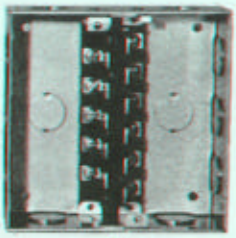
C40671
Supersedes C40469

Bulletin C-40
UVM-1D TFM-1D
UVM-1F TFM-1F

UVM and TFM COMMERCIAL FLAME SAFEGUARD CONTROLS


Cover

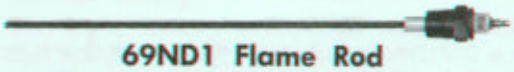

Chassis


Base

TYPES UVM and TFM CONTROLS


45AM1 Photocell


45CM1 Photocell


69ND1 Flame Rod


UV-1 Scanner


UV-2 Scanner

FEATURES:

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

The UVM-1D and UVM-1F are used with the UV-1 or UV-2 flame scanner, which uses an ultraviolet-sensitive gas discharge tube to visually monitor radiation from gas and light oil flames.

The TFM-1D and TFM-1F are used with the 45AM1 or 45CM1 photocell, and/or the 69ND1, or any other flame rod, to monitor gas and light oil flames.

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 restricted to 12 seconds.

UVM and TFM controls have terminals for the direct wiring of burner motor, ignition transformer, pilot fuel valve, main fuel valve, lockout alarm, limit and operating controls, and combustion air flow proving switches. The air flow switch connection provides for proving air flow during the entire firing cycle.

The controls cycle automatically each time the operating control closes, or, if power or air flow are interrupted and restored.

Flame failure response time is 0.8 second (UVM-1D and TFM-1D) or 2-4 seconds (UVM-1F and TFM-1F) following loss of flame. The control will then attempt to relight and, if flame is not re-established within 12 seconds, the control shuts off all fuel and locks out on safety. Manual reset is required for restart following a safety shutdown.

The UVM and TFM controls incorporate a safety checking circuit that is operative on each start. A 5 second pause for a safety check occures each time the power is turned on. Any malfunction which causes the flame relay to hold in at the start will result in a safety lockout.

SPECIFICATIONS: Fireye UVM-1D, UVM-1F TFM-1D, TFM-1F

SUPPLY:
120v (Min. 120v, Max. 132v) — 60 cycles
TMF-1D & F also suitable for use at 115v — 50 cycles

AMBIENT TEMPERATURE LIMIT:

	Max.	Min.
Control	125°F	−20°F
Scanner: UV-1, UV-2	212°F	−40°F
Photocell: 45AM1, 45CM1	165°F	−40°F
Flame Rod: 69ND1 (Rod Tip 2460°)	1500°F	−40°F

Flame Failure Response Time — 0.8 seconds (UVM-1D, TFM-1D), 2 to 4 seconds (UVM-1F, TFM-1F)

Trial for Ignition Period — 12 seconds

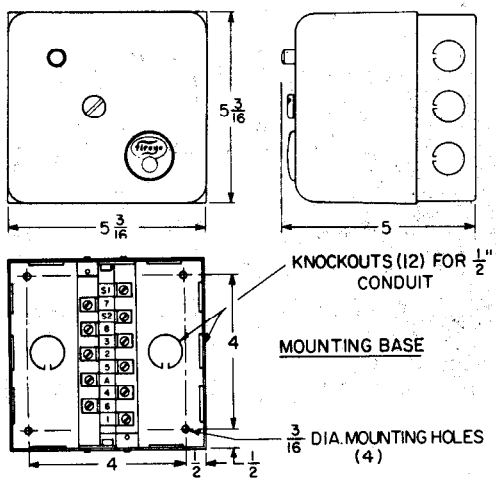
SHIPPING WEIGHT: 6 lbs.

LISTINGS AND APPROVALS:
UVM-1D, TFM-1D — Listed under Reexamination Service, Underwriters' Laboratories, Inc.
Factory Mutual Approved
UVM-1F, TFM-1F — Component Recognition, Underwriters' Laboratories, Inc.
Factory Mutual Approved

Load Ratings — UVM-1D, UVM-1F and TFM-1D, TFM-1F Controls
Maximum Connected Load — 1,600 va

Terminal	Typical Load	Maximum Rating at 120v, 60 Cycle
3	Solenoid Valve	125 va — Pilot Duty
	Ignition Transformer	300 va
4	Ignition Transformer	300 va
5	Main Fuel Valve	125 va Pilot Duty (Solenoid) or 400 va Opening (Motorized) & 25 va Pilot Duty (Solenoid)
8	Motor	Motor normally energized and deenergized by external operating control, which must be adequate for max. simultaneously connected load. Terminal 8 rated to deenergize 9.8 F.L.A., 58.8 L.R.A., on safety lockout.
A	Alarm	50 va — Pilot Duty

DIMENSIONS:



UVM and TFM Controls

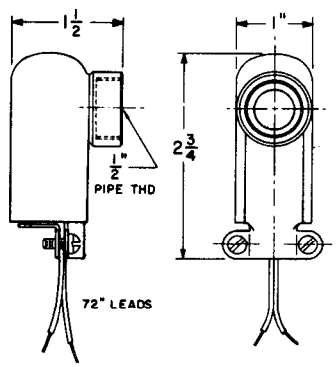
UV SYSTEM

1. Chassis and Cover – UVM-1D or UVM-1F
2. Wiring Base – 61-3060
3. Flame Detector – UV1 or UV2

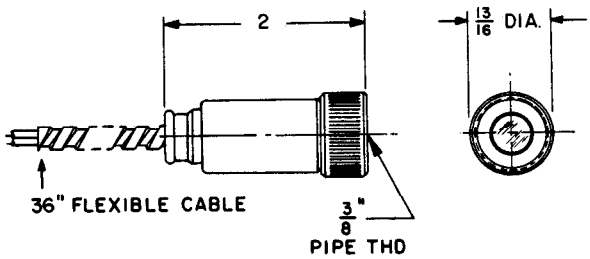
RECTIFICATION SYSTEM

1. Chassis and Cover – TFM-1D or TFM-1F
2. Wiring Base – 61-3060
3. Flame Detector
   - Rod – 69ND1
   - Photocell – 45CM1 – 1000, 45CM1 – 1000Y, 45AM1 – 1000

