

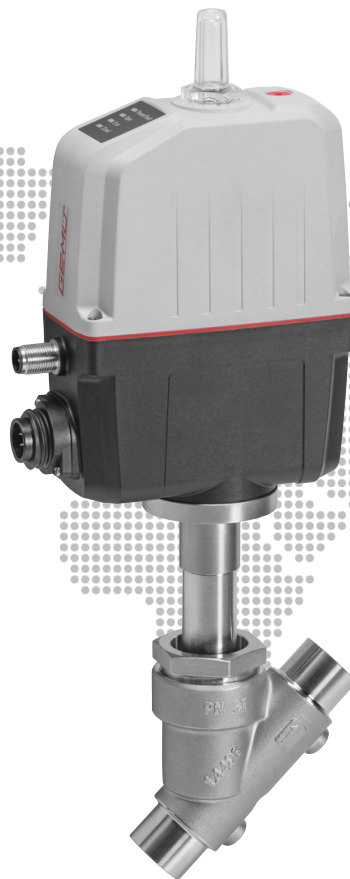
GEMÜ 543 eSyStep

Positioner (Code S0)

Motorized angle seat globe 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.

Diaphragm size

Uniform seat size of GEMÜ diaphragm valves for different nominal sizes.

1.5 Warning notes


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


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

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

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

NOTICE	
	Potentially dangerous situation! <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 materials.

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:

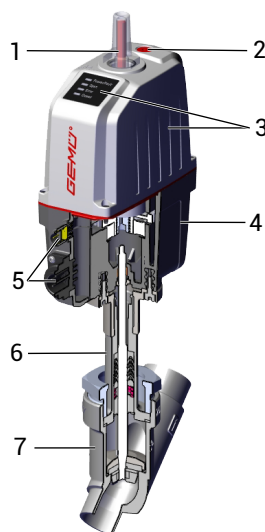
9. Keep this document available at the place of use.
10. Observe the safety information.
11. Operate the product in accordance with this document.
12. Operate the product in accordance with the specifications.
13. Maintain the product correctly.
14. Do not carry out any maintenance work and repairs not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

In cases of uncertainty:

15. Consult the nearest GEMÜ sales office.

3 Product description

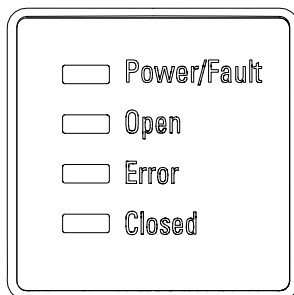
3.1 Construction



Item	Name	Materials
1	Optical position indicator	PA 12
2	Manual override	
3	Actuator top with LED display	Polyamide, 50% glass fibre
4	Actuator base	Polyamide, 50% glass fibre
5	Electrical connections	
6	Distance piece with leak detection hole	1.4305 / 1.4408
7	Valve body	1.4435 and 1.4408 (investment casting), 1.4435 (F316L) forged body, cast bronze

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 543 eSyStep 2/2-way angle seat globe valve is electrically operated. The eSyStep actuator is available as an ON/OFF actuator or as an actuator with integrated positioner. The valve spindle is sealed by a self-adjusting gland packing providing low maintenance and reliable valve spindle sealing even after a long service life. A wiper ring fitted in front of the gland packing protects the seal against contamination and damage. An integral optical and electrical position indicator is standard.

3.4 Function

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

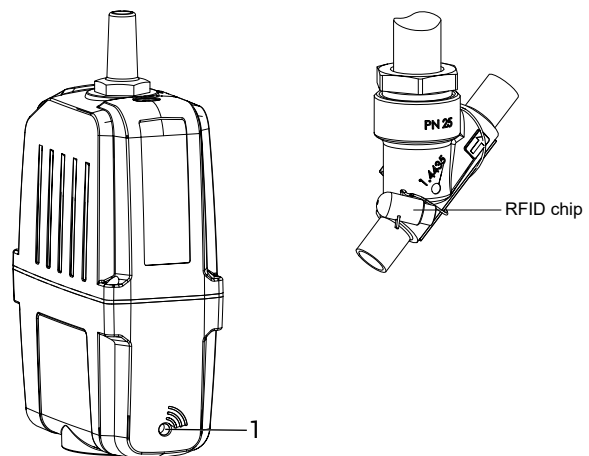
The product is equipped as standard with a mechanical position indicator as well as an electrical position and status indicator.

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

Valve body 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 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
Angle seat globe valve, electrically operated, eSyStep	543
2 DN	Code
DN 6	6
DN 8	8
DN 10	10
DN 15	15
DN 20	20
DN 25	25
3 Body configuration	Code
2/2-way body	D
Angle valve body	E
4 Connection type	Code
Spigot	
Spigot DIN	0
Spigot EN 10357 series B, formerly DIN 11850 series 1	16
Spigot EN 10357 series A (formerly DIN 11850 series 2)/DIN 11866 series A	17
Spigot DIN 11850 series 3	18
Spigot SMS 3008	37
Spigot ASME BPE	59
Spigot ISO 1127/EN 10357 series C/DIN 11866 series B	60
Spigot ANSI/ASME B36.19M schedule 10s	63
Spigot ANSI/ASME B36.19M schedule 40s	65
Threaded connection	
Threaded socket DIN ISO 228	1
Threaded socket BS 21 Rc, end-to-end dimension ETE DIN 3202-4 series M8	3C
Threaded socket NPT, end-to-end dimension ETE DIN 3202-4 series M8	3D
Threaded spigot DIN ISO 228	9
Flange	
Flange EN 1092, PN 25, form B, face-to-face dimension FTF EN 558 series 1, ISO 5752, basic series 1	10
Flange EN 1092, PN 25, form B	13
Flange ANSI Class 150 RF	47
Clamp	
Clamp ASME BPE, face-to-face dimension FTF ASME BPE	80
Clamp DIN 32676 series B, face-to-face dimension FTF EN 558 series 1	82

4 Connection type	Code
Clamp DIN 32676 series A, face-to-face dimension FTF EN 558 series 1	86
Clamp ASME BPE, face-to-face dimension FTF EN 558 series 1	88
5 Valve body material	Code
1.4435, investment casting	34
1.4408, investment casting	37
1.4435 (F316L), forged body	40
1.4435, investment casting	C2
6 Seat seal	Code
PTFE	5
PTFE, glass fibre reinforced	5G
1.4404	10
7 Voltage/frequency	Code
24 V DC	C1
8 Control module	Code
Positioner	S0
Positioner, configured for emergency power module (NC)	S5
Positioner, configured for emergency power module (NO)	S6
9 Regulating cone	Code
without	
Please find the number of the optional regulating cone (R-No.) for the linear or equal-percentage modified regulating cone in the Kv value table.	R....
10 Actuator version	Code
Actuator size 0	0A
11 Type of design	Code
without	
Ra ≤ 0.6 µm (25 µinch) for media wetted surfaces, in accordance with ASME BPE SF2 + SF3 mechanically polished internal	1903
Ra ≤ 0.8 µm (30 µinch) for media wetted surfaces, in accordance with DIN 11866 H3, mechanically polished internal	1904
Ra ≤ 0.4 µm (15 µinch) for media wetted surfaces, in accordance with DIN 11866 H4, ASME BPE SF1 mechanically polished internal	1909
Spindle seal PTFE-PTFE	2013
12 CONEXO	Code
without	
Integrated RFID chip for electronic identification and traceability	C

Order example

Order option	Code	Description
1 Type	543	Angle seat globe valve, electrically operated, eSyStep
2 DN	25	DN 25
3 Body configuration	D	2/2-way body
4 Connection type	1	Threaded socket DIN ISO 228
5 Valve body material	37	1.4408, investment casting
6 Seat seal	5	PTFE
7 Voltage/frequency	C1	24 V DC
8 Control module	S0	Positioner
9 Regulating cone	R....	Please find the number of the optional regulating cone (R-No.) for the linear or equal-percentage modified regulating cone in the Kv value table.
10 Actuator version	0A	Actuator size 0
11 Type of design		without
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.

Max. permissible viscosity: 600 mm²/s (cSt)
Other versions for lower/higher temperatures and higher viscosities on request.

7.2 Temperature

Media temperature: -10 to 180 °C

Ambient temperature: 0 to 60 °C*

* Depending on version and/or operating parameters (see chapter duty cycle and service life)

7.3 Pressure

Operating pressure:

DN	Actuator version 0A	Actuator version 0E
6	-	0 – 25
8		0 – 25
10	-	0 – 25
15	0 – 15	0 – 25
20	0 – 10	-
25	0 – 6	-

Pressures in bar

All pressures are gauge pressures.

For max. operating pressures the pressure / temperature correlation must be observed.

Higher operating pressures on request

Leakage rate:

Control valve

Seat seal	Standard	Test procedure	Leakage rate	Test medium
Metal	DIN EN 60534-4	1	IV	Air
PTFE, FPM, EPDM	DIN EN 60534-4	1	VI	Air

Pressure/temperature correlation:

Connection types code ¹⁾	Material code ²⁾	Max. allowable operating pressures in bar at temperature in °C			
		RT	100	150	200
1, 9, 17, 37, 60, 63, 3C, 3D	37	25.0	23.8	21.4	18.9
0, 16, 17, 18, 37, 59, 60, 65	34	25.0	24.5	22.4	20.3
13 (DN 15 - DN 50)	34	25.0	23.6	21.5	19.8
80, 88 (DN 15 - DN 40)	34	25.0	21.2	19.3*	-
80, 88 (DN 50 - DN 80)	34	16.0	16.0	16.0*	-
82 (DN 15 - DN 32)	34	25.0	21.2	19.3*	-
82 (DN 40 - DN 65)	34	16.0	16.0	16.0*	-
86 (DN 15 - DN 40)	34	25.0	21.2	19.3*	-
86 (DN 50 - DN 65)	34	16.0	16.0	16.0*	-

Pressure/temperature correlation:

Connection types code ¹⁾	Material code ²⁾	Max. allowable operating pressures in bar at temperature in °C			
		RT	100	150	200
10 (DN 15 - DN 50)	37	25.0	25.0	22.7	21.0
47 (DN 15 - DN 50)	34	15.9	13.3	12.0	11.1
0, 16, 17, 18, 59, 60	40	25.0	20.6	18.7	17.1
17, 59, 60	C2	25.0	21.2	19.3	17.9

* max. temperature 140 °C

1) Connection type

Code 0: Spigot DIN

Code 1: Threaded socket DIN ISO 228

Code 3C: Threaded socket BS 21 Rc, end-to-end dimension ETE DIN 3202-4 series M8

Code 3D: Threaded socket NPT, end-to-end dimension ETE DIN 3202-4 series M8

Code 9: Threaded spigot DIN ISO 228

Code 10: Flange EN 1092, PN 25, form B, face-to-face dimension FTF EN 558 series 1, ISO 5752, basic series 1

Code 13: Flange EN 1092, PN 25, form B

Code 16: Spigot EN 10357 series B, formerly DIN 11850 series 1

Code 17: Spigot EN 10357 series A (formerly DIN 11850 series 2)/DIN 11866 series A

