bürkert
FLUID CONTROL SYSTEMS

Type 8691 Rev.2

Control Head

Operating Instructions

MAN 1000334445 EN Version: B Status: RL (released | freigegeben) printed: 06.11.2017

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Operating Instructions 1710/01_EU-EN_00810626 / Original DE

Control head Type 8691, Rev. 2

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1 ABOUT THESE INSTRUCTIONS

The operating instructions describe the entire life cycle of the device.

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

Important safety information.

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

1.1 Symbols

DANGER

Warns of an immediate danger.

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

WARNING

Warns of a potentially dangerous situation.

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

CAUTION

Warns of a possible danger.

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

NOTE

Warns of damage to property.

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

Indicates important additional information, tips and recommendations.

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

▸ Designates an instruction for risk prevention.

→ Designates a procedure which you must carry out.

Indicates a result.

1.2 Definition of terms

In these instructions the term “device” denotes the following device types:

Control head Type 8691 Rev. 2.

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2 INTENDED USE

The control head Type 8691 Version 2 is designed to be mounted on pneumatic actuators of process valves for the control of media. The permitted fluid media are listed in the technical data.

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

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3 BASIC SAFETY INSTRUCTIONS

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

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

DANGER

Risk of injury from high pressure and discharge of medium.

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

DANGER

Risk of injury from electric shock.

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

To prevent injury, ensure the following:

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

The device has been developed with due consideration given to the accepted safety rules and is state-of-the-art. Nevertheless, dangerous situations may occur.

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4 GENERAL INFORMATION

4.1 Contact address

Germany

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

International

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

Also in the internet at:

www.burkert.com

4.2 Warranty

The warranty is only valid if the device is used as intended in accordance with the specified application conditions.

4.3 Information on the Internet

The operating instructions and data sheets for Bürkert products can be found on the Internet at:

www.burkert.com

4.4 Trademarks

The brands listed below are trademarks of the corresponding companies / associations or organizations.

Loctite Henkel Loctite Deutschland GmbH

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5 PRODUCT DESCRIPTION

5.1 Structure

The modular design of the device supports various configurations and variants.

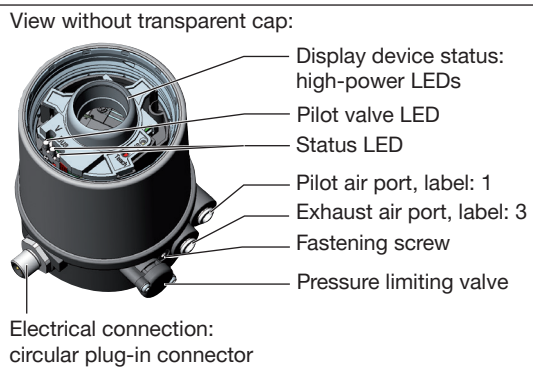

Figure 1: Structure

5.1.1 Structure, integrated pilot air duct (21xx, Element)

The structure with integrated pilot air duct is optimized for mounting on process valves of the 21xx series (Element).

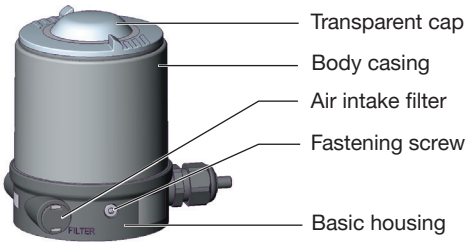

Figure 2: Structure, integrated pilot air duct

5.1.2 Structure, external pilot air duct (20xx, Classic)

The structure with external pilot air duct is optimized for mounting on process valves of the 20xx series (Classic).

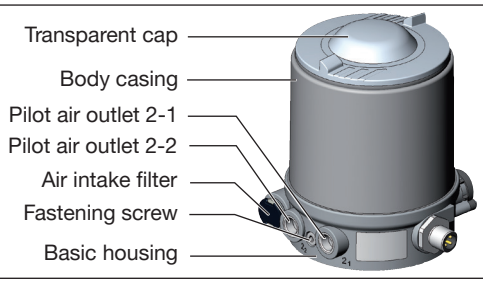

Figure 3: Structure, external pilot air duct

So that the pilot air can be externally connected to the actuator, this structure has a different basic housing..

5.1.3 Variants

Communication possible via:

- IO-Link
- büS

5.2 Function

This device is capable of controlling single-acting and double-acting process valves.

The pilot valves can be manually overridden.

An analog, inductive sensor element provides feedback about end positions being reached. The teach function is used for configuration.

Colored LEDs indicate the device status.

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6 TECHNICAL DATA

6.1 Conformity

The device conforms to the EU directives as per the EU Declaration of Conformity (if applicable).

6.2 Standards

The applied standards, which are used to demonstrate conformity with the EU Directives, are listed in the EU type examination certificate and/or the EU Declaration of Conformity (if applicable).

6.3 Approvals

The product is approved for use in zone 2 and 22 in accordance with ATEX directive 94/9/EC category 3GD.

Observe instructions on operation in the explosion-risk area. See additional explosion-related information.

The product is cULus approved. Instructions on operation in the UL area see chapter “Electrical data”.

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6.4 Type label

6.4.1 Type label standard

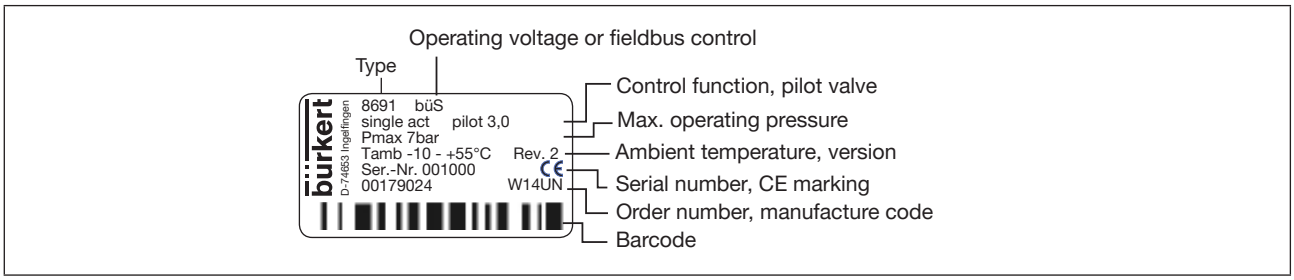

Figure 4: Type label standard (example)

6.4.2 UL type label

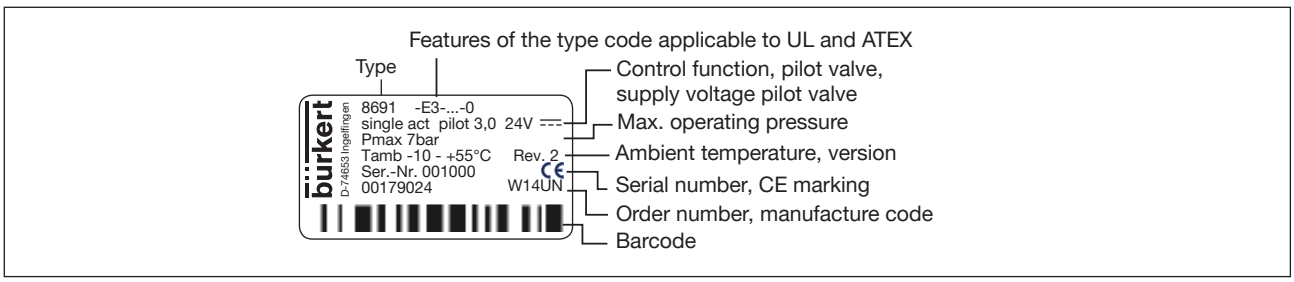

Figure 5: UL type label (example)

6.4.3 UL additional label

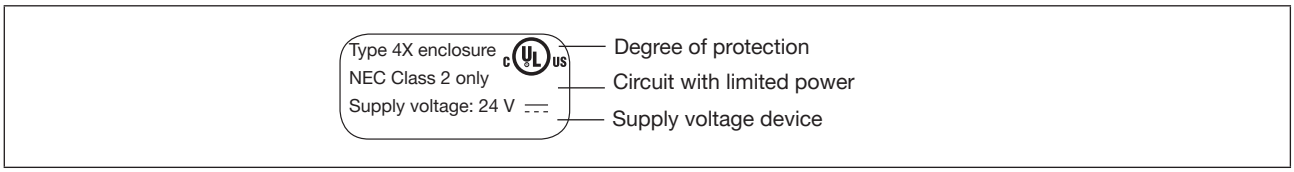

Figure 6: UL additional label (example)

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6.5 Operating conditions

Ambient temperature	See type label
Degree of protection	
Evaluated by manufacturer:	IP65, IP67 as per EN 60529*
Evaluated by UL:	UL type 4x Rating*

6.5.1 Fluidic data

Control medium	Neutral gases, air Quality classes as per ISO 8573-1
Dust content Class 7	Max. particle size 40 µm, max. particle density 10 mg/m^3
Water content class 3	Max. pressure dew point -20°C or min. 10°C below lowest operating temperature
Oil content Class X	Max. 25 mg/m^3
Pressure range	3–7 bar
Temperature range	-10 to +50 °C
Pilot valve air flow rate	250 l_N / min (for aeration and deaeration) (Q_{Nn} - value according to definition for pressure drop from 7 to 6 bar absolute)
Connections	Internal thread G 1/8 “

6.5.2 Electrical data

NOTE

For variants with uULus approval, please note:

▸ Only use circuits of limited power as per UL NEC Class 2.

6.5.2.1 Electrical data, IO-Link

Protection class	3 as per DIN EN 61140 (VDE 0140-1)
Connection	Circular plug-in connector M12 x 1, 4-pin, Port Class A
Operating voltage	18–30 V DC (according to specification)
Max. current consumption	135 mA @18 V (incl. inrush current pilot valve for 200 ms)
Current consumption input during normal operation (after current reduction, pilot valve after 200 ms and 1 end position reached)	110 mA @18 V

** Only if cables, plugs and sockets have been connected correctly and in compliance with the exhaust air concept see chapter “Pneumatic installation”.*

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6.5.2.2 Electrical data, büS

Protection class	3 as per DIN EN 61140 (VDE 0140-1)
Connection	Circular plug-in connector M12 x 1, 5-pin
Operating voltage	18–30 V DC (according to specification)
Max. current consumption	120 mA @18 V (incl. inrush current pilot valve for 200 ms)
Current consumption input during normal operation (after current reduction, pilot valve after 200 ms and 1 end position reached)	95 mA @18 V

6.6 Mechanical data

Dimensions	See data sheet
Body material	
exterior:	PPS, PC, VA
Seal material	
external:	EPDM
internal:	NBR
Stroke range of valve spindle	2–47 mm

6.6.1 Safety end positions

Safety end positions after failure of the electrical or pneumatic auxiliary power:

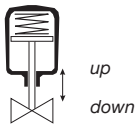
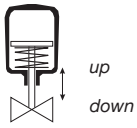
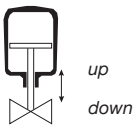
Actuator system	Designation	Safety end positions after failure of the auxiliary power	
		electrical	pneumatic
	single-acting control function A	down	down
	single-acting control function B	up	up
	double-acting control function I	down	not defined

Table 1: Safety end positions

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7 MECHANICAL INSTALLATION

7.1 Safety instructions

DANGER

Risk of injury from high pressure and discharge of medium.

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

WARNING

Risk of injury from improper installation.

▸ Only trained technicians may perform installations.

▸ Perform installations with suitable tools only.

WARNING

Risk of injury due to unintentional activation and uncontrolled start-up of the system.

▸ Secure system against unintentional activation.

▸ Ensure that the system does not start up in an uncontrolled manner.

7.2 Installing devices with integrated pilot air duct (21xx, Element)

Only for devices without preinstalled process valve.

Required attachment kit: ELEMENT Type 21xx

NOTE

Damage to the device and the drive when welding welded bodies.

Observe the following during installation on process valves with welded body:

▸ Observe the installation instructions for the operating manual of the process valve.

▸ Before installing the device, weld the process valve into the pipe system.

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1. Installing the switch spindle

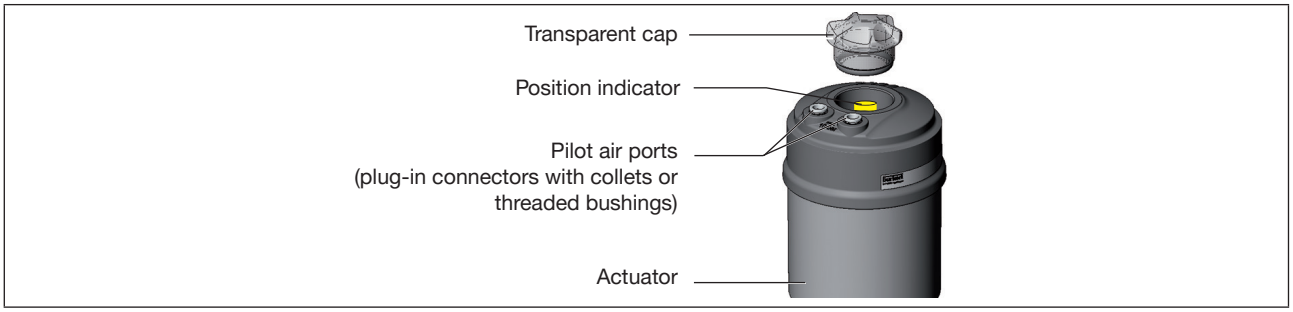

Figure 7: Installing the switch spindle (1), integrated pilot air duct

→ Unscrew the transparent cap from the actuator.

→ Unscrew position indicator from spindle extension.

→ For variant with hose connector: remove the collets (white sleeves) from the pilot air ports.

