



S7810M ModBus™ Module



Combustion Solutions
Burner & Boiler Control Europe



S7810M

Компания Honeywell рада предложить Вашему вниманию новый S7810M ModBus модуль. С его помощью можно быстро и легко соединить программаторы серии 7800, и новую систему ControlLink™ к PlantScape для обмена информацией или к другим системам совместимым с ModBus.

Что это значит для промышленности?

- ◆ Теперь соединение стало проще и дешевле с широко используемым стандартным протоколом. До 99 рабочих станций можно подключить с помощью S7810M. Каждая рабочая станция может контролировать программаторы EC/RM7800 и R7999 - систему ControlLink™.

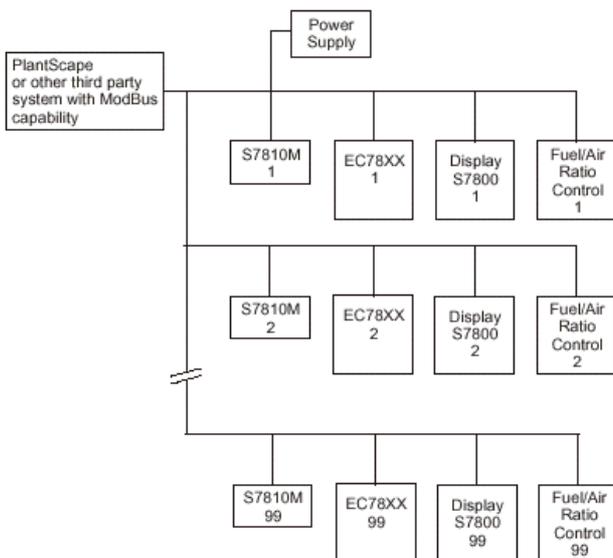
Что такое ModBus?

- ◆ ModBus – это промышленный стандарт для обмена информацией, используемый в большинстве продуктов, таких как: программируемый логический контроллер, SCADA, Front End Station, терминальные серверы и др. ModBus протокол предпочитают благодаря легкости его подключения и интеграции в другие системы.

Кто выигрывает?

- ◆ Более 30% всех интерфейсов использующихся в промышленных системах поддерживают протокол ModBus. Идеальное применение этих модулей там, где требуется постоянный контроль и мониторинг рабочей системы, состоящие из множества горелок, котлов, печей и т.п.

Сетевая структура может выглядеть следующим образом:



Особенности

- Итерфейсная шина Multi-Drop
- Возможность удаленного контроля
 - Включено / выключено
 - Положение максимального пламени
 - Положение минимального пламени
- Возможность дистанционной установки клавиатурно-дисплейного модуля

Спецификация

Модель

S7810M ModBus™ модуль

Электрические параметры

Напряжение и частота
13 Vdc (+20%/ -15%)

Рассеяние мощности
2W максимум

Параметры контактов

Питание: 13 Vdc

Заземление

ControlBus™ (1, 2, 3) и Multi-Drop ModBus™ (6, 7, 8):
5Vdc при 60mA максимум

Электрический коннектор (включен)

ControlBus™ : 208727 8-ми контактный коннектор

Окружающая среда

Температура

Функционирования: -40°C до +60°C

Хранение: -40°C до +66°C

Влажность: 85%

Вибрация: 0,5G

Размеры

См. рис. 1

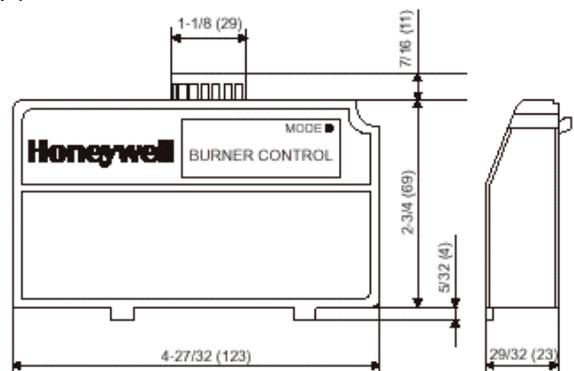
Вес

113 грамм

Аксессуары

208727 8-ми контактный коннектор

Рис. 1



Honeywell

S7810M

Honeywell is proud to introduce the new S7810M ModBus Module now CE approved for Europe. The ModBus Module allows for fast and easy communication between the SERIES 7800 controls and the new ControlLink System to PlantScape or any other system capable of ModBus communication.

What does this mean to the industry?

- Now communication can be made easy and less expensive with this widely accepted (standard) Protocol. Up to 99 sub-networks can be supported with the S7810M. Each sub-network can support an EC/RM7800 control and an R7999 Control Link System.

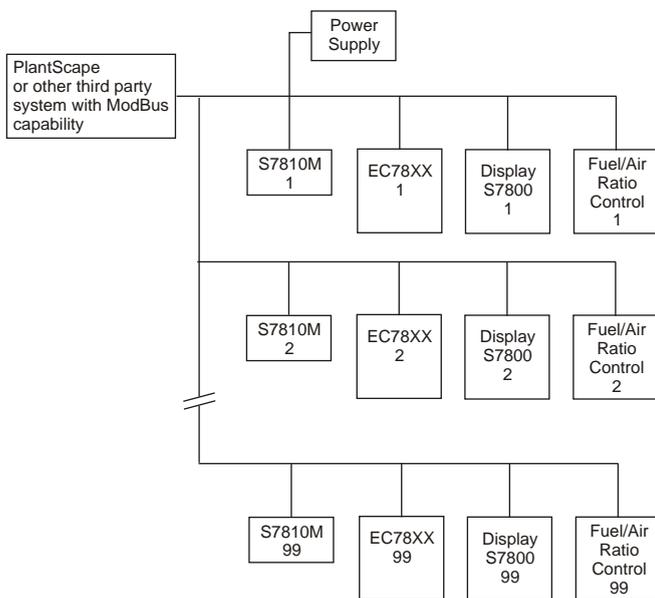
What's ModBus?

- ModBus Communication is an industry standard used in many products such as PLCs, SCADA systems, Front End Stations, Terminal Servers, etc. ModBus protocol is preferred due to its ease in communication and implementation which makes it easily integrateable to other systems.

Who benefits?

- With the S7810M, we focus on the industrial applications which have a third party interface with ModBus communication capability. The ideal applications are those with multiple burners, boilers, and ovens, which must remain on line.

What will the network architecture look like ?



Features:

- Multi/dropped communications bus interface
- Remote control capabilities
 - ON/OFF
 - Drive to High Fire
 - Drive to Low Fire
- Ability to remotely mount a Keyboard Display Module

Specifications:

Model
S7810M ModBus TM Module

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

Terminal Ratings
Power: 13 Vdc peak full/wave rectified
Earth ground
ControlBus™ (1,2,3) and Multi-Drop ModBus™ (6,7,8):
5 Vdc at 60 mA maximum

Electrical Connector (included)
ControlBus™ : 208727 8-pin electrical connector

Environmental Ratings
Ambient Temperature
Operating: -40° C to +60° C
Storage: -40° C to +66° C
Humidity: 85% relative humidity, continuous, noncondensing
Vibration: 0,5G envirement

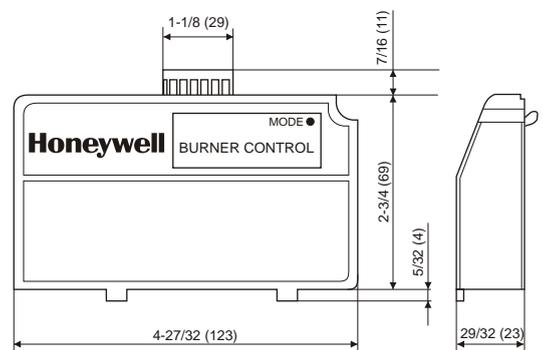
Dimensions:
See Fig.1

Weight
113 grams

Accessory
208727 eight-pin connector

Approvals
CE approved

Fig.1



Honeywell

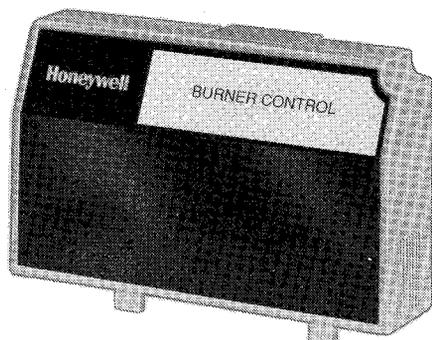
Honeywell Burner Boiler Control Center Europe

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7800 SERIES S7820 Remote Reset Module

The Honeywell 7800 SERIES is a microprocessor-based integrated burner control for automatically fired gas, oil or combination of fuel single-burner applications. The 7800 SERIES is programmed to provide a level of safety, functional capability and features beyond the capacity of conventional controls. Functions provided by the 7800 SERIES include automatic burner sequencing, flame supervision, system status indication, system or self diagnostics and troubleshooting.

The Remote Reset Module serves as a link between a remote reset switch and the Relay Module. Like the S7800 Keyboard Display Module, it allows the 7800 SERIES Burner Control to be reset from a remote switch, but provides none of the other Keyboard Display Module or DATA CONTROLBUS MODULE™ features.



- Reset **7800** SERIES Relay Module from a remote location.
- Install directly on the front of the 7800 SERIES Relay Module.
- Reset button can be installed up to 1000 feet away.

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Specifications

ELECTRICAL CONNECTORS (included):

ControlBus 5-Wire Electrical Connector, part no. 203541.

ENVIRONMENTAL RATINGS:

Ambient Temperature:

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

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

Humidity:

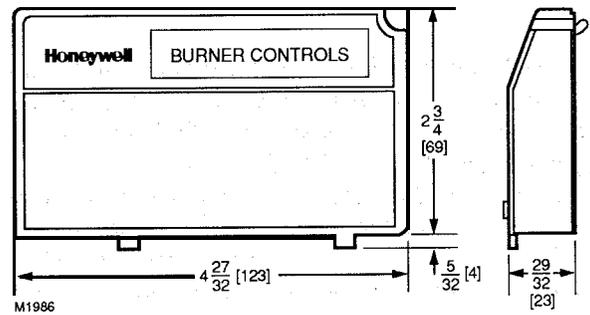
Operating: 85% RH continuous, noncondensing.

Vibration: 0.5 G environment.

DIMENSIONS: See Fig. 1.

WEIGHT: 3 ounces unpacked.

Fig. 1-Remote Reset Module dimensions in inches [millimeters].



Ordering Information

When purchasing replacement and modernization products from your 7800 SERIES distributor or refer to the TRADELINE Catalog 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:

1. Your local Honeywell Home and Building Control Sales Office (check white pages of your phone directory).
2. Home and Building Control Customer Satisfaction
Honeywell Inc., 1885 Douglas Drive North
Minneapolis, Minnesota 554224386 (612) 951-1000

In Canada-Honeywell Limited/Honeywell Limitee, 740 Ellesmere Road, Scarborough, Ontario M1P2V9 International Sales and Service Offices in all principal cities of the world. Manufacturing in Australia, Canada, Finland, France, Germany, Japan, Mexico, Netherlands, Spain, Taiwan, United Kingdom, U.S.A.

Installation

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 the application.
3. The installer must be a trained, experienced, flame safeguard control technician.
4. Disconnect the power supply before beginning installation to prevent electrical shock and equipment damage. More than one power supply disconnect may be involved.
5. Wiring must comply with all applicable codes, ordinances and regulations.
6. After installation is complete, check out the product operation as provided in these instructions.

HUMIDITY

Install the S7820 where the relative humidity never reaches the saturation point. The S7820 is designed to operate in a maximum 85% relative humidity (RH) continuous, noncondensing, moisture environment.

VIBRATION

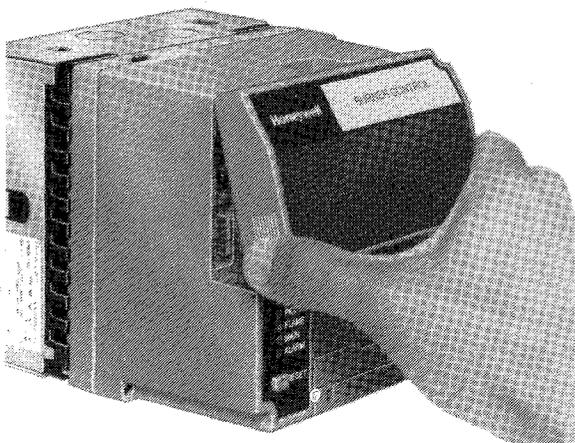
Do not install the S7820 where it could be subjected to vibration in excess of 0.5G continuous maximum vibration.

WEATHER

The S7820 is not designed to be weather tight. If installed outdoors, the S7820 must be protected by an approved weather-tight enclosure.

MOUNTING THE REMOTE RESET MODULE (See Fig. 2)

Fig. 2—Mounting the Remote Reset Module.



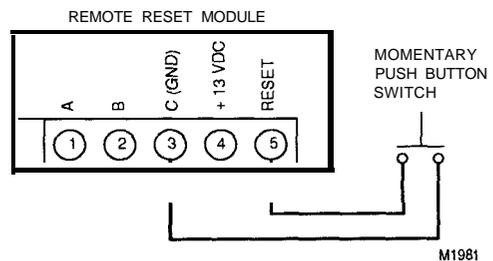
The S7820A Remote Reset Module mounts directly on the Relay Module to be remotely reset.

1. Align the two interlocking ears of the Remote Reset Module with the two mating slots on the 7800 SERIES Relay Module.
2. Insert the two interlocking ears into the two mating slots and with a hinge action push on the lower corners of the Remote Reset Module to **secure** it to the 7800 SERIES Relay Module.

WIRING

1. Disconnect the power supply from the main disconnect before beginning installation to prevent electrical shock and equipment damage. More than one disconnect may be involved.
2. All wiring must comply with all applicable electrical codes, ordinances and regulations.
3. Use recommended wire size and type of no. 22 AWG or greater twisted pair, insulated for low voltage, which is suitable for wiring the Remote Reset Module.
4. Use recommended grounding practice of connecting the momentary remote reset switch to terminal 3(c) on the Remote Reset Module (see Fig. 3).

Fig. 3—Wiring the Remote Reset Module.



5. Use recommended wire routing of avoiding running line voltage circuits, high voltage wires, and high voltage ignition transformer wires in the same' conduit with the remote reset wiring.
6. Use maximum wire length of 1000 feet to a remote reset switch.
7. Install all electrical connectors.
8. Restore power to the panel.

Checkout

Push the momentary pushbutton switch and make sure that the 7800 SERIES Relay Module resets.

