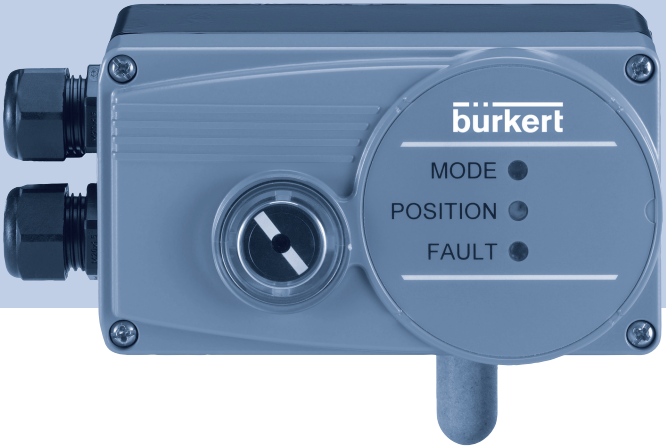
bürkert
FLUID CONTROL SYSTEMS

Type 8791

Positioner SideControl BASIC

Electropneumatic positioner
Elektropneumatischer Positioner
Régulateur de position électropneumatique



Quickstart

English / Deutsch / Français

MAN 1000122866 ML Version: HStatus: RL (released | freigegeben) printed: 22.09.2017

Operating Instructions 1705/06_EU-EN_00806173 / Original DE

MAN 1000122866 ML Version: HStatus: RL (released | freigegeben) printed: 22.09.2017

Positioner Type 8791

1 QUICKSTART

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

Important Safety Information!

Read Quickstart carefully and thoroughly. Study in particular the chapters entitled "Basic safety instructions" and "Authorized use".

- Quickstart must be read and understood.

Quickstart for positioner Type 8791 explains, for example, how to install and start-up the device.

A detailed description of the device can be found in the operating instructions for positioner Type 8791.

The operating instructions can be found on the enclosed CD and on the Internet at:

www.burkert.com

1.1 Definition of term / abbreviation

The term "device" used in these instructions always stands for the positioner Type 8791.

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

1.2 Symbols

The following symbols are used in these instructions.

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 injuries or death.

CAUTION!

Warns of a possible danger.

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

NOTE!

Warns of damage to property.

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 that must be carried out.

2 AUTHORIZED USE

Incorrect use of the positioner Type 8791 can be dangerous to people, nearby equipment and the environment.

The device is designed for the open-loop control and closed-loop control of media.

- The device must not be exposed to direct sunlight.
- Pulsating direct voltage (rectified alternating voltage without smoothing) must not be used as power supply.
- In the potentially explosion-risk area the positioner Type 8791 may be used only according to the specification on the separate Ex type label. For use observe the additional information enclosed with the device together with safety instructions for the explosion-risk area.
- Devices without a separate Ex type label may not be used in a potentially explosive area.
- During use observe the permitted data, the operating conditions and conditions of use specified in the contract documents and operating instructions, as described in chapter "6 Technical data" in this manual and in the operating instruction for the respective pneumatically actuated valve.
- The device may be used only in conjunction with third-party devices and components recommended and authorised by Bürkert.
- In view of the wide range of possible application cases, check whether the positioner is suitable for the specific application case.
- Correct transportation, correct storage and installation and careful use and maintenance are essential for reliable and faultless operation.
- Use the positioner Type 8791 only as intended.

2.1 Restrictions

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

3 BASIC SAFETY INSTRUCTIONS

These safety instructions do not make allowance for any

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

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:

- 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 of the device, ensure:

- Do not supply the supply pressure connection of the system with aggressive or flammable mediums.
- Do not supply the supply pressure connection with any liquids.
- 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.

NOTE!

Electrostatic sensitive components / modules.

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

- Observe the requirements in accordance with EN 61340-5-1 to 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 INFORMATION

4.1 Contact addresses

Germany

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

International

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

And also on the internet at:

