



GAI-TRONICS®  
A HUBBELL COMPANY

# Model 12579-004 *Elemec3* Beacon Monitor Relay Module (MRM)

## TABLE OF CONTENTS

*Confidentiality Notice* ..... 1

*General Information* ..... 1

    Application..... 1

    Interfaces ..... 2

    Definitions..... 2

    Abbreviations ..... 2

    Block Diagrams ..... 3

*Installation* ..... 4

    Installation Safety Guidelines ..... 4

    Mounting..... 4

    Wiring ..... 4

        Relay Contact Outputs ..... 4

        Communication..... 5

        Power ..... 5

        Grounding ..... 6

*Configuration* ..... 6

    Address Setting..... 6

    Jumper Settings..... 6

        CPU Board Jumpers..... 6

        Beacon Output Supervision Jumpers ..... 7

    Output Modes..... 8

        Supervised 120 V AC Powered Beacons ..... 8

        Unsupervised 120 V AC Beacons..... 8

*Operation* ..... 8

*Fault Diagnostics* ..... 9

*Specifications* ..... 9

    Electrical..... 9

    Mechanical..... 10



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## Confidentiality Notice

This manual is provided solely as an installation, operation, and maintenance guide and contains sensitive business and technical information that is confidential and proprietary to GAI-Tronics. GAI-Tronics retains all intellectual property and other rights in or to the information contained herein, and such information may only be used in connection with the operation of your GAI-Tronics product or system. This manual may not be disclosed in any form, in whole or in part, directly or indirectly, to any third party.


## General Information

### Application

The Model 12579-004 is an Eight Output, Beacon MRM (Monitored Relay Module) designed to drive beacons for use in *Elemec3* PA/GA (public address/general alarm) systems. The module provides eight independently controlled relay-contact outputs with status indicator LEDs. The relay-contact outputs are used to switch power to signaling devices, such as strobes, on command from an *Elemec3* controller.

The Model 12579-004 Beacon MRM allows supervision of the cable runs to the signaling devices to detect abnormal conditions, such as open-circuits, ground faults, and wire-to-wire short circuits. The Beacon MRM consists of three PCBAs; the Base Relay PCBA, the CAN Bus CPU PCBA, and the Upper Relay PCBA (see [Figure 1](#)).

The Model 12579-004 Beacon MRM differs from the Model 030-02-0097-0xx series MRMs in the following ways:

-  operates only with 120 V ac beacons or strobes
- tolerates discharge voltages produced by these devices when power is removed

