



GAI-TRONICS®
A HUBBELL COMPANY

Model 379-002

Monitored Relay Module (MRM) Station

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General Information

The Model 379-002 Monitored Relay Module (MRM) Station is used in SmartSeries ADVANCE Systems. Operation is controlled by the system's Master Control Unit (MCU) programming.

The MRM provides eight relay output circuits. Each relay contains two type "C" contacts rated for 5 Amps. Relay outputs are typically used for switching power to signaling devices such as beacons or strobes but can be used for any switching application that does not exceed the relay's current rating. Relay circuits can be programmed to activate during system alarms, pages, or trouble conditions.

The MRM also contains eight input circuits. Input circuits can be used supervise the cable integrity connecting the relay output to the signaling device (as described above). During an inactive state, the cable is monitored for open circuit, short circuit and ground fault conditions. If a cable fault is detected, the relay circuit will not activate, preventing a possible dangerous condition. The fault condition is automatically reported to the MCU.

For each relay circuit not requiring supervision, one input circuit is available for other functions. Inputs are activated by a voltage-free contact (either opening or closing) or the presence/absence of a 24 V dc input voltage. When using inputs from voltage-free contacts, the MRM can supervise the cabling between the input terminal and the remote contact closure device. The cable is monitored for open circuit, short circuit and ground fault conditions. The fault condition is automatically reported to the MCU.

Each input circuit can be programmed to initiate one of the following functions in the ADVANCE system.

- Activate an alarm
- Reset all alarms
- Cancel the current alarm
- Report a fault condition
- Reset the system MCU

Model 379-002 Monitored Relay Module (MRM) Station

The Model 379-002 Monitored Relay Module (MRM) Station components are housed in a NEMA 4X stainless steel enclosure measuring 13.00 W × 14.30 H × 6.23 D inches (330.2 × 363.2 × 158.2 mm). Components include a 12 V dc power supply and a 12579-002 Monitored Relay Module.

The 12579-002 Monitored Relay Module is comprised of three components: the 69248-102TR CPU and the 69251-201TR Monitored-Input PCBA, and the 69252-001TR Relay PCBA. Refer to Figure 1 for component locations.

The scope of this manual is limited to the mounting and wiring connections for the Model 379-002 Station. Refer to Pub. 42004-712L2 for additional information on the 12579-002 Monitored Relay Module.

