

REGULATORS

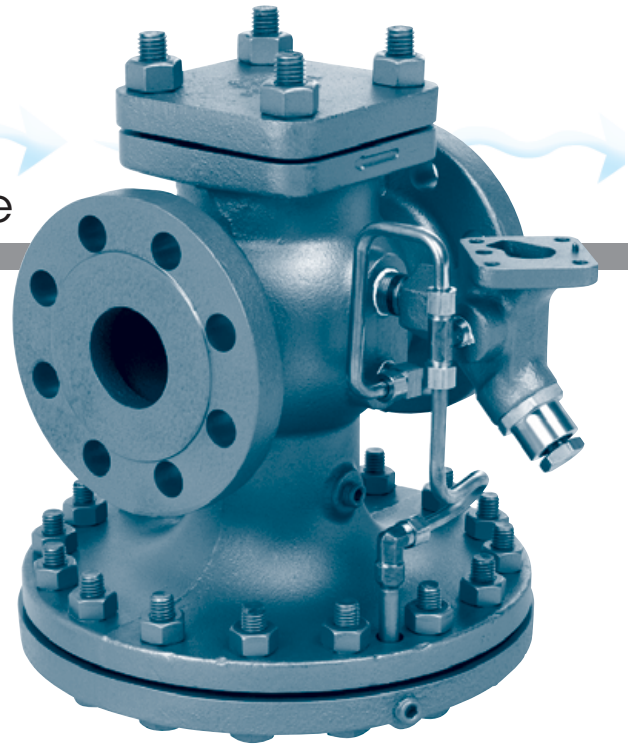
HD Series

Pilot-Operated Regulating Valve

Ductile Iron

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

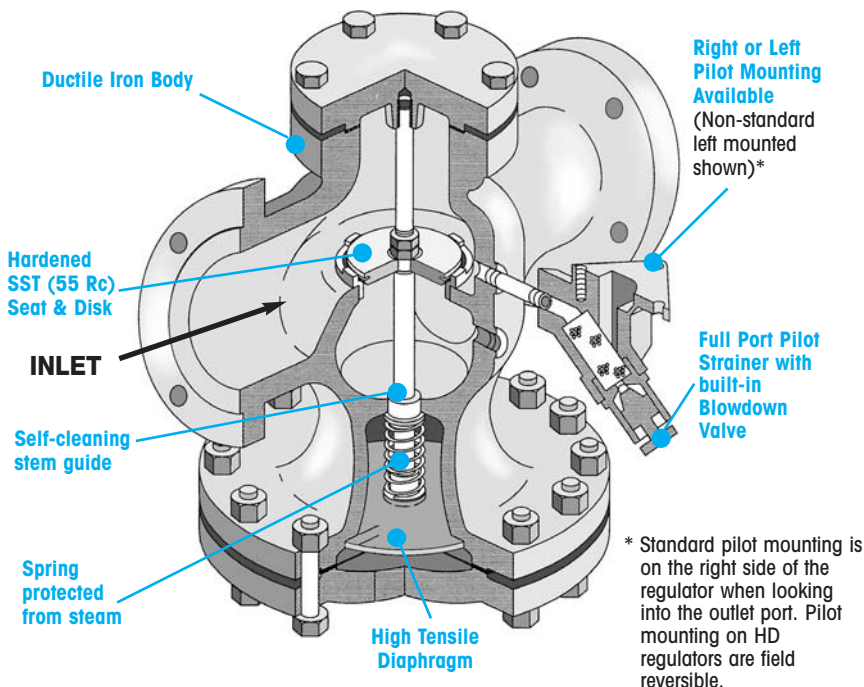
PILOT-OPERATED
REGULATING VALVES



TYPICAL APPLICATIONS

The Watson McDaniel **HD-Series** pilot operated regulators were designed for **extremely accurate control of temperature and pressure** in steam service applications. The **HD-Series** is made of **Ductile-iron** for extended pressure and temperature ratings. These regulators use several different control pilots, which can be attached to the valve to control pressure, temperature, or a combination of both. The different control pilots can be added or removed from the regulator body. This modular design adds to the versatility of this product. The most common options include the **P-Pilot** for pressure reducing, and the **T-Pilot** for temperature control.

