Differential Pressure Regulator

BOA-Control DPR

Operating Manual

KSB

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Operating Manual BOA-Control DPR

Original operating manual

Contents

Glossary

EPDM

Ethylene propylene diene rubber

Pressure Equipment (Safety) Regulations 2016 (PER)

The Pressure Equipment (Safety) Regulations 2016 set out the requirements to be met by pressure equipment intended to be placed on the UK market (except Northern Ireland).

Pressure Equipment Directive 2014/68/EU (PED)

The 2014/68/EU Directive sets out the requirements to be met by pressure equipment intended to be placed on the market in the European economic area.

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1 General

1.1 Principles

This operating manual is valid for the type series and variants indicated on the front cover.

The operating manual describes the proper and safe use of this equipment in all phases of operation.

In the event of damage, immediately contact your nearest KSB sales organisation responsible to maintain the right to claim under warranty.

1.2 Target group

This operating manual is aimed at the target group of trained and qualified specialist technical personnel.

1.3 Other applicable documents

Table 1: Overview of other applicable documents

Document	Contents
Type series booklet	Description of the valve
Flow characteristics	Information on Kv values and zeta values
General assembly drawing[1)]	Sectional drawing of the valve
Sub-supplier product literature[2)]	Operating manuals and other product literature for the accessories

Observe the relevant manufacturer's product literature for the accessories.

1.4 Symbols

Table 2: Symbols used in this manual

Symbol	Description
✓	Conditions which need to be fulfilled before proceeding with the step-by-step instructions
▷	Safety instructions
⇨	Result of an action
⇨	Cross-references
1. 2.	Step-by-step instructions
	Note Recommendations and important information on how to handle the product

1.5 Key to safety symbols/markings

Table 3: Definition of safety symbols/markings

Symbol	Description
DANGER	**DANGER** This signal word indicates a high-risk hazard which, if not avoided, will result in death or serious injury.
WARNING	**WARNING** This signal word indicates a medium-risk hazard which, if not avoided, could result in death or serious injury.

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1 If included in agreed scope of supply; otherwise refer to the type series booklet.

2 If included in agreed scope of supply

Symbol	Description
CAUTION	**CAUTION** This signal word indicates a hazard which, if not avoided, could result in damage to the machine and its functions.
	**General hazard** In conjunction with one of the signal words this symbol indicates a hazard which will or could result in death or serious injury.
	**Electrical hazard** In conjunction with one of the signal words this symbol indicates a hazard involving electrical voltage and identifies information about protection against electrical voltage.
	**Machine damage** In conjunction with the signal word CAUTION this symbol indicates a hazard for the machine and its functions.

2 Safety

DANGER

All the information contained in this section refers to hazardous situations.

In addition to the present general safety information the action-related safety information given in the other sections must be observed.

2.1 General

- This operating manual contains general installation, operating and maintenance instructions that must be observed to ensure safe operation of the system and prevent personal injury and damage to property.
- Comply with all the safety instructions given in the individual sections of this operating manual.
- The operating manual must be read and understood by the responsible specialist personnel/operators prior to installation and commissioning.
- The contents of this operating manual must be available to the specialist personnel at the site at all times.
- Information and markings attached directly to the product must always be complied with and kept in a perfectly legible condition at all times. This applies to, for example:
  - Manufacturer
  - Type designation
  - Nominal pressure
  - Nominal size
  - Flow direction arrow
  - Year of construction
  - Valve body material
- The operator is responsible for ensuring compliance with all local regulations not taken into account.
- The design, manufacture and testing of the valve are subject to a QM system to DIN EN ISO 9001 as well as the current regulations and directives for pressure equipment.
- Bear in mind that valves exposed to creep-rupture conditions have a limited service life and have to meet the applicable regulations stipulated in the technical codes.
- In the case of customised special variants, further restrictions may apply with regard to the operating mode and service life. Refer to the relevant sales documentation for applicable limitations.
- The operator is responsible for any eventualities or incidents which may occur during installation performed by the customer, operation and maintenance.

2.2 Intended use

- Only operate valves which are in perfect technical condition.
- Do not operate the valve in partially assembled condition.
- Only use the valve for fluids specified in the product literature. Take the design and material variant into account.
- Only operate the valve within the operating limits described in the other applicable documents.
- The valve's design and rating are based on predominantly static loading in accordance with the codes applied. Consult the manufacturer if the valve is subjected to dynamic loads or any other additional influences.
- Consult the manufacturer about any other modes of operation not described in the product literature.
- Do not use the valve as a foothold.

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2.2.1 Prevention of foreseeable misuse

- Never exceed the permissible application and operating limits specified in the data sheet or product literature regarding temperature, etc.
- Observe all safety information and instructions in this manual.

2.3 Personnel qualification and training

- All personnel involved must be fully qualified to transport, install, operate, maintain and inspect the product this manual refers to and be fully aware of the interaction between the valve and the system.
- The responsibilities, competence and supervision of all personnel involved in transport, installation, operation, maintenance and inspection must be clearly defined by the operator.
- Deficits in knowledge must be rectified by means of training and instruction provided by sufficiently trained specialist personnel. If required, the operator can commission the manufacturer/supplier to train the personnel.
- Training on the valve must always be supervised by specialist technical personnel.

2.4 Consequences and risks caused by non-compliance with this manual

- Non-compliance with these operating instructions will lead to forfeiture of warranty cover and of any and all rights to claims for damages.
- Non-compliance can, for example, have the following consequences:
  - Hazards to persons due to electrical, thermal, mechanical and chemical effects and explosions
  - Failure of important product functions
  - Failure of prescribed maintenance and servicing practices
  - Hazard to the environment due to leakage of hazardous substances

2.5 Safety awareness

In addition to the safety information contained in this operating manual and the intended use, the following safety regulations shall be complied with:

- Accident prevention, health regulations and safety regulations
- Explosion protection regulations
- Safety regulations for handling hazardous substances
- Applicable standards, directives and laws

2.6 Safety information for the operator/user

- Actuator-operated valves are intended for use in areas which cannot be accessed by unauthorised persons. Operation of these valves in areas accessible to unauthorised persons is only permitted if appropriate protective devices are fitted at the site. This must be ensured by the operator.
- Fit protective equipment (e.g. contact guards) supplied by the operator for hot, cold or moving parts, and check that the equipment functions properly. Do not touch rotating parts.
- Do not remove any protective equipment (e.g. contact guards) during operation.
- Provide the personnel with protective equipment and make sure it is used.
- Contain any leakage of hazardous fluids (e.g. explosive, toxic, hot) so as to avoid any danger to persons and the environment. Adhere to all relevant laws.
- Eliminate all electrical hazards. (In this respect refer to the applicable national safety regulations and/or regulations issued by the local energy supply companies.)

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2.7 Safety information for maintenance, inspection and installation

- Modifications or alterations of the valve require the manufacturer's prior consent.
- Use only original spare parts or parts/components authorised by the manufacturer. The use of other parts/components can invalidate any liability of the manufacturer for resulting damage.
- The operator ensures that maintenance, inspection and installation are performed by authorised, qualified specialist personnel who are thoroughly familiar with the manual.
- Carry out work on the valve during standstill only.
- The valve body must have cooled down to ambient temperature.
- The pressure in the valve body must have been released and the valve must have been drained.
- When taking the valve out of service always adhere to the procedure described in the manual.
- Decontaminate valves which handle fluids posing a health hazard.
- Protect the valve body and body bonnet/cover from any impacts.
- As soon as the work has been completed, re-install and re-activate any safety-relevant devices and protective devices. Before returning the product to service, observe all instructions on commissioning. (⇨ Section 6.1, Page 26)

2.8 Unauthorised modes of operation

- The valve is operated outside the limits stated in the operating manual.
- The valve is not operated in accordance with the intended use.

(⇨ Section 2.2, Page 8)

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3 Transport/Storage/Disposal

3.1 Checking the condition upon delivery

1. On transfer of goods, check each packaging unit for damage.
2. In the event of in-transit damage, assess the exact damage, document it and notify KSB or the supplying dealer and the insurer about the damage in writing immediately.

3.2 Transport

The valves are delivered in cardboard boxes.

DANGER

The valve could slip out of the suspension arrangement

Danger to life from falling parts!

- Only transport the valve in the specified position.
- Never attach lifting accessories to the handwheel.
- Observe the information on weights, centre of gravity and fastening points.
- Observe the applicable local accident prevention regulations.
- Use suitable, permitted lifting accessories, e.g. self-tightening lifting tongs.
- For valves with actuators observe the relevant actuator operating manual. Transport aids on the actuator are not suitable for suspending the entire valve/ actuator assembly.

CAUTION

Improper transport

Damage to the valve!

- Always transport the valve properly and in its original packaging.
- Protect the valve in its cardboard box from heavy impacts.
- Do not throw the valve.

CAUTION

Improper transport

Damage to pressure measurement connection branches or piping!

Measuring impossible

No valve function!

- Do not use lifting accessories in the area of the pressure measurement connection branches or piping.

To transport valves with flanged ends from DN 65, suspend them from the lifting tackle as shown.

