

# GEMÜ Q50 eSyStep

Open / Close (Code AE, A5, A6)

Motorized pinch 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 tube.


### 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"> <li>▶ Possible consequences of non-observance.</li> <li>● Measures for avoiding danger.</li> </ul>


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><b>Imminent danger!</b></p> <ul style="list-style-type: none"> <li>▶ Non-observance can cause death or severe injury.</li> </ul>

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

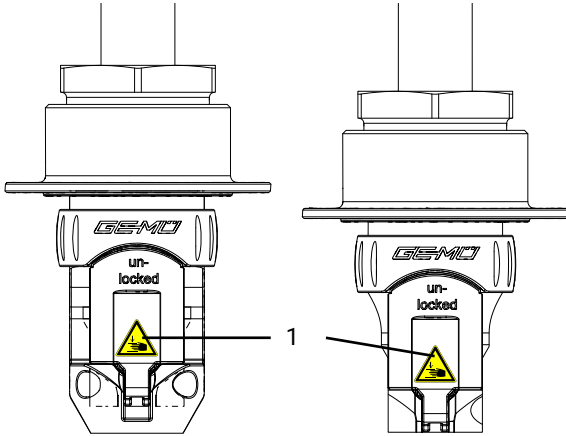
⚠ CAUTION	
	<p><b>Potentially dangerous situation!</b></p> <ul style="list-style-type: none"> <li>▶ Non-observance can cause moderate to light injury.</li> </ul>


NOTICE	
	<p><b>Potentially dangerous situation!</b></p> <ul style="list-style-type: none"> <li>▶ Non-observance can cause damage to property.</li> </ul>

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

Symbol	Meaning
	Danger of explosion!
	Corrosive chemicals!
	Hot plant components!
	Risk of crushing!
	Risk of crushing due to the compressor shutting down!

## 1.6 Safety information on the product



Item	Symbol	Meaning
1		Risk of crushing! - Do not reach into the tube crushing area.

Missing or illegible adhesive labels on the product must be attached or replaced.

## 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 screws 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:

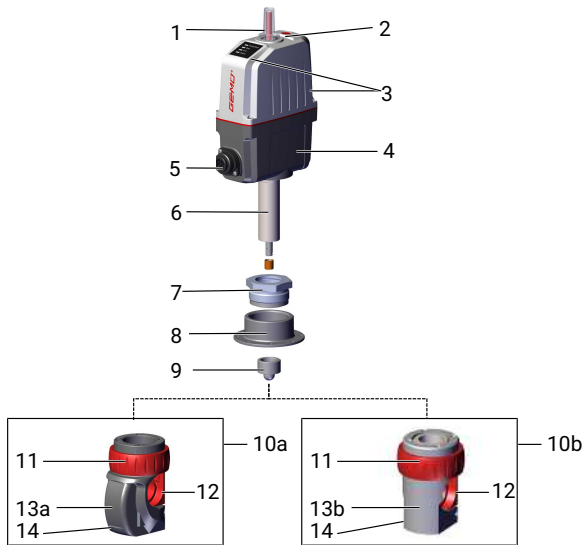
9. Keep this document available at the place of use.
10. Observe the safety information.
11. Operate the product in accordance with this document.
12. Operate the product in accordance with the specifications.
13. Maintain the product correctly.
14. Do not carry out any maintenance work and repairs not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

### In cases of uncertainty:

15. Consult the nearest GEMÜ sales office.

### 3 Product description

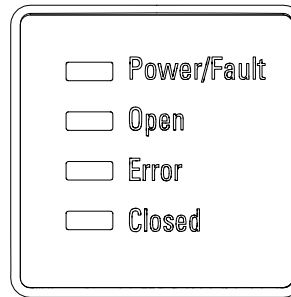
#### 3.1 Construction



Item	Name	Materials
1	Optical position indicator	PA 12
2	Manual override	
3	Actuator top with LED display	Polyamide, 50% glass fibre
4	Actuator base	Polyamide, 50% glass fibre
5	Electrical connection X1	
6	Distance piece	Stainless steel
7	Union nut	Stainless steel
8	Distance piece with mounting flange including EPDM seal	Stainless steel
9	Compressor	Stainless steel
10a	Valve body	PA6
10b	Valve body	Stainless steel/PA6
11	Locking ring	PA6
12	Tube holder	PA6
13a	Tube carrier	PA6
13b	Tube carrier	Stainless steel
14	Conexo RFID chip	

#### 3.2 LED displays

##### 3.2.1 Status LEDs



LED	Colour		Function
	Standard	Inversed <sup>1)</sup>	
<b>Power/fault</b>	green	green	Operating indication/communication status
	red	red	
<b>Open</b>	orange	green	Process valve in OPEN position
<b>Error</b>	red	red	Error
<b>Closed</b>	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 Q50 eSyStep 2/2-way pinch valve is motorized. The eSyStep actuator is designed as an ON/OFF actuator. The valve guides a tube which is compressed from above by a compressor to control and regulate media. The compressor's specially developed contour and the tube holder's contour minimize the strain on the tube and thus increase the tubes' service life. Tubes can be safely inserted and removed in simple steps and without tools. An optical and electrical position indicator is integrated as standard.

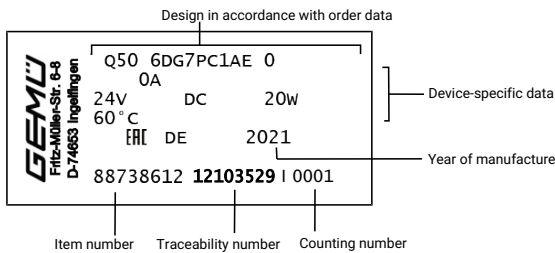
### 3.4 Function

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.

## 4 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.

### NOTICE

#### Suitability of the product.

- ▶ The product must be appropriate for the tube's operating conditions (medium, medium concentration, temperature and pressure) and the respective ambient conditions.

The product is designed to control a working medium guided in a tube.

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

- Use the product in accordance with the technical data.

## 5 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
Pinch valve, electrically operated, eSyStep	Q50

2 Tube inside diameter	Code
3.180 mm (1/8") inside diameter	2
6.350 mm (1/4") inside diameter	4
9.530 mm (3/8") inside diameter	6
12.700 mm (1/2") inside diameter	8

3 Tube outside diameter	Code
6.350 mm (1/4") outside diameter	DA
9.530 mm (3/8") outside diameter	DC
11.110 mm (7/16") outside diameter	DD
12.700 mm (1/2") outside diameter	DE
15.880 mm (5/8") outside diameter	DG
19.100 mm (3/4") outside diameter	DH
22.230 mm (7/8") outside diameter	DI

4 Tube carrier version	Code
Plastic design, stainless steel tube carrier and PA tube holder	7P
Plastic design, PA tube carrier and PA tube holder	PA

5 Voltage/Frequency	Code
24 V DC	C1

6 Control module	Code
OPEN/CLOSE control, additional end position indicators, configured for emergency power supply module (NC)	A5
OPEN/CLOSE control, additional end position indicators, configured for emergency power supply module (NO)	A6
OPEN/CLOSE control, additional end position indicators	AE
Positioner	S0
Positioner, configured for emergency power supply module (NC)	S5
Positioner, configured for emergency power supply module (NO)	S6

7 Mounting option	Code
Without mounting flange, with 4 x threaded hole in body	0
With mounting flange above	FT

8 Actuator version	Code
Actuator size 0	0A

9 CONEXO	Code
Without	
Integrated RFID chip for electronic identification and traceability	C

### Order example

Ordering option	Code	Description
1 Type	Q50	Pinch valve, electrically operated, eSyStep
2 Tube – inside diameter	8	12.700 mm (1/2") inside diameter
3 Tube – outside diameter	DH	19.100 mm (3/4") outside diameter
4 Valve body material	7P	Plastic design, stainless steel tube carrier and PA tube holder
5 Voltage/frequency	C1	24 V DC
6 Control module	AE	OPEN/CLOSE control, additional end position indicators
7 Actuator version	0A	Actuator size 0



