

GESTRA Steam Systems

BA 46

BA 46-ASME

BA 47

BA 47-ASME

BAE 46...

BAE 46...-ASME

BAE 47...

BAE 47...-ASME

EN

English

Installation Instructions / Product Information 818609-03

Continuous Blowdown Valve

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

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Important notes

Usage for the intended purpose

BA 46, BA 47:

Use the continuous blowdown valves BA 46, BA 47 only for discharging boiler blowdown from steam boilers. Use the equipment only within the allowable pressure and temperature ratings and only if the chemical and corrosive influences on the equipment are taken into account.

BAE 46, BAE 46-1, BAE 46-3, BAE 46-3-1, BAE 47, BAE 47-1:

Use continuous blowdown valve BAE 46..., BAE 47... only in conjunction with control units KS 90, LRR 1-40 or LRR 1-5 for the discharge of boiler blowdown from steam boilers. Use the equipment only within the allowable pressure and temperature ratings and only if the chemical and corrosive influences on the equipment are taken into account.

To ensure safe operation of the BAE 46..., BAE 47... only actuators named and specified by GESTRA may be installed on the valve. Specified and approved actuators are: ARIS EF 0.7, ARIS EF 0.7-1, ARIS EF 10 and ARIS EF 10-1.

Safety note

The equipment must only be installed and commissioned by qualified and competent staff.

Retrofitting and maintenance work must only be performed by qualified staff who - through adequate training - have achieved a recognised level of competence.



Danger

The valve is under pressure during operation.

When loosening flanged connections, sealing plugs or stuffing boxes, hot water and steam will escape.

The valve becomes hot during operation.

Risk of severe burns and scalds to the whole body!

Before carrying out any maintenance work on the valve or loosening flanged connections, stuffing box unions or sealing plugs make sure that all connected lines are depressurized (zero bar) and cooled down to room temperature (20 °C).

Sharp edges on internals present the danger of cuts to hands.

Always wear industrial gloves when replacing the packing, valve seat or valve plug!

Danger of bruising! During operation moving internal parts can pinch one's hands or fingers, causing severe injuries. Do not touch moving parts. The continuous blowdown valves BAE 46..., BAE 47... are remote-controlled and can open and close abruptly.

The terminal strips of the actuator EF... are live during operation. This presents the danger of electric shock!

Cut off power supply to the equipment before mounting or removing the equipment!

Important Notes - continued -



Attention

The name plate specifies the technical features of the equipment. Do not commission or operate any item of equipment that does not bear its specific name plate.


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 (Hazardous Area)

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.

Can be used in Ex zones 1, 2, 21, 22 (1999/92/EC), **CE**  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.

Note on the Declaration of Conformity / Manufacturer's Declaration **CE**

For details on the conformity assessment according to the European Directives see our Declaration of Conformity or our Declaration of Manufacturer.

The current Declaration of Conformity or Declaration of Manufacturer is available in the Internet under www.gestra.com → documents or can be requested from us.

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This declaration is no longer valid if modifications are made to the equipment without consultation with us.

Explanatory Notes

Scope of supply

BA 46

- 1 Continuous blowdown valve REAKTOMAT BA 46
- 1 Sample valve (supplied but not fitted)
- 1 Gasket A17 x 23 x 1.5
- 1 Installation manual GESTRA
- 1 Installation manual for sample valve

BA 47

- 1 Continuous blowdown valve REAKTOMAT BA 47
- 1 Sample valve (supplied but not fitted)
- 1 Gasket A17 x 23 x 1.5
- 1 Installation manual GESTRA
- 1 Installation manual for sample valve

Retrofitting kit for BA 46, BA 47

- 1 Electric actuator
EF 0.7, EF 0.7-1, EF 10 or EF 10-1
- 1 Mounting kit for coupling / mounting bracket
- 1 Installation manual for ARIS actuator EF...

Spare parts

- 1 Kit according to spare parts list, page 38.

BAE 46...

- 1 Continuous blowdown valve REAKTOMAT BAE 46...
- 1 Sample valve (supplied but not fitted)
- 1 Gasket A17 x 23 x 1.5
- 1 Installation manual GESTRA
- 1 Installation manual for sample valve
- 1 Installation manual ARIS for actuator EF...
- 1 Manufacturer's Declaration

BAE 47...

- 1 Continuous blowdown valve REAKTOMAT BAE 47...
- 1 Sample valve (supplied but not fitted)
- 1 Gasket A17 x 23 x 1.5
- 1 Installation manual GESTRA
- 1 Installation manual for sample valve
- 1 Installation manual ARIS for actuator EF...
- 1 Manufacturer's Declaration

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. If the TDS (= total dissolved solids) concentration exceeds the limit defined by pertinent regulations and dictated by the boiler manufacturer, foaming and priming occurs as the density of the boiler water increases, resulting in a carry-over of solids with vapour into steam lines and superheaters.

As a consequence, the operational safety is impaired and severe damage to boiler and tubes may occur. To keep the TDS concentration within admissible limits, a certain portion of boiler water must be removed continuously and/or periodically and fresh make-up water must be added to the boiler to compensate for the water lost through blowdown.

The continuous blowdown valves BA... and BAE... feature a specially designed and wear resistant nozzle stem that enters concentrically into a system of expansion chambers which are arranged one after the other, making these valves particularly suitable for the continuous discharge of boiler water at very high differential pressure. 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 10**¹⁾
- **BAE 46-1** PN 40, operated by the electric actuator **EF 10-1**¹⁾
- **BAE 46-3** PN 40, operated by the electric actuator **EF 0.7**¹⁾
- **BAE 46-3-1** PN 40, operated by the electric actuator **EF 0.7-1**¹⁾
- **BAE 47** PN 63, operated by the electric actuator **EF 10**¹⁾
- **BAE 47-1** PN 63, operated by the electric actuator **EF 10-1**¹⁾
- **EF 0.7** ARIS actuator with two position-controlled limit switches and an operating cam for intermediate positions
- **EF 0.7-1** ARIS actuator with two position-controlled limit switches and feedback potentiometer and an operating cam for intermediate positions
- **EF 10** ARIS actuator with two position-controlled limit switches and an operating cam for intermediate positions
- **EF 10-1** ARIS actuator with two position-controlled limit switches and feedback potentiometer and an operating cam for intermediate positions

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

Function

Continuous blowdown valve REAKTOMAT BA 46, BA 47

To open or close the continuous blowdown valve BA 46, BA 47 use the control lever and to set the required amount of boiler blowdown use the scale. The required amount of boiler blowdown can be calculated with the aid of a formula or read off on a nomogram.

Continuous blowdown valve REAKTOMAT BA 46..., BA 47...

Due to the continuous evaporation process the electrical conductivity of the boiler water is increased. Electrical conductivity - as a result of the TDS (Total Dissolved Solids) content - is measured by a conductivity electrode LRG 1-..or a conductivity transmitter LRGT 1-.. in conjunction with the industrial controller KS 90-1 or the conductivity controller LRR 1-... Depending on the adjusted setpoint the industrial controller KS 90-1 or the conductivity controller LRR 1-.. operates the electric actuator EF... and opens and closes the continuous blowdown valve.

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.

If a certain amount of boiler water is to be removed continuously via the continuous blowdown valve, make sure that the valve is permanently slightly open to ensure a steady flow of water (valve is in operating position). This operating position is adjustable and can be determined by using the capacity charts for the valve.

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 (EF 10-1, EF 0.7-1). However, if the actuator EF 10-1 or EF 0.7-1 is controlled by the conductivity controller LRR 1-52 or LRR 1-53 you can use the feedback potentiometer for indicating the valve position.

Technical Data

Name plate / marking

The temperature/pressure ratings are indicated on the body or on the name plate. For more information see GESTRA technical documents such as data sheets and the Technical Information.

