7800 SERIES
RM7888A Relay Module

FEATURES

- **Safety features:**
  - — **Closed loop logic test.**
  - — **Dynamic input check.**
  - — **Dynamic safety relay test.**
  - — **Dynamic self-check logic.**
  - — **Expanded safe-start check.**
  - — **Internal hardware status monitoring.**
  - — **Tamper resistant timing and logic.**
- **Access for external electrical voltage checks.**
- **Application flexibility.**
- **Communication interface capability through Modbus.**
- **Dependable, long-term operation provided by microcomputer technology.**
- **First-out annunciation and system diagnostics provided by a 2 row by 20 column vacuum fluorescent display (VFD) located on the KDM (optional).**
- **Five LEDs for sequence information (see Fig. 1).**
- **Interchangeable plug-in flame amplifiers.**
- **Local or remote annunciation of RM7888 operation and fault information (with optional keyboard display module).**
- **Nonvolatile memory; RM7888 retains history files and sequencing status after loss of power.**
- **Remote reset (optional).**
- **Burner control data (optional):**
  - — **Flame signal strength.**
  - — **Hold status.**
  - — **Lockout/alarm status.**
  - — **Sequence status.**
  - — **Sequence time.**
  - — **Total cycles of operation.**
  - — **Total hours of operation.**
  - — **Fault history providing the six most recent faults:**
    - — **Cycles of operation at the time of the fault.**
    - — **Fault message and code.**
    - — **Hours of operation at the time of the fault.**
    - — **Sequence status at the time of the fault.**
    - — **Sequence time at the time of the fault.**
  - — **Diagnostic information:**

APPLICATION

The Honeywell RM7888A Relay Module is a microprocessor-based integrated burner control for industrial process semi-automatically fired gas, oil, coal or combination fuels for single and multiple burner industrial applications. The RM7888 system consists of the relay module, wiring subbase and amplifier. Options include keyboard display module (KDM), Modbus™ module, Data ControlBus™ Module, and remote display mounting.

The RM7888 intended use is in conjunction with a master system control. The master system control determines the purge timing and confirms air supply and air flow.

The RM7888 is programmed to provide a level of safety, functional capability and features beyond the capacity of conventional controls.

The basic functions of the RM7888A include semi-automatic burner startup sequencing, five user selectable operating (run) sequences, four line voltage sequence control inputs (commonly controlled with a Programmable Logic Controller [PLC]), flame supervision, system status indication, system or self-diagnostics and troubleshooting.

SIL3 Capable

— **Device type.**
— **Flame amplifier type.**
— **Flame failure response time (FFRT).**
— **Manufacturing code.**
— **On/off status of all digital inputs and outputs.**
— **Software revision and version of RM7888 and optional KDM.**
— **Status of configuration jumper.**

SPECIFICATIONS

Electrical Ratings (See Table 1):
Voltage and Frequency: 120 Vac (+10/-15%), 50 or 60 Hz (±10%).
Power Dissipation: 10W maximum.
Maximum Total Connected Load: 2000 VA.
Fusing (Total Connected Load):15A, Fast Blow, type SC 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% RH continuous, noncondensing.
Vibration: 0.5G environment.
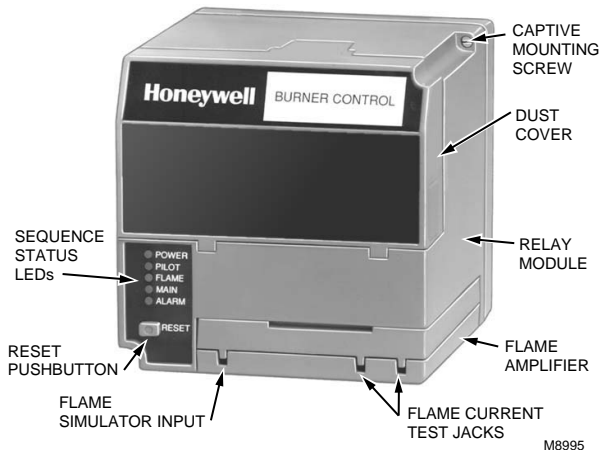
Dimensions: See Fig. 2.