## 6 Technical data

### 6.1 Medium

**Working medium:** Please observe the tube manufacturer's specifications

### 6.2 Temperature

**Media temperature:** Please observe the tube manufacturer's specifications

**Ambient temperature:** Actuator: 0 – 60 °C, Tube: Please observe the tube manufacturer's specifications

**Storage temperature:** 0 – 40 °C

### 6.3 Pressure

**Operating pressure:** max. 6 bar ,  
Please observe the tube manufacturer's specifications

### 6.4 Product compliance

**Machinery Directive:** 2006/42/EC

**EMC Directive:** 2014/30/EU

Technical standards used:

Interference emission      DIN EN 61000-6-4 (07/2011)  
DIN EN 61326-1 (industry) (07/2013)  
Interference emission class: Class A  
Interference emission group: Group 1

Interference resistance      DIN EN 61000-6-2 (03/2006)  
DIN EN 61326-1 (industry) (07/2013)

### 6.5 Mechanical data

**Protection class:** IP 65 acc. to EN 60529

**Mechanical environmental conditions:** Class 4M8 acc. to EN 60721-3-4:1998

**Vibration:** 5g acc. to IEC 60068-2-6 Test Fc

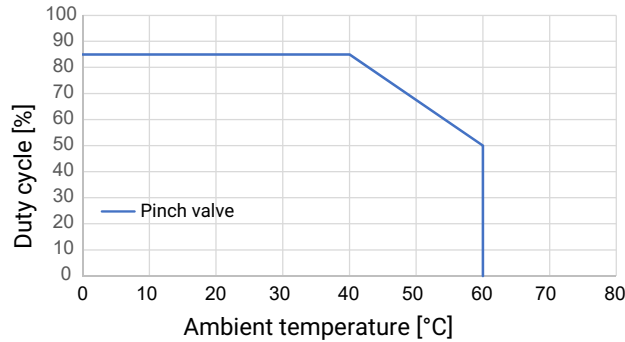
**Shock:** 25g acc. to 60068-2-27 Test Ea

**6.6 Actuator's duty cycle and service life**

If there is inadequate force to compress the tube, the force of the actuator can be adapted via the IO-Link using the config files.

**Service life:** At least 500,000 switching cycles at room temperature and permissible duty cycle.

**Duty cycle:** Control module – Open/Close control (code A5, A6, AE)  
 Duty cycle at full valve stroke and 10 minutes cycle time.



**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

**6.7 Electrical data**

**Supply voltage Uv:** 24 V DC ± 10%

**Rating:** Actuator size 0 (code 0A) 20 W

**Operation:** Stepper motor, self-locking

**Reverse battery protection:** Yes

**6.7.1 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

**6.7.2 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 Uv

**Switching current:** ≤ 140 mA

**Short-circuit proof:** Yes

### 6.7.3 Communication

**Interface:** IO-Link

**Function:** Parameterization/process data

**Transmission rate:** 38400 baud

**Frame type in Operate:** 2.5 (eSyStep ON/OFF, code AE, A5, A6)

**Min. cycle time:** 2.3 ms (eSyStep ON/OFF, code AE, A5, A6)

**Vendor-ID:** 401

**Device-ID:** 1906701 (eSyStep ON/OFF, code AE, A5, A6)

**Product-ID:** eSyStep On/Off (code AE, A5, A6)

**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](http://www.gemu-group.com).

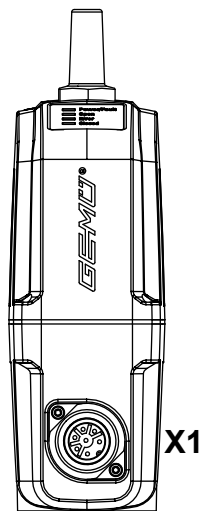
## 7 Electrical connection

### NOTICE

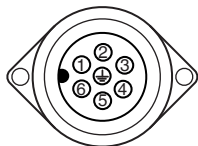
#### Appropriate cable socket/appropriate mating connector

- ▶ The appropriate connector is included for X1.

#### 7.1 Position of the connectors



## 7.2 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.

**7.3 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**

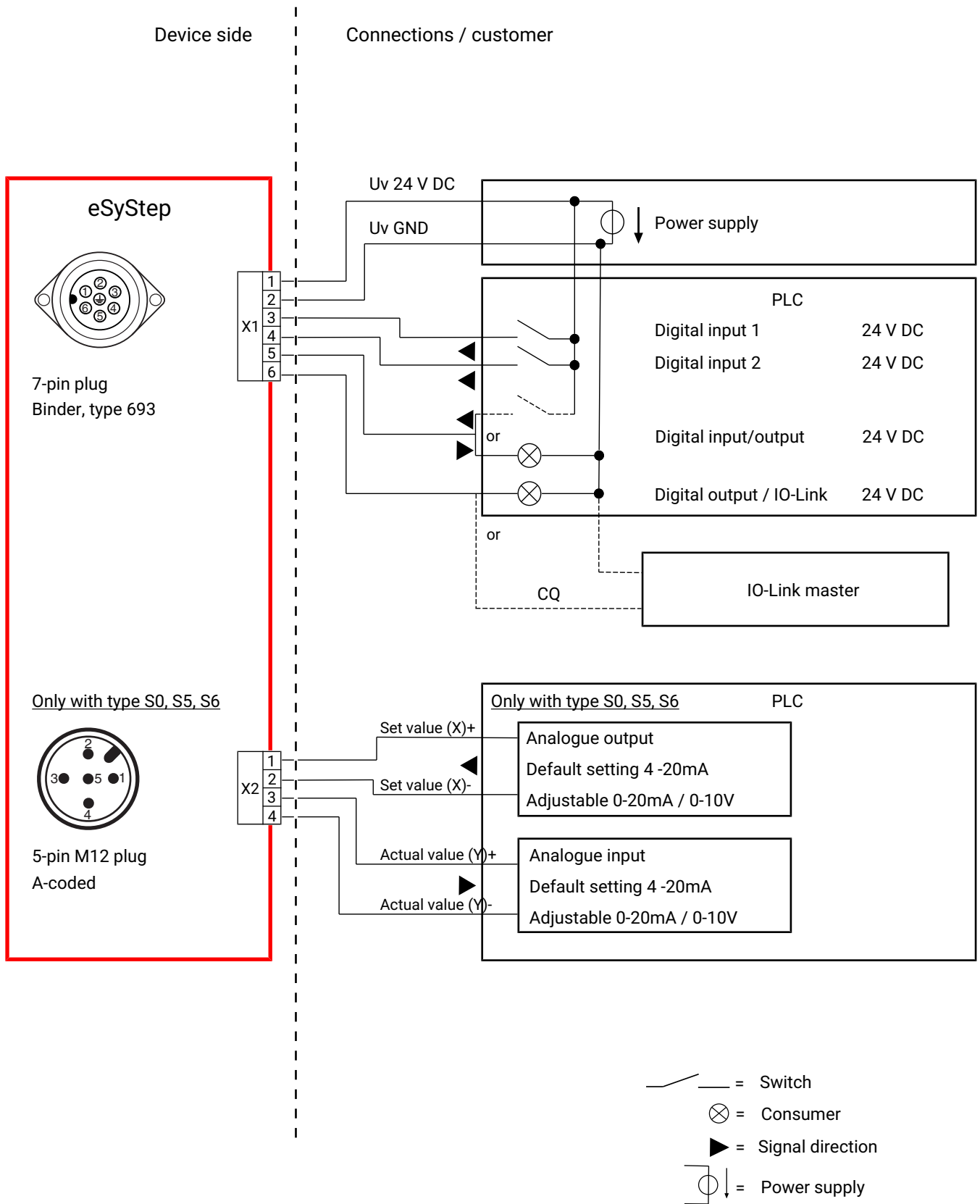
- ▶ When configuring the emergency power module (code A5 / A6), the control of the valve changes. Valve is controlled 1-pole via digital input 1. Level logic 1 moves the valve OPEN, level logic 0 moves the valve CLOSE.

