

GESTRA Steam Systems

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 600, 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 600, DN 25, 40, 50

Product Range

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 1¹⁾**
- **BAE 46-1** PN 40, operated by the electric actuator **EF 1-1¹⁾**
- **BAE 46-3** PN 40, operated by the electric actuator **EF 0.6¹⁾**
- **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 1¹⁾**
- **BAE 47-1** PN 63, operated by the electric actuator **EF 1-1¹⁾**
- **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.

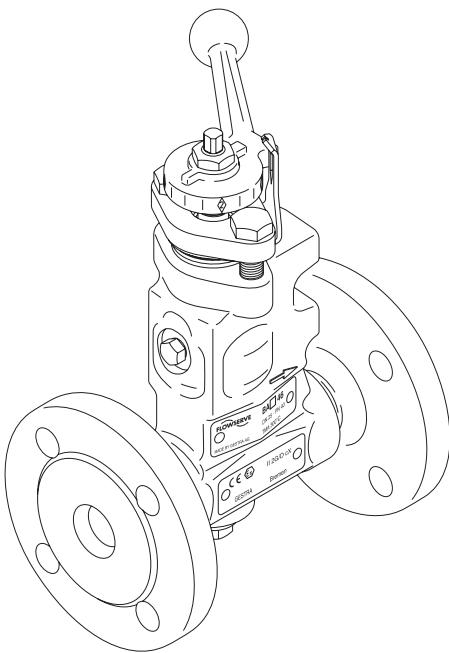
²⁾ Actuator with CAN bus control

Function

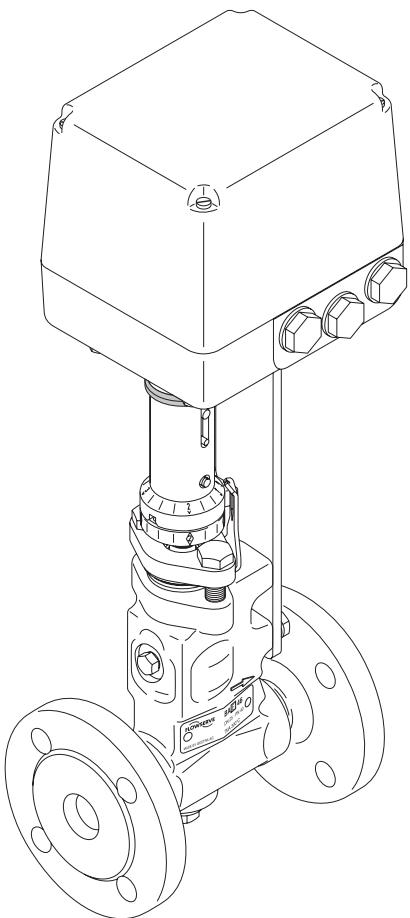
The continuous blowdown valve BA 46, BA 47 is moved to its control position by means of the control lever. Use the scale on the control lever to adjust the required amount of boiler blowdown. The required amount of boiler blowdown is calculated with the aid of a formula or read off on a nomogram. The continuous blowdown valve BAE 46..., BAE 47 is moved 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



BAE 46..., BAE 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), A105

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), A105

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 600, butt-weld ends B16.25, socket-weld ends B16.11, Class 3000

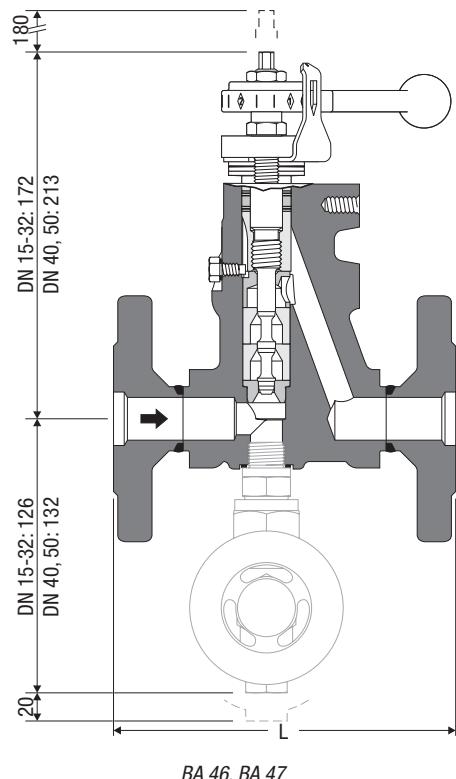
p_{\max} (max. pressure)	[bar]g	55				
t_s (boiling temperature)	[°C]	270				
p_{\max} (max. pressure)	[psi]g	797				
t_s (boiling temperature)	[°F]	518				

