Honeywell

RM7838A
7800 SERIES Relay Modules

INSTALLATION INSTRUCTIONS

APPLICATION

The Honeywell RM7838A is a microprocessor-based integrated on/off burner control for semi-automatically fired gas, oil, or combination fuel single burner applications. The RM7838A Relay Module is intended to replace the Industrial R4138A,B,C and D Flame Safeguard Primary Control, but does not include an override on momentary power interruptions. The RM7838A System consists of a relay module, keyboard display module, subbase, amplifier and purge card. Options include Data ControlBus Module™, remote display mounting and Modbus™ communications capable.

This document covers the following modules:

RM7838A1014
RM7838A2014

Functions provided by the RM7838A include semi-automatic on/off burner sequencing, flame supervision, system status indication, system or self-diagnosis and troubleshooting.

This document provides installation and static checkout instructions. Other applicable publications are:

Form Number	Description
32-00110	S7800A2142 4-line LCD Keyboard Display Module Product Data
32-00160	Tester for 2000 Series Flame Relays A7800A2010, (accommodates grounding pin)
32-00166	204729A/C KDM NEMA4 Covers for 4-line LCD KDM
32-00235	R7824, R7847, R7848, R7849, R7851, R7861, R7886 Flame Amplifiers for the 7800 SERIES Product Data (for CE, Modbus module S7810M1029 only)
65-0084	Q7800A,B 22-Terminal Wiring Subbase Product Data.
65-0089	ST7800A,C Plug-In Purge Timer Installation Instructions.
65-0090	S7800A 2-line VFD Keyboard Display Module Product Data.
65-0091	S7810A Data ControlBus Module™ Product Data.
65-0131	221818A Extension Cable Assembly Product Data.
65-0229	7800 Series Relay Modules Checkout and Troubleshooting Product Data.
65-0295	50023821-001/2 NEMA4 Covers for 2-line Keyboard Display Module

SPECIFICATIONS

Electrical Ratings, see Table 3:
Voltage and Frequency: 120 Vac (+10/-15%), 50/60 Hz (±10%).

Power Dissipation: 10W maximum.

Maximum Total Connected Load: 2000 VA.

Fusing Total Connected Load: 15A maximum, type SC fast blow or equivalent.

Environmental Ratings:
Ambient Temperatures:
Operating: -40°F to 140°F (-40°C to 60°C).
Storage: -40°F to 150°F (-40°C to 66°C).
Humidity: 85% relative humidity continuous, noncondensing.
Vibration: 0.5G environment.

SIL 3 Capable:
SIL 3 Capable in a properly designed Safety Instrumented System. See form number 65-0312-04 for Certificate Agreement.

Approvals:
cULus Underwriters Laboratories Inc. Listed: File No. MP268. ANSI/UL 60730-2-5 / CSA C22.2 No. 60730-2-5 - Automatic Electrical Controls for Household and Similar Use, Part 2-5: Particular Requirements for Automatic Electrical Burner Control Systems
FM Factory Mutual Approved: Report No. 1V9A0.AF.
Swiss Re (formerly Industrial Risk Insurers): Acceptable.
FCC Federal Communications Commission: Part 15, Class B, Emissions.
SIL 3 capable Exida: IEC/EN 61508:2010 Parts 1-7, SIL 3 capable.
CSD Control Safety Devices: Acceptable CSD-1
EAC: TC N RU д-US.Аи30.В.04013

SIL3 Capable

32-00213-03

ПРОМЭЛЕКТРОНИКА / sales@prom-elec.com

INSTALLATION

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 technician.
4. After installation is complete, check out the product operation as provided in these instructions.

⚠ WARNING

Fire or Explosion Hazard.Can cause property damage, severe injury, or death. Verify safety requirements each time a control is installed on a burner.

⚠ CAUTION

Electrical Shock Hazard. Can cause electrical shock or equipment/control damage.Disconnect the power supply before beginning installation.

IMPORTANT

1. *Wiring connections for the relay module are unique; refer to Fig. 2 or the correct Specifications for proper subbase wiring and sequence charts.*
2. *Wiring must comply with all applicable codes, ordinances and regulations.*
3. *Wiring must comply with NEC Class 1 (Line Voltage) wiring.*
4. *Loads connected to the RM7838A must not exceed those listed on the RM7838A label or the Specifications; see Table 3.*
5. *Limits and interlocks must be rated to simultaneously carry and break current to the ignition transformer, pilot valve, and main fuel valves.*
6. *All external timers must be listed or component-recognized by authorities having proper jurisdiction.*
7. *For on-off gas-fired systems, some authorities who have jurisdiction prohibit the wiring of any limit or operating contacts in series between the flame safeguard control and the main fuel valve(s).*
8. *Two flame detectors can be connected in parallel with the exception of Infrared Flame Detectors (C7015, C7915), Ultraviolet Flame Detectors (C7927, C7961) or Visible Light Detector (C7962).*
9. *This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, can cause interference with 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 provide 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, may be required to take whatever measures are required to correct this interference.*
10. *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.*

LOCATION

Humidity

Install the relay module where the relative humidity never reaches the saturation point. The relay module is designed to operate in a maximum 85% relative humidity continuous, noncondensing, moisture environment. Condensing moisture can cause a safety shutdown.