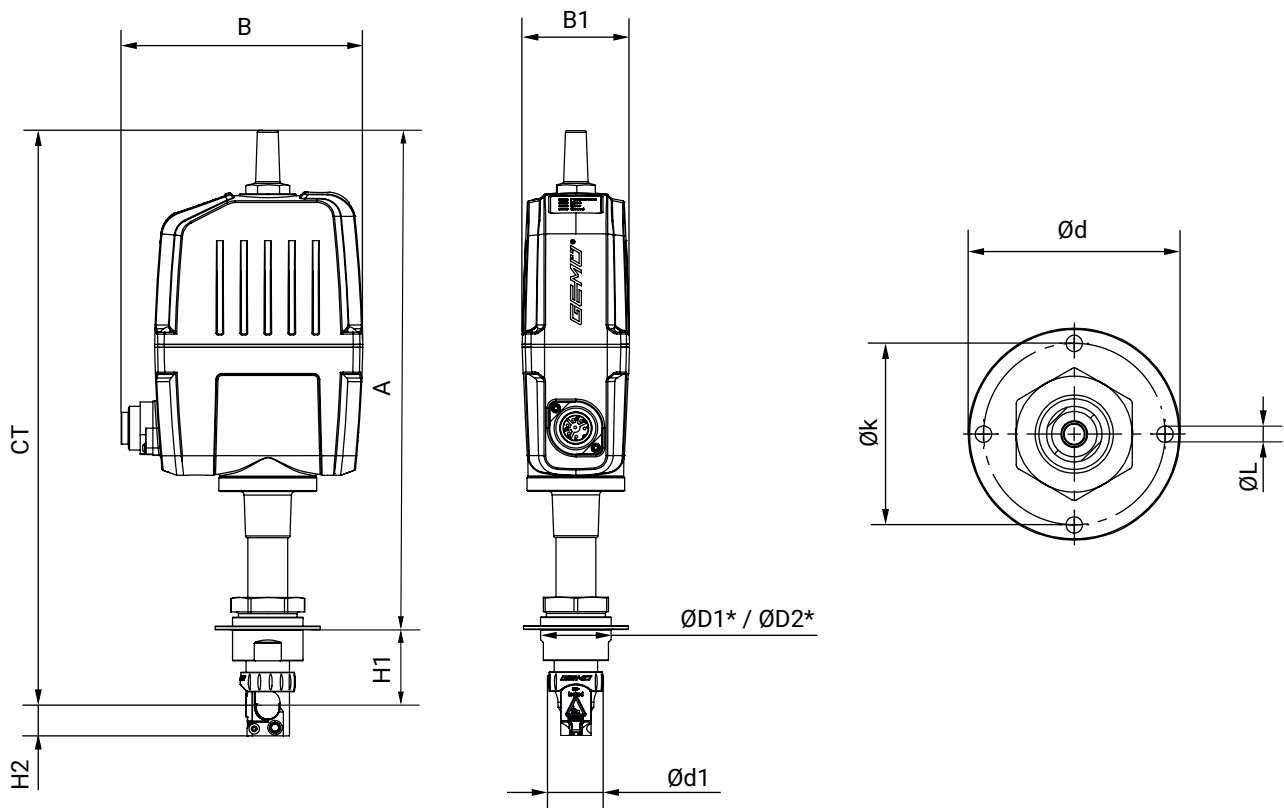
**NOTICE**

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

	Function	Control module AE	Control module A5, A6
		Default settings	Factory default setting "Configured for emergency power supply module"
Digital input 1	Off/Open/Closed/Safe/On/Initialization	Open	Open
Digital input 2	Off/Open/Closed/Safe/On/Initialization	Closed	Safe/On
Digital input/output	Open/Closed/Error/Error and warning/Initialization	Open	Open
Digital output	Open/Closed/Error/Error and warning	Closed	Closed

7.4 Connection diagram



**8 Dimensions****8.1 Actuator for tube outside diameter  $\leq 1/2''$** 

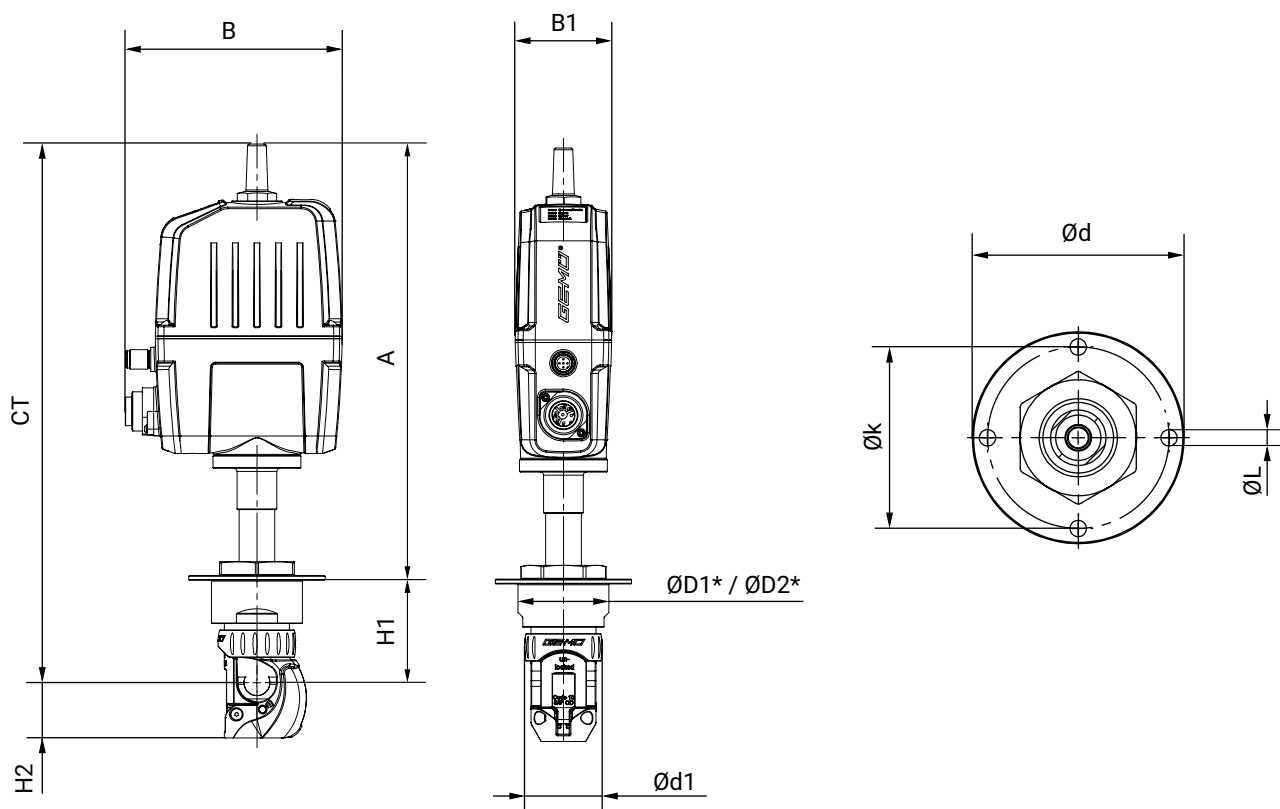
A	B	B1	CT	$\varnothing D1^*$	$\varnothing D2^*$	$\varnothing d$	$\varnothing d1$	H1	H2	$\varnothing k$	$\varnothing L$
275.9	133.5	59.4	318.9	39.0	42.0	58.0	30.5	43.0	15.6	49.0	4.5