7800 SERIES S7810B Multi-Drop Switch Module

PRODUCT DATA



FEATURES

- Multi-dropped communications bus interface.
- Remote reset.
- Ability to remotely mount a Keyboard Display Module.
- SYSNet™ system compatible.

APPLICATION

The Honeywell 7800 SERIES is a microprocessor-based integrated burner control for automatically fired gas, oil or combination fuel single-burner applications. The 7800 SERIES is programmed to provide a level of safety, functional capability and features beyond the capacity of conventional controls. Functions provided by the 7800 SERIES include automatic burner sequencing, flame supervision, system status indication, system or self-diagnostics and troubleshooting.

The S7810B Multi-Drop Switch Module supports remote mounting of a Keyboard Display Module, personal computer communications interface for multi-dropped 7800 SERIES subnetworks, and remote reset of a 7800 SERIES Relay Module.

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SPECIFICATIONS

Model:

S7810B Multi-Drop Switch Module.

Electrical Ratings:

Voltage and Frequency:

13 Vdc peak full-wave rectified (+20/-15%).

Power Dissipation:

2W maximum.

Terminal Ratings:

Power: 13 Vdc peak full-wave rectified.

Earth ground.

Local ControlBus (1,2,3) and Multi-Drop ControlBus (6,7,8):

5 Vdc at 1 mA maximum.

Electrical Connector (included):

ControlBus: 208727 8-pin electrical connector.

Environmental Ratings:

Ambient Temperature:

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

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

Humidity:

85% relative humidity continuous, noncondensing.

Vibration:

0.5G environment.

Dimensions:

See Fig. 1.

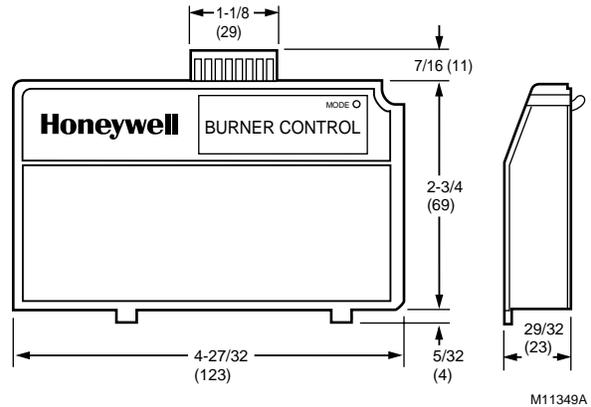


Fig. 1. Mounting dimensions of S7810B Multi-Drop Switch Module in in. (mm).

Weight:

4 ounces.

Accessory:

208727 eight-pin electrical connector.

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:

1. Your local Home and Building Control Sales Office (check white pages of your phone directory).
2. Home and Building Control Customer Logistics
Honeywell Inc., 1885 Douglas Drive North
Minneapolis, Minnesota 55422-4386 (612) 951-1000

In Canada—Honeywell Limited/Honeywell Limitée, 155 Gordon Baker Road, North York, Ontario M2H 3N7.
International Sales and Service Offices in all principal cities of the world. Manufacturing in Australia, Canada, Finland, France, Germany, Japan, Mexico, Netherlands, Spain, Taiwan, United Kingdom, U.S.A.

INSTALLATION

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. The installer must be a trained, experienced flame safeguard technician.
4. Disconnect the power supply before beginning installation to prevent electrical shock and equipment damage. More than one power supply disconnect can be required.
5. Wiring must comply with all applicable codes, ordinances and regulations.
6. After installation is complete, check out product operation as provided in these instructions.

IMPORTANT: This equipment can cause interference with radio communications.

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the Instructions Manual, may cause interference with radio communication. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J 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 is likely to cause interference, in which case, users at their own expense will be required to take whatever measures may be required to correct the interference. Any unauthorized modification of this equipment may result in the revocation of the owner's authority to continue its operation. When operating the S7810B remotely with a separate power supply, FCC compliance is not guaranteed unless an FCC-approved power supply is used.

Canadian EMI: This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the *Radio Interference Regulations* of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la Classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

Humidity

Install the S7810B where the relative humidity never reaches the saturation point. The S7810B is designed to operate in a maximum humidity environment of 85 percent relative humidity continuous, noncondensing moisture.

Weather

The S7810B is not designed to be weather-tight. When installed outdoors, protect the S7810B with an approved weather-tight enclosure.

Vibration

Do not install the S7810B where it could be subjected to vibration in excess of 0.5G continuous maximum vibration.

Mounting the S7810B Multi-Drop Switch Module (Fig. 2).

1. Align the two ears of the Multi-Drop Switch Module with the two mating slots on the 7800 SERIES Relay Module.
2. Insert the two interlocking ears into the two mating slots and, with a hinge action, push on the lower corners of the Multi-Drop Switch Module to secure it to the 7800 SERIES Relay Module.



Fig. 2. Multi-Drop Switch Module Mounting.

Wiring (Fig. 3)

1. Refer to Fig. 3 for proper wiring.
2. All wiring must comply with all applicable electrical codes, ordinances and regulations.
3. Recommended wiring size and type:
 - a. For ControlBus™ communications, use 22 AWG, 3-wire shielded cable (Belden part number 8723 or equivalent).
 - b. For 13 Vdc and remote reset switch operation, use 22 AWG wire insulated for voltages and temperatures in the application. Suggested wire types include TW (60°C), THW (75°C) and THHN (90°C) Terminal identification numbers and letters shown in Table 1.

Table 1. S7810B and QS7800B Terminal Identification.

Signal	S7810B Terminal	QS7800B terminal
Local Bus Data +	1	None
Local Bus Data -	2	None
Common • Local Bus Common • +13 Vdc Common • Remote Reset Common	3	None
+13 Vdc	4	None
Remote Reset	5	None
Multi-Drop Bus Common	6	c
Multi-Drop Bus Data +	7	a
Multi-Drop Bus Data -	8	b

4. Wire routing:
 - a. Do not route the ControlBus™ cable in conduit with line voltage circuits.
 - b. Do not route the ControlBus™ cable close to the ignition transformers.
 - c. Route the ControlBus™ cable outside of conduit if properly supported and protected from damage.
 - d. Route the ControlBus™ cable so that all devices are connected in a daisy chain configuration. See Fig. 3.
5. Maximum wire lengths:
 - a. RS-485 Communications bus, 4000 feet (1219 meters).
 - b. Remote reset switch, 1000 feet (305 meters).

BUILDING A MULTI-DROP NETWORK

The subnetwork addressing in the Q7700 Network Interface Unit (NIU) is not contiguous. It is divided into two blocks, containing 198 and 24 addresses, respectively. A maximum multi-drop configuration would include 222 subnetworks (198 plus 24) on a single Q7700 NIU.

One QS7800B ControlBus™ Module card supports up to 31 multi-drop subnetworks without using an RS-485 repeater. If an RS-485 repeater is used, up to 61 multi-drop subnetworks can be supported by one QS7800B card. The RS-485 repeater must be installed between the 30th and 31st subnetworks.

Each subnetwork includes one 7800 SERIES controller with or without an S7800 Keyboard Display Module and/or an S7830 Expanded Annunciator. An S7810B1007 Multi-Drop Switch Module is required in each subnetwork. See Fig. 3 for wiring information.

Subnetworks can be spread evenly (balanced) across the NIU slots to improve speed of communications.

It is recommended that the multi-drop network be built starting with slot number 1 of the NIU, subject to the above guidelines.

Record the serial number and physical location of each S7810B Multi-Drop Switch. This data will be useful when commissioning the ZM7850 Combustion System Manager (CSM) software. Refer to CSM manual, form 65-0102, for CSM commissioning.

Examples

Network with Maximum of 198 Subnetworks

NIU Slot Numbers	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	Total
Number of Subnetworks	61	61	61	15	open	open	198
Subnetworks Balanced	33	33	33	33	33	33	198

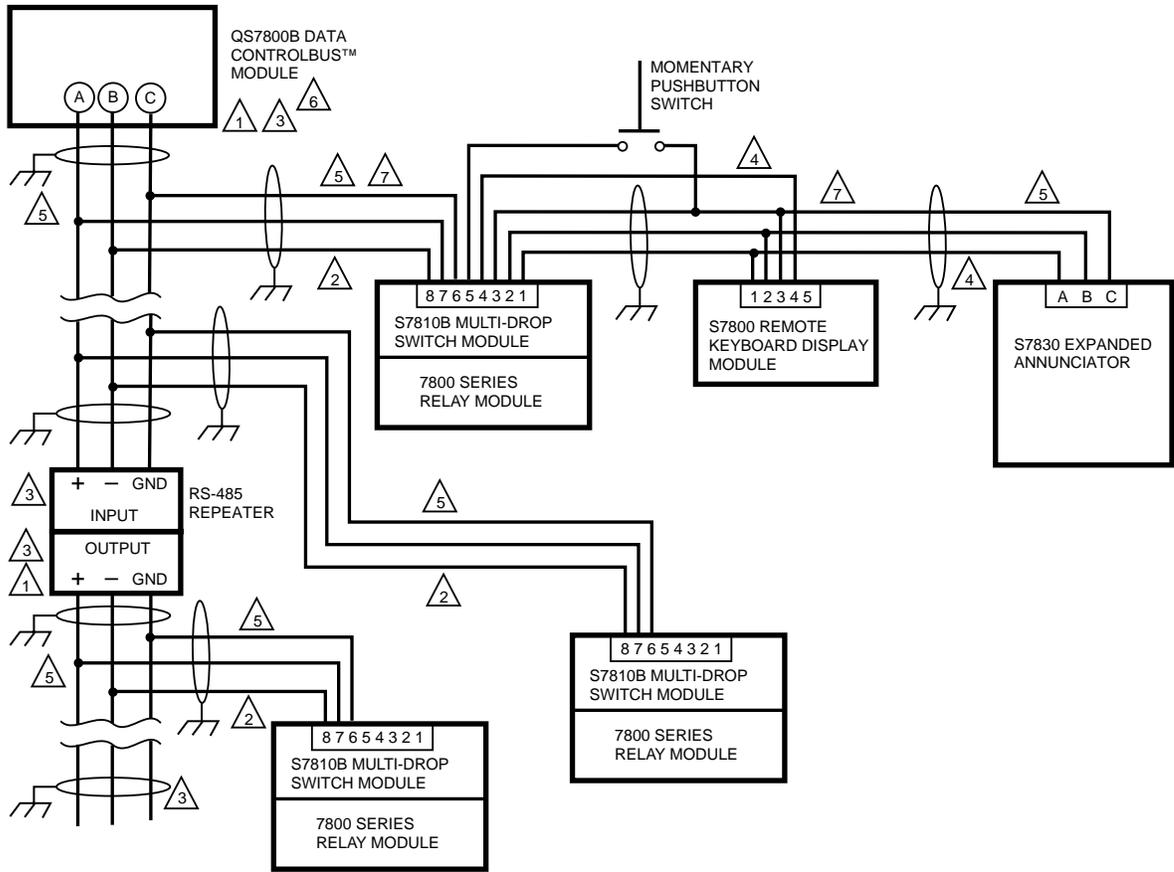
The open NIU slots can be used for other QS7800 ControlBus™ Module Cards.

Network with Maximum of 222 Subnetworks

NOTE: For networks that have more than 198 subnetworks, the last NIU card slot must have the 199th through 222nd subnetwork attached to it.

NIU Slot Numbers	1	2	3	4	5	6	Total
Number of Subnetworks	61	61	61	15	24	Open	222
Subnetworks Balanced	40	40	40	39	39	24	222

The open NIU slot can be used for other QS7800 ControlBus™ Module Cards.



- 1 MULTI-DROP RS-485 COMMUNICATION BUS. UP TO 31 S7810B MULTI-DROP SWITCH MODULES (SUBNETWORKS) CAN BE CONNECTED TO A SINGLE QS7800B CONTROLBUS™ MODULE WITHOUT AN RS-485 REPEATER. UP TO 61 S7810B MULTI-DROP SWITCH MODULES (SUBNETWORKS) CAN BE CONNECTED TO A SINGLE QS7800B CONTROLBUS™ MODULE WITH AN RS-485 REPEATER. WHEN USING AN RS-485 REPEATER, THE REPEATER MUST BE INSTALLED BETWEEN THE 30TH AND 31ST SUBNETWORKS.
- 2 THE SUBNETWORKS MUST BE WIRED IN A DAISY CHAIN CONFIGURATION. RECOMMEND THAT THE QS7800B CONTROLBUS™ MODULE BE AT ONE END OF THE DAISY CHAIN.
- 3 MULTI-DROP COMMUNICATION BUS TERMINATION RESISTORS:
 - A. WITHOUT RS-485 REPEATER: MODULES AT THE CLOSEST AND FARTHEST END OF THE DAISY CHAIN REQUIRE TERMINATION RESISTORS. INSTALL A 120 OHM, 1/4 WATT RESISTOR BETWEEN TERMINALS a AND b OF THE QS7800B CONTROLBUS™ MODULE. (IF INSTALLED AT ONE END OF DAISY CHAIN), INSTALL A 120 OHM, 1/4 WATT RESISTOR BETWEEN TERMINALS 7 AND 8 OF THE LAST S7810B MULTI-DROP SWITCH MODULE IN THE DAISY CHAIN.
 - B. WITH RS-485 REPEATER: WHEN AN RS-485 REPEATER IS USED, TWO DAISY CHAIN CONFIGURATIONS ARE EFFECTIVELY FORMED. MODULES AT THE CLOSEST AND FARTHEST END OF EACH DAISY CHAIN REQUIRE TERMINATION RESISTORS. INSTALL A 120 OHM, 1/4 WATT RESISTOR BETWEEN TERMINALS a AND b OF THE QS7800B CONTROLBUS™ MODULE. (IF INSTALLED AT ONE END OF DAISY CHAIN), INSTALL A 120 OHM, 1/4 WATT RESISTOR BETWEEN INPUT TERMINALS DATA+ AND DATA- OF THE RS-485 REPEATER. INSTALL A 120 OHM, 1/4 WATT RESISTOR BETWEEN OUTPUT TERMINALS DATA+ AND DATA- OF THE RS-485 REPEATER. INSTALL A 120 OHM, 1/4 WATT RESISTOR BETWEEN TERMINALS 7 AND 8 OF THE LAST S7810B MULTI-DROP SWITCH MODULE IN THE SECOND DAISY CHAIN.
- 4 LOCAL RS-485 COMMUNICATION BUS. THE DEVICES ON THIS BUS MUST BE WIRED IN A DAISY CHAIN CONFIGURATION. THE ORDER OF INTERCONNECTION IS NOT IMPORTANT. THE MODULES ON THE CLOSEST AND FARTHEST ENDS OF THE DAISY CHAIN REQUIRE A 120 OHM 1/4 WATT TERMINATION RESISTOR BETWEEN TERMINALS 1 AND 2 OR a AND b.
- 5 RECOMMEND THREE-WIRE SHIELDED CABLE (BELDEN 8723 SHIELDED OR EQUIVALENT). CABLE SHIELD MUST TERMINATE TO EARTH GROUND AT BOTH ENDS OF CABLE.
- 6 REFER TO QS7800B DATA CONTROLBUS™ MODULE INSTRUCTIONS, FORM 65-0227, FOR INSTALLATION INSTRUCTIONS.
- 7 THE MULTI-DROP BUS COMMON, S7810B TERMINAL 6, AND THE LOCAL BUS COMMON, S7810B TERMINAL 3, MUST NOT BE ELECTRICALLY CONNECTED TOGETHER.

