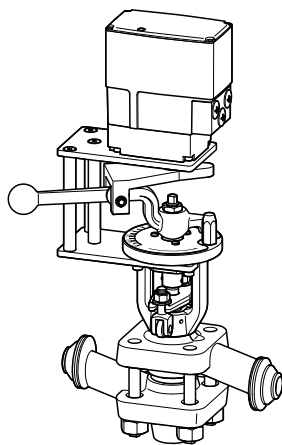


BA 210, BA 211, DN 25
with sampling valve



BAE 210, BAE 211, DN 25
without sampling valve

Continuous blowdown valve, Reaktomat®

BA 210, BAE 210, PN 250

BA 211, BAE 211, PN 320

DN 25, NPS 1"

System description

The continuous blowdown valves are used to continuously discharge boiler blowdown from steam generating units, evaporators, quench coolers and similar systems.

- BA 210 (manually operated)
- BA 211 (manually operated)
- BAE 210 (with electric actuator)
- BAE 211 (with electric actuator)

The equipment comes with a sampling valve as standard.

BAE equipment contains an EF30 actuator, 85—265 V AC, 50/60 Hz, as standard.

Optional extras

BA / BAE

- K nozzle for equipment with a low flowrate
- Without sampling valve (retrofitting not possible)
- On request: lower body section with sealing plug, prepared for retrofitting sampling valve
- Sampling valve (only for equipment with a lower body section featuring the optional connection for a sampling valve)

BAE

- EF30 actuator with supply voltage 24 V DC
- EF30 actuator with 1,000 ohm potentiometer
- EF30 actuator with electronic position transmitter 0(4)—20 mA, 0—10 V
- EF30 actuator with controller, I-ACT 0(4)—20 mA, 0—10 V

End connections

We reserve the right to design connections as welding neck flanges, socket-weld ends via transition pieces or butt-weld ends via transition pieces.

BA 210, BAE 210

- Butt-weld end EN 12627, welded joint geometry ISO 9692-1, code no. 1.3 (30° chamfer), (33.7×3.6)
- Flange EN 1092-1 B2, PN 63/100/160
- Flange EN 1092-1 B2, PN 250
- Flange ASME B16.5, Class 600 RF
- Flange ASME B16.5, Class 900/1500 RF
- Socket-weld end DIN EN 12760
- Socket-weld end ASME B16.11, Class 6000
- Butt-weld end EN 12627, welded joint geometry ISO 9692-1, code no. 1.3 (30° chamfer), PN 160, (33.7×3.2)
- Butt-weld end ASME B16.25, ASME B36.10, Sched. 80, (33.4×4.5)
- Butt-weld end ASME B16.25, ASME B36.10, Sched. 160, (33.4×6.4)

BA 211, BAE 211

- Butt-weld end EN 12627, welded joint geometry ISO 9692-1, code no. 1.3 (30° chamfer), (33.7×5.0)
- Flange EN 1092-1 B2, PN 320
- Flange ASME B16.5, Class 900/1500 RF
- Socket-weld end DIN EN 12760
- Socket-weld end ASME B16.11, Class 6000
- Butt-weld end ASME B16.25, ASME B36.10, Sched. 160, (33.4×6.4)
- Butt-weld end ASME B16.25, ASME B36.10, Sched. XXS, (33.4×9.1)

Electrical connection

- 3 cable glands M20 x 1.5 (provided by customer)

Fluids

The equipment is designed for the following fluids (in accordance with the EU Pressure Equipment Directive or Pressure Equipment (Safety) Regulations in the UK):

BA 210, BAE 210, BA 211, BAE 211

- Group 2 fluids

Chemical and corrosive influences must be taken into consideration.

Use in potentially explosive atmospheres

BA 210, BA 211

The equipment does not have its own potential source of ignition (as per ATEX Directive). Please note the following: Once installed, static electricity may arise between the equipment and the connected system.

If the equipment is used in potentially explosive atmospheres, the plant manufacturer or owner is responsible for discharging or preventing possible static charge.

- Make sure that installation work on the equipment is only carried out when no potentially explosive atmosphere is present.
- When performing electrically insulated installation work between pipe connections, make sure that measures to dissipate static electricity are taken.

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.

BAE 210, BAE 211 with actuator

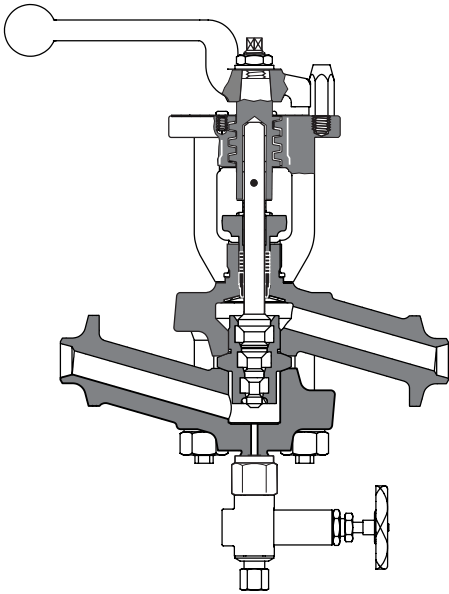
Equipment types BAE 210 and BAE 211 are not suitable for use in potentially explosive atmospheres.