Dimensions in mm

\* D1 = diameter without seal, D2 = diameter with seal



### 8.2 Actuator for tube outside diameter $\geq 5/8"$

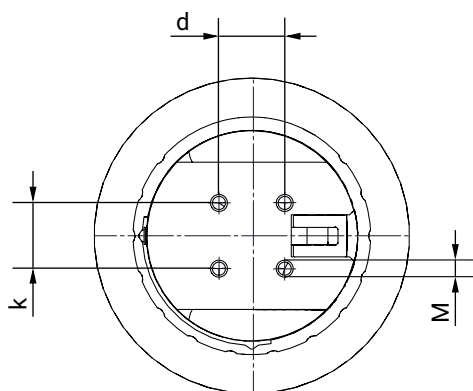


A	B	B1	CT	ØD1*	ØD2*	Ød	Ød1	H1	H2	Øk	ØL
235.0	133.5	59.4	332.0	56.0	60.0	84.0	47.8	63.0	34.0	72.0	6.5

Dimensions in mm

\* D1 = diameter without seal, D2 = diameter with seal

### 8.3 Valve body, without mounting flange



Tube outside diameter	d	k	M
$\leq 1/2"$	7.0	7.0	M2
$\geq 5/8"$	12.0	12.0	M4

Dimensions in mm

## 9 Manufacturer's information

### 9.1 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.

### 9.2 Packaging

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

### 9.3 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.



### 9.4 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.

## 10 Installation

### 10.1 Preparing for installation

 <b>WARNING</b>	
<b>The equipment is subject to pressure!</b>	
<ul style="list-style-type: none"> <li>▶ Risk of severe injury or death</li> <li>● Depressurize the plant.</li> <li>● Completely drain the plant.</li> </ul>	

 <b>WARNING</b>	
	<b>Corrosive chemicals!</b>
	<ul style="list-style-type: none"> <li>▶ Risk of caustic burns</li> <li>● Wear appropriate protective gear.</li> <li>● Completely drain the plant.</li> </ul>

 <b>CAUTION</b>	
	<b>Hot plant components!</b>
	<ul style="list-style-type: none"> <li>▶ Risk of burns</li> <li>● Only work on plant that has cooled down.</li> </ul>

 <b>CAUTION</b>
<b>Use as step.</b>
<ul style="list-style-type: none"> <li>▶ Damage to the product</li> <li>▶ Risk of slipping-off</li> <li>● Choose the installation location so that the product cannot be used as a foothold.</li> <li>● Do not use the product as a step or a foothold.</li> </ul>

<b>NOTICE</b>
<b>Suitability of the product.</b>
<ul style="list-style-type: none"> <li>▶ The product must be appropriate for the tube's operating conditions (medium, medium concentration, temperature and pressure) and the respective ambient conditions.</li> </ul>

<b>NOTICE</b>
<b>Requirements for tube lines used!</b>
<ul style="list-style-type: none"> <li>▶ Use tube lines suitable for the application, see manufacturer's information.</li> <li>● Only use undamaged tube lines.</li> </ul>

<b>NOTICE</b>
<b>Lay tube lines professionally!</b>
<ul style="list-style-type: none"> <li>▶ Lay tube lines professionally and do not bend them below the minimum bending radius, see manufacturer's information.</li> <li>● Do not kink or twist the tube lines.</li> </ul>

<b>NOTICE</b>
<b>Tools</b>
<ul style="list-style-type: none"> <li>▶ The tools required for installation and assembly are not included in the scope of delivery.</li> <li>● Use appropriate, functional and safe tools.</li> </ul>

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. Use appropriate protective gear as specified in plant operator's guidelines.
5. Observe appropriate regulations for connections.
6. Installation work must be performed by trained personnel.
7. Shut off plant or plant component.
8. Secure the plant or plant component against recommissioning.
9. Depressurize the plant or plant component.
10. Completely drain the plant or plant component and allow it to cool down until the temperature is below the media vaporization temperature and cannot cause scalding.
11. Pay attention to the installation position (see chapter "Installation position").

### 10.2 Installation position

The installation position of the product is optional.

### **10.3 Mounting without mounting flange**

1. Before mounting the valve body, machine the housing in accordance with the borehole pattern in the chapter "Dimensions" so that the valve body can be secured to the housing.
2. Secure the valve body to the housing using four screws.
3. Re-attach or reactivate all safety and protective devices.

### **10.4 Mounting with mounting flange**

1. Before mounting the actuator, machine the housing in accordance with the borehole pattern in the chapter "Dimensions" so that the valve body can be guided through the recess.
2. Guide the valve body through the recess in the housing. The actuator's mounting flange must be flush with the housing.
3. Connect the mounting flange and housing using appropriate screws and washers (not included in the scope of delivery).

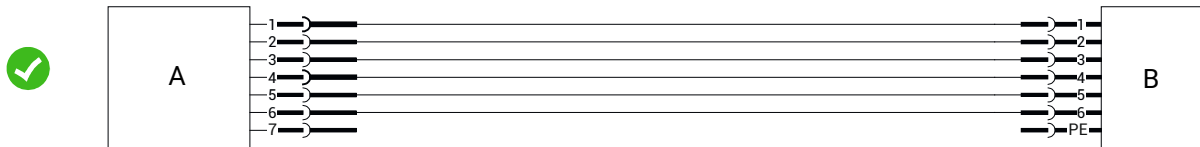
## 11 Specific data IO-Link (pin 6)

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.

