

### Pressure Control with PA Air-Loaded Pilot

Pilot-Operated REGULATORS

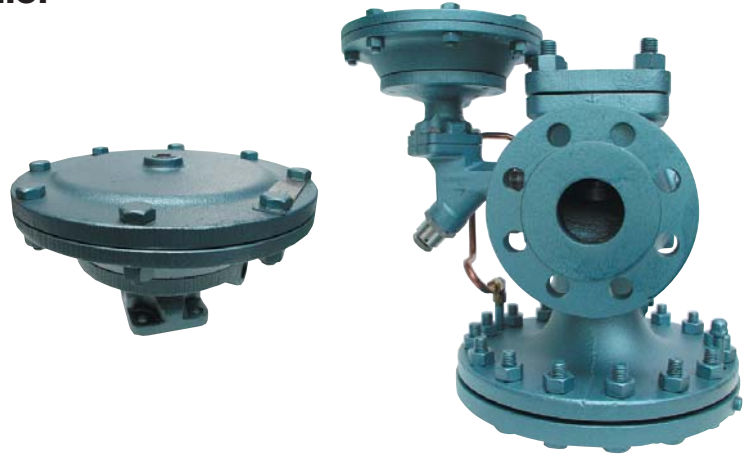
Pressure Pilot (Air)	<b>PA</b>
Pilot Body Material	<b>Ductile Iron</b>
Max Inlet Pressure	<b>300 PSIG</b>
Reduced Outlet Pressure Range	<b>3-200 PSIG</b>
Inlet Pressure Range (when used with <b>HD</b> Standard main valve)	<b>15-300 PSIG</b>
Inlet Pressure Range (when used with <b>HD-LP</b> Low-Pressure main valve)	<b>5-20 PSIG</b>

Minimum Differential Pressure:

**10 PSI** (Standard Main Valve)

**3 PSI** (Low Pressure Main Valve)

Note: Temperature Range: 0-350°F when used with PTL & PTR temperature controllers



#### Typical Applications

The **PA Air-Loaded Pressure Pilot** is used with the **HD** Regulator to control steam pressure on steam mains and process equipment. The principal advantage the **PA-Air Pilot** has over standard spring-loaded pilots is that pressure adjustments to the regulator can be made from a remote location. A regulator that is located in a difficult to reach or inaccessible location can be adjusted by a remote control panel board. The **PA-Air Pilot** can also be used in conjunction with the **PTL** or **PTR** pneumatic temperature controllers for controlling temperature in process applications.

#### How it Works

When air pressure is applied to the upper chamber of the air pilot it exerts a downward force on the air pilot's diaphragm. This force controls the outlet pressure of the steam through the regulating valve. The control process is similar to a spring loaded pressure pilot except that the air pressure takes the place of the spring. There are three separate models of air pilots that make up the complete range depending on the steam pressure that needs to be controlled and the control air pressure available. See Pressure Adjusting Ranges chart.

#### Features

- Pressure adjustments to the regulator can be done from a remote location using an air signal
- Air-operated pilot ensures instant response and extremely accurate control
- Full port strainer and blowdown valve on pilot adapter for protection of pilot from dirt and scale
- Controls pressure settings within  $\pm 1$  PSIG

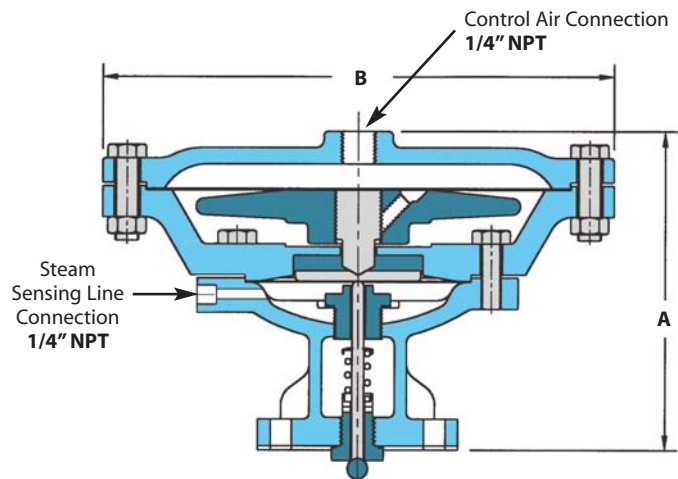
#### DIMENSIONS – inches

Model	A	B
<b>PA1</b>	5 <sup>1</sup> / <sub>4</sub>	5
<b>PA4</b>	5 <sup>1</sup> / <sub>4</sub>	7 <sup>7</sup> / <sub>8</sub>
<b>PA6</b>	5 <sup>1</sup> / <sub>4</sub>	9 <sup>1</sup> / <sub>2</sub>

