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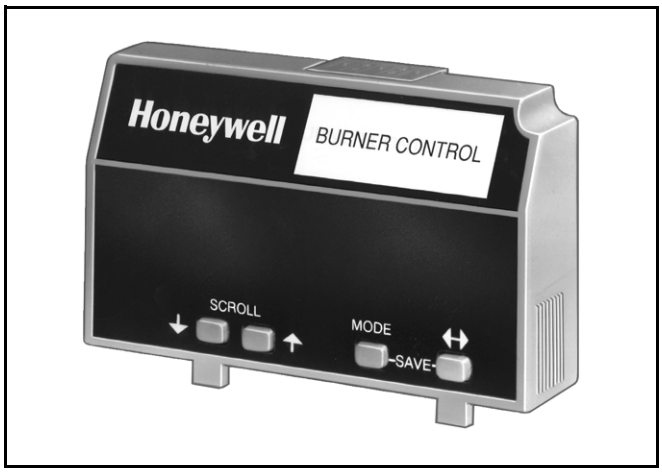
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Honeywell

7800 SERIES
S7800A Keyboard Display Module

PRODUCT DATA



APPLICATION

The S7800A Keyboard Display Module (KDM) provides first-out annunciation and system diagnosis using a two-row by twenty-column readout. The KDM provides local or remote annunciation of operation and fault information, remote reset, report generation, burner control data and diagnostic information. The KDM is part of the 7800 SERIES of microprocessor-based burner controls for gas, oil, coal or combination fuel single burner applications.

The 7800 SERIES is programmed to provide a level of safety, functional capabilities and features beyond the capacity of conventional controls.

FEATURES

- **Application flexibility.**
- **Communication interface capability.**
- **Dependable, long-term operation provided by microcomputer technology.**
- **First-out annunciation and system diagnostics provided by a 2-row by 20-column display.**
- **First-out expanded annunciation with 24 limit and interlock Light Emitting Diodes (LED).**
- **Local or remote annunciation of operation and fault information.**
- **UL Class 4 rating when P/N 204718A,C NEMA 4 cover is used.**
- **Remote reset.**
- **Report generation.**
- **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.**

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— **Diagnostic information:**
  • **Device type.**

  •Flame amplifier type.
  • Flame failure response time (FFRT).
  •Manufacturing code.
  •On-Off status of all digital inputs and outputs.
  •PREPURGE time selected.
  •Software revision and version of 7800 SERIES Relay Module and KDM.
  •Status of configuration jumpers.
  •Status of Run/Test Switch.

SPECIFICATIONS

Electrical Ratings:
Voltage and Frequency: 13 Vdc peak full wave rectified (+20/-15%).
Power Dissipation: 7W maximum.
VA Consumption: 2 VA maximum.

Terminal Ratings:
Power: 13 Vdc peak full wave rectified.
Earth Ground.

Environmental Ratings:
Ambient Temperature Ranges:
Operating: -40°F (-40°C) to +140°F (+60°C).
Storage: -60°F (-51°C) to +150°F (+66°C).
Humidity: 85 percent relative humidity continuous, noncondensing.

NOTE: UL Class 4 rating when P/N 204718A,C NEMA 4 Cover is used.

Vibration: 0.5G environment.

Mechanical:
Dimensions: See Fig. 1.
Weight: 4 ounces (124 grams), unpacked.

Display: 40 character (2 rows by 20 columns).

Languages:
S7800A1001 English language display.
S7800A1035 French language display.
S7800A1043 German language display.
S7800A1050 Italian language display.
S7800A1068 Spanish language display.
S7800A1118 Japanese (Katakana) language display.
S7800A1126 Portuguese language display.

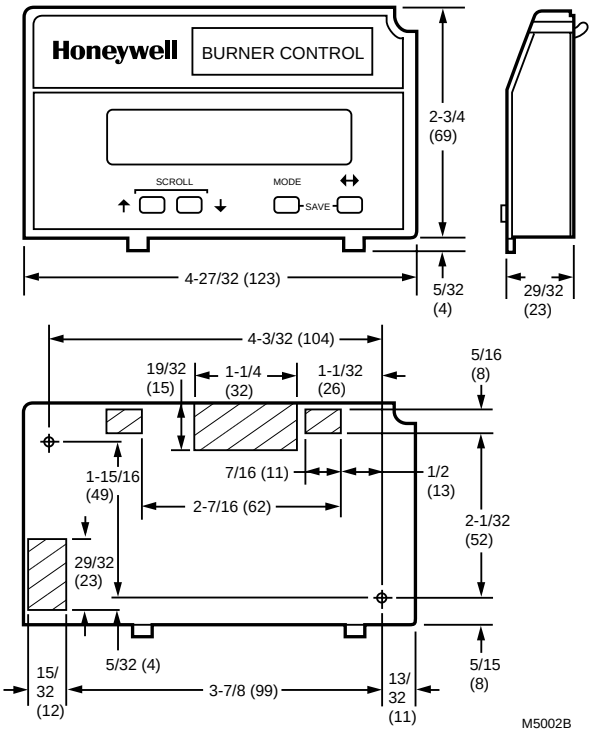


Fig. 1. Approximate dimensions of S7800 in in. (mm).

Approvals:
Underwriters Laboratories Inc. Listed:
File No. MP268, Guide No. MCCZ.
Canadian Standards Association Certified:
No. LR9S329-3.
Factory Mutual Approved: Report No. J.I.1V9A0.AF.
IRI: Acceptable.
Federal Communications Commission: Part 15, Class B emissions.
EN60730: For compliance with remote KDM mounting requirements, provide electrical insulation separation by insulation using double or reinforced insulation. Do this by: Optically isolating the communication or remote reset lines from the control cabinet, or provide physical separation

ORDERING INFORMATION

When purchasing replacement and modernization products from your TRADELINE® wholesaler or distributor, refer to the TRADELINE® Catalog or price sheets for complete ordering number.

If you have additional questions, need further information, or would like to comment on our products or services, please write or phone:

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   Minneapolis, Minnesota 55422-4386

In Canada—Honeywell Limited/Honeywell Limitée, 35 Dynamic Drive, Scarborough, Ontario M1V 4Z9.
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from the communication or remote display cover assembly (part number 204718A) or other suitable enclosure that meets the IP40 class of protection.

Accessories:
203541 ControlBus 5-wire Electrical Connector.
S7810A1009 Data ControlBus Module™.
203765 Remote Display Mounting Bracket.
221818A 60 in. (1.5m) Extension Cable Assembly.
221818C 120 in. (3m) Extension Cable Assembly.
204718A NEMA 4 Cover Assembly for S7800A KDM.
204718B NEMA 1 Cover Assembly for S7800A KDM.
204718C NEMA 4 Cover Assembly for S7800A KDM with reset button.
205321B Remote Display Flush Mount Kit.

INSTALLATION

⚠ WARNING

Electrical Shock Hazard.
Can cause severe injury or death.
Disconnect the power supply before beginning installation to prevent electrical shock and equipment damage. More than one power supply disconnect can be involved.

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 marked on the product to make sure the product is suitable for your application.
3. Installer must be a trained, experienced, flame safeguard service technician.
4. After installation is complete, check out the product operation as provided in these instructions.
5. Be sure wiring complies with all applicable codes, ordinances and regulations.
6. See Fig. 5, 6 and 7 for S7800A unique wiring connections.

IMPORTANT

1. *This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, can cause interference to radio communications. It has been tested and found to comply with the limits for a Class B computing device of Part 15 of FCC rules which are designed to provided reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area can cause interference, in which case, users, at their own expense, can be required to take whatever measures are required to correct this interference.*
2. *This digital apparatus does not exceed the Class B limits for radio noise for digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.*

Humidity

Install the S7800A where the relative humidity never reaches the saturation point. The S7800 is designed to operate in a maximum 85% RH continuous, noncondensing, moisture environment.

Vibration

Do not install the S7800A where it can be subjected to vibration in excess of 0.5G continuous maximum vibration.

Weather

The S7800A is not designed to be weather tight. If installed outdoors, the S7800A must be protected by an approved weather-tight enclosure such as the 204718A or 204718C NEMA 4 Enclosure listed in Accessories.

Mounting KDM on 7800 SERIES Relay Module.

1. Align the two interlocking ears of the KDM with the two mating slots on the 7800 SERIES Relay Module. See Fig. 2.



Fig. 2. Keyboard display module mounting.

2. Insert the two interlocking ears into the two mating slots and, with a hinge action, push on the lower corners of the KDM to secure it to the 7800 SERIES Relay Module.
3. Make sure the KDM is firmly in place.

Remote Mounting KDM

The KDM can be mounted either on the face of a panel door or on other remote locations. See Fig. 3. When mounting the KDM on the face of a door panel, closely follow these instructions:

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Door Panel Mounting



Fig. 3. Panel mounting of a keyboard display module.

1. Select the location on the door panel for flush mounting.
2. Pay attention to the insertion dimensions of the two KDM screws, two interlocking ears, and the two plug-in connections to allow for sufficient clearance.
3. Use the KDM or Data ControlBus Module™ as a template (Fig. 16) and mark the two screw locations, interlocking ear locations and the two plug-in connector locations.
4. Drill the pilot holes for the mounting screws.
5. Cut holes in the door panel for the interlocking ears and the two plug-in connectors.
6. Mount the KDM, securing it with the two screws provided in the KDM bag assembly.

Remote Display Mounting Bracket

Use the 203765 Remote Display Mounting Bracket when mounting the KDM on a wall or remote location:

1. Use the 203765 Remote Display Mounting Bracket as a template to mark the four screw locations.
2. Drill the pilot holes for the four mounting screws.
3. Mount the 203765 Remote Display Mounting Bracket by securing the four no. 6 screws (M3.5 x 0.6). See Fig. 4.
4. Mount the KDM by aligning the two interlocking ears with the two mating slots on the remote mounting bracket.
5. Insert the two interlocking ears into the two mating slots.
6. Push on the lower corners of the KDM to secure it to the remote mounting bracket.
7. Make sure the KDM is firmly in place.

