

# Pressure loading valves

Installation and operating instructions



## Original installation and operating instructions.

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**Warning**

*Prior to installation, read these installation and operating instructions. Installation and operation must comply with local regulations and accepted codes of good practice.*

## 1. Safety instructions

These installation and operating instructions contain all information important for users of the product:

- technical data
- instructions on installation and use
- safety information.

If you require further information or if any problems arise, which are not described in detail in this manual, please contact Grundfos.

### 1.1 Symbols used in this document

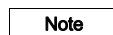
The safety instructions are identified by the following symbols:

**Warning**

*If these safety instructions are not observed, it may result in personal injury.*

**Caution**

*If these safety instructions are not observed, it may result in malfunction or damage to the equipment.*

**Note**

*Notes or instructions that make the job easier and ensure safe operation.*

### 1.2 Qualification and training of personnel

The personnel responsible for the installation, operation and service must be appropriately qualified for these tasks. Areas of responsibility, levels of authority and the supervision of the personnel must be precisely defined by the operator. If necessary, the personnel must be trained appropriately.

### 1.3 Safe operation

If safe operation is no longer possible, the product must be taken out of operation and secured against unintentional operation.

This is the case in the following situations:

- If the product is visibly damaged.
- If the product no longer seems operational.
- After long periods of storage under unfavourable conditions.

### 1.4 Safety instructions for the operator/user

The owner/operations manager of the system is responsible for training of operating personnel.

**Warning**

*When working with chemicals, the accident prevention regulations applicable at the installation site must be applied!*

*Observe the chemical manufacturer's safety data sheets when handling chemicals!*

**Warning**

*When working on the product, or connections and lines, always wear protective clothing (e.g. safety goggles and gloves)!*

*The system must be unpressurised!*

*Only operate the system if all lines are connected correctly!*

**Warning**

*The chemical resistance of the parts that come into contact with the dosing medium depends on the medium, media temperature and operating pressure!*

*Ensure that all parts in contact with the medium are resistant to the medium under operating conditions!*

## 2. General information

### 2.1 Applications

The pressure loading valve keeps the pump's counterpressure constant. The valve opens, if the pressure exceeds the opening pressure adjusted at the valve.

The valve is suitable to maintain the required counterpressure of the pump in case of:

- insufficient counterpressure in the system
- open discharge.



#### **Warning**

**Other applications or the operation in ambient and operating conditions, which are not approved, are considered improper and are not permitted! Grundfos cannot be held liable for any damage resulting from incorrect use!**

### 2.2 Improper operating methods

The operational safety of the product is only guaranteed if it is used in accordance with section 2.1 Applications.

#### **Caution**

**Pressure loading valves are not isolating valves. They are never completely tight when closed.**

The product must not be used for:

- operation in potentially explosive areas
- combustible media
- frozen media or gases
- abrasive or crystallising media.

### 2.3 Warranty

A guarantee claim in accordance with our general terms of sale and delivery is only valid if the following requirements are fulfilled:

- The product is used in accordance with the information within this manual.
- The product is not dismantled or handled incorrectly.
- The maintenance is carried out by authorised and qualified personnel.
- Only original spare parts are used for repairs during maintenance.

## 3. Technical data

### 3.1 Storage and ambient temperatures

	Operating pressure	
	< 10 bar	10-16 bar
Min./Max. ambient temperature [°C]	0/+40	0/+20
Min./Max. storage temperature [°C]	-10/+50	

### 3.2 Permissible media temperature

Material	Operating pressure	
	< 10 bar	10-16 bar
PVC, PP	0 °C to +40 °C	0 °C to +20 °C
PVDF, SS	-10 °C to +40 °C	-10 °C to +20 °C

### 3.3 Pressure loading valves up to 60 l/h

#### 3.3.1 Type key

Code	Example	PLV-	G5/8-	10	PP/	V,E	U2
PLV	Pressure loading valve						
	<b>Connection size</b>						
G5/8	G 5/8 male thread, groove for O-ring on top						
R1/4	Rp 1/4" female thread (only SS versions)						
1/4N	1/4" NPT female thread (only SS versions)						
	<b>Opening pressure</b>						
3	Preset opening pressure 3 bar						
	<b>Housing and connection material</b>						
PP	Polypropylene						
PVC	Polyvinyl chloride						
PV	Polyvinylidene fluoride (PVDF)						
SS	Stainless steel grade 1.4571 according to EN 10027-2						
	<b>Gasket materials</b>						
V,E	FKM and EPDM gaskets are enclosed						
T	PTFE gaskets are enclosed						
-	No gaskets (only SS versions)						
	<b>Hose or pipe connections</b>						
U2	Hose connections for sizes ID/OD [mm]: 4/6, 6/9, 6/12, 9/12						
U7	Hose connections for sizes ID x OD: 0.17" x 1/4", 1/4" x 3/8", 3/8" x 1/2"						
A	Threaded connections Rp 1/4" female						
V	Threaded connections 1/4" NPT female						
X	No connections included, please order separately from accessories range						