Vibration

Do not install the relay module where it could be subjected to vibration in excess of 0.5G continuous maximum vibration.

Weather

The relay module is not designed to be weather tight. When installed outdoors, protect the relay module in an approved weather-tight enclosure.

Mounting Wiring Subbase

1. Mount the subbase in any position except horizontally with the bifurcated contacts pointing down. The standard vertical position is recommended. Any other position decreases the maximum ambient temperature rating.
2. Select a location on a wall, burner or electrical panel. The Q7800 can be mounted directly in the control cabinet. Be sure to allow adequate clearance for service, installation, access or removal of the RM7838A, keyboard display module, flame amplifier, flame amplifier signal voltage probes, electrical signal voltage probes and electrical field connections.
3. For surface mounting, use the back of the subbase as a template to mark the four screw locations, then drill the pilot holes.
4. Securely mount the subbase using four no. 6 screws (not provided).

NOTE: You might receive an error code 101 (via KDM) if one of the following conditions exist:

a. The screws securing the relay to the subbase are not tight enough, re-tighten to insure there is no gap between the relay and the subbase.
b. If you attempt to place a 2000 series relay on a non-compatible 1000 series subbase, this indicates that you must:
   - Change out the subbase to a Q7800A2003/U or Q7800A2005/U
   - Choose a compatible 1000 series relay module

Relay Module and Subbase Compatiblity

NOTE: There are several different subbase models that can be purchased. It is important to note which subbase is compatible with the relay module when purchasing new, repair or replacement parts.

Series 1000 Relay Modules

All relay product codes that start with a 1 (example: EC7820A**1**026/U) can be used with existing subbase Q7800A1003/U and Q7800A1005/U.

Series 2000 Relay Modules

All relay product codes that start with a 2 (example: EC7820A**2**026/U) must be used with subbase Q7800A2003/U and Q7800A2005/U.

Subbase Compatibility

Any Relay Module in the 1000 Series with a Software Revision level number starting with a "5" or greater will be compatible with all subbase models both installed and newly purchased. This includes (Q7800A1005/U, Q7800B1003/U), and the 2000 Series subbases (Q7800A2005/U, Q7800B2003/U).

See Fig. 1 for Software Revision Level number location on the label (located on the rear of the relay module).

Any relay module in the new 2000 series will only be able to be installed on subbase Q7800A2005/U, Q7800B2003/U and will not be backward compatible with any Q7800A1003/U and Q7800A1005/U subbases already installed in the field.



Fig. 1. Software revision location.

IMPORTANT

Make sure to check the relay model number and the software revision level on the relay.

If you attempt to place a 2000 series relay on a non-compatible 1000 series subbase, you will receive an error code of 101. This indicates that you must a) change out the subbase to a Q7800A2003/U or Q7800A2005/U or b) choose a compatible 1000 series relay module.

Wiring Subbase

⚠ CAUTION

Electrical Hazard. Can cause electrical shock or equipment/control damage. Disconnect the power supply before beginning wiring. More than one disconnect can be required.

1. For proper subbase wiring and sequence chart, see Fig. 2.
2. For proper remote wiring of the KDM, refer to the Specifications for the 2-line VDF KDM (65-0090), the 4-line LCD KDM (32-00110), Data ControlBus Module™ (65-0091) or Extension Cable Assembly (65-0131).
3. All wiring must comply with all applicable electrical codes, ordinances and regulations. Wiring, where required, must comply with NEC, Class 1 (Line Voltage) wiring.
4. Recommended wire routing of leadwires:
   c. Do not run high voltage ignition transformer wires in the same conduit with the flame detector, Data ControlBus Module™, or remote reset module wiring.

d. Do not route flame detector, Data ControlBus Module™ or remote reset module leadwires in conduit with line voltage circuits.
e. Enclose flame detector leadwires without armor cable in metal cable or conduit.
f. Follow directions in flame detector, Data ControlBus Module™ or remote reset module instructions.

