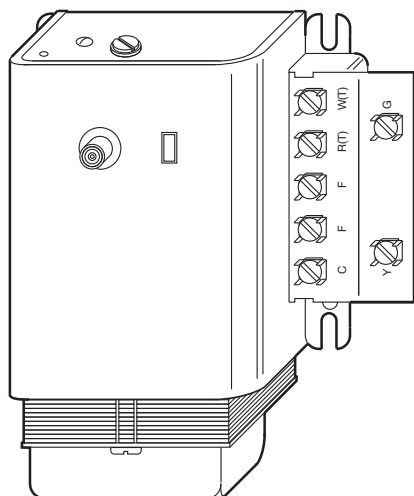


resideo



R8184M PROTECTORELAY OIL BURNER CONTROLS

PRODUCT DATA



APPLICATION

The R8184M Protectorelay oil burner control operates the oil burner and oil valve (if desired) in response to a call for heat from a low voltage control circuit.

FEATURES

- Provides intermittent ignition.
- Used with a C554A Cadmium Sulfide Cell and 24 Vac thermostat.
- Integral 24 Vac transformer powers low voltage control circuit.
- Solid state flame sensing circuit.
- Enclosed safety switch with external red reset button. Safety switch must be manually reset after safety shutdown.
- 45 second safety switch timing.
- Exposed terminal strip with screw terminals for low voltage connections. Y and G terminals are tie points for cooling circuit connections.
- Color-coded leadwires for line voltage connections.
- Mounts in any position on a standard 4 x 4 inch junction box or directly on burner housing.

SPECIFICATIONS

IMPORTANT

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

Models

R8184M Protectorelay Oil Primary Control

Electrical Ratings:

Transformer: 40 VA

Primary Voltage: 120V, 60 Hz.

Secondary Voltage: 26.5 V, 60 Hz.

Load Relay Contacts:

Full Load: 7.4 A.

Locked Rotor: 44.4 A

Ignition Rating: 360 VA (in addition to the load relay rating)

Power Consumption:

Start: 9.0 A

Running: 6.5 A

Safety Switch Timing: 45 seconds.

Ignition Sequence: All models provide intermittent ignition. Ignition is on whenever the burner is on.

Thermostat Heat Anticipator Setting: Models available for 0.2 A thermostat heat anticipator setting.

Ambient Temperature Range: -40 to 130 °F (-40 to 54 °C)

Mounting: Mounts on a standard 4 x 4 inch junction box.

Dimensions: Refer to Figs. 1 and 2.

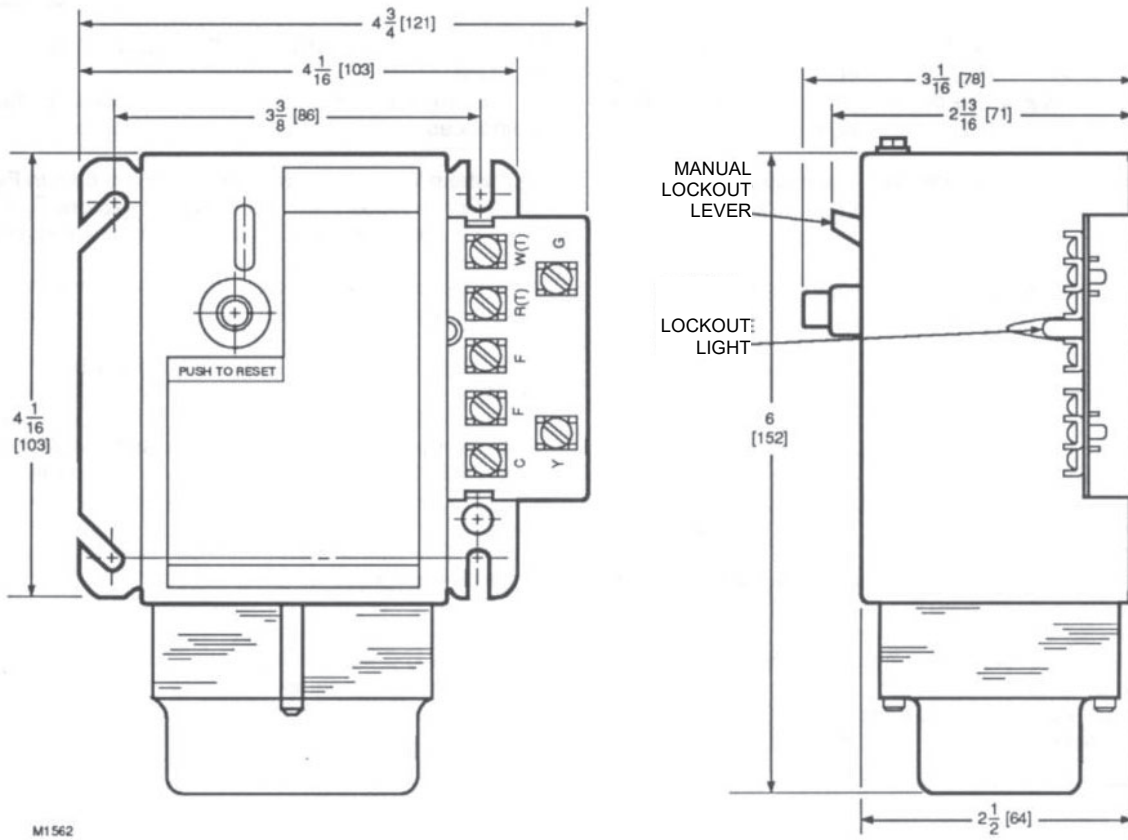
Flame Detector (order separately): C554A Cadmium Sulfide Cell.