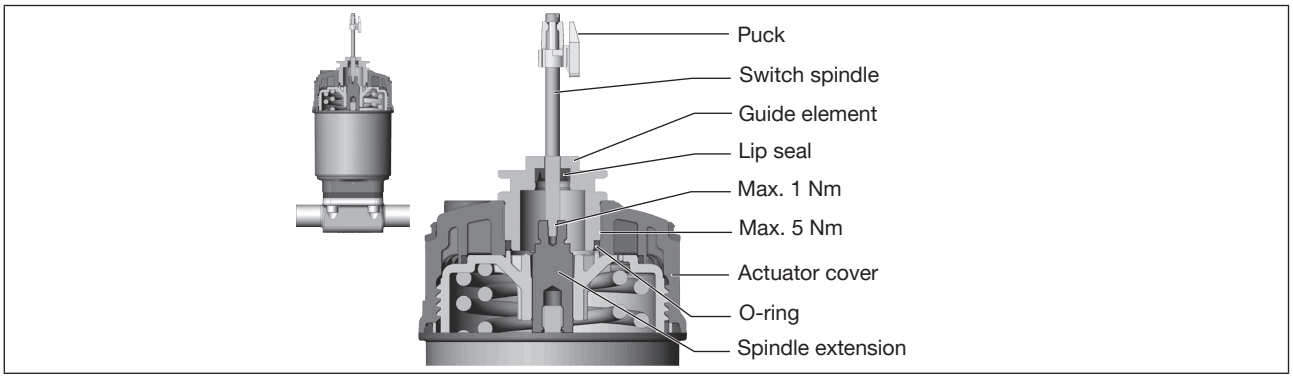

Figure 8: Installing the switch spindle (2), integrated pilot air duct

NOTE

Lip seal can be damaged if incorrectly installed.

The lip seal is pre-mounted in the guide element and must be "locked into position" in the undercut.

▸ When installing the switch spindle, do not damage the lip seal.

→ Slide switch spindle through the guide element.

NOTE

Contamination of the lip seal due to screw locking paint.

▸ Do not apply any screw locking paint to the switch spindle.

→ To secure the switch spindle, apply some screw locking paint (e.g. Loctite 290) in the threading of the spindle extension in the actuator.

→ Check that the O-ring is in the correct position.

→ Screw guide element in actuator cover (tightening torque: max. 5 Nm).

→ Screw switch spindle onto the spindle extension. A slot is provided on the top side (tightening torque: max. 1 Nm).

→ Push puck onto the switch spindle and lock into position.

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2. Attaching the form seal

→ Pull the form seal onto the actuator cover (smaller diameter points upwards).

→ Check that the O-rings are correctly positioned in the pilot air ports.

Before installing the device, remove the collets in the pilot air ports.

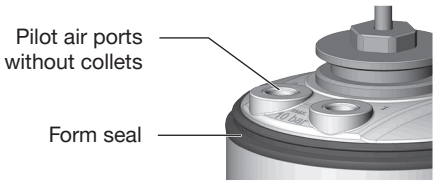

Figure 9: Attaching the form seal

3. Installing the device

NOTE

Damage or functional outage of the PCB

▸ Ensure that the puck lies flat in the guide rail.

→ Align the puck and device so that:
1. The puck rests in the guide rail of the device (see Fig. below).
2. Find the connection pieces of the device into the pilot air ports of the actuator (see second Fig. below).

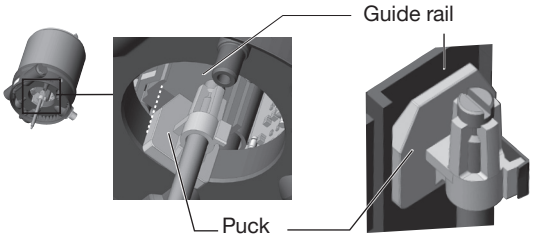

Figure 10: Aligning the puck

→ Push the device without turning it onto the actuator until no gap is visible on the form seal.

NOTE

Damage or malfunction due to ingress of dirt or moisture.

To observe the degree of protection IP65 or IP67:

▸ Tighten fastening screws only with a tightening torque of max. 1.5 Nm.

→ Attach device to the actuator using the two side fastening screws. In doing so, tighten the screws only hand-tight (max. torque: 1.5 Nm).

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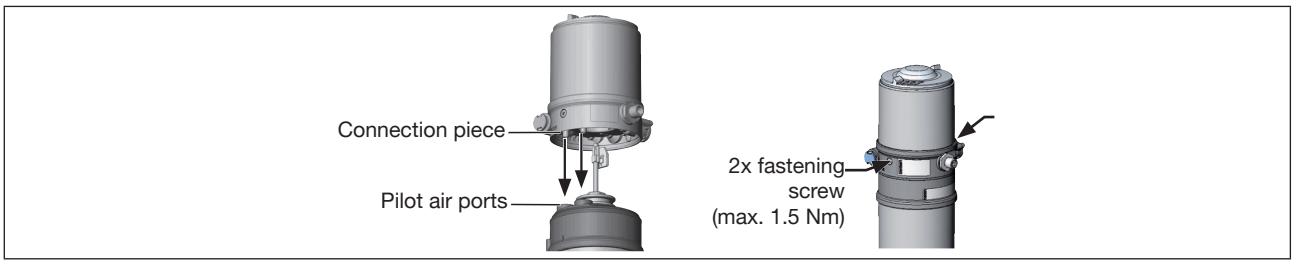

Figure 11: Installation

7.3 Installing devices with external control air duct (20xx, Classic)

Only for devices without preinstalled process valve.

Required attachment kit: Classic Type 20xx for the corresponding variant

NOTE

Damage to the device and the drive when welding welded bodies.

Observe the following during installation on process valves with welded body:

- ▸ Observe the installation instructions for the operating manual of the process valve.
- ▸ Before installing the device, weld the process valve into the pipe system.

1. Installing switch spindle

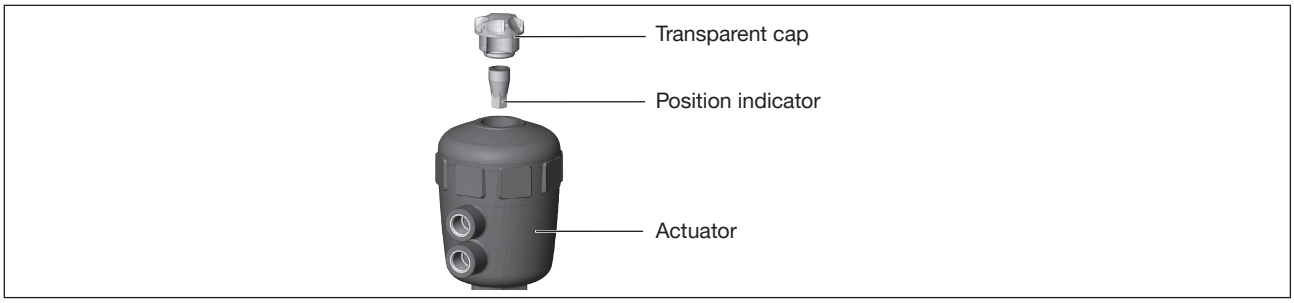

Figure 12: Installing the switch spindle (1), external pilot air duct

→ Unscrew the transparent cap from the actuator.

→ Unscrew the position indicator of the spindle with hex key.

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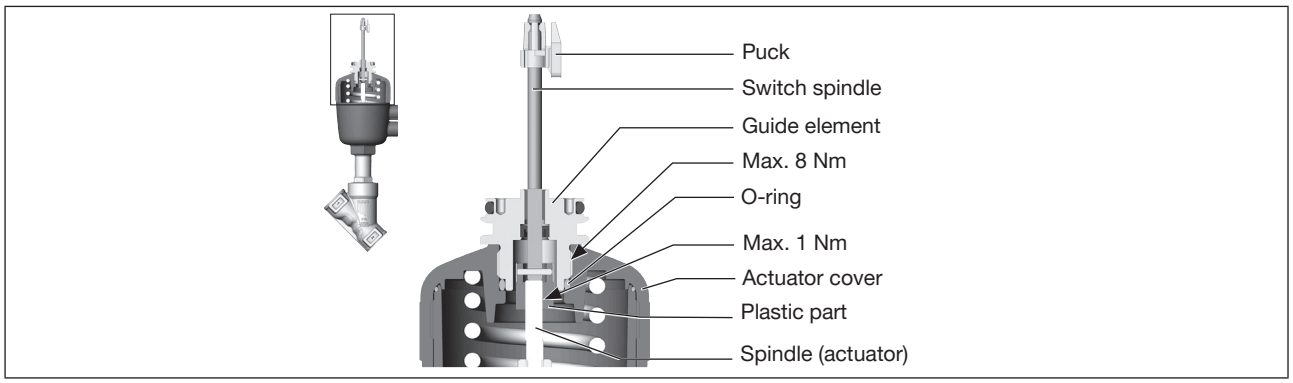

Figure 13: Installing the switch spindle (2), external pilot air duct

→ Press O-ring down into the actuator cover.

→ Manually screw the switch spindle (and the slipped over guide element) to the spindle of the actuator with the plastic part and do not tighten initially.

→ Screw the guide element into the cover of the actuator with a face pin wrench* (tightening torque: max. 8 Nm).

→ Tighten the switch spindle on the spindle of the actuator. A slot is provided on the top side (tightening torque: max. 1 Nm).

→ Push puck onto the switch spindle and lock into position.

2. Installing the device

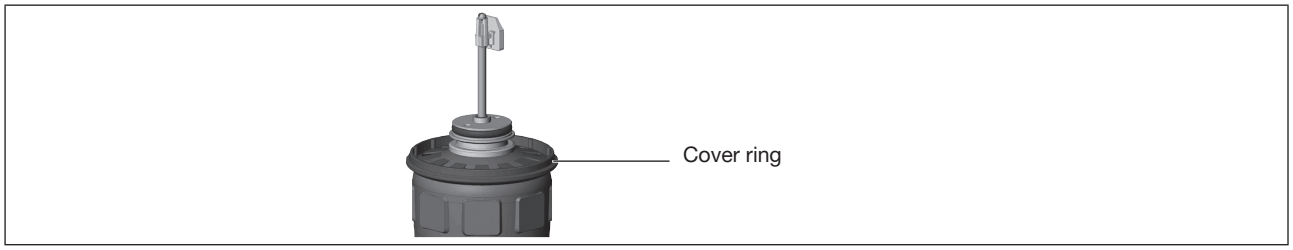

Figure 14: Attaching cover ring

→ Wind cover ring onto actuator cover (only for actuator size ø50 and ø63).

NOTE

Damage or functional outage of the PCB

▸ Ensure that the puck lies flat in the guide rail.

→ Align the puck and the device so that the puck rests in the guide rail of the device (see following figure).

** journal Ø: 3 mm; journal gap: 23.5 mm*

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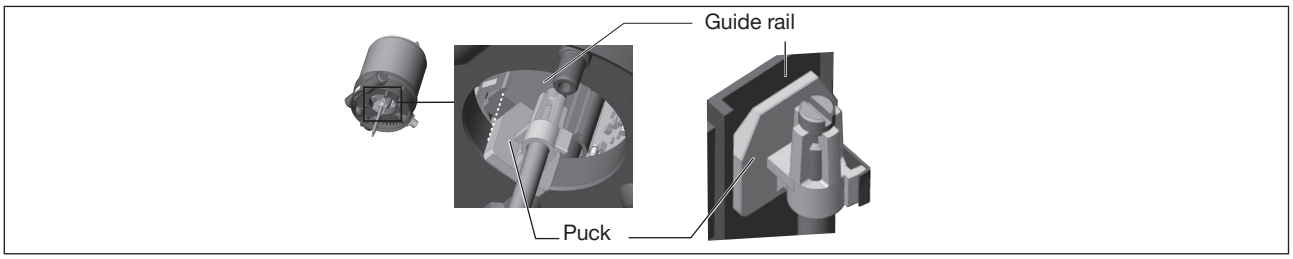

Figure 15: Aligning the puck

→ Press the device all the way down to the actuator and turn it into the required position.

Ensure that the pneumatic connections of the device and those of the valve actuator are situated preferably vertically one above the other (see Fig. below). For different positioning, longer hoses may be required than those supplied in the attachment kit.

NOTE

Damage or malfunction due to ingress of dirt or moisture.

To observe the degree of protection IP65 or IP67:

▸ Tighten fastening screws only with a tightening torque of max. 1.5 Nm.

→ Attach device to the actuator using the two side fastening screws. In doing so, tighten the screws only hand-tight (max. torque: 1.5 Nm).

3. Pneumatically connecting device and actuator

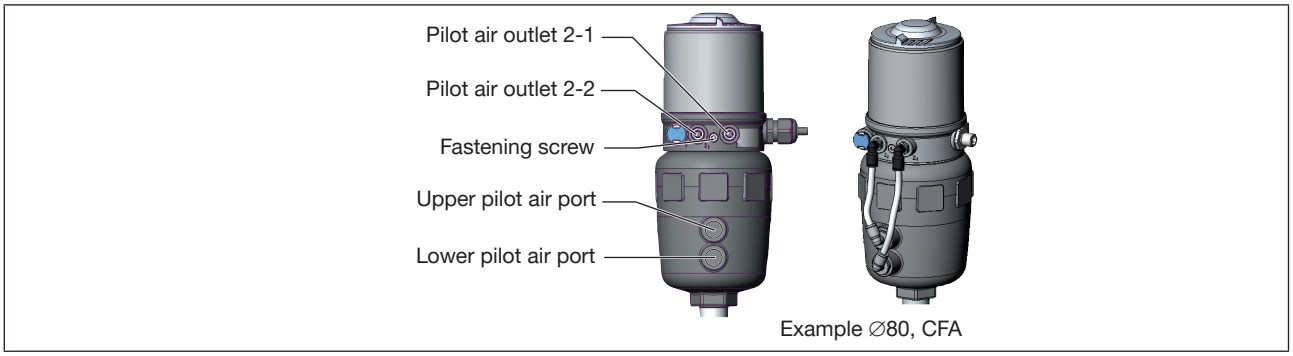

Figure 16: Pneumatically connecting device and actuator

→ Screw plug-in hose connector onto device and actuator.

→ Using the hoses supplied in the attachment kit, make the pneumatic connection between the device and actuator with the following table.

NOTE

Damage or malfunction due to ingress of dirt or moisture.

To observe the degree of protection IP65 or IP67:

▸ Only for CFA and CFB: Connect the pilot air outlet which is not required to the free pilot air port of the actuator or seal with a plug.

