

INSTRUCTIONS ON INSTALLATION, OPERATION AND MAINTENANCE FOR KIRLOSKAR MULTI DOOR NON RETURN VALVES



Enriching Lives



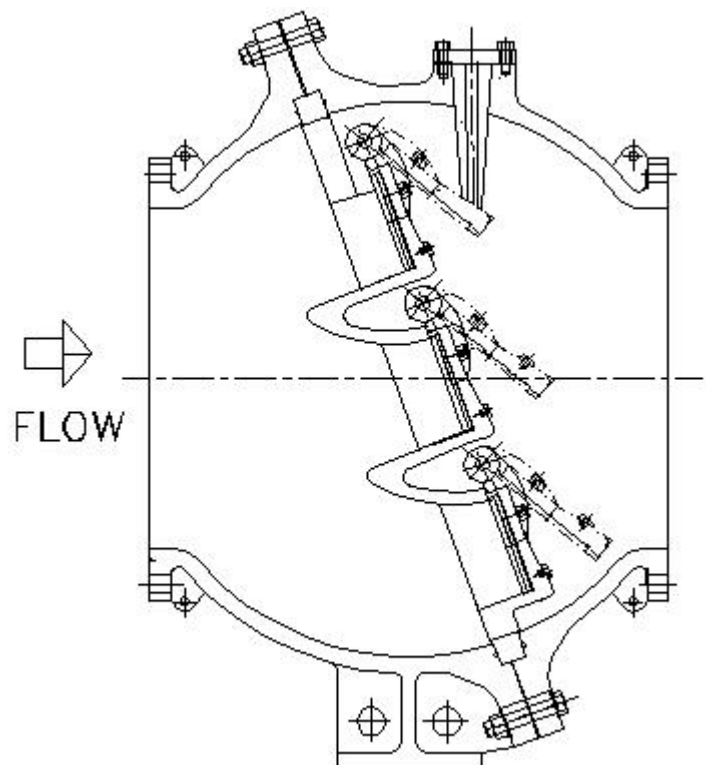
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KIRLOSKAR MULTI DOOR NON RETURN VALVES

1. INTRODUCTION



Multi Door Non Return valve
Typical View

Figure 1

Kirloskar Multi Door Non Return Valves generally conform to IS 5312, Part-2 standard for dimensions, materials of construction and constructional features, as per the need of the application. These Multi Door Non Return Valves are Metal Seated type with a choice of by-pass arrangement as an optional accessory and have proven performance.

The doors of the Multi Door Non Return Valve are hinged on Diaphragm. Door Rings and Diaphragm Rings are precisely machined, scraped and lapped to get mirror finish for achieving leak-tightness.

In Kirloskar Multi Door Non Return Valves, No. of Doors are two for sizes 600 to 800mm, three for sizes 900 & 1000mm and four for sizes 1100 & 1200mm.

By-pass arrangement is provided at specific requirement from customer, and the size of by-pass arrangement is referred from standard IS: 5312, Part-2.

2. INSPECTION ON RECEIPT, HANDLING, STORAGE & PRESERVATION

2.1 INSPECTION ON RECEIPT AND HANDLING

- a. At receipt of the product, ensure that there are no transit damages to the product received, especially on valve flanges, door / diaphragm ring faces etc.
- b. Also ensure that Parts and Accessories are received as per ordered scope of supply.
- c. Ensure that adequate numbers of fasteners for mounting accessories are received.
- d. While unloading the product, please use the provision of lifting made on the valve (e.g. Lifting Lugs, Lifting eye bolts).
- e. Use the safe lifting devices (e.g. slings, hoists, hooks etc.) of adequate capacity.
- f. Do not pass the slings through the weak parts of the product / accessory (e.g. By-pass bends – when it is assembled with the valve).
- g. The valve should be transported so that the Inlet Side flange rests on the horizontal floor.
- h. Support the valve properly during transportation to avoid toppling.
- i. Handle the product carefully – do not push, drag, drop from height.

If damages, short supply or wrong supply are observed, report the same immediately to the contact person mentioned in this manual.

