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| USER MANUAL | | |
| BALANCING VALVE zSTA | Fig. 221 | Version: 07/2016 Date: 01.07.2016 |

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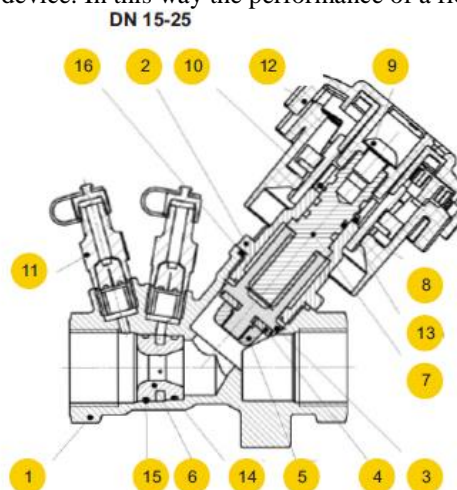
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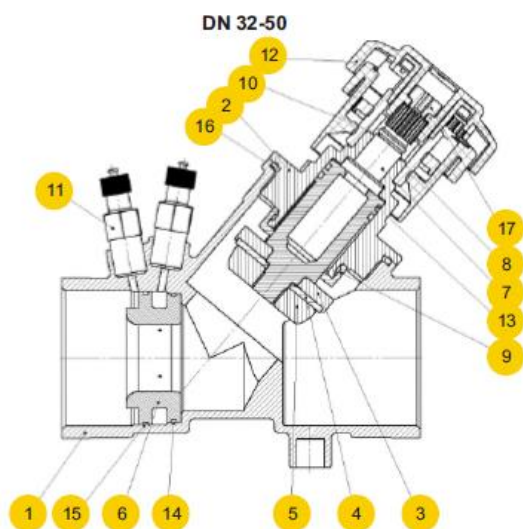
1. PRODUCT DESCRIPTION

Balancing valves Fig.221 are globe valves with threaded connections and an oblique body. They are used for medium flow control. The medium flows in the direction indicated on the valve.

Differential pressure measurement takes place in Venturi orifice. The advantage of this solution is, inter alia, the possibility of direct flow measurement. Kv factor of the Venturi orifice, where the measurement of the differential pressure is made, is constant and does not change during the adjustment the flow. In practice, this means that we can balance the system much more easily and faster. When measuring the flow rate, Kv is fed to the measuring device once (for the specific Venturi orifice), and then the flow can easily be adjusted by observing the varying flow on the measuring device. In this way the performance of a flow adjustment is easy and very accurate.



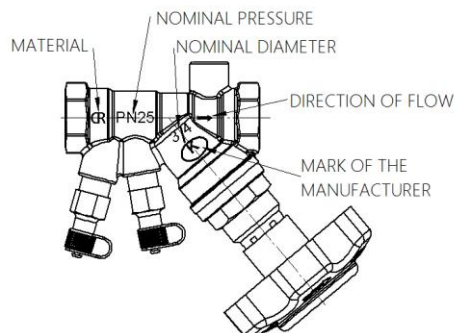
| | body material | H |
|----|------------------|--------------------|
| | type | 54 |
| 1 | body | CuZn36Pb2As |
| 2 | cover | CuZn36Pb2As |
| 3 | disc | composite material |
| 4 | gasket disc | EPDM |
| 5 | control ring | composite material |
| 6 | Venturi insert | composite material |
| 7 | stem | CuZn36Pb2As |
| 8 | nut | Cu |
| 9 | screw | CuZn39Pb |
| 10 | circlip | A2 |
| 11 | pressure tap | CuZn36Pb2As |
| 12 | hand-wheel | Polyamide |
| 13 | o-ring | EPDM |
| 14 | o-ring | EPDM |
| 15 | o-ring | EPDM |
| 16 | o-ring | EPDM |
| | max. temperature | 120°C |



| | body material | H |
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| | type | 54 |
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| 4 | gasket disc | EPDM |
| 5 | control ring | composite material |
| 6 | Venturi insert | composite material |
| 7 | stem | CuZn36Pb2As |
| 8 | nut | Cu |
| 9 | turn limiter | CuZn39Pb |
| 10 | circlip | A2 |
| 11 | pressure tap | CuZn36Pb2As |
| 12 | hand-wheel | Polyamide |
| 13 | o-ring | EPDM |
| 14 | o-ring | EPDM |
| 15 | o-ring | EPDM |
| 16 | o-ring | EPDM |
| 17 | screw | CuZn39Pb2 |
| | max. temperature | 120°C |

