Operating Instructions
ERHARD Ball Valve
with stem gearbox and electric actuator

1 Description of Product and Range of Application
ERHARD Ball Valves DN 80 – 1200
with stem gearbox and electric actuator
with or without inspection cover – depending on the corresponding type

ERHARD Ball Valves are the appropriate valves wherever a minimum of head loss is required, e.g., upstream of turbines. With their actuator being adapted to the hydraulic moments they are suitable for high flow velocities occurring e.g. during flushing and emptying of pipelines. ERHARD Ball Valves are also field-approved for contaminated water, for water containing foreign bodies and for sludge.

2 Design Features – Technical Data
2.1 Ball Valve
The ERHARD Ball Valve is a full diameter unreduced bore type valve. It is suitable for swabbing. Its robust off-set ball is equipped with a sealing ring the type and material of which are selected according to the operating conditions. This seal is lifted off the body seat after a short travel of the ball. There is a large gap area between ball and body which is flushed by the flow in intermediate positions bringing about a self-cleaning effect as well as a very good hydraulic behaviour of the Ball Valve during opening and closing under operating conditions.
In the open position, the ball sealing ring and the body seat ring are located outside the flow and are thus protected against wear and tear.

Perfect operation is guaranteed by the positive connection of shaft and ball ensuring secure power transmission without any fluttering.

2.2 Stem gearbox

The robust ERHARD stem gearbox turns the rotary movement of the stem into a transitory motion of the valve shaft. A nut running on the stem moves - depending on the type of gearbox - a gearbox fork or gearbox crank (with toggle lever) which is securely connected with the drive shaft. In both limit positions, the stem is equipped with threaded rings serving as fixed limit stops. These stops limit the torques initiated by the stem and prevent excessive forces from being transmitted onto the valve in the limit positions.

The stem gearbox is irreversible and closes in clockwise direction.

An indicator behind a sight-glass on the cover of the stem gearbox shows the valve position in a continuous manner. The indicator position corresponds to the position of the ball. The limit positions are shown as readily comprehensible symbols. The sight-glass made from shock-resistant polycarbonate (PC) is tightly screwed into the gearbox cover (IP 67).

3 Performance and Mode of Operation

The valve is operated by means of the stem gearbox and the electric actuator without any need of excessive forces. The valve is closed by turning the operating gear in clockwise direction.

4 Installation into the Pipeline – Mounting

Remove all packing material from the valve. Prior to installation, check the pipeline for impurities and foreign matters and clean it if necessary.

Attention!

For valves with an arrow showing the flow direction, this direction must be observed! For valves with foot plate, this plate only serves as a support of the valve.

It is important that all around the valve there is free access for operation and maintenance. For outdoor installation, the customer has to protect the valve against the direct effects of the weather.

During installation of the valve, the distance between the pipe flanges should exceed the valve face-to-face dimension by at least 20 mm. Thus, the raised faces will not be damaged and the gaskets can be inserted. Steel-reinforced rubber seals are
recommended for use as flange gaskets, for slip-on flanges they are absolutely necessary (consider resistance to flow medium and temperature).
The mating pipe flanges must be plain-parallel and concentric.

Tighten the connecting bolts evenly (without distortion) and crosswise. The pipeline mustn't by any means be pulled up to the valve.

5 Initial Operation

After installation, check the valve for ease of operation by moving it over the whole travel by means of the electric actuator.
For Ball valves DN 350 and larger, the air in the body can be evacuated by means of an air release plug.

6 Operation and Application

6.1 Inadmissible Modes of Operation

Avoid installation immediately upstream of elbows, T-pieces, butterfly valves or check valves.
The temperature limits for the flow medium must not be exceeded.
Keep within the limits of the maximum working pressure.
The nominal pressure is the maximum pressure to be applied on the closed valve.
Extending the operating elements, e.g. by levers is not allowed.

6.2 Design with mounted electric actuator

The electric actuator is mounted on the neck bearing of the stem gearbox. The standard type is equipped with:
Torque and travel limit switches with 1 make and 1 break contact each
Blinker transmitter for indication of running operation
Thermal switch in the motor winding

The valve is switched off in the following manner:
travel dependent in closing direction
travel dependent in opening direction

The switching points of the travel and torque switch are set at the factory. Moreover, the torque switches serve as safety switches, e.g. in intermediate positions.

When the valve is supplied without mounted electric actuator, the travel switches have to be adjusted after mounting the electric actuator.
See paragraph: "Initial Operation: Resetting the limit switches".

