Pietro Fiorentini

PF80 - PF120

Commercial & Industrial Pressure Regulators

PF80 - PF120

Overview

The **PF80 & PF120** spring loaded direct-acting natural gas pressure regulators are suited for commercial and industrial applications requiring low and medium delivery pressures. The modular design allows for easy adaptation of multiple optional overpressure protection devices to fit almost any application requirement.

Features

- Balanced valve design
  - Stable outlet pressure independent of inlet pressure variation
  - High turndown ratio easily serves varying loads
  - Single orifice simplifies sizing without impacting inlet pressure limitation
- Internal strainer protects the orifice and seat from foreign debris
- Multiple body sizes to fit design requirements
- Outlet pressure ranges from 6” WC to 10 PSIG
- Environmentally-friendly overpressure protection options that minimize or eliminate large volumes of gas from being emitted to the atmosphere in the event of an abnormal condition

Fig. 1 **PF80** - (Basic version)

Fig. 2 **IMD** - (Integral Monitoring Device)

Fig. 3 **SSV** - (Slam-Shut Valve)

Fig. 4 **IFM** - (Integral Full Monitor)

MAIN FEATURES

Specifications

Maximum Inlet Pressure:	125 PSIG
Outlet Pressure Range:	7” wc to 10 PSIG
Ambient Temperature Range:	-20°F +150°F
Flowing Gas Temperature Range:	Up to -4°F +140°F
Body Size:	PF80 1 ¼” NPT, 1 ½” NPT (2”NPT pending) PF120 1”1/2, 2” NPT (2” Flanged – pending)
Spring Case Vent Connection:	½” NPT
Orifice Size	PF80 3/4” PF120 1 ½”

Materials:

Body:	Ductile Iron
Diaphragm Case:	Aluminium
Diaphragm:	Nitrile Rubber
Orifice:	Brass
O-rings:	Nitrile

Benefits:

- **Spring loaded regulator with same accuracy of pilot loaded regulator due to balanced valve design**
- **No more orifice sizing required or to be replaced in case inlet pressure variations**
- **IMD Option allow OPP without venting large amount of gas to atmosphere (max 15 cf/h)**
- **Fix factor billing or general application regulator with built-in 300 microns protective screen**

Available Configurations:

MODEL	OPTIONS					
PF80 PF 120						
						APPLICATION
	A					Low Pressure (0-5 PSIG)
	B					Medium Pressure (5-10 PSIG)
	C					Monitor, Low Pressure (0-5 PSIG), external sense only
	D					Monitor, Medium Pressure (5-10 PSIG), external sense only
						OVERPRESSURE PROTECITON
		0				None
		1				Internal Monitoring Device (IMD)
		2				Integral Full Monitor (IFM)
		3				Slam Shut Device (SSV)
						RELIEF
			A			Token
			B			None
						AMBIENT TEMPERATURE
				0		Standard (-20F to +150F)
						BODY CONNECTIONS
					A	1-1/4" NPT (PF80)
					B	1-1/2" NPT (PF80, PF120)
					C	2" NPT (PF80, PF120)
					D	2” #125FF

Tab.1

1. BALANCED VALVE DESIGN

PF80 and **PF120** regulator models are spring loaded self-operated regulators that incorporate a balanced valve design. The balancing valve allow an opposite force equal to the inlet pressure to be applied on the back side of the orifice’s seat disk. This feature improves the consistency of the outlet pressure setting as inlet pressure fluctuates, and provides high turndown ratio across a wide flow range.

2. INTEGRAL STRAINER

All PF80 and **PF120** models are equipped with a removable internal 300 micron strainer to prevent foreign particles, like weld slag or PE shavings, from entering the orifice and seat disk chamber and preventing lockup. The strainer also provides protection to all optional integral overpressure protection devices as well as downstream customer assets. The strainer can easily be accessed without removing the regulator body from the piping, cleaned and replaced, if necessary.

3. TOKEN RELIEF VALVE

All PF80 and **PF120** regulator models have an available token relief valve that discharges a small volume of gas to the atmosphere when the regulator exceeds the outlet pressure set point. During no-flow conditions, thermal expansion of the gas can cause downstream static pressure to build up. The token relief valve will prevent downstream pressure from rising, and if equipped, prevent nuisance tripping of the SSV.