- Ductile Iron body for higher pressures
- Full port strainer & blowdown valve on pilot adapter for ultimate protection from dirt & scale
- Hardened stainless steel trim for extended life
- Pre-mounted tubing & field reversible pilot adapter
- Optional reduced port trim
- Low differential pressure option
- Low inlet pressure option



FEATURES

- No external power source is required. This simplifies the valve and minimizes installation and maintenance costs.
- Pressure and temperature pilots can be used in combination eliminating the need for a separate pressure and temperature regulator
- Ductile iron for higher pressure ranges and increased safety. Ductile Iron is a better choice than cast iron for steam applications.
- Full port strainer and blowdown valve on pilot adapter for ultimate protection against dirt and scale
- Hardened stainless steel trim (55 Rc) for extended life even in the most demanding applications
- The innovative design allows the pilot to be mounted on either side of the regulator and is easily field reversible
- Comes fully assembled with tubing and pilot adapter. The control pilot requires only four bolts to complete the installation.

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TYPICAL PILOTS



**PRESSURE
Pilot**



**AIR
Pilot**



**TEMPERATURE
Pilot**



**SOLENOID
Pilot**

TYPICAL APPLICATIONS

- Pressure Regulating
- Temperature Regulating
- Pressure-Temperature Control
- Back Pressure Control
- Differential Pressure Control

CONTROL PILOTS

Pilot Mounting

Standard pilot mounting is on the right side of the regulator when looking into the outlet port (see diagrams on next page which are all right mounted). For opposite mounting, please specify when ordering. Pilot mounting on HD regulators are field reversible.

Pressure

When controlling pressure there are several options you can use for a pilot. The **P**-Pilot and the **P5**-Pilot are both **spring adjusted** pressure pilots. The **P**-Pilot is used on typical general-purpose pressure reducing applications. The **P5**-Pilot is used when higher accuracy is required and is capable of maintaining a control pressure window of less than 1 PSI. The **A**-Pilot is air controlled and generally used when adjustment of the regulator and pressure reducing station is done remotely.

Temperature

The **T**-Pilot is used to control temperature. The **T**-Pilot is filled with a temperature sensitive liquid, which expands when heated. The expansion of this liquid actuates a bellows that controls the temperature-regulating valve. The **T**-Pilot is equipped with an overheat bellows that protects the pilot in case of an over temperature condition. The **T**-Pilot controls temperature through a range of **60-260°F**. Spec: ANSI/FCI 70-2 Class IV shut-off.

On-Off

On-off control of the regulator is possible by using the **S**-Solenoid Pilot. The **S**-Pilot allows the regulator to be shut off or turned on **electrically**. Normally the regulator is equipped with either a **P**-Pressure Pilot or **T**-Temperature Pilot in addition to the **S**-Solenoid Pilot.

Pressure-Temperature

The **PT**-Pilot combination is used when it is desirable to control both the **pressure** and **temperature** of a system with only one regulating valve. The unique features of this modular valve allow this to be accomplished quite easily. When the **PT**-Pilot combination is used, the downstream pressure is limited to a maximum setting by the pressure pilot, while the temperature pilot maintains the correct temperature.

Back Pressure

When controlling the back pressure in a steam system, the **BP**-Pilot is used in conjunction with the **HD-Series** Regulator. This controls the pressure on the upstream side of the regulator.

Differential Pressure

The **DP**-Pilot is used when trying to balance two different media sources that are being blended.

COMBINATION PILOTS

One of the advantages of the **HD-Series** regulating valve is that it can be used with many different variations of control pilots. Up to three pilots can be used simultaneously to control the operation of these valves. The most common is the "PT" Pressure-Temperature combination pilots. In addition to these pilots being used together the **S**-Solenoid Pilot can be used for turning the system on and off. (See next page for combination examples.)

REGULATORS

HD Series

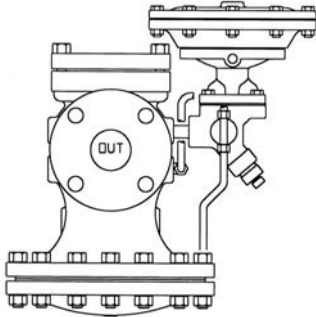
Pilot-Operated Regulating Valve

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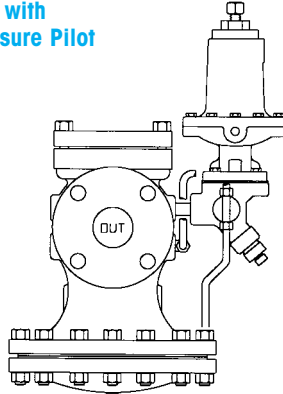
TYPICAL REGULATOR & PILOT COMBINATIONS