### 11.1 Operation on IO-Link

#### 11.1.1 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

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

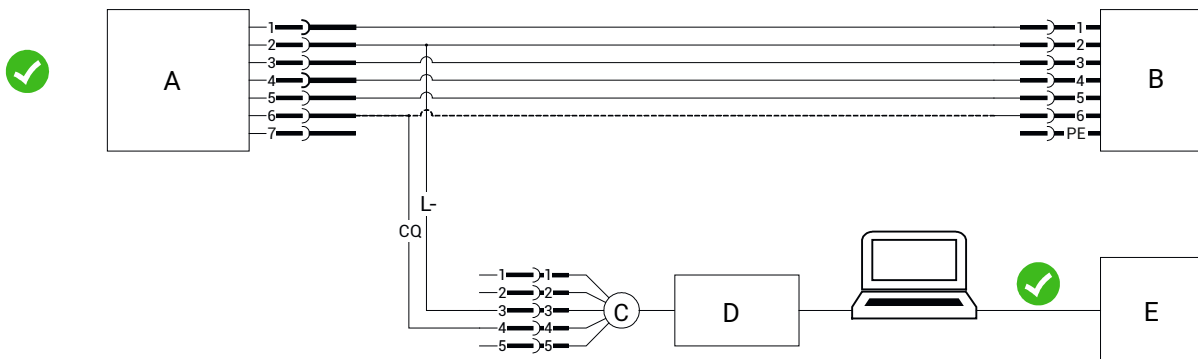
##### Basics

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

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

#### Basics

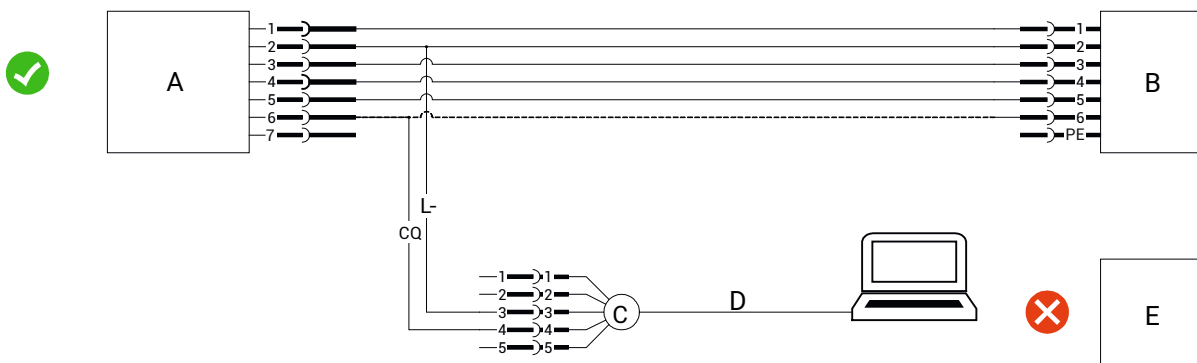
Only one laptop can be used if no galvanic isolation is available for the USB interface during communication via a USB IO-Link master. No other peripheral devices may be connected to the laptop. The laptop may only be operated without a power supply unit.

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

**11.1.4 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.

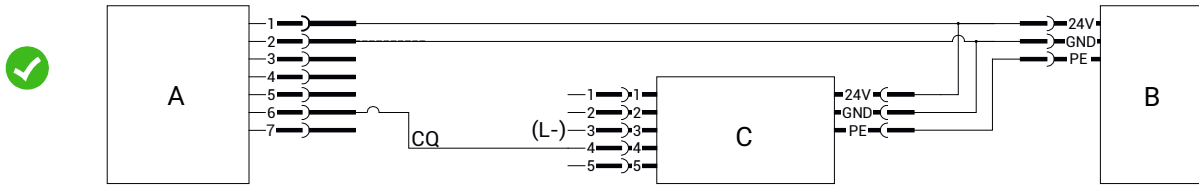
**11.1.4.1 Identical power supply**

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.



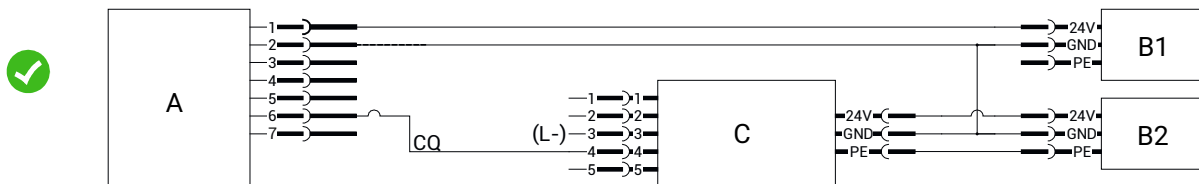
Item	Name
A	eSyStep
B	Supply voltage
C	USB IO-Link Master

**11.1.4.2 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

## 11.2 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 → Normal operation
		1 → Initialization mode
Locate	3	0 → Off
		1 → On

### 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

11.3 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	Factory settings	Setting options
0x02	0	W	System command		Transmission of commands for block parameterization and data storage		0x01 to 0x06 0x82 0xA2
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 On/Off"
0x13	0	RO	Product ID		Read out product ID		"eSyStep On/Off"
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	Factory 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		
0x40	0	RO	Actuator size		Read out actuator size	Depending on the actuator size used	0 → Actuator size 0 1 → Actuator size 1 2 → Actuator size 2
0x4B	1	R/W	Function digital inputs	Input 1	Configure digital input 1	1	0 → Off 1 → Open 2 → Close 3 → Safe/On 4 → Init
	2	R/W		Input 2	Configure digital input 2	2	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	0	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

Index	Sub-Index	Access rights	Index name	Parameter	Function	Factory settings	Setting options
0x4F	0	R/W	Error action	Error action	Set safety position	2	0 → Hold 1 → Open 2 → Close
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		Initialization mode	Set initialization mode auto / manual	0	0 → Automatic 1 → Manual
	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
0x56	1	R/W	Cycle counter	User	Customer switching cycles (resettable)	0	0 ... 16.777.215
	2	RO		Total	Total of switching cycles (not resettable)	0	0 ... 16.777.215
0x57	1	RO	Failure counter	Undervoltage	Number of undervoltage errors (U < 17.4)	0	0 ... 65.535
	2	RO		Temperature error	Number of errors or switch-offs of the actuator due to overtemperature	0	0 ... 65.535
	3	RO		Motor unable to move	Motor fault / motor blocked	0	0 ... 65.535
	4	RO		Internal error	Internal error of the actuator	0	0 ... 65.535

Index	Sub-Index	Access rights	Index name	Parameter	Function	Factory settings	Setting options
	5	RO		Emergency power	Supply voltage low / activation of Save/ on input	0	0 ... 65.535
	6	RO		Potifail open	Valve position OPEN error	0	0 ... 65.535
	7	RO		Potifail close	Valve position CLOSED error	0	0 ... 65.535
	8	RO		Overcurrent out 1	Overcurrent / short-circuit digital output 1	0	0 ... 65.535
	9	RO		Overcurrent out 2	Overcurrent / short-circuit digital output 2	0	0 ... 65.535
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
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	1	R/W	Drive sets	Speed	Speed – average traversing range	3	1 ... 3
	2	R/W		Force	Force, dependent on valve used		1 ... 6

**11.4 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.

**11.4.1 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	<b>System command</b>		UIntegerT	0x01 to 0x06 0x82 0xA2

**Description of parameter values**

Index name	Parameter	Values	Description
System command		0x01 to 0x06	Access to IO-Link
		0x82	Reset product to default settings *
		0xA2	Reset customized cycle counter

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

**11.4.2 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 11.4.3, page 29) 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	<b>Data storage index</b>	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	

### 11.4.3 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	<b>Device access locks</b>	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

### 11.4.4 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	<b>Profile Characteristics</b>		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

#### 11.4.5 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	<b>ProcessData Input Descriptor</b>		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

#### 11.4.6 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	<b>ProcessData Output Descriptor</b>		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

#### 11.4.7 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	<b>Vendor name</b>		StringT	"GEMUE"

#### 11.4.8 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	14 bytes	<b>Product name</b>		StringT	"eSyStep On/Off"

#### 11.4.9 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	14 bytes	<b>Product ID</b>		StringT	"eSyStep On/Off"

#### 11.4.10 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	<b>Serial number</b>		StringT	"XXXXXXXX/YYYY"

#### 11.4.11 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	<b>Hardware revision</b>		StringT	"Rev. XX/XX"

#### 11.4.12 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	9 bytes	<b>Firmware revision</b>		StringT	"V X.X.X.X"

#### 11.4.13 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	<b>Application specific tag</b>		StringT	"***** "

**11.4.14 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	<b>Function tag</b>		StringT	„*****“

**11.4.15 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	<b>Location tag</b>		StringT	„*****“

**11.4.16 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	<b>Device Status</b>		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

**11.4.17 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	<b>Detailed Device Status</b>		ArrayT	See chapter 12.5 Events

**Description of parameter values**

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



### 11.4.18 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	<b>Actuator size</b>		uint: 8	Depending on the actuator size used	0 → size 0	
										1 → size 1
										2 → size 2

### 11.4.19 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	<b>Function digital inputs</b>	Input 1	uint:8	<b>1</b>	0
									<b>1</b>
									2
									3
									4
	2	8	R/W	3 bits		Input 2	uint:8	<b>2</b>	0
									1
									<b>2</b>
									3
									4

**Description of parameter values**

Index name	Parameter	Values	Description
Function digital inputs	Input 1	0	<b>(Off)</b> Input without function.
		1	<b>(Open)</b> In case of the corresponding signal, the actuator moves in the <b>OPEN</b> 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	<b>(Close)</b> In case of the corresponding signal, the actuator moves in the <b>CLOSED</b> 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	<b>(Safe / On)</b> 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	<b>(Init)</b> Input can be used as an initialization input.
		0	<b>(Off)</b> Input without function.
	Input 2	1	<b>(Open)</b> In case of the corresponding signal, the actuator moves in the <b>OPEN</b> 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	<b>(Close)</b> In case of the corresponding signal, the actuator moves in the <b>CLOSED</b> 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	<b>(Safe/On)</b> 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	<b>(Init)</b> Input can be used as an initialization input.