Calculated in accordance with ASME B16.34

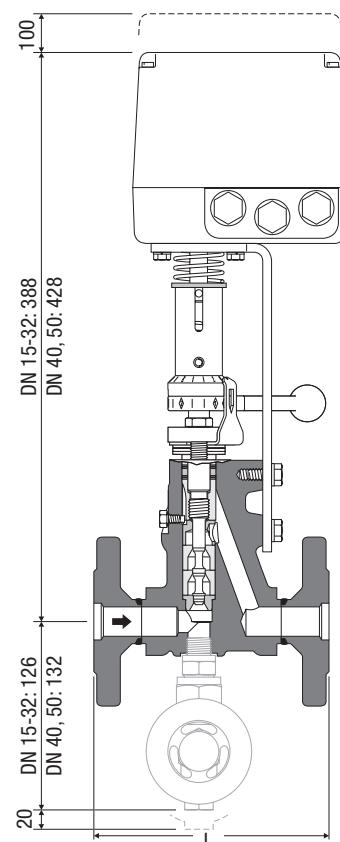
Materials

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

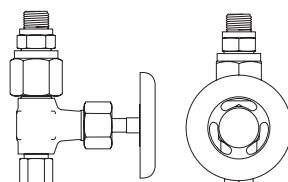
Dimensions



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]	1/2	3/4	1	1 1/4	1 1/2	2	1	1 1/2	2
[mm]	15	20	25	32	40	50	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]	1/2	3/4	1	1 1/4	1 1/2	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 600			
	[inch]	1/2	3/4	1	1 1/4	1 1/2	2	1	1 1/2	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]	1/2	3/4	1	1 1/4	1 1/2	2	1	1 1/2	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...

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]	1/2	3/4	1	1 1/4	1 1/2	2			
[mm]	15	20	25	32	40	50				
d ₂	35	40	45	55	62	75				
d ₁	21.8	27.3	34.1	42.8	48.8	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]*	3.7/7.8	3.9/8.0	4.2/8.3	5.1/9.2	8.3/12.4	9.5/13.6				

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

Other designs available on request. Special dimensions, sizes and materials for end connections on request.

