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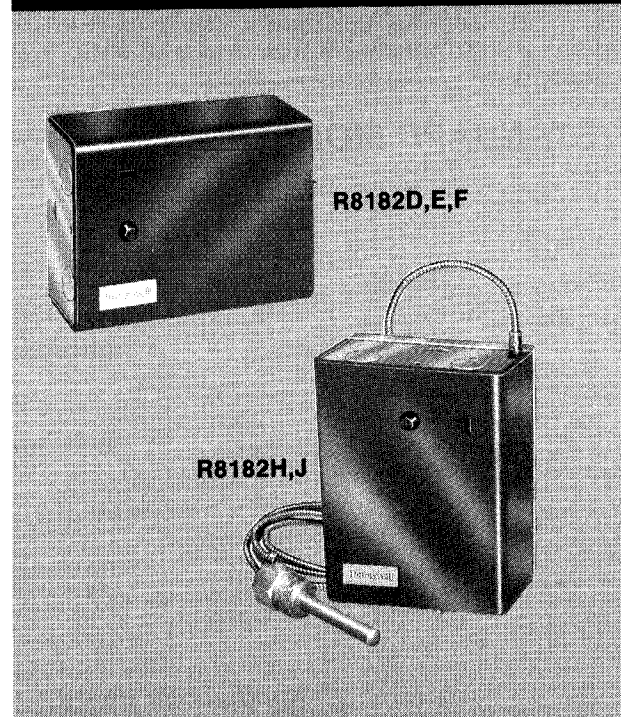
THE R8182 IS A COMBINATION PROTECTORELAY INTERMITTENT IGNITION OIL BURNER PRIMARY AND IMMERSION TYPE AQUASTAT CONTROLLER FOR OIL-FIRED, HYDRONIC HEATING SYSTEMS.

- Depending on model, these single unit devices provide combinations of high limit, low limit, and circulator control.
- All models use a 24 V thermostat and C554A Cadmium Sulfide Flame Detector.
- R8182D,E,H and J have auxiliary terminals ZC and ZR for circulator zone control. Each additional zone requires a separate 24 V thermostat and R845 Relay.
- All models have capability for zone control with zone valves. Each additional zone requires a separate 24 V thermostat and a V8043 or V8044 Zone Valve.
- Ideal for packaged boiler systems requiring compact, multipurpose controls.
- R8182D,E,F models mount directly on the boiler.
- R8182H,J models mount on a 4 x 4 in. junction box, and have a 5 ft. [1.5 m] armored capillary for remote sensor location.
- Aquastat controller section is field replaceable.
- Oil burner circuit includes safety shutoff in case burner fails to start.
- Flame failure during the running cycle results in a 45 second (or 30 second, depending on model) attempt to restart. If unsuccessful, safety shutoff occurs, requiring manual reset before burner can be restarted.

S.M.
REV. 8-85●

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COMBINATION PROTECTORELAY AND HYDRONIC HEATING CONTROLS



R8182D,E,F,H,J

SPECIFICATIONS

IMPORTANT

THE SPECIFICATIONS GIVEN IN THIS PUBLICATION DO NOT INCLUDE NORMAL MANUFACTURING TOLERANCES. THEREFORE, THIS UNIT MAY NOT MATCH THE LISTED SPECIFICATIONS EXACTLY. ALSO, THIS PRODUCT IS TESTED AND CALIBRATED UNDER CLOSELY CONTROLLED CONDITIONS, AND SOME MINOR DIFFERENCES IN PERFORMANCE CAN BE EXPECTED IF THOSE CONDITIONS ARE CHANGED.

TRADELINE MODELS

TRADELINE models are selected and packaged for ease of handling, ease of stocking, and maximum replacement value. TRADELINE model specifications are the same as those of standard models except as noted below.

TRADELINE MODELS AVAILABLE:

R8182D Combination Protectorelay Primary Control and Aquastat Controller.

R8182H Combination Protectorelay Primary Control and Aquastat Controller.

ADDITIONAL FEATURES:

- Well not included; universal well adapter provided (D model) for replacement installation in existing well. To order wells, refer to form 68-0040, "Wells

and Fittings for Temperature Controllers," for part numbers and descriptions.

- Heat-conductive compound supplied for better bulb response in oversize well.
- Field addable stops for Aquastat controller.
- Conversion to R8182E or F.
- TRADELINE pack with cross reference label and special instruction sheet.
- Wire nut.

STANDARD MODELS

MODEL	SWITCHING	ADJUSTABLE CONTROL RANGE		DIFFERENTIAL	
		F	C	F	C
R8182D ^a	High Limit, Spst	130 to 240	54 to 116	10 Fixed	6 Fixed
	Low Limit/Circulator, Spdt	110 to 220	43 to 104	10 to 25 Adj.	6 to 14 Adj.
R8182E ^a	High Limit, Spst	180 to 240	82 to 116	15 Fixed	8 Fixed
R8182F	High Limit, Spst	130 to 240	54 to 116	10 Fixed	6 Fixed
	Circulator, Spst	110 to 220	43 to 104	10 Fixed	6 Fixed
R8182H ^a Remote Bulb	High Limit, Spst	130 to 240	54 to 116	10 Fixed	6 Fixed
	Low Limit/Circulator, Spdt	110 to 220	43 to 104	10 to 25 Adj.	6 to 14 Adj.
R8182J ^a Remote Bulb	High Limit, Spst	180 to 240	82 to 116	15 Fixed	8 Fixed

^aAuxiliary ZC and ZR terminals may be used to provide circulator zone control through an R845A Switching Relay.

(continued on page 3)

ORDERING INFORMATION

WHEN PURCHASING REPLACEMENT AND MODERNIZATION PRODUCTS FROM YOUR TRADELINE WHOLESALER OR YOUR DISTRIBUTOR, REFER TO THE TRADELINE CATALOG OR PRICE SHEETS FOR COMPLETE ORDERING NUMBER, OR SPECIFY—

1. Order number, TRADELINE if desired.
2. Insulation length.
3. Boiler tap size.
4. Optional specifications, if desired.

IF YOU HAVE ADDITIONAL QUESTIONS, NEED FURTHER INFORMATION, OR WOULD LIKE TO COMMENT ON OUR PRODUCTS OR SERVICES, PLEASE WRITE OR PHONE:

1. YOUR LOCAL HONEYWELL RESIDENTIAL DIVISION SALES OFFICE (CHECK WHITE PAGES OF PHONE DIRECTORY).
2. RESIDENTIAL DIVISION CUSTOMER SERVICE
HONEYWELL INC., 1885 DOUGLAS DRIVE NORTH
MINNEAPOLIS, MINNESOTA 55422-4386 (612)542-7500

IN CANADA—HONEYWELL LIMITED/HONEYWELL LIMITEE, 740 ELLESMERE ROAD, SCARBOROUGH, ONTARIO M1P 2V9. INTERNATIONAL SALES AND SERVICE OFFICES IN ALL PRINCIPAL CITIES OF THE WORLD.

MOUNTING MEANS: R8182D,E,F—case clamps to horizontal immersion well installed through boiler wall; R8182H,J—mount on standard 4 x 4 in. junction box.

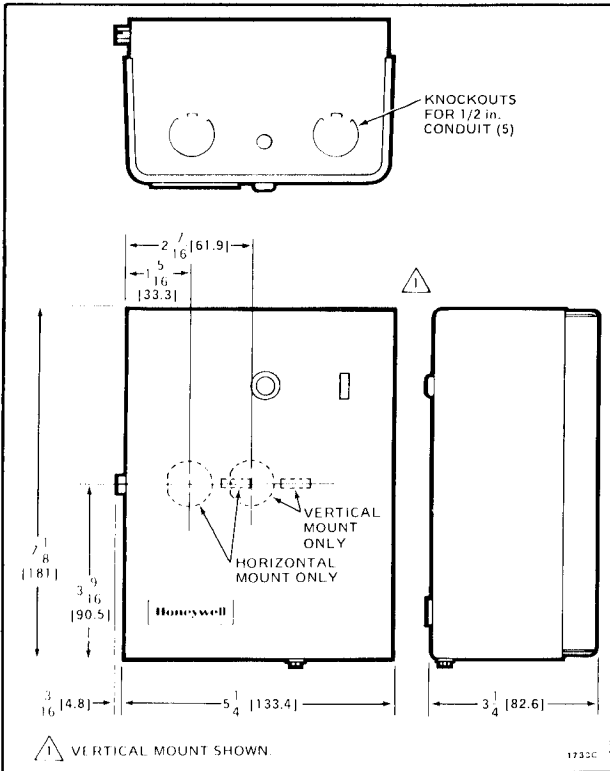


FIG. 1—R8182D,E,F INSTALLATION DIMENSIONS IN in. [mm SHOWN IN BRACKETS].