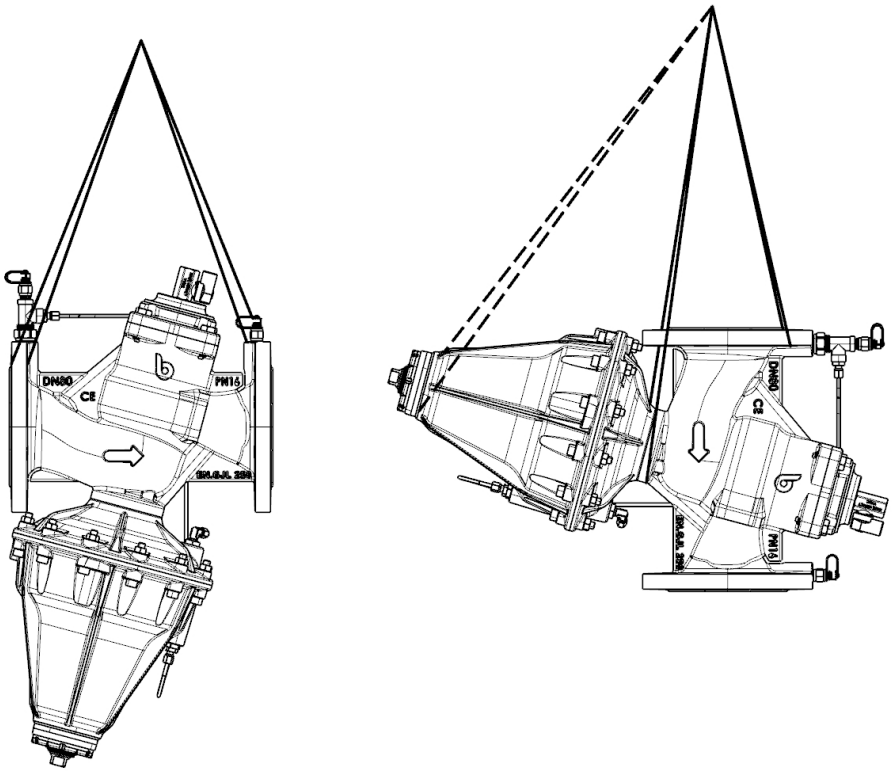

Fig. 1: Transporting the valve

3.3 Storage/preservation

If commissioning is to take place some time after delivery, we recommend that the following measures be taken for storage:

CAUTION

Incorrect storage

Damage due to dirt, corrosion, humidity and/or frost!

- ▷ Close the valve using little force and store in the closed position.
- ▷ Protect valve parts made of EPDM from sunlight or UV light from other sources. Observe the DIN 7716 standard for the storage of elastomers.
- ▷ Store the valve in a frost-proof room where the atmospheric humidity is as constant as possible.
- ▷ Protect the valve from dust during storage, e.g. with suitable caps or foils.
- ▷ Protect the valve from contact with solvents, lubricants, fuels or other chemicals.
- ▷ Store the valve in vibration-free conditions.

If properly stored indoors, the equipment is protected for a maximum of 12 months.

3.4 Return to supplier

1. Drain the valve as described in the manual.
2. Flush and clean the valve.
3. If the valve has handled fluids whose residues could lead to corrosion damage in the presence of atmospheric humidity or could ignite upon contact with oxygen also neutralise the valve and blow through with anhydrous inert gas to ensure drying.

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3.5 Disposal

⚠ WARNING

Fluids handled, consumables and supplies which are hot and/or pose a health hazard

Risk of injury!

Hazard to persons and the environment!

- ▷ Collect and properly dispose of flushing fluid and any residues of the fluid handled.
- ▷ Wear safety clothing and a protective mask if required.
- ▷ Observe all relevant laws.
- ▷ Decontaminate valves used in fluids posing a health hazard.

1. Dismantle the valve.
   Collect greases and other lubricants during dismantling.
2. Separate and sort the valve materials, e.g. by:
   - Metals
   - Plastics
   - Electronic waste
   - Greases and other lubricants
3. Dispose of materials in accordance with current regulations or in another controlled manner.

4 Description of the Valve

4.1 General description

- Valve for the hydraulic balancing of hot-water heating systems, air-conditioning systems and cooling circuits
- The valve maintains constant pressure conditions in the branch it is installed in.

4.2 Product information

4.2.1 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.

4.2.2 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 Group 2.

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

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

4.3 Marking

Table 4: General marking

Description	Marking
Nominal size	DN ...
Nominal pressure class	PN ...
Manufacturer	KSB
Year of construction	20..
Material	.....
Flow direction arrow	→
CE conformity marking	CE
UKCA conformity marking	UK CA
Customer's marking	e.g. plant/system No., etc.

CE marking

In accordance with the applicable Pressure Equipment Directive PED, Article 4, Paragraph 3, valves up to and including DN 50 must not bear the CE marking.

From DN 65 the valves are CE marked in accordance with the applicable Pressure Equipment Directive.

UKCA marking

In accordance with the Pressure Equipment (Safety) Regulations 2016 Part 1, para. 8, valves up to and including DN 50 must not bear the UKCA marking.

From DN 65 the valves are UKCA marked in accordance with the Pressure Equipment (Safety) Regulations 2016.

4.4 Operating data

Table 5: Operating properties

Characteristic	Value
Nominal pressure	16/25
Nominal size	15 - 100
Max. permissible pressure [bar]	25 (DN 15-25)
	16 (DN 32-100)

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Characteristic	Value
Min. permissible temperature [°C]	≥ -10
Max. permissible temperature [°C]	≤ +120
Max. permissible differential pressure [bar]	4

4.5 Fluids handled

- Water
- Water/glycol mixtures (glycol content ≤ 50 %)
- Other fluids on request.

4.6 Design details

Design

- Continuously adjustable differential pressure regulator
- Straight-way Y-pattern valve
- Internal thread (≤ DN 50) or flanges (≥ DN 65)
- Two self-sealing pressure measurement connection branches for checking differential pressure
- Device for presetting the differential pressure for all nominal sizes

4.7 Pressure/temperature ratings

Table 6: Test pressure and operating pressure

PN	DN	Shell test	Seat tightness test	Permissible operating pressure[3)]	
		With water			
		Tests P10 and P11 to DIN EN 12266-1	Test P12, leakage rate A to DIN EN 12266-1	-10 to +100 °C	120 °C
		[bar]	[bar]	[bar]	[bar]
25	15-25	37,5	27,5	25	21,7
16	32-100	24	17,6	16	12,7

3 Static load

4.8 Materials

DN 15 - 25

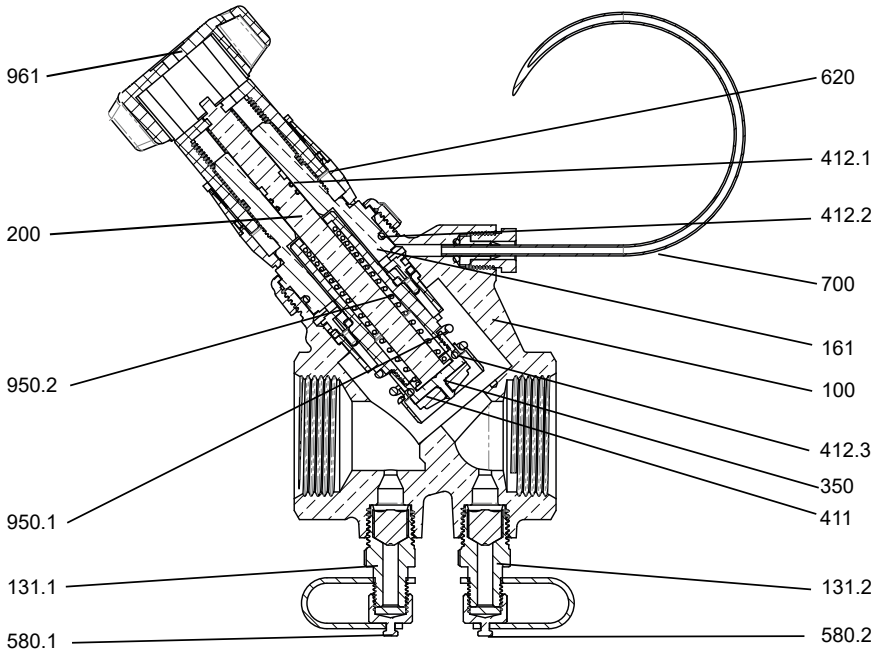

Fig. 2: Sectional drawing DN 15 - 25

Table 7: Overview of available materials DN 15 - 25

Part No.	Description	Material	Note
100	Body	CW602N	-
131.1/.2	Pressure measurement connection branch	CW617N	-
161	Body bonnet	CW602N	-
200	Stem	CW617N	-
350	Valve disc	CW617N	-
411	Sealing element	EPDM Perox 80SH	-
412.1/.2	O-ring	EPDM 70	-
412.3	O-ring	EPDM Perox	-
580.1/.2	Cap	CW617N	Red (580.1), blue (580.2)
620	Position indicator	Glass fibre reinforced plastics	-
700	Piping (capillary tube)	Copper	-
950.1/.2	Spring	AISI302	-
961	Handwheel	Glass fibre reinforced plastics	-

