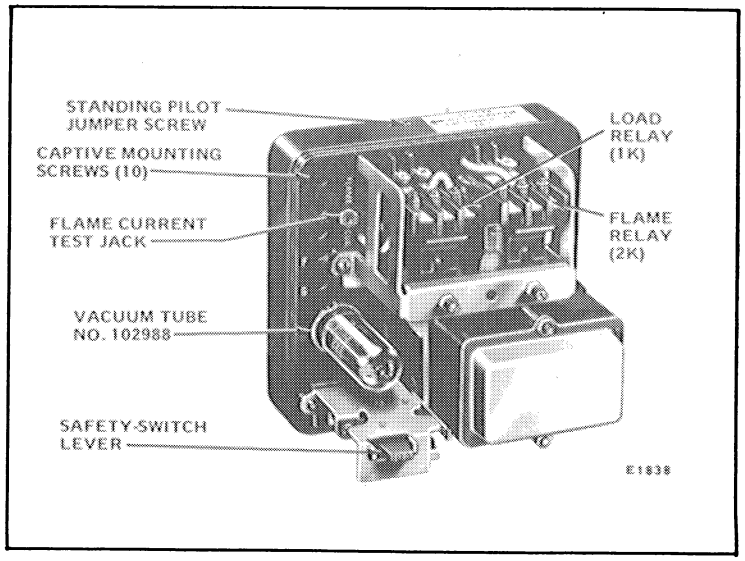
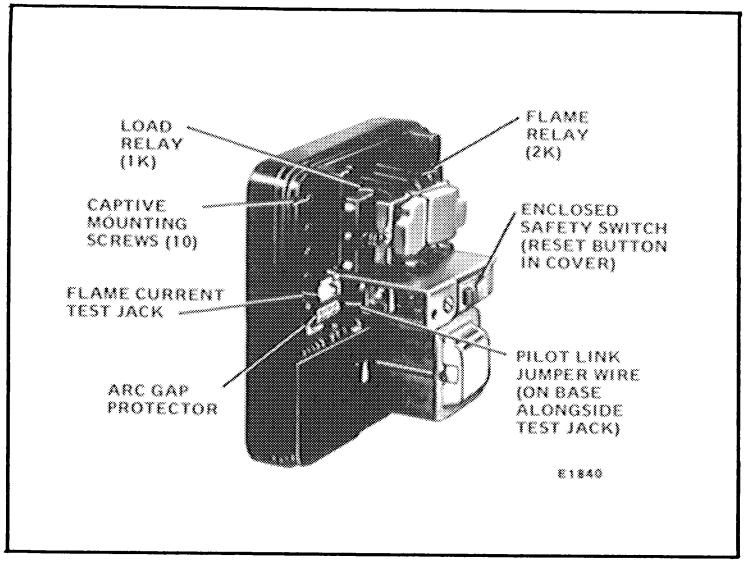
CONTENTS

RA890 AND R4795 MODELS

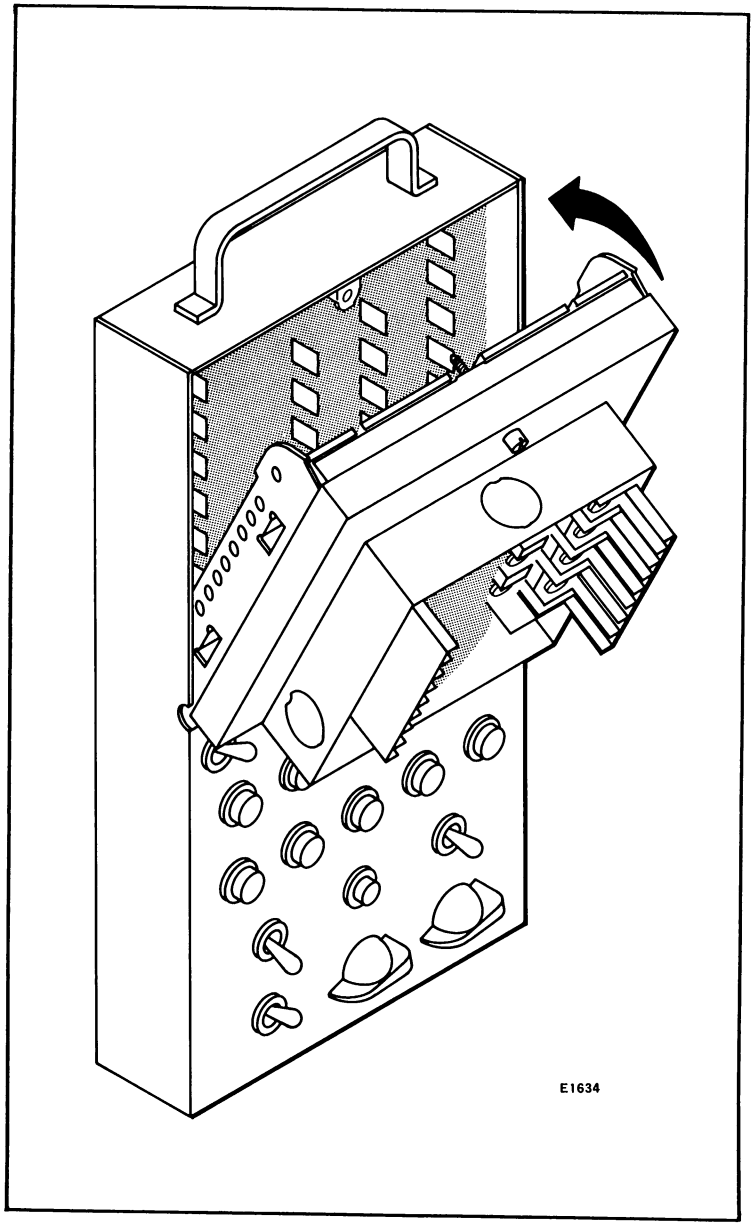


RA890E—electronic flame safeguard primary control for use with rectification type flame detectors (obsolete device no longer available).



RA890F—solid state electronic flame safeguard primary control for use with rectification type flame detectors—interchangeable with RA890E.

198355A ADAPTER BASE R7795A,B,C,D



The 198355A Adapter Base, when used with the FSP5004 Tester, provides a quick operational check of Honeywell R7795 full function primaries. Indicator lamps visually represent the control functions of the R7795 as it operates through its sequence.

The 123514B Flame Simulator is used when troubleshooting an R7795A,D, R4795A,D with R7290 Amplifier or RA890G system. The flame simulator plugs directly into the flame current jack on the primary control.

CAUTION

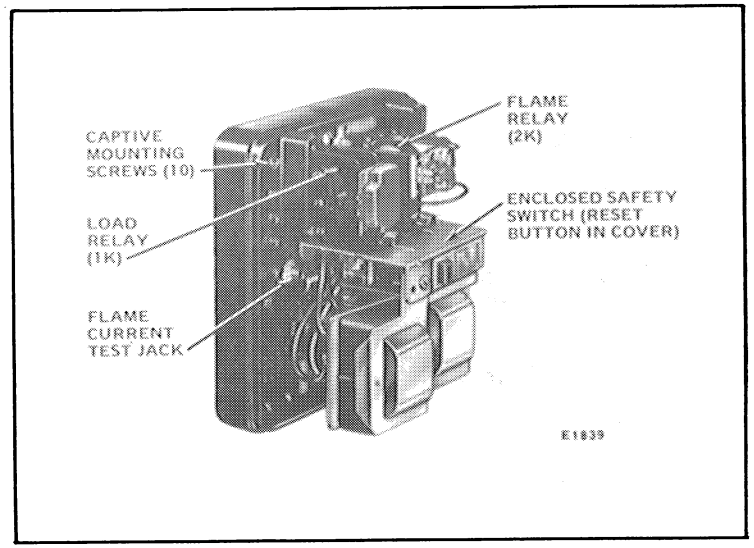
The captive mounting screws complete electrical connections. Always open the disconnect switch before loosening these screws.

NEVER USE OIL ON ANY PART OF THE R4795, R7795, OR RA890.

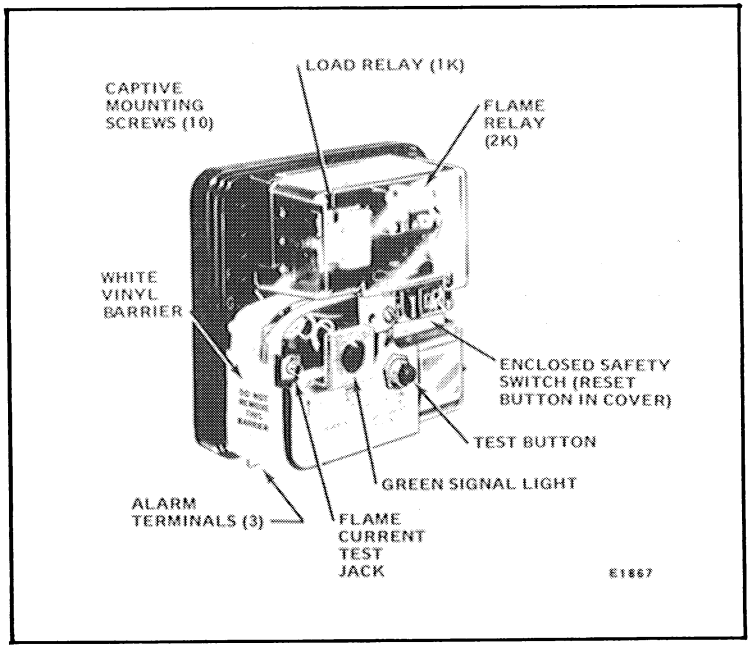
On the RA890H,J,K a tamper-resistant case covers the relays. *Do not* attempt to remove the case to clean the contacts.

Relay contacts should never be pushed in manually. This may damage the relays—and it is an unsafe practice because it overrides the protective features of the control. *Do not* push in the contacts to clean them. Use Honeywell contact cleaner, Part No. 132569. Only clean contacts when required by failure to operate properly.

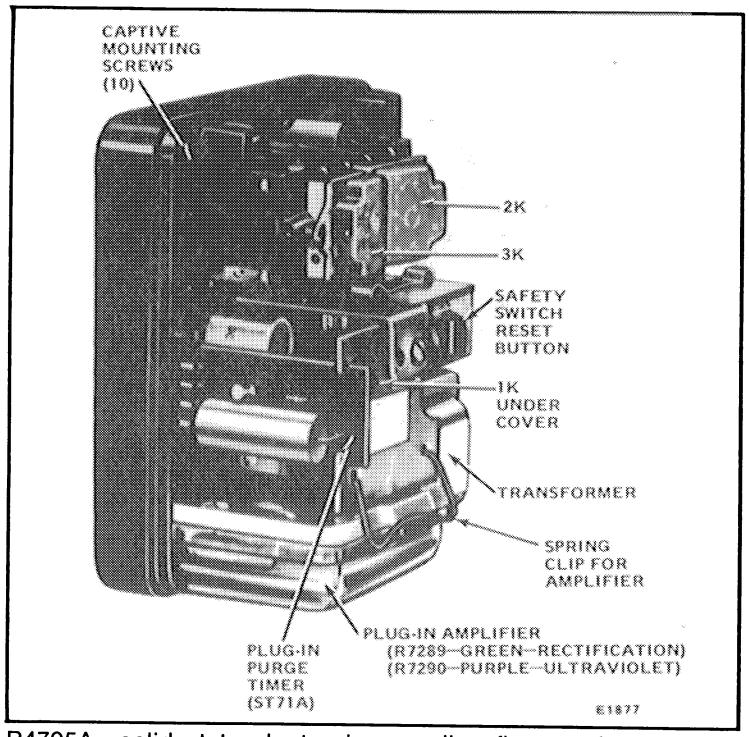
Only an experienced, trained, flame safeguard control service technician should service the R4795, RA890, or R7795.



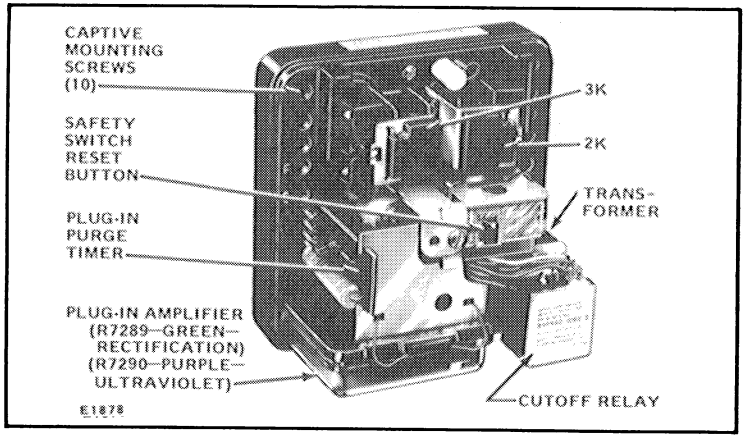
RA890G—solid state electronic flame safeguard primary control for use with ultraviolet Minipeeper flame detector (C7027 or C7035).



RA890H,J,K—self-checking, solid state electronic flame safeguard primary controls for use with rectification type flame detectors—directly replaces RA890E and F for most applications. (RA890K is obsolete and no longer available.)

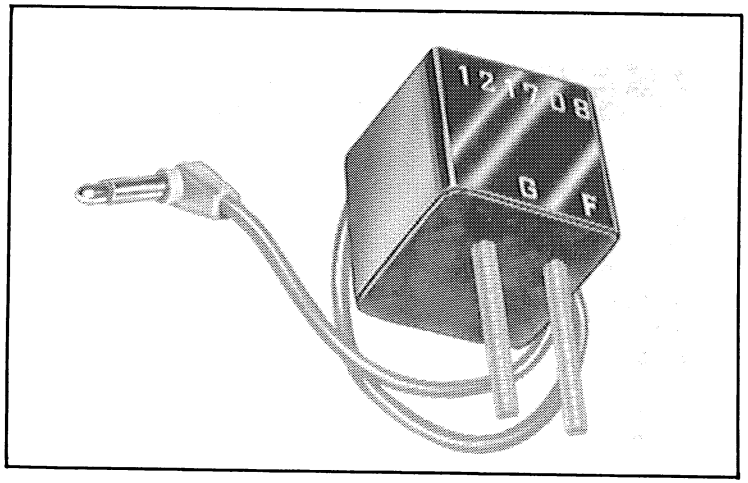


R4795A—solid state electronic recycling flame safeguard primary control with prepurge timer. Use with R7289A Amplifier on rectifying flame rod, rectifying photocell, C7012A,C Purple Peeper Ultraviolet Flame Detector; use with R7290A Amplifier on C7027A, C7035A, C7044A Minipeeper Ultraviolet Flame Detector.



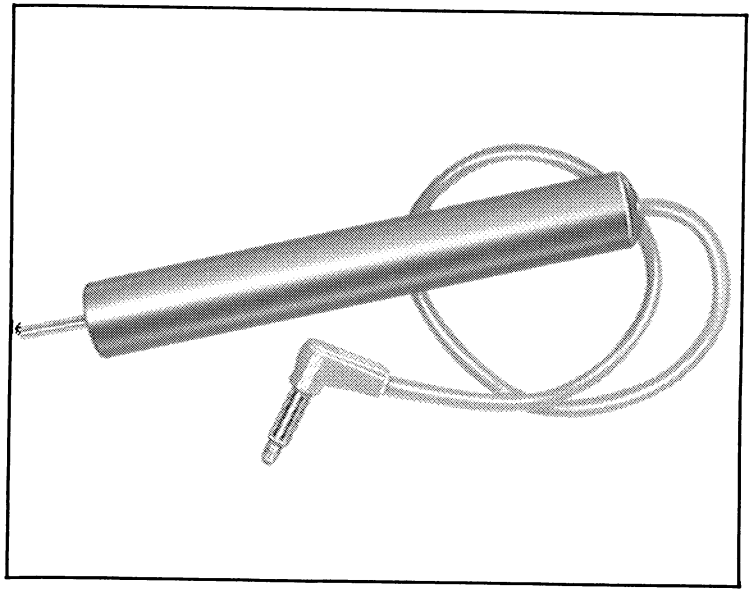
R4795D—solid state nonrecycling electronic flame safeguard primary control with prepurge timer. Use with R7289A Amplifier on rectifying flame rod, rectifying photocell, or C7012A,C Purple Peeper Ultraviolet Flame Detector; use with R7290A Amplifier on C7027A, C7035A, C7044A Minipeeper Ultraviolet Flame Detector.

