SELF-ACTUATING DIFFERENTIAL PRESSURE REDUCING REGULATORS WITH SOLENOID VALVES **TYPE ZSN10**

APPLICATION AREA:

These regulators are meant to maintain the presettable differential pressure in technological circuits that are connected to either the inlet or the outlet of the regulator valve. The regulator cutoffs the low when the control voltage signal is delivered o when the control voltage disappears. These devices are used in heating systems and industrial facilities to control flow of cold or hot water, steam, air and non-flammable gases. Application for other utilities needs authorization of the manufacturer.

DESIGN:

The regulator consists of four detachable major subassemblies: the flow control valve (01), actuator (02), adjusting unit (3) and solenoid valve (05).
The flow control valve is of the single-ported type
Valve – single-ported, with a balanced plug.
Body connections – flanged, with mating surface and gasket excess, to PN-EN 1092-1:2006 and
PN-EN 1092-2:1999 for PN10; 16; 25; 40
Face-to-face length to PN-EN 60534-3-1:2000 - Series 1 - for PN10; 16; 25; 40; Series 37 - for CL150; Series 38 - for CL300.
Membrane actuator (with active area of the membrane of 160 cm^2 or 320 cm^2) with half-casings bolted together. Leakage class of the valve of bubble grade (VI class to PN-EN 60534-4) – “soft” seat - PTFE or VMQ (ECOSIL). The adjusting unit for the presettable differential pressure combines three pre tensioned springs and in coaxially installed with both the valve and the actuator.

VARIANTS:

With regard to resistance of the actuator components to corrosion:
- standard design (ZSN10.1) - carbon steel with protective coatings,
- special design (ZSN10.2) - acid resistant (stainless) steel

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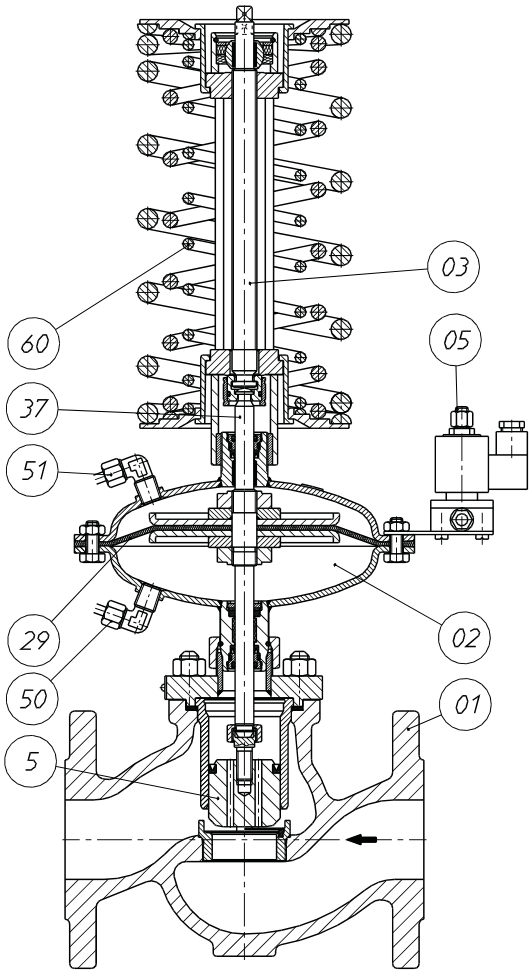


OPERATION PRINCIPLE:

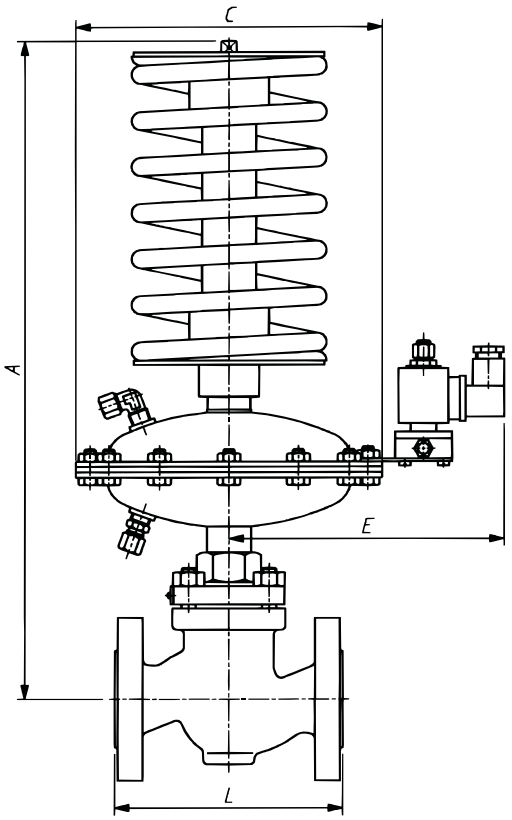
The differential pressure is maintained in two operation modes:

- without delivering the voltage signal to the solenoid valve (05) - diagrams 1 and 3,
- with delivering the voltage signal to the solenoid valve (05) - diagrams 2 and 4

The switchover from the state when the pressure difference is maintained to flow cutoff is carried out after delivering the control voltage signal to the valve solenoid (05) – point 1, or after the control voltage disappearing – point 2.

