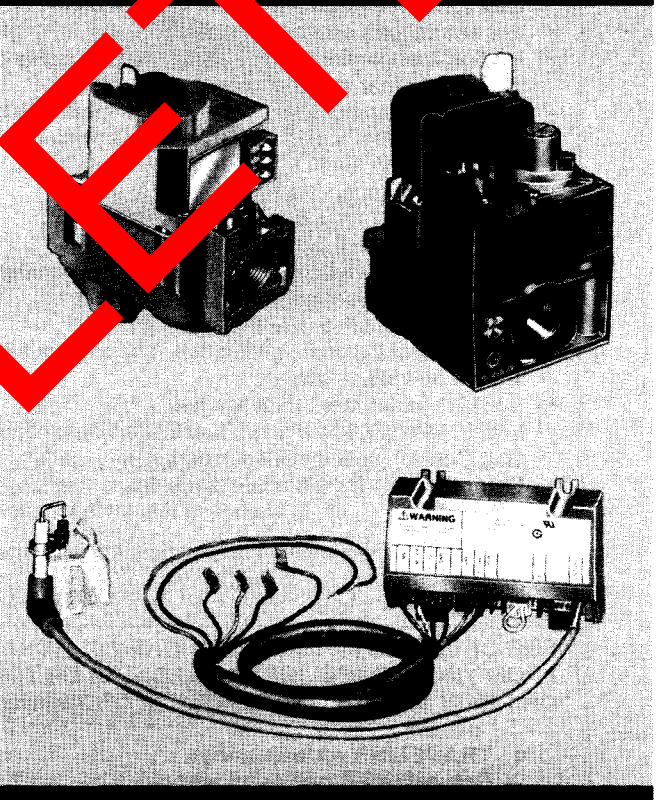
Honeywell

INTERMITTENT PILOT RETROFIT KIT



Y8610F,H

OBSOLETE

THE Y8610F,H ARE COMPLETE KITS FOR CONVERTING CONVENTIONAL STANDING PILOT SYSTEMS TO INTERMITTENT PILOT SYSTEMS. THEY ARE USED ON GAS-FIRED ATMOSPHERIC FURNACES, BOILERS, AND HEATING APPLIANCES. NOT FOR USE ON DIRECT VENT OR POWER BURNER EQUIPMENT. MEETS ANSI Z21.71 STANDARD FOR AUTOMATIC INTERMITTENT PILOT IGNITION SYSTEMS FOR FIELD INSTALLATIONS.

☐ Y8610F kits are for use on natural gas only; they continue trial for ignition until either the pilot lights or the system is shut down manually.

☐ Y8610H kits are available for either natural or LP gas; they provide timed trial for ignition and 100 percent pilot shutoff on loss of flame.

☐ Each kit includes:
- — S8610F or H Intermittent Pilot Module
- — VR8440A or M or VR8204A Dual Valve Combination Gas Control
- — 392431 Igniter-Sensor
- — 394800-30 Ignition Cable
- — Wiring Harness
- — 393690-14 Straight Flange Kit (3/4 inch) (VR8204A applications only)
- — Reducer adapters for gas control
- — Adhesive mounting option for S8610
- — Installation hardware

☐ Temperature Rating:
- — VR8204A: 0° to 175° F [-18° to 79° C]
- — VR8440A: -40° to 175° F [-40° to 79° C]
- — VR8440M: 32° to 175° F [0° to 79° C]

MODULE

☐ Uses rectification principle for fla[illegible] sensing.

☐ Provides 13 kV peak capacitive d[illegible]charge [illegible]outp[illegible] (at 25 pf load).

GAS CONTROL

☐ Straight through b[illegible]y patte[illegible] Some m[illegible]e 1/2 in. plugged side outle[illegible]

☐ Capacities at 1 in[illegible]wc[illegible]essure dr[illegible] [0.25 kPa pressure drop]:
VR8[illegible]r with[illegible]1/2" x 3[illegible] adapter):
[illegible]0 ft³/hr [4.[illegible]³/hr]
[illegible]8440A,M with [illegible]" x 3/4[illegible]" inlet x outlet
[illegible]190 ft³/hr [5.4 m[illegible]]
[illegible]8440A,M with 3/4[illegible] 3/4" NPT inlet x outlet
[illegible]200 ft³/hr [5.7 m³[illegible]]

☐ Mani[illegible]ON-OFF[illegible]ve blocks gas flow into gas control in the OFF positio[illegible]

☐ Two main automatic valves—one solenoid operated, the other diaphragm operated.

IGNITER/SENSOR

☐ Single electrode made of Kanthal provides both ignition and flame sensing.

☐ Rated for 1775° F [968° C] at electrode tip, 1250° F [677° C] at ceramic insulator.

D.T.
Rev. 5-93

Form Number 68-0102—2

SPECIFICATIONS

IMPORTANT

THE SPECIFICATIONS GIVEN IN THIS PUBLICATION DO NOT INCLUDE NORMAL MANUFACTURING TOLERANCES. THEREFORE, UNITS MAY NOT MATCH THE LISTED SPECIFICATIONS EXACTLY. ALSO, UNITS ARE 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.

TRADELINE MODELS AVAILABLE:

Y8610F Intermittent Pilot Retrofit Kit:

- All models meet ANSI Z21.71 Automatic Intermittent Pilot Ignition Systems for Field Installation.
- For natural gas applications only.
- Ignition trial continues until either the pilot lights or the system manually shuts down.
- S8610F Intermittent Pilot Module. Available with or without vent damper plug (specify when ordering).
- VR8204A or VR8440A or M Dual Valve Combination Gas Control (specify when ordering).
- Refer to Fig. 1 for other components.

Y8610H Intermittent Pilot Retrofit Kit:

- All models meet ANSI Z21.71 Automatic Intermittent Pilot Ignition Systems for Field Installation.
- For natural or LP gas applications.
- 90 second maximum ignition trial. 100 pe[illegible]nt pilot shutoff on loss of flame.
- S8610H Intermittent Pilot Module.
- VR8204A or VR8440A or M Dual Valve [illegible]mbination Gas Control (specify when ordering).
- Refer to Fig. 1 for other com[illegible]s.

AMBIENT TEMPERATURE RATING:
VR8204A: 0 to 175° F [-18 to 79[illegible]C].
VR8440A: -40 to 175° F [-40 t[illegible]9° C].
VR8440M: 32 to 175° F [0 to [illegible]° C].
Also refer to Igniter-Sen[illegible]r spe[illegible]ca[illegible]ns.

ELECTRICAL RATINGS:
Voltage and Frequ[illegible]cy: 20.5 to 2[illegible] Vac, [illegible]4 Vac nominal), 60 H[illegible]
Current Rating [illegible].7A (in[illegible]des both mo[illegible]le and gas control).
Thermost[illegible] Anticipator Setti[illegible]0.7A plus current ratings [illegible] other devices in ther[illegible]stat control circuit.

RELAT[illegible]E HUMIDI[illegible]Y RATING: 5 to 90 percent at 95° F [35[illegible]].

THERM[illegible]STA[illegible]COMPATIBILITY:
Compat[illegible] with any [illegible]oneywell 24V thermostat and with compa[illegible]ve 24[illegible]hermostat that is powered independently of t[illegible]dule.

TRANSFORMER [illegible]ZING:
Add current [illegible]atings of Y8610, vent damper, and any [illegible]ther con[illegible] system components. Multiply this total by [illegible] to [illegible]termine the transformer VA requirement.

WIRIN[illegible]CONNECTIONS:
Between the module and gas control: 30 inch [762 mm] wiring harness with 1/4 inch quick-connect terminals.
Between the module and the igniter-sensor: 30 inches [762 mm] ignition cable with stud terminal and 1/4 inch quick-connect terminal.

O[illegible]ERI[illegible]G INFORMATION

FOR ORDERIN[illegible]NFO[illegible]MATION WHEN[illegible]URCHASING REPLACEMENT AND MODERNIZATION PRODUCTS FROM YOUR[illegible]RADEL[illegible]E WHOLE[illegible]ER OR YOUR DISTRIBUTOR, REFER TO THE TRADELINE CATALOG OR PRICE S[illegible]ETS F[illegible] CO[illegible]LETE ORDERING NUMBER, OR SPECIFY:

1. **TRADELIN[illegible]rder num[illegible]r.**
2. **[illegible]Rate[illegible]or LP[illegible]s ap[illegible]cation.**
3. **Ambien[illegible]mpe[illegible] rating.**
4. **Gas control inlet and outlet size.**
5. **Vent damper plug on module, if desired.**

[illegible] YOU HAVE AD[illegible]ITIONAL QUESTIONS, NEED FURTHER INFORMATION, OR WANT TO COMMENT ON OUR [illegible]RODUCTS OR [illegible]ERVICES, PLEASE WRITE OR PHONE:

1. **[illegible]UR LOC[illegible]L HONEYWELL RESIDENTIAL AND BUILDING CONTROLS SALES OFFICE (CHECK WHITE PAG[illegible]OF PHONE DIRECTORY).**

2. **RESIDENTIAL AND BUILDING CONTROLS CUSTOMER SERVICES**
   HONEYWELL INC.,
   1885 DOUGLAS DRIVE NORTH
   MINNEAPOLIS, MINNESOTA 55422
   (612) 542-7500

   (IN CANADA: HONEYWELL CONTROLS LIMITED
   740 ELLESMERE ROAD
   SCARBOROUGH, ONTARIO M1P 2V9)

INTERNATIONAL SALES AND SERVICE OFFICES IN ALL PRINCIPAL CITIES OF THE WORLD.

FIG. 1—Y8610 RETROFIT KIT COMPONENTS.

INTERMITTENT PILOT MODEL SPECIFICATIONS

MODELS:
S8610F Intermittent Pilot Module, for natural gas applications only.
S8610H Intermittent Pilot Module, for natural or LP gas applications only.

DIMENSIONS: Refer to Fig. 2.

FLAME FAILURE RESPONSE TIME: 0.8 seconds maximum at 1.0 µf flame current.

IGNITION TIMING:
S8610F: Until pilot lights or system is shut down manually.
S8610H: Until pilot lights or lockout occurs.

MOUNTING: Mounts in any position except with terminals up. Recommended mounting position is with terminals down to provide maximum protection from dripping water or dust accumulation. Fasten with No. 6-32 machine screws or No. 8 sheet metal screws of appropriate length. Refer to Fig. 13.

SAFETY LOCKOUT TIMING:
S8610F: None. Ignition trial continues until pilot lights or system is manually shut down.
S8610H: 70 seconds nominal. 90 seconds maximum. Provides 100 percent gas shutoff if pilot does not light.

SPARK GENERATOR OUTPUT: 13 kV peak at 25 pf load (16kV peak open circuit).

TERMINALS: 1/4 inch male quick-connects. S8610F1016 has Molex plug for connection to Honeywell D80D Vent Damper or Penn Baso G60 or G66 Vent Damper. Once the S8610F has powered a vent damper, the module will work only if the vent damper is connected.

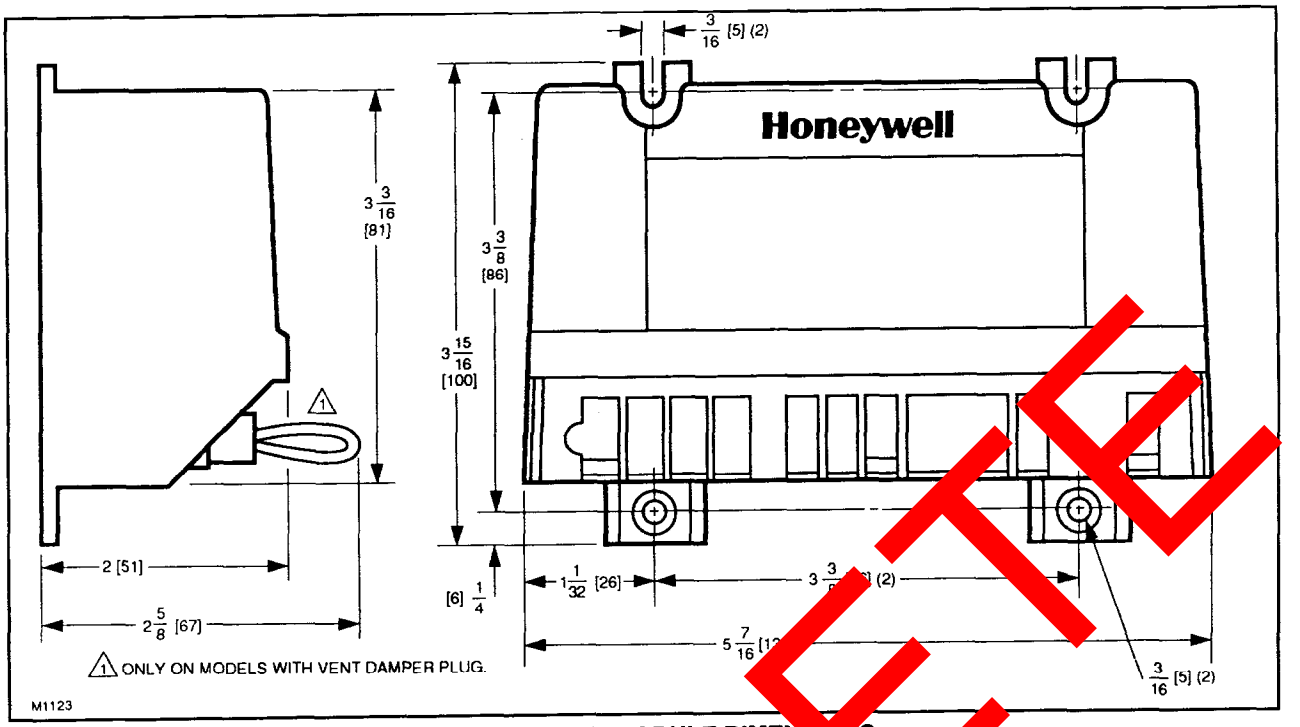


FIG. 2—S8610F,H MODULE DIMENSIONS.

