60 Series Pilot Regulator

Technical Bulletin

60Series™ Pilot Regulator

The 60Series Pilot Regulator provides an accurate control pressure, improving the performance of all types of flexible-element main valves. The 60Series provides fast, accurate and stable pressure regulation. It is recommended for installations where there are large variations in inlet temperatures and pressures.

All 60Series Pilots use premium materials throughout.

- Pressure-vessel parts are forged brass conforming to ASTM B283 standards for maximum strength.

- Both low (60L) and high-pressure (60H) 60Series pilot diaphragms are molded Buna N with nylon-fabric reinforcement for high strength.

- Each 60Series diaphragm has a molded convolution in the working area to provide accurate pressure control and a long diaphragm life.

- 60Series internal regulating stems are stainless steel. A premium Buna N SoftSeat bonded to the stem assures a positive lockup and a long service life.

Models

The 60Series Pilot is available in four (4) models:

- **(60L–PR)**   Low Pressure (3-325 PSIG) – Pressure reducing

- **(60L–*RV*)**   Low Pressure (3-325 PSIG) – *Relief valve*

- **(60H–PR)**   High Pressure (250-900 PSIG) – Pressure reducing

- **(60H–*RV*)**   High Pressure (250-900 PSIG) – *Relief valve*

How To Order

Please contact your AMCO representative with:

- Model Number:
  (60L–PR), (60L–*RV*), (60H–PR), or (60H–*RV*)

- Position of Pilot Vent
  (Standard is vent over sense line.)

- Required Outlet Pressure (or Spring Range)

- Buna N or Viton diaphragm/seat disc

- For (optional) AFV and RFV Control Loop(s):
  - Specify Axial or Radial-Flow Valve
  - Composite Block, Inspirator Block or Bare Block
  - Specify Single-Stage Pressure Reduction, Worker, or Monitor

60L – Low Pressure
Pressure Reducing (PR)

Dimensions and Weights

Model	Dimensions			Vent Size	Net Weight
	A	B	D		
60L	3-1/16"	2-1/8"	8-1/8"	1/4 NPT	5.5 lb
60H	3-1/16"	2-1/8"	8-1/8"	1/4 NPT	5.7 lb

All connections are 1/4 NPT

60Series™ Pilot Regulator

Pressure Reduction – PR *(refer to diagram 60L-PR)*

- Spring force from the main spring (1) is acting through the stem (2) and is holding the 60Series Pilot fully open.

- Note that the main spring force cannot damage the Soft SeatDisc (3), which is free to move downward against its retaining spring (6), preventing excess force.

- As outlet pressure under the diaphragm (4) builds, outlet pressure opposes the spring force that is holding the 60Series Pilot Regulator open. When there is a force balance, the Soft SeatDisc (3) moves upward to contact the orifice (5), shutting off flow and controlling pressure.

Relief Valve – RV *(refer to diagram 60L-RV)*

- Spring force from the main spring (1) is acting through the stem (2) and is holding the 60Series Pilot fully closed.

- Again, note that the main spring force cannot damage the Soft SeatDisc (3), which is free to move downward against its retaining spring (6), preventing excess force.

- As outlet pressure under the diaphragm (4) builds, outlet pressure opposes the spring force that is holding the 60Series Pilot Regulator closed. When there is a force balance, the Soft SeatDisc (3) moves upward away from the orifice (5), and flow commences. (back-pressure relief)

