# GEMÜ 4242

Combi switchbox with integrated pilot valve

EN

## Operating instructions

ASi-5

further information
webcode: GW-4242

## Contents

# 1 General information

## 1.1 Information

- The descriptions and instructions apply to the standard versions. For special versions not described in this document the basic information contained herein applies in combination with any additional special documentation.
- Correct installation, operation, maintenance and repair work ensure faultless operation of the product.
- Should there be any doubts or misunderstandings, the German version is the authoritative document.
- Contact us at the address on the last page for staff training information.

## 1.2 Symbols used

The following symbols are used in this document:

| Symbol | Meaning |
|---|---|
| ● | Tasks to be performed |
| ▶ | Response(s) to tasks |
| – | Lists |

## 1.3 Definition of terms

**Working medium**

The medium that flows through the GEMÜ product.

**Control function**

The possible actuation functions of the GEMÜ product.

**Control medium**

The medium whose increasing or decreasing pressure causes the GEMÜ product to be actuated and operated.

## 1.4 Warning notes

Wherever possible, warning notes are organised according to the following scheme:

| SIGNAL WORD | |
|---|---|
| Possible symbol for the specific danger | Type and source of the danger<br>▶ Possible consequences of non-observance.<br>● Measures for avoiding danger. |

Warning notes are always marked with a signal word and sometimes also with a symbol for the specific danger.

The following signal words and danger levels are used:

**⚠ DANGER**

**Imminent danger!**

▶ Non-observance can cause death or severe injury.

**⚠ WARNING**

**Potentially dangerous situation!**

▶ Non-observance can cause death or severe injury.

**⚠ CAUTION**

**Potentially dangerous situation!**

▶ Non-observance can cause moderate to light injury.

**NOTICE**

**Potentially dangerous situation!**

▶ Non-observance can cause damage to property.

The following symbols for the specific dangers can be used within a warning note:

| Symbol | Meaning |
|---|---|
|  | Danger of explosion! |
|  | Danger of explosion |
|  | Risk of electric shock |
|  | Hazardous situation |
|  | Safety notice! |

# 2 Safety information

The safety information in this document refers only to an individual product. Potentially dangerous conditions can arise in combination with other plant components, which need to be considered on the basis of a risk analysis. The operator is responsible for the production of the risk analysis and for compliance with the resulting precautionary measures and regional safety regulations.

The document contains fundamental safety information that must be observed during commissioning, operation and maintenance. Non-compliance with these instructions may cause:

- Personal hazard due to electrical, mechanical and chemical effects.
- Hazard to nearby equipment.

- Failure of important functions.
- Hazard to the environment due to the leakage of dangerous substances.

The safety information does not take into account:

- Unexpected incidents and events, which may occur during installation, operation and maintenance.
- Local safety regulations which must be adhered to by the operator and by any additional installation personnel.

**Prior to commissioning:**

1. Transport and store the product correctly.
2. Do not paint the bolts and plastic parts of the product.
3. Carry out installation and commissioning using trained personnel.
4. Provide adequate training for installation and operating personnel.
5. Ensure that the contents of the document have been fully understood by the responsible personnel.
6. Define the areas of responsibility.
7. Observe the safety data sheets.
8. Observe the safety regulations for the media used.

**During operation:**

9. Keep this document available at the place of use.
10. Observe the safety information.
11. Operate the product in accordance with this document.
12. Operate the product in accordance with the specifications.
13. Maintain the product correctly.
14. Do not carry out any maintenance work and repairs not described in this document without consulting the manufacturer first.

**In cases of uncertainty:**

15. Consult the nearest GEMÜ sales office.

# 3 Product description

## 3.1 Construction


| Item | Name | Materials | | |
|---|---|---|---|---|
| | | Size 1, 30 mm | Size 2, 75 mm | Size 2, 30 mm |
| 1 | Housing cover – standard version: | PC | PC | PC |
| 2 | Housing base | Anodized aluminium or stainless steel | Stainless steel | Stainless steel |
| 3 | Electrical connection | Threaded piece: Stainless steel (1.4305) Insert: PA | Threaded piece: Stainless steel (1.4305) Insert: PA | Threaded piece: Stainless steel (1.4305) Insert: PA |
| 4 | Adapter piece | Stainless steel (1.4305) | Stainless steel (1.4305) | Stainless steel (1.4305) |
| 5 | Mounting kit, valve-specific | Valve-specific materials | Valve-specific materials | Valve-specific materials |
| | Seals | EPDM and NBR | NBR, EPDM and VMQ | NBR, EPDM and VMQ |

## 3.2 Description

The GEMÜ 4242 combi switchbox is suitable for installation on pneumatically operated linear actuators. The position of the valve spindle is reliably electronically detected and evaluated using play-free and non-positive mounting. Integrated pilot valves enable direct activation of the process valve connected to them. Intelligent microprocessor-controlled functions facilitate commissioning and support during operation. The current position of the valve is displayed via high-visibility LEDs and fed back via electrical signals.

## 3.3 Function

The GEMÜ 4242 combi switchbox controls the pneumatic actuator via integrated pilot valves and simultaneously indicates the current position of the valve. Should the valve be opened, the internally installed pilot valves control the pneumatic actuator accordingly. The spindle in the combi switchbox consequently moves upwards and indicates that the valve is OPEN using the high visibility LEDs and communication interface. Should the valve be closed, the internally installed pilot valves control the pneumatic actuator accordingly. The spring in the mounting kit simultaneously pushes the spindle in the

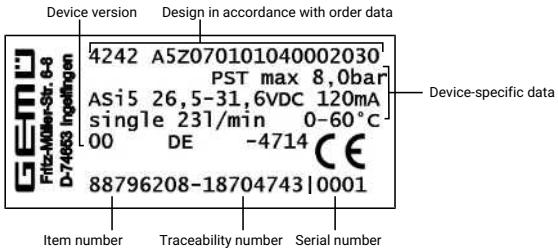
combi switchbox downwards and indicates that the valve is CLOSED using the high visibility LEDs and communication interface.

## 3.4 LEDs

As well as the electrical position indicator and error output, a visual signal of the various operating conditions is emitted by high-visibility LEDs integrated into the housing. The LEDs are arranged so that the transparent cover is illuminated all round, making the condition visible from afar. The following conditions are illustrated here:

| Colour of high-visibility LEDs | | Function |
|---|---|---|
| Standard | Inversed | |
| Green | Orange | Process valve in OPEN position |
| Orange | Green | Process valve in CLOSED position |
| Flashing green | Flashing orange | Movement of process valve in OPEN direction |
| Flashing orange | Flashing green | Movement of process valve in CLOSED direction |
| Flashing yellow/white | | Initialization active |
| Flashing white | | Localization active |
| Flashing orange/red | | Warning active |
| Flashing red | | Error active |
| Flashing yellow/turquoise | | Maintenance required |
| Flashing blue (briefly) | | Wireless connection established |
| Flashing purple/green | | Internal update process active |
| Flashing turquoise (briefly) | | Device start |

## 3.5 Product label



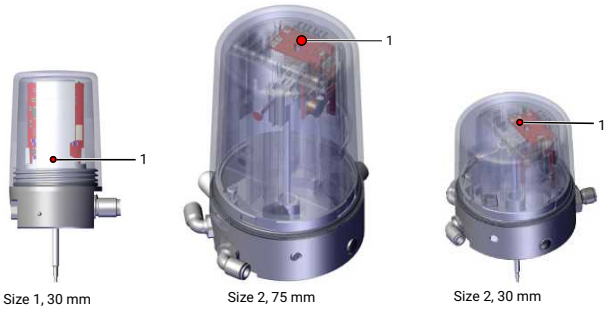

The manufacturing month is coded under the traceability number and can be requested from GEMÜ. The product was manufactured in Germany.

# 4 GEMÜ CONEXO

**Order variant**

In the corresponding design with CONEXO, this product has an RFID chip (1) for electronic identification purposes. The position of the RFID chip can be seen below. The CONEXO pen helps read out information stored in the RFID chips. The CONEXO app or CONEXO portal is required to display this information.

**Installing the RFID chip (1)**




For further information please read the operating instructions for CONEXO products or the CONEXO datasheet.

Products such as the CONEXO app, the CONEXO portal and the CONEXO pen are not included in the scope of delivery and need to be ordered separately.

# 5 Correct use

**⚠ DANGER**

**Danger of explosion!**

► Risk of severe injury or death

● Only versions that have been approved according to their technical data may be used in potentially explosive environments.

**⚠ WARNING**

**Improper use of the product!**

► Risk of severe injury or death

► Manufacturer liability and guarantee will be void

● Only use the product in accordance with the operating conditions specified in the contract documentation and in this document.

The GEMÜ 4242 with integrated pilot valve is designed for pneumatic actuators. The product has a microprocessor-controlled intelligent position sensor as well as an analogue travel sensor system (potentiometer). It is non-positively connected with the actuator spindle by means of a mounting kit (spring, operating bush). The valve end positions and the integrated travel sensor can be controlled via the electrical connections. The pneumatic valve actuator is directly activated by an integrated 3/2-way pilot valve. The housing cover must not be removed.

## 5.1 Product without special function X

The product is not intended for use in potentially explosive areas.

## 5.2 Product with special function X

The product with ordering option Special version X is intended for use in potentially explosive areas of zone 2 with gases, mists or vapours and zone 22 with combustible dusts in accordance with EU directive 2014/34/EU (ATEX) and IECEx.

The product has the following explosion protection marking:

**ATEX**

Gas: Ⓔx II 3G Ex ec nC IIC T4 Gc X

Dust: Ⓔx II 3D Ex tc IIIC T100°C Dc X

The product has been developed in compliance with the following harmonised standards:

- EN IEC 60079-0:2018
- EN IEC 60079-7:2015/A1:2018
- EN 60079-31:2014

Use of the product is permissible in the following ambient temperature ranges: 0 to +60 °C

**For use in potentially explosive areas, the following conditions or operation limits must be observed:**

Index X is applied to the explosion protection marking.

The following special conditions must be complied with:

1. Connection cables and connectors must be protected from damage.
2. Layers of dust > 5 mm must be removed.
3. Warning label "Danger from electrostatic build-up".
4. Warning label "Do not disconnect when live".

The housing must be installed protected from mechanical influences.

RFID chips must not be read out in potentially explosive areas.

## 6 Order data

The order data provide an overview of standard configurations.

Please check the availability before ordering. Other configurations available on request.

Note: A valve specific mounting kit is required for assembly. For designing the mounting kit, the valve type, nominal size, control function and actuator size must be stated.

Information for AS-Interface 5 versions: If there are customer or system restrictions that prohibit the use of a Bluetooth wireless interface, it is recommended to use an order variant with a deactivated BLE interface. For versions without a deactivated BLE interface, the option also exists to deactivate the interface independently later.

The versions with fieldbus ASi-5 are (temporarily) only available in the following basic configuration:

**Size 1:**

Fieldbus AS-Interface 5, 96 slaves, BLE (code A5),

Housing material: Stainless steel base (code 07),

Single acting (code 01),

M12 plug, 5-pin (code 01),

Pneumatic 6 mm angled connection (code 04),

Without manual override (code 01).

23 Nl/min flow rate (code 02),

30 mm travel sensor length (code 030),

Without special function (code -) or with ATEX special function (code X)

**Size 2:**

Fieldbus AS-Interface 5, 96 slaves, BLE (code A5),

Housing material: Stainless steel base (code 07),

Single acting (code 01),

M12 plug, 5-pin, stainless steel (code S1),

Pneumatic 6 mm angled connection (code 04),

No code option (code 00),

145 Nl/min flow rate,

30 mm travel sensor length (code 030) or 75 mm (code 075),

Without special function (code -) or with ATEX special function (code X)

## Order codes

| 1 Type | Code |
|---|---|
| Combi switchbox | 4242 |

| 2 Fieldbus | Code |
|---|---|
| AS-Interface 5, 96 slaves, BLE | A5 |
| AS-Interface 5, 96 slaves, BLE deactivated | A5D |

| 3 Accessory | Code |
|---|---|
| Accessory | Z |

| 4 Housing material | Code |
|---|---|
| Stainless steel base, PC cover | 07 |
| Aluminium base, PC cover | 14 |

| 5 Function | Code |
|---|---|
| Combi switchbox, single acting | 01 |

| 6 Electrical connection | Code |
|---|---|
| M12 plug, 5-pin | 01 |
| M12 plug, 5-pin, stainless steel, size 2 | S1 |

| 7 Pneumatic connection | Code |
|---|---|
| M5 connection thread for size 1,<br>G1/8 connection thread for size 2 | 01 |
| Air supply 4 mm angled connection,<br>exhaust air 4 mm angled connection | 02 |
| Air supply 4 mm T-connection,<br>exhaust air 4 mm angled connection | 03 |
| Air supply 6 mm angled connection,<br>exhaust air 6 mm angled connection | 04 |
| Air supply 6 mm T-connection,<br>exhaust air 6 mm angled connection | 05 |
| M5 connection thread for size 1,<br>G1/8 connection thread for size 2<br>(for IP67 or piped air outlet) | E1 |
| Air supply 6 mm angled connection,<br>exhaust air 6 mm angled connection<br>(for IP67 or piped air outlet) | E4 |
| Air supply 1/4" angled connection,<br>exhaust air 1/4" angled connection | U8 |

| 8 Option | Code |
|---|---|
| Without | 00 |
| Manual override | 01 |
| Inversed LED colours | 40 |
| Inversed LED colours,<br>manual override | 41 |

| 9 Flow rate | Code |
|---|---|
| 14 Nl/min, size 1 | 01 |
| 23 Nl/min (Booster), size 1 | 02 |
| 145 Nl/min, size 2 | R3 |

| 10 Travel sensor version | Code |
|---|---|
| Travel sensor 30 mm in length | 030 |
| Travel sensor 75 mm in length | 075 |

| 11 Special version | Code |
|---|---|
| Without | |
| ATEX (2014/34/EU), IECEx | X |

