

SELF-ACTUATING DIFFERENTIAL PRESSURE REDUCING REGULATORS WITH FLOW REDUCTION TYPE ZSN6

APPLICATION AREA:

Regulators ZSN6 are used to control preset pressure in process installations connected to regulator valve inlet. Regulators are applied in heating systems, in industrial processes with cold and hot water, steam, air and non-flammable gases. Using with other media subject to consulting with manufacturer.

DESIGN:

Regulator comprises three, temporary fastened main units: valve (01), actuator (02) and adjuster (03). valve single-ported with balanced plug and flow rate preset value adjuster in the form of gradually adjusted flap. Flanged connections of valve body with valve face as per PN-EN 1092-1:2006 and PN-EN 1092-2:1999 for PN10; 16; 25; 40 PN-EN 1759-1:2005 for CL150; CL300.

Body length as per:

PN-EN 60534-3-1:2000 - Series 1 for PN10; 16; 25; 40;

Series 37 for CL150; Series 38 for CL300

Diaphragm actuator (diaphragm effective area 160 cm², 320 cm²), with bolted housing.

Control pressure value adjuster with combination of three pre-tensioned springs, fixed coaxially with valve and actuator.



VARIANTS:

By valve leakage class:

- below 0.01%K_{vs} (class IV as per PN-EN 60534-4) - hard seat,
- bubble (class VI as per PN-EN 60534-4) – soft seat - PTFE or VMQ (ECOSIL).

By corrosion-proofness of actuator components:

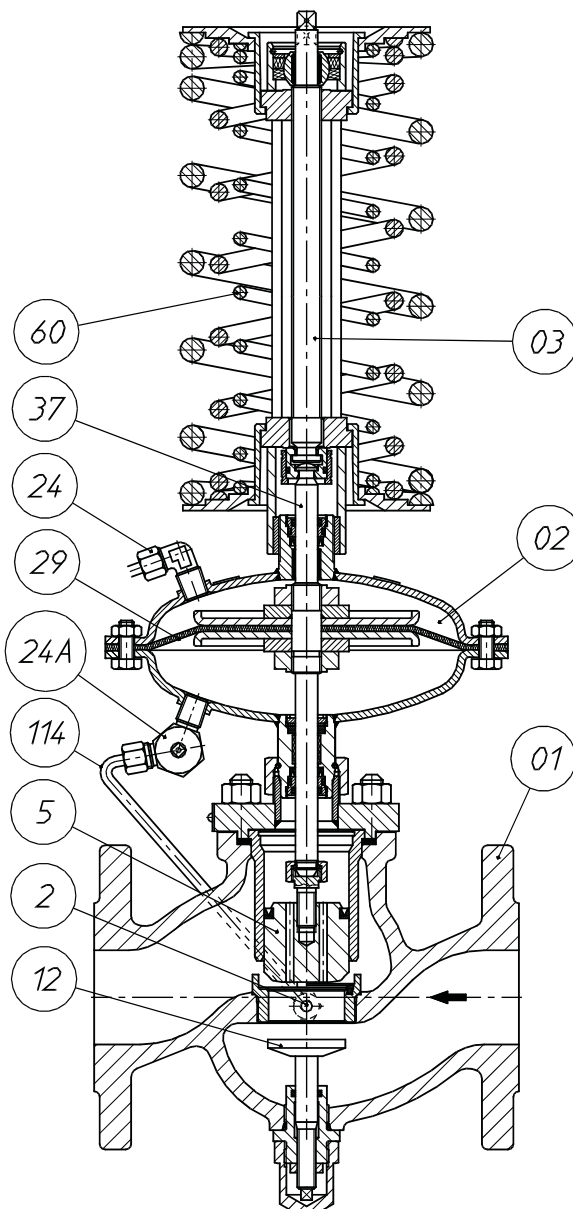
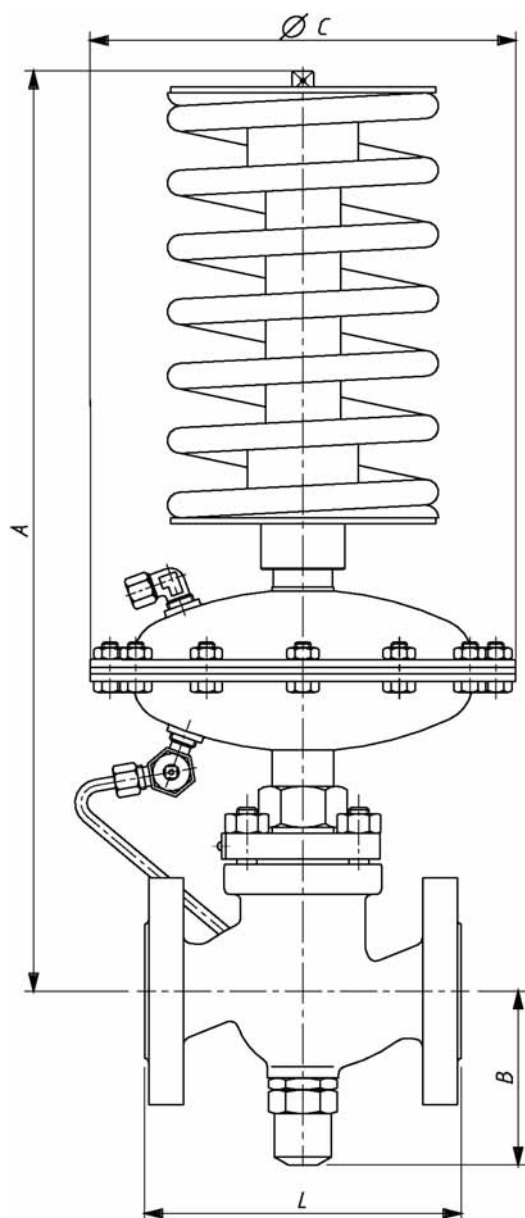
- standard (ZSN 6.1) – carbon steel with protection coatings,
- special (ZSN 6.2) – stainless steel.