4. OUTLET PRESSURE SENSING

All PF80 and **PF120** regulators can sense downstream pressure internally, externally, or by using both. Internal sense versions have a sense line built into the outlet of the regulator body. Externally sensed versions require the internal sense line to be plugged, and use a secondary external sense line connected to the lower diaphragm case. When using the external sense configuration without plugging the internal sense line, the higher pressure of the two will provide the control pressure to the lower diaphragm. This can be used to improve response in applications where the load changes quickly.

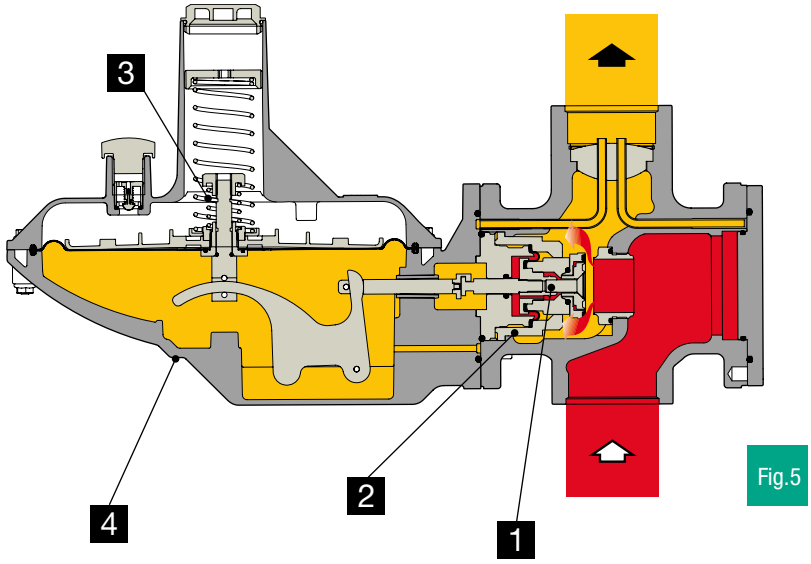


Fig.5

INTEGRAL MONITORING DEVICE - IMD

The IMD is an effective **overpressure protection safety device** designed to limit downstream pressure build-up in case of regulator seat failure or other catastrophic failure such as a cut diaphragm or lever disconnect. In the event of an abnormal situation, the IMD operates on the inlet side or the orifice to limit downstream pressure. Sine the IMD is a separate and independent device from the main regulator it can function in the event of a catastrophic failure on the main regulator. When used in conjunction with a token relief regulator, a small amount of gas (approximately 15 CFH) will bleed to the atmosphere when the IMD is functioning or in lock-up. The bleeding gas also serves as an alert that the regulator is operating in an abnormal condition. Bleeding gas to the atmosphere can be eliminated by using a non-token relief regulator. The IMD is an environmentally-friendly solution that minimizes venting hazardous gas to the atmosphere and helps reduce Unaccounted-For Gas.

During the operation of the IMD a **minimal gas bleeding as small as 15 cubic feet per hour (400 lt/h)** is released to alert about the OPP event

Fig.6 **IMD** - (Internal monitoring Device)

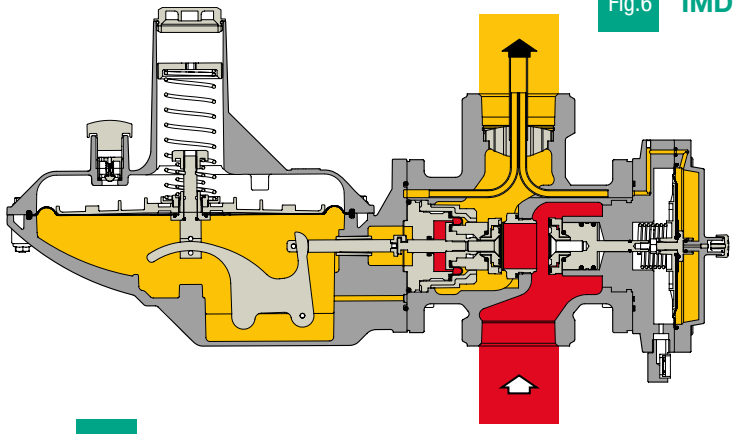


Fig.7 **IMD** - (Internal monitoring Device)