www.burkert.com

5 DESCRIPTION OF SYSTEM

5.1 Structure

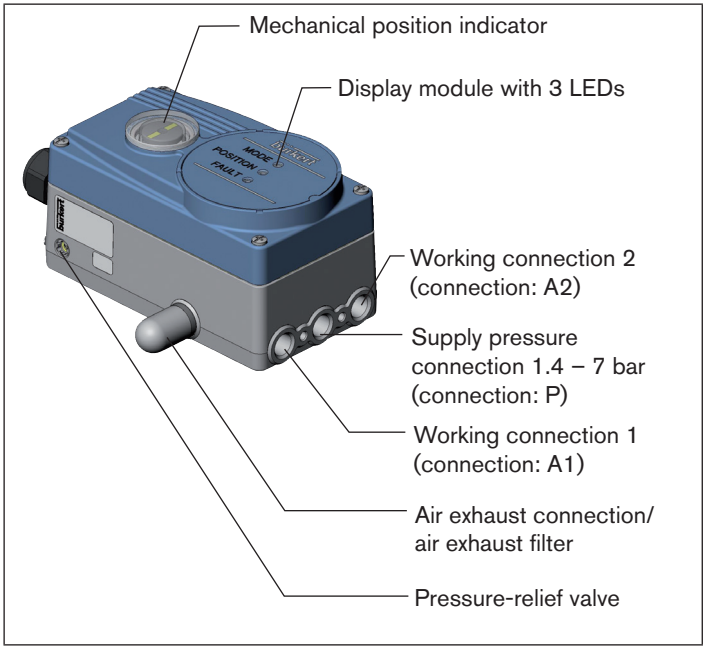


Fig. 1: Structure, positioner Type 8791

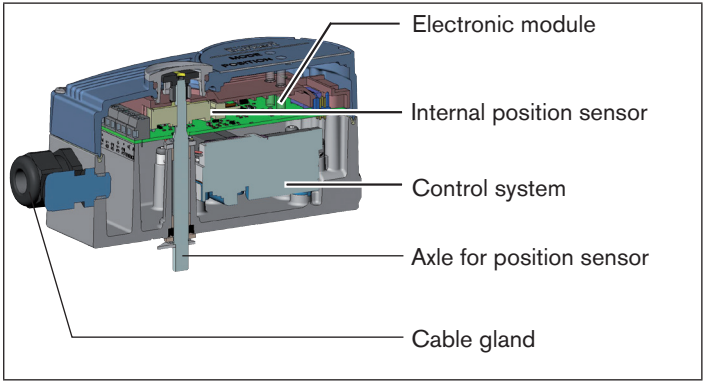


Fig. 2: Structure, positioner Type 8791

5.2 General description

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

- Position sensor
- Electro-pneumatic control system
- Microprocessor electronics

The position sensor measures the current positions of the proportional 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 control system corrects the actual position accordingly.

6 TECHNICAL DATA

6.1 Conformity

In accordance with the EC Declaration of conformity, the positioner Type 8791 is compliant with the EC Directives.

6.2 Standards

The applied standards, which verify conformity with the EC Directives, can be found on the EC-Type Examination Certificate and / or the EC Declaration of Conformity.

6.3 Operating conditions

WARNING!

If used outside, the device may be exposed to direct sunlight and temperature fluctuations which 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.

Environmental temperature	0 to +60 °C
Degree of protection	IP65 / IP67[1)] according to EN 60529 (only if cables, plugs and sockets have been connected correctly)

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.*

6.4 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

6.5 Electrical data

Connections	2 cable glands (M20 x 1.5) with screw-type terminals 0.14 – 1.5 mm² or circular plug-in connector (M12, 8 pole plug)
Interfaces	Communications interface USB: Direct connection to PC via USB adapter. Communication with communications software. An external adapter with integrated interface driver is required.
Supply voltage	24 V DC ± 10 %, max. residual ripple 10%
Power consumption	< 3.5 W
Input resistance for set-point value signal	180 Ω in 0/4 - 20 mA / Resolution 12 bit
Protection class	III in accordance with DIN EN 61140 (VDE 0140-1)
Analog position feedback max. Burden (load) for current output 0/4 – 20 mA)	560 Ω
Inductive proximity switches	100 mA current limit
Binary input	0 – 5 V = log "0", 10 – 30 V = log "1" inverted input in reverse order (input current < 6 mA)

6.6 Electrical data with AS-Interface bus control (optional)

Connections	circular plug-in connector (M12, 4 pole plug)
Supply voltage	29.5 V – 31.6 V DC (according to specification)

Units without external supply voltage:

Max. power consumption	150 mA

Units with external supply voltage:

External supply voltage	24 V ± 10 %, the supply voltage unit must feature a secure disconnection in accordance with IEC 364-4-41 (PELV or SELV)
Max. power consumption	100 mA
Max. power consumption from AS interface	50 mA

6.7 Pneumatic data

Control medium	Quality classes in accordance with ISO 8573-1
Dust content	Class 7, max. particle size 40 µm, max. particle density 10 mg/m³
Water content	Class 3, max. pressure dew point - 20 °C or min. 10 degrees below the lowest operating temperature
Oil content	Class X, max. 25 mg/m³
Temperature range of compressed air	0 – +60 °C
Pressure range	1.4 – 7 bar
Air flow rate	95 l_N / min (at 1.4 bar[2)]) for aeration and deaeration 150 l_N / min (at 6 bar[2)]) for aeration and deaeration (Q_{Nn} = 100 l_N / min (according to definition for pressure drop from 7 to 6 bar absolute).
Connections	Internal thread G1/4“

2) *Pressure specifications: Overpressure with respect to atmospheric pressure*

7 OPERATING

7.1 Operating status

AUTOMATIC (AUTO)

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

→ LED 1 (*MODE*) flashes green.

MANUAL

In MANUAL operating status the valve can be opened and closed manually via the keys.

→ LED 1 (*MODE*) flashes green.

→ LED 3 (*FAULT*) flashes red.

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

7.2 Control and display elements of the positioner

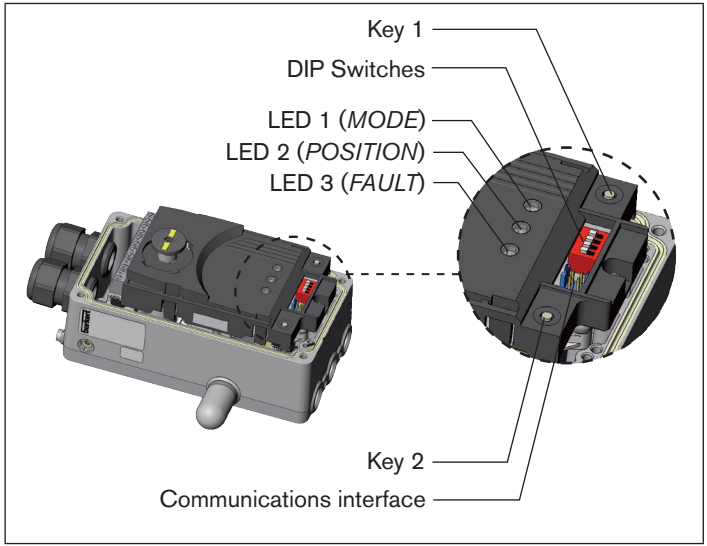


Fig. 3: Description of control elements

The positioner features 2 buttons, 4 DIP switches and 3 LEDs as a display element.