Approvals:

Underwriters Laboratories Inc. Component Recognized:
File Number MP268, Guide Number MCCZ2.

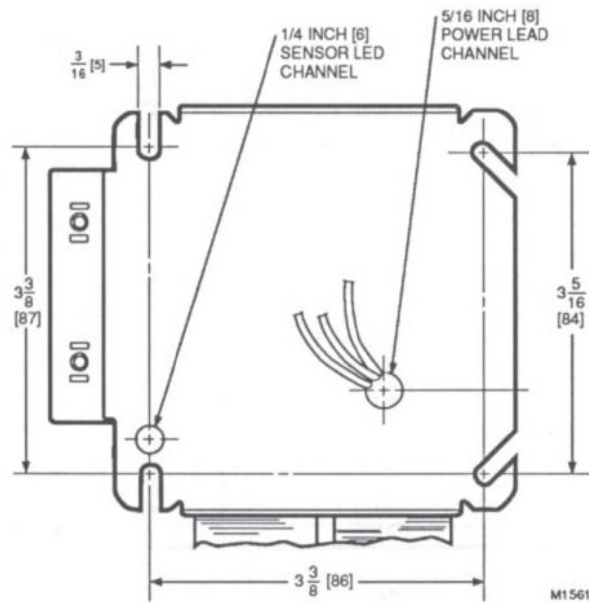


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M1562

Fig. 1. R8184M mounting dimensions in inches (mm).



M1561

Fig. 2. R8184M mounting plate in inches (mm).

INSTALLATION

WHEN INSTALLING THIS PRODUCT...

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

CAUTION

1. Disconnect power supply to prevent electrical shock or equipment damage.
2. Always loosen coil nut before attempting to rotate the powerhead.
3. Do not tighten valve on pipe using case as a handle.

CHOOSE LOCATION

- Mount the R8184M on a 4 x 4 inch junction box, directly on the burner housing, or inside the appliance cabinet.

- In replacement applications, mount the R8184M in the same location as the old control.
- Make all line voltage connections in a wiring enclosure such as a junction box or the appliance wiring compartment.
- Ensure operating temperatures at the selected location are between -40°F and 130°F (-40°C and 54°C).

MAKE WIRING CONNECTIONS AND MOUNT R8184M

1. Ensure all wiring complies with local codes and ordinances.
2. Make line voltage connections as shown in Fig. 3.
 - Splice leads with solderless connectors.
 - Do not exceed load ratings shown on device label or in the Specifications, page 2.
 - Leave enough slack in the wires to permit easy access into the junction box.
3. Mount the R8184M to the junction box. Refer to Fig. 4.
4. Connect the C554A Cadmium Sulfide Cell (ordered separately) leadwires to the F-F terminals on the terminal strip.
5. Connect all remaining low voltage wiring connections as shown in Fig. 3.