IMD Performance

Worker Set Point	IMD Max Activation Pressure	IMD Max Control Pressure	IMD Lock-up Max Pressure
7” wc	1.7 psig	1.3 psig	1.7 psig
2 psig	3.5 psig	3.4 psig	3.7 psig
5 psig	6.5 psig	5.8 psig	6.5 psig

Tab.2

SHUT-OFF DEVICE model SSV

The **SSV** is an overpressure protection safety device designed to shut off the gas flow under abnormal downstream pressure conditions. The SSV can be configured to operate when any of three conditions are met: overpressure, underpressure, or both over/under pressure.
To help ensure that the abnormal condition has been properly corrected, the SSV must be manually reset.
The integral bypass valve simplifies resetting by equalizing internal pressure, thus eliminating the need for any other tools or piping. SSV set-points are field adjustable.

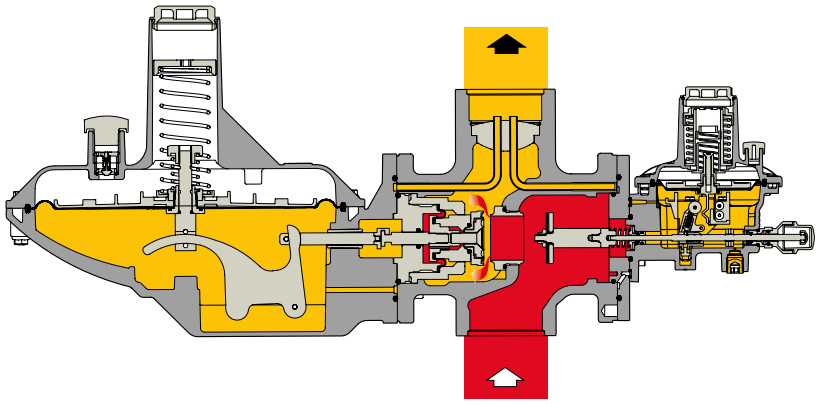


Fig.8 **SSV** - (Slam-Shut Valve)

Shut-Off Device Model SSV Performance

Worker Set Point	MINIMUM SUGGESTED SET-POINT
7” wc	15” wc
2 psig	3 psig
5 psig	7 psig
10 psig	12 psig

Tab.3

IFM: FULL INCORPORATED MONITOR

The **IFM** is an overpressure protection safety device that will precisely take over outlet pressure control when an abnormal event occurs in main worker regulator. In this configuration, the gas flows through the monitor first, and then through the worker (or operator) regulator. The monitor regulator outlet pressure set-point must be set higher than the worker which will allow full flow through to the worker regulator under normal operation. In the event of an abnormal condition in the worker regulator, the monitor will resume accurate pressure control at a slightly higher outlet pressure set-point. Since the two control actuators are externally tied together, regulator operation does not require and external sense line, although the control actuators can be tied to a common external sense connection which will override the internal sensing lines.

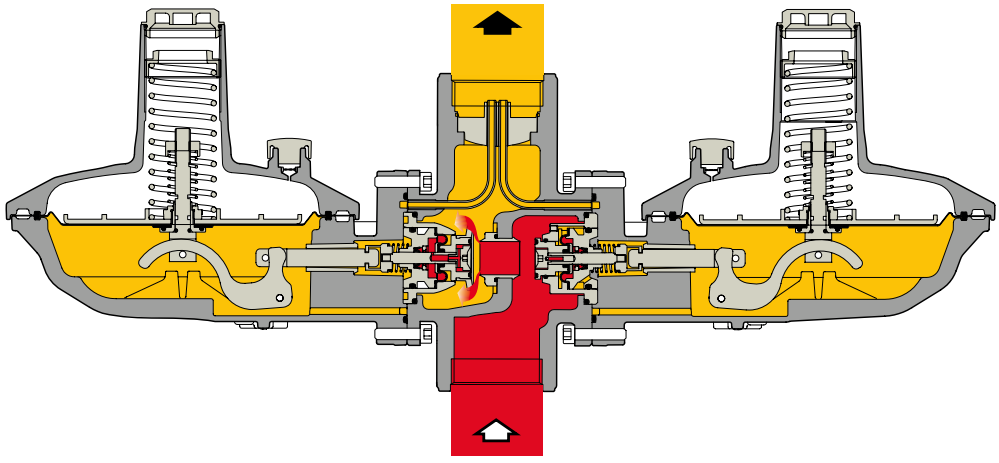


Fig.9 IFM (Integral Full Monitor)

