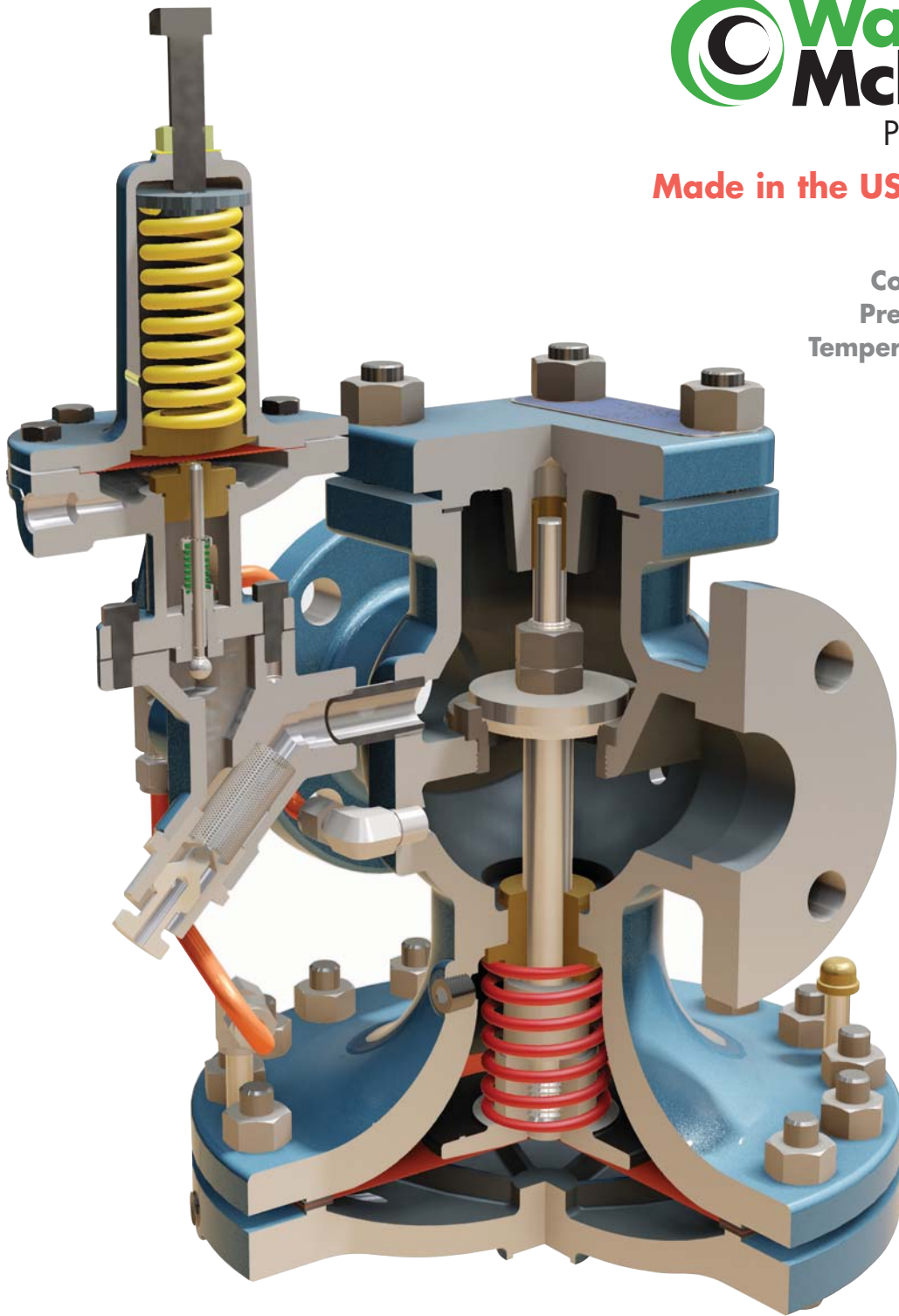




Product Catalog

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**Manufacturing High-Quality Steam & Fluid Specialty Products for Industry**