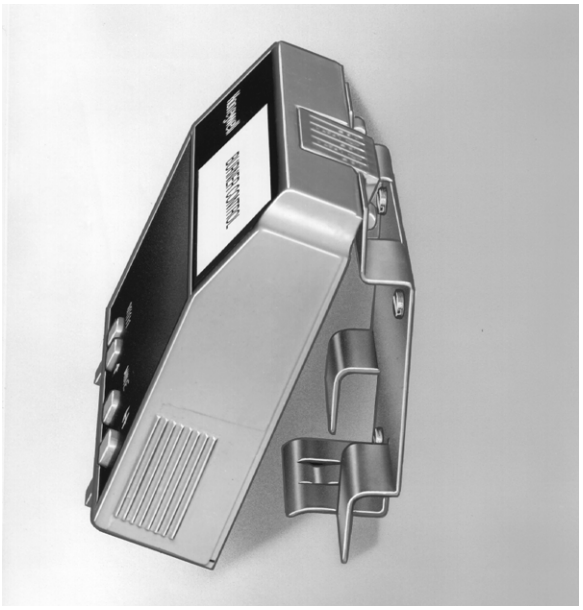


Fig. 4. Remote mounting of a keyboard display module using a 203765 Remote Display Mounting Bracket.

WIRING

⚠ WARNING

Electrical Shock Hazard.
Can cause severe injury or death.
To prevent electrical shock and equipment damage, disconnect the power supply from the main disconnect before beginning installation. More than one disconnect can be involved.

1. Refer to Fig. 5, 6, and 7 for proper wiring.
2. Make sure all wiring complies with all applicable electrical codes, ordinances and regulations.
3. For recommended wire size and type, see Table 1.
4. For Recommended grounding practices, see Table 2.
5. For KDM: The KDM is powered from a low voltage, energy-limited source. It can be mounted outside of a control panel if it is protected from mechanical damage.

NOTE: A 13 Vdc power supply must be used any time more than one KDM is used. A maximum of two KDM, Data ControlBus Modules™ or S7810B Multi-Drop Switch Modules are allowed in any combination.

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Table 1. Recommended Wire Size and Part Number.

Application	Recommended Wire Size	Recommended Part Number
Keyboard Display Module	22 AWG two-wire twisted pair with ground, or five-wire.	Belden 8723 shielded cable or equivalent.
Data ControlBus™ Module	22 AWG two-wire twisted pair with ground, or five-wire.	Belden 8723 shielded cable or equivalent.
Remote Reset Module	22 AWG two-wire twisted pair, insulated for low voltage.	—
Communications Interface ControlBus Module™	22 AWG two-wire twisted pair with ground.	Belden 8723 shielded cable or equivalent.
13 Vdc full wave rectified transformer power input.	18 AWG wire, insulated for voltages and temperatures for given applications.	TTW60C, THW75C, THHN90C

Table 2. Recommended Grounding Practices.

Ground Type	Recommended Practice
Signal ground (KDM, Data ControlBus™ Module, Communications Interface ControlBus Module™).	Use the shield of the signal wire to ground the device to the signal ground terminals [3(c)] of each device. Connect the shield at both ends of the daisy chain to ground.

6. Recommended wire routing:
   a. ControlBus:
      (1) Do not route the ControlBus cable in conduits that carry line voltage circuits.
      (2) Avoid routing the ControlBus cable close to ignition transformer leadwires.
      (3) Route the ControlBus cable outside of conduit if properly supported and protected from damage.
   b. Remote Reset:
      (1) Do not run high voltage ignition transformer wires in the same conduit with the Remote Reset wiring.
      (2) Do not route Remote Reset wires in conduit with line voltage circuits.

7. Maximum wire lengths:
   a. KDM: The maximum length interconnecting wire is 4000 ft (1219m).
   b. Remote Reset leadwires: The maximum length wire is 1000 ft (300m) to a Remote Reset push-button.

8. Install all electrical connectors.

9. Restore power to the panel.

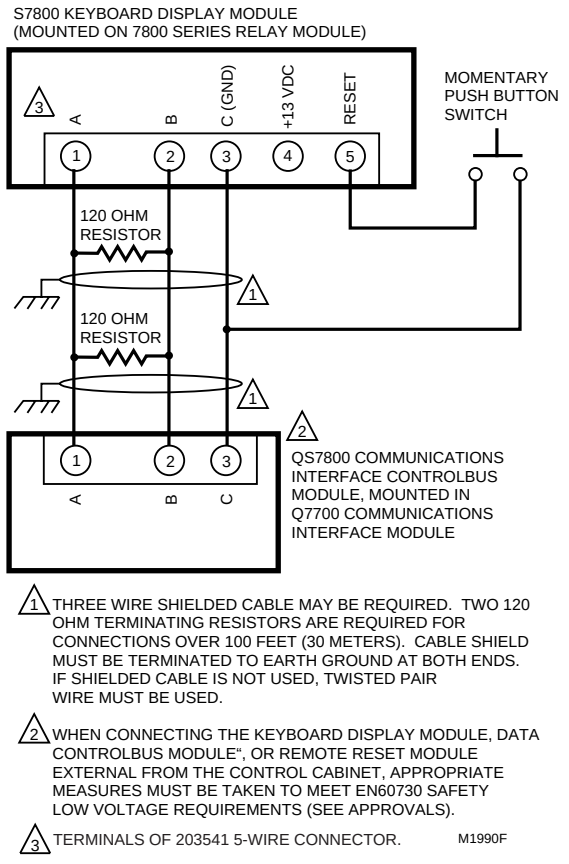


Fig. 5. Wiring the keyboard display module.

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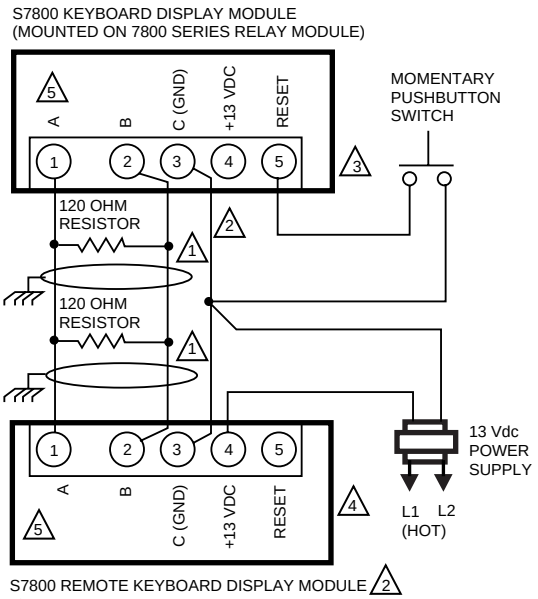


Fig. 6. Wiring for multiple keyboard display modules.

KDM Display

The first line of the KDM display provides current status of the burner sequence (STANDBY, PURGE, PILOT IGN, MAIN IGN, RUN and POSTPURGE), timing information (PURGE, PILOT IGN, MAIN IGN and POSTPURGE) in minutes and seconds, hold information (PURGE HOLD), and lockout information (Lockout, Fault Code, Message and Sequence), see Fig. 8. The extreme right side of the first line will be either blank or will show a small arrow pointing to the second line followed by a two-letter code (DI—Diagnostic Information, Hn—Fault History Information (where n equals the number of the fault), and EA—Expanded Annunciator). When the arrow and two-letter code are displayed, it indicates the second line is showing a selectable message submenu. The second line will display selectable or preemptive messages. A selectable message supplies information for flame strength, system status indication, system or self-diagnostics and troubleshooting. A preemptive message has parentheses around the message and supplies a detailed message to support the sequence status information. A preemptive message can also be a lockout message. A preemptive message replaces a selectable message to support the sequence status information. It also replaces a selectable message after 60 seconds if it or a lockout message is available. The 7800 SERIES Relay Module LED provide positive visual indication of the Relay Module sequence. The LED is energized simultaneously with the correct sequence description.

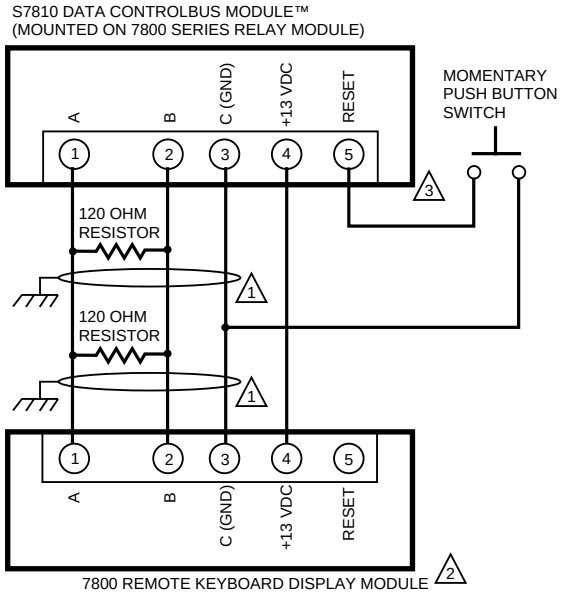


Fig. 7. Wiring keyboard display module for remote mounting.