MONITOR

A monitor is an emergency pressure regulator that is usually upstream from the worker regulator. In an abnormal event when the worker regulator is unable to maintain downstream pressure from exceeding the set point, the monitor will perform the function of the worker regulator at a set point slightly higher than the worker regulator.
External sensing line is required in upstream monitor configurations, and the internal sense line must be plugged.

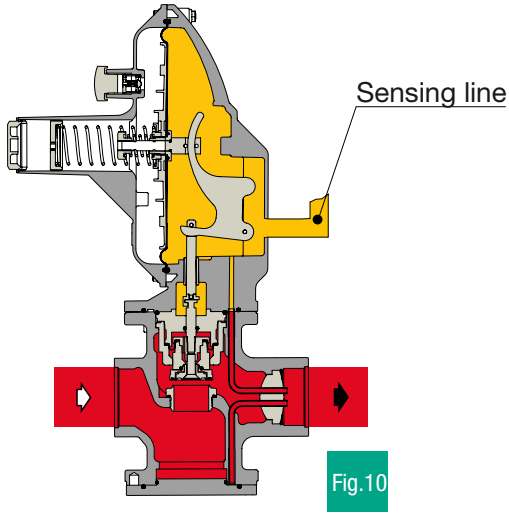


Fig.10

Remote sense connection for indipendent applications

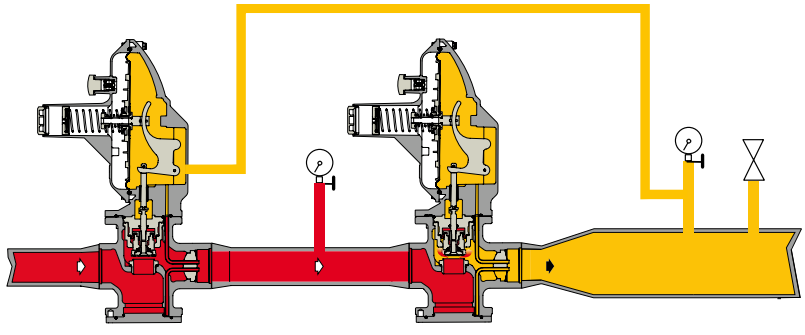


Fig. 11

INCORPORATED TOKEN RELIEF VALVE

The **PF80** & **PF120** series can be equipped with an incorporated token relief valve (IRV) that discharges a limited amount of gas into the atmosphere when the regulator outlet pressure exceeds the set point value.
The possible causes that can lead to the valve opening are:

- thermal expansion of the downstream gas in the absence of flow.
- pressure spikes caused by the downstream valve rapidly closing (in the event of small volumes).

When the outlet pressure returns to below the set value, the relief valve closes again.

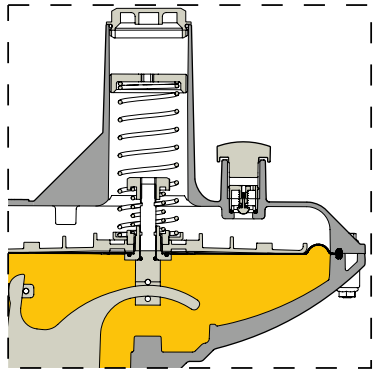


Fig.12 **PF...** - Token IRV

Sizing the Pressure regulator

The following charts are provided in order to simplify the sizing of the regulators. Select your inlet pressure, required outlet pressure and then select the given flow in the tables.

NOTE: The flow value in the following table are actual maximum recommender flows for the regulator and no safety factor is necessary when sizing the regulator.