MAXIMUM CONTROL AIR PRESSURE ON AIR PILOT IS 125 PSIG

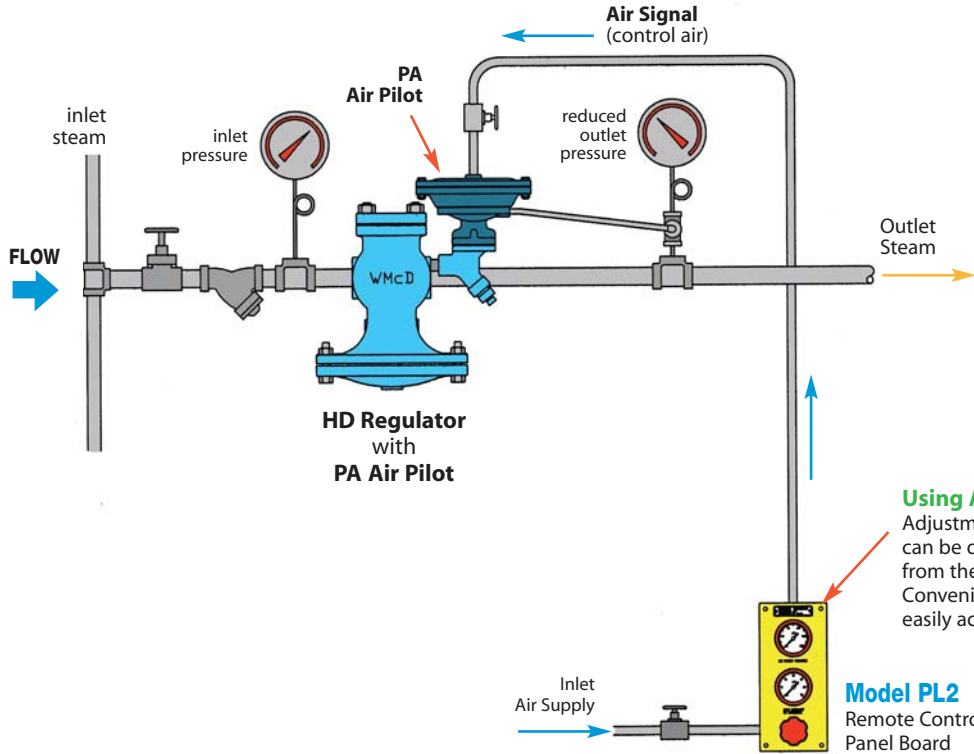
PRESSURE ADJUSTING RANGES		
Model	Pressure Ranges	Description
<b>PA1</b>	<b>3-125 PSIG</b>	<b>1:1</b> ratio of steam pressure to control air pressure
<b>PA4</b>	<b>3-200 PSIG</b>	<b>4:1</b> ratio of steam pressure to control air pressure
<b>PA6</b>	<b>20-200 PSIG</b>	<b>6:1</b> ratio of steam pressure to control air pressure

The larger Diaphragm area of the **PA4** & **PA6** Air Pilots allow the use of lower control air pressure to regulate higher pressure steam.



Pressure Control with PA Air-Loaded Pressure Pilot

Pressure Reducing Station Using HD Regulator with an Air Pilot



Pilot-Operated REGULATORS

**Using Air-loaded Pressure Pilot**  
Adjustment of outlet steam pressure can be done from a remote location from the valve by adjusting air pressure. Convenient if the regulator is not in an easily accessible area.