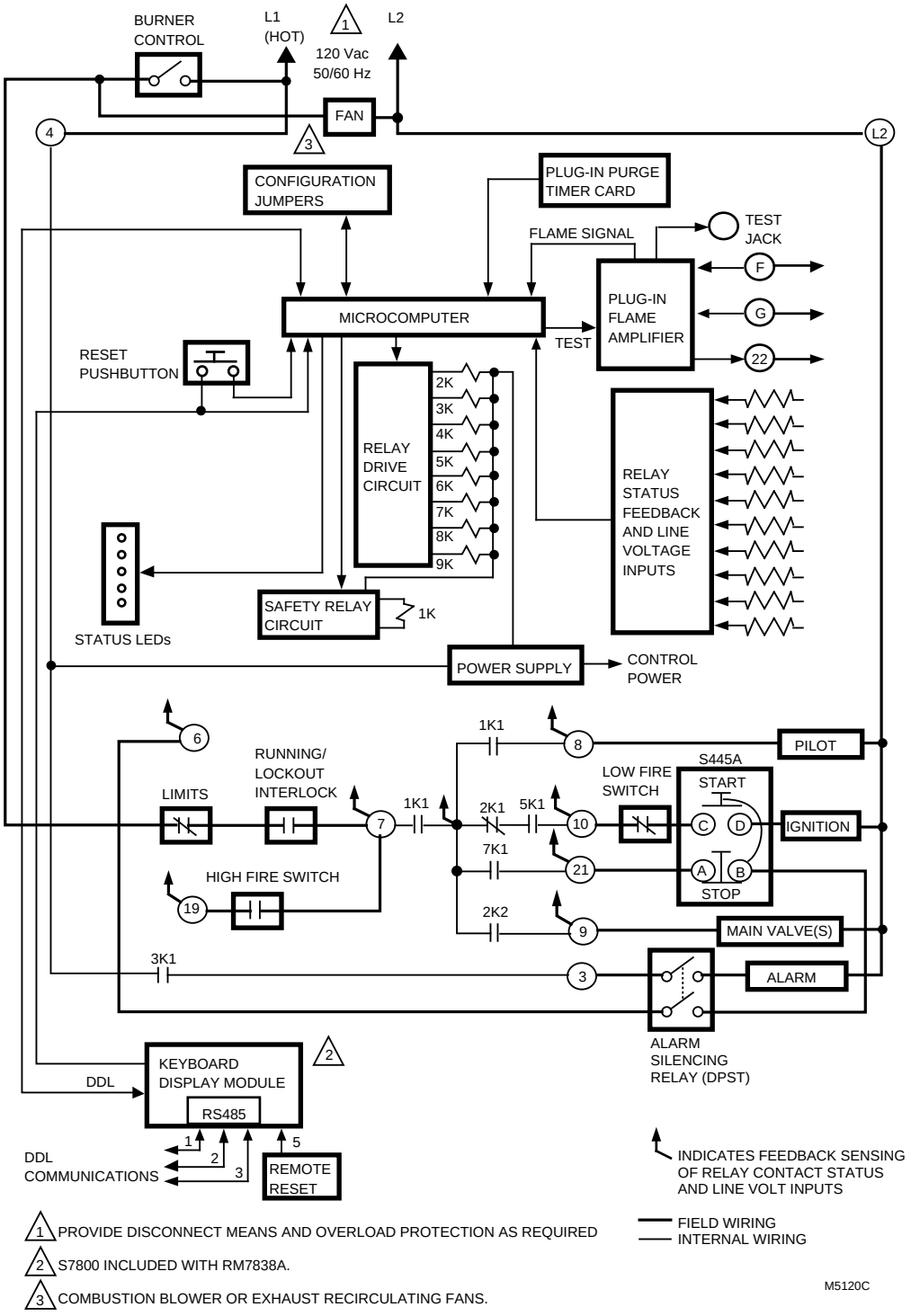


Fig. 2. Internal block diagram of the RM7838A (see Fig. 2 for detailed wiring instructions).

5. For recommended wire size and type, see Table 1.
6. For recommended grounding practices, see Table 2.
7. For keyboard display module (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 keyboard display module is used. A maximum of two keyboard display modules or Data ControlBus Modules™ are allowed in any combination.

8. Maximum wire lengths:
   a. RM7838A leadwires: The maximum leadwire length is 300 feet (91 meters) to terminal inputs (Control, Running Interlock, High Fire Switch and Low Fire Switch).
   b. Flame detector leadwires: The maximum flame sensor leadwire length is limited by the flame signal strength.
   c. Remote reset leadwires: The maximum length of wire is 1000 feet (305 meters) to a remote reset pushbutton.
   d. Data ControlBus Module™: The maximum Data ControlBus Module™ cable length depends on the number of system modules connected, the noise conditions and the cable used. The maximum length of all Data ControlBus Module™ interconnecting wire is 4000 feet (1219 meters).

9. Be sure loads do not exceed the terminal ratings. Refer to the label on the RM7838A or to the terminal ratings in Table 3.

10. The keyboard display module, Data ControlBus Module™ (for remote mounting or communications) must be wired in a daisy chain configuration, (1(a)-1(a), 2(b)-2(b), 3(c)-3(c)). The order of interconnection of all the devices listed above is not important. Be aware that modules on the closest and farthest end of the daisy chain configuration string require a 120 ohm (1/4 watt minimum) resistor termination across terminals 1 and 2 of the electrical connectors for connections over 100 feet (30.5m).

Table 1. Recommended Wire Size and Part Numbers

Application	Recommended Wire Size	Recommended Part Numbers
Line voltage terminals	14, 16, or 18 AWG copper conductor, 600 volt insulation wire.	TTW60C, THW75C, THHN90C
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.	-
13 Vdc full wave rectified transformer power input.	18 AWG wire insulated for votlages and temperatures for given application.	TTW60C, THW75C, THHN90C

Table 2. Recommended Grounding Practices.

Ground Type	Recommended Practice
Earth ground (subbase and relay module).	• Use to provide a connection between the subbase and the control panel of the equipment. Earth ground must be capable of conducting enough current to blow the 20A fuse (or breaker) in the event of an internal short circuit. • Use wide straps or brackets to provide minimum length, maximum surface area ground conductors. If a leadwire must be used, use 14 AWG copper wire. • Make sure that mechanically tightened joints along the ground path are free of nonconductive coatings and protected against corrosion on mating surfaces.
Signal ground (Keyboard Display Module, Data Controlbus Module™	Use the shield of the signal wire to ground the device to the signal gorund terminals [3(c)] of each device. Connect the shield at both ends of the daisy chain to earth ground.