NOTE: Y and G terminals are provided to simplify connections of cooling equipment; they are not connected to the internal circuitry of the R8184M.

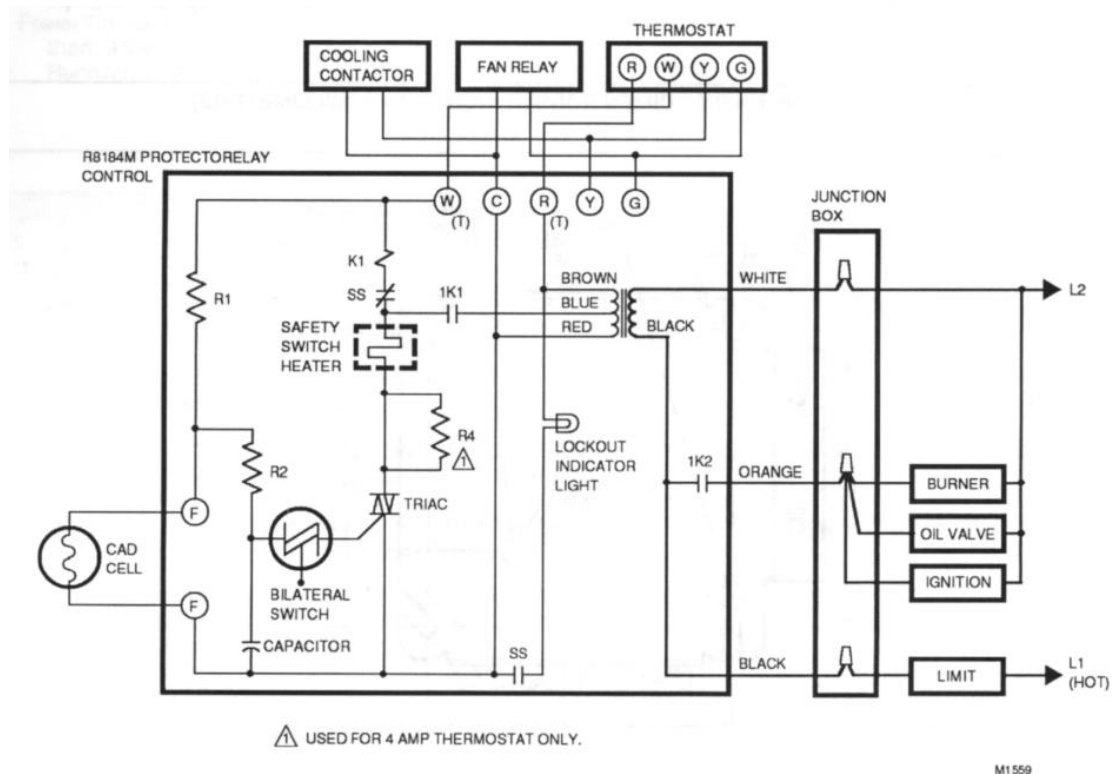


Fig. 3. WIRING DIAGRAM OF R8184M WITH LOCKOUT INDICATOR LIGHT.

