



Valves

Storage, Preservation and Handling Manual





BHARAT HEAVY ELECTRICALS LIMITED TIRUCHIRAPALLI

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SYMBOLS

Warning



Indicates that severe personal injury, death or substantial property damage will result if proper precautions are not taken

Caution



Indicates that minor personal injury or property damage can result if proper precautions are not taken

Note



Indicates an important information about the product itself or the respective part of the instruction manual which is essential to highlight.



GENERAL INSTRUCTIONS FOR ALL TYPES OF VALVES

1.0 VALVE STORAGE

1.1 MATERIAL RECEIPT

1. On arrival at site, the crates should be examined to ensure that they are in perfect condition. The invoice and the shipping documents shall be checked. Thereafter they should be stored in a covered dry room.
2. Check the items physically by not removing/opening the transparent packing. Check for valve tag No. or D.U. No. as per packing slip. Non-availability or discrepancy must be reported to the manufacturing unit.
3. Check for test certificates for each valve.
4. Do not remove identification tags.

1.2 UNPACKING



1. While unpacking, care may be taken to avoid any damage to the valve.
2. Make absolutely sure that no accessory items (i.e. control and blocking elements, solenoid valve etc. for HP bypass valves, disc, gag for safety valves, stem cover in conventional valves etc.,) are left in the packing case. These should be store dry and safe until the final mounting to the valve.



3. Ensure butt welding ends or flange contact faces are not damaged.



4. When the valves are uncrated and the flange protectors, end covers etc., are removed, meticulous care should be exercised to prevent dirt and other foreign materials from entering the passage bores while bolting in place.

5. For safety valves, check whether the inlet size, orifice, material grade, set pressure etc. are as per the boiler O&M Manual. Also check that the seals are intact on ring pin, spring adjuster and overlap collar.



6. Ensure that the ports/passage bores of valves, actuator air connection openings and flanges are always covered with cardboards, wooden plugs, PVC end covers, Metal end covers, cover plates, Flange protectors and sealing plugs during storage. They should be removed just prior to installation of the valve. Meticulous care should be taken to ensure that the foreign particles and insects do not enter through the ports/passage bores of valves

7. Protect the unpainted surfaces of valves components like stem, yoke bush etc., with grease or preserving oil (kerosene with graphite powder).



8. Keep the valves always with disc/wedge closed.

9. Make sure that there is no leakage of oil through gaskets and seals.



10. Ensure that all screws of terminal box cover and control compartment cover are intact and tightened fully.

11. Repaint the surfaces of actuator if required.



12. For check valves, ensure the disc is fixed carefully allowing no movement.



13. In the case of motor operated valves, actuator should be kept covered with a polythene bag during storage and transportation. In case actuator is removed from valve, rest the actuator on a piece of wood. Do not rest the actuator on its hand wheel. Take care that the actuator does not receive any bumps/jolts during storage.



14. Ensure that the safety valve discs have been received for all of the safety valves. Identify the disc according to the valve serial nos. punched on it and store it safely with D.U sequence. These details are required during replacement of hydro test plugs with discs. The disc dimensions shall be checked for identification before assembly.



15. The shaft of the Soot Blower motor should be kept locked so that, bearings don't get damaged during storage. However, it should be made to rotate periodically to ensure the functionality and should be kept locked once again.



16. For HP Bypass valves and control valves, if the storage time is expected to be more than 3 months, then it is advised to remove the stems and gland packing's from the valves and keep the stems properly greased and separated from the valves. Silica gel put inside a cotton bag, must be placed inside the valve.

1.3 STORAGE



1. Storage of valves in the open space is not recommended. However for large motorized valves where indoor storage facility is not available, outdoor storage may be permitted if the cases are stored without removal of cover and covered fully by tarpaulins. It should be ensured that the packing cases do not rest on the ground directly to avoid water /moisture entry from bottom



2. Proper storage of valves and accessories ensures easy identification, retrieval and trouble free installation and commissioning



3. Valves contain precisely machined parts and electronic parts that are sensitive to dust and moisture. Hence all valves shall be stored in dry indoor covered storage area protecting from foreign particle like, dust, mud, sand, coal dust, moisture, water etc., and extreme temperature variations.



