

GEMÜ R649 eSyDrive

Motorized diaphragm 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 Definition of terms

Working medium

The medium that flows through the GEMÜ product.

1.4 Warning notes

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

SIGNAL WORD	
Possible symbol for the specific danger	Type and source of the danger ► 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! ► Non-observance can cause death or severe injury.
 WARNING	
	Potentially dangerous situation! ► Non-observance can cause death or severe injury.

 CAUTION	
	Potentially dangerous situation! ► Non-observance can cause moderate to light injury.

NOTICE	
	Potentially dangerous situation! ► Non-observance can cause damage to property.

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

Symbol	Meaning
	Danger of explosion!
	Corrosive chemicals!
	Hot plant components!
	Rotating cover!

2 Safety information

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

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

- Personal hazard due to electrical, mechanical and chemical effects.
- Hazard to nearby equipment.
- Failure of important functions.
- Hazard to the environment due to the leakage of dangerous substances.

The safety information does not take into account:

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

Prior to commissioning:

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

During operation:

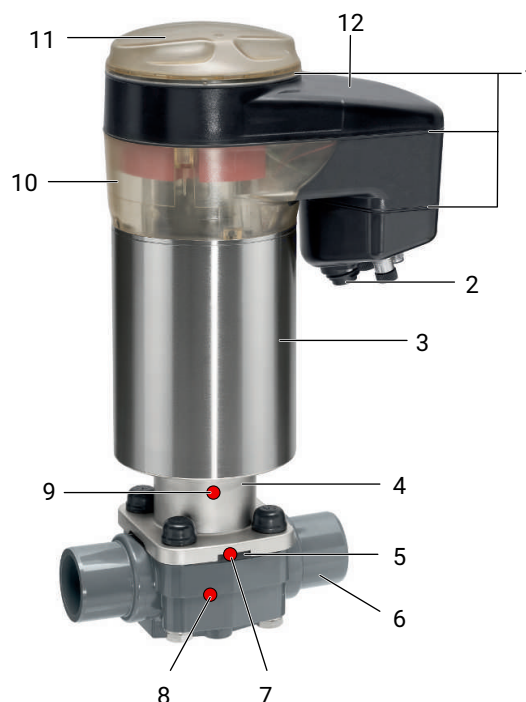
9. Keep this document available at the place of use.
10. Observe the safety information.
11. Operate the product in accordance with this document.
12. Operate the product in accordance with the specifications.
13. Maintain the product correctly.
14. Do not carry out any maintenance work and repairs not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

In cases of uncertainty:

15. Consult the nearest GEMÜ sales office.

3 Product description

3.1 Construction



Item	Name	Materials
1	O-rings	EPDM
2	Electrical connections	
3	Actuator base	1.4301
4	Distance piece with leak detection hole	1.4408
5	Diaphragm	EPDM, FKM, NBR, PTFE / EPDM
6	Valve body	PVC-U, grey ABS PP reinforced PVDF inliner PP-H, grey outliner PP, reinforced inliner PVDF/outliner PP, reinforced PP-H, natural
7	CONEXO diaphragm RFID chip (see Conexo information)	
8	CONEXO body RFID chip (see Conexo information)	
9	CONEXO actuator RFID chip (see Conexo information)	
10	Optical position indicator	PESU
11	Cover with high visibility LED, manual override and on-site control	PESU

3.2 Buttons for on-site control

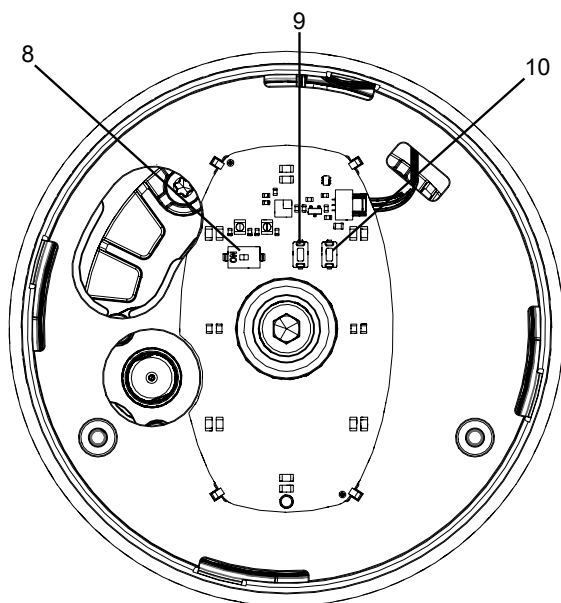


Fig. 1: Position of the buttons

Item	Name	Function
8	DIP switch, "ON-site" control	Switches the on-site control on the device on or off
9	"OPEN" button	Moves actuator to the open position Resets the network settings
10	"INIT/CLOSE" button	Moves actuator to the closed position Starting initialisation

3.3 LED displays

3.3.1 On-site status LEDs

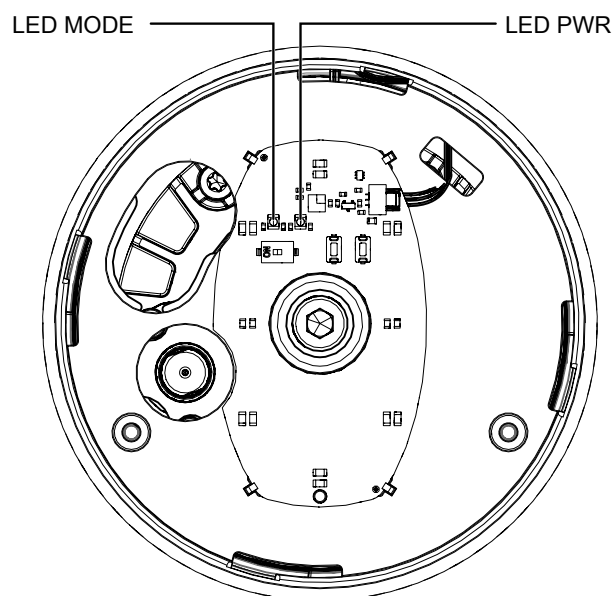


Fig. 2: Position of the status LEDs

The user checks the following conditions directly on-site at the valve using LED MODE and LED PWR:

Function	LED MODE		LED PWR	
	Yellow	Blue	Green	Red
Automatic operation	●	○	●	○
Manual operation	⦿	○	●	○
Actuator switched off (OFF mode)	○	○	●	○
Manual operation (on-site)	○	●	●	○
Software update	⦿	⦿	●	○
	alternating			
On-site initialisation (buttons)	○	⦿	●	○
Remote initialisation (via Di-gln)	●	○	●	○

Function	LED MODE		LED PWR	
	Yellow	Blue	Green	Red
Operation via emergency power supply module				

3.3.2 High visibility LEDs

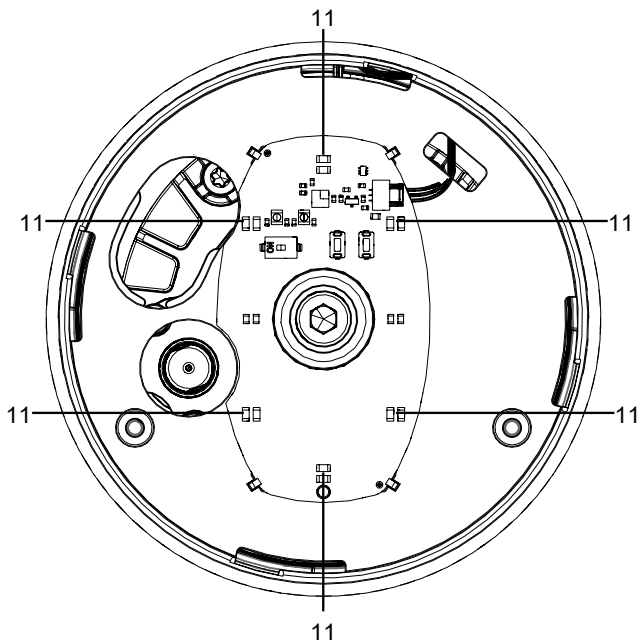
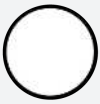
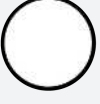


Fig. 3: Position of the high visibility LEDs

Item	Name
11	High visibility LEDs

Function		High visibility LED	
		green	orange
OPEN position	Position indicator LEDs standard		
OPEN position	Position indicator LEDs inversed		
CLOSED position	Position indicator LEDs standard		
CLOSED position	Position indicator LEDs inversed		
Position unknown	(e.g. 50%)		

Function	High visibility LED	
	green	orange
Initialization		
Location function	alternating	
		

3.4 Description

The GEMÜ R649 2/2-way diaphragm valve has a hollow shaft actuator and is electrically operated. The eSyDrive hollow shaft actuator can be operated as an ON/OFF actuator or as an actuator with integrated positioner or process controller. An integral optical and electrical position indicator is standard.

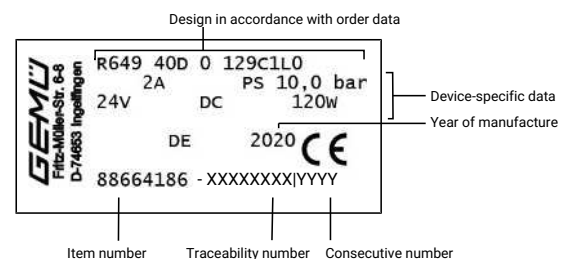
3.5 Function

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

The product has an optical position indicator as standard. The optical position indicator indicates the OPEN and CLOSED positions.

3.6 Product label

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



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

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

4 Correct use

 DANGER	
	Danger of explosion! ▶ Risk of death or severe injury ● Do not use the product in potentially explosive zones.

 WARNING	
Improper use of the product! ▶ Risk of severe injury or death ▶ Manufacturer liability and guarantee will be void ● Only use the product in accordance with the operating conditions specified in the contract documentation and in this document.	

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

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

- Use the product in accordance with the technical data.

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
Diaphragm valve, electrically operated, electro-mechanical hollow shaft actuator, eSyDrive	R649

2 DN	Code
DN 12	12
DN 15	15
DN 20	20
DN 25	25
DN 32	32
DN 40	40
DN 50	50
DN 65	65

3 Body configuration	Code
2/2-way body	D

4 Connection type	Code
Spigot	
Spigot DIN	0
Spigot for IR butt welding	20
Spigot for IR butt welding, BCF	28
Spigot - inch, for welding or solvent cementing, dependent on body material	30
Body with threaded spigots for unions	7X
Union end	
Union end with insert (socket) – DIN	7
Union end with insert (Rp threaded socket) - DIN	7R
Union end with inch insert - BS (socket)	33
Union end with inch insert – ASTM (socket)	3M
Union end with JIS insert (socket)	3T
Union end with insert (for IR butt welding) – DIN	78
Threaded socket	
Threaded socket DIN ISO 228	1
Solvent cement socket	
Solvent cement socket DIN	2
Flange	
Flange EN 1092, PN 10, form B, face-to-face dimension FTF EN 558 series 1, ISO 5752, basic series 1	4
Flange ANSI Class 125/150 RF, face-to-face dimension FTF EN 558 series 1, ISO 5752, basic series 1, length only for body configuration D	39
Flare	
Flare connection with PVDF union nut	75

5 Valve body material	Code
PVC-U, grey	1

5 Valve body material	Code
ABS	4
PP, reinforced	5
PVDF	20
Inliner PP-H, grey, outliner PP, reinforced	71
Inliner PVDF/outliner PP, reinforced	75
PP-H, natural	N5

6 Diaphragm material	Code
Elastomer	
NBR	2
FKM	4
EPDM	17
EPDM	29
PTFE	
PTFE/EPDM one-piece	54
PTFE/EPDM two-piece	5M
Note: The PTFE/EPDM diaphragm (code 5M) is available from diaphragm size 25.	

