GAI-TRONICS®
A HUBBELL COMPANY

Division 1 SMART Telephones

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Confidentiality Notice

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General Information

GAI-Tronics' Class I, Division 1 SMART Hazardous Area telephones are constructed of cast aluminum and are weatherproof and corrosion resistant. They combine standard telephone operation with GAI-Tronics' SMART (*self-monitoring and reporting telephone*) technology to provide optimum performance and flexibility.

Using GAI-Tronics' TMA (Telephone Management application) (*purchased separately*) provides status monitoring and reporting for each telephone. For complete details, please refer to the TMA's on-line help.

This manual applies to the following models:

Figure 1. Model 352-101 Division 1 SMART Hazardous Area Telephone

- **Model 352-101**—Division 1 SMART Hazardous Area Telephone

- **Model 352-102**—Division 1 SMART Hazardous Area Telephone with Ring Relay

- **Model 352-103**—Division 1 SMART Hazardous Area Telephone with Headset

- **Model 352-104**—Division 1 SMART Hazardous Area Telephone with Ring Relay and Headset

GAI-Tronics' SMART telephone product line provides flexibility to address a diverse range of applications. Altering the configuration data, in the telephone's non-volatile memory, achieves a wide variety of functions. The configuration options include:

- call progress detection, control, and call logging,

- auto-calling, auto-answering, and auto-dialing facilities,

- function inhibiting (e.g., tone pad and manual keypad dialing), and
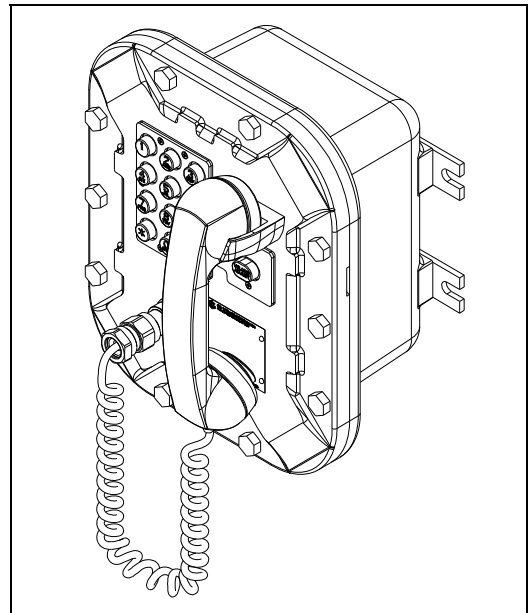
- maximum call duration.

GAI-Tronics initially programs these functions during manufacturing and testing. Reprogram them remotely, if necessary, via DTMF data call, after installation.

All SMART telephones receive power from the telephone line for connection to a 24 V dc or 48 V dc analog station port of a PBX (Private Branch Exchange), PABX (Private Automatic Branch Exchange) or KSU (Key Service Unit).

Do not make connections to pay telephone extensions or shared service (party) lines.

TMA users can schedule auto-dial maintenance calls to alert maintenance personnel of any unusual sensor or fault conditions that exist. SMART telephones can also generate an auto-dial *maintenance call* upon discovery of certain sensor events. Use of a *maintenance access PIN* restricts access to the SMART telephone's maintenance mode. Distribute the maintenance access PIN only to trained and authorized maintenance personnel.

