

7800 SERIES EC7810A, EC7820A Relay Modules



APPLICATION

The Honeywell EC7810/EC7820A Relay Module is a microprocessor-based integrated burner control for automatically fired gas, oil or combination fuel single burner atmospheric (EC7810A) or atmospheric with fan (EC7820A) applications. The EC7810A/EC7820A system consists of the relay module, wiring subbase, amplifier and purge card. The optional keyboard display module (KDM) can be mounted on the relay module or on the face of a panel door. The KDM can also be mounted remotely from the panel if this is approved for the application.

The EC7810/EC7820 is programmed to provide a level of safety, functional capability and features beyond the capacity of conventional controls.

The basic functions of the EC7810/EC7820A include automatic burner sequencing, flame supervision, system status indication, system or self-diagnostics and troubleshooting.

FEATURES

- **Safety features:**
 - Interlock check.
 - Dynamic AMPLI-CHECK™
 - Closed loop logic test.
 - Dynamic input check.
 - Dynamic safety relay test.
 - Dynamic self-check logic.

SPECIFICATION DATA

- Expanded safe-start check.
- Internal hardware status monitoring.
- Low Fire Start Switch test.
- Tamper resistant timing and logic.
- **Ignition attempts: 1 or 3. Selectable by model number.**
- **Access for external electrical voltage checks.**
- **Application flexibility.**
- **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 sequence information light emitting diodes (LED)—with symbols for Power, Pilot, Flame, Main and Alarm (see Fig. 1).**
- **Interchangeable plug-in flame amplifiers.**
- **Nonvolatile memory; EC7810/EC7820 retain history files and sequencing status after loss of power.**
- **Remote reset (subject to application approval; optional).**
- **Remote mounting of KDM (subject to application approval).**
- **Burner control data available on the optional KDM:**
 - 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:**
 - Device type.
 - Flame amplifier type.
 - Flame failure response time (FFRT).
 - Manufacturing code.
 - On/off status of all digital inputs and outputs.
 - Selected prepurge time.
 - Software revision and version of relay module and optional KDM.
 - Status of configuration jumper.
 - Status of Run/Test Switch.

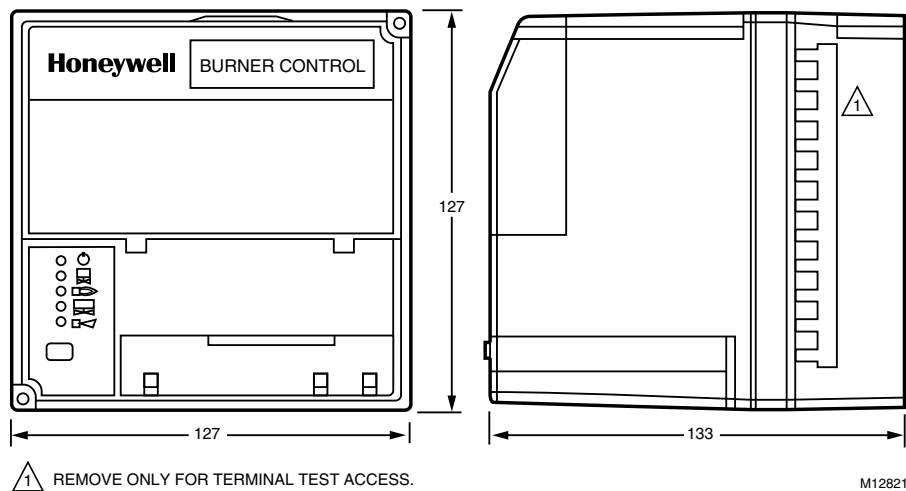


Fig. 1. Mounting dimensions of relay module and wiring subbase in millimeters only.

SPECIFICATIONS

Table 1. EC7810A/EC7820A Terminal Ratings .

