

# Gas Pressure Regulator

## Z-P Serie DN25 - DN150



### Main Features

Direct-acting Z-P Serie Gas Pressure Regulators According to 2014/68/EU Directive, EN334 and EN 14382

- **Balanced valve**
- **Rugged construction for durability**
- **Wide pressure regulation range**
- **Full seal at zero flow**
- **Easy maintenance**
- **Optional minimum and/or maximum pressure slam-shut device**
- **Optional silencer internal and/or external**
- **With or Without SSV**
- **With electric position indicator SSV closed by an inductive proximity switch**
- **Combined monitoring system**
- **Bypass system for to activate ssv easily**

### Technical Features



|  |   |
|--|---|
| Maximum allowable pressure –PS           | 50 bar  |
| Inlet pressure range –bPu                | 1 – 50 bar  |
| Outlet pressure range –Wd                | 0.3 – 16.000 mbar   |
| Allowable temperature –TS <sup>(1)</sup> | -20 °C to +60 °C  |
| Inlet gas temperature                    | -20 °C to +60 °C  |
| Accuracy class –AC                       | up to AC 2.5  |
| Lock-up pressure class –SG               | up to SG 5  |
| Nominal size –DN                         | DN25 1"   DN40 1 1/2"   DN50 2"   DN65 2 1/2"<br>DN80 3"   DN100 4"   DN150 6"      |
| Connections <sup>(3)</sup>               | PN16, PN25 according to ISO 7005<br>Class 150 or 300 RF according to ASME B16.5 and |

<sup>(1)</sup> Low temperature version -40°C: available on request

<sup>(3)</sup> On request for other connection class

### Metarials

|                               |   |
|-------------------------------|---|
| Body <sup>(1)</sup>           | ASTM A 352 LCC                                |
| Main Actuator <sup>(2)</sup>  | ASTM A 350                                    |
| Seat <sup>(2)</sup>           | Stainless Steel                               |
| Internal Parts <sup>(2)</sup> | Stainless steel and brass                     |
| Seals                         | NBR+canvas (powered by hot operation process) |
| Diaphragm                     | Synthetic rubber with fabric reinforcement    |

<sup>(1)</sup> A 216 WCB: available on request

<sup>(2)</sup> Other materials available on request

## Gas Pressure Regulator, Z-P Serie

### Standards and certificates

#### Applied directives:

Pressure Equipment Directive –PED

(EU) EU/2014/68



Compliance with the regulations of the applied directives is verified by the adherence to the following standards / regulations:

- Gas pressure regulators for inlet pressure up to 100 bar EN 334:2019
- Gas safety shut-off devices for inlet pressures 100 bar EN 14382:2019
- EU Desing Examination Certificate 2195-PED-20081-T



- UkrSepro Tecnical Regulations for Pressure Equipment UA.TR.012C.0368



The relevant valid edition of the standards can be found in the declaration of conformity!

### Use

#### General Gases :

Natural gas, town gas, propane, butane, air, nitrogen or all non-corrosive gases

Suitable for use with previously filtered gaseous fluids, it is mainly used for medium and low pressure natural gas distribution networks. Biogas resistant up to 0.1% H<sub>2</sub>S dry for standard version.

#### Hydrogen Ready :

Suitability of natural gas-hydrogen mixtures or pure hydrogen.

When using the Z-P Serie, a manufacturer's declaration and notified body reports can be provided on request.

#### Biogas or Biomethane Version :

Suitable for biogases and recycling gases

– up to maximum 1% by volume H<sub>2</sub>S, dry

– up to maximum 1% by volume NH<sub>3</sub>,

dry No non-ferrous metals (except in very small quantities found in the plastic components)

Biogas version of Z-P Serie are also designed for slightly aggressive, dry gases.

Gases according such as biogases, landfill gases, sewage gases, other recycled gases, process gases, and air. The chemical composition and aggressiveness of each biogas or recycled gas is different, not constant, and dependent on several factors.

The aggressiveness of the gas notably increases:

- as the hydrogen sulfide content H<sub>2</sub>S increases

- with the moisture content of the gas, condensation is not permitted inside the regulator

In consultation with Gastech, users must decide whether the materials used for the Z-P Serie are suitable for the intended types of recycling gas. These gases can vary in terms of both their composition and the respective concentration of the components.

As a result, it is not possible to make any warranties or definitive statements regarding service life. An assessment should be carried out to determine the suitability of the gas used.