7 Voltage/Frequency	Code
24 V DC	C1

8 Control module	Code
OPEN/CLOSE, positioner and process controller	L0

9 Actuator version	Code
Actuator size 0	0A
Actuator size 0 diaphragm size 20 with distance piece	E0
Actuator size 1	1A
Actuator size 2	2A

10 Mounting plate	Code
With mounting plate	M
Without	

11 Special version	Code
NSF 61 water approval	N

Order example

Ordering option	Code	Description
1 Type	R649	Diaphragm valve, electrically operated, electro-mechanical hollow shaft actuator, eSyDrive
2 DN	40	DN 40
3 Body configuration	D	2/2-way body
4 Connection type	0	Spigot DIN
5 Valve body material	1	PVC-U, grey
6 Diaphragm material	17	EPDM
7 Voltage/Frequency	C1	24 V DC
8 Control module	L0	OPEN/CLOSE, positioner and process controller
9 Actuator version	2A	Actuator size 2
10 Mounting plate		Without
11 Special version	N	NSF 61 water approval

6 Technical data

6.1 Medium

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

6.2 Temperature

Media temperature:

Valve body material	Media temperature
PVC-U, grey (code 1)	10 – 60 °C
ABS (code 4)	-10 – 60 °C
PP, reinforced (code 5)	5 – 80 °C
PVDF (code 20)	-10 – 80 °C
Inliner PP-H grey / outliner PP, reinforced (code 71)	5 – 80 °C
Inliner PVDF / outliner PP, reinforced (code 75)	-10 – 80 °C
PP-H, natural (code N5)	5 – 80 °C

Ambient temperature:

Valve body material	Ambient temperature
PVC-U, grey (code 1)	10 – 50 °C
ABS (code 4)	-10 – 50 °C
PP, reinforced (code 5)	5 – 50 °C
PVDF (code 20)	-10 – 50 °C
Inliner PP-H grey / outliner PP, reinforced (code 71)	5 – 50 °C
Inliner PVDF / outliner PP, reinforced (code 75)	-5 – 50 °C
PP-H, natural (code N5)	5 – 50 °C

Storage temperature: 0 – 40 °C

6.3 Pressure

Operating pressure:

MG	DN	Actuator version	Diaphragm materials	
			Elastomer	PTFE
10	12 - 20	0A	0 - 6	0 - 6
20	15 - 25	E0	0 - 6	0 - 5
		1A	0 - 10	0 - 10
25	32	1A	0 - 10	0 - 10
40	40 - 50	1A	0 - 5	0 - 2
		2A	0 - 10	0 - 10
50	65	2A	0 - 10	0 - 10

MG = diaphragm size

All pressures are gauge pressures. Operating pressure values were determined with static operating pressure applied on one side of a closed valve. Sealing at the valve seat and atmospheric sealing is ensured for the given values.

Information on operating pressures applied on both sides and for high purity media on request.

The operating pressures apply at room temperature. In case of deviating temperatures, observe the pressure / temperature correlation.

Pressure rating: PN 10

Pressure/temperature correlation:

MG	Actuator version	Valve body material		Temperature in °C (valve body)										
		Materials	Code	-10	0	5	10	20	30	40	50	60	70	80
10, 20	0C, 0E	PVC-U	1	-	-	-	6.0	6.0	6.0	6.0	3.5	1.5	-	-
		PP-H	5	-	-	6.0	6.0	6.0	6.0	6.0	5.5	4.0	2.7	1.5
		PVDF	20	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.4	4.7
		PP-H-Natur	N5	-	-	6.0	6.0	6.0	6.0	6.0	5.5	4.0	2.7	1.5
		ABS	4	6.0	6.0	6.0	6.0	6.0	6.0	6.0	4.0	2.0	-	-
		PP-H	71	-	-	6.0	6.0	6.0	6.0	6.0	5.5	4.0	2.7	1.5
		PVDF	75	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.4	4.7
20, 25, 40, 50	1A, 2A	PVC-U	1	-	-	-	10.0	10.0	8.0	6.0	3.5	1.5	-	-
		ABS	4	10.0	10.0	10.0	10.0	10.0	8.0	6.0	4.0	2.0	-	-
		PP-H	5	-	-	10.0	10.0	10.0	8.5	7.0	5.5	4.0	2.7	1.5
		PP-H	71	-	-	10.0	10.0	10.0	8.5	7.0	5.5	4.0	2.7	1.5
		PVDF	20	10.0	10.0	10.0	10.0	10.0	9.0	8.0	7.1	6.3	5.4	4.7
		PVDF	75	10.0	10.0	10.0	10.0	10.0	9.0	8.0	7.1	6.3	5.4	4.7

MG = diaphragm size

Actuator version 0E with PTFE diaphragm can be used up to max. 5 bar. At temperatures above 30 °C the maximum operating pressure decreases.

Actuator version 1A in conjunction with diaphragm size MG 40 is limited to 5 bar operating pressure. In conjunction with a PTFE diaphragm to 2 bar. At temperatures above 30 °C the maximum operating pressure decreases. The pressure rating (PN) depends on the diaphragm size.

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

Depending on the valve configuration, the maximum operating pressure of the pressure rating may be lower. Observe the operating pressure table.

Leakage rate:

Leakage rate A to P11/P12 EN 12266-1

Kv values:

MG	DN	Kv values
10	12	2.8
	15	3.5
	20	3.5
20	15	6.0
	20	10.0
	25	12.0
25	32	20.0
40	40	42.0
	50	46.0
50	65	70.0

MG = diaphragm size, Kv values in m³/h

Kv values determined acc.to DIN EN 60534 standard, inlet pressure 5 bar, Δp 1 bar, PVC-U valve body and soft elastomer diaphragm. The Kv values for other product configurations (e.g. other diaphragm or body materials) may differ. In general, all diaphragms are subject to the influences of pressure, temperature, the process and their tightening torques. Therefore the Kv values may exceed the tolerance limits of the standard.

The Kv value curve (Kv value dependent on valve stroke) can vary depending on the diaphragm material and duration of use.

6.4 Product compliance

Machinery Directive: 2006/42/EC

Pressure Equipment Directive: 2014/68/EU

Food: Regulation (EC) No. 1935/2004*
Regulation (EC) No. 10/2011*
FDA*

EMC Directive: 2014/30/EU

Technical standards used:

Interference resistance EN IEC 61000-6-2:2019
EN 61326-1 (Industry)
EN IEC 61800-3:2018

Interference emission EN IEC 61000-6-4:2019 (only actuator size 0 and actuator size 1)
EN 61326-1:2013 (Industry) (only actuator size 0 and actuator size 1)
EN IEC 61800-3:2018 (all actuator sizes)
The product is intended for operation in industrial environments.

Drinking water: NSF/ANSI*

* depending on version and / or operating parameters

6.5 Materials

Materials:

Diaphragm material	O-ring material
PTFE	FKM
NBR	EPDM
FKM	FKM
EPDM	EPDM

6.6 Mechanical data

Protection class: IP 65 acc. to EN 60529

Actuating speed: Actuator version 0A adjustable, max. 6 mm/s
 Actuator version E0 adjustable, max. 6 mm/s
 Actuator version 1A adjustable, max. 6 mm/s
 Actuator version 2A adjustable, max. 4 mm/s

Weight:

Actuator

Actuator version 0A 2.1 kg
 Actuator version E0 2.2 kg
 Actuator version 1A 3.0 kg
 Actuator version 2A 9.0 kg

Valve body

MG	DN	Spigot			Union end				Flange	Threaded socket	Solvent cement socket	Flare
		Connection type code										
0, 30	20	28	7, 7R	33	3M, 3T	78	4, 39	1	2	75		
10	12	-	-	-	-	-	-	-	-	0.08	0.06	-
	15	-	-	0.13	0.18	0.13	-	0.20	-	-	-	0.08
	20	-	-	-	-	-	-	-	-	-	-	0.125
20	15	0.12	0.10	-	0.17	0.24	0.26	0.27	0.67	-	-	-
	20	0.13	0.12	-	0.21	0.28	0.30	0.36	0.84	-	-	-
20	25	0.16	0.14	-	0.26	0.33	0.38	0.37	1.28	-	-	-
25	32	0.22	0.18	-	0.40	0.70	0.73	0.63	1.89	-	-	-
40	40	0.50	0.40	-	0.73	0.83	0.93	1.13	2.36	-	-	-
	50	0.57	0.47	-	1.00	1.40	1.50	1.60	3.08	-	-	-
50	65	0.92	3.57	-	-	-	-	-	3.20	-	-	-

MG = diaphragm size
 Weights in kg

Installation position: Optional

Flow direction: Optional

6.7 Duty cycle and service life

Service life:	Control operation - Class C acc. to EN 15714-2 (1,800,000 start-ups and 1200 start-ups per hour). Open / Close duty - Minimum 1,000,000 switching cycles at room temperature and permissible duty cycle.
Duty cycle:	Control operation - Class C acc. to EN 15714-2. Open/Close duty - 100%

6.8 Electrical data

Supply voltage:	Actuator size 0	Actuator size 1	Actuator size 2
Voltage	U _V = 24 V DC ± 10%		
Rating	Max. 28 W	Max. 65 W	Max. 120 W
Reverse battery protection	Yes		

6.8.1 Analogue input signals

6.8.1.1 Set value

Input signal:	0/4 - 20 mA; 0 – 10 V DC (selectable using software)
Input type:	passive
Input resistance:	250 Ω
Accuracy/linearity:	≤ ±0.3% of full flow
Temperature drift:	≤ ±0.1% / 10°K
Resolution:	12 bit
Reverse battery protection:	No
Overload proof:	Yes (up to ± 24 V DC)

6.8.1.2 Process actual value

Input signal:	0/4 - 20 mA; 0 – 10 V DC (selectable using software)
Input type:	passive
Input resistance:	250 Ω
Accuracy/linearity:	≤ ±0.3% of full flow
Temperature drift:	≤ ±0.1% / 10°K
Resolution:	12 bit
Reverse battery protection:	No
Overload proof:	Yes (up to ± 24 V DC)

6.8.2 Digital input signals

Digital inputs:	3
Function:	Can be selected using software
Voltage:	24 V DC
Logic level "1":	>14 V DC
Logic level "0":	< 8 V DC
Input current:	typ. 2.5 mA (at 24 V DC)

6.8.3 Analogue output signals

6.8.3.1 Actual value

Output signal:	0/4 - 20 mA; 0 – 10 V DC (selectable using software)
Output type:	Active (AD5412)
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:	10 bit
Overload proof:	Yes (up to $\pm 24\text{ V DC}$)
Short-circuit proof:	Yes

6.8.4 Digital output signals

6.8.4.1 Switching outputs 1 and 2

Design:	2x make contact, potential-free
Switching voltage:	max. 48 V DC / 48 V AC
Switch rating:	max. 60 W / 2A
Switch points:	Adjustable 0 - 100 %

6.8.4.2 Switching output 3

Function:	Signal fault
Type of contact:	Push-Pull
Switching voltage:	Supply voltage
Switching current:	$\leq 0.1\text{ A}$
Drop voltage:	Max. 2.5 V DC at 0.1 A
Overload proof:	Yes (up to $\pm 24\text{ V DC}$)
Short-circuit proof:	Yes
Pull-Down resistance:	120 k Ω

6.8.5 Communication eSy-Web

Interface:	Ethernet
Function:	Parameterisation via web browser
IP address:	192.168.2.1 alterable via web browser
Subnet screen:	255.255.252.0 alterable via web browser

The actuator and the PC must be in the same network to use the web server. The IP address of the actuator is entered in the web browser and the actuator can then be parametrised. In order to use more than one actuator, a definitive IP address must be assigned to each actuator in the same network.

6.8.6 Communication Modus TCP

Interface:	Modbus TCP
IP address:	192.168.2.1 alterable via web browser
Subnet screen:	255.255.252.0 alterable via web browser
Port:	502

Supported function codes:

Code Dezimal	Code Hex	Function
3	0x03	Read Holding Registers
4	0x04	Read Input Registers
6	0x06	Write Single Register
16	0x10	Write Multiple Registers
23	0x17	Read / Write Multiple Registers

6.8.7 Behaviour in the event of an error

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

7 Electrical connection

NOTICE

Appropriate cable socket / appropriate mating connector!

- ▶ The appropriate cable socket and/or appropriate mating connector is included for X1, X3 and X4.
- ▶ The appropriate cable socket and/or appropriate mating connector is **not** included for X2.

NOTICE

Damage to unused plugs due to penetration of humidity!

- ▶ Unused plugs must be covered with the protective caps supplied with the product to ensure IP protection.

