

Type 8792, 8793 REV.2

Electropneumatic positioner and process controller
Elektropneumatischer Positioner und Prozessregler
Positionneur et régulateur de process électropneumatique



Quickstart

English Deutsch Français

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Technische Änderungen vorbehalten.
Sous réserve de modifications techniques.

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Operating Instructions 2212/02_EU-ML_00810647 / Original DE

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1 QUICKSTART

The Quickstart 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 “Intended use”.

- ▶ Quickstart must be read and understood.

Quickstart for Type 8792/8793 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 8792/8793. These instructions also include the warranty provisions and details about the correct disposal of the device.



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

www.burkert.com

1.1 Definition of term “device”

The term “device” used in these instructions always stands for the Type 8792/8793 REV.2.

2 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 a serious or fatal injury.



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.



Important tips and recommendations.



refers to information in these operating instructions or in other documentation.

- ▶ designates instructions for risk prevention.

→ designates a procedure which you must carry out.

3 INTENDED USE

Incorrect use of the Type 8792 and 8793 can be dangerous to people, nearby equipment and the environment.

The device is designed for pneumatic actuators of process valves for the control of media.

- ▶ In the potentially explosive area use only devices with the Ex additional type label.
- ▶ For use in the potentially explosive area follow the ATEX additional instructions and the instructions on the Ex additional type label.
- ▶ The device must not be exposed to direct sunlight.
- ▶ Pulsating direct voltage (rectified alternating voltage without smoothing) must not be used as operating voltage.
- ▶ 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 “7 Technical Data” in this manual and in the valve manual 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 device is suitable for the specific application case and check this out if required.
- ▶ Correct transportation, correct storage and installation and careful use and maintenance are essential for reliable and faultless operation.
- ▶ Use the Type 8792 and 8793 only as intended.

4 BASIC SAFETY INSTRUCTIONS

These safety instructions do not make allowance for any

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



Danger – high pressure.

- ▶ Before loosening the pneumatic lines and valves, turn off the pressure and vent the pneumatic lines.

Risk of electric shock.

- ▶ Before reaching into the device or the equipment, switch off the operating voltage 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 authorised technicians only and with the appropriate tools.
- ▶ After an interruption in the operating voltage 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.

- ▶ 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.
- ▶ The general rules of technology apply to application planning and operation of the device.

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 operating voltage is present.

5 GENERAL INFORMATION

5.1 Scope of supply

Generally the product package consists of:
Type 8792/8793 and the associated Quickstart



We will provide you with attachment kits for linear actuator or rotary actuators as accessories.
For the multi-pole version of the Type 8792/8793 we will provide you with cable connectors as accessories.

If there are any discrepancies, please contact us immediately.

5.2 Contact address

Germany

Bürkert Fluid Control Systems
Chr.-Bürkert-Str. 13-17
D-74653 Ingelfingen
E-mail: info@burkert.com

International

Contact addresses can be found on the final pages of the printed Quickstart.

And also on the internet at:

www.burkert.com

5.3 Warranty

The warranty is only valid if the Type 8792/8793 are used as intended in accordance with the specified application conditions.

5.4 Master code

Operation of the device can be locked via a freely selectable user code. In addition, there is a non-changeable master code with which you can perform all operator actions on the device. This 4-digit master code can be found on the last pages of the printed Quickstart which are enclosed with each device.

If required, cut out the code and keep it separate from these instructions.

5.5 Information on the Internet

The operating instructions and data sheets for Type 8792 and 8793 can be found on the Internet at:

www.burkert.com

6 DESCRIPTION OF SYSTEM

6.1 General description

The positioner Type 8792 / process controller Type 8793 is a digital, electro-pneumatic positioner for pneumatically actuated continuous 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 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 positioner/process controller. If there is a control difference, the electro-pneumatic control system corrects the actual position accordingly.

6.2 Variants

6.2.1 Type 8792, positioner

The position of the actuator is regulated according to the position set-point value. The position set-point value is specified by an external standard signal (or via field bus).

6.2.2 Type 8793, process controller

Type 8793 also features a PID controller which, apart from actual position control, can also be used to implement process control (e.g. level, pressure, flow rate, temperature) in the sense of a cascade control.

The process controller is linked to a control circuit. The position set-point value of the valve is calculated from the process set-point value and the actual process value via the control parameters (PID controller). The process set-point value can be set by an external signal.

6.2.3 Type 8793 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.

! Depending on the connection type of the position sensor, Type 8793 functions as a process controller or positioner (positioner)

The following connection options are possible:

Function	Interface	Position sensor	Setting in the menu (ADD.FUNCTION)
Process controller Type 8793	digital (serial)	Remote Sensor Type 8798	POS.SENSOR → DIGITAL
Positioner Type 8793	analog (4...20 mA)*	Any, high-resolution position sensor	POS.SENSOR → ANALOG

Tab. 1: Connection options Type 8793 with external position sensor

! * If the position sensor is connected to the process controller Type 8793 via the analog interface, it can be operated only as a positioner (positioner).

6.3 Structure of the device

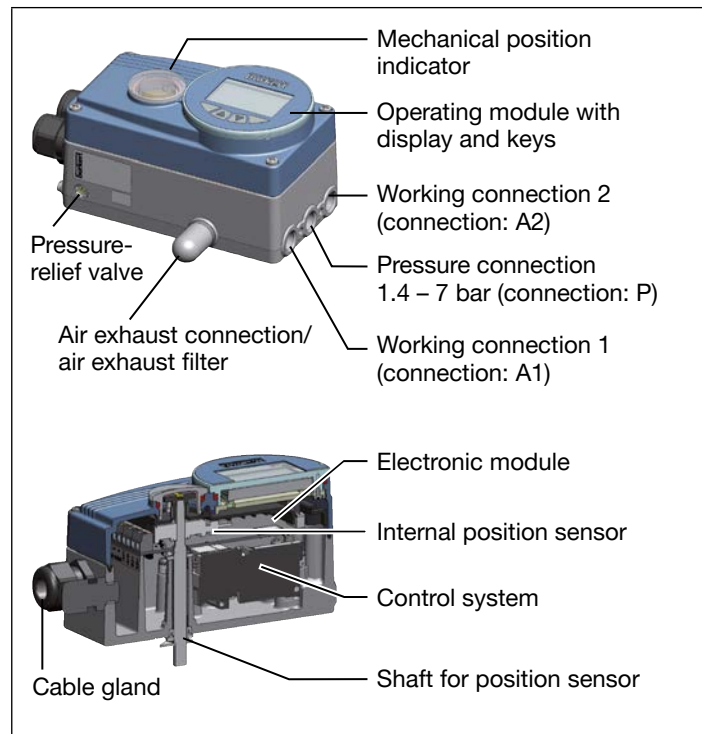


Fig. 1: Structure Type 8792/8793

7 TECHNICAL DATA

7.1 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.

7.2 Approval

According to Device Group II Category 3G/D, the product is approved for use in potentially explosive areas of Zones 2 and 22.



Follow instructions for use in potentially explosive areas. See additional instructions ATEX.

7.3 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 -10 – +60 °C

Operating altitude up to 2000 m above sea level

Degree of protection: IP65 / IP67* according to EN 60529 (only if cables, plugs and sockets have been connected correctly).

7.4 Type label

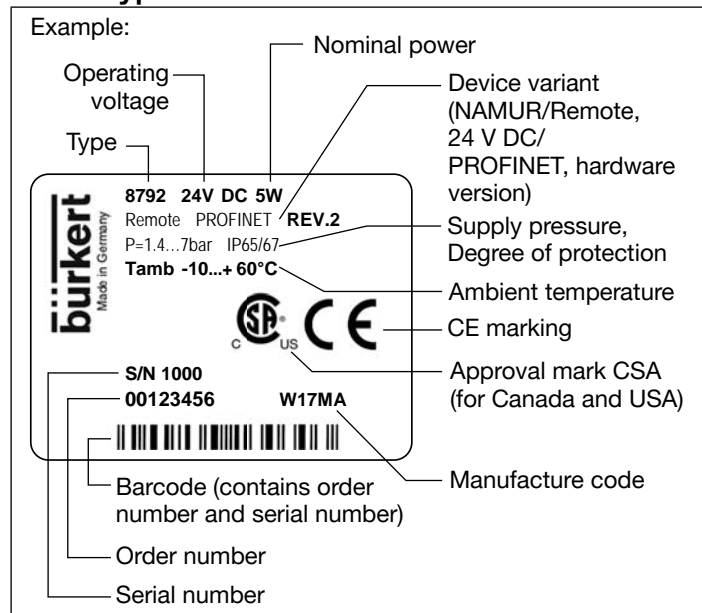


Fig. 2: Description type label (example)

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

7.5 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

Mass approx. 1.0 kg

7.6 Electrical data

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

Operating voltage 24 V DC \pm 10% max. residual ripple 10%

Power consumption < 5 W

Input data for actual value signal

4 – 20 mA Input resistance 70 Ω
 Resolution 12 bit

Frequency Measuring range 0 – 1000 Hz
 Input resistance 20 k Ω
 Resolution 1‰ of measurement
 value,
 Input signal > 300 mV_{ss}
 Signal form Sine, rectangle, triangle

Pt 100 Measuring range -20 – +220 °C
 Resolution < 0,1 °C
 Measurement current < 1 mA

Input data for set-point value signal

0/4 – 20 mA Input resistance 70 Ω
 Resolution 12 bit

0 – 5/10 V Input resistance 22 k Ω
 at 0 – 5 V only 11 bit
 Resolution 12 bit

Analogue feedback max. current

10 mA
 (for voltage output 0 – 5/10 V)

Burden (load) 0 – 560 Ω
 (for voltage output 0/4 – 20 mA)

Inductive proximity switches

100 mA current limit

Binary outputs

galvanically isolated

Current limiting 100 mA, output is clocked if overload
 occurs

Binary input

0 – 5 V = logical “0”, 10 – 30 V = logical “1”
 logic invertible in software
 Input current approx. 10 mA at 24 V DC

Communication interface

connection to PC via USB-büS-interface

Communications software

Bürkert Communicator (see “Accessories”)

7.7 Pneumatic data

Control medium	Air, neutral gases Quality classes in accordance with ISO 8573-1
Dust content	Quality class 7, max. particle size 40 µm, max. particle density 10 mg/m ³
Water content	Quality class 3, max. pressure dew point -20 °C or min. 10 degrees below the lowest operating temperature
Oil content	Quality class X, max. 25 mg/m ³
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*) for aeration and deaeration 150 l _N / min (at 6 bar*) 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

* Pressure specifications: overpressure with respect to atmospheric pressure

8 OPERATION

8.1 Description of the operating and display elements

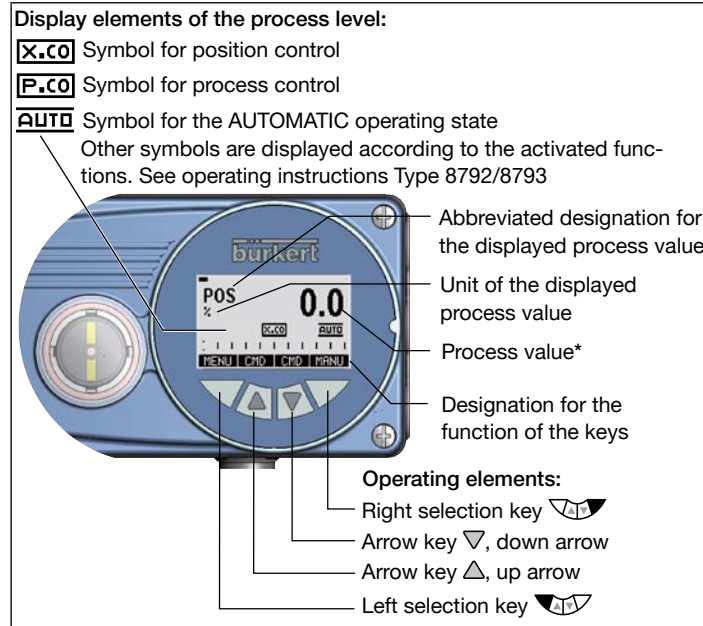


Fig. 3: Display elements of the process level; operating elements

* The process values which can be displayed in the AUTOMATIC operating state depend on type. See operating instructions for Type 8792/8793.