Table 3. Terminal Ratings

Terminal No.	Description	Ratings
G	Flame Sensor Ground[a]	-
Earth G	Earth Ground[1]	-
L2(N)	Line Voltage Common	-
3	Alarm	120 Vac, 1A pilot duty.
4	Line Voltage Supply (L1)	120 Vac, (+10/-15%), 50/60- Hz (±10%)[b]
5	Unused	-
6	Start/Stop Switch Input	120 Vac, 1 mA.
7	Running Interlock	120 Vac, 8A run, 43A inrush.
8	Intermittent Pilot	120 Vac.[c]
9	Main Fuel Valve	120 Vac.[c]
10	Ignition	120 Vac.[c]
F(11)	Flame Sensor	60 to 220 Vac, current limited.
12-18	Unused.	-
19	High Fire Switch Input	120 Vac, 1 mA.
20	Unused	-
21	Run Enable/Flame Proven	120 Vac, 2A pilot duty.
22	Shutter	120 Vac, 0.5A.

[a] See Table 2.

[b] 2000VA maximum connected load.

[c] See Tables 4 and 5.

Table 4. Combinations for Terminals 8, 9 and 10.

Pilot Fuel 8	Main 9	Ignition 10
C	F	No Load
B	F	No Load
F	F	A
F	No Load	A
D	F	A
D	D	A
D	No Load	A

Table 5. Composition of each Combination.

A	B	C	D	F
4.5A ignition	50 VA Pilot Duty plus 4.5A ignition.	180 VA Ignition plus Motor valves with: 660 VA inrush, 360 VA open, 250 VA hold.	2A Pilot Duty	65 VA Pilot Duty plus Motor valves with: 3850 VA inrush, 700 VA open, 250 VA hold.

Final Wiring Check

1. Check the power supply circuit. The voltage and frequency tolerance must match those of the RM7838A. A separate power supply circuit can be required for the RM7838A. Add the required disconnect means and overload protection.
2. Check all wiring circuits and complete Static Checkout in Table 7 before installing the RM7838A on the subbase.
3. Install all electrical connectors.
4. Restore panel power.

STATIC CHECKOUT

After checking all wiring, perform this checkout before installing the RM7838A on the subbase. These tests verify that the Q7800 Wiring Subbase is wired correctly and that the external controllers, limits, interlocks, actuators, valves, transformers, motors and other devices are operating properly.

⚠ WARNING

Explosion Hazard.Can cause explosion, electrical shock or equipment damage.

1. Close all manual fuel shutoff valves before starting these tests.
2. Use extreme care while testing the system. Line voltage is present on most terminal connections when power is on.
3. Open the master switch before installing or removing a jumper on the subbase.
4. Before continuing to the next test, be sure to remove test jumpers used in the previous test.
5. Replace all limits and interlocks that are not operating properly. Do not bypass limits and interlocks.

⚠ CAUTION

Equipment Damage Hazard. Can cause equipment damage.

Do not perform a dielectric test with the RM7838A installed. Internal surge protectors will break down and conduct a current. This can cause the RM7838A to fail the dielectric test or possibly destroy the internal lightning and high current protection.

Equipment Recommended

1. Voltmeter (1M ohm/volt minimum sensitivity) set on the 0 to 300 Vac scale.
2. Two jumper wires, No. 14 wire, insulated, 12 in. (304.8 mm) long with insulated alligator clips at both ends. An ammeter can replace the jumper wire to confirm the amp draw when testing the ignition, pilot valve or main valve.

General Instructions

1. Perform all applicable tests listed in Static Checkout, Table 7, in the order listed.
2. Make sure all manual fuel shutoff valves are closed.
3. Raise the setpoint of the operating controller to simulate a call for heat.
4. For each test, open the master switch and install the jumper wires between the subbase wiring terminals listed in the Test Jumpers column.
5. Close the master switch before observing operation.
6. Read the voltage between the subbase wiring terminals listed in the Voltmeter column.
7. If there is no voltage or the operation is abnormal, check the circuits and external devices as described in the last column.
8. Check all wiring for correct connections, tight terminal screws, correct wire and proper wiring techniques.
9. Replace all damaged or incorrectly sized wires.
10. Replace faulty controllers, limits, interlocks, actuators, valves, transformers, motors and other devices as required.
11. Make sure normal operation is obtained for each required test before continuing the checkout.
12. After completing each test, be sure to remove the test jumpers.

⚠ WARNING

Explosion Hazard. Can cause serious injury or death. Be sure all manual fuel shutoff valves are closed.

Table 6. Static Checkout

Test No.	Test Jumpers	Voltmeter	Normal Operation	If Operation is Abnormal, Check the Items Listed Below
1	None	4-L2	Line voltage at terminal 4.	**1.** Master switch. **2.** Power connected to the master switch. **3.** Overload protection (fuse, circuit breaker, etc.) has not opened the power line.
2	4-21	6-L2	Line voltage at terminal 6.	**1.** Stop station. **2.** Alarm silencing relay.
3	4-10	-	Push Start pushbutton and ignition sparks.	**1.** Watch for spark or listen for buzz. a. Ignition electrodes are clean. b. Ignition transformer is okay. c. Damper not at low fire position. d. Low Fire Switch.
4	4-8	-	Automatic pilot valve opens.	**1.** Listen for click or feel head of valve for activation. a. Actuator if used. b. Pilot valve.

