bürkert
FLUID CONTROL SYSTEMS

Type 8690
Pneumatic Control Unit

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Important information for devices with UL approval

1 Intended use

Non-intended use of the control head Type 8690 may be a hazard 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 use the device outdoors without protection from the weather.
- Use according to the authorized data, operating conditions and conditions of use specified as described in this document.
- The device may be used only in conjunction with third-party devices and components recommended and authorized by Bürkert.

Explosion hazard!

Only those devices are permitted to be installed in a potentially explosive atmosphere/ hazardous (classified) location that bear the corresponding labeling for the respective area.

2 Basic safety instructions

⚠ The operator is responsible for observing the location-specific safety regulations, also with reference to the personnel.

Risk of injury from high pressure in the equipment/device

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

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.

To prevent damage to property of 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 the device.
- Do not put any loads on the body (e.g. by placing objects on it or standing on it).
- Do not make any external modifications to the device bodies. Do not paint the body parts or screws.

3 Operating conditions

Altitude	restricted to max. 2000 m above sea level
Relative air humidity	max. 90% at 55 °C (non condensing)
Ambient temperature	see type label
Degree of protection	
evaluated by the manufacturer	IP65/IP67 according to EN 60529[1)]
evaluated by UL	UL Type 4x Rating indoor only[1)]

4 Pneumatic data

Control medium	neutral gases, air (Quality classes in accordance with DIN ISO 8573-1)
Pressure range	3...7 bar (43.5...101.5 psi)
Temperature range	–10...+50 °C (+14...+122 °F)

5 Electrical data

⚠ The device must be supplied by one of the following:

a) Limited Energy Circuit (LEC) according to UL/ IEC 61010-1
b) Limited Power Source (LPS) according to UL/ IEC 60950
c) SELV/ PELV with UL Recognized Overcurrent Protection dimensioned according to UL/ IEC 61010-1 Table 18
d) NEC Class 2 power source

Protection class	III as per DIN EN 61140 (VDE 0140-1)
Connections	Cable gland M16 × 1.5, wrench size 22 (clamping area 5...10 mm) with screw-type terminals for cable cross-sections 0.14...1.5 mm²
	Circular plug-in connector (M12 × 1, 8-pole)
Supply voltage	
Pilot valve	24 V ⎓ ± 10 %, residual ripple 10 %
Micro switch	24 V ⎓ max. 2 A
Proximity switches	24 V ⎓ max. 100 mA per proximity switch

[1)] Only if cables, plugs and sockets have been connected correctly and in compliance with the exhaust air concept

Power consumption of pilot valve	1 W
Position feedback (option)	1 or 2 x Micro switch (24 V ⎓) 1 or 2 x Proximity switch (24 V ⎓), normally open PNP 1 or 2 x Proximity switch NAMUR (8 V ⎓)

6 Installation

6.1 Installation of the Pneumatic Control Unit Type 8690 on process valves of series 21xx

NOTE!

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

1. Install switch spindle:

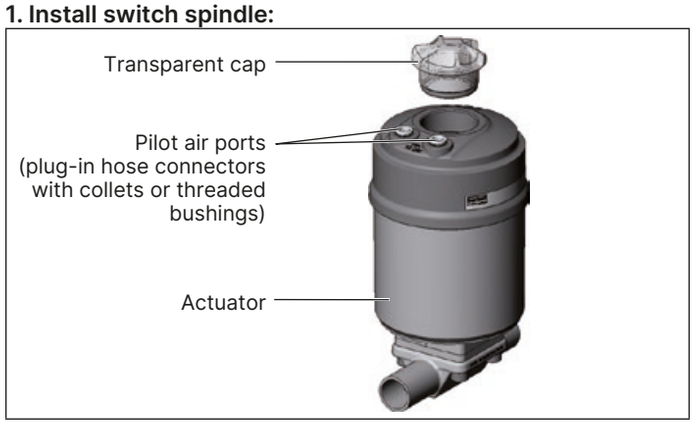

Fig. 1: Installation of the switch spindle (1), 21xx series

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

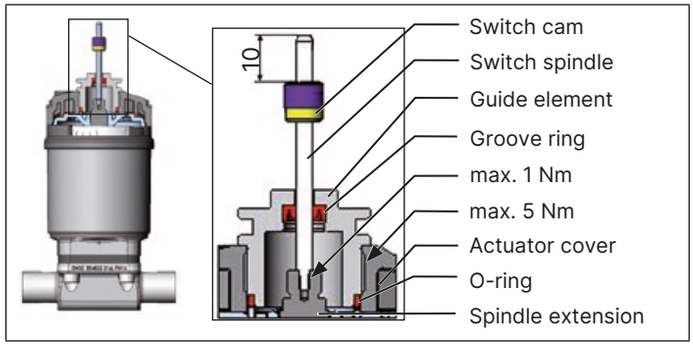

Fig. 2: Installation of switch spindle (2), 21xx series

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 central screw 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).
- Position the switch cam on the switch spindle so that the distance between the switch cam and top of the spindle is 10 mm (see Fig. 2)

