

GEMÜ 650 / 687 Special function J

Pneumatically operated diaphragm valve

EN

Operating instructions

Special function J



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11.10.2023

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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.

Control function

The possible actuation functions of the GEMÜ product.

Control medium

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

1.4 Warning notes

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

SIGNAL WORD	
Possible symbol for the specific danger	<p>Type and source of the danger</p> <ul style="list-style-type: none"> ▶ Possible consequences of non-observance. ● Measures for avoiding danger.

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

The following signal words and danger levels are used:

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

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

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

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

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

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

2 Safety information

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

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

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

The safety information does not take into account:

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

Prior to commissioning:

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

During operation:

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

In cases of uncertainty:

15. Consult the nearest GEMÜ sales office.

3 Correct use

 DANGER	
	<p>Danger of explosion!</p> <ul style="list-style-type: none"> ▶ Risk of severe injury or death ● Do not use the product in potentially explosive zones. ● Only use the product in potentially explosive zones confirmed in the declaration of conformity.

 WARNING	
<p>Improper use of the product!</p> <ul style="list-style-type: none"> ▶ 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.

1. Use the product in accordance with the technical data.
2. Note the supplement acc. to ATEX

4 Description

The GEMÜ 650 and 687 2/2-way diaphragm valve with special function J is suitable for operating pressures of up to 16 bar. It is available with a "Normally Closed (NC)" control function. The diaphragm is made of PTFE/EPDM (code 5M).

GEMÜ 650

Diaphragm size: 10, 40

GEMÜ 687

Diaphragm size: 25, 40, 50

GEMÜ 650 BioStar, special function J version

Pneumatically operated diaphragm valve



Features

- Compact design (ideal when space is at a premium)
- CIP/SIP capable
- Autoclave capability, depending on version
- Controlled exhaust air duct available as an option
- Wide range of adaptation options for add-on components and accessories
- ATEX version available as an option

Description

The GEMÜ 650 BioStar 2/2-way diaphragm valve has a stainless steel piston actuator and is pneumatically operated. The valve is designed for use in a sterile environment. All actuator parts are made from stainless steel (except seals). It is available with a "Normally Closed (NC)" control function. An integrated optical position indicator is standard.

5 GEMÜ 650 product description

5.1 Design

GEMÜ 650



Item	Name	Materials
1	Optical position indicator	
2	Membrane actuator	Stainless steel
3	Diaphragm	PTFE/EPDM (two-piece)
4	Valve body	1.4435 (F316L), forged body 1.4435 (F316L), block material 1.4435 (BN2), forged body, Δ Fe < 0.5% 1.4435 (BN2), block material, Δ Fe < 0.5% 1.4539, forged body
5	CONEXO diaphragm RFID chip (see Conexo information)	
6	CONEXO body RFID chip (see Conexo information)	
7	CONEXO actuator RFID chip (see Conexo information)	

5.2 Description

The GEMÜ 650 BioStar 2/2-way diaphragm valve has a stainless steel piston actuator and is pneumatically operated. The valve is designed for use in a sterile environment. All actuator

parts are made from stainless steel (except seals). It is available with a "Normally Closed (NC)" control function. An integrated optical position indicator is standard.

5.3 Function

The product is designed for use in piping. It controls a flowing medium insofar as it can be opened by a control medium.

5.4 GEMÜ CONEXO

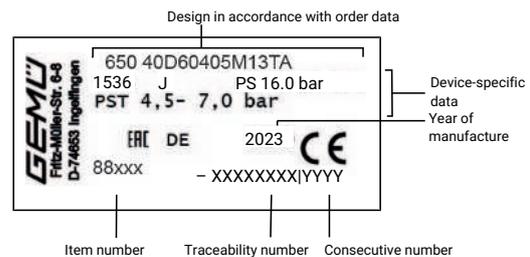
The interaction of valve components that are equipped with RFID chips and an associated IT infrastructure actively increase process reliability.



Thanks to serialization, every valve and every relevant valve component such as the body, actuator or diaphragm, and even automation components, can be clearly traced and read using the CONEXO pen RFID reader. The CONEXO app, which can be installed on mobile devices, not only facilitates and improves the "installation qualification" process, but also makes the maintenance process much more transparent and easier to document. The app actively guides the maintenance technician through the maintenance schedule and directly provides him with all the information assigned to the valve, such as test reports, testing documentation and maintenance histories. The CONEXO portal acts as a central element, helping to collect, manage and process all data.

For further information on GEMÜ CONEXO please visit:
www.gemu-group.com/conexo

5.5 Product label



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

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

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
Diaphragm valve, pneumatically operated, stainless steel piston actuator electropolished, optical position indicator	650

2 DN	Code
DN 10	10
DN 15	15
DN 20	20
DN 32	32
DN 40	40

3 Body configuration	Code
2/2-way body	D
T body	T
Body configuration code T: Dimensions on request	

4 Connection type	Code
Spigot	
Spigot DIN	0
Spigot DIN EN 10357 series B (2014 edition; formerly DIN 11850 series 1)	16
Spigot EN 10357 series A/DIN 11866 series A formerly DIN 11850 series 2	17
Spigot DIN 11850 series 3	18
Spigot JIS-G 3447	35
Spigot JIS-G 3459 schedule 10s	36
Spigot SMS 3008	37
Spigot BS 4825, Part 1	55
Spigot ASME BPE/DIN EN 10357 series C (from 2022 edition)/DIN 11866 series C	59
Spigot ISO 1127/DIN EN 10357 series C (2014 edition)/DIN 11866 series B	60
Spigot ANSI/ASME B36.19M schedule 10s	63
Spigot ANSI/ASME B36.19M schedule 5s	64
Spigot ANSI/ASME B36.19M schedule 40s	65
Threaded connection	
Threaded spigot DIN 11851	6
Cone spigot and union nut DIN 11851	6K
Flange	
Flange EN 1092, PN 16, form B, face-to-face dimension FTF EN 558 series 1, ISO 5752, basic series 1, length only for body configuration D	8
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

4 Connection type	Code
Clamp	
Clamp ASME BPE, face-to-face dimension FTF ASME BPE, length only for body configuration D	80
Clamp DIN 32676 series B, face-to-face dimension FTF EN 558 series 7, length only for body configuration D	82
Clamp ASME BPE, for pipe ASME BPE, face-to-face dimension FTF EN 558 series 7, length only for body configuration D	88
Clamp DIN 32676 series A, face-to-face dimension FTF acc. to EN 558 series 7, length only for body configuration D	8A
Clamp ISO 2852 for pipe ISO 2037, clamp SMS 3017 for pipe SMS 3008, face-to-face dimension FTF EN 558 series 7, length only for body configuration D	8E
Clamp DIN 32676 series C, face-to-face dimension FTF ASME BPE, length only for body configuration D	8P
Clamp DIN 32676 series C, face-to-face dimension FTF EN 558 series 7, length only for body configuration D	8T
Note: Connection code 8, 39 only possible in conjunction with actuator version (R)	

5 Valve body material	Code
1.4435 (F316L), forged body	40
1.4435 (BN2), forged body, $\Delta Fe < 0.5\%$	42
1.4539, forged body	F4
1.4435 (316L), block material	41
1.4435 (BN2), block material, $\Delta Fe < 0.5\%$	43

6 Diaphragm material	Code
PTFE/EPDM two-piece	5M

7 Control function	Code
Normally closed (NC)	1

8 Actuator version	Code
Actuator size 1R6 control air connector 90° offset to flow direction	1R6
Actuator size 1T6	1T6
Actuator size 3 control air connector 90° offset to flow direction	3RA
Actuator size 3TA	3TA

9 Surface	Code
Ra ≤ 0.25 µm (10 µin.) for media wetted surfaces *), in accordance with DIN 11866 HE5, electropolished internal/external, *) for inner pipe diameters < 6 mm, in the spigot Ra ≤ 0.38 µm	1516
Ra ≤ 0.25 µm (10 µin.) for media wetted surfaces *), in accordance with DIN 11866 H5, mechanically polished internal, *) for inner pipe diameters < 6 mm, in the spigot Ra ≤ 0.38 µm	1527
Ra ≤ 0.4 µm (15 µin.) for media wetted surfaces, in accordance with DIN 11866 H4, mechanically polished internal	1536
Ra ≤ 0.4 µm (15 µin.) for media wetted surfaces, in accordance with DIN 11866 HE4, electropolished internal/external	1537

9 Surface	Code
Ra max. 0.38 µm (15 µin.) for media wetted surfaces, in accordance with ASME BPE SF4, electropolished internal/external	SF4

10 Special version	Code
Special version for higher operating pressures of up to 16 bar Only for types 650 and 687 Only for diaphragm sizes 10 to 50 Only for forged bodies and block material bodies Only for seal code 5M Only with special actuator	J

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

Order example

Ordering option	Code	Description
1 Type	650	Diaphragm valve, pneumatically operated, stainless steel piston actuator electropolished, optical position indicator
2 DN	40	DN 40
3 Body configuration	D	2/2-way body
4 Connection type	60	Spigot ISO 1127/DIN EN 10357 series C (2014 edition)/DIN 11866 series B
5 Valve body material	40	1.4435 (F316L), forged body
6 Diaphragm material	5M	PTFE/EPDM two-piece
7 Control function	1	Normally closed (NC)
8 Actuator version	3TA	Actuator size 3TA
9 Surface	1536	Ra ≤ 0.4 µm (15 µin.) for media wetted surfaces, in accordance with DIN 11866 H4, mechanically polished internal
10 Special version	J	Special version for higher operating pressures of up to 16 bar Only for types 650 and 687 Only for diaphragm sizes 10 to 50 Only for forged bodies and block material bodies Only for seal code 5M Only with special actuator
11 CONEXO		Without

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 diaphragm material.
The valve will seal in both flow directions up to full operating pressure (gauge pressure).

Control medium: Inert gases

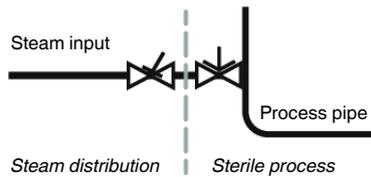
7.2 Temperature

Media temperature:

Diaphragm material	Standard
PTFE/EPDM (code 5M)	-10 – 100 °C

Sterilization temperature: PTFE/EPDM (code 5M) max. 150 °C, permanent temperature per cycle

The sterilization temperature is only valid for steam (saturated steam) or superheated water. If the sterilization temperatures listed above are applied to the EPDM diaphragms for longer periods of time, the service life of the diaphragms will be reduced. In these cases, maintenance cycles must be adapted accordingly. PTFE diaphragms can also be used as steam barriers; however, this will reduce their service life. This also applies to PTFE diaphragms exposed to high temperature fluctuations. The maintenance cycles must be adapted accordingly. GEMÜ 555 and 505 globe valves are particularly suitable for use in the area of steam generation and distribution. The following valve arrangement for interfaces between steam pipes and process pipes has proven itself over time: A globe valve for shutting off steam pipes and a diaphragm valve as an interface to the process pipes.