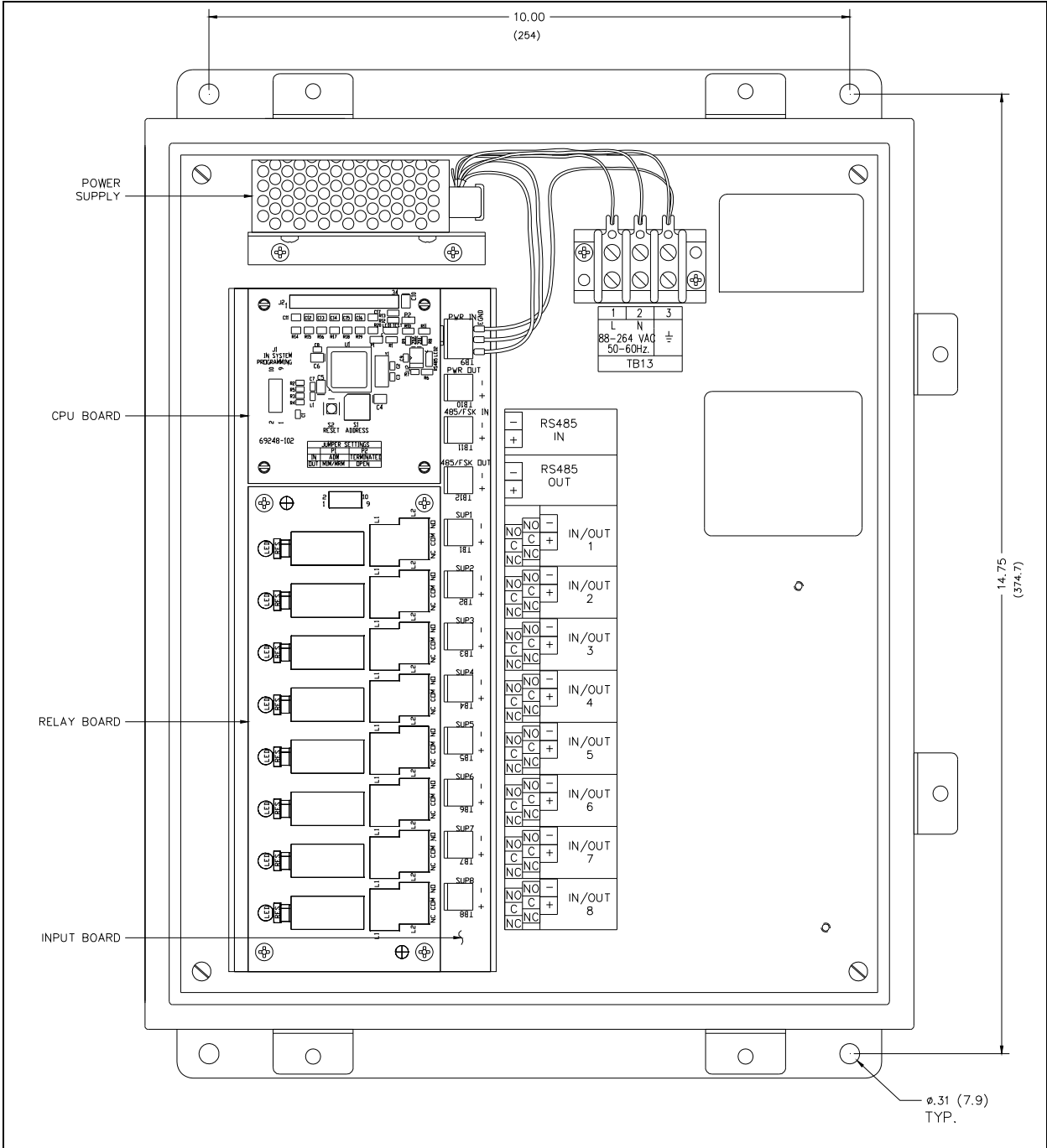


Figure 1. Model 379-002 MRM Station (Interior View)

Installation

 **CAUTION**  **Do not install this equipment in hazardous areas. Disconnect power before installing or removing the MRM.**

Mounting

The Model 379-002 MRM Station enclosure is not supplied with conduit or cable gland holes since cable quantity, size, and entry location vary with each installation.

Drill or punch openings at the required locations before mounting the enclosure. Typically multiple cables entries are required for power, serial data line, and input/output wiring. Refer to the “Wiring” section below. Use caution when drilling or punching the enclosure to avoid damaging the internal components. Bottom cable entry is recommended to prevent moisture from entering the enclosure and dripping onto the terminals or circuit boards.

Mount the enclosure to a suitable surface using appropriate customer-supplied hardware. Refer to Figure 1 for mounting hole dimensions.

Remove the shipping tie-wrap that is securing the PCBA to its mounting Snaptrack.

Wiring

The MRM Station requires 88 to 264 V ac, 50/60 Hz power and a serial data line connection (RS-485) to the ADVANCE System Control Cabinet. Up to eight input and relay output circuits are connected as needed. Each connection is explained below.

Power

88 to 264 V ac power is connected to terminal block TB13 at the top of the panel. Refer to Figure 1.

 **WARNING**  Insure proper grounding to protective earthing.



Earth grounding provisions are provided.

Table 1.

Function	Terminal Block	Wire Color
AC Line (hot)	TB13-1	Black
Neutral	TB13-2	White
Ground	TB13-3	Green/yellow

Data Communications

Terminal blocks TB11 and TB12 are for “feed-thru” connection of the RS-485 data cable. The data cable should consist of a twisted pair with shield. One end of the data cable must be terminated to the ADVANCE System Control Cabinet. A total of ten MRM and MIM modules can be parallel wired to the data cable. The most distant MRM or MIM should have a termination resistor installed to the data line by installing jumper P2 on the 69248-xxx CPU PCBA.

 **CAUTION**  **The RS-485 line is polarity-sensitive. Be sure to maintain circuit polarity throughout installation.**

NOTE: Only one termination resistor should be installed across the RS-485 data line. Be sure jumper P2 is installed on only the most distant MRM or MIM.

Address Setting

Each MRM and MIM on the RS-485 data line must be set with a unique hardware address. Consult the System Administrator for the proper address prior to setting the address switch on the MRM or MIM. Addresses for each module are determined by the System Administrator’s software configuration of the ADVANCE system. The address is set using the hexadecimal switch on the 69248-xxx CPU PCBA. Valid addresses are 5–F.

Relay - Contact Outputs

The MRM contains eight individually configurable relay-contact outputs, allowing it to control field devices such as beacons. Connections with these field devices are made at connectors TB1 through TB8 of the 69252-xxx Power Relay Module.

Each connector corresponds to a single output (TB1 is used for output #1, TB2 is used for output #2, etc.). If fewer than eight supervised relay-contact outputs are required, the unused outputs may be used to receive inputs (dry contact closures or non-supervised 24 V dc wet contact closures) from field devices.