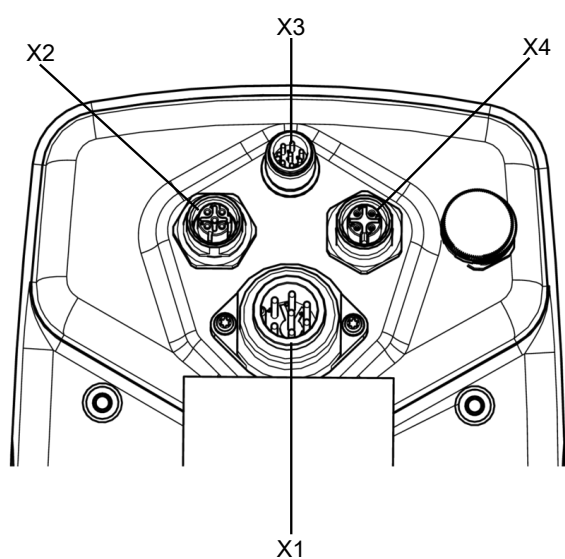
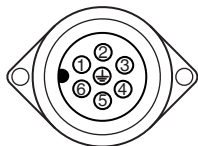


Fig. 4: Overview of electrical connections

7.1 Connection X1



7-pin plug, Binder, type 693

Pin	Signal name
Pin 1	Uv, 24 V DC supply voltage
Pin 2	Uv GND
Pin 3	Relay output K1, common
Pin 4	Relay output K1, make contact
Pin 5	Relay output K2, common
Pin 6	Relay output K2, make contact
Pin PE	Function earth

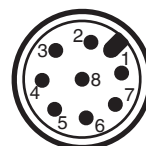
7.2 Connection X2



5-pin M12 built-in socket, D-coded

Pin	Signal name
Pin 1	Tx + (Ethernet)
Pin 2	Rx + (Ethernet)
Pin 3	Tx - (Ethernet)
Pin 4	Rx - (Ethernet)
Pin 5	Shield

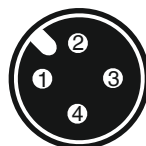
7.3 Connection X3



8-pin M12 plug, A-coded

Pin	Signal name
Pin 1	W+ set value input
Pin 2	W – set value input
Pin 3	X + actual value output
Pin 4	GND (actual value output, digital input 1 – 3, error message output)
Pin 5	Error message output 24 V DC
Pin 6	Digital input 3
Pin 7	Digital input 1
Pin 8	Digital input 2

7.4 Connection X4



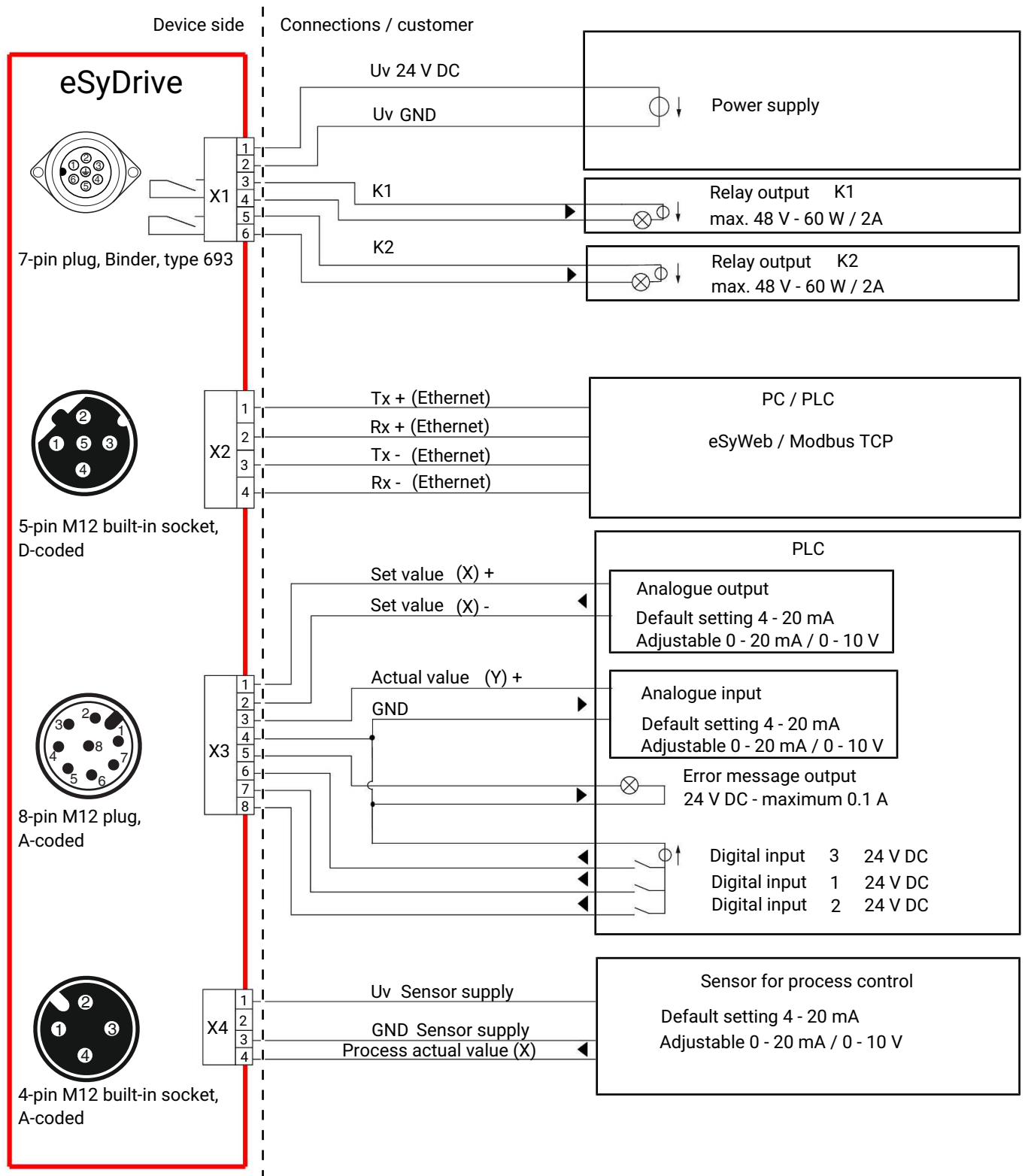
4-pin M12 built-in socket, A-coded

Pin	Signal name
Pin 1	UV, 24 V DC actual value supply
Pin 2	n.c.
Pin 3	GND (actual value supply, actual value input)
Pin 4	X+, process actual value input
Pin 5	n.c.

7.5 Connecting the valve electrically

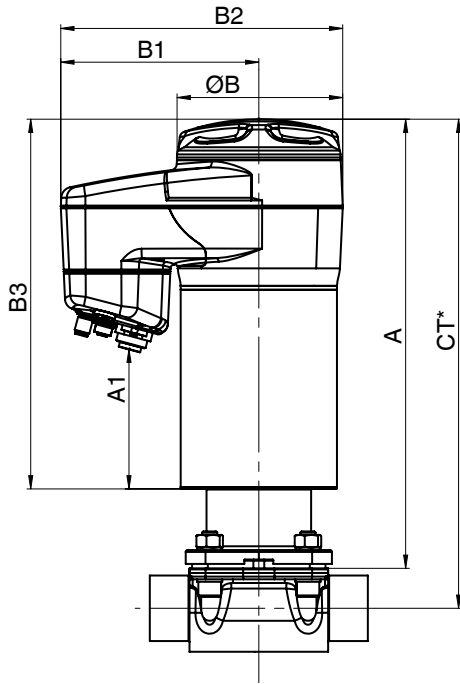
1. Protect the electrical connections from direct contact with rain water.
2. Lay the cables and pipework so that neither condensate nor rain water can get into the plug unions.
3. Check that all plug cable glands and fittings are mechanically secured.
⇒ The cable must be held firmly on all sides.
4. Check whether the actuator cover/manual override is closed and undamaged.
5. Correctly close the actuator cover/manual override again immediately after use (see "Manual override", page 39).
6. Correctly close the product again after replacing the diaphragm.

7.6 Connection diagram



8 Dimensions

8.1 Actuator dimensions



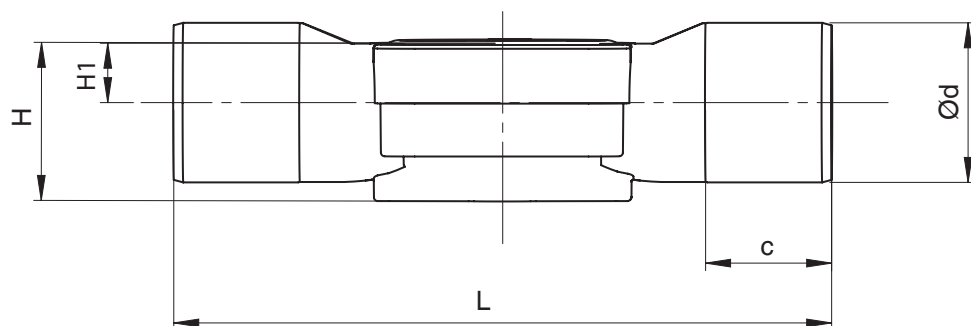
MG	DN	Actuator version	A	A1	Ø B	B1	B2	B3
10	10 - 20	0A	230.0	44.0	68.0	126.0	160.0	190.0
20	15 - 25	E0	237.0	44.0	68.0	126.0	160.0	190.0
		1A	299.0	83.0	82.0	132.0	172.0	250.0
25	32	1A	305.0	83.0	82.0	132.0	172.0	250.0
40	40, 50	1A	303.0	75.0	82.0	132.0	172.0	243.0
		2A	360.0	111.0	134.0	157.0	224.0	296.0
50	65	2A	360.0	111.0	134.0	157.0	224.0	296.0

Dimensions in mm, MG = diaphragm size

* CT = A + H1 (see body dimensions)

8.2 Body dimensions

8.2.1 Spigot DIN/inch (code 0, 30)



Connection type spigot DIN (code 0)¹⁾, body material PVC-U (code 1), PP (code 5), PVDF (code 20), inliner/outliner (code 71, 75)²⁾

MG	DN	NPS	c			ød	H			H1	L
			Material				Material				
			1	5, 20	71, 75		1	5, 20	71, 75		
20	15	1/2"	16.0	-	18.0	20.0	36.0	-	36.0	10.0	124.0
	20	3/4"	19.0	-	19.0	25.0	38.0	-	38.0	12.0	144.0
	25	1"	22.0	-	22.0	32.0	39.0	-	39.0	13.0	154.0
25	32	1¼"	32.0	-	32.0	40.0	41.0	-	41.0	15.0	174.0
40	40	1½"	35.0	-	26.0	50.0	63.2	-	63.2	23.2	194.0
	50	2"	38.0	-	33.0	63.0	63.2	-	63.2	23.2	224.0
50	65	2½"	46.0	46.0	-	75.0	78.8	78.8	-	38.8	284.0

Connection type spigot - inch (code 30)¹⁾, body material PVC-U (code 1), ABS (code 4)²⁾

MG	DN	NPS	c	ød	H	H1	L
20	15	1/2"	24.0	21.4	36.0	10.0	141.0
	20	3/4"	27.0	26.7	38.0	12.0	144.0
	25	1"	30.0	33.6	39.0	13.0	154.0
25	32	1¼"	33.0	42.2	41.0	15.0	174.0
40	40	1½"	35.0	48.3	63.2	23.2	194.0
	50	2"	40.0	60.3	63.2	23.2	224.0
50	65	2½"	46.0	73.0	78.8	38.8	284.0

Dimensions in mm

MG = diaphragm size

1) Connection type

Code 0: Spigot DIN

Code 30: Spigot - inch, for welding or solvent cementing, dependent on body material

2) Valve body material

Code 1: PVC-U, grey

Code 4: ABS

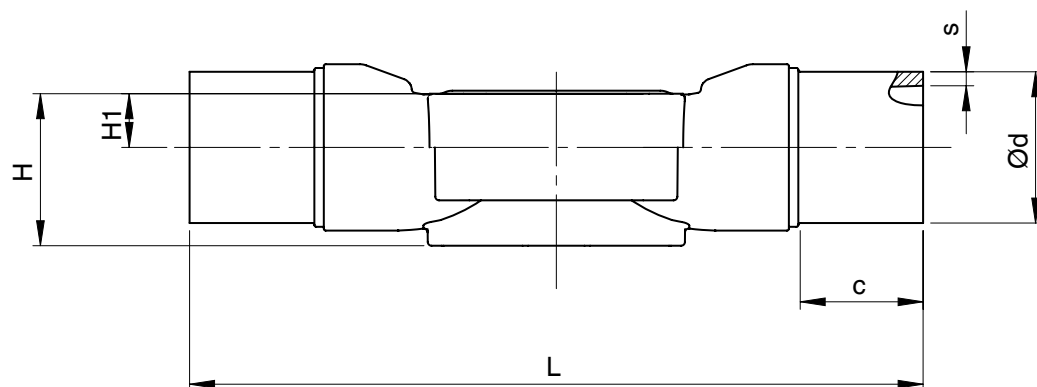
Code 5: PP, reinforced

Code 20: PVDF

Code 71: Inliner PP-H, grey, outliner PP, reinforced

Code 75: Inliner PVDF/outliner PP, reinforced

8.2.2 Spigot IR (code 20)



Connection type spigot IR (code 20)¹⁾, body material inliner/outliner (code 71, 75)²⁾

