

GEMÜ 656

Pneumatically operated full bore diaphragm valve

EN

Operating instructions



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Contents

1	General information	4
1.1	Information	4
1.2	Symbols used	4
1.3	Definition of terms	4
1.4	Warning notes	4
2	Safety information	5
3	Product description	5
3.1	Construction	5
3.2	Description	5
3.3	Function	5
3.4	Product label	6
4	GEMÜ CONEXO	6
6	Order data	7
6.1	Order codes	7
6.2	Order example	8
7	Technical data	9
7.1	Medium	9
7.2	Temperature	9
7.3	Pressure	10
7.4	Product compliance	12
7.5	Mechanical data	13
8	Dimensions	14
8.1	Actuator dimensions	14
8.2	Body dimensions	17
8.3	Diaphragm dimensions	23
9	Manufacturer's information	24
9.1	Delivery	24
9.2	Packaging	24
9.3	Transport	24
9.4	Storage	24
10	Installation in piping	24
10.1	Preparing for installation	24
10.2	Installation position	25
10.3	Installation with flanged connection	25
11	Pneumatic connections	25
11.1	Control functions	25
11.2	Connecting the control medium	26
12	Commissioning	26
13	Operation	26
14	Troubleshooting	27
15	Inspection and maintenance	28
15.1	Removing the actuator	28
15.2	Removing the diaphragm	28
15.3	Mounting the diaphragm	28
15.4	Mounting the actuator	31
16	Spare parts	32
17	Removal from piping	33
18	Disposal	33
19	Returns	34
20	Declaration of Incorporation according to 2006/42/EC (Machinery Directive)	35
21	Declaration of conformity according to 2014/68/EU (Pressure Equipment Directive)	36

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.
- A supplement to Directive 2014/34/EU (ATEX Directive) is included with the product, provided that it was ordered in accordance with ATEX.

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 medium

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

Control function

The possible actuation functions of 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	<p>Type and source of the danger</p> <ul style="list-style-type: none"> ▶ Possible consequences of non-observance. ● Measures for avoiding danger.


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

The following signal words and danger levels are used:




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

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

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

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

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

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

2 Safety information

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

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

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

The safety information does not take into account:

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

Prior to commissioning:

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

During operation:

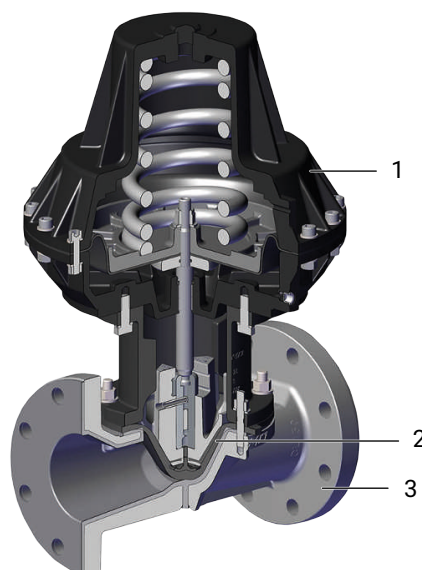
9. Keep this document available at the place of use.
10. Observe the safety information.
11. Operate the product in accordance with this document.
12. Operate the product in accordance with the specifications.
13. Maintain the product correctly.
14. Do not carry out any maintenance work and repairs not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

In cases of uncertainty:

15. Consult the nearest GEMÜ sales office.

3 Product description

3.1 Construction



Item	Name	Materials
1	Actuator	Cast iron
2	Diaphragm	CR EPDM IIR NBR NR
3	Valve body	EN-GJL-250 (GG 25) EN-GJL-250 (GG 25), soft rubber lined EN-GJL-250 (GG 25), hard rubber lined EN-GJL-250 (GG 25), butyl lined EN-GJS-400-18-LT (GGG 40.3), soft rubber lined EN-GJS-400-18-LT (GGG 40.3), hard rubber lined EN-GJS-400-18-LT (GGG 40.3), butyl lined EN-GJS-500-7 (GGG 50), soft rubber lined EN-GJS-500-7 (GGG 50), hard rubber lined EN-GJS-500-7 (GGG 50), butyl lined

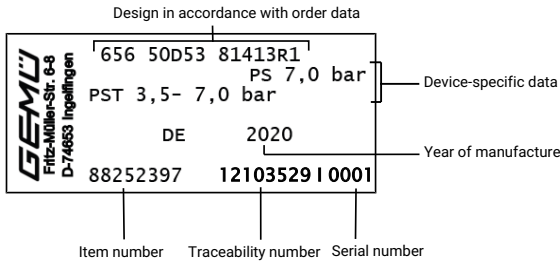
3.2 Description

The GEMÜ 656 2/2-way diaphragm valve has a low maintenance metal membrane actuator and is pneumatically operated. Normally Closed (NC), Normally Open (NO) and Double Acting (DA) control functions are available. The valve body has a full bore design.

3.3 Function

The product is designed for use in piping. It controls a flowing medium by being closed or opened by a control medium. The valve has a low maintenance membrane actuator which can be controlled by inert gases. The valve body and the diaphragm are available in various designs as shown in the data-sheet.

3.4 Product label



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

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 Correct use

⚠ **DANGER**

Danger of explosion!

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

⚠ **WARNING**

Improper use of the product!

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

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

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

- Use the product in accordance with the technical data.

6 Order data

The order data provide an overview of standard configurations.

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

Order codes

1 Type	Code
Diaphragm valve, pneumatically operated	656

2 DN	Code
DN 25	25
DN 40	40
DN 50	50
DN 65	65
DN 80	80
DN 100	100
DN 125	125
DN 150	150
DN 200	200
DN 250	250

3 Body configuration	Code
2/2-way body	D

4 Connection type	Code
Flange EN 1092, PN 10, form B, face-to-face dimension FTF EN 558 series 1, ISO 5752, basic series 1	4
Flange EN 1092, PN 16, form B, face-to-face dimension FTF EN 558 series 1, ISO 5752, basic series 1	8
Flange ANSI Class 125/150 RF, face-to-face dimension FTF EN 558 series 1, ISO 5752, basic series 1	39
Flange EN 1092, PN 10, form A, face-to-face dimension FTF EN 558 series 7, ISO 5752, basic series 7	52
Flange EN 1092, PN 16, form A, face-to-face dimension FTF EN 558 series 7, ISO 5752, basic series 7	53
Flange ANSI Class 125/150 FF, face-to-face dimension FTF EN 558 series 7, ISO 5752, basic series 7	58

5 Valve body material	Code
Cast iron material	
EN-GJL-250 (GG 25)	8
EN-GJL-250 (GG 25), hard rubber lined	13
EN-GJL-250 (GG 25), soft rubber lined	52
EN-GJL-250 (GG 25), butyl lined	58
SG iron material	
EN-GJS-500-7 (GGG-50), hard rubber lined	16
EN-GJS-400-18-LT (GGG 40.3), soft rubber lined	82
EN-GJS-400-18-LT (GGG 40.3), hard rubber lined	83
EN-GJS-400-18-LT (GGG 40.3), butyl lined	88
EN-GJS-500-7 (GGG 50), soft rubber lined	92

5 Valve body material	Code
EN-GJS-500-7 (GGG 50), butyl lined	98

6 Diaphragm material	Code
NBR	2
IIR	6
CR	8
EPDM	14
NR	15

7 Control function	Code
Normally Closed (NC)	1
Normally Open (NO)	2
Double Acting (DA)	3

8 Actuator version	Code
Actuator size 2R2, for DN 25 and 40	2R2
Actuator size 3R1, for DN 50 and 65	3R1
Actuator size 4R1, for DN 80 and 100	4R1
Actuator size 5R2, for DN 125 and 150	5R2
Actuator size 6R2, for DN 200 and 250	6R2
Actuator size 6R3, for DN 200 and 250	6R3
Actuator size 2RF, for DN 25 and 40	2RF
Actuator size 3RF, for DN 50 and 65	3RF
Actuator size 4RF, for DN 80 and 100	4RF
Actuator size 5RF, for DN 125 and 150	5RF
Actuator size 6RF, for DN 200 and 250	6RF
Actuator size 2RD, for DN 25 and 40	2RD
Actuator size 3RD, for DN 50 and 65	3RD
Actuator size 4RD, for DN 80 and 100	4RD
Actuator size 5RD, for DN 125 and 150	5RD
Actuator size 6RD, for DN 200 and 250	6RD

Order example

Ordering option	Code	Description
1 Type	656	Diaphragm valve, pneumatically operated
2 DN	50	DN 50
3 Body configuration	D	2/2-way body
4 Connection type	53	Flange EN 1092, PN 16, form A, face-to-face dimension FTF EN 558 series 7, ISO 5752, basic series 7
5 Valve body material	8	EN-GJL-250 (GG 25)
6 Diaphragm material	14	EPDM
7 Control function	1	Normally Closed (NC)
8 Actuator version	3R1	Actuator size 3R1, for DN 50 and 65

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.

