

## GESTRA Steam Systems

Continuous Blowdown Valves  
**BA 46, BA 47, BAE 46, BAE 47**

17/7/06

Product Range

**BA 46**  
**BA 47**  
**BAE 46**  
**BAE 47**

Issue Date: 2/06

### System 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 THD 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...\*)
- **BAE 47** PN 63, operated by the electric actuator EF...\*)

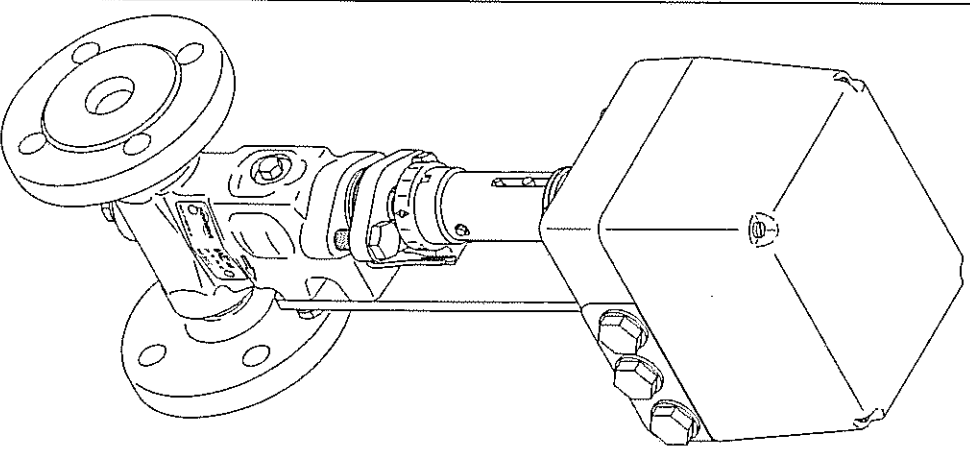
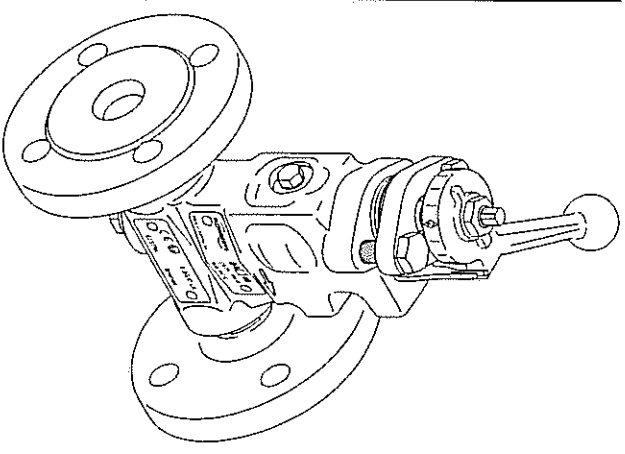
\*) Explosion-proof actuators or actuators powered by d. c. or three-phase current are available on request.

### 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 actuated by 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 LRG 1...-1 or the conductivity controller LRR 1-5, LRR 1-6 in combination with the GESTRA conductivity electrode LRG 16... 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 fundamental 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. The power flow towards the closing direction is transmitted via a rigid 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 value is reached, the actuator receives an opening pulse from the conductivity controller according to 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 in the actuator, the "OPERATING POSITION" is variably adjustable by means of an operating cam or a feedback potentiometer.



