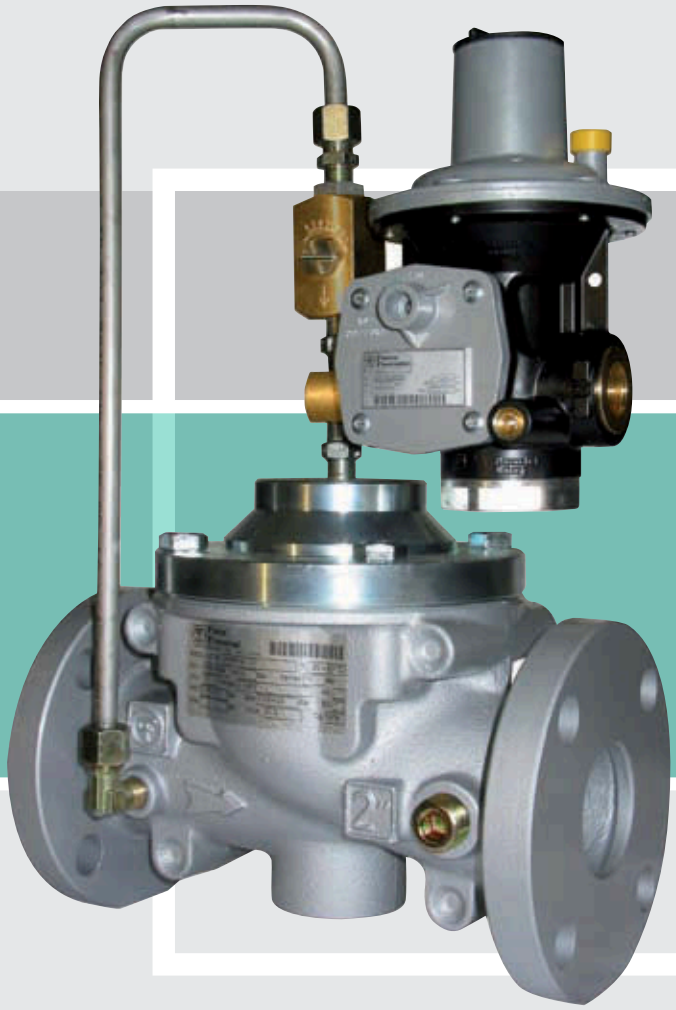
Aperval 101

Pressure
Regulators



Pietro Fiorentini®

Aperval 101

> Pressure regulators

Designed With Your Needs In Mind

Internal sensing line
(depending on installed pilot)

Compact design

Top entry costruction
for easy maintenance

Low noise

Wide rangeability

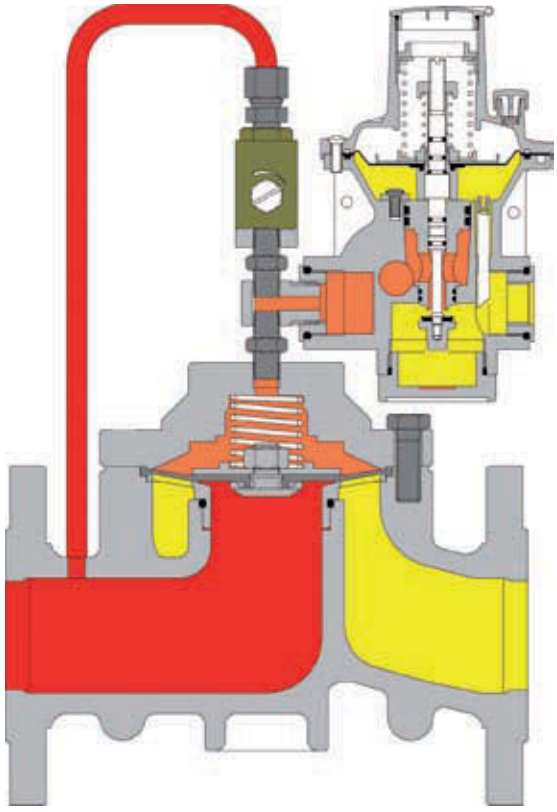
Internal connection for pilot
bleed (on request)