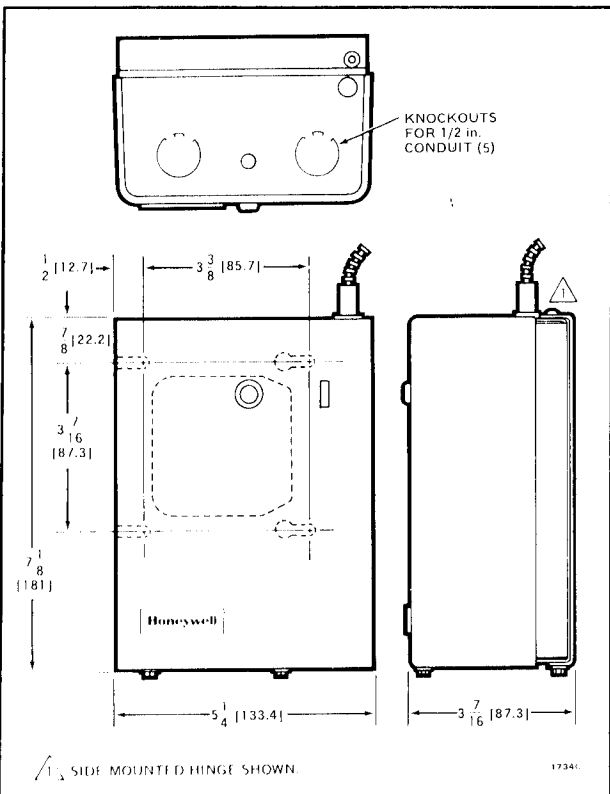


FIG. 2—R8182H,J INSTALLATION DIMENSIONS IN in. [mm SHOWN IN BRACKETS].

ELECTRICAL RATINGS:

Power Supply—120 Vac, 60 Hz.
 Ignition—360 VA in addition to motor load rating.
 Maximum Power Consumption—
 R8182D,E,H and J: 9 W.
 R8182F: 5.5 W.
 Burner Circulator Contact Rating—4.4 A full load;
 26.4 A locked rotor at 120 Vac.
SAFETY SWITCH TIMING: Approx. 45 sec; 30 sec model is also available.
FLAME DETECTOR REQUIRED: C554A Cadmium Sulfide Flame Detector (order separately).
THERMOSTAT REQUIRED: 24 V, 2-wire thermostat such as the T87F.
THERMOSTAT ANTICIPATOR SETTING: 0.2 A for R8182, 0.4 A for each R845A Switching Relay used.
MAXIMUM AMBIENT TEMPERATURE (at element): 250 F [121 C].
MAXIMUM PRESSURE RATING: 200 psi [1379 kPa] on immersion well, 100 psi [689.5 kPa] direct immersion.
DIMENSIONS: See Figs. 1 and 2.
WELL INSERTION LENGTH: 3-3/8 in. [85.7 mm].

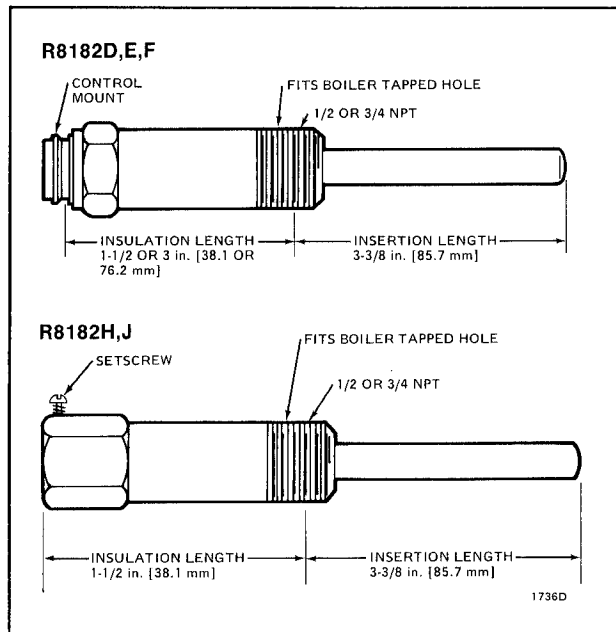


FIG. 3—APPROXIMATE IMMERSION WELL DIMENSIONS (order well separately).

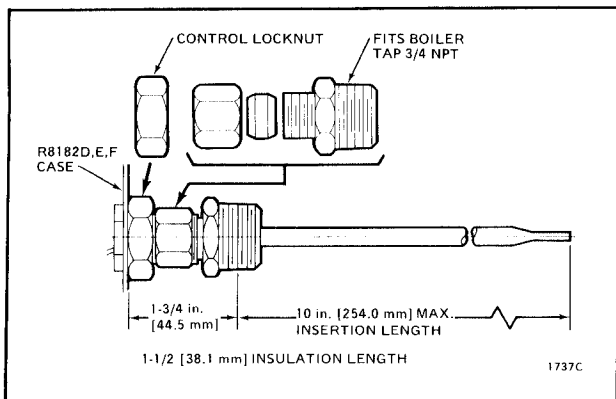
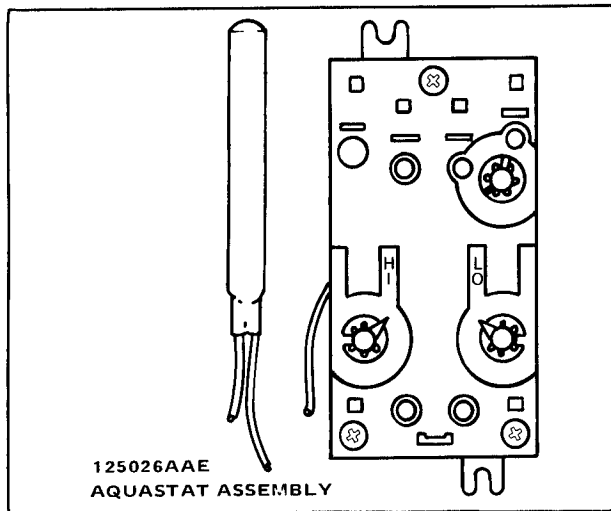


FIG. 4—DIRECT IMMERSION MOUNTING DIMENSIONS.

IMMERSION WELL DIMENSIONS: See Fig. 3:

AQUASTAT ASSEMBLY REPAIR PARTS:



DEVICE	DESCRIPTION	PART NO.
R8182D	Direct immersion, horizontal or vertical.	125026AAC
	1-1/2 in. [38.1 mm] insulation, horizontal or vertical; 3 in. [76.2 mm] insulation, horizontal.	125026AAD
	3 in. [76.2 mm] insulation, vertical.	125026AAE
R8182E	Direct immersion, horizontal or vertical.	123726AY
	1-1/2 in. [38.1 mm] insulation, horizontal or vertical; 3 in. [76.2 mm] insulation, horizontal.	123726AV
	3 in. [76.2 mm] insulation, vertical.	123726AW
R8182F	Direct immersion, horizontal or vertical.	125017AAD
	1-1/2 in. [38.1 mm] insulation, horizontal or vertical; 3 in. [76.2 mm] insulation, horizontal.	125017AAB
	3 in. [76.2 mm] insulation, vertical.	125017AAC
R8182H	1-1/2 in. [38.1 mm] insulation.	125026AAJ
R8182J	1-1/2 in. [38.1 mm] insulation.	123726AT

REPLACEMENT WELL ASSEMBLIES: Refer to form 68-0040, "Wells and Fittings for Temperature Controllers," for part numbers and descriptions.

