

# INSTRUCTIONS ON INSTALLATION, OPERATION AND MAINTENANCE FOR KIRLOSKAR SLUICE VALVES



Enriching Lives



**KIRLOSKAR BROTHERS LIMITED**  
MANUFACTURING UNIT, KONDHAPURI (PUNE)

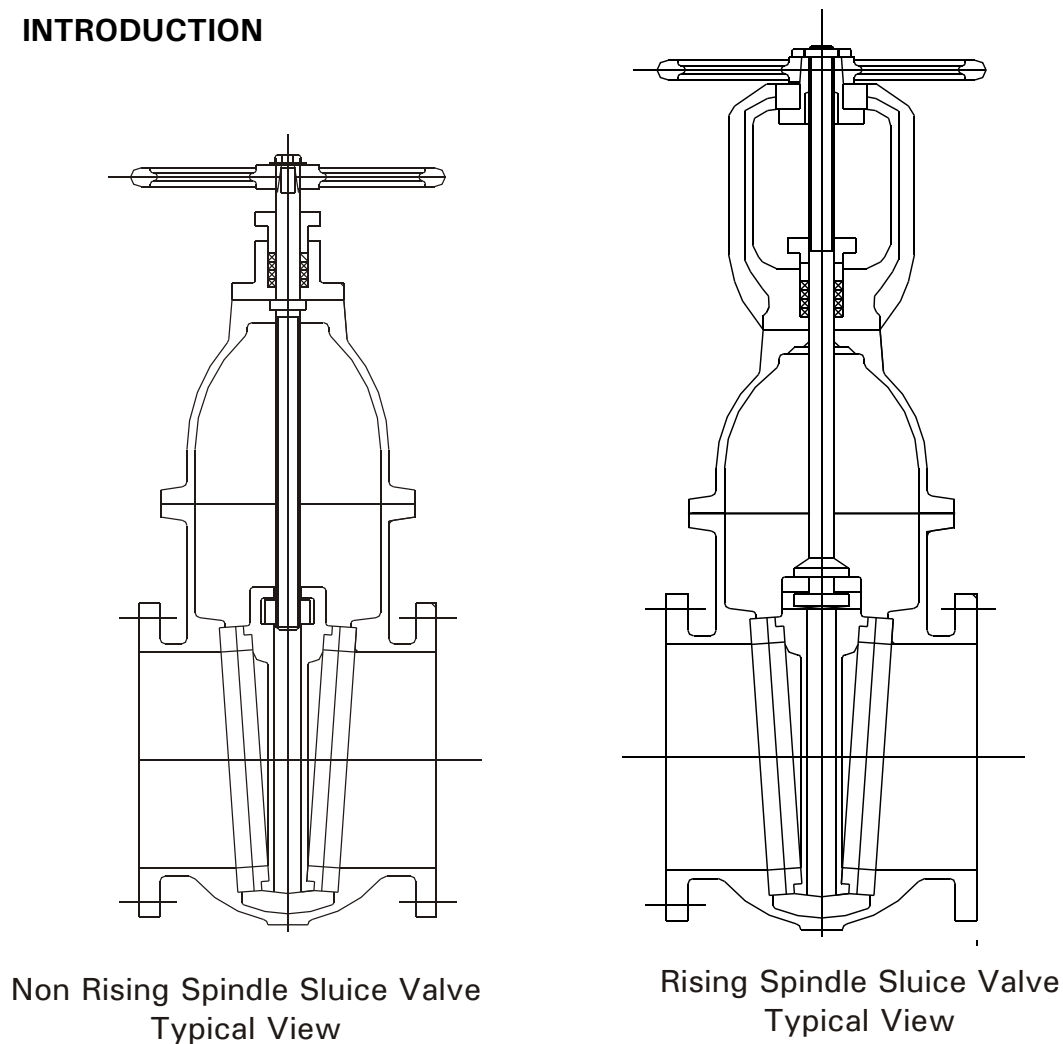
**INSTRUCTIONS ON INSTALLATION,  
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KIRLOSKAR  
SLUICE VALVES**

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## 1. INTRODUCTION



**Figure 1**

Kirloskar Sluice Valves generally conform to IS 14846 / BS 5163 standards for dimensions, materials of construction and constructional features; as per the need of the application. These Sluice Valves are Metal Seated type with a choice of Non Rising Spindle / Rising Spindle Operation, different type of operators and accessories and have proven performance.

The wedge is guided in integrally cast lugs in Body or precisely machined renewable channels provided in valve body (for valve sizes 300mm and above) at requirement of the application. For Non Rising Spindle sluice valves, the spindle collar is integrally forged while for Rising Spindle Sluice Valves, the lower end of the spindle is formed from forging and further machining to offer ample engagement in the wedge. Body Rings and Wedge Rings are machined with precisely close tolerances and press fitted in the grooves provided for them for trouble free life long operation.