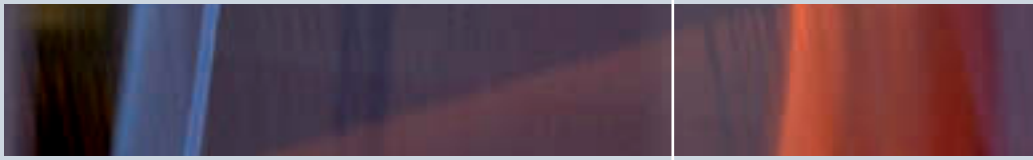
Main Features

APERVAL 101 is a pilot controlled regulator for low and medium pressure applications. **APERVAL 101** is normally a failed open regulator.
It opens in case of:

- lack of pilot loop supply
- damage of main pilot diaphragm

This regulator is suitable for use with previously filtered, non-corrosive gases.
Its truly "top entry design" allows any maintenance operation without removing the body from the line.





Main Features

-Design pressure: up to 246 Psi (17 bar)
-Design temperature: -4 to + 140 °F (-20 °C to +60 °C)
-Range of inlet pressure bpe: 7.25 to 246 Psig (0,5 to 17 bar)
-Range of outlet pressure Wh: 6"w.c. to 138 Psig (20 to 9500 mbar)
-Minimum working differential pressure 7 Psig (480 mbar)
-Available sizes: 2"- 3" -4"
-Flanging: class 125FF-125RF- 150RF according to ASME B 16.1

Materials

Body	Spheroidal cast iron GS 400-18 ISO 1083
Head covers	Rolled or forged carbon steel
Diaphgram	Vulcanized rubber
Valve seat	Nickel-plated carbon steel
Seals	Nitrile rubber
Compression fittings	SS Dual Lock Compression type

The characteristics listed above are referred to standard products. Special characteristics and materials for specific applications may be supplied upon request.

Pilot Systems

APERVAL 101 is equipped with series 300 and HP pilot listed below:
-HP 100AP + AR101HPZ control range Wh: 3 ÷ 12 Psig (200 ÷ 800 mbar)
-HP 100APTR + AR101HPZ control range Wh: 12 ÷ 65 (800 ÷ 4500 mbar)
-301/A + AR101 control range Wh 8"w.c. ÷ 1,5 Psig (20 ÷ 100 mbar)
-301/A TR + AR101 control range Wh 1,5 ÷ 29 Psig (100 ÷ 2000 mbar)
-302/A + AR101 control range Wh 12 ÷ 138 Psig (800 ÷ 9500 mbar)

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Choosing the pressure regulator

Sizing of regulators is usually made on the basis of Cg gas sizing coefficients (table 1). Flow rate at fully open position and various operating conditions are related by the following formula where:

Q = flow rate in scfh
Pu = inlet pressure in psia (abs)
Pd = outlet pressure in psia (abs)
K1 = body shape coefficient (table 1)

A > When the Cg value of regulator is known, as well as Pu and Pd, the flow rate can be calculated as follows:

A-1 in sub critical conditions: (Pu < 2 x Pd)

$$Q = 1.280 \times Cg \times Pu \times \sin\left(K1 \times \sqrt{\frac{Pu - Pd}{Pu}}\right)_{deg}$$

A-2 in critical flow conditions: (Pu ≥ 2 Pd)

$$Q = 1.280 \times Cg \times Pu$$

B > Vice versa, when the values of Pu, Pd and Q are known,the Cg values, and hence the regulator size, may be calculated using:

B-1 in sub-critical conditions: (Pu < 2 x Pd)

$$Cg = \frac{Q}{1.280 \times P_u \times \sin\left(K1 \times \sqrt{\frac{Pu - Pd}{Pu}}\right)_{deg}}$$

B-2 in critical conditions: (Pu ≥ 2 x Pd)

$$Cg = \frac{Q}{1.280 \times Pu}$$

NOTE: The sin val is understood to be DEG.

Table 1: Cg and Kg coefficient

Size (inches)	2″	3″	4″
Cg coefficient	2091	4796	7176
Kg coefficient	2199	5045	7546
K1 coefficient	108	108	108

This formula is applicable to natural gas having a gas specific gravity 0.61 (air = 1) and a regulator gas inlet temperature of 60 °F. For gases having different specific gravity S and regulator inlet temperature t_F in °F, the value of the flow rate, calculated as above, must be multiplied by a correction factor, as follows:

$$Fc = \sqrt{\frac{317.20}{S \times (460 + t_F)}}$$

Table 2 lists the correction factors Fc for a number of gases at 60 °F.