Valves produced by ZETKAMA, including balancing valves, have a permanent marking compliant with the requirements of PN-EN19. The marking facilitates technical identification and contains:

- DN nominal diameter (inch),
- PN nominal pressure (bar),
- designation of the material of which the body and cover are made,
- arrow indicating the direction of flow,
- manufacturer marking,



2. REQUIREMENTS FOR MAINTENANCE STAFF

The staff assigned to assembly, operating and maintenance shall be qualified to perform this work. During valve operation heat parts of the valve, e.g. body or cover parts could cause burn. If necessary the user should fit insulation shields and warning signs.

3. TRANSPORT AND STORAGE

Transport and storage should be carried out at a temperature from -20° to 65°C, and valves should be protected against external forces. Valves must be stored free from contaminants and protected against the weather. In humid areas drying agent or heating should be applied to prevent the formation of condensation. The valves should be transported in a manner that does not damage the handwheel.

4. FUNCTION

Balancing valves are used to control the hydraulic system. The valves can be installed in either the supply or the return pipelines.

5. APPLICATION

- heating
- refrigeration and air conditioning
- glycol
- industrial water
- neutral fluids

Working medium requires or prohibits the use of certain materials. The valves are designed for normal conditions of use. In the case that working conditions exceed these requirements, e.g. in the case of aggressive or abrasive factors, a user should make an inquiry to the manufacturer before ordering.

Working pressure should be adjusted to the maximum temperature of the medium, as shown below.

Balancing valve Fig. 221

| As for EN 1092-2 | | Temperature [° C] |
|------------------|----|-------------------|
| Material | PN | -10 to 120 |
| CuZn36Pb2As | 25 | 25 bar |

6. INSTALLATION

At the assembly of balancing valves, observe the following rules:

- before an assembly evaluate if the valves were not damaged during transport or storage, and make sure that applied valves are suitable for working conditions and the media in the system,
- remove caps if the balancing valves are provided with them
- Check if the interior of valve is free of foreign matter,
 - protect valves during e.g. welding, against splinters and used plastics against excessive temperature



Pipeline, on which valves are mounted, should be arranged and mounted so the valve body is not transmitting bending moment and is not extended.

- use compensators in order to reduce the impact of thermal expansion of pipelines,



Install the valve so that flow direction comply with an arrow placed on the body.

- correct operation of the valve requires suitably long straight sections: 5 x DN up and 2 x DN downstream
- during pipeline painting valve parts made of plastic and scale of the valve must be protected,
- valves can be mounted in any position, recommend position of the valve is wheel down,
- before starting the installation, especially after repairs, the pipeline should be flushed through with the fully opened valve,
- installation of settling tank - strainer before the valve increases certainty of its correct functioning

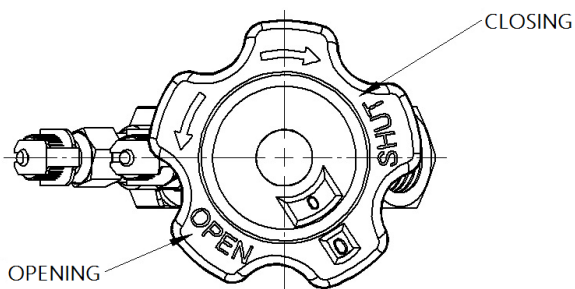


The responsibility for correct selection of the valve to the operating conditions, distribution and installation is borne by system designer, contractor and user.