Fix factor Billing and General Application Flow Chart

Outlet pressure (psig) 7"WC (+2"WC/-1"WC)				
Inlet pressure Pu (psig)	PF80*			PF120*
	1 ¼"	1 ½"	2"	2"
5	2,500	2,800	2,800	8,500
7	2,800	3,500	3,500	9,500
10	3,500	4,200	4,200	12,500
15	5,500	6,500	6,500	15,000
25	7,000	8,500	8,500	17,000
40	8,500	8,500	8,500	19,000
60	7,000	7,000	7,000	25,000
72	7,000	7,000	7,000	25,000
100	7,000	7,000	7,000	25,000
125	7,000	7,000	7,000	25,000
* Flow Rate (SCFH)				Tab.4

Outlet pressure (psig) 14"WC (+/-2"WC)				
Inlet pressure Pu (psig)	PF80*			PF120*
	1 ¼"	1 ½"	2"	2"
5	2,500	2,800	2,800	9,000
7	2,800	3,500	3,500	10,000
10	3,500	4,200	4,200	13,000
15	5,500	6,500	6,500	15,500
25	7,000	8,500	8,500	19,500
40	8,500	8,500	8,500	23,000
60	7,000	7,000	7,000	23,000
72	7,000	7,000	7,000	23,000
100	7,000	7,000	7,000	23,000
125	7,000	7,000	7,000	23,000
* Flow Rate (SCFH)				Tab.5

Outlet pressure (psig) 1 PSIG (+/-1% ABS)				
Inlet pressure Pu (psig)	PF80*			PF120*
	1 ¼"	1 ½"	2"	2"
5	2,500	2,800	2,800	9,000
7	2,800	3,700	3,700	10,500
10	3,500	4,500	4,500	13,000
15	5,500	6,000	6,000	17,000
25	7,000	9,500	9,500	21,500
40	8,500	12,000	12,000	27,250
60	7,000	12,000	12,000	27,250
72	7,000	12,000	12,000	27,250
100	7,000	12,000	12,000	27,250
125	7,000	12,000	12,000	27,250
* Flow Rate (SCFH)				Tab.6

Outlet pressure (psig) 2 PSIG (+/-1% ABS)				
Inlet pressure Pu (psig)	PF80*			PF120*
	1 ¼"	1 ½"	2"	2"
5	2,650	3,100	3,100	7,000
7	3,700	4,000	4,000	9,000
10	4,500	4,700	4,700	11,000
15	6,250	6,750	6,750	14,000
25	8,500	11,300	11,300	19,000
40	10,500	12,000	12,000	27,250
60	10,500	12,000	12,000	27,250
72	10,500	12,000	12,000	27,250
100	10,500	12,000	12,000	27,250
125	10,500	12,000	12,000	27,250
* Flow Rate (SCFH)				Tab.7

Outlet pressure (psig) 2 PSIG (+/-2% ABS)	
Inlet pressure Pu (psig)	PF120*
	2"
5	9,500
7	12,500
10	15,250
15	19,500
25	26,500
40	27,250
60	27,250
72	27,250
100	27,250
125	27,250
* Flow Rate (SCFH)	Tab.8

Fix factor Billing

Outlet pressure (psig) 5 PSIG (+/-1% ABS)				
Inlet pressure Pu (psig)	PF80			PF120
	1 ¼"	1 ½"	2"	2"
5	-	-	-	-
7	-	-	-	-
10	2,150	2,450	2,450	10,600
15	2,825	3,350	3,350	14,850
25	3,850	4,600	4,600	22,250
40	6,850	8,850	8,850	23,500
60	9,500	11,500	11,500	27,250
72	12,250	14,000	14,000	27,250
100	12,250	14,000	14,000	27,250
125	12,250	14,000	14,000	27,250
* Flow Rate (SCFH)				Tab.9

Outlet pressure (psig) 5 PSIG (+/-10% Gauge)				
Inlet pressure Pu (psig	PF80			PF120
	1 ¼"	1 ½"	2"	2"
5	-	-	-	-
7	-	-	-	-
10	4,950	5,300	5,300	17,500
15	6,500	7,250	7,250	25,000
25	10,000	11,000	11,000	30,000
40	13,500	15,000	15,000	30,000
60	13,500	15,000	15,000	30,000
72	13,500	15,000	15,000	30,000
100	13,500	15,000	15,000	30,000
125	13,500	15,000	15,000	30,000
* Flow Rate (SCFH)				Tab. 10

TYPICAL CONNECTION DIAGRAMS

The following examples are provided as a recommendation to get the best performance from the **PF80** & **PF120** regulators.

