



**GAI-TRONICS**<sup>®</sup>  
A HUBBELL COMPANY

# Model 370-301 Dual Channel 600-Ohm to 33-Ohm Converter

## 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

The Model 370-301 Dual Channel 600-Ohm to 33-Ohm Converter allows GAI-Tronics' Page/Party<sup>®</sup> systems to interface with standard 600-ohm networks for one- or two-way communication between dissimilar transmission mediums.

The Model 370-301 includes two hybrid interfaces in each channel to isolate the audio so that the received audio in one direction does not affect the audio transmitted in the other direction.

The Model 370-301 includes a VOX (voice activated switch) on each of the outputs. The VOX samples the audio output to the line. A relay is activated when audio is present on the line to enable the receiving amplifier.

## Features

- two independent conversion circuits, one for party lines and one for page lines
- individual gain and sidetone adjustment for each audio path
- VOX detection on the 33-ohm and 600-ohm interfaces for enabling a receiving amplifier
- ac or dc power operation
- 33-ohm termination internal to the unit

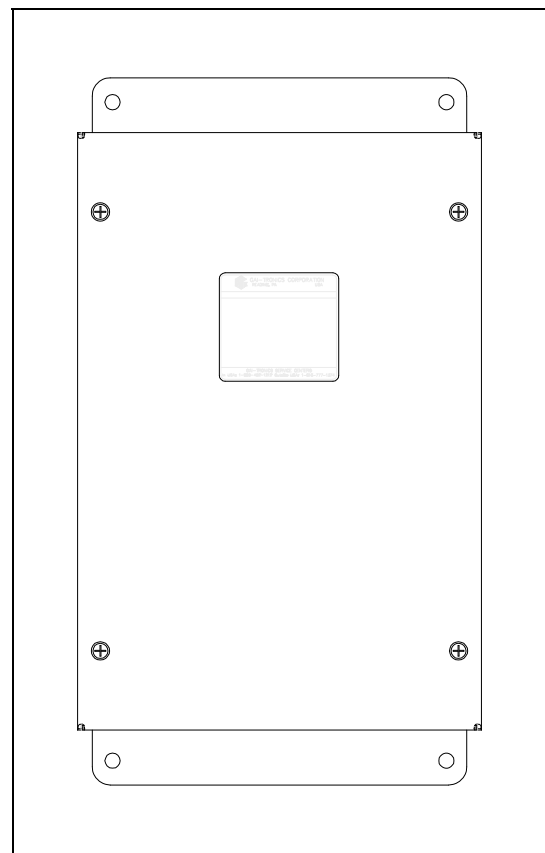


Figure 1. Outline of 370-301



# Installation

## Important Safety Instructions

- Read, follow, and retain instructions—All safety and operating instructions should be read and followed before operating the unit. Retain instructions for future reference.
- Heed warnings—Adhere to all warnings of the unit and in the operating instructions.
- Attachments—Attachments not recommended by the product manufacturer should not be used, as they may cause hazards.
- Servicing—Do not attempt to service this unit by yourself. Opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.

This permanently connected apparatus must have a UL Listed 15-amp circuit breaker incorporated in the electrical installation of the building.

**USA and Canada** Consult the National Electrical Code (NFPA 70), Canadian Standards Association (CSA 22.1), and local codes for specific requirements regarding your installation. Class 2 circuit wiring must be performed in accordance with NEC 725.55.

 **WARNING**  —In 24 V dc systems: Under NO condition should this equipment be operated from a battery charger without the batteries connected.

In 24 V dc systems, most chargers have an unloaded output of 35 to 45 volts that can quickly damage the equipment designed for nominal 24 volts. The maximum battery voltage should never exceed the maximum specified input voltage.

