

SINGLE-CHEK[®]

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OPERATING MANUAL

SINGLE-CHEK Check Valves Series CV



CRANE[®]

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SINGLE-CHEK Check Valves Series CV

1. Introduction

This manual is to support the user with the installation, operation and maintenance of SINGLE-CHEK Check Valves of the series CV.

CAUTION

If the following attention and warning notes are not adhered to, dangers could arise and the warranty of the manufacturer could become void.

In case of any further questions please contact the manufacturer, Xomox International GmbH & Co. OHG; addresses see section 9.

2. Intended use

These valves are exclusively designed for the following functions after installation in a pipe system:

- between flanges in accordance with EN 1092-1 or EN 1759-1, with sealing strips according to shape C, D or E, which have to be mechanically processed parallel and level and which have to be flush (installation between other flanges and/or other sealing strips only after checking back with Xomox International GmbH & Co. OHG),
- media with maximum permissible operating pressure PS, which is indicated for the maximum permissible temperature TS on the name plate of the check valve,
- to cut off in the case of a change of the flow direction contrary to the arrow direction marked on the body and to open in the direction of the flow marked with the arrow, with automatic actuation by the build up of the pressure.

The installation position of the check valve affects the function:

- In a horizontal or slightly tilted line the function is not impaired,
- In ascending pipelines a slightly increased pressure loss occurs with a low flow rate,
- The check valve must not be installed in penstocks.

Any other use of the valve is considered unintended.

3. Safety notes

3.1 General safety notes

To valves the same safety regulations apply as to the pipe system in which they are installed. This manual you have at hand only provides such safety notes which are additionally to be observed for valves.

3.2 Safety notes for the operator

It is not the responsibility of the manufacturer, Xomox International GmbH & Co. OHG, to ensure that

- the valve is only used as intended, as it is described in section 2,

CAUTION

No valve must be operated above the permissible pressure/ temperature range of which is insufficient for the operating condition: this permissible range is described in section 2. The application limits for pressure and temperature are marked on the valve.

The non-compliance of this instruction involves a risk to life and limb and may cause damage to the pipe system.

It has to be ensured that the selected materials of the medium-contacting valve parts are suitable for the used media. The manufacturer does not assume any liability for damage resulting from corrosion caused by aggressive media. The non-compliance of this instruction involves a risk to life and limb and may cause damage to the pipe system.

The check valve's function depends on the hydraulic conditions in the pipe system. It has to be ensured that the pressure increase remains limited to a maximum of 1.1 x PN when the check valve closes. If vibrations and/or water hammer occurs when the valve closes, the planner or operator of the pipe system has to check back with the manufacturer, Xomox International GmbH & Co. OHG.

- the pipe system was professionally mounted. The wall thickness of the valve body is dimensioned so that in such professionally routed pipelines additional loads of the standard range are considered,
- the valve is professionally connected to the pipe system
- in this pipe system the usual flow rates (e.g. 4 m/s for liquids) in continuous operation are not exceeded and abnormal operating conditions such as vibrations, water hammer, temperature shocks and significant portions of solids in the medium are co-ordinated with the manufacturer, Xomox International GmbH & Co. OHG,
- valves which are operated at operating temperatures

SINGLE-CHEK Check Valves Series CV

of >50°C (122°F) or <-20°C (-4°F) are protected against contact together with the pipe connections,

- the valve is only operated and maintained by personnel experiences in pressurized pipelines.
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3.3 Particular dangers

CAUTION

Before removing the valve from the pipeline the pressure in the pipeline has to be completely reduced so that the medium does not uncontrollably escape from the line.

If a valve has to be removed from a pipeline, medium may escape from the line or the valve. In the case of media which are harmful to health or hazardous the pipeline has to be completely empty before the valve is removed. Take care with residues which continue to flow from dead spaces or which remained in the valve (under pressure).

4. Transport and storage

Valves have to be handled, transported and stored carefully:

- The valve is to be kept in its original packaging and/or with the protection caps on the flange connections. Larger check valves should be loaded onto and transported (also to the installation site) on a pallet (or supported in a similar way).
- If the packaging does not show any damage, the valves should be unpacked prior to installation in the pipeline.
- In the case of storage prior to installation, valves are to be stored in a closed room and to be protected against harmful influences like dirt or moisture.
- Packaged valves may be exposed to full sunlight for a short time only.
- The flange connection faces must not be damaged by mechanical or any other influences.
- If lifting tackles (ropes or similar) are required for transport, these should be carefully attached to prevent any damage to the valve.

5. Installation in the pipeline

5.1. General remarks

With the installation of valves in a pipeline the same instructions apply as to the connection of pipes and similar piping

elements. The following instructions additionally apply to valves. For the transport to the installation site please also observe section 4.

CAUTION

SINGLE-CHEK Check Valves of the Series CV must not be installed in penstocks, see also the notes in section 2.

A check valve must not be installed as a terminal valve at the end of a pipeline.

