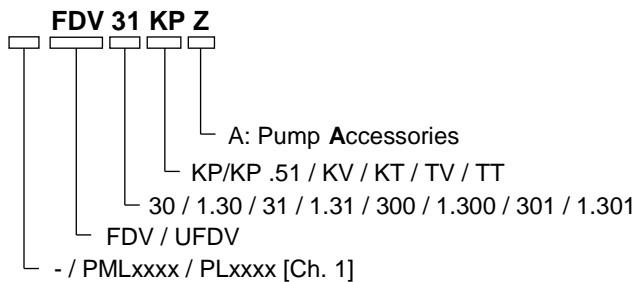


# DIAPHRAGM PRESSURE CONTROL VALVE

FDV 30 / 31, FDV 1.30 / 1.30

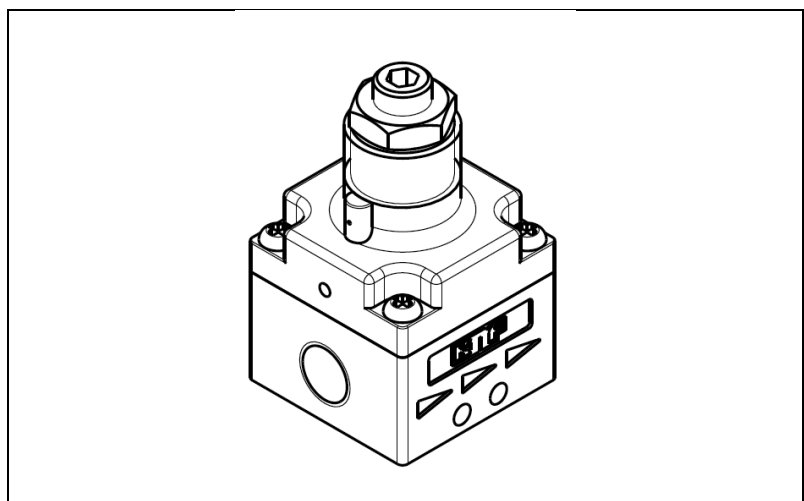
FDV 300 / 301, FDV 1.300 / 1.301



## Operating and Installation Instructions

Read and observe these Operating and Installation Instructions!

An additional letter prefixing the FDV model code is a country-specific designation, with no technical relevance.



KNF Flodos AG  
 Wassermatte 2  
 6210 Sursee, Switzerland  
 Tel. +41 (0)41 925 00 25  
 Fax +41 (0)41 925 00 35  
 www.knf-flodos.ch  
 info@knf-flodos.ch

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## 1. About this document

### 1.1. Use of the Operating and Installation Instructions

The Operating and Installation Instructions are part of the diaphragm pressure control valve.

→ Pass on the Operating and Installation Instructions to the next owner.

Customer projects

Customer-specific projects (pump models which begin with "PL" or "PML") may differ from the Operating and Installation Instructions.

→ In the case of projects, take note of any additionally agreed specifications.

### 1.2. Symbols and markings

#### Warning



**WARNING**

This symbol indicates a potential danger.

It also indicates the possible consequences of failure to observe the warning. The signal word (e.g. "Warning") indicates the level of danger.

→ This specifies measures for avoiding the danger and the consequences of failure to implement these measures.

#### Danger levels

Signal word	Meaning	Consequences if not observed
<b>DANGER</b>	warns of immediate danger	Consequences include death or serious injuries and/or serious property damage
<b>WARNING</b>	warns of possible danger	Death or serious injuries and/or serious property damage are possible
<b>CAUTION</b>	warns of a potentially dangerous situation	Minor injuries or property damage are possible

Tab. 1

#### Other information and symbols

→ This indicates an activity (step) that needs to be carried out.

1. This indicates the first step of an activity to be carried out. Any additional steps required are numbered consecutively.

