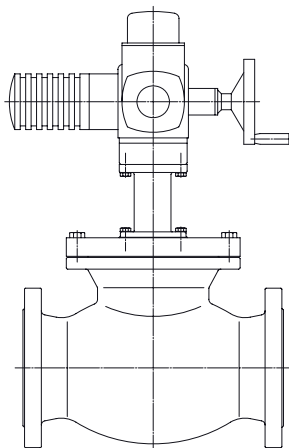


Operating Instructions

ERHARD Control Valve



With electric actuator



- 1 Description of Product and Range of Application
- 2 Design Features – Technical Data
- 3 Installation into Pipeline – Mounting
- 4 Initial Operation
- 5 Operation and Application
- 6 Maintenance

These operating instructions must always be used in combination with operating instructions BA01D001!

1 Description of Product and Range of Application

ERHARD Control Valves of straight and angular pattern with electric actuator.
Product No. 60..9512

The control valve is used for isolating, throttling or controlling pure neutral liquids.

The valve was designed according to the operating data (see cover sheet) known to us in order to achieve optimum adjustability. In case the operating data change, please ask the manufacturer whether the valve is still suitable. Enclosed characteristic curves - if any - are theoretical calculations based on test results and are subject to the tolerances to DIN/VDE 2173.

Special tasks:
pressure, flow rate and reservoir level control etc.
as filling valve in by-pass lines

Nominal size DN	Nominal pressure PN	Product Number	
		straight pattern	angular pattern
50-150	16	60319512	60369512
50-150	25	60329512	60379512
50-150	40	60339512	60389512

2 Design Features – Technical Data

Control Valves, straight or angular pattern, with body of ductile cast iron SG GGG-50. are equipped with a fixed slotted bush of stainless steel in which a massive control piston moves covering or releasing the slotted area of the bush according to the opening position. The pressure-balanced piston is guided by means of the PTFE slide ring. Bubble-tight sealing is achieved by an O-ring which is enclosed between seat ring and slotted bush. The closing limit position is limited by a fixed stop.

Due to the opposite arrangement of the slots in the bush, the flow of the medium converges concentrically so that the energy is actually converted in the center of the bush (far from the material). Thus noise and stress to the material are minimized.

The position of the valve is continuously shown by an indicator at the stem.

Retrofitting from handwheel to electric actuator or vice-versa is always possible in situ with the valve being in the pressureless pipeline. It is also possible to replace the slotted bush including the piston without removing the valve from the pipeline.

Dimensioning according to performance has to be based on the kv values considering the differential pressure acting on the valve and the characteristic curve of the pipeline.

The following values (see separate data sheet) are not valid for the design with special slotted cylinder.

Dimensioning the valve depending on the flow rate

DN	50	65	80	100	125	150
K_{vs} (m ³ /h)	36	59	87	140	210	280
Zeta	7.6	8.1	8.5	7.8	8.7	10.2
Q_{normal} (m ³ /h)	11-28	18-47	27-72	43-113	65-175	97-255
h_v bei Q_{normal} (mWS)	0.9 – 8.5					
Q_{max} (m ³ /h)	42	70	108	170	265	380
h_v Q_{max} (mWS)	14 – 19					
K_{v min} (m ³ /h)	1.2	1.2	1.2	1.5	1.5	1.5

- Q_{normal}** : Flow rate according to a flow velocity of 1.5 to 4 m/s referred to nominal diameter.
- Q_{max}** : Max. admissible flow rate for short-time operation according to a flow velocity of 6 m/s referred to nominal diameter.
- K_{v min}** : Min. controllable flow rate at a differential pressure of 1 bar for water. For other differential pressures, the min. controllable flow rate is:
- $$Q_{\min} = K_{v \min} \times \sqrt{\Delta p} \quad [\text{m}^3/\text{h}] \quad (\Delta p \text{ in bar})$$
- h_v** : Head loss when valve is fully open
- Zeta**: Head loss coefficient when valve is fully open

3 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!

