



## Control- and feedback head for integrated mounting on Robolux valves Type 2036

- Compact design
- Contactless valve position registration
- Coloured illuminated status display
- Fieldbus AS-Interface (optional)
- With ATEX II cat. 2G approval



Product variants described in the data sheet may differ from the product presentation and description.

### Can be combined with



#### Type 2036

Robolux multiway diaphragm valve, pneumatically operated

### Type description

Feedback Type 8685 and control head Type 8686 are optimized for integrated mounting on pneumatically operated actuators Type 2036 Robolux. The adjustment to the individual actuator size is done through DIP-switches.

As compact units the devices contain the complete automation functionality of both individually operated actuator pistons. Depending on the configuration, electrical and visual position feedback is done by non-contact switches and LEDs, integrated pilot valves control the actuator pistons and AS-interface communication is available. In this way a complete concept for decentralized automation is feasible.

The compact body is especially distinguished by its hygienic design, materials being chemically resistant against cleaning media and a proven IP protection. In addition the Control Head Type 8686 features an integrated compressed air filter to protect the pilot valve function against particles through the compressed air supply.

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## 1. General technical data

### 1.1. Control and feedback head Type 8685 and Type 8686

|                                                                                                        |                                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Product properties</b>                                                                              |                                                                                                                                                          |
| Dimensions                                                                                             | Further information can be found in chapter <a href="#">“4. Dimensions” on page 7.</a>                                                                   |
| <b>Material</b>                                                                                        |                                                                                                                                                          |
| Body                                                                                                   | PPS, stainless steel                                                                                                                                     |
| Seal                                                                                                   | EPDM                                                                                                                                                     |
| Cover                                                                                                  | PC                                                                                                                                                       |
| <b>Communication</b>                                                                                   |                                                                                                                                                          |
| Fieldbus                                                                                               | AS-Interface                                                                                                                                             |
| <b>Performance data</b>                                                                                |                                                                                                                                                          |
| <b>Position sensor</b>                                                                                 |                                                                                                                                                          |
| <b>Stroke range for linear actuator</b>                                                                |                                                                                                                                                          |
| Valve spindle                                                                                          | RV50 = 6.0 mm, RV70 = 9.5 mm, RV110 = 13.5 mm                                                                                                            |
| Position feedback                                                                                      | Reed sensors (contactless)                                                                                                                               |
| <b>Electrical data</b>                                                                                 |                                                                                                                                                          |
| <b>Operating voltage</b>                                                                               |                                                                                                                                                          |
| Pilot valve                                                                                            | 24 V DC $\pm$ 10 %<br>Maximum input voltage <sup>1)</sup><br>For Ex i variant: see <a href="#">“1.5. Ex i version Type 8685 and Type 8686” on page 5</a> |
| Residual ripple                                                                                        | 10 %                                                                                                                                                     |
| Power consumption                                                                                      | 0.8 W every valve                                                                                                                                        |
| Limit switches                                                                                         | 24 V DC $\pm$ 10 %<br>8.2 V DC (Ex i-NAMUR switch amplifier)<br>Ui < 12 V, li < 20 mA, Pi < 60 mW (Ex barrier)                                           |
| Protection class                                                                                       | III according to VDE 0580                                                                                                                                |
| <b>Electrical connection</b>                                                                           |                                                                                                                                                          |
| Multipole version                                                                                      | M12 (8-pin), M12 (4-pin) with 1 m cable (AS-Interface)                                                                                                   |
| Cable gland version                                                                                    | M16 $\times$ 1.5 (cable $\varnothing$ 6.5 mm), screw terminals (1.0 mm <sup>2</sup> )                                                                    |
| <b>Pneumatic data</b>                                                                                  |                                                                                                                                                          |
| <b>Control medium</b>                                                                                  | <b>Neutral gases, air, quality class according to ISO 8573 - 1</b>                                                                                       |
| Dust content                                                                                           | Class 5 (< 40 $\mu$ m particle size)                                                                                                                     |
| Particle density                                                                                       | Class 5 (< 10 mg/m <sup>3</sup> )                                                                                                                        |
| Pressure dew point                                                                                     | Class 3 (< 20 °C)                                                                                                                                        |
| Oil content                                                                                            | Class 5 (< 25 mg/m <sup>3</sup> )                                                                                                                        |
| <b>Air supply filter</b>                                                                               | <b>Exchangeable</b>                                                                                                                                      |
| Mesh size                                                                                              | ~0.1 mm                                                                                                                                                  |
| Supply pressure                                                                                        | 3...7 bar <sup>2)</sup>                                                                                                                                  |
| Pilot air ports                                                                                        | Threaded connection G 1/8                                                                                                                                |
| <b>Approvals and conformities</b>                                                                      |                                                                                                                                                          |
| Further information can be found in chapter <a href="#">“2. Approvals and conformities” on page 5.</a> |                                                                                                                                                          |
| <b>Environment and installation</b>                                                                    |                                                                                                                                                          |
| <b>Operating conditions</b>                                                                            |                                                                                                                                                          |
| Ambient temperature                                                                                    | 0...+ 55 °C                                                                                                                                              |
| Degree of protection                                                                                   | IP65/67 according to EN 60529                                                                                                                            |
| <b>Installation and mechanical data</b>                                                                |                                                                                                                                                          |
| Installation position                                                                                  | As required, preferably with actuator in upright position                                                                                                |
| Adapter kits                                                                                           | Further information can be found in chapter <a href="#">“Adapter kits” on page 15.</a>                                                                   |