Observe the relevant safety measures (VDE/TAB, etc.) and the instructions of the manufacturer of the electric actuator concerning transport, storage, initial operation and maintenance (operating instructions).
For the electrical connection, observe the suggested wiring and terminal diagram supplied by the manufacturer of the electric actuator (travel, torque and thermal switches, motor, and heating device in case). Measure the insulating resistance of the motor prior to connection. (If it is less than 500 K-ohms, this shows that there is moisture in the winding. Remove the motor for drying-up and heat it by means of a hot-air fan or in a heating chamber: max. admissible temperature 100°C).

Compare the existing voltages with the data on the name plate. After connection, the covers and the cable glands on the electric actuator have to be closed and sealed carefully.

6.2.1 Inching operation and Manual Emergency Operation

ATTENTION:

If a foreign body is jammed in when operating the valve, the torque switch for the corresponding direction responds and switches off the motor. The time lag between response of the torque switch and disconnection of the motor from the network depends on the signal delay. If another order is given in the original direction, without having moved the valve sufficiently in the opposite direction, the torque will increase. If this procedure is repeated several times, the torque will accumulate. The valve and its operating elements are not designed for such an emergency.

We explicitly draw your attention to the fact that such inching operation is inadmissible.

Inching is only admissible under the following conditions:

If the torque switch responds in intermediate position, the valve must first be moved in the opposite direction until the torque switch completely returns to its original position. Only now the valve may be moved again in the direction in which the disturbance occurred. Proceeding this way, you will obtain torques corresponding to the torques set at the torque switch. Moreover, the foreign matter can come off and be flushed out of the seating zone.

Operation by emergency handwheel:

If the valve is operated by means of the handwheel of the electric actuator, the torque switches do not provide any safety function.

If a foreign body is jammed with the valve being in intermediate position, excessive operating force - particularly in case of high gear reduction - might be damaging to the actuating components:
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If any resistance is detected during emergency handwheel operation, some turns must be made in the opposite direction before the valve is moved in the direction in which the disturbance occurred (flush out the foreign body). Continue operation with utmost care, in no case using excessive force. If need be, repeat flushing operation.

6.2.2 Initial Operation:

a) Move the valve manually to central position.
b) Check the movement of the indicator at the stem gearbox and thus the direction of rotation of the actuator by brief electrical starting.
c) In case of faulty direction of rotation, change the poles of the motor connection.
d) Check once again the direction of rotation shown by the indicator, by means of brief electrical starting.
e) Check disconnection of the torque and travel switches in Open and Close directions by operating the switches manually in central position.
f) Change poles if necessary.
g) Carry out complete travel only when the correct direction of rotation and disconnecting function are ensured.

+ In case of faulty direction of rotation, the travel and torque switches do not work

6.2.3 Resetting of the limit switches:

a) Move the valve manually against the limit stop in position "C" of the indicator.
b) Return by one turn of the stem.
c) Adjust "OPEN" travel switch according to the operating instructions for the electric actuator.
d) Move the valve manually against the limit stop in position "B" of the indicator.
e) Return by one turn of the stem.
f) Adjust the "CLOSED" travel switch according to the operating instructions for the electric actuator.
g) Screw-on the cover of the stem gearbox.

If the proposed measures are not respected, we cannot be made liable for any damages resulting thereof.

7 Maintenance

For inspection or repair work, protective equipment shall only be removed after the pipeline section in which the valve is installed has been isolated and pressure-relieved.
7.1 Maintenance

ERHARD Ball Valves are equipped with maintenance-free plain bearings. Gearbox stem and gearbox bearing are provided with long-time greasing. We recommend to move the ball valve over the whole travel at least every three months.

7.2 Inspection

Check the external condition of valve and actuator. Clean them and repair coating if necessary.
Check the flanges for tightness:
Move the valve manually over the whole travel.
Check seat for tightness.
Check sealing of shaft passage for tightness.

7.3 Regreasing the internal parts of the stem gearbox, see drawing 3E154791

- Move valve into "OPEN" position.
- Unscrew hexagon screws (25) for fixing the neck bearing/flanged bearing (21/22) and remove them.
- Screw-out stem (2) by turning to the right until reaching stop nut.
- Lift off bearing ring (3) so that the whole stem will be accessible.
- Unscrew cover (17) by turning off the cylindrical screws (19).
- Grease stem, axial bearing and sliding ways of stem nut.
- Mount gearbox vice versa and operate it several times.

7.4 Relubricating the internal parts of slider-crank mechanism, drawing 1E 30641

Screw off hexagon bolts (44) and lift off gearbox cover (41).
Lubricate stem (16) and sliding surfaces of the rollers (12) with grease.*)
Put on gearbox cover (41) with gasket (42) and screw in hexagon bolts (44).

Pay attention to the gasket (42) being inserted so that it fits on all sides.

*) Lubricants Manufacturer Standard
ALVINA Fett R3 (grease) SHELL DIN 51502 K-L3n
TEXANDO FO20 TEXACO DIN 51825 K-2n