Honeywell

7800 SERIES
RM7800E,G,L,M Relay Module

SPECIFICATION DATA

APPLICATION

The Honeywell RM7800 is a microprocessor based integrated burner control for automatically fired gas, oil or combination fuel single burner applications. The RM7800 system consists of a Relay Module and Keyboard Display Module. Subbase, Amplifier, and Purge Card. Options include Personal Computer Interface, DATA CONTROLBUS MODULE™, Remote Display Mounting, First-Out Expanded Annunciator and Combustion System Manager™ Software.

The RM7800 is programmed to provide a level of safety, functional capability and features beyond the capacity of conventional controls.

Functions provided by the RM7800 include automatic burner sequencing, flame supervision, system status indication, system or self-diagnostics and troubleshooting.

FEATURES

- Safety features:
  - Interlock check.
  - Closed loop logic test.
  - Dynamic AMPLI-CHECK™.
  - Dynamic input check.
  - Dynamic safety relay test.
  - Dynamic soft-check logic.
  - Expanded safe-start check.
  - High Fire Purge Switch test.
  - Internal hardware status monitoring.
  - Low Fire Start Switch test.
  - Tamper resistant timing and logic.
- Access for external electrical voltage checks.
- Application flexibility.
- Provides 0.8 to 3.0 second Flame Failure Response Time (FFRT), depending on amplifier selected.
- Communication interface capability.
- Dependable, long-term operation provided by microcomputer technology.
- First-out annunciation and system diagnostics provided by 2 row by 20 column Vacuum Fluorescent Display (VFD) located on the Keyboard Display Module.
- First-out expanded annunciation with 26 Light Emitting Diodes (LEDs) for limits and interlocks (optional).
- Five sequence information LEDs, see Fig. 1.
- Five function Run/Test Switch.
- Interchangeable plug-in flame amplifiers.
- Local or remote annunciation of operation and fault information (optional).
- Nonvolatile memory for retaining history files and sequencing status after loss of power.
- Remote reset (optional).
- Report generation (optional).
- Burner controller data:
  - Sequence status.
  - Sequence time.
  - Hold status.
  - Lockout/Alarm status.
  - Flame signal strength.
  - Expanded annunciator status.
  - Total cycles of operation.
  - Total hours of operation.
  - Fault history of six most recent faults:
    - Cycles of operation at time of fault.
    - Expanded annunciator data at time of fault.
    - Fault message and code.
    - Hours of operation at time of fault.
    - Sequence status at time of fault.
    - Sequence time at time of fault.
- Diagnostic information:
  - Device type.
  - Flame amplifier type.
  - Flame failure response time.
  - Manufacturing code.
  - On/Off status of all digital inputs and outputs.
  - Selected purg purge time.
  - Software revision and version of RM7800 and Keyboard Display Module.
  - Status of configuration jumpers.
  - Status of Run/Test Switch.

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SPECIFICATIONS

Electrical Ratings, see Table 1:
- Voltage and Frequency: 120 Vac (+10% to -15%), 50 or 60 Hz (+10% to -15%).
- Keyboard Display Module: 13 Vdc peak full wave rectified (+20% to -15%).
- Power Dissipation:
  - RM7800: 16 Watts maximum,
  - Display Module: 3 Watts maximum,
  - Maximum Total Connected Load: 2000 VA.
- Fusing: Total Connected Load: 20A maximum, type FRN or equivalent.

Environmental Ratings:
- Ambient Temperature:
  - Operating: -40°F to 140°F (-40°C to 60°C).
  - Storage: -40°F to 150°F (-40°C to 66°C).
- Humidity: 65% RH continuous, noncondensing.
- Vibration: 0.5G environment.

Weight:
- RM7800: 1 pound 13 ounces, unpacked.
- Keyboard Display Module: 4 ounces, unpacked.

Dimensions: See Fig. 2.

Approval Bodies:
- Underwriters Laboratories Inc. listed, File No. MP268, Guide No. MCC2.
- Canadian Standards Association certified, LR9S329-3.
- Federal Communications Commission, Part 15.
  - Class B—Emissions.

Mounting: Q7800A for panel mount or Q7800B for wall or burner mount.

Required Components:
- Plug-in Flame Signal Amplifier, see Table 2.
- ST7800A Plug-in Purge Timer Cards: selectable models; two seconds to 30 minutes.
- Q7800A or Q7800B Wiring Subbase.
Table 1. Terminal Ratings.

