

GEMÜ R563 eSyStep

Motorized control valve

EN

Operating instructions



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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 LED symbols

The following LED symbols are used in the documentation:

| Symbol | LED conditions |
|--------|----------------|
| ○ | Off |
| ● | Lit (on) |
| ☼ | Flashing |

1.4 Definition of terms

Working medium

The medium that flows through the GEMÜ product.


1.5 Warning notes


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


| SIGNAL WORD | |
|---|--|
| Possible symbol for the specific danger | <p>Type and source of the danger</p> <ul style="list-style-type: none"> ▶ Possible consequences of non-observance. ● 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 | |
|---|---|
|  | <p>Imminent danger!</p> <ul style="list-style-type: none"> ▶ Non-observance can cause death or severe injury. |

| ⚠ WARNING | |
|---|---|
|  | <p>Potentially dangerous situation!</p> <ul style="list-style-type: none"> ▶ Non-observance can cause death or severe injury. |

| ⚠ CAUTION | |
|---|---|
|  | <p>Potentially dangerous situation!</p> <ul style="list-style-type: none"> ▶ Non-observance can cause moderate to light injury. |

| NOTICE | |
|---|---|
|  | <p>Potentially dangerous situation!</p> <ul style="list-style-type: none"> ▶ 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! |
|  | Corrosive chemicals! |
|  | Hot plant components! |

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:

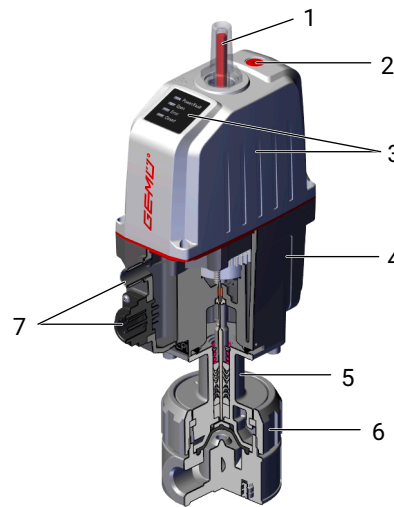
9. Keep this document available at the place of use.
10. Observe the safety information.
11. Operate the product in accordance with this document.
12. Operate the product in accordance with the specifications.
13. Maintain the product correctly.
14. Do not carry out any maintenance work and repairs not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

In cases of uncertainty:

15. Consult the nearest GEMÜ sales office.

3 Product description

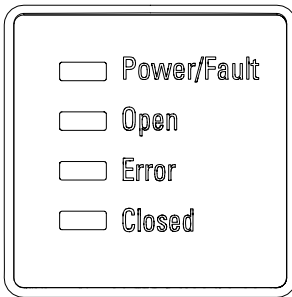
3.1 Construction



| Item | Name | Materials |
|------|---|---|
| 1 | Optical position indicator | PA 12 |
| 2 | Manual override | |
| 3 | Actuator top with LED display | Reinforced polyamide |
| 4 | Actuator base | Reinforced polyamide |
| 5 | Distance piece with leak detection hole | |
| 6 | Valve body | PVC-U, grey / regulating cone PEEK PVDF / regulating cone PEEK |
| 7 | Electrical connections | |

3.2 LED displays

3.2.1 Status LEDs



| LED | Colour | | Function |
|-------------|----------|------------------------|---|
| | Standard | Inversed ¹⁾ | |
| Power/fault | green | green | Operating indication/communication status |
| | red | red | |
| Open | orange | green | Process valve in OPEN position |
| Error | red | red | Error |
| Closed | green | orange | Process valve in CLOSED position |

1) Inversed representation of the OPEN and CLOSED LEDs, adjustable via IO-Link

3.2.2 LED conditions

| Status process valve | Power/fault | Open | Error | Closed |
|----------------------|-------------|-----------------------------------|-------|--------|
| OPEN position | ● | ● | ○ | ○ |
| CLOSED position | ● | ○ | ○ | ● |
| Position unknown | ● | ○ | ○ | ○ |
| Initialization | ● | ☀ | ○ | ☀ |
| | | Open and Closed flash alternately | | |

| LED conditions | | | | | |
|----------------|----------|---|---------|---|-----|
| ● | lit (on) | ☀ | flashes | ○ | off |

3.3 Description

The GEMÜ R563 2/2-way straight seat control valve has a body with an integrated control mechanism. The GEMÜ R563 valve was specially developed for controlling small quantities and allows flow rates from 63 l/h to 3300 l/h. The valve will be available with a positioner for a 0/4-20 mA or 0-10 V input signal and can also be configured to a fail-safe position by using an emergency power supply module. Additional functions can be adapted via the IO-Link interface. The self-locking actuator holds its position in a stable manner when idle and in the event of power supply failure.

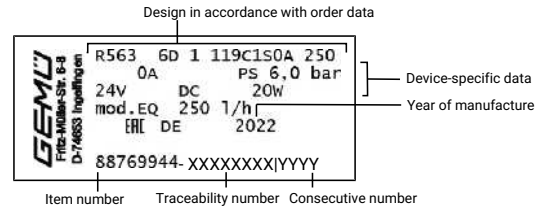
3.4 Function

The product controls or regulates (depending on version) a flowing medium by being closed or opened by a motorized actuator.

The product is equipped as standard with a mechanical position indicator as well as an electrical position and status indicator.

3.5 Product label

The product label is located on the actuator. Product label data (example):



The month of manufacture is encoded in the traceability number and can be obtained from GEMÜ. The product was manufactured in Germany.

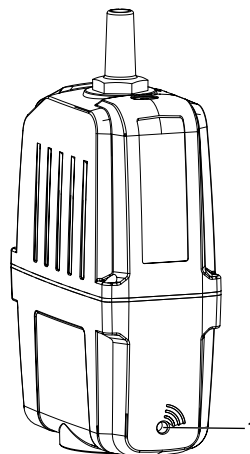
The operating pressure stated on the product label applies to a media temperature of 20 °C. The product can be used up to the maximum stated media temperature. You can find the pressure/temperature correlation in the technical data.

4 GEMÜ CONEXO

Order with CONEXO

GEMÜ CONEXO must be ordered separately with the ordering option "CONEXO" (see order data).

For electronic identification purposes, each replaceable component contained in the product is equipped with an RFID chip (1). Where you can find the RFID chip differs from product to product.



Actuator RFID chip

The CONEXO pen helps read out information stored in these RFID chips. The CONEXO app or CONEXO portal is required to view this information.

5 Correct use

DANGER



Danger of explosion!

- ▶ Risk of death or severe injury
- Do **not** use the product in potentially explosive zones.

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 product is designed for installation in piping systems and for controlling a working medium.

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

- Use the product in accordance with the technical data.

6 Order data

The order data provide an overview of standard configurations.

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

Order codes

| 1 Type | Code | 8 Control module | Code |
|---|------|---|------|
| Control valve, motorized, eSyStep | R563 | Positioner, configured for emergency power supply module (NO) | S6 |
| 2 DN | Code | 9 Control characteristic | Code |
| DN 3 | 3 | Regulating cone, equal-percentage | A |
| DN 6 | 6 | Regulating cone, equal-percentage | B |
| DN 10 | 10 | Regulating cone, equal-percentage | C |
| DN 15 | 15 | Regulating cone, linear | D |
| | | Regulating cone, linear | E |
| 3 Body configuration | Code | 10 Kv value | Code |
| 2/2-way body | D | 63 l/h | 63 |
| 4 Connection type | Code | 100 l/h | 100 |
| Threaded socket DIN ISO 228 | 1 | 160 l/h | 160 |
| Union end with insert (socket) – DIN | 7 | 250 l/h | 250 |
| 5 Valve body material | Code | 400 l/h | 400 |
| PVC-U, grey / regulating cone PEEK | 1 | 630 l/h | 630 |
| PVDF / regulating cone PEEK | 20 | 1000 l/h | 1000 |
| 6 Seal material | Code | 1600 l/h | 1600 |
| FKM | 4 | 2500 l/h | 2500 |
| EPDM | 19 | 3300 l/h | 3300 |
| 7 Voltage/frequency | Code | 11 Actuator version | Code |
| 24 V DC | C1 | Actuator size 0 | 0A |
| 8 Control module | Code | 12 CONEXO | Code |
| Positioner | S0 | Without | |
| Positioner, configured for emergency power supply module (NC) | S5 | Integrated RFID chip for electronic identification and traceability | C |

Order example

| Ordering option | Code | Description |
|--------------------------|------|---|
| 1 Type | R563 | Control valve, motorized, eSyStep |
| 2 DN | 3 | DN 3 |
| 3 Body configuration | D | 2/2-way body |
| 4 Connection type | 1 | Threaded socket DIN ISO 228 |
| 5 Valve body material | 1 | PVC-U, grey / regulating cone PEEK |
| 6 Seal material | 19 | EPDM |
| 7 Voltage/frequency | C1 | 24 V DC |
| 8 Control module | S0 | Positioner |
| 9 Control characteristic | A | Regulating cone, equal-percentage |
| 10 Kv value | 63 | 63 l/h |
| 11 Actuator version | 0A | Actuator size 0 |
| 12 CONEXO | C | Integrated RFID chip for electronic identification and traceability |

7 Technical data

7.1 Medium

Working medium: Corrosive, inert, gaseous and liquid media which have no negative impact on the physical and chemical properties of the body and seal material.

7.2 Temperature

Media temperature: 0 – 80 °C

Ambient temperature: 0 – 60 °C (code S0, S5, S6)*

* depending on version and/or operating parameters (see chapter Duty cycle and service life)

Storage temperature: 0 – 40 °C

7.3 Pressure

Operating pressure: 0 – 6 bar
All pressures are gauge pressures.

Pressure/temperature correlation:

| Valve body material | | Temperature in °C (valve body) | | | | | | | | | | | |
|---------------------|-----------|--------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Materials | Code | -10 | ±0 | 5 | 10 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 |
| PVC-U | 1 | - | - | - | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 3.5 | 1.5 | - | - |
| PVDF | 20 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 5.4 | 4.7 |

Permissible operating pressure in bar

The pressure rating (PN) depends on the connection code.

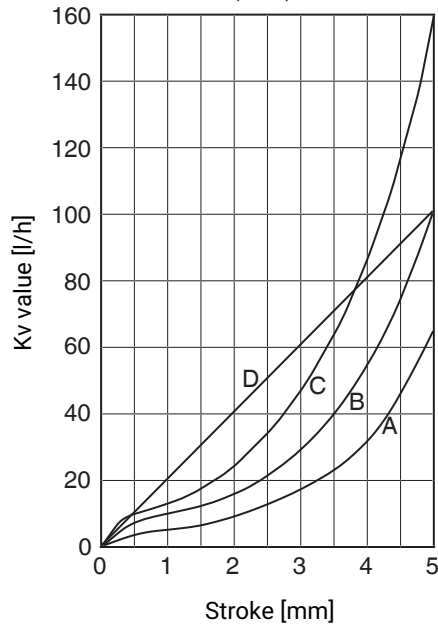
Data for extended temperature ranges on request. Please note that the ambient temperature and media temperature generate a combined temperature at the valve body which must not exceed the above values.

Leakage rate:

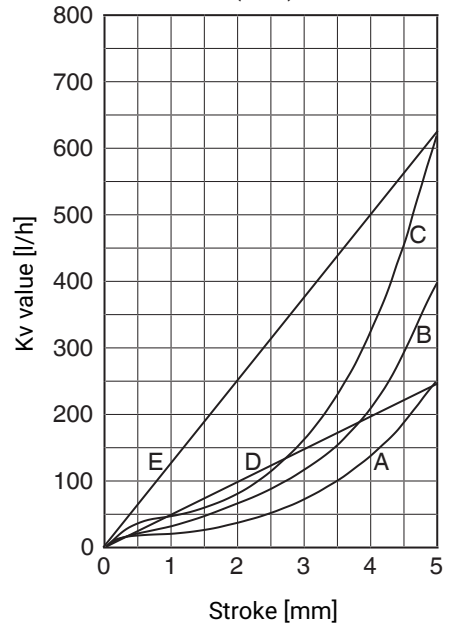
| Seat seal | Standard | Test procedure | Leakage rate | Test medium |
|-----------------|----------------|----------------|--------------|-------------|
| PEEK, PVC, PVDF | DIN EN 60534-4 | 1 | IV | Air |

Kv values:

Characteristics DN 3 (seat)



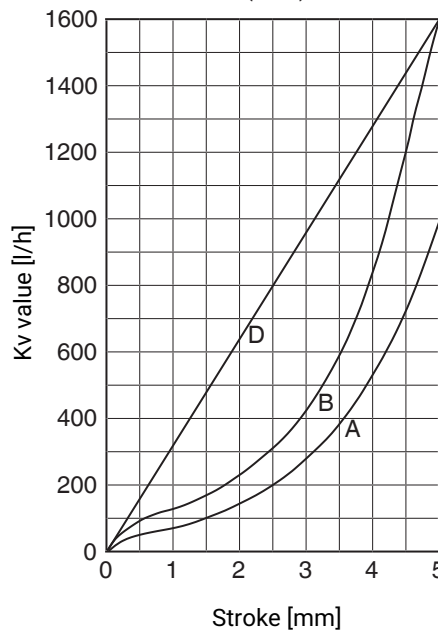
Characteristics DN 6 (seat)



