

Type 8691

Control Head



Operating Instructions

We reserve the right to make technical changes without notice.
Technische Änderungen vorbehalten.
Sous réserve de modifications techniques.

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Operating Instructions 2204/10_EN-EN_00806086 / Original DE

Control head Type 8691

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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.

Failure to observe these instructions may result in hazardous situations.

- ▶ 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 control head Type 8691.

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

2 AUTHORIZED USE

Non-authorized use of the control head Type 8691 may be a hazard to people, nearby equipment and the environment.

The device is designed to be mounted on pneumatic actuators of process valves for the control of media.

- ▶ In the potentially explosive atmosphere the control head Type 8691 may be used only according to the specification on the separate approval sticker. For use observe the additional instructions enclosed with the device together with safety instructions for the potentially explosive atmosphere.
- ▶ Devices without a separate approval sticker may not be used in a potentially explosive atmosphere.
- ▶ 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, before installation, it is essential to study and if necessary to test whether the control head is suitable for the actual use planned.
- ▶ Correct transportation, correct storage and installation and careful use and maintenance are essential for reliable and faultless operation.
- ▶ Use the control head Type 8691 only as intended.

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.

General hazardous situations.

To prevent injury, ensure:

- ▶ That the system cannot be activated unintentionally.
- ▶ Installation and repair work may be carried out by authorized technicians only and with the appropriate tools.
- ▶ After an interruption in the power supply or pneumatic supply, ensure that the process is restarted in a defined or controlled manner.
- ▶ The device may be operated only when in perfect condition and in consideration of the operating instructions.
- ▶ The general rules of technology apply to application planning and operation of the device.

To prevent damage to property on the device, ensure:

- ▶ Do not feed any aggressive or flammable media into the pilot air port.
- ▶ Do not feed any liquids into the pilot air port.
- ▶ 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 8691.
- ▶ Do not put any loads on 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.

4 GENERAL INFORMATION

4.1 Contact address

Germany

Bürkert Fluid Control System
Sales Center
Chr.-Bürkert-Str. 13-17
D-74653 Ingelfingen
Tel. + 49 (0) 7940 - 10 91 111
Fax + 49 (0) 7940 - 10 91 448
E-mail: info@de.buerkert.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 control head Type 8691 is used as intended in accordance with the specified application conditions.

4.3 Trademarks

Brands and trademarks listed below are trademarks of the corresponding companies / associations / organizations

Loctite Henkel Loctite Deutschland GmbH

4.4 Information on the internet

The operating instructions and data sheets for Type 8691 can be found on the Internet at:

www.burkert.com

5 SYSTEM DESCRIPTION

5.1 Configuration and function

The control head Type 8691 can control single or double-acting process valves.

The control head Type 8691 has been optimized for integrated, modular installation on process valves of the 21xx series. The module configuration permits a variety of expansion steps.

For installation on the 20xx series there is a special model which is described in chapter “5.1.2”.

The valve position is recorded via a contactless, analog sensor element which uses the teach function to automatically detect and save the valve end positions during start-up.

Apart from the electrical position feedback, the status of the device is optically displayed on the control head itself by a colored high-power LED.

Option: Communication possible via AS-Interface.

5.1.1 Control head for integrated installation on the 21xx series

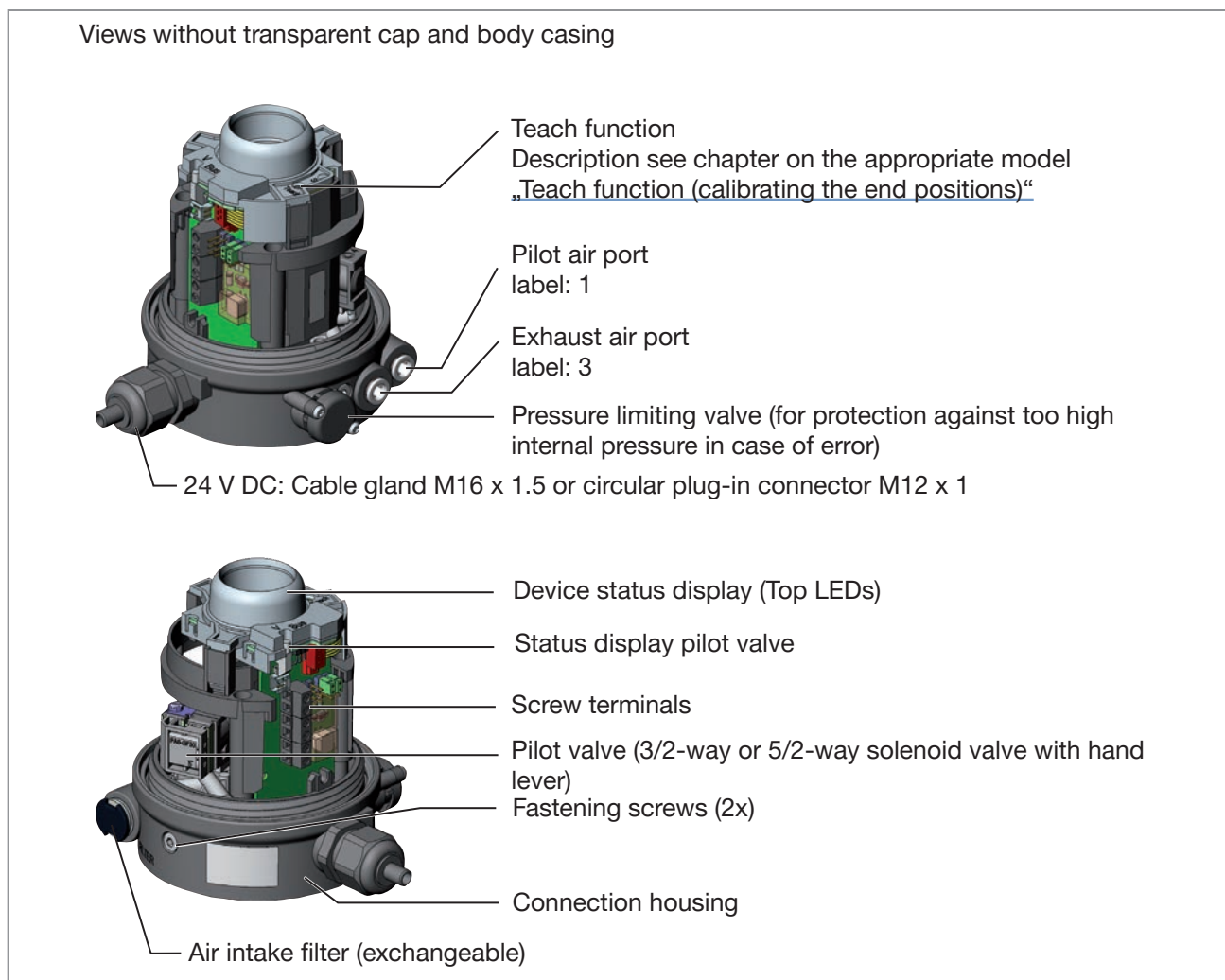


Figure 1: Design and function

5.1.2 Model for control of process valves belonging to the 20xx series

A special model enables the control head Type 8691 to be attached to process valves belonging to the 20xx series.

This model features has a different connection housing so that the pilot air ports can be connected to the outside of the actuator (see [“Figure 2”](#)).

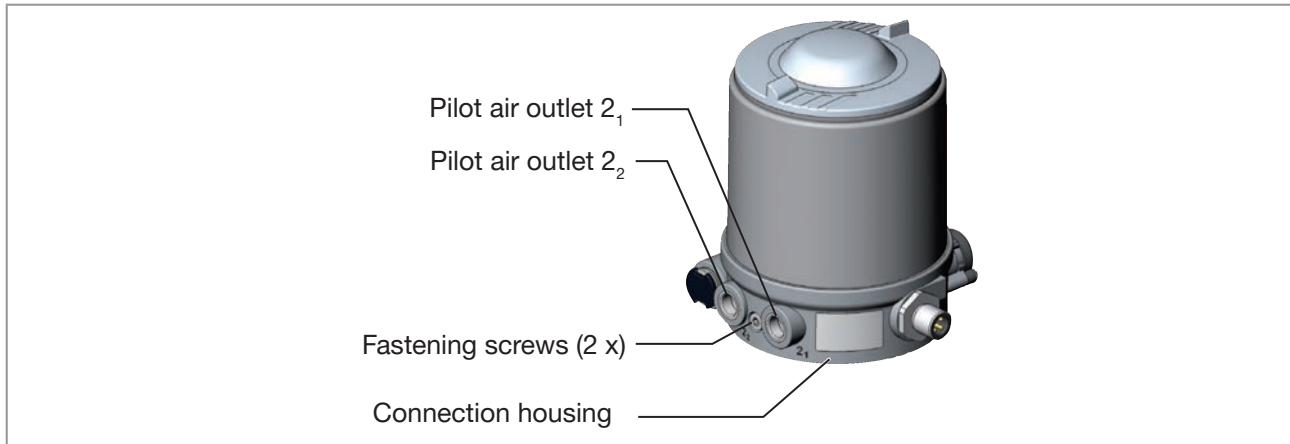


Figure 2: Connection module for process valves belonging to the 20xx series

6 TECHNICAL DATA

6.1 Conformity

In accordance with the EU Declaration of conformity, the control head Type 8691 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 EC 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 [“6.8 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 see type label

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 [“8 Pneumatic installation”](#).

6.5 Mechanical data

Dimensions	see data sheet
Body material	exterior: PPS, PC, VA
Sealing material	exterior: EPDM interior: NBR
Stroke range of valve spindle	2–47 mm

6.6 Type labels

6.6.1 Type label standard

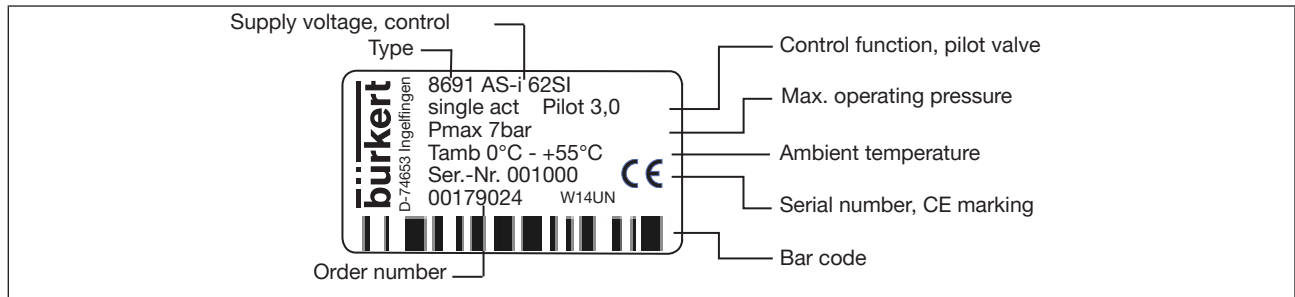


Figure 3: Example of type label

6.6.2 UL Type label

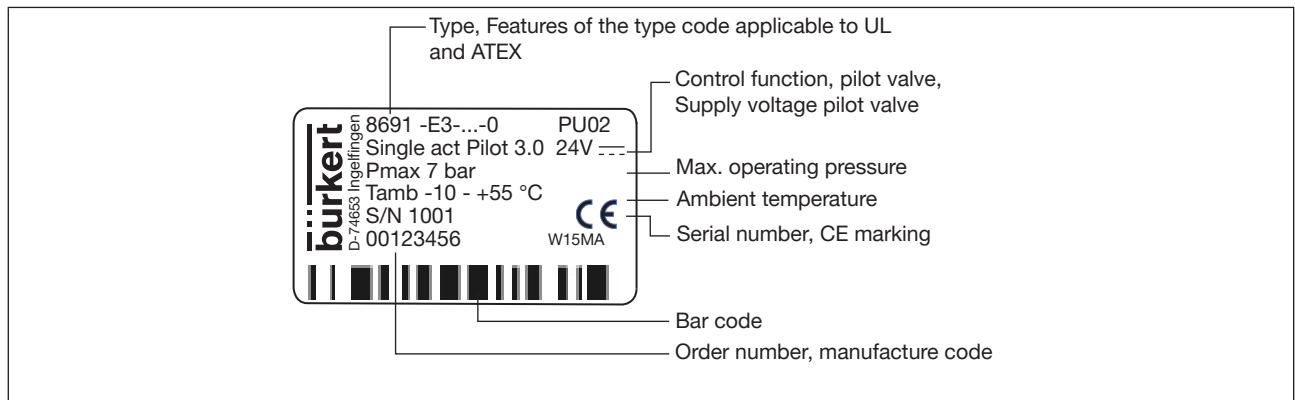


Figure 4: UL Type label (example)

6.6.3 UL additional label

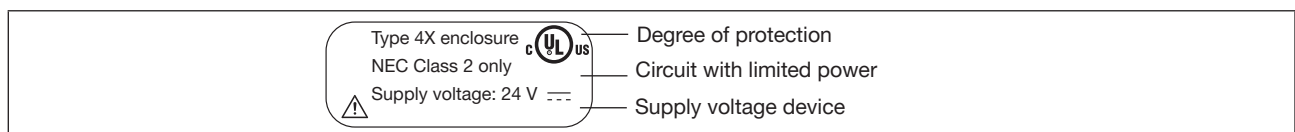


Figure 5: UL additional label (example)

6.7 Pneumatic data

Control medium		neutral gases, air; Quality classes in accordance with ISO 8573-1
Dust content	Class 7	max. particle size 40 µm, max. particle density 10 mg/m ³
Water content	Class 3	max. pressure dew point -20 °C or min. 10 °C below the lowest operating temperature
Oil content	Class X	max. 25 mg/m ³
Temperature range		-10–+50 °C
Pressure range		3–7 bar
Air output of pilot valve		250l _N /min (for ventilation and exhaust) (Q _{Nn} value according to definition for pressure drop from 7 to 6 bar absolute)
Connections		Plug-in hose connector Ø 6 mm / 1/4" Socket connection G1/8

6.8 Electrical data



WARNING!