Control medium: Inert gases

7.2 Temperature

Media temperature: 0 – 100 °C

Control medium temperature: 0 – 40 °C

Ambient temperature: 0 – 60 °C

Storage temperature: 0 – 40 °C

7.3 Pressure**Operating pressure:**

MG	DN	NPS	Control function	Actuator size	Operating pressure
40	25	1"	1	2R2	7.0
			2	2RF	7.0
			3	2RD	7.0
	40	1½"	1	2R2	7.0
			2	2RF	7.0
			3	2RD	7.0
65	50	2"	1	3R1	7.0
			2	3RF	7.0
			3	3RD	7.0
	65	2½"	1	3R1	7.0
			2	3RF	7.0
			3	3RD	7.0
100	80	3"	1	4R1	6.0
			2	4RF	7.0
			3	4RD	7.0
	100	4"	1	4R1	6.0
			2	4RF	7.0
			3	4RD	7.0
150	125	5"	1	5R2	4.0
			2	5RF	5.5
			3	5RD	5.5
	150	6"	1	5R2	4.0
			2	5RF	5.5
			3	5RD	5.5
200	200	8"	1	6R2	3.0
			1	6R3	3.5
			2	6RF	3.5
			3	6RD	3.5
250	250	10"	1	-	-
			2	6RF	3.5
			3	6RD	3.5

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.

Valve not suitable for vacuum applications

Control pressure:

MG	DN	NPS	Control function	Actuator size	Control pressure
40	25	1"	1	2R2	3.8 - 7.0
			2	2RF	max. 3.0 *
			3	2RD	max. 3.0 *
	40	1½"	1	2R2	3.8 - 7.0
			2	2RF	max. 3.0 *
			3	2RD	max. 3.0 *
65	50	2"	1	3R1	3.0 - 7.0
			2	3RF	max. 3.0 *
			3	3RD	max. 3.0 *
	65	2½"	1	3R1	3.0 - 7.0
			2	3RF	max. 3.0 *
			3	3RD	max. 3.0 *
100	80	3"	1	4R1	5.5 - 7.0
			2	4RF	max. 3.0 *
			3	4RD	max. 3.0 *
	100	4"	1	4R1	5.5 - 7.0
			2	4RF	max. 3.0 *
			3	4RD	max. 3.0 *
150	125	5"	1	5R2	4.5 - 7.0
			2	5RF	max. 7.0 **
			3	5RD	max. 7.0 **
	150	6"	1	5R2	4.5 - 7.0
			2	5RF	max. 7.0 **
			3	5RD	max. 7.0 **
200	200	8"	1	6R2	5.5 - 7.0
			2	6RF	max. 7.0 **
			3	6RD	max. 7.0 **
	200	8"	1	6R3	5.5 - 7.0
			2	6RF	max. 7.0 **
			3	6RD	max. 7.0 **
250	250	10"	1	-	-
			2	6RF	max. 7.0 **
			3	6RD	max. 7.0 **

MG = diaphragm size, all pressures are gauge pressures

* max. recommended control pressure (max. permissible control pressure is 5 bar)

Caution: If the control pressure is high, there is a risk of increased diaphragm wear.

We recommend using a pressure controller: Item no. 99168223.

** max. recommended and permissible control pressure

Filling volume:

Actuator size 2R2, 2RF, 2RD	0.625 dm ³
Actuator size 3R1, 3RF, 3RD	2.5 dm ³
Actuator size 4R1, 4RF, 4RD	6.8 dm ³
Actuator size 5R2, 5RF, 5RD	9.0 dm ³
Actuator size 6R2, 6R3, 6RF, 6RD	19.0 dm ³

Kv values:

MG	DN	NPS	Kv values
40	25	1"	35
	40	1½"	38
65	50	2"	108
	65	2½"	114
100	80	3"	284
	100	4"	298
150	125	5"	650
	150	6"	680
200	200	8"	1790
250	250	10"	2920

MG = diaphragm size, Kv values in m³/h

Kv values determined in accordance with EN 60534, inlet pressure 5 bar, Δp 1 bar, valve body material cast iron EN-GJL-250 with connection flange EN 1092 length EN 558 series 7 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

EAC: TR CU 010/2011

7.5 Mechanical data**Weight:****Actuator**

MG	DN	Control function 1	Control function 2 and 3
20	15	2.5	2.5
	20	3.0	
40	25	5.0	5.0
	40	5.5	
65	50	23.0	23.0
	65	25.0	
100	80	48.0	48.0
	100	51.0	
150	125	90.0	90.0
	150	100.0	
200	200	164.0	164.0
250	250	179.0	180.0

MG = diaphragm size
Weights in kg

Body

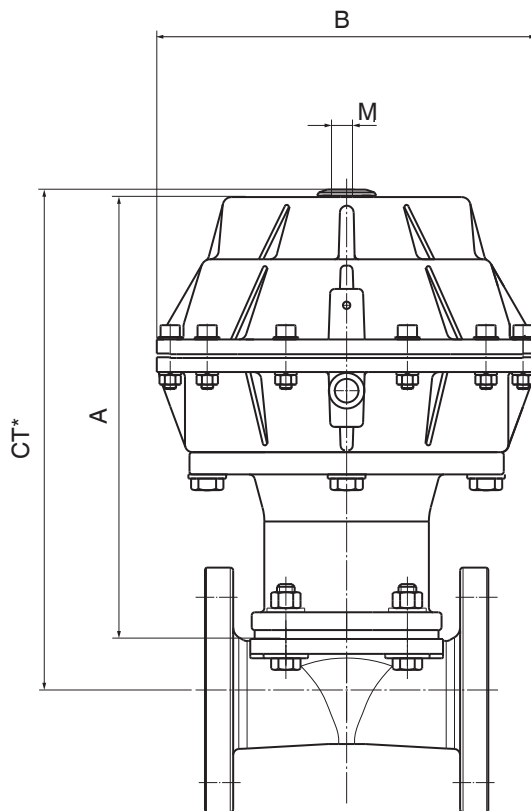
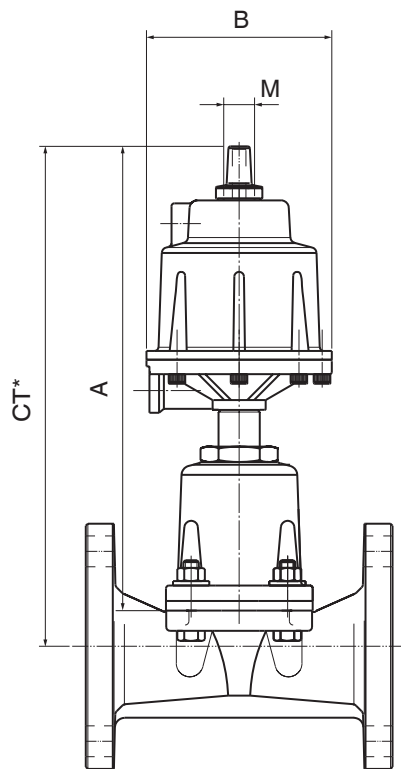
MG	DN	Weight
40	25	2.2
	40	5.4
65	50	6.3
	65	8.3
100	80	12.0
	100	17.1
150	125	28.4
	150	31.9
200	200	76.6
250	250	99.2

