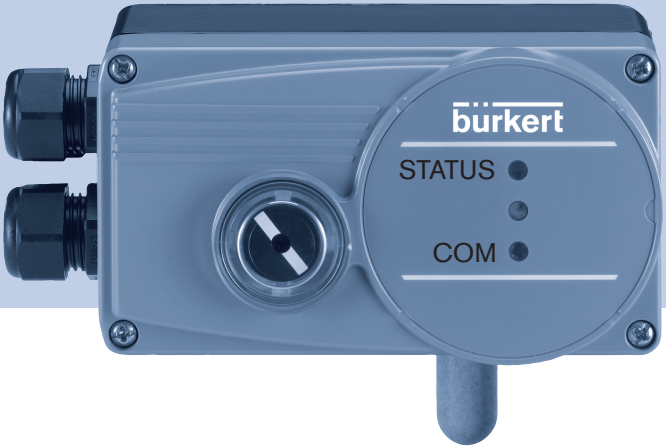
bürkert
FLUID CONTROL SYSTEMS

Type 8791 REV.2

Positioner SideControl BASIC

Electropneumatic positioner
Elektropneumatischer Positioner
Positionneur électropneumatique



Quickstart

English / Deutsch / Français

MAN 1000402009 EN Version: DStatus: RL (released | freigegeben) printed: 18.11.2022

Operating Instructions 2211/04_EUml_00815311 / Original DE

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Type 8791 positioner REV.2

1 ABOUT THESE INSTRUCTIONS

The Quickstart contains extremely important information on the device.

→ Keep these instructions ready to hand at the operation site.

Important safety information.

- Carefully read these instructions.
- Observe in particular the safety instructions, intended use and operating conditions.
- Persons, who work on the device, must read and understand these instructions.

The operating instructions can be found on the Internet at: country.burkert.com

1.1 Symbols

DANGER!

Warns of an immediate danger.

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

WARNING!

Warns of a potentially dangerous situation.

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

CAUTION!

arns of a possible danger.

- Failure to observe the warning may result in moderate or minor injuries.

NOTE!

Warns of damage to property.

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

Indicates important additional information, tips and recommendations.

Refers to information in these instructions or in other documentation.

- Designates an instruction to prevent risks.

→ designates a procedure that must be carried out.

Indicates a result

1.2 Definition of terms

In these instructions the term “device” denotes the following device types: positioner Type 8791 REV.2.

The term “büS” (Bürkert system bus) used in this instruction stands for the communication bus developed by Bürkert and based on the CANopen protocol.

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

2 INTENDED USE

The Positoner Type 8791 REV.2 is designed to be mounted on pneumatic actuators of process valves for the control of media. The permitted fluid media are listed in the technical data.

- Use the device for its intended purpose only. Non-intended use of the device may be dangerous to people, nearby equipment and the environment.
- Correct transportation, correct storage as well as correct installation, commissioning, operation and maintenance are essential for reliable and problem-free operation.
- When using the device, observe the permitted data, operating conditions and application conditions. This information can be found in the contractual documents, the operating instructions and on the type label.
- Use the device only in conjunction with third-party devices and components recommended and authorized by Bürkert.
- Do not use the device outdoors without protection from the weather.
- In areas at risk of explosion, only use devices approved for use in those areas. These devices are labeled with a separate Ex type label. For such use, note the information provided on the separate Ex type label and the additional explosion-related information or separate explosion-related operating instructions.
- Pulsating direct voltage (rectified alternating voltage without smoothing) must not be used as power supply.

3 BASIC SAFETY INSTRUCTIONS

These safety instructions do not consider any contingencies or incidents which occur during installation, operation and maintenance.

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

Risk of injury from high pressure and discharge of medium.

- Before working on the device or system, switch off the pressure. Vent or drain lines.

Risk of injury from electric shock.

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

To prevent injury, ensure the following:

- Secure device or system to prevent unintentional activation.
- Only trained technicians may perform installation and maintenance work.
- Perform installation and maintenance with suitable tools only.
- Do not make any changes to the device and do not subject it to mechanical stress.
- Operate the device only in perfect state and in consideration of the operating instructions.
- Observe the general rules of technology.
- Install the device according to the regulations applicable in the respective country.
- Do not feed corrosive or flammable media into the device connections.
- Do not feed any fluids into the connections of the device.
- After the process is interrupted, restart in a controlled manner. Observe sequence:
  1. Connect electrical or pneumatic power supply.
  2. Charge the device with medium.
- Observe intended use.

NOTE!

Electrostatic sensitive components or 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 minimise 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 NOTES

4.1 Contact address

Germany

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

International

The contact addresses can be found on the back pages of the printed quickstart.

Also on the Internet at: country.burkert.com

4.2 Warranty

A precondition for the warranty is that the Type 8694 positioner is used as intended in consideration of the specified operating conditions.

4.3 Information on the Internet

Operating instructions and data sheets for Type 8694 can be found on the Internet at: country.burkert.com

5 PRODUCT DESCRIPTION

5.1 Structure

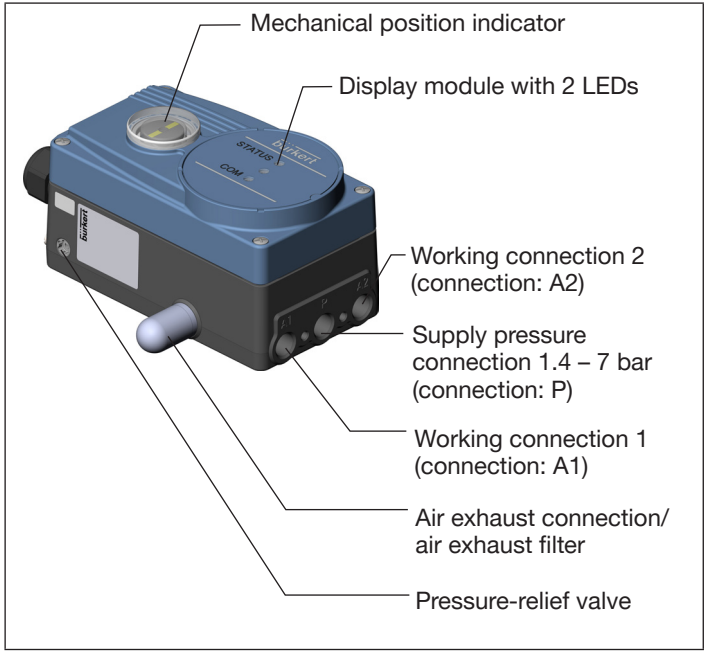


Fig. 1: Structure, positioner Type 8791

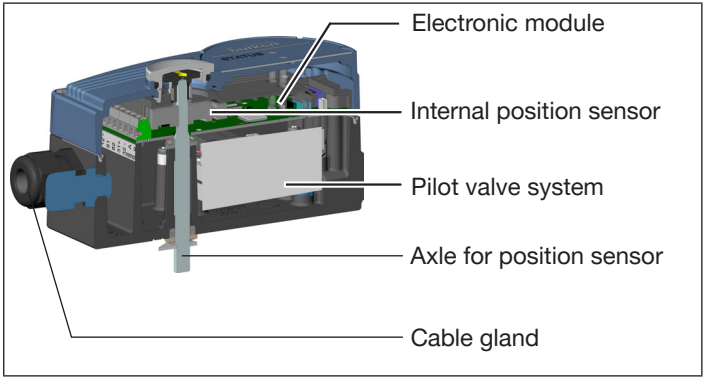


Fig. 2: Structure, positioner Type 8791

5.2 General description

The positioner Type 8791 is a digital, electro-pneumatic position controller for pneumatically actuated continuous valves. The device incorporates the main function groups

- Position sensor
- Electro-pneumatic pilot valve system
- Microprocessor electronics

The position sensor measures the current positions of the continuous valve. The microprocessor electronics continuously compare the current position (actual value) with a set-point position value specified via the standard signal input and supplies the result to the position controller. If there is a control difference, the electro-pneumatic valve pilot system corrects the actual position accordingly.