### HD Main Valve • Ductile Iron

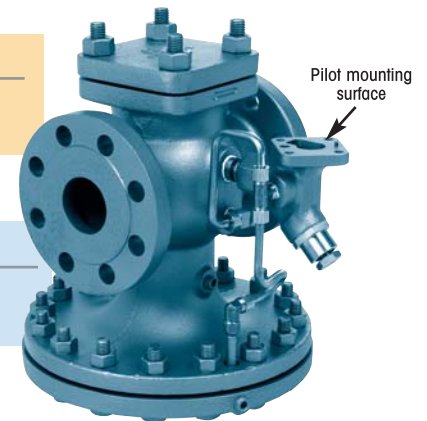
Main Valve	<b>HD-Series</b>
Sizes	<b>1/2" - 6"</b>
Connections	<b>NPT: 1/2" - 2"</b> <b>FLG: 1" - 6"</b>
Body Material	<b>Ductile Iron</b>
PMO Max. Operating Pressure	<b>300 PSIG</b>
Design Pressure/	NPT 450 PSIG @ 650° F
Temperature Ratings	150# FLG 150 PSIG @ 566° F
TMA/PMA	300# FLG 450 PSIG @ 650° F

#### STANDARD Main Valve Spring:

Inlet Pressure: **15-300 PSIG**  
Example Model Code: **HD-12-N**

#### LOW-PRESSURE Main Valve Spring:

Inlet Pressure: **5-20 PSIG**  
Example Model Code: **HD-12-N-LP**



Pilot-Operated REGULATORS

#### Model Code Configuration Chart

Models	Code	Size	Code	Connection Type	Options (Suffix)
HD Full Port	12	1/2"	N	NPT (1/2"-2")	SSD SS Diaphragm
HDR Reduced Port	13	3/4"	BSP	BSPT (1/2"-2")	SSXT SS External Tubing
	14	1"	F150	150# FLG (1" - 6")	LP Low Pressure Main Valve Spring with EPDM Diaphragm
	15	1 1/4"	F300	300# FLG (1" - 6")	
	16	1 1/2"			
	17	2"			
	18	2 1/2"			
	19	3"			
	20	4"			
	22	6"			

Note: For more than one Option, combine suffixes.  
Example: SSD-SSXT

Model Codes below are for HD Main Valve ONLY. Control Pilot must be ordered separately. When two or more pilots are used on the same valve, a pilot adapter must be ordered also. Use Part Number BADAPTER.

Size/Connection	STANDARD Inlet Pressure 15 - 300 PSI	LOW-PRESSURE Inlet Pressure 5 - 20 PSI	Weight lbs
1/2" NPT	HD-12-N	HD-12-N-LP	24
3/4" NPT	HD-13-N	HD-13-N-LP	24
1" NPT	HD-14-N	HD-14-N-LP	30
1" 150# FLG	HD-14-F150	HD-14-F150-LP	31
1" 300# FLG	HD-14-F300	HD-14-F300-LP	34
1 1/4" NPT	HD-15-N	HD-15-N-LP	50
1 1/2" NPT	HD-16-N	HD-16-N-LP	51
1 1/2" 150# FLG	HD-16-F150	HD-16-F150-LP	54
1 1/2" 300# FLG	HD-16-F300	HD-16-F300-LP	60
2" NPT	HD-17-N	HD-17-N-LP	72
2" 150# FLG	HD-17-F150	HD-17-F150-LP	80
2" 300# FLG	HD-17-F300	HD-17-F300-LP	82
2 1/2" 150# FLG	HD-18-F150	HD-18-F150-LP	105
2 1/2" 300# FLG	HD-18-F300	HD-18-F300-LP	109
3" 150# FLG	HD-19-F150	HD-19-F150-LP	150
3" 300# FLG	HD-19-F300	HD-19-F300-LP	158
4" 150# FLG	HD-20-F150	HD-20-F150-LP	230
4" 300# FLG	HD-20-F300	HD-20-F300-LP	250
6" 150# FLG	HD-22-F150	HD-22-F150-LP	450
6" 300# FLG	HD-22-F300	HD-22-F300-LP	472