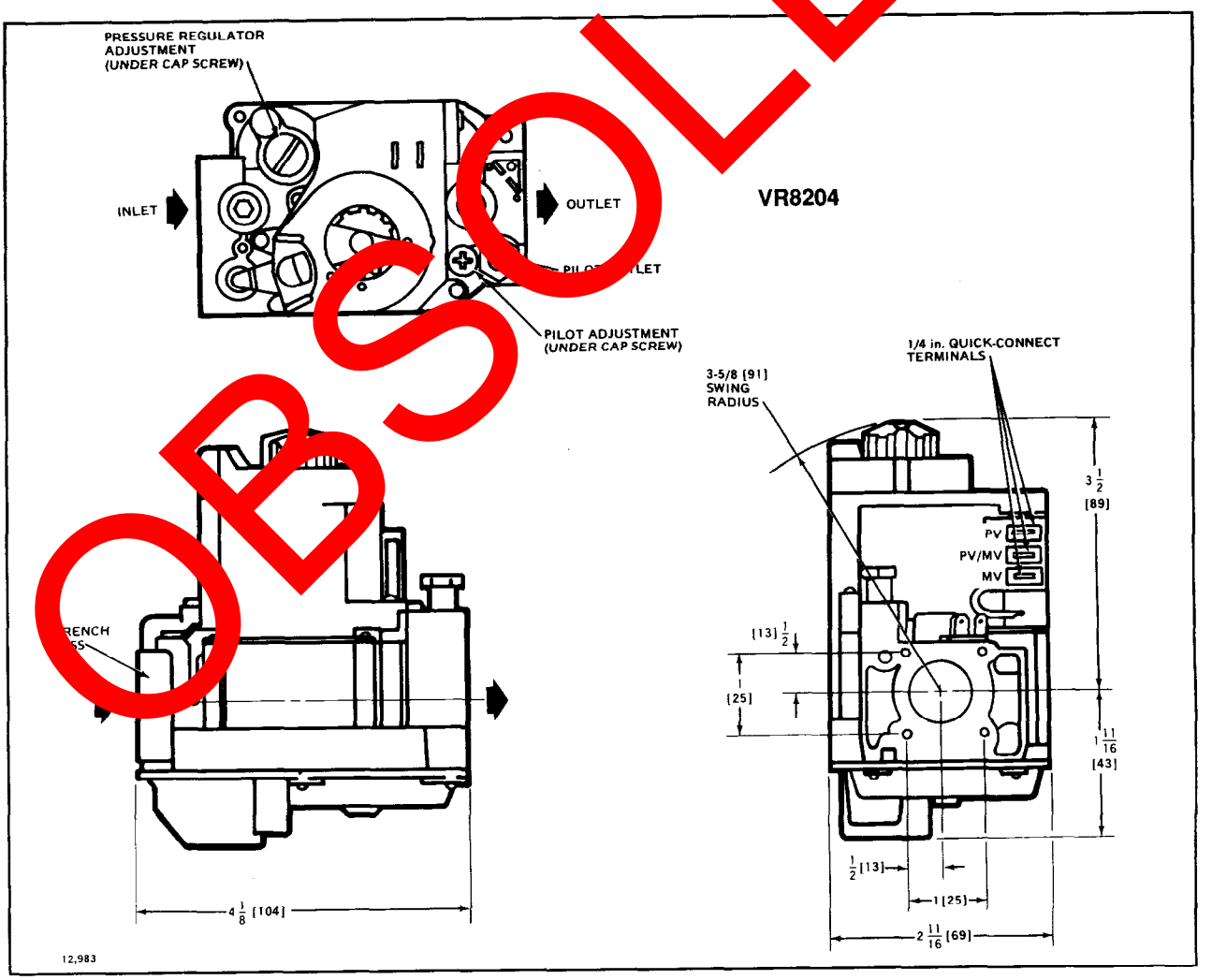


FIG. 3—VR8204A MOUNTING DIMENSIONS IN INCHES AND [MILLIMETERS].

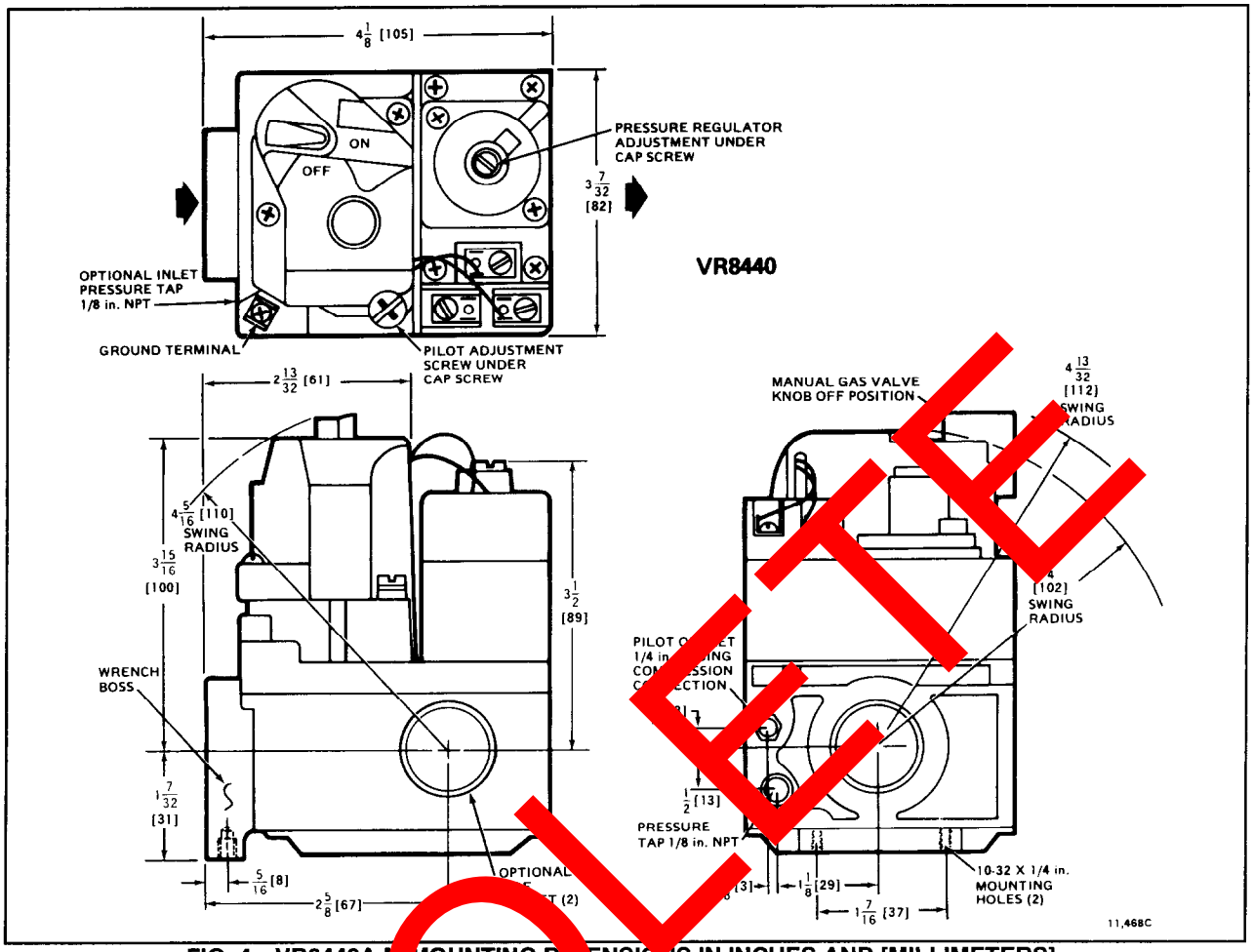


FIG. 4—VR8440A,M MOUNTING DIMENSIONS IN INCHES AND [MILLIMETERS].

DUAL VALVE COMBINATION GAS CONTROL SPECIFICATIONS

MODELS:
VR8204A Dual Valve Combination Gas
VR8440A Dual Valve Combination Gas Control.
VR8440M Dual Valve Combination Gas Control.

AMBIENT TEMPERATURE RATING:
VR8204A: 0 to 175° F [-18 to 79° C].
VR8440A: -40 to 175° F [-40 to 79° C].
VR8440M: 32 to 175° F [0 to 79° C].

CAPACITIES AND PIPE SIZES:

Model	Pipe Size (Inlet X Outlet)	Capacity[a] FT³/HR	Capacity[a] M³/HR
VR82	1/2 x 1/2	150	4.2
	1/2 x 3/4[b]	150	4.2
VR8440A,	1/2 x 3/4	190	5.4
	3/4 x 3/4	200	5.7

[a]Based on 1000 Btuh/ft³, 0.64 specific gravity natural gas at 4" wc pressure drop [37.3 MJ/m³, 0.64 specific gravity natural gas at 0.25 kPa pressure drop].

[b]With a 1/2 x 3/4 inch straight flange (included).

DIMENSIONS:
VR8204A: Refer to Fig. 3.
VR8440A,M: Refer to Fig. 4.

MOUNTING: Can be mounted from 0 to 90 degrees, in any direction, from the gas control upright position. Two No. 10-32 UNF tapped mounting holes in the base for bracket mounting (VR8440A,M only).

PRESSURE RATING: 1/2 psig [3.45 kPa] inlet pressure.

TERMINALS:
VR8204A; 1/4 inch male quick-connect terminals.
VR8440A,M: Combination screw terminals and 1/4 inch male quick-connect terminals.

IGNITER-SENSOR SPECIFICATIONS

MODEL: 392431 Igniter-Sensor. Includes igniter-sensor assembly, ground rod, and adapter (Refer to Fig. 1).

DIMENSIONS: Refer to Fig. 5.

ELECTRODE/FLAME ROD MATERIAL: Kanthal.

MAXIMUM TEMPERATURE RATINGS:
Ground rod tip: 1775° F [968° C].
Ceramic insulator: 1250° F [677° C].

MOUNTING: Replaces the thermocouple on the existing pilot burner.

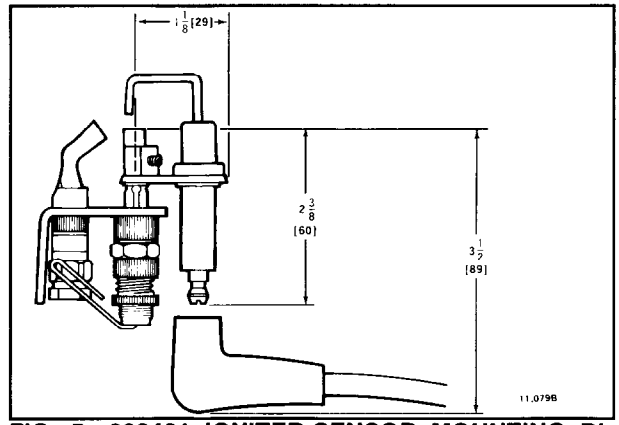


FIG. 5—392431 IGNITER-SENSOR MOUNTING DIMENSION IN INCHES AND [MILLIMETERS].

PLANNING THE INSTALLATION

Intermittent pilot systems are used on a variety of central heating equipment and on heating appliances such as commercial cookers, agricultural equipment, industrial heating equipment, and pool heaters. Some of these applications may make heavy demands on the controls, either because of frequent cycling or because of moisture, corrosive chemicals, dust, or excessive heat in the environment. In these applications, special steps may be required to prevent nuisance shutdowns and premature control failure. These applications require Honeywell Residential and Building Controls Engineering review; contact your Honeywell Sales Representative for assistance.

FREQUENT CYCLING

These controls are designed for use on space heating appliances that typically cycle 3 to 4 times an hour during the heating season and not at all during the cooling season. In applications with significantly greater cycling rates and longer heating seasons, we recommend monthly checkout because the controls may wear out more quickly.

WATER OR STEAM CLEANING

Once a module or gas control has been wet, it may operate unreliably and must be replaced. If the appliance will be cleaned with water or steam, the controls and associated wiring should be covered so water or steam flow cannot reach them. The controls should be high enough above the cabinet bottom so flooding or splashing water will not reach them during normal cleaning procedures. If necessary, shield the controls to protect them from splashing water. A NEMA 4 enclosure is recommended for the ignition module; see the Electronic Ignition Service Manual, form 70-6604.

HIGH HUMIDITY OR DRIPPING WATER

Over time, dripping water or high humidity can create unwanted electrical paths on the module circuit board, causing the module to fail. *Never* install the appliance where water can drip on the control.

