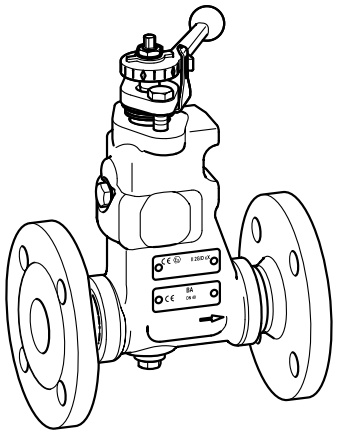
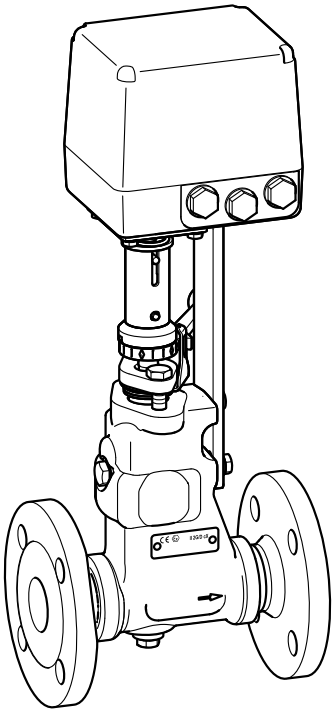
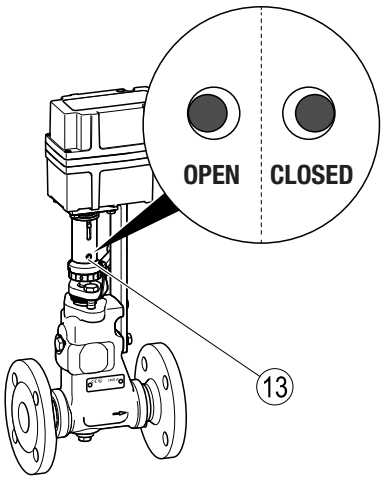


BA 46, BA 47



BAE 46..., BA 47...



Continuous Blowdown Valve Reaktomat

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

BA 46/BAE 46..., PN 40/CL 150/300, DN 15-DN 50
BA 47/BAE 47..., PN 63/CL 600, DN 25, 40, 50

Description

Continuous blowdown valves are used for removing boiler blowdown from steam generating units:

- Continuous blowdown valve BA 46 (manually operated)
- Continuous blowdown valve BA 47 (manually operated)
- Continuous blowdown valve BAE 46... (with electric actuator)
- Continuous blowdown valve BAE 47... (with electric actuator)

The equipment may only be used within the admissible pressure and temperature limits, with due consideration of chemical and corrosive influences. The equipment comes with a sampling valve as standard.

Function

BA 46 and BA 47 equipment models are designed for manual operation. The required flowrate is calculated using a formula and is read in the flow diagrams. The flowrate is set manually using the control lever.

In combination with an LRR 1-... conductivity controller and LRG 1...-... conductivity electrode or LRGT 1...-... conductivity transmitter, BAE units provide an automatic conductivity regulation system (continuous blowdown control).

Control lever positions:

- Position “0” (CLOSED): no blowdown water is removed
- Operating position: The set quantity of blowdown water is continuously removed.
- Position “1”: valve 8 % open
- Position “2”: valve 33 % open
- Position “3”: valve 66 % open
- Position “4” (OPEN): valve 100% open

The operating position can be infinitely adjusted using the control lever or actuator. The set valve position is displayed by the dial on the control lever scale.

In equipment models with actuator (BAE), the “OPEN” and “CLOSED” positions are indicated by the control pin (13).

End connections

BA 46, BAE 46...

- Flange PN 40, B1 (EN 1092-1)
- Flange CLASS 150, RF (ASME B 16.5)
- Flange CLASS 150, RFS (ASME B 16.5)
- Flange CLASS 300, RF (ASME B 16.5)
- Flange CLASS 300, RFS (ASME B 16.5)
- Socket-weld end DIN EN 12760/ASME B 16.11 CLASS 3000
- Butt-weld end via transition pieces EN 12627, welded joint geometry ISO 9692-1 code no. 1.3 (30° chamfer)
- Butt-weld end via transition pieces Sched 40 (ASME B 16.25, ASME B 36.10)

BA 47, BAE 47...

- Flange PN 63, B2 (EN 1092-1)
- Flange CLASS 600 RF (ASME B16.5)
- Flange CLASS 600 RFS (ASME B16.5)
- Socket-weld end DIN EN 12760/ASME B 16.11 CLASS 3000
- Butt-weld end via transition pieces EN 12627, welded joint geometry ISO 9692-1 code no. 1.3 (30° chamfer)
- Butt-weld end via transition pieces Sched 80 xs (ASME B 16.25, ASME B 36.10)

Optional extras

- Actuator for subsequently converting a BA 46 or BA 47 to a BAE 46... or BAE 47...
  - ARIS EF 0.7 (actuator with two travel limit switches and a switch cam), for BAE 46-3
  - ARIS EF 0.7-1 (actuator with two travel limit switches, feedback potentiometer and switch cam), for BAE 46-3-1
  - ARIS EF 10 (actuator with two travel limit switches and a switch cam), for BAE 46 and BAE 47
  - ARIS EF 10-1 (actuator with two travel limit switches, feedback potentiometer and switch cam), for BAE 46-1 and BAE 47-1
- Without sampling valve
- Control units, such as LRR 1- ..., for example

Materials

Component	DIN/EN	ASTM/ASME
Body[1)]	1.0460	SA 105
Stuffing box gland[1)]	1.0570	-
Stuffing box screws[1)]	A2-70	-
Stuffing box	PTFE yarn	PTFE yarn
Sealing plug[1)]	1.7225	SA 193 B7
Sealing ring	1.4301	-
Seat, stepped bushings	1.4104	430F
Disc springs	1.8159	-
Nozzle needle[1)]	1.4021	-
Locking screw	A2-70	A 192 CL 2B-BB
Welding neck flange/butt-weld end via transition pieces/socket-weld end[1)]	1.0460	SA 105

[1)] Pressure-bearing components

Pressure and temperature ratings of BA 46 and BAE 46...

