Water Heater

Water Heater Assembly – Model G6-10B

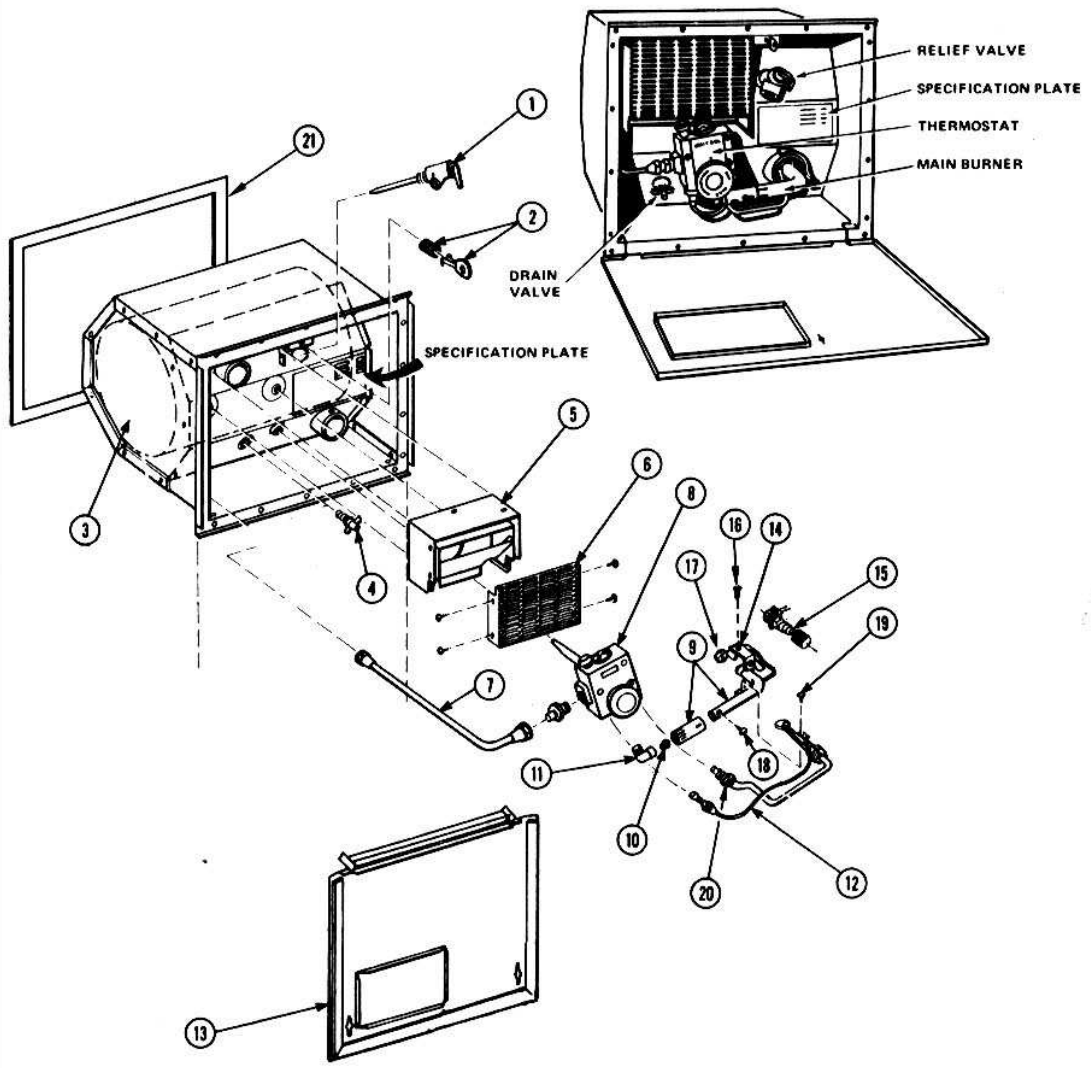

Fig. 1

No.	Part No.	Description
1	92656	Relief valve – 1/2" fitting
2	92609	Cam-loc fastener
3	91961	Inner tank only
4	92698	Drain valve – petcock type
5	91969	Flue box assembly
6	92787	Exhaust grille
7	92888	Gas inlet tube
8	93726	Thermostat – Robertshaw
	93727	Thermostat – ITT
9	91976	Main burner and air adjustment, sleeve ass'y.
10	91985	Main burner orifice
11	92741	Main burner orifice elbow
12	92616	Safety pilot assembly
13	92726	Access cover
14	92755	Spark ignitor bracket
15	92758	Spark ignitor
16	–	Mounting screw
17	–	Hexnut – main burner attachment
18	–	Screw – air adjustment
19	–	Screw – safety pilot attachment
20	92456	Compression fitting
21	02280	Gasket, vinyl foam tape