For safety reasons, we strongly recommend

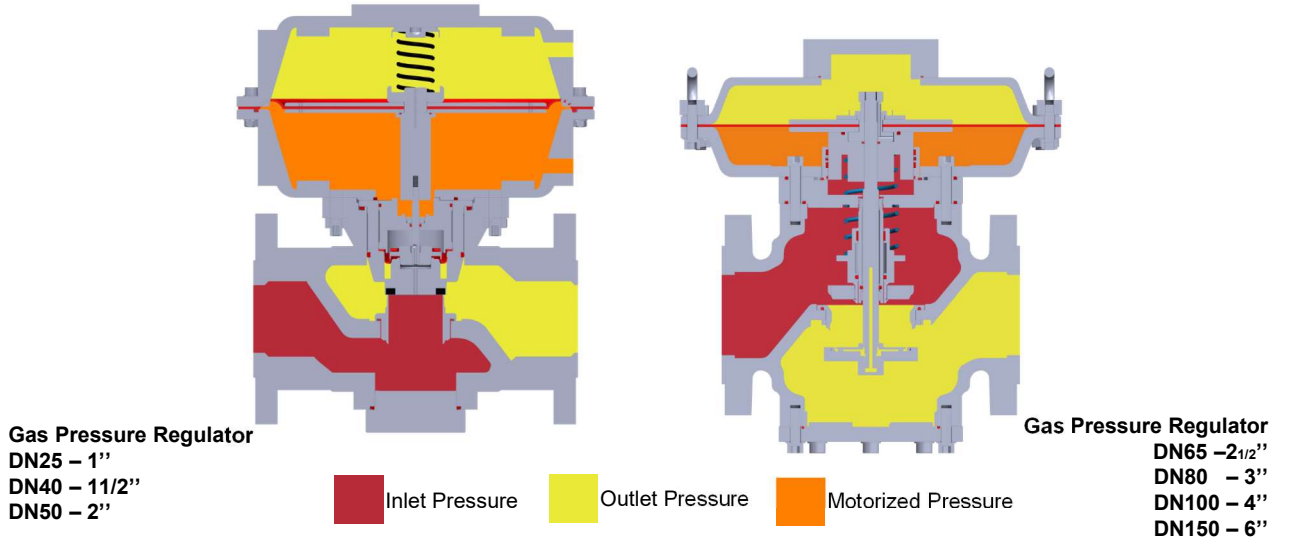
- the installation of a safety relief Valve and SSV device

- a visual inspection of the Z-P Serie regulator at intervals of 3 to 6 months

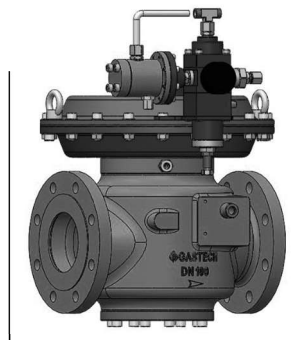
- Function and leakage tests

**Gas Pressure Regulator, Z-P Serie**

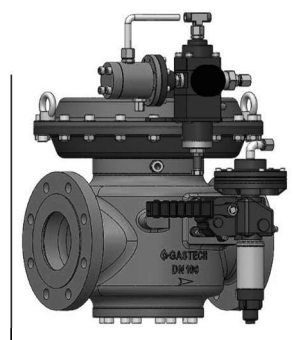
**Desing,  
Operational Diagram**



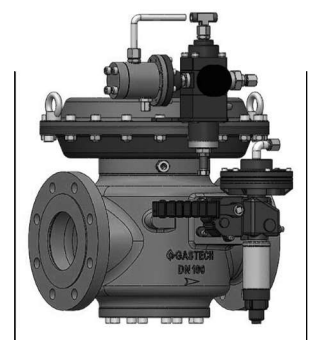
**Configurations**



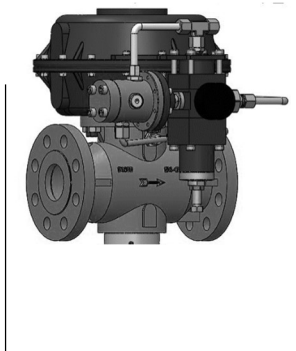
**Gas Pressure Regulator**  
**F65-150**



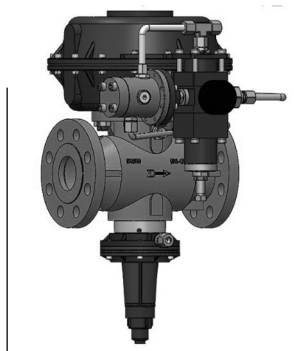
**Gas Pressure Regulator  
with Slum Shut Valve**  
**F65-150/S Serie**



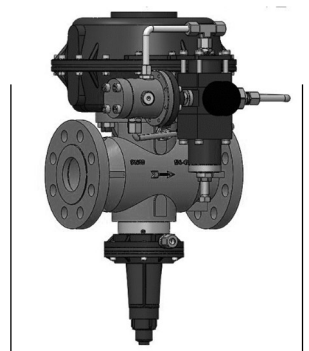
**Gas Pressure Regulator  
with Slum Shut Valve + Monitor**  
**F65-150M/S Serie**



**Gas Pressure Regulator**  
**F25-50**



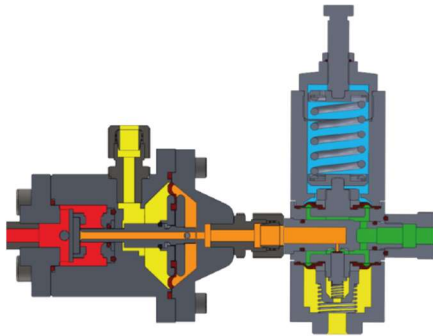
**Gas Pressure Regulator  
with Slum Shut Valve**  
**F25-50/S Serie**