4. Valves should be stored in the original crate in a dry environment. They should not be removed from the crates until immediately prior to installation

5. If the location is susceptible for vibrations transmitted due to working of heavy machinery, proximity to rail track, etc. it is desirable to have a resilient pad between the floor and the machine.

6. Make sure stainless steel valves are stored separately from carbon- / alloy steel valves in order to prevent contamination.

1.4 VALVE STORAGE POSITION



1. Valves should not be rested on the butt welded ends and the flange, or on the hand wheel or on motors or on Bypass / PRV tube arrangement.

2. Rest the valves upright on a wooden piece of board about 50 Centimeters high above the ground.



3. Avoid resting the valve on by-pass tubes/arrangement.



4. The safety valve / Electromatic relief valve, either crated or uncrated, should always be kept with the inlet down, i.e. never



laid on its side, to prevent possible misalignment and damage to internals.



5. Do not rest machined surfaces of any valve (or) its components / Accessories directly in contact with the floor.



6. Safety valve for any reason, should it be necessary to store the valve in an uncrated condition, then the valve shall be stored in an upright position on the inlet flange, making certain that the inlet flange is protected from damage. Never lay the valve on its side as damage to the internals and misalignment may be caused. The valve, when removed from the shipping container shall have the protectors kept intact to prevent the entry of foreign material. Use all precautions to prevent the entrance of dirt and foreign material into the valve.

1.5 LONG STORAGE

During long storage the following precautions are to be taken.



1. Insert small bags of silica gel or activated alumina in electrical compartment of each actuator.



2. When actuators alone are stored separately apply silica grease to flanges and surfaces of connecting components like threaded bush, claw coupling etc., to prevent rust formation.



3. Connect space heater if stored in damp place



2.0 VALVE HANDLING

2.1 HANDLING



1. Do not handle the valves roughly. Careless handling often results in damage to the valve parts.



2. The valves either crated or uncrated, should never be subjected to sharp impact. This would be most likely to occur by bumping or dropping during loading or unloading from a truck or while moving with a power conveyor, such as a fork lift truck. While hoisting to the installation, care should be exercised to prevent bumping the valve against steel structures and other objects.

2.2 TRANSPORTATION



1. The Valves are to be transported from the stores to the place of installation with all due care.



2. When transporting, the valves shall be closed to prevent the contact faces of both the valve seat and disc seat from damaging due to swing and vibration.

2.3 UNLOADING



1. Unloading shall be done with the help of Fork lift or with the help of wire ropes. In either case sufficient care must be taken to avoid accidents and damage. The strength of rope at various angles shown in Fig. 1 shall be taken as a guideline for lifting with wire.

