PILOT CONTROL REGULATOR (PCR)
FOR COMBINATION-FIRED BURNER SYSTEMS

Figure 1. Pilot Control Regulator (PCR)

WARNING

These instructions are intended for use only by experienced, qualified combustion start-up personnel.

WARNING

Adjustment of this equipment and its components can result in the incomplete combustion of fuel sources resulting in fire, explosion, severe personal injury, or even death

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These instructions are intended to serve as guidelines covering the installation, operation, and maintenance of Hauck equipment. While every attempt has been made to ensure completeness, unforeseen or unspecified applications, details, and variations may preclude covering every possible contingency. **WARNING: TO PREVENT THE POSSIBILITY OF SERIOUS BODILY INJURY, DO NOT USE OR OPERATE ANY EQUIPMENT OR COMPONENT WITH ANY PARTS REMOVED OR ANY PARTS NOT APPROVED BY THE MANUFACTURER.** Should further information be required or desired or should particular problems arise which are not covered sufficiently for the purchaser's purpose, contact Hauck Mfg. Co.

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Fax: 717-273-9882

A. GENERAL INFORMATION

The Hauck PCR Pilot Control Regulator provides combustion system ratio control in preheated air applications that have changing mass flows due to density changes. The PCR is sensitive, accurate and operates with temperatures to 150°F. The regulator holds a constant air/fuel ratio from cold startup through preheated air operation. The components are on the cold side of the system, reducing cost and maintenance.

An ambient combustion air orifice measures mass flow and the differential pressure is then applied to the top diaphragm of the regulator. The bottom diaphragm automatically proportions the fuel delivery pressure in direct relation to the top diaphragm differential pressure. The optional air/fuel ratio is maintained despite changes in air density or backpressure downstream of the measuring orifice, which can occur in a recuperated system. The top diaphragm is 2.5 times larger than the bottom diaphragm for improved low fire resolution.

NOTE

Supply air pressure to the PCR must be at least 2-3 osi higher than 2-1/2 times the maximum air orifice pressure drop.

