GAI-TRONICS®
A HUBBELL COMPANY

Model 352-701 and 352-703
Division 1 VoIP Telephones

Confidentiality Notice

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General Information

GAI-Tronics' Class I, Division 1 VoIP Telephones are constructed of cast aluminum and are weatherproof and corrosion resistant. User operation is identical to that of a standard analog telephone—simply lift the handset and dial the desired telephone number.

GAI-Tronics' VoIP Telephones are designed for connection to a 10/100 BaseT Ethernet, and operate from either Power-over-Ethernet or an external power source. The VoIP Telephones provide point-to-point communications between personnel throughout a facility over an existing LAN.

This manual applies to the following models:

- Model 352-701 Division 1 VoIP Telephone
- Model 352-703 Division 1 VoIP Telephone with Headset

In addition to providing standard telephone operation, the VoIP telephones feature real-time alarm reporting enabling system supervisors to monitor the telephones' activity and address caller needs or maintenance issues immediately. Also, four user-configurable inputs and two outputs have been provided for peripheral control.

System Requirements and Limitations

GAI-Tronics VoIP Telephones require Power-over-Ethernet or a local 24–48 V dc power source for operation. Two VoIP telephones can be connected in a peer-to-peer configuration without the need for a LAN, however, a 10/100 BaseT Ethernet with SIP server is required for systems containing three or more VoIP Telephones. Conferences are limited by the customer's LAN media capabilities and the services available at each end point.
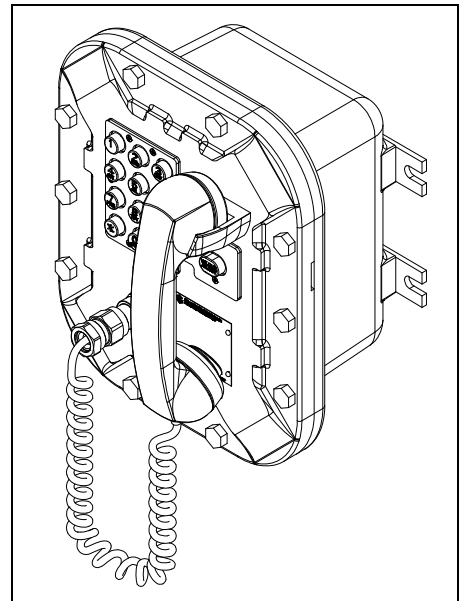

Figure 1. Model 352-701 Division 1 VoIP Telephone

Tips for VoIP Subscribers

If you have or are thinking of subscribing to an interconnected VoIP service, you should:

- Provide your accurate physical address to your interconnected VoIP service provider to ensure that emergency services can quickly be dispatched to your location.

- Be familiar with your VoIP service provider's procedures for updating your address, and promptly update address information in the event of a change.

- If your power is out or your internet connection is down, be aware that your VoIP service may not work. Consider installing a backup power supply, maintaining a traditional telephone line, or having a wireless telephone as a backup.

- If you have questions about VoIP in general, see http://www.fcc.gov/cgb/consumerfacts/voip.html.

Features and Functions

GAI-Tronics VoIP telephones include the following features:

- SIP compatible (RFC3261)

- Real-time alarm reporting via email or Syslog

- Power-over-Ethernet compatible (Power Mode A, Class 0)

- Configurable via web page, serial link or download

- Four configurable auxiliary inputs and two configurable voltage-free contact outputs

Installation

Installation Guidelines

These enclosures must be installed by trained, qualified and competent personnel. Installation must comply with state and national regulations, as well as safety practices for this type of equipment.

⚠️**CAUTION** ⚠️ **Do not install this equipment in hazardous areas other than those indicated on the approval listing in the "Specifications" section of this manual. Such installation may cause a safety hazard and consequent injury or property damage.**

The mounting location must be flat and provide proper clearance, rigidity and strength to support the enclosure and all contained devices.

⚠WARNING⚠ Securely fasten the enclosure to the mounting location, using 3/8-inch diameter steel mounting bolts and washers, or washer head bolts.

⚠WARNING⚠ **Do not disconnect equipment while energized. Insure proper grounding to protective earthing.**

⚠WARNING⚠ **The front cover is not hinged to the rear enclosure. When the cover bolts are removed, the cover must be adequately supported.**

⚠ATTENTION⚠ **Installation should be performed by qualified personnel and only in accordance with the National Electrical Code or applicable local codes.**

Inspect and clean the machined flange flame joint surfaces of both the cover and box. Surfaces must be smooth, free of nicks, scratches, dirt or any foreign particle build-up that would prevent a proper seal. Surfaces must seat fully against each other to provide a proper explosion-proof joint. Clean surfaces by wiping with a clean lint-free cloth.

Apply a light coat of Killark "LUBG" lubricant to flange surfaces and close the cover. Install and tighten all cover bolts to 30 ft-lbs. Make certain no cover bolts are omitted. Use only those bolts supplied with the enclosure.

When installing any GAI-Tronics telephone equipment, please adhere to the following guidelines to ensure the safety of all personnel:

- **Electrostatic Discharge (ESD) Protection:** Your telephone has an earth ground terminal provision. Ensure that it is connected to ground in accordance with all local safety regulations and the National Electrical Code (NEC). Grounding must be ensured for safe and stable communications. Do not use long and coiled ground wires. Trim ground wires to the required length. Please note proper grounding does not eliminate the need for lightning protection for the telephone or the telephone system.

- NEVER install the telephone during a lightning storm.

- **Install a Cat5 data line lightning surge protector** on any phone installed where the phone or phone cable is at risk of being exposed to lightning strikes. The lightning arrestor must be installed as close to the phone as possible in a non-hazardous environment. The lightning arrestor must not be installed within the telephone enclosure.

- USE CAUTION when installing or modifying Cat5 data lines.

Mounting

NOTE: The mounting surface must be able to support the weight of the telephone, which is 28 lbs.

The enclosure must be securely fastened with 3/8-inch diameter steel mounting bolts located on all four mounting feet. Stainless steel hardware is recommended in outdoor applications. Refer to Figure 2. The suggested mounting height is 48 inches to the bottom of the enclosure.