1.) Valve supply:

Maximum input power Pi = 1.1 mW

Maximum input voltage and maximum input current according to the following table

|         |     |     |     |     |     |     |     |    |
|---------|-----|-----|-----|-----|-----|-----|-----|----|
| Ui [V]  | 15  | 18  | 20  | 22  | 25  | 28  | 30  | 35 |
| li [mA] | 900 | 440 | 309 | 224 | 158 | 120 | 101 | 73 |

Internal capacity and inductance negligible

2.) The existing supply pressure must be 0.5...1 bar above the minimum required pilot pressure of the valve actuator.

### 1.2. Without fieldbus communication: 24 V DC

| Electrical data       |                                                                                                                      |
|-----------------------|----------------------------------------------------------------------------------------------------------------------|
| Operating voltage     | 24 V DC                                                                                                              |
| Residual ripple       | 10 %                                                                                                                 |
| Power consumption     | < 2 W                                                                                                                |
| Voltage tolerance     | ± 10 %                                                                                                               |
| Output                | Max. 100 mA per output, short-circuit protected                                                                      |
| Electrical connection |                                                                                                                      |
| Multipole             | M12 (8-pin)                                                                                                          |
| Cable gland           | M12 × 1.5 (cable Ø 6.5 mm), screw terminals (1.0 mm <sup>2</sup> / maximum port cross-section 0.25 mm <sup>2</sup> ) |

### 1.3. With fieldbus communication: AS-Interface Type 8685

| Product properties                                           |                                              |
|--------------------------------------------------------------|----------------------------------------------|
| Profile                                                      | S- 0.A.E (AB slave, max. 62 slaves/master)   |
| Electrical data                                              |                                              |
| <b>Operating voltage</b>                                     | <b>29.5...31.6 V DC</b>                      |
| Via bus cable                                                | According to specification                   |
| Separated from bus signal                                    | On request                                   |
| Maximum current consumption<br>(2 terminal position reached) | 35 mA                                        |
| Electrical connection                                        | M12, 4-pin with 1 m cable on flat cable clip |
| Programming data                                             | See <b>operating manual Type 8685</b> ►      |

### 1.4. With fieldbus communication: AS-Interface Type 8686

| Product properties                                                                    |                                              |
|---------------------------------------------------------------------------------------|----------------------------------------------|
| Profile                                                                               | S- 7.A.E (AB slave, max. 62 slaves/master)   |
| Electrical data                                                                       |                                              |
| <b>Operating voltage</b>                                                              | <b>29.5...31.6 V DC</b>                      |
| Via bus cable                                                                         | According to specification                   |
| Separated from bus signal                                                             | On request                                   |
| Maximum current consumption<br>(2 valves activated and<br>2 position feedback active) | 120 mA                                       |
| Outputs                                                                               |                                              |
| Contact rating                                                                        | ≤ 2 × 0.8 W (above AS-Interface)             |
| Watchdog function                                                                     | Integrated                                   |
| Inputs                                                                                |                                              |
| Sensor operating voltage                                                              | 24 V ± 10 % (above AS-Interface)             |
| Current carrying capacity                                                             | ≤ 50 mA short circuit protected              |
| Switching level High                                                                  | ≥ 10 V                                       |
| Input current High                                                                    | ≤ 1.5 mA                                     |
| Input current Low                                                                     | ≤ 0.1 mA                                     |
| Electrical connection                                                                 | M12, 4-pin with 1 m cable on flat cable clip |
| Programming data                                                                      | See <b>operating manual Type 8686</b> ►      |

