

Fireye M Series Controls

# UVM and TFM Flame Safeguard Controls



45CM1 Photocell



69ND1 Flame Rod



UV-1A

UV8A



UV-2

## UV SCANNERS

## DESCRIPTION

Fireye UVM and TFM Controls provide automatic ignition and flame safeguard control for commercial sizes of heating and process burners using gas and/or light oil fuels.

Flame monitoring is accomplished by miniature UV scanners with UVM units or Flame Rod/Photocell detectors with TFM units.

M Series Models provide five basic styles of function — RELIGHT (M1), RECYCLE with prepurge (M2), NON-RECYCLE with prepurge (M3), NON-RECYCLE with prepurge and two stage capability (M3H), NON-RECYCLE with prepurge, two stage capability and pilot cutoff (M5). The controls monitor both pilot and main flames and with pilot ignited burners prevent the main fuel valve from being energized until the pilot flame is proved. With spark ignited burners, trial for ignition of the main flame is safely limited to 10 seconds, STD (4 seconds available M2, M3, M3H, M5 Units.)

Plug-in purge timer cards for use with M2, M3, M3H and M5 provide selectable 7-30-60-90 second prepurge. A circuit is provided, for an air flow switch to prove air flow during the prepurge and throughout the entire firing cycle.

In the event of ignition failure, or following a safety shutdown, the lockout switch trips, activating an alarm circuit. Manual reset is required. A detailed description of each control's function may be found on Pages 8 and 9. Test jacks are provided to permit flame signal measurement during operation.

M Series controls incorporate a safety checking circuit that is operative on each start. If flame (real or simulated) is detected prior to a start or during the purge, the fuel valves will not be energized, and the unit will lockout.

**CAUTION:** While all controls in the M Series are mechanically interchangeable in that they mate with a common wiring base, you should select the correct model for your application. Inappropriate application of a control could result in an unsafe condition hazardous to life and property. Selection of a control for a particular application should be made by a competent professional, such as a boiler/burner service technician licensed by a state or other governmental agency.

## SPECIFICATIONS

### Supply:

120V (min. 102, max. 132) 50/60 Hz.

### Ambient Temperature Limits:

	Max.	Min.
Control UVM-TFM	125F	-40F
Scanner UV1A, UV2, UV8A, 45UV3	200F	-40F
Photocell 45CMI	165F	-40F
Flame Rod (Tip 2460F)	1500F	-40F

### Flame Failure Response Time

UVM1D-TFM1D	.8 seconds maximum
All other Units	4 seconds maximum
Trial for Ignition	10 seconds STD (4 Seconds Available M2, M3, M3H, M5 Units)

### Power Consumption

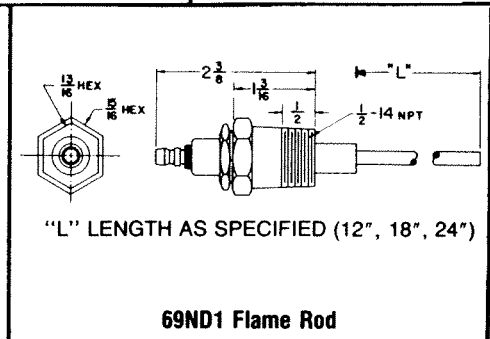
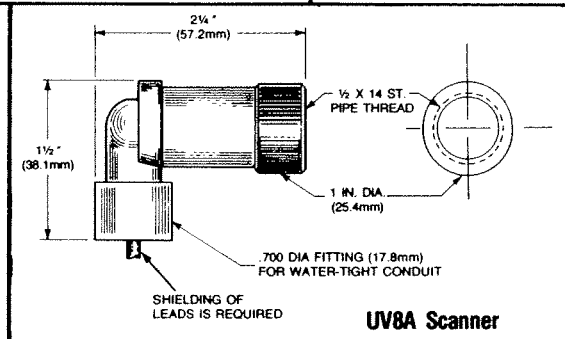
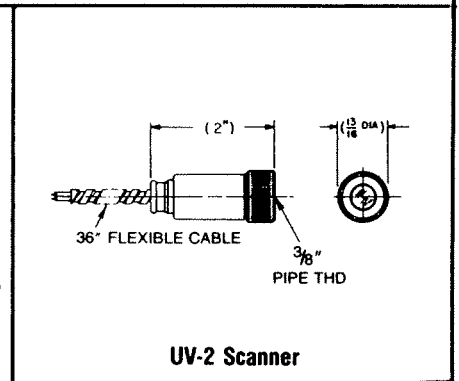
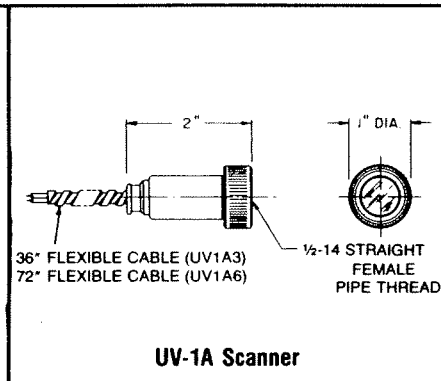
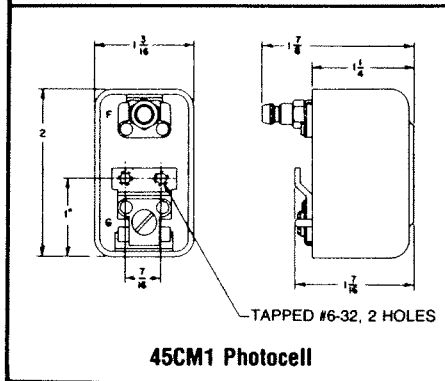
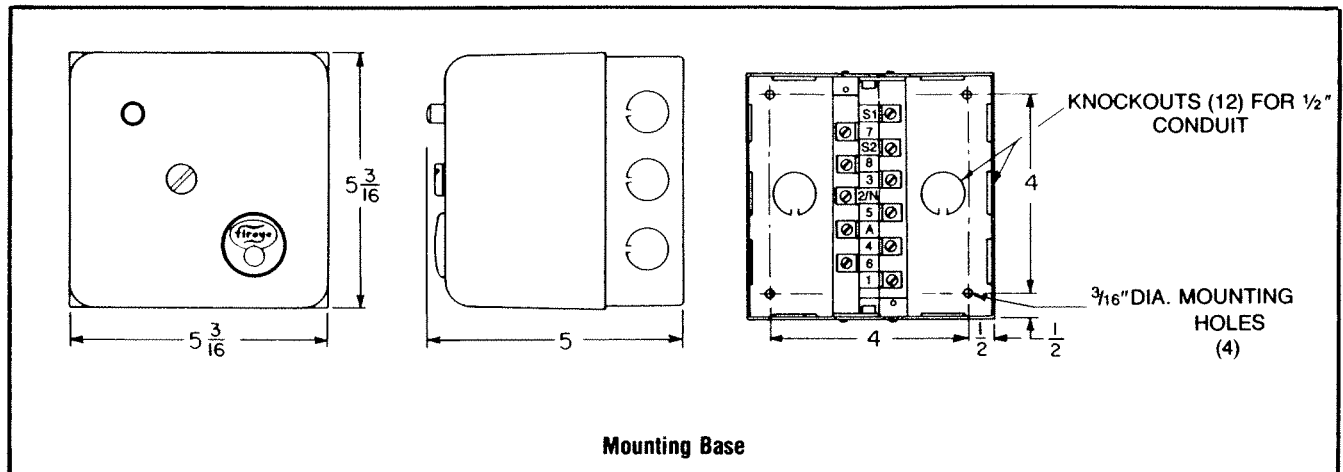
5.4VA (Operating)

