Multi-Zone Relay Module

HMZ-RM1 (PN #3015-6265)

Installation • Operation • Maintenance

Table of Contents

# 1 INTRODUCTION

1.1 About This Manual

This installation guide is intended to assist in the installation and configuration of the HMZ-RM1, Multi-Zone Relay Module. The HMZ-RM1 is a sixteen channel relay expansion module that integrates with all Multi-Zone Gas Monitors (Firmware 4.00 and newer) and is used to power and control auxiliary horns and strobes for alarming purposes. The HMZ-RM1 interfaces to the Multi-Zone through RS-485 Modbus. The relay configuration is done through the Multi-Zone menu system with each relay able to be assigned to any of the available Multi-Zone channels and can alarm at any of the alarm levels (leak, spill, evacuation) and when a fault occurs. In failsafe mode, the module will also alarm when a loss of power occurs. Each Multi-Zone can be connected to up to two HMZ-RM1 Relay Modules.

1.2 Warning and Caution Conventions

When used in this manual or as **labeled on the relay module**, the following hazard symbols and / or associated words are defined as follows.
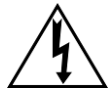
⚠	**WARNING:** This symbol and/or the use of the word **WARNING** indicates a potential hazard associated with the use of this equipment. It calls attention to a procedure, practice, condition, or the like, which if not correctly performed or adhered to, could result in death or serious injury.
⚡	**WARNING:** This symbol and/or the use of the word **WARNING** indicates a potential hazard from **electrical shock**. It calls attention to a procedure, practice, condition, or the like, which if not correctly performed or adhered to, could result in death or serious injury.
⚠	**CAUTION:** This symbol and/or the use of the word **CAUTION** indicates a potential hazard associated with the use of this equipment. It calls attention to a procedure, practice, condition, or the like, which if not correctly performed or adhered to, could result in minor or moderate injury.
☝	**IMPORTANT:** The use of the word **IMPORTANT** in this manual calls attention to a procedure, practice, condition, or the like, which if not correctly performed or adhered to, could result in incorrect performance of or damage to the equipment and may void the warranty.

1.3 Safety Precautions

☝	**IMPORTANT:** Before using this product, carefully read and strictly follow the instructions in the manual. Ensure that all product documentation is retained and available to anyone operating the instrument. The protection provided by this product may become impaired if it is used in a manner not specified by the manufacturer. Modifications to this instrument, not expressly approved, will void the warranty.
⚠	**CAUTION:** This instrument is neither certified nor approved for operation in oxygen-enriched atmospheres. Failure to comply may result in personal injury or death. **Explosion hazard!** Do not mount the Relay Module in an area that may contain flammable fluids. Operation of any electrical equipment in such an environment constitutes a safety hazard.
⚠	**CAUTION:** In case of malfunction, <u>DO NOT</u> continue to use this equipment if there are any symptoms of malfunction or failure. In the case of such occurrence, de-energize the power supply and contact a qualified repair technician or the nearest Bacharach Service Center.
⚠	**CAUTION:** Use <u>ONLY</u> the provided gland plate for electrical and communication wiring. Drilling into the box will void the warranty.

1.4 Components

External DC Power Terminal

Relay Power Jumper (16)

Relay Power LED (16)

Power Supply

Relay Module Terminals

Status LEDs (3)

Circuit Breaker

Horn/Strobe Grounding Terminals (18)