PILOT-OPERATED
REGULATING VALVES

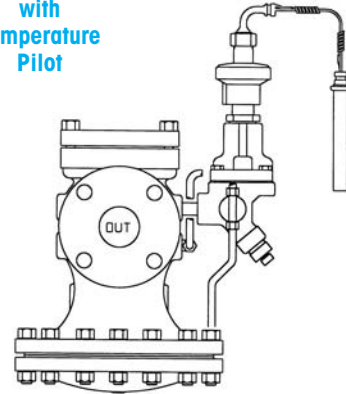
HDA
Regulator
with
Air Pilot



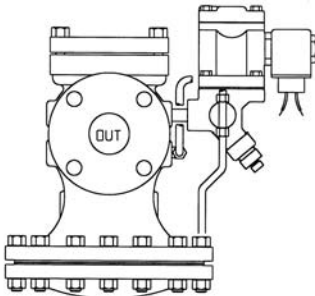
HDP
Regulator
with
Pressure Pilot



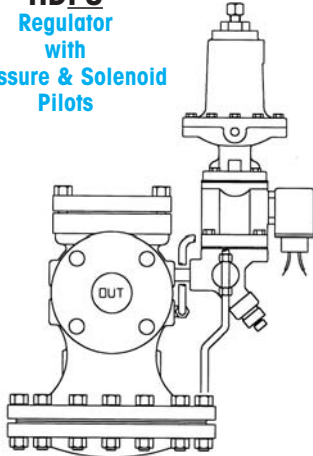
HDT
Regulator
with
Temperature
Pilot



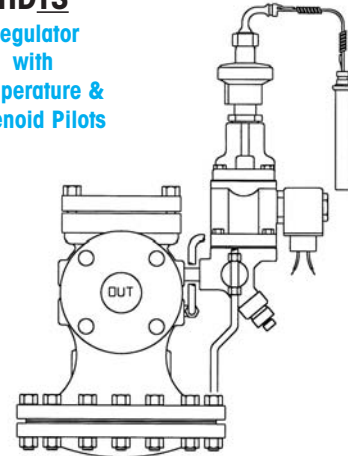
HDS
Regulator
with
Solenoid Pilot



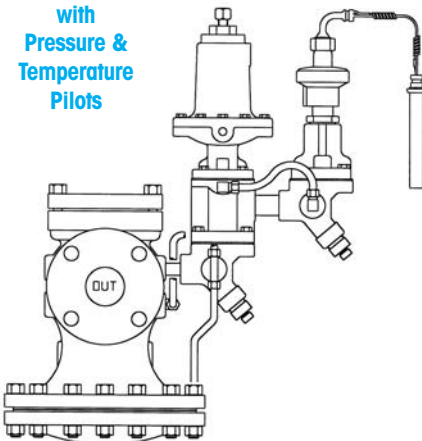
HDPS
Regulator
with
Pressure & Solenoid
Pilots



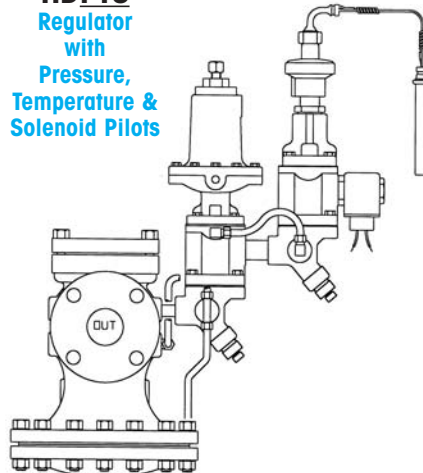
HDTS
Regulator
with
Temperature &
Solenoid Pilots



HDPT
Regulator
with
Pressure &
Temperature
Pilots



HDPTS
Regulator
with
Pressure,
Temperature &
Solenoid Pilots



OTHER PILOT CONFIGURATIONS USED WITH HD REGULATOR

- Air / Solenoid
- Air / Pneumatic Temperature Controller
- Air / Solenoid / Pneumatic Temperature Controller
- Back Pressure
- Back Pressure / Solenoid
- Differential Pressure