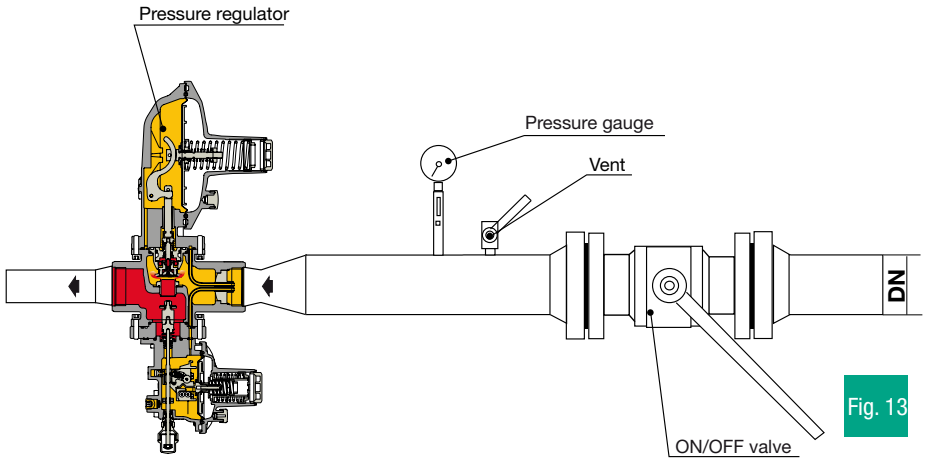


Fig. 13 In-Line Installation

Recommended Installations

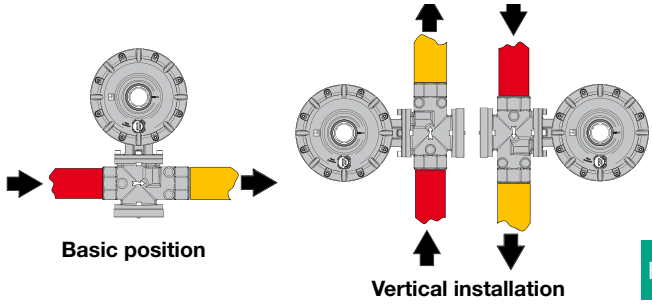
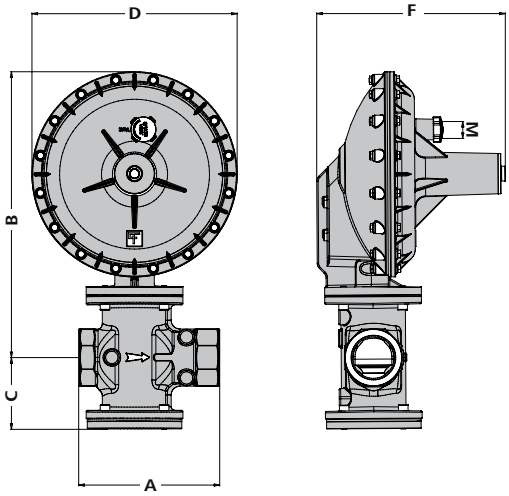


Fig.14

Inlet pressure

Outlet pressure

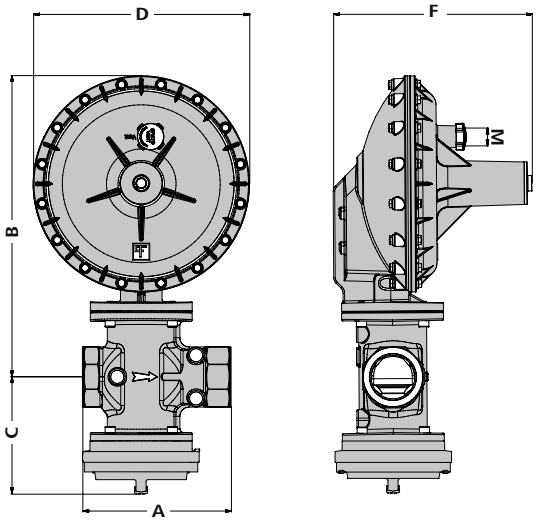
BASIC VERSION - OVERALL DIMENSIONS



Overall dimensions in inches		
	PF 80	**PF 120**
A	6.6”	7.6”
B	10.2”	15.4”
C	2.6”	3.9”
D	17.3”	11.0”
F	7.0”	10.1”
M	1.4”	1/2”
Inlet	1”1/4 or 1”1/2 NPT	2” NPT
Outlet	1”1/4 or 1”1/2 NPT	2” NPT