Ambient temperature: 0 – 60 °C

Control medium temperature: 0 – 70 °C

Storage temperature: 0 – 40 °C

Autoclavability:

MG	Actuator version	Autoclavability
10	1T6, 1R6	autoclavable
40	3TA, 3RA	with special version

7.3 Pressure

Operating pressure: 0 – 16 bar
 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.
 Since the high operating pressure may reduce the service life of the diaphragm, please adapt the maintenance intervals accordingly.

Pressure rating: PN 16

Leakage rate: Leakage rate A to P11/P12 EN 12266-1

Control pressure: MG 10: 6.0 - 7.0 bar
 MG 40: 3.5 - 7.0 bar

MG	Actuator size (code)	
	1T6, 1R6	3TA, 3RA
10	0.03	-
40	-	0.5

Filling volume in dm³
 MG = diaphragm size

MG	DN	Connection types (code)						
		0	16	17	18	37	59	60
10	10	-	2.4	2.4	2.4	-	2.2	3.3
	15	3.3	3.8	3.8	3.8	-	2.2	4.0
	20	-	-	-	-	-	3.8	-
40	32	25.3	27.0	27.0	27.0	26.2	-	30.0
	40	29.3	30.9	30.9	30.9	30.2	29.5	32.8

MG = diaphragm size
 Kv values in m³/h

Kv values determined in accordance with DIN EN 60534 standard, inlet pressure 5 bar, Δp 1 bar, stainless steel 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.

7.4 Product compliance

Pressure Equipment Directive:	2014/68/EU		
Machinery Directive:	2006/42/EC		
Food:	FDA Regulation (EC) No. 1935/2004 Regulation (EC) No. 10/2011 USP Class VI		
TA Luft (German Clean Air Act):	DIN EN ISO 15848-1, section 2		
SIL:	Product description:	GEMÜ diaphragm valve 650_687	
	Device type:	A	
	Fail safe function:	Due to the fail safe function, the diaphragm valve is placed in the closed position (with control function 1).	
	HFT (Hardware Fault Tolerance):	0	
	MTTR (Mean Time To Restoration):	24 hours	
	Product description:	GEMÜ diaphragm valve 650_687with GEMÜ 032x pilot solenoid valve	
	Device type:	A	
	Fail safe function:	Due to the fail safe function, the diaphragm valve is placed in the closed position (with control function 1).	
	HFT (Hardware Fault Tolerance):	0	
	MTTR (Mean Time To Restoration):	24 hours	
EAC:	The product is certified according to EAC.		

7.5 Mechanical data

Weight:

Actuator

MG	Actuator size (code)	Weight
10	1T6, 1R6	1.2
40	3TA, 3RA	7.3

Weights in kg

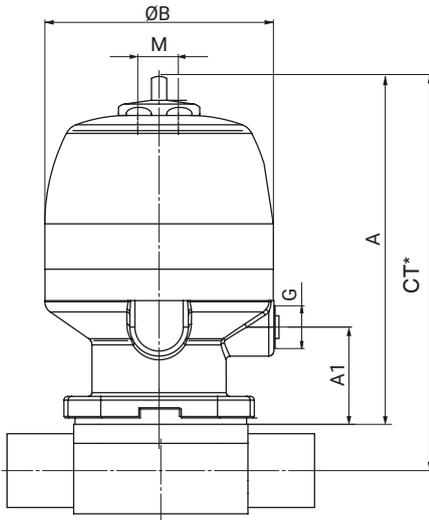
Body

MG	DN	Spigot	Threaded spigot, cone spigot	Flange	Clamp
		Connection type code			
		0, 16, 17, 18, 35, 36, 37, 55, 59, 60, 63, 64, 65	6, 6K	8, 39	80, 82, 88, 8A, 8E, 8P, 8T
10	10	0.30	0.33	-	0.30
	15	0.30	0.35	-	0.43
	20	-	-	-	0.43
40	32	1.45	1.66	3.40	1.62
	40	1.32	1.62	4.50	1.50

Weights in kg
MG = diaphragm size

8 Dimensions

8.1 Actuator dimensions



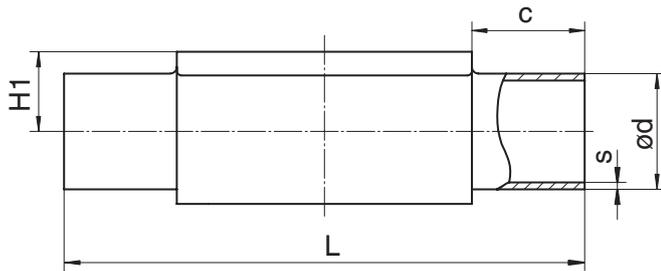
MG	DN	Actuator size (code)	A	A1	ø B	G	M
10	10 - 20	1T6, 1R6	116.0	37.0	61.0	G 1/4	M16x1
40	32, 40	3TA, 3RA	223.0	52.0	144.0	G 1/4	M16x1

Dimensions in mm, MG = diaphragm size

* CT = A + H1 (see body dimensions)

8.2 Body dimensions

8.2.1 Spigot DIN/EN/ISO (code 0, 16, 17, 18, 60)



Connection type spigot DIN/EN/ISO (code 0, 16, 17, 18, 60)¹⁾, forged material (code 40, 42, F4)²⁾

MG	DN	NPS	c (min)	ød					H1	L	s				
				Connection type							Connection type				
				0	16	17	18	60			0	16	17	18	60
10	10	3/8"	25.0	-	12.0	13.0	14.0	17.2	12.5	108.0	-	1.0	1.5	2.0	1.6
	15	1/2"	25.0	18.0	18.0	19.0	20.0	21.3	12.5	108.0	1.5	1.0	1.5	2.0	1.6
40	32	1¼"	25.0	34.0	34.0	35.0	36.0	42.4	26.0	153.0	1.5	1.0	1.5	2.0	2.0
	40	1½"	30.5	40.0	40.0	41.0	42.0	48.3	26.0	153.0	1.5	1.0	1.5	2.0	2.0

Dimensions in mm

MG = diaphragm size

1) Connection type

Code 0: Spigot DIN

Code 16: Spigot DIN EN 10357 series B (2014 edition; formerly DIN 11850 series 1)

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

Code 18: Spigot DIN 11850 series 3

Code 60: Spigot ISO 1127/DIN EN 10357 series C (2014 edition)/DIN 11866 series B

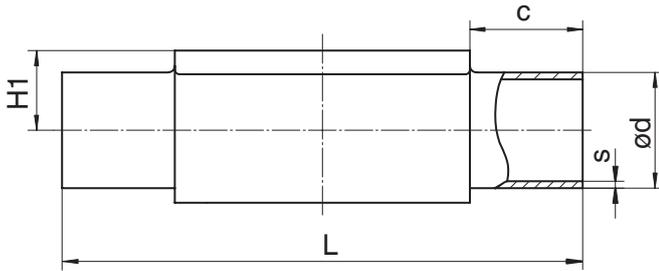
2) Valve body material

Code 40: 1.4435 (F316L), forged body

Code 42: 1.4435 (BN2), forged body, Δ Fe < 0.5%

Code F4: 1.4539, forged body

8.2.2 Spigot ASME/BS (code 55, 59, 63, 64, 65)



Connection type spigot ASME/BS (code 55, 59, 63, 64, 65)¹⁾, forged material (code 40, 42, F4)²⁾

MG	DN	NPS	c (min)	ød					H1	L	s				
				Connection type							Connection type				
				55	59	63	64	65			55	59	63	64	65
10	10	3/8"	25.0	9.53	9.53	17.1	-	17.1	12.5	108.0	1.2	0.89	1.65	-	2.31
	15	1/2"	25.0	12.70	12.70	21.3	21.3	21.3	12.5	108.0	1.2	1.65	2.11	1.65	2.77
	20	3/4"	25.0	19.05	19.05	-	-	-	12.5	108.0	1.2	1.65	-	-	-
40	32	1 1/4"	25.0	-	-	42.2	42.2	42.2	26.0	153.0	-	-	2.77	1.65	3.56
	40	1 1/2"	30.5	-	38.10	48.3	48.3	48.3	26.0	153.0	-	1.65	2.77	1.65	3.68

Dimensions in mm

MG = diaphragm size

1) Connection type

Code 55: Spigot BS 4825, Part 1

Code 59: Spigot ASME BPE/DIN EN 10357 series C (from 2022 edition)/DIN 11866 series C

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

Code 64: Spigot ANSI/ASME B36.19M schedule 5s

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

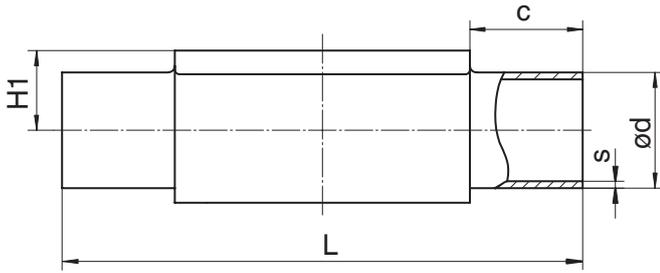
2) Valve body material

Code 40: 1.4435 (F316L), forged body

Code 42: 1.4435 (BN2), forged body, Δ Fe < 0.5%

Code F4: 1.4539, forged body

8.2.3 Spigot JIS/SMS (code 35, 36, 37)



Connection type spigot JIS/SMS (code 35, 36, 37)¹⁾, forged material (code 40, 42, F4)²⁾

MG	DN	NPS	c (min)	$\varnothing d$			H1	L	s		
				Connection type					Connection type		
				35	36	37			35	36	37
10	10	3/8"	25.0	-	17.3	-	12.5	108.0	-	1.65	-
	15	1/2"	25.0	-	21.7	-	12.5	108.0	-	2.10	-
40	32	1¼"	25.0	31.8	42.7	33.7	26.0	153.0	1.2	2.80	1.2
	40	1½"	30.5	38.1	48.6	38.0	26.0	153.0	1.2	2.80	1.2