7. OPERATION

When operating observe the following rules:

- process of starting up – commissioning should be conducted in a manner that eliminates the occurrence of sudden changes in temperature and pressure,
- close the valve by turning it to the right, looking down on the wheel (in the direction marked on the wheel)
- open the valve by turning it to the left



**the use of additional leverage when turning the wheel is prohibited
the closing cannot exceed the value of "0 - 0" on the wheel**

- operation of installed valves can be checked by repeated opening and closing



to ensure the safe operation of each valve, especially of the ones that are rarely used, they should be regularly monitored. Inspection frequency should be determined by the user.

8. MAINTENANCE AND REPAIR

Balancing valves Fig. 221 do not require any maintenance provided that they are used in accordance with their intended use

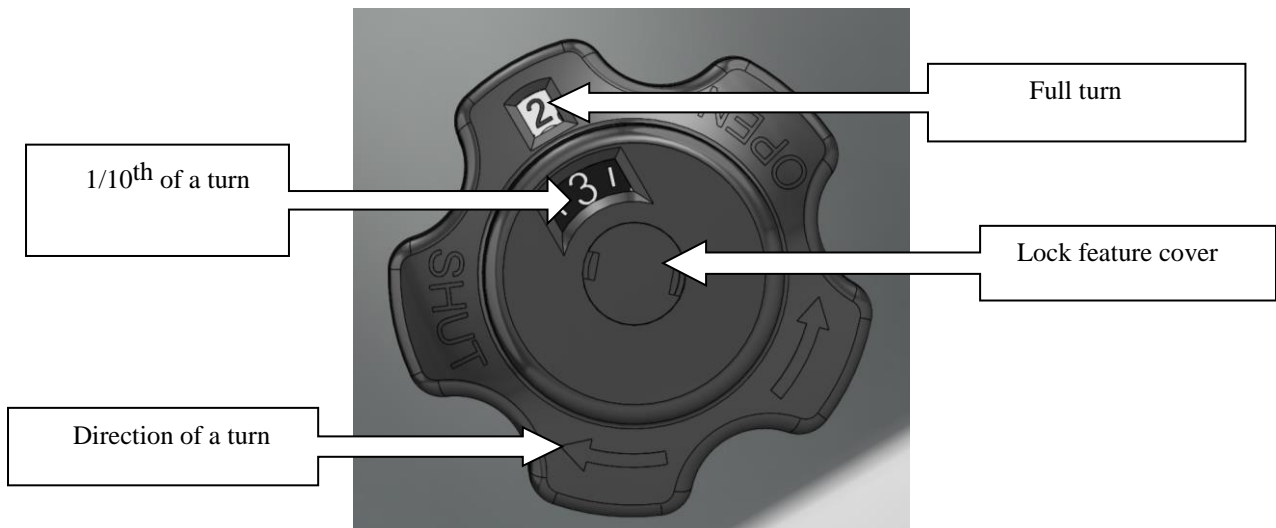


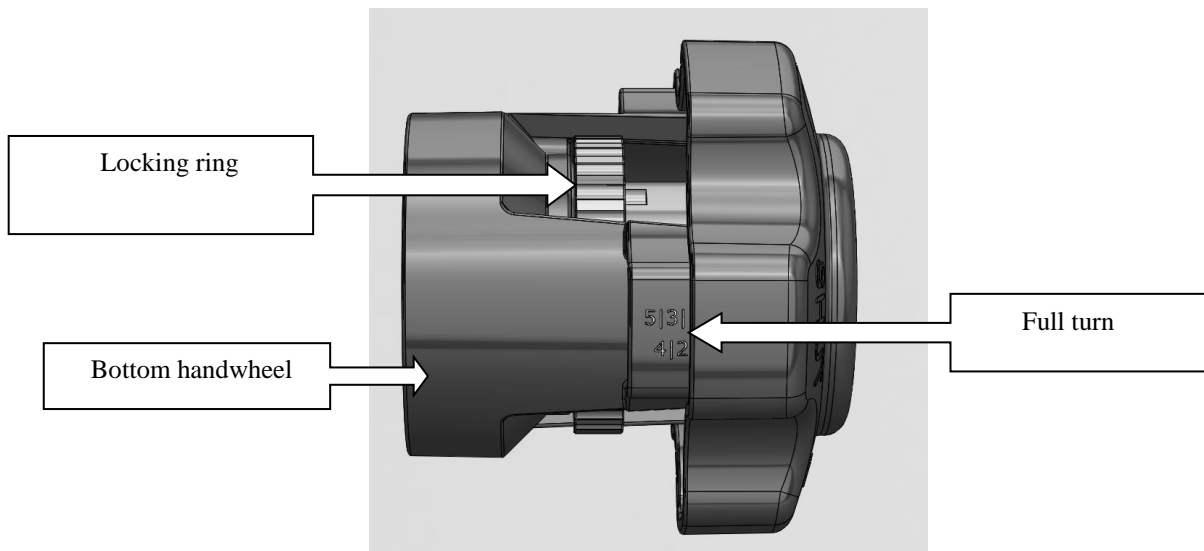
Before taking up any maintenance actions, make sure that you have cut off the flow of medium in the pipe, the pressure was reduced to ambient pressure, medium was removed and the system was cooled down.

- all maintenance and repair work should be performed by qualified personnel using suitable tools and original spare parts.