M11348A

Fig. 3. Wiring S7810B Multi-Drop Switch Module.

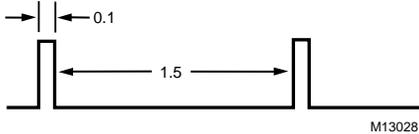
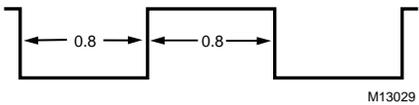
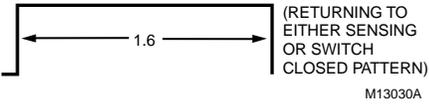
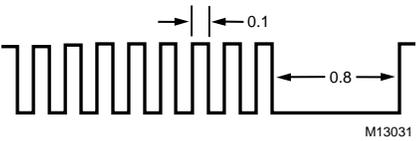
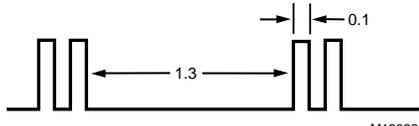
OPERATION

The S7810B Multi-Drop Switch Module has two communications ports. One communications port allows communication on a local bus that contains a burner controller and a keyboard display module(s) and/or an expanded annunciator. The other communications port is an addressed switched port which, when switched on by the

QS7800B ControlBus™ Module, communicates data from the local bus to the multi-drop bus. The S7810B also provides a +13 Vdc output for power to a remote Keyboard Display Module and an input for a remote reset switch.

A MODE light emitting diode (LED) provides status information through several blinking patterns. The patterns repeat every 1.6 seconds. See Table 2.

Table 2. Explanation of MODE LED light patterns.

Pattern in Seconds	Description
	<p>OFF LINE: The S7810B is not receiving any messages from the QS7800B ControlBus™ Module.</p> <p>LED is off for 1.5 seconds and on for 0.1 second.</p> <p>Check for:</p> <ul style="list-style-type: none"> • Wiring problems on multi-drop bus (loose connections, broken wires, or miswired connection). • QS7800B ControlBus™ Module or S7810B Multi-Drop Switch Module not connected to multi-drop bus. • QS7800B ControlBus™ Module not properly seated in Q7700 Network Interface Unit slot. • No power to Q7700 Network Interface Unit.
	<p>SENSING: The S7810B is receiving messages from the QS7800B ControlBus™ Module.</p> <p>LED is off for 0.8 second and then on for 0.8 second.</p> <p>The SENSING pattern reverts to the OFF LINE pattern when it has not received a message from the QS7800B ControlBus™ Module for more than four seconds.</p>
	<p>ALARM LISTEN: The S7810B monitors devices on the local bus and notes any alarm conditions.</p> <p>LED is on for 1.6 seconds then reverts to the SENSING or switch closed pattern.</p>
	<p>SWITCH CLOSED: The S7810B multi-drop bus port switch has been switched on by the QS7800B ControlBus™ Module and data from the local bus is being sent to the multi-drop bus.</p> <p>LED is off for 0.1 second and on for 0.1 second, repeating for the 1.6 seconds duration.</p>
	<p>FAULT: The S7810B has an internal fault.</p> <p>LED is off for 1.3 seconds, on for 0.1 second, off for 0.1 second, on for 0.1 second. (Pattern is mostly off with two short blinks.)</p>
<p>ON _____</p> <p style="text-align: center;">OR</p> <p>OFF _____</p> <p style="text-align: right;">M13033</p>	<p>STEADY STATE CONDITIONS:</p> <ul style="list-style-type: none"> • LED is always OFF. S7810B is either defective or no power has been applied to it. • LED is always ON. S7810B is defective.

Home and Building Control

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Honeywell Asia Pacific Inc.

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Hong Kong

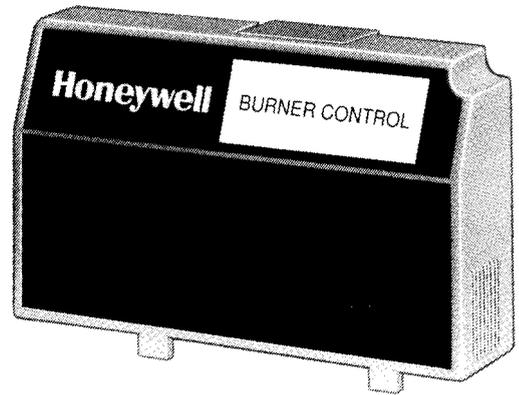
Honeywell



7800 SERIES S7810A DATA CONTROLBUS MODULE™

The Honeywell 7800 SERIES is a microprocessor-based integrated burner controller for automatically fired gas, oil or combination fuel single-burner applications. The 7800 SERIES is programmed to provide a level of safety, functional capability and features beyond the capacity of conventional controls. Functions provided by the 7800 SERIES include automatic burner sequencing, flame supervision, system status indication, system or self diagnostics and troubleshooting.

The DATA CONTROLBUS MODULE™ supports remote mounting of a Keyboard Display Module, personal computer communications interface, and remote reset.



■ Communications Bus Interface.

■ Remote reset.

■ Ability to remotely mount a Keyboard Display Module.

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<i>Specifications</i>2
<i>Ordering Information</i>	2
<i>Installation</i>3



Specifications

ELECTRICAL RATINGS:

Voltage and Frequency: 13 Vdc peak full-wave rectified (+20/-15%).

Power Dissipation: 2W maximum, 2 VA maximum.

TERMINAL RATINGS:

Power: 13 Vdc peak full-wave rectified.

Earth ground.

ControlBus (1(a), 2(b), 3(c)) 5 Vdc @ 1 mA maximum.

ELECTRICAL CONNECTORS (included):

2—ControlBus; 5-wire

Electrical Connector part no. 203541.

ENVIRONMENTAL RATINGS:

Ambient Temperature:

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

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

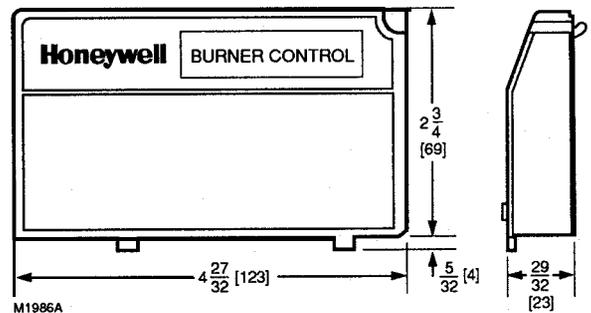
Humidity: 85% RH continuous, noncondensing.

Vibration: 0.5G environment.

DIMENSIONS: Refer to Fig. 1.

WEIGHT: 4 ounces unpacked.

Fig. 1—Mounting dimensions of the S7810A DATA CONTROLBUS MODULE™ in inches [millimeters].



Ordering Information

When purchasing replacement and modernization products for your 7800 SERIES distributor, refer to the TRADELINE® Catalog 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:

1. Your local Honeywell Home and Building Control Sales Office (check white pages of your phone directory).
2. Home and Building Control Customer Satisfaction
Honeywell Inc., 1885 Douglas Drive North
Minneapolis, Minnesota 554224386 (612) 542-7500

In Canada—Honeywell Limited/Honeywell Liiitee, 740 Ellesmere Road, Scarborough, Ontario M1P 2V9, International Sales and Service Offices in all principal cities of the world. Manufacturing in Australia, Canada, Finland, France, Germany, Japan, Mexico, Netherlands, Spain, Taiwan United Kingdom, U.S.A.

Installation

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 the application.
3. The installer must be a trained, experienced Flame Safeguard service technician.
4. Disconnect the power supply before beginning installation to prevent electrical shock and equipment damage. More than one power supply disconnect may be involved.
5. Wiring must comply with all applicable codes, ordinances and regulations.
6. After installation is complete, check out the product operation as provided in these Instructions.

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 provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area may cause interference; in which case, users at their own expense may 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 on the Radio Interference Regulations of the Canadian Department of Communications,***

HUMIDITY

Install the S7810 where the relative humidity never reaches the saturation point. The S7810 is designed to operate in a maximum 85% RH continuous, noncondensing, moisture environment.

VIBRATION

Do not install the S7810 where it could be subjected to vibration in excess of 0.5G continuous maximum vibration.

WEATHER

The S7810 is not designed to be weather tight. If installed outdoors, the S7810 must be protected by an approved weather-tight enclosure.

MOUNTING THE DATA CONTROLBUS MODULE™ (See Fig. 2)

1. Align the two interlocking ears of the DATA CONTROLBUS MODULE™ with the two mating slots on the 7800 SERIES Relay Module.
2. Insert the two interlocking ears into the two mating

slots and, with a hinge action, push on the lower corners of the DATA CONTROLBUS MODULE™ to secure it to the 7800 SERIES Relay Module.

Fig. 2 -DATA CONTROLBUS MODULE™ Mounting.

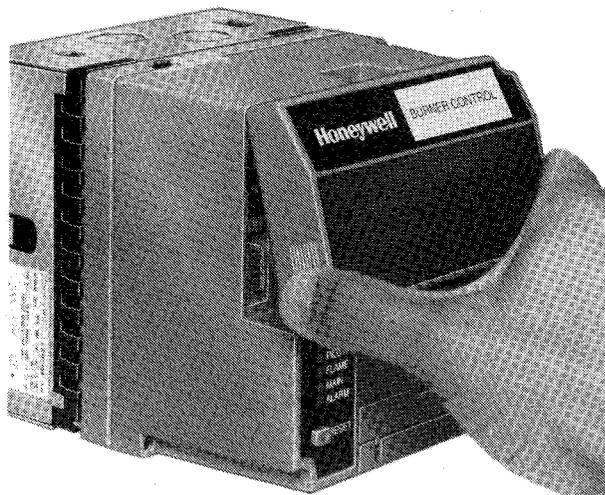
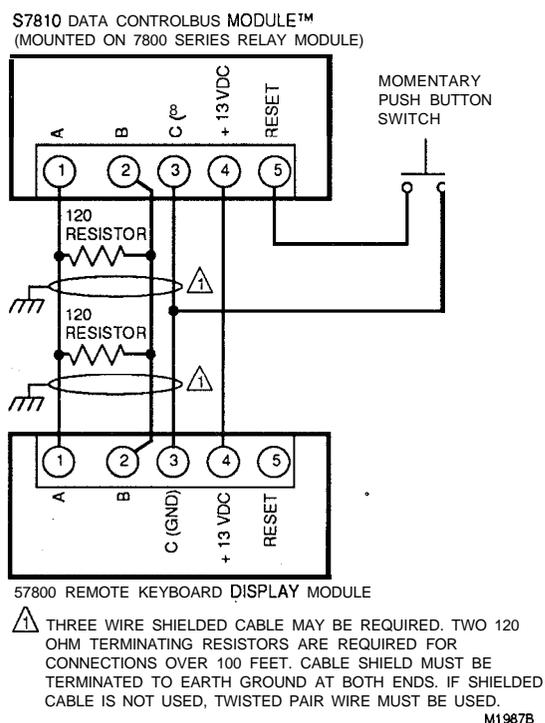


Fig. 3-Wiring the DATA CONTROLBUS MODULE™.

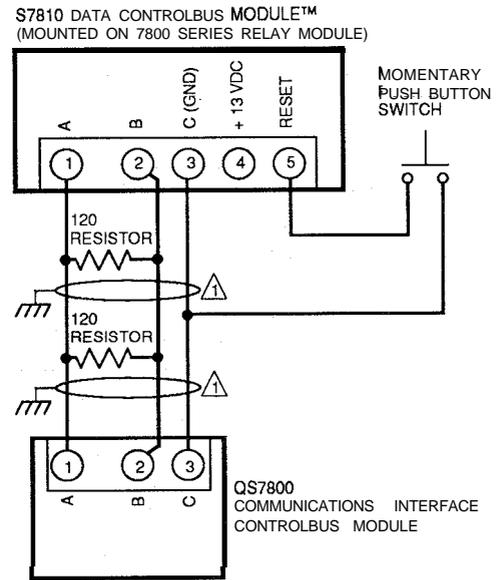


WIRING

1. Disconnect the power supply from the main disconnect before beginning installation to prevent electrical shock and equipment damage. More than one disconnect may be involved.
2. All wiring must comply with all applicable electrical codes, ordinances and regulations.
3. Recommended wire size and type:
 - a. Use an unshielded no. 22 AWG, 2-wire twisted cable and one wire for ground, for communications purposes, if the leadwire run and noise conditions permit; however, some installations may need up to five wires; three for communications and two for remote reset (in either a single cable or separate cables) or Belden 8771 shielded cable or equivalent. The 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 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 any connections over 100 feet, see Figs. 3 and 4.
 - b. Use no. 22 AWG wire insulated for voltages and temperatures in the application that use the 13 Vdc peak fullwave rectified power supply. Suggested wire types include TW (60C), THW (75C) and THHN (90C).
4. Recommended grounding practice for DATA CONTROLBUS MODULE™ is to connect the shield, if used, to signal ground, terminal 3(c), provided as part of the 7800 SERIES device ControlBus connection, see Figs. 3 and 4. Connect the shield at both ends to earth ground
5. Recommended wire routing:
 - a. Do not route the DATA CONTROLBUS MODULE™ cable in conduits with line voltage circuits.
 - b. Avoid routing the DATA CONTROLBUS MODULE™ cable in the same conduit with or close to ignition transformer leadwires.

- c. Route the DATA CONTROLBUS MODULE™ cable outside of conduit if it is properly supported and protected from mechanical damage.
6. Maximum wire lengths:
 - a. Use 1000 feet maximum length of all interconnecting wire for DATA CONTROLBUS MODULE™ and Keyboard Display Module leadwires.
 - b. Use 1000 feet maximum length of wire to a Remote Reset Switch for Remote Reset leadwires.
 7. Install all electrical connectors.
 8. Restore power to the panel.

