Válvula de Purga Continua Automática BAE

GESTRA Steam Systems

Product Range

Continuous Blowdown Valve Reaktomat®

BA 46 / BA 46-ASME, PN 40/CL 150/300, DN 15-DN 50
BA 47 / BA 47-ASME, PN 63/CL 400, DN 25, 40, 50
BAE 46... / BAE 46...-ASME, PN 40/CL 150/300, DN 15-DN 50
BAE 47... / BAE 47...-ASME, PN 63/CL 400, DN 25, 40, 50

BA 46 / BA 46-ASME
BA 47 / BA 47-ASME
BAE 46... / BAE 46...-ASME
BAE 47... / BAE 47...-ASME

Description

Due to the continuous evaporation process in the steam boiler the density and hence the TDS (= Total Dissolved Solids) concentration of the boiler water is increased. The TDS level must remain within the limits specified by the boiler manufacturer and applicable guidelines. For this purpose a certain amount of boiler water (= boiler blowdown) is discharged continuously or periodically. The continuous blowdown valves BA... and BAE... feature specially designed and wear resistant nozzle stems that enter concentrically into a system of expansion chambers which are arranged one after the other, making the valve well suited for the continuous discharge of boiler blowdown at very high differential pressures. The continuous blowdown valves BA... and BAE... are suitable for operation in steam boiler plants according to TRD 604, EN 12952 and EN 12953.

- **BA 46** PN 40, manually operated
- **BA 47** PN 63, manually operated
- **BAE 46** PN 40, operated by the electric actuator **EF 1** [1])
- **BAE 46-1** PN 40, operated by the electric actuator **EF 1-1** [1])
- **BAE 46-3** PN 40, operated by the electric actuator **EF 0.6** [1])
- **BAE 46-4** PN 40, operated by the electric actuator **EF 1-40** [1]), [2])
- **BAE 47** PN 63, operated by the electric actuator **EF 1** [1])
- **BAE 47-1** PN 63, operated by the electric actuator **EF 1-1** [1])
- **BAE 47-4** PN 63, operated by the electric actuator **EF 1-40** [1]), [2])

[1]) Explosion-proof actuators or actuators powered by d. c. or three-phase current are available on request.

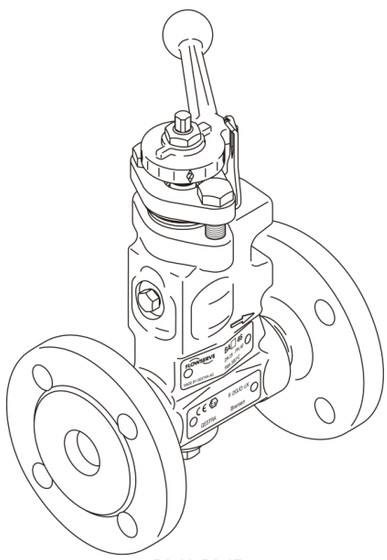
[2]) Actuator with CAN bus control

Function

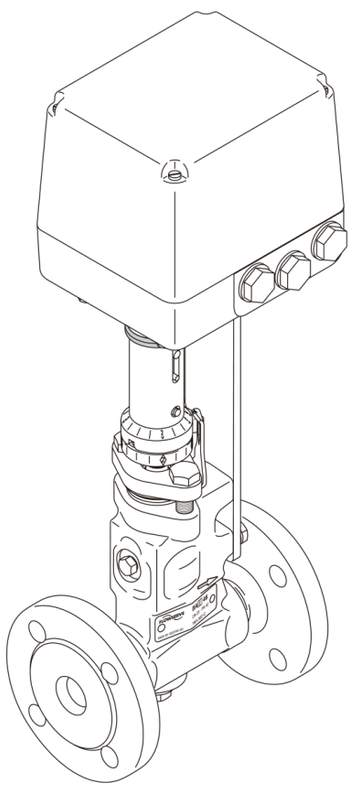
The continuous blowdown valve BA 46, BA 47 is moved to its control position by means of the control lever. Use the scale on the control lever to ajust the required amount of boiler blowdown. The required amount of boiler blowdown is calculated with the aid of a formula or read off on a nomogram. The continuous blowdown valve BAE 46..., BAE 47 is motored to its control position by means of the actuator EF... The actuator is activated by the GESTRA conductivity controller KS 90 working in conjunction with the GESTRA conductivity electrode LRGT 1... or the conductivity controller LRR 1-5, LRR 1-6 in combination with the GESTRA conductivity electrode LRG 1... or the conductivity controller LRR 1-40 in conjunction with the conductivity electrode LRG 1...-40.