Table 6. Static Checkout

Test No.	Test Jumpers	Voltmeter	Normal Operation	If Operation is Abnormal, Check the Items Listed Below
5	4-9	-	Automatic main fuel valve(s) opens.	**1.** Listen for and observe operation of the main fuel valve(s) and actuator(s). **2.** Valve(s) and actuator(s).
6	4-3	-	Alarm (if used) turns on.	**1.** Alarm.
7	May need to jumper limits and/or Running Interlocks	19-L2	Manually drive damper motor open and look for High Fire Switch closure.	**1.** High Fire Switch. **2.** Firing rate motor and transformer. **3.** Burner control. **4.** Limits. **5.** Running Interlocks.
FINAL	ALL	**⚠ CAUTION** **Equipment Damage Hazard.** **Can cause equipment damage.** After completing these tests, open the master switch and remove all test jumpers from the subbase terminals. Also remove bypass jumpers from limits if used.		

Mounting RM7838A Relay Module

1. Mount the RM7838A on the 7800 Subbase vertically, or mount horizontally with the knife blade terminals pointing down. When mounted on the Q7800A, the RM7838A must be in an electrical enclosure.
2. When mounted in an electrical enclosure, provide adequate clearance for servicing, installation and removal of the RM7838A, keyboard display module, flame amplifier, signal probes, electrical signal voltage probes and electrical connections.
   a. Allow an additional two inches (51 mm) below the RM7838A for the flame amplifier mounting.
   b. Allow an optional three-inch (76 mm) minimum to both sides of the RM7838A for electrical signal voltage probes.
3. Make sure no subbase wiring is projecting beyond the terminal blocks. Tuck in wiring against the back of the subbase so it does not interfere with the knife blade terminals or bifurcated contacts.

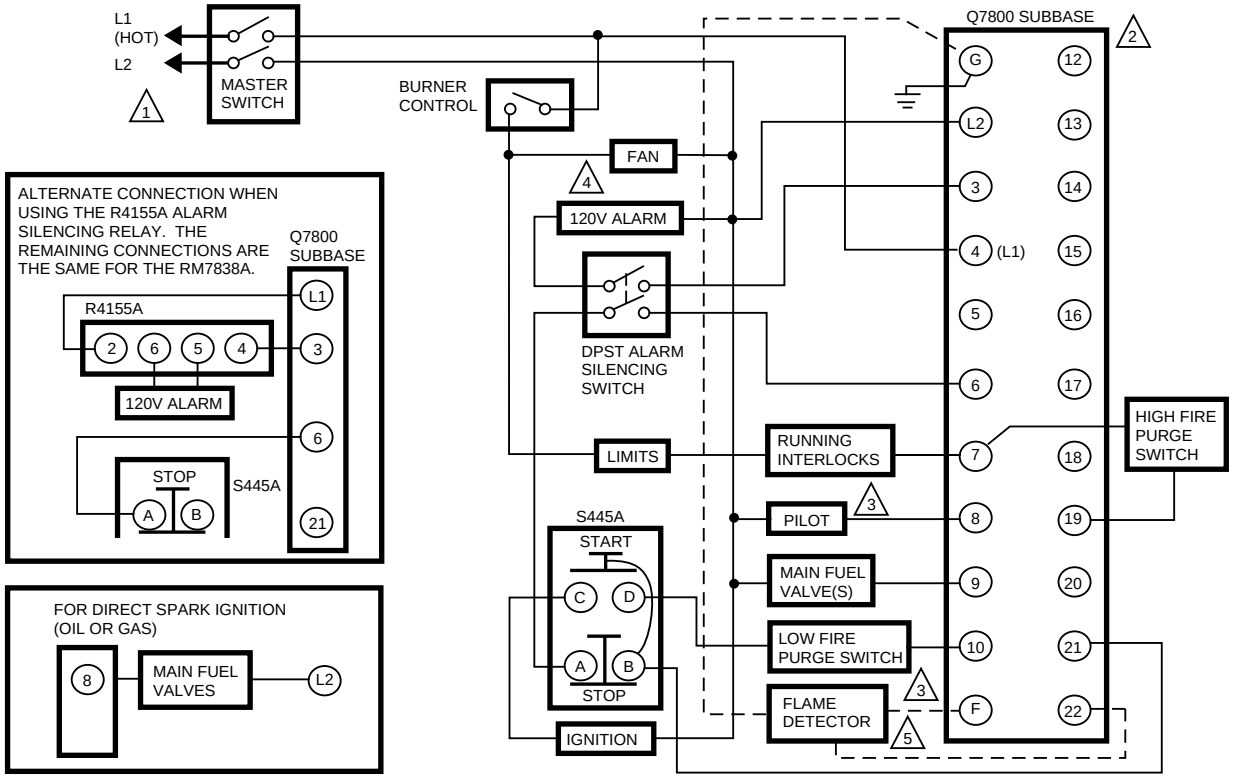
IMPORTANT

The RM7838A must be installed with a plug-in motion rather than a hinge action.

4. Mount the RM7838A by aligning the four L-shaped corner guides and knife blade terminals with the bifurcated contacts on the wiring subbase and securely tightening the two screws without deforming the plastic.

