bürkert
FLUID CONTROL SYSTEMS

Type 8696 REV.2
Positioner Top Control Basic

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Important information for devices with UL approval

1 Intended use

Non-intended use of the positioner Type 8696 REV.2 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.

- 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)

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

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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

Electrical data without field bus communication

Protection class	III as per DIN EN 61140 (VDE 0140-1)
Connections	Circular plug-in connector (M12 × 1, 8-pin)
Operating voltage	24 V ⎓ ± 25%, max. residual ripple 10 %
Current consumption	max. 150 mA
Power consumption	max. 3.5 W
Input resistance for set-point value signal	75 Ω at 0/4...20 mA / 12 bit resolution
Analogue position feedback max. load for current output 0/4...20 mA	560 Ω
Digital input	0...5 V = log "0", 12...30 V = log "1" inverted input in reverse order

Electrical data, IO-Link

Protection class	III as per DIN EN 61140 (VDE 0140-1)
Connection	Circular plug-in connector M12 × 1, 5-pin, A-coded
Port Class A:	
Operating voltage	24 V ⎓ ±25 % (according to specification)
Current consumption	max. 150 mA
Port Class B:	
Operating voltage	
System supply (Pin 1+3)	24 V ⎓ ±25 % (according to specification)
Actuator supply (Pin 2+5)[2)]	24 V ⎓ ±25 % (according to specification)
Current consumption	
System supply (Pin 1+3)	max. 50 mA
Actuator supply (Pin 2+5)	max 100 mA
Total power consumption	max. 3.5 W

Electrical data, büS

Protection class	III as per DIN EN 61140 (VDE 0140-1)
Connection	Circular plug-in connector M12 × 1, 5-pin, A coded
Operating voltage	24 V ⎓ ±25 %
Current consumption	max. 150 mA
Total power consumption	max. 3.5 W

[2)] Actuator supply is galvanically isolated from system supply in accordance with IEC 60664 and for electrical safety in accordance with SELV from IEC 61010-2-201

6 Installation

6.1 Installing the positioner on process valves belonging to series 2103 and 23xx

NOTE!

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

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

- Align the puck and the positioner until the puck can be inserted into the guide rail of the positioner and the connection pieces of the positioner can be inserted into the pilot air ports of the actuator (see Fig. 1).
- Ensure that the puck is situated flat on the guide rail.

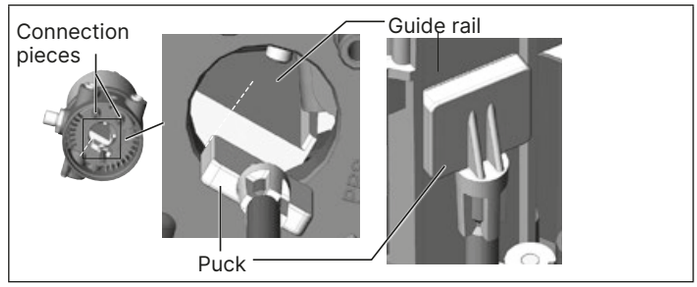

Fig. 1: Aligning the puck

- Push the positioner, without turning it, onto the actuator until no gap is visible on the form seal.
- Attach the positioner to the actuator using the two side fastening screws. In doing so, tighten the screws only hand-tight (max. torque: 1.5 Nm).

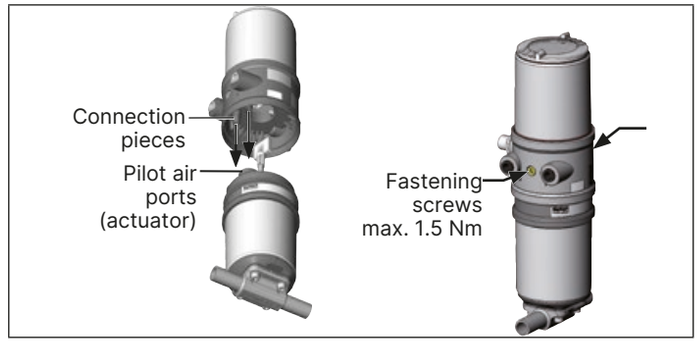

Fig. 2: Installing the positioner, series 2103, 2300 and 2301

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7 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.

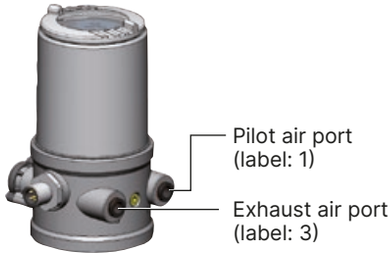

Fig. 3: Pneumatic connection

- Connect the control medium to the pilot air port (1) (3 – 7 bar; instrument air, free of oil, water and dust).
- Attach the exhaust air line or a silencer to the exhaust air port (3), see Fig. 3.