The actuator opens or closes the continuous blowdown valve as a function of the required amount of boiler blowdown and the desired operating position, at which – independent of the actual electrical conductivity of the boiler water – a freely selectable basic amount can be discharged by the BAE 46..., BAE 47... The valve positions OPEN and CLOSED are limited by the cam-operated switch located in the actuator, the OPERATING POSITION is variably adjustable by means of an operating cam or a feedback potentiometer. The power flow towards the closing direction is transmitted via a coupling with integrated torsion spring. The coupling permits the actuator to travel a little bit further when the nozzle stem is pressed into the valve seat.

The conductivity of the boiler water is monitored by the equipment combination consisting of a conductivity electrode and a conductivity controller. The continuous evaporation process in the steam boiler increases the boiler water density and, consequently, the TDS level, causing the conductivity of the boiler water to rise. Once the set limit is reached, the actuator receives an opening signal from the conductivity controller as a function of the deviation from the conductivity setpoint. When the adjusted conductivity setpoint is attained, the actuator closes the continuous blowdown valve or returns to the adjusted operating position. The valve positions CLOSED and OPEN are limited by the cam-operated switch located in the actuator, the OPERATING POSITION is variably adjustable by means of an operating cam or a feedback potentiometer.



BA 46, BA 47



Temperature/Pressure Ratings & End Connections

BA 46, BAE 46, Flanged PN 40, EN 1092-1 (2001), 1.0460 *)							
p_{max} (max. pressure)	[bar]g	29					
t_s (boiling temperature)	[°C]	234					

Calculated in accordance with DIN EN 12516-2, * material according to AD 2000

BA 46, BAE 46, Flanged PN 40, EN 1092-1 (2001), A 105							
p_{max} (max. pressure)	[bar]g	36					
t_s (boiling temperature)	[°C]	246					

Calculated in accordance with DIN EN 12516-2

BA 47, BAE 47, Flanged PN 63 / PN 100, EN 1092-1 (2001), 1.0460 *)							
p_{max} (max. pressure)	[bar]g	44					
t_s (boiling temperature)	[°C]	257					

Calculated in accordance with DIN EN 12516-2, *) material according to AD 2000

BA 47, BAE 47, Flanged PN 63 / PN 100, EN 1092-1 (2001), A 105							
p_{max} (max. pressure)	[bar]g	55					
t_s (boiling temperature)	[°C]	271					

Calculated in accordance with DIN EN 12516-2

BA 4..., BAE 4...-ASME, Flanged B16.5 Class 150, butt-weld ends B16.25, socket-weld ends B16.11, Class 3000							
p_{max} (max. pressure)	[bar]g	14					
t_s (boiling temperature)	[°C]	198					
p_{max} (max. pressure)	[psi]g	203					
t_s (boiling temperature)	[°F]	388					

Calculated in accordance with ASME B16.34

BA 4..., BAE 4...-ASME, Flanged B16.5 Class 300, butt-weld ends B16.25, socket-weld ends B16.11, Class 3000							
p_{max} (max. pressure)	[bar]g	42					
t_s (boiling temperature)	[°C]	254					
p_{max} (max. pressure)	[psi]g	609					
t_s (boiling temperature)	[°F]	489					

Calculated in accordance with ASME B16.34

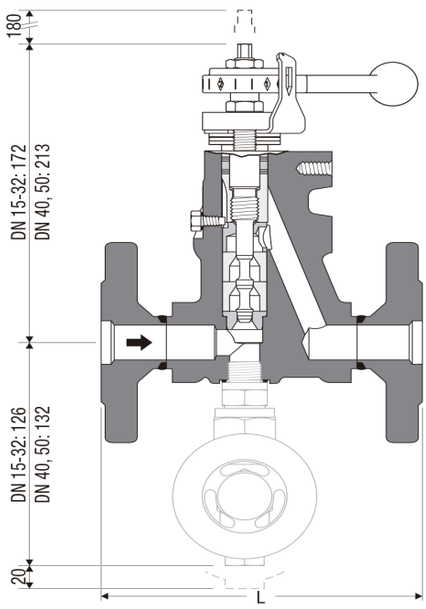
BA 4..., BAE 4...-ASME, Flanged B16.5 Class 400/600, butt-weld ends B16.25, socket-weld ends B16.11, Class 3000							
p_{max} (max. pressure)	[bar]g	55					
t_s (boiling temperature)	[°C]	270					
p_{max} (max. pressure)	[psi]g	797					
t_s (boiling temperature)	[°F]	518					