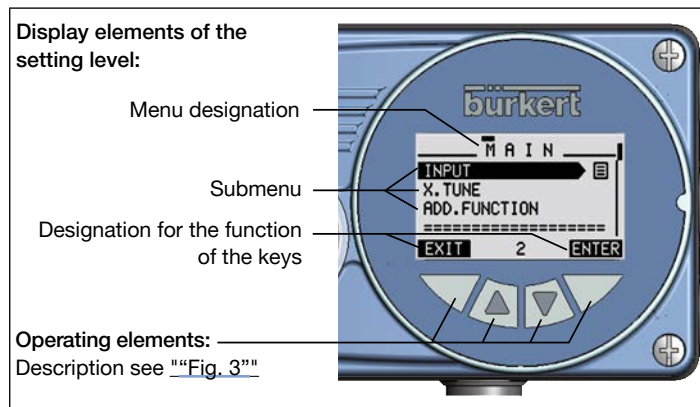


Fig. 4: Display elements of the setting level

The display is adjusted to the set functions and operating levels. In principle, a distinction can be made between the display view for the process level and the setting level.

When the operating voltage has been applied, the process level is displayed.




8.1.1 Flashing of the display background lighting


Flashing is used to localize the device in a network. It is activated when selecting the device in the Bürkert Communicator or when requested via a fieldbus.




8.2 Function of the keys


The function of the 4 keys in the control field differs depending on the operating state (AUTOMATIC or MANUAL) and operating level (process level or setting level).

The key function which is active is displayed in the gray text field which is above the key.

Key function on the process level:			
Key	Key function	Description of the function	Operating state
Arrow key 	OPN (OPEN)	Manual opening of the actuator	MANUAL
		Change the displayed value (e.g. POS-CMD-TEMP-...)	AUTOMATIC
Arrow key 	CLS (CLOSE)	Manual closing of the actuator	MANUAL
		Change the displayed value (e.g. POS-CMD-TEMP-...)	AUTOMATIC
Selection key 	MENU	Change to the setting level Note: Press key for approx. 3 s.	AUTOMATIC or MANUAL

Key function on the process level:			
Key	Key function	Description of the function	Operating state
Selection key 	AUTO	Return to AUTOMATIC operating state	MANUAL
	MANU	Change to MANUAL operating state	AUTOMATIC

Key function on the setting level:		
Key	Key function	Description of the function
Arrow key 		Scroll up in the menus
	+	Increase numerical values
Arrow key 		Scroll down in the menus
	-	Decrease numerical values
	< -	Change by one digit to the left; when entering numerical values
Selection key 	EXIT (BACK)	Return to the process level
		Gradually return from a submenu option
	ESC	Leave a menu
	STOP	Stop a sequence

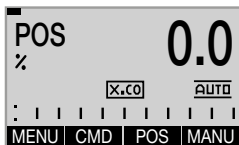
Key function on the setting level:		
Key	Key function	Description of the function
Selection key 	ENTER SELEC OK INPUT	Select, activate or deactivate a menu option
	EXIT (BACK)	Gradually return from a submenu option
	RUN	Start a sequence
	STOP	Stop a sequence

Tab. 2: Function of the keys

9 OPERATING STATES

Type 8792/8793 has 2 operating states:
AUTOMATIC and MANUAL.

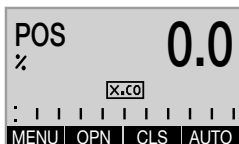
AUTOMATIC



In the AUTOMATIC operating state normal controlled operation is implemented.

(The symbol for AUTOMATIC **AUTO** is shown on the display. A bar runs along the top of the display).



MANUAL



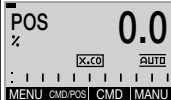
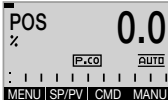
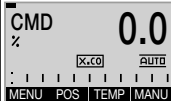
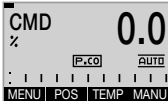
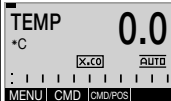
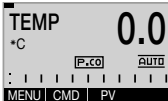
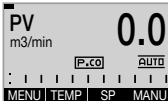

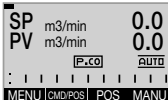
In the MANUAL operating state the valve can be manually opened or closed via the arrow keys \triangle ∇ (key function **OPN** and **CLS**).

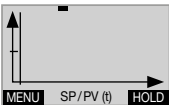
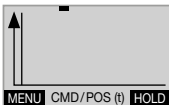

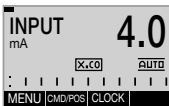



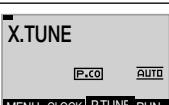
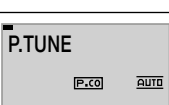
(The symbol for the AUTOMATIC **AUTO** is hidden. No bar running along the top of the display).


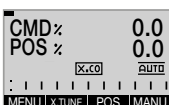
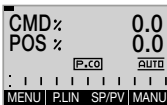
9.1 Changing the operating state

Change to MANUAL operating state (only available for process value display: POS, CMD, PV, SP)	MANU	 press
Return to AUTOMATIC operating state	AUTO	 press

9.2 Displays in the AUTOMATIC operating state

Type 8792	Description of the display	Type 8793
	Actual position of the valve actuator (0 – 100%)	
	Set-point position of the valve actuator (0 – 100%)	
	Internal temperature in the housing of the positioner (°C)	
	Process actual value	
	Process set-point value	
	Simultaneous display of the set-point position and the actual position of the valve actuator (0 – 100 %)	

Type 8792	Description of the display	Type 8793
	Graphical display of <i>SP</i> and <i>PV</i> with time axis	
	Graphical display of <i>POS</i> and <i>CMD</i> with time axis	
	Input signal for set-point position (0 – 5/10 V / 0/4 – 20 mA)	
	Time, weekday and date	
	Automatic adjustment of the positioner (positioner)	
	Automatic optimization of the process controller parameters	

Type 8792	Description of the display	Type 8793
	Automatic linearization of the process characteristics	
	Simultaneous display of the set-point position and the actual position of the valve actuator (0 – 100 %)	

10 OPERATING LEVELS

There is the process level and the setting level for the operation and setting of Type 8792/8793.

Process level:

The running process is displayed and operated on this level.

Operating state: AUTOMATIC – Displays of the process data
 MANUAL – Manual opening and closing of the valve

Setting level:

The basic settings for the process are made on this level.

- Inputting the operating parameters
- Activating auxiliary functions



If the device is in the AUTOMATIC operating state when changing to the setting level, the process continues running during the setting.

11 ATTACHMENT AND ASSEMBLY

11.1 Installation of devices for the Ex area

When installing devices in the potentially explosive atmosphere, observe the “ATEX additional instructions” enclosed with the Ex-devices.

11.2 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 pusher actuators can be purchased from Bürkert as an accessory by quoting order number 787215. For associated parts see “Tab. 3”.

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

Part no.	Quantity	Name
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. 3: Attachment kit for linear actuators

11.2.1 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.

Procedure:

- Using the clamping pieces ③, hexagon bolts ⑰ and circlips ⑱ attach the hoop ② to the actuator spindle.

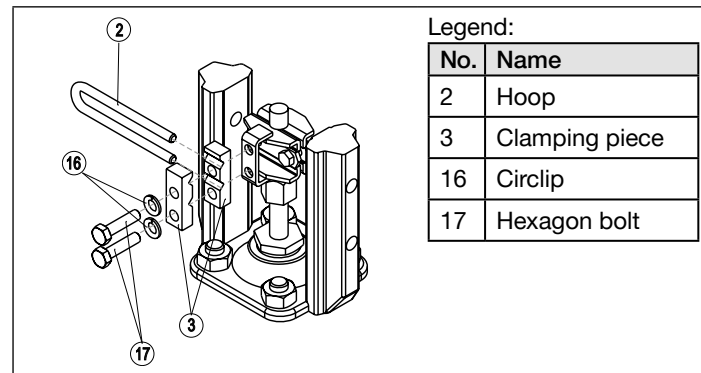


Fig. 5: Attaching the hoop

- Select short or long lever according to the stroke of the actuator. (see ["Tab. 3: Attachment kit for linear actuators"](#)).
- Assemble lever (if not pre-assembled) (see ["Fig. 6"](#)).

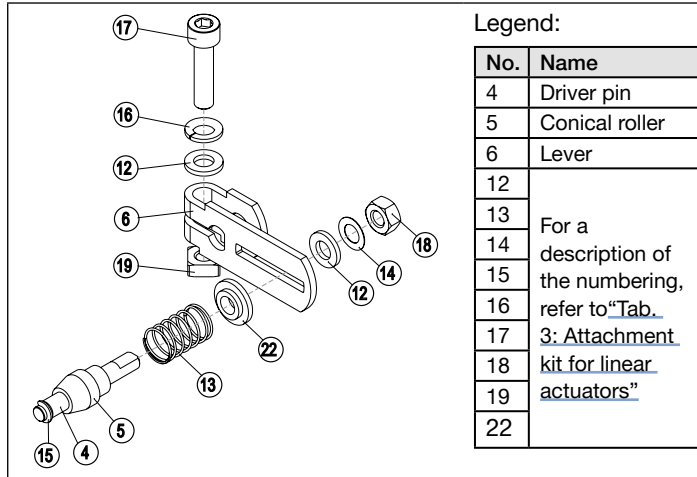


Fig. 6: Assembling the lever

! The gap between the driver pin and the shaft should be the same as the actuator stroke. As a result, the lever has a swing range of 60° (see ["Fig. 7"](#)).

Rotation range of the position sensor:

The maximum rotation range of the position sensor is 180°.



Swing range of the lever:

To ensure that the position sensor operates at a good resolution, the swing range of the lever must be at least 30°.

The swing movement of the lever must be within the position sensor rotation range of 180°.

