

Installation, Operation, and Maintenance Instructions for KÜHME Lever Flap Valves



Explanation of Symbols



The arrow points to the special features of the drop arm valve and its handling. You must observe this information to guarantee the function of the safety shut-off mechanism!



This symbol indicates risk of injury if you do not observe the operating instructions precisely!

The symbols and the rating plate on the drop arm valve must be observed at all costs. For this reason, they may not be removed and must always be kept clean!

Preface

KÜHME lever flap valves have been designed according to the latest, applicable technical regulations. They are used as self-acting safety shut-off mechanisms in the steam boilers of gas combustion plants, as well as in pipeline systems for gaseous fuels.

Component Tests

The proof of reliability is certified through a component test in accordance with the Pressure Equipment Directive 97/23/EC:

DIN EN 161 Automatic Shut-off Valves for Gas Burners and Gas Appliances

Proof of tests:

- Label with component test number (PIN no.)
- CE label for Pressure Equipment Directive 97/23/EC
- Declaration of conformity

Factory Tests and Inspections Performed

Before delivery, the following tests and inspections are performed:

- Stress test of pressurized components
- Pressure and leakage test of the outer and inner air-tightness using air according to DIN 3230/T3 (according to DN) leakage rate 1 – air-tight – testing time: 0.25 to 2 minutes.
- Opening and closing function using air, according to the given operating data
- Measurement of the closing time using the solenoid valve (< 1 second/< 3 seconds)
- Adjustment of the OPEN – CLOSED end positions using the limit switch
- Check that the accessory parts are complete and correct
- Final inspection of the complete unit by Kühme's QA department
- All test results are certified in an inspection certificate according to EN 10 204-3.1B.

Proper Use

The lever flap valve may be used only under the operating conditions listed on the rating plate. Use in other operating conditions is not permitted! In exceptional cases, KÜHME can grant permission for other uses after consultation.

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Transport and Storage

For transport, the regulations on work and environmental protection, as well as those governing accident prevention, must be taken into consideration. These regulations vary according to installation site and medium.

According to customer desire, our lever flap valves are delivered shrink-wrapped in plastic foil to protect them from dirt and damage. They are transported on a standard pallet or on a wire-mesh collapsible pallet. For on-site transport, a rope can be slung through the existing eyebolts or a chain can be hooked into place so that you can transport the lever flap valves using lifting gear.

The lever flap valves, control valves, limit switches and bearing bushings must be stored in a clean, dry room. These parts do not decline in quality or become unusable in age.

Since elastomers lose their elastic function or become unusable in age, however, they must be stored in the dark for a maximum period of five years. The sealing elements, which have been shrink-wrapped in UV-resistant foil, must be stored in a dry environment at room temperature.



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Installation

- Before installation, the pipeline system must be cleaned thoroughly of dirt and foreign bodies, e.g., by blowing it out with compressed air.
- Remove the protective caps from the flanges.
- Tension-free installation in a horizontal or vertical pipeline.
- Observe the arrow indicating direction of flow on the housing or flange.
- Install a dirt trap in front of the drop arm valve to filter out dirt (mesh width 0.5-1mm).
- For fitting groups (valve combinations), one dirt trap in front of every group suffices.

Installation into Vertical Pipelines



The installation of the lever flap valve into vertical pipelines is considered to be in the project stage and requires special attention in regard to the direction of flow:

Flow from top to bottom ↓

Flow from bottom to top ↑

This is particularly important in case of valves that close when loaded with weight. Here, observe the assembly drawing included in the documentation.

Control System

The required control fittings are usually part of the supply schedule. The manufacturer installs them ready for connection to the pneumatic system.

- You must lay control air lines that correspond to the size of the control air fittings.
G ¼ = EO tubing 10 x 1
G ¾ = EO tubing 15 x 1.5
- Required control air pressure, min. 4 bar, max. 8-10 bar
- The control voltage must be observed.
- In case of valve combinations, every valve has a separate solenoid control valve.
- The control air provided must be dry and free of dust and water; maintenance units are not required in this case.
- If maintenance units are used anyway, make sure that only oil types that are free of resin and acid with a viscosity of 2-4° Engler at 20°C are used for the solenoid control valves due to a risk of the valves gumming up.
- KÜHME drop arm valves are basically equipped with a mechanism for recirculating control air to prevent the ambient air from penetrating into the drive.



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Testing of Functional Behavior

After the complete installation of the valve including the electrical wiring of the control system, you must check the functional behavior before the trial run or before commissioning.