3.3.2 Technical data

Opening pressure [bar]	Connections included	Materials			Product number	Type designation	Drawing
		Housing	Connections	Gaskets			
3	Hose sizes [mm]: 4/6, 6/9, 6/12, 9/12	PP	PP	FKM/EPDM	95730741	PLV-G5/8-3 PP/V,E U2	Fig. 1
		PVC	PVC	FKM/EPDM	95730742	PLV-G5/8-3 PVC/V,E U2	
				PTFE	95730743	PLV-G5/8-3 PVC/T U2	
		PVDF	PVDF	FKM/EPDM	95730744	PLV-G5/8-3 PV/V,E U2	
				PTFE	95730745	PLV-G5/8-3 PV/T U2	
	Hose sizes: 0.17" x 1/4", 1/4" x 3/8", 3/8" x 1/2"	PP	PP	FKM/EPDM	95730746	PLV-G5/8-3 PP/V,E U7	Fig. 1
		PVC	PVC	FKM/EPDM	95730747	PLV-G5/8-3 PVC/V,E U7	
				PTFE	95730748	PLV-G5/8-3 PVC/T U7	
		PVDF	PVDF	FKM/EPDM	95730749	PLV-G5/8-3 PV/V,E U7	
				PTFE	95730750	PLV-G5/8-3 PV/T U7	
Threaded G 1/4	SS	(SS)	no gaskets	95730751	PLV-G1/4-3 SS/- A	Fig. 2	
Threaded 1/4" NPT	SS	(SS)	no gaskets	95730752	PLV-1/4N-3 SS/- V		
Without connections	PP	-	FKM/EPDM	95730753	PLV-G5/8-3 PP/V,E X	Fig. 1	
	PVC	-	FKM/EPDM	95730754	PLV-G5/8-3 PVC/V,E X		
			PTFE	95730755	PLV-G5/8-3 PVC/T X		
	PVDF	-	FKM/EPDM	95730756	PLV-G5/8-3 PV/V,E X		
			PTFE	95730645	PLV-G5/8-3 PV/T X		

3.3.3 Dimensional drawings

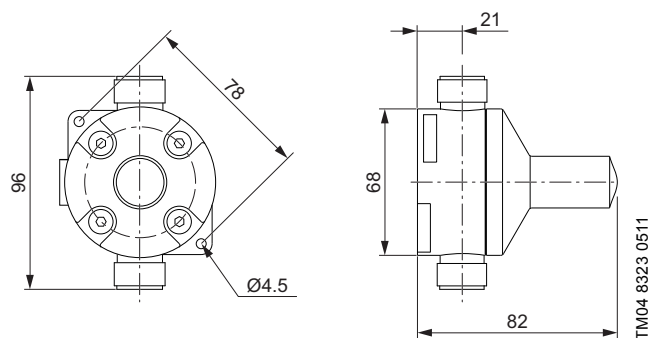


Fig. 1 Dimensions PP, PVC, PVDF

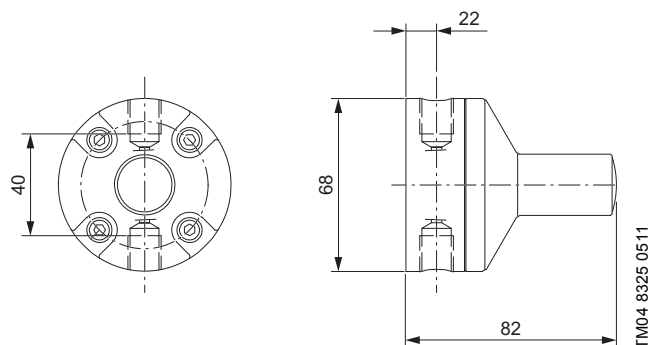


Fig. 2 Dimensions SS

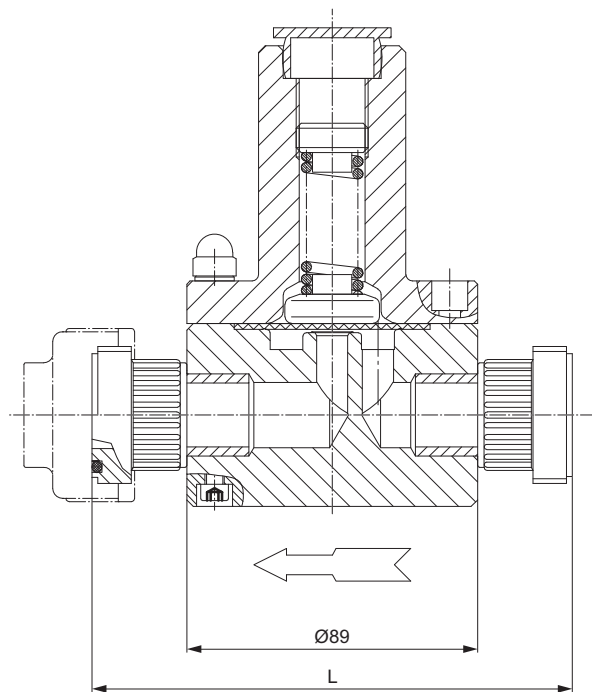
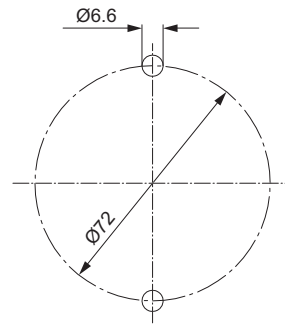
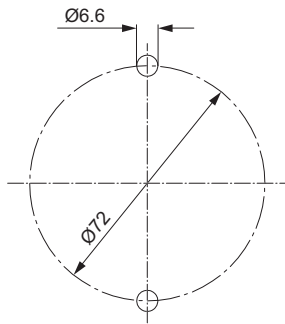
### 3.4 Pressure loading valves DN 20

