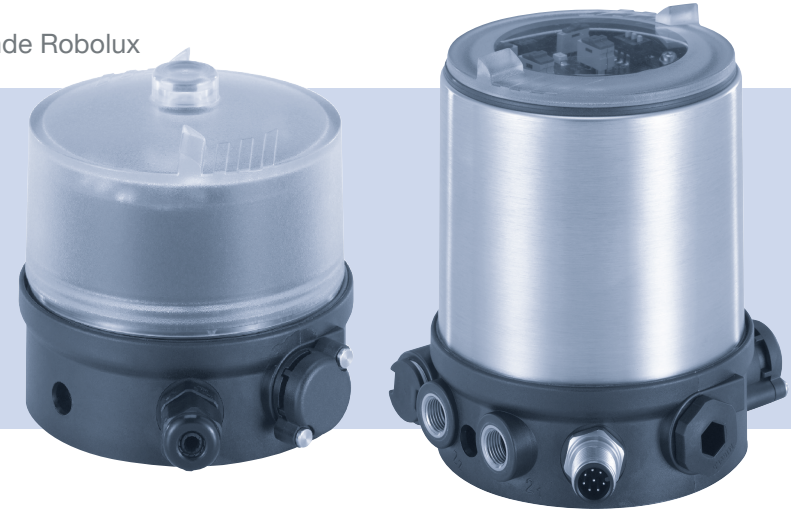
bürkert
FLUID CONTROL SYSTEMS

Type 8685 / 8686

Feedback Head / Control Head Robolux
Rückmeldekopf / Steuerkopf Robolux
Tête de recopie de position / Tête de commande Robolux



Operating Instructions

Bedienungsanleitung
Manuel d'utilisation

MAN 1000329132 EN Version: EStatus: RL (released | freigegeben) printed: 15.10.2026

We reserve the right to make technical changes without notice.
Technische Änderungen vorbehalten.
Sous réserve de modifications techniques.

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Operating Instructions 2211/06_EU-ml_00809600 / Original DE

MAN 1000329132 EN Version: EStatus: RL (released | freigegeben) printed: 15.10.2026

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1 OPERATING INSTRUCTIONS

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

The operating instructions contain important safety information.

Failure to observe these instructions may result in hazardous situations.

- The operating instructions must be read and understood.

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 in serious injuries or death.

CAUTION!

Warns of a possible danger.

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

NOTE!

Warns of damage to property.

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

Indicates important additional information, tips and recommendations.

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

- Indicates an instruction to prevent risks.

→ Designates a procedure which you must carry out.

1.2 Definition of term

The term “device” used in these instructions always stands for the feedback head Type 8685 and control head Type 8686.

2 AUTHORIZED USE

Non-intended use of the feedback head Type 8685 and the control head Type 8686 may be a hazard to people, nearby equipment and the environment.

The device is designed to be mounted on pneumatic actuators of process valves for the control of media.

- Do not expose the device to direct sunlight.
- Use according to the authorized data, service and operating conditions specified in the contract documents and operating instructions. These are described in the chapter on "6 Technical data".
- The device may be used only in conjunction with third-party devices and components recommended and authorized by Bürkert.
- In view of the large number of options for use, it is essential prior to installation to study and, if necessary, to test whether the feedback head or control head is suitable for the specific application case.
- Correct transportation, storage, and installation, as well as careful use and maintenance are essential for reliable and faultless operation.
- Use the device only as intended.

2.1 Restrictions

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

3 BASIC SAFETY INSTRUCTIONS

These safety instructions do not make allowance for any

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

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

- Before working on equipment or device, switch off the pressure and deaerate/drain lines.

Risk of electric shock.

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

General hazardous situations

To prevent injuries:

- The feedback head Type 8685 and control head Type 8686 must not be used in areas where there is a risk of explosion.
- Ensure that the system cannot be activated unintentionally.
- Installation and maintenance work may be carried out only by authorized technicians with the appropriate tools.
- After an interruption in the power supply or pneumatic supply, ensure that the process is restarted in a defined or controlled manner.

- The device may be operated only when in perfect condition and in consideration of the operating instructions.
- The general rules of technology must be observed for application planning and operation of the device.

To prevent damage to property of the device, ensure:

- Do not feed any aggressive or flammable media into the pilot air port for Type 8686
- Do not feed any liquids into the pilot air port for Type 8686.
- Do not physically stress the body (e.g. by placing objects on it or standing on it).
- Do not make any external modifications to the device housing.

NOTE!

Electrostatic sensitive components/modules.

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

- Observe the requirements in accordance with EN 61340-5-1 to minimize/avoid the possibility of damage caused by a sudden electrostatic discharge.
- Also, ensure that you do not touch electronic components when the power supply voltage is present.

4 GENERAL INFORMATION

4.1 Contact address

Germany

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

International

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

And also on the Internet at: country.burkert.com

4.2 Warranty

The warranty is only valid if the feedback head and control head are used as intended in accordance with the specified application conditions.

4.3 Information on the Internet

The operating instructions and data sheets for Type 8685 and Type 8686 can be found on the Internet at:

country.burkert.com

5 SYSTEM DESCRIPTION

5.1 Intended application area

The feedback head Type 8685 and the control head Type 8686 are designed to be mounted on pneumatic actuators of valves Type 2036 for the control of media.

5.2 General description

The feedback head Type 8685 and the control head Type 8686 are designed exclusively for integrated mounting on an actuator of the diaphragm valve Type 2036 in sizes RV50, RV70, RV110.

The actuator size is adjusted with DIP switches.

The valve position is recorded by a permanent magnet on the spindle extension. When a stroke movement occurs, the spindle extension is guided along a reed sensor (lower/upper end position).

In addition to the electrical position feedback, the device status on the feedback head and control head are represented visually by colored LEDs. The status of the integrated pilot valve is also indicated by LEDs for the control head.

In the variant with AS-Interface communication, bus status LEDs are also active.

5.3 Structure of feedback head Type 8685

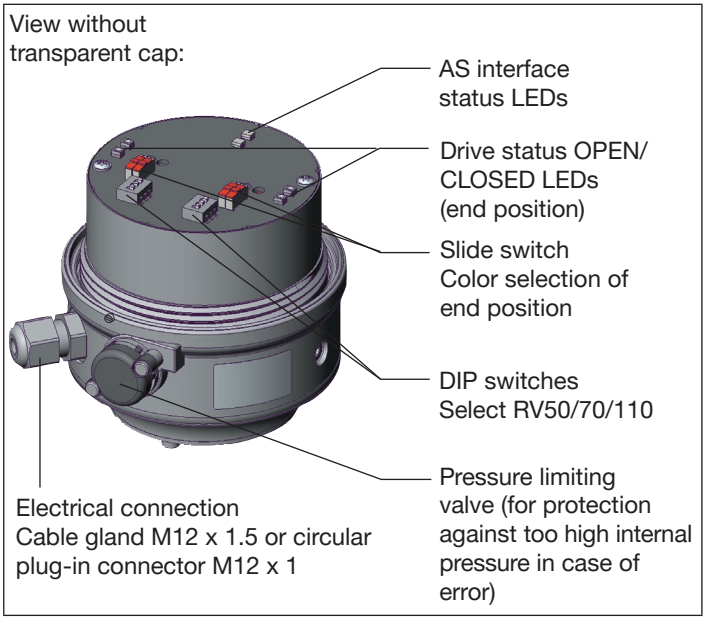


Fig. 1: Structure of feedback head Type 8685

5.4 Structure of control head Type 8686

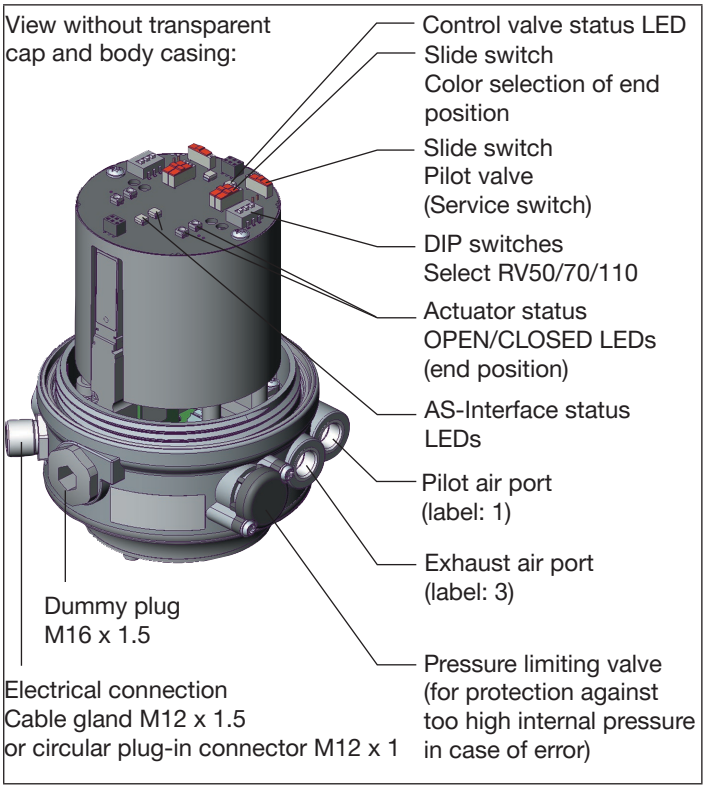


Fig. 2: Structure of control head Type 8686

5.5 Structure of adapter set for actuator Type 2036

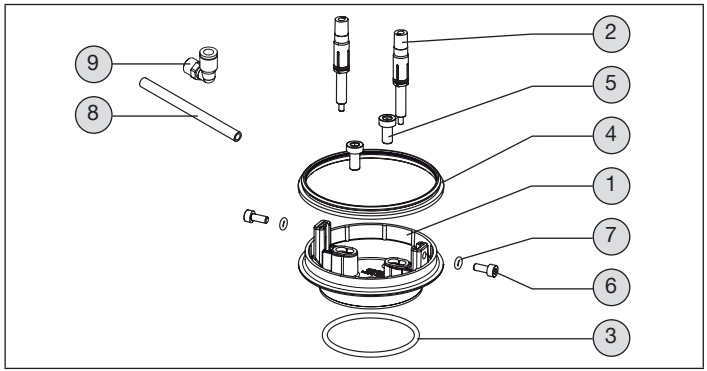


Fig. 3: Adapter set for Type 2036

Item	Quantity	Designation
1	1	Robolux adaptation body
2	6	2 units each Switch spindle RV50, RV70, RV110 cpl.
3	1	O-ring 52 x 3 EPDM 75
4	1	Form seal
5	2	Cylinder head screw M6 x 12 A2 DIN 912
6	2	Cylinder head screw M4 with shaft
7	2	O-ring 3.5 x 1.5 EPDM 70
8	2	Hose 280 mm
9	4	Angular connection G1/8 SL6 Legris

Tab. 1: Parts list for adapter set

6 TECHNICAL DATA

6.1 Standards and directives

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

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

6.2 Operating conditions

WARNING!