DIAL STOP: For restricting range, Part No. 126580 for R8182D,F,H.

OPTIONAL SPECIFICATIONS:

1. R8182D,E,F—direct immersion element, see Fig. 4.
2. R8182D,E,F—case with long dimension horizontal.
3. R8182H,J—end mounted hinge.

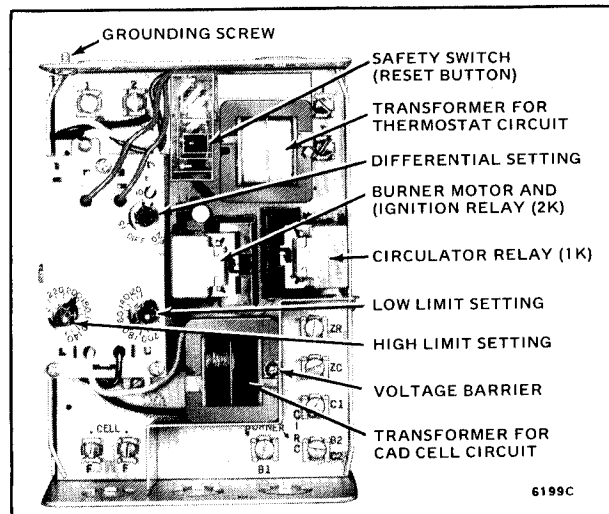


FIG. 5—INTERNAL VIEW OF R8182D.

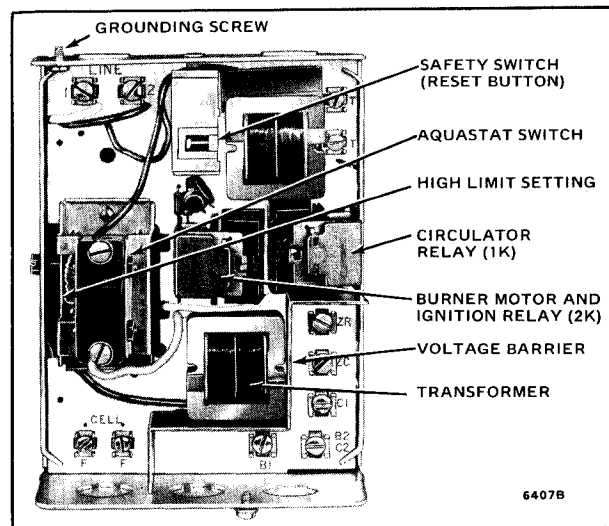


FIG. 6—INTERNAL VIEW OF R8182E.

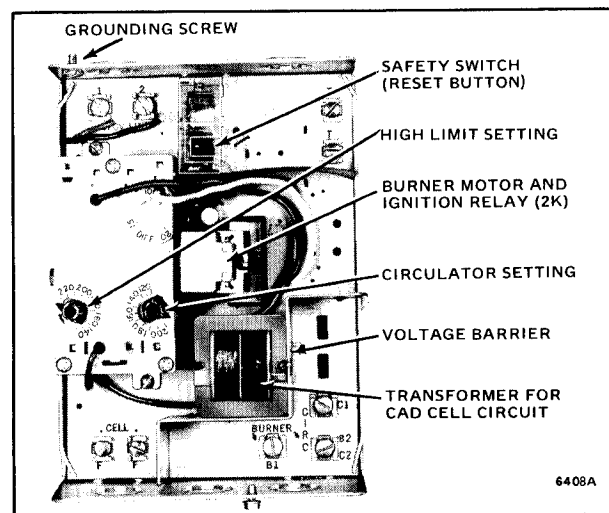


FIG. 7—INTERNAL VIEW OF R8182F.

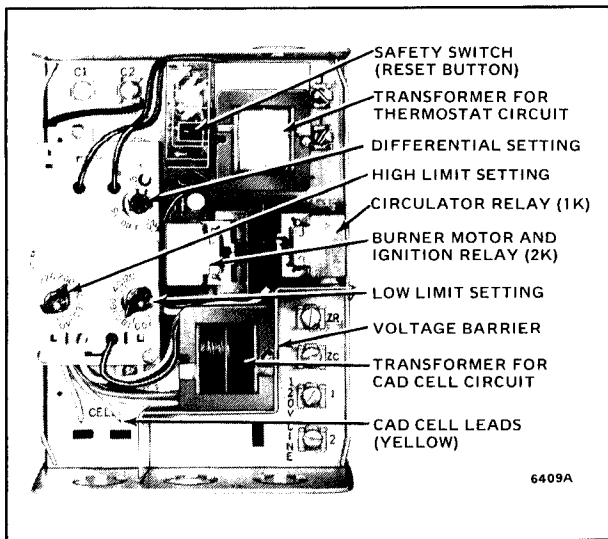


FIG. 8—INTERNAL VIEW OF R8182H.

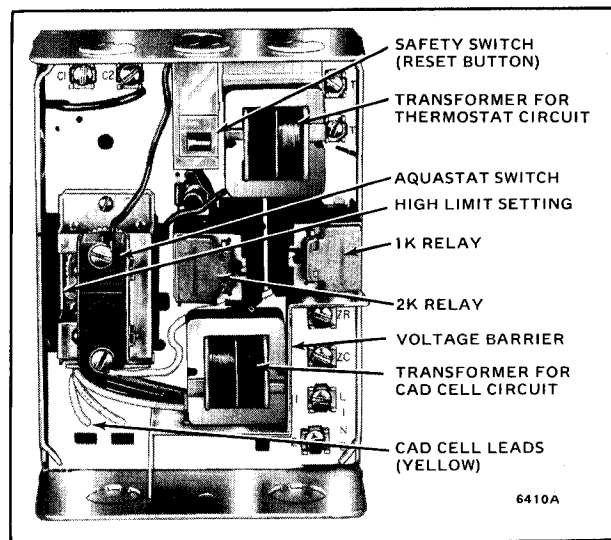


FIG. 9—INTERNAL VIEW OF R8182J.

INSTALLATION

WHEN INSTALLING THIS PRODUCT. . .

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Check the ratings given in the instructions and on the product to make sure the product is suitable for your application.
3. Installer must be a trained, experienced service technician.
4. After installation is complete, check out product operation as provided in these instructions.

CAUTION

1. Disconnect power supply before beginning installation to prevent electrical shock or equipment damage.
2. Check combustion chamber for oil or oil vapor before starting burner.
3. Ambient temperature at element must not exceed 250 F [121 C].

IMPORTANT

Immersion well must fit sensing element snugly and bulb must rest against bottom of well. Bend the tubing, if necessary, to hold bulb against bottom of well. Do not make a sharp bend in the tubing. A sharp bend may produce a break in the tubing and cause loss of fill. This condition will cause the high and low limit controls to be continuously made.

Some models have an adjustable tubing length to 3 in. [76.2 mm]. In these models, extra tubing coiled inside the case may be pulled out, if needed.

MOUNTING THE DEVICE

Boilers are generally equipped with a tapping to allow the well to be mounted horizontally at a location which will permit boiler water of average temperature to circulate freely about it.

1. Turn off power and drain boiler.
2. If no tapping is provided, prepare one.
3. Install immersion well (or compression fitting).

Order separately.

R8182D,E,F

- a. Loosen clamp screw on side of case.
- b. Insert bulb into well until it bottoms.
- c. Fit case onto well so that the clamp in the back of the case slides over the flange on the well.
- d. Tighten clamp screw securely. (Tighten control locknut with direct immersion models. See Fig. 4.)

R8182H,J

- a. Loosen screw holding hinged backplate to case and swing backplate away from case.
- b. Screw backplate to 4 x 4 in. junction box.
- c. Insert bulb into well until it bottoms.
- d. Tighten down setscrew on well over brass collar.
- e. After wiring, swing control against backplate and refasten with screw.