**Gas Pressure Regulator  
with Slum Shut Valve + Monitor**  
**F25-50M/S Serie**

**Gas Pressure Regulator, Z-P Serie**

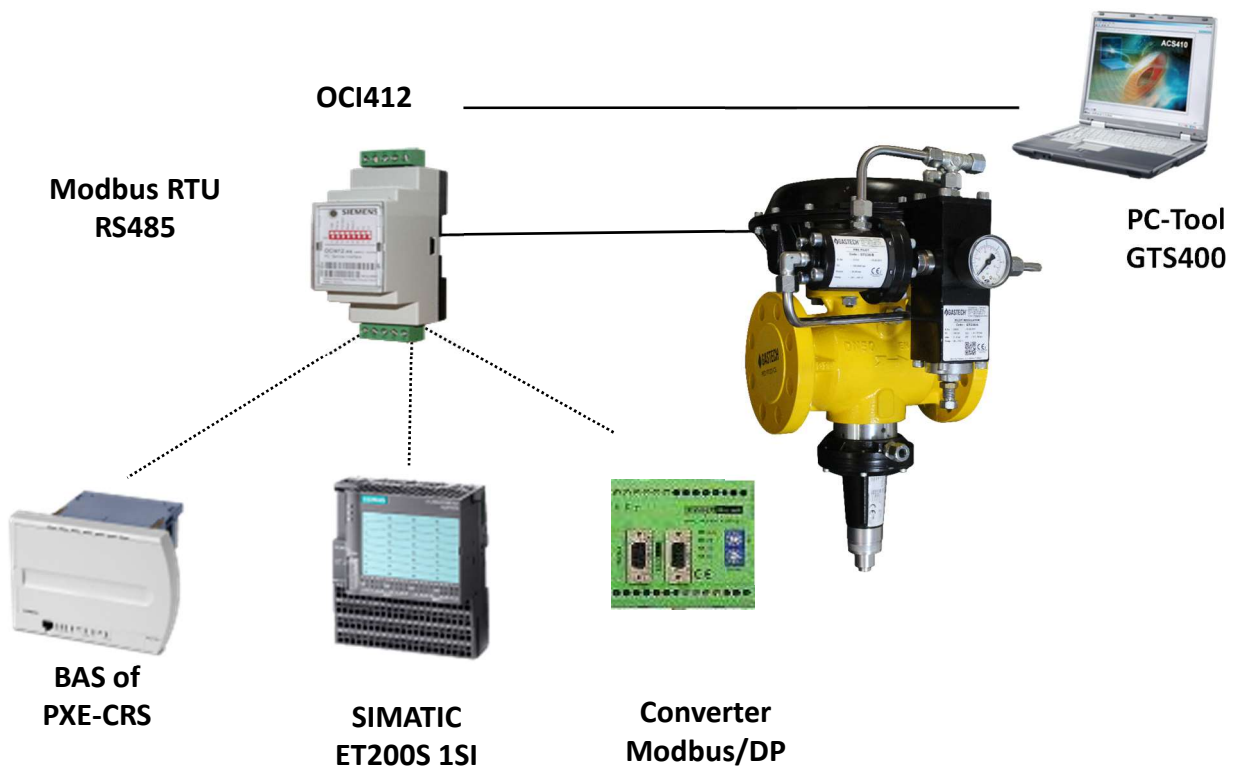
**Pre Pilot - Pilot**



|                           |   |
|---------------------------|---|
| Type                      | GT Serie                                  |
| Allowable temperature –TS | -20 °C to +60 °C                          |
| Set Range                 | GT239A 10 -500 mbar   GT238A 0.3 – 16 bar |

**Pilot Control System**

|        |   |
|--------|---|
| GTxxxA | Manual Setting                            |
| GTxxxB | Cannot be adjusted, only factory settings |
| GTxxxC | Analog Signal Control, 4-20mA or 0-10V    |
| GTxxxD | Pneumatic Control                         |
| GTxxxE | Flow Control with Orifice Plate           |



## Gas Pressure Regulator, Z-P Serie

### Slum Shut Valve

The Z-P Serie of regulators can be fitted with safety shut-off valve for overpressure (OPSO) or combined under-and-over pressure (UPS0/OPSO) protection. Shutoff gas flow when the outlet pressure of the regulator increases or/and decreases. The Slum shut valve trip pressure can easily be adjusted independently of the regulator set point. Built internal bypass, for balancing pressure before relatching the safety shut-off valve, is operated by pulling the valve stem. Possibility of application of devices for remote signal and remote control.

### Technical Features

|  |                  |                 |                 |                 |
|--|------------------|-----------------|-----------------|-----------------|
| Type                                     | IS               |                 |                 |                 |
| Operation class                          | A                |                 |                 |                 |
| Response time                            | < 2 s            |                 |                 |                 |
| Allowable temperature –TS <sup>(1)</sup> | -20 °C to +60 °C |                 |                 |                 |
| Accuracy –AG <sup>(2)</sup>              | 50 mbar          | AG 30           |                 |                 |
|  | 50 – 150 mbar    | AG 10           |                 |                 |
|  | 150 – 5.500 mbar | AG 5            |                 |                 |
|  | 1.0 – 16 bar     | AG 5            |                 |                 |
| Set Range OPSO <sup>(3)</sup>            | BP 20 -300mbar   | MP 50 - 500mbar | AP 0.3 – 5.5bar | HP 1 – 16 bar   |
| Set Range OPSO <sup>(3)</sup>            | BP 10 -280mbar   | MP 20 - 350mbar | AP 0.2 – 3.2bar | HP 0.8 – 14 bar |