NOTE: Refer to the Killark Installation, Operation, and Maintenance Data Sheet enclosed with the unit for additional enclosure information.
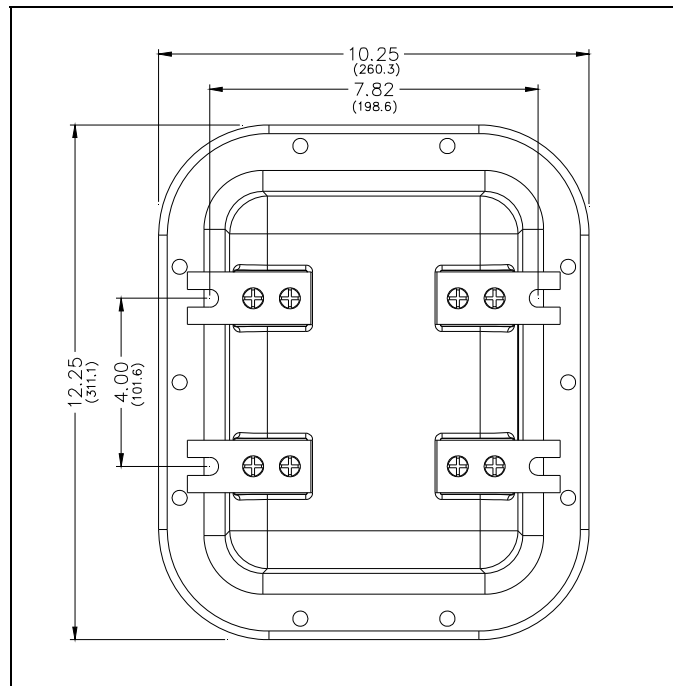
Figure 2. Model 352 Series Division 1 VoIP Telephone Enclosure Mounting Details

Cable Entries

Refer to Figure 3 for the NPT conduit entries. Ensure any unused openings are sealed with proper fittings per local standards. Use field wiring suitable for the ambient temperature. Any conduit NPT plugs (blanking elements) must be explosion-proof with a Type 4X rating.
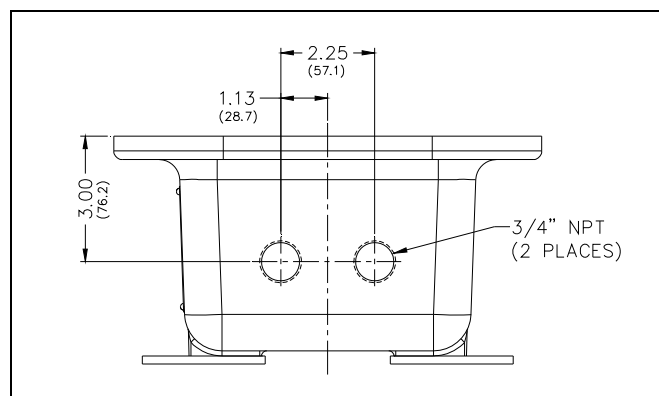
Figure 3. Model 352 Series Conduit Entries

Hardware Description

External

Model 352-701 contains a handset with an approved cable gland, standard keypad, volume control button, and applicable approval labeling. The handset rests on a cradle, which has a magnetic reed switch to signal an off-hook condition. The enclosure is sealed with ten cover mounting bolts located around the perimeter of the enclosure's flange. See Figure 4.
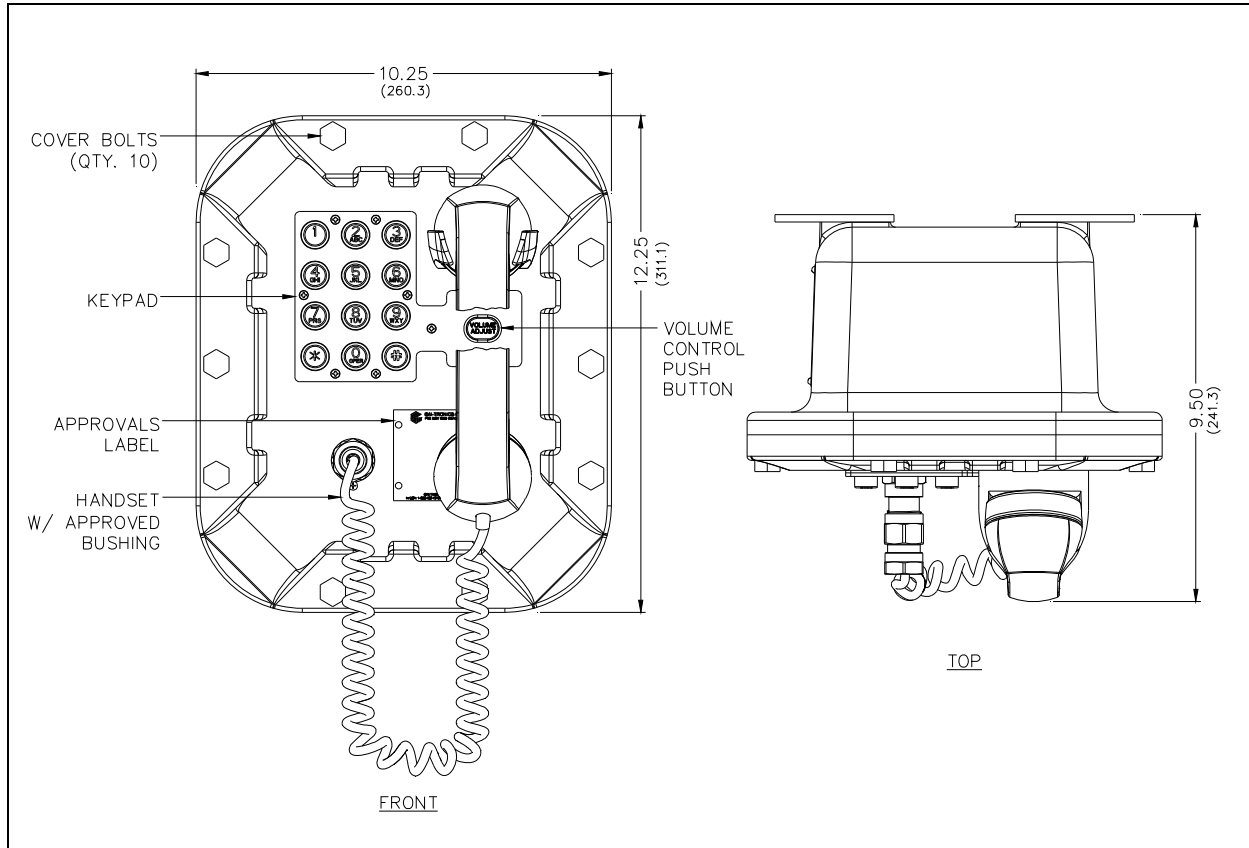
Figure 4. Model 352-701 Division 1 VoIP Telephone Outline

