

Balancing, Measurement and Shut-off
Valve

BOA-Control/ BOA-Control IMS

Type Series Booklet



Legal information/Copyright

Type Series Booklet BOA-Control/ BOA-Control IMS

All rights reserved. The contents provided herein must neither be distributed, copied, reproduced, edited or processed for any other purpose, nor otherwise transmitted, published or made available to a third party without the manufacturer's express written consent.

Subject to technical modification without prior notice.

© KSB SE & Co. KGaA, Frankenthal 2023-02-17

Contents

| | |
|--|----------|
| Control Valves / Measurement Valves | 4 |
| Balancing and Shut-off Valves to DIN/EN | 4 |
| BOA-Control/BOA-Control IMS..... | 4 |
| Main applications..... | 4 |
| Fluids handled | 4 |
| Operating data..... | 4 |
| Valve body materials..... | 4 |
| Design details | 4 |
| Product benefits..... | 5 |
| Product information | 5 |
| Certification..... | 5 |
| Related documents | 6 |
| Purchase order specifications | 6 |
| Pressure/temperature ratings..... | 6 |
| Materials..... | 7 |
| Colour coding system..... | 10 |
| Dimensions and weights..... | 11 |
| Installation information..... | 12 |
| Accessories..... | 13 |
| Technical data of BOATRONIC MS, BOATRONIC MS-420 | 13 |
| Characteristic curves of BOATRONIC MS-420 | 15 |
| Chemical resistance chart | 16 |

Control Valves / Measurement Valves

Balancing and Shut-off Valves to DIN/EN

BOA-Control/BOA-Control IMS



Main applications

- Hot-water heating systems
- Air-conditioning systems
- Cooling circuits
- Drinking water supply
- Permanent measurement set-ups

Fluids handled

- Hot water for heating systems, with or without glycol ($\leq 60\%$)
- Cold water for air-conditioning systems, with or without glycol ($\leq 60\%$)
- The fluid handled should meet the requirements as specified in VdTÜV/AGFW TCh 1466 or VDI 2035.
- Fluids containing gas or air can be measured with ultrasound equipment to a limited extent only. Proper venting of the systems is therefore essential.
- Drinking water (for variants BOA-Control EKB and BOA-Control IMS EKB only)
- Service water
- Not suitable for steam or fluids liable to attack EPDM and the electrostatic plastic coating.
- Other fluids on request.

Operating data

Table 1: Operating properties

| Characteristic | Value |
|-----------------------------------|------------------------------|
| Nominal pressure | PN 16 |
| Nominal size | DN 15 - 350 ^{1) 2)} |
| Max. permissible pressure [bar] | 16 |
| Min. permissible temperature [°C] | ≥ -10 |
| Max. permissible temperature [°C] | $\leq +120$ ³⁾ |

Valve body materials

Table 2: Overview of available materials

| Material | Material number | Nominal size |
|------------------|-----------------|---------------|
| EN-GJL-250 | 5.1301 | \leq DN 300 |
| EN-GJS-400-18-LT | 5.3103 | DN 350 |

Design details

Design

- BOA-Control IMS complete with sensors for measuring flow rate and temperature
- BOA-Control is suitable for mobile flow rate measurement and temperature measurement.
- Straight-way globe valve with slanted seat
- Non-rotating stem with protected, external thread
- Non-rising handwheel
- Locking device, travel stop, position indicator, throttling plug and insulating cap with anti-condensation feature as standard
- Compact EPDM-encapsulated throttling plug as soft main seat and back seat
- Maintenance-free stem seal with EPDM profile ring
- Face-to-face length to DIN EN 558/1
- Exterior coating: blue, RAL 5002

Measuring computer:

- Measuring flow rate and temperature requires the use of a measuring computer.
- Mobile short-term measurement with battery-powered BOATRONIC MS
- Permanent measurement set-up with BOATRONIC MS-420 (24 V DC power supply)

Variants

- Lead-sealable cap (prevents unauthorised actuation) as assembly set
- BOA CVE IMS: control valve with electric actuator (DN 15 - 200)
- BOA-Control EKB and BOA-Control IMS EKB for drinking water
 - Corrosion protection: internal and external electrostatic plastic coating (EKB), anthracite grey
 - Nominal sizes DN 15-100 are DIN-DVGW-approved for water in acc. with DIN 3546-1: NW-6150BQ0465. The elastomers and plastic parts in contact with the fluid handled and the (EKB) body coating comply with the

¹ DN 250 - 350: type BOA-H

² Variants BOA-Control EKB and BOA-Control IMS EKB up to DN 200

³ Variants BOA-Control EKB and BOA-Control IMS EKB $\leq 40\text{ °C}$

KTW recommendations for the use of elastomers in drinking water issued by the German Federal Office of Health.

The nominal sizes 15 - 100 of BOA-Control EKB and BOA-Control IMS EKB are DIN-DVGW-approved for water in acc. with DIN 3546-1: NW-6150BQ0465. The elastomers and plastic parts in contact with the fluid handled and the (EKB) body coating of all nominal sizes comply with the KTW recommendations for the use of elastomers in drinking water issued by the German Federal Office of Health.

Product benefits

- BOA-Control is ideally suited for use in heating systems.
- BOA-Control IMS is suitable for universal use in heating and cooling systems and as a permanent measurement valve.
- BOA-Control EKB/ BOA-Control IMS EKB variant for drinking water (DVGW-approved, DN 15 to DN 100)
- Innovative ultrasound technology for electronic flow rate measurement independent of minimum differential pressures.
- With BOA-Control, measuring time is saved due to the simple magnetic connection of the measurement sensors.
- With temperature sensor
- One model for shut-off and control duties due to EPDM-encapsulated throttling plug with linear characteristic
- Direct and straightforward measurement
- Minimised pressure loss and high flow rates due to hydraulically favourable flow passage.
- Ultrasonic measurement: no contact with fluid handled
- Simple body design and anti-condensation feature allow easy insulation, also for air-conditioning systems. Optional insulation shells available.
- Automatic identification of flow direction for optimised fault analysis
- Type series and nominal size can be identified reliably due to colour coding even on insulated valves; travel indicator scale provided

Product information

Product information as per Regulation No. 1907/2006 (REACH)

For information as per European chemicals regulation (EC) No. 1907/2006 (REACH) see <https://www.ksb.com/en-global/company/corporate-responsibility/reach>.

Product information as per Pressure Equipment Directive 2014/68/EU (PED)


The valves satisfy the safety requirements of Annex I of the European Pressure Equipment Directive 2014/68/EU (PED) for fluids in Groups 1 and 2.

Product information as per UK Pressure Equipment (Safety) Regulations 2016

The valves satisfy the safety requirements of the UK Pressure Equipment (Safety) Regulations 2016 (PER) for fluids in Groups 1 and 2.

Certification

Table 3: Overview

| Label | Effective in: | Comment |
|---|---------------|--|
|  | Germany | Approved in accordance with German drinking water regulation BOA-Control EKB / BOA-Control IMS EKB only |

Note on DVGW approval:

Related documents

- The valves are also available as automated variants with electric actuators (continuous-action 24 V AC and 230 V AC) or 3-point (Open/Stop/Closed) actuators (24 V AC and 230 V AC) as BOA-CVE C/CS/W/IMS/EKB/IMS EKB globe valves.