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, in case of 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.

A straight **pipe section** upstream of the valve is not necessary, i.e., the valve can be installed immediately downstream of a fitting, as e.g. elbow, t-piece or similar.

The straight downstream pipe section should not be inferior to following values:

DN	Straight downstream pipe section (m)
50, 65	0.4
80, 100	0.5
125, 150	0.7

If a water meter is installed, it has to be arranged upstream of the valve as the turbulent flow downstream of the valve will lead to incorrect metering.

4 Initial Operation

Each valve has been tested for tightness and performance before delivery.

After installation, check the valve for well-running.

The electric actuator is mounted on the valve concentrically. The stem of the valve is moved by the screw bush of the electric actuator in vertical direction (OPEN - CLOSED). The actuator is equipped in the standard version with:

Torque and travel switch with one open and 1 closed contact each.

Flasher unit for running indication

Thermal circuit breaker in the motor winding

The valve is turned off

in CLOSED direction: depending on torque

in OPEN direction: depending on travel.

The switch position of the travel and torque switches are factory set. The torque switches serve also as safety switches, e.g. in intermediate positions.

If the valve is supplied without mounted electric actuator, the travel switches must be adjusted after mounting the electric actuator.
See also section "Initial operation: Resetting of travel switches".

The relevant safety regulations (VDE/TAB etc.) and the instructions of the manufacturer of the electric actuator concerning transport, storage, initial operation and maintenance must be observed.

For the electric connection the proposal of the manufacturer of the electric actuator must be considered in terms of connection and terminal plan. (Travel torque and thermal switch, motor, heater if applicable). Prior to installation the insulation resistance of the motor must be measured. (In case it is below 500 K-Ohm, it means there is moisture in the winding. The motor must be removed for drying and be warmed up by means of a hot air gun or in a heated chamber: maximum permissible temperature is 100° C).

The available voltages must be compared with the information on the type plate. After the connection all covers and cable glands at the electric actuator must be carefully closed and sealed.

Inching and Emergency Operation

A t t e n t i o n :

If a foreign body is jammed in when operating the valve, the torque switch for the suitable 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 a new closing 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 a disturbance.

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

Inching is 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 suitable 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 elements. Therefore:

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.

4.1 Initial operation

- 4.1.1 Move the valve manually to central position.
- 4.1.2 Check the movement of the indicator at the stem gearbox and thus the direction of rotation of the motor by brief electrical starting.
- 4.1.3 In case of faulty direction of rotation, change the poles of the motor connection.
- 4.1.4 Check once again the direction of rotation shown by the indicator, by means of brief electrical starting.
- 4.1.5 Check disconnection of the torque and travel switches in Open and Close directions by operating the switches manually in central position.
- 4.1.6 Change poles if necessary.
- 4.1.7 Carry out complete travel only when the correct direction of rotation and disconnecting function are ensured.

In case of wrong direction of rotation, travel and torque switches are ineffective!

4.2 Resetting of the limit switches:

- 4.2.1 Move the valve manually against the limit stop in position "C" of the indicator.
- 4.2.2 Return by one turn of the stem.
- 4.2.3 Adjust "OPEN" travel switch according to the operating instructions for the electric actuator.
- 4.2.4 Move the valve manually against the limit stop in position "B" of the indicator.
- 4.2.5 Return by one turn of the stem.
- 4.2.6 Adjust the "CLOSED" travel switch according to the operating instructions for the electric actuator.
- 4.2.7 Screw on cover of stem gearbox.

If these measures proposed by us are not observed, we cannot be made liable for any damages resulting thereof.

5 Operation and Application

The valve is operated by the electric actuator.

If a control valve shall be changed from electric to manual operation this is possible by easy retrofitting.