## Mounting the Enclosure

The Model 370-301 enclosure is not supplied with conduit or cable openings. Complete the following steps to mount the enclosure:

**NOTE:** The enclosure is intended for indoor use only.

1. Remove the front panel and drill or punch entry openings in the rear section of the enclosure.  
There must be a minimum of ½ inch (13 mm) of material between entry holes. The station is suitable for top or bottom entry; however, bottom entry is recommended wherever possible (see [Figure 2](#)).
2. Mount the enclosure using the four 0.312-inch (8 mm) diameter holes located on the mounting flanges with ¼-inch (M6) hardware.

The standard unit orientation locates the power supply housing in the upper left corner. The orientation of the enclosure can be rotated 180° to allow clear access to the top (see [Figure 2](#)). The No. 69856-xxx PCBA can then be rotated for correct orientation.

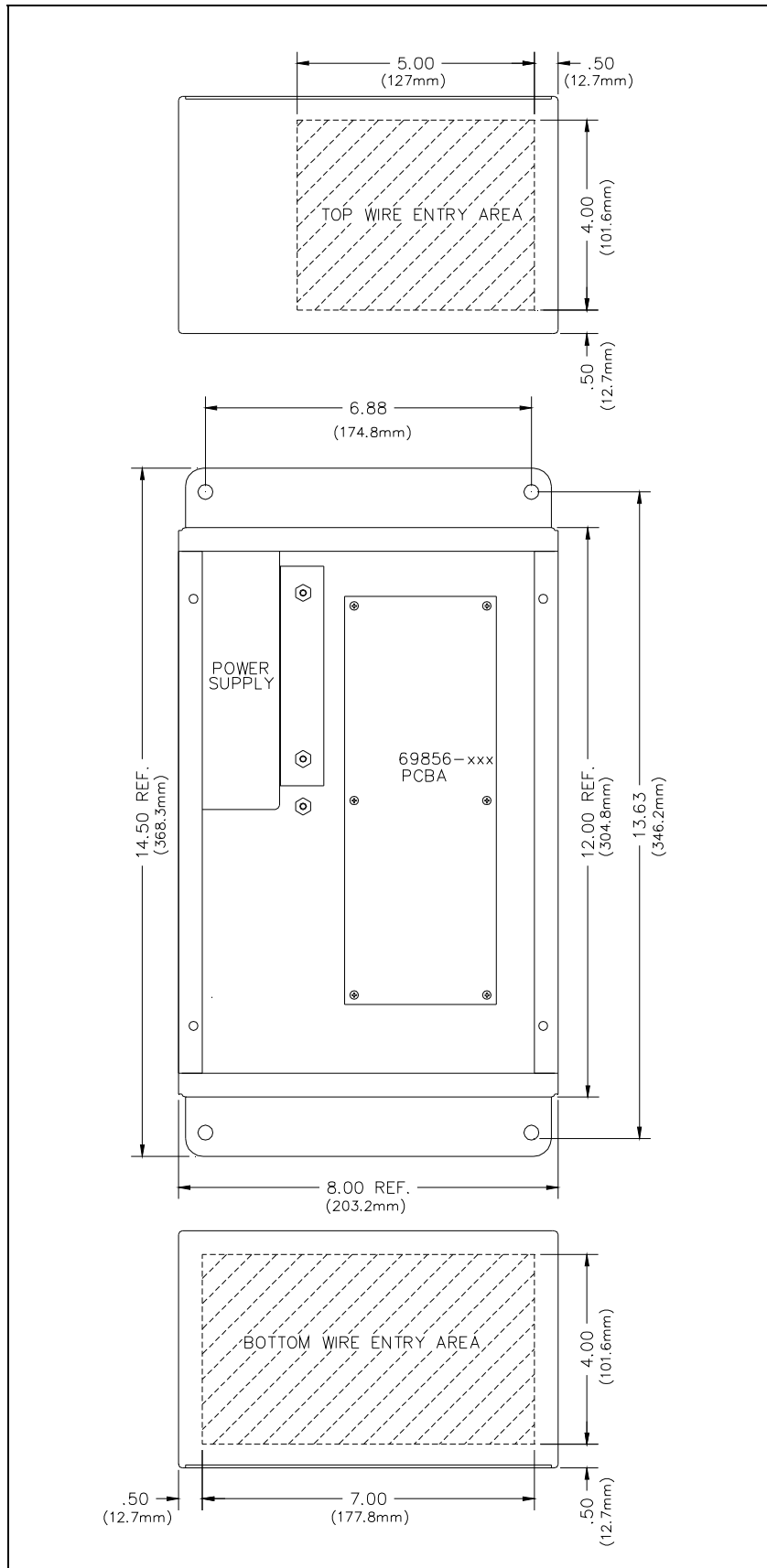


Figure 2. Mounting Details and Wire Entry Locations

# Field Wiring

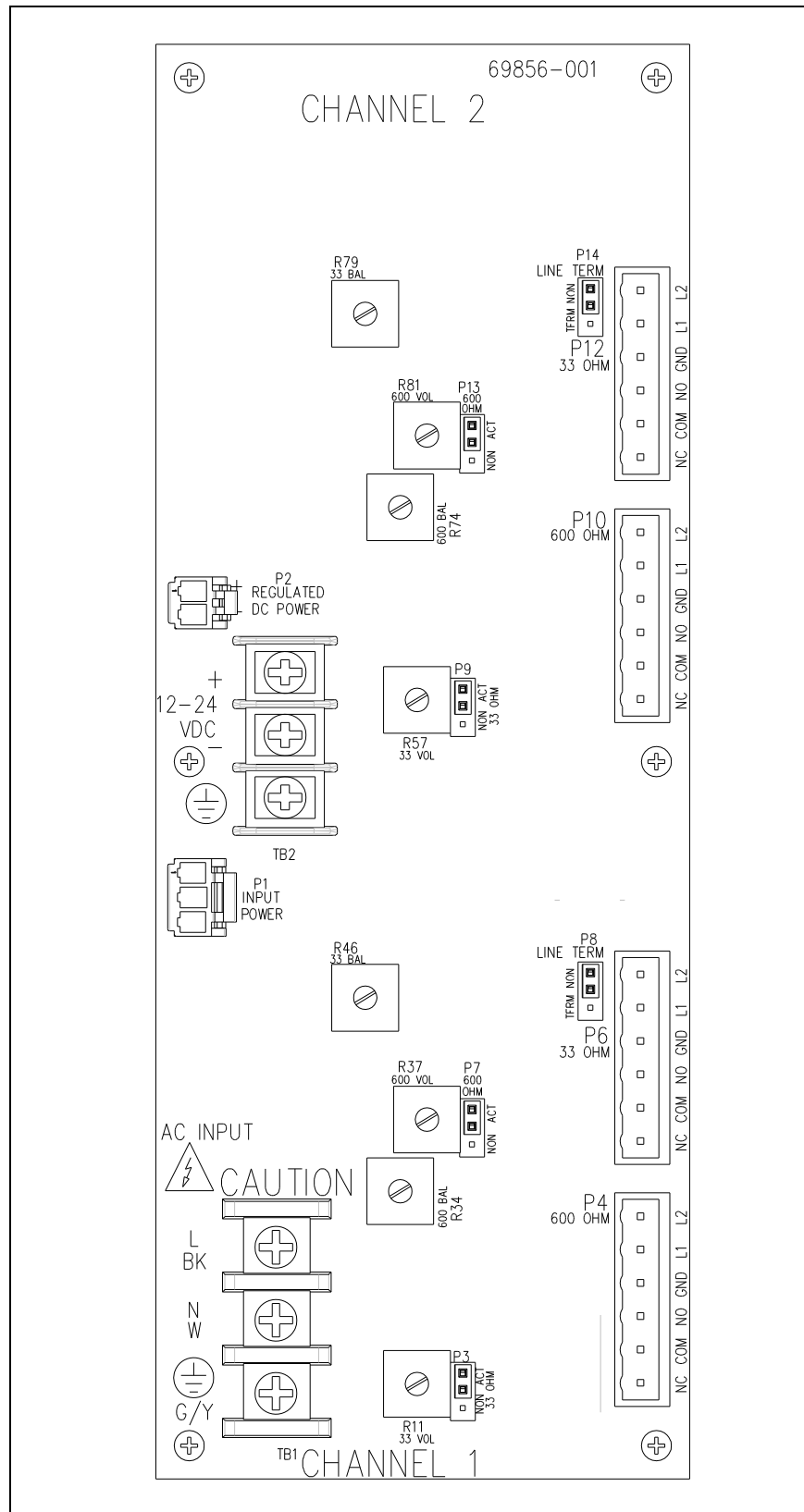




Figure 3. 69856-001 PCBA

## Power

The Model 370-301 Converter can be powered from a universal ac power source or a 12 to 24-volt dc source.