For the Model 352-703 Division 1 VoIP Telephone with the headset option, the cradle and handset are replaced with a removable headset and headset activation bracket.
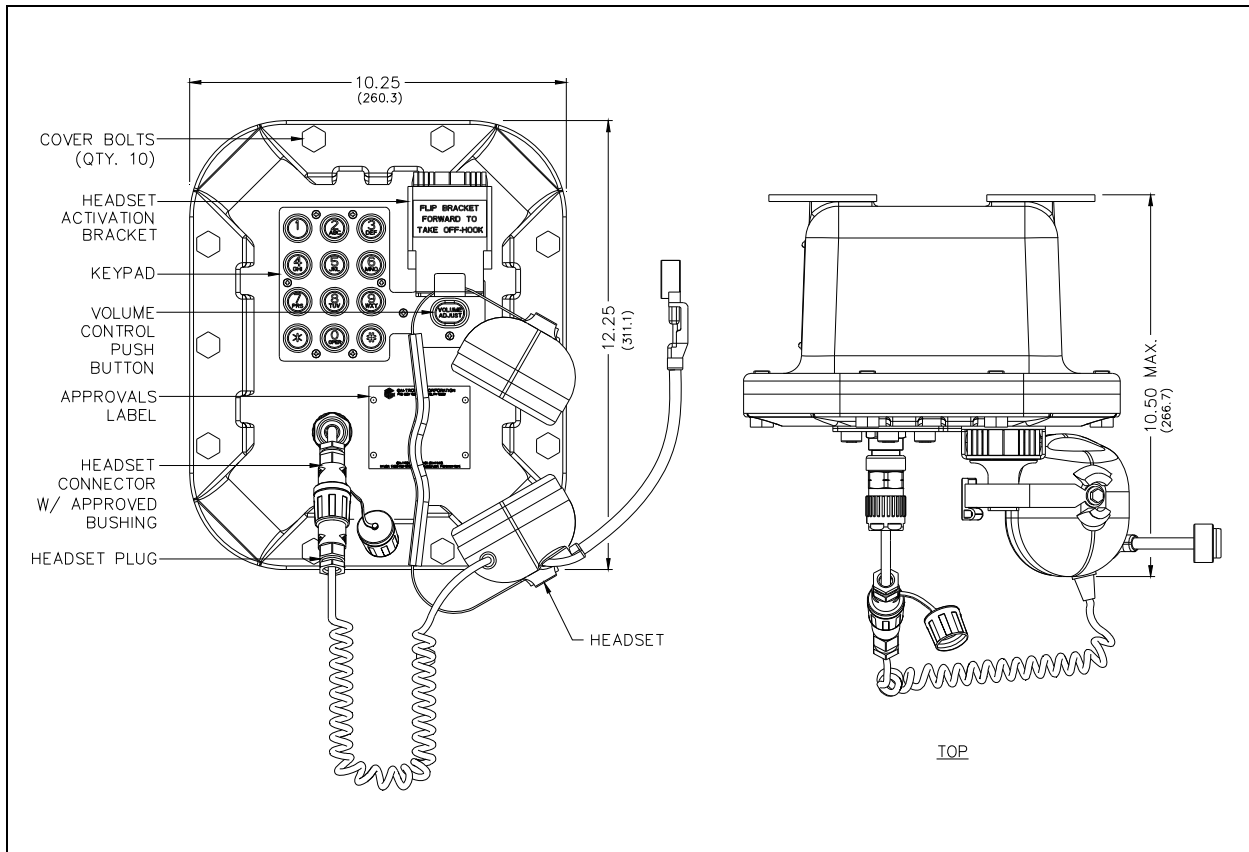
Figure 5. Model 352-703 Division 1 VoIP Telephone with Headset

Internal

All standard components are mounted to the rear of the front cover. See Figure 6 for the parts layout.
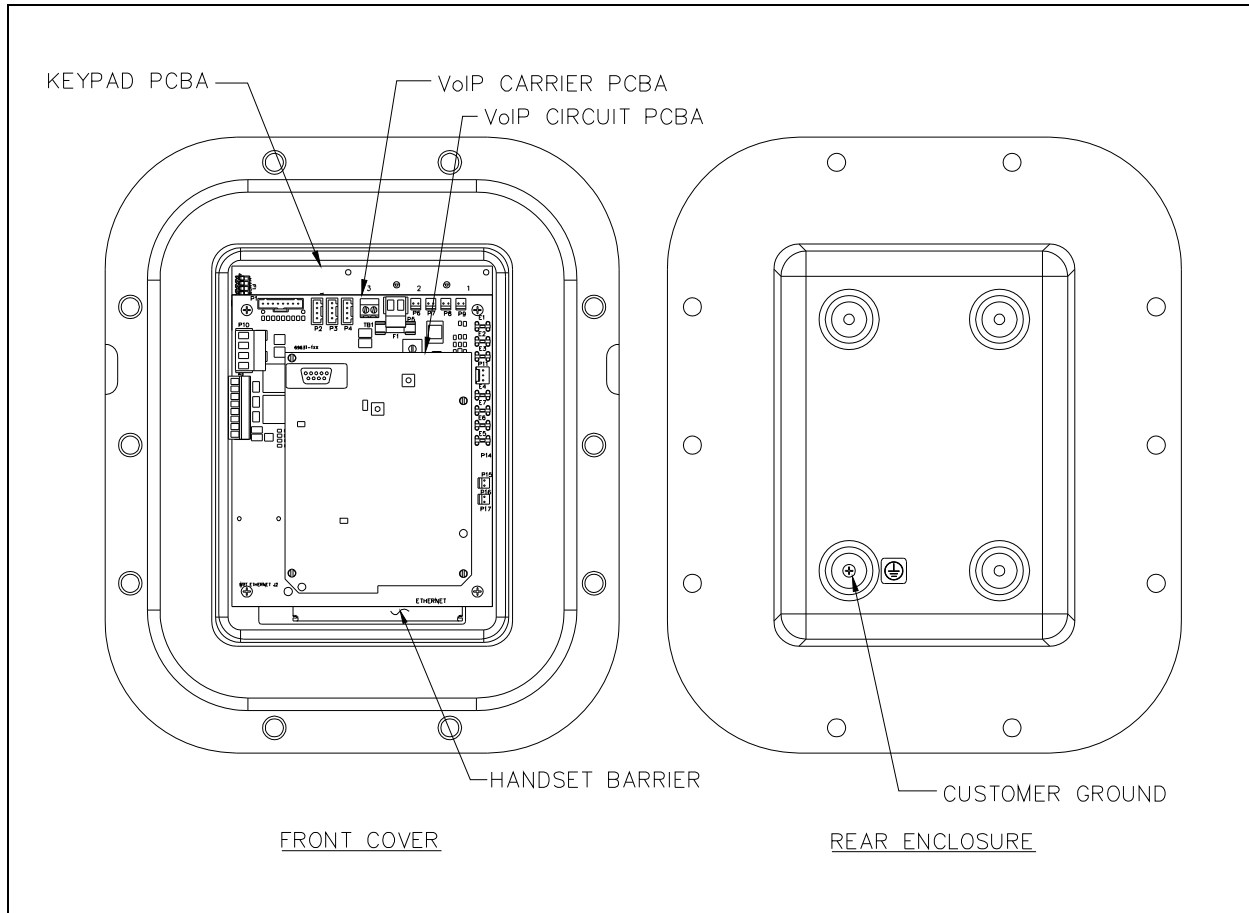
Figure 6. Model 352-70*x* Division 1 VoIP Telephone - Internal View