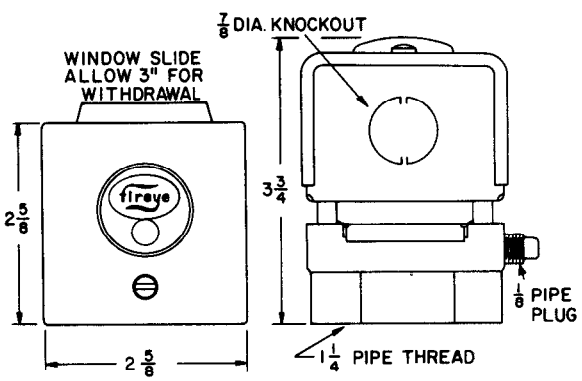
ORDERING INFORMATION



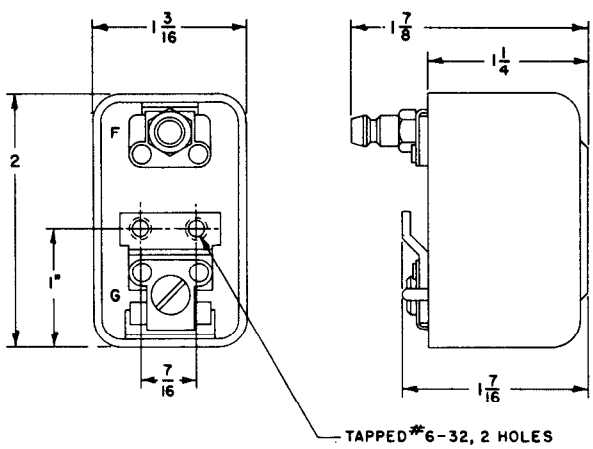
UV-1 Scanner



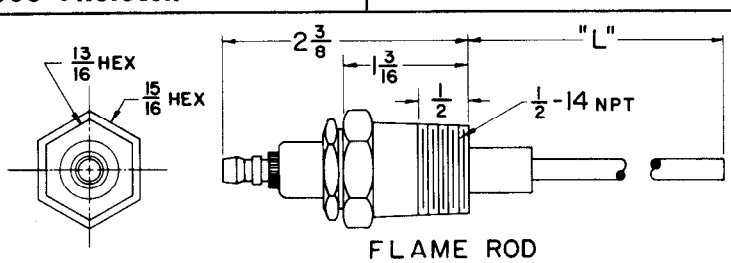
UV-2 Scanner



45AM1-1000 Photocell



45CM1 { – 1000 with filter / – 1000Y without filter } **Photocell**



FLAME ROD

"L" LENGTH AS SPECIFIED (12", 18", 24")

69ND1 Flame Rod

Figure 1

INSTALLATION: CONTROLS and UV-EYE SCANNERS

Follow the burner manufacturer's instructions, if supplied. Otherwise, proceed as follows:

Control:

Mount the control sub-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 sub-base may be mounted in any position.

All wiring should comply with applicable electrical codes, regulations and local ordinances. Circuit recommendations are provided on Pages 6, 7, 8, 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.

A. Scanner Wiring

The UV-1 scanner is supplied with a flexible conduit connector and 6′ of wire. The UV-2 scanner is supplied with 40″ of wire and 36″ of flexible conduit. If it is necessary to extend the scanner leads, the following instructions apply:

1. *Selection of Type of Wire*
   a. Use #18 wire with 80°C, 600 volt insulation for up to 50 foot distance.
   b. Use shielded wire (Belden #8254 or equal) for each scanner wire for 50 to 150 foot (max.) distance. The ends of the shielding must be taped and not grounded.
   c. Asbestos insulated wire should be avoided because of its moisture absorbing characteristics.
2. *Installation of Extended Wiring*
   a. For wiring runs up to 10 feet, the scanner leads may be run with the power wires in a common conduit.
   b. For wiring runs over 10 feet, the scanner leads should be installed in a separate conduit.
3. *Multiple Scanner Installations*
   a. Where unshielded leads from up to 4 scanners are installed in a single metallic conduit, the total distance between the scanners and controls may not exceed 25 feet.
   b. Where shielded leads are used for up to 4 scanners, installed in a single metallic conduit, the total distance between the scanners and controls may not exceed 100 feet.
   c. There may be no power wires included in the conduit when multiple scanner wires are installed.
4. *Special Applications*
   a. SCR motor speed controllers or battery chargers are capable of creating abnormal pulses in the power supply. Where SCR disturbances are encountered, shielded scanner leads are required with the shield grounded on both ends. The maximum distance between scanner and control under these circumstances is 25 feet.

B. Scanner Mounting

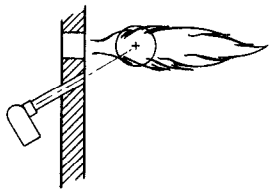
Where possible, obtain the burner manufacturer's instructions for mounting the scanner. This information is available for most standard burners manufactured. The scanner mounting must comply with the following general instructions:

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 (Fireye part no. 35-69) to reduce conducted heat; (b) a window coupling (Fireye part no. 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 ½″ or ⅜″ black iron pipe in a position that permits an unobstructed view of the pilot and/or main flame.
4. 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 10.
7. On installations having negative pressure combustion chambers, a small hole (⅛″ 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 should be installed in an upright position to prevent moisture from collecting in the base.
10. 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 lens coupling (Part no. 60-1290) or window coupling (Part no. 60-1257) may be used. Each is rated from −3 to +100 psi max.
11. To increase scanner sensitivity, a quartz lens coupling (Part no. 60-1290) may be used. The quartz lens permits location of the UV-eye at twice the distance noted in Item B-1.

INSTALLATION: UV-EYE SCANNER

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 10.