Mounting Other System Components (Fig. 3)

Refer to the applicable specifications for mounting other system components.



RM7838A

		00	00	00	PFEP	10	
VFD DISPLAY	INITIATE	STANDBY	PURGE	HOLD	4 OR 10 SEC	RUN	STANDBY
LED DISPLAY	● POWER	● POWER	● POWER	● POWER	● POWER	● POWER	● POWER
	○	○	○	○ PILOT	● PILOT	● PILOT	○
	○	○	○	○ FLAME	● FLAME	● FLAME	○
	○	○	○	○ MAIN	○ MAIN	● MAIN	○
	● ALARM	● ALARM	● ALARM	● ALARM	○ ALARM	○ ALARM	● ALARM
BURNER			COMBUSTION BLOWER, RECIRCULATING, EXHAUST FANS				
START				(10)	START/IGN.		
					INTERMITTENT PILOT (8)		
						MAIN VALVE (9)	
OPERATING CONTROLS AND INTERLOCKS			RUNNING INTERLOCKS AND BURNER CONTROLLER CLOSED (L1) TO (7)				
					STOP SWITCH (21) TO (6)		
		(7) TO (19)	HIGH FIRE SW.				
FLAME SIGNAL		SAFE START CHECK				FLAME PROVING	SSC

1. 120V, 50/60 Hz POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
2. EXTERNAL ISOLATION REQUIRED OF INPUT AND OUTPUT TERMINALS TO CONNECT THE RM7838A IN A PARALLEL APPLICATION.
3. ISOLATION CONTACT REQUIRED FOR STANDING PILOT APPLICATION. DRIVE 120 VAC RELAY FROM TERMINAL 8.
4. COMBUSTION BLOWER OR EXHAUST RECIRCULATING FANS.
5. SEE FLAME DETECTOR SPECIFICATION FOR CORRECT WIRING.

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Fig. 3. Wiring subbase and sequence chart for RM7838A Relay Module.

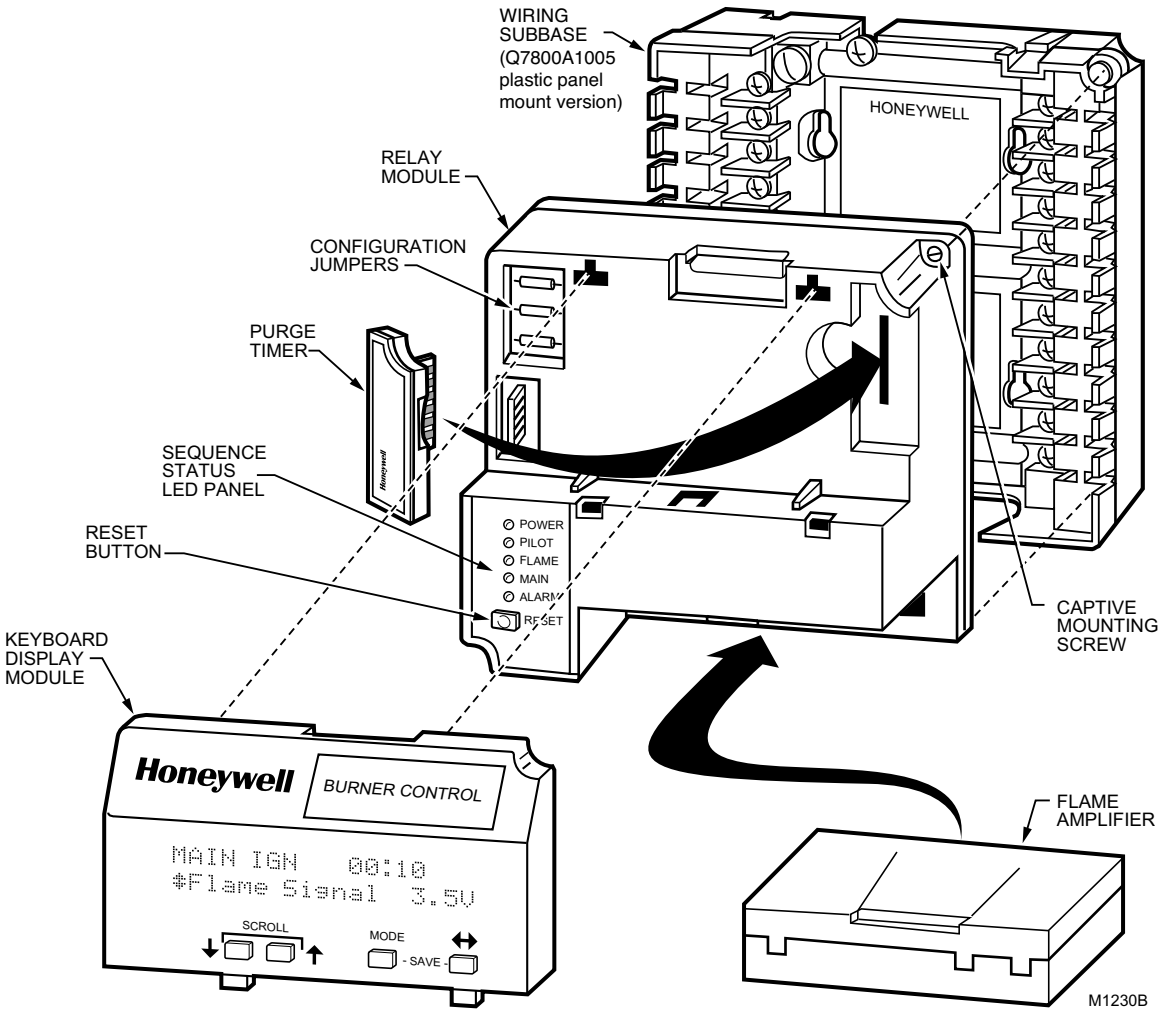


Fig. 4. RM7838A Relay Module exploded view.