2.2 STORAGE & PRESERVATION

If the valve has to be stored at site before installation,

- a. Store it on horizontal level surface in dry and clean atmosphere.
- b. Store the products in well-covered sheds, protected from sun, rain and dust.
- c. In the instance if the valve is required to be stored for long duration, ensure that rust preventive should be applied on the machined corrodible surfaces.
- d. It is advisable to give a coat of grease on seat rings during the storage period. Keep the seat rings away dusty atmosphere.

3. INSTRUCTIONS FOR INSTALLATION

CHECKS ON THE VALVE ASSEMBLY BEFORE INSTALLATION

- a. Before taking the Multi Door Non Return Valve for pipe installation, make sure that it is cleaned from inside and outside and there are no foreign or metallic objects sticking on to its sealing elements. Also clean the valve interior passages to remove any foreign matter & rust preventive on machined surfaces.
- b. Ensure that the entire rust preventive on the machined surface in the flow area is removed, before the valve is put in pipe-line.
- c. Note the name plate details on valve body and check valve pressure rating adequacy with respect to operating pressure. Also check direction of flow in the pipe-line and place the Multi Door Non Return Valve accordingly.
- d. Valves should be installed in the pipeline, only after verifying the sealing ability of valve. This can be done by examination of the seat surfaces for freedom from surface damages, scratch marks / dent marks as well as uniform mating of body diaphragm rings and door rings. If any abnormalities are observed, contact KBL.
- e. Multi Door Non Return Valves are designed to generally operate horizontal pipe lines, unless otherwise prior specified by the customer at the time of placement of order.
- f. Operate the Doors of Multi Door Non Return Valve manually from Full Close to Full Open and Full Open to Full Close. Ensure that there is no undue resistance / friction in the operation.
- g. Before connecting valve & pipeline flanges, ensure that they do not have parallel, angular and radial gaps. While fitting the valve in pipeline, ensure that diagonally opposite bolts are simultaneously & uniformly tightened.
- h. Orientation of Hinge Pins of the valve, while fitting in the pipe-line must be horizontal. This can be ensured by checking level of the support for the valve foot, using spirit level.

3.2 CHECKS FOR THE PIPE-LINE BEFORE INSTALLATION

- a. Clean the pipeline thoroughly so that it does not contain any solid matters which may damage the valve internals.
- b. Avoid parallel, radial and angular mismatch between connecting flanges of valve and the pipeline.
- c. Upstream and downstream piping should be adequately supported and anchored (if required) in such a way that the piping system does not impose any forces & moments on the valve body and the hydraulic

thrust arising due to valve closure is carried & sustained by valve supports. Valve flanges are not designed to carry any external loads and moments arising due to pipe expansions / contractions. It is advisable to use Flange Adapter Assembly, after the valve to facilitate valve dismantling and to prevent any undue loads being transmitted to valve flange.

- d. Provide suitable concrete block with foundation bolts for supporting the valves. It is advisable to install a support for the valve at bottom to prevent any sagging to be caused by weight of the valve.
- e. Ensure that pipeline flanges are parallel and are mating the valve flange without leaving any parallel or angular gap between the flanges. Do not over-tighten the flange bolts / nuts to make the flanges parallel forcefully. That may develop undue stresses in the valve flanges & body leading their deformation & malfunctioning.
- f. If the Multi Door Non Return Valves are supplied with By-pass arrangement (against specific order requirement), ensure the by-pass arrangement on the valve is intact.
- g. Maximum flow velocity in the pipe-line should not exceed 4 m/s.
- h. The valves are mainly designed for handling clear water with maximum impurities of 5000 PPM.

4. COMMISSIONING

4.1 PRE-COMMISSIONING CHECKS

- a. Ensure manually that the valve doors open and close smoothly.
- b. Flow Direction of the valve matches with that in the pipeline.
- c. The entire pipe flange bolting is properly tightened.
- d. Surge protection devices (if any) are operative.

4.2 COMMISSIONING

- a. Open the By-pass Valve across the valve (if provided).
- b. Charge the pipe-line with water.
- c. Ensure that there is no leakage through flange gaskets.

Now the valve is commissioned for its Operation.

5. OPERATION

- a. By-pass valve (if provided) – keep it open while every Start / Stop operation cycle of the Pump.

- b. Once the Multi Door Non Return Valve is closed, the By-pass valve may be kept closed till next operation of the valve.