MODBUS DIP Switch

RS485 Connector

1.5 Dimensions

C

E

F

B

D

A

SIDE VIEW

FRONT VIEW

DOOR SWING VIEW
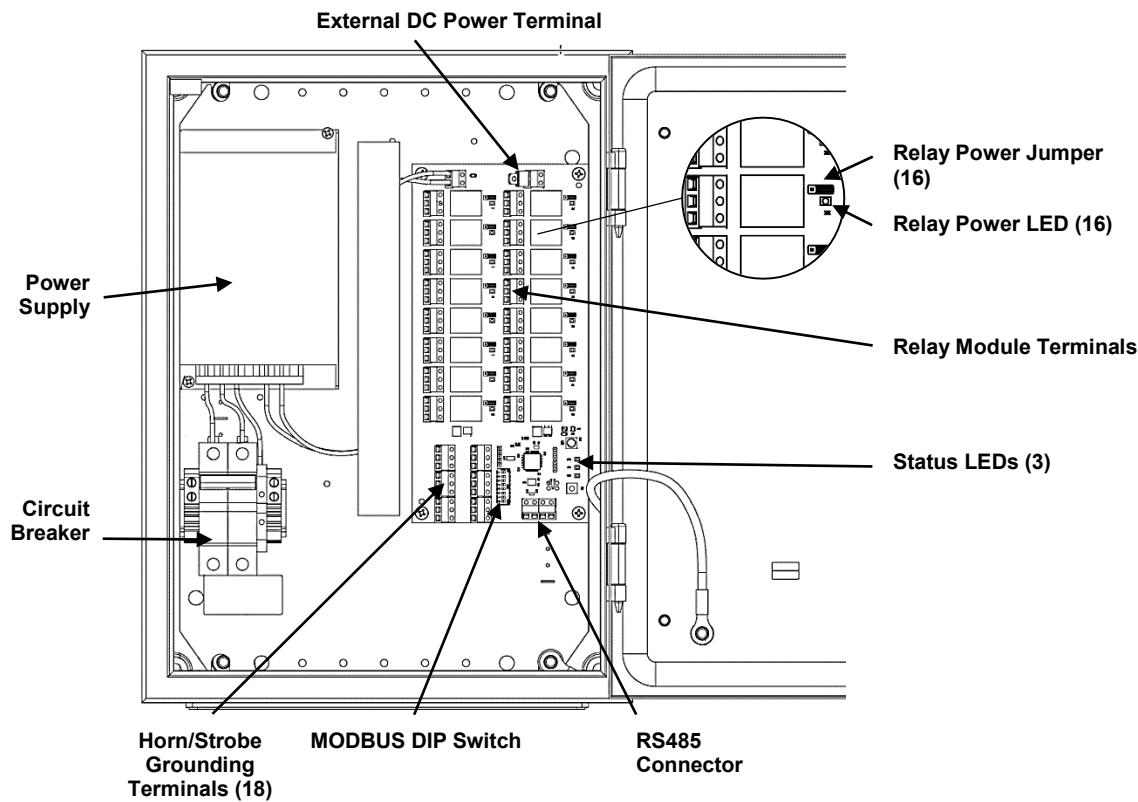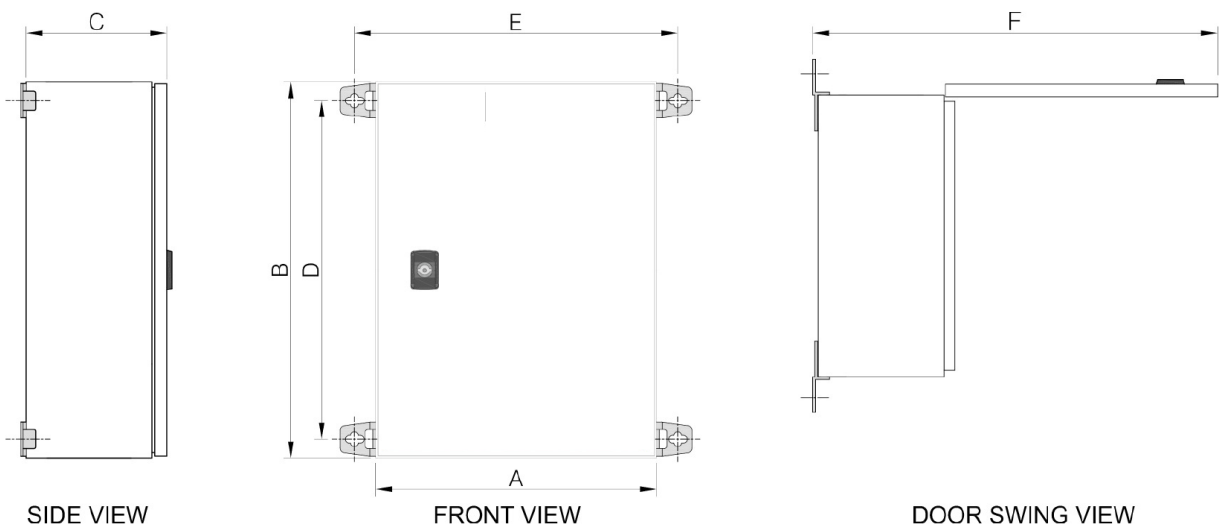
HMZ-RM1	A	B	C	D	E	F	Weight
Metric (mm)	300	400	150	360	345	440	10.0 kg
Imperial (in)	11.8	15.7	5.9	14.2	13.6	17.3	22 lbs

1.6   Specifications

Input Power	100 – 240VAC, 50/60Hz, 4A Protected by 5A fuse/breaker		**Warm Up**	30 seconds
External Load Capacity (Horns/Strobes)	24VDC, 60W total		**Enclosure Rating**	Indoor Use Only, IP20
Communications	INPUTS: (1) RS-485 Modbus OUTPUTS: (16) General purpose, SPDT relays, rated 24V 3A, configurable		**Third Party**	EN 50270, EN 50271, ROHS, REACH, Prop65, MET
			Operating temperature	-20 – 50 °C (-4 to 122 °F)
Mounting Distance	Adjacent Remote up to 305 m (1,000 ft)		**Operating Humidity**	0 to 95% RH (non-condensing)

Recommended Wire Sizes	
Mains power	1.5 mm^2 (16 AWG) min.
Relays	0.75 – 0.25 mm^2 (18-24 AWG)
Communications	Belden cable #8762 or similar

2   INSTALLATION

2.1   Installation Considerations

2.1.1   Warnings and Cautions

WARNING: Under no circumstances should this product be operated without connection to a protective ground. Failure to comply may result in a potential shock hazard and is a violation of electrical safety standards applicable to this category of equipment.

WARNING: Always remove AC power before working inside the module enclosure and exercise extreme care when accessing the products interior. Only qualified electrical maintenance personnel should perform connections and adjustments.

WARNING: Electrical installation should be performed by a certified electrician, and should comply with all applicable NEC / CEC and local electrical safety codes.

IMPORTANT: A certified AC power disconnect or circuit breaker should be mounted near the module and installed following applicable local and national codes. If a switch is used instead of a circuit breaker, a properly rated CERTIFIED fuse or current limiter is required to be installed as per local or national codes. Markings for positions of the switch or breaker should state (I) for on and (O) for off.

2.1.2   Inspection

The Relay Module has been thoroughly inspected and tested prior to shipment from the factory. Nevertheless, it is recommended that the module be re-checked prior to installation. Inspect the outside of the enclosure to make sure there are no obvious signs of shipping damage. Open the enclosure and inspect the interior of the module for loose components that may have become dislodged during shipment. If damage is discovered, please contact the nearest Bacharach Service Center for assistance.

2.1.3 Mounting Instructions

Dirt, grease, and oils can adversely affect the operation of the Relay Module. The module should be installed out of direct sunlight in a clean, dry area that is not subject to temperature or humidity extremes. Installation of the module in a mechanical room is acceptable provided reasonable environmental conditions exist. If there is a concern, consider installing the unit outside of the mechanical room in a cleaner area of the facility.