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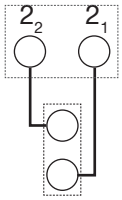
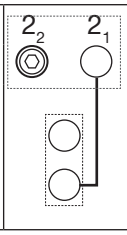
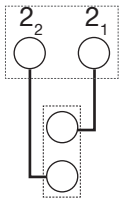
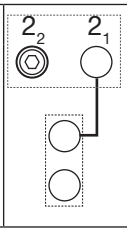
Control function A (CFA) Process valve closed in resting position (by spring force)				
Device	Pilot air outlet		or	
Actuator	Upper pilot air port			
	Lower pilot air port			
Control function B (CFB) Process valve open in resting position (by spring force)				
Device	Pilot air outlet		or	
Actuator	Upper pilot air port			
	Lower pilot air port			

Table 2: Pneumatically connecting device and actuator CFA and CFB

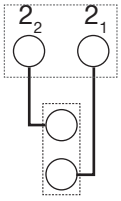
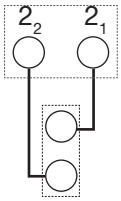
Control function I (CFI) Process valve closed in resting position				
Device	Pilot air outlet			
Actuator	Upper pilot air port			
	Lower pilot air port			
Control function I (CFI) Process valve open in resting position				
Device	Pilot air outlet			
Actuator	Upper pilot air port			
	Lower pilot air port			

Table 3: Pneumatically connecting device and actuator CFI

"In rest position" means that the pilot valves of the device are isolated and not actuated.

If the ambient air is humid, a hose can be connected between pilot air outlet 2_2 of the device and the unconnected pilot air port of the actuator for control function A and control function B. As a result, the spring chamber of the actuator is supplied with dry air from the pilot air outlet of the device.

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7.4 Aligning (turning) the device and position of connections

Devices with integrated pilot air duct:

Alignment of device and position of connections is only possible with 2100, 2101 and 2106 process valves.

The device and position of the connections can be aligned by:

- turning the actuator

Devices with external pilot air duct:

The device and position of the connections can be aligned by:

- turning the actuator (only types 2000, 2002, 2006 and 2012)
- turning the device

7.4.1 Turning the actuator, devices with hexnut

The following description only applies for devices with hexnut on the actuator.

For devices without a hexnut on the actuator: refer to the section "Turning the actuator, devices without hexnut" in the operating instructions.

The position of the connections can be infinitely adjusted by rotating the actuator through 360°.

Figure 17: Turning the actuator (1)

→ Clamp the valve body into a holding device (only for valves not yet installed).

With 2-position actuator:

NOTE

Damage to the seat seal or the seat contour.

▸ When turning the actuator, the valve must be open.

→ For control function A and I*:
Apply compressed air to pilot air port 1.

** if variant exists*

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With 3-position actuator:

NOTE

Damage to the seat seal or the seat contour.

▸ When turning the actuator, the valve must be in the central position.

→ Apply compressed air to pilot air port 1:
3.5 bar for actuator size 50 (D) and 70 (M)
4.0 bar for actuator size 90 (N) and 130 (P)

For both actuator variants:

→ Switching the device manually with pilot valve (see chapter).

→ Using a suitable open-end wrench, counter the wrench flat on the body connection.

→ Place a suitable open-end wrench on the hexagonal bolt of the actuator.

DANGER

Risk of injury from high pressure and discharge of medium.

If the direction of rotation is wrong, the body connection may become detached.

▸ Only turn the actuator is the prescribed direction.

→ Move the actuator to the required position by **turning it counter-clockwise** (viewed from below).

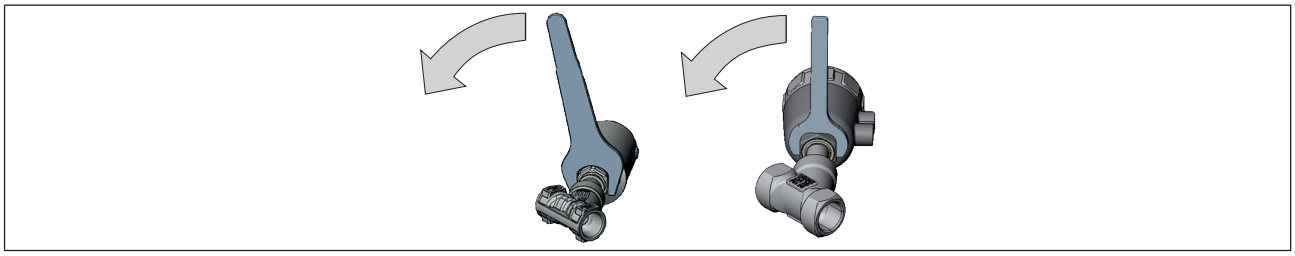

Figure 18: Turning the actuator (2)

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7.4.2 Turning the actuator, devices without hexnut

The position of the connections can be infinitely adjusted by rotating the actuator through 360°.

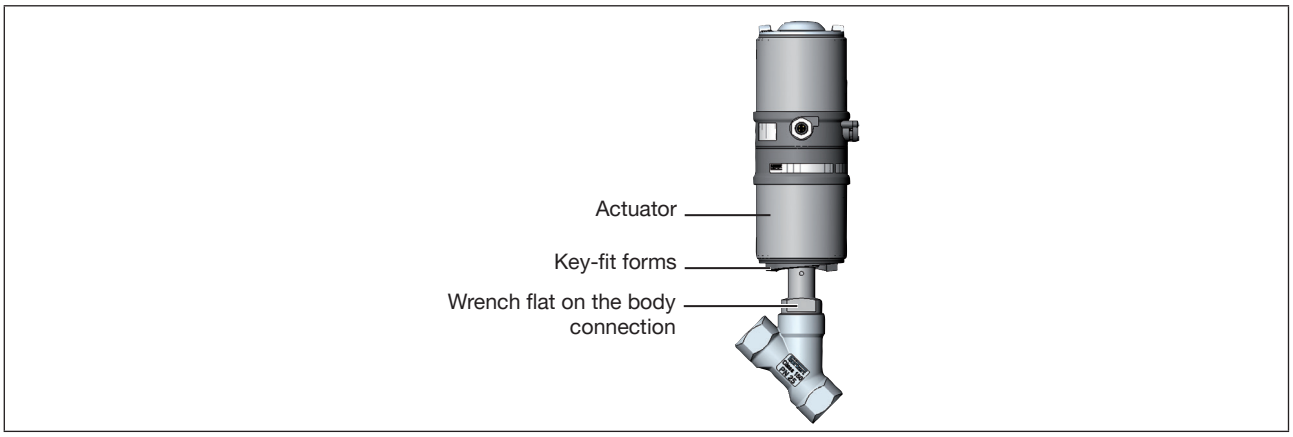

Figure 19: Turning the actuator (1), devices without hexnut

→ Clamp the valve body into a holding device (only for valves not yet installed).

With 2-position actuator:

NOTE

Damage to the seat seal or the seat contour.

▸ When turning the actuator, the valve must be open.

→ For control function A and I*:
Apply compressed air to pilot air port 1.

With 3-position actuator:

NOTE

Damage to the seat seal or the seat contour.

▸ When turning the actuator, the valve must be in the central position.

→ Apply compressed air to pilot air port 1:
3.5 bar for actuator size 50 (D) and 70 (M)
4.0 bar for actuator size 90 (N) and 130 (P)

For both actuator variants:

→ Switching the device manually with pilot valve (see chapter).

→ Using a suitable open-end wrench, counter the wrench flat on the body connection.

→ Use a special wrench** precisely in the key-fit forms of the actuator.

** if variant exists*
*** The special wrench (665702) can be procured from your Bürkert sales department.*

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DANGER

Risk of injury from high pressure and discharge of medium.

If the direction of rotation is wrong, the body connection may become detached.

▸ Only turn the actuator is the prescribed direction.

→ By rotating in a clockwise direction (viewed from below), move the actuator to the desired position.

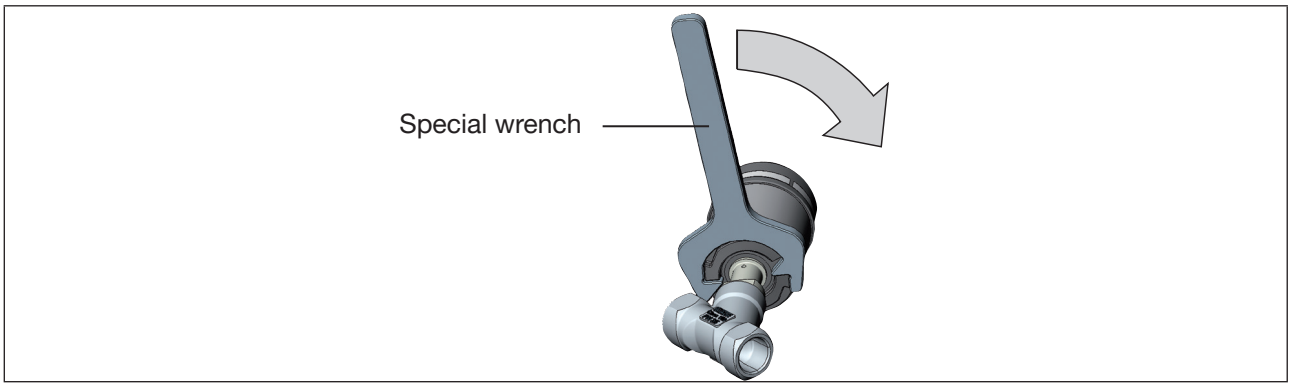

Figure 20: Turning the actuator (2), devices without hexnut

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7.4.3 Turning the device

Only for devices with external pilot air duct (20xx, Classic).

The position of the connections can be aligned by rotating the device continuously through 360°.

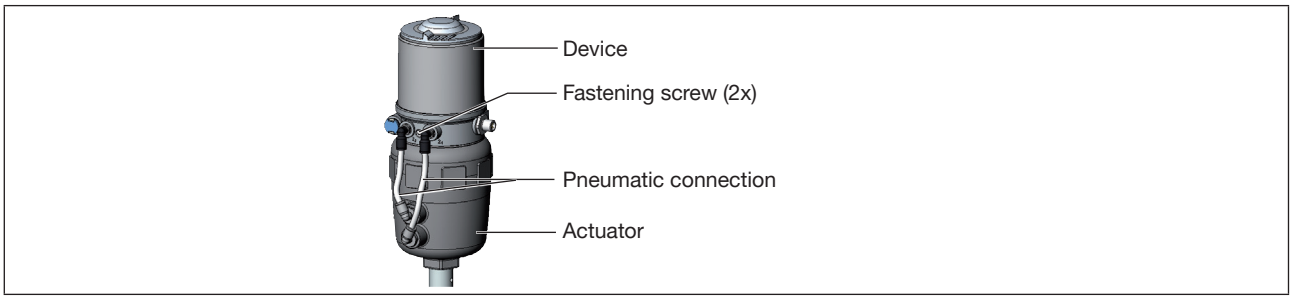

Figure 21: Turning the device

→ Loosen pneumatic connection between device and actuator.

→ Release fastening screws (hex socket bolt SW2.5).

→ Rotate the device into the required position.

NOTE

Damage or malfunction due to ingress of dirt or moisture.

To observe the degree of protection IP65 or IP67:

- Tighten fastening screws only with a tightening torque of max. 1.5 Nm.
- Screw in body casing to the stop.
- Screw in transparent cap to the stop.
- Only for CFA and CFB: Connect the pilot air outlet which is not required to the free pilot air port of the actuator or seal with a plug.

→ Only tighten the fastening screws until they are hand-tight (max. torque: 1.5 Nm).

→ Re-establish pneumatic connections between device and actuator. If necessary, use longer hoses.

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8 PNEUMATIC INSTALLATION

8.1 Safety instructions

DANGER

Risk of injury from high pressure and discharge of medium.

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

WARNING

Risk of injury from improper installation.

- Only trained technicians may perform installations.
- Perform installations with suitable tools only.

WARNING

Risk of injury due to unintentional activation and uncontrolled start-up of the system.

- Secure system against unintentional activation.
- Ensure that the system does not start up in an uncontrolled manner.

8.2 Connecting the device pneumatically

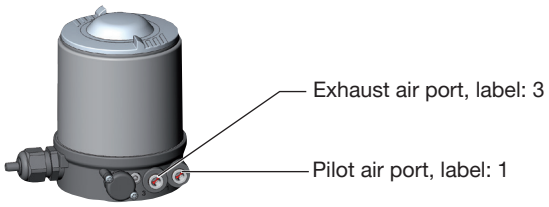

Figure 22: Connecting the device pneumatically

Important information for the problem-free functioning of the device:

- The installation must not cause back pressure to build up.
- Select a hose with sufficient cross section for the connection.
- Design the exhaust air line in such a way that no water or other liquid can get into the device through the exhaust air port.
- The pressure supply must always be at least 0.5–1 bar above the pressure required to bring the actuator into its end position.

→ Connect the control medium to the pilot air port (1)
(3–7 bar, instrument air, oil-free, anhydrous and dust-free).

→ Connect the exhaust air line or a silencer to the exhaust air port (3).

Exhaust air system:

- To maintain the IP67 degree of protection, install an exhaust air line in the dry area.

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9 ELECTRICAL INSTALLATION

9.1 Safety instructions for electrical installation

DANGER

Risk of injury from electric shock.

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

WARNING

Risk of injury from improper installation.

- Only trained technicians may perform installations.
- Perform installations with suitable tools only.

WARNING

Risk of injury due to unintentional activation and uncontrolled start-up of the system.

- Secure system against unintentional activation.
- Ensure that the system does not start up in an uncontrolled manner.