- during the maintenance and repair work personal protection measures appropriate for the risk involved should be used,
- after removing the valve there is a need to replace the sealing, with which the valve is connected to the pipeline,
- each time when the cover is removed, clean the valve sealing surface and apply new gasket of the same type as previously used
- tightening the cover to the body must be made with the valve opened (plug in the upper position)
- before reassembling the valve in the pipeline it is necessary to check valve operation and tightness of all connections. Tightness test should be carried out with water pressure of 1,5 x nominal pressure of the valve.

9. VALVE SETTING Fig. 221

The valve opening degree can be read on the dial and its lateral part



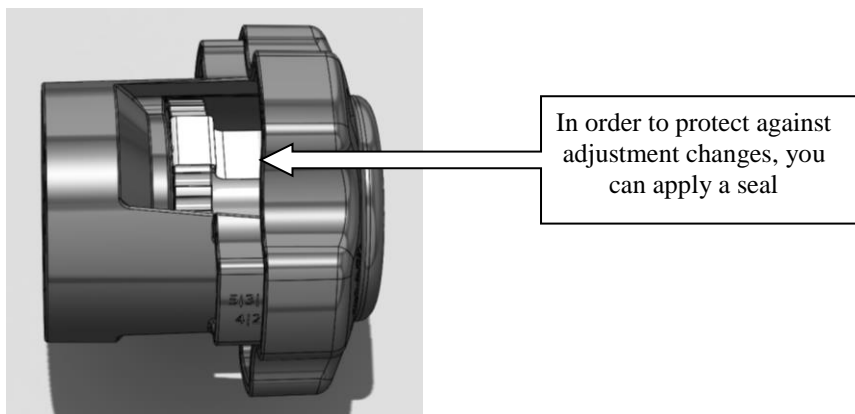


Number of turns between the locations closing and fully open is: 5

Set the valve on the adjustment 2,3 is done as follows:

1. Close the valve completely and check the scale 0-0
2. Open the valve to position 2.2 and turn the locking ring until the moment of touching the surface of the bottom knob
3. Twist off the knob on the adjustment 2.3

Blocking the adjustment



– for the proper adjustment of valve opening, tabulation and flow charts drawn up for each valve size should be used,

So adjusted balancing valve can be closed many times now, but its opening is only possible to the set value.