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

6.8.1 Electrical data without bus control 24 V DC

Protection class		3 as per DIN EN 61140 (VDE 0140-1)
Connections		Cable gland M16 x 1.5, wrench size 22 (clamping area 5–10 mm) with screw-type terminals for cable cross-sections 0.14–1.5 mm ² Circular plug-in connector (M12 x 1, 8-pole)
Pilot valve		
Operating voltage		24 V DC ± 10 % residual ripple 10 %
Power input		max. 1W
Output		max. 100 mA per output
Display		max. 20 mA per illustrated illuminated display (LED)

6.8.2 Electrical data with AS-Interface bus control

Protection class		3 as per DIN EN 61140 (VDE 0140-1)
Connections		Circular plug-in connector (M12 x 1, 4-pole)
Operating voltage		29.5 V – 31.6 V DC (according to specification)
Outputs		
Max. switching capacity		1 W via AS-Interface
Watchdog function		integrated

Devices without external supply voltage:

Max. power consumption	120 mA
Power consumption input during normal operation (after current reduction; valve + 1 end position reached)	90 mA

Devices with external supply voltage:

External supply voltage	24 V ± 10 %
The power supply unit must include a secure disconnection in accordance with IEC 364-4-41 (PELV or SELV)	
Max. power consumption	55 mA (after current reduction ≤ 30 mA)
Max. power consumption from AS-Interface	55 mA

7 INSTALLATION

7.1 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.

7.2 Installing the control head Type 8691 on process valves belonging to series 21xx

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

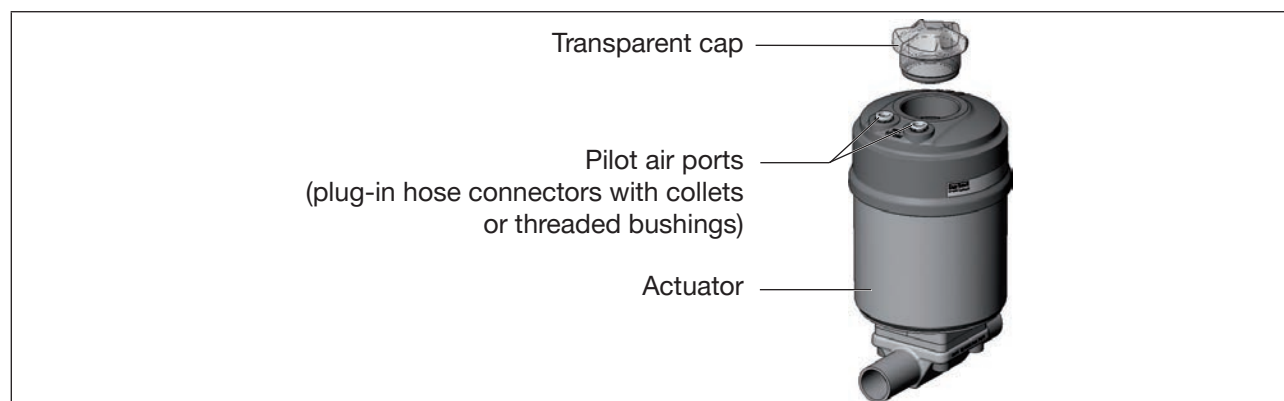


Figure 6: Installation of the switch spindle (1), 21xx series

→ Unscrew the transparent cap on the actuator and unscrew the position display (yellow cap) on the spindle extension (if present).

→ For model with plug-in hose connector, remove the collets (white nozzles) from both pilot air ports (if present).

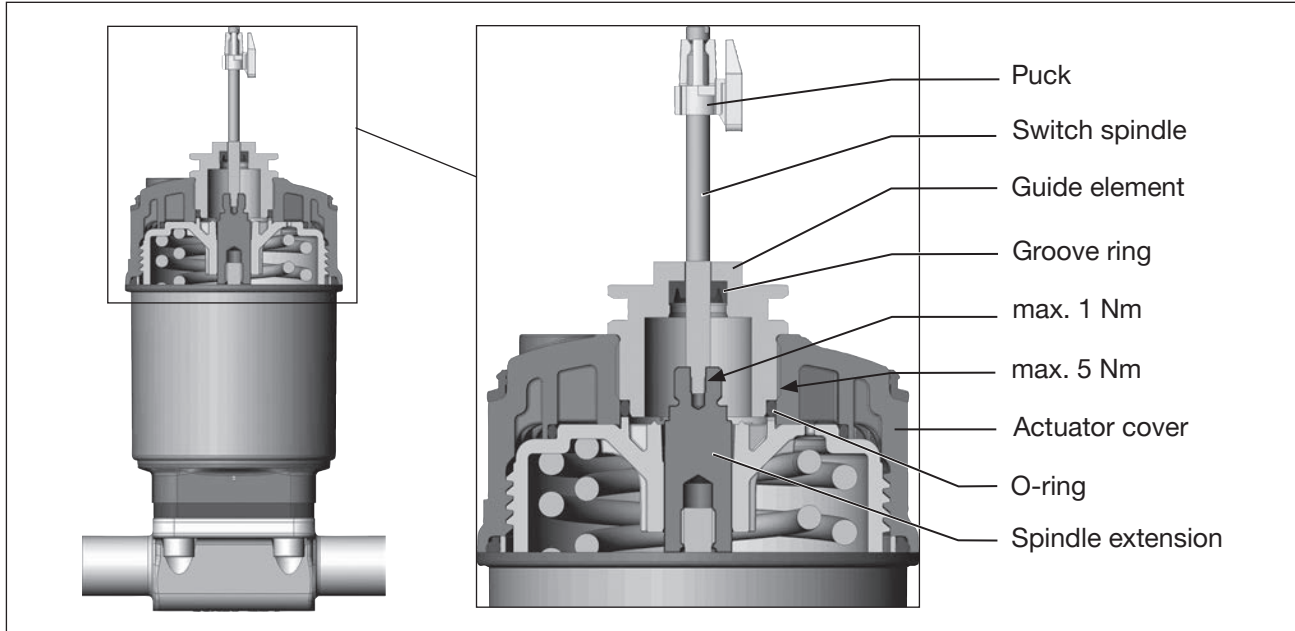


Figure 7: Installing of the switch spindle (2), series 21xx

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.

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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 control head is being installed, the collets of the pilot air ports must not be fitted to the actuator.

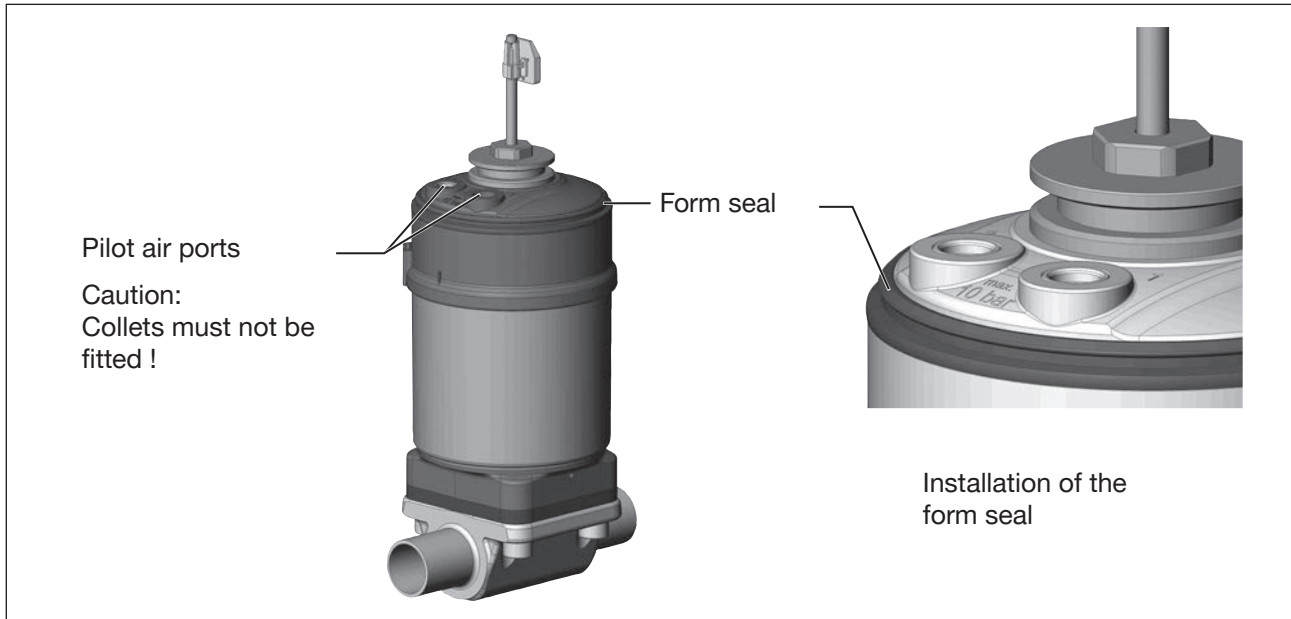


Figure 8: Installing of the sealing rings, 21xx series

3. Install the control head

NOTE!

Damaged printed circuit board or malfunction.

- ▶ Ensure that the puck is situated flat on the guide rail.

→ Align the puck and the control head until

1. the puck can be inserted into the guide rail of the control head (see “Figure 9”) and
2. the connection pieces of the control head can be inserted into the pilot air ports of the actuator (see “Figure 10”).

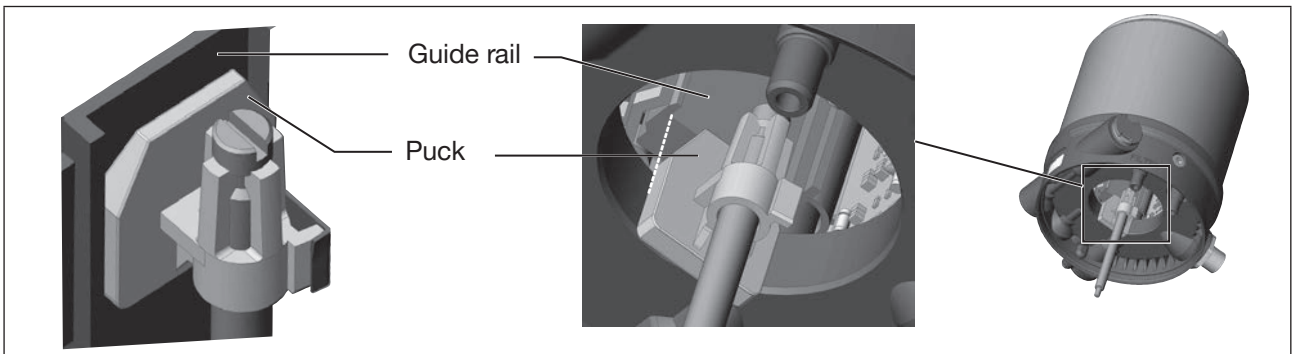


Figure 9: Aligning the puck

→ Push the control head, 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 control head to the actuator using the two side fastening screws. In doing so, tighten the screws only hand-tight (max. torque: 1.5 Nm).