121708 FLAME SIMULATOR FOR RECTIFICATION SYSTEMS

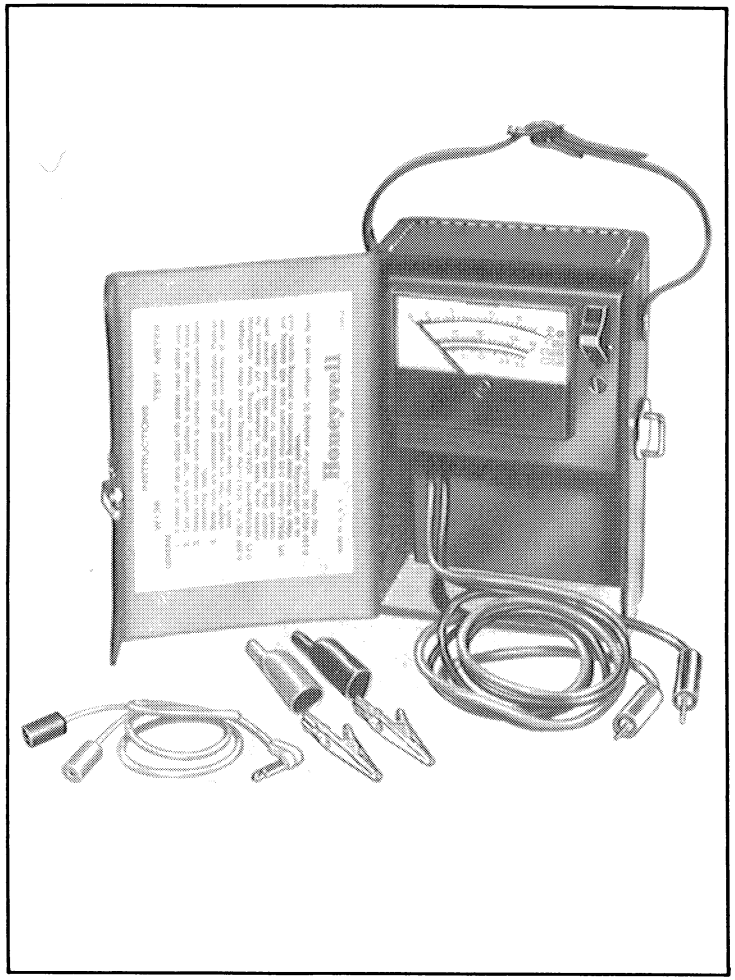


The 121708 Flame Simulator is used to help locate the source of trouble in an R4795A,D with R7289 Amplifier, RA890E,F,H,J,K, or R7795B,D system. It duplicates the electrical characteristics of a rectification type of flame detector. This allows the service technician to isolate the trouble in either the flame detector or the flame safeguard control.

123514B FLAME SIMULATOR FOR UV SYSTEMS

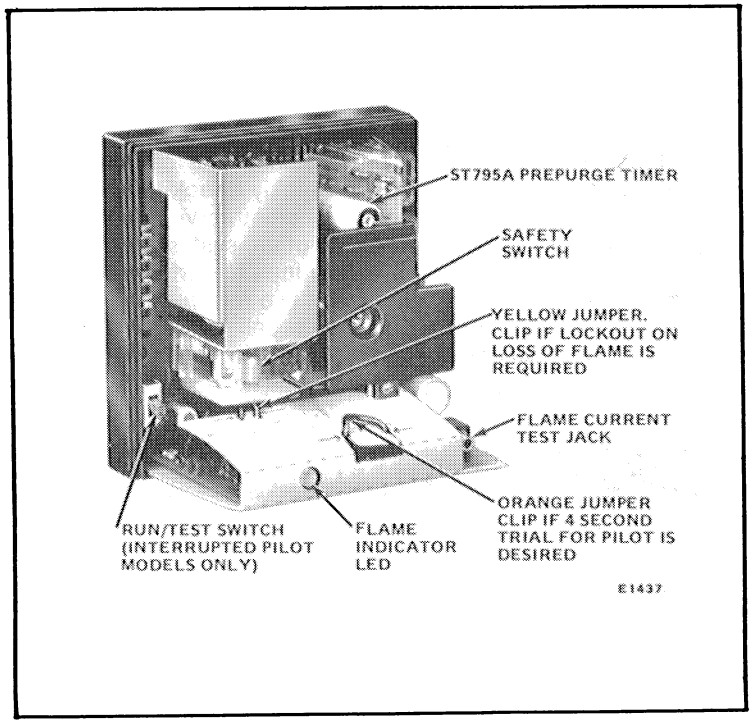


W136A TEST METER



The W136 Test Meter is a handy instrument for checking flame current and line voltage power supply on RA890 or R4795 systems. Scale ranges include—

—0-300 Vac.
—0-150 Vdc.
—0-25 microamps dc.
—SPL (special), 0-25 microamps dc with a filter for measuring flame current in pulsing type flame safeguard controls.



R7795A,B—solid state, electronic timing, intermittent pilot with plug-in purge timers. R7795A is used with C7027 or C7035 UV detectors. R7795B is used with rectifying photocells, flame rods, or C7012 detectors.

R7795C,D—solid state, electronic timing, interrupted pilot with plug-in purge timer. R7795C is used with C7027 or C7035 UV detectors. R7795D is used with rectifying photocells, flame rods, or C7012 detectors.

CHECKING RA890, R4795 AND R7795 SYSTEMS

The hardest job in most service situations is determining the exact location and nature of the problem. The checkout procedure that follows is designed to quickly check the operation of the RA890, R4795 or R7795 to tell what service is required, and to pinpoint troubles in other parts of the system.

The RA890, R4795 or R7795 is designed to perform two basic switching functions through the use of two relays.

1. The load relay (1K) responds to a call for heat. On R4795 and R7795, load relay responds only after prepurge is completed.
2. The flame relay (2K) responds to a flame signal.

CAUTION

1. Only a trained, experienced, flame safeguard control service technician should attempt to service the RA890.
2. Use utmost care while testing the RA890; line voltage can be present on some terminals and relay contacts when power is on.

TOOLS REQUIRED

The following tools are required to service the primary relay efficiently:

Screwdriver *(with insulated handle).*

121708 Flame Simulator for rectification systems with RA890E,F,H,J,K, R4795A,D and R7795B,D.

123514B Flame Simulator for UV systems with RA890G, R4795A,D and R7795A,C.

Voltmeter
DC Microammeter } Recommended W136A Meter

Insulated jumper wires.

If you service a large number of RA890 or R4795 controls, the FSP1535 Tester will save you time and money (refer to page 55). The 198355A Tester Adapter will allow the R7795 to be tested on the FSP5004. (See page 59.)

PRELIMINARY CHECK

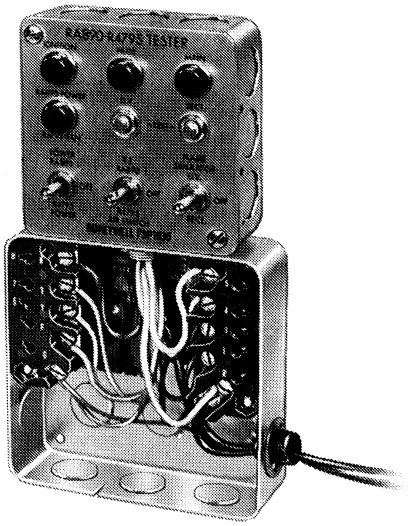
1. If the system uses a standing pilot, be sure it is lighted and the screw is removed (RA890E) or wire loop clipped (RA890F).
2. If the control is an RA890E, be sure the vacuum tube is seated securely.

RA890, R4795, AND R7795 TEST EQUIPMENT

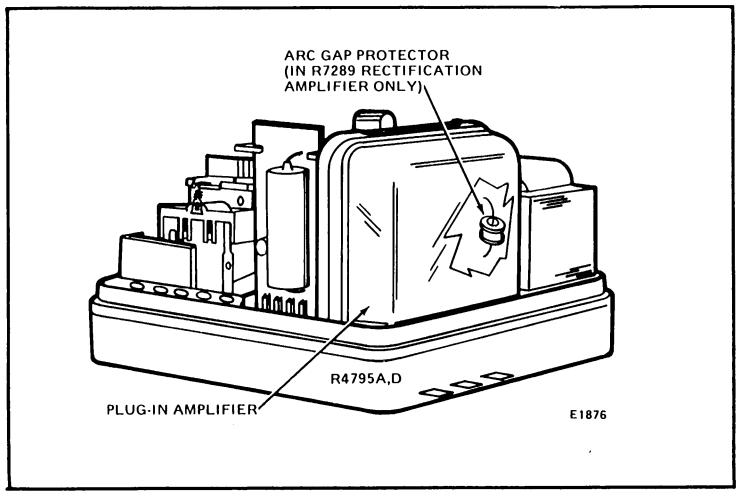
FSP1535 TESTER

RA890E,F,G,H,J,K

R4795A OR D



The FSP1535 Tester provides a quick operational check of the R4795 and RA890 series of controls. These panels are especially valuable to the service technician who works with a large number of R4795's and RA890's, or to the wholesaler for checking returned in-warranty devices. By operating the tester through its sequence, the functions of ignition, pilot, and main valve energization are visually represented by indicator lights. This allows a thorough check of the R4795 or RA890 without actually operating the entire system it is controlling. The FSP1535 includes complete operating instructions.



The arc gap conducts at high voltage levels to bypass the network. However, the interference at these levels is great enough to mask the flame signal and, thus, it causes a shutdown of the system. If the interference is severe, the arc gap will glow, providing a visual indication of interference.

Ignition interference (below the arcing level) can be determined by measuring the flame current with ignition and pilot on, and then with pilot only. Any significant difference (greater than 1/2 microampere) may indicate interference.

IMPORTANT

When an R4795A,D or RA890F,H,K replaces an RA890E—there may be installations where ignition interference is not sufficient to destroy the RA890E, but is sufficient to prevent operation of the R4795A,D or RA890F,H,K due to its arc gap protection. *Be very suspicious of ignition interference on any installation where the RA890E operates and the R4795 or the RA890F,H,K does not.*

HOW TO ELIMINATE INTERFERENCE
(Tabulated in Order of Importance)

1. Provide adequate flame grounding area.
2. Be sure the ignition electrode and the flame rod are on opposite sides of the grounding area.
3. Check for correct spacings on the ignition electrode. Spacing should by 1/16 in. [1.5 mm] to 3/32 in. [2.5 mm] for 6,000 volt systems; 1/8 in. [3 mm] to 3/16 in. [5 mm] for 10,000 volt systems.
4. Eliminate any marginal spacings at other areas along the lead routes. Replace any deteriorated leads.

TESTING STANDBY OPERATION

NOTE: R4795D does not have standby operation.

CHECK	POSSIBLE PROBLEM	CORRECTIVE ACTION
1. Set controller to not call for heat (lower set point).		
2. Reset safety switch by pushing reset button.		
3. Close master switch.		
4. RA890E,G—check for line voltage between terminals 1 and 2. RA890E,F,G,H,J or K—check for line voltage between terminals 6 and 2 if controls cycle off T-T. R7795—check for line voltage between terminals L1 and L2. Voltage should be within +10 to −15 percent of rated voltage.	4a. No voltage between terminals 1 and 2. 4b. No voltage between terminals 6 and 2. 4c. No voltage between terminals L1 and L2. 4d. Voltage not within +10 to −15 percent of rated voltage.	4a. RA890E or G—check power supply line. 4b. RA890F,H,J,K—check limits, replace if necessary △1 4c. R7795—check power supply line. 4d. Correct voltage supply.
5. RA890E only—check that tube filaments are lighted.	5a. Tube not lighted. 5b. New tube doesn't light up.	5a. Replace tube △2 5b. Replace RA890E.

For notes △1 △2 , refer to page 14.

(continued)

TESTING STANDBY OPERATION (continued)

CHECK	POSSIBLE PROBLEM	CORRECTIVE ACTION
6. Check position of load and flame relays: Both relays should be out, except RA890E using line voltage controller—right-hand flame relay should be in, left-hand load relay should be out (T-T jumpered).	6a. RA890E: Relay positions not as stated. 6b. RA890E,F,H or J with low voltage controller; flame relay pulled in (green signal light blinking on RA890H,J or K). 6c. RA890G: If flame relay is pulled in, control will lock out. On R4795A, startup is prevented while flame relay is pulled in.	6a. Replace vacuum tube. 6b. Check for flame simulating condition (3). If burner has a standing pilot, check that RA890F pilot link is clipped or that RA890E pilot screw is removed. 6c. Check for flame simulating condition (3). If trouble persists, replace control.

TESTING STARTING OPERATION

7. Set controller to call for heat.		

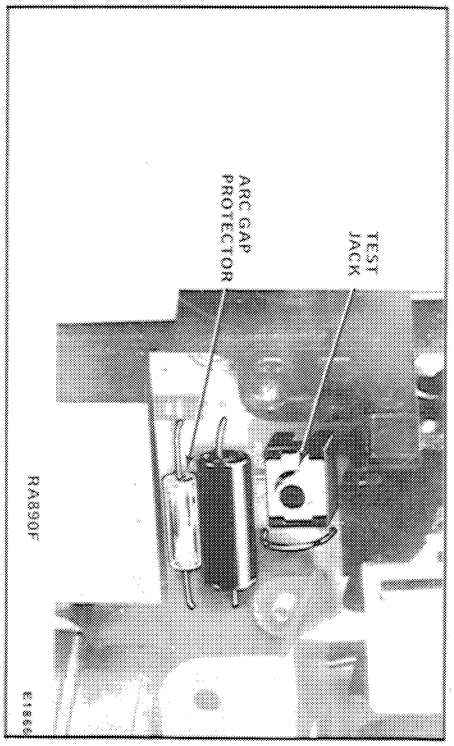
(continued)

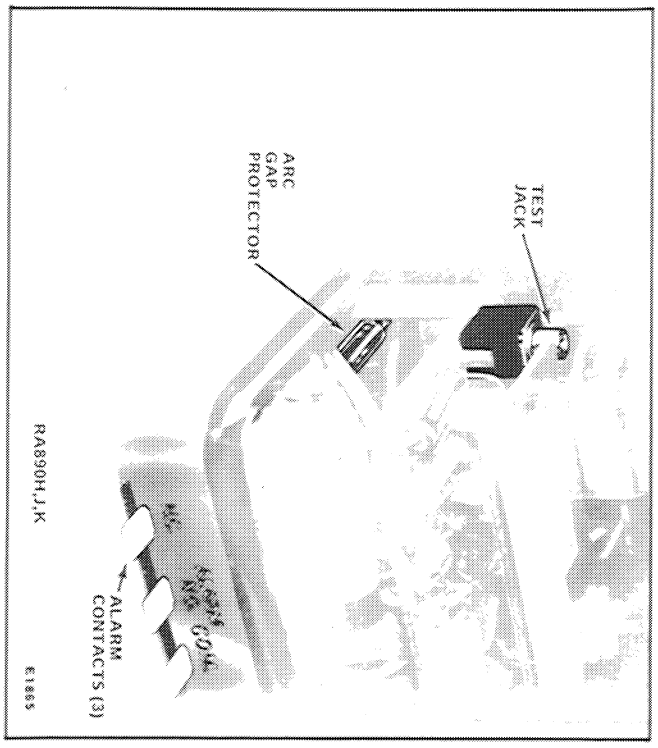
For note (3), refer to page 14.

6. IGNITION INTERFERENCE (Flame Rod Detectors Only)

Ignition interference is a false signal from a spark ignition system superimposed on the flame signal. The interference may be additive or subtractive (increase or decrease the flame current), and in some instances could be sufficient to destroy the electronic network of the RA890E. The R4795 with R7289 amplifier, RA890F,H,J,K and R7795B,D networks are protected against damage from high voltage ignition interference by the arc gap shown.

ARC GAP PROTECTORS





Contact cleaning on controls has generally been done by putting light pressure on the contacts while sliding a smooth-surfaced card back and forth. Newer relays, such as those used in the R4795D, R7795 and RA890F,G are more sensitive and, consequently, more delicate. There is a possibility of damaging these more sensitive relays by using a card to clean contacts. In order to standardize on a single method of cleaning contacts, Honeywell has tested numerous contact cleaners and has established a Honeywell contact cleaner which is available under Honeywell Part No. 132569. This cleaner comes in pressurized spray cans; directions for its use are printed on the can. Do not use other commercial contact cleaners.