<table>
<thead>
<tr>
<th>Terminal No.</th>
<th>Description</th>
<th>Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>Flame Sensor Grounda</td>
<td>—</td>
</tr>
<tr>
<td>Earth G</td>
<td>Earth Groundb</td>
<td>—</td>
</tr>
<tr>
<td>L2(N)</td>
<td>Line Voltage Common</td>
<td>—</td>
</tr>
<tr>
<td>3</td>
<td>Alarm</td>
<td>120 Vac, 1A pilot duty.</td>
</tr>
<tr>
<td>4</td>
<td>Line Voltage Supply (L1)</td>
<td>120 Vac (10-15%), 50 or 60 Hz (+10%,-15%)c,d</td>
</tr>
<tr>
<td>5</td>
<td>Burner Motor</td>
<td>120 Vac, 9.8 AFL, 56.8 ALR (inrush).</td>
</tr>
<tr>
<td>6</td>
<td>Burner Controller and Limits</td>
<td>120 Vac, 1 mA.</td>
</tr>
<tr>
<td>7</td>
<td>Lockout/Running Interlock</td>
<td>120 Vac, 6A run, 43A inrush.</td>
</tr>
<tr>
<td>8</td>
<td>Pilot Valve/Ignition</td>
<td>120 Vacd</td>
</tr>
<tr>
<td>9</td>
<td>Main Fuel Valve</td>
<td>120 Vacd</td>
</tr>
<tr>
<td>10</td>
<td>Ignition</td>
<td>120 Vacg</td>
</tr>
<tr>
<td>P(I1)</td>
<td>Flame Sensor</td>
<td>60 to 220 Vac, current limited.</td>
</tr>
<tr>
<td>12</td>
<td>Firing Rate High Fire</td>
<td>120 Vac, 75 VA pilot duty.</td>
</tr>
<tr>
<td>13</td>
<td>Firing Rate Common</td>
<td>120 Vac, 75 VA pilot duty.</td>
</tr>
<tr>
<td>14</td>
<td>Firing Rate Low Fire</td>
<td>120 Vac, 75 VA pilot duty.</td>
</tr>
<tr>
<td>15</td>
<td>Firing Rate Modulate</td>
<td>120 Vac, 75 VA pilot duty.</td>
</tr>
<tr>
<td>16</td>
<td>Unused</td>
<td>—</td>
</tr>
<tr>
<td>17</td>
<td>Unused</td>
<td>—</td>
</tr>
<tr>
<td>18</td>
<td>Low Fire Switch Input</td>
<td>120 Vac, 1 mA.</td>
</tr>
<tr>
<td>19</td>
<td>High Fire Switch Input</td>
<td>120 Vac, 1 mA.</td>
</tr>
<tr>
<td>20</td>
<td>Preignition Interlock Input</td>
<td>120 Vac, 1 mA.</td>
</tr>
<tr>
<td>21</td>
<td>Interrupted/Intermittent Pilot Valve/First Stage Oil Valve.</td>
<td>120 Vacd</td>
</tr>
<tr>
<td>22</td>
<td>Shutter</td>
<td>120 Vac, 0.5A.</td>
</tr>
</tbody>
</table>

a The RM7800 must have an earth ground providing a connection between the subbase and the control panel or the equipment. The earth ground wire must be capable of conducting the current to blow the 20A fuse (or breaker) in the event of an internal short circuit. The RM7800 needs a low impedance ground connection to the equipment frame which, in turn, needs a low impedance connection to earth ground.
b 2000 VA maximum connected load to RM7800 Assembly.
c See Tables 3 and 4.
d R7890G,M operating frequency determined by relay module selection.
Table 2. Sequence timing for normal operation.

<table>
<thead>
<tr>
<th>Device</th>
<th>Initiate</th>
<th>Standby</th>
<th>Purge</th>
<th>Flame Establishing Period</th>
<th>Pilot</th>
<th>Mainb</th>
<th>Run</th>
<th>Post Purge Timing</th>
<th>Interlock Circuits</th>
<th>Firing Rate Circuit</th>
<th>Energy Saving Prepurge</th>
<th>Approval Code Bodies</th>
</tr>
</thead>
<tbody>
<tr>
<td>RM7800E</td>
<td>10 sec.</td>
<td>&quot;</td>
<td>&quot;</td>
<td>4 or 10 sec.</td>
<td>10 or 15 sec.</td>
<td>&quot;</td>
<td>15 sec</td>
<td>Preignition, Lockout, High and Low Fire.</td>
<td>4-wire modulating</td>
<td>Yes</td>
<td>FM/GI Modulating</td>
<td></td>
</tr>
<tr>
<td>RM7800G</td>
<td>10 sec.</td>
<td>&quot;</td>
<td>&quot;</td>
<td>10 or 15 sec. or intermittent</td>
<td>&quot;</td>
<td>10 or 15 sec. or intermittent</td>
<td>10 sec</td>
<td>Preignition, Running, Low Fire</td>
<td>No</td>
<td>UL/CSA Modulating</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RM7800L</td>
<td>10 sec.</td>
<td>&quot;</td>
<td>&quot;</td>
<td>10 or 15 sec. or intermittent</td>
<td>&quot;</td>
<td>10 or 15 sec. or intermittent</td>
<td>10 sec</td>
<td>Preignition, Running, Low Fire</td>
<td>FM/GI Modulating</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RM7800M</td>
<td>10 sec.</td>
<td>&quot;</td>
<td>&quot;</td>
<td>10 or 15 sec. or intermittent</td>
<td>&quot;</td>
<td>10 or 15 sec. or intermittent</td>
<td>10 sec</td>
<td>Preignition, Running, Low Fire</td>
<td>2-wire isolated On-Off-On contacts</td>
<td>No</td>
<td>UL/CSA On/Off</td>
<td></td>
</tr>
</tbody>
</table>