According to EN 19 the name plate or the specification on the body indicate the type and design:

- Name/logo of the manufacturer
- Type designation:
- Pressure class PN or Class
- Material number
- Max. temperature
- Max. pressure
- Direction of flow
- Stamp on valve body, e. g. $\frac{4}{16}$ specifies the quarter and the year of production (example: 4th quarter 2016)

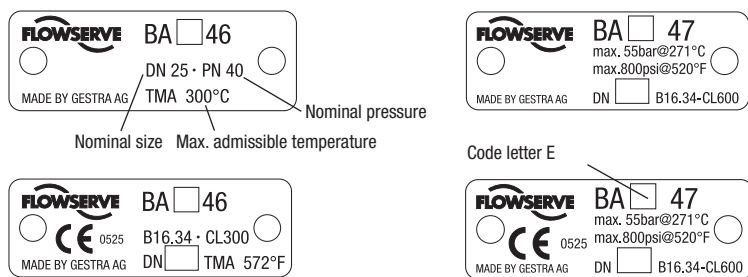


Fig. 1

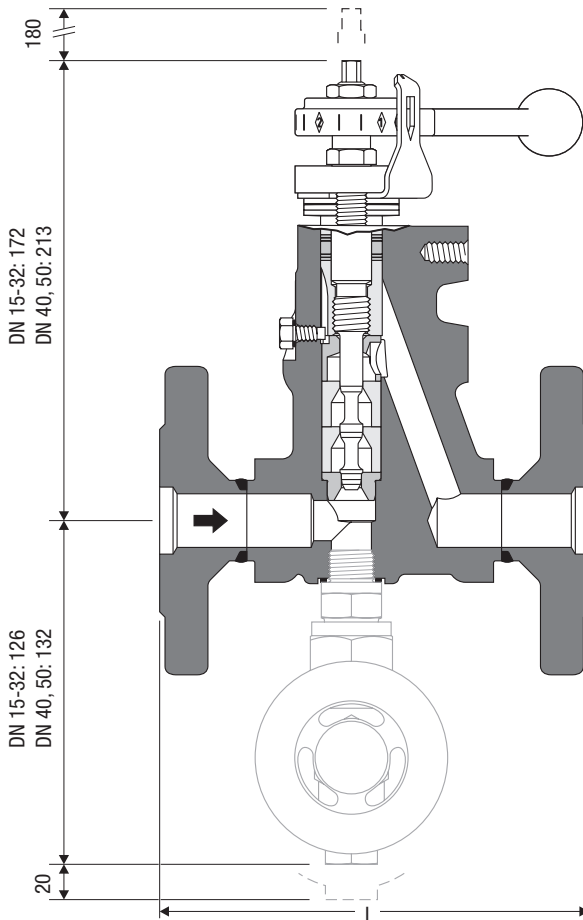


Fig. 2

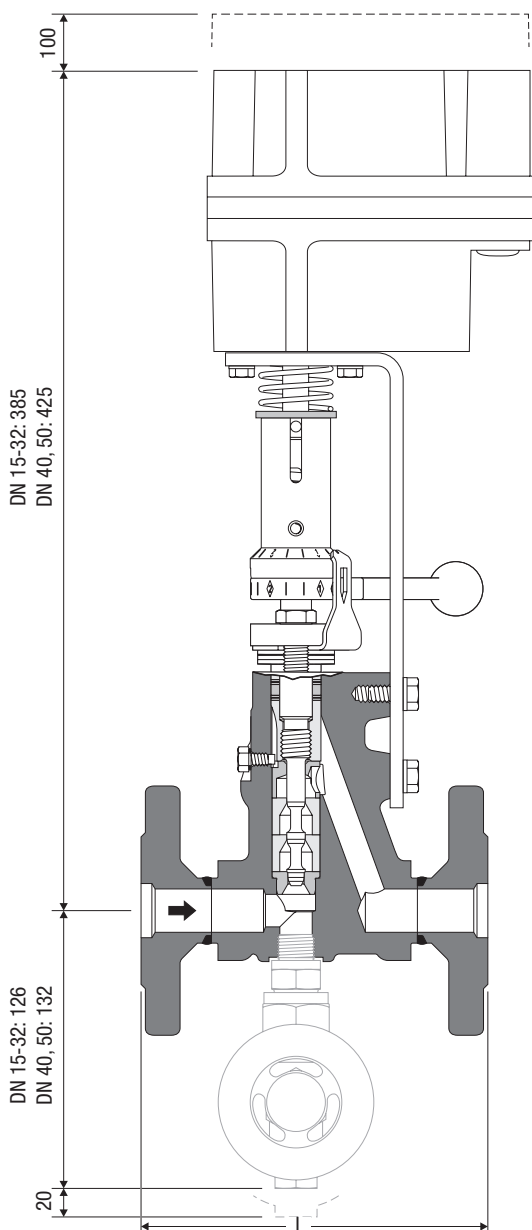
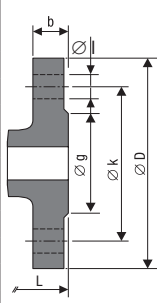


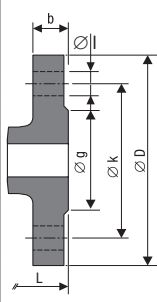
Fig. 3

Dimensions of flanged ends (extract)



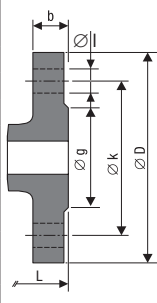
DN	EN 1092-1 (2001) PN 40						EN 1092-1 (2001) PN 63		
[inch]	½	¾	1	1¼	1½	2	1	1½	2
[mm]	15	20	25	32	40	50	25	40	50
D	95	105	115	140	150	165	140	170	180
b	16	18	18	18	18	20	24	26	26
k	65	75	85	100	110	125	100	125	135
g	45	58	68	78	88	102	68	88	102
l	14	14	14	18	18	18	18	22	22
n	4	4	4	4	4	4	4	4	4
L	150	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				
D	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...



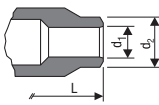
DN	ASME B16.5 Class 300						ASME B16.5 Class 600		
[inch]	½	¾	1	1¼	1½	2	1	1½	2
[mm]	15	20	25	32	40	50	25	40	50
D	95.2	117.5	123.8	133.3	155.6	165.1	123.8	155.6	165.1
b	14.3	15.9	17.5	19.0	20.6	22.2	17.5	22.2	25.4
k	66.7	82.5	88.9	98.4	114.3	127	88.9	114.3	127
g	34.9	42.9	50.8	63.5	73.0	92.1	50.8	73.0	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.

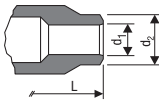
Technical Data - continued -

Dimensions of butt-weld ends (extract)



DN	DIN 3239-1, series 1 DIN 2559-2						DIN 3239-1, series 2 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	43	49	61	34	49	61	
d ₁	17.3	22.0	28.5	37.0	43.0	54.5	28.5	42.5	54.5	
for pipe	21.3x2.0	26.9x2.3	33.7x2.6	42.4x2.6	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...

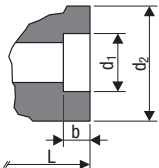


DN	ASME B16.25, Schedule 40 ASME B36.10						ASME B16.25, Schedule 80 ASME B36.10			
	[inch]	½	¾	1	1¼	1½	2	1	1½	2
[mm]	15	20	25	32	40	50	25	40	50	
d ₂	22	28	34	43	49	61	34	49	61	
d ₁	15.7	20.9	26.6	35.1	40.9	52.5	24.3	38.1	49.3	
for pipe	21.3x2.8	26.7x2.9	33.4x3.4	42.2x3.6	48.3x3.7	60.3x3.9	33.4x4.5	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	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.