Most commercial cleaners have one of two serious drawbacks—either they leave contaminants on the contact surface, or they attack chassis parts. *Use only Honeywell cleaner on the RA890.* This new cleaner may be used for all contact cleaning requirements.

IMPORTANT

Do not clean contacts as part of the routine maintenance procedure, but only when they fail to operate properly. Use Honeywell contact cleaner 132569.

4. REPEATED FAILURES

The most common causes of repeated failures of the control or flame detector are:

a. High ambient temperatures—
   RA890E—115 F max.
   R4795A,D and RA890F,G,H,J,K—125 F max.
   R7795—135 F max.
   Subtract 10 degrees for 50 Hz operation for R4795A,D and RA890F,H,J,K.
b. Supply voltage variation—
   For reliable operation, the supply voltage must not exceed the rated voltage by more than plus 10 percent or minus 15 percent.
c. Electrical overloading of the contacts.
d. Marginal or fluctuating flame current.
e. Frequent cycling at high ambient temperatures.

5. RELAY CHATTER

The main causes of relay chatter are low voltage, loose connections, and dirty relay contacts. If the flame relay chatters on pull-in, the first step should be to check the flame current (page 43).

On the RA890F,G,H,J the pull-in of the load relay is delayed by a thermistor. (On the RA890K, the load relay pulls in immediately.) As a result, the load relay coil may buzz briefly before pull-in. This is normal and is not relay chatter.

TESTING STARTING OPERATION (continued)

CHECK	POSSIBLE PROBLEM	CORRECTIVE ACTION
8. R4795A,D and R7795A,B,C,D—observe action of 3K relay. Relay 3K should pull in, and burner motor start if okay; proceed to step 9.	8a. Relay 3K does not pull in.	8a. Check voltage at terminals 1 and 2. On R7795, check 16 and L2. If voltage okay, clean 1K and 3K relay contacts. If voltage is zero, check circuit to controller limit. Replace R4795 or R7795 if trouble persists.
	8b. Relay 3K pulls in, but burner motor does not start.	8b. Check for power at terminal 8. Power okay, check fan or burner motor. No power, clean 3K contacts. Recheck for power. If no power, replace R4795 or R7795.
9. R4795A,D and R7795A,B,C,D—observe operation during prepurge. Prepurge should occur in rated timing.	9a. R7795A,B,C,D and R4795D locks out during prepurge.	9a. Flame relay pulled in. Check for flame simulating condition ③
	9b. Prepurge does not stop at end of purge timing. (Relay 1K does not pull in.)	9b. Check that the RUN/TEST switch is in RUN position on R7795C,D.
		9c. Check seating of purge timer. Check for 0 Vdc between terminals 7 (+) and 6 (−). If voltage not 0, check air switch contacts and wiring.

(continued)

For note ③, refer to page 14.

CHECK	POSSIBLE PROBLEM	CORRECTIVE ACTION
		Check if flame relay pulled in. Not pulled in, clean 2K contacts (4) Pulled in, check for flame simulating condition (3) Replace purge timer. Replace R7795 or R4795 if trouble persists.
10. Observe load and flame relays: Load relay should pull in to light pilot or to start burner motor, except RA890E using line voltage controller—flame relay drops out, load relay pulls in to light pilot or start burner motor. If okay, proceed to step 14.	10a. Load relay doesn't pull in. 10b. Load relay pulls in but pilot doesn't light or burner doesn't start. 10c. Flame relay stays in (RA890E with line voltage controller), or pulls in on call for heat (R4795A,D or RA890F,H,J,K with line voltage controller)—green signal light blinks on RA890H,J, or K. NOTE: RA890J,K would still start under this condition.	10a. Proceed to steps 11 and 12. 10b. Proceed to step 13. 10c. Check for flame simulating condition (3) If burner has a standing pilot, check that RA890F pilot link is clipped or that RA890E pilot screw is removed.

(continued)

For note (3), refer to page 14.

SERVICE NOTES

1. GENERAL SERVICE

a. Only trained, experienced, flame safeguard control service technicians should attempt to service heating equipment or controls.
b. Do all checks required under FINAL CHECKOUT (pages 48 to 45) when replacing the primary control, or when relighting or restoring power to the system after shutdown.
c. The captive mounting screws carry current; always disconnect power before loosening or tightening mounting screws.
d. On each service call, check the controller for approximately correct calibration and differential; ensure that it is mounted securely. (See controller instructions.)
e. Never use oil on any part of the R4795, RA890, or R7795.
f. When cleaning the burner, clean the flame detector.
g. On the RA890H and J, a tamper-resistant case covers the relays. *Do not* attempt to remove case to clean contacts.
h. *Never* push or hold in the relays manually. This may damage the relays and it is an unsafe practice because it overrides the protective features of the control.

2. PERIODIC MAINTENANCE

The specific maintenance schedule will be determined by a number of factors such as the type of heating equipment being supervised, the operating conditions (dirt and heat), the cost of nuisance shutdown, etc. The following should be included in any program:

Replace vacuum tubes in the RA890E and C7012 Flame Detector (if used) annually (*use only Honeywell tubes*).

Perform a flame failure check and Pilot Turndown Test annually and whenever the burner is serviced.

Inspect and clean the detector and any viewing windows as often as is required by soot accumulation and heat conditions at the detector.

Check the flame current monthly (more often where shutdowns are costly).

3. CONTACT CLEANING

CAUTION

Open the master switch before removing cover or cleaning contacts. Line voltage is present on most contacts when power is on. Clean contacts only when required by failure to operate properly.

FLAME FAILURE (Oil or Gas)

With the burner operating, close the manual fuel valves to simulate a flame failure. System should lock out after safety switch timing (15 or 30 seconds). R4795A and R7795 (with wire not clipped) will go through prepurge and make one attempt to reignite the burner. After the safety switch has cooled, open the manual fuel valves, light the pilot (on standing pilot applications), and then reset the safety switch. Burner should restart.

POWER FAILURE (Oil or Gas)

Let the burner run 5 minutes. Then simulate power failure by opening the line switch. All relays should drop out and the fuel valves should close. After a minimum of 5 seconds, close the line switch. The RA890, R4795, or R7795 should go through a normal cycle.

HOT REFRACTORY HOLD-IN (Photocell Oil Installations Only)

If hot refractory holds in the flame relay at the end of the burner-on cycle, the system cannot restart until the relay drops out. The R4795D and R7795 will lock out. Check for hot refractory hold-in by observing the flame relay for immediate dropout (green signal light stops blinking on RA890H or J) at the end of a long burner-on period. If the relay does not drop out (green signal light keeps blinking on RA890H or J), resight the photocell so it does not sight the refractory, or decrease photocell sensitivity by use of aperature discs or filters.

IGNITION SPARK RESPONSE TEST (UV Installations Only)

The flame relay should not respond (pull in) to ignition spark. To determine flame detector sensitivity to ignition spark, perform the following steps:

1. Shut off pilot and main fuel valves.
2. Start system by raising controller set point. This should energize the ignition transformer so ignition spark is produced between electrode and ground.
3. Check flame relay (2K). The relay should *not* pull in.
4. If relay 2K does pull in, resight the detector farther out from the spark, or away from possible reflection. It may be necessary to construct a barrier to block the ignition spark from the detector's view. Continue adjustments until flame detector does not respond to the ignition spark.

IMPORTANT

Repeat ALL required checkout tests after all adjustments have been completed. ALL tests must be satisfactory when the flame detector is in its FINAL position.

TESTING STARTING OPERATION (continued)

CHECK	POSSIBLE PROBLEM	CORRECTIVE ACTION
11. To check limit (and line voltage controller if used): a. RA890E—jumper terminals 1 and 6. b. RA890F,G,H,J,K—check for power at terminal 6. c. R4795A,D—check for power at terminal 1. d. R7795A,B,C,D—check for power at terminal 16.	11a. Load relay pulls in (RA890E) or no power at terminal 6 (RA890F,G,H or J). 11b. With low voltage controller: RA890E—load relay doesn't pull in, or RA890F,G,H or J—power at terminal 6, but load relay doesn't pull in. 11c. Load relay pulls in or no power at terminal 1 (R4795A,D). 11d. RA890E,F or G with line voltage controller—load relay doesn't pull in. 11e. RA890H,J,K with line voltage controller—power at terminal 6, but load relay doesn't pull in.	11a. Check limit (and line voltage controller if used) for open circuit. 11b. Proceed to step 12. 11c. Check limit and controller for open circuit or check power at L1 (HOT). 11d. Clean all relay contacts, and on RA890E, the safety switch contacts ⚠4. If load relay still does not pull in, replace RA890. 11e. Replace RA890.

For note ⚠3, refer to page 14.

(continued)

TESTING STARTING OPERATION (continued)

CHECK	POSSIBLE PROBLEM	CORRECTIVE ACTION
12. To check low voltage controller if used: Jumper T-T.	12a. Load relay pulls in only when T-T jumpered. 12b. RA890E,F or G—load relay doesn't pull in. 12c. RA890H,J,K—load relay doesn't pull in.	12a. Check low voltage controller for open circuit. Replace, if necessary. 12b. Clean all relay contacts, and on RA890E, the safety switch contacts. If load relay still does not pull in, replace RA890. 12c. Replace RA890.
13. If load relay pulls in but pilot won't light or burner motor won't start: Check that manual valves are open. Check voltage between terminals 3 and 2, and 4 and 2 (3 and 2 only on RA890J). On R7795, check voltage between terminals 5 and L2, and 18 and L2.	13a. No voltage at 3-2 or 4-2. (No voltage at 5-L2 or 18-L2 on R7795.) 13b. Voltage okay at 3-2 and 4-2. (Terminals 5-L2, 18-L2, on R7795.)	13a. Clean relay contacts ⚠4 (R4795A,D or RA890E,F,G only). Check that mounting screws are tight. If trouble persists, replace RA890, R4795, or R7795. 13b. Check burner motor, ignition, oil valve or pilot gas valve, and wiring to them.

(continued)

For note ⚠3, refer to page 14.

d. Again turn the pilot down *slightly* but not enough so the flame relay drops out. If the relay drops out, simply allow the control to complete the purge period (R4795A only) and then turn the pilot back up to pull in the flame relay as in step c, above. The RA890H,K, R4795D or R7795 (with wire clipped), will lock out if the 2K relay drops out. If this occurs, allow the safety switch to cool, reset the switch, then restart the system and adjust the pilot as in step c, above. The closer the pilot is to the dropout condition, the more conclusive the test will be.

CAUTION

DO NOT PUSH THE RELAYS IN MANUALLY.

4. *Check that pilot is lit and relay 2K is pulled in.*
5. Open the manual main burner shutoff cock. Main flame should light within 1 second. *If the burner does not light within 1 second, close the shutoff cock* and shut off power to the relay. Proceed to step 7.
6. If the burner lights, repeat step 5 two or three times to verify the lightoff.

CAUTION

If the pilot needs to be adjusted and rechecked, allow 5 minutes for the purge of unburned gases in the firebox before proceeding.

7. If the lightoff is unsatisfactory, readjust the flame detector to require a larger pilot flame to hold in the flame relay. This usually requires—
   a. resighting a photocell or UV type detector farther out on the axis of a pilot flame, or . . .
   b. adjusting a flame rod detector so that a larger minimum pilot is required.
8. Repeat the entire turndown test until the flame is established promptly in step 5.
9. *Turn the pilot up to full flame* at the completion of the test.

LIMIT ACTION (Oil or Gas)

With the burner operating, lower the high limit setting to simulate an overheated boiler or furnace. Normal shutdown should occur. Restore normal limit setting and the burner should restart.

Manual reset limits should be used with the R4795, RA890 and R7795 to prevent cycling off the limit, and to ensure that the condition which causes the limit action is detected as soon as possible.

FINAL CHECKOUT

Perform these checks after installation, after service, as part of the periodic maintenance, and as required when replacing the control or flame detector.

FLAME CURRENT CHECK

(Refer to page 43.)

PILOT TURNDOWN TEST (Gas Systems Only)

On systems that prove a pilot before the main fuel valve can be opened, perform a Pilot Turndown Test to prove that the main burner can be lighted by the smallest pilot that will hold in the flame relay. A flame current check should be performed before and after the Pilot Turndown Test.

CAUTION

The Pilot Turndown Test should be performed only by a trained, experienced, flame safeguard control service technician, and the instructions should be followed carefully.

1. Shut off the fuel supply to the main burner *only* by closing the manual main burner shutoff cock. *Do not* shut off fuel supply to the pilot valve.
2. Start the system by raising the set point of the controller (or pressing the start button). The pilot will light and pull in the flame relay. Manually light standing pilot on RA890J systems.
3. Reduce the size of the pilot flame to the turndown condition by slowly closing the manual valve on the pilot gas line. At the turndown condition, the pilot will be small enough so it just barely holds in the flame relay (2K).
   a. Slowly turn down the pilot until the flame relay drops out.
   b. Allow the control to complete prepurge. (On the RA890H,K, R4795D, and the R7795 [with wire clipped] the control will lock out when relay 2K drops out. Permit the safety switch to cool, reset, and restart the system.)
   c. As the control attempts to restart the pilot, turn the pilot back up slowly just until relay 2K pulls back in. You will have 15 seconds to complete this step before lockout occurs.

TESTING FLAME DETECTION FUNCTION

CHECK	POSSIBLE PROBLEM	CORRECTIVE ACTION
14. Observe right-hand flame relay for pull-in when flame is established. (Green signal light blinks on RA890H,J and K; LED on R7795 glows.)	14a. Flame relay doesn't pull in (Green signal light doesn't blink on RA890H,J,K); LED on R7795 does not glow.) 14b. RA890H,J,K—green signal light blinks, but flame relay doesn't pull in; or relay pulls in but light doesn't blink; or light stays on continuously.	14a. Replace vacuum tube (RA890E); if relay doesn't pull in, or for R7795, R4795; RA890F,G,H,J,K proceed to step 15. 14b. Replace RA890.
15. Rectification systems—R4795 with R7289, RA890E,F,H,J or R7795B,D. Check flame relay with 121708 Flame Simulator (page 40). UV systems—R4795 with R7280, RA890G or R7795A,C—use 123514B Flame Simulator (page 40).	15a. Relay pulls in with simulator or LED glows on R7795. 15b. Relay does not pull in with simulator. LED does not glow on R7795.	15a. Check burner adjustment and external flame detector circuit. Check flame current (page 38). Replace or reposition detector if necessary. 15b. Replace R4795 plug-in amplifier; if problem persists, replace R4795. Replace R7795.

(continued)

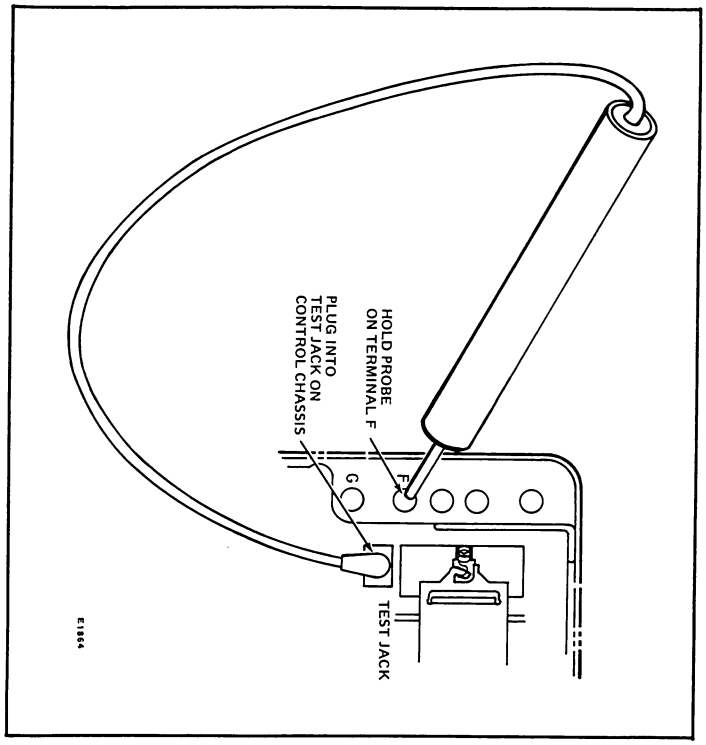
For note ⚠3, refer to page 14.