Wiring

⚠**WARNING**⚠ The front cover is not hinged to the rear enclosure. When the cover bolts are removed, the cover must be adequately supported.

1. While supporting the front cover, remove the ten cover bolts on the enclosure flange. Pull the front cover far enough away to expose the internal connections. Place the front cover aside.

2. Plug the incoming Cat5 data line to the network Cat5 cable receptacle on the underside of the VoIP PCBA. See Figure 7.

Install any additional connections as indicated below. Refer to Figure 7, 8 and 9 for wiring details. Refer to Table 3 on page 11 for the recommended conductor sizes.
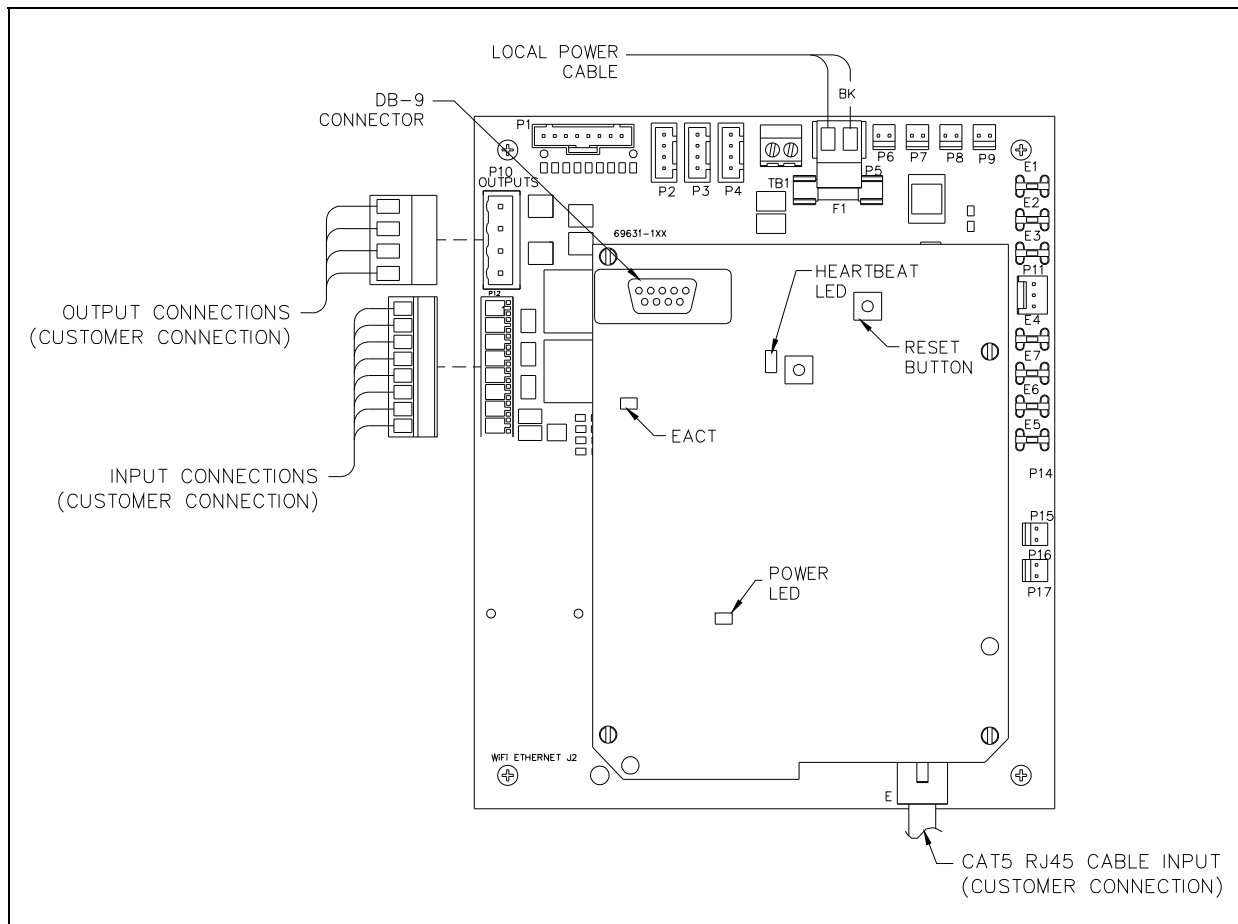
Figure 7. VoIP Telephone PCB Assembly
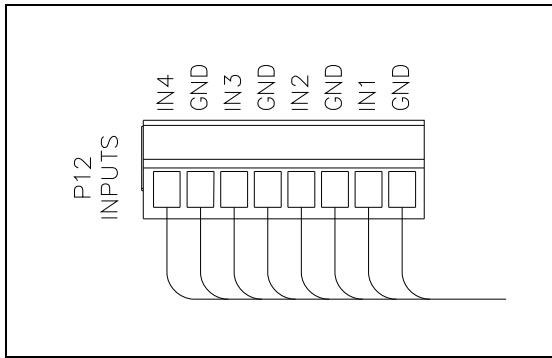
Figure 8. Input Cable Connections at P12
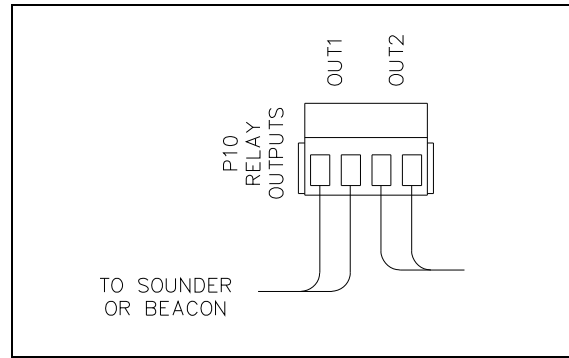
Figure 9. Output Cable Connections at P10
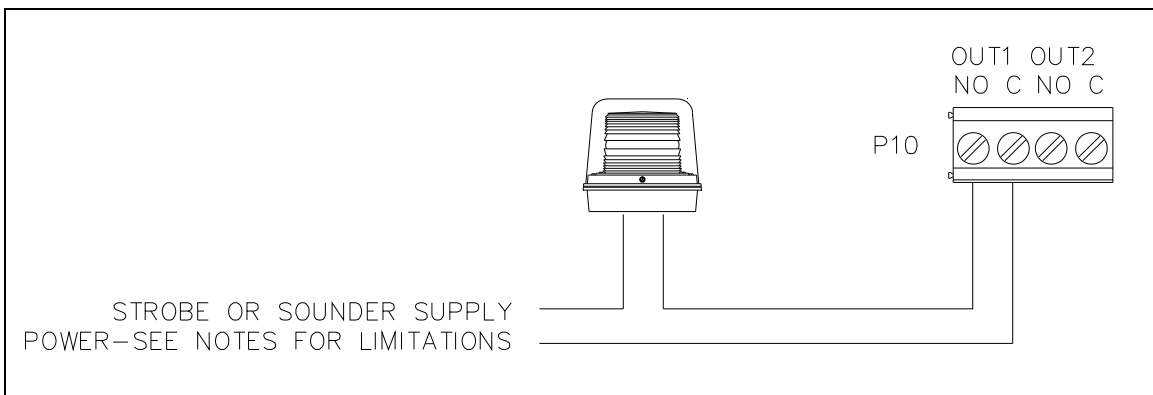
Figure 10.