End connection		Flange PN 40 and EN butt-weld ends			
Pressure[1]) p	[bar]	40.0	37.1	33.3	27.6
Temperature[1]) T	[°C]	20	100	200	300

[1]) Ratings for strength to EN 1092-1
Operating data: Maximum pressure 31 [bar] at boiling temperature 237.5 [°C]

End connection		Flange CLASS 150			
Pressure[1]) p	[bar]	19.6	17.7	13.8	10.2
Temperature[1]) T	[°C]	20	100	200	300

[1]) Ratings for strength to ASME B16.5

End connection		Flange CLASS 300, ASME socket-weld ends and butt-weld ends			
Pressure[1]) p	[bar]	51.1	46.6	43.8	39.8
Temperature[1]) T	[°C]	20	100	200	300

[1]) Ratings for strength to ASME B16.34
Operating data: Maximum pressure 41.5 [bar] at boiling temperature 254 [°C].

Pressure and temperature ratings of BA 47 and BAE 47...

End connection		Flange PN 63, EN butt-weld ends			
Pressure[1]) p	[bar]	63.0	58.5	52.5	43.5
Temperature[1]) T	[°C]	20	100	200	300

[1]) Ratings for strength to EN 1092-1
Operating data: Maximum pressure 46.7 [bar] at boiling temperature 261 [°C]

End connection		Flange CLASS 600, ASME socket-weld ends and butt-weld ends			
Pressure[1]) p	[bar]	102.1	93.2	87.6	79.6
Temperature[1]) T	[°C]	20	100	200	300

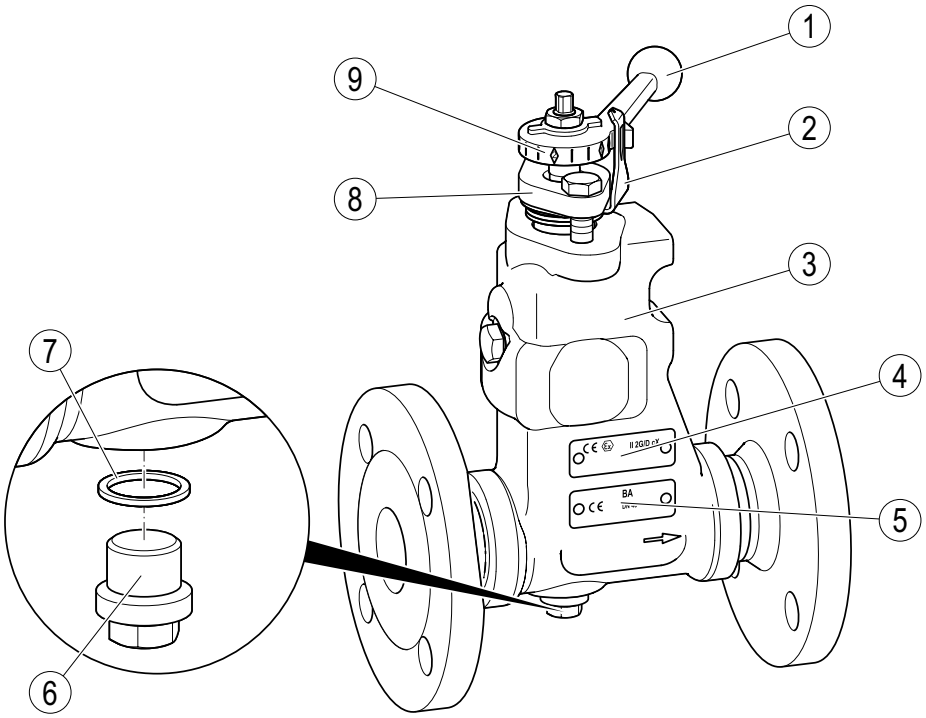
[1]) Ratings for strength to ASME B16.5
Operating data: Maximum pressure 55 [bar] at boiling temperature 271 [°C]

Technical data for BAE actuator

		DN ≤ 25, EF 0.7 (-1)	DN ≤ 50, EF 10 (-1)
Dimensions	Width [mm]	86	86
	Height [mm]	133	133
	Length [mm]	153	153
Voltage 50/60 Hz		230 V	230 V
Optional	24 V DC	x	x
	120 V 50/60 Hz	x	x
	3Ph 400 V 50/60 Hz	-	-
Protection rating IP		65	65
Optional up to IP		67	67
Power consumption		4 VA	4 VA
Torque		15 Nm	30 Nm
Ambient temperature		–15/+60 °C	–15/+60 °C
Ex version possible		Yes	Yes
Feedback	POT/resolution in ° for EF..-1 only	320°	320°
	4-20 mA possible	Yes	Yes

Please refer to the manufacturer's operating manual for further information.

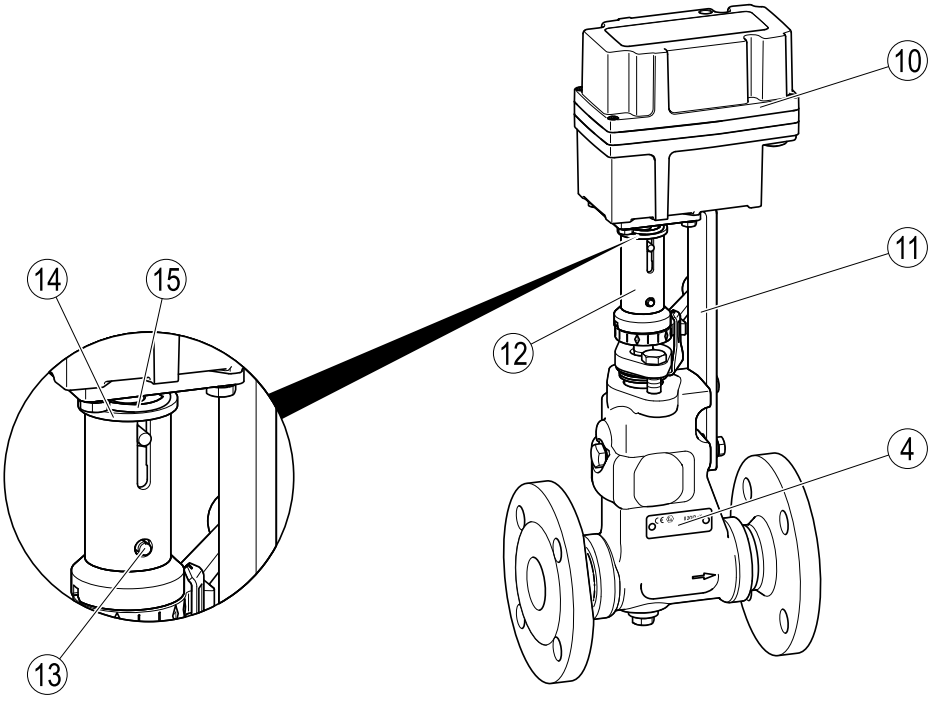
Equipment overview, BA



No.	Designation
1	Control lever
2	Dial
3	Body
4	ATEX label (BA only)
5	Name plate