Technical Data - continued -

Pressure /Temperature Ratings & End Connections

BA 46, BAE 46, Flanged PN 40, EN 1092-1 (2013), 1.0460*					
p_{max} (max. pressure)	[barg]	31			
t_s (boiling point)	[°C]	238			

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

BA 46, BAE 46, Flanged PN 40, EN 1092-1 (2013), A 105					
p_{max} (max. pressure)	[barg]	31			
t_s (boiling point)	[°C]	238			

Calculated in accordance with DIN EN 12516-2

BA 47, BAE 47, Flanged PN 63 / PN 100, EN 1092-1 (2013), 1.0460*					
p_{max} (max. pressure)	[barg]	47			
t_s (boiling point)	[°C]	261			

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 (2013), A 105					
p_{max} (max. pressure)	[barg]	47			
t_s (boiling point)	[°C]	261			

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)	[barg]	14			
t_s (boiling point)	[°C]	198			
p_{max} (max. pressure)	[psig]	203			
t_s (boiling point)	[°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)	[barg]	42			
t_s (boiling point)	[°C]	254			
p_{max} (max. pressure)	[psig]	609			
t_s (boiling point)	[°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)	[barg]	55			
t_s (boiling point)	[°C]	271			
p_{max} (max. pressure)	[psig]	800			
t_s (boiling point)	[°F]	520			

Calculated in accordance with ASME B16.34

Technical Data - continued -

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

Actuator

		EF 0.7 (-1)	EF 10 (-1)
Dimensions	Width	86	86
	Height	133	133
	Length	153	153
Voltage		230 V	230 V
optional	24 V DC		
	120 V 50/60 Hz	x	x
	3Ph 400 V 50/60 Hz		
Protection IP		65	65
optional up to			
Power consumption		4 VA	4 VA
Tightening torque		15 Nm	30 Nm
Ambient temperature		-15 / +60°C	-15 / +60°C
Ex version possible		yes	yes
Feedback	Potentiometer / resolution in ° only for EF..-1	320°	320°
	4-20 mA available	yes	yes
For more information please refer to installation manual of the manufacturer.			