Continuous blowdown valve, Reaktomat®

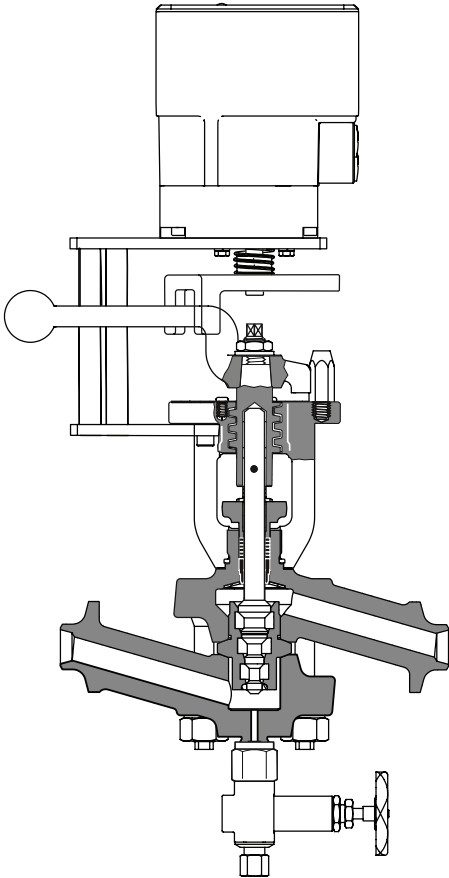
BA 210, BAE 210, PN 250

BA 211, BAE 211, PN 320

DN 25, NPS 1"



BA 210, BA 211, DN 25
with sampling valve



BAE 210, BAE 211, DN 25
with sampling valve

Function

In BA 210 and BA 211 equipment, the flowrate is adjusted manually using a control lever.

BAE 210 and BAE 211 equipment is adjusted by the electric actuator and its external control system.

The equipment allows the valve to move into three positions:

- Closed: no boiler blowdown is drained
- Operating position: the set quantity of boiler blowdown is drained continuously
- Open: boiler blowdown is drained at the maximum flowrate.

The operating position can be infinitely adjusted via the actuator (BAE) or control lever (BA).

Accessories

Control units, e.g. LRR 1-50, LRR 1-51, LRR 1-52, LRR 1-53, LRR 1-60

Materials

BA 210, BAE 210

Component	EN	ASME / ASTM
Body ¹	1.0460	SA 105
Flange	1.0460	SA105
Nozzle insert ¹	1.4922	–
K nozzle insert ¹	1.4112/1.4922	–
Nozzle needle	1.4462	–
K nozzle needle	1.4112	–
Hexagon head nut M20 ¹	1.7225	A194-Gr. 7
Threaded bolt ¹	1.7225	A193-B7
Stuffing box gland ¹	1.7335	SA 182 F12
Packing rings	Graphite	Graphite

¹ Pressure-bearing components

BA 211, BAE 211

Component	EN	ASTM
Body ¹	1.7335	SA 182 F12
Flange	1.0460	SA105
Nozzle insert ¹	1.4922	-
K nozzle insert ¹	1.4922/1.4112	-
Nozzle needle	1.4462	-
K nozzle needle	1.4112	-
Hexagon head nut M20 ¹	1.7225	A194-Gr. 7
Threaded bolt ¹	1.7225	A193-B7
Stuffing box gland ¹	1.7335	SA 182 F12
Packing rings	Graphite	Graphite

¹ Pressure-bearing components

Continuous blowdown valve, Reaktomat®
BA 210, BAE 210, PN 250
BA 211, BAE 211, PN 320
DN 25, NPS 1"

Pressure and temperature ratings

BA 210 and BAE 210 with PN 250 flange and EN butt-weld ends (for pipe 33.7 x ≥ 3.6)

p Pressure ¹	barg	250.0	232.1	208.3	172.6	160.7	148.8
T Temperature ¹	°C	−10—50	100	200	300	350	400
Maximum pressure at boiling temperature 348 °C	barg	161					

¹ Ratings for strength of body/cover to EN 1092-1

BA 210 and BAE 210 with CL900/1500 flange, EN/ASME CL6000 socket-weld end and ASME butt-weld ends (for pipe 33.4 x ≥ 4.5)

p Pressure ¹	barg	255.1	233.5	219.1	199.5	188.2	173.1
T Temperature ¹	°C	−29—38	100	200	300	350	400
Maximum pressure at boiling temperature 361 °C	barg	185					

p Pressure ¹	psig	3,705	3,270	3,015	2,840	2,655	2,535
T Temperature ¹	°F	−20—100	300	500	600	700	750

