



Operation maintenance manual

Gate Valves

The following operation instructions are valid
for F & M - valves of figure no.

Fig_480/481

CONTENT

1. General

- 1.1 Safety
- 1.2 Proper use

2. Transport and storage

- 2.1 Transport
- 2.2 Storage, packaging

3. Product and function description

- 3.1 Product features and function
- 3.2 Applications
- 3.3 Proper and improper mode of operation

4. Installation in the pipeline

- 4.1 Site requirements
- 4.2 Place of installation
- 4.3. Position of installation

5. Putting the valve into operation

- 5.1 Visual inspection of the valve
- 5.2 Function check

6. Maintenance and servicing

- 6.1 General safety instructions
- 6.2 Inspection and actuation intervals
- 6.3 Maintenance work and replacement of spare parts

7. Trouble-shooting



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1. GENERAL

1.1 Safety

These operating and maintenance instructions must be observed at all times and used jointly with the and Operating Instructins for Valves.

The user must not change or modify this product or the mounting parts/fittings supplied with it. Does not assume any warranty or liability for consequential damage arising from non-compliance with these instructions.

For the use of this non-return valve, the generally accepted technical rules (EN standards). The non-return valves must only be installed by qualified, specially trained staff.

For further specifications and information such as dimensions, materials and fields of application, please refer to the related documentation.

1.2 Proper use

The Norva non-return valve is a non-return valve designed for installation and pipelines.

The standard model is designed to allow the flow of the medium in pressurized pipelines in one direction and to automatically prevent return flow.

The technical application ranges (e.g. working pressure, medium, temperature etc.) are described in the product-related documentation.

For any deviating operating conditions and applications the user must obtain the manufacturers priors written approval.

2. TRANSPORT AND STORAGE

2.1 Transport

To transport the valve to its installation site, it must be packed in a stable, properly sized container. The container also needs to ensure that the valve is protected against weather influences and damage.

When the valve is transported long distance (e.g. overseas) and exposed to special climatic conditions, it needs to be protected by sealing it in plastic wrapping and adding a desiccant.

The Norva Non-Return Valve must be transported with the disk in closed position. It is advisable to place the valve in its container upright on its inlet flange (see Fig. 1).

The factory-applied corrosion protection coating and mountings (e.g. lifting device) need to be specially protected.

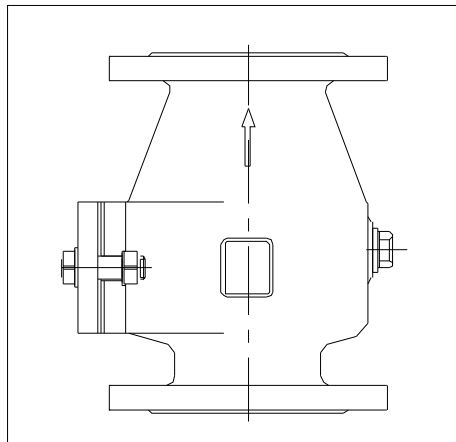


Fig. 1: Position for transport

2.2 Storage

The Non-Return Valve must be stored with the disk in closed position. Preferably the valve should be placed on its inlet flange (see Fig. 1). The elastomer parts (seals) must be protected against direct sunlight as otherwise their reliable long-term function cannot be ensured.

The valve should be stored in a dry, well-ventilated area. The direct exposure of the non-return valve to radiation heat emitted by radiators should be avoided.

The components relevant for proper function of the valve, such as the disk, the lifting device must be protected against dust and other kinds of dirt by appropriate covers.

3. PRODUCT AND FUNCTION DESCRIPTION

3.1 Product features and function

The valve is a Non-Return Valve with flanges on either side and can therefore be installed between two flanges or as an end-of-line valve without counter-flange under full operating pressure. The disk is attached to a rubber joint and opens automatically through the pressure of the medium conveyed. Proper sealing in the other direction is also controlled by the pressure of the medium (resilient seated). For complete sealing, a back-pressure of approx. 5m water column is needed.

The standard model is supplied with a G $\frac{3}{4}$ draining plug (Fig. 2). Instead of the plug, a separately available lifting device (also G $\frac{3}{4}$) can be screwed into the opening of the drain plug. It allows forced lifting of the disk to allow the medium to flow back.