Table 4: Information/documents

| Document | Reference number |
|--|------------------|
| BOA-CVE C/CS/W/IMS/EKB/IMS EKB type series booklet | 7520.1 |
| Flow characteristics | 7128.4 |
| Operating manual | 0570.88 |
| BOATRONIC MS, BOATRONIC MS-420 operating manual | 7134.8 |
| BOATRONIC MS, BOATRONIC MS-420 quick-reference operating manual | 7134.81 |
| Assembly instructions "Accessories Set: Lead-sealable Handwheel Cap" | 0570.811 |
| Typical tender for BOA-Control | 7128.523 |
| Typical tender for BOA-Control EKB | 7128.524 |
| Typical tender for BOA-Control IMS | 7128.521 |
| Typical tender for BOA-Control IMS EKB | 7128.522 |

Purchase order specifications

Please specify the following information in all enquiries or purchase orders:

- Type
- Nominal pressure
- Nominal size
- Variants
- Reference number

Measuring computer:

- BOATRONIC MS: material No. 01624491
- BOATRONIC MS-420: material No. 01624492

Pressure/temperature ratings

Table 5: Test pressure and operating pressure

| PN | DN | Materials | Shell test | Seat tightness test | Permissible operating pressure ⁴⁾ |
|------------------|----------|------------------|-------------------------------------|----------------------------|--|
| | | | With water | | |
| | | | Tests P10 and P11 to DIN EN 12266-1 | Test P14 to DIN EN 12266-1 | -10 to +120 °C ⁵⁾ |
| | | | [bar] | [bar] | [bar] |
| 16 ⁶⁾ | 15 - 300 | EN-GJL-250 | 24 | 17,6 | 16 |
| | 350 | EN-GJS-400-18-LT | | | 16 |

Valves from DN 250 can only be used for shut-off duties up to the differential pressures indicated below, even when handwheel levers are used!

Table 6: Permissible differential pressures [bar]

| PN | DN | Δ p [bar] |
|----|---------|-----------|
| 16 | 250 | 9 |
| | 300/350 | 6 |

⁴ Static load

⁵ Variants BOA-Control EKB and BOA-Control IMS EKB -10 to +40 °C

⁶ PN 10 available for variants BOA-Control EKB and BOA-Control IMS EKB up to DN 150 (same design as for PN 16)

Materials

BOA-Control/BOA-Control IMS, type BOA-CL, DN 15 - 200

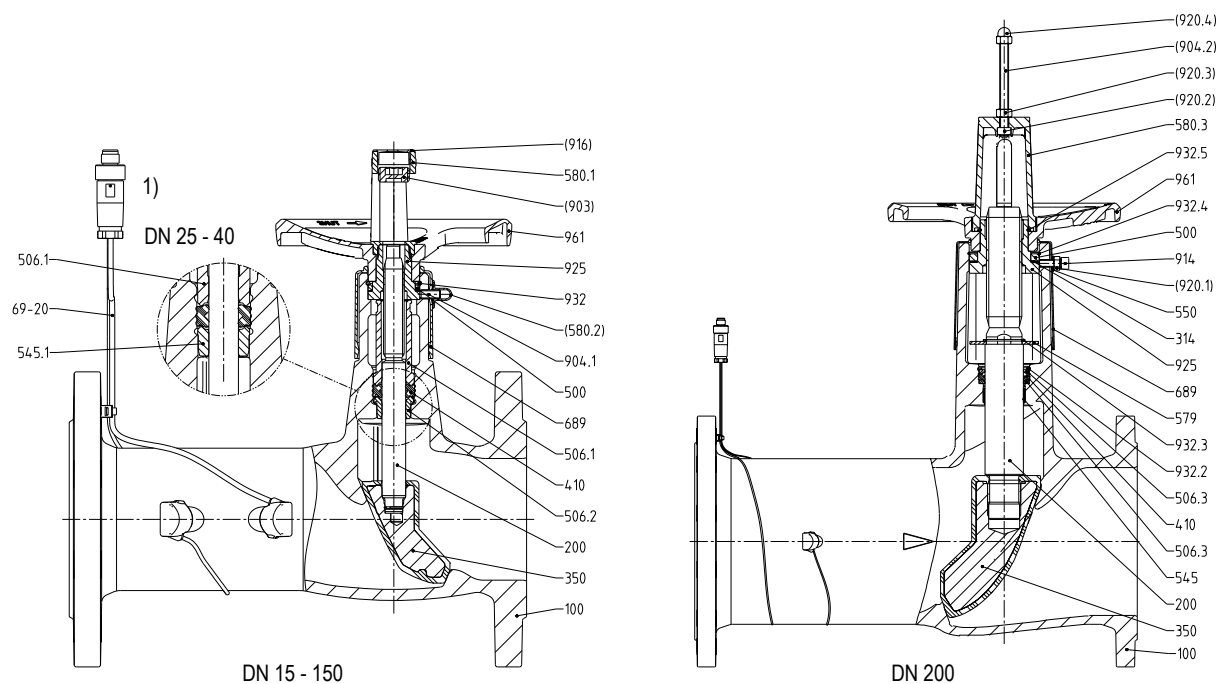


Fig. 1: Sectional drawings of BOA-Control/BOA-Control IMS, type BOA-CL, DN 15 - 200; 1) EKB variant DN 25 - 40

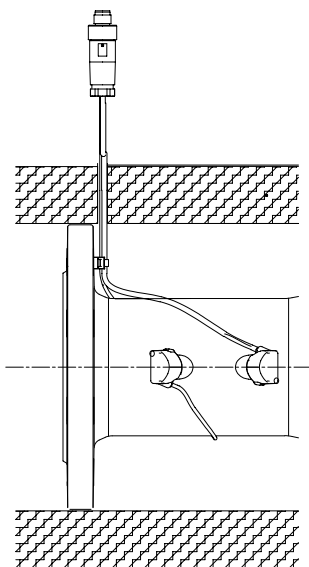


Fig. 2: Detail of insulation shell

Table 7: Parts list

| Part No. | Description | Standard material | Material of EKB variant | Note |
|----------|----------------|--|---|-------------|
| 100 | Body | EN-GJL-250 (5.1301) | EN-GJL-250 (5.1301) / EKB (with internal and external electrostatic coating), as per KTW recommendation | - |
| 200 | Stem | Stainless steel, min. 13 % chrome (Cr) | | - |
| 314 | Thrust bearing | Steel/PTFE | | DN 50 - 200 |
| 350 | Valve disc | EN-GJL-250 (5.1301) / EPDM | EN-GJL-250 (5.1301) / EPDM, as per KTW recommendation | - |
| 410 | Profile seal | Elastomer EPDM | Elastomer EPDM, as per KTW recommendation | - |