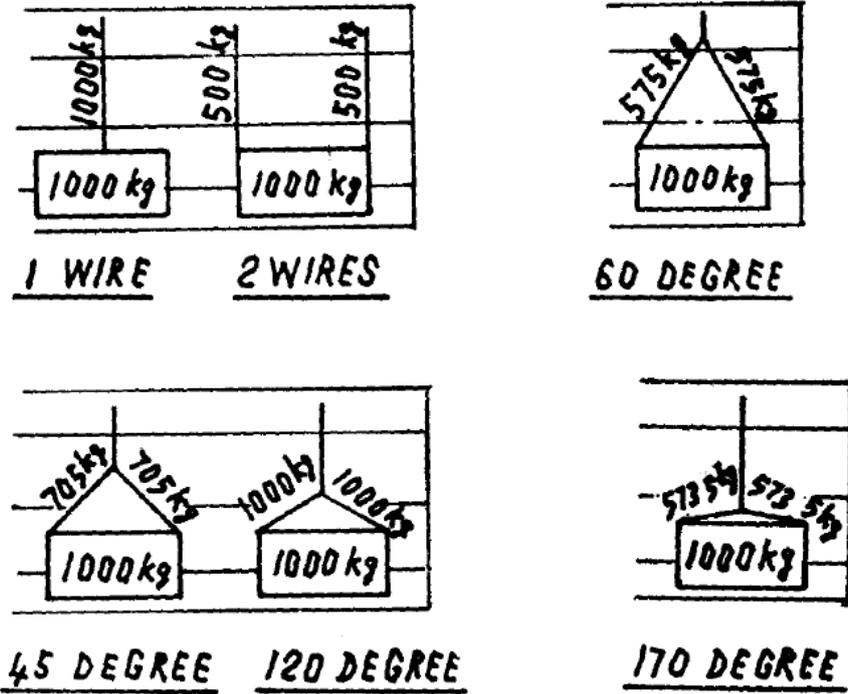


Figure 1

2.4 LIFTING



1. Do not lift the valves in a method not recommended and using any part built onto the valves.

LIFTING OF CONVENTIONAL VALVES



1. Do not lift the actuator/motor operated valve by the hand wheel. Use a sling passed under the actuator gear box.



2. While lifting a valve with by-pass valve assembly, the hand wheel or by-pass tube should not be used for lifting the valve. The sling should be passed around the main valve body while lifting.

Lifting of valves shall be performed in accordance with the following procedures.

PROPER PLACES TO LIFT (FIGURE 2)

- a. The arm sections of yoke
- b. Bonnet flange root
- c. Eye bolts of check valves (where eye bolts are provided)

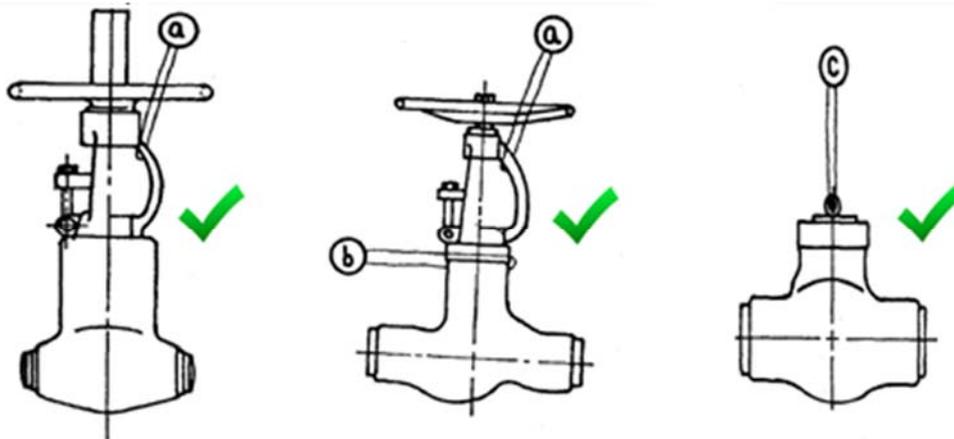


Figure 2

IMPROPER PLACES TO LIFT UP (FIGURE 3)

- a. Stem
- b. Gland bolt
- c. Hand wheel
- d. In case where actuators are provided, the eye bolt of the actuator.