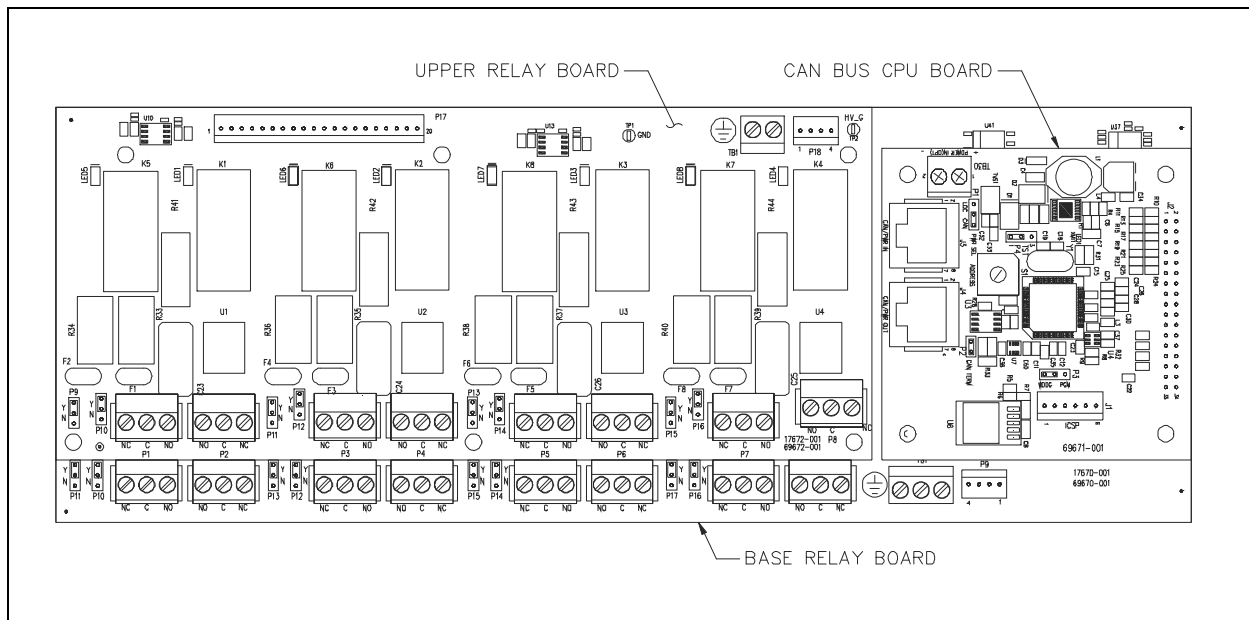


Figure 1. Model 12579-004 Beacon Monitor Relay Module

## Interfaces

The Model 12579-004 Beacon MRM interfaces to an *Elemec3* Controller in an *Elemec3* PA/GA system cabinet via the I/O port (CAN Bus).

The CAN Bus is monitored by the *Elemec3* controller for any interruption in communication. The *E3* controller uses this communication channel to control the activation/de-activation of the Beacon MRM's relay outputs. The Beacon MRM uses the communication channel to report any detected cable fault conditions to the *Elemec3* controller.