## 1.5. Ex i version Type 8685 and Type 8686

### Electrical data

#### Operating voltage

|                       |                                                                                                                                                                                                                |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Limit switches        | Operates with Ex i-NAMUR switch amplifier: 8.2 V DC<br>Operates with Ex barrier <sup>1)</sup> : Max. input voltage $U_i < 12$ V DC                                                                             |
| Pilot valve           | Control valve component for Ex valve coils <sup>2)</sup>                                                                                                                                                       |
| Limit switches status | Only electrical feedback                                                                                                                                                                                       |
| Current consumption   | Operates with Ex-i-NAMUR switch amplifier:<br>< 1.2 mA (terminal position reached)<br>> 2.1 mA (terminal position not reached)<br>Operates with Ex barrier <sup>1)</sup> : Maximum input current $I_i < 50$ mA |
| Electrical connection | Cable gland M12 × 1.5 (cable Ø 6.5 mm, screw terminals 1.0 mm <sup>2</sup> /max. port cross-section: 8685: 0.25 mm <sup>2</sup> , 8686: 0.14 mm <sup>2</sup> )                                                 |

### Approvals and conformities

#### Explosion protection

|                           |                                                                                          |
|---------------------------|------------------------------------------------------------------------------------------|
| Ignition protection class | BVS 13 ATEX E 039 X<br>IIG Ex ia IIC T4 Gb<br><br>IECEX BVS 13.0047 X<br>Ex ia IIC T4 Gb |
|---------------------------|------------------------------------------------------------------------------------------|

Further information can be found in chapter **"2. Approvals and conformities"** on page 5.

### Environment and installation

|                      |                                                                                                            |
|----------------------|------------------------------------------------------------------------------------------------------------|
| Operating conditions | Medium temperature of adapted process valve Type 2036<br>T (Medium): 0...130 °C (safety requirement value) |
|----------------------|------------------------------------------------------------------------------------------------------------|

1.) Electrical feed-in through intrinsically safe electric circuit of ignition protection Ex ia IIC. Each circuit (end position) has the following safety related max data:

Maximum input voltage  $U_i = 12$  V DC / Maximum input current  $I_i = 50$  mA

Maximum input power  $P_i = 60$  mW

Internal capacity and inductance negligible

2.) Valve supply:

Maximum input power  $P_i = 1.1$  mW

Maximum input voltage and maximum input current according to the following table

|                              |     |     |     |     |     |     |     |    |
|------------------------------|-----|-----|-----|-----|-----|-----|-----|----|
| <b><math>U_i</math> [V]</b>  | 15  | 18  | 20  | 22  | 25  | 28  | 30  | 35 |
| <b><math>I_i</math> [mA]</b> | 900 | 440 | 309 | 224 | 158 | 120 | 101 | 73 |

Internal capacity and inductance negligible

## 2. Approvals and conformities

### 2.1. General notes

- The approvals and conformities listed below must be stated when making enquiries. This is the only way to ensure that the product complies with all required specifications.
- Not all available versions can be supplied with the below mentioned approvals or conformities.

### 2.2. Conformity

In accordance with the Declaration of Conformity, the product is compliant with the EU Directives.

### 2.3. Standards

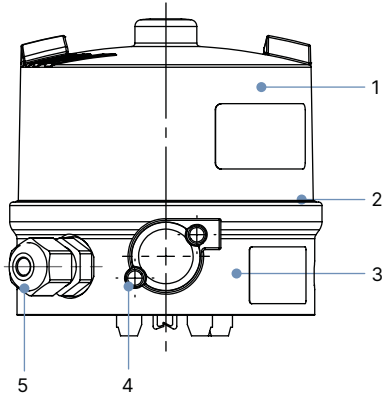
The applied standards which are used to demonstrate compliance with the EU Directives are listed in the EU-Type Examination Certificate and/or the EU Declaration of Conformity.

Type 8685

3. Materials

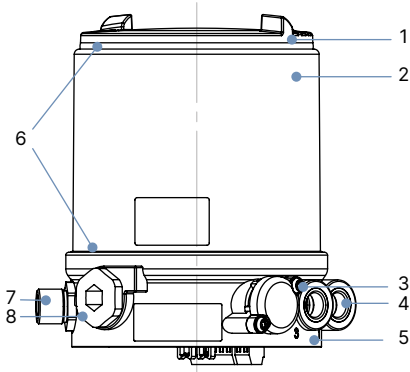
3.1. Material specifications

Type 8685



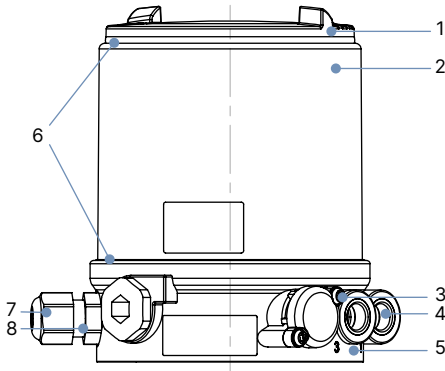
| No. | Element       | Material        |
|-----|---------------|-----------------|
| 1   | Cover         | PC              |
| 2   | Seal          | EPDM            |
| 3   | Basic housing | PPS             |
| 4   | Screws        | Stainless steel |
| 5   | Cable gland   | PA              |