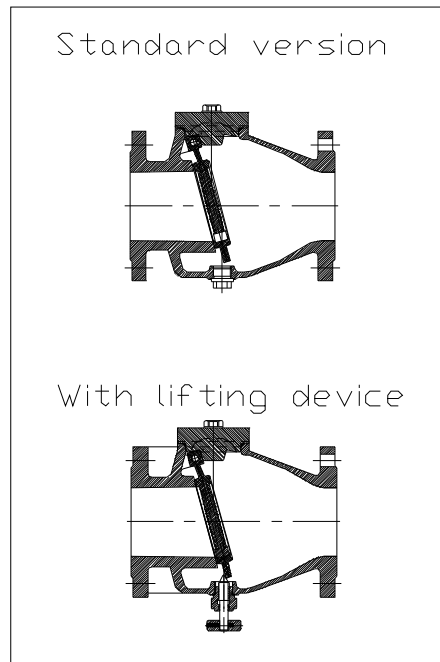


Fig. 2: Non – Return Valve

3.2. Fields of application

As the seals of the Non-Return Valve are made of EPDM materials, it can be used with the following media:

- Water, raw material and cooling water, municipal waste water, weak acids and lye solutions

Using the non-return valve with media containing oil and gas may destroy the rubber lining of the disk and the O-rings.

As the seals of the Norva Non-Return Valve are made of NBR materials, it can be used with the following media:

- Water, raw material and cooling water, municipal waste water, weak acids and lye solutions containing oil substance.

3.3 Proper and improper mode of operation

The maximum operating temperatures and pressures specified in the technical documentation must not be exceeded. The closed must only be exposed to pressures within the range of its nominal pressure.



The lifting device must only be operated up to its maximum specified differential pressure (see ART 480/481).

The maximum permissible flow velocity (stable flow) is that according to the EN 1074-1 standard:

Valves with PN 10: 3 m/s

Valves with PN 16: 4 m/s

In the case of turbulent flow (e.g. when the valve is installed behind elbows), the flow velocity must be reduced accordingly (see Sect. 4). Should this be impossible, the maintenance intervals (see Sect. 6) must be shortened.

4. INSTALLATION IN THE PIPELINE

4.1 Site requirements

When the valve is installed between pipeline flanges, the flanges must be plane-parallel and in true alignment. Misaligned pipelines must be put into a true alignment position before the valve is installed. Otherwise the body may be exposed to impermissibly high loads and strain during operation which may even cause the body to break.

The installation of the valve must ensure that the valve is not exposed to tensile stress. No loads of the pipeline must be transmitted to the valve. It needs to be ensured that the space left between the flanges is large enough to prevent damage of the coating of the raised faces of the flanges when the valve is installed. When work is performed in the valve area which may cause dirt (e.g. painting, erection of brick walls or concrete work), the valve must be protected by a suitable cover.

4.2 Place of installation

The place of installation for the valve must be selected in a way that ensures there is enough space to allow proper operation (lifting device), later function checks and maintenance work (e.g. cleaning of the valve). For open-air installation, the valve must be protected against extreme weather conditions, such as the formation of ice, by covering it appropriately. To ensure proper function and a long service life of the non-return valve, several factors need to be considered for the best place of installation.



4.2.1 Stable flow:

A smooth and even flow ensures the undisturbed position of the disk in the flow even under increased flow velocities (see Section 3.3). To achieve steady and even flow, a straight damping zone of 5x DN should be provided upstream of the non-return valve (see Fig. 3a).

If the construction and site conditions do not allow this distance, the preferred installation position should be that shown in Fig. 3a or 3c.

If it is not possible to provide a damping zone according to Fig. 3a, flow turbulences may cause the disk and rubber joint to vibrate and thus shorten their service life. To prevent this, the flow velocity should be reduced to 2m/s max. (e.g. by selecting a larger nominal diameter) or the maintenance intervals should be shortened.

