Diaphragm Valve type 604/605

Product description

Diaphragm Valve type 604/605 with integrated pneumatic actuator has a broad range of application, particularly when high actuating cycles, different control functions and chemical-resistant diaphragms are required.

Function

Pneumatic diaphragm valves from GF Piping Systems are used for regulating, as well as closing, controlling and monitoring volume flows. Especially when transporting solid or aggressive media, this Valve type has decisive advantages due to its simple function, compact construction and optimized flow geometry. Only the valve body and diaphragm come into contact with the medium.

Unlike other Valve types, no pressure surges can be caused by closing the diaphragm valve.

Applications

- Chemical process industry
- Dosing applications
- Water distribution

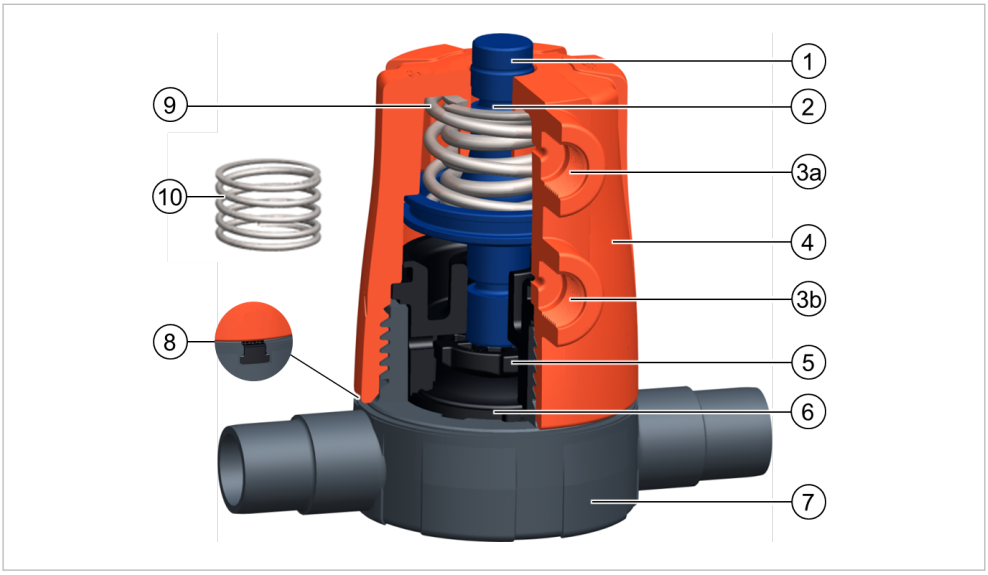
Benefits/features

- High actuating cycles
- Compact construction
- Fully plastic design without metal screws
- No corrosion caused by aggressive media
- Constant leak-tightness in the event of changes in temperature without tightening screws
- Long service life through optimized diaphragm geometry and Longlife variants
- Maintenance-free
- For easy installation and removal
- Maximum flow and linear characteristic curves for easier control

Possible flow media

The valve is suitable for use with gases, as well as solids and aggressive media.

Technical data



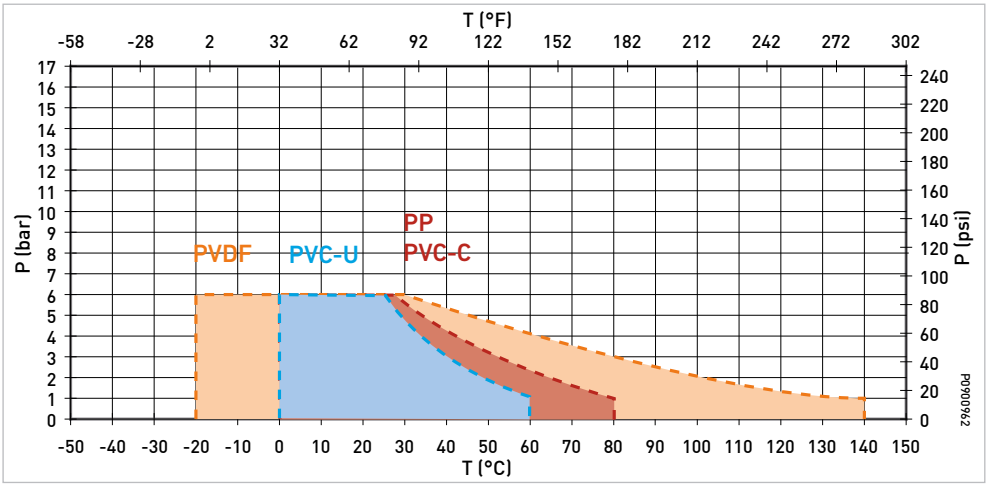
1 Optical position indicator
2 Piston
3 **a** Connection for control air FO
b Connection for control air FC
a + **b** Connection for control air DA
4 Upper part with plastic thread
5 Pressure piece
6 Diaphragm
7 Valve body
8 Indicator for diaphragm material
9 Spring for control function FC
10 Spring for control function FO