MG = diaphragm size
Weights in kg

8 Dimensions

8.1 Actuator dimensions

8.1.1 Actuator size 2, 3



Actuator size 2

MG	DN	NPS	A	B	M
40	25	1"	270.5	164.0	M22x1.5
	40	1 ½"	270.5	164.0	M22x1.5

Actuator size 3

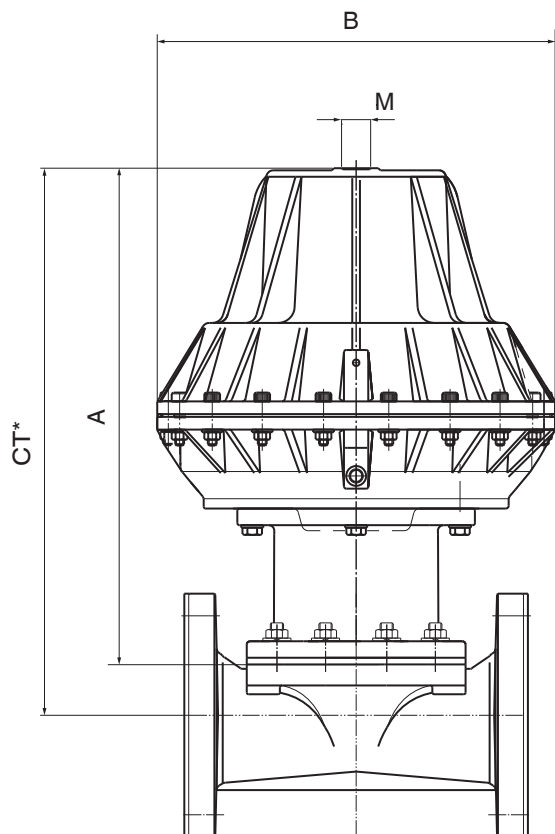
MG	DN	NPS	A		B	M
			Control function			
			1	2, 3		
65	50	2"	303.5	263.5	256.0	M22x1.5
	65	2 ½"	303.5	263.5	256.0	M22x1.5

Dimensions in mm, MG = diaphragm size

* CT = A + H1 (see body dimensions)

G1/4 connectors are available for connecting the control air.

8.1.2 Actuator size 4

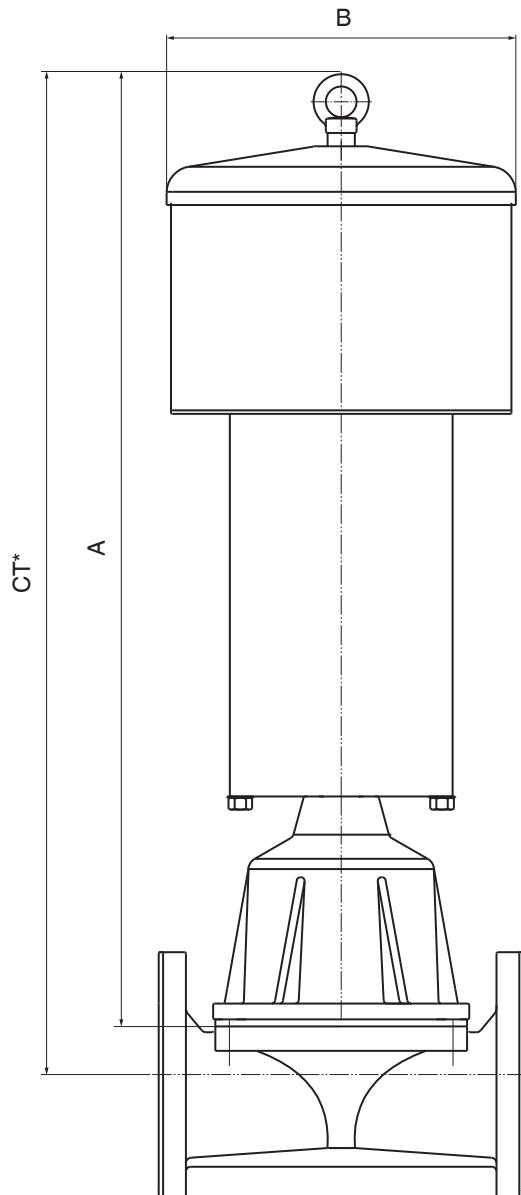


MG	DN	NPS	A		B	M	
			Control function			Control function	
			1	2, 3		1	2, 3
100	80	3"	457.5	369.5	360.0	M26x1.5	M22x1.5
	100	4"	457.5	369.5		M26x1.5	M22x1.5

Dimensions in mm, MG = diaphragm size

* CT = A + H1 (see body dimensions)

G1/4 connectors are available for connecting the control air.

8.1.3 Actuator size 5 and 6**Actuator size 5**

MG	DN	NPS	A		B
			Control function		
			1	2, 3	
150	125	5"	1093.5	737.0	388.0
	150	6"	1093.5	737.0	388.0

Actuator size 6

MG	DN	NPS	A		B
			Control function		
			1	2, 3	
200	200	8"	1278.0	907.0	440.0
250	250	10"	-	1033.0	440.0

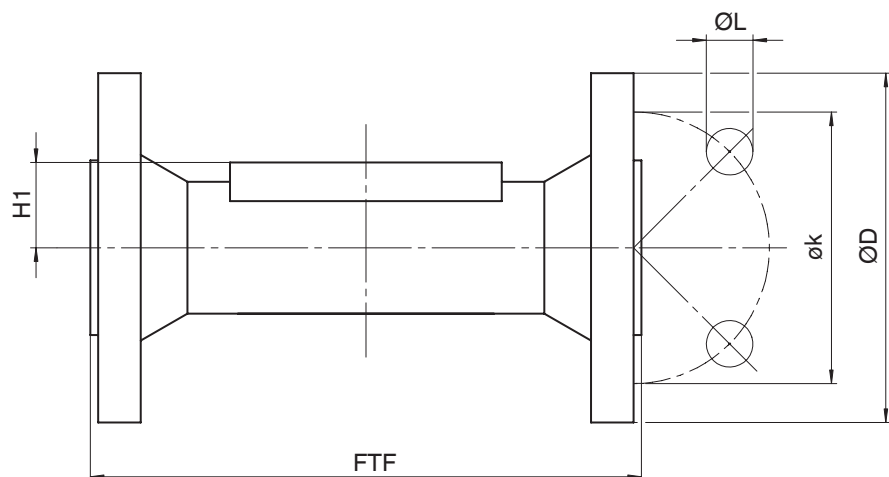
Dimensions in mm, MG = diaphragm size

* CT = A + H1 (see body dimensions)

G1/4 connectors are available for connecting the control air.