Fig. 1. Sequence status LED.

Weight:
RM7888 with Dust Cover: 1 pound, 13 ounces, unpacked.

IMPORTANT:

Flame Detection System available for use with RM7888. Select your plug-in Flame Signal Amplifier and applicable Flame Detector from Table 5.

SIL3 Capable
SIL3 Capable in a properly designed Safety Instrumented System See form *65-0312* for Certificate Agreement.

Approvals:
Underwriters Laboratories Inc. Component Recognized.
Canadian Standards Association Certified: LR9S329-3.
Factory Mutual: Approved.
Federal Communications Commission: Meets Part 15, Class A—Emissions.

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

Required Components:
Plug-in Flame Signal Amplifier (See Table 5).
Q7800A or Q7800B Wiring Subbase.

Accessories:
Keyboard Display Modules (KDM):
    S7800A1001 English language.
    S7800A1035 French language.
    S7800A1043 German language.
    S7800A1050 Italian language.
    S7800A1068 Spanish language.
    S7800A1118 Katakana (Japanese) language.
    S7800A1126 Portuguese language.
Communications:
    S7810A1009 Data ControlBus™ Module
    S7810M1003 ModBus Module.
Miscellaneous:
    A7800A1010 7800 SERIES Tester.
    S7820A1007 Remote Reset Module.
    S7830A1005 Expanded Annunciator, 120 Vac, 50/60 Hz.
    203541 Data ControlBus Connector, 5-wire.
    203765 Remote Display Mounting Bracket.
    221729 Dust Cover, Relay Module.
    50023821-001 Keyboard Display Module Cover, NEMA 4, clear.
    204718B Keyboard Display Module Cover, NEMA 1, clear.
    50023821-002 Keyboard Display Module Cover, NEMA 4, clear with reset button.
    205321B Flush Display mounting kit.
    221818A Extension Cable, display, 5 ft (1524 mm).
    221818C Extension Cable, display, 10 ft (3048 mm).
    123514A Rectification Flame Simulator.
    203659 Ultraviolet Flame Simulator.

Table 1. RM7888A Terminal Ratings.

Terminal No.	Description	Ratings
G	Flame Sensor Ground[a]	—
Earth G	Earth Ground[a]	—
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	Air Valve	120 Vac, 9.8A FL, 58.8A LR (inrush).
6	Special Function 1	120 Vac, 1 mA.
7	Limits Complete	120 Vac, 8A run, 43A inrush.
8	Pilot Valve	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(B)	Firing Rate High Fire	120 Vac, 75 VA Pilot Duty.
13(R)	Firing Rate Common	120 Vac, 75 VA Pilot Duty.
14(W)	Firing Rate Low	120 Vac, 75 VA Pilot Duty.
15	Firing Rate Modulate	120 Vac, 75 VA Pilot Duty.
16	Unused	—
17	Special Function 2	120 Vac, 1 mA.
18	@Low Fire Input	120 Vac, 1 mA.
19	Special Function 3	120 Vac, 1 mA.
20	Special Function 4	120 Vac, 1 mA.
21	Flame Proven	120 Vac, 2A pilot duty.
22	Shutter	120 Vac, 0.5A.

[a] The RM7888 must have an earth ground providing a connection between the subbase and the control panel or burner. The earth ground wire must be capable of conducting the current to blow the 15A fuse or breaker in the event of an internal short circuit. The RM7888 needs a low impedance ground connection to the equipment frame which, in turn, needs a low impedance connection to earth ground. For a ground path to be low impedance at RF frequencies, the connection must be made with minimum length conductors having maximum surface areas. Wide straps or brackets are preferred rather than leadwires. Make sure that mechanically tightened joints along the ground path, such as pipe or conduit threads or surfaces held together with fasteners, are free of nonconductive coatings and are protected against mating surface corrosion.

[b] 2000 VA maximum connected load to RM7888A Assembly.

[c] See Tables 2 and 3 for device load combinations.

Table 2. Combinations for RM7888A Terminals 8, 9 and 10.

