# SELF-ACTUATING DIFFERENTIAL PRESSURE REDUCING REGULATORS **TYPE ZSN2**

## APPLICATION AREA:

Regulators ZSN2 are used to control preset pressure in process installations connected to regulator valve outlet. 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 booster (06). Regulator valve single-ported with balanced plug. 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
Valve tightness – bubble (Class VI as per PN-EN 60534-4), tight seat in PTFE or VMQ (ECOSIL).
Diaphragm actuator (diaphragm effective area 160 $cm^2$), with bolted housing and spring, pre-tensioned to 20 [kPa] for DN15…32 valves and to 50 [kPa] for DN40 and DN50 valves, inside. Diaphragm type booster comprises control pressure value adjuster.

## VARIANTS:

By corrosion-proofness of actuator components:
- standard (ZSN 2.1) - carbon steel with protection coatings,
- special (ZSN 2.2) - stainless steel.

## OPERATING PRINCIPLE:

Valve is open when no supply. Connection of regulator to system causes its opening. Controlled pressure is fed via impulse duct (110) to actuator (02) chamber above diaphragm (29) and via impulse duct (111) to booster (06) under diaphragm (83). Pressure from upstream valve is transferred via duct (112) to booster, and via pressure divider (94) through duct (113) under actuator diaphragm. Both pressures are collected via impulse tubes (112) and (111) directly from valve inlet and outlet flange. Increase in controlled pressure above preset value, set by tensioning of spring (89) in booster (06), causes increases in pressure in actuator chamber above the diaphragm (29), movement of actuator stem (49) and closure of valve plug (5) until controlled pressure reaches value preset in booster. To ensure reliable operation a minimum pressure difference in valve equal to double value of actuator spring pre-tensioning: 40[kPa] or 100 [kPa].

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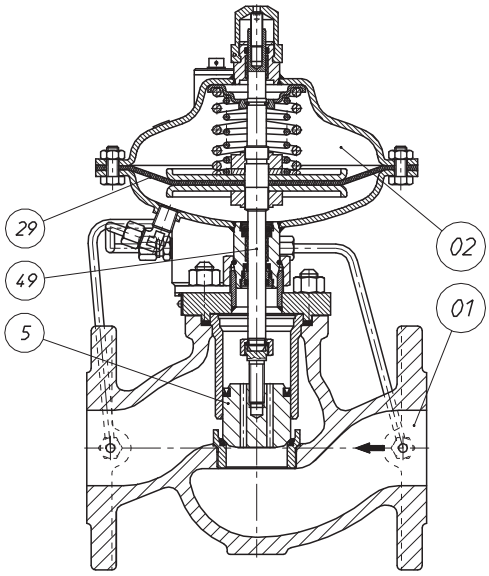
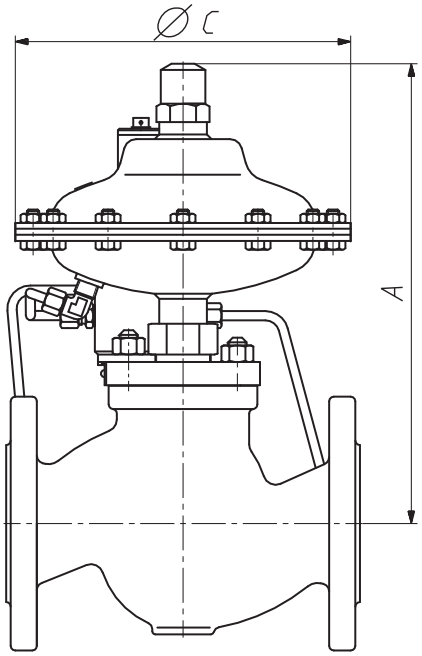
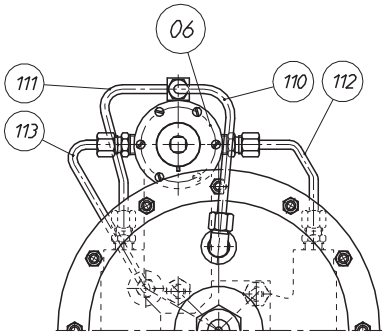
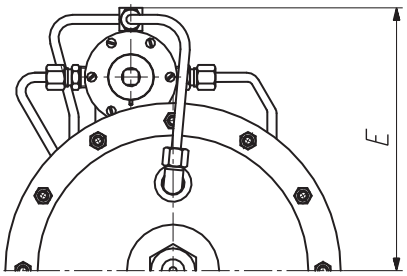
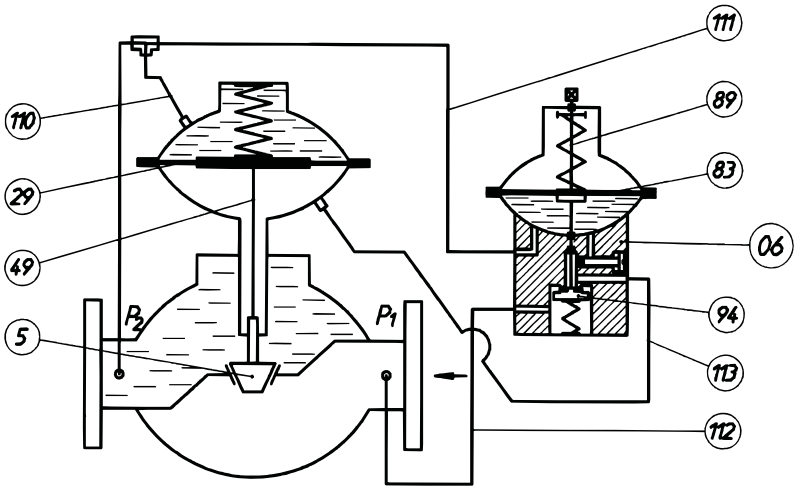
## DIMENSIONS AND WEIGHTS