## Definitions

**HIGH VOLTAGE**—An electrical potential greater than 42.4 V<sub>PEAK</sub> or 60 V dc

**LOW VOLTAGE**—An electrical potential less than or equal to 42.4 V<sub>PEAK</sub> or 60 V dc

## Abbreviations

**CPU**—Central Processing Unit

**WDOG**—Watchdog

**PCBA**—Printed Circuit Board Assembly

**PGM**—Program

**EOL**—End of Line

**TST**—Test

**LOC**—Local

**Y**—Yes, **N**—No

## Block Diagrams

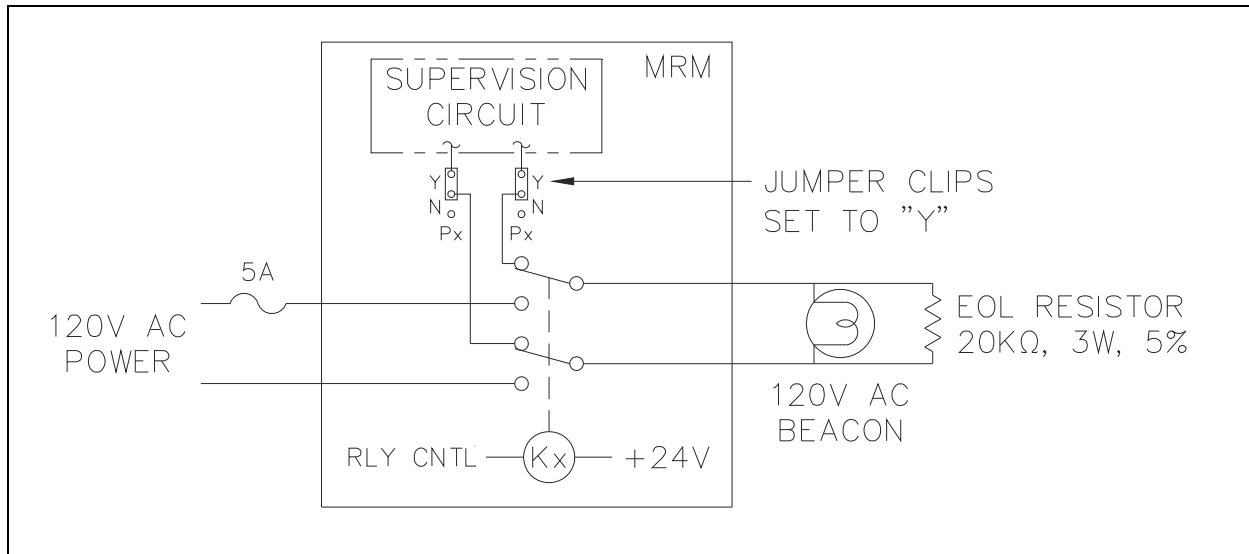


Figure 2. 12579-004 Beacon MRM Block Diagram—Typical Supervised 120V ac Beacon

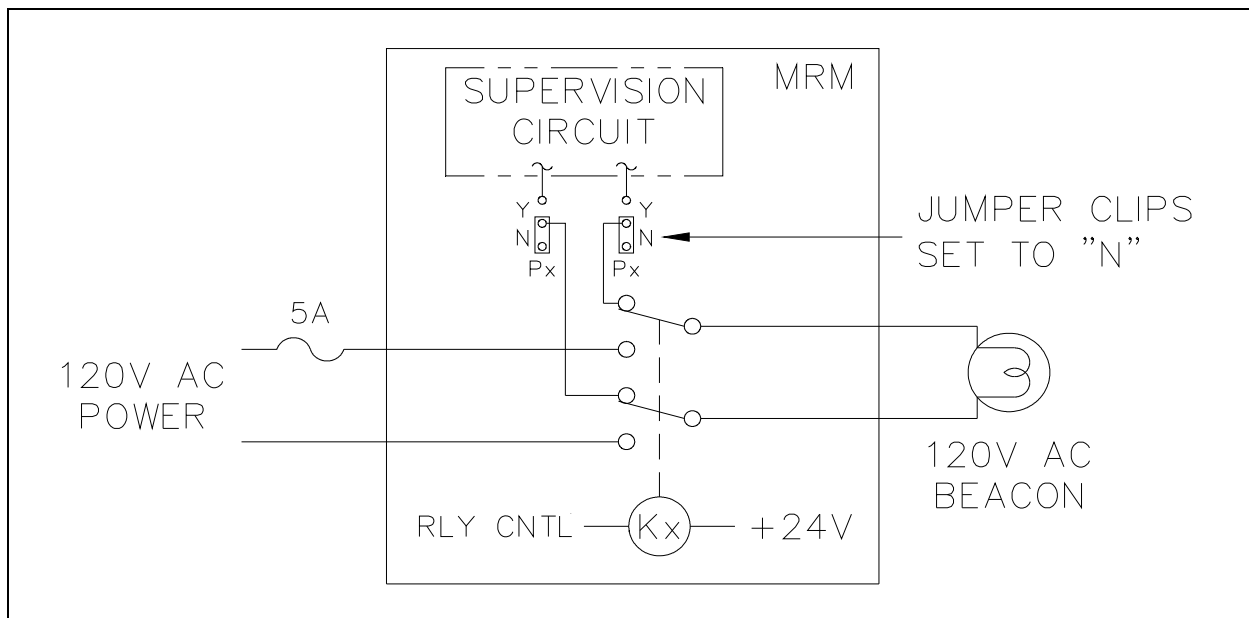


Figure 3. 12579-004 Beacon MRM Block Diagram—Typical Unsupervised 120V ac Beacon

### NOTES:

- EOL (End-of-Line) resistors are not included with the Beacon MRM. These items are included in the Model 12509-004 Kit that must be ordered separately.
- The Beacon MRM does not contain any current-limiting circuits for the beacon outputs. A 5-Amp maximum slow-blow fuse or 5 A Hi in-rush circuit breaker must be installed for each output circuit.
- Select the BEACON MONITOR module icon to properly configure this module in the *Elemec3* console.

# Installation

## Installation Safety Guidelines

Please adhere to all warnings, safety, and operating instructions on the unit and in the installation manual.