1. The module must be mounted to a solid vertical surface or structure capable of supporting the stated weight. It must be positioned where the door can be fully opened and in a location that facilitates easy service and maintenance.
2. The module should be mounted using the mounting bracket kit provided. The bracket bolts are fed through the back of the enclosure to the mounting bracket on the outside. See Section 1.1 for dimensional details.
3. Mounting hardware should be 4mm (1/8") or 5mm (3/16") screws or bolts minimum 40mm (1.5") long with plain washers and suitable wall plugs.
4. It is recommended that the module be located adjacent to the Multi-Zone Gas Monitor that it's connected to. If this is not feasible, the module can be mounted in a remote location.

2.2   Wiring Diagram
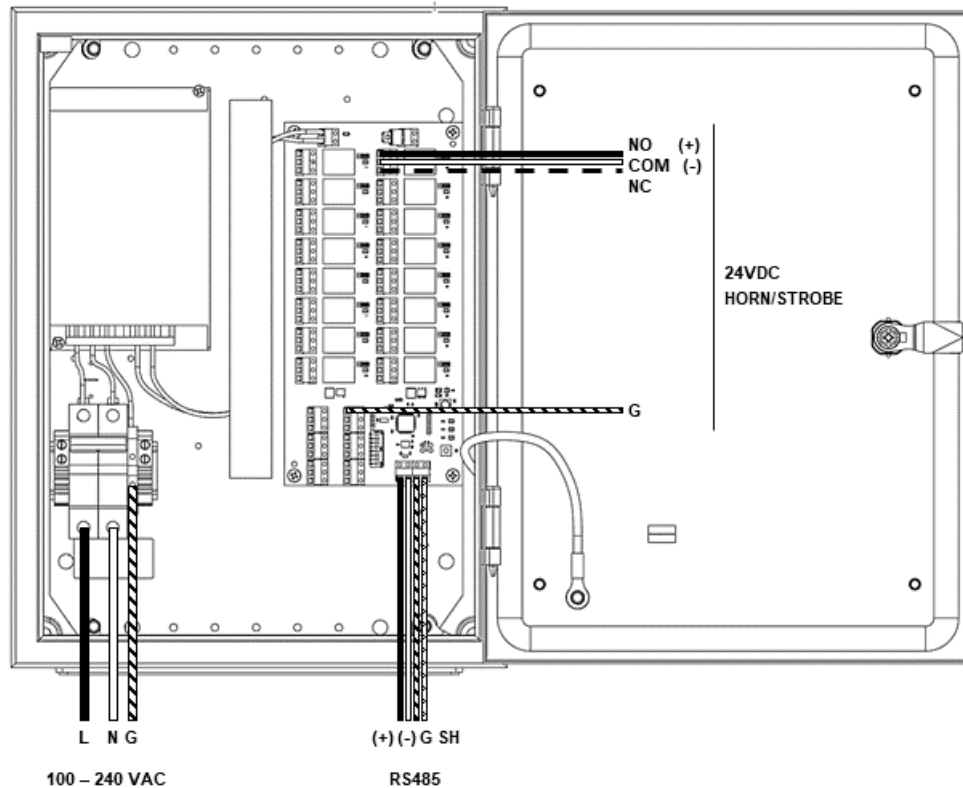
2.3   Electrical Wiring

Please see Section 1.6 power and electrical specifications.

The module is equipped with a gland plate, on the bottom of the enclosure, which can be modified in the field with conduit openings/glands. The available gland plate area is 210mm W x 56mm D (8.27" W x 2.2" D). Prior to modification, remove the gland plate by removing the (10) gland plate screws and the gland plate gasket. Once modifications are made, install in the reverse order, ensure the gland plate gasket is properly seated and the gland plate screws are torqued to 1.5 – 2 Nm (1.1 – 1.5 lbft).

Locate the AC input and ground terminals on the inside of the module. Secure the incoming AC power neutral (white/blue) and live (black/brown) wires to the (+) and (-) terminals to the circuit breaker. Secure the AC ground (green) to the terminal adjacent to the circuit breaker.

2.3.1 Horns/Strobes Wiring

WARNING: DO NOT apply Mains voltage to relay terminals

Horns and strobes can be wired to any of the sixteen available relays in the module. Each relay includes NO (Normally Open), COM (Common), and NC (Normally Closed) terminals (T1-16). Wire the horn or strobe to the appropriate terminals for the desired contact type:

MODE	RELAY TERMINALS
FAILSAFE (FS)	COMM-NC
NON-FAILSAFE (NFS)	COMM-NO

DEFAULT   **DRY CONTACT**
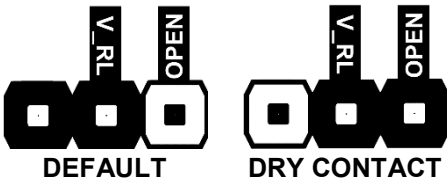
The red jumper (J1-16) can be moved to the V_RL and OPEN pins to allow the relay to operate as a dry contact.

External Vdc (+)   **External Vdc (-)**
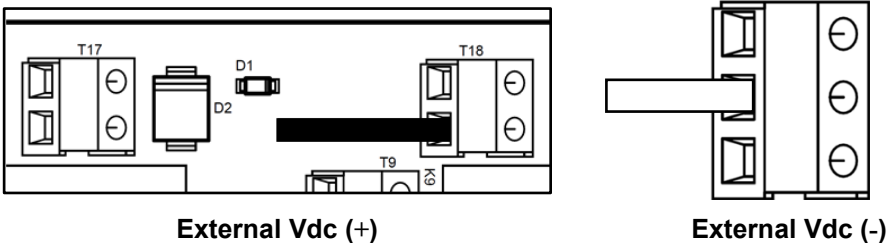
Externally derived power can also be applied to the relay output terminals to drive horns and strobes. The external source cannot exceed 30VDC. To wire external power to the relay outputs, remove the red jumper on terminal block T18 by loosening the terminal screws, wire the positive (+) of the external source to the lower terminal as shown above, and wire the negative (-) of the external source to any available terminal on the grounding terminals (terminal block T20 – T25)

2.4   Communications Wiring

The Relay Module can be connected to the Multi-Zone monitor using a shielded twisted pair instrument cable (See Section 1.6 for more details).

