



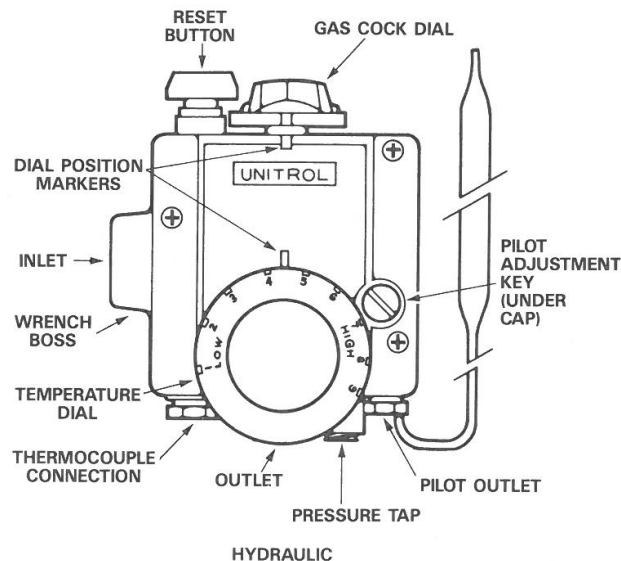
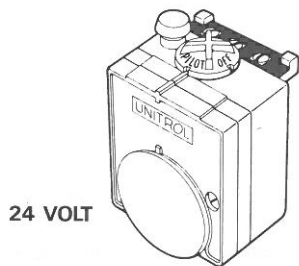
INSTALLATION DATA

120 SERIES

GAS HEATING CONTROLS

The Robertshaw® 120 Series gas heating controls are designed for a variety of heating applications. Models are available with hydraulic or 24 volt operators. Each control has positive snap-action, automatic pilot safety valve, pilot adjustment key, pilot filter and pilot outlet. Pressure regulation is optional by model.

24 volt models are thermostatically controlled by a remote electric wall thermostat. Hydraulic models are self-contained and require no outside control.



CAUTION
THIS DEVICE SHOULD BE INSTALLED BY A QUALIFIED SERVICE TECHNICIAN WITH DUE REGARD FOR SAFETY AS IMPROPER INSTALLATION COULD RESULT IN A HAZARDOUS CONDITION.

SPECIFICATIONS - HYDRAULIC

PART NUMBER	FACTORY MODEL	APPLICATION	TEMPERATURE RANGE	CAPILLARY LENGTH	PIPE SIZE INLET/OUTLET	PRESSURE REGULATOR SETTING	CAPACITY
120-201	110S	SPACE HEATING	58-90°F	36"	1/2" x 3/8"	NONE	85,170
120-202	110SR	SPACE HEATING	58-90°F	36"	1/2" x 3/8"	*	85,170
120-203	110SS	STOCK TANK	36-68°F	36"	1/2" x 3/8"	NONE	85,170
120-204	110S	BROODER / SPA	78-110°F	36"	1/2" x 3/8"	NONE	85,170

* Includes separate regulator. Select 4.0" W.C. for natural gas or 10.0" W.C. L.P. gas.

24 VOLT (Electrical rating: 24V AC, .62 Amps)

PART NUMBER	FACTORY MODEL	PIPE SIZE INLET/OUTLET	PRESSURE REGULATOR SETTING	CAPACITY
120-402	110ER	1/2" x 3/8"	3.5" W.C.	75,000
120-407	110ERCHC	1/2" x 1/2"	**	100,000
120-472†	110ERCHCSO-2E	1/2" x 3/8"	**	79,930
120-473†	110ERCHCSO-2D	1/2" x 3/8"	**	79,930
120-474†	110ERCHCS)-2C	1/2" x 3/8"	**	79,930

ALL MODELS

Pressure Tap - 1/8 NPT
Pilot Outlet - 1/4 Tubing
Maximum Ambient Temperature - 175°F

† Has step opening feature.

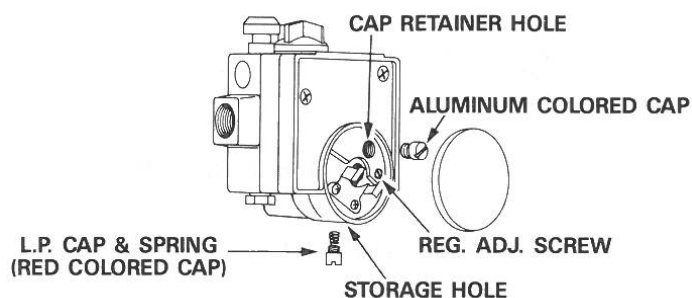
**Has gas converter feature for mobile home use only. Select 3.5" W.C. natural gas or 11.0" W.C. LP. gas.