- Disconnect power before servicing. Do not disconnect the equipment while circuit is energized.
- Avoid servicing the unit during electrical storms.
- Do not touch uninsulated wires.



Warning: Observe precautions for handling electrostatic sensitive devices.

- Notify plant personnel of a system shutdown prior to servicing the unit.
- Disconnect power before installing or removing the Beacon MRM or any of the individual PCBs.

## Mounting

The Beacon MRM is designed to be mounted on Tyco 6TK2 Snaptrack<sup>®</sup> that is installed in an equipment rack. The track is a grooved plastic channel designed to allow PCBAs to securely *snap* into the groove. The Snaptrack<sup>®</sup> can be installed inside a rack wherever it is convenient.

## Wiring

Refer to [Figure 4](#) for details on the Beacon MRM terminal and control locations.

### Relay Contact Outputs

The Beacon MRM contains eight individually configurable relay-contact outputs with status indicators, allowing it to control (activate) up to eight beacon circuits. Connections to field devices are made at terminal blocks P1 through P8 on the base relay PCBA, and P1 through P8 on the upper relay PCBA.

Two terminal blocks are provided for each DPDT (Double Pole Double Throw) output contact for each power relay (i.e.—terminal blocks P1 and P2 are used for output one, terminal blocks P3 and P4 are used for output two, etc.) (see [Figure 4](#)). The relay-contact outputs can be used in either supervised or unsupervised modes.

Properly sized ferrules must be crimped on all conductor ends terminated to the terminal blocks to ensure proper termination. The ferrule size is dependent upon the conductor size used and can be sourced from any supplier.