PRINCIPAL TECHNICAL FEATURES

The RM7838A provides all customary flame safeguard functions as well as significant advancements in safety, annunciation, and system diagnostics.

Safety Shutdown (Lockout) Occurs If:

1. INITIATE Period
   a. Purge card is not installed or removed.
   b. Purge card is bad.
   c. Configuration jumper was changed (after 200 hours).
   d. AC line power errors, see Operation.
   e. Four minute INITIATE period is exceeded.
2. STANDBY Period
   a. Flame signal is present after 240 seconds.
   b. Intermittent pilot valve/ 1st stage oil terminal is energized.
   c. Start Switch terminal energized.
   d. Main valve terminal is energized.
   e. Internal system fault.
   f. Purge card is not installed or removed.
   g. Purge card is bad.
   h. Flame detected during the last two seconds.
3. PURGE Period
   a. Flame signal detected during PURGE .
   b. High fire switch fails to close within four minutes, 15 seconds after the burner switch, limit and interlock string is closed.
   c. Intermittent pilot valve/1st stage oil terminal is energized.
   d. Main valve terminal is energized.
   e. Internal system fault.
   f. Purge card is removed.
   g. Purge card is bad.
   h. Start Switch terminal is energized.
4. PILOT FLAME ESTABLISHING Period (PFEP)
   a. Intermittent pilot valve/1st stage oil terminal is not energized.
   b. No flame is present at end of PFEP.
   c. Internal system fault.
   d. Purge card is not installed or removed.
   e. Purge card is bad.
   f. Main valve terminal is energized.
5. RUN Period
   a. Intermittent pilot valve/1st stage oil terminal is not energized.
   b. Main valve terminal is not energized.
   c. No flame is present.

d. Main valve terminal is de-energized.
e. Internal system fault.
f. Purge card is removed.
g. Purge card is bad.

OPERATION

Sequence of Operation

The RM7838A has the operating sequence listed below; see Fig. 2. The RM7838A LEDs provide visual indication of the program sequence: POWER, PILOT, FLAME, MAIN and ALARM and are displayed on the Keyboard Display Module.

Initiate

The RM7838A enters the INITIATE sequence when the relay module is initially powered. The RM7838A can also enter the INITIATE sequence if the relay module verifies voltage fluctuations of +10/-15% or frequency fluctuations of ±10% during any part of the operating sequence. The INITIATE sequence lasts for ten seconds unless the voltage or frequency tolerances are not met. When the tolerances are not met, a hold condition is initiated and displayed on the KDM for at least five seconds. When the tolerances are met, the INITIATE sequence restarts. If the condition is not correct and the hold condition exists for four minutes, the RM7838A locks out.

Causes for hold conditions in the INITIATE sequence include:

a. AC line dropout is detected.
b. AC line noise that can prevent a sufficient reading of the line voltage inputs.
c. Brownouts caused by low line voltage.

The alarm, terminal 3, is energized during INITIATE.

Standby

The RM7838A is ready to start an operating sequence. When the Burner Switch is closed, the Blower/Combustion Fan is powered. The Airflow Switch closes and provides power to terminal 7 through any additional limits or interlocks.

After terminal 7 is energized, "Safe Start Check" is displayed on the KDM as the RM7838A transitions from Standby to Purge. During safe start check, the RM 7838A verifies that the flame detection system and all components are not in a flame simulating condition. On applications using a shutter, the shutter is energized to make sure no flame is present.

The alarm, terminal 3, is energized all the time the system is in standby.

Normal Start-Up Purge

Closing the burner control switch energizes the combustion fan and provides power to terminal 7 through all limits and interlocks. Powering terminal 7 with all the microcomputer monitored circuits in the correct state, the relay module begins the PURGE sequence.

Selectable PURGE timing from two seconds to 30 minutes is available for the RM7838A.

Purge Hold T19 (High Fire Switch) is displayed until the High Fire Switch is proven.

PURGE timing begins when the damper motor is manually driven to the High Fire Purge position and the High Fire Switch is energized. Four minutes and 15 seconds are provided to drive the damper to the fully open position. A jumpered or welded High Fire Switch adds a 30 second hold to the beginning of purge timing. When PURGE timing is complete, "PILOT:HOLD:T6 (Start Switch)" is displayed on the KDM.