Checking, Removal, Replacement and Maintenance (Ref. Fig. 1)

Water Heater Removal and Replacement

1. Shut off water supply and open hot water faucets.
2. Open drain valve on water heater tank and drain completely.
3. After tank is drained, disconnect inlet and outlet water lines. These are located inside trailer by opening cabinet door. With a wrench, loosen the two flare nuts connecting these lines to the tank.
4. Shut off gas supply and disconnect gas lines, both at control valve of water heater and shut-off valve under trailer. Remove gas line completely.
5. Drill pop rivets from rub rail along bottom of water heater using a No. 30 drill bit. Drill to gain access to Phillips screws in bottom of water heater flange.
6. Remove screws along heater mounting flange, top, bottom and both sides.
7. Heater is now ready for removal and can be moved from trailer body. Sealers used to prevent rain leaking around installation flange may bind heater to body of trailer. With a putty knife or screwdriver, carefully pry heater loose.
8. Install by reversing above steps. Before pushing heater into place, remove all the old gasket from the flange and replace with new gasket material.
9. When installing gas line, be careful not to get any dirt into line when pushing through the underbelly.
10. Check all gas connects for leaks, using soapy water.

Thermostat Removal and Replacement

1. Shut off water supply.
2. Open water heater drain valve. Open hot water faucets.
3. Shut off gas valve.
4. Disconnect gas (Item No. 7) at thermostat control valve.
5. Disconnect pilot gas line and thermocouple lead (Item No. 12), at thermostat control valve.
6. Using thermostat wrench remove thermostat.
7. Replace by reversing above procedure.

Main Burner and/or Orifice Removal and Replacement

1. Remove hexnut (Item No. 17).
2. Remove main burner assembly and flint lighter.
3. Remove main burner orifice.
4. Clean with alcohol and compressed air or replace.
5. Replace by reversing above procedure.

Main Burner Air Adjustment

1. Loosen screw (Item No. 18).
2. Slide air adjustment sleeve to gain proper air adjustment. (Primary air should be adjusted so that slight yellow streaks may be seen in the flame. This flame should have slightly forceful noise.)

Thermocouple and Pilot Assembly Removal and Replacement

1. Remove main burner assembly.
2. Remove pilot line and thermocouple lead at thermostat control valve.
3. Remove screw (Item No. 19).
4. Replace by reversing above procedure. 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 seal the lock washer. CAUTION: Overtightening may cause damage to the thermocouple or magnet and is unnecessary.

Spark Ignitor Removal and Replacement

Installation Instructions

1. Remove hexnut (Item No. 17) from main burner assembly.

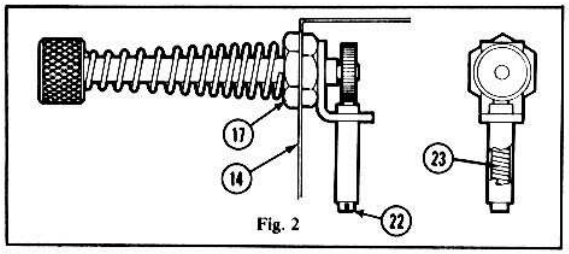

Fig. 2

2. Locate ignitor and bracket so that small offset in bracket aligns with edge of combustion tube. Curved cut-away at bottom of bracket should rest against top right of burner tube.
3. Replace hexnut (Item No. 17) through ignitor bracket and burner bracket. It should not touch main burner tube when ignitor is pressed in for use.

NOTE: Brass flint holder tube should be to right of bracket and should not touch main burner tube when ignitor is pressed in for use.

Flint Replacement (Use standard cigarette lighter flint.)

1. Loosen hexnut (Item No. 17) on barrel of ignitor and pull back toward knob. Slide it to the right and remove.
2. Remove flint screw (Item 22, Fig. 2). CAUTION - there is a small spring (Item 23) under this screw which may pop out when screw is removed.
3. Insert new flint, replace spring, replace screw until flush with end. Wheel may turn hard the first few times used until flint is shaped to spark wheel.
4. Replace by reversing step 1.