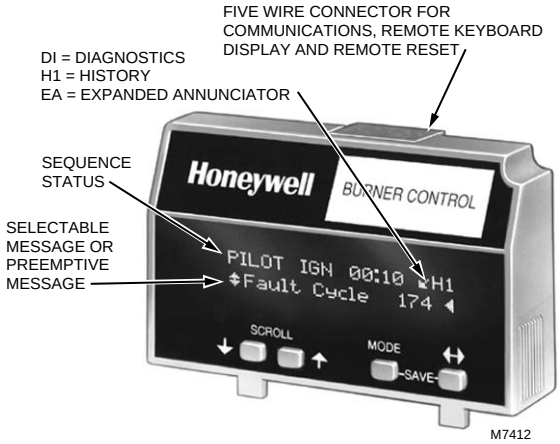


Fig. 8. S7800 Keyboard Display Module.

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Keyboard Functions

The keyboard contains four push-buttons with separate functions (SCROLL-down, SCROLL-up, MODE, and CHANGE-LEVEL). The MODE and CHANGE-LEVEL, when pressed together, provide a SAVE function.

1. SCROLL down-up push-buttons (↕). See Fig. 9. The SCROLL down-up push-buttons (↕) are used to scroll through the selectable messages. The double-headed arrow (↕), which is located in the lower left position of the second line of the display, represents the SCROLL down-up push-buttons. The SCROLL down-up push-buttons (↕) can be pressed to display the selectable messages one at a time or held down to scroll through the selectable messages at the rate of two per second. When the last item of the selectable message is viewed, the display wraps around and displays the first selectable message again.
2. CHANGE-LEVEL push-button (↔), see Fig. 10. The CHANGE-LEVEL push-button is used to change between the first hierarchy of selectable messages to a subset of selectable messages. The CHANGE-LEVEL push-button can also be used to change from a subset message to a first level selectable message. The symbol (<), located on the second line in the lower right corner of the display, represents a subset of selectable messages.
3. MODE push-button, see Fig. 11. Use the MODE push-button to instantaneously switch the display from a second-line selectable message to a second-line preempted message. The sixty second time-out function can also be used for this task. The MODE push-button only works if there is a second-line preempted message or a lockout message.

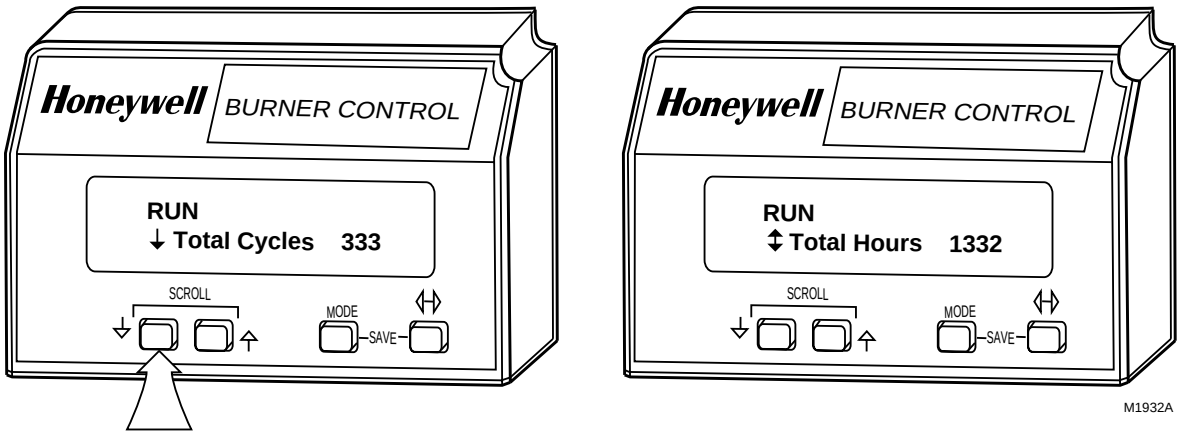


Fig. 9. SCROLL (↕) push-button function.

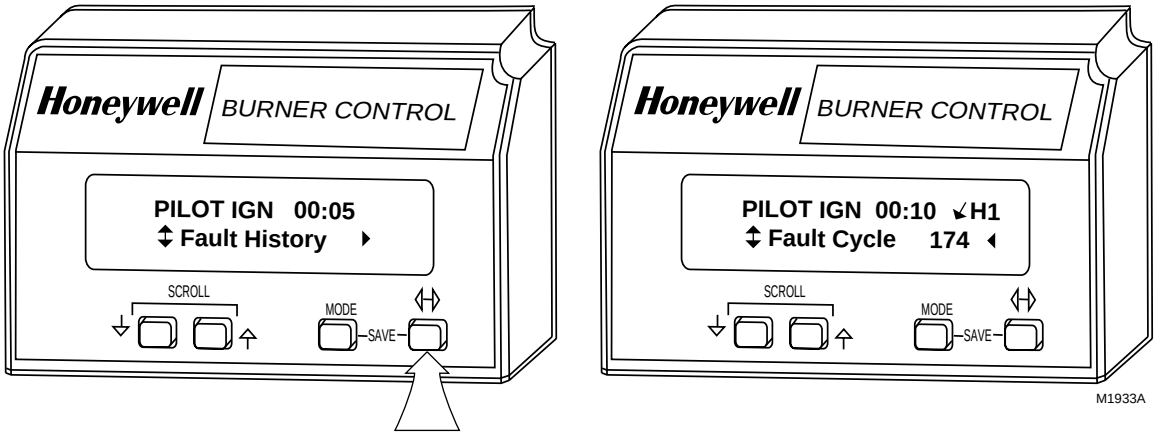


Fig. 10. CHANGE-LEVEL (↔) push-button function.

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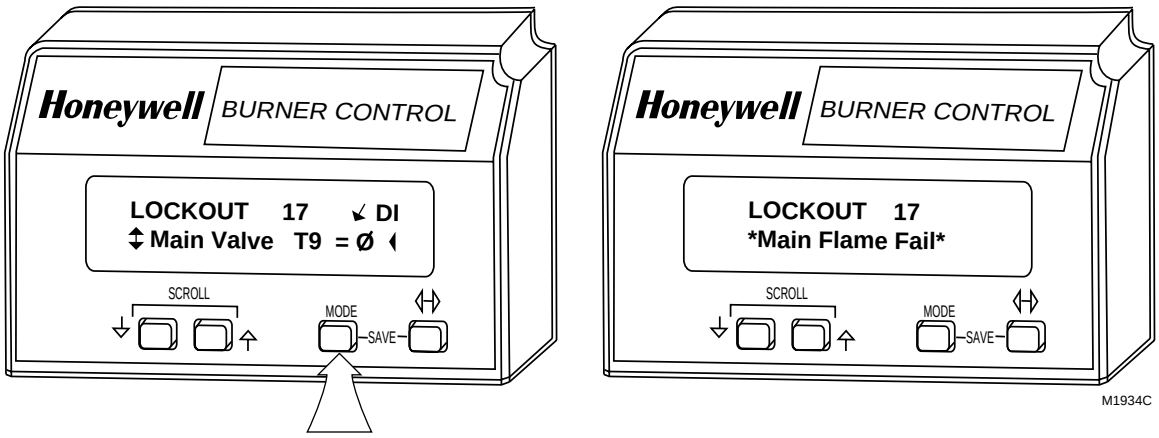


Fig. 11. MODE push-button function.

4. SAVE function, see Fig. 12. The SAVE function enables users to identify the selectable message they want to view upon power restoration. The second line selectable message are restored to the most recently saved selection when power returns. The SAVE function is performed is by pressing and holding the MODE key and then pressing the CHANGE-LEVEL key (´). The second line of the display briefly notes "…SAVING…" to confirm the keys were pressed.

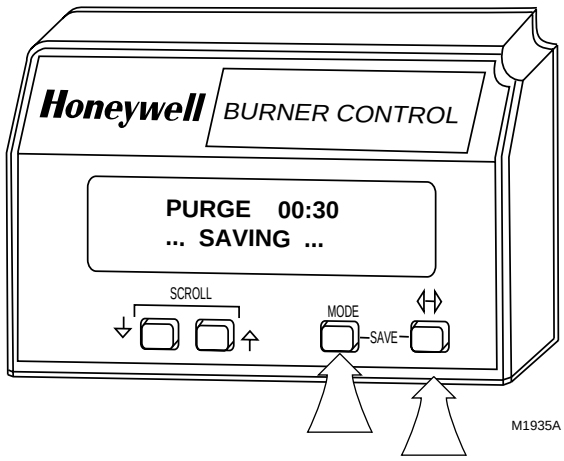


Fig. 12. SAVE function.

Selectable Messages

For the second line display, two-level hierarchy, see Table 3.

The display values are as follows:

n represents a numbered value.

T represents the terminal number.

x represents the suffix letter of the Relay Module.

Table 3. Selectable Messages.

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Table 3. Selectable Messages .