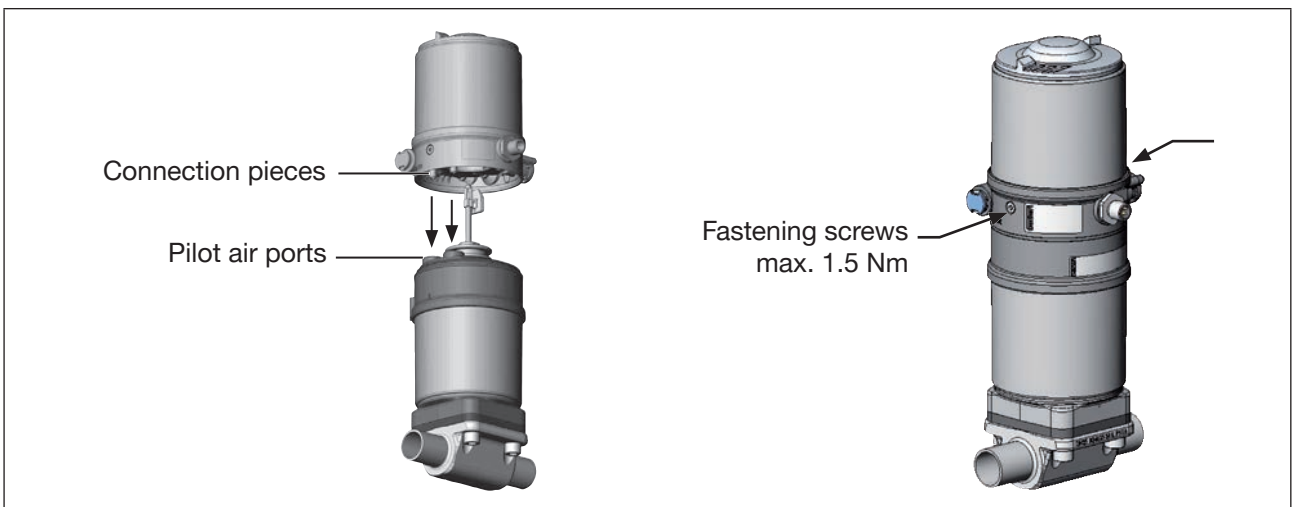


Figure 10: Installation of control head, series 21xx

7.3 Installing the control head Type 8691 on process valves belonging to series 20xx

Procedure:

1. Install switch spindle

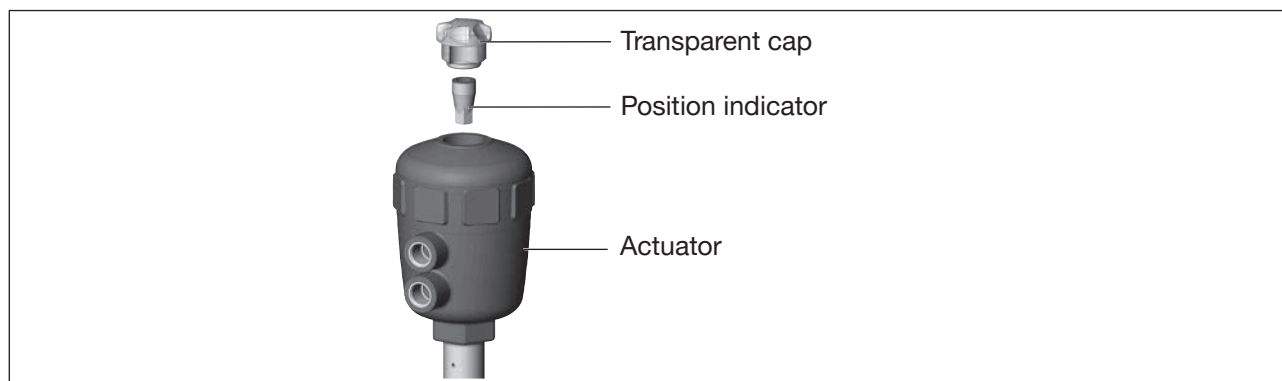


Figure 11: Installation of the switch spindle (1), series 20xx

- Unscrew the transparent cap on the actuator.
- Using a hexagon socket key, unscrew the orange/yellow position indicator from the inside of the actuator.

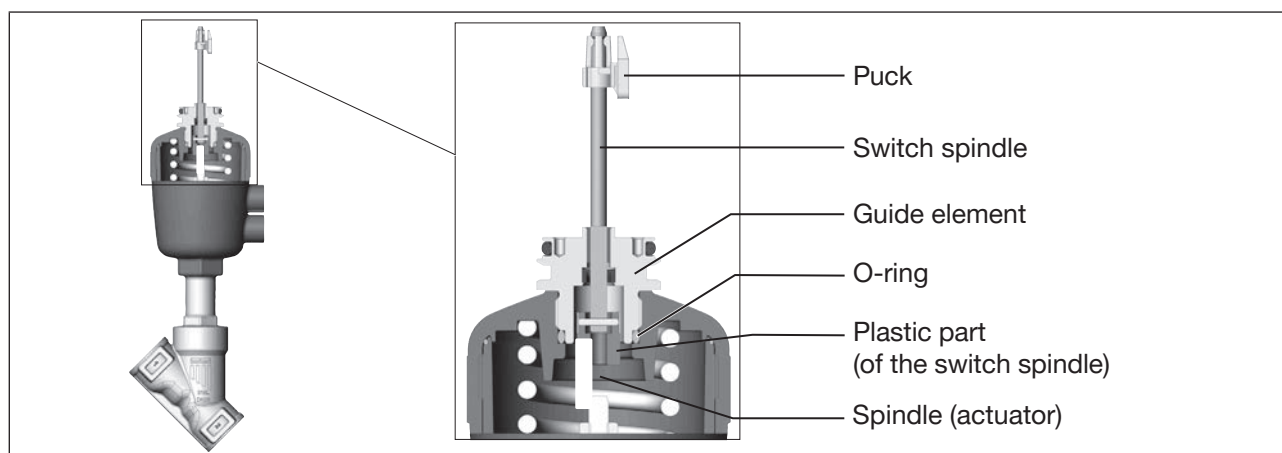


Figure 12: Installation of the switch spindle (2), series 20xx

- Press the O-ring downwards into the cover of the actuator.
- Manually screw the switch spindle (and the plugged-on guide element) together with the plastic part onto the spindle of the actuator, but do not tighten spindle yet.
- Tighten the guide element with a face wrench²⁾ into the actuator cover (torque: 8.0 Nm).
- Tighten the switch spindle on the spindle of the actuator. To do this, there is a slot on the upper side (torque: 1.0 Nm).
- Push the puck onto the switch spindle until it engages.

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

2. Installation of the masking ring and the control head

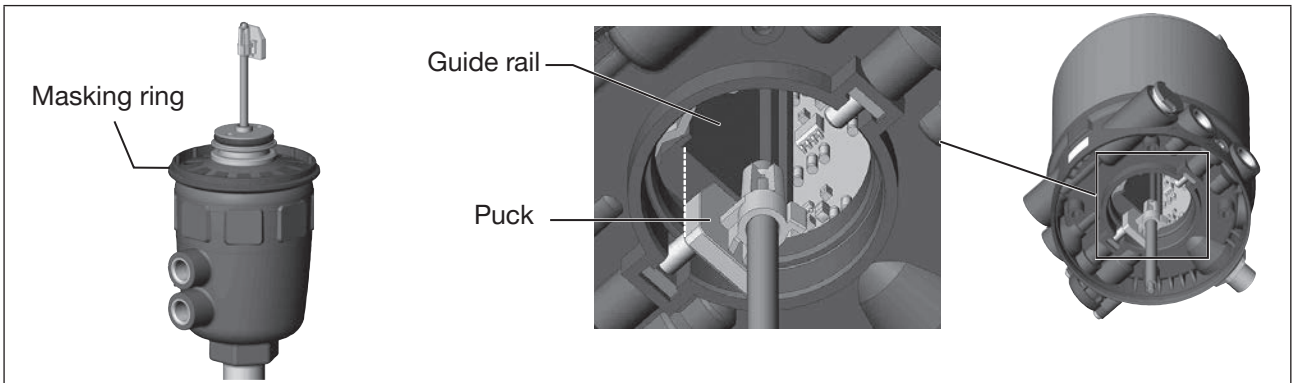


Figure 13: Installation of the masking ring and aligning the puck

→ Pull the masking ring onto the actuator cover (for actuator sizes $\varnothing 50$ and $\varnothing 63$ only).

NOTE!

Damaged printed circuit board or malfunction.

- ▶ Ensure that the puck is situated flat on the guide rail.

→ Push the control head onto the actuator. The puck must be aligned in such a way that it is inserted into the guide rail of the control head.

→ Press the control head all the way down as far as the actuator and turn it into the required position.

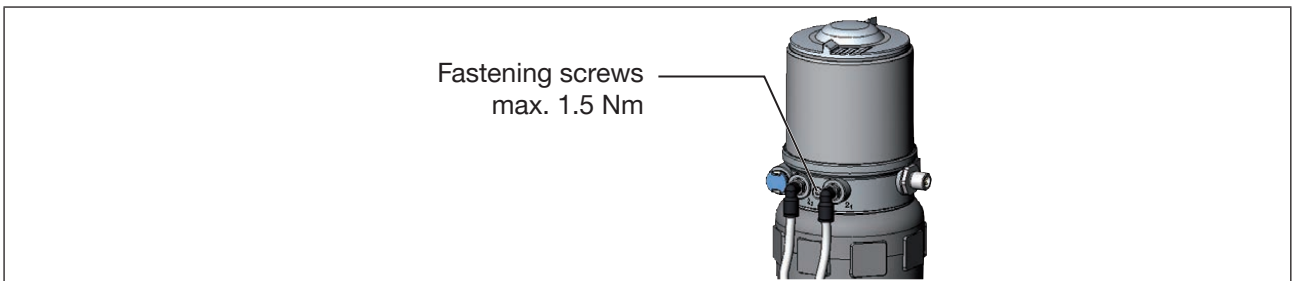


Figure 14: Installation of the control head



Ensure that the pneumatic connections of the control head and those of the valve actuator are situated preferably vertically one above the other (see "Figure 15"). If they are positioned differently, longer hoses may be required other than those supplied in the accessory kit.

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

3. Install pneumatic connection between control head and actuator

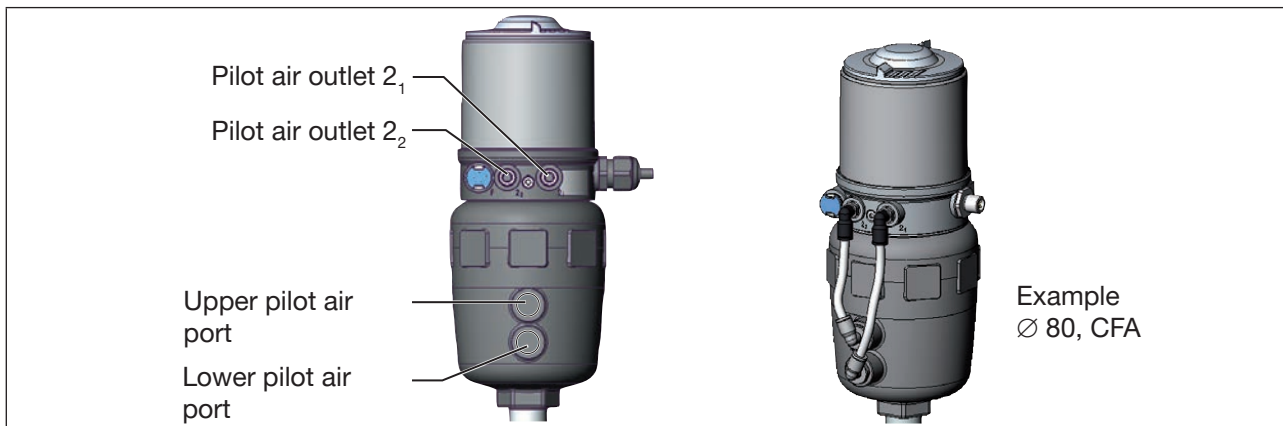


Figure 15: Installation of the pneumatic connection, 20xx series

- Screw the plug-in hose connectors onto the control head and the actuator.
- Using the hoses supplied in the accessory kit, make the pneumatic connection between the control head and actuator with the following “Table 1” or “Table 2”.

NOTE!

Damage or malfunction due to ingress of dirt and moisture.

- ▶ To comply with degree of protection IP65 / IP67, connect the pilot air outlet which is not required (on CFA and CFB) to the free pilot air port of the actuator or seal with a plug.

Control function A (CFA)		Process valve closed in rest position (by spring force)	
Control head	Pilot air outlet		
Actuator	Upper pilot air port	or	
	Lower pilot air port		
Control function B (CFB)		Process valve open in rest position (by spring force)	
Control head	Pilot air outlet		
Actuator	Upper pilot air port	or	
	Lower pilot air port		

Table 1: Pneumatic connection to actuator CFA and CFB

Control function I (CFI)		
Process valve closed in rest position		
Control head	Pilot air outlet	
Actuator	Upper pilot air port	
	Lower pilot air port	
Process valve open in rest position		
Control head	Pilot air outlet	
Actuator	Upper pilot air port	
	Lower pilot air port	

Table 2: Pneumatic connection to actuator CFI



"In rest position" means that the pilot valves of the control head Type 8691 are isolated or not actuated.



If the ambient air is humid, a hose can be connected between pilot air outlet 2₂ of the control head and the unconnected pilot air port of the actuator for control function A or control function B. As a result, the spring chamber of the actuator is supplied with dry air from the vent duct of the control head.

7.4 Rotating the actuator module



The actuator module (control head and actuator) can be rotated for straight seat valves and angle seat valves only.

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



Process valves Type 2100 and 2101: Only the entire actuator module can be rotated. The control head 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.