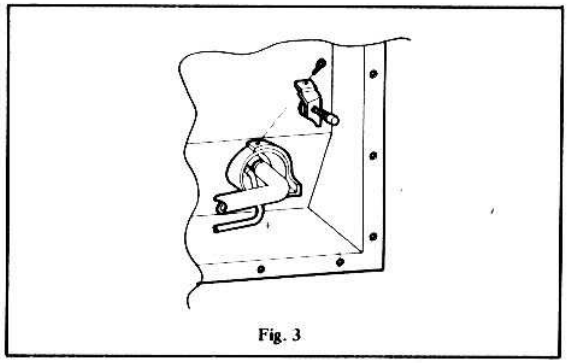
Fig. 3

Water Heater Thermostat Assembly

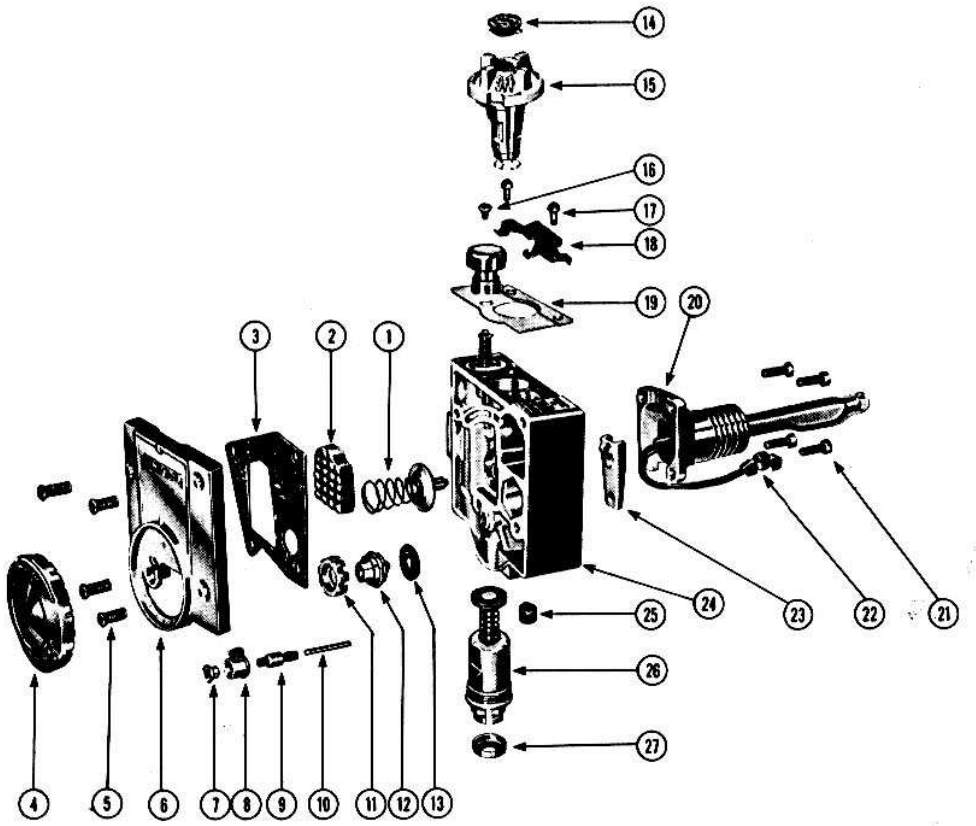

Fig. 4

No.	Description
1	Valve assembly
2	Pilot filter
3	Body gasket
4	Dial
5	Screw (4)
6	Cover
7	Stop adjustment nut
8	Stop
9	Temperature adjustment screw
10	Screw extension
11	Pilot regulator retaining spring
12	Pilot regulator assembly (nat. gas or L.P. gas)
13	Pilot regulator gasket
14	Regulator adjustment cap
15	Combination gas cock and pressure regulator (nat. gas or L.P. gas)
16	Screw (1)
17	Retaining screws (2)
18	Gas cock spring
19	Set button retainer assembly
20	Shank assembly
21	Screws (4)
22	E.C.O. switch terminal
23	Lever
24	Body
25	Pressure plug
26	*50650 Automatic pilot valve and magnet assembly
27	*50655 Terminal retainer

Note: To remove temperature dial, pull off (friction fit).

*These items available for Field Service Replacement. Order by part number shown above.