<sup>(1)</sup> Low temperature version -40°C: available on request


<sup>(2)</sup> Depending on working conditions

<sup>(3)</sup> change differant springs Refer to page

#### Slum Shut Unit for Z-P Serie

| Article No | Type | DN Size |
|------------|------|---------|
| 2.80.0311  | S-BP | DN25-40 |
| 2.80.0312  | S-MP | DN25-40 |
| 2.80.0313  | S-AP | DN25-40 |
| 2.80.0330  | S-HP | DN50    |
| 2.80.0314  | S-BP | DN50    |
| 2.80.0315  | S-MP | DN50    |
| 2.80.0316  | S-AP | DN50    |
| 2.80.0331  | S-HP | DN50    |
| 2.80.0317  | S-BP | DN65-80 |
| 2.80.0318  | S-MP | DN65-80 |
| 2.80.0319  | S-AP | DN65-80 |
| 2.80.0332  | S-HP | DN65-80 |
| 2.80.0320  | S-BP | DN100   |
| 2.80.0321  | S-MP | DN100   |
| 2.80.0322  | S-AP | DN100   |
| 2.80.0333  | S-HP | DN100   |
| 2.80.0323  | S-BP | DN150   |
| 2.80.0324  | S-MP | DN150   |
| 2.80.0325  | S-AP | DN150   |
| 2.80.0334  | S-HP | DN150   |



 Please, select the springs (OPSO and UPSO Range), Refer to Page 22 and 23

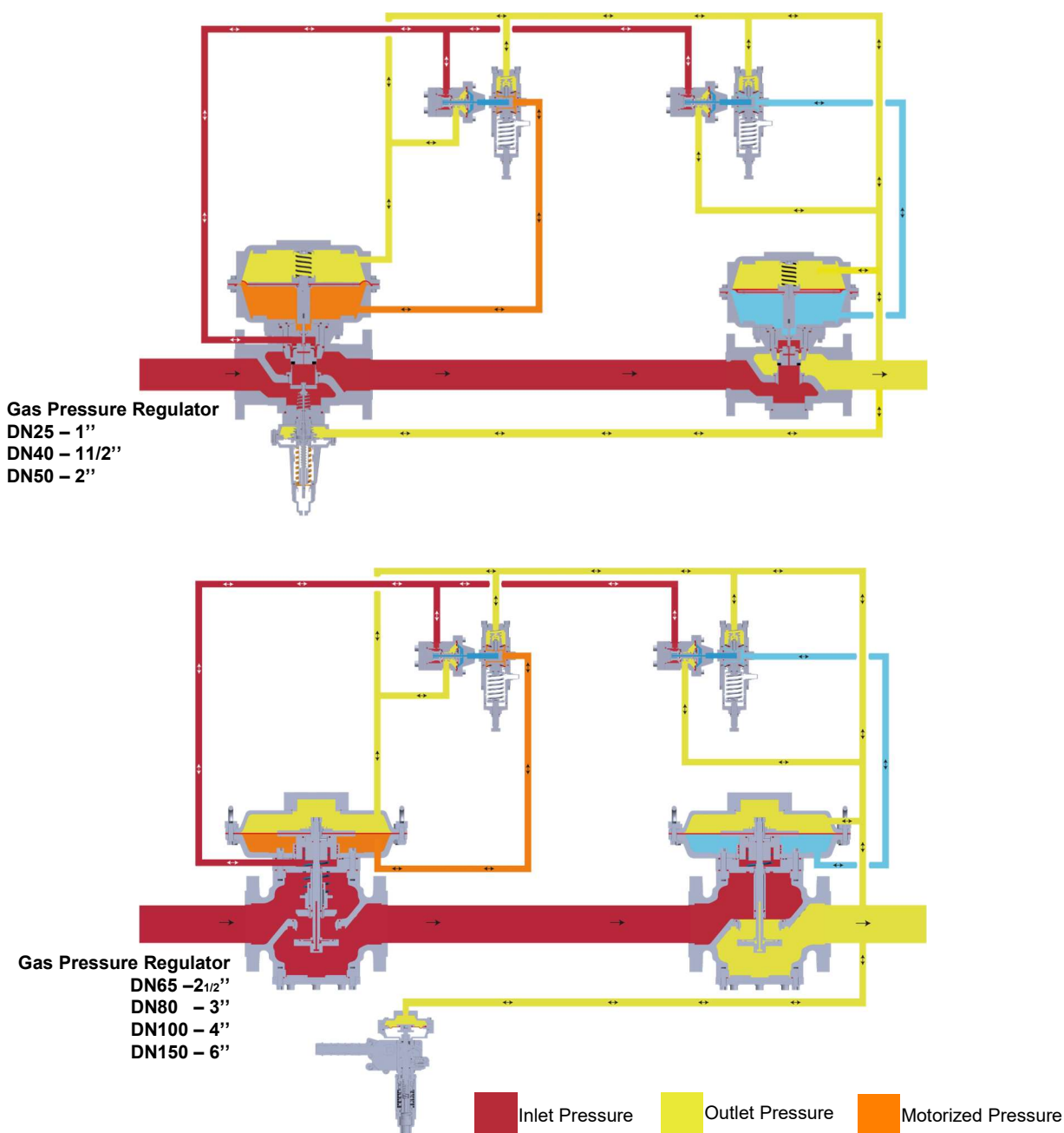
**Gas Pressure Regulator, Z-P Serie**

**Monitor Unit**

The Monitor or emergency regulator is used as a safety device in gas pressure reduction systems. The purpose of this device is to protect the system against possible overpressure, while keeping the reduction line in service. To perform a periodic test on a monitoring regulator, increase the outlet set pressure of the working regulator and watch the outlet pressure to determine if the monitoring regulator takes over at the appropriate outlet pressure.

Monitor regulator is generally installed upstream of the active regulator. Although the function of the monitor regulator is different, the two regulators are virtually identical from the point of view of their mechanical components. Flow coefficients of the regulator puls line monitor system are about 15% lower than those of the active regulator alone.