## Technical Data

### Pressure ratings

Type BA(E) 46: EN PN 40, ASME Class 150, 300

Type BA(E) 47: EN PN 63, ASME Class 400

Designation	EN	DIN	ASTM
Valve body BA..., BAE...	P250GH (1.0460)	C 22.8 (1.0460)	A 105
Nozzle stem	X20Cr13 (1.4021)	X20Cr13 (1.4021)	
Seat and stage sleeves	X14CrMoS17 (1.4104)	X14CrMoS17 (1.4104)	
Locking screw	A2-70	A2-70	A193 CL 2B-B8
Sealing plug	42CrMo4 (1.7225)		A193 B7

### Pressure/Temperature ratings

Type	Ratings according to	max. pressure [bar] at					
		100 °C	200 °C	300 °C	t <sub>s</sub> / P <sub>max</sub>		
BA(E) 46	EN 1092-1	1.0460*)	PN 40	37.3	30.2	25.8	234 / 29
	EN 1092-1	A105	PN 40	40	37.9	33.5	246 / 36
	ASME B16-34	A105	Class 150	17.7	13.8	10.2	198 / 14
	ASME B16-34	A105	Class 300	46.6	43.8	39.8	254 / 42
BA(E) 47	EN 1092-1	1.0460*)	PN 63	58.8	47.6	40.6	257 / 44
	EN 1092-1	A105	PN 63	63	59.6	52.7	271 / 55
	ASME B16-34	A105	Class 400	62.1	58.4	53.1	270 / 55

\*) Material according to AD 2000

### Overall lengths

End connection	[mm]	15	20	25	32	40	50
	[inch]	½	¾	1	1½	1½	2
Flange Class 150	L	150	150	160	180	180	230
Flange Class 300	L	150	150	160	180	230	230
Flange Class 400	L			216		216	250
Butt-weld ends	L	200	200	200	200	250	250
Socket-weld ends	L	200	200	200	200	250	250
Flange PN 40	L	150	150	160	180	200	230
Flange PN 63	L			190		220	250
Weight BA 4... [kg]		4.7	5.3	5.8	7.1	10.7	12.5
Weight BAE 4... [kg]		8.8	9.4	9.9	11.2	14.8	16.6

### Dimensions of end connections

	Outside diameter of pipe x wall thickness						
	DN15	DN20	DN25	DN32	DN40	DN50	
Butt-weld ends for pipe*)							
EN	PN 40	21.3 x 2	26.9 x 2.3	33.7 x 3.4	42.4 x 2.6	48.3 x 2.6	60.3 x 2.9
EN	PN 63	21.3 x 2	26.9 x 2.6	33.7 x 2.6	42.4 x 2.9	48.3 x 2.9	60.3 x 2.9
ASME Schedule 40	CL150/300	21.3 x 2.8	26.7 x 2.9	33.4 x 3.4	42.2 x 3.6	48.3 x 3.7	60.3 x 3.9
ASME Schedule 80	CL400/300	21.3 x 3.7	26.7 x 3.9	33.4 x 4.5	42.2 x 4.8	48.3 x 5.1	60.3 x 5.5
		Inside diameter x depth					
Socket-weld ends EN/ASME**)	DN15	15	20	25	32	40	50
EN/ASME		21.8 x 10	27.3 x 13	34.1 x 13	42.8 x 13	48.8 x 13	61.3 x 16

\*) The dimensions (outside diameter of pipe x wall thickness) refer to the connecting pipe, not to the dimensions of the butt-weld end!

\*\*) The dimensions (inside diameter x depth) refer to the socket-weld ends.

## Calculating the amount of boiler blowdown

Amount of boiler water to be discharged

- A = **Q · S**
- A = **K · S**
- A = Amount of boiler blowdown [kg/h]
- Q = Boiler capacity [kg/h]
- S = Conductivity of feedwater [µs/cm]
- K = Admissible conductivity of boiler water [µs/cm]

### Example

Boiler pressure: 15 bar  
 Nominal size of the continuous blowdown valve: DN 20  
 Boiler capacity: Q = 10000 kg/h  
 Conductivity of feedwater: S = 100 µs/cm  
 Admissible conductivity of the boiler water: K = 3000 µs/cm  
 Amount of boiler water to be discharged: A ≈ 345 kg/h  
 10 % of which is intermittently blown out: ≈ 35 kg/h  
 Amount of continuous blowdown: A<sub>c</sub> ≈ 310 kg/h  
 Set control lever according to scale to an opening of 41 %