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 (3).
- 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. ±10 %). If fluctuations are greater, the control parameters measured with the **X.TUNE** function are not optimum.

Exhaust air concept:

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

8 Electrical installation

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

8.1 Electrical installation without fieldbus communication

- Connect the positioner according to the table.

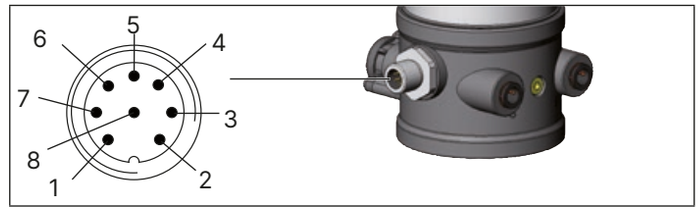

Fig. 4: Circular plug M12 × 1, 8-pin

Input signals of the control center (e.g. PLC)

Pin	Wire color[3)]	Configuration	External circuit, signal level
1	white	Set-point value + (0/4 – 20 mA)	1 + (0/4 – 20 mA)
2	brown	Set-point value GND	2 GND see table connection type 3-wire or 4-wire
5	grey	Digital input +	5 + 0...5 V (log. 0) 10...30 V (log. 1)
6	pink	Digital input GND	6 GND

Tab. 1: Pin assignment, input signals of the control center

Operating voltage

Pin	Wire color[3)]	Configuration	External circuit
3	green	GND	3 24 V ⎓ ±25 % max. residual ripple 10 %
4	yellow	+ 24 V	4

Tab. 2: Pin assignment, operating voltage

Output signals to the control center, (for analogue output variant only)

Pin	Wire color[3)]	Configuration	External circuit, signal level
8	red	Analogue position feedback +	8 + (0/4 – 20 mA)
7	blue	Analogue position feedback GND	7 GND

Tab. 3: Pin assignment, output signals of the control center, variant

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

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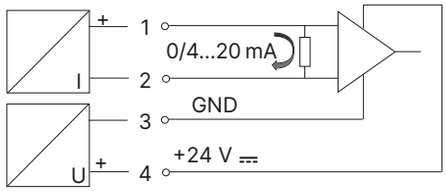
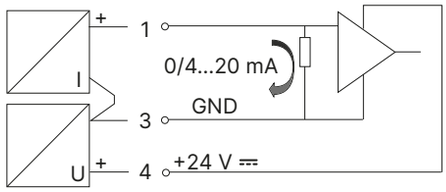
Connection type 3-wire or 4-wire

Setting via communication software

Connection type 4-wire (factory setting)
The set-point value input is designed as a differential input, i.e. the GND lines of the set-point value input and the supply voltage are not identical. Note: If the GND signals of the set-point value input and the supply voltage are connected, the 3-wire connection type must be set in the software.

Connection type 3-wire
The set-point value input is related to the GND line of the supply voltage, i.e. setpoint input and supply voltage have a common GND line.


Tab. 4: Connection type 3-wire or 4-wire

8.2 Electrical installation, IO-Link

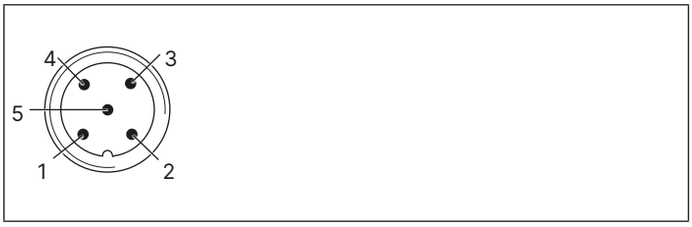


Fig. 5: Pin assignment

Pin assignment Port Class A

Pin	Designation	Configuration	
1	L +	24 V ⎓	System supply
2	I/Q	NC	Not used
3	L –	0 V (GND)	System supply
4	C/Q	IO-Link	Communication
5	NC	NC	Not used

Tab. 5: Pin assignment Port Class A

Pin assignment Port Class B

Pin	Designation	Configuration	
1	L +	24 V ⎓	System supply
2	P24	24 V ⎓	Actuator supply
3	L –	0 V (GND)	System supply
4	C/Q	IO-Link	Communication
5	N24	0 V (GND)	Actuator supply

Tab. 6: Pin assignment Port Class B

8.3 Electrical installation, büS

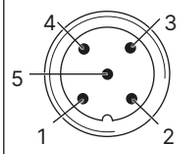


Fig. 6: Pin assignment

Pin	Wire color	Configuration
1	CAN plate/shielding	CAN plate/shielding
2	red	+24 V ⎓ ±25 %, max. residual ripple 10 %
3	black	GND / CAN_GND
4	white	CAN_H
5	blue	CAN_L

Tab. 7: Pin assignment

For electrical installation with büS network, note:
Use a 5-pin round plug and shielded 5-core cable.
The shielding in the device is not connected to the functional earth.

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