### Shipping Weight (Approx.)

5 lbs.

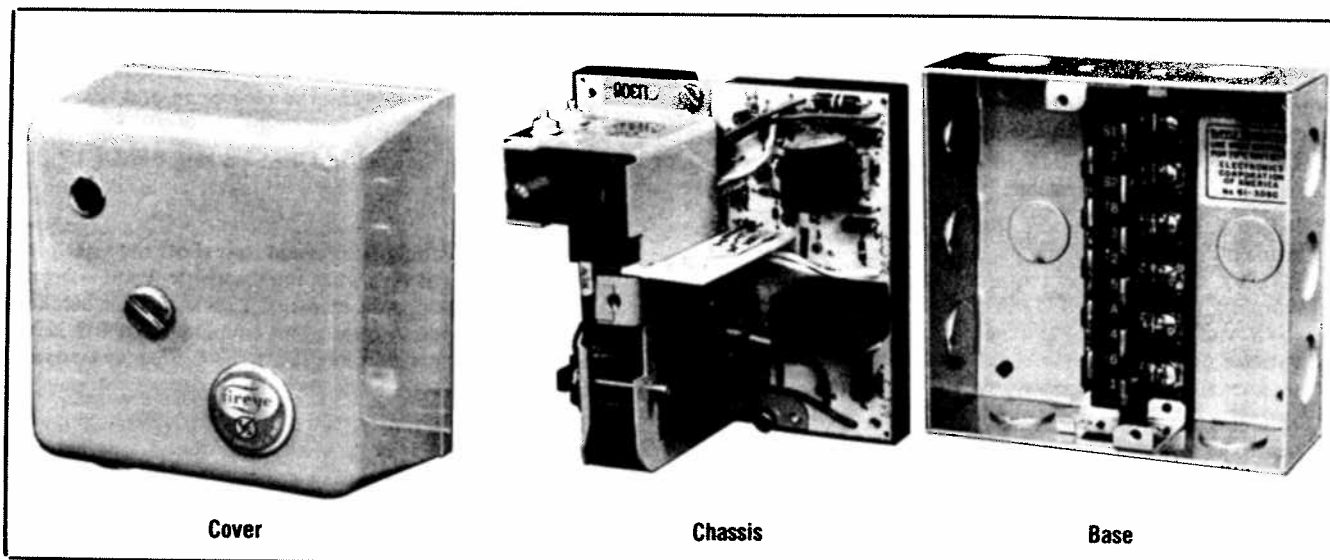
## LOAD RATINGS

Fireye Terminal	Typical Load	Maximum Rating at 120V 60 HZ
3	Solenoid valve, ignition transformer	125 VA pilot duty plus 250VA
4	Ignition transformer	250VA
5	Main fuel valve(s)	125VA pilot duty (solenoid) or 25VA pilot duty (solenoid) and 400VA (opening) motorized
8	Motor or contactor	Motor normally energized and deenergized by the operating control whose rating must be suitable. Terminal 8 rated to de-energize 9.8 FLA, 58.8 LRA, on safety lockout.
A	Alarm	50VA, pilot duty