In addition, high ambient humidity can cause the gas control to corrode, and finally to fail.

Where the appliance may be installed in a humid atmosphere, make sure air circulation around the module and gas control is adequate to prevent condensation. It's also important to regularly check out the system. A NEMA 4 enclosure may be needed; see the Electronic Ignition Service Manual, form 70-6604.

CORROSIVE CHEMICALS

Corrosive chemicals can also attack the module and gas control and eventually cause a failure. Where chemicals may be used routinely for cleaning, make sure the cleaning solution cannot reach the control. Where chemicals are likely to be suspended in air, as in some industrial and agricultural applications, protect the ignition module from exposure with a NEMA 4 enclosure; see the Electronic Ignition Service Manual, form 70-6604.

DUST OR GREASE ACCUMULATION

Heavy accumulations of dust or grease may cause the controls to malfunction. Where dust or grease may be a problem, provide covers for the module and the gas control that will limit environmental contamination. A NEMA 4 enclosure is recommended for the ignition module; see the Electronic Ignition Service Manual, form 70-6604.

HEAT

The control can be damaged by excessively high temperatures. Make sure the maximum ambient temperature at the control locations will not exceed the rating of the control. If the appliance normally operates at very high temperatures, insulation, shielding, and air circulation may be necessary to protect the controls. Proper insulation or shielding should be provided by the appliance manufacturer; make sure adequate air circulation is maintained when the appliance is installed.

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 these instructions and on the product to ensure the product is suitable for your application.

3. Ensure the installer is a trained, experienced service technician.

4. After completing installation, use these instructions to check product operation.

IMPORTANT

1. Installer must comply with local codes and ordinances of the National Fuel Code (ANSI Z223.1—NFPA No. 54.) and National Electrical Code (ANSI NFPA No. 70).
2. Installer must fill in and attach label to appliance being converted.
3. Use Y8610 retrofit kit only with atmospheric burners. Do not use on direct vent appliances or power burners.
4. Do not use the Y8610 retrofit kit with mercury pilots or 250 to 750 mV pilot systems.

WARNING

FIRE OR EXPLOSION HAZARD
CAN CAUSE PROPERTY DAMAGE, SEVERE INJURY, OR DEATH

Follow these warnings exactly:

1. Disconnect the power supply before wiring to prevent electrical shock or equipment damage.
2. To avoid dangerous accumulation of fuel gas, turn off gas supply at the appliance service valve before starting Installation and perform Gas Leak Test following the installation.
3. Never install where water can flood, drip, or condense on module or gas control. Never use a module or gas control that has been wet. If wet, controls can malfunction and lead to an accumulation of explosive gas.
4. Do not light or operate electric switches, lights, or appliances until you are sure the appliance area is free of gas. Liquefied petroleum (LP) gas is heavier than air and will not vent upward naturally.

PERFORM THE PREINSTALLATION SAFETY INSPECTION

The preinstallation checks described in ANSI Standard Z21.71 on page 24 **must** be performed before installing the Y8610. If an unsafe condition is detected, the appliance should be shut off and the owner advised of the unsafe condition. Any potentially unsafe condition must be corrected before proceeding with the Installation.

Maintenance Requirements In Severe Environments

Regular preventive maintenance is important in any application, but especially so in commercial cooking, agricultural, and industrial applications because

- In many applications, particularly commercial cooking, the equipment operates 100,000 to 200,000 cycles per year. Such heavy cycling can wear out the gas control in one to two years. Normal forced air furnace, for which the controls were originally intended, typically operates less than 20,000 cycles per year.
- Exposure to water, dirt, corrosives, and heat can damage the module or the gas control and shut down the control system. A NEMA 4 enclosure can reduce exposure to environmental contaminants. See Electronic Ignition Service Manual, form 70-6[illegible].

The maintenance program should include regular system checkout as outlined under Checkout, refer to page 14.

WARNING

FIRE OR EXPLOSION HAZARD
CAN CAUSE PROPERTY DAMAGE, SEVERE INJURY, OR DEATH

Do not attempt to disassemble or clean the module. Improper reassembly and cleaning may cause unreliable operation.

Maintenance frequency must be determined individually for each application. Some considerations are:

- *Cycling frequency*: Appliances that cycle more than 20,000 times annually should be checked monthly.
- *Intermittent use*: Appliances that are used seasonally should be checked before shutdown and again before the next use.
- *Consequence of unexpected shutdown*: Where the cost of an unexpected shutdown is high, the system should be checked more often.
- *Dusty, wet, or corrosive environment:* Since, these environments can cause the controls to deteriorate more rapidly, the system should be checked more often.

Any control should be replaced if it does not perform properly on Checkout or Troubleshooting. In addition, replace any module if it is wet or looks like it has ever been wet. Protective enclosures as outlined under "Planning the Installation" are recommended regardless of checkout frequency.

SHUT DOWN APPLIANCE

1. Turn off gas supply at the appliance service valve. Do not use the gas control knob.
2. Turn off the electricity at the service entrance.

CHECK APPLIANCE WIRING

The standing pilot gas control wires will be used with the Y8610 kit. Carefully identify and tag the wires before disconnecting. Refer to Fig. 6 for the most common types of terminal arrangements.

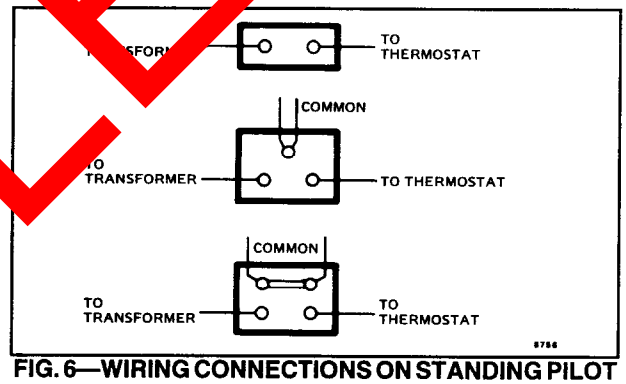


FIG. 6—WIRING CONNECTIONS ON STANDING PILOT GAS CONTROLS.

REMOVE STANDING PILOT GAS CONTROL

1. If the gas control has common terminal(s), remove the wires connected to the common terminal(s) and splice together with one of the wire nuts provided.
2. Tag and remove the remaining wires.

CAUTION

Do not bend the pilot gas tubing at the gas control or at the pilot burner. Gas leakage at the connection will result.

3. Disconnect the pilot tubing at the gas control. Cut off and discard the compression fitting. Do not disturb the compression fitting or pilot tubing at the pilot burner.
4. Disconnect the thermocouple lead at the gas control.
5. Disconnect the gas piping at the gas control.
6. Discard the gas control.

REMOVE THERMOCOUPLE

Unscrew or snap the thermocouple out of the pilot burner and discard. Refer to Fig. 7.

NOTE: It may be necessary to pull main burner out for access to the pilot burner. Do not move or relocate the pilot burner. Do not bend tubing near the pilot burner.

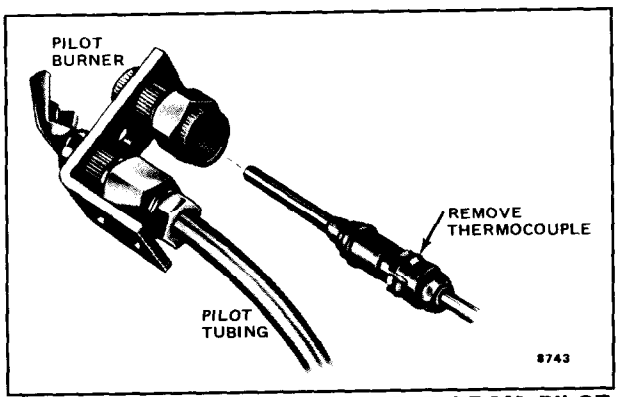
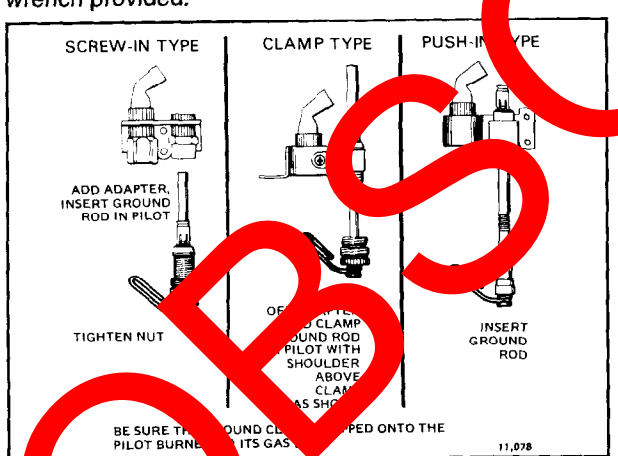


FIG. 7—REMOVE THERMOCOUPLE FROM PILOT BURNER.

INSTALL THE IGNITER-SENSOR ASSEMBLY

1. Install the ground rod if needed. Refer to Fig. 8.
   - Mount adapter to ground rod (if needed).
   - Line up ground rod so clip will hug pilot burner and keep ground rod from rotating. Refer to Fig. 9.
   - Insert ground rod in place of thermocouple on pilot burner. Push ground rod all the way up. Fasten as shown in Fig. 8.
2. Slide igniter-sensor mounting bracket over ground rod top.
3. Adjust electrode position so electrode tip and spark gas are in pilot flame. Turn ground rod to move igniter-sensor up and down.
4. Check that the chosen position allows room to connect the ignition cable to the stud terminal.
5. Tighten the setscrews on mounting bracket using hex wrench provided.



G. 8—MOUNT GROUND ROD ON PILOT BURNER.

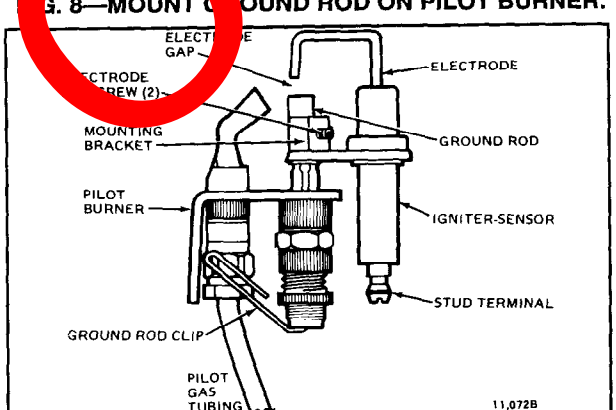


FIG. 9—FASTEN IGNITER-SENSOR TO GROUND ROD.

INSTALL THE GAS CONTROL

WARNING

FIRE OR EXPLOSION HAZARD
CAN CAUSE PROPERTY DAMAGE, SEVERE INJURY, OR DEATH
Follow these warnings exactly:

1. **Do not bend the pilot gas tubing at the gas control or at the pilot burner after compression fitting is tightened. Gas leakage at the connection may result.**
2. **Always install a sediment trap in the gas supply line to prevent contamination of the gas control.**
3. **Do not force the gas control knob. Use only your hand to turn the gas control knob. If the gas control knob will not operate by hand, the gas control should be replaced by a qualified service technician. Force or attempted repair may result in a fire or explosion.**

IMPORTANT

These gas controls are shipped with protective seals over the inlet and outlet tappings. Do not remove the seals until ready to connect piping.

INSTALL ADAPTERS TO GAS CONTROL (if used)

3690-14 Straight Flange (3/4 inch) (VR8204 only)

1. Remove seal over gas control inlet or outlet.
2. Ensure that the O-ring is fitted in the flange groove. If the O-ring is not attached or missing, do not use the flange.
3. With the O-ring facing the gas control, align the gas control threaded holes with the flange clearance holes.
4. Insert and tighten the screws provided with the flange. Tighten the screws to 25 inch pounds of torque to provide a gas tight seal.

Bushings:

1. Remove seal over gas control inlet or outlet.
2. Apply moderate amount of good quality pipe compound to bushing, leaving two end threads bare. On LP installation, use compound resistant to LP gas. Do not use Teflon Tape.
3. Insert bushing in gas control and thread pipe carefully into bushing until tight.

INSTALL GAS CONTROL PIPING

All pipe must comply with local codes and ordinances or with the National Fuel Code (ANSI Z223.1 NFPA No. 54), whichever applies. Tubing installation must comply with approved standards and practices.

1. Use new, properly reamed pipe free from chips. If tubing is used, ensure that ends are square, deburred, and clean. All tubing bends must be smooth and without deformation.
2. Run new pipe or tubing to the gas control. If tubing is used, obtain a tube-to-pipe coupling to connect tubing to gas control.
3. Install a sediment trap in the gas supply line. Refer to Fig. 10.