9.2 Connecting the device electrically, IO-Link

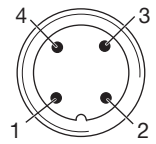

Figure 23: Pin assignment

Pin	Designation	Assignment	
		IO-Link mode	SIO mode
1	L +	24 V DC	
2	I/Q	Not assigned	DI or DO
3	L –	0 V (GND)	
4	Q/C	IO-Link	DI or DO

Table 4: Pin assignment

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9.3 Connecting the device electrically, büS

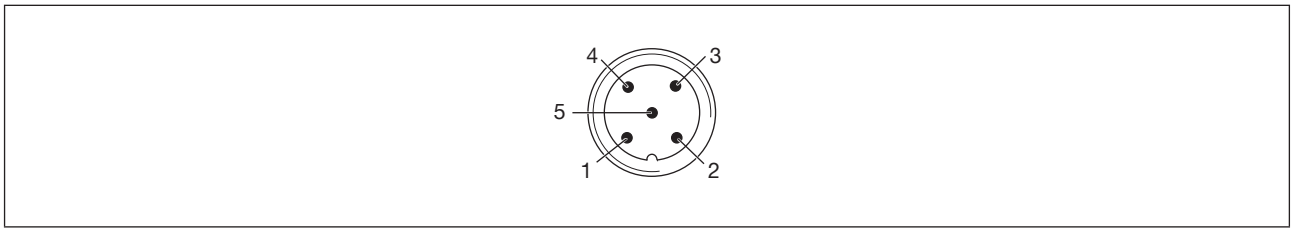

Figure 24: Pin assignment

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

Table 5: Pin assignment

For electrical installation with büS network, note:

Use a 5-pin round plug and shielded 5-core cable.

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10 START-UP

10.1 Teach function: Determine end positions and save these, Rev. 2

- **Automatic teach function:** For devices with pilot valve
  The teach function automatically identifies and saves the end positions of the valve.
- **Manual teach function:** For devices without pilot valve
  The end positions are captured and saved automatically.

10.1.1 Automatic teach function

For devices with pilot valve:
The teach function automatically identifies and saves the end positions of the valve.

With the IO-Link variant, the teach function can also be started with an acyclic IO-Link parameter (see parameter list) or with the Bürkert Communicator.

With the büS variant, the teach function can also be started with the Bürkert Communicator.

Essential requirements:

- The device is mounted on the actuator.
- The supply voltage is connected.
- The compressed air supply is connected.
- So that the correct reference conditions are identified, the pilot pressure must correspond to the operating conditions.

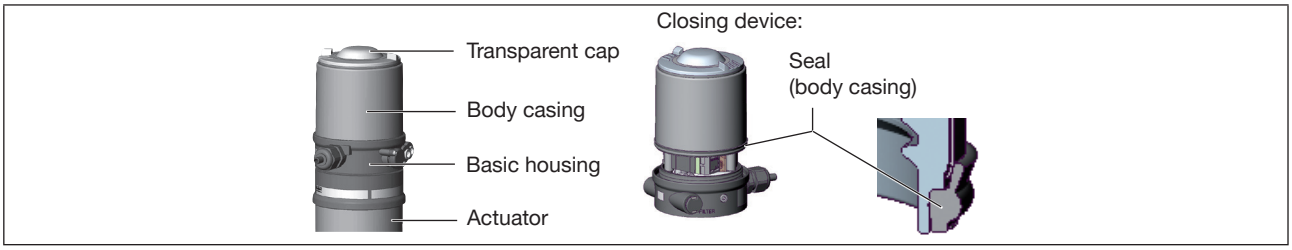

Figure 25: Opening or closing the device

NOTE

Breakage of the pneumatic connection pieces due to rotational impact.

▸ When opening or closing the device, do not press against the actuator, but against the basic housing.

→ Screw off the body casing by turning counterclockwise.

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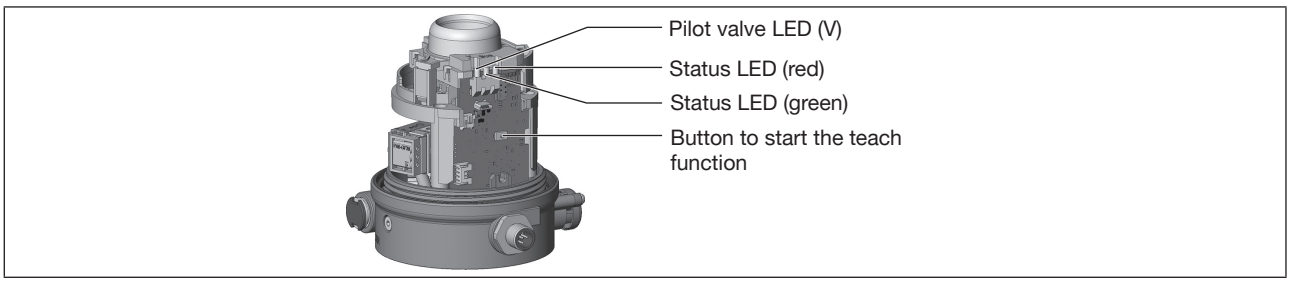

Figure 26: Starting teach function

→ Hold down the button to start the teach function for approx. 5 s until the red status LED blinks.

→ When the red status LED starts blinking, release the button within 5 seconds.

✓ When the red status LED stops blinking, the teach function is terminated.

✓ The end positions of the valve have been identified and saved.

→ Check that the seal (body casing) is in the correct position.

NOTE

Damage or malfunction due to ingress of dirt or moisture.

To observe the degree of protection IP65 or IP67:

▸ Screw in body casing to the stop.

→ Close the device (wrench*: 674077).

Description of workflow for teach function:

The status LED blinks red when the teach function is running.

- The end position is scanned in.
- The pilot valve switches.
- The actuator moves automatically to the upper position.
- The upper end position is scanned in.
- The pilot valve is switched off.
- The actuator moves to the lower position.
- In order to determine the opening time and the closing time, the actuator moves again into the upper and lower end position.

** The wrench (674077) is available from your Bürkert sales office..*

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10.1.2 Manual teach function

For devices without pilot valve:
The end positions are captured and saved manually by the user.

With the IO-Link variant, the teach function can also be started with an acyclic IO-Link parameter (see parameter list) or with the Bürkert Communicator.

With the büS variant, the teach function can also be started with the Bürkert Communicator.

Essential requirements:

- The device is mounted on the actuator.
- The supply voltage is connected.
- The compressed air supply is connected.
- So that the correct reference conditions are identified, the pilot pressure must correspond to the operating conditions.
- Provide the possibility for the user to switch the pneumatic actuator (open and closed).

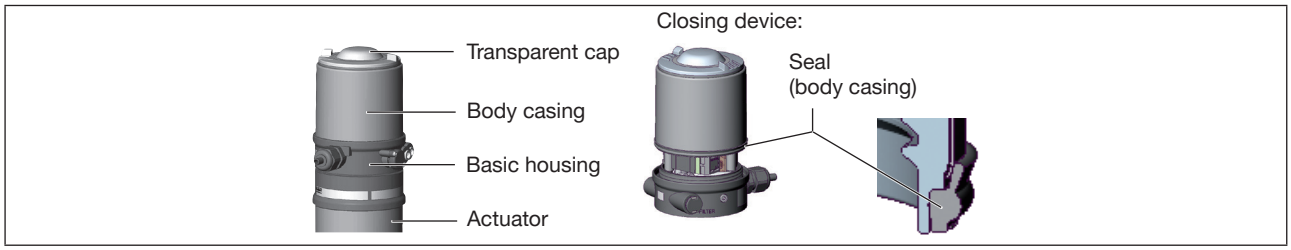

Figure 27: Opening or closing the device

NOTE

Breakage of the pneumatic connection pieces due to rotational impact.

▸ When opening or closing the device, do not press against the actuator, but against the basic housing.

→ Screw off the body casing by turning counterclockwise.

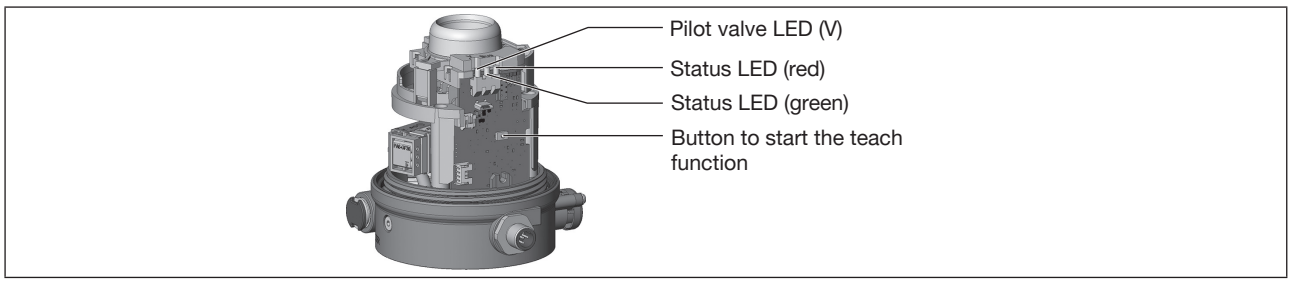

Figure 28: Starting teach function

→ Air bleed the pneumatic actuator: move to the unactuated end position.

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→ Hold down the button to start the teach function for at least 10 s.
After 5 s, the red status LED will start blinking. Keep the button pressed down. After a further 5 s, the red LED blinks very quickly. Only then release the button.

✓ Status LED red blinks once every second: The manual teach function is active.

→ Check whether the pneumatic actuator is in the deaerated, unactuated end position.

→ This end position is confirmed by briefly pressing the button.

✓ Yellow pilot valve LED is lit.

→ Move the pneumatic actuator into the aerated, switched end position.

→ This end position is confirmed by briefly pressing the button.

✓ Yellow pilot valve LED is not lit.

→ Air bleed the pneumatic actuator: move to the unactuated end position.

✓ Yellow pilot valve LED is lit.

To determine the opening times and closing times, aerate and deaerate the pneumatic actuator:

Measurement of opening time (Opening_Time):

→ Move the pneumatic actuator into the aerated, switched end position.

✓ Yellow status LED is not lit.

Measurement of closing time (Closing_Time):

→ Air bleed the pneumatic actuator: move to the unactuated end position.

✓ When the red status LED stops lighting, the teach function is terminated.

✓ The end positions of the valve have been identified and saved.

Note: If the red LED is lit, the manual teach function is defective and must be repeated.

→ Check that the seal (body casing) is in the correct position.

NOTE

Damage or malfunction due to ingress of dirt or moisture.

To observe the degree of protection IP65 or IP67:

▸ Screw in body casing to the stop.

→ Close the device (wrench*: 674077).

** The wrench (674077) is available from your Bürkert sales office.*

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10.2 Setting with Bürkert Communicator

The Bürkert Communicator can be used to make all settings on the device.

The settings in the Bürkert Communicator can be found in the operating manual.

10.2.1 Connecting IO-Link device with Bürkert Communicator

Required components:

- Communications software: Bürkert Communicator for PC
- büS standard set (see accessories)
- büS adapter for büS service interface (see accessories)
- If necessary, a büS cable extension (see accessories)

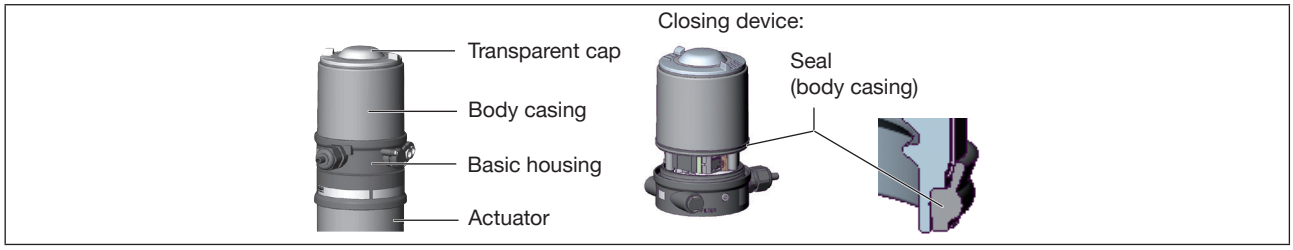

Figure 29: Opening or closing the device

NOTE

Breakage of the pneumatic connection pieces due to rotational impact.

▸ When opening or closing the device, do not press against the actuator, but against the basic housing.

→ Screw off the body casing by turning counterclockwise.

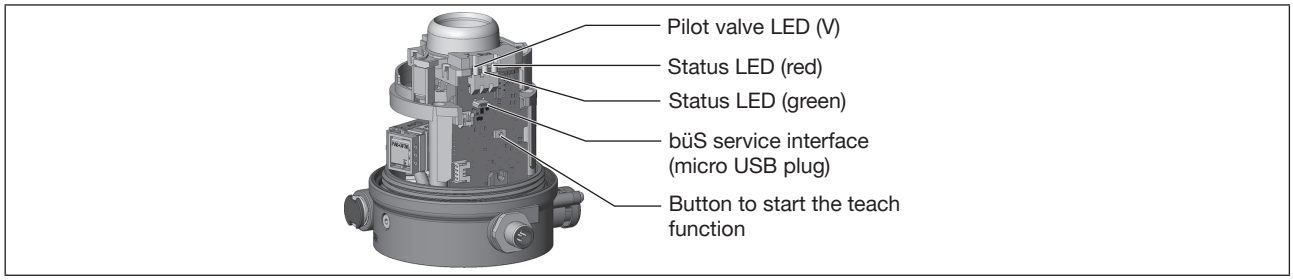

Figure 30: büS service interface

→ Insert micro USB plug in büS service interface.

→ Establish connection to PC with büS stick.

→ Starting Bürkert Communicator.

→ Implementing settings.

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10.2.2 Connecting büS device with Bürkert Communicator

Required components:

- Communications software: Bürkert Communicator for PC
- büS standard set (see accessories)

→ Establish connection to PC with büS stick.

→ Starting Bürkert Communicator.

→ Implementing settings.

10.3 IO-Link

10.3.1 Information, IO-Link

IO-Link is an internationally standardized IO technology (IEC 61131-9) to enable sensors and actuators to communicate.