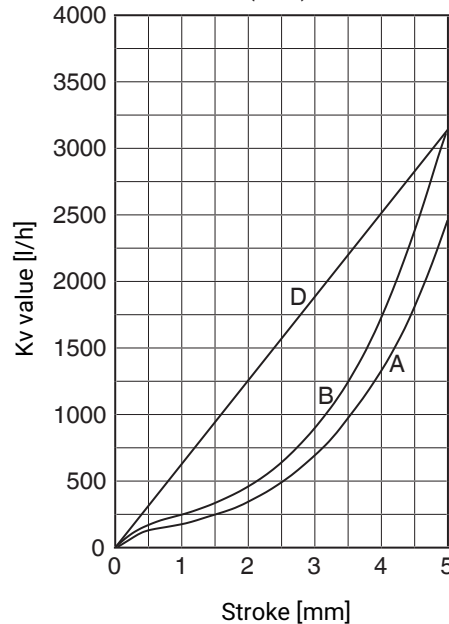
| Characteristic | Kv values DN 3 | Kv values DN 6 |
|----------------|----------------|----------------|
| A | 63 | 250 |
| B | 100 | 400 |
| C | 160 | 630 |
| D | 100 | 250 |
| E | - | 630 |

Kv values in l/h

Characteristics DN 10 (seat)



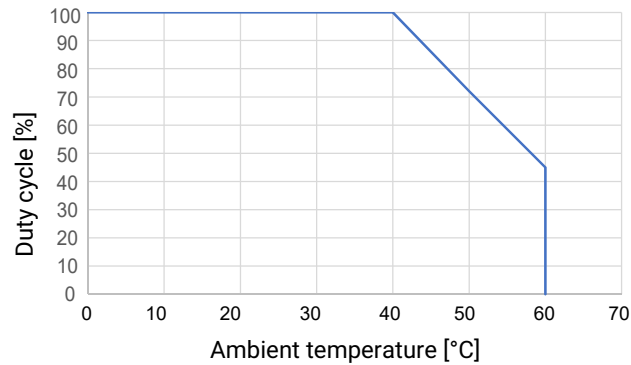
Characteristics DN 15 (seat)



| Characteristic | Kv values DN 10 | Kv values DN 15 |
|----------------|-----------------|-----------------|
| A | 1000 | 2500 |
| B | 1600 | 3300 |
| D | 1600 | 3300 |

Kv values in l/h

Duty cycle: Control module positioner (code S0, S5, S6), Open/Close duty cycle at full valve stroke and 10 minutes cycle time.



Control module positioner (code S0, S5, S6), control operation - class C acc. to EN 15714-2 - DN 10 - 15 up to 50 °C ambient temperature

NOTICE

- ▶ The specified characteristics and values apply to the default setting.
- ▶ With reduced forces, higher duty cycles and/or higher ambient temperatures are possible. At higher force settings the duty cycle and/or ambient temperature is reduced.
- ▶ IO-Link: Index 0x90 - Subindex 2 - Force

7.7 Electrical data

| | | |
|--------------------------------------|-----------------------------|------|
| Supply voltage U_v: | 24 V DC ± 10% | |
| Rating: | Actuator size 0 (code 0A) | 20 W |
| Operation: | Stepper motor, self-locking | |
| Reverse battery protection: | Yes | |

7.7.1 Analogue input signals – Control module Positioner (code S0, S5, S6)

7.7.1.1 Set value

| | |
|------------------------------------|---|
| Input signal: | 0/4 - 20 mA; 0 - 10 V (function selectable via IO-Link) |
| Input type: | passive |
| Input resistance: | 250 Ω |
| Accuracy/linearity: | ≤ ±0.3% of full flow |
| Temperature drift: | ≤ ±0.1% / 10°K |
| Resolution: | 12 bit |
| Reverse battery protection: | Yes (up to ± 24 V DC) |

7.7.2 Digital input signals

| | |
|-------------------------|--|
| Inputs: | Function selectable via IO-Link (see table Overview of available functions – Input and output signals) |
| Input voltage: | 24 V DC |
| Logic level "1": | > 15.3 V DC |
| Logic level "0": | < 5.8 V DC |
| Input current: | typically < 0.5 mA |

7.7.3 Analogue output signals – Control module Positioner (code S0, S5, S6)

7.7.3.1 Actual value

| | |
|-----------------------------|---|
| Output signal: | 0/4 - 20 mA; 0 - 10 V (function selectable via IO-Link) |
| Output type: | Active |
| Accuracy: | $\leq \pm 1\%$ of full flow |
| Temperature drift: | $\leq \pm 0.1\% / 10^\circ\text{K}$ |
| Load resistor: | $\leq 750\ \text{k}\Omega$ |
| Resolution: | 12 bit |
| Short-circuit proof: | Yes |

7.7.4 Digital output signals

| | |
|-----------------------------|--|
| Outputs: | Function selectable via IO-Link (see table Overview of available functions – Input and output signals) |
| Type of contact: | Push-Pull |
| Switching voltage: | Power supply U_v |
| Switching current: | $\leq 140\ \text{mA}$ |
| Short-circuit proof: | Yes |

7.7.5 Communication

| | |
|-------------------------------|--|
| Interface: | IO-Link |
| Function: | Parameterization/process data |
| Transmission rate: | 38400 baud |
| Frame type in Operate: | 2.V (eSyStep positioner, code S0, S5, S6), PDout 3Byte; PDin 3 Byte; OnRequestData 2 Byte |
| Min. cycle time: | 20 ms (eSyStep positioner, code S0, S5, S6) |
| Vendor-ID: | 401 |
| Device-ID: | 1906801 (eSyStep positioner, code S0, S5, S6), |
| Product-ID: | eSyStep Positioner (code S0, S5, S6) |
| ISDU support: | Yes |
| SIO operation: | Yes |
| IO-Link specification: | V1.1 |

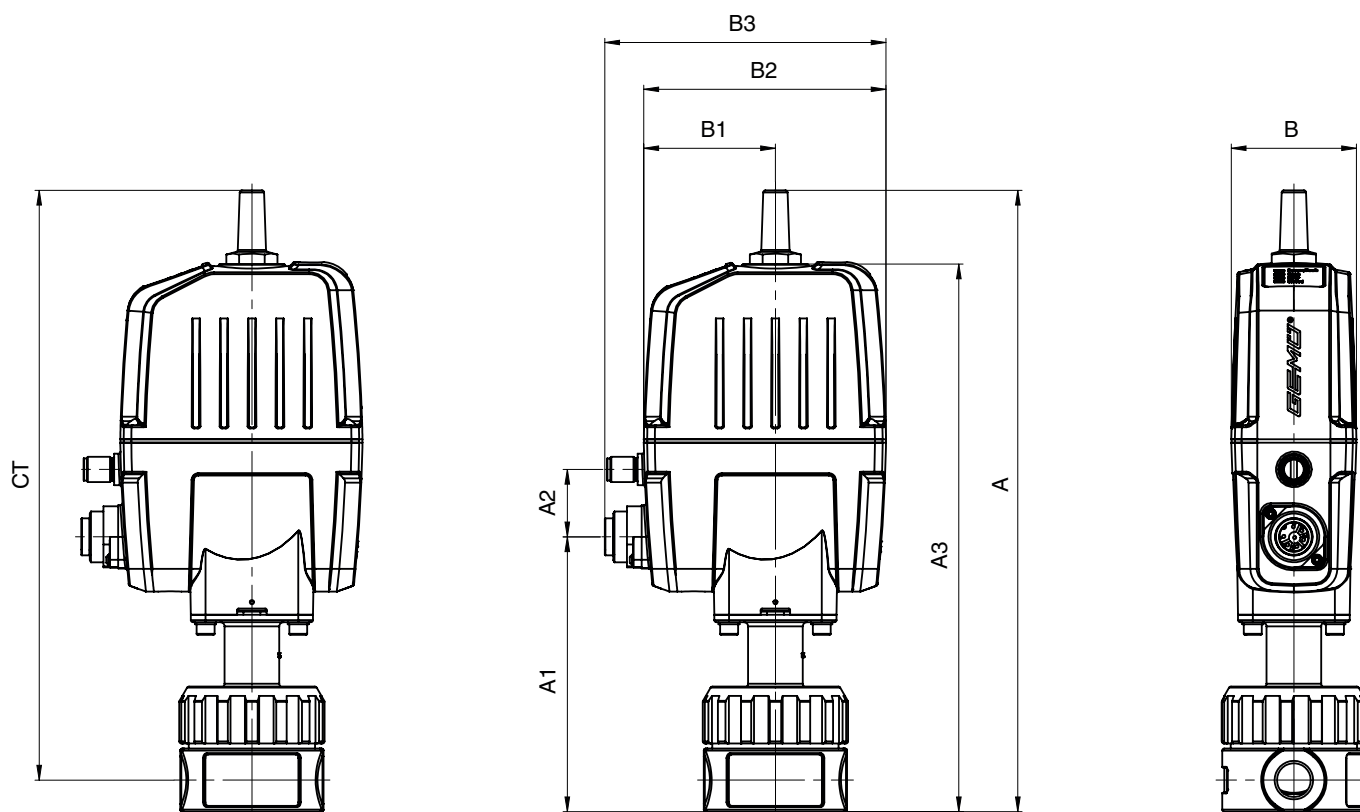
IODD files can be downloaded via <https://ioddfinder.io-link.com/> or www.gemu-group.com.

7.7.6 Behaviour in the event of an error

| | |
|------------------------|--|
| Function: | In the event of an error the valve moves to the error position. Notes: Moving to the error position is only possible with full power supply. This behaviour is not a safety position. The valve must be operated with a GEMÜ 1571 emergency power supply module (see accessories) to ensure the function in case of voltage loss. |
| Error position: | Closed, open or hold (adjustable via IO-Link). |

8 Dimensions

8.1 Installation and actuator dimensions

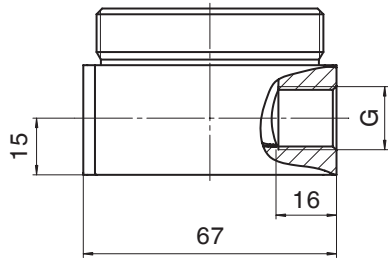


| Actuator version | A | A1 | A2 | A3 | B | B1 | B2 | B3 | CT |
|------------------|-----|-------|----|-----|------|-------|--------|--------|-----|
| 0A | 295 | 130.5 | 32 | 260 | 59.4 | 62.49 | 114.99 | 133.49 | 280 |

Dimensions in mm

8.2 Body dimensions

8.2.1 Threaded socket code 1

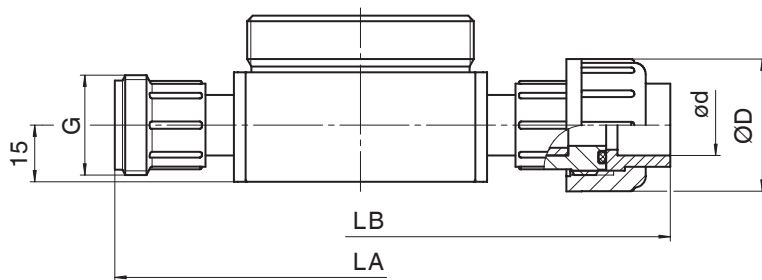


| Connection type code 1 ¹⁾ | | | |
|--------------------------------------|-----------------|-----------------|-------|
| Material code 1, 20 ²⁾ | | | |
| Nominal size | Code DN | Seat diameter | G |
| DN 10 | 3, 6, 10 | 3, 6, 10 | G 3/8 |
| DN 15 | 15 | 15 | G 1/2 |

Dimensions in mm

- 1) **Connection type**
Code 1: Threaded socket DIN ISO 228
- 2) **Valve body material**
Code 1: PVC-U, grey / regulating cone PEEK
Code 20: PVDF / regulating cone PEEK

8.2.2 Union end code 7



| Connection type code 7 ¹⁾ | | | | | | | |
|--------------------------------------|-----------------|-----------------|-------|----|----|-----|-----|
| Material code 1 ²⁾ | | | | | | | |
| Nominal size | Code DN | Seat diameter | G | øD | ød | LA | LB |
| DN 10 | 3, 6, 10 | 3, 6, 10 | G 3/4 | 35 | 16 | 130 | 164 |
| DN 15 | 15 | 15 | G 1 | 43 | 20 | 130 | 168 |

Dimensions in mm

- 1) **Connection type**
Code 1: Threaded socket DIN ISO 228
- 2) **Valve body material**
Code 1: PVC-U, grey / regulating cone PEEK

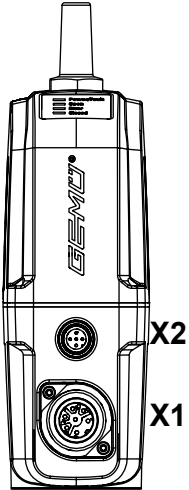
9 Electrical connection

NOTICE

Appropriate cable socket/appropriate mating connector

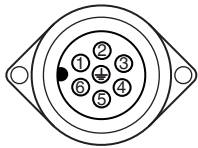
- The appropriate connectors are included for X1 and X2.