### 11.4.20 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	<b>Function digital in- / output 1</b>	In- / output 1	uint:8	<b>4</b>	0
									1
									2
									3
									<b>4</b>
	2	8	R/W	3 bits		Type in- / output 1	uint:8	<b>0</b>	0
									1
									2
									2

#### Description of parameter values

Index name	Parameter	Values	Description
Function digital in- / output 1	In- / output	0	<b>(Output Open)</b> Signal is output with the corresponding valve position. Detection of Open depends on the setting of the parameter <b>Position Feedback</b> (index 0x51 (see "Actuator position feedback", page 39)) and a correct initialization.
		1	<b>(Output Close)</b> Signal is output with the corresponding valve position. Detection of Close depends on the setting of the parameter <b>Position Feedback</b> (index 0x51 (see "Actuator position feedback", page 39)) and a correct initialization.
		2	<b>(Output Error)</b> Only output error detection.
		3	<b>(Output Error &amp; Warning)</b> Output error and warnings.
		4	<b>(Input Init)</b> Configure input/output as initialization input.
	Type in- / output	0	<b>(Push-Pull)</b> Configure output as Push-Pull.
		1	<b>(NPN)</b> Configure output as NPN.
		2	<b>(PNP)</b> Configure output as PNP.

**11.4.21 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	<b>Function digital output 2</b>		uint:8	<b>2</b>	0	
										1
										2
										3

**Description of parameter values**

Index name	Parameter	Values	Description
Function digital output		0	<b>(Output Open)</b> Signal is output with the corresponding valve position. Detection of Open depends on the setting of the parameter <b>Position Feedback</b> (index 0x51 (see "Actuator position feedback", page 39)) and a correct initialization.
		1	<b>(Output Close)</b> Signal is output with the corresponding valve position. Detection of Close depends on the setting of the parameter <b>Position Feedback</b> (index 0x51 (see "Actuator position feedback", page 39)) and a correct initialization.
		2	<b>(Output Error)</b> Only output error detection.
		3	<b>(Output Error &amp; Warning)</b> Output error and warnings.

**11.4.22 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	<b>Logic digital inputs / outputs</b>	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	<b>(Active high)</b> Input 1 <b>not</b> inverted.
		1	<b>(Active low)</b> Input 1 inverted.
	Input 2	0	<b>(Active high)</b> Input 2 <b>not</b> inverted.
		1	<b>(Active low)</b> Input 2 inverted.
	Input / output 1	0	<b>(Active high)</b> Input/output <b>not</b> inverted.
		1	<b>(Active low)</b> Input/output inverted.
	Output 2	0	<b>(Active high)</b> Output <b>not</b> inverted.
		1	<b>(Active low)</b> Output inverted.

### 11.4.23 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 (see "Failure counter", page 40).

#### 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	0	0	R/W	2 bits	<b>Error action</b>	Error action	uint:8	<b>2</b>	0
									1
									2

#### Description of parameter values

Index name	Parameter	Values	Description
Error action	Error action	0	<b>(Hold)</b> Actuator remains in the current position in case of an error.
		1	<b>(Open)</b> Actuator moves to the OPEN position in case of an error.
		2	<b>(Close)</b> Actuator moves to the CLOSED position in case of an error.

**11.4.24 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	<b>Basic settings</b>	Inversion of LED colours	Boolean	0	<b>0</b>
									1
	2	1	R/W	1 bit		On site initialization	Boolean	0	<b>0</b>
									1
	3	2	R/W	1 bit		Initialization mode	Boolean	0	<b>0</b>
									1
	4	3	R/W	1 bit		IO-Link process data	Boolean	0	<b>0</b>
									1

**Description of parameter values**

Index name	Parameter	Values	Description
Basic settings	Inversion of LED colours	0	<b>(Standard)</b> LEDs Close = green and Open = yellow ( <b>not</b> inverted).
		1	<b>(Inversed)</b> LEDs Close = yellow and Open = green (inversed).
	On site initialization	0	<b>(Enabled)</b> On-site initialization activated.
		1	<b>(Disabled)</b> On-site initialization deactivated.
	Initialization mode	0	Automatic initialization mode activated.
		1	Manual initialization mode activated.
	IO-Link process data	0	<b>(Disabled)</b> Use of IO-Link process data (see "Process data", page 23) is deactivated.
		1	<b>(Enabled)</b> Use of IO-Link process data (see "Process data", page 23) is activated.

### 11.4.25 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	<b>Actuator position feedback</b>	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

### 11.4.26 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	<b>Initialized positions</b>	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).

### 11.4.27 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	Offset	Access Rights	Length	Index name	Parameter	Type	Default	Values
0x55	1	0	RO	12 bits	<b>Calibration positions</b>	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.

### 11.4.28 Cycle counter

Switching cycles of the actuator or of the valve are counted with the **Cycle counter** parameter.  
For a switching cycle, end position OPEN and then end position CLOSED must be detected. This also means that cycles are not counted for a programming/initialization error.

Index	Sub-Index	Offset	Access Rights	Length	Index name	Parameter	Type	Default	Values
0x56	1	0	R/W	24 bits	<b>Cycle counter</b>	User	uint:24	0	0 ... 16.777.215
	2	32	RO	24 bits		Total	uint:24	0	0 ... 16.777.215

#### Description of parameter values

Index name	Parameter	Values	Description
Cycle counter	User	0 ... 16.777.215	Customer switching cycles (resettable)
	Total	0 ... 16.777.215	Total of switching cycles (not resettable)

### 11.4.29 Failure counter

For the **Failure counter** parameter, occurring errors and events are counted and emitted.

Index	Sub-Index	Offset	Access Rights	Length	Index name	Parameter	Type	Default	Values
0x57	1	0	RO	16 bits	<b>Failure counter</b>	Undervoltage	uint: 16	-	0 ... 65.535
	2	16	RO	16 bits		Temperature error	uint: 16	-	0 ... 65.535
	3	32	RO	16 bits		Motor unable to move	uint: 16	-	0 ... 65.535
	4	48	RO	16 bits		Internal error	uint: 16	-	0 ... 65.535
	5	64	RO	16 bits		Emergency power	uint: 16	-	0 ... 65.535
	6	80	RO	16 bits		Potifail open	uint: 16	-	0 ... 65.535
	7	96	RO	16 bits		Potifail close	uint: 16	-	0 ... 65.535
	8	112	RO	16 bits		Overcurrent out 1	uint: 16	-	0 ... 65.535
	9	128	RO	16 bits		Overcurrent out 2	uint: 16	-	0 ... 65.535



### Description of parameter values

Index name	Parameter	Values	Description
Failure counter	Undervoltage	0 ... 65.535	Number of undervoltage errors (U < 17.4 V)
	Temperature error	0 ... 65.535	Number of actuator switch-offs due to excessive motor temperature
	Motor unable to move	0 ... 65.535	Number of motor errors
	Internal error	0 ... 65.535	Number of internal errors
	Emergency power	0 ... 65.535	Number of emergency power cases
	Potifail open	0 ... 65.535	Number of times the actuator has moved to its mechanical stop OPEN.
	Potifail close	0 ... 65.535	Number of times the actuator has moved to its mechanical stop CLOSED.
	Overcurrent out 1	0 ... 65.535	Number of times output 1 has switched off due to excessive output current.
	Overcurrent out 2	0 ... 65.535	Number of times output 2 has switched off due to excessive output current.