In order for the standard regulator to be a monitor regulator, it is necessary to add a few mechanical parts. This attachment is directly integrated into the body of the monitor regulator. Figure below is focused on the monitor unit



**Gas Pressure Regulator, Z-P Serie**

**Silencer -INT**

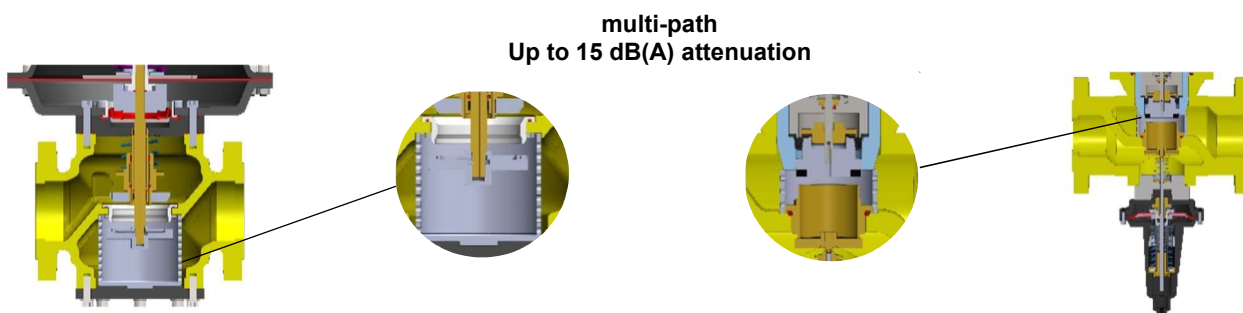
This silencer is fitted on the regulator orifice and is highly efficient up to a theoretical speed of 80 m/s calculated at the outlet flange.

Type int silencer multi-path noise abatement device is incorporated into the regulator on the seat area. It consists of plated Stainless steel metals containing no sound deadening materials. Depending on flows and pressure drop, the silencer can reduce noise levels as much as 15 dB (A) with an approximate 3% capacity reduction.

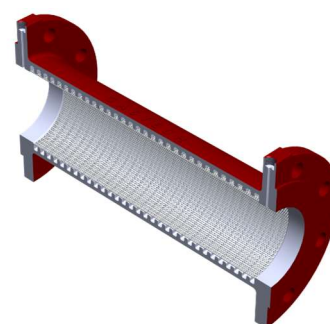
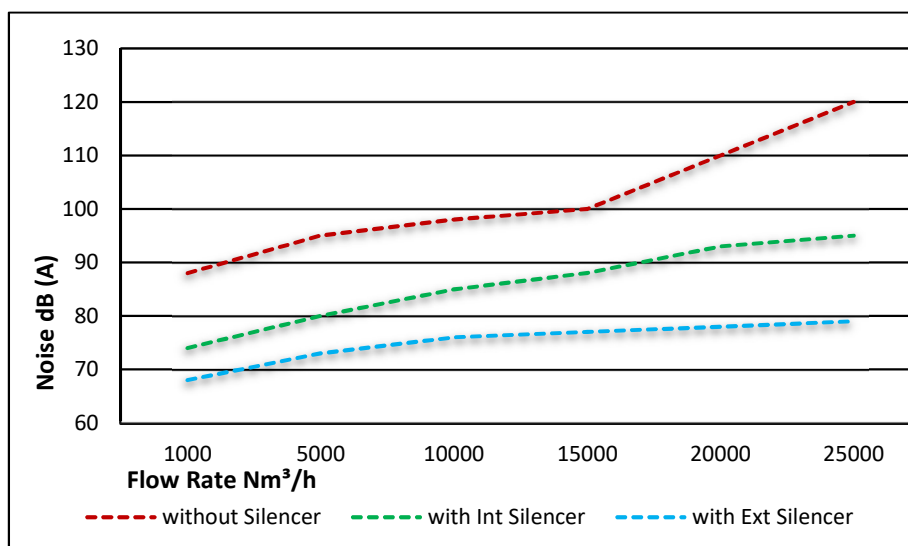
**Silencer Unit for Z-P Serie**



| Article No | Type       | DN Size |
|------------|------------|---------|
| 2.80.0580  | M-BP/MP/AP | DN25-40 |
| 2.80.0581  | M-BP/MP/AP | DN50    |
| 2.80.0582  | M-BP/MP/AP | DN65-80 |
| 2.80.0583  | M-BP/MP/AP | DN100   |
| 2.80.0584  | M-BP/MP/AP | DN150   |



**Performance of Silencer**



**Ext Silencer**



## Gas Pressure Regulator, Z-P Serie

### Pilot Heater - Electric

The electric pilot heater Type PEH is used for reheating gas supplying pressure reducing regulator pilots to avoid the inconveniences caused by freezing which occurs during large pressure drops and/or low ambient temperature

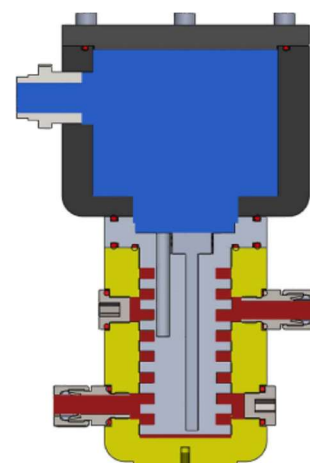


Pilot heater for Z-P Serie

| Article No | Type  | DN Size         |
|------------|-------|-----------------|
| 2.80.0680  | PEH27 | 230Vac 50-60 Hz |
| 2.80.0681  | PEH17 | 110Vac 50-60 Hz |
| 2.80.0682  | PEH10 | 12Vdc           |