7.2.1 Configuration of the keys

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

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

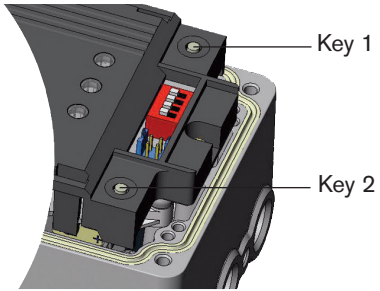


Fig. 4: Description of the buttons

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

Key	Function
1	Aerate[3)] (manually open / close the actuator)[4)]
2	Deaerate[3)] (manually open / close the actuator)[4)]

3) *No function if the binary input was activated with the “MANUAL / AUTOMATIC change-over” via the communications software.*
4) *Depending on the operating principle of the actuator.*

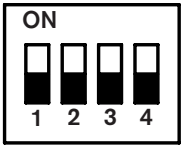
Tab. 1: Configuration of the keys for MANUAL operating status

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

Key	Function
1	Press for 5 seconds to start the *X.TUNE* function
2	-

Tab. 2: Configuration of the keys for AUTOMATIC operating status

7.2.2 Function of the DIP switches



DIP-Switches	Position	Function
1	ON	Reversal of the effective direction of the set-point value (*DIR.CMD*) (set-point value 20 – 4 mA corresponds to position 0 – 100%)
	OFF	Normal effective direction of the set-point value (set-point value 4 – 20 mA corresponds to position 0 – 100%)
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 (Linearization of the operating characteristic *CHARACT*) [6]
	OFF	Linear characteristic
4	ON	MANUAL operating status
	OFF	AUTO AUTOMATIC operating status

5) *Factory setting can be changed via communications software.*
6) *Characteristic type can be changed via communications software.*

Tab. 3: Function of the DIP switches

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 Display of the LEDs

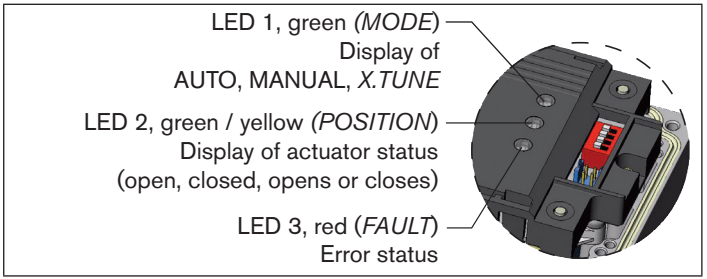


Fig. 5: LED display

LED 1 (green, *MODE*) and LED 3 (red, *FAULT*)

LED Status		Display
green	red	
on	off	Acceleration phase when Power ON
flashing slowly	off	Operating status AUTO
flashing alternating	flashing alternating	Operating status MANUAL
flashing quickly	off	*X.TUNE* function
off	on	FAULT (see chapter “7.3 Error messages”)
flashing slowly	flashing slowly	Operating status AUTO for sensor break detection

Tab. 4: LED Status, LED 1 and LED 2

LED 2 (green / yellow, *POSITION*)

LED-Status		Display
green	yellow	
on	off	Actuator closed
off	on	Actuator open
flashes slowly	off	Constant control deviation (actual value > nominal value)
off	flashes slowly	Constant control deviation (actual value > nominal value)
flashes quickly	off	Closing in operating status MANUAL
off	flashes quickly	Opening in operating status MANUAL

Tab. 5: LED Status, LED 2

7.3 Error messages

7.3.1 Error messages in MANUAL and AUTOMATIC operating status

Display	Cause of fault	Remedial action
LED 3 (red, *FAULT*) on	Checksum error in data memory → Data memory defective → The device automatically switches to an older (possibly not current) data record.	not possible, device defective. Contact your Bürkert sales office.

Tab. 6: Error messages in MANUAL and AUTOMATIC operating status

7.3.2 Error messages while the *X.TUNE* function is running

Display	Cause of fault	Remedial action
LED 3 (red, *FAULT*) on	No compressed air connected	Connect compressed air
	Compressed air failure during the *X.TUNE*	Check compressed air supply
	Actuator or control system deaeration side leaking	not possible, device defective
	Control system aeration side leaking	not possible, device defective
	The angular range of the position sensor exceeds 180°	Correct the attachment of the shaft for the position sensor on the actuator (see chapter “8.2.1” and “8.3.1”).

*Tab. 7: Error messages while the **X.TUNE** function is running*

8 ATTACHMENT AND ASSEMBLY

8.1 Installation of devices for the hazardous area

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

8.2 Attachment to a proportional valve with NAMUR linear actuators

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. 8: Attachment kit for linear actuators”.

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.

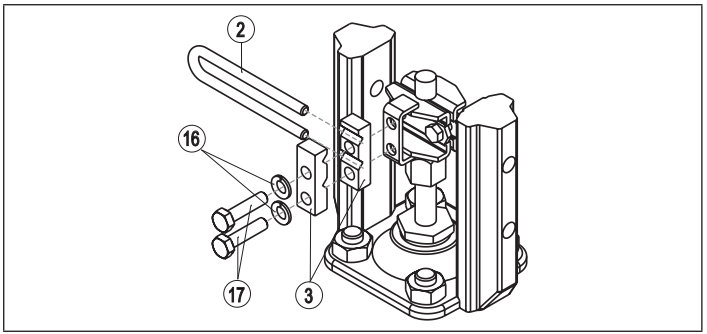


Fig. 6: Attaching the hoop

→ 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. 7").