The scale printed on the lever is not relevant.

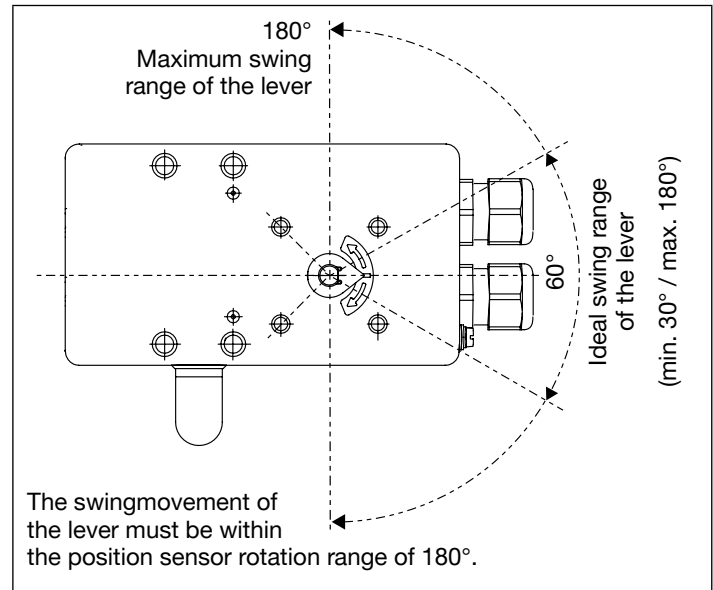


Fig. 7: Swing range of the lever

11.2.2 Attaching mounting bracket

- Attach mounting bracket ① to the back of the Type 8792/8793 with hexagon bolts ⑨, circlip ⑩ and washers ⑪ (see “Fig. 8”).



The selection of the M8 thread used on the Type 8792/8793 depends on the size of the actuator.

- To determine the correct position, hold the Type 8792/8793 with mounting bracket on the actuator.

The conical roller ⑤ on the lever ⑥ of the position sensor must be able to move freely in the hoop (refer “Fig. 8”) along the entire stroke range of the actuator.

At 50% stroke the lever position should be approximately horizontal (see chapter “11.2.3 Aligning lever mechanism”).

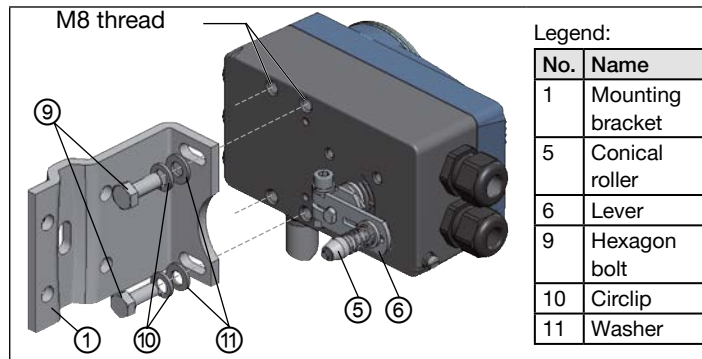


Fig. 8: Attaching mounting bracket

Attaching the Type 8792/8793 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. 9”).

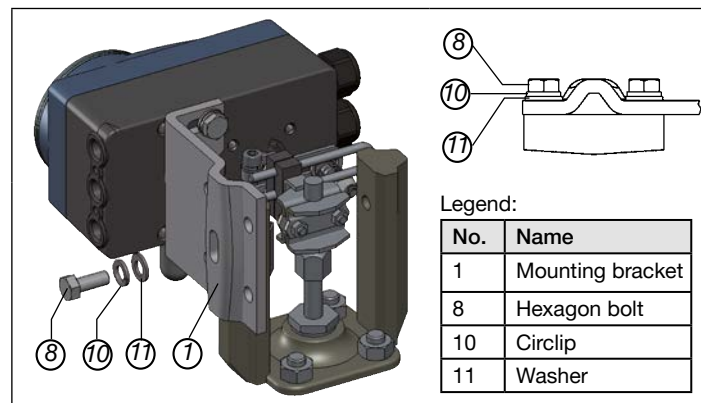


Fig. 9: Attach Type 8792/8793 with mounting bracket; for actuators with cast frame

Attaching the Type 8792/8793 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. 10”).

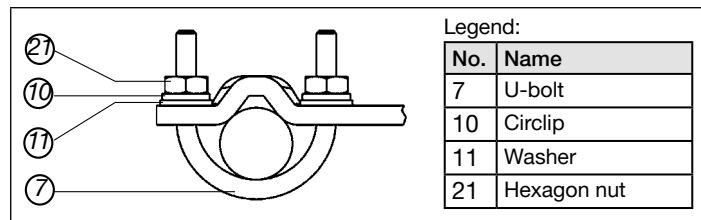


Fig. 10: Attach Type 8792/8793 with mounting bracket; for actuators with columnar yoke

11.2.3 Aligning lever mechanism

! The lever mechanism cannot be correctly aligned until the device has been connected electrically and pneumatically.

- Move the actuator in MANUAL operating state to half stroke (according to the scale on the actuator).
- Adjust the height of the Type 8792/8793 until the lever is horizontal.
- Fix the Type 8792/8793 in this position on the actuator.

11.3 Attachment to a continuous valve with rotary actuator

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

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

! The attachment kit for rotary actuators can be purchased from Bürkert as an accessory by quoting order number 787338. For associated parts see “Tab. 4”.

Part no.	Quantity	Name
1	1	Adapter
2	2	Setscrew DIN 913 M4 x 10
3	4	Hexagon bolt DIN 933 M6 x 12
4	4	Circlip B6
5	2	Hexagon nut DIN985, M4

Tab. 4: Mounting kit on rotary actuator



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 Type 8792/8793:
 - parallel to the actuator or
 - rotated by 90° to the actuator.
- Determine home position and direction of rotation of the actuator.
- Connect adapter to the shaft of the Type 8792/8793 and secure with 2 setscrews.



Anti-twist safeguard:

Note the flat side of the shaft.

One of the setscrews must be situated on the flat side of the shaft as an anti-twist safeguard (see "Fig. 11").

Rotation range of the position sensor:

The maximum rotation range of the position sensor is 180°. The shaft of the Type 8792/8793 may be moved within this range only.

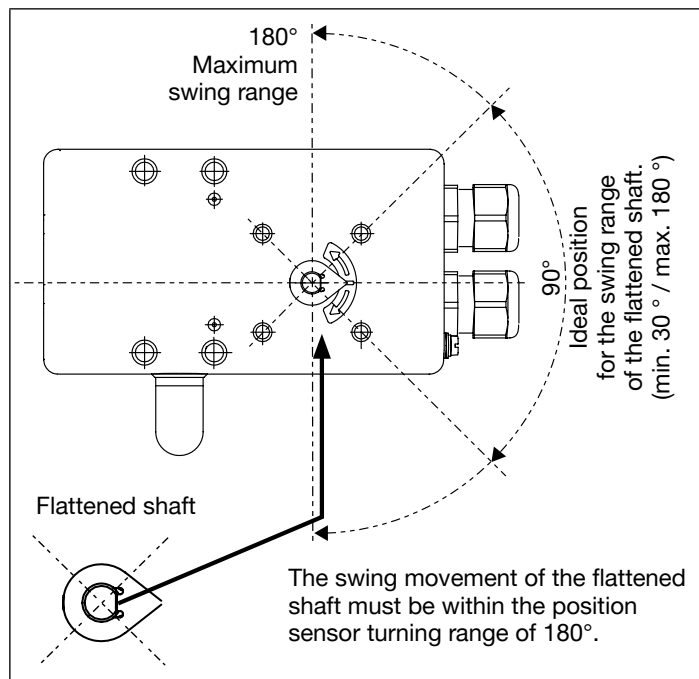


Fig. 11: Rotation range / anti-twist safeguard

Type 8792, 8793 REV.2

Attachment and assembly

- Assemble the multi-part assembly bridge* suitable for the actuator.
- Attach the assembly bridge to the Type 8792/8793 using 4 hexagon bolts ③ and circlips ④ (see “Fig. 12”).

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

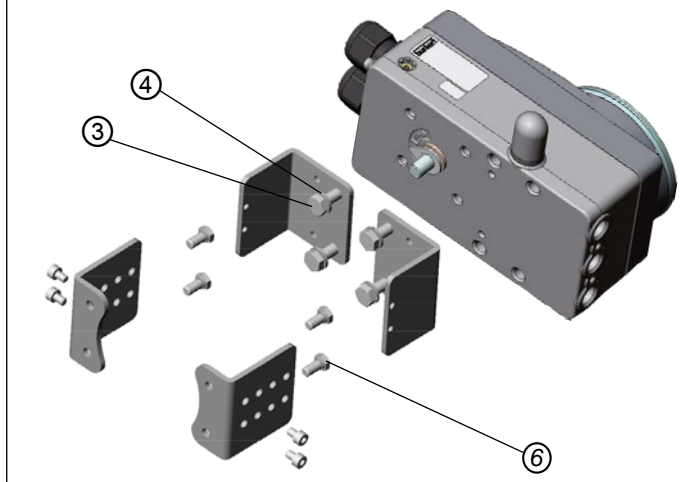


Fig. 12: Attach assembly bridge (schematic representation)

- Place Type 8792/8793 with assembly bridge on the rotary actuator and attach using 4 hexagon bolts ⑥ (see “Fig. 13”).

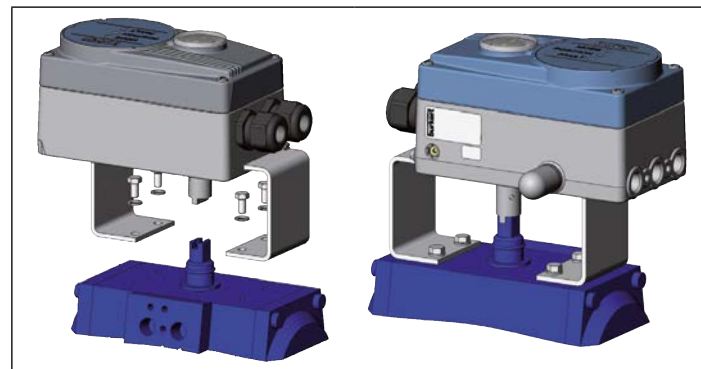


Fig. 13: Rotary actuator attachment



If the X.TUNE ERROR 5 message is indicated on the graphics display after the X.TUNE function starts, the shaft of the Type 8792/8793 is not correctly aligned with the shaft of the actuator.

- Check alignment (as described previously in this chapter).
- Then repeat the X.TUNE function.