No.	Designation
6	Sealing plug
7	Sealing ring
8	Stuffing box gland
9	Scale

With BAE electric actuator



No.	Designation
4	Name plate
10	Actuator
11	Bracket
12	Coupling

No.	Designation
13	Control pin
14	Thrust ring
15	Compression spring

The following actuators are available as standard:

- EF 10
- EF 10-1
- EF 0.7
- EF 0.7-1

Other actuators are available on request.

In these models, the opening signal can be sent by various controllers. The actuator and control system are described in their own separate installation & operating manuals.

Dimensions and weights

BA 46 and BAE 46..., flange PN 40 and ASME CLASS 150 and CLASS 300

DN		[mm]	15	20	25	32	40	50
		[in]	½	¾	1	1¼	1½	2
D (BAE only)		[mm]	154					
H1		[mm]	126	126	126	126	132	132
H2 (BA)		[mm]	172	172	172	172	213	213
H3 (BAE)		[mm]	385	385	385	385	425	425
L	PN 40, CLASS 150	[mm]	150	150	160	180	200	230
	CLASS 300		150	150	160	180	230	230
S1		[mm]	20					
S2 (BA)		[mm]	180					
S3 (BAE)			100					
Weight (BA)		[kg]	4.7	5.3	5.8	7.1	10.7	12.5
Weight (BAE)			8.8	9.4	9.9	11.2	14.8	16.6

BA 47 and BAE 47..., flange PN 63

DN	[mm]	25	40	50
	[in]	1	1½	2
D (BAE only)	[mm]	154		
H1	[mm]	126	132	132
H2 (BA)	[mm]	172	213	213
H3 (BAE)	[mm]	385	425	425
L	[mm]	190	220	250
S1	[mm]	20		
S2 (BA)	[mm]	180		
S3 (BAE)		100		
Weight (BA)	[kg]	7.1	10.7	12.5
Weight (BAE)		11.2	14.8	16.6

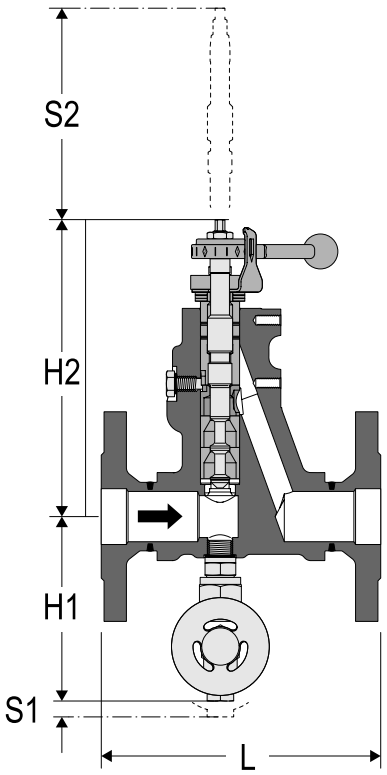
BA 47 and BAE 47..., flange CLASS 600

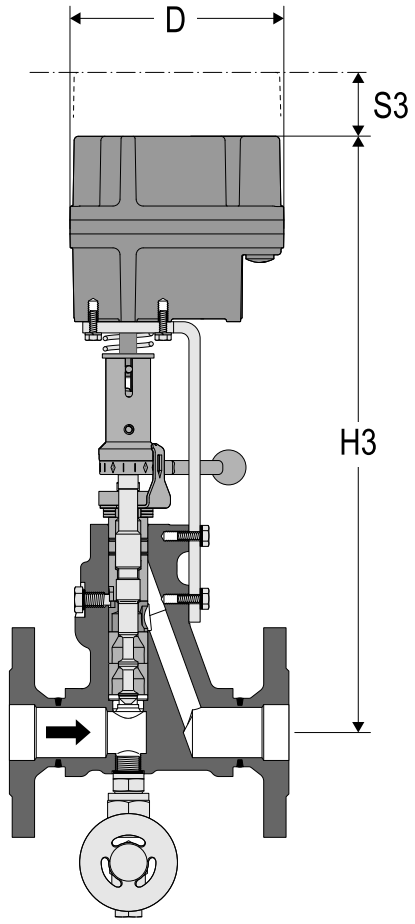
DN	[mm]	25	40	50
	[in]	1	1½	2
D (BAE only)	[mm]	154		
H1	[mm]	126	132	132
H2 (BA)	[mm]	172	213	213
H3 (BAE)	[mm]	385	425	425
L	[mm]	190	220	250
S1	[mm]	20		
S2 (BA)	[mm]	180		
S3 (BAE)		100		
Weight (BA)	[kg]	7.1	10.7	12.5
Weight (BAE)		11.2	14.8	16.6

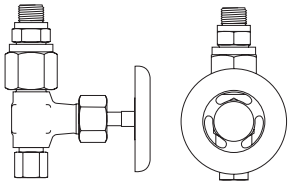
BA 46/BA 47 and BAE 46.../BAE 47..., butt-weld end

DN[1)]	[mm]	15	20	25	32	40	50
	[in]	½	¾	1	1¼	1½	2
D (BAE only)	[mm]	154					
H1	[mm]	126	126	126	126	132	132
H2 (BA)	[mm]	172	172	172	172	213	213
H3 (BAE)	[mm]	385	385	385	385	425	425
L	[mm]	200	200	200	200	250	250
S1	[mm]	20					
S2 (BA)	[mm]	180					
S3 (BAE)		100					
Weight (BA)	[kg]	4.1	4.7	4.7	5.4	8.9	10.2
Weight (BAE)		8.2	8.8	8.8	9.5	13.0	14.3