## Design

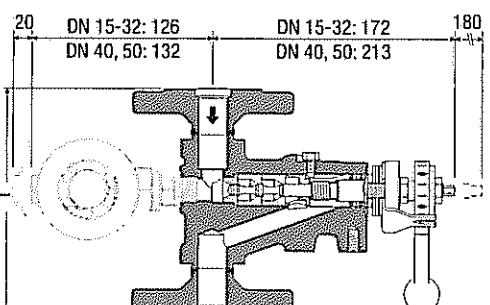
### BA(E) 46

Standard: Flanged to EN 1092-1, PN 40  
 Special version: Flanged to ASME, Class 150, 300  
 Butt-weld ends for pipes to DIN or ASME  
 Socket-weld ends for pipes to DIN or ASME

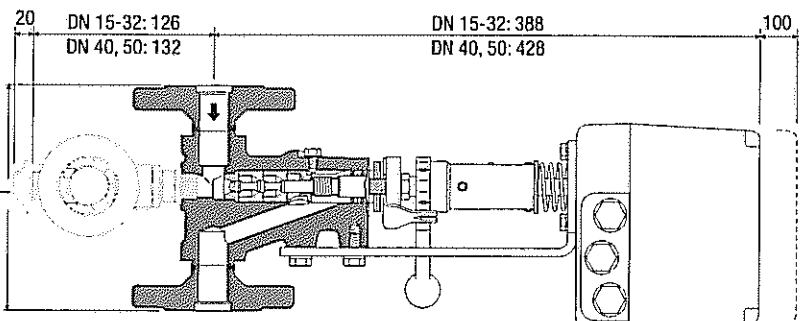
### BA(E) 47

Standard: Flanged to EN 1092-1, PN 63  
 Special version: Flanged to ASME, Class 400  
 Butt-weld ends for pipes to DIN or ASME  
 Socket-weld ends for pipes to DIN or ASME

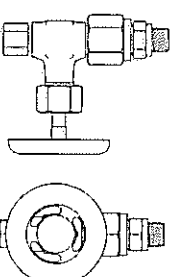
## Dimensions



BA 46, BA 47

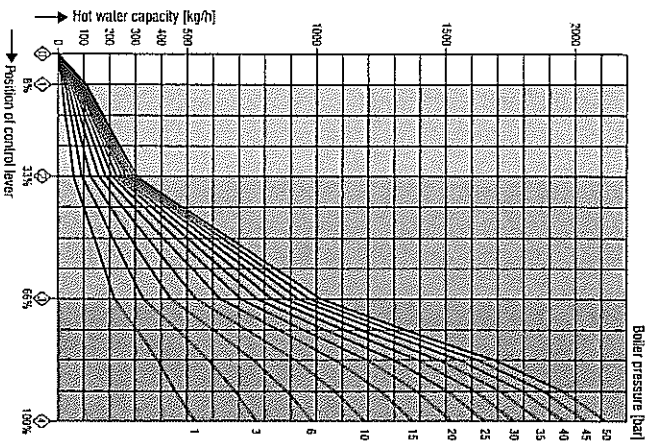


BAE 46, BAE 47

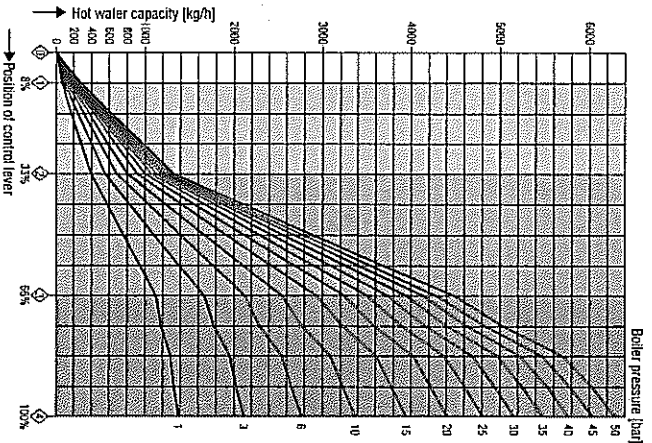


Sample valve 3/4"