Solar radiation and temperature fluctuations may cause malfunctions or leaks.

- If the device is used outdoors, do not expose it unprotected to the weather conditions.
- Ensure that the permitted ambient temperature does not exceed the maximum value or drop below the minimum value.

Ambient temperature	0 – +55 °C
Degree of protection	IP65/IP67 according to EN 60529 (only if cables, plugs and sockets have been connected correctly and in compliance with the exhaust air concept in chapter “8.3”.
Operating altitude	up to 2000 m above sea level
Relative air humidity	max. 90% at 55 °C (non condensing)

6.3 Mechanical data

Dimensions	See data sheet	
Body material	PPS, PC, VA	
Sealing material	outside EPDM inside NBR	
Stroke range of valve spindle	RV50 actuator size RV70 actuator size RV110 actuator size	6 mm 9.5 mm 13.5 mm

6.4 Type label

Example:

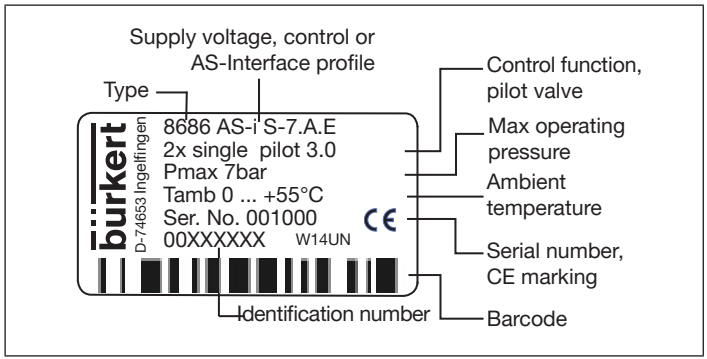


Fig. 4: Example of type label

6.5 Pneumatic data

Control medium		neutral gases, air Quality classes in accordance with ISO 8573-1
Dust content	Class 7	Max. particle size 40 µm, max. particle density 10 mg/m^3
Water content of	Class 3	max. pressure dew point - 20 °C or min. 10 °C below the lowest operating temperature
Oil content	Class X	max. 25 mg/m^3
Temperature range Control medium		-10 – + 50 °C
Pressure range Control medium		6 – 7 bar (for further details see operating instructions Type 2036 and chapter “8.3 Pneumatic installation of control head Type 8686”)
Air output of pilot valve		250 l_N / min (for aeration and deaeration) (Q_{Nn} value according to definition for pressure drop from 7 to 6 bar absolute)
Connections		Plug-in hose connector Ø 6 mm / 1/4" Socket connection G1/8

6.6 Electrical data for feedback head Type 8685

6.6.1 Electrical data without bus control

Connections	Cable gland M12 x 1.5, wrench size 15 (clamping area 3 – 6.5 mm) with screw terminals (nominal cross section 1.0 mm^2, min. cable cross-section 0.25 mm^2)
Supply voltage	24 V DC ± 10%, max. residual ripple 10%
Output	max. 100 mA per output / short circuit-proof
Display (2 end positions = 2 LEDs)	max. 20 mA

6.6.2 Electrical data with AS-Interface bus control

Connections	Remote 975 mm AS-Interface cable with circular plug-in connector (M12 x 1, 4-pin)
Supply voltage	29.5 V – 31.6 V DC (according to specification)
Max. power consumption	35 mA

6.7 Electrical data control head Type 8686

6.7.1 Electrical data without bus control

Connections	Cable gland M12 x 1.5, wrench size 15 (clamping area 3 – 6.5 mm) with screw terminals (nominal cross section 1.0 mm², min. cable cross-section 0.25 mm²) Circular plug-in connector (M12 x 1, 8-pin)
Pilot valve	
Supply voltage	24 V DC ± 10% , max. residual ripple 10%
Power input	2 x 0.8 W
Output	max. 100 mA per output / short circuit-proof
Display (2 end positions = 2 LEDs)	max. 20 mA
Service:	
Power consumption (2 end positions + 2 valves / service switch on)	90 mA

6.7.2 Electrical data with AS-Interface bus control

Connections	Remote 975 mm AS-Interface cable with circular plug-in connector (M12 x 1, 4-pin)
Supply voltage	29.5 V – 31.6 V DC (according to specification)
Outputs	
Max. switching capacity:	2 x 0.8 W via AS-Interface
Watchdog function	integrated
Max. power consumption (2 valves when activated + 2 end positions)	120 mA
Service:	
Power consumption (2 end positions + 2 valves / service switch on)	105 mA

7 ASSEMBLY

These operating instructions describe the installation of feedback head Type 8685 and control head Type 8686 to a valve Type 2036 with an actuator. The information also applies to Type 2036 valves with two actuators or Type 2034 valve clusters when using Robolux components. The information here also applies if the actuator, adapter kit and feedback/control head are in the position shown in “Fig. 10”

7.1 Safety instructions

DANGER!

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

- Before working on equipment or device, switch off the pressure and deaerate/drain lines.

Risk of electric shock.

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

WARNING!

Risk of injury from improper assembly.

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

Risk of injury from unintentional activation of the system and uncontrolled restart.

- Secure system from unintentional activation.
- Following assembly, ensure a controlled restart.

7.2 Assembly of Type 8685 and Type 8686 on the actuator Type 2036

An adapter set is required for assembly on the actuator Type 2036.

The adapter set (see “Fig. 3”, page 9) includes an adaptation body, a form seal, three O-rings, four cylinder screws and three switch spindle pairs. There are different adapter sets for feedback head and control head. Because of the different working height for actuator sizes RV50, RV70 and RV110, an adapter set contains different spindle lengths.

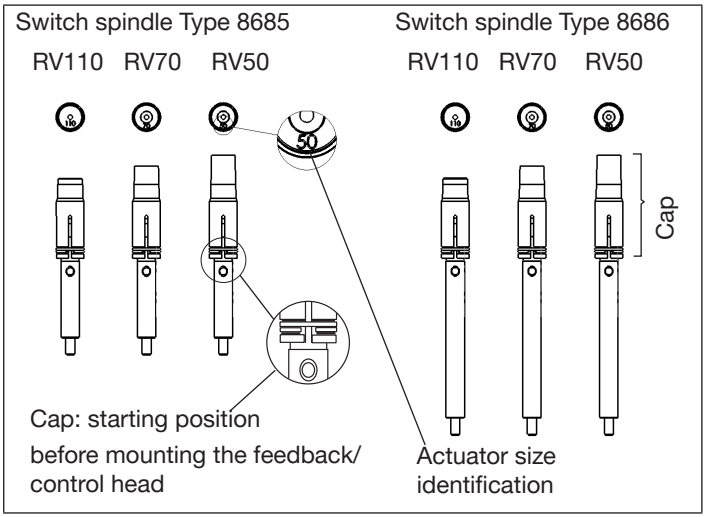


Fig. 5: Switch spindle identification

Designation	Order no.
Adapter set for Type 8685	684267
Adapter set for Type 8686	684268

Tab. 2: Adapter sets

Procedure:

Step 1: Assembly of adaptation housing on the actuator

→ Unscrew the transparent cap from the actuator.

→ Remove cover foil, if present. This makes the coding holes and M6 threads accessible.

→ Place the 52 x 3 O-ring in the profile on the bottom of the adaptation housing.

→ Place the adaptation housing on the actuator, paying close attention to the coding pin.

→ Screw the adaptation housing tightly onto the actuator with two cylinder screws M6 x 12.

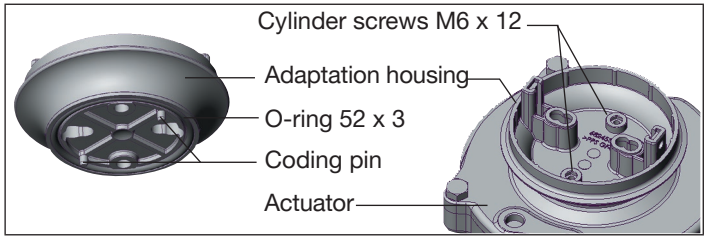


Fig. 6: Assembly of adaptation housing

NOTE!

Using a switch spindle that does not fit will result in irreparable destruction of the feedback head and/or control head and the actuator.

- Use only switch spindles that match the actuator size. The corresponding actuator size identification (RV50, RV70, RV110) for switch spindles are embossed on the front of the PVC cap (see "Fig. 5").

→ Select the switch spindle that matches the actuator size (see "Fig. 5: Switch spindle identification").

→ Apply threadlocker (Loctite M290, for example) to the two switch spindles corresponding to the actuator size.

NOTE!

Using the wrong spindle lead-through will result in malfunction.

- Use only the spindle lead-through that matches the actuator size (see "Fig. 7").