a STANDBY and RUN can be an infinite time period.
b PURGE will be determined by which ST7900A purge card is selected; 15 timings are available, from 2 seconds to 30 minutes.
c The MFEP will be determined by which terminal is used, configuration jumper selected, or jumper wire added.
d RM7800L1066: 10 seconds or intermittent.

Table 3. Combinations for terminals 8, 9, 10 and 21.

<table>
<thead>
<tr>
<th>Combination No.</th>
<th>Pilot Fuel 8</th>
<th>Main 9</th>
<th>Ignition 10</th>
<th>Intermittent Pilot Valve 21</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>C</td>
<td>F</td>
<td>No Load</td>
<td>No Load</td>
</tr>
<tr>
<td>2</td>
<td>B</td>
<td></td>
<td></td>
<td>S</td>
</tr>
<tr>
<td>3</td>
<td>No Load</td>
<td></td>
<td>A</td>
<td>F</td>
</tr>
<tr>
<td>4</td>
<td>F</td>
<td></td>
<td>No Load</td>
<td>D</td>
</tr>
<tr>
<td>5</td>
<td>No Load</td>
<td></td>
<td></td>
<td>D</td>
</tr>
<tr>
<td>6</td>
<td>D</td>
<td></td>
<td></td>
<td>D</td>
</tr>
<tr>
<td>7</td>
<td>No Load</td>
<td>D</td>
<td></td>
<td>D</td>
</tr>
<tr>
<td>8</td>
<td>D</td>
<td></td>
<td></td>
<td>D</td>
</tr>
<tr>
<td>9</td>
<td>No Load</td>
<td>D</td>
<td></td>
<td>D</td>
</tr>
</tbody>
</table>

Table 4. Composition of each combination.

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.5A Ignition.</td>
<td>60 VA Pilot Duty plus 4.5A Ignition.</td>
<td>160 VA Ignition plus Motor valve with: 960 VA inrush, 360 VA open, 250 VA hold.</td>
<td>2A Pilot Duty.</td>
<td>64 VA Pilot Duty plus Motor valves with: 3850 VA inrush, 700 VA open, 250 VA hold.</td>
</tr>
</tbody>
</table>
Fig. 2. Mounting dimensions of RM7800 Relay Module, Q7800 Subbase, and Q7800 Subbase, respectively, in in. (mm).

Accessories:

- Keyboard Display Module (KDM):
  - S7800A1001 English language (Standard)
  - S7800A1035 French language
  - S7800A1043 German language
  - S7800A1050 Italian language
  - S7800A1088 Spanish language
  - S7800A1118 Katakana (Japanese) language
  - S7800A1126 Portuguese language
  - S7800B1009 Chinese language

- Communications:
  - Q7700A1014 Network Interface Unit, 120 Vac, 60/60 Hz applications, external modem required
  - Q7700B1004 Network Interface Unit with universal 100 to 250 Vac, 50/60 Hz external power supply, external modem required
  - GS7800A1001 ControlBus Module, standard
  - GS7800B1000 ControlBus Module, multdrop
  - GS7800A1006 ControlBus Module, General Purpose Interface
  - ZM7859A1001 Combustion System Manager™ software

- S7810A1009 Data ControlBus™ Module (if no KDM is used)
- S7810B1007 Data ControlBus™ Module, Multi-Drop Switch Module
- S7810M1003 ModBus™ Module

Miscellaneous:

- A7890A1002 7800 SERIES Tester
- S7820A1007 Remote Reset Module
- S7830A1006 Expanded Annunciator, 120 Vac, 60/60 Hz
- 203841 Data ControlBus Connector, 5-wire
- 203768 Remote Display Mounting Bracket
- 221723 Dust Cover, Relay Module
- 204715A Keyboard Display Module Cover, NEMA 4, clear
- 204716B Keyboard Display Module Cover, NEMA 4, clear with reset button
- 205221B Push Display mounting kit
- 221819A Extension Cable, display, 5 ft (1.524 mm)
- 221819C Extension Cable, display, 10 ft (3.048 mm)
- 123514A Rectification Flame Simulator
- 203859 Ultraviolet Flame Simulator
- 203988A Remote Display Power Supply, 13 Vdc, plug-in
### Table 5. Flame Detector System.

