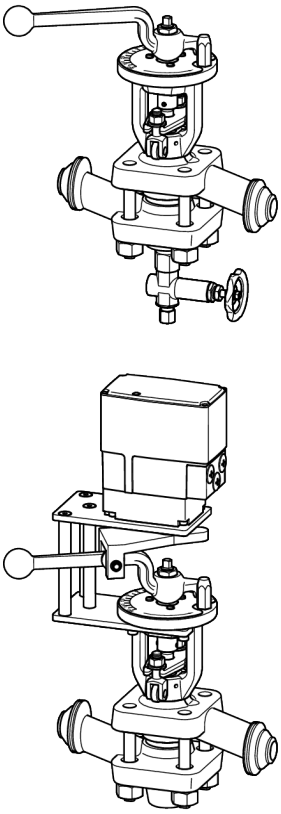
GESTRA®



Continuous Blowdown Valve
Reaktomat®

BA 210
BA 211
BAE 210
BAE 211

EN
English

Original Installation Instructions

818996-02

Contents

Foreword

This installation & operating manual will help you use the following types of equipment safely and efficiently for their intended purpose.

Equipment for continuous discharge by lever:

- Continuous blowdown valve Reaktomat® BA 210
- Continuous blowdown valve Reaktomat® BA 211

Equipment for continuous discharge by electric actuator:

- Continuous blowdown valve Reaktomat® BAE 210
- Continuous blowdown valve Reaktomat® BAE 211

These steam traps will be called equipment in this document.

This installation & operating manual is intended for anyone commissioning, using, operating, servicing, cleaning or disposing of this equipment and, in particular, for professional after-sales service technicians, qualified personnel and authorised and trained staff.

All of these persons must read and understand the content of this installation & operating manual.

Following the instructions given in this installation & operating manual helps avoiding danger and increases the reliability and service life of the equipment. Please note that in addition to the instructions given in this installation & operating manual you must also observe all locally applicable rules and regulations concerning the prevention of accidents as well as approved safety guidelines for good professional practice.

Availability

Keep this installation & operating manual together with the plant documentation for future reference. Make sure that this installation & operating manual is available to the operator.

The installation & operating manual is part of the equipment. Please hand over this installation & operating manual when selling the equipment or passing it on.

Formatting features in the document

Certain text elements of this installation & operating manual feature a specific typographic design. You can easily distinguish the following text elements:

Standard text

Cross-reference

- Listing
  - Sub-items in listings

➢ Steps for action.

Here you will find additional useful information and tips serving to assist you in using the equipment to its fullest potential.

Safety

Use for the intended purpose

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

Equipment for continuous discharge by lever:

- Continuous blowdown valve Reaktomat® BA 210
- Continuous blowdown valve Reaktomat® BA 211

Equipment for continuous discharge by electric actuator:

- Continuous blowdown valve Reaktomat® BAE 210
- Continuous blowdown valve Reaktomat® BAE 211

The equipment must only be used within the allowable pressure and temperature limits and only if the chemical and corrosive influences on the equipment are taken into account.

Type BAE 210 and BAE 211 equipment may only be operated with control units that the manufacturer has approved for use with the

equipment. Information on approved control units can be requested from the manufacturer.

This equipment may only be operated with actuators that the manufacturer has approved for use with the equipment. Information on approved actuators can be requested from the manufacturer.

Correct use includes compliance with the instructions given in this installation & operating manual, in particular obedience to all safety instructions.

Any other use of the equipment is considered to be improper.

Note that the equipment is also used incorrectly if the materials of the equipment are not suitable for the fluid.

Basic safety notes

Explosion hazard

- Explosion risk if equipment is used that is not suitable for the environmental conditions. When using the equipment in explosion risk areas make sure that:
  - The permissible surface temperature of the equipment for the place of installation must not be exceeded.
  - If electrically insulated equipment is installed appropriate measures must be taken to discharge any static electricity between pipe flanges.
- The heat generated by friction caused by moving parts that do not run smoothly can cause explosions. Make sure that all moving parts can operate smoothly.
- When carrying out welding work in order to install or remove the equipment flying sparks may be generated that can cause fire or explosion. Observe any on-site regulations for fire and explosion prevention.
  Only qualified personnel is allowed to mount or remove the equipment or its components.

Risk of severe injuries

- The equipment is under pressure during operation and may be hot. Before carrying out any work on the equipment make sure that the following requirements are met:
  - The pipes must be depressurized (0 bar).
  - The fluid must be completely removed from the pipes and the equipment.
  - During work on the equipment the installation must be switched off and protected against unauthorised or unintended activation.
  - The pipes and the equipment must have cooled down to room temperature (approx. 20 °C).
- If the equipment is used in contaminated areas there is a risk of severe injuries or death caused by harmful substances in or on the equipment. Before working on the equipment make sure that it is completely decontaminated. Always wear the protective clothing prescribed for contaminated areas when working on the equipment.
- The equipment must only be used with fluids that do not attack the material and the gaskets and sealings of the equipment. Otherwise leaks may occur and hot or toxic fluid could escape.
- The equipment and its component parts must only be mounted or removed by qualified personnel. A qualified person must be acquainted with and experienced in the following:
  - Making pipe connections.
  - Selecting suitable lifting gear and understanding the rules for its safe use.
  - Working with dangerous (contaminated, hot or pressurized) fluids.
- If the admissible temperature and pressure limits are exceeded the equipment may be destroyed and hot or pressurized fluid may escape. Make sure that the equipment is only operated within the admissible service range and limits.
  For more information on limits and pressure & temperature ratings see name plate and the section "*Technical Data*".

- The moving parts of the equipment can cause severe injuries or death. Make sure that nobody is standing close to these moving parts or can touch them while the equipment is operating. Before working on the equipment make sure that the power supply to the actuator is cut off and cannot be switched on accidentally.
- If the stuffing box is leaking there is a risk of severe injuries caused by escaping hot fluid. Use the equipment only if it is in proper working condition. Replace any leaking stuffing box seal.
- The connections of the electric actuator are live during operation. Take care not to touch connections during operation. Disconnect the actuator from the power supply before performing any work on the equipment.
- A sound pressure level of over 70 dB(A) is possible during operation. Damage to or loss of hearing is possible.
  Wear ear protectors when working on the equipment, and mark out the danger zone.

Risk of minor injuries

- Sharp edges on internals present the danger of cuts to hands. Always wear industrial gloves when servicing the equipment.
- If the equipment is inadequately supported during installation, there is a risk of getting crushed if it falls. Use the eyebolt to secure lifting gear, if available. Secure the equipment during installation so it cannot fall. Use the eyebolt to do this, if available. Wear sturdy safety boots.
- In terms of strength, the equipment is designed for a connection size of DN 25. If the pipe connection is subject to higher stresses, the admissible strength limit may be exceeded, leading to a risk of breakage. In this case, make sure that structural measures are taken to prevent higher stress on the pipe connection.
- Raising the equipment incorrectly can lead to injury. Equipment weighing more than around 15 kg requires support from a second person or suitable lifting gear. The precise weight above which support is needed depends on your physical capabilities and local regulations and conditions.

Information on property damage or malfunctions

- Malfunctions will occur if the equipment is installed in a wrong position or with the flow arrow pointing in the opposite direction of the fluid flow. This may result in damage to the equipment or the installation. Make sure that the flow arrow on the equipment body matches the indicated direction of the fluid flow in the pipe.
- If the material is unsuitable for the fluid, increased wear may occur and fluid may escape. Make sure that the material is suitable for the fluid used in your installation.

Qualification of personnel

A qualified person must be acquainted with and experienced in the following:

- the pertinent on-site rules and regulations for preventing fire and explosions as well as industrial safety regulations
- working on pressure equipment
- making pipe connections
- working with dangerous (hot or pressurized) fluids
- lifting and transporting loads
- observing all notes and instructions in this installation & operating manual and the applicable documents
- connecting the power supply of the actuator

Protective gear

The operator must ensure that anyone working on the equipment must wear the required protective clothing and safety gear stipulated for the site of installation. The protective clothing must be suitable for the used media and must protect the wearer against safety and health hazards associated with a particular job to be carried out at the site of installation. Protective clothing & equipment must provide protection from potential hazards, in particular from injuries to:

- Head
- Eyes
- Body
- Hand
- Feet
- Hearing

Note that this list is not exhaustive. The operator must establish personal protective equipment guidelines and specify any additional protective gear that is required if the worker is exposed to a specific risk at the site of installation.

Typographic features of warning notes

DANGER

Notes with the heading DANGER warn against imminent dangerous situations that can lead to death or serious injuries.

WARNING

Notes with the heading WARNING warn against possibly dangerous situations that could lead to death or serious injuries.

CAUTION

Notes with the heading CAUTION warn against dangerous situations that could lead to minor or moderate injuries.

Formatting features for warnings of property damage

Attention!

This information warns of a situation leading to property damage.

Description

Scope of supply and equipment specification

BA and BAE models have different types of actuator. The two types of actuator are shown below in separate diagrams. The bodies are identical in both models.

Scope of supply

Our equipment is delivered packed and ready for assembly.

Dedicated operating manuals are supplied for the various external devices, such as the following:

- External control system
- Actuator
- Sampling valve

These operating manuals count as applicable documents to this document.

➢ Read and follow all instructions in these operating manuals.

Equipment specification

BA equipment is operated manually.

BAE equipment is also equipped with an electric actuator.
The standard installed actuator is a type EF 30, 85-265 V AC, 50/60 Hz.

BA/BAE 210 and BA/BAE 211 models have different areas of application.

Nozzles for low flowrates are available for all models. Nozzles consist of a nozzle insert and nozzle needle. Equipment featuring these nozzles is identified by the letter “k” after the type designation. By replacing the nozzle, you can retrospectively convert standard equipment into equipment designed for low flowrates.