6. MAINTENANCE INSTRUCTIONS

Maintenance Check Points:

Sr.	Parameter to Check	Method of Checking	Weekly	During Overhaul
01	Leakage through valve seat	Visual / Feel	•	
02	Noise / Vibrations while Opening or Closing the Valve	Feel	•	
03	Condition of Door Ring / Diaphragm Ring faces – scratches, dent marks, intactness & continuity of contact	Visual & feeler gauge		•
04	Condition of Hinge Pins	Visual		•

Kirloskar Multi Door Non Return Valves require very little maintenance if maintenance check point are attended to during periodic inspection & during overhaul. However valves could malfunction in unusual conditions of usage, water contamination and may require maintenance as below:

7. TROUBLE SHOOTING OF KIRLOSKAR MULTI DOOR NON RETURN VALVES

Sr.	Problem	Probable Reason	Action Required
01	Leakage through the valve seat	<p>a. By-pass connection open (if by-pass arrangement is provided)</p> <p>b. External object caught between door ring & diaphragm ring.</p> <p>c. Worn out / Deformed or damaged seat rings</p>	<p>a. Close By-pass valve</p> <p>b. Try to flush away the external object by creating flow to flush it away. If it does not work, open flanged joint to reach the object and remove it manually (**).</p> <p>c. Replace the Door Rings / Diaphragm rings (%%)</p>
02	Leakage through side flanges	<p>a. Inadequate tightening of flanged joint</p> <p>b. Damaged gasket</p> <p>c. Parallel / angular gap between valve and pipe flanges</p>	<p>a. Re-tighten the flanged joint</p> <p>b. Replace gasket (**)</p> <p>c. Remove parallel / angular gap between valve and pipe flanges (**)</p>
03	Noise / vibrations during operation & during closure	Inadequately supported / inadequately fixed piping / valve	Support / fix upstream / downstream piping & valve (with foundation bolts where applicable)

IMPORTANT (**): All these procedures require emptying the upstream and downstream piping and removal of the valve from the pipeline.

(%%) : As the Diaphragm Rings / Door Rings require very precise machining for mating surface we strongly recommend that this operation of Diaphragm Ring / Door Ring fitment should be carried out at KBL factory only.

8. Recommended Spares for Multi Door Non Return Valves

Product Cross Sectional and General Assembly Drawing attached with this manual indicates the components of the respective valves, alongwith the recommended spares.

We strongly recommend to keep the spares handy all the time to be able to eliminate delays in attending the operation troubles and scheduled replacements / overhauls.



9. SAFETY INSTRUCTIONS FOR “KIRLOSKAR” MAKE VALVES TO BE FOLLOWED BY USER, AT SITE

[These Safety Instructions are the integral part of “Instruction Manual for Installation, Operation and Maintenance of Kirloskar Make Valves”]

PART – A: GENERAL INFORMATION & SAFETY REQUIREMENTS

1. The Products supplied by KBL have been designed with safety in mind. Where hazards can not be eliminated, the risk has been minimized by the use of guards and other design features. Some hazards can not be guarded against and the instructions below **MUST BE COMPLIED WITH** for safe operations. These instructions can not cover all circumstances; **USER** of the product is responsible for using safe-working practices at all times.
2. KBL product are designed for installation in designated area, which are to be kept clean and free of obstructions that may restrict safe access to the controls and maintenance access points.
3. Access to the equipment should be kept restricted to the personnel responsible for installation, operation and maintenance and they must be trained, adequately qualified and supplied with adequate tools for their respective tasks.
4. KBL requires that, all personnel that are responsible for installation, operation or maintenance of the equipment, have access to study the product instruction manual **BEFORE** any work is done and they will comply with all local and industry based safety instructions and regulations.
5. Personnel protection safety equipment must be worn where local rules apply.
6. Read the instruction manual before installation, operation and maintenance of the equipment.
7. Note that the limit of product application and permissible use of the product is according to the respective product design & testing standard and product pressure rating. Operation of the equipment beyond these limits will increase risk from hazards and may lead to premature and hazardous failure of the valve / accessories.
8. Clear and easy access to all controls etc. must be maintained at all times. Hazardous or flammable materials must not be stored near valves unless safe areas or racking and suitable containers have been provided.