Capacity Charts

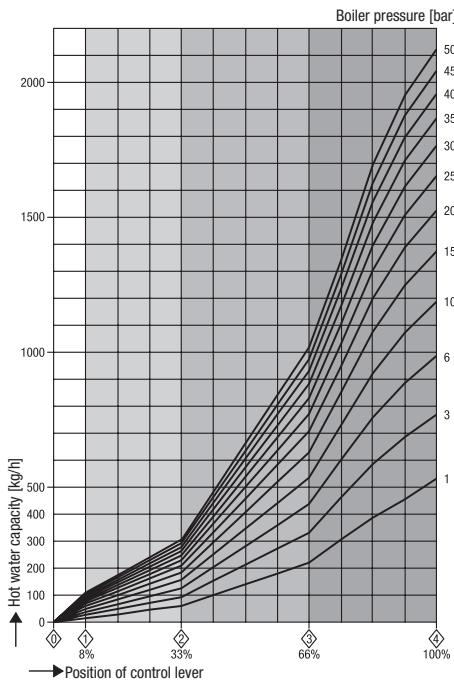


Fig. 1 For DN 15 to 32
Capacity ranges at a glance

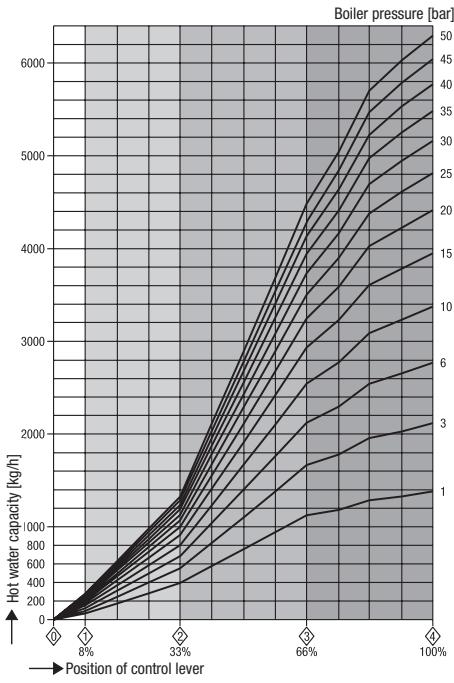


Fig. 5 For DN 40 to 50
Capacity ranges at a glance

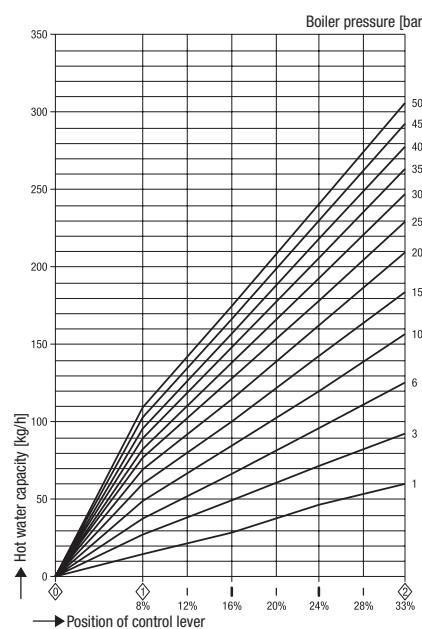


Fig. 2 For DN 15 to 32
Capacity range up to 310 kg/h

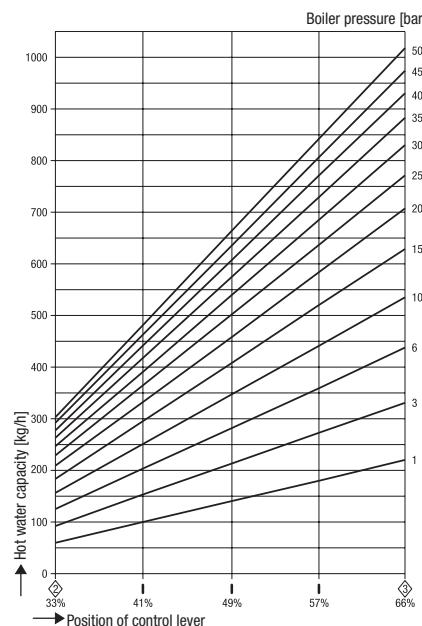


Fig. 3 For DN 15 to 32
Capacity range up to 1,020 kg/h

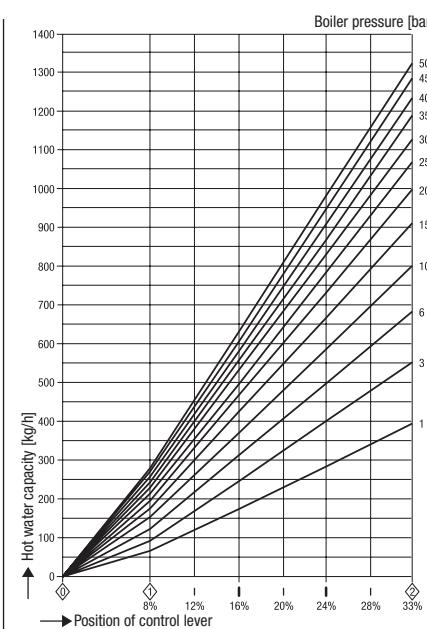


Fig. 6 For DN 40 and 50
Capacity range up to 1,340 kg/h

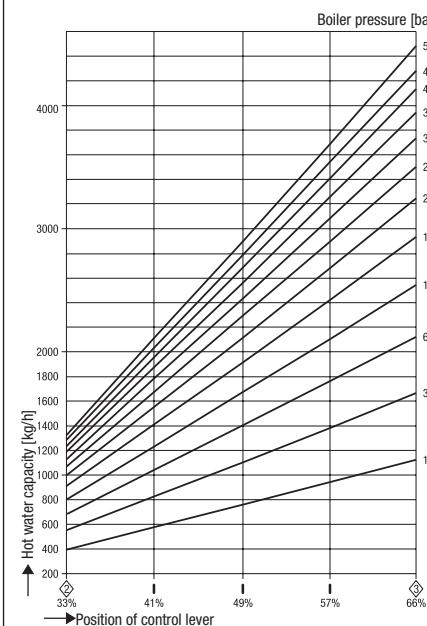


Fig. 7 For DN 40 and 50
Capacity range up to 4,500 kg/h

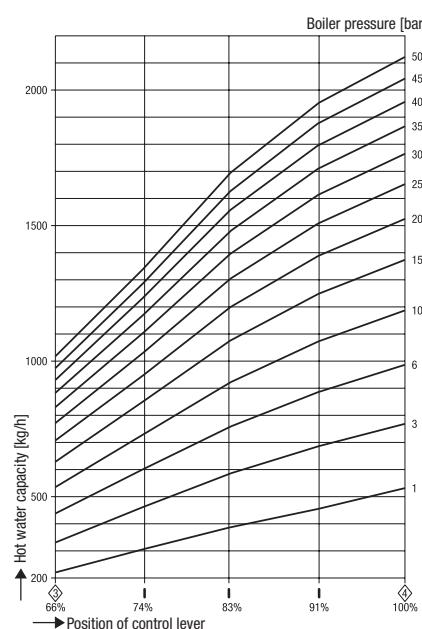


Fig. 4 For DN 15 to 32
Capacity range up to 2,120 kg/h