12 EXTERNAL POSITION SENSOR (REMOTE)

! Depending on the connection type of the position sensor, Type 8793 functions as a process controller or positioner (positioner)

The following connection options are possible:

Device type Remote	Interface	Position sensor	Setting in the menu (ADD.FUNCTION)
Type 8792	digital (serial)	Remote Sensor Type 8798	–
Type 8793			POS.SENSOR → DIGITAL
Type 8793	analog (4 – 20 mA) *	Any, high-resolution position sensor	POS.SENSOR → ANALOG

Tab. 5: Connection options of position sensor

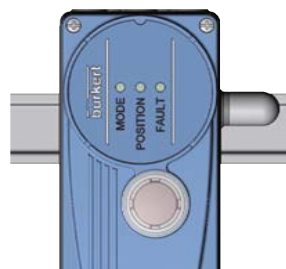
! * If the position sensor is connected to the process controller Type 8793 via the analog interface, it can be operated only as a positioner (positioner).

12.1 Mounting accessories

There are two options of attaching the Type 8792/8793 in remote operation.

- **Installation on a standard rail**
Holder for standard rail mounting: Order number 675702
- **Installation on a wall**
Bracket for wall mounting: Order number 675715

Installation on a standard rail



Installation on a wall

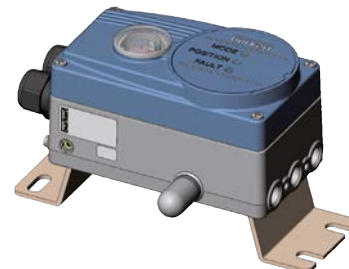


Fig. 14: Attachment types in remote operation

12.2 Connection and starting up of the external position sensor (remote operation)



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.

12.2.1 Remote Sensor Type 8798

- Connect the 3 or 4 wires of the sensor cable to the designated screw-type terminals of Type 8792/8793.

Connection of screw-type terminals: (see chapter [“14.6.4 Terminal assignment for external position sensor \(for remote variant only\)”](#)).

Connection of M8 circular connector

(only for EtherNET/IP, PROFINET, Modbus TCP and bÜS): see chapter [“16.3.2 X4: M8 socket, 4-pin, optional - Remote sensor \(for remote variant only\)”](#) or [“17.2.5 X4: M8 socket, 4-pin, optional - Remote sensor \(for remote variant only\)”](#)

- Attach remote sensor on the actuator.
The correct procedure is described in the brief instructions for the remote sensor.
- Connect compressed air to Type 8792/8793.
- Connect Type 8792/8793 pneumatically to the actuator.
- Switch on operating voltage to the Type 8792/8793.
- Run the X.TUNE function.

12.2.2 Position sensor (for Type 8793 remote model only)



When a 4 – 20 mA position sensor is connected, the process controller Type 8793 can be used as a positioner (positioner) only, as the process actual value input is used as input for the position sensor.

In principle, any position sensor with a 4 – 20 mA output can be connected which has an adequate resolution of the path signal.

Good control properties are obtained if the resolution of the position sensor allows at least 1000 measuring steps over the path to be measured.

Example: Position sensor with 150 mm measurement range
Of which used measurement range (= stroke) 100 mm
Required minimum resolution of the position sensor:

$$\frac{100 \text{ mm}}{1000 \text{ Steps}} = 0.1 \text{ mm}$$

- Connect 4 – 20 mA position sensor to the terminals 1 – 4 of the process controller Type 8793 remote variant (see chapter [“14.7.1 Terminal assignments of the process actual value input”](#)).

Internal supply of the position sensor by Type 8793:

→ Connection according to input type “4 – 20 mA - internally supplied”.

Separate supply of the position sensor:

→ Connection according to input type “4 – 20 mA - externally supplied”.

- Attach remote sensor on the actuator.
The correct procedure is described in the instructions for the position sensor.
- Connect compressed air to the Type 8793.
- Connect Type 8793 pneumatically to the actuator
- Switch on Type 8793 operating voltage.
- To obtain the best possible control precision, adjust the position sensor so that path to be measured corresponds to the signal range 4 – 20 mA (only if the position sensor includes this function).
- In the *ADD.FUNCTION* menu activate the *POS.SENSOR* function. Then select *POS.SENSOR* in the main menu and set *ANALOG*.
The procedure is described in the operating instructions for Type 8792/8793 in the chapter *“Starting up and operation of the process controller / auxiliary functions / POS.SENSOR”*.
- Run the *X.TUNE* function.

13 PNEUMATIC CONNECTION



DANGER

Risk of injury from high pressure in the equipment.

- ▶ Before loosening the pneumatic lines and valves, turn off the pressure and vent the pneumatic 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.

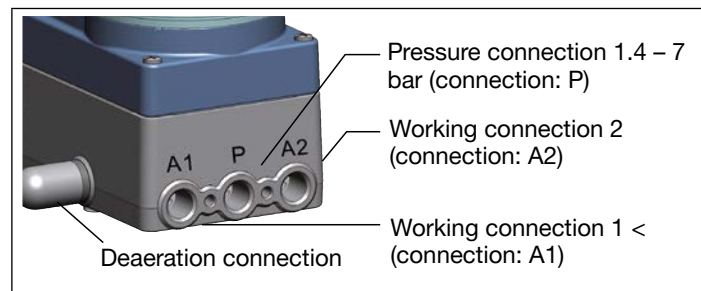


Fig. 15: Pneumatic installation / Location of the connections

Procedure:

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

For single-acting actuators (control function A and 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 [“13.1.1”](#).

→ 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 [“13.1.2”](#).

**Important information for perfect control behaviour!**

This ensures that the control behaviour 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.

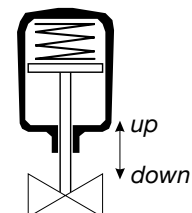
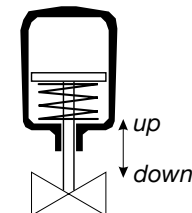
If fluctuations are greater, the control parameters measured with the *X.TUNE* function are not optimum.

→ During operation keep the fluctuations of the supply pressure as low as possible (max. $\pm 10\%$).

13.1 Safety end positions

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

13.1.1 Single-acting actuators

Actuator system	Safety end positions after failure of the	
	electrical auxiliary power	pneumatic auxiliary power
 Control function A	down → Connection according to “Fig. 16”	down
	up → Connection according to “Fig. 17”	
 Control function B	up → Connection according to “Fig. 16”	up
	down → Connection according to “Fig. 17”	

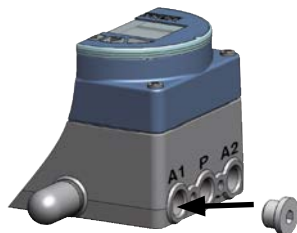
Tab. 6: Safety end positions - single-acting actuators

Single-acting actuators - control function A or B



Connection:
working connection A1
to actuator
A2 sealing

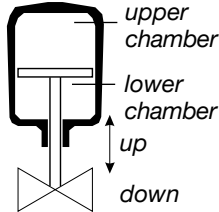
Fig. 16: Connection A1



Connection:
working connection A2
to actuator
A1 sealing

Fig. 17: Connection A2

13.1.2 Double-acting actuators

Actuator system	Safety end positions after failure of the	
	electrical auxiliary power	pneumatic auxiliary power
 <p>Control function I</p>	→ Connection according to "Fig. 18"	not defined
	up = lower chamber of the actuator to A2	
	down = upper chamber of the actuator to A2	

Tab. 7: 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. 18: Connection with CFI

14 ELECTRICAL INSTALLATION WITHOUT FIELDBUS

14.1 Electrical installation with circular connectors



DANGER

Risk of injury due to electrical shock.

- ▶ Before reaching into the device or the equipment, switch off the operating voltage 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.

14.2 Designation of the circular connectors and contacts

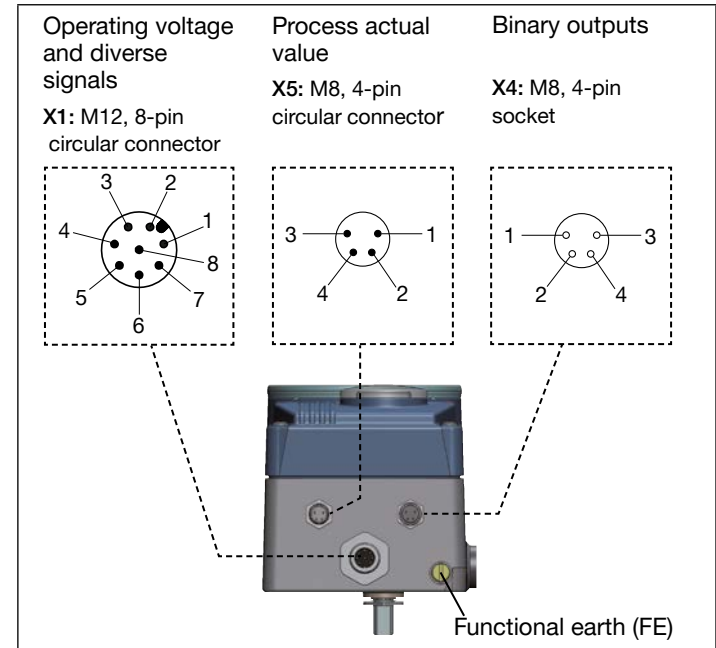


Fig. 19: Designation of the circular connectors and contacts

14.2.1 Location of the switch

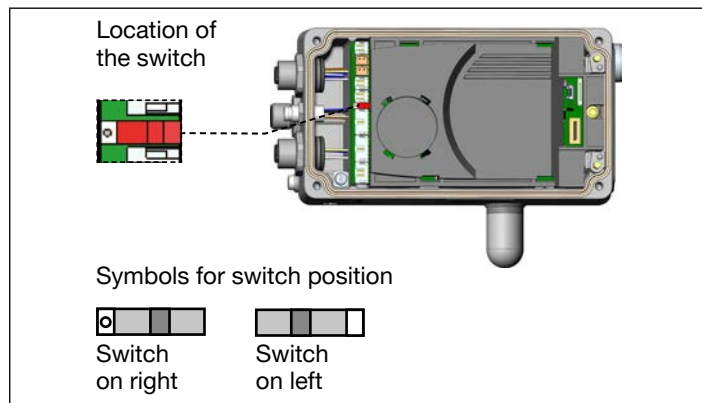






Fig. 20: Location of the switch; Symbols for switch position

14.3 Connection of the positioner Type 8792

→ Connect pins according to the model (options) of the positioner.




14.3.1 X1: M12, 8-pin circular connector

Pin	Configuration	On the device side	External circuit/ Signal level
Input signals of the control centre (e.g. PLC)			
1	(white)* Set-point value + (0/4...20 mA or 0...5/10 V)	1	+ (0/4 – 20 mA or 0 – 5/10 V) completely galvanically isolated
2	(brown)* Set-point value GND	2	GND set-point value
5	(grey)* Binary input	5	+ $\begin{cases} 0 - 5 \text{ V} \\ (\text{logical } 0) \\ 10 - 30 \text{ V} \\ (\text{logical } 1) \end{cases}$
6	(pink)* Binary input GND	6	GND (identical with the GND operating voltage)

Pin	Configuration	On the device side	External circuit/ Signal level
Output signals to the control centre (e.g. PLC) - (only used for analog output option)			
8	(red)* Analogue feedback +	8 	+ (0/4–20 mA or 0–5/10 V) completely galvanically isolated
7	(blue)* Analogue feedback GND	7 	GND Analogue feedback
Operating voltage			
3	(green)* GND	3  4 	24 V DC $\pm 10\%$ max. residual ripple 10 %
4	(yellow)* +24 V		
* The wire colours indicated in brackets refer to the connection cable, order no. 919267, available as an accessory.			