9.1 Position of the connectors



9.2 Electrical connection

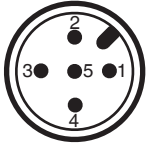
9.2.1 Connection X1



7-pin plug, Binder, type 693

| Pin | Signal name |
|-----|----------------------------|
| 1 | Uv, 24 V DC supply voltage |
| 2 | GND |
| 3 | Digital input 1 |
| 4 | Digital input 2 |
| 5 | Digital input/output |
| 6 | Digital output, IO-Link |
| 7 | n.c. |

9.2.2 Connection X2 (only for positioner design)



5-pin M12 plug, A-coded

| Pin | Signal name |
|-----|----------------------------|
| 1 | I+/U+, set value input |
| 2 | I-/U-, set value input |
| 3 | I+/U+, actual value output |
| 4 | I-/U-, actual value output |
| 5 | n.c. |

9.3 Overview of available functions – Input and output signals

NOTICE

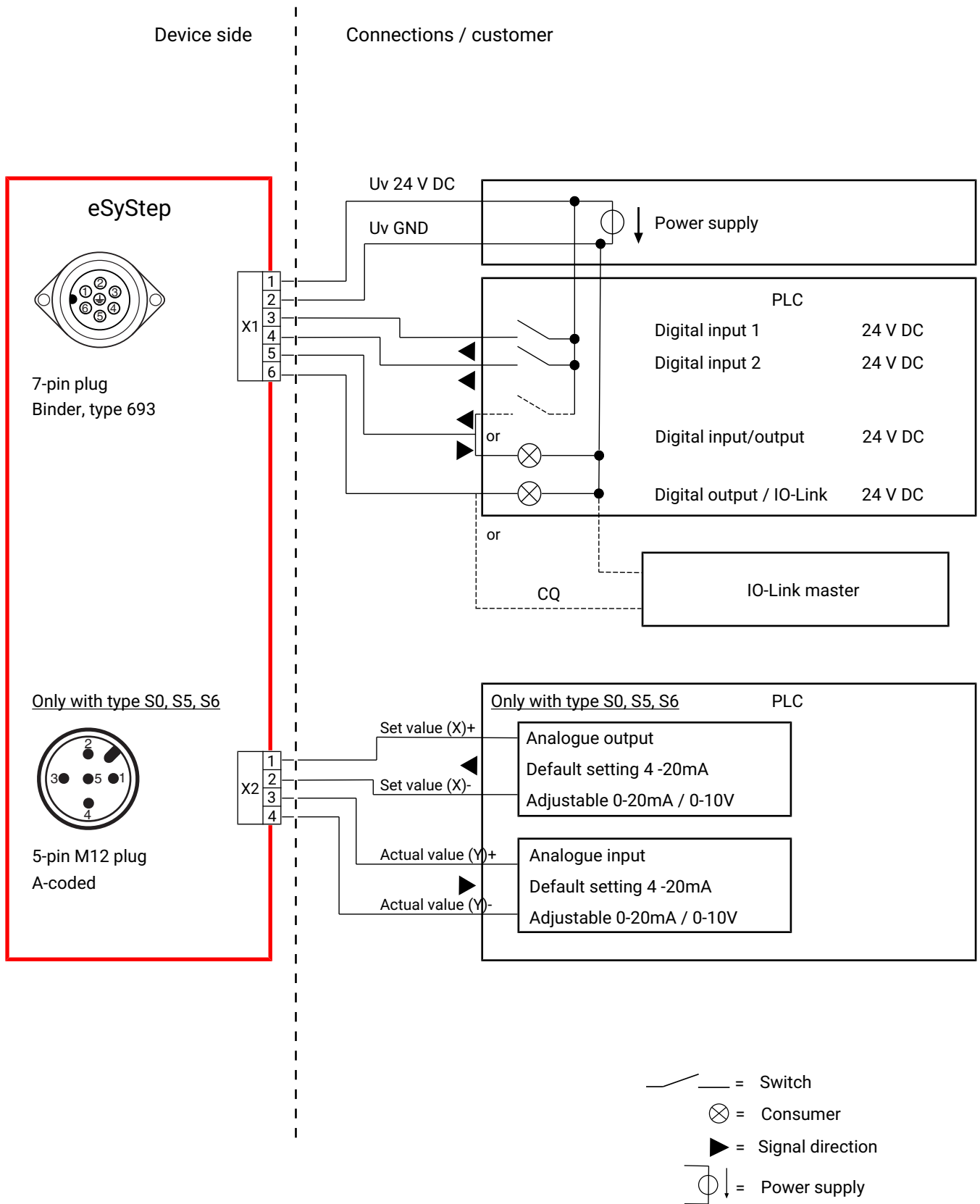
- ▶ The factory default setting "Configured for emergency power supply module" is reset to default settings when a reset is carried out.

NOTICE

- ▶ When the digital inputs for OPEN and CLOSE are activated simultaneously, the defined error position is approached.

| | Function | Control module S0 | Control module S5, S6 |
|----------------------|--|-------------------|--|
| | | Default settings | Factory default setting "Configured for emergency power supply module" |
| Digital input 1 | Off/Open/Closed/Safe/On/Initialization | Initialization | Initialization |
| Digital input 2 | Off/Open/Closed/Safe/On/Initialization | Off | Safe/On |
| Digital input/output | Open/Closed/Error/Error and warning/Initialization | Error | Error |
| Digital output | Open/Closed/Error/Error and warning | Closed | Closed |
| Analogue input | 4–20 mA/0–20 mA/0–10 V | 4–20 mA | 4–20 mA |
| Analogue output | 4–20 mA/0–20 mA/0–10 V | 4–20 mA | 4–20 mA |

9.4 Connection diagram



10 Manufacturer's information

10.1 Delivery

- Check that all parts are present and check for any damage immediately upon receipt.

The product's performance is tested at the factory. The scope of delivery is apparent from the dispatch documents and the design from the order number.

10.2 Packaging

The product is packaged in a cardboard box which can be recycled as paper.

10.3 Transport



1. Only transport the product by suitable means. Do not drop. Handle carefully.
2. After the installation dispose of transport packaging material according to relevant local or national disposal regulations / environmental protection laws.

10.4 Storage

1. Store the product free from dust and moisture in its original packaging.
2. Avoid UV rays and direct sunlight.
3. Do not exceed the maximum storage temperature (see chapter "Technical data").
4. Do not store solvents, chemicals, acids, fuels or similar fluids in the same room as GEMÜ products and their spare parts.

11 Installation in piping

11.1 Preparing for installation

| | |
|--|---|
| ⚠ WARNING | |
| The equipment is subject to pressure! | |
| <ul style="list-style-type: none"> ▶ Risk of severe injury or death ● Depressurize the plant. ● Completely drain the plant. | |
| ⚠ WARNING | |
|  | Corrosive chemicals! |
| | <ul style="list-style-type: none"> ▶ Risk of caustic burns ● Wear appropriate protective gear. ● Completely drain the plant. |
| ⚠ CAUTION | |
|  | Hot plant components! |
| | <ul style="list-style-type: none"> ▶ Risk of burns ● Only work on plant that has cooled down. |
| ⚠ CAUTION | |
| Exceeding the maximum permissible pressure. | |
| <ul style="list-style-type: none"> ▶ Damage to the product ● Provide precautionary measures against exceeding the maximum permitted pressures caused by pressure surges (water hammer). | |
| ⚠ CAUTION | |
| Use as step. | |
| <ul style="list-style-type: none"> ▶ Damage to the product ▶ Risk of slipping-off ● Choose the installation location so that the product cannot be used as a foothold. ● Do not use the product as a step or a foothold. | |
| NOTICE | |
| Suitability of the product! | |
| <ul style="list-style-type: none"> ▶ The product must be appropriate for the piping system operating conditions (medium, medium concentration, temperature and pressure) and the prevailing ambient conditions. | |

NOTICE**Tools**

- ▶ The tools required for installation and assembly are not included in the scope of delivery.
 - Use appropriate, functional and safe tools.
1. Ensure the product is suitable for the relevant application.
 2. Check the technical data of the product and the materials.
 3. Keep appropriate tools ready.
 4. Wear appropriate protective gear, as specified in the plant operator's guidelines.
 5. Observe appropriate regulations for connections.
 6. Have installation work carried out by trained personnel.
 7. Shut off plant or plant component.
 8. Secure plant or plant component against recommissioning.
 9. Depressurize the plant or plant component.
 10. Completely drain the plant (or plant component) and let it cool down until the temperature is below the media vaporization temperature and cannot cause scalding.
 11. Correctly decontaminate, rinse and ventilate the plant or plant component.
 12. Lay piping so that the product is protected against transverse and bending forces, and also from vibrations and tension.
 13. Only install the product between matching aligned pipes (see chapters below).
 14. Please note the flow direction.
 15. Please note the installation position (see chapter "Installation position").

11.2 Installation position

GEMÜ recommend installing the actuator vertically upright or vertically down to optimise the service life.

11.3 Installation with threaded sockets**NOTICE****Sealing material**

- ▶ The sealing material is not included in the scope of delivery.
 - Only use appropriate sealing material.
1. Keep thread sealant ready.
 2. Carry out preparations for installation (see chapter "Preparing for installation").
 3. Screw the threaded connections into the pipe in accordance with valid standards.
 4. Screw the body of the product onto the piping using appropriate thread sealant.
 5. Re-attach or reactivate all safety and protective devices.

11.4 Installation with union ends with insert (socket)**NOTICE****Sealing material**

- ▶ The sealing material is not included in the scope of delivery.
 - Only use appropriate sealing material.
1. Carry out preparations for installation (see chapter "Preparing for installation").
 2. Depending on the application, comply with the welding standards and the specifications of the solvent cement manufacturer for adhesive bonds.
 3. Screw the threaded connections into the piping in accordance with valid standards.
 4. Unscrew the union nut from the body of the product.
 5. Reinsert the O-ring if necessary.
 6. Push the union nut over the piping.
 7. Connect the insert with the piping by solvent cementing/welding.
 8. Screw the union nut back onto the body of the product.
 9. Connect the other side of the body of the product with the piping in the same way.
 10. Reactivate all safety and protective devices.

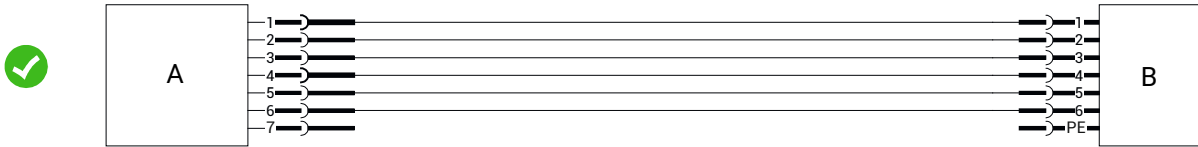
12 Specific data IO-Link (pin 6)

IO-Link process data and parameters can be set via pin 6 for the motorized linear actuator eSyStep. The assignment of the connectors and the current consumption of the actuator are non-compliant with the IO-Link specification.

12.1 Operation on IO-Link

12.1.1 Operation on PLC as a 24 V device

The motorized actuator GEMÜ eSyStep can be operated directly in a PLC control unit without limitations. Technical data of the product and of PLC must be complied with.



| Item | Name |
|------|-------------------------|
| A | eSyStep |
| B | PLC with supply voltage |

12.1.2 Operation on PLC and additional parameterization via USB master with galvanic isolation

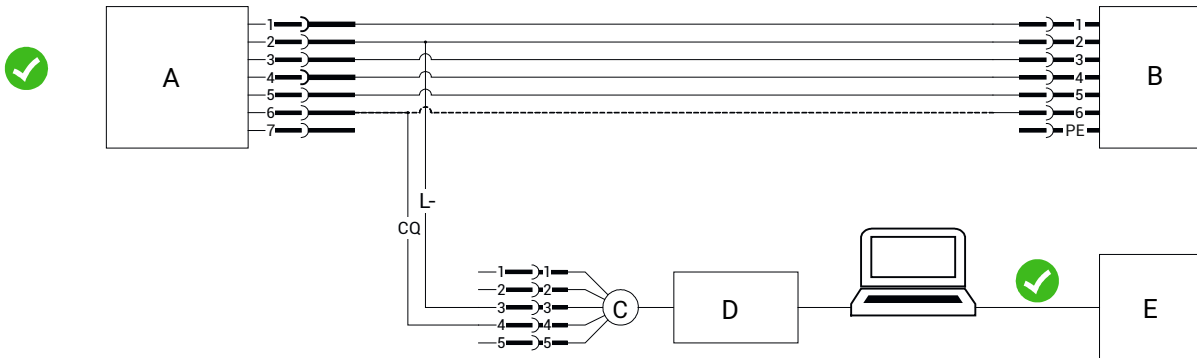
Basics

When operating the product on a PLC control unit, a parameterization via a USB IO-Link master is possible at the same time. In this case, a galvanically isolated USB interface must be used. The PC/laptop can be used as usual and all peripheral devices can remain connected.

Connection

1. Connect **pin 3 (L-)** of the master with **pin 2 (GND)** of the product.
2. Connect **pin 4 (CQ)** of the master with **pin 6** of the product.