Capacity chart for DN 15 to 32, capacity ranges at a glance

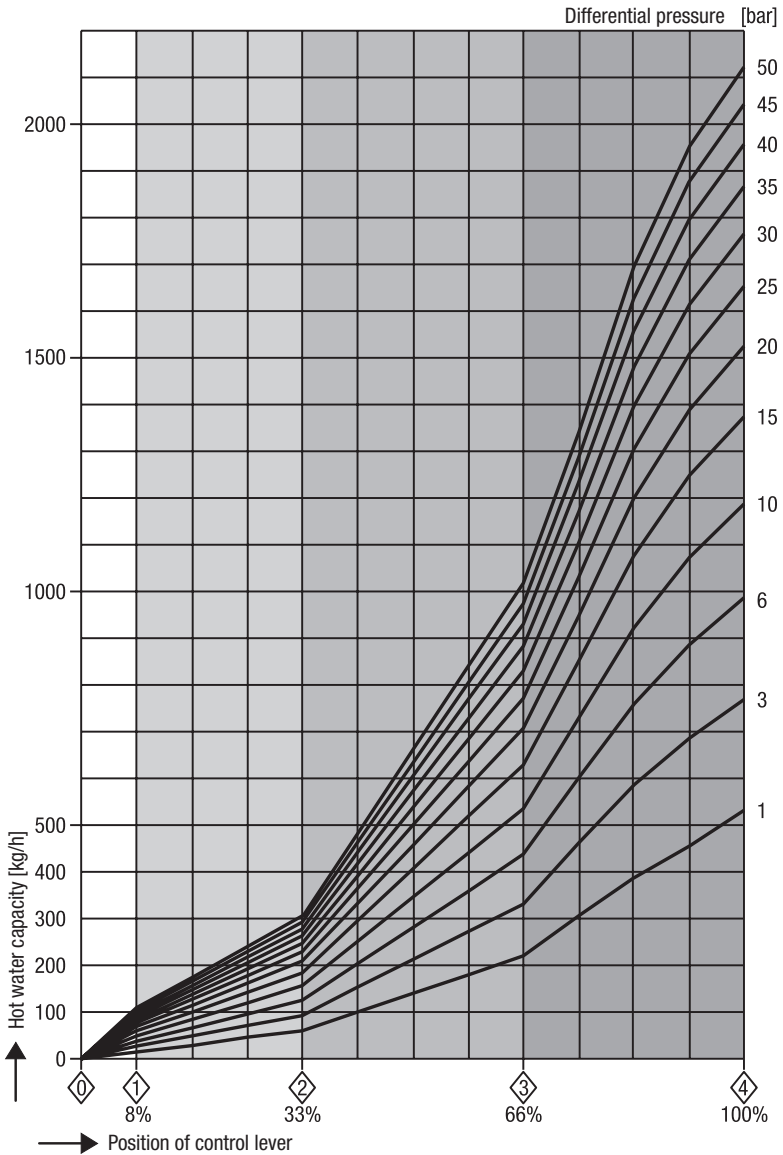


Fig. 4

Capacity chart for DN 15 to 32, capacity range up to 310 kg/h

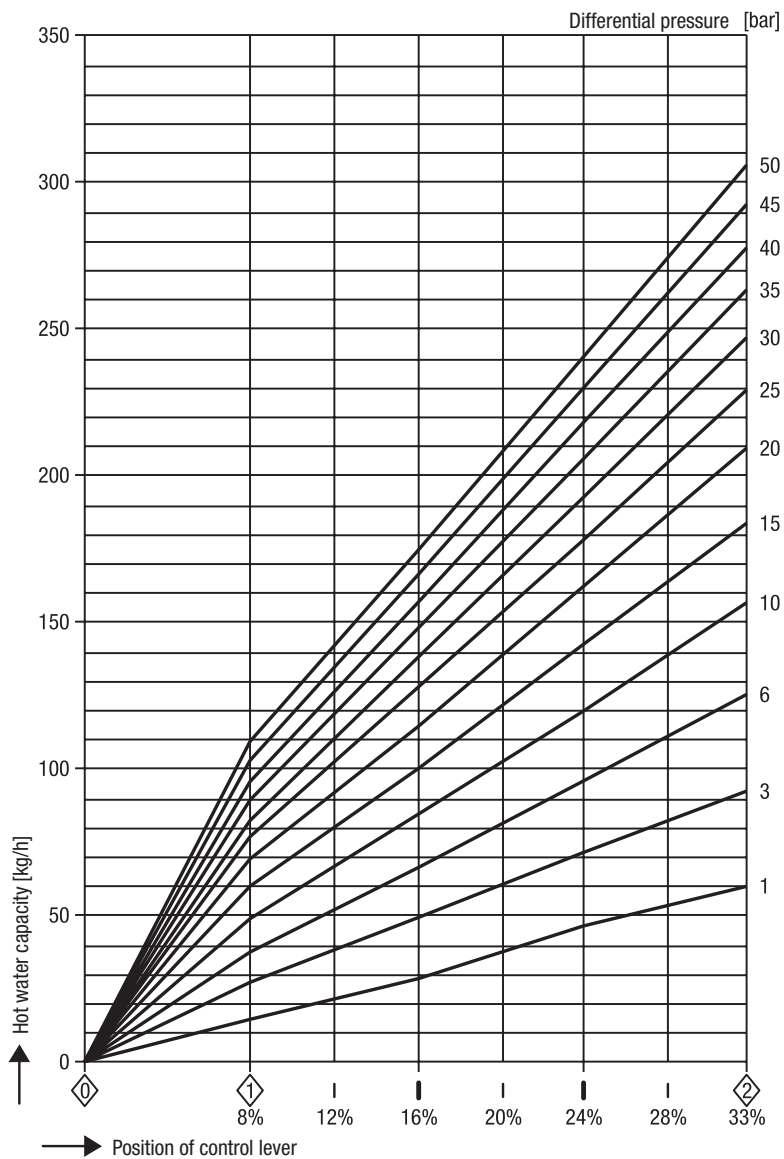


Fig. 5

Capacity chart for DN 15 to 32 , capacity range up to 1020 kg/h

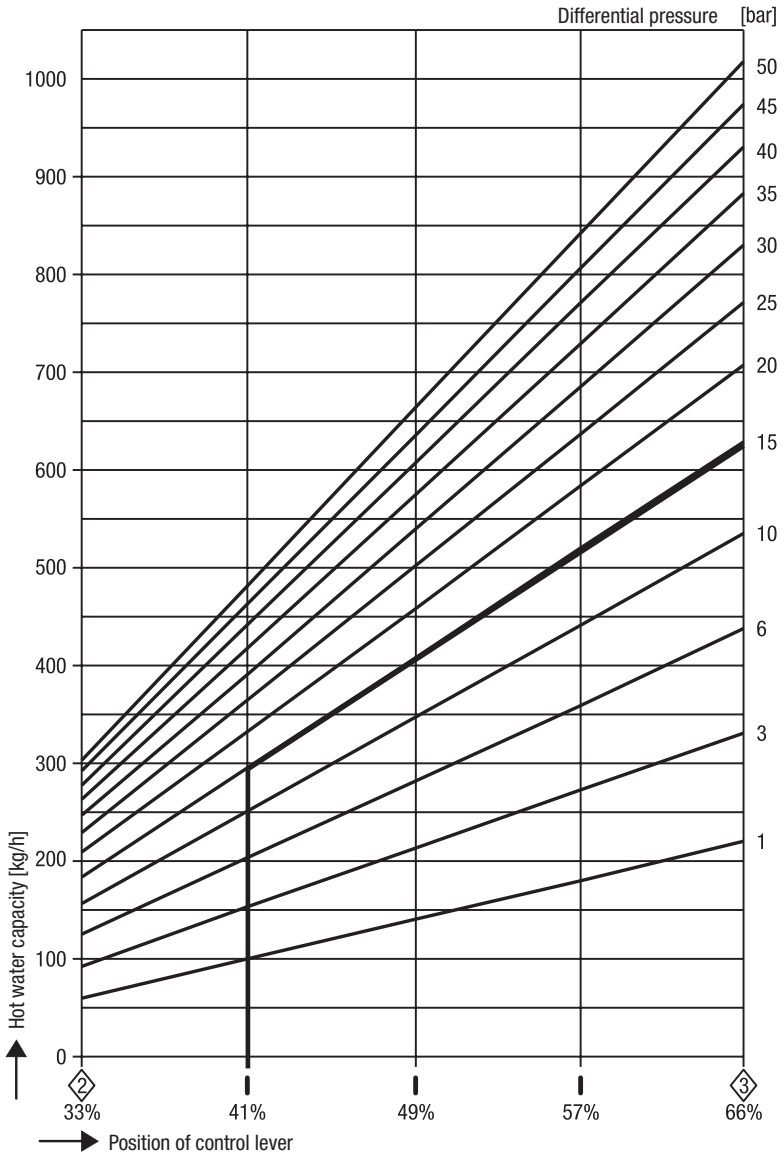


Fig. 6

Capacity chart for DN 15 to 32, capacity range up to 2120 kg/h

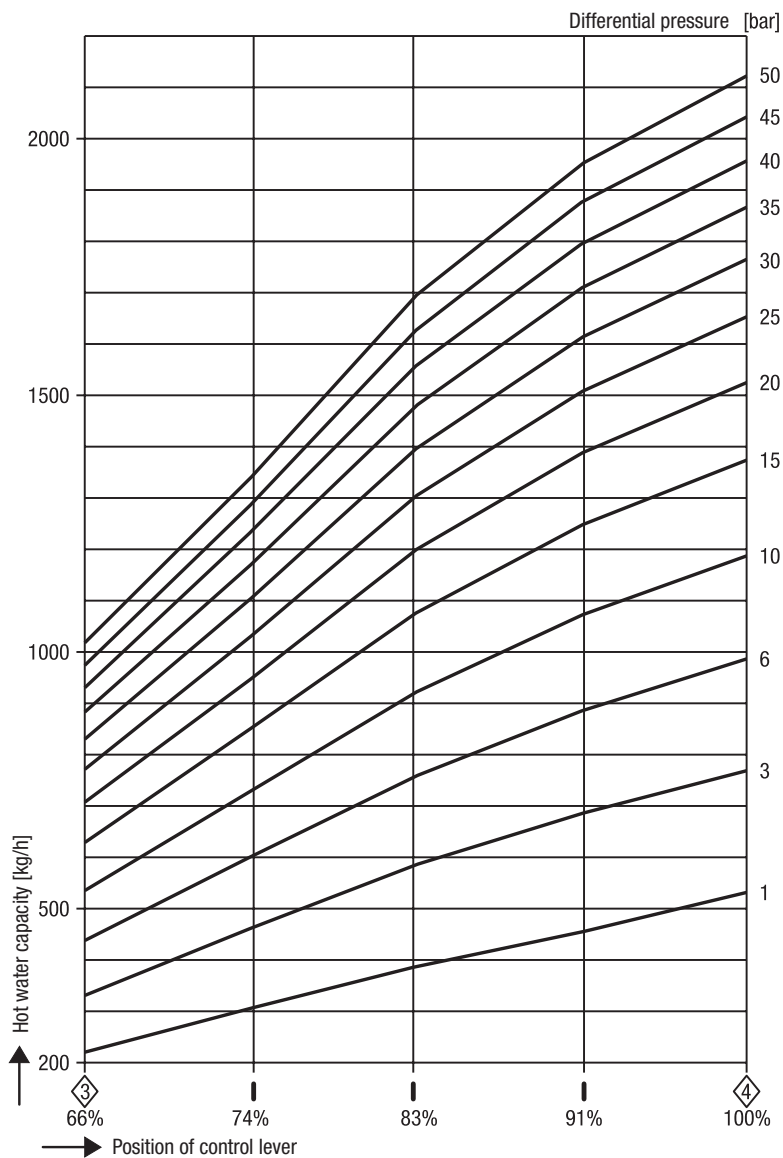


Fig. 7

Capacity chart for DN 40 and 50, capacity ranges at a glance

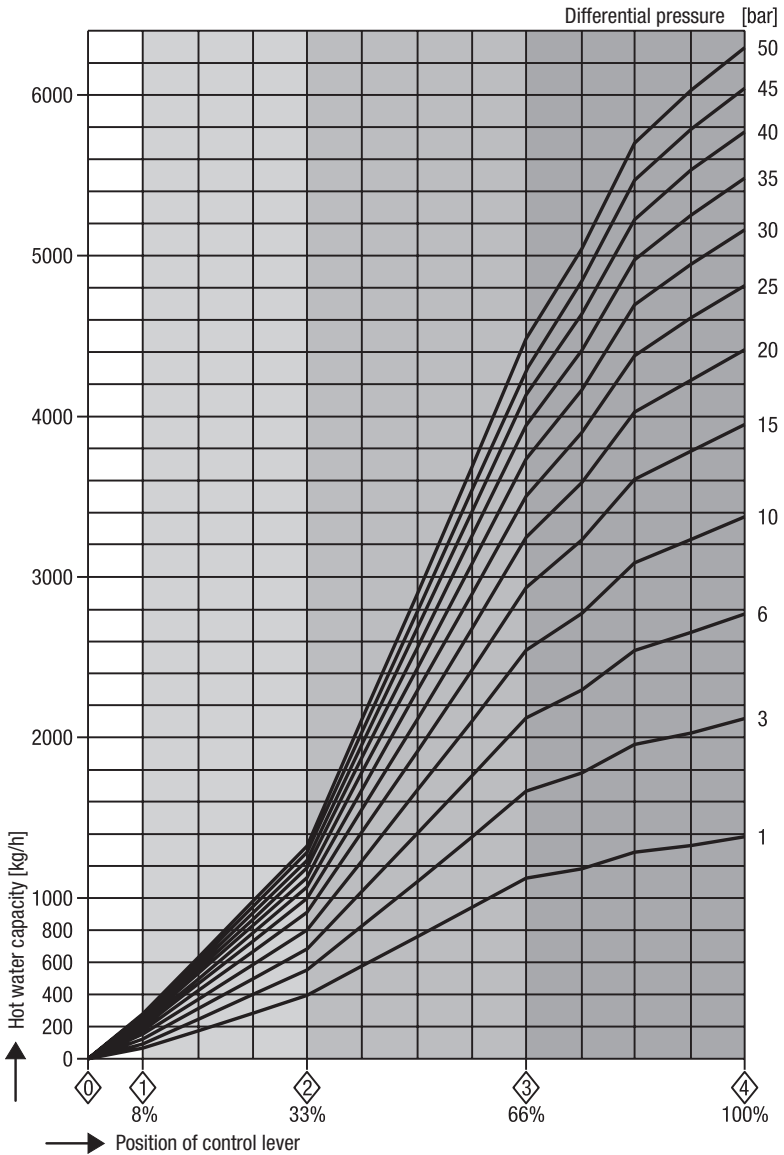


Fig. 8

Capacity chart for DN 40 and 50, capacity range up to 1340 kg/h

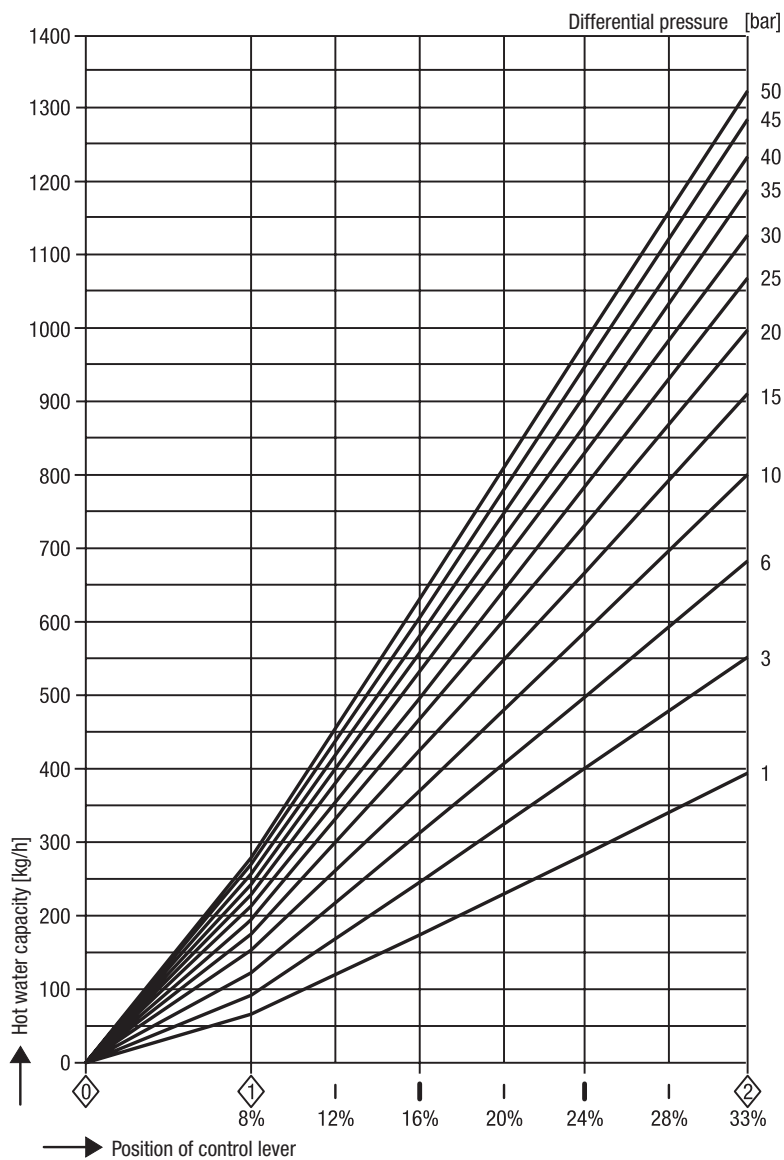


Fig. 9

Capacity chart for DN 40 and 50, capacity range up to 4500 kg/h

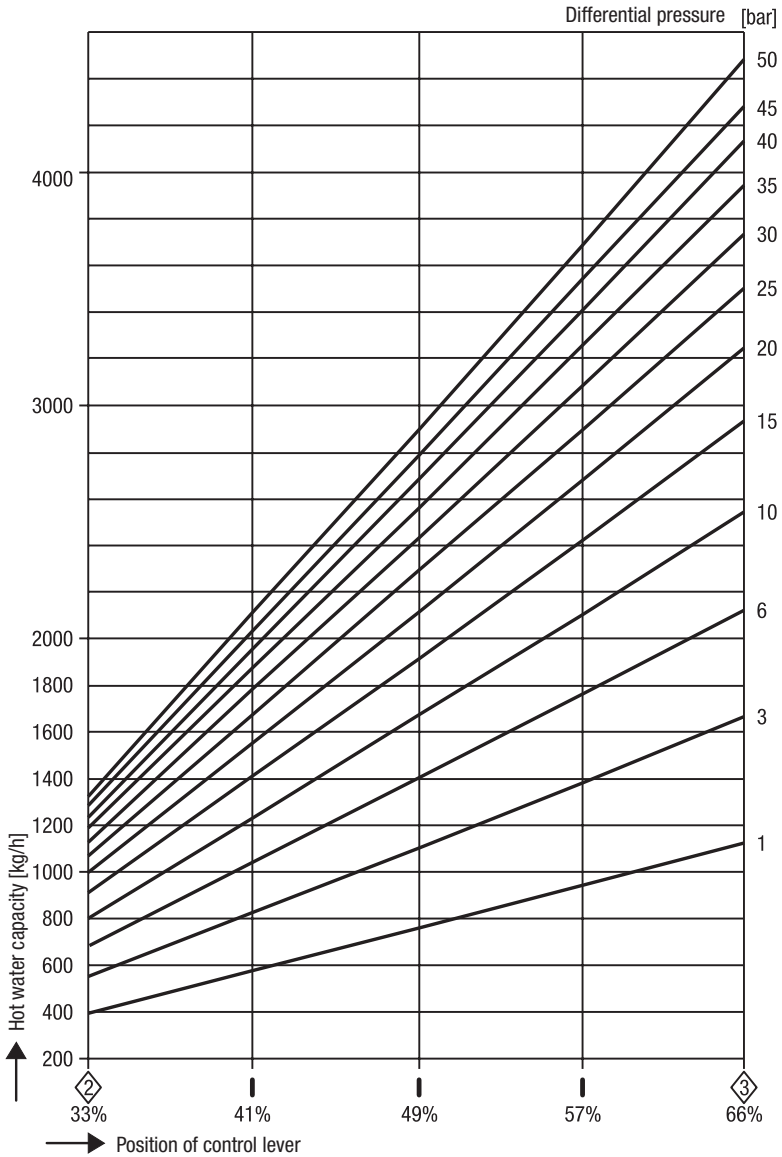


Fig. 10

Capacity chart for DN 40 and 50, capacity range up to 6300 kg/h

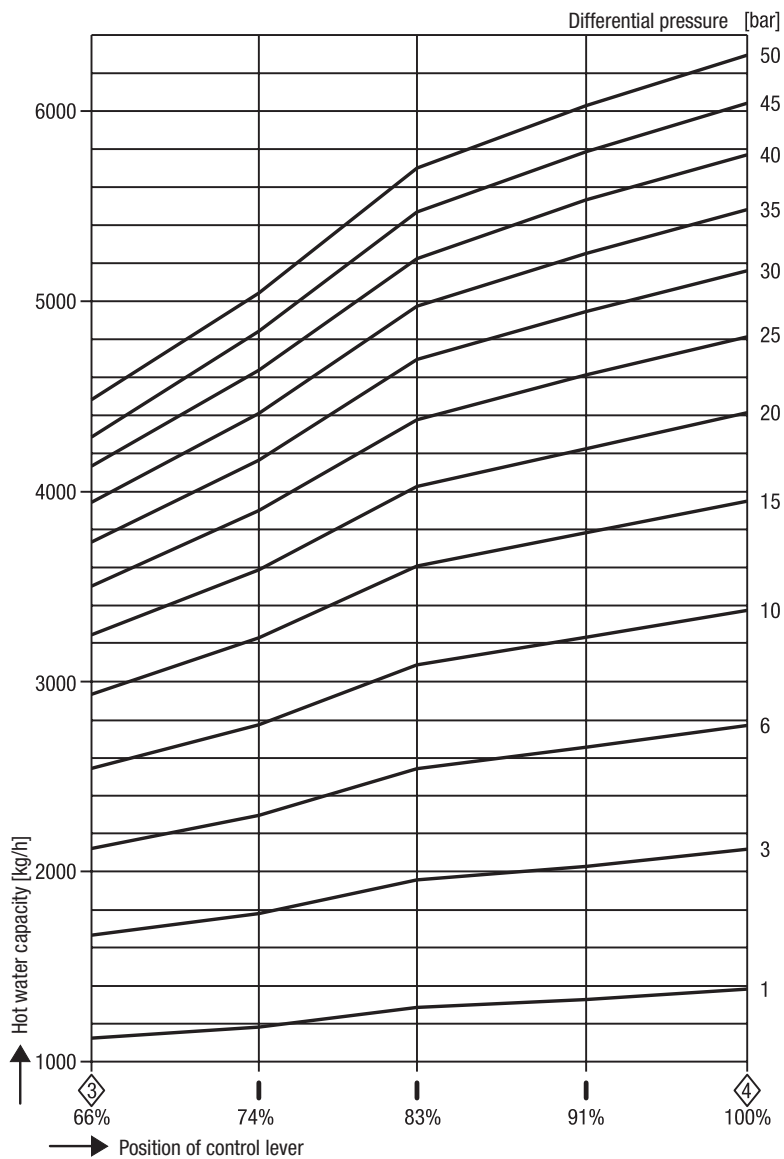


Fig. 11

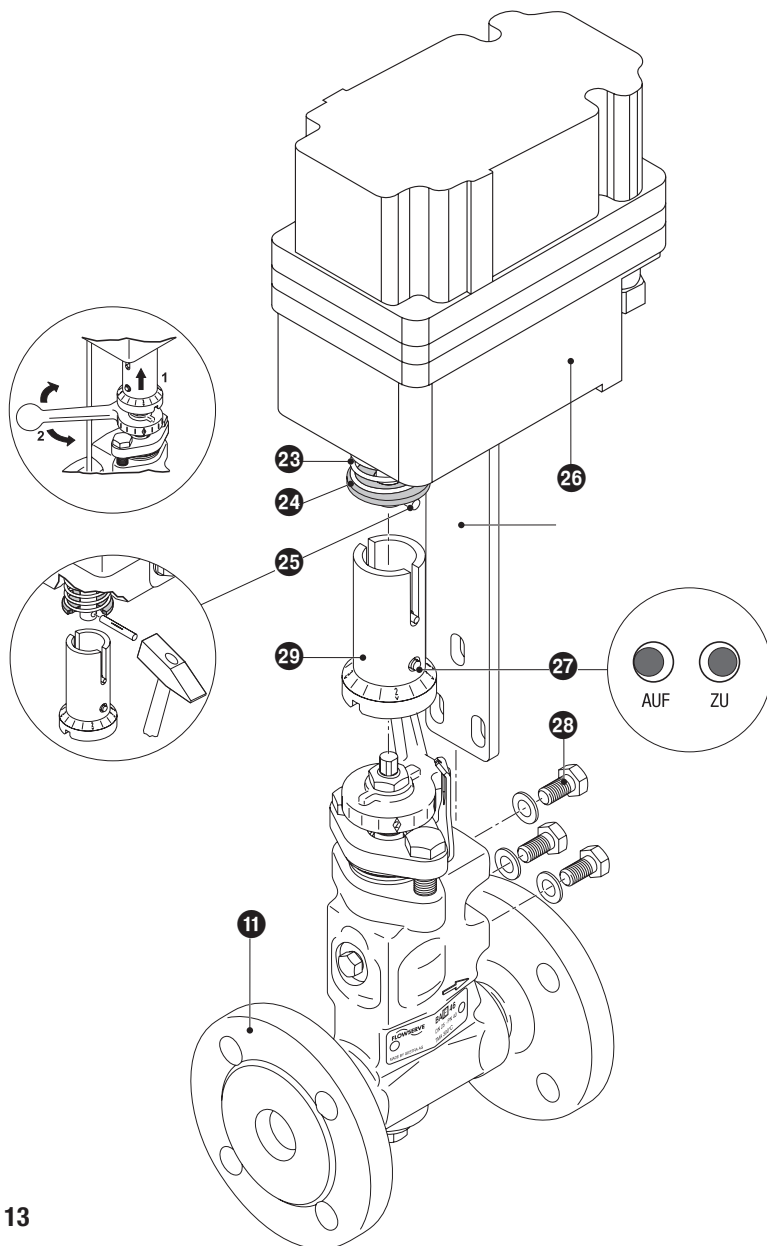


Fig. 13

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 GasketA 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

Installation

BA 46, BA 47, BAE 46..., BAE 47...

When installing the continuous blowdown valve make sure that the flow arrow matches the flow direction. The blowdown take-off point must be located **below the low level mark** and close to the steam outlet of the steam boiler. The continuous blowdown valve can be installed in horizontal and vertical pipes. The continuous blowdown valve is supplied ready for installation and without or with an actuator mounted. Before commissioning read the technical documentation provided by the manufacturer of the actuator and store the document together with the installation manual "BA 46, BA 47, BAE 46..., BAE 47..." in a sheltered place. The continuous blowdown valve is delivered with a sampling valve (not installed). Attach the sampling valve only to the correct connection of the continuous blowdown valve, following the rules of the state of the technical art! Before commissioning read the technical documentation provided by the manufacturer of the sampling valve and store the document together with the installation manual "BA 46, BA 47, BAE 46..., BAE 47..." in a sheltered place.