5.2 Working steps

- Transport valve in the protective packaging to the installation site and unpack it only there.
- Inspect valve for damage in transport. Damaged check valves must not be installed.
- Ensure valves installed meet the application requirements in terms of pressure class, connection type and dimensions. Refer to the valve name plate. Do not remove the name plate on the valve after commissioning.

CAUTION

No valve must be operated above the permissible pressure/ temperature range of which is insufficient for the operating condition: this permissible range is described in section 2, <Intended use>. The non-compliance of this instruction involves a risk to life and limb and may cause damage to the pipe system.

- Prior to installation, the valve and the down-stream pipeline must be thoroughly cleaned and free of any contamination, especially hard foreign substances.
- At the beginning of the installation an operational check is to be carried out: press disc by hand from the closing position by approx. 15°. The disc must automatically return to the "CLOSED" position due to the spring force.
- The counterflanges of the pipeline have to be flush, level and parallel.
- The counterflanges have to feature a clear span allowing for sufficient space for the opened valve disc so that the latter is not damaged when being swivelled out. This corresponds to the "C" dimension in the Xomox International GmbH & Co. OHG data sheets, see section 9, <Information>.
- With already installed pipelines, ensure that the distance of the pipeline flanges corresponds to (face-to-face dimension of the valve + 2x thickness of the used flange seal).

SINGLE-CHEK Check Valves Series CV

CAUTION

The check valve has to be mounted in such a way that the marked arrow direction corresponds to the flow direction of the pipe section.

In the case of a non-vertical line the check valve should be aligned in such a way that the name plate is positioned at the side.

- During mounting between the two flanges, center the check valve by the flange screws. Attach 3 to 5 flange screws to the bottom area prior to the insertion of the check valve and seals in the gap. Support the check valve and seals on these screws.
- Afterwards the remaining flange screws are to be fitted and the correct centering of the valve and the two flange seals between the (through) bolts to be checked before these are tightened.
- The flange screws are to be tightened diagonally. With metal flanges the tightening moment should correspond to the specifications of the flange seal manufacturer.
- With plastic lined systems with FRP flanges, observe the torque values of the respective pipe and flange manufacturers for flange screws tightening.

6. Pressure test of the pipe section

To the pressure test of valves the same instructions apply as to the pipeline. In addition, the following applies:

- For flushing and ventilation note the check valve automatically closes in the opposite direction of the arrow shown on the body.

NOTE

The check valve features a clear cross-section which is a slightly narrow than the that of the pipeline. Thus flush thoroughly in order to flood out the foreign substances upstream of the valve.

- The testing pressure of the check valve must not exceed the value of $1.1 \times PS$ (at $20^{\circ}C / 68^{\circ}F$) if the valve is unidirectionally stressed in the arrow direction during testing. The component with the lowest PN limits the maximum permissible testing pressure in the line section. (PS = maximum permissible operating pressure, see also name plate).
- A check valve which is unidirectionally stressed with the same testing pressure may be pressure-tested with $1.5 \times Ps$.

7. Normal operation and maintenance

Regular maintenance work on the valves is not required; however, when the line section is inspected no leakage must escape to the outside on any valve. In such cases please observe section 8, <Troubleshooting>.

CAUTION

In the case of partially loaded operation: If with a low flow rate the throughput is too small, the return spring on the valve disc can be replaced by a weaker one thus slightly reducing the flow resistance. The prerequisite is that the valve was not already ordered and delivered in this special design.

SINGLE-CHEK Check Valves Series CV

8. Troubleshooting

When rectifying faults section 3, <Safety notes>, must absolutely be observed.

Fault Type	Remedy	Note
Leakage on the flange connection	In the case of leakage on flange connection: Retighten screws.	
Leakage in the seat seal	A foreign body could be clamped on the disc: Try to (repeatedly) open and close the check valve by switching the pipeline. If the valve is still leaking:Repair required: remove check valve and replace (in the case of a O-ring design) or rework (if with metal seat) seat seal. Request spare parts and necessary manual from Crane Process Flow Technologies GmbH. Observe section 4.3, <Particular dangers>.	<p>Note 1: If after the removal it is discovered that the O-Ring sealing or the disc are not sufficiently resistant to the medium, suitable materials are to be selected if according to the data sheet <Chemical resistance of the O-Ring> a material of a higher resistance is available</p>
Malfunction	Check whether the check valve was correctly mounted: In the case of a non-vertical line the check valve should be aligned in such a way that the name plate is positioned at the side. If this is not the case: Remove valve and install it correctly, see section 4.2. Observe section 4.3, <Particular dangers>. If the valve is correctly mounted: Repair required: remove check valve and replace or rework functional parts. Request spare parts and necessary manual from Crane Process Flow Technologies GmbH. Observe section 4.3, <Particular dangers>.	<p>Note 2: If a check valve has to be removed and repaired, the return spring should always be replaced.</p>

Spare parts are to be ordered with all specifications in the name plate. Only CRANE original parts must be installed.

9. Further information

You can obtain this manual, the above-mentioned data and design sheets, additional assembly and maintenance manuals as well as further information and details – also in other languages - via:

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