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DN 32 - 50

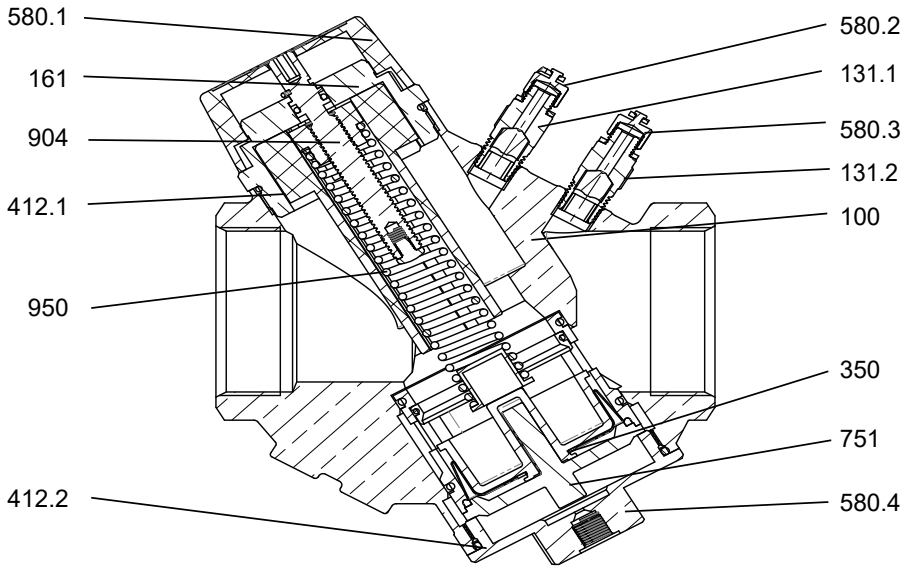

Fig. 3: Sectional drawing DN 32 - 50

Table 8: Overview of available materials DN 32 - 50

Part No.	Description	Material	Note
100	Body	CW602N	-
131.1/.2	Pressure measurement connection branch	CW617N	-
161	Body bonnet	CW602N	-
350	Valve disc	Plastic	-
412.1/.2	O-ring	EPDM 70	-
580.1	Cap	Plastic	-
580.2/.3	Cap	CW617N	Red (580.2), blue (580.3)
580.4	Cap	CW602N	-
751	Inserted piece	Plastic	-
904	Grub screw	Stainless steel	-
950	Spring	AISI302	-

DN 65 - 100

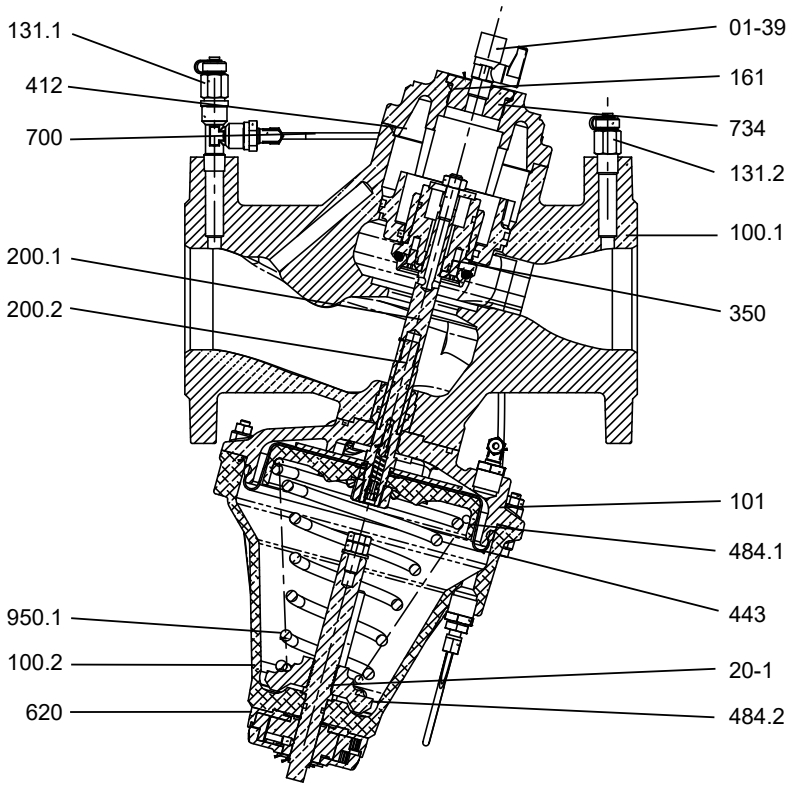

Fig. 4: Sectional drawing DN 65 - 100

Table 9: Overview of available materials DN 65 - 100

Part No.	Description	Material	Note
01-39	Ball valve	CW617N	-
100.1	Body (valve)	EN-GL-250 (5.1301)	-
100.2	Housing (actuator)	G-AlSi4.5MnMg	-
101	Lower housing section (actuator)	G-AlSi4.5MnMg	-
131.1/.2	Pressure measurement connection branch	CW617N	-
161	Body bonnet	EN-GL-250 (5.1301)	-
20-1	Adjusting stem	CW617N	-
200.1/.2	Stem	CW617N	-
350	Valve disc	CW617N	-
412	O-ring	EPDM	-
443	Diaphragm	EPDM	-
484.1	Spring plate	G-AlSi4.5MnMg	-
484.2	Spring plate	CW617N	-
620	Position indicator	Polyamide	-
700	Piping (capillary tube)	Copper	-
734	Screwed union	CW617N	-
950.1	Spring	AISI302	-

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4.9 Function

Design The valves basically consist of body 100, body bonnet 161 and the functional unit. Nominal sizes DN 15 - 50 have female threaded ends to ISO 288. From DN 65, the valves have flanged line connections. The functional unit consists of stem 200, valve disc 350 and a valve insert.

Function The valves maintain a constant differential pressure as defined by the presetting, irrespective of fluctuating pressures in the system. A pressure tapping is required in the supply, which is connected to the differential pressure regulator with a pressure measurement line. The differential pressure in the branch is adjusted by means of an integral fluid-controlled actuator which moves the functional unit.

The differential pressure can be measured at the two pressure measurement connection branches 131.1/.2 with a differential pressure gauge.

4.10 Scope of supply

The following items are included in the scope of supply:

- Valve
- Pressure measurement line[4)]

A suitable pressure tapping is required for full functionality of the valve. BOA-Control SBV is recommended as a partner valve.

4.11 Dimensions and weights

For dimensions and weights please refer to the type series booklet.

4 For nominal sizes DN 15 - 25 and DN 65 - 100 only

5 Installation at Site

5.1 General information/Safety regulations

Responsibility for positioning and installing the valve lies with the consultant, the engineering contractor or the operator. Planning errors and installation errors can prevent the reliable function of the valves and pose a substantial safety hazard.

The valves are supplied ready for operation.

5.2 Installation position

Non-compliance with the following installation instructions may result in failure of the measuring function.

CAUTION

Flow in opposite direction of flow direction arrow

No valve function!

- ▷ Flow through the valves must be in the direction indicated by the flow direction arrow cast on the valve body.

The valve must be installed in the return only. The valves can be installed in any position.

5.3 Piping

⚠ WARNING

Impermissible piping forces

Leakage from or rupture of the valve body!

- ▷ Connect the pipes to the valve without transmitting any stresses or strains.
- ▷ Take structural measures to prevent any piping forces from being transmitted to the valve.
- ▷ Avoid mechanical loads beyond normal levels, e.g. piping forces, moments and vibrations.

CAUTION

Welding in close proximity to soft-seated valves

Damage to the seat/disc interface!

- ▷ Ensure that the valve is not heated beyond the specified temperature limits.

CAUTION

Painting of the piping

Valve function impaired!

Loss of important information provided on the valve!

- ▷ Protect stem and plastic components prior to applying paint.
- ▷ Protect printed name plates prior to applying paint.

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5.4 Installing the valve

CAUTION

Improper installation

Damage to the valve!

- ▷ Protect the body and body bonnet from any impacts.

CAUTION

Outdoor installation

Damage due to corrosion!

- ▷ Provide weather-proof protection to protect the valve against moisture.

CAUTION

Welding beads, scale and other impurities in the piping

Damage to the valve!

- ▷ Remove any impurities from the piping.
- ▷ If necessary, install a strainer.

1. Thoroughly clean, flush and blow through all vessels, piping and connections (especially of new installations).
2. Check that the inside of the valve is free from any foreign objects. Remove any foreign objects.
3. If required, install a strainer in the piping.

Threaded connection (DN 15 - 50)

The valves have female threaded ends (DN 15 - 50) to ISO 228 for installation in the piping.

CAUTION

Tightening the threaded connection with an unsuitable tool

Damage to the valve!

Leakage at the valve body!

Leakage of fluid!

- ▷ Tighten the threaded connection with an open-ended spanner only.

✓ The thread is free of dirt.

1. Always apply sealing material to the male thread of the threaded connection only.
2. Tighten the threaded connection with an open-ended spanner.

Flanged connection (DN 65 - 150)

Only use fasteners (e.g. to DIN EN 1515-4) and flange gaskets (e.g. to DIN EN 1514) made of materials approved for the respective nominal valve size. Always use all flange bolt holes provided when connecting the valve to the pipe. For details on flange connections refer to the type series booklet and (⇨ Table 10) .

Table 10: Bolt sizes and lengths to DIN EN 1092-2 PN 10/16

DN	Quantity	Thread size	Bolt length [mm]
65	4	M16	55
80	8	M16	60
100	8	M16	65

DN	Quantity	Thread size	Bolt length [mm]
125	8	M16	65
150	8	M20	70

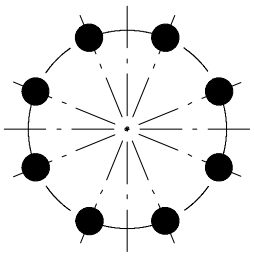
The bolt lengths are specified without considering tolerances; they refer to the installation of the valve in a pipe with a standardised steel mating flange to DIN EN 1092-1.