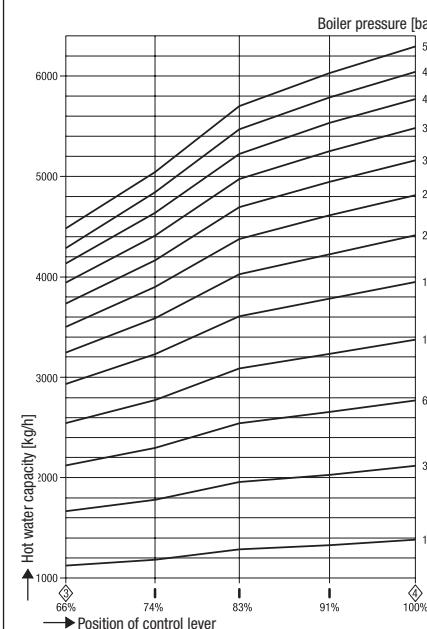


Fig. 8 For DN 40 and 50
Capacity range up to 6,300 kg/h

Calculating the amount of boiler blowdown

Example

Boiler pressure: 15 bar

Nominal size of continuous blowdown valve: DN 20

Boiler capacity: $Q = 10000 \text{ kg/h}$

Conductivity of feedwater: $S = 100 \mu\text{s/cm}$

Admissible conductivity of boiler water:

$K = 3000 \mu\text{s/cm}$

Amount of boiler water to be discharged: $A \approx 345 \text{ kg/h}$ approx. 10 % of which is intermittently blown out: $\approx 35 \text{ kg/h}$

Amount of continuous blowdown: $A_1 \approx 310 \text{ kg/h}$

Set control lever according to scale to an opening of 41 %. (Fig. 3)