| Part No. | Description | Standard material | Material of EKB variant | Note |
|---|------------------|---|---|--|
| 500 | Ring | Steel, electro-galvanised and thick-film passivated | | DN 32 - 200 |
| 506.1 | Retaining ring | Plastic | Plastic, as per KTW recommendation | DN 50 - 150 |
| 506.2 | | Plastic | Plastic | DN 15 - 150 |
| 506.3 | | Stainless steel | | DN 200 |
| 545.1 | Bearing bush | - | Brass (CW614N) | DN 25 - 40, below profile seal |
| 545.2 | | Steel/PTFE | Plastic | DN 200 |
| 579 | Stop | Steel, electro-galvanised and thick-film passivated | | DN 200 |
| 580.1 ⁷⁾ Cap assembly incl. travel stop, comprising: | | | | |
| | 580.1 | Cap | Plastic, glass-fibre reinforced, impact-resistant | DN 15 - 150 |
| | 903 | Screw plug | Steel, electro-galvanised, blue chromated | |
| | 916 | Plug | Plastic | |
| 580.3 ⁷⁾ Cap assembly incl. travel stop, comprising: | | | | |
| | 580.3 | Cap | Plastic, glass-fibre reinforced, impact-resistant | DN 200 |
| | 904.2 | Grub screw | Galvanised steel | |
| | 920.2 | Square nut | Galvanised steel | |
| | 920.3 | Hexagon nut | Galvanised steel | |
| | 920.4 | Cap nut | Plastic | |
| 689 | Insulation | Plastic | - | - |
| 69-20 | Sensor set | Plastic with ceramics | | BOA-Control IMS and BOA-Control IMS EKB only |
| 81-73 | Cable tie | Plastic | | BOA-Control IMS and BOA-Control IMS EKB only |
| 904.1 ⁷⁾ Locking device assembly, comprising: | | | | |
| | 904.1 | Grub screw | Galvanised steel | DN 15 - 150 |
| | 580.2 | Cap | Plastic | |
| 914 ⁷⁾ Locking device assembly, comprising: | | | | |
| | 914 | Hexagon socket head cap screw | Stainless steel | DN 200 |
| | 920.1 | Hexagon nut | Galvanised steel | |
| 925 | Stem nut | Steel, electro-galvanised and thick-film passivated | | - |
| 932.1 | Circlip | Stainless spring steel | | DN 15 - 150 |
| 932.2 | | Stainless spring steel | | DN 200 |
| 932.3 | | Stainless spring steel | | DN 200 |
| 932.4 | | Stainless spring steel | | - |
| 932.5 | | Stainless spring steel | | DN 200 |
| 961 | Handwheel | Plastic, glass-fibre reinforced, impact-resistant | | DN 15 - 50 |
| | | Die-cast aluminium | | DN 65 - 150 |
| | | EN-GJL-200 (5.1300) | | DN 200 |
| - | Insulation shell | Polystyrene shell with hard polyurethane foam | | Accessories |

⁷⁾ Spare part

BOA-Control/BOA-Control IMS, type BOA-H, DN 250 - 350

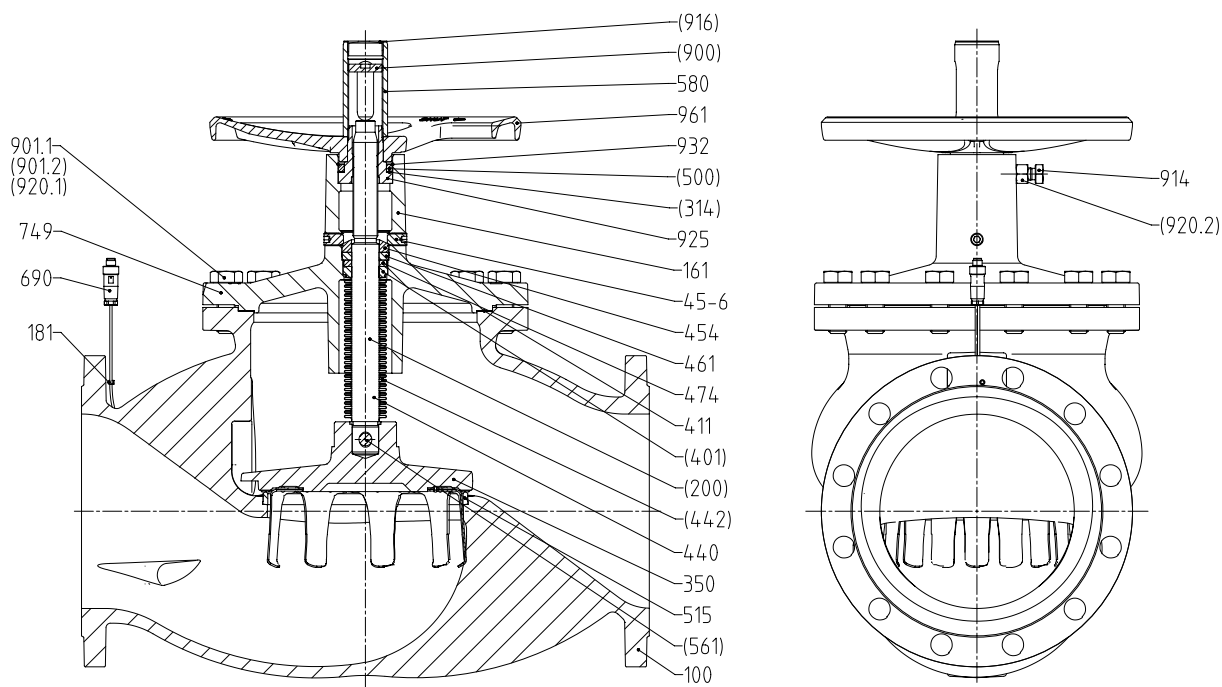


Fig. 3: Sectional drawings of BOA-Control/BOA-Control IMS, type BOA-H, DN 250 - 350



Table 8: Parts list

| Part No. | Description | Material | Note |
|-------------------------|---|--|--------------|
| 100⁸⁾ | Complete body assembly, comprising: | | |
| 100 | Body | EN-GJL-250 (5.1301) | DN 250 - 300 |
| | | EN-GJS-400-18-LT | DN 350 |
| 411 ⁸⁾ | Joint ring | CrNi steel/graphite 1 F | - |
| 515 | Seat ring | 1.4301 | - |
| 901.1 | Hexagon head bolt | 8.8 | DN 250 - 300 |
| 901.2 | Stud | C35E+QT | DN 350 |
| 920.1 | Hexagon nut | C35E+N | DN 350 |
| 181 | Cable tie | PA | - |
| 690 | Sensor set | Acc. to manufacturer | - |
| 749⁸⁾ | Complete bonnet assembly, comprising: | | |
| 161 | Body bonnet | EN-GJL-250 (5.1301) | DN 250 - 350 |
| | | EN-GJS-400-18-LT | DN 350 |
| 350⁸⁾ | Complete V-port plug assembly, comprising: | | |
| 350 | V-port plug | EN-GJL-250 (5.1301) | - |
| 561 | Grooved pin | 45 H+A2A | - |
| 411 ⁸⁾ | Joint ring | CrNi steel/graphite 1 F | - |
| 440 | Bellows assembly, comprising: | | |
| 200 | Stem | Stainless steel, min. 13 % chrome (Cr) | - |
| 401 | Weld ring | 1.4021+QT800 | - |
| 442 | Bellows | 1.4541 | - |
| 45-6 | Stuffing box screw | 45 H | - |
| 454 | Stuffing box ring | 46S20+C | - |
| 461 | Gland packing | GH1,4-IA | - |
| 474 | Thrust ring | 1.4104 | - |
| 580⁸⁾ | Complete cap assembly for V-port plug incl. travel stop, comprising: | | |
| 580 | Cap | 1.4027 | - |
| 900 | Bolt/screw | 1.4021+QT800 | - |