General Description

The Unitrol R103-RV-LP-78 is a combination water heater thermostat, 100% automatic pilot, built-in automatic over temperature "ENERGY CUT-OFF" device, balanced adjustable main gas pressure regulator, pilot filter, separate fixed setting pilot gas regulator, with main and pilot gas cock in one compact unit.

Balanced Pressure Regulation

The main gas regulator, located within the manual valve, has a balancing diaphragm in addition to the main pressure regulator diaphragm to balance the effect of pressure differential across the regulator valve.

The location of the regulator in the normal gas flow pattern, without materially diverting the normal flow, minimizes the pressure drop within the control.

The combined advantages of using a balanced regulator plus its optimum regulator location within the control makes possible a combination control with improved characteristics using a regulator of greatly reduced size.

The Unitrol R110R-LP-TP for L.P. gas has a pressure adjustment range of 10"-12" W.C.

Built-in E.C.O. Operation

In addition to the previous features of the Unitrol, the new Unitrol R110RT-P with built-in E.C.O. provides the following additional function: in case of excessive water temperature in the heater, a switch inside the shank assembly shuts off the automatic pilot and all gas to the heater. The Unitrol R110RT-P provides a completely self-contained automatic gas shut-off system.

Pilot Regulator

A separate pressure regulator for pilot gas is located in the control down stream of the pilot filter to control pilot gas pressure independently. No pilot adjustment key is provided or needed on controls with pilot regulators.

Installation Instructions

Piping

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 the type gas being used. Thread compound should be used sparingly and on male threads only, leaving the first two threads clean. Pipe dope or thread compound should never be used on female threads as it may be pushed into the valve body.

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 seat the lock washer. CAUTION: Overtightening may cause damage to the thermocouple or magnet and is unnecessary.

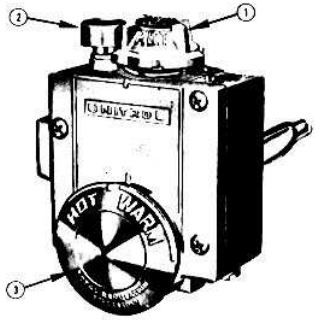

Fig. 5

Procedure for Lighting or Relighting (See Fig. 5).

1. Turn GAS COCK DIAL (1) TO "OFF" position.
2. Wait sufficient length of time to allow gas which may have accumulated in burner compartment to escape (at least 5 minutes).
3. Turn GAS COCK DIAL (1) to "PILOT" position. Depress and hold SET BUTTON (2) while lighting pilot burner.
4. Allow pilot to burn approximately one-half minute before releasing RESET BUTTON. If pilot does not remain lighted, repeat operation allowing longe; period before releasing SET BUTTON.
5. Turn GAS COCK DIAL (1) to "ON" position and turn TEMPERATURE DIAL (3) to desired position.

To Clean Thermostat Valve

1. Shut off gas at line valve or meter.
2. Turn GAS COCK DIAL to "OFF" position.
3. Remove TEMPERATURE DIAL.
4. Turn temperature stop to match opening in cover.
5. Remove four screws to remove COVER and COVER GASKET.
6. Remove SPRING and VALVE ASSEMBLY.
7. Clean VALVE and SEAT with lint-free cloth or chamois and replace valve in control.
8. Replace COVER GASKET and COVER. Tighten screws.
   NOTE: Place gasket on cover and slip screws into cover before replacing cover on body.
9. Relight PILOT and leak test with SOAL SOLUTION around gasket with main burner "ON."
10. Replace TEMPERATURE DIAL.

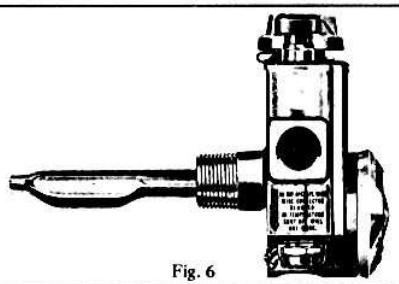
Fig. 6

Automatic Pilot Valve and Magnet Assembly Replacement

1. Shut off gas at line valve or meter.
2. Remove thermocouple.
3. With small screwdriver, remove TERMINAL RETAINER.
4. With narrow blade screwdriver pry TERMINAL from magnet base slot working from both sides to avoid TERMINAL damage.
5. Remove MAGNET ASSEMBLY by unscrewing 3/4" hexagon magnet base.
6. When replacing MAGNET ASSEMBLY, apply thread lube and tighten sufficiently to prevent gas leakage.
7. Reinstall TERMINAL in magnet base slot (it may be necessary to reposition TERMINAL wires).
8. Reinstall THERMAL RETAINER (snaps on).
9. Reinstall thermocouple (see "Installation Instructions" for proper thermocouple installation).
10. Re-establish gas supply and leak test with soap solution.