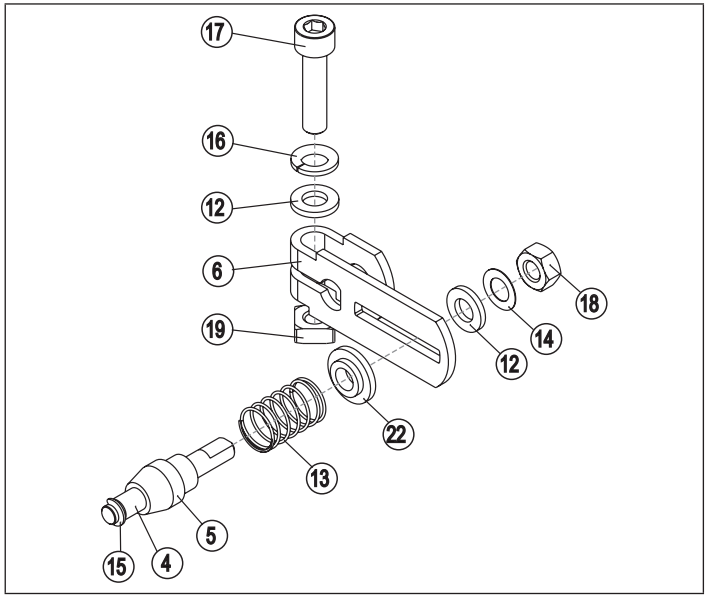


Fig. 7: Assembling the lever

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. 8”).

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 at least 30°.

The rotational movement of the lever must be within the position sensor angular range of 180°.

The scale printed on the lever is not relevant.

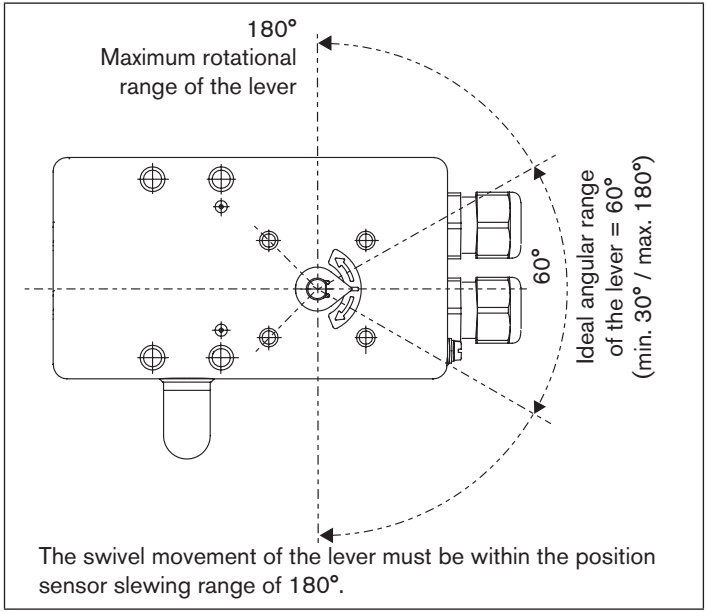


Fig. 8: Rotational range of the lever

→ 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. 9").

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").

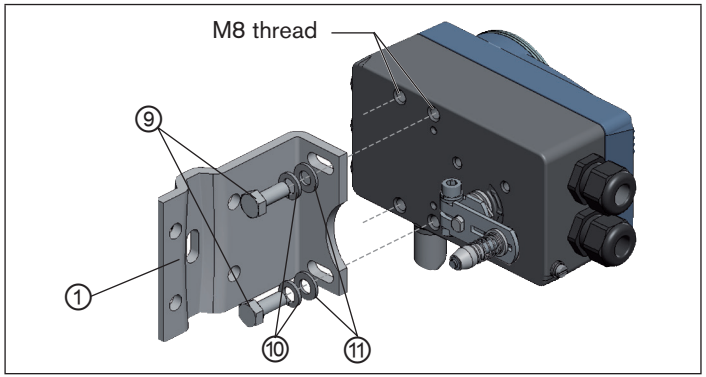


Fig. 9: Attaching mounting bracket

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. 10").

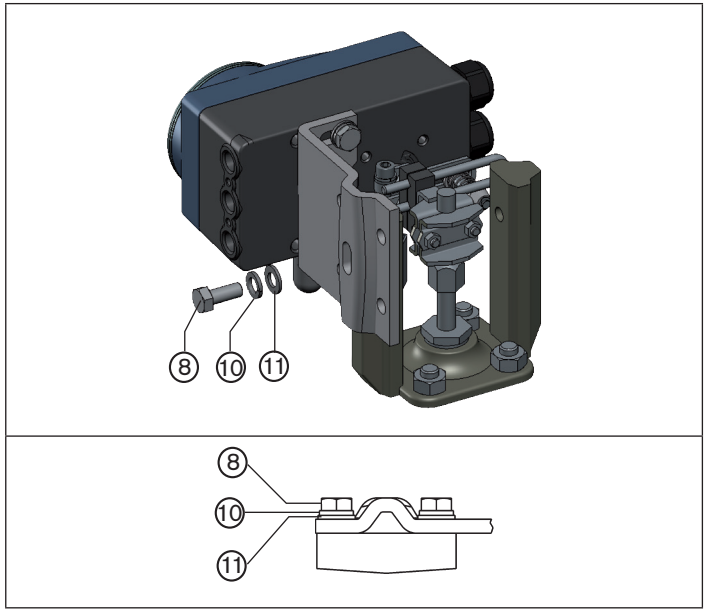


Fig. 10: Attach positioner with mounting bracket; for actuators with cast frame

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. 11").