### Technical Features

|  |                 |
|--|-----------------|
| Heater tube                                | 102 bar         |
| Thermometer pocket                         | 102 bar         |
| Group according to directive 2014/34/UE    | Group II        |
| Category according to directive 2014/34/UE | Category 2      |
| Protection                                 | Ex db IIC T2 Gb |
| Power supply                               | 230 V 50-60 Hz  |
| Power consumption                          | 280W Max.       |
| Recommended operating temperature          | 0 to 30 °C      |
| Max. allowable admitted temperature        | 60 °C           |
| Selector for temperature A range           | 0/30            |
| Thermostat                                 | + 30 to + 90 °C |
| Differential selector C                    | 2               |
| Interchangeable thermic probe              | 10 kΩ           |





**Gas Pressure Regulator, Z-P Serie**

**Accessories**  
(to be ordered separately)



**Switch** for SSV of Z-P Serie - EExd II CT6 - IP65

| Article No | Type       | DN Size         |
|------------|------------|-----------------|
| 2.80.0622  | M-BP/MP/AP | DN25-40-50      |
| 2.80.0623  | M-BP/MP/AP | DN65-80-100-150 |



**Switch** for SSV of Z-P Serie - EN 50041 - IP66

| Article No | Type       | DN Size         |
|------------|------------|-----------------|
| 2.80.0624  | M-BP/MP/AP | DN25-40-50      |
| 2.80.0625  | M-BP/MP/AP | DN65-80-100-150 |



**3 way solenoid valve** for SSV of Z-P Serie -EExd II CT6 - IP65

| Article No | Type       | DN Size                  |
|------------|------------|--------------------------|
| 2.80.0699  | M-BP/MP/AP | DN25-40-50-65-80-100-150 |

**Pnömatic Actuator** for Z-P Serie –Air supply pressure 2-6bar



| Article No | Type      | DN Size   |
|------------|-----------|-----------|
| 2.80.1143  | N.O or NC | DN25 – 40 |
| 2.80.1144  | N.O or NC | DN50      |
| 2.80.1145  | N.O or NC | DN65 – 80 |
| 2.80.1146  | N.O or NC | DN100     |
| 2.80.1147  | N.O or NC | DN150     |



**Sensing Line Kit** for Z-P Serie

| Article No | Type     | DN Size  |
|------------|----------|----------|
| 2.80.2122  | All Type | All size |



Consisting of: 3pcs x 1mt dia.10mm steel pipe – 3pcs x pipe connection for 10 mm dia. ¼”

**Gas Pressure Regulator, Z-P Serie**

**Flow Calculations**

For a 0.6 specific gravity gas, sizing of regulators is usually made on the basis of Cg valve and KG flow rate coefficients. Flow rates at the fully open position and the various operating conditions are related by the following formula

**Sub-critical flow behaviour (Pu -Pd) ≤ 0.5 Pu**

$$Q = 0,52 \times Cg \times Pu \times \text{sen}\left(K1 \times \sqrt{\frac{Pu - Pd}{Pd}}\right)$$

$$Q = KG \times \sqrt{Pd \times (Pu - Pd)}$$

**Critical flow behaviour (Pu -Pd) > 0.5 Pu**

$$Q = 0,52 \times Cg \times Pu$$

$$Q = \frac{KG}{2} \times Pu$$

**Acronyms**

|    |                                   |
|----|-----------------------------------|
| Q  | volumetric flow rate in (m3 /h)   |
| Pu | absolute inlet pressure in (bar)  |
| Pd | absolute outlet pressure in (bar) |

**Flow rate coefficient**

| Size | 25   1" | 40   1 1/2" | 50   2" | 50H   2"H | 65   2 1/2" | 80   3" | 100   4" | 150   6" |
|------|---------|-------------|---------|-----------|-------------|---------|----------|----------|
| Cg   | 540     | 984         | 1525    | 2200      | 3320        | 4553    | 7990     | 16700    |
| KG   | 567     | 1034        | 1632    | 2288      | 3452        | 4735    | 8395     | 17368    |

Select the diameter of the regulator with Cg higher than calculated value. After finding the DN of the regulator, check that gas speed on the seat does not exceed 100 m/sec, using the following formula:

$$V = 345.92 \times \frac{Q}{DN^2} \times \frac{1 - 0.002 \times Pd}{1 + Pd}$$

|        |  |
|--------|--|
| V      | Velocity (m/s)                               |
| 345.92 | Numerical constant                           |
| Q      | Flow rate under standard conditions (Stm3/h) |
| DN     | Regulator nominal diameter (mm)              |
| Pd     | absolute outlet pressure in (bar)            |

**Correction factor for non-natural gas applications**

The flow rates are indicated for a 0.6 specific gravity gas. To determine the volumetric flow rate for gases other than natural gas, multiply or calculate the values in the capacity tables using the sizing equations with a correction factor. The table below lists correction factors for some common gases:

| Gas Type        | Density ratio to air | Conversion factor |
|-----------------|----------------------|-------------------|
| Air             | 1.00                 | 0.77              |
| Butane          | 2.00                 | 0.55              |
| Propane         | 1.52                 | 0,63              |
| Propane+Air Mix | 1.2                  | 0,71              |
| Hydrogen        | 0.07                 | 2.94              |
| Nitrogen        | 0.97                 | 0.79              |
| Carbondioxide   | 1.52                 | 0.63              |