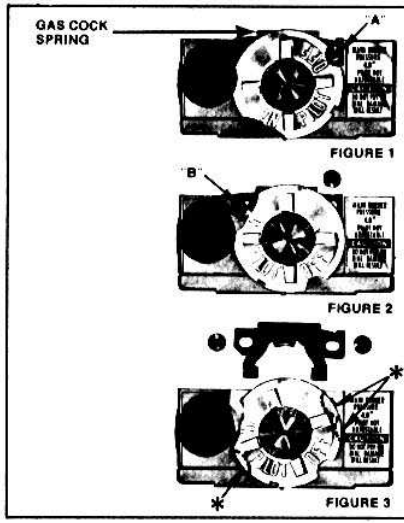

Fig. 7

To Lubricate Gas Cock and Regulator Combination

CAUTION: Do not attempt to remove plastic dial from gas cock plug.

1. Shut off gas supply at meter or line valve.
2. Rotate gas cock dial to position as shown on Fig. 7 and remove retaining screw "A".
3. Rotate gas cock dial to position as shown on Fig. 7 and remove retaining screw "B". Remove spring.
4. Rotate gas cock dial to position as shown on Fig. 7.
5. Grip dial with thumb and fingers as shown on Fig. 7* and lift assembly straight out of cavity. Rotate plug slightly if necessary.
6. Remove old grease from plug only. Do not attempt to clean cavity as old grease or foreign matter may be pushed into cavity.
7. Relubricate plug only with good quality gas cock grease suitable for aluminum gas cocks. Do not over-lubricate.
   CAUTION: Do not allow lubricant on regulator valve or valve seat (small end of gas cock.)
8. Replace gas cock plug being careful not to scrape grease from cavity onto regulator valve and position gas cock spring fingers, in plug channel.
9. Rotate gas cock dial to allow access to retaining screw holes and replace screws.
10. Re-establish gas supply and relight pilot.
11. Test for leaks with soap solution with gas cock in both "ON" and "OFF" positions.

Pressure Regulator Adjustment

The main burner pressure regulator adjustment screw slot is filled to seal the factory pressure setting; the regulator should never need readjustment. If, however, adjustment should be necessary a qualified serviceman can proceed as follows:

1. Remove regulator adjustment cap by inserting screwdriver in slot and rotating counter-clockwise (See Fig. 8).
2. With small screwdriver, remove sealant from adjustment screw slot, if necessary.
3. Rotate adjustment screw "clockwise" to increase or "counter-clockwise" to decrease pressure.
4. Replace regulator adjustment cap.

NOTE: Pilot pressure regulator is non-adjustable.

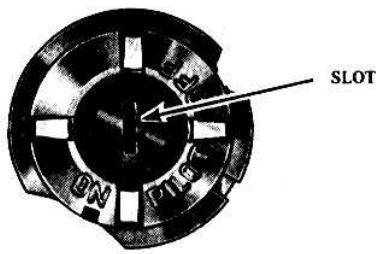

Fig. 8

To Recalibrate Thermostat

The Unitrol thermostat is built to the most exacting standards, and is a precision instrument which should never need recalibration. If, however, through misuse, tampering, or other conditions beyond our control, the thermostat is found to be more than 20°F out of calibration, a qualified serviceman may recalibrate as follows:

1. Determine water temperature at the nearest hot water faucet.
2. Turn TEMPERATURE DIAL to correspond to the actual water temperature and remove DIAL, being careful not to rotate dial during removal. Mark location of STOP for reference and replace DIAL.
3. Turn DIAL slowly until the control snaps "OFF". Remove TEMPERATURE DIAL. Holding STOP, to prevent rotation, carefully loosen STOP ADJUSTMENT NUT (See Fig. 9).
4. Taking care not to move TEMPERATURE ADJUSTING SCREW, turn STOP until it corresponds with reference mark previously made.
5. Hold STOP and tighten STOP ADJUSTMENT NUT.
6. Replace TEMPERATURE DIAL; recheck "OFF" temperature.

NOTE: Temperature dial marking.