 **NOTE**  Do not use an ac and a dc power source at the same time.

### Universal AC Power Source

Terminal Block TB1 is used to terminate a universal ac power source to the converter. P1 on the No. 69856-001PCBA connects ac to the dc power supply in the unit. DC power is then terminated back to P2 on the No 69856-001 PCBA. Terminal block TB2 is not used in this configuration.

Complete the following steps to terminate the universal ac power source to the Model 370-301 Converter:

1. Attach #6 spade lugs to the wires.
2. Secure each wire to terminal block TB1 (see [Table 1](#))

Table 1. Universal AC Power Connections—TB1

Pin Number	Pin Name
1	Input Line
2	Input Neutral
3	Earth

### DC Power Source

Terminal block TB2 is used to terminate a dc power source to the converter. Terminal Blocks TB1, P1, and P2 are not used in this configuration.

Complete the following steps to terminate the dc power source to the Model 370-301 Converter:

1. Attach #6 spade lugs to the wires.
2. Secure each wire to terminal block TB2 (see [Table 2](#)).

Table 2. 12–24 Volt DC Connections—TB2

Pin Number	Pin Name
1	12–24 V dc +
2	12–24 V dc -
3	Earth

### Audio and Control Signals

The Model 370-301 provides 33-ohm and 600-ohm audio line inputs and outputs, and relay contacts for the VOX detection. The following tables provide the connection information for each of these terminations.

Table 3. 600-Ohm Connections Channel 1, P4

<b>Pin Number</b>	<b>Pin Name</b>	<b>Function</b>