In this Installation & Operating Manual, equipment for low flowrates is referred to in brief as “k equipment”.

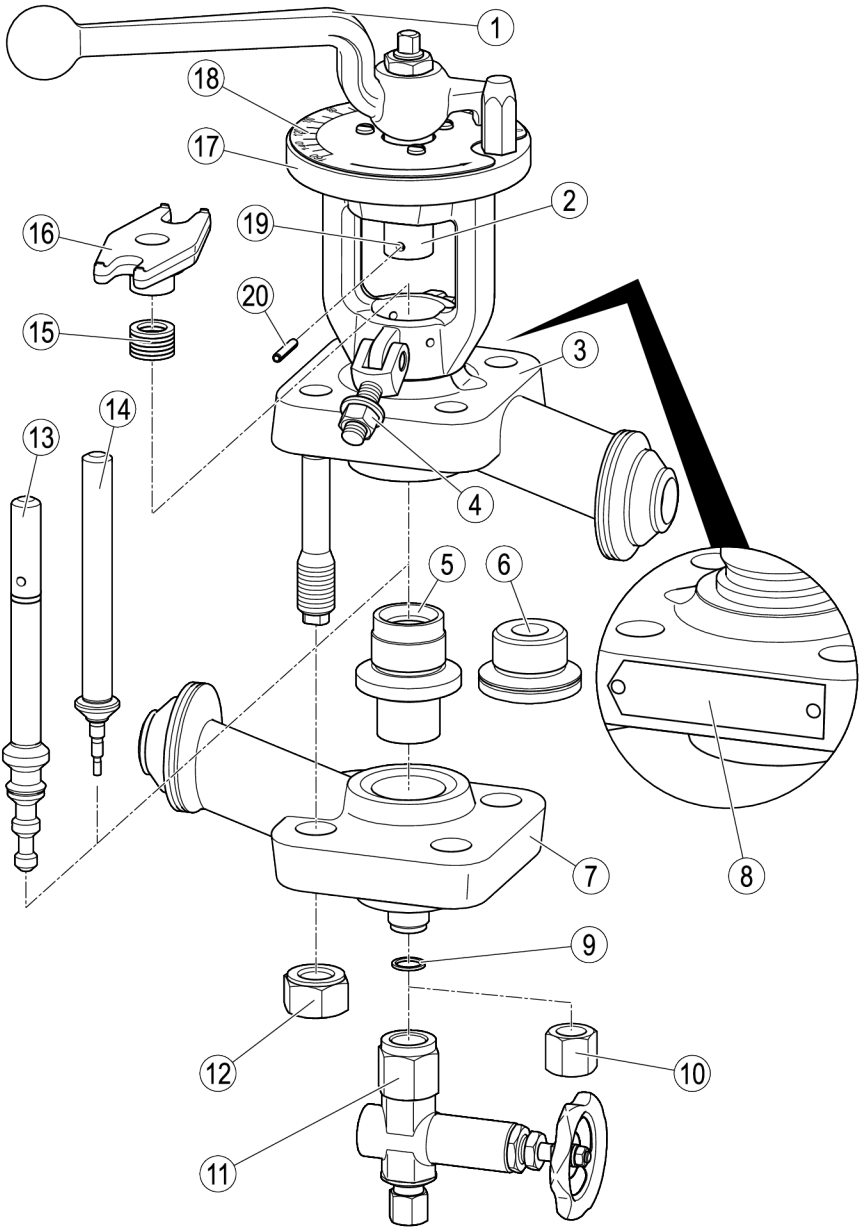
Nozzles for k equipment are referred to as “K nozzles”. Nozzle inserts for k nozzles are referred to as “K nozzle inserts”. Nozzle needles for k nozzles are referred to as “K nozzle needles”.

To distinguish equipment for normal flowrates from k equipment, it is referred to as “standard equipment”.
In this case, the nozzles and their components are referred to as “standard nozzles”, “standard nozzle inserts” and “standard nozzle needles”.

The equipment comes with a sampling valve as standard. If you order equipment without a sampling valve, it cannot be retrofitted.

A body with lock nut is available on request. This allows a sampling valve to be retrofitted.

Equipment overview, BA



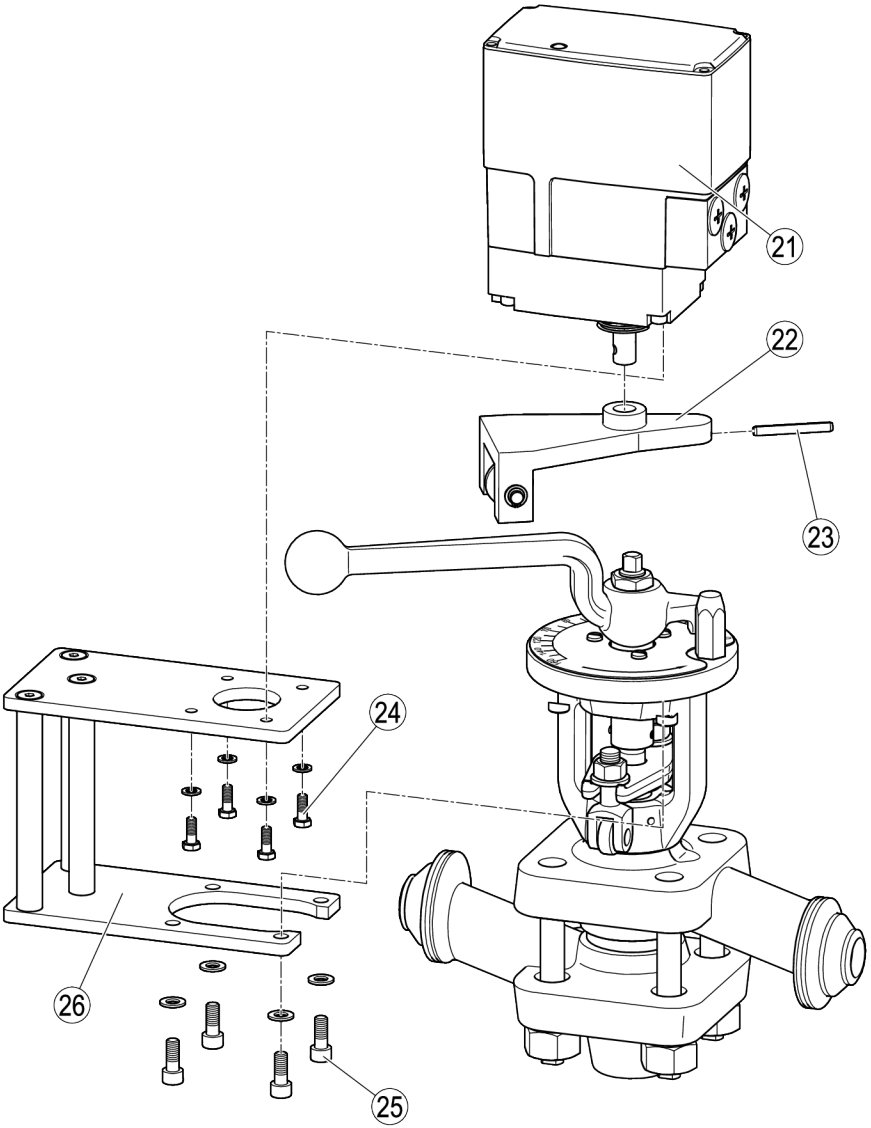
No.	Designation
1	Control lever
2	Stem attachment
3	Upper body section
4	Hinged bolt
5	Standard nozzle insert
6	K nozzle insert (optional, for low flowrates)
7	Lower body section
8	Name plate
9	Sealing ring[1]
10	Lock nut[1] (optional)

No.	Designation
11	Sampling valve
12	Hexagon nuts (4 x)
13	Standard nozzle needle
14	K nozzle needle (optional, for low flowrates)
15	Packing rings (6 x)
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.

Equipment overview, BAE

The diagram below only lists the additional components of the electric actuator. The other components are identical to those of the BA model.



No.	Designation
21	Actuator
22	Claw coupling
23	Dowel pin

No.	Designation
24	Hexagon head bolt M6 × 18
25	Socket-head screw M8 × 20
26	Support

The standard actuator provided is an ARIS EF 30 85-265V AC, 50/60 Hz. Other types of actuator are available.

Type designations

These types of actuator are not suitable for use in potentially explosive atmospheres.

➢ For information on actuators with Ex classification and other types of actuator, please contact the manufacturer.

The following equipment versions are possible:

Type	PN	Scale range	Operation
BA 210	250	0–160	Manual
BA 210 k		0-255	
BA 211	320	0–160	
BA 211 k		0-255	
BAE 210	250	0–160	Actuator
BAE 210 k		0-255	
BAE 211	320	0–160	
BAE 211 k		0-255	

Optional extras

The following optional extras are available for the equipment:

- K nozzle for equipment with a low flowrate
- Sampling valve (only for equipment with a lower body section featuring the optional connection for a sampling valve)

The following electric actuators are suitable for the BAE.

- EF30 actuator with voltage 85—265V AC, 50/60Hz
- EF30 actuator with voltage 24V DC
- EF30 actuator with 1,000 ohm potentiometer
- EF30 actuator with controller, I-ACT 0(4)—20 mA, 0—10 V
- EF30 actuator with electronic position transmitter 0(4)—20 mA, 0—10 V

For these models, the opening of the valve can be initiated by different control systems.

You can find information on the actuator and control system in the manufacturer's instructions supplied with the product.

