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1. ERIKS operating companies

ECON trunnion mounted ball valves are being delivered by several ERIKS operating companies on a worldwide basis. In this manual these will be referred to as 'ERIKS', the individual terms of delivery of the ERIKS operating company having executed the order are applicable.

2. Product description

The ECON trunnion mounted ball valves are designed according to ASME B16.34 and EN 125616-1. Technical information about the ball valves can be found in our latest catalogue or see our website www.eriks.com and should be used in accordance with the applicable pressure-temperature rating as stated on this website.

Ball valves are provided with marking, according to MSS SP 25 and EN 19. The marking makes the identification of the valve easier and contains:

- size
- pressure rating class
- body and endcap material marking
- Econosto logo
- heat numbers
- tag plate

ECON trunnion mounted ball valves have a two-piece construction and are available in 8"/DN200, 10"/DN250 and 12"/DN300. The ball valve has two seat rings which can be sealed in each direction, without restrictions to the flow direction. Both upper and lower stems are equipped with bearings, which reduce friction and ensure easy and stable operation. The acting force on the ball made by upstream pressure is transmitted to upper and lower stem and the ball will not move out of its position. The valve sealing is realized by a spring behind the seat. The seat-springs pre-tightening unit features in self-sealing and ensures its sealing capability.

According to customers' requirements, the valve can be provided with a grease injection system, in order to extend the life-cycle of the valve, in case the ball or seats have been damaged.

Before using grease injection fittings, assure that the valve is in fully closed position. Connect a grease gun to the fitting and inject an appropriate volume of grease. If the valve fails to seal after the injection of grease, turn the handwheel gently back and forth, moving the ball against the seat in order to assist the spread of the grease over the seat surface.

Due to the grease injection into the sealing surface, the friction and damage on the sealing surface will be reduced and the life-cycle of the valve extended. In case when the valve seat is damaged, grease injection will only function as a temporary seal until the valve can be repaired or replaced.

3. Requirements for maintenance staff

The staff assigned to assembly, operating and maintenance tasks should be qualified to carry out such jobs and in any circumstance, ensure personal safety

4. Transport and storage

Transport and storage should always be carried out with the ball complete open and the valves should be protected against external forces, influence and destruction of the painting layer as well. The purpose of the painting layer is to protect the valve against rust, during transport and storage. The valves should be stored in an unpolluted space and should also be protected against all atmospheric circumstances. There should be taken care of the temperature and humidity in the room, in order to prevent condensate formation.

5. Function

ECON trunnion mounted ball valves are designed to stop the flow of a medium. The valve is closed by turning the handwheel clockwise; please don't use tools to increase the torque on the handwheel. The maximum working pressure under maximum and minimum temperature is shown on the nameplate of the valve. Throttling operation is prohibited; please do not keep the valve in half-open position frequently. The pressure difference and the impact of the liquid may do damage to the ball and seat.

6. Application

The ECON trunnion mounted ball valve can be applied in long distance pipelines as well as normal industrial systems. This type of valve can be widely used in the industry such as chemical, petrochemical, oil & gas, power, off-shore etc. The valves are designed for standard operating conditions. For the use of extreme conditions e.g. aggressive or abrasive media, it is recommended to mention this at the ordering stage, to verify whether the valve is suitable. The installation designer is responsible for the valve selection, suitable for the working conditions. The valves are unsuitable, without written permission of an ERIKS company, to apply for hazardous media as referred into Regulation (EC) No 1272/2008.

ECON trunnion mounted ball valves can be operated by a worm gear box, pneumatic, electric, hydraulic or electric-hydraulic actuator.

7. Installation

During the assembly of the ball valves, the following rules should be observed:

- make sure before an assembly that the ball valves were not damaged during the transport or storage.
- make sure that applied ball valves are suitable for working conditions, medium used in the plant and the right system connections, according to pressure and temperature limits as per the tag plate.
- to take off dust caps if the valves are provided with them.
- the interior of the ball valve and pipeline must be free from foreign particles.
- the valve should be installed in the pipeline in open position, for a correct functioning, the valve must be stress free connected to the pipeline, supports must be arranged to prevent any additional stress, caused by the weight of the valve or the pipeline.
- steam line systems should be designed to prevent water accumulation.
- install pipelines so that damaging transverse, excessive vibrations, bending and tensional forces are avoided.
- for easy operating, the free space around the handwheel shall be not less than 100 MM.
- before plant startup, especially after repairs carried out, flash out the pipeline, of course with fully opened position.
- don't leave the ball partly open (throttling operation), where the pressure drop and/or flow rate can bring damage to the valve seats and/or ball.
- don't open or close the ball valve too quickly, this might cause water hammer
- it is good practice to operate the valve periodically in order to assure that the ball is able to move freely.