4. Refill boiler and check for water leakage.

MOUNTING TRADELINE R8182D

IMPORTANT

Use the heat-conductive grease furnished with the TRADELINE R8182 to obtain best thermal response. Fold the plastic bag of grease lengthwise and twist it gently. Snip off end and work open end of bag all the way into the well. Slowly pull the bag out while squeezing it firmly to distribute the grease evenly.

Use the furnished well adapter if old well does not fit R8182D immersion well clamp. Adapter has a flange at one end over which the R8182D immersion well clamp can be fastened. See Fig. 10. Place adapter on capillary tube, putting end of adapter into hole in case and tighten clamp screw. Apply heat-conductive grease in well.

Insert bulb into well and bend tubing, if necessary, to hold bulb against bottom of well. Be sure to wipe off excess grease and tighten setscrew (if one is present in old well spud) against adapter.

WIRING

IMPORTANT

Special terminals on R8182 allow option of either

1. wrapping wire around screw, or
2. inserting wire from side (see Fig. 11).

When using method 1, wrap the wire at least 3/4 of the distance around the screw without overlapping. Tighten the screw until the wire is snugly in contact with the underside of screw and contact plate. Tighten screw an additional 1/2 turn. Do not use a push type ratchet screwdriver.

When using method 2, strip wire 3/8 in. [9.5 mm] and insert from side, above or below.

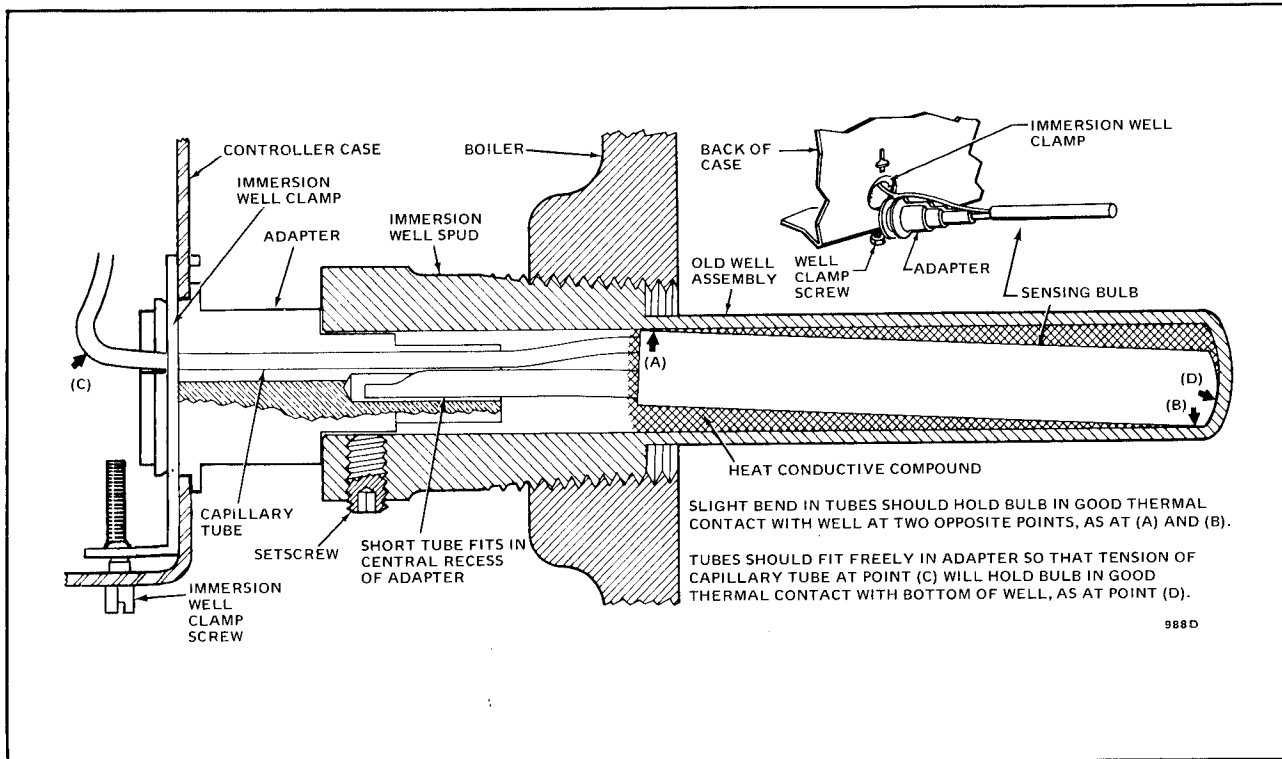


FIG. 10—POSITION OF BULB IN IMMERSION WELL, AND USE OF WELL ADAPTER FURNISHED WITH TRADELINE R8182D, WHEN REQUIRED.

IMPORTANT

When making external circuit connections to the orange and white line voltage burner and ignition leadwires of the R8182H,J, use only Underwriters Laboratories Inc. listed connectors.

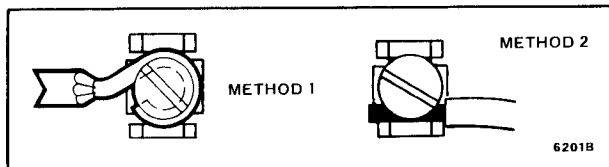


FIG. 11—WRAP WIRE AROUND SCREW (METHOD 1) OR INSERT WIRE FROM THE SIDE (METHOD 2).

Disconnect power supply before connecting wiring. All wiring must comply with local codes, regulations, and ordinances. Refer to cover insert for electrical ratings and maximum load information. Use manufacturer's instructions when wiring controlled equipment or refer to typical hookups in Figs. 13-19.

The TRADELINE R8182D may be converted for replacement of an R8182B,C,E,F or White Rodgers 6C92-2 or 6C92-3. (Replacing these White Rodgers controls necessitates replacement of the immersion well.) See Fig. 12 for Aquastat limit connections necessary for each conversion. Release wires by inserting a screwdriver in the rectangular hole adjacent to the wire. Push inward to release the locking-grip on the wire, and pull the wire out of the terminal hole. Simply push wire into slot to reinsert.