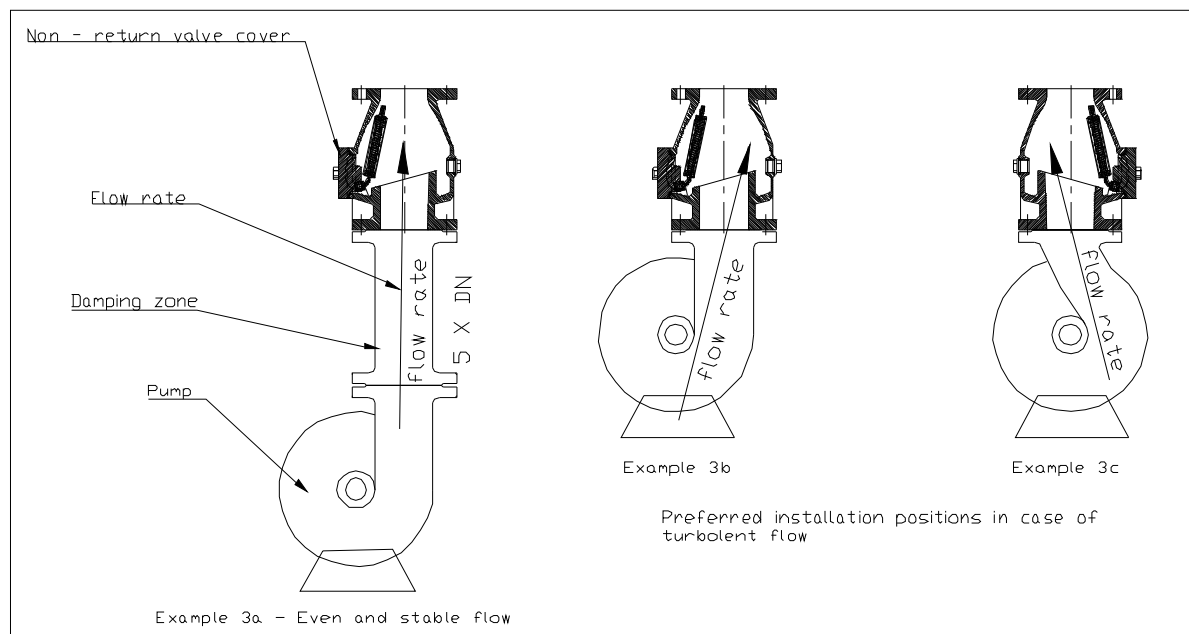


Fig. 3: Installation Non - Return Valve

4.2.2 Flow velocity

The Non-Return Valve is suitable for operation at maximum flow velocity according to EN 1074-1 (see section 3.3).

The prerequisite for this kind of operation is the installation of the valve with an upstream damping zone (see Section 4.2.1, Fig. 3a).

If it is impossible to provide a damping zone, the disk and rubber joint will very probably be subject to increased wear and tear. To prevent this, it is advisable to reduce the flow velocity



to max. 2 m/s (e.g. by selecting a larger nominal diameter) or to shorten maintenance intervals.

For operation with waste water containig suspended solids, the flow velocity should be as high as possible within the permissible range as this will prevent the valve from being clogged with deposits.

4.3 Installation position

The Norva Non Return Valve can be installed in horizontal or ascending pipelines up to angle of inclination of 90^0 (observe flow arrow on valve body). The valve will not operate in any other position (figure 3).

When used in pipelines conveying waste water containig suspended solids, horizontal installation is advisable as this will prevent the valve from being clogged by deposits.