Selectable Message/Display	Description	Possible States/ Range (Terminals)	Comments
↕Flame Signal	Flame signal strength.	0 - 5.0 Vdc Flame Amp (+ and - (Com))	Flame relay pull-in and drop-out value 1.25 Vdc.
↕Total Cycles	Total number of equipment operating cycles.	0 - 99,999 (250,000) cycles[a]	Cycle will be updated each time main valve is energized.
↕Total Hours	Total number of equipment operating hours.	0 - 99,999 (250,000) hours[a]	Hour will be updated each time main valve output is energized for 60 minutes.
↕Fault History > (Six most recent faults)	First level prompt for history information. Has subset level.	—	—
Fault Cycle ↙ H1	Cycle when fault occurred.	0 - 99,999 cycles (250,000) cycles	—
Fault Hours ↙ H1	Run hour when fault occurred.	0 - 99,999 (250,000) hours[a]	—
Fault Code ↙ H1	Number that identifies the reason for lockout.	0 - 999	—
Fault Message ↙ H1	Indicates cause of lockout.	—	—
Sequence Message ↙ H1	Indicates where in the sequence the lockout occurred.	—	—
(Second Line Message) ↙ H1	Second line message explains any further information that is available from the 7800 SERIES or may be blank if there is not a preemptive second-line. H2…H6 etc.	—	—
Diagnostic Information >	First level prompt for diagnostic information. Has subset level.	—	—
Device	Device type number.	RM78XXX or EC78XXX	—
Device Suffix	Device suffix number.	nnnn	—
Run/Test Sw.	Position of Run/Test Switch.	RUN or TEST	Indicates if 7800 SERIES is in RUN or TEST mode.
OperControl T6	Operating Control Input.	= 1 or 0	Indicates if input is on or off, energized or de-energized.
Interlock T7	Running/Lockout Interlock.	= 1 or 0	Indicates if input is on (1) or off (0), energized or de-energized.
Pilot Valve	T8 Pilot Valve.	= 1 or 0	Indicates if output terminal is on or off, energized or de-energized.
Main Valve	T9 Main Fuel Valve.	= 1 or 0	Indicates if output terminal is on or off, energized or de-energized.
Ignition	T10 Ignition.	= 1 or 0	Indicates if output terminal is on or off, energized or de-energized.
LowFire Sw	T18 Low Fire Switch.	= 1 or 0	Indicates if input is on or off, energized or de-energized.
HighFireSw	T19 High Fire Switch.	= 1 or 0	Indicates if input is on or off, energized or de-energized.
PreIgn ILK	T20 or T17[b] Preignition Interlock	= 1 or 0	Indicates if input is on or off, energized or de-energized.

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Table 3. Selectable Messages (Continued).

Selectable Message/Display	Description	Possible States/ Range (Terminals)	Comments
Valv/Start	T21 Interrupted/Intermittent Pilot Valve, First Stage Oil Valve or Start Input.	= 1 or 0	Indicates if output is on or off, energized or de-energized.
Jumper 1	Pilot Flame Establishing Period (PFEP).	INTACT/CLIPPED	Display shows state of PFEP jumper. If jumper is intact, 7800 SERIES was 10 second PFEP. If jumper is clipped, 7800 SERIES has 4 second PFEP.
	First Safety Time (for RM/ EC7850).	INTACT/CLIPPED	Display shows state of First Safety Time (EC7850) jumper. If jumper is intact, EC7850 has 5 second First Safety Time. If jumper is clipped, the EC7850 has 3 second First Safety Time.
Jumper 2	Pilot Valve.	INTACT/CLIPPED	Display shows state of Pilot Valve (terminal no. 21). If jumper is intact, RM7800G has Intermittent Pilot Valve. If jumper is clipped, RM7800G has 15 or 30 second Interrupted Pilot Valve.
	Main Trial Time (for RM/ EC7850).	INTACT/CLIPPED	Display shows state of Main Trial Time (EC7850)Valve (terminal no. 21). If jumper is intact, EC7850 has 5 second Main Trial Time. If jumper is clipped, EC7850 has 3 second Main Trial Time.
Jumper 3	Start-up Airflow Switch (AFS) check.	INTACT Disabled/CLIPPED Enabled	Display shows state of Start-up AFS check jumper. If jumper is clipped, RM7800 AFS check is enabled and if jumper is intact, AFS check is disabled.
Amp Type	Defines type of amplifier installed.	STANDARD/AMP-CHECK/ SHUTTER	Display shows type of flame detection system installed (i.e., as STANDARD, AMP-CHECK/ AMPLI-CHECK™ and SHUTTER/ Dynamic Self-Checking).
Flame Response	Amplifier Flame Failure Response Time (FFRT) in seconds.	.8s, 1s, 2s, or 3s	—
Purge Time	Timing value of purge card.	mm:ss	Two seconds to 30 minutes.

[a]European Approved Controls.

[b] Preignition Interlock Terminal 17 or 20 is model dependent.

Expanded Annunciator Messages (Table 4)

The Expanded Annunciator (EA) may or may not be connected because it is an optional device. If the EA is not connected, a display message of “(EA not connected)” is shown. If the EA is connected, display messages are shown; see Table 4 (Note that 1 means ON and 0 means OFF). When accessing Expanded Annunciator messages, follow the same operations as used with the Selectable messages.

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Table 4. Expanded Annunciator.

Selectable Message[a] (Second Line)	Display Value (Second Line)	First Line Message
↕Expanded Annunciator↔		
↕Expanded Annunciator (EA not connected)<		↓EA
↕Current Status (CS:)[a]	EA Message<	↓EA
↕Valve Closure (Valve Close)	T5 = 1 or 0<	↓EA
↕Burner Switch (Burner Sw.)	T5 = 1 or 0<	↓EA
↕Operating Control (OperControl)	T6 = 1 or 0<	↓EA
↕Auxiliary Limit (Aux Limit 1)	T7 = 1 or 0<	↓EA
↕Auxiliary Limit (Aux Limit 2)	T8 = 1 or 0<	↓EA
↕Low water Cutoff (LWCO)	T9 = 1 or 0<	↓EA
↕High Limit (High Limit)	T10 = 1 or 0<	↓EA
↕Auxiliary Limit (AuxLimit 3)	T11 = 1 or 0<	↓EA
↕Oil Selection Switch (Oil Select)	T12 = 1 or 0<	↓EA
↕High Oil Pressure Switch (Hi OilPres)	T13 = 1 or 0<	↓EA
↕Low Oil Pressure Switch (LowOilPres)	T14 = 1 or 0<	↓EA
↕High Oil Temperature Switch (Hi OilTemp)	T15 = 1 or 0<	↓EA
↕Low Oil Temperature Switch (LowOilTemp)	T16 = 1 or 0<	↓EA
↕Atomizing Switch (Atomize Sw)	T19 = 1 or 0	↓EA
↕Gas Selection Switch (Gas Select)	T17 = 1 or 0<	↓EA
↕High Gas Pressure Switch (Hi GasPres)	T18 = 1 or 0<	↓EA
↕Low Gas Pressure Switch (LowGasPres)	T19 = 1 or 0<	↓EA
↕Airflow Switch (Airflow Sw)	T20 = 1 or 0<	↓EA
↕Auxiliary Interlock (Aux ILK 4)	T21 = 1 or 0<	↓EA
↕Auxiliary Interlock (Aux ILK 5)	T22 = 1 or 0<	↓EA
↕EA Fault Code	nnn<	↓EA
↕Software Revision (SW Rev.)	nnnn<	↓EA

TROUBLESHOOTING

After the KDM is installed, return the 7800 SERIES to normal operation, restore power and run the system through at least one complete automatic cycle. For complete Troubleshooting and System Checkout information, see form 65-0229.

7800 SERIES System Diagnostics

Troubleshooting control system equipment failures is made easier with the 7800 SERIES self-diagnostics and first-out annunciation. The S7800 provides visual annunciation by displaying a fault code and fault or hold message on the display.

Self-diagnostics of the 7800 SERIES enables it to detect and annunciate both external and internal system problems. Internal faults and external faults such as interlock failures, flame failures and false flame signals are annunciated by the KDM via the 7800 SERIES Relay Module.

The KDM displays a sequence status message indicating STANDBY, PREPURGE, PREIGNITION, SAFETY 1, PILOT IGN, PILOT STAB., MAIN IGN, RUN or POSTPURGE, as appropriate. The selectable messages also provide visual indication of current status and historical status of the equipment, such as: Flame Signal, Total Cycles, Total Hours, Fault History, Diagnostic Information and Expanded Annunciator terminal status (if used). With this information, most problems can be diagnosed without extensive trial-and-error testing.

Table 5 provides the sequence and status hold messages.

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Table 5. Keyboard Display Module Sequence and Status Hold Messages .

Sequence	Status
INITIATE mm:ss	The Keyboard Display Module (KDM) indicates the burner status, INITIATE, a stabilization period for the relay module to check for any fluctuations in ac line voltage inputs or control inputs on power up or during normal operation. The timing of the INITIATE period is either two seconds or ten seconds, depending on the model, before entering STANDBY.
If the relay module is in an INITIATE HOLD status, the following conditions could exist:	
INITIATE HOLD: (AC Frequency/Noise)	The KDM indicates the burner status and that it is waiting for excess line noise to clear up, which prevents sufficient reading of the line voltage inputs. The burner sequence does not advance into STANDBY until the excess line noise ceases or a line frequency error occurs; this is caused by using a 60 Hz device on a 50 Hz line, or vice versa on devices with a date code earlier than 9804, is corrected.
INITIATE HOLD: (AC Line Dropout)	The KDM indicates the burner status and that ac line power has momentarily dropped out. The burner sequence does not advance into STANDBY until the ac line voltage has stabilized throughout the INITIATE sequence.
INITIATE HOLD: (AC Frequency)	The KDM indicates the burner status and that line frequency is faster than the expected value. The burner sequence does not advance into STANDBY until the line frequency returns to the proper value; this is perhaps caused by using a 60 Hz device on a 50 Hz line for devices with a date code earlier than 9804.
INITIATE HOLD: (Low Line Voltage)	The KDM indicates the burner status and that low line voltage (10% lower than rated voltage) has occurred. The burner sequence does not advance into STANDBY until the line voltage is at a sufficient level for proper operating parameters.
STANDBY	The KDM indicates the burner status, STANDBY. The burner can be placed in STANDBY by opening the burner switch or if the operating controller indicates its setpoint is satisfied. If a demand is present for burner operation, the burner sequence does not advance from STANDBY to PURGE until the recycle limits close. If an Expanded Annunciator is connected, the display messages are enhanced.
If the relay module is in a STANDBY HOLD status, the following conditions could exist:	
STANDBY HOLD: F/G (Flame Detected)	The KDM indicates the burner status and that a flame is detected. A demand is present for burner operation. The sequence does not advance to PREPURGE until the flame signal clears. If the flame signal does not clear within 40 seconds, the relay module locks out.
STANDBY HOLD: T20 (Preignition Interlock)	The KDM indicates the burner status and that the Preignition Interlock is not closed. A demand is present for burner operation, but the burner sequence does not advance to PREPURGE until the Preignition Interlock proves closed. If this time exceeds a 30 second hold, the relay module locks out.
STANDBY HOLD: T7 (Lockout Interlock)	The KDM indicates the burner status and that the Lockout Interlock is closed. A demand is present for burner operation, but the burner sequence does not advance to PREPURGE until the Lockout Interlock proves open. If this time exceeds the 120 second hold, the relay module locks out.
STANDBY HOLD: T7 (Running Interlock) EC/RM7850	The KDM indicates the burner status and that the Running Interlock is closed. A demand is present for burner operation, but the burner sequence does not advance to PREPURGE until the Running Interlock proves open. If this time exceeds the 120 second hold, the relay module locks out.
PURGE	The KDM indicates the burner status, PURGE, which is the period of time the blower motor is running before the Ignition period. The timing of the PURGE period is selectable.
If the relay module is in a PURGE HOLD status, the following conditions could exist:	
PURGE HOLD: T19 (High Fire Switch)	The KDM indicates the burner status and that the High Fire Switch is not closed. The firing rate motor is driving to its PURGE rate position. If this time exceeds four minutes and fifteen seconds, the relay module locks out.
PURGE DELAY: T19 (High Fire Switch Jumpered)	The KDM indicates the burner status and that the High Fire Switch is jumpered. The High Fire Switch is bypassed, welded or otherwise prematurely closed. The system automatically adds 30 seconds to allow the firing rate motor additional drive time to reach or near the open damper position before starting the PURGE sequence.
PURGE HOLD: TEST (Run/Test Switch)	The KDM indicates the burner status and that the Run/Test Switch is in the TEST position. The sequence does not continue until the Run/Test Switch is placed in the RUN position.
PURGE HOLD: T18 (Low Fire Switch Jumpered)	The KDM indicates the burner status and that the Low Fire Switch is jumpered. The Low Fire Switch is bypassed, welded or otherwise prematurely closed. The system automatically adds 30 seconds to allow the firing rate motor additional drive time to reach or near the closed damper position before starting the ignition sequence.