Terminal No.	Abbreviation	Description	Ratings
G	—	Flame Sensor Ground ^a	—
Earth G	—	Earth Ground ^a	—
N	—	Line Voltage Common (Neutral)	—
3 (EC7810A)	L1	Line Voltage Supply (L1)	220-240 Vac (+10%/-15%), 50/60 Hz (±10%). ^b
3 (EC7820A)	AL	Alarm (Normally Open)	220/230/240 Vac, 1A, 10A inrush for 5000 cycles.
4 (EC7810A)	AL	Alarm (Normally Open)	220/230/240 Vac, 1A, 10A inrush for 5000 cycles.
4 (EC7820A)	FAN	Burner/Blower Motor	220/230/240 Vac, 4A at P.F. = 0.5, 20A inrush.
5 (EC7810A)	Not used		
5 (EC7820A)	L1	Line Voltage Supply (L1)	220-240 Vac (+10%/-15%), 50/60 Hz (±10%). ^b
6	RT	Limits and Burner Control	220/230/240 Vac, 5A (maximum).
7	LD2	Airflow Switch Input	220/230/240 Vac, 1 mA.
8	PV1	Pilot Valve 1 (interrupted)	220/230/240 Vac, 4A at P.F. = 0.5, 20A inrush. ^c
9	MV	Main Fuel Valve	220/230/240 Vac, 4A at P.F. = 0.5, 20A inrush. ^c
10	IGN	Ignition	220/230/240 Vac, 4A at P.F. = 0.2. ^c
F (11)	—	Flame Signal	135 to 220 Vac, current limited.
12	Not used		
13	COM	Firing Rate Common	220/230/240 Vac, 4A at P.F. = 0.5. ^d
14	MOD	Firing Rate Modulate	220/230/240 Vac, 4A at P.F. = 0.5. ^d
15	Not Used		
16	—	Control Voltage	220-240 Vac, (+10%/-15%).
17	ES2	Preignition Interlock Input	220/230/240 Vac, 1 mA.
18	ES1	Low Fire Switch Input	220/230/240 Vac, 1 mA.

Table 1. EC7810A/EC7820A Terminal Ratings (Continued).

Terminal No.	Abbreviation	Description	Ratings
19	Not used.		
20	LOS	Lockout Input	220/230/240 Vac, 1 mA.
21	PV2	Pilot Valve 2 (Intermittent)	220/230/240 Vac, 4A at P.F. = 0.5, 20A inrush. ^c
22	SHTR	Shutter	220-240 Vac, 0.25A. ^e

^a See Table 2.^b 2000 VA maximum connected load to 7800 SERIES Relay Module Assembly.^c Total load current, excluding burner/boiler motor and firing rate outputs cannot exceed 5A, 25A inrush.^d Can also be 24 Vac, 3A at PF = 0.5.^e 220-240 Vac to 120 Vac, 10 VA (minimum) stepdown transformer (not provided) required to drive shutter.**Table 2. Recommended grounding practices.**

Ground Type	Recommended Practice
Earth ground (subbase and relay module).	1. 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 15A fuse (or breaker) in the event of an internal short circuit. 2. 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. 3. Make sure that mechanically-tightened joints along the ground path are free of nonconductive coatings and protected against corrosion on mating surfaces.
Signal ground (KDM, Data ControlBus Module™, Modbus™ Module).	Use the shield of the signal wire to ground the device to the signal ground terminal 3(c) of each device. Connect the shield at both ends of the daisy chain to earth ground.

Table 3. Sequence Timing for Normal Operation.

Device	Initiate	Standby	Purge or Waiting	Preignition	First Safety Time	Pilot Stab.	Main Trial Time***	Main Stab.	Run	Ignition Attempts
EC7810A1027	2 sec	*	**	3 sec	5 or 10 sec	5 sec	5 or 8 sec	5 sec	*	1
EC7810A1035										3
EC7820A1026										1
EC7820A1034										3

*Standby and Run can be an infinite period.

**Waiting Time is determined by the ST7800A Purge Card selected.

***Second Safety Time is Main Trial Time plus Flame Failure Response Time.

Electrical Ratings (See Table 1):

Voltage and Frequency: 220 to 240 Vac (+10%/-15%), 50/60 Hz (±10%).

Keyboard Display Module (Optional): 13 Vdc peak full wave rectified (+20%/-15%).

Power Dissipation:

Relay Module: 10W maximum.

KDM: 3W maximum.

Maximum Total Connected Load: 2000 VA.

Fusing (Total Connected Load): 15A, type SC or equivalent

Environmental Ratings:

Ambient Temperatures:

Operating: -40°C to 60°C (-40°F to 140°F).

Storage: -40°C to 66°C. (-40°F to 150°F).