During IO-Link operation, pin 6 **cannot** be evaluated by the PLC control unit as an output signal.



| Item | Name |
|------|-------------------------------------|
| A | eSyStep |
| B | PLC with supply voltage |
| C | USB IO-Link Master |
| D | Galvanically isolated USB interface |
| E | Mains plug – laptop |

12.1.3 Operation on PLC and additional parameterization via USB master without galvanic isolation

Basics

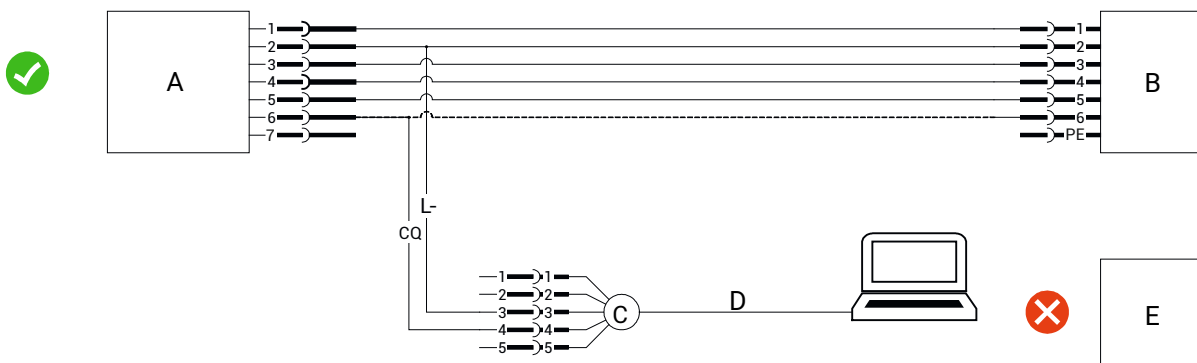
Only one laptop can be used if no galvanic isolation is available for the USB interface during communication via a USB IO-Link master. No other peripheral devices may be connected to the laptop. The laptop may only be operated without a power supply unit.

If further peripheral devices and the power supply unit are not disconnected, different ground potentials to the product can result in excessive compensating currents. These can damage the USB interface of the laptop, the connected peripheral devices or the USB IO-Link master.

Connection

1. Connect **pin 3 (L-)** of the master with **pin 2 (GND)** of the product.
2. Connect **pin 4 (CQ)** of the master with **pin 6** of the product.

During IO-Link operation, pin 6 **cannot** be evaluated by the PLC control unit as an output signal.



| Item | Name |
|------|-------------------------|
| A | eSyStep |
| B | PLC with supply voltage |
| C | USB IO-Link Master |
| D | USB interface |
| E | Mains plug – laptop |

12.1.4 Direct operation on the IO-Link master

Basics

If the product is to be operated on an IO-Link master, it must be ensured that the **GND** levels in the product and in the IO-Link master have the same potential so that there are no compensating currents which would cause damage in the system. This can be made possible using several procedures.

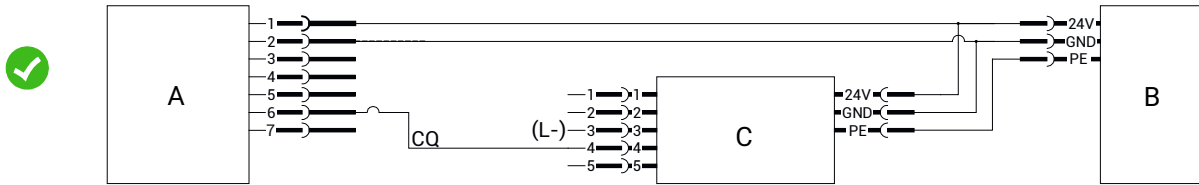
12.1.4.1 Identical power supply

The IO-Link master is operated from the same power supply as the product.

- Connect **pin 4 (CQ)** of the master with **pin 6** of the product.

However, **pin 3 (L-)** of the master should **not** be connected to **pin 2 (GND)** of the product under any circumstances.

This prevents a ground loop and no unexpected high currents can occur via **pin 3 (L-)** which can damage the master.



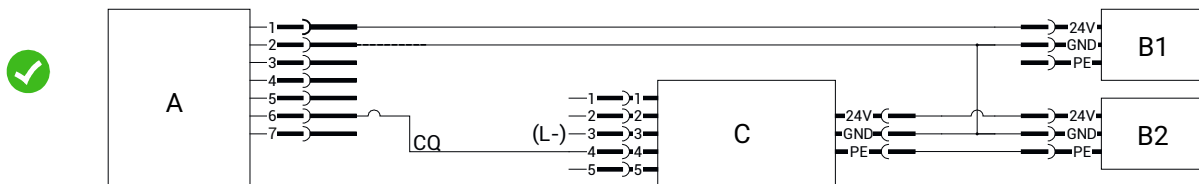
| Item | Name |
|------|--------------------|
| A | eSyStep |
| B | Supply voltage |
| C | USB IO-Link Master |

12.1.4.2 Separate power supply, GND-connected

The IO-Link master and the product can also be operated with different power supply sources if the **GND** of both power supply sources is connected. In this case, the master is connected as when the power supply is identical

- Connect **pin 4 (CQ)** IO-Link master with **pin 6** of the product.

Do **not** connect (**pin 3**) L- IO-Link master.



| Item | Name |
|-----------|--------------------|
| A | eSyStep |
| B1 and B2 | Supply voltages |
| C | USB IO-Link Master |

12.2 Process data

The motorized linear actuator has access to process data via the IO-Link. This is transmitted in cycles with every IO-Link telegram.

Master → Device

| Name | Bit | Values |
|----------------------|----------|---|
| Drive go Open | 0 | 0 → Actuator does not move into position Open |
| | | 1 → Actuator moves into position Open |
| Drive go Close | 1 | 0 → Actuator does not move into position Closed |
| | | 1 → Actuator moves into position Closed |
| Start initialization | 2 | 0 → No initialization |
| | | 1 → Start initialization |
| Locate | 3 | 0 → Off |
| | | 1 → On |
| Setpoint analog | 8 ... 23 | Setpoint in the range 0 ... 1000 |

Device → Master

| Name | Bit | Values |
|-----------------------|----------|---|
| Valve position Open | 0 | 0 → Process valve not in Open position |
| | | 1 → Process valve in Open position |
| Valve position Close | 1 | 0 → Process valve not in Closed position |
| | | 1 → Process valve in Closed position |
| Operating mode | 2 | 0 → Normal operation |
| | | 1 → Initialization mode |
| Valve position analog | 8 ... 23 | Position of the valve in the range 0 ... 1000 |

12.3 Parameter overview

NOTICE

► All IO-Link parameters that contain sub-indexes can also be addressed in bundles via sub-index 0.

| Index | Sub-Index | Access rights | Index name | Parameter | Function | Default settings | Setting options |
|-------|-----------|---------------|--------------------------------|--------------------------|--|---|---|
| 0x02 | 0 | W | System command | | Transmission of commands for block parameterization and data storage | | 0x01 to 0x06 0x82 |
| 0x03 | 1 | R/W | Data storage index | Data storage cmd | Saving and restoring parameter data for device identical in construction | | |
| | 2 | RO | | State property | | | |
| | 3 | RO | | Data storage size | | | |
| | 4 | RO | | Parameter checksum | | | |
| | 5 | RO | | Index list | | | |
| 0x0C | 1 | R/W | Device access locks | Parameter (write) access | Parameter write protection | | 0 → unlocked 1 → locked |
| | 2 | R/W | | Data storage | Data memory | | 0 → unlocked 1 → locked |
| | 3 | R/W | | Local parameterization | Local parameterization | | 0 → unlocked 1 → locked |
| | 4 | R/W | | Local user interface | Local user interface | | 0 → unlocked 1 → locked |
| 0x0D | 0 | RO | Profile characteristics | | Supported Device Profile IDs, Common Application Profile IDs, Function Class IDs | 0x8000 (Device Ident. Objects) 0x8002 (Process Data Mapping) 0x8003 (Diagnosis) 0x8100 (Ext. Identification) | |
| 0x0E | 0 | RO | Process data input descriptor | | Data format of input process data | | 0x00 (Bit offset) 0x03 (Type Length) 0x01 (DataType -> BoolT) |
| 0x0F | 0 | RO | Process data output descriptor | | Data format of output process data | | 0x00 (Bit offset) 0x04 (Type Length) 0x01 (DataType -> BoolT) |
| 0x10 | 0 | RO | Vendor name | | Read out manufacturer name | | "GEMUE" |
| 0x12 | 0 | RO | Product name | | Read out device name | | "eSyStep Positioner" |
| 0x13 | 0 | RO | Product ID | | Read out product ID | | "eSyStep Positioner" |
| 0x15 | 0 | RO | Serial number | | Read out serial number | | "XXXXXXXX/YYYY" |
| 0x16 | 0 | RO | Hardware revision | | Read out hardware version | | "Rev. XX/XX" |
| 0x17 | 0 | RO | Firmware revision | | Read out software version | | "V X.X.X.X." |

| Index | Sub-Index | Access rights | Index name | Parameter | Function | Default settings | Setting options |
|-------|-----------|---------------|--------------------------------|---------------------|--|------------------|---|
| 0x18 | 0 | R/W | Application specific tag | | Text with 32 characters can be entered | | „*****“ |
| 0x19 | 0 | R/W | Function tag | | Text with 32 characters can be entered | | „*****“ |
| 0x1A | 0 | R/W | Location tag | | Text with 32 characters can be entered | | „*****“ |
| 0x24 | 0 | RO | Device status | | (Simple) device status | | 0 → Operating properly 2 → Out of specification 4 → Failure |
| 0x25 | 0 | RO | Device status | | Detailed device status | | |
| 0x4B | 1 | R/W | Function digital inputs | Input 1 | Configure digital input 1 | 4 | 0 → Off 1 → Open 2 → Close 3 → Safe/On 4 → Init |
| | 2 | R/W | | Input 2 | Configure digital input 2 | 0 | 0 → Off 1 → Open 2 → Close 3 → Safe/On 4 → Init |
| 0x4C | 1 | R/W | Function digital in-/output 1 | In- / output 1 | Configure digital inputs/outputs | 2 | 0 → Output open 1 → Output close 2 → Output error 3 → Output Error & warning 4 → Input init |
| | 2 | R/W | | Type in- / output 1 | Configure type of digital inputs/outputs | 0 | 0 → Push-pull 1 → NPN 2 → PNP |
| 0x4D | 0 | R/W | Function digital output 2 | | Configure digital output | 1 | 0 → Output open 1 → Output close 2 → Output error 3 → Output error & warning |
| 0x4E | 1 | R/W | Logic digital inputs / outputs | Input 1 | Configure logical digital input 1 | 0 | 0 → Active high 1 → Active low |
| | 2 | R/W | | Input 2 | Configure logical digital input 2 | 0 | 0 → Active high 1 → Active low |
| | 3 | R/W | | Input / output 1 | Configure logical digital input/output | 0 | 0 → Active high 1 → Active low |
| | 4 | R/W | | Output 2 | Configure logical digital output | 0 | 0 → Active high 1 → Active low |
| 0x4F | 1 | R/W | Error action | Error action | Set safety position | 2 | 0 → Hold 1 → Open 2 → Close |

| Index | Sub-Index | Access rights | Index name | Parameter | Function | Default settings | Setting options |
|-------|-----------|---------------|----------------------------|--------------------------|--|------------------|-------------------------------|
| | 2 | R/W | | Error time | Determine time from error detection to error message | 1 (0.1s) | 1 ... 1000 (0.1s ... 100s) |
| 0x50 | 1 | R/W | Basic settings | Inversion of LED colours | Activate / deactivate inversion of LEDs | 0 | 0 → Standard 1 → Inversed |
| | 2 | R/W | | On site initialization | Activate / deactivate on site initialization | 0 | 0 → Enabled 1 → Disabled |
| | 3 | R/W | | Operating mode | Operating mode change-over (positioner; ON/OFF) | 0 | 0 → Positioner 1 → On/Off |
| | 4 | R/W | | IO-Link process data | Activate/deactivate use of IO-Link process data | 0 | 0 → Disabled 1 → Enabled |
| 0x51 | 1 | R/W | Actuator position feedback | Open request | Request valve position OPEN | 900 (90.0%) | 30 ... 970 (3.0 ... 97.0%) |
| | 2 | R/W | | Close request | Request valve position CLOSED | 100 (10.0%) | 30 ... 970 (3.0 ... 97.0%) |
| | 3 | RO | | Open real | Real valve position OPEN | | 0 ... 4095 |
| | 4 | RO | | Close real | Real valve position CLOSED | | 0 ... 4095 |
| 0x53 | 1 | RO | Initialized positions | Open | Analog value valve position OPEN | | 0 ... 4095 |
| | 2 | RO | | Close | Analogue value valve position CLOSED | | 0 ... 4095 |
| | 3 | RO | | Stroke | Read out the analog value for stroke (difference between OPEN and CLOSED). | | 0 ... 4095 |
| 0x55 | 1 | RO | Calibrated positions | Max. | OPEN end position | | 0 ... 4095 |
| | 2 | RO | | Min. | CLOSED end position | | 0 ... 4095 |
| 0x60 | 1 | RO | Analog values | Potentiometer | Analog value potentiometer | | 0 ... 4095 |
| | 2 | RO | | Supply voltage | Analog value supply voltage | | 0 ... 4095 |
| | 3 | RO | | Temperature | Analog value temperature sensor | | 0 ... 4095 |
| | 4 | RO | | Set value (W) | Analog value set value signal | | 0 ... 4095 |
| 0x62 | 1 | RO | Operating times | Open | Operating time OPEN | 0 | 0 to 255 (0 to 25.5s) |
| | 2 | RO | | Close | Operating time CLOSE | 0 | 0 to 255 (0 to 25.5s) |
| 0x90 | 2 | R/W | Drive sets | Force | Force, dependent on valve used | | 1 ... 6 |
| | 3 | R/W | | Force initialization | Force during initialization, dependent on valve used | | 1 ... 6 |