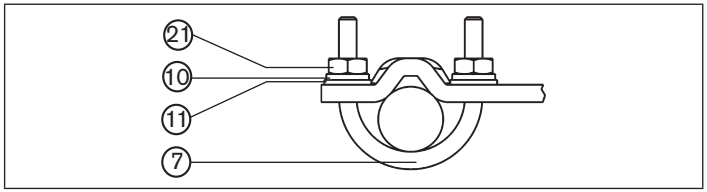


Fig. 11: Attach positioner with mounting bracket; for actuators with columnar yoke

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 proportional 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. 12").

→ 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 axle of the positioner may be moved within this range only.

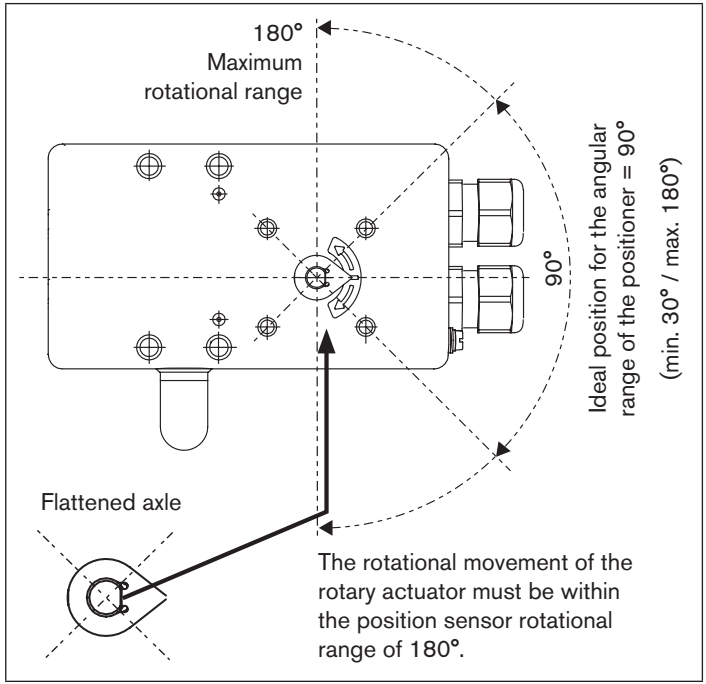
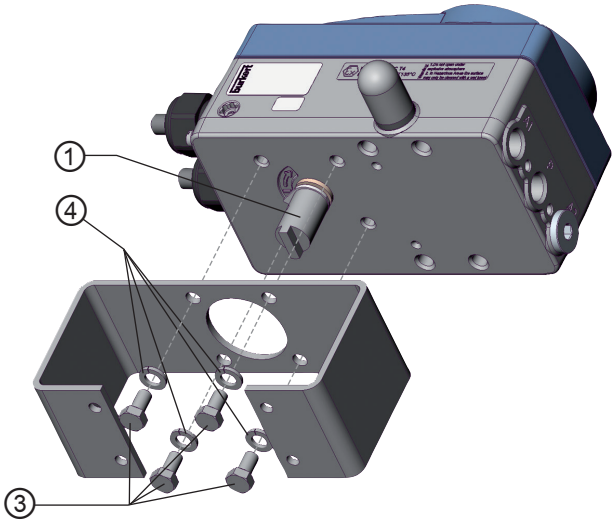


Fig. 12: Angular range / anti-twist safeguard

→ Assemble the multi-part assembly bridge* suitable for the actuator.

→ Attach the assembly bridge to the positioner using 4 cheese-head screws ③ and circlips ④. (see “Fig. 13”).



* The assembly bridge consists of 4 parts which can be adjusted to the actuator by varying the arrangement.

Fig. 13: Attach assembly bridge (schematic representation)

→ Place positioner with assembly bridge on the rotary actuator and attach (see “Fig. 14”).

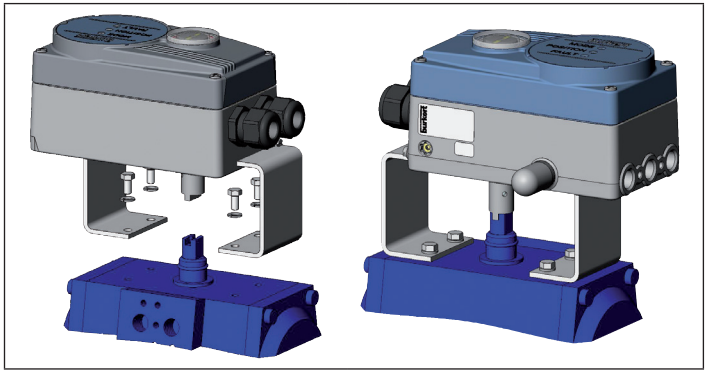


Fig. 14: Rotary actuator attachment

8.4 Remote operation with external position sensor

In the case of this model the positioner has no position sensor in the form of a rotary position sensor, but an external Remote-Sensor.

The Remote-Sensor Type 8798 is connected via a serial, digital interface.

8.4.1 Mounting accessories

There are two options of attaching the positioner in remote operation (see “Fig. 15”).

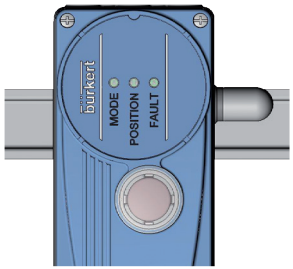
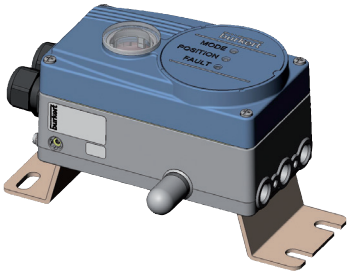
Installation on a DIN rail with accessory kit, part no. 675702	Installation on a wall with accessory kit, part no. 675715
	

Fig. 15: Attachment types in remote operation

8.4.2 Connection and start-up of the Remote-Sensor Type 8798

WARNING!