End connections

The equipment is available with the following end connections:

- Flanges
- Socket-weld ends
- Butt-weld ends

Name plate

The following items are indicated on the name plate:

- Manufacturer
- Type designation
- Nominal size
- Pressure rating
- Max. service pressure
- Direction of flow

The following items are indicated on the equipment body:

- Date of manufacturing

The limiting conditions and pressure & temperature ratings specified in this installation manual are applicable for standard equipment. Note that these values may differ for modified or customized equipment.

All equipment specific values are indicated on the nameplate.

Application of European Directives

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):

- Fluids of group 2

Due consideration must be given to chemical and corrosive influences.

Use in potentially explosive atmospheres

BA 210 and BA 211 equipment

The equipment does not have its own potential source of ignition (as per ATEX Directive). Please pay attention to the following information:

➢ Please observe the following notes if the equipment is to be used in explosion-risk areas:

When installed, static electricity may arise between the equipment and the connected system.
When used in potentially explosive atmospheres, the plant manufacturer or plant operator is responsible for discharging or preventing possible static charge.

When working on the equipment, sparks can trigger an explosion.
Only work on the equipment when no potentially explosive atmosphere is present.

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

BAE 210 and BAE 211 equipment with actuator

Do not use the equipment in potentially explosive atmospheres.

➢ To use the equipment, always also read and follow the instructions from the actuator manufacturer.

Task and function

Purpose

This equipment is used to discharge boiler blowdown from steam generating units, evaporators, quench coolers and similar systems.

BA continuous blowdown valves are used for continuous discharge by lever.

BAE continuous blowdown valves are used for continuous discharge by electric actuator.

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).

Storing and transporting the equipment

Attention!

Equipment can be damaged if stored or transported improperly.

- ➢ Close all openings with the sealing plugs or covers supplied with the equipment or use similar sealing covers.
- ➢ Protect the equipment against moisture and corrosive atmospheres.
- ➢ Please contact the manufacturer if the specified transport and/or storage requirements cannot be met.

➢ Before transport and storage, turn the control lever to the “open” position.

The control lever must be parallel to the direction of flow.

Storing the equipment

➢ Please observe the following items when storing the equipment:

- ◗ Do not store the equipment for more than 12 months.
- ◗ Use the supplied sealing plugs or other suitable seal caps in order to seal off all openings of the equipment.
- ◗ Protect the sealing surfaces and contact areas against mechanical damage.
- ◗ Protect the equipment and all components against hard shocks and impacts.
- ◗ Store the equipment only in closed rooms that meet the following environmental conditions:
  - ◗ Air humidity below 50 %, not condensing
  - ◗ Indoor air: clean, salt-free and non-corrosive
  - ◗ Temperature 5–60 °C.
  - ◗ Control lever in the “open” position, parallel to the direction of flow

➢ Make sure that all these requirements are always met when storing the equipment.

➢ Please contact the manufacturer if you cannot comply with the recommended storage conditions.

Transporting the equipment

DANGER

Risk of bruises if the equipment or component parts fall down.

- ➢ Use suitable lifting gear when moving or lifting the equipment and/or component parts.
- ➢ Make sure that the equipment cannot topple over.
- ➢ Make sure that nobody is standing below the lifted equipment.

CAUTION

Do not drop the equipment. If it falls down it may cause bruises and injuries.

- ➢ To transport and mount the equipment safely use suitable lifting gear.
- ➢ Connect the noose strap of the lifting gear to the body.
- ➢ Provide sufficient support for the equipment during transport and installation.
- ➢ Wear protective safety footwear.

The lifting gear must be of sufficient strength for the equipment including the actuator.

More lightweight equipment can be transported and assembled without the use of lifting gear.

Equipment weighing more than around 15 kg requires support from a second person or suitable lifting gear.

The precise weight above which support is needed depends on your physical capabilities and local regulations and conditions.

➢ Meet the requirements for storage also when transporting the equipment.

➢ Prior to transport seal off connections with sealing plugs.

If you do not have the sealing plugs supplied with the equipment use appropriate seal caps to seal off the connections.

- For short distances (only a few metres) you can transport the equipment unpacked.
- When transporting the equipment over larger distances use the original packaging.
- If you do not have the original packaging use a box that protects the equipment adequately against corrosion and physical damage.

For a short period of time the equipment may be transported even if the temperature is below 0 °C, provided that the equipment is completely empty and dry.

Mounting and connecting the equipment

Preparing installation

- Take the equipment out of the transport packaging.
- Check the equipment for transport damage.
- Contact the manufacturer if you detect any kind of shipping damage.

When supplied by the factory, the connections may be sealed off with sealing plugs.

- Remove sealing plugs before mounting the equipment.
- Keep the sealing plugs and the packing for further use.

DANGER

Personnel working on pipes are exposed to safety risks and may suffer severe injuries, poisoning or even loss of life.

- Make sure that no hot or hazardous fluid is in the equipment or the pipes.
- Make sure that the pipes upstream and downstream of the equipment are depressurised.
- Make sure that the installation is switched off and protected against unauthorised or unintended activation.
- Make sure that the equipment and the pipes have cooled down to room temperatures.
- Wear protective clothing that is suitable for the fluid and, if necessary, wear protective gear.

For more information on suitable protective clothing and safety gear refer to the safety data sheet of the fluid in question.

- Drain pipes until they are empty.
- Switch the installation off and protect it against unauthorised or unintended re-activation.

Connecting the equipment

DANGER

Incorrectly connected equipment can result in accidents with extremely severe injuries or death.

- Make sure that only specialist personnel connect the equipment to the pipe.
- Make sure that the direction of flow in the pipe matches the flow direction arrow on the equipment.
- Make sure that the connected pipe does not subject the body to any stress (forces or torques) during installation and operation.

Specialist personnel must have knowledge and experience of the type of pipe connection used.

CAUTION

Do not drop the equipment. If it falls down it may cause bruises and injuries.

- ➢ To transport and mount the equipment safely use suitable lifting gear.
- ➢ Connect the noose strap of the lifting gear to the body.
- ➢ Provide sufficient support for the equipment during transport and installation.
- ➢ Wear protective safety footwear.

More lightweight equipment can be transported and assembled without the use of lifting gear.

Equipment weighing more than around 15 kg requires support from a second person or suitable lifting gear.

The precise weight above which support is needed depends on your physical capabilities and local regulations and conditions.

Attention!

Equipment will be damaged if the end connections are undersized.

- ➢ Make sure that the connections are strong and rigid enough to support the weight of the equipment and to withstand the forces that occur during operation.

Position the equipment below the low-level mark. The manufacturer recommends keeping the length of the pipe between the steam generating unit and the equipment to less than two metres. Otherwise, the equipment may not function optimally.

- ➢ Make sure that these conditions have been adhered to at the installation site.

Consider space required for servicing the equipment and/or exchanging components and observe the necessary withdrawal distance to remove the cover. For more information on the required withdrawal distances see section "*Dimensions and weights*" on page 38.

- ➢ Make sure that the pipe system of the plant is clean.
- ➢ Make sure that the equipment is free from foreign matter.
- ➢ Install the equipment in the desired, permitted installation position.
- ➢ Connect the end connections of the equipment properly to the pipes.

Some materials require a subsequent heat treatment of the welds after the equipment has been welded in place. If you want to perform a heat treatment please observe the following notes:

Attention!

The equipment might get damaged.

- ➢ Make sure that only qualified personnel carries out the heat treatment.
- ➢ Before starting the heat treatment make sure that the equipment is not insulated.

Specialist personnel must be highly qualified and fully experienced in making welded joints with the type of material used. For information on the materials of the equipment see the nameplate on the equipment.

- ➢ Make sure that the valve is at its middle position, i. e. half stroke.
- ➢ Have the heat treatment of weld seams performed by specialist personnel.
- ➢ Attach any necessary insulation to the equipment after heat treatment.

DANGER

Incorrectly connected equipment can cause fatal accidents or severe injuries.

- ➢ Make sure that only qualified skilled personnel connect the actuator to the power supply.
- ➢ Follow all instructions given by the actuator manufacturer.

Specialist personnel must be highly qualified and fully experienced in connecting the power supply in question.

- Connect the actuator properly to its power supply.
- When doing this, read and follow the instructions in the actuator operating manual.
- Make sure that the equipment is safely mounted and that all connections are made correctly.

Starting up the equipment

WARNING

Risk of burns from hot parts during operation.

- Wear insulated and heat-resistant protective gloves to operate the control lever.

WARNING

Risk of being crushed by moving parts.

BAE type equipment is actuated and controlled remotely. It can therefore open or close without warning.

- Never reach into moving parts during operation.

Attention!

Bringing the system into service with safety equipment attached can damage the system.

- Before bringing into service, make sure that transport locks and lifting devices have been removed.

- Actuate the equipment after the steam generating unit or pressure vessel has powered up, as described in the following section.
- Check whether fluid is escaping from the stuffing box bush.
- If it is, retighten the stuffing box as described on page 24.