Hardware Description

External

Models 352-101 and 352-102 include a handset with approved cable gland, standard keypad, volume control button, and applicable approval labeling. The handset rests on a cradle, which has a magnetic reed switch, behind it, to signal off-hook conditions. Ten cover mounting bolts, around the perimeter of the enclosure's flange, seal the enclosure (see Figure 2).
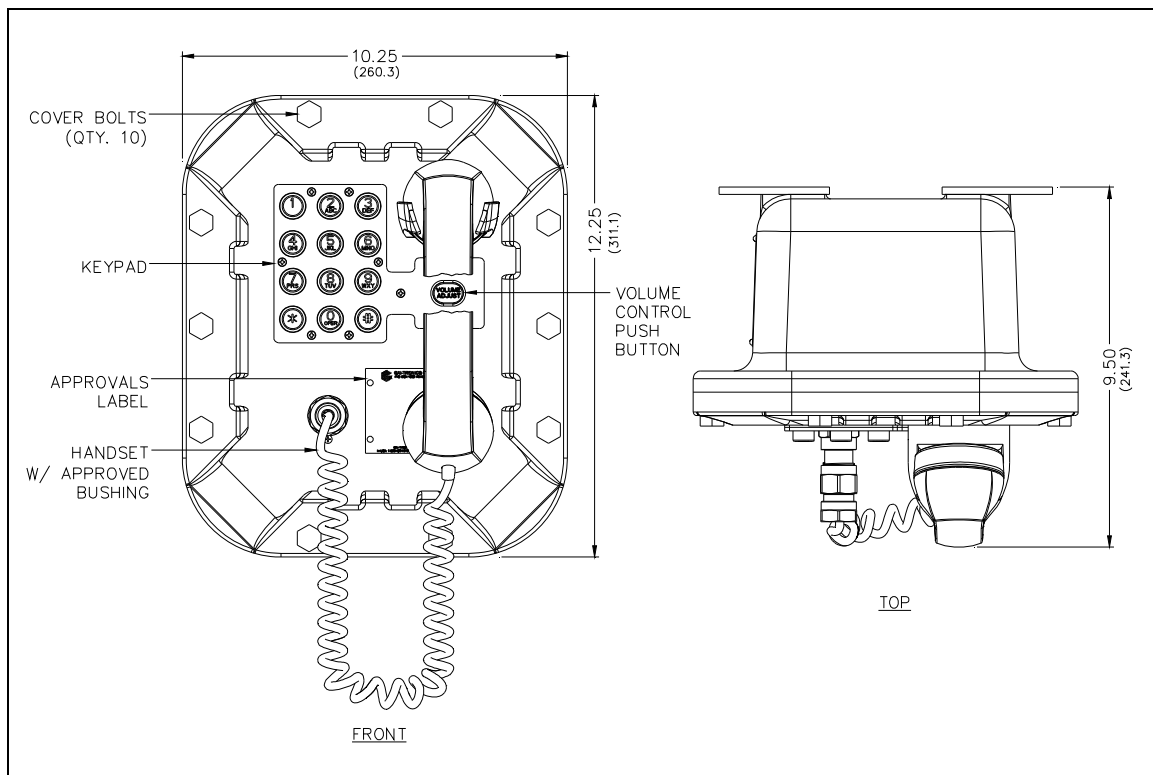
Figure 2. 352 Series Division 1 SMART Hazardous Area Telephone Outline Drawing