Dimensions in mm

MG = diaphragm size

1) **Connection type**

Code 35: Spigot JIS-G 3447

Code 36: Spigot JIS-G 3459 schedule 10s

Code 37: Spigot SMS 3008

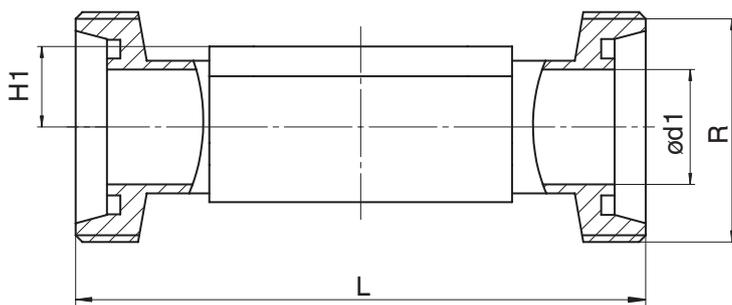
2) **Valve body material**

Code 40: 1.4435 (F316L), forged body

Code 42: 1.4435 (BN2), forged body, $\Delta Fe < 0.5\%$

Code F4: 1.4539, forged body

8.2.4 Threaded spigot DIN (code 6)



Connection type threaded spigot DIN (code 6)¹⁾, forged material (code 40, 42)²⁾

MG	DN	NPS	ød1	H1	L	R
10	10	3/8"	10.0	12.5	118.0	Rd 28 x 1/8
	15	1/2"	16.0	12.5	118.0	Rd 34 x 1/8
40	32	1¼"	32.0	26.0	147.0	Rd 58 x 1/6
	40	1½"	38.0	26.0	160.0	Rd 65 x 1/6

Dimensions in mm

MG = diaphragm size

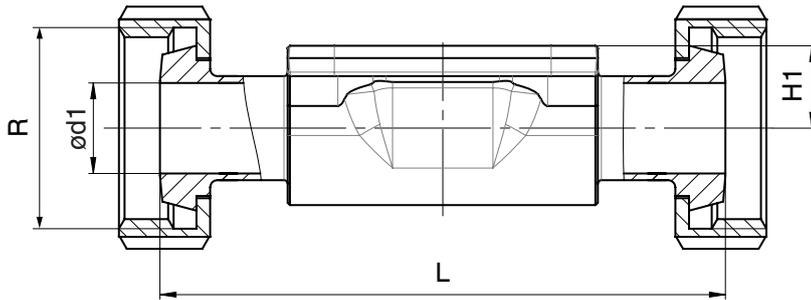
1) **Connection type**

Code 6: Threaded spigot DIN 11851

2) **Valve body material**

Code 40: 1.4435 (F316L), forged body

Code 42: 1.4435 (BN2), forged body, Δ Fe < 0.5%

8.2.5 Cone spigot DIN (code 6K)**Connection type cone spigot DIN (code 6K)¹⁾, forged material (code 40, 42)²⁾**

MG	DN	NPS	ød1	H1	L	R
10	10	3/8"	10.0	12.5	116.0	Rd 28 x 1/8
	15	1/2"	16.0	12.5	116.0	Rd 34 x 1/8
40	32	1¼"	32.0	26.0	147.0	Rd 58 x 1/6
	40	1½"	38.0	26.0	160.0	Rd 65 x 1/6

Dimensions in mm

MG = diaphragm size

1) Connection type

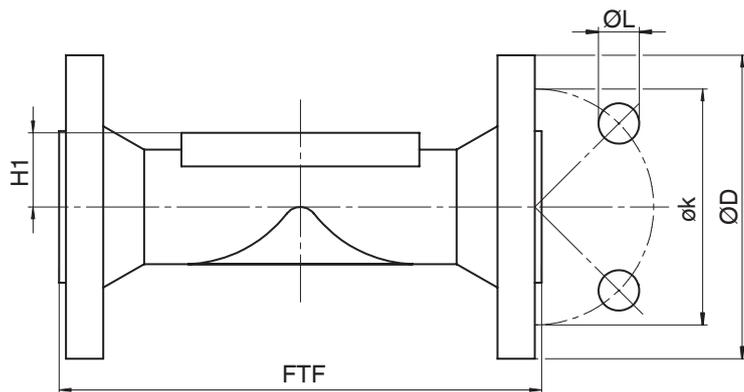
Code 6K: Cone spigot and union nut DIN 11851

2) Valve body material

Code 40: 1.4435 (F316L), forged body

Code 42: 1.4435 (BN2), forged body, Δ Fe < 0.5%

8.2.6 Flange EN (code 8)



Connection type flange, length EN 558 (code 8)¹⁾, forged material (code 40, 42)²⁾

MG	DN	NPS	øD	FTF	H1	øk	øL	n
40	32	1¼"	140.0	180.0	26.0	100.0	19.0	4
	40	1½"	150.0	200.0	26.0	110.0	19.0	4

Dimensions in mm

MG = diaphragm size

n = number of bolts

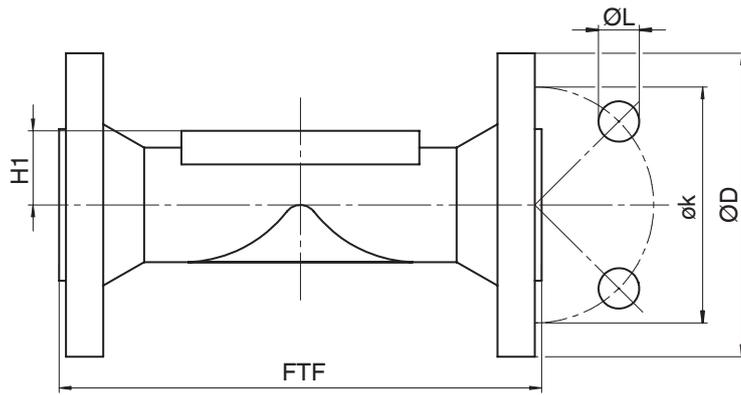
1) Connection type

Code 8: Flange EN 1092, PN 16, form B, 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 40: 1.4435 (F316L), forged body

Code 42: 1.4435 (BN2), forged body, Δ Fe < 0.5%

8.2.7 Flange ANSI Class (code 39)**Connection type flange, length EN 558 (code 39), ¹⁾ forged material (code 40, 42) ²⁾**

MG	DN	NPS	øD	FTF	H1	øk	øL	n
40	32	1¼"	115.0	180.0	26.0	88.9	15.9	4
	40	1½"	125.0	200.0	26.0	98.4	15.9	4

Dimensions in mm

MG = diaphragm size

n = number of bolts

1) Connection type

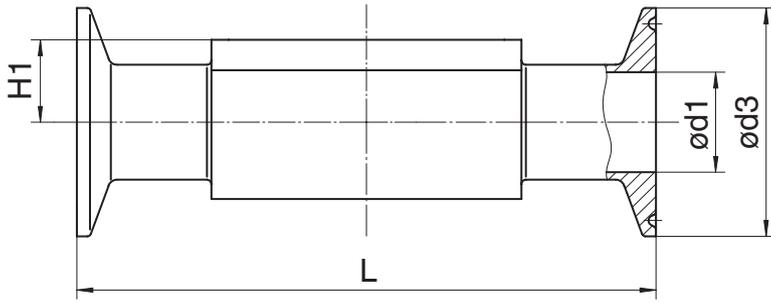
Code 39: Flange ANSI Class 125/150 RF, face-to-face dimension FTF EN 558 series 1, ISO 5752, basic series 1, length only for body configuration D

2) Valve body material

Code 40: 1.4435 (F316L), forged body

Code 42: 1.4435 (BN2), forged body, Δ Fe < 0.5%

8.2.8 Clamp DIN/ISO/ASME (code 80, 82, 88, 8A, 8E, 8P, 8T)



Connection type clamp DIN/ASME (code 80, 88, 8P, 8T)¹⁾, forged material (code 40, 42, F4)²⁾

MG	DN	NPS	ød1		ød3		H1	L	
			Connection type		Connection type			Connection type	
			80, 8P	88, 8T	80, 8P	88, 8T		80, 8P	88, 8T
10	15	1/2"	9.40	9.40	25.0	25.0	12.5	88.9	108.0
	20	3/4"	15.75	15.75	25.0	25.0	12.5	101.6	117.0
40	40	1½"	34.80	34.80	50.5	50.5	26.0	139.7	159.0

Dimensions in mm

MG = diaphragm size

1) Connection type

Code 80: Clamp ASME BPE, face-to-face dimension FTF ASME BPE, length only for body configuration D

Code 88: Clamp ASME BPE, for pipe ASME BPE, face-to-face dimension FTF EN 558 series 7, length only for body configuration D

Code 8P: Clamp DIN 32676 series C, face-to-face dimension FTF ASME BPE, length only for body configuration D

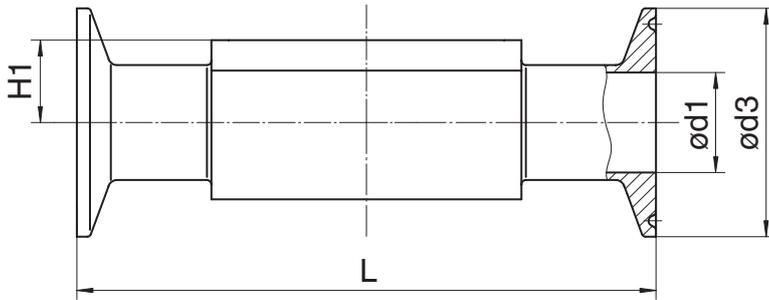
Code 8T: Clamp DIN 32676 series C, face-to-face dimension FTF EN 558 series 7, length only for body configuration D

2) Valve body material

Code 40: 1.4435 (F316L), forged body

Code 42: 1.4435 (BN2), forged body, Δ Fe < 0.5%

Code F4: 1.4539, forged body


Connection type clamp DIN/ISO (code 82, 8A, 8E)¹⁾, forged material (code 40, 42, F4)²⁾

MG	DN	NPS	ød1			ød3			H1	L		
			Connection type			Connection type				Connection type		
			82	8A	8E	82	8A	8E		82	8A	8E
10	10	3/8"	14.0	10.0	-	25.0	34.0	-	12.5	108.0	108.0	-
	15	1/2"	18.1	16.0	-	50.5	34.0	-	12.5	108.0	108.0	-
40	32	1¼"	38.4	32.0	31.3	64.0	50.5	50.5	26.0	146.0	146.0	146.0
	40	1½"	44.3	38.0	35.6	64.0	50.5	50.5	26.0	159.0	159.0	159.0

Dimensions in mm

MG = diaphragm size

1) **Connection type**

Code 82: Clamp DIN 32676 series B, face-to-face dimension FTF EN 558 series 7, length only for body configuration D

Code 8A: Clamp DIN 32676 series A, face-to-face dimension FTF acc. to EN 558 series 7, length only for body configuration D

Code 8E: Clamp ISO 2852 for pipe ISO 2037, clamp SMS 3017 for pipe SMS 3008, face-to-face dimension FTF EN 558 series 7, length only for body configuration D

2) **Valve body material**

Code 40: 1.4435 (F316L), forged body

Code 42: 1.4435 (BN2), forged body, Δ Fe < 0.5%

Code F4: 1.4539, forged body

GEMÜ 687 special function J version

Pneumatically operated diaphragm valve



Features

- Hermetic separation between medium and actuator
- CIP/SIP capable
- Wide range of adaptation options for add-on components and accessories

Description

The GEMÜ 687 2/2-way diaphragm valve has a low-maintenance plastic membrane actuator and is pneumatically operated. The valve has a metal distance piece. It is available with a "Normally Closed (NC)" control function.