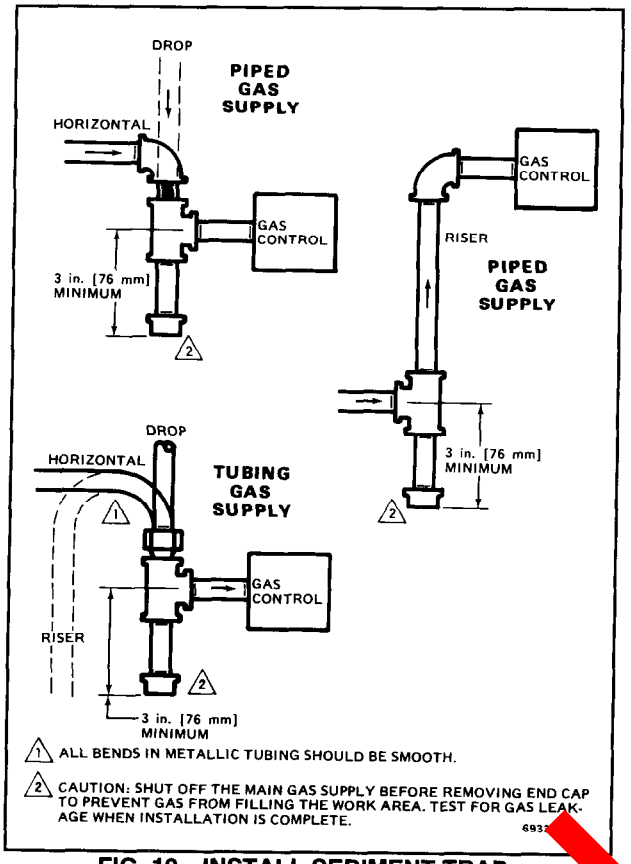


FIG. 10—INSTALL SEDIMENT TRAP.

MOUNT GAS CONTROL

1. The gas control can be mounted in any position from 0 to 90 degrees, in any direction, from the upright position of the gas control knob, including vertically.
2. Mount the gas control so gas flow is in the same direction as the arrow on the gas control bottom.
3. Thread the pipe as listed in Table 1.

NOTE: Do not thread the pipe more than indicated in Table 1. If pipe is inserted too far into the gas control, second main valve or safety valve may distort causing malfunction.

TABLE 1—NOMINAL PIPE THREAD LENGTH (INCHES).

Pipe Size	Overall Thread Length	Maximum Depth Pipe Can Be Inserted Into Gas Control
	9/16	3/8
1/2		1/2
3/4	11/16	3/4

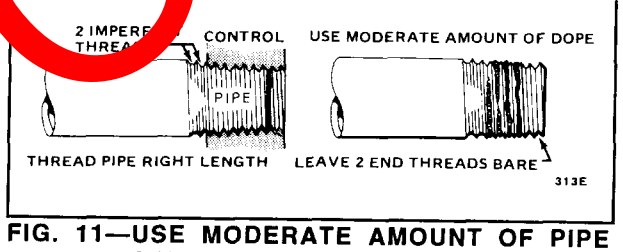


FIG. 11—USE MODERATE AMOUNT OF PIPE COMPOUND.

4. Apply a moderate amount of good quality pipe compound to pipe only, leaving two end threads bare. DO NOT USE TEFLON TAPE. In LP installations, use compound resistant to LP gas. Refer to Fig. 11.
5. Remove protective seals over the gas control inlet and outlet, if necessary.
6. Connect pipe to the gas control inlet and outlet. Tighten the inlet and outlet connections using a wrench on the gas control projecting wrench boss. Refer to Figs. 3 or 4.

CONNECT PILOT GAS TUBING

1. Cut the pilot gas tubing and bend as necessary for routing to the pilot burner.
   - Do not make sharp bends or deform tubing.
   - Do not bend tubing at the gas control after the compression nut has been tightened. Gas leakage at the connection may result.
2. Square off and remove burrs from the tubing end.
3. Unscrew the brass compression fitting from pilot gas outlet (Refer to Figs. 3 and 4). Slip the fitting over the pilot gas tubing and slide out of the way.

NOTE: When replacing a gas control, cut off the old compression fitting and replace with the new compression fitting provided on the new gas control. Never use the old compression fitting as it may not provide a gas tight seal. Refer to Fig. 12.

4. Push the gas tubing into pilot gas tapping until it bottoms. While holding tubing all the way in, slide compression fitting into place and engage threads. Turn until finger tight. Using a wrench, tighten one more turn. Do not overtighten.

Connect other end of pilot gas tubing to pilot burner according to pilot burner manufacturer's instructions.

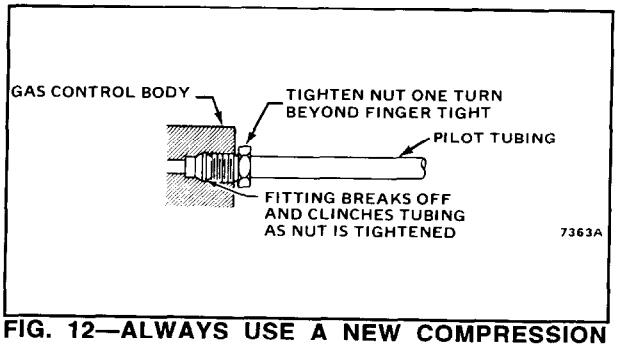


FIG. 12—ALWAYS USE A NEW COMPRESSION FITTING.

MOUNTING S8610 INTERMITTENT PILOT MODULE

Select a location close to the pilot burner to allow the ignition cable to run to the igniter-sensor. The ambient temperature and other conditions should match those listed in Specifications.

We recommend mounting the module with the terminals down so the terminals are protected from dripping water and dust. It can also be mounted with the terminals on either side. Do not mount the module with the terminals pointing up. Refer to Fig. 13 for mounting recommendations. Fasten securely with four No. 6-32 machine screws or No. 8 sheetmetal screws of appropriate length.

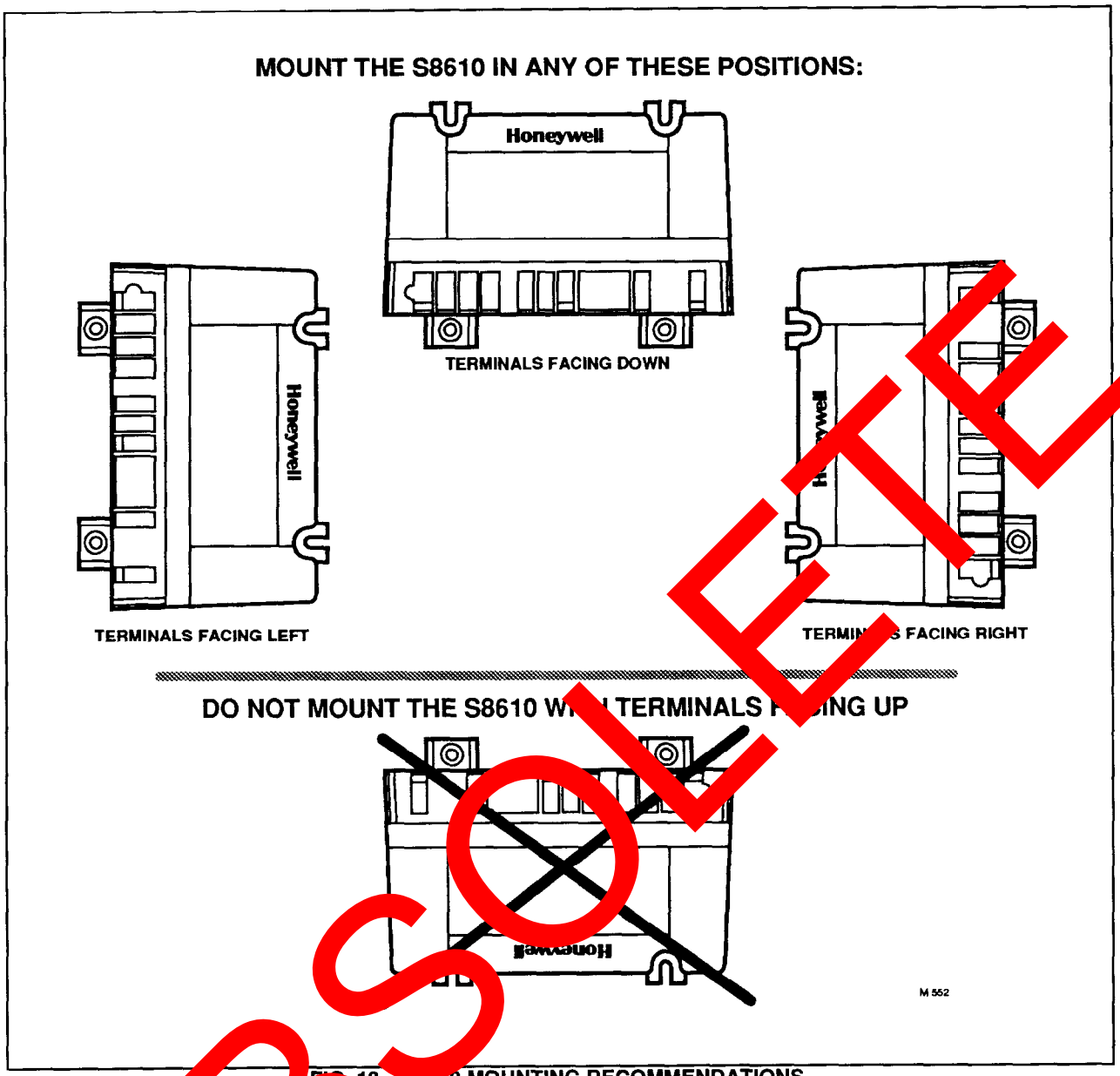


FIG. 13—S8610 MOUNTING RECOMMENDATIONS.

WIRING THE SYST

CA TION

Dis nnect the p r sup fore making wiring co ections to pre nt elec rical shock or equipm t damage.

Conne the Ignition able

1. Co t one of the ignition cable to the male quick-connect SPARK terminal on the S8610 Module.
2. Connect the other ignition cable end to the 392431 Igniter-Sensor.

Connect the Vent Damper

The D80D Vent Damper can be used with all ignition modules, although the Molex plug provided on some modules simplifies wiring connections when used with the D80D Plug-in Vent Damper. *Once a module with a vent damper plug has powered a vent damper circuit it cannot be used in a gas system without a vent damper.* A replaceable fuse in the module blows on initial power-up. Once this fuse has blown, the module won't work unless the vent damper is connected.

To connect the plug-in vent damper:

1. Remove and discard the vent damper plug from the module terminal strip.
2. Using the wiring harness supplied, insert the matching pin plug into the receptacle on the module and the other end to the vent damper.

To connect the D80B Vent Damper follow the wiring diagrams supplied with the vent damper.

Connect S8610 Module

1. Connect the gas control and other remaining system components to the ignition module terminals as shown in the Figs. 14 through 16.
   - Fig. 14 shows a basic circuit for a heating only atmospheric burner system.
   - Fig. 15 shows a heating only atmospheric burner system with a D80D Vent Damper.

- Fig. 16 shows a heating only system with a D80B Vent Damper.

2. Adjust the thermostat heat anticipator to match system current draw. The current draw equals the total current required for the ignition module (0.2A) plus the gas control and any other auxiliary equipment in the control circuit.

Connect Ground Control System

The igniter, flame sensor, and ignition module must share a common ground with the main burner.

1. Fit one end of the ground wire with a female 1/4 inch quick-connect terminal and connect it to the male quick-connect GND (BURNER) terminal on the ignition module.

2. Strip the other end of the wire and fasten it under the igniter bracket mounting screw. If necessary, use a shield to protect the ground wire from radiant heat.

3. The burner serves as the common grounding area. If there is not a good metal-to-metal contact between burner and ground, run a lead from the burner to ground.

NOTE: "Earth" ground is not required.

