



BR 14a · Double-eccentric Control and Shut-off Butterfly Valve DIN and ANSI-Version



Applications

Tight-closing, double-eccentric butterfly control valve produced from anticorrosive material especially for the chemical industry where aggressive media's are used, for example in steam pipelines:

- **Nominal size DN 80 to DN 500 and NPS3 to NPS20**
- **Nominal pressure PN 10 and cl150**
- **Temperatures -10°C to +200°C (14°F to 392°F)**

The control equipment consists of a stainless steel butterfly valve and a pneumatic rotary actuator or a manual actuator. The valves designed in the modular principle can be combined with various accessories and are equipped with the following special features:

- Valve body, valve shaft and valve disc made of special material
- Low breakaway torque and low amount of wear due to the double eccentric bearing design of the shaft
- Valve shaft sealing through live-loadet PTFE V-ring packing
- Anti blow out valve shaft
- Tighter sealing through various exchangeable seat rings.
- Attachment options acc. to DIN ISO 5211
- Face-to-face acc. to DIN EN 558, basic series 16

Versions

Butterfly control valve Series optionally available in the following versions:

- Hand lever / grid plate
- Manual gear actuator
- Pneumatic Quarter-turn actuator BR 31a
- Pneumatic Multi-turn actuator BR 30a

Special versions

- Special materials, e.g. nickel, hastelloy, monel, titanium
- Nominal size > DN 500 on request
- Safety stem seal
- Primary seal
- Groove in raised face
- Metal seat rings
- Low temperature version
- High temperature version