1	NC 600-ohm active	normally closed connection of 600-ohm output VOX detection
2	COM 600-ohm active	common connection of 600-ohm output VOX detection
3	NO 600-ohm active	normally open connection of 600-ohm output VOX detection
4	GND	ground reference for field wiring
5	L1 600-ohm audio	bi-directional audio for 600-ohm interface
6	L2 600-ohm audio	bi-directional audio for 600-ohm interface

Table 4. 33-Ohm Connections Channel 1, P6

<b>Pin Number</b>	<b>Pin Name</b>	<b>Function</b>
1	NC 33-ohm active	normally closed connection of 33-ohm output VOX detection
2	COM 33-ohm active	common connection of 33-ohm output VOX detection
3	NO 33-ohm active	normally open connection of 33-ohm output VOX detection
4	GND	ground reference for field wiring
5	L1 33-ohm audio	bi-directional audio for 33-ohm interface
6	L2 33-ohm audio	bi-directional audio for 33-ohm interface

Table 5. 600-Ohm Connections Channel 2, P10

<b>Pin Number</b>	<b>Pin Name</b>	<b>Function</b>
1	NC 600-ohm active	normally closed connection of 600-ohm output VOX detection
2	COM 600-ohm active	common connection of 600-ohm output VOX detection
3	NO 600-ohm active	normally open connection of 600-ohm output VOX detection
4	GND	ground reference for field wiring
5	L1 600-ohm audio	bi-directional audio for 600-ohm interface
6	L2 600-ohm audio	bi-directional audio for 600-ohm interface