Use the following formula to calculate the correction factor for gases not listed above. In the formula, d is the specific gravity of the gas.

$$\text{Conversion factor} = \sqrt{\frac{0.6}{d}}$$

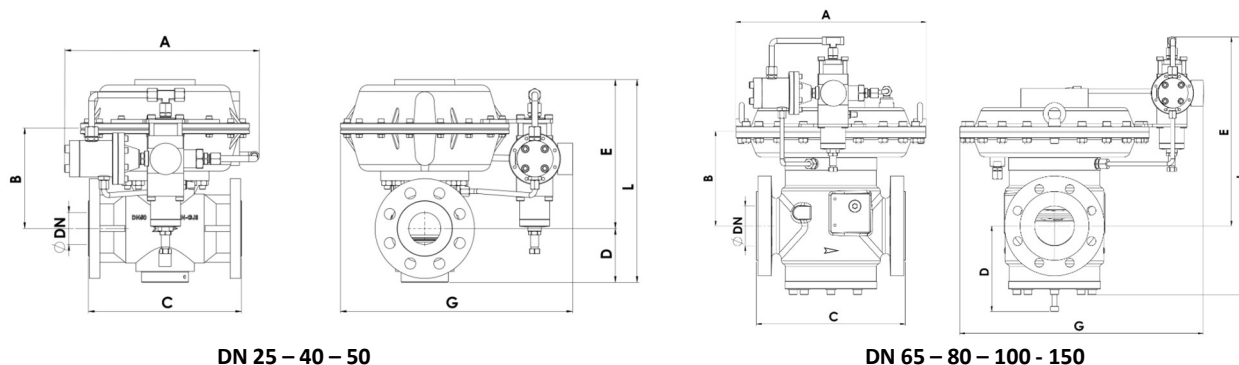
Stm3 /h /reference conditions 15 °C, 1 barg

Stm3 /h x 0.94795 = Nm3 /h Nm3 /h reference conditions 0 °C, 1 barg

**Gas Pressure Regulator, Z-P Serie**

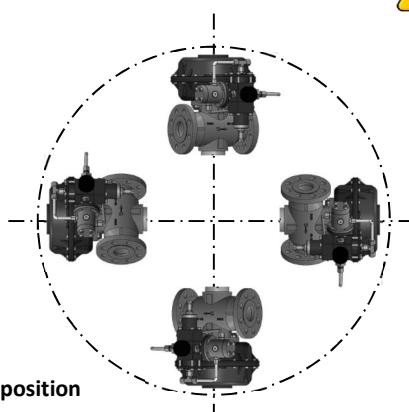
**Dimensions and Weights**

Z-P Serie -without SSV



| DN <sup>(1)</sup> | A   | B   | C   | D   | E   | G   | L   | Wgt kg |
|-------------------|-----|-----|-----|-----|-----|-----|-----|--------|
| 25   1"           | 320 | 160 | 222 | 80  | 240 | 385 | 320 | 26     |
| 40   1 1/2"       | 320 | 160 | 222 | 80  | 240 | 385 | 320 | 27     |
| 50   2"           | 320 | 170 | 254 | 90  | 246 | 385 | 340 | 32     |
| 50   2"           | 385 | 190 | 254 | 90  | 246 | 490 | 340 | 41     |
| 65   2 1/2"       | 385 | 190 | 298 | 175 | 380 | 490 | 520 | 82     |
| 80   3"           | 385 | 190 | 298 | 175 | 380 | 490 | 520 | 83     |
| 100   4"          | 385 | 190 | 352 | 175 | 380 | 490 | 520 | 103    |
| 150   6"          | 385 | 280 | 451 | 360 | 780 | 490 | 700 | 165    |

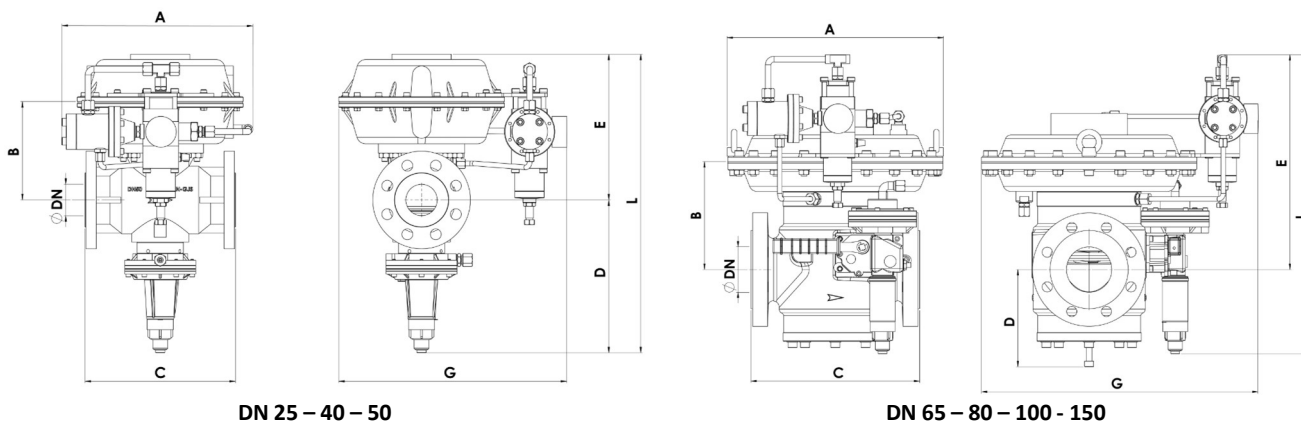
**!** Int silencer does not affect dimensions  
 Flange holes on DN25 size are threaded M12x1,75  
 Flange holes on DN65 size are threaded M16x2,0