9 GEMÜ 687 product description

9.1 Design



Item	Name	Materials
1	Position indicator	
2	Membrane actuator	PP, glass fibre reinforced
3	Control air connector	
4	Diaphragm	PTFE/EPDM (two-piece)
5	Valve body	1.4435 (F316L), forged body 1.4435 (F316L), block material 1.4435 (BN2), forged body, Δ Fe < 0.5% 1.4435 (BN2), block material, Δ Fe < 0.5% 1.4539, forged body
6	CONEXO diaphragm RFID chip (see Conexo information)	
7	CONEXO body RFID chip (see Conexo information)	
8	CONEXO actuator RFID chip (see Conexo information)	

9.2 Description

The GEMÜ 687 2/2-way diaphragm valve has a low-maintenance plastic membrane actuator and is pneumatically operated. The valve has a metal distance piece. It is available with a "Normally Closed (NC)" control function.

9.3 Function

The product is designed for use in piping. It controls a flowing medium insofar as it can be opened by a control medium.

9.4 GEMÜ CONEXO

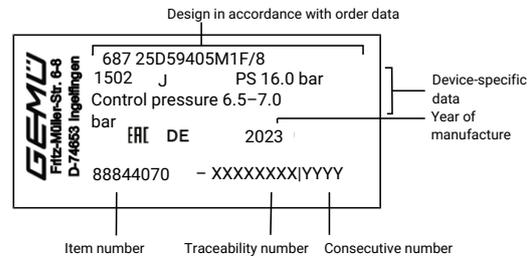
The interaction of valve components that are equipped with RFID chips and an associated IT infrastructure actively increase process reliability.



Thanks to serialization, every valve and every relevant valve component such as the body, actuator or diaphragm, and even automation components, can be clearly traced and read using the CONEXO pen RFID reader. The CONEXO app, which can be installed on mobile devices, not only facilitates and improves the "installation qualification" process, but also makes the maintenance process much more transparent and easier to document. The app actively guides the maintenance technician through the maintenance schedule and directly provides him with all the information assigned to the valve, such as test reports, testing documentation and maintenance histories. The CONEXO portal acts as a central element, helping to collect, manage and process all data.

For further information on GEMÜ CONEXO please visit: www.gemu-group.com/conexo

9.5 Product label



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

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

10 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, pneumatically operated, plastic actuator, stainless steel distance piece	687

2 DN	Code
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
T body	T
Body configuration code T: Dimensions on request	

4 Connection type	Code
Spigot	
Spigot DIN	0
Spigot DIN EN 10357 series B (2014 edition; formerly DIN 11850 series 1)	16
Spigot EN 10357 series A/DIN 11866 series A formerly DIN 11850 series 2	17
Spigot DIN 11850 series 3	18
Spigot JIS-G 3447	35
Spigot JIS-G 3459 schedule 10s	36
Spigot SMS 3008	37
Spigot BS 4825, Part 1	55
Spigot ASME BPE/DIN EN 10357 series C (from 2022 edition)/DIN 11866 series C	59
Spigot ISO 1127/DIN EN 10357 series C (2014 edition)/DIN 11866 series B	60
Spigot ANSI/ASME B36.19M schedule 10s	63
Spigot ANSI/ASME B36.19M schedule 5s	64
Spigot ANSI/ASME B36.19M schedule 40s	65
Threaded connection	
Threaded spigot DIN 11851	6
Cone spigot and union nut DIN 11851	6K
Flange	
Flange EN 1092, PN 16, form B, face-to-face dimension FTF EN 558 series 1, ISO 5752, basic series 1, length only for body configuration D	8
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

4 Connection type	Code
Clamp	
Clamp ASME BPE, face-to-face dimension FTF ASME BPE, length only for body configuration D	80
Clamp DIN 32676 series B, face-to-face dimension FTF EN 558 series 7, length only for body configuration D	82
Clamp ASME BPE, for pipe ASME BPE, face-to-face dimension FTF EN 558 series 7, length only for body configuration D	88
Clamp DIN 32676 series A, face-to-face dimension FTF acc. to EN 558 series 7, length only for body configuration D	8A
Clamp ISO 2852 for pipe ISO 2037, clamp SMS 3017 for pipe SMS 3008, face-to-face dimension FTF EN 558 series 7, length only for body configuration D	8E
Clamp DIN 32676 series C, face-to-face dimension FTF ASME BPE, length only for body configuration D	8P
Clamp DIN 32676 series C, face-to-face dimension FTF EN 558 series 7, length only for body configuration D	8T

5 Valve body material	Code
1.4435 (F316L), forged body	40
1.4435 (BN2), forged body, $\Delta Fe < 0.5\%$	42
1.4539, forged body	F4
1.4435 (316L), block material	41
1.4435 (BN2), block material, $\Delta Fe < 0.5\%$	43

6 Diaphragm material	Code
PTFE/EPDM two-piece	5M

7 Control function	Code
Normally closed (NC)	1

8 Actuator version	Code
Actuator size F/8	F/8
Actuator size H/N	H/N
Actuator size J/N	J/N

9 Surface	Code
Ra $\leq 0.25 \mu\text{m}$ (10 $\mu\text{in.}$) for media wetted surfaces *), in accordance with DIN 11866 HE5, electropolished internal/external, *) for inner pipe diameters < 6 mm, in the spigot Ra $\leq 0.38 \mu\text{m}$	1516
Ra $\leq 0.25 \mu\text{m}$ (10 $\mu\text{in.}$) for media wetted surfaces *), in accordance with DIN 11866 H5, mechanically polished internal, *) for inner pipe diameters < 6 mm, in the spigot Ra $\leq 0.38 \mu\text{m}$	1527

9 Surface	Code
Ra ≤ 0.4 µm (15 µin.) for media wetted surfaces, in accordance with DIN 11866 H4, mechanically polished internal	1536
Ra ≤ 0.4 µm (15 µin.) for media wetted surfaces, in accordance with DIN 11866 HE4, electropolished internal/external	1537
Ra max. 0.38 µm (15 µin.) for media wetted surfaces, in accordance with ASME BPE SF4, electropolished internal/external	SF4

10 Special version	Code
Special version for higher operating pressures of up to 16 bar Only for types 650 and 687 Only for diaphragm sizes 10 to 50 Only for forged bodies and block material bodies Only for seal code 5M Only with special actuator	J

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

Order example

Ordering option	Code	Description
1 Type	687	Diaphragm valve, pneumatically operated, plastic actuator, stainless steel distance piece
2 DN	25	DN 25
3 Body configuration	D	2/2-way body
4 Connection type	60	Spigot ISO 1127/DIN EN 10357 series C (2014 edition)/DIN 11866 series B
5 Valve body material	40	1.4435 (F316L), forged body
6 Diaphragm material	5M	PTFE/EPDM two-piece
7 Control function	1	Normally closed (NC)
8 Actuator version	F/8	Actuator size F/8
9 Surface	1536	Ra ≤ 0.4 µm (15 µin.) for media wetted surfaces, in accordance with DIN 11866 H4, mechanically polished internal
10 Special version	J	Special version for higher operating pressures of up to 16 bar Only for types 650 and 687 Only for diaphragm sizes 10 to 50 Only for forged bodies and block material bodies Only for seal code 5M Only with special actuator
11 CONEXO		Without

11 Technical data

11.1 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.

Control medium: Inert gases

11.2 Temperature

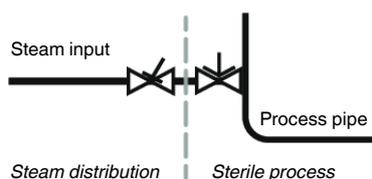
Media temperature:

Diaphragm material	Standard
PTFE/EPDM (code 5M)	-10 – 100 °C

Sterilization temperature: PTFE/EPDM (code 5M) max. 150 °C, permanent temperature per cycle

The sterilization temperature is only valid for steam (saturated steam) or superheated water. If the sterilization temperatures listed above are applied to the EPDM diaphragms for longer periods of time, the service life of the diaphragms will be reduced. In these cases, maintenance cycles must be adapted accordingly.

PTFE diaphragms can also be used as steam barriers; however, this will reduce their service life. This also applies to PTFE diaphragms exposed to high temperature fluctuations. The maintenance cycles must be adapted accordingly. GEMÜ 555 and 505 globe valves are particularly suitable for use in the area of steam generation and distribution. The following valve arrangement for interfaces between steam pipes and process pipes has proven itself over time: A globe valve for shutting off steam pipes and a diaphragm valve as an interface to the process pipes.



Ambient temperature: 0 – 60 °C

Control medium temperature: 0 – 40 °C

Storage temperature: 0 – 40 °C

11.3 Pressure

Operating pressure: 0 – 16 bar

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.

Since the high operating pressure may reduce the service life of the diaphragm, please adapt the maintenance intervals accordingly.

Pressure rating: PN 16

Leakage rate: Leakage rate A to P11/P12 EN 12266-1

Control pressure:
 MG25: PS 6.5–7.0 bar
 MG40: PS 5.5–7.0 bar
 MG50: PS 5.5–7.0 bar

Filling volume:

MG	Actuator version (code)	Control function 1
25	F/8	0.20
40	H/N, HRN	0.42
50	J/N, JRN	0.79

Filling volume in dm³

Kv values:

MG	DN	Connection type code						
		0	16	17	18	37	59	60
25	15	4.1	4.7	4.7	4.7	-	-	7.4
	20	6.3	7.0	7.0	7.0	-	4.4	13.2
	25	13.9	15.0	15.0	15.0	12.6	12.2	16.2
40	32	25.3	27.0	27.0	27.0	26.2	-	30.0
	40	29.3	30.9	30.9	30.9	30.2	29.5	32.8
50	50	46.5	48.4	48.4	48.4	51.7	50.6	55.2
	65	-	-	-	-	62.2	61.8	-

MG = diaphragm size

Kv values in m³/h

Kv values determined in accordance with DIN EN 60534 standard, inlet pressure 5 bar, Δp 1 bar, stainless steel 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.