| Index | Sub-Index | Access rights | Index name | Parameter | Function | Default settings | Setting options |
|-------|-----------|---------------|---------------------|-----------------|--|------------------|--|
| 0xB0 | 1 | R/W | Control parameters | P amplification | P component – positioner | 200 | 1 ... 200 (0.1 ... 20.0) |
| | 2 | R/W | | D amplification | D component – positioner | 10 | 1 ... 200 (0.1 ... 20.0) |
| | 3 | R/W | | Derivative time | Delay constant | 0 | 0 to 100 (0 to 100 s) |
| | 4 | R/W | | Dead band | Permissible system deviation | 10 | 1 ... 250 (0.1 ... 25.0 %) |
| 0xB2 | 1 | R/W | Open / close tight | Open tight | Sealing function valve position OPEN | 995 | 800 ... 1000 (80.0 ... 100.0 %) |
| | 2 | R/W | | Close tight | Sealing function valve position CLOSED | 5 | 0 ... 200 (0 ... 20.0 %) |
| 0xB4 | 1 | R/W | Split range | Split start | Set set value start | 0 | 0 to Split End – 100 (0.0 to Split End – 10.0%) |
| | 2 | R/W | | Split end | Set set value end | 1000 | Split Start + 100 to 1000 (Split Start + 10.0% to 100.0%) |
| 0xB6 | 1 | R/W | Stroke limiter | Max pos | Stroke limiter valve position OPEN | 1000 | Min Pos to 1000 (Min Pos to 100.0%) |
| | 2 | R/W | | Min pos | Stroke limiter valve position CLOSED | 0 | 0 to Max Pos (0.0% to Max Pos) |
| 0xB8 | 1 | R/W | Set value (W) input | Direction | Set value direction set value input | 0 | 0 → Rise (rising) 1 → Fall (falling) |
| | 2 | R/W | | Type | Determine signal input | 1 | 0 → 0 to 20 mA 1 → 4 to 20 mA 2 → 0 to 10 V |
| | 3 | R/W | | I min | Determine minimum current input | 35 | 0 to 40 (0 to 4.0 mA) |
| | 4 | R/W | | I max | Determine maximum current input | 205 | 200 to 220 (20.0 to 22.0 mA) |
| | 5 | R/W | | U max | Determine maximum current input | 103 | 100 to 110 (10.0 to 11.0 V) |
| 0xBA | 1 | R/W | Analog output | Direction | Set value direction set value output | 0 | 0 → Rise (rising) 1 → Fall (falling) |
| | 2 | R/W | | Type | Determine signal output | 1 | 0 → 0 to 20 mA 1 → 4 to 20 mA 2 → 0 to 10 V |
| | 3 | R/W | | Min. | Determine minimum signal output | 0 | 0 to Max (0.0% to Max) |
| | 4 | R/W | | Max | Determine maximum signal output | 1000 | Min to 1000 (Min to 100%) |

12.4 Parameter

The motorized linear actuator eSyStep supports parameter data in the ISDU (Index Service Data Unit). Parameters can be transmitted non-cyclically with ISDU. Block parametrization and data storage are also supported.

12.4.1 System command

The commands required for block parametrization and data storage are transmitted with the **System command** parameter.

| Index | Sub-Index | Off-set | Access Rights | Length | Index name | Parameter | Type | Values |
|-------|-----------|---------|---------------|--------|-----------------------|-----------|-----------|----------------------|
| 0x02 | 0 | 0 | W | 1 byte | System command | | UIntegerT | 0x01 to 0x06 0x82 |

Description of parameter values

| Index name | Parameter | Values | Description |
|----------------|-----------|--------------|-------------------------------------|
| System command | | 0x01 to 0x06 | Access to IO-Link |
| | | 0x82 | Reset product to default settings * |

* Except the index 0x90 settings – Drive Sets, these are not reset.

12.4.2 Data storage index

Changes to the parameters are stored in the IO-Link master with the **Data storage index** parameter and restored with a IO-Link device identical in construction when replaced. To do so, the **Data storage** parameter must be enabled in the Device access locks (see Chapter 12.4.3, page 31) parameter. The parameters are automatically replaced via the IO-Link master.

| Index | Sub-Index | Off-set | Access Rights | Length | Index name | Parameter | Type | Values |
|-------|-----------|---------|---------------|----------|---------------------------|---------------------|--------------|--------|
| 0x03 | 1 | 0 | R/W | 1 byte | Data storage index | Data Storage Cmd | UIntegerT8 | |
| | 2 | 8 | RO | 1 byte | | State Property | UIntegerT8 | |
| | 3 | 16 | RO | 4 bytes | | Data Storage Size | UIntegerT32 | |
| | 4 | 48 | RO | 4 bytes | | Parameter Check-sum | UIntegerT32 | |
| | 5 | 80 | RO | 41 bytes | | Index List | OctetStringT | |

12.4.3 Device access locks

Access to the parameters can be controlled with the **Device access locks** parameter.

| Index | Sub-Index | Off-set | Access Rights | Length | Index name | Parameter | Type | Values |
|-------|-----------|---------|---------------|--------|----------------------------|--------------------------|----------|--------|
| 0x0C | 1 | 0 | R/W | 1 bit | Device access locks | Parameter (write) access | BooleanT | 0 |
| | | | | | | | | 1 |
| | 2 | 1 | R/W | 1 bit | | Data storage | BooleanT | 0 |
| | | | | | | | | 1 |
| | 3 | 2 | R/W | 1 bit | | Local parameterization | BooleanT | 0 |
| | | | | | | | | 1 |
| | 4 | 3 | R/W | 1 bit | | Local user interface | BooleanT | 0 |
| | | | | | | | | 1 |

Description of parameter values

| Index name | Parameter | Values | Description |
|---------------------|------------------------|--------|--|
| Device access locks | Local user interface | 0 | Enable write access |
| | | 1 | Block write access |
| | Data storage | 0 | Enable storage of parameter data in the IO-Link master |
| | | 1 | Block storage of parameter data in the IO-Link master |
| | Local parameterization | 0 | Enable local parameterization |
| | | 1 | Block local parameterization |
| | Local user interface | 0 | Enable local user interface |
| | | 1 | Block local user interface |

12.4.4 Profile Characteristics

The **Profile Characteristics** parameter specifies which DeviceProfileIDs, CommonApplicationProfileIDs and FunctionClassIDs are supported.

| Index | Sub-Index | Off-set | Access Rights | Length | Index name | Parameter | Type | Values |
|-------|-----------|---------|---------------|---------|--------------------------------|-----------|--------|--------|
| 0x0D | 0 | 0 | RO | 8 bytes | Profile Characteristics | | ArrayT | 0x8000 |
| | | | | | | | | 0x8002 |
| | | | | | | | | 0x8003 |
| | | | | | | | | 0x8100 |

Description of parameter values

| Index name | Parameter | Values | Description |
|-------------------------|-----------|--------|-------------------------------|
| Profile Characteristics | | 0x8000 | Device identification objects |
| | | 0x8002 | Process data mapping |
| | | 0x8003 | Diagnostics |
| | | 0x8100 | External identification |

12.4.5 ProcessData Input Descriptor

The **ProcessData Input Descriptor** parameter describes the data format of the process data. Thus the master receives information about the process data without IODD.

| Index | Sub-Index | Off-set | Access Rights | Length | Index name | Parameter | Type | Values |
|-------|-----------|---------|---------------|--------|-------------------------------------|-----------|--------|--------|
| 0x0E | 0 | 0 | RO | 3 byte | ProcessData Input Descriptor | | ArrayT | 0x00 |
| | | | | | | | | 0x03 |
| | | | | | | | | 0x01 |

Description of parameter values

| Index name | Parameter | Values | Description |
|------------------------------|-----------|--------|--------------------|
| ProcessData Input Descriptor | | 0x00 | Bit offset |
| | | 0x03 | Type length |
| | | 0x01 | Data type -> BoolT |

12.4.6 ProcessData Output Descriptor

The **ProcessData Output Descriptor** parameter describes the data format of the process data. Thus the master receives information about the process data without IODD.

| Index | Sub-Index | Off-set | Access Rights | Length | Index name | Parameter | Type | Values |
|-------|-----------|---------|---------------|--------|--------------------------------------|-----------|--------|--------|
| 0x0F | 0 | 0 | RO | 3 byte | ProcessData Output Descriptor | | ArrayT | 0x00 |
| | | | | | | | | 0x04 |
| | | | | | | | | 0x01 |

Description of parameter values

| Index name | Parameter | Values | Description |
|-------------------------------|-----------|--------|--------------------|
| ProcessData Output Descriptor | | 0x00 | Bit offset |
| | | 0x04 | Type length |
| | | 0x01 | Data type -> BoolT |

12.4.7 Vendor name

The manufacturer name can be read out in ASCII format with the **Vendor name** parameter.

| Index | Sub-Index | Off-set | Access Rights | Length | Index name | Parameter | Type | Values |
|-------|-----------|---------|---------------|---------|--------------------|-----------|---------|---------|
| 0x10 | 0 | 0 | RO | 5 bytes | Vendor name | | StringT | "GEMUE" |

12.4.8 Product name

The device name can be read out in ASCII format with the **Product name** parameter.

| Index | Sub-Index | Off-set | Access Rights | Length | Index name | Parameter | Type | Values |
|-------|-----------|---------|---------------|---------|---------------------|-----------|---------|----------------------|
| 0x12 | 0 | 0 | RO | 18 byte | Product name | | StringT | "eSyStep Positioner" |

12.4.9 Product ID

The product ID can be read out in ASCII format with the **Product ID** parameter.

| Index | Sub-Index | Off-set | Access Rights | Length | Index name | Parameter | Type | Values |
|-------|-----------|---------|---------------|---------|-------------------|-----------|---------|----------------------|
| 0x13 | 0 | 0 | RO | 18 byte | Product ID | | StringT | "eSyStep Positioner" |

12.4.10 Serial number

The serial number of the device can be read out with the **Serial number** parameter.

The serial number consists of an 8-digit traceability number, a forward slash and a 4-digit index.

| Index | Sub-Index | Off-set | Access Rights | Length | Index name | Parameter | Type | Values |
|-------|-----------|---------|---------------|----------|----------------------|-----------|---------|-----------------|
| 0x15 | 0 | 0 | RO | 13 bytes | Serial number | | StringT | "XXXXXXXX/YYYY" |

12.4.11 Hardware revision

The circuit boards' version can be read out with the **Hardware revision** parameter.

The hardware version is displayed with the 2-digit version number of the basic assembly and the 2-digit version number of the OPEN/CLOSED or positioner assembly.

| Index | Sub-Index | Off-set | Access Rights | Length | Index name | Parameter | Type | Values |
|-------|-----------|---------|---------------|----------|--------------------------|-----------|---------|--------------|
| 0x16 | 0 | 0 | RO | 10 bytes | Hardware revision | | StringT | "Rev. XX/XX" |

12.4.12 Firmware revision

The software version can be read out with the **Firmware revision** parameter.

| Index | Sub-Index | Off-set | Access Rights | Length | Index name | Parameter | Type | Values |
|-------|-----------|---------|---------------|---------|--------------------------|-----------|---------|-------------|
| 0x17 | 0 | 0 | RO | 21 byte | Firmware revision | | StringT | "V X.X.X.X" |

12.4.13 Application specific tag

A text with 32 characters can be stored in the device with the **Application specific tag** parameter.

