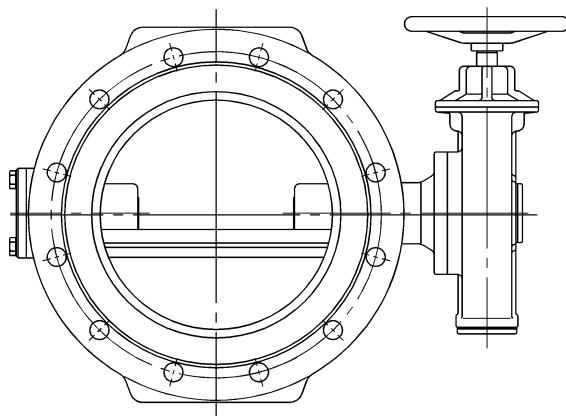




Operating Instructions

ROCO Butterfly Valve with SKG slider-crank mechanism, manually operated



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1 General

The technical data of the order are binding for the type of design. Modifications can only be considered if they are specified to us in time before starting production. Every ERHARD valve is checked for completeness, performance, and tightness before leaving the factory.

In case of non-compliance with these Operating Instructions, we cannot be made liable for any damages or troubles resulting thereof. We reserve the right to technical modifications as against the data and representations contained in these Operating Instructions in case this should be necessary for improving the valves.

2 Safety Aspects

ERHARD valves are reliable and designed to the state of the art. However, these valves can be a danger when handled by untrained staff in an inexperienced manner or when they are not used in accordance with their duty and purpose. Whoever in the user's works is engaged in mounting, dismantling or remounting, operation and service (inspection, maintenance, repair) of the valves, is supposed to have read the complete Operating Instructions and to have understood them. The user is recommended to have the person involved confirm this fact in writing in each particular case.

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Before removing safety devices and/or carrying out work on the valve, the pipe section must be made pressureless leaving no risk, e.g. by lowering the weight-loaded lever if any. Unauthorized, erroneous and unexpected operation as well as dangerous movements caused by stored energy (compressed air, compressed water, hydraulic) must be avoided.

When using the valves, observe the approved technical rules, e.g. DIN standards, DVGW prints, VDI rules, VDMA standards, etc. For valves which must be supervised, observe the relevant laws and regulations, e.g. trading regulations, regulations for prevention of accidents, steam boiler regulations, regulations for gas mains under high pressure, regulations for combustible liquids as well as technical regulation works TRD, SR, TRG, TRbF, TRGL, TRAC, UVV, AD instructions etc.

The local safety regulations and rules for prevention of accidents are applicable.

If work is carried out in the vicinity of the valve, which leads to soiling (concrete work, masonry, painting, sandblasting), the valve must be covered effectively.

3 Product and Performance Description

3.1 Product Description

ROCO Butterfly Valve to DIN 3354, part 2
with flanges, double-offset shaft bearing, resilient-seated, tightly closing, of ductile cast iron.

Operation by SKG slider-crank mechanism by means of handwheel, extension stem, underground installation set, chain wheel, electric multi-turn actuator.

Nominal sizes: DN 80, 100, 125

Pressure ratings: PN 16, 25

Prod. No.:	5065	PN 16
	5066	PN 25

3.2 Performance Description (see fig. 1)

A valve disc (3) hinged in the body (1) is moved through an actuating shaft (7) which protrudes into a laterally mounted part-turn gearbox. The pipeline is isolated, when the valve disc is vertical to the flow direction. Tight closure on the seat in the body is achieved by a sealing element vulcanized on the valve disc. The travel between "OPEN" and "CLOSED" position (90° swinging movement) is limited by means of stop nuts on the actuating stem of the attached part-turn actuator. Normally, the valve closes in clockwise direction (turning the handwheel to the right).