#### Ordering Instructions:

NOTE: When two or more pilots are used on the same valve: An additional Pilot Adapter for Second Pilot is required: (Not required for Solenoid Pilot)

Use part number: **(BADAPTER)**

#### Options & Adders:

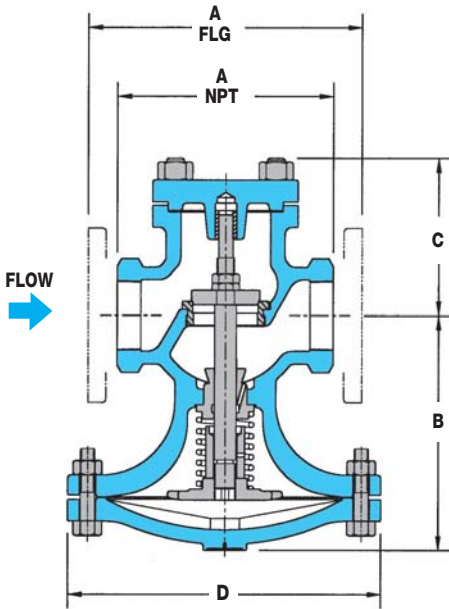
	Code
Low Pressure Main Valve:	<b>LP</b>
Reduced Port Valves:	<b>HDR</b>
Stainless Steel Diaphragm:	<b>SSD</b>
Stainless Steel External Tubing:	<b>SSXT</b>

Required for secondary Pilot: **BADAPTER**  
(Not required for Solenoid Pilot)

#### Example Model Codes for Main Valve:

- HD-15-N**  
(HD Series Valve with 1 1/4" Threaded, NPT connections)
- HDR-16-F150**  
(HD Series Valve, Reduced Port with 1 1/2" 150# Flanged connections)
- HD-20-F300-SSXT**  
(HD Series Valve with 4" 300# Flanged connections & SS External tubing)

HD Main Valve • Ductile Iron



HD-Series DIMENSIONS - inches

Size	(A) Face-To-Face			B	C	D	Weight (lbs)		
	NPT	150#	300#				NPT	150#	300#
1/2"	4 <sup>3</sup> / <sub>8</sub>			5 <sup>1</sup> / <sub>2</sub>	3 <sup>3</sup> / <sub>8</sub>	6 <sup>1</sup> / <sub>2</sub>	18		
3/4"	4 <sup>3</sup> / <sub>8</sub>			5 <sup>1</sup> / <sub>2</sub>	3 <sup>3</sup> / <sub>8</sub>	6 <sup>1</sup> / <sub>2</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>	3 <sup>1</sup> / <sub>2</sub>	7	23	40	45
1 <sup>1</sup> / <sub>4</sub> "	6 <sup>1</sup> / <sub>2</sub>			7 <sup>3</sup> / <sub>8</sub>	4 <sup>7</sup> / <sub>8</sub>	8 <sup>3</sup> / <sub>4</sub>	43		
1 <sup>1</sup> / <sub>2</sub> "	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>	4 <sup>7</sup> / <sub>8</sub>	8 <sup>3</sup> / <sub>4</sub>	43	55	60
2"	7 <sup>1</sup> / <sub>2</sub>	8 <sup>1</sup> / <sub>2</sub>	9	8 <sup>1</sup> / <sub>4</sub>	5 <sup>3</sup> / <sub>8</sub>	10 <sup>7</sup> / <sub>8</sub>	65	75	85
2 <sup>1</sup> / <sub>2</sub> "		9 <sup>3</sup> / <sub>8</sub>	10	9	5 <sup>3</sup> / <sub>4</sub>	11 <sup>3</sup> / <sub>4</sub>		100	105
3"		10	10 <sup>3</sup> / <sub>4</sub>	8 <sup>7</sup> / <sub>8</sub>	6 <sup>3</sup> / <sub>4</sub>	13 <sup>1</sup> / <sub>4</sub>		130	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>		215	235
6"		15 <sup>1</sup> / <sub>8</sub>	16	14 <sup>1</sup> / <sub>8</sub>	10	19 <sup>3</sup> / <sub>4</sub>		420	470