Humidity: 85% RH continuous, noncondensing.

Vibration: 0.5G environment.

Dimensions: See Fig. 1.**Weight:**

Relay Module: 0,730 kg unpacked.

KDM: 0,113 kg unpacked.

IMPORTANT

Flame Detection System available for use with EC7810/EC7820. Select your plug-in Flame Signal Amplifier and applicable Flame Detector from Table 4.

SIL 3 Capable:

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

Approvals:

This product complies with the following European directives: Gas Appliance Directive (90/269/EEG).

Low Voltage Directive (73/23/EEG).

EMC Directive (89/336/EEG).

GASTEC (CE-63AP3070/1).

Factory Mutual: J.I.OY0A9.AF.

Oil Approvals:

EC7810A1027: DIN-5F104/96.

EC7820A1026: DIN-5F105/96.

7800 SERIES EC7810A, EC7820A RELAY MODULES

EN298: "Automatic gas burner systems for gas burners and gas burning appliances with or without fans."

Please note the following to comply with EN60730 for remote mounting of the KDM and/or remote reset. It is necessary to provide electrical separation using insulation at least equivalent to double or reinforced insulation. Accomplish this by either:

- Optically isolating the communication and/or remote reset lines from the control cabinet or
- Providing physical separation from the communication and/or remote reset lines using electrical conduit and a remote display cover assembly (part no. 204718A) or other suitable enclosure that meets IP40 class of protection.

Mounting:

Q7800A Wiring Subbase for Panel Mount: To meet EN60730 requirements, mount the relay module in a secured panel which meets IP40 class of protection.

Required Components:

Plug-in Flame Signal Amplifier: See Table 2.

ST7800A Plug-in Purge Timer Cards: Selectable from two seconds to 30 minutes.

Q7800A Wiring Subbase.

Accessories:

Keyboard Display Modules (KDM) (Optional):

S7800A1001 English language.

S7800A1035 French language.

S7800A1043 German language.

S7800A1050 Italian language.

S7800A1167 Spanish language.

S7800A1118 Katakana (Japanese) language.

S7800A1126 Portuguese language.

Communications:

S7810A1009 Data ControlBus™ Module (if no KDM is used).

S7810M1029 ModBus Module

Miscellaneous:

S7820A1007 Remote Reset Module.

203541 Data ControlBus Connector, 5-wire.

203765 Remote Display Mounting Bracket.

221729 Relay Module Dust Cover.

50023821-001 Keyboard Display Module Cover, NEMA 4, clear.

50023821-002 Keyboard Display Module Cover, NEMA 4, clear with reset button.

205321B Flush Display Mounting Kit.

221818A Extension Cable, display, (1524 mm).

221818C Extension Cable, display, (3048 mm).

123514A Rectification Flame Simulator.

203659 Ultraviolet Flame Simulator.

Table 4. Flame Detection 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	1 or 2 sec maximum	Gas	Rectifying Flame Rod Holders ^a	C7004, C7007, C7011. Complete Assemblies: C7008, C7009, Q179.
		Dynamic Ampli-Check™	R7847B ^b				
Ultraviolet	Purple	No ^c	R7849A		Gas, oil	Ultraviolet (Minipeeper™)	C7027, C7035, C7044. ^c
		Dynamic Ampli-Check™	R7849B ^d				
		Dynamic Self-Check	R7861A ^{d,e}			Ultraviolet	C7061. ^f
	Blue		R7886A ^{d,e}	2 sec maximum	Gas, oil, coal	Ultraviolet (Adjustable Sensitivity)	C7076. ^f

^a Order flame rod separately; see holder instructions.

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

^c C7027, C7035 and C7044 Flame Detectors should be used only on burners that cycle on-off at least once every 24 hours. Appliances with burners that remain on continuously for 24 hours or longer should use C7061A Flame Detector with R7861A Amplifier as ultraviolet flame detection system.

^d Dynamic Self-Check ultraviolet amplifiers should be used only on burners that cycle on-off at least once every 24 hours. Appliances with burners that remain on continuously for 24 hours or longer should use C7061A Flame Detector with R7861A Amplifier or C7076 Flame Detector with R7886 Amplifier.

^e 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.

^f A 220/240 Vac to 120 Vac 10 VA step-down transformer (not provided) must be used to drive the shutter.

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