GAI-TRONICS®
A HUBBELL COMPANY

12579-006 E3 CAN Bus
240V Beacon MRM
(Monitored Relay Module)

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Confidentiality Notice

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General Information

Application

The Model 12579-006 is an eight output, CAN bus, 240 V ac Beacon MRM (Monitored Relay Module) that controls power to beacons for use in *Elemec3* PA/GA (public address/general alarm) systems. The module provides eight independent relay-contact outputs with status indicator LEDs. The relay-contact outputs switch power to signaling devices, such as beacons, on command from an *Elemec3* controller.

The Model 12579-006 Beacon MRM provides 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 12579-006 Beacon MRM differs from the Model 030-02-0097-0xx series MRMs in the following ways:

- ⚠️—**operates only with 230–240 V ac** beacon**s**

- tolerates discharge voltages produced by these devices when removing power
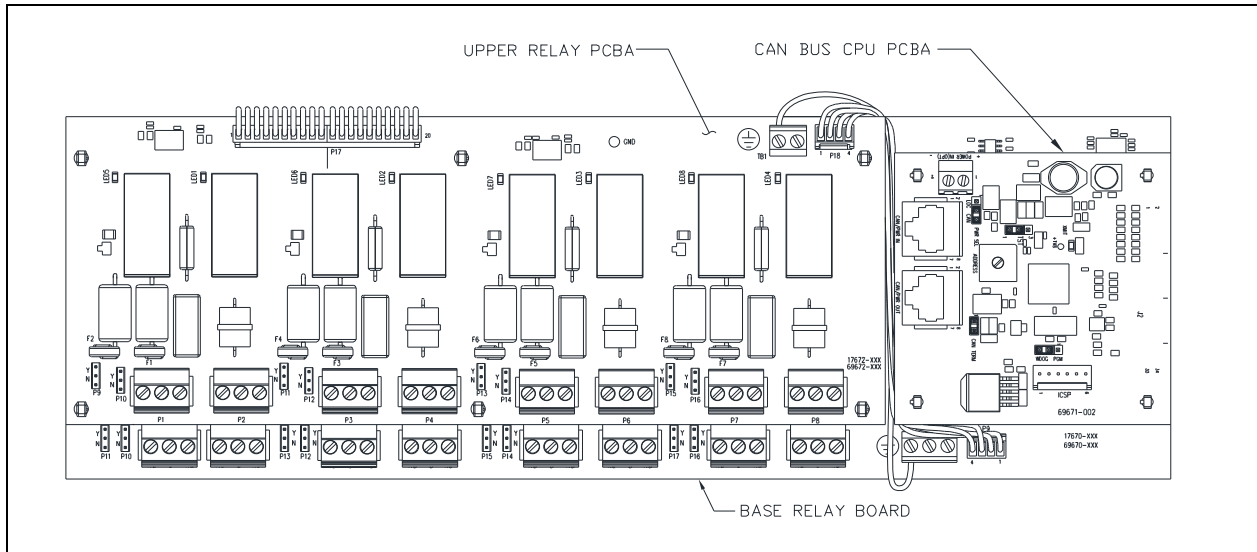
Figure 1. 12579-006 CAN Bus 240 V ac Beacon MRM

Interfaces

The Model 12579-006 Beacon MRM interfaces to an *Elemec3* controller in an *Elemec3* PA/GA system cabinet via the I/O port (CAN Bus).

The *Elemec3* controller monitors the CAN bus for communication interruptions. 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 all cable fault conditions to the *Elemec3* controller.