NOTE

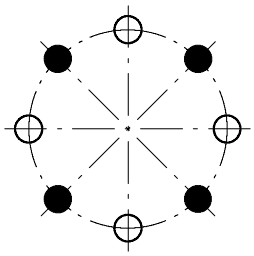
Exception: DN 65 PN 16

When using steel flanges to DIN EN 1092-1 in conjunction with cast iron valves with flanges machined to DIN EN 1092-2, ensure that for nominal size DN 65 classed PN 16 the mating flanges are fitted offset by 22.5°.

Table 11: Valve bolting DN 65 PN 16



DN 65 PN 16 (steel/steel):
DIN EN 1092-1 with DIN EN 1092-1: bolts through 8 holes



DN 65 PN 16 (steel/cast iron):
DIN EN 1092-1 with DIN EN 1092-2: bolt hole circle to DIN EN 1092-1 rotated by 22.5°, bolts through 4 holes, 4 holes free

✓ The mating flange faces are clean and undamaged.

1. Use an appropriate tool to evenly tighten the fasteners crosswise.

5.5 Connecting the pressure measurement line

CAUTION

Pressure measurement line missing during commissioning

Damage to the valve!

▹ The pressure measurement line always has to be fitted prior to commissioning.

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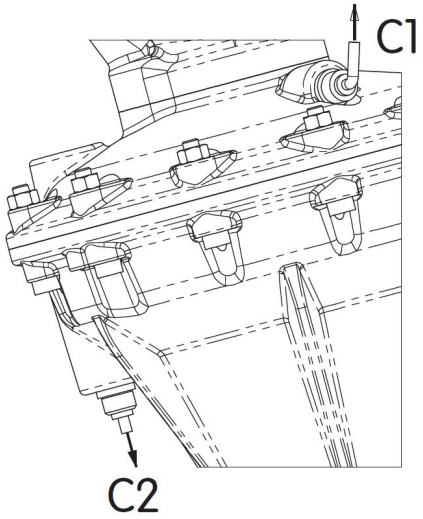

Fig. 5: Connecting the pressure measurement line

For connecting the pressure tapping in the supply with the valve, a pressure measurement line made of copper, with an outside diameter of 4 mm, is included in the scope of supply.

1. Connect connection C1 with the pressure tapping in the supply by means of the pressure measurement line.

	NOTE
	Connection C2 on the valve body has already been connected at the factory.

5.6 Flushing the valve

Flushing the piping prior to commissioning is recommended to prevent dirt particles from the installation process from clogging system components or impairing their function. Fully opening the valves is usually sufficient to allow maximum throughflow. On nominal sizes DN 15 - 25 a defined handwheel position allows optimum flushing.

DN 15 - 25

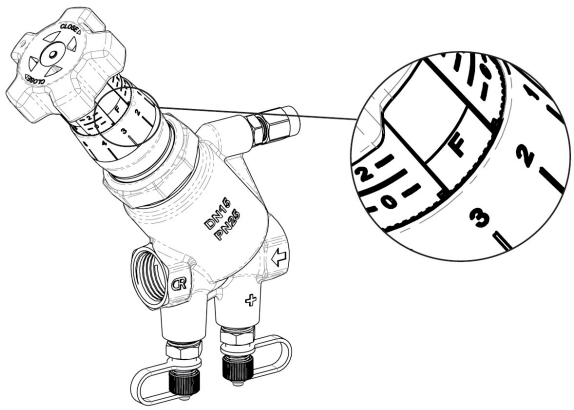

Fig. 6: Flushing the valve (DN 15 - 25)

1. Turn handwheel 961 anti-clockwise until F is indicated.
2. Flush the valve.
3. Turn handwheel 961 clockwise to preset the required (⇨ Section 6.1.2, Page 26) differential pressure.

5.7 Insulation

If the valve is used for handling hot fluids, insulate it in accordance with the German energy-saving regulations.

⚠ WARNING

Cold/hot piping and/or valve

Risk of thermal injury!

- ▷ Insulate the valve.
- ▷ Fit warning signs.

CAUTION

Condensation forming in air-conditioning systems, cooling systems and refrigerating systems

Ice forming!

Actuating element blockage!

Damage due to corrosion!

- ▷ Insulate the valve to prevent diffusion.

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5.8 Measuring computer

CAUTION

Incorrect operation of the measuring computer

Incorrect readings and setting of valve!

- ▷ Observe the relevant operating manual of the measuring computer.

The differential pressure can be measured at the two pressure measurement connection branches with a differential pressure gauge. For measuring the volume flow rate, a measuring kit can be hired on request.

6 Commissioning/Start-up/Shutdown

6.1 Commissioning/Start-up

6.1.1 Prerequisites for commissioning/start-up

Before commissioning/start-up of the valve, ensure that the following requirements are met:

- The material, pressure data and temperature data of the valve are compatible with the operating conditions of the piping.
- The material's chemical resistance and stability under load have been checked.

DANGER

Surge pressure/water hammer potentially occurring at high temperatures

Danger to life caused by burns or scalds!

- ▷ Do not exceed the valve's maximum permissible pressure.
- ▷ Use valves made of nodular cast iron or steel.
- ▷ The operator shall provide general safety measures for the system.

6.1.2 Setting the differential pressure

DN 15 - 25

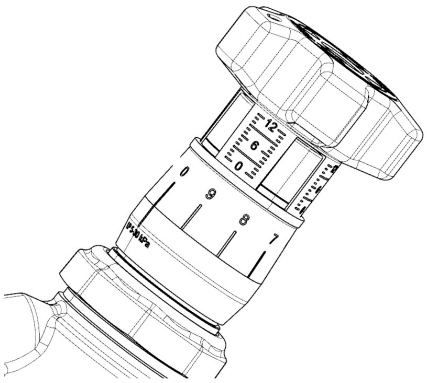

Fig. 7: Setting the differential pressure (DN 15 - 25)

A scale is provided on the handwheel. The moving part of the scale at the handwheel indicates the number of full turns. The fixed part of the scale indicates tenths of a full turn. This enables the differential pressure to be set precisely.

1. Set the defined differential pressure by turning handwheel 961. Refer to the characteristic curves for the presettings on the handwheel travel scale.
(⇨ Section 6.1.2.1, Page 27)

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DN 32 - 50

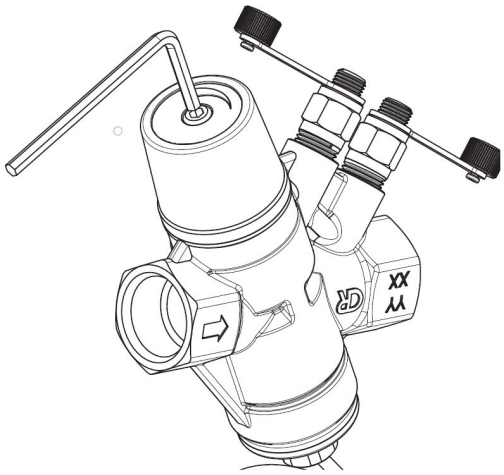

Fig. 8: Setting the differential pressure (DN 32 - 50)

1. Close the valve by means of an Allen key WAF 4, turning the Allen key anti-clockwise.
2. Set the differential pressure required by counting the number of Allen key turns in clockwise direction. Refer to the characteristic curves for the presettings. (⇨ Section 6.1.2.2, Page 31)

DN 65 - 100

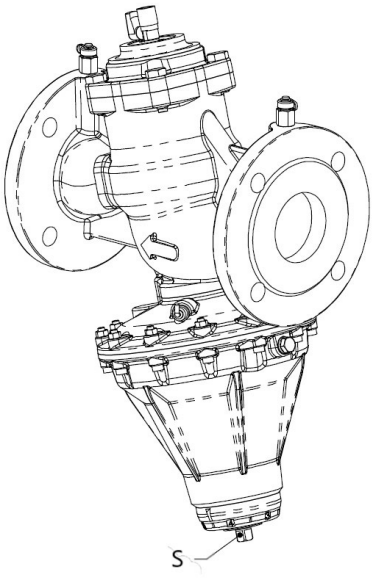

Fig. 9: Setting the differential pressure (DN 65 - 100)

1. Set the differential pressure required by counting the number of turns of the screw (S) in anti-clockwise direction. Refer to the tables for the presettings. (⇨ Section 6.1.2.3, Page 33)

6.1.2.1 Presettings for DN 15 - 25

Table 12: Key

Symbol	Description
Δ p	Differential pressure
n	Presetting as per handwheel scale
Q	Volume flow rate

