

Instruction Manual

Diaphragm Valve Types 514, 515, 517, 519



Before installing or commissioning diaphragm valves read this instruction manual carefully. This instruction manual gives valuable recommendations to avoid personal injuries and material damages.

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Related documents to this instruction manual

The «Georg Fischer Planning Fundamentals» give you additional information for the use of diaphragm valves. The Planning Fundamentals may be obtained from your Georg Fischer sales company or via www.piping.georgfischer.com

1. Intended use

The diaphragm valves type 514, 515, 517 and 519 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. Requirements for user and operator responsibility

- The diaphragm valve must only be used according to the specifications for which it has been intended, as indicated in the previous paragraph
- Piping system must be installed by professionals and its functionality is checked regularly
- Installation, operation, service and repairs must only be carried out by qualified personnel
- Users and operators must be instructed on a regular basis in all aspects of work safety and environmental protection especially those pertaining to pressure-bearing piping systems
- The users and operators must be familiar with the operating instructions and must adhere to the information contained therein

3. Safety messages

Observe instruction manual

The instruction manual is part of the product and an important module of the safety concept. Non-observance could result in serious injury or death.

- Read and observe instruction manual
- Instruction manual must be available at the product
- Pass instruction manual to following users of the product

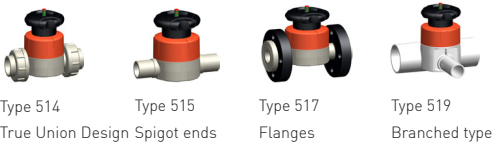
4. Transport and storage

Please handle, transport and store the diaphragm valve carefully:

- The diaphragm valve should be transported and stored in its original packaging
- The valve must be protected from harmful influences such as dirt, dust, humidity, and especially heat and UV radiation
- The connection ends should not be damaged mechanically or in any other way
- The diaphragm valve should be stored in opened position

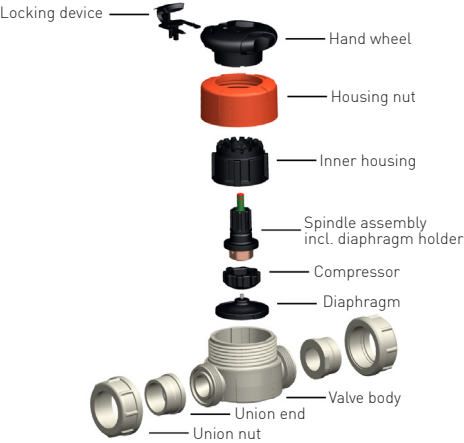
5. Product description

5.1 Types

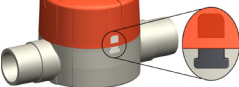


5.2 Assembly

The assembly of the four valve types is exactly the same, only the connection to the piping system is different. Below shown the assembly of the type 514 as an example:



5.3 Recognition feature for diaphragm material



Colour of the friction lock shows type of diaphragm material:

black	EPDM diaphragm
white	PTFE/EPDM diaphragm
green	PTFE/FPM diaphragm
red	FPM diaphragm
blue	NBR diaphragm

6. Installation

6.1 General information

Diaphragm valve installation in a piping system is subject to the same regulations as other connecting elements of pipes, fittings and related piping system components. Further chapters in the Planning Fundamentals give you additional information regarding installation and jointing methods.

6.2 Installation process

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

Before installation, please check the diaphragm valve accordingly to the following points:

- 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 manually
- 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
- You must not install valves which do not function properly
- After installation another function test is to be carried out

Safety messages for the installation of diaphragm valves

NOTICE

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

1. Loosen the union nut and push them toward the designated piping end
2. Depending on the type of piping end, connecting parts are cemented, screwed or welded. Further chapters in the Planning Fundamentals include additional information
3. Diaphragm valve is then positioned between the connecting parts
4. Manually tightened the union nuts

Cement connections

UPVC, CPVC, ABS - types 514, 515

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

Fusion connections

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

Only identical materials may be jointed together (see chapter jointing methods in the Planning Fundamentals).