¹ Ratings for strength of body/cover to ASME B16.5

BA 210 and BAE 210 with CL600 flange

p Pressure ¹	barg	102.0	93.4	90.1	87.6	83.9	79.8
T Temperature ¹	°C	−29—38	100	150	200	250	300
Maximum pressure at boiling temperature 296 °C	barg	80					

p Pressure ¹	psig	1,480	1,360	1,310	1,265	1,205	1,135
T Temperature ¹	°F	−20—100	200	300	400	500	600

¹ Ratings for strength of body/cover to ASME B16.5

BA 210 and BAE 210 with PN 63/100/160 flange and EN butt-weld ends (for pipe 33.7 x ≥ 3.2)

p Pressure ¹	barg	160.0	148.5	133.3	110.4	102.8	95.2
T Temperature ¹	°C	−10—50	100	200	300	350	400
Maximum pressure at boiling temperature 316 °C	barg	108					

¹ Ratings for strength of body/cover to EN 1092-1

Continuous blowdown valve, Reaktomat®
BA 210, BAE 210, PN 250
BA 211, BAE 211, PN 320
DN 25, NPS 1"

Pressure and temperature ratings

**BA 211 and BAE 211 without sampling valve with PN 320 flange and EN butt-weld ends
(for pipe 33.7 × ≥ 5.0)**

p Pressure ¹	barg	320.0	320.0	304.7	288.0	269.7	208.7
T Temperature ¹	°C	−10—50	300	350	400	450	500
Maximum pressure at boiling temperature 374 °C	barg	220					

¹ Ratings for strength of body/cover to EN 1092-1

**BA 211 and BAE 211 with sampling valve with PN 320 flange and EN butt-weld ends
(for pipe 33.7 × ≥ 5.0)**

p Pressure ¹	barg	320.0	297.1	266.6	220.9	205.7	190.4
T Temperature ¹	°C	−10—50	100	200	300	350	400
Maximum pressure at boiling temperature 366 °C	barg	200					

¹ Ratings for strength of body/cover to EN 1092-1

BA 211 and BAE 211 without sampling valve with CL900/1500 flange, EN/ASME CL6000 socket-weld end and ASME butt-weld ends (for pipe 33.4 × ≥ 6.4)

p Pressure ¹	barg	258.6	231.4	218.1	209.1	174.9	105.9
T Temperature ¹	°C	−29—38	200	300	350	450	500
Maximum pressure at boiling temperature 364 °C	barg	195					

p Pressure ¹	psig	3,750	3,495	3,230	2,980	2,655	1,870
T Temperature ¹	°F	−20—100	300	500	700	800	900

¹ Ratings for strength of body/cover to ASME B16.5

BA 211 and BAE 211 with sampling valve with CL900/1500 flange, EN/ASME CL6000 socket-weld end and ASME butt-weld ends (for pipe 33.4 × ≥ 4.5)

p Pressure ¹	barg	255.1	233.5	219.1	199.5	188.2	173.1
T Temperature ¹	°C	−29—38	100	200	300	350	400
Maximum pressure at boiling temperature 368 °C	barg	204					

p Pressure ¹	psig	3,705	3,270	3,015	2,840	2,655	2,535
T Temperature ¹	°F	−20—100	300	500	600	700	750

¹ Ratings for strength of body/cover to ASME B16.5

BAE actuator

Voltage, frequency	85—265 V AC, 50/60 Hz
Power consumption	20 VA
Torque	60 Nm
IP rating	IP 66
Ambient temperature	−15—60 °C
Optional: Supply voltage	24 V DC
Optional: Feedback / potentiometer	1,000 ohms
Optional: Feedback / electronic position transmitter	0(4)—20 mA / 0—10 V
Optional: Electronic positioner (I-ACT)	0(4)—20 mA / 0—10 V