Kv values for the various settings for the valve Fig. 221:

| Wheel position | Valve flow Kv coefficient [m ³ /h] | | | | | |
|----------------|---|-------|-------|-------|-------|-------|
| | DN 15 | DN 20 | DN 25 | DN 32 | DN 40 | DN 50 |
| 0,5 | | | | | | |
| 1,0 | 0,26 | 0,59 | 0,70 | 1,76 | 2,67 | |
| 1,5 | 0,45 | 0,88 | 1,10 | 2,49 | 3,73 | 5,00 |
| 2,0 | 0,75 | 1,34 | 1,78 | 3,69 | 5,23 | 6,69 |

| | | | | | | |
|-----|------|------|------|-------|-------|-------|
| 2,5 | 1,07 | 2,05 | 2,82 | 5,75 | 7,72 | 9,47 |
| 3,0 | 1,41 | 2,65 | 3,76 | 7,56 | 10,05 | 12,47 |
| 3,5 | 1,57 | 2,95 | 4,59 | 8,94 | 12,25 | 15,90 |
| 4,0 | 1,63 | 3,10 | 5,15 | 9,94 | 14,16 | 19,04 |
| 4,5 | 1,66 | 3,20 | 5,57 | 10,65 | 16,04 | 21,91 |
| 5,0 | 1,67 | 3,25 | 5,83 | 11,13 | 17,25 | 24,43 |

n – number of turns of the wheel

10. Additional valves equipment



- electronic device for measuring and balancing of hydronic heating and cooling systems
- QWGA RGB 2,2 inch, 240 x 320 pixel backlight display
- all parameters of ZETKAMA balancing valves stored in the unit memory
- possibility of media correction and working with completed projects
- project measuring with report printing
- more information can be found in the user's manual

| | |
|---|---------------------------------|
| Pressure range | 0-10 bar |
| Max. static pressure | 10 |
| Max. overpressure | 12 |
| Medium temperature | -5 to 90°C |
| Ambient temperature | -5 to 50°C |
| Storage temperature | from -5 to 50°C |
| Power supply | Li-Ion 3,6 V battery 950 mAh |
| Max. operating time | 12 hours |
| Charging | 230V~ USB |
| Display | 240 x 320 pixel RGB 65k colours |
| Power consumption | 80 mA |
| Number of valve producers / number of valves stored | 20/1200 |
| Stand-by time | 1 year |
| Keyboard | 9 keys |
| Dimensions (W x H x D) | 84 x 180 x 51 mm |
| Weight | 380 g |
| Cover | IP 65 |
| Calibration validity | 12 months |

Measurement device can be used to take the measurements. Characteristics of ZETKAMA balancing valves saved in them allow direct measurement of the flow rate. The instrument provides a measurement of the pressure drop and the possibility of recording it. The exact description of the device is in the manufacturer's data sheet of the instrument.

11. Causes of operating disturbances and their elimination

- When searching for the malfunctioning of the valve safety rules must be observed

| Disturbance | Possible cause | How to remove |
|-----------------------------|--|--|
| No flow | Valve closed | Open the valve |
| Low flow | Valve not sufficiently open | Open the valve |
| | Contaminated filter | Clean or replace the strainer |
| | Clogged pipeline system | Check the pipeline |
| Difficult to control valves | Dry spindle | Oil the spindle |
| Leakage on the spindle | Contaminated O-rings | Replace the O-rings |
| Leakage on the seat | Improper closing | Tighten the hand wheel without using auxiliary tools |
| | Damaged seat or plug | Replace the valve. Contact the supplier or manufacturer |
| | Too high pressure difference | Check that the valve is installed in accordance with the flow direction marked on the valve. |
| | Medium contaminated with solid objects | Clean the valve. Install the filter before the valve. |

12. Decommissioning

After decommissioning and dismantling, valves must not be disposed of with household waste. The valves are made of materials that can be recycled. To do this, deliver them to a recycling point.

13. Terms of warranty

- ZETKAMA guarantees the quality with assurance for proper operation of its products, when installed in accordance with the instruction manual and the operation according to technical conditions and parameters described in the data sheets of ZETKAMA. The warranty period is 18 months from the date of installation, but not longer than 24 months from the date of sale.

- the warranty does not cover assembly of foreign parts and design changes made by the user as well as natural wear.