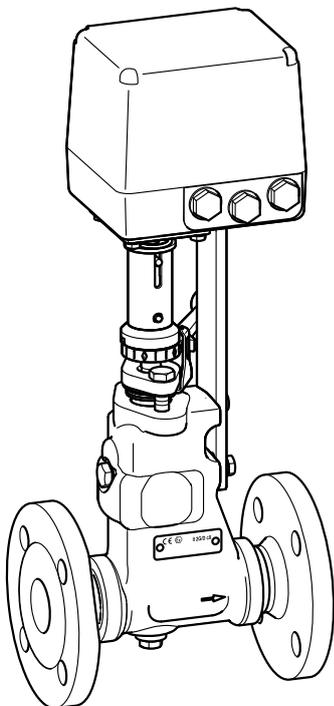
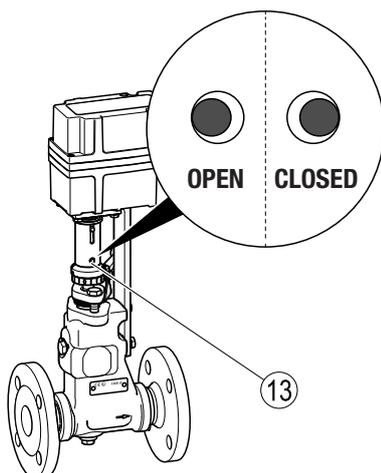


BA 46, BA 47



BAE 46..., BAE 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

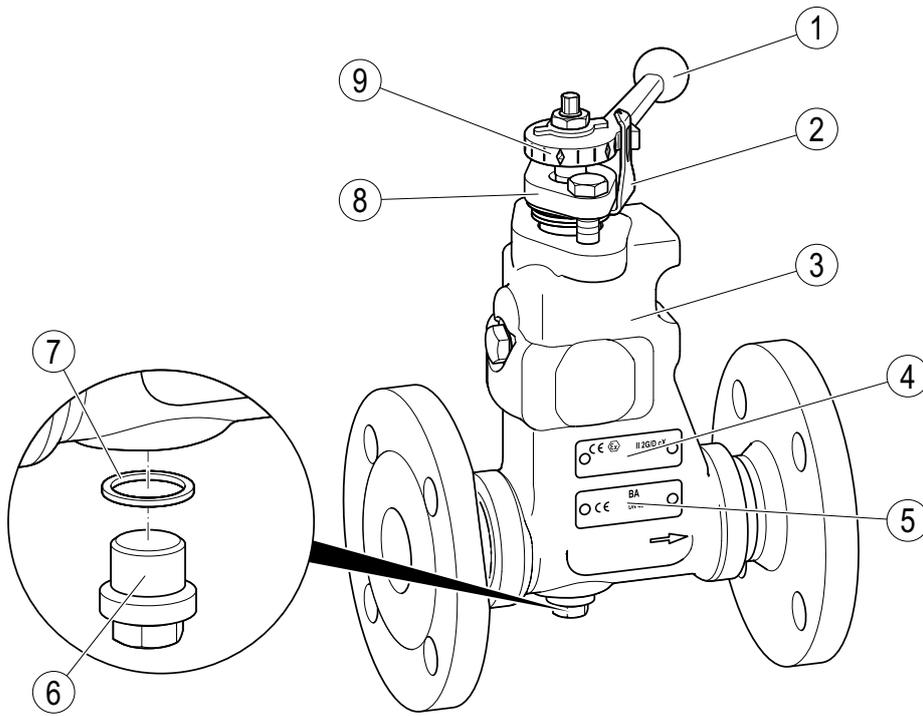
Operating data: Maximum pressure 55 [bar] at boiling temperature 271 [°C]

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.