6 Maintenance

ERHARD control valves are exposed to more or less stress, depending on operating condition. Due to using high quality material and by appropriate design maintenance free operation is achieved to a great extent. Approx. every 3000 OPEN - CLOSED cycles or once per year, respectively, the stem screw must be cleaned and lubricated.

*) Lubricant	Supplier	NLGI class
Renolit CX-FO20	Fuchs Europe Schmierstoffe, Mannheim	KP2 N-30

Check external condition of the valve. Clean and mend the coating if necessary. Check tightness at flanges. Check valve for well-running. Move valve manually over total travel. Check tightness at the seat.

Mounting of the piston slide ring

To valve drawing No **3. 52819**, spare parts list No **4.119990** with mounting tool to drawing No **4.119999**

When it is necessary to replace the slide ring (9) in the piston (8) (drawing 352819 and 4.119990) - consisting of O-ring and Turcon-Glyd-ring, the new sealing set has to be mounted in accordance with these instructions. Otherwise one has to reckon with damaging or destruction of the sealing elements.

Use only original spare parts and the mounting tools (drawing No. 4.119 999) supplied on request.

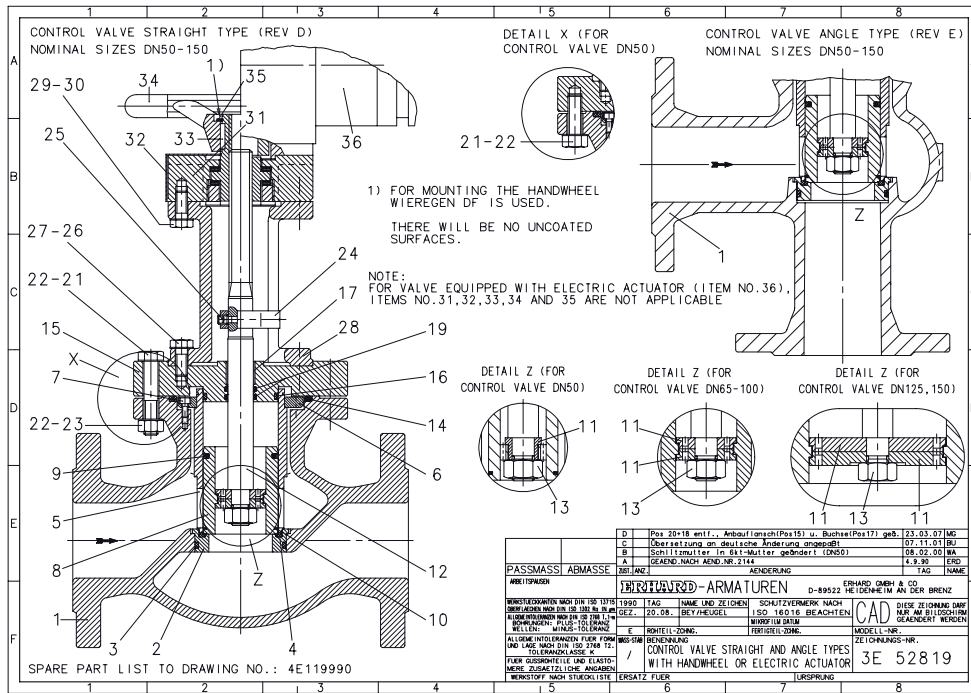
6.1 Insert the O-ring without any torsion into the cleaned groove of the piston. For this purpose, the plug (3) can also be used. By heating in hot water (about 80° to 120°C), the Turcon-Glyd-rings can easily be stretched and they will recover their original shape.

6.2 Place the plug (3) on the side of the piston groove as shown in drawing "Mounting Tools". By means of the expanding sleeve (5), the Turcon-Glyd-ring (4) must be

pushed over the plug and into the piston groove, the Turcon-Glyd-ring being expanded during this process.