Fig. AS7800 Wiring DATA CONTROLBUS MODULE™ to Communications Interface ControlBus Module.



⚠ **THREE WIRE SHIELDED** CABLE MAY BE REQUIRED. TWO 120 OHM TERMINATING RESISTORS ARE REQUIRED FOR CONNECTIONS OVER 100 FEET. CABLE SHIELD MUST BE TERMINATED TO EARTH GROUND AT BOTH ENDS. IF SHIELDED CABLE IS NOT USED, TWISTED PAIR WIRE MUST BE USED.

M2673

Honeywell

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Helping You Control Your World



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 (RM78XX only).
- 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.
- 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.
 - 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.

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Troubleshooting	11



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.
 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.

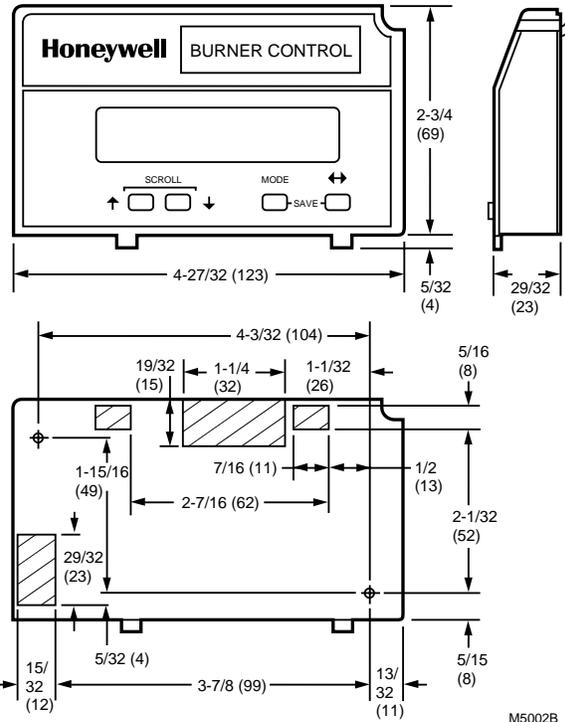


Fig. 1. Approximate dimensions of S7800 in in. (mm).

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 from the communication or remote display cover assembly (part number 204718A) or other suitable enclosure that meets the IP40 class of protection.

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:

1. Your local Home and Building Control Sales Office (check white pages of your phone directory).
2. Home and Building Control Customer Logistics
 Honeywell Inc., 1885 Douglas Drive North
 Minneapolis, Minnesota 55422-4386 (612) 951-1000

In Canada—Honeywell Limited/Honeywell Limitée, 155 Gordon Baker Road, North York, Ontario M2H 3N7.
 International Sales and Service Offices in all principal cities of the world. Manufacturing in Australia, Canada, Finland, France, Germany, Japan, Mexico, Netherlands, Spain, Taiwan, United Kingdom, U.S.A.

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 serious 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 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, 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:



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.

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 serious 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.

Table 1. Recommended Wire Size and Part Number.

Application	Recommended Wire Size	Recommended Part Numbers
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:

- Do not route the ControlBus cable in conduits that carry line voltage circuits.
- Avoid routing the ControlBus cable close to ignition transformer leadwires.
- Route the ControlBus cable outside of conduit if properly supported and protected from damage.

b. Remote Reset:

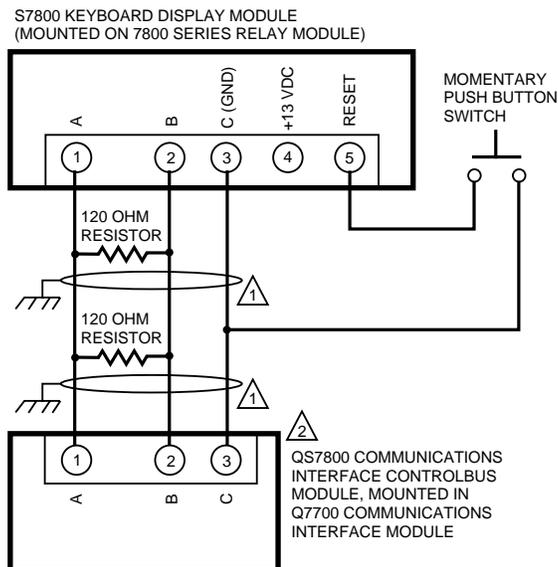
- Do not run high voltage ignition transformer wires in the same conduit with the Remote Reset wiring.
- Do not route Remote Reset wires in conduit with line voltage circuits.

7. Maximum wire lengths:

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

8. Install all electrical connectors.

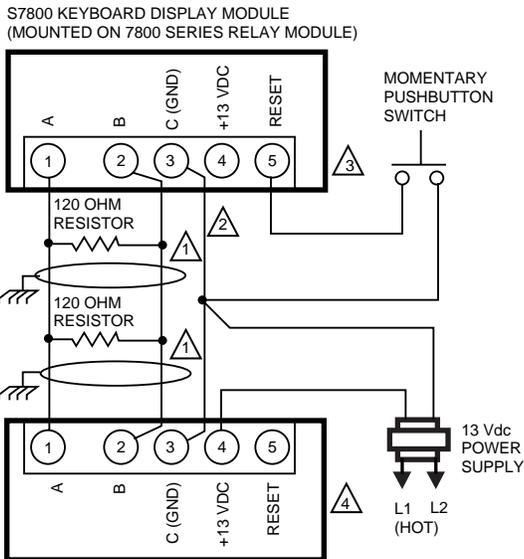
9. Restore power to the panel.



1 THREE WIRE SHIELDED CABLE MAY BE REQUIRED. TWO 120 OHM TERMINATING RESISTORS ARE REQUIRED FOR CONNECTIONS OVER 100 FEET (30 METERS). CABLE SHIELD MUST BE TERMINATED TO EARTH GROUND AT BOTH ENDS. IF SHIELDED CABLE IS NOT USED, TWISTED PAIR WIRE MUST BE USED.

2 WHEN CONNECTING THE KEYBOARD DISPLAY MODULE, DATA CONTROLBUS MODULE™, OR REMOTE RESET MODULE EXTERNAL FROM THE CONTROL CABINET, APPROPRIATE MEASURES MUST BE TAKEN TO MEET EN60730 SAFETY LOW VOLTAGE REQUIREMENTS (SEE APPROVALS). M1990E

Fig. 5. Wiring the keyboard display module.



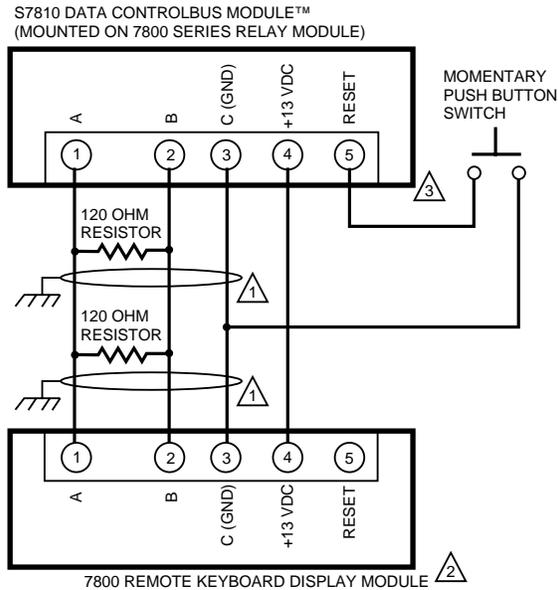
- S7800 REMOTE KEYBOARD DISPLAY MODULE
- 1 THREE WIRE SHIELDED CABLE MAY BE REQUIRED. TWO 120 OHM TERMINATING RESISTORS ARE REQUIRED FOR CONNECTIONS OVER 100 FEET [30 METERS]. CABLE SHIELD MUST BE TERMINATED TO EARTH GROUND AT BOTH ENDS. IF SHIELDED CABLE IS NOT USED, TWISTED PAIR WIRE MUST BE USED.
 - 2 WHEN CONNECTING THE KEYBOARD DISPLAY MODULE DATA CONTROLBUS MODULE™, OR REMOTE RESET MODULE EXTERNAL FROM THE CONTROL CABINET, APPROPRIATE MEASURES MUST BE TAKEN TO MEET EN60730 SAFETY LOW VOLTAGE REQUIREMENTS (SEE APPROVALS).
 - 3 7800 SERIES RELAY MODULE CAN SUPPORT ONE S7800 KEYBOARD DISPLAY MODULE. A 13 Vdc POWER SUPPLY IS REQUIRED FOR EACH ADDITIONAL DISPLAY.
 - 4 UP TO 36 S7800 KEYBOARD DISPLAYS CAN BE CONNECTED TO A SINGLE 7800 RELAY MODULE NOT TO EXCEED 4000 FEET (1219M) TOTAL LEADWIRE RUN. DAISY CHAIN 1 TO 1, 2 TO 2, 3 TO 3 AND PROVIDE 13 Vdc POWER SUPPLY FOR EACH S7800 DISPLAY. M5006F

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.



- 7800 REMOTE KEYBOARD DISPLAY MODULE
- 1 THREE WIRE SHIELDED CABLE MAY BE REQUIRED. TWO 120 OHM TERMINATING RESISTORS ARE REQUIRED FOR CONNECTIONS OVER 100 FEET. CABLE SHIELD MUST BE TERMINATED TO EARTH GROUND AT BOTH ENDS. IF SHIELDED CABLE IS NOT USED, TWISTED PAIR WIRE MUST BE USED.
 - 2 WHEN CONNECTING THE KEYBOARD DISPLAY MODULE DATA CONTROLBUS MODULE™, OR REMOTE RESET MODULE EXTERNAL FROM THE CONTROL CABINET, APPROPRIATE MEASURES MUST BE TAKEN TO MEET EN60730 SAFETY LOW VOLTAGE REQUIREMENTS (SEE APPROVALS).
 - 3 221818A OR C EXTENSION CAN BE USED IN PLACE OF THE S7810 DATA CONTROLBUS MODULE™ IF DISPLAY IS TO A CABINET DOOR. M5285C

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

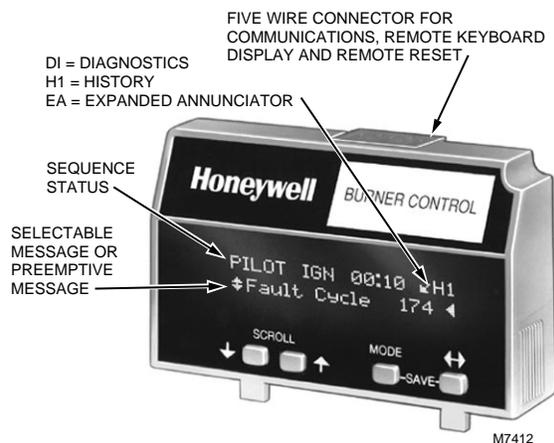


Fig. 8. S7800 Keyboard Display Module.

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.

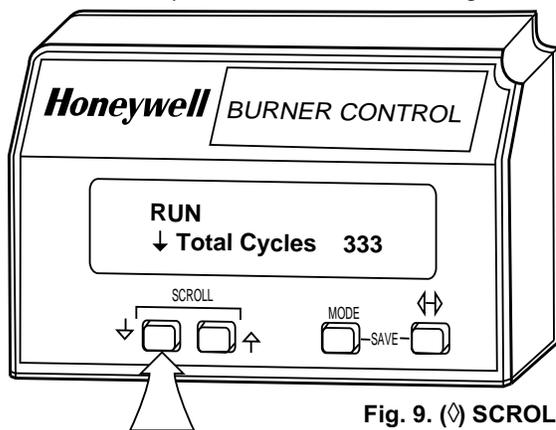
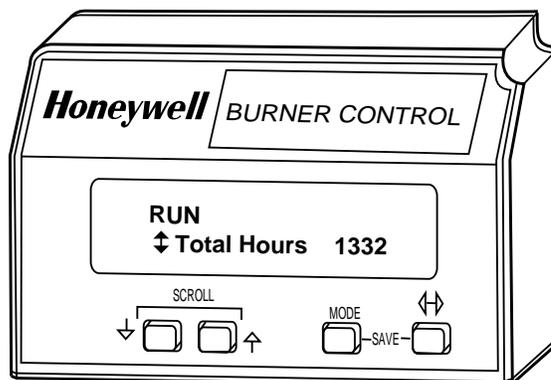


Fig. 9. (↕) SCROLL push-button function.



M1932A

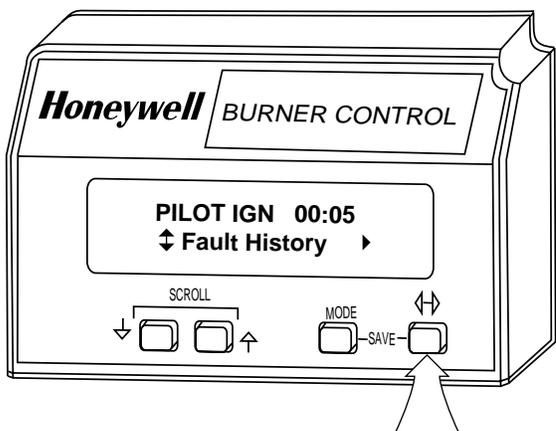
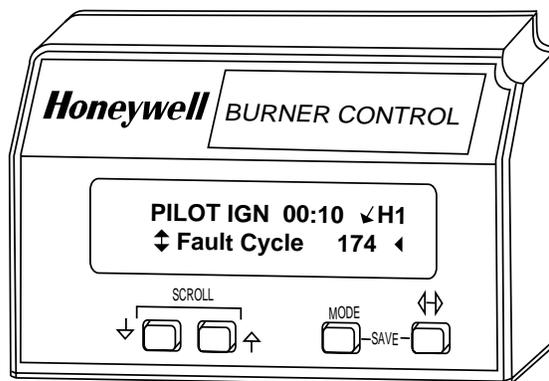


Fig. 10. (↔) CHANGE-LEVEL push-button function.