8.2 Body dimensions

8.2.1 Flange EN (code 4)



Connection type flange, length EN 558 (code 4)¹⁾, SG iron material (code 82, 83, 88)²⁾

MG	DN	NPS	øD	FTF	H1	øk	øL	n
200	200	8"	340.0	600.0	64.0	295.0	22.0	8

Dimensions in mm

MG = diaphragm size

n = number of bolts

1) Connection type

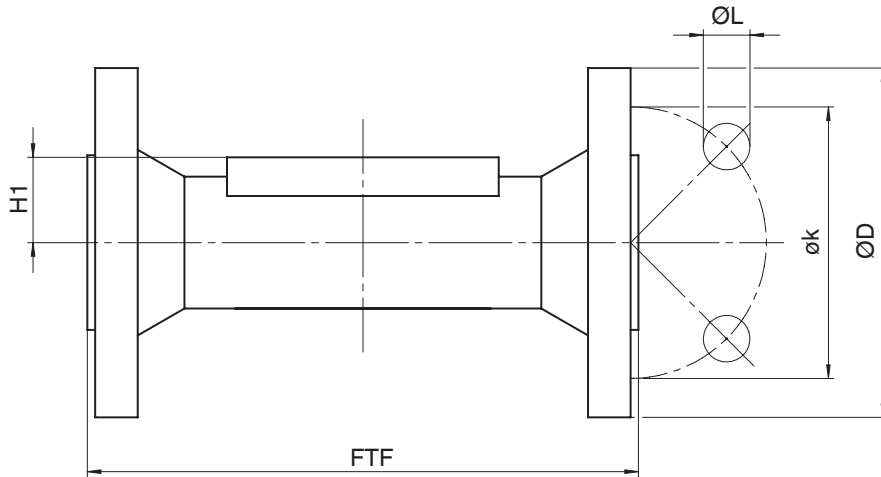
Code 4: Flange EN 1092, PN 10, form B, face-to-face dimension FTF EN 558 series 1, ISO 5752, basic series 1

2) Valve body material

Code 82: EN-GJS-400-18-LT (GGG 40.3), soft rubber lined

Code 83: EN-GJS-400-18-LT (GGG 40.3), hard rubber lined

Code 88: EN-GJS-400-18-LT (GGG 40.3), butyl lined

8.2.2 Flange EN (code 8)

Connection type flange, length EN 558 (code 8)¹⁾, SG iron material (code 82, 83, 88)²⁾

MG	DN	NPS	øD	FTF	H1	øk	øL	n
40	25	1"	115.0	160.0	24.0	85.0	14.0	4
	40	1½"	150.0	200.0	24.0	110.0	18.0	4
65	50	2"	165.0	230.0	32.0	125.0	18.0	4
	65	2½"	185.0	290.0	32.0	145.0	18.0	4
100	80	3"	200.0	310.0	40.0	160.0	18.0	8
	100	4"	220.0	350.0	40.0	180.0	18.0	8
150	125	5"	250.0	400.0	55.0	210.0	18.0	8
	150	6"	285.0	480.0	55.0	240.0	22.0	8

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

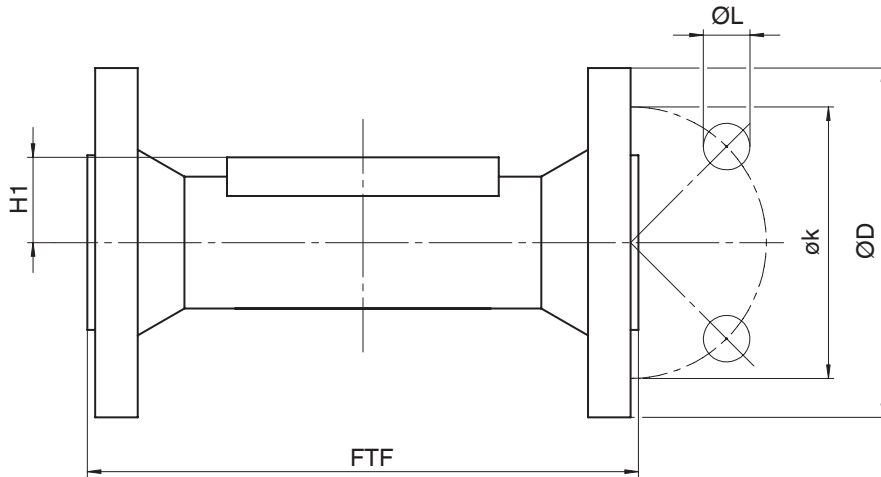
2) **Valve body material**

Code 82: EN-GJS-400-18-LT (GGG 40.3), soft rubber lined

Code 83: EN-GJS-400-18-LT (GGG 40.3), hard rubber lined

Code 88: EN-GJS-400-18-LT (GGG 40.3), butyl lined

8.2.3 Flange EN (code 52)



Connection type flange, length EN 558 (code 52)¹⁾, cast iron material (code 8), SG iron material (code 16, 92, 98)²⁾

MG	DN	NPS	$\varnothing D$	FTF		H1	$\varnothing k$	$\varnothing L$	n
				Material		Material			
				8	16, 92, 98	8, 16, 92, 98			
200	200	8"	340.0	521.0	521.0	59.0	295.0	22.0	8

Connection type flange, length EN 558 (code 52)¹⁾, cast iron material (code 8, 13, 52, 58)²⁾

MG	DN	NPS	$\varnothing D$	FTF		H1	$\varnothing k$	$\varnothing L$	n
				Material		Material			
				8	13, 52, 58	8, 13, 52, 58			
250	250	10"	400.0	635.0	647.0	78.0	350.0	22.0	12

Dimensions in mm

MG = diaphragm size

n = number of bolts

1) Connection type

Code 52: Flange EN 1092, PN 10, form A, face-to-face dimension FTF EN 558 series 7, ISO 5752, basic series 7

2) Valve body material

Code 8: EN-GJL-250 (GG 25)

Code 13: EN-GJL-250 (GG 25), hard rubber lined

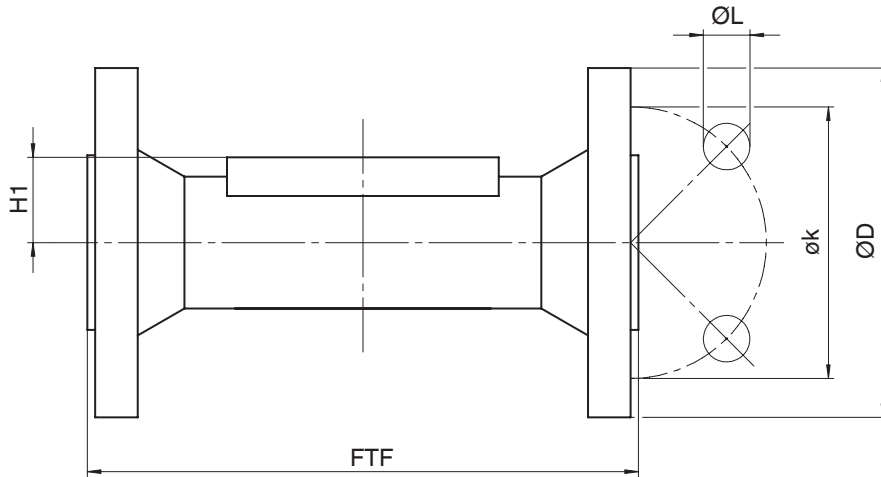
Code 16: EN-GJS-500-7 (GGG-50), hard rubber lined

Code 52: EN-GJL-250 (GG 25), soft rubber lined

Code 58: EN-GJL-250 (GG 25), butyl lined

Code 92: EN-GJS-500-7 (GGG 50), soft rubber lined

Code 98: EN-GJS-500-7 (GGG 50), butyl lined

8.2.4 Flange EN (code 53)

Connection type flange, length EN 558 (code 53)¹⁾, cast iron material (code 8), SG iron material (code 16, 92, 98)²⁾

MG	DN	NPS	øD	FTF		H1		øk	øL	n
				Material		Material				
				8	16, 92, 98	8	16, 92, 98			
40	25	1"	115.0	127.0	127.0	20.0	22.0	85.0	14.0	4
	40	1½"	150.0	159.0	159.0	18.0	24.0	110.0	18.0	4
65	50	2"	165.0	191.0	191.0	39.0	32.0	125.0	18.0	4
	65	2½"	185.0	216.0	216.0	28.0	32.0	145.0	18.0	4
100	80	3"	200.0	254.0	254.0	40.0	40.0	160.0	18.0	8
	100	4"	220.0	305.0	305.0	40.0	40.0	180.0	18.0	8
150	125	5"	250.0	356.0	366.0	50.0	55.0	210.0	18.0	8
	150	6"	285.0	406.0	406.0	52.0	55.0	240.0	22.0	8