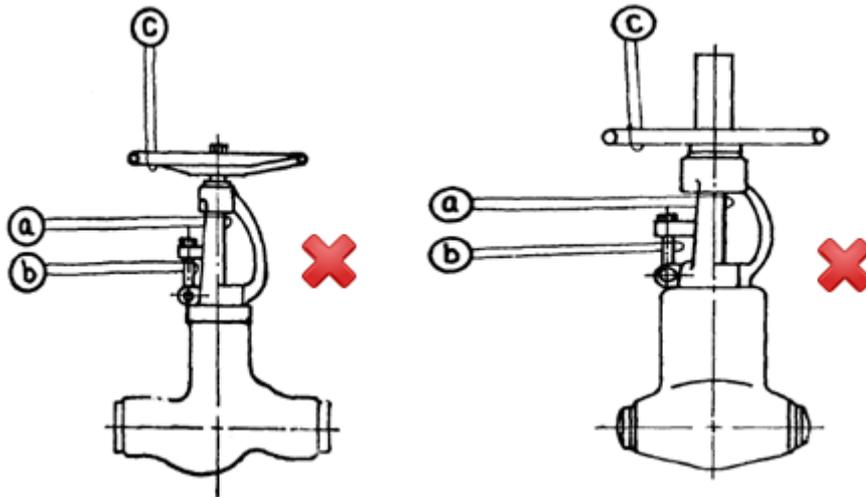
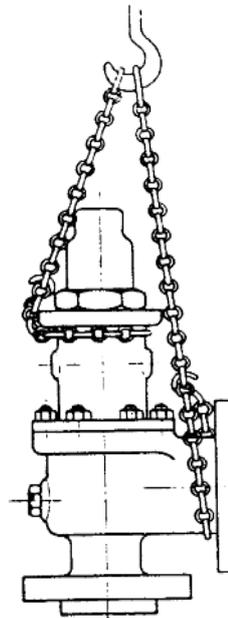


Figure 3

LIFTING OF SAFETY VALVE / ERV

3. Crated safety valves should always be lifted with the inlet flange down, i.e. same as installation position
4. Uncrated safety valves should be moved or hoisted by wrapping a chain or sling around discharge neck, then around upper bonnet structure in such manner as will insure the valve is in vertical position during lift, i.e. not lifted in horizontal position
5. Never lift full weight of the valve by the lifting lever. Never hook to the spring to lift. Figure 4 shows the correct way of lifting the valves.



METHOD OF LIFTING
SAFETY RELIEF VALVE

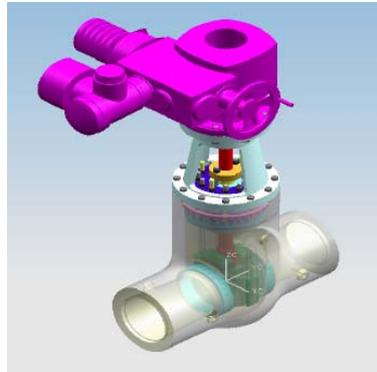
Figure 4

6. Uncrated 1538VX ERV shall be moved only by lifting or hoisting using eye bolts, which are located on the valve body near the discharge collar
7. Uncrated 1525VX ERV should be moved or hoisted by wrapping a sling (cloth web preferred) around the bottom of the pilot base and eye bolts should be installed in the outlet flange in such a manner to ensure the valve is in a vertical position during lift, i.e. not lifted in horizontal position.
8. Lift the ERV models 1533 VX valve using eye bolts 1/2 inch, (12.7 mm minimum size) installed in outlet flange bolt holes. A chain or sling through the eyebolts will permit lifting the valve in a horizontal upright position and provide for ease of balancing. The uncrated weight of the valve is approximately 265 pounds (120 kg). The crated weight is approximately 320 pounds (145 kg).



3.0 SPECIAL INSTRUCTIONS

3.1 CONVENTIONAL VALVES



3.1.1 INSTALLATION



1. Actuators / Motors are fitted to suit the working conditions as per the particular tag no. Do not inter change the actuators / Motors.
2. Installation shall be done as per tag No. indicated on the name plate. Ensure foreign matter do not exist in the piping.
3. Remove Silica gels by all means after removing the protectors for the edge preparations. Ensure the anti-rust paint is removed (if provided) with the help of an alcoholic cleaner before Welding to pipe



4. At the time of welding (pre-heating-welding-post heating), hand wheel should be rotated by one or two revolutions to keep the valve open slightly.