OBSERVING SEQUENCING OPERATION

CHECK	POSSIBLE PROBLEM	CORRECTIVE ACTION
16. Check that main gas valve or second stage oil valve opens when flame relay pulls in.	16. Valve doesn't open.	16. Check for line voltage between terminals 5 and 2 (terminals 6 and L2 on R7795). Zero volts—clean all relay contacts ⚠4 (R4795 or RA890E,F or G only); replace RA890 or R4795 if necessary. Line voltage—check valve and valve circuit.
17. Observe ignition for cutoff when flame relay pulls in (if connected to terminal 4). On R7795, ignition is cut off after LED glows (if connected to terminal 18).	17. Ignition continues to run.	17. Check wiring. Replace control if wiring is correct.

For note ⚠4 , refer to page 14.

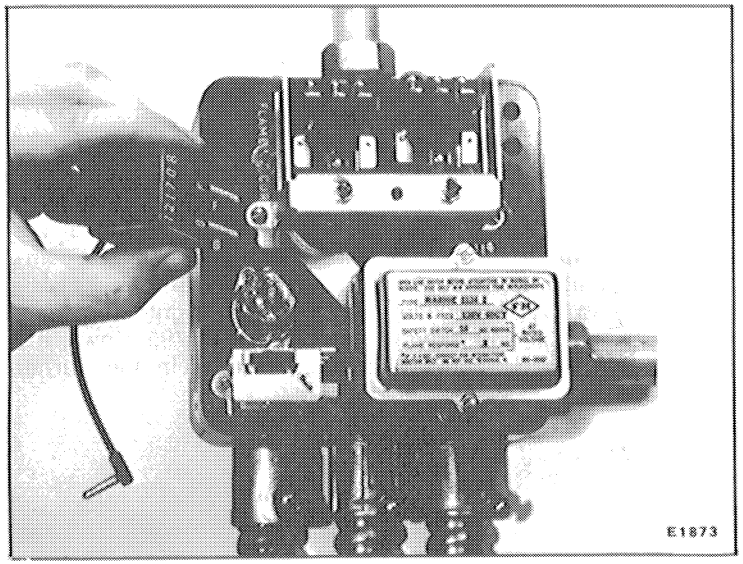
123514B USED ON RA890G (shown) AND R4795A,D WITH R7290 AMPLIFIER



PROCEDURE FOR CHECKING RA890E WITHOUT TEST JACK

IMPORTANT

If RA890E has no test jack, remove the control from the base, disconnect the F lead, and remount the control. Complete steps 2, 3, and 4 on page 45. Then, as the control attempts to start burner, apply flame simulator lugs F and G to terminals F and G. Results should be the same as before.



ULTRAVIOLET SYSTEMS—123514B SIMULATOR

1. *Turn off the fuel supply manually.*
2. Set the controller to call for heat.
3. Reset the safety switch.
4. After the load relay or R4795 and R7795 purge relay (1K) pulls in, insert simulator into test jack. Touch the probe of the simulator on the F terminal to complete the circuit. If the flame relay now pulls in and holds in, the trouble is in the detector circuit.

NOTES FOR CHECKOUT PROCEDURE

⚠1 On the RA890F,H,J, or K, the control is powered at terminal 6 only. With a low voltage controller, there should be normal line voltage between terminals 6 and 2 if the limit switch is closed. With a line voltage controller, check for line voltage when controller is set to call for heat.

⚠2 When replacing RA890E vacuum tubes, it is recommended that tubes be ordered from Honeywell—these tubes are factory tested. Order Part No. 102988.

⚠3 To check for flame simulating condition holding in the flame relay—

RA890 OR R4795 WITH R7289 RECTIFICATION AMPLIFIER OR R7795B,D

Disconnect flame circuit by inserting flame simulator plug into flame current test jack. Do not touch ground lug to chassis.

If flame relay holds in—replace RA890, R7795, or replace amplifier on R4795.

If problem in R4795 persists, replace R4795.

If flame relay drops out—trouble is in flame detector or its circuit. Check for light reaching photocell, hot refractory hold-in, defective wiring, or defective cell.

RA890 OR R4795 WITH R7290A ULTRAVIOLET (UV) AMPLIFIER OR R7795A,C

1. Measure flame current with a W136 Microammeter by inserting the meter connector plug into the flame current jack. The flame current should not exceed 1/4 microamp when no flame is present.
2. If an excessive flame current is present, disconnect the UV sensor. If an excessive current persists, replace the RA890, R7795, or R7290A. If problem is eliminated, replace UV sensor.

Refer to page 40 for detailed instructions on checking the control with the flame simulator.

Do not push on the relay armature when cleaning contacts. Only Honeywell contact cleaner, Part No. 132569, is recommended for cleaning contacts.

⚠4 On the RA890H and J, a tamper-resistant case covers the relays; do not attempt to remove the case to clean the contacts.

RA890 AND R4795 HOOKUPS

TERMINAL USAGE

RA890E,F,G,H,J or K

TERMINAL	PURPOSE
1	Supplies power to RA890E,G flame amplifier. Not used on RA890F,H,J,K.
2	Ground.
3	Pilot gas valve, or burner motor and delayed oil valve; and intermittent ignition.
4	Interrupted ignition (not used on RA890J).
5	Main gas valve or second stage oil valve.
6	Supplies power to loads and power for RA890F,H,J,K. Limits and line voltage controllers are connected in series to terminal 6.
T-T	Low voltage controller. (Jumper terminals if line voltage terminals are used.)
F-G	Flame detector.

R4795A,D

TERMINAL	PURPOSE
1	Supplies power to loads and R4795. Limits and controller connected in series to terminal 1.
2	Ground.
3	Pilot gas valve, first stage oil valve, or intermittent ignition.
4	Interrupted ignition.
5	Main gas valve or second stage oil valve.
6-7	Air switch terminals.
8	Fan or burner motor.
F-G	Flame detector.

R7795A,B,C,D

TERMINAL	PURPOSE
L1	Supplies power to R7795A,B,C,D.
L2	Ground.

FLAME SIMULATOR

If the flame relay does not pull in when the flame is established, use the flame simulator to make a quick check to determine whether the trouble is in the detector, the detector circuit, or the primary control itself.

The *121708 Flame Simulator* (page 57) is for use on rectification systems with the RA890E,F,H,J,K, R7795B,D and R4795A,D with R7289A Amplifier.

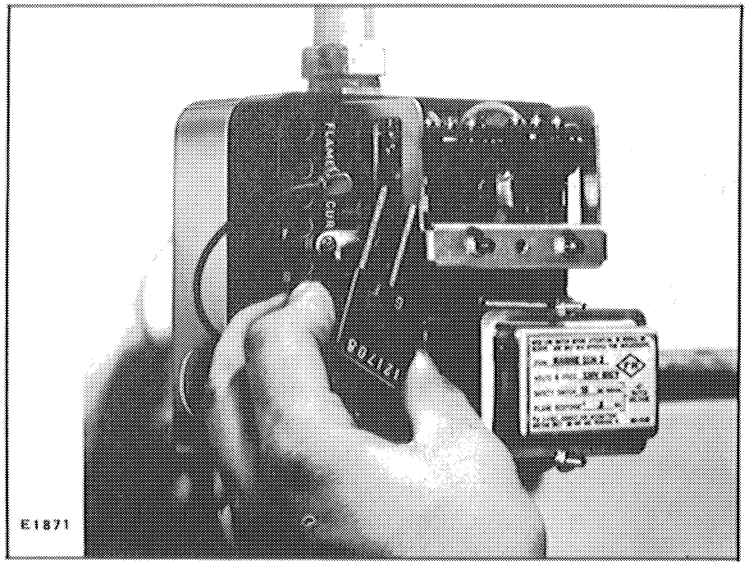
The *123514B Flame Simulator* (page 57) is for use on UV systems with RA890G, R7795A,C or R4795A,D with R7290 Amplifier.

RECTIFICATION SYSTEMS—121708 SIMULATOR

To check the flame relay:

1. *Turn off the fuel supply manually.*
2. Set the controller to call for heat.
3. Reset the safety switch.
4. After load relay or R4795 and R7795 purge (1K) relay pulls in, insert simulator into test jack and touch the G lug of the simulator against the metal chassis or wiring subbase to complete the circuit to ground. (See photo below for RA890E,F,H,J,K. R4795A,D with R7289 Amplifier is similar.) If the right-hand flame relay now pulls in and stays in, or LED on R7795 glows, the trouble is in the detector, detector circuit, or in the burner adjustment.

PROCEDURE FOR CHECKING RA890E,F,H,J AND K WITH TEST JACK



Insert a 196146 Meter Connector Plug, wired color-to-color to the W136 leadwires, into the test jack on the RA890, R4795 or R7795 amplifier.

If an RA890E,F,H,J,K, R7795B,D or R4795A,D with R7289A rectification type amplifier is used and a meter connector plug is not available, disconnect the flame detector lead from the F terminal; then connect this lead to the BLACK lead of the microammeter, and connect the RED lead of the microammeter to the F terminal.

NOTE: If an RA890G, R7795A,C or an R4795A,D with R7290A ultraviolet type amplifier is used, the flame current *cannot* be read by connecting a microammeter in series with the F lead.

When reading the flame current, ensure that 2 criteria are met:

1. The flame current must be steady; meter should not vary more than a needle width.
2. The flame current must be at least 2 microamperes for a rectification type flame detector, or at least 1.5 microamperes for an ultraviolet type flame detector.

IF A STEADY READING OF AT LEAST MINIMUM STRENGTH CANNOT BE OBTAINED, CHECK THE FOLLOWING

FOR GAS OR OIL FLAMES (Minipeeper)—

Low supply voltage.
Detector location.
Defective detector wiring.
Dirty viewing windows.
Faulty Minipeeper.

FOR OIL FLAMES (Photocell)—

Detector location and wiring.
Smoky flame or poorly adjusted air shutter.
Faulty photocell.
Temperature over 165 F [74 C] at photocell.

FOR GAS FLAMES (Flame Rod)—

Ignition interference (refer to page xx).
Insufficient ground (must be at least 4 times the detector area).
Flame lifting off burner head (ground), or not continuously in contact with the flame rod.
Temperature in excess of 600 F [316 C] at the flame electrode insulator causing short to ground.

3-8	Airflow switch terminals.
5	Pilot (interrupted on R7795C,D or intermittent on R7795A,B).
6	Main valve(s).
7	Delayed main valve.
8	Burner motor.
9	Line voltage alarm.
16-1	Controller and limit terminals.
18	Interrupted ignition.

WIRING

For *normal installations,* use moisture-resistant wire (rated for 194 F [90 C] or higher required by Underwriters Laboratories Inc.).

For *high temperature installations,* use moisture-resistant wire, selected for a temperature rating above the maximum operating temperature, for all but the ignition and flame detector "F" leadwires.

—*For the ignition,* use Honeywell Spec. No. R1061012 Ignition Cable or equivalent. (This wire is rated at 350 F [175 C] for continuous duty, and up to 500 F [260 C] for intermittent use. It has been tested to 25,000 volts.)

—*For the flame detector "F" leadwire;* use Honeywell Spec. No. R1298020 or equivalent. (This wire is rated up to 400 F [205 C] for continuous duty. It is tested for operation up to 600 volts and breakdown up to 7500 volts.)

For *ignition installations in a contaminating environment,* use Honeywell Spec. No. R1239001 High Tension Ignition Cable or equivalent. (This wire is very resistant to severe conditions of oil, heat, and corona, and is tested to withstand high voltages up to 25,000 volts RMS in a salt bath for 1 minute without breakdown. It is rated at 200 F [93 C] for continuous duty, and up to 350 F [175 C] for intermittent use.)

IMPORTANT

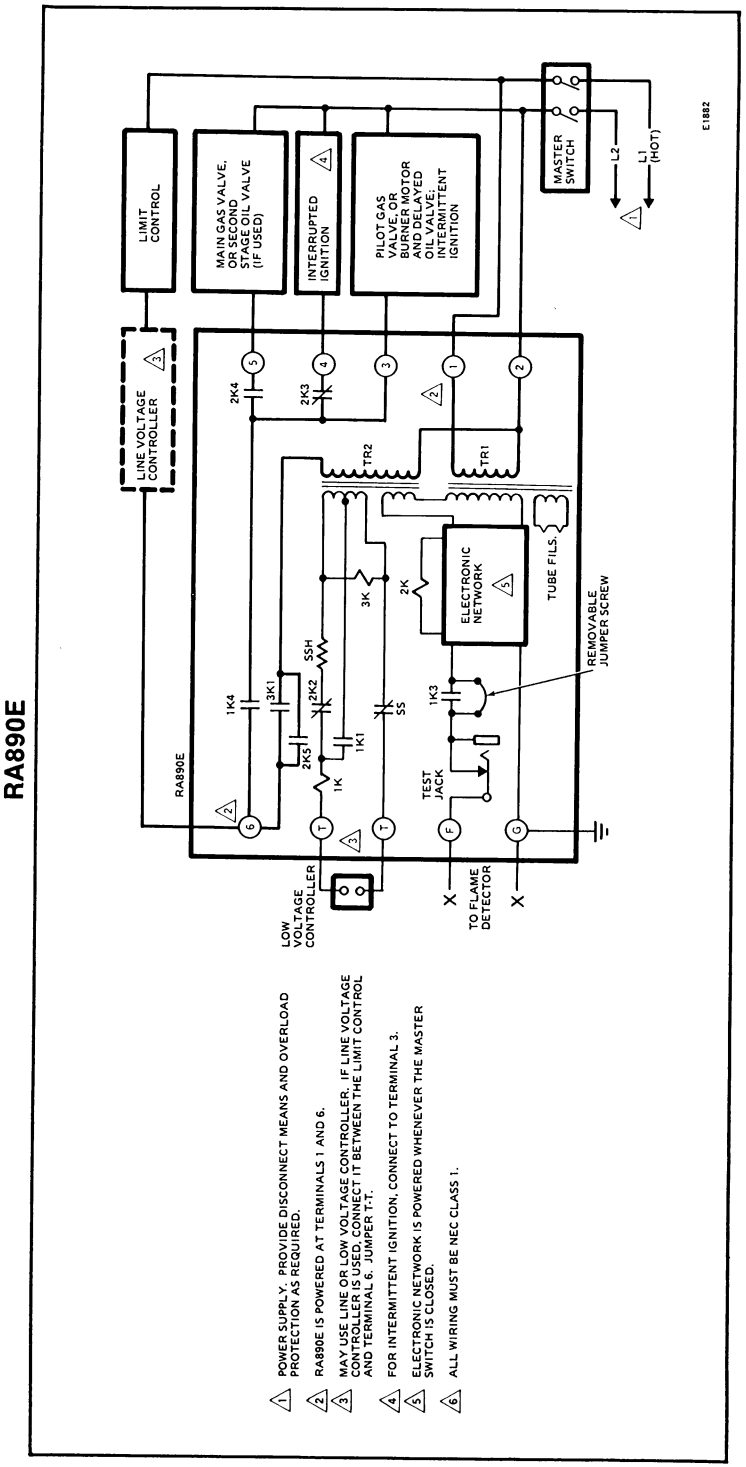
Do not run high voltage ignition transformer wires in the same conduit with the flame detector wiring.

HOOKUPS

The following pages contain typical hookups for the R4795, R7795, and the RA890E,F,G,H,J, and K.

Manual reset limits are desirable in R4795, R7795, and RA890 circuits to prevent the system from cycling off the limit control, and to ensure that troubles are found and corrected as soon as possible.

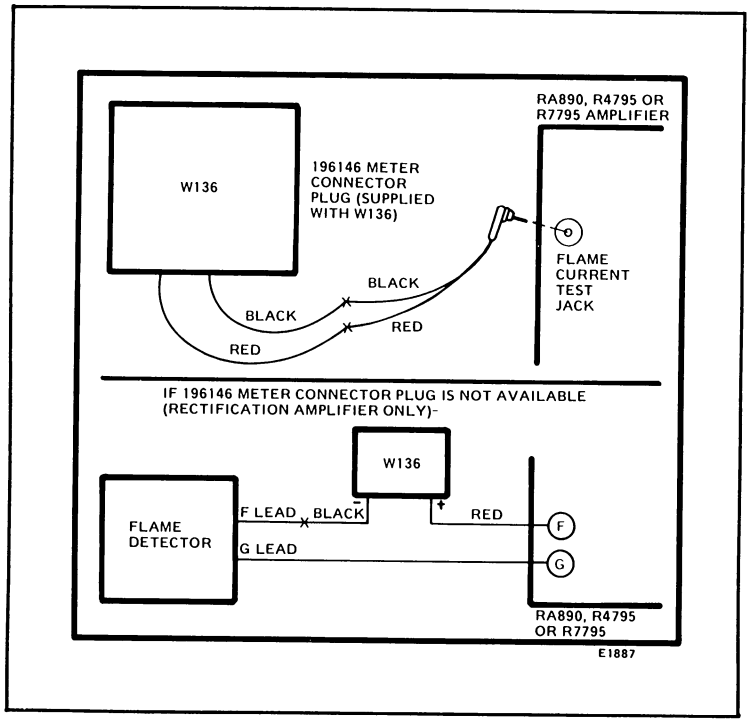
RA890E



FLAME CURRENT CHECK

The flame current check is the best indicater of proper flame detector application. The check should be done at the time of installation, at any time service is done on the system, and at least once a month (or more often) while the system is in operation. This will prevent shutdowns due to poor flame signal.