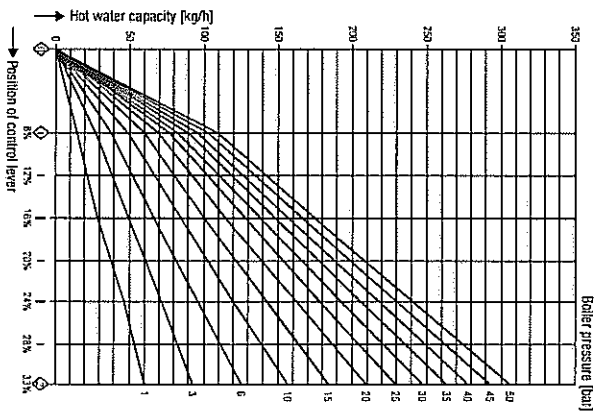
### Capacity Charts



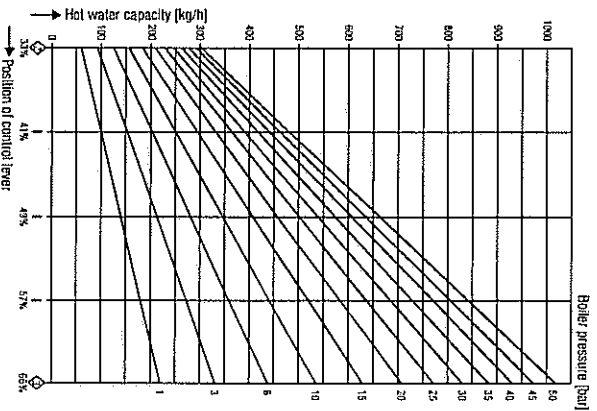
**Fig. 1** For DN 15 - 32  
Capacity ranges at a glance



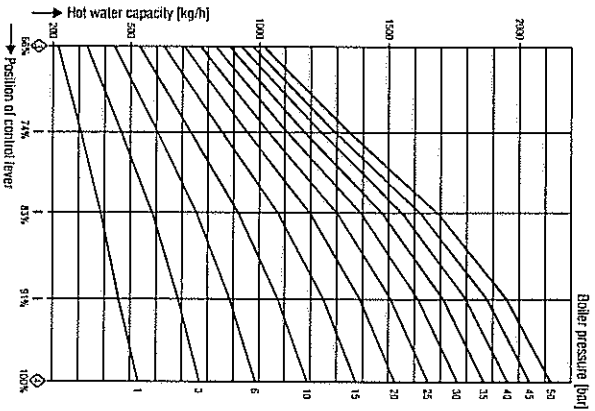
**Fig. 5** For DN 40 + 50  
Capacity ranges at a glance



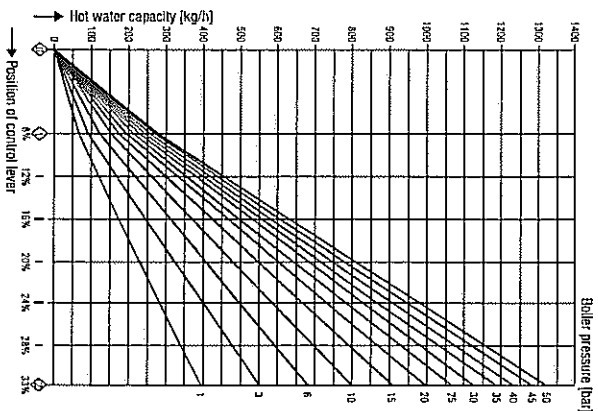
**Fig. 2** For DN 15 - 32  
Capacity range up to 310 kg/h