In this case, connections with these field devices are made at connectors TB1 through TB8 of the 69251-xxx Monitored-In-8 PCBA. Each of these outputs may be configured to operate in one of six modes. Two of these six modes are used to control signaling devices, while the remaining four modes are used to receive inputs (contact closures) from field devices.

Each mode requires a unique connection scheme between the external field devices and the appropriate connector on the MRM. The connection scheme for each mode is described below. Since the connection scheme is independent of which output is used, only Output #1 will be discussed.

To ensure proper termination, ferrules must be crimped on the ends of all conductors that are terminated on the terminal blocks. The size of the ferrule is dependent upon the size of the conductor used and can be sourced from any supplier such as Phoenix, Altec or Weidmuller. The terminals accept a maximum conductor size of No. 12 AWG and a minimum conductor size of No. 28 AWG.

Mode 0: Deactivate Circuit

In Mode 0, outputs may be used to control several signaling devices by connecting/disconnecting power to these devices. In this mode, no supervision of the loop is supported. This mode supports both ac and dc-powered signaling devices.

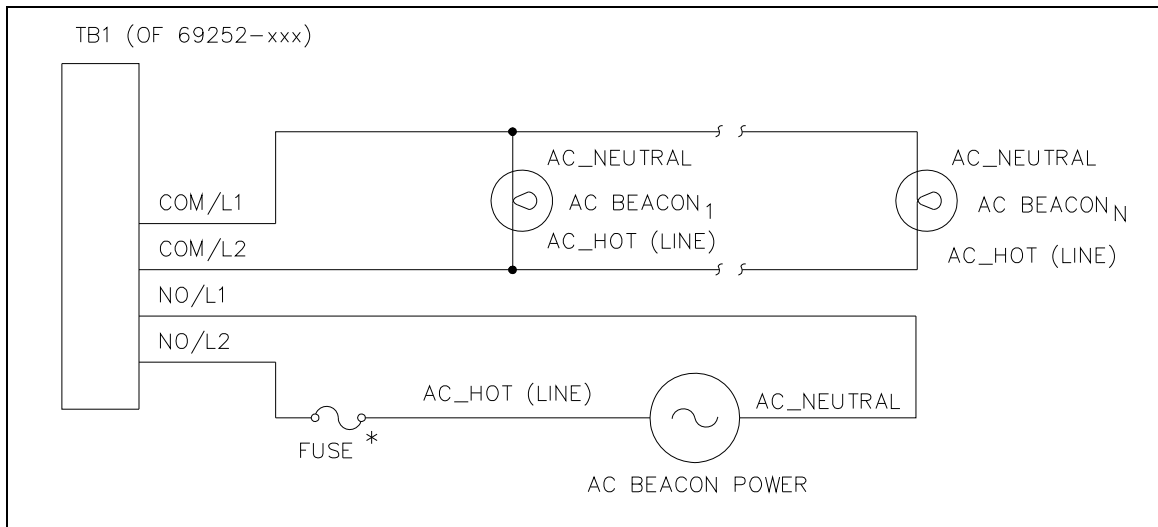


Figure 2. Deactivate Circuit - AC-Powered Beacons

Figure 2 shows the recommended wiring diagram for ac-powered signaling devices, while Figure 3 shows the recommended wiring diagram for dc-powered signaling devices (using Output #1 as an example.)

***NOTE:** The MRM does not contain any current-limiting for the signaling device power. It is recommended that an external fuse be provided for each output circuit with the appropriate voltage and current ratings. The selected fuse should be of the slow-blow variety.