The test is done by connecting a W136 (or equivalent) to the amplifier and reading the flame current while the main burner is operating.



NOTE: The test button on the RA890H,J,K must be held in while reading flame current. Green signal light is on continuously (not blinking) when test button is pushed.

CAUTION

Because depressing the RA890H,J,K test button bypasses the Dynamic Self Check circuitry, it should be depressed *only* while actually reading flame current.

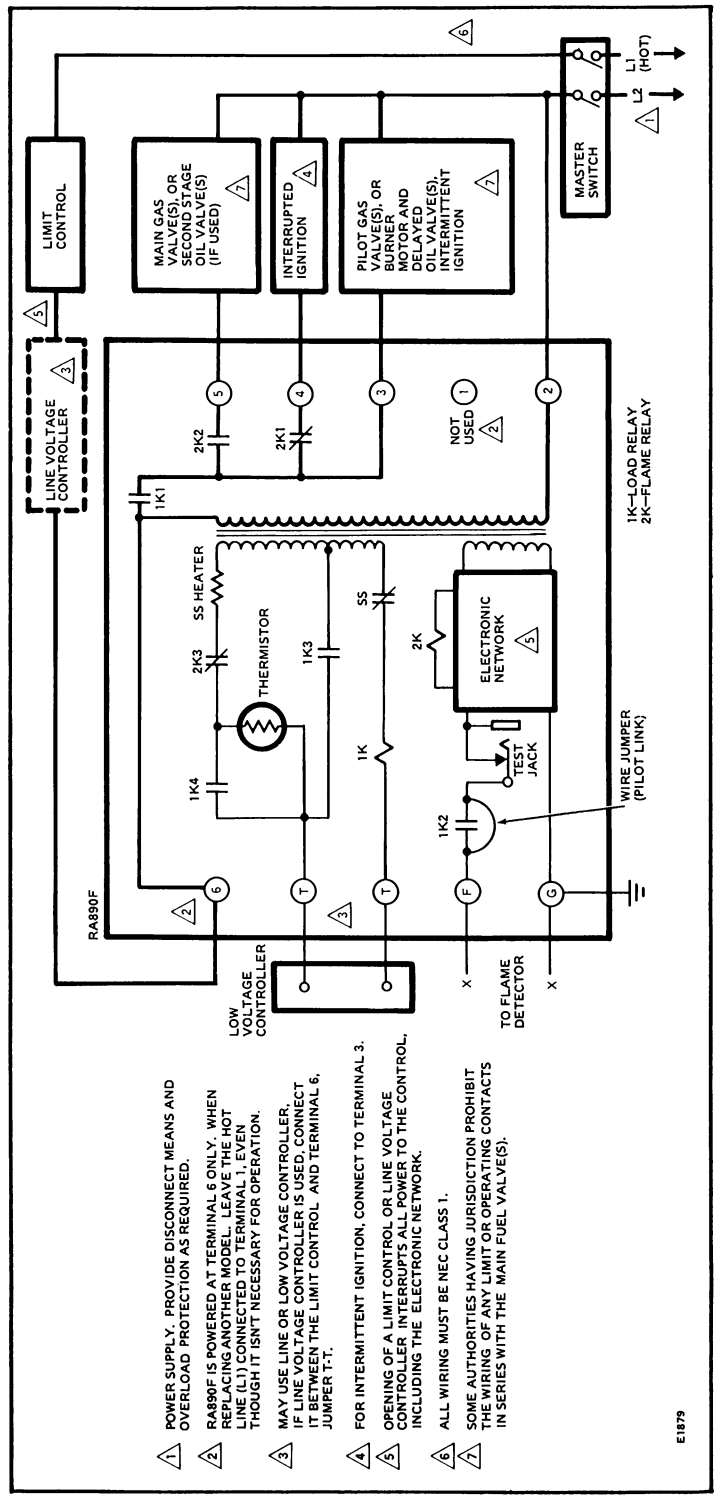
R7795A,B (Refer to page 26 for schematic)

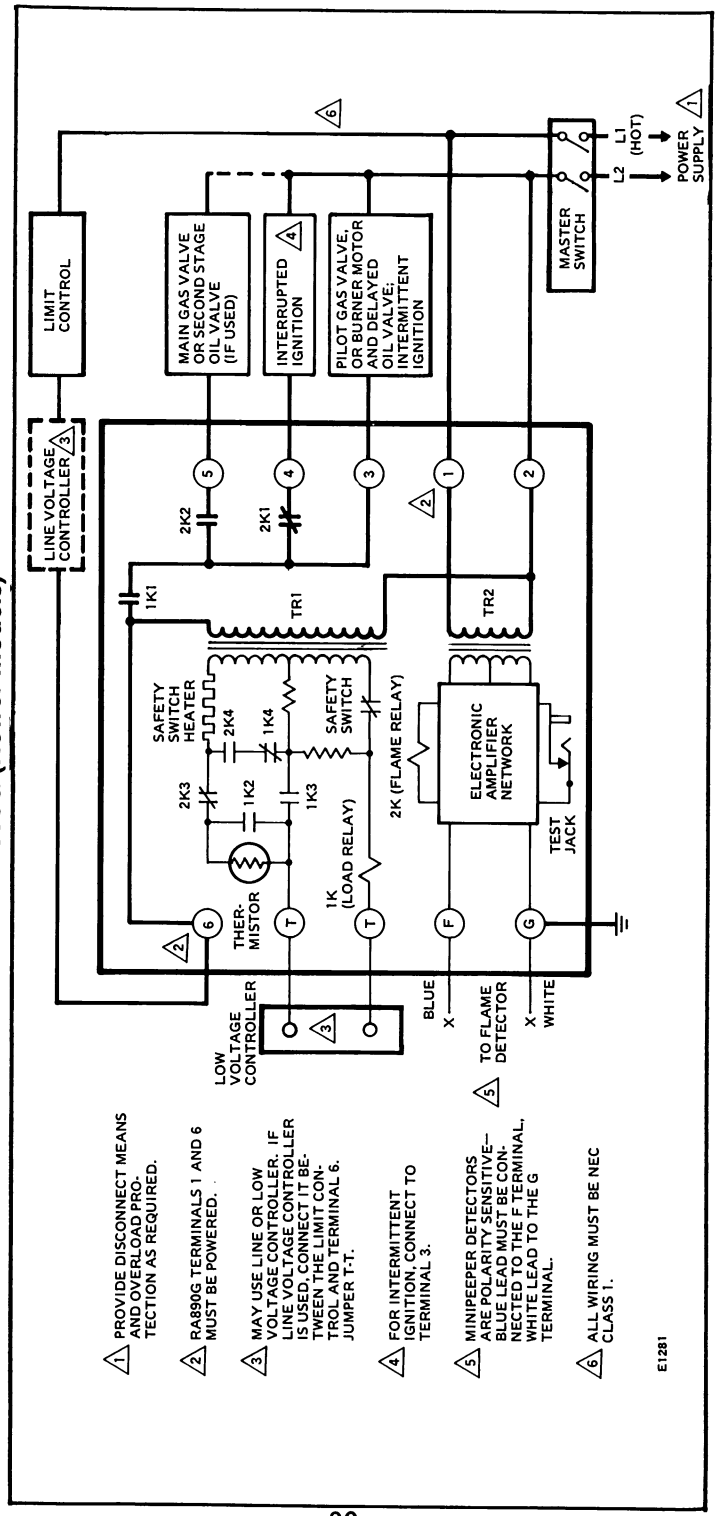
1. Call for Heat (limit switch closed)	Terminal 16 energized. Relay 3K pulls in to close contacts 3K2 and 3K3 and energize terminal 8—fan or burner motor.
2. Airflow Proved	Line voltage airflow switch between terminals 3 and 8 close to energize purge timer.
3. Prepurge Complete (1.5, 7, 10, 30, 60, 90 seconds)	Relay 1K pulls in energizing ignition transformer (terminal 18) and the intermittent pilot valve (terminal 5). This starts the 4 or 10 second pilot flame establishing period (PFEP).
4. Flame Proven (pilot or 1st stage oil)	At end of PFEP, relay 2K pulls in energizing the main valves (terminal 6) and de-energizing the ignition transformer (terminal 18).
5. Call for Heat Satisfied	All relays drop out, system returns to standby mode.

R7795C,D, (Refer to page 27 for schematic)

1. Call for Heat (limit switch closed)	Terminal 16 energized. Relay 3K pulls in to close contacts 3K2 and 3K3 and energize terminal 8—fan or burner motor.
2. Airflow Proven	Line voltage airflow switch between terminals 3 and 8 close to energize purge timer.
3. Prepurge Complete (1.5, 7, 10, 30, 60 or 90 seconds)	Relays 1K and 4K pull in simultaneously energizing ignition transformer (terminal 18) and the interrupted pilot valve (terminal 5). This starts 10 or 4 second and pilot flame establishing period (PFEP).
4. Flame Proven	At end of PFEP, relay 2K pulls in energizing the main valve (terminal 6) and de-energizing the ignition transformer (terminal 18).
5. Main Flame Proven	Ten seconds after the main valve (terminal 6) is energized relay 4K drops out to open contacts 4K1 and de-energizing the pilot valve (terminal 5).

RA890F





R4795A (Refer to page 24 for schematic)

1. Call for Heat (limit switch closed)	Terminal 1 energized. Relay 3K pulls in to close contact 3K2 and energize terminal 8—fan or burner motor.
2. Airflow Proved	Low voltage airflow switch between terminal 6 and 7 closes to energize the purge timer.
3. Prepurge Complete (7, 10, 30, 60, or 90 seconds)	Relay 1K pulls in to close contact 1K4 and energize terminal 3 (pilot valve, 1st stage oil valve[s], or expanding pilot valve) directly and terminal 4 (ignition) through the closed flame relay contact 2K2. Contact 1K1 closes to energize the safety switch heater.
4. Flame Proven (pilot or 1st stage oil)	Relay 2K pulls in. Contact 2K2 opens to cut off ignition, contact 2K3 closes to energize the main fuel valve(s) or 2nd stage oil valve(s). Contact 2K1 opens to de-energize the safety switch heater and reset the purge timer.
5. Call for Heat Satisfied	All relays drop out, system shuts down.

R4795D (Refer to page 25 for schematic)

1. Call for Heat (limit switch closed)	Terminal 1 energized. Relay 3K pulls in to close contact 3K2 and energize terminal 8—fan or burner motor.
2. Airflow Proved	Low voltage airflow switch between terminal 6 and 7 closes to energize the purge timer.
3. Prepurge Complete (7, 10, 30, 60, or 90 seconds)	Relay 1K pulls in to close contact 1K4 and energize terminal 3 (pilot valve, 1st stage oil valve[s], or expanding pilot valve) directly and terminal 4 (ignition) through the closed flame relay contact 2K2. Contact 1K1 closes to energize the safety switch heater.
4. Flame Proven (pilot or 1st stage oil)	Relays 2K and 4K pull in. (Pull-in of 4K de-energizes the prepurge circuit.) Contact 2K2 opens to cut off ignition; 2K3 closes to power the main valve(s). Contact 2K1 opens to de-energize the safety switch heater.
5. Call for Heat Satisfied	All relays drop out, system shuts down.

NORMAL OPERATION SUMMARY

RA890E (Refer to page 18 for schematic)

1. Control Powered—
   Line voltage controller—flame relay pulls in (drops out on call for heat).
   Low voltage controller—flame relay stays out.

2. Call for Heat—load relay pulls in (flame relay must be out), ignition starts, and pilot valve or burner motor is powered. Safety switch heats.

3. Flame Proved—flame relay pulls in, safety switch heater is de-energized, main valve is powered, and ignition is cut off (if wired for interrupted ignition).

4. Call for Heat Satisfied—load relay drops out, fuel valves close, and burner motor stops.
   Line voltage controller—flame relay holds in.
   Low voltage controller—flame relay drops out.

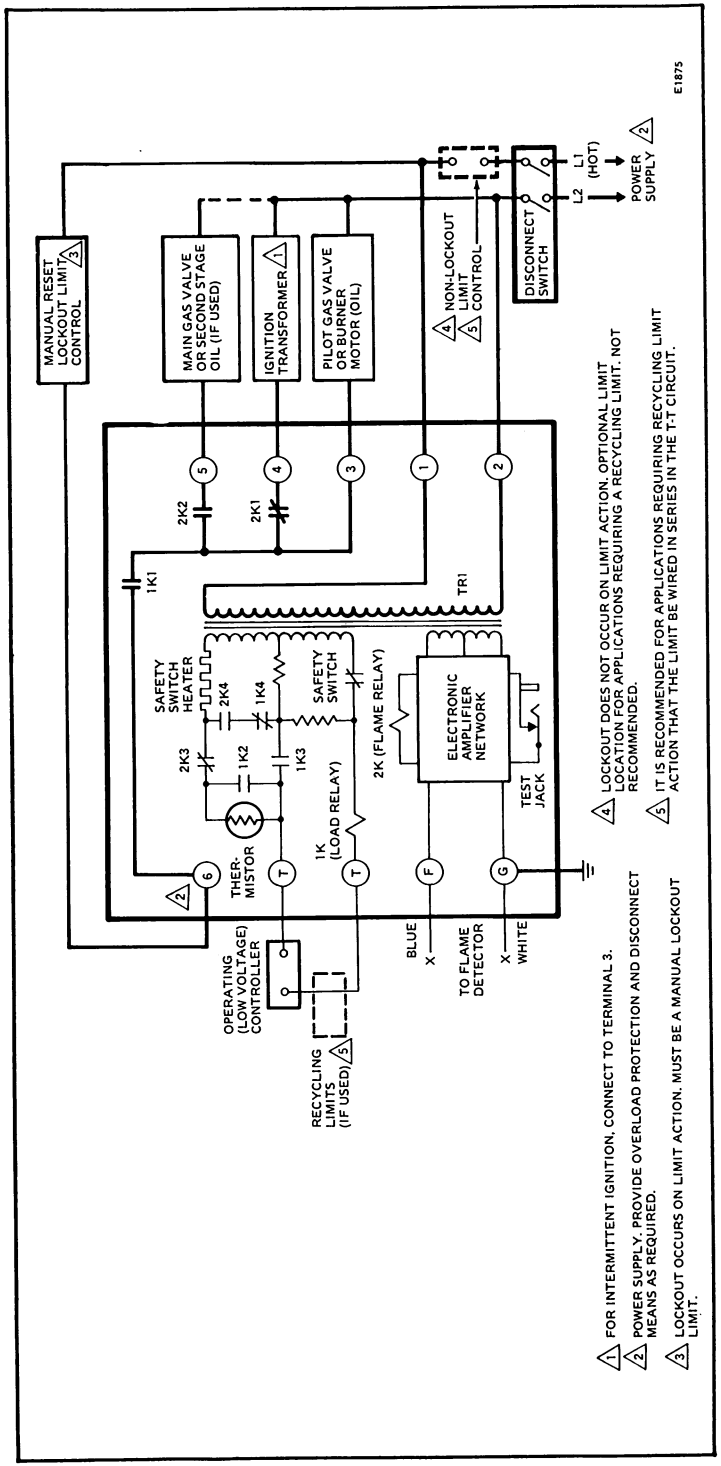
RA890F,G,H AND J (Refer to pages 19, 20, 21, 22, and 23 for schematics)

1. Call for Heat—load relay pulls in after a *slight delay* (flame relay must be out), ignition starts, and pilot valve or burner motor is powered. Safety switch heats.