Tab.11

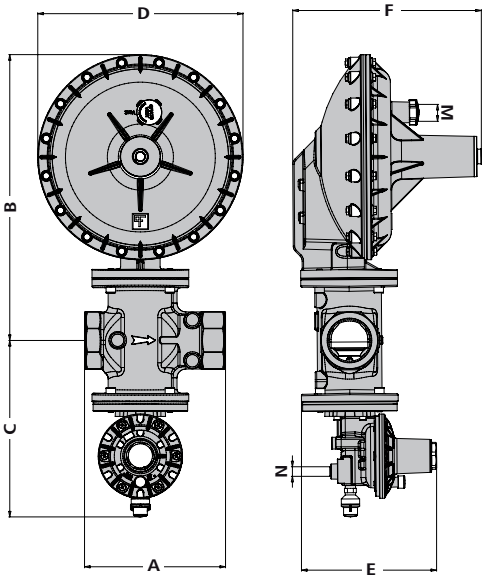
IMD - OVERALL DIMENSIONS



Overall dimensions in inches		
	PF 80 IMD	**PF 120 IMD**
A	6.6”	7.6”
B	10.2”	15.4”
C	4.25”	6.10”
D	7.3”	11.0”
F	7.0”	10.1”
M	1.4”	1/2”
Inlet	1”1/4 or 1”1/2 NPT	2” NPT
Outlet	1”1/4 or 1”1/2 NPT	2” NPT

Tab.12

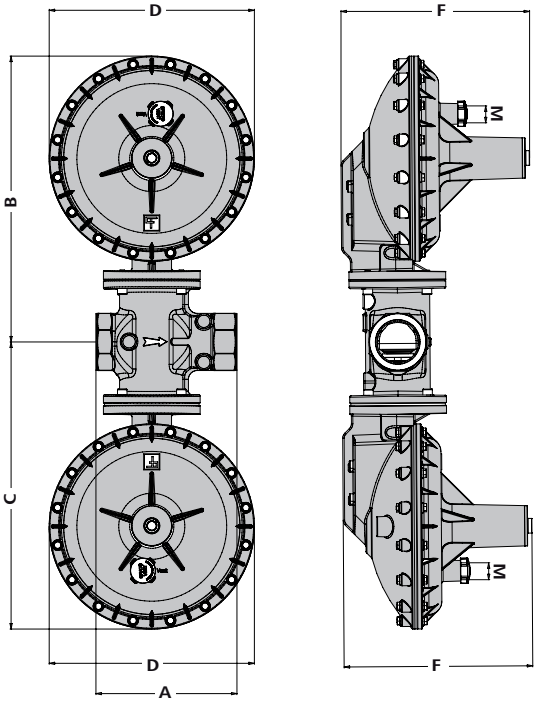
SVV OVERALL DIMENSIONS



Overall dimensions in inches		
	PF 80 SSV	PF 120 SSV
A	6.6”	7-6”
B	10.2”	15.4”
C	8.2”	9.5”
D	7.3”	11.0”
E	6.5”	7.3”
F	7.0”	10.1”
M	1.4”	1/2”
N	1.4”	1/4”
Inlet	1”1/4 or 1”1/2 NPT	2” NPT
Outlet	1”1/4 or 1”1/2 NPT	2” NPT

Tab.13

IFM OVERALL DIMENSIONS



Overall dimensions in inches		
	PF 80 IFM	PF 120 IFM
A	6.6”	7.6”
B	10.2”	15.4”
C	10.3”	3.9”
D	7.3”	11.0”
F	7.0”	10.1”
M	1.4”	1/2”
Inlet	1”1/4 or 1”1/2 NPT	2” NPT
Outlet	1”1/4 or 1”1/2 NPT	2” NPT

Tab.14

www.fiorentini.com

The data are not binding. We reserve the right to make changes without prior notice.

CT-s 647-US July 17