11.4 Product conformity

Machinery Directive: 2006/42/EC

Pressure Equipment Directive: 2014/68/EU

Food: Regulation (EC) No. 1935/2006
Regulation (EC) No. 10/2011*
FDA*
USP* Class VI

* depending on version and / or operating parameters

SIL:

Product description: GEMÜ diaphragm valve 650_687
Device type: A
Fail safe function: Due to the fail safe function, the diaphragm valve is placed in the closed position (with control function 1).
HFT (Hardware Fault Tolerance): 0
MTTR (Mean Time To Restoration): 24 hours

Product description: GEMÜ diaphragm valve 650_687with GEMÜ 032x pilot solenoid valve
Device type: A
Fail safe function: Due to the fail safe function, the diaphragm valve is placed in the closed position (with control function 1).
HFT (Hardware Fault Tolerance): 0
MTTR (Mean Time To Restoration): 24 hours

11.5 Mechanical data

Weight:

Actuator

MG	DN	Actuator version (code)	Control function 1
25	15, 20, 25	F/8	2.2
40	32, 40	H/N	4.7
50	50, 65	J/N	6.9

Weights in kg
MG = diaphragm size

Body

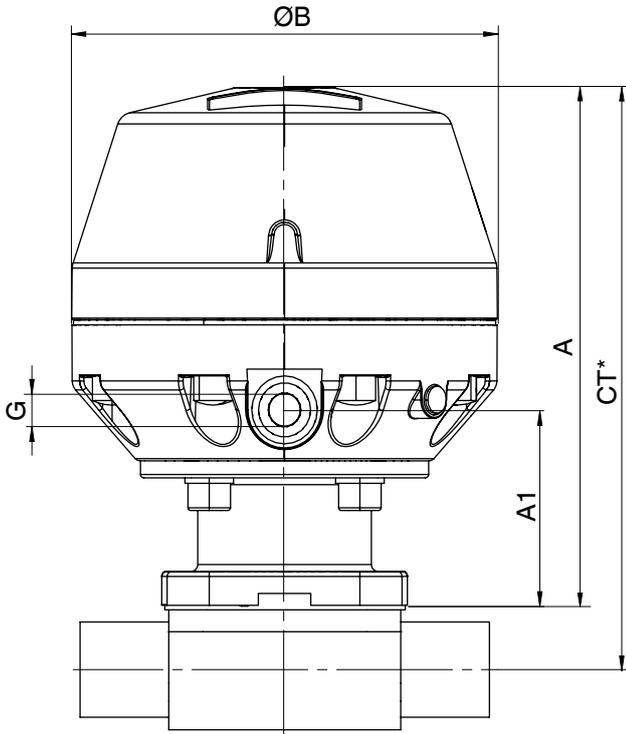
MG	DN	Spigot	Threaded spigot, cone spigot	Flange	Clamp
		Connection type code			
		0, 16, 17, 18, 35, 36, 37, 55, 59, 60, 63, 64, 65	6, 6K	8, 38, 39, 51, 56	80, 82, 88, 8A, 8E, 8P, 8T
25	15	0.62	0.71	1.50	0.75
	20	0.58	0.78	2.20	0.71
	25	0.55	0.79	2.80	0.63
40	32	1.45	1.66	3.40	1.62
	40	1.32	1.62	4.50	1.50
50	50	2.25	2.70	6.30	2.50
	65	2.20	-	10.30	2.30

Weights in kg
MG = diaphragm size

12 Dimensions

12.1 Actuator dimensions

12.1.1 Actuator - Control function 1



MG	Actuator size	$\varnothing B$	A	A1	G
25	F/8	130.0	170.0	59.0	G 1/4
40	H/N	171.0	208.0	75.0	G 1/4
50	J/N	211.0	244.0	90.0	G 1/4

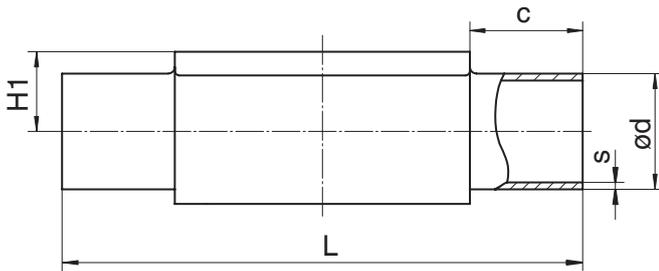
Dimensions in mm

MG = diaphragm size

* CT = A + H1 (see body dimensions)

12.2 Body dimensions

12.2.1 Spigot DIN/EN/ISO (code 0, 16, 17, 18, 60)



Connection type spigot DIN/EN/ISO (code 0, 16, 17, 18, 60)¹⁾, forged material (code 40, 42, F4)²⁾

MG	DN	NPS	c (min)	ød					H1	L	s				
				Connection type							Connection type				
				0	16	17	18	60			0	16	17	18	60
25	15	1/2"	25.0	18.0	18.0	19.0	20.0	21.3	19.0	120.0	1.5	1.0	1.5	2.0	1.6
	20	3/4"	25.0	22.0	22.0	23.0	24.0	26.9	19.0	120.0	1.5	1.0	1.5	2.0	1.6
	25	1"	25.0	28.0	28.0	29.0	30.0	33.7	19.0	120.0	1.5	1.0	1.5	2.0	2.0
40	32	1¼"	25.0	34.0	34.0	35.0	36.0	42.4	26.0	153.0	1.5	1.0	1.5	2.0	2.0
	40	1½"	30.5	40.0	40.0	41.0	42.0	48.3	26.0	153.0	1.5	1.0	1.5	2.0	2.0
50	50	2"	30.0	52.0	52.0	53.0	54.0	60.3	32.0	173.0	1.5	1.0	1.5	2.0	2.0

Dimensions in mm

MG = diaphragm size

1) Connection type

Code 0: Spigot DIN

Code 16: Spigot DIN EN 10357 series B (2014 edition; formerly DIN 11850 series 1)

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

Code 18: Spigot DIN 11850 series 3

Code 60: Spigot ISO 1127/DIN EN 10357 series C (2014 edition)/DIN 11866 series B

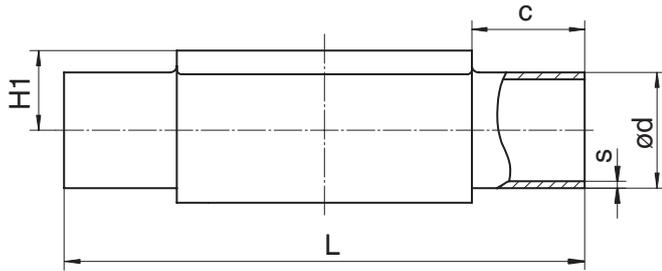
2) Valve body material

Code 40: 1.4435 (F316L), forged body

Code 42: 1.4435 (BN2), forged body, Δ Fe < 0.5%

Code F4: 1.4539, forged body

12.2.2 Spigot ASME/BS (code 55, 59, 63, 64, 65)



Connection type spigot ASME/BS (code 55, 59, 63, 64, 65)¹⁾, forged material (code 40, 42, F4)²⁾

MG	DN	NPS	c (min)	ød					H1	L	s				
				Connection type							Connection type				
				55	59	63	64	65			55	59	63	64	65
25	15	1/2"	25.0	-	-	21.3	21.3	21.3	19.0	120.0	-	-	2.11	1.65	2.77
	20	3/4"	25.0	19.05	19.05	26.7	26.7	26.7	19.0	120.0	1.2	1.65	2.11	1.65	2.87
	25	1"	25.0	-	25.40	33.4	33.4	33.4	19.0	120.0	-	1.65	2.77	1.65	3.38
40	32	1 1/4"	25.0	-	-	42.2	42.2	42.2	26.0	153.0	-	-	2.77	1.65	3.56
	40	1 1/2"	30.5	-	38.10	48.3	48.3	48.3	26.0	153.0	-	1.65	2.77	1.65	3.68
50	50	2"	30.0	-	50.80	60.3	60.3	60.3	32.0	173.0	-	1.65	2.77	1.65	3.91
	65	2 1/2"	30.0	-	63.50	-	-	-	34.0	173.0	-	1.65	-	-	-

Dimensions in mm

MG = diaphragm size

1) Connection type

Code 55: Spigot BS 4825, Part 1

Code 59: Spigot ASME BPE/DIN EN 10357 series C (from 2022 edition)/DIN 11866 series C

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

Code 64: Spigot ANSI/ASME B36.19M schedule 5s

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

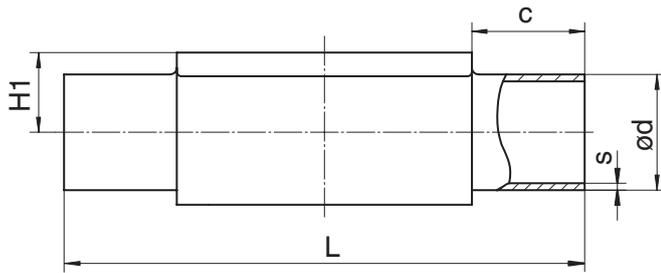
2) Valve body material

Code 40: 1.4435 (F316L), forged body

Code 42: 1.4435 (BN2), forged body, Δ Fe < 0.5%

Code F4: 1.4539, forged body

12.2.3 Spigot JIS/SMS (code 35, 36, 37)



Connection type spigot JIS/SMS (code 35, 36, 37)¹⁾, forged material (code 40, 42, F4)²⁾

MG	DN	NPS	c (min)	ød			H1	L	s		
				Connection type					Connection type		
				35	36	37			35	36	37
25	15	1/2"	25.0	-	21.7	-	19.0	120.0	-	2.10	-
	20	3/4"	25.0	-	27.2	-	19.0	120.0	-	2.10	-
	25	1"	25.0	25.4	34.0	25.0	19.0	120.0	1.2	2.80	1.2
40	32	1¼"	25.0	31.8	42.7	33.7	26.0	153.0	1.2	2.80	1.2
	40	1½"	30.5	38.1	48.6	38.0	26.0	153.0	1.2	2.80	1.2
50	50	2"	30.0	50.8	60.5	51.0	32.0	173.0	1.5	2.80	1.2
	65	2½"	30.0	63.5	-	63.5	34.0	173.0	2.0	-	1.6