6 TECHNICAL DATA

6.1 Standards and directives

The device complies with the relevant EU harmonisation legislation. In addition, the device also complies with the requirements of the laws of the United Kingdom.

The harmonised standards that have been applied for the conformity assessment procedure are listed in the current version of the EU Declaration of Conformity/UK Declaration of Conformity.

6.2 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	IP65 / IP67[1)] according to EN 60529 (only if cables, plugs and sockets have been connected correctly)
Operating altitude	up to 2000 m above sea level

1) If the positioner is used under IP67 conditions, the ventilation filter (see "Fig. 1") must be removed and the exhaust air conducted into the dry area.

6.3 Mechanical data

Dimensions	See data sheet
Material	
Housing material	Plastic-coated aluminium
Other external parts	Stainless steel (V4A), PC, PE, POM, PTFE
Sealing material	EPDM, NBR, FKM
Weight	approx. 1.0 kg

6.4 Type label

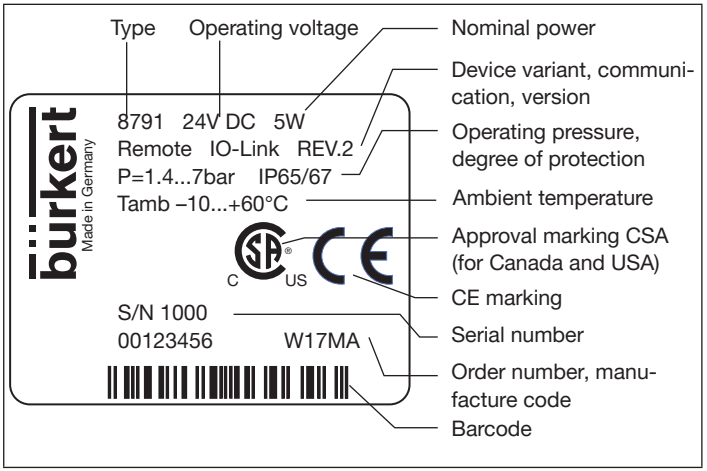


Fig. 3: Type label (example)

6.5 Electrical data

6.5.1 Electrical data, without field bus communication

Protection class	III in accordance with DIN EN 61140 (VDE 0140-1)
Connections	2 cable glands (M20 x 1.5) with screw-type terminals 0.14 – 1.5 mm² or circular plug-in connector (M12, 8-pin plug)
Operating voltage	24 V DC ±25 %, max. residual ripple 10%
Current consumption	max. 190 mA
Power consumption	max. 3.5 W
Input resistance for set-point value signal	75 Ω in 0/4 – 20 mA / 12 bit resolution
Analog position feedback max. Burden (load) for current output 0/4 – 20 mA	560 Ω
Inductive proximity switches	100 mA current limit
Digital input	0–5 V = logical “0”, 10–30 V = logical “1” logic invertible in software (input current < 6 mA)
Communications interface	Connection to PC via USB bus interface set
Communication software	Bürkert Communicator

6.5.2 Electrical data, IO-Link

Protection class	III as per DIN EN 61140 (VDE 0140-1)
Connection	Circular plug-in connector M12 x 1, 5-pin, A-coded
Port Class A	
Operating voltage	24 V DC ±25% (according to specifications)
Current consumption	max. 150 mA
Port Class B	
Operating voltage	
System supply (Pin 1+3)	24 V DC ±25 % (according to specification)
Actuator supply (Pin 2+5)[2)]	24 V DC ±25 % (according to specification)
Current consumption	
System supply (Pin 1+3)	max. 50 mA
Actuator supply (Pin 2+5)	max. 120 mA
Total power consumption	max. 3.5 W

6.5.3 Electrical data, büS

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

6.6 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	0 – +60 °C
Pressure range	1.4 – 7 bar

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

Air flow rate	
Universal Air flow rate	50 l_N/min (at 1.4 bar[3]) for aeration and ventilation
Single and	150 l_N/min (at 6 bar[3]) for aeration and double acting ventilation
	Q_{Nn} = 100 l_N/min (according to definition with pressure drop from 7 to 6 bar absolute)
Low air flow rate	Q_{Nn} = 7 l_N/min (according to defnition with Single-acting pressure drop from 7 to 6 bar absolute)
Connections	Internal thread G1/4”

3) *Pressure information: overpressure with respect to atmospheric pressure*

7 OPERATING

7.1 Operating state

AUTOMATIC (AUTO)

Normal controller mode is implemented and monitored in AUTOMATIC operating state.

MANUAL

In MANUAL operating state the valve can be opened and closed manually via the buttons.

To operate the DIP switches and buttons, make sure that the local control lock is deactivated/unlocked (factory setting): with communication software or fieldbus communication.

DIP switch 4 can be used to switch between the two operating states AUTOMATIC and MANUAL (see chapter “7.2.2 Function of the DIP switches”).

7.2 Operating and display elements of the positioner

To operate the DIP switches and buttons, make sure that the local control lock is deactivated/unlocked (factory setting): with communication software or fieldbus communication.

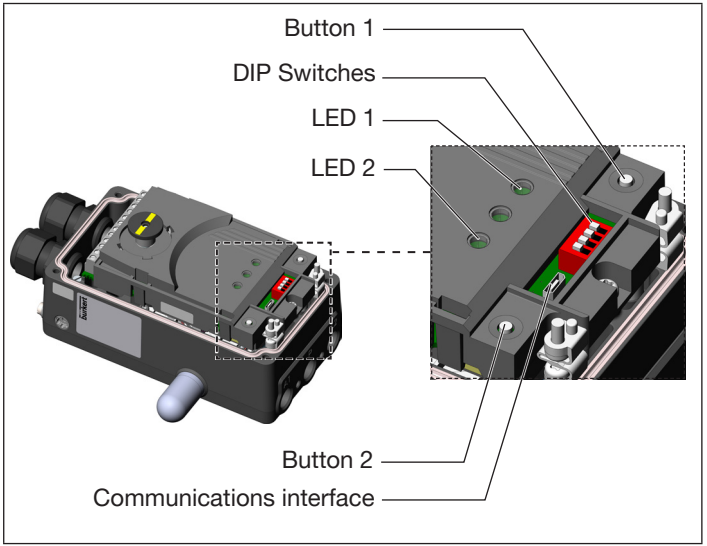


Fig. 4: Description of control elements

The positioner features 2 buttons, 4 DIP switches and 2 LEDs as a display element.

7.2.1 Configuration of the buttons

To operate the DIP switches and buttons, make sure that the local control lock is deactivated/unlocked (factory setting): with communication software or fieldbus communication.

The configuration of the 2 buttons inside the housing varies depending on the operating state (AUTOMATIC / MANUAL).