Use the provided gland plate to install knockouts and gain access to the interior of the module (See Section 2.3).
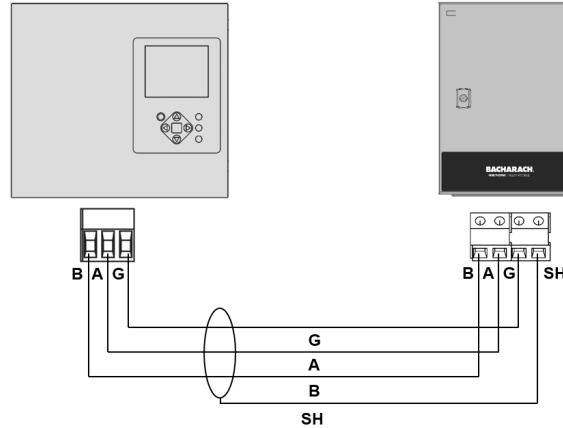
2.4.1   Multi-Zone Communication Options

The Multi-Zone Gas Monitor has three available communications ports that can be utilized to connect to the Relay Module:

PORT	REQUIRED ACCESSORY
RS-485 (PORT 1)	NONE
RS-232C (PORT 2)	PN # 3015-6028, RS-232C to RS-485 Adapter Kit
AUX RS-485 (PORT 3)	PN # 3015-6027, RS-485 Lon Socket Adapter Kit

To free the other ports for additional MZ accessories and system integration, the Multi-Zone is set to communicate to the Relay Module via the RS-232C port (RS-232C to RS-485 Adapter required). The port used to communicate with the Relay module can be changed. See Section 3.5 and 3.6 for more details.

See Multi-Zone manual PN #3015-5074 for details on the available ports.

2.5   Wiring (2) Relay Modules

Up to (2) Relay Modules can be wired to a Multi-Zone Monitor.

Follow Section 2.3 and 2.4 for wiring guidance. Once the first Relay Module is installed, a second module can be installed by running power to it in a similar fashion to the first module and daisy chaining the R485 terminals from the first module to the RS485 terminals of the second module.
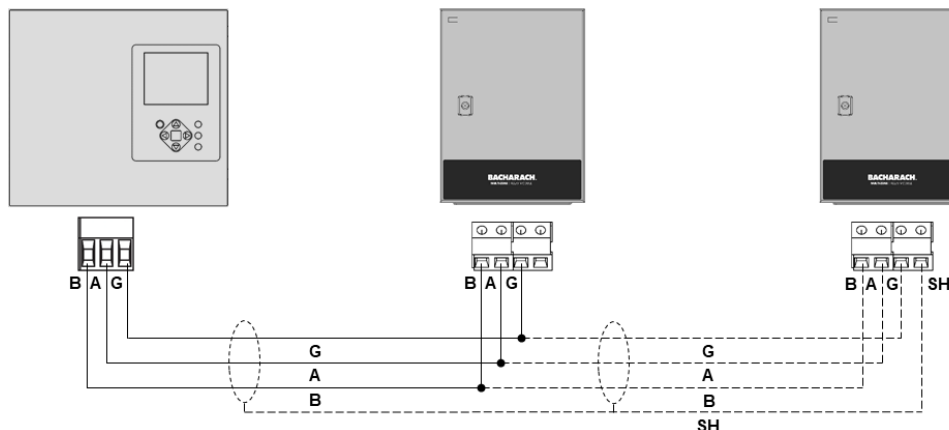
3 SETUP

⚠ **CAUTION:** Ensure the Multi-Zone Monitor is in Service Mode prior to Relay Module setup. Failure to do so will prevent access to parameters and the ability to save changed parameters.

All setup flow charts start from the Main Data Display Screen of the Multi-Zone monitor. Return to Main Data Display Screen by pressing ESC.

▲	UP	⊡ ENTER	ENTER	◇ KEYPAD
▼	DOWN	OPTION	ON-SCREEN OPTION	

3.1 Enable Service Mode

The default Service Mode Duration is 15 minutes. Service Mode Duration can be changed from 1 – 300 minutes. See Multi-Zone manual PN #3015-5074 for more details on Service Mode.