⁸⁾ Spare part

| Part No. | Description | Material | Note |
|-------------------|--------------------------------------|-------------|------|
| 916 | Plug | PE-LD | - |
| 914 ⁸⁾ | Locking device assembly, comprising: | | |
| 914 | Hexagon head bolt | 8.8 | - |
| 920.2 | Hexagon nut | 8+A2A | - |
| 925 | Stem nut assembly, comprising: | | |
| 314 | Thrust bearing | Steel/PTFE | - |
| 500 | Ring | ST+GAL ZN | - |
| 925 | Stem nut | 46S20+C | - |
| 932 | Circlip | 1.4310 | - |
| 961 ⁸⁾ | Handwheel | AC-46200F-D | - |

Colour coding system

| (BOA-Control / BOA-Control IMS / BOA-Control EKB / BOA-Control IMS EKB) Soft-seated valve disc | (BOA-Control IMS until 2015) Soft-seated valve disc |
|--|---|
|  <p>Diagram of a BOA-Control valve with a red plug and a grey cap featuring a scale. The scale has markings for 30, 50, 70, 90, and 'open'. The text 'DN 150' and 'BOA-Control' are also visible on the cap.</p> |  <p>Diagram of a BOA-Control IMS valve with a red plug and a grey cap. The cap features markings for '120°C', 'A', and 'Z'.</p> |
| Red plug / grey cap with scale | Red plug / grey cap |

Dimensions and weights

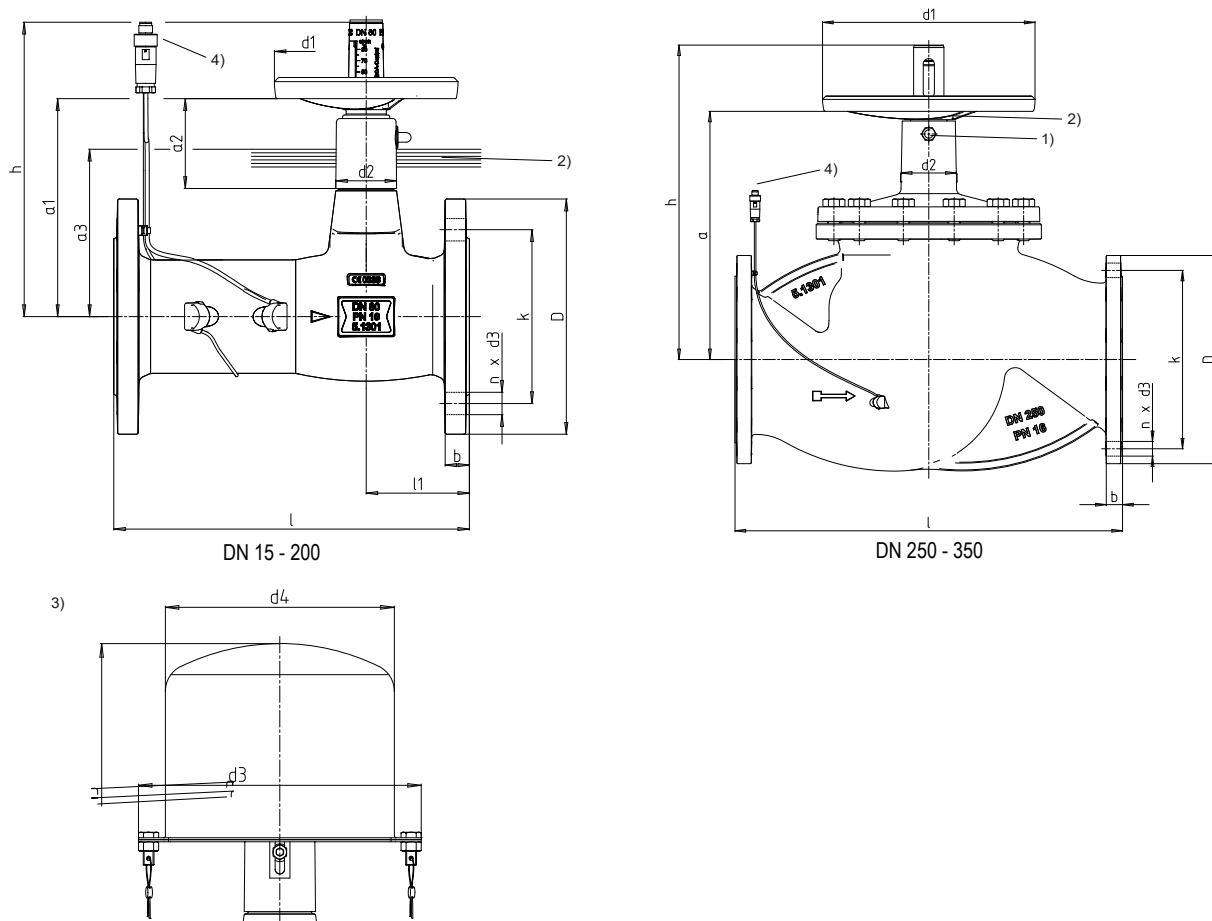


Fig. 4: Dimensions; BOA-CL DN 15 - 200, BOA-H DN 250 - 350

| | | | |
|----|---|----|-----------------------------------|
| 1) | Shown offset by 90° | 2) | Insulation boundary ⁹⁾ |
| 3) | Lead-sealable cap (prevents unauthorised actuation) as assembly set | 4) | Sensor |