Type 8686



| No. | Element              | Material            |
|-----|----------------------|---------------------|
| 1   | Cover                | PC                  |
| 2   | Outer casing         | EPDM                |
| 3   | Screws               | Stainless steel     |
| 4   | Threaded ports G 1/8 | Stainless steel     |
| 5   | Basic housing        | PPS                 |
| 6   | Seal                 | EPDM                |
| 7   | Plug connector M12   | Nickel-plated brass |
| 8   | Dummy plug           | PA                  |

Type 8686 Ex i (NAMUR)



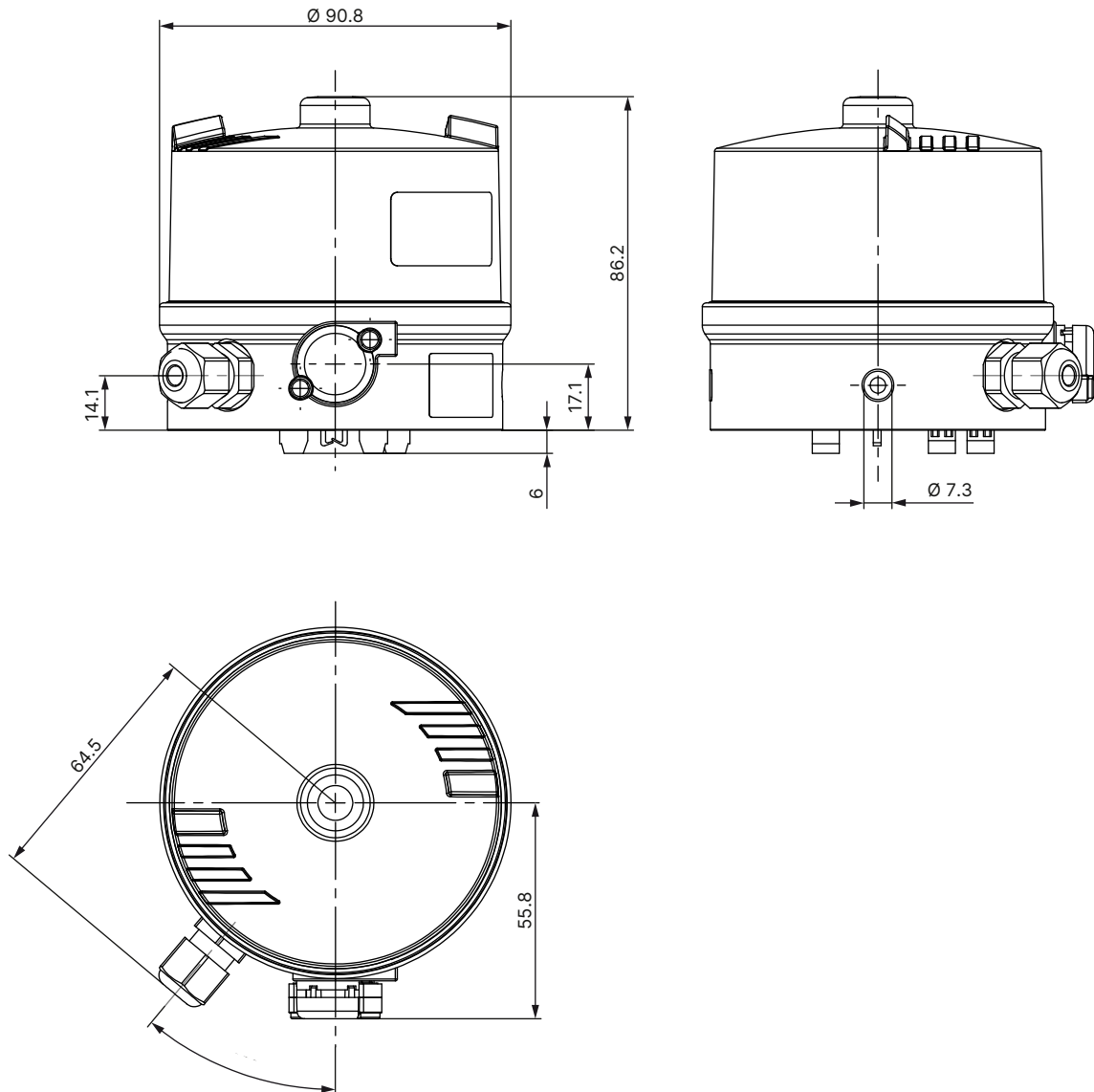
| No. | Element              | Material        |
|-----|----------------------|-----------------|
| 1   | Cover                | PC              |
| 2   | Outer casing         | EPDM            |
| 3   | Screws               | Stainless steel |
| 4   | Threaded ports G 1/8 | Stainless steel |
| 5   | Basic housing        | PPS             |
| 6   | Seal                 | EPDM            |
| 7   | Cable connection     | PA              |
| 8   | Dummy plug           | PA              |