Tab. 8: Pin assignment; X1 - M12, 8-pin circular connector

14.3.2 X4: M8, 4-pin socket (for binary outputs option only) output signals to the control centre (e.g. PLC)

Pin	Configuration	On the device side	External circuit / Signal level
1	Binary output 1	1 	0 – 24 V
2	Binary output 2	2 	0 – 24 V
3	Binary output GND	3 	GND (identical with the GND operating voltage)

Tab. 9: Pin assignment; X4 - M8, 4-pin socket - output signals to the control centre


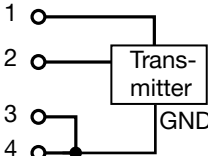

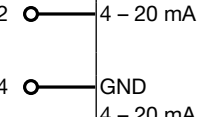
When the operating voltage is applied, the positioner is operating.


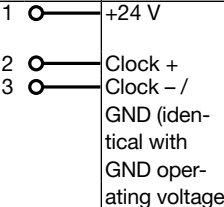

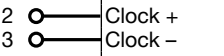

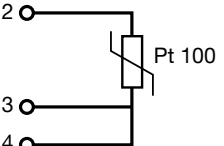
→ Now make the required basic settings and actuate the automatic adjustment of the positioner. The procedure is described in chapter “15.2 Start-up Type 8792”.

14.4 Connecting the process controller Type 8793

→ First connect the process controller as described in chapter
“14.3 Connection of the positioner Type 8792”.

14.4.1 X5: M8, 4-pin circular connector, process actual value input

Input type ²⁾	Pin	Configuration ¹⁾	Switches	On the device side	External circuit
4 – 20 mA - internally supplied	1 2 3 4	(brown) +24 V transmitter supply (white) Output from transmitter (blue) GND (identical with GND operating voltage) (black) Bridge to GND (Pin 3)	 Switch on left		
4 – 20 mA - externally supplied	1 2 3 4	(brown) not used (white) Process actual + (blue) not used (black) Process actual –	 Switch on right		

Input type ²⁾	Pin	Configuration ¹⁾	Switches	On the device side	External circuit
Frequency -internally supplied	1 2 3 4	(brown) +24 V sensor supply (white) clock input (blue) clock input – (GND) (black) not used	 Switch on left		
Frequency - externally supplied	1 2 3 4	(brown) not used (white) clock input + (blue) clock input – (black) not used	 Switch on right		
Pt 100 (see infor- mation*)	1 2 3 4	(brown) not used (white) process actual 1 (power supply) (blue) process actual 3 (GND) (black) Process actual 2 (compensation)	 Switch on right		

1) The wire colours indicated in brackets refer to the connection cable, order no. 918718, available as an accessory.
2) Can be adjusted via software (see operating instructions, chapter “Basic setting of the process controller”).

Tab. 10: Pin assignment; X5, M8, 4-pin circular connector - process actual value input



* Connect the Pt 100 sensor via 3 cables for cable compensation reasons. It is essential to bridge terminal 3 and terminal 4 on the sensor.

When the operating voltage is applied, the process controller is operating.

→ Now make the required basic settings and actuate the automatic adjustment of the process controller. The procedure is described in chapter “15.3 Start-up Type 8793”.

14.4.2 Switch position (only Type 8793)

For the “internally supplied” input type, the GND signal of the process actual value must be connected to the GND signal of the operating voltage. A bridge is established internally between both GND signals.

Supplied	Assignment	Switch position
Internally supplied	GND process actual value equal to GND operating voltage	Switch on left
Externally supplied	GND process actual value electrically isolated from GND operating voltage	Switch on right

Tab. 11: Switch position

14.5 Electrical installation with cable gland



DANGER

Risk of injury due to electrical shock.

- ▶ Before reaching into the device or the equipment, switch off the operating voltage 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.



Using the 4 – 20 mA set-point value input

If several devices of Type 8792/8793 are connected in series and the power supply to a device in this series connection fails, the input of the failed device becomes highly resistive.

As a result, the 4 – 20 mA standard signal fails.

In this case please contact Bürkert Service directly.

14.5.1 Connection PCB of the Type 8792/8793 with screw-type terminals

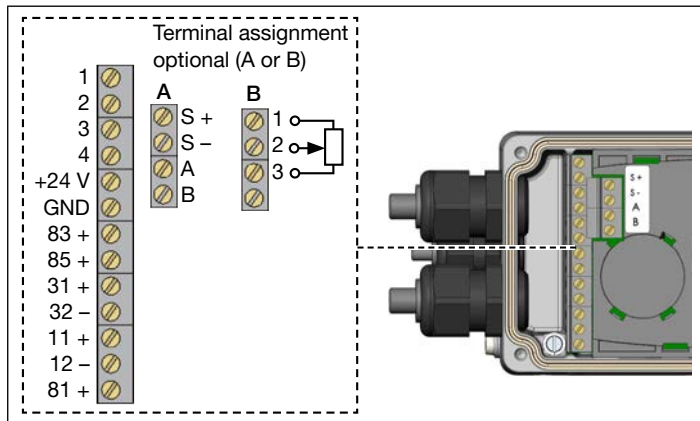





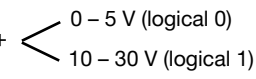
Fig. 21: Designation of the screw-type terminals

Procedure:

- Unscrew the 4 screws on the housing cover and remove the cover.
The screw-type terminals are now accessible.
- Connect Type 8792/8793.
The procedure is described in the following chapters.

14.6 Terminal assignment for cable gland - positioner Type 8792





14.6.1 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 or 0 – 5/10 V) completely galvanically isolated
12 –	Set-point value GND	12 – 	GND Set-point value
81 +	Binary input +	81 + 	+  specific to operating voltage GND (terminal GND)

Tab. 12: Terminal assignment; input signals of the control centre



14.6.2 Output signals to the control centre (e.g. PLC) (required for analogue output and/or binary output option only)

→ Connect terminals according to the model (options) of the positioner.

Terminal	Configuration	On the device side	External circuit / Signal level
83 +	Binary output 1	83 + 	24 V / 0 V, NC / NO specific to operating voltage GND (terminal GND)
85 +	Binary output 2	85 + 	24 V / 0 V, NC / NO specific to operating voltage GND (terminal GND)
31 +	Analogue feedback +	31 + 	+ (0/4 – 20 mA or 0 – 5/10 V) completely galvanically isolated
32 –	Analogue feedback GND	32 – 	GND Analogue feedback

Tab. 13: Terminal assignment; output signals to the control centre

14.6.3 Operating voltage





Terminal	Configuration	On the device side	External circuit / Signal level
+24 V	Operating voltage +	+24 V 	24 V DC $\pm 10\%$ max. residual ripple 10 %
GND	Operating voltage GND	GND 	

Tab. 14: Terminal configuration; operating voltage

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

Connection of the digital, contact-free position sensor

Type 8798:


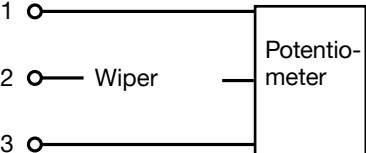


Terminal	Configuration	On the device side	External circuit / Signal level
S +	Supply sensor +	S + 	<div> Remote Sensor Type 8798 For assignment of the wire color see "Tab. 16" </div>
S –	Supply sensor –	S – 	
A	Serial interface A-line	A 	
B	Serial interface B-line	B 	

Tab. 15: Terminal configuration; position sensor Type 8798

Positioner Terminal	Wire color Type 8798	
	Cable type 1	Cable type 2
S +	brown	brown
S –	white	black
A	green	red
B	yellow	orange

Tab. 16: Assignment of the wire color, position sensor Type 8798

Connection of a potentiometric position sensor:

Terminal	Configuration	On the device side	External circuit
	Potentiometer 1	1	
	Wiper 2	2	
	Potentiometer 3	3	

Tab. 17: Terminal assignment; potentiometric position sensor

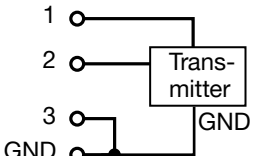
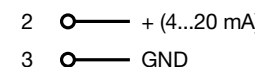
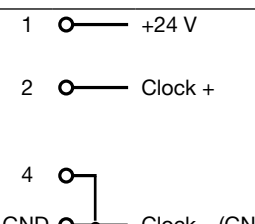
When the operating voltage is applied, the positioner is operating.



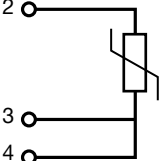
→ Now make the required basic settings and actuate the automatic adjustment of the positioner. The procedure is described in chapter [“15.2 Start-up Type 8792”](#)

14.7 Terminal assignment for cable gland - process controller Type 8793

→ First connect the process controller as described in chapter [“14.6 Terminal assignment for cable gland - positioner Type 8792”](#).

14.7.1 Terminal assignments of the process actual value input

Input type ³⁾	Terminal	Configuration	On the device side	External circuit
4 – 20 mA - internally supplied	actual value	1		
		2		
		3		
		4		
	GND	GND from operating voltage		
4 – 20 mA - externally supplied	actual value	1		
		2		
		3		
		4		
Frequency -internally supplied	actual value	1		
		2		
		3		
		4		
	GND	GND from operating voltage		

Input type ³⁾	Terminal	Configuration	On the device side	External circuit
Frequency - exter- nally supplied	actual value	1	not used	
		2	Clock input +	2  — Clock +
		3	not used	
		4	Clock input -	4  — Clock -
Pt 100 see infor- mation*	actual value	1	not used	
		2	Process actual 1 (Power supply)	 Pt 100
		3	Process actual 3 (GND)	
		4	Process actual 2 (Compensation)	

3) Can be adjusted via software (see operating instructions, chapter “Basic setting of the process controller”).

Tab. 18: Terminal assignments of the process actual value input



* Connect the Pt 100 sensor via 3 cables for cable compensation reasons.
It is essential to bridge terminal 3 and terminal 4 on the sensor.

When the operating voltage is applied, the process controller is operating.

→ Now make the required basic settings and actuate the automatic adjustment of the process controller. The procedure is described in chapter ["15.3 Start-up Type 8793"](#).

15 START-UP

15.1 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.

15.2 Start-up Type 8792

15.2.1 Specifying the standard settings



The basic settings are made on the setting level.
To change from the process to the setting level, press the **MENU** key for approx. 3 seconds.








You must make the following basic settings for starting up:

- Setting the input signal (INPUT)
- Automatic adjustment of the positioner (X.TUNE)

Setting the input signal (INPUT)

This setting is used to select the input signal for the set-point value.