Calculated in accordance with ASME B16.34

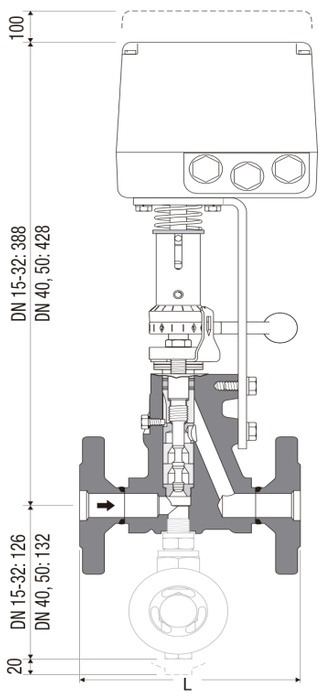
Materials

Type	BA 4..., BAE 4...	BA 4... ASME, BAE 4... ASME
Designation	**DIN / EN**	**ASTM**
Body	1.0460	A 105
Nozzle stem	1.4021	A 276 Grade 420
Seat and stage sleeves	1.4104	430F
Locking screw	A2-70	A 192 CL 2B-BB
Sealing plug	1.7225	A193 B7

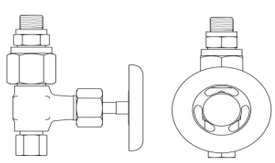
Dimensions



BA 46, BA 47

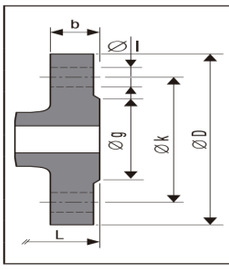


BAE 46..., BAE 47...



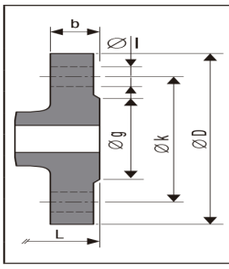
Sample valve G 3/8 / Ermeto 8S

Dimensions of flanged ends (extract)



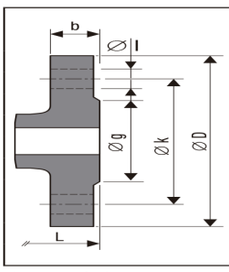
DN	EN 1092-1 PN 40						EN 1092-1 PN 63		
[inch]	½	¾	1	1¼	1½	2	1	1½	2
[mm]	15	20	25	32	40	50	25	40	50
GB	95	105	115	140	150	165	140	170	180
b	16	18	18	18	18	20	24	26	26
k	65	75	85	100	110	125	100	125	135
g	45	58	68	78	88	102	68	88	102
l	14	14	14	18	18	18	18	22	22
n	4	4	4	4	4	4	4	4	4
L	150	150	160	180	200	230	190	220	250
[kg] *)	4.7/8.8	5.3/9.4	5.8/9.9	7.1/11.2	10.7/14.8	12.5/16.6	7.1/11.2	10.7/14.8	12.5/16.6

*) Weight BA 4... / Weight BAE 4...



DN	ASME B16.5 Class 150								
[inch]	½	¾	1	1¼	1½	2			
[mm]	15	20	25	32	40	50			
GB	88.9	98.4	107.9	117.5	127.0	152.4			
b	11.1	12.7	14.3	15.9	17.5	19.0			
k	60.3	69.8	79.4	88.9	98.4	120.6			
g	34.9	42.9	50.8	63.5	73.0	92.1			
l	15.9	15.9	15.9	15.9	15.9	19.0			
n	4	4	4	4	4	4			
L	150	150	160	180	230	230			
[kg] *)	4.7/8.8	5.3/9.4	5.8/9.9	7.1/11.2	10.7/14.8	12.5/16.6			

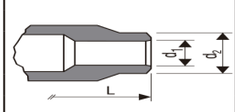
*) Weight BA 4... / Weight BAE 4...