Attention

- Make sure that the inclination of the actuator does not exceed 90 ° when installed!

Flanged design

1. Observe position of installation. The control lever ② must be free to move!
2. Observe direction of flow. The arrow indicating the flow direction is on the valve body.
3. Consider space required for servicing the equipment. When the continuous blowdown valve is installed a minimum space of at least 180 mm is required for removing the equipment or for the subsequent installation of the actuator!
4. Remove plastic plugs. They are only used as transit protection.
5. Clean seating surfaces of both flange faces.
6. Install the continuous blowdown valve.

Butt-weld design

1. Observe position of installation. The control lever ② must be free to move!
2. Observe direction of flow. The arrow indicating the flow direction is on the valve body.
3. Consider space required for servicing the equipment. When the continuous blowdown valve is installed a minimum space of at least 180 mm is required for removing the equipment or for the subsequent installation of the actuator!
4. Remove plastic plugs. They are only used as transit protection.
5. Clean butt-weld ends.
6. Arc-weld trap only manually (welding processes 111 and 141 in accordance with ISO 4063) or use gas welding process (welding process 3 in accordance with ISO 4063).

Socket-weld design

1. Observe position of installation. The control lever ② must be free to move!
2. Observe direction of flow. The arrow indicating the flow direction is on the valve body.
3. Consider space required for servicing the equipment. When the continuous blowdown valve is installed a minimum space of at least 180 mm is required for removing the equipment or for the subsequent installation of the actuator!
4. Remove plastic plugs. They are only used as transit protection.