When de-energized, the regulator valve remains open. The higher pressure pulse of the maintained pressure difference is delivered via the solenoid valve (04) and nozzle (51). The lower pressure pulse is delivered via the pulse line via the nozzle (50) to the area below the actuator membrane. Rise of the maintained pressure difference above the desired value that is set by tension of the spring (60) in the adjusting unit (03) results in deflection of the membrane (29) and consequential movement of the actuator stem (37). The valve plug (5) is being closed until the moment when the desired differential pressure in the actuator is restored to the value that has been set with the adjusting unit. When the regulator is installed on the feeding pipeline, the sampling points for the differential pressure should be located downstream the outlet of the regulator valve. Otherwise, when the regulator is installed on the return pipeline, the sampling points for the differential pressure should be located upstream the intlet of the regulator valve.

DIMENSIONS AND WEIGHT



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 effective 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 PARAMETERS

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	1,6 2,5 3,2	2,5 3,2 5	5	8	12,5	20	32	50
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		

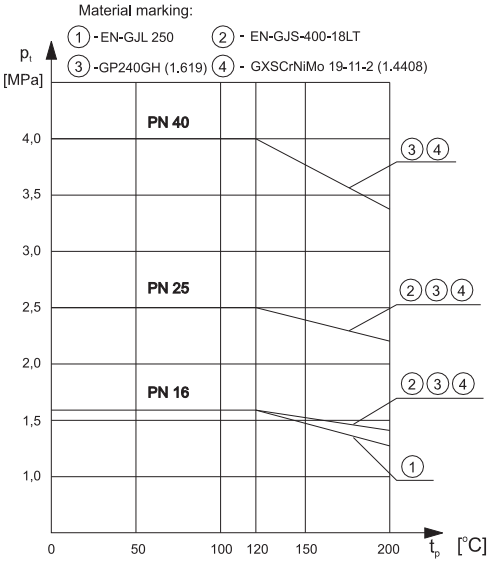
[1)] other values of KVS - upon request.
[2)] other ranges - upon request.

MATERIALS as per PN

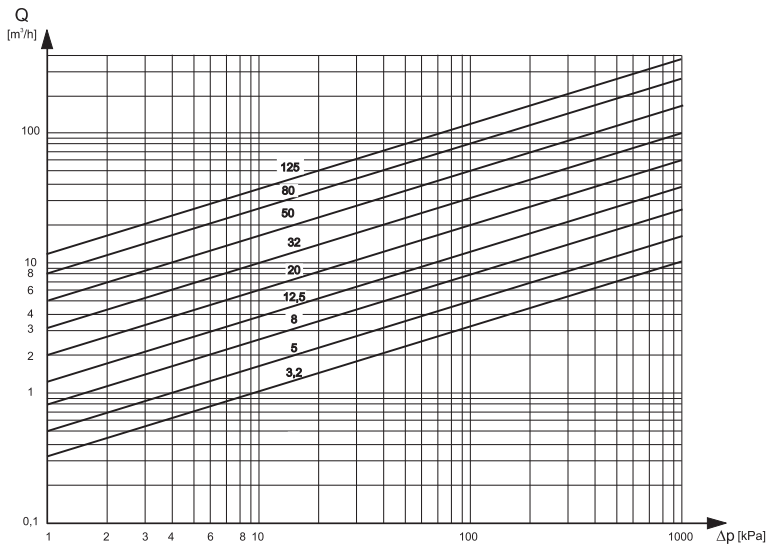
Regulator	ZSN 10.1	ZSN 10.2
VALVE (01)		
Body	grey iron EN-GJL-250 spheroidal iron EN-GJS-400-18LT carbon steel GP240GH (1.0619) stainless steel GX5CrNiMo 19-11-2 (1.4408)	
Plug and seat	X6CrNiMoTi 17-12-2 (1.4571)	
Guide bushing		
Sealing	EPDM[3)]	
ACTUATOR (02)		
Body	carbon steel S235JRG2C (1.0122)	stainless steel X6CrNiTi 18-10 (1.4541)
Stem	X17CrNi 16-2 (1.4057)	
Diaphragm	EPDM + polyester fabric[3)]	
Packing	EPDM[3)]	
ADJUSTING UNIT (03)		
Components of the adjusting unit	carbon steel C45 (1.0503)	
Spring	spring steel 60Si7	

[3)] other materials – depending on the handled fluid.