Dimensions in mm

MG = diaphragm size

n = number of bolts

1) **Connection type**

Code 53: Flange EN 1092, PN 16, form A, face-to-face dimension FTF EN 558 series 7, ISO 5752, basic series 7

2) **Valve body material**

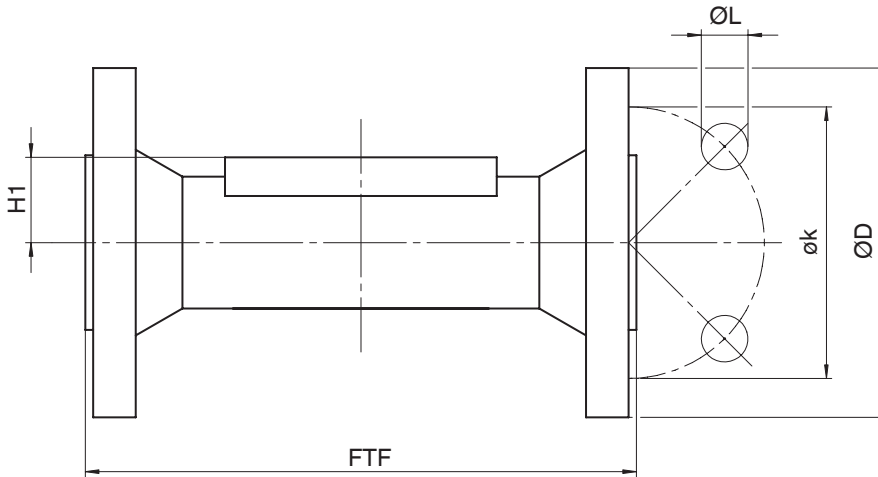
Code 8: EN-GJL-250 (GG 25)

Code 16: EN-GJS-500-7 (GGG-50), hard rubber lined

Code 92: EN-GJS-500-7 (GGG 50), soft rubber lined

Code 98: EN-GJS-500-7 (GGG 50), butyl lined

8.2.5 Flange ANSI Class (code 39)



Connection type flange, length EN 558 (code 39)¹⁾, SG iron material (code 82, 83, 88)²⁾

MG	DN	NPS	øD	FTF	H1	øk	øL	n
40	25	1"	108.0	160.0	24.0	79.4	15.9	4
	40	1½"	127.0	200.0	24.0	98.4	15.9	4
65	50	2"	152.4	230.0	32.0	120.7	19.0	4
	65	2½"	177.8	290.0	32.0	139.7	19.0	4
100	80	3"	190.5	310.0	40.0	152.4	19.0	4
	100	4"	220,0 ³⁾	350.0	40.0	190.5	19.0	8
150	125	5"	254.0	400.0	55.0	215.9	22.2	8
	150	6"	279.0	480.0	55.0	241.3	22.2	8
200	200	8"	342.9	600.0	64.0	298.5	22.2	8

Dimensions in mm

MG = diaphragm size

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

2) **Valve body material**

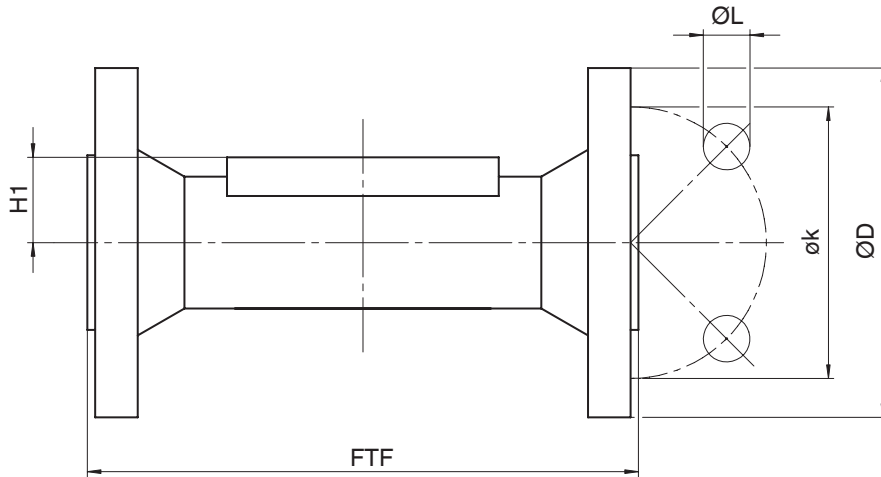
Code 82: EN-GJS-400-18-LT (GGG 40.3), soft rubber lined

Code 83: EN-GJS-400-18-LT (GGG 40.3), hard rubber lined

Code 88: EN-GJS-400-18-LT (GGG 40.3), butyl lined

3) not according to ASME standard

8.2.6 Flange ANSI Class (code 58)



Connection type flange, length EN 558 (code 58)¹⁾, cast iron material (code 8), SG iron material (code 16, 92, 98)²⁾

MG	DN	NPS	øD	FTF		H1		øk	øL	n
				Material		Material				
				8	16, 92, 98	8	16, 92, 98			
40	25	1"	108.0	127.0	127.0	20.0	24.0	79.4	15.9	4
	40	1½"	127.0	159.0	159.0	18.0	24.0	98.4	15.9	4
65	50	2"	152.4	191.0	191.0	39.0	32.0	120.7	19.0	4
	65	2½"	177.8	216.0	216.0	28.0	32.0	139.7	19.0	4
100	80	3"	190.5	254.0	254.0	40.0	40.0	152.4	19.0	4
	100	4"	228.6	305.0	305.0	40.0	40.0	190.5	19.0	8
150	125	5"	254.0	356.0	366.0	50.0	55.0	215.9	22.2	8
	150	6"	279.0	406.0	406.0	52.0	55.0	241.3	22.2	8
200	200	8"	342.9	521.0	521.0	59.0	64.0	298.5	22.2	8

Connection type flange, length EN 558 (code 58)¹⁾, cast iron material (code 8, 13, 52, 58)²⁾

MG	DN	NPS	øD	FTF		H1		øk	øL	n
				Material		Material				
				8	13, 52, 58	8	13, 52, 58			
250	250	10"	406.0	635.0	647.0	78.0	72.0	362.0	25.4	12

Dimensions in mm

MG = diaphragm size

n = number of bolts

1) Connection type

Code 58: Flange ANSI Class 125/150 FF, face-to-face dimension FTF EN 558 series 7, ISO 5752, basic series 7

2) Valve body material

Code 8: EN-GJL-250 (GG 25)