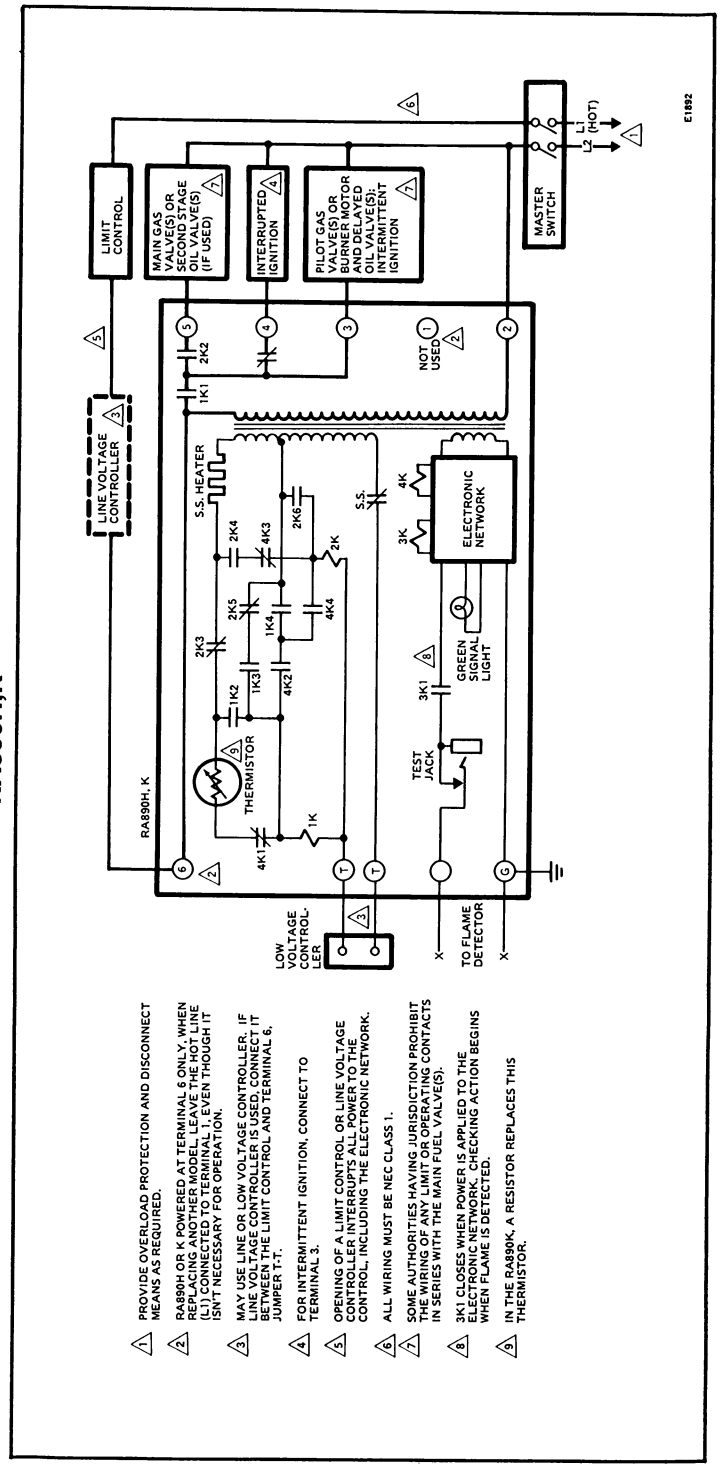
2. Flame Proved—flame relay pulls in, safety switch heater is de-energized, main valve is powered, and ignition is cut off (if used for interrupted ignition). On RA890H and J, green signal light blinks.

3. Call for Heat Satisfied—load relay drops out, fuel valves close, burner motor stops, and flame relay drops out.

RA890G (Older Models)

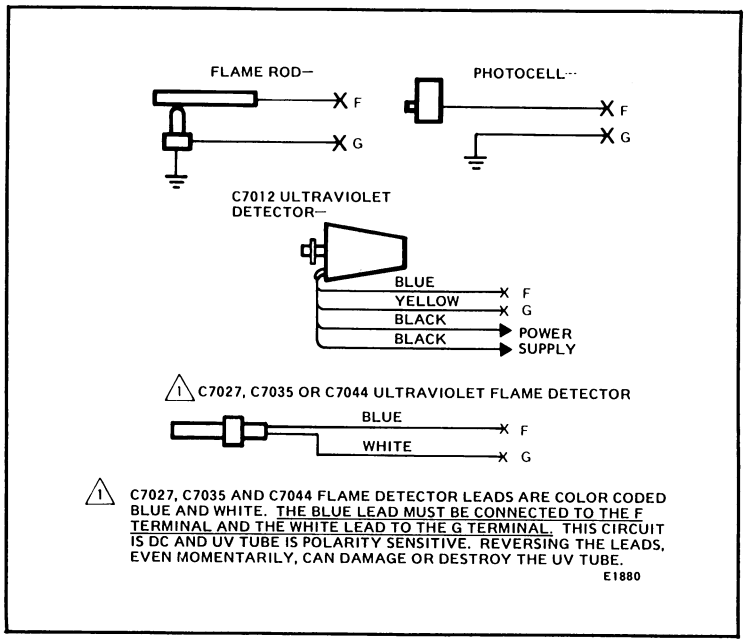


RA890H,K



1. PROVIDE OVERLOAD PROTECTION AND DISCONNECT MEANS AS REQUIRED.
2. RA890H OR K POWERED AT TERMINAL 6 ONLY. WHEN REPLACING ANOTHER MODEL, LEAVE THE HOT LINE (L1) CONNECTED TO TERMINAL 1, EVEN THOUGH IT ISN'T NECESSARY FOR OPERATION.
3. MAY USE LINE OR LOW VOLTAGE CONTROLLER. IF LINE VOLTAGE CONTROLLER IS USED, CONNECT IT BETWEEN THE LIMIT CONTROL AND TERMINAL 6, JUMPER T-T.
4. FOR INTERMITTENT IGNITION, CONNECT TO TERMINAL 3.
5. OPENING OF A LIMIT CONTROL OR LINE VOLTAGE CONTROLLER INTERRUPTS ALL POWER TO THE CONTROL, INCLUDING THE ELECTRONIC NETWORK.
6. ALL WIRING MUST BE NEC CLASS 1.
7. SOME AUTHORITIES HAVING JURISDICTION PROHIBIT THE WIRING OF ANY LIMIT OR OPERATING CONTACTS IN SERIES WITH THE MAIN FUEL VALVE(S).
8. 3K1 CLOSES WHEN POWER IS APPLIED TO THE ELECTRONIC NETWORK. CHECKING ACTION BEGINS WHEN FLAME IS DETECTED.
9. IN THE RA890K, A RESISTOR REPLACES THIS THERMISTOR.

FLAME DETECTOR WIRING



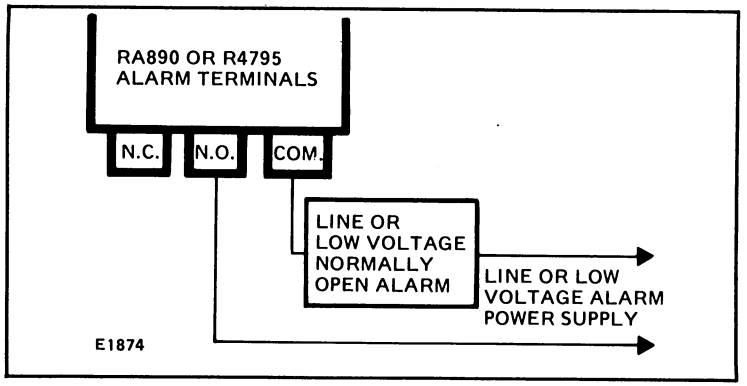
1 C7027, C7035 AND C7044 FLAME DETECTOR LEADS ARE COLOR CODED BLUE AND WHITE. THE BLUE LEAD MUST BE CONNECTED TO THE F TERMINAL AND THE WHITE LEAD TO THE G TERMINAL. THIS CIRCUIT IS DC AND UV TUBE IS POLARITY SENSITIVE. REVERSING THE LEADS, EVEN MOMENTARILY, CAN DAMAGE OR DESTROY THE UV TUBE.

E1880

WIRING ALARM CONTACTS

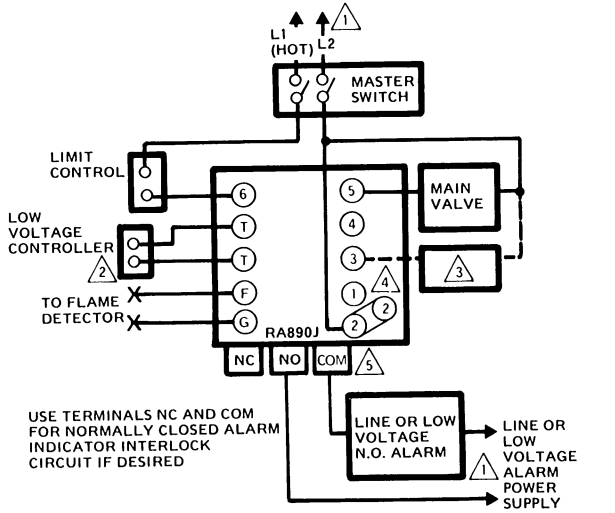
Models with alarm contacts have 3 male quick-connect terminals. Three female quick-connect terminals are provided for field installation. To connect leadwires to the female quick-connects, strip 1/4 in. [6 mm] insulation from end of leadwire, insert into the quick-connect, and crimp securely with a crimping tool. Hookup below shows proper alarm terminal connections.

If a line voltage alarm is used with the primary control, the entire control must be mounted in a suitable enclosure.



TYPICAL HOOKUP OF RA890J IN MANUALLY LIGHTED STANDING PILOT INSTALLATIONS

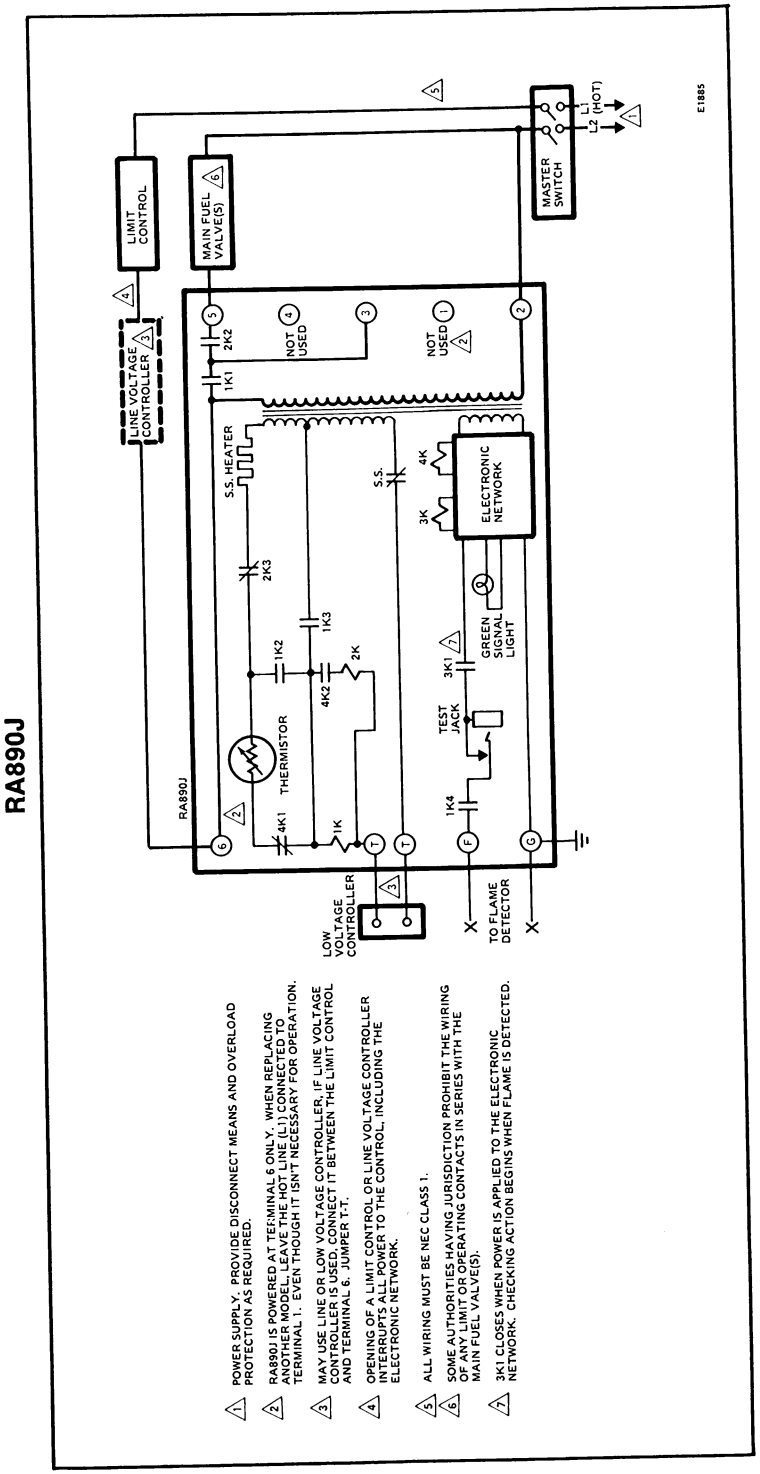
The RA890J is designed for manually lighted standing pilot applications where the pilot is not electronically supervised during the "OFF" cycle. On a call for heat, the load relay pulls in; if the pilot is proven, the main valve is energized. The pilot is not supervised until the load relay pulls in.



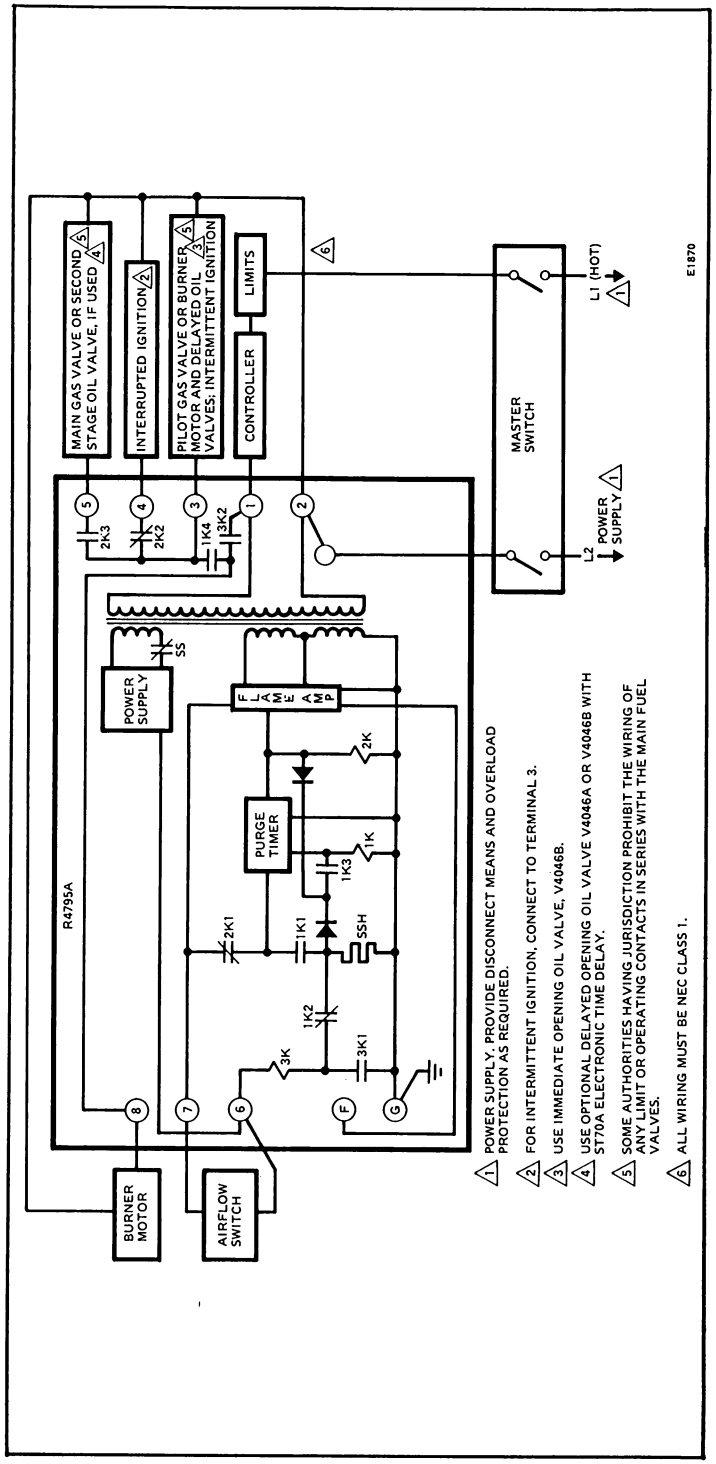
1. POWER SUPPLY. PROVIDE OVERLOAD PROTECTION AND DISCONNECT MEANS AS REQUIRED.
2. IF LINE VOLTAGE CONTROLLER IS USED, CONNECT IT BETWEEN THE LIMIT CONTROL AND TERMINAL 6. JUMPER T-T.
3. TERMINAL 3 POWERED ON 1K PULL IN: CAN BE USED FOR BURNER MOTOR, FIRST STAGE VALVE, ETC.
4. FOR RA890B, C OR E REPLACEMENT, LEAVE POWER CONNECTED TO TERMINAL 1. SUBBASE WIRING CHANGES ARE NOT REQUIRED.
5. SPDT ALARM TERMINALS. IF LINE VOLTAGE ALARM IS USED, RA890J MUST BE MOUNTED IN SUITABLE ENCLOSURE.