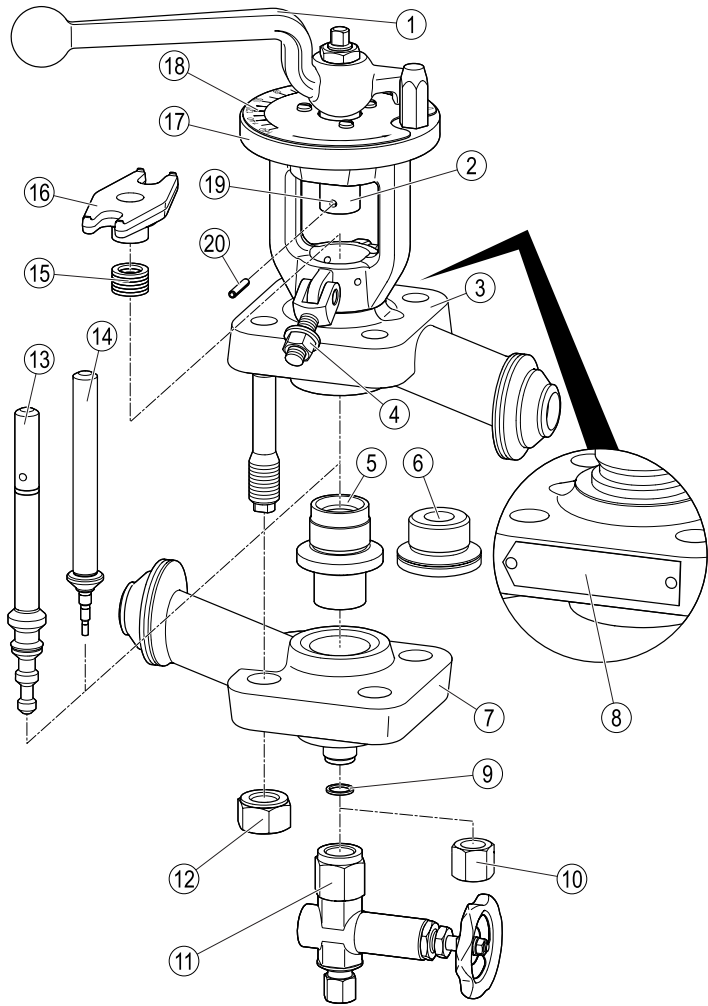
Continuous blowdown valve, Reaktomat®
BA 210, BAE 210, PN 250
BA 211, BAE 211, PN 320
DN 25, NPS 1"

No.	Designation
1	Control lever
2	Stem attachment
3	Upper body section
4	Swing pins
5	Standard nozzle insert
6	K nozzle insert (optional, for low flowrates)
7	Lower body section
8	Name plate
9	Sealing ring ¹
10	Lock nut ¹ (optional)
11	Sampling valve
12	Hexagon nuts (4x)
13	Nozzle needle (standard)
14	K nozzle needle (optional, for low flowrates)
15	Packing rings (6x)
16	Stuffing box gland
17	Flange
18	Scale
19	Hole
20	Dowel pin

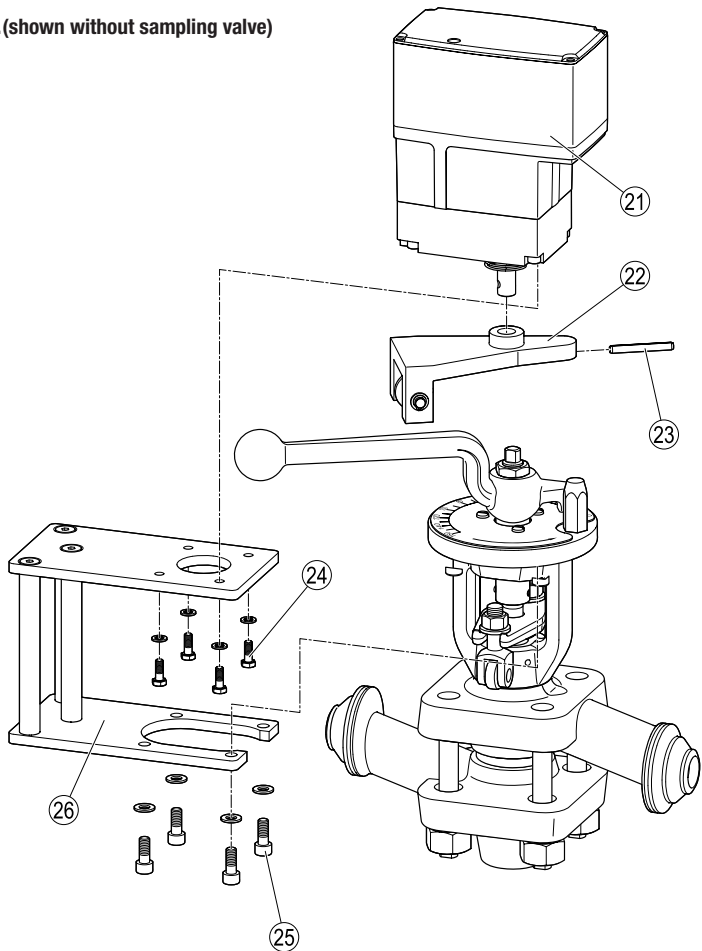
¹ The lock nut and sealing ring are only required if the sampling valve has been removed. They are used on lower body sections with a connection for the sampling valve.

No.	Designation
21	Actuator
22	Claw coupling
23	Dowel pin
24	Hexagon head bolt M6 x 18
25	Socket-head screw M8 x 20
26	Support

Equipment overview
BA ...