Risk of injury from improper start-up.

- Start-up 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.

→ Connect the 4 wires of the sensor cable to the designated screw-type terminals of the positioner (see chapter “10.4.5 Terminal assignment for connecting the external position sensor (for remote model only)”).

→ Attach Remote-Sensor on the actuator.
The correct procedure is described in the brief instructions for the Remote-Sensor.

→ Connect positioner pneumatically to the actuator.

→ Connect compressed air to positioner.

→ Switch on supply voltage to the positioner.

→ Run the *X.TUNE* function.

9 FLUID CONNECTION

9.1 Connection of devices for the hazardous area

When connecting devices in the hazardous area, observe the “Additional information for use in the hazardous area“ enclosed with the Ex-devices.

9.2 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.

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.

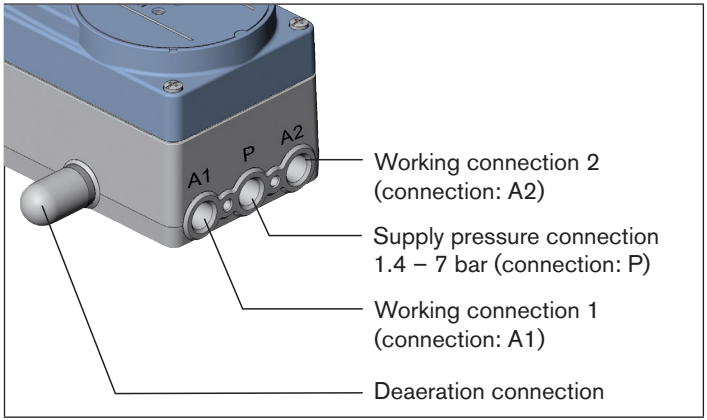


Fig. 16: Fluid installation / Location of the connections

Procedure:

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

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

→ Connect one working connection (A1 or A2, depending on required safety end position) to the chamber of the single-acting actuator.
Safety end positions see chapter “9.3 Safety end positions”.

→ Seal a working connection which is not required with a plug.

For double-acting actuators (control function I):

→ Connect working connections A1 and A2 to the respective chambers of the double-acting actuator.
Safety end positions see chapter "9.3 Safety end positions".

Important information for perfect control behavior.

This ensures that the control behavior is not extremely negatively affected in the upper stroke range on account of too little pressure difference.

- keep the applied supply pressure at least 0.5 – 1 bar above the pressure which is required to move the pneumatic actuator to its end position.

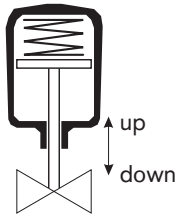
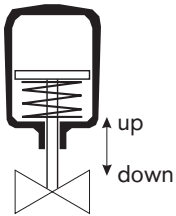
If fluctuations are greater, the control parameters measured with the *X.TUNE* function are not optimum.

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

9.3 Safety end positions

The safety end position after failure of the electrical auxiliary power depends on the fluid connection of the actuator to the working connections A1 or A2.

9.3.1 Single-acting actuators

Actuator system	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 according to "Fig. 17"	down
	up → Connection according to "Fig. 18"	
 Control function B	up → Connection according to "Fig. 17"	up
	down → Connection according to "Fig. 18"	

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

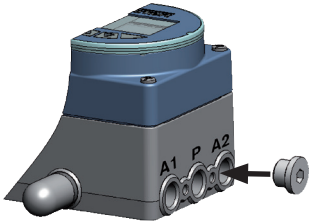
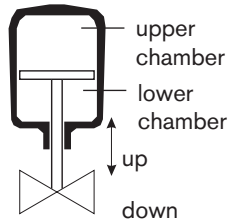
Single-acting actuator - control function A or B	
 Connection: working connection A1 to actuator A2 sealing	 Connection: working connection A2 to actuator A1 sealing

Fig. 17: Connection A1

Fig. 18: Connection A2

9.3.2 Double-acting actuators

Actuator system	Safety end positions after failure of the electrical auxiliary power	Safety end positions after failure of the pneumatic auxiliary power
 Control function I	→ Connection see "Fig. 19"	not defined
	up = lower chamber of the actuator to A2	
	down = upper chamber of the actuator to A2	

Tab. 11: Safety end positions - double-acting actuators

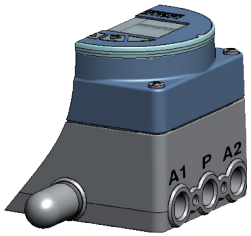
Double-acting actuators - control function I	
	Connection: Working connection A1 and A2 to actuator Safety end position: up = lower chamber to A2 down = upper chamber to A2

Fig. 19: Connection with control function I

10 ELECTRICAL CONNECTION

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

10.1 Connection of devices for the hazardous area

When connecting devices in the hazardous area, observe the "Additional information for use in the hazardous area" enclosed with the Ex-devices.

10.2 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.