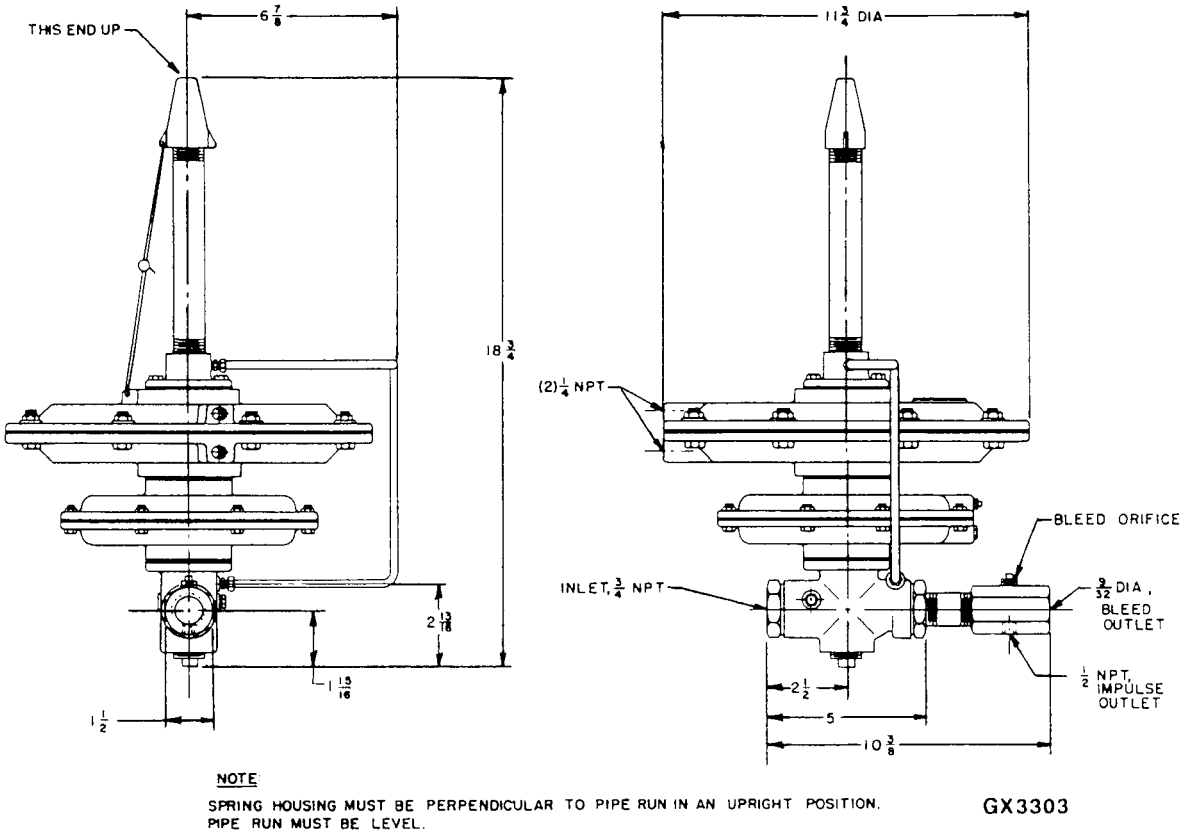
CAUTION

1. Remove Bottom Plug or Cover.
2. Remove Wooden Plug Shipping Spacer.
3. Check the pipe thread sealing compound on bottom plug, or gasket sealer on bottom cover gasket, and, if necessary add sealing compound.
   On high temperature regulators use no-lock or equivalent high temperature sealing compound.
4. Replace Bottom Plug or Cover.

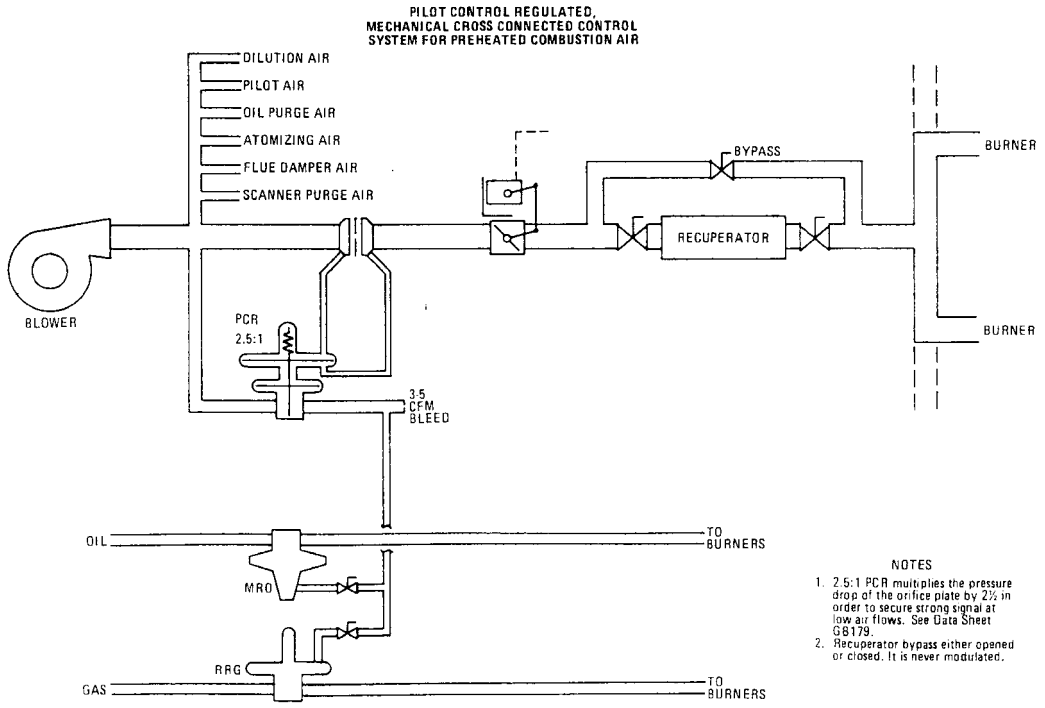
B. RECEIVING AND INSPECTION

Upon receipt, check each item to determine that all equipment has been received and to ascertain if there has been any damage in shipment. If installation is delayed and the equipment is to be stored outside, be sure to provide adequate weather protection as dictated by climate and the period of exposure.