Specification		
Dimensions	d20/DN15	
Materials	Valve body	PVC-U, PVC-C, PP-H, PVDF, others upon request
	Diaphragms	EPDM, FKM, PTFE/EPDM, PTFE/FKM
	Spring	Spring steel EN 10270-1 SH (C) Deltatone
Gasket materials	NBR	
Connections	Screw connection with solvent cement sockets, threaded sockets, fusion sockets, butt fusion spigots	
	Solvent cement spigots, butt fusion spigots	
Pressure level	PN6	
Product standard	EN ISO 16138	
Test standard	ISO 9393-2, EN 12266-1 (leackage rate A)	
Approvals	ACS, FDA, DIBt	

Kv 100 values

DN (mm)	Inch (inch)	d (mm)	Kv 100 (L/min)	Kv 100 (m^3/h)	Kv 100 (US gpm)
15	½	20	125	7.5	0.55

Pressure-temperature diagrams



T Temperature (°C, °F)
P Permissible pressure (bar, psi)

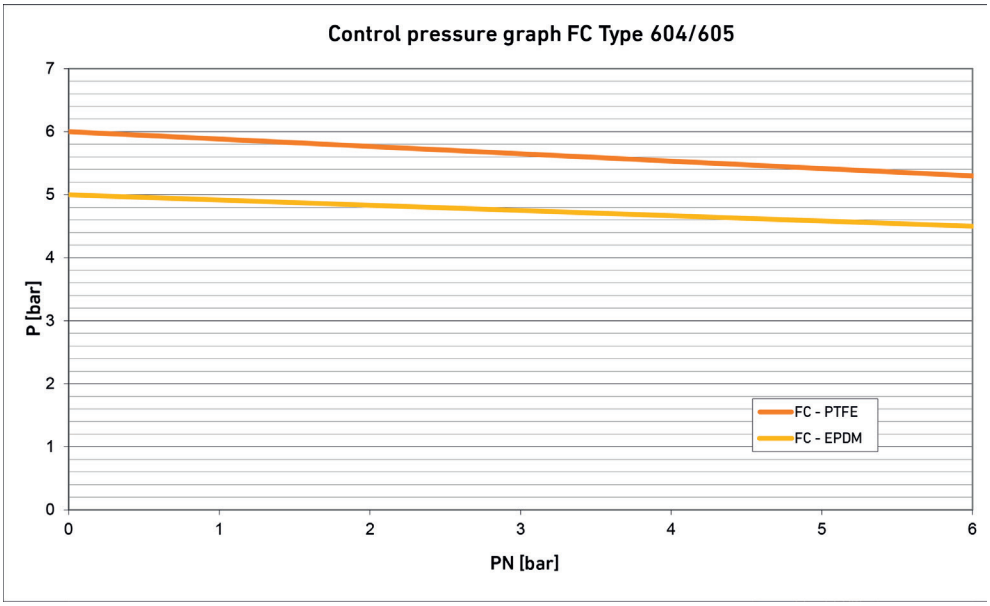
Pressure ratings

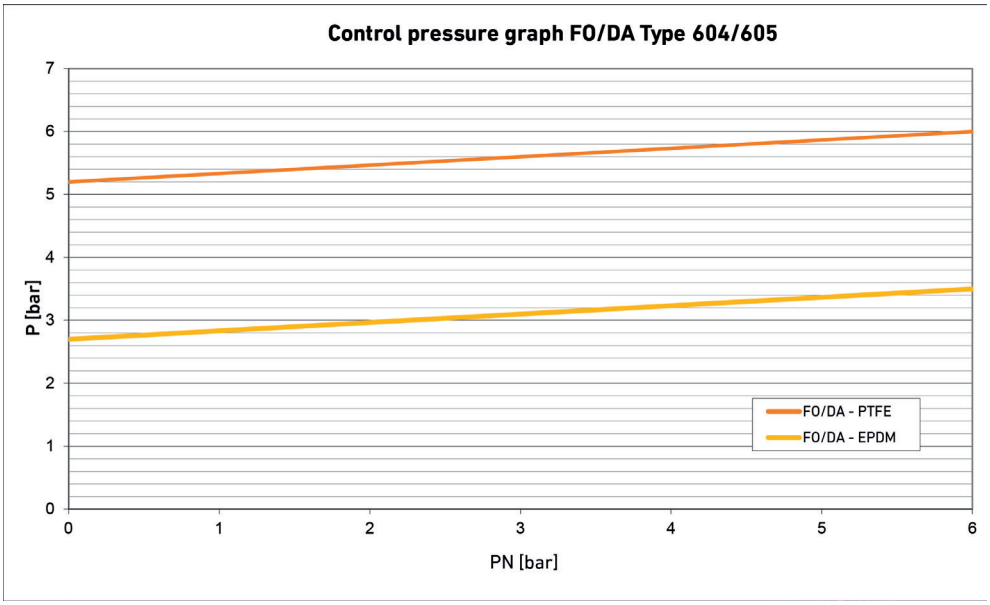
	Pressure rating [bar]	Max. control pressure [bar]			
		FC	FC	FO/DA	FO/DA
DN		EPDM[1)]	PTFE[1)]	EPDM[2)]	PTFE[2)]
20DN15	6	5.0	6.0	3.5	6.0
Medium pressure →	One sided applied				

[1)] At 0 bar medium pressure

[2)] At 6 bar medium pressure

Control pressure diagrams





Technical basics

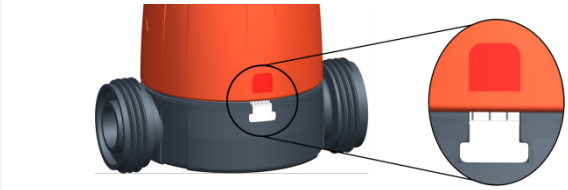
The actuators are available with the functions fail safe to close (FC), fail safe to open (FO) and double-acting (DA). Actuators in the FC design have pre-tensioned spring assemblies made of galvanized steel for safer operation and safer maintenance of the actuator.