Option: Stainless diaphragms and external tubing - consult factory

Standard pilot mounting is on the right side of the regulator when looking into the outlet port (as shown). Pilot mounting on HD regulators are field-reversible.

OPERATING PRESSURES

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

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

\* Not required for Temperature Pilot applications

MATERIALS

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 (55Rc)
Valve Disc	Hardened SST (55Rc)
Diaphragm	Phosphor Bronze (standard) EPDM (Low Pressure Main Valve)

Pilot-Operated  
REGULATORS

Ordering Instructions: HD Series Regulator with a Pilot

Model Code for Main Valve: **HD-19-F150** HD Series Valve with 3" 150# Flanges  
 Model Code for Pilot: **PP-B** Pressure Pilot, 20-100 PSIG (Blue spring color)

HD Valve with Pressure Pilot



Model Code for Main Valve: **HD-17-F150**  
 (2" HD Series Valve with 150# Flanges)  
 Model Code for Pilot: **PP-B**  
 (Pressure Pilot with 20-100 PSIG Range)

HD Valve with Temperature Pilot



Model Code for Main Valve: **HD-17-F150**  
 (2" HD Series Valve with 150# Flanges)  
 Model Code for Pilot: **PTU-14-8**  
 (Temperature Pilot (100-160° F) with 8 Ft. Capillary)

HD Valve with Pressure & Temperature Pilots



\* If 2 Pilots are used on the same valve, a Secondary Pilot Adapter is required.

Model Code for Main Valve: **HD-17-F150**  
 (2" HD Series Valve with 150# Flanges)  
 Model Code for Pilot: **PP-B**  
 (Pressure Pilot with 20-100 PSIG Range)  
 Model Code for Pilot: **PTU-14-8**  
 (Temperature Pilot (100-160° F) with 8 Ft. Capillary)  
 Model Code for Secondary Pilot Adapter\*: **BADAPTER**

### Pressure Regulating with PP & PP5 Spring-loaded Pilot

Pressure Pilot	(Standard: 1.0 psig accuracy) (High-accuracy: 0.5 psig accuracy)	<b>PP</b> <b>PP5</b>
Pilot Body Material		<b>Cast Steel</b>
Max Inlet Pressure		<b>300 PSIG</b>
Reduced Outlet Pressure Range		<b>3-200 PSIG</b>
Inlet Pressure Range		<b>15-300 PSIG</b>
(with HD Standard main valve)		<b>5-20 PSIG</b>
(with HD Low-Pressure (LP) main valve)		
Minimum Differential Pressure		<b>10 PSI</b>
(with HD Standard main valve)		<b>3 PSI</b>
(with HD Low-Pressure (LP) main valve)		



Pilot-Operated REGULATORS

#### Typical Applications

The **PP & PP5 Pressure Pilots** are used with the HD Regulator to control steam pressure in steam mains or for process equipment. Pilot-operated regulators maintain constant downstream pressure even when the inlet pressure to the valve fluctuates or steam usage varies. The PP-Pressure Pilot is adequate for controlling pressure in most industrial applications. For increased accuracy use the PP5 Pilot.