Determining the 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 µS/cm

K = admissible conductivity of boiler water in µS/cm

Example

BA 210, nominal size DN 25

Differential pressure: 50 bar

S = 5 µS/cm

K = 200 µS/cm

Boiler water blowdown rate

$W \approx 900$ kg/h

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

Continuous blowdown rate $W1 \approx 810$ kg/h

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

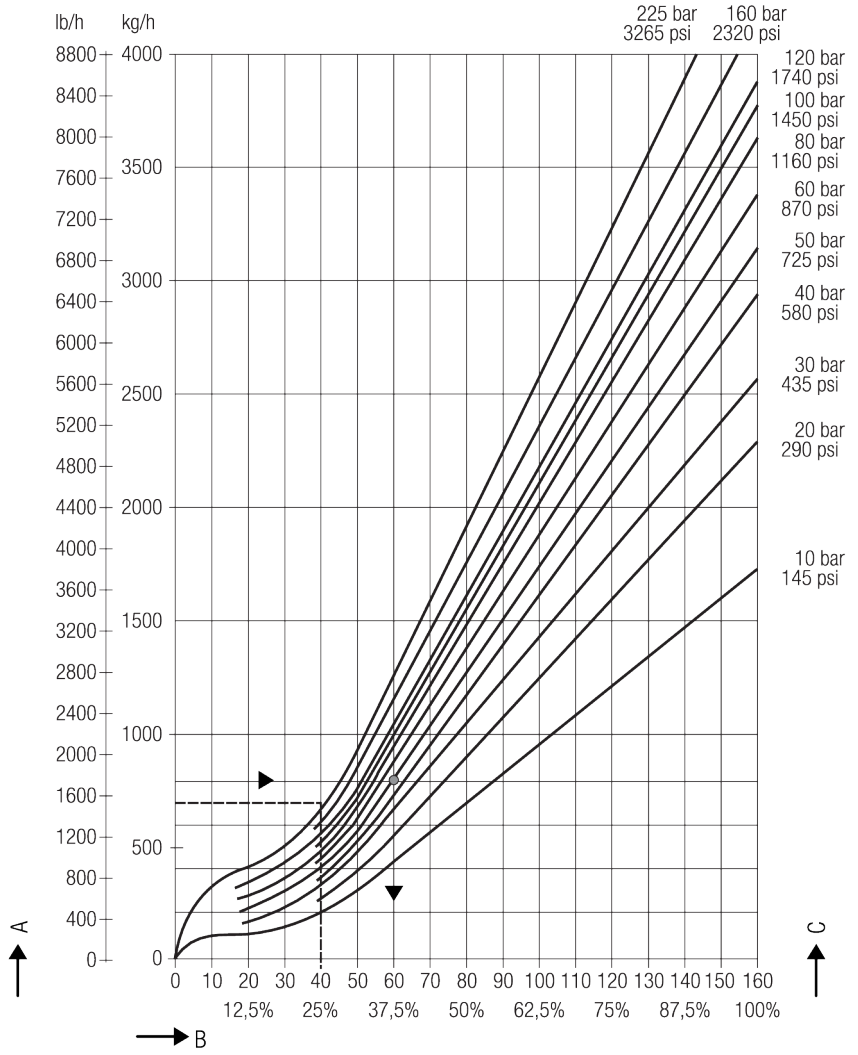
- Use the flow chart to determine the point of intersection of the flowrate (W1) and the curve for the given differential pressure.
- Determine the point at which the curve for the given differential pressure intersects with the flowrate you are calculating.
- Drop a perpendicular onto axis B.

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

Determining the flowrate

- Determine the position of the control lever individually for each boiler using the flow charts below.

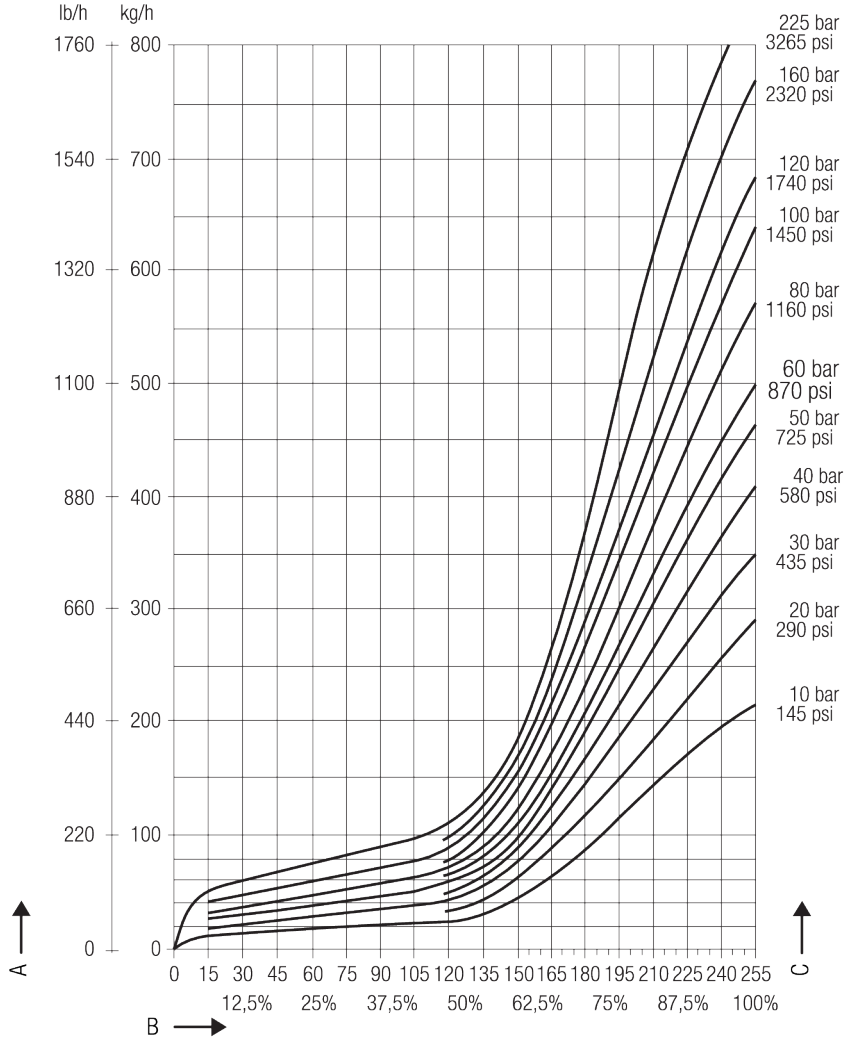
Flow chart for standard equipment



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).

Flow chart for equipment with K nozzle

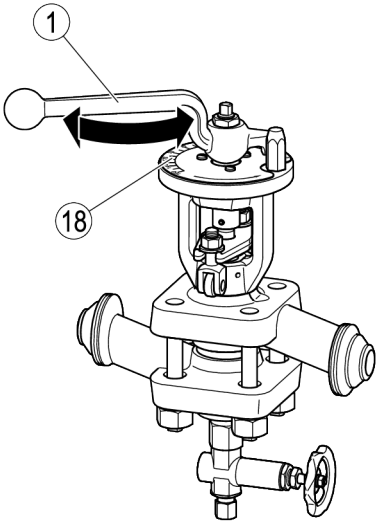


A	Flowrate	kg/h or lb/h
B	Position of control lever and associated valve opening	Scale value or %
C	Differential pressure	bar or psi

Adapting settings

Setting BA equipment

➢ Turn the control lever (1) to the position you have determined on the scale (18).



Setting BAE equipment

On standard BAE equipment, the settings of the EF 30 actuator are as follows on delivery:

- CLOSED (scale position "0")
- OPERATING POSITION (scale position "120")
- OPEN (scale position "160")

On EF 30 actuators with optional feedback pot, the feedback potentiometer settings are as follows on delivery:

- 50 Ω ± 5 Ω at scale position "0" (CLOSED)
- 940 Ω ± 5 Ω at scale position "160" (OPEN)

The position transmitter settings of the EF 30 actuator with electronic position transmitter or I-ACT controller are as follows on delivery:

- 4 mA at scale position "0" (CLOSED)
- 20 mA at scale position "160" (OPEN)

Setting k equipment

On BAE k equipment, the EF 30 actuator settings are as follows on delivery:

- CLOSED (scale position "0")
- OPERATING POSITION (scale position "40")
- OPEN (scale position "255")

On EF 30 actuators of k equipment with optional feedback pot, the feedback potentiometer settings are as follows on delivery:

- 50 Ω ± 5 Ω at scale position "0" (CLOSED)
- 940 Ω ± 5 Ω at scale position "255" (OPEN)

The position transmitter settings of the EF 30 actuator in k-equipment with electronic position transmitter or I-ACT controller are as follows on delivery:

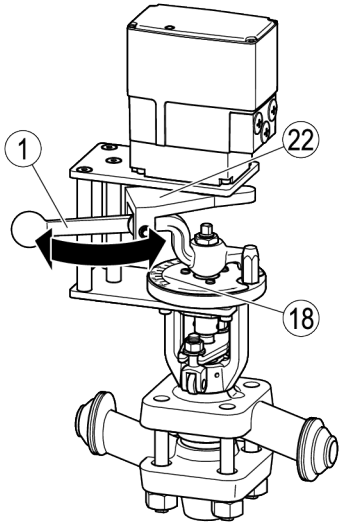
- 4 mA at scale position "0" (CLOSED)
- 20 mA at scale position "255" (OPEN)

➢ Carry out the settings as described in the actuator and control unit operating manuals.

Emergency mode on failure of the actuator in the BAE 210 and BAE 211

If the actuator is not functioning, you can carry out settings manually in emergency mode. Proceed as follows:

- ➢ Make sure that the actuator has been disconnected from the power supply.
- ➢ Lift the claw coupling (22) about 2 cm by hand.
- ➢ Turn the control lever (1) to the position you have determined on the scale (18).



Operation

WARNING

Hot liquids and steam can cause scalding.

- ➢ Wear protective clothing that is suitable for the fluid and, if necessary, wear protective gear.

Protective clothing and protective gear must protect the whole body against contact with escaping hot steam.

For more information on suitable protective clothing and safety gear refer to the safety data sheet of the fluid in question.

WARNING

Risk of burns from hot components during operation.

- ➢ Wear insulated and temperature-resistant protective gloves when operating the control lever.

WARNING

Risk of being crushed by moving parts.

The control lever of the BAE is powered electrically and can open and close unexpectedly.

- ➢ Never reach into moving parts during operation.

Apart from opening and closing, no further work is needed on the equipment during operation.