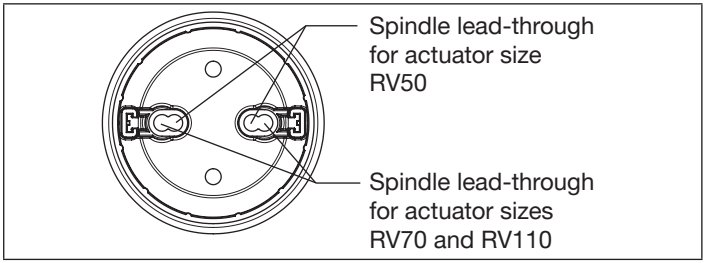


Fig. 7: Spindle lead-through

NOTE!

No detection or faulty detection of end positions.

- Do not change the position of the cap on the switch spindle.
- Use the hole ∅ 2.3 for fastening the switch spindle.

→ Push the switch spindles through the matching spindle lead-throughs. The outside lead-throughs are designed for actuator size RV70/110, while the inside lead-throughs for actuator size RV50 (see "Fig. 7").

→ Attention: Do not bring the threadlocker into contact with the spindle seal.

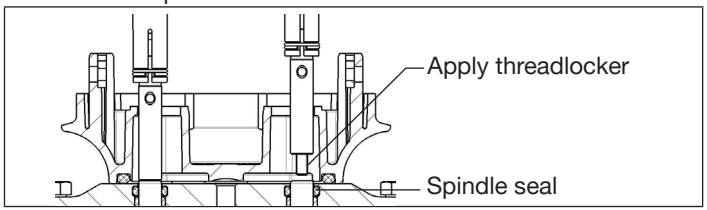


Fig. 8: Threadlocker

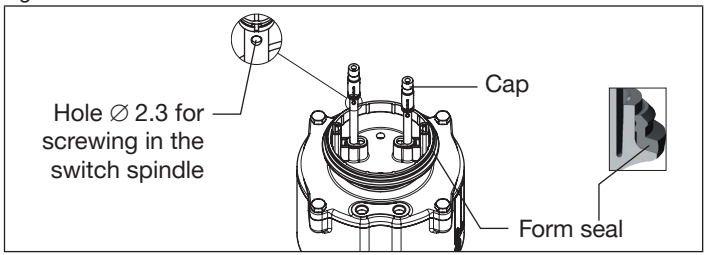


Fig. 9: Assembly of switch spindles and form seal

→ Using a suitable tool, screw the two switch spindles onto the actuator spindles. There is a hole ∅ 2.3 on the spindle side for this purpose (torque 1.0 Nm ± 0.1 Nm).

→ Place the form seal on the adaptation body (smaller diameter points upwards).

Step 2: Assembly of the feedback head / control head on the adaptation body

If the electrical connection is made with a cable gland, we recommend connecting the wires at this point, since otherwise the feedback head / control head will have to be removed again for the electrical connection.

For electrical installation see: "9.2 Device veriant 24 V DC"
"Device connection for cable gland Type 8685"
"Device connection for cable gland Type 8686"

NOTE!

Faulty detection of end positions.

- For actuators with control function B (CFB, NO), the lower end position must be approached before the feedback head / control head is placed on the adaptation body. To do this, pressurize the appropriate pilot air port of the actuator ("Fig. 10").
- Make certain the feedback head / control head is correctly positioned relative to the actuator: The dummy plug or pressure-relief valve must be located on the side of the pneumatic connections of the actuator (see "Fig. 10").

→ Place the feedback head / control head on the actuator. As you do, note:
- The dummy plug or pressure-relief valve must be located on the side of the pneumatic connections of the actuator.
- The caps must be in the starting position. If not, move the caps to the starting position (see "Fig. 5")
- The switch spindles must lodge inside the recesses on the bottom of the feedback head / control head. Do not move the caps onto the switch spindles.

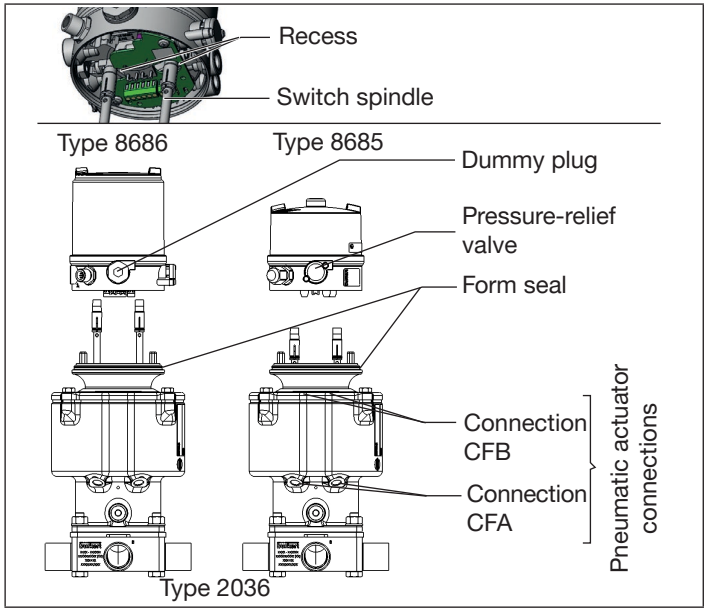


Fig. 10: Assembly of feedback head / control head

→ Push the feedback head / control head onto the adaptation body until no gap is visible on the form seal. Now align the mounting hole of the feedback head / control head on each side with the square nut of the adaptation body.

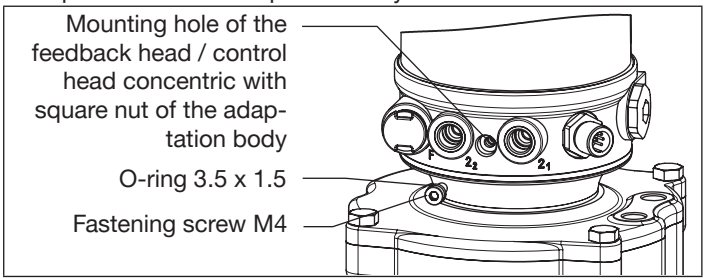


Fig. 11: Fastening of feedback head / control head

NOTE!

If the torque is too high when screwing in the fastening screw or if the O-ring is missing, degree of protection IP65 / IP67 is not ensured.

- The fastening screw may only be tightened to a maximum torque of 0.5 Nm ± 0.1 Nm.
- Check the position of the O-ring.

→ Use the two fastening screws M4 and matching O-rings to fasten the feedback head / control head onto the adaptation body (torque: 0.5 Nm ± 0.1 Nm).

The mechanical connection is already completed for the feedback head after these two assembly steps. "Step 3: Assembly of pneumatic connection - install the actuator" must still be performed for the control head.

Control head Type 8686 only:

Step 3: Assembly of pneumatic connection - install the actuator

→ Screw the plug-in hose connectors onto the control head and the actuator.

→ Cut the enclosed hoses (2 x 280 mm) to length as appropriate for the device layout.

→ Using the hoses supplied in the accessory kit, make the pneumatic connection between the control head and actuator according to the control function (CF) with the following "Tab. 3: Overview of pneumatic connections for actuator variants".

→ When using the control head on a Single actuator, only connect the pilot air outlet 2_1 to the left actuator chamber with a hose. Close the outlet 2_2 on the control head.

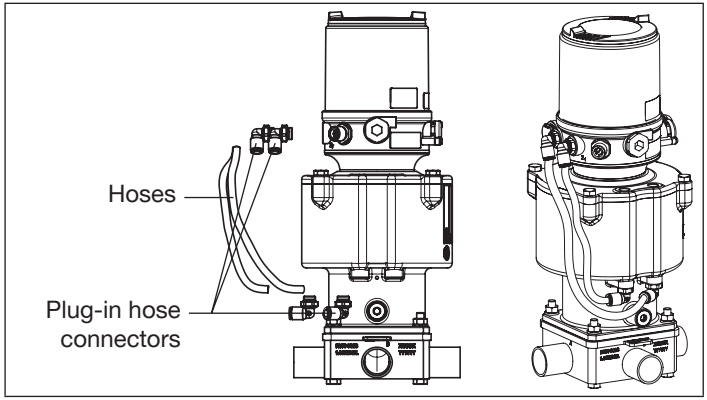


Fig. 12: Assembly of pneumatic connections

NOTE!

Damage or malfunction due to ingress of dirt and moisture.

- To comply with degree of protection IP65 / IP67, install an exhaust air line on the unneeded pilot air port (for CFA, NC and CFB, NO) in the dry area.

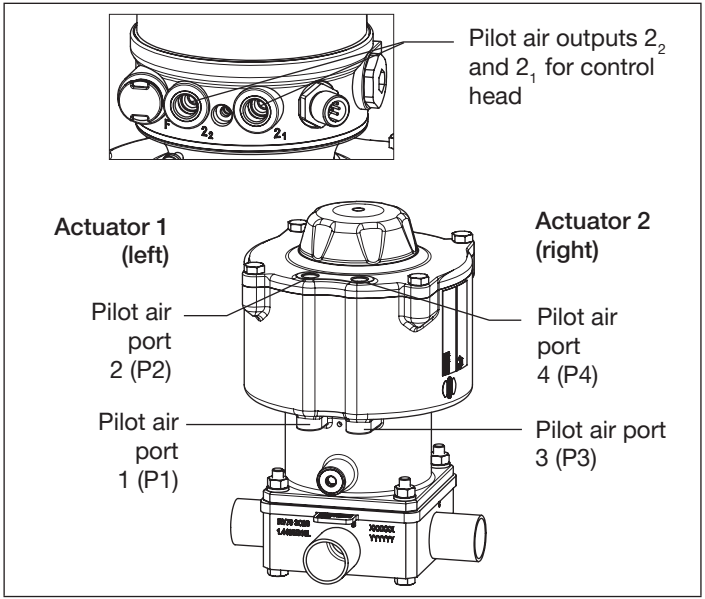


Fig. 13: Pneumatic connection

Type 2036	Actuator 1		Actuator 2	
	CF	Connection	CF	Connection
D11, D55 CFA/CFA	CFA	2_1 ⟶ P1 P2: Deaeration	CFA	2_2 ⟶ P3 P4: Deaeration
D12 CFA/CFB	CFA	2_1 ⟶ P1 P2: Deaeration	CFB	2_2 ⟶ P4 P3: Deaeration
D21 CFB/CFA	CFB	2_1 ⟶ P2 P1: Deaeration	CFA	2_2 ⟶ P3 P4: Deaeration
D22 CFB/CFB	CFB	2_1 ⟶ P2 P1: Deaeration	CFB	2_2 ⟶ P4 P3: Deaeration

Tab. 3: Overview of pneumatic connections for actuator variants

CFA, NC: Valve closed in rest position (by spring force)
CFB, NO: Valve open in rest position (by spring force)

For the assignment of control connections see the installation and dimensional drawing included with delivery of the valve or in the Type 2036 operating instructions.