[1)] BA 47 and BAE 47... in DN 25, 40, 50 only







Sampling valve G 3/8 / Ermeto 8S

BA 46/BA 47 and BAE 46.../BAE 47..., socket-weld end

DN[1])	[mm]	15	20	25	32	40	50
	[in]	½	¾	1	1¼	1½	2
D (BAE only)	[mm]	154					
H1	[mm]	126	126	126	126	132	132
H2 (BA)	[mm]	172	172	172	172	213	213
H3 (BAE)	[mm]	385	385	385	385	425	425
L	[mm]	200	200	200	200	250	250
S1	[mm]	20					
S2 (BA)	[mm]	180					
S3 (BAE)		100					
Weight (BA)	[kg]	3.7	3.9	4.2	5.1	8.3	9.5
Weight (BAE)		7.8	8.0	8.3	9.2	12.4	13.6

[1]) BA 47 and BAE 47... in DN 25, 40, 50 only

Determining the blowdown rate

Calculate the correct blowdown rate using a formula and determine the required position of the control lever using the flow diagrams below.

For BAE models, the blowdown rate can be determined by measuring the conductivity of the blowdown water. You can find further information on this in the control system installation & operating manual.

A = (Q × S) / (K – S) whereby:

A = quantity of boiler water to be drained [kg/h]
Q = boiler capacity [kg/h]
S = feedwater conductivity [µs/cm]
K = admissible boiler water conductivity [µs/cm]

Example

Differential pressure: 15 bar with nominal size DN 20
Boiler capacity Q = 10,000 kg/h
Conductivity S = 100 µs/cm
Admissible conductivity K = 3,000 µs/cm

Quantity of boiler water to be drained

A = approx. 345 kg/h

The required blowdown rate A1 is the quantity of boiler water to be drained A minus 10 % for intermittent blowdown.

Continuous blowdown rate A1 = 310 kg/h

The required control lever position can be seen in the relevant flow diagram, with value A1.

■ Use the flow diagram in which the required blowdown rate is achieved at the stated differential pressure.

In the example shown here, you would use the flow diagram for DN 15 to DN 32 with a capacity range up to 1,020 kg/h.

■ Determine the intersection of the curve for the given differential pressure with the required flowrate.

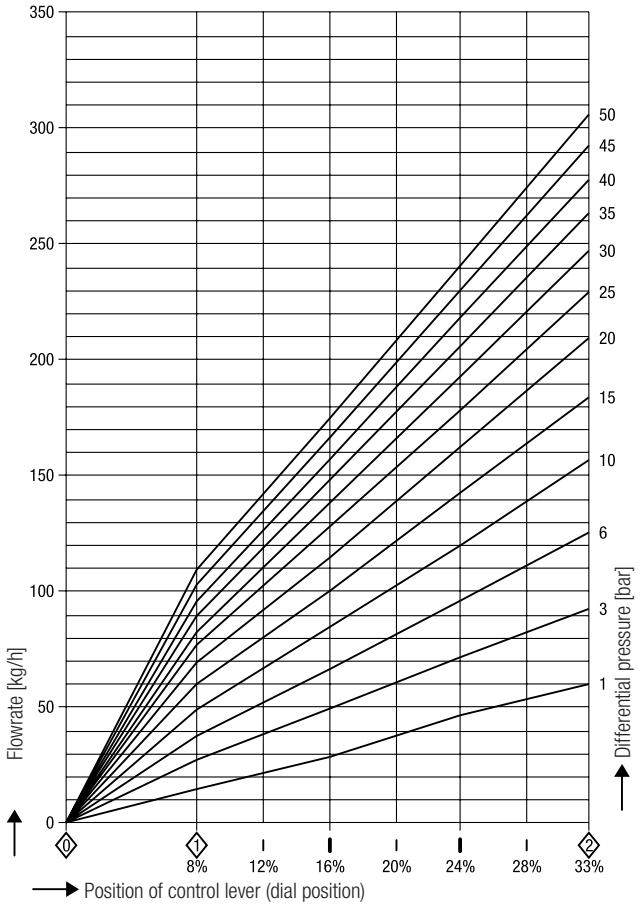
■ Drop a perpendicular on the axis of the control lever position.

In this example, the required control lever position is 41 %.

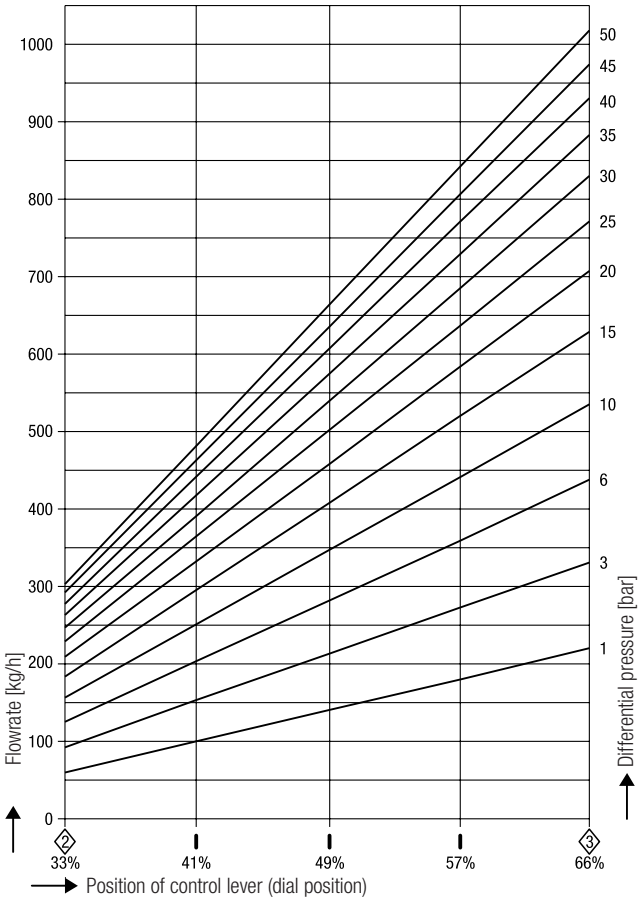
Flow diagrams

The possible flowrate as a function of the differential pressure is shown in the following diagrams.
To improve clarity, there are separate flow diagrams for DN 15 to DN 32 and for DN 40 and DN 50.