- ➢ Check the condition and operation of the equipment in accordance with the specifications of the plant operator.

After operation

DANGER

If fluid escapes personnel may suffer severe injuries, poisoning or even loss of life.

- After working on the equipment make sure that all connections and valves are tight.
- Make sure that the gaskets of the body are leakproof.

DANGER

If the equipment is used in contaminated areas there is a risk of severe injuries or death caused by harmful substances in or on the equipment.

- Only qualified personnel are allowed to perform work on contaminated equipment.
- Always wear the protective clothing prescribed for contaminated areas when working on the equipment.
- Make sure that the equipment is completely decontaminated before carrying out any service work.
- Follow the pertinent instructions for handling the hazardous substances in question.

DANGER

Personnel working on pipes are exposed to safety risks and may suffer severe injuries, poisoning or even loss of life.

- Make sure that no hot or hazardous fluid is in the equipment or the pipes.
- Make sure that the pipes upstream and downstream of the equipment are depressurised.
- Make sure that the installation is switched off and protected against unauthorised or unintended activation.
- Make sure that the equipment and the pipes have cooled down to room temperatures.
- Wear protective clothing that is suitable for the fluid and, if necessary, wear protective gear.

For more information on suitable protective clothing and safety gear refer to the safety data sheet of the fluid in question.

DANGER

Risk of bruises when working on the equipment during operation.

- Switch off the equipment if you have to work close to any moving equipment parts.
- Make sure that the equipment cannot be switched on inadvertently.

Attention!

Damage to the equipment due to improper maintenance work.

- Make sure that only qualified personnel performs maintenance work.

A qualified person must be acquainted with and experienced in the following:

- Working on pressure equipment
- Lifting loads
- Assembling and disassembling the equipment
- The qualified personnel must observe and follow the instructions given in this operating manual and in the applicable documents.

Attention!

Frost damage can occur when the system is switched off.

➢ Drain the equipment if there is a risk of frost.

Removing external dirt deposits

➢ To remove dirt deposits rinse the equipment with fresh water and wipe it with a clean, lint-free cloth.

➢ To remove any persistent residues use a cleaning agent that is suitable for the material and carefully wipe the equipment with a clean, lint-free cloth.

Maintaining the equipment

To disassemble the equipment use the following tools:

- Combination spanner size 18
- Combination spanner size 24
- Combination spanner size 30
- Combination spanner size 32
- Torque wrench 5-100 Nm
- Torque wrench 80-400 Nm
- Pin punch 4 mm
- Hammer, 300 g

Maintenance schedule

Interval	Component	Activity
Daily	Nozzle needle	Move nozzle needle by at least one full stroke.
3 months	Stuffing box seal	Visually inspect to ensure tightness. Replace a leaky stuffing box.
	◗ Connections ◗ Body gasket ◗ Cone guide	Visually inspect for the following points: ◗ Tightness ◗ Cleanliness Replace leaky or worn components. Remove dirt.
12 months	Actuator fastening	Check that the actuator is securely seated on the equipment and inspect bolts. Tighten loose connections.
36 months	Entire equipment	Check condition of inner parts. Replace defective or worn components.

Flushing manually set equipment

Attention!

Blocked equipment can lead to damage or malfunctions.

➢ Flush the equipment daily.

Attention!

Exceeding the operating limits can damage the system.

➢ When flushing, take care not to exceed the operating limits of downstream parts of the system.

➢ Briefly turn the control lever to “Purge”.

➢ Then move the control lever back to its original position.

Flushing equipment with an actuator

Attention!

Blocked equipment can lead to damage or malfunctions.

➢ Flush the equipment daily.

Attention!

Exceeding the operating limits can damage the system.

➢ When flushing, take care not to exceed the operating limits of downstream parts of the system.

➢ Select the “Flush” setting, as described in the actuator and control unit operating manuals.

Retightening the stuffing box

If the stuffing box packing is leaking, retighten the hinged bolts.

WARNING

Risk of burns from hot components during operation.

➢ Wear insulated and temperature-resistant protective gloves when operating the control lever.

WARNING

Risk of being crushed by moving parts.

The control lever of the BAE is powered electrically and can open and close unexpectedly.

➢ Never reach into moving parts during operation.

➢ For BAE equipment, make sure that the actuator has been disconnected from the mains supply.

➢ Drain the equipment.

➢ Fully close the valve.

➢ Make sure that there is no fluid in the equipment and it is lukewarm, at the most.

➢ Tighten the two hinged bolts evenly.

The torque required for tightening the stuffing box bush is generally 35 Nm. The precise torque varies and depends on the condition of the stuffing box packing. You need to tighten the stuffing box bush until the following conditions have been met:

◗ No fluid may escape from the stuffing box.

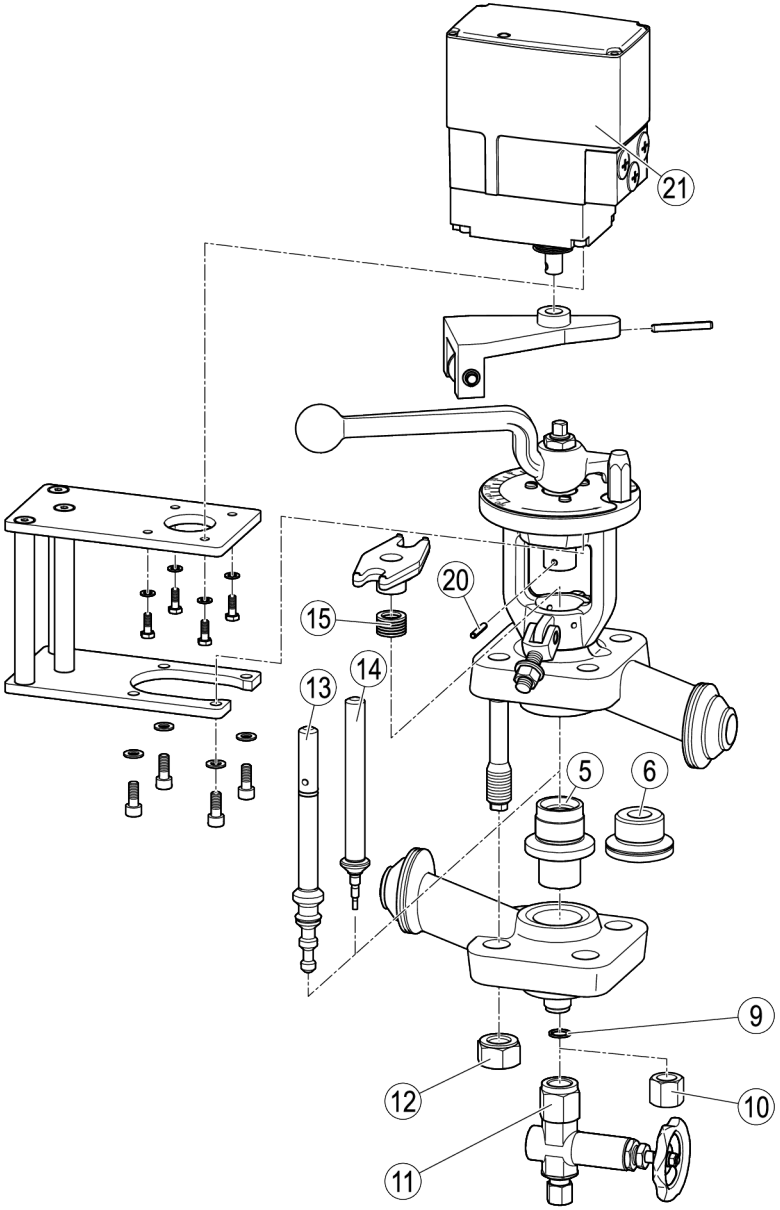
◗ The stuffing box must not hinder the movement of the control lever.

➢ Check that the control lever can still move freely.

➢ Check that the stuffing box packing is leak-tight.

Servicing the equipment and installing spare parts

You may exchange the following component parts
in case of wear or damage:



No.	Designation	Stock code	
		Standard equipment	k equipment
	Spare parts set, complete:	333565	334036
13/14	◗ Nozzle needle		
5/6	◗ Nozzle insert		
15	◗ 6 packing rings		
20	◗ Dowel pin 5 x 28		
15	6 packing rings	333697	
21	Actuator EF 30 85-265 VAC 60NM 60S/90°[1]	338355	
	Actuator EF 30 85-265 VAC 60NM 60S/90° with 1,000 ohm potentiometer[1]	338354	
	Actuator EF 30 85-265 VAC 60NM 60S/90° with electronic position transmitter 0(4)-20 mA / 0-10 V[1]	338436	
	Actuator EF 30 85-265 VAC 60NM 60S/90° with I-ACT positioner 0(4)-20 mA / 0-10 V[1]	338293	
	Actuator EF 30 24 V DC 60NM 60S/90°[1]	338597	
	Actuator EF 30 24 V DC 60NM 60S/90° with 1,000 ohm potentiometer[1]	338598	
	Actuator EF 30 24 V DC 60NM 60S/90° with electronic position transmitter 0(4)-20 mA / 0-10 V[1]	338599	
	Actuator EF 30 24 V DC 60NM 60S/90° with I-ACT positioner 0(4)-20 mA / 0-10 V[1]	338363	
9, 11	Sampling valve, complete	337957	
9, 10	Lock nut with sealing ring[2]	338022	

1 BAE only

2 Only for bodies with sampling valve connection

Disassembling the equipment

DANGER

Personnel working on pipes are exposed to safety risks and may suffer severe injuries, poisoning or even loss of life.