**Gas Pressure Regulator, Z-P Serie**

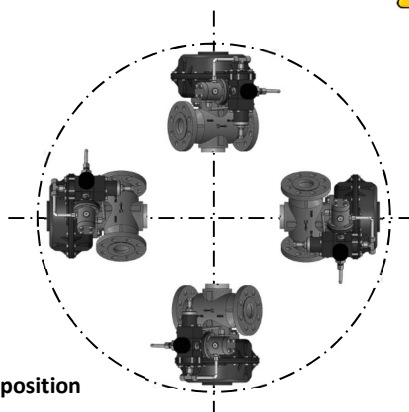
**Dimensions and Weights**

Z-P Serie -with SSV



| DN <sup>(1)</sup> | A   | B   | C   | D   | E   | G   | L   | Wgt kg |
|-------------------|-----|-----|-----|-----|-----|-----|-----|--------|
| 25   1"           | 320 | 160 | 222 | 250 | 240 | 385 | 490 |        |
| 40   1 1/2"       | 320 | 160 | 222 | 250 | 240 | 385 | 490 |        |
| 50   2"           | 320 | 170 | 254 | 260 | 246 | 385 | 510 |        |
| 50   2"           | 385 | 190 | 254 | 260 | 246 | 490 | 510 |        |
| 65   2 1/2"       | 385 | 190 | 298 | 175 | 380 | 490 | 530 |        |
| 80   3"           | 385 | 190 | 298 | 175 | 380 | 490 | 530 |        |
| 100   4"          | 385 | 190 | 352 | 175 | 380 | 490 | 530 |        |
| 150   6"          | 385 | 280 | 451 | 350 | 780 | 490 | 610 |        |

**!** Int silencer does not affect dimensions  
 Flange holes on DN25 size are threaded M12x1,75  
 Flange holes on DN65 size are threaded M16x2,0



**Gas Pressure Regulator, Z-P Serie**

## Outlet Pressure Range and Setting Springs

The spring setting ranges for all diameter regulator are shown in the tables below






| Pressure Range (mbar) | Actuator (∅) | Color  |  | Diameter (mm) | Order Code |
|-----------------------|--------------|--------|---|---------------|------------|
| 300 – 1100            | GT238A       | Orange |  | 3.5           | 2.13.0419  |
| 1000 – 2500           | GT238A       | Grey   |  | 4.0           | 2.13.0420  |
| 1500 – 6000           | GT238A       | Yellow |  | 5.0           | 2.13.0421  |
| 4000 – 6000           | GT238A       | Blue   |  | 6.0           | 2.13.0422  |
| 6000 – 16000          | GT238A       | Black  |  | 7.0           | 2.13.0423  |

## Shut Off Range and Setting Springs

Over- Shut off setting ranges for the all diameters are shown in the tables below

| Pressure Range (mbar) | Actuator (∅) | Color  |  | Diameter (mm) | Order Code |
|-----------------------|--------------|--------|---|---------------|------------|
| 80 – 370              | 120 BP-MP    | Yellow |  | 2.7           | 2.13.0714  |
| 280 – 490             | 120 BP-MP    | Black  |  | 3.2           | 2.13.0066  |
| 480 – 1000            | 120 AP       | Purple |  | 3.5           | 2.13.0682  |
| 750 – 1250            | 120 AP       | Silver |  | 3.7           | 2.13.0683  |
| 1000 – 1750           | 120 AP       | Pink   |  | 4.0           | 2.13.0744  |
| 1500 – 2500           | 120 AAP      | White  |  | 4.5           | 2.13.0319  |
| 2000 – 5500           | 120 AAP      | Orange |  | 5.0           | 2.13.0324  |

Over- Shut off setting ranges for the all diameters are shown in the tables below





| Pressure Range (mbar) | Actuator (∅) | Color  |  | Diameter (mm) | Order Code |
|-----------------------|--------------|--------|---|---------------|------------|
| 60 – 240              | 120 BP-MP    | Black  |  | 2.3           | 2.13.0069  |
| 70 – 450              | 120 BP-MP    | Purple |  | 2.5           | 2.13.0746  |
| 350 – 900             | 120 AP-AAP   | Silver |  | 2.8           | 2.13.0320  |
| 700 – 3200            | 120 AP-AAP   | Pink   |  | 3.5           | 2.13.0745  |

## Gas Pressure Regulator, Z-P Serie

### Color of Products





#### Standard Colors


The colors of the regulator parts are painted as follows.

| Part   | RAL Code | Color   |
|--|----------|---|
| Body<br>PN16-20 according to ISO 7005        | 1021     |  |
| Body<br>Class 150 RF according to ASME B16.5 | 3000     |  |
| Main Actuator<br>All Versions                | 9005     |  |
| Slum Shut Covers<br>All Versions             | 9005     |  |

#### Optional Colors

You can choose one or more of the following colors.

| Part      | RAL Code | Color   |
|-----------|----------|---|
| All Parts | 1021     |  |
| All Parts | 3000     |  |
| All Parts | 9005     |  |
| All Parts | 6011     |  |
| All Parts | 5010     |  |

 delivery times and price may vary in optional color options.

**Gas Pressure Regulator, Z-P Serie**

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**NOTES**

For more information, contact your local sales representative or agency.



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