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
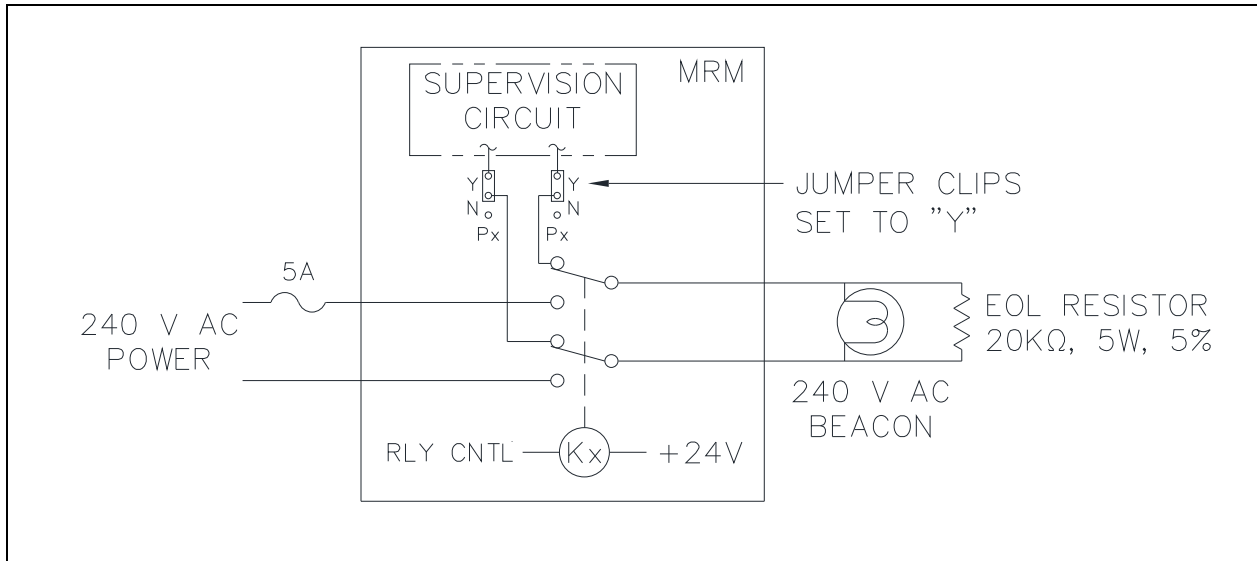
Figure 2. 12579-006 CAN Bus Beacon MRM Block Diagram—Typical Supervised 240 V ac Beacon
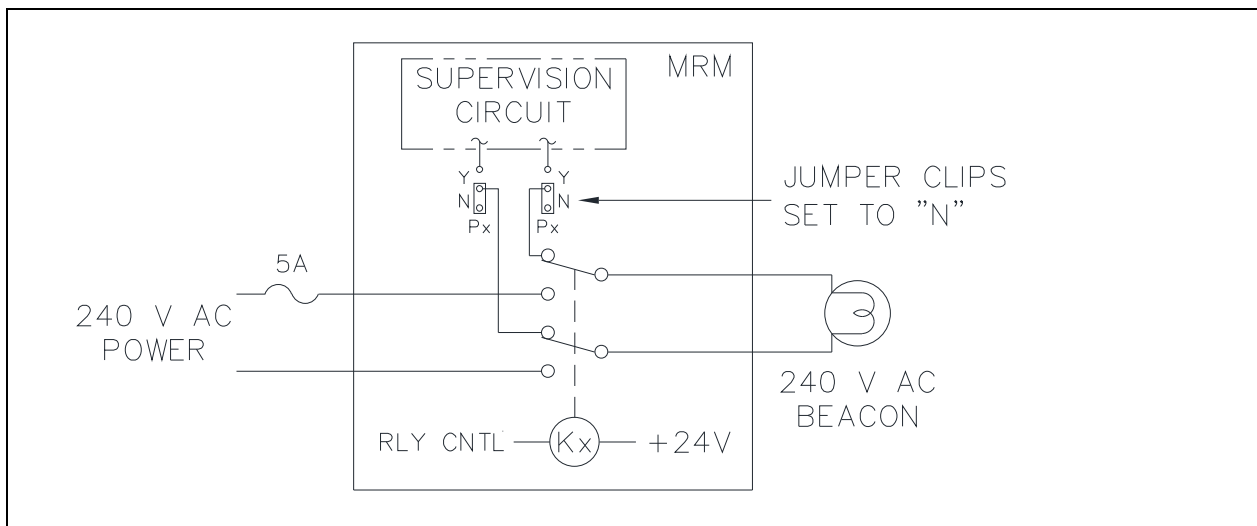
Figure 3. 12579-006 CAN Bus Beacon MRM Block Diagram—Typical Unsupervised 240 V ac Beacon

NOTES:

- The beacon MRM does not include EOL (End-of-Line) resistors. The Model 12509-004 Kit (*purchased separately*) includes these items.

- The beacon MRM does not contain any current-limiting circuits for the beacon outputs. Install a 5-amp maximum slow-blow fuse or 5-amp Hi in-rush circuit breaker 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.