- Make sure that no hot or hazardous fluid is in the equipment or the pipes.
- Make sure that the pipes upstream and downstream of the equipment are depressurised.
- Make sure that the installation is switched off and protected against unauthorised or unintended activation.
- Make sure that the equipment and the pipes have cooled down to room temperatures.
- Wear protective clothing that is suitable for the fluid and, if necessary, wear protective gear.

For more information on suitable protective clothing and safety gear refer to the safety data sheet of the fluid in question.

WARNING

Risk of burns from hot components during operation.

- Wear insulated and temperature-resistant protective gloves when operating the control lever.

WARNING

Risk of being crushed by moving parts.

The control lever is powered electrically (BAE) or by spring force (BA) and can open and close unexpectedly.

- Never reach into moving parts during operation.

The equipment needs to be removed in order to separate the upper body section from the lower body section.

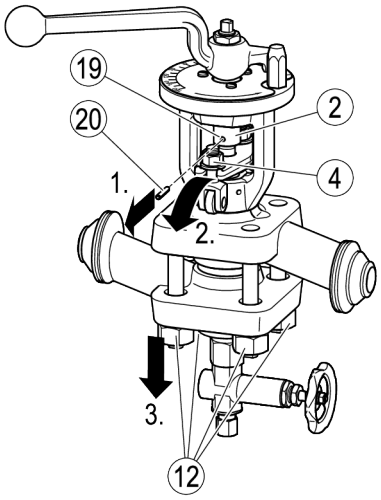
- Have the equipment removed professionally from the pipe.

To disassemble the equipment, you must turn the control lever to a certain scale position.

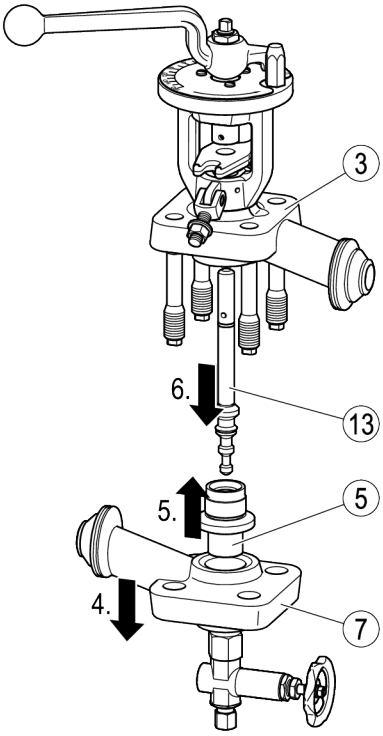
This scale position varies depending on the type of equipment:
With standard equipment, the required scale position is “40”.
With k equipment, the required scale position is “75”.

In equipment with an actuator, you first need to lift the claw coupling about 2 cm.

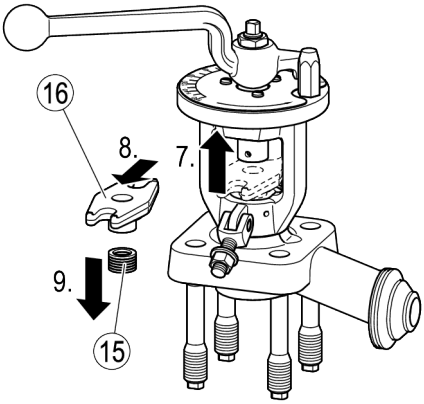
- Turn the control lever to the scale position to disassemble the equipment.
- Knock the dowel pin (20) out of the hole (19) in the stem attachment (2) (1.).
- Undo the two hinged bolts (4).
- Swing the hinged bolts away to the side (2.).
- Undo the hexagon nuts (12) in the body (3.).



- Remove the lower body section (7) from the upper body section (3) (4.).
- Take the nozzle insert (5) out of the lower body section (5.)
- Pull the nozzle needle (13) down and out of the upper body section (6.).

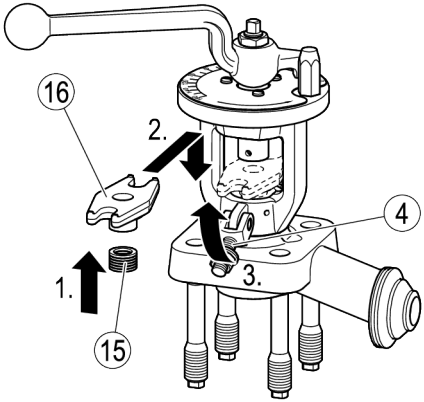


- Lift the stuffing box gland (16) (7.).
- Pull the stuffing box gland out of the side of the equipment (8.).
- Remove the packing rings (15) (9.).



Replacing the stuffing box packing

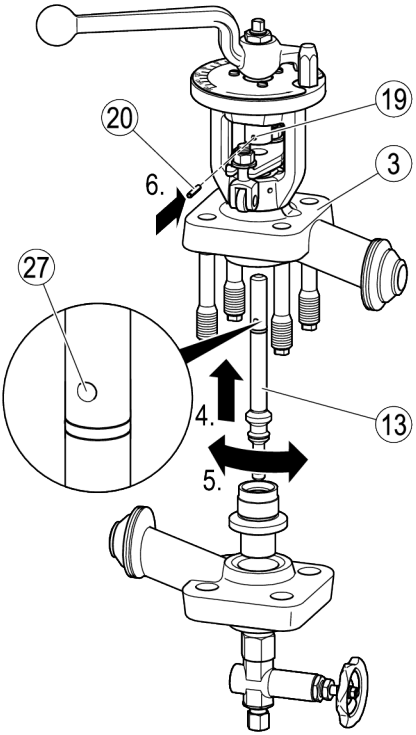
- Disassemble the equipment as described in section “Disassembling the equipment” on page 27 ff.
- Clean the body, sealing surfaces and stuffing box.
- Clean the nozzle needle and nozzle insert.
- Replace the packing rings with new ones.
- Insert the packing rings (15) in the stuffing box (1.).
- Place the stuffing box gland (16) on the upper body section (2.).
- Swing the hinged bolts (4) into position (3.).
- Tighten the hinged bolts a little.



- Insert the nozzle needle (13) in the upper body section (3) (4.).

The hole (27) in the nozzle needle must be aligned with the hole (19) in the stem attachment.

- Turn the nozzle needle to the correct position (5.).
- Insert a new dowel pin (20) in the holes (6.).

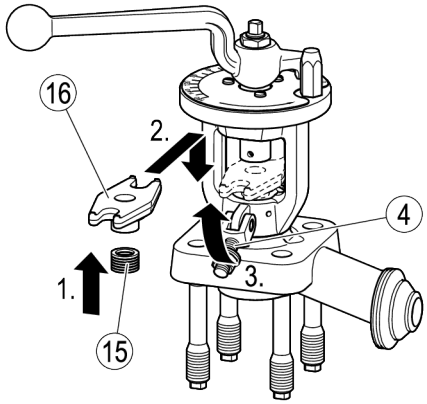


- Assemble the equipment as described in section “Assembling the equipment” on page 31 ff.

Replacing the nozzle

By replacing the standard nozzle with a K nozzle or vice versa, you can adapt the equipment to different flowrates.

- Disassemble the equipment as described in section “Disassembling the equipment” on page 27 ff.
- Insert the packing rings (15) in the stuffing box (1.).
- Place the stuffing box gland (16) on the upper body section (2.).
- Swing the hinged bolts (4) into position (3.).
- Tighten the hinged bolts a little.



The procedure for installing a new nozzle needle differs from the procedure for fitting a used needle.

Installing a used nozzle needle

Attention!

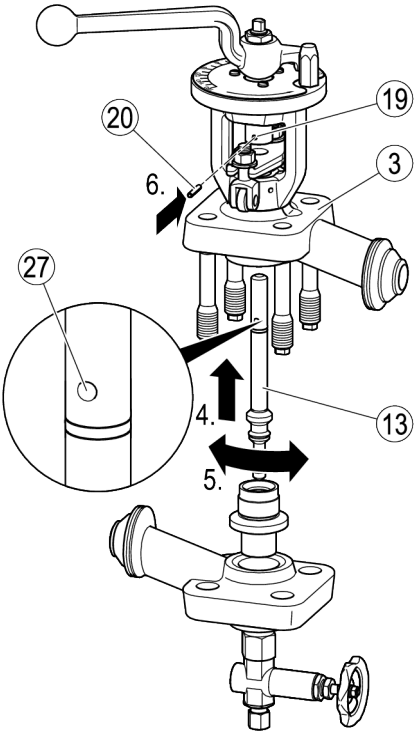
Installing incorrect nozzle parts can cause material damage or malfunctions.

- Always install the correct nozzle needle for your particular nozzle insert.

- Insert the nozzle needle (13) in the upper body section (3) (4.).

The hole (27) in the nozzle needle must be aligned with the hole (19) in the stem attachment.

- Turn the nozzle needle to the correct position (5.).
- Insert a new dowel pin (20) in the holes (6.).



- Assemble the equipment as described in section “Assembling the equipment” on page 31 ff.

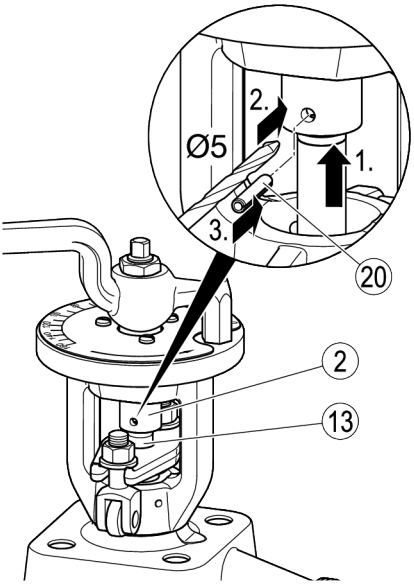
Installing a new nozzle needle

Attention!

Installing incorrect nozzle parts can cause material damage or malfunctions.