Code 18: Spigot DIN 11850 series 3

Code 37: Spigot SMS 3008

Code 47: Flange ANSI Class 150 RF

Code 59: Spigot ASME BPE

Code 60: Spigot ISO 1127/EN 10357 series C/DIN 11866 series B

Code 63: Spigot ANSI/ASME B36.19M schedule 10s

Code 65: Spigot ANSI/ASME B36.19M schedule 40s

Code 80: Clamp ASME BPE, face-to-face dimension FTF ASME BPE

Code 82: Clamp DIN 32676 series B, face-to-face dimension FTF EN 558 series 1

Code 86: Clamp DIN 32676 series A, face-to-face dimension FTF EN 558 series 1

Code 88: Clamp ASME BPE, face-to-face dimension FTF EN 558 series 1

2) Valve body material

Code 34: 1.4435, investment casting

Code 37: 1.4408, investment casting

Code 40: 1.4435 (F316L), forged body

Code C2: 1.4435, investment casting

Kv values:**Control valve**

DN	Operating pressure [bar]	Kv value [m³/h]	Seat seal code	R-Number	
	0A			Linear	Equal-percentage
15	25	0.1	10	RA205	RA409
	25	0.16	10	RB213	RA410
	25	0.25	10	RB214	RB409
	25	0.4	10	RB215	RB410
	25	0.63	10	RC209	RC410
	25	1	10	RC210	RC411
	25	1.6	5, 5G	RD211	RD411
	25 ¹⁾	2.5	5, 5G	RE213	RE413
20	25	1.6	5, 5G	RD212	RD412
	25	2.5	5, 5G	RE214	RE414
	25	4	5, 5G	RF215	RF415
	15 ¹⁾	6.3	5, 5G	RG217	RG417
25	25	2.5	5, 5G	RE215	RE415
	25	4	5, 5G	RF216	RF416
	15	6.3	5, 5G	RG218	RG418
	10 ¹⁾	10	5, 5G	RH217	RH417

1) not for connection codes 37, 59, 80, 88

Kv values determined in accordance with DIN EN 60534. The Kv value specifications refer to the largest actuator for the respective nominal size. The Kv values for other product configurations (e.g. other connections or body materials) may differ.

7.4 Product compliance**Food:**

Regulation (EC) No. 1935/2004*

Regulation (EC) No. 10/2011*

FDA*

* depending on version and/or operating parameters

Pressure Equipment Directive:

2014/68/EU

Machinery Directive:

2006/42/EU

7.5 Mechanical data**Protection class:**

IP 65 acc. to EN 60529

Weight:

Actuator

950 g

Body

DN	Spigot K514	Threaded socket	Threaded spigot	Flange K514	Clamp
	Connection types code				
	0, 16, 17, 18, 1A, 1B, 37, 55, 59, 60, 63, 65	1, 3D	9	8, 10, 13, 47	80, 82, 86, 88
6	0.12	-	0.14	-	-
8	0.12	0.25	0.12	-	-
10	0.12	0.25	0.14	-	-
15	0.16	0.25	0.14	-	-

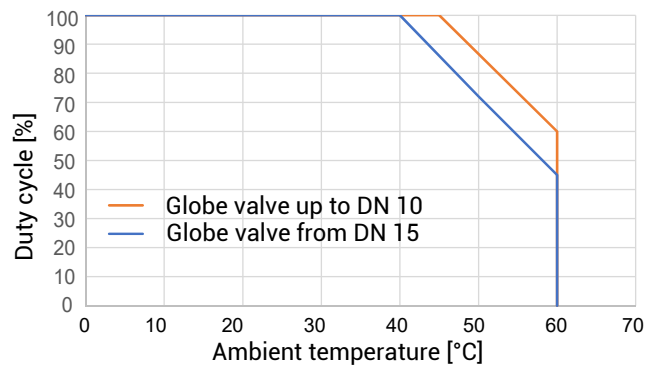
Weight:

DN	Spigot K514	Threaded socket	Threaded spigot	Flange K514	Clamp
	Connection types code				
	0, 16, 17, 18, 1A, 1B, 37, 55, 59, 60, 63, 65	1, 3D	9	8, 10, 13, 47	80, 82, 86, 88
10	0.25	0.25	-	-	-
15	0.24	0.35	0.31	1.8	0.370
20	0.50	0.35	0.50	2.5	0.634
25	0.50	0.35	0.65	3.1	0.628

Weights in kg

Actuating speed: Max. 3 mm/s**7.6 Duty cycle and service life**

Service life: **Control operation** - Class C according to EN 15714-2 (1,800,000 starts and 1200 starts per hour).
Open/Close duty - At least 500,000 switching cycles at room temperature and permissible duty cycle.

Duty cycle: Control module Positioner (code S0), Open/Close duty**7.7 Electrical data****Supply voltage U_v :** 24 V DC \pm 10%**Rating:** 20 W**7.7.1 Analogue input signals – Control module Positioner (code S0)****7.7.1.1 Set value****Input signals:** 0/4 - 20 mA; 0 - 10 V (function selectable via IO-Link)**Input type:** passive**Input resistance:** 250 Ω **Accuracy/linearity:** $\leq \pm 0.3\%$ of full flow**Temperature drift:** $\leq \pm 0.1\%$ / 10°K**Resolution:** 12 bit**Reverse battery protection:** Yes (up to \pm 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)

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

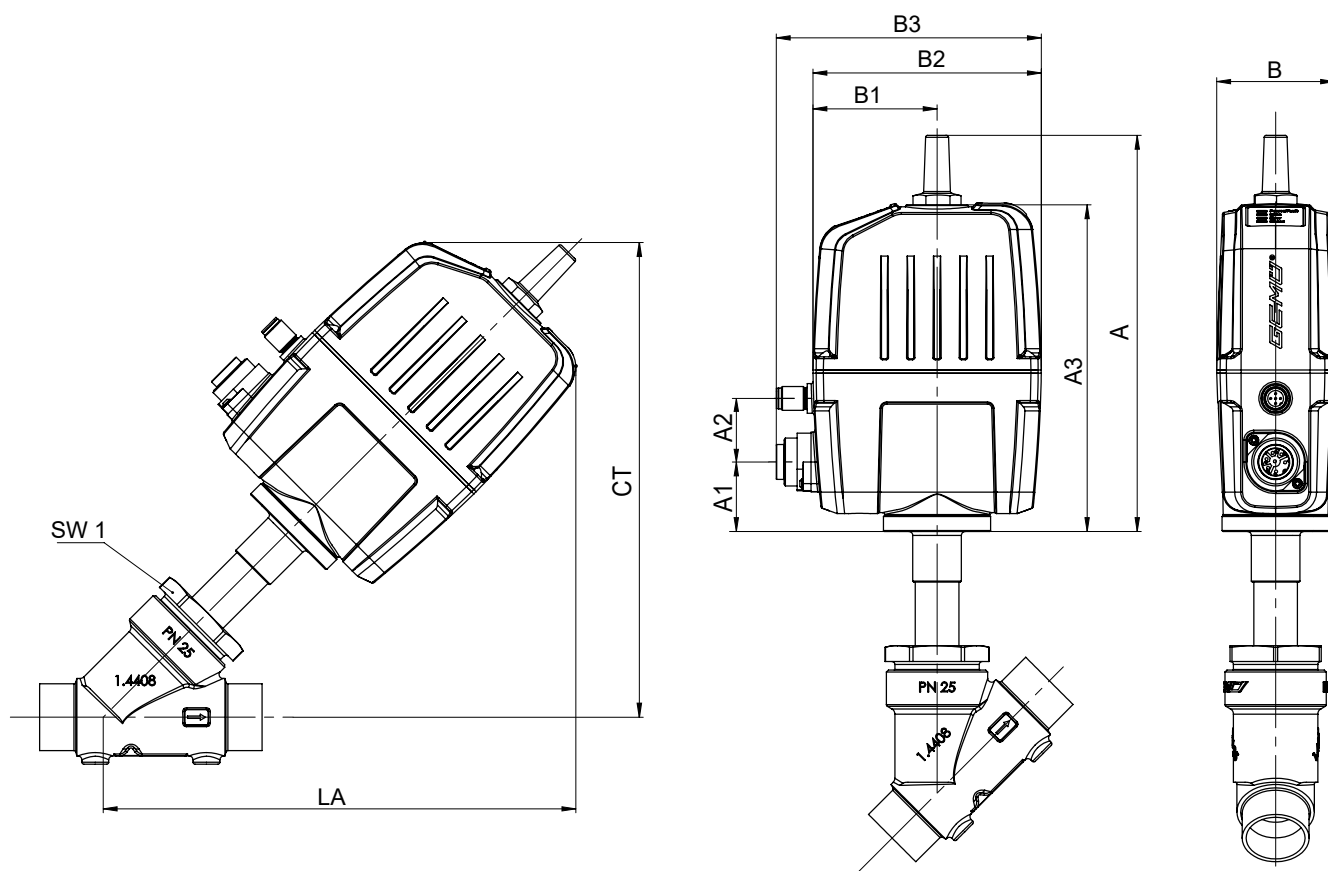
Outputs:	Function selectable via IO-Link (see table Overview of available functions – Input and output signals)
Type of contact:	Push-Pull
Switching voltage:	Power supply U_v
Switching current:	$\leq 140\text{ mA}$
Short-circuit proof:	Yes

7.7.5 Communication

Interface:	IO-Link
Function:	Parameterization/process data
Transmission rate:	38.4 kBaud

8 Dimensions

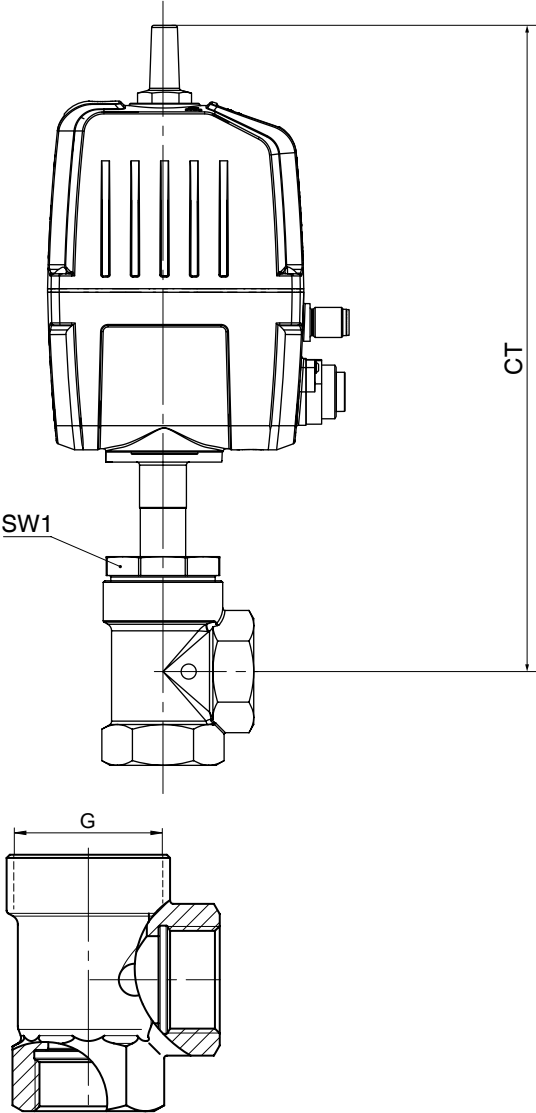
8.1 Installation and actuator dimensions - Valve with 2/2-way body



DN	SW1	G	A	A1	A2	A3	B	B1	B2	B3	CT	LA
10	24	M22x1	197.7	33.2	32	162.7	59.4	62.5	115	133.5	210.2	209.17
15	36	M35x1.5	197.7	33.2	32	162.7	59.4	62.5	115	133.5	228.8	227.8
20	41	M40x1.5	197.7	33.2	32	162.7	59.4	62.5	115	133.5	234.15	233.1
25	46	M45x1.5	197.7	33.2	32	162.7	59.4	62.5	115	133.5	239.1	238.05

