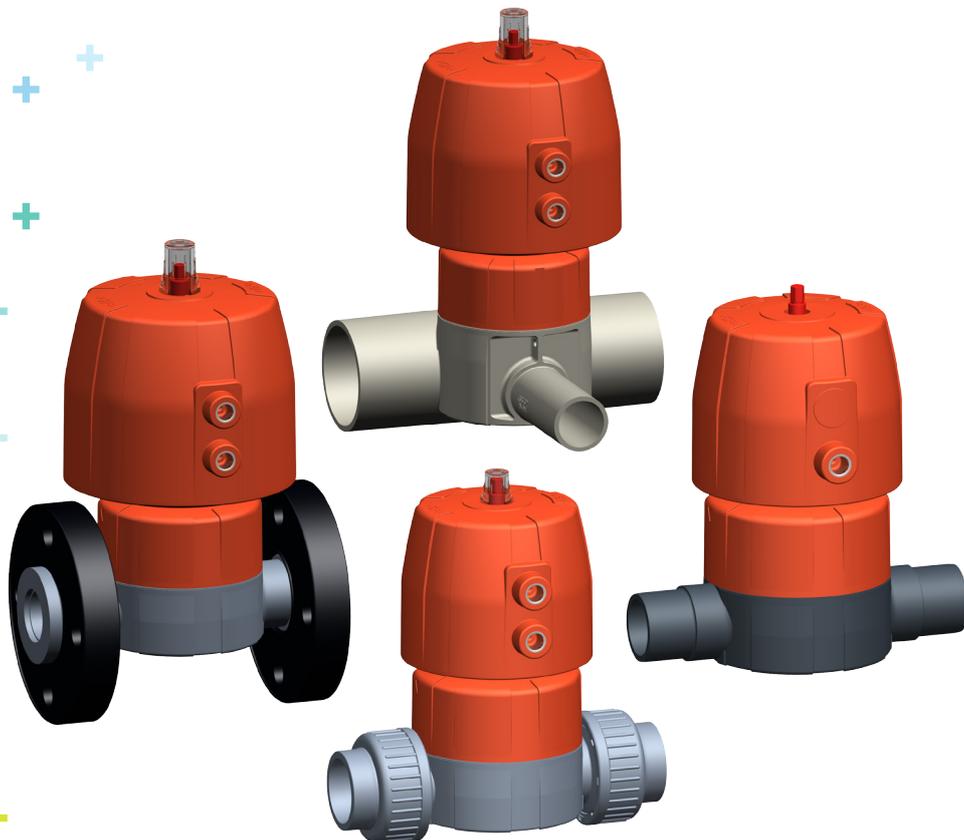


# Instruction Manual

## Pneumatic Diaphragm Valve DIASTAR



# Content

|                                 |    |
|---------------------------------|----|
| Content                         | 31 |
| Original instruction manual     | 33 |
| 1 Regarding this document       | 33 |
| 1.1 Warning notices             | 33 |
| 1.2 Further symbols and labels  | 34 |
| 1.3 Related documents           | 34 |
| 1.4 Product types               | 34 |
| 1.5 Abbreviations               | 34 |
| 2 Safety and responsibility     | 35 |
| 2.1 Intended use                | 35 |
| 2.2 Safety information          | 35 |
| 3 Transport and storage         | 35 |
| 4 Design and function           | 36 |
| 4.1 Design                      | 36 |
| 4.2 Function                    | 37 |
| 4.3 Identification              | 38 |
| 4.3.1 Diaphragm valves          | 38 |
| 4.3.2 Identification valve body | 39 |
| 4.3.3 Diaphragm material        | 39 |
| 5 Technical Data                | 40 |
| 5.1 Air connection              | 40 |
| 5.2 Control medium              | 41 |
| 5.3 Control volume              | 41 |
| 5.4 Pressure ranges             | 42 |
| 5.5 Control pressure diagrams   | 43 |

---

|       |   |    |
|-------|---|----|
| 6     | Installation  | 46 |
| 6.1   | Preparation   | 46 |
| 6.2   | Install diaphragm valve DIASTAR                     | 47 |
| 6.3   | Change flexible air connection                      | 48 |
| 6.4   | Connect control medium                              | 51 |
| 6.4.1 | FC-mode / Faile-safe-to-close                       | 51 |
| 6.4.2 | FO-mode / Fail-safe-to-open                         | 51 |
| 6.4.3 | DA-mode / Double acting                             | 52 |
| 7     | Commissioning                                       | 52 |
| 7.1   | Pressure testing                                    | 52 |
| 8     | Maintenance   | 53 |
| 8.1   | Maintenance schedule                                | 53 |
| 8.2   | Replacing diaphragm                                 | 54 |
| 9     | Troubleshooting list                                | 57 |
| 10    | List of spare parts                                 | 59 |
| 11    | Disposal  | 59 |
| 12    | Original EC-Declaration of conformity for machinery | 60 |

# Original instruction manual

## Observe instruction manual

The instruction manual is part of the product and an important element within the safety concept.

- ▶ Read and observe instruction manual.
- ▶ Always have instruction manual available at the product.
- ▶ Pass on instruction manual to all subsequent users of the product.

## 1 Regarding this document

### 1.1 Warning notices

This instruction manual contains warning notices that shall prevent you from death, injuries or material damages. Always read and observe these warning notices!

| Warning symbol   | Meaning  |
|--|--|
| <br>DANGER  | Imminent danger!<br>Failure to observe these warnings could result in death or very serious injuries.<br>▶ Measurements to avoid the danger. |
| <br>WARNING | Possible imminent danger!<br>Failure to observe these warnings could result in very serious injuries.<br>▶ Measurements to avoid the danger. |
| <br>CAUTION | Dangerous situation!<br>Failure to observe these warnings could result in small injuries.<br>▶ Measurements to avoid the danger.             |
| CAUTION  | Dangerous situation!<br>Failure to observe these warnings could result in material damages.<br>▶ Measurements to avoid the danger.           |

## 1.2 Further symbols and labels

| Symbol  | Meaning   |
|---|---|
|  | Notes: Especially important information for comprehension included. |
|  | Call for action: Here, you have to do something.                    |
| 1.  | Call for action in a certain order: Here, you have to do something. |

## 1.3 Related documents

- Georg Fischer planning fundamentals industry

These documents can be obtained from the GF Piping Systems representation or under [www.piping.georgfischer.com](http://www.piping.georgfischer.com).

## 1.4 Product types

| Type             | Nominal pressure (bar) |
|------------------|------------------------|
| DIASTAR Six      | 6                      |
| DIASTAR Ten      | 10                     |
| DIASTAR Ten Plus | 10                     |
| DIASTAR Sixteen  | 16                     |

## 1.5 Abbreviations

|    |                             |
|----|-----------------------------|
| FC | FC-mode/ Fail-safe-to-close |
| F0 | F0-mode/ Fail-safe-to-open  |
| DA | DA-mode/ Double acting      |

## 2 Safety and responsibility

### 2.1 Intended use

The diaphragm valves with DIASTAR actuator are intended exclusively for shutting off and conveying media in the allowable pressure and temperature range or for controlling flow in piping systems into which they have been installed. The valve is intended to be used within the chemical resistance of the valve and all components involved.

### 2.2 Safety information

In order to provide safety in the plant, the operator is responsible for the following measures:

- ▶ Products may only be used for its intended use, see intended use.
- ▶ Never use a damaged or defective product. Immediately sort out damaged product.
- ▶ Make sure that the piping system has been installed professionally and serviced regularly.
- ▶ Products and equipment shall only be installed by persons who have the required training, knowledge or experience.
- ▶ Regularly train personnel in all relevant questions regarding locally applicable regulations regarding safety at work, environmental protection especially for pressurised pipes.

The personnel is responsible for the following measures:

- ▶ Know, understand and observe the instruction manual and the advices therein.

## 3 Transport and storage

- ▶ Transport and/or store product in unopened original packaging.
- ▶ Protect product from dust, dirt, dampness as well as thermal and UV radiation.
- ▶ Make sure that the product has not been damaged neither by mechanical nor thermal influences.
- ▶ Check product for transport damages prior to the installation.