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

10.3.2 Technical specifications, IO-Link

IO-Link specifications	V1.1.2
Supply	via IO-Link (M12 x 1, 4-pin, A-coded)
Port Class	A
SIO mode	yes, optionally 2xDO (end positions), or1xDI+1xDO (switch valve + one end position)
IODD file	File name: "Buerkert_Werke_GmbH-ControlHead8691-20170208-IODD1.1.xml"
VendorID	0x78, 120
DeviceID	0x0021F301, 2224897
Transmission speed	COM3 (230.4 kbit/s)
M-sequence type in Operate Mode	TYPE_2_V
Min. cycle time	1 ms
Data storage	Yes
Max. cable length	20 m

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10.3.3 Interfaces, IO-Link

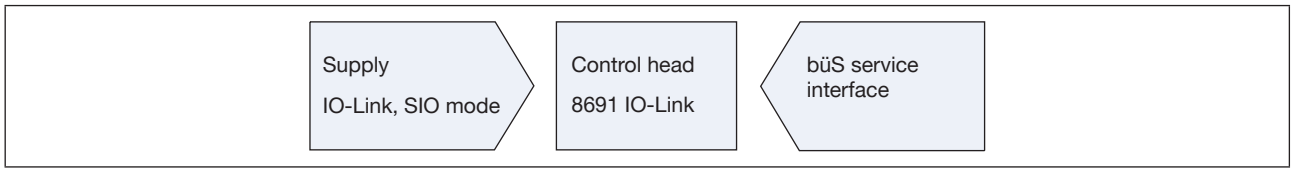

Figure 31: Interfaces

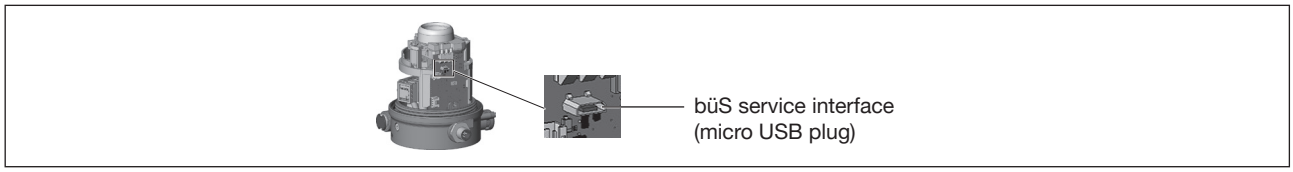

Figure 32: büS service interface

10.3.4 Process data, IO-Link

10.3.4.1 Process input data (PDin)

Length: 3 bytes

Sub-index	Bit offset	Length (bits)	Data type	Description
1	0	16	Integer	Position in ‰ 0 = Lower end position 1000 = Upper end position
2	16	1	Boolean	True = Closed False = Not closed
3	17	1	Boolean	True = Opened False = Not opened
4	18	2	Integer	Valve mode 0 = Initialization 1 = Normal operation 2 = Teach function active 3 = SafePos active
5	20	1	Boolean	Warning indicator True = Active warnings False = No active warnings
6	21	1	Boolean	Error indicator True = Active errors False = No active errors

Table 6: Process input data

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10.3.4.2 Process output data (PDout)

Length: 1 bytes

Sub-index	Bit offset	Length (bits)	Data type	Description
1	0	1	Boolean	CMD set-point value True = Open False = Closed
2	1	1	Boolean	Locating function (fast flashing LEDs) True = Activated False = Deactivated

Table 7: Process output data

10.3.5 Non-cyclic parameters (On-Request Data (ISDU))

Data types used

Name	IO-Link type	Length
UINT8	UIntegerT	1 bytes
UINT16	UIntegerT	2 bytes
UINT32	UIntegerT	4 bytes
SINT8	IntegerT	1 bytes
SINT16	IntegerT	2 bytes
SINT32	IntegerT	4 bytes
FLOAT32	Float32T	4 bytes
STRING	StringT	20 bits

Table 8: Data types used

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10.3.5.1 0x2000 Buerkert Device Description Object

Sub-index	Name	Description	Access type	Data type	Data memory	Factory reset
0x1	Device Name	Unique device name Used to identify the device	RO	STRING		
0x2	Ident Number	Device identification number	RO	UINT32		
0x3	Manufacture Date	Manufacture date	RO	STRING		
0x4	Software Ident Number	Identification number of firmware	RO	UINT32		
0x5	Software Version	Firmware version number	RO	UINT32		
0x6	Hardware Version	Hardware version number	RO	UINT32		
0x7	Serial Number	Serial number of device	RO	UINT32		
0x8	Product Code	Type of product (type code)	RO	UINT32		
0x9	Product Group	Specific Bürkert product group, e.g. sensor, actuator, etc. Used to configure the büS system	RO	UINT8		

Table 9: 0x2000 Buerkert Device Description Object

10.3.5.2 0x2004 Device Status Object

Sub-index	Name	Description	Access type	Data type	Data memory	Factory reset
0x2	Device Temperature	Temperature of the device in kelvin	RO	FLOAT32		
0x3	Device Supply Voltage	Supply voltage in volt	RO	FLOAT32		
0x4	Operation Time_[s]	Device operation time counter in seconds	RO	UINT32		
0x5	Maximum Device Temperature	Maximum internal device temperature in kelvin throughout the device's service life	RO	FLOAT32		
0x6	Minimum Device Temperature	Minimum internal device temperature in kelvin throughout the device's service life	RO	FLOAT32		
0x7	Maximum Device Supply Voltage	Maximum device supply voltage value since start-up	RO	FLOAT32		
0x8	Minimum Device Supply Voltage	Minimum device supply voltage value since start-up	RO	FLOAT32		

Table 10: 0x2004 Device Status Object

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10.3.5.3 0x2101 Locating function

Sub-index	Name	Description	Access type	Data type	Data memory	Factory reset
0x1	Locating function	Activate or deactivate locating function: This function enables a device in the system to be located using the PLC. The top LED indicator will briefly start to flash when the locating function is activated (fast flashing LEDs) 0 = activated 1 = deactivated	RW	UINT8		

Table 11: 0x2101 Locating function

10.3.5.4 0x2120 LED mode

Sub-index	Name	Description	Access type	Data type	Data memory	Factory reset
0x0	LED mode	Select LED indicator mode Please refer to the chapter “Device status indicator” of the operating instructions for a description of the possible indicator modes 0: NAMUR mode 1: Valve mode (signal open/closed), no errors 2: Valve mode + errors (red) 3: Valve mode + errors (red) + warnings (yellow, blue orange) 4: External color mode (defined in index 0x2122) 5: LED demo 6: LED off	RW	UINT32	x	x

Table 12: 0x2120 LED mode

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10.3.5.5 0x2122 External color

Sub-index	Name	Description	Access type	Data type	Data memory	Factory reset
0x0	Color for external color mode	Select external LED color Byte 0: Red component Byte 1: Green component Byte 2: Blue component Byte 3: Bit 0-3: 0=Always on; 1=Slow flashing; 2=Fast flashing; 3=Double flashing Byte 3: Bit 4-7: 0=Interpret bytes 0-2 as RGB; 1=Interpret byte 0 as listed color: 0: Off 1: White 2: Green 3: Blue 4: Yellow 5: Orange 6: Red	RW	UINT32	x	x

Table 13: 0x2122 External color

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10.3.5.6 0x2C01 LED color for end positions

Sub-index	Name	Description	Access type	Data type	Data memory	Factory reset
0x1	Color valve opened	LED color for valve open: Select top LED color for valve in open position 0: Off 1: White 2: Green 3: Blue 4: Yellow 5: Orange 6: Red	RW	UINT8	x	x
0x2	**Color valve closed**	LED color for valve closed: Select top LED color for valve in closed position 0 = Off 1 = White 2 = Green 3 = Blue 4 = Yellow 5 = Orange 6 = Red	RW	UINT8	**x**	**x**
0x3	**Color valve between**	LED color for valve in-between: Select top LED color for valve position between closed and open 0: Off 1: White 2: Green 3: Blue 4: Yellow 5: Orange 6: Red	RW	UINT8	**x**	**x**

Table 14: 0x2C01 LED color for end positions

10.3.5.7 0x2C0B Control head settings

Sub-index	Name	Description	Access type	Data type	Data memory	Factory reset
0x1	Upper tolerance band	Tolerance band for the upper end position (open) in mm	RW	FLOAT32	x	x

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Sub-index	Name	Description	Access type	Data type	Data memory	Factory reset
0x2	Lower tolerance band	Tolerance band for the lower end position (closed) in mm	RW	FLOAT32	x	x
0x3	Inverting CMD setpoint	Invert CMD set-point value 0 = CMD set-point value inversion inactive 1 = CMD set-point value inversion active	RW	UINT8	x	x
0x4	Opening time (CMD)	Opening time: Time needed to reach the upper tolerance band, specified in ms. The message begins when the CMD set-point value is changed	RO	UINT16		
0x5	Closing time (CMD)	Closing time: Time needed to reach the lower tolerance band, specified in ms. The message begins when the CMD set-point value is changed	RO	UINT16		
0x8	Set-point error	Select reaction in the event of a set-point error (bus error or invalid process data) 0 = Maintain position 1 = Safety position (pilot valve off)	RW	UINT8	x	x
0xA	Moving direction	Direction of valve movement -1: Valve leaves upper end position (Movement downwards) 0: Valve is in end position 1: Valve leaves lower end position (Movement upwards)	RO	SINT8		
0xC	Device lock	Activate or deactivate local operation: Button for manual operation inside the device is deactivated to prevent unintentional operation 0 = Not deactivated (button is enabled) 1 = Deactivated (button is disabled)	RW	UINT8	x	x
0xE	Opening time	Opening time: Time, measured from the time when the lower tolerance band is left until the time when the upper tolerance band is reached, specified in ms	RO	UINT16		
0xF	Closing time	Closing time: Time, measured from the time when the upper tolerance band is left until the time when the lower tolerance band is reached, specified in ms	RO	UINT16		

Table 15: 0x2C0B Control head settings

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10.3.5.8 0x2C0C Teach function

Sub-index	Name	Description	Access type	Data type	Data memory	Factory reset
0x1	Upper end position	Upper end position in mm	RO	FLOAT32		
0x2	Lower end position	Lower end position in mm	RO	FLOAT32		
0x3	Opening time	Opening time: Time, measured from the time when the upper tolerance band is left until the time when the lower tolerance band is reached, specified in ms	RO	UINT16		
0x4	Closing time	Closing time: Time, measured from the time when the lower tolerance band is left until the time when the upper tolerance band is reached, specified in ms	RO	UINT16		
0x5	Stroke	Valve stroke in mm: Valve stroke measured during last teach function	RO	FLOAT32		
0x6	Is teached	Indicates whether teach function has been successfully completed 0: Device has not been taught 1: Device has been taught	RO	UINT8		
0x7	Teach function state	State of teach function: Displays the sequence of the phases 0–5 of the teach function (negative values are indicative of error states following failure of the teach function) 0: Complete 1: Initialization 2: End position 1 (pilot valve off) 3: End position 2 (pilot valve on) 4: Check stroke 5: Determine switching time -1: Timeout end position 1 -2: Timeout end position 2 -3: Stroke too small -4: Error in determining switching time -5: Abort by SafePos -6: Abort by user	RO	UINT8		

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Sub-index	Name	Description	Access type	Data type	Data memory	Factory reset
0x8	Teach function start	Start teach function: Function for measuring the stroke, opening time, closing time and end positions. 0: Finished (teach function aborted) 1: Start automatic teach function 2: Start manual teach function	RW	UINT8		
0x9	Is NO	Flag shows pneumatic function 0: Normally closed (NC) 1: Normally open (NO)	RO	UINT8		

Table 16: 0x2C0C Teach function

10.3.5.9 0x2C0D CMD set-point

Sub-index	Name	Description	Access type	Data type	Data memory	Factory reset
0x1	CMD set-point value source	Select CMD set-point value source: Configure the source of the control signal for opening and closing the valve 0: büS/CanOpen 1: IO-Link 2: Internal button (manual) 3: Manual set-point value (see 0x4)	RW	UINT8	x	x
0x4	Manual CMD setpoint	Select manual set-point value 0: Close 1: Open	RW	UINT8		

Table 17: 0x2C0D CMD set-point

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10.3.5.10 0x2C0E Diagnostics

Sub-index	Name	Description	Access type	Data type	Data memory	Factory reset
0x1	Travel accumulator	Travel accumulator total: Travel distance of the valve spindle from factory default is added up to determine the service life.	RO	FLOAT32		
0x2	Travel accumulator resettable	Travel accumulator resettable: Travel distance of the valve spindle is added up since last reset (e.g. once maintenance is complete)	RO	FLOAT32		
0x3	Travel accumulator limit	Travel accumulator: Activate or deactivate maintenance threshold 0: Diagnostics deactivated >0: Diagnostics activated Warning is output when the resettable travel accumulator reaches this threshold	RW	Float32T	x	x
0x4	Valve cycles	Total number of switching cycles: Number of all ON/OFF switching cycles performed since factory default	RO	UINT32		
0x5	Valve cycles	Number of resettable switching cycles: Number of all ON/OFF switching cycles performed since last reset.	RO	UINT32		
0x6	Valve cycle limit	Switching cycles: Activate or deactivate maintenance threshold 0: Diagnostics deactivated >0: Diagnostics activated Warning is output when the number of resettable switching cycles reaches this threshold	RW	UINT32	x	x
0x7	Operating time resettable	Operating time counter [s] resettable: Sum of the time for which the device was receiving an operating voltage.	RO	UINT32		
0x8	Operating time limit	Operating time counter: Activate or deactivate maintenance threshold 0: Diagnostics deactivated >0: Diagnostics activated Warning is output when the resettable operating time counter reaches this threshold	RW	UINT32	x	x

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Sub-index	Name	Description	Access type	Data type	Data memory	Factory reset
0x9	Reset command	Reset counters: The resettable counters can be reset as follows: Bit0 = 1: Reset switching cycles Bit1 = 1: Reset travel accumulator Bit2 = 1: Reset operating time counters Bit3 = 1: Reset number of opening time timeouts Bit4 = 1: Reset number of closing time timeouts Bit5 = 1: Import measured switching times (0xA and 0xB). Source dependent on setting in 0x15 Bit6 = 1: Reset number of switching time timeouts	RW	UINT8		
0xA	Opening time limit	Maximum opening time [ms]: Configurable opening time from which a warning (active) should be generated to indicate potential faults in the system (e.g. pilot pressure too low, excessive friction in actuator, etc.).	RW	UINT16	x	x
0xB	Closing time limit	Maximum closing time [ms]: Configurable closing time from which a warning (active) should be generated to indicate potential faults in the system (e.g. pilot pressure too low, excessive friction in actuator, etc.).	RW	UINT16	x	x
0xC	Time tolerance	Tolerance for configurable switching times [%]: Specifies the tolerance for the parameters “opening time limit” and “closing time limit”, from which point an active warning is generated.	RW	UINT8	x	x
0xD	Opening time error counter	Number of times opening time threshold exceeded (resettable): Value configured in “opening time limit” + “time tolerance” has been exceeded	RO	UINT32		
0xE	Closing time error counter	Number of times closing time threshold exceeded (resettable): Value configured in “closing time limit” + “time tolerance” has been exceeded	RO	UINT32		
0xF	Teach function counter	Number of teach functions performed	RO	UINT32		