8 PNEUMATIC INSTALLATION

The dimensions of the feedback head / control head and the different complete device models, consisting of control, feedback head / control head, actuator and valve, can be found in the relevant data sheets.

8.1 Safety instructions

DANGER!

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

- Before working on equipment or device, switch off the pressure and deaerate/drain lines.

Risk of electric shock.

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

WARNING!

Risk of injury from improper installation.

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

Risk of injury from unintentional activation of the system and uncontrolled restart.

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

8.2 Pneumatic installation of feedback head Type 8685

The feedback head does not require a pilot air supply.

A description of the pneumatic installation of the actuator is included in the valve operating instructions.

8.3 Pneumatic installation of control head Type 8686

DANGER!

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

- Before working on equipment or device, switch off the pressure and deaerate/drain lines.

Procedure:

→ Connect the control medium to the pilot air port (1) (6 – 7 bar; instrument air, free of oil, water and dust).

→ Mount the exhaust air line or a silencer on the exhaust air port (3) (see “Fig. 14: Pneumatic connection Type 8686”).

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

- The installation must not cause back pressure to build up.
- To make the connection, select a hose with sufficient cross section.
- The exhaust air line must be designed in such a way that no water or other liquid can get into the device through the exhaust air connection (3).

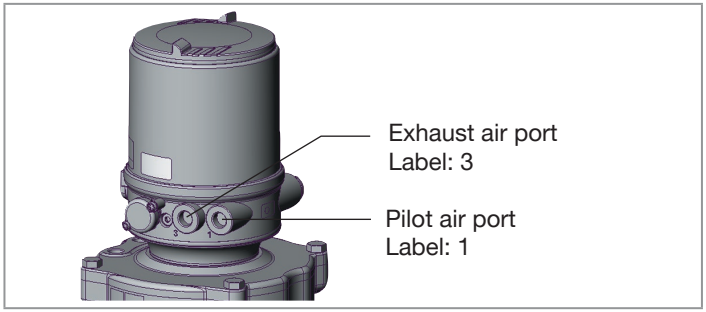


Fig. 14: Pneumatic connection Type 8686

Caution (exhaust air concept)**:** In compliance with degree of protection IP65 / IP67, an exhaust air line must be installed in the dry area.

Always maintain an applied control pressure of at least 0.5 – 1 bar above the pressure which is required to move the actuator to its end position.

9 ELECTRICAL INSTALLATION

9.1 Safety instructions

DANGER!

Risk of electric shock.

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

WARNING!

Risk of injury from improper installation.

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

Risk of injury from unintentional activation of the system and uncontrolled restart.

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

9.2 Device veriant 24 V DC

9.2.1 Electrical installation for feedback head Type 8685

Device connection for cable gland Type 8685

→ Use a cable cross-section of 0.25 mm² for the electrical connection.

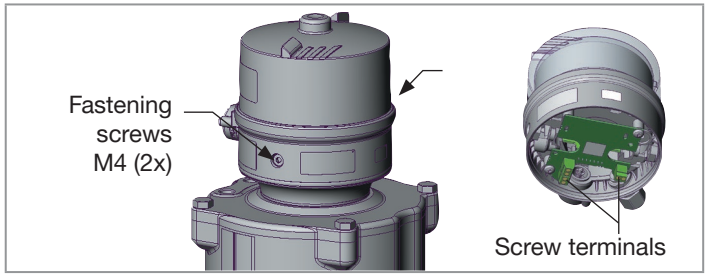


Fig. 15: Position of screw terminals Type 8685

→ Loosen the fastening screws M4 and pull the feedback head up (only if the feedback head is already installed).

→ Install the cable gland, if necessary (approx. 1,5 Nm).

→ Guide the cables through the cable gland.

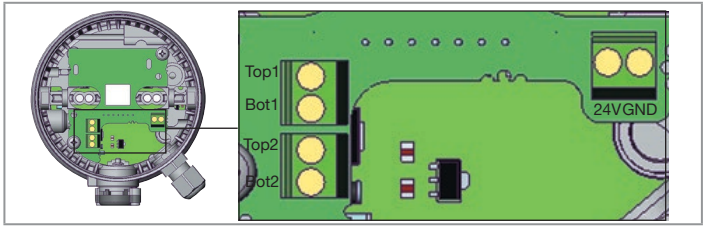


Fig. 16: Designation on PCB Type 8685

Designation on PCB	Assignment[1)]	
24 V	Supply voltage +	24 V DC ±10%
GND	Supply voltage -	GND
Top 1	Top end position - Top actuator 1	24 V / 0 V (max. 0.1 A) GND
Bot 1	Bottom end position - Bot actuator 1	24 V / 0 V (max. 0.1 A) GND
Top 2	Top end position - Top actuator 2	24 V / 0 V (max. 0.1 A) GND
Bot 2	Bottom end position - Bot actuator 2	24 V / 0 V (max. 0.1 A) GND

Tab. 4: Connection for cable gland Type 8685

1) Actuator assignment see "Fig. 17".

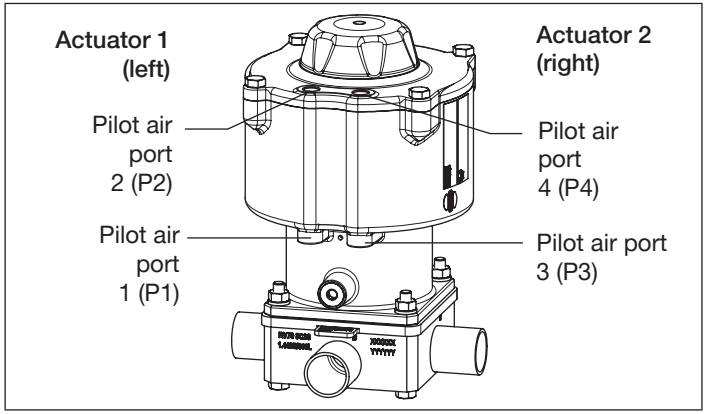


Fig. 17: Pneumatic connection

→ Connect the wires (see pin assignment in "Tab. 4").

NOTE!

Damage or malfunction due to ingress of dirt and moisture.

- To ensure degree of protection IP65 / IP67, tighten the union nut of the cable gland according to the cable size you are using (approx. 1.5 Nm).

→ Tighten the union nut of the cable gland on the body (approx. 1.5 Nm).

NOTE!

Faulty detection of end positions.

- For actuators with control function B (CFB, NO), the lower end position must be approached before the feedback head is placed on the adaptation body. To do this, pressurize the appropriate pilot air port of the actuator (“Fig. 10”).
- Make certain the feedback head is correctly positioned relative to the actuator: The dummy plug or pressure-relief valve must be located on the side of the pneumatic connections of the actuator (see “Fig. 10”).

→ Place the feedback head on the actuator. As you do, note:
- The dummy plug or pressure-relief valve must be located on the side of the pneumatic connections of the actuator.
- The caps must be in the starting position. If not, move the caps to the starting position (see “Fig. 5”)
- The switch spindles must lodge inside the recesses on the bottom of the feedback head. Do not move the caps onto the switch spindles.

→ Push the feedback head onto the adaptation body until no gap is visible on the form seal. Now align the mounting hole of the feedback head on each side with the square nut of the adaptation body.

NOTE!

If the torque is too high when screwing in the fastening screw or if the O-ring is missing, degree of protection IP65 / IP67 is not ensured.

- The fastening screw may only be tightened to a maximum torque of 0.5 Nm ± 0.1 Nm.
- Check the position of the O-ring.

→ Use the two fastening screws M4 and matching O-rings to fasten the feedback head onto the adaptation body (torque: 0.5 Nm ± 0.1 Nm).

When the supply voltage is applied, the feedback head is operating.

→ Before the device can be used, the basic settings (see section “10.3.1 Basic settings”) must still be made on the feedback head.

9.2.2 Electrical installation of control head Type 8686

Device connection for circular plug-in connector Type 8686

→ Connect the circular plug-in connector of the control head as described in "Tab. 5".

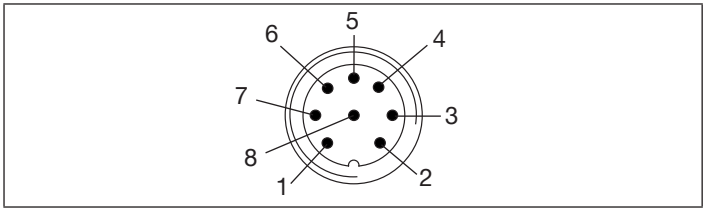


Fig. 18: Assignment of circular plug (M12 x 1, 8-pin)

Use only straight connecting socket.

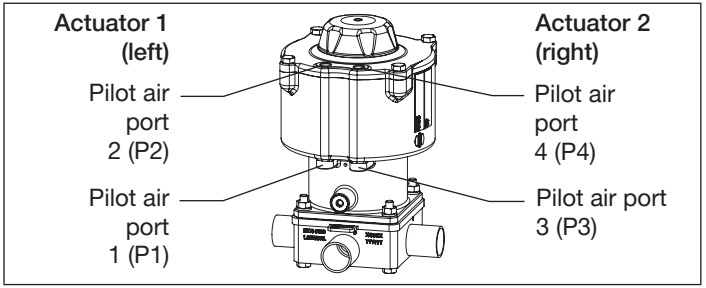


Fig. 19: Pneumatic connection

When the supply voltage is applied, the control head is operating.