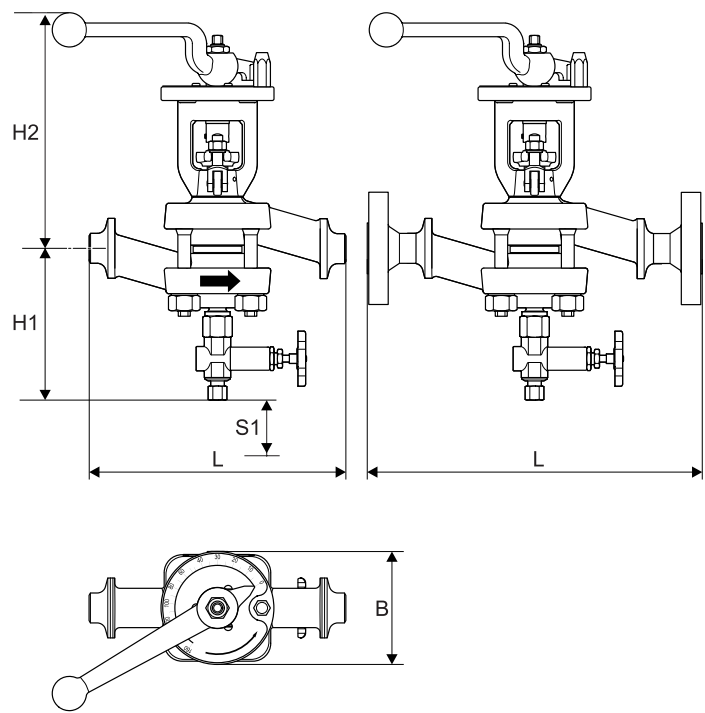


BAE...(shown without sampling valve)



Continuous blowdown valve, Reaktomat®
BA 210, BAE 210, PN 250
BA 211, BAE 211, PN 320
DN 25, NPS 1"

Dimensions and weights
BA



		BA 210	BA 211
Height H1	mm	177 (91 ¹)	
Height H2	mm	276 (closed), 286 (open)	
Length L	mm	See "Lengths and weights" tables	
Width B	mm	132	
Space required for control lever	mm	220	220
Service dimension S1	mm	20	20
Service dimension S1 ²	mm	80	80
Weight	kg	See "Lengths and weights" tables	

¹ Without sampling valve

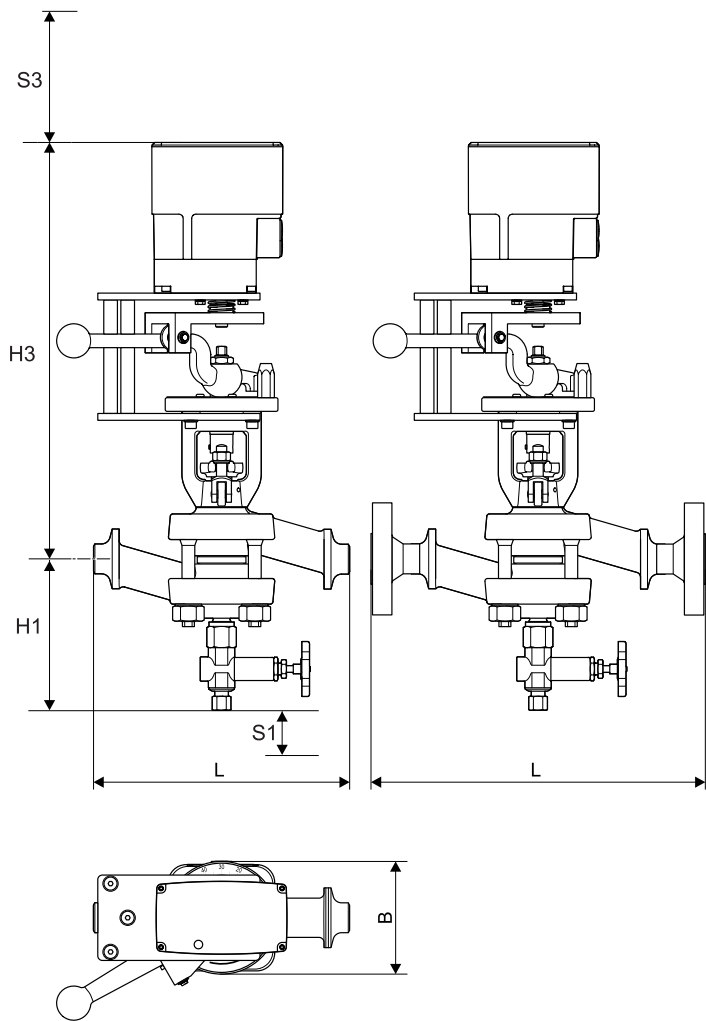
² Without sampling valve, for removing the valve stem

Sampling valve

Weight	kg	0.7
Progressive ring fitting	DN	5
Inlet M22	Size	32
Outlet M16	Size	24

Continuous blowdown valve, Reaktomat®
BA 210, BAE 210, PN 250
BA 211, BAE 211, PN 320
DN 25, NPS 1"