M1933A

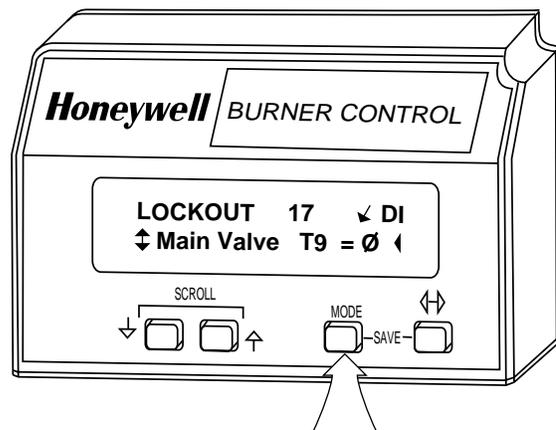
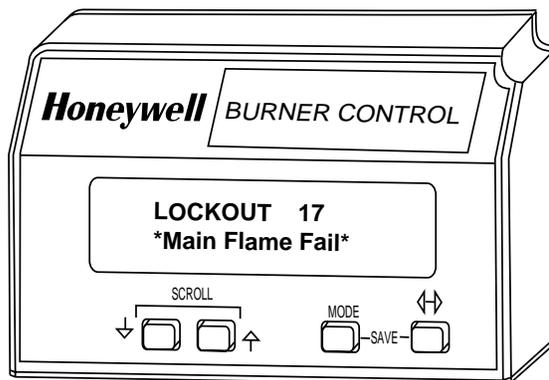


Fig. 11. MODE push-button function.



M1934C

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 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.

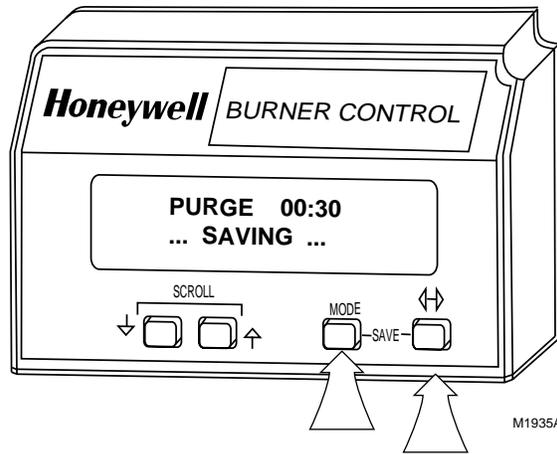


Fig. 12. SAVE function.

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.

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.

^aEuropean Approved Controls.

(continued)

Table 3. Selectable Messages (continued).

Selectable Message/Display	Description	Possible States/Range (Terminals)	Comments
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 ^a Preignition Interlock	= 1 or 0	Indicates if input is on or off, energized or de-energized.
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.

^aPreignition Interlock Terminal 17 or 20 is model dependent.

(continued)

Table 3. Selectable Messages (continued)

Selectable Message/Display	Description	Possible States/Range (Terminals)	Comments
Mfg Code	Manufacturing code is five digit number representing date code.	nnnnn	—
SW Rev.	Software revision and version code for 7800 SERIES and Keyboard Display Module.	nnnn/nnn	—
Expanded Annunciator	First level prompt for history information. Has subset level; see Table 2.	—	—
Remote Command	Status of firing rate command from remote controller.	NONE/HOLD HF/LF	—

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.

Table 4. Expanded Annunciator.

Selectable Message ^a (Second Line)	Display Value (Second Line) ^b	First Line Message
↑Expanded Annun.↔		
↑Expanded Annunciator (EA not connected)<		
↑Current Status (CS:) ^a	EA Message<	↓EA
↑Valve Closure (Valve Close)	T4 =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.

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.

(continued)

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

Sequence	Status
STANDBY HOLD: T7 (Running Interlock) T17 for EC/RM7810, 7820, EC/RM7830, 7850 devices	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.
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 condition 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.

(continued)

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

Sequence	Status
If the relay module is in a RUN HOLD status, the following condition could exist (continued):	
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 7.

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.

Table 7. Selectable Messages (see Table 1).

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	Cycle will be updated each time main valve is energized.
Total Hours	Total number of equipment operating hours.	0 - 99,999 (250,000) hours	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	—
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 or off, 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 ^a	Preignition Interlock.	= 1 or 0	Indicates if input is on or off, energized or de-energized.
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.

(continued)

Table 7. Selectable Messages (continued).

Selectable Message/Display	Description	Possible States/Range (Terminals)	Comments
Jumper 1	Pilot Flame Establishing Period (PFEP).	INTACT/CLIPPED	Display shows state of PFEP jumper. If jumper is intact, 7800 SERIES has 10 second PFEP. If jumper is clipped, 7800 SERIES has 4 second PFEP.
	First Safety Time (for 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 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.
Mfg Code	Manufacturing code is five digit number representing date code.	nnnnn	—
SW Rev.	Software revision and version code for 7800 SERIES and Keyboard Display Module.	nnnn/nnn	—
Expanded Annunciator	First level prompt for history information. Has subset level; see Table 2.	—	—
Remote Command	Status of firing rate command from remote controller.	NONE/HOLD HF/LF	—

SERVICE NOTE: If the KDM is scrambled, remove and reinstall the KDM and reset the 7800 SERIES Relay Module. Reset the 7800 SERIES Relay Module by pressing the RESET button on the relay module, or pressing the remote reset push-button wired through the KDM, Data ControlBus™ Module or Remote Reset Module. A power-up reset causes an electrical reset of the 7800 SERIES Relay Module but does 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.

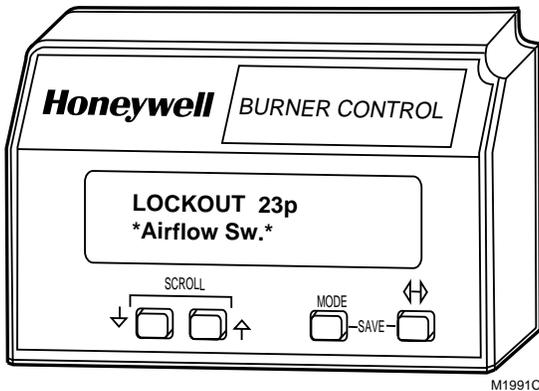


Fig. 13. Lockout message, State 1.

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

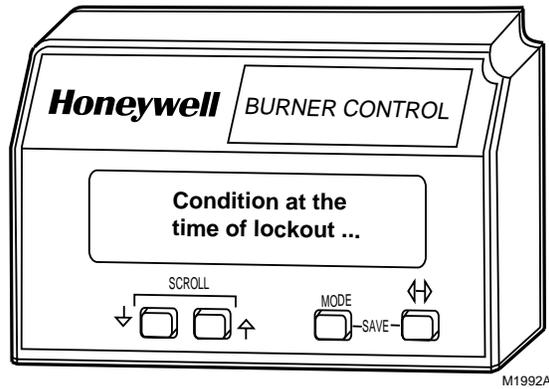


Fig. 14. Lockout message, State 2.

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.

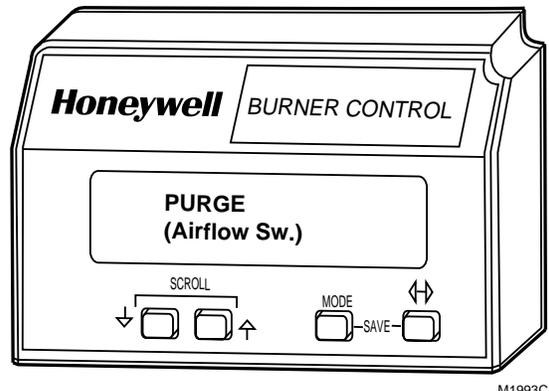


Fig. 15. Lockout message, State 3.

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 8. 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.	<ol style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 1. Check the relay module and display module connections. 2. Reset and sequence the relay module.
Fault 3 *AC Line Dropout*	Ac line dropout detected.	<ol style="list-style-type: none"> 3. Check the relay module power supply and make sure that both frequency and voltage meet the specifications.
Fault 4 *AC Frequency*	Device running on fast ac.	<ol style="list-style-type: none"> 4. Check the backup power supply, as appropriate.
Fault 5 *Low Line Voltage*	Low ac line detected.	
Fault 6 *Purge Card Error*	Purge card timing changed since card was initially read.	<ol style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 1. Check wiring and correct any errors. Make sure that 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. Reseat the amplifier. 4. Reset and sequence the relay module. 5. If the code reappears, replace the amplifier.
Fault 8 *Flame Amp/Shutr*	Flame sensed when no signal expected during shutter-check or Ampli-Check™ versions.	<ol style="list-style-type: none"> 6. If the fault persists, replace the flame detector. 7. If the fault persists, replace the relay module.
Fault 9 *Flame Detected*	Flame sensed when no flame is expected during STANDBY.	<ol style="list-style-type: none"> 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. Reseat 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 *EC/RM7800, 7840, 7838B only).	<ol style="list-style-type: none"> 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.
Fault 11 *Running ILK On*	Running Interlock powered at improper sequence point.	<ol style="list-style-type: none"> 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 is jumpered.

(continued)

Table 8. Hold and Fault Message Summary (continued).

Fault Code	System Failure	Recommended Troubleshooting
Fault 12 *Lockout ILK On*	Lockout Interlock powered at improper point in sequence.	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.
Fault 13 *Airflow Sw. On*	Combustion airflow interlock fault during STANDBY.	5. If steps 1 through 4 are correct and the fault persists, replace the relay module.
Fault 14 *High Fire Sw.*	High Fire Interlock Switch failure to close during PREPURGE.	<ol style="list-style-type: none"> 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 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.	<ol style="list-style-type: none"> 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. Reseat the 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.	<ol style="list-style-type: none"> 1. Measure the flame signal. If one exists, make sure it meet 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 and on for at least 10 seconds.	<ol style="list-style-type: none"> 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.
Fault 18 *Flame Detected*	Flame sensed when shutter is open and no flame is expected during PREPURGE.	<ol style="list-style-type: none"> 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. Reseat 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.

(continued)

Table 8. Hold and Fault Message Summary (continued).

Fault Code	System Failure	Recommended Troubleshooting
Fault 19 *Main Flame Ign.*	Flame was lost during MFEP or the first 10 seconds of the RUN state.	<ol style="list-style-type: none"> 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. 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.	<ol style="list-style-type: none"> 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 that it closes 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.	<ol style="list-style-type: none"> 1. Check wiring; 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.
Fault 22 *Lockout ILK*	Lockout Interlock fault during PREPURGE.	<ol style="list-style-type: none"> 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.
Fault 23 *Airflow Switch*	Combustion airflow interlock fault during PREPURGE.	<ol style="list-style-type: none"> 5. If steps 1 through 4 are correct and the fault persists, replace the relay module.
Fault 24 *Call Service*	The flame interlock (relay module) was on when it should be off.	<ol style="list-style-type: none"> 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 (RM7838B only).	<ol style="list-style-type: none"> 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.
Fault 27 *Start Switch On*	Start Switch was on during PREPURGE (RM7838A, RM7838B only).	<ol style="list-style-type: none"> 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 3 are correct and the fault persists, replace the relay module.

(continued)

Table 8. Hold and Fault Message Summary (continued).

Fault Code	System Failure	Recommended Troubleshooting
Fault 28 *Pilot Flame Fail*	Pilot flame failure.	<ol style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 1. Check wiring; 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 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 30 *Running ILK*	Running Interlock fault.	<ol style="list-style-type: none"> 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 of 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 (RM7838B only).	<ol style="list-style-type: none"> 1. Check wiring; 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 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.
Fault 32 *Airflow Switch*	Combustion Airflow Interlock fault.	<ol style="list-style-type: none"> 1. Check wiring; 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 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.

(continued)

Table 8. Hold and Fault Message Summary (continued).

Fault Code	System Failure	Recommended Troubleshooting
Fault 33 *Preignition ILK*	Preignition interlock fault.	<ol style="list-style-type: none"> 1. Check wiring; 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). For EC/RM7810, 7820, EC/RM7830, 7850, check voltage between terminal 17 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.	<ol style="list-style-type: none"> 1. Check wiring; 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.	<ol style="list-style-type: none"> 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.
Fault 36 *Call Service*	Main valve terminal was off when it should be on, or the internal fuse has blown.	<ol style="list-style-type: none"> 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. If fault persists, replace the relay module.
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.	<p> WARNING</p> <p>Explosion Hazard. Can cause explosion, serious injury or death.</p> <ol style="list-style-type: none"> 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.	

(continued)

Table 8. 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.	<ol style="list-style-type: none"> 1. Check wiring; 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 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. If steps 1 through 4 are correct and the fault still persists, replace the relay module.
Fault 46 *Flame Amp Type*	<p>This fault indicates:</p> <ol style="list-style-type: none"> a. The Flame Failure Response Time (FFRT) or TYPE input from the amplifier changed while the device was powered; or b. A standard amplifier was used in a pilot valve application; or c. A three-second FFRT Amplifier was used with the relight option on the RM7890 Relay Module. 	<ol style="list-style-type: none"> 1. Remove power to the device. 2. Reseat the flame amplifier and reset and sequence the relay module. 3. For EC/RM7890 only; make sure that Jumper JR2 is completely clipped if a three-second FFRT amplifier is being used. If Jumper JR2 is intact (relight option is selected), use 0.8 second FFRT amplifier. 4. For RM7838B only; make sure that a Shutter Check Flame Amplifier is being used with the Pilot Valve Hold option selected.
Fault 47 *Jumpers Changed*	The configuration jumpers differ from the sample taken at startup.	<ol style="list-style-type: none"> 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.	<p> WARNING</p> <p>Explosion Hazard. Can cause explosion, serious injury or death.</p> <ol style="list-style-type: none"> 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.	<p> WARNING</p> <p>Explosion Hazard. Can cause explosion, serious injury or death.</p> <ol style="list-style-type: none"> 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.

(continued)

Table 8. Hold and Fault Message Summary (continued).

Fault Code	System Failure	Recommended Troubleshooting
Fault 50 *Jumpers Wrong*	The sequence logic detected a combination of jumpers that is illegal for the sequence eg, if it is correct to clip Jumper JR1 or Jumper JR2, but not both, this fault would be used when both are clipped (RM7888 only).	<ol style="list-style-type: none"> 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.
Fault 51 *Flame Too Strong*	Flame signal value is too high to be valid.	<ol style="list-style-type: none"> 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 to 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.	<ol style="list-style-type: none"> 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 (EC7810, 7820, EC/RM7830, 7850 only).	<ol style="list-style-type: none"> 1. Check wiring; 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).	<ol style="list-style-type: none"> 1. Check wiring; 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 or 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).	<ol style="list-style-type: none"> 1. Check wiring; 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).	<ol style="list-style-type: none"> 1. Check wiring; 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).	<ol style="list-style-type: none"> 1. Inspect the Prepurge Fan Switch terminal 18 and the connections. Make sure the switch is working properly. 2. Reset and sequence the relay module. 3. If the fault persists, replace the relay module.

(continued)

Table 8. Hold and Fault Message Summary (continued).