Table 9: Dimensions and weights

| PN | DN | a ₁ | a ₂ | a ₃ | b | D | d ₁ | d ₂ ≈ | h | k | l | l ₁ | n × d ₃ | [kg] | Capped valve | | |
|----|-----|----------------|----------------|----------------|------|------|----------------|------------------|------|------|------|----------------|--------------------|------|----------------|----------------|----------------|
| | | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | | h ₃ | d ₄ | a ₄ |
| 16 | 15 | 93 | 29 | 57,5 | 14 | 95 | 50 | 33 | 130 | 65 | 130 | 42,5 | 4 × 14 | 2,0 | 181,5 | 130 | 166 |
| | 20 | 93 | 29 | 62,5 | 16 | 105 | 50 | 33 | 130 | 75 | 150 | 48 | 4 × 14 | 2,4 | 181,5 | 130 | 166 |
| | 25 | 105 | 46 | 72,5 | 16 | 115 | 80 | 35 | 156 | 85 | 160 | 54,5 | 4 × 14 | 3,1 | 191,5 | 130 | 166 |
| | 32 | 122 | 46 | 85 | 18 | 140 | 100 | 43 | 178 | 100 | 180 | 65 | 4 × 19 | 5,0 | 205,0 | 130 | 166 |
| | 40 | 122 | 46 | 95 | 18 | 150 | 100 | 43 | 178 | 110 | 200 | 70 | 4 × 19 | 5,8 | 207,5 | 130 | 166 |
| | 50 | 133 | 46 | 107,5 | 20 | 165 | 100 | 43 | 189 | 125 | 230 | 75 | 4 × 19 | 7,6 | 218,5 | 130 | 166 |
| | 65 | 175 | 66 | 125 | 20 | 185 | 125 | 47 | 247 | 145 | 290 | 85 | 4 × 19 | 11,5 | 258,5 | 130 | 166 |
| | 80 | 186 | 76 | 140 | 22 | 200 | 160 | 52 | 251 | 160 | 310 | 90 | 8 × 19 | 14,5 | 330,5 | 170 | 210 |
| | 100 | 224 | 73 | 160 | 24 | 220 | 160 | 63 | 305 | 180 | 350 | 95 | 8 × 19 | 20,7 | 346,5 | 170 | 210 |
| | 125 | 271 | 115 | 175 | 26 | 250 | 200 | 85 | 371 | 210 | 400 | 125 | 8 × 19 | 31,7 | 431,0 | 220 | 270 |
| | 150 | 283 | 113 | 192,5 | 26 | 285 | 250 | 85 | 385 | 240 | 480 | 150 | 8 × 23 | 41,6 | 453,0 | 340 | 390 |
| | 200 | 434 | 175 | 220 | 30 | 340 | 315 | 136 | 697 | 295 | 600 | 180,5 | 12 × 23 | 90,7 | 597,0 | 340 | 390 |

Table 10: Dimensions

| PN | DN | a | b | D | d ₁ | d ₂ ≈ | h | k | l | n × d ₃ | [kg] |
|----|-----|------|------|------|----------------|------------------|------|------|------|--------------------|------|
| | | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | |
| 16 | 250 | 476 | 32 | 405 | 400 | 93 | 606 | 355 | 730 | 12 × 28 | 239 |
| | 300 | 530 | 32 | 460 | 400 | 93 | 660 | 410 | 850 | 12 × 28 | 343 |

⁹ In acc. with EnEV

| PN | DN | a | b | D | d ₁ | d ₂ ≈ | h | k | l | n × d ₃ | [kg] |
|----|-----|------|------|------|----------------|------------------|------|------|------|--------------------|------|
| | | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | |
| 16 | 350 | 530 | 36 | 520 | 400 | 93 | 660 | 470 | 980 | 16 × 28 | 390 |

Mating dimensions as per standard

Face-to-face lengths: DIN EN 558/1, ISO 5752/1
 Flanges: DIN EN 1092-2, flange type 21
 Flange facing: DIN EN 1092-2, type B

Installation information

i Non-compliance with the following installation information may result in failure of the measuring functions!

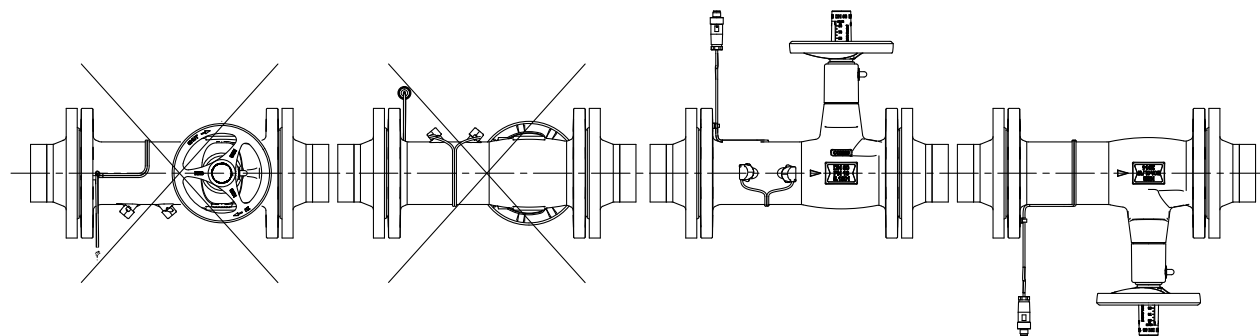
For measuring purposes, the flow direction through BOA-Control/BOA-Control IMS balancing, measurement and shut-off valves of the BOA-CL series (DN 15 - 200) must correspond to the direction indicated by the flow direction arrow cast on the valve body. An alternating flow direction is permissible for shut-off duty.

Flow through valve type BOA-H (DN 250 - 350) must be in the direction indicated by the flow direction arrow cast on the valve body.

Insulate the globe valves when using them for hot water and high-temperature hot water applications.

Vertical installation: For installation in vertical piping, no restrictions apply with regard to the installation position of the valves.

Horizontal installation: Installation with the valve stem in a horizontal position is not allowed, to prevent air bubbles or deposits in the measuring plane.



| | | | |
|---|---|---------------------------------------|-------------------------------------|
| 1) Sensor below, handwheel in front. Arrangement is not allowed. | 2) Sensor on top, handwheel in back. Arrangement is not allowed. | 3) Sensor in front, handwheel on top. | 4) Sensor in back, handwheel below. |
|---|---|---------------------------------------|-------------------------------------|

i For optimum measuring accuracy, the following straight, minimum upstream stabilisation distances free from any sources of potential interference must be provided, irrespective of the installation position:

- At least 5 x DN between BOA-Control/BOA-Control IMS and single sources of interference such as single 90° pipe bends or open shut-off valves
- At least 10 x DN between BOA-Control/BOA-Control IMS and turbulence-producing elements such as pumps, control valves or combinations of pipe bends.

Installation in the return line is recommended. Installation at the highest points of a system must be avoided.

Any sources of potential interference in the upstream stabilisation area (such as, for example, immersion sensors or non-standardised sealing elements) must be avoided.

Any sources of interference must be assessed in accordance with EN ISO 5167-1, section 7.3 (previously DIN 1952, section 6).

A downstream stabilisation distance is not required!

i To avoid thermal damage to the valve disc and sensors, welding work in the area of the pipe flanges may only be carried out after the valve has been removed.

i Avoid installing valves of DN 250 - 350 with the stem pointing downwards to prevent dirt deposits between the folds of the bellows which might cause valve failure.

i The cable connecting the sensors to the BOATRONIC must only be extended using the extension cable available as an accessory.

