9.4.1 Pneumatic connection of the Remote Sensor with internal air supply (Type 2103, 2300 and 2301)



DANGER!

Risk of injury from high pressure in the equipment/device.

- Before working on equipment or device, switch off the pressure and deaerate/drain lines.

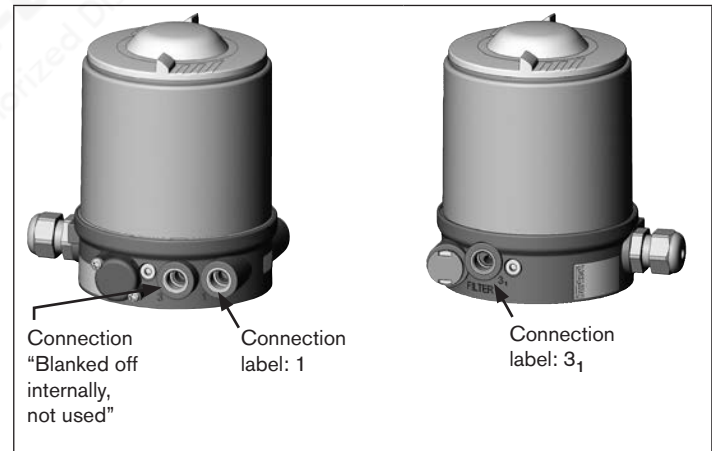


Fig. 31: Pneumatic connection with internal air supply



The length of this control line should be adapted to the actuator size because the clearance volumes caused by the control line can have a negative influence on the control properties. The following is the case: the smaller the actuator, the more sensitively the control system reacts to the length of the pneumatic control line.

Procedure:

Control functions A and B (single-acting actuators):

- Connect the working connection A1 or A2⁴⁾ of the positioner Type 8791 or Type 8792/8793 to the connection (1) using a hose.
- Attach the exhaust airline or a silencer to the connection (3₁).

⁴⁾ in line with desired safety position (see operating instructions Type 8791 or Type 8792/8793)

Control function I (double-acting actuators):

- Connect working connections A1 and A2 to the respective chambers of the Remote Sensor.

Connection for Remote Sensor	Actuator
3 ₁	upper chamber of the actuator
1	lower chamber of the actuator

Tab. 5: Pneumatic connection - control function I

Connection 3 — upper chamber

Connection 1 — lower chamber

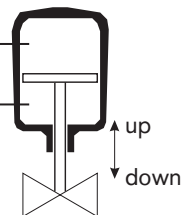


Fig. 32: Pneumatic connection - control function I



Caution: (Exhaust air concept):

In compliance with degree of protection IP67, an exhaust air line must be installed in the dry area (control function A and B).

Keep the adjacent supply pressure **always** at least 0.5 – 1 bar above the pressure which is required to move the actuator to its end position. This ensures that the control behavior is not extremely negatively affected in the upper stroke range on account of too little pressure difference.

During operation keep the fluctuations of the pressure supply as low as possible (max. $\pm 10\%$). If fluctuations are greater, the control parameters measured with the *X.TUNE* function are not optimum.

9.4.2 Pneumatic connection for process valves belonging to series 26xx and 27xx



DANGER!

Risk of injury from high pressure in the equipment/device.

- ▶ Before working on equipment or device, switch off the pressure and deaerate/drain lines.

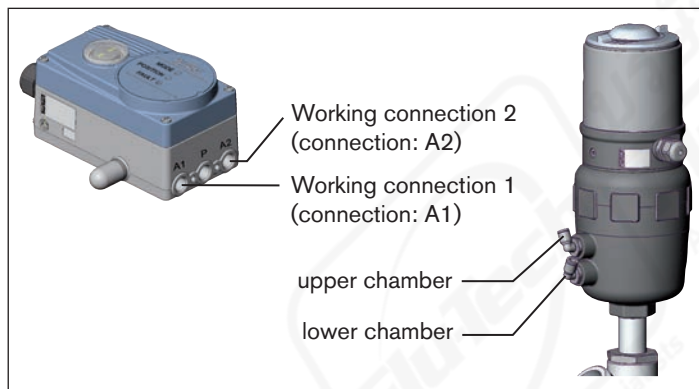


Fig. 33: Pneumatic connection series 26xx and 27xx



The length of this control line should be adapted to the actuator size because the clearance volumes caused by the control line can have a negative influence on the control properties. The following is the case: the smaller the actuator, the more sensitively the control system reacts to the length of the pneumatic control line.