A) Opening Function

- The control air is pressurized.
- The solenoid control valve is supplied with voltage. It releases control air to the valve actuator.
- The valve opens without delay (for the installation of a throttle valve into the control air line, the opening time is adjustable).
- The OPEN position of the valve is at a 36° angle of rotation on the valve shaft.
- Electrical signalling of the OPEN position via limit switch

B) Closing Function

- De-energize the solenoid valve.
- The solenoid valve switches to venting and releases the control air pressure from the valve actuator via the ventilation connection on the solenoid valve, as well as via the attached fast-acting vent in the upper valve actuator frame. Air can then escape via a fixed throttle valve.
- The valve closes using spring force or counterweight.
- Electrical signaling of the CLOSED position via limit switch



According to the electrical wiring of the limit switch, the exact signaling of the OPEN and CLOSED positions via the limit switch should be checked by opening and closing the valve several times. A readjustment is usually required.

Pressure Test



In the case of the system pressure test, please observe that the valve may be pressurized at 1.3 times the permissible operating pressure listed on the rating plate.

During the pressure test, you must perform a leakage test of all crew connections (including the fast-acting valves). In the process, you should also tighten screw connections, if necessary.

In case of hot media (e.g. hot oil/steam), tightening the connections is absolutely necessary **after the first commissioning and after an additional 60-70 operating hours before isolating** the lines.



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Maintenance/Revision

The plant owner must determine the maintenance intervals depending on the operating conditions such as medium, temperature, degree of soiling, environmental influences, switching cycles, and so on (KÜHME recommends a maintenance interval of two years).



Before starting maintenance work, make sure the operating system is blocked off or, in the case of gas plants, sufficiently inertized.

You can check the **external air-tightness** on the passage of the drive shaft out of the valve housing by brushing it with Nekal.

The test of the internal air-tightness – the seat seal in the case of **single-seat valves** – can be performed using the depressurizing method. In this case, corresponding shut-off fittings and measuring connections must exist.

After the space between both valves has been vented, you can test of the internal air-tightness – the seat seal or, in the case of **valve combinations**, the burner seal – as follows.

Testing the First Valve in the Direction of Flow

In case of existing gas pressure, the manual shutoff valve in front of the valve combination is closed. The enclosed gas pressure is monitored for pressure drops via a pressure measuring point. This can be checked on site optically using a fine measurement pressure gauge or signaled automatically via a pressure switch.

Testing the Second Valve in the Direction of Flow

Here, the space venting valve is closed pneumatically. The first valve is entered and the gas in the space is pressurized. After that, the first valve is closed again.

The leakage test is performed using a fine measurement pressure gauge or a pressure switch as described above.

After the test is complete, the space is depressurized again via the space venting valve.

Testing the Interior Air-Tightness in Case of Double-Seat Valves

After the ring chamber between the valve seats is vented, the space venting valve will be closed pneumatically at the present gas pressure.

The gas in the space will be pressurized via a manual shutoff fitting using a primary gas pressure pulse line.

Via an installed measuring point, the pressure drop can be monitored either optically on site using a fine measurement pressure gauge or automatically using a pressure switch.

After the test is complete, the space is depressurized again via the space venting valve.

Alternatively, the leakage test can also be performed with nitrogen!



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Recommendation

For the **trial run**, we recommend that you have a corresponding number of original valve flange seals and housing seals from the manufacturer on stock so that you can reestablish the availability of the plant again as quickly as possible, according to the size of the plant.

Drop arm valves must be maintained after 2 – 3 years operation **at the latest** by maintenance personnel – special KÜHME installers – trained by the manufacturer. In the process, damaged parts must be exchanged.

Based on the assessment of wear, you can determine whether a longer operating time is possible.



All **elastomers must be exchanged after** five years at the latest (limit of the manufacturer's warranty for elastomers).

They must also be exchanged if the safety device was not used under normal operating conditions.

The same prerequisites apply for the attached control parts – **especial for the solenoid control valves**.

During the revision of the valves, some of them should be disassembled to check the parts subject to wear and the cleanliness of the control air system.

When maintaining the valve actuators, you must grease the cylinder tube and the spindle guides/seals slightly before assembly.

The silicon paste Gleitmo 750, for example, is recommended as lubricant.



After maintenance or revision, you must recheck the functional behavior as described above and readjust the signaling components (e.g. limit switches) before renewed commissioning.



For all maintenance and revision work, it is vital that you use only original manufacturer's components.

For the availability of the plant, corresponding replacement parts must, for this reason, be kept on stock or be reported for acquisition under specification of the manufacturer's order number as required by the manufacturer.

Insofar as possible, complete revisions should be performed at the Kühme factory for reasons of cost and time.

Maintenance and Revision by Externals

If external companies are assigned with servicing performances on safety devices, proof of qualification according to DIN ISO 9000 must be present or the maintenance work must be supervised by qualified expert personnel.

This circumstance, however, voids an extension of the warranty by the manufacturer!

Contact partner for the Service department at KÜHME:

Mr. Lothar Neubert

Tel. +49-234-29802-56
Fax +49-234-29802-72
Mobile +49-173-7020202
E-mail neubert@kuehme.de

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KÜHME Armaturen GmbH ☎ +49(0)234-29802-0

Fax +49-(0)234-29802-10

info@kuehme.de

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