⚠ **WARNING** ⚠

⚠ —Electrical Safety Hazard—Authorized personal only. Serious shock or death could result.

- Disconnect power before servicing. Do not disconnect the equipment while the circuit has power.

- Avoid servicing the unit during electrical storms.

- Do not touch uninsulated wires.

- 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.

- Only trained personnel must install this equipment.

⚠ Warning: Observe precautions for handling electrostatic sensitive devices.

Mounting

Mount the beacon MRM on Tyco's 6TK2 Snaptrack® and install it in an equipment rack. The track is a grooved plastic channel that allows PCBAs to securely *snap* into the groove. Install Snaptrack® inside a rack or wherever it is convenient.

Wiring

See 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 LED status indicators, allowing it to control (activate) up to eight beacon circuits. Use the relay-contact outputs in either supervised or unsupervised modes.

1. Crimp properly sized ferrules on all conductor ends to ensure proper termination.

   - The ferrule size is dependent upon the conductor size in use.
   - Source the ferrules from any electrical supplier.

2. Make all field device connections at terminal blocks P1 through P8, on the base relay PCBA and P1 through P8 on the upper relay PCBA.

   The beacon MRM provides two terminal blocks for each DPDT (Double Pole Double Throw) output contact for each power relay (i.e.—terminal blocks P1 and P2 are for output one, terminal blocks P3 and P4 are for output two, etc.) (see Figure 4).
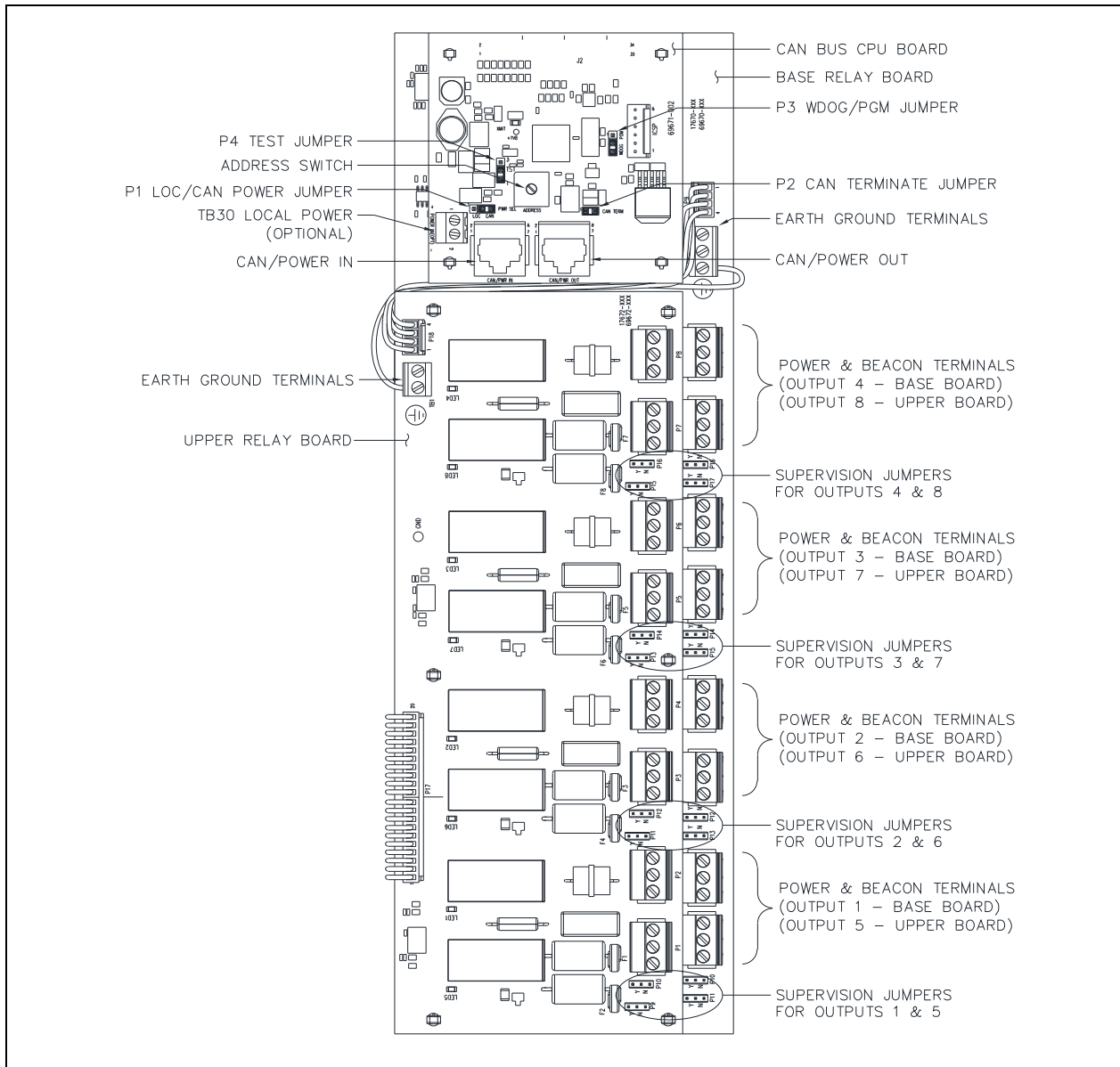
Figure 4. Beacon MRM Terminals and Control Locations