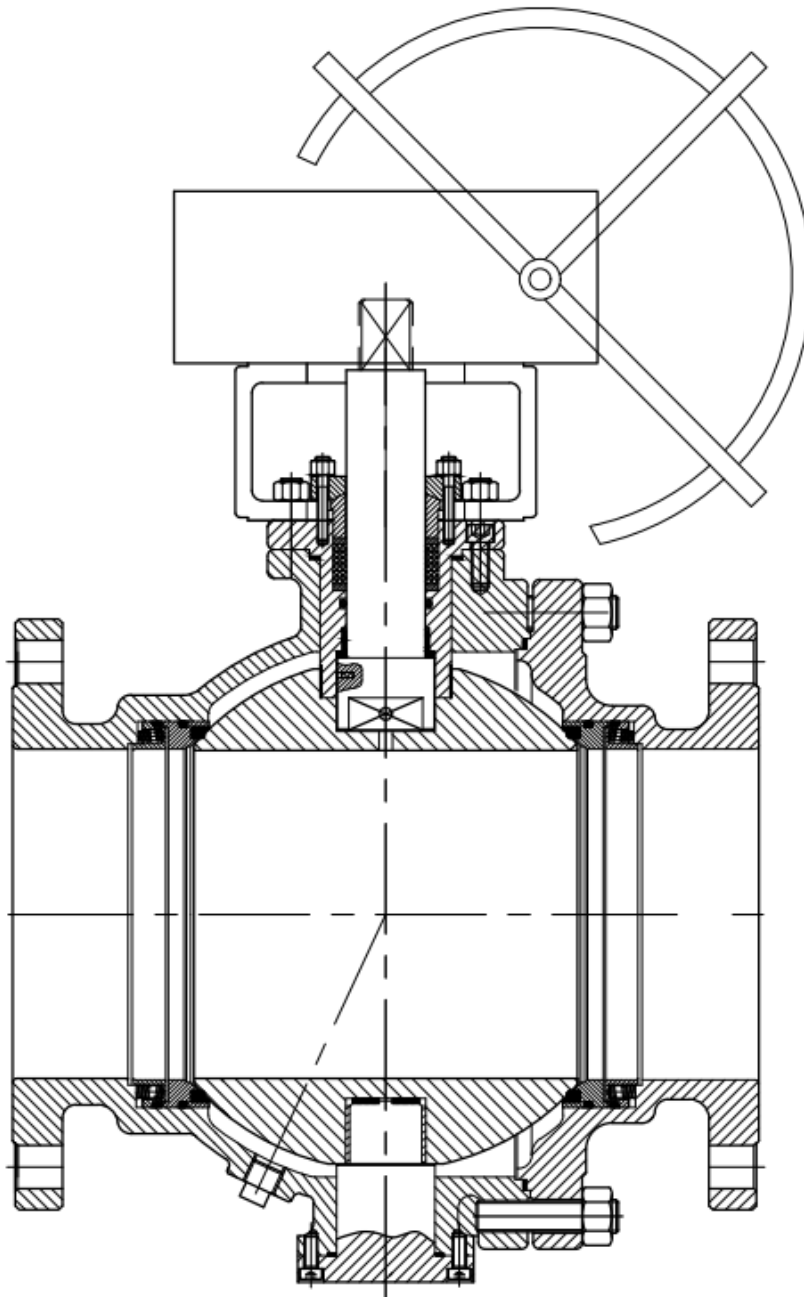
8. Maintenance

Before starting any service jobs, make sure that the medium supply to the pipeline is cut off, pressure was decreased to ambient pressure, the pipeline is completely cleaned and ventilated and the plant is cooled down. Always keep safety instructions in mind and take all personal safety precautions.