5. Clean socket-weld ends.
6. Arc-weld trap only manually (welding processes 111 and 141 in accordance with ISO 4063) or use gas welding process (welding process 3 in accordance with ISO 4063).

Installation - continued -



Attention

- Only qualified welders certified e. g. according to EN 287-1 may weld the continuous blowdown valve into pressurised lines.

Heat treatment of welds

After welding the continuous blowdown valve in place a heat treatment of the welds may be required (stress-relief annealing to DIN EN 10052).

The heat treatment must be restricted to the immediate area of the weld.

The internals of the continuous blowdown valve need **not** be removed before the heat treatment.

Reposition control lever by 180° (if position of installation of BA 46 or BA 47 is unfavourable)

If the position of installation is unfavourable (flow from right to left), it may be necessary to reposition the control lever by 180° so that the scale plate can be seen.

1. Take heed of danger note on page 5!
2. Unscrew the hexagon nut 20 and detach the control lever 21 with the aid of the pulling device.
3. Undo stuffing box screws 1, remove the stuffing box gland 3 and scale plate 2. Turn scale plate by 180° and put it back in place.
4. Mount stuffing box gland 3 and screw in stuffing box 1.
5. Screw out nozzle stem 18 by half a turn and tighten stuffing box screws 1.
6. Turn nozzle stem 18 into the closed position, applying a torque of **7 Nm**. Put control lever 21 in place and align scale 19 with the scale plate 2 such that the diamond-shaped marker "0" is in the middle of the scale plate.
7. Screw hexagon nut 20 onto the threaded part of the nozzle stem 18 and tighten while holding the control lever.

Please refer to the table "Torques required for tightening".

Install sampling valve (if desired)

1. Unscrew sealing plug 15 and remove gasket 14.
2. Observe installation instructions of the sampling valve.
2. Install sample valve in compliance with the accredited state of the technical art.