⚠ **CAUTION:** Multi-Zone must be in Service Mode to configure the Relay Module.
Service Mode cannot be enable when an alarm is active.
Service Mode must be exited or timeout for the Multi-Zone to resume functioning properly.
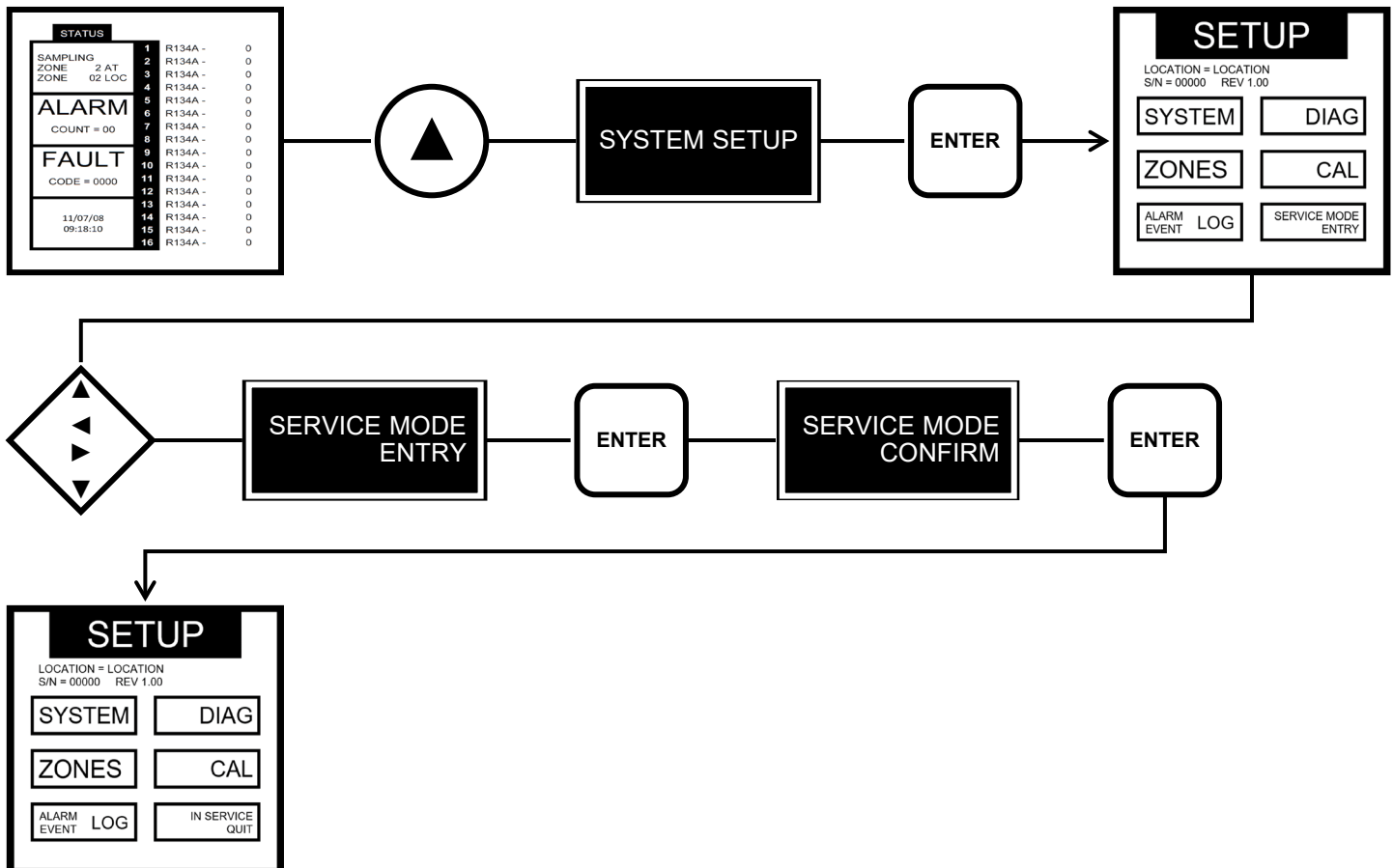
3.1.1 Quit Service Mode
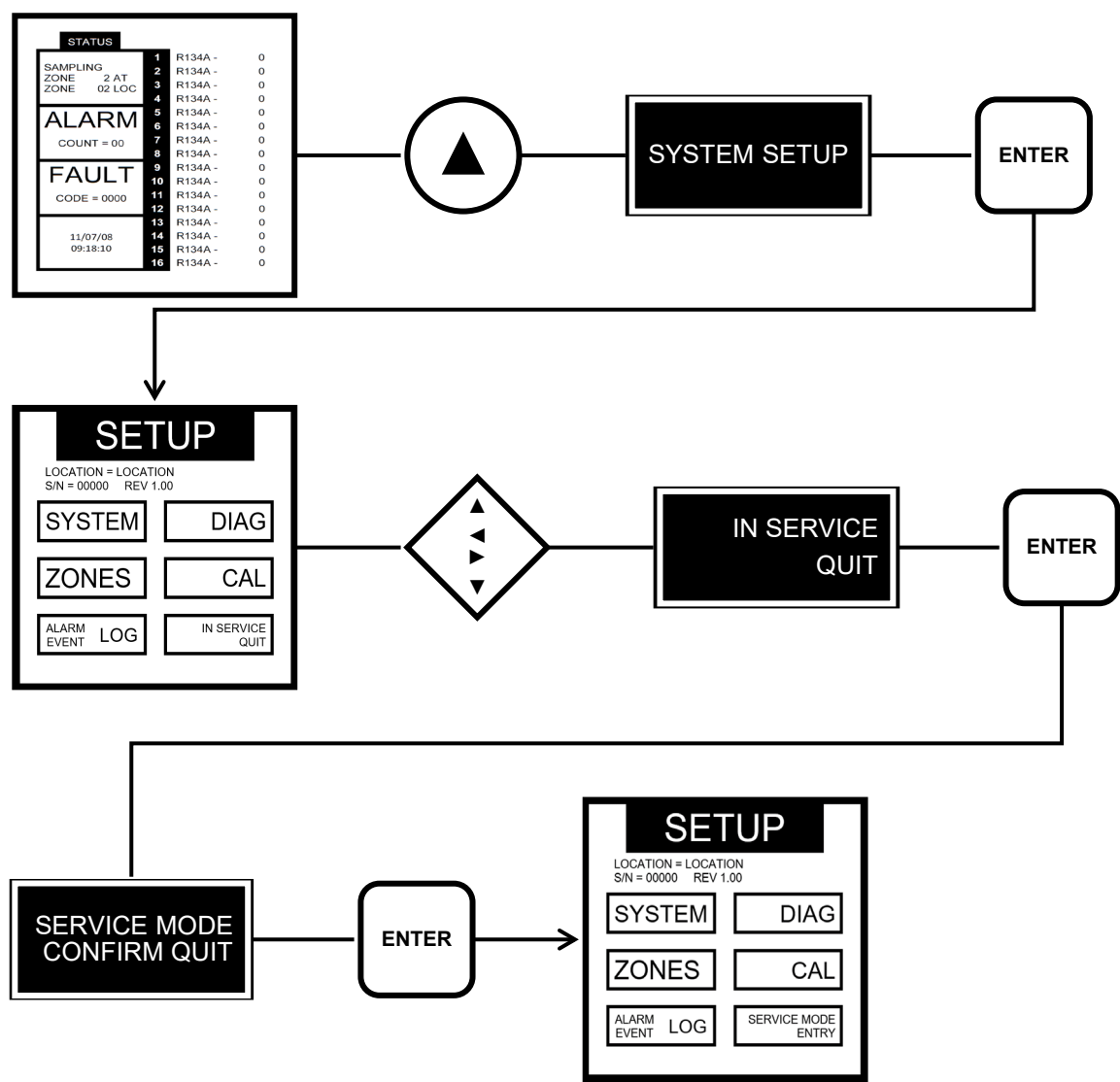
3.2   Relay (Rly) Module Setup Menu

```
STATUS
SAMPLING
ZONE      2 AT
ZONE     02 LOC

ALARM
COUNT = 00

FAULT
CODE = 0000

11/07/08
09:18:10
```

```
1   R134A -    0
2   R134A -    0
3   R134A -    0
4   R134A -    0
5   R134A -    0
6   R134A -    0
7   R134A -    0
8   R134A -    0
9   R134A -    0
10  R134A -    0
11  R134A -    0
12  R134A -    0
13  R134A -    0
14  R134A -    0
15  R134A -    0
16  R134A -    0
```