→ Before the device can be used, the basic settings (see section "10.3.1 Basic settings") must still be made on the control head.

Pin	Wire color[2]	Assignment[3]	External circuit
1	white	Bottom end position - Bot actuator 2	1 → 24 V / 0 V (max. 0.1 A) GND (7)
2	brown	Top end position - Top actuator 2	2 → 24 V / 0 V (max. 0.1 A) GND (7)
3	green	Bottom end position - Bot actuator 1	3 → 24 V / 0 V (max. 0.1 A) GND (7)
4	yellow	Top end position - Top actuator 1	4 → 24 V / 0 V (max. 0.1 A) GND (7)
5	gray	Valve control Y2 Actuator 2 activated	← 5 high active, to activate connect with 24 V
6	pink	Valve control Y1 Actuator 1 activated	← 6 high active, to activate connect with 24 V
7	blue	Supply voltage –	GND
8	red	Supply voltage +	24 V DC ±10%

Tab. 5: Connection for circular plug-in connector Type 8686

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

3) Actuator assignment see "Fig. 19".

Device connection for cable gland Type 8686

→ Use a cable cross-section of 0.25 mm² for the electrical connection.

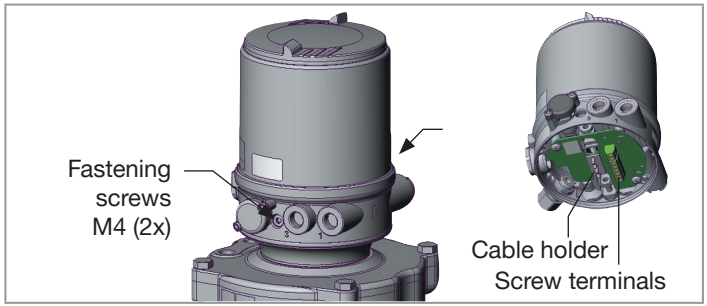


Fig. 20: Position of screw terminals Type 8686

→ Loosen the fastening screws M4 and pull the control head up (only if the control head is already installed).

→ Install the cable gland, if necessary (approx. 1,5 Nm).

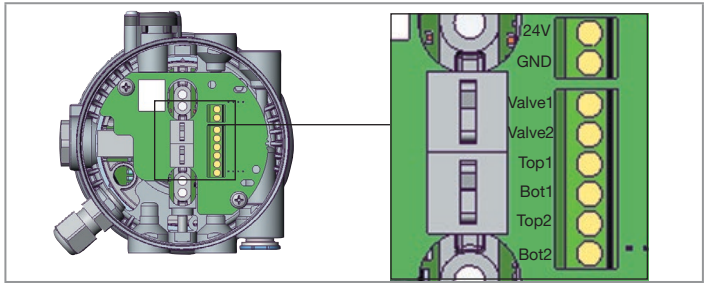


Fig. 21: Designation on PCB Type 8686

→ Guide the cables through the cable gland.

→ Connect the wires (see pin assignment in "Tab. 6").

Designation on PCB	Assignment[4)]	External circuit
Bot2	Bottom end position - Bot actuator 2	→ 24 V / 0 V (max. 0.1 A) — GND
Top2	Top end position - Top actuator 2	→ 24 V / 0 V (max. 0.1 A) — GND
Bot1	Bottom end position - Bot actuator 1	→ 24 V / 0 V (max. 0.1 A) — GND
Top1	Top end position - Top actuator 1	→ 24 V / 0 V (max. 0.1 A) — GND
Valve2	Valve control Y2 Actuator 2 activated	← high active, to activate connect with 24 V
Valve1	Valve control Y1 Actuator 1 activated	← high active, to activate connect with 24 V
GND	Supply voltage -	GND
24V	Supply voltage +	24 V DC ±10%

Tab. 6: Connection for cable gland Type 8686

4) Actuator assignment see "Fig. 19".

NOTE!

Malfunction due to damaged wires.

- To keep the spindle guides free, guide all wires through the cable holders.

Damage or malfunction due to ingress of dirt and moisture.

- To ensure degree of protection IP65 / IP67, tighten the union nut of the cable gland according to the cable size you are using (approx. 1.5 Nm).

→ Guide all wires through the cable holders.

→ Tighten the union nut of the cable gland on the body (approx. 1.5 Nm).

NOTE!

Faulty detection of end positions.

- For actuators with control function B (CFB, NO), the lower end position must be approached before the control head is placed on the adaptation body. To do this, pressurize the appropriate pilot air port of the actuator (“Fig. 10”).
- Make certain the control head is correctly positioned relative to the actuator: The dummy plug or pressure-relief valve must be located on the side of the pneumatic connections of the actuator (see “Fig. 10”).

→ Place the control head on the actuator. As you do, note:

- The dummy plug or pressure-relief valve must be located on the side of the pneumatic connections of the actuator.
- The caps must be in the starting position. If not, move the caps to the starting position (see “Fig. 5”)
- The switch spindles must lodge inside the recesses on the bottom of the control head. Do not move the caps onto the switch spindles.

→ Push the control head onto the adaptation body until no gap is visible on the form seal. Now align the mounting hole of the control head on each side with the square nut of the adaptation body.

NOTE!

If the torque is too high when screwing in the fastening screw or if the O-ring is missing, degree of protection IP65 / IP67 is not ensured.

- The fastening screw may only be tightened to a maximum torque of 0.5 Nm ± 0.1 Nm.
- Check the position of the O-ring.

→ Use the two fastening screws M4 and matching O-rings to fasten the control head onto the adaptation body (torque: 0.5 Nm ± 0.1 Nm).

When the supply voltage is applied, the control head is operating.

→ Before the device can be used, the basic settings (see section “10.3.1 Basic settings”) must still be made on the control head.

9.3 Device veriant AS-Interface

9.3.1 Electrical installation feedback head and control head

The feedback head and control head are electrically connected by a multi-pole cable (M12 circular plug-in connector) and flat cable terminal. The circular plug can simply be connected with the flat cable terminal (see “Fig. 22”).

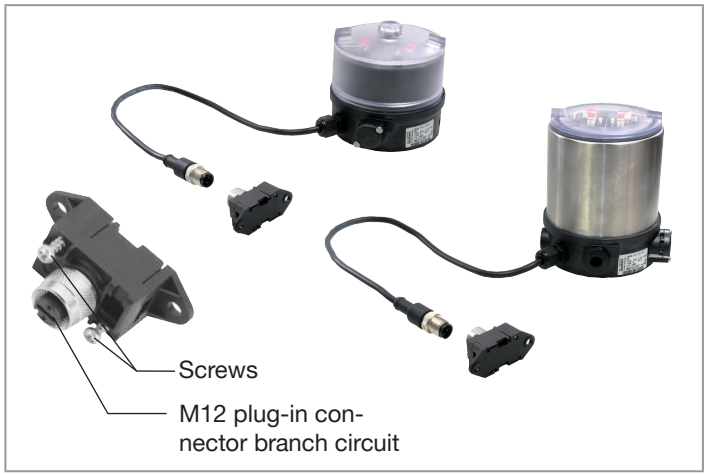


Fig. 22: Feedback head / control head with multi-pole cable and flat cable terminal

Wiring diagram of circular plug M12

The view shows the image from the front looking at the pins, the solder connections are behind them.

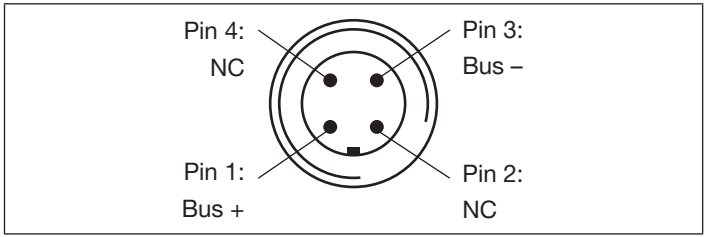


Fig. 23: Bus connection

Pin	Designation	Assignment
1	Bus +	AS-Interface bus line +
2	NC	not used
3	Bus –	AS-Interface bus line –
4	NC	not used

Tab. 7: Pin assignment of circular plug-in connector for AS-Interface

Handling the flat cable terminal

The multi-pole cable features a flat cable terminal - with M12 plug-in connector branch circuit - for AS-Interface cable harness. The flat cable terminal contacts the AS-Interface flat cable by means of penetration technology which allows installation by “clipping in” the AS-Interface flat cable without cutting and without removing insulation.

Procedure:

→ Open the flat cable terminal
(loosen screws and remove cover).

→ Insert flat cable to fit closely.

→ Close flat cable terminal again.

→ Tighten the screws
Loosen the thread-forming screws slightly (approx. 3/4 turn to the left) and position them on the existing threaded hole and screw in.

9.3.2 AS-Interface connection

AS-Interface (Actuator Sensor Interface) is a field bus system which is used primarily for networking binary sensors and actuators (slaves) with a higher-level control (master).

Bus line

Unshielded two-wire line (AS-Interface line as AS-Interface flat cable) along which both information (data) and energy (power supply voltage for the actuators and sensors) are transmitted.