DN	ASME B16.5 Class 300						ASME B16.5 Class 400		
[inch]	½	¾	1	1¼	1½	2	1	1½	2
[mm]	15	20	25	32	40	50	25	40	50
GB	95.2	117.5	123.8	133.3	155.6	165.1	123.8	155.6	165.1
b	14.3	15.9	17.5	19.0	20.6	22.2	17.5	22.2	25.4
k	66.7	82.5	88.9	98.4	114.3	127	88.9	114.3	127
g	34.9	42.9	50.8	63.5	73.0	92.1	50.8	73.0	92.1
l	15.9	19.0	19.0	19.0	22.2	19.0	19.0	22.2	19.0
n	4	4	4	4	4	4	4	4	4
L	150	150	160	180	230	230	216	216	250
[kg] *)	4.7/8.8	5.3/9.4	5.8/9.9	7.1/11.2	10.7/14.8	12.5/16.6	7.1/11.2	10.7/14.8	12.5/16.6

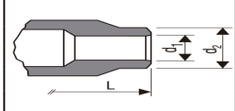
*) Weight BA 4... / Weight BAE 4...
Other designs available on request. Special dimensions, sizes and materials for end connections on request.

Dimensions of butt-weld ends (extract)



DN	DIN 3239-1 DIN 2559-2						DIN 3239-1 DIN 2559-2		
[inch]	½	¾	1	1¼	1½	2	1	1½	2
[mm]	15	20	25	32	40	50	25	40	50
d_2	22	28	34	32.0	38.0	40.0	34	49	61
d_1	17.3	22.3	28.5	21.8	27.3	34.1	28.5	42.5	54.5
for pipe	21.3x2.0	26.9x2.3	33.7x2.6	42.6x2.6	48.3x2.6	60.3x2.9	33.7x2.6	48.3x2.9	60.3x2.9
L	200	200	200	200	250	250	200	250	250
[kg] *)	4.1/8.2	4.7/8.8	4.7/8.8	5.4/9.5	8.9/13.0	10.2/14.3	4.7/8.8	8.9/13.0	10.2/14.3

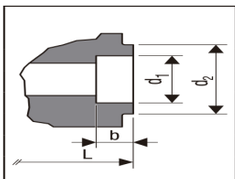
*) Weight BA 4..., / Weight BAE 4...



DN	ASME B16.25, Schedule 40 ASME B36.10						ASME B16.25, Schedule 80 ASME B36.10		
[inch]	½	¾	1	1¼	1½	2	1	1½	2
[mm]	15	20	25	32	40	50	25	40	50
d_2	22	28	34	43	49	61	34	49	61
d_1	15.7	20.9	26.6	35.1	40.9	52.5	24.3	38.1	49.3
for pipe	21.3x2.8	26.7x2.9	33.4x3.4	42.2x3.6	48.3x3.7	60.3x3.9	33.4x4.5	48.3x5.1	60.3x5.5
L	200	200	200	200	250	250	200	250	250
[kg] *)	4.1/8.2	4.7/8.8	4.7/8.8	5.4/9.5	8.9/13.0	10.2/14.3	4.7/8.8	8.9/13.0	10.2/14.3

*) Weight BA 4.. / Weight BAE 4...
Other designs available on request. Special dimensions, sizes and materials for end connections on request.

Dimensions of socket-weld ends (extract)



DN	DIN EN 12760, ASME B16.11 Class 3000								
[inch]	½	¾	1	1¼	1½	2			
[mm]	15	20	25	32	40	50			
d_2	32	37.5	46	55.5	62	75.5			
d_1	21.9	27.3	34	42.8	48.9	61.3			
b	10	13	13	13	13	16			
for pipe	21.3/21.3	26.9/26.7	33.7/33.4	42.4/42.2	48.3/48.3	60.3/60.3			
L	200	200	200	200	250	250			
[kg] *)	5.1	5.1	5.1	5.1	5.1	5.1			

*) Weight BA 4... / Weight BAE 4...
Other designs available on request. Special dimensions, sizes and materials for end connections on request.