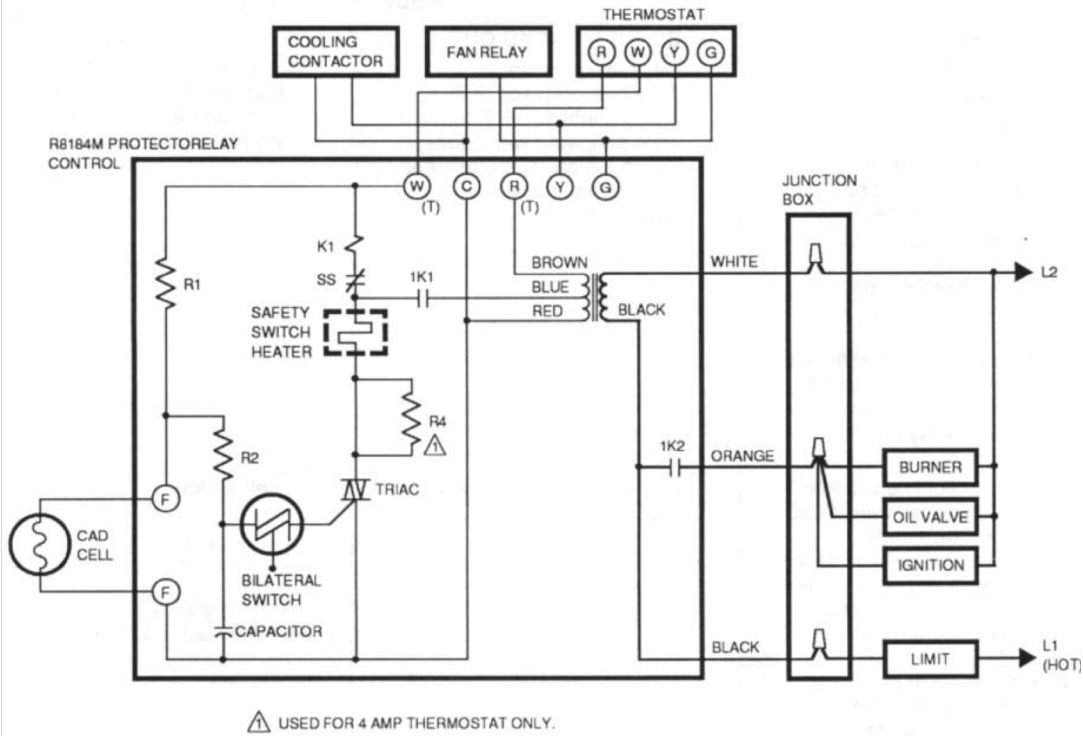


Fig. 4. WIRING DIAGRAM OF R8184M WITHOUT LOCKOUT INDICATOR LIGHT.

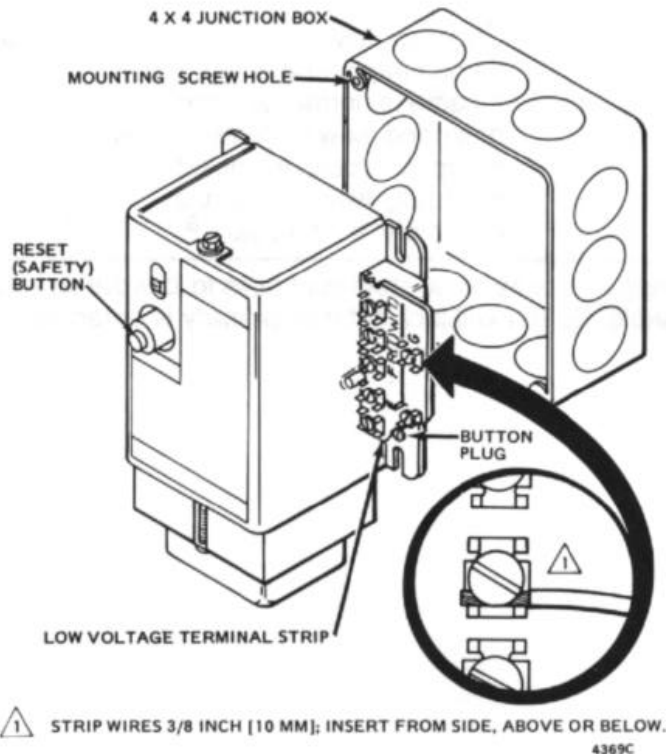


Fig. 5. MOUNT THE R8184M AFTER MAKING LINE VOLTAGE CONNECTIONS.