For example, installation location, function, installation date, etc.

| Index | Sub-Index | Off-set | Access Rights | Length | Index name | Parameter | Type | Values |
|-------|-----------|---------|---------------|----------|---------------------------------|-----------|---------|----------|
| 0x18 | 0 | 0 | R/W | 32 bytes | Application specific tag | | StringT | "***** " |

12.4.14 Function tag

A text with 32 characters can be stored in the device with the **Function tag** parameter. For example, installation location, function, installation date, etc.

| Index | Sub-Index | Off-set | Access Rights | Length | Index name | Parameter | Type | Values |
|-------|-----------|---------|---------------|----------|---------------------|-----------|---------|---------|
| 0x19 | 0 | 0 | R/W | 32 bytes | Function tag | | StringT | „*****“ |

12.4.15 Location tag

A text with 32 characters can be stored in the device with the **Location tag** parameter. For example, installation location, function, installation date, etc.

| Index | Sub-Index | Off-set | Access Rights | Length | Index name | Parameter | Type | Values |
|-------|-----------|---------|---------------|----------|---------------------|-----------|---------|---------|
| 0x1A | 0 | 0 | R/W | 32 bytes | Location tag | | StringT | „*****“ |

12.4.16 Device Status

The simple device status can be read out with the **Device Status** parameter.

| Index | Sub-Index | Off-set | Access Rights | Length | Index name | Parameter | Type | Values |
|-------|-----------|---------|---------------|--------|----------------------|-----------|---------|-------------|
| 0x24 | 0 | 0 | RO | 1 byte | Device Status | | uint: 8 | 0 2 4 |

Description of parameter values

| Index name | Parameter | Values | Description |
|---------------|-----------|--------|---|
| Device Status | | 0 | The valve is operating properly |
| | | 2 | The valve is operated outside the specification |
| | | 4 | The valve is in fault status |

12.4.17 Detailed Device Status

The detailed device status can be read out with the **Detailed Device Status** parameter. The values of the array correspond to the IO-Link events (see chapter 12.5 Events).

| Index | Sub-Index | Off-set | Access Rights | Length | Index name | Parameter | Type | Values |
|-------|-----------|---------|---------------|---------|-------------------------------|-----------|--------|-------------------------|
| 0x25 | 0 | 0 | RO | 39 byte | Detailed Device Status | | ArrayT | See chapter 12.5 Events |

Description of parameter values

| Index name | Parameter | Values | Description |
|------------------------|-----------|--------|-------------------------|
| Detailed Device Status | | | See chapter 12.5 Events |

12.4.18 Actuator size

The actuator size can be read out in numbers with the **Actuator size** parameter.

| Index | Sub-Index | Offset | Access Rights | Length | Index name | Parameter | Type | Default | Values |
|-------|-----------|--------|---------------|--------|----------------------|-----------|---------|-------------------------------------|--|
| 0x40 | 0 | 0 | RO | 2 bits | Actuator size | | uint: 8 | Depending on the actuator size used | 0 → size 0 1 → size 1 2 → size 2 |

12.4.19 Function digital inputs

The functions of the digital inputs can be configured with the **Function digital inputs** parameter.

| Index | Sub-Index | Offset | Access Rights | Length | Index name | Parameter | Type | Default | Values |
|-------|-----------|--------|---------------|--------|--------------------------------|-----------|--------|----------|----------|
| 0x4B | 1 | 0 | R/W | 3 bits | Function digital inputs | Input 1 | uint:8 | 4 | 0 |
| | | | | | | | | | 1 |
| | | | | | | | | | 2 |
| | | | | | | | | | 3 |
| | | | | | | | | | 4 |
| | 2 | 8 | R/W | 3 bits | | Input 2 | uint:8 | 0 | 0 |
| | | | | | | | | | 1 |
| | | | | | | | | | 2 |
| | | | | | | | | | 3 |
| | | | | | | | | 4 | |

Description of parameter values

| Index name | Parameter | Values | Description |
|-------------------------|-----------|--------|--|
| Function digital inputs | Input 1 | 0 | (Off) Input without function. |
| | | 1 | (Open) In case of the corresponding signal, the actuator moves in the OPEN direction. If the other input (Digital Input 2) is configured as "Close", the actuator stops when the inputs are not actuated. If the other input is not configured as "Close", the actuator moves independently in the CLOSED direction when the "Open" input is not actuated. |
| | | 2 | (Close) In case of the corresponding signal, the actuator moves in the CLOSED direction. If the other input (Digital Input 2) is configured as "Open", the actuator stops when the inputs are not actuated. If the other input is not configured as "Open", the actuator moves independently in the OPEN direction when the "Close" input is not actuated. |
| | | 3 | (Safe / On) Safety position of the device is triggered. The device operates normally if the signal is active. If there is no signal, the device moves into the safety position. The safety position is defined by the parameter Error Action (index 0x4F (see "Error Action")). |
| | | 4 | (Init) Input can be used as an initialization input. |
| | | 0 | (Off) Input without function. |
| | Input 2 | 1 | (Open) In case of the corresponding signal, the actuator moves in the OPEN direction. If the other input (Digital Input 1) is configured as "Close", the actuator stops when the inputs are not actuated. If the other input is not configured as "Close", the actuator moves independently in the CLOSED direction when the "Open" input is not actuated. |
| | | 2 | (Close) In case of the corresponding signal, the actuator moves in the CLOSED direction. If the other input (Digital Input 1) is configured as "Open", the actuator stops when the inputs are not actuated. If the other input is not configured as "Open", the actuator moves independently in the OPEN direction when the "Close" input is not actuated. |
| | | 3 | (Safe/On) Safety position of the device is triggered. The device operates normally if the signal is active. If there is no signal, the device moves into the safety position. The safety position is defined by the parameter Error Action (index 0x4F (see "Error Action")). |
| | | 4 | (Init) Input can be used as an initialization input. |

12.4.20 Function digital in- / output 1

The function of the input/output can be set with the **Function Digital In-/Output 1** (subindex 1) parameter.

| Index | Sub-Index | Offset | Access Rights | Length | Index name | Parameter | Type | Default | Values |
|-------|-----------|--------|---------------|--------|--|---------------------|--------|----------|--------|
| 0x4C | 1 | 0 | R/W | 3 bits | Function digital in- / output 1 | In- / output 1 | uint:8 | 2 | 0 |
| | | | | | | | | | 1 |
| | | | | | | | | | 2 |
| | | | | | | | | | 3 |
| | | | | | | | | | 4 |
| | 2 | 8 | R/W | 3 bits | | Type in- / output 1 | uint:8 | 0 | 0 |
| | 1 | | | | | | | | |
| 2 | | | | | | | | | |

Description of parameter values

| Index name | Parameter | Values | Description |
|---------------------------------|-------------------|--------|--|
| Function digital in- / output 1 | In- / output | 0 | (Output Open) Signal is output with the corresponding valve position. Detection of Open depends on the setting of the parameter Position Feedback (index 0x51 (see "Actuator position feedback", page 41)) and a correct initialization. |
| | | 1 | (Output Close) Signal is output with the corresponding valve position. Detection of Close depends on the setting of the parameter Position Feedback (index 0x51 (see "Actuator position feedback", page 41)) and a correct initialization. |
| | | 2 | (Output Error) Only output error detection. |
| | | 3 | (Output Error & Warning) Output error and warnings. |
| | | 4 | (Input Init) Configure input/output as initialization input. |
| | Type in- / output | 0 | (Push-Pull) Configure output as Push-Pull. |
| | | 1 | (NPN) Configure output as NPN. |
| | | 2 | (PNP) Configure output as PNP. |

12.4.21 Function digital output 2

The output function can be set with the **Function digital output 2** parameter.

| Index | Sub-Index | Offset | Access Rights | Length | Index name | Parameter | Type | Default | Values | |
|-------|-----------|--------|---------------|--------|----------------------------------|-----------|--------|----------|--------|---|
| 0x4D | 0 | 0 | R/W | 2 bits | Function digital output 2 | | uint:8 | 2 | 0 | |
| | | | | | | | | | | 1 |
| | | | | | | | | | | 2 |
| | | | | | | | | | | 3 |

Description of parameter values

| Index name | Parameter | Values | Description |
|-------------------------|-----------|--------|--|
| Function digital output | | 0 | (Output Open) Signal is output with the corresponding valve position. Detection of Open depends on the setting of the parameter Position Feedback (index 0x51 (see "Actuator position feedback", page 41)) and a correct initialization. |
| | | 1 | (Output Close) Signal is output with the corresponding valve position. Detection of Close depends on the setting of the parameter Position Feedback (index 0x51 (see "Actuator position feedback", page 41)) and a correct initialization. |
| | | 2 | (Output Error) Only output error detection. |
| | | 3 | (Output Error & Warning) Output error and warnings. |

12.4.22 Logic digital inputs / outputs

The inputs and outputs can be inverted with the **Logic digital inputs/outputs** parameters.

| Index | Sub-Index | Offset | Access Rights | Length | Index name | Parameter | Type | Default | Values |
|-------|-----------|--------|---------------|--------|---------------------------------------|------------------|---------|---------|--------|
| 0x4E | 1 | 0 | R/W | 1 bit | Logic digital inputs / outputs | Input 1 | Boolean | 0 | 0 |
| | | | | | | | | | 1 |
| | 2 | 1 | R/W | 1 bit | | Input 2 | Boolean | 0 | 0 |
| | | | | | | | | | 1 |
| | 3 | 2 | R/W | 1 bit | | Input / output 1 | Boolean | 0 | 0 |
| | | | | | | | | | 1 |
| | 4 | 3 | R/W | 1 bit | | Output 2 | Boolean | 0 | 0 |
| | | | | | | | | | 1 |

Description of parameter values

| Index name | Parameter | Values | Description |
|--------------------------------|------------------|--------|--|
| Logic digital inputs / outputs | Input 1 | 0 | (Active high) Input 1 not inverted. |
| | | 1 | (Active low) Input 1 inverted. |
| | Input 2 | 0 | (Active high) Input 2 not inverted. |
| | | 1 | (Active low) Input 2 inverted. |
| | Input / output 1 | 0 | (Active high) Input/output not inverted. |
| | | 1 | (Active low) Input/output inverted. |
| | Output 2 | 0 | (Active high) Output not inverted. |
| | | 1 | (Active low) Output inverted. |

12.4.23 Error action

The safety position can be set with the **Error action** parameter.

The safety position is approached when an error occurs, if the supply voltage is too low within the range of 17.8 V to 21.1 V or in case of the corresponding signal present at Safe/On.

NOTICE

- ▶ Except the Temperature Over-Run error device, exceeding the permissible motor temperature. If the permissible temperature is exceeded, the motor is switched off to prevent damage.

| Index | Sub-Index | Offset | Access Rights | Length | Index name | Parameter | Type | Default | Values |
|-------|-----------|--------|---------------|---------|---------------------|--------------|---------|----------|------------------------------|
| 0x4F | 1 | 0 | R/W | 2 bits | Error action | Error action | uint:8 | 2 | 0 |
| | | | | | | | | | |
| | 2 | 0 | R/W | 10 bits | | Error time | uint:16 | 1 (0.1s) | 1 ... 1000 (0.1s to 100s) |

Description of parameter values

| Index name | Parameter | Values | Description |
|--------------|--------------|------------|---|
| Error action | Error action | 0 | (Hold) Actuator remains in the current position in case of an error. |
| | | 1 | (Open) Actuator moves to the OPEN position in case of an error. |
| | | 2 | (Close) Actuator moves to the CLOSED position in case of an error. |
| | Error time | 1 ... 1000 | Determine delay time between error detection and error message. |

12.4.24 Basic settings

The different settings are summarized with the **Basic settings** parameter.

| Index | Sub-Index | Offset | Access Rights | Length | Index name | Parameter | Type | Default | Values |
|-------|-----------|--------|---------------|--------|-----------------------|--------------------------|---------|---------|----------|
| 0x50 | 1 | 0 | R/W | 1 bit | Basic settings | Inversion of LED colours | Boolean | 0 | 0 |
| | | | | | | | | | 1 |
| | 2 | 1 | R/W | 1 bit | | On site initialization | Boolean | 0 | 0 |
| | | | | | | | | | 1 |
| | 3 | 2 | R/W | 1 bit | | Operating mode | Boolean | 0 | 0 |
| | | | | | | | | | 1 |
| | 4 | 3 | R/W | 1 bit | | IO-Link process data | Boolean | 0 | 0 |
| | | | | | | | | | 1 |

Description of parameter values

| Index name | Parameter | Values | Description |
|----------------|--------------------------|--------|---|
| Basic settings | Inversion of LED colours | 0 | (Standard) LEDs Close = green and Open = yellow (not inverted). |
| | | 1 | (Inversed) LEDs Close = yellow and Open = green (inversed). |
| | On site initialization | 0 | (Enabled) On-site initialization (see "Initialization", page 49) activated. |
| | | 1 | (Disabled) On-site initialization (see "Initialization", page 49) deactivated. |
| | Operating mode | 0 | Operating mode for positioner activated. |
| | | 1 | Operating mode for OPEN/CLOSE control activated. |
| | IO-Link process data | 0 | (Disabled) Use of IO-Link process data (see "Process data", page 25) is deactivated. |
| | | 1 | (Enabled) Use of IO-Link process data (see "Process data", page 25) is activated. |

12.4.25 Actuator position feedback

The settings for the OPEN and CLOSED position feedback can be stored with the **Actuator position feedback** parameter.

| Index | Sub-Index | Offset | Access Rights | Length | Index name | Parameter | Type | Default | Values |
|-------|-----------|--------|---------------|---------|-----------------------------------|---------------|---------|----------------|-------------------------------|
| 0x51 | 1 | 0 | R/W | 10 bits | Actuator position feedback | Open request | uint:16 | 900 (90.0%) | 30 ... 970 (3.0 ... 97.0%) |
| | 2 | 16 | R/W | 10 bits | | Close request | uint:16 | 100 (10.0%) | 30 ... 970 (3.0 ... 97.0%) |
| | 3 | 32 | RO | 10 bits | | Open real | uint:16 | | 0 ... 4095 |
| | 4 | 48 | RO | 10 bits | | Close real | uint:16 | | 0 ... 4095 |

Description of parameter values

| Index name | Parameter | Values | Description |
|----------------------------|---------------|-------------------------------|-------------------------------|
| Actuator position feedback | Open request | 30 ... 970 (3.0 ... 97.0%) | Request valve position OPEN |
| | Close request | 30 ... 970 (3.0 ... 97.0%) | Request valve position CLOSED |
| | Open real | 0 ... 4095 | Real valve position OPEN |
| | Close real | 0 ... 4095 | Real valve position CLOSED |

12.4.26 Initialized positions

The analog values of the initialized valve positions can be read out with the **Initialized positions** parameter.

| Index | Sub-Index | Offset | Access Rights | Length | Index name | Parameter | Type | Default | Values |
|-------|-----------|--------|---------------|---------|------------------------------|-----------|---------|---------|------------|
| 0x53 | 1 | 0 | RO | 12 bits | Initialized positions | Open | uint:16 | 0 | 0 ... 4092 |
| | 2 | 16 | RO | 12 bits | | Close | uint:16 | 4092 | 0 ... 4092 |
| | 3 | 32 | RO | 12 bits | | Stroke | uint:16 | 0 | 0 ... 4092 |

Description of parameter values

| Index name | Parameter | Values | Description |
|-----------------------|-----------|------------|---|
| Initialized positions | Open | 0 ... 4092 | Analog value valve position OPEN |
| | Close | 0 ... 4092 | Analog value valve position CLOSED |
| | Stroke | 0 ... 4092 | Analog value stroke (difference between OPEN and CLOSED). |

12.4.27 Calibration positions

The values of the factory calibration can be read out with the **Calibration positions** parameter.