Dimensions in mm

8.2 Installation dimensions - Valve with angle valve body

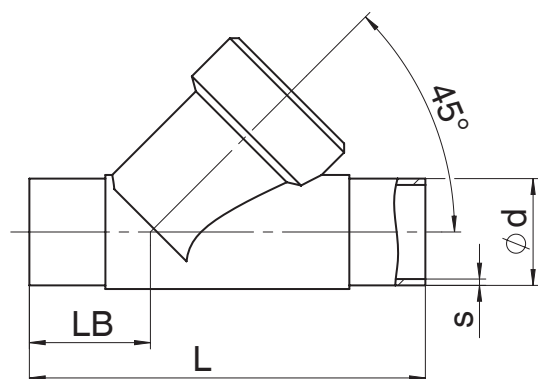


DN	SW1	R	CT
15	36	G ½	300.8
20	41	G ¾	304.3
25	46	G 1	308.3

Dimensions in mm

8.3 Body dimensions

8.3.1 Spigot, actuator size 0E



DN	Connection types code ¹⁾													
		0		16		17		18		59		60		
	Material code 40 ²⁾													
	L	LB	ø d	s	ø d	s	ø d	s	ø d	s	ø d	s	ø d	s
6	80.0	26.5	8.0	1.0	-	-	-	-	-	-	-	-	-	-
8	80.0	26.5	10.0	1.0	-	-	-	-	-	-	-	-	13.5	1.6
10	80.0	26.5	-	-	12.0	1.0	13.0	1.5	14.0	2.0	9.53	0.89	-	-
15	80.0	26.5	-	-	-	-	-	-	-	-	12.70	1.65	-	-

Dimensions in mm

1) Connection type

Code 0: Spigot DIN

Code 16: Spigot EN 10357 series B, formerly DIN 11850 series 1

Code 17: Spigot EN 10357 series A (formerly DIN 11850 series 2)/DIN 11866 series A

Code 18: Spigot DIN 11850 series 3

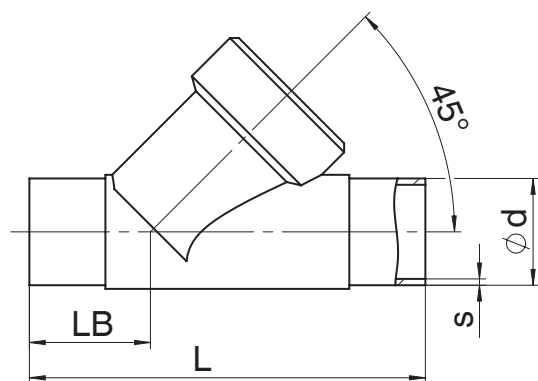
Code 59: Spigot ASME BPE

Code 60: Spigot ISO 1127/EN 10357 series C/DIN 11866 series B

2) Valve body material

Code 40: 1.4435 (F316L), forged body

8.3.2 Spigot, actuator size 0A



DN	Connection types code ¹⁾															
			0		16		17		18		37		59		60	
	Material code 34 ²⁾															
	L	LB	ø d	s	ø d	s	ø d	s	ø d	s	ø d	s	ø d	s	ø d	s
10	105.0	35.5	-	-	12.0	1.0	13.0	1.5	14.0	2.0	-	-	-	-	17.2	1.6
15	105.0	35.5	18.0	1.5	18.0	1.0	19.0	1.5	20.0	2.0	-	-	12.70	1.65	21.3	1.6
20	120.0	39.0	22.0	1.5	22.0	1.0	23.0	1.5	24.0	2.0	-	-	19.05	1.65	26.9	1.6
25	125.0	38.5	28.0	1.5	28.0	1.0	29.0	1.5	30.0	2.0	25.0	1.2	25.40	1.65	33.7	2.0

Dimensions in mm

1) Connection type

Code 0: Spigot DIN

Code 16: Spigot EN 10357 series B, formerly DIN 11850 series 1

Code 17: Spigot EN 10357 series A (formerly DIN 11850 series 2)/DIN 11866 series A

Code 18: Spigot DIN 11850 series 3

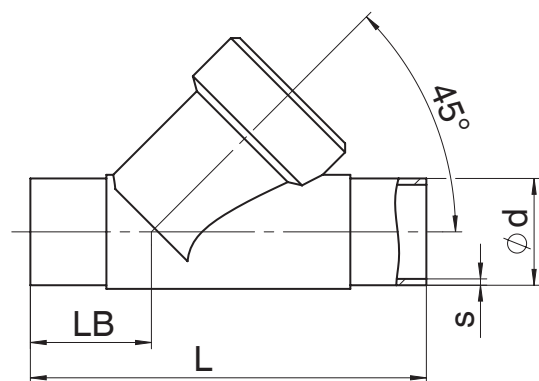
Code 37: Spigot SMS 3008

Code 59: Spigot ASME BPE

Code 60: Spigot ISO 1127/EN 10357 series C/DIN 11866 series B

2) Valve body material

Code 34: 1.4435, investment casting

8.3.3 Spigot, actuator size 0A

DN	Connection types code ¹⁾					
				17	60	
	Material code 37 ²⁾					
	L	LB	ø d	s	ø d	s
15	100.0	33.0	19.0	1.5	21.3	1.6
20	108.0	33.0	23.0	1.5	26.9	1.6
25	112.0	32.0	29.0	1.5	33.7	2.0

Dimensions in mm

1) Connection type

Code 17: Spigot EN 10357 series A (formerly DIN 11850 series 2)/DIN 11866 series A

Code 37: Spigot SMS 3008

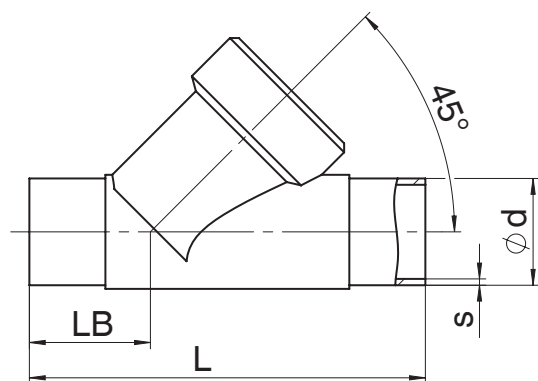
Code 59: Spigot ASME BPE

Code 60: Spigot ISO 1127/EN 10357 series C/DIN 11866 series B

2) Valve body material

Code 37: 1.4408, investment casting

8.3.4 Spigot, actuator size 0A



DN	Connection types code ¹⁾							
			17		60		59	
	Material code C2 ²⁾							
	L	LB	ø d	s	ø d	s	ø d	s
8	105,0*	35,5*	-	-	13.5	1.6	-	-
10	105.0	35.5	13.0	1.5	17.2	1.6	-	-
15	105.0	35.5	19.0	1.5	21.3	1.6	12.70	1.65
20	120.0	39.0	23.0	1.5	26.9	1.6	19.05	1.65
25	125.0	39.5	29.0	1.5	33.7	2.0	25.40	1.65

Dimensions in mm

* Connection code 1A: L = 100, LB = 33.5

1) **Connection type**

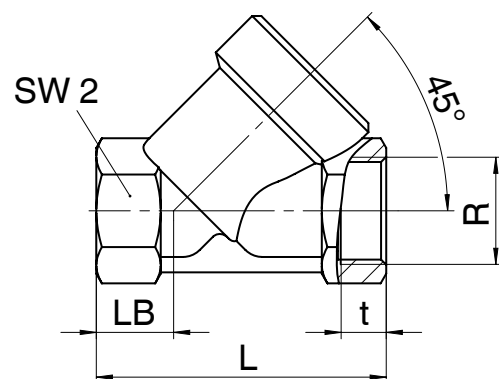
Code 59: Spigot ASME BPE

Code 1A: Spigot DIN 11866 series A

Code 1B: Spigot DIN 11866 series B

2) **Valve body material**

Code C2: 1.4435, investment casting

8.3.5 Threaded socket, body configuration D, actuator size 0E

DN	Connection types code ¹⁾														
	1					3C					3D				
	Material code 37 ²⁾														
	L	LB	SW2	R	t	L	LB	SW2	R	t	L	LB	SW2	R	t
8	65.0	19.0	17.0	G 1/4	12.0	65.0	19.0	17.0	-	-	65.0	19.0	17.0	1/4" NPT	10,1
10	65.0	19.0	24.0	G 3/8	12.0	65.0	27.0	24.0	-	-	65.0	27.0	24.0	3/8" NPT	10.4
15	65.0	19.0	24.0	G 1/2	11.4	65.0	27.0	24.0	-	-	65.0	27.0	24.0	1/2" NPT	13.6

Dimensions in mm

1) Connection type

Code 1: Threaded socket DIN ISO 228

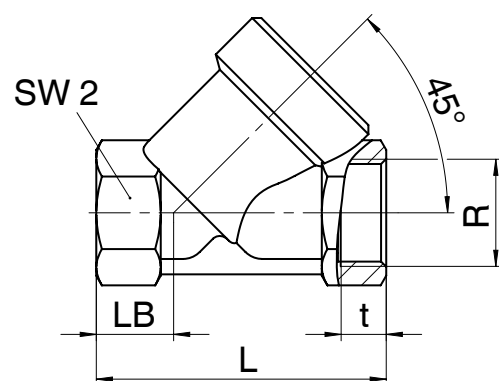
Code 3C: Threaded socket BS 21 Rc, end-to-end dimension ETE DIN 3202-4 series M8

Code 3D: Threaded socket NPT, end-to-end dimension ETE DIN 3202-4 series M8

2) Valve body material

Code 37: 1.4408, investment casting

8.3.6 Threaded socket, body configuration D, actuator size 0A



DN	Connection types code ¹⁾														
	1					3C					3D				
	Material code 37 ²⁾														
	L	LB	SW2	R	t	L	LB	SW2	R	t	L	LB	SW2	R	t
10	65.0	16.5	27.0	G 3/8	11.4	-	-	-	-	-	-	-	-	-	-
15	65.0	16.5	27.0	G 1/2	15.0	65.0	16.5	27.0	Rc 1/2	15.0	65.0	16.5	27.0	1/2" NPT	13.6
20	75.0	17.5	32.0	G 3/4	16.3	75.0	17.5	32.0	Rc 3/4	16.3	75.0	17.5	32.0	3/4" NPT	14.1
25	90.0	24.0	41.0	G 1	19.1	90.0	24.0	41.0	Rc 1	19.1	90.0	24.0	41.0	1" NPT	17.0