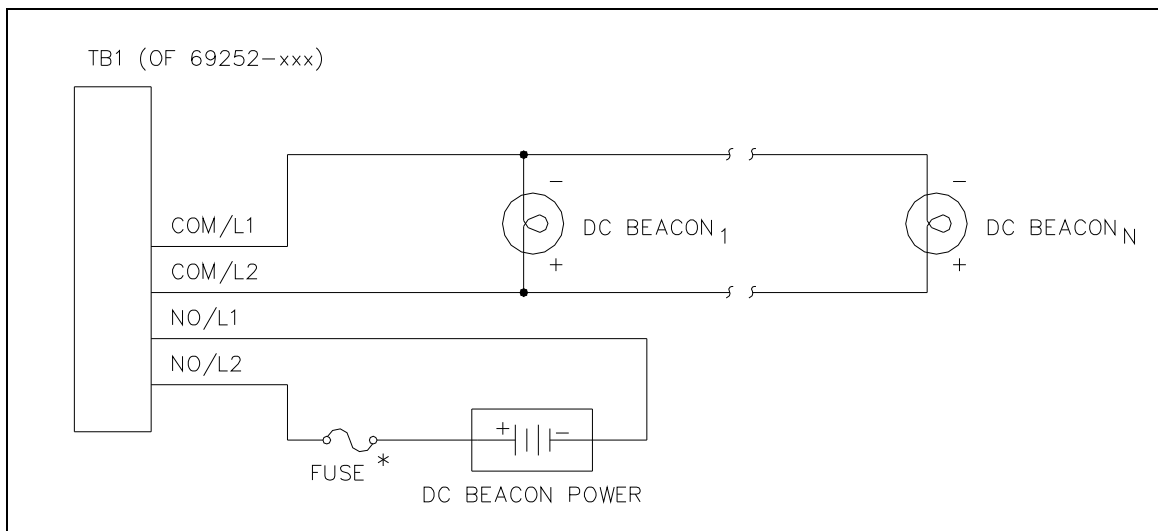


Figure 3. Deactivate Circuit - DC-Powered Beacons

Mode 1: IDC Line Supervision Multiple Switch

In this mode any number of normally-open dry contact closures may be installed on the line. The loop is monitored for ground faults and open circuits in Mode 1. The end-of-line device is a 20-kilohm, 5% tolerance resistor.

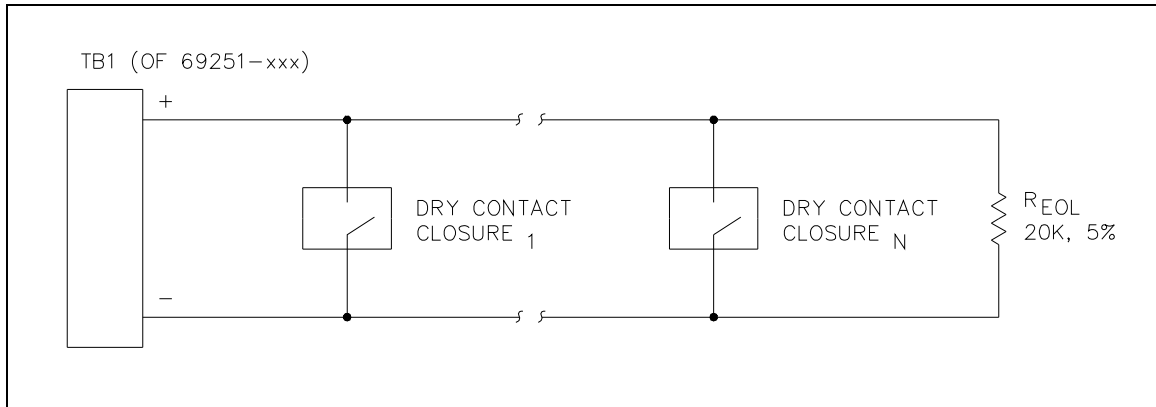


Figure 4. IDC Line Supervision Multiple Switch

NOTE: The 20-kilohm, 5% tolerance resistor is not included with the MRM. The resistor is included in a kit (12509-004), which must be ordered separately.

Mode 2: IDC Single Normally-Open (N.O.) Switch

In this configuration, only one normally-open dry contact closure may be installed per supervised line. In this mode, the loop is monitored for open circuits, wire-to-wire short circuits (across + and -), and ground faults. When the contact closure is not active (open), the loop appears as 20.1-kilohm load (15 kilohms in series with 5.1 kilohms). This appears on the input to the MIM and indicates a healthy loop. When the contact closure is active (closed), the 15-kilohm resistor is bypassed.