OPERATING PRINCIPLE:

valve is open when no supply. Impulse of higher pressure of controlled pressure difference is collected upstream controlled installation, via impulse duct, through connection (24) and above diaphragm (29) of actuator (02). Impulse of lower pressure of controlled pressure difference is collected from behind the flow reduction flap (12) and transferred through opening in seat (2) via impulse duct (114) below actuator diaphragm. Increase in control pressure above preset value, set by tensioning of spring (60) in adjuster (03), causes deflection of diaphragm, movement of actuator stem (37) and closure of valve plug (5) until controlled pressure reaches value preset in adjuster.

Increase in flow above the preset value, set by adjuster flap (12), causes increase in packing gland resistance and increase in pressure difference in actuator chambers, which in turn causes deflection of diaphragm, movement of stem and closure of valve plug until flow value as set by flap is reached. Needle valve (24A) enables choking and cutting off control pressure impulse, deaeration of actuator chamber, as well as protects diaphragm against hydraulic impacts.

DIMENSIONS AND WEIGHTS



| DN | A | L | Valve weight (01) |
|-----|------|-----|-------------------|
| | [mm] | | [kg] |
| 15 | 470 | 130 | 4,0 |
| 20 | | 150 | 5,1 |
| 25 | | 160 | 5,6 |
| 32 | 485 | 180 | 8,5 |
| 40 | 490 | 200 | 10,6 |
| 50 | 495 | 230 | 14 |
| 65 | 605 | 290 | 23 |
| 80 | | 310 | 29 |
| 100 | 615 | 350 | 44 |

| Spring range [kPa] | C [mm] | Diaphragm effec- tive area[cm²] | Weight | | |
|-----------------------|-----------|------------------------------------|------------------|---------------|-------------|
| | | | Actuator (02) | Adjuster (03) | |
| | | | | DN 15...50 | DN 65...100 |
| 10...40 | 282 | 320 | 9,1 | 2,4 | 2,8 |
| 20...80 | | | | 3,2 | 3,6 |
| 40...160 | 215 | 160 | 4,4 | | |
| 80...320 | | | | 5,0 | 6,3 |