Fig. 1: Tight shut-off BR 14a Butterfly valve



Fig. 2: Tight shut-off BR 14a Butterfly valve with Gear actuator

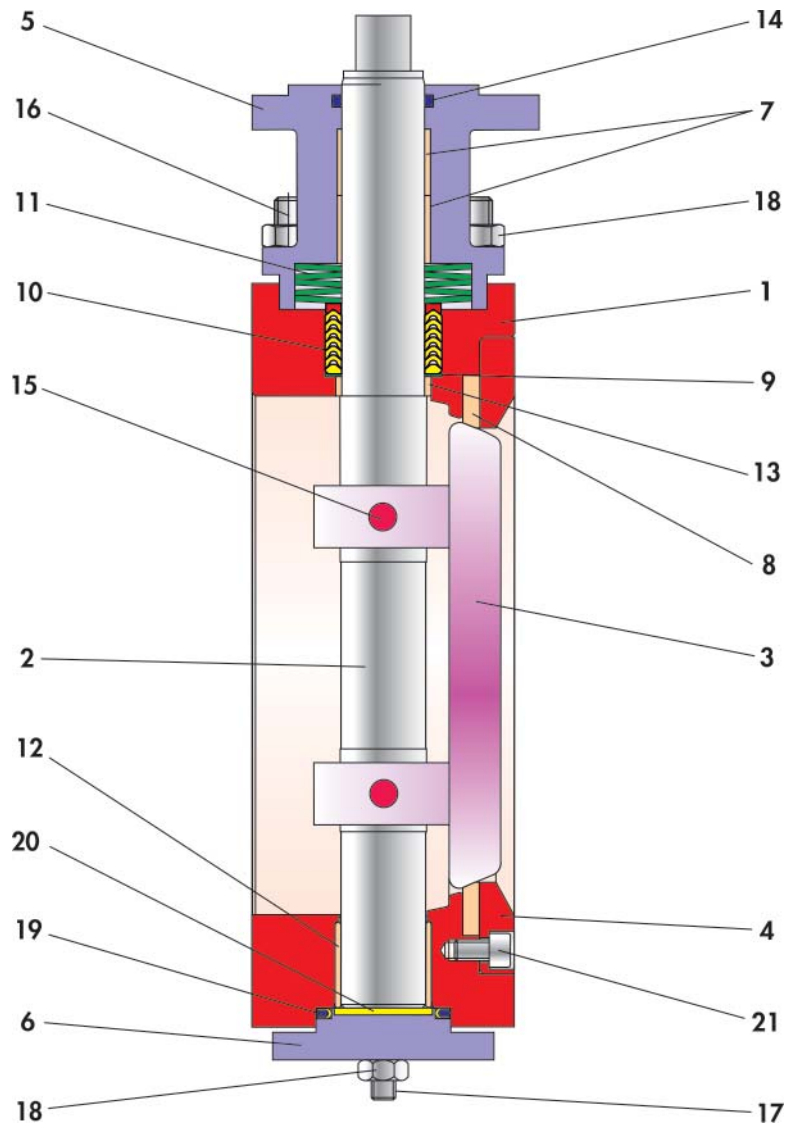


Fig. 3: BR 14a Butterfly valve

Table 1: Parts list

Item	Description
1	Valve body
2	Valve shaft
3	Valve disc
4	Fastening ring
5	Bonnet flange
6	Bonnet
7	Bushing
8	Sealing ring
9	Thrust washer
10	V-ring packing
11	Belleville spring washer

Item	Description
12	Bearing bushing
13	Bearing bushing
14	O-ring
15	Grooved pin
16	Stud bolt
17	Stud bolt
18	Nut
19	O-ring
20	Lower disc
21	Screw

Additional accessories

The control valves are also available without any accessories or in combination with the following parts:

- Positioner
- Limit switch
- Solenoid valve
- Air sets
- Gauge block

Other special accessories are available on request.

Principle of operation

The process medium can flow through the valve in both directions.

The valve disc (3) determines the flow through the free area between disc and seat (4).

The valve shaft (2) is sealed by a packing (10). This is a PTFE-V-ring packing, which by means of the mounted spring washers (11) located in the top part of the packing chamber, are maintenance free and under tension.

With butterfly valves, the seal is between the valve disc (3) and the sealing ring (8). The direction of flow and the pressure difference determine the breakaway torque to open the butterfly valve. The double eccentric bearing design of the shaft causes the disc on opening and closing to remain in contact with the seat only over a very small angle of rotation (Fig. 4).

This reduces wear and increases the service life of the valve. In addition, it reduces the breakaway torque.

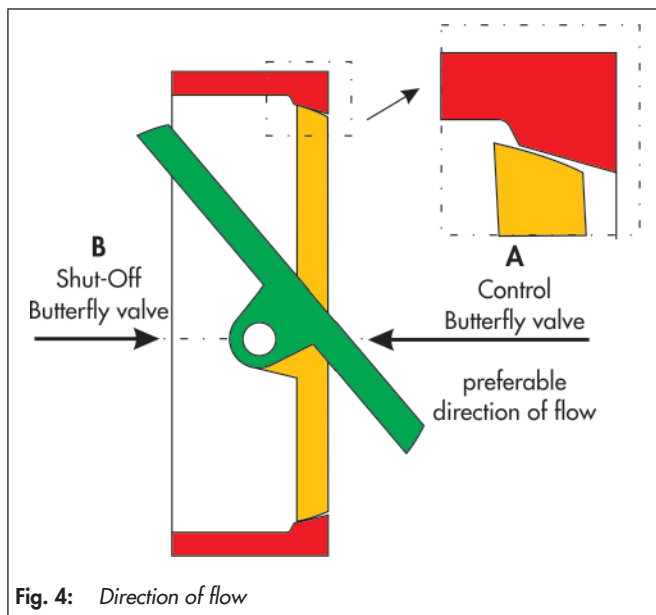


Fig. 4: Direction of flow

Direction of flow

When the process medium flows through the valve in direction **A** (Fig. 4), the butterfly disc is slightly pressed out of the seat. This reduces the pre-loaded pressure and the breakaway torque.

When the process medium flows through the valve in direction **B**, the pre-loaded pressure increases, with a rise in the breakaway torque. This results in a better tightness being achieved.

Failure position

In dependance of mounting position of the actuator there are two failure positions, which take place by pressure relieving or on failure of air supply:

• Butterfly valve with actuator "on failure closing"

On failure of air supply the butterfly valve closes. The opening of the butterfly valve accrues on rising of air supply against the force of the springs.

• Butterfly valve with actuator "on failure opening"

On failure of air supply the butterfly valve opens. The closing of the butterfly valve accrues on rising of air supply against the force of the springs.

i Info

Before using the butterfly valve in hazardous areas, check whether this is possible acc. to ATEX 2014/34/EU. See Operating Instructions ► BA 14b.