Electrical connection



Danger

Danger of bruising! During operation moving internals can pinch one's hands or fingers, causing severe injuries. Do not touch moving parts. The continuous blowdown valves BAE 46..., BAE 47... are remote-controlled and can open and close abruptly.

The terminal strips of the actuator EF... are live during operation. This presents the danger of electric shock!

Cut off power supply to the equipment before mounting or removing the equipment!

Continuous blowdown valves BAE 46..., BAE 47... with actuator

Apart from the positions OPEN and CLOSED you can select an OPERATING POSITION for the actuators **EF 0.7..** and **EF 10..** The OPERATING POSITION allows the continuous discharge of a defined amount of boiler water. The OPERATING POSITION can be adjusted in the actuator by means of a switching cam. For the adjustment follow the instructions given in the attached installation manual for the Actuator EF... The actuators **EF 10-1** and **EF 0.7-1** have a feedback potentiometer 0 - 1000 ohm. For the adjustment follow the instructions given in the attached installation manual for the actuator EF... The electrical connection of the actuator EF... must be established as specified in the attached installation manual "Actuator EF ...".

Factory settings for BAE 46..., BAE 47...

The default settings of the actuators **EF 0.7** and **EF 10** are: CLOSED (scale position "0"), OPERATING POSITION (scale position "1") and "OPEN" (scale position "4"). **Fig. 4, Fig. 8**

The OPERATING POSITION allows the continuous discharge of a defined amount of boiler water.

The OPERATING POSITION can be adjusted in the actuator by means of a switching cam.

For more information on the adjustment refer to the installation manual for the Actuator EF...

The default settings of the actuators **EF 10-1** and **EF 0.7-1** are: CLOSED (scale position "0") and OPEN (scale position "4"). The default factory setting of the feedback potentiometer is $50 \Omega \pm 5 \Omega$ for scale position "0" and $940 \Omega \pm 5 \Omega$ for scale position "4".

Commissioning procedure



Danger

Danger of burns! The control lever of the continuous blowdown valve and the coupling of the actuator are hot during operation. Touching the control lever and the coupling presents the risk of severe burns to hands and arms.

Always wear thermally insulated and heat resistant safety gloves when operating the valves.

BA 46, BA 47, BAE 46..., BAE 47...

Make sure that the flanged connections of the BA 46, BA 47, BAE 46..., BAE 47...are tightly bolted together and leakproof. The stuffing box gland **3** must be re-tightened if leaks occur.



Attention

- As the stuffing box screws are tightened the break-out force and the frictional forces of the nozzle stem are increased!
- The break-away force and the friction force of the nozzle stem must not exceed the maximum operating force of the actuator.!
- Excessive fastening of the stuffing box screws impairs the correct functioning of the continuous blowdown valve and can cause jamming of the nozzle stem.
- If the nozzle stem is blocked, the continuous blowdown valve can no longer open, regulate or close.

Calculating the amount of boiler blowdown

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 [$\mu\text{s}/\text{cm}$]

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

Example

Differential pressure: 15 bar

Nominal size of continuous blowdown valve: DN 20

Boiler capacity: Q = 10000 kg/h

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

Admissible conductivity of boiler water: K = 3000 $\mu\text{s}/\text{cm}$

Boiler water to be discharged: A \approx 345 kg/h

of which approx. 10 % by means of

continuous blowdown: \approx 35 kg/h

Boiler blowdown: A₁ \approx 310 kg/h

Set control lever according to scale to an opening of 41 %. Fig. 6

Continuous blowdown valves BA 46, BA 47 without actuator

The amount of boiler blowdown dictated by the operating conditions can be adjusted by means of the control lever on the continuous blowdown valve. For more information please refer to the capacity charts on pages 17 to 24.

Continuous blowdown valves BAE 46..., BAE 47... with actuator

Use the control equipment KS 90, LRR 1-40, LRR 1-5x to set the required TDS level of the boiler water. Please compare the resulting valve positions (see scale on control lever) with the values indicated in the capacity charts on pages 17 to 24.

Operation



Danger

Danger of burns! The control lever of the continuous blowdown valve and the coupling of the actuator are hot during operation. Touching the manual lever and the coupling presents the risk of severe burns to hands and arms.

Always wear thermally insulated and heat resistant safety gloves when operating the valves.

BA 46, BA 47, BAE 46..., BAE 47...

Make sure that the flanged connections of the BA 46, BA 47, BAE 46..., BAE 47...are tightly bolted together and leakproof. The stuffing box gland **3** must be re-tightened if leaks occur.



Attention

- As the stuffing box screws are tightened the break-out force and the frictional forces of the nozzle stem are increased!
- The break-away force and the friction force of the nozzle stem must not exceed the maximum operating force of the actuator.!
- Excessive fastening of the stuffing box screws impairs the correct functioning of the continuous blowdown valve and can cause jamming of the nozzle stem.
- If the nozzle stem is blocked, the continuous blowdown valve can no longer open, regulate or close.

Purging

Completely open the blowdown valve once a day for a short period of time. For this purging process take the operating limits of the plant into consideration.

Emergency operation

BAE 46..., BAE 47...

1. Cut off power supply to actuator and lift coupling **29** manually by approx. 1 cm. **Fig. 13**
2. Set the control lever **21** to the desired flowrate by using the scale **19**. **Fig. 13**

Maintenance

BA 46, BA 47, BAE 46..., BAE 47...

The continuous blowdown valves BA 46, BA 47, BAE 46... and BAE 47... do not require any special maintenance. Depending on the quality of the boiler water it might be necessary to service the valve every one or two years.

Changing packing and internals of BA 46, BA 47

1. Observe the danger note on page 5!
2. Unscrew the hexagon nut **20** and detach the control lever **21** with the aid of the pulling device.
3. Undo stuffing box screws **1**, remove stuffing box gland **3**, scale plate **2**, disk springs **4** and spring sleeve **5**.
4. Unscrew nozzle stem **18** and pull it out of the valve body.
5. Unscrew locking screw **16** and remove gasket **17**.
6. Unscrew sealing plug **15** and remove gasket **14**.
7. Use a brass drift punch $d = 14.8 \text{ mm}$ to force out the internals **6** to **10**. **Fig. 14**
8. Clean and, if necessary, exchange valve body **11** and internals.
9. Apply glue "Loctite 620" to seat bushing **10**® and put it in place. Insert stage bushing **9**.
10. Align wearing bushing **8** in such a way that the groove is on the longitudinal axis of the locking screw **16**.
11. Screw in the locking screw **16** together with gasket **17** and tighten it when cold.
12. Align wearing bushing **7** in such a way that the groove is on the longitudinal axis of the locking screw **16**. **Fig. 12**
13. Insert new wiper rings and packing rings **6** as shown in **Fig. 12**
14. Apply lubricant WINIX 2010 to the thread and the sealing surface of the nozzle stem.
15. Insert nozzle stem **18** and screw it into the guide sleeve by two turns.
16. Insert spring sleeve **5** and disk springs **4** in the shown sequence.
17. Put scale plate **2** and stuffing box gland **3** in place and tighten stuffing box screws **1** slightly.
18. Screw out nozzle stem **18** by half a turn and tighten stuffing box screws **1**.
19. Turn nozzle stem **18** into the closed position, applying a torque of **7 Nm**. Put control lever **21** in place and align scale **19** with the scale plate **2** such that the diamond-shaped marker "0" is in the middle of the scale plate
20. Screw hexagon nut **20** onto the threaded part of the nozzle stem and tighten while holding the control lever.
21. Screw sealing plug **15** together with gasket **14** into the valve body and tighten or screw in the sampling valve with the gasket according to the instructions given by the manufacturer.

Please refer to the table "Torques required for tightening".

