



**GAI-TRONICS®**  
A HUBBELL COMPANY

# Model 378-002

## Monitored Input Module (MIM) Station

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### Confidentiality Notice

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### General Information

The Model 378-002 Monitored Input Module (MIM) Station is used in SmartSeries ADVANCE systems. Operation is controlled by the system's Master Control Unit (MCU) programming.

The MIM monitors up to eight input circuits. Each input circuit is 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 MIM can supervise the cabling between the MIM input terminal and the remote contact closure device. 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

The Model 378-002 Monitored Input Module (MIM) 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, a Model 12578-002 Monitored Input Module, and two terminal blocks.

The 12578-002 Monitored Input Module is comprised of two components: the 69248-102TR CPU and the 69251-201TR Monitored-Input PCBA. Refer to Figure 1 for component locations.

The scope of this manual is limited to the mounting and wiring connections for the Model 378-002 station. Refer to Pub. 42004-711L2 for additional information on the 12578-002 Monitored Input Module.



# Installation

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

## Mounting

The Model 378-002 MIM 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 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 MIM 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 activation switches (inputs) 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. AC Power Connection

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

## Data Communication Line

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 MIM and MRM modules can be parallel wired to the data cable. The most distant MIM or MRM should have a termination resistor installed across 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 MIM and MRM 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.

## Inputs

The MIM contains eight individually configurable inputs, allowing it to interface with field devices. Connections with these field devices are made at connectors TB1 through TB8. Each connector corresponds to a single input (TB1 is used for input #1, TB2 is used for input #2, etc.) Each one of these inputs may be configured to operate in one of five input modes.

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

To ensure proper termination, ferrules must be crimped on the end 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 may be sourced from any supplier such as Phoenix, Altec or Weidmuller. The terminal blocks may accept conductors sizes from No. 28 AWG to 12 AWG.

### Mode 0: Deactivate Circuit

In this mode, input #1 is not used and is not monitored by the MIM. If this mode is used, **no external connections** should be made to connector TB1.

**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.

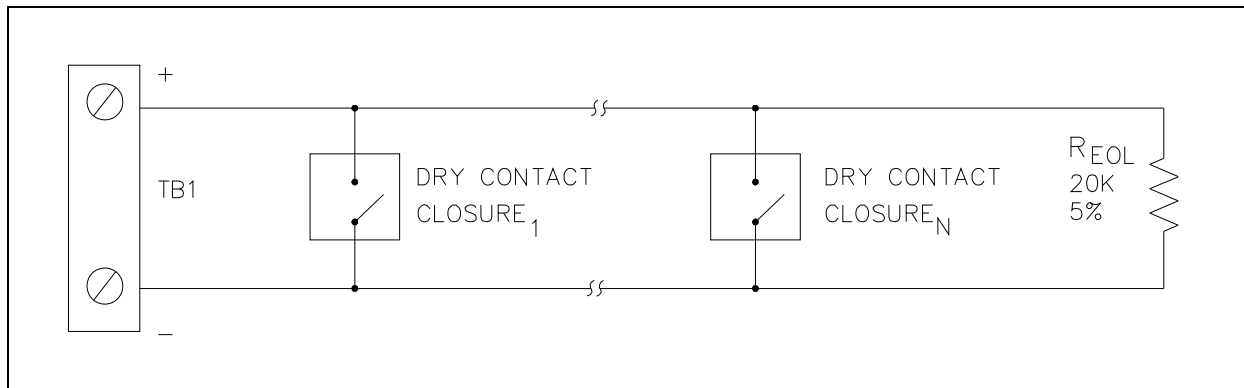


Figure 2. IDC Line Supervision Multiple Switch

**NOTE:** The 20-kilohm, 5% tolerance resistor is not included with the MIM. This resistor is included in a kit (12509-003), which must be ordered separately.

**Model 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 a 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.

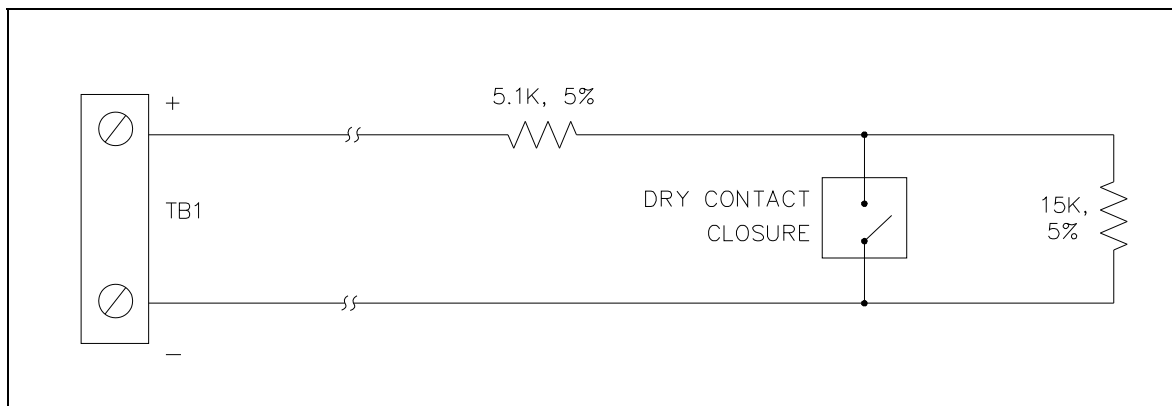


Figure 3. IDC Single Normally-Open Switch

The circuit then sees only the 5.1-kilohm load. This changes the value of the input and indicates to the MIM that the contact closure is active. If there is a short across + and -, if either leg is grounded, or if a break occurs on either leg, the MIM indicates that a fault has occurred.