10.3 Electrical connection with circular plug-in connector M12, 8-pole

10.3.1 Designation of the circular plug-in connector

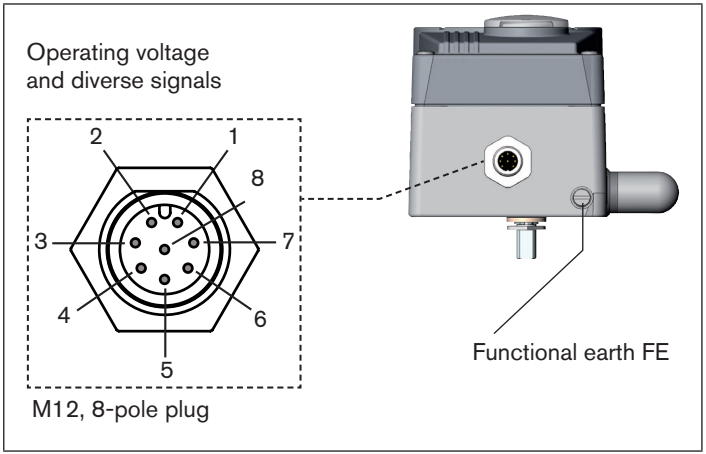


Fig. 20: Designation of the circular plug-in connector and contacts

10.3.2 Pin assignment for operating voltage

Pin	Wire color[7)]	Configuration	External circuit / Signal level
3	green	GND	3 ○ ⊥ 24 V DC ± 10 %
4	yellow	+24 V	4 ○ max. residual ripple 10%

Tab. 12: Pin assignment; operating voltage

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

Pin	Wire color[7)]	Configuration	On the device side	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
5	grey	Binary input	5 ○——	+ < 0 – 5 V (log. 0) / 10 – 30 V (log. 1) with reference to Pin 3 (GND)

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

10.3.4 Pin assignment for output signals to the control centre (e.g. PLC) - required for analogue output option only

Pin	Wire color[7)]	Configuration	On the device side	External circuit / Signal level
8	red	Analogue feedback +	8 ○——	+ (0/4 – 20 mA)
7	blue	Analogue feedback GND	7 ○——	GND (identical with the GND operating voltage)

Tab. 14: Pin assignment; output signals to the control centre

7) *The indicated wire colors refer to the connection cable, part no. 919061, available as an accessory*

10.4 Electrical connection with cable gland

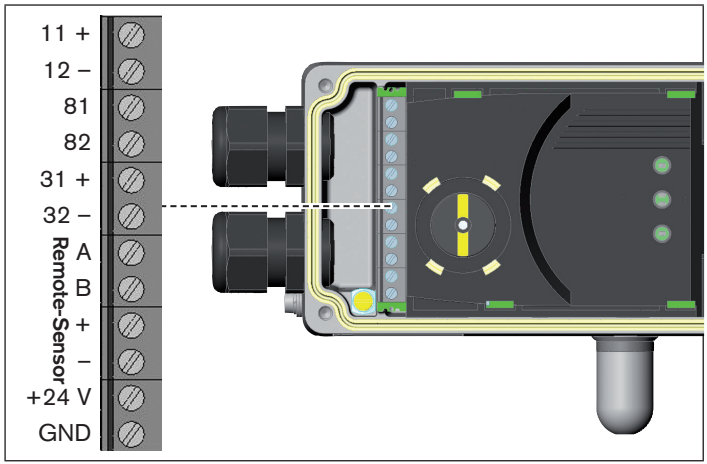


Fig. 21: Designation of the screw-type terminals

10.4.1 Connection of the terminals

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

→ Connect terminals according to the configuration.

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

Terminal	Configuration	On the device side	External circuit / Signal level
11 +	Set-point value +	11 +	+ (0/4 – 20 mA)
12 –	Set-point value GND	12 –	GND set-point value
81 +	Binary input +	81 +	+ 0 – 5 V (log. 0); 10 – 30 V (log. 1)
82 –	Binary input –	82 –	GND (identical with the GND operating voltage)

Tab. 15: Terminal assignment; input signals of the control centre

10.4.3 Terminal assignment for output signals to the control centre (e.g. PLC) - (required for analogue output option only)

Terminal	Configuration	On the device side	External circuit / Signal level
31 +	Analogue feedback +	31 +	+ (0/4 – 20 mA)
32 –	Analogue feedback GND	32 –	GND (identical with the GND operating voltage)

Tab. 16: Terminal assignment; output signals to the control centre

10.4.4 Terminal assignment for operating voltage

Terminal	Configuration	External circuit / Signal level
+24 V	Operating voltage +	+24 V — 24 V DC ± 10 % max. residual ripple 10%
GND	Operating voltage GND	GND

Tab. 17: Terminal assignment; operating voltage

10.4.5 Terminal assignment for connecting the external position sensor (for remote model only)

Terminal	Configuration	On the device side	External circuit / Signal level
S +	Supply sensor +	S +	+
S –	Supply sensor –	S –	–
A	Serial interface, A cable	A	A-line
B	Serial interface, B-cable	B	B-line

Remote Sensor Type 8798[8)]

8) *Assignment of the wire color see "Tab. 19"*

Tab. 18: Terminal assignment; external position sensor

Positioner Terminal	Wire color Remote-Sensor with cable type 1	Wire color Remote-Sensor with cable type 2
S +	brown	brown
S –	white	black
A	green	red
B	yellow	orange

Tab. 19: Assignment of the wire color (Remote-Sensor)

10.5 Electrical installation AS-Interface

A detailed description of the bus communication can be found in the operating instructions Type 8791.

10.5.1 Connection with circular plug-in connector M12 x 1, 4-pole, male

Connector views

The views show the image from the front looking at the pins, the solder connections are behind them.