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

Table 3. 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 Valve with: 650 VA inrush, 360 VA open, 250 VA hold.	2A Pilot Duty	64 VA Pilot Duty plus Motor valves with: 3850 VA inrush. 700 VA Open 250 VA hold.

Table 4. Sequence Timing for Normal Operation.

RM7888A Sequence	Initiate	Standby	Purge	Pilot Flame Establishing Period (PFEP)	Main Flame Establishing Period (MFEP)	Pilot Relight	Run
Pilot: PV Return	10 seconds	*	**	10 seconds	15 seconds	5 seconds to infinity	*
PIlot: MV Lo Fire	10 seconds	*	**	10 seconds	15 seconds	—	*
DSI Normal	10 seconds	*	**	***	—	—	*
DSI High/Low Stepfire	10 seconds	*	**	***	—	—	*
DSI On/Off Stepfire	10 seconds	*	**	***	—	—	*

  * STANDBY and RUN can be an infinite time period.
 ** PURGE will be determined by the system master controller.
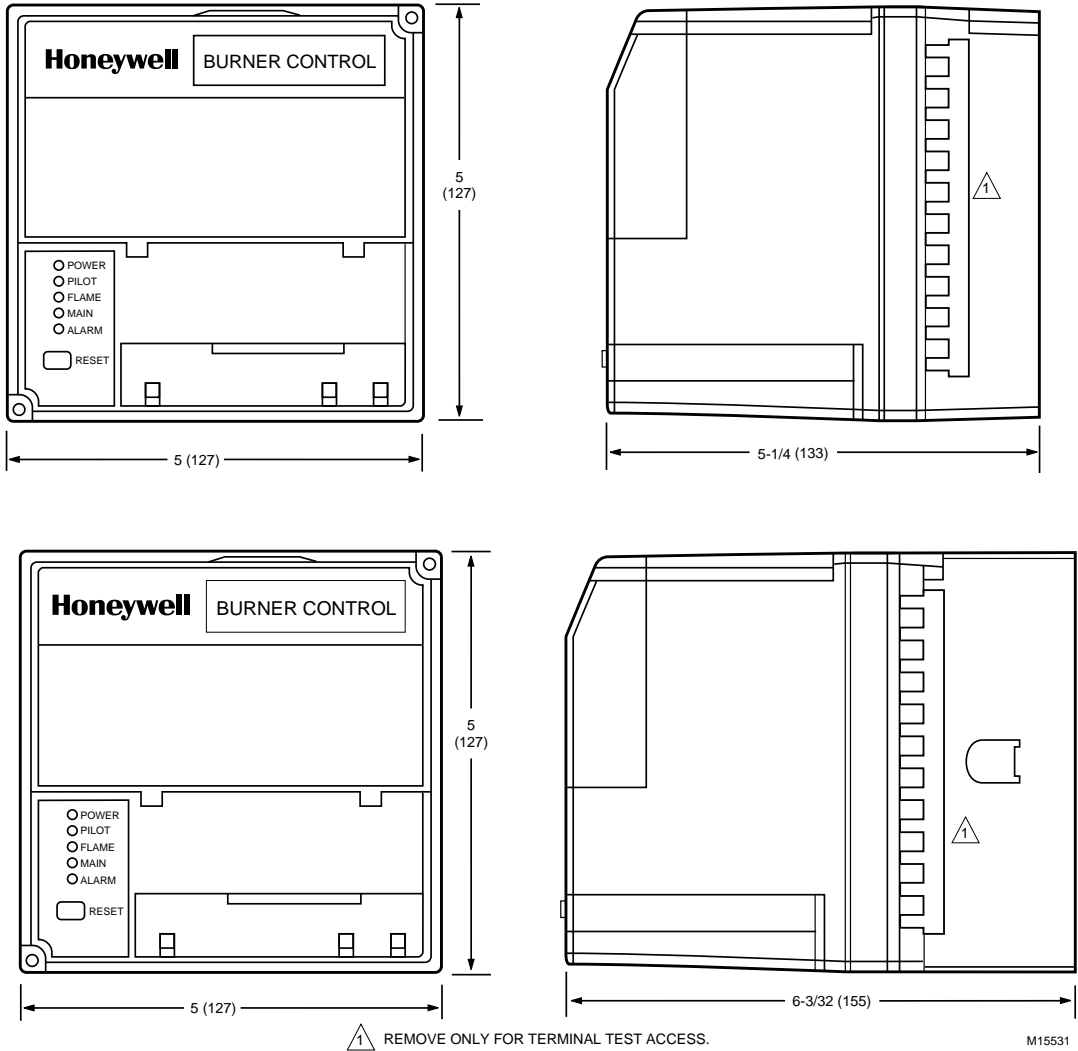*** RM7888A1001 and A1019 are 4 seconds, RM7888A1027 is 10 seconds.