**i** This symbol indicates important information.

## 2. Use

### 2.1. Intended use

The diaphragm pressure control valves restrict excessive pressure or are used to generate a constant counterpressure when transferring liquids.

#### Owner's responsibility

Operating parameters and conditions

Only install and operate the diaphragm pressure control valves under the operating parameters and conditions described in Chapter 4, Technical data.

Only complete diaphragm pressure control valves may be taken into service.

Requirements for transferred medium

Before transferring or metering a medium, check that it can be transferred without risk in the specific application case.

Before using a medium, make sure that it is compatible with the materials used to construct the diaphragm and lower section.

The temperature of the medium must lie within the permissible temperature range (see Chapter 4).

The transferred medium should not contain particles as these can prevent the diaphragm pressure control valve from working correctly. If this cannot be ensured, a filter with a sufficiently large filter area must be used upstream of the diaphragm pressure control valve.

.51\* version – version with food grade approval

The .51 versions of our diaphragm pressure control valves have been certified by NSF according to the standard NSF/ANSI 169 and are therefore suitable for use with foodstuffs without any restrictions.

All materials used have been checked through a series of toxicological tests. In order to ensure that the food grade quality is maintained, NSF will carry out a yearly audit checking our certified products.

Only the diaphragm pressure control valves marked with ".51" are NSF-certified and contain a defined material combination that also has a FDA certificate of conformity.

NSF: National Sanitary Foundation

FDA: Food and Drug Administration

ANSI: American National Standard Institute

*\* Diaphragm pressure control valves with other customer-specific certified material combinations are available on request.*

➔ All certified diaphragm pressure control valves are clearly marked with ".51" in the type designation along with the NSF-logo on the type plate. If either or both of these markings are missing, the diaphragm pressure control valve is not certified.

- Because the cleaning requirements of the diaphragm pressure control valve depends on the application, KNF is unable to guarantee cleaning options. The responsibility for cleaning therefore lies with the user. While the NSF/ANSI 169 standard regulates OEM products, it does not define cleaning methods for specific OEM products.
- All parts in contact with the medium can be replaced as spare parts without losing the certification. Component parts cannot be traded as certified parts. When replacing parts/assemblies only use original KNF parts.

## **2.2. Improper use**

The diaphragm pressure control valve must not be operated in a potentially explosive atmosphere.

For special modifications outside the standard technical specifications, please contact a KNF pump specialist.

### 3. Safety

- i** Follow the safety information in Chapter 6. Installation and connection.

The diaphragm pressure control valve is built according to the generally recognised rules of technology and in accordance with the pertinent occupational safety and accident prevention regulations. Nevertheless, potential dangers during use can result in injuries to the user or others or in damage to the diaphragm pressure control valve or other property. Only use diaphragm pressure control valves in perfect working order and in accordance with their intended use. Always ensure adherence to the Operating and Installation Instructions and work in a safety-conscious manner.

Personnel	<p>Make sure that only trained and instructed personnel or specially trained personnel work on the diaphragm pressure control valves. This especially applies to assembly, connection and servicing work.</p> <p>Make sure that all personnel have read and understood the Operating and Installation Instructions, and in particular the "Safety" chapter.</p>
Working in a safety-conscious manner	Always ensure adherence to all pertinent accident prevention and safety regulations when working on and operating the diaphragm pressure control valve.
Handling dangerous media	When transferring dangerous media, observe the safety regulations for handling such media.
Notes	Always ensure adherence to all information stickers on the diaphragm pressure control valve, such as flow direction arrows and type plates, and keep stickers in legible condition.
Environmental protection	All replacement parts should be properly stored and disposed of in accordance with the applicable environmental protection regulations. Ensure adherence to the pertinent national and international regulations. This especially applies to parts contaminated with toxic substances.
Disposal	<p>Dispose of all packaging in an environmentally-appropriate manner. The packaging materials are recyclable.</p> <p>Ensure that the diaphragm pressure control valve is disposed of in an environmentally-appropriate manner at the end of its useful life. Use appropriate waste collection systems for the disposal of end-of-life equipment. Used diaphragm pressure control valves contain valuable recyclable materials.</p>