The description of the operating state (AUTOMATIC / MANUAL) can be found in the chapter entitled “7.1 Operating state”.

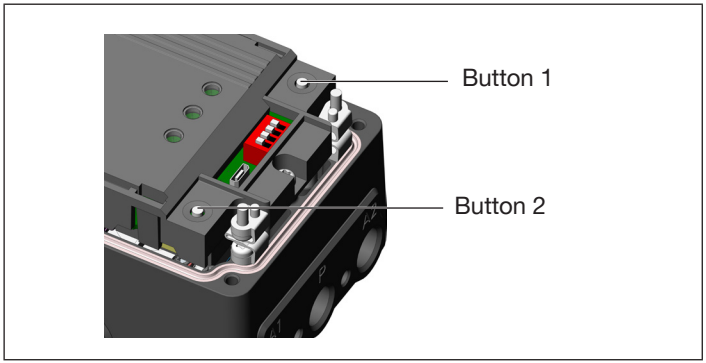


Fig. 5: Description of the buttons

→ To operate the buttons and DIP switches, unscrew the 4 screws on the housing cover and remove the housing cover.

MANUAL operating state (DIP switch 4 set to ON):

Button	Function
1	Aerate (manually open / close the actuator)[4]
2	Deaerate (manually open / close the actuator)[4]
1 and 2 simultaneously	Longer than 10 s (< 30 s, LED 2 flashes at 5 Hz): Device restart
	Longer than 30 s (LED 2 flashes at 10 Hz): Reset device to factory setting

Tab. 1: Configuration of the buttons for MANUAL operating state

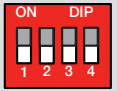
AUTOMATIC operating state (DIP switch 4 set to OFF):

Button	Function
1	Press for 5 s to start the *X.TUNE* function
2	-
1 and 2 simultaneously	Longer than 10 s (< 30 s, LED 2 flashes at 5 Hz): Device restart
	Longer than 30 s (LED 2 flashes at 10 Hz): Reset device to factory setting

Tab. 2: Configuration of the buttons for AUTOMATIC operating state

4) Depending on the operating principle of the actuator.

7.2.2 Function of the DIP switches

DIP switches		Function 
1	ON	Reversal of the effective direction of the set-point value (20 – 4 mA corresponds to 0 – 100 %), descending (*DIR.CMD*)
	OFF	Normal effective direction of the set-point value (4 – 20 mA corresponds to 0 – 100 %), ascending
2	ON	Sealing function active. The valve completely closes below 2 %[5] and opens above 98 % of the set-point value (*CUTOFF*)
	OFF	No sealing function
3	ON	Correction characteristic for adjustment of the operating characteristic (*CHARACT*)[5]
	OFF	Linear characteristic
4	ON	Operating status MANUAL (MANU)
	OFF	Operating status AUTOMATIC (AUTO)

Tab. 3: DIP switches

5) Can be changed via communications software.

Information about the communications software:

The switching position of the DIP switch has priority over the communications software.

If the values of the sealing function (CUTOFF) or the correction characteristic (CHARACT) are changed via the communications software, the corresponding function must be active (DIP switch set to ON).

The effective direction of the set-point value (DIR.CMD) can be changed via the DIP switches.

7.2.3 LED display

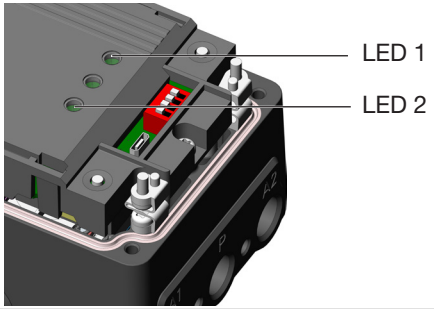


Fig. 6: LED display

7.2.4 Device status display

The LED 1 (RGB) show the device status.

The user can set the following LED modes for the display of device status and valve position.

- Valve mode
- Valve mode with error messages
- Valve mode with error messages and warnings (factory setting)
- NAMUR mode
- LED off

The LED mode and the colors of the valve position can be set with the Bürkert Communicator.

IO-Link:
The LED mode and the colors of the valve position can be also set with an acyclic parameter (see parameter list).

The description for setting the LED mode can be found in the section "Setting the LED mode, device status" in the operating manual.

7.2.5 Valve mode + warnings (factory setting)

Displays in valve mode + warnings:

- Valve position: open, half-way, closed
- Device status: failure, function check, out of specification, maintenance required (according to NAMUR)

Valve position		Device status
	Status, color	Normal operation
Open	is lit yellow[6)]	--
Half-way	is lit white[6)7)]	--
Closed	is lit green[6)]	--

Tab. 4: Valve mode + warnings, normal operation

If several device statuses exist simultaneously, the device status with the highest priority is displayed.

Valve position	Device status				
	Failure	Function check	Out of specifi-cation	Maintenance required	
	Status, color	Status, color	Status, color	Status, color	
Open	flashes red	flashes orange	flashes yellow	blinks blue	alternately with yellow[6)]
Half-way	flashes red	flashes orange	flashes yellow	blinks blue	alternately with white[6)7)]
Closed	flashes red	flashes orange	flashes yellow	flashes blue	alternately with green[6)]

Tab. 5: Valve mode + warnings, device status

For warning messages, the LEDs are briefly switched off between the change of the colors.

For localizations, the colors are only shown momentarily.

6) *Factory setting, selectable colours for valve position: off, white, green, blue, yellow, orange, red*
7) *From firmware A.1.6*

7.2.6 NAMUR mode

The LED 1 show the device status.

The display elements change color in accordance with NAMUR NE 107.

If several device statuses exist simultaneously, the device status with the highest priority is displayed. The priority is determined by the severity of the deviation from controlled operation (red LED = failure = highest priority).

Status display in accordance with NE 107, edition 2006-06-12			
Color	Color code	Status	Description
Red	5	Outage, error or malfunction	Normal operation is not possible due to a malfunction in the device or on its peripheral equipment.
Orange	4	Function check	Work is being carried out on the device; normal operation is therefore temporarily not possible
Yellow	3	Out of specification	Ambient conditions or process conditions for the device are outside the specified area.
Blue	2	Maintenance required	The device is in normal operation, although a function is briefly restricted. → Service device.

Status indicator in line with NE 107, issue 2006-06-12			
Colour	Colour code	Status	Description
Green	1	Diagnostics active	Device is in error-free operation. Status changes are highlighted in colour. Messages are sent via any fieldbus that may be connected.

Tab. 6: Description of colour

7.2.7 Status LED, green

LED 2 (green) shows the following.

Colour	State	Description
Green	is not lit	IO-Link communication inactive[8)]
	flashes	IO-Link communication active[8)]
	flashes at 5 Hz	Feedback when pressing key 1 (start X.TUNE) or key 1+2 (device restart) > 5 s
	flashes at 10 Hz	Feedback when pressing keys 1+2 (reset device to factory setting) > 30 s

Tab. 7: LED 2, green

8) Variant IO-Link only

8 ATTACHMENT AND ASSEMBLY

8.1 Installation of devices for the Ex area

When installing devices in the potentially explosive atmosphere, observe the “Additional information for use in the Ex area“ enclosed with the Ex-devices.

8.2 Attachment to a continuous valve with linear actuators according to NAMUR

The valve position is transferred to the position sensor installed in the positioner via a lever (according to NAMUR).