Set the input signal as follows:

-  Press **MENU** for 3 s. Switching from process level ⇒ setting level.
-  Select **INPUT**.
-  Select **ENTER**. The possible input signals for **INPUT** are displayed.
-  Select input signal (4–20 mA, 0–20 mA, ...). Select.
-  Select **SELECT**. The selected input signal is now marked by a filled circle ●.
-  Select **EXIT**.
Return to the main menu (MAIN).
-  Select **EXIT**. Switching from setting level ⇒ process level.
- ✓ You have set the input signal.



WARNING

Danger due to the valve position changing when the X:TUNE function is run.

When the X:TUNE function is run under operating pressure, there is an acute risk of injury.

- ▶ *Never run X:TUNE while the process is running.*
- ▶ *Secure system from unintentional activation.*

NOTE

An incorrect supply pressure or incorrectly connected operating medium pressure may cause the controller to be wrongly adjusted.

- ▶ Run X:TUNE in each case at the supply pressure available in subsequent operation (= pneumatic auxiliary power).
- ▶ Run the X:TUNE function preferably **without** operating medium pressure to exclude interference due to flow forces.




The following functions are actuated automatically:

- Adjustment of the sensor signal to the (physical) stroke of the actuator used.
- Determination of parameters of the PWM signals to control the solenoid valves integrated in Type 8792/8793.
- Setting of the controller parameters of the positioner. Optimization occurs according to the criteria of the shortest possible transient time with simultaneous freedom from overshoot.



To stop X:TUNE, press the left or right selection key **STOP**.

Automatically adjust the position controller as follows:


-  Press **MENU** for 3 s. Switching from process level ⇒ setting level.
-  Select X:TUNE.
-  Select **RUN**. Hold down as long as countdown (5 ...) is running.
During the automatic adjustment messages are displayed

indicating the progress of the *X.TUNE*

(e.g. “*TUNE #1....*”).

When the automatic adjustment ends, the message “X.TUNE READY” is indicated.

→ Select any key. Return to the main menu (MAIN).

→  Select **EXIT**. Switching from setting level \Rightarrow process level.

✓ You have automatically adjusted the position controller.



You have to exit the main menu by pressing the left selection key **EXIT** before the modified data is saved in the memory (EEPROM).

15.3 Start-up Type 8793

To be able to operate the positioner as a process controller, perform the following steps:


1. Setting up the positioner:

Description see [“15.2.1 Specifying the standard settings”](#)


2. Setting up the process controller:

→ Enter the *P.CONTROL* auxiliary function into the main menu (MAIN) via the configuration menu (*ADD.FUNCTION*).

Activate the process controller as follows:


→  Press **MENU** for 3 s. Switching from process level \Rightarrow setting level.

→  Select *ADD.FUNCTION*.

→  Select **ENTER**. The possible auxiliary functions are displayed.

→  Select *P.CONTROL*.

→  Select **ENTER**. *P.CONTROL* is now marked by a cross .


→  Select **EXIT**. Acknowledgment and simultaneous return to the main menu (MAIN).


P.CONTROL is now activated and incorporated into the main menu.


✓ You have activated the process controller.

15.3.1 Basic settings of the process controller


Set up the process controller as follows:

→  Press **MENU** for 3 s. Switching from process level \Rightarrow setting level.

→  Select *P.CONTROL*. Selection in the main menu (MAIN).

→  Select **ENTER**. The submenu options for the basic setting are displayed.


→  Select *SETUP*.


→  Select **ENTER**. The menu for setting up the process controller is displayed.
Setting up is described in the operating instructions.


→  Select **EXIT**. Return to *P.CONTROL*.


✓ You have set up the process controller.


Parameterize the process controller as follows:

→  Press **MENU** for 3 s. Switching from process level ⇒ setting level.


→  Select *P.CONTROL*. Selection in the main menu (MAIN).


→  Select **ENTER**. The submenu options for the basic setting are displayed.

→  Select *PID.PARAMETER*.

→  Select **ENTER**. The menu for parameterizing the process controller is displayed.
Parameterization is described in the operating instructions.

→  Select **EXIT**. Return to *P.CONTROL*.

→  Select **EXIT**. Return to the main menu (MAIN).


→  Select **EXIT**. Switching from setting level ⇒ process level.

✓ You have parameterized the process controller.

<i>PID.PARAMETER</i>	Parameter settings of the process controller
DBND 0,1 %	Insensitivity area of the PID process controller
KP 0,00	Amplification factor of the process controller
TN 0,5	Reset time
TV 0,0	Hold-back time
X0 0,0 %	Operating point
FILTER 0	Filtering of the process actual value input

<i>SETUP</i>	Setting up the process controller:
PV-INPUT	Indication of the signal type for process actual value
PV-SCALE	Scaling the process controller
SP-INPUT	Type of the set-point value default (internal or external)
SP-SCALE*	Scaling the positioner (for external set-point value default only)
P.CO-INIT	Enables a smooth switchover between AUTOMATIC and MANUAL operating state

Tab. 19: Basic settings of the process controller

 Parameters can be set automatically with the aid of the *P.TUNE* function (description see “Operating instructions for Type 8792/8793”).

15.3.2 Manually changing the process set-point value

Procedure:

1. Set the set-point value default on the setting level:

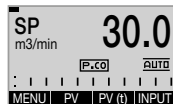
In the main menu (MAIN) select the **P.CONTROL** function



→ Return to the process level via the **EXIT** button (press 4 x).

2. Manually change the process set-point value on the process level:

→ Using the arrow keys Δ ∇ , select the display for the process set-point value (SP).



→ Press the **INPUT** button.

→ Input process set-point value (as described in the image on the right).

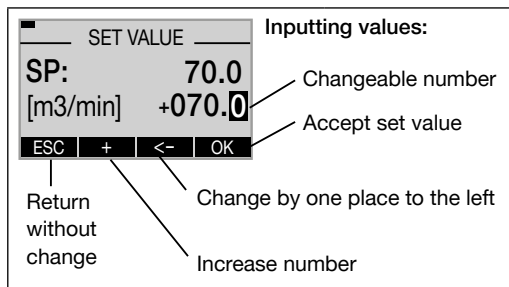


Fig. 22: Inputting values

16 ETHERNET/IP, PROFINET AND MODBUS TCP

The quickstart describes only the electrical installation of Type 8792, 8793 and the specification of the basic settings.



The settings for the bus communication via the BUS. COMM menu are described in the operating instructions of Type 8792, 8793.

16.1 Connection diagram Type 8792

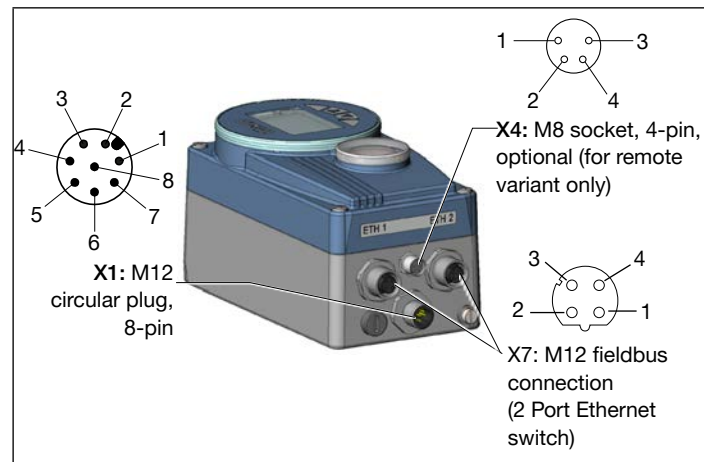


Fig. 23: Fieldbus connection, positioner Type 8792

16.2 Connection diagram Type 8793

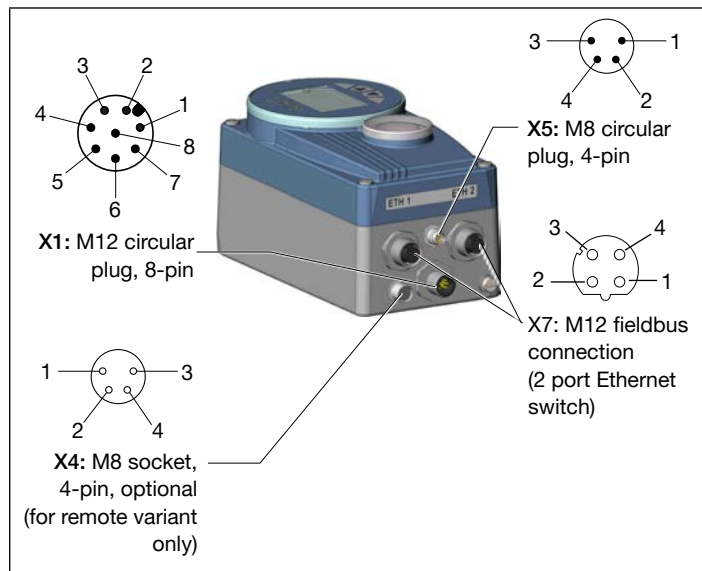


Fig. 24: Fieldbus connection, process controller Type 8793

16.3 Electrical Installation EtherNet/IP, PROFINET, Modbus TCP



DANGER

Risk of injury due to electric shock.

- Before reaching into the system, switch off the power supply and secure to prevent reactivation.
- Observe the applicable accident prevention regulations 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 due to unintentional switching on of the plant and uncontrolled start-up.

- Secure the device against accidental activation.
- Following installation, ensure a controlled restart.

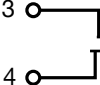




NOTE

Electromagnetic compatibility (EMC) is only ensured if the appliance is connected correctly to an earthing point.

On the outside of the housing is a FE terminal for connection of the functional earth (FE).

- Connect the FE terminal to the earthing point via a shortest possible cable (maximum length 30 cm).