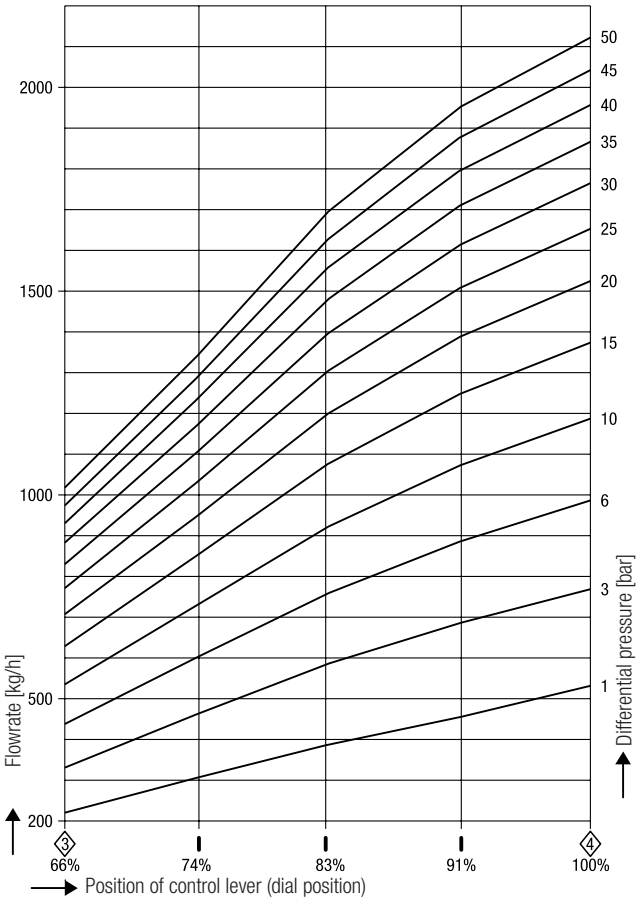
Flow diagram for DN 15 to DN 32, capacity range up to 310 kg/h



Flow diagram for DN 15 to DN 32, capacity range up to 1,020 kg/h



Flow diagram for DN 15 to DN 32, capacity range up to 2,120 kg/h

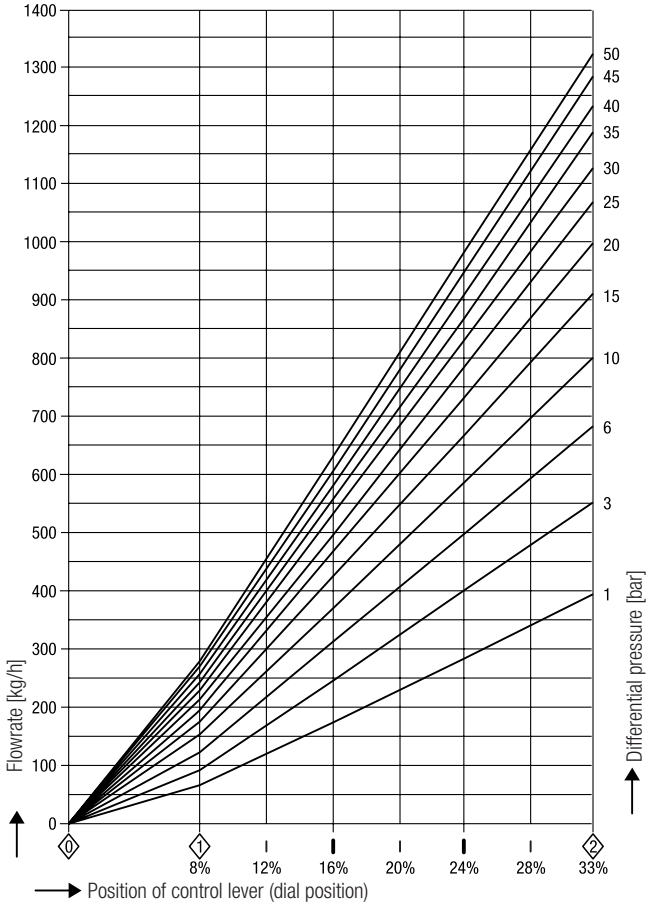


Flow characteristics

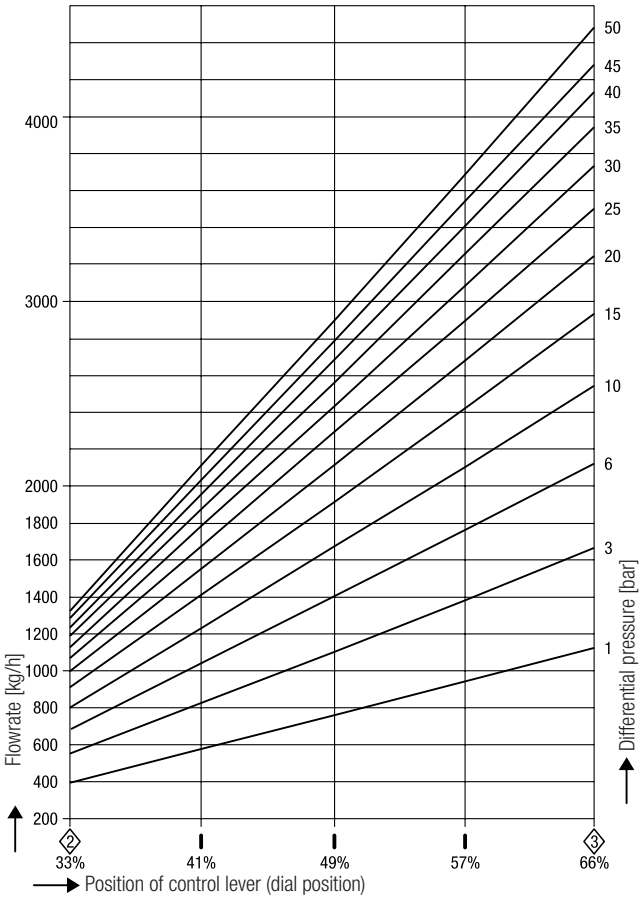
The K_V value is the metric measure for the volume flow of water at a temperature of 5 to 30 °C in [m^3/h] with a pressure drop of 1 bar and the control lever at the respective opening angle. The K_{VS} value is the K_V value with the control lever fully open.