**PP-Pressure Pilot (Standard) 1.0 PSIG accuracy**

**PP5-Pressure Pilot (Special Applications) 0.5 PSIG accuracy**

#### Features

- The **PP**-Pilot can maintain downstream pressure to  $\pm 1$  PSIG
- **PP5**-Pilot can maintain downstream pressure to  $\pm 0.5$  PSIG
- Choices of three overlapping pressure ranges
- Pilot is easily installed on pilot adapter using four bolts, no tubing connections are required
- Full port strainer and blowdown valve on pilot adapter for protection of pilot from dirt and scale
- Solid floating diaphragm is more failure resistant
- Watson McDaniel's pilots can be used with other manufacturers' regulators

#### Options

- Pressure pilot can be used with temperature pilot to eliminate the need for two separate regulators
- Solenoid pilot can be added for remote on/off control of regulator

#### Example: PP-B Pilot at 20-100 PSIG

Reduced Pressure Range PSI	Model Code	Spring Color	Weight lbs
<b>PP-Pressure Pilot (for Standard Industrial Applications) 1.0 PSIG accuracy</b>			
3-25	<b>PP-Y</b>	Yellow	10
20-100	<b>PP-B</b>	Blue	10
80-200	<b>PP-R</b>	Red	10
<b>PP5-Pressure Pilot (Special Applications) 0.5 PSIG accuracy</b>			
1-10	<b>PP5-Y*</b>	Yellow	25
10-25	<b>PP5-B*</b>	Blue	25

\* A Spacer (model # BAP-SPACE) is required when using PP5 Pressure Pilots on a 3" & 4" HD Main Valve.

#### HD Main Valve

with  
**PP-Pressure Pilot**



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

Model Code for Pilot: **PP-B**  
(Pressure Pilot with 20-100 PSIG Range)

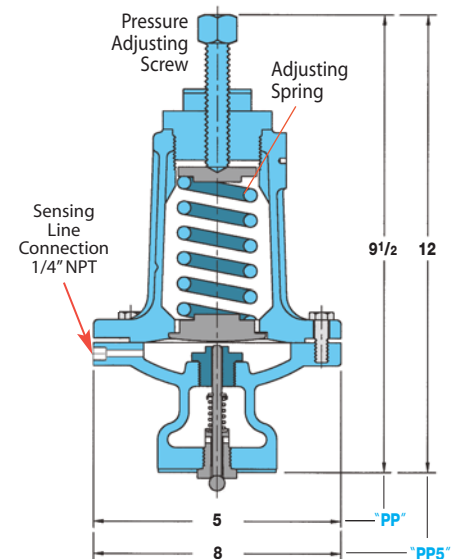
#### MATERIALS for PP Pressure Pilot

PP Pilot Body	<b>WCb 216 Cast Steel</b>
PP5 Pilot Body	<b>Cast Iron</b>
Head & Seat Gasket	302 SS
Diaphragm	Phosphor Bronze
Head & Seat Assembly	Hardened SST (55 Rc)