OPERATION

External Action	R8184M Action
Connect line voltage power	Transformer primary is energized if limit switch is closed.
Thermostat calls for heat	Relay 1K pulls in, closing contacts 1K1 and 1 K2. Burner motor, oil valve, and ignition are energized and safety switch heater begins heating.
Cad cell senses flame	Safety switch heater is de-energized. Burner operation continues under control of the thermostat and limit.
Call for heat is satisfied	Relay 1K is de-energized and contacts 1K1 and 1K2 break, stopping the burner and ignition.
Burner fails to ignite on a call for heat	Safety switch is heated. If flame is not established within 45 seconds, the safety switch breaks, de-energizing the 1K relay and lighting the indicator light (if provided). Contacts 1K1 and 1K2 break, stopping the burner motor, oil valve, and ignition. Manual reset of safety switch is required.
Flame fails during burner-on cycle	Safety switch heater starts. If flame is not reestablished within 45 seconds, the safety switch opens, de-energizing the 1K relay. The indicator light (if provided) lights. Contacts 1K1 and 1K2 break, stopping the burner motor, oil valve, and ignition. Manual reset of safety switch is required.
Power fails during a call for heat	Burner shuts down safely and automatically returns to normal operation when power is restored.



CAUTION

The heating system shuts down when the R8184M locks out on safety. Freezeout (i.e., cold house, frozen pipes) can occur if weather conditions are severe. Models are available with indicator light for lockout indication.

CHECKOUT

Start System



WARNING

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

Ensure the combustion chamber is free of oil or oil vapor before starting the system.

1. Open the hand valve in the oil supply line.
2. Ensure the system is powered. Check the circuit breaker or fuse and close the system switch, if provided.
3. Push in and release the red reset button.

NOTE: If the safety switch has just locked out, the safety switch may need a minute to cool down before it can be relit.

4. Set thermostat to call for heat.
5. Oil burner should light and operate until the call for heat ends.

Check Safety Features

Simulate flame failure:

1. Follow the starting procedure to turn on the burner.
2. Close the hand valve in the oil supply line.
3. Safety switch should lock out in approximately 45 seconds. The indicator light, if provided, should light. Ignition and motor should stop and oil valve should close.
4. Restart system.

Simulate ignition failure:

1. Follow the starting procedure to turn on the burner, but do not open the oil supply hand valve.
2. The safety switch should lock out in approximately 45 seconds. Indicator light, if provided, should light. Ignition and motor should stop and oil valve should close.
3. Restart system.

Simulate power failure:

1. Turn on the main burner following the starting procedure.
2. Disconnect power supply. Main burner should shut off.
3. Reconnect power supply. Main burner should turn on.

If system does not operate as described, proceed to Troubleshooting.

TROUBLESHOOTING AND MAINTENANCE

IMPORTANT

The R8184M contains no field-serviceable parts. Do not disassemble the R8184M. Replace the entire control if operation is not as described.

To completely troubleshoot an oil burner installation, check the burner, ignition transformer, oil primary control, and cad cell for proper operation and condition.

The indicator light lights to indicate the system is locked-out on safety.

Preliminary Steps

Before checking the R8184M and cad cell, perform these preliminary checks. Repair or replace controls as necessary.

- Check all wiring connections, power supply, and burner motor fuse. Ensure power is turned on to all controls, burner motor, and ignition transformer.
- Check the limit switch for proper operation.
- Check the ignition transformer.
- Check the electrode gap and position.
- Check the contacts between the ignition transformer and electrode.
- Check the oil pump pressure.
- Check the piping to the oil tank.
- Check the oil nozzle, oil supply, and oil filter.

Check CAD Cell and R8184M

WARNING

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

Troubleshooting is done with the equipment powered. Observe all necessary precautions to prevent electrical shock or equipment damage.

Use the following equipment to troubleshoot the R8184M and cad cell.

- Screwdriver
- 0 to 150 Vac voltmeter
- Insulated jumper wire with both ends stripped
- Ohmmeter
- 2700 Ohm resistor (optional)

Burner Motor Does Not Start When Thermostat Calls For Heat

PRELIMINARY CHECKS

1. Make sure limit switch is closed and that contacts are clean.
2. Check for line voltage power at the oil primary. With thermostat calling for heat, voltage between black and white leadwires on oil primary should be 120 Vac.