Dimensions in mm

1) Connection type

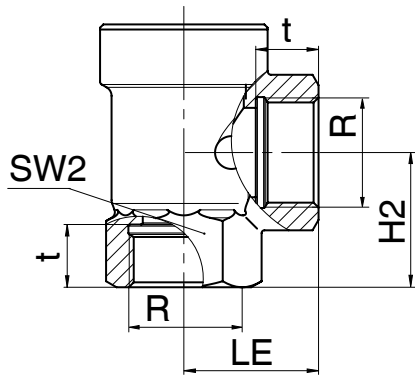
Code 1: Threaded socket DIN ISO 228

Code 3C: Threaded socket BS 21 Rc, end-to-end dimension ETE DIN 3202-4 series M8

Code 3D: Threaded socket NPT, end-to-end dimension ETE DIN 3202-4 series M8

2) Valve body material

Code 37: 1.4408, investment casting

8.3.7 Threaded socket, body configuration E, actuator size 0A

DN	Connection types code ¹⁾									
	1					3D				
	Material code 37 ²⁾									
	SW2	LE	H2	R	t	SW2	LE	H2	R	t
15	27.0	30.0	30.0	G 1/2	15.0	27.0	30.0	30.0	1/2" NPT	13.6
20	32.0	35.0	37.5	G 3/4	16.3	32.0	35.0	37.5	3/4 " NPT	14.1
25	41.0	41.0	41.0	G 1	19.1	41.0	41.0	41.0	1" NPT	17.0

Dimensions in mm

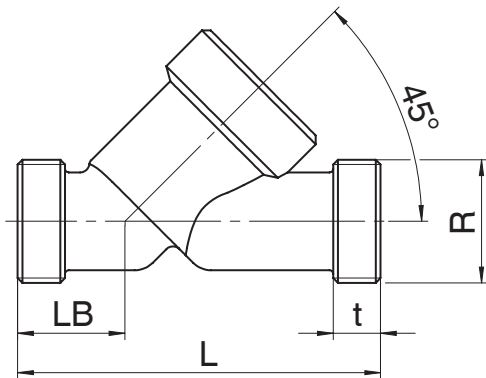
1) Connection type

Code 1: Threaded socket DIN ISO 228

Code 3D: Threaded socket NPT, end-to-end dimension ETE DIN 3202-4 series M8

2) Valve body material

Code 37: 1.4408, investment casting

8.3.8 Threaded spigot, actuator size 0E

DN	Connection types code 9 ¹⁾							
	Material code ²⁾							
	37				40			
	L	LB	R	t	L	LB	R	t
6	-	-	-	-	65.0	19.0	G 1/4	12.0
8	65.0	19.0	G 3/8	12.0	-	-	-	-
10	65.0	19.0	G 1/2	12.0	-	-	-	-
15	65.0	19.0	G 3/4	12.0	-	-	-	-

Dimensions in mm

1) Connection type

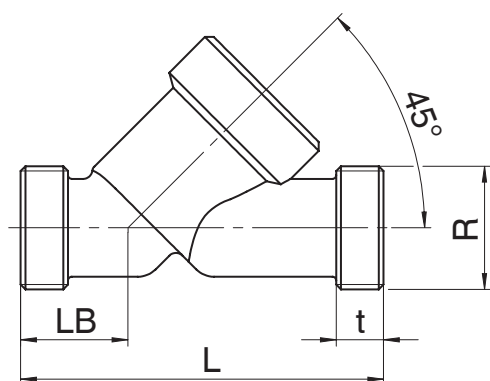
Code 9: Threaded spigot DIN ISO 228

2) Valve body material

Code 37: 1.4408, investment casting

Code 40: 1.4435 (F316L), forged body

8.3.9 Threaded spigot, actuator size 0A

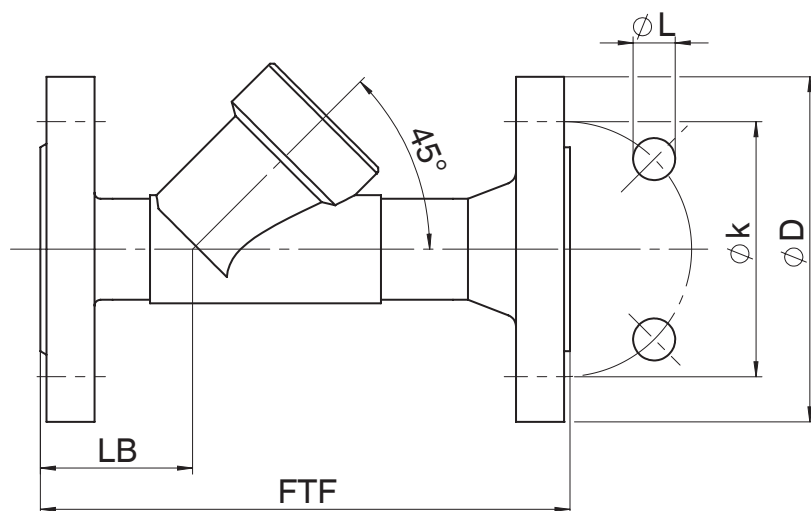


DN	Connection types code 9 ¹⁾			
	Material code 37 ²⁾			
	L	LB	R	t
15	90.0	25.0	G 3/4	12.0
20	110.0	30.0	G 1	15.0
25	118.0	30.0	G 1 1/4	15.0

Dimensions in mm

- 1) **Connection type**
Code 9: Threaded spigot DIN ISO 228
- 2) **Valve body material**
Code 37: 1.4408, investment casting

8.3.10 Flange, length EN 558, series 1, actuator size 0A

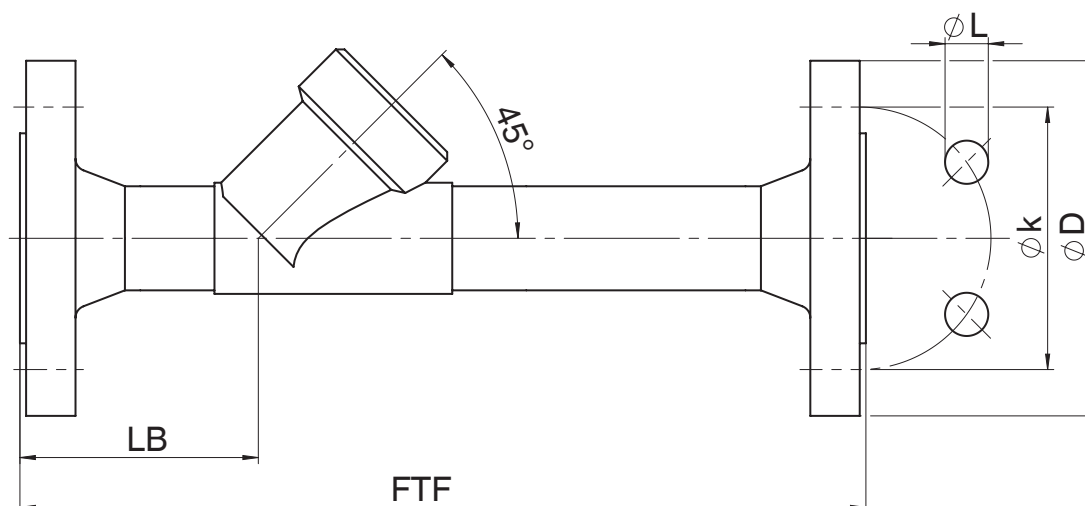


DN	Connection types code 10 ¹⁾					
	Material code 37 ²⁾					
	FTF	LB	Ø D	Ø L	Ø k	n
15	130.0	33.0	95.0	14.0	65.0	4
20	150.0	45.0	105.0	14.0	75.0	4
25	160.0	44.0	115.0	14.0	85.0	4

Dimensions in mm

n = number of bolts

- 1) **Connection type**
Code 10: Flange EN 1092, PN 25, form B, face-to-face dimension FTF EN 558 series 1, ISO 5752, basic series 1
- 2) **Valve body material**
Code 37: 1.4408, investment casting

8.3.11 Flange, special length, actuator size 0A

DN	Connection types code ¹⁾									
	13, 47		13				47			
	Material code 34 ²⁾									
	FTF	LB	ø D	ø L	ø k	n	ø D	ø L	ø k	n
15	210.0	72.0	95.0	14.0	65.0	4	89.0	15.7	60.5	4
20	280.0	78.0	105.0	14.0	75.0	4	98.6	15.7	69.8	4
25	280.0	77.0	115.0	14.0	85.0	4	108.0	15.7	79.2	4

Dimensions in mm

n = number of bolts

1) Connection type

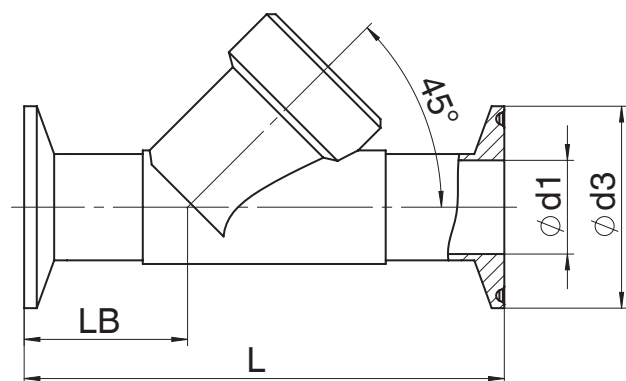
Code 13: Flange EN 1092, PN 25, form B

Code 47: Flange ANSI Class 150 RF

2) Valve body material

Code 34: 1.4435, investment casting

8.3.12 Clamp, actuator size 0A



DN	Connection types code ¹⁾																
		80				82				86				88			
	Material code 34 ²⁾																
	NPS	LB	L	ø d1	ø d3	LB	L	ø d1	ø d3	LB	L	ø d1	ø d3	LB	L	ø d1	ø d3
15	1/2"	33.5	101.6	9.40	25.0	47.5	130.0	18.1	50.5	47.5	130.0	16.0	34.0	47.5	130.0	9.40	25.0
20	3/4"	30.0	101.6	15.75	25.0	54.0	150.0	23.7	50.5	54.0	150.0	20.0	34.0	54.0	150.0	15.75	25.0
25	1"	33.0	114.3	22.10	50.5	56.0	160.0	29.7	50.5	56.0	160.0	26.0	50.5	56.0	160.0	22.10	50.5

Dimensions in mm

1) Connection type

Code 80: Clamp ASME BPE, face-to-face dimension FTF ASME BPE

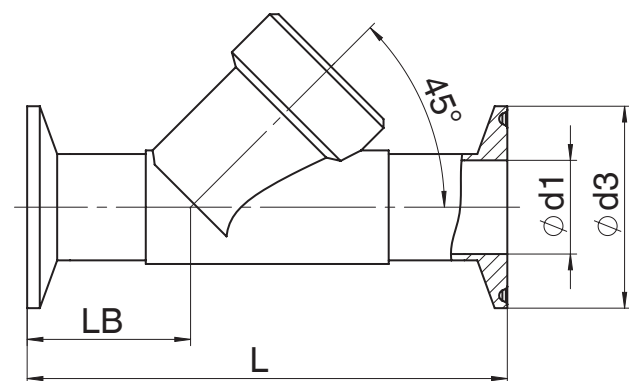
Code 82: Clamp DIN 32676 series B, face-to-face dimension FTF EN 558 series 1

Code 86: Clamp DIN 32676 series A, face-to-face dimension FTF EN 558 series 1

Code 88: Clamp ASME BPE, face-to-face dimension FTF EN 558 series 1

2) Valve body material

Code 34: 1.4435, investment casting

8.3.13 Clamp, actuator size 0A

DN	Connection types code ¹⁾												
		82				86				88			
	Material code C2 ²⁾												
	NPS	LB	L	ø d1	ø d3	LB	L	ø d1	ø d3	LB	L	ø d1	ø d3
8	1/4"	47.5	130.0	10.3	25.0	-	-	-	-	-	-	-	-
10	3/8"	47.5	130.0	14.0	25.0	-	-	-	-	-	-	-	-
15	1/2"	47.5	130.0	18.1	50.5	47.5	130.0	16.0	34.0	47.5	130.0	9.40	25.0
20	3/4"	54.0	150.0	23.7	50.5	54.0	150.0	20.0	34.0	54.0	150.0	15.75	25.0
25	1"	56.0	160.0	29.7	50.5	56.0	160.0	26.0	50.5	56.0	160.0	22.10	50.5

Dimensions in mm

1) Connection type

Code 82: Clamp DIN 32676 series B, face-to-face dimension FTF EN 558 series 1

Code 86: Clamp DIN 32676 series A, face-to-face dimension FTF EN 558 series 1

Code 88: Clamp ASME BPE, face-to-face dimension FTF EN 558 series 1

2) Valve body material

Code C2: 1.4435, investment casting

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 packed 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 packing 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 in piping

10.1 Preparing for installation

WARNING

The equipment is subject to pressure!