Amount of boiler water to be discharged

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

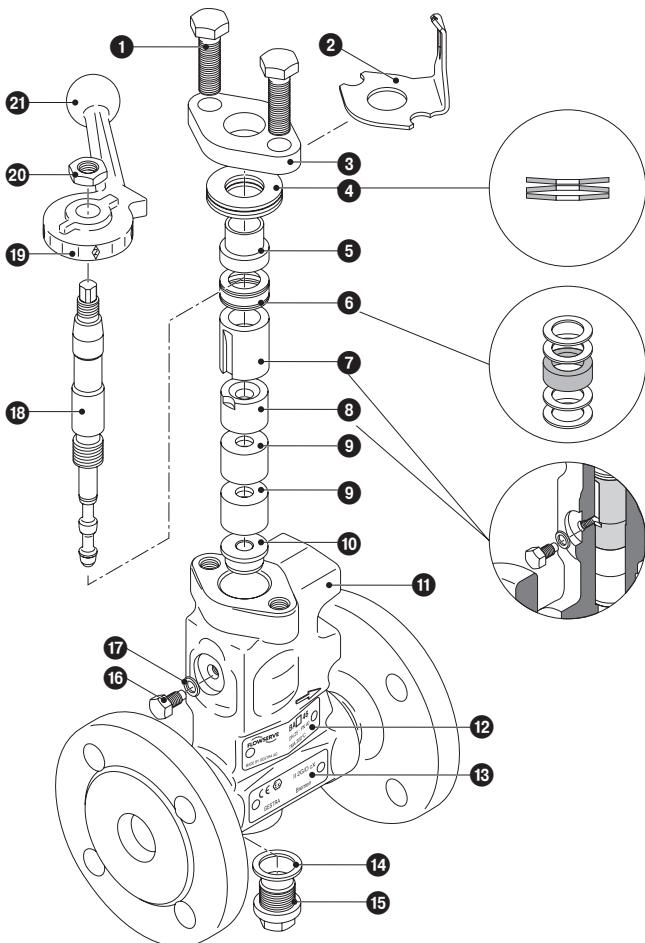
A = Amount of boiler water to be discharged [kg/h]

Q = Boiler capacity [kg/h]

S = Conductivity of feedwater [$\mu\text{s/cm}$]

K = Admissible conductivity of Boiler water [$\mu\text{s/cm}$]

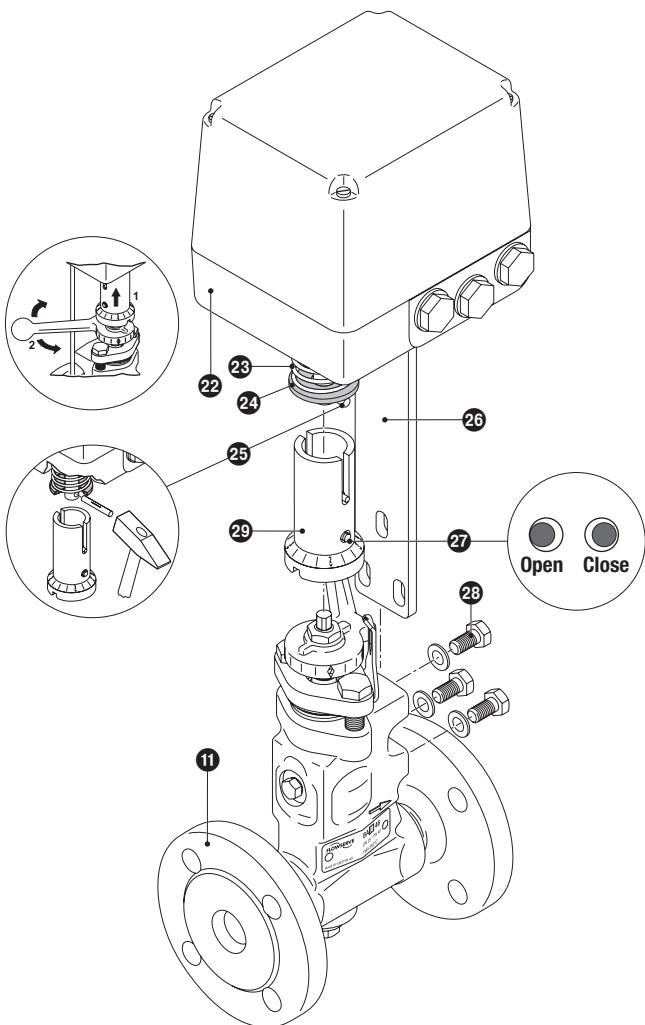
Component Parts BA 46, BA 47



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

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



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PN 40/CL 150/300, DN 15-DN 50**
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PN 63/CL 600, 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 600, 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),  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	Stock code
		BA 46	BAE 46...
  	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
  	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
       	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
       	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
	Actuator EF 0.6 , 230 V, 50/60 Hz (for BAE 46-3)		335932
	Actuator EF 1 , 230 V, 50/60 Hz (for BAE 46, BAE 47)		335929
	Actuator EF 1-1 , 230 V, 50/60 Hz (for BAE 4...-1)		335931
	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	Stock code
		BA 46	BAE 46...
	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 )	335769	

Supply in accordance with our general terms of business.



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