Functional diagram with opening angles

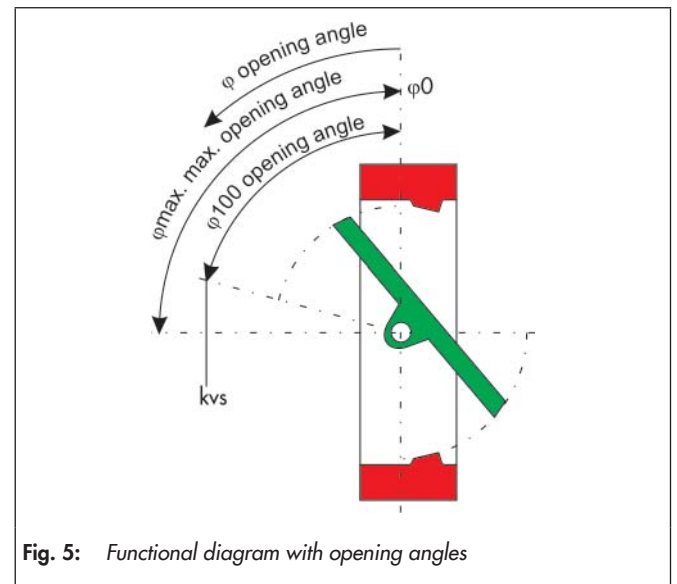


Fig. 5: Functional diagram with opening angles

Characteristic curve

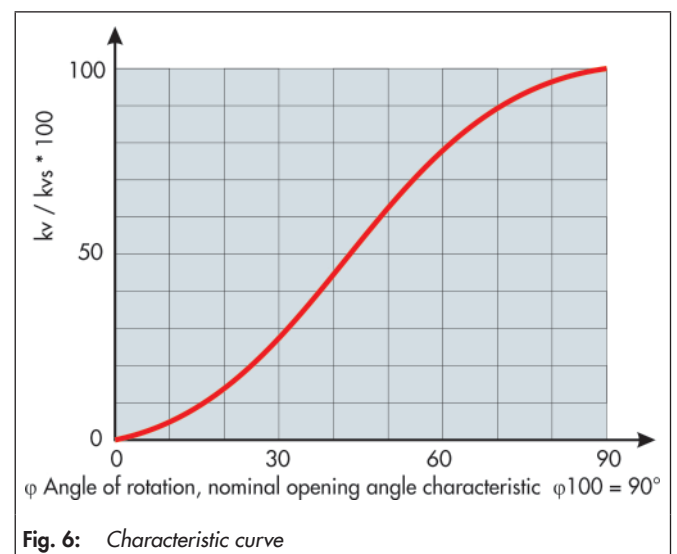


Fig. 6: Characteristic curve

Table 2: General technical data

Nominal size	DN 80 to DN 500 and NPS3 to NPS20
Nominal pressure	PN 10 and ANSI d150
End connection	Can be mounted between PN 10 or ANSI d150
Temperature range	See pressure-temperature diagram
Leakage for direction of flow	On request as it depends on pressure and temperature
	Leakage rate A acc. to DIN EN 12266-1, P12 (Leakage rate 1 BO acc. to DIN 3230 Part 3)
Rangeability	50 : 1

Table 3: Material

Valve body, disc, shaft	Special material
Fastening ring	
Bonnet flange	
Sealing ring	PTFE with 20% glass
Stuffing box packing	Live-loaded PTFE V-ring packing

Table 4: Terms for noise level calculation:

φ	10°	20°	30°	40°	50°	60°	70°	80°	90°
FL	0.95	0.95	0.92	0.82	0.74	0.67	0.61	0.57	0.54
xT	0.75	0.75	0.73	0.57	0.47	0.38	0.31	0.28	0.25
Z	0.35	0.30	0.25	0.20	0.17	0.15	0.13	0.12	0.11

z-values for noise level calculation according to VDMA 24422 and Terms for control valve sizing acc. to DIN EN 60534.