BA(E) 46, BA(E) 47 DN 15-32	Position	K_V value [m^3/h]
Control lever	2	0.072
	3	0.325
	4	0.885

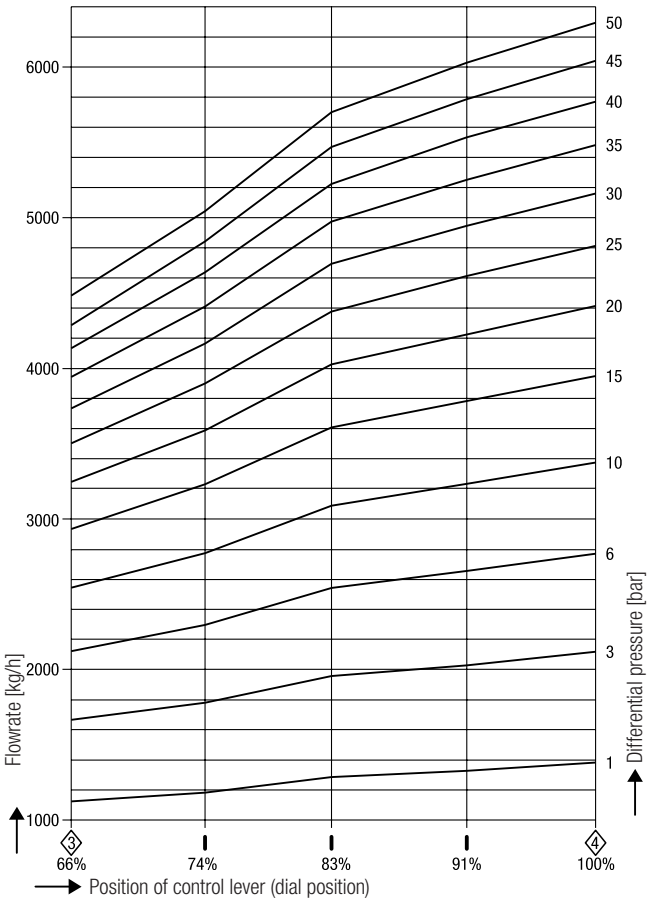
Flow diagram for DN 40 and DN 50, capacity range up to 1,340 kg/h



Flow diagram for DN 40 and DN 50, capacity range up to 4,500 kg/h



Flow diagram for DN 40 and DN 50, capacity range up to 6,300 kg/h



Flow characteristics

The K_V value is the metric measure for the volume flow of water at a temperature of 5 to 30 °C in [m^3/h] with a pressure drop of 1 bar and the control lever at the respective opening angle. The K_{VS} value is the K_V value with the control lever fully open.

BA(E) 46, BA(E) 47 DN 40, 50	Position	K_V value [m^3/h]
Control lever	2	0.46
	3	1.73
	4	2.72

Continuous Blowdown Valve Reaktomat

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

BA 46/BAE 46...,
PN 40/CL 150/300, DN 15-DN 50
BA 47/BAE 47...,
PN 63/CL 600, DN 25, 40, 50

Application of European Directives

Pressure Equipment Directive

The equipment conforms to this directive and can be used for the following fluids:

■ Group 2 fluids

ATEX Directive

BAE equipment is not suitable for use in potentially explosive atmospheres.

For BA 46 and BA 47 equipment, please note the following instructions for use in potentially explosive environments.

The equipment does not have its own potential ignition source and is therefore not subject to this directive.

If it is possible for fluid to escape, e.g. through actuating mechanisms or leaks in threaded joints, the plant manufacturer or owner must take this into consideration when dividing the area into zones.

The equipment has classification: CE Ex II 2G/D c X.

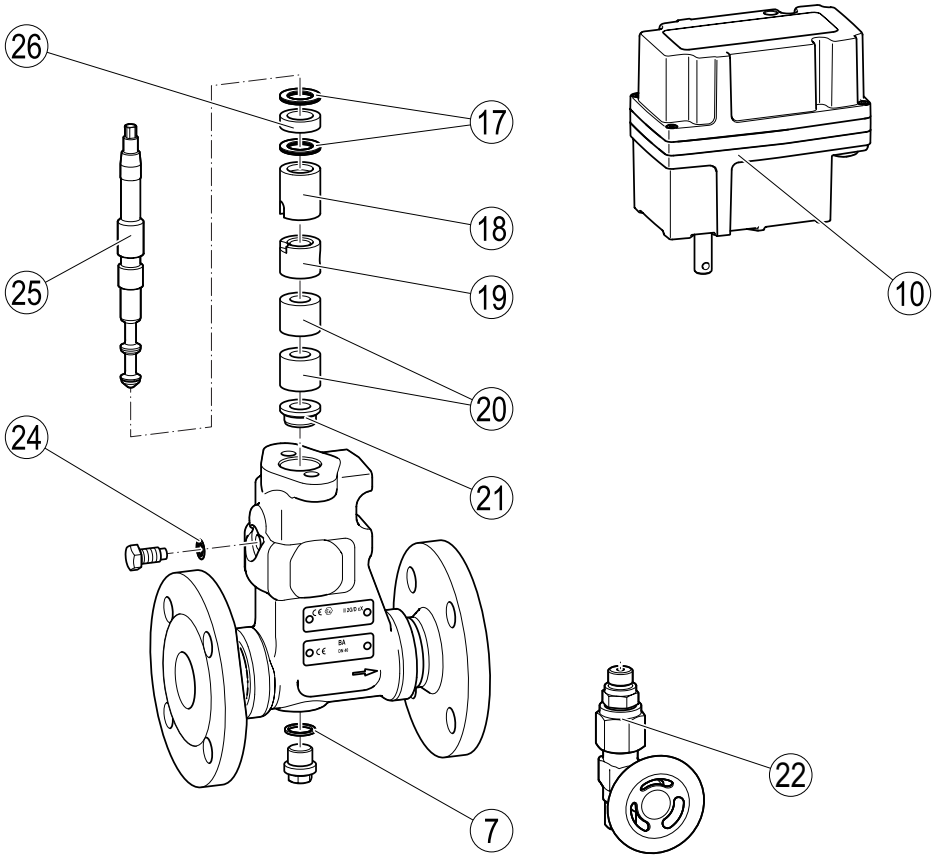
For use in potentially explosive atmospheres in zones (surrounding atmosphere to Directive 1999/92/EC) 1, 2, 21 and 22, please read and observe the following information: The sign "X" in the Ex label signifies that operation at an excessive surface temperature caused by the medium must be avoided. The equipment itself does not generate additional surface temperatures.