The attachment kit for the linear actuators can be purchased from Bürkert as an accessory by quoting the identification number 787215. The associated parts are listed in the “Tab. 6: Description of colour”.

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
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. 8: Attachment kit for linear actuators

8.2.1 Installation

WARNING!

Risk of injury from improper installation.

- Installation may be carried out by authorised 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.

Yoke mount procedure:

→ Using the bracket ② the clamping pieces ③, hexagon bolts ⑰ and circlips ⑯ attach the hoop to the actuator spindle.

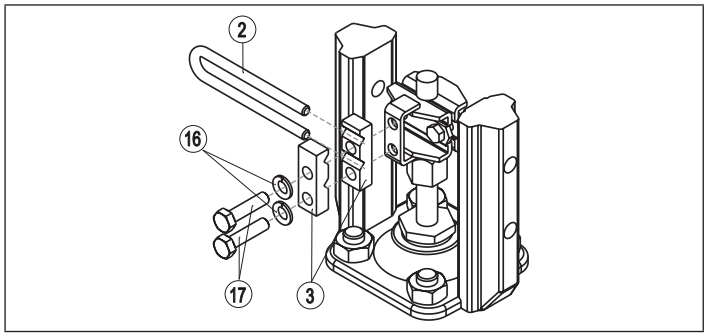


Fig. 7: Attaching the hoop

→ Select short or long lever according to the stroke of the actuator (see “Tab. 8: Attachment kit for linear actuators”, part no. 6a/6b).

→ Assemble lever (if not pre-assembled) (see “Fig. 8”).

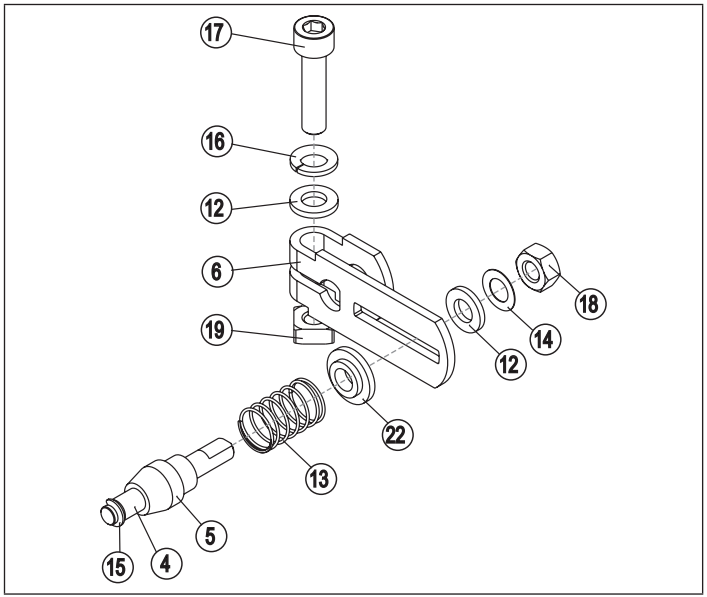


Fig. 8: Assembling the lever

The gap between the driver pin and the axle should be the same as the drive stroke. This results in the ideal angular range of the lever of 60° (see “Fig. 9”).

Angular range of the position sensor:
The maximum angular range of the position sensor is 180°.

Rotational range of the lever:
To ensure that the position sensor operates at a good resolution, the rotational range of the lever must be between 30° and 120°.

The scale printed on the lever is not relevant.

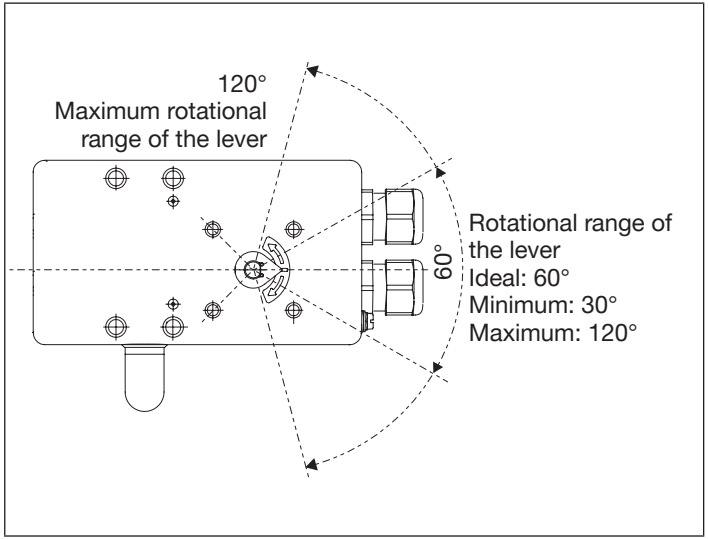


Fig. 9: Rotational range of the lever

→ Attach lever to the axle of the positioner and screw tight (⑰ and ⑲)

8.2.2 Attaching mounting bracket

→ Attach mounting bracket ① to the back of the positioner with hexagon bolts ⑨, circlip ⑩ and washers ⑪ (see "Fig. 10").

The selection of the M8 thread used on the positioner depends on the size of the actuator.

→ To determine the correct position, hold the positioner with mounting bracket on the actuator.

The conical roller on the lever of the position sensor in the hoop must be able to run freely on the drive over the entire stroke range.
At 50% stroke the lever position should be approximately horizontal (see chapter "8.2.3 Aligning lever mechanism").

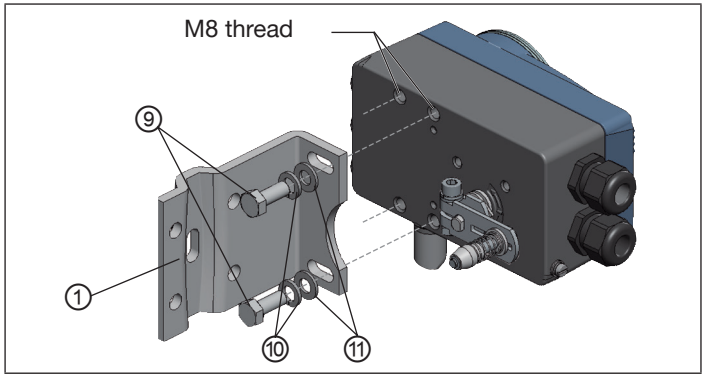


Fig. 10: Attaching mounting bracket

Attaching the positioner with mounting bracket for actuators with cast frame:

→ Attach mounting bracket to the cast frame with one or more hexagon bolts ⑧, washers ⑪ and circlips ⑩ (see "Fig. 11").