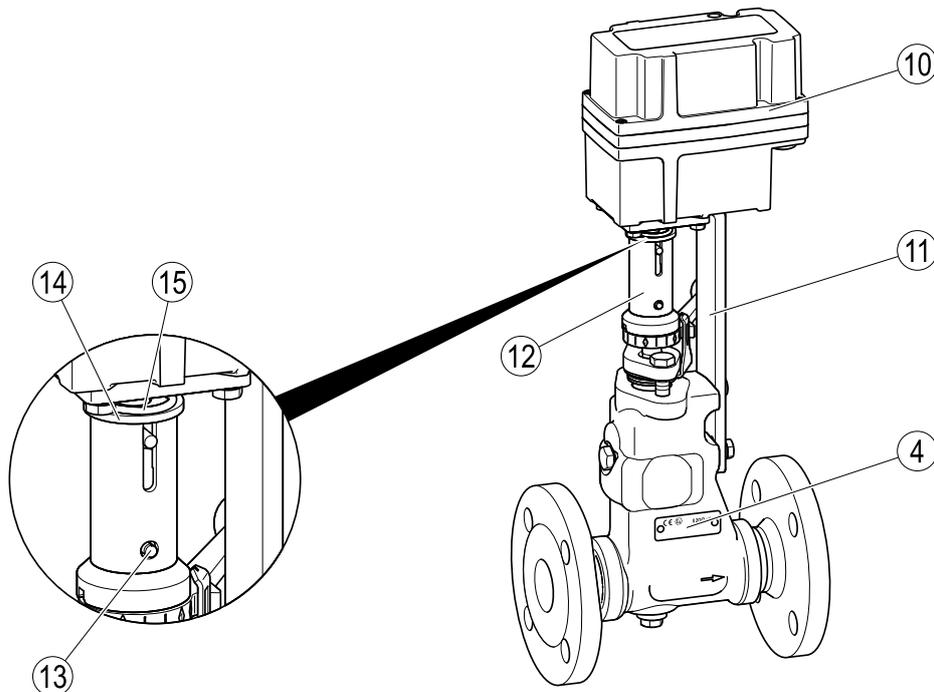
Equipment overview, BA



| 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 | [mm] | PN 40, CLASS 150 | | | | | |
| | | CLASS 300 | | | | | |
| 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 |

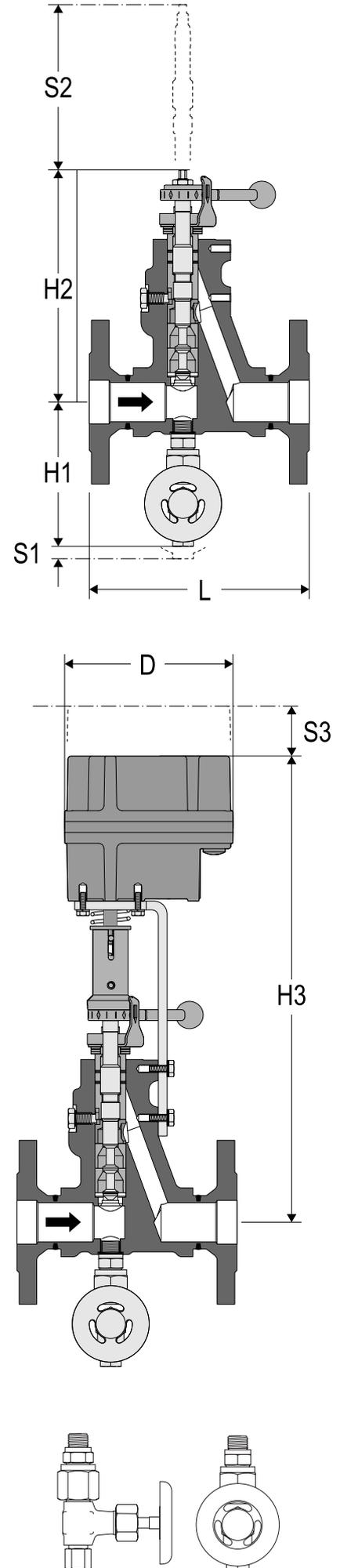
BA 47 and BAE 47..., flange CLASS 600

| 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.

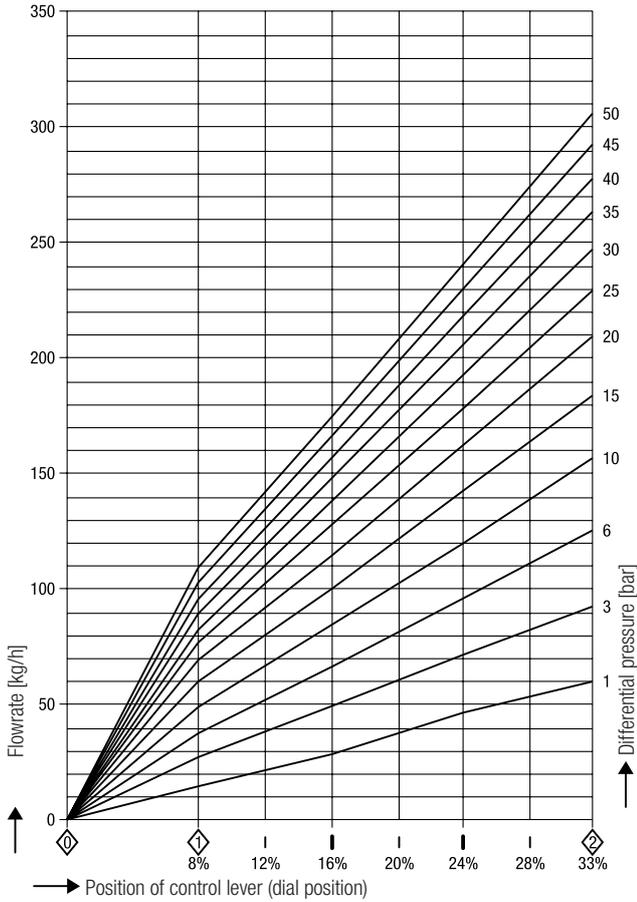
■ Drop a perpendicular on the axis of the control lever position.