### *Order example*

| Ordering option | Code | Description |
|---|---|---|
| 1 Type | 4242 | Combi switchbox |
| 2 Fieldbus | A5 | AS-Interface 5, 96 slaves, BLE |
| 3 Accessory | Z | Accessory |
| 4 Housing material | 07 | Stainless steel base, PC cover |
| 5 Function | 01 | Combi switchbox, single acting |
| 6 Electrical connection | 01 | M12 plug, 5-pin |
| 7 Pneumatic connection | 01 | M5 connection thread for size 1,<br>G1/8 connection thread for size 2 |
| 8 Option | 01 | Manual override |
| 9 Flow rate | 01 | 14 Nl/min, size 1 |
| 10 Travel sensor version | 030 | Travel sensor 30 mm in length |
| 11 Special version | | Without |

# 7 Technical data

## 7.1 Medium

**Working medium:**
Compressed air and inert gases
Quality classes to DIN ISO 8573-1

**Dust content:**
Class 3, max. particle size 5 µm, max. particle density 5 mg/m³

**Pressure dew point:**
**Size 1**
Class 3, max. pressure dew point -20 °C
**Size 2**
Class 4, max. pressure dew point +3 °C

**Oil content:**
**Size 1**
Class 3, max. oil concentration 1 mg/m³
**Size 2**
Class 5, max. oil concentration 25 mg/m³

## 7.2 Temperature

**Ambient temperature:**
0 — 60 °C

**Control medium temperature:**
0 — 50 °C

**Storage temperature:**
-10 — 70 °C

## 7.3 Pressure

**Operating pressure:**

| Size 1 | Size 2 |
|---|---|
| 1 to 10 bar (at 40 °C)<br>1 to 8 bar (at 60 °C) | 2 to 7 bar |

Observe the maximum control pressure of the valve actuator.

**Flow rate:**

| Size 1 | Size 2 |
|---|---|
| Flow rate code 01:<br>14 Nl/min<br>Flow rate code 02 (booster):<br>23 Nl/min | Flow rate code R3:<br>145 Nl/min |

## 7.4 Product conformity

**EMC Directive:**
2014/30/EU
Class: B
Group: 1
Technical standards used:

| AS-Interface 5 | |
|---|---|
| **Interference emission:** | ASi-5 Spec V1.04 |
| **Interference resistance:** | ASi-5 Spec V1.04 |
| **Interference emission/ interference resistance** | EN 62026-2:2013 + A1:2019 |

**RoHS Directive:**
2011/65/EU

**Radio Equipment Directive (RED):**

2014/53/EU

Technical standards used:

| | |
|---|---|
| Standard regarding the use of radio frequencies: | EN 300 328 V2.2.2 (2019-07) |
| Electromagnetic compatibility (EMC) for radio devices and services: | EN 301 489-1 V2.2.3 (2019-11)<br>EN 301 489-17 V3.2.4 (2020-09) |
| Electrical safety: | EN 61010-1:2010 + A1:2019 + A1:2019/AC:2019 |

**Explosion protection:**

ATEX (2014/34/EU), order code special version X:

**ATEX marking:**

Gas: II 3G Ex ec nC IIC T4 Gc X

Dust: II 3D Ex tc IIIC T100°C Dc X

**Approvals:**

AS-Interface certificate no. 137301

## 7.5 Mechanical data

**Installation position:**

Optional

**Weight:**

| Size 1 | Size 2 | |
|---|---|---|
| | 75 mm | 30 mm |
| Housing material code 14 (aluminium base): 320 g<br>Housing material code 07 (stainless steel base): 600 g | Housing material code 07 (stainless steel base): 1150 g | Housing material code 07 (stainless steel base): 1080 g |

**Travel sensor:**

| | Size 1 | Size 2 | |
|---|---|---|---|
| | | 75 mm | 30 mm |
| **Minimum stroke:** | 2 mm | 5 mm | 2 mm |
| **Maximum stroke:** | 40 mm | 75 mm | 30 mm |

* limited to 30 mm by the mounting kit

## 7.6 Operating conditions

**Ambient conditions:**

**Use indoors and outdoors**

Dry and wet environments

**Height:**

Up to 2000 m (above sea level)

**Relative air humidity:**

0–100%

**Protection class:**

IP 65 / IP 67 acc. to EN 60529
IP 67 is achieved by piping away the exhaust air

**Degree of contamination:**

4 (pollution degree)

## 7.7 Electrical data

**Electrical connection type:**

1 x 5-pin M12 plug (A-coded)

**Supply voltage:**

26.5 to 31.6 V DC (according to AS-Interface specifications)

**Current consumption:**

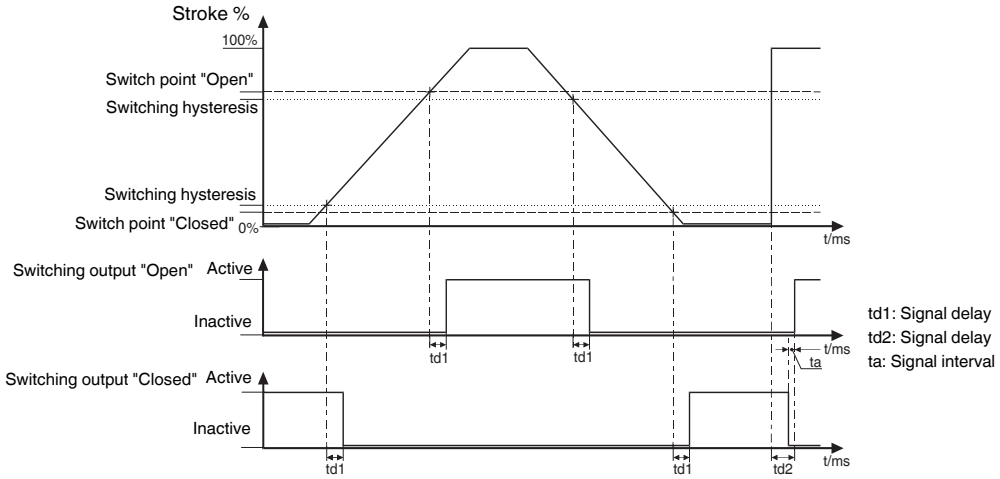
| Flow rate (code) | AS-Interface |
|---|---|
| **01** | Max. 80 mA |
| **02** | Max. 120 mA |
| **R3** | Max. 90 mA |

**Duty cycle:** Continuous duty

**Electrical protection class:** III

**Reverse battery protection:** yes

**Switching characteristic:**



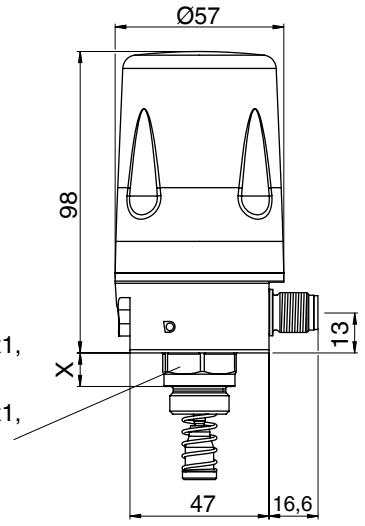

Switch points: ASi-5: The data in percent refers to the programmed stroke, with reference to the lower end position (0%)

**Switch points:**

| | Size 1 | Size 2 | |
|---|---|---|---|
| | | 75 mm | 30 mm |
| **Default setting switch point CLOSED** | 12% | 12% | 12% |
| **Default setting switch point OPEN** | 75% | 75% | 75% |

# 8 Dimensions

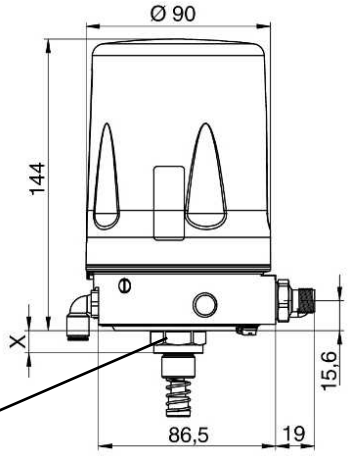
## 8.1 Size 1




WAF 20 for mounting kit M12x1,
x = 9 mm
WAF 24 for mounting kit M16x1,
x = 11 mm
dependent on valve used

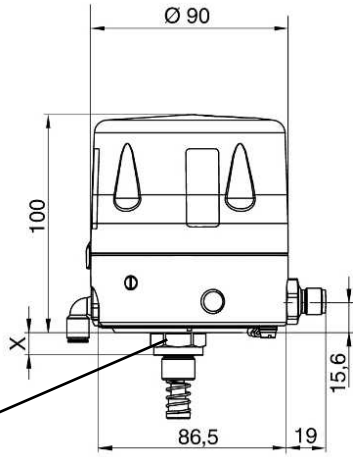
Dimensions in mm

## *8.2 Size 2*




WAF 20 for mounting kit M12x1, x = 9 mm
WAF 24 for mounting kit M16x1, x = 11 mm
dependent on the valve that is used

Travel sensor 75 mm in length




WAF 20 for mounting kit M12x1, x = 9 mm
WAF 24 for mounting kit M16x1, x = 11 mm
dependent on the valve that is used

Travel sensor 30 mm in length

Dimensions in mm

## 9 Assembly and installation

**NOTICE**

- Pay attention to the information on product labels and in product documentation.
- Connect cable carefully, do not damage individual wires.
- When connecting multiwire or finewire cables, prepare the wire ends.
- Always use suitable pinch tools for pinching wire end ferrules in order to achieve consistent quality.
- Tighten all clamping points, even the ones not being used.

1. Observe the national regulations and provisions.
2. Observe the installer provisions.
3. Protect M12 plugs against electro-static build-up.
4. Protect M12 plugs against damage.
5. Lay cables securely and protect them from damage.

### 9.1 Mounting kit assembly

| Item | Name | Item | Name |
|---|---|---|---|
| 1 | Spindle | 7 | Flange plate |
| 2 | Spring | 8 | Screws |
| 3 | Operating bush | 9 | Pressure disc* |
| 4 | Distance piece | 10 | O-ring* |
| 5 | O-ring | 11 | O-ring* |
| 6 | Adapter | | |

* Included depending on version.

**⚠ CAUTION**

**Pretensioned spring!**

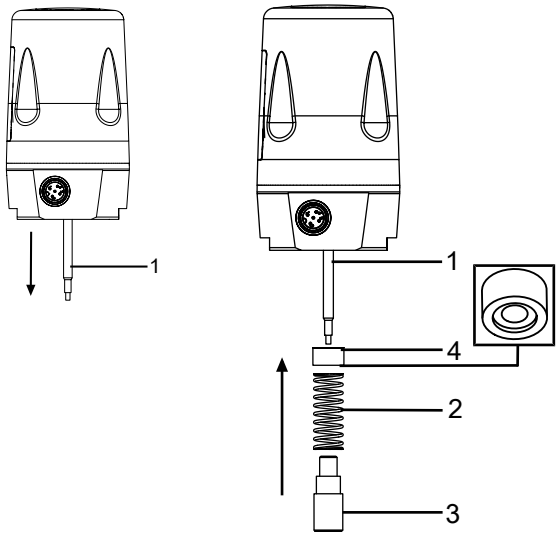
► Damage to the device.

- Slowly release the tension in the spring.

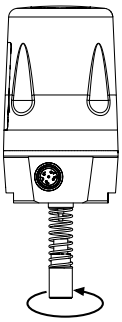
**⚠ CAUTION**

**Do not scratch the spindle!**

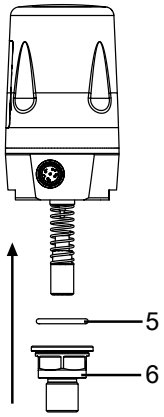
► A damaged spindle surface may cause failure of the travel sensor.



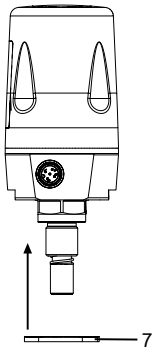

1. Pull out the spindle**1**.



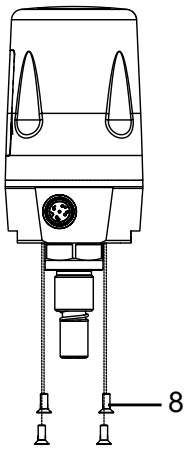
2. Align the indentation of the distance piece **4** to the spring and push it over the spindle **1** using the spring **2** and fix it in place using the operating bush **3**.




3. Tighten the operating bush **3** by turning it clockwise.




4. Affix the O-ring **5** and the adapter **6**.




5. Attach the flange plate **7**

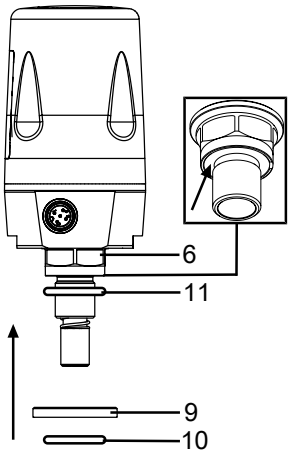
6. Screw the flange plate on tight using screws **8** (1–1.5 Nm).

- Push in the spindle until it pushes against the spring and then slowly release the pressure on the spring.