5. The area for preheating and post heating shall be approximately 2.5 times of the width of weld area. Care should be taken to avoid temperature rise at other parts of valve.



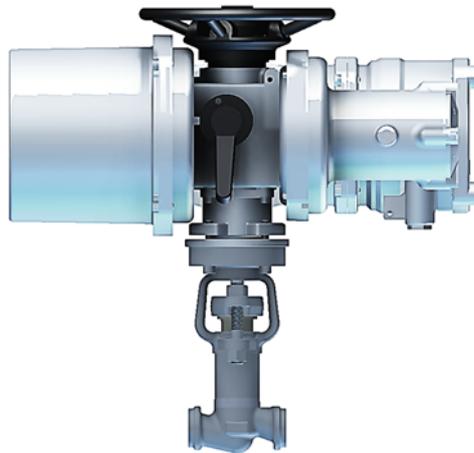
6. After completing welding (when temperature drops to normal), close the valve.



7. Ensure the threaded sections of clamping bolts and nuts are applied with anti-seizure component.



3.2 ELECTRICAL MOTOR OPERATED VALVE



3.2.1 STORAGE



1. Electrical Actuators always supplied mounted on Valve. These actuators contain electrical and electronic parts which are sensitive to moisture and water entry. Hence utmost care shall be taken to store these valves in a covered dry place and ensured that water / moisture does not enter in to actuator enclosure.

70% of all actuator failures are due to moisture/ water entry – hence maximum care to be taken to avoid this

2. The actuators are wrapped in polythene cover during dispatch from unit to minimize water/Moisture entry during transport. Further during storage, it is recommended that the motorized valves are stored in covered place. However for large motorized valves where indoor storage facility is not available, outdoor storage may be permitted if the cases are stored without removal of cover and covered fully by tarpaulins. It should be ensured that the packing cases do not rest on the ground directly to avoid water /moisture entry from bottom.



3.2.2 UNPACKING

3. Care to be taken to avoid mechanical damage to valve and actuator during unpacking.



4. Check for any physical damage during transport, immediate action to be taken to replace the defective parts to avoid further damages.

5. Standard size Cable glands to suit all the cable entries are supplied along with the actuator. These are packed and attached to the actuators.



Cable gland is one of the item which is frequently reported missing at site. It is recommended that the glands are collected immediately after unpacking and stored separately.



6. Actuator cover to be opened and checked for any water entry or moisture sign. In case of water entry, it is dangerous to power the actuator and further it may damage the valve and actuator. Actuator shall be checked by trained service person before connecting to supply.



7. Ensure that the plugs provided in all the cable entries are intact and fully tightened.



8. Repack the actuator with water proof cover until commissioning



3.2.3 HANDLING



9. The lifting hook provided on the actuator is meant for lifting the actuator alone – it shall not be used to lift the valve with actuator. Valve along with the actuator to be lifted using chain as indicated elsewhere in this document.



10. The lifting chain shall not be supported/touching the delicate parts of actuator like hand-wheel, manual-auto lever, terminal covers etc.

11. Actuators are made of aluminum casting hence to be handled carefully to avoid any breakage.



Actuators are factory set for “Torque Closing” or “Limit Closing” method, according to the valve design and hydraulic pressure tested with the valve. Hence it shall not be disturbed at Site.



The Torque Limit setting and position limit setting are done at factory for the design parameters. Changing these setting may cause severe damage to the valve and actuator.