## 4. Dimensions

### 4.1. Type 8685

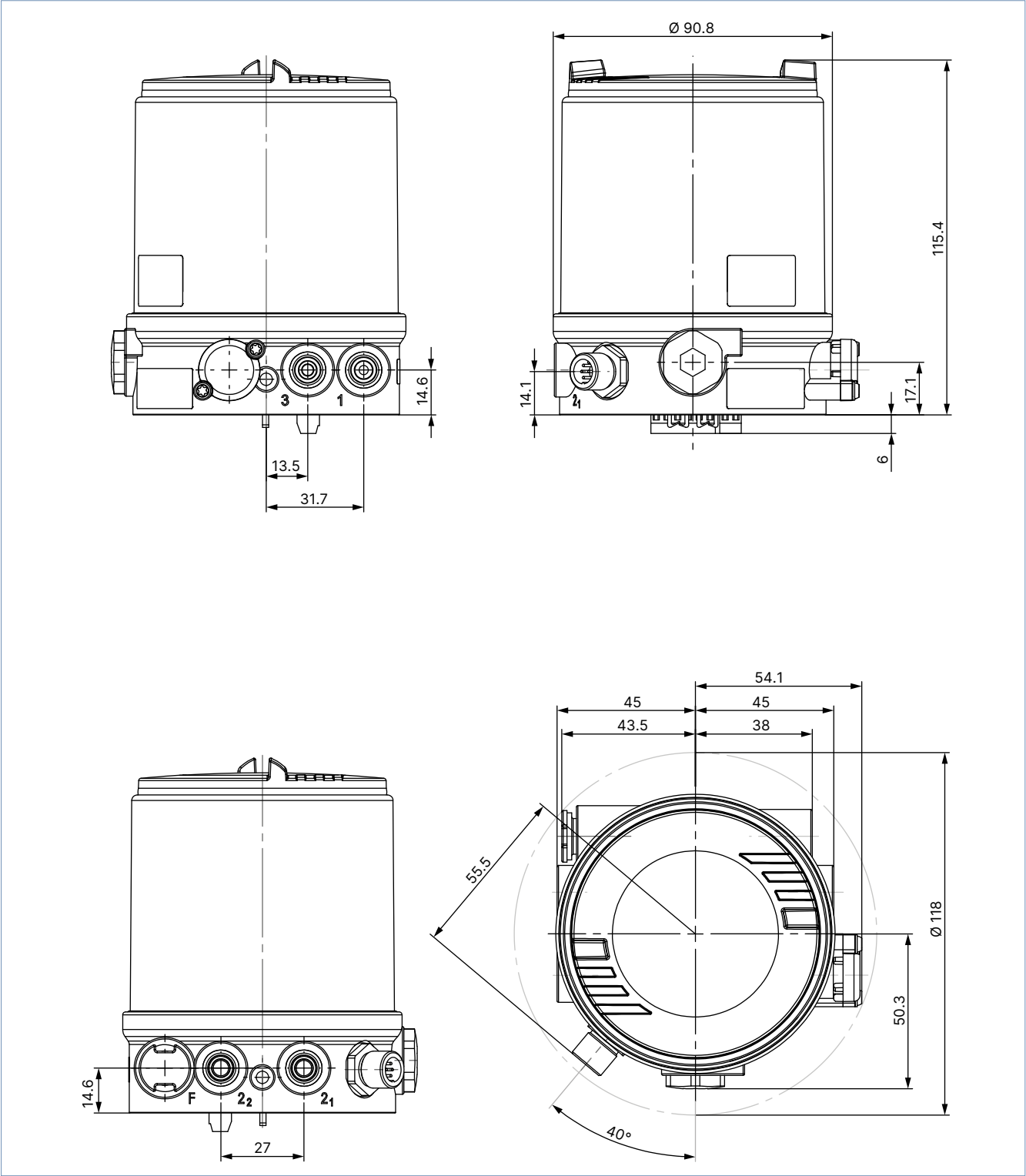
**Note:**

Dimensions in mm



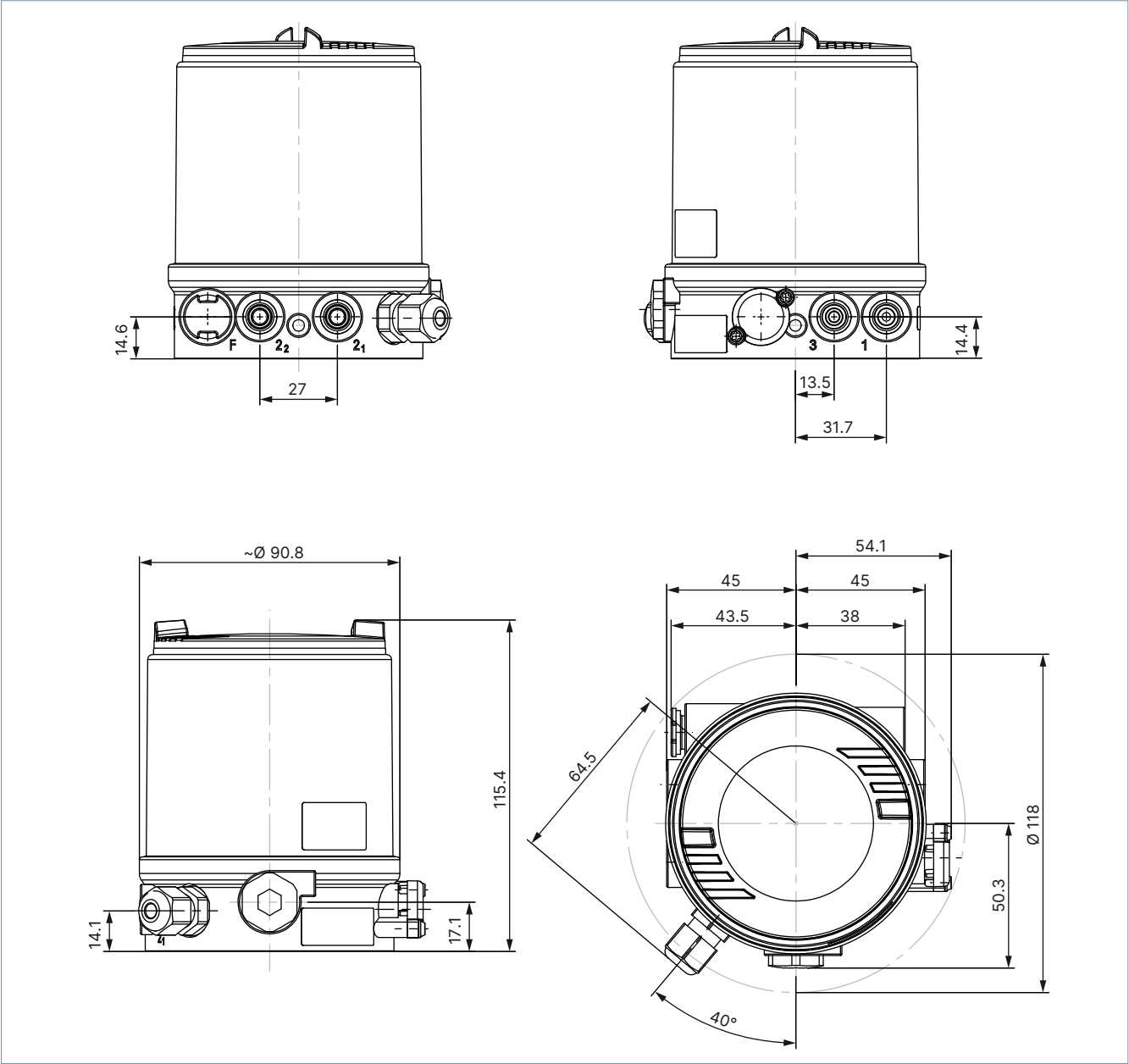
4.2. Type 8686

**Note:**  
Dimensions in mm



4.3. Type 8686 Ex i (NAMUR)