▲   SYSTEM SETUP   ENTER

```
SETUP
LOCATION = LOCATION
S/N = 00000    REV 1.00

SYSTEM        DIAG
ZONES         CAL
ALARM
EVENT  LOG    SERVICE MODE
                ENTRY
```

SYSTEM   ENTER

```
SYSTEM SETUP
LOCATION              ZONE HOLD
LOCATION             MINUTES 015
NUM ZONES            DETECTION
INSTALLED 16         LIMIT 00.9
ALM ACK MODE         LOOP MODE
MANUAL               TRACK ZONES
AUDIBLEALARM         RELAY SETUP
UNUSED
                          MORE
```

◆ (arrows)   MORE   ENTER

```
SYSTEM SETUP
NODE ADDRESS         ADVANCED
01                   SETUP
PASSWORD
000
COMMS SETUP
RLY MODULE
SETUP
                          BACK
```

▼   RELAY MODULE SETUP   ENTER

```
RLY MODULE SETUP
RLY MODULE A         RLY MODULE B
INSTALLED            UNINSTALLED
RLY MODULE A         RLY MODULE B
MODBUS ID=10         MODBUS ID=20
RLY MODULE A         RLY MODULE B
FAILSAFE             FAILSAFE
COMMS PORT=2         RELAY SETUP
RS232
MORE                      BACK
```

3.3 Relay Module Setup

See Section 3.2 to enter Relay (Rly) Module Setup Screen.

RLY MODULE SETUP	
RLY MODULE A UNINSTALLED	RLY MODULE B UNINSTALLED
RLY MODULE A MODBUS ID=10	RLY MODULE B MODBUS ID=20
RLY MODULE A FAILSAFE	RLY MODULE B FAILSAFE
COMMS PORT=2 RS232	RELAY SETUP
	BACK

RLY MODULE A UNINSTALLED	RLY MODULE B UNINSTALLED	Default: DISABLED **Select to Enable/Disable Relay Module** Options: ENABLED, DISABLED
RLY MODULE A MODBUS ID=10	RLY MODULE B MODBUS ID=20	Default: Module A: 10, Module B: 20 **Set Relay Module Modbus ID** Options: 10 – 80 (Module A and B cannot be the same address)
RLY MODULE A FAILSAFE	RLY MODULE B FAILSAFE	Default: FAILSAFE **Set Relay Module as Failsafe/Non-Failsafe** Options: FAILSAFE, NON-FAILSAFE (See Section 2.3.1)
COMMS PORT=2 RS232		**Select Communication Port for Relay Module** Options: 1 (RS485), 2 (RS232), 3 (AUX485) Default: 2
	RELAY SETUP	**Select to configure all relays on Enabled Relay Modules.** (See Section 3.4 for more detail)

⬦ **NAVIGATE / TOGGLE**   [ENTER] **SELECT / SAVE**

3.4 Relay Setup

See Section 3.2 to enter the Relay (Rly) Module Setup Screen. Each Relay Module is equipped with sixteen programmable relays. Relay Module A, Relay 2 (A02) shown below. The first twelve relays are shown when accessing the Relay Setup Screen. Default relay settings shown below.

See Multi-Zone manual PN #3015-5074 for more information on zones and TRIG alarms.