Correction terms

- With liquids $\Delta LF = 0$,
- With gases and vapors $\Delta LG = 0$

Table 5: Torque and breakaway torques

Differential pressure Δp in bar		0	1	2	3	5
Nominal size		Breakaway torque Mdl in Nm				
DN 80	NPS3	29	31	34	36	41
DN 100	NPS4	46	50	55	60	69
DN 150	NPS6	104	119	135	150	182
DN 200	NPS8	185	222	259	296	370
DN 250	NPS10	289	361	433	506	650
DN 300	NPS12	416	541	666	791	
DN 400	NPS16	740	1036	1332	1638	

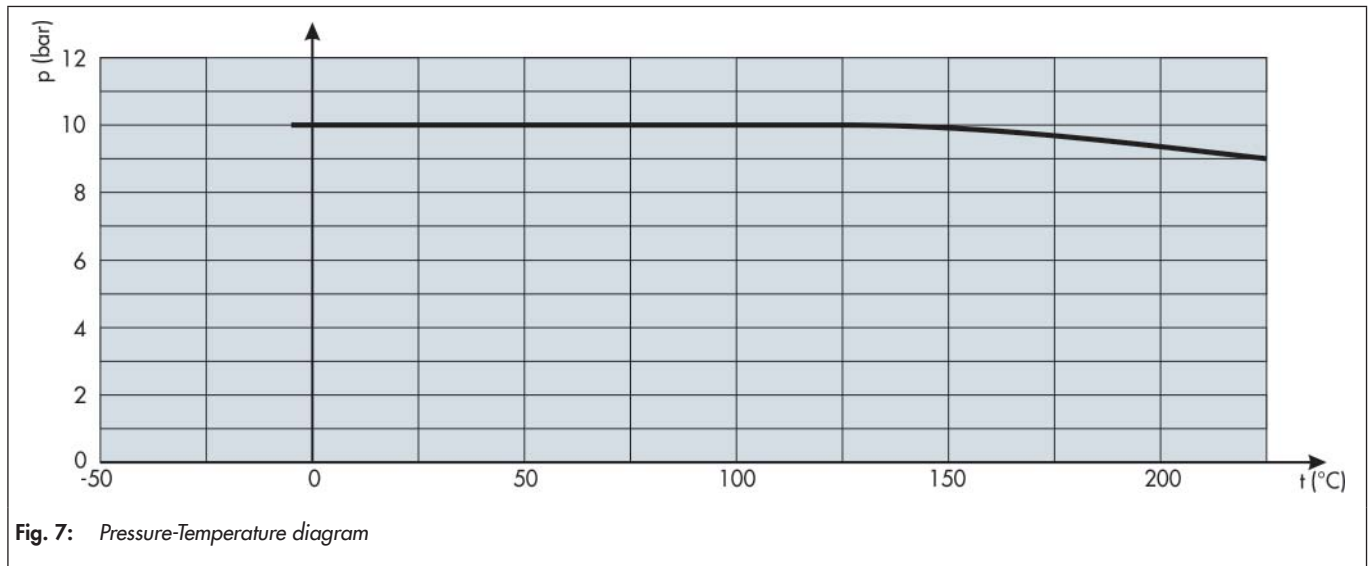
The breakaway torques specified are average values which were measured with air at 20°C with the corresponding differential pressures. Operating temperature, process medium and long operating times may affect the permissible torques and breakaway torques considerably.

Table 6: kv values and associated opening angles

Nominal size		Opening angle φ								
DN	NPS	10°	20°	30°	40°	50°	60°	70°	80°	90°
80	3	4,5	23	45	68	93	118	133	147	150
100	4	7	36	72	108	149	190	214	235	240
150	6	21	105	210	315	434	553	623	686	700
200	8	42	208	417	625	862	1098	1237	1362	1390
250	10	68	341	681	1022	1407	1793	2020	2224	2270
300	12	100	501	1002	1503	2071	2639	2973	3273	3340
400	16	183	915	1830	2745	3782	4819	5429	5978	6100
500	20	289	1443	2886	4329	5964	7600	8562	9427	9620

Pressure-Temperature diagram

The area of application is determined by the pressure-temperature diagram. Process data and the process medium can affect the values in the diagram.