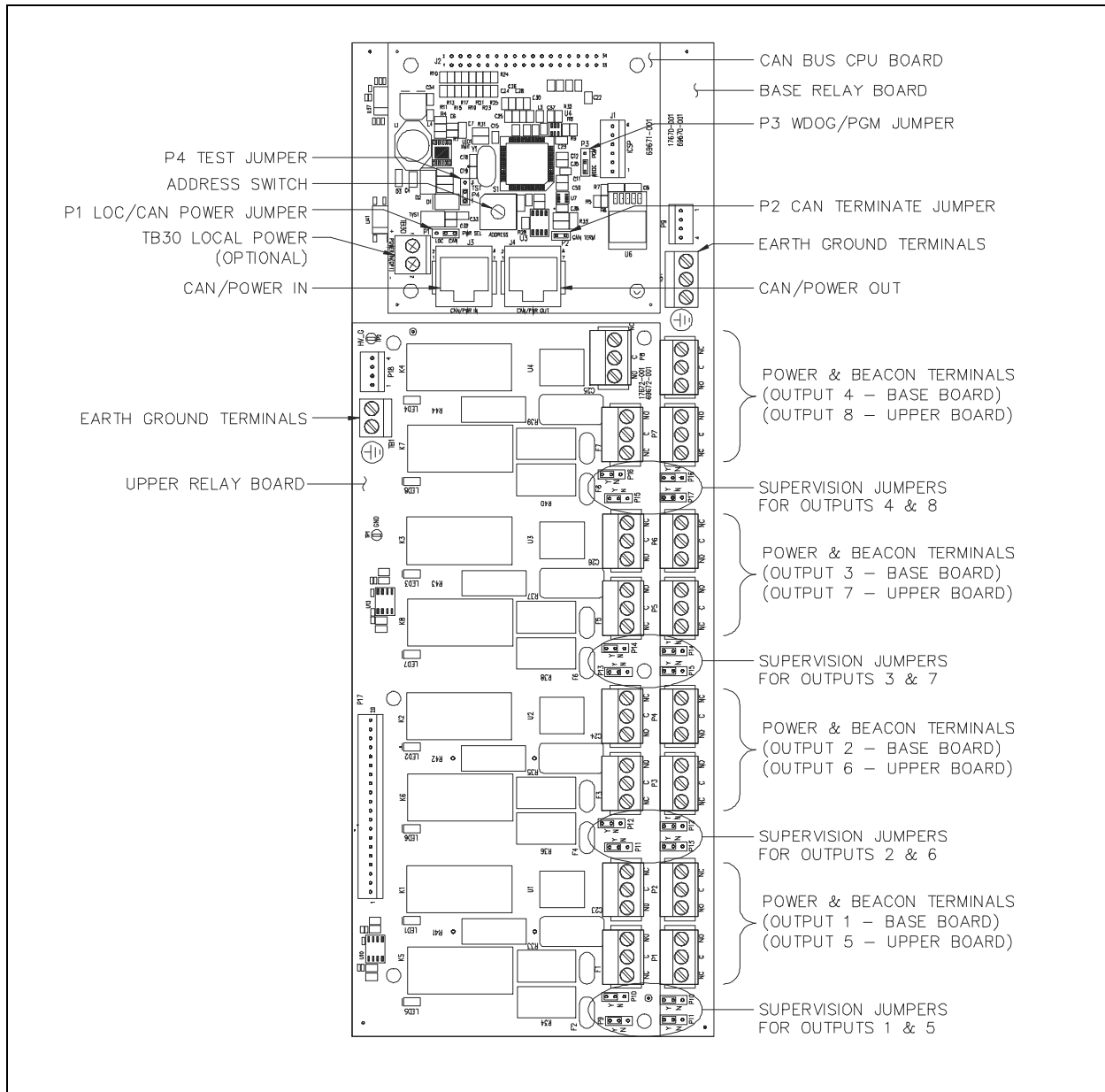


Figure 4. Beacon MRM Terminals and Controls Locations

Communication

The communication line (CAN Bus) between the *Elemec3* controller and the Beacon MRM is provided via a CAT5 cable assembly. Additional modules can be added by connecting a CAT5 cable assembly from the CAN OUT (J4) connector on the CPU PCBA of this module to the CAN IN (J3) connector on the CPU PCBA of the next module.

Power

**Power—System**

Power for the Beacon MRM is provided via the CAT5 CAN bus cable assembly connected to the *Elemec3* controller. Up to 1.6 amps can be supplied through the CAT5 cable to power multiple modules. Local power must be utilized if additional modules are required that exceed this maximum current.

**Power—Local 24V dc (Optional)**

24 V dc power can be brought in from an auxiliary power supply and terminated on TB30 (located on the CPU PCBA), if necessary.

1. Terminate the positive leg to TB30-1 (+).
2. Terminate the return leg to TB30-2 (-).
3. Install jumper P1 between pins 1 and 2 (LOC) when local power is utilized.

**NOTES:**

- When daisy-chaining power between this module and another module, the P1 jumper should be fitted between pins 1 and 2 (LOC) of the first module in the daisy-chain. The remaining modules in the daisy-chain must have jumper, P1, across pins 2 and 3 (CAN). P1 is located on the CPU Board.
- When daisy-chaining power between this module and other modules, a CAT5 cable assembly must be connected from the CAN OUT (J4) connector of this module to the CAN IN (J3) of the next module.
- Although local power may be daisy-chained between this module and other modules, the preferred method of delivering power to these modules is by providing a dedicated cable run between each module and the auxiliary power supply.
- The local power supply return leg must be connected to earth ground in the cabinet for proper operation. The physical connection should be made at the local power supply terminals.
- The ground reference for this assembly must be identical to that of the cabinet.
- The Beacon MRM does not contain any current-limiting for local power. An external fuse should be installed with the appropriate voltage and current ratings. The selected fuse should be a slow-blow type.

**Grounding**

Connect TB1 on the base relay board to the earth ground bar in the cabinet. A local power supply return leg must be connected to the earth ground bar in the cabinet for proper operation if a local power supply is used. A ground wire must also be installed on the upper relay PCBA for proper operation.