Code 13: EN-GJL-250 (GG 25), hard rubber lined

Code 16: EN-GJS-500-7 (GGG-50), hard rubber lined

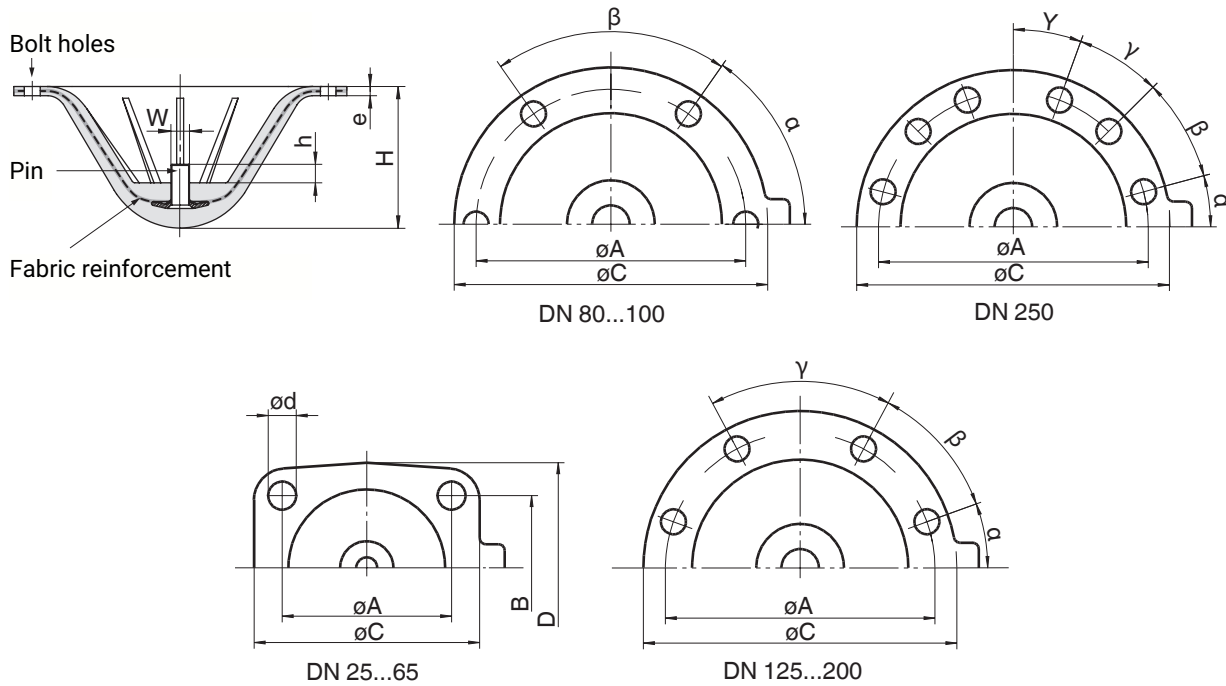
Code 52: EN-GJL-250 (GG 25), soft rubber lined

Code 58: EN-GJL-250 (GG 25), butyl lined

Code 92: EN-GJS-500-7 (GGG 50), soft rubber lined

Code 98: EN-GJS-500-7 (GGG 50), butyl lined

8.3 Diaphragm dimensions



MG	DN	NPS	A	B	C	D	ød	e	h	W	H	α	β	γ	Y	n
40	25	1"	64.0	51.0	90.0	70.0	9.0	5.0	8.0	1/4"	36.0	-	-	-	-	4
	40	1 1/2"	64.0	51.0	90.0	70.0	9.0	5.0	8.0	1/4"	36.0	-	-	-	-	4
65	50	2"	101.0	82.0	159.0	128.0	13.5	6.0	10.0	5/16"	64.0	-	-	-	-	4
	65	2 1/2"	101.0	82.0	159.0	128.0	13.5	6.0	10.0	5/16"	64.0	-	-	-	-	4
100	80	3"	175.0	-	223.0	-	13.5	6.0	12.0	5/16"	80.0	56°	34°	-	-	6
	100	4"	175.0	-	223.0	-	13.5	6.0	12.0	5/16"	80.0	56°	34°	-	-	6
150	125	5"	255.0	-	287.0	-	13.5	8.0	16.0	5/8"	115.0	20°	40°	60°	-	8
	150	6"	255.0	-	287.0	-	13.5	8.0	16.0	5/8"	115.0	20°	40°	60°	-	8
200	200	8"	305.0	-	341.0	-	18.5	8.0	20.0	5/8"	145.0	30°	40°	40°	-	8
250	250	10"	381.0	-	410.0	-	17.0	10.0	20.0	5/8"	178.0	15°	30°	25°	20°	12

Dimensions in mm

n = number of bolts

The thread of the diaphragm pin "W" corresponds to Whitworth standard.

9 Manufacturer's information

9.1 Delivery

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

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

9.2 Packaging

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

9.3 Transport

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

9.4 Storage

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

10 Installation in piping

10.1 Preparing for installation

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. 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).

⚠ 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

Leakage

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

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).

WARNING**The equipment is subject to pressure!**

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

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.

10.2 Installation position

The installation position of the product is optional.

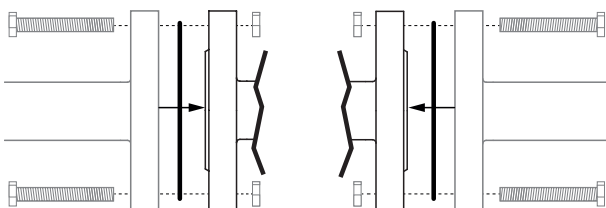
10.3 Installation with flanged connection

Fig. 1: Flanged connection

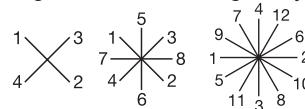
NOTICE**Sealing material**

- ▶ 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 Pneumatic connections**11.1 Control functions**

The following control functions are available:

Control function 1**Normally closed (NC):**

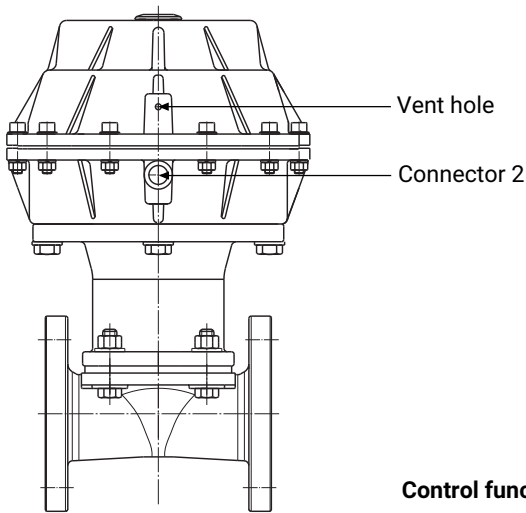
Valve resting position: closed by spring force. Activation of the actuator (connector 2) opens the valve. When the actuator is vented, the valve is closed by spring force.

Control function 2**Normally open (NO):**

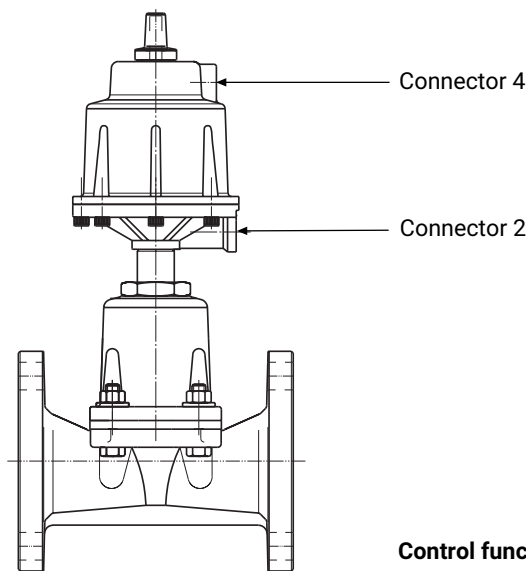
Valve resting position: opened by spring force. Activation of the actuator (connector 4) closes the valve. When the actuator is vented, the valve is opened by spring force.

Control function 3**Double acting (DA):**

Valve resting position: no defined normal position. The valve is opened and closed by activating the respective control medium connectors (connector 2: open / connector 4: close).



Control function 1



Control function 2 + 3

Control function	Control medium connector 2 (open)	Control medium connector 4 (close)
1 (NC)	+	-
2 (NO)	-	+
3 (DA)	+	+

+ = available
 - = not available


11.2 Connecting the control medium

The product has 2 control medium connectors.

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

12 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.

13 Operation

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

14 Troubleshooting

Error	Possible cause	Troubleshooting
Control medium escaping from vent hole* in the actuator cover for control function NC or control medium connector 2* for control function NO	Actuator membrane* faulty	Replace the actuator
Control medium escapes from leak detection hole*	Spindle seal leaking	Replace the actuator and check control medium for impurities
Working medium escapes from leak detection hole*	Diaphragm faulty	Check diaphragm for potential damage, replace diaphragm if necessary
Control medium escaping to the outside at the actuator membrane*	Connecting bolts between actuator cover and base loose	Retighten bolts professionally diagonally
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
	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
	Actuator spring faulty (for control function NO)	Replace the actuator
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
	Control pressure too low (for control function NO and control function DA)	Operate the product with the control pressure specified in the 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

* see chapter "Control functions (see Chapter 11.1, page 25)" and chapter "Spare parts (see Chapter 16, page 32)"

15 Inspection and maintenance

⚠ WARNING

The equipment is subject to pressure!