EU directives/standards	For the purposes of the Machinery Directive 2006/42/EC, diaphragm pressure control valves are "partly completed machinery", and are therefore to be regarded as not ready for use. Partly completed machinery may not be commissioned until such time as it has been determined that the machine in which the partly completed machinery is to be assembled conforms to the provisions of Machinery Directive 2006/42/EC. The essential requirements of Annex I of Directive 2006/42/EC (general principles) are applied and observed.
Customer service and repairs	All repairs to the diaphragm pressure control valves must be carried out by the relevant KNF Customer Service team. Only use genuine parts from KNF for servicing work.

## 4. Technical data

### 4.1. Design variants

The diaphragm pressure control valve is available in various designs:

#### Basic type selection

Basic type selection		
	Adjustability	Pump type
FDV 30 / 1.30	With threaded pin and lock nut	NF 5 / NF 10 / NF 25 NF 30 / NF 60 NF 100
FDV 31 / 1.31	With rotary knob	NF 1.5 / NF 1.10 NF 1.30 / NF 1.60 NF 1.100
FDV 300 / 1.300	With threaded pin and lock nut	NF 300 / NF600
FDV 301 / 1.301	With rotary knob	NF 1.300 / NF 1.600

Tab. 2

#### Materials selection

Materials selection		
FDV 30 / 31 KPZ FDV 30 / 31 KP. 51Z* FDV 1.30 / 1.31 KPZ FDV 1.30 / 1.31 KP. 51Z*	Lower section Diaphragm	PP EPDM
FDV 30 / 31 KVZ FDV 1.30 / 1.30 KVZ	Lower section Diaphragm	PP FKM
FDV 30 / 31 KTZ FDV 1.30 / 1.31 KTZ	Lower section Diaphragm	PP FFKM
FDV 30 / 31 TVZ FDV 1.30 / 1.31 TVZ	Lower section Diaphragm	PVDF FKM
FDV 30 / 31 TTZ FDV 1.30 / 1.31 TTZ	Lower section Diaphragm	PVDF FFKM
FDV 300 / 301 KPZ FDV 300 / 301 KP. 51Z* FDV 1.300 / 1.301 KPZ FDV 1.300 / 1.301 KP .51*Z	Lower section Diaphragm	PP EPDM
FDV 300 / 301 KVZ FDV 1.300 / 1.301 KVZ	Lower section Diaphragm	PP FKM
FDV 300 / 301 KTZ FDV 1.300 / 1.301 KTZ	Lower section Diaphragm	PP FFKM
FDV 300 / 301 TVZ FDV 1.300 / 1.301 TVZ	Lower section Diaphragm	PVDF FKM
FDV 300 / 301 TTZ FDV 1.300 / 1.301 TTZ	Lower section Diaphragm	PVDF FFKM

Tab. 3

\* Version with NSF certificate (see Chapter 2.1)

## 4.2. General data

### Hydraulic ratings

Basic type selection			
	Setting range [bar g]	Factory-set opening pressure [bar g]	Max. flow rate for water* [l/min]
FDV 30 / 31	0.5 - 2.5	0.5	3.0
FDV 1.30 / 1.31	2.0 - 6.5	3.0	3.0
FDV 300 / 301	0.8 - 2.5	1.0	12.0
FDV 1.300 / 1.301	2.0 - 6.5	3.0	12.0

Tab. 4

\* Measured using water at 20 °C

### Hydraulic connections

Parameter	Value
Thread for connecting piece FDV 30 / 31 FDV 1.30 / 1.31	G 1/8"
Thread for connecting piece UFDV 30 / 31 UFDV 1.30 / 1.31	NPT 1/8"
Thread for connecting piece FDV 300 / 301 FDV 1.300 / 1.301	G 3/8"
Thread for connecting piece UFDV 300 / 301 UFDV 1.300 / 1.301	NPT 3/8"