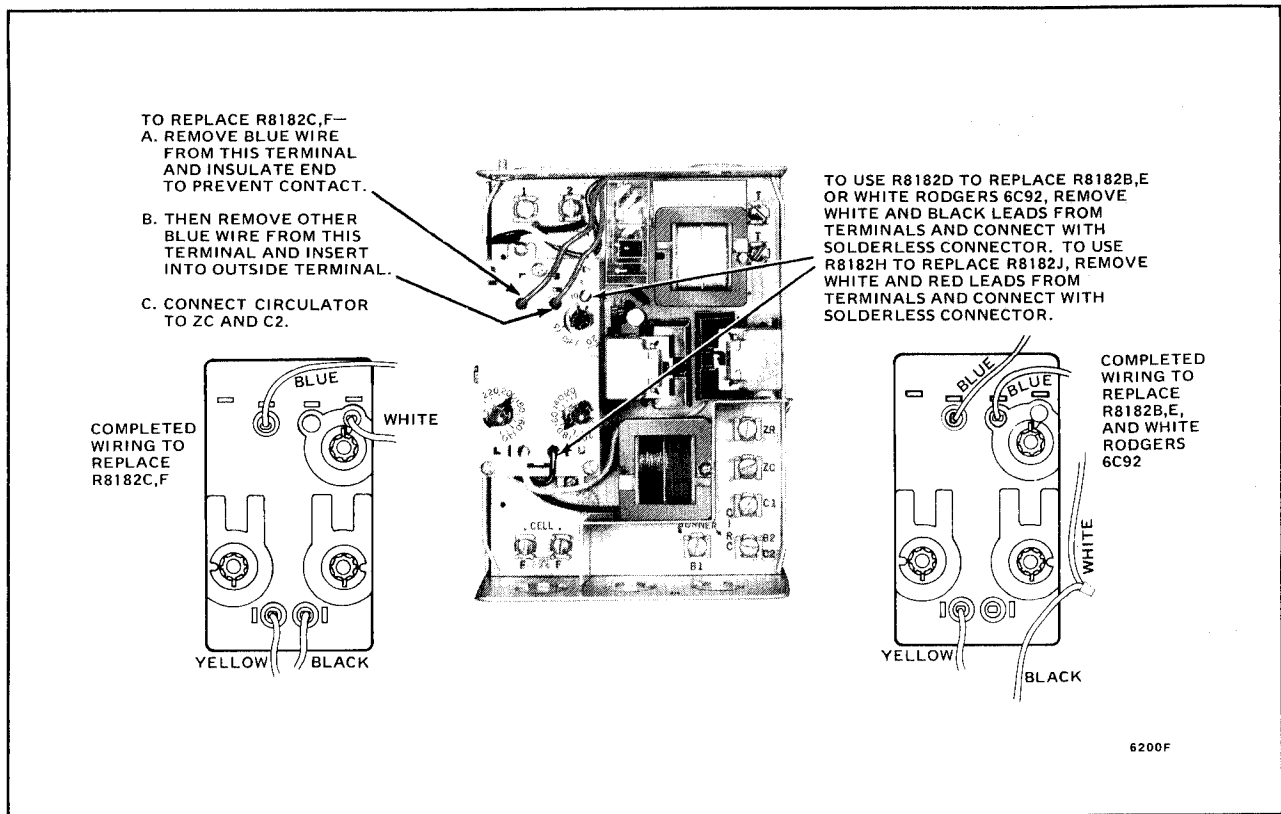


FIG. 12—CONVERSION OF TRADELINE R8182 AQUASTAT LIMIT ASSEMBLY FOR REPLACEMENT OF OTHER CONTROLS.

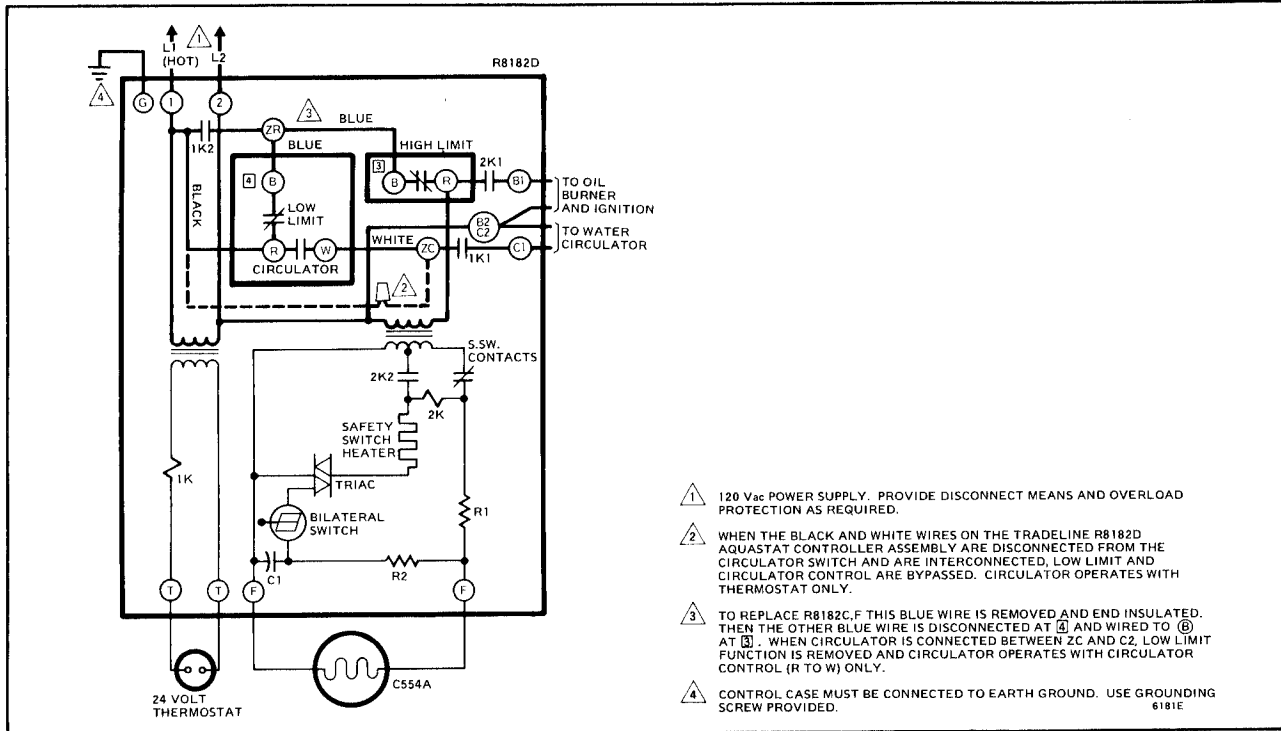


FIG. 13—INTERNAL SCHEMATIC AND TYPICAL CONNECTIONS FOR R8182D. SEE FIGS. 18 AND 19 FOR MULTIPLE ZONING HOOKUP.

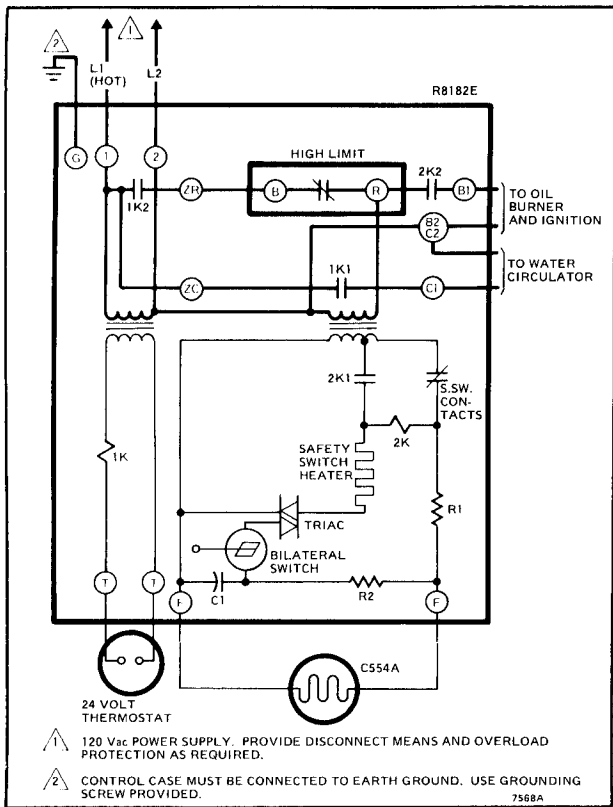


FIG. 14—INTERNAL SCHEMATIC AND TYPICAL CONNECTIONS FOR R8182E. SEE FIGS. 18 AND 19 FOR MULTIPLE ZONING HOOKUP.

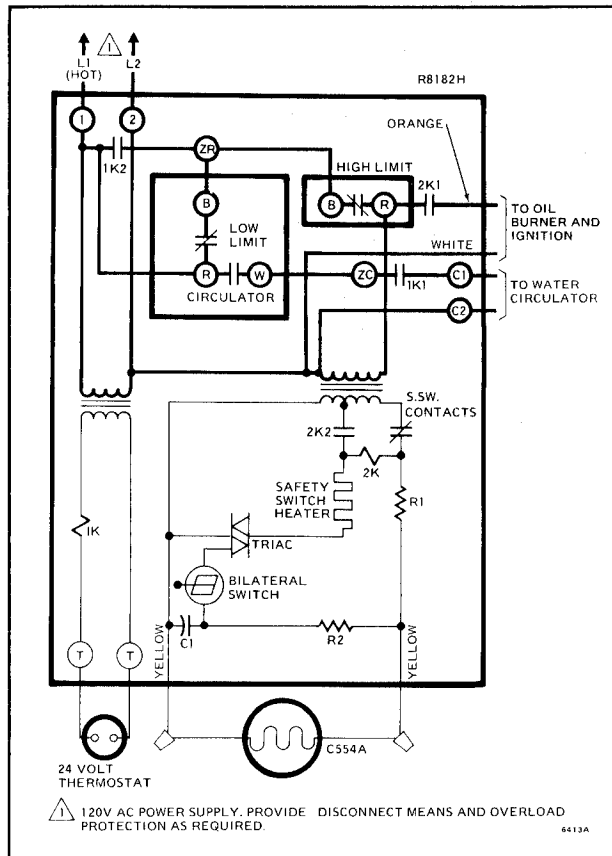


FIG. 16—INTERNAL SCHEMATIC AND TYPICAL CONNECTIONS FOR R8182H. SEE FIGS. 18 AND 19 FOR MULTIPLE ZONING HOOKUP.