For the Division 1 SMART telephone models with the headset option, a removable headset and headset activation bracket replace the cradle and handset.
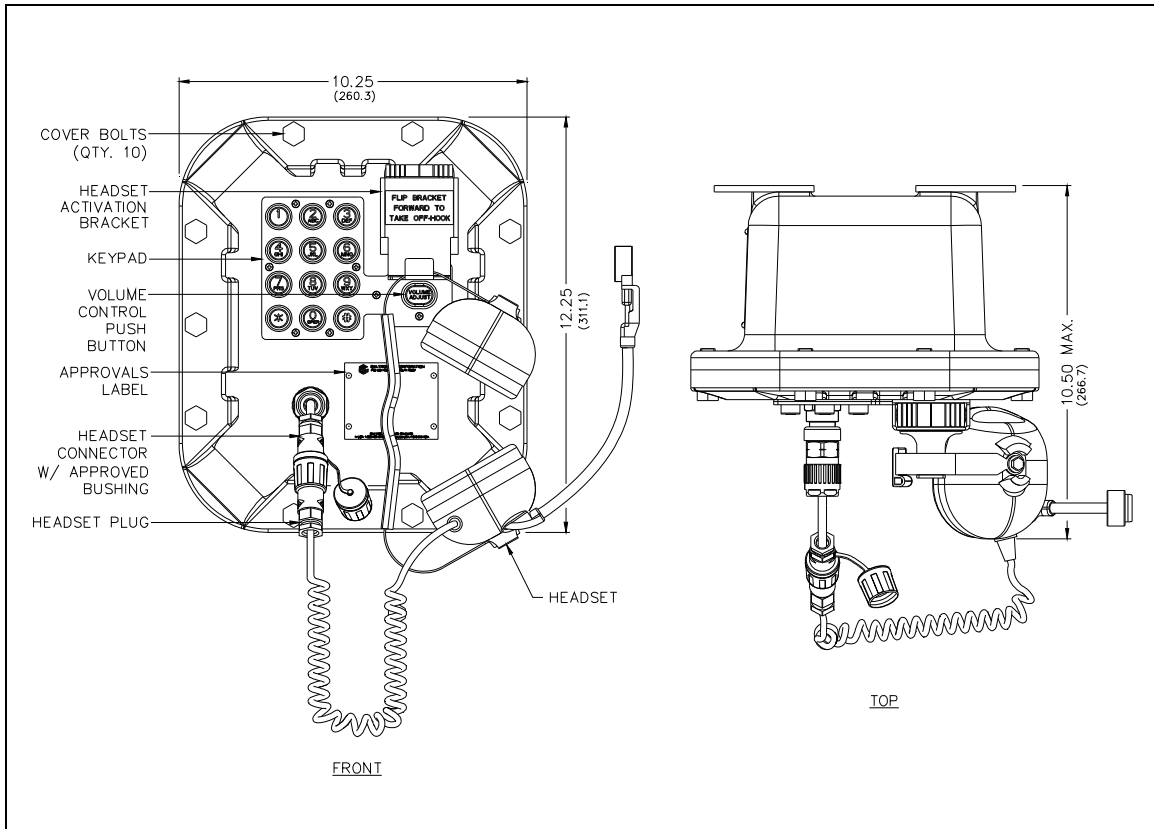

Figure 3. 352 Series Division 1 SMART Hazardous Area Headset Telephone Outline Drawing

Internal

All standard components mount to the rear of the front cover, except for the ring relay PCBA (*when installed*) (see Figure 4).

⚠**WARNING**⚠ —The front cover is not hinged to the rear enclosure. Adequately support the cover when removing the flange bolts.
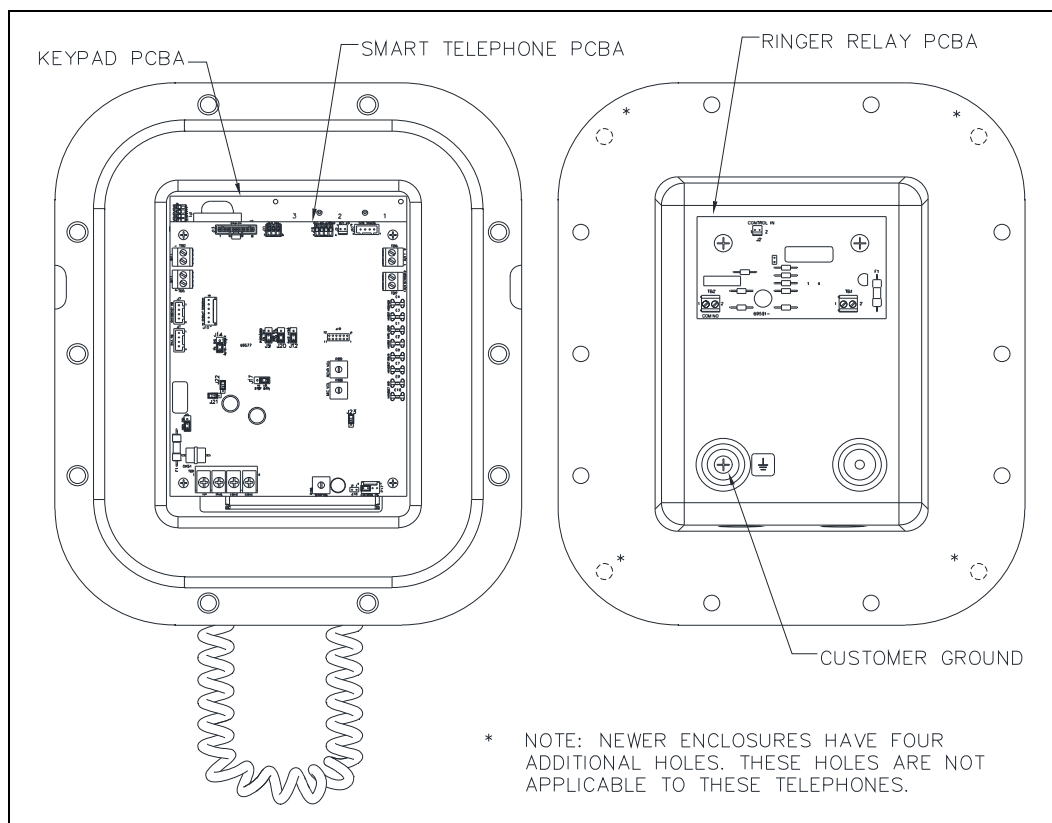
Figure 4. 352 Series Division 1 SMART Hazardous Area Telephone—Internal View