4 Design Features

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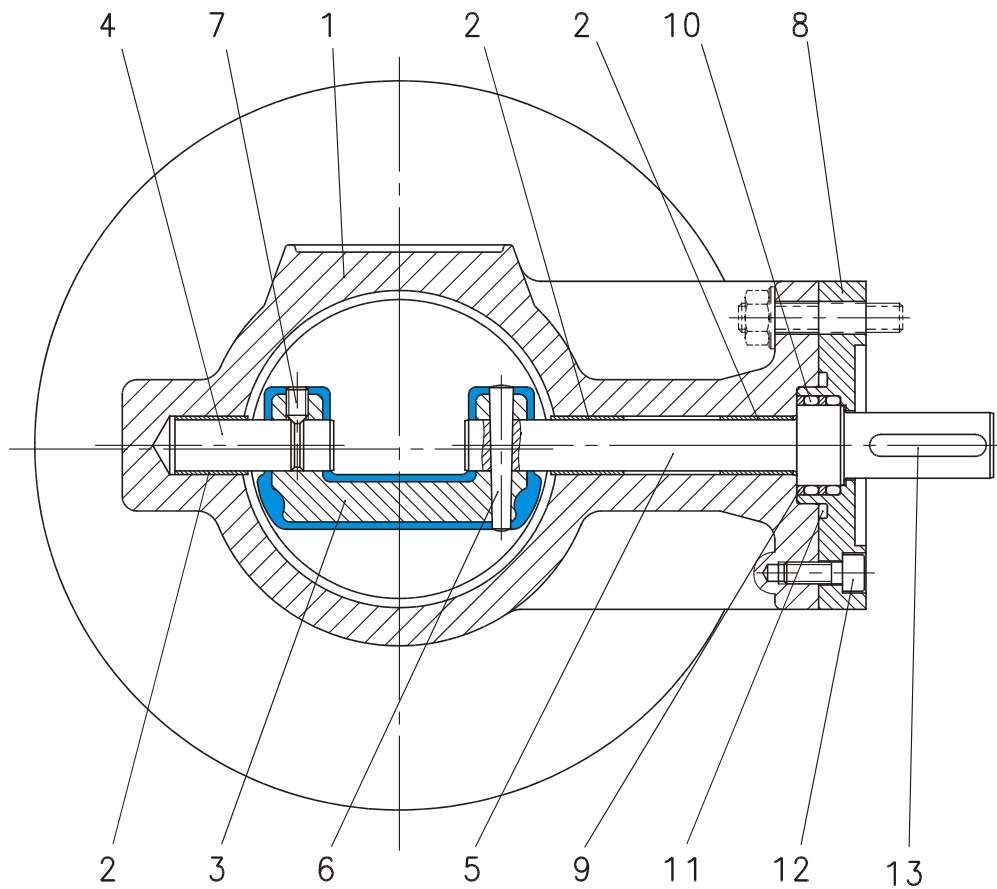


Figure 1: Sectional drawing of ROCO Butterfly Valve DN 80-125

Part	Description	Spare part
1	Body	
2	Bearing bush	
3	Valve disc	
4	Trunnion	
5	Actuating shaft	
6	Taper pin	
7	Threaded pin	
8	Clamping ring	
9	Back-up ring	X
10	O-ring	X
11	O-ring	X
12	Cylindrical screw	
13	Parallel key	

- Main sealing: internally and externally rubber-coated valve disc with vulcanized sealing element, optimum corrosion protection, maintenance-free.
- Body seat: rolled-in solid seat ring of stainless steel.
- Connection key/valve disc by taper pins.
- Gearbox connection: to prEN 12116 (DIN ISO 5211), round spigot with parallel key.

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- Shaft sealing by means of back-up rings and enclosed O-rings (10).
- When the gearbox is disassembled, the shafts (4, 5) and shaft sealing are protected against blowing-off.
- Shaft bearing: maintenance-free and self-lubricating plain bearings (2).

5 Transport

Transport has to be carried out carefully. Inexpert handling may cause damages to the valve. Prior to mounting, such damages are to be repaired in an appropriate manner.

Valves too heavy to be handled manually have to be transported by means of lifting gears suitable for the weight involved, e.g. broad belts. They have to be placed around the body, e.g. between the two connecting flanges. Valves with eyebolts or lugs have to be suspended at these devices in an appropriate manner.