## 4 Design and function

### 4.1 Design

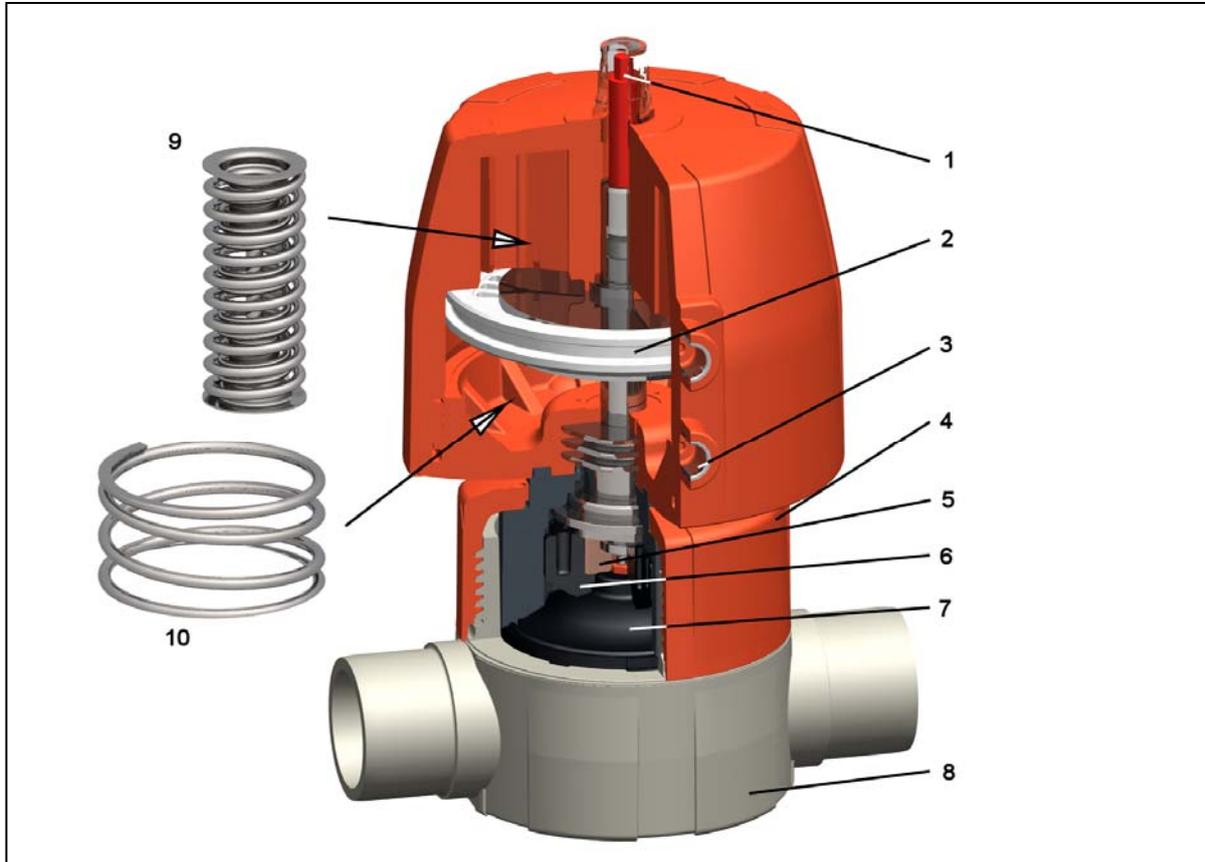


Fig. 1

|   |                            |    |                                    |
|---|----------------------------|----|------------------------------------|
| 1 | Optical position indicator | 6  | Compressor                         |
| 2 | Piston                     | 7  | Diaphragm                          |
| 3 | Air connections            | 8  | Valve body                         |
| 4 | All-plastic housing        | 9  | Pre-loaded spring sets for FC-mode |
| 5 | Diaphragm holder           | 10 | Spring for FO-mode                 |

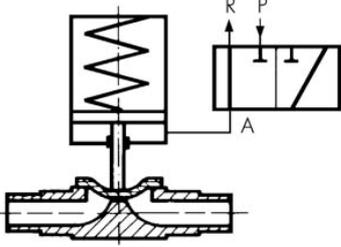
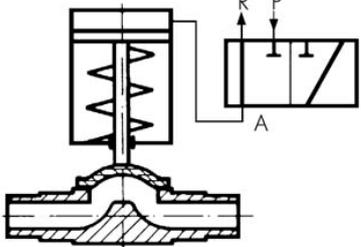
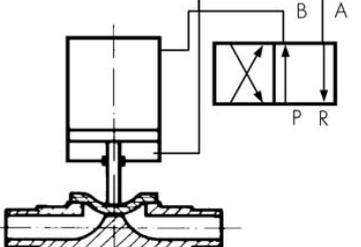


*DA-mode without springs (Pos. 9 or 10).*

## 4.2 Function

| FC-mode  | FO-mode  | DA-mode   |
|--|--|---|
| In the non-operative state, the valve is closed with spring force. When the actuator is pressurised with the control medium (bottom connection), the valve opens. When the control medium escapes, the valve is closed via spring force. | In the non-operative state, the valve is open with spring force. 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 force. | 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). |

### Solenoid pilot valve and matching connection thread

|  |  |  |
|--|--|--|
|  <p>FC mode of operation with a 3/2-way solenoid valve for bottom connection</p> |  <p>FO mode of operation with a 3/2-way solenoid valve for top connection</p> |  <p>The DA-mode of operation with a 4/2- or 5/2-way solenoid valve. Both connections are used.</p> |
|--|--|--|

*Information regarding connection, see chapter 6.4 Connecting control medium as well as the subchapters*



*6.4.1 Diaphragm valve with FC function*

*6.4.2 Diaphragm valve with FO function*

*6.4.2 Diaphragm valve with DA function*

### 4.3 Identification

#### 4.3.1 Diaphragm valves

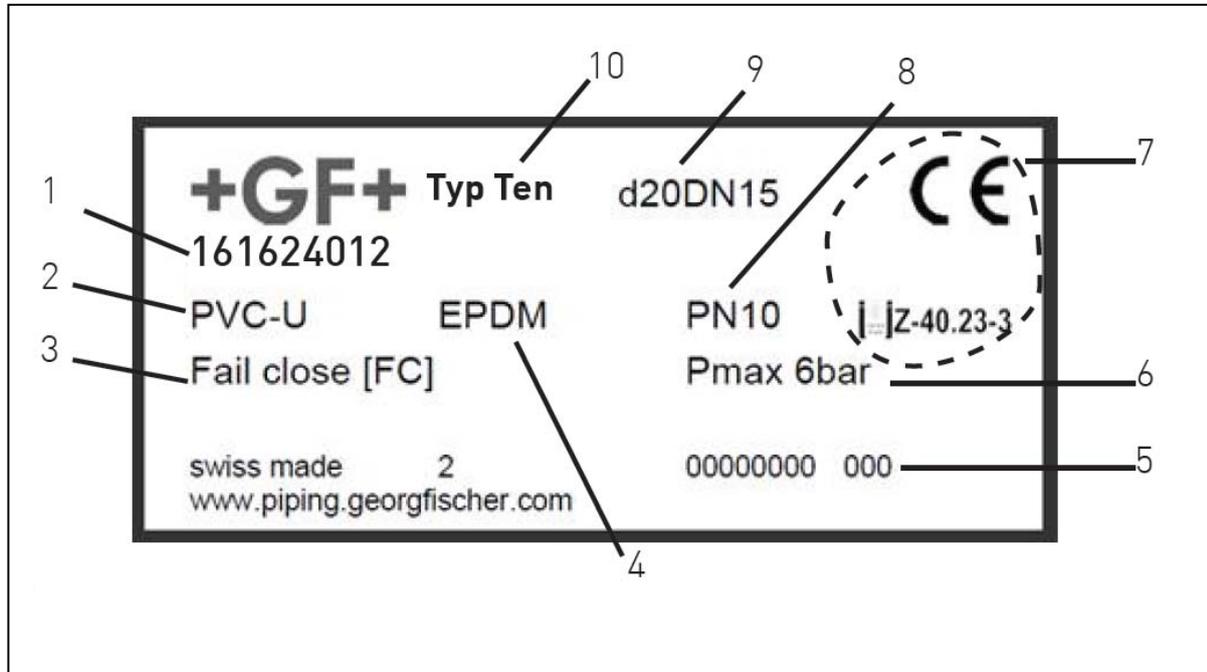
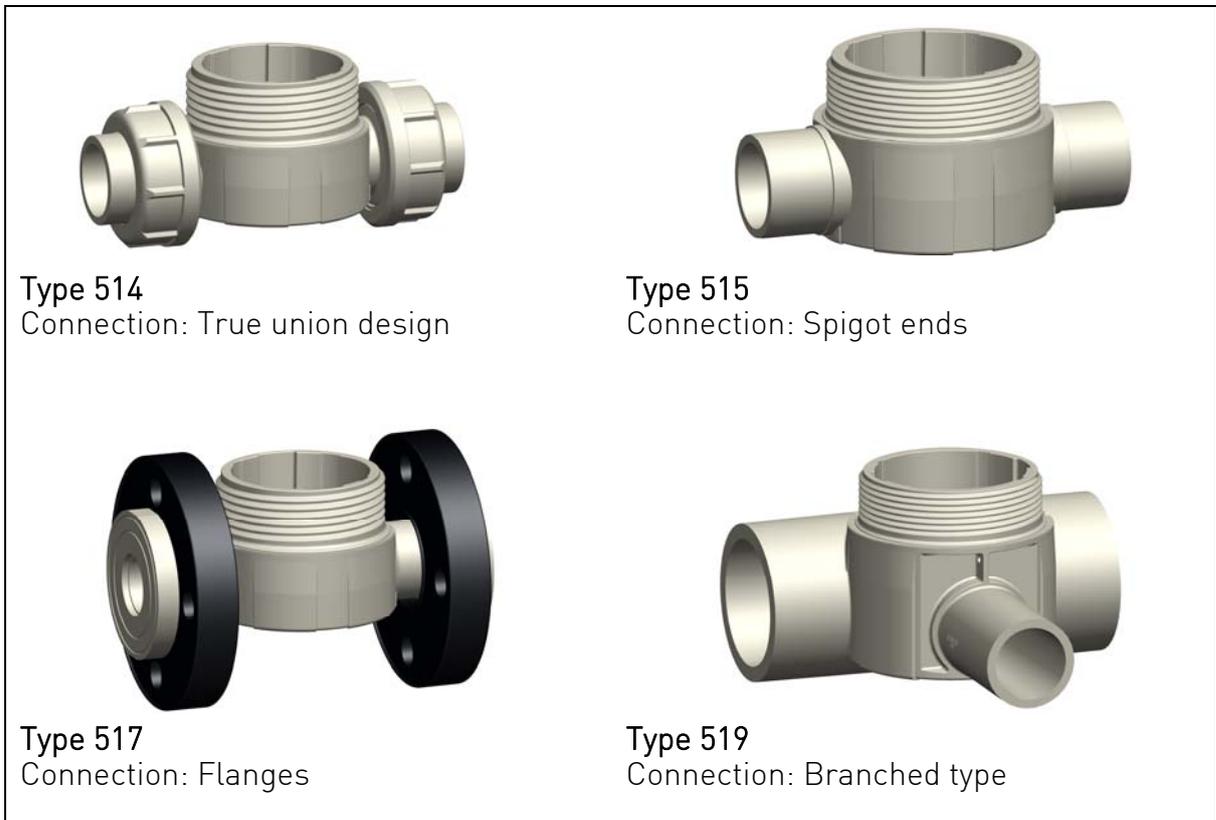


Fig. 2

|   |                     |    |                            |
|---|---------------------|----|----------------------------|
| 1 | Code                | 6  | Max. Pressure              |
| 2 | Valve body material | 7  | CE-marking and submissions |
| 3 | Mode                | 8  | Pressure Nominal           |
| 4 | Diaphragm material  | 9  | Dimension                  |
| 5 | Serial number       | 10 | Type of DIASTAR            |

### 4.3.2 Identification valve body

Each type of valve body describes a connection type:



**Type 514**  
Connection: True union design

**Type 515**  
Connection: Spigot ends

**Type 517**  
Connection: Flanges

**Type 519**  
Connection: Branched type

### 4.3.3 Diaphragm material

|   |                  |                             |
|---|------------------|-----------------------------|
| <p>The diagram shows a cross-section of a valve body with a diaphragm. A circular inset provides a magnified view of the diaphragm's friction lock, which is color-coded. The lock is shown in a recessed area of the valve body.</p> | <b>Diaphragm</b> | <b>Colour friction lock</b> |
|   | EPDM             | black                       |
|   | PTFE/EPDM        | white                       |
|   | PTFE/FPM         | green                       |
|   | FPM              | red                         |
|   | NBR              | blue                        |

## 5 Technical Data

### 5.1 Air connection

|        | DIASTAR Six (FC) | DIASTAR Ten (FC/F0/ DA) | DIASTAR Ten Plus (FC) | DIASTAR Sixteen (FC) |
|--------|------------------|-------------------------|-----------------------|----------------------|
| 20DN15 | G 1/8"           | G 1/8"                  | G 1/8"                | G 1/8"               |
| 25DN20 | G 1/8"           | G 1/8"                  | G 1/8"                | G 1/8"               |
| 32DN25 | G 1/8"           | G 1/8"                  | G 1/8"                | G 1/8"               |
| 40DN32 | G 1/8"           | G 1/8"                  | G 1/4"                | G 1/4"               |
| 50DN40 | G 1/8"           | G 1/4"                  | G 1/4"                | G 1/4"               |
| 63DN50 | G 1/8"           | G 1/4"                  | G 1/4"                | G 1/4"               |

#### Relation between line pressure and spring sets

The closing force of the actuators were designed for the specified PN rating. Operation with low line pressure and very strong actuators can cause increase diaphragm wear. For example, only use DIASTAR Sixteen (FC) if media pressure > PN 6. In order to extend the diaphragm life span with low line pressure, the number of spring packages can be reduced.