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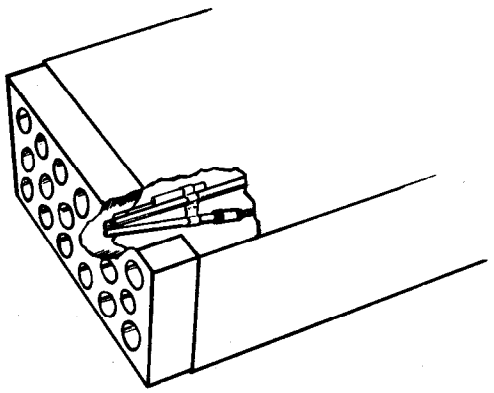
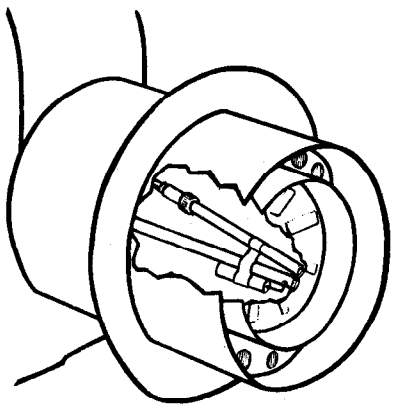
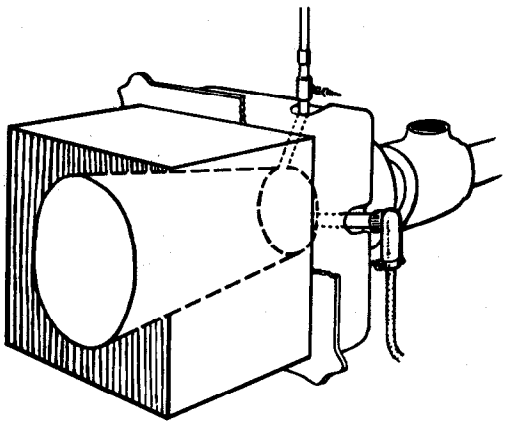
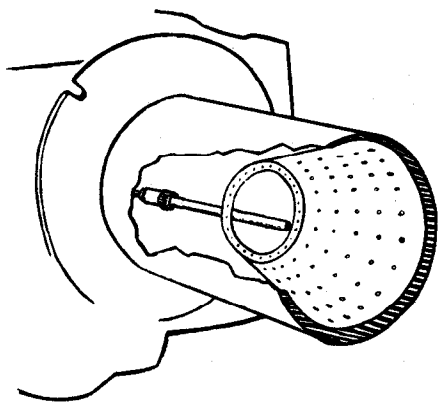
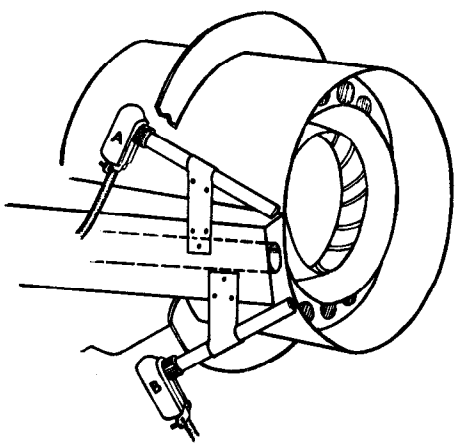
Typical UV-Eye Installations

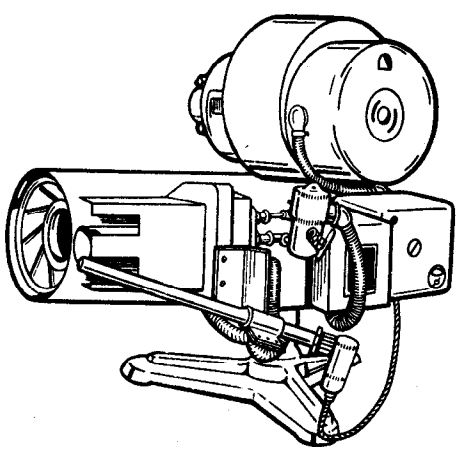












Select the scanner location (A or B) which gives best view of the pilot flame.

45AM1 PHOTOCELL MOUNT —

General Description

The 45AM1 photocell mount contains a focusing lens in the housing to concentrate light and block radiant heat. The lens can be cleaned by lifting it out. When the cover is removed, the circuit is grounded to insure against any false operation from outside sources of light.

Installation

The 45AM1 should be located to sight the flame under all firing conditions and should be as close as possible to the flame with the viewing angle relative to the burner center line as small as possible.

Note: For steam or air atomizing oil burner applications, two 45AM1's may be connected in parallel to improve operation under varying flame characteristics at low fire in this type of burner.

Mounting

The 45AM1 should be mounted as shown in Fig. 2 on a short length of 1¼" pipe (not over 3" in length) with the viewing opening through the fire wall expanding 1" in diameter for each 3" of refractory through which it passes.

Note: The temperature of the photocell must not exceed 165° F. The ⅛"-27 N.P.T. pipe tapping, shown in Fig. 2, provides connection for pressure ventilation, if desired.

Wiring

It is recommended that 105°C type TW be used for both photocell and flame rod applications.

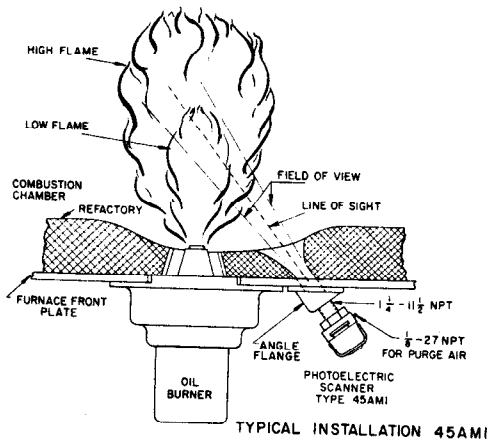


Figure 2

Use of Iris Slides — 45AM1

The opening of the viewing window is limited by the bore of the photocell mount. Three iris slides to reduce this opening are supplied.

The three slides can be used to reduce firebox reflection. When an iris is installed, be certain that the photocell still gets enough light from the flame under all conditions of normal operation.

45CM1 PHOTOCELL MOUNT —

General Description & Installation

The 45CM1 photocell mount 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 3.

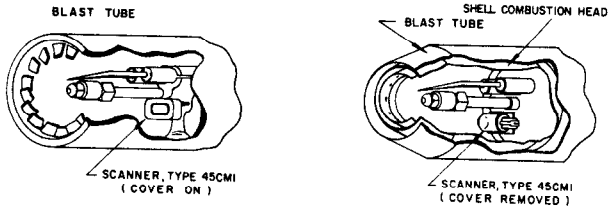


Figure 3

69ND1 FLAME ROD —

General Description

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

It is a "spark plug" type unit consisting of a ½" 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.

Installation

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 on a ½" N.P.T. coupling.

The following instructions should be observed:

1. Keep flame rod as short as possible.
2. Keep flame rod at least ½" 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 ½" 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. It is not necessary to maintain absolutely uninterrupted contact with 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 12v D.C.

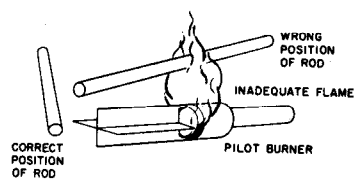


Figure 4

8. Two proven types of flame grounding adapters as shown in Fig. 5 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 burner nozzle.

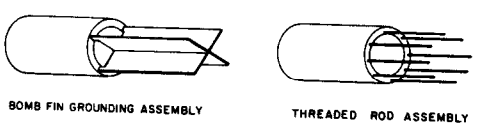


Figure 5

INSTALLATION: PHOTOCELL SCANNER and FLAME ROD

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General Description

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Installation

The 45AM1 should be located to sight the flame under all firing conditions and should be as close as possible to the flame with the viewing angle relative to the burner center line as small as possible.