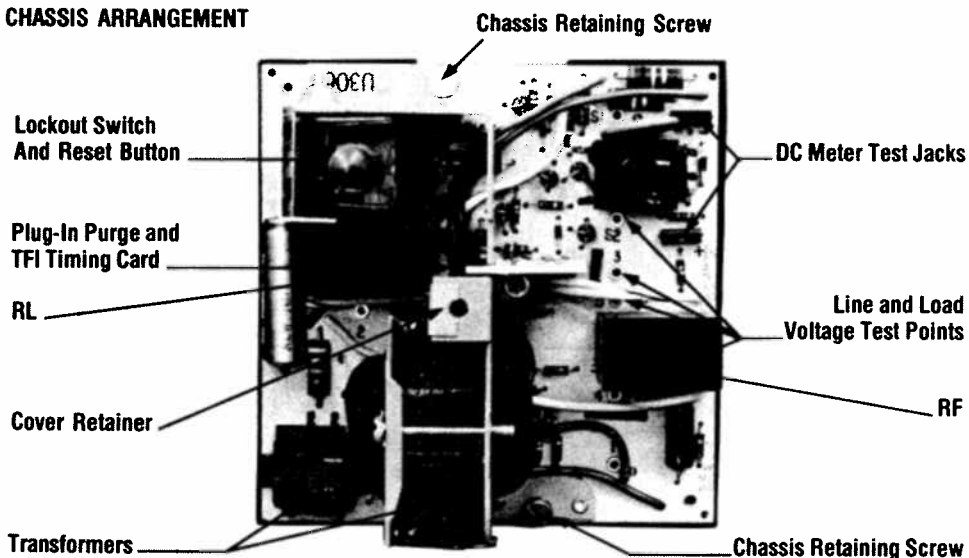


**ORDERING INFORMATION**

UV SYSTEM	RECTIFICATION SYSTEM
<b>Control</b> UVM1D or UVM1F (Relight) UVM2 (Recycle) UVM3 or UVM3H (Non-recycle)	<b>Control</b> TFM1D or TFM1F (Relight) TFM2 (Recycle) TFM3 or TFM3H (Non-recycle)
<b>Purge Timing Card for M2, M3 or M5</b> MT 55 ( 5 second purge, 5 second trial for ignition) MT 74 ( 7 second purge, 4 second trial for ignition) MT 304 (30 second purge, 4 second trial for ignition) MT 710 ( 7 second purge, 10 second trial for ignition) MT 904 (90 second purge, 4 second trial for ignition) MT 3010 (30 second purge, 10 second trial for ignition) MT 6010 (60 second purge, 10 second trial for ignition) MT 9010 (90 second purge, 10 second trial for ignition)	<b>Purge Timing Card for M2 or M3</b> MT 55 ( 5 second purge, 5 second trial for ignition) MT 74 ( 7 second purge, 4 second trial for ignition) MT 304 (30 second purge, 4 second trial for ignition) MT 710 ( 7 second purge, 10 second trial for ignition) MT 904 (90 second purge, 4 second trial for ignition) MT 3010 (30 second purge, 10 second trial for ignition) MT 6010 (60 second purge, 10 second trial for ignition) MT 9010 (90 second purge, 10 second trial for ignition)
<b>UV Scanner</b> UV1A3 - 1/2" mount, 3' cable UV1A6 - 1/2" mount, 6' cable UV8A- 1/2" mount 6' unshielded cable UV2 - 3/8" mount, 3' cable 45UV3-1050 - 3/8"mount, cast alum. housing, 8'	<b>Flame Detectors</b> 45CM1-1000 Photocell with filter 45CM1-1000Y Photocell without filter 69ND1-1000K4 12" Flame Rod 69ND1-1000K6 18" Flame Rod 69ND1-1000K8 24" Flame Rod
<b>Wiring Base</b> 61-3060	<b>Wiring Base</b> 61-3060



### M2, M3, M3H, M5 CHASSIS ARRANGEMENT



## INSTALLATION—CONTROLS AND UV-EYE SCANNERS

**Caution:** Installer must be trained and qualified. Follow the burner manufacturer's instructions, if supplied. Otherwise, proceed as follows:

### Control

Mount the control base on the burner or on a panel. The location selected should be free from excessive vibration and within the specified ambient temperature rating. The base may be mounted in any angular position.

All wiring should comply with applicable electrical codes, regulations and local ordinances. Circuit recommendations are provided on Pages 6, 7. Consult the factory for assistance with non-standard applications.

The control chassis is retained on the base with two screws which should be securely tightened.

**Caution:** Turn off the power when installing or removing the control chassis.

### Wiring of UV Scanners

The UV-1A scanner is supplied with 36" or 72" of flexible cable. The UV-2 Scanner is supplied with 36" of flexible cable. If it is necessary to extend the scanner leads, the following instructions apply:

**Caution:** Scanners without armor cable must be wired using metal cable or conduit.

### 1. Selection of wire

- Use #14, 16 or 18 wire with 75C, 600 volt insulation for up to 200 foot distance (approximately 20% signal loss at 100 feet, 40% loss at 200 feet.)
- Use shielded wire (Belden 8254-RG-62 Coax Cable or equal) for each scanner wire up to 500 feet (max).
- Asbestos insulated wire should be avoided.
- Multiconductor cable is not recommended without prior factory approval.

### 2. Installation of extended wiring

- For runs up to 10 feet (max.) the scanner leads may be run in a common conduit with other wires.
- For runs over 10 feet the scanner leads must be installed in a separate conduit.
- Multiconductor cable is not recommended without prior factory approval.

### 3. Multiple scanner installations

- The wiring from multiple UV scanners may be installed in a common metallic conduit.
  - Multiconductor cable is not recommended without prior factory approval.
- High voltage ignition wiring should not be installed in the same conduit with flame detector wires.

#### 4 UV Scanner Mounting

Where possible, obtain the burner manufacturer's instructions for mounting the scanner. This information is available for most standard burners manufactured. The scanner mounting must comply with the following general instructions:

1. Locate the scanner within 18 inches of the flame to be monitored, closer if possible.
2. Select a scanner location that will remain within the ambient temperature limits of the UV-eye scanner (212°F). If cooling is required, use (a) an insulating coupling (Fireeye part #35-69) to reduce conducted heat; (b) a window coupling (Fireeye part #60-1257) to seal off furnace or burner pressure; (c) cooling air to reduce the scanner sight pipe temperature.
3. Mount rigidly a short length (4" to 8") of 1/2" or 3/8" black iron pipe in a position that permits an unobstructed view of the pilot and/or main flame.

**4. Caution:** The scanner must not sight the spark directly or any part of the burner that can reflect the spark back to the scanner.

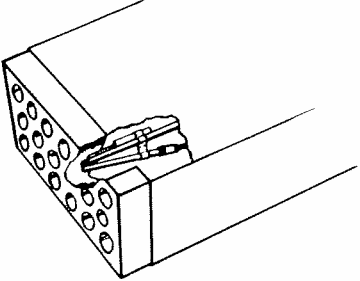
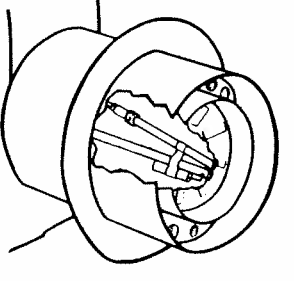
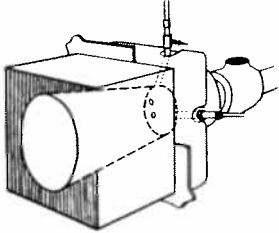
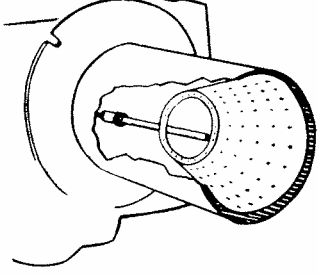
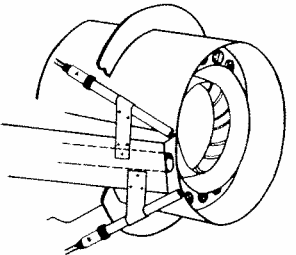
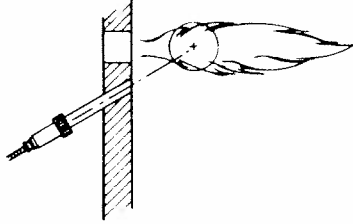
5. The maximum UV signal from a flame is found in the first one-third of the visible flame taken from the point where the flame begins. The scanner sight pipe should be aimed at this area.
6. A correct scanner application will not see a pilot flame that is too small to ignite the main flame reliably. Note particularly the test for minimum pilot that is described on Page 9.

7. On installations having negative pressure combustion chambers, a small hole (1/8" or 3/16") drilled in the sight pipe will assist in keeping the pipe clean and free from smoke.
8. Two scanners may be installed on one burner if it is necessary to view two areas to obtain reliable detection of the flame. They should be wired in parallel.
9. The UV-eye scanner is designed to seal off the sight pipe up to pressures of 1 psi when the scanner lock nut is firmly tightened. Pressures in excess of 1 psi should be blocked from the scanner. A quartz lens coupling (Part #60-1290) or quartz window coupling (Part #60-1257) may be used. Each is rated from -3 to +100 psi max.
10. To increase scanner sensitivity, a quartz lens coupling (Part #60-1290) may be used. The quartz lens permits location of the UV-eye at twice the distance noted in Item B-1. Use 1/2" x 1 1/2" nipple between UVIA or UVIB scanner and union. Use 3/8" x close nipple and 1/2" by 3/8" bushing on UV-2 applications.