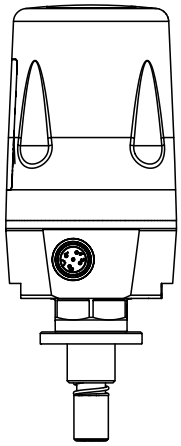
**NOTICE**

► For some valves (e.g. GEMÜ 650 and GEMÜ 687) it is necessary to fit a pressure disc between the threaded adapter and the actuator head. This is included in the required mounting kits, sometimes with an additional O-ring (only GEMÜ 650 with normally open and double acting control function – code 2+3).

► If the pressure disc does not have a groove for a seal, this will already be inserted in the groove provided at the adapter opening of the actuator head (e.g. GEMÜ 687 with normally open control function – code 2).




Insert the O-ring **11** (if included) into the corresponding groove on the adapter **6**.

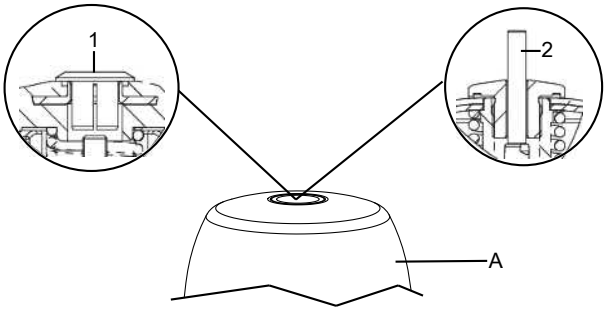


If included: Push the pressure disc **9** over the adapter **6** and insert the O-ring **10** in the intended groove of the pressure disc.

## 9.2 Mounting the combi switchbox on linear actuators

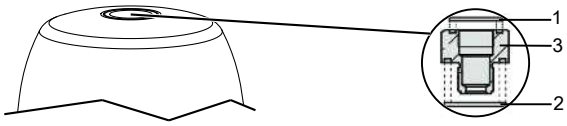
### 9.2.1 Preparations for assembly to the valve

1. Move the actuator **A** into zero position (actuator vented).
2. Remove optical position indicator **2** and / or protective cap **1** from the actuator top.



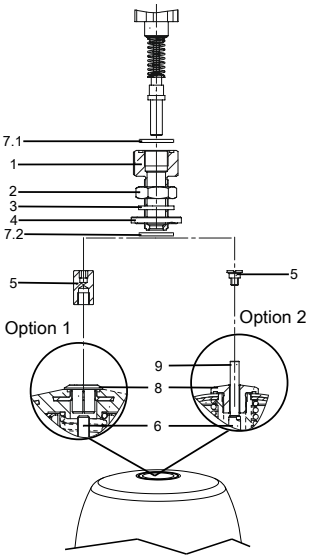

### 9.2.2 Threaded adapter assembly (linear actuator)

With some mounting kits, it is necessary to install a threaded adapter as well. This threaded adapter is enclosed with the required mounting kits. Valves with a normally open and double acting control function (code 2+3) also include additional O-rings (1+2).




1. Move the actuator to the closed position.
2. Place O-rings **1** and **2** into threaded adapter **3**.
3. Screw threaded adapter **3** into the actuator opening as far as it will go and tighten.

### 9.2.3 Assembling the stroke limiter (linear actuator)




1. Screw distance piece **5** onto/ into actuator spindle **6**.
2. Move the actuator to the closed position.
3. Insert the O-ring **7.1** in the stroke limiter **1**.
4. Insert the O-ring **7.2** in the washer **4**.
5. Screw stroke limiter **1** with nut **2**, seal **3** and washer **4** into the actuator opening.
6. Set stroke limiter **1** to the required stroke.
7. Make sure that the minimum stroke is reached.
8. Secure stroke limiter **1** with nut **2**.

| Key | | | |
|---|---|---|---|
| 1 | Stroke limiter | 7.1 [1)]<br>7.2 [1)] | O-ring |
| 2 | Nut | 8 | Protective cap |
| 3 [1)] | Seal | 9 | Position indicator |
| 4 [1)] | Washer | 10 | Operating bush |
| 5 [2)] | Distance piece | 11 | Spindle |
| 6 | Actuator spindle | 12 | Travel sensor |

1) Only available for valves with the NO and DA control functions.

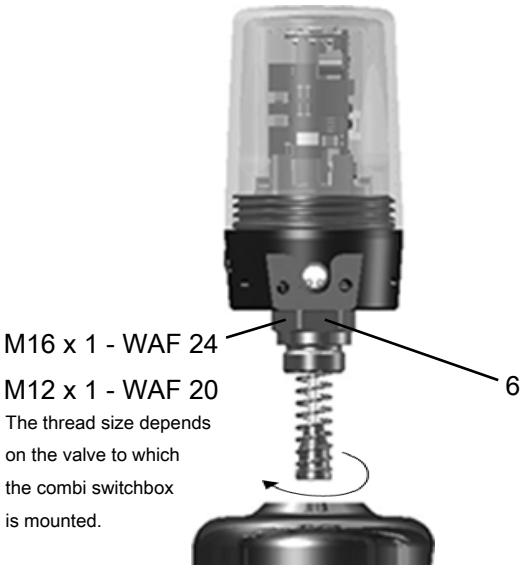
2) Only included in required mounting kits. The design depends on the valve.

### *9.2.4 Assembling and installing the combi switchbox (linear actuator)*

**⚠ DANGER**

**Danger of explosion**

- ► Risk of death or severe injury.
- ● Do not use the product as a step or foothold.
- ● Prior to commissioning, ensure that the cover is fully closed and that the housing and the O-ring are not damaged.




1. Move the actuator into the OPEN position.
2. Guide the product as far as it will go into the actuator opening, the adapter 3 (see “Threaded adapter assembly (linear actuator)“, page 16) or the stroke limiter 1 (see “Assembling the stroke limiter (linear actuator)“, page 16) and screw in clockwise against the initial spring tension.
3. Use the spanner flat of the travel sensor to tighten the product.
4. Turn the housing clockwise to align the pneumatic or electrical connections.
5. Connect the product electrically.
6. Connect the product pneumatically.

**⚠ CAUTION**

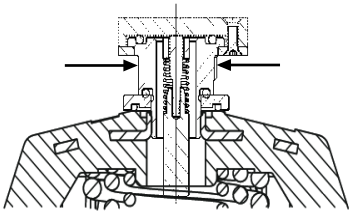
**Incorrect installation of the product.**

- ► Damage to the housing.
- ● Only tighten the product using the spanner flats provided for this purpose.

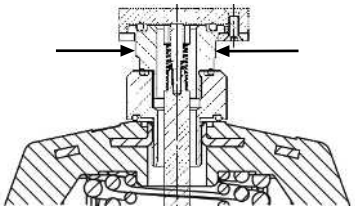
**NOTICE**

**Wrong mounting kit**

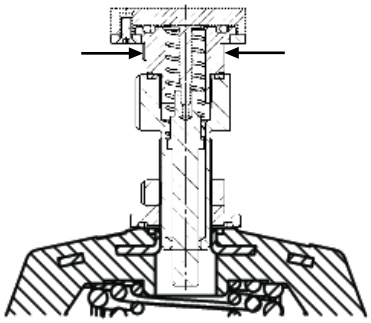
- ► If no initial spring tension can be felt, it may be the case that the wrong mounting kit with too short an operating bush has been used.
- ► If the spring locks and the positioner cannot be correctly mounted on the valve, it may be the case that the wrong mounting kit with too long an operating bush has been used or that a required adapter has not been used.
- ● In both cases, check that the mounting kit parts are being used correctly and in their entirety.



7. The product with mounting kit is fully assembled.



8. The product with mounting kit and adapter is fully assembled.



9. The product with mounting kit and stroke limiter is fully assembled.

## 9.3 Mounting the combi switchbox on quarter turn actuators

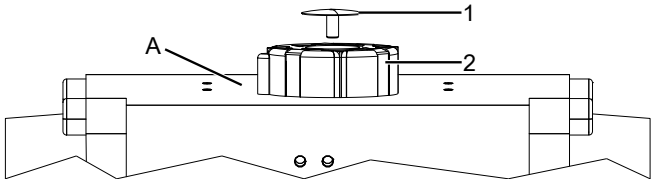
### 9.3.1 Contents of PTAZ mounting kit for quarter turn actuator

The PTAZ mounting kit contains the following items:

| Item |
|---|
| PTAZ adapter |
| PTAZ mounting kit |
| Flange plate |
| O-ring |
| Screws (4x) |
| Adapter (M16x1) |
| Operating bush |
| Compression spring |

### 9.3.2 Preparations for assembly to the valve (quarter turn actuator)

1. Move the actuator **A** into zero position (actuator vented).




2. Remove the screw **1** from the trigger cam **2**.

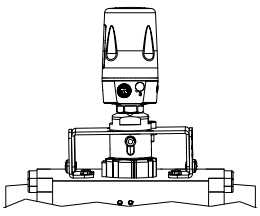
### 9.3.3 Assembling and installing the combi switchbox (quarter turn actuator)

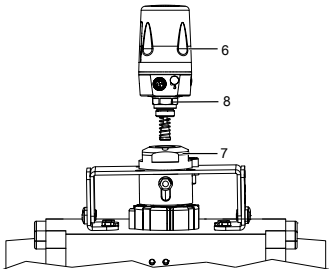
**⚠ CAUTION**

**Incorrect installation of the product.**

► Damage to the housing.

● Only tighten the product using the spanner flats provided for this purpose.






1. Screw the product **6** onto the adapter **7**.
2. Use the spanner flat **8** (WAF 27) of the travel sensor to tighten the product.
3. Turn the housing clockwise to align the pneumatic or electrical connections.
4. Connect the product electrically.
5. Connect the product pneumatically.
6. Initialize the product.

## 10 Pneumatic connection

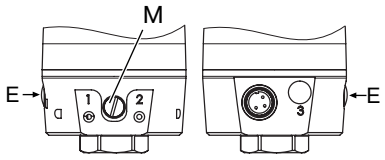
**⚠ CAUTION**

**Reduction of the flow at the vent connection 3**

► Increased overpressure in the upper part of the housing

- Do not operate vent connection 3 with chokes, filters or similar.
- Ensure that vent lines are always depressurised.
- Install vent lines free of tension and kinks.

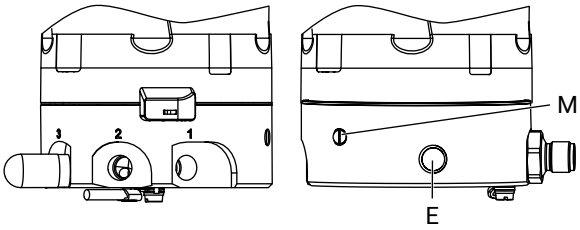
### 10.1 Size 1, standard, single acting




| Connection | Designation | Connection size |
|---|---|---|
| 1 | Air supply connection | M5 |
| 2 | Working connection for process valve | M5 |
| 3 | Venting connection with integrated check valve | M6 x 0.75 [1)] |
| E | Housing ventilation with integrated check valve | M6 x 0.75 |
| M | Manual override | - |

1) only relevant for exhaust air duct and/or increase of protection class

### 10.2 Size 2, standard, single acting




| Connection | Designation | Connection size |
|---|---|---|
| 1 | Air supply connection | G 1/8 |
| 2 | Working connection for process valve | G 1/8 |
| 3 | Venting connection with silencer | G 1/8 [1)] |
| E | Housing ventilation with integrated check valve | M6 x 0.75 |
| M | Manual override | - |

1) only relevant for exhaust air duct and/or increase of protection class

### 10.3 Information for use in damp conditions

The following information is intended to help when installing and operating the product in damp conditions.

1. Cables and pipework must be laid so that condensate or rain water that remains on the pipework/cables cannot enter the screw fittings of the product's M12 plugs.
2. Check that all cable glands of the M12 plugs and the fittings are mechanically secured.
3. In case of doubt, the housing protection class should be increased with an exhaust air duct to areas free from moisture. To accomplish this, equip the provided venting connection with suitable pneumatic connections to discharge the exhaust air in a targeted manner via a pneumatic line. Ensure that the ventilation line is always depressurized, that it is not operated with throttles, filters or similar components, and that it is laid in such a way that moisture cannot flow back.

# 11 Electrical connection

**⚠ DANGER**

**Risk of electric shock**

- ► Risk of injury or death (if operating voltage is higher than safe extra low voltage).
- ► Electric shock can cause severe burns and fatal injury.
- ● Work on electrical connections only by qualified trained personnel.
- ● Disconnect the cable from the power supply before making the electrical connection.
- ● Connect the protective earth conductor.

**⚠ DANGER**

**Danger of explosion**

- ► Risk of severe injury or death.
- ● Do not connect or disconnect the device until the power has been switched off or the area has been classified as non-hazardous.
- ● The standard version of the product (without special function X or Y) must not be used in potentially explosive zones.
- ● Danger from sparking. Never disconnect the connection cables when live.

**NOTICE**

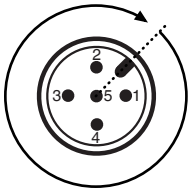
**Danger: Electrostatic discharge**

- ► Destruction of electronic components
- ● Take the necessary ESD safety precautions during installation of the product.

**NOTICE**

**Risk of cable break**

- ► Overtightening can result in damage to the internal cables.
- ● Turn electrical connections once by max. 360°.




## 11.1 AS-Interface, fieldbus ordering option, code A5, A5D

1. Connect the product in accordance with the pin assignment.

For electrical connection special version X, we recommend the M12 connectors for EX areas supplied by IFM, series EVCxxA.

The M12 plugs may only be assembled, connected and commissioned by trained personnel. The trained personnel must have expertise in types of ignition protection, and regulations and provisions for operating media in EX areas.