Accessories

- Insulation shells¹⁰⁾ for thermal insulation up to 130 °C with a thermal conductivity at 40 °C of 0.029 W/mk
Material: polyurethane
- Lead-sealable cap (prevents unauthorised actuation) as assembly set
- Mobile measuring computer BOATRONIC MS incl. mobile sensor set
- Stationary measuring computer BOATRONIC MS-420
- Extension cable (1.2 m)
- Upgrade from BOA-Control (EKB) to BOA-Control IMS (EKB) by KSB Service (sensors glued to valve)
- Free update software for BOATRONIC MS/MS-420 firmware

Technical data of BOATRONIC MS, BOATRONIC MS-420
Table 11: Technical data of BOATRONIC MS, BOATRONIC MS-420

| Characteristic | | Measuring computer | |
|-------------------------------------|-------------------|--|--|
| | | BOATRONIC MS | BOATRONIC MS-420 |
| Power supply | | 1.5 volt batteries, 4 pcs, AA Mignon | 24 V DC ± 25 % |
| Output Q [m³/h] | | Display Q in m³/h, alternatively in [l/s] or [l/min] OR V in [m/s] | Display and current output 4 - 20 mA (0 m³/h = 4 mA) (max. m³/h "depending on DN" = 20 mA) |
| Output T (-10 to +120 °C) | | Display T in [°C], alternatively in [°F] | Display and current output 4 - 20 mA (-10 °C = 4 mA) (+120 °C = 20 mA) ¹¹⁾ |
| Current requirement [mA] | | 150 | 190 |
| Low voltage monitoring | | Battery status icon flashes when battery is very low (7.2 V) 1. Under 10 % voltage, error F16: Measuring still possible 2. Under 5 % voltage, message "Change batteries": No measurement possible 3. Under 1 % voltage, message "Low battery": Device switches off. | - |
| Terminals: Output/power supply | | - / 2 battery holder | Spring-type |
| Enclosure to EN 60529 | | IP54 | IP54 |
| Safety class | | III | III |