E1886

RA890J

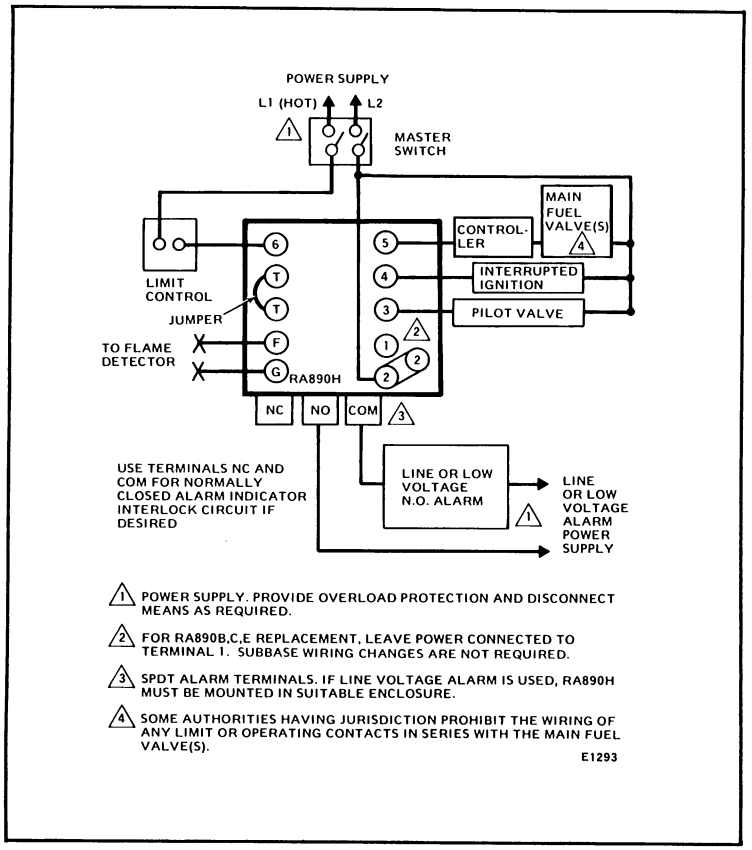


1. POWER SUPPLY: PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
2. RA890J IS POWERED AT TERMINAL 6 ONLY. WHEN REPLACING ANOTHER MODEL, LEAVE THE HOT LINE (L1) CONNECTED TO TERMINAL 1. EVEN THOUGH IT ISN'T NECESSARY FOR OPERATION.
3. MAY USE LINE OR LOW VOLTAGE CONTROLLER. IF LINE VOLTAGE CONTROLLER IS USED, CONNECT IT BETWEEN THE LIMIT CONTROL AND TERMINAL 6. JUMPER T-T.
4. OPENING OF A LIMIT CONTROL OR LINE VOLTAGE CONTROLLER INTERRUPTS ALL POWER TO THE CONTROL, INCLUDING THE ELECTRONIC NETWORK.
5. ALL WIRING MUST BE NEC CLASS 1.
6. SOME AUTHORITIES HAVING JURISDICTION PROHIBIT THE WIRING OF ANY LIMIT OR OPERATING CONTACTS IN SERIES WITH THE MAIN FUEL VALVE(S).
7. 3K1 CLOSES WHEN POWER IS APPLIED TO THE ELECTRONIC NETWORK. CHECKING ACTION BEGINS WHEN FLAME IS DETECTED.



TYPICAL HOOKUP USING RA890H FOR CONSTANT MONITORING OF STANDING PILOT IN APPLICATIONS THAT ARE SHUT DOWN PRIOR TO SYSTEM START

This hookup can be used to supervise the pilot continuously. When power is applied to the RA890, the load relay pulls in, the pilot valve opens, and ignition occurs. The RA890 is powered continuously through the limit control. If the pilot goes out, the load relay drops out and the pilot valve closes. The main valve is energized on a call for heat by the controller; it closes or remains closed if the pilot goes out. On a pilot failure, the entire system must be restarted.



CONVERSION STEPS

1. Disconnect all power to programmer.

2. Remove old programmer from subbase (trade in to Honeywell Authorized Flame Safeguard Distributor).

3. Mark all wires on subbase; i.e., wires connected to terminal "1" should be marked "1." Disconnect wires as they are marked.

4. Remove old subbase.

5. Mount Q795A subbase.

6. Connect wires to subbase per attached cross reference. Pay close attention to footnotes. For example: To convert a Fireye UVM-2 to a R7795, the wire marked "A" would connect to terminal 9 on the Q795. The wire marked "8" would connect to Q795 terminal 8.

7. The symbol " ⚠1 " designates a footnote. Study these footnotes carefully.

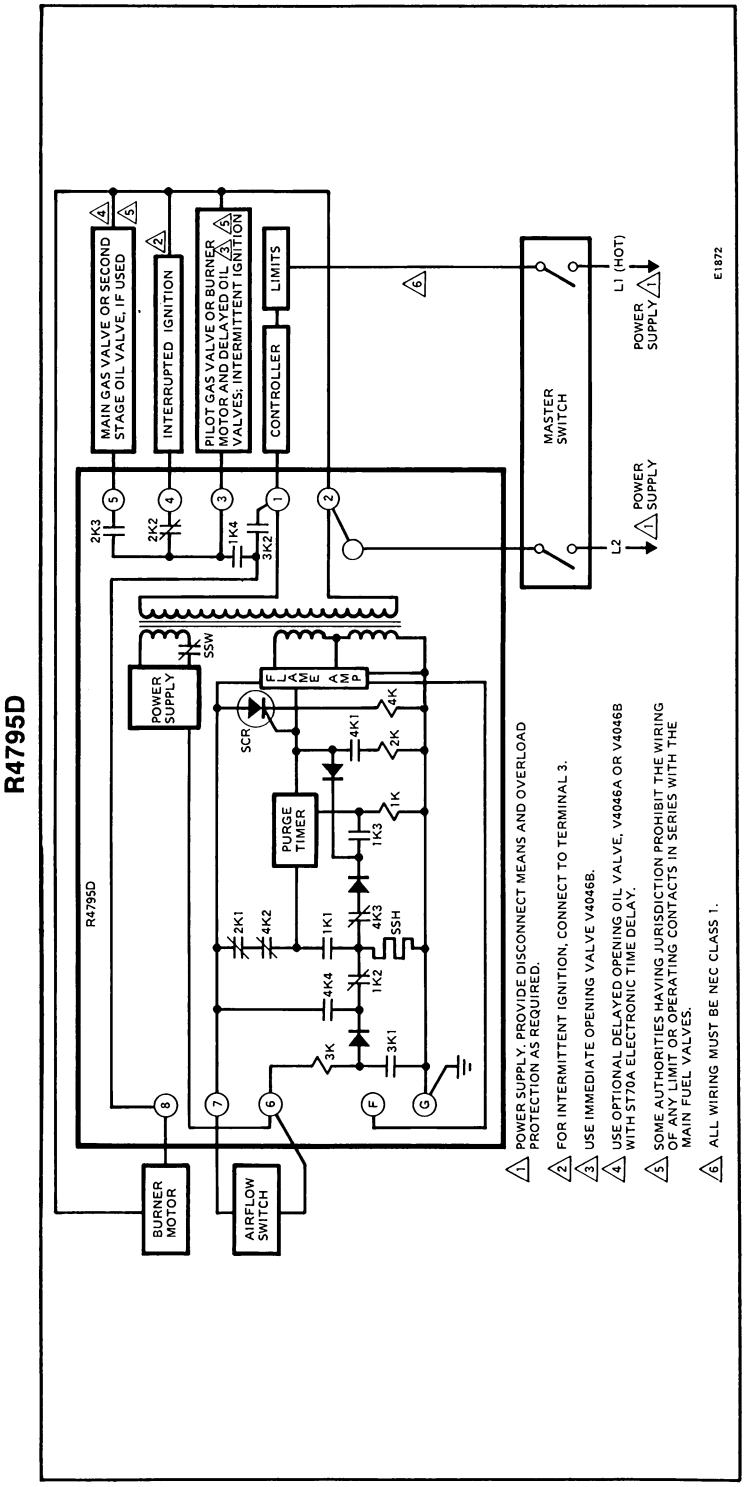
8. Plug in the R7795. Make sure you select the proper ST795A purge timer and detector for the application.

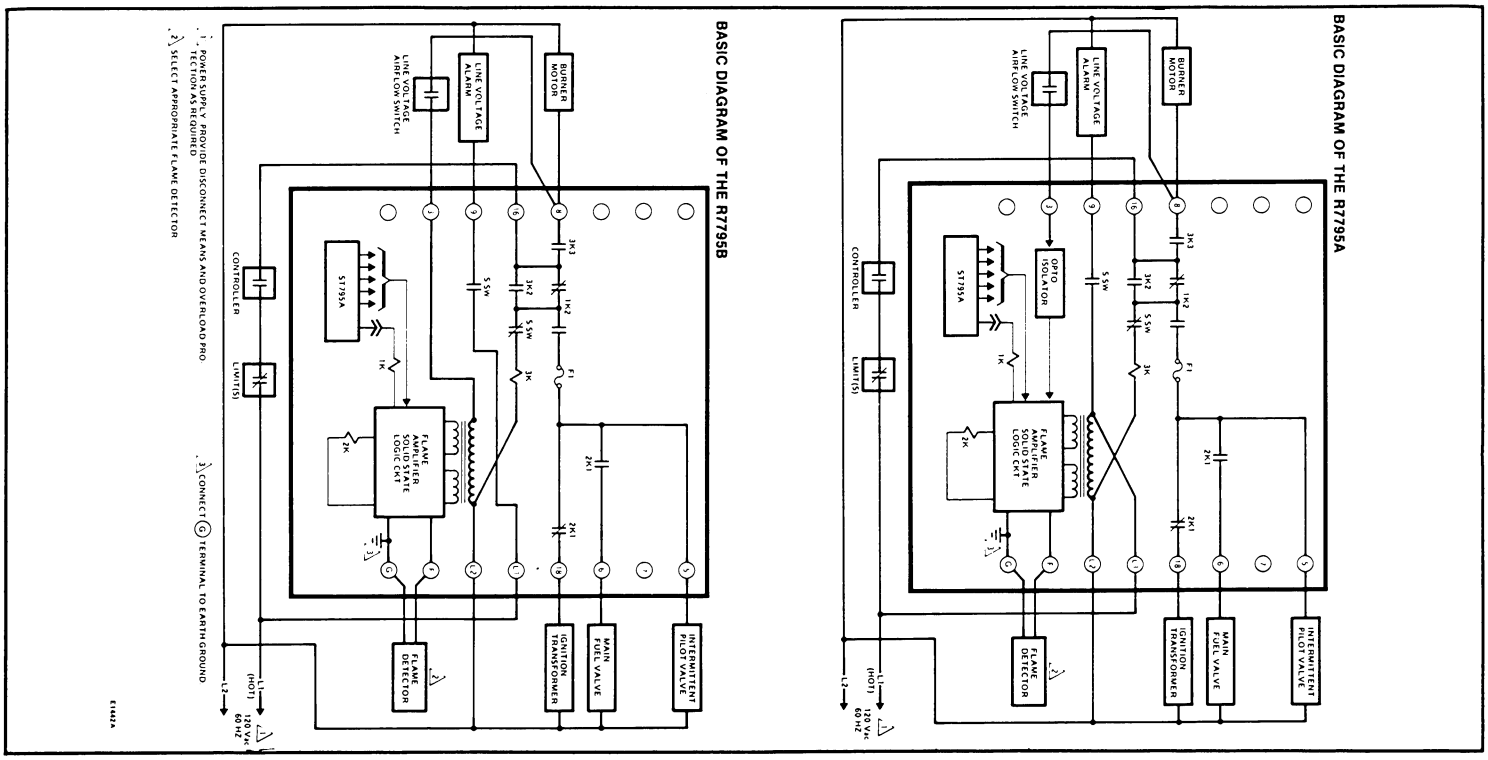
9. There are 2 wires on the amplifier section of the R7795, which are used to select the desired trial for ignition timing and mode (lock-out or recycle). Refer to the R7795 instruction sheet (form 66-2001) for assistance with proper selection.

10. If a low voltage controller is used, remove it and replace it with a line voltage controller. The line voltage controller should be connected in series with the limits.

11. If a low voltage airflow switch is used on the R4795, it must be replaced with a line voltage airflow switch, such as the Honeywell C645.

12. The following models are recommended for replacements:





TERMINAL CONVERSION CHART FOR R7795 (120 V Only)

Q795 TERMINAL PROGRAMMER TO BE CONVERTED	L1	L2	3	5	6	7	8	3	16	18	F	G
RA890 (All)	1 (1)	2	(2)	3 (4)	5	—	(4) (2)	(3)	6	4	F	G
R4795 (All)	(1)	2	6 , (2)	3	5	—	8, 7	(3)	1	4	F	G
R4140P	L1	L2	P	5	7	6	M	A	3	—	S1	S2
R4140Y	L1	L2	3	6	7	—	8	9	4	5	F (5)	G
Fireye: UVM/ TFM (All models)	1	2	6	3	5	—	8	A	7	4	S2 (6)	S1
UVM-1 (Prior to 1968)	(1)	2	(2)	3	5	—	(4) (2)	A	1	4	S (6)	S
UVM-2 (Prior to 1968)	(1)	2	6	3	5	—	8	A	1	4	S (6)	S

(1) Connect power to terminal L1.

(2) If no airflow switch is used, jumper Q795 terminal 3 to 8.

(3) Replace low voltage alarm (if used) with line voltage alarm. Connect alarm directly to Q795 terminal 9.

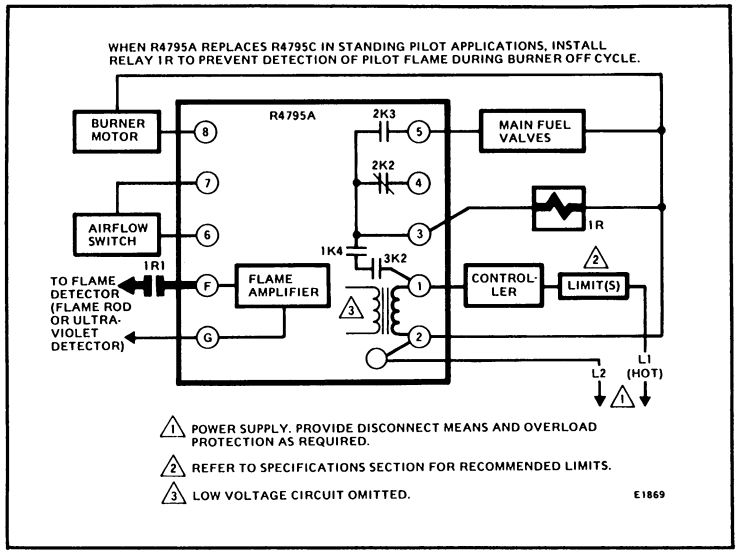
(4) On power burners, identify burner motor wire on terminal 3 and connect it to Q795 terminal 8.