#### MATERIALS for HD Main Valve

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

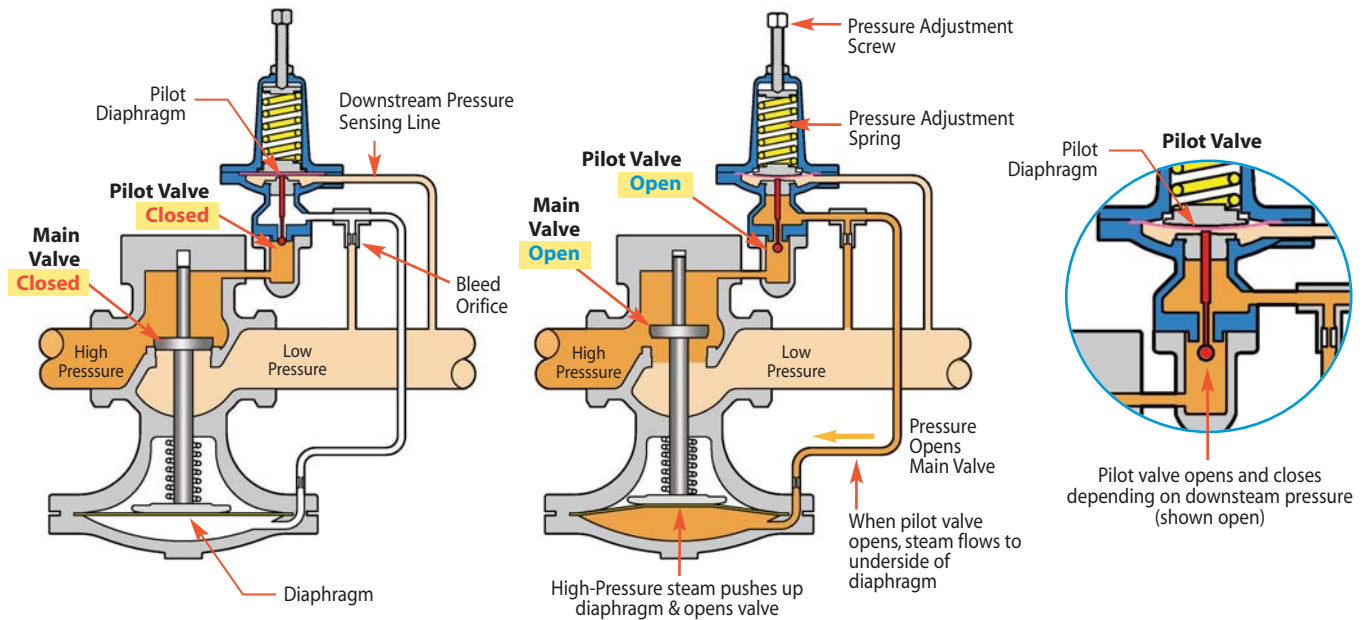
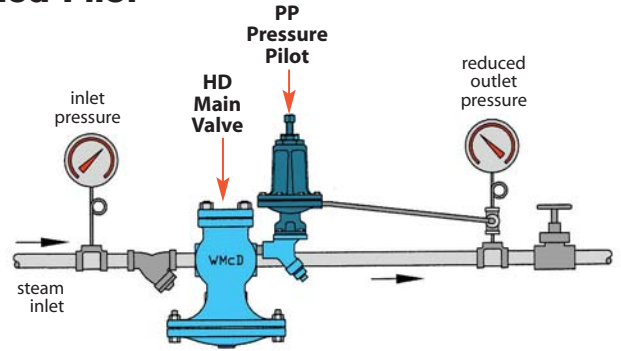
Units: inches



Pressure Regulating with PP & PP5 Spring-loaded Pilot

Reducing Pressure

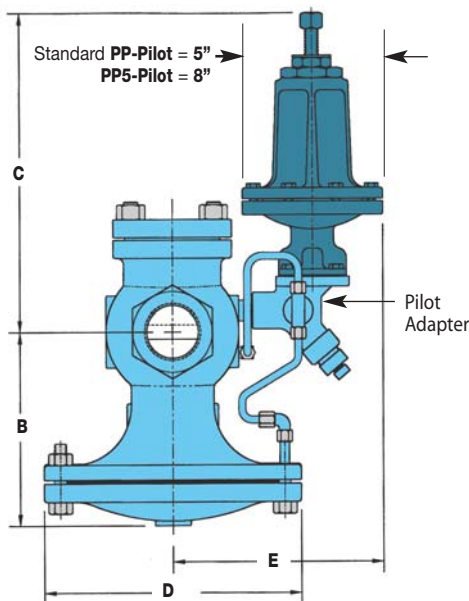
The PP-Pilot and the PP5-Pilot are both spring-adjusted pressure pilots. The PP-Pilot is used on typical general-purpose pressure reducing applications. The PP5-Pilot is used when higher accuracy is required and is capable of maintaining a control pressure window of less than 1 PSI.



Pilot-Operated REGULATORS

How it Works

The Pressure Pilot controls the operation of the HD Regulator. The sensing line connects the pressure pilot to the downstream side of the regulator. Pressure in the sensing line applies an upward force to the pilot diaphragm to compress the adjustment spring. When system pressure equals set point, the diaphragm moves upwards against the force of the adjusting spring, closing pilot valve. When the pilot valve is shut, steam cannot pass thru to the underside of the regulator diaphragm, closing the regulator. When the steam pressure falls below its set point, the pilot valve opens allowing steam to lift the main valve diaphragm which opens up the regulating valve.