i All diaphragm valves are manufactured in accordance with EN ISO 16138. The upper housing made of PPGF (fiberglass-reinforced polypropylene) is screwed together with the lower housing using a central plastic nut, which avoids exposed metal screws.

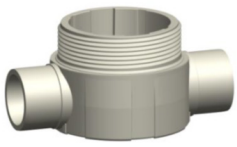
Indicator for diaphragm material

The color of the index plate on the valve body shows the type of diaphragm material:

Diaphragm	Index plate color
EPDM	Black
FKM	Red
PTFE/EPDM	White
PTFE/FKM	Green



Indicator for Valve type

Type 604	Type 605
	
Connection: Union	Connection: Spigot

Differentiation in functionalities – FC, FO, DA

Function	Name
FC	Fail safe to close
FO	Fail safe to open
DA	Fail safe double-acting

FC mode	FO mode	DA mode
In the non-operative state, the valve is closed by means of spring resistance. When the actuator is pressurized with the control medium (bottom connection), the valve opens. When the control medium escapes, the valve is closed via spring resistance.	In the non-operative state, the valve is opened by means of spring resistance. When the actuator is pressurized with the control medium (top connection), the valve closes. When the control medium escapes, the valve is opened via spring resistance.	The valve has no defined basic position. The valve is opened and closed by applying control pressure to the corresponding connection (top connection for closing, bottom connection for opening).