☞ **IMPORTANT:** Press ► or ◄ to toggle between RLY A SETUP (Module A) and RLY B SETUP (Module B), if multiple Modules are wired to the Multi-Zone monitor

☞ **IMPORTANT:** When ANY is selected for a zone, the relay state will change when any zone's TRIG criteria has been met

⬦ **NAVIGATE / TOGGLE**   [ENTER] **SELECT / SAVE**

RLY A SETUP			
RLY	ZONE	TRIG	STATE
A01	Z01	EVAC	NORMAL
A02	Z02	EVAC	NORMAL
A03	Z03	EVAC	NORMAL
A04	Z04	EVAC	NORMAL
A05	Z05	EVAC	NORMAL
A06	Z06	EVAC	NORMAL
A07	Z07	EVAC	NORMAL
A08	Z08	EVAC	NORMAL
A09	Z09	EVAC	NORMAL
A10	Z10	EVAC	NORMAL
A11	Z11	EVAC	NORMAL
A12	Z12	EVAC	NORMAL

ZONE

Default: Relay 2 (A02) = Zone 2 (Z02)

Select Zone corresponding to relay

Options: Z01-Z16, ANY, NONE

(▲) (▼)

STATE

Default: NORMAL

Shows current relay state

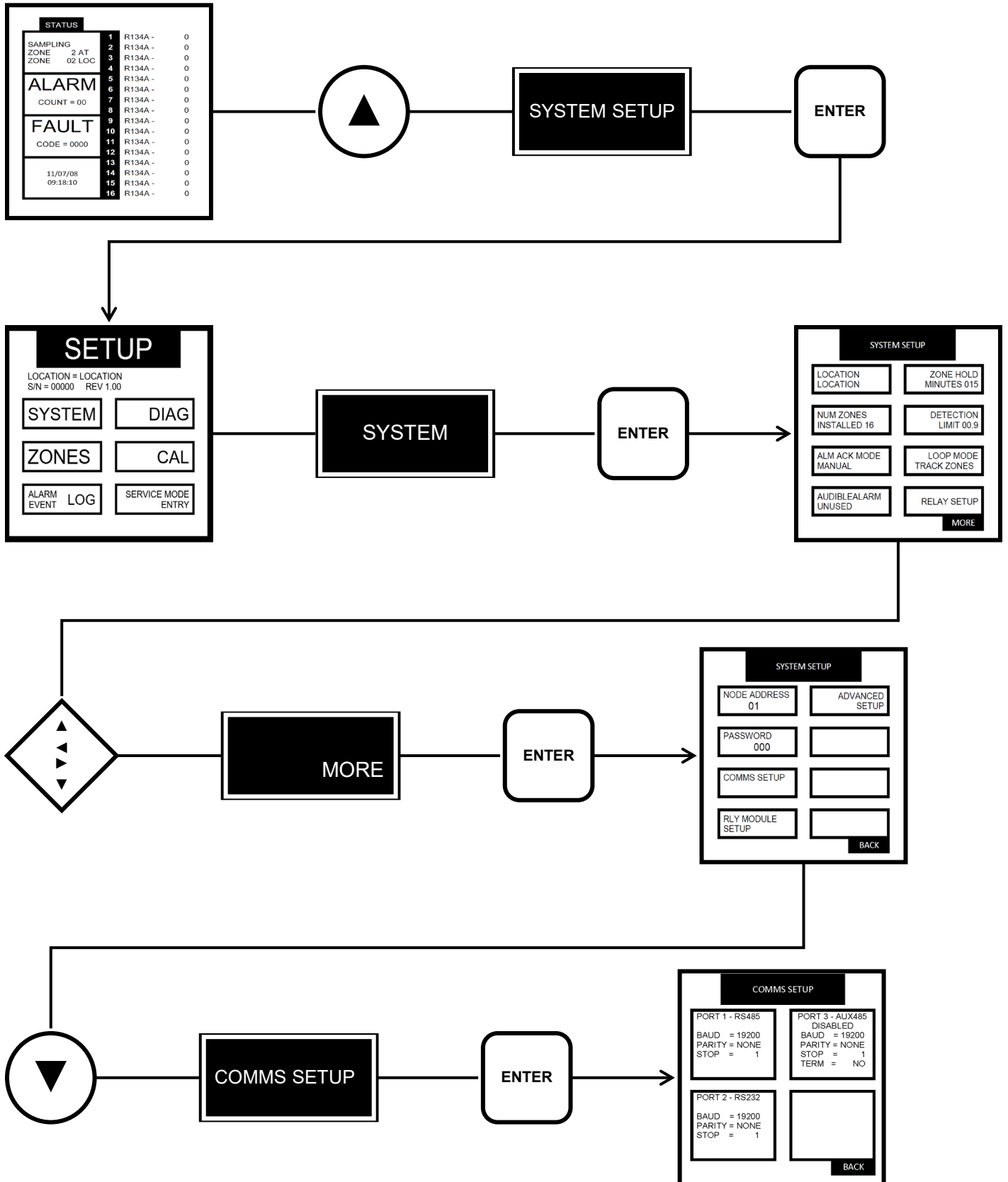Options: NORMAL, ACTIVE

[ENTER] **3 secs to test**

TRIG

Default: EVAC

Select alarm/fault that triggers relay

Options: EVAC, SPILL, LEAK, FAULT

(▲) (▼)

3.5 Communications (Comms) Setup Menu

STATUS

SAMPLING
ZONE   2 AT
ZONE   02 LOC

ALARM

COUNT = 00

FAULT

CODE = 0000

11/07/08
09:18:10

1	R134A -	0
2	R134A -	0
3	R134A -	0
4	R134A -	0
5	R134A -	0
6	R134A -	0
7	R134A -	0
8	R134A -	0
9	R134A -	0
10	R134A -	0
11	R134A -	0
12	R134A -	0
13	R134A -	0
14	R134A -	0
15	R134A -	0
16	R134A -	0

▲ → SYSTEM SETUP → ENTER

SETUP

LOCATION = LOCATION
S/N = 00000   REV 1.00

SYSTEM   DIAG
ZONES   CAL
ALARM EVENT LOG   SERVICE MODE ENTRY

→ SYSTEM → ENTER →

SYSTEM SETUP

LOCATION LOCATION | ZONE HOLD MINUTES 015
NUM ZONES INSTALLED 16 | DETECTION LIMIT 00.9
ALM ACK MODE MANUAL | LOOP MODE TRACK ZONES
AUDIBLEALARM UNUSED | RELAY SETUP
| MORE