Once installed, static electricity may arise between the equipment and the connected system. If used in potentially explosive atmospheres, the plant manufacturer or owner is responsible for discharging or preventing possible static charge. If it is possible for fluid to escape, e.g. through actuating mechanisms or leaks in threaded joints, the plant manufacturer or owner must take this into consideration when dividing the area into zones.

Special actuators with ATEX approval are available on request.

Please note our general terms of business.

Spare parts



No.	Designation	Stock code	
		BA 46, BA 47	BAE 46..., BAE 47...
7, 17, 24, 26	Packing and sealing set DN 15–32, comprising: Packing ring 15 × 23 × 8 with 4 wipers Sealing ring C 6 × 10 × 1.5 Sealing ring A 17 × 23 × 1.5	335702	335702
7, 17, 24, 26	Packing and sealing set DN 40, DN 50, comprising: Packing ring 18 × 28 × 10 with 4 wipers Sealing ring C 10 × 16 × 1.5 Sealing ring A 17 × 23 × 1.5	335704	335704
7, 17, 18, 19, 20, 21, 24, 25, 26	Spare parts set DN 15 – DN 32, comprising: Packing and sealing set Nozzle needle Seat bushing 2 stepped bushings Anti-wear bushing Guide bushing	335703	335703
7, 17, 18, 19, 20, 21, 24, 25, 26	Spare parts set DN 40 and DN 50, comprising: Packing and sealing set Nozzle needle Seat bushing 2 stepped bushings Anti-wear bushing Guide bushing	335705	335705
10	Actuator EF 0.7 for BAE 46-3	-	336806
	Actuator EF 0.7-1 for BAE 46-3-1	-	336807
	Actuator EF 10 for BAE 46 and BAE 47	-	336808
	Actuator EF 10-1 for BAE 46-1 and BAE 47-1	-	336809
22	Sampling valve	335693	335693

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BA 28 – BA 211

Continuous Blowdown Valves

Reactomats
BA 28, BA 29, BA 210, BA 211
PN 63 – 320, DN 25 mm (1")

Description

The valve is connected to the water space of the boiler. Precise adjustment of blowdown rate by turning regulating lever on the calibrated scale plate (see charts on back page).

With the regulating lever in blow-off position the capacity is approximately three times the capacity at scale division 100.

The BA includes a sampling valve for checking the boiler-water concentration.

Application

Continuous blowdown of steam boilers, evaporators, quench coolers and similar installations. Regulating or dosing valve for all industries.

Connections

Butt-weld ends for pipe according to DIN 2448:

30 x 2.6 to 4.5
31.8 x 2.6 to 5
33.7 x 3.6 to 6.3
38 x 5.6 to 8
ANSI B 36.10: 1" Schedule 80 and 160

Other dimensions or weld-neck flanges on request at extra cost.

Design

Straight-through valves with butt-weld ends, weld-neck flanges at extra cost. With GESTRA stage-nozzle, regulating lever, calibrated scale and sampling valve.

On request with electric actuator as BAE 28 – 211.

Range

If used as continuous blowdown valve (at saturation temperature):

BA 28 max. 63 bar g (915 psig)
BA 29 max. 94 bar g (1360 psig)
BA 210 max. 142 bar g (2060 psig)
BA 211 max. 226 bar g (3280 psig)

Max. temperature			°C	120	200	250	300	350	400	450	500	530
Max. service pressure	BA 28	PN 63/100	barg	100	80	70	60	56	50	–	–	–
			psig	1450	1160	1015	870	810	725	–	–	–
	BA 29	PN 160*)	barg	160	130	112	96	90	80	–	–	–
			psig	2320	1885	1625	1390	1305	1160	–	–	–
	BA 210	PN 250*)	barg	250	200	175	150	140	125	–	–	–
			psig	3625	2900	2540	2175	2030	1810	–	–	–
	BA 211	PN 320*)	barg	320	320	320	320	304	292	278	237	124
			psig	4640	4640	4640	4640	4410	4235	4030	3435	1800

*) For relatively small capacities (see charts) use BA 29k, 210k or 211k with special stage nozzle.

Materials

BA 28
Body (two parts): forged steel C 22.8 (No. 1.0460 DIN)
Nozzle insert: cast stainless steel G-X 22 CrMoV 12 1 (1.4931)
Stage nozzle: stainless steel C 20 Cr 13 (1.4021)

BA 29
Body (two parts): C 22.8 (1.0460)
Nozzle insert*): G-X 22 CrMoV 12 1 (1.4931)
Stage nozzle*): stainless steel X 8 CrTi 17 (1.4510)

BA 210
Lower-body part: C 22.8 (1.0460)
Upper-body part*): C 22.8 (1.0460)
Nozzle insert*): G-X 22 CrMoV 12 1 (1.4931)
Stage nozzle*): X 8 CrTi 17 (1.4510)

BA 211
Lower-body part: forged alloy steel 13 CrMo 44 (1.7335)
Upper-body part*): 13 CrMo 44 (1.7335)
Nozzle insert*): G-X 22 CrMoV 12 1 (1.4931)
Stage nozzle*): X 8 CrTi 17 (1.4510)

*) additionally armoured

Order Specifications

Valve type, nominal pressure (PN), nominal size (DN), capacity, service pressure, back pressure, fluid, application (e.g. type of boiler).

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

All inspection requirements have to be stated with the order. After supply of the equipment certification cannot be established. For tests and inspection charges please consult us.

Enquiry Specification

Reactomats (continuous blowdown valves) with GESTRA stage nozzle, regulating lever, calibrated scale and sampling valve.

Application (optional) as continuous blowdown valve for steam boilers, evaporators and similar installations or as regulating/dosing valve.