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Table 5. Keyboard Display Module Sequence and Status Hold Messages (Continued).

Sequence	Status
PURGE HOLD: F/G (Flame Detected)	The KDM indicates the burner status and that a flame is detected. The burner sequence does not advance through PREPURGE because a flame is detected as being present. The sequence holds waiting for the flame signal to clear. If the time exceeds 30 seconds, the relay module locks out.
PURGE HOLD: T18 (Low Fire Switch)	The KDM indicates the burner status and that the Low Fire Switch is not closed. The firing rate motor is driving to its Low Fire position in preparation for Ignition Trials. If this time exceeds four minutes and fifteen seconds, the relay module locks out.
PURGE HOLD: T7 (Running Interlock)	The KDM indicates the burner status and that the Running Interlock is not closed. The sequence does not advance to ignition until the Running Interlock proves closed. If this time exceeds 30 seconds, the relay module locks out.
PILOT IGN mm:ss	The KDM indicates the burner status, PILOT IGN, and the timing of the PILOT IGN trial begins, in seconds. During this period, the relay module permits the pilot valve to open and the pilot flame to establish.
If the relay module is in a PILOT HOLD status, the following conditions could exist:	
PILOT HOLD: TEST (Run/Test Switch)	The KDM indicates the burner status, PILOT IGN, and that the Run/Test Switch is in the TEST position. The sequence does not continue until the Run/Test Switch is placed in the RUN position.
MAIN IGN mm:ss	The KDM indicates the burner status, MAIN IGN, and the timing of the MAIN IGN trial begins, in seconds. During this period, the relay module permits the main valve to open and the main flame to establish.
RUN	The KDM indicates the burner status, RUN, which is the period of time after the Ignition Trials and before the operating controller setpoint is reached. During this time, the burner is firing under control of the firing rate control.
If the relay module is in a RUN HOLD status, the following condition could exist:	
RUN LOWFIRE: TEST (Run/Test Switch)	The KDM indicates the burner status and that the Run/Test Switch is in the TEST position. Normal modulation or operation does not continue until the Run/Test Switch is placed in the RUN position.
POSTPURGE mm:ss	The KDM indicates the burner status, POSTPURGE, which is the period of time after the RUN period when the blower motor continues to run. The timing of the POSTPURGE period is fifteen seconds.
Waiting for connection...	The KDM has power but is waiting to receive a signal from the relay module to continue operation.
RESET/ALARM TEST	The KDM indicates the burner status, RESET/ALARM TEST. This condition indicates that the reset button is pressed. If it is held for more than four seconds, the alarm output is energized. The alarm output is de-energized when the reset button is released.
Additional Sequence Status Information When An Expanded Annunciator is Connected to the Relay Module:	
BURNER OFF: T6 (Burner Switch)	The KDM indicates the Burner Switch is not closed. The burner sequence does not advance to PREPURGE until the Burner Switch closes.
STANDBY	The KDM indicates the burner status, STANDBY, and that the Operating Control is not closed. The burner sequence does not advance to PREPURGE until the Operating Control closes.
STANDBY HOLD: T6 (EA Hold Message)	The KDM indicates the burner status, STANDBY, and that a limit is not closed. The burner sequence does not advance to PREPURGE until one or all limits close downstream from the Operating Control.
STANDBY HOLD: T6 (Circuit Fault)	The KDM indicates the burner status, STANDBY, and that the control input is not closed. The burner sequence does not advance to PREPURGE until the control input closes.

The S7800 provides diagnostic information to aid the service mechanic in obtaining information when troubleshooting the system. See Table 6 for information on accessing historical and diagnostic selectable messages. Information available in the Diagnostic Information includes Device Type, Device Suffix, Software Revision, Manufacturing Code, Flame Amplifier Type, Flame Failure Response Time (FFRT), Selectable Jumper Configuration Status, Run/Test Switch Status and Terminal Status.

Historical Information Index

The S7800 displays historical information for the six most recent lockouts. Each of the six lockout records retains the cycle when the fault occurred, a fault code, a fault message, and burner status when the fault occurred. See Table 6.

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Table 6. Accessing Historical and Diagnostic Selectable Messages.

Step	Operation	Press	Display	Comments
1.	Press SCROLL key to access Diagnostic Information.	(↕)	STANDBY ↕Diagnostic Info>	Use the Down/Up SCROLL keys to access the selectable message. The second line will display Diagnostic Information.
2.	Press Change Level key to Access Diagnostic Information.	(↔)	STANDBY ↕Diagnostic Info>	Use the Change Level key to access the Diagnostic Information.
3.	Continue display of Diagnostic Information.	(↕)	STANDBY ↙ DI ↕Device RM7800<	Push the (↕) SCROLL key to scroll to the next Diagnostic Message.
4.	Continue through remaining Diagnostic Information display following step 3 as required.	—	—	—
5.	Press the Change Level key to return to the first level of Diagnostic Information data prompt or to other selectable messages.	(↔)	STANDBY ↕Diagnostic Info>	Another display can be selected or discontinue accessing Diagnostic Information review.

SERVICE NOTE: If the Keyboard Display Module screen is scrambled, remove and reinstall the Keyboard Display Module and reset the 7800 SERIES Relay Module.

SERVICE NOTE: Reset the 7800 SERIES Relay Module by pressing the reset pushbutton on the relay module or pressing a remote reset pushbutton wired through the Keyboard Display Module, Data ControlBus™ Module or Remote Reset Module. A power-up reset will cause an electrical reset of the 7800 SERIES Relay Module but will not reset a lockout condition.

Lockout Messages

When the 7800 SERIES is locked out, it displays a repeating cycle of messages. See Table 8. There are four states in the cycle:

1. State 1 (Fig. 13). A first state message display lasts six seconds. First line displays the word LOCKOUT followed by the fault code number and possibly a lower case letter if an Expanded Annunciator is connected. The letter corresponds to the first-out code supplied by the Expanded Annunciator. The lockout reason corresponding to the fault code number is displayed on the second line, highlighted by asterisks on each side.

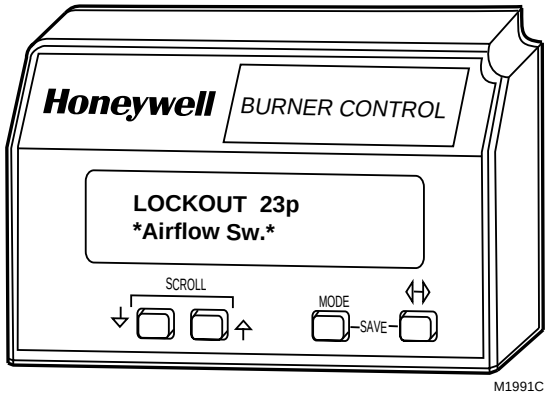


Fig. 13. Lockout message, State 1.

2. State 2 (Fig. 14). Display of the second state message lasts two seconds.

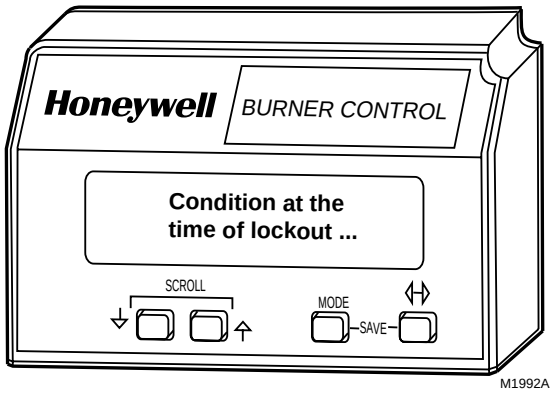


Fig. 14. Lockout message, State 2.