DIMENSIONS HD-Series - inches									
Size	Face-To-Face							Weight (lbs)	
	NPT	150#	300#	B	C*	D	E**	NPT	FLG
1/2"	4 <sup>3</sup> / <sub>8</sub>	-	-	5 <sup>1</sup> / <sub>2</sub>	11 <sup>7</sup> / <sub>8</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>	11 <sup>7</sup> / <sub>8</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>	11 <sup>7</sup> / <sub>8</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>	11 <sup>7</sup> / <sub>8</sub>	8 <sup>3</sup> / <sub>4</sub>	8 <sup>1</sup> / <sub>4</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>	11 <sup>7</sup> / <sub>8</sub>	8 <sup>3</sup> / <sub>4</sub>	8 <sup>1</sup> / <sub>4</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>	11 <sup>7</sup> / <sub>8</sub>	10 <sup>7</sup> / <sub>8</sub>	8 <sup>1</sup> / <sub>2</sub>	65	85
2 1/2"	-	9 <sup>3</sup> / <sub>8</sub>	10	9	11 <sup>7</sup> / <sub>8</sub>	11 <sup>3</sup> / <sub>4</sub>	8 <sup>1</sup> / <sub>2</sub>	-	105
3"	-	10	10 <sup>3</sup> / <sub>4</sub>	8 <sup>7</sup> / <sub>8</sub>	11 <sup>7</sup> / <sub>8</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>	11 <sup>7</sup> / <sub>8</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>	12 <sup>1</sup> / <sub>2</sub>	19 <sup>3</sup> / <sub>4</sub>	11 <sup>3</sup> / <sub>4</sub>	-	470

For PP5 Pilot: \* For sizes 1/2" to 1 1/2" add 2 1/2" to "C" dimension;  
For sizes 2" to 6" add 5" to "C" dimension.  
\*\* Add 1 1/2" to "E" dimension for all sizes.