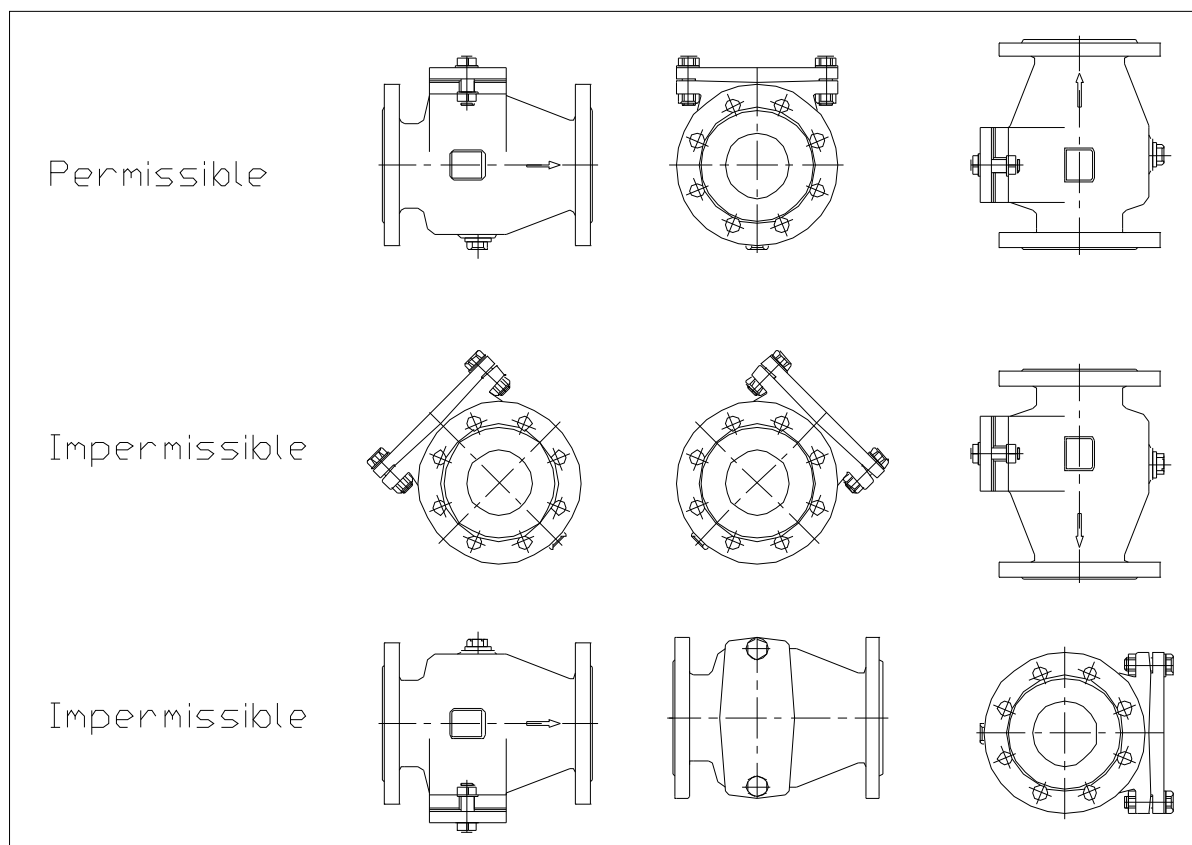


Fig. 4: Permissible and impermissible installation positions

4.4 Mounting instructions, fittings



Before the valve is installed, it must be checked for transport or storage damage. While being stored on the construction site before its installation, the valve must be protected against dirt by an appropriate cover. When the valve is being installed, its functional parts such as the disk, lifting device and the bypass must be free of dust and dirt. Does not assume any liability for consequential damage caused by dirt, grit residues etc.

The proper motion and function of the function parts should be checked before installation. If the valves are painted later on, it must be made sure that the function parts are not painted over.

The lifting device is screwed into the valve body instead of the plug.

When installing the Non-Return Valve, it must be made sure that suitable load suspension devices as well as transport equipment and cranes and elevators are available. Suspending the valve using its lifting device or the bypass may damage or even destroy the mounts.

For the connection of the valve to the pipeline flanges, the hexagonal bolts and nuts used in the bore holes must be screwed in using washers from flange to flange.

The screws must be fastened evenly and crosswise to prevent unnecessary tension which may cause cracks or breaks.

The pipeline must not be pulled towards the fitting. If the gap between the fitting and flange is too large, this must be compensated by using thicker seals. Pipeline loads must only be transmitted to the valve within the limits specified by EN 1074-3

We recommend using steel-reinforced rubber seals according to EN 1514-1 shape IBC. If flared flanges are to be used, these seals are mandatory.

5. PUTTING THE VALVE INTO OPERATION

5.1 Visual inspection

Before putting the valve and the equipment into operation, all functional parts must be subjected to visual inspection. All screwed connections need to be checked as to whether they are tightly fastened.



5.2 Function check and pressure test

Before the installation of the valve, its function parts (disk, lifting device) should be completely opened and closed at least once and their proper operation should be tested.
For proper function of the non-return valve, the lifting device must afterwards be brought into its basic position.