#### DANGER

##### Personal and/or material damage by reducing spring sets!

Reduced spring sets lead to a reduced closing force. At a rising line pressure the valve cannot close or not close properly due to missing spring sets. Death or serious injury could occur due to open piping. The process can be influenced negatively.

- ▶ Configure diaphragm valve and actuator according to your line pressure.

## 5.2 Control medium

| FC-mode  | FO-mode  | DA-mode  |
|--|--|--|
| 6 bar max. for the FC-mode; lower control pressure possible due to reduced spring sets                                     | 5 bar max. for the FO-mode. For DN50 and from a line pressure of 10 bar the control pressure is 6 bar max                  | 5 bar max. for the DA-mode. For DN50 and from a line pressure of 10 bar the control pressure is 6 bar max.                 |
| Compressed air class (ISO 8573-1) 2 or 3 for $-10\text{ }^{\circ}\text{C}$ and 3 or 4 for $T > 0\text{ }^{\circ}\text{C}$  | Compressed air class (ISO 8573-1) 2 or 3 for $-10\text{ }^{\circ}\text{C}$ and 3 or 4 for $T > 0\text{ }^{\circ}\text{C}$  | Compressed air class (ISO 8573-1) 2 or 3 for $-10\text{ }^{\circ}\text{C}$ and 3 or 4 for $T > 0\text{ }^{\circ}\text{C}$  |
| When pressure exceeds 10 bar the controll pressure must be throttled by exhaust air (adjust actuating time to approx. 3 s) | When pressure exceeds 10 bar the controll pressure must be throttled by exhaust air (adjust actuating time to approx. 3 s) | When pressure exceeds 10 bar the controll pressure must be throttled by exhaust air (adjust actuating time to approx. 3 s) |
| Temperature of control medium, max. $40\text{ }^{\circ}\text{C}$   | Temperature of control medium, max. $40\text{ }^{\circ}\text{C}$   | Temperature of control medium, max. $40\text{ }^{\circ}\text{C}$   |
|  | Depending on the working pressure PN, lower control pressure may be selected.  | Depending on the working pressure PN, lower control pressure may be selected.  |

## 5.3 Control volume

|        | DIASTAR Six (FC)<br>[dm <sup>3</sup> ] | DIASTAR Ten (FC)<br>[dm <sup>3</sup> ] | DIASTAR Ten (FO)<br>[dm <sup>3</sup> ] | DIASTAR Ten (DA)<br>[dm <sup>3</sup> ] |      | DIASTAR Ten Plus (FC)<br>[dm <sup>3</sup> ] | DIASTAR Sixteen (FC)<br>[dm <sup>3</sup> ] |
|--------|--|--|--|--|------|---|--|
|        |  |  |  | close                                  | open |   |  |
| 20DN15 | 0.04                                   | 0.04                                   | 0.07                                   | 0.07                                   | 0.04 | 0.10  | 0.10                                       |
| 25DN20 | 0.12                                   | 0.12                                   | 0.20                                   | 0.20                                   | 0.12 | 0.12  | 0.12                                       |
| 32DN25 | 0.12                                   | 0.12                                   | 0.23                                   | 0.23                                   | 0.12 | 0.22  | 0.22                                       |
| 40DN32 | 0.24                                   | 0.24                                   | 0.44                                   | 0.44                                   | 0.24 | 0.40  | 0.40                                       |
| 50DN40 | 0.24                                   | 0.42                                   | 0.86                                   | 0.86                                   | 0.42 | 0.70  | 0.70                                       |
| 63DN50 | 0.24                                   | 0.44                                   | 0.86                                   | 0.86                                   | 0.44 | 0.80  | 0.80                                       |

### 5.4 Pressure ranges

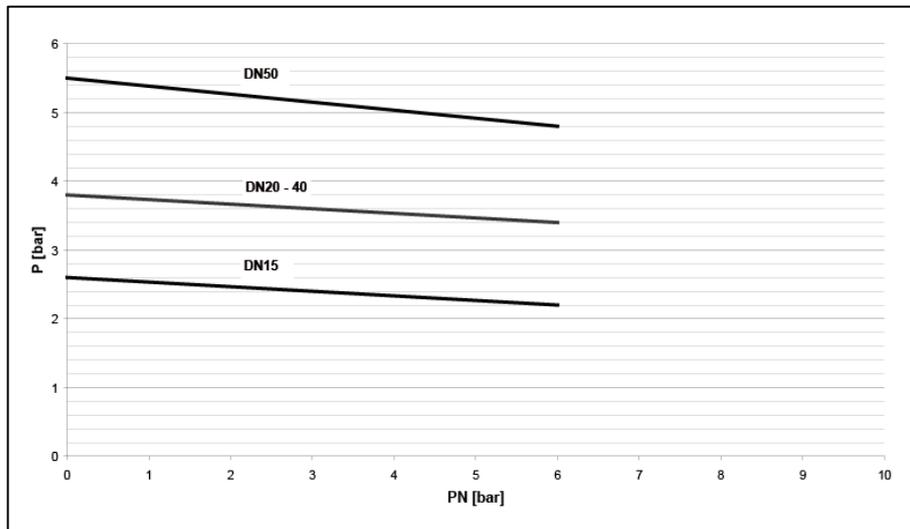
| Type                | DIASTAR Six FC                |            |                        | DIASTAR Ten DA/FO                             |            |                        | DIASTAR Ten FC                                |            |                        |
|---------------------|-------------------------------|------------|------------------------|---|------------|------------------------|---|------------|------------------------|
| Valve body material | PVC-U, PVC-C, ABS, PP-H, PP-N |            |                        | PVC-U, PVC-C, ABS, PP-H, PVDF, PVDF-HP, PP-N* |            |                        | PVC-U, PVC-C, ABS, PP-H, PVDF, PVDF-HP, PP-N* |            |                        |
| Pressure rate       | EPDM [bar]                    | PTFE [bar] | Control pressure [bar] | EPDM [bar]                                    | PTFE [bar] | Control pressure [bar] | EPDM [bar]                                    | PTFE [bar] | Control pressure [bar] |
| 20DN15              | 6                             | -          | 6                      | 10  | 10/6*      | 5                      | 10  | 10/6*      | 6                      |
| 25DN20              | 6                             | -          | 6                      | 10  | 10/6*      | 5                      | 10  | 10/6*      | 6                      |
| 32DN25              | 6                             | -          | 6                      | 10  | 10/6*      | 5                      | 10  | 10/6*      | 6                      |
| 40DN32              | 6                             | -          | 6                      | 10  | 10/6*      | 5                      | 10  | 10/6*      | 6                      |
| 50DN40              | 6                             | -          | 6                      | 10  | 10/6*      | 5                      | 10  | 10/6*      | 6                      |
| 63DN50              | 6                             | -          | 6                      | 10  | 10/6*      | 5                      | 10  | 6/5*       | 6                      |
| Operating pressure  | →                             |            |                        | →   |            |                        | →   |            |                        |

| Type                | DIASTAR Ten Plus                       |            |                        | DIASTAR Sixteen FC   |            |                        |
|---------------------|--|------------|------------------------|----------------------|------------|------------------------|
| Valve body material | PVC-U, PVC-C, ABS, PP-H, PVDF, PVDF-HP |            |                        | PVC-U, PVDF, PVDF-HP |            |                        |
| Pressure rate       | EPDM [bar]                             | PTFE [bar] | Control pressure [bar] | EPDM [bar]           | PTFE [bar] | Control pressure [bar] |
| 20DN15              | 10                                     | 10         | 6                      | 16                   | 16         | 6                      |
| 25DN20              | 10                                     | 10         | 6                      | 16                   | 16         | 6                      |
| 32DN25              | 10                                     | 10         | 6                      | 16                   | 16         | 6                      |
| 40DN32              | 10                                     | 10         | 6                      | 16                   | 16         | 6                      |
| 50DN40              | 10                                     | 10         | 6                      | 16                   | 16         | 6                      |
| 63DN50              | 10                                     | 10         | 6                      | 16                   | 10         | 6                      |
| Operating pressure  | ↔                                      |            |                        | →                    |            |                        |