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

⚠ CAUTION

Use of incorrect spare parts!

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

⚠ CAUTION



Hot plant components!

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

NOTICE

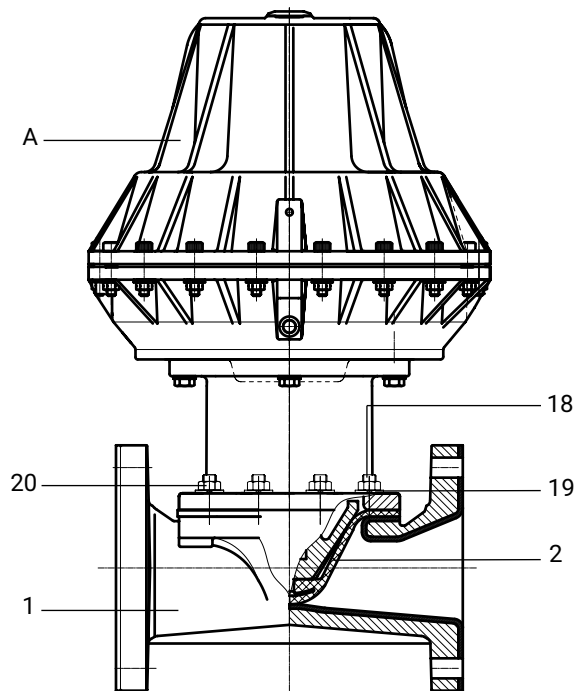
Exceptional maintenance work!

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

The operator must carry out regular visual examination of the GEMÜ products dependent on the operating conditions and the potential danger in order to prevent leakage and damage. The product also must be disassembled and checked for wear in the corresponding intervals.

1. Have servicing and maintenance work performed by trained personnel.
2. Wear appropriate protective gear as specified in plant operator's guidelines.
3. Shut off plant or plant component.
4. Secure the plant or plant component against recommissioning.
5. Depressurize the plant or plant component.
6. Actuate GEMÜ products which are always in the same position four times a year.

15.1 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).

15.2 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).

15.3 Mounting the diaphragm

15.3.1 General information

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.

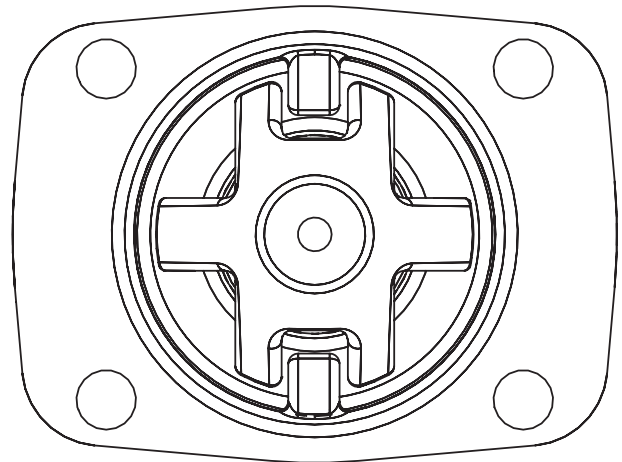
NOTICE

- ▶ 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.

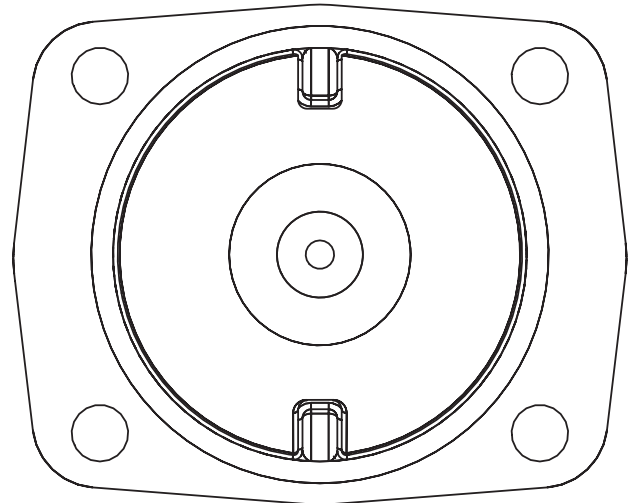
The compressor is fixed to the spindle for all nominal sizes.

DN 25 – 40:

Compressor and actuator flange seen from below:

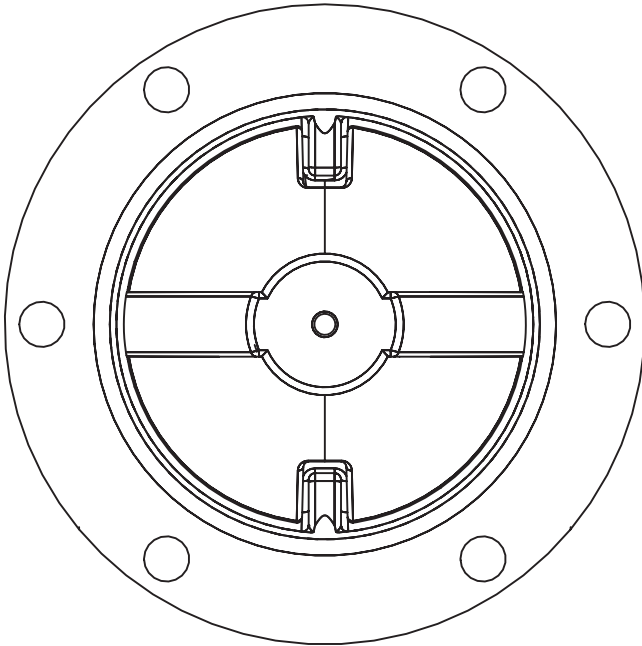
**DN 50 – 65:**

Compressor and actuator flange seen from below:



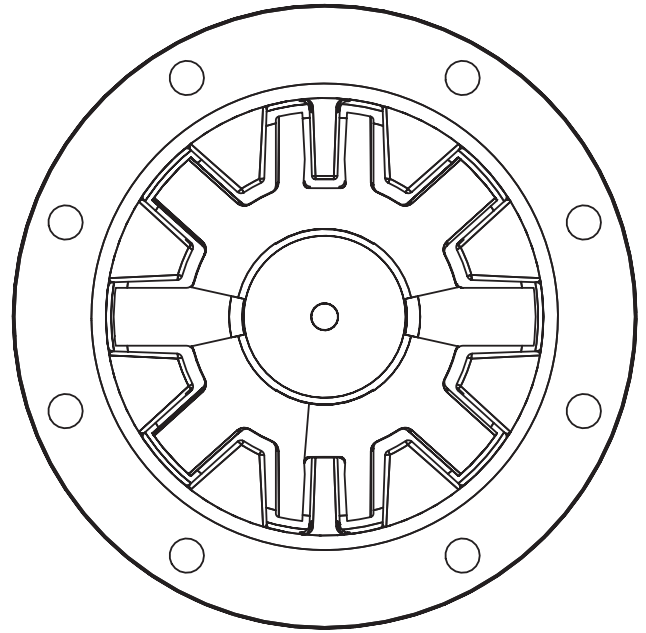
DN 80 – 100:

Compressor and actuator flange seen from below:



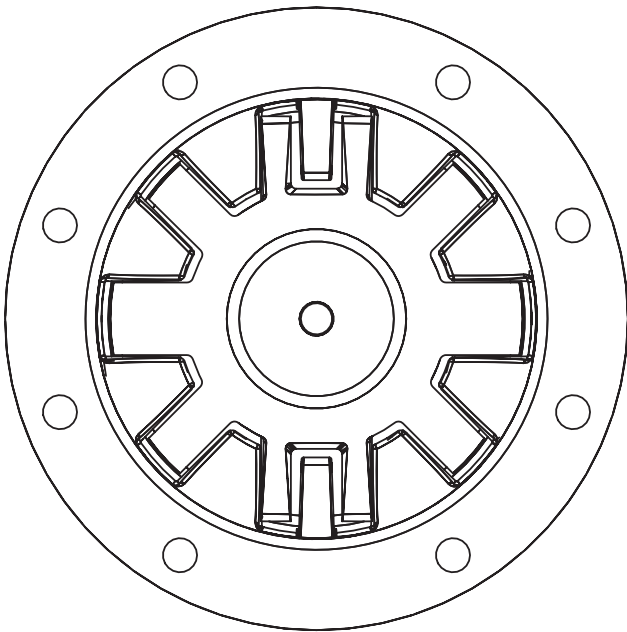
DN 200:

Compressor and actuator flange seen from below:



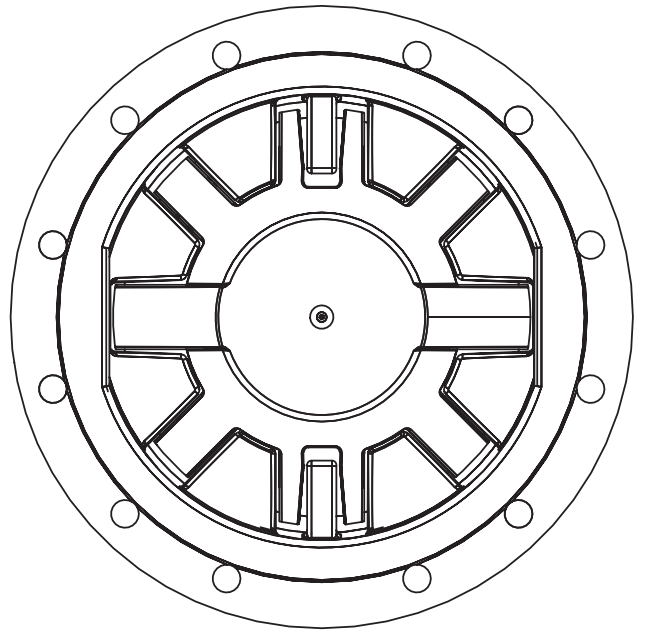
DN 125 – 150:

Compressor and actuator flange seen from below:



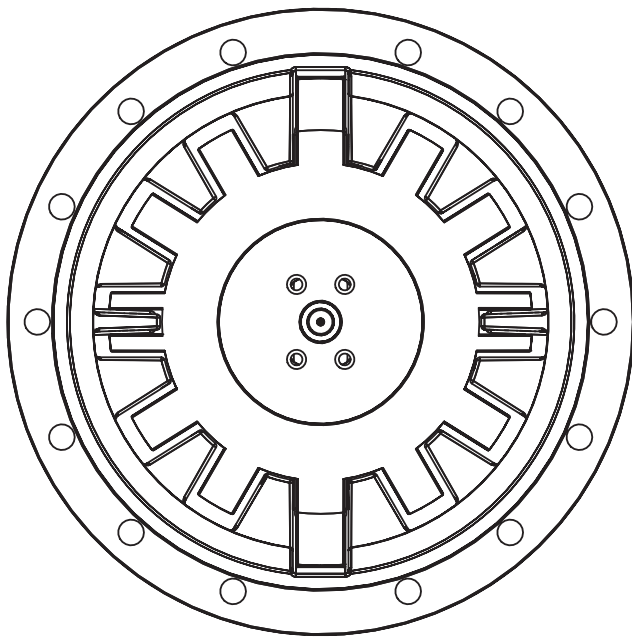
DN 250:

Compressor and actuator flange seen from below:



DN 300:

Compressor and actuator flange seen from below:



- ⇒ 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. 50%.
- 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 outer bulge.
- 8. With the valve fully assembled, check the function and tightness.

15.3.2 Mounting the full bore diaphragm

NOTICE

Important:

- ▶ Mount the correct diaphragm that suits the valve (suitable for medium, medium concentration, temperature and pressure).
1. Before mounting the new diaphragm, please remove the actuator as described in chapter "Removing the diaphragm".
 2. Close actuator **A** by approx. 75%.
 3. Screw the diaphragm pin of the new diaphragm into the compressor of the actuator manually. 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.

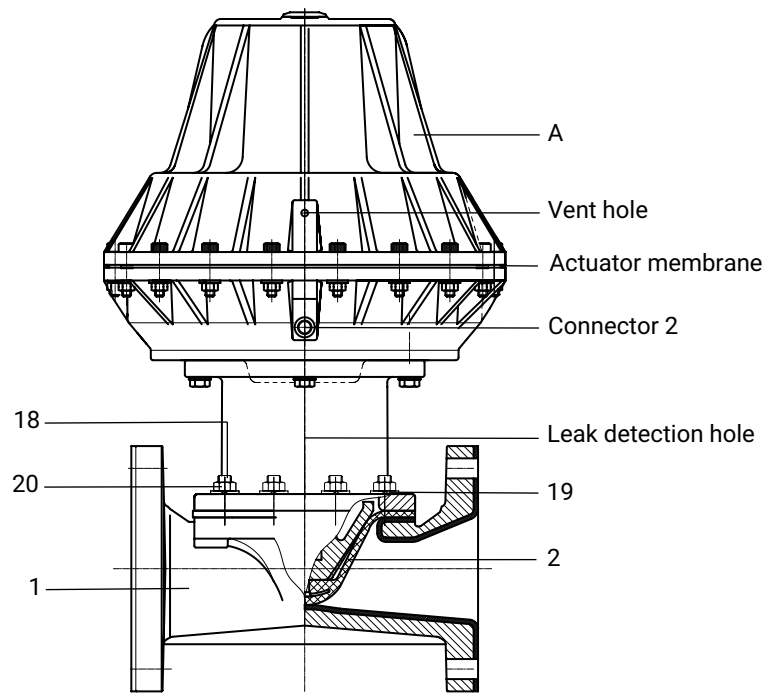
15.4 Mounting the actuator

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.

16 Spare parts



Item	Name	Order designation
1	Valve body	K655...
2	Full bore diaphragm	655...M...
18	Bolt	655...S30...
19	Washer	
20	Nut	
A	Actuator	9656...

17 Removal from piping

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

18 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.

19 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.

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

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

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

declare that the following product

Make: GEMÜ Pneumatically operated angle seat globe valve
Serial number: from 29.12.2009
Project number: MV-Pneum-2009-12
Commercial name: GEMÜ 656

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

1.1.3.; 1.1.5.; 1.1.7.; 1.2.1.; 1.3.; 1.3.2.; 1.3.3.; 1.3.4.; 1.3.7.; 1.3.9.; 1.5.3.; 1.5.5.; 1.5.6.; 1.5.7.; 1.5.8.; 1.5.9.; 1.6.5.; 2.1.1.; 3.2.1.; 3.2.2.; 3.3.2.; 3.4.4.; 3.6.3.1.; 4.1.2.1.; 4.1.2.3.; 4.1.2.4.; 4.1.2.5.; 4.1.2.6. a); 4.1.2.6. b); 4.1.2.6. c); 4.1.2.6. d); 4.1.2.6. e); 4.1.3.; 4.2.1.; 4.2.1.4.; 4.2.2.; 4.2.3.; 4.3.1.; 4.3.2.; 4.3.3.; 4.4.1.; 4.4.2.; 5.3.; 5.4.; 6.1.1.; 6.3.3.; 6.4.1.; 6.4.3.

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

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

Electronically

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

This does not affect the industrial property rights!

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

2021-04-26



Joachim Brien
Head of Technical Department

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

EU Declaration of Conformity

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

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

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

Description of the pressure equipment: GEMÜ 656
Notified body: TÜV Rheinland Industrie Service GmbH
Number: 0035
Certificate no.: 01 202 926/Q-02 0036
Conformity assessment procedure: Module H
Technical standard used: AD 2000

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

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

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

2021-04-26



Joachim Brien
Head of Technical Department



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Subject to alteration

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