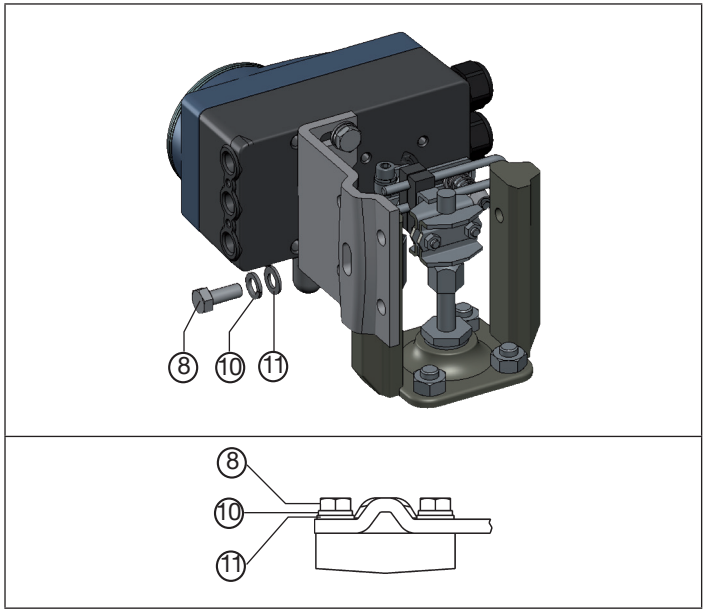


Fig. 11: Attach positioner with mounting bracket; for actuators with cast frame

Attaching the positioner with mounting bracket for actuators with columnar yoke:

→ Attach mounting bracket to the columnar yoke with the U-bolt ⑦, washers ⑪, circlips ⑩ and hexagon nuts ㉑ (see "Fig. 12").

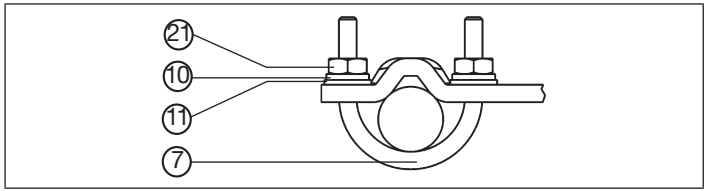


Fig. 12: Attach positioner with mounting bracket; for actuators with columnar yoke

8.2.3 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 positioner until the lever is horizontal.

→ Fix the positioner in this position on the actuator.

8.3 Attachment to a continuous valve with rotary actuator

The axle of the position sensor integrated in the positioner is connected directly to the axle of the rotary actuator.

The assembly bridge can be purchased from Bürkert as an accessory by quoting the identification number 770294.

The attachment kit for the rotary actuators can be purchased from Bürkert as an accessory by quoting the identification number 787338.

The associated parts are listed in the "Tab. 9: Mounting kit on rotary actuator".

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. 9: Mounting kit on rotary actuator

8.3.1 Installation

WARNING!

Risk of injury from improper installation.

- Installation may be carried out by authorised 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.

Procedure:

→ Specify the attachment position of the positioner:
- parallel to the actuator or
- rotated by 90° to the actuator.

→ Determine home position and direction of rotation of the actuator.

Anti-twist safeguard:

Note the flat side of the axle!
One of the setscrews must be situated on the flat side of the axle as an anti-twist safeguard (see “Fig. 13”).

→ Connect adapter ① to the axle of the positioner and secure with 2 setscrews.

→ Secure setscrews with self-locking nuts to prevent them from working loose.

Angular range of the position sensor:
The maximum angular range of the position sensor is 180°. The axis of the positioner should only be used within this range.

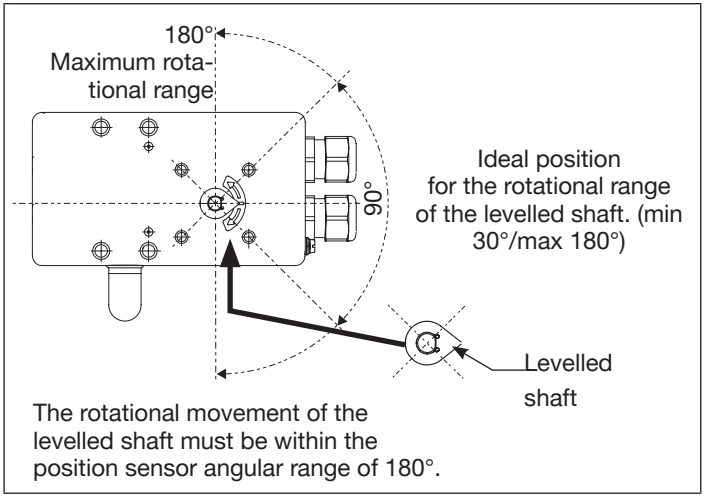


Fig. 13: Angular range/anti-twist safeguard

→ Assemble the multi-part assembly bridge suitable for the actuator. The assembly bridge consists of 4 parts, which can be adjusted to the actuator by varying the arrangement.

→ Attach the assembly bridge to the positioner using four hexagon bolts ③ and spring lock washers ④ (see “Fig. 14”).

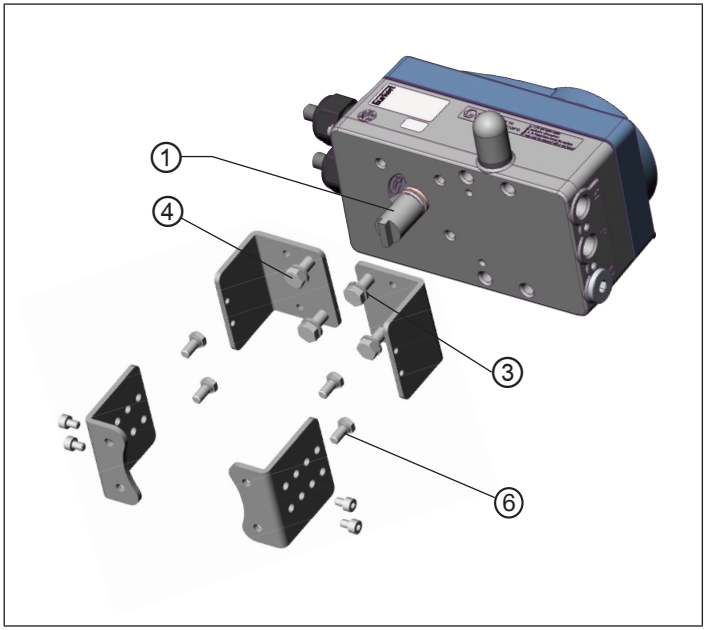


Fig. 14: Attaching assembly bridge (schematic representation)

→ Place the positioner with the assembly bridge on the rotary actuator and attach it using four hexagon bolts ⑥ (see “Fig. 15”).

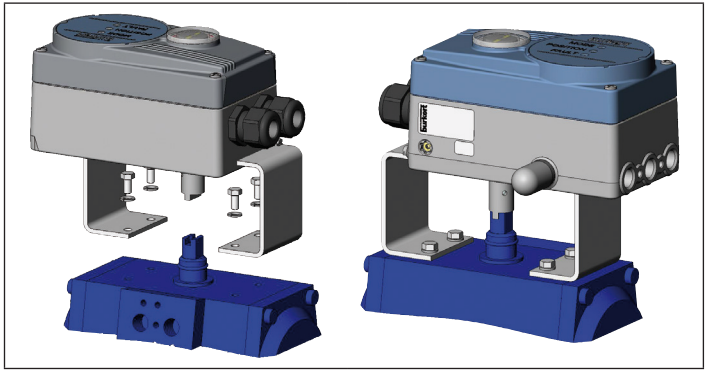


Fig. 15: Rotary actuator attachment

8.4 Remote operation with external position sensor

In this variant, the positioner does not have a position sensor in the form of an angle of rotation sensor but has an external remote sensor.

The Type 8798 remote sensor is connected using a serial digital interface.

8.4.1 Attachment accessories

There are two options for attaching the positioner in remote operation (see “Fig. 16”).