Control medium

FC mode	FO mode	DA mode
	Max. 6 bar	Max. 5 bar
ISO 8573-1 pressurized air classes 2 or 3 at 10 °C, ISO 8573-1 pressurized air classes 3 or 4 at T > 0 °C		
Temperature of control medium: max. 40 °C		
Depending on the operating pressure, lowercontrol pressures can be selected		

Valve handling

Installation notes

Valve failure due to the wrong choice of material

The valve body, gaskets, diaphragms, diaphragm support, housing and mechanical components can be damaged or impaired in their function due to lack of chemical resistance, external influences, wear of the diaphragm or diffusion effects. Please consult the "List of chemical resistance".

Use of lubricants

Use of lubricants on the threaded connection between the housing nut and valve body causes stress fractures. Do not use lubricants on the threaded connection between the housing nut and valve body.

Heat expansion due to changes in temperature

Due to temperature changes, longitudinal or bending forces may occur in the pipes through thermal expansion.

The following points should be noted here:

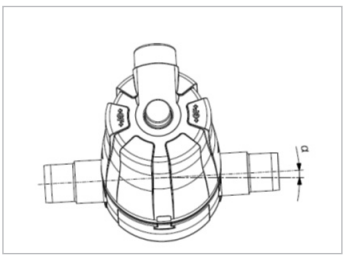
- Mount the diaphragm valve as a fixed point or
- Mount the pipe bracket directly in front of and after the diaphragm valve
- Mount the diaphragm valve and pipe such that they are flush

⚠ The plastic thread must not be tightened to more than 2 Nm at the control air connection. No tapered threads may be used.

Installation angle for optimal draining of the valve

To achieve optimal draining, GF Piping Systems recommends installing the individual dimensions in accordance with the corresponding angle (a and b). An installation inclination of about 1 - 2° is not taken into consideration with the stated angles.

Dimension	Angle a
d20/DN15	2



Integrated fastening and PP mounting blocks

ENSAT® bushings on the underside of the valve allow simple and stable attachment of the diaphragm valve. With this, the forces that can occur when operating the valve (e.g. breakaway torque) are absorbed and therefore not transferred to the piping system.

Diaphragms

Diaphragms in this Valve type are heavily stressed components. In addition to the mechanical stress caused by wear and tear over several actuating cycles, the diaphragms are also subject to wear and tear due to the flow medium. We strongly recommend that you inspect and, if necessary, replace the diaphragms after 50,000 cycles. In the case of abrasive media, the inspection of the diaphragms should take place regularly at short intervals.

Maintenance notes

The valve is nearly maintenance-free with the optimized Longlife diaphragms in FKM or EPDM. In particular when using abrasive and aggressive media, we recommend inspecting the diaphragms after approx. 50,000 cycles.

If necessary, the diaphragms should be exchanged in order to ensure optimal function of the valve. If diaphragms are used under special conditions (e.g., higher temperatures, media with abrasive effect, chemicals), more frequent checks are recommended.

⚠ Installation and maintenance must be performed in accordance with the corresponding installation manual. The installation manual is provided with the product, see also the online product catalog at www.gfps.com

Tips for installation

- The direction of flow and the mounting position may be chosen freely.
- In types with FC or FO mode, the free control air connection contains the bleed bore. Keep this open and protect it from contamination.

Closing times

The most important factors that determine the closing time are:

- Volume of control medium
- Spring resistance

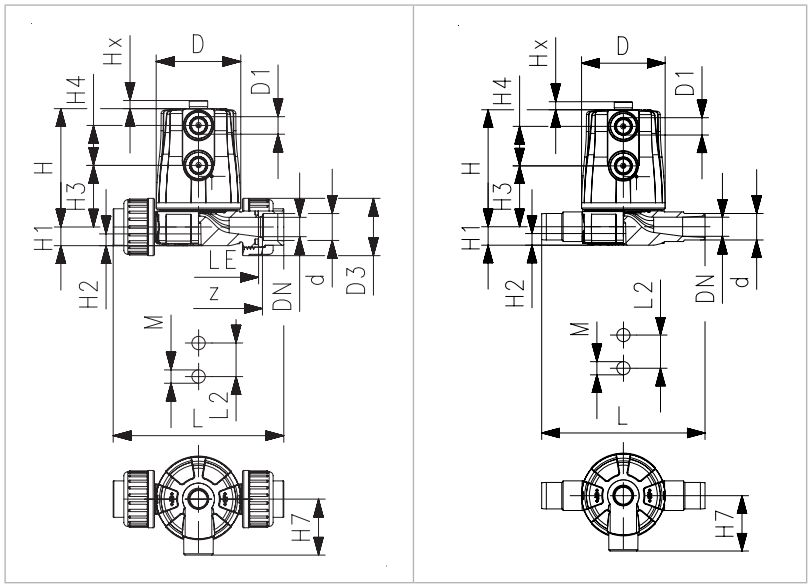
The following options are available for optimizing the closing times:

- Remove upper O-ring on the piston
- Increase the bleed bore from 2 mm to 4 mm

	Volume of compressed air (dm^3)	Closing speed at max. 6 bar (ms)	Lag (ml)
Type 604/605 Standard	0.02	114	238
Larger ventilation bore	0.02	66	138
Without upper O-ring	0.02	77	160

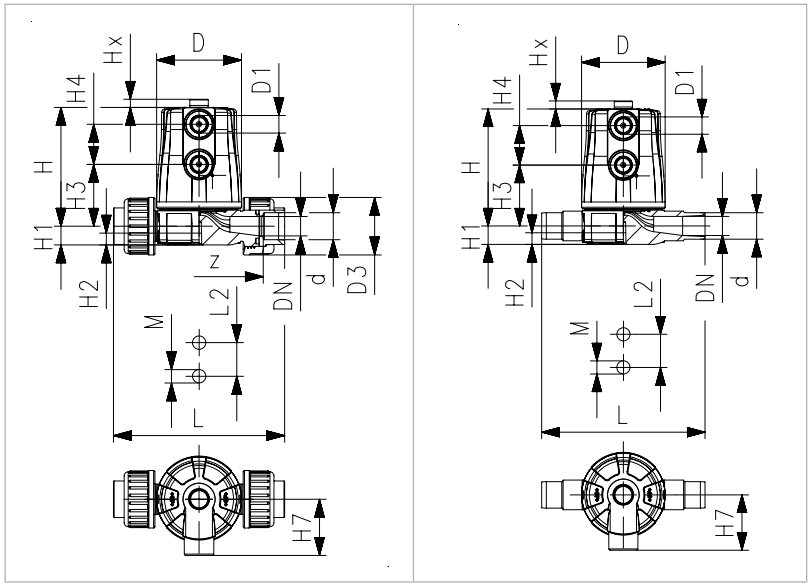
Dimensions

PVC-U



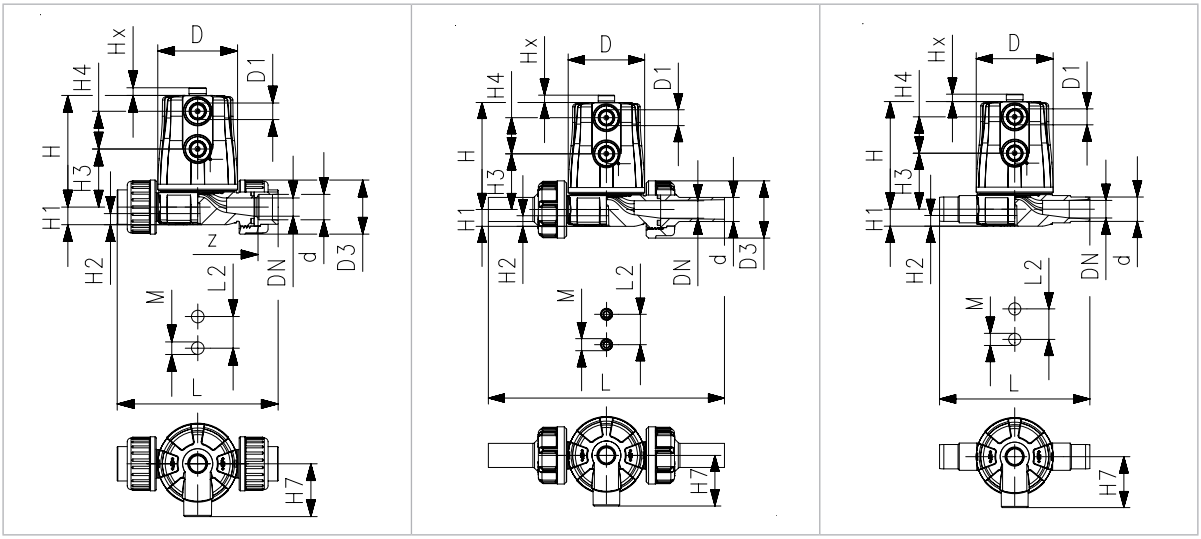
Jointing	d (mm)	DN (mm)	Size (inch)	D (mm)	D1_G (mm)	D3 (mm)	H (mm)	H1 (mm)	H2 (mm)	H3 (mm)	H4 (mm)	H7 (mm)	L (mm)	L2 (mm)	M (mm)	Z (mm)	Lift (Hx)
ASTM Socket	20	15	½	65	¼	43	89	14	12	46	30	42	140.6	25	M6	96	6
Metric Socket	20	15	½	65	¼	43	89	14	12	46	30	42	128	25	M6	96	6
Rp Socket	20	15	½	65	¼	43	89	14	12	46	30	42	128	25	M6	102	6
Metric Spigot	20	15	½	65	¼		89	14	12	46	30	42	124	25	M6		6