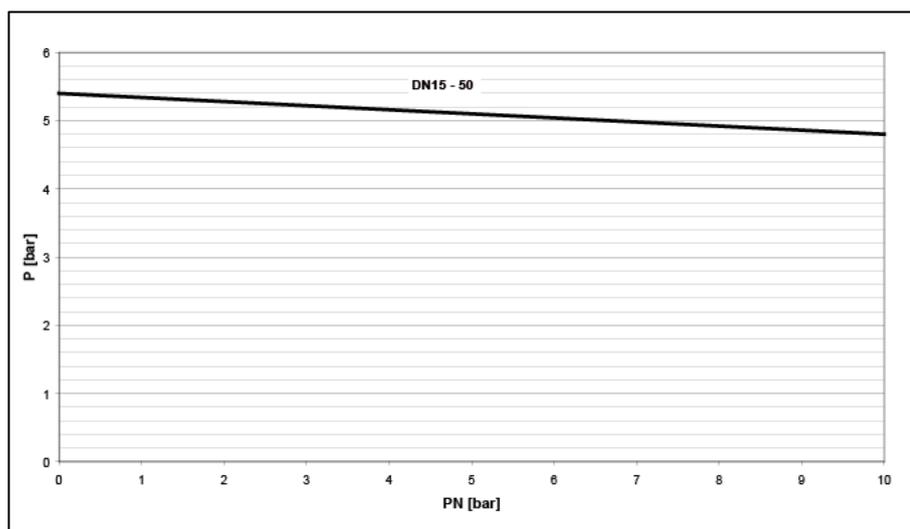
|   |                       |
|---|-----------------------|
| → | <i>Unidirectional</i> |
| ↔ | <i>Bidirectional</i>  |

## 5.5 Control pressure diagrams

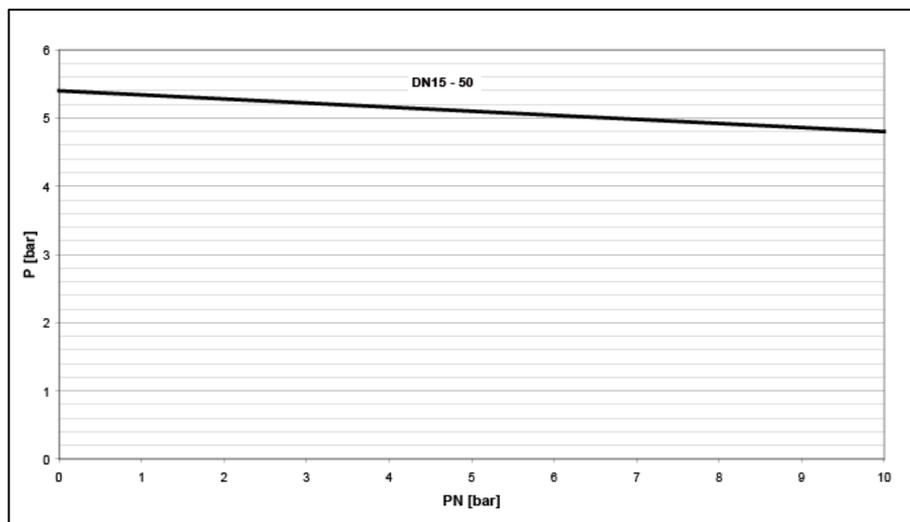
DIASTAR Six FC with EPDM diaphragm



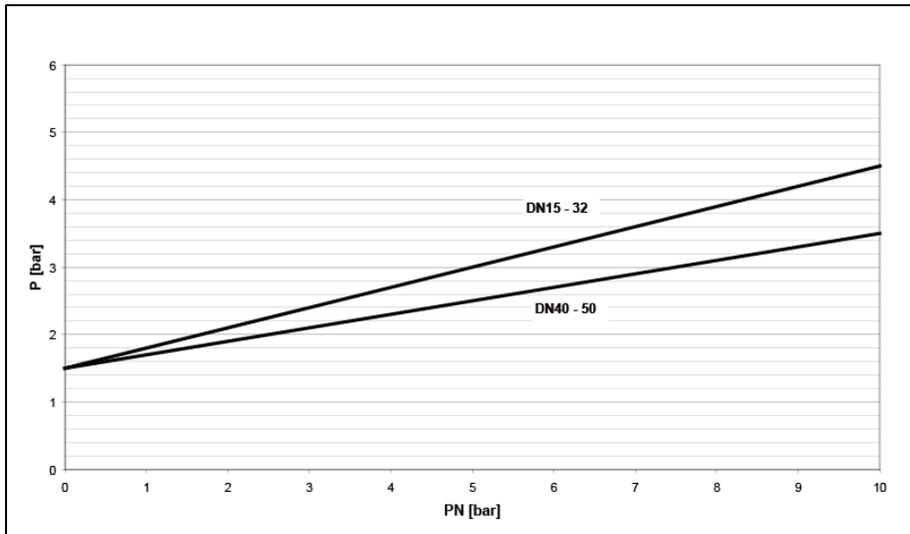
DIASTAR Ten FC with EPDM diaphragm



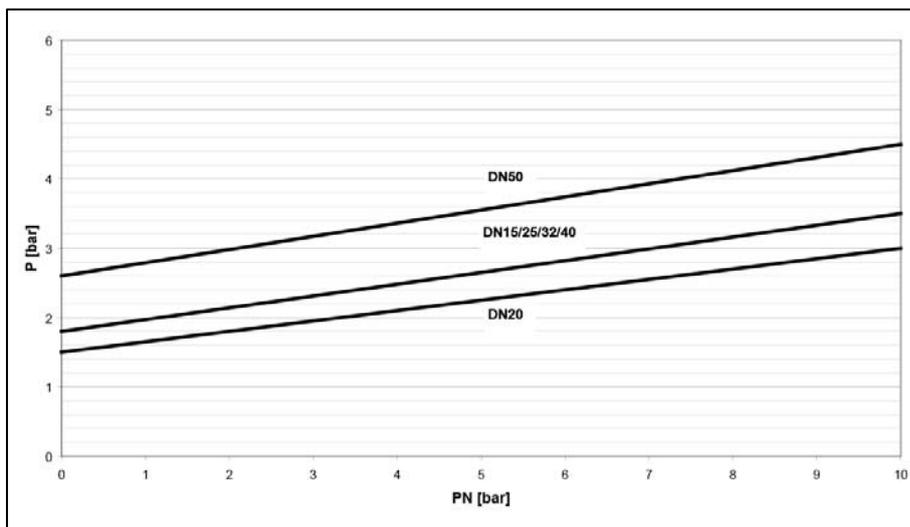
DIASTAR Ten FC with PTFE diaphragm



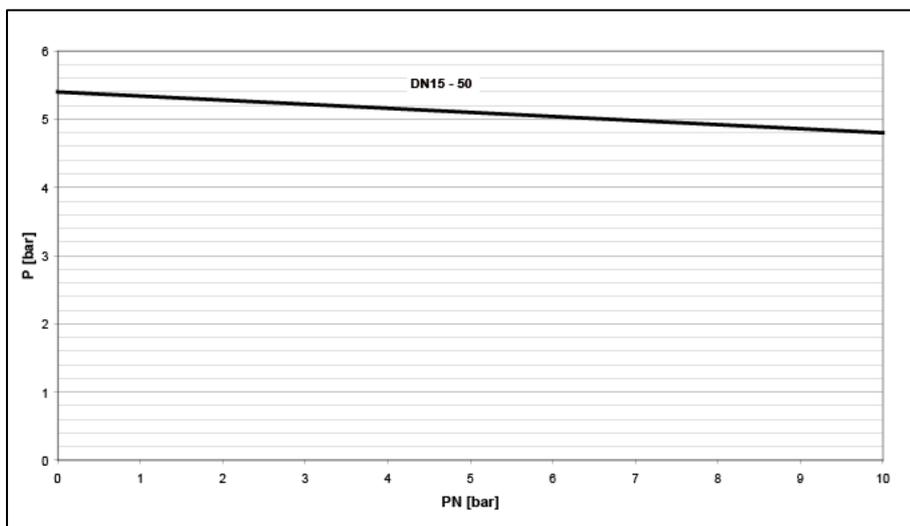
DIASTAR Ten FO and DA with EPDM diaphragm



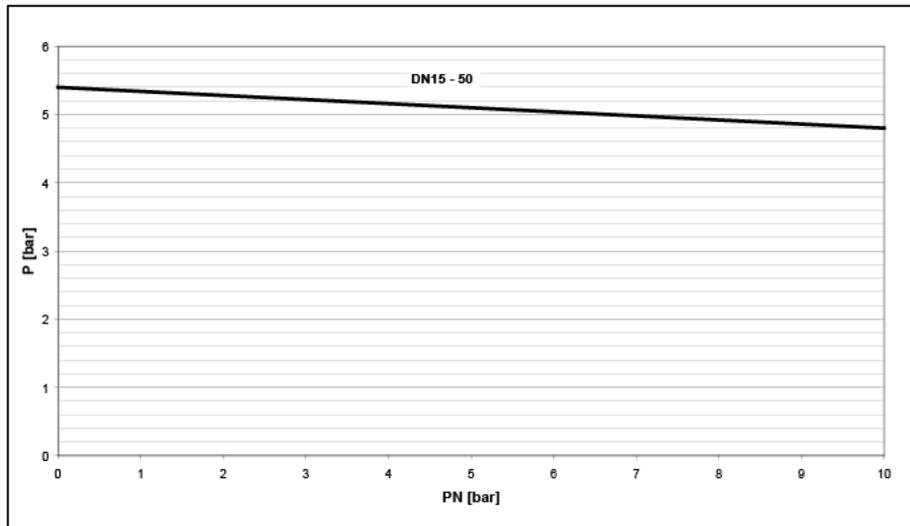
DIASTAR Ten FO and DA with PTFE diaphragm