Capacity Charts

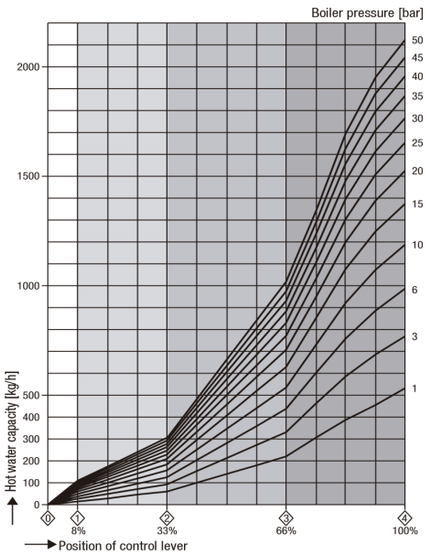


Fig. 1 *For DN 15 to 32*
Capacity ranges at a glance

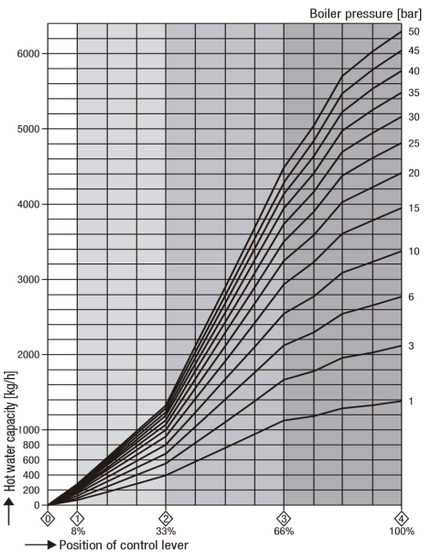


Fig. 5 *For DN 40 to 50*
Capacity ranges at a glance

Calculating the amount of boiler blowdown

Example

Boiler pressure: 15 bar
Nominal size of continuous blowdown valve: DN 20
Boiler capacity: **Q** = 10000 kg/h
Conductivity of feedwater: **S** = 100 µs/cm
Admissible conductivity of boiler water:
K = 3000 µs/cm
Amount of boiler water to be discharged: **A** ≈ 345 kg/h
approx. 10 % of which is intermittently blown out: ≈ 35 kg/h
Amount of continous blowdown: $\mathbf{A_1}$ ≈ 310 kg/h
Set control lever according to scale to an opening of 41 %. (**Fig. 3)**

Amount of boiler water to be discharged

$$\mathbf{A} = \frac{\mathbf{Q} \cdot \mathbf{S}}{\mathbf{K} - \mathbf{S}}$$

A = Amount of boiler water to be discharged [kg/h]
Q = Boiler capacity [kg/h]
S = Conductivity of feedwater [µs/cm]
K = Admissible conductivity of Boiler water [µs/cm]