2. Install sealing rings

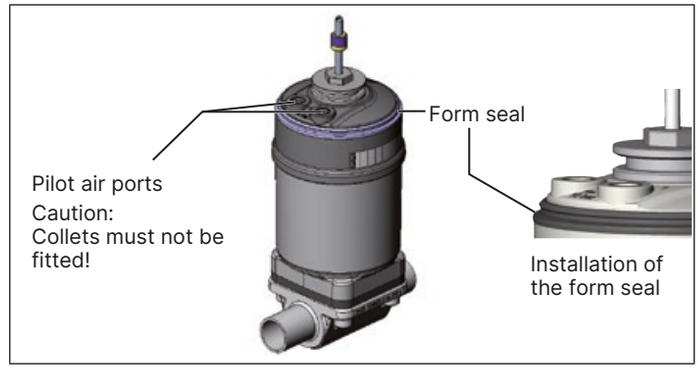

Fig. 3: Installing of the sealing rings, 21xx series

- 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 Pneumatic Control Unit is being installed, the collets of the pilot air ports must not be fitted to the actuator.

3. Installation of the Pneumatic Control Unit

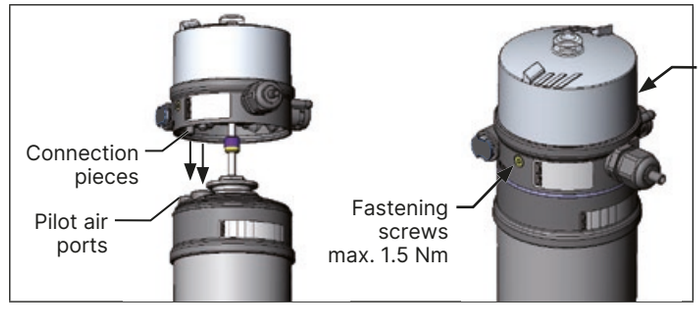

Fig. 4: Installation of the Pneumatic Control Unit, 21xx series

- Align the Pneumatic Control Unit until the connection pieces of the Pneumatic Control Unit can be inserted into the pilot air ports of the actuator (see also Fig. 4).
- Push the Pneumatic Control Unit, 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 Pneumatic Control Unit to the actuator using the two side fastening screws. In doing so, tighten the screws only hand-tight (max. torque: 1.5 Nm).

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6.2 Installation of the Pneumatic Control Unit Type 8690 on process valves of series 20xx

1. Install switch spindle

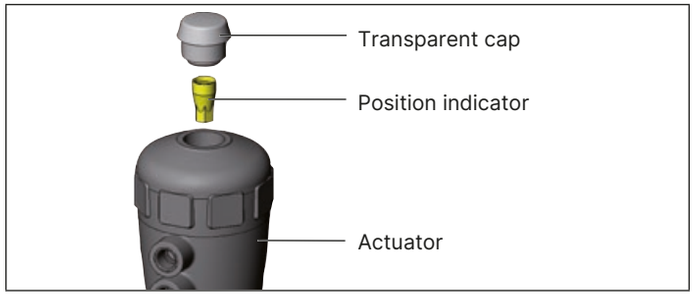

Fig. 5: Installation of the switch spindle (1), series 20xx

- Unscrew the transparent cap on the actuator.
- Using a hexagon socket key, unscrew the orange/yellow position indicator from the inside of the actuator.
- Press the O-ring downwards into the cover of the actuator (see Fig. 6).

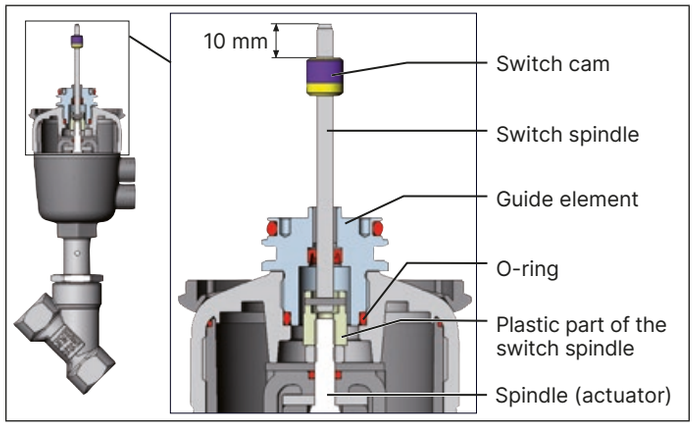

Fig. 6: Installation of the switch spindle (2), series 20xx

- 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 wrench[2)] 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).
- Position the switch cam on the switch spindle so that the distance between the switch cam and top of the spindle is 10 mm (see Fig. 6).