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

WARNING



Corrosive chemicals

- Risk of caustic burns
- Wear suitable protective gear.
- Completely drain the plant.

CAUTION



Hot plant components!

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

CAUTION

Exceeding the maximum permissible pressure.

- Damage to the GEMÜ product.
- Provide precautionary measures against exceeding the maximum permitted pressures caused by pressure surges (water hammer).

CAUTION

Use as step.

- 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!

- 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").

10.2 Installation position

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

10.3 Installation with butt weld spigots

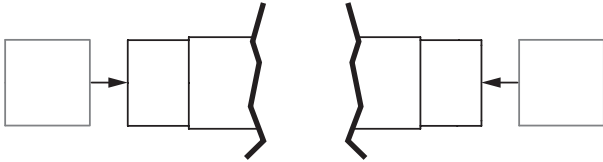


Fig. 1: Butt weld spigots

1. Carry out preparations for installation (see chapter "Preparations for installation").
2. Adhere to good welding practices!
3. Remove actuator **A** (see chapter "Removing the actuator").
4. Weld the body of the product in the piping.
5. Allow butt weld spigots to cool down.
6. Mount actuator **A** (see chapter "Mounting the actuator").
7. Re-attach or reactivate all safety and protective devices.
8. Flush the system.

10.4 Installation with threaded sockets

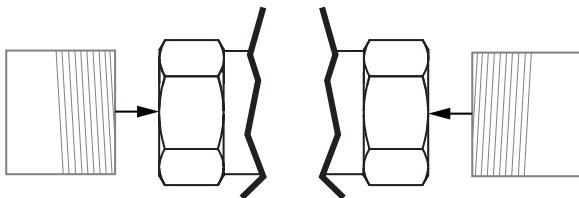


Fig. 2: Threaded socket

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 "Preparations 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.

10.5 Installation with threaded spigots

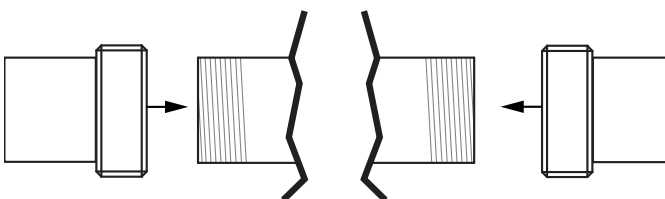


Fig. 3: Threaded spigots

NOTICE

Thread sealant

- The thread sealant is not included in the scope of delivery.
- Only use appropriate thread sealant.

1. Keep thread sealant ready.
2. Carry out preparations for installation (see chapter "Preparations for installation").
3. Screw the pipe into the threaded connection of the valve body in accordance with valid standards.
 - ⇒ Use appropriate thread sealant.
4. Re-attach or reactivate all safety and protective devices.

10.6 Installation with flanged connection

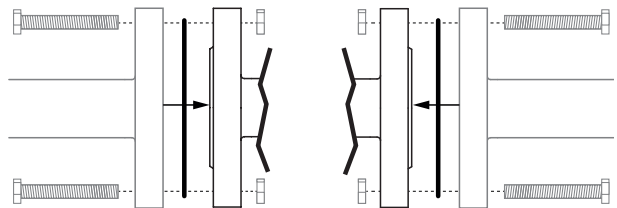


Fig. 4: Flanged connection

NOTICE

Sealing material

- The sealing material is not included in the scope of delivery.
- Only use appropriate sealing material.

NOTICE

Connector elements

- The connector elements are not included in the scope of delivery.
- Only use connector elements made of approved materials.
- Observe permissible tightening torque of the bolts.

1. Keep sealing material ready.
 2. Carry out preparations for installation (see chapter "Preparations for installation").
 3. Ensure clean, undamaged sealing surfaces on the connection flanges.
 4. Align flanges carefully before installing them.
 5. Clamp the product centrally between the piping with flanges.
 6. Centre the gaskets.
 7. Connect the valve flange and the piping flange using appropriate sealing materials and matching bolting.
 8. Use all flange holes.
-
9. Tighten the bolts diagonally.
 10. Re-attach or reactivate all safety and protective devices.

10.7 Installation with clamp connections

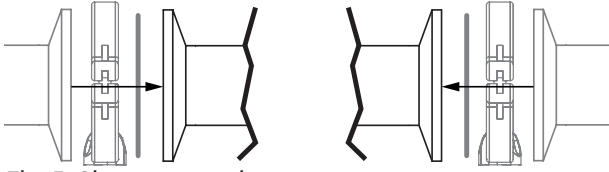


Fig. 5: Clamp connection

NOTICE

Gasket and clamp

- The gasket and clamps for clamp connections are not included in the scope of delivery.

1. Keep ready gasket and clamp.
2. Carry out preparation for installation (see chapter "Preparing for installation").
3. Insert the corresponding gasket between the body of the product and the pipe connection.
4. Connect the gasket between the body of the product and the pipe connection using clamps.
5. Re-attach or reactivate all safety and protective devices.

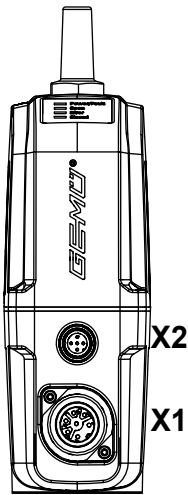
11 Electrical connection

NOTICE

Appropriate cable socket/appropriate mating connector

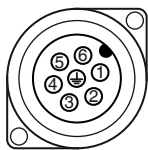
► The appropriate connectors are included for X1 and X2.

11.1 Position of the connectors



11.2 Electrical connection

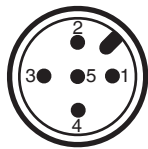
Connection X1



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.

Connection X2 (only for control module code S0)



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.

11.3 Overview of available functions – Input and output signals

	Function	Default settings		
		Control module S0	Control module S5	Control module S6
Digital input 1	Off Open Close Safe/On Initialization	Initialization	Initialization	Initialization
Digital input 2	Off Open Close Safe/On Initialization	Off	Safe/On	Safe/On
Digital input/output	Open Close Error Error+warning Initialization	Error	Error	Error
Digital output	Open Close Error Error+warning	Close	Close	Close
Analogue input	4 – 20 mA 0 – 20 mA 0 – 10 V	4 – 20 mA	4 – 20 mA	4 – 20 mA
Analogue output	4 – 20 mA 0 – 20 mA 0 – 10 V	4 – 20 mA	4 – 20 mA	4 – 20 mA

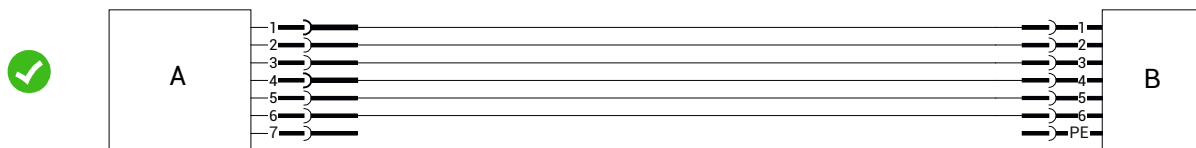
12 Specific data IO-Link (pin 6)

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

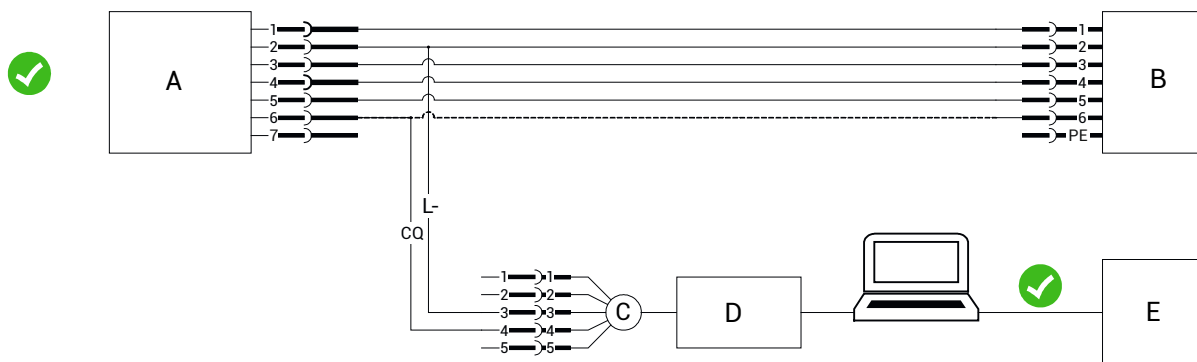
Basics

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

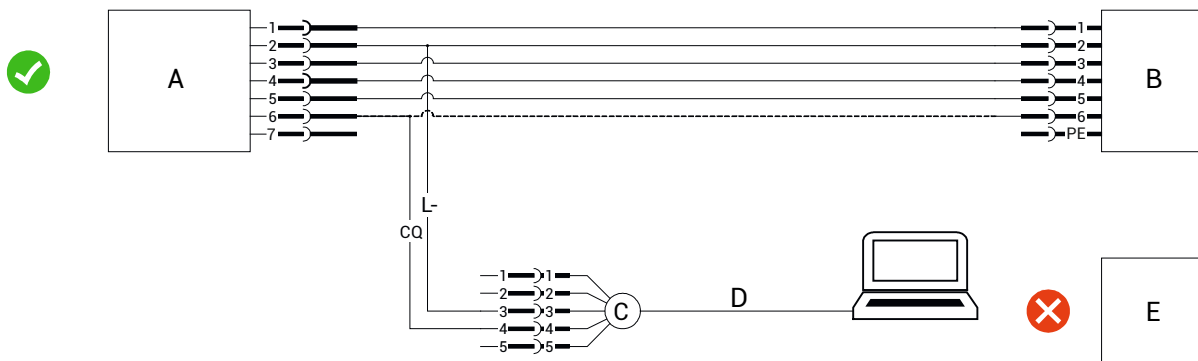
Only one laptop can be used if no galvanic isolation is available for the USB interface during communication via a USB IO-Link master. No other peripheral devices may be connected to the laptop. The laptop may only be operated without a power supply unit.

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

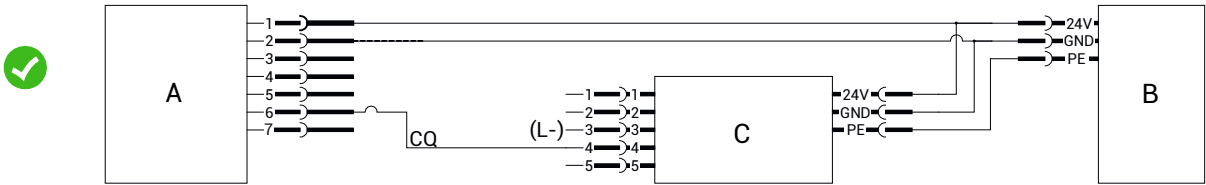
Basics

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.