TEMPERATURE DIAL TYPES MUST NOT BE INTERCHANGED SINCE E.C.O. TEMPERATURES ARE MATCHED TO DIAL TYPE

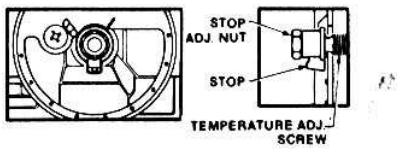

Fig. 9

Built-in E.C.O. Test Procedure Unitrol 110T Series

Follow standard procedure for lighting or relighting.

1. If heater does not start up immediately under standard procedure for lighting, check the following:
   a. Check Thermostatic Valve Action.
      Thermostat valve leaks can result in overheating of tank water and result in shutdown due to E.C.O. action. If valve is found to leak, clean valve; if valve still leaks, replace thermostat.
   b. Check Thermostat Calibration at Highest Setting.
      160° Thermostats – (Hot-Warm, Dial)
      If top temperature exceeds 160°F at shut-off, shutdown was likely due to E.C.O. action. Recalibrate so top setting is in 155°F range.
      180° Thermostats – (Very Hot Dial)
      If top temperature exceeds 180°F at shut-off, recalibrate so top setting is in 175°F range.
   c. If none of the above conditions exist, shutdown was most likely due to other causes.
2. If standard procedure for lighting does not result in start-up, proceed to Sections 3., 4., and 5., if Test Kit is available, or Sections 6., 7., and 8., if Test Kit is not available. A proven "good" magnet is required for tests outlined in Sections 6., 7., and 8.

If Test Kit Is Available

3. Make closed circuit millivolt check as follows:
   a. Use Graysen Test Kit No. B165-34 or equivalent millivolt meter.
   b. Connect Adaptor No. 75036 and Test Kit as shown in Figure 10, being sure connections are tight.
   c. Follow standard lighting procedure.
   d. Check closed circuit output. If less than eight millivolts, replace the thermocouple.
   e. Repeat standard lighting procedure after thermocouple replacement.

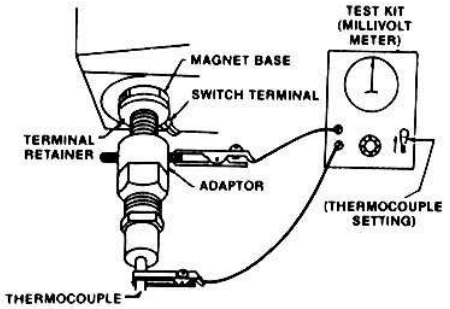

Fig. 10

If closed circuit millivolt check is greater than eight millivolts, or Section c. does not secure start up, proceed to Section d.

4. With adaptor connected as in Figure 10, check as follows:
   a. Follow standard lighting procedure.
   b. With closed circuit output in excess of eight millivolts, blow out pilot.
   c. A good magnet should remain locked up for a drop of five millivolts or more from original stabilized output.
   d. If magnet does not operate properly, replace magnet.
   e. Repeat standard lighting procedure.

If Section d. does not result in start-up, proceed to Section 5.

5. Check E.C.O. switch for closure.
   a. Be sure water at thermostat level is below 120°F. To insure this, draw water from hot water faucet until thermometer registers 120°F or less.

b. With Test Kit on "Magnet" setting and dial set for maximum amperage, check for switch closure and continuity through the switch by touching clips to opposite switch terminal contacts as shown in Figure 11.
   (1) If switch is closed, essentially full amperage reading will be obtained (approaching maximum needle deflection to the right).
   (2) If switch is open, no current will be shown (no meter needle deflection).
c. If switch contacts are open, replace control.
d. If switch contacts are closed, follow standard lighting procedure if these checks do not result in start-up, replace control.