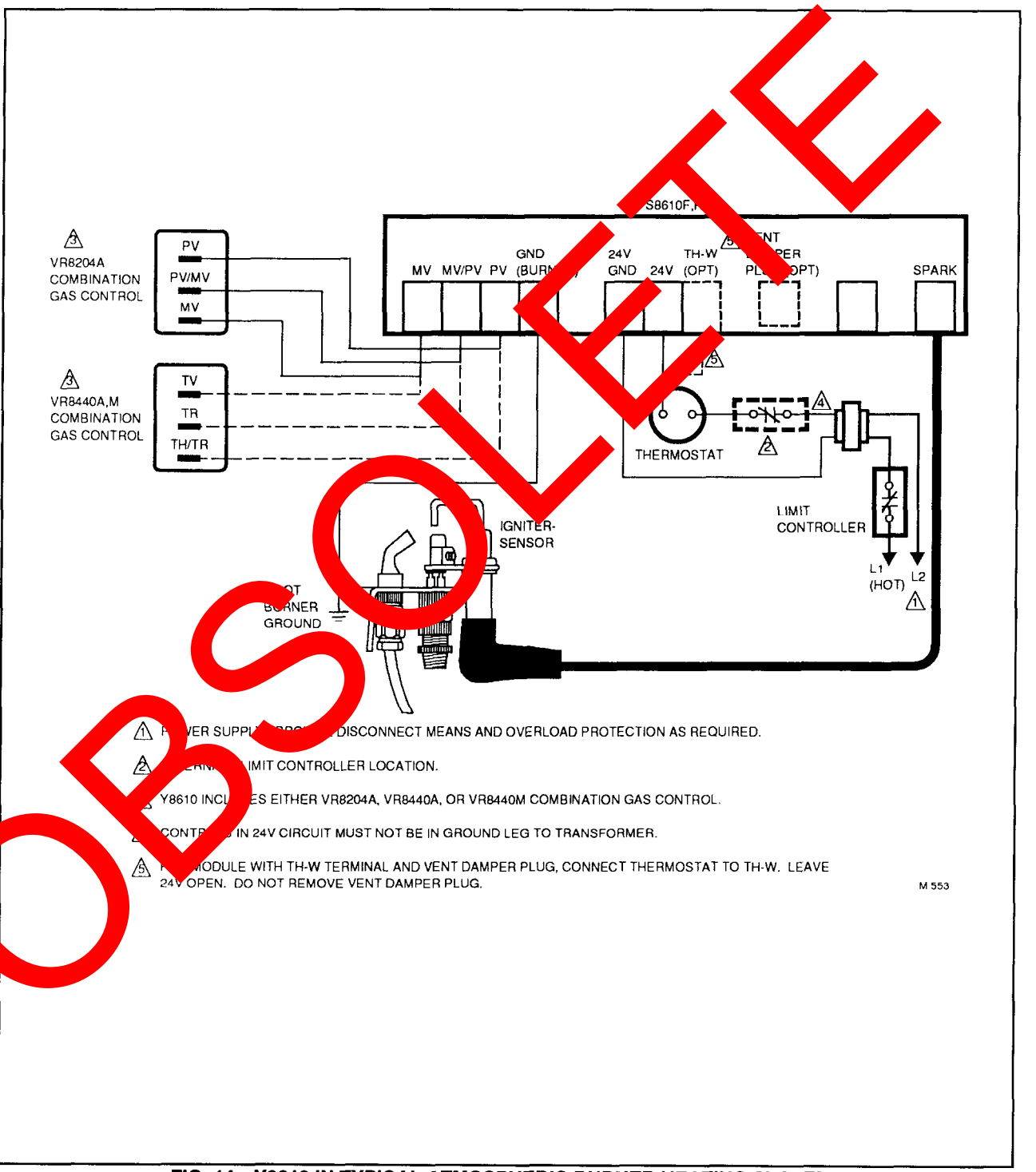
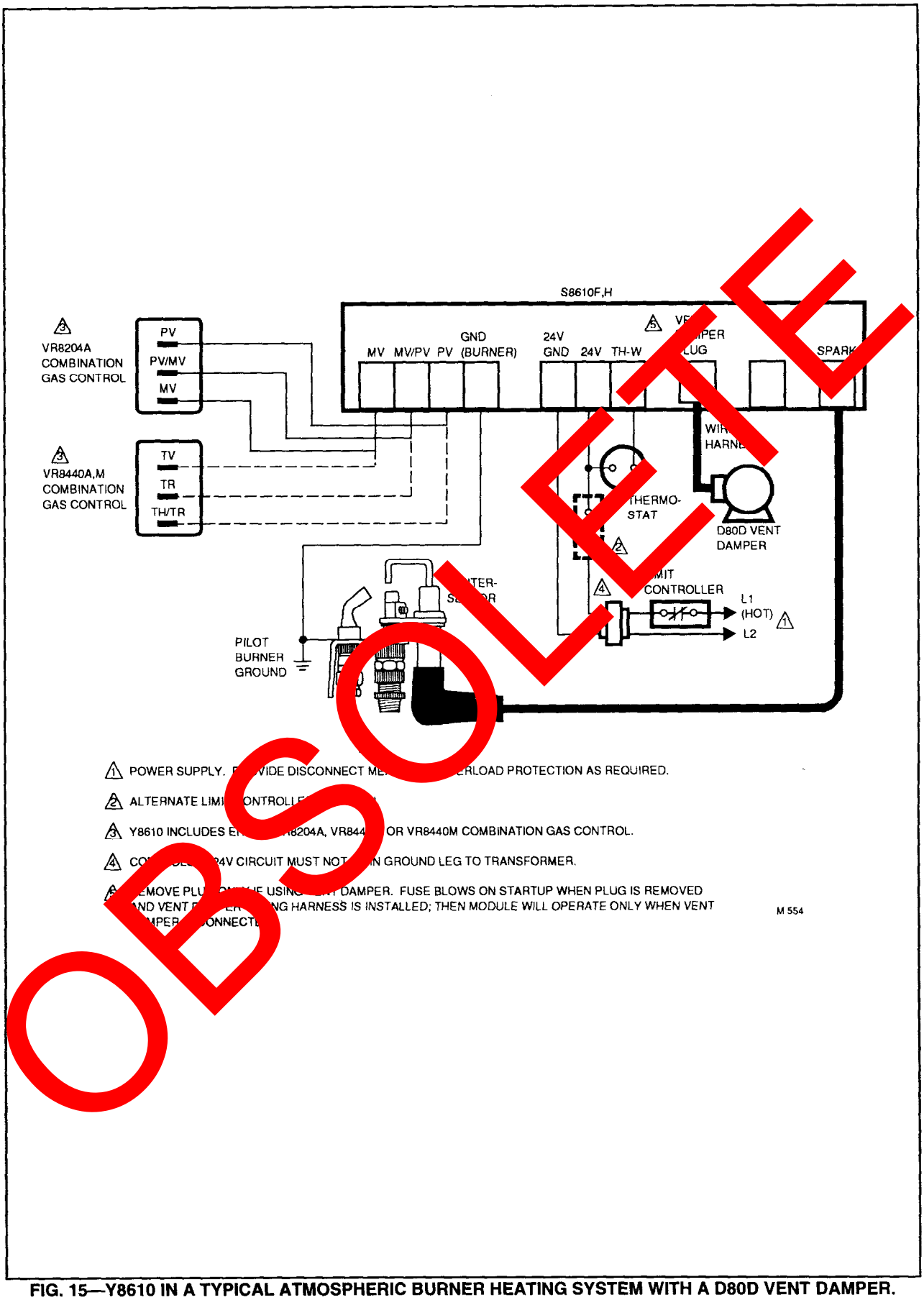


FIG. 14—Y8610 IN TYPICAL ATMOSPHERIC BURNER HEATING SYSTEM.



1 POWER SUPPLY. P VIDE DISCONNECT ME ERLOAD PROTECTION AS REQUIRED.

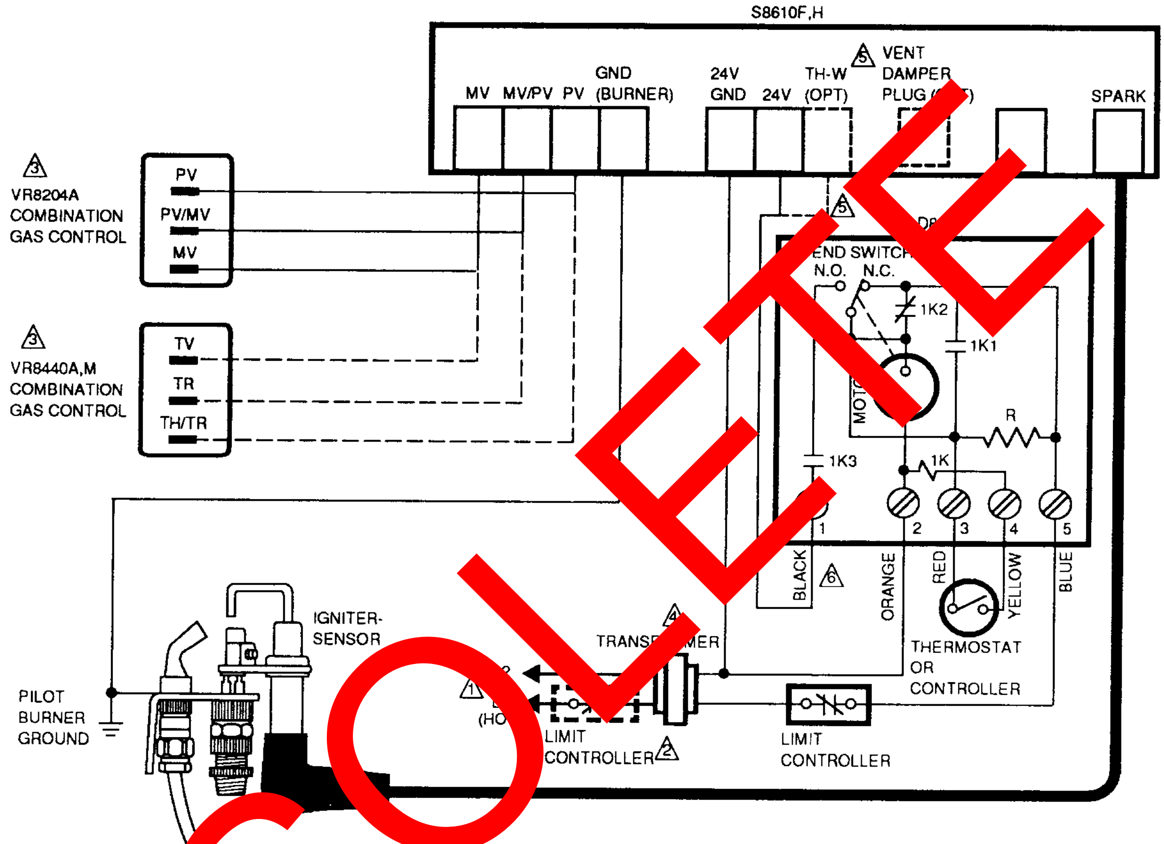
2 ALTERNATE LIMI ONTROLLE

3 Y8610 INCLUDES EI 8204A, VR844 OR VR8440M COMBINATION GAS CONTROL.

4 CO 24V CIRCUIT MUST NOT N GROUND LEG TO TRANSFORMER.

5 EMOVE PLU IF USING DAMPER. FUSE BLOWS ON STARTUP WHEN PLUG IS REMOVED ND VENT NG HARNESS IS INSTALLED; THEN MODULE WILL OPERATE ONLY WHEN VENT MPER ONNECTE

FIG. 15—Y8610 IN A TYPICAL ATMOSPHERIC BURNER HEATING SYSTEM WITH A D80D VENT DAMPER.



1. POWE[illegible]UPPLY. P[illegible]ONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
2. ALTERNA[illegible] CONTROLLE[illegible]OCATION.
3. [illegible] INCLUDES EITHER A[illegible]204A, VR8440A, OR VR8440M COMBINATION GAS CONTROL.
4. CO[illegible] 24V CIRCUIT MUST NOT BE IN GROUND LEG TO TRANSFORMER.
5. [illegible]R MODUL[illegible]TH TH-W TERMINAL AND VENT DAMPER PLUG, CONNECT VENT DAMPER TERMINAL 1 [illegible] TH-W. LEAVE 24V OPEN. DO NOT REMOVE VENT DAMPER PLUG.
6. [illegible]LORS[illegible]FER TO WIRE HARNESS, IF USED.

M 556A

FIG. 16—Y8610 IN A TYPICAL FAN ASSISTED COMBUSTION BURNER HEATING SYSTEM.

CHECKOUT

Check out the gas control system:
- At initial appliance installation.
- As part of regular maintenance procedures. Maintenance intervals are determined by the application. See PLANNING THE INSTALLATION, page 6, for more information.
- As the first Troubleshooting step.
- Any time work is done on the system.

WARNING

FIRE OR EXPLOSION HAZARD
CAN CAUSE PROPERTY DAMAGE, SEVERE INJURY, OR DEATH
1. **If you smell gas or suspect a gas leak, turn off gas at the manual service valve and evacuate the building. Do not try to light any appliance and do not touch any electrical switch or telephone in the building until no spilled gas remains.**
2. **Perform the Gas Leak Test after initial Installation and any time work is done to the gas piping.**

STEP 1: Perform a Visual Inspection.
- With the power off, ensure all wiring connections are clean and tight.
- Turn off all power to appliances and ignition module.
- Open manual shutoff valves in the gas line to the appliance.
- Perform Gas Leak Test.

WARNING

FIRE OR EXPLOSION HAZARD
CAN CAUSE PROPERTY DAMAGE, SEVERE INJURY, OR DEATH
Check for gas leaks with rich soap and water solution any time work is done on a gas control.

GAS LEAK TEST
1. Paint all pipe connections upstream of the gas control with a rich soap and water solution. Bubbles indicate a gas leak.
2. If a gas leak is detected, tighten the pipe connection.
3. Open and clear vent line lighting main burner to prevent injury caused from hidden gas leaks which could cause flashback in the appliance vestibule. Light the main burner.
4. With the main burner in operation, paint all pipe joints (including adapters) and gas control inlet and outlet with rich soap and water solution.
5. If another gas leak is detected, tighten adapter screws, joints, and pipe connections.
6. Replace the part if gas leak can not be stopped.

STEP 2: Review Normal Operating Sequence and Module Specifications.
- See OPERATION, page 16, and SPECIFICATIONS, page 2.

STEP 3: Reset the Module.
- Turn the thermostat to its lowest setting.
- Wait one minute.

As you perform Steps 4 through 9, watch for points where operation deviates from normal. Refer to Troubleshooting Chart to correct problem.

STEP 4: Check Safety Shutoff Operation
- Turn gas supply off at the manual shutoff valve.
- Set thermostat above controller above room temperature to call for heat.
- Watch for spark at pilot burner.
- Time spark from start to shutoff. See SPECIFICATIONS, page 2.
- Open gas control knob and ensure no gas is flowing to pilot or main burner.
- Set thermostat below room temperature and wait one minute before continuing.