Procedure:

Control function A (single-acting actuator):

- Connect the working connection A1 or A2⁵⁾ of the positioner Type 8791 or Type 8792/8793 to the lower chamber of the actuator using a hose.
- Attach the exhaust airline or a silencer to the upper chamber.

Control function B (single-acting actuator):

- Connect the working connection A1 or A2⁵⁾ of the positioner Type 8791 or Type 8792/8793 to the upper chamber of the actuator using a hose.
- Attach the exhaust airline or a silencer to the lower chamber.

Control function I (double-acting actuators):

- Connect working connections A1 and A2 to the respective chambers of the actuator.

⁵⁾ in line with desired safety position (see operating instructions Type 8791 or Type 8792/8793)



Caution: (Exhaust air concept):

In compliance with degree of protection IP67, an exhaust air line must be installed in the dry area (control function A and B).

Keep the adjacent supply pressure **always** at least 0.5 – 1 bar above the pressure which is required to move the actuator to its end position. This ensures that the control behavior is not extremely negatively affected in the upper stroke range on account of too little pressure difference.

During operation keep the fluctuations of the pressure supply as low as possible (max. $\pm 10\%$). If fluctuations are greater, the control parameters measured with the *X.TUNE* function are not optimum.

10 ELECTRICAL INSTALLATION

10.1 Safety instructions



DANGER!

Risk of electric shock.

- ▶ Before working on equipment or device, switch off the power supply and secure to prevent reactivation.
- ▶ Observe applicable accident prevention and safety regulations for electrical equipment.



WARNING!

Risk of injury from improper installation.

- ▶ Installation may be carried out by authorized technicians only and with the appropriate tools.

Risk of injury from unintentional activation of the system and an uncontrolled restart.

- ▶ Secure system from unintentional activation.
- ▶ Following installation, ensure a controlled restart.

10.2 Electrical connection to the positioner Type 8791 or Type 8792/8793

Procedure:

- If necessary, shorten the cable of the Remote Sensor and connect it to the M12 cable gland on the positioner Type 8791 or Type 8792/8793.
- Connect the 4 wires of the cable, as described in "Tab. 6" and in the operating instructions of the positioner Type 8791 or Type 8792/8793, to the appropriate terminals (Chapter "Terminal assignment for external position sensor" in the operating instruction of Type 8791 or Type 8792/8793).

Terminal	Wire color for cable type		Configuration	External circuit 8791 or 8792/8793
	1	2		
1	white	black	Supply sensor -	—○ S -
2	brown		Supply sensor +	—○ S +
3	yellow	orange	Serial interface B cable	—○ B
4	green	red	Serial interface A cable	—○ A

Tab. 6: Wire color - configuration with screw-type terminals

10.2.1 Terminal configuration linear Remote Sensor

NOTE!

Breakage of the pneumatic connection pieces due to rotational impact.

- When unscrewing the body casing, do not hold the actuator of the process valve but the connection housing.

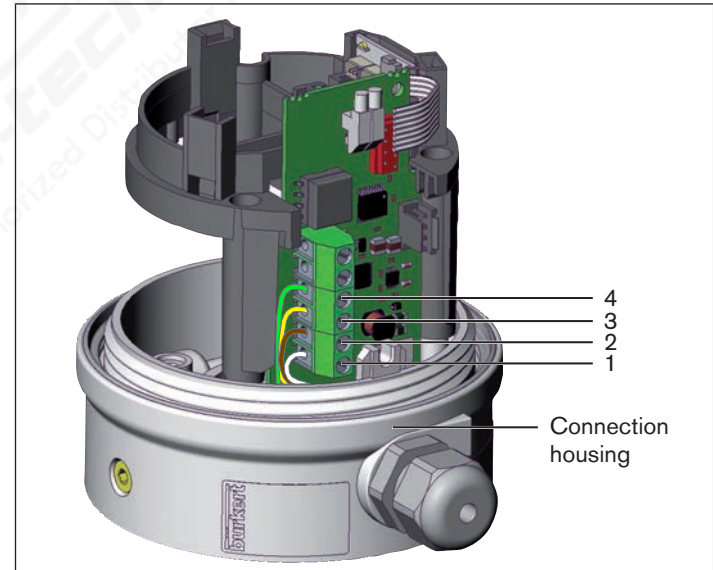


Fig. 34: Terminal configuration linear Remote Sensor

10.3 Electrical connection of the rotating Remote Sensor to the positioner Type 8791 or Type 8792/8793

- If necessary, shorten the cable of the Remote Sensor or extend it to a maximum of 10 m and connect it to the designated M12 cable gland on the positioner Type 8791 or Type 8792/8793.
- Connect the 4 wires of the cable, as described in "Tab. 7" and in the operating instructions of the positioner Type 8791 or Type 8792/8793, to the appropriate terminals.
- For potential equalization, connect the shield of the cable to the grounding connection in the terminal compartment of the position controller.