**Note:**  
Dimensions in mm

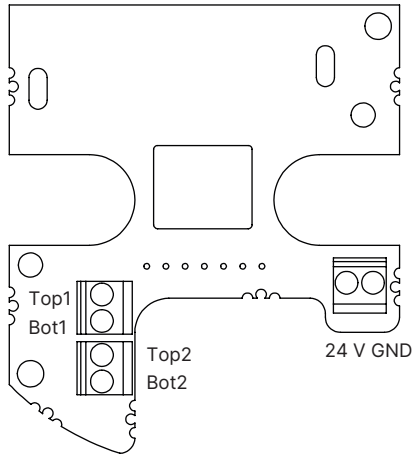


5. Device/Process connections

5.1. Electrical connections

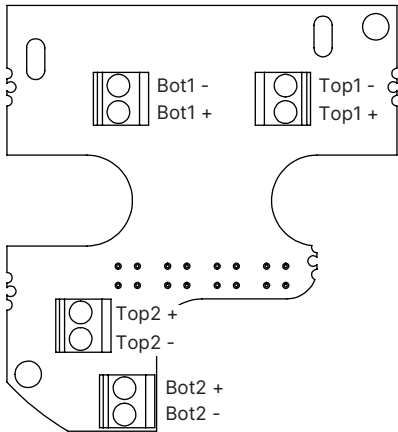
Without fieldbus communication 24 V DC: Type 8685