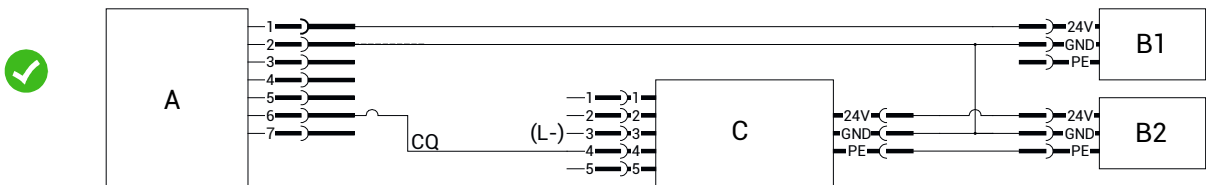


Item	Name
A	eSyStep
B	Supply voltage
C	USB IO-Link Master

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 does move into position Open
Drive go Close	1	0 actuator does not move into position Close
		1 actuator does move into position Close
Start Initialization	2	0 No Initialization
		1 Start Initialization
Locate	3	0 off
		1 on
Current Setpoint	8 to 23	Set value within range of 0 to 1000

Device Master

Name	Bit	Values
Feedback – Open position	0	0 process valve not in Open position
		1 process valve in Open position
Feedback – Close position	1	0 process valve not in Close position
		1 process valve in Close position
Indication of operating mode	2	0 normal operation
		1 initialization mode
Position feedback	8 to 23	Position of the valve within the range of 0 to 1000

12.3 Parameter overview

Index	Sub-Index	Access rights	Parameter	Function	Factory 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 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	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
0x10	0	RO	Vendor Name	Read out manufacturer name		"GEMUE"
0x12	0	RO	Product Name	Read out device name		"eSyStep Positioner"
0x15	0	RO	Serial Number	Read out serial number		"XXXXXXXX/YYY"
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."
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		"*****"
0x20	0	R/W	Location Tag	Text with 32 characters can be entered		"*****"
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 input 1	Configure digital input 1	4	0 Off 1 Open 2 Close 3 Safe / On 4 Init
	2	R / W	Function digital input 2	Configure digital input 2	Code S0: 0 Code S5 / S6: 3	0 Off 1 Open 2 Close 3 Safe / On 4 Init
0x4C	1	R/W	Function digital input/output	Configure digital inputs/outputs	2	0 Output Open 1 Output Close 2 Output Error 3 Output Error & Warning 4 Input Init

Index	Sub-Index	Access rights	Parameter	Function	Factory settings	Setting options
	2	R/W	Type digital input/output	Configure type of digital inputs/outputs	0	0 Push-Pull 1 NPN 2 PNP
0x4D	0	R/W	Function digital output	Configure digital output	1	0 Output Open 1 Output Close 2 Output Error 3 Output Error & Warning
0x4E	1	R/W	Logic digital input 1	Configure logical digital input 1	0	0 Active high 1 Active low
	2	R/W	Logic digital input 2	Configure logical digital input 2	0	0 Active high 1 Active low
	3	R/W	Logic digital input/output	Configure logical digital input/output	0	0 Active high 1 Active low
	4	R/W	Logic digital output	Configure logical digital output	0	0 Active high 1 Active low
0x4F	1	R / W	Error Action	Set safety position	Code S0 / S5: 2 Code S6: 1	0 Hold 1 Open 2 Close
	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	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	Activate / deactivate set initialization mode	0	0 Positioner 1 OPEN/CLOSE
	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 to 970 (3.0 to 97.0%)
	2	R/W	Actuator Position Feedback CLOSED request	Request valve position CLOSED	100 (10.0%)	30 to 970 (3.0 to 97.0%)
0x53	1	RO	Open	Analogue value valve position OPEN		0 to 4095
	2	RO	Closed	Analogue value valve position CLOSED		0 to 4095
0x55	1	RO	Max.	OPEN end position		0 to 4095
	2	RO	Min.	CLOSED end position		0 to 4095
0x56	1	R/W	User	Customer switching cycles (resettable)	0	0 to 16,777,215
	2	RO	Total	Total of switching cycles (not resettable)	0	0 to 16,777,215
0x60	1	RO	Potentiometer	Analogue value potentiometer		0 to 4095
	2	RO	Supply Voltage	Analogue value supply voltage		0 to 4095
	3	RO	Temperature	Analogue value temperature sensor		0 to 4095
	4	RO	Set value input	Analogue value signal input		0 to 4095

Index	Sub-Index	Access rights	Parameter	Function	Factory settings	Setting options
0x62	1	RO	Operating Time Open	Current operating time OPEN	0	0 to 255 (0 to 25.5s)
	2	RO	Operating Time Close	Current operating time CLOSE	0	0 to 255 (0 to 25.5s)
0x90	2	R/W	Force	Force of average traversing range and sealing	6	1 to 6
	3	R/W	Init Force	Force of initialization	3	1 to 6
0xB0	1	R/W	Reinforcement P kp	P component – positioner	200	1 to 200 (0.1 to 20.0)
	2	R/W	Reinforcement D kD	D component – positioner	10	1 to 200 (0.1 to 20.0)
	3	R/W	Derivative action time	Delay constant	0	0 to 100 (0 to 100 s)
	4	R/W	Dead zone	Hysteresis	10	1 to 250 (0.1 to 25.0%)
0xB2	1	R/W	Open Tight	Sealing function valve position OPEN	995	800 to 1000 (80.0 to 100.0%)
	2	R/W	Close Tight	Sealing function valve position CLOSED	5	0 to 200 (0 to 20.0%)
0xB4	1	R/W	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	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 Direction	Set value direction set value input	0	0 Rise (rising) 1 Fall (falling)
	2	R/W	Set Value 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 W	Determine minimum current input	35	0 to 40 (0 to 4.0 mA)
	4	R/W	I Max W	Determine maximum current input	205	200 to 220 (20.0 to 22.0 mA)
	5	R/W	U Max W	Determine maximum current input	103	100 to 110 (10.0 to 11.0 V)
0xBA	1	R/W	Analog Output Dir	Set value direction set value output	0	0 Rise (rising) 1 Fall (falling)
	2	R/W	Analog Output Type	Determine signal output	1	0 0 to 20 mA 1 4 to 20 mA 2 0 to 10 V
	3	R/W	Analog Out Min	Determine minimum signal output	0	0 to Max (0.0% to Max)
	4	R/W	Analog Out Max	Determine maximum signal output	1000	Min to 1000 (Min to 100%)
0xBC	0	R/W	Init Time	Set debounce time for initialization start	150	50 to 5000 (50 to 5000 ms)

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	Parameter	Type	Values
0x02	0		W	1 byte	System Command	UIntegerT	0x01 to 0x06 0x82

Description of parameter values

Parameter	Values	Description
System Command	0x01 to 0x06	Access to IO-Link
	0x82	Reset product to default settings

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 "Device Access Locks", page 40) parameter. The parameters are automatically replaced via the IO-Link master.

Index	Sub-Index	Off-set	Access Rights	Length	Parameter	Type	Values
0x03	1		R/W	1 byte	Data Storage Cmd	UIntegerT8	
	2		RO	1 byte	State Property	UIntegerT8	
	3		RO	4 bytes	Data Storage Size	UIntegerT32	
	4		RO	4 bytes	Parameter Checksum	UIntegerT32	
	5		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	Parameter	Type	Values
0x0C	1	0	R/W	1 bit	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

Parameter	Values	Description
Parameter (write) access	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 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	Parameter	Type	Values
0x10	0		RO	5 bytes	Vendor Name	StringT	"GEMUE"

12.4.5 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	Parameter	Type	Values
0x12	0		RO	14 bytes	Product Name	StringT	"eSyStep Positioner"

12.4.6 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 completion confirmation number, a forward slash and a 4-digit index.

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

12.4.7 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	Parameter	Type	Values
0x16	0		RO	10 bytes	Hardware Revision	StringT	"Rev. XX/XX"

12.4.8 Firmware Revision

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

Index	Sub-Index	Off-set	Access Rights	Length	Parameter	Type	Values
0x17	0		RO	9 bytes	Firmware Revision	StringT	"V X.X.X.X"

12.4.9 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	Parameter	Type	Values
0x18	0		R/W	32 bytes	App. Spec. Tag	StringT	"*****"

12.4.10 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	Parameter	Type	Values
0x19	0		R/W	32 bytes	Function Tag	StringT	"*****"

12.4.11 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	Parameter	Type	Values
0x20	0		R/W	32 bytes	Location Tag	StringT	"*****"

12.4.12 Actuator Size

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

In-dex	Sub-In-dex	Off-set	Access Rights	Length	Parameter	Type	Default	Values
0x40	0		RO	2 bits	Actuator Size	uint: 8	0	0 size 0
								1 size 1
								2 size 2

12.4.13 Function Digital Input

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

In-dex	Sub-In-dex	Off-set	Access Rights	Length	Parameter	Type	Default	Values
0x4B	1		R / W	3 bits	Function Digital Input 1	uint:8	4	0
								1
								2
								3
								4
	2		R / W	3 bits	Function Digital Input 2	uint:8	Code S0: 0 Code S5 / S6: 3	0
								1
								2
								3
								4

Description of parameter values

Parameter	Values	Description
Function Digital 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.
Function Digital input 2	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 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.

12.4.14 Function digital input/output

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

In-dex	Sub-In-dex	Off-set	Access Rights	Length	Parameter	Type	Default	Values
0x4C	1		R / W	3 bits	Function Digital Input / Output 1	uint:8	2	0
								1
								2
								3
								4
	2		R / W	3 bits	Type Digital Input / Output	uint:8	0	0
								1
								2

Description of parameter values

Parameter	Values	Description
Function Digital Input/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 "Position feedback", page 46)) 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 "Position feedback", page 46)) 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 Digital Input/Output	0	(Push-Pull) Configure output as Push-Pull.
	1	(NPN) Configure output as NPN.
	2	(PNP) Configure output as PNP.

12.4.15 Function digital output

The output function can be set with the **Function Digital Output** parameter.

In-dex	Sub-In-dex	Off-set	Access Rights	Length	Parameter	Type	Default	Values
0x4D	0		R/W	2 bits	Function Digital Output	uint:8	2	0
								1
								2
								3

Description of parameter values

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 "Position feedback", page 46)) 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 "Position feedback", page 46)) and a correct initialization.
	2	(Output Error) Only output error detection.
	3	(Output Error & Warning) Output error and warnings.

12.4.16 Logic Digital Inputs/Outputs

The inputs and outputs can be inverted with the **Logic Digital Inputs/Outputs** parameters.

In-dex	Sub-In-dex	Off-set	Access Rights	Length	Parameter	Type	Default	Values
0x4E	1	0	R/W	1 bit	Logic digital input 1	Boolean	0	0
								1
	2	1	R/W	1 bit	Logic digital input 2	Boolean	0	0
								1
	3	2	R/W	1 bit	Logic Digital Input/Output	Boolean	0	0
								1
0x4E	4	3	R/W	1 bit	Logic digital output	Boolean	0	0
								1

Description of parameter values

Parameter	Values	Description
Logic Digital Input 1	0	(Active high) Input 1 not inverted.
	1	(Active low) Input 1 inverted.
Logic Digital Input 2	0	(Active high) Input 2 not inverted.
	1	(Active low) Input 2 inverted.
Logic Digital Input/Output	0	(Active high) Input/output not inverted.
	1	(Active low) Input/output inverted.
Logic Digital Output	0	(Active high) Output not inverted.
	1	(Active low) Output inverted.