Ring Relay PCBA

The ring relay PCBA allows the telephone to activate an external beacon or sounder when the telephone receives a call. The ring relay PCBA connects to the main PCBA via a two-wire cable assembly. This cable assembly allows communication between the main PCBA and the ring relay PCBA. The ring relay PCBA is in the rear enclosure (see Figure 4 for mounting, and steps 3 through 5 in the Wiring section).

Installation

Installation Guidelines

Only trained, qualified, and competent personnel shall install these enclosures. 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 in the Approvals 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 internal 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.
Securely support the front cover while removing the cover bolts.

⚠️**ATTENTION** ⚠️ — Only qualified personnel shall install this equipment, which must be in accordance with the NEC (National Electrical Code) and/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 coating of Killark LUBG lubricant to the flange surfaces and close the cover. Install and tighten all cover bolts to 30 ft-lb. Do <u>NOT</u> omit any cover bolts. Use only the bolts supplied with the enclosure.

Adhere to the following guidelines when installing GAI-Tronics telephone equipment to ensure the safety of all personnel:

- **Electrostatic Discharge (ESD) Protection:** These telephones have an earth ground terminal. Connect this terminal to earth ground in accordance with all local safety regulations and the NEC (National Electrical Code). Safe and stable communications require proper grounding. Do not use long and coiled ground wires.

  NOTE: Proper grounding does not eliminate the need for lightning protection for the telephone or the telephone system.

- NEVER install a telephone during a lightning storm.

- **Install a UL Listed lightning arrestor** on any telephone where the telephone or telephone cable is at risk of exposure to lightning strikes. Install the lightning arrestor as close to the telephone as possible, in a non-hazardous environment, to maximize the protection. Do <u>NOT</u> install the lightning arrestor within the enclosure supplied with the telephone.

- NEVER install telephone jacks in wet locations unless the jack is specifically designed for wet locations.

- NEVER touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.

- USE CAUTION when installing or modifying telephone lines.

The <u>General Information</u> section details the types of telephone lines that GAI-Tronics' SMART telephones operate on. These telephones only operate with one telephone per line. Operating telephones in parallel or in a party-line configuration may cause sporadic telephone operation, difficulties with programming, or premature disconnection of calls. Additionally, if unique features, e.g., voice mail, call waiting, etc., are not disabled, the telephone may not function.

Front Cover Removal

⚠️**WARNING** ⚠️ —The front cover is not hinged to the rear enclosure. Adequately support the cover while removing the cover bolts.

1. Support the front cover and remove the ten cover bolts from the enclosure flange.

2. Pull the front cover far enough away to expose the internal connections.

3. Place the front cover aside.

Enclosure Mounting

NOTE: The mounting surface must support the weight of the aluminum enclosure, which is 28 lbs.