Dimensions and weights
BA 210, BA 211, DN 25 with sampling valve



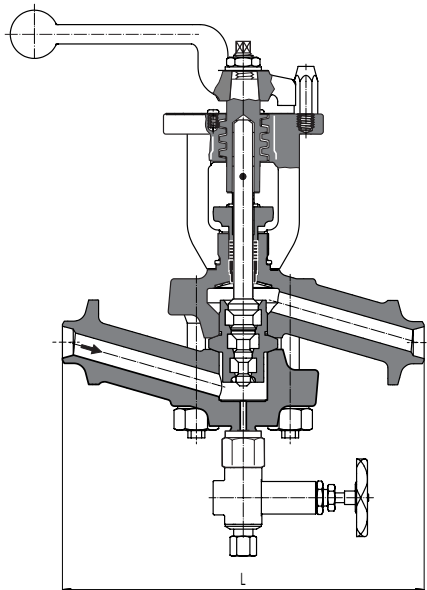
		BAE 210	BAE 211
Height H1	mm	177 (911)	
Height H3	mm	488	
Length L	mm	See "Lengths and weights" tables	
Width B	mm	132	
Space required for control lever	mm	220	220
Service dimension S1	mm	20	20
Service dimension S1 ²	mm	80	80
Service dimension S3	mm	40	40
Weight	kg	See "Lengths and weights" tables	

¹ Without sampling valve
² Without sampling valve, for removing the valve stem

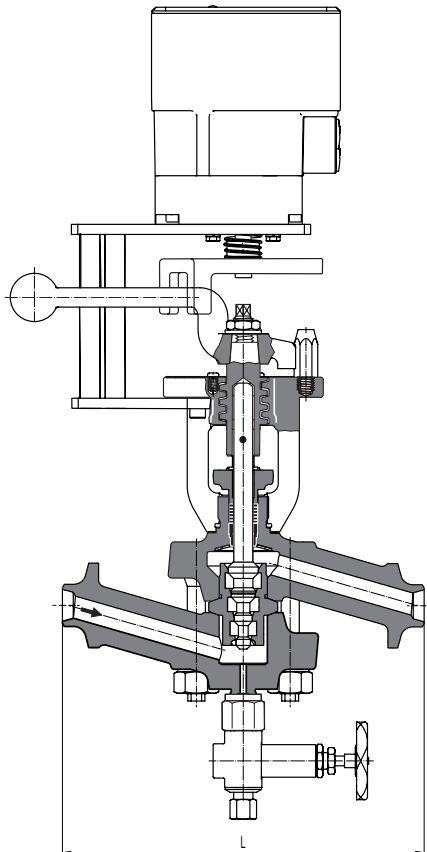
Sampling valve

Weight	kg	0.7
Progressive ring fitting	DN	5
Inlet M22	Size	32
Outlet M16	Size	24

Continuous blowdown valve, Reaktomat®
BA 210, BAE 210, PN 250
BA 211, BAE 211, PN 320
DN 25, NPS 1"



BA 210, BA 211, DN 25
with sampling valve



BAE 210, BAE 211, DN 25
with sampling valve

Dimensions and weights

Lengths and weights for equipment with flange

	Length L mm	BA 210	BA 211	BAE 210	BAE 211
		Weight kg			
PN 63 to PN 160	390	23.0	–	30.5	–
PN 250	410	22.5	–	30.0	–
PN 320	450	–	18.5	–	27.0
CL600	410	21.5	–	29.0	–
CL900/1500	440	22.5	22.5	30.0	30.0

Lengths and weights for equipment with butt-weld end BA 210, BAE 210

	Length L mm	Butt-weld end dims. mm	BA 210	BAE 210
			Weight kg	
PN 160	300	33.7×3.2	17.5	25.0
PN 250	300	33.7×3.6	17.5	25.0
CL1500 (Sched. 80)	300	33.4×4.5	18.5	26.0
CL1500 (Sched. 160)	300	33.4×6.4	18.5	26.0

Lengths and weights for equipment with butt-weld end BA 211, BAE 211

	Length L mm	Butt-weld end dims. mm	BA 211	BAE 211
			Weight kg	
PN 320	300	33.7×5.0	18.0	25.5
CL1500 (Sched. 160)	300	33.4×6.4	18.5	23.0
CL1500 (Sched. XXS)	300	33.4×9.1	18.5	23.0

Lengths and weights for equipment with socket-weld end

	Length L mm	Socket-weld end dims. mm	BA 210	BAE 210
			Weight kg	
EN/ASME CL6000	280	34.0×13.0	17.5	25.0

	Length L mm	Socket-weld end dims. mm	BA 211	BAE 211
			Weight kg	
EN/ASME CL6000	280	34.0×13.0	17.5	25.0

Continuous blowdown valve, Reaktomat®
BA 210, BAE 210, PN 250
BA 211, BAE 211, PN 320
DN 25, NPS 1"

Determining the continuous blowdown rate

Calculate the correct boiler water blowdown rate W using a formula and determine the position of the control lever required to achieve this using the flow charts below.
For BAE models, you can determine the continuous blowdown rate by measuring the conductivity of the boiler water. For further information, please refer to the control system operating manual.