WORKING PRESSURE, WORKING TEMPERATURES AND WORKING PRESSURES



FLOW DIAGRAM FOR WATER



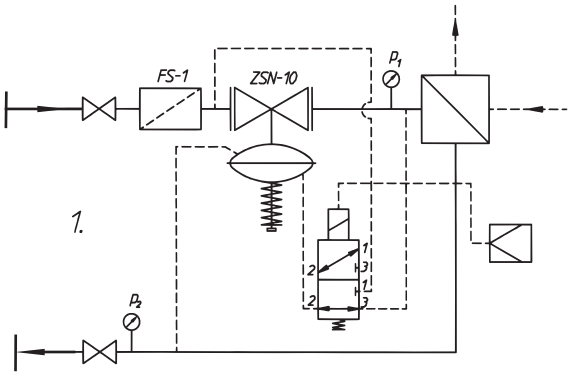
INSTALLATION

The regulator should be installed on a horizontal section of pipeline. Flow direction must match the arrow on the valve body. When temperature of the handled fluid is below 100°C, position of the regulator is discretional whereas at higher temperatures position of installation with the adjusting unit (03) looking downward is recommended. To assure trouble-free operation of the regulator, a mesh strainer FS1 should be installed upstream of the unit.

APPLICATION EXAMPLE

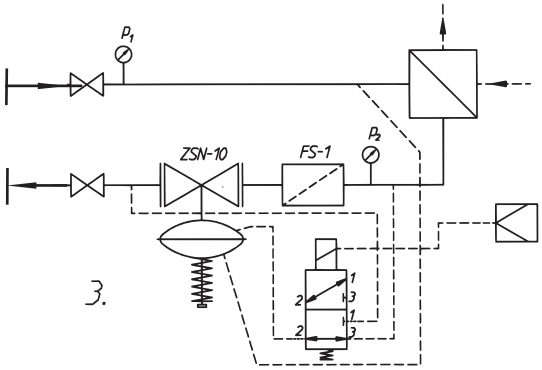
Monitoring $\Delta p=p_1-p_2$

Supply mounted

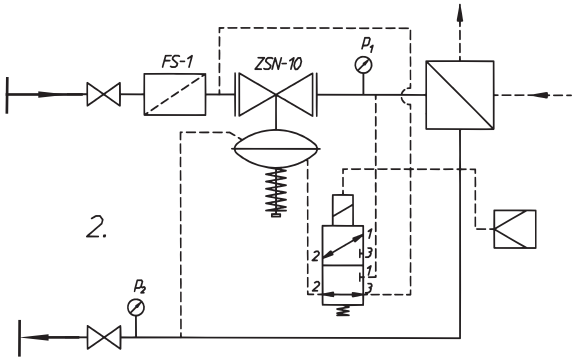


—— existing connections
----- connections to be added (pipe ∅ 6 x1)

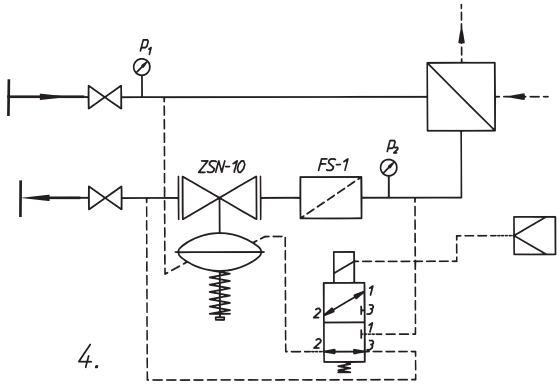
Return-mounted



—— existing connections
----- connections to be added (pipe ∅ 6 x1)



—— existing connections
----- connections to be added (pipe ∅ 6 x1)



—— existing connections
----- connections to be added (pipe ∅ 6 x1)

ACCESSORIES

Delivered:
- nakrętka i pierścień zacinający do rurki impulsowej,

Optional (ordered separately):
- strainer FS1,
- straight connection pipes ∅ 6×1
- connection stub NPT 1/4”,
- impulse tube ∅ 6×1,
- adjustment wrench.

ORDER PLACEMENT

Orders must contain: full name and design option of the regulator, i.e. ZSN10.1 or ZSN 10.2, nominal diameter DN, nominal pressure PN, flow coefficient K_{VS}, material for the body and range of settings.

Example of order:

Differential pressure regulator ZSN 10.1 – DN20; PN16; K_{VS} 5; spheroidal iron; 40 … 160 [kPa]

Revision: ZSN10/03/2011
Valid until the next revision.