#### General Requirements

1. As close as possible — 18" or closer.
2. As cool as possible — Not over 212°F.
3. Avoid sighting the spark — Resight scanner, shield between spark and scanner, or orifice to reduce reflected signal from spark.
4. Must see pilot and/or main flame — Scanner view must be unobstructed.
5. Minimum pilot test — See Page 9.

#### TYPICAL UV-EYE INSTALLATIONS

Select the scanner location (A or B) which gives best view of the pilot flame.

The maximum UV signal from a flame is found in the first one-third of the visible flame taken from the point where the flame begins. The scanner sight pipe should be aimed at this area.

# INSTALLATION — PHOTOCCELL SCANNER AND FLAME ROD

## Installation—45CM1 Photocell Scanner

The 45CM1 photocell scanner with #922 photocell and Rajah stud terminal is designed for use in the blast tube on conventional pressure atomizing oil burners. Two typical applications are shown in Figure 1.

### 45CM1 — INTERNAL MOUNT

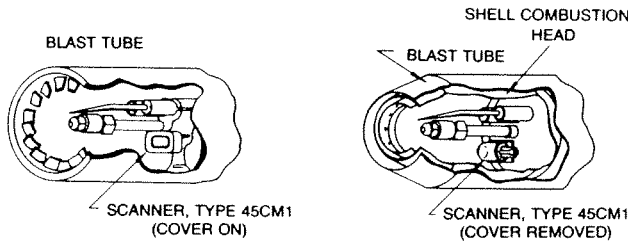


Figure 1

## 69ND1 Flame Rod

The 69ND1 flame rod proves a gas pilot flame and/or main gas flame.

It is a "spark plug" type unit consisting of a 1/2" N.P.T. mounting base, a KANTHAL flame rod, a glazed porcelain insulating rod holder and a spark plug connector for making electrical connection. The 69ND1 is available in 12", 18" or 24" lengths.

Follow the burner manufacturer's instructions, if available, otherwise, proceed as follows.

The flame rod may be located to monitor only the gas pilot flame or both the gas pilot and main gas flames. It is mounted in a 1/2" N.P.T. coupling. The following instructions should be observed:

1. Keep the flame rod as short as possible.
2. Keep flame rod at least 1/2" from any refractory.
3. Flame rod should enter the pilot flame from the side so as to safely prove an adequate pilot flame under all draft conditions.
4. If the flame is nonluminous (air and gas mixed before burning,) the electrode tip should extend at least 1/2" into the flame, but not more than half way through.
5. If the flame is partly luminous, the electrode tip should extend only to the edge of the flame.

6. It is preferable to angle the rod downward to minimize the effect of sagging and to prevent it from coming in contact with any object.
7. An adequate grounding surface for the pilot flame must be provided. The grounding surface in actual contact with the flame must be at least four times greater than the area of the portion of the flame rod in contact with the flame. It is essential to adjust the flame rod and ground area ratio to provide a minimum meter reading of 14 VDC.

**Note:** Interference from the ignition spark can alter the true testmeter reading by adding to or subtracting from it. This trend sometimes may be reversed by interchanging the primary wires (line voltage) to the ignition transformer, and may be made ineffective by the addition of grounded shielding between the flame rod and ignition spark.

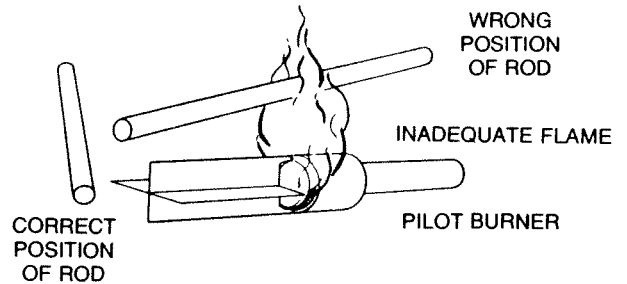


Figure 2

8. Two proven types of flame grounding adapters as shown in Fig. 3 may be used to provide adequate grounding surface. High temperature stainless steel should be used to minimize the effect of metal oxidation. This assembly may be welded directly over the pilot or main flame burner nozzle.

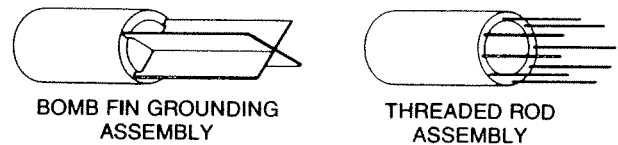


Figure 3

## APPROVALS

**Underwriters Laboratories Inc.**  
Listed Guide MCCZ-File MP 1537

**Underwriters Laboratories Inc.**  
Recognized Component Guide MCCZ2-File MP 1537  
All UVM and TFM Controls

**Canadian Standards Association**  
Guide 300-1-.2 Class 2642 Oil File 7989  
Guide 140-A-2 Class 2632 Gas File 7989  
UVM3H-TFM3H