Power

Power-Over-Ethernet (POE)

Connect power to the system as indicated in your POE equipment manual. (Power Mode A, Class 0)

Local Power

When POE is not available, this telephone can operate from a local 24–48 V dc power source. A removable terminal block, P5, has been provided for connection of local power to the telephone. Connect the positive conductor to the (+) terminal and the negative conductor to the (−) terminal of P5. Connection is polarity sensitive.

Network Cable

Connect a Cat5 or Cat5e UTP cable with an RJ45 connector between the Local Area Network (LAN) and the VoIP PCBA.

I/O

Inputs

Four auxiliary inputs have been provided for customer use. Terminations for these inputs are provided on terminal block P12. Connect each input between the desired input (INPUT 1–4) and common (COM) on terminal block P12. Refer to the "Inputs" section of Pub. 42004-481 for programming instructions of these inputs.

Table 1. Auxiliary Inputs – P12

Pin	Label	Function
1	IN4	Input 4
2	COM	Common
3	IN3	Input 3
4	COM	Common
5	IN2	Input 2
6	COM	Common
7	IN1	Input 1
8	COM	Common

Outputs

Two outputs have been provided for customer use. Terminations for these outputs are provided on connector P10.

Each VoIP Telephone contains two voltage-free output contacts. Refer to the "Specifications" section of this manual for the output ratings. Both outputs are single-pole, single-throw contacts.

The function of each output is configurable. Outputs can be configured for one of the following modes: On, Off, Pulse, Mute, Ring, Call, Connect, Hook, In Use, Ring Cadence, Ring Out, Page, Registered, or Emergency. In some modes, the duration of the activation or on/off times can also be set. Refer to the "Logic Settings" section of GAI-Tronics Pub. 42004-481, "VoIP Telephone Configuration Guide" for more details.

An external beacon or sounder can be activated with output 1 on the VoIP PCBA. The output must be configured to "Ring" mode to activate the external device.

Table 2. Output Contacts – P10

Pin	Label	Description
1	C1	Common Output 1
2	NO1	Normally Open Output 1
3	C2	Common Output 2
4	NO2	Normally Open Output 2

Table 3. Recommended Cabling

Cable Use	Size
LAN	Cat5 or Cat5e UTP cable with an RJ45 connector
Power	Two-conductor, No. 22 AWG is typical
Inputs	Two-conductor, No. 22 AWG is typical
Output contacts	Two or three-conductor, No. 18 AWG is typical
Speaker	Two or three-conductor, No. 18 AWG is typical

Status Indication

Power

The Power LED located on the VoIP PCBA illuminates when power is applied to the telephone.

Heartbeat

The Heartbeat LED located on the VoIP PCBA will flash once communication over the LAN is established.