16.3.1 X1: M12 circular plug, 8-pin

Pin	Assignment	On the device side	External circuit / signal level
1	Not assigned		
2	Not assigned		
Operating voltage			
3	GND		24 V DC \pm 10% max. residual ripple 10%
4	+ 24 V		
Input signal of the control center (e.g. PLC)			
5	Binary input +		0 – 5 V (logical 0) 10 – 30 V (logical 1)
6	Binary input -		
			GND (identical with pin 3)
Output signals to the control center (e.g. PLC) - (assigned for the binary output option only)			
7	Binary output 1 (referring to Pin 3)		0 – 24 V
8	Binary output 2 (referring to Pin 3)		0 – 24 V

Tab. 20: Pin assignment; X1 - M12, 8-pin circular connecto EtherNet/IP, PROFINET, Modbus TCP

16.3.2 X4: M8 socket, 4-pin, optional - Remote sensor (for remote variant only)

Connection of the digital, non-contacting position sensor Type 8798:

Pin	Assignment	On the device side	External circuit
1	Supply sensor +	S +	Remote Sensor Type 8798 digital
2	Supply sensor -	S -	
3	Serial interface, A cable	A	
4	Serial interface, B cable	B	

Tab. 21: Plug assignments; X4 - M8, 4-pin socket - digital, contact-free position sensor Type 8798









Connection of an analog, potentiometric position sensor:

Pin	Assignment	On the device side	External circuit
1	Potentiometer 1	1	<p>Potentiometer</p>
2	Sliding contact 2	2	
3	Potentiometer 3	3	
4	Not assigned		

Tab. 22: Pin assignment; X4 - M8 socket - 4-pin - analog, potentiometer-type position sensor


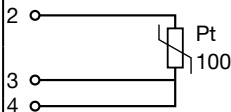
16.3.3 X5: M8 circular plug, 4-pin - Process actual value (for Type 8793)

Pin	Wire color ⁵⁾	Assignment	DIP switches ⁶⁾	On the device side	External circuit
4 – 20 mA - internally supplied ⁴⁾					
1	brown	+24 V transmitter power supply	<p>Switch on left</p>	<p>Transmitter</p> <p>GND</p>	
2	white	Output from transmitter			
3	blue	GND (identical to GND operating voltage)			
4	black	Bridge after GND (Pin 3)			

Pin	Wire color ⁵⁾	Assignment	DIP switches ⁶⁾	On the device side	External circuit
4 – 20 mA - externally supplied ⁴⁾					
1 2	brown white	Not assigned Process actual +		2	 4 – 20 mA
3 4	blue black	Not assigned Process actual –		Switch on right	4
Frequency - internally supplied ⁴⁾					
1	brown	+24 V sensor power supply		1	 +24 V
2	white	Clock input +		2	 Clock +
3	blue	Clock input – (GND)		3	 Clock –
4	black	Not assigned		Switch on left	GND (identical to GND operating voltage)
Frequency - externally supplied ⁴⁾					
1 2 3 4	brown white blue black	Not assigned Clock input + Clock input – Not assigned		2	 Clock +
				Switch on right	3

Type 8792, 8793 REV.2

EtherNet/IP, PROFINET and Modbus TCP

Pin	Wire color ⁵⁾	Assignment	DIP switches ⁶⁾	On the device side	External circuit
Pt 100 ⁴⁾ (see information below*)					
1 2	brown white	Not assigned Process actual 1 (power supply)	 Switch on right		Pt 100
3	blue	Process actual 3 (GND)			
4	black	Process actual 2 (compensation)			
<p>4) Can be adjusted via software (see operating instructions, chapter "Basic setting of the process controller")</p> <p>5) The indicated wire colors refer to the connection cable available as an accessory (92903474).</p> <p>6) The switch is located inside the device on the printed circuit board (see "14.2.1 Location of the switch")</p>					

Tab. 23: Pin assignment; X5 - M8 circular plug, 4-pin- process actual value input



*For reasons of wire compensation connect the Pt 100 sensor via 3 wires.
Always bridge Terminal 3 and Terminal 4 on the sensor.

Switch position (only Type 8793)

For the "internally supplied" input type, the GND signal of the process actual value must be connected to the GND signal of the operating voltage. A bridge is established internally between both GND signals.

Supplied	Assignment	Switch position
Internally supplied	GND process actual value equal to GND operating voltage	Switch on left
Externally supplied	GND process actual value electrically isolated from GND operating voltage	Switch on right

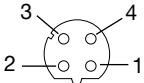
Tab. 24: Switch position

NOTE

To ensure electromagnetic compatibility (EMC), use a shielded Ethernet cable. Ground the cable shield on both sides, on each of the connected devices.
For the grounding use a short line (max. 1 m) with a cross-section of at least 1.5 mm².

16.3.4 X7: M12 fieldbus connection D-coded

The EtherNet/IP is connected with an M12 circular plug-in connector, 4-pin D-coded.

	Pin 1	Transmit +
	Pin 2	Receive +
	Pin 3	Transmit –
	Pin 4	Receive –

Tab. 25: Electrical assignment EtherNet/IP

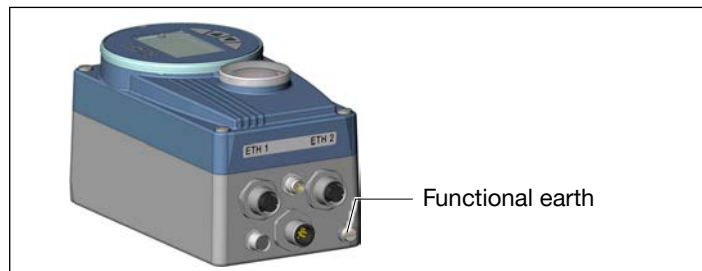


Fig. 25: Functional earth

17 bÜS OPTION

17.1 Definition

bÜS is a fieldbus which is based on CANopen with additional functionality for networking several devices.

17.2 Electrical installation - bÜS



DANGER

Risk of injury due to electric shock.

- ▶ Before reaching into the system, switch off the power supply and secure to prevent reactivation.
- ▶ Observe the applicable accident prevention regulations 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 due to unintentional switching on of the plant and uncontrolled start-up.

- ▶ Secure the device against accidental activation.
- ▶ Following installation, ensure a controlled restart.

Procedure:

→ Connect Type 8792, 8793 according to the tables.

A setscrew with nut is located on the electrical connection housing for connection of the functional earth.

→ Connect setscrew to a suitable grounding point. To guarantee electromagnetic compatibility (EMC), ensure that the cable is as short as possible (max. 30 cm, Ø 1.5 mm²).

When the operating voltage is applied, type 8792, 8793 is operating.

→ Now make the required basic settings and adjustments for the position controller/process controller. See chapter [“15 Start-Up”](#).

17.2.1 Connection diagram Type 8792

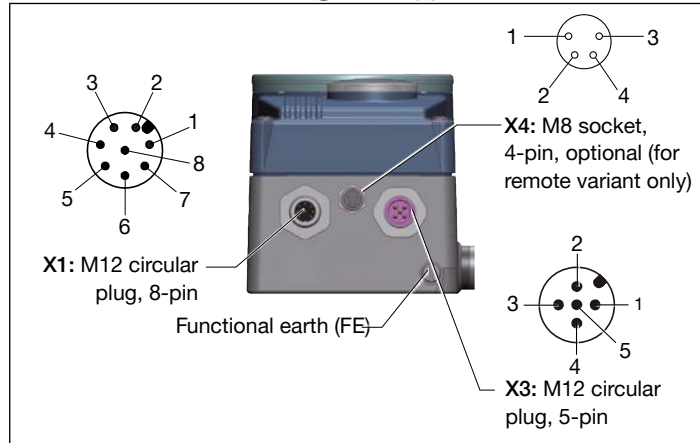


Fig. 26: Connection diagram Type 8792

17.2.2 Connection diagram Type 8793

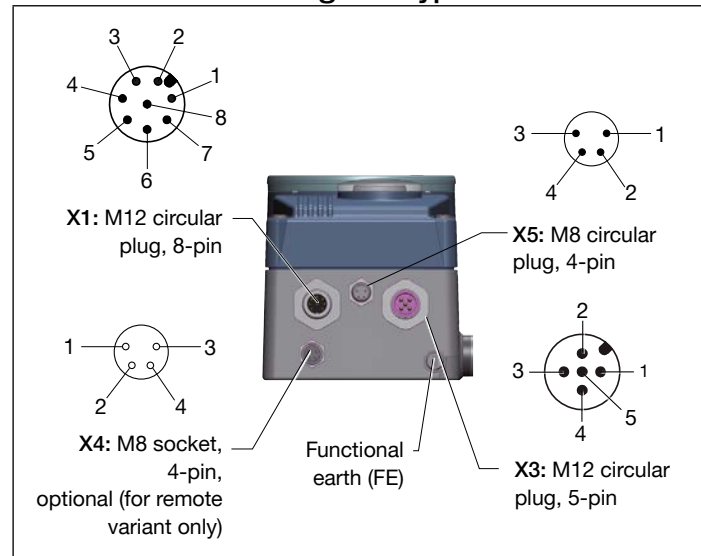
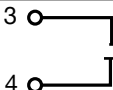
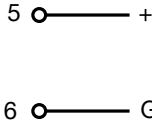





Fig. 27: Connection diagram Type 8793

17.2.3 X1: M12, 8-pin circular connector

Pin	Assignment	On the device side	External circuit / signal level
1	Not assigned		
2	Not assigned		

Pin	Assignment	On the device side	External circuit / signal level
Operating voltage			
3	GND		24 V DC $\pm 10\%$ max. residual ripple 10%
4	+ 24 V		
Input signal of the control center (e.g. PLC)			
5	Binary input +		<div>0 – 5 V (logical 0)</div> <div>10 – 30 V (logical 1)</div>
6	Binary input -		
6  GND (identical with pin 3)			
Output signals to the control center (e.g. PLC) - (assigned for the binary output option only)			
7	Binary output 1 (referring to pin 3)		0 – 24 V
8	Binary output 2 (referring to pin 3)		0 – 24 V

Tab. 26: X1, M12 circular plug, 8-pin (operating voltage)

17.2.4 X3: circular plug-in connector M12x1, 5-pin

Pin	Wire color	Assignment
1	CAN shield	CAN shield
2	Not assigned	
3	Black	Black GND / CAN_GND
4	White	White CAN_H
5	Blue	Blue CAN_L

Tab. 27: Connection of the circular plug-in connector


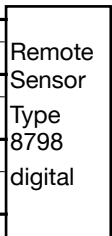





Electrical installation with or without büS network:

To be able to use the büS network (CAN interface), a 5-pin circular plug and a shielded 5-wire cable must be used.


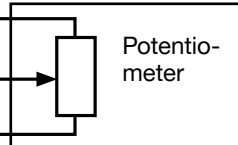


17.2.5 X4: M8 socket, 4-pin, optional - Remote sensor (for remote variant only)

Connection of the digital, non-contacting position sensor Type 8798:

Pin	Assignment	On the device side	External circuit
2	Supply sensor +	S + 	 Remote Sensor Type 8798 digital
	Supply sensor -	S - 	
3	Serial interface, A cable	A 	
4	Serial interface, B cable	B 	


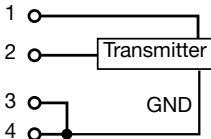



Tab. 28: Pin assignment; X4 - M8 socket, 4-pin - digital, non-contacting position sensor Type 8798








Connection of an analog, potentiometric position sensor:


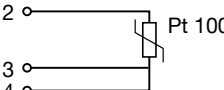
Pin	Assignment	On the device side	External circuit
1	Potentiometer 1	1 	 Potentiometer
2	Sliding contact 2	2 	
3	Potentiometer 3	3 	
4	Not assigned		

Tab. 29: Pin assignment; X4 - M8 socket - 4-pin - analog, potentiometer-type position sensor

17.2.6 X5: M8 circular plug, 4-pin - Process actual value (for Type 8793)

Pin	Wire color ⁸⁾	Assignment	DIP switches ⁹⁾	On the device side	External circuit
4 – 20 mA - internally supplied ⁷⁾					
1	brown	+24 V transmitter supply	 Switch on left	 Transmitter GND	
2	white	Output from transmitter			
3	blue	GND (identical with GND operating voltage)			
4	black	Bridge to GND (pin 3)			
4 – 20 mA - externally supplied ⁷⁾					
1	brown	Not used Process actual + Not used Process actual -	 Switch on right	2	 4 – 20 mA
2	white				
3	blue				
4	black				
				4	 GND 4 – 20 mA

Pin	Wire color ⁸⁾	Assignment	DIP switches ⁹⁾	On the device side	External circuit
Frequency - internally supplied ⁷⁾					
1	brown	+24 V sensor supply	 Switch on left	1	 +24 V
2	white	Clock input +		2	 Clock +
3	blue	Clock input – (GND)		3	 Clock – GND (identical with GND operating voltage)
4	black	Not used			
Frequency - externally supplied ⁷⁾					
1	brown	Not used	 Switch on right	2	 Clock +
2	white	Clock input +		3	 Clock –
3	blue	Clock input –			
4	black	Not used			

Pin	Wire color ⁸⁾	Assignment	DIP switches ⁹⁾	On the device side	External circuit
Pt 100 ⁷⁾ (see information below*)					
1 2	brown white	Not used Process actual 1 (power supply)	 Switch on right	 Pt 100	
3	blue	Process actual 3 (GND)			
4	black	Process actual 2 (com- pensation)			
<p>7) Can be adjusted via software (see operating instructions, chapter “Basic setting of the process controller”)</p> <p>8) The indicated wire colors refer to the connection cable available as an accessory (92903474).</p> <p>9) The switch is located inside the device on the printed circuit board (see “14.2.1 Location of the switch”)</p>					

Tab. 30: Pin assignment; X5 - M8 circular plug, 4-pin - process actual value input



*For reasons of wire compensation connect the Pt 100 sensor via 3 wires.
Always bridge Terminal 3 and Terminal 4 on the sensor.