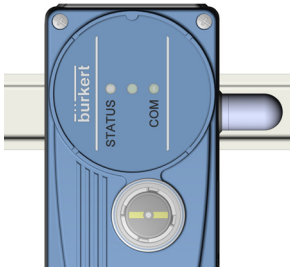
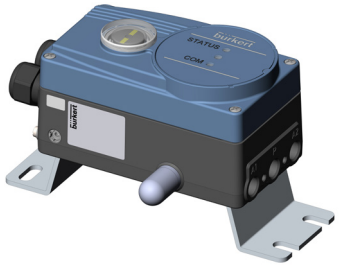
Installation on a standard rail Holder for standard rail installation Order number 675702	**Wall installation** Hoop for wall installation Order number 675715
	

Fig. 16: Attachment types in remote operation

8.4.2 Connection and start-up of the remote sensor Type 8798

WARNING!

Risk of injury due to improper start-up.

- Start-up may be carried out by authorised technicians only and with the appropriate tools.

Risk of injury due to unintentional activation of the system and uncontrolled restart.

- Secure the system against unintentional activation.
- Ensure a controlled restart after installation.

→ Connect the 4 wires of the sensor cable to the screw-type terminals of the positioner intended for this (see Chapter “10.3.5 Terminal assignment for external position sensor (only remote variant)”).

→ Mount the remote sensor on the actuator.
The proper procedure is described in the quickstart for the Type 8798 remote sensor.

→ Pneumatically connect the positioner to the actuator.

→ Connect compressed air to the positioner.

→ Switch on the positioner supply voltage.

→ Perform the*X.TUNE* function.

9 PNEUMATIC CONNECTION

9.1 Connection of devices for Ex areas

For connection in potentially explosive atmospheres, the “Additional information for use in potentially explosive atmospheres” enclosed with the device must be adhered to.

9.2 Safety instructions

DANGER!

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

- Before working on the system or device, switch off the pressure and vent/empty the lines.

WARNING!

Risk of injury due to improper installation.

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

Risk of injury due to unintentional activation of the system and uncontrolled restart.

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

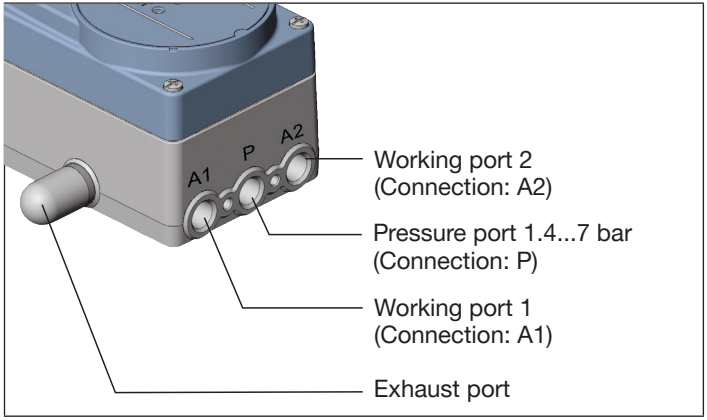


Fig. 17: Pneumatic installation/location of connections

Procedure:

→ Apply supply pressure (1.4...7 bar) to the pressure port P

For single-acting actuators (control function A and B):

→ Connect a working port (A1 or A2, depending on the desired safety end position) to the chamber of the single-acting actuator.
For safety end positions see Chapter “9.3 Safety end positions”.

→ Seal the working ports that are not needed with a sealing plug.

For double-acting actuators (control function I):

→ Connect working ports A1 and A2 to the respective chamber of the double-acting actuator.
For safety end positions see Chapter "9.3 Safety end positions".

Important information for perfect control behaviour!

To prevent the control behaviour in the upper stroke range from being negatively influenced by a small pressure difference

- Keep the applied supply pressure at least 0.5...1 bar above the pressure that is required to move the pneumatic actuator into end position.

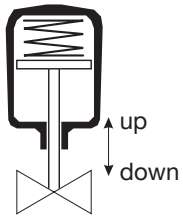
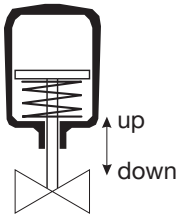
The control parameters calibrated with the *X.TUNE* function are not ideal for larger fluctuations.

- Keep the supply pressure fluctuations as low as possible during operation (max. ±10%).

9.3 Safety end positions

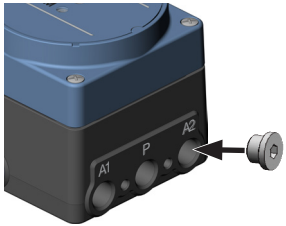
The safety end position after the electrical auxiliary power fails depends on the fluidic connection of the actuator to the working ports A1 or A2.

9.3.1 Single-acting actuators

Actuator type	Safety end positions after failure of the electrical auxiliary power	Safety end positions after failure of the pneumatic auxiliary power
 Control function A	down → Connection acc. to "Fig. 18"	univ. air flow rate: down
	up → Connection acc. to "Fig. 19"	Low air flow rate: not defined
 Control function B	up → Connection acc. to "Fig. 18"	univ. air flow rate: up
	down → Connection acc. to "Fig. 19"	Low air flow rate: not defined

Tab. 10: Safety end positions, single-acting actuators

Single-acting actuators - control function A or B



Connect working port A1 to the actuator

Seal A2

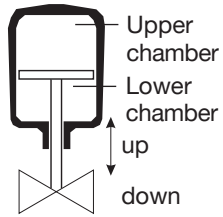
Fig. 18: Connection A1

Connect working port A2 to the actuator

Seal A1

Fig. 19: Connection A2

9.3.2 Double-acting actuators

Actuator type	Safety end positions after failure of the	
	electrical auxiliary power	pneumatic auxiliary power
 Control function I	→ Connection see "Fig. 20"	not defined
	up = lower chamber of the actuator on A2	
	down = upper chamber of the actuator on A2	

Tab. 11: Safety end position, double-acting actuators

Double-acting actuators - control function I

Connect working ports A1 and A2 to the actuator

Safety end position:
up = lower chamber on A2
down = upper chamber on A2

Fig. 20: Connection at control function I (SFI)

10 ELECTRICAL CONNECTION

All electrical inputs and outputs of the device are not galvanically isolated to the supply voltage.

10.1 Connection of devices for Ex areas

For connection in potentially explosive atmospheres, the “Additional information for use in potentially explosive atmospheres” enclosed with the device must be adhered to.

10.2 Safety instructions

DANGER!

Risk due to electric shock.

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

WARNING!

Risk of injury due to improper installation.

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

Risk of injury due to unintentional activation of the system and uncontrolled restart.