Flange connections

All materials with valve body type 517

The tightening torque can be found in the "Georg Fischer Planning Fundamentals".

7. Commissioning

Diaphragm valve pressure testing is subject to the same regulations as the piping system; however, the test pressure may not exceed the PN of the diaphragm valve.

NOTICE

Operate the diaphragm valve
Damage of diaphragm valve is possible if actuating torque is too high.

- Operate the valve with normal manual hand power
- Use no additional tools which increase actuating torque

NOTICE

Control operations
Due to cavitation the diaphragm valve could be damaged.

- Use valve only at optimal control operation conditions

Information
Slight hysteresis occurs in the steady state characteristics when the direction of actuation is changed.

Procedure commissioning

- Check that all valves are in the required open or closed position
- Fill the piping system and deaerate completely
- The component with the lowest PN determines the maximum allowable test pressure in the piping section
- The valves and connections should be checked for a tight seal during the pressure test

8. Normal operation and maintenance

The connection between the bonnet and valve body should be checked for tightness at regular intervals. Please consider at leakage or other defects the chapter "Help in case of problems" and additional information in the Planning Fundamentals.

Check functionality regularly

We recommend checking the functionality of diaphragm valves which are kept permanently opened or closed. This can be done by unseating the diaphragm manually 1 to 2 times a year.

Safety messages for normal operations and maintenance

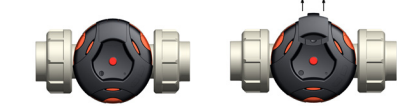
Diaphragm valve used as end valve
Medium can exit uncontrollably, if piping system is opened under pressure. Death or serious injury could occur due to contact with the medium.

- 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

Dismounting diaphragm valve or opening the housing nut
The medium may exit uncontrollably or flow out from the pipe or valve, whether under pressure or not. The valve or pipe may contain residue or remnants of aggressive, hazardous, flammable or explosive medium. Death or serious injury could occur due to contact with the medium.

- Release all pressure from the piping system
- Empty the piping system completely
- Rinse the system, if aggressive, hazardous, flammable or explosive media are involved
- Empty the diaphragm valve completely when it has been dismantled. In order to do so, let the valve drain completely

8.1 Hand wheel locking device



Hand wheel in opened (left) and locked position (right)

8.2 Replacing diaphragm

We strongly recommend that the diaphragm is inspected on a regular basis. The diaphragm can be checked by opening the bonnet.

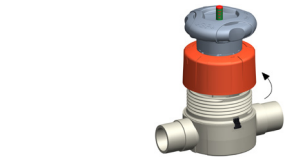
Replacing diaphragm
Damage to property and/or personal injuries due to medium which may exit uncontrollably or flow out from the pipe or valve.

- If a PTFE diaphragm is used: Replace **both**, PTFE and backing diaphragm EPDM or FPM.

1. Empty the piping system completely and release all pressure. Consider the safety message "Dismounting diaphragm valve or opening the housing nut"
2. Open valve
3. Open housing nut with a strap wrench

Information

On opening: unlatching of the friction lock is clearly audible

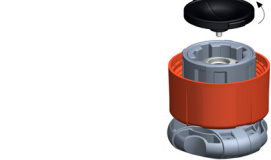


NOTICE

Dismounting diaphragm
Position indicator will break, if spindle assembly is completely turned off. Position of the diaphragm can no longer be shown by the indicator.

- On opened valve: Only turn the hand wheel two times to loosen the diaphragm from the inner housing

4. First do two turns with the hand wheel to loosen diaphragm from the inner housing. Hold hand wheel tight and screw diaphragm counter clockwise out of the inner housing

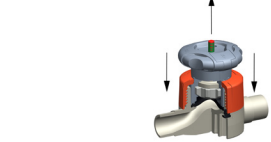


5. Hold hand wheel tight. Screw new diaphragm handtight clockwise into the inner housing and then turn the diaphragm back by min. 90°.