Tab. 5

### Other parameters

Parameter	Value
Permissible ambient temperature range [°C]	+ 5 to + 40
Permissible media temperature range [°C]	+ 5 to + 80

Tab. 6

### General data

Basic type selection	Weight depending on material design <sup>1)</sup> [g]
FDV 30 / 31 FDV 1.30 / 1.31	50 - 60
FDV 300 / 301 FDV 1.300 / 1.301	50 - 60

Tab. 7

<sup>1)</sup> The weight may differ slightly from the stated value, depending on the version.



## 5. The working principle

The diaphragm pressure control valve is based on the technology of membrane valves.

The required pressure can be set continuously using the initial tension of the pressure spring. The pressure exerted by the prestressed spring is absorbed by the membrane and transferred to the fluid system.

By turning the threaded pin clockwise, the opening pressure increases whilst the flow rate remains the same; the opening pressure is reduced by turning it anti-clockwise. The threaded pin is fixed in position using the lock nut, thus preventing movement.

In idle mode, the membrane lies on top of the two flow openings and the system is thus closed. If the pressure generated by the pump now exceeds the set opening pressure, the membrane is pressed upwards and the medium is able to flow. The diaphragm pressure control valve is now in its working state and is open.

## 6. Installation and connection

Always install diaphragm pressure control valves under the operating parameters and conditions described in Chapter 4, Technical data.

Observe the safety precautions (see Chapter 3).

### 6.1. Installation

#### General information

Be aware of the following before commissioning the diaphragm pressure control valve:

1. Follow the safety regulations specific to the media used.
  2. The diaphragm pressure control valve must always be used on the pressure side of a system.
  3. The materials of the diaphragm pressure control valve, the hose connections and the hoses themselves must be sufficiently chemically resistant to the liquid being transferred (see Chapter 4.1, Table 3).
  4. Check the correct and tight connection of hoses, screw fittings, etc. and any transition joints (hose connectors / hose, etc.).
- We recommend securing transition joints between hose and hose connectors with clamps or other clamping elements. If you are working in an area under pressure, this is imperative to prevent the hoses from coming off the hose connectors.
- Mounting dimensions (see Fig. 1 to 4)