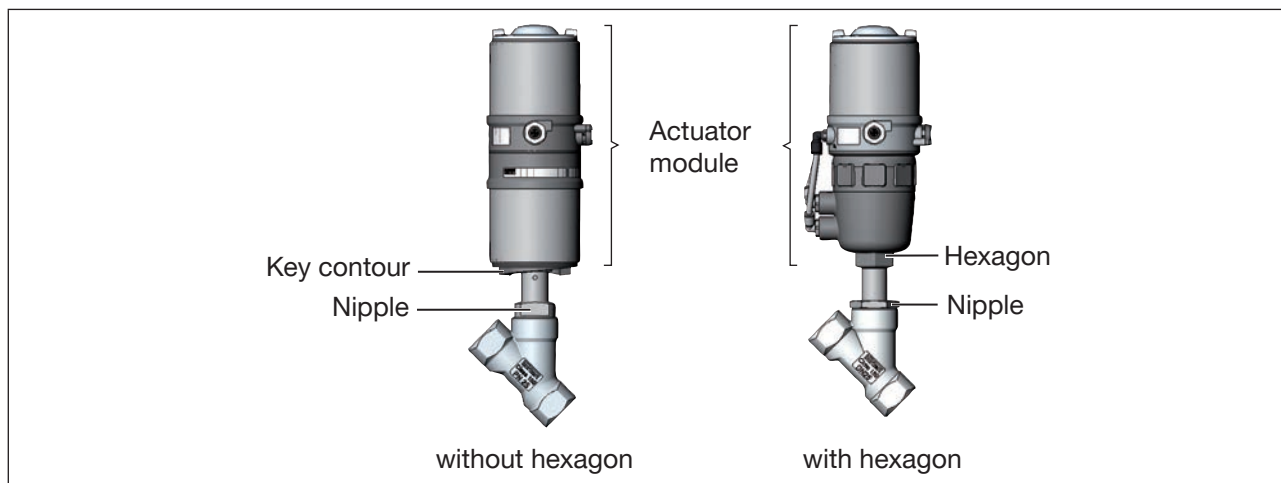


Figure 16: Rotating the actuator module

→ Using a suitable open-end wrench, counter the wrench flat on the pipe.

→ Actuator module without hexagon:

Fit special key³⁾ exactly in the key contour on the underside of the actuator.

→ Actuator module with hexagon:

Place suitable open-end wrench on the hexagon of the actuator.



WARNING!

Risk of injury from discharge of medium and pressure.

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

▶ Rotate the actuator module in the specified direction only (see “Figure 17”).

→ Actuator module without hexagon:

Rotate **clockwise** (as seen from below) to bring the actuator module into the required position.

→ Actuator module with hexagon:

Rotate **counter-clockwise** (as seen from below) to bring the actuator module into the required position.

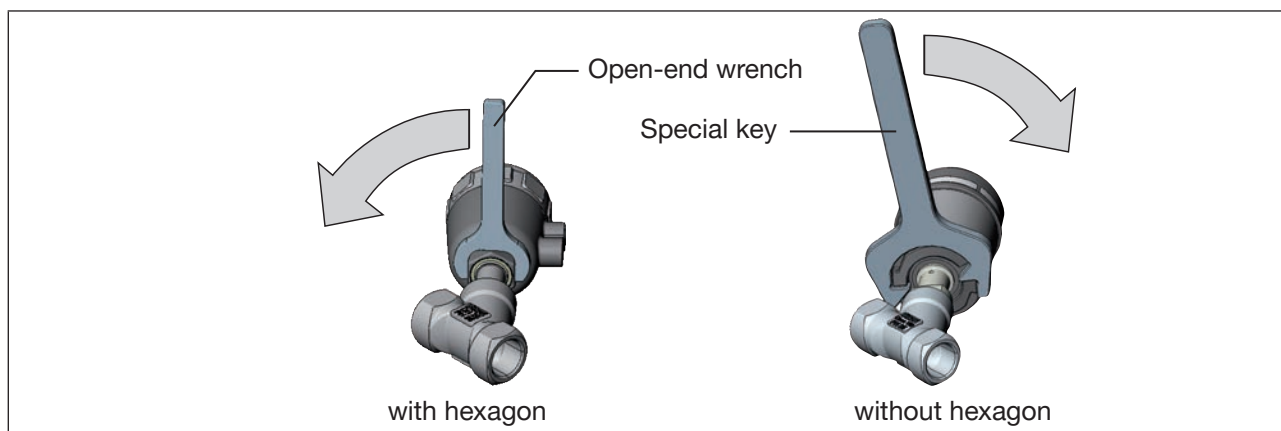


Figure 17: Rotating with special key / open-end wrench

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

7.5 Rotating the control head for process valves belonging to series 20xx

If the connecting cables or hoses cannot be fitted properly following installation of the process valve, the control head can be rotated contrary to the actuator.

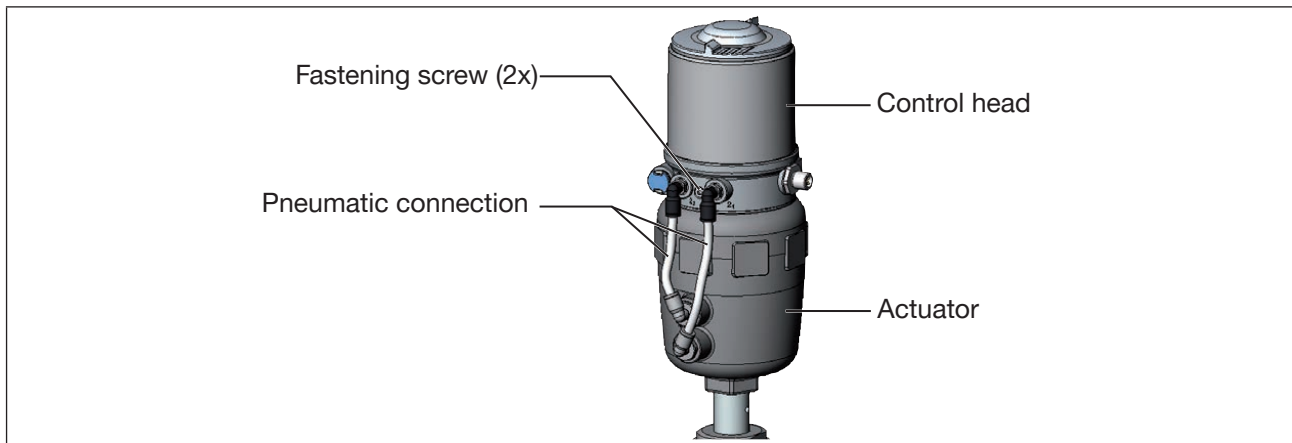


Figure 18: Rotating the control head, series 20xx

Procedure

- Loosen the pneumatic connection between the control head and the actuator.
- Loosen the fastening screws (hexagon socket wrench size 2.5).
- Rotate the control head 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).
- Re-attach the pneumatic connections between the control head and the actuator. If required, use longer hoses.

7.6 Manual actuation of the actuator via pilot valve

The actuator can be moved without a power supply from the rest position to its end position and back again, *when the control air is connected.*

To do this, the pilot valve must be actuated with a screwdriver.

NOTE!

The hand lever may be damaged if it is simultaneously pressed and turned.

- ▶ Do not press the hand lever when turning it.

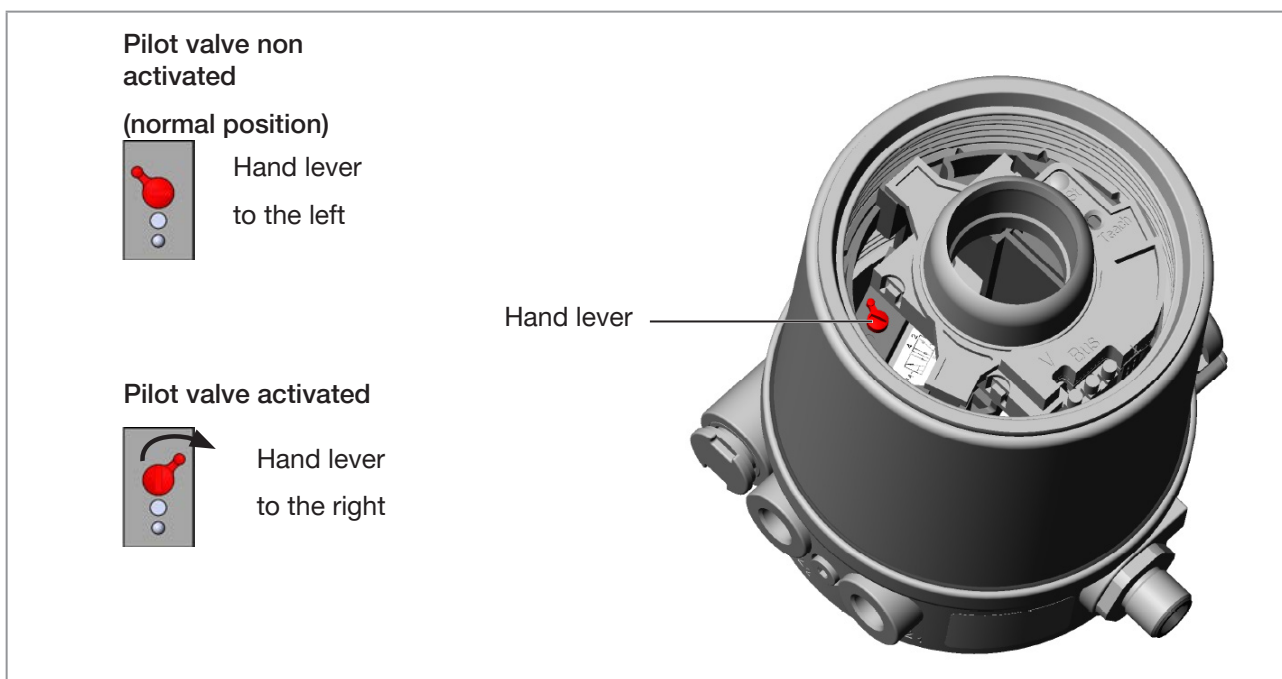


Figure 19: Pilot valve for aerate and deaerate the actuator

Move actuator to end position

→ Turn the hand lever to the right using a screwdriver.

Note: Do not press the hand lever when turning it

Move actuator back to the rest position

→ Turn the hand lever to the left using a screwdriver.

Note: Do not press the hand lever when turning it

8 PNEUMATIC INSTALLATION



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.



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.

Procedure:

- Connect the control medium to the pilot air port (1)
(3 – 7 bar; instrument air, free of oil, water and dust).
- Attach the exhaust airline or a silencer to the exhaust air port (3) (see “[Figure 20](#)”).



Important information for the problem-free functioning of the device:

- ▶ The installation must not cause back pressure to build up.
- ▶ Select a hose for the connection with an adequate cross-section.
- ▶ The exhaust air line must be designed in such a way that no water or other liquid can get into the device through the exhaust air port.

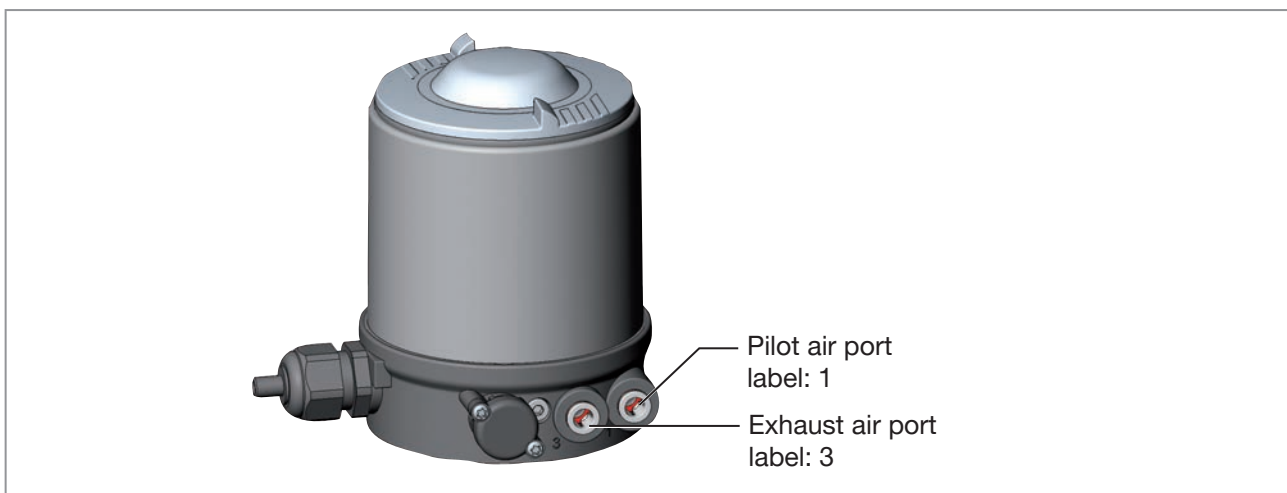


Figure 20: Pneumatic connection



Caution: (Exhaust air concept):

In compliance with degree of protection IP67, an exhaust air line must be installed in the dry area. 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.

9 ELECTRICAL INSTALLATION 24 V DC

Two kinds of connections are used for the electrical bonding of the control head:

- **Cable gland**
with cable gland M16 x 1.5 and screw terminals
- **Multi-pole**
with circular plug-in connector M12 x 1, 8-pole

9.1 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.

Minimum temperature rating of the cable to be connected to the field wiring terminals: 75 °C

9.2 Electrical installation with cable gland

NOTE!

Breakage of the pneumatic connection pieces due to rotational impact.

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

→ Unscrew the body casing (stainless steel) in a counter-clockwise direction.