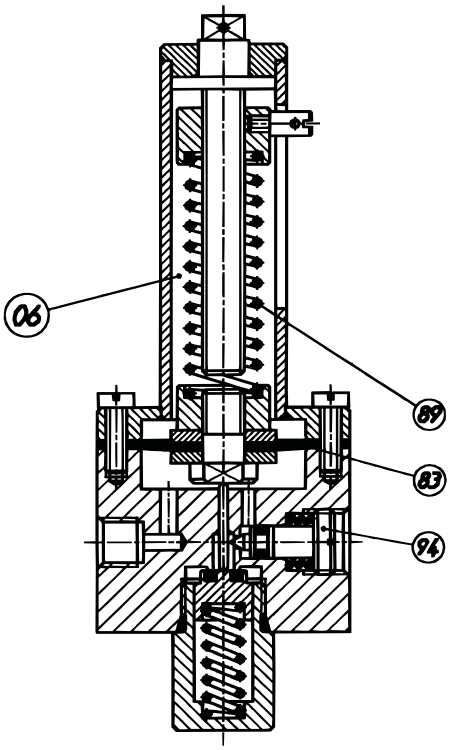



| DN | A | C | Diaphragm effecti-ve area[cm²] | E | L | Weight |
|---|---|---|---|---|---|---|
| | [mm] | | | | | [kg] |
| 15 | 279 | 215 | 160 | 165 | 130 | 8,8 |
| 20 | | | | | 150 | 9,9 |
| 25 | | | | | 160 | 10,4 |
| 32 | 294 | | | 170 | 180 | 13,4 |
| 40 | 299 | | | 175 | 200 | 15,5 |
| 50 | 304 | | | | 230 | 19,3 |

## TECHNICAL SPECIFICATIONS

| DN | | 15 | 20 | 25 | 32 | 40 | 50 |
|---|---|---|---|---|---|---|---|
| $K_{VS}$ [1)] [$m^3/h$] | full flow | 3,2 | 5 | 8 | 12,5 | 20 | 32 |
| | reduced flow | 1<br>1,6<br>2,5 | 1,6<br>2,5<br>3,2 | 2,5<br>3,2<br>5 | 5 | 8 | 12,5 |
| Stroke [mm] | | 6 | | | 8 | | |
| Noise coefficient Z | | 0,65 | 0,6 | 0,55 | | 0,45 | 0,4 |
| Control characteristics | | Integrating | | | | | |
| Spring range [kPa] | | 10…100; 40…400; 100…1000 | | | | | |
| Allowed pressure drop in valve [bar] | | 12 | | | | | |
| Minimum pressure drop in valve [bar] | | 0,4 | | | | 1 | |
| 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] | | water, steam | | | | 150 | |
| | | gases | | | | 80 | |

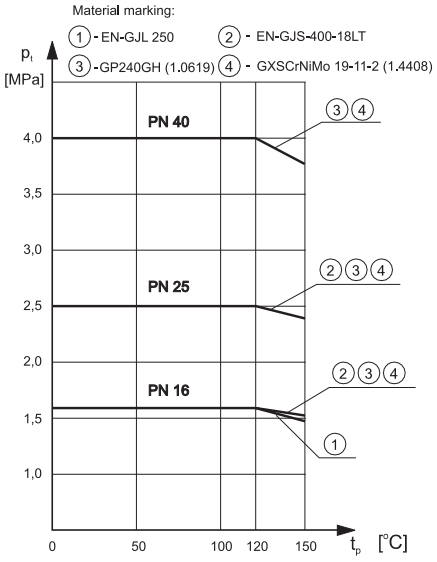
[1)] other flow ratios $K_{vs}$ subject to order specification.