- ➢ Always install the correct nozzle needle for your particular nozzle insert.

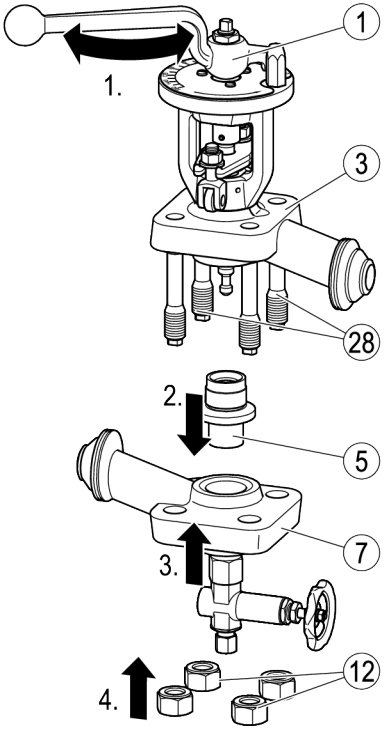
- ➢ Insert the new nozzle needle (13) into the upper body section as far as it will go (1.).
- ➢ Using a 5 mm drill bit, drill through the stem attachment (2) and the nozzle needle (2.)
- ➢ Insert a new dowel pin (20) in the hole (3.)



- ➢ Assemble the equipment as described in section “Assembling the equipment” on page 31 ff.

Assembling the equipment

- ➢ Turn the control lever (1) to “Purge” (1.).
- ➢ Coat the threads of the threaded bolts (28) and hexagon nuts (12) with OKS 217.
- ➢ Insert the nozzle insert (5) in the lower body section (7) (2.).
- ➢ Position the lower body section on the upper body section (3) (3.).
- ➢ Hand-tighten the hexagon nuts (12).

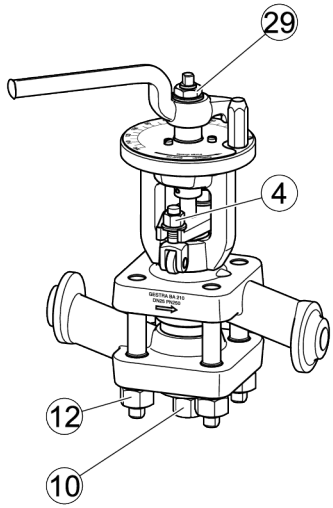


Attention!

The wrong torque can lead to malfunctions.

- Always tighten the nuts and bolts described in the sections below to the torques mentioned there.

- Tighten the four nuts (12) crosswise to a torque of 225 Nm.
- Tighten the hexagon nut (29) to a torque of 70 Nm.
- Tighten the two hinged bolts (4) to a torque of 35 Nm.
- Tighten the lock nut (10) to a torque of 170 Nm.



- Have the equipment installed professionally in the pipe, see page 14 ff.
- Determine the operating position as described in section "*Determining the flowrate*" on page 16 ff.
- Turn the control lever to the operating position.
- In equipment with an actuator, lower the claw coupling onto the control lever.

WARNING

Hot fluid can spurt out and cause injuries.

- If you have disconnected the upper and lower body sections from one another, you must have a pressure test performed after assembly.

Retrofitting the sampling valve

You can only retrofit a sampling valve in equipment with the optional lower body section featuring a connection for this valve. Standard equipment does not have a connection for the sampling valve.

- Proceed in the same way to replace the sampling valve.

The sampling valve is available to order under stock code 337957.

DANGER

Personnel working on pipes are exposed to safety risks and may suffer severe injuries, poisoning or even loss of life.

- Make sure that no hot or hazardous fluid is in the equipment or the pipes.
- Make sure that the pipes upstream and downstream of the equipment are depressurised.
- Make sure that the installation is switched off and protected against unauthorised or unintended activation.
- Make sure that the equipment and the pipes have cooled down to room temperatures.
- Wear protective clothing that is suitable for the fluid and, if necessary, wear protective gear.

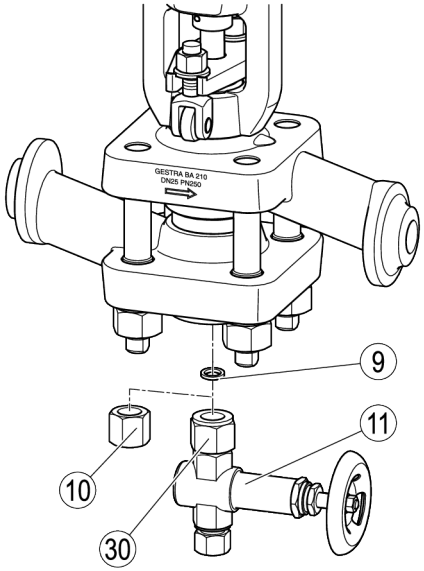
For more information on suitable protective clothing and safety gear refer to the safety data sheet of the fluid in question.

Attention!

An incorrectly installed sampling valve can lead to material damage or malfunctions.

- ➢ Install the sampling valve as described in the following section.
- ➢ For further information, please contact the manufacturer.

- ➢ Undo the lock nut (10).
- ➢ Remove the lock nut and sealing ring (9) from the body.
- ➢ Insert a new sealing ring in the body.
- ➢ Screw the sampling valve (11) onto the body.
- ➢ Align the sampling valve so that the handwheel is under the outlet.
- ➢ Tighten the nut (30) on the sampling valve far enough to ensure that no fluid emerges.



- ➢ To replace the sampling valve with a lock nut, proceed in the reverse order.
- ➢ Tighten the lock nut to a torque of 170 Nm.

Troubleshooting

Problem	Cause	Remedy
Fluid escapes (equipment is leaking).	The equipment or the body is damaged.	Replace the equipment with a new one.
Fluid escapes (equipment is leaking).	A gasket is damaged.	Replace the gasket with a new one. Clean gasket seating surfaces.
Fluid escapes (equipment is leaking).	The connections are not tight.	Provide the connections with leakproof seals.
Fluid escapes (equipment is leaking).	The stuffing box packing has not been tightened enough.	Tighten the stuffing-box packing hand tight. Make sure that the stuffing box packing does not impair the movement of the internals.
Fluid escapes (equipment is leaking).	The stuffing-box packing is damaged.	Replace the stuffing-box packing.
Moving inner parts move jerkily or with difficulty, or are jammed. The actuator cuts out automatically.	The stuffing box is hampering the movement of inner parts.	Slacken the stuffing box screw a little. Replace the stuffing box if damaged.
Moving inner parts move jerkily or with difficulty, or are jammed. The drive cuts out automatically.	The drive or other accessories are defective or damaged.	Follow the instructions in the installation & operating manuals for the drive and accessories.
Moving inner parts move jerkily or with difficulty, or are jammed. The actuator cuts out automatically.	The control system is not working correctly.	Follow the instructions in the control system installation & operating manual.
The equipment does not close fully.	The equipment contains dirt, deposits or foreign bodies.	Open and close the equipment several times quickly. Clean all inner parts. Replace damaged inner parts.

➢ If faults occur that are not listed above or cannot be corrected, please contact our Technical Service or authorized agency in your country.

Putting the equipment out of operation

Removing harmful substances

DANGER

If the equipment is used in contaminated areas there is a risk of severe injuries or death caused by harmful substances in or on the equipment.

- ➢ Only qualified personnel are allowed to perform work on contaminated equipment.
- ➢ Always wear the protective clothing prescribed for contaminated areas when working on the equipment.
- ➢ Make sure that the equipment is completely decontaminated before carrying out any service work.
- ➢ Follow the pertinent instructions for handling the hazardous substances in question.

Qualified personnel must have extensive experience with and a working knowledge of:

- ◗ pertinent rules and regulations concerning handling hazardous substances
- ◗ special regulations for handling the hazardous substances encountered on site
- ◗ using the required personal protective equipment (PPE) and clothing

CAUTION

Environmental damage may be caused by poisonous fluid residues.

- ➢ Before disposing of the equipment make sure that it is clean and free of fluid residues.
- ➢ For the disposal of all materials observe the pertinent legal regulations concerning waste disposal.

➢ Remove all residues from the equipment.

➢ For the disposal of all residues observe the pertinent legal regulations concerning waste disposal.

Removing the equipment

DANGER

Personnel working on pipes are exposed to safety risks and may suffer severe injuries, poisoning or even loss of life.

- ➢ Make sure that no hot or hazardous fluid is in the equipment or the pipes.
- ➢ Make sure that the pipes upstream and downstream of the equipment are depressurised.
- ➢ Make sure that the installation is switched off and protected against unauthorised or unintended activation.
- ➢ Make sure that the equipment and the pipes have cooled down to room temperatures.
- ➢ Wear protective clothing that is suitable for the fluid and, if necessary, wear protective gear.

For more information on suitable protective clothing and safety gear refer to the safety data sheet of the fluid in question.

CAUTION

Risk of injuries if the equipment falls down.

- ➢ When removing the equipment make sure the it is safely held in place and cannot fall down.

Suitable measures are for instance:

- ◗ Equipment that is not too heavy may be supported by a second person.
- ◗ For heavy equipment use suitable lifting equipment of sufficient strength.

➢ Detach the end connections of the equipment from the pipes.

➢ Put the equipment onto a suitable base.

➢ Store the equipment as described on page 13.

Re-using equipment after storage

Observe the following instructions if you want to remove the equipment and use it again somewhere else:

- Make sure that the equipment is free of any fluid residues.
- Make sure that all connections are in good condition and leak-free.
- If necessary re-work welded connections in order to ensure that they are in good working condition.

➢ Use the equipment only for its intended purpose and the service conditions for which it was specified.

Returning the equipment

You can return the valve to your contractual partner.

