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.

- Provides intermittent ignition.
- Used with a C554A Cadmium Sulfide Cell and 24 Vat thermostat.
- Integral 24 Vat 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, UNITS MAY NOT MATCH THE LISTED SPECIFICATIONS EXACTLY. ALSO, PRODUCTS 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:

R8184M Protectorelay Oil Primary Control

**TRADELINE FEATURES:**

MANUAL TRIP SAFETY SWITCH LEVER: Tradeline models include a lever to manually trip the safety switch.

LOCKOUT INDICATOR LIGHT: Tradeline models include a light emitting diode (LED) on the terminal strip that lights to indicate when the oil primary control has locked out on safety.

**STANDARD MODELS**

MODELS:

R8184M Protectorelay Oil Primary Control

ELECTRICAL RATINGS:

Transformer: 40 VA
Primary Voltage: 120V, 60 Hz.
Secondary Voltage: 26.5V, 60 Hz.
Load Relay Contacts:
Full Load: 7.4A.
Locked Rotor: 44.4A.
Ignition Rating: 360 VA (in addition to the load relay rating)
Power Consumption:
Start: 9.0A
Running: 6.5A

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 0.2A thermostat heat anticipator setting.
AMBIENT TEMPERATURE RANGE: -40°F to 130°F [-40°C 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 INCORPORATED COMPONENT RECOGNIZED: File Number MP268, Guide Number MCCZ2.

**ORDERING INFORMATION**

FOR ORDERING INFORMATION WHEN PURCHASING REPLACEMENT AND MODERNIZATION PRODUCTS FROM YOUR TRADELINE WHOLESALER OR YOUR DISTRIBUTOR, REFER TO THE TRADELINE CATALOG OR PRICE SHEETS FOR COMPLETE ORDERING NUMBER, OR SPECIFY:

1. Order number. Tradeline if desired.
2. Heat anticipator setting.

IF YOU HAVE ADDITIONAL QUESTIONS, NEED FURTHER INFORMATION, OR WANT TO COMMENT ON OUR PRODUCTS OR SERVICES, PLEASE WRITE OR PHONE:

1. YOUR LOCAL HONEYWELL RESIDENTIAL AND BUILDING CONTROLS SALES OFFICE (CHECK WHITE PAGES OF PHONE DIRECTORY).
2. RESIDENTIAL AND BUILDING CONTROLS CUSTOMER SATISFACTION 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—R8184M MOUNTING DIMENSIONS IN INCHES AND [MILLIMETERS].

FIG. 2—R8184M MOUNTING PLATE IN INCHES AND [MILLIMETERS].
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.

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.

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].

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

<table>
<thead>
<tr>
<th>EXTERNAL ACTION</th>
<th>R8184M ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connect line voltage power</td>
<td>Transformer primary is energized if limit switch is closed.</td>
</tr>
<tr>
<td>Thermostat calls for heat</td>
<td>Relay 1K pulls in, closing contacts 1K1 and 1K2. Burner motor, oil valve, and ignition are energized and safety switch heater begins heating.</td>
</tr>
<tr>
<td>Cad cell senses flame</td>
<td>Safety switch heater is de-energized. Burner operation continues under control of the thermostat and limit.</td>
</tr>
<tr>
<td>Call for heat is satisfied</td>
<td>Relay 1K is de-energized and contacts 1K1 and 1K2 break, stopping the burner and ignition.</td>
</tr>
<tr>
<td>Burner fails to ignite on a call for heat</td>
<td>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.</td>
</tr>
<tr>
<td>Flame fails during burner-on cycle</td>
<td>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.</td>
</tr>
<tr>
<td>Power fails during a call for heat</td>
<td>Burner shuts down safely and automatically returns to normal operation when power is restored.</td>
</tr>
</tbody>
</table>

## 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.
**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.

**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.

**CHECK CAD CELL AND R8184M**

**PROCEDURE**

<table>
<thead>
<tr>
<th>1. Jumper thermostat terminals:</th>
<th><strong>CORRECTIVE ACTION</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Jumper low volt thermostats at oil primary.</td>
<td>Trouble is in thermostat circuit. Check thermostat and wiring connections.</td>
</tr>
<tr>
<td>• Jumper line volt thermostats at thermostat.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Disconnect one cad cell leadwire.</th>
<th><strong>CORRECTIVE ACTION</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cad cell is seeing external light, is defective, or cad cell connections are shorted. Go to step 3.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>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.</th>
<th><strong>CORRECTIVE ACTION</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Eliminate external light source or permanently shield cad cell.</td>
<td>Replace cad cell with Part No. 130367.</td>
</tr>
</tbody>
</table>

**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.
## PROCEDURE

1. a. Reset safety switch by pushing red reset button.
   b. Disconnect cad cell leadwires at oil primary.
   c. Jumper thermostat terminals to start burner:
      - 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.

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:
      - Jumper low volt thermostats at oil primary.
      - Jumper line volt thermostats at thermostat.

3. Reset safety switch and restart burner.

## CORRECTIVE ACTION

<table>
<thead>
<tr>
<th>BURNER LOCKS OUT</th>
<th>BURNER KEEPS RUNNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>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).</td>
<td>Check cad cell with ohmmeter, see Cad Cell Troubleshooting table on page 9. If ohmmeter is not available, go to step 2.</td>
</tr>
<tr>
<td>Replace cad cell with Part No. 130367, go to step 3.</td>
<td>Cad cell is okay.</td>
</tr>
<tr>
<td>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</td>
<td>Cad cell and socket assembly are okay.</td>
</tr>
</tbody>
</table>

aIf cad cell is okay and oil primary appears okay but system continues to lock out 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.

<table>
<thead>
<tr>
<th>OHMMETER READING</th>
<th>CAUSE</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 ohms.</td>
<td>Short circuit.</td>
<td>Check for pinched cad cell leadwires.</td>
</tr>
<tr>
<td>Less than 1600 ohms, but not 0.</td>
<td>Cad cell and application are operating correctly.</td>
<td>Recheck oil primary using a 2700 ohm resistor to jumper F-F terminals; repeat steps 1a-1d under &quot;Burner Starts, Flame is Established&quot; on page 8.</td>
</tr>
<tr>
<td>Over 1600 ohms, but not infinite.</td>
<td>Dirty cad cell.</td>
<td>Clean cad cell face and recheck.</td>
</tr>
<tr>
<td></td>
<td>Improper cad cell sighting.</td>
<td>Check flame sighting.</td>
</tr>
<tr>
<td></td>
<td>Improper air adjustment.</td>
<td>Adjust air band to get good reading.</td>
</tr>
<tr>
<td></td>
<td>Defective cad cell.</td>
<td>Replace cad cell with Part No. 130367 and recheck.</td>
</tr>
<tr>
<td>Infinite resistance.</td>
<td>Open circuit.</td>
<td>Check for improper wiring, loose cad cell in holder, or defective cad cell. Replace defective cad cell with Part No. 130367.</td>
</tr>
</tbody>
</table>

TRIP SAFETY SWITCH BEFORE OPERATING
BURNER MAINTENANCE (Tradeline model only)

**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. 5. Burner will not operate until safety switch is reset by pushing in the red reset button.

**FIG. 5—TRIPPING THE SAFETY SWITCH.**