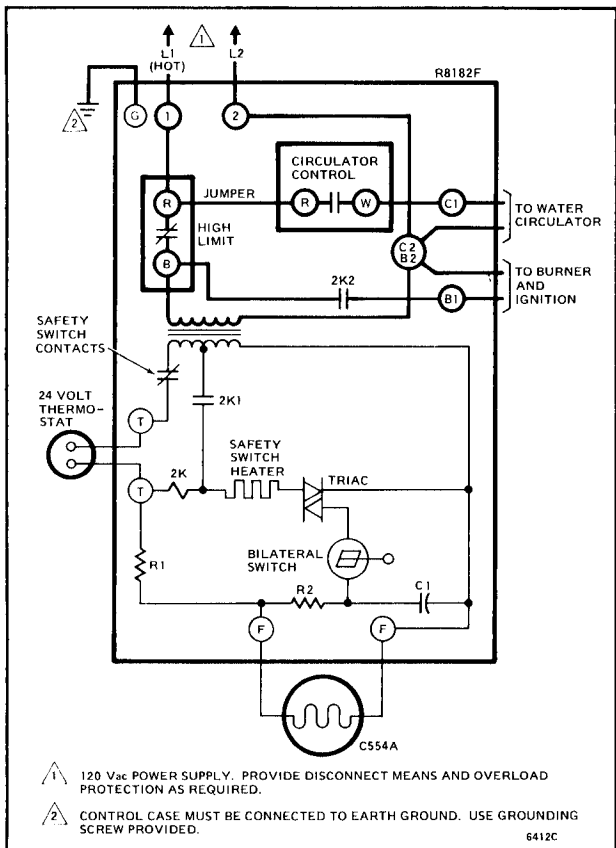


FIG. 15—INTERNAL SCHEMATIC AND TYPICAL CONNECTIONS FOR R8182F. SEE FIG. 19 FOR MULTIPLE ZONING HOOKUP.

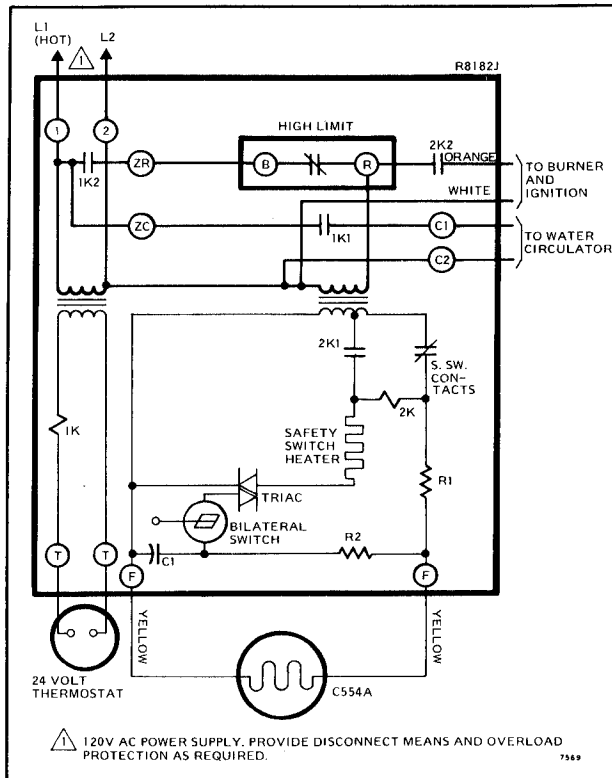


FIG. 17—INTERNAL SCHEMATIC AND TYPICAL CONNECTIONS FOR R8182J. SEE FIGS. 18 AND 19 FOR MULTIPLE ZONING HOOKUP.

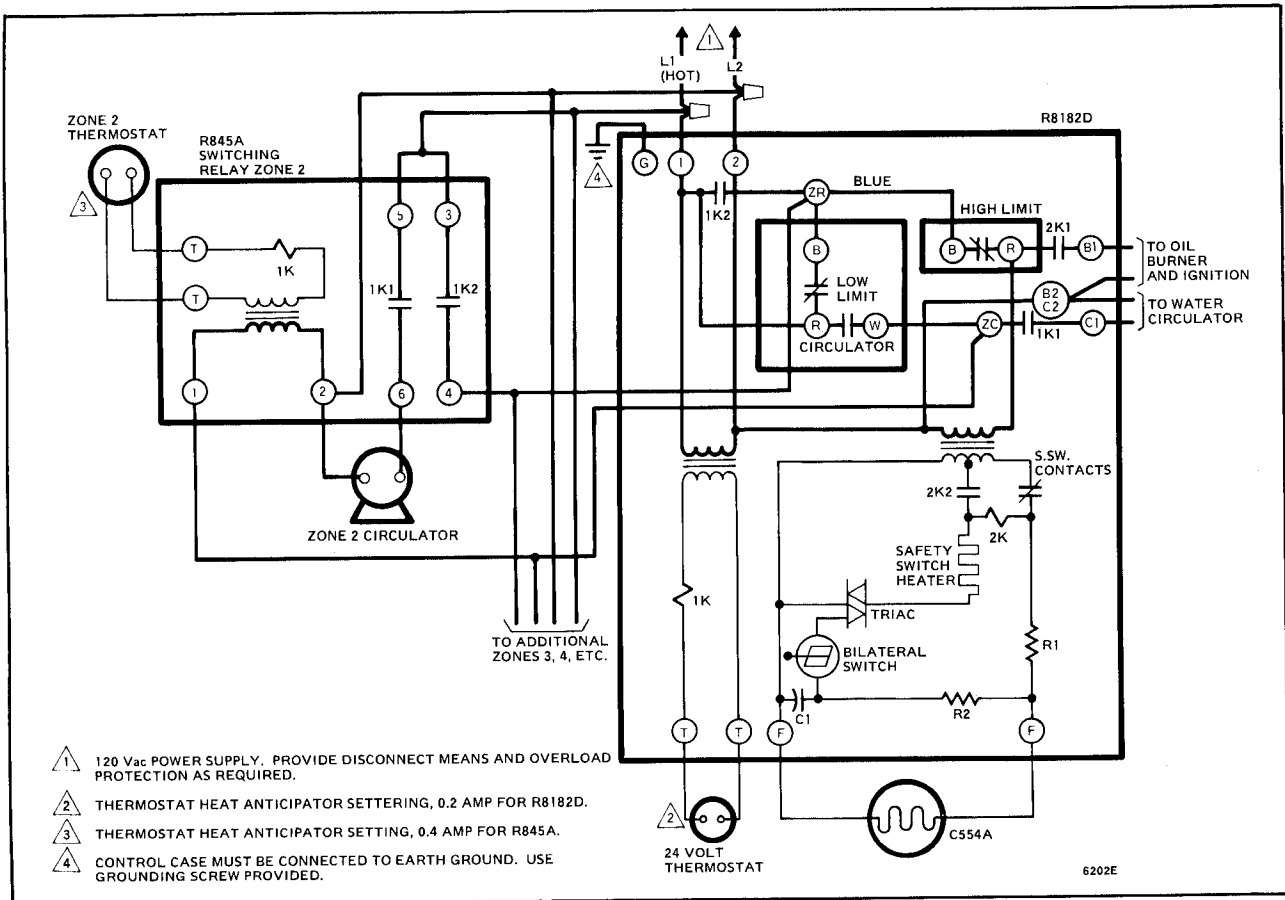


FIG. 18—INTERNAL SCHEMATICS FOR R8182D and R845A WITH TYPICAL CONNECTIONS FOR MULTIPLE CIRCULATOR ZONING. R8182E,H, AND J CONNECTIONS FROM ZC AND ZR ARE IDENTICAL FOR MULTIPLE CIRCULATOR ZONING APPLICATION. EACH ADDITIONAL ZONE REQUIRES A SEPARATE FIELD-ADDED 24 V THERMOSTAT AND R845 RELAY.