Fault Code	System Failure	Recommended Troubleshooting
Faults 58 - 66 *Call Service*	Unused faults	—
Fault 67 *AC Phase*	L1 and L2 miswired/exchanged (EC/RM7830, 7850 only).	1. Check L1 and L2 for proper line phasing.
Fault 68 *Preignition ILK*	Preignition Interlock fault.	1. Check wiring; 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.
Fault 69 - 70 *Call Service*	Unused faults.	—
Fault 71 *Dynamic LFS*	Low Fire Switch closed, High Fire Switch must be open (EC/RM7850 only).	1. Check firing rate position switches (usually in Modutrol® Motor) for proper operation. 2. Check wiring, 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, 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. (RM7888 only)	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. (RM7888 only)	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 3 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. (RM7888 only)	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.
Fault 76 - 93 *Accessory Fault*	—	—
Fault 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

(continued)

Table 8. Hold and Fault Message Summary (continued).

Fault Code	System Failure	Recommended Troubleshooting
Fault 106 *Call Service*	Relay Module self-test failure.	and reapply the power; reset and sequence the relay module. 3. If the fault persists, replace the relay module.
Fault 107 *Call Service*	Relay Module flame signal crosscheck failure.	
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 <i>cannot</i> be reset and <i>must</i> 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.

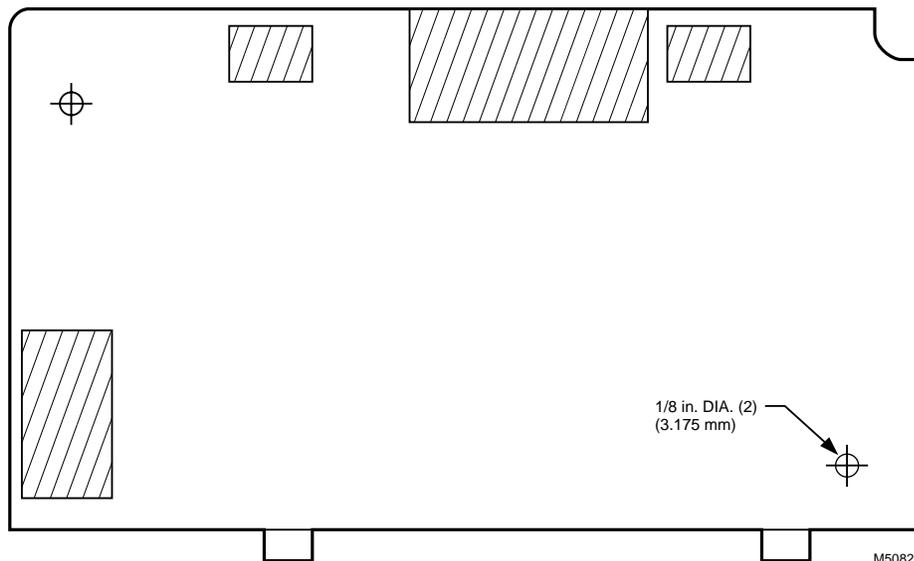


Fig. 16. KDM flush mounting outline.

Home and Building Control

Honeywell Inc.
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P.O. Box 524
Minneapolis MN 55408-0524

Honeywell Latin American Region

480 Sawgrass Corporate Parkway
Suite 200
Sunrise FL 33325

Home and Building Control

Honeywell Limited-Honeywell Limitée
155 Gordon Baker Road
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M2H 3N7

Honeywell Europe S.A.

3 Avenue du Bourget
1140 Brussels
Belgium

Honeywell Asia Pacific Inc.

Room 3213-3225
Sun Hung Kai Centre
No. 30 Harbour Road
Wanchai
Hong Kong

Honeywell

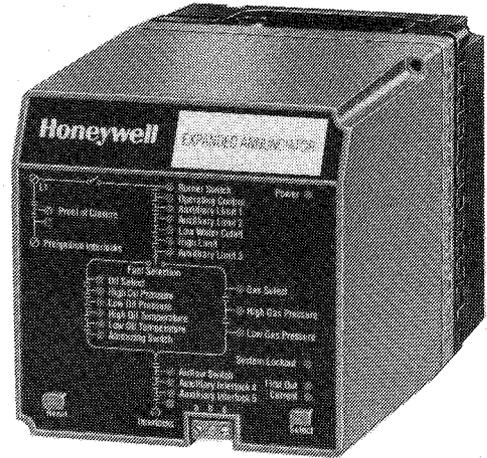


7800 SERIES

S7830 Expanded Annunciator

The Honeywell 7800 SERIES is a microprocessor based integrated burner control for automatically or semi-automatically fired gas, oil, coal, or combination fuel single burner applications. The 7800 SERIES provides a level of safety, functional capability and features beyond the capacity of conventional controls. Functions provided by the 7800 SERIES include: automatic burner sequencing, flame supervision, system status indication, system or self-diagnostics and troubleshooting. The 7800 SERIES consists of a Relay Module, Flame Amplifier, Universal Mounting Subbase, Plug-In Purge Timer and optional Keyboard Display Module, Remote Reset, and Communications Interface for integrating personal computer networking.

The S7830 Expanded Annunciator is an enhancement module for use with any 7800 SERIES Relay Module. The S7830 is a microprocessor based device designed to monitor the status of a series string of limit, control, and interlock contacts for a commercial or industrial burner. The S7830 acts as a system monitor and enhances fault and status messages of the 7800 SERIES burner control.



- 26 status LEDs.
- Front panel LED array—arranged in a pattern to clearly indicate the flow of line-voltage through the string of limits, controls, and interlocks.
- Selectable current and first-out LED array display status.
- Power and proper operation indicating LED.
- Common Universal Mounting Subbase (Q7800 A or B).
- 21 monitored contact points.
- Access for external electrical voltage checks.
- Communication interface capability.
- S7800 Keyboard Display Module data:
 - Device type.
 - Software revision and version.
 - Expanded Annunciator current status.
 - First-out fault code.
 - Status (on/off) of all line voltage monitored contact points.
- LED operational test.
- 36 additional 7800 SERIES fault and hold messages.

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Specifications

ELECTRICAL RATINGS (See Table 1):

Voltage and Frequency: 120 Vac +10/-15%, 50 or 60 Hz +/-10 %.

Power Dissipation: 4.6W maximum.

TABLE 1—TERMINAL RATINGS

Terminal Number	Description	Rating
1	Earth Ground ¹	
2	Input Line Voltage (Neutral)	120 Vac +10/-15%
3	Input Line Voltage (Hot)	
4	Main Valve Proof Of Closure	120 Vac +10/-15%, 2 mA
5	Burner Switch	
6	Operating Control	
7	Auxiliary Limit # 1	
8	Auxiliary Limit # 2	
9	Low Water Cutoff	
10	High Limit	
11	Auxiliary Limit # 3	
12	Oil Select Switch	
13	High Oil Pressure	
14	Low Oil Pressure	
15	High Oil Temperature	
16	Low Oil Temperature	
17	Gas Select Switch	
18	High Gas Pressure	
19	Low Gas Pressure or Atomizing Switch	
20	Air Flow Switch	
21	Auxiliary Interlock # 4	
22	Auxiliary Interlock # 5	

¹ The S7830 must have an earth ground providing a connection between the subbase and the control panel or the equipment. The earth ground must be capable of conducting the current to blow a 20A fuse (or breaker) in event of an internal short circuit. The S7830 needs a low impedance ground connection to the equipment frame that, 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 that have maximum surface areas. Wide straps or brackets rather than leadwires are preferred. Be careful to verify that the 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.

Ordering Information

When purchasing replacement and modernization products from your 7800 SERIES distributor, refer to the TRADELINE® Catalog 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:

1. Your local Home and Building Control Sales Office (check white pages of your phone directory).
2. Home and Building Control Customer Satisfaction

Honeywell Inc., 1885 Douglas Drive North
Minneapolis, MN 554224386 (612) 542-7500

In Canada-Honeywell Limited/Honeywell Limitee, 740 Ellesmere Road, Scarborough, Ontario M1P2VP. International Sales and Service Offices in all principal cities of the world. Manufacturing in Australia, Canada, Finland, France, Germany, Japan, Mexico, Netherlands, Spain, Taiwan United Kingdom, U.S.A.

ENVIRONMENTAL RATINGS:

- Ambient Temperature:
- Operating: -40° F to 140° F
- Storage: - 40° F to 150° F
- Humidity: 85% continuous, noncondensing
- Vibration: 0.5 G environment

DIMENSIONS:

Refer to Figs. 1 and 2.

WEIGHT:

1 pound 6 ounces, unpacked

APPROVAL BODIES:

- Underwriters Laboratories Inc. listed: File No. MH17367, Guide No MJAT.
- Canadian Standards Association certified: LR95329.
- Factory Mutual Approved.
- IRI Acceptable.

Federal Communications Commission: Part 15, Class B Emissions.

MOUNTING:

- Q7800A two sided subbase for control panel mounting.
- Q7800B four sided subbase for external from control panel mounting.

REQUIRED COMPONENTS:

- Q7800A or Q7800B Universal Wiring Subbase.
- 7800 SERIES Primary Safety Control Relay Module.
- S7800 Keyboard Display Module or S7810 DATA CONTROLBUS MODULE.

ACCESSORIES:

- Optional:
- Communications Interface Base Unit Q7700A.
- Communication ControlBus Module QS7800A.
- Combustion System Manager Personal Computer Software ZM7850.

Fig. 1-Mounting dimensions of S7830 Expanded Annunciator and Q7800A Subbase in inches [mm].

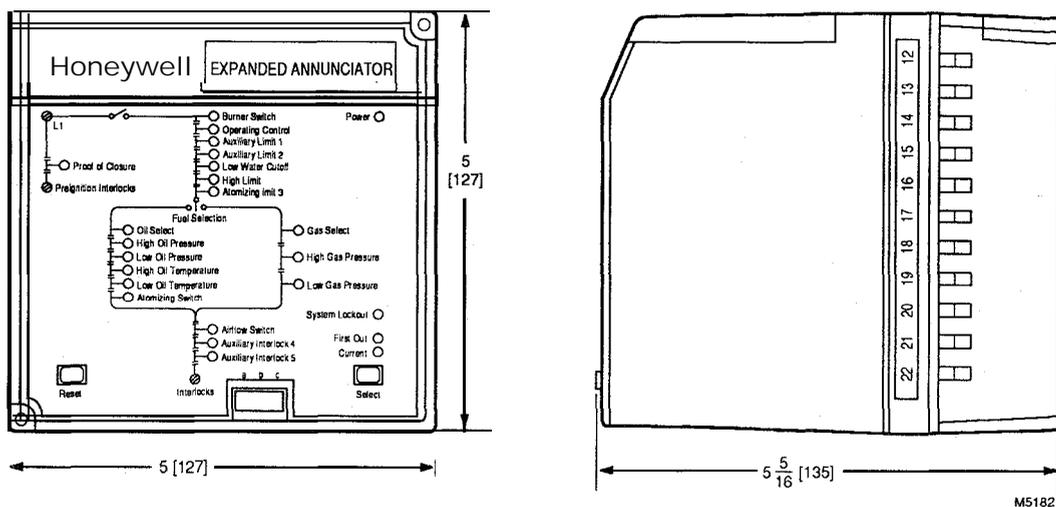
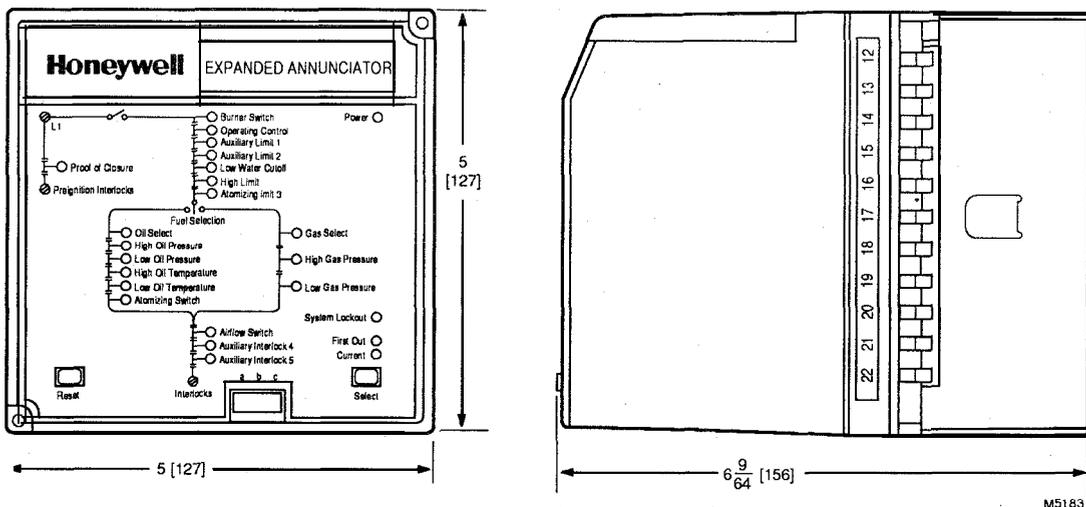


Fig. 2—Mounting dimensions of S7830 Expanded Annunciator and Q7800B Subbase in inches [mm].



Principal Technical Features

The S7830 Expanded Annunciator is an enhancement module for use with any 7800 SERIES Relay Module. The S7830 is a microprocessor based device designed to monitor the status of a series string of limit, control, and interlock contacts for a commercial or industrial burner. The S7830 acts as a system monitor and enhances fault and status messages for the 7800 SERIES burner control.

CONTROLBUS COMMUNICATIONS

The S7830 provides interfaces with the 7800 SERIES Relay Module through a three wire RS-485 interface. Using this communication bus, the S7830 provides additional **first-out annunciation, burner hold, and current status information** for the control, limit, and interlock string of the burner equipment.

LED ARRAY

The S7830 provides visual indication of the status of the burner equipment control, limit, and interlock string. The

string of contact and switch points are individually identified with a colored LED. When power is present at the contact point, the LED is illuminated. When the contact point is de-energized, the LED is dark. If the contact or switch is identified as the **first-out annunciation point**, the LED flashes.

OPTO-ISOLATOR COUPLING

The S7830 utilizes opto-isolators to couple the line voltage input to the micro-processor. An opto-isolator allows a micro-processor to determine the status of line voltage at control, limit, or interlock switch points. Using this capability, the micro-processor is able to determine the current as well as first-out status of twenty-three digital points, each representing specific burner control, limit, or interlock switches.

Installation



WARNING

FIRE OR EXPLOSION HAZARD CAN CAUSE PROPERTY DAMAGE, SEVERE INJURY, OR DEATH.

Verification of safety requirements must be performed *each time* a control is installed on a burner to prevent possible hazardous burner operation.

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 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.