12.4.17 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.

In-dex	Sub-In-dex	Off-set	Access Rights	Length	Parameter	Type	Default	Values
0x4F	1		R / W	2 Bit	Error Action	uint:8	Code S0 / S5: 2 Code S6: 1	0
								1
								2
	2		R / W	10 bits	Error Time	uint:16	1 (0,1s)	1 ... 1000 (0,1s ... 100s)

Description of parameter values

Parameter	Values	Description
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 to 1000	Determine delay time between error detection and error message.

12.4.18 Basic Settings

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

In-dex	Sub-In-dex	Off-set	Access Rights	Length	Parameter	Type	Default	Values
0x50	1	0	R/W	1 bit	Inversion of LED Colours	Boolean	0	0
								1
	2	1	R/W	1 bit	On Site Initialization	Boolean	0	0
								1
	3	1	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

Parameter	Values	Description
Inversion of LED Colours	0	(Standard) LEDs Close = green and Open = yellow (not inversed).
	1	(Inversed) LEDs Close = yellow and Open = green (inversed).
On Site Initialization	0	(Enabled) On-site initialization (see "Initialization", page 55) activated.
	1	(Disabled) On-site initialization (see "Initialization", page 55) deactivated.
Operating Mode	0	(Positioner) The actuator is in positioner mode.
	1	(OPEN/CLOSE) The actuator is in OPEN/CLOSE mode.
IO-Link Process Data	0	(Disabled) Use of IO-Link process data (see "Process data", page 35) is deactivated.
	1	(Enabled) Use of IO-Link process data (see "Process data", page 35) is activated.

12.4.19 Position feedback

Settings for valve position detection can be stored with the **Position Feedback** parameter.

In-dex	Sub-In-dex	Off-set	Access Rights	Length	Parameter	Type	Default	Values
0x51	1		R/W	10 bits	Actuator Position Feedback Open Request	uint:16	900 (90.0%)	30 to 970 (3.0 to 97.0%)
	2		R/W	10 bits	Actuator Position Feedback Close Request	uint:16	100 (10.0%)	30 to 970 (3.0 to 97.0%)

Description of parameter values

Parameter	Values	Description
Actuator Position Feedback Open Request	30 to 970 (3.0 to 97.0%)	Determine the switch point for the OPEN end position.
Actuator Position Feedback Close Request	30 to 970 (3.0 to 97.0%)	Determine the switch point for the CLOSED end position.

12.4.20 Initialized Positions

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

In-dex	Sub-In-dex	Off-set	Access Rights	Length	Parameter	Type	Default	Values
0x53	1		RO	12 bits	Open	uint:16	0	0 to 4092
	2		RO	12 bits	Closed	uint:16	4092	0 to 4092
	3		RO	12 bits	Stroke	uint:16	0	0 to 4092

Description of parameter values

Parameter	Values	Description
Open	0 to 4092	Read out the OPEN position analogue value.
Close	0 to 4092	Read out the CLOSED position analogue value.
Stroke	0 to 4092	Read out the analogue value for stroke (difference between OPEN and CLOSED).

12.4.21 Calibration Positions

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

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

In-dex	Sub-In-dex	Off-set	Access Rights	Length	Parameter	Type	Default	Values
0x55	1		RO	12 bits	Max.	uint:16	0	0 to 4092
	2		RO	12 bits	Min.	uint:16	4092	0 to 4092

Description of parameter values

Parameter	Values	Description
Max.	0 to 4092	Read out analogue value of the potentiometer for the mechanical end position OPEN.
Min.	0 to 4092	Read out analogue value of the potentiometer for the mechanical end position CLOSED.

12.4.22 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.

In-dex	Sub-In-dex	Off-set	Access Rights	Length	Parameter	Type	Default	Values
0x56	0		R/W		Cycle Counter			
	1		R/W	24 bits	User	uint:24	0	0 to 16,777,215
	2		RO	24 bits	Total	uint:24	0	0 to 16,777,215

Description of parameter values

Parameter	Values	Description
User	0 to 16,777,215	The User counter can be reset, for example, after maintenance.
Total	0 to 16,777,215	The Total counter cannot be reset.

12.4.23 AD-Values

Different analog values can be read out with the **AD-Values** parameter.

Index	Sub-Index	Off-set	Access Rights	Length	Parameter	Type	Values
0x60	1		RO	12 bits	Potentiometer	uint:16	0 to 4095
	2		RO	12 bits	Supply Voltage	uint:16	0 to 4095
	3		RO	12 bits	Temperature	uint:16	0 to 4095
	4		RO	12 bits	Set value input	uint:16	0 to 4095

Description of parameter values

Parameter	Values	Description
Potentiometer	0 to 4095	Read out current analogue value of the potentiometer.
Supply Voltage	0 to 4095	Read out current analogue value of the supply voltage.
Temperature	0 to 4095	Read out current analogue value of the temperature sensor.
Set value input	0 to 4095	Read out current analogue value of the set value.

12.4.24 Operating Times

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

In-dex	Sub-In-dex	Off-set	Access Rights	Length	Parameter	Type	Default	Values
0x62	1		RO	8 bits	Operating Time Open	uint:8	0	0 to 255, 0 to 25.5 s
	2		RO	8 bits	Operating Time Close	uint:8	0	0 to 255, 0 to 25.5 s

Description of parameter values

Parameter	Values	Description
Operating Time Open	0 to 255 0 to 25.5 s	Read out current operating time (in tenths of seconds) from end position CLOSED to end position OPEN.
Operating Time Close	0 to 255 0 to 25.5 s	Read out current operating time (in tenths of seconds) from end position OPEN to end position CLOSED.

12.4.25 Positioner parameter

The properties can be set for the **Positioner** parameter.

In-dex	Sub-In-dex	Off-set	Access Rights	Length	Parameter	Type	Default	Values
0xB0	1		R/W	16 bits	Reinforcement P kp	uint: 16	200	1 to 200 (0.1 to 20.0)
	2		R/W	16 bits	Reinforcement D kD	uint: 16	10	1 to 200 (0.1 to 20.0)
	3		R/W	16 bits	Derivative action time T1	uint: 16	0	0 to 100 (0 to 100 s)
	4		R/W	16 bits	Dead zone	uint: 16	10	1 to 250 (0.1 to 25.0%)

Description of parameter values

Parameter	Values	Description
Reinforcement P kp	1 to 200 (0.1 to 20.0)	Set the P component of the positioner.
Reinforcement D kD	1 to 200 (0.1 to 20.0)	Set the D component.
Derivative action time T1	0 to 100 (0 to 100 s)	Set the derivative action time T1 (always available delay constant).
Dead zone	1 to 250 (0.1 to 25.0%)	Set the dead zone (hysteresis).

12.4.26 Open Close Tight

The sealing function can be set for the **Open Close Tight** parameter.

In-dex	Sub-In-dex	Off-set	Access Rights	Length	Parameter	Type	Default	Values
0xB2	1		R/W	16 bits	Open Tight	uint:16	995	800 to 1000 (80.0 to 100%)
	2		R/W	16 bits	Close Tight	uint:16	5	0 to 200 (0.0 to 20.0%)

Description of parameter values

Parameter	Values	Description
Open Tight	800 to 1000 (80.0 to 100.0%)	Set the sealing function valve position OPEN.
Close Tight	0 to 200 (0 to 20.0%)	Set the sealing function valve position CLOSED.

12.4.27 Split range

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

In-dex	Sub-In-dex	Off-set	Access Rights	Length	Parameter	Type	Default	Values
0xB4	1		R/W	16 bits	Split Start	uint: 16	0	0 to Split End – 100 (0.0 to Split End – 10.0%)
	2		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

Parameter	Values	Description
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.

12.4.28 Stroke limiter

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

In-dex	Sub-In-dex	Off-set	Access Rights	Length	Parameter	Type	Default	Values
0xB6	1		R/W	16 bits	Max Pos	uint:16	1000	Min Pos to 1000 (Min Pos to 100.0%)
	2		R/W	16 bits	Min Pos	uint:16	0	0 to Max Pos (0.0% to Max Pos)

Description of parameter values

Parameter	Values	Description
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.

12.4.29 Set value input

In-dex	Sub-In-dex	Off-set	Access Rights	Length	Parameter	Type	Default	Values
0xB8	1		R/W	1 bit	Set Value Direction	uint:1	0	0 1
	2		R/W	2 bits	Set Value Type	uint:2	1	0 1 2
	3		R/W	8 bits	I Min W	uint:8	35	0 to 40 (0 to 4.0 mA)
	4		R/W	8 bits	I Max W	uint:8	205	200 to 220 (20.0 to 22.0 mA)
	5		R/W	8 bits	U Max W	uint:8	103	100 to 110 (10.0 to 11.0 V)

Description of parameter values

Parameter	Values	Description
Set Value Direction	0 1	Specify direction of the set value input. 0 = Rise (rising) 1 = Fall (falling)
Set Value Type	0 1 2	Determine signal input. 0 = 0 to 20 mA 1 = 4 to 20 mA 2 = 0 to 10 V
I Min W	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 W	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 W	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.

12.4.30 Analogue output

In-dex	Sub-In-dex	Off-set	Access Rights	Length	Parameter	Type	Default	Values
0xBA	1		R/W	1 bit	Analog Output Dir	boolean	0	0 1
	2		R/W	2 bits	Analog Output Type	uint:8	1	0 1 2
	3		R/W	16 bits	Analog Out Min	uint:16	0	0 to Max (0.0% to Max)
	4		R/W	16 bits	Analog Out Max	uint:16	1000	Min to 1000 (Min to 100%)

Description of parameter values

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

12.4.31 Debounce time initialization input

In-dex	Sub-In-dex	Off-set	Access Rights	Length	Parameter	Type	Default	Values
0xBC	0		R/W		Init Time	uint:16	150	50 to 5000 (50 to 5000 ms)

Description of parameter values

Parameter	Values	Description
Debounce time initialization input	50 to 5000 (50 to 5000 ms)	Determine time from applying the signal to starting initialization.

12.4.32 Force settings

In-dex	Sub-In-dex	Off-set	Access Rights	Length	Parameter	Type	Default	Values
0xC0	1		R/W	10 bits	Force Valve	uint:16	1000	0 to 1000 (0.0 to 100%)
	2		R/W	10 bits	Force Init	uint:16	550	0 to 1000 (0.0 to 100%)

Description of parameter values

Parameter	Values	Description
Force Valve	0 to 1000 (0.0 to 100%)	Set the force of the valve.
Force Init	0 to 1000 (0.0 to 100%)	Set the force during initialization.

Force settings

Actuator size	Setting parameter	Force in Newton
AS 0	0 (0%)	0
	500 (50%)	270
	1000 (100%)	540

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. 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
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).	– Check valve/diaphragm

Event	Description	Possible cause	Troubleshooting
		Actuator has been fitted on the valve incorrectly (stroke of the valve in the incorrect area).	