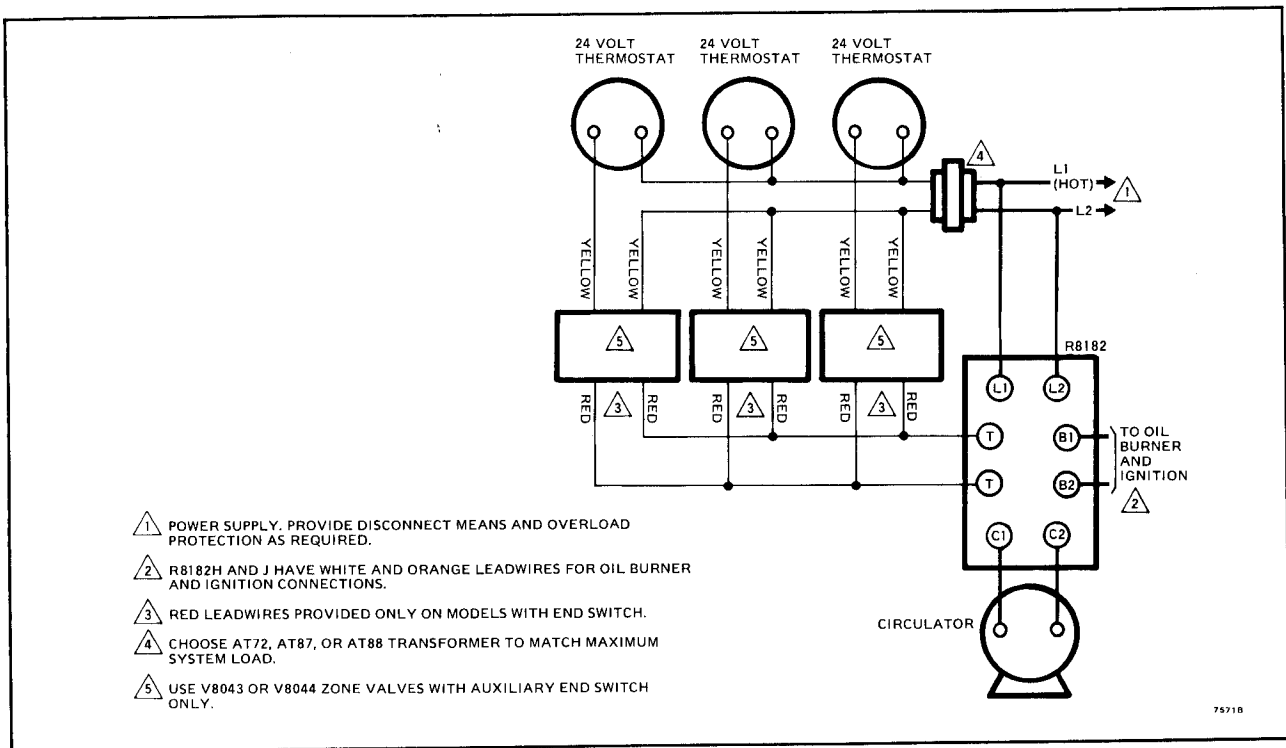


FIG. 19—TYPICAL CONNECTIONS FOR R8182D,E,F,H OR J FOR MULTIPLE ZONING WITH ZONE VALVES.

OPERATION

R8182D

A call for heat by the thermostat pulls in relay 1K which energizes the safety switch circuit and relay 2K to turn on the burner. Safety switch starts to heat. If burner ignites within safety switch timing, the cadmium sulfide flame detector sees flame and safety switch heater circuit is bypassed. Burner operates until call for heat is satisfied. Circulator operates when relay 1K pulls in *only* if R to W is made in the Aquastat limit.

When R to B (low limit) is made by a drop in water temperature, it acts as a call for heat, pulling in relay 2K to turn on the burner. Circulator cannot operate. See Figs. 13, 18, 19, and 20.

R8182E

Burner and circulator operate whenever thermostat calls for heat. Relay 2K pulls in. When cadmium sulfide flame detector sees flame, the safety switch heater circuit is bypassed. 2K is held in through 2K1. If temperature rises to high limit set point, R to B breaks shutting off burner. Circulator continues operation under direction of thermostat. See Figs. 14, 18, 19, and 21.

R8182F

Thermostat call for heat pulls in relay 2K to turn on burner. When cadmium sulfide flame detector sees flame, safety switch heater circuit is bypassed. Circulator is independent of thermostat circuit, being controlled only by Aquastat limit switch. See Figs. 15, 19 and 22.

R8182H

A call for heat by the thermostat pulls in relay 1K which energizes the safety switch circuit and relay 2K to turn on the burner. Safety switch starts to heat. If burner ignites within safety switch timing, cadmium sulfide flame detector sees flame and safety switch heater circuit is bypassed. Burner shuts off when call for heat is satisfied. Circulator operates when relay 1K pulls in *only* if R to W in the Aquastat limit is made.

When R to B (low limit) is made by a drop in water temperature, it acts as a call for heat, pulling in relay 2K to turn on the burner. Circulator cannot operate. See Figs. 16, 18, 19 and 20.

R8182J

Burner and circulator operate whenever thermostat calls for heat. Relay 2K pulls in. When cadmium sulfide flame detector sees flame, the safety switch heater circuit is bypassed. 2K is held in through 2K1. If temperature rises to high limit set point, R to B breaks shutting off burner. Circulator continues operation under direction of thermostat. See Figs. 17, 18, 19, and 21.

MULTIZONE CONTROL

In all multizone applications, a call for heat in any zone energizes the safety switch circuit and relay 2K pulls in. If burner ignites within safety switch timing, the cadmium sulfide flame detector sees flame and safety switch heater is bypassed.

In all multizone applications with R8182D and H, the low limit control in the Aquastat limit acts independently to turn on the main burner on a drop in water temperature. When R to B (low limit) is made, relay 2K pulls in to turn on the main burner, the same as in single-zone applications.

ZONE CIRCULATOR CONTROL WITH R8182D,H

The relay for each zone is connected to the Aquastat limit through terminals ZC and ZR. The R845 Relay and thermostat for each zone can energize the zone circulator through ZC *only* if R to W in the Aquastat limit is made. If R to B (high limit) is made, the zone thermostat energizes the burner through ZR.

ZONE CIRCULATOR CONTROL WITH R8182E,J

The relay for each zone is connected to the Aquastat limit through terminals ZC and ZR. The R845A Relay and thermostat in each zone can energize the zone circulator through ZC on a call for heat. If R to B (high limit) is made, the zone thermostat energizes the burner through ZR.

ZONE VALVE CONTROL WITH R8182

The valve for each zone is connected to the Aquastat limit by wiring end switches on the zone valve to T-T on the R8182. On a call for heat from any zone, the R8182 operates the same as in single zone applications.

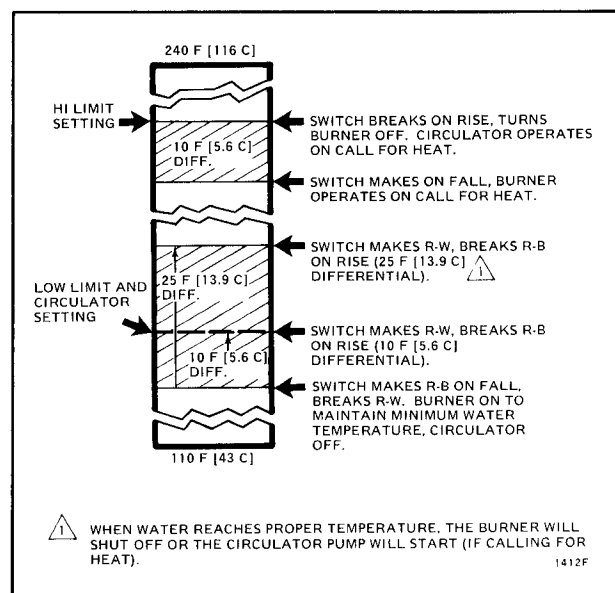


FIG. 20—AQUASTAT LIMIT SWITCHING FOR R8182D,H.