**60Series™ Pilot Regulator
Model 60L (PR) Pressure Reduction**

Pressure Ratings

1480 PSIG = Maximum allowable operating pressure (MAOP)

2220 PSIG = Shell-strength test pressure
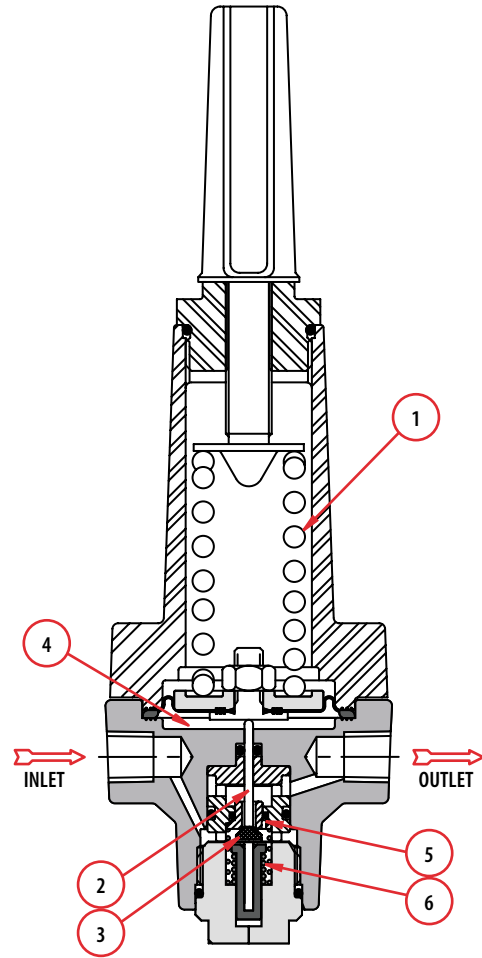(all units production test)

3 PSIG = Minimum outlet pressure (60L models)

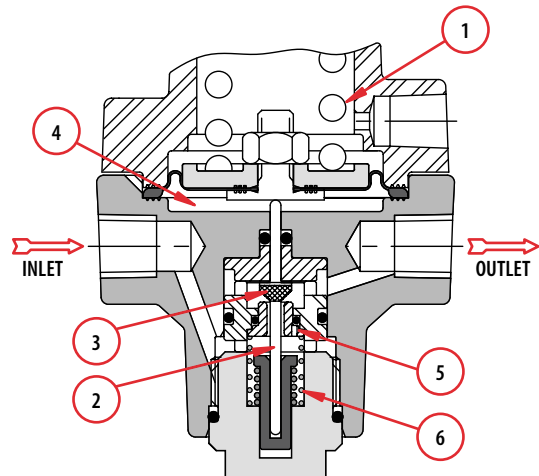**325 PSIG** = Maximum outlet pressure (60L models)

250 PSIG = Minimum outlet pressure (60H models)

900 PSIG = Maximum outlet pressure (60H models)

1350 PSIG = Maximum outlet pressure
(emergency without damage)

**60Series™ Pilot Regulator
Model 60L (RV) Relief Valve**

60Series™ Pilot Regulator

Capacity in SCFH – 0.6 Specific Gravity Gas

CV = 13.4
FG = 1.29
Standard orifice size = .150"/.094"

Inlet Pressure PSIG	Outlet Pressure PSIG													
	5	10	25	50	60	100	200	300	40	500	600	700	800	900
10	214													
25	343	343												
50	559	559	559											
60	646	646	646	440										
80	819	819	819	762	668									
100	992	992	992	992	945									
200	1856	1856	1856	1856	1856	1856								
300	2720	2720	2720	2720	2720	2720	2533							
400	3585	3585	3585	3585	3585	3585	3585	3067						
500	4449	4449	4449	4449	4449	4449	4449	4337	3520					
600	5313	6313	6313	6313	6313	6313	6313	6313	4978	3922				
700	6177	6177	6177	6177	6177	6177	6177	6177	6097	5546	4286			
800	7042	7042	7042	7042	7042	7042	7042	7042	7042	6793	6061	4621		
900	7906	1906	7906	7906	7906	7906	7906	7906	7906	7844	7423	6536	4934	
1000	8770	8770	8770	8770	8770	8770	8770	8770	8770	8770	8572	8004	6978	5228
1200	10499	10499	10499	10499	10499	10499	10499	10499	10499	10499	10499	10334	9868	9055
1480	12919	12919	12919	12919	12919	12919	12919	12919	12919	12919	12919	12919	12866	12591

☐ Sub-Critical Flow

▨ Critical Flow

Capacity Formulas

- **Sub-Critical Flow Formula**
  Use when (P2+14.73) > .53* (P1+14.73)

$$Q = C*\sqrt{(P_2+14.73)*h} \quad *F_G$$

- **Critical Flow Formula**

$$Q = 0.5C* \ (P_1+14.73) \quad *F_G$$

Q = SCFH (cubic feet per hour @ 14.73PSIA and 60°F)

P1 = Inlet Pressure (PSIG)

P2 = Outlet Pressure (PSIG)

h = Differential pressure (P1-P2)

C = Orifice constant (13.4 for all 60Series Pilots)

Fg = Specific gravity factor $\sqrt{\dfrac{1}{S.G.}}$

Examples

- **60Series Pilot operating on .6 S.G. natural gas**

  Inlet pressure (P1) = 80 PSIG
  Outlet Pressure (P2) = 60 PSIG
  Find: full capacity (Q) in SCFH

  Test for sub-critical flow:
  (P2+14.73) > .53* (P1+14.73)
  (60+14.73) > .53* (80+14.73)
  (74.73 > 50.2) ⟶ TRUE
  Therefore: Flow is sub critical

  Use sub-critical flow formula:
  $Q = C*\sqrt{(P_2+14.73)*h} \quad *F_G$
  $Q = 13.4*\sqrt{(60+14.73)*20} \quad *1.29$

  Q = 668 SCFH ← ANSWER

- **60Series Pilot operating on .6 S.G. natural gas**

  Inlet pressure (P1) = 300 PSIG
  Outlet Pressure (P2) = 60 PSIG
  Find: full capacity (Q) in SCFH