$W = (Q \times S) / (K - S)$ whereby:
W = boiler water blowdown rate in kg/h
Q = boiler capacity in kg/h
S = conductivity of feedwater in $\mu\text{S/cm}$
K = admissible conductivity of boiler water in $\mu\text{S/cm}$

Example

BA 210, nominal size DN 25
Differential pressure: 50 bar
Q= 35,000 kg/h
S = 5 $\mu\text{S/cm}$
K = 200 $\mu\text{S/cm}$

Boiler water blowdown rate

W ≈ 900 kg/h

The required continuous blowdown rate W1 is the boiler water blowdown rate W minus 10% for intermittent blowdown.

Continuous blowdown rate **W1 ≈ 810 kg/h**

The required control lever position can be seen in the relevant flow chart, with the value W1.

In this example, the required control lever position is 37.5% (mark 60 on the scale).

Flow characteristics

Standard nozzle needle

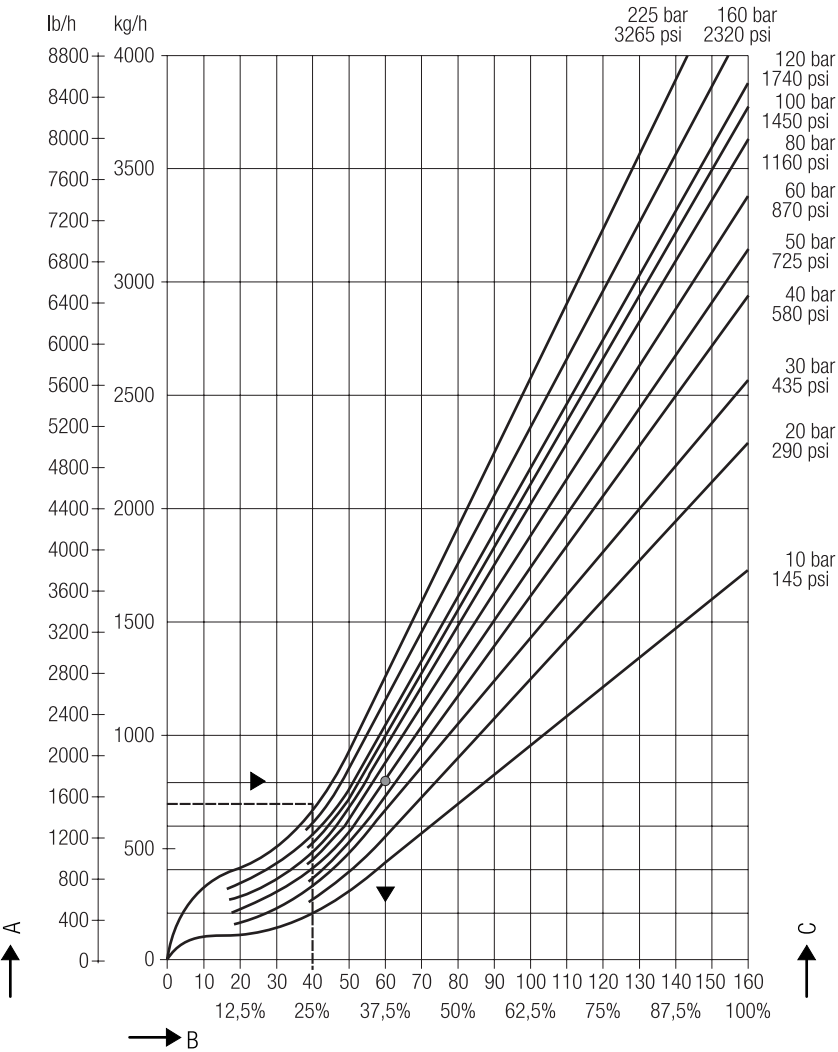
Valve position		Kv value m³/h
Scale value	Opening %	
40	25	0.2
80	50	0.7
120	75	1.2
160	100	1.7

K nozzle needle for low flowrates

Valve position		Kv value m³/h
Scale value	Opening %	
255	100	0.3

The Kv value is the metric measure for the volume flow of water at a temperature of 5 to 30 °C in m³/h with a pressure drop of 1 bar and the control lever at the respective opening angle. The Kvs value is the Kv value with the control lever fully open.

Flow charts
BA 210, BA 211, BAE 210, BAE 211



No.	Designation	Unit
A	Flowrate	kg/h or lb/h
B	Position of control lever and associated valve opening	Scale value or %
C	Differential pressure	bar or psi

For low flowrates (area inside dotted line), use BA 210k, BA 211k, BAE 210k or BAE 211k (with special nozzle).

Continuous blowdown valve, Reaktomat®
BA 210, BAE 210, PN 250
BA 211, BAE 211, PN 320
DN 25, NPS 1"

How to order

Continuous blowdown valve, Reaktomat
BA 210 (manually operated)
BA 211 (manually operated)
DN 25, NPS 1" with sampling valve
Connection.....
K nozzle option for low flowrate.....
Option without sampling valve
Information on nominal pressure, max. admissible overpressure, backpressure, service temperature, fluid, location of use (e.g. boiler type).
Continuous blowdown valve, Reaktomat
BAE 210 (with electric actuator)
BAE 211 (with electric actuator)
DN 25, NPS 1", sampling valve
Connection.....
K nozzle option for low flowrates.....
Option without sampling valve
Actuator options.....
Information on nominal pressure, max. admissible overpressure, backpressure, service temperature, fluid, location of use (e.g. boiler type).