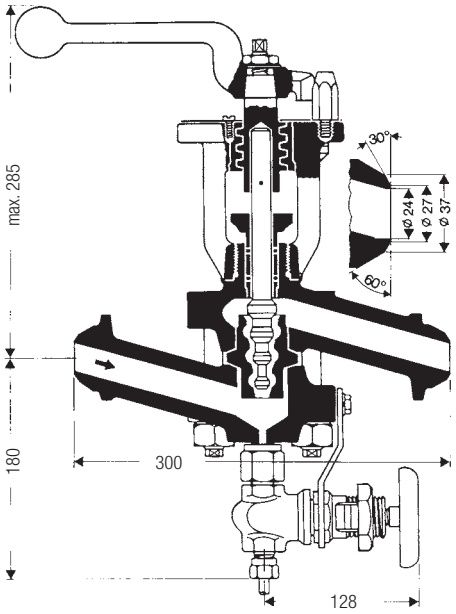
Indications on nominal pressure (PN), nominal size (DN), type of connection, service pressure, back pressure, temperature, fluid, application (e.g. type of boiler).

Continuous Blowdown Valves

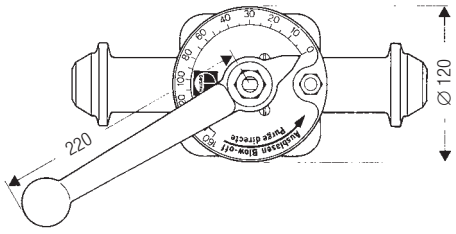
Reactomats
BA 28, BA 29, BA 210, BA 211
PN 63 – 320, DN 25 mm (1")

Dimensions

BA 28 – 211 (approx. weight 21 kg)



Sampling valve with compression fitting 8 mm O.D.



Supply in accordance with our general terms of business.

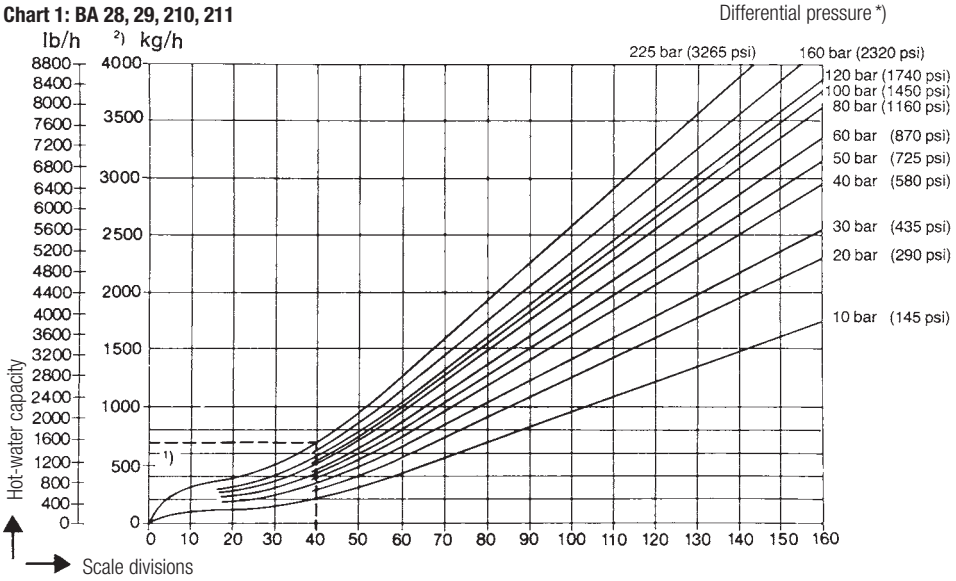
Types, Capacity, Scale Division

Selection of valve type according to pressure and temperature see under "Range".

Scale divisions for required capacity (blow-down quantity) see charts.

In blow-off position (regulating lever against stop) the capacity is approximately three times the capacity at scale division 100.

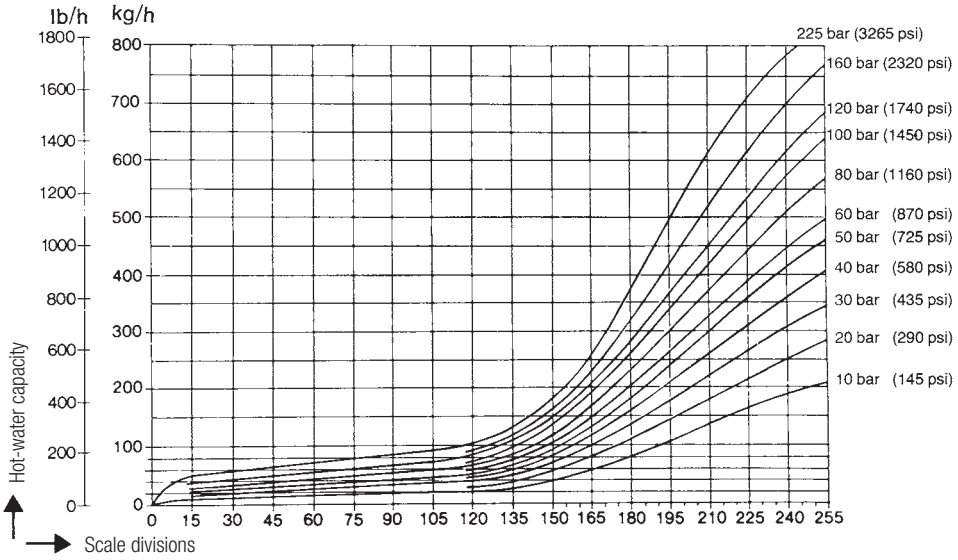
Chart 1: BA 28, 29, 210, 211



1) For relatively small quantities (see dotted lines in chart) use BA 29k, 210k or 211k (with special stage nozzle). Scale divisions according to chart 2.

2) If the quantity of boiler water to be discharged is higher than the values covered by chart 1, GESTRA Reactomats BA 39 with radial stage nozzle should be used.

Chart 2: BA 29k, 210k, 211k



*) Differential pressure (working pressure) = **Inlet** minus **outlet** pressure.

If the boiler water is lifted after the Reactomat, the differential pressure is reduced by approximately 1 bar for 7 m (or 2 psi for 3 feet) in lift.

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