Full Port

Pilot-Operated  
REGULATORS

CAPACITIES – Steam (lbs/hr)											
											FULL PORT
Inlet Pressure (PSIG)	Outlet Pressure (PSIG)	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	6"
C <sub>v</sub> Factors		3.8	6.7	11	15	21	37	55	71	113	241
5	0	85	150	250	350	500	800	1200	1600	2600	5500
	2	80	140	230	310	440	770	1100	1500	2400	5100
7	0	115	200	325	450	600	1100	1650	2100	3600	7800
	2	105	180	300	400	575	1000	1500	2000	3100	6700
	3	90	160	275	375	525	900	1300	1800	2800	6000
10	0	150	260	425	575	850	1500	2200	2800	4600	9900
	2	140	240	400	550	800	1400	2100	2700	4300	9100
	5	100	175	300	400	600	1000	1600	2000	3200	6900
12	0	160	280	475	600	900	1600	2400	3100	4900	10300
	4	140	240	400	550	800	1400	2100	2700	4300	9100
	7	125	200	375	500	700	1200	1900	2400	3800	8200
15	0-3	190	325	550	750	1000	1800	2700	3500	5600	12000
	5	175	300	500	700	900	1700	2500	3200	5200	11100
	8	140	250	400	500	800	1300	2000	2600	4200	8900
20	0-5	210	375	625	850	1200	2100	3100	4000	6400	13700
	10	190	325	550	750	1000	1800	2700	3500	5600	12000
	12	170	300	500	675	950	1600	2500	3200	5100	10800
25	0-7	250	450	775	1050	1500	2600	3800	5000	7900	16900
	10	225	425	700	975	1300	2400	3600	4600	7300	15600
	15	200	350	600	800	1100	2000	3000	3900	6200	13200
30	0-12	275	500	800	1100	1500	2700	4100	5200	8300	17800
	15	250	450	750	1000	1400	2500	3800	4900	7800	16600
	20	225	375	650	850	1200	2100	3200	4100	6500	14000
40	0-18	350	600	1000	1350	1900	3300	5000	6400	10300	21900
	25	300	500	850	1150	1600	2800	4200	5400	8700	18500
	30	250	425	700	1000	1400	2500	3700	4700	7600	16100
50	0-20	400	700	1200	1650	2300	4100	6000	7800	12400	26500
	30	350	650	1100	1500	2000	3600	5400	6900	11000	23600
	40	275	500	800	1100	1500	2700	4100	5200	8300	17800
60	0-30	475	850	1350	1900	2600	4600	6900	8900	14200	30300
	35	425	775	1250	1700	2400	4300	6400	8200	13100	27900
	50	300	525	850	1200	1600	2900	4300	5600	8900	19000
75	0-35	575	1000	1650	2300	3200	5600	8300	10800	17200	36600
	50	475	825	1350	1900	2600	4600	6900	8900	14100	30100
	60	400	700	1150	1600	2200	3900	5800	7400	11800	25200
90	0-45	675	1200	1950	2700	3700	6600	9800	12700	20200	43100
	60	575	1000	1700	2300	3200	5700	8500	10900	17400	37100
	75	425	750	1200	1700	2300	4100	6100	7900	12600	27000
100	0-50	750	1300	2100	3000	4100	7300	10800	14000	22200	47500
	60	700	1200	2000	2700	3800	6700	10000	12900	20500	43800
	80	500	875	1400	1900	2700	4800	7100	9200	14700	31300
125	0-60	925	1650	2700	3700	5200	9100	14000	17500	28000	59500
	75	825	1475	2400	3300	4600	8200	12200	15700	25000	53500
	100	625	1100	1800	2500	3500	6200	9200	11900	19000	40400
150	0-75	1100	1900	3100	4300	6000	10600	15800	20400	32400	69100
	100	925	1600	2700	3600	5100	9000	13400	17400	27700	59000
	125	650	1150	1900	2600	3600	6400	9500	12300	19600	41900
175	0-85	1275	2250	3700	5000	7100	12500	18600	24000	38200	81400
	125	1000	1800	2900	4000	5600	9900	14700	18900	30100	64300
	150	750	1300	2100	2900	4100	7300	10800	14000	22200	47500
200	0-100	1450	2500	4200	5700	8000	14100	21000	27100	43100	92000
	125	1300	2300	3700	5100	7100	12600	18700	24100	38400	81900
	150	1075	1900	3100	4300	6000	10600	15700	20300	32300	68900
225	0-120	1575	2800	4600	6200	8700	15400	22900	29500	47000	100200
	150	1450	2500	4200	5700	8000	14100	21000	27200	43300	92300
	175	1350	2400	3900	5300	7400	13100	19500	25200	40100	85500
250	0-130	1750	3100	5100	6900	9700	17100	25500	32900	53400	111800
	150	1650	2900	4700	6500	9100	16000	23800	30800	49000	104600
	200	1200	2100	3500	4800	6700	11900	17600	22800	36200	77300
300	0-160	2045	3605	5920	8075	11310	19220	29610	38230	60840	129750
	175	1945	3425	5625	7670	10740	18925	28130	36320	57800	123270
	200	1780	3140	5155	7030	9840	17340	25780	33275	52960	112950
400	0-200			7980		1480	22000		48800	78000	
	250			7550		13800	23800		46200	73950	
	300			6700		12100	21200		41000	65200	
450	0-225			8970		16000	22000		55000	87600	
	300			8500		15000	26900		52100	83200	
	350			7540		13300	23900		46200	73900	

Note: For inlet pressures in green shaded area, use low pressure main valve and low pressure temperature pilot. For 400 & 450 PSIG inlet pressures, use HSP regulator only.