TECHNICAL SPECIFICATION

| DN | | 15 | 20 | 25 | 32 | 40 | 50 | 65 | 80 | 100 |
|--|--------------|--|-----|------|----------|-----------|----------|---------------------|------|-----|
| K _{vs} ¹⁾ [m³/h] | full flow | 3,2 | 5 | 8 | 12,5 | 20 | 32 | 50 | 80 | 125 |
| | reduced flow | 1 | 1,6 | 2,5 | 5 | 8 | 12,5 | 20 | 32 | 50 |
| | | 1,6 | 2,5 | 3,2 | | | | | | |
| 2,5 | | 3,2 | 5 | | | | | | | |
| Stroke [mm] | | 6 | | | 8 | | | 12 | | 14 |
| Noise coefficient Z | | 0,65 | 0,6 | 0,55 | | 0,45 | 0,4 | | 0,35 | |
| Control characteristics | | proportional | | | | | | | | |
| Spring range [kPa] ²⁾ | | 10...40; | | | 20...80; | 40...160; | 80...320 | | | |
| Maximum pressure in actuator chamber [bar] | | 20 | | | | | | | | |
| Allowed pressure drop in valve [bar] | | 12 | | | | | | 10 | | |
| Valve nominal pressure | | valve body in grey iron | | | | | | PN 16 | | |
| | | valve body in spheroidal iron | | | | | | PN 16; PN 25; PN 40 | | |
| | | valve body in carbon steel and stainless steel | | | | | | PN 16; PN 25; PN 40 | | |
| Maximum medium temperature [°C] | | steam | | | | | | 200 | | |
| | | water | | | | | | | | |
| | | gases | | | | | | 80 | | |

¹⁾ other flow ratios K_{vs} subject to order specification.

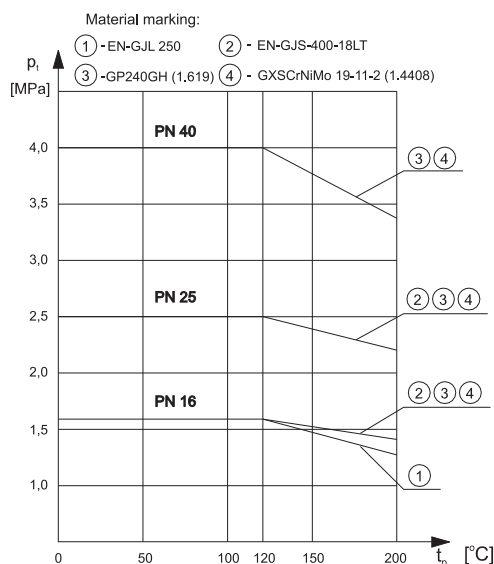
²⁾ other ranges subject to order specification.