BAE 46..., BAE 47... Changing packing and internals

1. Observe the danger note on page 5!
2. Cut off power supply to the actuator **22**.
3. Use hexagon screws **28** and remove actuator and coupling **29**.
4. Unscrew the hexagon nut **20** and detach the control lever **21** with the aid of the pulling device.
5. Undo stuffing box screws **1**, remove stuffing box gland **3**, scale plate **2**, disk springs **4** and spring sleeve **5**.
6. Unscrew nozzle stem **18** and pull it out of the valve body.
7. Unscrew locking screw **16** and remove gasket **17**.
8. Unscrewed sealing plug **15** and remove gasket **14**.
9. Use a brass drift punch $d = 14.8 \text{ mm}$ to force out the internals **6** to **10**. **Fig. 14**
10. Clean and, if necessary, exchange valve body **11** and internals.
11. Apply glue "Loctite 620" to seat bushing **10** [®] and put it in place. Insert stage bushing **9**.
12. Align wearing bushing **8** in such a way that the groove is on the longitudinal axis of the locking screw **16**.
13. Screw in the locking screw **16** together with gasket **17** and tighten it when cold.
14. Align wearing bushing **7** in such a way that the groove is on the longitudinal axis of the locking screw **16**. **Fig. 12**
15. Insert new wiper rings and packing rings **6** as shown in **Fig. 12**
16. Apply lubricant WINIX 2010 to the thread and the sealing surface of the nozzle stem.
17. Insert nozzle stem **18** and screw it into the guide sleeve by two turns.
18. Insert spring sleeve **5** and disk springs **4** in the shown sequence.
19. Put scale plate **2** and stuffing box gland **3** in place and tighten stuffing box screws **1** slightly.
20. Screw out nozzle stem **18** by half a turn and tighten stuffing box screws **1**.
21. Turn nozzle stem **18** into the closed position, applying a torque of **7 Nm**. Put control lever **21** in place and align scale **19** with the scale plate **2** such that the diamond-shaped marker "0" is in the middle of the scale plate
22. Screw hexagon nut **20** onto the threaded part of the nozzle stem and tighten while holding the control lever.
23. Screw sealing plug **15** together with gasket **14** into the valve body and tighten or screw in the sampling valve with the gasket according to the instructions given by the manufacturer.
24. Put coupling **29** onto control lever **21** and fix the mounting bracket **26** and actuator **22** to the valve body using the hexagon screws **28**. Adjust control lever until the coupling makes contact.

Maintenance - continued -

BAE 46..., BAE 47... Changing packing and internals - continued -

25. Align the actuator, making sure that the coupling **29** is level on the control lever.
Fasten hexagon screws **23**.
26. Adjust the switching cams for OPEN, CLOSED and OPERATING POSITION or, if fitted, the feedback potentiometer according to the attached installation manual Actuators EF... .
27. Set the switching cam for CLOSED in the actuator such that the torque checking pin **27** is to the right but does not touch the checking hole. The closing torque in this position is 10 Nm. **Fig. 13**

Please refer to the table "Torques required for tightening".

Tightening torques

Item	Continuous blowdown valves	Torque for tightening [Nm]	
		DN 15-32:	DN 40, 50
1	BA 46, BA 47, BAE 46..., BAE 47...	7	11
15	BA 46, BA 47, BAE 46..., BAE 47...	130	
16	BA 46, BA 47, BAE 46..., BAE 47...	5	11
18	BA 46, BA 47, BAE 46..., BAE 47...	7	
20	BA 46, BA 47, BAE 46..., BAE 47...	20	
28	BAE 46..., BAE 47... DIN EN 10052	30	

All torques indicated in the table are based at a room temperature of 20 °C.

Tools

- Combination spanner A. F. 7 mm, DIN 3113, Form B
- Combination spanner A. F. 10 mm, DIN 3113, Form B
- Combination spanner A. F. 13 mm, DIN 3113, Form B
- Combination spanner A. F. 16 mm, DIN 3113, Form B
- Combination spanner A. F. 17 mm, DIN 3113, Form B
- Torque spanner (US: torque wrench) 1-12 Nm, ISO 6789
- Torque spanner (US: torque wrench) 8-40 Nm, ISO 6789
- Torque spanner (US: torque wrench) 80-400 Nm, ISO 6789
- Punch 14,8x220, CuZn (brass)
- Hammer 300g, DIN 1041
- Self-centering pulling device, size 0

Retrofitting

GESTRA continuous blowdown valves BA 46 and BA 47 can be retrofitted with an actuator EF.. (BAE 46..., BAE 47...).



Danger

Danger of bruising! During operation moving internal parts can pinch one's hands or fingers, causing severe injuries. Do not touch moving parts. The continuous blowdown valves BAE 46..., BAE 47... are remote-controlled and can open and close abruptly.

The terminal strips of the actuator EF.. are live during operation. This presents the danger of electric shock!

Cut off power supply to the equipment before mounting or removing the equipment!

Mounting the actuator

1. Observe the installation instructions of the actuator manufacturer.
2. Attach compression spring 23, thrust washer 24 and grooved dowel pin 25 to actuator 22 EF.. .
Fig. 13
3. Put coupling 29 onto control lever 21 and fix the mounting bracket 26 and actuator 22 to the valve body using the hexagon screws 28. Adjust control lever until the coupling makes contact.
4. Align the actuator, making sure that the coupling 29 is level on the control lever. Fasten hexagon screws 28 as specified in the table below **Tightening torques**.
5. Adjust the switching cams for OPEN, CLOSED and OPERATING POSITION or, if fitted, the feedback potentiometer according to the attached installation manual Actuators EF.. .
6. Set the switching cam for CLOSED in the actuator such that the torque checking pin 27 is to the right but does not touch the checking hole. The closing torque in this position is 10 Nm. **Fig. 13**
7. Remove the ATEX marking 13 from the valve body 11. BAE 46..., BAE 47... must not be used in potentially explosive areas.

Tightening torques

Item	Continuous blowdown valves	Torque for tightening [Nm]
28	BAE 46..., BAE 47...	30

All torques indicated in the table are based at a room temperature of 20 °C.

Tools

- Combination spanner A. F. 13 mm, DIN 3113, Form B
- Torque spanner (US: torque wrench) 1-12 Nm, ISO 6789
- Hammer 300g, DIN 1041

Spare Parts

Spare parts list

Item	Designation	Stock code #	Stock code #
		BA 46 BA 47	BAE 46... BAE 47...
<p>6 14</p> <p>17</p>	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
<p>6 14</p> <p>17</p>	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
<p>6 7</p> <p>8 9</p> <p>10 14</p> <p>17 18</p>	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
<p>6 7</p> <p>8 9</p> <p>10 14</p> <p>17 18</p>	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
22	Actuator EF 0.7 , 230 V, 50/60 Hz (for BAE 46-3)		336806
22	Actuator EF 0.7-1 , 230 V, 50/60 Hz (for BAE 46-3-1)		336807
22	Actuator EF 10 , 230 V, 50/60 Hz (for BAE 46, BAE 47)		336808
22	Actuator EF 10-1 , 230 V, 50/60 Hz (for BAE 4...-1)		336813

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

Parts for retrofitting

List of parts for retrofitting

Item	Designation	Stock code #	
		BA 46 BA 47	BAE 46... BAE 47...
22	1 actuator EF 0.7 , 230 V, 50/60 Hz, 1 mounting bracket, 1 assembly set for coupling, 3 hexagon screws (for BAE 46-3)	336810	
23	1 actuator EF 0.7 , 230 V, 50/60 Hz, 1 mounting bracket, 1 assembly set for coupling, 3 hexagon screws (for BAE 46-3-1)	336811	
24	1 actuator EF 10 , 230 V, 50/60 Hz, 1 mounting bracket, 1 assembly set for coupling, 3 hexagon screws (for BAE 46..., BAE 47...)	336812	
25	1 actuator EF 10-1 , 230 V, 50/60 Hz, 1 mounting bracket, 1 assembly set for coupling, 3 hexagon screws (for BAE 4...-1)	336813	
26	1 mounting bracket, 1 assembly set for coupling, 3 hexagon screws (without actuator 22)	335769	

Decommissioning



Danger

Risk of severe burns and scalds to the whole body!

Before loosening flanged connections, stuffing box unions or sealing plugs make sure that all connected lines are depressurized (zero bar) and cooled down to room temperature (20 °C).

The terminal strips of the actuator EF... are live during operation. This presents the danger of electric shock!

Cut off power supply to the equipment before mounting or removing the equipment!

Disposal

Dismantle the equipment and separate the waste materials (see **Technical Data**).

For the disposal of the equipment observe the pertinent legal regulations concerning waste disposal.



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