Securely fasten the enclosure to the mounting surface with 3/8-inch diameter steel mounting bolts, on all four mounting feet (see Figure 5).

- Stainless steel hardware is recommended for outdoor applications.
- 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.
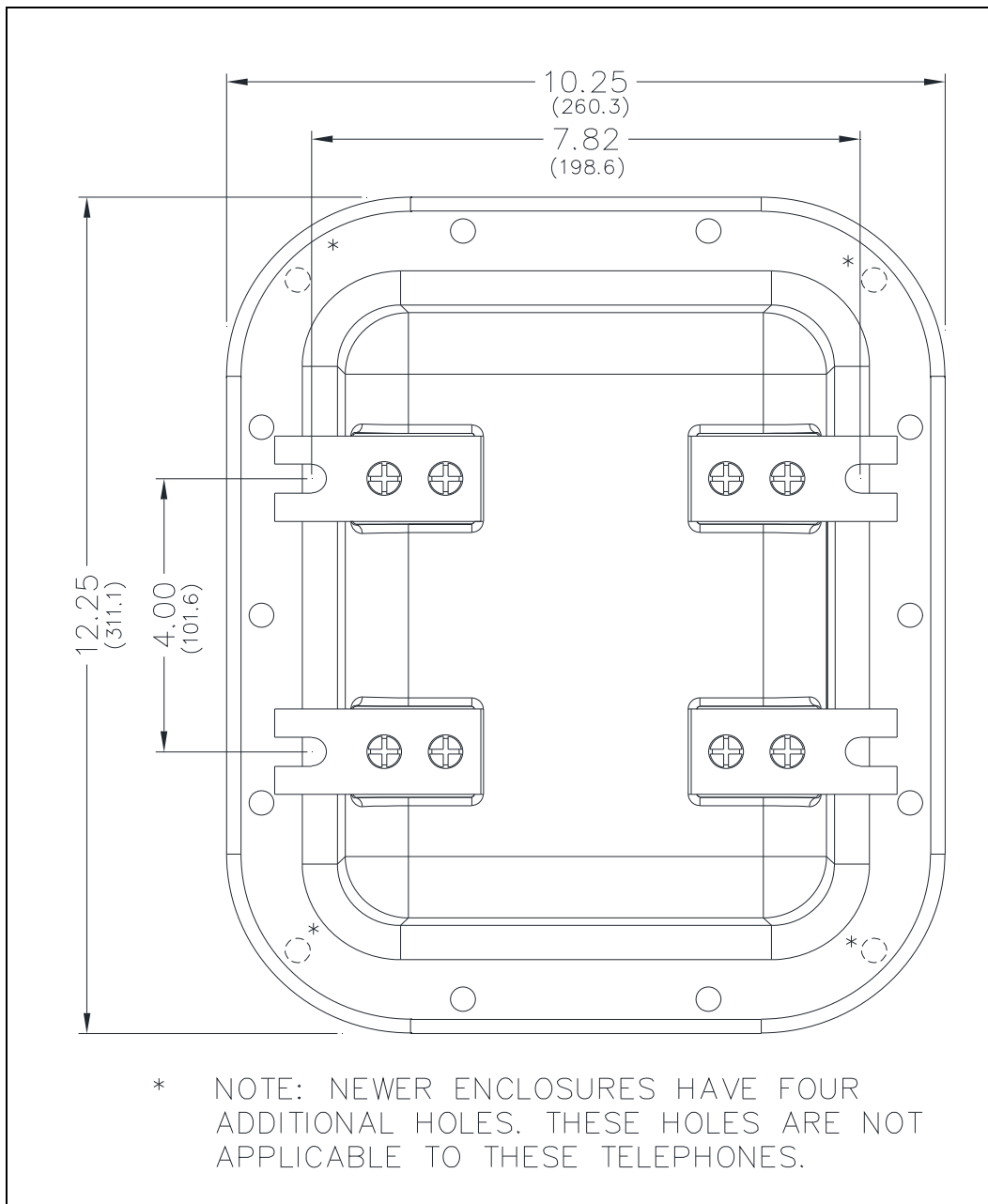
Figure 5. 352 Series Division 1 SMART Hazardous Area Telephone—Enclosure Mounting Detail