MATERIALS as per PN

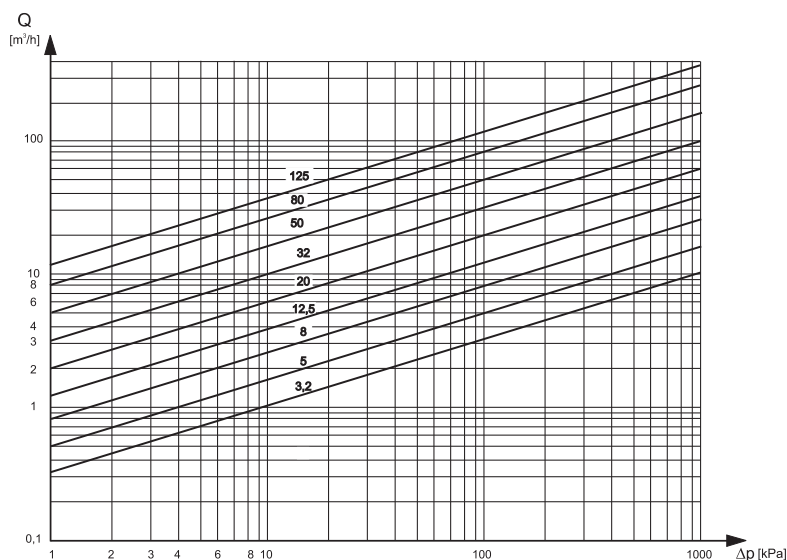
| Regulator | ZSN 6.1 | ZSN 6.2 |
|---------------------|---|---|
| | VALVE (01) | |
| Body | grey iron EN-GJL-250 spheroidal iron EN-GJS-400-178LT carbon steel GP240GH (1.0619) stainless steel GX5CrNiMo 19-11-2 (1.4408) | |
| Plug and seat | X6CrNiMoTi 17-12-2 (1.4571) | |
| Guide sleeve | | |
| Packing | EPDM ³⁾ | |
| | ACTUATOR (02) | |
| Housing | carbon steel S235JRG2C (1.0122) | stainless steel X6CrNiTi 18-10 (1.4541) |
| Stem | X17CrNi 16-2 (1.4057) | |
| Diaphragm | EPDM + polyester fabric ³⁾ | |
| Packing | EPDM ³⁾ | |
| | Adjuster (03) | |
| Adjuster components | carbon steel C45 (1.0503) | |
| Springs | spring steel 60Si7 | |

³⁾ other materials, subject to medium type.

NOMINAL PRESSURE, WORKING TEMPERATURE AND WORKING PRESSURE



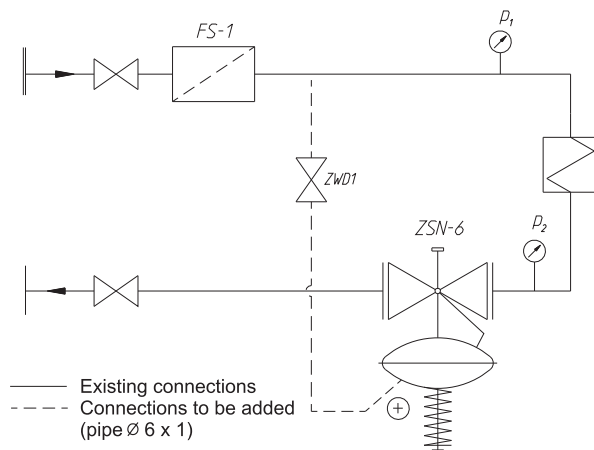
FLOW DIAGRAM FOR WATER



INSTALLATION

Regulator is to be installed on horizontal pipeline. Medium flow direction is to conform to arrow on body. At medium temperature lower than 130°C regulator position is optional, at higher temperatures it is recommended to install regulator with adjuster unit (03) down. To ensure reliable operation apply strainer FS1 upstream and needle valve ZWD 1 at impulse collection point.

EXAMPLES OF APPLICATION



ACCESSORIES

Delivered:

- nut and cutting ring for impulse tube,

Optional (ordered separately):

- strainer FS1,
- straight tube connection Ø 6×1,
- connection stub NPT 1/4"
- impulse tube Ø 6×1,
- adjustment wrench,
- needle valve ZWD 1.

ORDERING

In your order specify type and marking, ZSN 6.1 or ZSN 6.2, DN nominal diameter, PN nominal pressure, flow ratio K_{vs} , body material, spring range, closure type (only for tight executions).

Example of order:

ZSN 6.2 – DN 65; PN 16; Kvs 50; spheroidal iron; 40...160 kPa, tight.