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

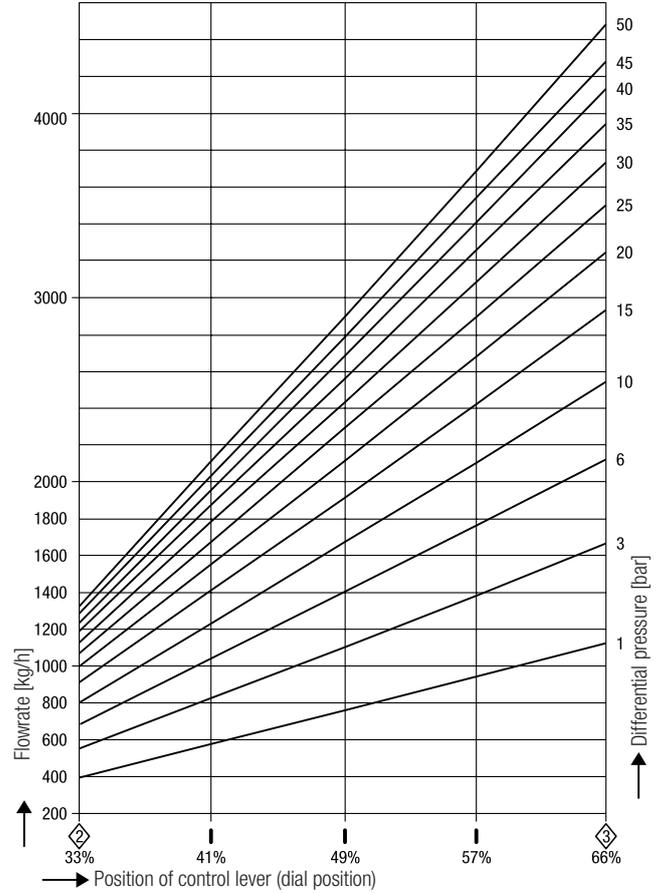
Flow diagrams

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.

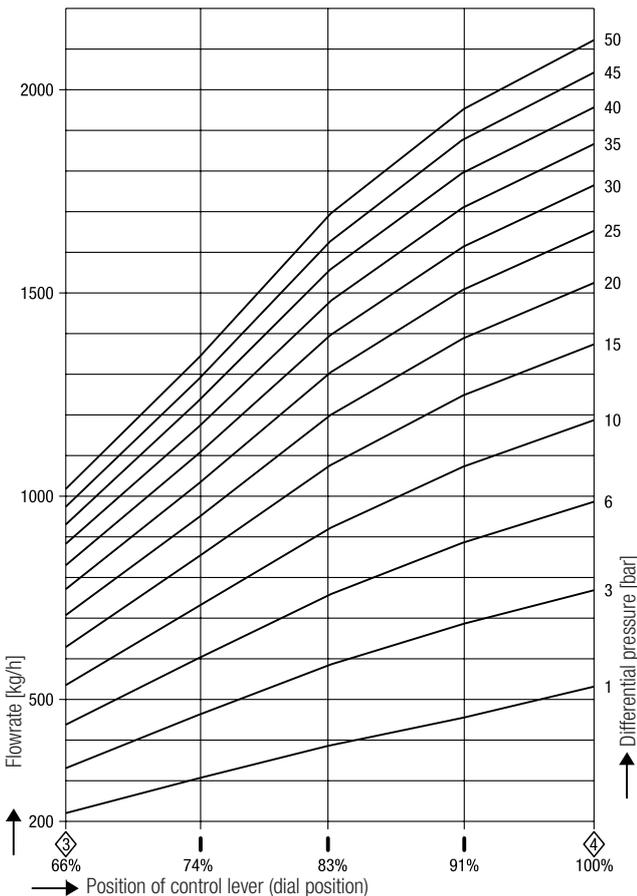
**Flow diagram for DN 15 to DN 32,
capacity range up to 310 kg/h**