*Watson McDaniel's Pilots will fit other
Manufacturers' Regulators.*

HD Series

Pilot-Operated Regulating Valves

HD-Series DIMENSIONS – inches / pounds

Size	(A) Face-To-Face			B	C	D	Weight (lbs)		
	NPT	150#	300#				NPT	150#	300#
1/2"	4 ³ / ₈			5 ¹ / ₂	3 ³ / ₈	6 ¹ / ₂	18		
3/4"	4 ³ / ₈			5 ¹ / ₂	3 ³ / ₈	6 ¹ / ₂	18		
1"	5 ³ / ₈	5 ¹ / ₂	6	6 ¹ / ₄	3 ¹ / ₂	7	23	40	45
1 ¹ / ₄ "	6 ¹ / ₂			7 ³ / ₈	4 ⁷ / ₈	8 ³ / ₄	43		
1 ¹ / ₂ "	7 ¹ / ₄	6 ⁷ / ₈	7 ³ / ₈	7 ³ / ₈	4 ⁷ / ₈	8 ³ / ₄	43	55	60
2"	7 ¹ / ₂	8 ¹ / ₂	9	8 ¹ / ₄	5 ³ / ₈	10 ⁷ / ₈	65	75	85
2 ¹ / ₂ "		9 ³ / ₈	10	9	5 ³ / ₄	11 ³ / ₄		100	105
3"		10	10 ³ / ₄	8 ⁷ / ₈	6 ³ / ₄	13 ¹ / ₄		130	145
4"		11 ⁷ / ₈	12 ¹ / ₂	10 ⁷ / ₈	7 ¹ / ₂	14 ³ / ₄		215	235
6"		15 ¹ / ₈	16	14 ¹ / ₈	10	19 ³ / ₄		420	470

Option: Stainless diaphragms and external tubing - consult factory

MATERIALS

Body	Ductile Iron
Cover	Ductile Iron
Gasket	Grafoil
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

MINIMUM OPERATING PRESSURES

Minimum Inlet Pressure (for Valve):
15 PSIG (Standard Main Valve)
5 PSIG (Low Pressure Main Valve)

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

* Not required for Temperature Pilot applications

PILOT-OPERATED
REGULATING VALVES

HOW TO ORDER

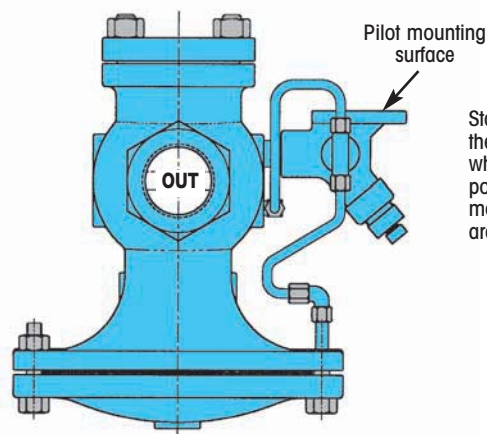
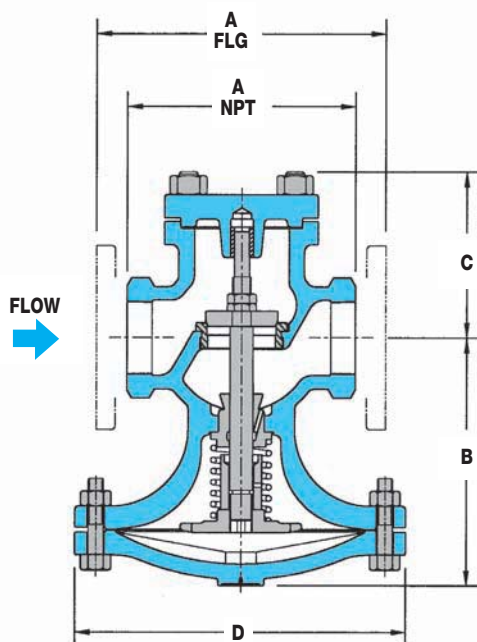
REGULATOR BODY

Specify: • **HD** regulator body
 • Regulator size or capacity of steam required
 • End connections
 (threaded, 150/300# flanged)

PILOT REQUIRED TO OPERATE THIS VALVE

Note: See "How to Order" in specific Pilot Section

- **T** Temperature Pilot
- **P** Pressure Pilot
- **A** Air Pilot
- **S** Solenoid Pilot
- **BP** Back Pressure Pilot
- **PD** Differential Pressure



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