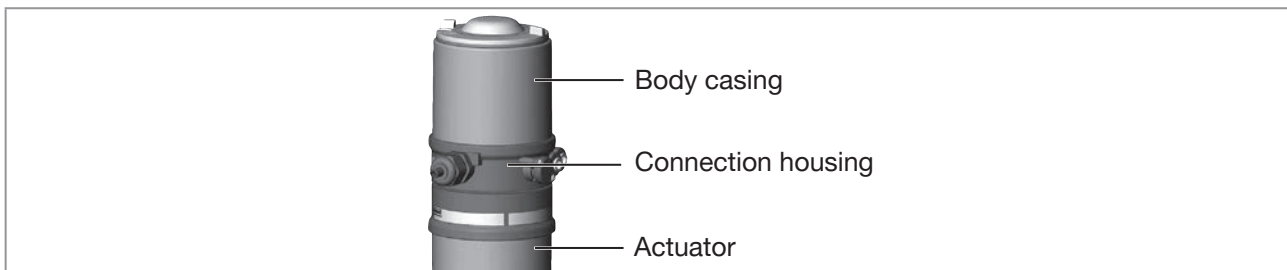


Figure 21: Open control head

→ Push the cables through the cable gland.

→ Connect the wires (see connection diagram in [“Figure 22: Printed circuit board 24 V DC - cable gland”](#)).

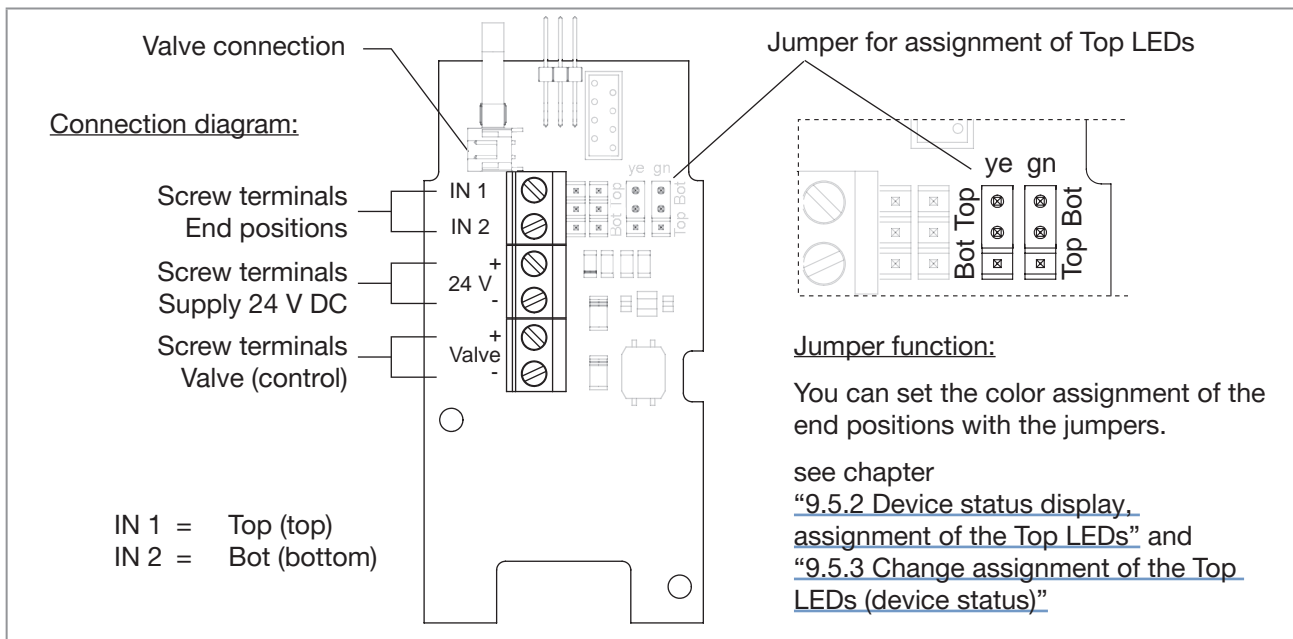


Figure 22: Printed circuit board 24 V DC - cable gland

→ Check that the seal is correctly positioned in the body casing.

NOTE!

Breakage of the pneumatic connection pieces due to rotational impact.

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

Damage or malfunction due to penetration of dirt and humidity.

To ensure degree of protection IP65 / IP67:

- ▶ Tighten the union nut on the cable gland according to the cable size or dummy plugs used. (ca. 1.5 Nm).
- ▶ Screw the body casing in all the way.

→ Tighten union nut on the cable gland (torque approx. 1.5 Nm).

→ Close the device (assembly tool: 674077⁴⁾).

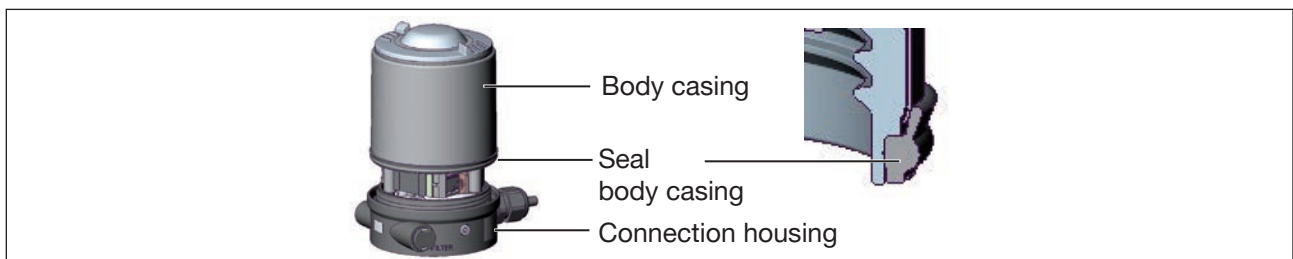


Figure 23: Position of the seal in the body casing

The teach function can now be used to automatically determine and read in the end positions of the valve (description of the teach function see chapter “9.4 Teach function (calibrating the end positions)”).

4) The assembly tool (674077) is available from your Bürkert sales office.

9.3 Electrical installation with circular plug-in connector

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.

→ Connect the control head according to the table.

Configuration circular plug (M12 x 1, 8-pole):

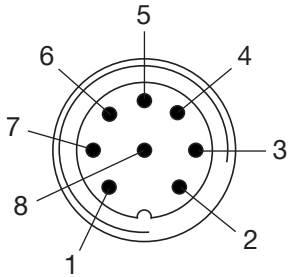
	Pin	Wire color ⁵⁾	Designation	Configuration
	1	white	limit switch top	IN 1 (= Top)
	2	brown	limit switch bottom	IN 2 (= Bot)
	3	green	supply voltage	GND
	4	yellow	supply voltage +	24 V DC
	5	grey	Valve control +	Valve +
	6	pink	Valve control -	Valve -
	7		-	not used
	8		-	not used

Table 3: Circular plug M12 x 1, 8-pole

The teach function can now be used to automatically determine and read in the end positions of the valve (description of the teach function see chapter “9.4 Teach function (calibrating the end positions)”).

9.4 Teach function (calibrating the end positions)

The teach function can be used to automatically determine and read in the end positions of the valve.

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.



Necessary requirements:

Before you can actuate the teach function, you must

- mount the control head on the actuator,
- connect the supply voltage and
- connect the compressed-air supply.

5) The indicated colors refer to the connecting cable available as an accessory (919061)

Procedure:

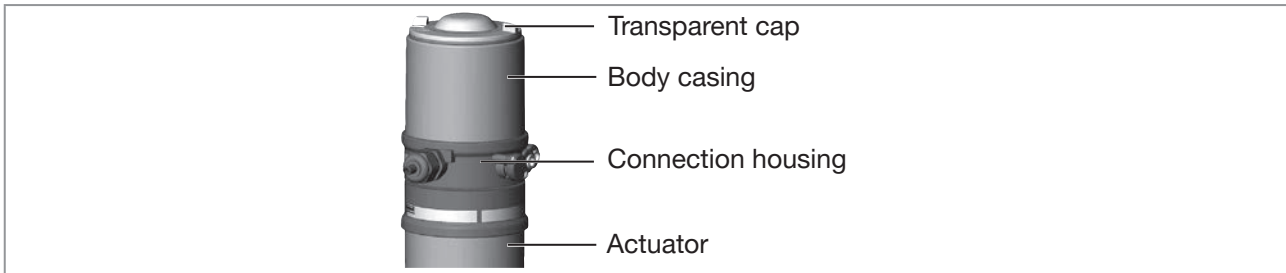


Figure 24: Open control head

NOTE!

Breakage of the pneumatic connection pieces due to rotational impact.

- ▶ When unscrewing and screwing in the transparent cap, do not hold the actuator of the process valve but the connection housing.

- Open the control head: turning the transparent cap anti-clockwise.
- The key in recess for actuating the teach function keep pressed for approximately 5 seconds.
- Only for control heads without pilot valve:
When yellow pilot valve LED is lit, move actuator to upper end position.
When yellow pilot valve LED goes out again, move actuator to lower end position.

NOTE!

Damage or malfunction due to penetration of dirt and humidity.

To ensure degree of protection IP65 / IP67:

- ▶ Screw the transparent cap in all the way.

- Close the device (assembly tool: 674077⁶⁾).

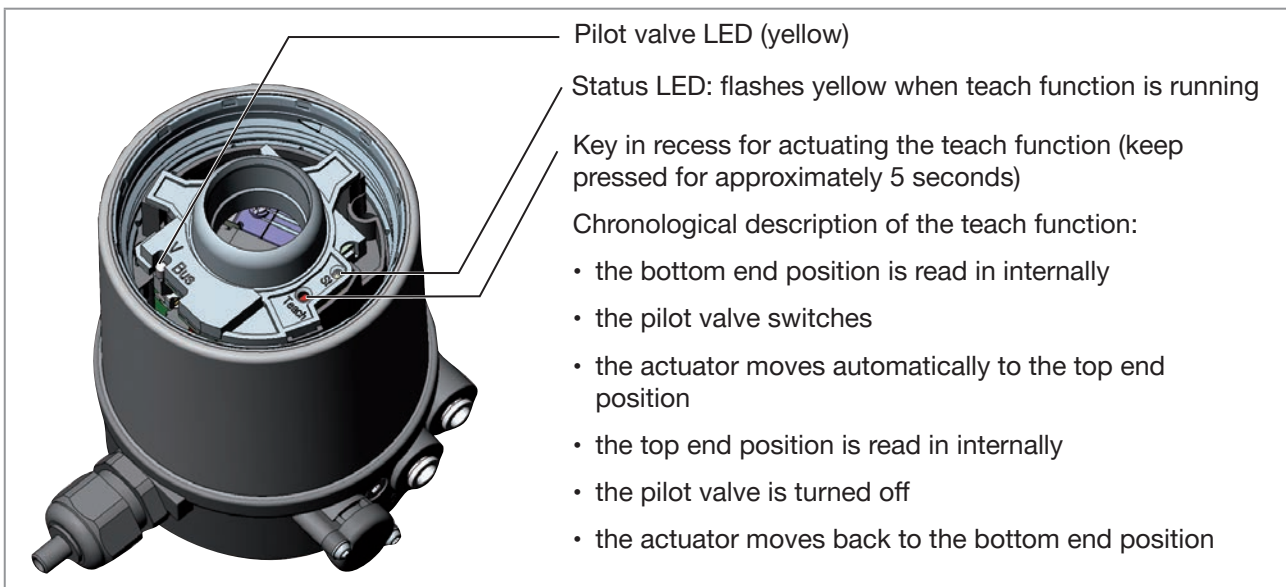


Figure 25: Teach function

6) The assembly tool (674077) is available from your Bürkert sales office.

9.5 Display elements 24 V DC

9.5.1 LED status display

The LED status display (24 V DC) indicates whether the pilot valve is actuated (LED is lit yellow).

NOTE!

Breakage of the pneumatic connection pieces due to rotational impact.

- ▶ When unscrewing and screwing in the transparent cap, do not hold the actuator of the process valve but the connection housing.

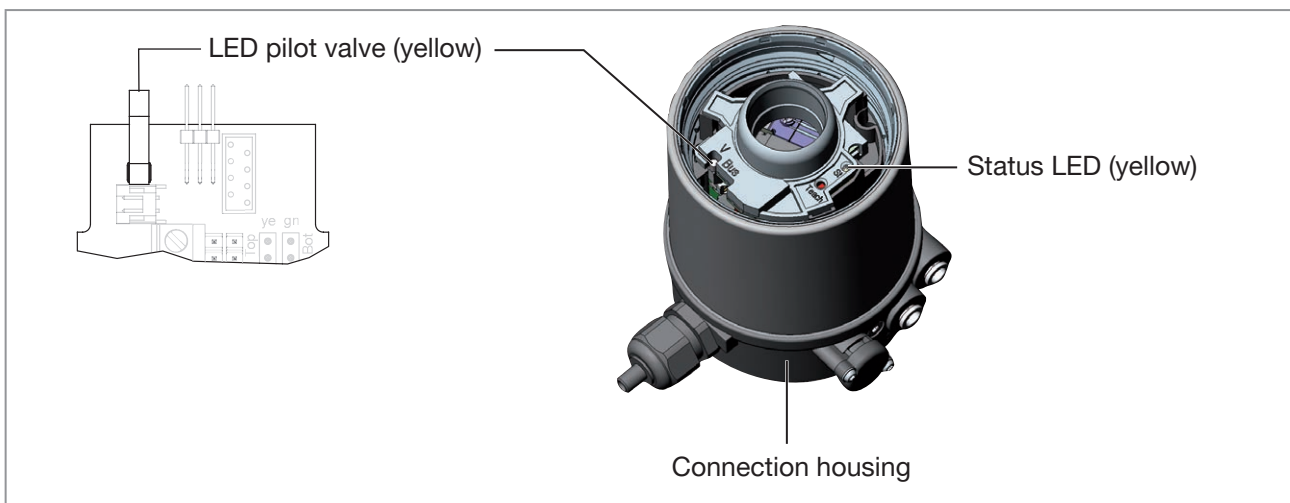


Figure 26: LED status display, Status LED

Status LED yellow

LED yellow	
flashing	Teach function is running
flickers	Puck not available → Insert puck

Table 4: Status LED yellow - 24 V DC

NOTE!