#### 11.4.30 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	<b>Analog values</b>	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

### 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.

**11.4.31 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	<b>Operating times</b>	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.

**11.4.32 Drive sets**

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

Index	Sub-Index	Offset	Access Rights	Length	Index name	Parameter	Type	Default	Values
0x90	1	0	R/W	2 bits	<b>Drive sets</b>	Speed		3	1 ... 3
	2	8	R/W	3 bits		Force		-	1 ... 6

**Description of parameter values**

Index name	Parameter	Values	Description
Drive sets	Speed	1 ... 3	Select the speeds for the average travel range.
	Force	1 ... 6	Set the force for the average travel range and for sealing. Preset at the factory depending on the valve type.

**Speed**

Actuator size	Setting parameter	Average speed in mm / s
AG0 and AG1	1 (43 %)	1.6
	2 (71 %)	2.3
	3 (100 %)	3.0

**Force settings**

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

**11.5 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

Event	Mode	Type	Code
Potifail Close	App/Disapp	Warning	0x8CA5
Potifail Open	App/Disapp	Warning	0x8CA4
Init Fail With No Stroke	App/Disapp	Warning	0x8CA6
Init Fail With Less Stroke	App/Disapp	Warning	0x8CA7
Init Fail After Potifail	App/Disapp	Warning	0x8CA8
Not Calibrated	App/Disapp	Warning	0x8CA9
Over Current Output 1	App/Disapp	Warning	0x8CC0
Over Current Output 2	App/Disapp	Warning	0x8CC1
Non Volatile Memory Loss	Single Shot	Warning	0x5011
Parameter Changed	Single Shot	Information	0x6350

### 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. Parameter can no longer be read when switching the device on.	Contact GEMÜ Support
Motor Unable To Move 0x8CE0	The event occurs when the motor is blocked.	Valve is blocked (for example, solid stuck in valve). Valve corroded (rusted in place). End position can no longer be reached (after replacing the diaphragm).	Check valve Carry out initialization if valve is OK
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

Event	Description	Possible cause	Troubleshooting
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
Init Fail 0x8CA6 0x8CA7 0x8CA8	The events occur if the distance between the OPEN and CLOSED positions determined during initialization is implausible.	Valve is blocked (for example, solid stuck in valve). Valve is corroded (rusted in place). Valve not yet initialized. Initialization carried out with incorrectly mounted valve (spindle, diaphragm or valve body incorrectly mounted, for example).	Check valve Carry out initialization if valve is OK
Not Calibrated 0x8CA9	The event occurs if the actuator does not have a valid calibration. The actuator is calibrated in the factory.		Contact GEMÜ Support
Over Current Output 1 0x8CC0	The event occurs when a short circuit is present at pin 5 (digital input/digital output).	Supply line insulation is damaged. Incorrect pin configuration. Incorrect wiring of the pin.	Check supply line Check pin configuration Check the wiring of the pin
Over Current Output 2 0x8CC1	The event occurs when a short circuit is present at pin 6 (digital output (IO-Link)).	Supply line insulation is damaged. Incorrect wiring of the pin.	Check supply line Check the wiring of the pin
Non Volatile Memory Loss 0x5011	The event occurs when it has been determined when starting the actuator that the specific data in the actuator's read-only memory has been changed unintentionally.	Save values in the read-only memory in case of power failure (eSyStep OPEN/CLOSE does not have any power buffering).	It is uncritical data in the case of this event, the actuator still functions
Parameter Changed 0x6350	The event occurs when it is has been determined when starting the actuator that the configuration data in the actuator's read-only memory has been changed unintentionally. The configuration data that has been changed has been reset to its default values. The event serves to signal the changes in the configuration data.	Save values in the read-only memory in case of power failure (eSyStep OPEN/CLOSE does not have any power buffering).	Check the configuration of the actuator

## 12 Operation

### 12.1 Initialization

Initialization must be carried out in the following situations:

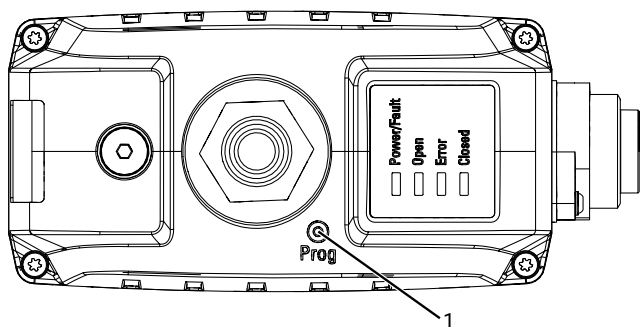
- Retrofitting an electrical position indicator
- Tube replacement
- Tube holder replacement
- Compressor replacement

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")

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



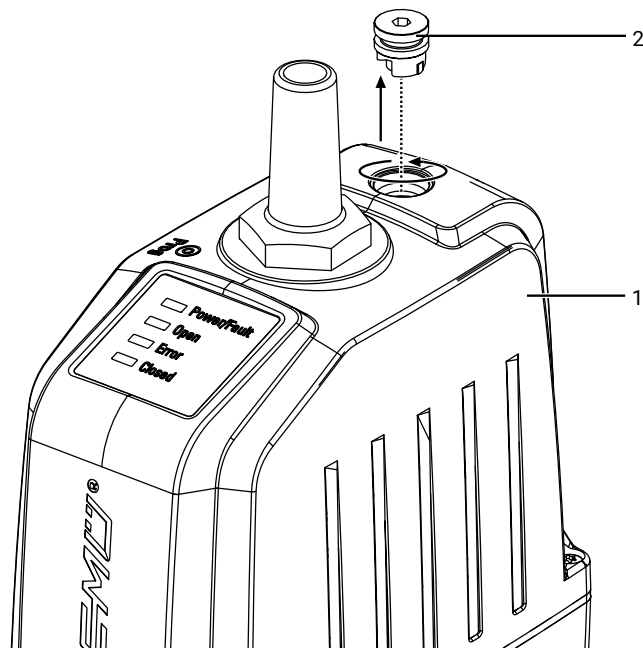
1. Connect supply voltage.
2. Hold the magnet briefly (>100 ms) at the point on the housing cover marked with PROG 1.
  - ⇒ OPEN and CLOSED LEDs flash alternately.
3. Valve automatically moves into the OPEN position.
4. Valve automatically moves into the CLOSED position.
5. Initialization mode is automatically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

#### 12.1.2 Initialization of the end positions via IO-Link

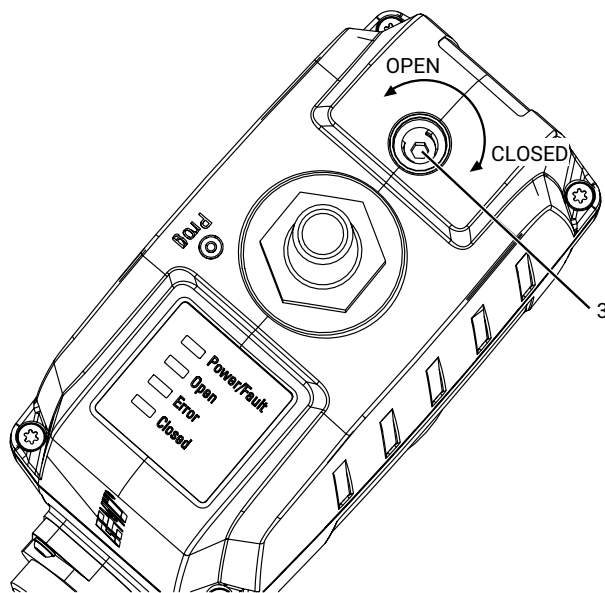
1. Select automatic initialization mode (parameter data "Initialization Mode").
2. Briefly activate (>100 ms) initialization mode (process data "Selection of operating mode").
  - ⇒ OPEN and CLOSED LEDs flash alternately.
3. Valve automatically moves into the OPEN position.
4. Valve automatically moves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

### 12.2 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.

### 13 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.

#### ⚠ CAUTION



**Risk of crushing!**

- ▶ Risk of severe injury!
- Before performing any work on the GEMÜ product, depressurize the plant.