◆ → MORE → ENTER →

SYSTEM SETUP

NODE ADDRESS 01 | ADVANCED SETUP
PASSWORD 000 |
COMMS SETUP |
RLY MODULE SETUP |
| BACK

▼ → COMMS SETUP → ENTER →

COMMS SETUP

PORT 1 - RS485
BAUD = 19200
PARITY = NONE
STOP = 1

PORT 3 - AUX485 DISABLED
BAUD = 19200
PARITY = NONE
STOP = 1
TERM = NO

PORT 2 - RS232
BAUD = 19200
PARITY = NONE
STOP = 1

BACK

3.6 Communications Setup

Default Relay Module Modus Parameters shown. See Multi-Zone Manual PN #3015-5074 for more information.

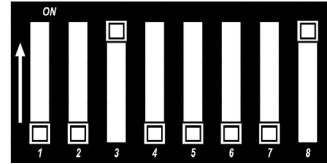**MULTI-ZONE**

COMMS SETUP

PORT 1 - RS485

BAUD = 19200
PARITY = NONE
STOP =   1

PORT 3 - AUX485
DISABLED
BAUD = 19200
PARITY = NONE
STOP =   1
TERM =   NO

PORT 2 - RS232

BAUD = 19200
PARITY = NONE
STOP =   1

BACK

NAVIGATE / TOGGLE   ENTER SELECT / SAVE

RELAY MODULE DIP SWITCH

Switch Pos.	Function	Default	10	20	30	40	50	60	70	80
1	Modbus Address	Off	Off	Off	Off	On	On	On	On	Off
2		Off	Off	On	On	Off	Off	On	On	Off
3		On	On	Off	On	Off	On	Off	On	Off
4		Reserved								
5		Reserved								
6	Word Format	Off	6=Off, 7=Off		6=Off, 7=On		6=On, 7=Off		6=On, 7=On	
7		Off	8,N,1		8,N,2		8,O,1		8,E,1	
8	Baud Rate	On	Off=9600 bps				On=19200 bps			

4 GENERAL OPERATION

4.1 Functional Overview

⚠ **CAUTION:** Once a relay module is enabled and connected to a Multi-Zone monitor is cannot be easily disable/disconnect. Please contact Bacharach Product Support for additional assistance.

By way of a RS485 connection, the Multi-Zone Relay Module expands the available alarm relays of the Multi-Zone Gas Monitor from (4) to (36) relays with a maximum of (2) modules per monitor. With a possibility of (32) additional relays, a multitude of horns and strobes can be deployed throughout a facility to readily alert personnel to a leak or fault occurrence.

Once operational, the Relay module communicates visually to the user via LED lights on the Relay Module board.

LED COLOR	STATE	DESCRIPTION
GREEN	STEADY	Power applied to Module
	FLASHING	Communication Received/Transmitted
AMBER	FLASHING	Heartbeat, once per second
RED	STEADY	Fault or Loss of Communications

4.2 Relay Module Status & Faults

The Relay Module must be enabled to view Module Status and Faults. Status and fault displays below are shown with Relay Module A enabled and Relay Module B disabled. Voltage[1], Temperature[1], Modbus[1], Fault Codes[1], and Fault Details[2] can be viewed from these menus. See Section 3 for Iconography.

*Available when there is a fault active on any relay

4.3 Fault Codes

See Section 4.2 to access Relay Module Status and Faults

FAULT	CODE	DESCRIPTION
Firmware Fault	<0001>	Error detected in firmware
Voltage out of specification 3.3V	<0002>	3.3V out of range
Voltage out of specification 24V	<0004>	24V out of range
Relay Fault	<0008>	Relay state does not match expected state
Modbus Fault	<0010>	Error detected in Modbus communications
Temperature Fault	<0020>	Measured temperature is outside of limits
RAM Integrity Fault	<0040>	Error detected during RAM test

5 MAINTENANCE

A technician with the use of readily available hand tools and factory provided instructions can perform basic diagnostics, replace subcomponents, and confirm proper operation before putting the unit back into service. Field upgrade is possible with proper equipment.

SPARE PARTS	
PART NUMBER	DESCRIPTION
3015-6251	Relay Board
3015-6256	Circuit Breaker, 2-Pole, 4A, 250V
3015-6254	Power Supply, 24V

5.1 Cleaning

When required, cleaning of the HMZ-RM1 should be performed using a clean, dry cloth on the outside of the enclosure. To avoid shock hazard and/or equipment damage, DO NOT use soap and water.

WARRANTY

Bacharach, Inc. warrants to Buyer that at the time of delivery this Product will be free from defects in material and manufacture and will conform substantially to Bacharach Inc.'s applicable specifications. Bacharach's liability and Buyer's remedy under this warranty are limited to the repair or replacement, at Bacharach's option, of this Product or parts thereof returned to Seller at the factory of manufacture and shown to Bacharach Inc.'s reasonable satisfaction to have been defective; provided that written notice of the defect shall have been given by Buyer to Bacharach Inc. within two (2) years after the date of delivery of this Product by Bacharach, Inc.

Bacharach, Inc. warrants to Buyer that it will convey good title to this Product. Bacharach's liability and Buyer's remedy under this warranty of title are limited to the removal of any title defects or, at the election of Bacharach, to the replacement of this Product or parts thereof that are defective in title.

The warranty set forth in Paragraph 1 does not apply to parts that the Operating Instructions designate as having a limited shelf-life or as being expended in normal use (e.g., filters).

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