#### 3.4.1 Technical data

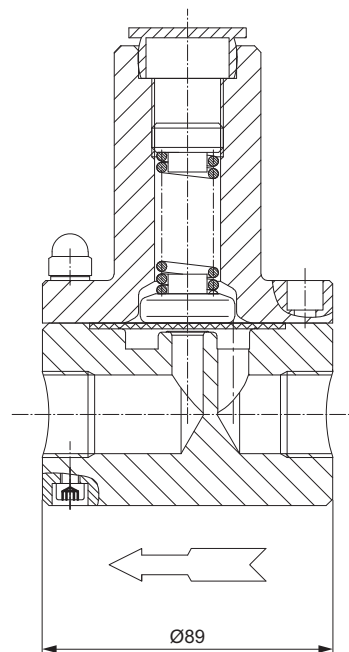
Opening pressure [bar]	Housing	Gasket	L [mm]	Hose ID/OD [mm]	Pipe ID/OD [mm]	Connection	Product number	Drawing	
3	PVC	Viton	149	13/20	20/25	G 1 1/4	96376567	Fig. 3	
	PVC	Viton	149	19/27		G 1 1/4	96295906		
	PVC	EPDM	149	13/20	20/25	G 1 1/4	96693603		
	PVC	EPDM	149	19/27		G 1 1/4	96295905		
	PVC	PTFE	149	19/27		G 1 1/4	96727369		
	PP	Viton	152.5		20/25	G 1 1/4	96693704		
	PP	Viton	152.5	19/27		G 1 1/4	96295904		
	PP	EPDM	152.5		20/25	G 1 1/4	96727370		
	PP	EPDM	152.5	19/27		G 1 1/4	96295903		
	PVDF	PTFE	145.5		20/25	G 1 1/4	96618727		
	SS*		-			G 3/4	96295907		Fig. 4
	PVC	Viton	149			3/4" NPT	91835674		Fig. 3

\* Stainless steel 1.4571, according to EN 10027-2

#### 3.4.2 Dimensional drawings



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Fig. 3 Dimensions PP, PVC, PVDF

Fig. 4 Dimensions SS

### 3.5 Pressure loading valves DN 32

#### 3.5.1 Technical data

Opening pressure [bar]	Housing	Gasket	L [mm]	Pipe ID/OD [mm]	Connection	Product number	Drawing
3	PP	Viton	229	32/40	flange DN 32	96695919	Fig. 7
	PP	Viton	205	32/40	G 2	96295909	Fig. 6
	PP	EPDM	229		flange DN 32	96727371	Fig. 7
	PP	EPDM	205	32/40	G 2	96295908	
	PVC	Viton	205	32/40	G 2	96295911	Fig. 6
	PVC	EPDM	205	32/40	G 2	96295910	
	PVC	Viton	229		flange DN 32	96695695	Fig. 7
	PVC	EPDM	229		flange DN 32	96695696	
	SS*	-	-	-	G 1 1/4	96295912	Fig. 8
	SS*	PVC	206		flange DN 32/G 1 1/4	96652055	Fig. 9
	PVDF	PTFE	229	32/40	flange DN 32	96692234	Fig. 7

\* Stainless steel 1.4571, according to EN 10027-2

#### 3.5.2 Dimensional drawings

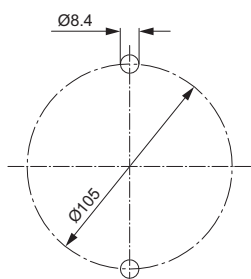


Fig. 5 Drilling scheme (all versions)

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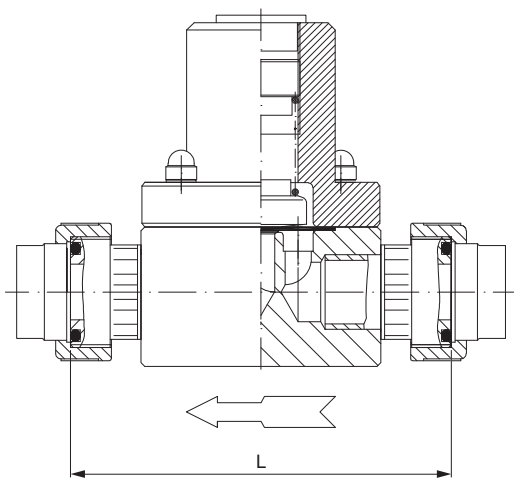


Fig. 6 Dimensions PP, PVC, PVDF, no flange

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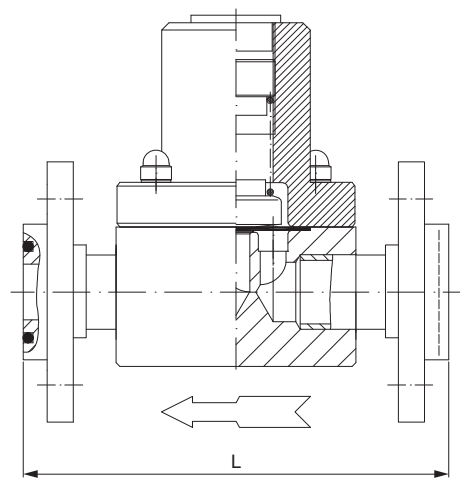


Fig. 7 Dimensions PP, PVC, PVDF, with flange

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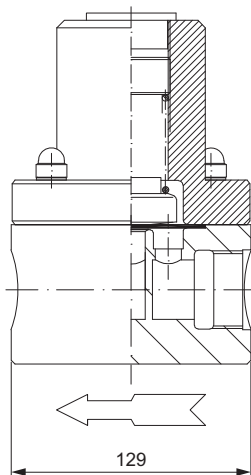


Fig. 8 Dimensions SS, no flange

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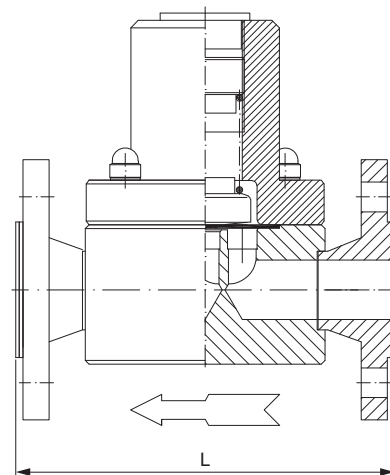


Fig. 9 Dimensions SS, with flange

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### 3.6 Pressure loading valves DN 50 and DN 65