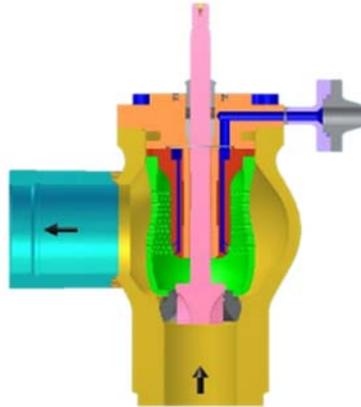
During the cabling, the actuator cover shall be replaced immediately after the work is completed. Covers left open is one of the major reason for water entry in to actuator



During the cabling, proper tight fitting cable glands to be provided and it shall be fully threaded on to the actuator, ill fitting cable glands / absence cable glands are another major reason for water entry in to the actuator



3.3 HP BYPASS SYSTEM



3.3.1 MATERIAL RECEIPT AND STORAGE INSTRUCTIONS

DOs



1. Remove the stems and gland packing from the valves if storage time of the same is expected to be more than 3 or 4 months, in such case follow steps 2 to 6 otherwise follow from step 7 onwards.
2. Keep the stems properly greased and separate from the valve.
3. Repack the valves without gland, packing and stems and store in original crates.
4. Silica gel put inside a cotton bag, are to be placed inside valve bodies.
5. Leave the servo valves and blocking elements in air-tight plastic transparent bag.

DON'Ts



6. Do not lift the valves in a method not recommended and using any part built onto the valves.
7. Do not remove cover plates provided on the Actuators, Servo valves, Blocking Elements, until servo valves and blocking



elements are mounted on the Actuators which should take place just before commissioning. This will avoid dirt, dust and any other foreign particles entry.



8. Do not remove any components from any equipment unnecessarily like dipstick from oil supply units, air filter element from air filter on the oil supply units etc., to avoid entry of dirt, dust etc.,
9. Do not remove any item from their original crates / packing cases after the checking the material receipt is over and during storage.
10. Do not mix up small items like threaded couplings, filter elements, cutting rings, small length of tubes etc.,

3.3.2 HANDLING INSTRUCTIONS

DOs

11. Put back the gland packing and stems (after removing the grease) in the valves just before installation.

12. Remove silica gel filled cotton bags from the valve bodies.



13. Assemble the valves with respective actuators and adjust valve strokes.



14. Transport the valves, actuators, hydraulic components etc., carefully from stores to the place of installation.



15. Unpack the items at the installation place and just before mounting on to the system to avoid damage and to restrict dirt entry.



16. Before unpacking oil supply units make sure that their foundations are complete.



17. Lift the valves by slinging rope around valve bodies.



18. Install the valves on to the pipe work in such a way that they are completely free of stress.

19. Remove the end caps of the valves just before welding the valves onto the pipe work.

20. Weld the valves on to the pipe work with TIG ROOT.

21. Observe cleanliness throughout mounting operation.



22. Keep the oil supply units, hydraulic components etc., covered to prevent dirt, dust and other foreign matters entry.



23. Keep all connections on oil supply units, actuators (servo valve, blocking element side) sealed.



24. Mount servo valves, blocking elements just before commissioning just after taking them out of plastic transparent bag.

25. Make flexible layout of oil lines using minimum possible number of bends.

26. Support the oil lines by U-clamp.

27. For assembly and commissioning of hydraulic system refer O & M Manual. (Pub. 7116)

28. Refer chapter on points to be noted during erection and commissioning.

DON'Ts

11. Do not damage weld preparation edge

12. Do not carry out any welding on the valves or accessories other than at the valve ends.



13. Do not use any point on the valves or other items for load bearing.

14. Do not subject valves to any inadmissibly high temperature during various phases of welding and subsequent heat treatment operation.

15. Do not Insulate valve bodies during operations mentioned in (14) above.



16. Do not remove covers provided on the Actuators, Servo valves, and Blocking Elements until servo valves and blocking elements are mounted on the Actuators which should take place just before commissioning. This will avoid dirt, dust and any other foreign particle entry.



17. Do not stand or apply load in any other ways on the valves or other items like feedback transmitters, servo valve, oil lines etc.