MG	DN	NPS	c	ød	H	H1	L	s	
								Material	
								71	75
20	15	1/2"	33.0	20.0	36.0	10.0	154.0	1.9	1.9
	20	3/4"	33.0	25.0	38.0	12.0	154.0	2.3	1.9
	25	1"	33.0	32.0	39.0	13.0	154.0	2.9	2.4
25	32	1¼"	33.0	40.0	41.0	15.0	194.0	3.7	2.4
40	40	1½"	33.0	50.0	63.2	23.2	194.0	4.6	3.0
	50	2"	33.0	63.0	63.2	23.2	224.0	5.8	3.0

Connection type spigot IR (code 20)¹⁾, body material PVDF (code 20)³⁾

MG	DN	NPS	c	ød	H	H1	L	s
50	65	2½"	43.0	75.0	78.8	38.8	284.0	3.6

Dimensions in mm

MG = diaphragm size

1) **Connection type**

Code 20: Spigot for IR butt welding

2) **Valve body material**

Code 71: Inliner PP-H, grey, outliner PP, reinforced

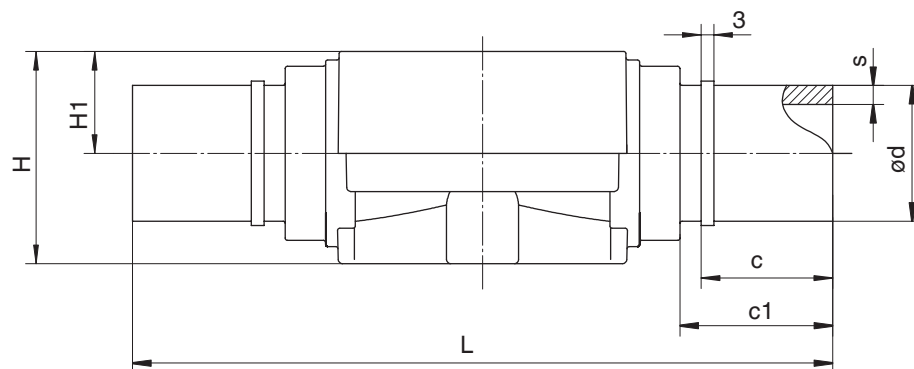
Code 75: Inliner PVDF/outliner PP, reinforced

3) **Valve body material**

Code 20: PVDF

Code 71: Inliner PP-H, grey, outliner PP, reinforced

Code 75: Inliner PVDF/outliner PP, reinforced

8.2.3 Spigot (code 28)**Connection type spigot (code 28) ¹⁾, body material PVDF (code 20) ²⁾**

MG	DN	NPS	c	c1	ød	H	H1	L	s
10	15	1/2"	31.0	37.0	20.0	41.0	16.0	134.0	1.9

Dimensions in mm

MG = diaphragm size

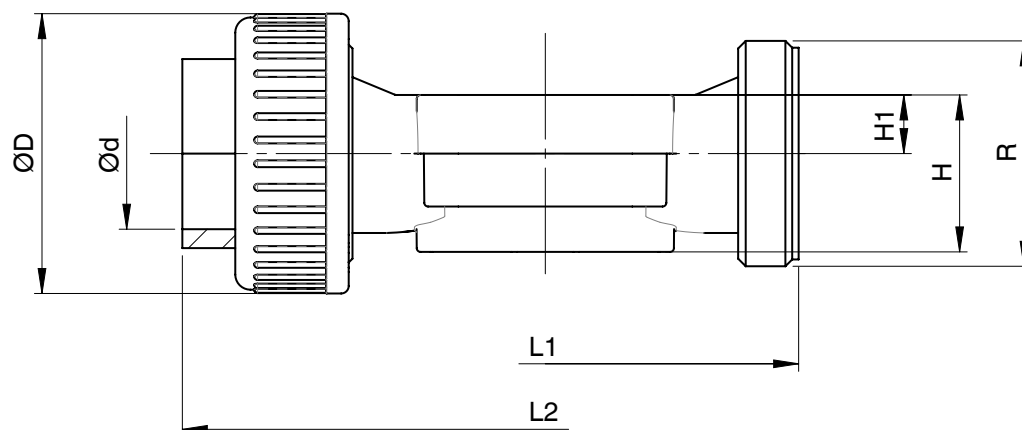
1) Connection type

Code 28: Spigot for IR butt welding, BCF

2) Valve body material

Code 20: PVDF

8.2.4 Union end DIN (code 7)



Connection type union end DIN (code 7)¹⁾, body material PVC-U (code 1), PP (code 5), PVDF (code 20), PP-H (code N5)²⁾, diaphragm size 10

MG	DN	NPS	ød	øD	H		H1		L1	L2		R
					Material		Material			Material		
					1, 20	5, N5	1, 20	5, N5		1, 20	5, N5	
10	15	1/2"	20.0	43.0	30.0	41.0	15.0	16.0	90.0	128.0	125.0	G 1

Connection type union end DIN (code 7)¹⁾, body material PVC-U (code 1), ABS (code 4), inliner/outliner (code 71, 75)²⁾, diaphragm size 20 – 40

MG	DN	NPS	ød	øD	H	H1	L1	L2				R
								Material				
								1	4	71	75	
20	15	1/2"	20.0	43.0	36.0	10.0	108.0	146.0	150.0	143.0	146.0	G 1
	20	3/4"	25.0	53.0	38.0	12.0	108.0	152.0	156.0	146.0	150.0	G 1¼
	25	1"	32.0	60.0	39.0	13.0	116.0	166.0	170.0	158.0	162.0	G 1½
25	32	1¼"	40.0	74.0	41.0	15.0	134.0	192.0	196.0	181.0	184.0	G 2
40	40	1½"	50.0	83.0	63.2	23.2	154.0	222.0	222.0	207.0	210.0	G 2¼
	50	2"	63.0	103.0	63.2	23.2	184.0	266.0	266.0	245.0	248.0	G 2¾

Dimensions in mm

MG = diaphragm size

1) Connection type

Code 7: Union end with insert (socket) – DIN

2) Valve body material

Code 1: PVC-U, grey

Code 4: ABS

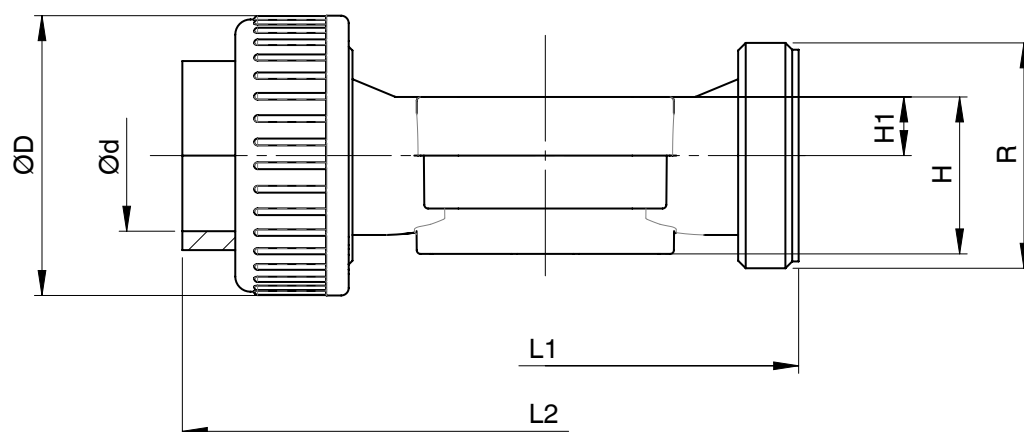
Code 5: PP, reinforced

Code 20: PVDF

Code 71: Inliner PP-H, grey, outliner PP, reinforced

Code 75: Inliner PVDF/outliner PP, reinforced

Code N5: PP-H, natural

8.2.5 Union end inch (code 33, 3M, 3T)**Connection type union end inch (code 33)¹⁾, body material PVC-U (code 1)²⁾, diaphragm size 10**

MG	DN	NPS	Ød	ØD	H	H1	L1	L2	R
10	15	1/2"	21.4	43.0	30.0	15.0	90.0	128.0	G1

Connection type union end inch (code 33, 3M, 3T)¹⁾, body material PVC-U (code 1)²⁾, diaphragm sizes 20 - 40

MG	DN	NPS	ød			øD		H	H1	L1	L2			R	
			Connection type								Connection type				
			33	3M	3T	33, 3M	3T				33	3M	3T	33, 3M	3T
20	15	1/2"	21.4	21.4	22.0	43.0	53.0 *	36.0	10.0	108.0	146.0	158.0	152.0	G 1	G 1¼ *
	20	3/4"	26.8	26.7	26.0	53.0	53.0	38.0	12.0	108.0	152.0	164.0	152.0	G 1¼	G 1¼
	25	1"	33.6	33.5	32.0	60.0	60.0	39.0	13.0	116.0	166.0	180.0	166.0	G 1½	G 1½
25	32	1¼"	42.3	42.2	38.0	74.0	74.0	41.0	15.0	134.0	192.0	204.0	192.0	G 2	G 2
40	40	1½"	48.3	48.3	48.0	83.0	83.0	63.2	23.2	154.0	222.0	230.0	222.0	G 2¼	G 2¼
	50	2"	60.4	60.4	60.0	103.0	103.0	63.2	23.2	184.0	264.0	266.0	266.0	G 2¾	G 2¾

Connection type BS (code 33)¹⁾, body material ABS (code 4)²⁾

MG	DN	NPS	Ød	ØD	H	H1	L1	L2	R
20	15	1/2"	21.4	43.0	36.0	10.0	108.0	150.0	G 1
	20	3/4"	26.8	53.0	38.0	12.0	108.0	156.0	G 1 ¼
	25	1"	33.6	60.0	39.0	13.0	116.0	170.0	G 1 ½
25	32	1 ¼"	42.3	74.0	41.0	15.0	134.0	198.0	G 2
40	40	1 ½"	48.3	83.0	63.2	23.2	154.0	220.0	G 2 ¼
	50	2"	60.4	103.0	63.2	23.2	184.0	264.0	G 2 ¾

Dimensions in mm

MG = diaphragm size

* Insert requires valve body DN 20

1) Connection type

Code 33: Union end with inch insert - BS (socket)

Code 3M: Union end with inch insert – ASTM (socket)

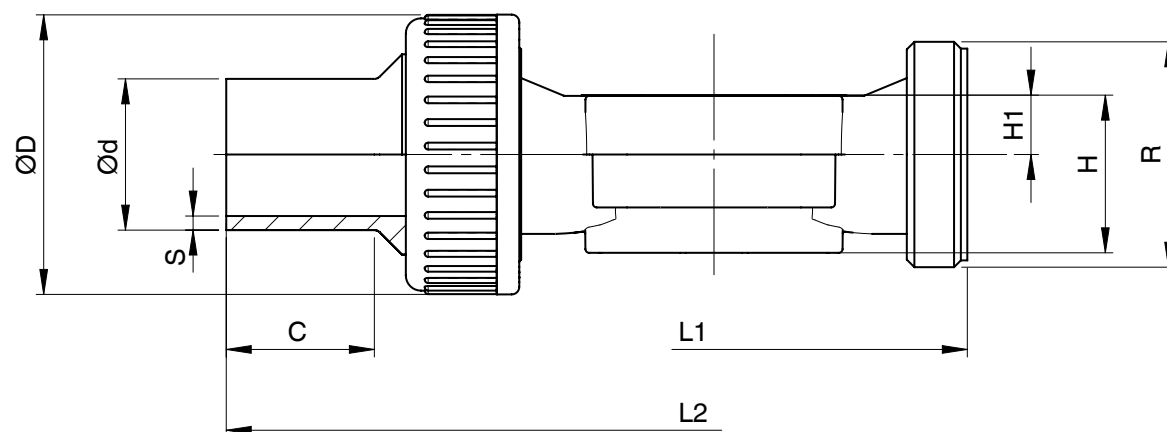
Code 3T: Union end with JIS insert (socket)