The ring faces are machined to high degree of flatness and blue match is ensured between body ring face and wedge ring face to ensure leak-tightness.

Against specific requirement of the application, the body rings and wedge rings are fitted with rivets and / or by application of special synthetic adhesive for ensuring trouble free operation of the rings at elevated temperatures or pressures. 'Wear Travel' allowance is kept in the rings as per the product design standard requirement, to ensure prolonged life of the valve. Spindle Nut, Stuffing Box are provided with ample depth. Repacking / Back Seat Bush is provided in the valve, against specific requirement from the customer, to enable replacement of valve gland packing when the pipe line is in operation. Accessories like Thrust Bearing Arrangement, By-pass, Drain Plug, Gear Box and / or Electric Actuator, Indicator arrangement, Head Stock & Extension Shafting arrangement etc. are provided according to specific order requirements of the customer. As a standard practice, Sluice Valves close when the Hand Wheel is rotated in Clockwise direction when seen from top. Only in specific requirement from the customer, the Clockwise Opening feature of Sluice Valve can be provided.

### **1.1 NON RISING SPINDLE SLUICE VALVES: (Figure 1)**

In Non Rising Spindle Valve, the Spindle Nut is placed in the Wedge in such a way that the Spindle Nut is locked in the wedge along direction of spindle axis and also it can not rotate in the wedge. Integral Collar of the Spindle is rested in the step provided in Dome or on the anti-friction ball type thrust bearing in the 'Stuffing Box with Thrust Bearing Housing' (if valve is supplied with thrust bearing arrangement). Rotation of the spindle causes Opening / Closing of the wedge responding to direction of rotation.

### **1.2 RISING SPINDLE SLUICE VALVES: (Figure 1)**

In Rising Spindle Valve, the Yoke Sleeve (Spindle Nut) is placed in the Yoke in such a way that the axial movement of the Yoke Sleeve is avoided in the yoke along direction of spindle axis and but it can not rotate. Integrally formed end of the Spindle is locked in Wedge, Rotation of the yoke sleeve causes Opening / Closing of the wedge responding to direction of rotation. Against specific requirement from customer, the ball type thrust bearing is provided above and below the collar of the yoke sleeve to minimize the operating torque. When the Rising Spindle sluice valve is supplied with gear box and / or electric actuator, the spindle threads are engaged in the operator drive sleeve.

## **2. INSPECTION ON RECEIPT, HANDLING, STORAGE & PRESERVATION**

### **2.1 INSPECTION ON RECEIPT AND HANDLING**

- a. At receipt of the product, ensure that there are transit damages to the product received, especially on valve flanges, operating actuators etc.

- b. Also ensure that Parts and Accessories are received as per ordered scope of supply.
- c. Special operators (if any), like Electric Actuators / Pneumatic Actuators / Hydraulic Actuators & their accessories (if any) are sent loose alongwith the product for their safe transportation. Examine them for freedom from damages. Also 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. Hand Wheels, Gear Box Body when it is coupled with the valve, threaded portion of the rising spindles).
- g. The valve should be transported so that the side flanges remain in horizontal position.
- 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.

## **2.1 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 and keep the valves in partly open position so that the seat surfaces do not gall. Keep the seat rings away dusty atmosphere.
- e. Gear Box, Electrical / Hydraulic / Pneumatic actuators & accessories should also be stored under shed & away from dust, dirt or any rainfall or water.

### **3. INSTRUCTIONS FOR INSTALLATION**

#### **3.1 CHECKS ON THE VALVE ASSEMBLY BEFORE INSTALLATION**

- a. Before taking the Sluice 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. While installing the operating element, make sure that the Sluice Valve, the operating element and the intermediate gear box, if any are in fully closed position.
- c. Do not attempt to force Electric actuator assembly on the Gear Box connecting shaft. In case of any difficulty in proper fitment of the key ways, please de-burr the bore, key ways & keys with polish paper. In any case, do not hammer the actuator surface to drive it in. If difficulty persists, contact KBL.
- d. Ensure that the entire rust preventive on the machined surface in the flow area is removed, before the valve is put in pipe-line.
- e. Note the name plate details on valve body and valve pressure rating adequacy with respect to operating pressure.
- f. 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. If abnormalities are observed, contact KBL.
- g. Sluice Valves are designed to generally operate with spindle in vertical position, unless otherwise prior specified by the customer.
- h. Operate the Sluice Valve manually from Full Close to Full Open and Full Open to Full Close, with the operator / hand wheel. Ensure that there is no undue resistance / friction in the operation.
- i. 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.