Cable Entries

Seal all unused openings with proper fittings per local standards. Use field wiring suitable for the ambient temperature. All conduit NPT plugs (blanking elements) must be explosion-proof with a Type 4X rating (see Figure 6 for the NPT conduit entries).
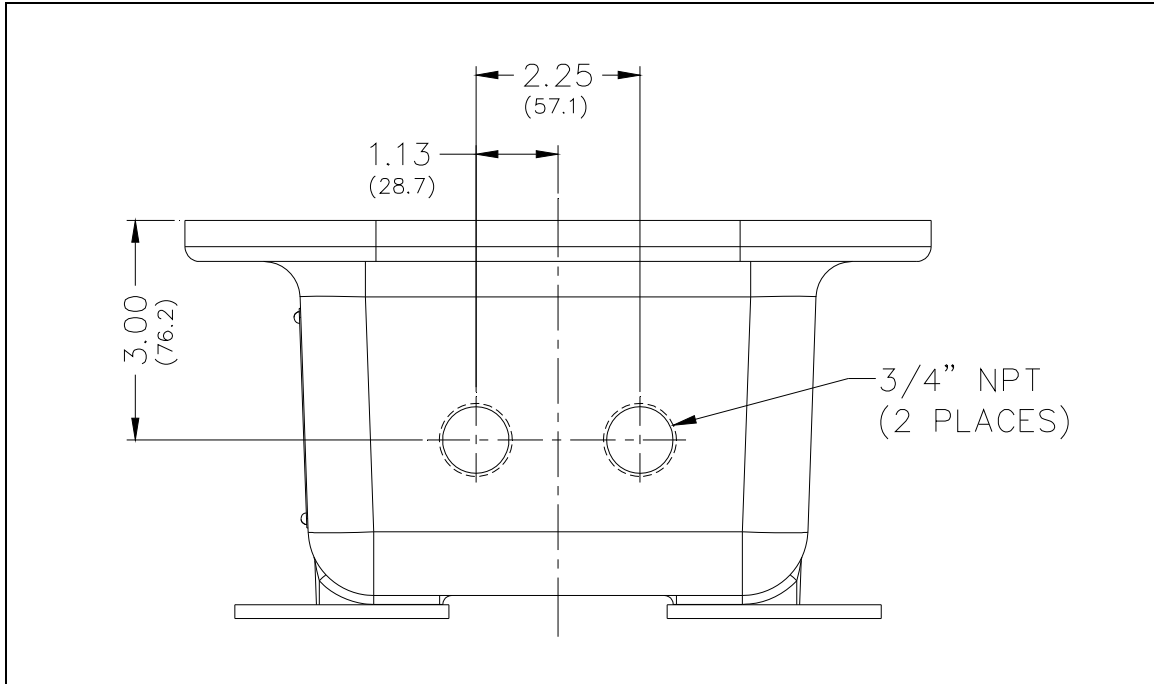
Figure 6. 352 Series Division 1 SMART Hazardous Area Telephone—Conduit Entries

Wiring

⚠**WARNING** ⚠ —The front cover is not hinged to the rear enclosure. Adequately support the cover while removing the cover bolts.

1. While supporting the front cover, remove the ten cover bolts from the enclosure flange.

2. Pull the front cover far enough away to expose the internal connections and disconnect any wiring between the front cover and rear enclosure. Place the front cover aside.