C. DIMENSIONS



D. TYPICAL PIPING SCHEMATIC



E. INSTALLATION (Refer to Typical Piping Schematic)

CAUTION

1. Remove Bottom Plug or Cover.
2. Remove Wooden Plug Shipping Spacer.
3. Check the pipe thread sealing compound on bottom plug, or gasket sealer on bottom cover gasket, and, if necessary add sealing compound. On high temperature regulators use no-lock or equivalent high temperature sealing compound.
4. Replace Bottom Plug or Cover.

1. Install a combustion air orifice meter (OMA) in the air line between the blower and the main (control) butterfly air valve.

2. Install the PCR in a convenient location which will allow ready access to air and fuel line piping. The unit must be mounted with the diaphragm chambers in a horizontal position and the tubular spring casing vertically up. Position the PCR so flow through the valve corresponds to the direction of the arrow on the body assembly.

NOTE

Hauck recommends impulse connections to be made with 3/8" copper tubing or 1/4" pipe.

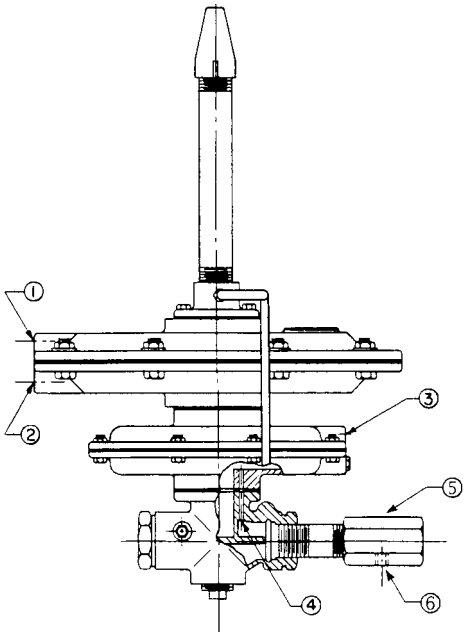


Figure 2. Cutaway of PCR

3. Connect the two air lines from the combustion air orifice meter to the top diaphragm of the PCR (1) and (2) in Figure 2. The "higher" pressure line must be connected to the "higher" tap (1), the "lower" pressure line to (2). Pipe in bleeder supplied with regulator.

4. The bleeder orifice (5) must be used so there is an air flow through the regulator existing at (5).

5. Connect impulse connection (6) to system ratio regulator impulse connection.

F. ADJUSTMENTS

The PCR unit has been properly adjusted at the factory. No additional adjustments are required.

> **NOTE**
> Ratio adjustments for fuel/air control can be made with the system ratio regulator and limiting orifice valve.

G. OPERATION

The theory of operation of the PCR is best understood by use of an example referenced to the cut-away illustration (Figure 2).

Example:

Assume the combustion air orifice meter supplies 20 osi to (1) and 15 osi to (2). A downward pressure of 5 osi would then result across the upper diaphragm. This downward pressure opens the flow valve until a counteracting pressure of 12.5 osi is developed at (4), the lower portion of the bottom diaphragm. Item (3) is assumed open to the atmosphere. However, (3) can be backloaded. (If backloaded , the pressure applied to (3) would add directly to (4) pressure of 12.5 osi).

If furnace pressure exceed .1"wc, backloading is recommended.

Consideration must be given to multiburner, individual burner shutdown applications. In certain applications shutting off just the fuel flow will change the air flow through that burner, effecting the total mass flow and, therefore, the fuel pressure at the other burners, making them go rich. If the air flow is shut off also, the total air mass flow would decrease, thus decreasing the fuel pressure and, therefore, flow to the other burners, making them go lean. A solution in a combination-fired system would be to reduce air flow manually in the burner to be shut off to the "firing" air flow value, and thus provide the same fuel pressure to the remaining burners.

H. MAINTENANCE

PCR regulators are precision units constructed to extremely close tolerances. The diaphragm positions, diaphragm slack and spring tension are quite critical. These are preset at the factory and require no maintenance or adjustment. If it should ever become necessary to replace the diaphragm assembly, follow the instructions which accompany the replacement parts.