## Configuration

**Address Setting**

The controller identifies each module on the CAN bus by its module address. Set the module's address using the rotary hex switch S1 located on the CPU board. The range of valid settings is from 0 to F (hex). Refer to the *Elemec3* controller configuration for the address setting.

**Jumper Settings****CPU Board Jumpers****P1—Power Select**

Place the POWER SELECT shorting clip in the CAN position (across pins 2 and 3) to power the beacon MRM from the *Elemec3* controller. Power to all modules is limited to 1.6 amps. If the maximum current draw is reached, additional modules can be added by providing local power (24 V dc) to terminal block TB30 and setting the POWER SELECT shorting clip to LOC (across pins 1 and 2).

**P2—CAN Termination**

The CPU board contains jumper P2 for the end of line (EOL) termination of the CAN bus. Install the jumper across P2 only at the last CAN device in the chain. All other CAN devices should have the P2 jumper removed.

**P3—Watchdog/Program Select**

The default position for P3 is the WDOG (Watchdog) position (across pins 2 and 3). The PGM (program) position should not be selected since it is reserved for programming the CPU Board.

**P4—Test**

The default position for P4 is across pins 1 and 2, which is the run position. The TST (Test) position (pins 2 and 3) should not be used since it is for test purposes only.

**Beacon Output Supervision Jumpers**

Table 1. Beacon Output Supervision Jumpers

Beacon outputs one to four are located on the base PCBA. Beacon outputs five through eight are located on the upper relay PCBA. Each output can be set to supervise or not supervise the beacon cable:

- Set both jumper clips to the Y position (*see note*) to enable supervision.
- Set both jumper clips to the N position (*see note*) to disable supervision

Beacon Output	Location	Terminal Blocks	Jumper Clips	Factory Default Setting
1	Base Board (Lower)	P1, P2	P10, P11	Y (pins 1 and 2)
2		P3, P4	P12, P13	Y (pins 1 and 2)
3		P5, P6	P14, P15	Y (pins 1 and 2)
4		P7, P8	P16, P17	Y (pins 1 and 2)
5	Relay Board (Upper)	P1, P2	P9, P10	Y (pins 1 and 2)
6		P3, P4	P11, P12	Y (pins 1 and 2)
7		P5, P6	P13, P14	Y (pins 1 and 2)
8		P7, P8	P15, P16	Y (pins 1 and 2)

Legend: Y = Yes  
N = No

**NOTE:** Beacon cable supervision must also be selected (enabled) in the *Elemec3* Console software for each beacon output.

Table 1 lists the beacon outputs, with corresponding terminal blocks, and supervision selection jumpers.



## Output Modes

### Supervised 120 V AC Powered Beacons

The relay outputs are used to connect/disconnect 120 V ac power to signaling devices with supervision of the beacon cable (see [Figure 5](#)).

#### NOTES:

- Dc-resistance measured across the loop (with both end-of-line device and the Beacon MRM removed from the loop) must be at least 100 kilohms. Be sure to observe this limitation for reliable operation of the loop monitoring feature.
- The Beacon MRM does not contain any current-limiting circuits for the beacon outputs. A 5-amp maximum, slow-blow fuse or 5-amp, high in-rush circuit breaker must be installed for each output circuit.

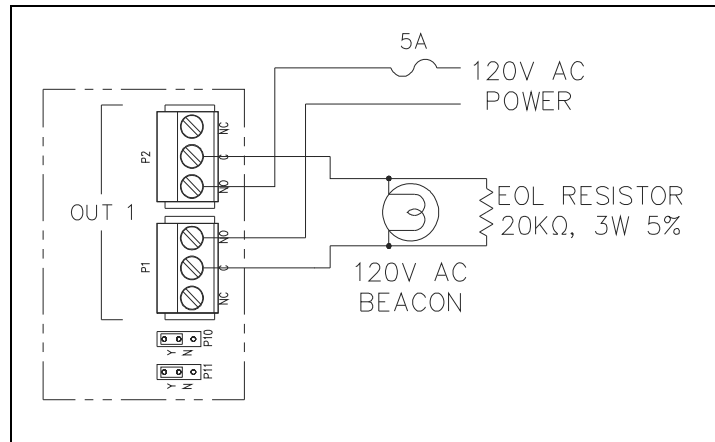


Figure 5. Supervised 120V AC-Powered Beacons

### Unsupervised 120 V AC Beacons

The relay outputs are used to connect/disconnect 120 V ac power to the signaling devices without cable supervision (see [Figure 6](#)).