Table 2: Correction factors FC

Type of gas	Specific gravity	Fc Factor
Air	1.0	0.78
Propane	1.53	0.63
Butane	2.0	0.55
Nitrogen	0.97	0.79
Oxygen	1.14	0.73
Carbon dioxide	1.52	0.63

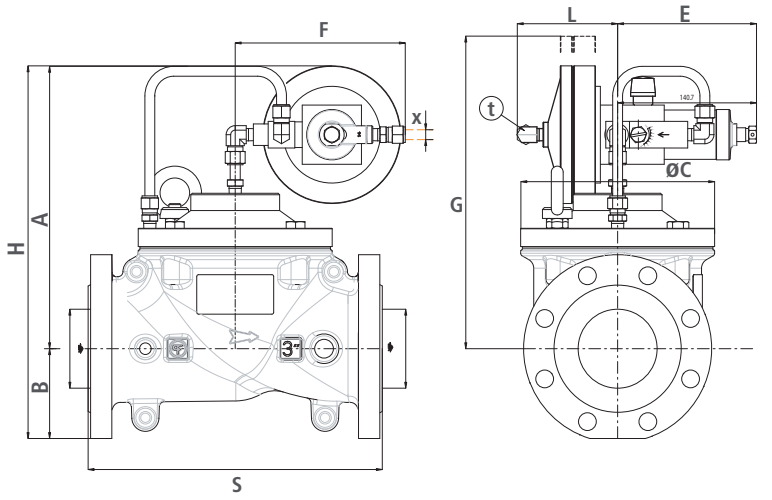
Caution:
In order to get optimal performance, avoid premature diaphragm failure and limit noise emissions, it is recommended that the gas speed at the outlet flange does not exceed 492 ft/sec (150m/s). The gas speed at the outlet flange may be calculated by means of the following formula:

$$V = 10.02 \times \frac{Q}{DN^2} \times \frac{1}{1 + (0.06895 \times Pd)}$$

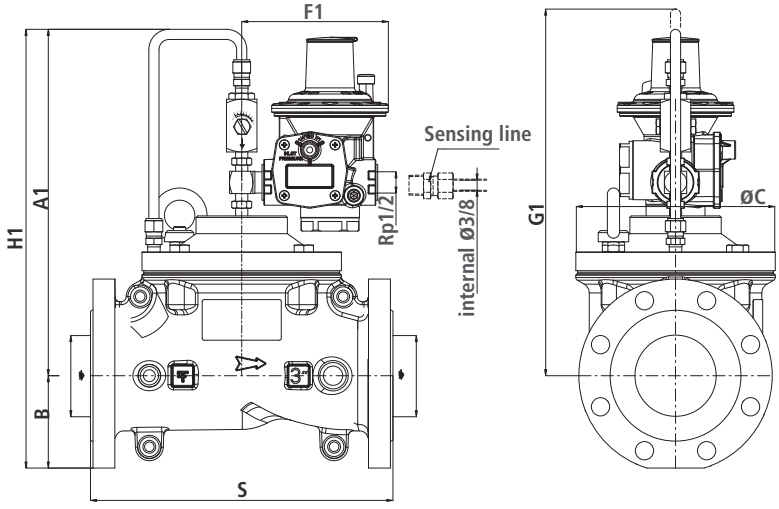
where:
V = gas speed in ft./sec
Q = gas flow rate in SCFH
DN = nominal size of regulator in inches
Pd = outlet pressure in psi (pressure gauge)

OVERAL DIMENSIONS

300 Series Pilot



HP Series Pilot



Overall dimensions in Inches

Inches	2″	3″	4″
S	10	11.73	13.86
A	10.24	11.42	13.58
A1	12	13.39	15.35
ANSI 150	2.95	3.58	4.33
PN16	3.19	3.78	4.13
ØC	6.38	7.76	11.42
E	6.50	6.50	6.50
F	6.69	6.69	6.69
F1	5.83	5.83	5.83
G	11.22	13.19	15.94
G1	12.99	15.16	17.71
H	13.43	15.20	17.91
H1	15.20	17.17	19.68
L	4.13	4.13	4.13

Weights in pounds

ANSI 125RF-150RF WITH PILOT HP	46.30	63.93	134.48
125FF-150FF WITH PILOT 300 SERIES	48.50	66.14	136.69

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