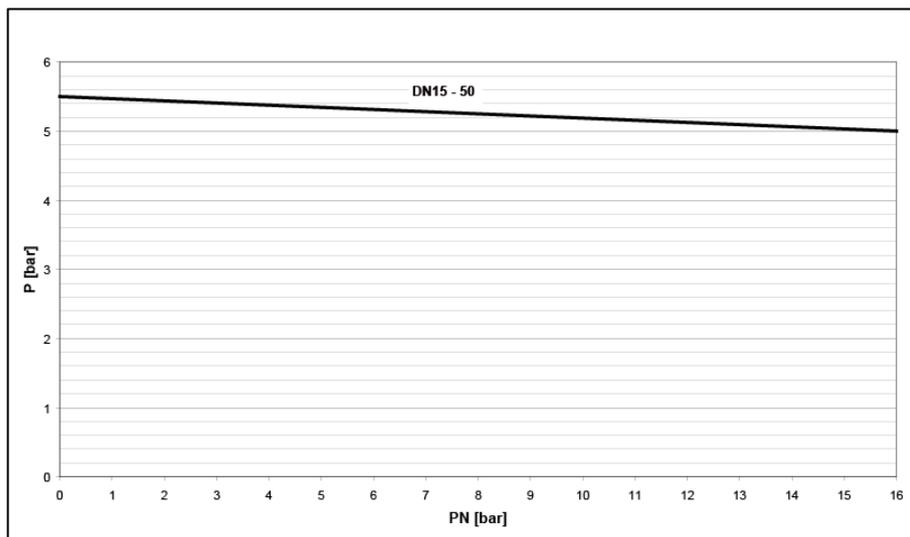
DIASTAR Ten Plus FC with EPDM diaphragm



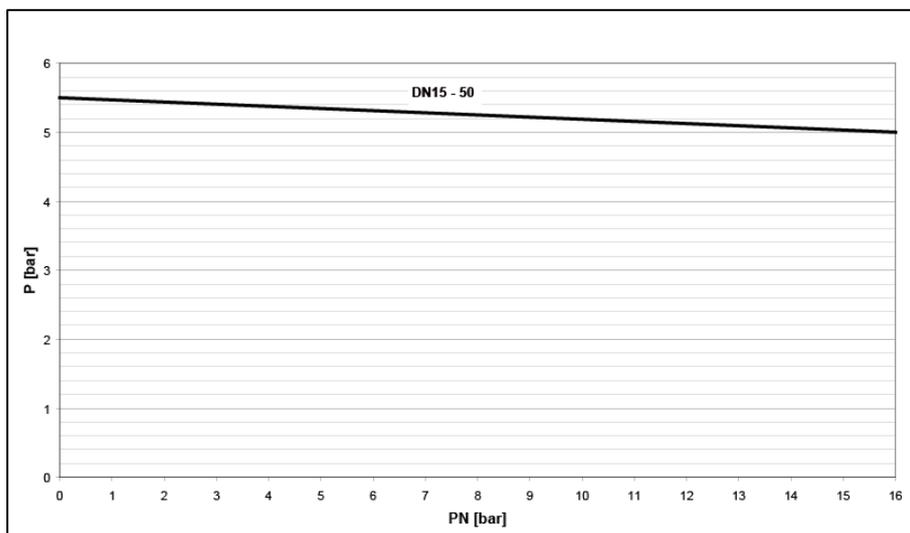
DIASTAR Ten Plus FC with PTFE diaphragm



DIASTAR Sixteen FC with EPDM diaphragm



DIASTAR Sixteen FC with PTFE diaphragm



## 6 Installation

### 6.1 Preparation



#### WARNING

Use of grease on the threaded connection between housing nut and **valve body**.

The use of grease, especially on amorphous plastics, can cause stress cracking on the valve body. Death or serious injury could occur due to contact with the medium. The function of the valve is not warranted.

- ▶ Irrespective of the valve body material, do not use grease for the threaded connection between housing nut and valve body

- ▶ Inspect the diaphragm valve for transport damages. Damaged valves must not be installed.
- ▶ Only use diaphragm valves where the valve and the diaphragm correspond specifically to the materials, pressure rating, type of connection and dimensions for the particular application.
- ▶ Carry out function test: open and close the diaphragm valve. You must not install valves which do not function properly.
- ▶ Diaphragms and other sealing elements should be checked before mounting to make sure there are no damages from aging. Aged parts which exhibit hardening or fissures must not be installed.

## 6.2 Install diaphragm valve DIASTAR

### CAUTION

#### Fixation of the diaphragm valve!

Due to temperature changes, longitudinal or lateral forces may occur if thermal expansion is constrained.

- ▶ Absorb forces via respective fixed points in front or after the valve.

Operation of a valve causes reactive forces which could damage the valve

- ▶ Mount the diaphragm valve as a fixed point with the designated fastener or reinforce the piping directly before and after the diaphragm valve with suitable supports.

Superimposed loadings could damage the diaphragm valve.

- ▶ Diaphragm valve and piping must be aligned

### True Union Design

#### All materials with valve body type 514

- ▶ Loosen the union nut and push them toward the designated piping end.
- ▶ Depending on the type of piping end, connecting parts are cemented, screwed or welded. The Georg Fischer Planning Fundamentals include additional information.
- ▶ Diaphragm valve is then positioned between the connecting parts.
- ▶ Manually tightened the union nuts.

### Cement connections

#### PVC-U, PVC-C and ABS - types 514, 515

- ▶ Only identical materials may be joined together.
- ▶ Pipe sections with solvent cement connections should be rinsed unpressurized with water after the drying time (see chapter jointing methods in the Georg Fischer Planning Fundamentals).

### Fusion connections

#### PP-H, PP-n, PVDF, PVDF-HP – types 514, 515, 519

- ▶ Only identical materials may be joined together (see chapter jointing methods in the Georg Fischer Planning Fundamentals).

### Flange connections

#### All materials with valve body type 517

- ▶ The tightening torque can be found in further chapters in the Georg Fischer Planning Fundamentals.

### 6.3 Change flexible air connection

The air connection is turnable in 90° intervals due to the round design.



#### WARNING

##### Risk of injury due to uncontrolled evasion of the medium!

If the pressure was not relieved completely, the medium can evade uncontrolled. Depending on the type of medium, risk of injury may exist.

- ▶ Completely relieve pressure in the pipes prior to dismounting.
- ▶ Completely empty and rinse pipe prior to dismounting in connection with harmful, flammable, or explosive media. Pay attention to potential residues.
- ▶ Provide for safe collection of the medium by implementing appropriate actions.

- ▶ Drain and de-pressurized the pipeline. Level and pressure sensors display "0".

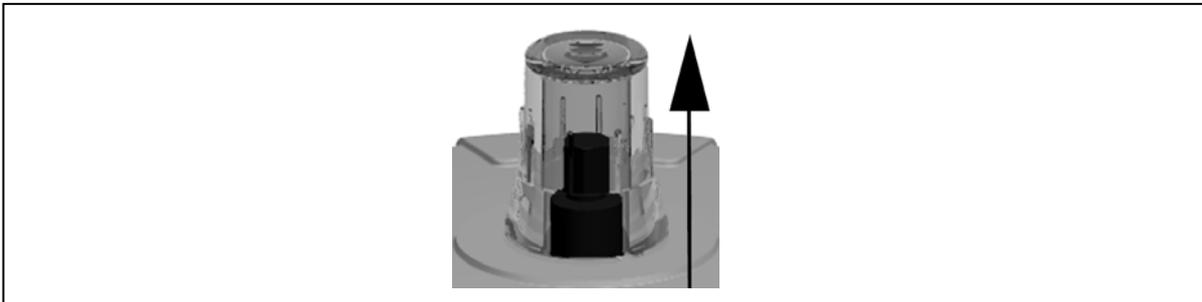


Fig. 12

- ▶ Move the valve into the "open" position, see fig. 12

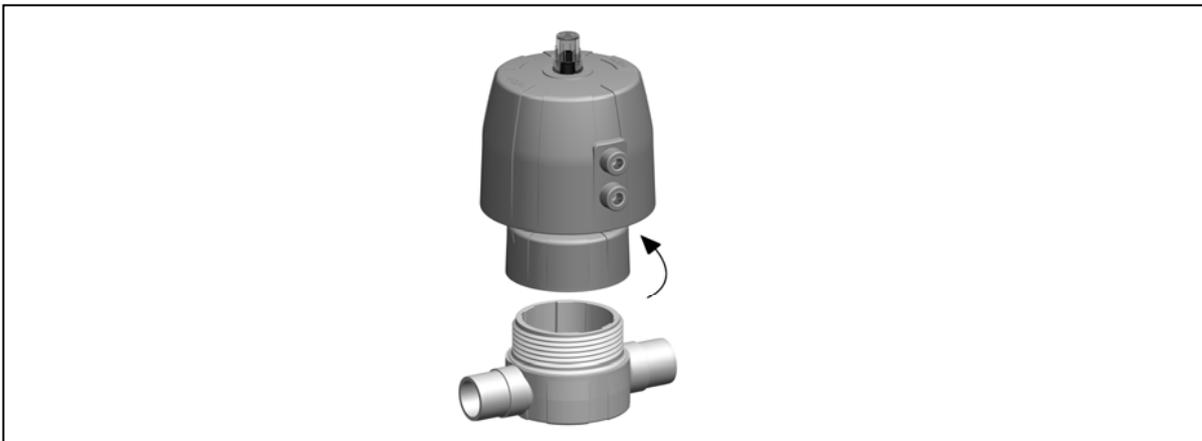


Fig. 13

- ▶ Open housing nut, see fig. 13. Use a strap wrench/ special tool for open it.
- ▶ Turn actuator in 90° intervals to the desired position.



Fig. 14

- ▶ Realign diaphragm parallel to the compression piece. Diaphragm tabs must be positioned between the narrow guiding bars of the inner housing, see fig. 14
- ▶ Move the valve into the “open” position, see fig. 12

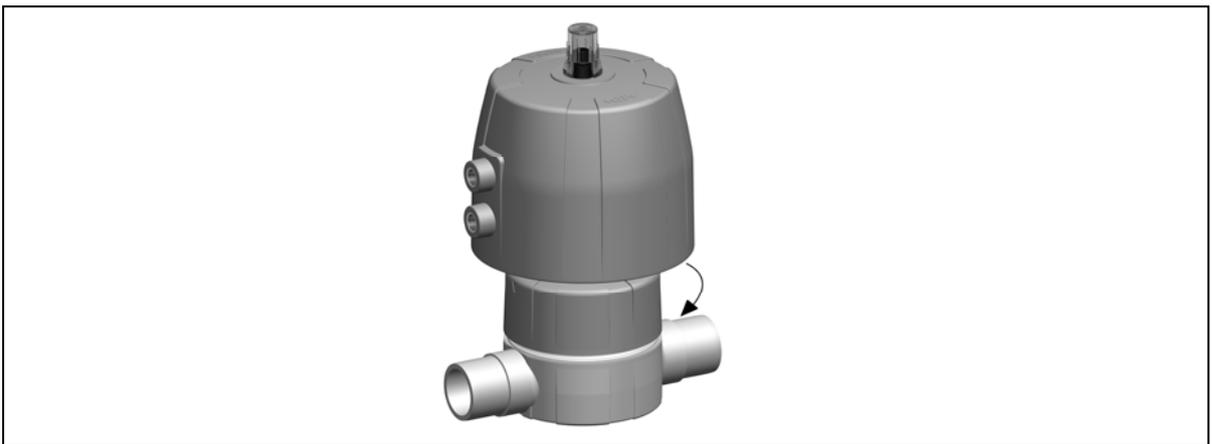


Fig. 15

- ▶ Position actuator on the valve body and tighten housing nut handtight, see fig. 15  
Diaphragm is now centered.