Note: For steam or air atomizing oil burner applications, two 45AM1's may be connected in parallel to improve operation under varying flame characteristics at low fire in this type of burner.

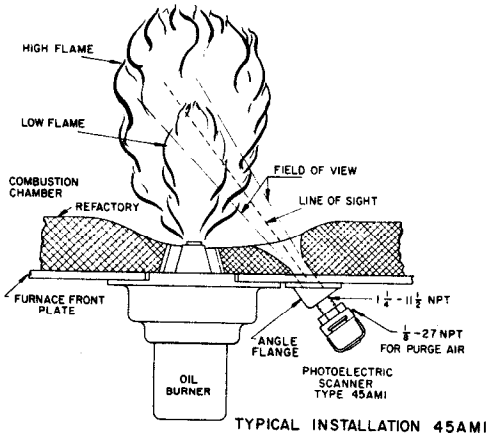
Mounting

The 45AM1 should be mounted as shown in Fig. 2 on a short length of 1¼" pipe (not over 3" in length) with the viewing opening through the fire wall expanding ½" in diameter for each 3" of refractory through which it passes.

Note: The temperature of the photocell must not exceed 165° F. The ⅛"-27 N.P.T. pipe tapping, shown in Fig. 2, provides connection for pressure ventilation, if desired.

Wiring

It is recommended that 105°C type TW be used for both photocell and flame rod applications.



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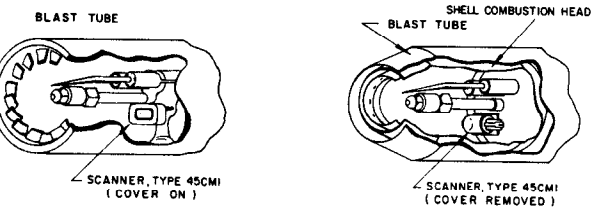

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Installation

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 on a ½" N.P.T. coupling.

The following instructions should be observed:

1. Keep flame rod as short as possible.

2. Keep flame rod at least ½" 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 ½" 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. It is not necessary to maintain absolutely uninterrupted contact with 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 12v D.C.

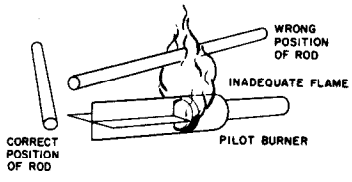

Figure 4

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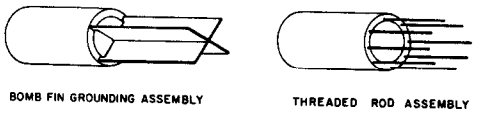
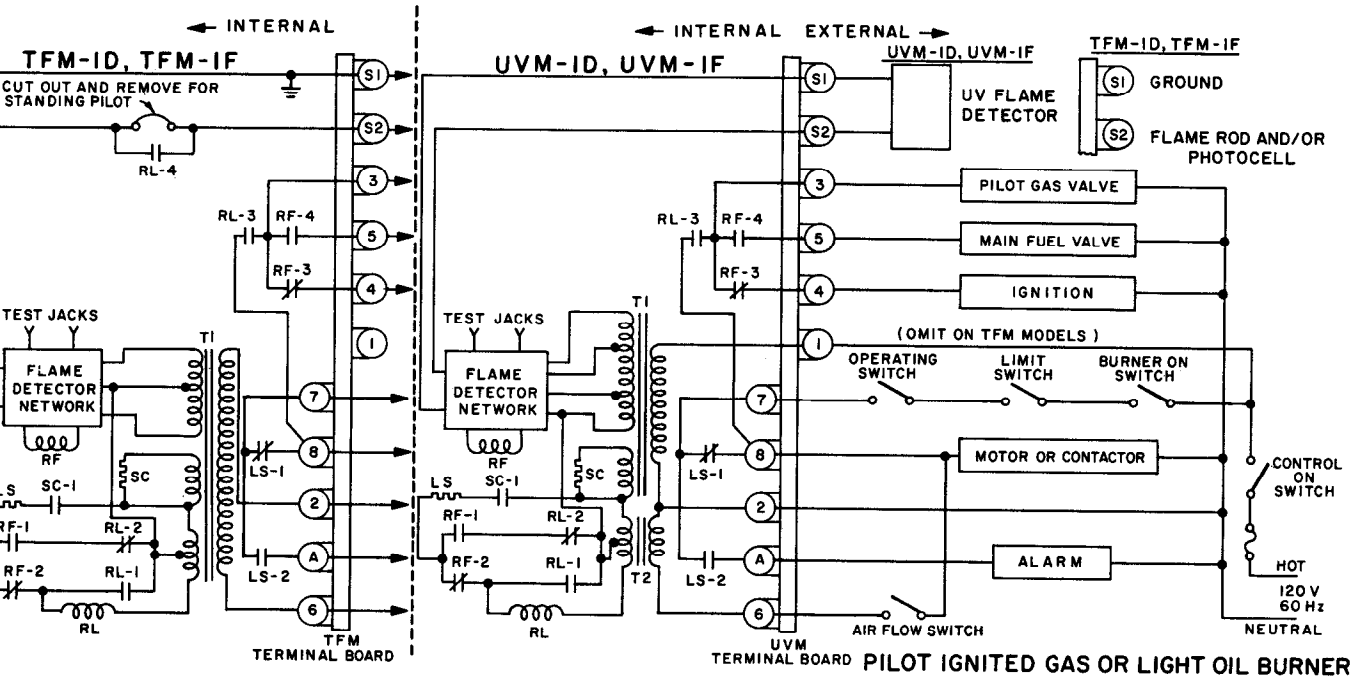


Figure 5

WIRING DIAGRAM



SEQUENCE OF OPERATION

Power on. Limit Switch closed. Operating control closes and the burner motor is energized. Terminal 8 is powered through LS-1 and terminal 7. Air flow is available.

(a) UVM-1D, UVM-1F

When the air flow switch closes, terminal 6 is powered. Transformer, T2, is energized and the RL relay is energized. On the first start, there will be a 5 second delay while the SC heater closes contact SC-1. Succeeding start-ups will be instantaneous. LS heater is powered. RL-1 closes and RL is latched in. RL-3 closes, energizing terminal 3 (intermittent pilot gas valve) and terminal 4 (interrupted spark ignition) through RF-3.

(b) TFM-1D, TFM-1F

When the air flow switch closes, terminal 6 is powered. Transformer, T1, is energized and the RL relay is energized. On every start, there will be a 5 second delay while the SC heater closes contact SC-1. LS heater is powered. RL-1 closes and RL is latched in. RL-3 closes, energizing terminal 3 (intermittent pilot gas valve) and terminal 4 (interrupted spark ignition) through RF-3.