2) Valve body material

Code 1: PVC-U, grey

Code 4: ABS

8.2.6 Union end DIN, IR butt welding (code 78)



Connection type union end DIN, IR butt welding (code 78)¹⁾, body materials PP (code 5), PVDF (code 20), PP-H (code N5)²⁾

MG	DN	NPS	c	ød	øD	H		H1		L1	L2	R	s
						Material		Material					
						5	20, N5	5	20, N5				
10	15	1/2"	36.0	20.0	42.0	30.0	41.0	15.0	16.0	90.0	196.0	G 1	1.9

Connection type union end DIN, IR butt welding (code 78)¹⁾, body material inliner/outliner (code 71, 75)²⁾

MG	DN	NPS	c	ød	øD	H	H1	L1	L2	R	s	
											Material	
											71	75
20	15	1/2"	36.0	20.0	43.0	36.0	10.0	108.0	214.0	G 1	1.9	1.9
	20	3/4"	37.0	25.0	53.0	38.0	12.0	108.0	220.0	G 1¼	2.3	1.9
	25	1"	39.0	32.0	60.0	39.0	13.0	116.0	234.0	G 1½	2.9	2.4
25	32	1¼"	39.0	40.0	74.0	41.0	15.0	134.0	258.0	G 2	3.7	2.4
40	40	1½"	43.0	50.0	83.0	63.2	23.2	154.0	284.0	G 2¼	4.6	3.0
	50	2"	43.0	63.0	103.0	63.2	23.2	184.0	320.0	G 2¾	5.8	3.0

Dimensions in mm

MG = diaphragm size

1) Connection type

Code 78: Union end with insert (for IR butt welding) – DIN

2) Valve body material

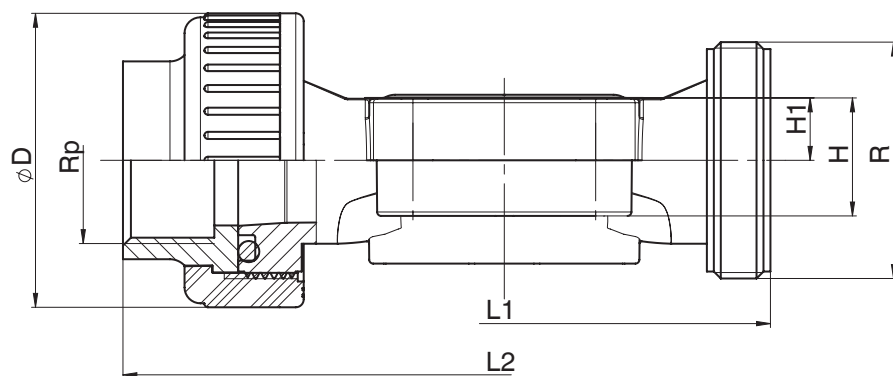
Code 5: PP, reinforced

Code 20: PVDF

Code 71: Inliner PP-H, grey, outliner PP, reinforced

Code 75: Inliner PVDF/outliner PP, reinforced

Code N5: PP-H, natural

8.2.7 Union end Rp (code 7R)**Connection type union end Rp (code 7R)¹⁾, body material PVC-U (code 1)²⁾**

MG	DN	NPS	$\varnothing D$	H	H ₁	L ₁	L ₂	R	Rp
20	15	1/2"	43.0	36.0	10.0	108.0	146.0	G 1	1/2
	20	3/4"	53.0	38.0	12.0	108.0	152.0	G 1¼	3/4
	25	1"	60.0	39.0	13.0	116.0	166.0	G 1½	1
25	32	1¼"	74.0	41.0	15.0	134.0	192.0	G 2	1¼
40	40	1½"	83.0	63.2	23.2	154.0	222.0	G 2¼	1½
	50	2"	103.0	63.2	23.2	184.0	266.0	G 2¾	2

Dimensions in mm

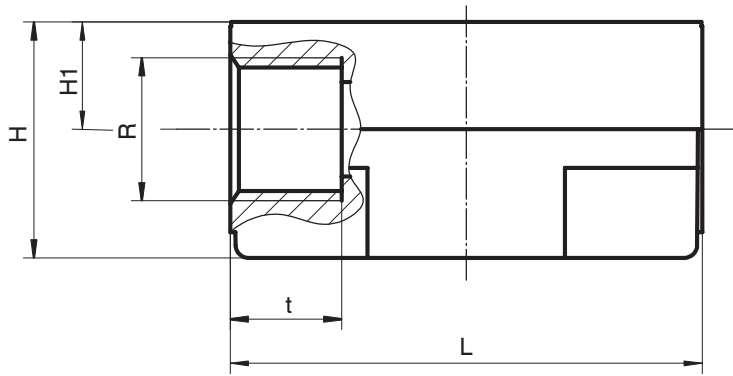
MG = diaphragm size

1) Connection type

Code 7R: Union end with insert (Rp threaded socket) - DIN

2) Valve body material

Code 1: PVC-U, grey

8.2.8 Threaded socket (code 1)**Connection type threaded socket (code 1)¹⁾, body materials PVC-U (code 1), PP (code 5), PVDF (code 20)²⁾**

MG	DN	NPS	H		H1	L	R	t
			Material					
			1, 5	20				
10	12	3/8"	27.5	31.5	12.5	55.0	G3/8	13.0

Dimensions in mm

MG = diaphragm size

1) Connection type

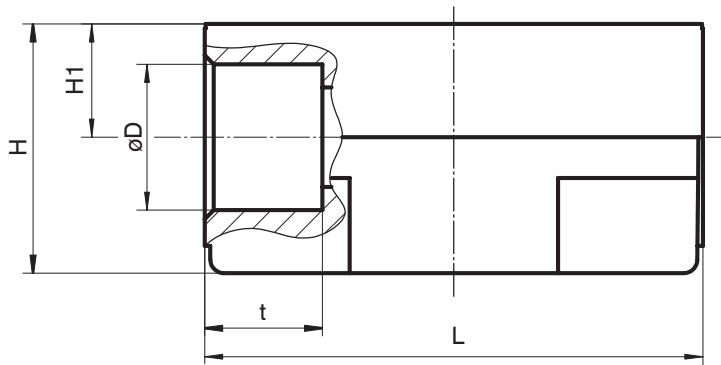
Code 1: Threaded socket DIN ISO 228

2) Valve body material

Code 1: PVC-U, grey

Code 5: PP, reinforced

Code 20: PVDF

8.2.9 Solvent cement socket (code 2)**Connection type solvent cement socket (code 2)¹⁾, body material PVC-U (code 1)²⁾**

MG	DN	NPS	ø D	H	H1	L	t
10	12	3/8"	16.0	27.5	12.5	55.0	13.0

Dimensions in mm

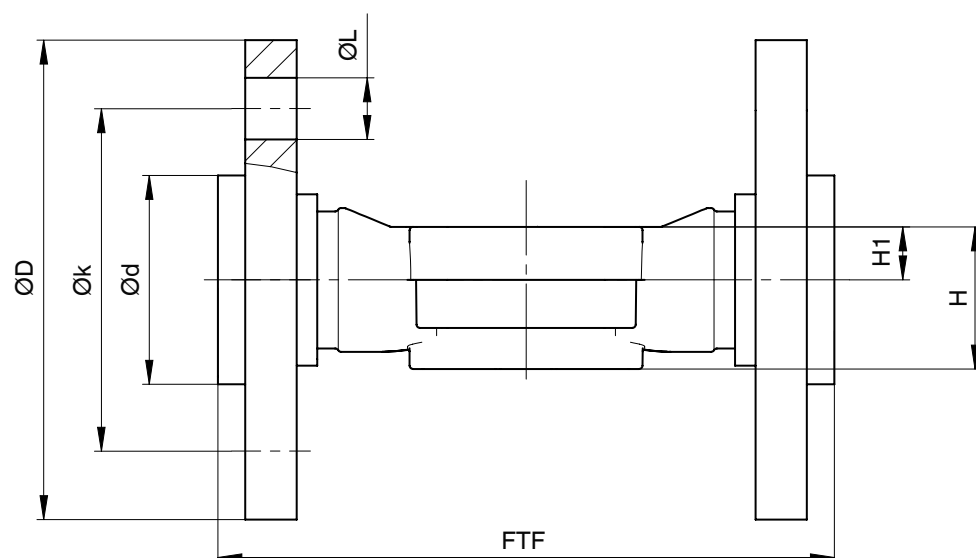
MG = diaphragm size

1) Connection type

Code 2: Solvent cement socket DIN

2) Valve body material

Code 1: PVC-U, grey

8.2.10 Flange EN (code 4)**Connection type flange EN (code 4)¹⁾, body material PVC-U (code 1)²⁾**

MG	DN	NPS	ød	øD	FTF	H	H1	øk	øL	n
20	15	1/2"	34.0	95.0	130.0	36.0	10.0	65.0	14.0	4
	20	3/4"	41.0	105.0	150.0	38.0	12.0	75.0	14.0	4
	25	1"	50.0	115.0	160.0	39.0	13.0	85.0	14.0	4
25	32	1¼"	61.0	140.0	180.0	41.0	15.0	100.0	18.0	4
40	40	1½"	73.0	150.0	200.0	63.2	23.2	110.0	18.0	4
	50	2"	90.0	165.0	230.0	63.2	23.2	125.0	18.0	4
50	65	2½"	106.0	185.0	290.0	78.8	38.8	145.0	18.0	4

Connection type flange EN (code 4)¹⁾, body materials PP (code 5), PVDF (code 20)²⁾

MG	DN	NPS	ød		øD	FTF	H	H1	øk	øL	n
			Material								
			5	20							
50	65	2½"	122.0	120.0	185.0	290.0	78.8	38.8	145.0	18.0	4

Dimensions in mm

MG = diaphragm size

n = number of bolts

1) Connection type

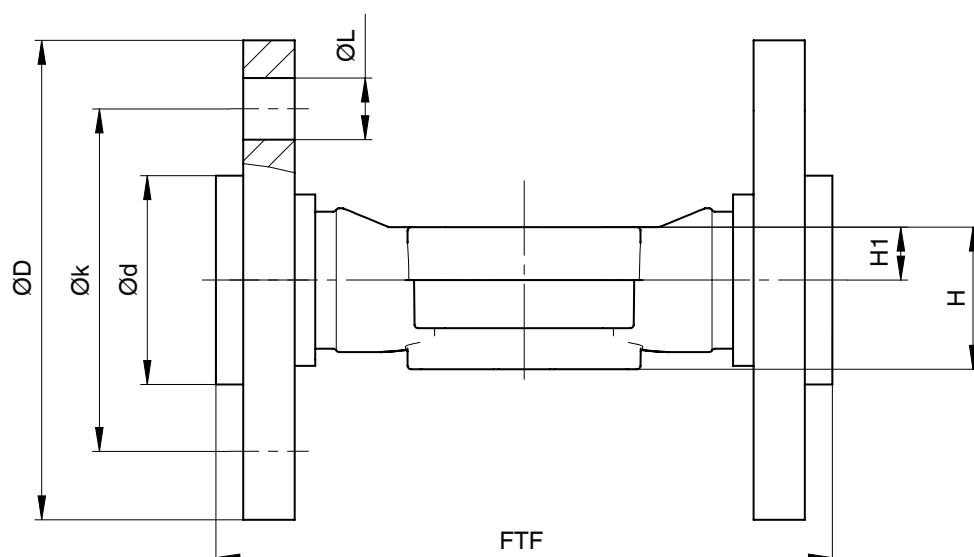
Code 4: Flange EN 1092, PN 10, form B, face-to-face dimension FTF EN 558 series 1, ISO 5752, basic series 1

2) Valve body material

Code 1: PVC-U, grey

Code 5: PP, reinforced

Code 20: PVDF



Connection type flange EN (code 4)¹⁾, body material inliner/outliner (code 71, 75)²⁾