Table 6. 33-Ohm Connections Channel 2, P12

<b>Pin Number</b>	<b>Pin Name</b>	<b>Function</b>
1	NC 33-ohm active	normally closed connection of 33-ohm output VOX detection
2	COM 33-ohm active	common connection of 33-ohm output VOX detection
3	NO 33-ohm active	normally open connection of 33-ohm output VOX detection
4	GND	ground reference for field wiring
5	L1 33-ohm audio	bi-directional audio for 33-ohm interface
6	L2 33-ohm audio	bi-directional audio for 33-ohm interface

## Settings and Adjustments

### Opening the Station

Remove the four screws from the front panel and place the front panel to the side.

### Jumper Settings

#### P3—Channel 1: 33-Ohm Activation:

- Install the jumper in the ACT (default) position to enable the 33-ohm audio output.
- Install the jumper in the NON position to disable the 33-ohm audio output.

#### P8—Channel 1: 33-Ohm Termination:

The page and party lines in a Page/Party<sup>®</sup> system require 33-ohm line terminations. A line balance assembly is needed in the system for the unterminated position.

- Install the jumper in the TERM position to terminate the line.
- Install the jumper in the NON (default) position to leave the line unterminated.

#### P7—Channel 1: 600-Ohm Activation:

- Install the jumper in the ACT (default) position to enable the 600-ohm audio output.
- Install the jumper in the NON position to disable the 600-ohm audio output.

#### P9—Channel 2: 33-Ohm Activation:

- Install the jumper in the ACT (default) position to enable the 33-ohm audio output.
- Install the jumper in the NON position to disable the 33-ohm audio output.

#### P14—Channel 2: 33-Ohm Termination:

The page and party lines in a Page/Party<sup>®</sup> system require 33-ohm line terminations. A line balance assembly is needed in the system for the unterminated position.

- Install the jumper in the TERM position to terminate the line.
- Install the jumper in the NON (default) position to leave the line unterminated.

**P13—Channel 2: 600-Ohm Activation:**

- Install the jumper in the ACT (default) position to enable the 600-ohm audio output.
- Install the jumper in the NON position to disable the 600-ohm audio output.

**Level Adjustments**

**R11—Channel 1, 33-Ohm Volume Level:** Potentiometer R11 adjusts the signal level output to the 33-ohm line of Channel 1.

**R46—Channel 1, 33-Ohm Balance:** Potentiometer R46 adjusts the sidetone present on the 33-ohm interface of Channel 1. It adjusts the amount of audio transmitted on the 33-ohm line that is heard on the 600-ohm line.

**R37—Channel 1, 600-Ohm Volume Level:** Potentiometer R37 adjusts the signal level output to the 600-ohm line of Channel 1.

**R34—Channel 1, 600-Ohm Balance:** Potentiometer R34 adjusts the sidetone present on the 600-ohm interface of Channel 1. It adjusts the amount of audio transmitted on the 600-ohm line that is heard on the 33-ohm line.

**R57—Channel 2, 33-Ohm Volume Level:** Potentiometer R57 adjusts the signal level output to the 33-ohm line of Channel 2.

**R79—Channel 2, 33-Ohm Balance:** Potentiometer R79 adjusts the sidetone present on the 33-ohm interface of Channel 2. It adjusts the amount of audio transmitted on the 33-ohm line that is heard on the 600-ohm line.

**R81—Channel 2, 600-Ohm Volume Level:** Potentiometer R81 adjusts the signal level out to the 600-ohm line.

**R74—Channel 2, 600-Ohm Balance:** Potentiometer R74 adjusts the sidetone present on the 600-ohm side of the interface. It adjusts the amount of audio transmitted on the 600-ohm line that is heard on the 33-ohm line.