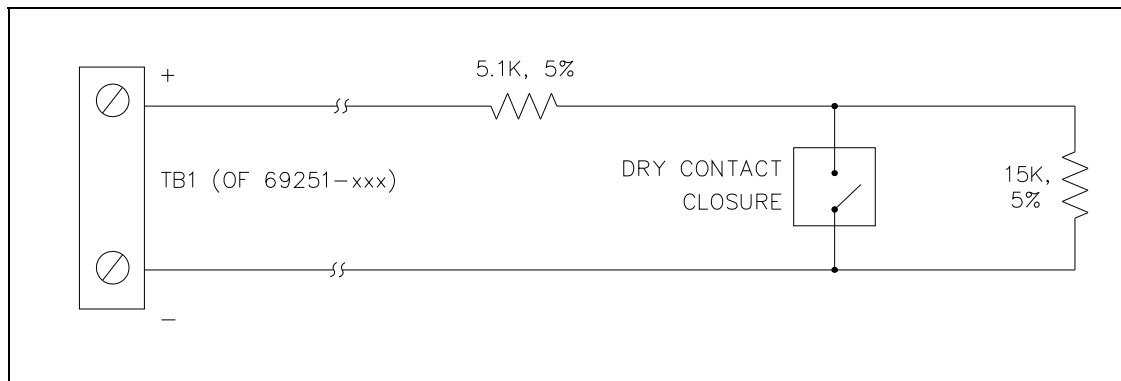


Figure 5. IDC Single Normally-Open Switch

When the contact closure is active (closed), the 15-kilohm resistor is bypassed. In this case, output #1 only sees a 5.1-kilohm load. When this occurs, it indicates to the MRM that the contact closure is active. If there is a short across L1 and L2, if either leg is grounded, or if a break occurs on either leg, the MRM indicates that a fault has occurred.

NOTE: The terminating resistors are not included with the MRM. These resistors are included in a kit (12509-004), which must be ordered separately.

Mode 3: IDC Single Normally-Closed (N.C.) Switch

In this configuration, only one normally-closed dry contact closure may be installed per supervised line. In this mode, the loop is monitored for open circuits, wire-to-wire short circuits (across + and -), and ground faults. When the contact closure is not active (closed), the 15-kilohm resistor is bypassed and the circuit sees only the 5.1-kilohm load.

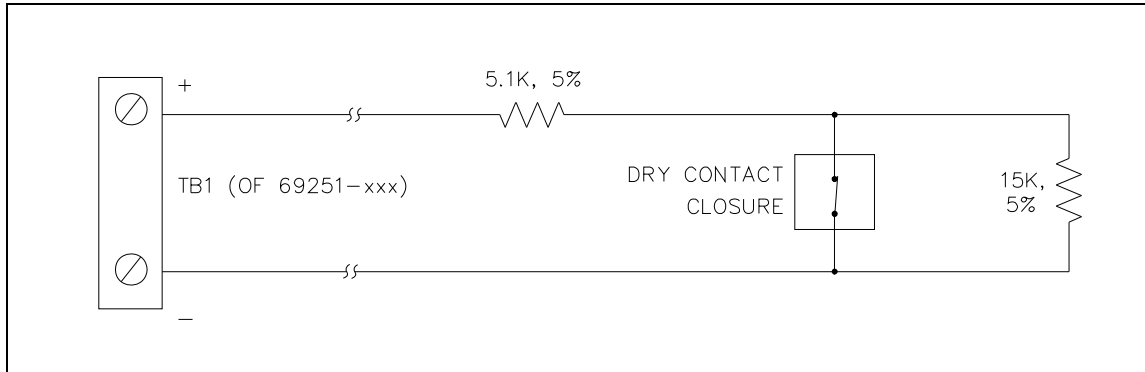


Figure 6. IDC Single Normally-Closed Switch

This change is sensed by the MRM and indicates to the MRM that the contact closure is active. If there is a short across L1 and L2, if either leg is grounded, or if a break occurs on either leg, the MRM indicates that a fault has occurred.

NOTE: The terminating resistors are not included with the MRM. These resistors are included in a kit (12509-004), which must be ordered separately.

Mode 4: IAC Line Supervision

In Mode 4, outputs can be used to control several dc-powered signaling devices by connecting/disconnecting power to these devices. In addition, this loop is monitored for open circuits, wire-to-wire short circuits (across + and -), and ground faults. If any of these three conditions are detected by the MRM, the MRM indicates that a fault has occurred. Please note that monitoring of the loop only occurs while the loop is **inactive** (signaling devices are off).