MG	DN	NPS	ød	øD	FTF	H	H1	øk	øL	n
20	15	1/2"	45.0	95.0	130.0	36.0	10.0	65.0	14.0	4
	20	3/4"	58.0	105.0	150.0	38.0	12.0	75.0	14.0	4
	25	1"	68.0	115.0	160.0	39.0	13.0	85.0	14.0	4
25	32	1¼"	78.0	140.0	180.0	41.0	15.0	100.0	18.0	4
40	40	1½"	88.0	150.0	200.0	63.2	23.2	110.0	18.0	4
	50	2"	102.0	165.0	230.0	63.2	23.2	125.0	18.0	4

Dimensions in mm

MG = diaphragm size

n = number of bolts

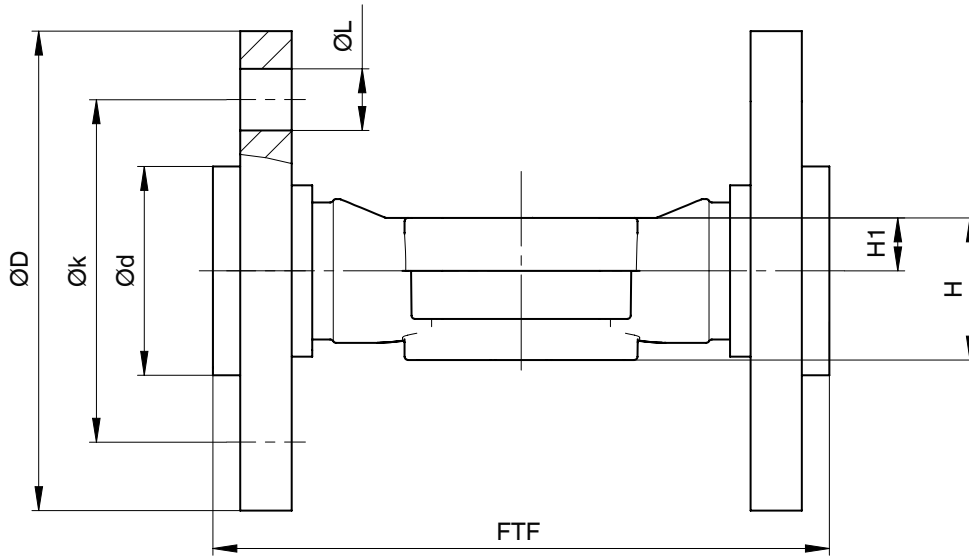
1) **Connection type**

Code 4: Flange EN 1092, PN 10, form B, face-to-face dimension FTF EN 558 series 1, ISO 5752, basic series 1

2) **Valve body material**

Code 71: Inliner PP-H, grey, outliner PP, reinforced

Code 75: Inliner PVDF/outliner PP, reinforced

8.2.11 Flange ANSI (code 39)**Connection type flange ANSI (code 39)¹⁾, body material PVC-U (code 1)²⁾**

MG	DN	NPS	ød	øD	FTF	H	H1	øk	øL	n
20	15	1/2"	34.0	95.0	130.0	36.0	10.0	60.0	16.0	4
	20	3/4"	41.0	105.0	150.0	38.0	12.0	70.0	16.0	4
	25	1"	50.0	115.0	160.0	39.0	13.0	79.0	16.0	4
25	32	1¼"	61.0	140.0	180.0	41.0	15.0	89.0	16.0	4
40	40	1½"	73.0	150.0	200.0	63.2	23.2	98.0	16.0	4
	50	2"	90.0	165.0	230.0	63.2	23.2	121.0	19.0	4
50	65	2½"	106.0	185.0	290.0	78.8	38.8	140.0	19.0	4

Connection type flange ANSI (code 39)¹⁾, body material PP (code 5), PVDF (code 20)²⁾

MG	DN	NPS	ød		øD	FTF	H	H1	øk	øL	n
			Material								
			5	20							
50	65	2½"	122.0	120.0	185.0	290.0	78.8	38.8	140.0	19.0	4

Dimensions in mm

MG = diaphragm size

n = number of bolts

1) Connection type

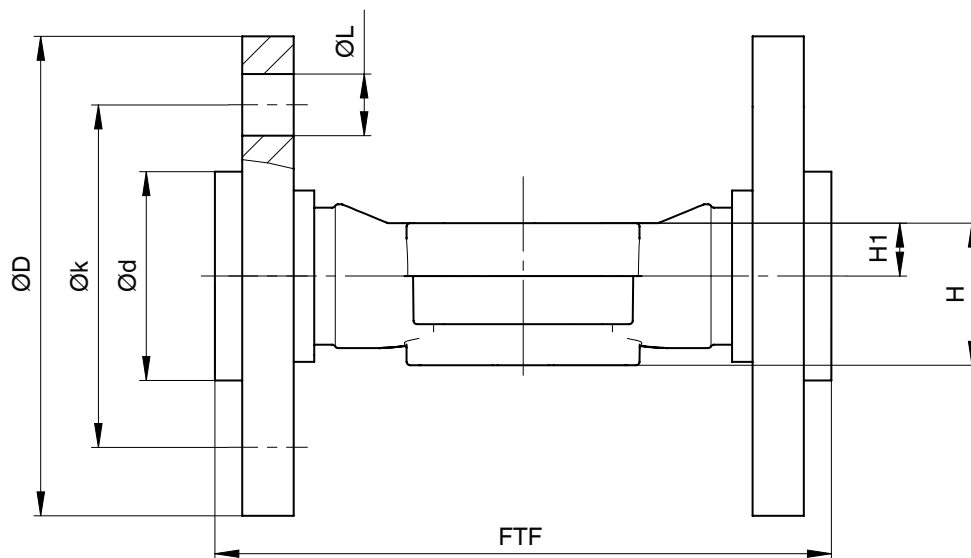
Code 39: Flange ANSI Class 125/150 RF, face-to-face dimension FTF EN 558 series 1, ISO 5752, basic series 1, length only for body configuration D

2) Valve body material

Code 1: PVC-U, grey

Code 5: PP, reinforced

Code 20: PVDF



Connection type flange ANSI (code 39)¹⁾, body material inliner/outliner (code 71, 75)²⁾

MG	DN	NPS	ød	øD	FTF	H	H1	øk	øL	n
20	15	1/2"	45.0	95.0	130.0	36.0	10.0	60.0	16.0	4
	20	3/4"	54.0	105.0	150.0	38.0	12.0	70.0	16.0	4
	25	1"	63.0	115.0	160.0	39.0	13.0	79.0	16.0	4
25	32	1¼"	73.0	140.0	180.0	41.0	15.0	89.0	16.0	4
40	40	1½"	82.0	150.0	200.0	63.2	23.2	98.0	16.0	4
	50	2"	102.0	165.0	230.0	63.2	23.2	121.0	19.0	4

Dimensions in mm

MG = diaphragm size

n = number of bolts

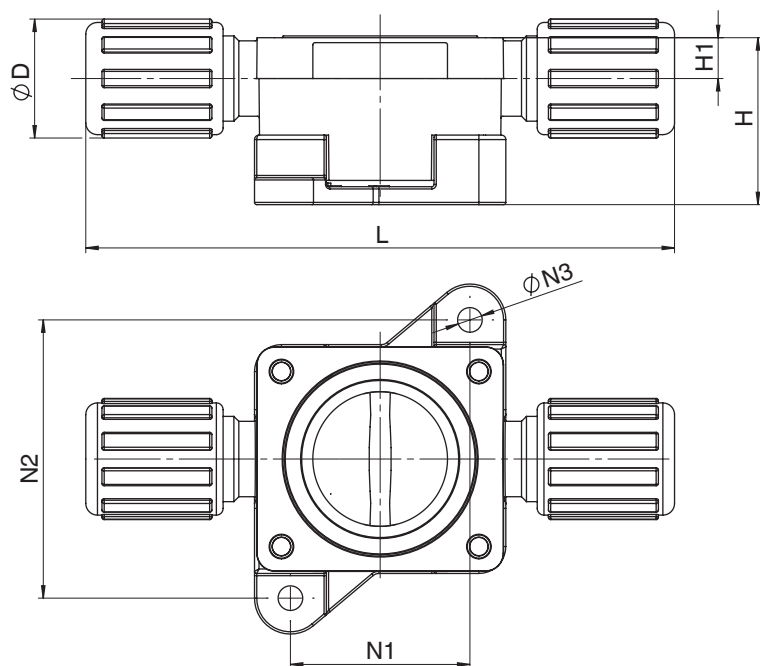
1) **Connection type**

Code 39: Flange ANSI Class 125/150 RF, face-to-face dimension FTF EN 558 series 1, ISO 5752, basic series 1, length only for body configuration D

2) **Valve body material**

Code 71: Inliner PP-H, grey, outliner PP, reinforced

Code 75: Inliner PVDF/outliner PP, reinforced

8.2.12 Flare (code 75)**Connection type flare (code 75) ¹⁾, body material PP-H (code N5) ²⁾**

MG	DN	NPS	ØD	H	H1	L	N1	N2	ØN3
10	15	1/2"	26.5	38.1	10.0	132.0	40.0	62.0	5.5
	20	3/4"	26.5	44.5	15.0	134.0	40.0	62.0	5.5

Dimensions in mm

MG = diaphragm size

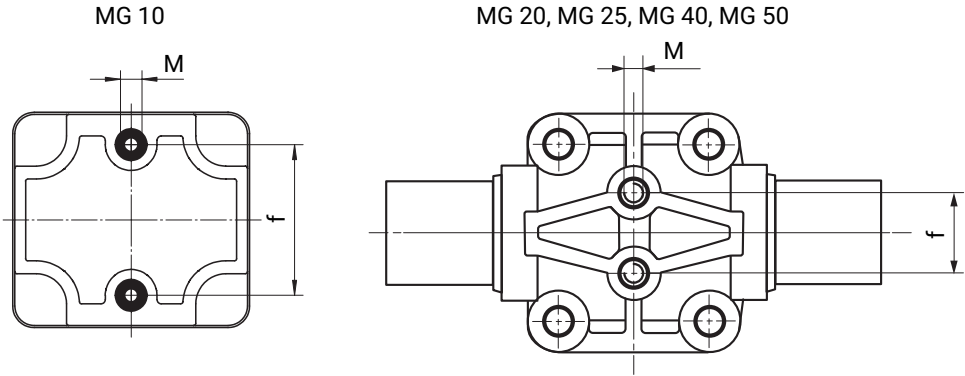
1) Connection type

Code 75: Flare connection with PVDF union nut

2) Valve body material

Code N5: PP-H, natural

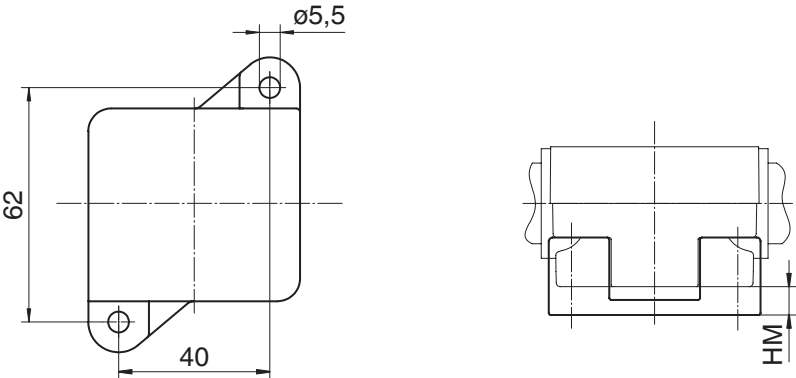
8.3 Valve body mounting



MG	DN	NPS	f	M	
				Connection type	
				0, 4, 7, 7R, 20, 28, 33, 39, 3M, 3T, 78	30
10	12 - 20	1/4" - 1/2"	35.0	M5	M5 *
20	15 - 25	1/2" - 1"	25.0	M6	M6 *
25	32	1 1/4"	25.0	M6	M6 *
40	40 - 50	1 1/2" - 2"	44.5	M8	M8 *
50	65	2 1/2"	44.5	M8	M8 *

Dimensions in mm, MG = diaphragm size
 * Inch thread on request

8.4 Availability of mounting plate



MG	DN	HM
10	12	5.0
	15	4.5
	20	4.5

Dimensions in mm, MG = diaphragm size

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.

Control function	Function	Condition as supplied to customer
1	Normally closed (NC)	closed
2	Normally open (NO)	open
3	Double acting (DA)	undefined

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 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 appropriate 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 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 (see chapter "Flow direction").
 15. Please note the installation position (see chapter "Installation position").

10.2 Installation position

The installation position of the product is optional.