DN 15, PN25

Table 13: Selection table DN 15

Version	Δ p	Q	Kvs
	[kPa]	[l/h]	
LP	5 - 30	75 - 600	4,1
HP	20 - 60	150 - 1100	4,1

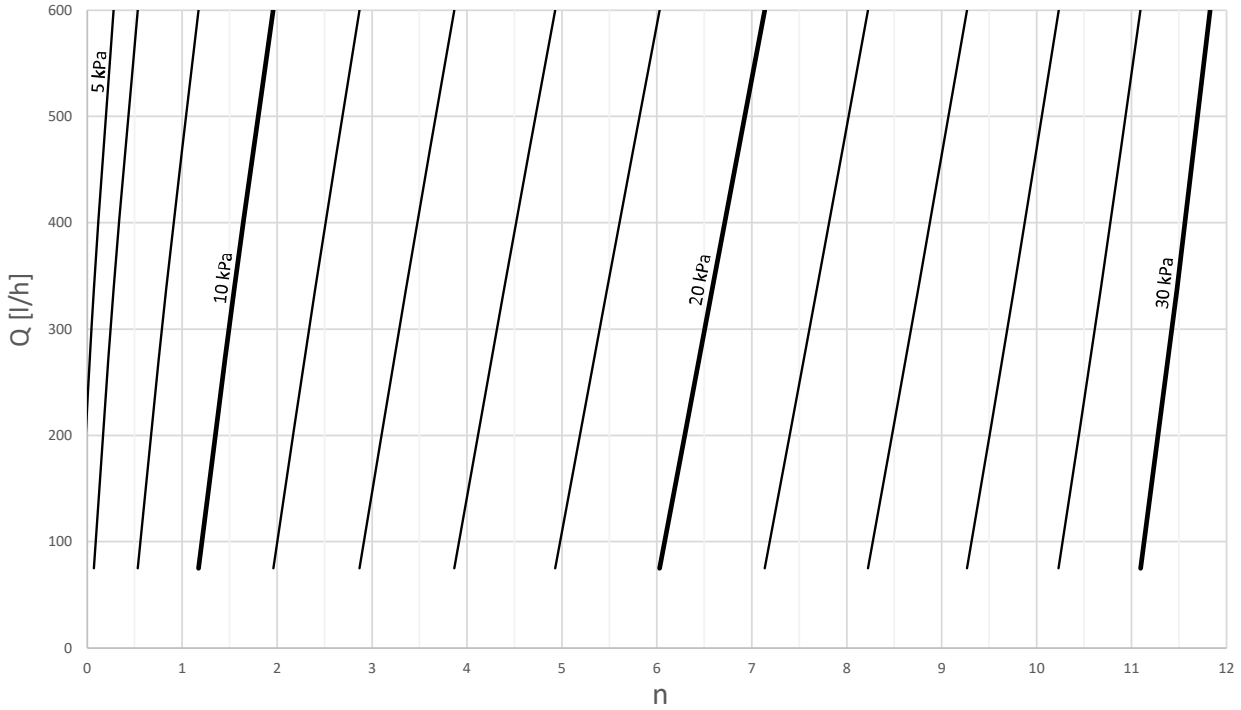

Fig. 10: Presettings DN 15LP

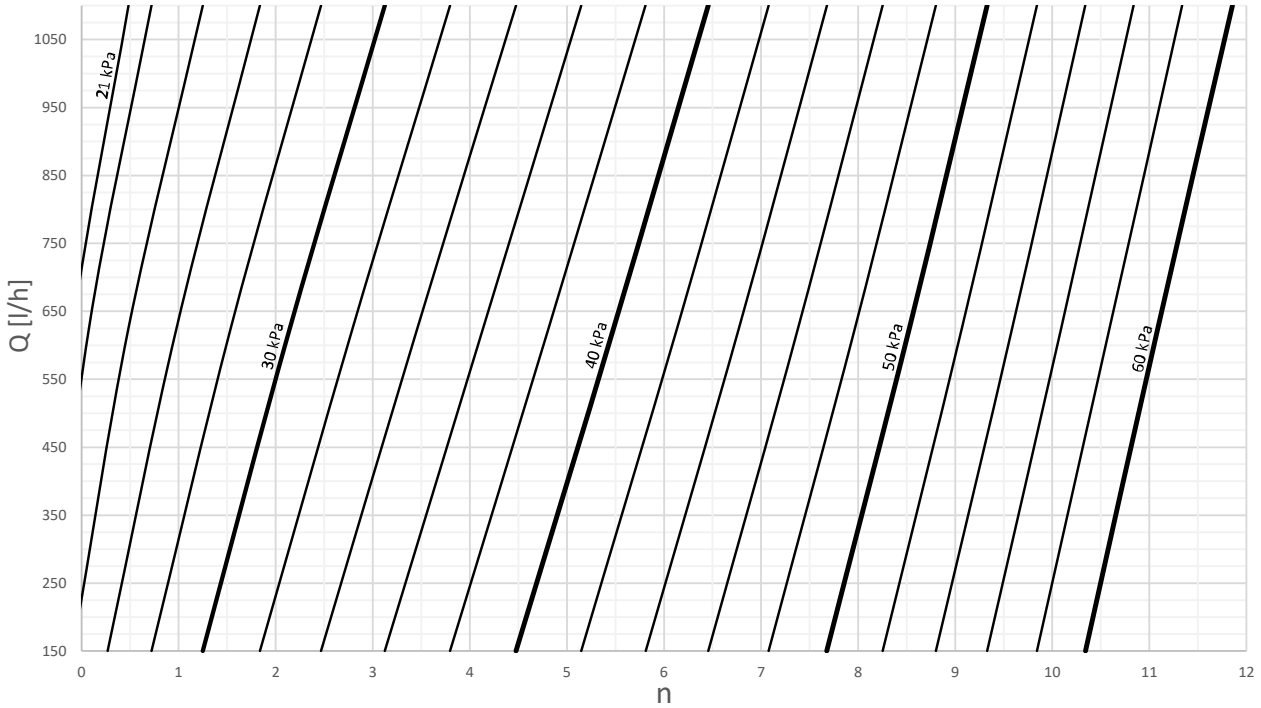

Fig. 11: Presettings DN 15HP

DN 20, PN 25

Table 14: Selection table DN 20

Version	Δ p	Q	Kvs
	[kPa]	[l/h]	
LP	5 - 30	100 - 1250	4,9
HP	20 - 60	150 - 2000	4,9