#### **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 get access to valve internals and to prevent any undue loads being transmitted to valve flange.
- d. Provide suitable concrete block for supporting the valves and 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 Sluice Valves are supplied with By-pass arrangement (against specific order requirement), ensure the by-pass arrangement on the valve is intact.
- g. For the valve supplied with Rising Spindle, ensure that there is adequate space available to accommodate the rising spindle when valve is in fully Open condition.
- h. Maximum flow velocity in the pipe-line should not exceed 4 m/s.

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 operates smoothly.
- b. The entire pipe flange bolting is properly tightened.
- c. Electrical Actuator (if any) is properly earthed.
- 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 and shaft seals.



- b. After charging the pipeline, operate the valve gradually from Full Close to Full Open. Allow the flow stabilize for 10 to 15 minutes. Operate the valve from Full Open to Full close. Ensure that there is no abnormal noise and vibrations during full travel of the valve.

Now the valve is commissioned for its Operation.

## 5. OPERATION

- a. By-pass valve (if provided) keep it open while every opening / closing cycle of the Sluice Valve.
- b. Once the Sluice Valve is closed, the By-pass valve may be kept closed till next operation of the valve.
- c. In case the manually operated Sluice Valve demands excessive force to operate, ensure that there is no mechanical obstruction in pipeline or in the operating mechanism.
- d. Do not use means like levers on hand wheel to exert addition force. These hand wheels are designed to be weak links to protect other expensive parts in operators.

## 6. MAINTENANCE INSTRUCTIONS

### Maintenance Check Points

Sr.	Parameter to Check	Method of Checking	Weekly Overhaul	During
01	Leakage through Stuffing Box / Gland, Body-Dome, Dome-Stuffing Box and side flange gaskets	Visual		
02	Noise / Vibrations while Opening or Closing the Valve	Feel		
03	Condition of Body Seat Ring / Wedge Seat Ring faces scratches, dent marks, intactness	Visual & feeler gauge		
04	Condition of Spindle & Spindle Nut / Yoke Sleeve threads	Visual		

Kirloskar Sluice 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 SLUICE VALVES

Sr.	Problem	Probable Reason	Action Required
01	Leakage through the valve in fully closed condition	a. By-pass connection open (if by-pass arrangement is provided) b. External object caught between body ring & wedge ring. c. Worn out / Deformed or damaged seat rings	a. Close By-pass valve b. Try to flush away the external object by opening & closing the valve & creating flow to flush it Away. open flanged joint to reach the object and remove it manually (**). c. Replace the Body / Wedge seat rings (%%)
02	Leakage through Stuffing Box / Gland	a. Loose gland packing b. Old gland packing rings, due for replacement	a. Tighten the gland gradually and uniformly b. Replace the gland packing rings (##)
03	Leakage through Body-Dome / Dome-Stuffing Box gaskets	a. Loose bolting of Body-Dome / Dome-stuffing box fasteners. b. Old gaskets due for Replacements	a. Tighten the joint fasteners gradually and uniformly. b. Replace the gaskets (**).
04	Leakage through Side flanges	a. Inadequate tightening of flanged joint b. Damaged gasket c. Parallel / angular gap between valve and pipe Flanges	a. Re-tighten the flanged joint b. Replace gasket (**) c. Remove parallel / angular gap between valve and pipe flanges (**)
05	Noise / vibrations while opening or closing valve	Inadequately supported / inadequately fixed piping / valve	Support / fix upstream / downstream piping & valve (with foundation bolts where applicable)
06	'Loose' rotations of the spindle of Non Rising Spindle Sluice Valve, without causing valve to open or close	a. Damaged / worn-out threads in spindle or spindle nut. b. In case of gear box operation, possibility of worn-out or damaged gear teeth.	a. Replace Spindle nut. Spindle also may be replaced if the threads are excessively worn-out or damaged. (**) b. Repair / replace the gear box components as required.

**IMPORTANT (\*\*) :** All these procedures require emptying the upstream and downstream piping and removal of the valve from the pipeline.  
**(##) :** If Repacking / Back Seat Bush arrangement is not provided in the valve, then stopping the pump operation and / or depressurizing the pipe-line is necessary before removing the gland packing pieces for replacement.

If Repacking / Back Seat Bush arrangement is provided in the valve, then OPEN the valve fully. In this complete Open Position, the collar on the spindle takes seat against the mating surface on repacking bush provided in the valve, and does not allow water to enter into stuffing box. In this position, gland packing can be replaced, even the water is there in the pipeline.

(%%): As the Body Rings / Wedge Rings require very precise machining for mating surfaces, we strongly recommend that this operation of Body Ring / Wedge Ring should be performed at KBL factory only.

## **8. Recommended Spares for Sluice 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.

## **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 though 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 though 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 & Support Sector  
Kirloskar Brothers Limited  
"Chintan", Mukund Nagar,  
Pune – 411 037, (India)  
Phone: +91 20 2444 0770  
Fax: +91 20 24270879  
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