Communication

The communication line (CAN Bus) between the *Elemec3* controller and the beacon MRM is via a CAT5 cable assembly. Add additional modules 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

The beacon MRM receives power via the CAT5 CAN bus cable assembly connecting it to the *Elemec3* controller. Power is available (up to 1.6 amps) through the CAT5 cable to power multiple modules. Use local power if additional modules exceed this maximum current.

Power—Local 24V dc (Optional)

Use an auxiliary power supply to provide 24 V dc power, if necessary. Terminate the auxiliary power supply to terminal block TB30 (on the CPU PCBA).

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 using local power.

NOTES:

- When daisy-chaining power between this module and another module, install jumper P1 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 on the CPU Board.

- When daisy-chaining power between this module and other modules, connect a CAT5 cable assembly from the CAN OUT (J4) connector of this module to the CAN IN (J3) of the next module.

- Although daisy-chaining local power between this module and other modules is acceptable, the preferred method to deliver power to these modules is by providing a dedicated cable run between each module and the auxiliary power supply.

- Connect the local power supply return leg to earth ground, in the cabinet, for proper operation. Make the physical connection at the local power supply terminals.

- This assembly must use the same ground reference as the cabinet.

- The beacon MRM does not contain any current-limiting for local power. Install external fuses with appropriate voltage and current ratings. Use slow-blow type fuses.

Grounding

⚠—Ensure power is disconnected before making this connection.

1. Connect terminal TB1, on the upper and base relay boards, to the earth ground bar, in the cabinet.

   Use an earth ground wire with a green/yellow sheath that is #18 AWG (0.75mm^2).

2. When using a local power supply, connect the local power supply return leg to the earth ground bar, in the cabinet.

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, on the CPU board. The range of valid settings is 0–F (hex). Refer to the *Elemec3* controller configuration for the address setting.

Jumper Settings

CPU Board Jumpers

P1—Power Select

To power the beacon MRM from the *Elemec3* controller, place the POWER SELECT shorting clip in the CAN position (across pins 2 and 3). There is a 1.6-amp power limit available to all modules. Upon reaching the maximum current draw, add additional modules 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 EOL (end of line) termination of the CAN bus. Install the jumper across P2 <u>only</u> at the last CAN device in the chain. Remove jumper P2, on all other CAN devices on the bus.

P3—Watchdog/Program Select

The default position for P3 is the WDOG (watchdog) position (across pins 2 and 3). Do <u>not</u> select the PGM (program) position since it is exclusively for programming the CPU board.

P4—Test

The default position for P4 is the RUN position (across pins 1 and 2). Do not use the TST (Test) position (pins 2 and 3) since it is for test purposes only.

Beacon Output Supervision Jumpers

⚠—Ensure power is disconnected before performing this configuration.

Beacon outputs one to four are on the base PCBA. Beacon outputs five through eight are on the upper relay PCBA. Set each output 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

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

Table 1. Beacon Output Supervision Jumpers

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: Select beacon cable supervision (*enable it*) in the *Elemec3* Console software for each beacon output that requires supervision.

Output Modes

⚠—Electrical Safety Hazard. Authorized personal only. Serious shock or death could result.

Supervised 240 V AC Powered beacons

Use the relay outputs to cycle 240 V ac power to beacons with cable supervision (see Figure 5).