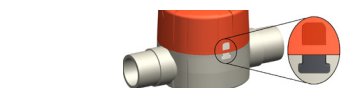
For assembly: Diaphragm tabs must be positioned between the narrow guiding bars of the inner housing



6. Replace friction lock on the valve body, therefore loose it with a screw driver. Push new element in
7. Put bonnet in opened position on the valve body



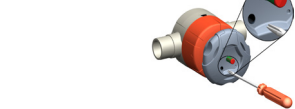
8. Screw housing nut with a strap wrench tight, till...
 - ... a uniform all-around gap of 0.5 up to 1 mm between valve body and bonnet is achieved and
 - ... the half-round position indicator aligns with the friction lock



8.3 Replacing seals

Only for option „pressure tight housing“

1. Empty the piping system completely and release all pressure. Consider the safety message "Dismounting diaphragm valve or opening the housing nut"
2. Open valve
3. Slide locking device in (unlocked)
4. Release fixation of the hand wheel: Push with a screw driver (Philips, Pozidriv, TORX max. Ø 4mm) in the biggest round hole of the hand wheel
5. Take hand wheel and screw driver off. Push screw driver out of the hand wheel

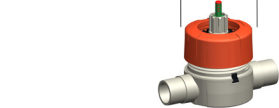


6. Open housing nut with a strap wrench

Information

On opening: unlatching of the friction lock is clearly audible

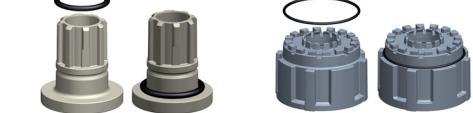
7. Remove housing nut



8. Take inner housing and spindle assembly out of the valve body
9. Push spindle device out of the inner housing with a little tap on the position indicator



10. Before mounting grease all o-rings with silicone grease. Replace seal on spindle nut and on inner housing



11. Screw position indicator out of the spindle nut. Screw new position indicator with o-ring hand-tight into the spindle nut

TIP

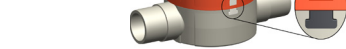
Thread of the position indicator is secured. By screwing the position indicator out, first turns are running rough
On assembling: Spindle nut must be screwed in completely



12. Assembly till step 6 is done in reversed order

For assembly: Diaphragm tabs must be positioned between the narrow guiding bars of the inner housing

13. 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 aligns with the friction lock



14. Put hand wheel on. The engagement is clearly audible.

9. Help in case of problems

Please observe the chapter "Help in case of problems" in the Planning Fundamentals and the safety messages in this document when handling defects! The Planning Fundamentals may be obtained from your Georg Fischer sales company or via Internet.

10. Accessories and spare parts

Orders for spare parts for diaphragm valves should include all specifications. Only the prescribed original spare parts from Georg Fischer must be used.

Accessories

- Electrical feedback with the following switches AgNi, Au
- Modification set for pressure tight housing

These accessories and spare parts as well as further information may be obtained from your Georg Fischer sales company or via www.piping.georgfischer.com

Additional information

The above mentioned Planning Fundamentals may be obtained from the Georg Fischer sales company responsible for your country or from the internet Georg Fischer Piping Systems Ltd. CH-8201 Schaffhausen (Switzerland) Info.ps@georgfischer.com or www.piping.georgfischer.com

EC declaration of conformity

The manufacturer, Georg Fischer Piping Systems Ltd, CH-8201 Schaffhausen (Switzerland) declares, that the diaphragm valve types 514, 515, 517 and 519 fulfil all corresponding regulations of the Pressure Equipment Directive 97/23/EC.

The products fulfil also the following corresponding regulations of the Community which are harmonized:

- Building Construction Directive 89/106/EC

Following harmonized standards were also used:

- EN ISO 16138

The CE emblem on the valve refers to this accordance (as per the directive on pressure equipment, only valves larger than DN25 can be labelled with CE).

Operation of these diaphragm valves is prohibited until conformity of the entire system into which the diaphragm valves have been installed is established according to one of the above mentioned EC Directives.

Information

Modifications on the diaphragm valve which have an effect on the given technical specifications and the intended use render this declaration of conformity null and void.

U. B. B. *M. Meyer*
Schaffhausen, 2010-02-01