2. Installation of the cover ring and the Pneumatic Control Unit

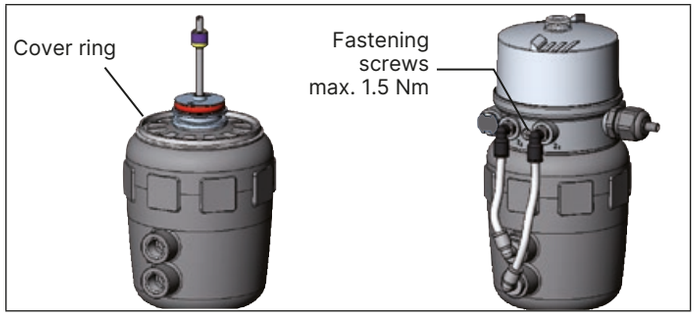

Fig. 7: Installation of the cover ring and the Pneumatic Control Unit, series 20xx

- Pull the cover ring onto the actuator cover (for actuator sizes ⌀ 50 and ⌀ 63 only).
- Push the Pneumatic Control Unit onto the actuator.
- Press the Pneumatic Control Unit all the way down as far as the actuator and turn it into the required position.

- Ensure that the pneumatic ports of the Pneumatic Control Unit and those of the actuator are situated preferably vertically one above the other (see Fig. 7). 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 Pneumatic Control Unit to the actuator using the two side fastening screws. In doing so, tighten the fastening screws hand-tight only (max. torque: 1.5 Nm).

3. Installation of the pneumatic connection on the actuator

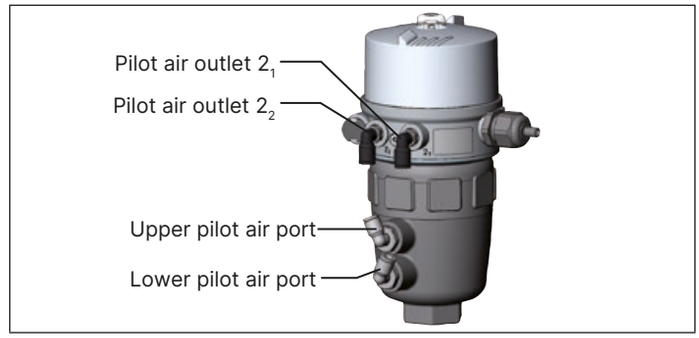

Fig. 8: Installation of the pneumatic connection, 20xx series

- Screw the plug-in hose connectors onto the Pneumatic Control Unit and the actuator.
- Using the hoses supplied in the accessory kit, make the connection between the Pneumatic Control Unit and the actuator.

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 to the free pilot air port of the actuator or seal with a plug.

- If the ambient air is humid, a hose can be connected between pilot air outlet 2$_2$ of the Pneumatic Control Unit 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 Pneumatic Control Unit.

6.3 Manual actuation of the actuator with pilot valves

The actuator can be moved without a power supply from the rest position to its end position and back again.

To do this, the pilot valves 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.

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

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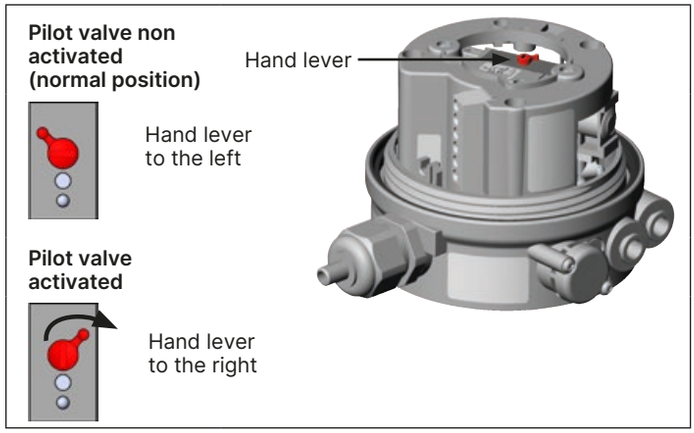


Fig. 9: Pilot valves for aerate and deaerate the actuator

Move actuator to end position

▸ Turn the hand levers to the right using a screwdriver.

Note: Do not press the hand levers when turning them.