INSTALLATION INSTRUCTIONS

Turn off gas to equipment before servicing.

1. Remove defective control.

2. If installing a thermostat with the gas converter feature, set control for the type gas being used. **NOTE:** If changing from natural to L.P. gas or L.P. to natural gas, pilot and burner orifices must also be changed.



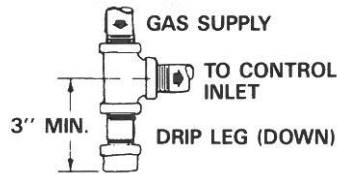
FOR NATURAL GAS OPERATION: Install the aluminum colored cap in the threaded hole in the regulator cover (see figure at left). **NOTE:** With no cap installed in the regulator cover, the regulator will provide natural gas regulation; however, it is imperative that the aluminum cap be used to provide proper venting and damping.

FOR L.P. GAS OPERATION: Install the red colored cap in the threaded hole in the regulator cover (see figure at left).

Outlet pressure can be adjusted to the exact setting specified by the manufacturer of the appliance by using the regulator adjustment screw (see figure at left). To provide a means of storing the unused cap, a blank threaded mounting hole is provided at the bottom of the center casting (see figure at left).

INSTALLATION INSTRUCTIONS (Con't)

- Prior to connecting piping to the thermostat, check inlet gas pressure to make sure it does not exceed 1/2 PSI (14" W.C.). High pressure can damage the control causing a hazardous condition.
- If it is not already installed, a drip leg (sediment trap) must be added to the gas supply line to the control. (See figure below.) All piping must comply with local codes and ordinances and with National Fuel Gas Code (ANSI Z223.1/ NFPA, No. 54).



- Make sure that the piping is clean and free from scale and burrs. Apply a small amount of good quality pipe thread compound which is suitable for type gas used and connect piping to inlet and outlet of control. Thread compound should be used sparingly and on male threads only, leaving first two threads clean. Pipe dope or thread compound should never be used on female threads as it may be pushed into control body, possibly causing the valve to stick or fail to close.

MOUNTING CONTROL (All except 120-202)

- The gas valve can be mounted in any position without affecting its operation.
- Install valve so gas conforms with gas flow pattern through the valve.
- A back-up wrench should only be used on the wrench boss provided for this purpose, never on body of the control, as this could distort the casting.
- Connect pilot gas tubing. Make sure tube has no burrs and dirt. Tighten provided fitting finger-tight and approximately one turn beyond with small wrench. After tightening, tubing near fittings must not be bent.

The 120, when equipped with a pressure regulator, has as standard equipment a built-in Vent Limiter. The regulator vent is tapped 1/8" tubing if vent tubing is required. **CAUTION:** If bleed tubing is used, do not allow main burner or pilot flame impingement on the tubing as this will eventually cause clogging of the tubing and improper regulator operation. If bleed tubing is not used, the regulator vent must be properly shielded from moisture.

- Connect thermocouple. The thermocouple nut should be started and turned all the way in by hand. An additional quarter turn with a small (4") wrench will then be sufficient to set the lock washer. **DO NOT** overtighten nuts as this may damage the thermocouple or magnet and is unnecessary.
- Leak test with a soapy solution after installation or servicing with main burner on. Coat pipe and tubing joints, gasket etc. with soap solution. Bubbles indicate leaks.

SPECIAL NOTE: The 120-203 controls are calibrated to control temperatures from 36°F to 68°F, therefore, if the temperature at the sensing element is below 36°F, the burner will be "ON" at any setting of the temperature dial. If the temperature is above 68°F, the burner will not turn on at any setting of the temperature dial.

To check thermostat operation when temperature is out of 36°F to 68°F range:

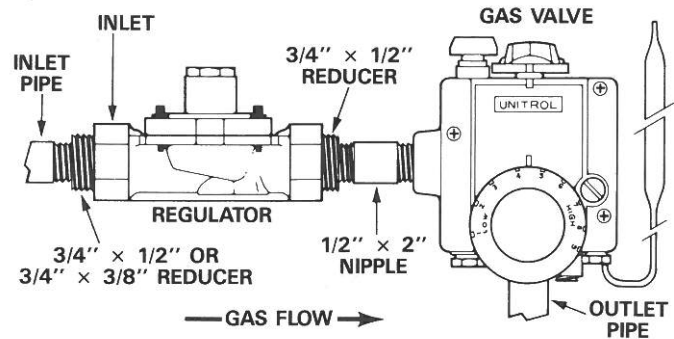
If temperature is below 36°F, it may be necessary to warm the sensing element with the hands until the thermostat shuts off. Conversely, if the temperature at the sensing element is above 68°F, it can be cooled either by allowing water to evaporate from the surface of the sensing element or by immersing the sensing element in water which has been cooled to below 60° (with ice cubes if necessary).