CAUTION

1. Disconnect the power supply before beginning installation to prevent electrical shock and equipment damage. More than one power supply disconnect may be involved.
2. Wiring connections for the S7830 are unique; therefore, refer to Fig. 3 for proper subbase wiring.
3. Wiring must comply with all applicable codes, ordinances and regulations.
4. Wiring must comply with NEC Class 1 (Line Voltage) wiring.
5. Loads connected to the S7830 must not exceed those listed in the Specifications, see Table 1.
6. The S7830 should not interfere with the proper safety operation of the controls, limits, and interlocks it is monitoring. After installation, check each control, limit, and interlock to ensure it is operating properly. **DO NOT PLACE JUMPER WIRES ACROSS THE INSTALLATION CONTROLS, LIMITS, AND INTERLOCKS.**

IMPORTANT:

1. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with these instructions, may cause interference to radio communications. It has been tested and found to comply with the limits of 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 may cause interference; in which case, the user at their own expense may 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, set out in the Radio Interference Regulations of the Canadian Department of Communications.
3. If a control, limit, or interlock is not used with the installation, a jumper must be installed on the S7830 wiring subbase. **DO NOT PLACE JUMPER WIRES ACROSS THE INSTALLATION CONTROLS, LIMITS, AND INTERLOCKS.** For example, if Auxiliary Limit # 1 (Aux Limit #1) is not used, place a jumper wire between terminals 6 and 7 on the S7830 wiring subbase.
4. For straight gas burner applications, the oil limit and interlock inputs **DO NOT** need to be jumpered.
5. For straight oil burner applications, the gas limit and interlock inputs **DO NOT** need to be jumpered.
6. For combination gas-oil burner applications, a double poledouble throw (dpdt) fuel select switch is required, see Fig.3.
7. For communications ControlBus connections in excess of 100 feet, a 120 ohm (1/4 watt minimum) termination resistor must be placed across terminals 1 (a) and 2 (b) of the electrical connectors at the closest and farthest end of the daisy chain.

8. The 7800 SERIES Relay Module control point can be tied into the S7830:
 - For dual fuel burners, from terminals 6 to 11, inclusive.
 - For single fuel burners, from terminals 6 to 19, inclusive.

HUMIDITY

Install the S7830 where the relative humidity never reaches the saturation point. The S7830 is designed to operate in a maximum 85% RH continuous, noncondensing, moisture environment. Condensing moisture may cause erratic operation.

VIBRATION

Do not install the S7830 where it could be subjected to excessive vibration, 0.5G continuous maximum.

WEATHER

The S7830 is not designed to be weather tight. If installed outdoors, the S7830 must be protected by a weather-tight, NEMA 4, enclosure.

MOUNTING WIRING SUBBASE

NOTE: For installation dimensions, see Figs. 1 or 2.

1. Mount the subbase in any position except horizontally with the bifurcated contacts pointing down. A vertical mounting position is recommended. Any other positions decrease the maximum ambient temperature rating.
2. Select a location on a wall, burner surface, or within an electrical control panel. Be sure to allow adequate clearance for electrical voltage probe tests, electrical field connections, and wiring of the RS-485 ControlBus to the 7800 SERIES Relay Module. The S7830 must be within 1000 feet of the 7800 SERIES Relay Module for proper communication of first-out annunciation and current burner status information.
3. Use the back of the subbase as a template to mark the four screw locations, and drill pilot holes.
4. Insert four no. 6 screws for mounting and tighten securely.

Wiring

1. Refer to Fig. 3 for proper subbase wiring.
2. Disconnect the power supply from the main disconnect before beginning installation to prevent electrical shock and equipment damage. More than one disconnect may be involved.
3. Ail wiring must comply with all appropriate electrical codes, ordinances, and regulations. Wiring, where required, must comply with NBC Class 1 (Line Voltage).
4. Recommended wire size and type:
 - Line voltage:
Use no. 14, 16, or 18 gauge (TTW60C or THW75C or THHN90C), 600 volt insulation for all Line Voltage terminals.
 - RS-485 ControlBus:
Use an unshielded three-wire twisted cable. Some installations may require shielded cable, Belden 8771 or equivalent. The connection to the 57800

Keyboard Display Module, S7810 DATA CONTROLBUS MODULE, or QS7800 Communications Interface ControlBus Module 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. For connections in excess of 100 feet, a 120 ohm (114 watt minimum) termination resistor must be placed across terminals 1 (a) and 2 (b) of the electrical connectors at the closest and farthest end of the daisy chain.

5. Recommended grounding practices:
 - a. The earth ground provides for a connection between the wiring subbase and the control panel or the equipment. The earth ground wire must be capable of conducting the current to blow the 20A fuse (or breaker) in event of an internal short circuit.

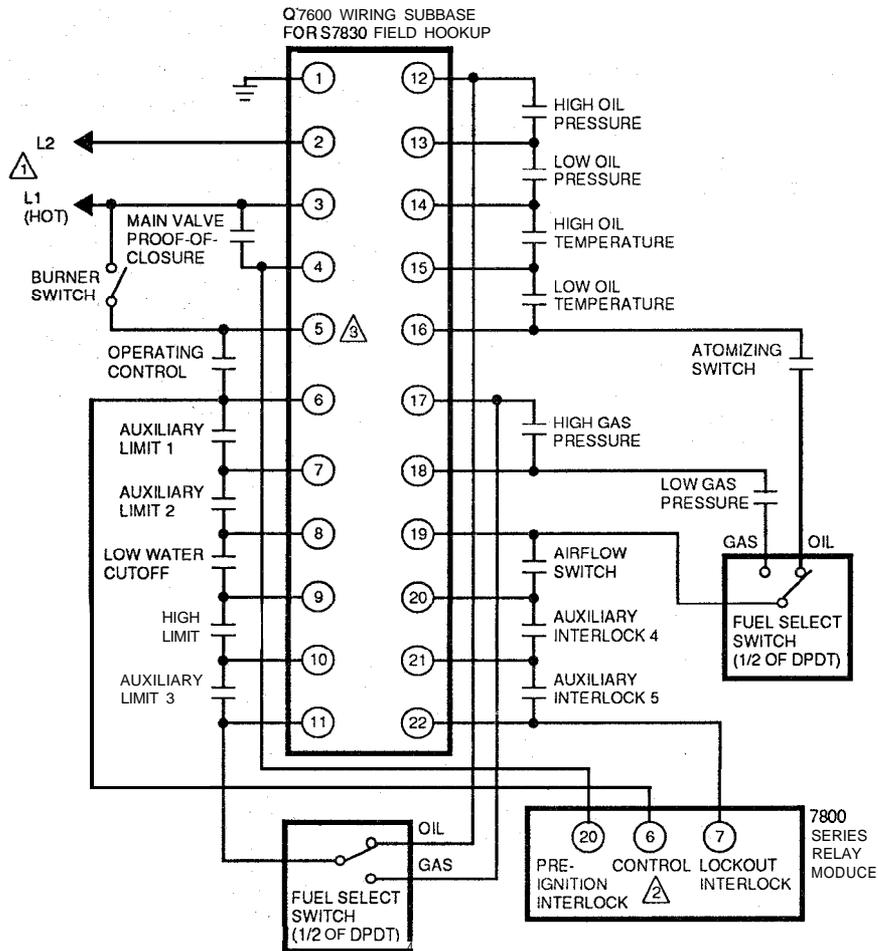
The S7830 needs a **low impedance ground connection** to the equipment frame which, in turn, needs a low impedance connection to earth ground. For a **ground path to be low impedance at RF frequencies**, the connection must be made with minimum length conductors that have a maximum surface area. Wide straps or brackets are preferred rather than leadwires. Be careful to ensure 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 corrosion on mating surfaces.

- b. The ControlBus shielded cable, if used, should be connected to the signal ground terminal 3 (c) provided as part of the S7830 ControlBus connector.

The shield should be connected at both ends to earth ground.

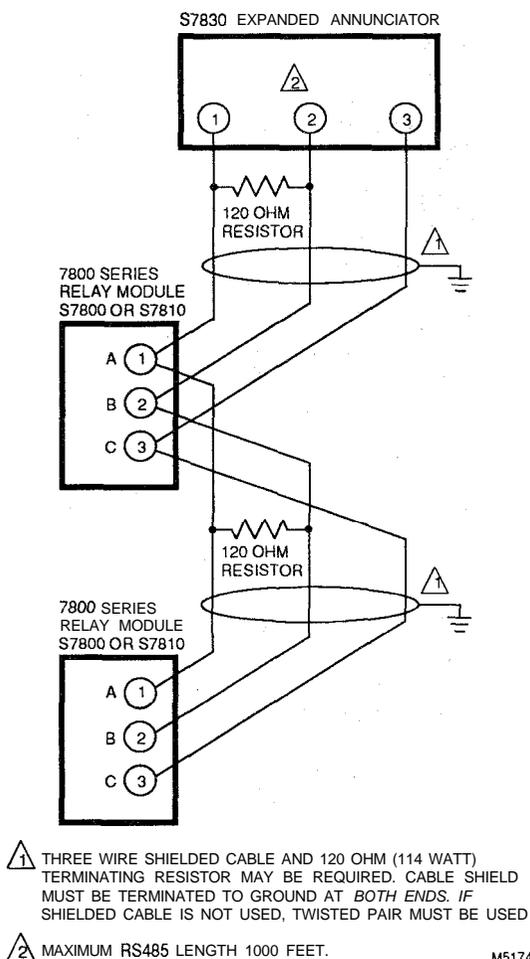
- 6. Recommended Wire Routing:
 - a. Communications ControlBus:
 - 1. Do not run high voltage ignition transformer wires in the same conduit or close proximity with the ControlBus wiring.
 - 2. Do not route the ControlBus wires in conduit with line voltage circuits.
- 7. Maximum wire lengths:
 - a. Communications ControlBus:
 - 1. The maximum ControlBus cable length depends on the number of system modules connected, the noise conditions and the cable used. The maximum length of all interconnecting wire is 1000 feet.

Fig. 3—S7830 wiring hookup.



- ⚠ 120V, 50/60 Hz POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
- ⚠ IN DUAL FUEL SYSTEMS, 7600 SERIES-T6 CAN BE TIED TO ANY POINT FROM 6 TO 11, INCLUSIVE. IN SINGLE FUEL SYSTEMS, 7600 SERIES-T6 CAN BE TIED TO ANY POINT FROM 6 TO 19, INCLUSIVE. (ANYTHING BEFORE THIS POINT IS CONSIDERED A LIMIT AND ANYTHING AFTER IT IS CONSIDERED AN INTERLOCK.)
- ⚠ PLACE JUMPERS ON S7830 WIRING SUBBASE ONLY FOR UNUSED CONTROL, LIMIT, OR INTERLOCKS. M5173

Fig. 4—Wiring the RS-485 ControlBus



2. S7830 leadwires - The maximum length of the control, limit, and interlock leadwires is 500feet to the terminal inputs.

8. Make sure loads do not exceed the terminal ratings. Refer to the ratings in the Specifications, Table 1.

9. Check the power supply circuit. The voltage and frequency tolerance must match those of the S7830. Do not connect the S7830 to a power supply circuit that can have wide line voltage variations. A separate power supply circuit may be required for the S7830. Add the required disconnect means and overload protection.

10. Check all wiring circuits, see Fig. 3, before installing the S7830 on the wiring subbase.

11. Install all electrical connectors.

12. Restore power to the panel.

Fig. 5—Electrical panel installation.

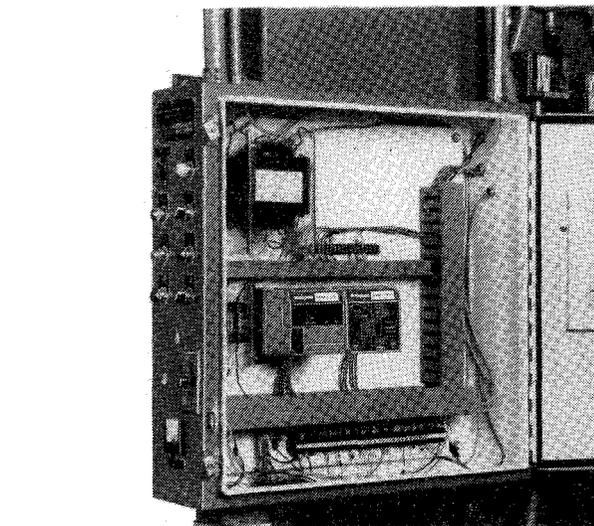
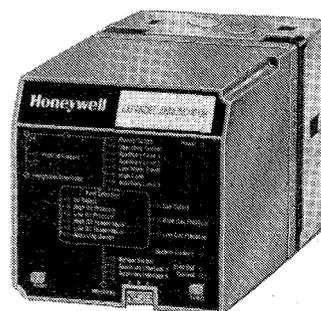


Fig. 6—Wall or burner installation.



MOUNTING THE S7830

NOTE: For installation dimensions, see Figs. 1 or 2.

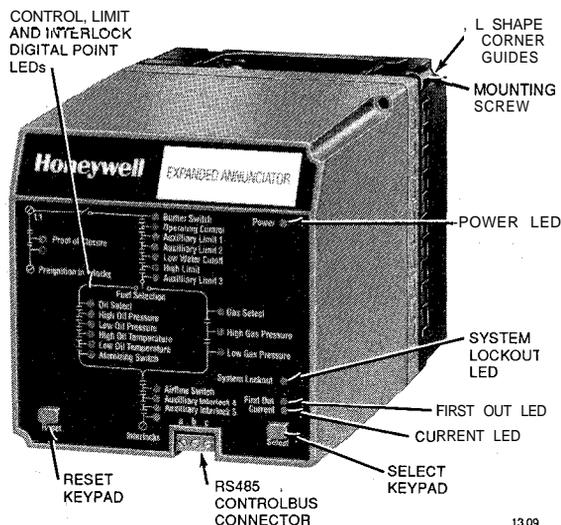
1. Mount the S7830 vertically (see Figs. 5, 6, and 7) or horizontally with the knife blade terminals pointing downward. When mounted on the Q7800A wiring subbase, the S7830 must be in an electrical enclosure.

2. Select the location in the electrical enclosure. Be sure to allow clearances for servicing, electrical signal voltage probes, and electrical connections. Allow an optional three inches minimum on both sides of the S7830 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.

4. Mount the S7830 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 mounting screws.

Fig. 747830.



Operation

The S7830 is designed to operate in conjunction with 7800 SERIES Relay Modules to enhance information for causes of burner lockouts and sequence status by monitoring up to 21 digital contact points. Current burner status and lockout information is displayed at the S7830 through an array of 26 LEDs and also on the face of the S7800 Keyboard Display Module. The information from the S7830 is communicated through a three-wire twisted ControlBus communications link to the S7800 and/or the QS7800 Communications ControlBus Module to be integrated with ZM7850 Combustion System Manager PC Software.