Damage or malfunction due to penetration of dirt and humidity.

To ensure degree of protection IP65 / IP67:

- ▶ Screw the transparent cap in all the way.

9.5.2 Device status display, assignment of the Top LEDs

The device status of the control head (transparent cap) is displayed optically by colored high-power LEDs (Top LEDs).

NOTE!

Breakage of the pneumatic connection pieces due to rotational impact.

- ▶ When unscrewing and screwing in the transparent cap, do not hold the actuator of the process valve but the connection housing.

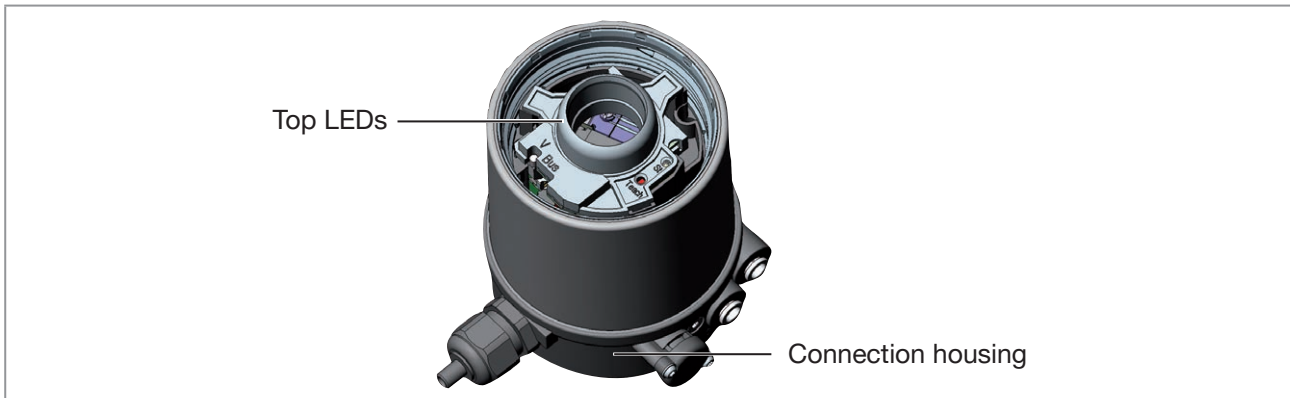


Figure 27: LED status display

The following functions are shown as standard:

Color	Device status
green Top LEDs on	End position bottom
yellow Top LEDs on	End position top

Table 5: Assignment of Top LEDs - 24 V DC

NOTE!

Damage or malfunction due to penetration of dirt and humidity.

To ensure degree of protection IP65 / IP67:

- ▶ Screw the transparent cap in all the way.

9.5.3 Change assignment of the Top LEDs (device status)

! 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.

Procedure:

NOTE!

Breakage of the pneumatic connection pieces due to rotational impact.

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

→ Unscrew the body casing (stainless steel) in a counter-clockwise direction.

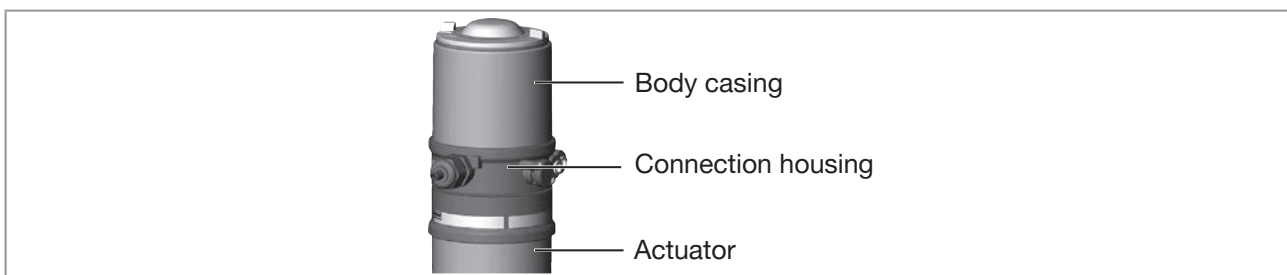


Figure 28: Open control head

→ Using the jumpers, assign the required color to the Top LEDs.

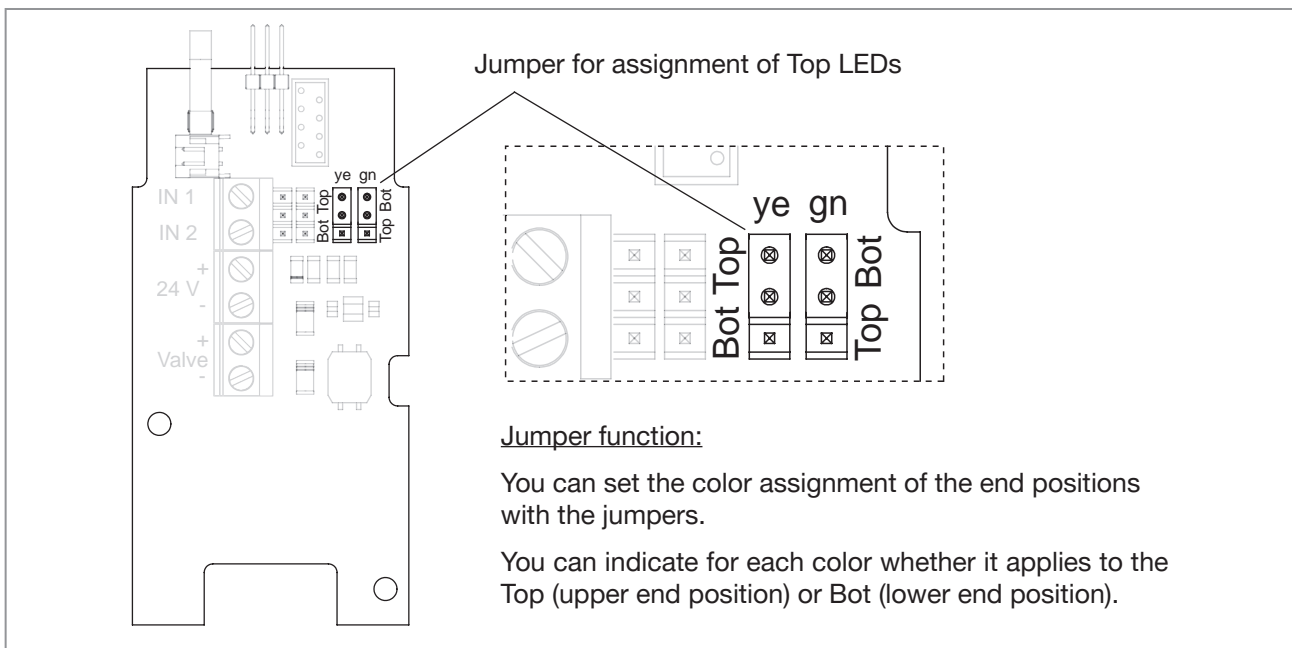


Figure 29: Assignment of the Top LEDs

→ Check that the seal is correctly positioned in the body casing.

NOTE!

Breakage of the pneumatic connection pieces due to rotational impact.

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

Damage or malfunction due to penetration of dirt and humidity.

To ensure degree of protection IP65 / IP67:

- ▶ Screw the body casing in all the way.

→ Close the device (assembly tool: 674077⁷⁾).

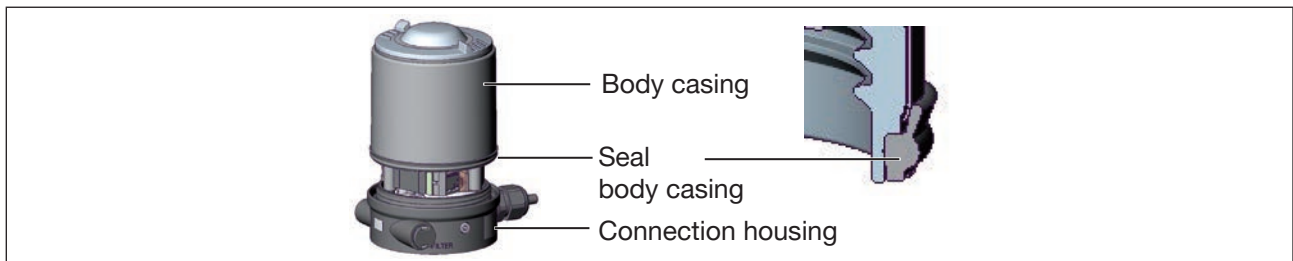


Figure 30: Position of the seal in the body casing

7) The assembly tool (674077) is available from your Bürkert sales office.

10 AS-INTERFACE INSTALLATION

10.1 AS-Interface connection

AS-Interface (Actuator Sensor Interface) is a field bus system which is used primarily for networking binary sensors and actuators (slaves) with a higher-level control (master).

Bus line

Unshielded two-wire line (AS-Interface line as AS-Interface cable harness) along which both information (data) and energy (supply voltage for the actuators and sensors) are transmitted.

Network topology

Freely selectable within wide limits, i.e. star, tree and line networks are possible. Further details describe the AS-Interface specification (A/B slave model conforms to the version 3.0 specification).

10.2 Technical data for AS-Interface PCBs

Supply: via AS-Interface (29,5 V – 31,6 V)

Outputs: 1 valve Y1, max. 1 W, power reduction after approx. 100 ms with integrated Watch Dog function

Certification: Licence no. 77601 according to version 3.0

10.3 Programming data

	AS-Interface 31 slaves	AS-Interface 62 slaves
I/O configuration	B hex (1 input, 2 outputs)	
ID code	F hex	A hex
Extended ID code 1	F hex	7 hex
Extended ID code 2	F hex	E hex
Profile	S-B.F.F	S-B.A.E

Table 6: Programming data

Bit configuration

Data bit	D3	D2	D1	D0
Input	0 Top not reached 1 Top reached	0 Bot not reached 1 Bot reached	–	–
Output	–	–	not used	0 Pilot valve OFF 1 Pilot valve ON
Parameter bit	P3	P2	P1	P0
Output	not used	not used	not used	"0" START teach function "1" STOP teach function

Table 7: Bit configuration

10.4 Electrical installation AS-Interface

10.4.1 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.

10.4.2 Connection with circular plug-in connector M12x1, 4-pole, male

Bus connection without external / with external supply voltage

Pin	Designation	Configuration
1	Bus +	AS-Interface bus line +
2	NC or GND (optional)	not used or external supply voltage - (optional)
3	Bus -	AS-Interface bus line -
4	NC or 24 V + (optional)	not used or external supply voltage + (optional)

Table 8: Pin assignment circular plug-in connector AS-Interface

Views of plug: From the front onto the pins, the soldered connections are behind

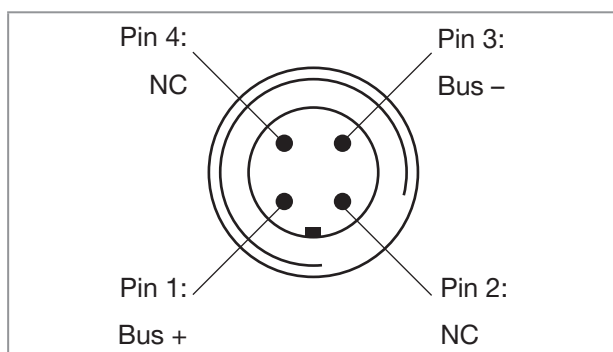


Figure 31: Bus connection without external supply voltage

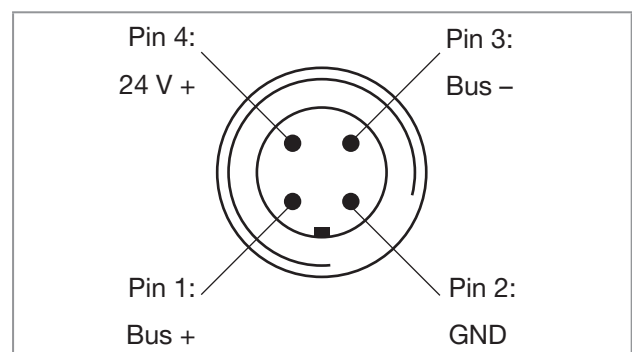


Figure 32: Bus connection with external supply voltage (optional)

The teach function can now be used to automatically determine and read in the end positions of the valve (description of the teach function see chapter “10.5 Teach function (calibrating the end position)”).

10.4.3 Connection with multi-pole cable and flat cable terminal

As an alternative to the bus connection model with 4-pole circular plug, there is the control head with multi-pole cable (M12 circular plug) and flat cable terminal. The wiring diagram of the circular plug corresponds to the bus connection of the M12 4-pole circular plug (see "[Figure 25](#)" and "[Figure 26](#)") and can easily be connected to the flat cable terminal (see "[Figure 33](#)").