Network topology

Freely selectable within wide limits, i.e. star, tree and line networks are possible. Further details are described in the AS-Interface Specification (A/B slave model conforms to the version 3.0 specification

9.3.3 Technical Data for AS-Interface PCBs

Supply:	via AS-Interface (29.5 V – 31.6 V)	
Control head outputs:	Valve Y1 and valve Y2, each with max. 0.8 W, Power reduction after approx. 100 ms with integrated watchdog function	
Certification:	Feedback head:	Certificate No. 94701 based on version 3.0
	Control head:	Certificate No. 94801 based on version 3.0
Bus address:	0 is the default delivery address	

9.3.4 Programming data

Programming data for feedback head Type 8685

I/O configuration	0 hex
ID code	A hex (see below for bit configuration)
Extended ID code 1	7 hex
Extended ID code 2	E hex
Profile	S-0.A.E

Tab. 8: Programming data for feedback head Type 8685

Bit configuration

Data bit Inputs	Function	Assignment[5)]
D0	Top end position - Top actuator 1	0 Top not reached 1 Top reached
D1	Bottom end position - Bot actuator 1	0 Bot not reached 1 Bot reached
D2	Top end position - Top actuator 2	0 Top not reached 1 Top reached
D3	Bottom end position - Bot actuator 2	0 Bot not reached 1 Bot reached
Data bit Outputs	**Function**	**Assignment[5)]**
D0	-	not used
D1	-	not used
D2	-	not used
D3	-	not used

Tab. 9: Bit configuration of AS-Interface for feedback head Type 8685

Parameter bits have no function.

5) *Actuator assignment see "Fig. 24".*

Programming data for control head Type 8686:

I/O configuration	7 hex
ID code	A hex (see below for bit configuration)
Extended ID code 1	7 hex
Extended ID code 2	E hex
Profile	S-7.A.E

Tab. 10: Programming data for control head Type 8686

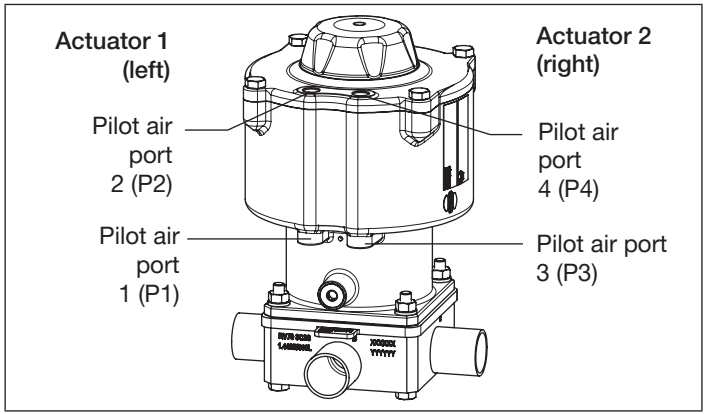


Fig. 24: Pneumatic connection

Bit configuration

Data bit Inputs	Function	Assignment[6)]
D0	Top end position - Top actuator 1	0 Top not reached 1 Top reached
D1	Bottom end position - Bot actuator 1	0 Bot not reached 1 Bot reached
D2	Top end position - Top actuator 2	0 Top not reached 1 Top reached
D3	Bottom end position - Bot actuator 2	0 Bot not reached 1 Bot reached
Data bit Outputs	**Function**	**Assignment[6)]**
D0	Pilot valve Y1	0 Pilot valve OFF 1 Pilot valve ON
D1	Pilot valve Y2	0 Pilot valve OFF 1 Pilot valve ON
D2	-	not used
D3	-	not used

Tab. 11: Bit configuration of AS-Interface for control head Type 8686

Parameter bits have no function.

6) *Actuator assignment see "Fig. 25".*

9.3.5 LED status display for AS-Interface

Status LED 1 (green)	Status LED 2 (red)	
off	off	POWER OFF
off	on	No data traffic (expired Watch Dog at slave address does not equal 0)
on	off	OK
flashing	on	Slave address equals 0

Tab. 12: LED status display for AS-Interface

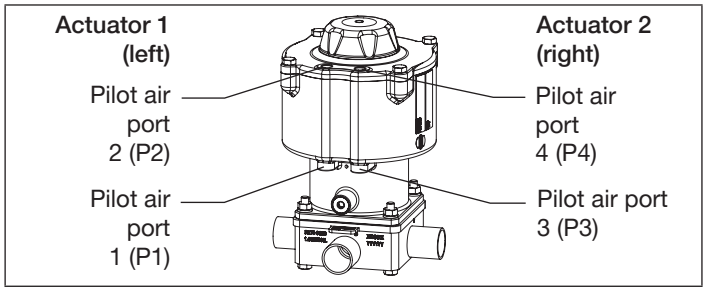


Fig. 25: Pneumatic connection

10 CONTROL AND DISPLAY

10.1 Control and display elements for feedback head Type 8685

10.1.1 Device version 24 V DC

The items listed below are designed separately for actuator 1 and 2.

Display elements:

- Status of actuator (end position)

The display elements are designed in the form of an LED.

Control elements:

- DIP switch for selecting actuator size RV50, RV70, RV110
- Slide switch for color selection of end position

If the transparent cap is unscrewed, follow the instructions in “Step 4: Closing the transparent cap / body casing”, page 36.

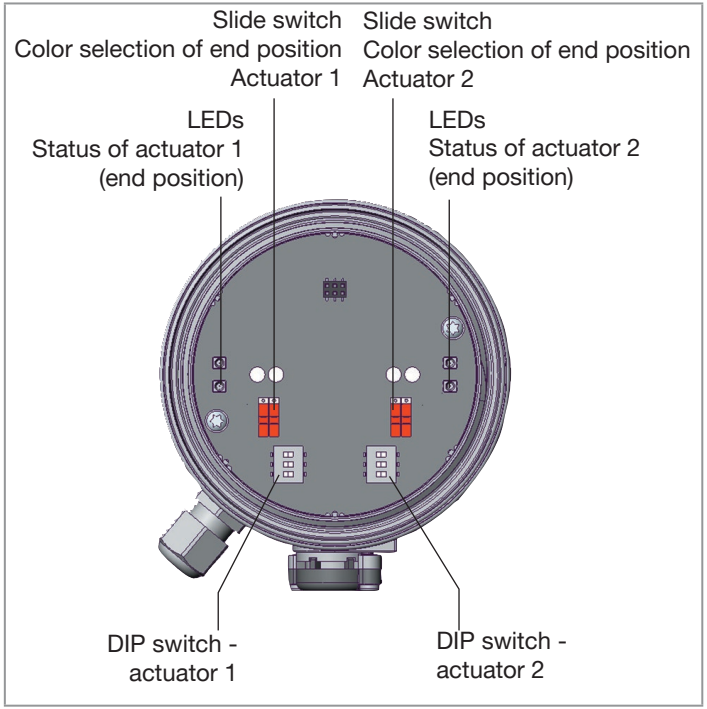


Fig. 26: Control and display elements for 24 V DC feedback head

10.1.2 Device version AS-Interface

Other than the AS-Interface bus status, the items listed below are designed separately for actuator 1 and 2.

Display elements:

- AS-Interface bus status
- Status of actuator (end position)

The display elements are designed in the form of an LED.

Control elements:

- DIP switch for selecting actuator size RV50, RV70, RV110
- Slide switch for color selection of end position

If the transparent cap is unscrewed, follow the instructions in “Step 4: Closing the transparent cap / body casing”, page 36.

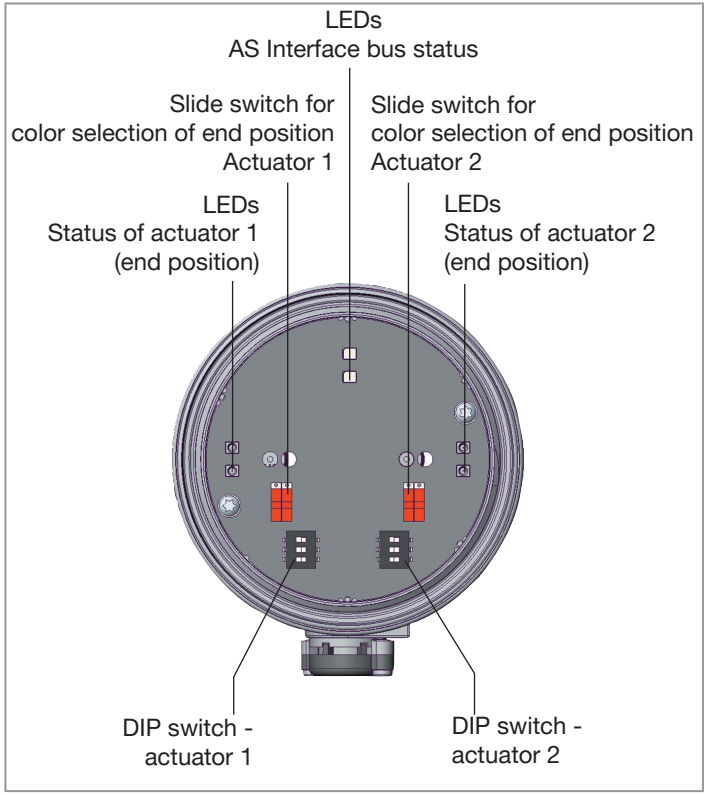


Fig. 27: Control and display elements for AS-Interface feedback head

10.2 Control and display elements for control head Type 8686

The items listed below are designed separately for actuator 1 and 2.

Device versions 24 V DC and AS-Interface have the same display and control PCB.

The AS-Interface bus status LEDs are accordingly inactive for the 24 V DC device version.

Display elements:

- AS-Interface bus status
- Status of actuator (end position)
- Status of pilot valve

The display elements are designed in the form of an LED.

Control elements:

- DIP switch for selecting actuator size RV50, RV70, RV110
- Slide switch for color selection of end position
- Slide switch for direct activation of pilot valves (service switch)

If the transparent cap / the body casing is unscrewed, follow the instructions in “Step 4: Closing the transparent cap / body casing”, page 36.