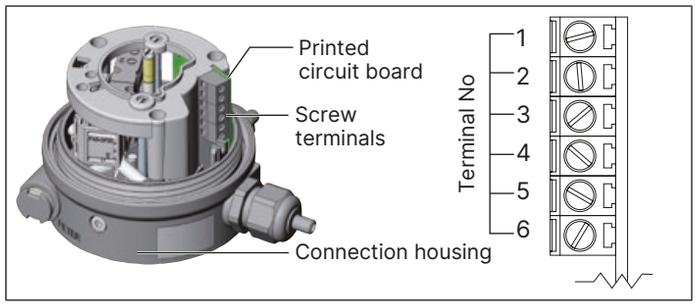
Move actuator back to the rest position

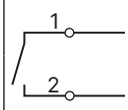
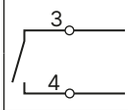
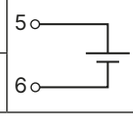
▸ Turn the hand levers to the left using a screwdriver.

Note: Do not press the hand levers when turning them.

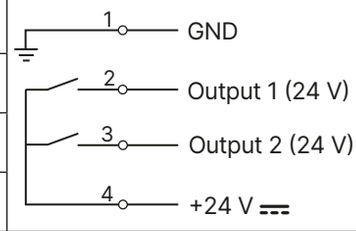
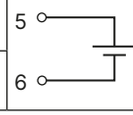
7 Electrical installation

7.1 Electrical installation with cable gland



TERM	Assignment	External circuit	
1	Micro switch top (NO)		Micro switch top (NO)
2			Micro switch top (NO)
3	Micro switch bottom (NO)		Micro switch bottom (NO)
4			Micro switch bottom (NO)
5	Valve control 0 / 24 V		0/24 V ⎓ ± 10 % Residual ripple 10 %
6	Valve control GND		

Tab. 1: Terminal assignment 24 V with micro switches

TERM	Assignment	External circuit	
1	INI - (GND) Supply		GND Output 1 (24 V) Output 2 (24 V) +24 V ⎓
2	INI Bottom OUT Output		
3	INI Top OUT Output		
4	INI + (24 V ⎓) Supply		
5	Valve control 0 / 24 V ⎓		0/24 V ⎓ ±10 % Residual ripple 10 %
6	Valve control GND		

Tab. 2: Terminal assignment with inductive proximity switch 3-wire

7.2 Pin assignment

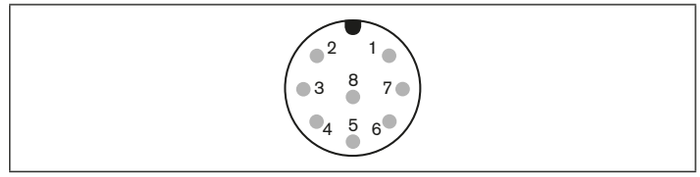


Fig. 10: Circular connector M12×1, 8-pole

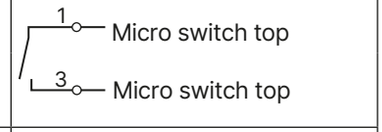
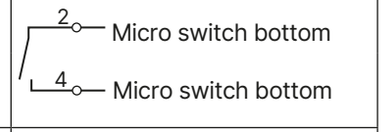
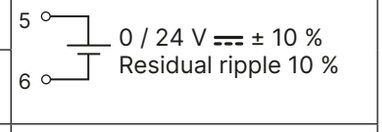
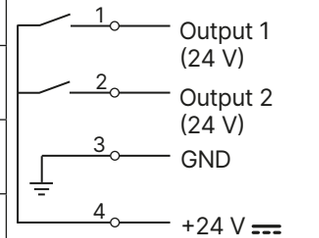
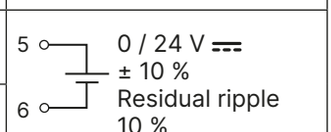
Pin	Wire color[3)]	Configuration	External circuit
1	white	Micro switch top (NO)	
3	green		
2	brown	Micro switch bottom (NO)	
4	yellow		
5	grey	Valve control 0 / 24 V	
6	pink	Valve control GND	
7		not used	
8		not used	

Fig. 11: Pin assignment 24 V with micro switches (mechanical limit switches)

Pin	Wire color[3)]	Configuration	External circuit
1	white	INI Bottom OUT Output	
2	brown	INI Top OUT Output	
3	green	INI - (GND) Supply	
4	yellow	INI + (24 V ⎓) Supply	
5	grey	Valve control 0 / 24 V	
6	pink	Valve control GND	

Tab. 3: Pin assignment with three-wire proximity switches

[3)] The indicated colors refer to the connecting cable available as an accessory (919061)