STEP 5: CHECK AND ADJUST GAS INPUT TO MAIN BURNER

CAUTION

1. Do not exceed the input rating stamped on the appliance nameplate, or manufacturer's recommended burner orifice pressure for the size orifice(s) used. Ensure the main burner primary air supply is properly adjusted for complete combustion (refer to the appliance manufacturer's instructions).
2. IF CHECKING GAS INPUT BY CLOCKING THE GAS METER:
   - Ensure that they only gas flow through the meter is that of the appliance being tested.
   - Ensure that other appliances are turned off and that their pilot burners are extinguished (or deduct their gas consumptions from the meter reading).
   - Convert the flow rate to Btuh as described in the Gas Controls Handbook (form number 70-6202) and compare to the Btuh input rating on the appliance nameplate.
3. IF CHECKING GAS INPUT WITH A MANOMETER (PRESSURE GAUGE):
   - Ensure the gas control knob is in the PILOT position before removing the outlet pressure tap plug to connect the manometer.
   - Turn the gas control knob back to PILOT when removing the manometer and replacing outlet pressure tap plug.
   - Shut off the gas supply at the appliance service valve or, for LP gas, at the gas tank before removing outlet the pressure tap plug and before disconnecting the manometer and replacing the outlet pressure tap plug.
   - Perform the Gas Leak Test at the inlet pressure tap plug.

1. The gas control output pressure should match the *manifold pressure listed on the appliance nameplate.*

2. With the main burner operating, check the gas control flow rate using the meter clocking method or check the gas pressure using a manometer connected to the gas control outlet pressure tap. Refer to Figs. 3 or 4.

3. If necessary, adjust the pressure regulator to match the appliance rating.

Gas control outlet pressure is normally set at 3.5 inches wc [0.9 kPa] *nominal for natural gas. It can be adjusted* from 3 to 5 inches wc [0.74 to 1.2 kPa].

Gas control outlet pressure is normally set at 10 inches wc [2.5 kPa] nominal for LP gas. It can be adjusted from 8 to 12 inches wc [2 to 3 kPa].

a. Remove the pressure regulator adjustment cap and screw.
b. Using a screwdriver, turn the inner adjustment screw clockwise to increase or counterclockwise to decrease the main burner gas pressure.
c. *Always replace the cap screw and tighten firmly to* ensure proper operation.

4. If the desired outlet gas pressure or gas flow rate cannot be achieved by adjusting the gas control, check the gas control inlet pressure using a manometer at the inlet pressure tap. If the inlet pressure is in the normal range, replace the gas control. Otherwise, take the necessary steps to provide proper gas pressure to the gas control.

STEP 6: Adjust Pilot Flame

The pilot flame should envelop 3/8 to 1/2 [10 to millimeters] of the ground rod and tip of the igniter-sensor. Refer to Fig. 17. To adjust the pilot flame:

1. Remove the pilot adjustment cover screw. Refer to Figs. 3 or 4.

2. Turn the inner adjustment screw clockwise to *decrease or counterclockwise to increase the pilot* flame.

3. Always replace the cover screw after adjustment and tighten firmly to ensure proper operation.

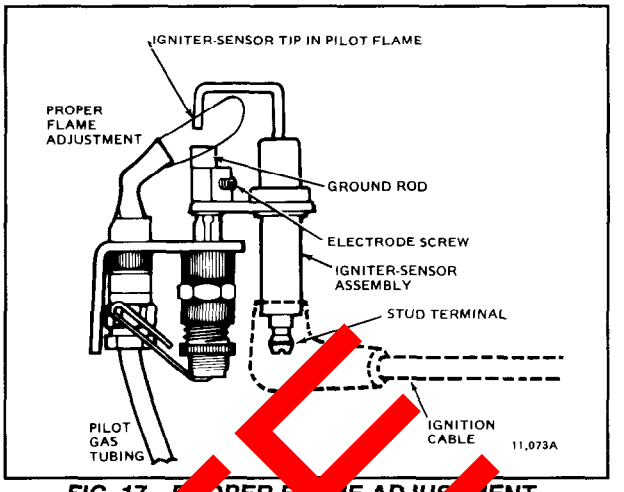


FIG. 17—PROPER FLAME ADJUSTMENT.

STEP 7: Check Other System Components

- ON FURNACE: Ensure the limit controller and fan controller are operating in accordance with the appliance manufacturer's instructions.
- ON BOILERS: Ensure the circulating water pumps, low water cutoffs, automatic feed controllers, pressure and temperature limit controllers, and relief valves are operating in accordance with the appliance manufacturer's recommendations.

STEP 8: Check Normal Operation

- Set thermostat or controller above room temperature to call for heat.
- Ensure pilot lights smoothly when gas reaches the pilot burner.
- Ensure main burner lights smoothly without flashback.
- Ensure main burner operates smoothly without floating, lifting, or flame rollout to the furnace vestibule or heat buildup in the vestibule.
- If gas line has been disturbed, complete the Gas Leak Test, page 14.
- Turn thermostat or controller below room temperature. Ensure the main burner and pilot flames go out.

OPERATION

System operation is divided into two stages:

1. Trial for ignition.
2. Main burner operation

Refer to Fig. 19 for the normal operating sequence.

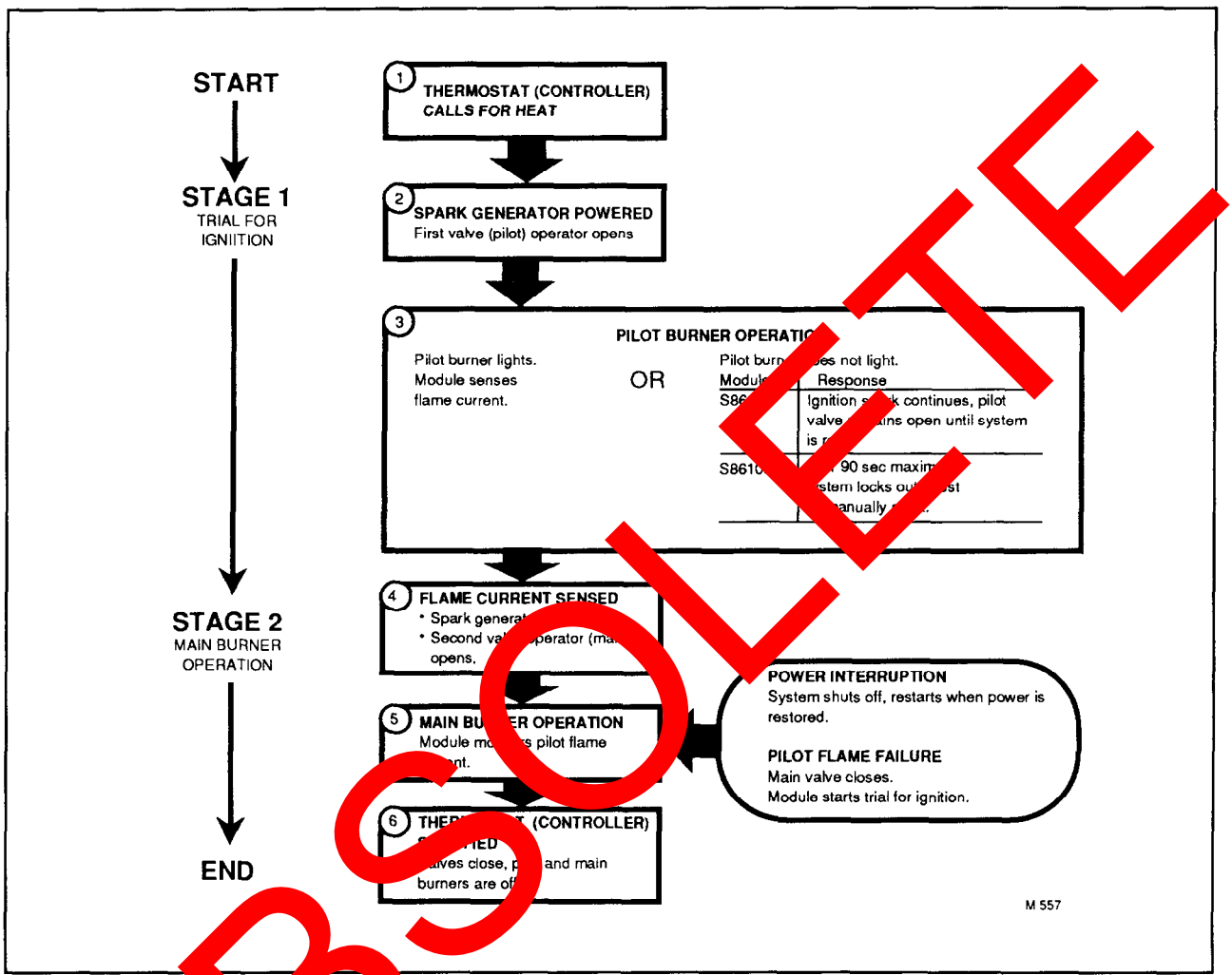


FIG. —S8610 NORMAL OPERATING SEQUENCE.

TRIAL FOR TION

Pilot Ig ion

Fo wing the cal heat module energizes the first n in valve operato The first main valve opens, which allow as to flow to the lot burner. At the same time, the electr c spark gener r in the module produces a high voltage rk pulse o ut. The voltage generates a spark at the igni hat lights the pilot.

If the pilot does not light, or the pilot flame current is not at least 1.0 µA and steady, the module will not energize the second (main) valve and the main burner will not light. S8610F will continue to spark as long as the thermostat calls for heat or until the pilot lights.

Safety Lockout (S8610H)

These modules provide 100 percent shutoff safety lockout. A timer in these models starts timing the moment the trial for ignition starts. Ignition spark continues only until the timed trial for ignition period ends. Then the module goes into safety lockout. Lockout de-energizes the first main valve operator and closes the first main (pilot) valve in the gas control, stopping pilot gas flow. The control system must be reset by setting the thermostat below room temperature for one minute or by turning off power to the module for one minute.

MAIN BURNER OPERATION

When the pilot flame is established, a flame rectification circuit is completed between the sensor and burner ground. The flame sensing circuit in the module detects the flame current, shuts off the spark generator and energizes the second main valve operator. The second main valve opens and gas flows to the main burner, where it is ignited by the pilot burner. On lockout models, the flame current also holds the safety lockout timer in the reset (normal) operating condition.

When the call for heat ends, both valve operators are de-energized, and both valves in the gas control close.

TROUBLESHOOTING

IMPORTANT

1. The following service procedures are provided as a general guide. Follow appliance manufacturer's service instructions if available.
2. On lockout and retry models, meter readings between gas control and ignition module must be taken within the trial for ignition period. Once the ignition module shuts off, lockout models must be reset by setting the thermostat down for at least one minute before continuing. On retry models, wait for retry or reset at the thermostat.
3. If any component does not function properly, make sure it is correctly installed and wired before replacing it.
4. The ignition module cannot be repaired. If it malfunctions, it must be replaced.
5. Only trained, experienced service technicians should service intermittent pilot systems.

Perform the Checkout on page 14 as the first step in troubleshooting. Then check the appropriate troubleshooting guide (Fig. 20) and the schematic diagram (Figs. 23-25) to pinpoint the cause of the problem. If troubleshooting indicates an ignition problem, see Ignition System Checks below to isolate and correct the problem.

Following troubleshooting, perform the check[out] procedure (page 14) again to be sure system is operating normally.

IGNITION SYSTEM CHECKS

STEP 1: Check ignition cable.

Make sure:

☐ Ignition cable does not run in contact with any metal surfaces.

☐ Connections to the ignition module and [igniter-sensor] or igniter-sensor are clean and tight.

☐ Ignition cable provides good electrical continuity.

STEP 2: Check ignition system grounding. *Nuisance shutdowns are often caused by a poor, erratic ground.*

☐ A common ground, usually supplied by the pilot burner bracket, is required for the module and the pilot burner/igniter sensor.

- Check for good metal-to-metal contact between the pilot burner bracket and the main burner.
- Check the ground lead from the GND(BURNER) terminal on the module to the pilot burner. Make sure connections are clean and tight. If the wire is damaged or deteriorated, replace it with No. 14-18 gauge moisture-resistant, thermoplastic insulated wire with 105° C [221° F] minimum rating.
  - — Check the ceramic flame rod insulator for cracks or evidence of exposure to extreme heat, which can permit leakage to ground. Replace pilot burner/igniter-sensor and provide shield if necessary.
  - — If flame rod or bracket are bent out of position, restore to correct position.

STEP 3: Check spark ignition circuit. *You will need a short jumper wire made from ignition cable or other heavily insulated wire.*

☐ Close the manual gas valve.

☐ Disconnect the ignition cable at the SPARK terminal on the module.

WARNING

When performing the following steps, do not touch stripped end of jumper or SPARK terminal. The ignition circuit generates over 10,000 volts and electrical shock can result.

☐ Energize the module and immediately touch one end of the jumper firmly to the GND terminal on the module. Move the free end of the jumper slowly toward the SPARK terminal until a spark is established.

☐ Pull the jumper slowly away from the terminal and note the length of the gap when sparking stops. Check table below.

ARC LENGTH	ACTION
No arc or arc less than 1/8 in. [3 mm]	Check external fuse, if provided. Verify power at module input terminal. Replace module if fuse and power ok.
1/8 in. [3 mm] or more	Voltage output is okay.

STEP 4: Check pilot and main burner lightoff.

☐ Open the manual gas valve.