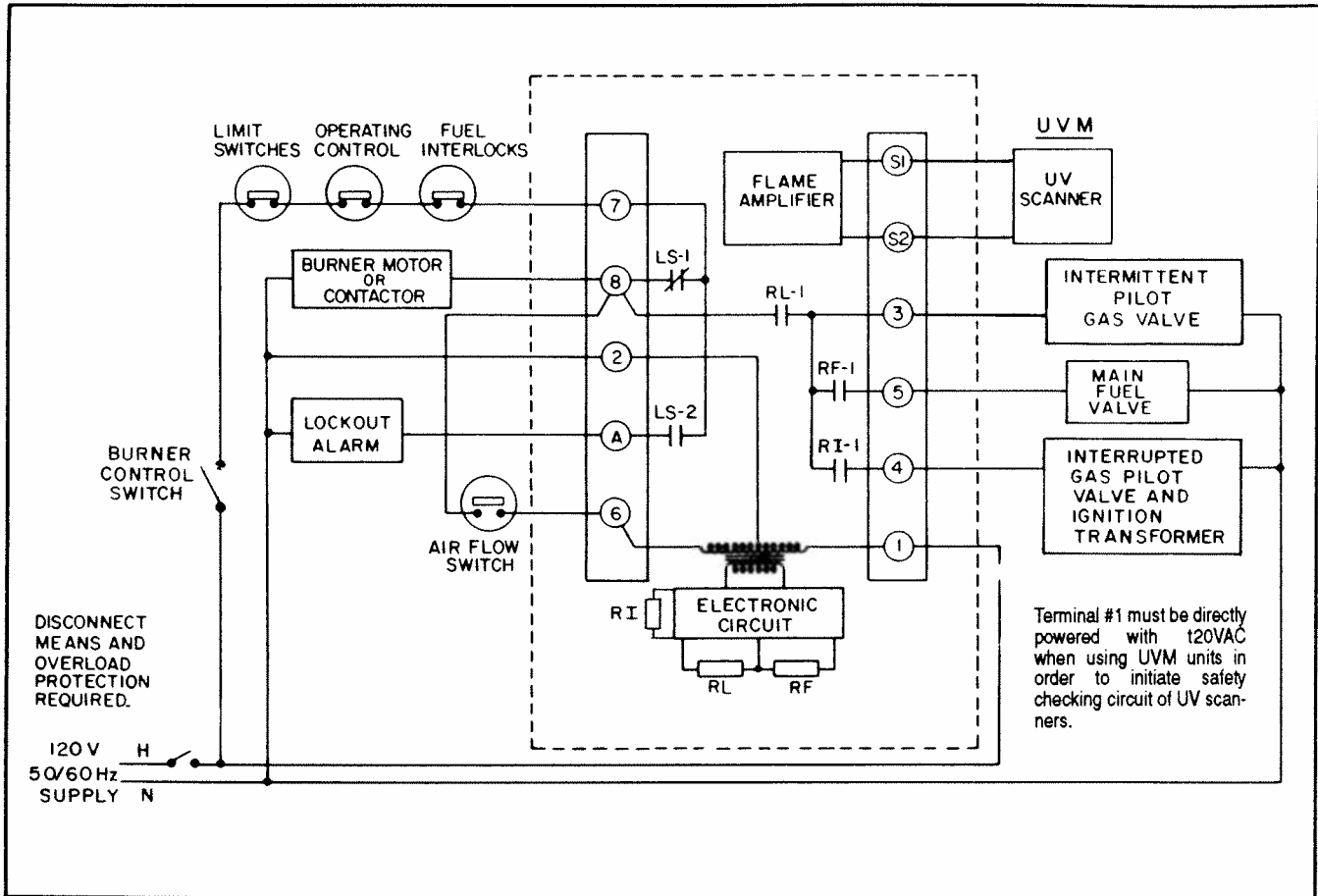
**Factory Mutual System**  
Report #27856  
UVM3H-TFM3h

**American Gas Association**  
Design Certified  
ANSZ21.20 Automatic Ignition Systems  
UVM1D, UVM1F  
TFM1D, TFM1F  
TFM3

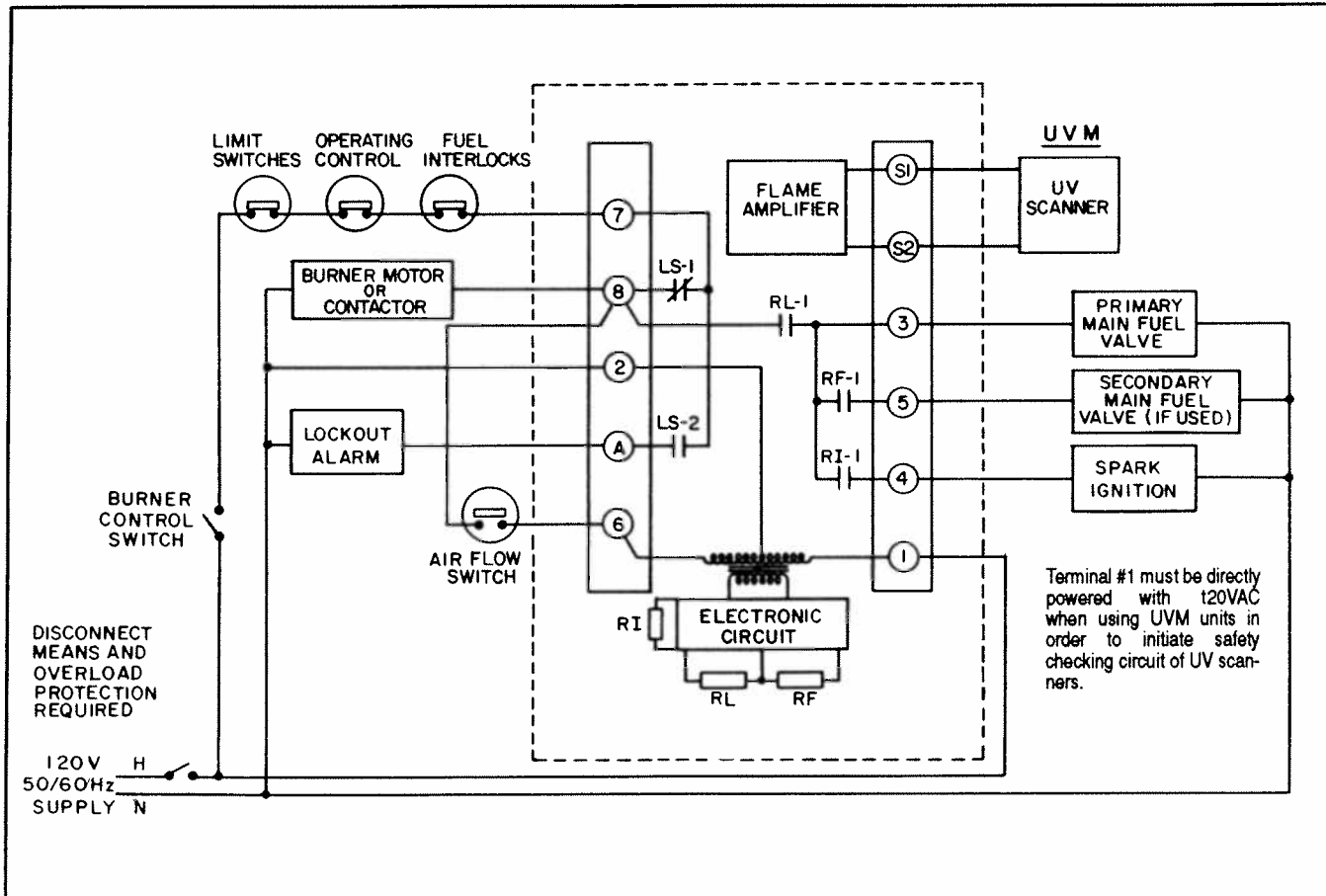




8 TYPICAL UVM5 SERIES WIRING ARRANGEMENT FOR PILOT IGNITED BURNER



TYPICAL UVM5 WIRING ARRANGEMENT FOR DIRECT SPARK IGNITED BURNER





## APPLICATION AND FUNCTION — UVM1D, UVM1F, TFM1D, TFM1F

Fireye M1 Series, "re-light" controls, provide ignition and Flame Safeguard for heating or process light oil or gas fired burners. UVM1D, F controls use UV flame detection. TFM1D, F controls use flame rod or photocell flame detection. UVM1D-TFM1D controls have .8 sec. flame failure response. UVM1F, TFM1F have 4 sec. (max.) flame failure response, and 10 sec. trial for ignition.