9. IMPROPER INSTALLATION, OPERATION OR MAINTENANCE OF THE KBL PRODUCT COULD RESULT IN INJURY OR DEATH.

PART – B: SAFETY INSTRUCTIONS WHILE HANDLING, STORAGE AND USAGE

1. For handling / lifting the valves, use devices of adequate capacities certified by competent authorities. Use lifting provisions e.g. lifting eyebolts, lifting lugs etc. wherever provided on the valves.
2. Before fitting the valve in pipeline, ensure that Pressure Rating of the valve is suitable for maximum working pressure / surge pressure that may arise in the pipeline.
3. Non Return Valves / Reflux Valves with Dash-pot arrangement & Counter weight arrangement: Safety Guard for the counter weight & cylinder arrangement shall be provided by the customer to avoid accidents, as the lever with counterweight falls down rapidly during valve closure. It may come down without warning in case of power failure.
4. Electrically Operated Valves –
 - a. It is to be ensured before operation that proper earthing connection is provided to the actuators.
 - b. While wiring the actuator in circuit, ensure that direction of actuator rotation which 'Opens' / 'Closes' the valve is according to 'Open' / 'Close' switch.
5. User is solely responsible to refer to and follow Instructions stated in 'Instruction & Operation Manual' (I.O.M. manual) of the Gearbox / Electric Actuator / Hydraulic Power Pack. These IOM Manuals are supplied along-with the operator(s), wherever applicable.
6. Open type Gear Arrangement: Due care shall be taken by user while operating valves with Open type Gear Arrangement. The user shall ensure that no part of body or clothing gets caught between pair of Open type gears.
7. In case of manual operated valves, avoid excessive torquing at valve hand wheel / hand lever. Do not use extra leverage to Open / Close the valves.
8. User shall prevent any unauthorized person to mount, dismantle or remount, operate and repair the valves.
9. During using the valve, ensure that approved technical rules & regulations e.g. trading regulations, regulations for prevention of accidents, steam boiler

regulations, regulations of gas mains under high pressure, regulations for combustible fluids, local safety regulations etc. are followed.

10. During repairs / maintenance of the valve at site, the user shall take minimum following precautions:
- a. Provide adequate working platform near the valve.
 - b. Make pipelines pressureless and harmless i.e. switch off the pumps, empty the pipelines, remove and switch-off all electric connections (in case of electric operated valves).
 - c. If work is carried-out in vicinity of the valve, which leads to dusty atmosphere (e.g. concrete work, masonry, painting, sandblasting etc.) the valve / valve components must be covered effectively.

10. ORDERING INFORMATION

(To be sent to the Contact Person mentioned in this manual)

Details required to be furnished while ordering Spares

- a. KBL Order Acceptance Number (O/A No. or Sale Order No.)
- b. Product Description – Type, Size, Pressure Rating etc.
- c. Product Serial No. (This is hard punch marked on Valve Flange)
- d. KBL SAP Product Code – This code is mentioned in the Invoice through which the product has been dispatched.
- e. KBL Cross Sectional Assembly Drawing No. for the product (if provided)
- f. Required Part Name & Part No. as shown in the Cross Sectional Assembly drawing.
- g. Material of construction of the required part, as that appears in the Cross Sectional Assembly drawing.

INTIMATING PRODUCT / PERFORMANCE COMPLAINT

(Information to be sent to the Contact Person mentioned in this manual)

While communicating product complaint, furnish following information to help us to resolve the problem promptly.

- a. KBL Order Acceptance Number (O/A No. or Sale Order No.)
- b. Product Description – Type, Size, Pressure Rating etc.
- c. Product Serial No. (This is hard punch marked on Valve Flange)
- d. KBL SAP Product Code – This code is mentioned in the Invoice through which the product has been dispatched.
- e. KBL Cross Sectional Assembly Drawing No. for the product (if provided)
- f. Exact nature of complaint

If the complaint is related to Short Supply, Wrong Supply, Transit Damage, it is necessary to communicate the Invoice Number which will help in tracking the cause of the problem.

In case if you need additional information or help, please contact:

Customer Service and Support Sector

Kirloskar Brothers Limited

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Pune – 411037, (India)

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