FIRST-OUT ANNUNCIATION

The S7830 does not cause burner lockouts, because only the 7800 SERIES Relay Module can cause a burner lockout (safety shutdown) for abnormal conditions. From the time a lockout occurs, the expanded first-out annunciation is communicated as follows:

1. The 7800 SERIES Relay Module causes a lockout due to, for example, the opening of the Lockout Interlock circuit.
2. The 7800 SERIES Relay Module communicates the lockout status to any modules connected to the RS485 ControlBus communication network including the time when the fault occurred.
3. The S7830 recognizes the lockout status of the 7800 SERIES Relay Module and the time when the fault occurred.
4. The S7830 begins to review the status of all switched inputs on a grouping of several line cycles time duration. When identifying a normal status of all switched inputs, the S7830 will advance one line cycle grouping to identify the first switched input that opened after the normal status. This

switch point, for example, air flow switch, is identified as the first-out annunciation point.

5. This first-out information is communicated by the S7830 to:

- a. The 7800 SERIES Relay Module to enhance the lockout display message, for example, from Lockout Interlock fault to Airflow Switch fault.
- b. The array of 26 status LEDs on the face of the S7830 that are latched to the lockout mode to visually indicate which switch is the first-out point. For the example being used:
 - All LEDs electrically upstream from the airflow switch will be illuminated constantly.
 - The airflow switch LED will flash on and off to indicate that this switch was the first-out cause of the lockout condition.
 - Any LEDs electrically downstream from the first-out point will remain dark because the circuit upstream of that point has been broken.
 - The first-out LED will be latched to indicate the mode of the 26 LED array.

6. When the lockout is cleared, by resetting the 7800 SERIES Relay Module, the S7830 mode is automatically changed from first-out to current.

CURRENT STATUS

The S7830 provides current status information, through the RS485 ControlBus, defining which switch point is causing a hold condition. The 7800 SERIES Relay Module places the burner in Standby when the control input, terminal 6, opens. The exact switch causing the burner to enter Standby may be one of several controls, limits, or interlocks. The

S7830, through the RS-485 ControlBus, communicates the current status of the 21 monitored digital contact points twice each second. For example, if the Standby hold is being caused by the Burner Switch being open, the Standby hold message will be enhanced to identify the Burner Switch, providing information that identifies the reason for the hold.

S7830 User Interface

LED STATES

The array of 26 LEDs can have the following states:

- Digital Points

The digital contact switch points can have one of three states:

- LED ON indicates power is present at the S7830 terminal monitoring that switch.
- LED OFF indicates power is absent at the S7830 terminal monitoring that switch.
- LED FLASHING indicates the switch that is the cause of the lockout, first-out point.

Digital Points LEDs:

- Main Valve Proof Of Closure
- Burner Switch
- Operating Control
- Auxiliary Limit # 1
- Auxiliary Limit # 2
- Low Water Cutoff
- High Limit
- Auxiliary Limit # 3
- Oil Select Switch
- High Oil Pressure
- Low Oil Pressure
- High Oil Temperature
- Low Oil Temperature
- Gas Select Switch
- High Gas Pressure
- Low Gas Pressure or Atomizing Switch
- Air Flow Switch
- Auxiliary Interlock # 4
- Auxiliary Interlock # 5
- Other Preignition Interlock
- Other Lockout Interlock

- Power LED

The Power LED can have one of three states:

- LED ON indicates an abnormal condition that shows power is present at the S7830, but the device is inoperative (reset the S7830).
- LED OFF indicates:
 - Power is absent at the S7830.
 - Power is present at the S7830, but the Power LED is defective.
 - Power is present at the S7830, the Power LED is not burned out, but the device is inoperative (reset the S7830).
- LED FLASHING (off briefly every four seconds) indicates power is present at the S7830 and the device is operating properly.

- System Lockout LED

The System Lockout LED can have one of two states:

- LED ON indicates the 7800 SERIES Relay Module is in a lockout status.
- LED OFF indicates the 7800 SERIES Relay Mod-

ule is in a normal operating status, power is off, or the LED is defective.

- First-out LED

The First-out LED can have one of three states:

- LED ON indicates the LED array is latched in a mode showing the status at the time of the lockout.
- LED OFF indicates the LED array is in a Current status mode, power is off, or the LED is defective.
- LED FLASHING indicates the Select keypad is being depressed constantly (4 seconds or longer) and a Lockout is not present.

- Current LED

The Current LED can have one of two states:

- LED ON indicates the LED array is in a Current status.
- LED OFF indicates the LED array is latched in a first-out mode, power is off, or the LED is defective.

SELECT KEYPAD FUNCTIONS

The Select keypad provides two functions:

1. When depressed momentarily, the S7830 mode will toggle between lockout (first-out) and Current status. Therefore, the operator can actively switch back and forth between these two modes to define the status of the 21 digital switched inputs.

2. When depressed constantly (four seconds), all 25 LEDs (exclusive of the Power LED) in the array will be forced on. This is a means to check to make certain that an LED can illuminate or is operating properly.

RESET KEYPAD FUNCTION

The Reset keypad is used to cause an electrical reset of the S7830. If the operation of the S7830 is in question, an attempt can be made to reset the internal microprocessor. It is not necessary to depress the Reset keypad after a system lockout. Once the 7800 SERIES Relay Module is reset, the S7830 LED array automatically will be reset to the Current status mode.

DISPLAY MESSAGES

The S7830 is used to enhance the lockout and hold information generated by the 7800 SERIES Relay Module, and allows point-by-point interrogation of the digital switch points by using the S7800 Keyboard Display Module and/or ZM7850 Combustion System Manger PC software. This information is contained within an Expanded Annunciator informational index, see Table 2.

S7800/ZM7850 EXPANDED ANNUNCIATOR INFORMATIONAL INDEX

Using the S7800 and/or ZM7850 PC software, referring to Table 2, the individual ON/OFF status of 22 digital points can be monitored. The display message values for the Expanded Annunciator Informational Index are also explained in Table 2.

HOLD MESSAGES

Using the S7800 and/or ZM7850 PC software, the S7830 provides 16 HOLD messages. The HOLD messages are summarized in Table 3.

LOCKOUT MESSAGES

Using the S7800 and/or ZM7850 PC software, the S7830 provides 20 enhanced LOCKOUT messages. The LOCKOUT messages are summarized in Table 4.

TABLE 2—EXPANDED ANNUNCIATOR INFORMATIONAL INDEX

Selectable Message	Display Value	Description
EA not connected		The Expanded Annunciator (EA) is not connected.
CS:	Reference Table 5	Current status of Expanded Annunciator (EA) digital switch points.
Valve Close	ON or OFF	The main valve proof of closure switch is open (OFF) or closed (ON)
Burner Sw.		The burner switch switch is open (OFF) or closed (ON).
OperControl		The operating control (pressure or temperature) switch is open (OFF) or closed (ON)
Aux Limit 1		An auxiliary limit switch is open (OFF) or closed (ON).
Aux Limit 2		An auxiliary limit switch is open (OFF) or closed (ON).
LWCO		The low water cutoff switch is open (OFF) or closed (ON).
High Limit		The appliance high limit (pressure or temperature) switch is open (OFF) or closed (ON)
Aux Limit 3		An auxiliary limit switch is open (OFF) or closed (ON).
Oil Select		The fuel oil select switch is open (OFF) or closed (ON).
HiOilPres		The high oil pressure limit switch is open (OFF) or closed (ON).
LowOilPres		The low oil pressure limit switch is open (OFF) or closed (ON).
HiOilTemp		The high oil temperature limit switch is open (OFF) or closed (ON).
LowOilTemp		The low oil temperature limit switch is open (OFF) or closed (ON).
Atomize S w		The oil atomizing proving switch is open (OFF) or closed (ON)
Gas Select		The has select switch is open (OFF) or closed (ON).
HiGasPres		The high gas pressure limit switch is open (OFF) or closed (ON).
LowGasPres		The low gas pressure limit switch is open (OFF) or closed (ON)
Airflow Sw		The airflow interlock switch is open (OFF) or closed (ON)
Aux ILK 4		An auxiliary interlock switch is open (OFF) or closed (ON).
Aux ILK 5		An auxiliary interlock switch is open (OFF) or closed (ON)
EA Fault Code	nnn	The fault code number, identifying the specific Expanded Annunciator fault.
SW Rev.	nnnn	Identifies the software revision of the S7830.

TABLE 3-EXPANDED ANNUNCIATOR HOLD CODES.

Message	Description
BURNER OFF: T6 (Burner Switch)	Burner switch is open (OFF) and keeping the burner in an Off condition.
STANDBY HOLD: T6 (Aux Limit # 1)	Auxiliary limit # 1 is open (OFF) and keeping the burner in Standby.
STANDBY HOLD: T6 (Aux Limit # 2)	Auxiliary limit # 2 is open (OFF) and keeping the burner in Standby.
STANDBY HOLD: T6 (LWCO)	Low water cutoff is open (OFF) and keeping the burner in Standby.
STANDBY HOLD: T6 (High Limit)	The appliance high limit is open (OFF) and keeping the burner in Standby.
STANDBY HOLD: T6 (Aux Limit # 3)	Auxiliary limit # 3 is open (OFF) and keeping the burner in Standby.
STANDBY HOLD: T6 (FuelSelectOff)	Both fuel select inputs are open (OFF) and keeping the burner in Standby.
STANDBY HOLD: T6 (BothFuelSelect)	Both fuel select inputs are closed (ON) and keeping the burner in Standby.

TABLE 3—EXPANDED ANNUNCIATOR HOLD CODES (Continued)

Message	Description
STANDBY HOLD: T6 (High Oil Press)	High oil pressure limit is open (OFF) and keeping the burner in Standby.
STANDBY HOLD: T6 (Low Oil Press)	Low oil pressure limit is open (OFF) and keeping the burner in Standby.
STANDBY HOLD: T6 (High Oil Temp)	High oil temperature limit is open (OFF) and keeping the burner in Standby.
STANDBY HOLD: T6 (Low Oil Temp)	Low oil temperature limit is open (OFF) and keeping the burner in Standby.
STANDBY HOLD: T6 (Atomizing Sw.)	Oil atomizing switch is open (OFF) and keeping the burner in Standby.
STANDBY HOLD: T6 (High Gas Press)	High gas pressure limit is open (OFF) and keeping the burner in Standby.
STANDBY HOLD: T6 (Low Gas Press)	Low gas pressure limit is open (OFF) and keeping the burner in Standby.
STANDBY HOLD: T6 (Circuit Fault)	Control input is not energized.

TABLE 4—EXPANDED ANNUNCIATOR LOCKOUT CODES.

Message	Description
LOCKOUT nna *Aux.Limit#1*	Auxiliary Limit # 1 was open.
LOCKOUT nmb *Aux.Limit#2*	Auxiliary Limit # 2 was open.
LOCKOUT nnc *LWCO*	Low water cutoff was open.
LOCKOUT nnd *High Limit*	Appliance high limit was exceeded.
LOCKOUT nne *Aux.Limit#3*	Auxiliary Limit # 3 was open.
LOCKOUT nnf *FuelSelectOff*	No fuel was selected.
LOCKOUT nng *BothFuelSelect*	Both fuels were selected.
LOCKOUT nnh *High Oil Press*	Oil pressure was above the high limit setting.
LOCKOUT nni *Low Oil Press*	Oil pressure was below the low limit setting.
LOCKOUT nnj *High Oil Temp*	Oil temperature was above the high limit setting.
LOCKOUT nnk *Low Oil Temp*	Oil temperature was below the low limit setting.
LOCKOUT nnm *Atomizing Sw.*	Atomizing switch failed to close.
LOCKOUT nnn *High Gas Press*	Gas pressure was above the high limit setting.
LOCKOUT nno *Low Gas Press*	Gas pressure was below the low limit setting.
LOCKOUT nnp *Airflow Switch*	The airflow switch was open (OFF) when it should have been closed (ON). Or the airflow switch was closed (ON) when it should have open (OFF).
LOCKOUT nnq *Aux.ILK#4*	Auxiliary Interlock # 4 was open.
LOCKOUT nnr *Aux.ILK#5*	Auxiliary Interlock # 5 was open.

TABLE "EXPANDED ANNUNCIATOR LOCKOUT CODES (continued)

Message	Description
LOCKOUT nns *Other ILKs*	An interlock, electrically downstream of Auxiliary Interlock # 5, was open
LOCKOUT nny *Valve Closure*	Main valve proof of closure switch was open.
LOCKOUT nnz *Other PII*	An interlock, electrically downstream of the main valve proof of closure (Valve Closure), was open

TABLE 5-EXPANDED ANNUNCIATOR CURRENT STATUS MESSAGES.

Message	Description
Burner Sw.	Burner Switch
Oper. Control	Operating Control
Aux. Limit # 1	Auxiliary Limit # 1
Aux. Limit # 2	Auxiliary Limit # 2
LWCO	Low Water Cutoff
High Limit	High temperature or pressure Limit
Aux. Limit # 3	Auxiliary Limit # 3
FuelSelectOff	Fuel Select switch is off.
BothFuelSelect	Both fuel select inputs are on.
High Oil Pres.	High Oil Pressure
Low Oil Pres.	Low Oil Pressure
Low Oil Temp.	Low Oil Temperature
Atomizing Sw.	Atomizing Switch
High Gas Pres.	High Gas Pressure
Low Gas Pres.	Low Gas Pressure
Airflow Sw.	Airflow Switch
Aux. ILK # 4	Auxiliary Interlock # 4
Aux. ILK # 5	Auxiliary Interlock # 5

Checkout

Several basic steps can be taken to check proper operation of the S7830.

1. Depress and hold the Select keypad for five seconds. All 25 LEDs (exclusive of the Power LED) should illuminate.
2. Through the S7800 Keyboard and Display Module or ZM7850 PC software, access the Expanded Annunciator Informational Index. If the S7830 is operating properly, it should be possible to access the status of all switched points.
3. Open equipment control, limits, and interlock inputs. The S7830 LED array, S7800 Keyboard Display Module, and ZM7850 PC software should indicate the cause of the burner lockout and switched point status.

IMPORTANT: Restore ALL controls, limits, and interlock inputs to proper operation altered in step 3. DO NOT PLACE JUMPER WIRES ACROSS THE INSTALLATION CONTROLS, LIMITS, AND INTERLOCKS.

If improper operation is identified, check all S7830 wiring against Fig. 3 and correct any errors. If problems persist, reset the S7830. If problems continue to persist, replace the S7830 Expanded Annunciator.

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