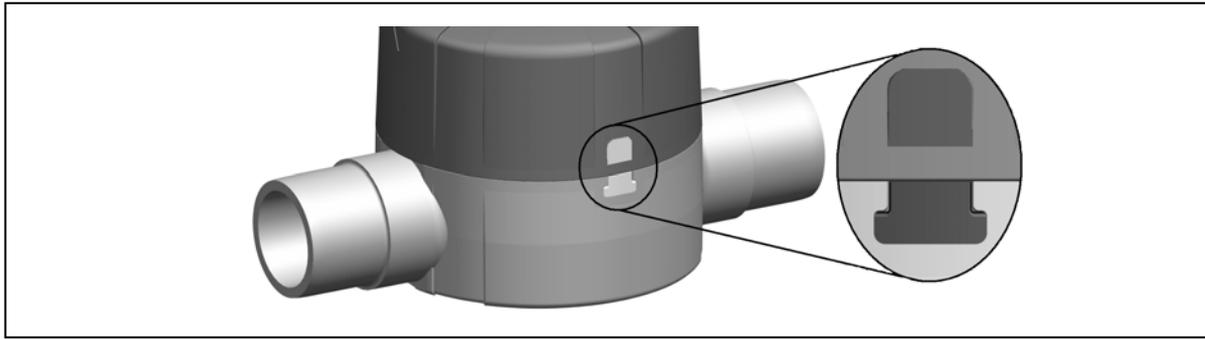


Fig. 16

- ▶ Screw housing nut with strap wrench/ special tool tight, till
  - a uniform all-around gap of 0.5 up to 1 mm between valve body and bonnet is achieved and
  - the half-round position indicator is align with the friction lock, see fig. 16



*For valves with a built-in stroke limiter, we recommend to read just the valve.*

---

## 6.4 Connect control medium

### 6.4.1 FC-mode / Faile-safe-to-close

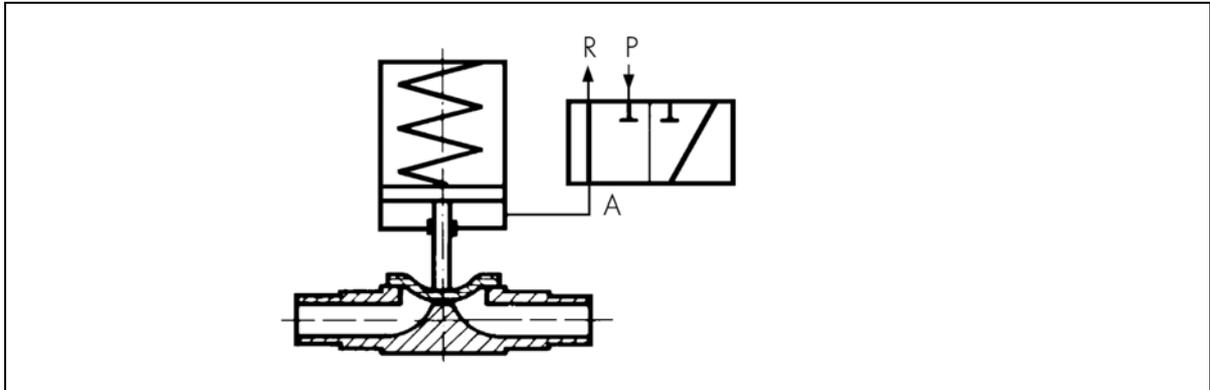


Abb. 17

- ▶ 3/2-way solenoid valves are used to control single acting actuators (FC).
- ▶ They are mounted either directly to the actuator via a banjo bolt or via a battery mounting plate or valve cluster, as required.

### 6.4.2 FO-mode / Fail-safe-to-open

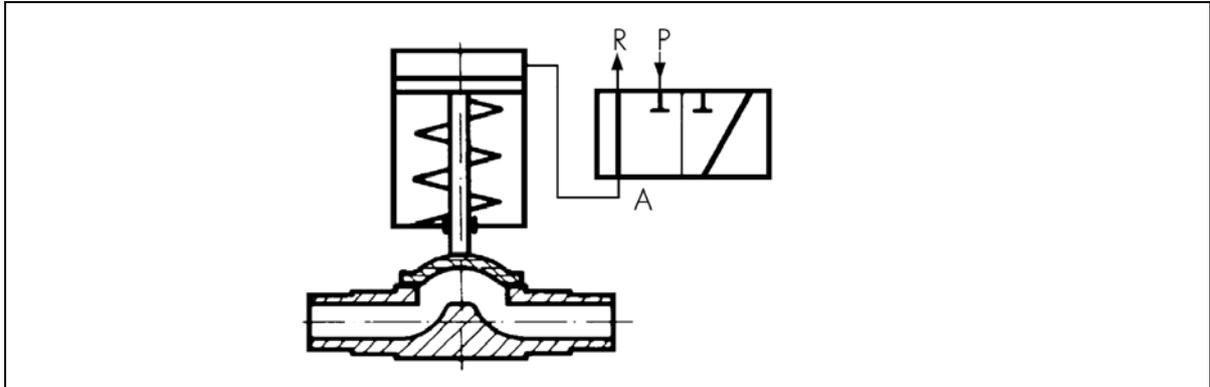


Abb. 18

- ▶ 3/2-way solenoid valves are used to control single acting actuators (FO).
- ▶ They are mounted either directly to the actuator via a banjo bolt or via a battery mounting plate or valve cluster, as required.

### 6.4.3 DA-mode / Double acting

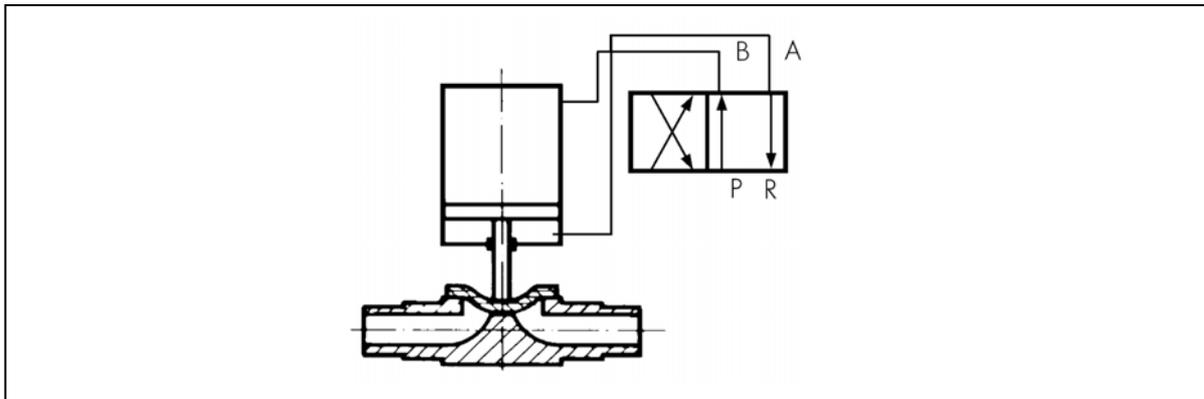


Abb. 19

- ▶ 4/2-way or 5/2-way solenoid valves are used to control double acting actuators (DA).
- ▶ They can be mounted either directly to the actuator via a Namur connector plate or via valve clusters.

## 7 Commissioning

### NOTICE

Higher control pressures or mechanical aids or cavitation

Damage to the diaphragm valve.

- ▶ Use mentioned control pressure to actuate the diaphragm valve.
- ▶ Use valve only at optimal control operation conditions.

- ▶ Check that all valves are in the required open or closed position.
- ▶ Fill the piping system and deaerate completely.

### 7.1 Pressure testing

- ▶ Make sure that the test pressure may not exceed the PN of the diaphragm valve.



*Diaphragm valve pressure testing is subject to the same regulations as the piping system.*

- ▶ When pressure exceeds 10 bar the controll pressure must be throttled by exhaust air (adjust actuating time to approx. 3 s)
- ▶ The valves and connections should be checked for a tight seal during the pressure test.

## 8 Maintenance



### WARNING

#### Diaphragm valve used as end valve!

Medium can exit uncontrollably, if piping system is opened under pressure.

Death or serious injury could occur due to contact with the medium.

- ▶ The end valve may only be opened when the medium can be caught or carried off safely and splashing is prevented by taking appropriate measures.

If you have questions regarding the maintenance of your product, please contact your national GF Piping Systems representative.

### 8.1 Maintenance schedule

| Maintenance interval  | Maintenance activity  |
|---|---|
| regular   | ▶ Check connection between the bonnet and valve body for tightness.   |
| 1-2 times per year  | ▶ Check the functionality of diaphragm valves which are kept permanently opened or closed   |
| 100,000 cycles with <ul style="list-style-type: none"> <li>- less than 10 bar nominal pressure at 20 °C and water</li> <li>- DIASTAR Ten/ Ten Plus</li> </ul> | <ul style="list-style-type: none"> <li>▶ Visual inspection of the actuator.</li> <li>▶ Disassemble the actuator and check the diaphragm for damage.</li> <li>▶ If necessary, change diaphragm.</li> </ul> |
| 50,000 cycles with <ul style="list-style-type: none"> <li>- bar or higher nominal pressure at 20°C and water</li> <li>- DIASTAR Sixteen</li> </ul>            | <ul style="list-style-type: none"> <li>▶ Visual inspection of the actuator.</li> <li>▶ Disassemble the actuator and check the diaphragm for damage.</li> <li>▶ If necessary, change diaphragm.</li> </ul> |



*If the flow medium has higher temperatures, other chemicals or abrasive particles, we recommend more frequent inspections.*

## 8.2 Replacing diaphragm



### WARNING

#### Risk of injury due to uncontrolled evasion of the medium!

If the pressure was not relieved completely, the medium can evade uncontrolled. Depending on the type of medium, risk of injury may exist.

- ▶ Completely relieve pressure in the pipes prior to dismounting.
- ▶ Completely empty and rinse pipe prior to dismounting in connection with harmful, flammable, or explosive media. Pay attention to potential residues.
- ▶ Provide for safe collection of the medium by implementing appropriate actions.



### WARNING

#### Replacing PTFE diaphragm!

Damage to property and/or personal injuries due to medium which may exit uncontrollably or flow out from the pipe or valve.