#### 3.6.1 Technical data

Opening pressure [bar]	Nominal width [mm]	Housing	Gasket	L [mm]	Connection	Product number	Drawing
2.2	50	PP	Viton	250	flange DN 50	96727376	Fig. 10
1.5	65	PVC	Viton	271	flange DN 65	96638486	
1.5	65	PVC	EPDM	271	flange DN 65	96635246	
1.5	65	PP	Viton	324	flange DN 65	96727367	Fig. 11
1.5	65	SS*	PVC, soft	280	flange DN 65	96694434	

\* Stainless steel 1.4571, according to EN 10027-2

#### 3.6.2 Dimensional drawings

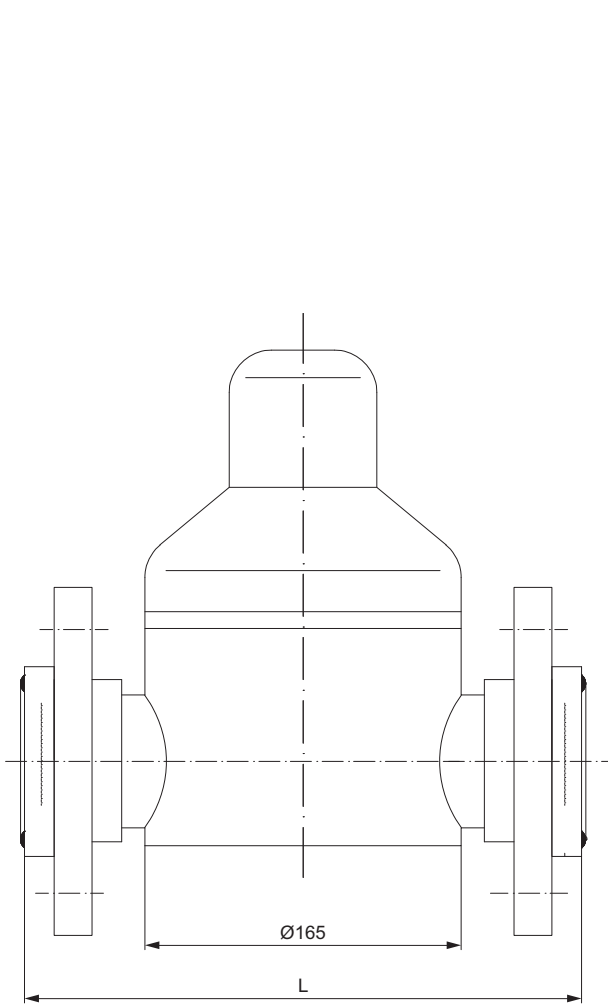


Fig. 10 Dimensions PP, PVC

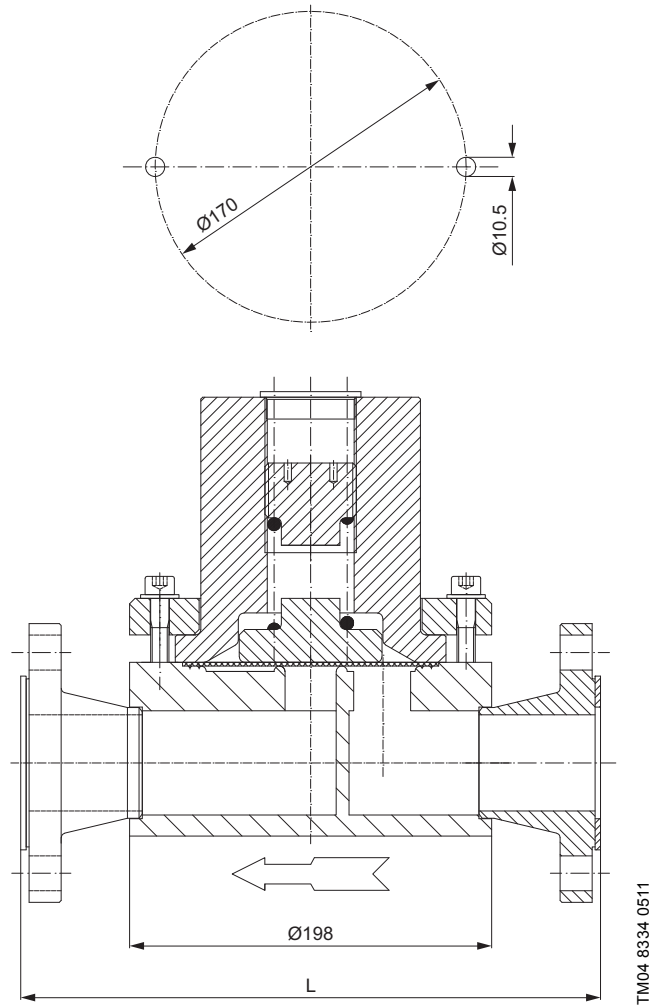


Fig. 11 Dimensions SS



## 4. Installation



### Warning

The valve must only be installed by authorised and qualified personnel!



### Warning

When working with chemicals, the accident prevention regulations applicable at the installation site must be applied!

Observe the chemical manufacturer's safety data sheets when handling chemicals!



### Warning

When working on the product, or connections and lines, always wear protective clothing (e.g. safety goggles and gloves)!

The system must be unpressurised!

Only operate the system if all lines are connected correctly!

### Caution

When using a pressure loading valve in conjunction with a pulsation damper, the pressure loading valve must be installed behind the pulsation damper.