EACT

The EACT LED located on the VoIP PCBA will turn on when the VoIP PCBA is connected to an Ethernet device and flash when data is being transmitted.
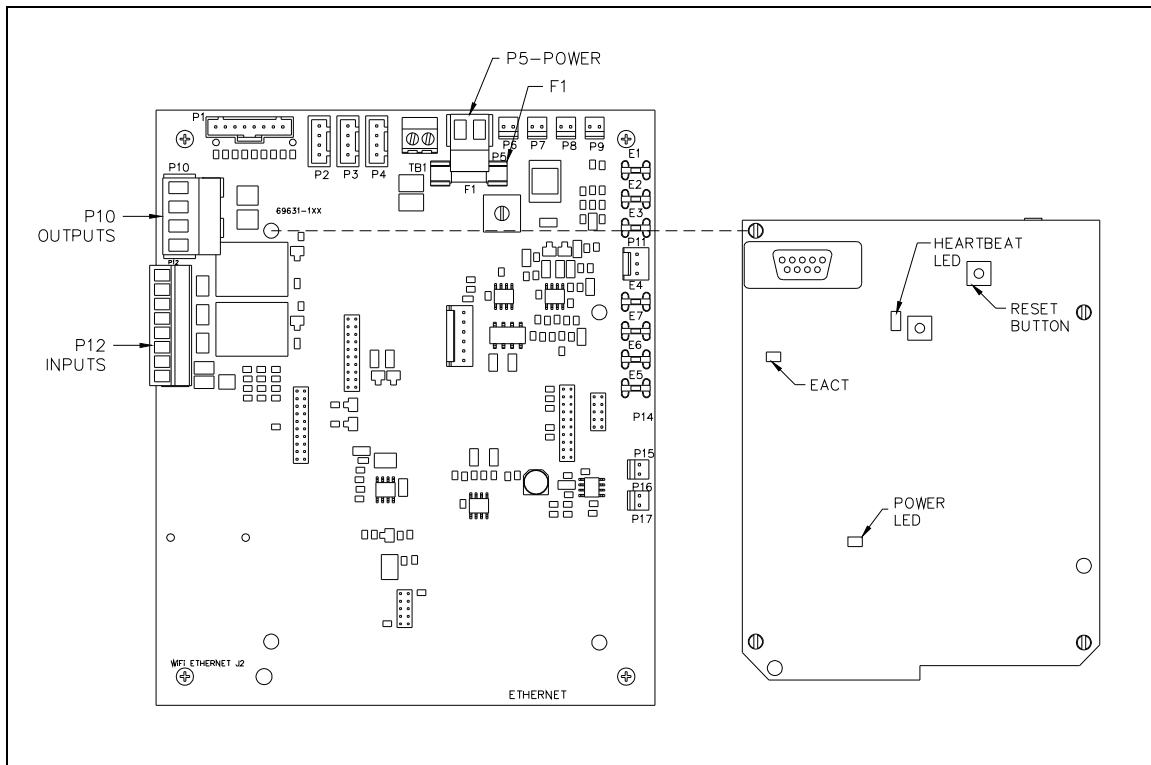
Figure 11. VoIP Carrier PCBA Component Locations

Attach the Front Cover

After all adjustments have been completed, inspect and clean the machined flange joint surfaces of both the cover and box. Surfaces must be smooth, free of nicks, scratches dirt or any foreign particle build-up that would prevent a proper seal. Surfaces must seat fully against each other to provide a proper explosion-proof joint. Clean surfaces by wiping with a clean lint-free cloth.

Apply a light coat of Killark "LUBG" lubricant to flange surfaces and close the cover. Install and tighten all cover bolts to 30 ft-lbs. Make certain no cover bolts are omitted. Use only those bolts supplied with the enclosure.

NOTE: Refer to the Killark Installation, Operation, and Maintenance Data Sheet enclosed with the unit for additional information.

External Controls

Handset Receiver Volume Control

A push-button switch has been provided on the front cover of the telephone for adjustment of the handset receiver volume. The receiver volume adjustment operates as follows:

- The initial direction of the volume (increase or decrease) is determined by prior activity. The initial direction will be opposite of the previous activity.

- Changing the direction is accomplished by allowing a period of inactivity (greater than 1 second).

Example – Increasing Volume: Depress the volume switch. If the receiver volume begins to decrease, wait at least 1 second and depress the volume switch again. The volume will begin to increase. When the desired volume is achieved, do not depress the switch.

Maximum (Handset Receiver) Level Remote Control

The receiver volume level can be controlled remotely by changing the setting in the configuration file. Refer to the "Handset Volume Setting in the Audio Setting" section in Pub. 42004-396 for programming instructions.

NOTE: The handset receiver volume setting using PB1 should be set for the maximum volume (factory default) prior to adjusting the volume remotely.

Programming

Refer to Pub. 42004-396, VoIP Telephone Configuration Guide for detailed programming and configuration instructions.

Quick Start Guide

For easier set up, configure the software prior to installing the telephone in a hazardous environment. The general sequence for set up and use is as follows:

Stage of Process	Comments
1. Initial network configuration	**Essential**: The telephone must be set up for the network prior to installation.
2. Assign a host name	**Recommended**: The host name provides identification of the different VoIP telephones on the network.
3. Change user name and password	**Recommended**: This security measure helps to prevent unauthorized changes to the telephone's configuration.
4. Mounting	Physically mount the telephone at the intended location.
5. Installation	Provide telephone connections and cabling to the network at the intended location.
6. Final configuration (can also be done prior to installation)	Set the autodial numbers, etc. Configuration changes can be performed remotely, if desired.
7. Test	Verify that calls can be made successfully.
8. Maintain	Monitor alarms. Set up auto-updates.

Verify the PC is connected to the same network as the VoIP telephone.

The easiest way to get started is to make a network connection to the unit and log on via a web browser. The unit is initially set with a static IP address:

IP address   192.168.1.2

A user name and password will be requested. The initial factory settings are:

User Name   **user**

Password   **password**

The telephone's home page is as shown in Figure 12 below, and allows access to all the other configuration pages. Use the Network page to change IP settings appropriate for the intended network.

⚠ **ATTENTION** ⚠ Be sure to assign a unique host name (located on the UNIT settings page) for each telephone on the network. The factory default host name in each unit is its serial number prefixed by "GT".

Full help is available from: www.gai-tronics.co.uk/voipsupport.htm

Figure 12.

Alternative Configuration Methods

There are three methods for configuring GAI-Tronics Handset VoIP telephones:

- Web pages
- Configuration file
- Command Line interface (CLI)

Web pages (held within the telephone) can be accessed over the network using a browser such as Internet Explorer™, to view and change settings within a single unit.

Configuration files are ASCII text files containing configuration options that can be read and edited by VCONF (a dedicated software configuration tool), or directly by a knowledgeable user. The telephone can automatically download a configuration file from the network, providing a controlled method of configuring multiple telephones.