It is not allowed to attach the lifting gears to the handwheel, the stem, the gearbox case or to the flange holes which would be contrary to the relevant safety regulations.

6 Storage

Do not store the valves outdoors. During the storage period, the valves have to be protected against outside influences and impurities, e.g. by covering them with a tarpaulin. Store valves standing on their feet. Store valves without feet flat on their connecting flange by means of intermediate boards.

If long-time storage is required, the place of storage should be selected in such a way that the following conditions are met: frost-protected - cool - dry - dust-free - dark (for elastomer UV-light is inadmissible). If it is impossible to comply with these conditions, the valves must be packed to meet these requirements, e.g. they have to be welded in dark foil.

7 Installation into the Pipeline

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

Attention !

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 direct effects of the weather.

Operating Instructions for ROCO Butterfly Valve

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 to be used as flange gaskets (consider resistance to flow medium and temperature), for slip-on flanges they are absolutely necessary.

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.

ROCO Butterfly Valves can be installed in any position.

In open position the valve disc exceeds the valve face-to-face dimension.

Keep corresponding distance to any fitting or valve, e.g. check valve.

8 Initial Operation

After installation, check valve for smooth operation: move the valve over the total travel (Open – Closed) by means of operating element.

9 Operation and Application

9.1 Admissible Operation

The valve is designed for flow from the direct side (A preferred flow direction) as well as from the indirect side (B).

The valve is operated by means of the handwheel, chain wheel or operating key to DIN 3223. It is not permissible to apply excessive forces.

Max. admissible flow velocities:

PN 16: 5 m/s

PN 25: 6 m/s

9.2 Inadmissible Operation

Installation behind elbows or similar disturbing installation parts is to be prevented. Long-time operation in throttled position leads to higher wear. When the valve is used as throttling valve, it has to be checked whether the valve is suitable for the operating conditions.

Do not exceed limiting values of the flow medium temperature.

Do not exceed limiting values of the working pressure.

Closed valve may only be charged up to the nominal pressure.

For EPDM profile sealing rings and sealings: rubber parts must not get in contact with oil or grease (EPDM swells!).

10 Maintenance

10.1 Maintenance and Inspection

ROCO Butterfly Valves are equipped with maintenance-free plain bearings. Gearbox stem and gearbox bearing are of the long-time lubricating type. Control of the performance and tightness is to be done regularly in intervals of ≤ 4 years according to DVGW print W390.



Before carrying out work on the valve, the repair valve must be closed and the pipe section must be made pressureless.

Check external condition of the valve including operating gear.
If necessary clean the valve and patch the coating. Check tightness at flanges.
Check well-running of valve and operating gear. Move valve manually over total travel.

Check seat tightness: close the valve.

Check pressure drop upstream and downstream of the valve.

10.2 Readjustment and Repair

10.2.1 Readjustment and Replacement of the Sealing Element

The sealing element is securely vulcanized on the internally and externally rubber-coated valve disc and dimensioned in such a way that the Butterfly Valve is leaktight under all operating conditions. Therefore, readjustment of the sealing is not required and also not possible.

In case of leakage, the complete valve disc has to be replaced at our works.

10.2.2 Replacement of the Shaft Sealing (Drive Side Only)

Required spare parts: shaft sealing set consisting of O-rings (10), 2 Nos., and back-up rings (9), 2 Nos.

- Remove gearbox/part-turn actuator from the valve (see chapter 11).
- Remove parallel key (13).
- Loosen cylindrical screws (12) and remove clamping ring (8).
- Remove O-rings (10) and back-up rings (9).
- Clean installation area.
- Install shaft sealing in the following order one after another: back-up ring/O-ring/back-up ring/O-ring (9, 10). Please take care that no damage occurs to the O-rings at the groove of the parallel key.
- Install clamping ring (8) with cylindrical screw (12).
- Install gearbox/part-turn actuator (see chapter 11).