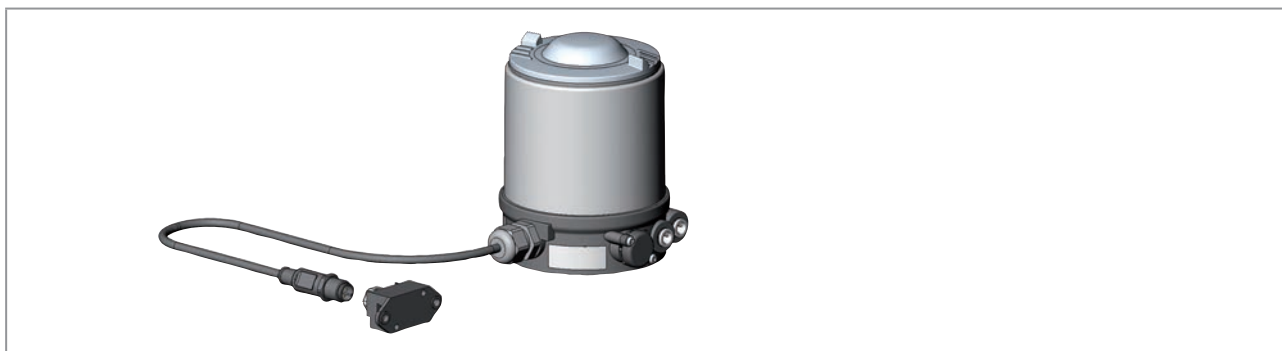


Figure 33: Control head 8691 with multi-pole cable and flat cable terminal

Handling the flat cable terminal

The multi-pole cable features a flat cable terminal, with M12 plug-in connector branch circuit, for AS-Interface flat cable. The flat cable terminal contacts the AS-Interface flat cable by means of penetration technology which allows installation by "clipping in" the AS-Interface flat cable without cutting and without removing insulation.

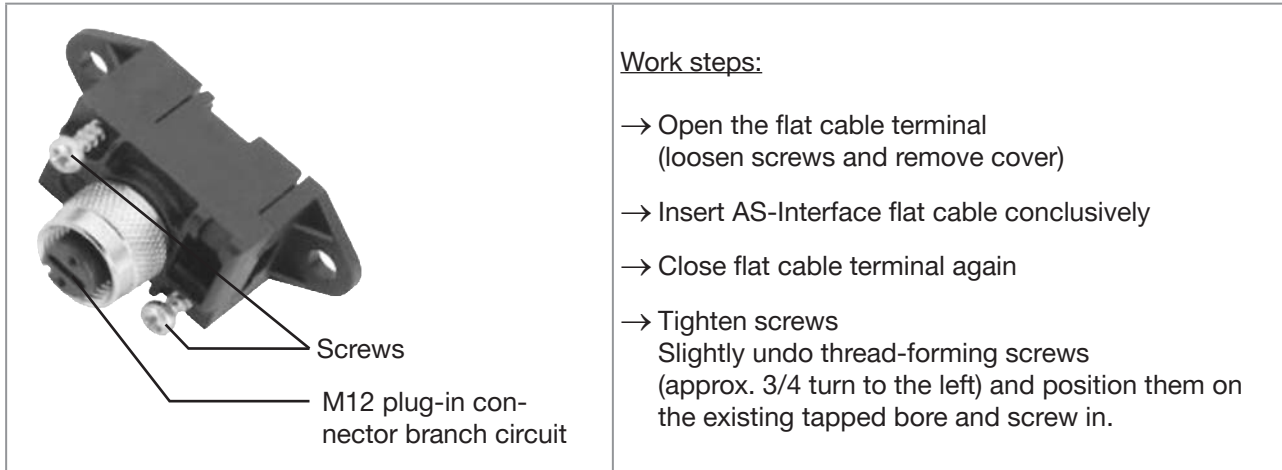


Figure 34: Flat cable terminal

The teach function can now be used to automatically determine and read in the end positions of the valve (description of the teach function see chapter "[10.5 Teach function \(calibrating the end position\)](#)").

10.5 Teach function (calibrating the end position)

The teach function can be used to automatically determine and read in the end positions of the valve.



For the bus variant AS-Interface, the teach function can also be started via the bus protocol.



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.



Necessary requirements:

Before you can actuate the teach function, you must

- mount the control head on the actuator,
- connect the supply voltage,
- connect the compressed-air supply and
- pilot valve OFF (D0 = 0).

Procedure:

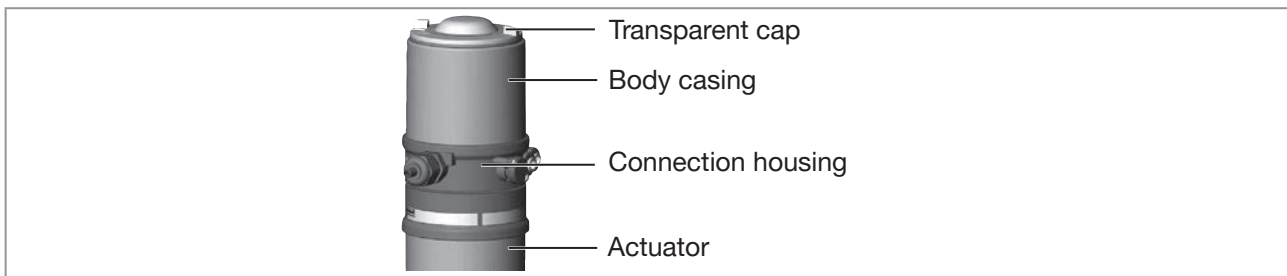


Figure 35: Open control head

NOTE!

Breakage of the pneumatic connection pieces due to rotational impact.

- ▶ When unscrewing and screwing in the transparent cap, do not hold the actuator of the process valve but the connection housing.

- Open the control head: turning the transparent cap anti-clockwise.
- The key in recess for actuating the teach function keep pressed for approximately 5 seconds.
- Only for control heads without pilot valve:
When yellow pilot valve LED is lit, move actuator to upper end position.
When yellow pilot valve LED goes out again, move actuator to lower end position.

NOTE!

Damage or malfunction due to penetration of dirt and humidity.

To ensure degree of protection IP65 / IP67:

- ▶ Screw the transparent cap in all the way.

→ Close the device (assembly tool: 674077⁸⁾).

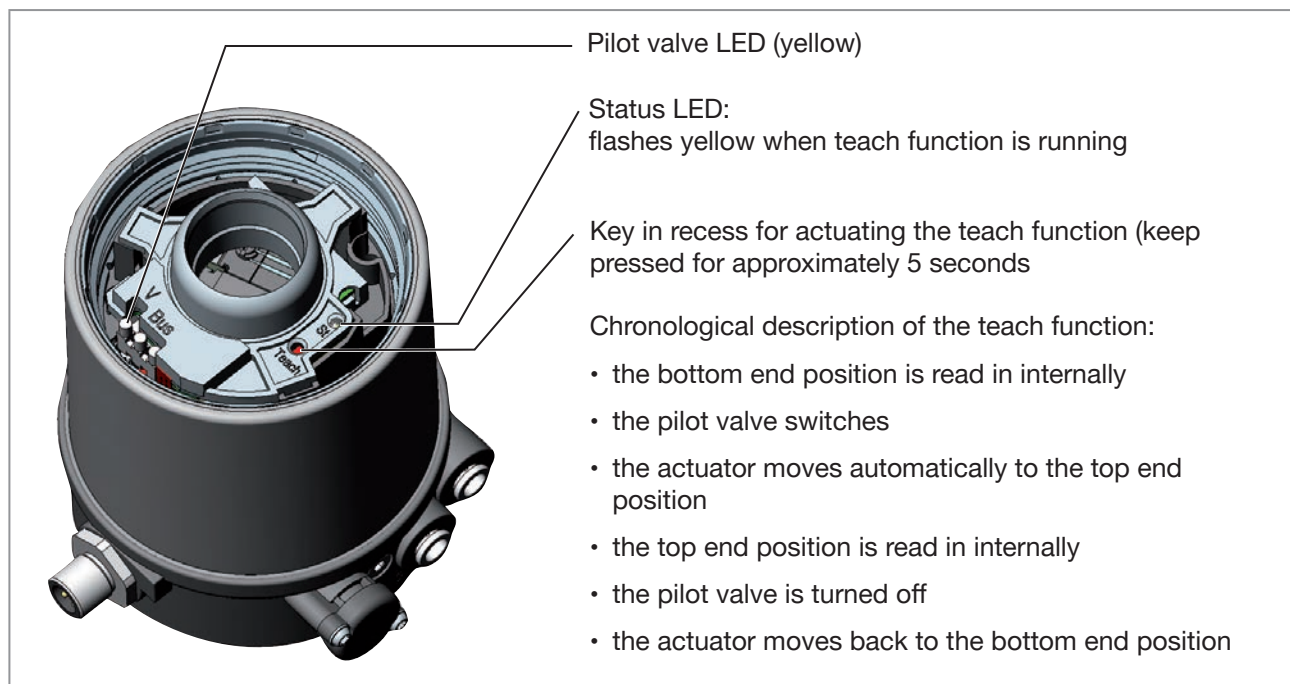


Figure 36: Teach function



When the teach function is activated the actuator cannot be actuated via the AS-Interface communication.

⁸⁾ The assembly tool (674077) is available from your Bürkert sales office.

10.6 Display elements AS-Interface

10.6.1 LED status display

NOTE!

Breakage of the pneumatic connection pieces due to rotational impact.

- ▶ When unscrewing and screwing in the transparent cap, do not hold the actuator of the process valve but the connection housing.

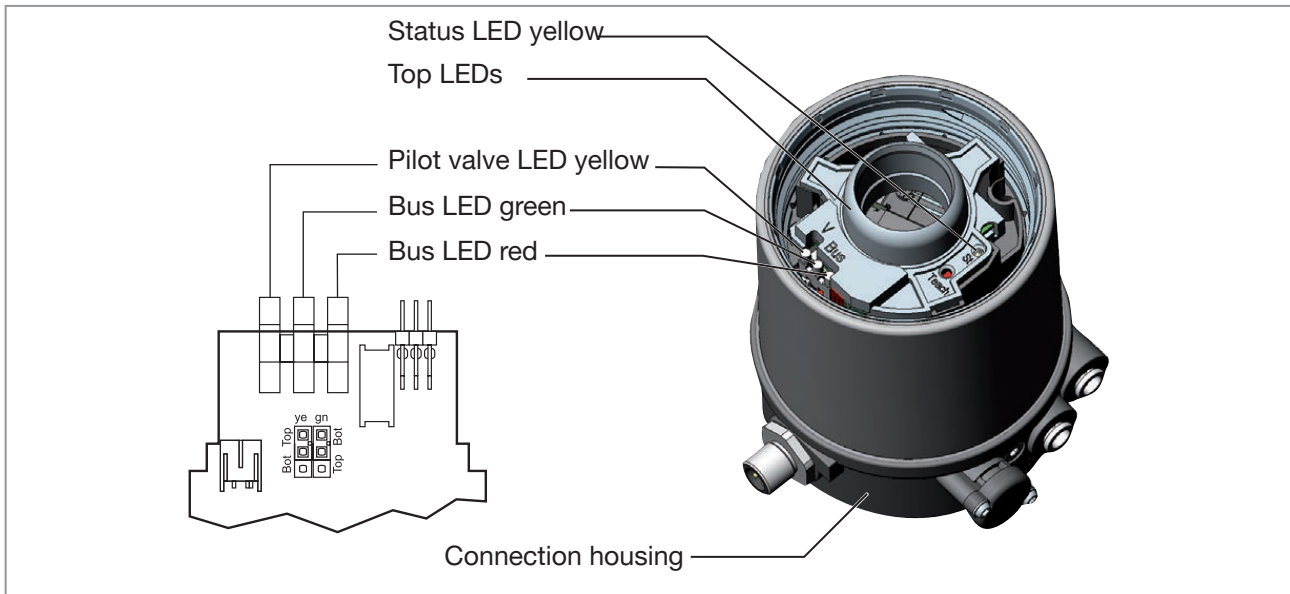


Figure 37: LED status display - AS-Interface

Status LED yellow

LED yellow	
flashing	Teach function is running
flickers	Puck not available → Insert puck

Table 9: Status LED yellow - AS-Interface

Valve LED yellow

The yellow LED (valve) indicates whether the pilot valve is actuated (LED is lit yellow).

Bus LED red and green

The red and green LEDs (bus) indicate the bus status:

LED green	LED red	
off	off	POWER OFF
off	on	No data traffic (expired Watch Dog at slave address does not equal 0)
on	off	OK
flashing	on	Slave address equals 0
off	flashing	Sensor supply overloaded or external reset
flashing	flashing	Teach function error (periphery error)

Table 10: LED Status display bus status

NOTE!

Damage or malfunction due to penetration of dirt and humidity.

To ensure degree of protection IP65 / IP67:

- ▶ Screw the transparent cap in all the way.

10.6.2 Device status - assignment of the LEDs

The device status of the control head (transparent cap) is displayed optically by colored high-power LEDs (Top LEDs).

The following functions are shown as standard

Color	Device status
green Top LED on	End position bottom
yellow Top LED on	End position top
red LED flashing alternately with the green or yellow Top LEDs	no data traffic or Teach function error

Table 11: Assignment of Top LEDs - AS-Interface

10.6.3 Change assignment of the Top LEDs (device status)

⚠ 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.