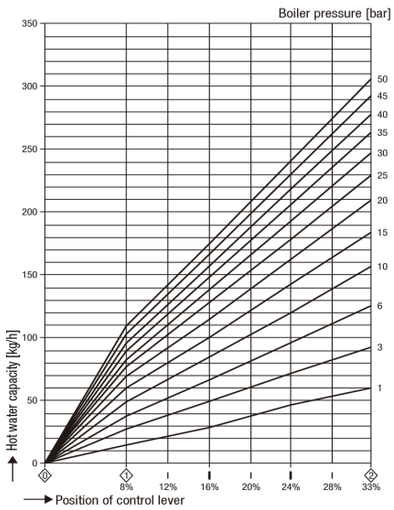


Fig. 2 *For DN 15 to 32*
Capacity range up to 310 kg/h

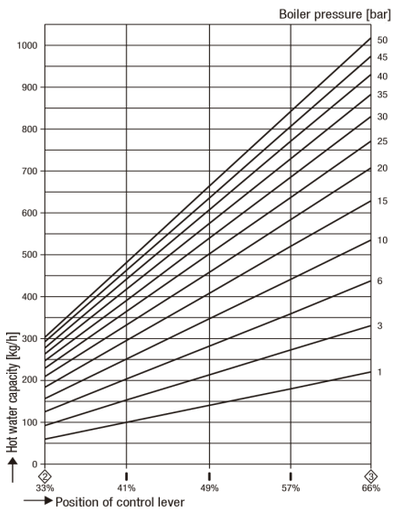


Fig. 3 *For DN 15 to 32*
Capacity range up to 1,020 kg/h

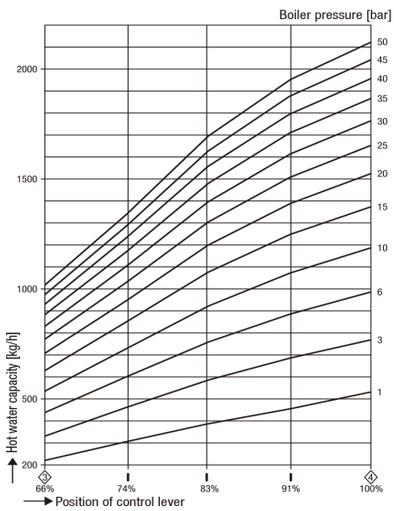


Fig. 4 *For DN 15 to 32*
Capacity range up to 2,120 kg/h

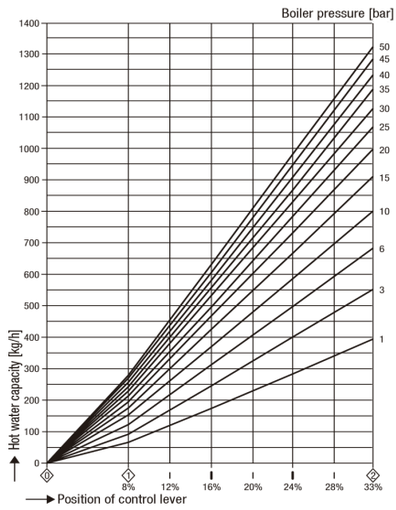


Fig. 6 *For DN 40 and 50*
Capacity range up to 1,340 kg/h

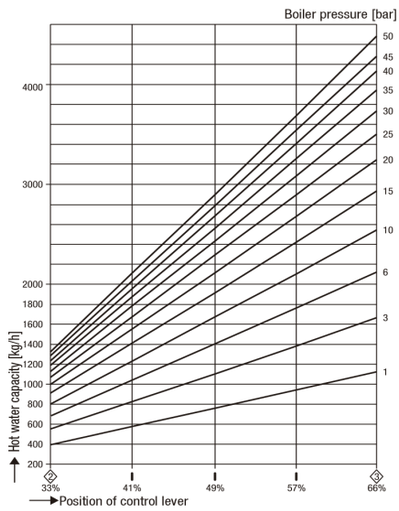


Fig. 7 *For DN 40 and 50*
Capacity range up to 4,500 kg/h

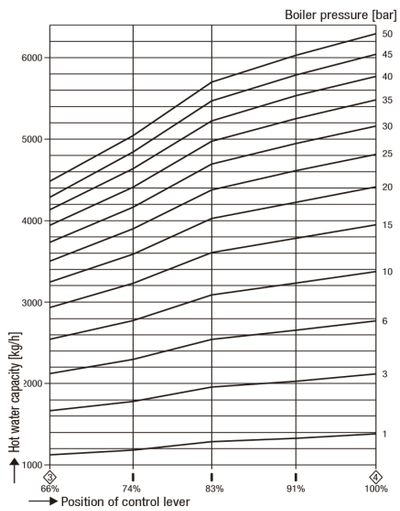
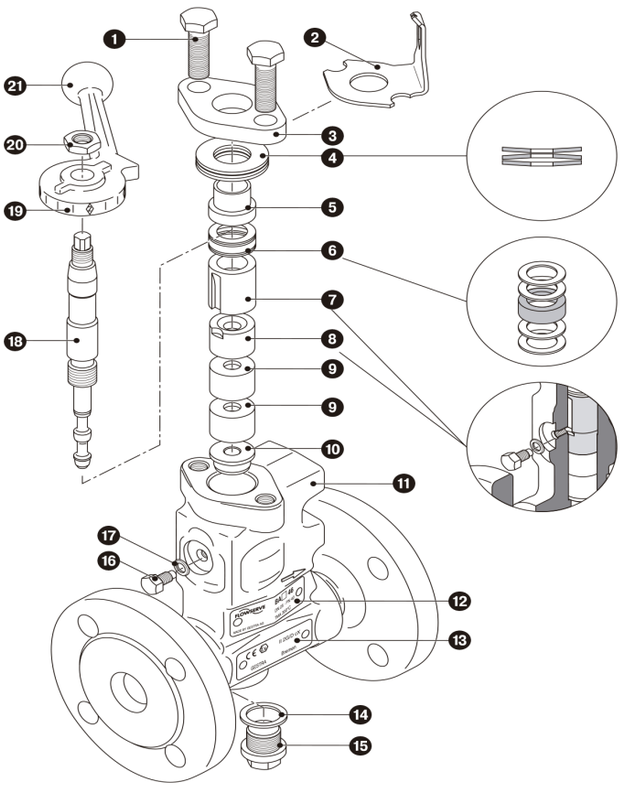
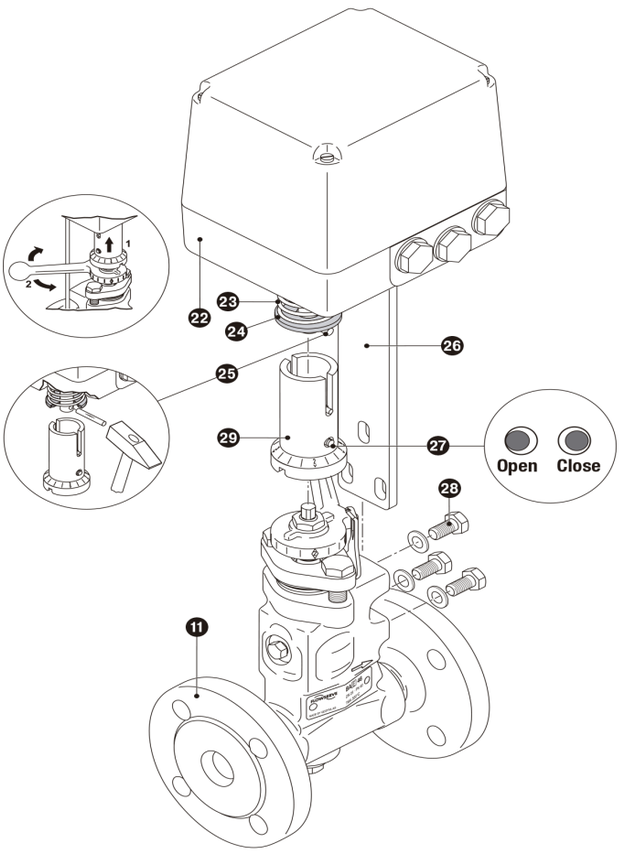


Fig. 8 *For DN 40 and 50*
Capacity range up to 6,300 kg/h

Component Parts BA 46, BA 47



Component Parts BAE 46..., BAE 47...



Key

1. Stuffing box screw
2. Scale plate
3. Stuffing box gland
4. Disk spring (3 pieces)
5. Spring sleeve
6. Packing with 4 wiper rings
7. Guide sleeve
8. Wear resisting sleeve
9. Stage bushing
10. Seat bushing
11. Valve body
12. Name plate
13. ATEX marking
14. Gasket A 17 x 23 x 1.5
15. Sealing plug (connection for sample valve)
16. Locking screw
17. Gasket C6 x 10 x 1.5 (DN 15-32)
    C10 x 16 x 1.5 (DN 40, 50)
18. Nozzle stem
19. Scale
20. Hexagon nut
21. Control lever
22. Actuator
23. Compression spring
24. Thrust washer
25. Grooved dowel pin ISO 8742
26. Mounting bracket
27. Checking pin
28. Hexagon screw with washer
29. Coupling

Continuous Blowdown Valve Reaktomat®

BA 46 / BA 46-ASME, PN 40/CL 150/300, DN 15-DN 50 BA 47 / BA 47-ASME, PN 63/CL 400, DN 25, 40, 50 BAE 46... / BAE 46...-ASME, PN 40/CL 150/300, DN 15-DN 50 BAE 47... / BAE 47...-ASME, PN 63/CL 400, DN 25, 40, 50

When ordering please state:

Steam pressure, design, end connection, size, type and place of installation

The following test certificates can be issued on request, at extra cost:
In accordance with EN 10204-2.1, -2.2, 3.1 and 3.2.