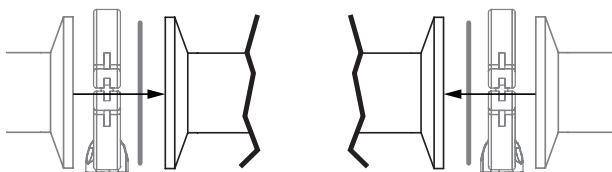
10.3 Installation with clamp connections

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.

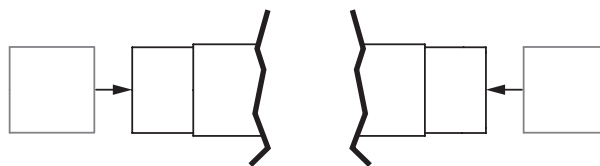
10.4 Installation with butt weld spigots

Fig. 6: Butt weld spigots

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

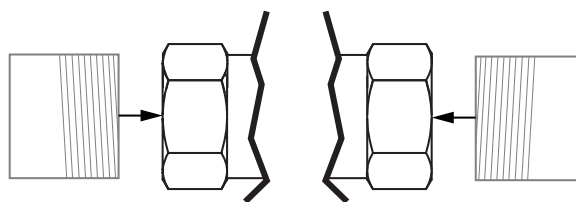
10.5 Installation with threaded sockets

Fig. 7: 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 "Preparing for installation").
3. Screw the threaded connections into the pipe in accordance with valid standards.
4. Screw the body of the product onto the piping using appropriate thread sealant.
5. Re-attach or reactivate all safety and protective devices.

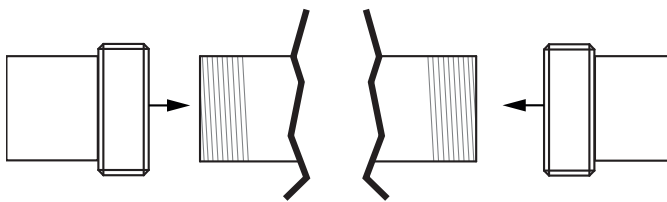
10.6 Installation with threaded spigots

Fig. 8: 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 "Preparing 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.

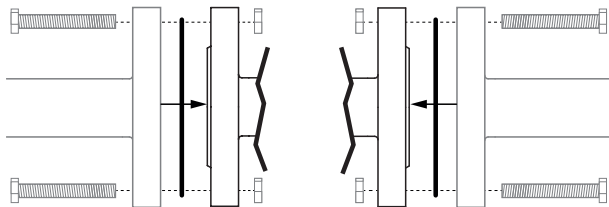
10.7 Installation with flanged connection

Fig. 9: 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 "Preparing 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.

11 Network connection

11.1 Network settings

The network interface has the following default settings:

IP address: 192.168.2.1

Subnet screen: 255.255.252.0

The default settings can be changed. See the eSy-Web operating instructions.

11.2 Connecting the network

1. Connect the network plug and cables with the electrical connection X2 of the product.
2. Change the IP address using the web server.

11.3 Resetting the network settings

1. Ensure that the "ON-Site" DIP switch **8** is not in the "ON" position.
2. Press and hold down the "OPEN" button **9** for at least 8 s.
⇒ LED 1 flashes fast in blue.
3. Press the "INIT/CLOSE" button **10**.
⇒ Network settings are reset in the default settings.

12 Commissioning

12.1 Commissioning on the device

1. Ensure that the "ON-Site" DIP switch **8** is not in the "ON" position (see "Buttons for on-site control", page 6).
 2. Press and hold down the "INIT/CLOSE" button **10** for at least 8 s.
⇒ Initialization of the actuator begins.
 3. Green and orange LEDs flash alternately.
⇒ Initialization is completed.
- ⇒ Commissioning is completed.

12.2 Commissioning via the eSy-Web web interface

- See separate eSy-Web operating instructions.

12.3 Commissioning via digital input

- ✓ The function of input 3 is set to init.
1. Apply 24 V DC signal briefly (max. 2 s) to connection X3 pin 6 (reference GND connection X3 pin 4).
⇒ Initialization of the actuator begins.
 2. Green and orange LEDs flash alternately.
⇒ Initialization is completed.
- ⇒ Commissioning is completed.

13 Operation

13.1 Operation on the device

13.1.1 Moving the valve to the open position

1. Move the "ON-Site" DIP switch **8** to the "ON" position (see "Buttons for on-site control", page 6).
⇒ Control on the device is activated.
 2. Press the "OPEN" button **9**.
⇒ The valve moves slowly to the open position.
 3. Also press the "INIT/CLOSE" button **10**.
⇒ The valve moves quickly to the open position.
⇒ If the valve is fully opened, the high visibility LEDs are lit in green.
 4. Move the "ON-Site" DIP switch **8** to the "OFF" position.
⇒ Control on the device is deactivated.
- ⇒ The valve is in the open position.

13.1.2 Moving the valve to the closed position

1. Move the "ON-Site" DIP switch **8** to the "ON" position.
⇒ Control on the device is activated.
 2. Press the "INIT/CLOSE" button **10**.
⇒ The valve moves slowly to the closed position.
 3. Also press the "OPEN" button **9**.
⇒ The valve moves quickly to the closed position.
⇒ If the valve is fully closed, the high visibility LEDs are lit in orange.
 4. Move the "ON-Site" DIP switch **8** to the "OFF" position.
⇒ Control on the device is deactivated.
- ⇒ The valve is in the closed position.

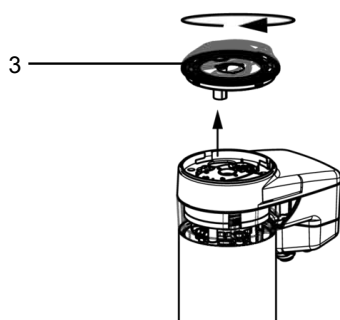
13.2 Operation via the web server

See separate "eSy-Web" operating instructions.

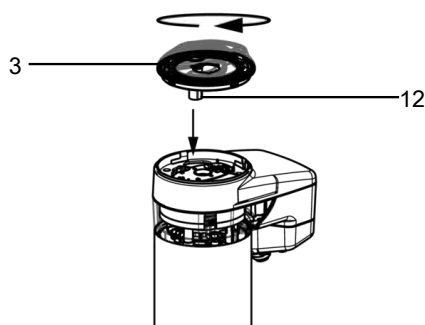
13.3 Manual override

⚠ WARNING	
	Rotating cover! ► Risk of crushing. ● Disconnect the power supply before using the manual override.

1. Disconnect the power supply.
2. Turn housing cover **3** clockwise.
3. Remove housing cover **3**.

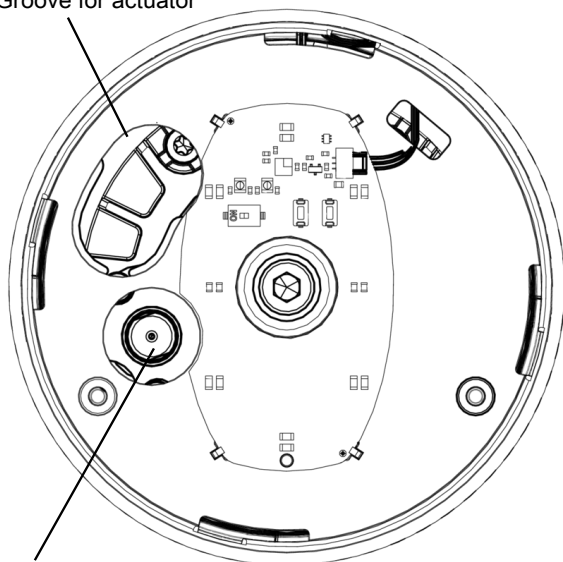


4. Place the actuator of housing cover **12** in the starting point for manual override.



Item	Name
3	Housing cover
12	Housing cover actuator

Groove for actuator



Starting point for manual override

5. Turn housing cover **3** anticlockwise.
 ⇒ The product opens.
 6. Turn housing cover **3** clockwise.

- ⇒ The product closes.
 7. Pull manual override off the starting point.
 8. Ensure correct positioning of the O-ring.
 9. Push actuator **12** into the groove provided for this purpose.
 10. Turn housing cover **3** anticlockwise until it stops.
 ⇒ The actuator cover is closed.
 11. Reconnect the power supply.

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 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.

14.1 Spare parts

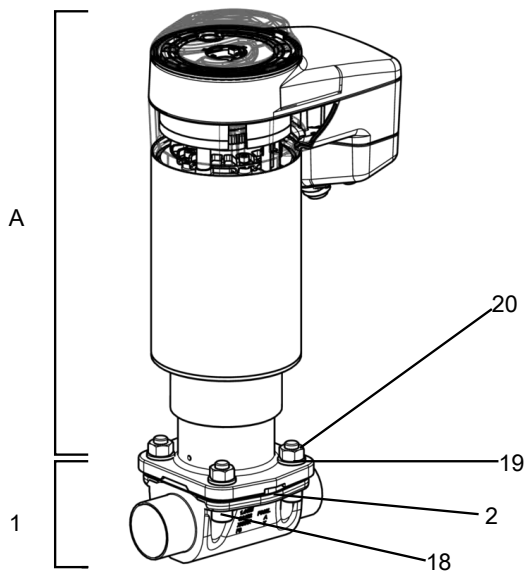


Fig. 10: Spare parts

Item	Name	Order description
A	Actuator	9649
1	Valve body	K600
2	Diaphragm	600...M
18	Bolt	649...S30...
19	Washer	
20	Nut	

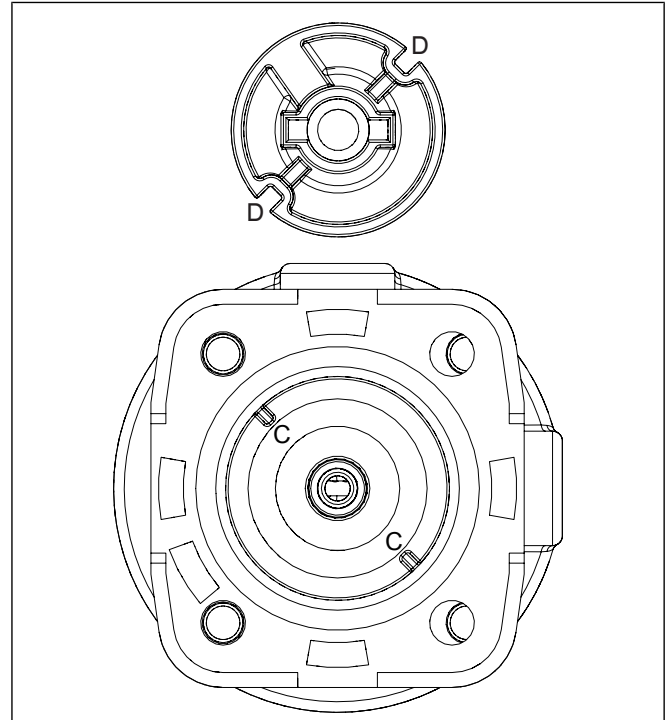
14.2 Removing the actuator

1. Move the actuator **A** to the open position.
2. Loosen the fastening elements between actuator **A** and valve body **1** diagonally and remove them.
3. Lift actuator **A** off valve body **1**.
4. Move the actuator **A** to the closed position.
5. Clean all parts of contamination (do not damage parts during cleaning).
6. Check parts for potential damage, replace if necessary (only use genuine parts from GEMÜ).

14.3 Removing the diaphragm

1. Remove actuator **A** (see chapter "Removing the actuator").
2. Unscrew the diaphragm.
 - ⇒ Please note: Depending on the version, the compressor may fall out.
3. Clean all parts of contamination (do not damage parts during cleaning).
4. Check parts for potential damage, replace if necessary (only use genuine parts from GEMÜ).

14.4 Mounting the compressor



1. Place the compressor loosely on the actuator spindle.
 2. Fit recesses **D** into guides **C**.
- ⇒ The compressor must be able to be moved freely between the guides.

14.5 Mounting the diaphragm

14.5.1 Mounting the convex diaphragm

NOTICE

- Fit the diaphragms suitable for the product (suitable for medium, medium concentration, temperature and pressure). The diaphragm is a wearing part. Check the technical condition and function of the product before commissioning and during the whole term of use. Carry out checks regularly and determine the check intervals in accordance with the conditions of use and/or the regulatory codes and provisions applicable for this application.