Procedure:

NOTE!

Breakage of the pneumatic connection pieces due to rotational impact.

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

→ Unscrew the body casing (stainless steel) in a counter-clockwise direction.

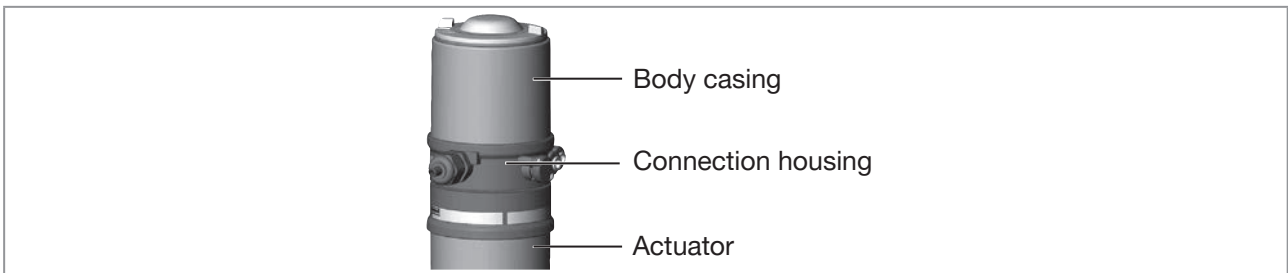


Figure 38: Open control head

→ Using the jumpers, assign the required color to the Top LEDs (see “Figure 39”).

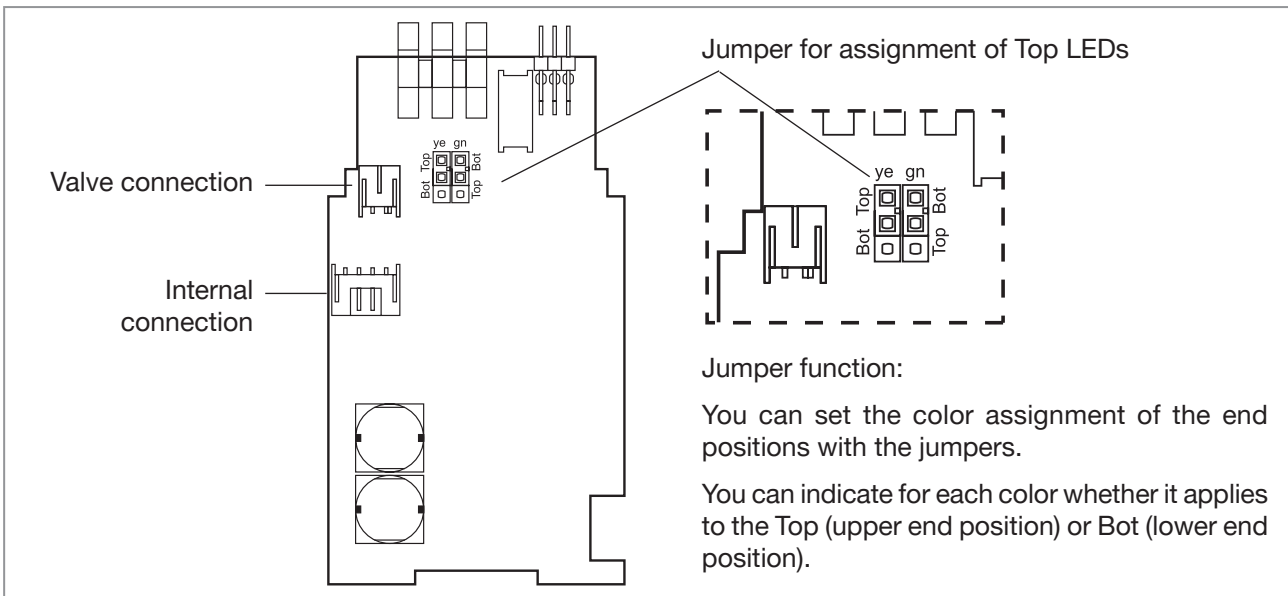


Figure 39: AS-Interface PCB

→ Check that the seal is correctly positioned in the body casing.

NOTE!

Breakage of the pneumatic connection pieces due to rotational impact.

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

Damage or malfunction due to penetration of dirt and humidity.

To ensure degree of protection IP65 / IP67:

- ▶ Screw the body casing in all the way.

→ Close the device (assembly tool: 674077⁹⁾).

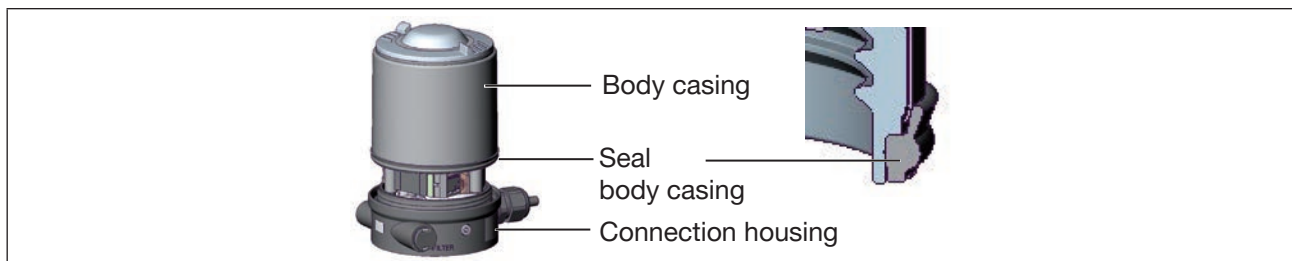


Figure 40: Position of the seal in the body casing

9) The assembly tool (674077) is available from your Bürkert sales office.

11 SAFETY END POSITIONS

Safety end positions after failure of the electrical or pneumatic auxiliary power:

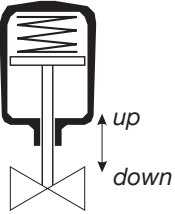
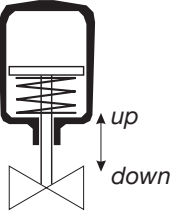
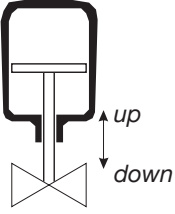
Operating mode	Designation	Safety end positions after failure of the auxiliary power	
		Electrical	Pneumatic
	Single-acting Control function A	down	down
	Single-acting Control function B	up	up
	Double-acting Control function I	down	not defined

Table 12: Safety end positions

12 MAINTENANCE

12.1 Service at the air intake filter



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 internal pilot valves and 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.

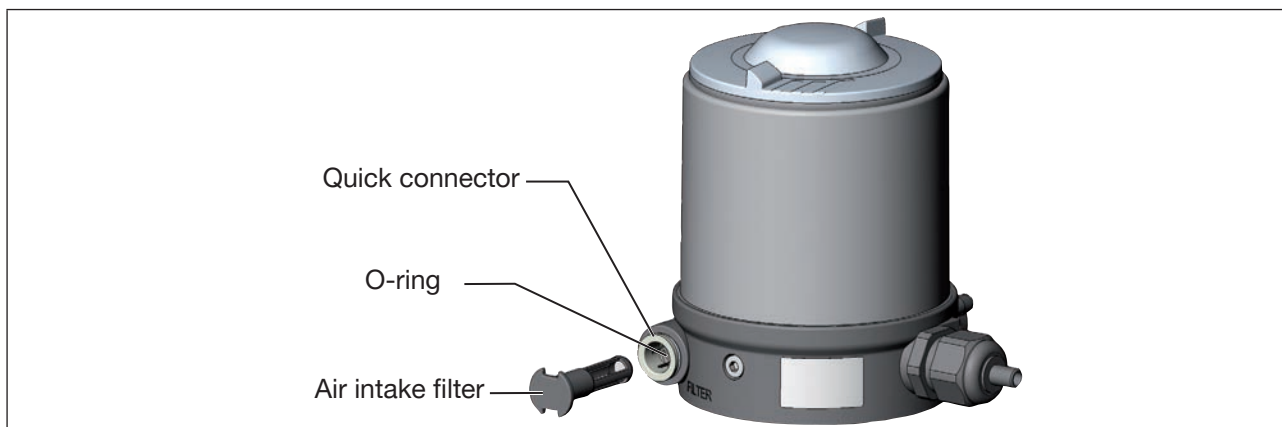


Figure 41: Service on the air intake filter

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.



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 DISASSEMBLY

13.1 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 disassembly.

- ▶ Disassembly 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 disassembly, ensure a controlled restart.

13.2 Disassembly the control head

Procedure:

1. Pneumatic connection

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.

→ Loosen the pneumatic connection.

→ Series 20xx:

Loosen the pneumatic connection between control head and actuator.

2. Electrical connection



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.

Circular plug-in connector:

→ Loosen the circular connector.

Cable gland:

→ Open the control head: unscrewing the transparent cap in an anticlockwise direction.

→ Unscrew the screw terminals and pull out cables.

→ Close the control head.

3. Mechanical connection

→ Loosen the fastening screws.

→ Remove the control head upwards.

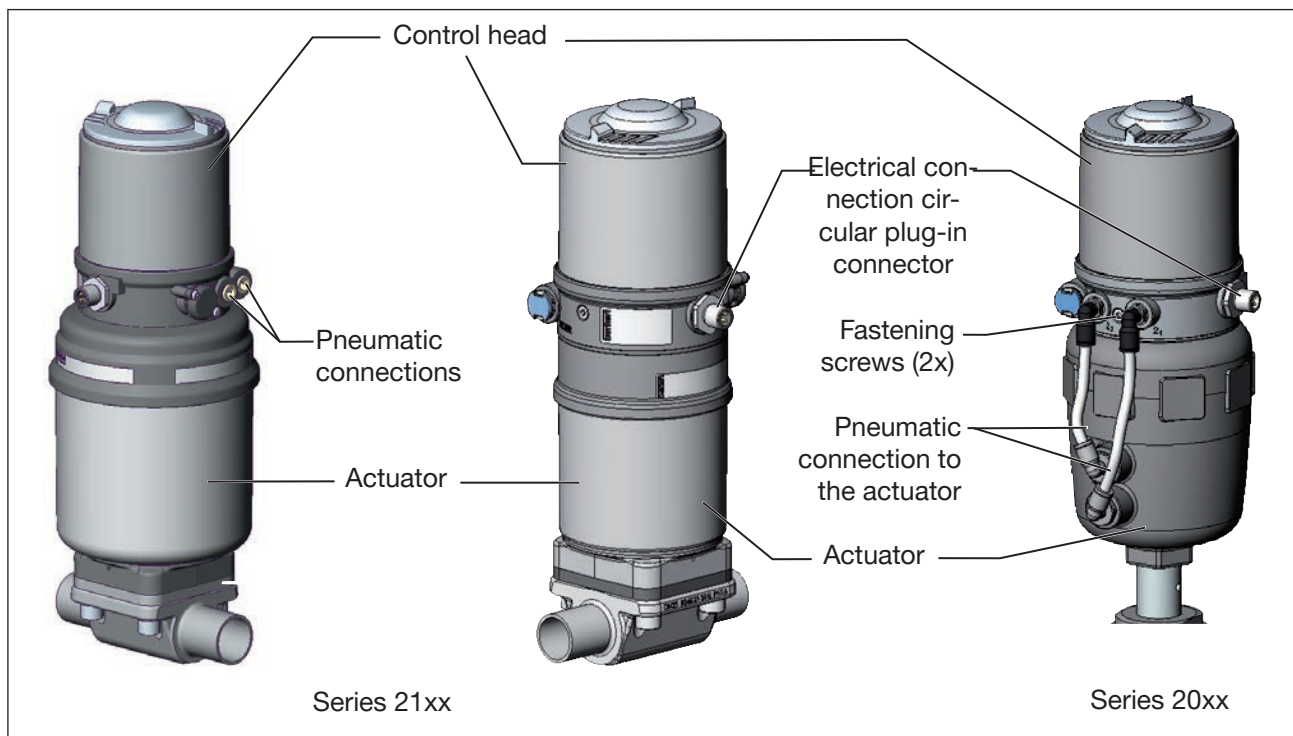


Figure 42: Disassembly the control head

14 ACCESSORIES

Designation	Order no.
Connection cable M12 x 1, 8-pole	919061
Special key	665702
Assembly tool	674077
USB adapter for connection to a PC in conjunction with an extension cable	227093

Table 13: Accessories

14.1 USB interface

The PC requires an USB interface for communication with the devices as well as an additional adapter with interface driver (see [“Table 13: Accessories”](#)).

The data transfer must be according to HART specification.

15 PACKAGING AND TRANSPORT

Transport damages.

Inadequately protected equipment may be damaged during transport.

- ▶ Protect the unit against wet and dirt during transport and pack safely in shock-resistant packaging.
- ▶ Avoid the effects of heat and cold which could result in temperatures above or below the permitted storage temperature.

16 STORAGE

Incorrect storage may damage the device.

- ▶ Store the device in a dry and dust-free location.
- ▶ Storage temperature: -20 – +65°C.

17 DISPOSAL

→ Dispose of the device and packaging in an environmentally friendly manner.

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

- ▶ Observe the relevant disposal and environmental protection regulations.



Note:

Observe the national waste disposal regulations.