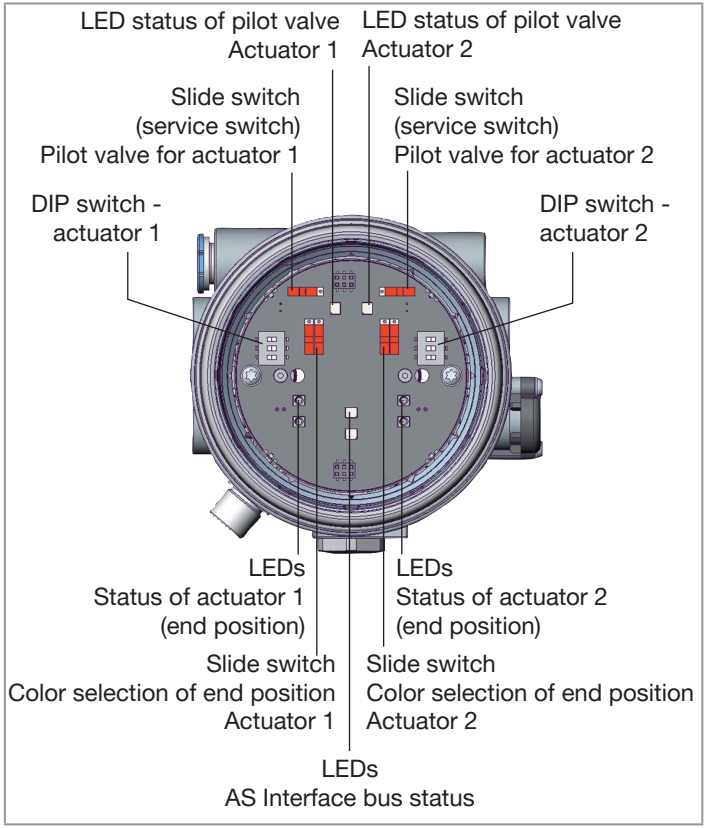


Fig. 28: Control and display elements - control head

10.3 Control

10.3.1 Basic settings

To ensure the function of Types 8685 and 8686, these basic settings must be made before start-up in the isolated state.

DANGER!

Risk of electric shock.

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

→ Unscrew the transparent cap.

→ Perform steps 1 to 4.

Step 1: Select the actuator size

The control elements are designed for one actuator side only.

Switch only one DIP switch element per actuator size to active, depending on the actuator size (see actuator type label). Only one uniform actuator size needs to be selected on both actuator sides.

Incorrect settings of the DIP switches result in malfunctions or no function of the end position feedback.

→ Pushing a DIP switch element to the “ON” position causes the end position sensors of the selected actuator size to be activated.

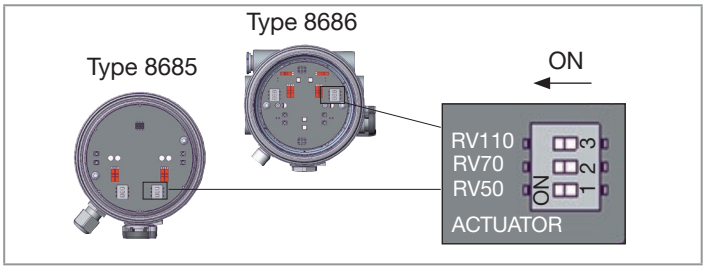


Fig. 29: Selection of actuator size via DIP switch

Step 2: Change the assignment of the end position LEDs (actuator status)

You can set the color assignment of the end positions with these slide switches. You can indicate for each color whether it applies to the Top (upper end position) or Bot (lower end position).

The slide switches for color selection must be unambiguously selected inside the actuator chamber, i.e. both switches must be up or both must be down.

Incorrect settings of these switches will result in an incorrect visual interpretation of end position detection, but the end position detection will still be correct.

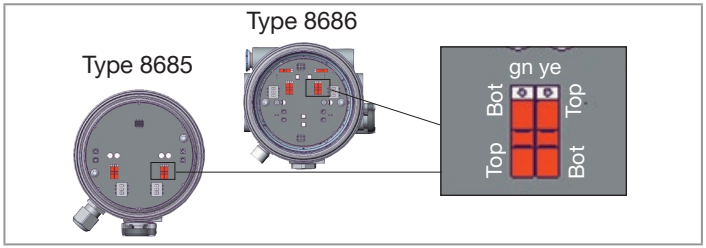


Fig. 30: Color assignment of end positions via slide switch

Refer to the PCB labeling in the table below

Switch position for one actuator side	Actuator status LED
Both switches up	End position Top yellow / End position Bot green
Both switches down	End position Top green / End position Bot yellow
Switch up/down	- Invalid state -
Switch down/up	- Invalid state -

Tab. 13: Color assignment of end positions

The following function is set in the factory:

Color	Actuator status
Green LED lit	Lower end position
Yellow LED lit	Upper end position

Tab. 14: Assignment of status of actuator LEDs (end position)

10.3.2 Start-up

Step 3: Reference movement for spindle adjustment

To make the fine adjustment of the spindle for actuator size, it is essential to move both spindles from the lower to the top end position.

Procedure for Type 8685:

Actuator with design control function A (CFA, NC):

→ Apply operating voltage.

→ Under maximum control pressure, move the spindles up by activating the actuator chambers.

→ After the end position is reached (preselected LED is lit), turn off the control pressure. The spindle moves to the lower end position. LED for end position Bot is lit with the selected color.

Actuator with design control function B (CFB, NO):

→ Apply operating voltage.

→ Under maximum control pressure, move the spindles down by activating the actuator chambers.

→ After the end position is reached (preselected LED is lit), turn off the control pressure. The spindle moves to the upper end position. The corresponding LED for the end position is lit with the selected color.

Procedure for Type 8686:

→ Apply operating voltage.

→ Under maximum control pressure, switch the service switch to “On”. The spindle moves to the upper end position.

→ After the end position is reached (preselected actuator status LED is lit), switch the service switch back to “Off”. The spindle moves to its initial position. The corresponding actuator status LED for the end position is lit with the selected color.

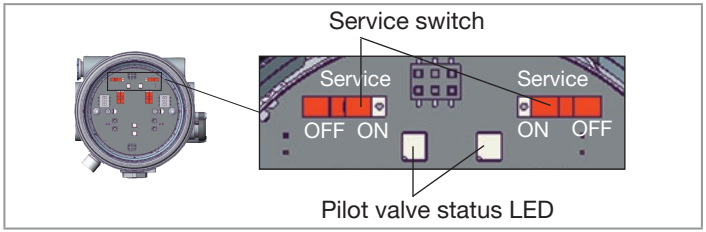


Fig. 31: Spindle adjustment

Step 4: Closing the transparent cap / body casing

→ Check that the seal is correctly positioned in the transparent cap / body casing (see “Fig. 32”).

NOTE!

Damage or malfunction due to ingress of dirt and moisture.

- To comply with degree of protection IP65 / IP67, screw in the transparent cap / body casing all the way.

→ Close the transparent cap / body casing (auxiliary tool for installing the cover: 674077[7]).

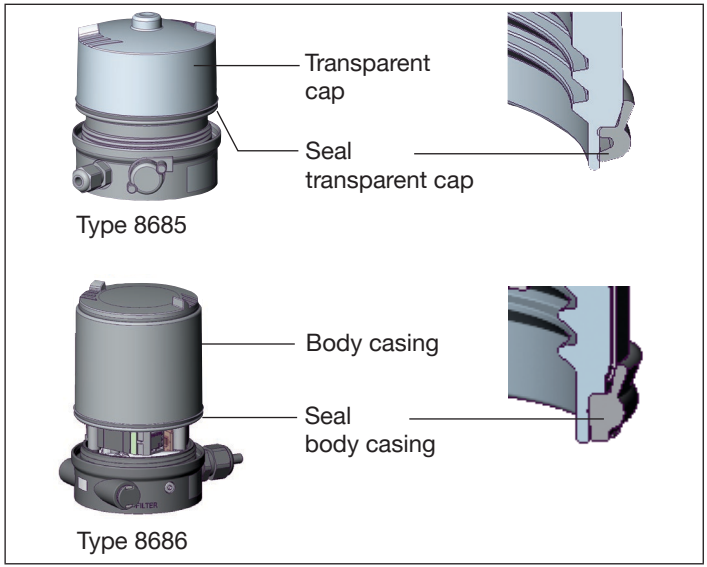


Fig. 32: Position of the seal in the transparent cap / body casing

The device is now configured and ready for operation.

7) *The auxiliary tool for installing the cover (674077) is available through your Bürkert sales office.*

10.3.3 Changing the settings

To ensure the function of the types 8685 and 8686, these changes must be made in a de-energised state.

DANGER!

Risk of electric shock.

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

Procedure:

→ Unscrewing the transparent cap makes the slide switches and DIP switches accessible.

→ Select the actuator size with the DIP switches. Only one uniform actuator size needs to be selected on both actuator sides (see valve type label).

→ Use the "Tab. 13: Color assignment of end positions" or the labeling on the PCB to assign the desired color to the actuator status LEDs (end position).

→ Check that the seal is correctly positioned in the transparent cap / body casing (see "Fig. 32").

NOTE!

Damage or malfunction due to ingress of dirt and moisture.

- To comply with degree of protection IP65 / IP67, screw in the transparent cap / body casing all the way.

→ Close the transparent cap / body casing (auxiliary tool for installing the cover: 674077[8]).

8) *The auxiliary tool for installing the cover (674077) is available through your Bürkert sales office.*

10.3.4 Manual activation of pilot valves with the control head Type 8686

The pilot valves can be switched with the service switches. With control function A, the spindle moves up with switch position "On". With control function A, the spindle moves down with switch position "On".

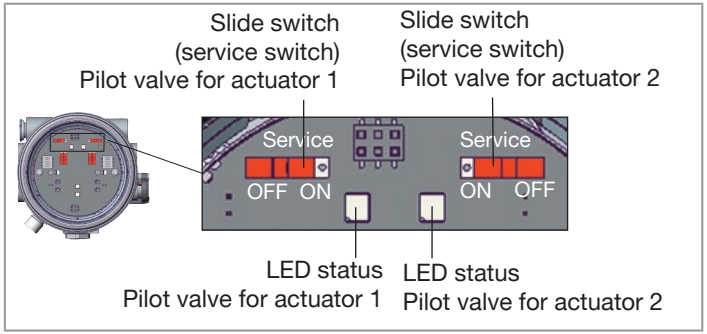


Fig. 33: Service switch and status LEDs for pilot valve (Type 8686)

Procedure:

⚠ Voltage is absolutely essential on the device!