Dimensions in mm

MG = diaphragm size

1) Connection type

Code 35: Spigot JIS-G 3447

Code 36: Spigot JIS-G 3459 schedule 10s

Code 37: Spigot SMS 3008

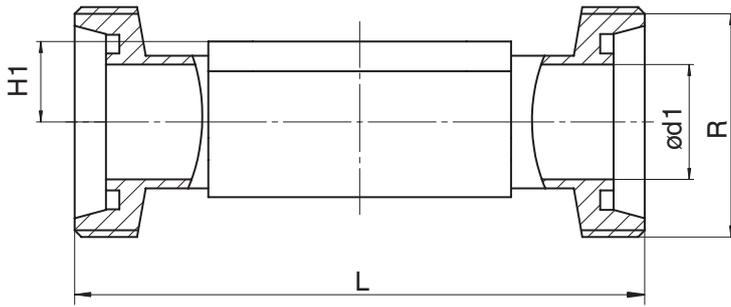
2) Valve body material

Code 40: 1.4435 (F316L), forged body

Code 42: 1.4435 (BN2), forged body, Δ Fe < 0.5%

Code F4: 1.4539, forged body

12.2.4 Threaded spigot DIN (code 6)



Connection type threaded spigot DIN (code 6)¹⁾, forged material (code 40, 42)²⁾

MG	DN	NPS	ød1	H1	L	R
25	15	1/2"	16.0	19.0	118.0	Rd 34 x 1/8
	20	3/4"	20.0	19.0	118.0	Rd 44 x 1/6
	25	1"	26.0	19.0	128.0	Rd 52 x 1/6
40	32	1¼"	32.0	26.0	147.0	Rd 58 x 1/6
	40	1½"	38.0	26.0	160.0	Rd 65 x 1/6
50	50	2"	50.0	32.0	191.0	Rd 78 x 1/6

Dimensions in mm

MG = diaphragm size

1) Connection type

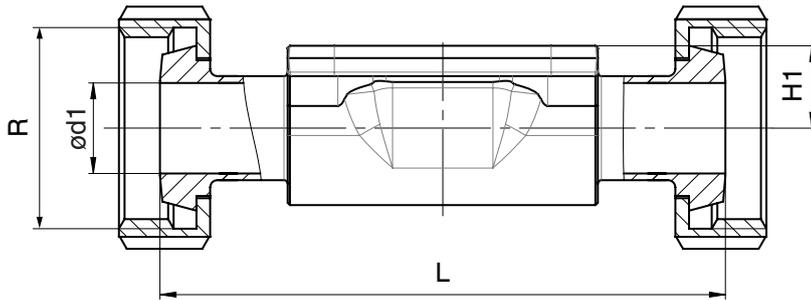
Code 6: Threaded spigot DIN 11851

2) Valve body material

Code 40: 1.4435 (F316L), forged body

Code 42: 1.4435 (BN2), forged body, Δ Fe < 0.5%

12.2.5 Cone spigot DIN (code 6K)



Connection type cone spigot DIN (code 6K)¹⁾, forged material (code 40, 42)²⁾

MG	DN	NPS	ød1	H1	L	R
25	15	1/2"	16.0	19.0	116.0	Rd 34 x 1/8
	20	3/4"	20.0	19.0	114.0	Rd 44 x 1/6
	25	1"	26.0	19.0	127.0	Rd 52 x 1/6
40	32	1¼"	32.0	26.0	147.0	Rd 58 x 1/6
	40	1½"	38.0	26.0	160.0	Rd 65 x 1/6
50	50	2"	50.0	32.0	191.0	Rd 78 x 1/6

Dimensions in mm

MG = diaphragm size

1) Connection type

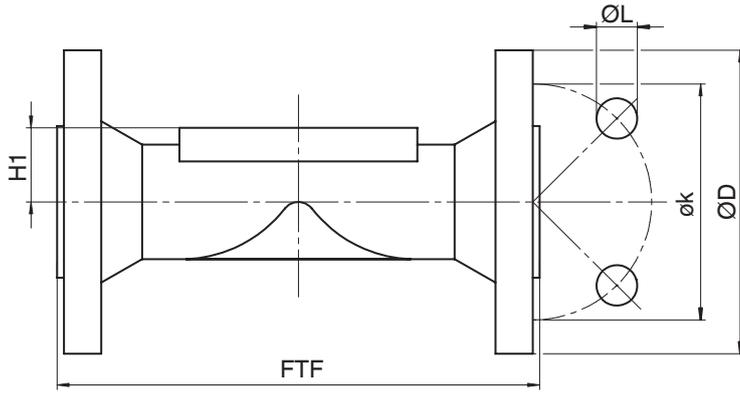
Code 6K: Cone spigot and union nut DIN 11851

2) Valve body material

Code 40: 1.4435 (F316L), forged body

Code 42: 1.4435 (BN2), forged body, Δ Fe < 0.5%

12.2.6 Flange EN (code 8)



Connection type flange, length EN 558 (code 8)¹⁾, forged material (code 40, 42)²⁾

MG	DN	NPS	øD	FTF	H1	øk	øL	n
40	32	1¼"	140.0	180.0	26.0	100.0	19.0	4
	40	1½"	150.0	200.0	26.0	110.0	19.0	4

Dimensions in mm

MG = diaphragm size

n = number of bolts

1) Connection type

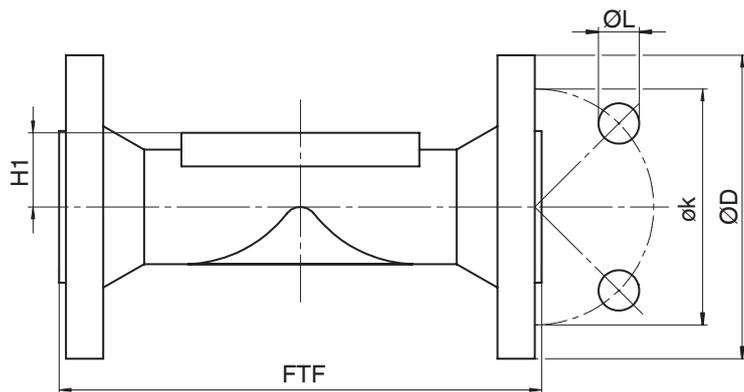
Code 8: Flange EN 1092, PN 16, form B, face-to-face dimension FTF EN 558 series 1, ISO 5752, basic series 1, length only for body configuration D

2) Valve body material

Code 40: 1.4435 (F316L), forged body

Code 42: 1.4435 (BN2), forged body, Δ Fe < 0.5%

12.2.7 Flange ANSI Class (code 39)



Connection type flange, length EN 558 (code 39), ¹⁾ forged material (code 40, 42)²⁾

MG	DN	NPS	øD	FTF	H1	øk	øL	n
25	15	1/2"	90.0	130.0	19.0	60.3	15.9	4
	20	3/4"	100.0	150.0	19.0	69.9	15.9	4
	25	1"	110.0	160.0	19.0	79.4	15.9	4
40	32	1¼"	115.0	180.0	26.0	88.9	15.9	4
	40	1½"	125.0	200.0	26.0	98.4	15.9	4
50	50	2"	150.0	230.0	32.0	120.7	19.0	4

Dimensions in mm

MG = diaphragm size

n = number of bolts

1) **Connection type**

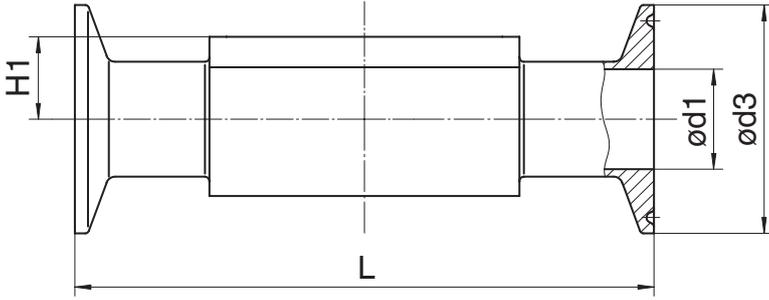
Code 39: Flange ANSI Class 125/150 RF, face-to-face dimension FTF EN 558 series 1, ISO 5752, basic series 1, length only for body configuration D

2) **Valve body material**

Code 40: 1.4435 (F316L), forged body

Code 42: 1.4435 (BN2), forged body, $\Delta Fe < 0.5\%$

12.2.8 Clamp (code 80, 82, 88, 8A, 8E, 8P, 8T)



Connection type clamp DIN/ASME (code 80, 88, 8P, 8T), forged material (code 40, 42, F4)¹⁾

MG	DN	NPS	ød1		ød3		H1	L	
			Connection type		Connection type			Connection type	
			80, 8P	88, 8T	80, 8P	88, 8T		80, 8P	88, 8T
25	20	3/4"	15.75	15.75	25.0	25.0	19.0	101.6	117.0
	25	1"	22.10	22.10	50.5	50.5	19.0	114.3	127.0
40	40	1½"	34.80	34.80	50.5	50.5	26.0	139.7	159.0
50	50	2"	47.50	47.50	64.0	64.0	32.0	158.8	190.0
	65	2½"	60.20	60.20	77.5	77.5	34.0	193.8	216.0

Dimensions in mm

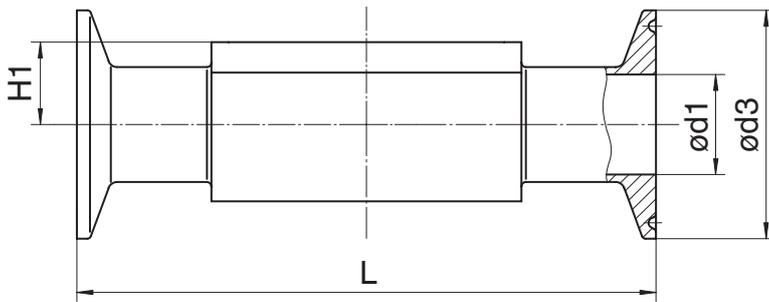
MG = diaphragm size

1) Valve body material

Code 40: 1.4435 (F316L), forged body

Code 42: 1.4435 (BN2), forged body, Δ Fe < 0.5%

Code F4: 1.4539, forged body



Connection type clamp DIN/ISO (code 82, 8A, 8E), forged material (code 40, 42, F4) ¹⁾

MG	DN	NPS	ød1			ød3			H1	L		
			Connection type			Connection type				Connection type		
			82	8A	8E	82	8A	8E		82	8A	8E
25	15	1/2"	18.1	16.0	-	50.5	34.0	-	19.0	108.0	108.0	-
	20	3/4"	23.7	20.0	-	50.5	34.0	-	19.0	117.0	117.0	-
	25	1"	29.7	26.0	22.6	50.5	50.5	50.5	19.0	127.0	127.0	127.0
40	32	1¼"	38.4	32.0	31.3	64.0	50.5	50.5	26.0	146.0	146.0	146.0
	40	1½"	44.3	38.0	35.6	64.0	50.5	50.5	26.0	159.0	159.0	159.0
50	50	2"	56.3	50.0	48.6	77.5	64.0	64.0	32.0	190.0	190.0	190.0
	65	2½"	-	-	60.3	-	-	77.5	34.0	-	-	216.0

Dimensions in mm

MG = diaphragm size

1) **Valve body material**

Code 40: 1.4435 (F316L), forged body

Code 42: 1.4435 (BN2), forged body, Δ Fe < 0.5%

Code F4: 1.4539, forged body

13 Manufacturer's information

13.1 Packaging

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

13.2 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.