The values are analog values of the potentiometer in the mechanical end positions of the actuator.

| Index | Sub-Index | Off-set | Access Rights | Length | Index name | Parameter | Type | Default | Values |
|-------|-----------|---------|---------------|---------|------------------------------|-----------|---------|---------|------------|
| 0x55 | 1 | 0 | RO | 12 bits | Calibration positions | Max. | uint:16 | 0 | 0 ... 4092 |
| | 2 | 16 | RO | 12 bits | | Min. | uint:16 | 4092 | 0 ... 4092 |

Description of parameter values

| Index name | Parameter | Values | Description |
|-----------------------|-----------|------------|--|
| Calibration positions | Max. | 0 ... 4092 | Read out analog value of the potentiometer for the mechanical end position OPEN. |
| | Min. | 0 ... 4092 | Read out analog value of the potentiometer for the mechanical end position CLOSED. |

12.4.28 Analog values

Different analog values can be read out with the **Analog values** parameter.

| Index | Sub-Index | Off-set | Access Rights | Length | Index name | Parameter | Type | Values |
|-------|-----------|---------|---------------|---------|----------------------|----------------|---------|------------|
| 0x60 | 1 | 0 | RO | 12 bits | Analog values | Potentiometer | uint:16 | 0 ... 4095 |
| | 2 | 16 | RO | 12 bits | | Supply voltage | uint:16 | 0 ... 4095 |
| | 3 | 32 | RO | 12 bits | | Temperature | uint:16 | 0 ... 4095 |
| | 4 | 48 | RO | 12 bits | | Set value (W) | uint:16 | 0 ... 4095 |

Description of parameter values

| Index name | Parameter | Values | Description |
|---------------|----------------|------------|--|
| Analog values | Potentiometer | 0 ... 4095 | Read out current analog value of the potentiometer. |
| | Supply voltage | 0 ... 4095 | Read out current analog value of the supply voltage. |
| | Temperature | 0 ... 4095 | Read out current analog value of the temperature sensor. |
| | Set value (W) | 0 ... 4095 | Read out current analog value of the set value. |

12.4.29 Operating times

The current valve travel times can be read out with the **Operating times** parameter.

| Index | Sub-Index | Offset | Access Rights | Length | Index name | Parameter | Type | Default | Values |
|-------|-----------|--------|---------------|--------|------------------------|-----------|--------|---------|--------------------------|
| 0x62 | 1 | 0 | RO | 8 bits | Operating times | Open | uint:8 | 0 | 0 to 255, 0 to 25.5 s |
| | 2 | 8 | RO | 8 bits | | Close | uint:8 | 0 | 0 to 255, 0 to 25.5 s |

Description of parameter values

| Index name | Parameter | Values | Description |
|-----------------|-----------|-------------------------|---|
| Operating times | Open | 0 to 255 0 to 25.5 s | Read out operating time (in tenths of seconds) from end position CLOSED to end position OPEN. |
| | Close | 0 to 255 0 to 25.5 s | Read out operating time (in tenths of seconds) from end position OPEN to end position CLOSED. |

12.4.30 Drive sets

The force of the actuator can be influenced with the **Drive sets** parameter when the valve is initialized and during initialization.

| Index | Sub-Index | Offset | Access Rights | Length | Index name | Parameter | Type | Default | Values |
|-------|-----------|--------|---------------|--------|-------------------|----------------------|---------|---------|---------|
| 0x90 | 2 | 8 | R/W | 3 bits | Drive sets | Force | uint:16 | - | 1 ... 6 |
| | 3 | 16 | R/W | 3 bits | | Force initialization | uint:16 | - | 1 ... 6 |

Description of parameter values

| Index name | Parameter | Values | Description |
|------------|----------------------|---------|---|
| Drive sets | Force | 1 ... 6 | Set the force of the valve. Preset at the factory depending on the valve type. |
| | Force initialization | 1 ... 6 | Set the force during initialization. Preset at the factory depending on the valve type. |

Force settings

| Actuator size | Setting parameter | Force |
|---------------|-------------------|---------------|
| AG0 and AG1 | 1 | Minimum force |
| | 6 | Maximum force |

12.4.31 Control parameters

The properties can be set with the **Control parameters** parameter.

| Index | Sub-Index | Offset | Access Rights | Length | Index name | Parameter | Type | Default | Values |
|-------|-----------|--------|---------------|---------|---------------------------|-----------------|----------|---------|-------------------------------|
| 0xB0 | 1 | 0 | R/W | 16 bits | Control parameters | P amplification | uint: 16 | 200 | 1 ... 200 (0.1 ... 20.0) |
| | 2 | 16 | R/W | 16 bits | | D amplification | uint: 16 | 10 | 1 ... 200 (0.1 ... 20.0) |
| | 3 | 32 | R/W | 16 bits | | Derivative time | uint: 16 | 0 | 0 to 100 (0 to 100 s) |
| | 4 | 48 | R/W | 16 bits | | Dead band | uint: 16 | 10 | 1 ... 250 (0.1 ... 25.0 %) |

Description of parameter values

| Index name | Parameter | Values | Description |
|--------------------|-----------------|-------------------------------|---|
| Control parameters | P amplification | 1 ... 200 (0.1 ... 20.0) | Set the P component of the positioner. |
| | D amplification | 1 ... 200 (0.1 ... 20.0) | Set the D component of the positioner. |
| | Derivative time | 0 to 100 (0 to 100 s) | Set the delay constant of the positioner. |
| | Dead band | 1 ... 250 (0.1 ... 25.0 %) | Set the permissible system deviation of the positioner. |

12.4.32 Open / close tight

The sealing function can be set for the **Open / close tight** parameter.

| Index | Sub-Index | Offset | Access Rights | Length | Index name | Parameter | Type | Default | Values |
|-------|-----------|--------|---------------|---------|---------------------------|-------------|---------|---------|------------------------------------|
| 0xB2 | 1 | 0 | R/W | 16 bits | Open / close tight | Open tight | uint:16 | 995 | 800 ... 1000 (80.0 ... 100.0 %) |
| | 2 | 16 | R/W | 16 bits | | Close tight | uint:16 | 5 | 0 ... 200 (0.0 ... 20.0 %) |

Description of parameter values

| Index name | Parameter | Values | Description |
|--------------------|-------------|------------------------------------|---|
| Open / close tight | Open tight | 800 ... 1000 (80.0 ... 100.0 %) | Set the sealing function valve position OPEN. |
| | Close tight | 0 ... 200 (0 ... 20.0 %) | Set the sealing function valve position CLOSED. |

12.4.33 Split range

The start and end of the set value range can be set for **Split range** parameter.

| Index | Sub-Index | Offset | Access Rights | Length | Index name | Parameter | Type | Default | Values |
|-------|-----------|--------|---------------|---------|--------------------|-------------|----------|---------|--|
| 0xB4 | 1 | 0 | R/W | 16 bits | Split range | Split start | uint: 16 | 0 | 0 to Split End – 100 (0.0 to Split End – 10.0%) |
| | 2 | 16 | R/W | 16 bits | | Split end | uint: 16 | 1000 | Split Start + 100 to 1000 (Split Start + 10.0% to 100.0%) |

Description of parameter values

| Index name | Parameter | Values | Description |
|-------------|-------------|--|---------------------------------------|
| Split range | Split start | 0 to Split End – 100 (0.0 to Split End – 10.0%) | Set the start of the set value range. |
| | Split end | Split Start + 100 to 1000 (Split Start + 10.0% to 100.0%) | Set the end of the set value range. |

12.4.34 Stroke limiter

The upper and lower valve position of the control range can be set as stroke limiter with the **Stroke limiter** parameter.

NOTICE

To use the stroke limiter, the close tight function (open/close tight) must be deactivated. To do this, Open tight must be set to the value 1000 (100.0%) and Close tight to the value 0 (0.0%).

| Index | Sub-Index | Offset | Access Rights | Length | Index name | Parameter | Type | Default | Values |
|-------|-----------|--------|---------------|---------|-----------------------|-----------|---------|---------|--|
| 0xB6 | 1 | 0 | R/W | 16 bits | Stroke limiter | Max pos | uint:16 | 1000 | Min Pos to 1000 (Min Pos to 100.0%) |
| | 2 | 16 | R/W | 16 bits | | Min pos | uint:16 | 0 | 0 to Max Pos (0.0% to Max Pos) |

Description of parameter values

| Index name | Parameter | Values | Description |
|----------------|-----------|--|---|
| Stroke limiter | Max pos | Min Pos to 1000 (Min Pos to 100.0%) | Set the stroke limiter of the control range in valve position OPEN. |
| | Min pos | 0 to Max Pos (0.0% to Max Pos) | Set the stroke limiter of the control range in valve position CLOSED. |

12.4.35 Set value (W) input

The function of the analog input can be set with the **Set value (W) input** parameter.

| Index | Sub-Index | Offset | Access Rights | Length | Index name | Parameter | Type | Default | Values |
|-------|-----------|--------|---------------|--------|----------------------------|-----------|--------|---------|---------------------------------|
| 0xB8 | 1 | 0 | R/W | 1 bit | Set value (W) input | Direction | uint:1 | 0 | 0 1 |
| | 2 | 8 | R/W | 2 bits | | Type | uint:2 | 1 | 0 1 2 |
| | 3 | 16 | R/W | 8 bits | | I min | uint:8 | 35 | 0 to 40 (0 to 4.0 mA) |
| | 4 | 24 | R/W | 8 bits | | I max | uint:8 | 205 | 200 to 220 (20.0 to 22.0 mA) |
| | 5 | 32 | R/W | 8 bits | | U max | uint:8 | 103 | 100 to 110 (10.0 to 11.0 V) |

Description of parameter values

| Index name | Parameter | Values | Description |
|---------------------|-----------|---------------------------------|---|
| Set value (W) input | Direction | 0 1 | Specify direction of the set value input. 0 = Rise (rising) 1 = Fall (falling) |
| | Type | 0 1 2 | Determine signal input. 0 = 0 to 20 mA 1 = 4 to 20 mA 2 = 0 to 10 V |
| | I min | 0 to 40 (0 to 4.0 mA) | Determine minimum value of the current input. If the set value is not reached, the message "Set value too small" is issued. |
| | I max | 200 to 220 (20.0 to 22.0 mA) | Determine maximum value of the current input. If the set value is exceeded, the message "Set value too high" is issued. |
| | U max | 100 to 110 (10.0 to 11.0 V) | Determine maximum value of the voltage input. If the set value is exceeded, the message "Set value too high" is issued. |

12.4.36 Analog output

The analog output function can be set with the **Analog Output** parameter.

| Index | Sub-Index | Offset | Access Rights | Length | Index name | Parameter | Type | Default | Values |
|-------|-----------|--------|---------------|---------|----------------------|-----------|---------|---------|------------------------------|
| 0xBA | 1 | 0 | R/W | 1 bit | Analog output | Direction | Boolean | 0 | 0 1 |
| | 2 | 8 | R/W | 2 bits | | Type | uint:8 | 1 | 0 1 2 |
| | 3 | 16 | R/W | 16 bits | | Min. | uint:16 | 0 | 0 to Max (0.0% to Max) |
| | 4 | 32 | R/W | 16 bits | | Max. | uint:16 | 1000 | Min to 1000 (Min to 100%) |

Description of parameter values

| Index name | Parameter | Values | Description |
|---------------|------------------------------|--|---|
| Analog output | Direction | 0 | Specify direction of the set value output. 0 = Rise (rising) 1 = Fall (falling) |
| | | 1 | |
| | Type | 0 | Determine signal output. 0 = 0 to 20 mA 1 = 4 to 20 mA 2 = 0 to 10 V |
| | | 1 | |
| 2 | | | |
| Min. | 0 to Max (0.0% to Max) | Determine minimum value of the output. | |
| Max. | Min to 1000 (Min to 100%) | Determine maximum value of the output. | |

12.5 Events

The following IO-Link events can be transmitted.

| Event | Mode | Type | Code |
|----------------------------------|------------|---------------|--------|
| Device Hardware Fault | App/Disapp | Error | 0x5000 |
| Motor Unable To Move | App/Disapp | Error | 0x8CE0 |
| Device Temperature Over-Run | App/Disapp | Warning/Error | 0x4210 |
| Emergency Power | App/Disapp | Warning | 0x5100 |
| Primary Supply Voltage Under-Run | App/Disapp | Error | 0x5111 |
| Potifail Close | App/Disapp | Warning | 0x8CA5 |
| Potifail Open | App/Disapp | Warning | 0x8CA4 |

Description – Events

| Event | Description | Possible cause | Troubleshooting |
|---------------------------------|---|---|--|
| Device Hardware Fault 0x5000 | The event occurs when a hardware fault is detected. | Fault in valve position detection. | Contact GEMÜ Support |
| | | Parameter can no longer be read when switching the device on. | |
| Motor Unable To Move 0x8CE0 | The event occurs when the motor is blocked. | Valve is blocked (for example, solid stuck in valve). | Check valve Carry out initialization if valve is OK |
| | | Valve corroded (rusted in place). | |

| Event | Description | Possible cause | Troubleshooting |
|--|---|---|--|
| | | End position can no longer be reached (after replacing the diaphragm). | |
| Device Temperature Over-Run 0x4210 | The event occurs as a warning or error if the motor temperature is too high. | Control is operated outside of the specification. The ambient temperature is too high. | Check temperature Set control correctly (check duty cycle (ED) of the actuator) |
| Emergency Power 0x5100 | The event occurs if the supply is too low. The event is triggered as a warning if the supply voltage U_v is below a value of 21.1 V. (If the supply voltage is below 17.4 V, the event Primary Supply Voltage Under-Run (0x5111) is triggered as an error). | Power supply unit overloaded. Cross-section of the supply line is too small. Supply line is too long. | Check supply |
| Primary Supply Voltage Under-Run 0x5111 | The event occurs if the supply voltage is too low. | Power supply unit overloaded. Cross-section of the supply line is too small. Supply line is too long. | Check supply |
| Potifail Close 0x8CA5 | The event occurs if a valve position is read which can never be achieved in the "Close" direction. | Fault in valve position detection. Error when replacing a diaphragm (stroke of the valve in incorrect area). Actuator has been fitted on the valve incorrectly (stroke of the valve in the incorrect area). | Check valve/diaphragm |
| Potifail Open 0x8CA4 | The event occurs if a valve position is read which can never be achieved in the "Open" direction. | Fault in valve position detection. Error when replacing a diaphragm (stroke of the valve in incorrect area). Actuator has been fitted on the valve incorrectly (stroke of the valve in the incorrect area). | Check valve/diaphragm |

13 Operation

13.1 Initialization

NOTICE

- Initialization should be carried out in a depressurized condition (initialization force = 1/2 nominal force). For initialization under operating pressure, the initialization force (IO-Link index 0x90 – subindex 3 – Force initialization) must be adapted.