11 SKG Slider-crank Mechanism

11.1 Design Features

- **Design (Figure 4):** Attachable quarter-turn gearbox according to the slider-crank principle. The rotation of the stem (2) is changed into a swinging movement of the gearbox crank by means of the stem nut (5) and the gearbox bracket (8) (articulated lever). The gearbox crank is rigidly connected to the valve shaft by means of the output shaft. The slider-crank mechanism is irreversible.
- Cast iron encapsulated gearbox case totally enclosed (enclosure rating IP68).
- **Interfaces:**
 - Output: to prEN 12116 (DIN ISO 5211), round spigot with parallel key.
 - Output: Flanged bearing with round trunnion for receiving the handwheel, chain wheel, extension stem or underground installation set or flange to DIN 5210, shape B1 (plug socket) for connecting an electric multi-turn actuator.
- **Limit Stops:** Solid stop nut (6) on the stem (2). "CLOSED" position is adjustable. Exceeding load will be absorbed by the stem and does not affect the case components of the gearbox. Maximum input torque : 450 Nm (in the limit positions).
- **Position Indicator:** The indicator which is directly connected to the valve shaft is visible through a sight glass on the gearbox case. The sight glass is made of impact resistant polycarbonate (PC) and thus suitable for plant, pit and underground installation.