| Shock test, drop from 1 m | | Passed | Passed |
| In-service ambient temperature | | -20 to +50 °C | |
| In-storage ambient temperature | | -20 to +50 °C | |
| Measuring range | Temperature | -10 to +120 °C ¹²⁾ | |
| | Flow velocity | 0.1 to 4 m/s | |
| Measurement accuracy ¹³⁾ | Flow rate | ± 5 % of actual value | |
| Measurement cable | Sensor connection | Length: 1 m | |

¹⁰⁾ Insulation in accordance with German energy-saving regulations EnEV 2002 Annex 5

¹¹⁾ For variants BOA-Control EKB / BOA-Control IMS EKB (+40 °C = 20 mA)

¹²⁾ -10 to 40 °C for variants BOA-Control EKB / BOA-Control IMS EKB

¹³⁾ Applies to BOA-Control IMS and BOA-Control IMS EKB with H₂O at 20 °C, v ≥ 0.5 m/s with manual zero point calibration

Design

Table 12: Overview of BOATRONIC models

| Type | Function |
|------------------|---|
| BOATRONIC MS | <ul style="list-style-type: none"> For short-term measurement Mobile device (battery-powered) With USB interface for software updates Mobile sensor set included |
| BOATRONIC MS-420 | <ul style="list-style-type: none"> For permanent measurement Power supply 24 V DC Current output 4-20 mA / 2-10 V for Q and T With USB interface for software updates |

Configuration and function

For measuring flow rate and temperature, the measuring computer must be connected to any balancing valve or shut-off valve of the BOA-Control type series. The measuring computer is operated via a 3-key membrane keypad. This measuring computer features a multi-line LCD display and multicolour LED.

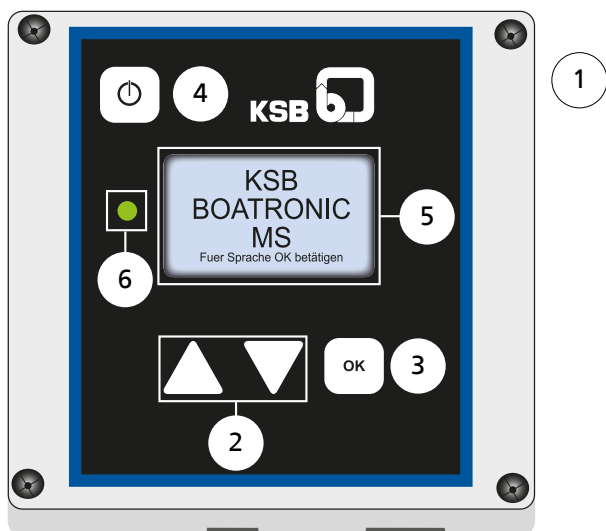
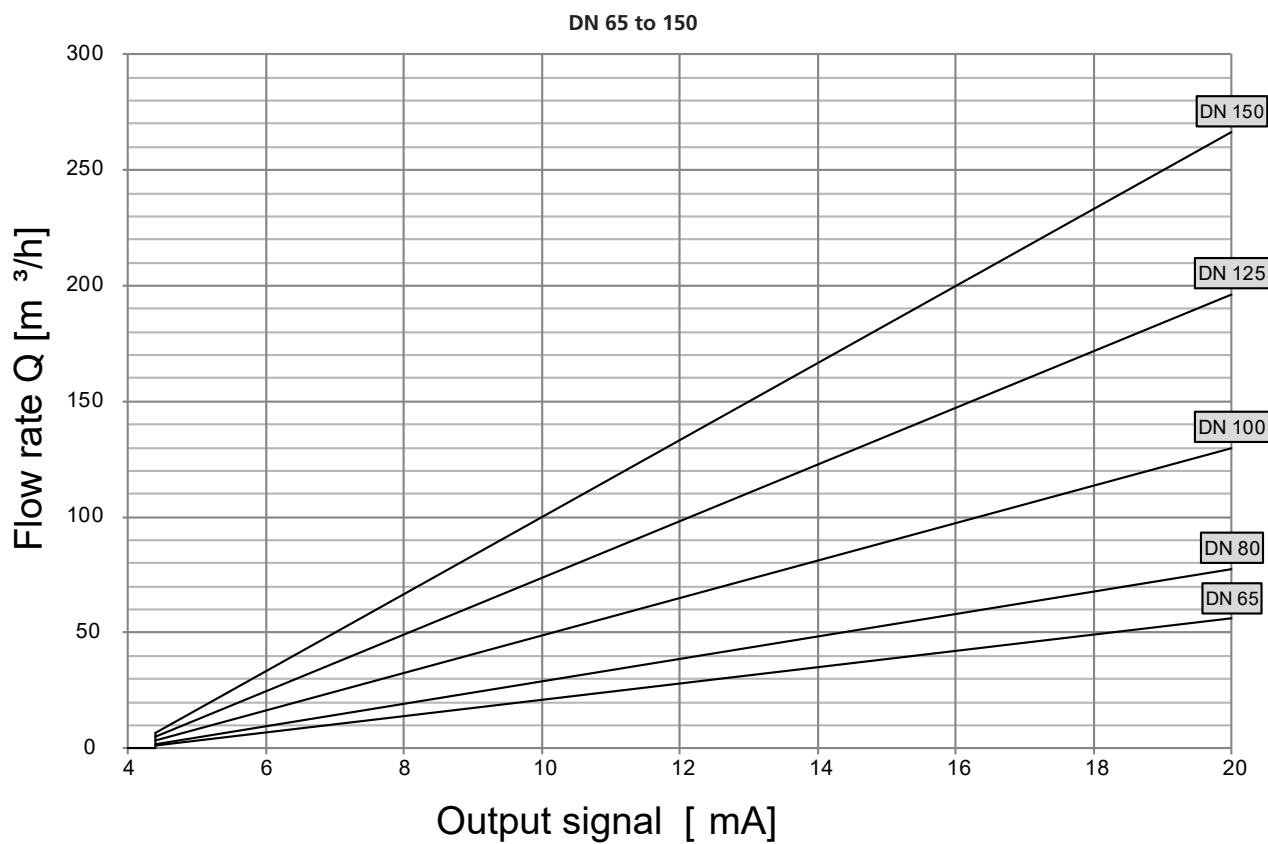
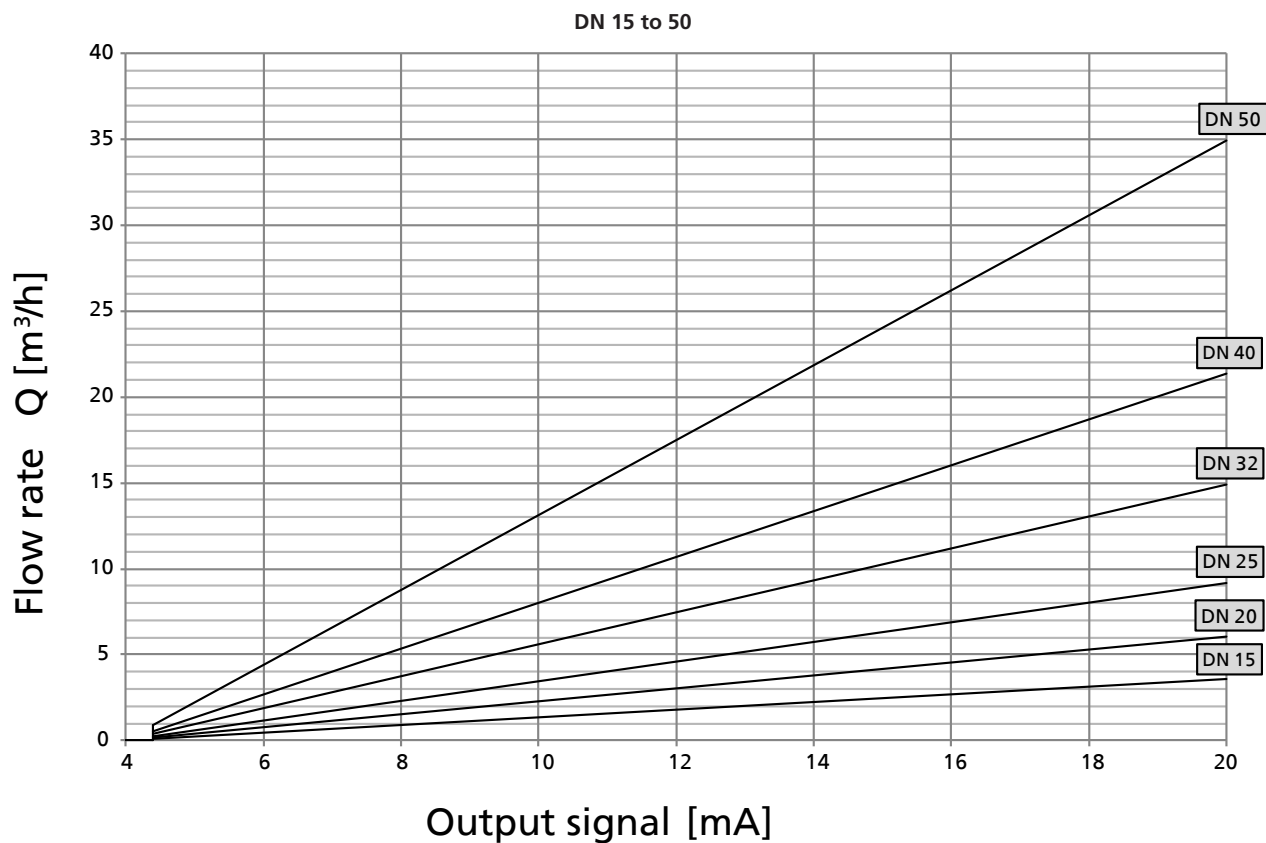