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

10.3 Electrical installation without fieldbus communication

10.3.1 Electrical installation with circular plug-in connector M12, 8-pin

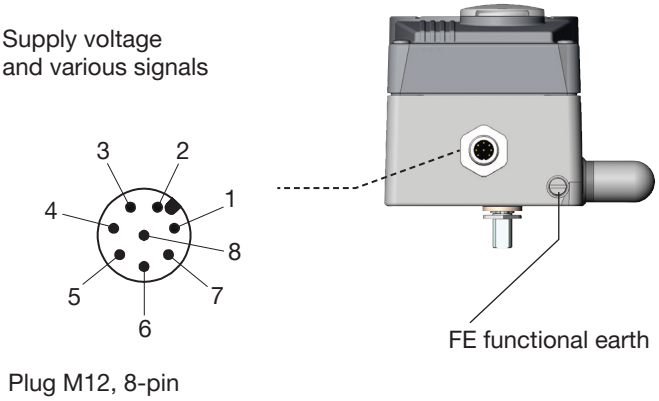


Fig. 21: Designation circular plug-in connector (M12, 8-pin) and contacts

Pin assignment for operating voltage

Pin	Wire colour[10)]	Assignment	External circuit/signal level
3	green	GND	3 ○ ┐ 24 V DC ±25% max. residual ripple 10%
4	yellow	+24 V	4 ○ ┘

Tab. 12: Pin assignment for operating voltage

Pin assignment for input signals from control centre (e.g. PLC)

Pin	Wire colour[10)]	Assignment	Device end	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 set-point value [9)] see chapter “3 conductor or 4 conductor connection type”
5	grey	Digital input	5 ○—	+ < 0...5 V (logical 0) / 10...30 V (logical 1) referring to pin 3 (GND)

Tab. 13: Pin assignment for input signals of the control centre

Pin assignment for the output signals to the control centre (only analogue output variant)

Pin	Wire colour[10)]	Assignment	Device end	External circuit/signal level
8	red	Analogue feedback +	8 ○—	+ (0/4...20 mA)
7	blue	Analogue feedback GND	7 ○—	GND (identical to GND operating voltage)

Tab. 14: Pin assignment; output signal to control centre

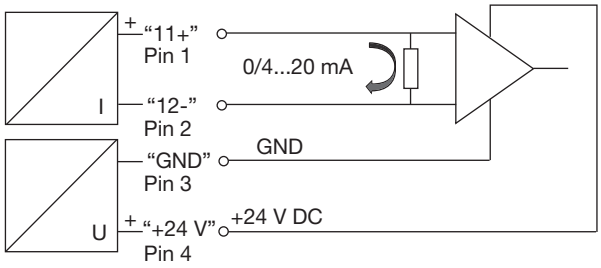
9) Factory setting: 4 conductor connection type

10) The specified wire colours refer to the connection cable, which is available as an accessory with order no. 919061.

10.3.2 3 conductor or 4 conductor connection type

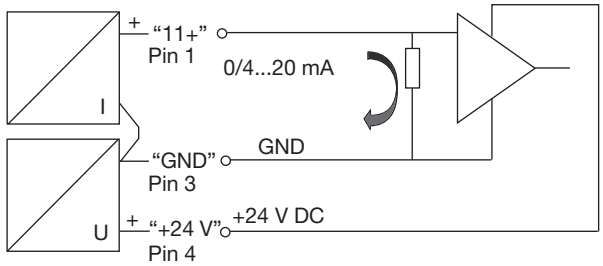
Configuration with communication software

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



Tab. 15: 4 conductor connection type with terminal designation or PIN of M12 8-pin circular plug-in connector

3 conductor connection type
The setpoint input is linked to the GND line of the supply voltage, i.e. setpoint input and supply voltage share a GND line.



Tab. 16: 3 conductor connection type with terminal designation or PIN of M12 8-pin circular plug-in connector

10.3.3 Electrical installation with cable gland

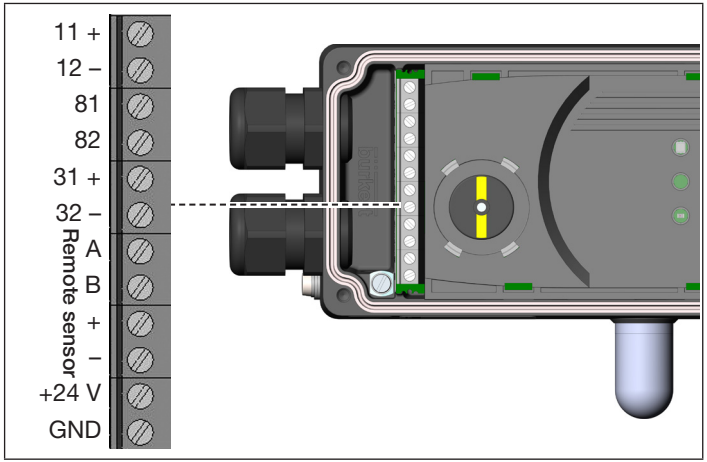


Fig. 22: Designation of screw-type terminals

10.3.4 Connection of terminals

→ Unscrew the 4 screws on the housing lid and remove the housing lid.
The screw-type terminals are now accessible.

→ Connect terminals according to the pin assignment.

Terminal assignment for input signals from control centre (e.g. PLC)

Clip	Assignment	Device end	External circuit/signal level
11 +	Set-point value +	11 +	+ (0/4...20 mA)
12 –	Set-point value GND	12 –	GND set-point value [15] see chapter “3 conductor or 4 conductor connection type”
81 +	Digital input +	81 +	+ 0...5 V (logical 0); 10...30 V (logical 1)
82 –	Digital input –	82 –	GND (identical to GND operating voltage)

Tab. 17: Terminal layout; input signal from control centre

11)Factory setting: 4 conductor connection type

Terminal assignment for the output signals to the control centre (only analogue output variant)

Clip	Assignment	Device end	External circuit/signal level
31 +	Analogue feedback +	31 +	+ (0/4...20 mA)
32 –	Analogue feedback GND	32 –	GND (identical to GND operating voltage)

Tab. 18: Terminal layout; output signal to control centre

Terminal layout for operating voltage

Clip	Assignment	External circuit/signal level
+24 V	Operating voltage +	+24 V
GND	Operating voltage GND	GND
		24 V DC ±25% max. residual ripple 10%

Tab. 19: Terminal layout operating voltage

10.3.5 Terminal assignment for external position sensor (only remote variant)

Clip	Assignment	Device end	External circuit/signal level
S +	Sensor supply +	S +	+
S –	Sensor supply –	S –	–
A	Serial interface, A-line	A	A-line
B	Serial interface; B-line	B	B-line
			Remote sensor Type 8798[16)]

12)Assignment of wire colour see "Tab. 21"

Tab. 20: terminal assignment; external position sensor

Positioner terminal	Wire colour Remote sensor with cable type 1	Wire colour Remote sensor with cable type 2
S +	brown	brown
S –	white	black
A	green	red
B	yellow	orange

Tab. 21: Assignment of wire colour on the remote sensor

10.4 Electrical installation, IO-Link

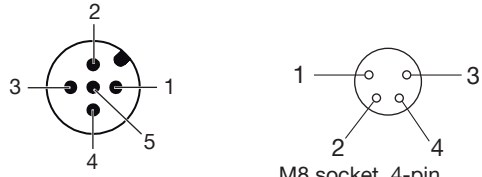


Fig. 23: Pin assignment

Pin assignment port class A

Pin	Designation	Assignment	
1	L +	24 V DC	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. 22: Pin assignment port class A

Pin assignment port class B

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

Tab. 23: Pin assignment port class B

You can find the pin assignment of the remote variant in the chapter “10.6”

10.5 Electrical installation, büS

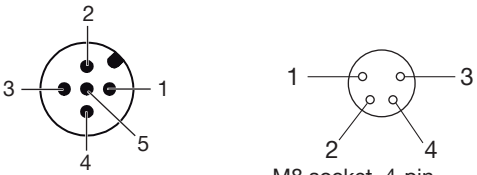


Fig. 24: Pin assignment

Pin	Wire colour	Assignment
1	CAN label/shielding	CAN label/shielding
2	red	24 V DC ±25% max. residual ripple 10%
3	black	GND/CAN_GND
4	white	CAN_H
5	blue	CAN_L

Tab. 24: Pin assignment

For electrical installation with büS network note the following:

Use a 5-pin circular plug and a shielded 5-wire cable.