2. Securely lay the connection cables or ensure sufficient tension relief.
3. Refer to the technical data and cable gland documentation for details of the wire cross-sections.
4. Protect the product and the cables from damage.
5. Only clean the product with an anti-static or damp cloth.
6. Only operate the product when it is fully assembled.

### 11.1.1 Pin assignment


| Pin | Signal name |
|---|---|
| 1 | AS-Interface + |
| 2 | - |

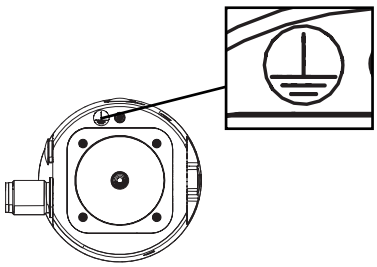
| Pin | Signal name |
|---|---|
| 3 | AS-Interface - |
| 4 | n.c. |
| 5 | - |

## *11.2 Potential equalization – Special function X*

The potential equalization can be established using the following methods:

- Pre-assembled earthing kit for the on-site wiring of the earth via a stranded wire, yellow/green H07 V-K 4.0
- Conductive connection via the mechanically coupled valve fitting to the system earth

### Connecting the potential equalization device



1. Use a screw M4x8 to attach the potential equalization device to the electrical position indicator.
   ⇨ Potential equalization for metal housings in potentially explosive areas: Minimum 4 mm².
2. Secure the connection against working itself loose.
   ⇨ Tighten the screw with a torque of 1.8 Nm.

The potential equalization connection's maximum permissible resistance limit value is defined as R ≤ 100 Ω. During the plant-specific maintenance cycle, the potential equalization connection must be checked to ensure that it has been connected correctly and that the maximum resistance limit value has not been exceeded.

# 12 Commissioning

**⚠ CAUTION**

**Hazardous situation**

- ► Risk of injury or damage possible.
- For correct commissioning, the product must be calibrated to the process valve via the initialization process.
- During this commissioning, the valve is automatically opened and closed several times. It must therefore be ensured in advance that this does not lead to a dangerous situation.

**NOTICE**

**Incorrect initialization**

- Always carry out initialization without operating medium pressure on the process valve. Carry out initialization of the process valve in neutral position (NO/NC).

**NOTICE**

- For delivery of the product assembled on a valve at the factory, the complete construction is already ready for operation at a control pressure of 5.5 to 6 bar without operating pressure. A reinitialization is recommended if the plant is operated with a different control pressure or if the mechanical end positions have been changed (e.g. seal replacement on the valve or actuator replacement). The initialization is retained even in the event of voltage cutoff.

**NOTICE**

- For delivery of the product without default setting (e.g. for delivery without valve) initialization must be carried out once for correct operation. This initialization must be repeated every time that the process valve is changed (e.g. seal replacement or actuator replacement).

1. Connect the connection cable tension-free and without any bends or knots.
2. Switch on supply voltage.
3. Use suitable connectors.
4. Connect the control medium lines tension-free and without any bends or knots.
5. Connect the product pneumatically to the process valve.
6. Connect the pneumatic tubes and activate the pneumatic control air supply of max. 7 or 9 bar.

**NOTICE**

**Initialization is active for an unusually long time**

- ► For actuators with a large air volume (filling volume), in some circumstances it can take several minutes until initialization can be completed. Initialization is only unsuccessful if an error message appears with LED signalling.

## 12.1 Initialization of end positions

The initialization of the end positions is dependent on the setting of the operating parameter (operating mode). A distinction is made between the **autonomous** and **classic** modes for detection of end positions.

In the **autonomous detection of end positions** mode (default setting), the end positions are determined independently as soon as the valve moves (triggered by the corresponding control command). The valve is therefore ready for operation directly, reports the end positions back after an initial movement cycle, and shows these via the LED display.

In **classic** mode, the end positions must be calibrated via the active triggering of the initialization process, via the communication interface or the on-site option. If correct initialization has not been carried out, then the device is in a warning state (signalling via the corresponding high visibility LEDs).

### 12.1.1 Autonomous end position process/end position tracking

The autonomous end position process or end position tracking is an intelligent function, with the help of which the end positions of a valve are independently determined (without external triggering). If this function is active, the end positions are automatically determined the first time the valve moves, and the product is ready for operation directly. The end positions are continuously monitored and responded to accordingly in case of deviations.

Explanation of the functional principle:

In the autonomous end position tracking mode, a distinction is made between two different conditions, which have an influence on the behaviour of the function.

**No initialization:** The device monitors whether two different end positions have been approached at a certain distance. The first two end positions that comply with this condition are calibrated as newly initialized end positions.

**Existing initialization:** The function determines whether there is a displacement of the end positions over the operating time. If these displacements are outside a certain tolerance range and display a certain consistency, the initialized end positions are overwritten by the adjusted initialization values. If this process is triggered, this is indicated by a corresponding message. The deviations are evaluated alongside here, and allow conclusions to be drawn as to the cause.

A **classic initialization** can also be carried out in the operating mode of autonomous end position tracking. This is recommended after a seal replacement or the like, in order to prevent faulty messages regarding end position changes. If the initialization is successful here, then the currently calibrated end positions are overwritten and the tracking operates against these updated end positions. If the actively triggered initialization process is not successful here, then the most recently calibrated initialization positions are deleted.

### 12.1.2 Classic initialization process

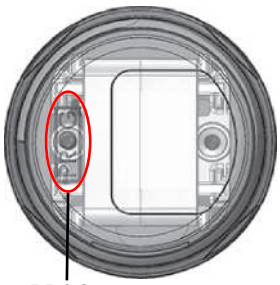
**NOTICE**

► The initialization must be repeated every time that the process valve is changed (for example, seal replacement or actuator replacement).

The initialisation process must be actively started via the communication interface or the on-site option. The started initialization process is carried out automatically.

After implementation of the initialization, the device checks whether the minimum stroke of the calibrated positions has been complied with. If this condition is complied with, then the initialization has been successfully carried out and the end positions have been successfully calibrated.

#### 12.1.2.1 On-site initialization of the end positions




PROG

**NOTICE**

► If the magnet is held against the housing cover for too long, the programming mode is left and the previous condition is restored.

1. Connect supply voltage.
2. Briefly (>500 ms) hold a magnet (e.g. 1242000ZMA) at the position labelled **"PROG"** on the housing cover.
   ⇨ High visibility LEDs light up white (magnet detected)
3. As soon as the high visibility LEDs change colour to yellow, remove the magnet again.
4. Initialization process is started.
   ⇨ High visibility LEDs flashing alternately (white/yellow).
   ⇨ The process valve is automatically moved to the OPEN and CLOSED position.
5. Initialization process is automatically ended.
6. After successful termination, the current valve position is signalled directly via the high visibility LEDs (lit green or orange) and electronically reported back.
   ⇨ The end positions are set.

In the event of deviating status indications, observe the LEDs and Troubleshooting chapters.

#### 12.1.2.2 Initialization of end positions via ASI

**NOTICE**

► Set the function of digital input 3 (corresponding to bit DO2) to INIT (default setting).
Alternatively, any other digital input 1–8 can be assigned to this function. The corresponding bit, DO0 to DO7, must be used depending on the input used.

1. Connect supply voltage.
2. Set DO2 (toggle from 0->1).
3. Initialization process started.

⇨ High visibility LEDs flashing alternately (white/yellow).

⇨ Process valve is automatically moved to the OPEN and CLOSED position.

4. Initialization process is automatically ended (verification via DI2 possible).
5. After successful termination, the current valve position is signalled directly via the high visibility LEDs (lit green or orange) and electronically reported back.

⇨ The end positions are set.

⇨ In the event of deviating status indications, observe the **LEDs** and **Troubleshooting** chapters.

## 13 Operation

### 13.1 Wireless interface

**NOTICE**

► For **FIELDBUS Code A5D** order versions, the wireless interface is deactivated by the software ex works. The wireless interface can be managed (activated/deactivated) automatically via a corresponding parameter. If the wireless interface is subsequently activated via a parameter setting, it is recommended to adjust the Bluetooth name and password configuration immediately afterwards. A corresponding setup manager in the app provides support for the configuration process.

► For order versions with the **FIELDBUS Code A5** wireless interface activated, it is recommended to adjust the Bluetooth name and password configuration immediately after commissioning. A corresponding setup manager in the app provides support for the configuration process.

**NOTICE**

► During an initialization process that is started by the magnetic trigger, no actions can be taken in the app. After ending the process, the app can be used again without restrictions.
While the wireless connection is active, starting the initialization via the magnetic trigger is deactivated.

Using an integrated Bluetooth Low Energy interface, the following functions can be used in conjunction with the **GEMÜ app**:

1. Changing the device configuration (parameter settings).
2. Reading out the current device status.
3. Display and evaluation of historic events.
4. Implementation of the initialization.
5. Moving the valve in manual mode.
6. Resetting the device to the default settings.
7. Activating the localization (device detection).
8. Security management (blocking access for a certain group of participants).

**NOTICE**

► Only one end device can ever be simultaneously connected to the product. For additional participants, this device is not visible during this period.

After starting the app, all compatible GEMÜ products within range are displayed in the connection list. The product that is to be connected can be referenced via the Bluetooth name. In the condition as supplied to the customer, this corresponds to the last four digits of the serial number printed on the digital product label (QR code). The Bluetooth name can optionally be changed at any time after the connection is established (maximum 16 characters).

**NOTICE**

**Safety notice!**

► The wireless interface can be activated in the condition as supplied to customer, depending on the order version, and is ready for connection immediately after the product has been electrically commissioned.

In the condition as supplied to the customer, the product is protected against unauthorized access via a unique connection password. The password corresponds to the digital product label (QR code) that is affixed to the product. To enter the password, this can optionally be read via the camera scan function on the smartphone/tablet or entered manually. The password can be managed independently and set to any other password. By amending the original password, you lose the option to read this via the digital product label. The connection password function can be deactivated, but we do not recommend this. Furthermore, a configuration lock can be set up for the product using a separate optional password – providing the product with additional protection. If this function is activated, you cannot implement any changes to the settings without first entering the password (read-only mode). There is an option to reset both passwords if you forget these. The user can define whether one, both or none of the passwords can be reset via the reset mechanism.

**Caution!** If you forget your passwords and one or both passwords for the reset mechanism are disabled, the product can only be unlocked by GEMÜ.

**Caution!** If one or both passwords for the reset mechanism are enabled, anyone with access to the digital product label (QR code) can remove the password protection.

**Reset mechanism:**

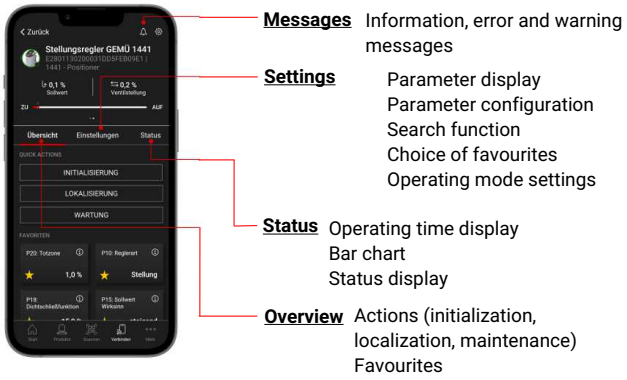
There are two options for resetting one of the two passwords (connection or configuration lock password). Both passwords can/must be reset separately from each other.

9. Digital product label (QR code):
   ⇨ By scanning the QR code that is affixed to the product.
10. RFID (optional if integrated)
   ⇨ The optional RFID chip that is integrated into the housing can be read out by additional hardware (Conexo Pen) that is available separately, and this can be used to reset the passwords.

**NOTICE**

► A setting parameter can be used to block the reset of one or both passwords.

## 13.2 Basic operation of the app




The GEMÜ app consists of several function modules that can be called up via the bottom navigation at the bottom of the display. The functions for operating the product are located in the "Connect" area. The figure above gives a rough overview of the structure. By selecting the tabs "Overview", "Settings" or "Status", it is possible to navigate within the "Connect" area. Important information, error or warning messages can be called up on all pages via the bell symbol.