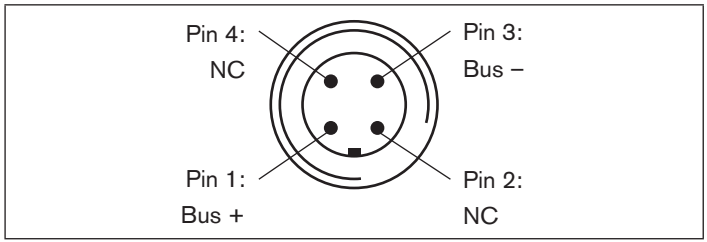


Fig. 22: Bus connection without external supply voltage

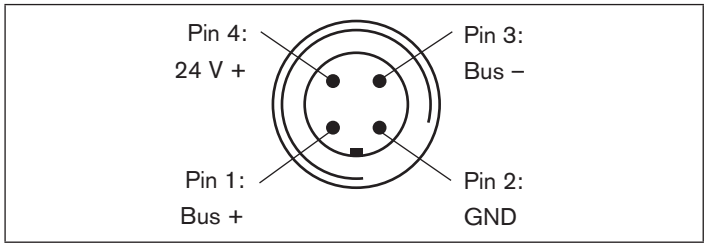


Fig. 23: Bus connection with external supply voltage (optional)

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)

Tab. 20: Pin assignment of circular plug-in connector for AS-Interface

When the supply voltage is applied, the positioner is operating.

→ Actuate the automatic adjustment of the positioner, as described in the chapter entitled "11.2 Specifying the standard settings".

10.5.2 Programming data AS-Interface

	Version Profile S-7.3.4	Version Profile S-7.A.5
I/O configuration	7 hex	7 hex
ID code	3 hex (analog profile)	A hex
Extended ID code 1	F hex (Default value, can be changed by the user)	7 hex
Extended ID code 2	4 hex	5 hex
Profile	S-7.3.4	S-7.A.5

Tab. 21: Programming data

10.6 LED status display AS-Interface

The LED bus status display indicates the status of the AS-Interface (LED green and red).

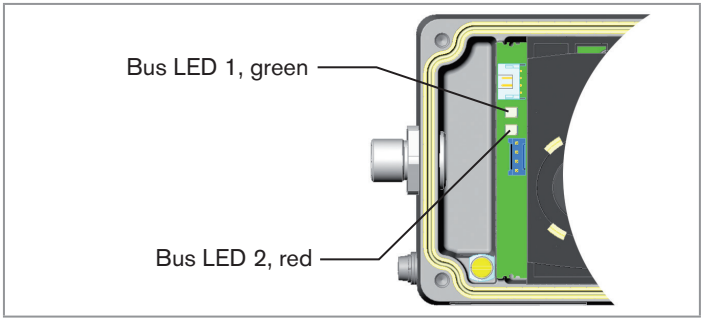


Fig. 24: LED status display (AS-Interface)

Bus LED 1 (green)	Bus LED 2 (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	Electronic error or external reset
flashing	flashing	Timeout bus communication after 100 ms (periphery error)

Tab. 22: LED Status display (AS-Interface)

11 START-UP

11.1 Safety instructions

WARNING!

Risk of injury from improper operation.

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

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

11.2 Specifying the standard settings

The basic settings of the positioner are implemented at the factory.

To adjust the positioner to local conditions, the *X.TUNE* function must be run following installation.

11.2.1 Running the automatic adjustment *X.TUNE*:

WARNING!

While the *X.TUNE* function is running, the valve automatically moves from its current position.

- Never run *X.TUNE* while a process is running.
- Take appropriate measures to prevent the equipment from being accidentally actuated.

NOTE!

Avoid maladjustment of the controller due to an incorrect supply pressure or applied operating medium pressure.

- Run *X.TUNE* **whenever** the supply pressure (= pneumatic auxiliary energy) is available during subsequent operation.
- Run the *X.TUNE* function preferably **without** operating medium pressure to exclude interference caused by flow forces.

To run *X.TUNE*, the positioner must be in the AUTOMATIC operating status
(DIP switch 4 = OFF).

→ Start *X.TUNE* by pressing button 1 for 5 sec [9].

While *X.TUNE* is running, LED 1 flashes very quickly (green).

When the automatic adjustment has completed, LED 1 flashes slowly (green) [10].

The changes are automatically transferred to the memory (EEPROM) only when the *X.TUNE* function is successful.

If LED 3 (red) is lit after the *X.TUNE* function started, the *X.TUNE* function was ended due to a fault.

→ Check possible faults
(see "Tab. 7: Error messages while the X.TUNE function is running").

→ Then repeat the *X.TUNE* function.

9) *The X.TUNE can also be started via communications software.*
10) *If a fault occurs, LED 3 is lit red.*

12 ACCESSORIES

Designation	Order no.
USB adapter for connection to a PC in conjunction with an extension cable	227093
Communicator / PACTware and DTM	Information at www.burkert.com

Tab. 23: Accessories

12.1 Communications software

The PC operating program "Communicator" is designed for communication with the devices from the Bürkert positioner family. Devices constructed since August 2014 support the full range of functions. If you have any questions regarding compatibility, please contact the Bürkert Sales Center.

A detailed description and precise schedule of the procedure for the installation and operation of the software can be found in the associated documentation.

12.2 USB interface

The PC requires an USB interface for communication with the positioners as well as an additional adapter with interface driver (see "Tab. 23").

12.3 Download

Download the software at: www.burkert.com

13 PACKAGING, TRANSPORT, STORAGE

NOTE!

Transport damages.

Inadequately protected equipment may be damaged during transport.

- During transportation protect the device against moisture and dirt in shock-resistant packaging.
- Follow the allowable storage temperature.

Incorrect storage may damage the device.

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

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

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

bürkert
FLUID CONTROL SYSTEMS

www.burkert.com

MAN 1000122866 ML Version: HStatus: RL (released | freigegeben) printed: 22.09.2017