Factory test of the valve to EN 12266

DN mm	PN bar	Permissible working Overpressure bar	Permissible working Temperature For water and waste water °C	Test pressure in bar – with water	
				In the Body	In the seat
50...300	16	16	50	24	17,6
200..300	10	10	50	15	11

Table 1

CAUTION! The closed non-return valve must only be exposed to pressures not exceeds its nominal pressure (see table 1). When a pipeline pressure test is performed during which the test pressure in the closing direction of the non-return valve, the disk must be opened a little in order not to expose the elastomer parts to excessive loads. To open the valve, the lifting device may be used.

6. MAINTENANCE AND REPAIR

6.1 General safety instructions

Prior to any inspections and maintenance work to be performed on the valve or mounted parts and attachments, the pressurized pipeline must be shut off, the pressure must be relieved and the system must be secured against unintentional switching on.
Depending on the kind and criticality of the medium or fluid conveyed, all the required safety regulations must be complied with!

Upon completion of the maintenance work and prior to resuming operation, all connections must be checked for proper fastening and leak-freeness.
The individual steps as stated under Section 5 need to be preformed.

6.2 Inspection and actuation intervals

The condition of the disk should be checked at least once per year. The proper function of lifting device should also be checked at least once per year. In case of extreme operating



conditions and heavily polluted media, inspection and actuation should be carried out more frequently depending on the conditions.

6.3 Maintenance and replacement of spare parts

The spare parts and wearing parts needed can be found in the spare parts list ART 480/481.

6.3.1 Inspection of the disk

For inspection according to the recommended intervals the valve must be opened and the disk must be cleaned. In the course of the inspection the rubber joint and the sealing parts must be checked for cracks. Should the sealing parts be damaged, the disk can be turned over and thus used again. If the rubber joint shows cracks, the disk (spare parts kit 1) must be replaced.

6.3.2 Leaking body seals

After a longer period of operation or frequent opening of the valve, material fatigue may cause the seals of the cover or the plug to leak. Should this be the case, the respective seal must be replaced (spare parts kit 2).

6.3.4 Cleaning, lubrication

To ensure the proper function of the disk, lifting device the body of the valve must be cleaned according to the recommended intervals.

It is not necessary to lubricate the disk joint.

In case of sluggish operation, the stem of the lifting device may be slightly greased.

Recommended lubricant:
KLUBERSYNTH VR 69-252
(KTW-approved for drinking water)

6.3.5 Recommendations for the replacement of parts

(partlist and spare parts see ART 480/481)

- a. Replace disk Set 1 every 5 years
- b. Replace sealing Set 2 when necessary

Under extreme operating conditions, the parts mentioned above may have to be replaced more frequently.



7. Trouble-shooting

For all maintenance and repair work please observe the general safety instructions under Section 6.1!

Problem	Cause	Remedial action
Disk does not seal properly	Foreign particle(s) jammed in the seat area	Purge valve, dismantle, if necessary and remove foreign particle(s)
	Deposits from the medium have settled on the seat or disk	Dismantle valve and clean seat area and disk
	Back-pressure too low	To achieve the specified leak rate, the back-pressure must be at least 5 m water column
	Unfavourable flow at the valve disk and obstruction of the closing movement	Change installation position (cf. Section 4)
	Final position damper until blocked	Disassemble damper unit according to operating instructions and unblock it
	Obstruction of the closing movement due to worn bearing	Change installation position (cf. Section 4)
Disks slams	Unfavourable installation position and thus unfavourable flow at the disk (e.g. installed too closely behind the elbow)	Change installation position (cf. Section 4)
	Flow velocity of the medium too low	Install valve with smaller nominal diameter or increase flow velocity in the system within the permitted range of the valve



Problem	Cause	Remedial action
Valve soils too fast	Unfavourable installation position (e.g. vertical installation)	Change installation position (see section 4)
	Change installation position (see section 4)	Install valve with a smaller nominal diameter or increase flow velocity in the system observing the permissible application ranges of the valve
Body leaks	Deteriorated seals	Replace seals (cf. Section 6)
	Packing gland at bypass leaky	Retighten packing gland
Sluggish operation of the lifting device	Counter-pressure too high during lifting	Observe operating ranges of the lifting device (see KAT-1544-A)
	Not enough grease on the stem	Lubricate stem (see Section 6)