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## Bi-directional Alignment

The unit is factory aligned for ideal conditions, such as the 33-ohm line termination at the unit. For areas where this is not the case, adjustments may be required to improve audio and sidetone levels.

Adjust the sidetone alignment of the unit as two one-way systems and then enable both systems to operate as a two-way system. Complete the following procedure to align the sidetone in each direction:

1. Remove the jumper P7 for Channel 1 or P13 for Channel 2 to deactivate the 600-ohm output.

This will set up the unit for 33-ohm output only.

2. Apply a signal to the 600-ohm input and adjust the 33-ohm volume level potentiometer, R11 for Channel 1 or R57 for Channel 2, for the desired output level on the 33-ohm side.
3. Monitor the signal level at pin 1 of P7 for Channel 1 or P13 for Channel 2. This is the sidetone signal level.

Pin 1 is located at the top of the header.

4. Adjust the 33-ohm balance potentiometer, R46 for Channel 1 or R79 for Channel 2 for minimal signal level at pin 1.
5. Install the jumper P7 for Channel 1 or P13 for Channel 2 to activate the 600-ohm output
6. Fine tune the 33-ohm volume level potentiometer, R11 for Channel 1 or R57 for Channel 2, for desired output level.

7. Remove the jumper P3 for Channel 1 or P9 for Channel 2 to deactivate the 33-ohm output.

This will set up the unit for 600-ohm output only.

8. Apply a signal to the 33-ohm input and adjust the 600-ohm volume level potentiometer, R37 for Channel 1 or R81 for Channel 2, for the desired output level on the 600-ohm side.
9. Monitor the signal level at pin 1 of P3 for Channel 1 or P9 for Channel 2. This is the sidetone signal level.

Pin 1 is located at the top of the header.

10. Adjust the 600-ohm balance potentiometer, R34 for Channel 1 or R74 for Channel 2 for minimal signal level at pin 1.

11. Install the jumper P3 for Channel 1 or P9 for Channel 2 to activate the 33-ohm output

12. Fine tune the 600-ohm volume level potentiometer, R37 for Channel 1 or R81 for Channel 2, for the desired output level.

## Attaching the Front Panel

1. Place the front cover on the rear enclosure.
2. Secure the front cover using the four screws and washers provided.
3. Torque the screws to 10–12 in·lb (1.13–1.36 Nm).

# Specifications

## AC/DC Input

### AC Power Supply

Input voltage.....	120/230 V ac (nominal), 50/60 Hz
Power factor @ nominal 120 V ac .....	0.98
Current draw @ nominal 120 V ac.....	100 mA

### DC Power Supply

Input voltage.....	12–24 V dc
Current draw @ nominal 12 V dc .....	175 mA
Current draw @ nominal 24 V dc .....	130 mA

## 33-Ohm Audio Output

Output with 1 V <sub>RMS</sub> at 600-ohm input.....	1.5 V <sub>RMS</sub> , factory aligned 2.3 V <sub>RMS</sub> maximum
Distortion .....	<1.5% @ 1 kHz
Sidetone .....	-30 dB factory aligned
VOX threshold.....	>150 mV <sub>RMS</sub>
VOX activation time .....	<50 ms
VOX hold-time .....	>4 s

## 600-Ohm Audio Output

Output with 1.5 V <sub>RMS</sub> at 33-ohm input.....	1.0 V <sub>RMS</sub> , factory aligned 1.3 V <sub>RMS</sub> maximum
Distortion .....	<1.0% @ 1 kHz
Sidetone .....	-30 dB factory aligned
VOX threshold.....	>200 mV <sub>RMS</sub>
VOX activation time .....	<50 ms
VOX hold-time .....	>3.5 s

## Relay Outputs

Maximum load.....	2 A @ 30 V dc
Dimensions .....	14.50 H × 8.31 W × 5.26 D in (368.3 × 211.1 × 133.6 mm)
Shipping weight .....	10.5 lb (4.76 kg)
Net weight.....	9.5 lb (4.31 kg)

# 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.