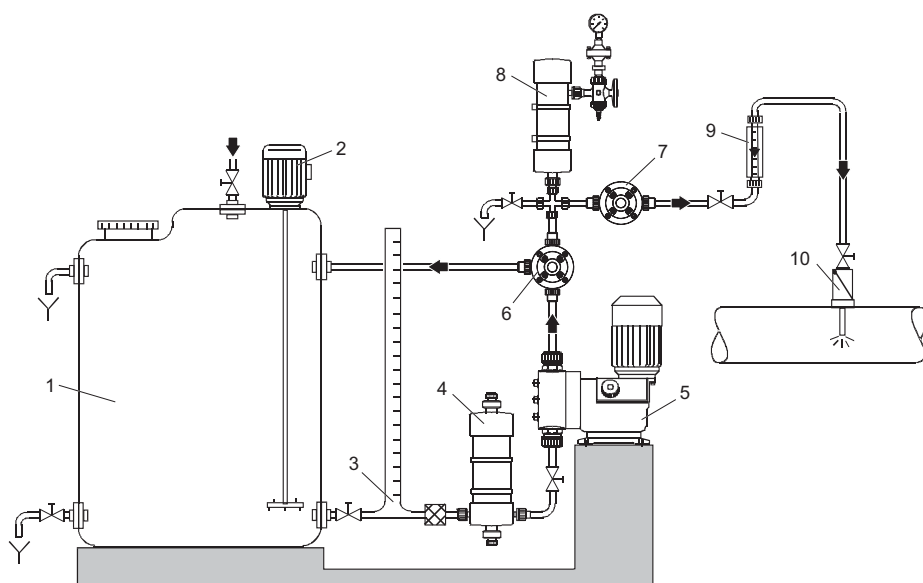
### Caution

When using a pressure loading valve in conjunction with a pressure relief valve, the pressure loading valve must be installed behind the pressure relief valve.

### Note

The pressure loading valve should be installed directly in front of the injection unit. For installation directly on the pump, the line connected to the injection unit should be as short as possible.

### 4.1 Optimal installation



- 1 Dosing tank
- 2 Electric agitator
- 3 Extraction device
- 4 Suction pulsation damper
- 5 Dosing pump
- 6 Pressure relief valve
- 7 Pressure loading valve
- 8 Pulsation damper
- 9 Flow meter
- 10 Injection unit

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Fig. 12 Optimal installation

### 4.2 Connections

The pressure loading valves have an inlet and an outlet (see arrow on housing). They are installed in the discharge line.

Pressure loading valves can also be mounted directly on the discharge valve of the dosing pump with an optional adapter.



### Warning

Observe the flow direction (indicated by an arrow on the valve housing).

#### 4.2.1 Installation in the discharge line

1. Connect the discharge line from the discharge valve of the dosing pump to the inlet of the valve.
2. Connect the outgoing discharge line to the outlet of the valve.
3. Re-tighten screws on top part of valve after 48 operating hours. Max. torque:

Up to 60 l/h	DN 20, DN 32	DN 50, DN 65
2 Nm	5 Nm	5 Nm

#### 4.2.2 Installation directly on the pump

### Note

A special adapter is needed, see 8.1 Adapter for installation directly on the pump (up to 60 l/h).

1. Remove connection from the inlet of the valve.
2. Screw the adapter onto the inlet of the valve.
3. Screw the valve with the adapter onto the discharge valve of the pump.
4. Connect the outgoing discharge line to the outlet of the valve.
5. Re-tighten screws on top part of valve after 48 operating hours. Max. torque:

Up to 60 l/h	DN 20, DN 32	DN 50, DN 65
2 Nm	5 Nm	5 Nm

## 5. Settings



### Warning

**Settings on the valve must only be carried out by authorized personnel!**

The opening pressure can only be set, if a pressure gauge is installed in the system between the pump and the pressure loading valve.

The opening pressure of the valve is set in the factory to the value specified in the technical data. During operation, the opening pressure depends on various factors, e.g. the flow, the stroke frequency of the pump, or the counterpressure. If a more precise setting is required, the valve must be adapted to the local conditions.

### 5.1 Setting the opening pressure



### Warning

**Danger of injury! Never set the opening pressure higher than the maximum permissible operating pressure of dosing system and dosing pump!**

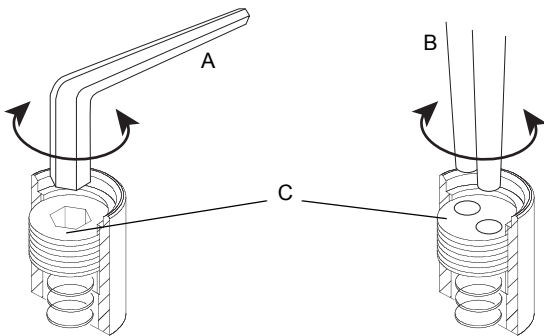


Fig. 13 Setting the opening pressure

While the pump is running:

1. Remove the protective cap from the top part of the valve.
2. Read the current opening pressure on the pressure gauge installed in front of the pressure loading valve.
3. For valves up to 60 l/h use a hexagon wrench (A), for DN 20 to DN 65 use a pair of needle-nosed pliers (B):
  - turn adjustment screw (C) clockwise to increase the pressure
  - turn adjustment screw (C) counterclockwise to reduce the pressure
4. Set the desired opening pressure.
5. Attach the protective cap again.

## 6. Maintenance



### Warning

**When working on the product, or connections and lines, always wear protective clothing (e.g. safety goggles and gloves)!**

**The system must be unpressurised!**

**Only operate the system if all lines are connected correctly!**

### 6.1 Intervals for cleaning and maintenance

- At least every 12 months or after 8000 operating hours
- If faults occur.

Clean the valve, and replace the diaphragm and O-rings, if necessary.