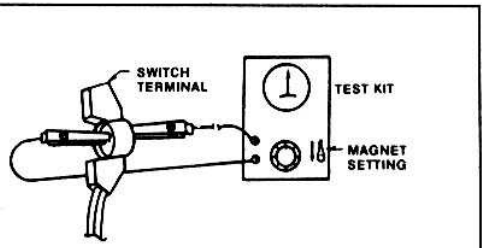

Fig. 11

Without Test Kit

6. To Check Thermocouple
   a. Remove thermocouple nut from Magnet Base and connect "Known Good Magnet" to thermocouple.
   b. Follow standard lighting procedure, holding reset button down at least 30 seconds after lighting pilot.
   c. Lock-up "Known Good Magnet" by depressing magnet valve face. If thermocouple is good, magnet should remain locked-up for at least 30 seconds after pilot is extinguished.
   d. If thermocouple does not lock-up "Known Good Magnet", replace thermocouple.
   e. If thermocouple is good, proceed to Section g.
7. To Check Magnet
   a. With small screwdriver, remove E.C.O. terminal retainer.
   b. With narrow blade screwdriver, pry E.C.O. terminal from magnet base slot, working from both sides to avoid terminal damage.
   c. Follow thermocouple installation instructions, leaving switch terminal out of magnet base.
   d. Follow standard lighting procedure.
   e. After thermocouple temperature is stabilized (pilot burning at least 2 minutes), blow out pilot; if magnet is good, it should remain locked-up for at least 30 seconds after pilot is extinguished.
   f. If magnet will not lock-up or will not remain locked-up for at least 30 seconds after pilot is extinguished, replace magnet following Magnet Replacement Instructions (Page11-5). If magnet is good, proceed to Section 8.
   CAUTION: Never leave water heater with switch terminal disconnected from magnet at conclusion of service call.
8. To Check E.C.O. Switch
   a. Be sure water at thermostat level is below 120°F. To insure this, draw water from hot water outlet until thermometer registers 120°F or less.
   b. Light pilot. If pilot does not remain lit when reset button is released, proceed as follows:
   c. Remove thermocouple from magnet base.
   d. Remove E.C.O. terminal retainer.
   e. Remove E.C.O. switch terminal.
   f. Install thermocouple in magnet base.
   g. Light pilot. If pilot remains lit when reset button is released and if tests in Section 6. and 7. prove thermocouple and magnet are good, E.C.O. switch is not closing. Replace entire control.
   CAUTION: Never leave water heater with switch terminal disconnected from magnet at conclusion of service call.

Water Heater Service Analysis

EFFECT			CAUSE
Pilot will not stay on	Not enough hot water	Over heated water	
x			Too much primary air
	x		Dirt in orifice
x			Defective magnetic valve
x			Need new thermocouple lead
x			Thermocouple lead connection loose
x			Pilot line clogged
	x		Dirt in pilot orifice
x	x		Improper pressure on regulator
x			Pilot not striking thermocouple properly
		x	Thermostat set too hot
	x		Thermostat set too low
		x	Dirt on thermostat seat
x			Wrong pilot burner
	x		Heater too small for the job
	x		Sediment or lime in tank
	x		Wrong piping connections
	x		Leaky faucets
	x		Long runs of exposed piping
x	x		Heater subjected to strong cold drafts
	x	x	Defective thermostat
	x	x	Improper calibration
x			E.C.O. switch contacts open (See test procedure for E.C.O.)

Ordering Information

When ordering Control specify:

1. Model – Unitrol (see smooth side of casting for stamped model number).
2. Outlet Size – 1/2" inverted flare, 3/8" pipe.
3. Shank Length (See Fig.12).
4. Temperature Dial
   Hot – R110RTP
   Very Hot – R110RT8P
   Dials not interchangeable.

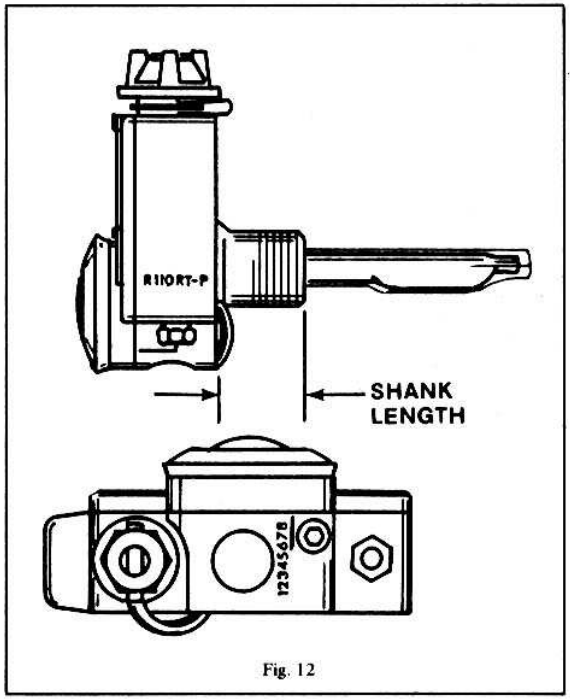

Fig. 12