Initialization must be carried out in the following situations:

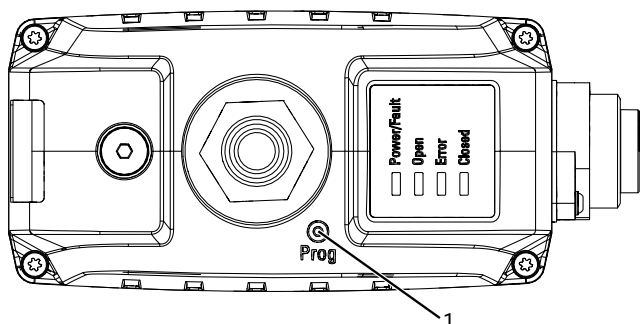
- Retrofitting an electrical position indicator
- Replacing the actuator
- Replacing the diaphragm

If the process valve is fully assembled at the factory, initialization has already been carried out.

Initialization can be carried out using the following procedures:

- On-site initialization
- Initialization via IO-Link
- Initialization via configurable digital input (digital input must be set to "Init")

13.1.1 On-site initialization of the end positions



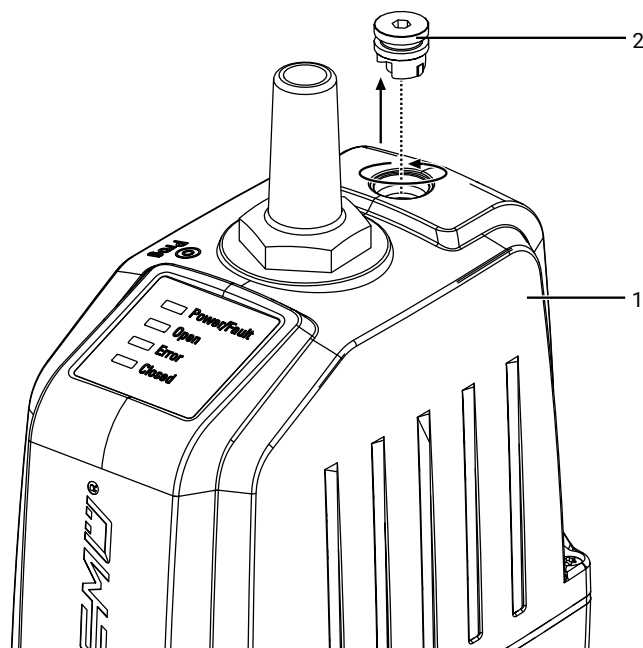
1. Connect supply voltage.
2. Hold the magnet briefly (>100 ms) at the point on the housing cover marked with PROG 1.
 - ⇒ OPEN and CLOSED LEDs flash alternately.
3. Valve automatically moves into the OPEN position.
4. Valve automatically moves into the CLOSED position.
5. Initialization mode is automatically ended.
6. The end positions are set.

13.1.2 Initialization of the end positions via IO-Link

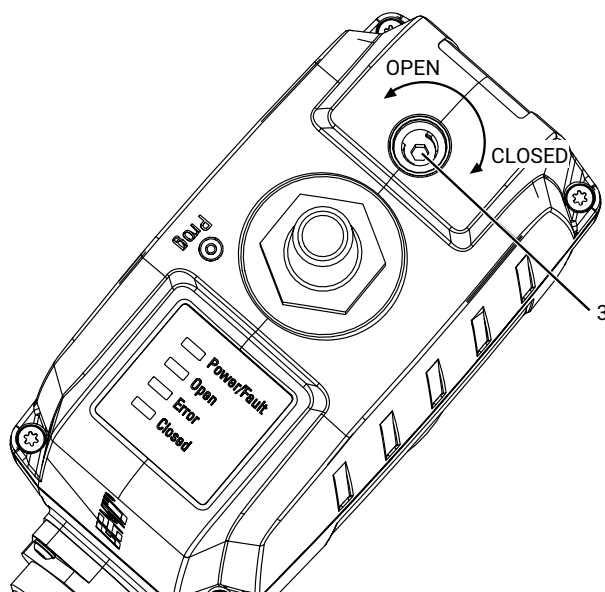
1. Briefly activate (>100 ms) initialization mode (process data "Selection of operating mode").
 - ⇒ OPEN and CLOSED LEDs flash alternately.
2. Valve automatically moves into the OPEN position.
3. Valve automatically moves into the CLOSED position.
4. Initialization mode is automatically ended.
5. The end positions are set.

13.2 Manual override

Open, actuate and close the manual override with the hexagon socket (SW3).



1. Unscrew sealing plug 2 anti-clockwise out of cover 1 and remove it.



2. Operate the manual override 3 with the hexagon socket (WAF3).
 - ⇒ Turn clockwise to close the valve.
 - ⇒ Turn anticlockwise to open the valve.

14 Troubleshooting

14.1 LED error message

| Function | Power/fault | Open | Error | Closed |
|---|-------------|-----------------------------------|-------|--------|
| Supply voltage too low | | | | |
| | red | | | |
| Software Update | | | | |
| Internal error | | | | |
| Product not calibrated | | | | |
| Motor does not move | | | | |
| Product not initialized | | | | |
| | | Open and Closed flash alternately | | |
| Temperature error | | | | |
| Emergency power operation, OPEN position | | | | |
| | red | | | |
| Emergency power operation, CLOSED position | | | | |
| | red | | | |
| Emergency power operation, position unknown | | | | |
| | red | | | |
| Set value too small | | | | |
| Set value too high | | | | |
| Abort IO-Link communication | | | | |
| Maintenance required, OPEN position | | | | |
| Maintenance required, CLOSED position | | | | |
| Maintenance required, position unknown | | | | |

14.2 Troubleshooting

| Error | Possible cause | Troubleshooting |
|--|--|--|
| The product is leaking downstream (does not close or does not close fully) | Operating pressure too high | Operate the product with operating pressure specified in datasheet |
| | Valve body leaking or damaged | Check valve body for potential damage, replace valve body if necessary |
| The product does not open or does not open fully | Actuator defective | Replace the actuator |
| | Operating pressure too high | Operate the product with operating pressure specified in datasheet |
| | Foreign matter in the product | Remove and clean the product |
| | The actuator design is not suitable for the operating conditions | Use an actuator that is designed for the operating conditions |
| | Voltage is not connected | Connect voltage |
| | Cable ends incorrectly wired | Wire cable ends correctly |
| The product does not close or does not close fully | The actuator design is not suitable for the operating conditions | Use an actuator that is designed for the operating conditions |
| | Foreign matter in the product | Remove and clean the product |
| | Voltage is not connected | Connect voltage |
| The product is leaking between actuator and valve body | Bolting between valve body and actuator loose | Tighten bolting between valve body and actuator |
| | Actuator/valve body damaged | Replace actuator/valve body |
| The product is leaking between actuator flange and valve body | Mounting parts loose | Retighten mounting parts |
| | Valve body / actuator damaged | Replace valve body/actuator |
| Valve body of the GEMÜ product is leaking | Valve body of the GEMÜ product is faulty or corroded | Check valve body of the GEMÜ product for potential damage, replace valve body if necessary |
| Body of the GEMÜ product is leaking | Incorrect installation | Check installation of valve body in piping |
| Valve body connection to piping leaking | Incorrect installation | Check installation of valve body in piping |

15 Inspection and maintenance

WARNING

The equipment is subject to pressure!

- ▶ Risk of severe injury or death
- Depressurize the plant.
- Completely drain the plant.

CAUTION

Use of incorrect spare parts!

- ▶ Damage to the GEMÜ product
- ▶ Manufacturer liability and guarantee will be void
- Use only genuine parts from GEMÜ.

CAUTION



Hot plant components!

- ▶ Risk of burns
- Only work on plant that has cooled down.

NOTICE

Exceptional maintenance work!

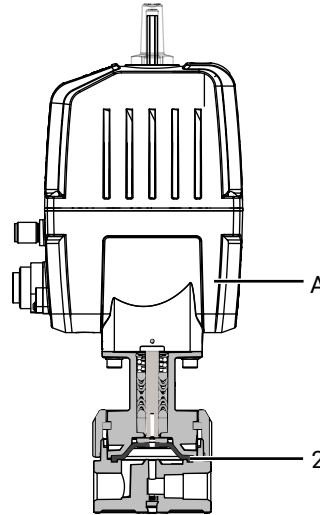
- ▶ Damage to the GEMÜ product
- Any maintenance work and repairs not described in these operating instructions must not be performed without consulting the manufacturer first.

The operator must carry out regular visual examination of the GEMÜ products dependent on the operating conditions and the potential danger in order to prevent leakage and damage.

The product also must be disassembled and checked for wear in the corresponding intervals.

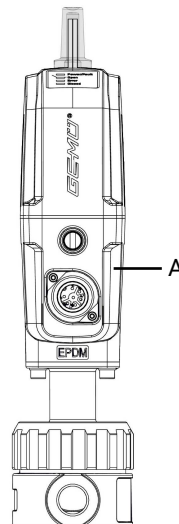
1. Have servicing and maintenance work performed by trained personnel.
2. Wear appropriate protective gear as specified in plant operator's guidelines.
3. Shut off plant or plant component.
4. Secure the plant or plant component against recommissioning.
5. Depressurize the plant or plant component.
6. Actuate GEMÜ products which are always in the same position four times a year.
7. If necessary, the end position counter **User** can be reset after maintenance or other changes under parameter Cycle Counter.

15.1 Spare parts

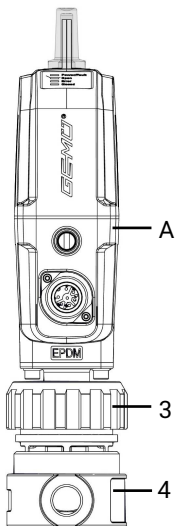


| Item | Designation |
|------|---------------------|
| A | Actuator |
| 2 | Isolating diaphragm |

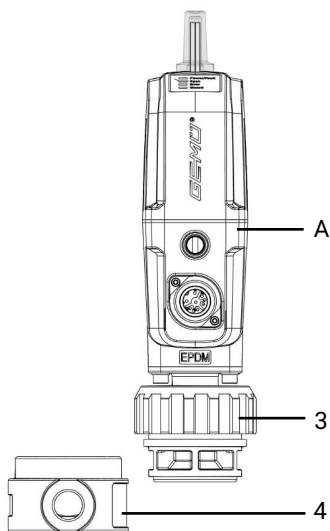
15.2 Replacing the isolating diaphragm



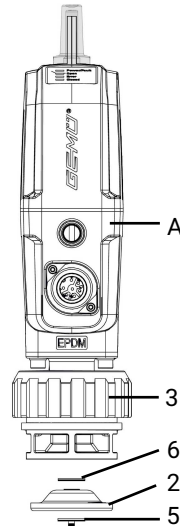
1. Move actuator **A** to the open position.



2. Undo union nut **3** of valve body **4**.



3. Remove valve body **4**.



4. Dismantle regulating cone **5**, isolating diaphragm **2** and washer **6** from the valve.
5. Check parts for potential damage.
6. Replace isolating diaphragm **2**.
7. Reassemble the parts in reverse order (tightening regulating cone **5**, isolating diaphragm **2** and washer **6** until they are hand tight).

15.3 Cleaning the product

- Clean the product with a damp cloth.
- Do **not** clean the product with a high pressure cleaning device.

16 Removal from piping

1. Remove in reverse order to installation.
2. Unscrew the electrical wiring.
3. Disassemble the product. Observe warning notes and safety information.

17 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.

18 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.



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Subject to alteration

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