→ Unscrewing the transparent cap makes the service switches accessible.

→ Switch the relevant pilot valve with the service switches.

→ Check that the seal is correctly positioned in the transparent cap / body casing (see “Fig. 32”).

NOTE!

Damage or malfunction due to ingress of dirt and moisture.

- To comply with degree of protection IP65 / IP67, screw in the transparent cap / body casing all the way.

→ Close the transparent cap / body casing (auxiliary tool for installing the cover: 674077[9]).

Procedure for replacing the diaphragm for Type 2036

⚠ Voltage is absolutely essential on the device!

→ Unscrewing the transparent cap makes the service switches accessible.

→ Replace the diaphragm as described in the operating instructions for Type 2036.

→ After the diaphragm is replaced, perform a reference movement for spindle adjustment (see “10.3.1 Basic settings”, step 3).

→ Check that the seal is correctly positioned in the transparent cap / body casing (see “Fig. 34”).

NOTE!

Damage or malfunction due to ingress of dirt and moisture.

- To comply with degree of protection IP65 / IP67, screw in the transparent cap / body casing all the way.

→ Close the transparent cap (auxiliary tool for installing the cover: 674077[9]).

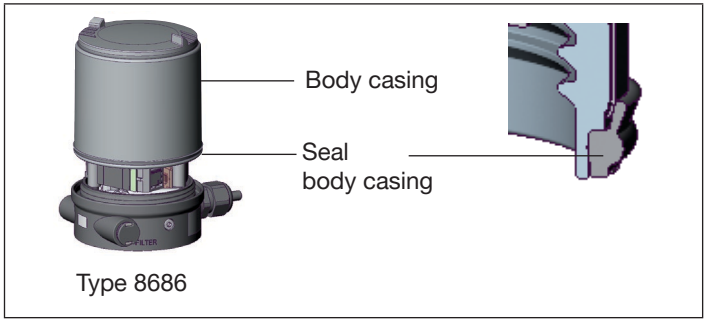
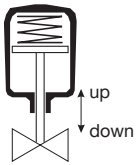
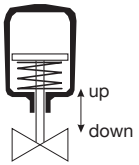


Fig. 34: Position of the seal in the body casing

9) The auxiliary tool for installing the cover (674077) is available through your Bürkert sales office.

11 SAFETY POSITIONS

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

Actuator type	Designation	Safety positions after failure of the auxiliary power	
		electrical	pneumatic
	single-acting Control function A	down	down
	single-acting Control function B	up	up

Tab. 15: Safety positions

12 MAINTENANCE

12.1 Safety instructions

DANGER!

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

- Before working on equipment or device, switch off the pressure and deaerate/drain lines.

Risk of electric shock.

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

WARNING!

Risk of injury from improper maintenance.

- Maintenance may only be carried out by authorized technicians with the appropriate tools.

Risk of injury from unintentional activation of the system and uncontrolled restart.

- Secure system from unintentional activation.
- Following maintenance, ensure a controlled restart.

12.2 Service at the air intake filter

DANGER!

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

- Before working on equipment or device, switch off the pressure and deaerate/drain lines.

To protect the internal pilot valves and the actuator, the control air is filtered.

The direction of flow of the air intake filter in installed state is from the inside to the outside through the filter material.

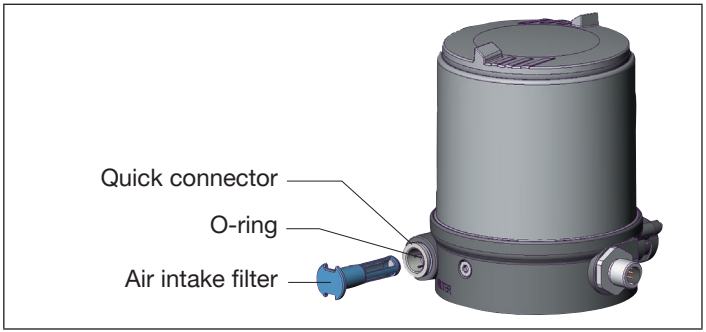


Fig. 35: Service at the air intake filter

Procedure:

→ Unlock the quick connector by pressing the holding element and pulling out the air intake filter (if necessary, use a suitable tool in between the recesses in the head of the filter).

→ Clean the filter or, if necessary, replace the filter.

→ Check inner O-ring and, if required, clean.

→ Insert the air intake filter all the way into the quick connector.

DANGER!

Risk of injury due to improper installation.

- Ensure that the air intake filter is installed correctly.

→ Check that the air intake filter is secure.

13 MALFUNCTIONS

Malfunction	Cause and remedial action
End position is not detected	No or inadequate supply voltage → Check the electrical connection and supply voltage
	Wrong size of switch spindles from the adapter set → Replace switch spindles
	Wrong spindle lead-through selected for spindle installation → Push the switch spindle through the matching spindle lead-through
	Wrong actuator size selected with the DIP switches → Select the matching actuator size
	Cap of the switch spindle moved by force during assembly → Remove the feedback head / control head → Pull the cap towards the end of the switch spindle until you can see one groove → Install the feedback head / control head → Perform a reference movement for spindle adjustment
Faulty detection of end position	Wrong actuator size selected with the DIP switches → Select the matching actuator size
	More than one actuator size selected with the DIP switches → Select the matching actuator size
	Feedback head / control head not mounted in the correct position → Mount the feedback head / control head in the correct position (see “Fig. 10”)
Incorrect display of actuator status LED	Color selection switch not correctly selected → Select the color assignment correctly (both up or both down, see section “10.3.1 Basic settings” “Fig. 30”)
Actuator does not switch	No or inadequate supply voltage → Check the electrical connection and supply voltage
	Pressure supply too low → Check the control pressure
	Faulty hose system → Check the pneumatic connections

Malfunction	Cause and remedial action
AS-Interface bus status LEDs off	No or inadequate supply voltage → Check contact of ribbon cable terminal with AS-Interface line → Ensure supply voltage is present on the AS-Interface line

Tab. 16: Malfunctions

14 SHUTDOWN

14.1 Safety instructions

DANGER!

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

- Before working on equipment or device, switch off the pressure and deaerate/drain lines.

Risk of electric shock.

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

WARNING!

Risk of injury from improper removal.

- Removal may be carried out by authorized technicians only and with the appropriate tools.

14.2 Disassembly

Procedure:

→ Turn off the pressure and vent the lines.

→ Switch off the power supply.

1. Pneumatic connection (control head Type 8686 only)

DANGER!

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

- Before working on equipment or device, switch off the pressure and deaerate/drain lines.

→ Loosen pneumatic connection.

→ Release the pneumatic connection to the actuator.

2. Mechanical connections

→ Release the fastening screws.

→ Pull the feedback head / control head up and out.

3. Electrical connection

DANGER!

Risk of electric shock.

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

Device with circular plug-in connector:

→ Release the circular plug.

Device with cable gland:

→ Release the cable gland.

→ Loosen the wires from the screw terminals.

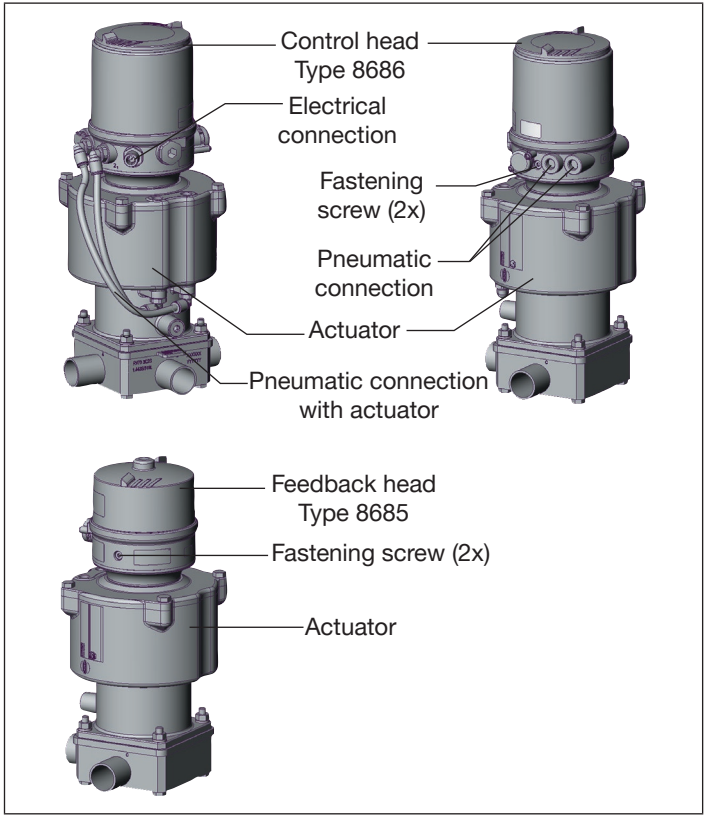


Fig. 36: Disassembly

15 ACCESSORIES

Designation	Order no.
Connecting cable M12 x 1, 8-pin	919061
Auxiliary tool for installing the transparent cap	674077

Tab. 17: Accessories

16 TRANSPORT, STORAGE, PACKAGING

NOTE!

Transport damage.

Inadequately protected equipment may be damaged during transportation.

- During transportation protect the device against moisture and dirt in shock-resistant packaging.
- Prevent the temperature from exceeding or dropping below the permitted storage temperature.
- Protect the electrical interfaces of the coil and the pneumatic connections from damage by placing protective caps on them.

Incorrect storage may damage the device.

- Store the device in a dry and dust-free location.

Storage temperature -20 – 65 °C.

Environmentally friendly disposal

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

Further information country.burkert.com.

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FLUID CONTROL SYSTEMS

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MAN 1000329132 EN Version: EStatus: RL (released | freigegeben) printed: 15.10.2026