### 6.2 Replacing the diaphragm

For spare parts see section 8. *Spare parts and accessories.*

1. Shut down dosing system.
2. Make it impossible for a return flow or overpressure to occur.
3. Loosen screws on top part of valve.
4. Remove top part of valve.
5. Remove diaphragm.
6. Insert new diaphragm.
7. Refit top part of valve and tighten screws diagonally.  
Max. torque:

Up to 60 l/h	DN 20, DN 32	DN 50, DN 65
2 Nm	5 Nm	5 Nm

8. Start up dosing system again.
9. Re-tighten screws on top part of valve after 48 operating hours. Max. torque:

Up to 60 l/h	DN 20, DN 32	DN 50, DN 65
2 Nm	5 Nm	5 Nm

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## 7. Fault finding

Fault	Possible cause	Possible remedy
The pressure loading valve does not produce any counterpressure.	Defective diaphragm.	Replace the diaphragm.
	Dirt in the pressure loading valve.	Rinse the pressure loading valve.
	Opening pressure set too low.	Set the pressure loading valve to a higher opening pressure.

## 8. Spare parts and accessories

### 8.1 Adapter for installation directly on the pump (up to 60 l/h)

Connections	Housing	Product number	Description
G 5/8 - G 5/8	PVC	95730437	PVC nut G 5/8 - nut G 5/8
	PP	95730438	PP nut G 5/8 - nut G 5/8
	PVDF	95730439	PVDF nut G 5/8 - nut G 5/8
G 5/8 - 1/4"	SS*	96693273	SS nut G 5/8 - 1/4"

\* Stainless steel 1.4571, according to EN 10027-2

### 8.2 Spare parts for pressure loading valves up to 60 l/h

Description	Suitable for housing materials	Product number
Diaphragm	all	91834367
Pressure spring	all	91834370
Adjusting screw	all	96679604
Kit, gaskets 2 pcs - G 5/8 V/E	PVC, PP, PVDF	95731456
Kit, gaskets 2 pcs - G 5/8 T	PVC, PP, PVDF	95731457

### 8.3 Set of counter flanges for pressure loading valves DN 32 and DN 65

Size	Material	Product number	Description
DN 32	SS*	91835727	Includes lapped flange, headed bush, screws, washers, nuts
DN 32	PVC	91835728	
DN 32	PVDF	96727588	
DN 65	PVC	96727602	Includes welding neck flange, flat gasket, screws, washers, nuts
DN 65	PP	96727603	
DN 32	PP	96727589	
DN 65	SS*	96727604	Includes welding neck flange, screws, washers, nuts

\* Stainless steel 1.4571, according to EN 10027-2

## 8.4 Spare parts for pressure loading valves &gt; 60 l/h

Pressure loading valve	Size	Diaphragm	O-rings	Quantity	Pressure spring	Adjusting screw
96376567			91835574			
96295906			91835574			
96693603			91835575			
96295905			91835575			
96727369			91835576	2		
96693704	DN 20	91834368	91835574		91834371	91834083
96295904			91835574			
96727370			91835575			
96295903			91835575			
96618727			91835576			
96295907			-	-		
91835674			91835574	2		
96695919			96688232			
96295909			96688232			
96727371			96688248			
96295908			96688248	2		
96295911			96688221			
96295910	DN 32	91834369	96688263		91834086	96679389
96695695			96688232			
96695696			96688248			
96295912			-	-		
96652055			-	-		
96692234			96688277	2		
96638486			96688247			
96635246	DN 65	-	96688246	2	-	-
96727367			96688247			
96694434		96707093	96728858	1	96707230	

## 9. Disposal

This product or parts of it must be disposed of in an environmentally sound way. Use appropriate waste collection services. If this is not possible, contact the nearest Grundfos company or service workshop.





## Argentina

Bombas GRUNDFOS de Argentina S.A.  
Ruta Panamericana km. 37.500 Lote 34A  
1619 - Garin  
Pcia. de Buenos Aires  
Phone: +54-3327 414 444  
Telefax: +54-3327 411 111

## Australia

GRUNDFOS Pumps Pty. Ltd.  
P.O. Box 2040  
Regency Park  
South Australia 5942  
Phone: +61-8-8461-4611  
Telefax: +61-8-8340 0155

## Austria

GRUNDFOS Pumpen Vertrieb Ges.m.b.H.  
Grundfosstraße 2  
A-5082 Grödig/Salzburg  
Tel.: +43-6246-883-0  
Telefax: +43-6246-883-30

## Belgium

N.V. GRUNDFOS Bellux S.A.  
Boomssesteenweg 81-83  
B-2630 Aartselaar  
Tél.: +32-3-870 7300  
Télécopie: +32-3-870 7301

## Belorussia

Представительство ГРУНДФОС в  
Минске  
220123, Минск,  
ул. В. Хоружей, 22, оф. 1105  
Тел.: +(37517) 233 97 65  
Факс: (37517) 233 9769  
E-mail: grundfos\_minsk@mail.ru

## Bosnia/Herzegovina

GRUNDFOS Sarajevo  
Trg Heroja 16,  
BiH-71000 Sarajevo  
Phone: +387 33 713 290  
Telefax: +387 33 659 079  
e-mail: grundfos@bih.net.ba

## Brazil

BOMBAS GRUNDFOS DO BRASIL  
Av. Humberto de Alencar Castelo Branco,  
630  
CEP 09850 - 300  
São Bernardo do Campo - SP  
Phone: +55-11 4393 5533  
Telefax: +55-11 4343 5015

## Bulgaria

Grundfos Bulgaria EOOD  
Slatina District  
Iztochna Tangenta street no. 100  
BG - 1592 Sofia  
Tel. +359 2 49 22 200  
Fax. +359 2 49 22 201  
email: bulgaria@grundfos.bg

## Canada

GRUNDFOS Canada Inc.  
2941 Brighton Road  
Oakville, Ontario  
L6H 6C9  
Phone: +1-905 829 9533  
Telefax: +1-905 829 9512

## China

Grundfos Alldos  
Dosing & Disinfection  
ALLDOS (Shanghai) Water Technology  
Co. Ltd.  
West Unit, 1 Floor, No. 2 Building (T 4-2)  
278 Jinhua Road, Jin Qiao Export Process-  
ing Zone  
Pudong New Area  
Shanghai, 201206  
Phone: +86 21 5055 1012  
Telefax: +86 21 5032 0596  
E-mail: grundfosalldos-CN@grundfos.com