## 14 App parameter list

| No. | Parameter | Description | Value range | Default setting |
|---|---|---|---|---|
| P03 | Switch point OPEN | Defines switch point OPEN | 3 ... 97 % | 75 |
| P04 | Switch point CLOSED | Defines switch point CLOSED | 3 ... 97 % | 12 |
| | Total operating hours | Displays the total operating hours | 0 ... 2147483647 s | 0 |
| | Localization | Activates/deactivates the location function | Deactivated<br>Activated | Deactivated |
| S06 | Control function | Displays the determined control function of the valve | Undefined<br>NC<br>NO<br>DA | Undefined |
| S07 | Firmware version | Displays the firmware revision status | 0 ... 21 | V0.0.0.0 |
| P05 | High visibility position indicator | Activates/deactivates the visual end position display | Dimmed<br>Deactivated<br>Activated | Activated |
| P06 | Inversion of LED colours | Activates/deactivates the inversion of LED colours for the end position display | Deactivated<br>Activated | Deactivated |
| | Operating hours since last start | Displays operating hours since the last start | 0 ... 2147483647 s | 0 |
| S03 | Total switching cycle counter | Displays the total number of counted switching cycles | 0 ... 2147483647 | 0 |
| S02 | Warning threshold for user switching cycles | Defines the warning threshold for user switching cycles | 0 ... 2147483647 | 5000000 |
| S01 | User switching cycle counter | Displays the number of counted user switching cycles | 0 ... 2147483647 | 0 |
| P01 | Detection of end positions mode | Defines the end position detection mode | Classic<br>Autonomous | Autonomous |
| P02 | Initialization via magnet contact | Activates/deactivates initialization via magnet contact | Deactivated<br>Activated | Activated |
| S09 | Operating time OPEN | Displays the duration of opening the valve | 0 ... 99,9 s | |
| S10 | Operating time CLOSED | Displays the duration of closing the valve | 0 ... 99,9 s | |
| S11 | Product start counter | Displays the number of product starts | 0 ... 2147483647 | |
| | Current absolute position | Displays the absolute position of the travel sensor | 0 ... 1 | |
| | Bluetooth product name | Defines the name in the product overview | 0 ... 16 | |
| S12 | Production ID | Displays the production ID | | |
| M01 | Operating mode | Defines the operating mode | Auto<br>Manual | Auto |
| | Manual valve control | Defines the valve activation | | |
| | Valve actuations warning ratio | Displays the relative degree of wear on the pilot valve module | 0 ... 100 % | 0 |
| S08 | Hardware version | Displays the hardware version | | |
| P09 | Inversion of the travel sensor signal | Activates/deactivates inversion of the travel sensor signal | Deactivated<br>Activated | Deactivated |
| P07 | Error position | Defines the valve position in the event of error detection | Hold position<br>Open<br>Closed<br>Safety position | Safety position |
| P14 | Digital input 1 function | Defines the function of digital input 1 | Deactivated<br>Activation of pilot valve 1<br>Initialization input<br>Localization<br>Safety position | Activation of pilot valve 1 |

| No. | Parameter | Description | Value range | Default setting |
|---|---|---|---|---|
| P15 | Digital input 2 function | Defines the function of digital input 2 | Deactivated<br>Activation of pilot valve 1<br>Initialization input<br>Localization<br>Safety position | Deactivated |
| P16 | Digital input 3 function | Defines the function of digital input 3 | Deactivated<br>Activation of pilot valve 1<br>Initialization input<br>Localization<br>Safety position | Initialization input |
| P17 | Digital input 4 function | Defines the function of digital input 4 | Deactivated<br>Activation of pilot valve 1<br>Initialization input<br>Localization<br>Safety position | Localization |
| P18 | Digital input 5 function | Defines the function of digital input 5 | Safety position<br>Deactivated<br>Activation of pilot valve 1<br>Initialization input<br>Localization<br>Safety position | Deactivated |
| P19 | Digital input 6 function | Defines the function of digital input 6 | Deactivated<br>Activation of pilot valve 1<br>Initialization input<br>Localization<br>Safety position | Deactivated |
| P20 | Digital input 7 function | Defines the function of digital input 7 | Deactivated<br>Activation of pilot valve 1<br>Initialization input<br>Localization<br>Safety position | Deactivated |
| P21 | Digital input 8 function | Defines the function of digital input 8 | Deactivated<br>Activation of pilot valve 1<br>Initialization input<br>Localization<br>Safety position | Deactivated |
| P22 | Digital output 1 function | Defines the function of digital output 1 | Deactivated<br>OPEN feedback<br>CLOSED feedback<br>Error output<br>Warning output<br>Operating mode feedback | OPEN feedback |
| P23 | Digital output 2 function | Defines the function of digital output 2 | Deactivated<br>OPEN feedback<br>CLOSED feedback<br>Error output<br>Warning output<br>Operating mode feedback | CLOSED feedback |
| P24 | Digital output 3 function | Defines the function of digital output 3 | Deactivated<br>OPEN feedback<br>CLOSED feedback<br>Error output<br>Warning output<br>Operating mode feedback | Operating mode feedback |
| P25 | Digital output 4 function | Defines the function of digital output 4 | Deactivated<br>OPEN feedback<br>CLOSED feedback<br>Error output<br>Warning output<br>Operating mode feedback | Deactivated |
| P26 | Digital output 5 function | Defines the function of digital output 5 | Deactivated<br>OPEN feedback<br>CLOSED feedback<br>Error output<br>Warning output<br>Operating mode feedback | Deactivated |

| No. | Parameter | Description | Value range | Default setting |
|---|---|---|---|---|
| P27 | Digital output 6 function | Defines the function of digital output 6 | Deactivated<br>OPEN feedback<br>CLOSED feedback<br>Error output<br>Warning output<br>Operating mode feedback | Deactivated |
| P28 | Digital output 7 function | Defines the function of digital output 7 | Deactivated<br>OPEN feedback<br>CLOSED feedback<br>Error output<br>Warning output<br>Operating mode feedback | Deactivated |
| P29 | Digital output 8 function | Defines the function of digital output 8 | Deactivated<br>OPEN feedback<br>CLOSED feedback<br>Error output<br>Warning output<br>Operating mode feedback | Deactivated |
| S04 | Absolute travel sensor position CLOSED/OPEN | Displays the valve absolute position for the end positions | 0 ... 100 % | 0 |
| S15 | Warning threshold for valve activations user counter | Defines the warning threshold for the user counter for valve activations | 0 ... 2147483647 Cycles | 5000000 |
| S13 | Valve activations total counter | Displays the total number of counted valve activations | 0 ... 2147483647 Cycles | 0 |
| P08 | Error time | Defines the debounce time in the event of error detection | 1 ... 1000 s | 0,1 |
| | Acceleration in X axis | Indicates the measured acceleration of the X axis | -32768 ... 32768 m/s2 | |
| | Acceleration in Y axis | Indicates the measured acceleration of the Y axis | -32768 ... 32768 m/s2 | |
| | Acceleration in Z axis | Indicates the measured acceleration of the Z axis | -32768 ... 32768 m/s2 | |
| | Frontally inclined installation position | Indicates the frontally inclined installation position detected | -180 ... 180 ° | |
| | Current consumption | Indicates the measured current consumption | 0 ... 375 mA | |
| | Supply voltage | Indicates the measured supply voltage | 0 ... 3600 mV | |
| P33 | Alarm threshold for min. internal temperature of housing | Defines the threshold below which an alarm signal will be generated to indicate the internal temperature of the housing is too low | -40 ... 100 °C | -5,0 |
| P34 | Alarm threshold for max. internal temperature of housing | Defines the threshold above which an alarm signal will be generated to indicate the internal temperature of the housing is too high | -40 ... 100 °C | 75,0 |
| P35 | Alarm threshold for min. humidity of housing | Defines the threshold below which an alarm signal will be generated to indicate the humidity inside the housing is too low | 0 ... 100 % | 50,0 |
| P36 | Alarm threshold for max. humidity of housing | Defines the threshold above which an alarm signal will be generated to indicate the humidity inside the housing is too high | 0 ... 100 % | 90,0 |
| | Humidity of housing | Indicates the measured relative humidity inside the housing | 0 ... 100 % | |

| No. | Parameter | Description | Value range | Default setting |
|---|---|---|---|---|
| P37 | Alarm threshold for min. internal pressure of housing | Defines the threshold below which an alarm signal will be generated to indicate the internal pressure in the housing is too low | 260 ... 1260 mbar | 500 |
| P38 | Alarm threshold for max. internal pressure of housing | Defines the threshold above which an alarm signal will be generated to indicate the internal pressure in the housing is too high | 260 ... 1260 mbar | 1230 |
| | Control air supply pressure | Indicates the measured supply pressure of the control air | 0 ... 30 bar | |
| P39 | Alarm threshold for high oscillations | Defines the threshold above which an alarm signal will be generated to indicate the oscillations are too high | 0 ... 100,00% % | 0,0 |
| P40 | Alarm threshold for max. control pressure | Defines the threshold above which an alarm signal will be generated to indicate the supply pressure of the control air is too high | 0 ... 30 bar | 8,0 |
| | Laterally inclined installation position | Indicates the laterally inclined installation position detected | -180 ... 180 ° | |
| | Housing internal pressure | Indicates the internal pressure measured in the housing | 260 ... 1260 mbar | |
| | Housing internal temperature | Indicates the internal temperature measured in the housing | -40 ... 100 °C | |
| S14 | Valve actuations user counter | Displays the number of user valve actuations counted | 0 ... 2147483647 Cycles | 0 |
| P30 | Time-based diagnostic messages | Defines whether a warning message needs to be issued for time-based diagnostic functions | Deactivated<br>Activated | Activated |

# 15 Specific data – AS-Interface

AS-Interface specification: ASi-5 Spec. V1.04 Rev. 1

## 15.1 Cyclical process data

### 15.1.1 Inputs

| Inputs (Slave → Master) | | | |
|---|---|---|---|
| **Byte (address)** | **Bit** | **Default setting** | **Logic** |
| 0 | DI0 | Indication of OPEN position | 0 = process valve not in OPEN position<br>1 = process valve in OPEN position |
| | DI1 | Indication of CLOSED position | 0 = process valve not in CLOSED position<br>1 = process valve in CLOSED position |
| | DI2 | Indication of operating mode | 0 = normal operation<br>1 = active initialization |
| | DI3 | Off | |
| | DI4 | Off | |
| | DI5 | Off | |
| | DI6 | Off | |
| | DI7 | Off | |
| 1 to 2 | DI8 to DI21 | Current valve position (0 to 1000) | - |

| Device-side digital output signals can be used to output various statuses, such as limit values / errors / alarms.<br>→ The statuses are set in the corresponding parameters | | | |
|---|---|---|---|
| Function of digital outputs 1 to 8 (slave outputs) | 0 | Off | Without function |
| | 1 | Indication of OPEN position | Valve position OPEN feedback |
| | 2 | Indication of CLOSED position | Valve position CLOSED feedback |
| | 3 | Error output | Signals an active error |
| | 4 | Warning message output | Signals an active warning |
| | 5 | Indication of operating mode | Feedback of the active operating mode → normal operation / initialisation active |
| | 6 | | |

### 15.1.2 Outputs

| Outputs (Master → Slave) | | | |
|---|---|---|---|
| **Byte (address)** | **Bit** | **Default setting** | **Logic** |
| 0 | DO0 | Controlling pneumatic outputs | 0 = pneumatic outputs vented<br>1 = pneumatic outputs pressurized |
| | DO1 | Off | |
| | DO2 | Initialization | 0 = normal operation<br>1 = initialization mode |
| | DO3 | Localization | 0 = localization inactive<br>1 = localization active |
| | DO4 | Off | |
| | DO5 | Off | |
| | DO6 | Off | |
| | DO7 | Off | |
| 1…2 | DO8 to DO21 | Not used | |

| Device-side digital input signals can be used to start various actions, such as start initialization / pilot valve actuation / approaching a specified position, etc.<br>→ The actions are set in the corresponding parameters | | | |
|---|---|---|---|
| Function of digital inputs 1 to 8 (slave inputs) | 0 | Off | No function |
| | 1 | Controlling pneumatic outputs | Activates the pneumatic output |
| | 2 | Unavailable | Unavailable |
| | 3 | Initialization | Starting initialization |
| | 4 | Localization | Activates the location function |
| | 5 | Safe/On | If the signal is not active, the position defined in the "ErrorAction" (0x004F) parameter is approached. If the signal is active, normal operation is carried out in accordance with external signals. |
| | 6 | | |

## 15.2 Non-cyclical parameter data

| Port | Index [Hex] | "Access Rights" | Parameter | "Length" | "Data type" | "Default setting" | | "Adjustment facility" | "Description" |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 0x0007 | RO | ASI ID | 7 byte | - | - | - | 0x0191 (Vendor ID) and 5 byte (consecutive numbers) | - |
| 0 | 0x0001 | RO | Manufacturer device name | 10 byte | StringT | - | - | "4242 AS-I5" | - |
| 0 | 0x000F | RO | Manufacturer device family | 14 byte | StringT | - | - | "4242" | - |
| 0 | 0x0031 | RO | ASi-5 device Process input data | 1 byte | - | - | - | Current input data | - |
| 0 | 0x0032 | RO | ASi-5 device Process output data | 3 byte | - | - | - | Current output data | - |
| 0 | 0x0610 | RO | Vendor name | 5 byte | StringT | - | - | GEMUE | Manufacturer's designation |

| Port | Index [Hex] | "Access Rights" | Parameter | "Length " | "Data type" | "Default setting" | | "Adjustment facility" | "Description" |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 0x0614 | RO | Product text | 13 byte | StringT | - | - | "CombiSwitchbox" | Equipment category |
| 0 | 0x0615 | RO | Serial number | 15 byte | StringT | - | - | - | "RRRRRRRR/IIII" (traceability number and index) |
| 0 | 0x0616 | RO | Hardware revision | 52 byte | StringT | - | - | "Rev. XX/XX" | The revision status of the installed hardware |
| 0 | 0x0617 | RO | Firmware revision | 21 byte | StringT | - | - | "V x.x.x.x" | Revision status of the firmware |
| 0 | 0x0618 | RW | Application-specific tag | 32 byte | StringT | 0x20 | - | "*** " | Option to define a designation specific to the application |
| 0 | 0x0619 | RW | Function tag | 32 byte | StringT | 0x20 | - | - | Option to define a functional designation |
| 0 | 0x061A | RW | Location tag | 32 byte | StringT | 0x20 | - | - | Option to define a location-specific designation |
| 1 | 0x6421 | RW | Digital output 1 function<br>(Defines the behaviour of the output process data bit 0) | 8 bit | uint:8 | 1 (Indication of OPEN position) | 0 | OFF | No function |
| | | | | | | | 1 | Indication of OPEN position | Valve position OPEN feedback |
| | | | | | | | 2 | Indication of CLOSED position | Valve position CLOSED feedback |
| | | | | | | | 3 | Error output | Signals an active error |
| | | | | | | | 4 | Warning message output | Signals an active warning |
| | | | | | | | 5 | Indication of operating mode | Feedback of the active operating mode -> normal operation/initialization active |
| 1 | 0x6431 | RW | Digital output 2 function<br>(Defines the behaviour of the output process data bit 1) | 8 bit | uint:8 | 2 (Indication of CLOSED position) | 0 | OFF | No function |
| | | | | | | | 1 | Indication of OPEN position | Valve position OPEN feedback |
| | | | | | | | 2 | Indication of CLOSED position | Valve position CLOSED feedback |
| | | | | | | | 3 | Error output | Signals an active error |
| | | | | | | | 4 | Warning message output | Signals an active warning |
| | | | | | | | 5 | Indication of operating mode | Feedback of the active operating mode -> normal operation/initialization active |
| 1 | 0x6441 | RW | Digital output 3 function | 8 bit | uint:8 | 5 (Indication of operating mode) | 0 | OFF | No function |
| | | | | | | | 1 | Indication of OPEN position | Valve position OPEN feedback |

