



KEYSTONE

Please read these instructions carefully



This symbol indicates important messages and safety instructions.

Hazard potentials:

- disregarding of instructions
- improper use of product
- insufficiently qualified personnel

Valve application to be within the pressure/temperature limits indicated in the P/T diagram.

Essential points and functions of the valve should be inspected on a regular basis.

When the valve is used in an end-of-line function, PED Cat-I applications are allowed only. For other categories, contact factory.

1 Storage & handling

1.1 Protection

Keystone valves are delivered with protection in accordance with the Keystone Engineering Instructions, to protect the valve seats and disc from damage. Wrapping and/or covers should be left in place until immediately before fitting to the pipe.

The commissioning set is supplied completely assembled, except for the metering plugs.

1.2 Storage

When valves are to be stored for some time (2 months or more) before being fitted, storage should be in the original delivery crates or cases.

1.2.1 Storage conditions

The valves should be stored off the ground in a clean, dry indoor area.

Protect the valve from temperature and humidity extremes, and exposure to excessive dust, moisture, vibration, deformations, sunlight and ozone.

Recommendations

1. Temperature: storage temperature below 25°C, above 0°C preferable below 15°C.
2. Humidity: storage conditions should be such that condensation does not occur, store in a dry environment. Maximal 50% relative humidity.
3. Light: valve rubbers should be protected from light, in particular direct sunlight or strong artificial light with high ultra violet.
4. Ozone: storage rooms should not contain any equipment generating ozone. E.g. lamps, electric motors.



Important

Before valves are being installed or used the following actions are recommended.

1. Valves/parts have to be inspected and thoroughly cleaned if required.
2. Rubber parts need to be greased with silicone grease if not present anymore.
3. All surfaces in contact with seats have to be thoroughly cleaned and greased with silicone grease if stored for more than 5 months.

1.3 Handling

1.3.1 Packed valves

Lifting and handling of the packed valves in crates should be carried out by appropriate lifting equipment. If a fork lift truck is used, appropriate fork hitches are required.

The lifting and handling of packed valves in cases will be carried out in the lifting points.

The transportation of all packed material should be carried out safely and according the local safety regulations.

1.3.2 Unpacked valves

The lifting and the handling of these valves have to be carried out by using appropriate means and by respecting the carrying limits. The handling must, preferably, be carried out on pallets, protecting the machined surfaces and seat to avoid damage.

When lifting the large dimension valves, the sling and the hooking of the load must be carried out by using the appropriate tools (brackets, hook, fasteners) and load balancing tools in order to prevent the valves from falling or moving during the lifting and handling.

The valve may be lifted only by slings attached to the flange holes or valve body; never to the actuator or the valve opening.

2 Installation

WARNING!

For safety reasons, it is important to take the following precautions before you start work on the valve:

1. Personnel making any adjustments to the valves should utilize suitable equipment. All required personal protection means should be worn.
2. The line must be depressurized before installing the valve.
3. Personnel trained in all aspects of manual and mechanical handling techniques must carry out handling of the valves.
4. Misuse of the valve is not allowed. For example: the valve, handles, actuators or other parts may not be used as 'climbing tools'.
5. Ensure that valve pressure/temperature limitations marked on the identification tag are within the service conditions. The trim number on the valve's tagplate identifies the valve materials. See Product Manual for valve specific P/T diagram and trim number definition.
6. Ensure that valve materials are compatible with the pipeline fluid.

2.1 Valve inspection

1. Carefully remove the valve from the shipping package (box or pallet) avoiding any damage to the valve or, in case of automated valves, to the electric or pneumatic/hydraulic actuator or instrumentation.
2. Confirm that the materials of construction listed on the valve nameplate are appropriate for the service intended and are as specified.
3. It is not allowed to use third party spare parts. In case of third party spare parts, safe operation is not guaranteed.

2.2 Flange and pipe compatibility

Check matching of flange drilling pattern of valve and pipe before assembly.

Flanges have to meet the following requirements:

- The face inside diameter should be:

D min. : The valve Q-dimension + adequate disc clearance.