INSTALLATION INSTRUCTIONS (Con't)

MOUNTING CONTROL (120-202 only)

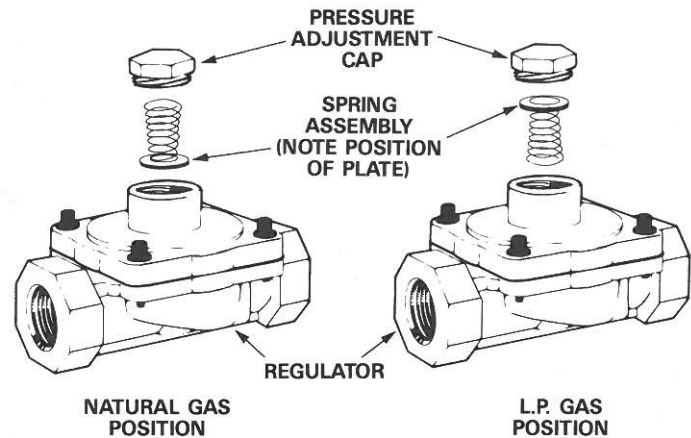
The 120-202 originally included a built-in pressure regulator, but now requires a separate unit. A pressure regulator is included with the control.

- Mounting instructions are the same as for other models except pressure regulator must be installed ahead of the control. (See figure shown below.)



NOTE: Regulator should be mounted in the upright position to insure proper operation.

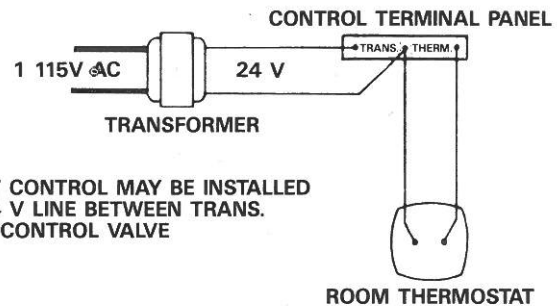
- Pressure regulator is factory set for use with natural gas.** To use with L.P. gas, change the setting by removing the pressure adjustment cap, (see figure below), invert the internal spring assembly and replace the cap.



WIRING (Electric Models only)

All wiring must conform to applicable codes and ordinances. The gas valve control should be wired in accordance with the appliance equipment instructions.

The electric gas valves have terminals on top for connecting room thermostat and transformer and/or other switching device.



LIMIT CONTROL MAY BE INSTALLED IN 24 V LINE BETWEEN TRANS. AND CONTROL VALVE

TYPICAL APPLICATION

OPERATING INSTRUCTIONS



WARNING

LP. GAS APPLICATIONS

To avoid possible injury, fire and explosion, please read and follow these precautions and all instructions on appliance before lighting the pilot. LP. (Propane) gas is heavier than air and will remain at **floor level** if there is a leak. Before lighting, sniff at **floor level, if you smell gas**, follow these rules:

1. Get all people out of building.
2. **DO NOT** light matches. **DO NOT** turn electric lights or switches on or off in area. **DO NOT** use an electric fan to remove gas from area.
3. Shut off gas at L.P. tank outside of building.
4. Telephone gas company and fire department. Ask instructions. Before hanging up, give your name, address, and phone number. **DO NOT** go back into building. If help is coming wait for them to arrive.

If L.P. tank runs out of fuel, turn off gas at the appliance. After L.P. tank is refilled, appliance must be relit according to manufacturer's instructions. If the gas control has been exposed to **WATER** in any way, **DO NOT** try to use it. It must be replaced. **DO NOT** attempt repair on gas control or appliance. Tampering is **DANGEROUS** and voids all warranties.