18 PROFIBUS DPV1

The quickstart describes only the electrical installation of Type 8792, 8793 and the specification of the basic settings.



The settings for the bus communication via the BUS. COMM menu are described in the operating instructions of Type 8792, 8793.

18.1 Electrical installation



DANGER

Risk of injury due to electric shock.

- Before reaching into the system, switch off the power supply and secure to prevent reactivation.
- Observe the applicable accident prevention regulations 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 due to unintentional switching on of the plant and uncontrolled start-up.

- Secure the device against accidental activation.
- Following installation, ensure a controlled restart.

NOTE

Electromagnetic compatibility (EMC) is only ensured if the appliance is connected correctly to an earthing point.

On the outside of the housing is a FE terminal for connection of the functional earth (FE).

► Connect the FE terminal to the earthing point via a shortest possible cable (maximum length 30 cm).

18.1.1 Connection diagram Type 8792

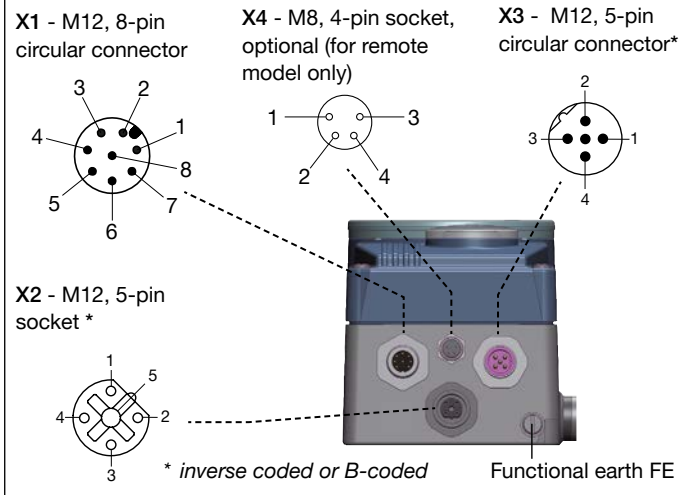


Fig. 28: PROFIBUS DPV1, connection diagram Type 8792

18.1.2 Connection diagram Type 8793

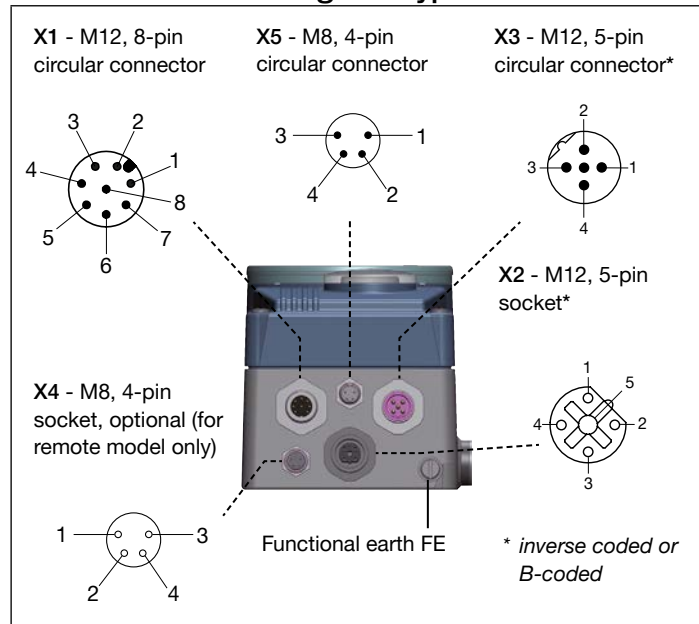










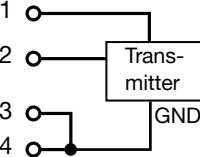

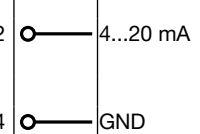

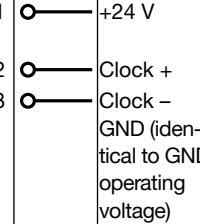
Fig. 29: PROFIBUS DPV1, connection diagram Type 8793







18.1.3 X1 - M12, 8-pin circular connector

Pin	Configuration	On the device side	External circuit / Signal level
1	Not assigned		
2	Not assigned		
Operating voltage			
3	GND	3 	24 V DC \pm 10 % max. residual ripple 10 %
4	+24 V	4 	
Input signals of the control centre (e.g. PLC)			
5	Binary input +	5  + 	0...5 V (log. 0) 10...30 V (log. 1)
6	Binary input –	6  GND (identisch mit Pin 3)	
Output signals to the control centre (e.g. PLC) - (only used for binary output option)			
7	Binary output 1 (referring to Pin 3)	7 	0...24 V
8	Binary output 2 (referring to Pin 3)	8 	0...24 V

Tab. 31: Pin assignment; X1 - M12, 8-pin circular connector; PROFIBUS DPV1

18.1.4 X5: M8 circular plug, 4-pin - Process actual value (for Type 8793)

Input type**	Pin	Configuration	Switch ***	On the device side	External circuit
4...20 mA - inter- nally supplied	1	(brown)* +24 V Supply transmitter	 Switch on left		
	2	(white)* Output from transmitter			
	3	(blue)* GND (identical to GND operating voltage)			
	4	(black)* Bridge to GND (Pin 3)			
4...20 mA - exter- nally supplied	1	(brown)* Not assigned	 Switch on right		
	2	(white)* Process actual +			
	3	(blue)* Not assigned			
	4	(black)* Process actual –			
Frequency - internally supplied	1	(brown)* +24 V Supply sensor	 Switch on left		
	2	(white)* Clock input +			
	3	(blue)* Clock input – (GND)			
	4	(black)* Not assigned			

Input type**	Pin	Configuration	Switch ***	On the device side	External circuit
Frequency - externally supplied	1	(brown)* Not assigned	 Switch on right	 2	Clock +
	2	(white)* Clock input +			
	3	(blue)* Clock input -			
	4	(black)* Not assigned			Clock -
Pt 100 (see information below)	1	(brown)* Not assigned	 Switch on right	 2	 Pt 100
	2	(white)* Process actual 1 (power supply)			
	3	(blue)* Process actual 3 (GND)			
	4	(black)* Process actual 2 (compensation)		 4	

* The indicated wire colors refer to the connection cable available as an accessory (92903474).

** Can be adjusted via software (see chapter "Specifying the standard settings" in operating instructions).

*** The switch is located inside the device on the printed circuit board (see "14.2.1 Location of the switch")


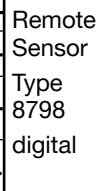



Tab. 32: Pin assignment PROFIBUS DPV1; X5 - M8 circular plug, 4-pin - process actual value input



For reasons of wire compensation connect the Pt 100 sensor via 3 wires.
Always bridge Terminal 3 and Terminal 4 on the sensor.


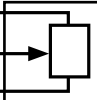


18.1.5 X4 - M8, 4-pin socket, optional - remote sensor (for remote model only)

Connection of the digital, contact-free position sensor
Type 8798:

Pin	Configuration	On the device side	External circuit
1	Supply sensor +	S + 	 Remote Sensor Type 8798 digital
2	Supply sensor -	S - 	
3	Serial interface, A-line	A 	
4	Serial interface, B-line	B 	

Tab. 33: Plug assignments PROFIBUS DPV1; X4 - M8, 4-pin socket - digital, contact-free position sensor Type 8798

Connection of an analog, potentiometric position sensor:

Pin	Configuration	On the device side	External circuit
1	Potentiometer 1		 Potentiometer
2	Wiper 2		
3	Potentiometer 3		
4	Not assigned		

Tab. 34: Plug assignments PROFIBUS DPV1; X4 - M8, 4-pin socket - analog, potentiometric position sensor

18.1.6 X2/X3 - M12, 5-pin socket/circular connector - bus connection

Pin	Configuration	External circuit / Signal level
1	VP+5	Supply the terminating resistors
2	RxD/TxD-N	Received/transmitted data -N, A-line
3	DGND	Data transmission potential (earth to 5 V)
4	RxD/TxD-P	Received/transmitted data -P, B-line
5	Shielding	Shielding / protective earth

Tab. 35: Pin assignment PROFIBUS DPV1;
X2/X3 - M12, 5-pole circular connector/socket - bus connection

When the operating voltage is applied, type 8792, 8793 is operating.

→ Now make the required basic settings and adjustments for the position controller/process controller. See chapter [“15 Start-Up”](#).

19 ACCESSORIES

Designation	Order no.
USB-büS-interface (büS stick + 0.7 m cable with M12 plug)	772551
büS adapter for büS service interface (M12 to büS service interface micro USB)	773254
Bürkert Communicator	Information at www.burkert.com

Tab. 36: Accessories

Other accessories can be found on the data sheet for Type 8792/8793.

19.1 Communication software

The PC operating program “Bürkert Communicator” is designed for communication with Bürkert devices.



A detailed description for installing and operating the software can be found in the associated operating instructions.

Download the software from: www.burkert.com

19.2 USB interface

The PC requires a USB interface for communication with the devices, also a USB-büS interface set

Data is transmitted according to CANopen specification.

20 PACKAGING, TRANSPORT, STORAGE

NOTE

Transport damages.

Inadequately protected equipment may be damaged during transport.

- ▶ During transportation protect the device against wet and dirt in shock-resistant packaging.
- ▶ Avoid exceeding or dropping below 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.

21 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.

www.burkert.com