(5) R7795 uses only rectification or U.V. detectors. All other detectors must be converted to these types.

(6) On UVM models, the detector must be changed to a Honeywell C7027 or C7035.

R4795C REPLACEMENT

In most cases, the R4795A can directly replace an R4795C. For standing pilot applications where the pilot flame was detected during the off cycle, install a relay as shown.

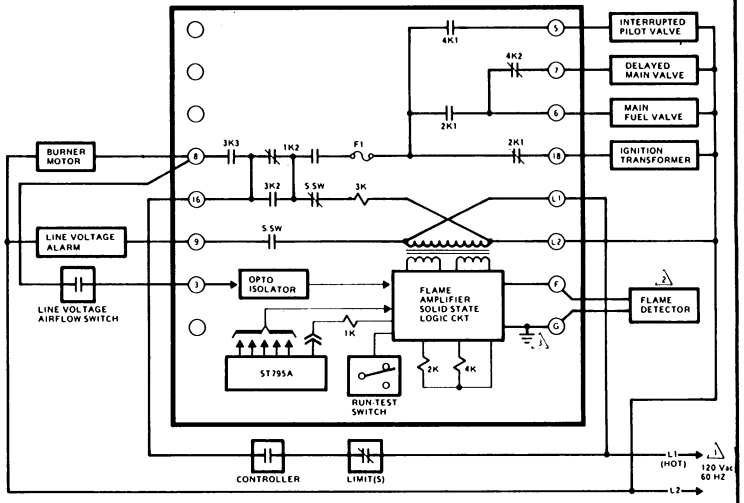


WHEN R4795A REPLACES R4795C IN A STANDING PILOT APPLICATION, INSTALL RELAY 1R TO PREVENT DETECTION OF PILOT FLAME DURING THE BURNER OFF CYCLE.

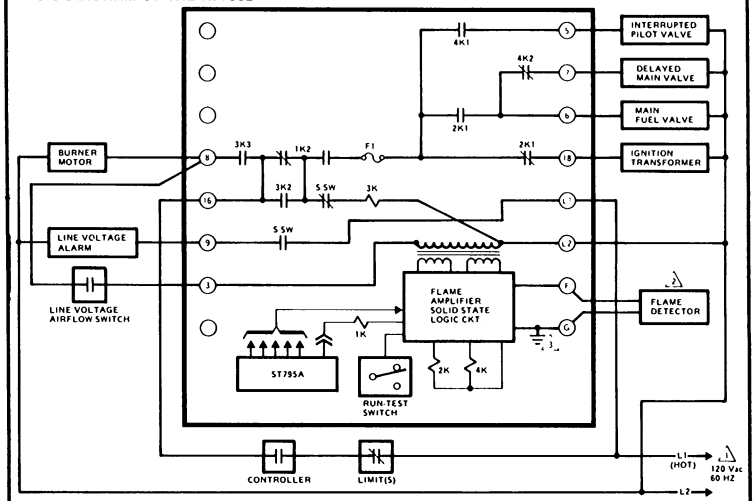
REPLACING HONEYWELL RA890, R4795, R4140Y,P AND FIREYE M-SERIES (All 120 V Models) WITH THE R7795A,B,C,D

HONEYWELL DEVICE TO BE REPLACED	REPLACE WITH	FIREYE DEVICE TO BE REPLACED	REPLACE WITH
RA890E,F	R7795B	TFM1,2,3,3H	R7795B
RA890G	R7795A	UVM1,2,3,3H	R7795A
R4795A,D/W -R7290AMP	R7795A	UVM5	R7795C
R4795A,D/W H7289 AMP	R7795B		
R4140P	R7795C,D		
R4140Y	R7795A,B		

BASIC DIAGRAM OF THE R7795C



BASIC DIAGRAM OF THE R7795D

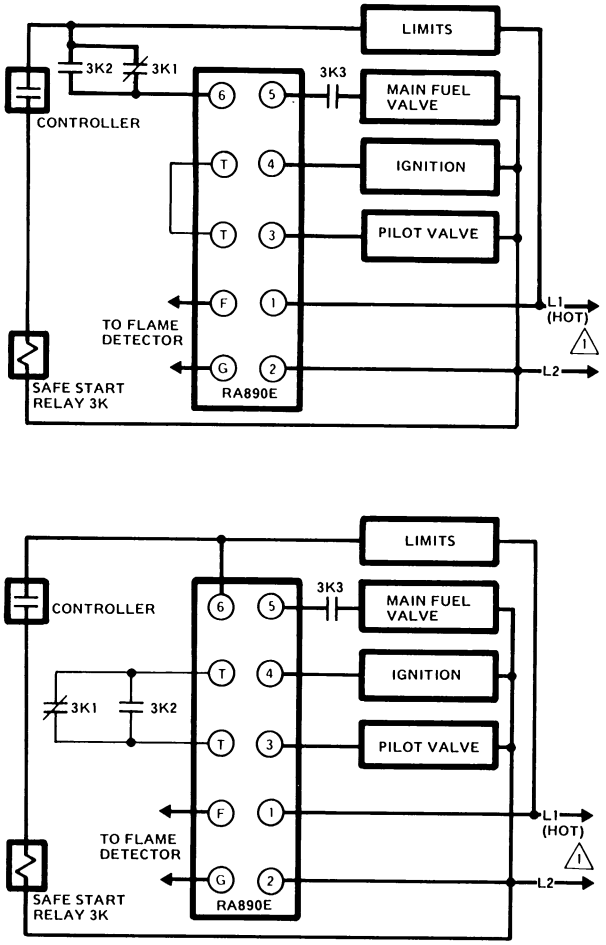


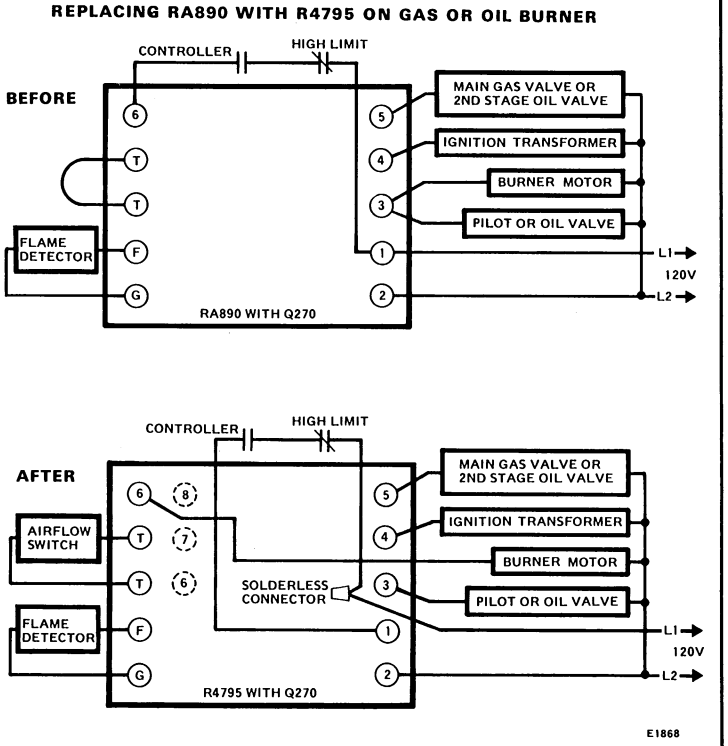
HOOKUP FOR PROVIDING SAFE START CHECK ON STANDING PILOT APPLICATIONS

RA890E

A switching relay may be used with the RA890E on constant pilot applications to provide a safe start check each time the controller calls for heat. This is accomplished by momentarily interrupting power to the control; the load relay drops out and does not pull back in if a flame simulating failure has occurred.

NOTE: Two different hookups are shown for the RA890E. If an RA890F is used to replace an RA890E in this type of circuit, an R482F must be substituted for the existing 3K relay according to the diagram on page 19.





REPLACING RA890E,F,G WITH R4795A,D ON GAS OR OIL BURNER.

TYPICAL CUTOFF SYSTEM USING R482D OR R488G (With Overlapping Contacts)

For applications where it is undesirable for the RA890E,F,G to return ignition on flame failure, a cutoff circuit is used. The purpose of the cutoff hookup is to prevent recycling of the relay on flame failure. When using this hookup, flame failure will be followed by safety lockout, requiring that the primary control be manually reset before a restart can be made. The RA890H,J,K and R4795D automatically provide cutoff without external wiring. Cutoff systems may be designed so that ignition only, or ignition and pilot valve, will be cut off on flame failure. One hundred percent gas shutoff, including pilot, is required for LP gas.

RETROFITTING R4795

CAUTION

Make wiring connections as shown on page 33 or 34. Do not simply plug R4795 into old subbase without first changing wiring at subbase.

Keep the following in mind when retrofitting the R4795:

1. The R4795 requires a line voltage controller capable of switching the entire electrical load connected to the R4795.
2. A delayed opening oil valve may be retained, but its delay is not necessary. The R4795's integral ST71A purge timer meets the intent of a delayed opening valve.
3. Refer to R4795 hookups for proper wiring connections.

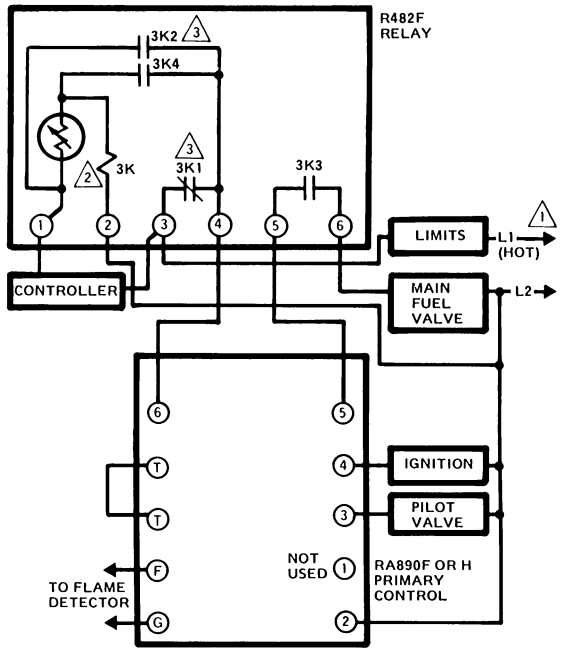
REPLACING RA890E,F,G WITH R4795A,D

1. Disconnect all wires from terminal 1, and splice with solderless connector. (If RA890 has no terminal 1 wiring, disregard this step).
2. Remove line voltage controller wire from terminal 6 and connect to terminal 1.
3. Move burner motor connection from terminal 3 to terminal 6 on subbase.
4. Remove jumper from T and T and install air switch. If low voltage control was wired to RA890 T-T, remove low voltage control and install line voltage control as shown.
5. If an R482D relay was used with the RA890E, remove it. The R482D is not needed when an R4795D is used.
6. Check for proper operation through at least 2 cycles.

HOOKUP FOR SUPERVISING PILOT DURING OFF CYCLE WITH SAFE START CHECK

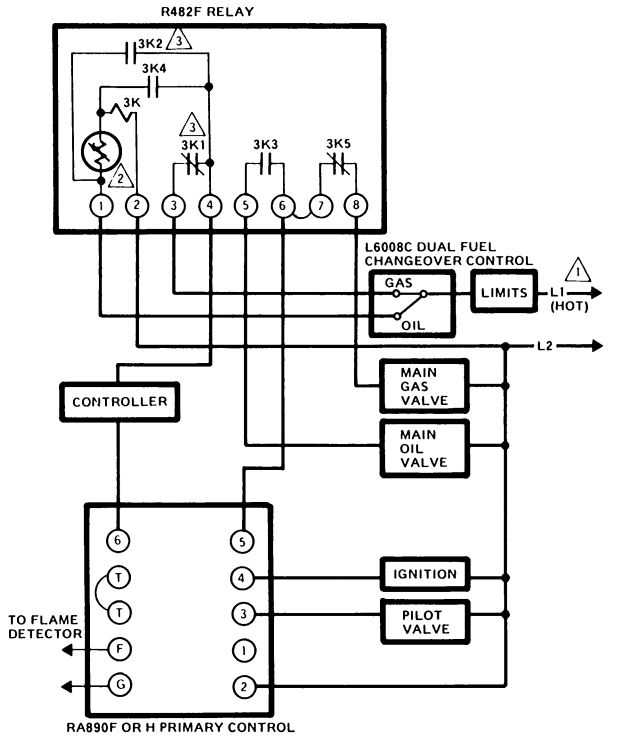
RA890F

In applications requiring pilot operation during the OFF cycle, use the hookup shown in the accompanying figure. The R482F Relay has a thermistor connected in series with the coil to provide a slight pause between contact break and make when the armature pulls in. This circuit extinguishes and relights the pilot each time the controller makes.



AUTOMATIC FUEL CHANGEOVER

When automatic fuel changeover is desired, the following RA890F or H hookup may be used. The L6008C controller energizes or de-energizes the R482F, causing a momentary interruption of power to terminal 6 of the RA890. The burner stops, if it is operating, and starts again on the other fuel.



1. POWER SUPPLY. PROVIDE DISCONNECT MEANS AN OVERLOAD PROTECTION AS REQUIRED.
2. THERMISTOR DELAYS PULL-IN OF RELAY.
3. WHEN RELAY IS ENERGIZED, 3K1 OPENS BEFORE 3K2 CLOSES, MOMENTARILY INTERRUPTING POWER TO THE RA890.

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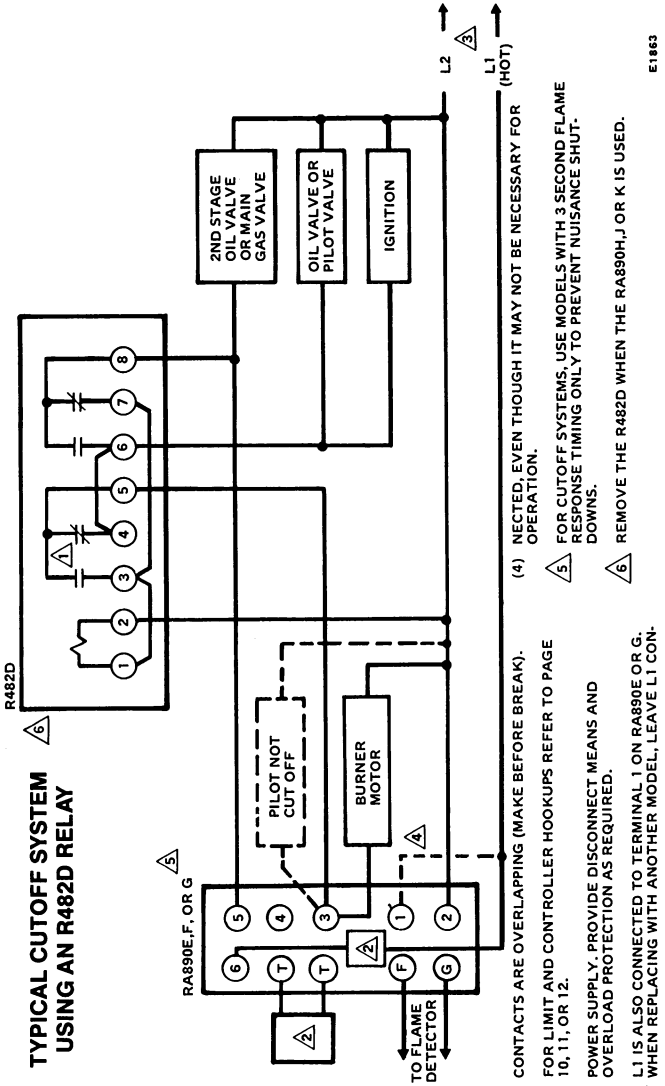

1. CONTACTS ARE OVERLAPPING (MAKE BEFORE BREAK).
2. FOR LIMIT AND CONTROLLER HOOKUPS REFER TO PAGE 10, 11, OR 12.
3. POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
4. L1 IS ALSO CONNECTED TO TERMINAL 1 ON RA890E OR G. WHEN REPLACING WITH ANOTHER MODEL, LEAVE L1 CONNECTED, EVEN THOUGH IT MAY NOT BE NECESSARY FOR OPERATION.
5. FOR CUTOFF SYSTEMS, USE MODELS WITH 3 SECOND FLAME RESPONSE TIMING ONLY TO PREVENT NUISANCE SHUTDOWNS.
6. REMOVE THE R482D WHEN THE RA890H,J OR K IS USED.

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