3. State 3 (Fig. 15). Display of the third state message lasts three seconds. It is a replica of the burner status as it existed at the time of the lockout. The second line is blank if the burner status at the time of lockout did not include a preemptive message (in parentheses) for the second line.

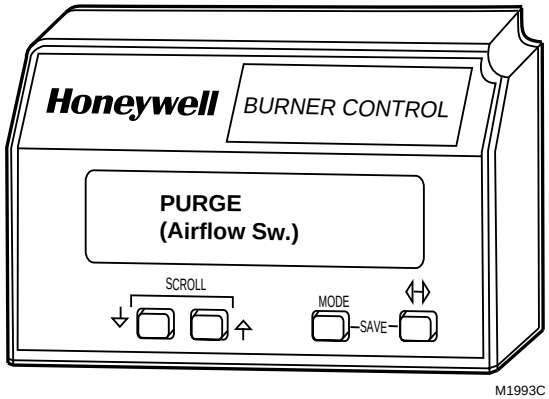


Fig. 15. Lockout message, State 3.

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4. State 4: In the fourth state, both lines are blanked for one-half second, then the display sequences to the first state.

NOTE: For further explanation of Lockout Messages, Troubleshooting and Checkout, refer to form 65-0229.

Table 7. Hold and Fault Message Summary.

Fault Code	System Failure	Recommended Troubleshooting
Fault 1 *No Purge Card*	No card is plugged into the purge card slot.	**1.** Make sure the purge card is seated properly. **2.** Inspect the purge card and connector on the relay module for damage or contaminants. **3.** Reset and sequence the relay module. **4.** If the fault code reappears, replace the purge card. **5.** Reset and sequence the relay module. **6.** If the fault persists, replace the relay module.
Fault 2 *AC Frequen/Noise	Excess noise or device running on slow ac.	**1.** Check the relay module and display module connections. **2.** Reset and sequence the relay module. **3.** Check the relay module power supply and make sure that both frequency and voltage meed the specifications. **4.** Check the backup power supply, as appropriate.
Fault 3 *AC Line Dropout	Ac line dropout detected.	
Fault 4 *AC Frequency*	Device running on fast ac.	
Fault 5 *Low Line Voltage*	Low ac line detected.	
Fault 6 *Purge Card Error*	Purge card timing changed since card was initially read.	**1.** Make sure the purge card is seated properly. **2.** Inspect the purge card and connector on the relay module for damage or contaminants. **3.** Reset and sequence the relay module. **4.** If the fault code reappears, replace the purge card. **5.** Reset and sequence the relay module. **6.** If the fault persists, replace the relay module.
Fault 7 *Flame Amplifier*	Flame sensed when flame not present.	**1.** Check wiring and correct any errors. Make sure that the flame sensor wires are in separate conduits. Check for noise coupling into the flame detector leadwires. **2.** Make sure that flame detector and flame amplifier are compatible. **3.** Remove the flame amplifier and inspect connections. Reset the flame amplifier. **4.** Reset and sequence the relay module. **5.** If the code reappears, replace the amplifier. **6.** If the fault persists, replace the flame detector. **7.** If the fault persists, replace the relay module.
Fault 8 *Flame Amp/Shutr*	Flame sensed when no signal expected during shutter-check or Ampli-Check™ versions.	
Fault 9 *Flame Detected*	Flame sensed when no flame is expected during STANDBY.	**1.** Check that flame is not present in the combustion chamber; correct any errors. **2.** Check wiring and correct any errors. Make sure that flame sensor wires are in separate conduits. Check for noise coupling into flame detector leadwires. **3.** Remove the flame amplifier and inspect its connections. Reset the amplifier. **4.** Reset and sequence the relay module. **5.** If the code reappears, replace the amplifier and/or the flame detector. **6.** If the fault persists, replace the flame detector. **7.** If the fault persists, replace the relay module.
Fault 10 *Preignition ILK*	Preignition Interlock fault during STANDBY	**1.** Check wiring and correct any errors. **2.** Check Preignition Interlock switches to assure proper functioning. **3.** Check fuel valve operation. **4.** Reset and sequence the relay module; monitor the Preignition Interlock status. **5.** If the code persists, replace the relay module.

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Table 7. Hold and Fault Message Summary (Continued).

Fault Code	System Failure	Recommended Troubleshooting
Fault 11 *Running ILK On*	Running Interlock powered at improper sequence point.	**1.** Check wiring to make sure that interlocks are connected properly between terminals 6 and 7. Correct any errors. **2.** Reset and sequence the relay module. **3.** If the fault persists, measure the voltage between terminals 6 and L2(N) (ground), then terminals 7 and L2(N). If there is line supply voltage present at terminal 6 when the controller is off, the controller switch may be bad or jumpered. **4.** If steps 1 through 3 are correct and there is line supply voltage present at terminal 7 when the controller is closed and the fault persists, check for a welded or jumpered Running Interlock, Lockout Interlock, or Airflow Switch. Correct any errors. **5.** If steps 1 through 4 are correct and the fault persists, replace the relay module.
Fault 12 *Lockout ILK On*	Lockout Interlock powered at improper sequence point.	
Fault 13 *Airflow Sw. On*	Combustion airflow interlock fault during STANDBY.	
Fault 14 *High Fire Sw.*	High Fire Interlock Switch failure to close during PREPURGE.	**1.** Check wiring and correct any errors. **2.** Reset and sequence the relay module. **3.** Use either the manual motor potentiometer to drive the motor to the High Fire position or use the Run/Test Switch option, if available. Sequence to Prepurge drive to High Fire and place in the Test position. Adjust the High Fire Switch while in this state to make sure that it closes properly. **4.** Measure the voltage between terminal 19 and L2(N) while in the Prepurge drive to High Fire state. Line supply voltage should be present. If not, the switch adjustment is incorrect and/or the switch is defective and needs replacing. **5.** Reset and sequence the relay module. If the line supply voltage was present between the High Fire Switch and terminal 19, and the fault still persists, replace the relay module.
Fault 15 *Flame Detected*	Flame sensed when no flame is expected during STANDBY.	**1.** Check that the flame is not present in the combustion chamber; correct any errors. **2.** Make sure that the flame amplifier and flame detector are compatible. **3.** Check wiring and correct any errors. **4.** Remove the flame amplifier and inspect the connections. Reset the flame amplifier. **5.** Reset and sequence the relay module. **6.** If the code reappears, replace the amplifier and/or the flame detector. **7.** If the fault persists, replace the relay module.
Fault 16 *Flame-Out Timer*	No-flame detected during Pilot Flame Establishing Period.	**1.** Measure the flame signal. If one exists, make sure it meets specifications. Make any necessary burner adjustments using manufacturer instructions. **2.** Make sure that the flame amplifier and flame detector are compatible. **3.** If the code reappears, replace the amplifier and/or the flame detector. **4.** If the fault persists, replace the relay module.
Fault 17 *Main Flame Fail*	Main flame failure during RUN after flame is established an on for at least 10 seconds.	**1.** Inspect the main fuel valve(s) and connection(s). **2.** Make sure that the fuel pressure is high enough to supply fuel to the combustion chamber. **3.** Check the flame detector sighting for adequate flame signal throughout the burner firing rate.

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Table 7. Hold and Fault Message Summary (Continued).

Fault Code	System Failure	Recommended Troubleshooting
Fault 18 *Flame Detected*	Flame sensed when the shutter is open and no flame is expected during PREPURGE.	**1.** Check that flame is not present in the combustion chamber. Correct any errors. **2.** Make sure that the flame amplifier and flame detector are compatible. **3.** Check the wiring and correct any errors. Make sure F and G wires are in individual conduits and protected from stray noise pickup. **4.** Remove the flame amplifier and inspect the connectors. Reset the flame amplifier. **5.** Reset and sequence the relay module. **6.** If the code reappears, replace the flame amplifier and/or the flame detector. **7.** If the fault persists, replace the relay module.
Fault 19 *Main Flame Ign.*	Flame was lost during MFEP or the first 10 seconds of the RUN state.	**1.** Inspect the main fuel valve(s) and connection(s). **2.** Make sure the fuel pressure is high enough to supply fuel to the combustion chamber. **3.** Make sure the flame detector is positioned to obtain the required flame signal strength; reset and recycle.
Fault 20 *Low Fire Sw. Off*	Low Fire Interlock switch failure to close during PREPURGE.	**1.** Check wiring and correct any errors. **2.** Reset and sequence the relay module. **3.** Use either the manual motor potentiometer to drive the motor to the Low Fire position or use the Run/Test Switch option, if available. Sequence to Prepurge drive to Low Fire and place in the Test Position. Adjust the Low Fire Switch to make sure it closed properly. **4.** Measure the voltage between terminal 18 and L2(N) while in the Prepurge drive to Low Fire state. Line supply voltage should be present. If not, the switch adjustment is incorrect and/or the switch is defective and needs replacing. **5.** Reset and sequence the relay module. If line supply voltage was present between the Low Fire Switch and terminal 18, and the fault still persists, replace the relay module.
Fault 21 *Running ILK*	Running Interlock fault during PREPURGE.	**1.** Check wiring and correct any errors. **2.** Inspect the fan; make sure there is no blockage of the air intake and that it is supplying air. **3.** Make sure the Interlock Switches are working properly and that all switch contacts are free of contaminants. **4.** Reset and sequence the relay module to PREPURGE (place the Run/Test Switch in the Test position, if available). Measure the voltage between terminals 7 and L2(N). Line voltage should be present. **5.** If steps 1 through 4 are correct and the fault persists, replace the relay module.
Fault 22 *Lockout ILK*	Lockout Interlock fault during PREPURGE.	
Fault 23 *Airflow Switch*	Combustion airflow interlock fault during PREPURGE.	
Fault 24 *Call Service*	The flame interlock (relay module) was on when it should be off.	**1.** Check for F leadwire routing. Make sure routing is in its conduit and isolated from noise-producing circuits.
Fault 25 *Call Service*	The flame interlock (relay module) was off when it should be on.	
Fault 26 *Man-Open Sw. Off*	The Manual Open Valve Switch was off when it should be on (Device specific).	**1.** Check wiring and correct any errors. **2.** Make sure that the Manual Open Valve Switch is fully open. **3.** Make sure that the Manual Open Valve Switch is functioning properly and that the switch contacts are free from contaminants. **4.** Reset and sequence the relay module. **5.** Make sure that the Manual Open Valve Switch provides an electrical path when closed. Verify that the relay module is receiving power at terminal 17. **6.** If steps 1 through 5 are correct and the fault persists, replace the relay module.