<table>
<thead>
<tr>
<th>Type</th>
<th>Color</th>
<th>Self-Checking</th>
<th>Model</th>
<th>Flame Failure Response Time</th>
<th>Fuel</th>
<th>Applicable Flame Detectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rectification</td>
<td>Green</td>
<td>No</td>
<td>R7847A</td>
<td>0.8 or 3 sec.</td>
<td>Gas</td>
<td>Rectifying Flame Rod Holders&lt;sup&gt;a&lt;/sup&gt; C7004, C7007, C7011. Complete Assemblies: C7008, C7009, C719.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Oil</td>
<td>Rectifying Photoelectric C7003, C7010, C7013, C714.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Gas, oil, coal</td>
<td>Ultraviolet (Purple Peeper) C7012A,C&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Dynamic AMPLI-CHECK&lt;sup&gt;TM&lt;/sup&gt;</td>
<td></td>
<td></td>
<td>R7847B&lt;sup&gt;CD&lt;/sup&gt;</td>
<td>0.8 or 3 sec.</td>
<td>Gas</td>
<td>Rectifying Flame Rod Holders&lt;sup&gt;a&lt;/sup&gt; C7004, C7007, C7011. Complete Assemblies: C7008, C7009, C719.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Oil</td>
<td>Rectifying Photoelectric C7003, C7010, C7013, C714.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Gas, oil, coal</td>
<td>Ultraviolet (Purple Peeper) C7012A,C&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Infrared</td>
<td>Red</td>
<td>No</td>
<td>R7848A</td>
<td></td>
<td></td>
<td>Infrared (Lead Sulfide) C7015.</td>
</tr>
<tr>
<td>Dynamic AMPLI-CHECK&lt;sup&gt;TM&lt;/sup&gt;</td>
<td></td>
<td></td>
<td>R7848B&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
<td></td>
<td>Ultraviolet (Purple Peeper) C7012A,C&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Ultraviolet</td>
<td>Purple</td>
<td>No</td>
<td>R7849A</td>
<td>0.8 or 3 sec.</td>
<td>Gas, oil</td>
<td>Ultraviolet (Mini-peeper) C7027, C7035, C7044&lt;sup&gt;d&lt;/sup&gt;.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>R7849B&lt;sup&gt;e&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>R7861A&lt;sup&gt;f&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blue</td>
<td>Dynamic Self-Check</td>
<td>R7866A&lt;sup&gt;g&lt;/sup&gt;</td>
<td>3 sec.</td>
<td>Gas, oil, coal</td>
<td>Ultraviolet (Adjustable Sensitivity) C7076.</td>
<td></td>
</tr>
<tr>
<td>Optical</td>
<td>White</td>
<td>Dynamic AMPLI-CHECK&lt;sup&gt;TM&lt;/sup&gt;</td>
<td>R7861B</td>
<td>0.8 or 3 sec.</td>
<td>Gas, oil, coal</td>
<td>Optical (Ultraviolet, infrared, visible light) C7927, C7935, C7915, C7962.</td>
</tr>
</tbody>
</table>

<sup>a</sup> Order flame rod separately, see holder instructions.

<sup>b</sup> The C7012A,C; C7027, C7035 and C7044 Flame Detectors should be used only on burners that cycle on-off at least once every twenty-four hours. Apparatuses with burners that remain on continuously for twenty-four hours or longer should use the C7012E,F Flame Detector with the R7847C Amplifier, the C7061A Flame Detector with the R7861 Amplifier, or the C7061A,D Flame Detector with the R786A Amplifier as the ultraviolet flame detection system.

<sup>c</sup> Circuitry tests the flame signal amplifier at least 12 times a minute during burner operation and shuts down the boiler if the amplifier fails.

<sup>d</sup> Use only Honeywell Photo cell, part number 38316.

<sup>e</sup> Circuitry tests all electronic components in the flame detection system (amplifier and detector) 12 times a minute during burner operation and shuts down the burner if the detection system fails.

<sup>f</sup> Series 4 and greater check flame detector system when flame reaches 1.5 Vdc or at 4.5 seconds whichever occurs first.