  Test for sub-critical flow:
  (P2+14.73) > .53* (P1+14.73)
  (60+14.73) > .53* (300+14.73)
  (74.73 > 166.8) ⟶ FALSE
  Therefore: Flow is critical

  Use critical-flow formula:
  $Q = 0.5 C* (P_2+14.73) \quad *Fg$
  $Q = 6.7* \ (300+14.73) \quad *1.29$

  Q = 2720 SCFH ← ANSWER

# 60Series™ Pilot Regulator with optional Jordan® Electronic Controller

Available OEM with Jordan® Electronic Controllers

• Factory assembled and tested to your specifications

• Integral top mount retains pilot serviceability

• Allows remote pressure adjustment from gas control

How To Order

Please contact your AMCO representative with 60Series Pilot ordering information and:

• Jordan Model Number:
  (SM1020 recommended)

• Gearbox Option (Required)

• Mounting (60Series Pilot/Full Assembly and Test)

• Voltage Input 120/240 VAC – or – 12/36 VDC

• Signal Options
  • None
  • 3 wire, 120/240 VAC incremental control
  • 2 wire, DC incremental control

Jordan Controls SM-1020 Series Actuator

INLET   OUTLET
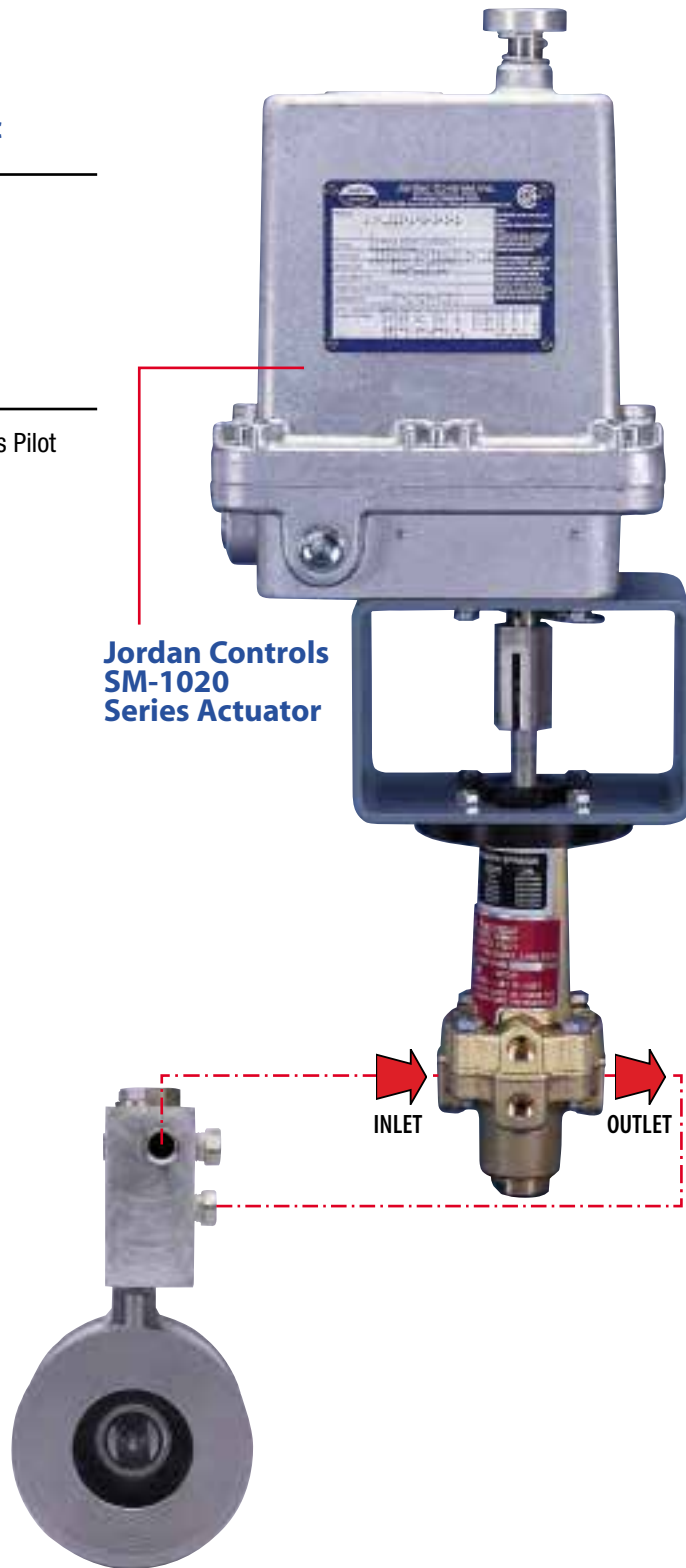
CONTROLS SUPPLY CHAIN

VALVES ACTUATORS INSTRUMENTATIONS