The typical wiring arrangement illustrated on Page 6 for pilot ignited burners provides the following function:

1. With power applied, and the limit-operating control circuit closed, the burner motor circuit is energized. The air flow switch circuit closes.
2. Following a short-time delay (2 to 5 sec.), RL-1 closes, energizing terminal 3 which powers the pilot gas valve, and terminal 4 which powers the spark ignition. A 10 sec. trial for ignition is initiated.
3. When pilot flame is detected, RF-1 closes, energizing terminal 5 which powers the main fuel valve, RF-2 opens, de-energizing terminal 4 which shuts off the spark ignition.
4. When the operating control opens its circuit, or if a power failure occurs, the entire system is de-energized.
5. In the event the pilot flame is not detected by the end of the trial for ignition period, the pilot gas valve and spark ignition are de-energized. A safety lockout occurs which de-energizes the burner motor and energizes the lockout alarm circuit.
6. In the event of a flame failure during a firing period, the main fuel valve is de-energized and the spark ignition re-energized. A 10 sec. re-light trial for ignition is initiated. If flame is detected during the trial for ignition period, the main fuel valve is re-energized and the spark ignition de-energized. If flame is not detected during the trial for ignition period, the pilot gas valve and spark ignition are de-energized. A safety lockout occurs which de-energizes the burner motor, and energizes the lockout alarm circuit.

7. Manual reset is required following any safety lockout.

The typical wiring arrangement illustrated on Page 6 for direct spark ignited burners provides the following function:

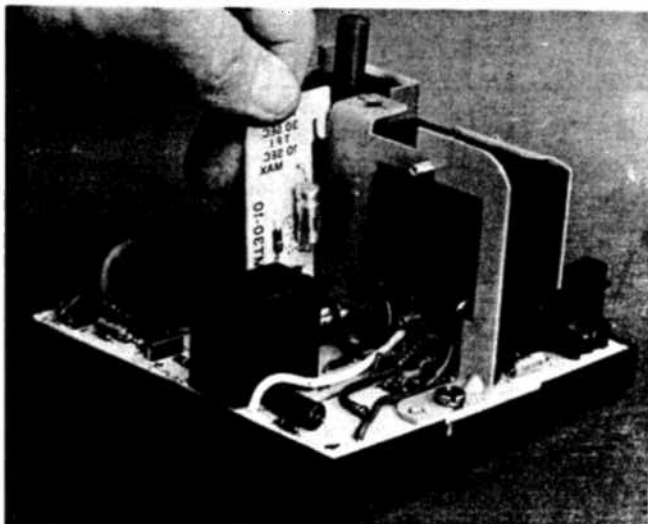
1. With power applied, and the limit-operating control circuit closed, the burner motor circuit is energized. The air flow switch circuit closes.
2. Following a short-time delay (2-5 sec.) RL-1 closes, energizing terminal 3 which powers the primary main fuel valve and terminal 4 which powers the spark ignition. A ten sec. trial for ignition is initiated.
3. When main flame is detected, RF-1 closes, energizing terminal 5 which powers the secondary main fuel valve (if used), RF-2 opens de-energizing terminal 4 which shuts off the spark ignition.
4. When the operating control opens or if a power failure occurs, the entire system is de-energized.
5. In the event that main flame is not detected by the end of the trial for ignition period, the primary main fuel valve and the spark ignition are de-energized. A safety lockout occurs, which de-energizes the burner motor and energizes the lockout alarm circuit.
6. In the event of a flame failure during a firing period, the secondary main fuel valve (if used) is de-energized and the spark ignition is re-energized. A 10 sec. re-light trial for ignition is initiated. If flame is detected, the secondary main fuel valve (if used) is re-energized and the spark ignition de-energized. If flame is not detected during the trial for ignition period, the primary main fuel valve and the spark ignition are de-energized. A safety lockout occurs, which de-energizes the burner motor, and energizes the lockout alarm circuit.
7. Manual reset is required following any safety lockout.

## APPLICATION AND FUNCTION — UVM2, TFM2

Fireye M2 Series, "recycle" controls provide prepurge, ignition and flame safeguard for heating and process light oil or gas fired burners. UVM2 controls use UV flame detection. TFM2 controls use flame rod or photocell flame detection. M2 controls have a 4 sec. (max.) flame failure response and 10 sec. trial for ignition (4 seconds available). Plug-in circuit cards provide selectable 7-30-60-90 second prepurge.

The typical wiring arrangement illustrated on Page 6 for pilot ignited burners provides the following function:

1. With power applied, and the limit-operating control circuit closed, the burner motor circuit is energized. The air flow circuit closes.
2. Following the selected prepurge period, RL-1 closes, energizing terminal 3 which powers the pilot gas valve and terminal 4 which powers the spark ignition. A 10 sec. trial for ignition is initiated (4 seconds available).
3. When pilot flame is detected, RF-1 closes, energizing terminal 5 which powers the main fuel valve, RF-2 opens de-energizing terminal 4 which shuts off the spark ignition.
4. When the operating control opens its circuit, or if a power failure occurs, the entire system is de-energized.
5. In the event the pilot flame is not detected by the end of trial for ignition period, the pilot gas valve and spark ignition are de-energized. A safety lockout occurs which de-energizes the burner motor and energizes the lockout alarm circuit.
6. In the event of a flame failure during a firing period, the pilot and main fuel valves are de-energized. Following the prepurge period, with proven air flow, the pilot gas valve and spark ignition are re-energized and a 10 sec. trial for ignition is initiated (4 seconds available). If pilot flame is detected, the main fuel valve is energized, the spark ignition is de-energized. If the pilot flame is not detected during the trial for ignition period, the pilot gas valve and spark



10 ignition are de-energized. A safety lockout occurs which de-energizes the burner motor and energizes the lockout alarm switch.