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BURNER CONTROL

○ POWER
○ PILOT
○ FLAME
○ MAIN
○ ALARM

RESET

5 (127)

5 (127)

5-1/4 (133)

Honeywell

BURNER CONTROL

○ POWER
○ PILOT
○ FLAME
○ MAIN
○ ALARM

RESET

5 (127)

5 (127)

6-3/32 (155)

⚠1 REMOVE ONLY FOR TERMINAL TEST ACCESS.

M15531

Fig. 2. Mounting dimensions of RM7888 Relay Module and Q7800A and Q7800B Wiring Subbases in in. (mm).

Table 5. Flame Detector System.

Plug-In Flame Signal Amplifiers					Applicable Flame Detectors		
Type	Color	Self-Checking	Model	Flame Failure Response Time	Fuel	Type	Models
Rectification	Green	No	R7847A	0.8 or 3 sec.	Gas	Rectifying Flame Rod Holders[a]	C7004, C7007 Complete Assemblies: C7005, C7008, C7009, Q179
				3 sec.	Gas, oil, coal	Ultraviolet (Purple Peeper)	C7012A,C[b]
		Dynamic AMPLI-CHECK™	R7847B[c]	0.8 or 3 sec.	Gas	Rectifying Flame Rod Holders[a]	C7004, C7007 Complete Assemblies: C7005, C7008, C7009, Q179
				3 sec.	Gas, oil, coal	Ultraviolet (Purple Peeper)	C7012A,C[b]
		Dynamic Self-Check	R7847C[d]			Ultraviolet (Purple Peeper)	C7012E,F
Infrared	Red/ White	No	R7852A			Infrared (Lead Sulfide)	C7915
		Dynamic AMPLI-CHECK™	R7852B[c]				
Ultraviolet	Purple	No	R7849A	0.8 or 3 sec.	Gas, oil	Ultraviolet (Minipeeper)	C7027, C7035, C7044[b]
		Dynamic AMPLI-CHECK™	R7849B[c]				
		Dynamic Self-Check	R7861A[d]			Ultraviolet	C7061
	Blue	Dynamic Self-Check	R7886A[d]	3 sec.	Gas, oil, coal	Ultraviolet (Adjustable Sensitivity)	C7076
Optical	White	Dynamic AMPLI-CHECK™	R7851B[c]	0.8 or 3 sec.	Gas, oil, coal	Optical (Ultraviolet, visible light)	C7927, C7962

[a] Order flame rod separately, see holder instructions.

[b] The C7012A,C; C7027, C7035 and C7044 Flame Detectors should be used only on burners that cycle on-off at least once every twenty-four hours. Appliances with burners that remain on continuously for twenty-four hours or longer should use the C7012E,F Flame Detector with the R7847C Amplifier; the C7061 Flame Detector with the R7861 Amplifier, or the C7076 Flame Detector with the R7886A Amplifier as the ultraviolet flame detection system.

[c] Circuitry tests the flame signal amplifier at least 12 times a minute during burner operation and shuts down the boiler if the amplifier fails.

[d] Circuitry tests all electronic components in the flame detection system (amplifier and detector) 12 times a minute during burner operation and shuts down the burner if the detection system fails.

NOTE: R7847C Series 4 or greater, pulse the shutter when the flame signal of 1.5 is sensed. Display readings of 0.7 to 2.4Vdc are common.

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