**NOTE:** The Beacon MRM does not contain any current-limiting circuits for the beacon outputs. A 5-amp maximum, slow-blow fuse or a 5-amp, high in-rush current circuit breaker must be installed for each output circuit.

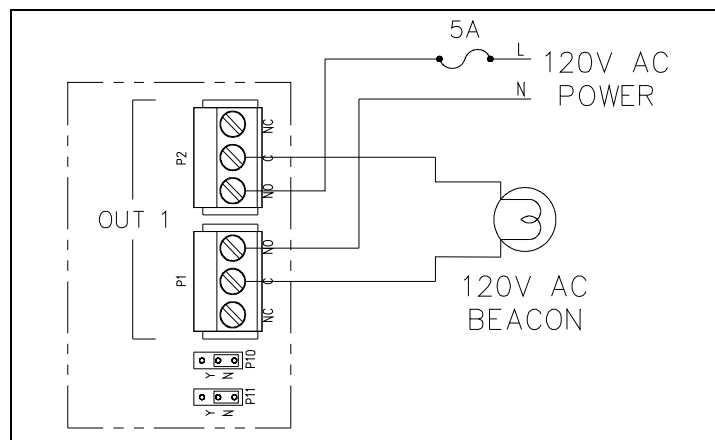


Figure 6. Unsupervised 120V AC-Powered Beacons

## Operation

All operation is controlled by the *Elemec3* Controller and is set up in the configuration software. See the *Elemec3* controller configuration details in the system manual for all operational information.

# Fault Diagnostics

Table 2. Troubleshooting Guide

Symptom	Action
Beacon MRM does not communicate with <i>E3</i> controller.	<ul style="list-style-type: none"> <li>• Verify power is applied to the Beacon MRM.</li> <li>• Verify that the CAN line is connected to the Beacon MRM.</li> <li>• Verify that the address of the Beacon MRM agrees with the setup configuration.</li> <li>• Ensure that the CPU PCBA is correctly connected via J1.</li> <li>• Call for service of the Beacon MRM.</li> </ul>
Beacon MRM does not activate relay outputs.	<ul style="list-style-type: none"> <li>• Verify that power is applied to the Beacon MRM.</li> <li>• Verify that the CAN line is connected to the Beacon MRM.</li> <li>• Verify end-of-line resistor(s) properly installed on each beacon circuit.</li> <li>• Verify jumper clips are properly set for affected relay output(s).</li> <li>• Verify total loop resistance is at least 100 kilohms.</li> <li>• Call for service of the Beacon MRM.</li> </ul>

# Specifications

## Electrical

Power requirements .....	24 V dc ±10%
Current draw .....	0.35 A maximum @ 24 V dc (does not include beacon power)
Maximum number of relay outputs.....	8 loops
Maximum devices on output.....	limited by maximum current draw
Input/output.....	24V dc Power in CAN in CAN out Eight relay outputs
Data communications.....	CAN
End-of-line device.....	20 kΩ, 3 W, 5% (Supervised Mode) None (Unsupervised Mode)

## Switched Relay Outputs

Maximum current draw (per output).....	5 A
Maximum ac switching voltage .....	120 V ac
Open fault detection.....	minimum 65 kΩ
Ground fault detection .....	less than 200 Ω to ground
Wire-to-wire short fault detection.....	less than 1 kΩ

## Loop Supervision Limitations:

Cable limitations .....	100 Ω maximum loop resistance
Resistance across loop (excluding end-of-line device).....	100 kΩ minimum