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Table 7. Hold and Fault Message Summary (Continued).

Fault Code	System Failure	Recommended Troubleshooting
Fault 27 *Start Switch On*	Start Switch was on during PREPURGE (Device specific).	**1.** Start Switch held on too long. **2.** Check wiring; verify that Start Switch is correctly connected. **3.** Make sure that the Start Switch is functioning properly and that the switch contacts are free of contaminants. **4.** Reset and sequence the relay module to PREPURGE; set the Run/Test Switch to Test. Make sure there is no power at terminal 6 during PREPURGE. **5.** If steps 1 through 4 are correct and the fault persists, replace the relay module.
Fault 28 *Pilot Flame Fail*	Pilot flame failure.	**1.** Check pilot valve wiring and operation. Correct any errors. **2.** Check fuel supply. **3.** Check pilot pressure and repeat pilot turndown test. **4.** Check ignition transformer electrode, flame detector, flame detector sighting and flame amplifier. **5.** If steps 1 through 4 are correct and the fault persists, replace the relay module.
Fault 29 *Lockout ILK*	Lockout Interlock fault.	**1.** Check wiring and correct any errors. **2.** Inspect the fan; make sure that there is no blockage of the air intake and that it is supplying air. **3.** Make sure that the Lockout Interlock Switches are working properly and that all switch contacts are free from contaminants. **4.** Reset and sequence the relay module to PREPURGE (place the Run/Test Switch in the Test position, if available). Measure the voltage between terminals 7 and L2(N). Line voltage should be present. **5.** If steps 1 through 4 are correct and the fault persists, replace the relay module.
Fault 30 *Running ILK*	Running Interlock fault.	**1.** Inspect the Running Interlocks, including the Airflow Switch, and the connections. **2.** Make sure that the Running Interlocks, including the Airflow Switch, are functioning properly and that switch contacts are free from contaminants. **3.** Reset and sequence the relay module to PREPURGE. Set the Run/Test Switch, if available, to Test. Measure the voltage between terminal 7 and L2(N). Line voltage should be present. **4.** If steps 1 through 3 are correct and the fault persists, replace the relay module.
Fault 31 *Low Fire Sw. Off*	Low Fire Interlock Switch failure to close during RUN (Device specific).	**1.** Check wiring and correct any errors. **2.** Reset and sequence the relay module. **3.** Use either the manual motor position to drive the motor to the Low Fire position, or use the Run/Test Switch option, if available. Sequence to Run drive to Low Fire and place the switch in the Test position. Adjust the Low Fire Switch while in this state to make sure it is closing properly. **4.** While in Run, drive to Low Fire state, measure the voltage between terminal 18 and L2(N). Line voltage should be present. If not, the switch adjustment is incorrect and/or the switch is defective and needs replacement. **5.** Reset and sequence the relay module. If line voltage was present between the Low Fire Switch and terminal 18, and the fault persists, replace the relay module.

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Table 7. Hold and Fault Message Summary (Continued).

Fault Code	System Failure	Recommended Troubleshooting
Fault 32 *Airflow Switch*	Combustion Airflow Interlock fault.	**1.** Check wiring and correct any errors. **2.** Inspect the fan; make sure there is no blockage of the air intake and it is supplying air. **3.** Make sure the Airflow Interlock Switches are working properly and all switch contacts are free from contaminants. **4.** Reset and sequence the relay module to PREPURGE. Place the Run/Test Switch in the Test position, if available. Measure the voltage between terminals 7 and L2(N). Line voltage should be present. **5.** If steps 1 through 4 are correct and the fault persists, replace the relay module.
Fault 33 *Preignition ILK*	Preignition Interlock fault.	**1.** Check wiring and correct any errors. **2.** Inspect the Preignition Interlock switches and make sure they function properly. **3.** Check fuel valve operation. Valve must close within five seconds. **4.** Reset and sequence the relay module. **5.** During STANDBY or PREPURGE, measure the voltage between terminal 20 and L2(N). Line voltage should be present. If not, the Preignition Interlock switches can be defective and need replacing. **6.** If the fault persists, replace the relay module.
Fault 34 *Control On*	CTL input was energized at the wrong time for the relay module. This fault implies a field wiring error.	**1.** Check wiring and correct any errors. **2.** Reset and sequence the relay module. **3.** If fault persists, replace the relay module.
Fault 35 *Call Service*	Safety relay was off when it should be on or the internal fuse has blown.	**1.** Reset and sequence the relay module. If fault repeats, replace relay module, but be sure to test for excessive loads on appropriate terminals described by fault code. **2.** If fault does not repeat on next cycle, check for electrical noise being coupled into the relay module through the loads on appropriate terminals described by the fault code. **3.** Possibly check for bouncing running on Lockout Interlock. **4.** If fault persists, replace the relay module.
Fault 36 *Call Service*	Main valve terminal was off when it should be on, or the internal fuse has blown.	
Fault 37 *Call Service*	Pilot (ignition) valve terminal was off when it should be on, or the internal fuse has blown.	
Fault 38 *Call Service*	Ignition terminal was off when it should be on, or the internal fuse has blown.	
Fault 39 *Call Service*	V2S valve terminal (usually terminal 21) was off when it should be on, or the internal fuse has blown.	
Fault 40 *Call Service*	Safety relay was on when it should be off.	
Fault 41 *Main Valve On*	Main valve terminal was on when it should be off.	**⚠ WARNING** **Explosion Hazard.** **Can cause severe injury, death or property damage.** 1. Remove system power, turn off fuel supply. 2. Check for wiring errors that could provide power to terminals described by the fault. Correct any errors. 3. Re-power system; reset and sequence the relay module. 4. If fault persists, replace the relay module. 5. When fault is corrected, turn on fuel supply.
Fault 42 *Pilot Valve On*	Pilot (ignition) valve terminal was on when it should be off.	
Fault 43 *Ignition On*	Ignition terminal was on when it should be off.	
Fault 44 *Pilot Valve 2 On*	V2S valve terminal, used as a pilot, is on when it should be off.	

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Table 7. Hold and Fault Message Summary (Continued).

Fault Code	System Failure	Recommended Troubleshooting
Fault 45 *Low Fire Sw. Off*	Low Fire Interlock switch failure to close or stay closed.	**1.** 1. Check wiring and correct any errors. **2.** 2. Reset and sequence the relay module. **3.** 3. Use either the manual motor position to drive the motor to the Low Fire position, or use the Run/Test Switch option, if available. Sequence to Run, drive to Low Fire and place in the Test position. Adjust the Low Fire Switch while in this state to make sure it is closing properly. **4.** 4. While in Run, drive to Low Fire state, measure the voltage between terminal 18 and L2(N). Line voltage should be present. If not, the switch adjustment is incorrect and/or the switch is defective and needs replacement. **5.** 5. If steps 1 through 4 are correct and the fault still persists, replace the relay module.
Fault 46 *Flame Amp Type*	Device specific.	**1.** Remove power to the device. **2.** Reset the flame amplifier and reset and sequence the relay module.
Fault 47 *Jumpers Changed*	The configuration jumpers differ from the sample taken at startup.	**1.** Inspect the jumper connections. Make sure that clipped jumpers are completely removed. **2.** Reset and sequence the relay module. **3.** If fault persists, replace the relay module.
Fault 48 *Delayed MV On* (2nd Stage Valve)	V2S valve terminal, used as a delayed main valve, was on when it should be off.	**⚠ WARNING** **Explosion Hazard.** **Can cause severe injury, death or property damage.** 1. Remove system power, turn off fuel supply. 2. Check wiring; correct any errors. 3. Inspect the V2S Fuel Valve and its connections. Make sure the switch is working correctly and is not jumpered or welded. 4. Reset and sequence the relay module. 5. If fault persists, replace the relay module.
Fault 49 *Man-Open Sw. On*	The manual open switch was on when it should be off.	**⚠ WARNING** **Explosion Hazard.** **Can cause severe injury, death or property damage.** 1. Remove system power, turn off fuel supply. 2. Check wiring; correct any errors. 3. Inspect the Manual-Open Switch and its connections. Make sure the switch is working correctly and is not jumpered or welded. 4. Reset and sequence the relay module. 5. If fault persists, replace the relay module.
Fault 50 *Jumpers Wrong*	The sequence logic detected a combination of jumpers that is illegal for the sequence, e.g., if it is correct to clip jumper JR1 or Jumper JR2, but not both, this fault would be used when both are clipped (Device specific).	**1.** Inspect the jumpers and refer to the installation instructions for compatible jumper configurations. **2.** Make sure that clipped jumpers are completely removed. **3.** Reset and sequence the relay module. **4.** If fault persists, replace the relay module.

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Table 7. Hold and Fault Message Summary (Continued).