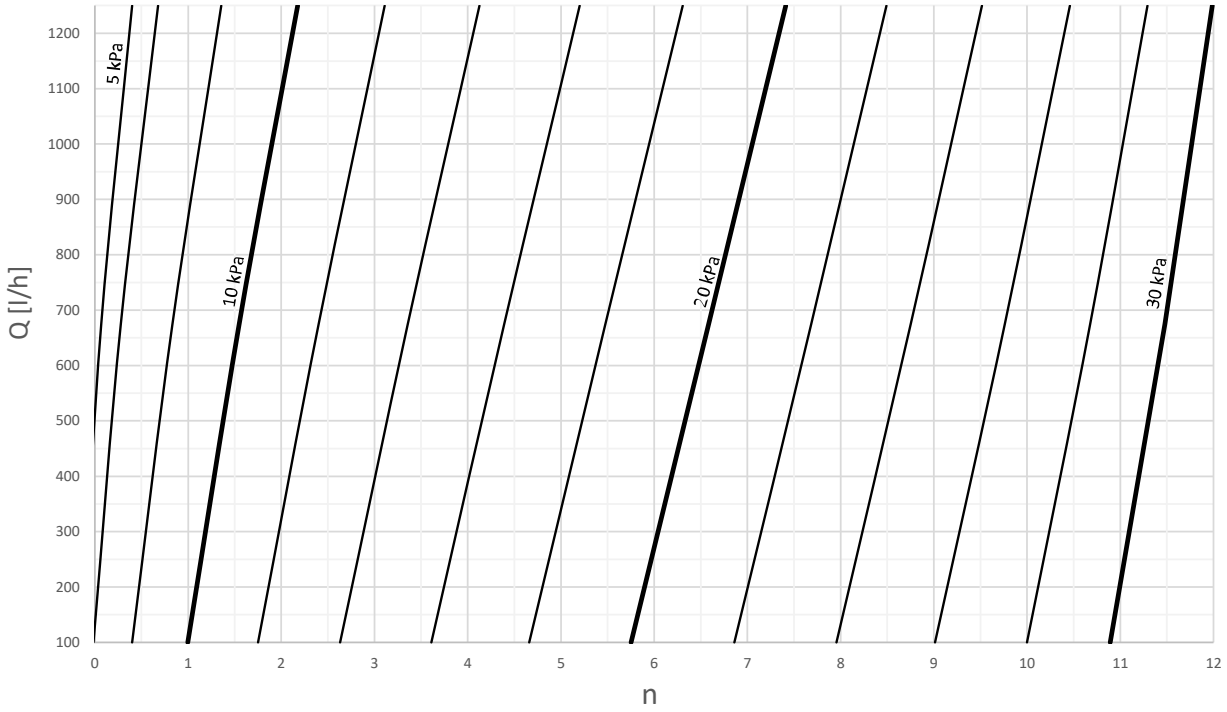

Fig. 12: Presettings DN 20LP

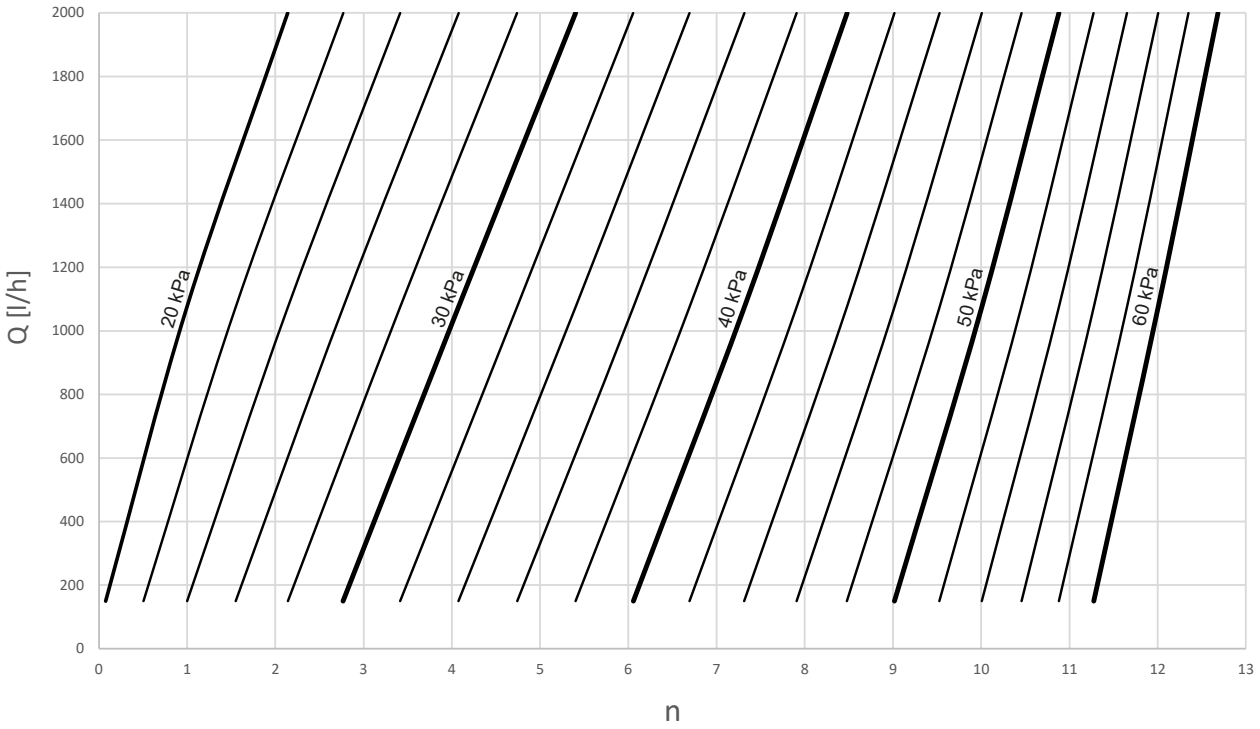

Fig. 13: Presettings DN 20HP

DN 25, PN 25

Table 15: Selection table DN 25

Version	Δ p	Q	Kvs
	[kPa]	[l/h]	
LP	5 - 30	500 - 2500	5,0
HP	20 - 60	700 - 2500	5,0

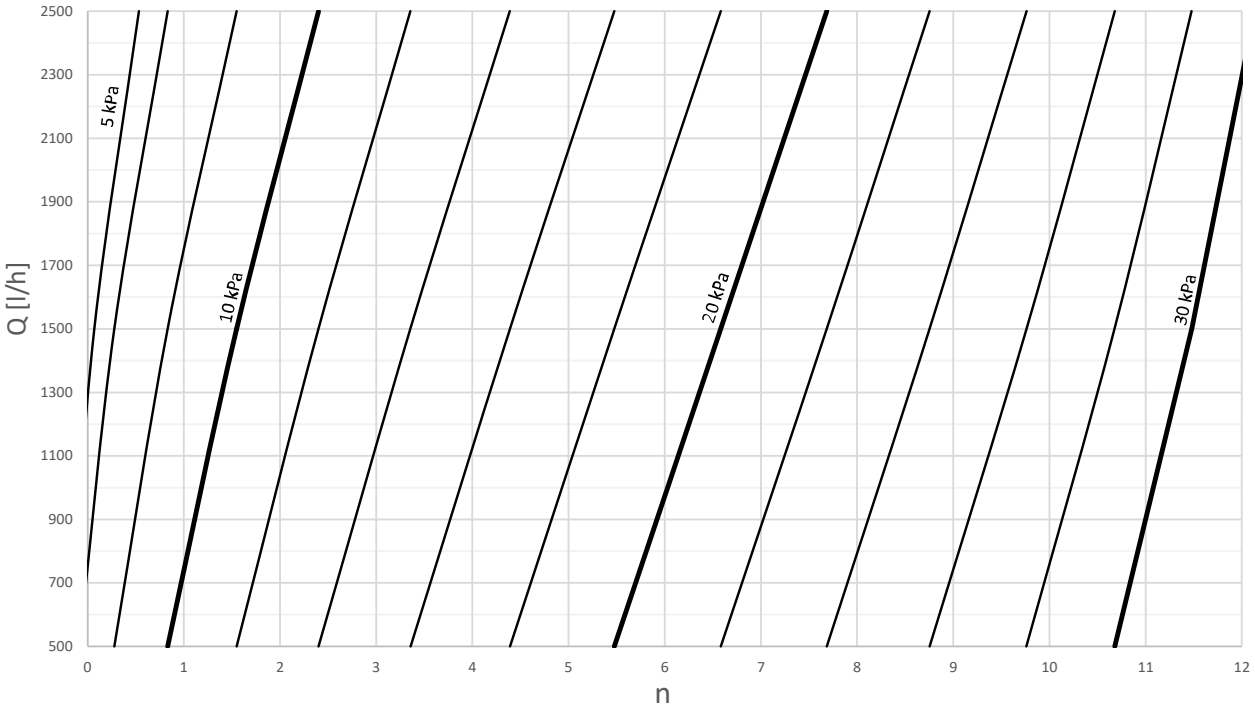

Fig. 14: Presettings DN 25LP

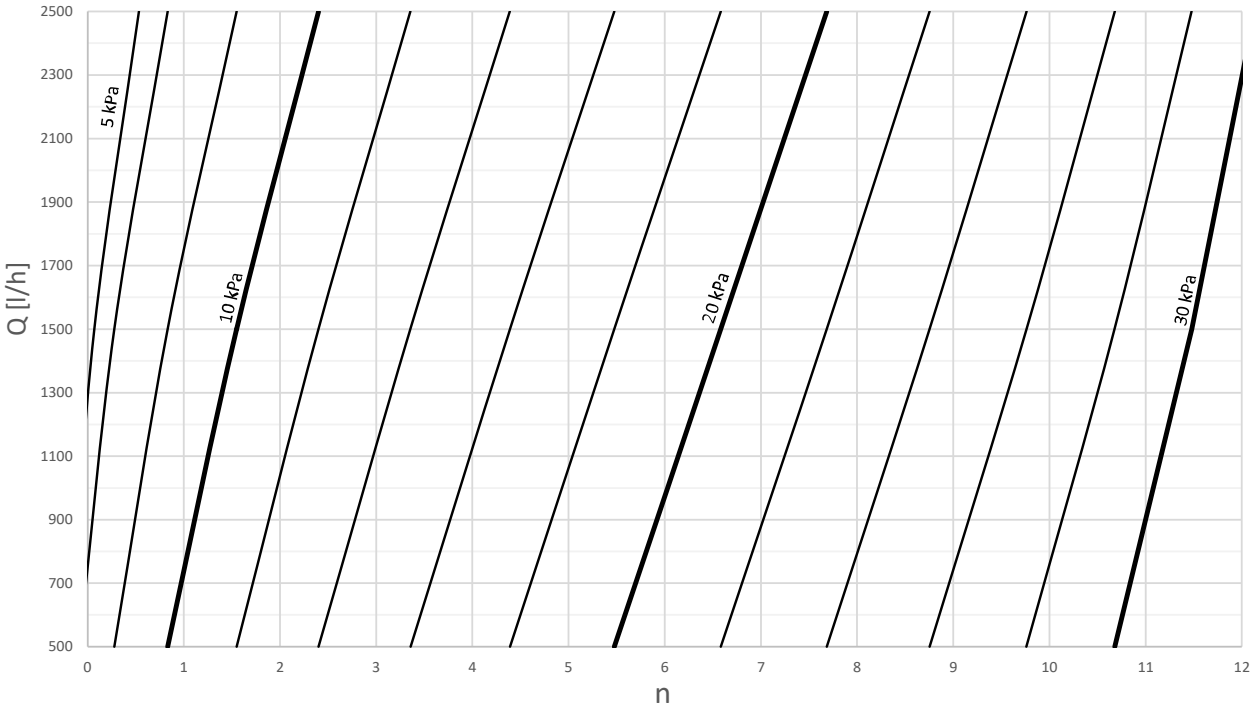

Fig. 15: Presettings DN 25HP

6.1.2.2 Presettings for DN 32 - 50

Table 16: Key

Symbol	Description
Δ p	Differential pressure
n	Turns of Allen key
Q	Volume flow rate