**Model PL2**  
Remote Control Panel Board

Description of Operation

The PA-Air Pilot is being used in conjunction with the PL2 Control Panel Board to regulate steam pressure. A small air regulator on the panel board can be adjusted to control the air pressure to the pilot. One gauge on the panel board measures air line pressure to the panel board and the other gauge shows the air pressure being sent to the pilot. Steam pressure at the outlet of the regulator is controlled by the air pressure signal to the pilot. Depending on the air pilot model chosen (PA1, PA4, PA6), there will be a 1:1, 4:1, or 6:1 ratio of outlet steam pressure to air pressure.

REMOTE CONTROL PANEL BOARDS

Three different options of remote control panel boards can be used along with the Air Pilots. Supply air is fed directly through the control panel board to the air pilot. You can choose one of the three options of control panel boards when using the air piloted regulators. Minimum of 5 PSIG air supply pressure is required.



PL1



PL2



PL3

PL1

The PL1 is made up of an air pressure regulator with adjustment knob and pressure gauge that measures the amount of air pressure going to the pilot (air signal). Steam pressure of the system is controlled by adjusting the air pressure regulator.

PL2

The PL2 is the same as the PL1 with the addition of an extra air pressure gauge for measuring the air supply pressure to the control panel board.

PL3

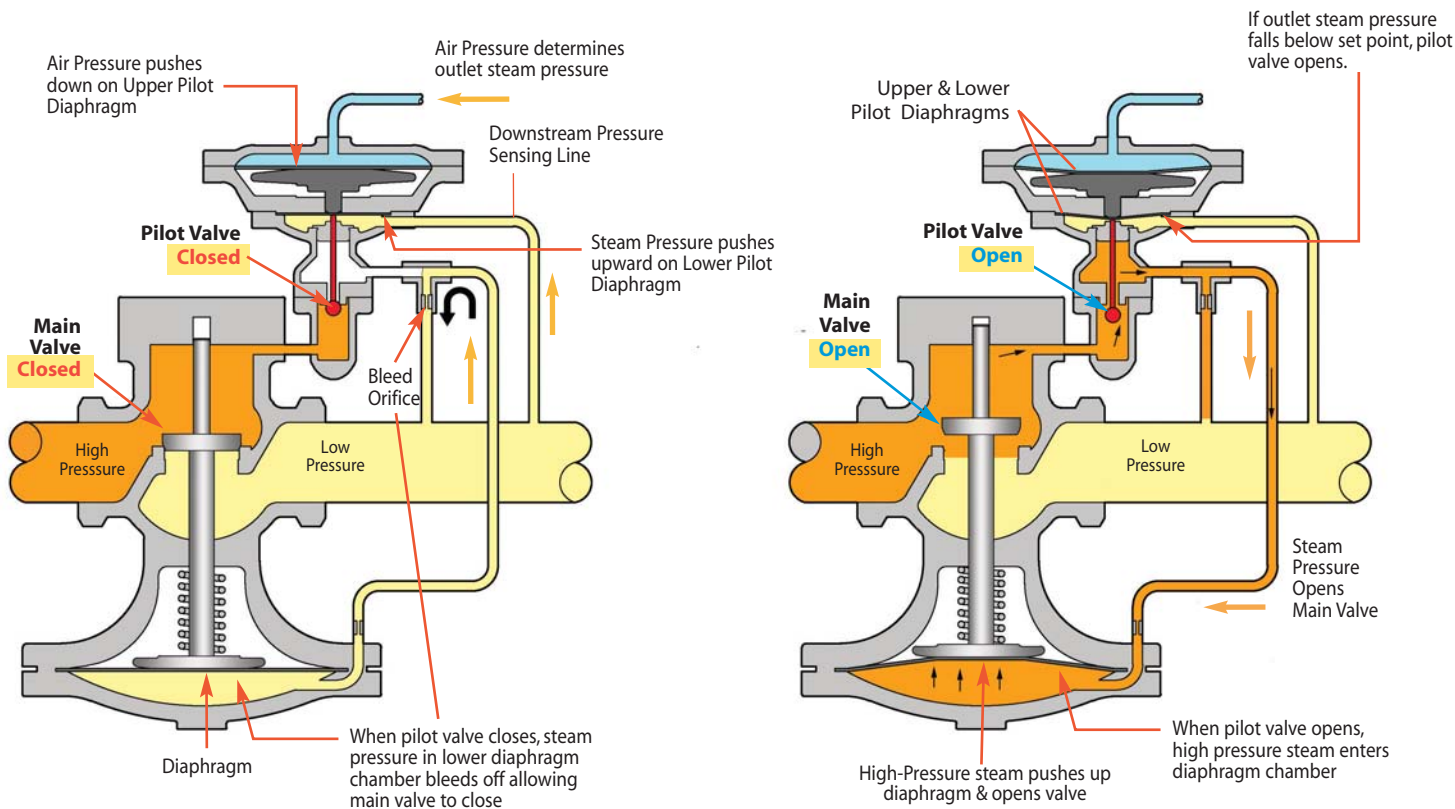
The PL3 is the same as the PL2 with the addition of a Steam Pressure Gauge for measuring steam pressure on the outlet side of the regulating valve.