Ignition Trials

1. Pilot Flame Establishing Period (PFEP):
   a. With the damper motor manually driven to the Low Fire position:
      (1) Press the START pushbutton and the ignition transformer is energized with power from terminal 10. Power is also applied to terminal 6 through the Start/Stop Switch internal jumper. The STOP Switch and the Alarm Silencing Switch. The RM7838A then energizes the Intermittent Pilot valve (terminal 8).
      (2) During PFEP, the Low Fire Switch and the START switch must remain closed. If one opens before the flame is proven, the pilot valve shuts off , but the pilot flame establishing timer continues to time.
   b. Flame must be proven by the end of the ten- second PFEP (four if configuration JRI jumper is removed) to allow the sequence to continue. If flame is not proven by the end of PFEP, a safety shutdown occurs.
   c. With flame proven, terminal 21 outputs line voltage to maintain the input to terminal 6, which allows the Start Switch to be released and the ignition to be shut off.

NOTE: Terminal 10 verifies that the Start Switch is released. If the Start Switch is not released, a shutdown occurs.

2. Alarm LED and terminal 3 are turned off when flame is detected.

Run

1. When the flame is proven, the FLAME LED lights and the ALARM LED turns off. Release the Start push-button and the ignition transformer shuts off. At the end of PFEP, the RM7838A proceeds to the RUN period by energizing the main valve, terminal 9, and the MAIN status LED on the relay module.
2. The firing rate damper motor can now be positioned to meet the setpoint of the process controller.
3. The RM7838A is in RUN and remains in RUN until the STOP pushbutton is pushed, or a limit opens terminal 7.
4. The alarm, terminal 3, is de-energized during RUN and energized when shutdown occurs.

Keyboard Display Module (KDM)

The Keyboard Display Module (see Fig. 3) is provided with the RM7838A Relay Module. The first line of the Vacuum Fluorescent Display (VFD) provides:

1. Current status of the burner sequence (STANDBY, PURGE, PILOT IGN, MAIN IGN and RUN).
2. Timing information (PURGE, PILOT IGN, and MAIN IGN) in minutes and seconds.
3. Hold information (PURGE HOLD:T19).
4. Lockout information (Lockout, Fault Code, Message and Sequence).

The extreme right side of the first line is either blank or shows a small arrow pointing to the second line followed by a two-letter code (DI, Diagnostic Information; Hn, Fault History Information; EA. When the arrow and two-letter codes are displayed, it indicates the second line is showing a selectable message submenu. The second line displays selectable or pre-emptive messages.

A selectable message supplies information for flame strength, system status indication, system or self-diagnostics and troubleshooting.

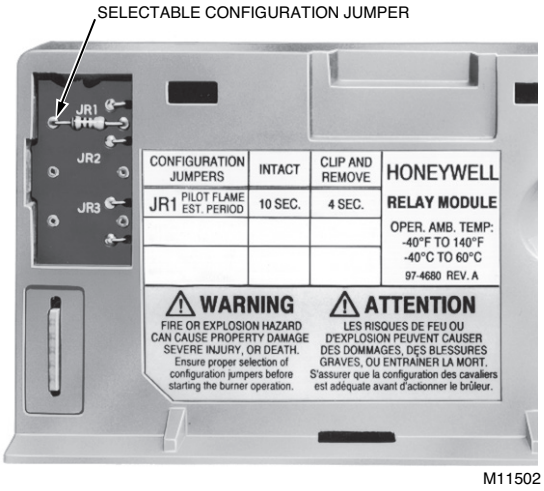
A pre-emptive message has parentheses around the message and supplies a detailed message to support the sequence status information. A pre-emptive message can also be a lockout message. A pre-emptive message replaces a selectable message to support the sequence status information. It also replaces a selectable message after

60 seconds or if a lockout message is available.

SETTINGS AND ADJUSTMENTS

Selectable Site-Configurable Jumpers

The RM7838A has one site-configurable jumper option, see Fig. 4 and Table 6. If necessary, the site configurable jumper should be clipped with side cutters and the resistor removed from the relay module.



M11502

Fig. 5. Selectable site-configurable jumper.

Table 7. Site-Configurable Jumper Options

Jumper Number	Description	Intact	Clipped
JR1	Pilot Flame Establishing Period (PFEP)	10 seconds	4 seconds

NOTE: Clipping and removing a site-cofigurable-jumper enhances the level of safety and removing a site-configurable-jumper after 200 hours of operation causes a non-resettable fault 110.

SAFETY AND SECURITY

Physical device protection

Device shall be accessible to authorized personnel only – Installation on publicly accessible places is not recommended as this could lead to unwanted and potentially unsafe changes to device (wiring, configuration, etc).

It is recommended to lock the device in an enclosed cabinet with access allowed only to approved and trained personnel. Also, it is strongly advised to keep all the wiring of device physically secure.

Physical protection of the device is applied via a temper evident label/seal. It is intended to prevent and detect unauthorized access.

Modbus & DDL Interface security

Any conducts critical to device functionality (DDL, Modbus lines etc.) shall be physically protected (installed outside public access) since they could be damaged or tampered-with by unauthorized people, either accidentally or for purpose.

Modbus RS-485 & DDL protocols do not support security features. For DDL interface - only DDL devices shall be connected to the Burner Controller DDL line.

License agreement

NOTE: Copying and reverse engineering is prohibited by the law.

For More Information

The Honeywell Thermal Solutions family of products includes Honeywell Combustion Safety, Eclipse, Exothermics, Hauck, Kromschröder and Maxon. To learn more about our products, visit ThermalSolutions.honeywell.com or contact your Honeywell Sales Engineer.

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