The telephone can also be configured using a command line interface, either via the local serial port or remotely via a TELNET session over the network.

Operation

Model 352-701 Handset Operation

1. Lift the handset to place a call.

2. The handset receiver volume control located on the front cover keypad, can be adjusted to the desired level by pressing the volume control push button.

3. Dial the desired number.

4. After completion of the call, place the handset on-hook.
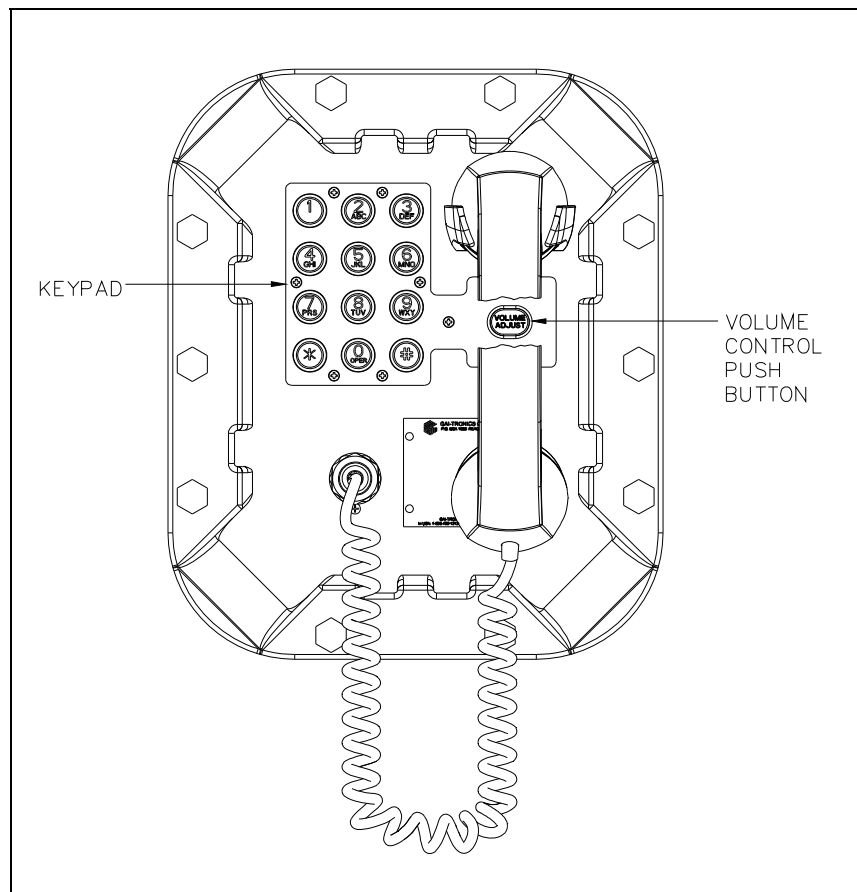
Figure 13.

Model 352-703 Headset Operation

1. To connect the headset, plug it into the flexible plug on the front of the telephone by removing the sealing cap from the receptacle, aligning the connector pins, and screwing the two ends together. See Figure 14.
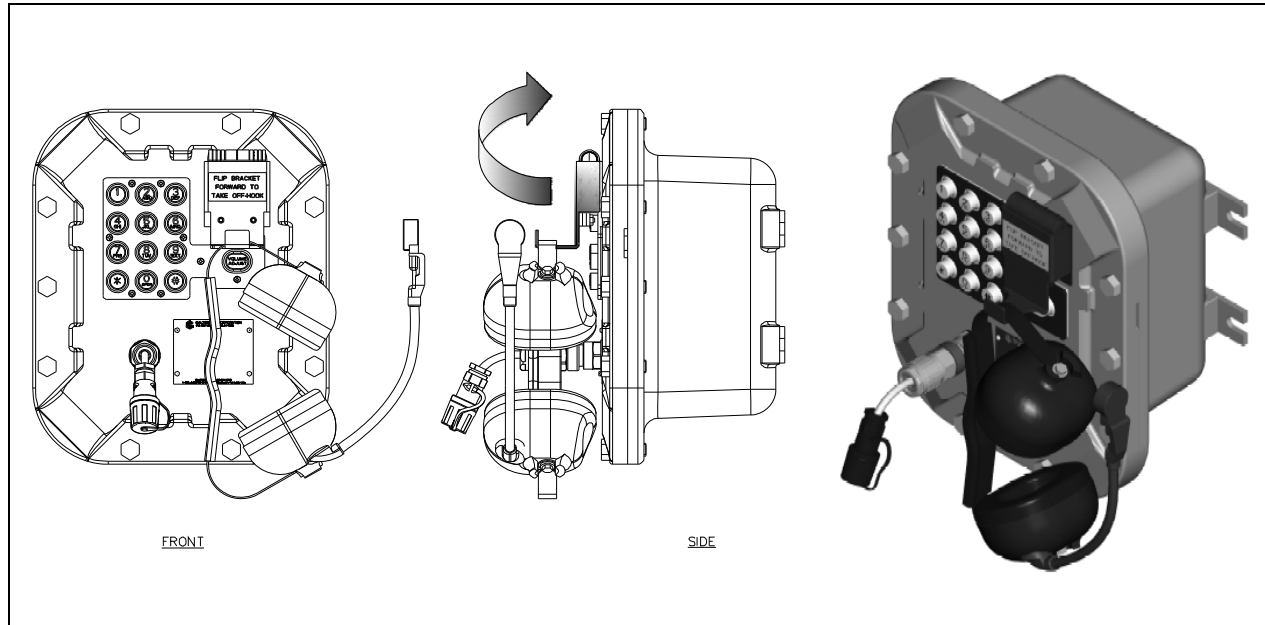
Figure 14.

2. To place a call, remove the headset from the headset activation bracket and flip the headset bracket forward to its preset position.

3. The handset receiver volume control, which is located on the front cover keypad, can be adjusted to the desired level by pressing the volume control push button.

    NOTE: Pressing the volume control push button increases the volume in 3-dB increments. The volume starts at 0 db and increases to a maximum volume of 18 dB. Pressing the volume control push button a seventh time will return the volume to 0 dB.