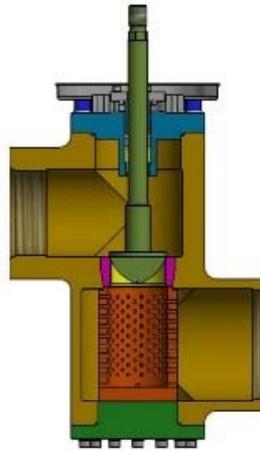


18. Do not strike arc for welding on the valve bodies or any other items.



19. Do not remove any components from any equipment unnecessarily like dipstick from oil supply units, air filter element from air filter on oil supply units etc., to avoid entry of dirt, dust etc.,

3.4 CONTROL VALVES



3.4.1 STORAGE PRIOR TO ASSEMBLY



1. If the storage time is expected to be more than 3 months, it is advisable to remove the stems and gland packing from the valves and keep the stems properly greased or separated from the valve. Silica gel, put inside a cotton bag, must be placed inside the valve.
2. Actuators should be left in the packing crate.
3. Servo valves and blocking elements should be left in the air tight plastic bag.

3.4.2 STORAGE AFTER FLUSHING OF OIL LINES

1. All connections on oil supply unit and on actuator side (Servo valve) must be sealed either by connecting the hoses and closing the other ends of the hoses or by using tight caps.

3.4.3 PRESERVATION AFTER SOME PERIOD OF OPERATION

1. In case of standstill for more than 4 months, it is advisable to remove the stems and gland packing's from the valves and keep the stems property greased and separated from the valves.
2. Silica gel, put inside a cotton bag, must be placed inside the valve.



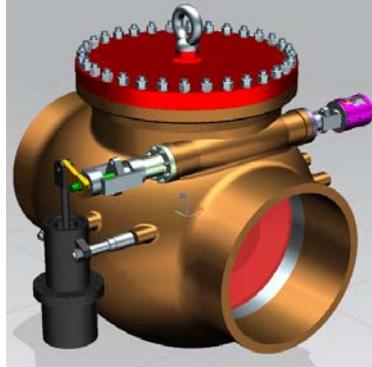
Valves Division



3. Make absolutely sure that no accessory items (i.e. control and blocking elements, solenoid valve etc.) are left in the packing case. These should be store dry and safe until the final mounting to the valve.



3.5 QUICK CLOSING NON-RETURN VALVE



3.5.1 STORAGE

1. QCNRVs are packed in Steel Crates and all the relevant information like Customer name, unit number, Quantity, Weight, Sale order no. and DU are clearly provided on the outer cover.
2. Care has been taken from our end not to mix items pertaining to more than 1 unit. If any consignment having QCNRVs of 2 or more units is found, then open the box and after taking the QCNRVs relevant to the unit under erection, pack the box again to avoid any water or dust entrapment into the Box and damaging the valve which will be erected at a later stage.



3. Accessories like Solenoid valve, position transmitters and air filter regulators are proved as loose items and same shall be assembled to the valve only during commissioning.



4. Unused ports of solenoid valves are to be plugged to avoid any ingress of foreign particles.

3.5.2 HANDLING



1. QCNRVs can be lifted using lifting eye bolts provided on the top of the bonnet.



2. While placing the QCNRV on the ground, care should be taken to ensure the valve drain nozzle is not damaged. Place the valve suitable v blocks.



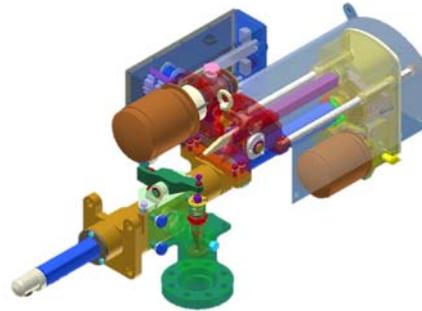
3. Do not keep the valve on the spindle or with actuator touching the floor. This will cause the spindle to bend and will affect the functioning of the valve.



In most of the sites it is found that the limit switch connector are damaged during handling. Limit switches are provided on the actuator side. Care should be taken to lift the valve without damaging he limit switches.