When flame is detected, relay RF is energized. RF-2 opens and the LS heater is disconnected. RF-3 opens and terminal 4 is de-energized. RF-4 closes and energizes terminal 5 (main fuel valve).

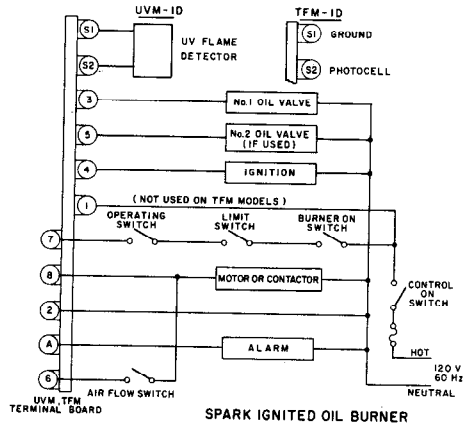
4. In the event flame is not detected within 12 seconds after RL is energized, the LS heater trips, opening LS-1 which disconnects power to terminal 8, shutting the burner down. LS-2 closes and terminal A (alarm) is energized.

5. In the event of flame failure, terminal 5 is de-energized in .8 seconds (UVM-1D, TFM-1D) or 2-4 seconds (UVM-1F, TFM-1F), and terminal 4 is re-energized. A 12 second attempt to relight the pilot occurs. If the pilot fails to relight, the control will lock out.

6. If the flame relay should be in an energized position at the start, RF-1 will be closed, and the LS heater will be powered through RF-1 and RL-2. Lockout will occur in 12 seconds.

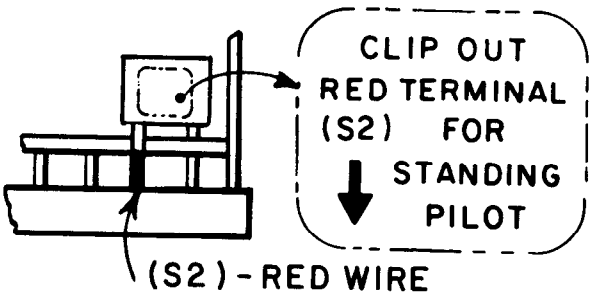
NOTE: IF THE TOTAL BURNER LOAD CURRENT IS IN EXCESS OF THE OPERATING CONTROL SWITCH RATING, A MOTOR CONTACTOR IS REQUIRED.

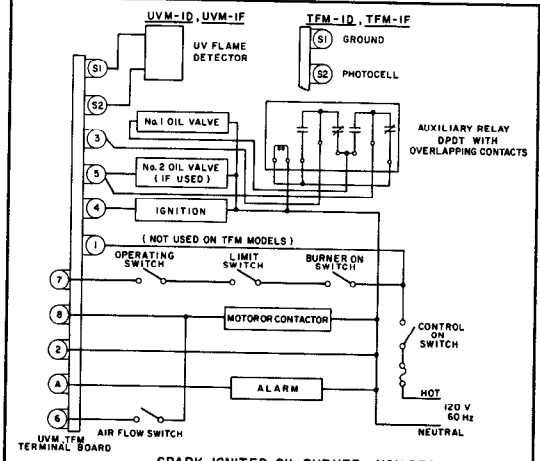
WIRING DIAGRAMS



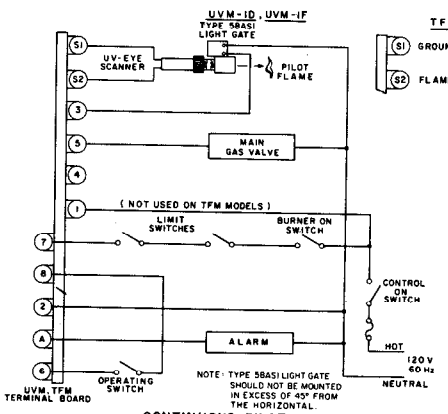
SPARK IGNITED OIL BURNER

NOTE: For standing pilot, red lug attached to terminal S2 must be completely removed by clipping at both ends within 1/16" of the circuit boards. See detail below.





SPARK IGNITED OIL BURNER - NON RECYCLING



CONTINUOUS PILOT

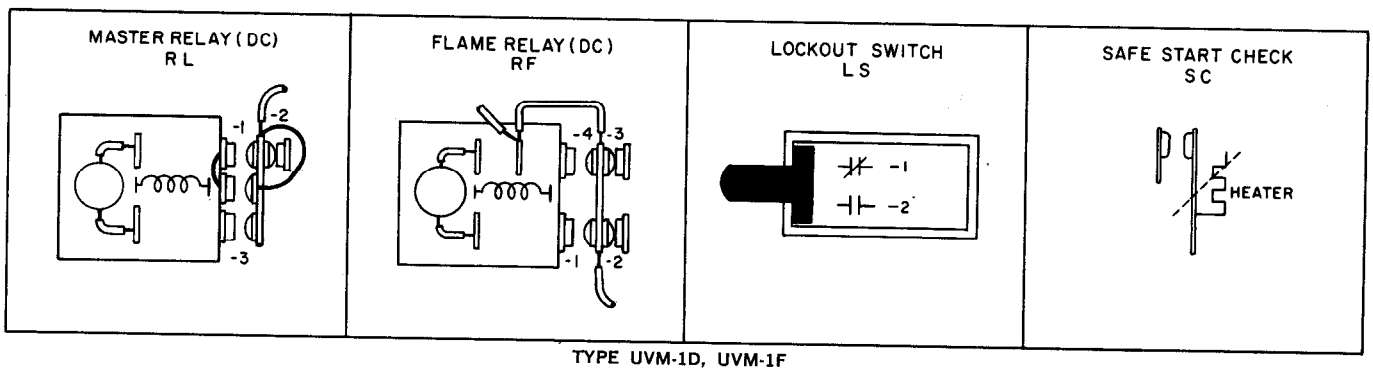
SEQUENCE OF OPERATION

CONTINUOUS PILOT IS MANUALLY IGNITED. WHEN THE OPERATING CONTROL CLOSES:

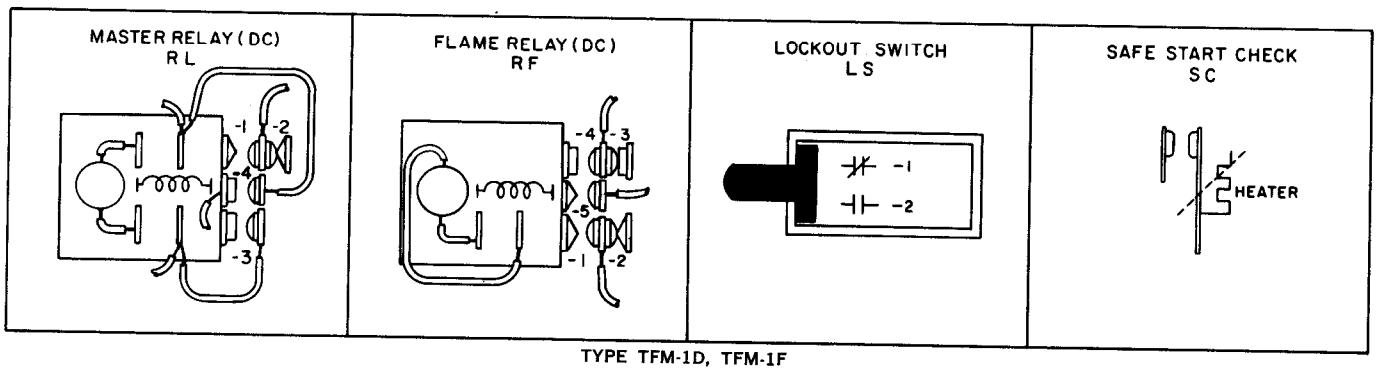
A. UVM-1D, UVM-1F THE TYPE 58ASI LIGHT GATE OPENS PERMITTING THE U-V-EYE SCANNER TO DETECT THE PILOT FLAME.

B. TFM-1D, TFM-1F THE FLAME ROD IS PLACED IN THE CIRCUIT TO DETECT THE PILOT FLAME.

IF PILOT FLAME IS PROVED, THE MAIN FUEL VALVE WILL BE ENERGIZED. IN THE EVENT OF FLAME FAILURE, THE MAIN FUEL VALVE WILL BE DE-ENERGIZED IN .8 SECONDS (UVM-1D, TFM-1D) OR 2-4 SECONDS (UVM-1F, TFM-1F). LOCKOUT WILL OCCUR.



TYPE UVM-1D, UVM-1F
CONTACT IDENTIFICATION

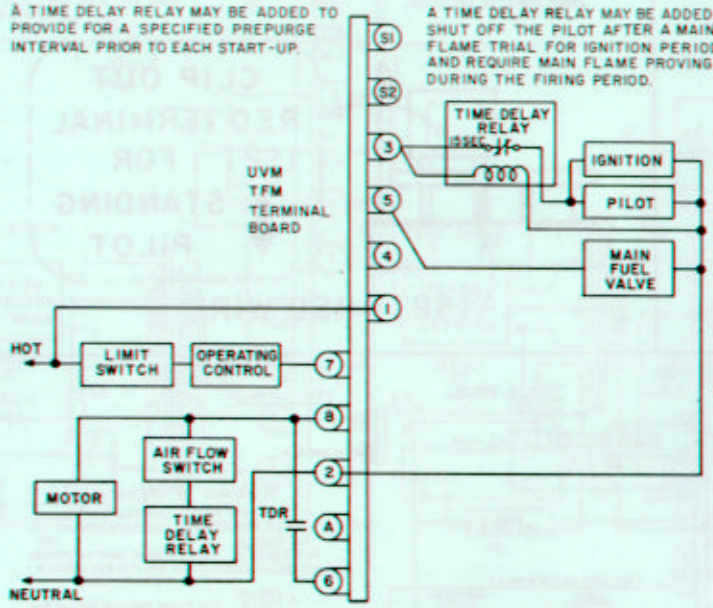


TYPE TFM-1D, TFM-1F
CONTACT IDENTIFICATION

WIRING DIAGRAMS

A. FOR PREPURGE

A TIME DELAY RELAY MAY BE ADDED TO PROVIDE FOR A SPECIFIED PREPURGE INTERVAL PRIOR TO EACH START-UP.

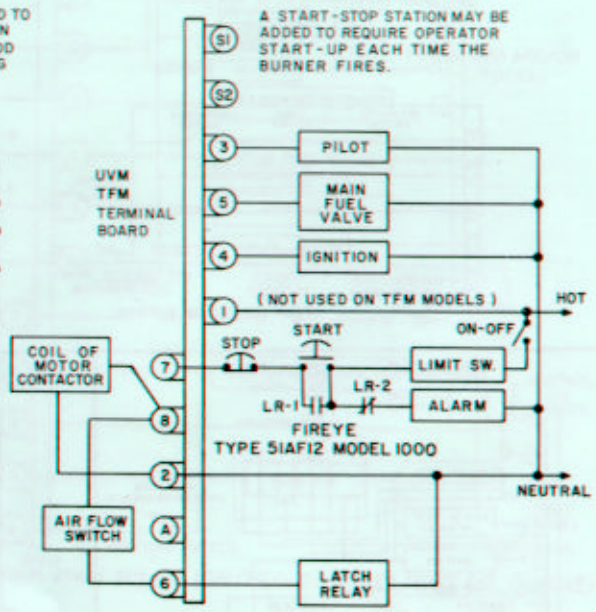


B. FOR PILOT CUTOFF

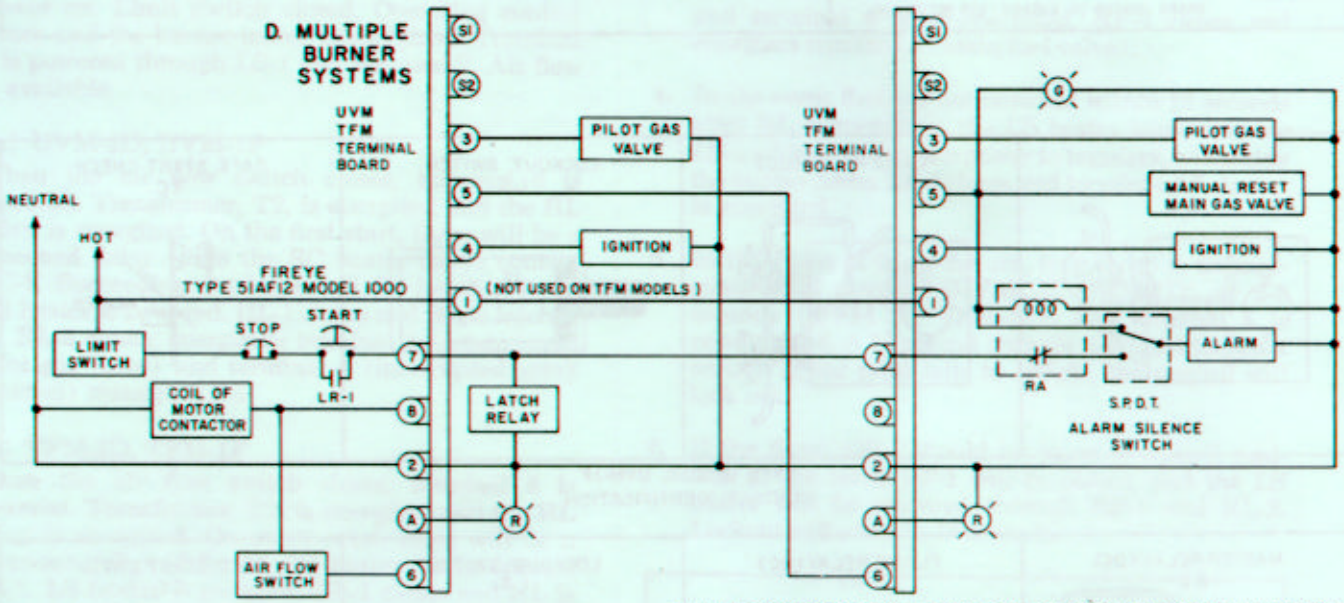
A TIME DELAY RELAY MAY BE ADDED TO SHUT OFF THE PILOT AFTER A MAIN FLAME TRIAL FOR IGNITION PERIOD AND REQUIRE MAIN FLAME PROVING DURING THE FIRING PERIOD.