Table 13: Display/indicator elements and operating elements

| Elements | Key | Function/design |
|----------------------------|--------|---|
| BOATRONIC front membrane | ① | Membrane keypad with display/indicator elements |
| Direction keys | ② | Selection of menu items |
| OK key | ③ | Confirmation of input/selection |
| ON/OFF key | ④ | Press and hold to switch the analysing unit on or off. Press briefly to switch the display backlight on or off. |
| Display/indicator elements | ⑤ ⑥ | Graphical LCD display Red LED indicates fault. Green LED indicates measurement in progress. |

Characteristic curves of BOATRONIC MS-420

Table 14: Correlation between volume flow rate and output signal for BOATRONIC MS-420



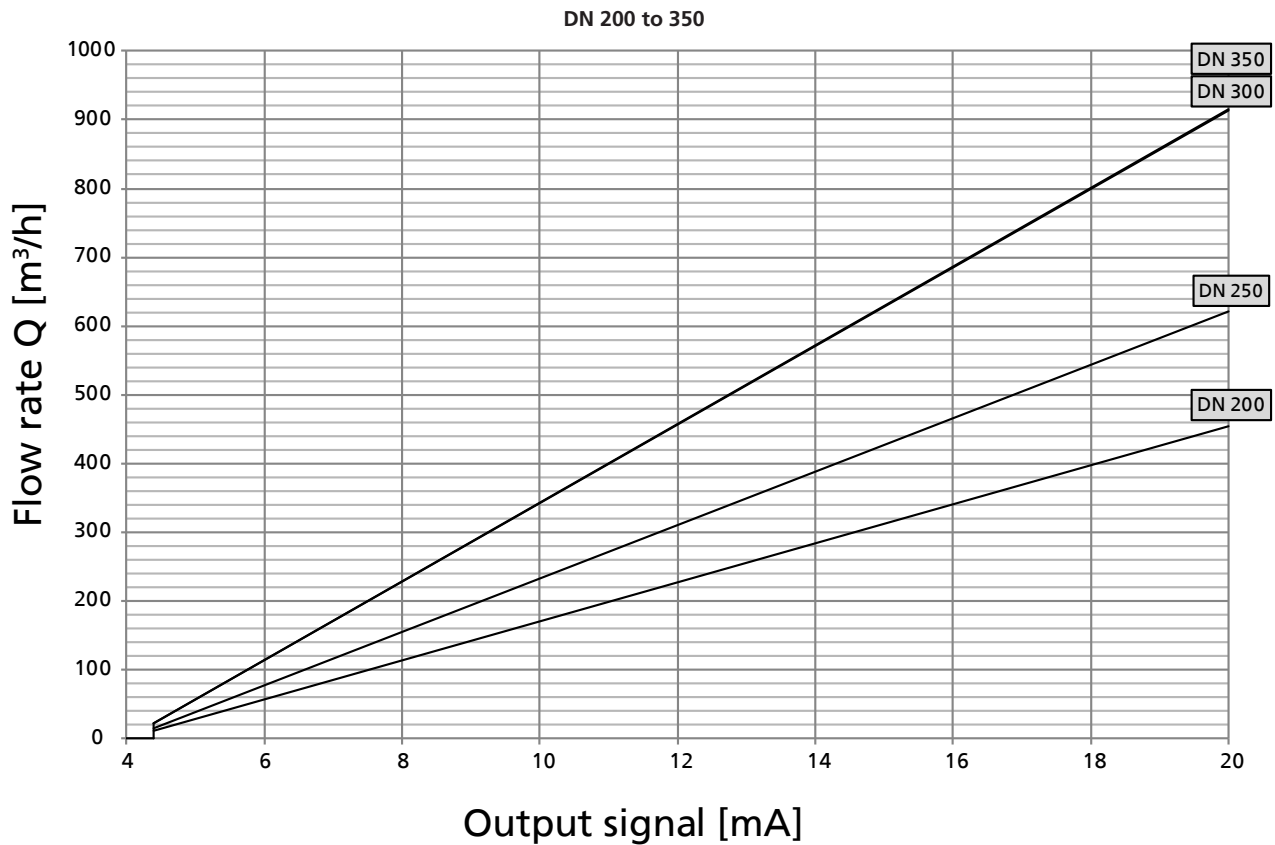


Table 15: Data table

| DN | [mA] | [m³/h] | [mA] | [m³/h] | [mA] | [m³/h] |
|-----|------|--------|------|--------|------|--------|
| 15 | 4,4 | 0,09 | 12 | 1,80 | 20 | 3,61 |
| 20 | 4,4 | 0,15 | 12 | 3,01 | 20 | 6,02 |
| 25 | 4,4 | 0,23 | 12 | 4,59 | 20 | 9,17 |
| 32 | 4,4 | 0,37 | 12 | 7,46 | 20 | 14,93 |
| 40 | 4,4 | 0,53 | 12 | 10,67 | 20 | 21,33 |
| 50 | 4,4 | 0,87 | 12 | 17,46 | 20 | 34,93 |
| 65 | 4,4 | 1,41 | 12 | 28,24 | 20 | 56,48 |
| 80 | 4,4 | 1,93 | 12 | 38,69 | 20 | 77,37 |
| 100 | 4,4 | 3,24 | 12 | 64,85 | 20 | 129,70 |
| 125 | 4,4 | 4,90 | 12 | 98,08 | 20 | 196,17 |
| 150 | 4,4 | 6,65 | 12 | 133,08 | 20 | 266,16 |
| 200 | 4,4 | 11,37 | 12 | 227,33 | 20 | 454,65 |
| 250 | 4,4 | 15,51 | 12 | 310,17 | 20 | 620,33 |
| 300 | 4,4 | 22,84 | 12 | 456,74 | 20 | 913,48 |
| 350 | 4,4 | 22,87 | 12 | 457,38 | 20 | 914,77 |

Chemical resistance chart

The information provided in this chemical resistance chart is based on experience, the Dechema lists as well as manufacturer information. Corrosion resistance is largely dependent on the operating conditions, temperatures and concentrations. Hydroabrasive wear in fluids containing solids is not covered in this list. The information provided in this list is for orientation only. Warranty claims may not be asserted on the basis of this list.

Table 16: Symbols key

| Symbol | Description |
|--------|---|
| ✓ | The fluid handled is not normally aggressive toward the materials. Valve can be used if ¹⁴⁾ and are observed. |
| X | The fluid handled is aggressive toward the materials. Valve cannot be used. The fluid handled is not suitable or applicable for sensor measurement. |
| ○ | The materials and/or the valve can only be used under certain operating conditions. Please enquire accordingly, stating the operating conditions such as concentration, temperature, pH and composition of the fluid handled. |

Table 17: Chemical resistance chart for water

| Fluids handled | BOA Control/ BOA Control IMS | BOA Control EKB/ BOA Control IMS EKB |
|---------------------------------------|---------------------------------|---|
| Bathing water (fresh water) | ○ | ✓ |
| Bathing water (seawater) | X | X |
| Brackish water | X | X |
| Service water | ○ | ✓ |
| Chlorinated water (≤ 0.6 mg/kg) | ✓ | ✓ |
| Deionised water (demineralised water) | ○ ¹⁵⁾ | ✓ |
| Distilled water | ○ ¹⁵⁾ | ✓ |
| Heating water ¹⁵⁾ | ✓ | ○ ¹⁶⁾ |
| Condensate | ○ | ✓ |
| Oil-free cooling water | ○ | ✓ |
| Oil-containing cooling water | X | X |
| Seawater | X | X |
| Ozonised water (≤ 0.5 mg/kg) | ✓ | ✓ |
| Pure water | ✓ | ✓ |
| Raw water | ○ | ✓ |
| Grey water ¹⁷⁾ | ○ | ✓ |
| Partly desalinated water | ○ ¹⁵⁾ | ✓ |
| Thermal water | X | ○ |
| Drinking water | X | ✓ |
| Fully desalinated water | ○ ¹⁵⁾ | ✓ |

Table 18: Chemical resistance chart for oils (aromatic content 5 mg/kg)

| Fluids handled | BOA Control/ BOA Control IMS | BOA Control EKB/ BOA Control IMS EKB |
|--------------------|---------------------------------|---|
| Vegetable oils | X | X |
| Mineral oils | X | X |
| Synthetic oils | X | X |
| Petroleum | X | X |
| Oil/water emulsion | X | X |
| Kerosene | X | X |

Table 19: Chemical resistance chart for refrigerants

| Fluids handled | BOA Control/ BOA Control IMS | BOA Control EKB/ BOA Control IMS EKB |
|---|---------------------------------|---|
| Ammonium hydroxide (≤ 25 %, ≤ 25 °C) | X | X |
| Glycol (ethylene glycol) | X | X |
| Water/glycol mixture (20 % $\leq c \leq 60$ %, ≤ 90 °C) | ✓ | ○ ¹⁶⁾ |
| Inorganic cooling brine, pH 7.5 ¹⁸⁾ | ○ | ○ |

¹⁴ General criteria for water to be handled by products made of non-alloyed materials: pH > 7; chlorides (Cl-) < 150 mg/kg; chlorine (Cl) < 0.6 mg/kg. Other factors to be considered: hardness, carbon dioxide content (CO₂), oxygen (O₂) and dissolved substances. Contact KSB if limits are exceeded.

¹⁵ Can only be used with systems and water qualities complying with VdTÜV 1466 or VDI 2035 guidelines. A pH ≥ 9.5 and an oxygen content of ≤ 0.02 mg/l are also recommended.

¹⁶ Variants BOA-Control EKB / BOA-Control IMS EKB up to a max. fluid temperature of 40 °C

¹⁷ Without larger solids or stringy material

¹⁸ Reduced accuracy of flow measurement

Table 20: Chemical resistance chart for cleaning agents

| Fluids handled | BOA Control/ BOA Control IMS | BOA Control EKB/ BOA Control IMS EKB |
|----------------------------------|---------------------------------|---|
| Lye for bottle rinsers (e.g. P3) | X | X |
| Lye for metal cleaning | X | X |

Table 21: Chemical resistance chart for other fluids

| Fluids handled | BOA Control/ BOA Control IMS | BOA Control EKB/ BOA Control IMS EKB |
|-----------------------------------|---------------------------------|---|
| Landfill gas | X | X |
| Oil-containing compressed air | X | X |
| Aqueous glycerine | X | X |
| Carbon dioxide (gas) | X | X |
| Carbon dioxide (aqueous solution) | X | X |
| Oxygen O ₂ | X | X |



KSB SE & Co. KGaA
Johann-Klein-Straße 9 • 67227 Frankenthal (Germany)
Tel. +49 6233 86-0
www.ksb.com