NOTICE

- If the diaphragm is not screwed into the adapter far enough, the closing force is transmitted directly onto the diaphragm pin and not via the compressor. This will cause damage and early failure of the diaphragm and leakage of the product. If the diaphragm is screwed in too far, perfect sealing at the valve seat will not be achieved. The function of the product is no longer ensured.

NOTICE

- Incorrectly mounted diaphragms cause the product leakage and emission of medium. In this case, remove the diaphragms, check the complete valve and diaphragms and reassemble again proceeding as described above.

NOTICE

- The compressor is loose and can fall out.

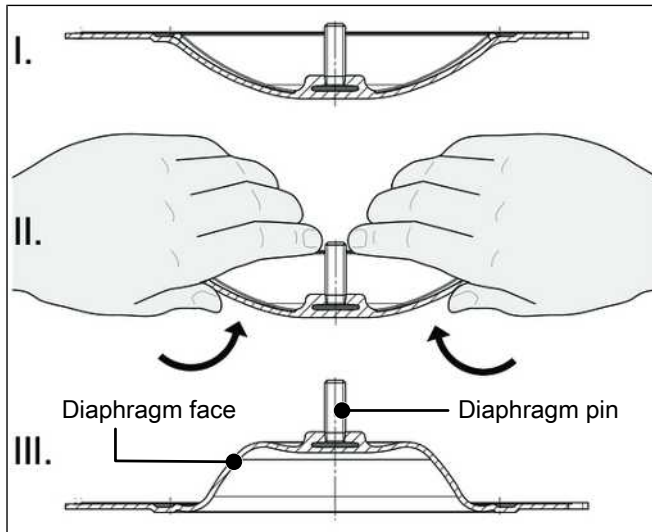


Fig. 11: Inverting the diaphragm face

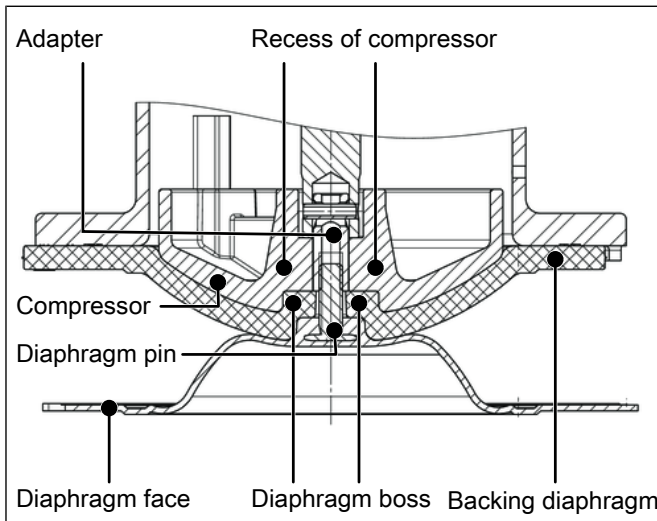


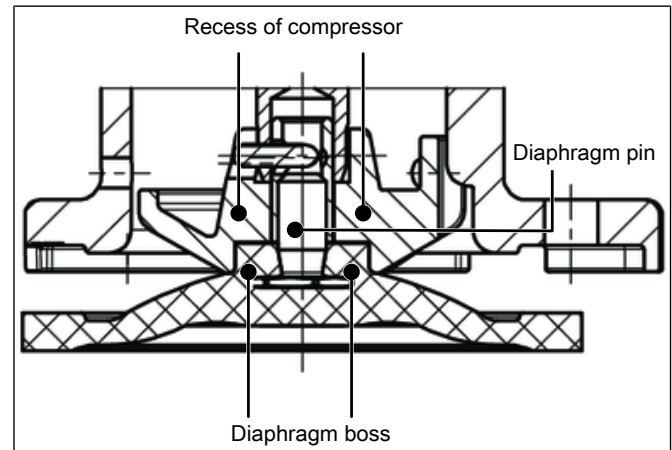
Fig. 12: Screwing in the diaphragm face

1. Move the actuator **A** to the closed position.
2. Mount the compressor (see "Mounting the compressor").
3. Check if the compressor is fitted in the guides.
4. Invert the new diaphragm face manually (use a clean, padded mat with larger nominal sizes).
5. Position the new backing diaphragm onto the compressor.
6. Position the diaphragm face onto the backing diaphragm.
7. Screw diaphragm face tightly into the compressor manually.

⇒ The diaphragm boss must fit closely in the recess of the compressor.

8. If it is difficult to screw it in, check the thread and replace damaged parts.
9. When definitive resistance is felt, turn back the diaphragm until its bolt holes are in correct alignment with the bolt holes of the actuator.
10. Press the diaphragm face tightly onto the backing diaphragm manually so that it returns to its original shape and fits closely on the backing diaphragm.
11. Align the weir of compressor and diaphragm in parallel.

14.5.2 Mounting the concave diaphragm



1. Move the actuator **A** to the closed position.
2. Mount the compressor (see "Mounting the compressor").
3. Check if the compressor is fitted in the guides.
4. Manually screw new diaphragm tightly into the compressor.
5. Check if the diaphragm boss fits closely in the recess of the compressor.
6. If it is difficult to screw it in, check the thread and replace damaged parts.
7. When definitive resistance is felt, turn back the diaphragm until its bolt holes are in correct alignment with the bolt holes of the actuator.
8. Align the weir of compressor and diaphragm in parallel.

14.6 Mounting the actuator

NOTICE

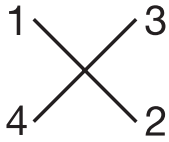
Diaphragms set in the course of time.

- Leakage
- After disassembly/assembly of the product, check that the bolts and nuts on the body are tight and retighten if required.
- Retighten the bolts and nuts at the very latest after the first sterilization process.

1. Move the actuator **A** to the open position.
2. Position actuator **A** with the mounted diaphragm on the valve body **1**.
3. Screw in bolts, washers and nuts hand tight.

⇒ Fastening elements may vary depending on the diaphragm size and/or valve body version.

4. Move the actuator **A** to the closed position.
5. Open actuator **A** approx. 20%.
6. Fully tighten the bolts with nuts diagonally.



7. Ensure even compression of the diaphragm (approx. 10 to 15%).
 - ⇒ Even compression is detected by an even bulge to the outside.
 - Please note:** For a code 5M diaphragm (convex diaphragm), the PTFE diaphragm face and the EPDM backing diaphragm must be positioned level with and parallel to the valve body.
8. With the valve fully assembled, check the function and tightness.
9. Carry out initialisation.

15 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
	Foreign matter between shut-off diaphragm and valve body	Remove the actuator, remove foreign matter, check diaphragm and valve body for potential damage, replace damaged parts if necessary
	Valve body leaking or damaged	Check valve body for potential damage, replace valve body if necessary
	Shut off diaphragm faulty	Check shut off diaphragm for potential damage, replace the shut off diaphragm if necessary
The product does not close or does not close fully	The actuator design is not suitable for the operating conditions	Use an actuator that is designed for the operating conditions
	Foreign matter in the product	Remove and clean the product
	Voltage is not connected	Connect voltage
The product does not open or does not open fully	Actuator defective	Replace the actuator
	Shut-off diaphragm incorrectly mounted	Remove the actuator, check the diaphragm mounting, replace the shut-off diaphragm if necessary
	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 is leaking between actuator and valve body	Shut-off diaphragm incorrectly mounted	Remove the actuator, check the diaphragm mounting, replace the shut-off diaphragm if necessary
	Bolting between valve body and actuator loose	Tighten bolting between valve body and actuator
	Shut off diaphragm faulty	Check shut off diaphragm for potential damage, replace the shut off diaphragm if necessary
	Actuator/valve body damaged	Replace actuator/valve body
The product is leaking between actuator flange and valve body	Mounting parts loose	Retighten mounting parts
	Valve body / actuator damaged	Replace valve body/actuator
Valve body of the GEMÜ product is leaking	Valve body of the GEMÜ product is faulty or corroded	Check valve body of the GEMÜ product for potential damage, replace valve body if necessary
Body of the GEMÜ product is leaking	Incorrect installation	Check installation of valve body in piping
Valve body connection to piping leaking	Incorrect installation	Check installation of valve body in piping
LED 1 is not lit	No initialisation	Initialise valve
	Supply voltage too low	Check supply voltage
LED 1 lights up yellow	Set value signal outside of the area	Check set value signal
	Temperature error	Check temperature
LED 1 flashes yellow	Actual value signal outside of the area	Check actual value signal
LED 1 and 2 are flashing yellow and red simultaneously	No calibration	Contact GEMÜ
	Internal error	Contact GEMÜ

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



EU Declaration of Incorporation

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

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

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

Product: GEMÜ R649
Product name: Motorized diaphragm valve
The following essential health and safety requirements of the EC Machinery Directive 2006/42/EC, Annex I have been applied or adhered to: 1.1.2.; 1.1.3.; 1.1.5.; 1.3.2.; 1.3.4.; 1.3.7.; 1.3.8.; 1.5.1.; 1.5.13.; 1.5.2.; 1.5.4.; 1.5.6.; 1.5.7.; 1.5.8.; 1.6.1.; 1.6.3.; 1.6.5.; 1.7.1.; 1.7.1.1.; 1.7.2.; 1.7.3.; 1.7.4.; 1.7.4.1.; 1.7.4.2.; 1.7.4.3.
The following harmonized standards (or parts thereof) have been applied: EN ISO 12100:2010

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

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

This does not affect the industrial property rights.

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

M. Barghoorn
Head of Global Technics
Ingelfingen, 20/09/2023

20 EU Declaration of Conformity in accordance with 2014/68/EU (Pressure Equipment Directive)



EU Declaration of Conformity

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

We, the company

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

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

Product: GEMÜ R649
Product name: Motorized diaphragm valve
Notified body: TÜV Rheinland Industrie Service GmbH
Am Grauen Stein 1
51105 Cologne, Germany

ID number of the notified body: 0035

No. of the QA certificate: 01 202 926/Q-02 0036

Applied conformity assessment procedure(s): Module H

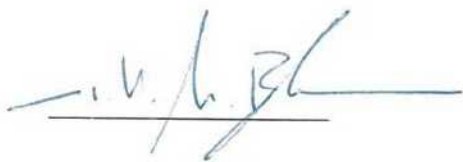
The following harmonized standards (or parts thereof) have been applied: EN ISO 16138:2006/A1:2019

Information for products with a nominal size $\leq$ DN 25:

The products are developed and produced according to GEMÜ's in-house process instructions and standards of quality 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-marking.

Other applied technical standards / Remarks:

- AD 2000



M. Barghoorn
Head of Global Technics

Ingelfingen, 20/09/2023

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

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21 EU Declaration of Conformity in accordance with 2014/30/EU (EMC Directive)



EU Declaration of Conformity

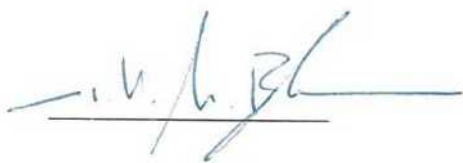
in accordance with 2014/30/EU (EMC Directive)

We, the company

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

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

Product: GEMÜ R649
Product name: Motorized diaphragm valve
The following harmonized standards (or parts thereof) have been applied: EN 61800-3:2004/A1:2012; EN 61000-6-2:2005/AC:2005 (valid for all types)
EN 61326-1:2013; EN 61000-6-4:2007/A1:2011 (only valid for Actuator size 1 / Actuator size 0)



M. Barghoorn
Head of Global Technics
Ingelfingen, 20/09/2023

22 EU Declaration of Conformity in accordance with 2011/65/EU (RoHS Directive)



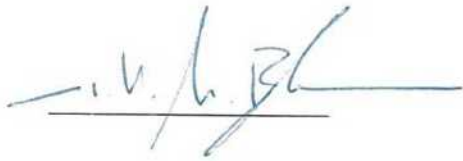
EU Declaration of Conformity

In accordance with 2011/65/EU (RoHS Directive)

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

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

Product: GEMÜ R649
Product name: Motorized diaphragm valve
The following harmonized standards (or parts thereof) have been applied: EN IEC 63000:2018

A handwritten signature in blue ink, appearing to read "M. Barghoorn", is written over a horizontal line.

M. Barghoorn
Head of Global Technics

Ingelfingen, 20/09/2023



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www.gemu-group.com

Subject to alteration

09.2023 | 88659161