Dimensions and Weights

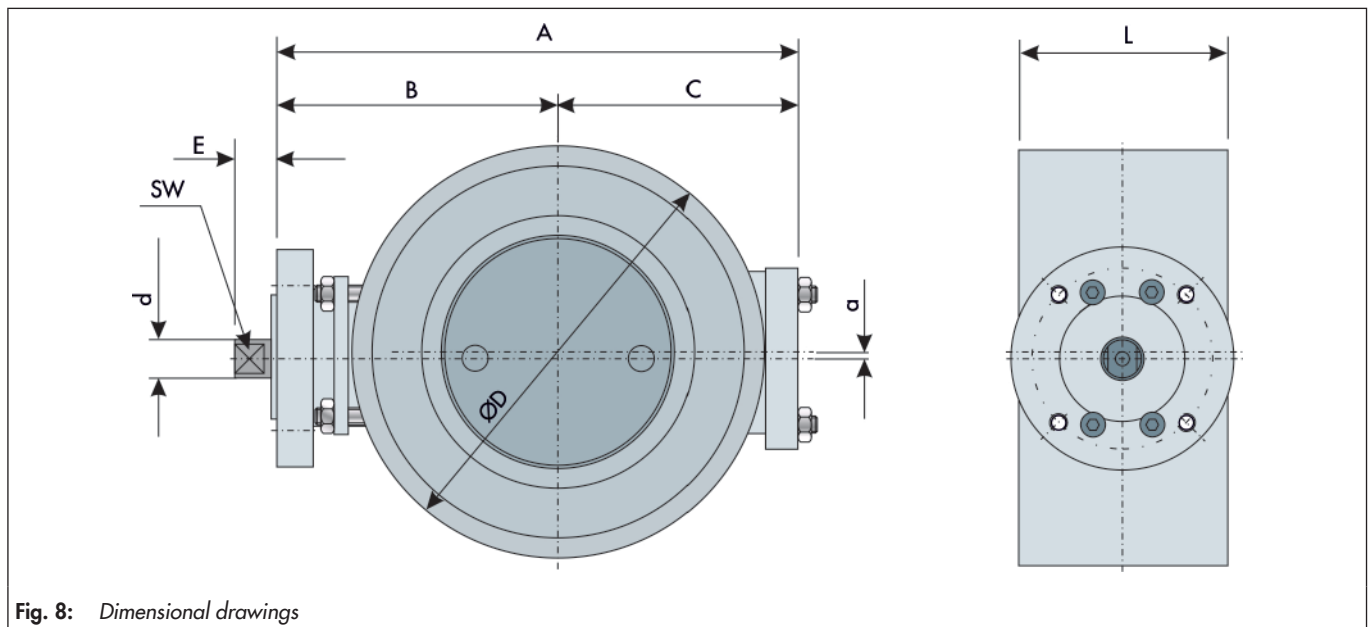


Table 7: Dimensions in mm and weights in kg

Nominal size	DN 80	DN 100	DN 150	DN 200	DN 250	DN 300	DN 350	DN 400	DN 500
	NPS3	NPS4	NPS6	NPS8	NPS10	NPS12	NPS14	NPS16	NPS20
A	184	214	282	342	445	503	624	680	819
B	104	124	165	194	267	298	339	369	445
C	80	90	117	148	178	205	285	311	374
ØD	140	160	215	272	326	378	438	489	594
E	19	19	23	27	27	31	31	41	44
L	64	64	76	89	114	114	127	140	152
a	1.6	2	3	4	5	6	7	8	10
SW	12	12	16	20	20	24	24	32	34
Ø d	16	20	24	28	32	35	40	45	55
DIN ISO connection	F05	F05	F07	F07	F10	F12	F14	F14	F16
Weights	11	14	22	33	45	57	75	89	123

Selecting and sizing the butterfly valve

1. Calculate the appropriate kv value
2. Select the nominal size and the kvs value from Table 6
3. Comparing the operation conditions in accordance to the pressure-temperature diagram
4. Select a suitable actuator

Ordering text

Control and Shut-Off Butterfly valve BR 14a,

Nominal size DN

Nominal pressure PN

Optional special version

Manual gear actuator or
actuator

brand name:

Supply pressure bar

Fail-safe position

Limit switch brand name:

Solenoid valve brand name:

Positioner brand name:

Others

Associated Data Sheets

- For Multi-turn act BR 30a, vgl. ► TB 30a.
- For Quarter-turn actuator BR 31a, vgl. ► TB 31a.

Info

All relevant details regarding the version ordered, which deviate from the specified version in this data sheet can be taken if required, from the corresponding order confirmation.