- ▶ If y PTFE diaphragm is used: Replace **both**, PTFE diaphragm and backing diaphragm EPDM or FPM.
- ▶ Drain and de-pressurized the pipeline.  
Level and pressure sensors display "0".

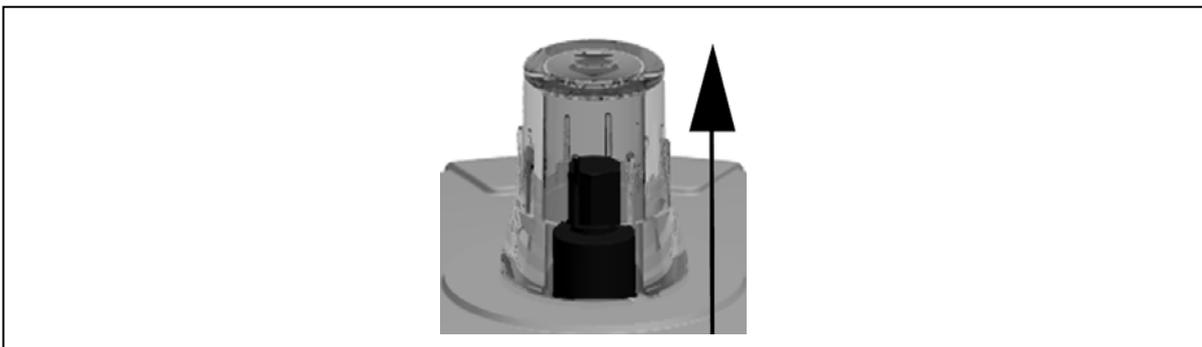


Fig. 20

- ▶ Move the valve into the "open" position, see fig. 20

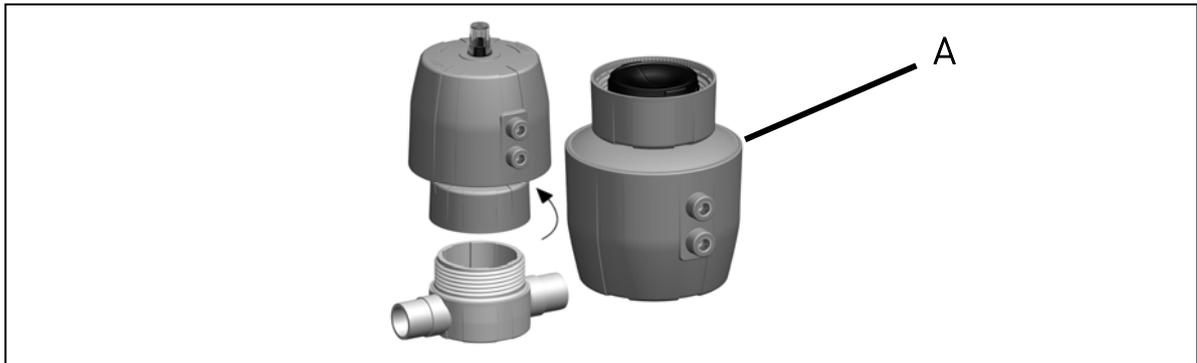


Fig. 21

- ▶ Open housing nut **A** with a strap wrench, take actuator out, see fig. 21. Use a strap wrench.

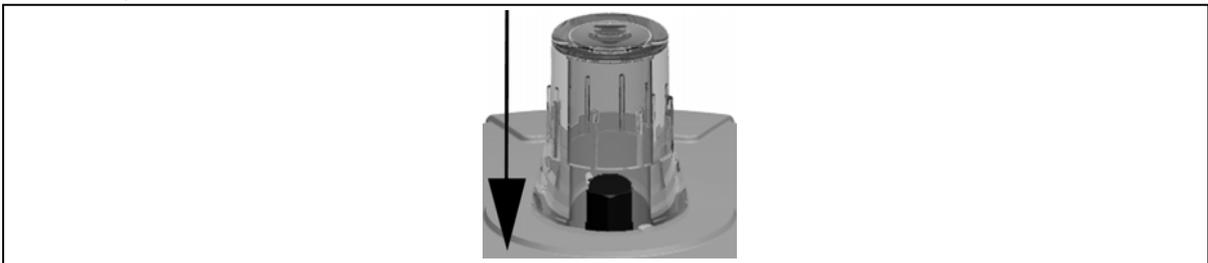


Fig. 22

- ▶ Move actuator in "closed" position, see fig. 22.



Fig. 23

- ▶ Hold actuator tight and screw diaphragm counter clockwise out of the inner housing, see fig. 23
- ▶ Assemble new diaphragm in the same position as the old diaphragm:
  - Position actuator upright for the first turns thus the membrane holder, may take the set screw of the diaphragm.
  - screw new diaphragm clockwise into the inner housing.
  - Turn the diaphragm back by min. 90°/ max. 360°.
  - Realign the bulge of the diaphragm parallel to compression piece. Diaphragm tabs must be positioned between the narrow guiding bars of the inner housing.

- ▶ Replace friction lock on the valve body, therefore loose it with a screw driver.
- ▶ Push the new one in.



Fig. 24

- ▶ Position actuator on the valve body: Realign the bulge of the diaphragm parallel to compression piece, see fig. 24
- ▶ Move the actuator in “open” position, see fig. 20

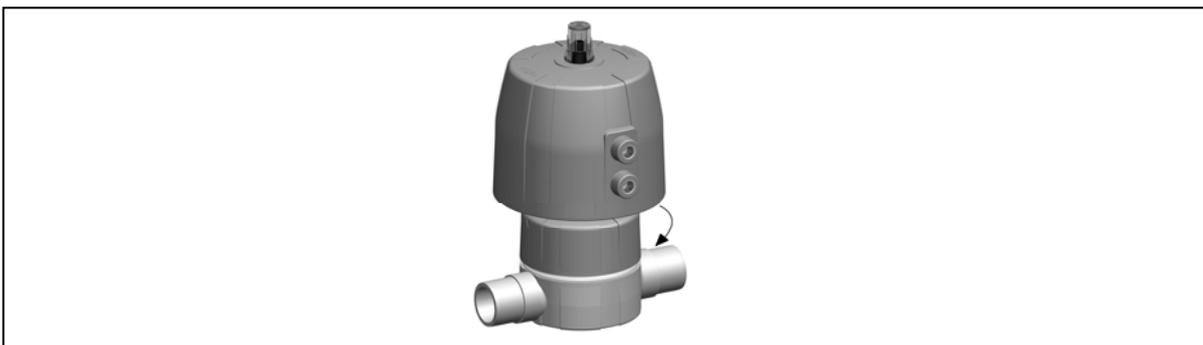


Fig. 25

- ▶ Tighten housing nut handtight, see fig. 25  
Diaphragm is now centred.

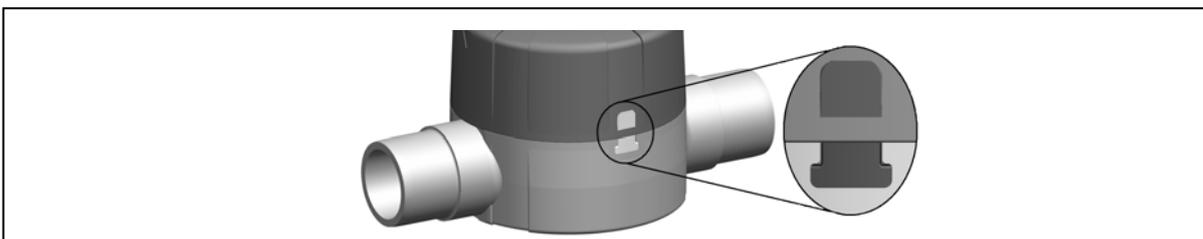


Fig. 26

- ▶ Screw housing nut with strap wrench tight, till
  - a uniform all-around gap of 0.5 up to 1 mm between valve body and bonnet is achieved and
  - the half-round position indicator is align with the friction lock, see fig. 26



*For valves with a built-in stroke limiter, we recommend to read just the valve.*

## 9 Troubleshooting list

| Problem  | Possible cause of fault                                       | Problem fixing   |
|--|---|--|
| Deformation and expansion of piping / valve                    | Piping stresses due to restricted thermal expansion           | ▶ Improve the piping support.  |
| Premature wear of diaphragm valve or individual parts          | Material of the housing or the seal is inadequately resistant | ▶ Choose suitable materials, see list of "Chemical Resistance" or the planning fundamentals. |
| Leakage to the outside at flange joint                         | Changes in temperature  | ▶ Tighten joint or if necessary replace sealings.  |
|  | Defective seal  | ▶ Replace sealings.  |
| Leakage to the outside at union nuts                           | Loose association of nut and valve body                       | ▶ Tighten joint with manual effort.  |
|  | Defective seal  | ▶ Replace sealings.  |
| Leakage between valve body and housing nut connection          | Housing nut is not tightened properly                         | ▶ Screw housing nut tight, see chapter 6.3   |
|  | Wear of diaphragm   | ▶ Replace diaphragm, see chapter 8.2   |
| Leakage at seat  | Wear of diaphragm   | ▶ Replace diaphragm, see chapter 8.2   |
| Sluggish valve   | Wear of sealings and/or spindle                               | ▶ If necessary replace seals and other functional parts.                                     |
| Leakage of control medium on the non connected air connections | Wear of sealings  | ▶ Replace sealings on the spindle and piston.  |

|  |  |  |
|--|--|--|
| Valve does not perform specified stroke or even does not close or open | Control pressure is not selected correctly                     | ▶ Check control pressure.  |
|  | Function and connections for control medium are not compatible | ▶ Check connections and suitable mode of function (FC, FO, DA)             |
|  | Defective aeration and deaeration line.                        | ▶ Check function of aeration and deaeration line.                          |
| Leakage of medium at the indicator pin                                 | Wear of diaphragm and/or sealings                              | ▶ Replace sealings on the spindle and piston.<br>▶ Replace diaphragm.      |
| Leakage of medium at the vent  | Wear of diaphragm and/or sealings                              | ▶ Replace sealings on the spindle and piston.                              |
| Premature wear of diaphragm  | Incorrect control pressure                                     | ▶ Check control pressure   |
|  | Function and connections for control medium are not compatible | ▶ Check connections and suitable mode of function (FC, FO, DA)             |
|  | Valve is not chosen according to the line pressure             | ▶ Check size of actuator   |
|  | Dirty vent hole  | ▶ Check and clean if necessary deaeration drill on the intermediate piece. |

## 10 List of spare parts

If no spare part code is specified, order as follows:

- ▶ Read code number and serial number of the diaphragm valve on the type plate, see chapter 4.3 Identification
- ▶ Position numbers and descriptions can be read out from the spare parts list..
- ▶ Send your order with these information to your representative of GF Piping Systems.