TO TURN HEATER ON

1. Turn temperature dial or wall thermostat to its lowest temperature setting. **CAUTION:** Temperature dial, gas cock, and reset button should only be operated by hand. If more force is required, control should be replaced. Never use any tools.
2. Remove burner door.
3. Turn gas cock dial clockwise to "OFF" position.
4. **CAUTION:** Wait at least five minutes (ten minutes for L.P.) to allow gas which may have accumulated in burner compartment to escape. (For L.P. installations, see WARNING above.)
5. If you don't smell gas, turn gas cock dial counterclockwise to "PILOT" position.
6. Hold match at pilot burner. **CAUTION:** If pilot lights without depressing reset button, replace control. Depress and hold reset button down completely and light the pilot. Continue to hold the reset button down for about one (1) minute after the pilot is lit. Release reset button and it will pop back up. Pilot should remain lit. If it goes out, repeat steps 4 and 6. **CAUTION:** If reset button does not pop up when released or if pilot will not stay lit after several tries, turn the gas control knob to "OFF," and test system as explained under "SERVICE INSTRUCTIONS - AUTOMATIC PILOT SYSTEM".
7. Turn gas control knob counterclockwise to "ON" position.
8. Replace burner door.
9. When heat is desired turn temperature dial or wall thermostat to desired setting.

SPECIAL NOTE: The 120-203 controls are calibrated to control temperatures from 36°F to 68°F, therefore, if the temperature at the sensing element is below 36°F, the burner will be "ON" at any setting of the temperature dial. If the temperature is above 68°F, the burner will not turn on at any setting of the temperature dial.

To check thermostat operation when temperature is out of 36° to 68°F range:

If temperature is below 36°F, it may be necessary to warm the sensing element with the hands until the thermostat shuts off. Conversely, if the temperature at the sensing element is above 68°F, it can be cooled either by allowing water to evaporate from the surface of the sensing element or by immersing the sensing element in water which has been cooled to below 60°F (with ice cubes if necessary).

CAUTION: Keep combustible material away from gas appliance. Keep burner area clean and free of dust and lint.

TO SHUT HEATER OFF

1. Turn temperature dial or wall thermostat to lowest setting.
2. Turn gas cock dial to "OFF." Do not force.
3. IF CONTROL FAILS TO TURN OFF, shut off gas ahead of control at line valve or meter. Replace control.

SERVICE INSTRUCTIONS

CAUTION

THIS DEVICE SHOULD BE INSTALLED BY A QUALIFIED SERVICE TECHNICIAN WITH DUE REGARD FOR SAFETY AS IMPROPER INSTALLATION COULD RESULT IN A HAZARDOUS CONDITION.

CAUTION: If control has been exposed to water in any way, it must be replaced.



PILOT BURNER ADJUSTMENT

1. Remove Pilot Adjustment Cap.
2. Adjust Pilot Key to provide properly sized flame on the thermocouple. The flame should cover the upper 3/8" of the tip.
3. Replace Pilot Adjustment Cap.

CAUTION: The gas cock must be in either the "OFF," "PILOT" or full "ON" position. Do not use it to adjust gas flow. An incorrect burner flame can result.

AUTOMATIC PILOT SYSTEM

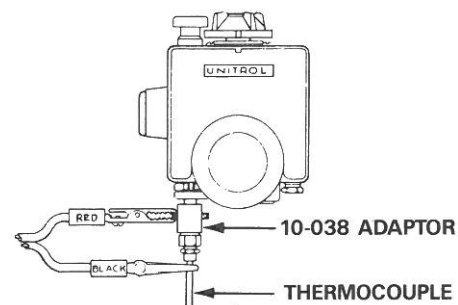
There are four major causes of pilot outage in the automatic pilot systems.

1. Improper pilot operation.
2. Low output thermocouple.
3. Inoperative automatic pilot magnet.

To perform the following tests, using your test instrument.

Thermocouple Check

1. Check for proper pilot operation. Flame should cover the upper 3/8" of the thermocouple tip.
2. Unscrew thermocouple from control.
3. Screw Robertshaw adaptor 10-038 into control.
4. Screw thermocouple into adaptor.
5. Connect millivolt meter leads to adaptor and thermocouple as shown in figure at right.
6. Light pilot and allow it to heat tip of thermocouple for three minutes. If pilot will not stay lit, hold red reset button down during this test.
7. If meter reads below 13 millivolts, replace thermocouple. If meter reads 13 millivolts or more, the thermocouple is good.



Magnet Check

1. After testing thermocouple and replacing if necessary as described above, follow normal pilot lighting procedure with adaptor and millivolt meter attached as shown for thermocouple check.
2. Allow pilot to burn for three minutes.
3. Note millivolt reading on meter and blow out pilot.
4. Magnet should continue to hold for a drop of five millivolts or more before it releases. A "snap" can be heard when magnet releases. If magnet does not hold for a drop of at least five millivolts, replace control. Magnet is good if it holds for a drop of five millivolts or more.



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