**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**

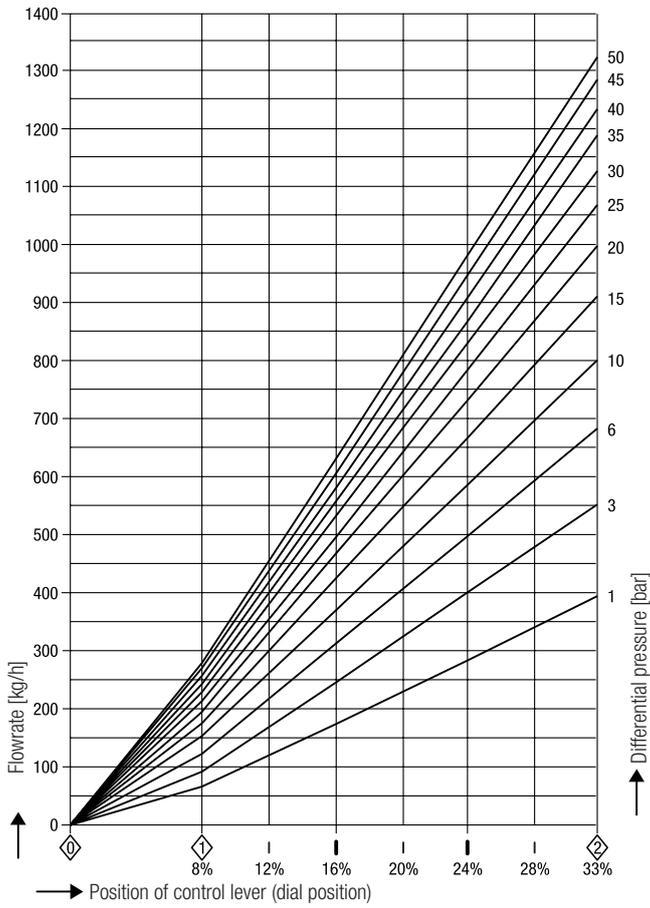


Flow characteristics

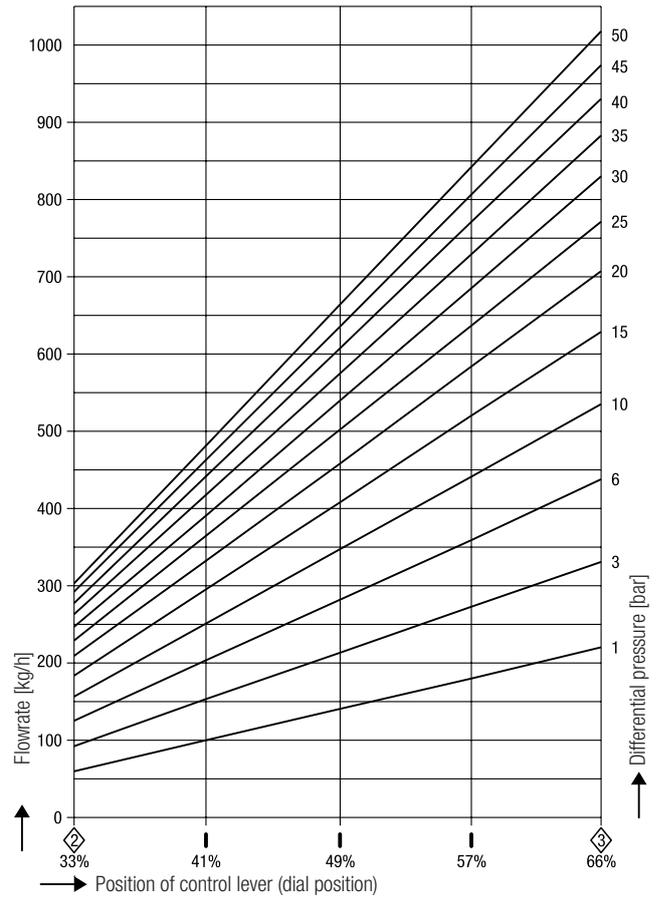
The K_V value is the metric measure for the volume flow of water at a temperature of 5 to 30 °C in [m³/h] with a pressure drop of 1 bar and the control lever at the respective opening angle. The K_{VS} value is the K_V value with the control lever fully open.

| BA(E) 46, BA(E) 47 DN 15-32 | Position | K_V value [m³/h] |
|--------------------------------|----------|-----------------------|
| Control lever | 2 | 0.072 |
| | 3 | 0.325 |
| | 4 | 0.885 |