3.6 SOOT BLOWER



3.6.1 STORAGE

All the Soot Blowers, though designed for outdoor applications, require special care during storage before erection and commissioning. These instructions may please be taken seriously to avoid costly replacements or breakdowns at a later date.

1. On receipt of the Soot Blowers, carefully check for any damage of the components. List out the damaged components with reference to the item no. in the concerned assembly Drawings to BHEL, Tiruchirappalli for further action.
2. Soot Blower assemblies are shipped completely covered. Unless the blowers are taken for immediate erection please do not disturb the coverings. Coverings are to be replaced wherever damaged.
3. Some assemblies like Wall Deslagers and Rotary heads are shipped with temporary wooden platforms to prevent parts getting damaged during.
4. All the electrical items are to be covered with waterproof and dust proof coverings. Nozzle and valve openings are shipped covered. This may be checked and covered wherever necessary.



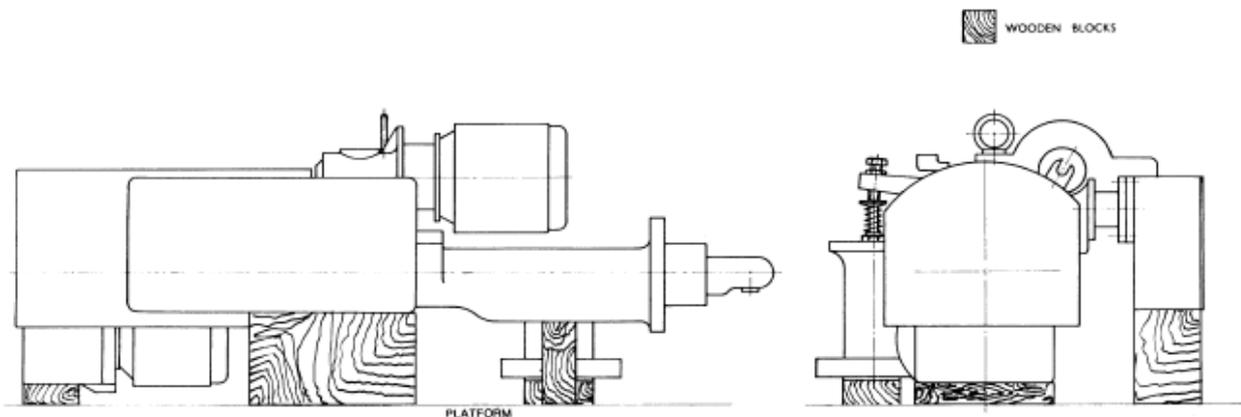


5. Wall Deslagers and Rotary Soot Blower heads can be stored under covered roof if the interval between Soot Blower erection and receipt is more than two months.



6. Always use the lifting lugs or hooks provided to avoid damage to the connected parts. Similarly avoid hitting the assembly against structures or other boiler components while the Soot Blowers are being lifted.

7. The above instructions are for guidelines only and the concerned persons may use their own discretion's knowing well that these are electro-mechanical components.



CORRECT METHOD OF SUPPORTING THE WALL
DESLAGGER ON THE GROUND/PLATFORM.

For further details, suggestion and improvement Pl. contact the following Engineering Executives

Name (Mr.)	Product	Contact No.	Email ID
E. ATHIANNAVI	Soot Blower, Safety Valve, Safety Relief Valve, Silencer & Electromagnetic relief Valve	0431-2576608	annavi@bheltry.co.in
N.RAJASEKAR	HP bypass Valve, Waterlevel gauges, QCNRV, CRHNRV, Control Valve	0431-2576690	nrsekar@bheltry.co.in
K.RAJASEKARAN	Gate, Globe & Check Valves	0431-2576587	kraja@bheltry.co.in
D.DINAKARAN	All the above valves	0431-2576631	dina@bheltry.co.in