C. FOR MANUAL START

A START-STOP STATION MAY BE ADDED TO REQUIRE OPERATOR START-UP EACH TIME THE BURNER FIRES.



D. MULTIPLE BURNER SYSTEMS



MULTIPLE BURNER SYSTEMS UTILIZING SEMI-AUTOMATIC OPERATION INCORPORATE THE UVM & TFM CONTROLS IN A CASCADING SEQUENCE. WHEN PILOT No.1 IS PROVEN, TRIAL FOR IGNITION FOR PILOT No.2 BEGINS. WHEN ALL PILOTS ARE PROVEN THE SAFETY SHUTOFF VALVE MAY BE MANUALLY OPENED. FLAME FAILURE OF ANY BURNER WILL TRIP ALL FUEL VALVES CLOSED, SHUT DOWN THE SYSTEM AND SOUND ALARM.

INSTALLATION TESTING

Testing the UVM and TFM controls is easily accomplished with a 20,000 ohm per volt DC voltmeter.

(a) UVM-1D, UVM-1F: Set the voltmeter on the 10 volt scale.

(b) TFM-1D, TFM-1F: Set the voltmeter on the 25 volt scale.

Insert the probes in the test jacks. The signal will be 1 V.D.C. or less when no flame is present. Refer to DC flame signal chart below for proper reading.

The test meter on a 150 volt AC scale may be used to check line and load voltages at the identified terminal studs on the chassis.

FLAME SIGNAL CHART
(DC VOLTAGE)

	Pull-In	Normal	Saturation
UVM-1D, UVM-1F	2	4	5
TFM-1D, TFM-1F	6	13	20

I. Flame Signal Testing:

A. For pilot test on intermittent pilot ignited burners, manually shut off fuel supply to main burner and follow test procedure below (C).

B. For main flame test on spark ignited oil burner, follow test procedure below (C).

C. Test Procedure:

1. Connect test meter to test jacks. Set on 25 volt DC scale; (if meter reads backwards during the test, reverse the meter leads at the test jacks).

2. Initiate a normal start-up.

3. When flame is established, the test meter reading should be normal (see DC Flame Signal Chart). It is normal for the meter to fluctuate.

4. Inadequate flame signal may be improved by one of the following:

Scanner or Photocell:

(a) Insure that the detector is clean, in good condition and mounted properly.

(b) Improve detector viewing by increasing the sight pipe diameter or by moving the detector closer to the flame.

(c) Make sure the detector is aimed at the first ⅓ of the flame.

Flame Rod:

(a) The rod should be mounted properly, be clean and in good condition. Refer to page 5 for tips on improving the rod signal.

5. a. Check flame failure by manually shutting off all fuel. (Ignition transformer should be temporarily connected to terminal 3 for this test.)

b. The DC test meter reading should drop within 0.8 seconds (UVM-1D and TFM-1D) or 2-4 seconds (UVM-1F, TFM-1F) following loss of flame. If the meter reading does not drop, the scanner is being actuated by UV radiation from the spark ignitor (UVM-1D or UVM-1F only). This effect may be corrected by realigning the scanner sight pipe so that it does not sight the spark or any surface that can reflect the spark radiation.

c. Reconnect ignition transformer to terminal 4.

11. 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 on each new installation and following repositioning of the flame detector.

A. Manually shut off the fuel to the main burner.

B. Connect test meter to test jacks.

C. Initiate a normal start-up.

D. Reduce the fuel to the pilot until the flame relay just holds in. This is minimum pilot.

E. Turn on the main fuel and insure that the main flame lights off promptly and normally.

F. 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.

G. After the minimum pilot test is completed satisfactorily, increase the pilot flame to normal size.

OPERATIONAL CHECK

Repeated lockout caused by a malfunction will prevent the ignition system from being energized. First determine that the scanner is not sighting flame during downtime. If flame is not being sighted, replace the scanner; then the control chassis.

MAINTENANCE

Photocell: Type 922 (E.C.A.) Part #4-230 — 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.

Contacts: Should contact cleaning be required, use a burnishing tool or fine crocus, never a file or sandpaper..

Humidity effects: In areas of high humidity, the chassis should be removed and placed in a dry atmosphere when the system is expected to be out of service for an extended period.