D max. : The optimum inside diameter (ID) is equal to the inside diameter of flange standard EN 1092-1, table 8, type 11. For larger than D max inside diameters or other flange types please contact your local Emerson Sales organization, as larger inside diameters might result in reduced valve functionality.

- If the flange (or pipe) is provided with a raised face, the diameter of this shall be at least 8 mm larger than the YY-dimension of the valve.

The use of the flange-gaskets is not allowed since it might damage the valve.

The Keystone seat-face design eliminates the need for the gaskets.

Use flange bolting in agreement with appropriate standard.

Do not use flange gaskets, these lead to valve damage!

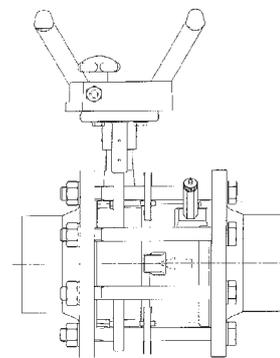
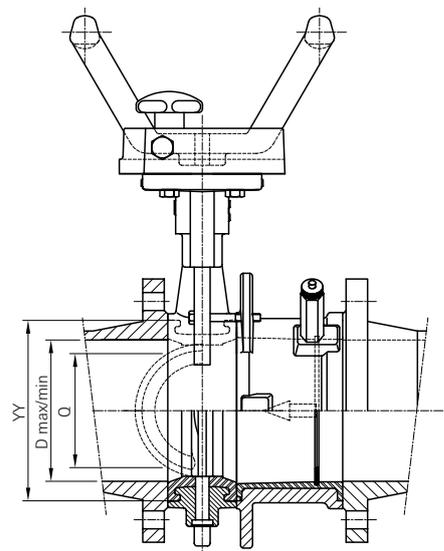
2.3 Valve installation

The valve is suitable for measuring flow in one direction only; the attached butterfly valve is pressure tight in both flow directions. See picture 1 for correct valve positioning.

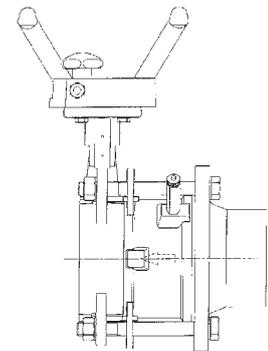
The measuring error of a commissioning valve largely depends on proper design of mating piping and installation of the unit. Please note the following points:

- A length of 5 times the pipe diameter upstream the orifice body and 2,5 times the pipe diameter downstream must be straight without fittings, reducers or any other obstruction.
- The inside diameters of the flanges must correspond with the inside diameter of the orifice body.
- The commissioning set must be properly aligned to the mating flanges and piping.

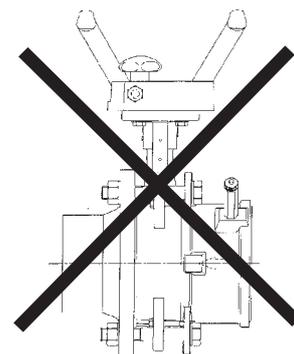
The commissioning set may be used as end of line valve with a maximum static pressure of 6 bar only, if the flange on the valve side is removed (see picture 2). Installations as end of line valves shown in picture 3 is not allowed; it can cause serious damage to the orifice lugs.



1. Normal installation



2. Allowed installation for end of line service.
Max. 6 bar static pressure



3. Not allowed for end of line service

Notes

- Make sure that you can turn the disc cautious so you can feel a mismatch resulting from a disc touching the adjacent piping.
- Do not use the valve as a support of the pipe line construction.
- Adjacent piping must be positioned so that minimal piping stresses are transmitted to the valve flanges during or after installation.
- Handling and lifting of the valves during installation **MUST** be performed following the same instructions described in previous paragraph '1.3 Handling'.



Important

Mating flange faces should be in good condition and free of dirt and/or inclusions. Both pipe insides to be well cleaned.