## China

GRUNDFOS Pumps (Shanghai) Co. Ltd.  
22 Floor, Xin Hua Lian Building  
755-775 Huai Hai Rd, (M)  
Shanghai 200020  
PRC  
Phone: +86-512-67 61 11 80  
Telefax: +86-512-67 61 81 67

## Croatia

GRUNDFOS CROATIA d.o.o.  
Cebini 37, Buzin  
HR-10010 Zagreb  
Phone: +385 1 6595 400  
Telefax: +385 1 6595 499  
www.grundfos.hr

## Czech Republic

GRUNDFOS s.r.o.  
Čapkovského 21  
779 00 Olomouc  
Phone: +420-585-716 111  
Telefax: +420-585-716 299

## Denmark

GRUNDFOS DK A/S  
Martin Bachs Vej 3  
DK-8850 Bjerringbro  
Tlf.: +45-87 50 50 50  
Telefax: +45-87 50 51 51  
E-mail: info\_GDK@grundfos.com  
www.grundfos.com/DK

## Estonia

GRUNDFOS Pumps Eesti OÜ  
Peterburi tee 92G  
11415 Tallinn  
Tel: + 372 606 1690  
Fax: + 372 606 1691

## Finland

OY GRUNDFOS Pumpat AB  
Mestarintie 11  
FIN-01730 Vantaa  
Phone: +358-3066 5650  
Telefax: +358-3066 56550

## France

Pompes GRUNDFOS Distribution S.A.  
Parc d'Activités de Chesnes  
57, rue de Malacombe  
F-38290 St. Quentin Fallavier (Lyon)  
Tél.: +33-4 74 82 15 15  
Télécopie: +33-4 74 94 10 51

## Germany

GRUNDFOS Water Treatment GmbH  
Reetzstraße 85  
D-76327 Pfinztal (Söllingen)  
Tel.: +49 7240 61-0  
Telefax: +49 7240 61-177  
E-mail: gwt@grundfos.com

## Germany

GRUNDFOS GMBH  
Schlüterstr. 33  
D-40699 Erkrath  
Tel.: +49-(0) 211 929 69-0  
Telefax: +49-(0) 211 929 69-3799  
E-mail: infoservice@grundfos.de  
Service in Deutschland:  
E-mail: kundendienst@grundfos.de

## Greece

GRUNDFOS Hellas A.E.B.E.  
20th km. Athinon-Markopoulou Av.  
P.O. Box 71  
GR-19002 Peania  
Phone: +0030-210-66 83 400  
Telefax: +0030-210-66 46 273

## Hong Kong

GRUNDFOS Pumps (Hong Kong) Ltd.  
Unit 1, Ground floor  
Siu Wai Industrial Centre  
29-33 Wing Hong Street &  
68 King Lam Street, Cheung Sha Wan  
Kowloon  
Phone: +852-27861706 / 27861741  
Telefax: +852-27858664

## Hungary

GRUNDFOS Hungária Kft.  
Park u. 8  
H-2045 Törökbálint,  
Phone: +36-23 511 110  
Telefax: +36-23 511 111

## India

GRUNDFOS Pumps India Private Limited  
118 Old Mahabalipuram Road  
Thoraiakkam  
Chennai 600 096  
Phone: +91-44 2496 6800

## Indonesia

PT GRUNDFOS Pompa  
Jl. Rawa Sumur III, Blok III / CC-1  
Kawasan Industri, Pulogadung  
Jakarta 13930  
Phone: +62-21-460 6909  
Telefax: +62-21-460 6910 / 460 6901

## Ireland

GRUNDFOS (Ireland) Ltd.  
Unit A, Merrywell Business Park  
Ballymount Road Lower  
Dublin 12  
Phone: +353-1-4089 800  
Telefax: +353-1-4089 830

## Italy

GRUNDFOS Pompe Italia S.r.l.  
Via Gran Sasso 4  
I-20060 Truccazzano (Milano)  
Tel.: +39-02-95838112  
Telefax: +39-02-95309290 / 95838461

## Japan

GRUNDFOS Pumps K.K.  
Gotanda Metalion Bldg. 5F,  
5-21-15, Higashi-gotanda  
Shiagawa-ku, Tokyo,  
141-0022 Japan  
Phone: +81 35 448 1391  
Telefax: +81 35 448 9619

## Korea

GRUNDFOS Pumps Korea Ltd.  
6th Floor, Aju Building 679-5  
Yeoksam-dong, Kangnam-ku, 135-916  
Seoul, Korea  
Phone: +82-2-5317 600  
Telefax: +82-2-5633 725

## Latvia

SIA GRUNDFOS Pumps Latvia  
Deglava biznesa centrs  
Augusta Deglava ielā 60, LV-1035, Rīga,  
Tālr.: + 371 714 9640, 7 149 641  
Fakss: + 371 914 9646

## Lithuania

GRUNDFOS Pumps UAB  
Smolensko g. 6  
LT-03201 Vilnius  
Tel: + 370 52 395 430  
Fax: + 370 52 395 431

## Malaysia

GRUNDFOS Pumps Sdn. Bhd.  
7 Jalan Peguam U1/25  
Glenmarie Industrial Park  
40150 Shah Alam  
Selangor  
Phone: +60-3-5569 2922  
Telefax: +60-3-5569 2866

## México

Bombas GRUNDFOS de México S.A. de  
C.V.  
Boulevard TLC No. 15  
Parque Industrial Stiva Aeropuerto  
Apodaca, N.L. 66600  
Phone: +52-81-8144 4000  
Telefax: +52-81-8144 4010