Cable gland



| Description on circuit board | Description                         |
|------------------------------|-------------------------------------|
| 24 V                         | Operating voltage + (24 V DC)       |
| GND                          | Operating voltage – (GND)           |
| Top 1                        | End positions above, Top actuator 1 |
| Bot 1                        | End positions below, Bot actuator 1 |
| Top 2                        | End positions above, Top actuator 2 |
| Bot 2                        | End positions below, Bot actuator 2 |

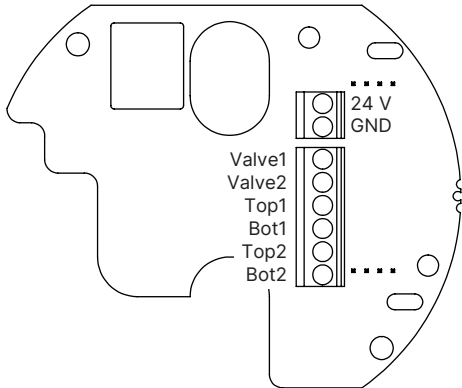
Ex i (NAMUR): cable gland



| Description on circuit board | Description                      |
|------------------------------|----------------------------------|
| Top 1 +                      | End positions above + actuator 1 |
| Top 1 –                      | End positions above – actuator 1 |
| Bot 1 +                      | End positions below + actuator 1 |
| Bot 1 –                      | End positions below – actuator 1 |
| Top 2 +                      | End positions above + actuator 2 |
| Top 2 –                      | End positions above – actuator 2 |
| Bot 2 +                      | End positions below + actuator 2 |
| Bot 2 –                      | End positions below – actuator 2 |

Without fieldbus communication 24 V DC: Type 8686

Cable gland

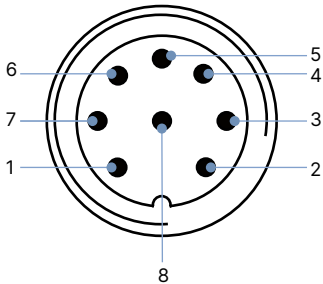


| Description on circuit board | Description                              |
|------------------------------|------------------------------------------|
| Bot 2                        | End positions below, Bot actuator 2      |
| Top 2                        | End positions above, Top actuator 2      |
| Bot 1                        | End positions below, Bot actuator 1      |
| Top 1                        | End positions above, Top actuator 1      |
| Valve 2                      | Valve control Y2 + (actuator 2 operated) |
| Valve 1                      | Valve control Y1 + (actuator 1 operated) |
| GND                          | Operating voltage –                      |
| 24 V DC                      | Operating voltage +                      |

Multipole connection M12, 8-pin

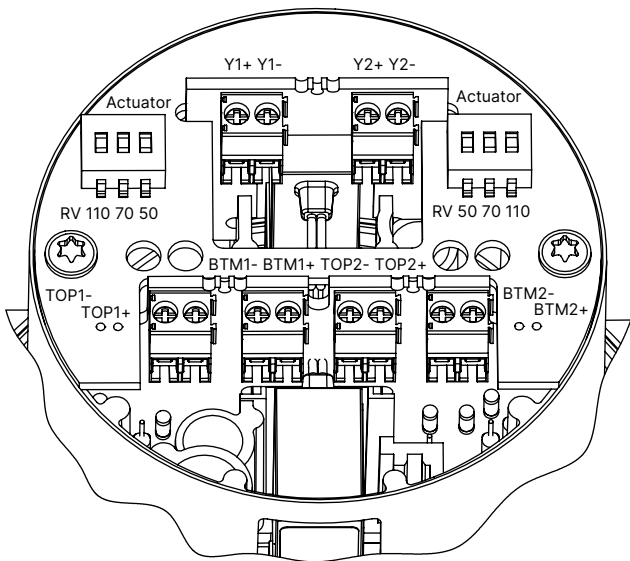
Note:

Use only straight cable sockets.