**Power Relay Module/CAN Bus CPU Terminals:**

Minimum conductor size .....0.20 mm<sup>2</sup>  
Maximum conductor size.....2.50 mm<sup>2</sup>

**Mechanical**

**Unit Dimensions**

Model 12579-004..... 1.53 H × 11.00 W × 4.00 D in (38.9 × 279.4 × 101.6 mm)  
Unit weight..... 1.75 lb maximum

**Environmental**

Temperature range (operating/storage)..... -30 °C to 50 °C (-22 °F to 122 °F)  
Humidity .....95% non-condensing relative humidity`

# Warranty

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Equipment. GAI-Tronics warrants for a period of one (1) year from the date of shipment, that any GAI-Tronics equipment supplied hereunder shall be free of defects in material and workmanship, shall comply with the then-current product specifications and product literature, and if applicable, shall be fit for the purpose specified in the agreed-upon quotation or proposal document. If (a) Seller's goods prove to be defective in workmanship and/or material under normal and proper usage, or unfit for the purpose specified and agreed upon, and (b) Buyer's claim is made within the warranty period set forth above, Buyer may return such goods to GAI-Tronics' nearest depot repair facility, freight prepaid, at which time they will be repaired or replaced, at Seller's option, without charge to Buyer. Repair or replacement shall be Buyer's sole and exclusive remedy. The warranty period on any repaired or replacement equipment shall be the greater of the ninety (90) day repair warranty or one (1) year from the date the original equipment was shipped. In no event shall GAI-Tronics warranty obligations with respect to equipment exceed 100% of the total cost of the equipment supplied hereunder. Buyer may also be entitled to the manufacturer's warranty on any third-party goods supplied by GAI-Tronics hereunder. The applicability of any such third-party warranty will be determined by GAI-Tronics.

Services. Any services GAI-Tronics provides hereunder, whether directly or through subcontractors, shall be performed in accordance with the standard of care with which such services are normally provided in the industry. If the services fail to meet the applicable industry standard, GAI-Tronics will re-perform such services at no cost to buyer to correct said deficiency to Company's satisfaction provided any and all issues are identified prior to the demobilization of the Contractor's personnel from the work site. Re-performance of services shall be Buyer's sole and exclusive remedy, and in no event shall GAI-Tronics warranty obligations with respect to services exceed 100% of the total cost of the services provided hereunder.

Warranty Periods. Every claim by Buyer alleging a defect in the goods and/or services provided hereunder shall be deemed waived unless such claim is made in writing within the applicable warranty periods as set forth above. Provided, however, that if the defect complained of is latent and not discoverable within the above warranty periods, every claim arising on account of such latent defect shall be deemed waived unless it is made in writing within a reasonable time after such latent defect is or should have been discovered by Buyer.

Limitations / Exclusions. The warranties herein shall not apply to, and GAI-Tronics shall not be responsible for, any damage to the goods or failure of the services supplied hereunder, to the extent caused by Buyer's neglect, failure to follow operational and maintenance procedures provided with the equipment, or the use of technicians not specifically authorized by GAI-Tronics to maintain or service the equipment. **THE WARRANTIES AND REMEDIES CONTAINED HEREIN ARE IN LIEU OF AND EXCLUDE ALL OTHER WARRANTIES AND REMEDIES, WHETHER EXPRESS OR IMPLIED BY OPERATION OF LAW OR OTHERWISE, INCLUDING ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.**

## Return Policy

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If the equipment requires service, contact your Regional Service Center for a return authorization number (RA#). Equipment should be shipped prepaid to GAI-Tronics with a return authorization number and a purchase order number. If the equipment is under warranty, repairs or a replacement will be made in accordance with the warranty policy set forth above. Please include a written explanation of all defects to assist our technicians in their troubleshooting efforts.

Call 800-492-1212 (inside the USA) or 610-777-1374 (outside the USA) for help identifying the Regional Service Center closest to you.