Operating Instructions for ROCO Butterfly Valve

Mechanism design for mounting multi-turn electric actuator

Mechanism design for handwheel, buried installation, stem extension

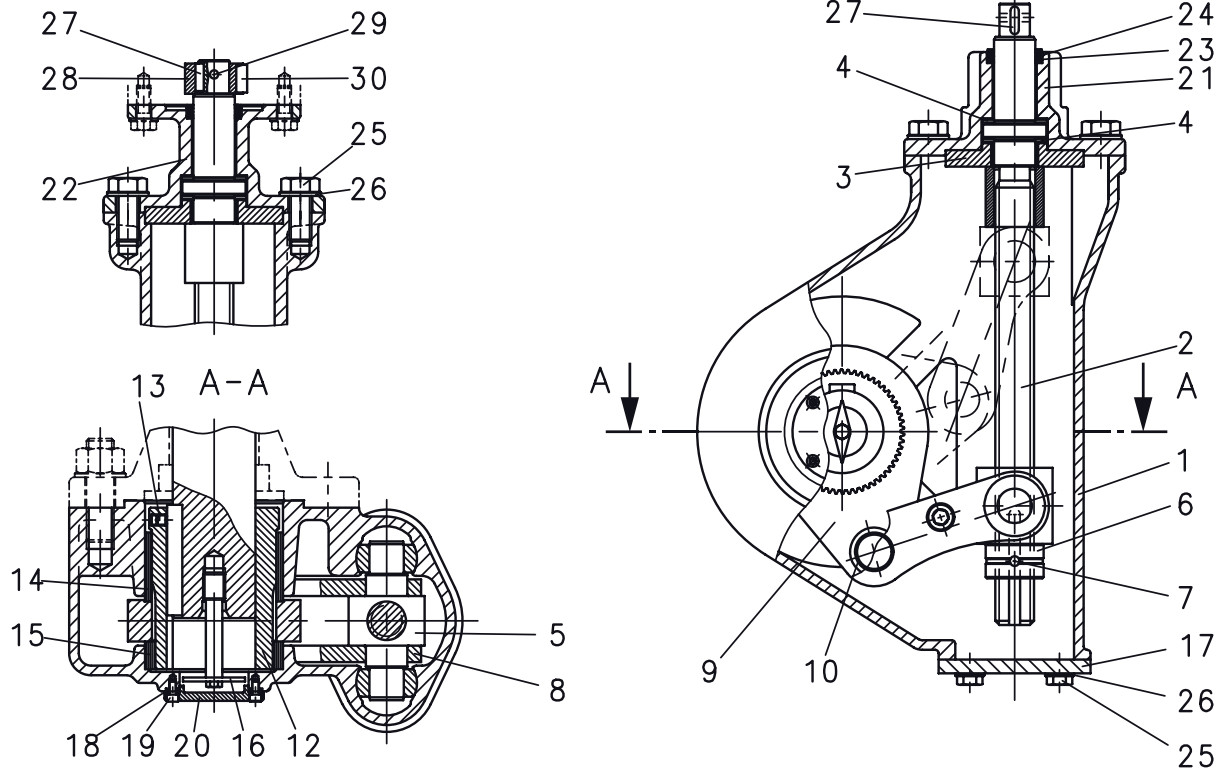


Figure 4: Sectional drawing of slider-crank mechanism SKG

Part	Description	Spare part
1	Gearbox casing	
2	Stem	
3	Bearing ring	
4	Axial bearing	
5	Stem nut	
6	Stop nut	
7	Retention pin	
8	Bracket	
9	Gearbox crank	
10	Bush	
11	Riveting bolt	
12	Output shaft	
13	Threaded pin	
14	Bush	
15	Bush	

Part	Description	Spare part
16	Indicator	
17	Cover	
18	Gasket	
19	Cylindrical screw	
20	Sight glass	
21	Flanged bearing ¹⁾	
22	Neck bearing ²⁾	
23	Bush	
24	O-ring ¹⁾	
25	Hexagon screw	
26	Washer	
27	Parallel key	
28	Follower bush ²⁾	
29	Close-tolerance grooved pin ²⁾	
30	Parallel key ²⁾	

¹⁾ Parts only applicable for design with handwheel, for underground installation and extension stem

²⁾ Parts only applicable for design for/with electric multi-turn actuator

11.2 Operation and Application

SKG slider-crank gearboxes are used for operating valves with an operating travel (part-turn movement) of up to 90°.

Manual operation by means of handwheel, chainwheel, underground installation set, operating key.

Motor operation by means of electric part-turn and modulating actuators.

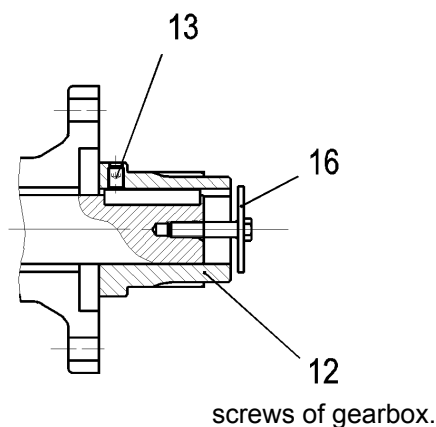
SKG gearboxes are suitable for plants and pit installation as well as buried and under-water installation up to a max. flooding height of 6 m water column.

11.3 Mounting

Attention:

Prior to mounting the SKG gearbox to the valve, ensure that both parts are in the same limit position OPEN or CLOSED.

- Plug output shaft (12) onto the valve shaft up to the flange (see fig. 5) and lock by threaded pin (13).
- Screw indicator (16) into the centering of the valve shaft and align it parallelly to the valve disc.
- Grease the tothing of the output shaft (12).
- Plug the gearbox and draw the fastening screws crosswise with torque according to table 2.



Mt [Nm]	
M10	48
M12	85
M16	210
M20	410

Table 2: Tightening torques for fastening

Fig. 5: Mounting of output shaft

11.4 Setting the Limit Stop ("CLOSED" Position) (Fig. 4)

- Remove cover (17) and gasket (18) by loosening the cylindrical screws (19).
- Raise the retention pin (7) of the stem nut (6) by means of a slotted screwdriver pressing the screwdriver into the groove provided for this purpose between stop nut and annular spring.
- The stop nut can be positioned by turning the screwdriver.
- Having reached the position of the stop nut, draw off the screwdriver. Then slightly carry on turning the stop nut until the retention pin is perceptibly caught.
- Check swinging angle by opening and closing of the valve.
- Mount cover (17)



11.5 Maintenance

Stem (2) and axial bearing (4) have a long-time lubrication. The performance of the valve should be checked regularly at least every four years according to DVGW print W 392.

Regreasing the Trim of the Stem Gearbox

- 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.

Lubricating agent	Manufacturer	Standard
ALVINA Fett R3	SHELL	DIN 51502 K-L3n
TEXANDO FO20	TEXACO	DIN 51825 K-2n

Table: Recommended lubricating agents