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Sub-index	Name	Description	Access type	Data type	Data memory	Factory reset
0x10	Pilot valve cycles	Number of pilot valve switching cycles	RO	UINT32		
0x11	Active warnings	Active warnings (bit field) Bit0: Travel accumulator threshold reached Bit1: Valve switching cycle threshold reached Bit2: Operating time threshold reached Bit3: Opening time timeout Bit4: Closing time timeout Bit5: Calibration required Bit6: Tolerance bands overlap	RO	UINT16		
0x12	Switching time out counter	Number of switching time timeouts	RO	UINT32		
0x13	Active errors	Active errors (bit field) Bit0: Switching time timeout Bit1: Teach function error Bit2: Position sensor error Bit3: IO-Link set-point value error Bit4: büS/CanOpen set-point value error	RO	UINT16		
0x15	Time diagnostic type	Select type of switching times for diagnostics: 0: Use switching time based on CMD set-point value (0x2C0B sub-index 0x4 and 0x5) 1: Use switching time based on position (0x2C0B sub-index 0xE and 0xF)	RW	UINT8	x	x
0x17	Switching timeout detection	Activate or deactivate switching time timeout detection: If activated, switching time timeouts are detected whenever the end position is not reached within a certain time (sub-index 0x18) 0: Deactivated 1: Activated	RW	UINT8	x	x
0x18	Switching timeout	Select maximum time by which the end position should be reached	RW	UINT16	x	x

Table 18: 0x2C0E Diagnostics

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10.3.5.11 0x2C0F IO-Link SIO mode settings

Sub-index	Name	Description	Access type	Data type	Data memory	Factory reset
0x1	SIO mode	Select SIO mode: 0: Pin 4 (output) Low = Valve not closed; High =Valve closed Pin 2 (output) Low = Valve not open; High =Valve open 1: Pin 4 (output) Low = Valve not closed; High =Valve closed Pin 2 (input) as CMD set-point value Low = Closed; High =Open PD set-point value is ignored 2: Pin 4 (output) Low = Valve not open; High =Valve open Pin 2 (input) as CMD set-point value Low = Closed; High =Open PD set-point value is ignored **Device must be restarted!**	RW	UINT8	x	x
0x2	Output type	Select switching mode of SIO outputs: 0: PNP (plus switching) 1: NPN (ground switching) 2: PP (push-pull output) **Device must be restarted!**	RW	UINT8	x	x

Table 19: 0x2C0F IO-Link SIO mode settings

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10.3.5.12 IO-Link-Events

Message	Description	IO-Link event code	IO-Link event type	Action
Internal error	Internal device error	0x1000	ERROR	Contact Bürkert Service
Internal error: WMS signal error	Data from WMS defective	0x1800	ERROR	Restart device If fault persists, contact Bürkert Service
IO-Link error	IO-Link bus error	0x1801	ERROR	Check IO-Link connection
Tolerance bands overlap	Tolerance bands for the upper and lower position overlap	0x1802	WARNING	Check whether the teach function has been successfully performed. Check whether the tolerance bands have been correctly configured (total of both tolerance bands should be greater than the calculated stroke)
Teach function required	No teach function present	0x1803	WARNING	Starting teach function
Teach function active	Teach function running	0x1804	WARNING	Wait until teach function has been completed
Teach function error	Teach function error	0x1805	ERROR	Check pilot pressure Check pilot valve Restart teach function If fault persists, contact Bürkert Service
büS error	Communication error	0x1806	ERROR	Check signal to büS partner Check büS network Check büS producer
Travel limit exceeded	Specified travel distance exceeded	0x1807	WARNING	Where appropriate, check wear-and-tear parts in pneumatic actuator and valve
Switching cycle limit exceeded	Specified switching cycle limit exceeded	0x1808	WARNING	Where appropriate, check wear-and-tear parts in pneumatic actuator and valve
Operating time limit exceeded	Specified operating time limit exceeded	0x1809	WARNING	Perform maintenance as appropriate
Closing time threshold exceeded	Specified closing time and tolerance exceeded	0x180A	WARNING	1. Check compressed air supply 2. Check actuator and valve for friction
Opening time threshold exceeded	Specified opening time and tolerance exceeded	0x180B	WARNING	1. Check compressed air supply 2. Check actuator and valve for friction
Switching timeout	End position not reached	0x180C	ERROR	Check pilot pressure Check pilot valve Restart teach function If fault persists, contact Bürkert Service

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Message	Description	IO-Link event code	IO-Link event type	Action
Temperature error overload	Device temperature for operation too high or too low	0x4000	ERROR	Modify ambient temperature. If fault persists, contact Bürkert Service
Temperature warning upper threshold exceeded	Ambient temperature too high or excessive friction in actuator	0x4210	WARNING	Reduce ambient temperature. If fault persists, contact Bürkert Service.
Temperature warning lower threshold exceeded	Ambient temperature too low	0x4220	WARNING	Increase ambient temperature
General power supply error	Supply voltage for operation of device too high or too low	0x5100	ERROR	Check supply voltage Contact Bürkert Service
Voltage warning upper threshold exceeded	Supply voltage too high	0x5110	WARNING	Check supply voltage
Voltage warning lower threshold exceeded	Supply voltage too low	0x5111	WARNING	Check supply voltage

Table 20: IO-Link-Events

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10.4 büS

10.4.1 Information, büS

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

10.4.2 Interfaces, büS

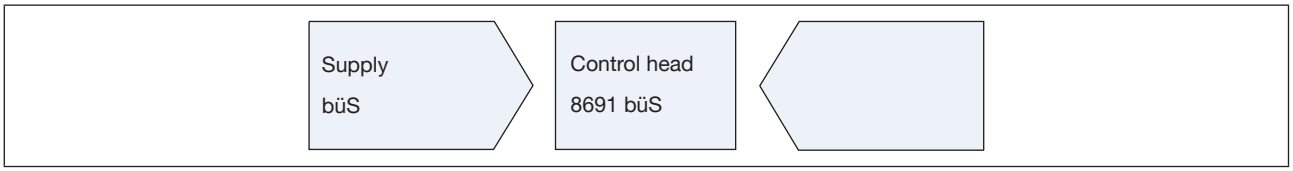

Figure 33: Interfaces

10.4.3 Objects

10.4.3.1 0x2000 Buerkert Device Description Object

Sub-index	Name	Description	Access type	Factory reset
1	Device Name	Unique device name Used to identify the device by name in a büS system (e.g. Bürkert Communicator) (in conjunction with User Configuration Object)	RO	
2	Ident Number	Device identification number (in conjunction with Common Object)	RO	
3	Manufacture Date	Manufacture date (in conjunction with Common Object)	RO	
4	Software Ident Number	Identification number of firmware	RO	
5	Software Version	Firmware version number	RO	
6	Hardware Version	Hardware version number	RO	
7	Serial Number	Serial number of device (in conjunction with Common Object)	RO	
8	Product Code	Type of product (type code) (in conjunction with Common Object)	RO	
9	Product Group	Specific Bürkert product group, e.g. sensor, actuator, etc. Used to configure the büS system	RO	

Table 21: 0x2000 Buerkert Device Description Object

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10.4.3.2 0x2001 Device Communication Object

Sub-index	Name	Description	Access type	Factory reset
1	Baud rate	Specified by CANopen (see chapter on baud rates for more details)	RW	x
2	Address	Device address range 0...127 handled automatically in büS mode	RW	x
3	büS mode	Select büS mode 0: CANopen For CANopen applications 1: büS mode For CANopen, supplemented with specific Bürkert communication elements	RW	x
4	Reset	Handles various device resets 1: Communication reset 2: Node reset (device reset) 3: büS reset 4: Factory reset 5: Device starts in bootloader mode	RW	
5	büS version	Version number of büS driver	RO	
6	Rx error count	Number of Rx errors occurred during device service life	RO	
7	Rx error count max	Maximum number of Rx errors occurred	RW	
8	Tx error count	Number of Tx errors occurred during device service life	RO	
9	Tx error count max	Maximum number of Tx errors occurred	RW	
A	CAN operation status	CAN operating state	RO	
C	Deallocation delay	Delay time [ms] to wait between partner allocations with remote nodes until retry	RW	x
D	EDS Version	Version number of EDS file		

Table 22: 0x2001 Device Communication Object

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10.4.3.3 0x2002 User Configuration Object

Sub-index	Name	Description	Access type	Factory reset
1	Unique Device Name	Imported by Bürkert Device Description Object during device startup	RW	x
2	Location Information	Additional user information about device location	RW	x
3	User Description	Additional user-defined information about the device	RW	x
4	Displayed Device Name	The device name that is displayed	RW	x

Table 23: 0x2002 User Configuration Object

10.4.3.4 0x2004 Device Status Object

Sub-index	Name	Description	Access type	Factory reset
1	Device Status NamurNe107	Matches the device status, see table “Device Status”	RO	
2	Device Temperature	Temperature of the device in kelvin	RO	
3	Device Supply Voltage	Supply voltage	RO	
4	Operation Time_[s]	Device operation time counter in seconds	RO	
5	Maximum Device Temperature	Maximum internal device temperature in kelvin throughout the device’s service life	RO	
6	Minimum Device Temperature	Minimum internal device temperature in kelvin throughout the device’s service life	RO	
7	Maximum Device Supply Voltage	Maximum device supply voltage value since start-up	RO	
8	Minimum Device Supply Voltage	Minimum device supply voltage value since start-up	RO	

Table 24: 0x2004 Device Status Object

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Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Gateway: 0 - Run 1 - Stop 0 if no gateway is supported by device	F(x): 0 - Run 1 - Stop 0 if no F(x) functionality is supported by device	NAMUR mode: 0 - Automatic 1 - Manual 2 - Flash		NAMUR state 0 - Normal 1 - Diagnostics active 2 - Maintenance required 3 - Out of specification 4 - Warning 5 - Error			

Table 25: Device status

10.4.3.5 0x2100 Get Mapping Function

Internal function

10.4.3.6 0x2101 Locating function

Sub-index	Name	Description	Access type	Factory reset
1	call/cancel	Internal büS function This function enables a device in the system to be located using the control system. The top LED indicator will briefly start to flash when the locating function is activated (fast flashing LEDs) 0 = activated 1 = deactivated	RW	

Table 26: 0x2101 Locating function

10.4.3.7 0x2102 Blockdownload Config Function

Internal function

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10.4.3.8 0x2120 LED mode

Sub-index	Name	Description	Access type	Factory reset
0x0	LED modes	Select LED indicator mode Please refer to the chapter “Device status indicator” of the operating instructions for a description of the possible indicator modes 0: NAMUR mode 1: Valve mode (signal open/closed), no errors 2: Valve mode + errors (red) 3: Valve mode + errors (red) + warnings (yellow, blue orange) 4: External color mode (defined in index 0x2122) 6: LED off	RW	x

Table 27: 0x2120 LED mode

10.4.3.9 0x2122 External color

Sub-index	Name	Description	Access type	Factory reset
0x0	Color for external color mode	Select external LED color Byte 0: Red component Byte 1: Green component Byte 2: Blue component Byte 3: Bit 0-3: 0=Always on; 1=Slow flashing; 2=Fast flashing; 3=Double flashing Byte 3: Bit 4-7: 0=Interpret bytes 0-2 as RGB; 1=Interpret byte 0 as listed color: 0: Off 1: White 2: Green 3: Blue 4: Yellow 5: Orange 6: Red	RW	x

Table 28: 0x2122 External color

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10.4.3.10 0x2200 Buerkert Driver Archive

Internal object

10.4.3.11 0x2220 EDS

Internal object

10.4.3.12 0x2400 Sensor Type

Internal object

10.4.3.13 0x2420 No Measure Values

Internal object

10.4.3.14 0x2421 No Control Values

Internal object

10.4.3.15 0x2422 No Calibration Values

Internal object

10.4.3.16 0x2426 MPDO Inhibit Time bueS

Internal object

10.4.3.17 0x242C Partner Status Object

Internal object

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10.4.3.18 0x2500 GMV Position

Sub-index	Name	Description		Access type	Factory reset
1	Value	Current valve position in %		RWR	
2	Unit	0xFE000000	%	RO	
3	Name	GMV position	Object name	RO	
4	Classification	0x000E	büS-specific	RO	
5	Data type	0x08	REAL32	RO	
6	Precision	0.1	büS-specific	RO	
7	Feature group	0	büS-specific Used for automatic configuration in büS system	RW	x

Table 29: 0x2500 GMV Position

10.4.3.19 0x2501 GMV End Positions

Sub-index	Name	Description		Access type	Factory reset
1	Value	Bit field for end position Bit0: Open Bit1: Closed		RWR	
2	Unit	0x0		RO	
3	Name	GMV.Valve.EndPos	Object name	RO	
4	Classification	0x000E	büS-specific	RO	
5	Data type	0x05	UINT8	RO	
6	Precision	1	büS-specific	RO	
7	Feature group	0	büS-specific used for automatic configuration in büS system	RW	x

Table 30: 0x2501 GMV End Positions

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10.4.3.20 0x2540 GCV Setpoint

Sub-index	Name	Description		Access type	Factory reset
1	Value	CMD set-point value Bit0: Closed Bit1: Open		RWR	
2	Unit	0x0		RO	
3	Name	GCV.Setpoint	Object name	RO	
4	Classification	0x001C	büS-specific	RO	
5	Data type	0x05	UINT8	RO	
6	Precision	1	büS-specific	RO	
7	Feature group	0	büS-specific used for automatic configuration in büS system	RW	x