7. Manual reset is required following any safety lockout.

The typical wiring arrangement illustrated on Page 6 for direct spark ignited burners provides the following function:

1. With power applied, and the limit-operating control circuit closed, the burner motor circuit is energized. The air flow switch circuit closes.
2. Following the selected prepurge period, RL-1 closes, energizing terminal 3 which powers the primary main fuel valve, and terminal 4 which powers the spark ignition. A ten second trial for ignition is initiated (4 seconds available).
3. When pilot flame is detected, RF-1 closes, energizing terminal 5 which powers the main fuel valve, RF-2 opens, de-energizing terminal 4 which shuts off the spark ignition.

4. When the operating control opens its circuit, or if a power failure occurs, the entire system is de-energized.

5. In the event the pilot flame is not detected by the end of the trial for ignition period, the pilot gas valve and spark ignition are de-energized. A safety lockout occurs which de-energizes the burner motor and energizes the lockout alarm circuit.

6. In the event of a flame failure during a firing period, all fuel valves are de-energized. Following the prepurge period, with proven air flow, the primary main fuel valve and spark ignition are re-energized and a ten second trial for ignition period is initiated (4 seconds available). If flame is detected, the secondary main fuel valve (if used) is energized. The spark ignition is de-energized. If flame is not detected during the trial for ignition period, the primary main fuel valve and spark ignition are de-energized. A safety lockout occurs, de-energizing the burner motor and energizing the lockout alarm circuit.

7. Manual reset is required following any safety lockout.

## APPLICATION AND FUNCTION — UVM3-TFM3

Fireye M3 Series "non-recycle" controls, provide prepurge, ignition, and flame safeguard for heating and process light oil or gas fired burners. UVM3 controls use UV flame detection. TFM3 controls use flame rod or photocell flame detection. M3 controls have a 4 second (max.) flame failure response and 10 second trial for ignition (4 seconds available). Plug in circuit

cards provide selectable 7-30-90 second prepurge.

The function of the M3 series controls is the same as described for the M2 Series except that the M3 series provide non-recycle operation and will lockout following any flame failure.

## APPLICATION AND FUNCTION — UVM3H-TFM3H

Fireye M3H is similar to the M3 Series. All installations, wiring, functions, testing instructions for the M3 are applicable to the M3H.

The M3H provides an additional function whereby the powering of Terminal 5 is delayed for five (5) seconds after flame is detected, and Terminal 4 remains powered during the

five (5) second delay.

This additional function is offered primarily for two-stage light oil burners, to assure a specific delay between the light off of the first and second stage, and to provide additional ignition timing to improve flame stabilization.

## APPLICATION AND FUNCTION—UVM5

Fireye UVM5 Controls provide prepurge (selectable 7-30-60-90 second), ignition and flame safeguard for heating and process light oil or gas fired burners, using ultraviolet flame detection.

Flame establishing trial for ignition period is electronically

timed, (selectable 4 or 10 seconds). Ignition flame must be proved prior to energizing the main fuel valve. A five second pilot stabilization period is provided. The pilot is deenergized 10 seconds after the main fuel valve is energized.

**Note:** Recommended wiring arrangements on Page 8.

## OPERATION TEST

**CAUTION:** Before testing the control operation on the boiler, close the manual main fuel supply. Failure to do this may cause injury or property damage.

**STEP 1:** Close the manual main shut-off fuel valve.

**STEP 2:** Recheck all limit circuit wiring for proper operation and correct connection.

**STEP 3:** Confirm that the automatic main fuel valves are wired to terminal "5".

**STEP 4:** Power the control and electrically check the proper sequence of operation according to page 9 in this bulletin.

**STEP 5:** After assuring yourself that all interlocks and valves are properly wired and that the sequence of operation is correct, open the manual main shut-off fuel valve and proceed cautiously through the boiler light off process. Check all safety interlocks for proper shut down off the boiler.

## INSTALLATION TESTING

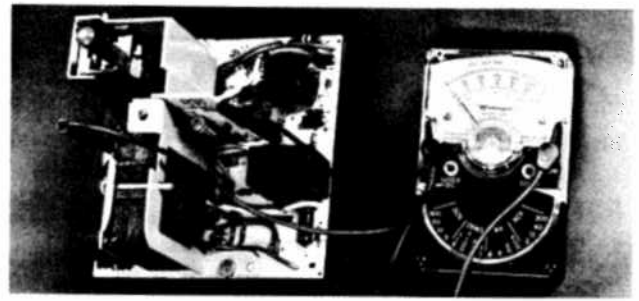
### Use of Test Meter

Testing UVM and TFM controls requires the use of a test AC-DC multimeter, with a minimum 20,000 ohm/volt DC rating, or a digital meter with 500K input impedance or greater.

With the test meter leads inserted into the test jacks, a steady DC voltage reading of 4.0-5.5 volts (UVM) and 14 to 17 volts (TFM) should be obtained when the controls are detecting flame, and zero volts when no flame is present.

With the test meter on the AC scale, line and load voltages may be measured at the identified test points on the chassis.

On the TFM controls, a microammeter may be connected in series with the wire to Terminal S2. Normal flame will produce a meter reading between 4 and 10 microamps.



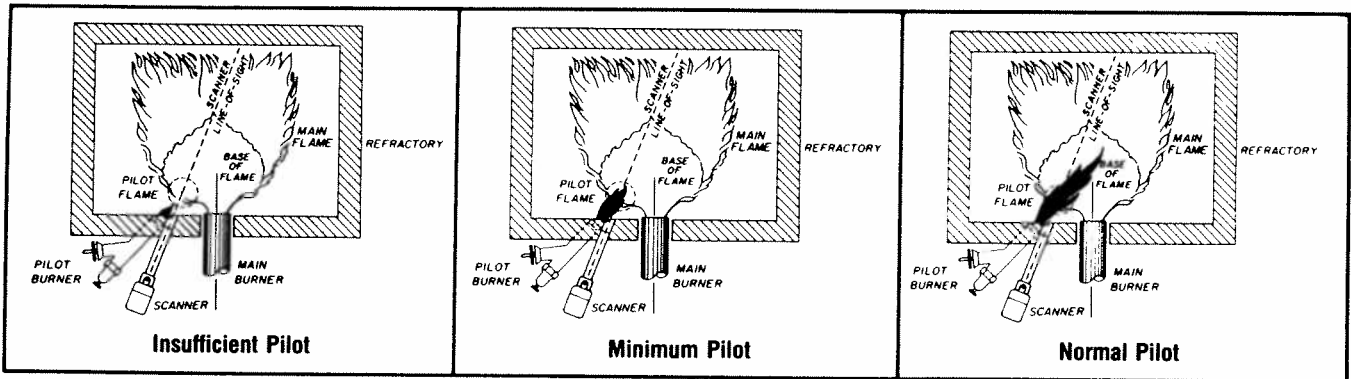
**Flame Signal Testing**

1. Manually shut off the main fuel valve, for a pilot ignited burner or the secondary main fuel valve for a direct spark ignited burner.
2. Set the test meter on the DC scale and insert the meter leads into the test jacks. (If the meter reads backwards, reverse the meter leads.)
3. Initiate a normal startup.
4. When flame is established, the test meter reading should be normal.
5. Inadequate flame signal may be improved by:
  - a. Assure that the flame detector and wiring installation have followed the instructions on Pages 3,4,5.
  - b. Assure that the flame detector is clean and within the ambient temperature limits.
  - c. Assure that the flame is sufficiently large to detect.
  - d. If a UV scanner is used, try a shorter sight pipe, or increase the sight pipe diameter.