All inspection requirements have to be stated with the order. After supply of the equipment certification cannot be established. Charges and extent of the above mentioned certificates as well as the different tests confirmed therein are listed in our price list "Test and Inspection Charges for Standard Equipment". For other tests and inspections than those listed above, please consult us.

PED (Pressure Equipment Directive)

The equipment fulfils the requirements of the Pressure Equipment Directive PED 97/23/EC. For use with fluids of group 2. With CE marking (apart from equipment that is excluded from the scope of the PED as specified in section 3.3).

ATEX (Atmosphère Explosible)

The equipment BA 46, BA 47 can be used in potentially explosive areas, provided that the following notes are observed: The service fluid must not generate excessively high operating temperatures. Electrostatic charges that may be produced during operation must be discharged. The tight shut-off of the stuffing box must be ensured. The valve spindle must be able to move smoothly. Applicable in Ex zones 1, 2, 21, 22 (1999/92/EC), CE Ex II 2 G/D c X. According to the European Directive 94/9/EC the equipment BAE 46..., BAE 47... must not be used in potentially explosive areas. For more information refer to our ATEX Declaration of Conformity.

Spare parts list

Item	Designation	Stock code BA 46 BA 47	Stock code BAE 46... BAE 47...
6 d g	Packing & gasket kit, DN 15 to DN 32: 1 Packing ring 15 x 23 x 8, 4 wiper rings, 1 gasket C 6 x 10 x 1.5, 1 gasket A 17 x 23 x 1.5	335702	335702
6 d g	Packing & gasket kit, DN 40 and DN 50: 1 Packing ring 18 x 28 x 10, 4 wiper rings, 1 gasket C 10 x 16 x 1.5, 1 gasket A 17 x 23 x 1.5	335704	335704
6 7 8 9 0 d g h	Complete spare parts kit, DN 15 to DN 32: 1 nozzle stem, 1 seat bushing, 2 stage bushings, 1 wear resistant sleeve, 1 guide sleeve, 1 packing ring 15 x 23 x 8, 4 wiper rings, 1 gasket C 6 x 10 x 1.5, 1 gasket A 17 x 23 x 1.5	335703	335703
6 7 8 9 0 d g h	Complete spare parts kit, DN 40 and DN 50: 1 nozzle stem, 1 seat bushing, 2 stage bushings, 1 wear resistant sleeve, 1 guide sleeve, 1 packing ring 18 x 28 x 10, 4 wiper rings, 1 gasket C 10 x 16 x 1.5, 1 gasket A 17 x 23 x 1.5	335705	335705
l	Actuator **EF 0.6**, 230 V, 50/60 Hz (for BAE 46-3)		335932
l	Actuator **EF 1**, 230 V, 50/60 Hz (for BAE 46, BAE 47)		335929
l	Actuator **EF 1-1**, 230 V, 50/60 Hz (for BAE 4...-1)		335931
l	Actuator **EF 1-40**, 230 V, 50/60 Hz (for BAE 4...-4)		335952

Explosion-proof actuators or actuators powered by d. c. or three-phase current are available on request.

List of parts for retrofitting

Item	Designation	Stock code BA 46 BA 47	Stock code BAE 46... BAE 47...
l m n o p r s	1 actuator **EF 0.6,** 230 V, 50/60 Hz, 1 mounting bracket, 1 assembly set for coupling, 3 hexagon screws (for BAE 46-3)	335658	
	1 actuator **EF 1,** 230 V, 50/60 Hz, 1 mounting bracket, 1 assembly set for coupling, 3 hexagon screws (for BAE 46..., BAE 47...)	335659	
	1 actuator **EF 1-1,** 230 V, 50/60 Hz, 1 mounting bracket, 1 assembly set for coupling, 3 hexagon screws (for BAE 4...-1)	335660	
	1 actuator **EF 1-40,** 230 V, 50/60 Hz, 1 mounting bracket, 1 assembly set for coupling, 3 hexagon screws (for BAE 4...-4)	335661	
	1 mounting bracket, 1 assembly set for coupling, 3 hexagon screws (without actuator l)	335769	