Table 31: 0x2540 GCV Setpoint

10.4.3.21 0x2C01 LED colors

Sub-index	Name	Description	Access type	Factory reset
0x1	LED_ColorOpened	LED color for valve open: Select top LED color for valve in open position 0: Off 1: White 2: Green 3: Blue 4: Yellow 5: Orange 6: Red	RW	x
0x2	LED_ColorClosed	LED color for valve closed: Select top LED color for valve in closed position 0 = Off 1 = White 2 = Green 3 = Blue 4 = Yellow 5 = Orange 6 = Red	RW	x

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Sub-index	Name	Description	Access type	Factory reset
0x3	LED_ColorBetween	LED color for valve in-between: Select top LED color for valve position between closed and open 0: Off 1: White 2: Green 3: Blue 4: Yellow 5: Orange 6: Red	RW	x

Table 32: 0x2C01 LED Colors

10.4.3.22 0x2C0B XControl

Sub-index	Name	Description	Access type	Factory reset
0x1	UpperToleranceBand	Tolerance band for the upper end position (open) in mm	RW	x
0x2	LowerToleranceBand	Tolerance band for the lower end position (closed) in mm	RW	x
0x3	InvertSetpoint	Invert CMD set-point value 0 = CMD set-point value inversion inactive 1 = CMD set-point value inversion active	RW	x
0x4	T_open	Opening time: Time needed to reach the upper tolerance band, specified in ms. The message begins when the CMD set-point value is changed	RO	
0x5	T_close	Closing time: Time needed to reach the lower tolerance band, specified in ms. The message begins when the CMD set-point value is changed	RO	
0x6	ValveState	Select bit field for end position Bit0: Open Bit1: Closed	RO	
0x8	SafePosActive	Select reaction in the event of a set-point error (bus error or invalid process data) 0 = Maintain position 1 = Safety position (pilot valve off)	RW	x

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Sub-index	Name	Description	Access type	Factory reset
0xB	ValveMode	Valve mode 0 = Initialization 1 = AUTOMATC operating state 2 = Teach function active 3 = SafePos active	RO	
0xC	Device lock	Activate or deactivate local operation: Button for manual operation inside the device is deactivated to prevent unintentional operation 0 = Not deactivated (button is enabled) 1 = Deactivated (button is disabled)	RW	x
0xE	T_opening	Closing time: Time, measured from the time when the lower tolerance band is left until the time when the upper tolerance band is reached, specified in ms	RO	
0xF	T_closing	Opening time: Time, measured from the time when the upper tolerance band is left until the time when the lower tolerance band is reached, specified in ms	RO	

Table 33: 0x2C0B Control head settings

10.4.3.23 0x2C0C Teach function

Sub-index	Name	Description	Access type	Factory reset
0x1	Upper end position	Upper end position in mm	RO	
0x2	Lower end position	Lower end position in mm	RO	
0x3	T_open	Opening time: Time, measured from the time when the upper tolerance band is left until the time when the lower tolerance band is reached, specified in ms	RO	
0x4	T_close	Closing time: Time, measured from the time when the lower tolerance band is left until the time when the upper tolerance band is reached, specified in ms	RO	
0x5	Stroke mm	Valve stroke in mm: Valve stroke measured during last teach function	RO	

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Sub-index	Name	Description	Access type	Factory reset
0x6	IsCalibrated	Indicates whether teach function has been successfully completed 0: Device has not been taught 1: Device has been taught	RO	
0x7	TuneState	State of teach function: Displays the sequence of the phases 0–5 of the teach function (negative values are indicative of error states following failure of the teach function) 0: Complete 1: Initialization 2: End position 1 (pilot valve off) 3: End position 2 (pilot valve on) 4: Check stroke 5: Determine switching time -1: Timeout end position 1 -2: Timeout end position 2 -3: Stroke too small -4: Error in determining switching time -5: Abort by SafePos -6: Abort by user	RO	
0x8	StartTune	Start teach function: Function for measuring the stroke, opening time, closing time and end positions. 0: Finished (teach function aborted) 1: Start automatic teach function 2: Start manual teach function	RW	
0x9	IsNO	Flag shows pneumatic function 0: Normally closed (NC) 1: Normally open (NO)	RO	

Table 34: 0x2C0C Teach function

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10.4.3.24 0x2C0D CMD set-point

Sub-index	Name	Description	Access type	Factory reset
0x1	CMD set-point value source	Select CMD set-point value source: Configure the source of the control signal for opening and closing the valve 0: büS/CanOpen 1: IO-Link 2: Internal button (manual) 3: Manual set-point value (see 0x4)	RW	x
0x4	Manual CMD setpoint	Select manual set-point value 0: Close 1: Open	RW	

Table 35: 0x2C0D CMD set-point

10.4.3.25 0x2C0E Diagnostics

Sub-index	Name	Description	Access type	Factory reset
0x1	Totalizer TravelAccu	Travel accumulator total: Travel distance of the valve spindle from factory default is added up to determine the service life.	RO	
0x2	Totalizer TravelAccu Service	Travel accumulator resettable: Travel distance of the valve spindle is added up since last reset (e.g. once maintenance is complete)	RO	
0x3	Totalizer TravelAccu Service Limit	Travel accumulator: Activate or deactivate maintenance threshold 0: Diagnostics deactivated >0: Diagnostics activated Warning is output when the resettable travel accumulator reaches this threshold	RW	x
0x4	Totalizer Valve Cycles	Total number of switching cycles: Number of all ON/OFF switching cycles performed since factory default	RO	
0x5	Totalizer Valve Cycles Service	Number of resettable switching cycles: Number of all ON/OFF switching cycles performed since last reset.	RO	

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Sub-index	Name	Description	Access type	Factory reset
0x6	Totalizer Valve Cycles Service Limit	Switching cycles: Activate or deactivate maintenance threshold 0: Diagnostics deactivated >0: Diagnostics activated Warning is output when the number of resettable switching cycles reaches this threshold	RW	x
0x7	Totalizer Time Service	Operating time counter [s] resettable: Sum of the time for which the device was receiving an operating voltage.	RO	
0x8	Totalizer Time Service Limit	Operating time counter: Activate or deactivate maintenance threshold 0: Diagnostics deactivated >0: Diagnostics activated Warning is output when the resettable operating time counter reaches this threshold	RW	x
0x9	DiagControlCommand	Reset counters: The resettable counters can be reset as follows: Bit0 = 1: Reset switching cycles Bit1 = 1: Reset travel accumulator Bit2 = 1: Reset operating time counters Bit3 = 1: Reset number of opening time timeouts Bit4 = 1: Reset number of closing time timeouts Bit5 = 1: Import measured switching times (0xA and 0xB). Source dependent on configuration of 0x15 Bit6 = 1: Reset number of switching time timeouts	RW	
0xA	OpeningTimeLimit	Maximum opening time [ms]: Configurable opening time from which a warning (active) should be generated to indicate potential faults in the system (e.g. pilot pressure too low, excessive friction in actuator, etc.).	RW	x
0xB	ClosingTimeLimit	Maximum closing time [ms]: Configurable closing time from which a warning (active) should be generated to indicate potential faults in the system (e.g. pilot pressure too low, excessive friction in actuator, etc.).	RW	x
0xC	TimeTolerance	Tolerance for configurable times [%]: Specifies the tolerance for the parameters “opening time limit” and “closing time limit”, from which point an active warning is generated.	RW	x

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Sub-index	Name	Description	Access type	Factory reset
0xD	OpeningErrorCnt	Number of times opening time threshold exceeded (resettable): Value configured in “opening time limit” + “time tolerance” has been exceeded	RO	
0xE	ClosingErrorCnt	Number of times closing time threshold exceeded (resettable): Value configured in “closing time limit” + “time tolerance” has been exceeded	RO	
0xF	TuneStarts	Number of teach functions performed	RO	
0x10	PilotValveCycles	Number of pilot valve switching cycles	RO	
0x11	ActiveWarnings	Active warnings (bit field) Bit0: Travel accumulator threshold reached Bit1: Valve switching cycle threshold reached Bit2: Operating time threshold reached Bit3: Opening time timeout Bit4: Closing time timeout Bit5: Calibration required Bit6: Tolerance bands overlap	RO	
0x12	SwitchingTimeoutCnt	Number of switching timeouts	RO	
0x13	ActiveErrors	Active errors (bit field) Bit0: Switching timeout Bit1: Teach function error Bit2: Position sensor error Bit3: IO-Link set-point value error Bit4: büS/CanOpen set-point value error	RO	
0x15	TimeDiagnosticType	Select type of switching times for diagnostics: 0: Use switching time based on CMD set-point value (0x2C0B sub-index 0x4 and 0x5) 1: Use switching time based on position (0x2C0B sub-index 0xE and 0xF)	RW	x
0x17	SwitchingTimeoutDetection	Activate or deactivate switching timeout detection: If activated, switching timeouts are detected whenever the end position is not reached within a certain time (sub-index 0x18) 0: Deactivated 1: Activated	RW	x
0x18	SwitchingTimeout	Select maximum time by which the end position should be reached	RW	x

Table 36: 0x2C0E Diagnostics

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10.4.3.26 0x2C0F IO-Link SIO mode settings

Internal object

10.4.3.27 0x2C11 MenuOptionBits

Internal object

10.4.3.28 0x2C13 FactoryReset

Sub-index	Name	Description	Access type	Factory reset
		Factory reset parameters 0: Complete 111: Factory reset start	RW	

Table 37: 0x2C13 FactoryReset

10.4.3.29 Baud rates

The applied baud rates can be configured in “Device Communication Object (0x2001sub1)”. The supported baud rates are specified in the EDS file.

Possible values:

0: 1000 kbit/s
1: 800 kbit/s (not supported)
2: 500 kbit/s (default)
3: 250 kbit/s
4: 125 kbit/s
5: 100 kbit/s
6: 50 kbit/s
7: 20 kbit/s
8: 10 kbit/s

10.4.3.30 Cyclic data

RPDOs (received data)

1. Receive PDO mapping parameter 0:
   Sub1: PDO mapping entry (object 2540sub1)

TPDOs (sent data)

1. Send PDO mapping parameter 0:
   Sub1: PDO mapping position (object 2500sub1)
   Sub2: PDO mapping end positions (object 2501sub1

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11 OPERATION

11.1 Display device status, IO-Link and büS

Following device statuses are indicated with LEDs:

- Pilot valve LED: Activation of pilot valve
- Device status LED: Valve position, errors, warnings
- Status LED green: IO-Link mode
- Status LED red: Teach function, error

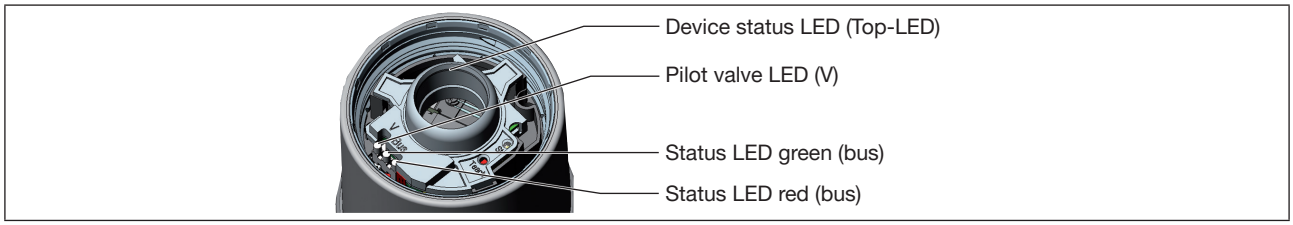

Figure 34: Display device status

Note the following when opening and closing the transparent cap:

NOTE

Breakage of the pneumatic connection pieces due to rotational impact.

▸ When opening or closing the device, do not press against the actuator, but against the basic housing.

NOTE

Damage or malfunction due to ingress of dirt or moisture.

To observe the degree of protection IP65 or IP67:

▸ Screw in transparent cap to the stop.

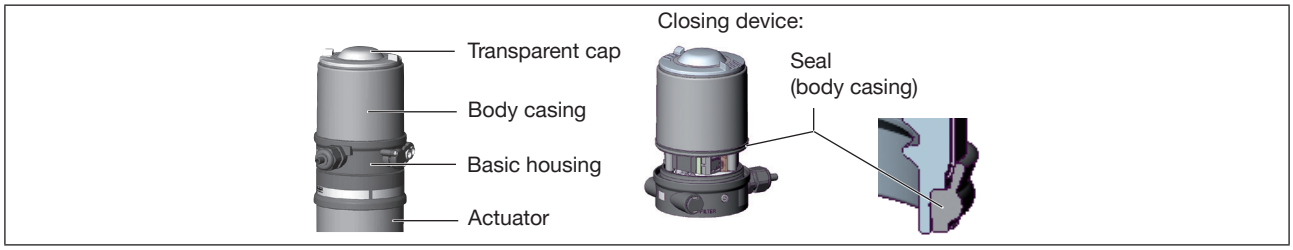

Figure 35: Opening or closing the device

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11.1.1 Pilot valve LED

Color	Status	Description
yellow	is lit	Pilot valve is activated
yellow	is not lit	Pilot valve is not activated

Table 38: Pilot valve LED

11.1.2 Status LED, green and red

Color	Status	Description
green	is lit	
green	is not lit	IO-Link communication inactive
green	blinking	IO-Link communication active

Table 39: IO-Link status LED, green

Color	Status	Description
red	is lit	Teach function error
red	is not lit	After restart or successful teach function
red	blinking	Teach function active

Table 40: IO-Link status LED, red

11.1.3 Device status display

The device status LEDs (top LED) show the device status.