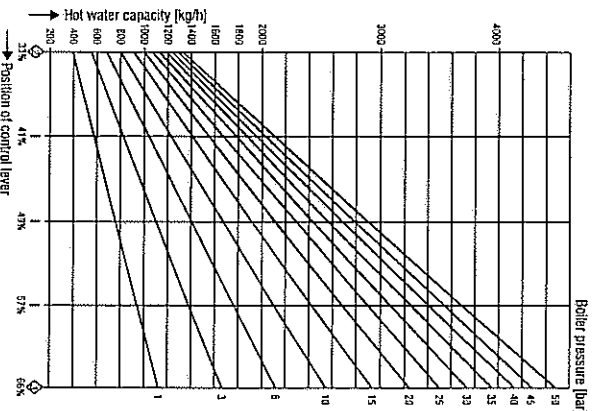
**Fig. 3** For DN 15 - 32  
Capacity range up to 1020 kg/h



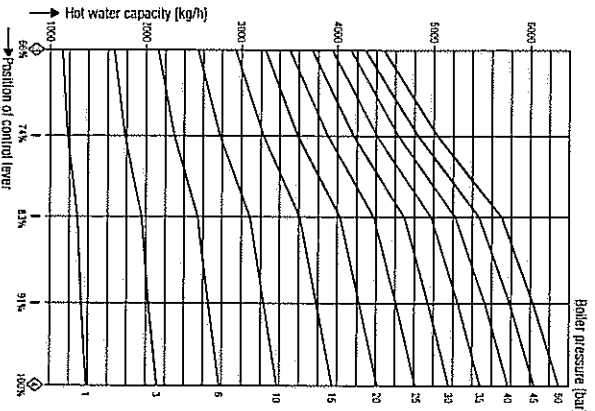
**Fig. 4** For DN 15 - 32  
Capacity range up to 2120 kg/h



**Fig. 6** For DN 40 + 50  
Capacity range up to 1340 kg/h



**Fig. 7** For DN 40 + 50  
Capacity range up to 4500 kg/h




**Fig. 8** For DN 40 + 50  
Capacity range up to 6300 kg/h

## Continuous Blowdown Valves BA 46, BA 47, BAE 46, BAE 47

**PED (Pressure Equipment Directive)**  
The equipment fulfills the requirements of the Pressure Equipment Directive (PED) 97/23/EC. Applicable in fluids of group 2. With CE marking, except equipment according to section 3.3.

### ATEX (Atmosphere 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 temperatures. Electrostatic charges that may be produced during operation must be discharged. The light shut-off of the stuffing box must be ensured. The valve spindle must operate smoothly. Applicable in Ex zones 1, 2, 21, 22 (1999/92/EC)  II 2 G/D c X. Note that according to the European Directive 94/9/EC the equipment BAE 46, BAE 47 must not be used in explosion-risk areas. For more information refer to our ATEX Declaration of Conformity.

### Spare parts list

Item	Designation	Stock code	Stock code
		BA 46 BA 47	BAE 46 BAE 47
<b>F</b> <b>N</b> <b>O</b>	Packing/gasket kit, DN 15 to DN 32: 2 packing rings 15 x 23 x 4, 4 wiper rings, 1 gasket C 6 x 10 x 1,5, 1 gasket A 17 x 23 x 1,5	335702	335702
<b>F</b> <b>N</b> <b>Q</b>	Packing/gasket kit, DN 40 and DN 50: 2 packing rings 18 x 28 x 5, 4 wiper rings, 1 gasket C 10 x 16 x 1,5, 1 gasket A 17 x 23 x 1,5	335704	335704
<b>R</b> <b>I</b> <b>J</b> <b>H</b> <b>G</b> <b>F</b> <b>N</b> <b>Q</b>	Complete spare parts kit, DN 15 to DN 32: 1 nozzle stem, 1 seat bushing, 2 stage bushings, 1 wearing bushing, 1 guide sleeve, 2 packing rings 15 x 23 x 4, 4 wiper rings, 1 gasket C 6 x 10 x 1,5, 1 gasket A 17 x 23 x 1,5	335703	335703
<b>R</b> <b>I</b> <b>J</b> <b>H</b> <b>G</b> <b>F</b> <b>N</b> <b>Q</b>	Complete spare parts kit, DN 40 and DN 50: 1 nozzle stem, 1 seat bushing, 2 stage bushings, 1 wearing bushing, 1 guide sleeve, 2 packing rings 18 x 28 x 5, 4 wiper rings, 1 gasket C 10 x 16 x 1,5, 1 gasket A 17 x 23 x 1,5	335705	335705
<b>I</b>	Actuator EF 0,5, 230 V, 50/60 Hz		332754
<b>I</b>	Actuator EF 1, 230 V, 50/60 Hz		333312
<b>I</b>	Actuator EF 1-1, 230 V, 50/60 Hz		333311
<b>I</b>	Actuator EF 1-4Q, 230 V, 50/60 Hz		335664