- 6.3 Having been pushed to its place, the Turcon-Glyd-ring is caught in the groove, but still slightly protruding. By means of the calibrating sleeve (6) the expanded ring is caused to recover its original shape.
- 6.4 For mounting the piston into the slotted bush of the valve, as shown in the drawing, place the mounting ring (8) on the slotted bush and insert the piston through the mounting ring into the valve. The mounting ring contains the appropriate chamfer necessary for insertion in order to avoid injury to the sealing elements.

Control valve of straight and angular type (to drawing No 3. 52819)



Parts list (to drawing No. 4.119990)

DESCRIPTION	ITEM	MATERIAL	MARKING
BODY	1	EN-1S1050 (0.7050)	
SEAT RING	2	1.4301	
O-RING	3	PERB 80	#
O-RING	4	PERB 80	#
SLOTTED BUSH	5	1.4301	
RETAINING RING	6	1.4301	
SOCKET-HEAD CAP SCREW	7	A4	
PISTON	8	1.4301	
SLIDE RING	9	PTFE CARBON / PERB 80	#
LAMELLAR RING	10	1.4310	#
CLAMPING RING DN65, COLLAR BUSH DN60	11	1.4057.05	
STEM	12	1.4057.05	
HEXAGON NUT	13	A2	
O-RING	14	PERB 80	#
MOUNTING FLANGE	15	RST 37-2	
O-RING	16	PERB 80	#
BUSH	17	P1	
O-RING	19	PERB 80	#
HEXAGON-HEAD CAP SCREW	21	A2	
WASHER	22	1.4301	
HEXAGON NUT DN65-150	23	A2	
POINTER	24	2.0401.30	
THREADED PIN	25	A4	
HEXAGON-HEAD CAP SCREW	26	A2	
WASHER	27	1.4301	
MOUNTING COLUMN	28	EN-1S1050 (0.7050)	
HEXAGON-HEAD CAP SCREW	29	A2	
WASHER	30	1.4301	
CONNECTING PIECE FOR HANDWHEEL	31		
PROTECTIVE CAP	32	NONRIGID PE	
FITTING KEY	33	ST 60-2K	
HANDWHEEL	34	EN-J1 1030 (0.6020)	
LOCKING RING	35	1.4122	
ELECTRIC ACTUATOR WITH OUTPUT FLANGE	36		

SEE DRAWING NO.: 3E 52819 and 3E 52823

CAD	DIESE ZEICHNUNG DARF NUR AM BILDSCHIRM GEÄNDERT WERDEN	CONTROL VALVE SPARE PART LIST	4E119990
17.08.1990	BET/HEUGEL	ERHARD - ARMATUREN	ERHARD GMBH & CO D-89522 HEIDENHEIM AN DER BRENZ

Mounting tool (to drawing No. 4.119999)

MOUNTING THE SLIDE RING

MOUNTING THE PISTON

CALIBRATING THE SLIDE RING

ENGL. TEXT BERICHTIGT 31.01.92 ERD
ENGL. TEXT BERICHTIGT 05.11.01 BU

A SEPARATE MOUNTING TOOL IS NECESSARY FOR EACH VALVE SIZE

1	SLOTTED BUSH	9	STAINLESS STEEL
1	MOUNTING RING	8	STAINLESS STEEL
1	LAMELLAR RING	7	STAINLESS STEEL
1	SLEEVE	6	PLASTOMER
1	EXPANSION SLEEVE	5	PLASTOMER
1	SLIDE RING	4	PTFE/CARBON
1	PLUG	3	PLASTOMER
1	O-RING	2	ELASTOMER
1	PISTON	1	STAINLESS STEEL
QTY.	DESCRIPTION	PART	MATERIAL

CAD DIESE ZEICHNUNG DARF NUR AM BILDSCHIRM GEAENDERT WERDEN

31.07.89 STAUFNER

CONTROL VALVE, FLOAT VALVE
DIRECT CONTROL, DN50-150
MOUNTING TOOL

4E119999

ERHARD-ARMATUREN ERHARD GMBH & CO
D-89522 HEIDENHEIM AN DER BRENZ