DN 32, PN 16

Table 17: Selection table DN 32

Δ p	Q	Kvs
[kPa]	[l/h]	
20 - 80 kPa	1000 - 5000	11,4

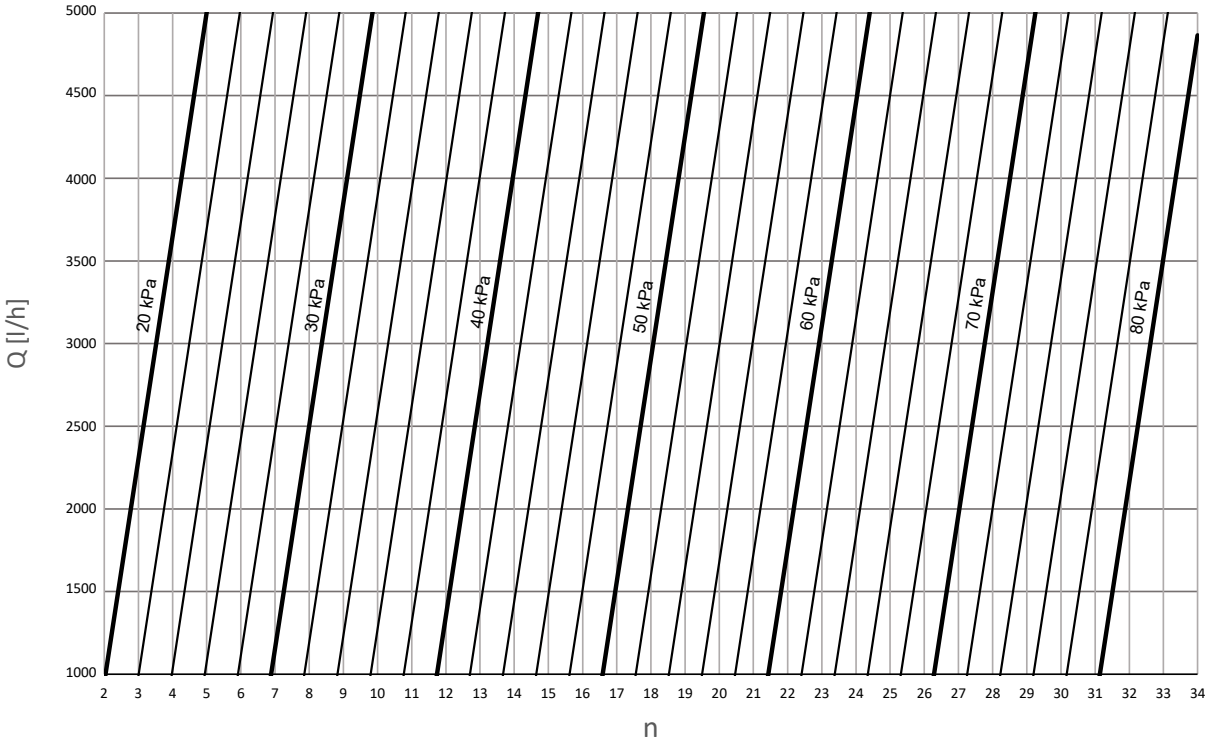

Fig. 16: Presettings DN 32

DN 40, PN 16

Table 18: Selection table DN 40

Δ p	Q	Kvs
[kPa]	[l/h]	
20 - 80 kPa	3000 - 8000	16,4

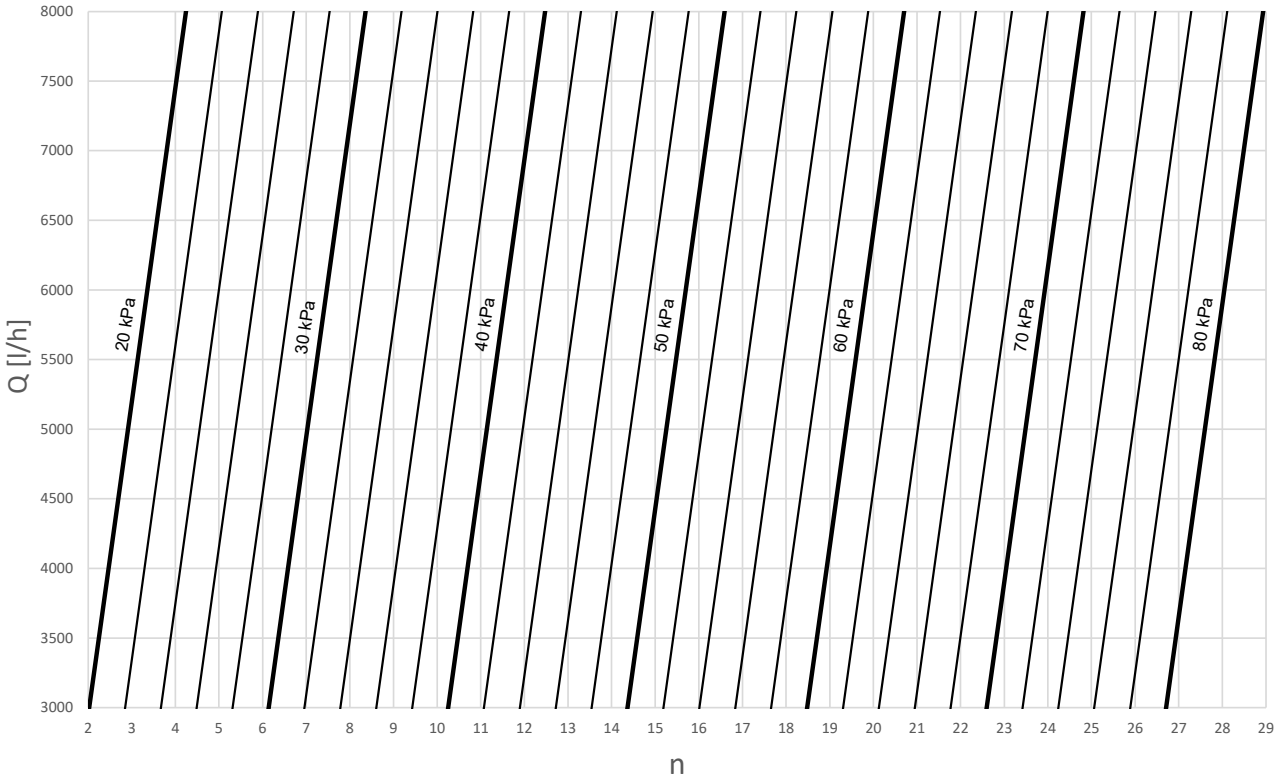

Fig. 17: Presettings DN 40

DN 50, PN 16

Table 19: Selection table DN 50

Δ p	Q	Kvs
[kPa]	[l/h]	
20 - 80 kPa	5000 - 15000	17,9

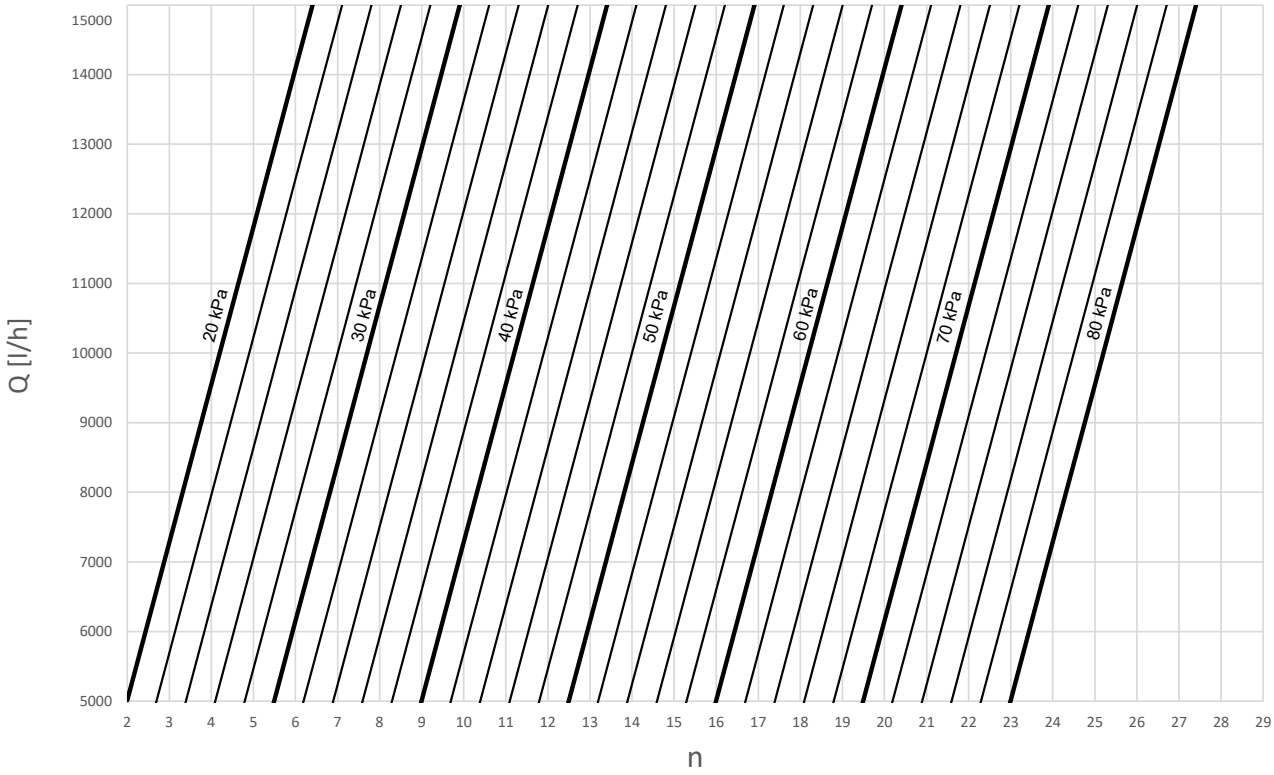

Fig. 18: Presettings DN 50

6.1.2.3 Presettings for DN 65 - 100

Table 20: Selection table DN 65 - 100

DN	Version	Δ p	Q	Kvs
		[kPa]	[m^3/h]	
65	LP	20 - 80	1 - 72	50,5
	HP	80 - 160	2 - 77	53
80	LP	20 - 80	1 - 98	70
	HP	80 - 160	2 - 115	75,5
100	LP	20 - 80	1 - 125	92
	HP	80 - 160	5 - 156	106,5