## Netherlands

GRUNDFOS Netherlands  
Veluwezoom 35  
1326 AE Almere  
Postbus 22015  
1302 CA ALMERE  
Tel.: +31-88-478 6336  
Telefax: +31-88-478 6332  
E-mail: info\_gnl@grundfos.com

## New Zealand

GRUNDFOS Pumps NZ Ltd.  
17 Beatrice Tinsley Crescent  
North Harbour Industrial Estate  
Albany, Auckland  
Phone: +64-9-415 3240  
Telefax: +64-9-415 3250

## Norway

GRUNDFOS Pumper A/S  
Strømsveien 344  
Postboks 235, Leirdal  
N-1011 Oslo  
Tlf.: +47-22 90 47 00  
Telefax: +47-22 32 21 50

## Poland

GRUNDFOS Pompy Sp. z o.o.  
ul. Klonowa 23  
Baranowo k. Poznania  
PL-62-081 Przeźmierowo  
Tel: (+48-61) 650 13 00  
Fax: (+48-61) 650 13 50

## Portugal

Bombas GRUNDFOS Portugal, S.A.  
Rua Calvet de Magalhães, 241  
Apartado 1079  
P-2770-153 Paço de Arcos  
Tel.: +351-21-440 76 00  
Telefax: +351-21-440 76 90

## România

GRUNDFOS Pompe România SRL  
Bd. Biruintei, nr 103  
Pantelimon county Ilfov  
Phone: +40 21 200 4100  
Telefax: +40 21 200 4101  
E-mail: romania@grundfos.ro

## Russia

ООО Грундфос  
Россия, 109544 Москва, ул. Школьная  
39  
Тел. (+7) 495 737 30 00, 564 88 00  
Факс (+7) 495 737 75 36, 564 88 11  
E-mail grundfos.moscow@grundfos.com

## Serbia

GRUNDFOS Predstavništvo Beograd  
Dr. Milutina Ivkovića 2a/29  
YU-11000 Beograd  
Phone: +381 11 26 47 877 / 11 26 47 496  
Telefax: +381 11 26 48 340

## Singapore

GRUNDFOS (Singapore) Pte. Ltd.  
24 Tuas West Road  
Jurong Town  
Singapore 638381  
Phone: +65-6865 1222  
Telefax: +65-6861 8402

## Slovenia

GRUNDFOS d.o.o.  
Šlandrova 8b, SI-1231 Ljubljana-Črnuče  
Phone: +386 1 568 0610  
Telefax: +386 1 568 0619  
E-mail: slovenia@grundfos.si

## South Africa

Grundfos (PTY) Ltd.  
Corner Mountjoy and George Allen Roads  
Wilbart Ext. 2  
Bedfordview 2008  
Phone: (+27) 11 579 4800  
Fax: (+27) 11 455 6066  
E-mail: lsmart@grundfos.com

## Spain

Bombas GRUNDFOS España S.A.  
Camino de la Fuentequilla, s/n  
E-28110 Algete (Madrid)  
Tel.: +34-91-848 8800  
Telefax: +34-91-628 0465

## Sweden

GRUNDFOS AB  
(Box 333) Lunnagårdsgatan 6  
431 24 Mölndal  
Tel.: +46(0)771-32 23 00  
Telefax: +46(0)31-331 94 60

## Switzerland

GRUNDFOS ALLDOS International AG  
Schönmattpstraße 4  
CH-4153 Reinach  
Tel.: +41-61-717 5555  
Telefax: +41-61-717 5500  
E-mail: grundfosalldos-CH@grundfos.com

## Switzerland

GRUNDFOS Pumpen AG  
Bruggacherstrasse 10  
CH-8117 Fällanden/ZH  
Tel.: +41-1-806 8111  
Telefax: +41-1-806 8115

## Taiwan

GRUNDFOS Pumps (Taiwan) Ltd.  
7 Floor, 219 Min-Chuan Road  
Taichung, Taiwan, R.O.C.  
Phone: +886-4-2305 0868  
Telefax: +886-4-2305 0878

## Thailand

GRUNDFOS (Thailand) Ltd.  
92 Chaloom Phrakiat Rama 9 Road,  
Dokmai, Pravej, Bangkok 10250  
Phone: +66-2-725 8999  
Telefax: +66-2-725 8998

## Turkey

GRUNDFOS POMPA San. ve Tic. Ltd. Sti.  
Gebze Organize Sanayi Bölgesi  
İhsan dede Caddesi,  
2. yol 200. Sokak No. 204  
41490 Gebze/ Kocaeli  
Phone: +90 - 262-679 7979  
Telefax: +90 - 262-679 7905  
E-mail: satis@grundfos.com

## Ukraine

ТОВ ГРУНДФОС УКРАЇНА  
01010 Київ, Вул. Московська 86,  
Тел.: (+38 044) 390 40 50  
Факс.: (+38 044) 390 40 59  
E-mail: ukraine@grundfos.com

## United Arab Emirates

GRUNDFOS Gulf Distribution  
P.O. Box 16768  
Jebel Ali Free Zone  
Dubai  
Phone: +971-4- 8815 166  
Telefax: +971-4-8815 136

## United Kingdom

GRUNDFOS Pumps Ltd.  
Grovebury Road  
Leighton Buzzard/Beds. LU7 8TL  
Phone: +44-1525-850000  
Telefax: +44-1525-850011

## U.S.A.

GRUNDFOS Pumps Corporation  
17100 West 118th Terrace  
Olathe, Kansas 66061  
Phone: +1-913-227-3400  
Telefax: +1-913-227-3500

## Uzbekistan

Представительство ГРУНДФОС в  
Ташкенте  
700000 Ташкент ул.Усмана Носира 1-й  
тулик 5  
Телефон: (3712) 55-68-15  
Факс: (3712) 53-36-35

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