#### Mounting dimensions

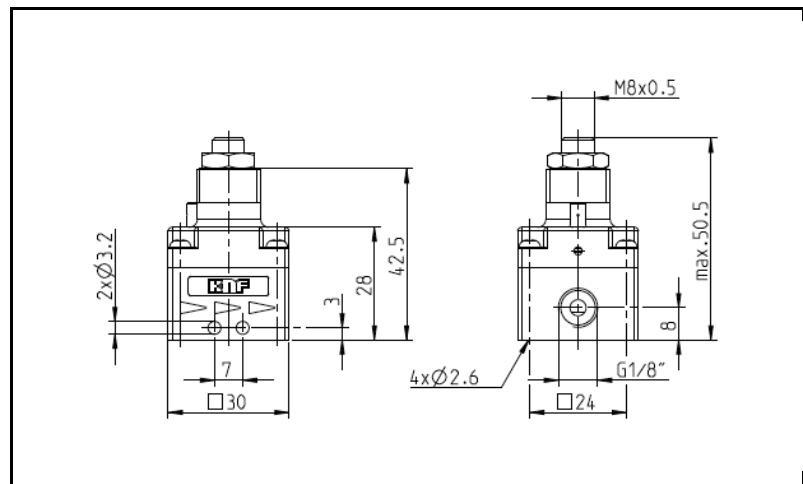


Fig. 1: Mounting dimensions FDV\_30

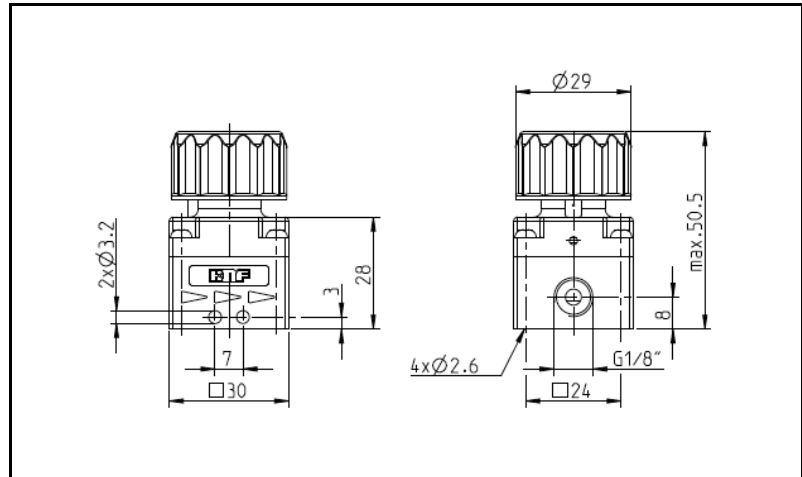


Fig. 2: Mounting dimensions FDV\_.31

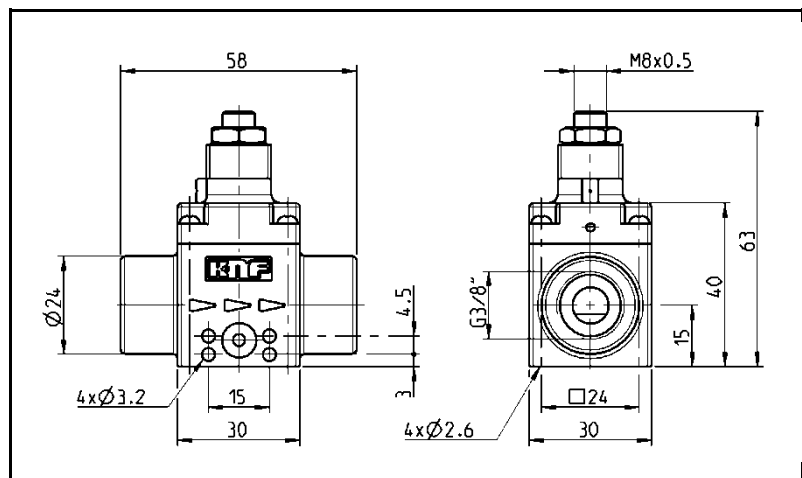


Fig. 3: Mounting dimensions FDV\_.300

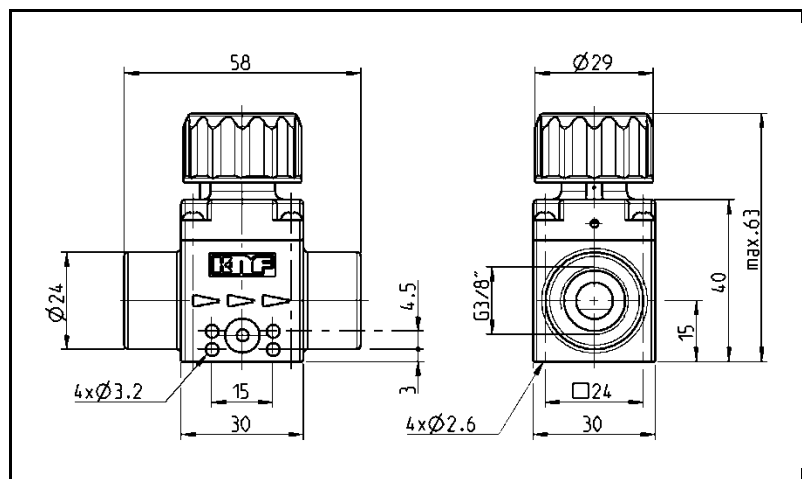


Fig. 4: Mounting dimensions FDV\_.301

### Mechanical

- ➔ There is a mounting facility provided by four screws in the lower section or by two screws through the diaphragm pressure control valve (see data sheet).
- ➔ It can be mounted in any orientation.