**NOTE:** The terminating resistors are not included with the MIM. These resistors are included in a kit (12509-003) that 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.

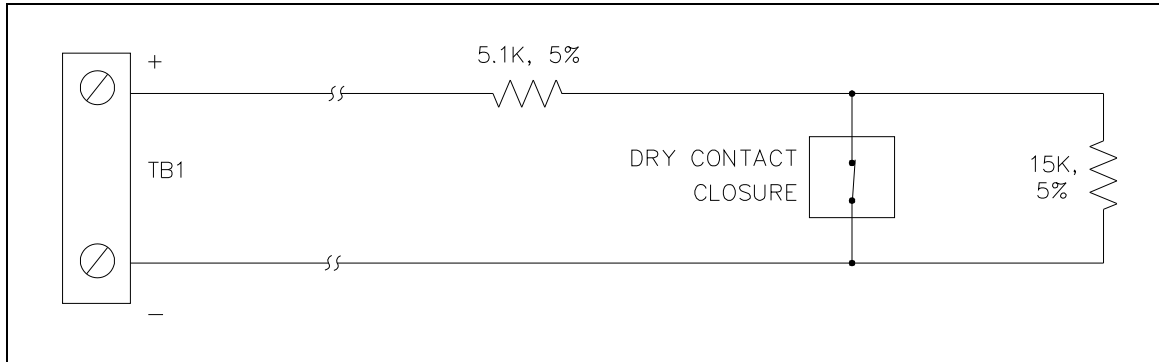


Figure 4. IDC Single Normally-Closed Switch

When the contact closure is active (open), the loop appears as a 20.1-kilohm load (15 kilohms in series with 5.1 kilohms). This changes the value of the input and indicates to the MIM that the contact closure is active. If there is a short across + and -, if either leg is grounded, or if a break occurs on either leg, the MIM indicates that a fault has occurred.

**NOTE:** The terminating resistors are not included with the MIM. These resistors are included in a kit (12509-003) that must be ordered separately.

**Mode 4: IAC Line Supervision**

(Reserved for 12579-002 Monitored Relay Module)

**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.

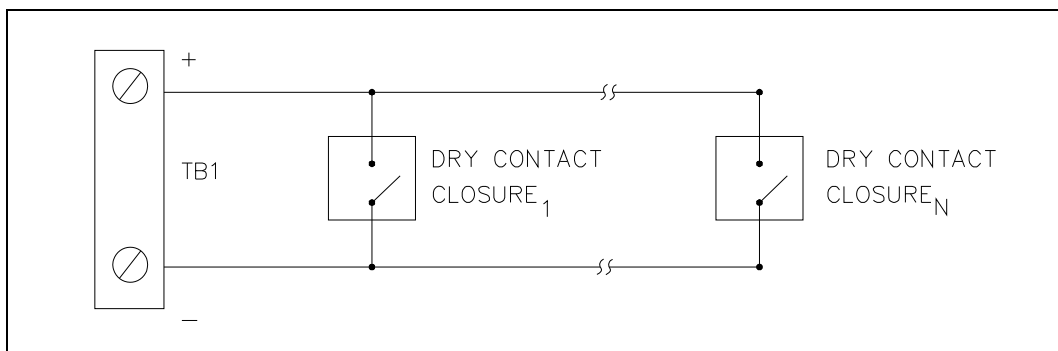


Figure 5. IDC Non-Supervision Multiple Switch (Dry Contact)

**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 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 input connection is correct as it is polarity sensitive.

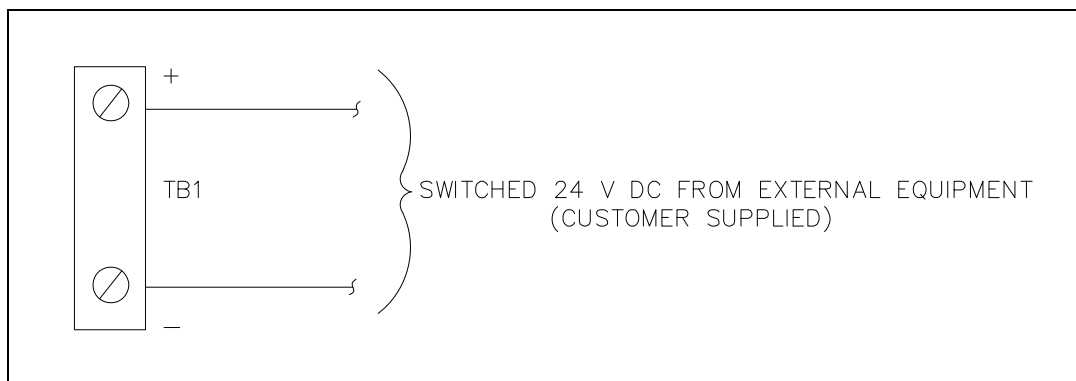


Figure 6. IDC Non-Supervision (Wet Contact)

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

Input No.	Dry Contact Input Selection	24 V DC Wet Contact Input Selection	Factory Default Setting
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
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

### Mechanical

Enclosure material ..... No. 16 gauge 316 stainless steel

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

Weight..... 18 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
40404-009	Power Supply, 12 V dc, 25 W



## References

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

42004-711L2.....Model 12578-002 Monitored Input Module (MIM) Manual

# 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.