➢ Make sure that all harmful substances are removed from the valve.

➢ Insert the stoppers in the connections.

➢ Observe the instructions in section "Transporting the equipment" from page 13.

➢ Pack the valve in its original packaging or in a suitable transport packaging.

The transport packaging must protect the valve from damage in the same way as the original packaging.

➢ Add the completed and signed decontamination declaration to the valve. The decontamination declaration must be attached to the packaging so that it is accessible from outside.

➢ Register the return delivery with your contractual partner before returning the valve.

Disposing of the equipment

CAUTION

Environmental damage may be caused by poisonous fluid residues.

➢ Before disposing of the equipment make sure that it is clean and free of fluid residues.

➢ For the disposal of all materials observe the pertinent legal regulations concerning waste disposal.

The equipment is made from the following materials:

Materials of the BA 210 and BAE 210

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

1 Pressure-bearing components

Materials of the BA 211 and BAE 211

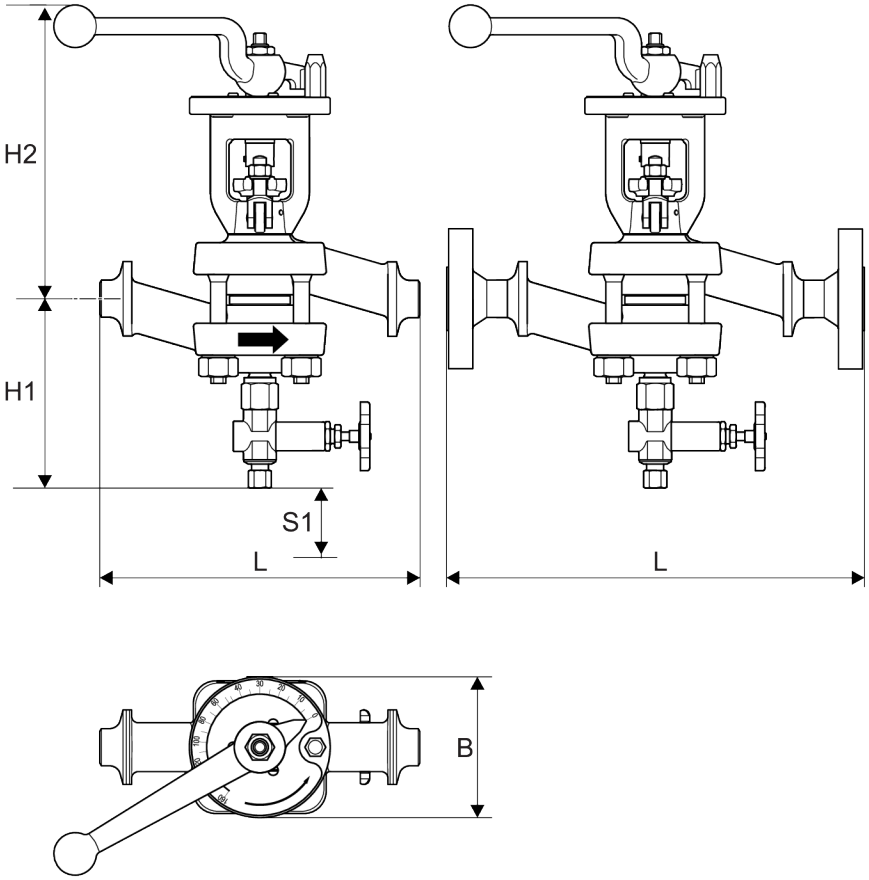
Component	EN	ASTM
Body[1]	1.7335	SA 182F12
Flange	1.0460	SA 105
Nozzle insert[1]	1.4922	–
k nozzle insert[1]	1.4922/ 1.4112	–
Nozzle needle	1.4462	–
k nozzle needle	1.4112	–
Hexagon nut M20[1]	1.7225	A194-Gr.7
Threaded bolt[1]	1.7225	A193-B7
Stuffing box gland[1]	1.7335	SA 182F12
Packing rings	Graphite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

1 Pressure-bearing components

Technical data

Dimensions and weights

BA

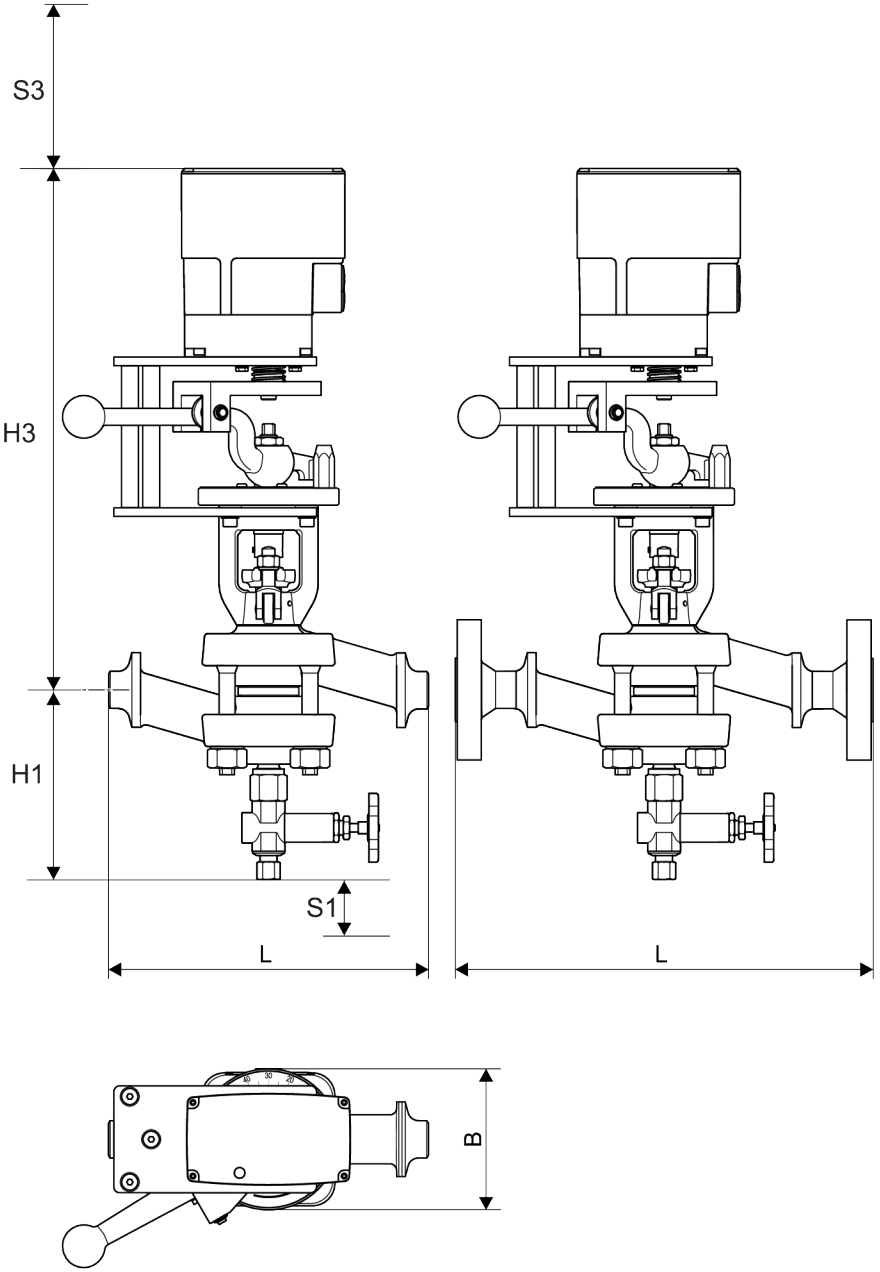


		BA 210	BA 211
Height H1	mm	177 (91[1])	
Height H2	mm	276 (closed), 286 (open)	
Length L	mm	See “Lengths and weights” tables as from page 41	
Width B	mm	132	
Space required for control lever	mm	220	220
Service dimension S1	mm	20	20
Service dimension S1[2]	mm	80	80
Weight	kg	See “Lengths and weights” tables as from page 41	

1 Without sampling valve

2 Without sampling valve, for removing the valve stem

BAE



		BAE 210	BAE 211
Height H1	mm	177 (91[1])	
Height H3	mm	488	
Length L	mm	See “Lengths and weights” tables as from page 41	
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 as from page 41	

1 Without sampling valve

2 Without sampling valve, for removing the valve stem

Technical data for the actuator can be found in the supplied operating manual from the manufacturer.

The information below applies to equipment without a sampling valve. The sampling valve weighs 0.7 kg.

Lengths and weights for equipment with flange

		BA 210	BA 211	BAE 210	BAE 211
	Length L mm	**Weight kg**			
PN63 to PN160	390	23.0	–	30.5	–
PN250	410	22.5	–	30.0	–
PN320	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

			BA 210	BAE 210
	Length L mm	**Butt-weld end dims. mm**	**Weight kg**	
PN160	300	33.7×3.2	17.5	25.0
PN250	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

			BA 211	BAE 211
	Length L mm	**Butt-weld end dims. mm**	**Weight kg**	
PN320	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

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

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

Pressure & temperature ratings

BA 210 and BAE 210 with PN250 flange and EN butt-weld ends (for pipe 33.7 × ≥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 × ≥ 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 PN63/100/160 flange and EN butt-weld ends (for pipe 33.7 × ≥ 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

BA 211 and BAE 211 without sampling valve with PN320 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 PN320 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					

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

Declaration of Conformity – Standards and Directives

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.

The valid Declaration of Conformity is available to download at www.gestra.com . You can request the associated certificates and approvals by writing to the following address:

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Modifications to the equipment not approved by us will invalidate the Declaration of Conformity, certificates and approvals.

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