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

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

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

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

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

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11.1.3.1 Valve mode

Displays in valve mode:

- Valve position: open, half-way, closed

Valve position	Valve position status, color
Open	is lit yellow*
Half-way	LED off*
Closed	is lit green*

Table 41: Valve mode

11.1.3.2 Valve mode + errors

Displays in valve mode + errors:

- Valve position: open, half-way, closed
- Device status: Error

Valve position	Valve position status, color	Device status: Error status, color
Open	is lit yellow*	blinks alternately with color of valve position
Half-way	is lit white*	blinks alternately with color of valve position
Closed	is lit green*	blinks alternately with color of valve position

Table 42: Valve mode + errors

11.1.3.3 Valve mode + errors + warnings

Displays in valve mode + errors + warnings:

- Valve position: open, half-way, closed
- Device status: Error
- Device status: Displays of NAMUR mode

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

Valve position	Valve position status, color	Device status: Error status, color
Open	is lit yellow*	blinks alternately red and yellow*
Half-way	is lit white*	blinks alternately red and white*
Closed	is lit green*	blinks alternately red and green*

Table 43: Valve mode + errors + warnings, part 1

** Factory setting, selectable colors for the valve position: Off, white, green, blue, yellow, orange, red*

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Valve position	Valve position status, color	Device status: Function control status, color
Open	is lit yellow*	blinks alternately orange and yellow*
Half-way	is lit white*	blinks alternately orange and white*
Closed	is lit green*	blinks alternately orange and green*

Table 44: Valve mode + errors + warnings, part 2

Valve position	Valve position status, color	Device status: Out of specification status, color
Open	is lit yellow*	blinks alternately yellow and yellow*
Half-way	is lit white*	blinks alternately yellow and white*
Closed	is lit green*	blinks alternately yellow and green*

Table 45: Valve mode + errors + warnings, part 3

Valve position	Valve position status, color	Device status: Maintenance required status, color
Open	is lit yellow*	blinks alternately blue and yellow*
Half-way	is lit white*	blinks alternately blue and white*
Closed	is lit green*	blinks alternately blue and green*

Table 46: Valve mode + errors + warnings, part 4

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

For localizations, the colors are only shown momentarily.

** Factory setting, selectable colors for the valve position: Off, white, green, blue, yellow, orange, red*

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11.1.3.4 NAMUR mode

The device status LEDs (top LED) show the device status.

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

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

Status display in accordance with NE 107, edition 2006-06-12			
Color	**Color code**	**Status**	**Description**
Red	5	Outage, error or malfunction	Normal operation is not possible due to a malfunction in the device or on its peripheral equipment.
Orange	4	Function check	Work is being carried out on the device; normal operation is therefore temporarily not possible
Yellow	3	Out of specification	Ambient conditions or process conditions for the device are outside the specified area.
Blue	2	Maintenance required	The device is in normal operation, although a function is briefly restricted. →Service device.
Green	1	Diagnostics active	Device is operating perfectly. Status changes are indicated in different colors. Messages are transmitted via a fieldbus if connected.

Table 47: Description of the colors

11.2 Switching the device manually with pilot valve

The device can be switched manually with the pilot valve when the control air is connected.

Opening the device:

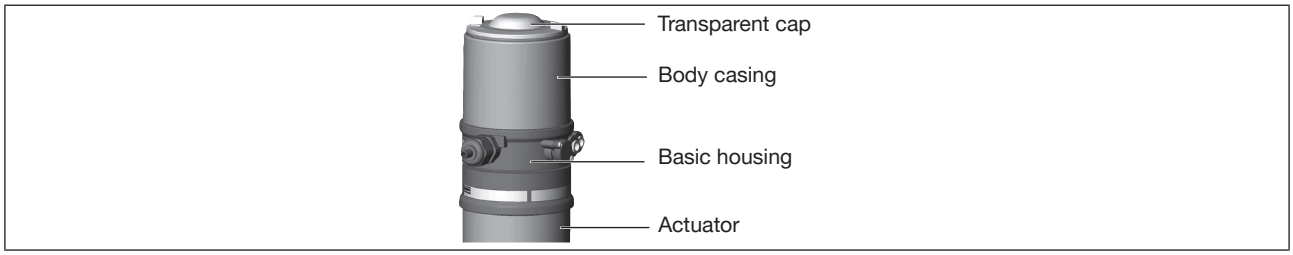

Figure 36: Opening the device

NOTE

Breakage of the pneumatic connection pieces due to rotational impact.

▸ When opening or closing the device, do not press against the actuator, but against the basic housing.

→ Screw off the body casing by turning counterclockwise.

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Switching the device:

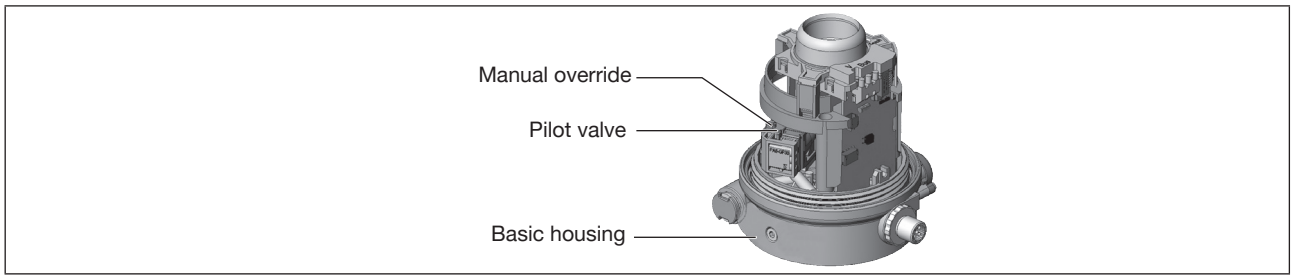

Figure 37: Manually switching the device

NOTE

Damage to the manual override by pressing and rotating at the same time.

▸ Do not simultaneously press and turn manual override.

Switching the positions for manual override:

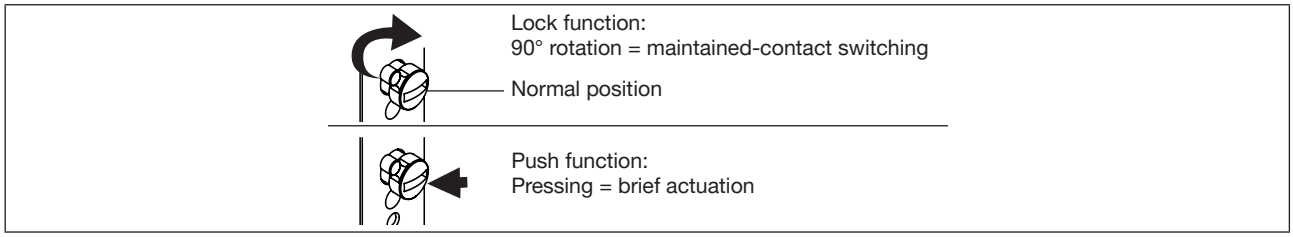

Figure 38: Manual override

→ Switch manual override with a screwdriver (button or click).

Closing the device:

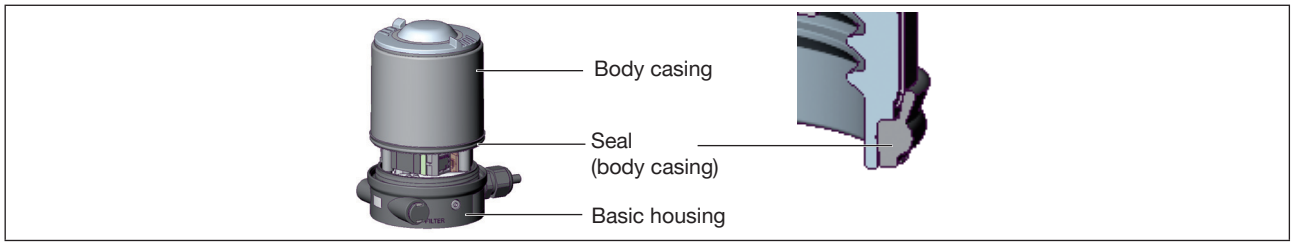

Figure 39: Closing the device

→ Check that seal is in the correct position.

NOTE

Damage or malfunction due to ingress of dirt or moisture.

To observe the degree of protection IP65 or IP67:

▸ Screw in body casing to the stop.

→ Close the device (wrench*: 674077).

** The wrench (674077) is available from your Bürkert sales office..*

12 MAINTENANCE

12.1 Servicing the air intake filter

To protect the pilot valve and actuator, the pilot air is filtered.

Air flows through the air intake filter from inside to outside through the filter fabric in its pre-installed state.

DANGER!

Risk of injury if not maintained correctly.

- Only trained and qualified personnel may perform maintenance.
- Perform maintenance with suitable tools only.

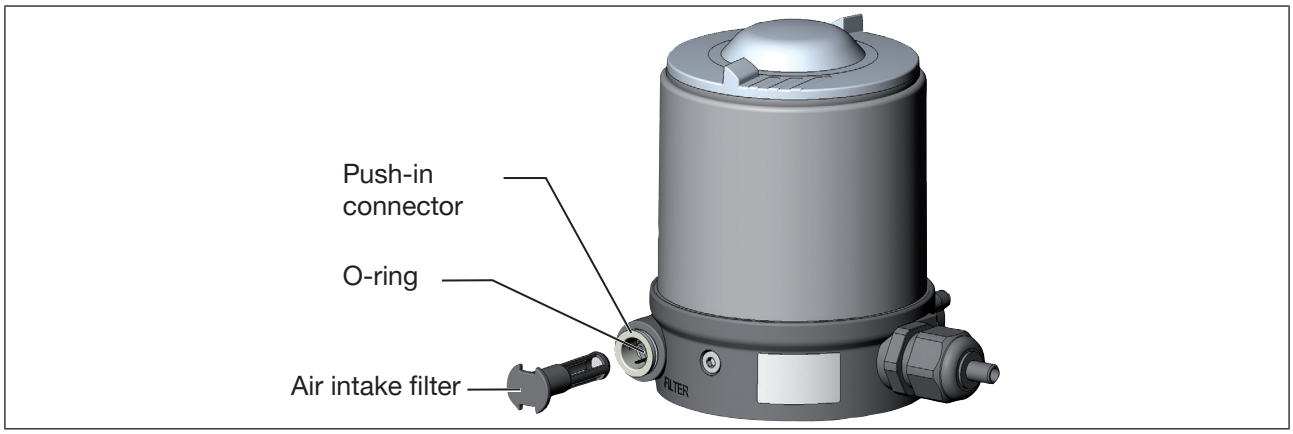

Figure 40: Servicing the air intake filter

DANGER!

Risk of injury from high pressure and discharge of medium.

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

→ Unclamp the push-in connector by pressing the collet, then pull out the air intake filter. If necessary, use a suitable tool between the recesses in the head of the air intake filter.

→ Clear or (if appropriate) replace the filter.

→ Check the intside O-ring and clean if necessary.

→ Push the air intake filter into the push-in connector as far as it will go.

→ Ensure that the air intake filter is securely seated.

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13 DEINSTALLATION

13.1 Safety instructions deinstallation

DANGER

Risk of injury from high pressure and discharge of medium.

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

DANGER

Risk of injury from electric shock.

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

WARNING

Risk of injury due to improper deinstallation.

- Only trained technicians may perform deinstallations.
- Perform deinstallations with suitable tools only.

WARNING

Risk of injury due to unintentional activation and uncontrolled start-up of the system.

- Secure system against unintentional activation.
- Ensure that the system does not start up in an uncontrolled manner.

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13.2 Deinstallation

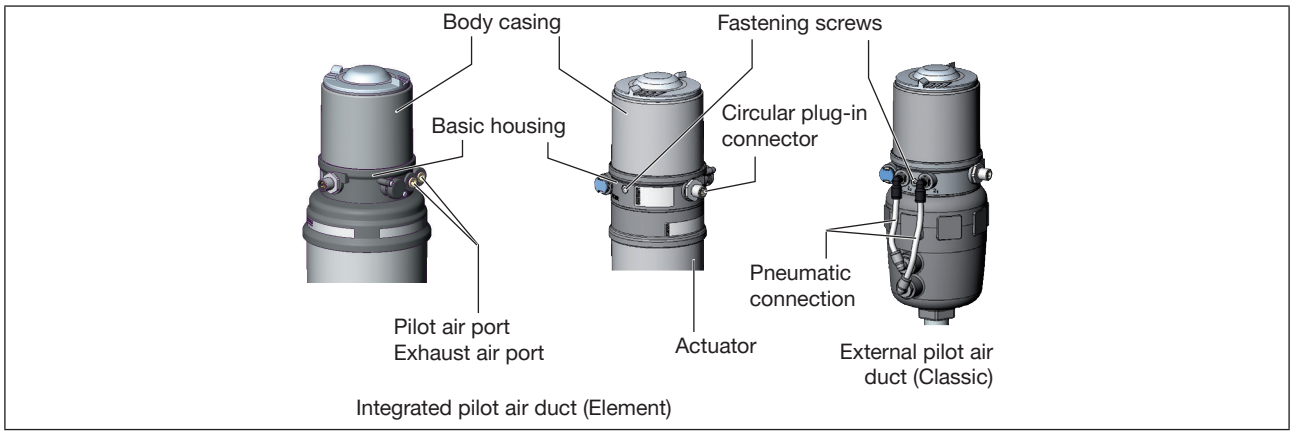

Figure 41: Deinstalling the device

Pneumatically deinstalling the device

→ Disconnect pilot air port.

→ When exhaust air port connected: Disconnect exhaust air port:

→ With external control air duct (Classic):
Disconnect the pneumatic connection to the actuator.

Electrically deinstalling the device

Devices with circular plug-in connector:

→ Disconnect the circular plug.

Mechanically deinstalling the device

→ Release the fastening screws.

→ Pull off the device by lifting upward.

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14 SPARE PARTS, ACCESSORIES

Designation	Order no.
Special wrench	665702
Wrench for opening/closing the transparent cap	674077
Communication software Bürkert Communicator	Information at www.burkert.com

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

Table 48: Accessories

14.1 Communications software

The Bürkert Communicator PC program is designed for communication with Type 8691 devices with fieldbus control via DeviceNet, IO-Link or büS. Devices from year of construction April 2014 support the full range of functions.

For questions regarding compatibility, please contact the Bürkert Sales Center.

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

Download the software from: www.burkert.com

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15 TRANSPORTATION, STORAGE, DISPOSAL

NOTE

Damage in transit due to inadequately protected devices.

- ▸ Protect the device against moisture and dirt in shock-resistant packaging during transportation.
- ▸ Observe permitted storage temperature.

NOTE

Incorrect storage may damage the device.

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

NOTE

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

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

Observe national regulations on the disposal of waste.

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