| Port | Index [Hex] | "Access Rights" | Parameter | "Length " | "Data type" | "Default setting" | | "Adjustment facility" | "Description" |
|---|---|---|---|---|---|---|---|---|---|
| | | | (Defines the behaviour of the output process data bit 2) | | | | 2 | Indication of CLOSED position | Valve position CLOSED feedback |
| | | | | | | | 3 | Error output | Signals an active error |
| | | | | | | | 4 | Warning message output | Signals an active warning |
| | | | | | | | 5 | Indication of operating mode | Feedback of the active operating mode -> normal operation/initialization active |
| 1 | 0x6451 | RW | Digital output 4 function<br>(Defines the behaviour of the output process data bit 3) | 8 bit | uint:8 | 0<br>(Off) | 0 | OFF | No function |
| | | | | | | | 1 | Indication of OPEN position | Valve position OPEN feedback |
| | | | | | | | 2 | Indication of CLOSED position | Valve position CLOSED feedback |
| | | | | | | | 3 | Error output | Signals an active error |
| | | | | | | | 4 | Warning message output | Signals an active warning |
| | | | | | | | 5 | Indication of operating mode | Feedback of the active operating mode -> normal operation/initialization active |
| 1 | 0x6461 | RW | Digital output 5 function<br>(Defines the behaviour of the output process data bit 4) | 8 bit | uint:8 | 0<br>(Off) | 0 | OFF | No function |
| | | | | | | | 1 | Indication of OPEN position | Valve position OPEN feedback |
| | | | | | | | 2 | Indication of CLOSED position | Valve position CLOSED feedback |
| | | | | | | | 3 | Error output | Signals an active error |
| | | | | | | | 4 | Warning message output | Signals an active warning |
| | | | | | | | 5 | Indication of operating mode | Feedback of the active operating mode -> normal operation/initialization active |
| 1 | 0x6471 | RW | Digital output 6 function<br>(Defines the behaviour of the output process data bit 5) | 8 bit | uint:8 | 0<br>(Off) | 0 | OFF | No function |
| | | | | | | | 1 | Indication of OPEN position | Valve position OPEN feedback |
| | | | | | | | 2 | Indication of CLOSED position | Valve position CLOSED feedback |
| | | | | | | | 3 | Error output | Signals an active error |

| Port | Index [Hex] | "Access Rights" | Parameter | "Length" | "Data type" | "Default setting" | | "Adjustment facility" | "Description" |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 4 | Warning message output | Signals an active warning |
| | | | | | | | 5 | Indication of operating mode | Feedback of the active operating mode -> normal operation/initialization active |
| 1 | 0x6481 | RW | Digital output 7 function<br>(Defines the behaviour of the output process data bit 6) | 8 bit | uint:8 | 0<br>(Off) | 0 | OFF | No function |
| | | | | | | | 1 | Indication of OPEN position | Valve position OPEN feedback |
| | | | | | | | 2 | Indication of CLOSED position | Valve position CLOSED feedback |
| | | | | | | | 3 | Error output | Signals an active error |
| | | | | | | | 4 | Warning message output | Signals an active warning |
| | | | | | | | 5 | Indication of operating mode | Feedback of the active operating mode -> normal operation/initialization active |
| 1 | 0x6491 | RW | Digital output 8 function<br>(Defines the behaviour of the output process data bit 7) | 8 bit | uint:8 | 0<br>(Off) | 0 | OFF | No function |
| | | | | | | | 1 | Indication of OPEN position | Valve position OPEN feedback |
| | | | | | | | 2 | Indication of CLOSED position | Valve position CLOSED feedback |
| | | | | | | | 3 | Error output | Signals an active error |
| | | | | | | | 4 | Warning message output | Signals an active warning |
| | | | | | | | 5 | Indication of operating mode | Feedback of the active operating mode -> normal operation/initialization active |
| 1 | 0x64F1 | RW | Error time | 16 bit | uint:16 | 0.1 s | - | 1 to 1000 (0.1 to 100.0 s) | Defines the delay time between detection of an error or warning and the predetermined response to it. |
| 1 | 0x64F2 | RW | Error position | 8 bit | uint:8 | 3<br>(Vent valve) | 0 | Hold valve position | Position of the valve is held in the event of an error |
| | | | | | | | 1 | Open valve | Valve is opened in the event of an error |
| | | | | | | | 2 | Close valve | Valve is closed in the event of an error |

| Port | Index [Hex] | "Access Rights" | Parameter | "Length" | "Data type" | "Default setting" | | "Adjustment facility" | "Description" |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 3 | Vent valve (approach safety position) | The valve is vented and thereby moved to the safety position |
| 1 | 0x64F3 | RW | Time-based diagnostic messages | 8 bit | uint:8 | 1 (activated) | 1 | 1 activated<br><br>0 deactivated | Diagnostic messages activated<br><br>Diagnostic messages deactivated |
| 1 | 0x6501 | RW | Inversion of LED colours | 1 byte | uint:8 | Standard or inversed depending on the order version | 0 | Standard | CLOSED = green, OPEN = orange |
| | | | | | | | 1 | Inversed | CLOSED = orange, OPEN = green |
| 1 | 0x6503 | RW | Detection of end positions mode | 1 byte | uint:8 | 1 (autonomous) | 0 | Classic | Classic initialization mode |
| | | | | | | | 1 | Autonomous | Autonomous end positions tracking |
| 1 | 0x6504 | RW | Initialization via magnetic switch | 1 byte | uint:8 | 1 (activated)* | 0 | Deactivated | Programming procedure starting via reed contact deactivated |
| | | | | | | | 1 | Activated | Programming procedure starting via reed contact possible |
| 1 | 0x6505 | RW | Fieldbus communication | 8 bit | uint:8 | 0 (deactivated) | 0 | Deactivated | Fieldbus communication deactivated |
| | | | | | | | 1 | Activated | Fieldbus communication activated |
| 1 | 0x6506 | RW | Bluetooth interface | 1 byte | uint:8 | 1 (activated) * | 0 | Deactivated | Bluetooth communication option deactivated |
| | | | | | | | 1 | Activated | Bluetooth communication option activated |
| 1 | 0x6509 | RW | High-visibility position indicator | 1 byte | uint:8 | 1 (On) | 0 | Off | End position feedback via LEDs deactivated |
| | | | | | | | 1 | On | End position feedback via LEDs activated |
| | | | | | | | 2 | Dimmed | Dimmed end position feedback via LEDs |
| 1 | 0x6511 | RW | Switch point OPEN | 2 byte | uint:16 | 75.0% | - | 10.0 to 100.0% | Set switching threshold for Open Must be at least 10.0% higher than switch point Closed |
| 1 | 0x6512 | RW | Switch point CLOSED | 2 byte | uint:16 | 12.0% | - | 0.0 to 90.0% | Set switching threshold for Closed Must be at least 10.0% lower than switch point Open |
| 1 | 0x6531 | RO | Absolute travel sensor position OPEN end position | 2 byte | uint:16 | 0 | - | 0.0 to 100.0% | Initialized travel sensor position OPEN end position |

| Port | Index [Hex] | "Access Rights" | Parameter | "Length" | "Data type" | "Default setting" | | "Adjustment facility" | "Description" |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0x6532 | RO | Absolute travel sensor position CLOSED end position | 2 byte | uint:16 | 0 | - | 0.0 to 100.0% | Initialized travel sensor position CLOSED end position |
| 1 | 0x65C1 | RO | Control function | 1 byte | uint:8 | - | 0 | undefined | No control function recognised |
| | | | | | | | 1 | NC | Normally closed control function detected |
| | | | | | | | 2 | NO | Normally open control function detected |
| | | | | | | | 3 | DA | Double acting control function detected |
| 1 | 0x6641 | RW | Digital input 1 function (Defines the behaviour of the input process data bit 0) | 8 bit | uint:8 | 1 (Controlling pneumatic outputs) | 0 | Off | No function |
| | | | | | | | 1 | Controlling pneumatic outputs | Activates the pneumatic output |
| | | | | | | | 2 | - | - |
| | | | | | | | 3 | Initialization | Starting initialization |
| | | | | | | | 4 | Localization | Activates the location function |
| | | | | | | | 5 | Safe/On | If the signal is not active, the position defined in the "Error-Action" (0x004F) parameter is approached. If the signal is active, normal operation is carried out in accordance with external signals. |
| 1 | 0x6651 | RW | Digital input 2 function (Defines the behaviour of the input process data bit 1) | 8 bit | uint:8 | 0 (Off) | 0 | Off | No function |
| | | | | | | | 1 | Controlling pneumatic outputs | Activates the pneumatic output |
| | | | | | | | 2 | - | - |
| | | | | | | | 3 | Initialization | Starting initialization |
| | | | | | | | 4 | Localization | Activates the location function |
| | | | | | | | 5 | Safe/On | If the signal is not active, the position defined in the "Error-Action" (0x004F) parameter is approached. If the signal is active, normal operation is carried out in accordance with external signals. |
| 1 | 0x6661 | RW | Digital input 3 function (Defines the behaviour of the input process data bit 2) | 8 bit | uint:8 | 3 (Initialization) | 0 | Off | No function |
| | | | | | | | 1 | Controlling pneumatic outputs | Activates the pneumatic output |
| | | | | | | | 2 | - | - |

| Port | Index [Hex] | "Access Rights" | Parameter | "Length" | "Data type" | "Default setting" | | "Adjustment facility" | "Description" |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 3 | Initialization | Starting initialization |
| | | | | | | | 4 | Localization | Activates the location function |
| | | | | | | | 5 | Safe/On | If the signal is not active, the position defined in the "Error-Action" (0x004F) parameter is approached. If the signal is active, normal operation is carried out in accordance with external signals. |
| 1 | 0x6671 | RW | Digital input 4 function (Defines the behaviour of the input process data bit 3) | 8 bit | uint:8 | 4 (Localization) | 0 | Off | No function |
| | | | | | | | 1 | Controlling pneumatic outputs | Activates the pneumatic output |
| | | | | | | | 2 | - | - |
| | | | | | | | 3 | Initialization | Starting initialization |
| | | | | | | | 4 | Localization | Activates the location function |
| | | | | | | | 5 | Safe/On | If the signal is not active, the position defined in the "Error-Action" (0x004F) parameter is approached. If the signal is active, normal operation is carried out in accordance with external signals. |
| 1 | 0x6681 | RW | Digital input 5 function (Defines the behaviour of the input process data bit 4) | 8 bit | uint:8 | 0 (Off) | 0 | Off | No function |
| | | | | | | | 1 | Controlling pneumatic outputs | Activates the pneumatic output |
| | | | | | | | 2 | - | - |
| | | | | | | | 3 | Initialization | Starting initialization |
| | | | | | | | 4 | Localization | Activates the location function |
| | | | | | | | 5 | Safe/On | If the signal is not active, the position defined in the "Error-Action" (0x004F) parameter is approached. If the signal is active, normal operation is carried out in accordance with external signals. |
| 1 | 0x6691 | RW | Digital input 6 function (Defines the behaviour of the input process data bit 5) | 8 bit | uint:8 | 0 (Off) | 0 | Off | No function |

| Port | Index [Hex] | "Access Rights" | Parameter | "Length" | "Data type" | "Default setting" | | "Adjustment facility" | "Description" |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 1 | Controlling pneumatic outputs | Activates the pneumatic output |
| | | | | | | | 2 | - | - |
| | | | | | | | 3 | Initialization | Starting initialization |
| | | | | | | | 4 | Localization | Activates the location function |
| | | | | | | | 5 | Safe/On | If the signal is not active, the position defined in the "Error-Action" (0x004F) parameter is approached. If the signal is active, normal operation is carried out in accordance with external signals. |
| 1 | 0x66A1 | RW | Digital input 7 function (Defines the behaviour of the input process data bit 6) | 8 bit | uint:8 | 0 (Off) | 0 | Off | No function |
| | | | | | | | 1 | Controlling pneumatic outputs | Activates the pneumatic output |
| | | | | | | | 2 | - | - |
| | | | | | | | 3 | Initialization | Starting initialization |
| | | | | | | | 4 | Localization | Activates the location function |
| | | | | | | | 5 | Safe/On | If the signal is not active, the position defined in the "Error-Action" (0x004F) parameter is approached. If the signal is active, normal operation is carried out in accordance with external signals. |
| 1 | 0x66B1 | RW | Digital input 8 function (Defines the behaviour of the input process data bit 7) | 8 bit | uint:8 | 0 (Off) | 0 | Off | No function |
| | | | | | | | 1 | Controlling pneumatic outputs | Activates the pneumatic output |
| | | | | | | | 2 | - | - |
| | | | | | | | 3 | Initialization | Starting initialization |
| | | | | | | | 4 | Localization | Activates the location function |

| Port | Index [Hex] | "Access Rights" | Parameter | "Length " | "Data type" | "Default setting" | | "Adjustment facility" | "Description" |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 5 | Safe/On | If the signal is not active, the position defined in the "Error-Action" (0x004F) parameter is approached. If the signal is active, normal operation is carried out in accordance with external signals. |
| 1 | 0x67A1 | RW | Alarm threshold for min. internal temperature of housing | 2 byte | int:16 | -5 °C | | -40 to 100 °C | Defines the threshold below which an alarm signal will be generated to indicate the internal temperature of the housing is too low |
| 1 | 0x67A2 | RW | Alarm threshold for max. internal temperature of housing | 2 byte | int:16 | 75 °C | | -40 to 100 °C | Defines the threshold above which an alarm signal will be generated to indicate the internal temperature of the housing is too high |
| 1 | 0x67A3 | RW | Alarm threshold for min. humidity of housing | 2 byte | int:16 | 0.0% | | 0.0 to 100.0% | Defines the threshold below which an alarm signal will be generated to indicate the humidity inside the housing is too low |
| 1 | 0x67A4 | RW | Alarm threshold for max. humidity of housing | 2 byte | int:16 | 100.0 % | | 0.0 to 100.0% | Defines the threshold above which an alarm signal will be generated to indicate the humidity inside the housing is too high |
| 1 | 0x67A5 | RW | Alarm threshold for high oscillations | 2 byte | int:16 | 0.0% | | 0.0 to 100.0% | Defines the threshold above which an alarm signal will be generated to indicate the oscillations are too high |
| 1 | 0x67A6 | RW | Alarm threshold for min. internal pressure of housing | 2 byte | int:16 | 500mbar | | 260–1260 mbar | Defines the threshold below which an alarm signal will be generated to indicate the internal pressure in the housing is too low |
| 1 | 0x67A7 | RW | Alarm threshold for max. internal pressure of housing | 2 byte | int:16 | 1230 mbar | | 260–1260 mbar | Defines the threshold above which an alarm signal will be generated to indicate the internal pressure in the housing is too high |