## **MATERIALS** as per PN

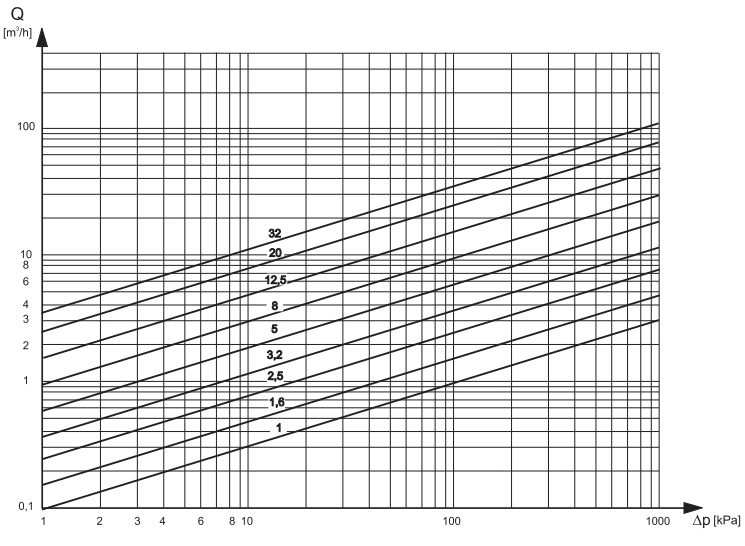
| **Regulator** | **ZSN 2.1** | **ZSN 2.2** |
|---|---|---|
| **VALVE (01)** | | |
| Body | grey iron EN-GJL-250<br>spheroidal iron EN-GJS-400-178LT<br>carbon steel GP240GH (1.0619)<br>stainless steel GX5CrNiMo 19-11-2 (1.4408) | |
| Plug and seat | X6CrNiMoTi 17-12-2 (1.4571) | |
| Guide sleeve | | |
| **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[2)] | |
| Packing | EPDM[2)] | |
| **BOOSTER (06)** | | |
| Booster components | carbon steel X6CrNiTi 18-10 (1.4541) | |
| Springs | spring steel 12R10 | |
| Diaphragm | EPDM + polyester fabric[2)] | |
| Packings | EPDM[2)] | |

[2)] other materials, subject to medium type.

NOMINAL PRESSURE, WORKING TEMPERATURE AND WORKING PRESSURE



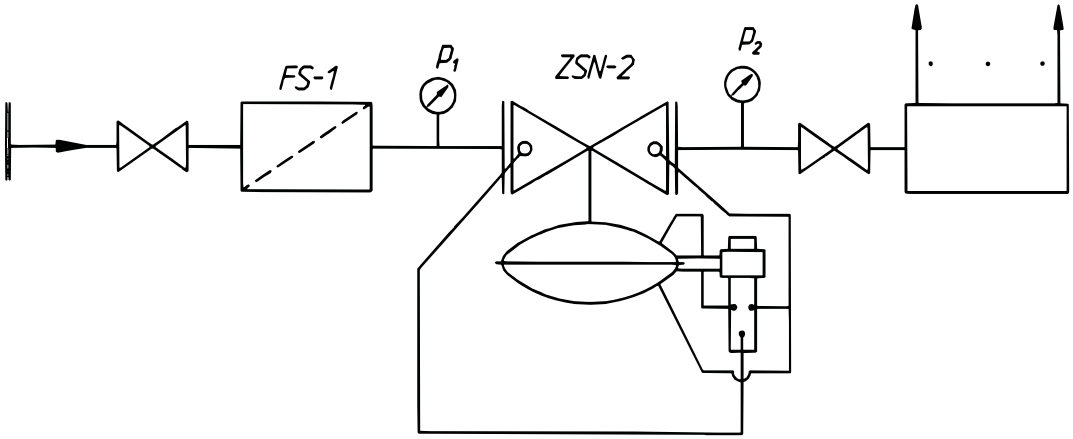

FLOW DIAGRAM FOR WATER



**INSTALLATION**

Regulator is to be installed on horizontal pipeline. Medium flow direction is to conform to arrow on body. At medium temperature lower than 100°C regulator position is optional, at higher temperatures it is recommended to install regulator with actuator unit (02) down. To ensure reliable operation of regulator apply strainer FS1 upstream.

**EXAMPLES OF APPLICATION**




**ACCESSORIES**

**Optional (ordered separately):**
- strainer FS1,
- straight tube connection ∅ 6×1,
- elbow tube connection ∅ 6×1,
- adjustment wrench,

**ORDERING**

In your order specify type and marking, ZSN 2.1 or ZSN 2.2, DN nominal diameter, PN nominal pressure, flow ratio $K_{vs}$, body material, spring range.

Example of order:

**ZSN 2.1 – DN 25; PN 16; $K_{vs}$ 5; spheroidal iron; 40…100 kPa.**



Revision: ZSN2/03/2011
Valid until the next revision.