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

### Retrofitting parts list

Item	Designation	Stock code	Stock code
		BA 46 BA 47	BAE 46 BAE 47
<b>1</b> <b>2</b> <b>3</b> <b>4</b> <b>5</b> <b>7</b> <b>8</b>	1 actuator EF 0,5, 230 V, 50/60 Hz, 1 mounting bracket, 1 assembly set for coupling, 3 hexagon screws	335658	
<b>1</b> <b>2</b> <b>3</b> <b>4</b> <b>5</b> <b>7</b> <b>8</b>	1 actuator EF 1, 230 V, 50/60 Hz, 1 mounting bracket, 1 assembly set for coupling, 3 hexagon screws	335659	
<b>1</b> <b>2</b> <b>3</b> <b>4</b> <b>5</b> <b>7</b> <b>8</b>	1 actuator EF 1-1, 230 V, 50/60 Hz, 1 mounting bracket, 1 assembly set for coupling, 3 hexagon screws	335660	
<b>1</b> <b>2</b> <b>3</b> <b>4</b> <b>5</b> <b>7</b> <b>8</b>	1 actuator EF 1-4Q, 230 V, 50/60 Hz, 1 mounting bracket, 1 assembly set for coupling, 3 hexagon screws	335661	

Supply in accordance with our general terms of business.

## GESTRA AG

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### Design

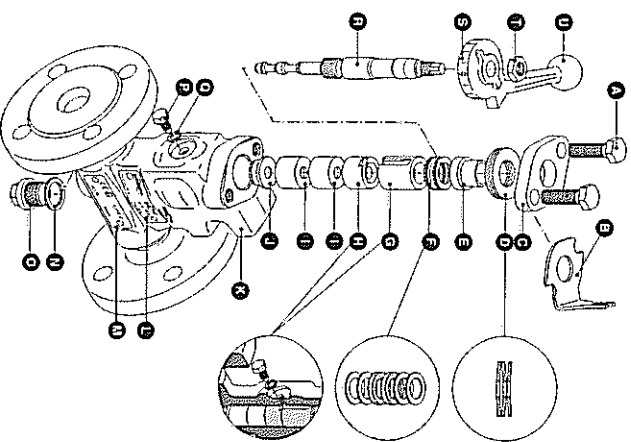


Fig. 9 BA 46, BA 47

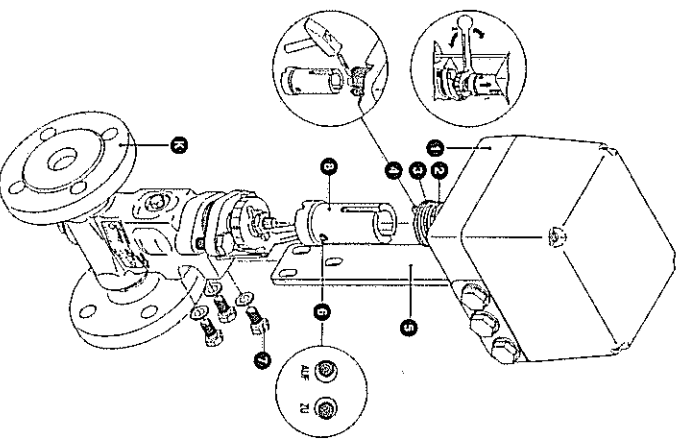


Fig. 10 BAE 46, BAE 47