13 Operation

13.1 Initialization

Initialization must be carried out in the following situations:

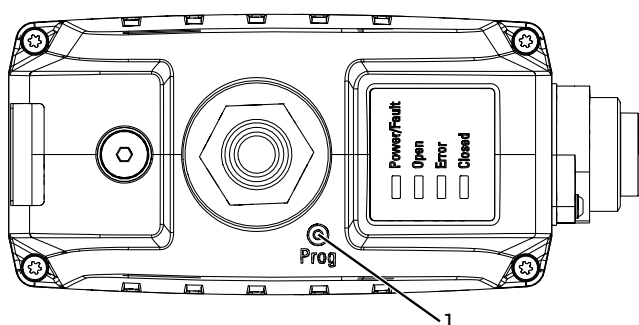
- Retrofitting an electrical position indicator
- Replacing the actuator
- Replacing the diaphragm

Initialization is already carried out for the process valve which was fully mounted in the factory.

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



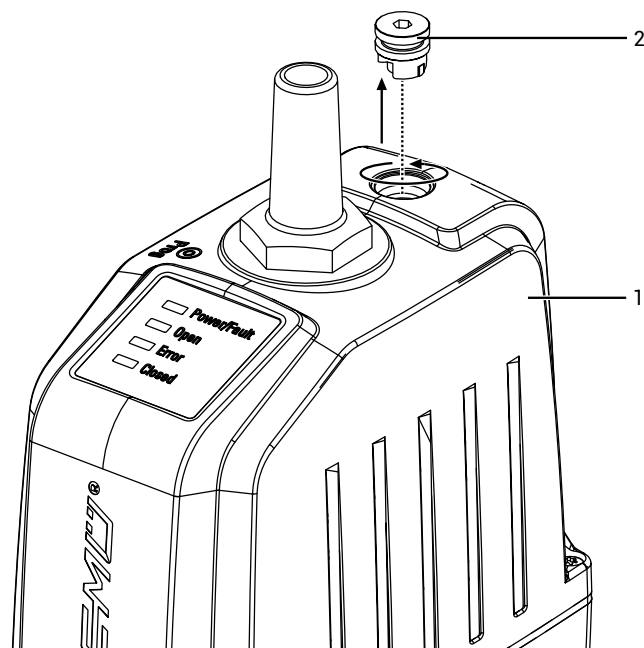
1. Connect supply voltage.
2. Hold the magnet briefly (>100 ms) at the point on the housing cover marked with PROG 1.
 - ⇒ OPEN and CLOSED LEDs flash alternately.
3. Valve automatically moves into the OPEN position.
4. Valve automatically moves into the CLOSED position.
5. Initialization mode is automatically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

13.1.2 Initialization of the end positions via IO-Link

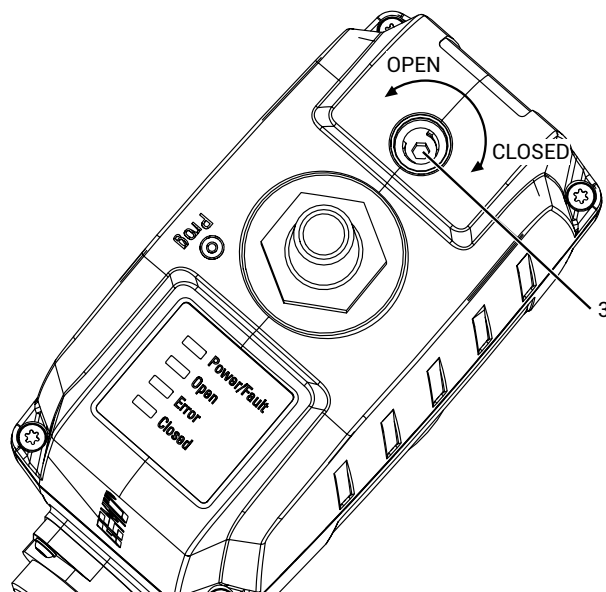
1. Briefly activate (>100 ms) initialization mode (process data "Selection of operating mode").
 - ⇒ OPEN and CLOSED LEDs flash alternately.
2. Valve automatically moves into the OPEN position.
3. Valve automatically moves into the CLOSED position.
4. Initialization mode is automatically ended.
5. The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

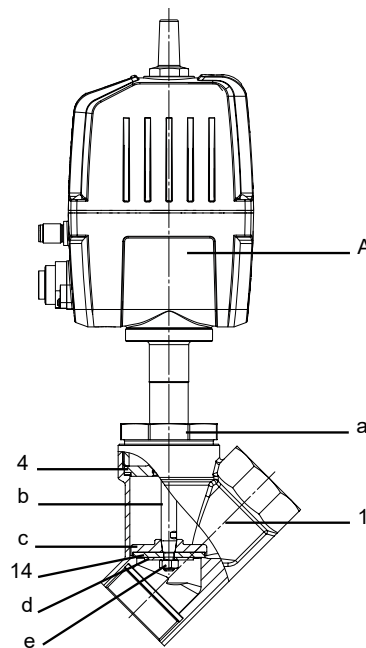
Exceptional maintenance work!

- ▶ 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 depending 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 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.

14.1 Spare parts



Item	Name	Order description
1	Valve body	K514... (DN6 – DN15) K550... (DN15 – DN25)
4	Sealing washer	543...SVS...
14	Shut-off seal	
A	Actuator	9543...
a	Union nut	-
b	Spindle	-
c	Valve plug	-
d	Retaining washer	-
e	Nut	-

14.2 Removing the actuator

1. Move the actuator **A** to the open position.
2. Undo union nut **a**.
3. Lift actuator **A** off valve body **1**.
4. Clean all parts of contamination (do not damage parts during cleaning).
5. Check parts for potential damage, replace if necessary (only use genuine parts from GEMÜ).

14.3 Replacing the seals

1. Remove the actuator (see "Removing the actuator", page 56).
2. Remove sealing washer **4** from the valve body.
3. Loosen nut **e** on spindle **b** (hold spindle **b** with appropriate tool that will not damage the spindle surfaces).
4. Clean all parts of contamination (do not damage parts during cleaning).
5. Insert new seat seal **14**.
6. Insert retaining washer **d**.
7. Apply appropriate thread locking compound on the thread of spindle **b**.
8. Fix spindle **b** in place with nut **e** (hold spindle **b** in place with appropriate tools which do not damage the spindle surfaces).
9. Insert new sealing washer **4** in valve body **1**.

Mount the actuator (see "Mounting the actuator", page 57).

14.4 Mounting the actuator

1. Move the actuator **A** to the open position.
2. Lubricate the thread of the union nut **a** using a suitable lubricant.
3. Place actuator **A** on valve body **1** approx. 90° in front of the end position (orientation of the connections) and screw hand tight with union nut **a**.
4. Tighten union nut **a** with an open-end wrench (for torques, see table).
 - ⇒ This rotates the actuator clockwise approx. 90° to the desired position.





























































Actuator size 0A

Nominal size	Torque
DN 10	90 Nm
DN 15	90 Nm
DN 20	100 Nm
DN 25	120 Nm

5. Move the actuator **A** to the closed position.
6. With the valve fully assembled, check the function and tightness.
7. Carry out initialisation.

15 Troubleshooting

15.1 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				
Maintenance required, OPEN position				
Maintenance required, CLOSED position				
Maintenance required, position unknown				

15.2 Troubleshooting

Error	Possible cause	Troubleshooting
The product leaks downstream (doesn't close or doesn't close fully)	Operating pressure too high	Operate the product with operating pressure specified in datasheet
	Valve body leaks or is damaged	Check valve body for potential damage, replace valve body if necessary
The product doesn't open or doesn't 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 doesn't close or doesn't 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 leaks between actuator and valve body	Bolting between valve body and actuator loose	Retighten bolting between valve body and actuator
	Actuator/valve body damaged	Replace actuator/valve body
The product leaks between actuator flange and valve body	Mounting parts loose	Retighten mounting parts
	Valve body / actuator damaged	Replace valve body/actuator
Body of the GEMÜ product is leaking	Body of the GEMÜ product is faulty or corroded	Check the body of the GEMÜ product for potential damage, replace body if necessary
	Incorrect installation	Check installation of valve body in piping
Valve body connection to piping leaks	Incorrect installation	Check installation of valve body in piping

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.

19 Declaration of Incorporation according to 2006/42/EC (Machinery Directive)

Declaration of Incorporation
according to the EC Machinery Directive 2006/42/EC, Annex II, 1.B for
partly completed machinery

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

declare that the following product

Make: GEMÜ Motorized angle seat globe valve
Serial number: from 10th April 2019
Project number: FE_130605
Commercial name: GEMÜ 543

meets the following essential requirements of the Machinery Directive 2006/42/EC:

1.1.3, 1.1.8, 1.3., 1.3.4, 1.3.7, 1.3.8, 1.5.1, 1.5.2, 1.5.3, 1.5.5, 1.5.6, 1.5.7, 1.5.14, 1.5.15, 1.5.16, 1.6.1, 1.6.3, 3.2.1, 3.2.2, 3.3.4, 3.4, 3.4.2, 3.4.3, 3.4.5, 5.1, 5.2

We also declare that the specific technical documentation has been compiled in accordance with part B of Annex VII.

The manufacturer or his authorised representative undertake to transmit, in response to a reasoned request by the national authorities, relevant information on the partly completed machinery. This transmission takes place:

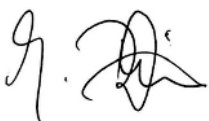
Electronically

Authorised documentation officer GEMÜ Gebr. Müller Apparatebau GmbH & Co. KG
Fritz-Müller-Straße 6-8
74653 Ingelfingen, Germany

This does not affect the industrial property rights!

Important note! The partly completed machinery may be put into service only if it was determined, where appropriate, that the machinery into which the partly completed machinery is to be installed meets the provisions of this Directive.

Ingelfingen-Criesbach 2019-10-08



Joachim Brien
Head of Technical Department

20 Declaration of conformity according to 2014/68/EU (Pressure Equipment Directive)

EU Declaration of Conformity

in accordance with 2014/68/EU (Pressure Equipment Directive)

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

declare that the product listed below complies with the safety requirements of the Pressure Equipment Directive 2014/68/EU.

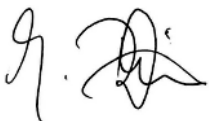
Description of the pressure equipment: GEMU 543
Notified body: TÜV Rheinland Industrie Service GmbH
Number: 0035
Certificate no.: 01 202 926/Q-02 0036
Conformity assessment procedure: Module H
Technical standard used: AD 2000

Note for products with a nominal size \leq DN 25:

The products are developed and produced according to GEMÜ process instructions and quality standards which comply with the requirements of ISO 9001 and ISO 14001.

According to Article 4, Paragraph 3 of the Pressure Equipment Directive 2014/68/EU these products must not be identified by a CE-label.

Ingelfingen-Criesbach 2019-09-25



Joachim Brien
Head of Technical Department

21 Declaration of conformity according to 2014/30/EU (EMC Directive)

EU Declaration of Conformity

according to 2014/30/EU (EMC Directive)

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

declare that the product listed below complies with the safety requirements of the EMC Directive 2014/30/EU.

Description of the product: GEMÜ 543

Technical standards used:

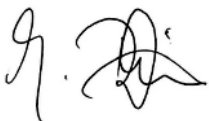
Interference resistance:

- DIN EN 61326-1 (industrial processes)
- DIN EN 61800-3

Interference emission:

- DIN EN 61800-3

Ingelfingen-Criesbach 2019-09-25



Joachim Brien
Head of Technical Department



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www.gemu-group.com

Subject to alteration

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