Fault Code	System Failure	Recommended Troubleshooting
Fault 51 *Flame Too Strong*	Flame signal value is too high to be valid.	**1.** Make sure that flame detector and flame amplifier are compatible. **2.** Remove the flame amplifier and inspect the connections. Reset the flame amplifier. **3.** Reset and sequence the relay module. **4.** Check the flame detector sighting position, reset and cycle. **5.** Verify that no ignition noise is present in the F lead due to wire routing. **6.** Measure the flame strength. Verify it meets specifications. If not, refer the flame amplifier and/or flame detector checkout procedures. **7.** If the code reappears, replace the flame amplifier. **8.** If the code reappears, replace the flame detector. **9.** If the fault persists, replace the relay module.
Fault 52 *Call Service*	Pilot Valve 2 (terminal 21) was off when it should be on.	**1.** Inspect terminal 21 and connections. Make sure that the valve is operating properly. **2.** Reset and sequence the relay module. **3.** If the fault persists, replace the relay module.
Fault 53 *Lockout Switch*	Lockout Input fault (EC/RM7850 only).	**1.** Check wiring and correct any errors. **2.** Inspect the Lockout Switch to make sure it is working properly. **3.** Reset and sequence the relay module. During STANDBY or PREPURGE, measure the voltage between terminal 20 and L2(N). Supply voltage should be present. If not, the lockout switch is defective and needs replacing. **4.** If the fault persists, replace the relay module.
Fault 54 *Comb. Pressure*	Combustion pressure switch fault (Fulton pulse only).	**1.** Check wiring and correct any errors. **2.** Inspect the Combustion Pressure Switch to make sure it is working correctly. **3.** Reset and sequence the relay module. **4.** During STANDBY and PREPURGE, measure the voltage between terminal 20 and L2(N). Supply voltage should be present. If not, the Combustion Pressure Switch is defective and needs replacing. **5.** If the fault persists, replace the relay module.
Fault 55 *Purge Fan Sw. On*	Purge fan switch is on when it should be off (Fulton pulse only).	**1.** Check wiring and correct any errors. **2.** Inspect the Purge Fan Switch terminal 18 and its connections. Make sure the switch is working correctly and is not jumpered or welded. **3.** Reset and sequence the relay module. **4.** If the fault persists, replace the relay module.
Fault 56 *Block Intake*	Block intake fault (Fulton pulse only).	**1.** Check wiring and correct any errors. **2.** Inspect the Block Intake Switch and make sure it is working properly. **3.** Reset and sequence the relay module. **4.** During PREPURGE, measure the voltage between terminal 7 and L2(N). Supply voltage should be present. If not, the Block Intake Switch is defective and needs replacing. **5.** If the fault persists, replace the relay module.
Fault 57 *Purge Fan Sw. Off*	Purge Fan Switch is off when it should be on (Fulton pulse only).	**1.** Inspect the Prepurge Fan Switch terminal 18 and the connections. Make sure the fan is working properly. **2.** Reset and sequence the relay module. **3.** If the fault persists, replace the relay module.
FAult 58 - 66 *Call Service*	Unused faults.	—
Fault 67 *AC Phase*	L1 and L2 miswired/exchanged (EC/RM7850 only).	**1.** Check L1 and L2 for proper line phasing.

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Table 7. Hold and Fault Message Summary (Continued).

Fault Code	System Failure	Recommended Troubleshooting
Fault 68 *Preignition ILK*	Preignition Interlock fault.	**1.** Check wiring and correct any errors. **2.** Inspect the Preignition Interlock switches and make sure they work properly. **3.** Check fuel valve operation. Valve must close within five seconds. **4.** Reset and sequence the relay module. **5.** During STANDBY or PREPURGE, measure the voltage between terminal 17 and L2(N). Supply voltage should be present. If not, the Preignition Interlock switches are defective and need replacing. **6.** If the fault persists, replace the relay module.
Faults 69 - 70 *Call Service*	Unused faults.	—
Fault 71 *Dynamic LFS*	Low Fire Switch closed, High Fire Switch must be open (EC/RM 7850 only).	**1.** Check firing rate position switches (usually in Modutrol® Motor) for proper operation. **2.** Check wiring and correct any errors. **3.** Reset and sequence the relay module. **4.** If the fault persists, replace the relay module.
Fault 71 *Limits Complete*	Limit Input (terminal 7) is off when it should be on (RM7888 only).	**1.** Check limits to make sure they are satisfied after resetting. **2.** Check electrical connections to terminal 7 of wiring subbase. **3.** Reset relay module. **4.** If the fault persists, replace the relay module.
Fault 72 *Dynamic HFS*	High Fire Switch closed; Low Fire Switch must be open (EC/RM7850 only).	**1.** Check firing rate position switches (usually in Modutrol® Motor) for proper operation. **2.** Check wiring and correct any errors. **3.** Reset and sequence the relay module. **4.** If the fault persists, replace the relay module.
Fault 72 *Spec.Func.2*	Special Function 2 Input (terminal 17) is off when it should be on (Device specific).	**1.** Check operation of Special Function 2 of PLC. **2.** Check electrical connection to terminal 17 of wiring subbase and confirm presence of supply power when Special Function 2 is activated. **3.** Reset relay module. **4.** If the fault persists, replace the relay module.
Fault 73 *Spec.Func.3*	Special Function 3 Input (terminal 19) is off when it should be on (Device specific).	**1.** Check operation of Special Function 3 of PLC. **2.** Check electrical connection to terminal 19 of wiring subbase and confirm presence of supply power when Special Function 2 is activated. **3.** Reset relay module. **4.** If the fault persists, replace the relay module.
Fault 75 *Flame Proven Feedback*	Flame Indication Feedback (terminal 21) either on when it should be off or off when it should be on (Device specific).	**1.** Remove wire to terminal 21 and reset relay module. **2.** If the fault persists, replace relay module. **3.** Reconnect wire to terminal 21. If the fault returns, verify wiring.
Faults 76 - 93 *Accessory Fault*	—	—
Faults 94 - 104 *Call Service*	—	—
Fault 105 *Call Service*	Relay Module self-test failure.	**1.** Reset and sequence the relay module. **2.** If the fault reappears, remove power from the relay module and reapply the power; reset and sequence the relay module. **3.** If the fault persists, replace the relay module.
Fault 106 *Call Service*	Relay Module self-test failure.	
Fault 107 *Call Service*	Relay Module flame signal crosscheck failure.	—

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Table 7. Hold and Fault Message Summary (Continued).

Fault Code	System Failure	Recommended Troubleshooting
Fault 109 *Call Service*	Negative cycle test failed, earth ground absent or line voltage phasing improper.	**1.** Make sure a good earth ground connection exists at the installation site and all earth ground connections are complete and correct. **2.** Make sure the relay module and all loads operate at the same line voltage phase. **3.** Reset and sequence the relay module. **4.** If the fault persists, replace the relay module.
Fault 110 *Call Service*	The configuration jumpers differ from stored values.	**1.** Inspect the jumper connections. Make sure they match the original selection and clipped jumpers are completely removed. **2.** Reset and sequence the relay module. **3.** If the fault persists, replace the relay module. **4.** Configuration jumpers must be selected prior to 200 hours of operation. If configuration jumpers are changed after 200 hours of operation, lockout 110 occurs. Relay module *cannot* be reset and *must* be replaced.
Fault 111 *Call Service*	Relay Module configuration jumper test failure.	**1.** Inspect the jumper connections. Make sure they match the original selection and clipped jumpers are completely removed. **2.** Reset and sequence the relay module. **3.** If the fault persists, replace the relay module.
Fault 112 - 126 *Call Service*	Relay Module self-test failure.	**1.** Reset and sequence the relay module. **2.** If the fault persists, replace the relay module.
Fault 127 *Call Service*	Safety relay feedback circuit was in an improper state.	**1.** Reset and sequence the relay module. **2.** If the fault persists, replace the relay module.

Expanded Annunciator Messages

If an Expanded Annunciator is wired to the limit control and interlock control strings, and connected to the 7800 SERIES Relay Module, additional hold messages, fault messages or code numbers enhance the original hold messages, fault messages or code numbers. See the Expanded Annunciator specification, form 65-0101, for detailed information. The message demonstrates which device opened first in a monitored string of limits or interlocks.

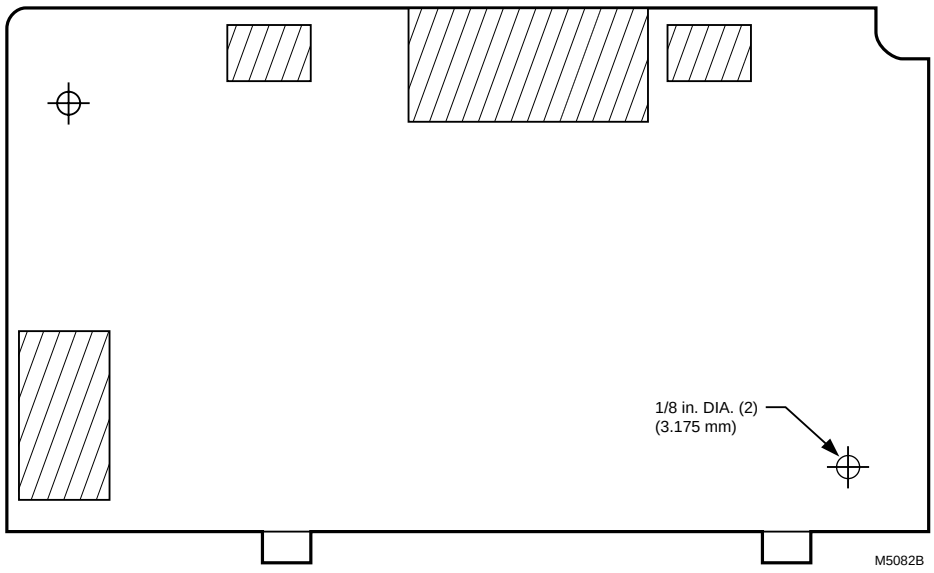


Fig. 16. KDM flush mounting outline.

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