#### NOTICE

**Requirements for tube lines used!**

- ▶ Use tube lines suitable for the application, see manufacturer's information.
- Only use undamaged tube lines.

#### NOTICE

**Lay tube lines professionally!**

- ▶ Lay tube lines professionally and do not bend them below the minimum bending radius, see manufacturer's information.
- Do not kink or twist the tube lines.

#### 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.

### 13.1 Removing the tube

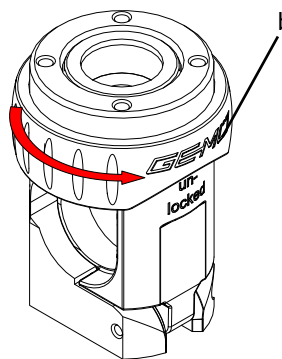
#### ⚠ CAUTION



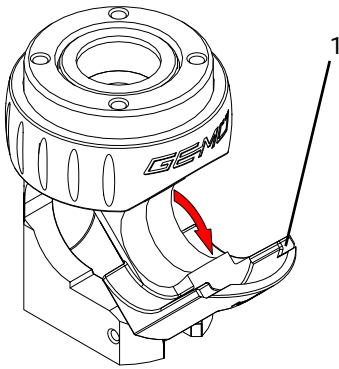
**Risk of crushing!**

- ▶ While the tube holder is open, the actuator can move. Severe injury due to crushing or shearing of the fingers.
- Ensure that the actuator remains in the open position during tube replacement.
- Do not reach into the tube crushing area.

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



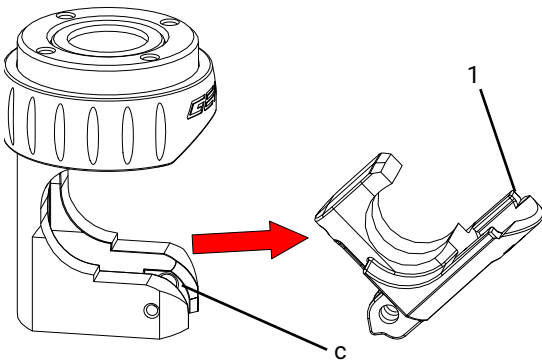
2. Turn the locking ring **b** by 90° in the direction of the arrow.
  - ⇒ The word "unlocked" can be read on the tube holder.



3. Open the tube holder 1.
4. Remove the tube.

### 13.2 Disassembling the tube holder

1. Remove the tube (see "Removing the tube", page 46).



2. Loosen the fixing screw **c** using an Allen key.
3. Remove the tube holder 1.

### 13.3 Disassembling the compressor

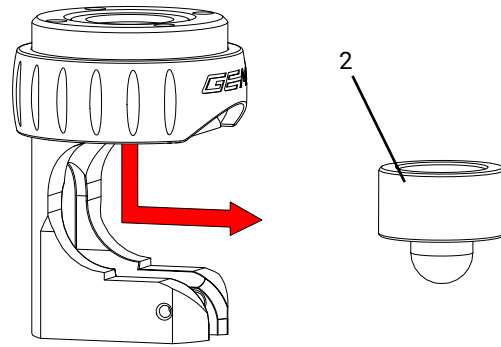
#### CAUTION



#### Risk of crushing due to the compressor shutting down!

- ▶ Severe injury due to crushing or shearing of the fingers.
- Ensure that the actuator remains in the open position while replacing the compressor.
- Do not reach into the tube crushing area.

1. Remove the tube (see "Removing the tube", page 46).
2. Disassemble the tube holder (see "Disassembling the tube holder", page 47).
3. Move the actuator **A** to the closed position.



4. Pull the compressor 2 out downwards.

### 13.4 Installing the compressor

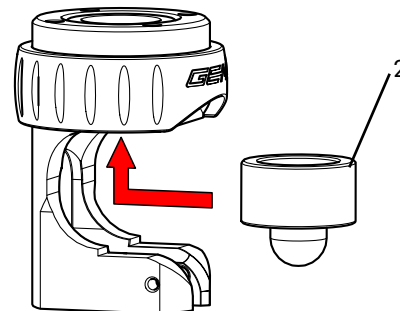
#### CAUTION



#### Risk of crushing due to the compressor shutting down!

- ▶ Severe injury due to crushing or shearing of the fingers.
- Ensure that the actuator remains in the open position while replacing the compressor.
- Do not reach into the tube crushing area.

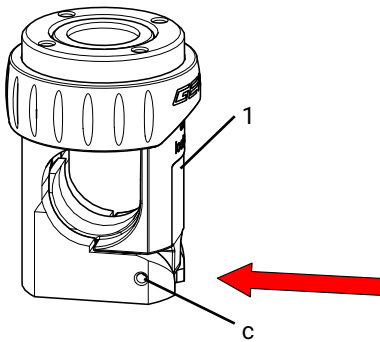
1. Remove the tube (see "Removing the tube", page 46).
2. Disassemble the tube holder (see "Disassembling the tube holder", page 47).
3. Disassemble the compressor (see "Disassembling the compressor", page 47).



4. Insert the compressor 2 and press upwards until the compressor engages.
5. Move the actuator **A** to the open position.

### 13.5 Assembling the tube holder

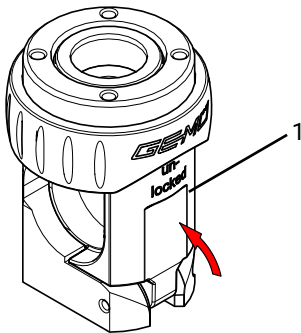
1. Disassemble the tube holder (see "Disassembling the tube holder", page 47).



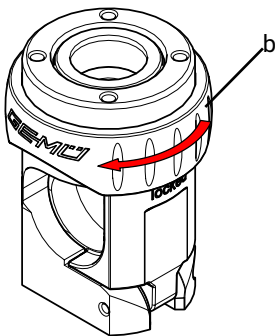
2. Insert the tube holder 1.
3. Tighten the fixing screw c using an Allen key.

### 13.6 Inserting the tube

1. Remove the tube (see "Removing the tube", page 46).
2. Insert the tube.



3. Close the tube holder 1.



































































4. Turn the locking ring b by 90° in the direction of the arrow.  
⇒ The word "locked" can be read on the tube holder.
5. With the valve fully assembled, check the function and tightness.



## 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			
Mechanical stop, OPEN position				
Mechanical stop, CLOSED position				
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
	Tube leaking or damaged	Check tube for potential damage, replace tube if necessary
The product does not open or does not open fully	Actuator defective	Replace valve
	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

### **15 Removal**

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

### **16 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.

### **17 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.



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

Subject to alteration

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