13.3 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.

13.4 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.

14 Installation in piping

14.1 Preparing for installation

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

NOTICE**Tools**

- ▶ The tools required for installation and assembly are not included in the scope of delivery.
- Use appropriate, functional and safe tools.

1. Ensure the product is suitable for the relevant application.
2. Check the technical data of the product and the materials.
3. Keep appropriate tools ready.
4. Wear appropriate protective gear as specified in the plant operator's guidelines.
5. Comply with appropriate regulations for the connections.
6. Installation work must be performed by trained personnel.
7. Shut off the plant or plant component.
8. Secure the plant or plant component against recommissioning.
9. Depressurize the plant or plant component.
10. Completely drain the plant or plant component and allow it to cool down until the temperature is below the media vaporization temperature and cannot cause scalding.
11. 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 vibrations and tension.
13. Only install the product between matching aligned pipes (see chapters below).
14. Pay attention to the installation position (see "Installation position" chapter).

14.2 Installation position

The installation position of the product is optional.

Observe the angle of rotation to enable installation for optimized draining (document available on request or at www.gemu-group.com).

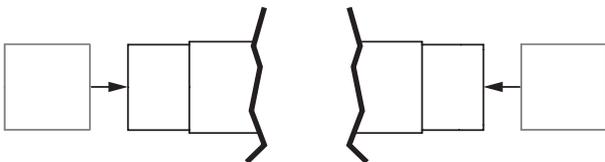
14.3 Installation with butt weld spigots

Fig. 1: 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.

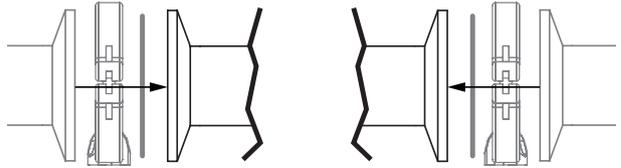
14.4 Installation with clamp connections

Fig. 2: 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.

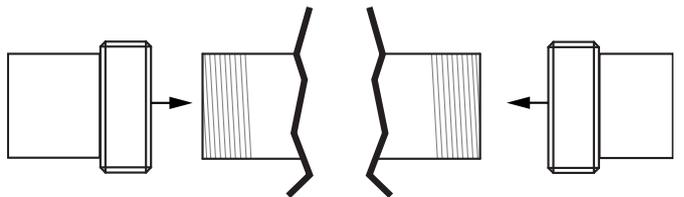
14.5 Installation with threaded spigots

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 "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.

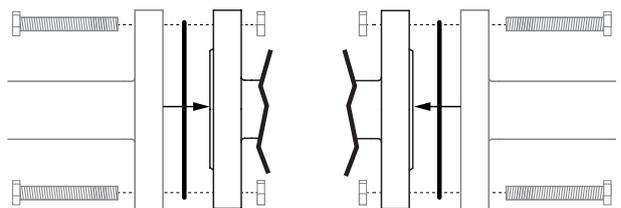
14.6 Installation with flanged connection

Fig. 4: Flanged connection

NOTICE

Sealing material

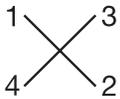
- ▶ The sealing material is not included in the scope of delivery.
- Only use appropriate sealing material.

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 "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. Re-attach or reactivate all safety and protective devices.
10. Tighten the bolts diagonally.



14.7 After the installation

- Re-attach or reactivate all safety and protective devices.

15 Pneumatic connections

15.1 Control function

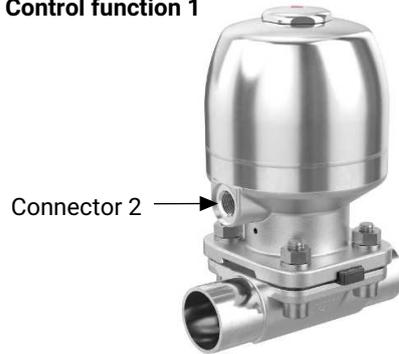
The following control function is available:

Control function 1

Normally closed (NC):

Valve resting position: Closed by spring force. Activation of the actuator (connector 2) opens the valve. When the actuator is vented, the valve is closed by spring force.

Control function 1



Control function 1



15.2 Connecting the control medium

1. Use suitable connectors.
2. Connect the control medium lines tension-free and without any bends or knots.

Thread size of the control medium connector:

GEMÜ 650

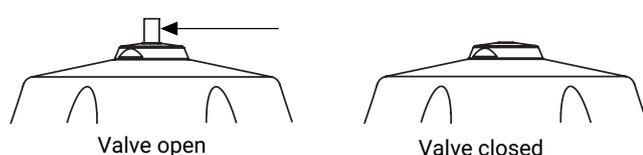
diaphragm size 10, 40: G1/4

GEMÜ 687

diaphragm size 25, 40, 50: G1/4

	Control function	Connector 2
1	Normally closed (NC)	Control medium (open)
For connector 2, see figures		

15.3 Optical position indicator



15.4 Stroke limiter

NOTICE

- ▶ For GEMÜ 687, there must not be a stroke limiter fitted.

16 Commissioning

⚠ WARNING



Corrosive chemicals!

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

⚠ CAUTION

Leakage

- ▶ Emission of dangerous materials.
- Provide precautionary measures against exceeding the maximum permitted pressures caused by pressure surges (water hammer).

⚠ CAUTION

Cleaning agent

- ▶ Damage to the GEMÜ product.
- The plant operator is responsible for selecting the cleaning material and performing the procedure.

1. Check the tightness and the function of the product (close and reopen the product).
2. Flush the piping system of new plant and following repair work (the product must be fully open).
 - ⇒ Harmful foreign matter has been removed.
 - ⇒ The product is ready for use.
3. Commission the product.
4. Commissioning of actuators in accordance with the enclosed instructions.

17 Operation

Operate the product according to the control function (see also chapter "Pneumatic connections").

18 Troubleshooting

Error	Error cause	Troubleshooting
Control medium escaping from a vent hole in the actuator cover	Actuator membrane faulty	Replace the actuator
Control medium escaping from leak detection hole	Spindle seal leaking	Replace the actuator
Working medium escaping from leak detection hole	Shut off diaphragm faulty	Check shut off diaphragm for potential damage, replace diaphragm if necessary
The product does not open or does not open fully	Control pressure too low (for control function NC)	Operate the product with the control pressure specified in the datasheet
	Pilot valve faulty	Check and replace pilot valve
	Actuator defective	Replace the actuator
	Control medium not connected	Connect control medium
	Shut-off diaphragm incorrectly mounted	Remove the actuator, check the diaphragm mounting, replace the shut-off diaphragm if necessary
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
	Actuator spring faulty (for control function NC)	Replace actuator
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
Connection between valve body and piping leaking	Incorrect installation	Check installation of valve body in piping
	Threaded connections / unions loose	Tighten threaded connections / unions
	Sealing material faulty	Replace sealing material
Valve body leaking	Valve body leaking or corroded	Check valve body for damage, replace valve body if necessary

19 Inspection and maintenance

⚠ WARNING

The equipment is subject to pressure!

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

⚠ CAUTION



Hot plant components!

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

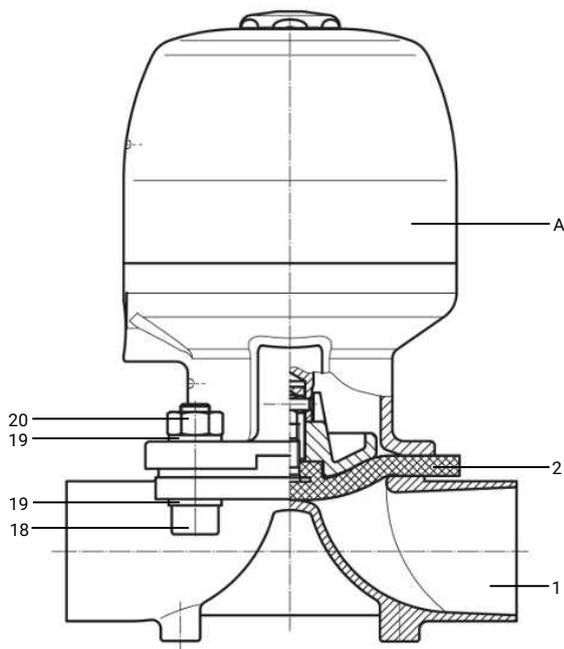
⚠ CAUTION

- Servicing and maintenance work must only be performed by trained personnel.
- Do not extend hand lever. GEMÜ shall assume no liability whatsoever for damages caused by improper handling or third-party actions.
- In case of doubt, contact GEMÜ prior to commissioning.

1. Wear appropriate protective gear as specified in the plant operator's guidelines.
2. Shut off the plant or plant component.
3. Secure against recommissioning.
4. Depressurize the plant or plant component.

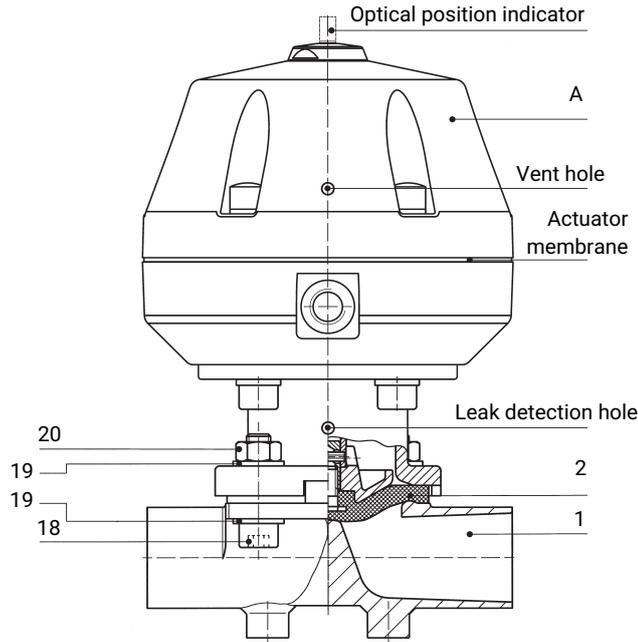
The operator must carry out regular visual examination of the valves dependent on the operating conditions and the potential danger in order to prevent leakage and damage. The valve also has to be disassembled in corresponding intervals and checked for wear (see "Fitting/removing spare parts").