### Pressure Control with PA Air-Loaded Pilot

#### How it Works

When air pressure is applied to the upper chamber of the air pilot, it exerts a downward force on the air pilot's diaphragm. The lower chamber of the air pilot is connected to the outlet side of the regulator using a sensing line. The purpose of the sensing line is to sense the pressure on the outlet side of the regulator and direct it under the lower pilot diaphragm to push it upwards. When the intended set pressure is reached, the pilot valve closes, which then closes off the flow path of steam to the underside of the diaphragm chamber in the regulator body. The regulator modulates open and closed maintaining the desired downstream pressure. To change downstream pressure, increase or decrease air pressure to pilot accordingly.

Pilot-Operated REGULATORS

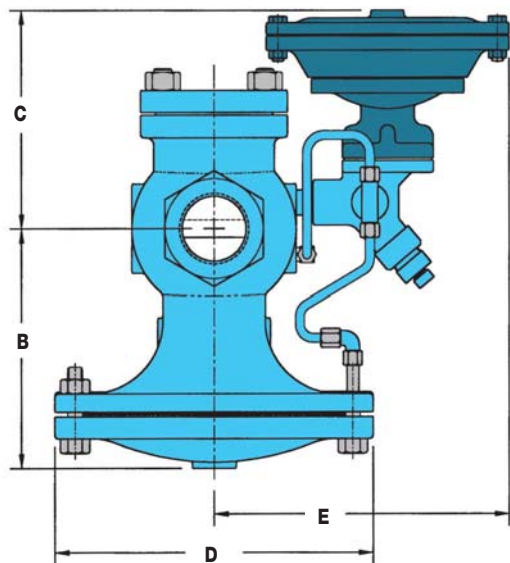


MAXIMUM CONTROL AIR PRESSURE ON AIR PILOT IS 125 PSIG

PRESSURE ADJUSTING RANGES		
Model	Pressure Ranges	Description
PA1	3-125 PSIG	1:1 ratio of steam pressure to control air pressure
PA4	3-200 PSIG	4:1 ratio of steam pressure to control air pressure
PA6	20-200 PSIG	6:1 ratio of steam pressure to control air pressure

The larger Diaphragm area of the **PA4 & PA6** Air Pilots allow the use of lower control air pressure to regulate higher pressure steam.