## 6.2. Hydraulic

- Slide the hose over the hose connectors on the supply and output sides.
- For the direction of flow, please observe the orientation of the arrow on the lower section.
- Check that the system is leak-tight.
- The diaphragm pressure control valve, hoses and other elements must be rated for the maximum permissible operating pressure.
- Thread for connecting pieces: See Chapter 4, Technical data, Tab. 5.

## 7. Servicing

### 7.1. Servicing schedule

Component	Servicing interval
Diaphragm pressure control valve	- Regular inspection for external damage or leaks
Upper section	- Clean when the flow rate decreases
Diaphragm	- Change as soon as the capacity decreases, preferably sooner
Filter (accessory)	- Change if it is dirty

Tab. 8

### 7.2. Cleaning

Information on procedure



#### WARNING

Dangerous substances in the diaphragm pressure control valve can cause a health hazard  
Depending on the medium transferred, caustic burns or poisoning are possible.

- Wear protective clothing if necessary, e.g. protective gloves.
- Rinse the diaphragm pressure control valve with a neutral liquid and pump empty.

#### 7.2.1. Flushing the pump

- When transferring aggressive media, KNF recommends flushing the diaphragm pressure control valve with air under atmospheric conditions for several minutes prior to switch off (if necessary for safety reasons: use an inert gas). This will extend the service life of the diaphragm.

#### 7.2.2. Cleaning the pump

- Where possible, wipe the components with a dry cloth. Do not use cleaning solvents as these may corrode plastic parts.
- If there is compressed air available, blow off components.

Prior requirements

- Diaphragm pressure control valve free of hazardous materials
- Hoses removed from diaphragm pressure control valve
- We recommend replacing the diaphragm when the upper section is removed.

Tools

Qty.	Tool
1	Phillips screwdriver no. 1

Tab. 9

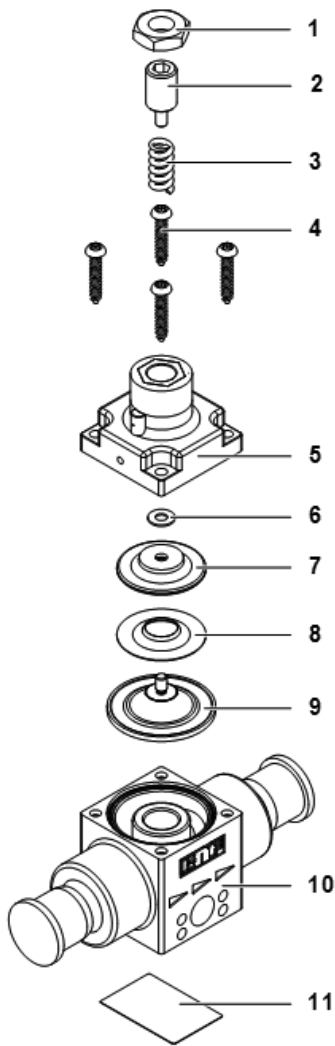


Fig. 5: FDV\_300

- 1 Lock nut
- 2 Threaded pin
- 3 Pressure spring
- 4 Head screw
- 5 Upper section
- 6 Washer
- 7 Support
- 8 Sliding disk
- 9 Diaphragm
- 10 Lower section
- 11 Type plate

### Preparatory steps

1. On decommissioning, the entire installation as well as the diaphragm pressure control valve must be flushed with a neutral liquid and then pumped empty.
2. Remove the hoses from the diaphragm pressure control valve (on the supply and output sides)

### 7.3. Dismantling the upper section

1. **For FDV 30 / 1.30 or FDV 300 / 1.300:** Turn the threaded pin (2) as high as possible in order to relieve the pressure on the pressure spring (3).  
**For FDV 31 / 1.31 or FDV 301 / 1.301:** Turn the rotary knob as high as possible in order to relieve the pressure on the pressure spring (3).
2. Undo the four head screws (4) and remove the entire upper section (5).