## 11 Disposal

- ▶ Before disposing of the different material, separate it by recyclables, normal waste and special waste.
- ▶ Comply with local legal regulations and provisions when recycling or disposing of the product, the individual components and the packaging.
- ▶ Comply with National regulations, standards and directives..



### WARNING

Parts of the product may be contaminated with medium which is detrimental to health and the environment and therefore cleaning is not sufficient!

Risk of personal and health injury caused by this medium.

Prior to the disposal of the product:

- ▶ Collect any medium which has escaped and dispose of it in accordance with the local regulations.
- ▶ Neutralize residues of media in the product.
- ▶ Separate materials (plastics, metals etc.) and dispose of them in accordance with the local regulations.

If you have questions regarding the disposal of your product, please contact your national GF Piping Systems representative.

## 12 Original EC-Declaration of conformity for machinery

### EC Machinery Directive 2006/42/EC, Annex II A)

**Manufacturer:**

Georg Fischer Piping Systems Ltd.  
Ebnatstrasse 111  
8201 Schaffhausen / Switzerland

**Authorized person to compile the technical file:**

R&D Manager  
Georg Fischer Piping Systems Ltd.  
Ebnatstrasse 111  
8201 Schaffhausen / Switzerland

Herewith we declare that

**Pneumatic diaphragm valves**

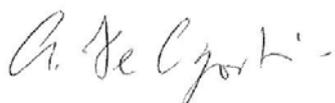
Type: DIASTAR Six, DIASTAR Ten, DIASTAR Ten Plus, DIASTAR Sixteen  
Variants: fail-safe to close, FC-mode; fail-safe to open, FO-mode; double acting DA-mode

Code: 161 614 001 – 161 657 977, 163 614 012 – 163 657 877, 169 614 012 – 169 657 137,  
167 614 002 – 167 689 756, 168 615 112 – 168 689 356, 175 624 032 – 175 689 356,  
180 624 132 – 180 689 556, 181 624 132 – 181 689 556, 185 624 132 – 185 689 556,  
800 000 000 – 800 999 999

- is in conformity with the relevant provision of the Machinery Directive 2006/42/EC
- is in conformity with the provisions of the following other EC-Directives:
  - 97/23/EC on pressure equipment, category I, module A
  - 89/106/EC on construction products
  - RoHS (2011/65/EC)

And furthermore we declare that the following (parts/clauses of) other technical standards and specifications have been used:

- NA19 (air connections)



Name: Dirk Petry  
Position: R&D Manager  
Georg Fischer Piping Systems  
Date: 2013-05-13

# Worldwide at home

Our sales companies and representatives ensure local customer support in over 100 countries

[www.gfps.com](http://www.gfps.com)

## Argentina / Southern South America

Georg Fischer Central Plastics  
Sudamérica S.R.L.  
Buenos Aires, Argentina  
Phone +54 11 4512 02 90  
gfccentral.ps.ar@georgfischer.com  
www.gfps.com/ar

## Australia

George Fischer Pty Ltd  
Riverwood NSW 2210 Australia  
Phone +61 (0) 2 9502 8000  
australia.ps@georgfischer.com  
www.gfps.com/au

## Austria

Georg Fischer  
Rohrleitungssysteme GmbH  
3130 Herzogenburg  
Phone +43 (0) 2782 856 43-0  
austria.ps@georgfischer.com  
www.gfps.com/at

## Belgium / Luxembourg

Georg Fischer NV/SA  
1070 Bruxelles/Brüssel  
Phone +32 (0) 2 556 40 20  
be.ps@georgfischer.com  
www.gfps.com/be

## Brazil

Georg Fischer Sist. de Tub. Ltda.  
04795-100 São Paulo  
Phone +55 (0) 11 5525 1311  
br.ps@georgfischer.com  
www.gfps.com/br

## Canada

Georg Fischer Piping Systems Ltd  
Mississauga, ON L5T 2B2  
Phone +1 (905) 670 8005  
Fax +1 (905) 670 8513  
ca.ps@georgfischer.com  
www.gfps.com/ca

## China

Georg Fischer Piping Systems Ltd  
Shanghai 201319  
Phone +86 21 3899 3899  
china.ps@georgfischer.com  
www.gfps.com/cn

## Denmark / Iceland

Georg Fischer A/S  
2630 Taastrup  
Phone +45 (0) 70 22 19 75  
info.dk.ps@georgfischer.com  
www.gfps.com/dk

## Finland

Georg Fischer AB  
01510 VANTAA  
Phone +358 (0) 9 586 58 25  
Fax +358 (0) 9 586 58 29  
info.fi.ps@georgfischer.com  
www.gfps.com/fi

## France

Georg Fischer SAS  
95932 Roissy Charles de Gaulle Cedex  
Phone +33 (0) 1 41 84 68 84  
fr.ps@georgfischer.com  
www.gfps.com/fr

## Germany

Georg Fischer GmbH  
73095 Albershausen  
Phone +49 (0) 7161 302-0  
info.de.ps@georgfischer.com  
www.gfps.com/de

## India

Georg Fischer Piping Systems Ltd  
400 076 Mumbai  
Phone +91 224007 2001  
branchoffice@georgfischer.com  
www.gfps.com/in

## Italy

Georg Fischer S.p.A.  
20063 Cernusco S/N (MI)  
Phone +39 02 921 861  
it.ps@georgfischer.com  
www.gfps.com/it

## Japan

Georg Fischer Ltd  
556-0011 Osaka,  
Phone +81 (0) 6 6635 2691  
jp.ps@georgfischer.com  
www.gfps.com/jp

## Korea

Georg Fischer Piping Systems  
271-3 Seohyeon-dong Bundang-gu  
Seongnam-si, Gyeonggi-do  
Seoul 463-824  
Phone +82 31 8017 1450  
Fax +82 31 8017 1454  
kor.ps@georgfischer.com  
www.gfps.com/kr

## Malaysia

Georg Fischer [M] Sdn. Bhd.  
40460 Shah Alam, Selangor Darul Ehsan  
Phone +60 (0) 3 5122 5585  
my.ps@georgfischer.com  
www.gfps.com/my

## Mexico / Northern Latin America

Georg Fischer S.A. de C.V.  
Apodaca, Nuevo Leon  
CP66636 Mexico  
Phone +52 (81) 1340 8586  
Fax +52 (81) 1522 8906  
mx.ps@georgfischer.com  
www.gfps.com/mx

## Middle East

Georg Fischer  
Piping Systems [Switzerland] Ltd  
Dubai, United Arab Emirates  
Phone +971 4 289 49 60  
gcc.ps@georgfischer.com  
www.gfps.com/int

## Netherlands

Georg Fischer N.V.  
8161 PA Epe  
Phone +31 (0) 578 678 222  
nl.ps@georgfischer.com  
www.gfps.com/nl

## New Zealand

Georg Fischer Ltd  
13 Jupiter Grove, Upper Hutt 5018  
PO Box 40399, Upper Hutt 5140  
Phone +64 (0) 4 527 9813  
nz.ps@georgfischer.com  
www.gfps.com/nz

## Norway

Georg Fischer AS  
1351 Rud  
Phone +47 67 18 29 00  
no.ps@georgfischer.com  
www.gfps.com/no

## Poland

Georg Fischer Sp. z o.o.  
05-090 Sekocin Nowy  
Phone +48 (0) 22 31 31 0 50  
poland.ps@georgfischer.com  
www.gfps.com/pl

## Romania

Georg Fischer  
Piping Systems (Switzerland) Ltd  
020257 Bucharest - Sector 2  
Phone +40 (0) 21 230 53 80  
ro.ps@georgfischer.com  
www.gfps.com/int

## Russia

Georg Fischer  
Piping Systems (Switzerland) Ltd  
Moscow 125047  
Phone +7 495 258 60 80  
ru.ps@georgfischer.com  
www.gfps.com/ru

## Singapore

George Fischer Pte Ltd  
11 Tampines Street 92, #04-01/07  
528 872 Singapore  
Phone +65 6747 0611  
sgp.ps@georgfischer.com  
www.gfps.com/sg

## Spain / Portugal

Georg Fischer S.A.  
28046 Madrid  
Phone +34 (0) 91 781 98 90  
es.ps@georgfischer.com  
www.gfps.com/es

## Sweden

Georg Fischer AB  
117 43 Stockholm  
Phone +46 (0) 8 506 775 00  
info.se.ps@georgfischer.com  
www.gfps.com/se

## Switzerland

Georg Fischer  
Rohrleitungssysteme [Schweiz] AG  
8201 Schaffhausen  
Phone +41 (0) 52 631 30 26  
ch.ps@georgfischer.com  
www.gfps.com/ch

## Taiwan

Georg Fischer Co., Ltd  
San Chung Dist., New Taipei City  
Phone +886 2 8512 2822  
Fax +886 2 8512 2823  
www.gfps.com/tw

## United Kingdom / Ireland

Georg Fischer Sales Limited  
Coventry, CV2 2ST  
Phone +44 (0) 2476 535 535  
uk.ps@georgfischer.com  
www.gfps.com/uk

## USA / Caribbean

Georg Fischer LLC  
Tustin, CA 92780-7258  
Phone +1 (714) 731 88 00  
Toll Free 800 854 40 90  
us.ps@georgfischer.com  
www.gfiping.com

## Vietnam

Georg Fischer Pte Ltd  
136E Tran Vu, Ba Dinh District, Hanoi  
Phone +84 4 3715 3290  
Fax +84 4 3715 3285  
www.gfps.com/int

## International

Georg Fischer  
Piping Systems [Switzerland] Ltd  
8201 Schaffhausen/Switzerland  
Phone +41 (0) 52 631 30 03  
Fax +41 (0) 52 631 28 93  
info.export@georgfischer.com  
www.gfps.com/int

The technical data are not binding. They neither constitute expressly warranted characteristics nor guaranteed properties nor a guaranteed durability. They are subject to modification. Our General Terms of Sale apply.