DN 65, PN 16

LP version

Table 21: Presettings DN 65LP

Presetting	Volume flow rate	Differential pressure
	[m^3/h]	[kPa]
0,0	1,1	31
	5,5	28
	12,6	21
	18,0	20
	27,2	18
	34,6	12
1,0	1,2	47
	5,5	42
	10,9	38
	20,0	32
	32,7	30
	42,0	28
	51,0	25
	63,0	24
	71,0	25
2,0	2,3	76
	11,9	66
	15,5	60
	20,5	57
	28,5	50
	58,0	42
	70,0	41
2,8	1,9	105
	7,7	100
	12,0	90
	27,3	80
	38,0	75
	49,0	70
	64,0	69
	72,0	68

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HP version

Table 22: Presettings DN 65HP

Presetting	Volume flow rate	Differential pressure
	[m³/h]	[kPa]
0,0	2,6	105
	8,6	100
	15,7	95
	24,2	90
	40,6	80
	56,0	80
	76,5	72
0,5	3,3	115
	12,0	110
	18,0	110
	28,7	105
	42,0	100
	58,7	92
	73,0	90
1,0	3,3	150
	14,9	135
	20,9	130
	28,2	120
	45,9	118
	54,0	115
	77,0	105
2,0	3,8	180
	8,0	175
	10,7	170
	23,6	162
	35,0	160
	52,0	158
	72,6	145

DN 80, PN 16

LP version

Table 23: Presettings DN 80LP

Presetting	Volume flow rate	Differential pressure
	[m^3/h]	[kPa]
0,0	1,44	36
	6,48	32
	16,2	30
	26,0	29
	45,0	26
	58,0	22
	70,0	20
	80,0	19
1,0	3,96	67
	12,60	52
	17,28	48
	22,0	45
	46,0	44
	61,0	42
	92,0	40
2,0	4,32	85
	10,80	78
	15,84	72
	39,0	66
	64,0	57
	98,0	54
3,0	1,80	88
	6,12	85
	16,92	85
	24,0	82
	44,0	78
	52,0	77
	73,0	70
	95,0	68

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HP version

Table 24: Presettings DN 80HP

Presetting	Volume flow rate	Differential pressure
	[m³/h]	[kPa]
0,0	5,6	90
	12,3	90
	23,4	90
	57,1	82
	67,5	85
	77,0	85
	99,0	75
1,0	2,5	115
	4,5	110
	11,0	110
	29,0	105
	43,5	100
	77,0	100
	113,0	95
2,0	3,0	140
	12,8	140
	16,3	135
	23,1	135
	41,7	130
	62,8	125
	84,0	125
	115,0	100
2,5	3,9	190
	7,6	175
	15,5	175
	22,6	160
	40,1	155
	59,0	150
	81,0	142
	105,0	138

DN 100, PN 16

LP version

Table 25: Presettings DN 100LP

Presetting	Volume flow rate	Differential pressure
	[m^3/h]	[kPa]
0,0	1,87	37
	4,97	30
	14,4	27
	20,0	24
	37,0	23
	63,0	18
	108,0	18
1,0	2,38	44
	16,2	40
	21,6	35
	25,0	32
	43,0	30
	59,0	29
	91,0	27
	122,0	27
2,0	2,84	59
	9,00	55
	18,36	53
	27,0	51
	78,0	49
	110,0	42
	125,0	41
3,5	2,74	100
	11,2	91
	19,1	86
	58,0	82
	100,0	72
	122,0	70

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HP version

Table 26: Presettings DN100HP

Presetting	Volume flow rate	Differential pressure
	[m³/h]	[kPa]
0,0	6,12	95
	9,00	90
	14,04	90
	26,0	90
	43,4	90
	79,6	83
	113,0	78
	152,0	72
1,0	5,4	115
	12,6	110
	16,2	110
	48,7	105
	78,0	100
	115,0	92
	156,0	90
2,0	6,73	135
	11,45	122
	16,92	120
	29,4	120
	58,0	113
	82,0	110
	104,0	108
	151,0	100
2,5	6,12	170
	20,16	162
	22,68	160
	33,3	156
	58,0	152
	78,0	145
	126,0	135
	146,0	130

6.1.3 Closing the valve

The valve provides a shut-off function (DN 15 - 25).

DN 15 - 25

1. Turn handwheel 961 clockwise up to the stop.

6.2 Shutdown

6.2.1 Measures to be taken for shutdown

⚠ WARNING

Fluids handled, consumables and supplies which are hot and/or pose a health hazard

Risk of injury!

Hazard to persons and the environment!

- ▷ Collect and properly dispose of flushing fluid and any residues of the fluid handled.
- ▷ Wear safety clothing and a protective mask if required.
- ▷ Observe all relevant laws.
- ▷ Decontaminate valves used in fluids posing a health hazard.

CAUTION

Excessively long idle periods

Damage to the valve!

- ▷ Check the function by opening and closing the valve at least once or twice a year.

During prolonged shutdown periods, ensure that the following conditions are met:

1. Drain fluids which change their physical condition due to changes in concentration, polymerisation, crystallisation, solidification, etc. from the piping.
2. If required, flush the piping with the valves fully opened.

7 Servicing/Maintenance

7.1 Safety regulations

DANGER

Pre-loaded springs, stored forces

Danger to life!

- Never undo the bolts/screws of the integrated fluid-controlled actuator.

DANGER

Valve under pressure

High-pressure hazard!

Leakage of hot and/or toxic fluids!

Risk of burns!

- Depressurise the valve and its surrounding system prior to any maintenance work and installation work.
- If the bellows are defective or fluid escapes, depressurise the valve.
- Ensure the valve is depressurised before removing any drain plugs, opening plugs or vent plugs.
- Allow the valve to cool down until the temperature of the fluid in all valve areas in contact with the fluid is lower than the fluid's vaporisation temperature.
- Never vent the valve by removing the bonnet bolting or gland packing.
- Use original spare parts and appropriate tools, even in emergencies.

Before removing the valve, ensure that the pipe has been shut off and released for repair/maintenance work.

A regular maintenance schedule will help avoid expensive repairs and contribute to trouble-free, reliable operation of the valve with a minimum of servicing/ maintenance expenditure and work.

The user is responsible for defining appropriate intervals for checks and maintenance, depending on the application of the valve.

NOTE

All maintenance, service and installation work can be carried out by KSB Service or authorised workshops. Find your contact on the Internet at "www.ksb.com/contact".

Never use force when removing and installing the valve.

7.2 Maintenance

The valve has been designed to be largely maintenance-free. The materials of the sliding parts have been selected to ensure minimum wear.

All elastomers are organic substances and as such subject to natural ageing. Continuous operation at high operating temperatures may reduce their service lives.

8 Trouble-shooting

⚠ WARNING

Improper remedial work on the valve

Risk of injury!

- ▷ For any work performed in order to remedy faults on the valve observe the relevant information given in this operating manual and/or the product literature provided by the accessories manufacturers.

If problems occur that are not described in the following table, consultation with the KSB service is required.

Table 27: Trouble-shooting

Problem	Remedy
Leakage at the seat/disc interface	Rework not possible. Replace valve.
Leakage at the stem seal	Rework not possible. Replace valve.
Leakage at the pressure measurement connection branches	Contact KSB, spare parts available

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9 EU Declaration of Conformity

9.1 EU Declaration of Conformity for BOA-Control DPR

Herewith we,

KSB SE & Co. KGaA
Johann-Klein-Straße 9
67227 Frankenthal (Germany)

declare that **the product**:

BOA-Control DPR PN 16/25 DN 15-100

satisfies the safety requirements laid down in the European Pressure Equipment Directive 2014/68/EU.

Applied harmonised European standards:

EN 12266-1

DIN EN 12516

Suitable for:

Fluids in Group 2

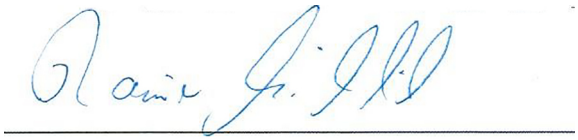
Conformity assessment procedure:

Module A

Valves ≤ DN 50 comply with Article 4, Section 3, of the Pressure Equipment Directive 2014/68/EU. They must bear neither the CE marking nor the identification number of a notified body.

The EU Declaration of Conformity was issued in/on:

Frankenthal, 18 October 2022



Rainer Michalik
Head of Integrated Management Systems

Marco Kroth
Head of BU GGC Product Development

10 UK Declaration of Conformity

10.1 UK Declaration of Conformity

Herewith we,

KSB SE & Co. KGaA
Johann-Klein-Straße 9
67227 Frankenthal (Germany)

declare that **the product**:

BOA-Control DPR PN 16/25 DN 15-100

satisfies the safety requirements of the Pressure Equipment (Safety) Regulations 2016.

Applied harmonised European standards:

EN 12266-1

DIN EN 12516

Suitable for:

Fluids in Group 2

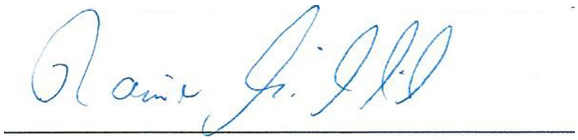
Conformity assessment procedure:

Module A

Valves ≤ DN 50 comply with the Pressure Equipment (Safety) Regulations 2016 Part 1, para. 8. They must bear neither the UKCA marking nor the identification number of a UK-approved body.

The UK Declaration of Conformity was issued in/on:

Frankenthal, 18 October 2022



Rainer Michalik
Head of Integrated Management Systems

Marco Kroth
Head of BU GGC Product Development

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