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

ROTATION

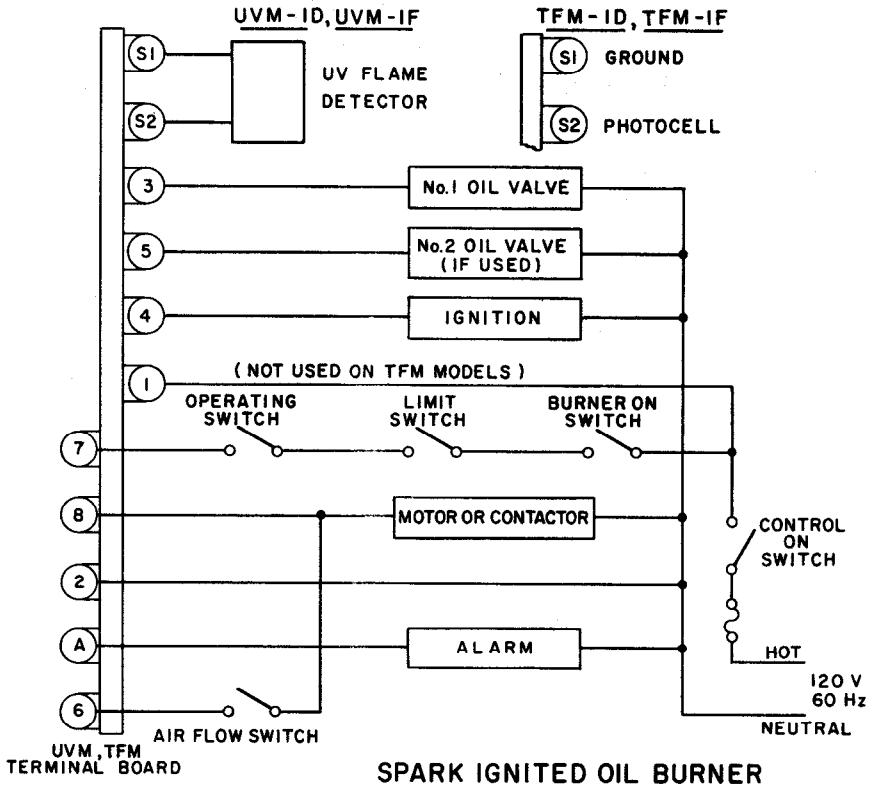
It is recommended that units purchased as spares be rotated periodically, so that each unit will be placed in operation at least every 90 days.

WARRANTY

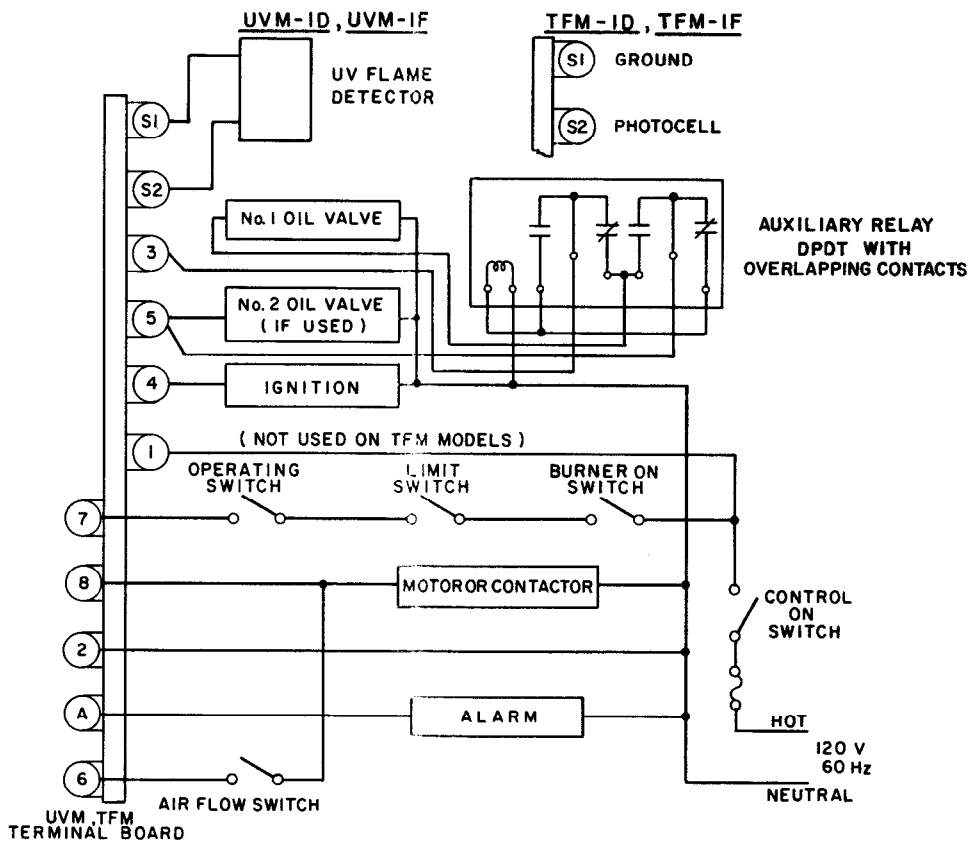
We guarantee for one year from date of shipment to replace or, at our option, to repair any products or parts thereof (except lamps, electronic tubes and photocells) which are found defective in material or workmanship or which otherwise fail to conform to the contract description or to any warranty, express or implied.

We make no warranties which extend beyond the description of our product on the face of our sales orders.

The Purchaser's remedies with respect to any product or part sold by us shall be limited exclusively to the right to replacement or repair f.o.b. Cambridge, as above provided. In no event shall we be liable for consequential or special damages of any nature which may arise in connection with such product or part.



SPARK IGNITED OIL BURNER



SPARK IGNITED OIL BURNER - NON RECYCLING

SUGGESTED SPECIFICATIONS FOR FLAME SAFEGUARD CONTROL FOR AUTOMATIC COMMERCIAL-PROCESS BURNERS

Each burner shall be equipped with a UL listed and FM approved flame safeguard control which shall provide all of the following:

1. Twelve second trial for ignition timing.
2. (a) 0.8 second flame failure response timing.
   (b) 2-4 seconds flame failure response timing.
3. With pilot ignited burners the main fuel valve shall not be energized until a suitable pilot flame is proved.
4. An integral air flow interlock circuit shall be provided to prove air flow before ignition and during the firing cycle.
5. An integral alarm circuit shall be energized following a safety shutdown.
6. Manual reset is required following a safety shutdown.
7. Test jacks shall be provided to read out flame signal voltage with a DC voltmeter.
8. The control shall be suitable for use at nominal 120 volts, 60 Hz. supply.
9. In the event of a flame failure during the firing cycle of a pilot ignited burner, the main fuel valve will be de-energized within:
   (a) 0.8 seconds (UVM-1D or TFM-1D)
   (b) 2-4 seconds (UVM-1F or TFM-1F)
   The spark ignition will be turned on and a 12 second trial for ignition of the pilot will be initiated. If the pilot flame is not re-established, the control will lock out on safety.
10. Flame detection shall be accomplished by:
    (a) An ultraviolet sensitive scanner, having a high ambient limit of 212°F.
    (b) A light-sensitive photocell scanner, having a high ambient limit of 165°F.
    (c) A flame rod.
11. (a) The flame safeguard control shall be Fireye UVM-1D (0.8 sec. flame failure response time)
    (b) The flame safeguard control shall be Fireye TFM-1D (0.8 sec. flame failure response time)
    (c) The flame safeguard control shall be Fireye UVM-1F (2-4 sec. flame failure response time)
    (d) The flame safeguard control shall be Fireye TFM-1F (2-4 sec. flame failure response time)

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