### 7.4. Replacing the diaphragm

- ➔ Remove the washer (only included in version FDV 31), the pressure spring (3), washer (6), support (7) and sliding disk (8) from the diaphragm (9).
- ➔ Remove the old diaphragm (9).  
We recommend replacing the diaphragm (9).
- ➔ Insert the new diaphragm (9) in the lower section (10).
- ➔ Place the following on the diaphragm in the following order: sliding disk (8), support (7), washer (6), pressure spring (3) and washer (only included in version FDV 31).

### 7.5. Mounting the upper section

1. Place the upper section (5) on top of the lower section (10).
2. Alternately tighten the four head screws (4).

### 7.6. Setting the pressure control valve

1. **For FDV 30 / 1.30 or FDV 300 / 1.300:** Turn the threaded pin (2) back into its old position. Secure with the lock nut (1).  
**For FDV 31 / 1.31 or FDV 301 / 1.301:** Turn the rotary knob into its old position.
2. The pressure setting on the diaphragm pressure control valve must be checked.

## 8. Troubleshooting

<b>Flow rate, suction head or pressure head is too low</b>	
The diaphragm pressure control valve does not achieve the performance stated in the technical data or on the data sheet.	
Cause	Fault remedy
Components in the system connected to the suction and pressure sides, such as hoses, valves or filters, are causing too much resistance	→ Modify installation, check cross-sections of components
Hose connections are not leak-tight	→ Secure transition joints between hose and hose connectors with clamps or other clamping elements
Particles in the diaphragm pressure control valve	→ Clean the diaphragm pressure control valve; install suction-side filter if required.
Viscosity of the transferred medium is too high	→ Contact KNF
Incorrect interchange of outlet and inlet line connections	→ Remove outlet and inlet lines and re-connect correctly
The diaphragm pressure control valve parts are not resistant to the medium to be transferred	→ Replace the diaphragm pressure control valve with a resistant variant
The generated pressure is greater than the overflow setting (.27)	→ Reduce pressure if possible → Set the overflow higher (maximum specification must not be exceeded)
Diaphragm is worn	→ Replace diaphragm (see Chapter 7.4)
Diaphragm pressure control valve does not open	→ The pressure value set using the threaded pin or rotary knob is too high → The pressure spring is defective → The diaphragm pressure control valve is clogged

Tab. 10

### Fault cannot be rectified

If you are unable to identify any of the above causes, please send the diaphragm pressure control valve to KNF customer services (see address on last page).

1. Flush the diaphragm pressure control valve to clear it of any hazardous or aggressive fluids (see Chapter 7.2.1).
2. Remove the diaphragm pressure control valve
3. Clean the diaphragm pressure control valve (see Chapter 7.2.2).
4. Send the diaphragm pressure control valve to KNF customer services along with the completed decontamination declaration (see Chapter 9). Please indicate the medium that the pump is used to transfer.

## 9. Decontamination declaration

**i** KNF shall only undertake to repair a diaphragm pressure control valve on condition that the customer provides certification of the transferred media and the cleaning of the diaphragm pressure control valve (decontamination declaration).

→ Copy this page.

Enter the diaphragm pressure control valve model, the serial number and the transferred media in the form below and send the signed form together with the flushed and cleaned diaphragm pressure control valve to KNF customer services (see address on last page)

### Customer decontamination declaration for repair order

We confirm that the diaphragm pressure control valve below has been used to transfer the following media, and that the diaphragm pressure control valve has been flushed and cleaned.

Diaphragm pressure control valve model	
Serial No.	
Transferred media	

The diaphragm pressure control valve does not contain aggressive, biological, radioactive, poisonous, or other dangerous media.

\_\_\_\_\_  
Company

\_\_\_\_\_  
Date/Signature









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