☐ Set the thermostat to call for heat.

☐ Watch the pilot burner during the ignition sequence. If the:

- ignition spark continues after the pilot is lit;
- pilot lights and the spark stops, but main burner does not light; or
- *S8610H only:* the pilot lights, the spark stops, and main burner lights, but the system locks out.

Ensure adequate flame current as follows:

- Turn off furnace at circuit breaker or fuse box.
- Clean the flame rod with emery cloth.
- Make sure electrical connections are clean and tight. Replace damaged wire with moisture-resistant No. 18 wire rated for continuous duty up to 105° C [221° F].
- Check for cracked ceramic insulator, which can cause short to ground, and replace igniter-sensor if necessary.
- At the gas control, disconnect main valve wire from the TH or MV terminal.
- Turn on power and set thermostat to call for heat. The pilot should light but the main burner will remain off because the main valve actuator is disconnected.
- Check the pilot flame. Make sure it is blue, steady and envelops 3/8 to 1/2 in. [10 to 13 mm] of the flame rod. See Fig. 20 for possible flame problems and their causes.
- If necessary, adjust pilot flame by turning the pilot adjustment screw on the gas control clockwise ↷ to decrease or counterclockwise ↶ to increase pilot flame. Following adjustment, always replace pilot adjustment cover screw and tighten firmly to assure proper gas control operation.
- Set thermostat below room temperature to end call for heat.

- Recheck ignition sequence as follows.
  - Reconnect main valve wire.
  - Set thermostat to call for heat.
  - Watch ignition sequence at burner.
  - If spark still doesn't stop after pilot lights, replace ignition module.
- If main burner doesn't light or if main burner lights but system locks out, check module, ground wire, and gas control as described in the troubleshooting chart, Fig. 19.

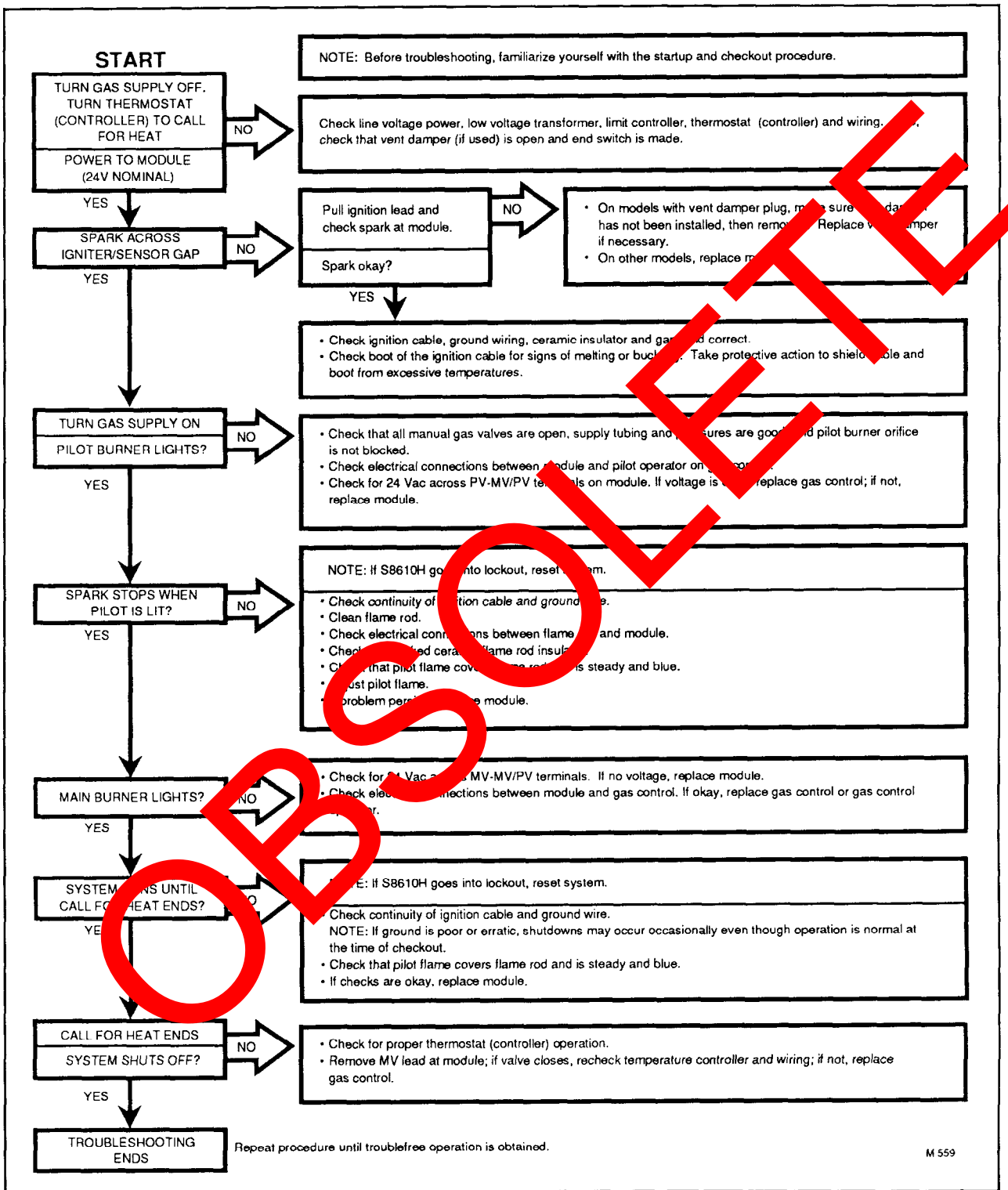
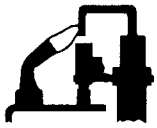
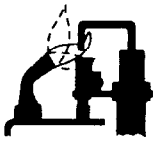
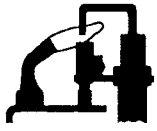
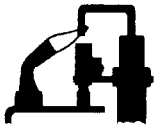


FIG. 19—S8610 TROUBLESHOOTING GUIDE.

APPEARANCE	CAUSE
SMALL BLUE FLAME 	CHECK FOR LACK OF GAS FROM: • CLOGGED ORIFICE FILTER • CLOGGED PILOT FILTER • LOW GAS SUPPLY PRESSURE • PILOT ADJUSTMENT AT MINIMUM
LAZY YELLOW FLAME 	CHECK FOR LACK OF AIR FROM: • DIRTY ORIFICE • DIRTY LINT SCREEN, IF USED • DIRTY PRIMARY AIR OPENING, IF THERE IS ONE • PILOT ADJUSTMENT AT MINIMUM
WAVING BLUE FLAME 	CHECK FOR: • EXCESSIVE DRAFT AT PILOT LOCATION • RECIRCULATING PRODUCTS OF COMBUSTION
NOISY LIFTING BLOWING FLAME 	CHECK FOR: • HIGH GAS PRESSURE
HARD SHARP FLAME 	THIS FLAME IS CHARACTERISTIC OF MANUFACTURED GAS CHECK FOR: • HIGH GAS PRESSUR • ORIFICE TOO SMAL

M 558

FIG. 20—EXAMPLES OF UNS ICTOR PILOT FLAMES.

Adjust Pilot Flame Current

The pilot flame current must measure at least 1µA and steady or nuisance shutdowns may occur. Use a Honeywell W136 to adjust the pilot flame current.

1. Disconnect the furnace power at the service entrance.

2. Disconnect the control module green ground wire.

3. Connect the microammeter negative lead to the control module GND (BURNER) terminal and the positive lead to the green ground wire (Refer to Fig. 21).

4. Disconnect the red wire fr the gas control TH or MV terminal to disable the ga control.

5. Loosen the set scr s ho e igniter-s sor on the ground rod.

6. Restore po r a set thermost call for heat.

7. Wait u l the pilot ligh nd sparking stops. The main burner w ot light.

8. djust the gniter-sensor position and watch the micr mete eading.

9. Whe ou find igniter-sensor position that gives the maximu mi ammeter reading, tighten the set-screws to lock igniter-sensor in place. This reading must be at least 1.0 µA and steady.

10. T off power, remove microammeter, and reconnec and green leads.

11. Perform Checkout procedures.

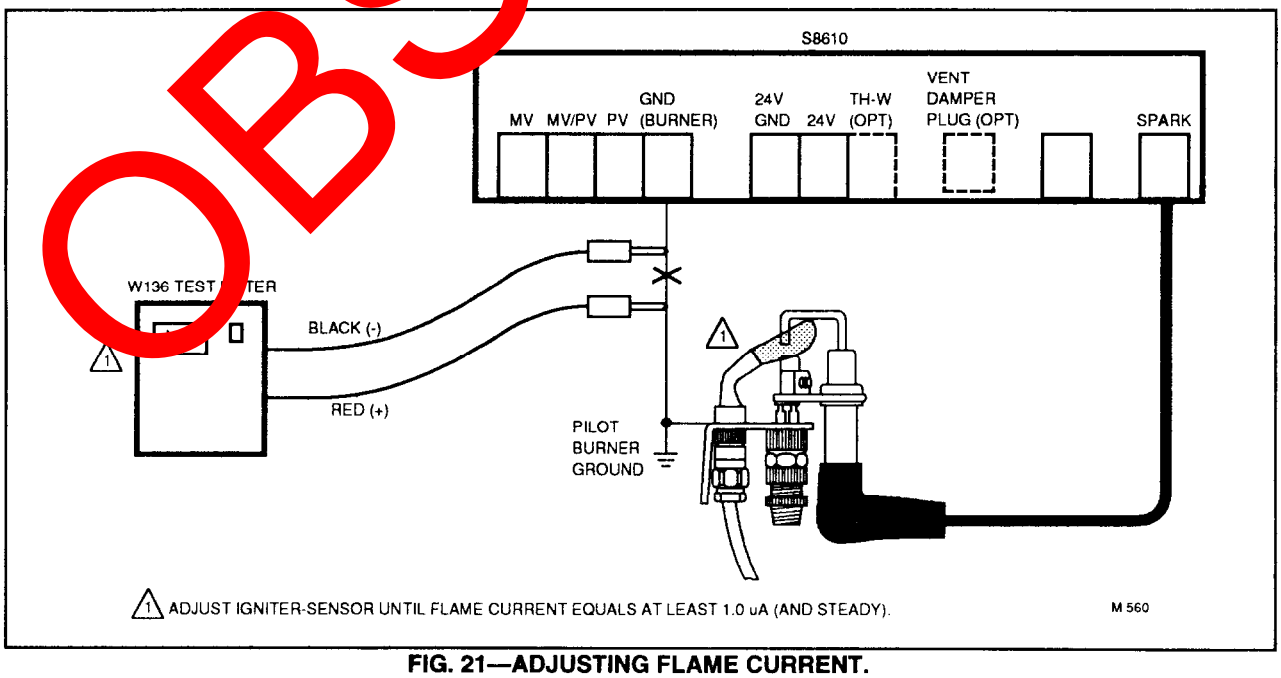


FIG. 21—ADJUSTING FLAME CURRENT.