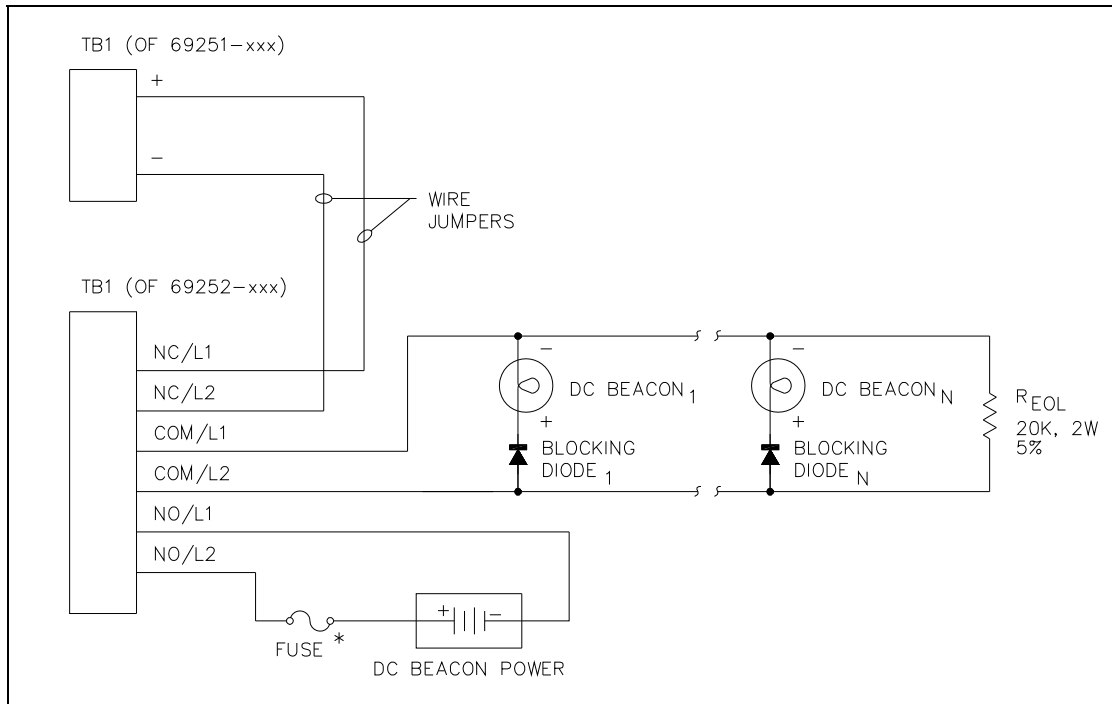


Figure 7. IAC Line Supervision – DC-Powered Beacons

It is recommended that Mode 4 only be used with dc-powered signaling devices. In Mode 4, one blocking diode must be provided for every signaling device connected to the loop. Note that some signaling devices already include a blocking diode in the unit – in this case, no additional blocking diode is required. The end-of-line device is a 20-kilohm, 2-watt, 5% tolerance resistor. Please observe all polarities as indicated in Figure 7 above.

NOTE: The blocking diodes, the wire jumpers, and the 20-kilohm, 2-watt, 5% tolerance resistor are not included with the MRM. These components are included in a kit (12509-004), which must be ordered separately.

***NOTE:** The MRM does not contain any current-limiting for the signaling device power. It is recommended that an external fuse be provided for each output circuit with the appropriate voltage and current ratings. The selected fuse should be of the slow-blow variety.

CAUTION If ac-powered signaling devices are being used on an output loop configured for Mode 4 (Figure 8), observe the following limitations necessary for reliable operation for the loop monitoring feature:

- **The dc resistance measured across the loop (with both end-of-line device and the MRM removed from the loop must be at least 100 kilohms**
- **Do NOT use blocking diodes in this loop.**