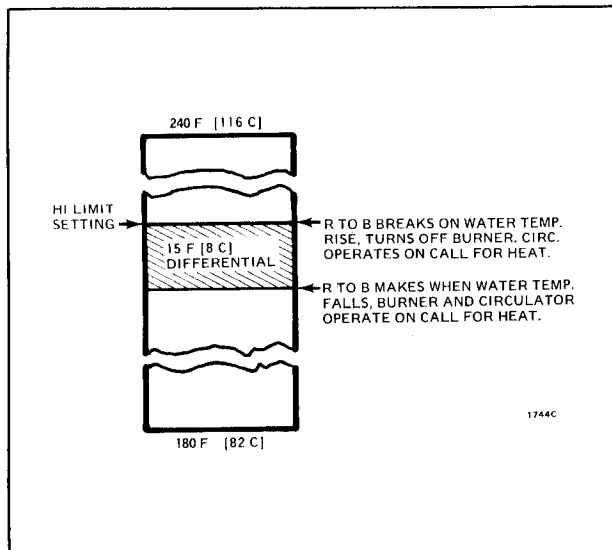


FIG. 21—AQUASTAT LIMIT SWITCHING FOR R8182E,J.

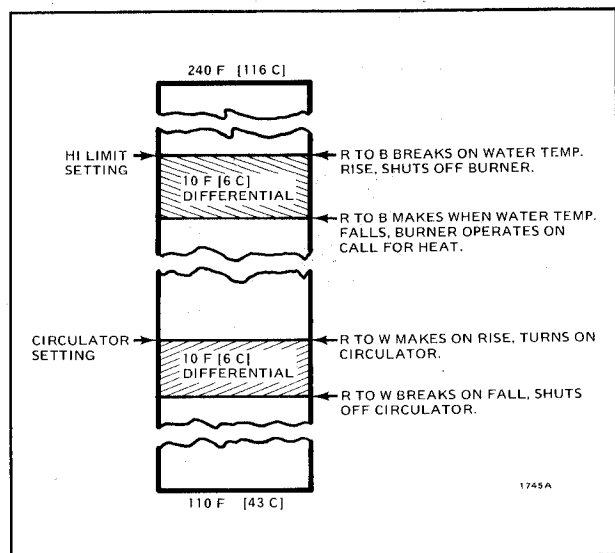


FIG. 22—AQUASTAT LIMIT SWITCHING FOR R8182F.

SETTING AND CHECKOUT

Because heating systems differ, the correct temperature setting for one system may not be correct for another. Follow the boiler manufacturer's recommendations for proper selection of settings.

HIGH LIMIT SETTING—ALL MODELS

The high limit opens and turns off the burner when the water temperature reaches the set point. The high limit automatically resets after the water temperature drops past the set point and through the 10 F [5.6 C] (15 F [8.0 C] with R8182E,J) differential.

Set the indicator at desired shutoff temperature.

LOW LIMIT/CIRCULATOR SETTING—D AND H MODELS

On a temperature rise, with the adjustable differential at the minimum setting of 10 F [5.6 C], the burner circuit (R-B) breaks and the circulator circuit (R-W) makes at the low limit set point. See Fig. 20. On a temperature drop of 10 F [5.6 C] below the set point, the R-B circuit makes and the R-W circuit breaks.

At any differential setting greater than 10 F [5.6 C], the R-B make temperature and R-W break temperature will remain the same—control setting minus 10 F [5.6 C]. The R-B break and R-W make temperature will be the set point temperature plus the difference between the differential setting and 10 F [5.6 C].

EXAMPLE: Set point of 140 F [60 C]; differential set at 25 F [14.0 C]. On a temperature rise, R-B will break and R-W will make at 155 F [68 C]. On a temperature fall, R-B will make and R-W will break at 130 F [54 C].

Set low limit indicator at the minimum temperature recommended for domestic hot water supply. This setting *must* be at least 20 F [11.0 C] below high limit setting to prevent one switch from locking out the other.

Set the differential the desired number of degrees.

CIRCULATOR SETTING—F MODELS

Set circulator indicator at the minimum water temperature recommended for hydronic heating comfort.

SETTING STOPS (R8182D,H TRADELINE)

Part No. 126580 Setting Stops may be installed on the low and high limit adjusting knobs to prevent turning the knobs beyond a predetermined point. To install the setting stops, proceed as follows:

IMPORTANT

Once the setting stops are in place, they cannot be replaced. If they must be removed, snip them off with cutters—do not twist off.

1. On low limit knob, turn knob to setting that is to be established as the limit.
 2. Place setting stop over knob so that arm of setting stop will (after stop is pressed into place) strike projection "A" and prevent turning the knob beyond the chosen limit setting. See Fig. 23.
 3. Press setting stop tightly onto knob so that its inner teeth engage knob securely.
 4. Turn knob back and forth several times to make sure stop functions properly.
 5. Repeat steps 1-4 for high limit knob.
- When settings have been made, replace the cover.

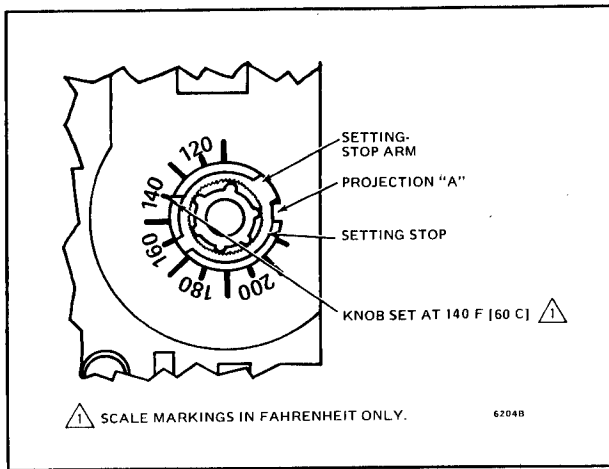


FIG. 23—SETTING STOP IN POSITION TO RESTRICT LOW LIMIT SETTING TO 180 F [82 C] OR BELOW.

START-UP

CAUTION

Be sure combustion chamber is free of oil or vapor.

1. Push red reset button and release.
 2. Open hand valve on oil supply line.
 3. Set thermostat to call for heat.
 4. Close line switch; burner will start.
 5. Under normal conditions, burner operates until thermostat is satisfied or line switch is opened.
- Make certain the system operates as described in OPERATION. Use the following procedure to verify that the Protectorelay burner sequencing relay is controlling properly.

FLAME FAILURE CHECK

Shut off oil supply hand valve while burner is on. After 45 seconds the safety switch locks out, motor stops, and the oil valve closes. Allow 5 minutes for burner to cool, then reset safety switch manually.

IGNITION FAILURE CHECK

Test by closing oil supply while burner is off. Run through starting procedure but do not open the oil supply line hand valve. Safety switch locks out as in flame failure. Then turn oil back on, and reset safety switch.

POWER FAILURE CHECK

Turn off power supply while burner is on. When burner goes out, restore power and burner will restart.

NOTE: If operation is not as described, see cover insert for additional information and check wiring.

AQUASTAT CONTROLLER REPLACEMENT

The Aquastat limit section of the Protectorelay control is field replaceable. When ordering a replacement assembly, specify the complete model number of the R8182.

TO REPLACE THE AQUASTAT LIMIT

1. Disconnect power supply.
2. ON ALL MODELS—NOTE THE POSITION OF THE CONNECTING WIRES.
3. Remove fastening screws and wires.
4. Remove Aquastat limit and install new assembly.