1. Check whether the flange distance meets the valve face-to-face dimensions. Spread with adequate tooling the flanges for easy insertion of the valve.
2. Mount the metering plugs in the appropriate threaded holes. Add some hydraulic sealant to the thread to provide a satisfactory seal.
3. Close the valve so far, that the disc edge is at least 10 mm within the body.
4. Position the commissioning set between the flanges. Make sure that the arrow on the orifice body points in the flow direction. Insert the flange bolts.
5. Tighten the bolts by hand and check the distance from the raised face of the flange to the outside diameter of the orifice body. This distance should be equal to within 0.5 mm over the circumference.
6. Maintain the valve flange alignment while gradually removing the flange-spreaders and tighten the flange-bolts hand tight.
7. Slowly close and open the valve to check for adequate disc clearance.
8. Cross-tighten all bolting to the proper torque. Do not overtighten.
9. Check again the distance from the raised face of the flange to the outside diameter of the orifice body. This distance should be equal to within 0.5 mm over the circumference.
10. Turn the Twin Grip a few times and lock it in the fully opened position with the star grip.

2.4 Valve verification

Check the operation of the valve by operating it to 'full open' and 'full close'. To verify the valve operation, the disc position indicator on the actuator or the handle should rotate between the 'full open' and 'full close' indicators on the actuator or throttle plate. Generally the valve disc travels clockwise to close.

Commissioning procedure

The procedure for commissioning an installation depends on the exact circumstances. The procedure below only presents a general guideline. Always contact your supplier or contractor before you start balancing an installation.

You will need the following items:

- A diagram of the installation as designed and completed by the contractor, where all valves are identified.
- A pressure drop/flow rate graph for each size of valve.
- Two 1/4-inch pressure gauge probe adapters to connect to the metering plugs.
- A manometer with a pressure range of about 0-5 kPa; this can be either a liquid or electronic type.
- A set of forms to record calculated settings, readings and final settings for all valves identified in the diagram.
- A calculator to calculate flow rate proportion factors.

2.5 Sources of possible danger

This section contains some examples of possible foreseen danger sources.

2.5.1 Mechanical

- A) When manual operators are used, available space should be checked in order to avoid hands being clamped.
- B) Mechanical sparks caused on impact of valve and e.g. tooling, are a potential source of ignition of surrounding atmosphere.

2.5.2 Electrical

If static charges or stray electrical currents can initiate explosions, the valve should be grounded to earth.

2.5.3 Thermal

- A) If the valve is used in applications with a fluid temperature above 40°C the outside of the body might be hot. Sufficient measurements should be taken to avoid burning. A manual operated valve should be opened and closed with sufficient protection for the personnel operating the valve. For example: protecting gloves.
- B) Hot surfaces can be a potential source of ignition of the environment.

2.5.4 Operational

Waterhammer should be avoided in all circumstances. Waterhammer results in excessive stresses in the valve's body and will cause severe damage. For example: Closing a valve too fast may result in waterhammer in the upstream part of the pipeline.

2.6 Troubleshooting guide

Symptom	Possible cause	Resolution
Valve would not rotate	Actuator has failed	Replace or repair
	Valve packed with debris	Flush or clean valve to remove debris
Valve leaking	Valve not fully closed	Close valve
	Debris trapped in valve	Cycle and flush (with valve open) to remove debris
	Seat is damaged	Replace valve
Jerky operation	Debris trapped in valve	Cycle and flush (with valve open) to remove debris
	Air supply actuator inadequate	Increase air supply pressure and/or volume

3 Maintenance

The Keystone valve figure 40 is designed to require a minimum of maintenance.



WARNING!

Depressurize and, if necessary in case of dangerous fluids, drain the line and flush with appropriate cleaning fluid before starting any maintenance. Failure to do so may cause serious personal injury and/or equipment damage.

Before disassembling the valve, ensure the valve has been decontaminated correctly from any harmful gasses or liquids and that it is within a safe temperature range for handling.

Personnel making any adjustments to the valves should utilize suitable equipment. All required personal protection means should be worn.

Only personnel trained in all aspects of manual and mechanical handling techniques must carry out handling of all valves.

3.1 Routine maintenance

Routine maintenance or lubrication is not required other than periodic inspection to ensure satisfactory operation and sealing.