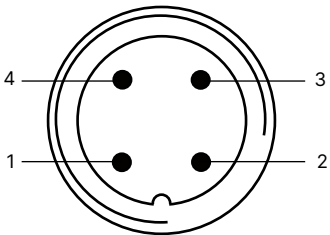
| Pin | Description      | Assignment                          |
|-----|------------------|-------------------------------------|
| 1   | Limit switches 3 | End positions below, Bot actuator 2 |
| 2   | Limit switches 4 | End positions above, Top actuator 2 |
| 3   | Limit switches 1 | End positions below, Bot actuator 1 |
| 4   | Limit switches 2 | End positions above, Top actuator 1 |
| 5   | Valve 2          | Valve control Y2 +                  |
| 6   | Valve 1          | Valve control Y1 +                  |
| 7   | GND              | Operating voltage –                 |
| 8   | 24 V DC          | Operating voltage +                 |

Ex i (NAMUR): cable gland



| Description on circuit board | Description                      |
|------------------------------|----------------------------------|
| TOP 1 +                      | End positions above + actuator 1 |
| TOP 1 –                      | End positions above – actuator 1 |
| BTM 1 +                      | End positions below + actuator 1 |
| BTM 1 –                      | End positions below – actuator 1 |
| TOP 2 +                      | End positions above + actuator 2 |
| TOP 2 –                      | End positions above – actuator 2 |
| BTM 2 +                      | End positions below + actuator 2 |
| BTM 2 –                      | End positions below – actuator 2 |
| Y1 +                         | Supply line valve1               |
| Y1 –                         | Return circuit valve1            |
| Y2 +                         | Supply line valve2               |
| Y2 –                         | Return circuit valve2            |

AS-Interface connection: Type 8685 and Type 8686

| Circular plug M12, 4-pin                                                          |     |             |                                                                                    |                                                                                     |
|-----------------------------------------------------------------------------------|-----|-------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  | Pin | Description | Control head Type 8686                                                             | Feedback head Type 8685                                                             |
|                                                                                   | 1   | Bus +       |  |  |
|                                                                                   | 2   | NC          |                                                                                    |                                                                                     |
|                                                                                   | 3   | Bus -       |                                                                                    |                                                                                     |
|                                                                                   | 4   | NC          |                                                                                    |                                                                                     |

6. Product installation

6.1. Combination options with pneumatic process valves ELEMENT

**Note:**

A complete **process valve system Type 8806** consists of **control head Type 8686** or **position feedback Type 8685**, a control valve **Type 2036 Robolux** and an **adapter set**.

The following information is required to select a complete system:

- **Article no.** of the desired **positioner control head Type 8686** or **feedback Type 8685**
- **Article no.** of the desired **control valve Type 2036 Robolux**

You order two components and receive a completely assembled and tested valve.

Examples of control valve systems



7. Ordering information

7.1. Bürkert eShop



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7.2. Bürkert product filter



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7.3. Ordering chart

| Type | Communication    | Electrical connection                         | Pneumatic function      | Position feedback  | Pilot air ports           | Article no. |
|------|------------------|-----------------------------------------------|-------------------------|--------------------|---------------------------|-------------|
| 8685 | Without          | Cable gland                                   | Without                 | 2 switching points | Threaded connection G 1/8 | 231306      |
|      | AS-Interface A/B | Cable gland with 1 m cable on flat cable clip | Without                 | 2 switching points | Threaded connection G 1/8 | 231307      |
|      | Ex i (NAMUR)     | Cable gland                                   | Without                 | 2 switching points | Threaded connection G 1/8 | 242249      |
| 8686 | Without          | M12 (8-pin)                                   | 2x single-acting DN 3.0 | 2 switching points | Threaded connection G 1/8 | 231292      |
|      | AS-Interface A/B | Cable gland with 1 m cable on flat cable clip | 2x single-acting DN 3.0 | 2 switching points | Threaded connection G 1/8 | 231293      |
|      | Ex i (NAMUR)     | Cable gland                                   | 2x single-acting DN 3.0 | 2 switching points | Threaded connection G 1/8 | 242250      |

**Further versions on request**

**Additional**

- Type 8686 ASI - variants with external power supply
- Type 8686 24 V DC - variants with cable gland

7.4. Ordering chart accessories

Standard accessories

**Note:**  
Must be ordered separately.

| Description                                                                            | Article no.                                                                                |
|----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| M12 circular socket with cable, 8-pin, cable length: 5 m, for input and output signals | 919267  |
| M12 circular socket with cable, 8-pin, cable length: 2 m, for input and output signals | 919061  |
| AS-Interface flat cable clamp, M12 outlet, stainless steel outlet                      | 799646  |
| Silencer G 1/8                                                                         | 780779  |
| Pilot tool for cover mounting                                                          | 674077  |

Adapter kits

**Note:**  
Must be ordered separately.

| Description               | Actuator size     | Article no.                                                                                |
|---------------------------|-------------------|--------------------------------------------------------------------------------------------|
| Adapter set for Type 8685 | RV50, RV70, RV110 | 684267  |
| Adapter set for Type 8686 | RV50, RV70, RV110 | 684268  |