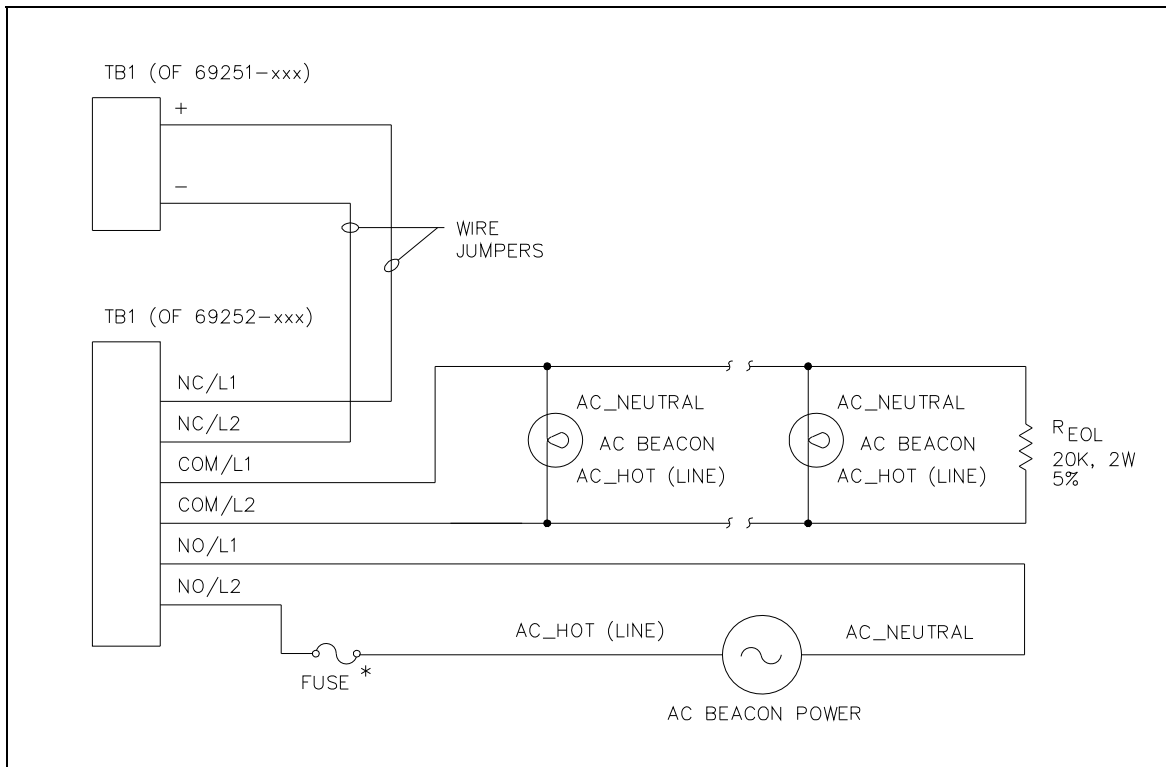


Figure 8. IAC Line Supervision – AC-Powered Beacons

Mode 5: IDC Non-supervision Multiple Switch (Dry Contact)

In this mode, any number of normally-open dry contact closures can be installed on the line. The loop will not be monitored for any faults in Mode 5.

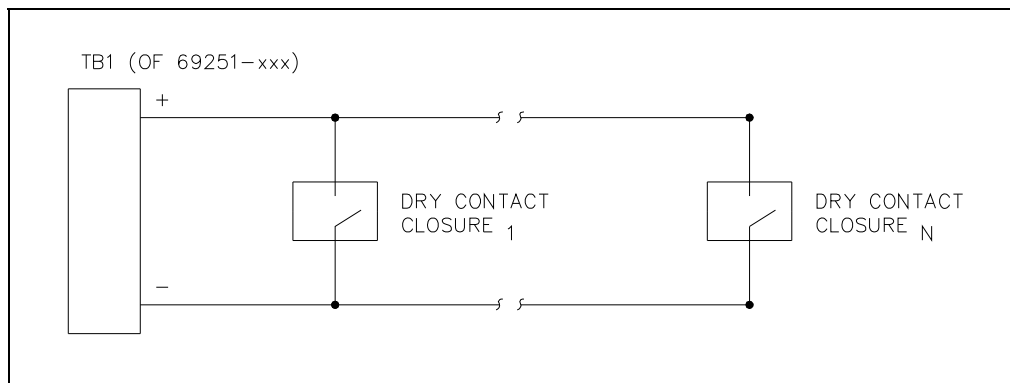


Figure 9. IDC Non-Supervision Multiple Switch (Dry Contact)

Mode 5: IDC Non-Supervision (Wet Contact)

In this wet contact mode, shorting jumpers for each input must be moved from the factory default of “dry” to “wet” contact mode. When in “wet” contact mode, the input can be activated during a 0 V condition or a 24 V condition. The factory default setting is “24 V dc input when active” (position 2-3).

If “0 V dc input when active” is desired, move the jumper from position 2-3 to position 1-2. The loop will not be monitored for any faults in Mode 5. Ensure the polarity of the input connection is correct as it is polarity sensitive.

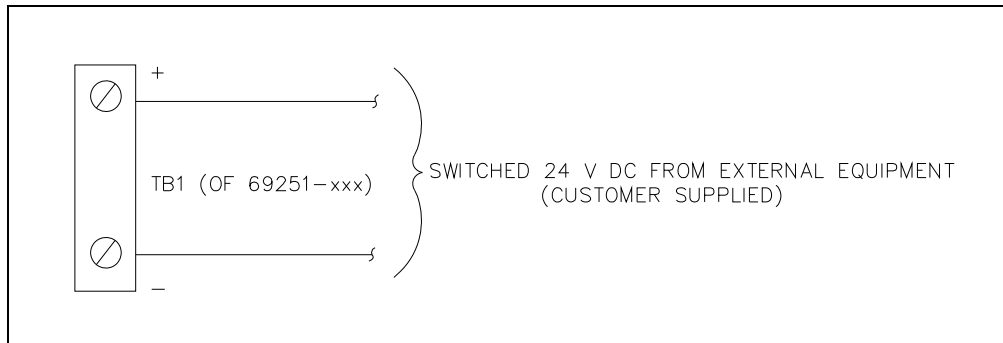


Figure 10. IDC Non-Supervision (Wet Contact)