4. Dial the desired number.

5. Flip the headset activation bracket to its vertical preset position to hang up. If applicable, place the headset on the bracket after the completion of the call. Otherwise, disconnect the flexible receptacle and plug by unscrewing the two ends, and pulling them apart. When disconnected, reattach the sealing cap to the end of the receptacle.

FRONT   SIDE
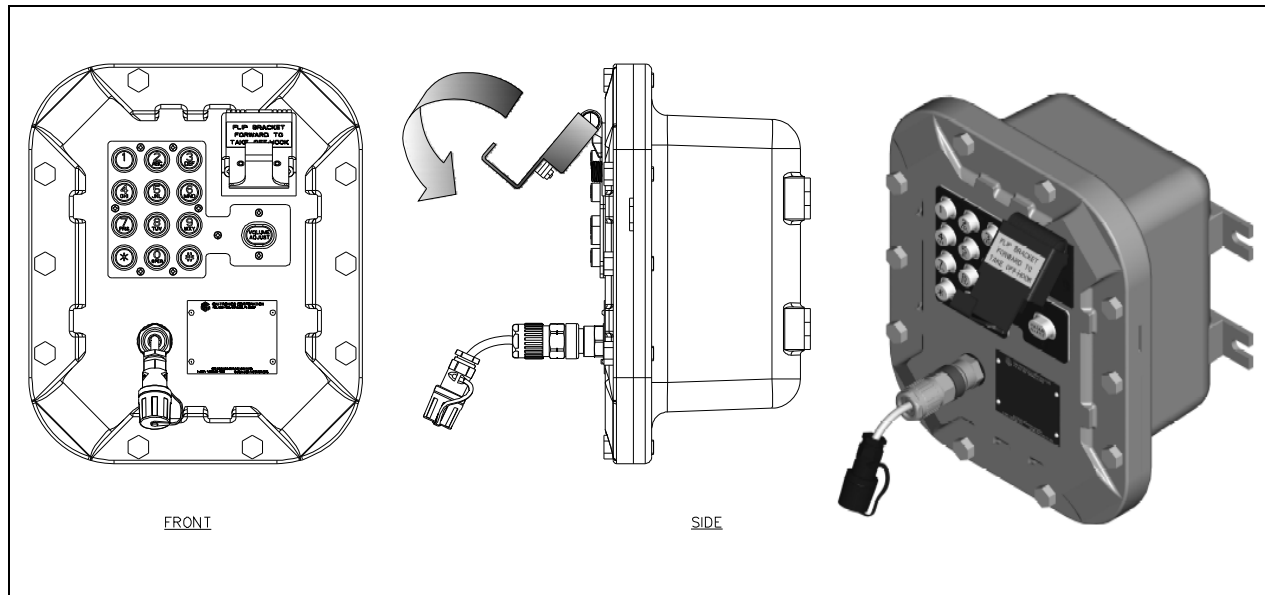
Figure 15.

Maintenance

Service

If your telephone requires depot 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 will be made without charge. 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.

Troubleshooting

Table 4. Troubleshooting Chart

Problem	Possible Solution
Low volume in handset or headset	Increase the volume setting using the Volume Adjust button on the front panel. **NOTE:** There is no external speaker adjustment.
High volume in handset or headset	Decrease the volume setting using the Volume Adjust button on the front panel. **NOTE:** There is no external speaker adjustment.
Front panel push buttons are not operational	Verify the push buttons are properly configured.
Inputs not operational	Check the input connections. Verify the inputs are properly configured.
Outputs not operational	Check the output connections. Verify the outputs are properly configured.
Cannot make or receive calls	Check the connection of the LAN cable. Verify that power is applied to the unit. Verify the LAN parameters have been configured properly. Verify the telephone has been set up on the network.
No power indication	Check the power connections. If using POE, check the operation of the POE equipment.

Specifications

Power .... Power-over-Ethernet, 802.3af compliant (via RJ45) Power Mode A, Class 0, or
External power supply: 24–48 V dc, 200 mA
A separate, isolated supply must be provided for each telephone.

Network .... 10/100 BaseT Ethernet RJ45, Cat5 or Cat5e UTP
Static IP provisioning or DHCP STUN client (NAT traversal)

Call control signaling.. SIP (RFC3261 compliant) Loose routing

Inputs

Keypad .... 3 × 4 matrix
Configurable inputs.. Four

Outputs

Output 1 .... 5 A @ 250 V ac/30 V dc (resistive load)
Output 2 .... 5 A @ 250 V ac/30 V dc (resistive load)

Controls

External... Push-button volume control
Internal .... Mic bias, reset switch, handset enable

Indicators

Internal .... Power, Heartbeat, & EACT LEDs

Codecs and audio .... G.711 A-Law
G.711 µ-Law
G.722
G.729
G.723.1 MP-MLQ
G.723.1 ACELP
Codec preference sequence
DTMF in-band / out-of-band (RFC2833)
Configurable comfort tones (to emulate national tones)

Configuration .... Embedded web server
Embedded Telnet server
Configuration file download
Configuration file building tool (Vconf.exe)
Direct serial connection
(Nine-way D-type female connector)
Command line interface
SNTP with time zone and daylight saving
Automatic updating via TFTP
Password protection

Monitoring and reporting.......................... Real-time over TCP/IP proprietary Syslog application or email
Embedded SMTP client
Automatic fault reporting

Compliance to Standards .... FCC CFR 47 Part 15

Environmental

Operating temperature .... −4º F to +131º F (−20º C to +55º C)

Humidity .... 95% non-condensing

Mechanical

Enclosure .... Cast aluminum with aluminized lacquer paint

Handset Cord .... "G" style handset/PVC 6-foot extended length (standard)

Connection .... RJ45 receptacle

Dimensions, outside .... 10.25 W × 12.25 H × 9.50 D inches (260.3 × 311.1 × 241.3 mm)

Mounting .... Wall or column, four 3/8-inch (10 mm) mounting feet with slots

Shipping weight .... 30.0 lbs. (13.6 kg)

Net weight .... 28.0 lbs. (12.7 kg)

Approvals

NRTL listed .... Hazardous locations Class I, Division 1, Groups B, C, & D
  (USA and Canada)   Class II, Division 1, Groups F & G
                                                                         Class III, Division 1
                                                                                Type 4X
                                                                              T6 – Gas
                                                                             T4A – Dust

User Instructions (USA)

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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.