PVC-C



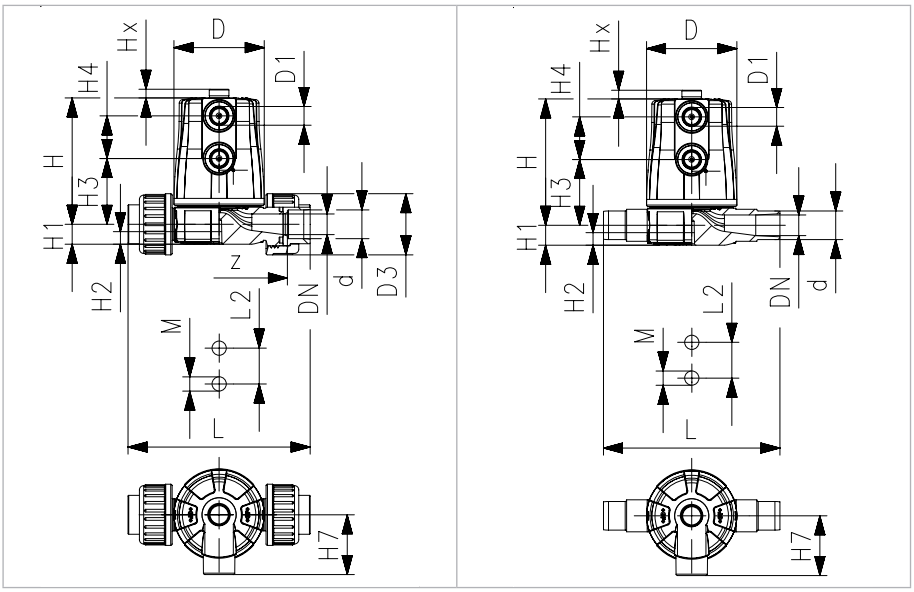
Jointing	d (mm)	DN (mm)	Size (inch)	D (mm)	D1_G (mm)	D3 (mm)	H (mm)	H1 (mm)	H2 (mm)	H3 (mm)	H4 (mm)	H7 (mm)	L (mm)	L2 (mm)	M (mm)	Z (mm)	Lift (Hx)
Metric Socket	20	15	½	65	¼	43	89	14	12	46	30	42	131	25	M6	99	6
Metric Spigot	20	15	½	65	¼		89	14	12	46	30	42	124	25	M6		6

PP-H



Jointing	d (mm)	DN (mm)	Size (inch)	D (mm)	D1_G (mm)	D3 (mm)	H (mm)	H1 (mm)	H2 (mm)	H3 (mm)	H4 (mm)	H7 (mm)	L (mm)	L2 (mm)	M (mm)	Z (mm)	Lift (Hx)
Metric Socket	20	15	½	65	¼	48	89	14	12	46	30	42	128	25	M6	96	6
Metric Unions Spigot	20	15	½	65	¼	48	89	14	12	46	30	42	196	25	M6	100	6
Metric Spigot	20	15	½	65	¼		89	14	12	46	30	42	124	25	M6	100	6

PVDF



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Metric Socket	20	15	½	65	¼	43	89	14	12	46	30	42	128	25	M6	96	6
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