The shielding is capacitively connected to the functional earth through the device.

You can find the pin assignment of the remote variant in the chapter “10.6”

10.6 Connection assignment for external position sensors (remote variant)

Pin	Assignment	Device end	External circuit
1	Sensor supply +	S +	+
2	Sensor supply –	S –	–
3	Serial interface, A-line	A	A-line
4	Serial interface; B-line	B	B-line

Remote sensor Type 8798

Tab. 25: Pin assignment, M8 socket, 4 pin

11 START-UP

11.1 Safety instructions

WARNING!

Risk of injury due to 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 aware of and have completely understood the contents of the operating instructions.
- The safety instructions and the intended use must be observed.
- Only adequately trained personnel may start up the system/device.

11.2 Defining base settings

The base settings of the positioner are configured in the factory.

To adapt the positioner to the local conditions, the *X.TUNE* function must be executed after installation.

11.2.1 Perform the *X.TUNE* automatic adjustment

WARNING!

Risk from changing the valve position when executing the *X.TUNE* function.

If *X.TUNE* is operated under operating pressure there is an acute risk of injury.

- *Never execute X.TUNE* when a process is running.
- Secure the system against unintentional activation.

NOTE!

Faulty adjustment of the controller may occur if the pilot pressure is incorrect or the operating pressure is applied to the valve seat.

- **Always** execute *X.TUNE* in case of pilot pressure (pneumatic auxiliary power) present in later operation.
- Ideally, execute the *X.TUNE* function **without** operating medium pressure to prevent interference as a result of flow forces.

→ Unscrew the 4 screws on the housing lid and remove the housing lid.

To execute *X.TUNE* the positioner must be in AUTOMATIC operating state
(DIP switch 4 = OFF).

→ Start *X.TUNE* by pressing key 1 for 5 s[17)].

LED 2 flashes at 5 Hz. The device is in NAMUR functional inspection state, LED 1 lights orange.

If X.TUNE has been successfully complete, the NAMUR state is reset. The changes are automatically adopted in the memory (EEPROM).

If LED 1 lights red after X.TUNE:

→ Execute X.TUNE again.

→ Perform device restart if necessary.

13) X.TUNE can also be started via communication software.

11.3 Set device with Bürkert Communicator

All settings can be made on the device with Bürkert Communicator.

You can find the settings in Bürkert Communicator in the operating instructions.

11.3.1 Connecting the IO-Link device to the Bürkert Communicator

Necessary components:

- Communication software: Bürkert Communicator for PC
- USB büS interface set (see accessories)
- büS adapter for communication interface (see accessories)
- A büS cable extension if necessary (see accessories)

→ To connect the IO-Link device to Bürkert Communicator, unscrew the housing lid.

→ Insert the Micro USB plug into the communication interface.

→ Create the connection to the PC with the büS stick.

→ Start the Bürkert Communicator.

→ Configure settings.

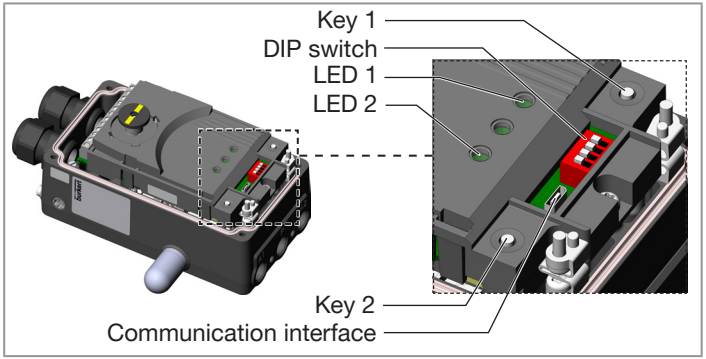


Fig. 25: Description of operating elements

11.3.2 Connecting the büS device to the Bürkert Communicator

Necessary components:

- Communication software: Bürkert Communicator for PC
- USB büS interface set (see accessories)

→ Make the connection to the PC with the USB büS interface set.

→ Start the Bürkert Communicator.

→ Configure settings.

11.4 IO-Link

11.4.1 Information, IO-Link

IO-Link is an internationally standardised IO technology (IEC 61131-9) for communicating with sensors and actuators.

IO-Link is a point-to-point communication system with 3-wire connection technology for sensors and actuators and unshielded standard sensor lines.

To ensure unambiguous communication, IO-Link devices should not be configured simultaneously using the global controller (PLC) via the IO-Link master and using the Bürkert Communicator (via the service interface).

11.4.2 Technical data, IO-Link

IO-Link specification	V1.1.2
Supply	via IO-Link (M12 x 1, 5-pin, A-coded)
Port class	A or B
SIO mode	No
IODD file	See Internet
VendorID	0x0078, 120
DeviceID	See IODD file
ProductID	8791
Transmission speed	COM3 (230.4 kbit/s)
PD input bits	80
PD output bits	40
M-sequence cap.	0x0D
Min. cycle time	5 ms
Data storage	Yes
Max. line length	20 m

11.4.3 Configuring the fieldbus

The necessary start-up files and the description of the process data and acyclic parameters are available online.

Download at:
www.burkert.com/Type 8791/Software

11.5 büS

11.5.1 Information, büS

büS is a system bus developed by Bürkert. The communication protocol is based on CANopen.

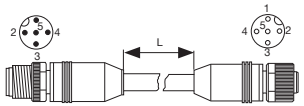
11.5.2 Configuring the fieldbus

The necessary start-up files and the description of the objects are available online.

Download at:
www.burkert.com/Type 8791/Software

12 ACCESSORIES

Designation	Order no.
Connection cable M12, 8-pin	919061
Bürkert Communicator communication software	Info at country.burkert.com

USB büS interface set:	
USB büS interface set 2 (büS stick + 0.7 m cable with M12 plug)	772551
büS adapter for communication interface (M12 to büS service interface micro-USB)	773254
	
büS cable extension (M12), length 1 m	772404
büS cable extension (M12), length 3 m	772405
büS cable extension (M12), length 5 m	772406
büS cable extension (M12), length 10 m	772407

Tab. 26: Accessories

12.1 Communication software

The Bürkert Communicator PC operating program has been designed for communication with devices from the Bürkert positioner family.

Please contact the Bürkert Sales Center for compatibility questions.

A detailed description of the installation and operation of the software can be found in the associated operating instructions.

Download the software from: country.burkert.com

13 TRANSPORT, STORAGE, PACKAGING

NOTE!

Transport damage.

Inadequately protected devices may be damaged during transport.

- Use shock-resistant packaging to protect the device against moisture and dirt during transport.
- Avoid exceeding or dropping below the permitted storage temperature.
- Protect pneumatic connections from damage with protective caps.

Incorrect storage may damage the device.

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

Environmentally friendly disposal

- Follow national regulations regarding disposal and the environment.
- Collect electrical and electronic devices separately and dispose of them as special waste.

Further information country.burkert.com.

bürkert
FLUID CONTROL SYSTEMS

www.burkert.com

MAN 1000402009 EN Version: DStatus: RL (released | freigegeben) printed: 18.11.2022