**Minimum Pilot Test**

This test insures that the detector will not sense a pilot flame too small to light the main flame reliably. It must be made by a trained and qualified person on each new installation and following repositioning of the flame detector.

1. Manually shut off the fuel to the main burner.
2. Connect test meter to test jacks.
3. Initiate a normal start-up.
4. Reduce the fuel to the pilot until the flame relay just holds in. This is minimum pilot.
5. Slowly turn on the main fuel and insure that the main flame lights off promptly and normally.
6. **Caution:** If lightoff is delayed, shut off the power to the installation. Realign the detector so that pilot flame detection requires a larger pilot flame. Repeat this test until main flame lights reliably with minimum pilot.
7. After the minimum pilot test is completed satisfactorily, increase the pilot flame to normal size.



**Flame Failure Test**

1. Temporarily connect spark ignition to Terminal 3.
2. Initiate a normal start-up.
3. Manually shut off all fuel and observe the loss of flame signal on the test meter.
4. If flame signal does not reduce to zero within the flame failure response time of the control, verify that the UV flame detector is not actuated by the spark. If spark is detected, a metallic shield or relocation of the UV scanner sight pipe, is required.
5. When test is completed, reconnect the spark ignition to Terminal 4.

**Recommendation**

**Periodic Safety Check:** Test the complete flame safeguard system at least one a month. This test should verify flame failure safety shutdown and positive fuel cutoff when the fuel valve is de-energized.

**Photocell:** Type 922 (Fireye Part \$4-230) must be kept clean. Use a clean cloth with detergent as often as operating conditions require. Annual replacement recommended.

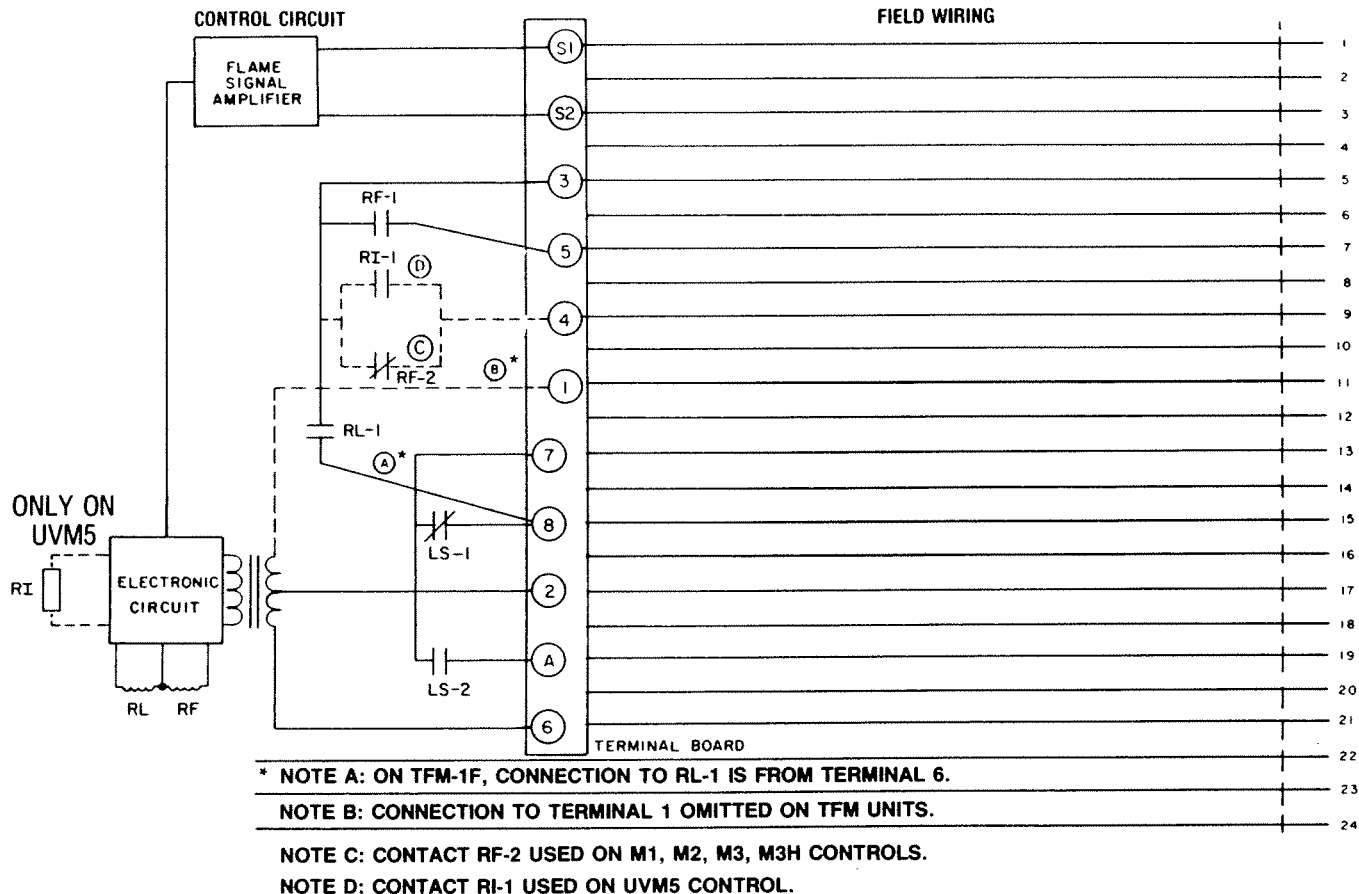
**Flame Rod:** Type 69ND1 — Replace as necessary. Routine

cleaning of the rod and insulator with soap and water or solvent recommended.

**UV-eye Scanner:** The UV tube must be kept clean. Use a clean cloth with detergent as often as operating conditions require.

**ROTATION**

It is recommended that units purchased as spares be rotated periodically, so that each unit will be placed in operation at least every 90 days.



**WARRANTIES**

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