SCHEMATIC DIAGRAMS

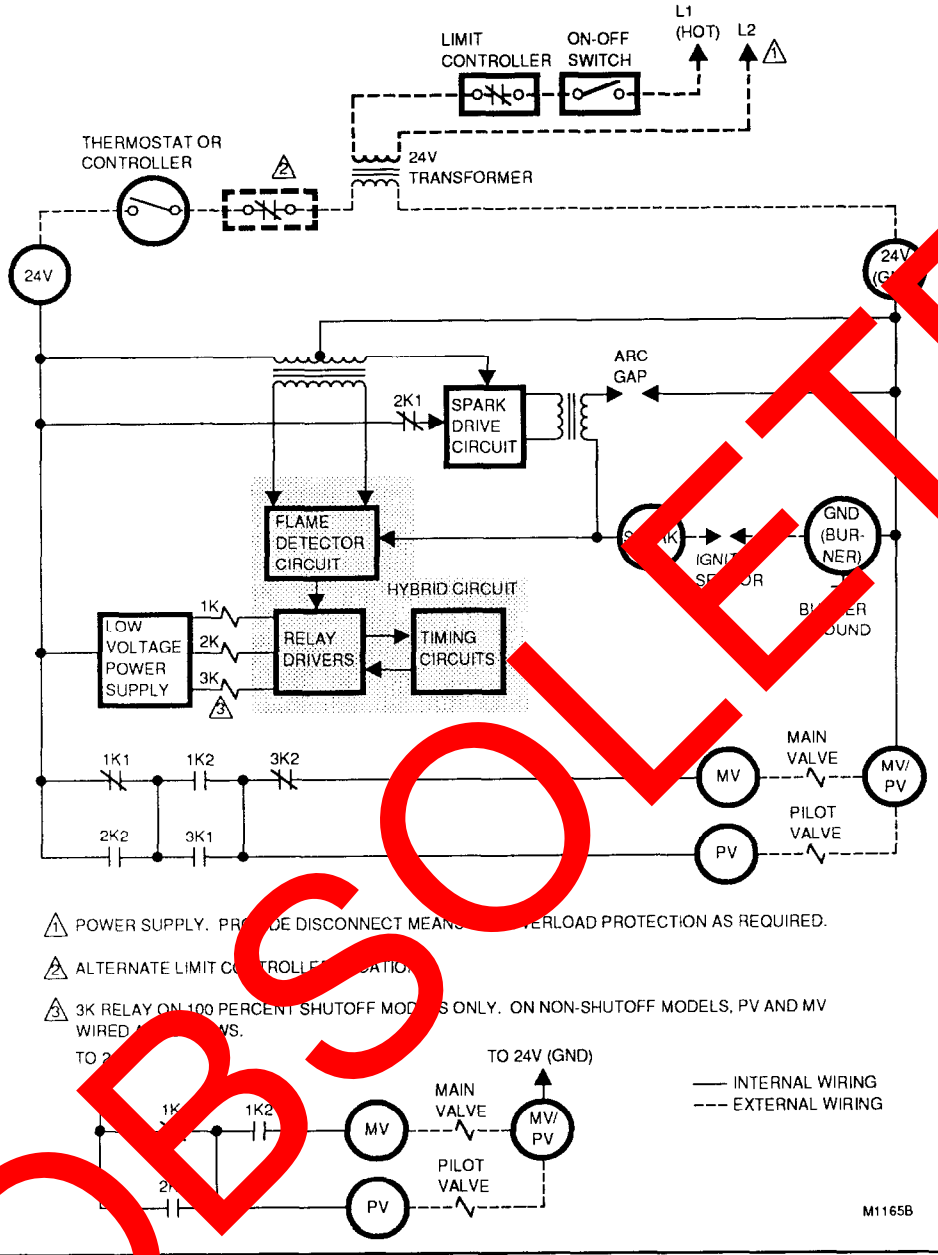
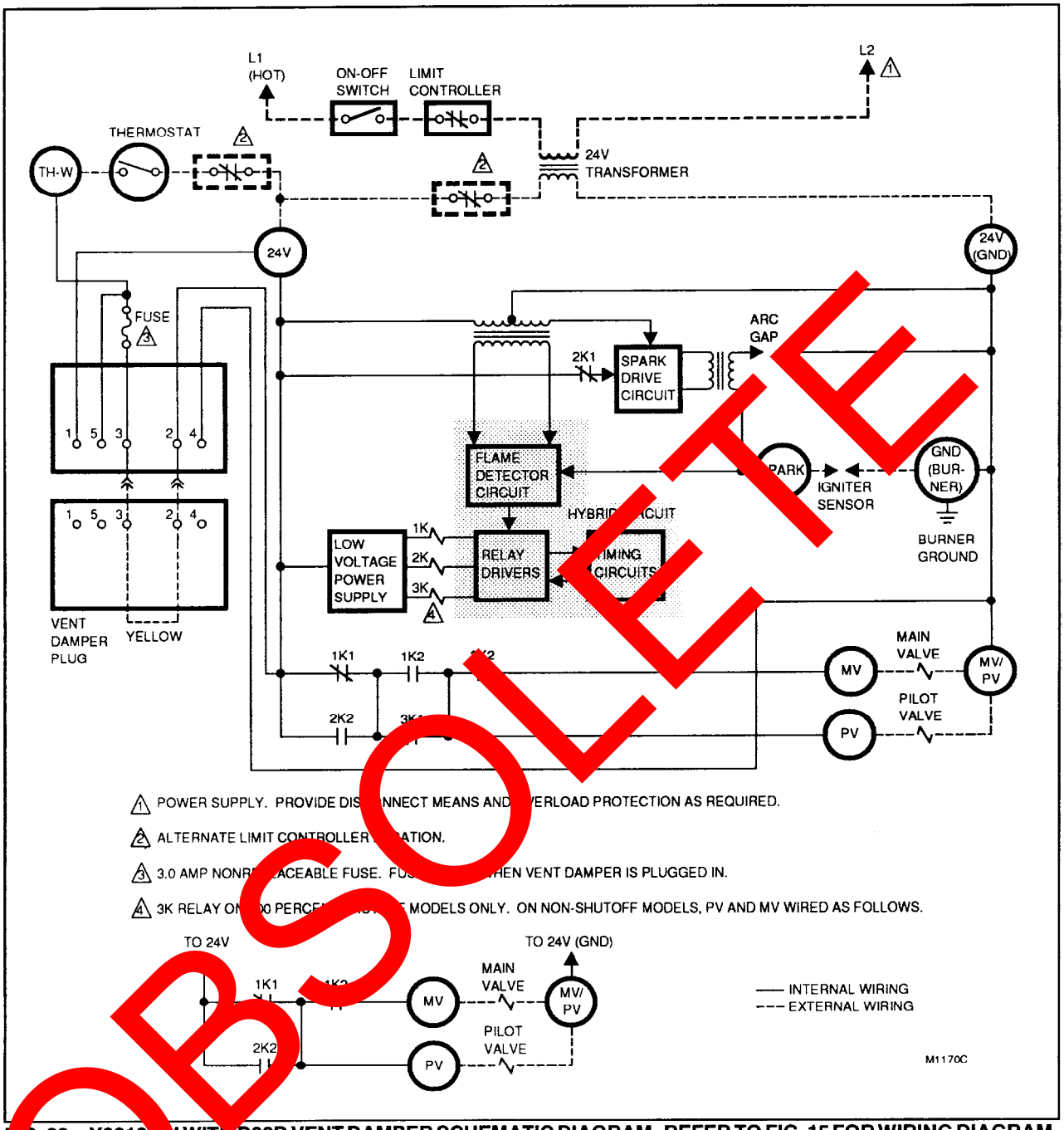


FIG. 22—Y86 F,H SCHEMATIC DIAGRAM. REFER TO FIG. 14 FOR WIRING DIAGRAM.



G. 23—Y8610 WITH D80D VENT DAMPER SCHEMATIC DIAGRAM. REFER TO FIG. 15 FOR WIRING DIAGRAM.

ANSI STANDARDS

EXHIBIT A

RECOMMENDED PROCEDURE FOR SAFETY INSPECTION OF AN EXISTING APPLIANCE INSTALLATION AS A PRELIMINARY STEP TO APPLYING AN AUTOMATIC INTERMITTENT PILOT SYSTEM

The following procedure is intended as a guide to aid in determining that an appliance is properly installed and is in a safe condition for continuing use.

This procedure is predicated on central furnace and boiler installations equipped with an atmospheric gas burner(s) and not of the direct vent type. It should be recognized that generalized test procedures cannot anticipate all situations. Accordingly, in some cases, deviation from this procedure may be necessary to determine safe operation of the equipment.

a. This procedure should be performed prior to any attempt at modification of the appliance or the installation.

b. If it is determined there is a condition which could result in unsafe operation, the appliance should be shut off and the owner advised of the unsafe condition.

The following steps should be followed in making the safety inspection:

1.Conduct a Gas Leakage Test of the appliance piping and control system downstream of the shutoff valve in the supply line to the appliance.

2.Visually inspect the venting system for proper size and horizontal pitch and determine there is no blockage or restrictions, leakage or corrosion or other deficiencies which could cause an unsafe condition.

3.Shut off all gas to the appliance and shut off any other fuel-burning appliance within the room. Use the shutoff valve in the supply line to each appliance. If a manual gas valve is not in the gas supply line within 6 feet of the appliance in an accessible location, one shall be installed.

4.Inspect burners and burner covers for blockage and corrosion.

5.Applicable only to warm air heating appliances. Inspect heat exchangers for cracks, openings or excessive corrosion.

6.Applicable only to boilers. Inspect for evidence of water or combustion product leaks.

7.Insofar as is practical, close all building doors and windows and all doors between the space in which the appliance is located and other spaces of the building. Turn off clothes dryers. Turn on any exhaust fans, such as range hoods and bathroom exhausts, so they will operate at maximum speed. Do not operate a summer exhaust fan. Close fireplace dampers. If, after completing steps 7 through 12, it is believed sufficient combustion air is not available, refer to 1.3.4 of the National Fuel Gas Code (Z223.1) for guidance.

8. Place in operation the appliance being inspected. Follow the lighting instructions. Adjust thermostat so appliance will operate continuously.

9.a. Determine that pilot is burning properly and that main burner ignition is satisfactory by interrupting and re-establishing the electrical supply to the appliance by any convenient manner.

b. Determine manifold pressure in order to match input rate the new control is installed.

10.a. Visually determine that main burner gas is burning properly; i.e., no floating, lifting or flashback. Adjust the primary air shutter(s) as required.

b. If appliance is equipped with high and low flame control or flame modulation, check for proper main burner operation at low flame.

11.Test for spillage at the draft hood relief opening after 5 minutes of main burner operation. Use a draft gauge, the flame of a match or candle, or smoke from a cigarette, cigar or pipe.

12.Return doors, windows, exhaust fans, fireplace dampers and all other fuel-burning appliances to their previous conditions of use.

13.Applicable only to warm air heating appliances. Check both limit controller and fan controller for proper operation. Limit controller operation can be checked by temporarily disconnecting the electrical supply to the blower motor and determining that the limit control acts to shut off the main burner gas.

14. Applicable only to boilers:

a. Determine that the circulating water pumps are in operating condition.

b. Test low water cutoffs, automatic feed controls, pressure and temperature limit controls and relief valves in accordance with the manufacturer's recommendations and instructions to determine they are in operating condition.

EXHIBIT A OF ANSI STANDARD Z21.71 FOR AUTOMATIC INTERMITTENT PILOT IGNITION SYSTEMS FOR FIELD INSTALLATION

EXHIBIT B

PROCEDURE FOR INSTALLING AUTOMATIC INTERMITTENT PILOT SYSTEMS

Prior to beginning this procedure, a preliminary examination of the appliance and the automatic intermittent pilot system should be made to determine that the automatic intermittent pilot system can be properly applied to the appliance.

This procedure is intended as a guide to aid in safely installing a listed automatic intermittent pilot system on an existing listed appliance equipped with an atmospheric gas burner(s) and not of the direct vent type.

This procedure is based on the assumption that the history of the specific installation has been one of safe and satisfactory operation.

This procedure is predicated on central furnace and boiler installations, and it should be recognized that generalized procedures cannot anticipate all situations. Accordingly, in some cases, deviation from this procedure may be necessary to determine safe operation of the equipment.

The following steps should be followed in making the modifications:

1. Perform a safety inspection of the existing appliance installation. See Exhibit A for a recommended procedure for such a safety inspection.

2. Shut off all gas and electricity to the appliance. To shut off gas, use the shutoff valve in the supply line to the appliance. If a manual gas valve is not in the gas supply line within 6 feet of the appliance in an acessible location, one shall be installed. Do not use the shutoff valve which is provided as part of a combination control.

3. Install the automatic intermittent pilot system in strict accordance with the manufacturer's installation instructions.

4. Turn on all gas and electricity to the appliance.

5. Determine that the appliance transformer has adequate capacity by following the steps outlined below:

   a. Compute the approximate current draw by adding the current draw of the automatic intermittent pilot system to (1) the current draw of the associated valving and (2) the current draw of any relays or other devices operated by the transformer.

   b. Multiply the total current draw as computed above by 2 to determine the total VA (volt-ampere) required.

   c. The total VA (volt-ampere) required should be equal to or less than the VA rating of the transformer.

   d. If the total VA (volt-ampere) required is greater than the VA rating of the transformer, the transformer must be replaced with a Class 2 transformer of adequate rating.

6. Check the heat antiicipator in the comfort thermostat to determine if it is properly adjusted to the current draw of the control system. Follow the thermostat manufacturer's instructions.

7. Make certain wiring connections are tight and wires are positioned and secured so they will not be able to contact high temperature locations.

8. Conduct a Gas Leakage Test of the appliance piping and control system downstream of the shutoff valve in the supply line to the appliance.

9. a. Adjust the thermostat to its highest temperature setting, and the manifold pressure and adjust the pressure regulator to match original input as required (refer to Exhibit A, step 9b).

   b. Visually determine that main burner is burning properly (i.e., no floating, lifting, flashback. Adjust the primary air shutter(s) as required.

10. If the appliance is equipped with high and low flame control or flame modulation, check for proper main burner operation at both high and low flame.

11. Determine that the pilot is igniting and burning properly and that main burner ignition is satisfactory by interrupting and re-establishing the electrical supply to the appliance in any convenient manner. Make this determination with the appliance burner both cold and hot. Perform this step as many times as is necessary to satisfy yourself that the automatic intermittent pilot system is operating properly.

12. Test the pilot safety device (1) to determine if it is operating properly, and (2) for turndown characteristics according to the manufacturer's installation instructions. No adjustments should be made other than those recommended by the system manufacturer.

13. Sequence the appliance through at least three operating cycles.

14. Applicable only to furnaces. Check both the limit controller and the fan controller for proper operation. Limit control operation can be checked by blocking the circulating air inlet or temporarily disconnecting the electrical supply to the blower motor and determining that the limit controller acts to shut off the main burner gas.

15. Applicable only to boilers.

   a. Determine that the circulating water pumps are in operating condition.

   b. Test low water cutoffs, automatic feed water controls, pressure and temperature limit controllers and relief valves in accordance with the manufacturer's recommendation to determine they are in operating condition.

16. Add the labels (see 1.6.1-n and -o) on the appliance.

EXHIBIT B OF ANSI STANDARD Z21.71 FOR AUTOMATIC INTERMITTENT PILOT IGNITION SYSTEMS FOR FIELD INSTALLATION.