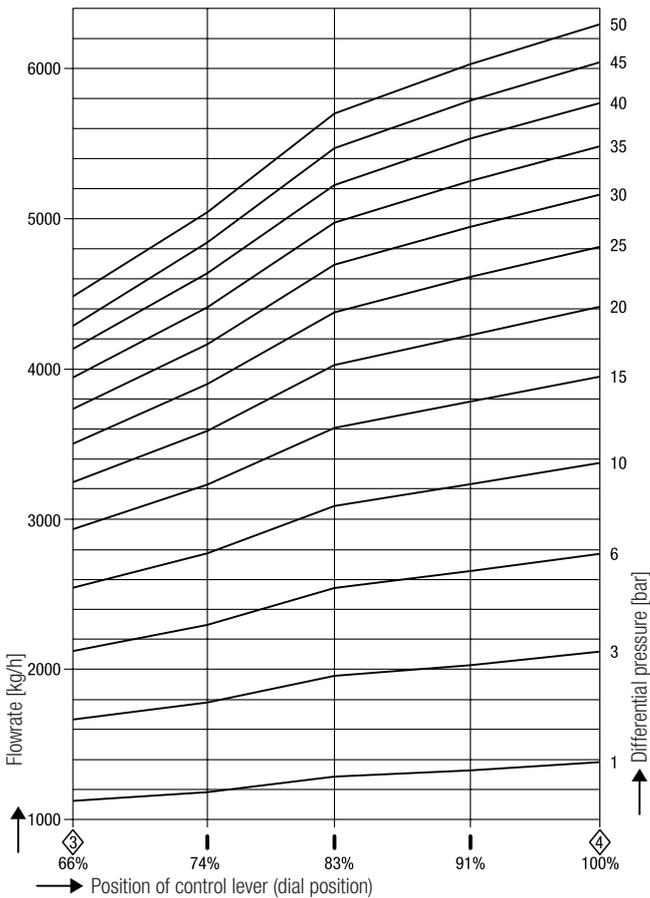
**Flow diagram for DN 40 and DN 50,
capacity range up to 1,340 kg/h**



**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 [m³/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.

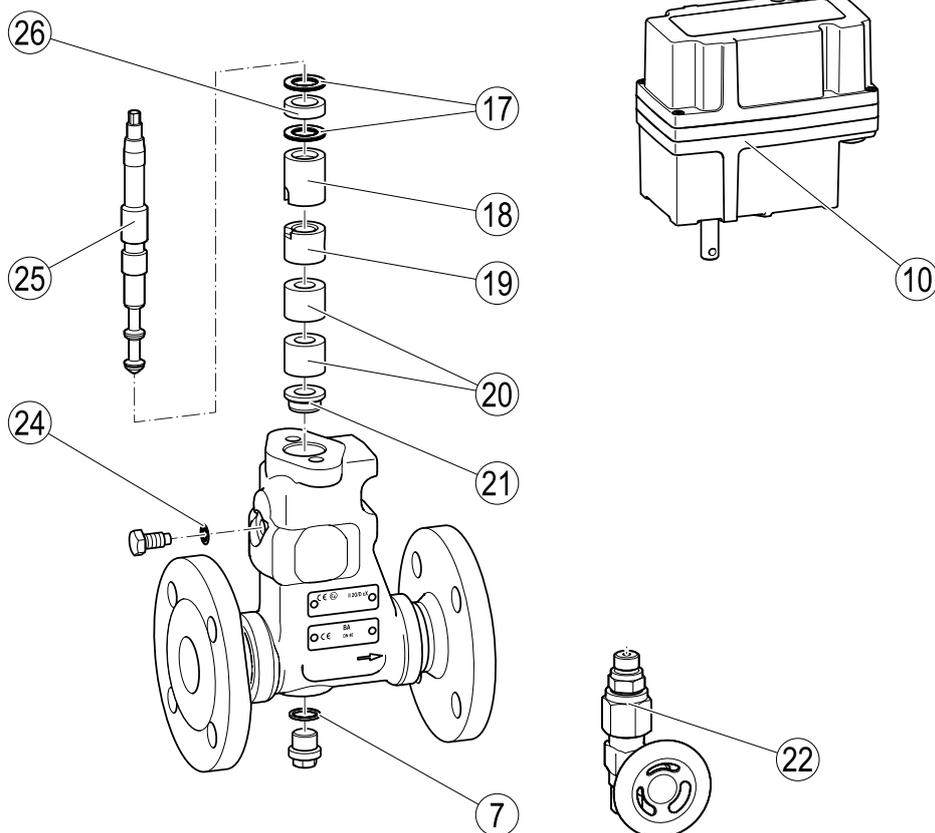
The equipment has classification: CE Ex II 2G/D c X.

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.

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 |

Please note our general terms of business.

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