* These parameters are not reset to default settings with the "Restore Factory Settings" AS-I system command, but instead retain their set values

### 15.3 Non-cyclical condition monitoring data

| Port | Index [Hex] | "Access Rights" | Parameter | "Length" | "Data type" | "Default setting" | | "Adjustment facility" | "Description" |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0x6561 | RO | User switching cycle counter | 32 bit | uint:32 | 0 * | | 0 … 2.147.483.647 | (OPEN -> CLOSED -> OPEN = switching cycle feedback) can be reset (for example, after replacing the diaphragm) |
| 1 | 0x6562 | RO | Total switching cycle counter | 32 bit | uint:32 | 0 * | | 0 … 2.147.483.647 | (OPEN -> CLOSED -> OPEN = switching cycle feedback) cannot be reset (actuator switching cycles) |
| 1 | 0x6563 | RW | Warning threshold for user switching cycles | 32 bit | uint:32 | 0 * | | 1 … 2.147.483.647 | Adjustable alarm threshold for user switching cycles (cycle counter user) |
| 1 | 0x6564 | RO | Valve actuations user counter | 32 bit | uint:32 | 0 * | | 0 … 2.147.483.647 | Counts the actuation pulses (even if they do not result in movement of the actuator). Can be reset (for example, after replacing the pilot valve module) |
| 1 | 0x6565 | RO | Valve actuations total counter | 32 bit | uint:32 | 0 * | | 0 … 2.147.483.647 | Counts the actuation pulses (even if they do not result in movement of the actuator). |
| 1 | 0x6566 | RW | Warning threshold for valve actuations user counter | 32 bit | uint:32 | 0 * | | 1 … 2.147.483.647 | Adjustable alarm threshold for actuation pulse counter |
| 1 | 0x6567 | RO | Switching cycles warning ratio | 16 bit | uint:16 | 0 * | | 0 to 1000 (0 to 100.0%) | Pilot valve wear level in %. Calculated from the actuation counter and the set alarm threshold |
| 1 | 0x65A1 | RO | Total operating hours | 32 bit | uint:32 | 0 * | | 0 … 2.147.483.647 | Total operating hours counter |
| 1 | 0x65A2 | RO | Operating hours since last start | 32 bit | uint:32 | 0 * | | 0 … 2.147.483.647 | Operating hours since last device start |
| 1 | 0x6621 | RO | Operating time OPEN | 16 bit | uint:16 | - | | 0 to 999 (0.0 to 99.9 s) | Travel time from OPEN to CLOSED end position |
| 1 | 0x6622 | RO | Operating time CLOSED | 16 bit | uint:16 | - | | 0 to 999 (0.0 to 99.9 s) | Travel time from CLOSED to OPEN end position |

| Port | Index [Hex] | "Access Rights" | Parameter | "Length" | "Data type" | "Default setting" | | "Adjustment facility" | "Description" |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0x6781 | RO | Housing internal temperature | 16 bit | int:16 | 0 * | | ´-400 to 1000 (-40.0 °C to 100.0 °C) | Measured housing internal temperature in °C |
| 1 | 0x6782 | RO | Housing internal pressure | 16 bit | int:16 | 0 * | | 260 to 1260 (260 mbar to 1260 mbar) | Measured housing internal pressure in mbar |
| 1 | 0x6783 | RO | Laterally inclined installation position in ° | 16 bit | int:16 | 0 * | | ´-1800 to 1800 (-180.0° to 180.0°) | Detected laterally inclined installation position in ° |
| 1 | 0x6784 | RO | Frontally inclined installation position in ° | 16 bit | int:16 | 0 * | | ´-1800 to 1800 (-180.0° to 180.0°) | Detected frontally inclined installation position in ° |
| 1 | 0x6785 | RO | Acceleration in X axis | 16 bit | int:16 | 0 | | -32768 ... 32767 | Indicates the measured acceleration of the X axis |
| 1 | 0x6786 | RO | Acceleration in Y axis | 16 bit | int:16 | 0 | | -32768 ... 32767 | Indicates the measured acceleration of the Y axis |
| 1 | 0x6787 | RO | Acceleration in Z axis | 16 bit | int:16 | 0 | | -32768 ... 32767 | Indicates the measured acceleration of the Z axis |
| 1 | 0x6788 | RO | Supply voltage | 16 bit | int:16 | 0 * | | 0 to 3600 (0.00 V to 36.00 V) | Measured supply voltage in V |
| 1 | 0x6789 | RO | Current consumption | 16 bit | int:16 | 0 * | | 0 to 375 (0 mA to 375 mA) | Measured current consumption in mA |
| 1 | 0x678A | RO | Humidity of housing | 16 bit | int:16 | 0 * | | 0 to 1000 (0.0% to 100.0%) | Measured relative humidity in housing in % |

* These parameters are not reset to default settings with the "Restore Factory Settings" AS-I system command, but instead retain their set values

### 15.4 AS-I5 events

**Note:** Specific error description and troubleshooting measures in accordance with "Messages and troubleshooting" chapter (see “Messages and troubleshooting“, page 43).

| Event | Mode | Type | Code |
|---|---|---|---|
| Internal device error | Rising / Leaving | Error | 0x0001 |
| Temperature exceeded | Rising / Leaving | Error | 0x0021 0x03 |
| Temperature not reached | Rising / Leaving | Error | 0x0021 0x01 |
| Travel sensor not calibrated | Rising / Leaving | Error | 0x0301 |
| Not initialized | Rising / Leaving | Warning | 0x0302 |
| End position displacement OPEN | Single Shot | Information | 0x0303 |
| End position displacement CLOSED | Single Shot | Information | 0x0304 |
| Duration error in the OPEN direction | Rising / Leaving | Warning | 0x031C |
| Duration error in the CLOSED direction | Rising / Leaving | Warning | 0x031D |
| No movement or incorrect movement towards OPEN | Rising / Leaving | Warning | 0x031F |
| No movement or incorrect movement towards CLOSED | Rising / Leaving | Warning | 0x0320 |
| Undefined position change in the OPEN direction | Rising / Leaving | Warning | 0x0321 |
| Undefined position change in the CLOSED direction | Rising / Leaving | Warning | 0x0322 |
| Travel sensor error | Rising / Leaving | Error | 0x033C |
| Travel sensor maximum value exceeded | Rising / Leaving | Warning | 0x033E |
| Travel sensor minimum value not reached | Rising / Leaving | Warning | 0x033F |
| Initialization error | Single Shot | Information | 0x03FA |
| Valve actuations alarm threshold reached | Rising / Leaving | Warning | 0x0346 |
| Switching cycles alarm threshold reached | Rising / Leaving | Warning | 0x0348 |
| Critical supply voltage | Rising / Leaving | Error | 0x036D |
| Supply voltage exceeded | Rising / Leaving | Warning | 0x036E |
| Supply voltage not reached | Rising / Leaving | Warning | 0x036F |
| Temperature alarm threshold exceeded | Rising / Leaving | Warning | 0x0378 |
| Temperature alarm threshold not reached | Rising / Leaving | Warning | 0x0379 |
| Humidity alarm threshold exceeded | Rising / Leaving | Warning | 0x037A |
| Humidity alarm threshold not reached | Rising / Leaving | Warning | 0x037B |
| Internal pressure alarm threshold exceeded * | Rising / Leaving | Warning | 0x037C |
| Internal pressure alarm threshold not reached | Rising / Leaving | Warning | 0x037D |
| Vibration alarm threshold exceeded | Rising / Leaving | Warning | 0x0382 |

* Message at size 2 inactive

## 16 Manual override

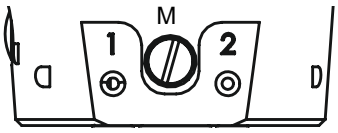
**NOTICE**

► Manual override only available for "single acting" version.

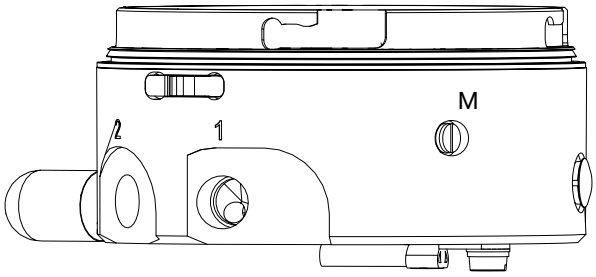
**NOTICE**

► Control air and the minimum pressure must be available to use the manual override.

The combi switchbox has a manual override in the corresponding design, which enables manual operation of the process valve.




Size 1




Size 2

**Activating the manual override:**

Use a flathead screwdriver (maximum slot width of 6 mm) to carefully screw in the manual override screw **M** clockwise as far as it will go or until you feel resistance.

**Deactivating the manual override:**

Use a flathead screwdriver (maximum slot width of 6 mm) to unscrew the manual override screw **M** anticlockwise as far as it will go.

## 17 Messages and troubleshooting

Three different conditions are distinguished between in the device, which suggest faults due to internal or external influences. These are made visible via different flashing patterns.

**Error:** Device can no longer properly carry out its function. The valve is moved to the defined safety position in a controlled manner. The cause of the error must be eliminated for continued operation.

**Warning:** A warning does not affect the operating mode of the device; however, under certain circumstances, it may not carry out the required function. We recommend checking the cause and, if required, eliminating it.

**Info:** The status of a temporary function is displayed.

The following warning and error messages are defined for the device, and can be read out on the GEMÜ app:

| Message ID and type | Message | Error description | Cause and remedial measures |
|---|---|---|---|
| 1<br>Error | Not calibrated | The product is not calibrated. | Please send the product to GEMÜ for repair. Please contact your GEMÜ representative. Further information can also be found on the product overview in the GEMÜ app under Maintenance. |
| 2<br>Warning | Not initialized | The product is not initialised. | Please perform an initialisation. If autonomous end position detection is activated, both end positions of the valve must be approached once. In the classic end position detection mode, the initialisation must be started manually. This can be done, for example, via the button on the product overview in the GEMÜ app. Alternatively, please note the information in the chapter "Commissioning" in the operating instructions. |
| 3<br>Info | End position displacement OPEN | A shift of the OPEN end position was detected and tracked by the autonomous end position detection. | No measure required |
| 4<br>Info | End position displacement CLOSED | A displacement of the CLOSED end position was detected and tracked by the autonomous end position detection. | no action required |
| 28<br>Warning | Duration error in the OPEN direction | The OPEN end position of the process valve has been reached, but not within the expected time | Please ensure an adequate compressed air supply. Check the pneumatic connections. Check the pneumatic connection points. Check that the valve is working correctly. |
| 29<br>Warning | Duration error in the CLOSED direction | The CLOSED end position of the process valve has been reached, but not within the expected time | Please ensure an adequate compressed air supply. Check the pneumatic connections. Check the pneumatic connection points. Check that the valve is working correctly. |
| 31<br>Warning | No movement or incorrect movement towards OPEN | The OPEN end position of the process valve is not reached. | Please ensure sufficient compressed air supply. Check the pneumatic connections. Check the pneumatic connection points. Check the valve for function. |
| 32<br>Warning | No movement or incorrect movement towards CLOSED | The CLOSED end position of the process valve is not reached. | Please ensure sufficient compressed air supply. Check the pneumatic connections. Check the pneumatic connections. Check the valve for function. |
| 33<br>Warning | Undefined position change in the OPEN direction | The position of the process valve changes to an undefined position, without actuation in the OPEN direction | Please ensure an adequate compressed air supply. Check the pneumatic connections. Check the pneumatic connection points. Check that the valve is working correctly. |
| 34<br>Warning | Undefined position change in the CLOSED direction | The position of the process valve changes to an undefined position, without actuation in the CLOSED direction | Please ensure an adequate compressed air supply. Check the pneumatic connections. Check the pneumatic connection points. Check that the valve is working correctly. |
| 60<br>Error | Travel sensor error | No valid signal from the position transmitter can be read in. | Please send the product to GEMÜ for repair. Please contact your GEMÜ representative. Further information can also be found on the product overview in the GEMÜ app under Maintenance. |
| 62<br>Warning | Travel sensor maximum value exceeded | The position sensor provides values above the maximum valid range. | Please ensure correct mechanical mounting on the valve. Please check all connecting parts (e.g. mounting kits, etc.) between valve and product for correct and complete use. |
| 63<br>Warning | Travel sensor minimum value not reached | The position sensor delivers values below the minimum valid range. | Please ensure correct mechanical assembly on the valve. Please check all connecting parts (e.g. mounting kits, etc.) between valve and product for correct and complete use. |