Wire color	Configuration	External circuit	
		8798	8791 or 8792/8793
brown	Supply sensor +	Brown (BN)	—○ S +
white	Supply sensor –	White (WH)	—○ S –
grey	Serial interface A cable	Grey (GY)	—○ A
pink	Serial interface B cable	Pink (PK)	—○ B
black	Shielding	Black (BK)	—⏏

Tab. 7: Wire colors and configuration; rotating Remote Sensor

11 START-UP

11.1 Safety instructions



WARNING!

Risk of injury from improper operation.

Improper operation may result in injuries as well as damage to the device and the area around it.

- ▶ Before start-up, ensure that the operating personnel are familiar with and completely understand the contents of the operating instructions.
- ▶ Observe the safety instructions and intended use.
- ▶ Only adequately trained personnel may operate the equipment/ the device.

No separate steps for starting up are necessary for the Remote Sensor Type 8798.

- Carry out the steps outlined for starting up in the operating instructions of the positioner (Chapter "Start-up" in the operating instructions of Type 8791 or Type 8792/8793).

12 MAINTENANCE

12.1 Safety instructions



DANGER!

Risk of injury from high pressure in the equipment/device.

- ▶ Before working on equipment or device, switch off the pressure and deaerate/drain lines.

Risk of electric shock.

- ▶ Before working on equipment or device, switch off the power supply and secure to prevent reactivation.
- ▶ Observe applicable accident prevention and safety regulations for electrical equipment.



WARNING!

Risk of injury from improper maintenance.

- ▶ Maintenance may be carried out by authorized technicians only and with the appropriate tools.

Risk of injury from unintentional activation of the system and an uncontrolled restart.

- ▶ Secure system from unintentional activation.
- ▶ Following maintenance, ensure a controlled restart.

12.2 Maintenance work

12.2.1 Service on intake air filter for the Remote Sensor with internal air supply (Type 2103, 2300 and 2301)



DANGER!

Risk of injury from high pressure in the equipment/device.

- ▶ Before working on equipment or device, switch off the pressure and deaerate/drain lines.

To protect the actuator, the pressure supply air is filtered.

The direction of flow of the air intake filter in installed state is from the inside to the outside through the filter material.

Procedure:

- Unlock the quick connector by pressing the holding element and pulling out the air intake filter (if necessary, use a suitable tool in between the recesses in the head of the filter).
- Clean the filter or, if necessary, replace the filter.
- Check inner O-ring and, if required, clean.
- Insert the air intake filter all the way into the quick connector.

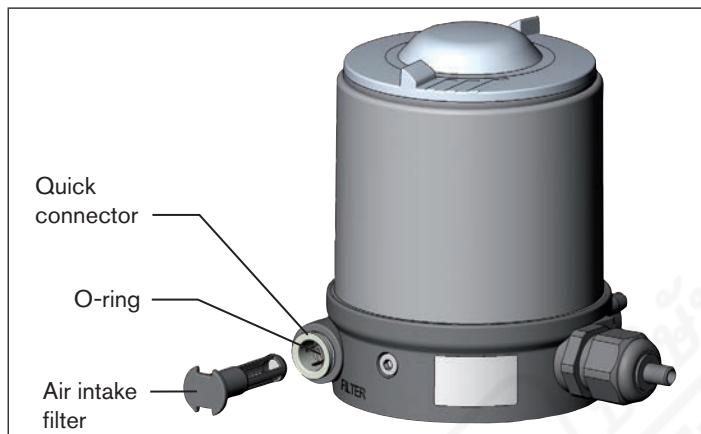


Fig. 35: Service on the air intake filter



DANGER!

Risk of injury due to improper installation.

- Ensure that the air intake filter is installed correctly.

→ Check that the air intake filter is secure.

13 TRANSPORT, STORAGE, DISPOSAL

NOTE!

Transport damages.

Inadequately protected equipment may be damaged during transport.

- During transportation protect the device against moisture and dirt in shock-resistant packaging.
- Avoid exceeding or dropping below the allowable storage temperature.

Incorrect storage may damage the device.

- Store the device in a dry and dust-free location.
- Storage temperature -40 – +85 °C.

Damage to the environment caused by device components contaminated with media.

- Observe applicable regulations on disposal and the environment.
- Observe national waste disposal regulations.
- Dispose of the device and packaging in an environmentally friendly manner.

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