Procedure	Corrective Action	
	Burner Starts	Burner Doesn't Start
1. Jumper thermostat terminals: <ul style="list-style-type: none"> • Jumper low volt thermostats at oil primary. • Jumper line volt thermostats at thermostat. 	Trouble is in thermostat circuit. Check thermostat and wiring connections.	Trouble is in cad cell or oil primary. Go to Step 2.
2. Disconnect one cad cell lead-wire.	Cad cell is seeing external light, is defective, or cad cell connections are shorted. Go to Step 3.	Disconnect power; check all wiring connections. Tighten any loose connections, if necessary, and retest. If burner motor and ignition still don't start, replace oil primary. If ignition is on and burner motor is off, check burner motor and wiring connections to motor. Replace burner motor, if necessary.
3. Turn off burner and reconnect cad cell. Make sure F-F terminals are not shorted. Shield cad cell from external light, and jumper W(T)-R(T) terminals to start burner.	Eliminate external light source or permanently shield cad cell.	Replace cad cell with Part No. 130367.

Burner Motor Starts But Flame Is Not Established

Check burner and ignition transformer per manufacturer's recommendations. This is not an oil primary or cad cell problem.

Burner Starts, Flame Is Established; Then Burner Locks Out On Safety

Procedure	Corrective Action	
	Burner Locks Out	Burner Keeps Running
1. a. Reset safety switch by pushing red reset button. b. Disconnect cad cell lead-wires at oil primary. c. Jumper thermostat terminals to start burner: <ul style="list-style-type: none"> • Jumper low volt thermostats at oil primary. • Jumper line volt thermostats at thermostat. d. After flame is established, but before safety switch locks out, short cad cell by jumpering F-F terminals.	Oil primary control is defective-replace. If there is any doubt that F-F terminals were jumpered within safety switch timing, wait 5 minutes, then repeat procedure (Steps 1a-1d).	Check cad cell with ohmmeter, see Cad Cell Troubleshooting table on page 8. If ohmmeter is not available, go to step 2.
2. a. Disconnect line voltage power and reconnect cad cell F-F terminals. b. Unplug cad cell and clean face with soft cloth. Check sighting for clear view of flame. Replace cell in socket. c. Reconnect line voltage power. Reset safety switch by pushing red reset button, and jumper thermostat terminals to start burner: <ul style="list-style-type: none"> • Jumper low volt thermostats at oil primary. • Jumper line volt thermostats at thermostat. 	Replace cad cell with Part No.130367, go to step 3.	Cad cell is okay.
3. Reset safety switch and restart burner.	Check cad cell view of flame, flame shape, and oil nozzle. If flame is normal and cad cell has good view of flame, check for open circuits in socket assembly wiring. Replace assembly, if necessary. ^a	Cad cell and socket assembly are okay.

^a If cad cell is okay and oil primary appears okay but system continues to lockout on safety, repeat steps 1a-1d using a 2700 ohm resistor to jumper F-F terminals. Burner will lock out if oil primary is defective; replace oil primary, if necessary.

CAD CELL TROUBLESHOOTING

Check cad cell by reading resistance with ohmmeter while flame is present. See the table below for cause and corrective action to be taken for resistance that is read.

OHMETER READING	CAUSE	ACTION
0 ohms.	Short circuit.	Check for pinched cad cell leadwires.
Less than 1600 ohms, but not 0.	Cad cell and application are operating correctly.	Recheck oil primary using a 2700 ohm resistor to jumper F-F terminals; repeat steps 1a-1d under "Burner Starts, Flame is Established" on page 7.
Over 1600 ohms, but not infinite.	Dirty cad cell.	Clean cad cell face and recheck.
	Improper cad cell sighting.	Check flame sighting.
	Improper air adjustment.	Adjust air band to get good reading.
	Defective cad cell.	Replace cad cell with Part No. 130367 and recheck.
Infinite resistance.	Open circuit.	Check for improper wiring, loose cad cell in holder, or defective cad cell. Replace defective cad cell with Part No. 130367.

TRIP SAFETY SWITCH BEFORE OPERATING BURNER MAINTENANCE

CAUTION

Tripping the safety switch shuts down the burner but does not disconnect the power supply. Turn off power at system switch or circuit breaker before servicing the control system, burner motor, oil valve or ignition to avoid electrical shock.

To trip the safety switch, move the safety switch lever down until the red reset button pops out and the indicator light comes on. See Fig. 6. Burner will not operate until safety switch is reset by pushing in the red reset button.



Fig. 6. TRIPPING THE SAFETY SWITCH.



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