Inspection and certification

An inspection certificate to EN 10204 can be provided as verification of material and construction tests. All inspection requirements must be included in the request for a quote or in the order. Once a product has been delivered, inspection certificates can no longer be issued. The standard test scope and costs of the above-mentioned test certificates can be found in our price list "Test and Inspection Charges for Standard Equipment". If you require a different inspection scope, please request a separate quote.

Directives and standards

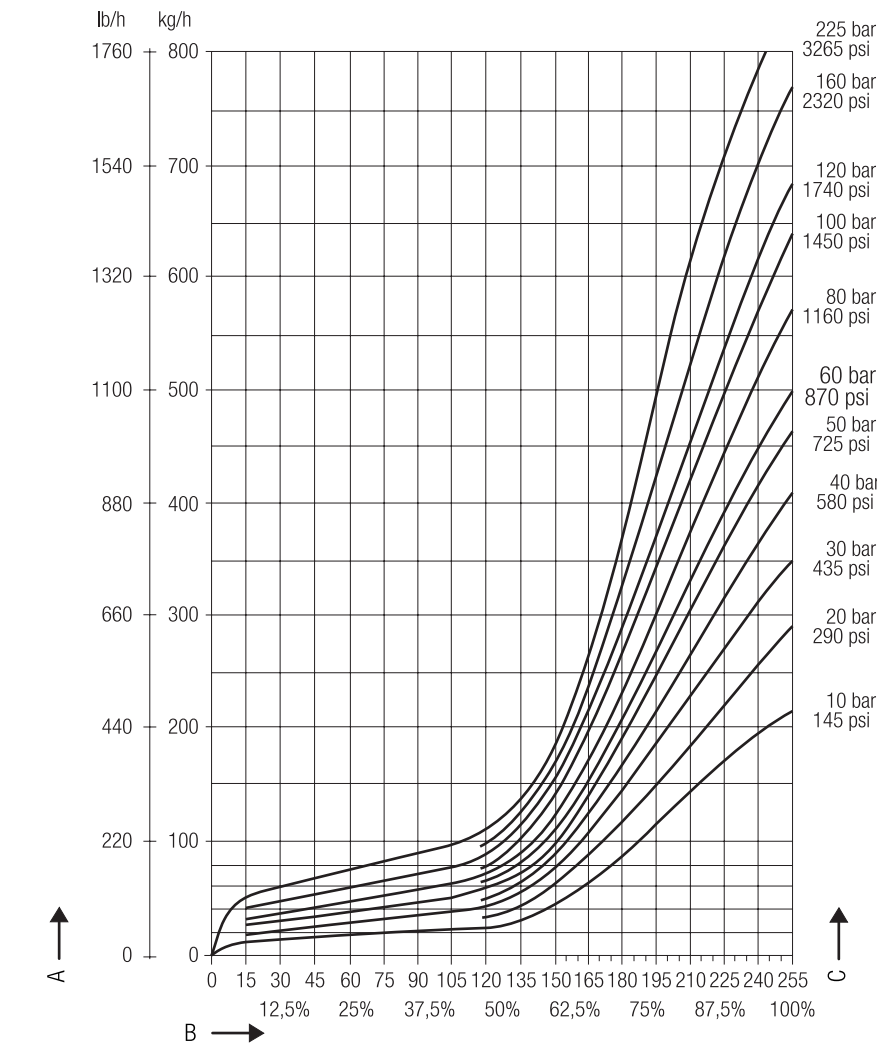
You can find details on the conformity of the equipment and the relevant standards and directives, where applicable, in the Declaration of Conformity and associated certificates or approvals.

Important notes

- The following points must be observed to ensure correct connection to the pressure vessel:
- The equipment must be connected at about 100 mm below the low level line in the steam generating unit.
 - We recommend that the distance between the steam generating unit and the equipment is no more than 2 m.
 - Do not connect the equipment on the floor of the steam generating unit.
 - Do not connect the equipment in the steam zone of the vessel.
- In the case of different installation positions, follow the instructions below:
- Preferably, install the equipment horizontally with the nozzle needle upright.
 - If the equipment is installed with the nozzle needle inclined or horizontal, provide support for the actuator.
 - Please contact the manufacturer if you wish to install the equipment in a different position.

Please note our general terms of business.

Flow charts
BA 210k, BA 211k, BAE 210k, BAE 211k



No.	Designation	Unit
A	Flowrate	kg/h or lb/h
B	Position of control lever and associated valve opening	Scale value or %
C	Differential pressure	bar or psi

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