19.1 Spare parts for the 650



Item	Name	Order designation
A	Actuator	9650
1	Valve body	K600
2	Diaphragm	Code 5M
18, 19, 20	Screw connection kit	650 S30

19.2 Spare parts for the 687



Item	Name	Order designation
A	Actuator	9687
1	Body	K600
2	Diaphragm	Code 5M
18, 19, 20	Screw connection kit	687 S30

19.3 Fitting/removing spare parts

19.3.1 Valve disassembly (removing the actuator from the body)

1. Move the actuator **A** to the open position.
2. Remove the actuator **A** from the valve body **1**.
3. Move the actuator **A** to the closed position.

NOTICE

Important:

- ▶ Clean all parts of contamination (do not damage the parts during cleaning) following removal. Check parts for potential damage; replace if necessary (only use genuine parts from GEMÜ).

19.3.2 Removing the diaphragm

NOTICE

- ▶ Before removing the diaphragm, please remove the actuator, see "Valve disassembly (removing the actuator from the body)".

1. Unscrew the diaphragm.
2. Clean all parts of remains of product and contaminants. Do not scratch or damage parts during cleaning.
3. Check all parts for potential damage.
4. Replace damaged parts (only use genuine parts from GEMÜ).

19.3.3 Mounting the diaphragm

19.3.3.1 General information

NOTICE

- ▶ Mount the correct diaphragm that suits the valve (suitable for medium, medium concentration, temperature and pressure). The shut-off diaphragm is a wearing part. Check the technical condition and function of the valve before commissioning and during the whole duration 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 valve. If the diaphragm is screwed in too far, perfect sealing at the valve seat will not be achieved. The function of the valve is no longer ensured.

NOTICE

- ▶ An incorrectly mounted diaphragm may cause valve leakage/emission of medium. In this case, remove the diaphragm, check the complete valve and diaphragms and reassemble again proceeding as described above.

19.3.3.2 GEMÜ 650

Diaphragm sizes 10 + 40:
The compressor is loose.

Diaphragm size 10:

Compressor and actuator flange seen from below:

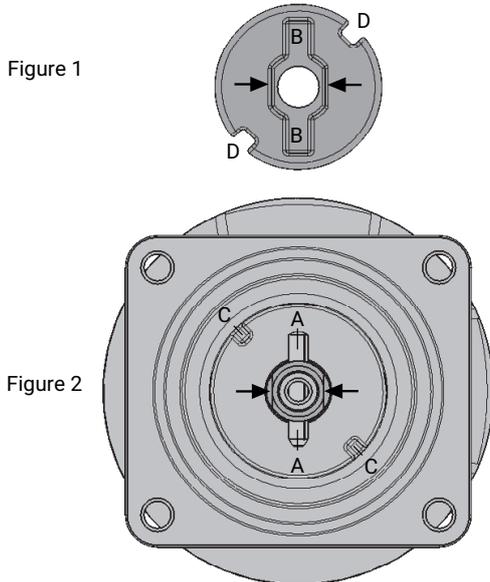


Figure 1

Figure 2

Anti-twist system of the spindle at the compressor

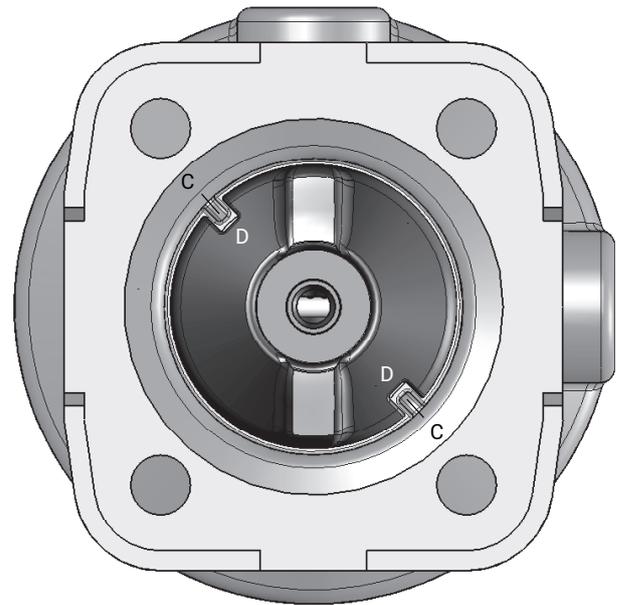
A double flat (arrows in figure 2) is fitted at the end of the actuator spindle to protect the actuator spindle against twisting. When mounting the compressor, the double flat must be in correct alignment with the recess of the compressor back (arrows in figure 1).

If the actuator spindle is not in the correct position, it must be turned to the correct position. The position of **A** is offset by 45° to the position of **C**.

Place the compressor loosely on the actuator spindle, fit the recesses **D** into the guides **C** and **A** into **B**. It must be possible to move the compressor freely between the guides.

Diaphragm size 40:

Compressor and actuator flange seen from below:



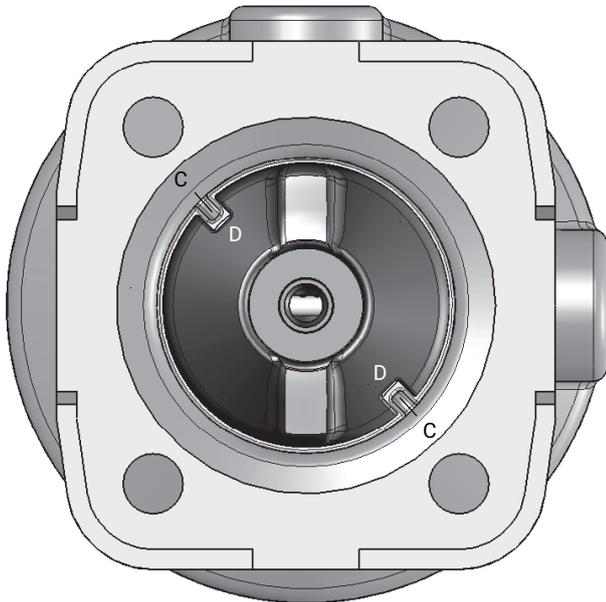
Place the compressor loosely on the actuator spindle, fit the recesses **D** into the guides **C**. It must be possible to move the compressor freely between the guides.

19.3.3.3 GEMÜ 687

The compressor is loose on diaphragm sizes 25–50 (DN 15–65).

Diaphragm size 25–50 (DN 15–65):

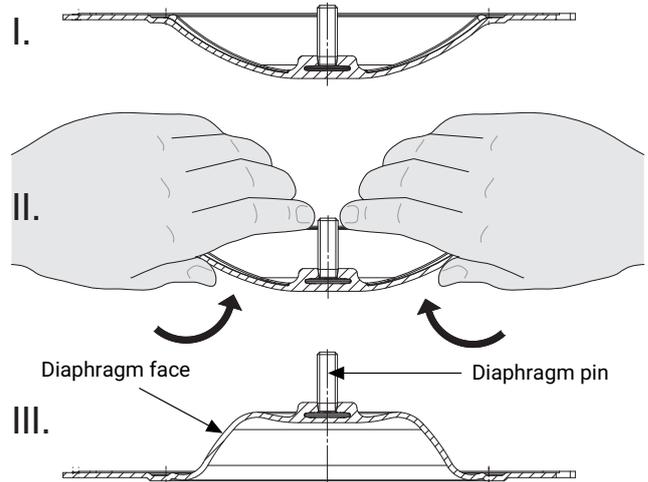
Compressor and actuator flange seen from below:



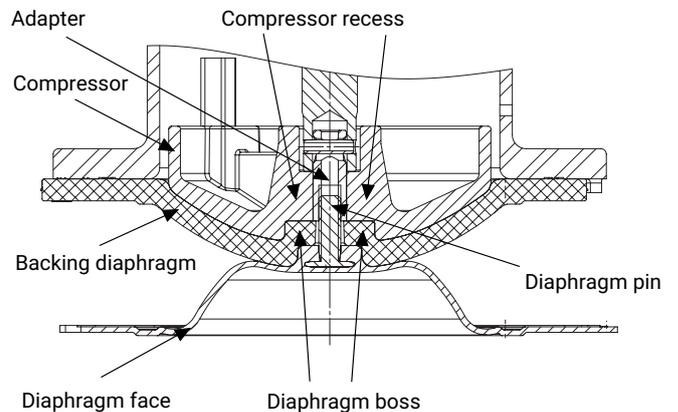
Place the compressor loosely on the actuator spindle, fit the recesses **D** into the guides **C**. It must be possible to move the compressor freely between the guides.

19.3.3.4 Mounting a convex diaphragm

1. Move the actuator **A** to the closed position.
2. GEMÜ 650: Diaphragm sizes 10, 40, GEMÜ 687: Diaphragm sizes 25, 40, 50 Place the compressor loosely on the actuator spindle, fit the recesses **D** into the guides **C**.
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. Manually screw the diaphragm face into the compressor tightly. The diaphragm boss must fit closely in the recess of the compressor.

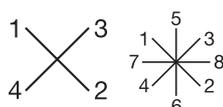


8. If it is difficult to screw it in, check the thread and replace damaged parts.
9. When clear resistance is felt, turn back the diaphragm anticlockwise until its bolt holes are in correct alignment with the bolt holes of the actuator.

- 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.

19.3.4 Mounting the actuator on the valve body

- Move the actuator **A** to the open position.
- Position the actuator **A** with the mounted diaphragm **2** on the valve body **1**. Take care to align the compressor weir and valve body weir.
- Tighten the bolts **18**, washers **19** and nuts **20** by hand (hand tight only) (fastening elements may vary depending on the diaphragm size and/or valve body version).
- Move the actuator **A** to the closed position.
- Fully tighten the bolts **18** with nuts **20** diagonally.



- Ensure that the diaphragm **2** is compressed evenly (the PTFE diaphragm face and the EPDM backing diaphragm must be positioned level with and parallel to the valve body).
- Check the fully assembled valve for leaks.

NOTICE

- Service and maintenance:
Diaphragms set in the course of time. After installing and commissioning the valve, always retighten the bolts **18** or nuts **20** (see Chapter "Spare parts") (after the first sterilization process, at the latest).

20 Removal from piping

- Remove in reverse order to installation.
- Deactivate the control medium.
- Disconnect the control medium line(s).
- Disassemble the product. Observe warning notes and safety information.

21 Disposal

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

22 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.

- Clean the product.
- Request a return delivery note from GEMÜ.
- Complete the return delivery note.
- Send the product with a completed return delivery note to GEMÜ.

23 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 650/687 Special version J
Product name: Pneumatically operated 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.; 1.3.3.; 1.3.4.; 1.3.7.; 1.5.13.; 1.5.3.; 1.5.4.; 1.5.5.; 1.5.8.; 1.5.9.; 1.6.1.; 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, 11/10/2023

24 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 650/687 Special version J
Product name: Pneumatically operated 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 13397:2001

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, 11/10/2023

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Subject to alteration

10.2023 | 88887281