During maintenance, the following rules should be observed:

- Always keep personal safety precautions in mind and always use appropriate protection e.g. clothing, masks, gloves etc.
 - be alert that the temperature still can be very high or low and can cause burns.
 - check the valve on all possible leaking possibilities.
 - dust, grease and medium residual, must be frequently cleaned of the valve body and all moving parts, such as stem and actuator to maintain all operating functions.
 - check if all bolts and nuts are still fastened. (also of the supports when used)
 - before attempting to dismantle any ball valve, the valve should be opened and closed a complete cycle to assure that there is no pressure trapped within the body cavity.
 - if required replace the stem seal, for safety reasons, these valves only can be repacked when depressurized, drained and ventilated.
 - the thickness of body and endcap must be checked to ensure safety operation at an interval of at least three months.
- 1) Re-tighten packing
- Should a leakage occur at the gland packing, retighten the gland nuts.
 - Take care that the gland nuts are not tighten too much; normally the leakage can be stopped by simply turning the stem nuts by 30° to 60°.
- 2) Replacement of seats and seals.
- A) Disassembly
- Place the valve in half-open position and flush the line to remove any hazardous material from the valve body.
 - Put the valve in a vertical position with the body end cap facing up-wards.
 - Place the valve in the closed position; remove both counter flange bolts & nuts and lift the valve out of the pipeline.
 - Remove the gear box or actuator, gland nuts, gland and bonnet bolts and lift the bonnet including the stem out of the valve body. Now the stem and stem seals can be removed from the bonnet.
 - Remove the body bolts or studs and nuts to allow the endcap, to be separated from the body, remove body gasket.
 - Remove the trunnion which supports the ball at the bottom side and make sure that the ball is in "Close" position. Now the ball can be taken out easily from the body, by using lifting equipment. Make sure the ball will be handled with care in order to avoid scratches and dents.
 - Finally the ball seats can be removed from the valve body and end cap.

Caution: Use care to avoid scratching the surface of ball, stem and packing chamber.



2-piece trunnion mounted ball valve

B) Reassembly

- Reassembly process is reverse sequence of disassembly.
- Clean and inspect all parts, full replacement of all soft parts (seats and seals) is strongly recommended.
- Put the valve in the “open” position, otherwise the seats can be damaged.
- Tighten the body bolts crosswise.
- Tighten the gland nuts
- Cycle the valve slowly with gentle back and forth motion to build gradually to full quarter turn.
- If possible, test the valve before placing it back to line for service.

9. Service and repair

All service and repair jobs should be carried out by authorized staff, using suitable tools and user shall use valve genuine packing, gasket, bolt and nut of the same size and material as the original one.

- welding repair and drilling of the valve is forbidden.
- it is forbidden to replace seats or seals when the valve is under pressure.
- before you replace seats or seals you have to clean the valve body on these areas.
- after replacement of seats or seals it is necessary to check the valve operation and tightness of all connections. Tightness test should be carried out.
- after installation, the valve should be checked and maintained periodically at least every 3 months, depending on the medium.

10. Troubleshooting

It is essential that the safety regulations are observed when identifying the fault.

Problem	Possible cause	Corrective measures
No flow	The ball valve is closed	Open the ball valve
	Dust caps were not removed	Remove dust caps
Little flow	Valve not completely open	Open valve completely
	Piping system clogged	Check piping system
Valve difficult to open	Stuffing box seal too tight	Slacken nuts
	Wrong direction of rotation	Turn counter clockwise to open
	Ball seat damaged by foreign particles.	Replace the ball seats
Leakage on the connection between valves and pipes	The flange nuts haven't been turned down or haven't been fastened evenly.	Turn down the nut evenly
	Flange sealing surface or valve sealing surface was damaged or there is dirt on it.	Repair the sealing surface or clean the valve and flange.
	Gasket is out of use	Replace the gasket
Leakage across the stem	Stuffing box gland slack	Tighten stuffing box gland evenly, if necessary renew stuffing box packing
Leakage across valve seat	Valve not properly closed	Pull the wheel tight without tools
	Seat damaged by foreign particles	Replace the ball seats
	Medium contaminated	Clean valve and install dirt screen
Operating failure	Packing too tight	Loosen gland nuts

11. Removal

All dismantled and rejected valves cannot be disposed with household waste. The valves are made of materials which can be re-used and should be delivered to designated recycling centers.

General warning:

General note for products which may be used for seawater:

Although our products can be used in seawater systems it should always be noted that, in case of installation in a piping system made of materials which are frequently used because of their excellent seawater resistance (e.g. Cunifer), large potential differences may occur possibly causing corrosion which could permanently damage the proper functioning and integrity of our product.

A combination of different materials should always be mentioned prior to the purchase of our products in order for us to give the best possible advice on a safe functioning.