| Message ID and type | Message | Error description | Cause and remedial measures |
|---|---|---|---|
| 70 Warning | Valve activations alarm threshold reached | The number of valve actuations set at parameter "S14:Warning threshold user counter valve actuations" was reached. | Please check the condition of the wear parts of the valve control. Further information on this can be found on the product overview in the GEMÜ app under Maintenance. If the condition is perfect, you can alternatively adjust the warning threshold in the parameter "S14: Warning threshold user counter valve actuators". |
| 72 Warning | Switching cycles alarm threshold reached | The number of switching cycles set in parameter "S02: Warning threshold user switching cycles" has been reached. | Please check the condition of the valve wear parts. You can find more information on this on the product overview in the GEMÜ app under Maintenance. If the condition is perfect, you can alternatively adjust the warning threshold in parameter "S02: Warning threshold user switching cycles". |
| 73 Info | Switching cycle counter reset | The user switching cycle counter has been reset | No action necessary |
| 100 Error | Control pressure exceeded | The maximum permissible control pressure has been exceeded | Please reduce the control air supply pressure at the product. Unacceptably high control pressures can permanently damage or destroy the product. |
| 109 Error | Critical supply voltage | The maximum permissible supply voltage has been exceeded | Please check the power source to ensure that the output voltage has been selected and set correctly. Ensure that the power supply is within the permissible range. |
| 110 Warning | Supply voltage exceeded | The maximum permissible supply voltage will soon be exceeded | Please check the power source to ensure that the output voltage has been selected and set correctly. Ensure that the power supply is within the permissible range. |
| 111 Error | Supply voltage not reached | The minimum permissible supply voltage has not been reached | Please check the power source to ensure that the output voltage has been selected and set correctly. Ensure that the power supply is within the permissible range. |
| 118 Error | Temperature exceeded | The maximum permissible temperature has been exceeded | Please reduce the ambient temperature at the product's installation site or establish cooler conditions. |
| 119 Error | Temperature not reached | The minimum permissible temperature has not been reached | Please increase the ambient temperature at the product's installation site or establish warmer conditions. |
| 120 Warning | Temperature alarm threshold exceeded | The maximum temperature set in parameter "P34: Alarm threshold for max. internal housing of housing" has been reached or exceeded. | Please reduce the ambient temperature at the product's installation site or establish cooler conditions. Alternatively, check the maximum permissible temperature range of the product. If this is above the set value in parameter "P34: Alarm threshold for max. internal temperature of housing", it can be increased. |
| 121 Warning | Temperature alarm threshold not reached | The minimum temperature set in parameter "P33: Alarm threshold for min. internal temperature of housing" has been reached or has not been reached. | Please increase the ambient temperature at the product's installation site or establish warmer conditions. Alternatively, check the minimal permissible temperature range of the product. If this is below the set value in parameter "P33: Alarm threshold for min. internal temperature of housing", it can be reduced. |
| 122 Warning | Humidity alarm threshold exceeded | The maximum humidity set in parameter "P36: Alarm threshold for max. humidity of housing" has been reached or exceeded. | Please check that the product housing is fully intact and sealed and that all seals are seated correctly. Please reduce the humidity at the product's installation site or establish dryer conditions. Alternatively, check the maximum permissible humidity range of the product. If this is above the set value in parameter "P36: Alarm threshold for max. humidity of housing", it can be increased. |
| 123 Warning | Humidity alarm threshold not reached | The minimum humidity set in parameter "P35: Alarm threshold for min. humidity of housing" has been reached or has not been reached. | Please increase the humidity at the product's installation site or establish damper conditions. Alternatively, check the minimum permissible humidity range of the product. If this is below the set value in parameter "P35: Alarm threshold for min. humidity of housing", it can be reduced. |
| 124 Warning | Internal pressure alarm threshold exceeded | The maximum internal pressure set in parameter "P38: Alarm threshold for max. internal pressure of housing" has been reached or exceeded. | Please check the product for internal leakages. Please check the height above sea level at the product's installation site. Alternatively, check the maximum permissible internal pressure/height above sea level of the product. If this is above the set value in parameter "P38: Alarm threshold for max. internal pressure of housing", it can be increased. |

| Message ID and type | Message | Error description | Cause and remedial measures |
|---|---|---|---|
| 125 Warning | Internal pressure alarm threshold not reached | The minimum internal pressure set in parameter "P37: Alarm threshold for min. internal pressure of housing" has been reached or has not been reached. | Please check the height above sea level at the product's installation site. Alternatively, check the minimum permissible internal pressure/height above sea level of the product. If this is below the set value in parameter "P37: Alarm threshold for min. internal pressure of housing", it can be reduced. |
| 130 Warning | Vibration alarm threshold exceeded | The maximum vibration set in parameter "P39: Alarm threshold for vibration exceeded" has been reached or exceeded. | Please check the product's installation conditions, specifically for loose screws, fastening components and mounts for fixing the pipeline. Please check the flow velocity in the piping and reduce it if possible. Please check that the process valve is suitable for the prevailing operating parameters. |
| 201 Error | Internal memory error | Currently the memory cannot be accessed. | Please send the product to GEMÜ for repair. Please contact your GEMÜ representative. Further information can also be found on the product overview in the GEMÜ App under Maintenance. |
| 205 Error | Fieldbus communication error | Fieldbus communication was terminated while the associated parameter "Fieldbus communication" was activated | Fieldbus communication is expected. Please check that the communication interface is wired and configured correctly |
| 250 Info | Initialization error | During initialization, an error occurred which caused it to be terminated | Please ensure that the mechanical assembly on the valve is correct. Please check all connecting components (e.g. mounting kits, etc.) between the valve and product to ensure that they are being used correctly and in their entirety. Please ensure an adequate compressed air supply. Check the pneumatic connections. Check the pneumatic connection points. Check that the valve is working correctly. |

**Note:** Message **ID 124** "Internal pressure alarm threshold exceeded" at size 2 inactive

## 18 Disposal

1. Pay attention to adhered residual material and gas diffusion from penetrated media.
2. Dispose of all parts in accordance with the disposal regulations/environmental protection laws.

## 19 Returns

Legal regulations for the protection of the environment and personnel require that the completed and signed return delivery note is included with the dispatch documents. Returned goods can be processed only when this note is completed. If no return delivery note is included with the product, GEMÜ cannot process credits or repair work but will dispose of the goods at the operator's expense.

1. Clean the product.
2. Request a return delivery note from GEMÜ.
3. Complete the return delivery note.
4. Send the product with a completed return delivery note to GEMÜ.

## *20 EU Declaration of Incorporation according to the EC Machinery Directive 2006/42/EC, Annex II B*

# EU Declaration of Incorporation

### *according to the EC Machinery Directive 2006/42/EC, Annex II B*

We, the company

GEMÜ Gebr. Müller Apparatebau GmbH & Co. KG
Fritz-Müller-Strasse 6–8
74653 Ingelfingen-Criesbach, Germany

hereby declare under our sole responsibility that the below-mentioned product complies with the relevant essential health and safety requirements in accordance with Annex I of the above-mentioned Directive.

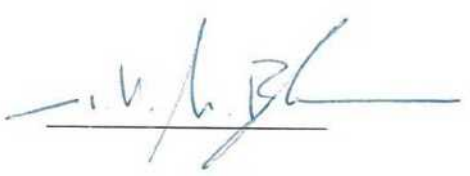
| | |
|---|---|
| **Product:** | GEMÜ 4242 |
| **Product name:** | Combi switchbox with integrated pilot valve |
| **The following essential health and safety requirements of the EC Machinery Directive 2006/42/EC, Annex I have been applied or adhered to:** | 1.1.7.; 1.3.2.; 1.3.7.; 1.3.8.; 1.3.9.; 1.5.1.; 1.5.8.; 1.6.1. |
| **The following harmonized standards (or parts thereof) have been applied:** | EN ISO 12100:2010 |

We also declare that the specific technical documents have been created in accordance with part B of Annex VII.

The manufacturer undertakes to transmit relevant technical documents on the partly completed machinery to the national authorities in response to a reasoned request. This communication takes place electronically.

This does not affect the industrial property rights.

**The partly completed machinery may be commissioned only if it has been determined, if necessary, that the machinery into which the partly completed machinery is to be installed meets the provisions of the Machinery Directive 2006/42/EC.**



M. Barghoorn
Head of Global Technics

Ingelfingen, 12/12/2023

## *21 EU Declaration of Conformity in accordance with 2014/53/EU (RED Directive)*

# EU Declaration of Conformity

### *in accordance with 2014/53/EU (RED Directive)*

| | |
|---|---|
| We, the company | GEMÜ Gebr. Müller Apparatebau GmbH & Co. KG<br>Fritz-Müller-Strasse 6–8<br>74653 Ingelfingen-Criesbach, Germany |

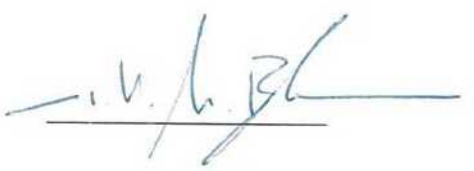
declare that the following product fulfils the safety requirements of the EMC Directive 2014/30/EU.

| | |
|---|---|
| **Product:** | GEMÜ 4242 |
| **Product name:** | Combi switchbox with integrated pilot valve |

The Essential Safety and Health Requirements are met by compliance with the standards used in parts listed below that are applicable for the above mentioned product:

- EN 300 328 V2.2.2 (2019-07)
- EN 301 489-1 V2.2.3 (2019-11)
- EN 301 489-17 V3.2.4 (2020-09)
- EN 61010-1:2010/A1:2019/AC:2019-04

The sole responsibility for issuing this declaration of conformity lies with the company GEMÜ Gebr. Müller Apparatebau GmbH & Co. KG.



M. Barghoorn
Head of Global Technics

Ingelfingen, 12/12/2023

GEMÜ Gebr. Müller Apparatebau GmbH & Co. KG
Fritz-Müller-Straße 6-8, 74653 Ingelfingen, Deutschland
www.gemu-group.com
info@gemue.de

## 22 EU Declaration of Conformity in accordance with 2014/34/EU (ATEX Directive)

# EU Declaration of Conformity

### *in accordance with 2014/34/EU (ATEX Directive)*

| | |
|---|---|
| We, the company | GEMÜ Gebr. Müller Apparatebau GmbH & Co. KG<br>Fritz-Müller-Strasse 6–8<br>74653 Ingelfingen-Criesbach, Germany |

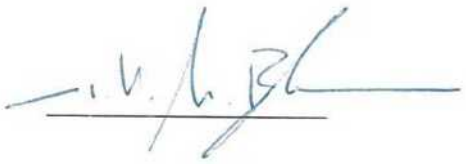
declare that the following product complies with the requirements of Directive 2014/34/EU for intended use in potentially explosive areas.

| | | |
|---|---|---|
| **Product:** | GEMÜ 4242 | |
| **Product name:** | Combi switchbox with integrated pilot valve | |
| **Explosion protection marking:** | Gas: | II 3G Ex ec nC IIC T4 Gc X |
| **Explosion protection designation:** | Dust: | II 3D Ex tc IIIC T100°C Dc X |
| **Explanations:** | For special conditions or operation limits, see the "Correct use" chapter in the operating instructions. | |

The Essential Safety and Health Requirements are met by compliance with the standards used in parts listed below that are applicable for the above mentioned product:

- EN IEC 60079-0:2018
- EN IEC 60079-7:2015/A1:2018
- EN 60079-31:2014

The sole responsibility for issuing this declaration of conformity lies with the company GEMÜ Gebr. Müller Apparatebau GmbH & Co. KG.



M. Barghoorn
Head of Global Technics

Ingelfingen, 12/12/2023

## *23 EU Declaration of Conformity in accordance with 2011/65/EU (RoHS Directive)*

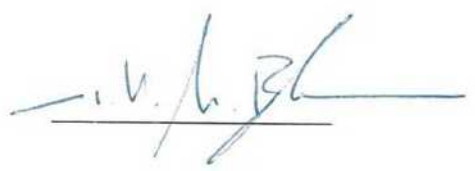
# EU Declaration of Conformity

### *in accordance with 2011/65/EU (RoHS Directive)*

| | |
|---|---|
| We, the company | GEMÜ Gebr. Müller Apparatebau GmbH & Co. KG<br>Fritz-Müller-Strasse 6–8<br>74653 Ingelfingen-Criesbach, Germany |

hereby declare under our sole responsibility that the below-mentioned product complies with the regulations of the above-mentioned Directive.

| | |
|---|---|
| **Product:** | GEMÜ 4242 |
| **Product name:** | Combi switchbox with integrated pilot valve |
| **The following harmonized standards (or parts thereof) have been applied:** | EN IEC 63000:2018 |



M. Barghoorn
Head of Global Technics

Ingelfingen, 12/12/2023

GEMÜ Gebr. Müller Apparatebau GmbH & Co. KG
Fritz-Müller-Straße 6-8, 74653 Ingelfingen-Criesbach, Germany
Phone +49 (0) 7940 1230 · info@gemue.de
www.gemu-group.com



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