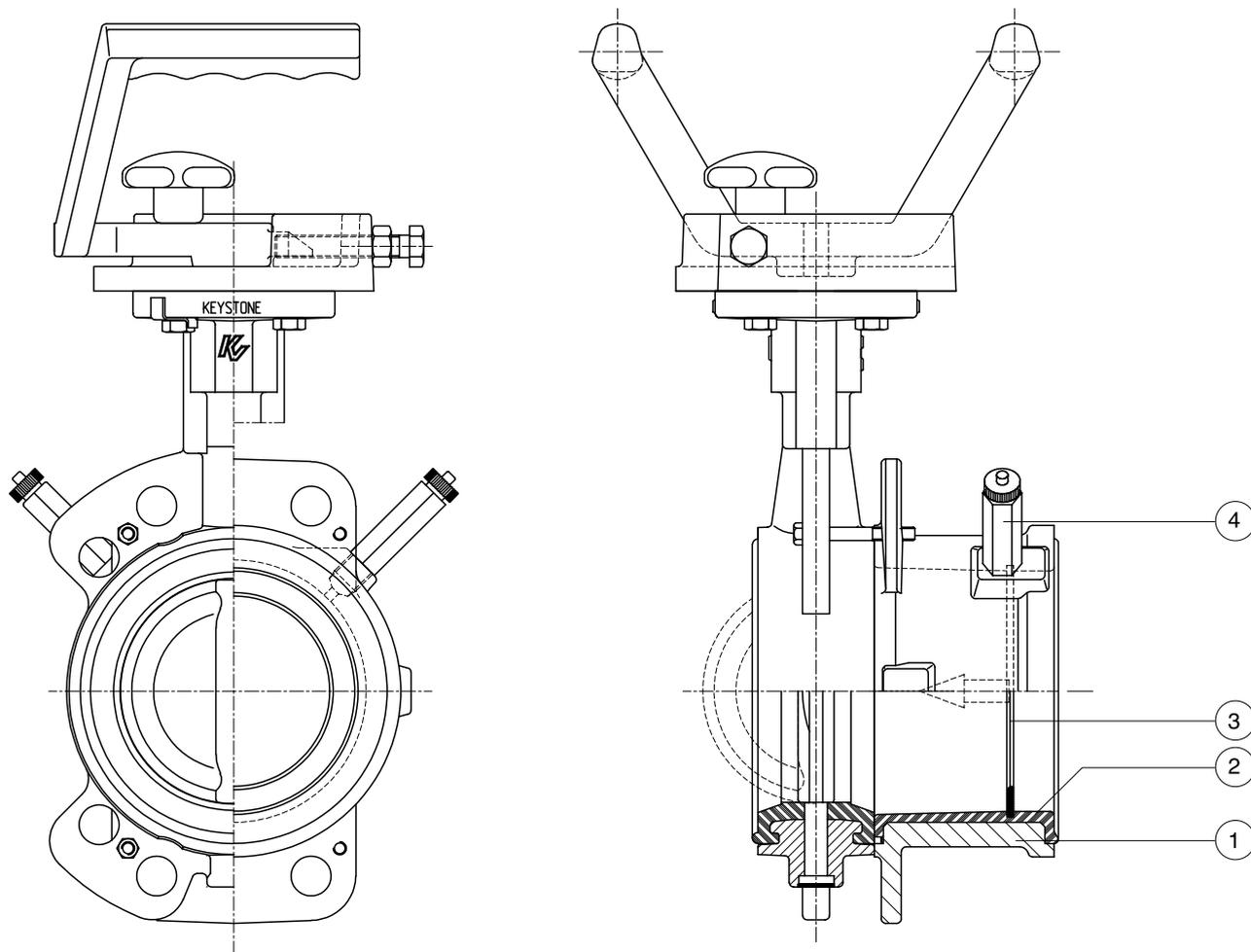
3.2 Removing the valve

1. Turn the disc to nearly closed position. (The disc is in line with the parallel flats in the stem).
2. Loosen all flange bolts and remove the bolts.
3. Spread the flanges with adequate tooling, and remove the valve.

3.3 Valve disassembly

Disassembly of the butterfly valve is not possible. The shafts are press-fitted into the disc during the production at factory.

The orifice body is connected to the valve body with four bolts to ensure proper alignment. To prevent misalignment and misreading, the orifice body should not be disconnected from the valve body.



Parts list

1. Orifice body
2. Liner
3. Orifice
4. Metering plugs (self sealing)