Table 2. Jumper Settings for Mode 5 Input Operation

Input No.	Dry Contact Input Selection	24 V DC Wet Contact Input Selection	Factory Default Setting
1	P1 – Pins 2 & 3 P2 – Pins 2 & 3 P3 – Pins 2 & 3	P1 – Pins 1 & 2 P2 – Pins 1 & 2 0 V dc – Active: P3 – Pins 1 & 2 24 V dc – Active: P3 – Pins 2 & 3	P1 – Pins 2 & 3 P2 – Pins 2 & 3 P3 – Pins 2 & 3
2	P4 – Pins 2 & 3 P5 – Pins 2 & 3 P6 – Pins 2 & 3	P4 – Pins 1 & 2 P5 – Pins 1 & 2 0 V dc – Active: P6 – Pins 1 & 2 24 V dc – Active: P6 – Pins 2 & 3	P4 – Pins 2 & 3 P5 – Pins 2 & 3 P6 – Pins 2 & 3
3	P7 – Pins 2 & 3 P8 – Pins 2 & 3 P9 – Pins 2 & 3	P7 – Pins 1 & 2 P8 – Pins 1 & 2 0 V dc – Active: P9 – Pins 1 & 2 24 V dc – Active: P9 – Pins 2 & 3	P7 – Pins 2 & 3 P8 – Pins 2 & 3 P9 – Pins 2 & 3
4	P10 – Pins 2 & 3 P11 – Pins 2 & 3 P12 – Pins 2 & 3	P10 – Pins 1 & 2 P11 – Pins 1 & 2 0 V dc – Active: P12 – Pins 1 & 2 24 V dc – Active: P12 – Pins 2 & 3	P10 – Pins 2 & 3 P11 – Pins 2 & 3 P12 – Pins 2 & 3
5	P13 – Pins 2 & 3 P14 – Pins 2 & 3 P15 – Pins 2 & 3	P13 – Pins 1 & 2 P14 – Pins 1 & 2 0 V dc – Active: P15 – Pins 1 & 2 24 V dc – Active: P15 – Pins 2 & 3	P13 – Pins 2 & 3 P14 – Pins 2 & 3 P15 – Pins 2 & 3

Input No.	Dry Contact Input Selection	24 V DC Wet Contact Input Selection	Factory Default Setting
6	P16 – Pins 2 & 3 P17 – Pins 2 & 3 P18 – Pins 2 & 3	P16 – Pins 1 & 2 P17 – Pins 1 & 2 0 V dc – Active: P18 – Pins 1 & 2 24 V dc – Active: P18 – Pins 2 & 3	P16 – Pins 2 & 3 P17 – Pins 2 & 3 P18 – Pins 2 & 3
7	P19 – Pins 2 & 3 P20 – Pins 2 & 3 P21 – Pins 2 & 3	P19 – Pins 1 & 2 P20 – Pins 1 & 2 0 V dc – Active: P21 – Pins 1 & 2 24 V dc – Active: P21 – Pins 2 & 3	P19 – Pins 2 & 3 P20 – Pins 2 & 3 P21 – Pins 2 & 3
8	P22 – Pins 2 & 3 P23 – Pins 2 & 3 P24 – Pins 2 & 3	P22 – Pins 1 & 2 P23 – Pins 1 & 2 0 V dc – Active: P22 – Pins 1 & 2 24 V dc – Active: P22 – Pins 2 & 3	P22 – Pins 2 & 3 P23 – Pins 2 & 3 P24 – Pins 2 & 3

Specifications

Electrical

Power requirements 88 to 264 V ac, 50/60 Hz, 0.87 A maximum

NOTE: Power requirements do NOT include power switched to external devices such as strobe lights.

Maximum current draw and switching voltage (per outlet)..... 5 A @ 30 V dc or 132 V ac

Mechanical

Dimensions 13.00 W × 14.30 H × 6.23 D in (330.2 × 363.2 × 158.2 mm)

Weight..... 19 lb

Environmental

Humidity 95% non-condensing relative humidity

Temperature range -22 °F to 158 °F (-30 °C to 70 °C)

Environmental rating NEMA 4X

Replacement Parts

Part Number	Description
69248-102TR	PCBA, CPU Module with RS-485
69251-201TR	PCBA, Monitored-In-8
69252-001TR	PCBA, Relay Module
40404-009	Power Supply, 12 V dc, 25W

References

For additional information, please refer to the standard publication listed below.

42004-712L2..... Model 12579-002 Monitored Relay Module (MRM) Manual

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.