### Pressure Control with PA Air-Loaded Pilot



DIMENSIONS HD-Series – inches									
Size	Face-To-Face			B	C*	D	E**	Weight (lbs)	
	NPT	150#	300#					NPT	FLG
1/2"	4 <sup>3</sup> / <sub>8</sub>			5 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	6 <sup>1</sup> / <sub>2</sub>	7 <sup>3</sup> / <sub>4</sub>	18	
3/4"	4 <sup>3</sup> / <sub>8</sub>			5 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	6 <sup>1</sup> / <sub>2</sub>	7 <sup>3</sup> / <sub>4</sub>	18	
1"	5 <sup>3</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>2</sub>	6	6 <sup>1</sup> / <sub>4</sub>	7 <sup>1</sup> / <sub>2</sub>	7	7 <sup>3</sup> / <sub>4</sub>	23	35
1 1/4"	6 <sup>1</sup> / <sub>2</sub>			7 <sup>3</sup> / <sub>8</sub>	7 <sup>1</sup> / <sub>2</sub>	8 <sup>3</sup> / <sub>4</sub>	8 <sup>3</sup> / <sub>8</sub>	43	
1 1/2"	7 <sup>1</sup> / <sub>4</sub>	6 <sup>7</sup> / <sub>8</sub>	7 <sup>3</sup> / <sub>8</sub>	7 <sup>3</sup> / <sub>8</sub>	7 <sup>1</sup> / <sub>2</sub>	8 <sup>3</sup> / <sub>4</sub>	8 <sup>3</sup> / <sub>8</sub>	43	60
2"	7 <sup>1</sup> / <sub>2</sub>	8 <sup>1</sup> / <sub>2</sub>	9	8 <sup>1</sup> / <sub>4</sub>	7 <sup>1</sup> / <sub>2</sub>	10 <sup>7</sup> / <sub>8</sub>	8 <sup>3</sup> / <sub>4</sub>	65	85
2 1/2"		9 <sup>3</sup> / <sub>8</sub>	10	9	7 <sup>1</sup> / <sub>2</sub>	11 <sup>3</sup> / <sub>4</sub>	8 <sup>3</sup> / <sub>4</sub>		105
3"		10	10 <sup>3</sup> / <sub>4</sub>	8 <sup>7</sup> / <sub>8</sub>	7 <sup>1</sup> / <sub>2</sub>	13 <sup>1</sup> / <sub>4</sub>	9 <sup>1</sup> / <sub>2</sub>		145
4"		11 <sup>7</sup> / <sub>8</sub>	12 <sup>1</sup> / <sub>2</sub>	10 <sup>7</sup> / <sub>8</sub>	7 <sup>1</sup> / <sub>2</sub>	14 <sup>3</sup> / <sub>4</sub>	10 <sup>1</sup> / <sub>2</sub>		235
6"		15 <sup>1</sup> / <sub>8</sub>	16	14 <sup>1</sup> / <sub>8</sub>	8 <sup>1</sup> / <sub>4</sub>	19 <sup>3</sup> / <sub>4</sub>	11 <sup>3</sup> / <sub>4</sub>		470

\* Add 2<sup>1</sup>/<sub>2</sub>" to "C" dimension for PA4 or PA6 Air Pilots on 2" thru 4" valves.  
 \*\* Add 1<sup>1</sup>/<sub>2</sub>" to "E" dimension for PA4, and 2<sup>1</sup>/<sub>4</sub>" for PA6.

Pilot-Operated REGULATORS

MATERIALS for PA Pressure Pilot	
Pilot Body & Cover	Ductile Iron
Head & Seat Gasket	302 SS
Cover Screws	Steel, GR5
Head & Seat Assembly	Hardened SST (55 Rc)

MATERIALS for HD Main Valve	
Body	Ductile Iron
Cover	Ductile Iron
Gasket	Grafoil/Garlock
Cover Screws	Steel
Pilot Adapter	Ductile Iron/Cast Steel
Screen	Stainless Steel
Tubing	Copper
Valve Seat	Hardened SST (55 Rc)
Valve Disc	Hardened SST (55 Rc)
Diaphragm	Phosphor Bronze

### OPERATING PRESSURES

Inlet Pressure Range:  
**15-300 PSIG** (Standard Main Valve)  
**5-20 PSIG** (Low Pressure Main Valve)


Minimum Differential Pressure:  
**10 PSI** (Standard Main Valve)  
**3 PSI** (Low Pressure Main Valve)

### CONTROL AIR PRESSURE RANGE

A-Pilot Control Pressure:  
**3-125 PSIG** (depending on pilot selected and desired outlet pressure)

### HD Main Valve

with  
**PA-Pressure Pilot**  
 Air-Loaded



Model Code for Main Valve: **HD-17-F150**  
 (2" HD Series Valve with 150# Flanges)

Model Code for Pilot: **PA4**  
 (Air Pilot, 4:1 ratio of steam pressure to control air pressure)

### How to Size / Order

- PA - AIR PILOT**
- Specify:
- Air Pilot **PA1**, **PA4** or **PA6**
  - Remote Control Panel Board **PL1**, **PL2** or **PL3**
- REGULATOR BODY**
- Specify:
- HD** regulator body
  - Regulator size or capacity and pressure range of steam required
  - End connections (threaded, 150/300# flanged)