NOTES:

- Dc-resistance across the loop (without the end-of-line device(s) and beacon MRM in the loop) must be at least 100 kilohms. Observe this limitation for reliable operation of the loop monitoring feature.

- The beacon MRM does not contain any current-limiting circuits for the outputs. Install a 5-amp maximum, slow-blow fuse or 5-amp, high in-rush circuit breaker in each output circuit.
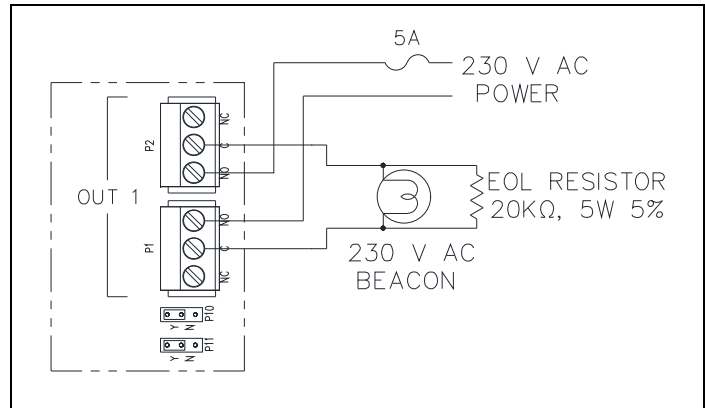
Figure 5. Supervised 240 V AC-Powered Beacons

Unsupervised 240 V AC Beacons

Use the relay outputs to cycle 240 V ac power to the beacons without cable supervision (see Figure 6).

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

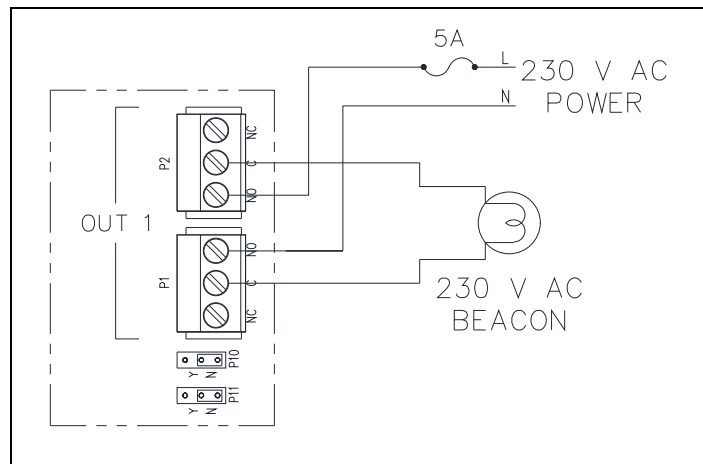Figure 6. Unsupervised 240 V AC-Powered Beacons

Operation

An *Elemec3* controller's configuration software controls all operation of the system. Each system's configuration manual contains the *Elemec3* controller's configuration details for all system operation.

Fault Diagnostics

Table 2. Troubleshooting Guide

Symptom	Action
beacon MRM does not communicate with *E3* controller.	• Verify power application to the beacon MRM. • Verify the CAN line connection to the beacon MRM. • Verify the address of the beacon MRM agrees with the setup configuration. • Verify correct connection of the CPU PCBA via J1. • Call for service of the beacon MRM.
beacon MRM does not activate relay outputs.	• Verify power application to the beacon MRM. • Verify the CAN line connection to the beacon MRM. • Verify proper installation of end-of-line resistor(s) on each beacon circuit. • Verify jumper clips are properly set for each relay output. • Verify total loop resistance is at least 100 kilohms. • Call for service of the beacon MRM.

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.. 24 V dc Power in

CAN in

CAN out

Eight relay outputs

Data communications.. CAN

End-of-line device... 20 kΩ, 5 W (minimum), 5% (Supervised Mode)

None (Unsupervised Mode)

Switched Relay Outputs

Maximum current draw (per output)... 5 A

Maximum ac switching voltage .... 240 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 ....24 AWG (0.20 mm^2)

Maximum conductor size...18 AWG (2.50 mm^2)

Mechanical

Unit Dimensions

Model 12579-006..2.75 H × 12.00 W × 4.00 D in (69.9 × 304.8 × 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

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

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.