3. Connect the incoming subscriber line or the telephone line suppressor (if applicable) to terminal block TB1 on the main PCBA (see Figure 7).
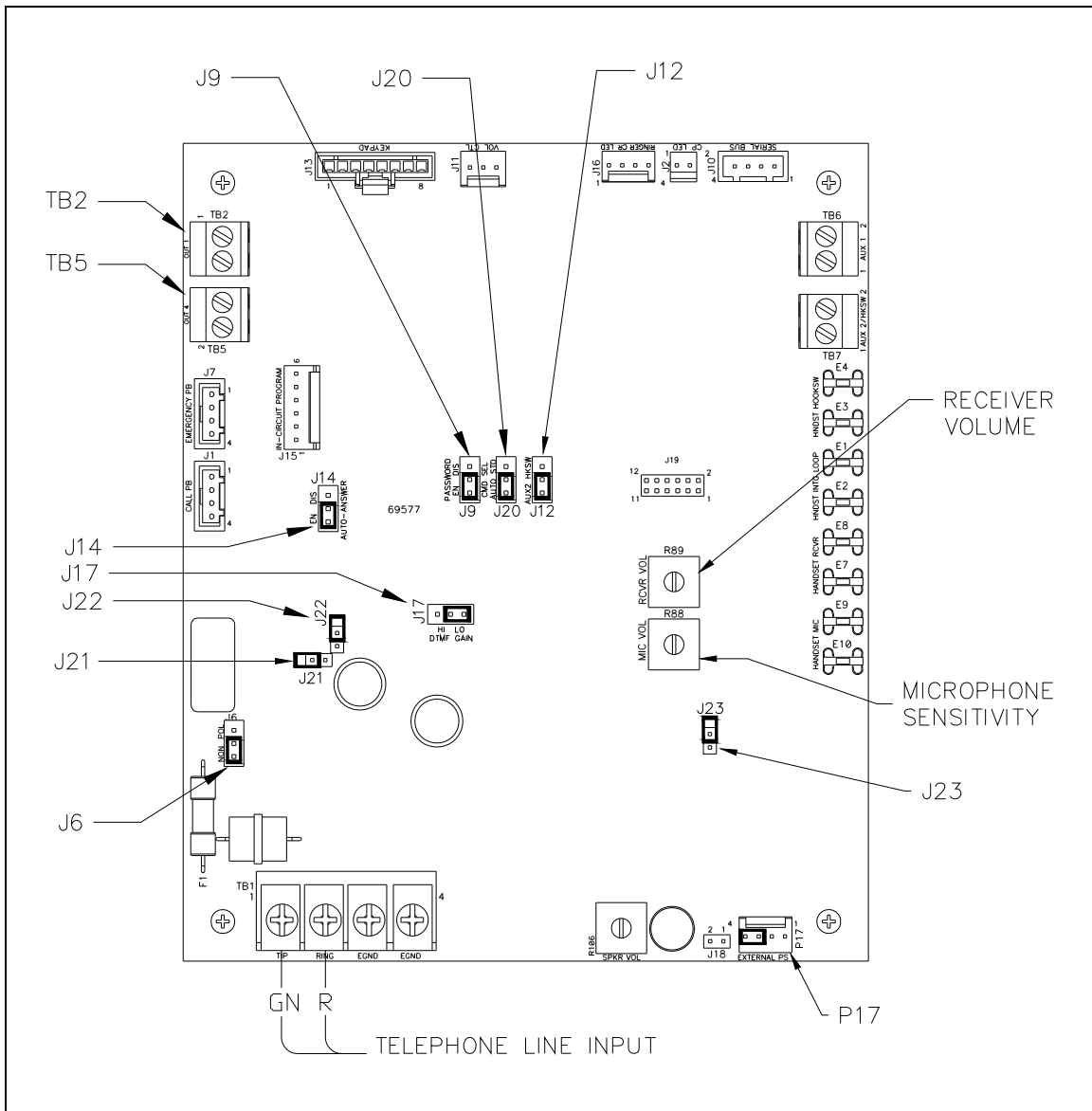
Figure 7. Main PCBA

4. When a ring relay PCBA option is present, connect incoming 120 V ac power to terminal block TB1, on the ring relay PCBA (see Figure 8).
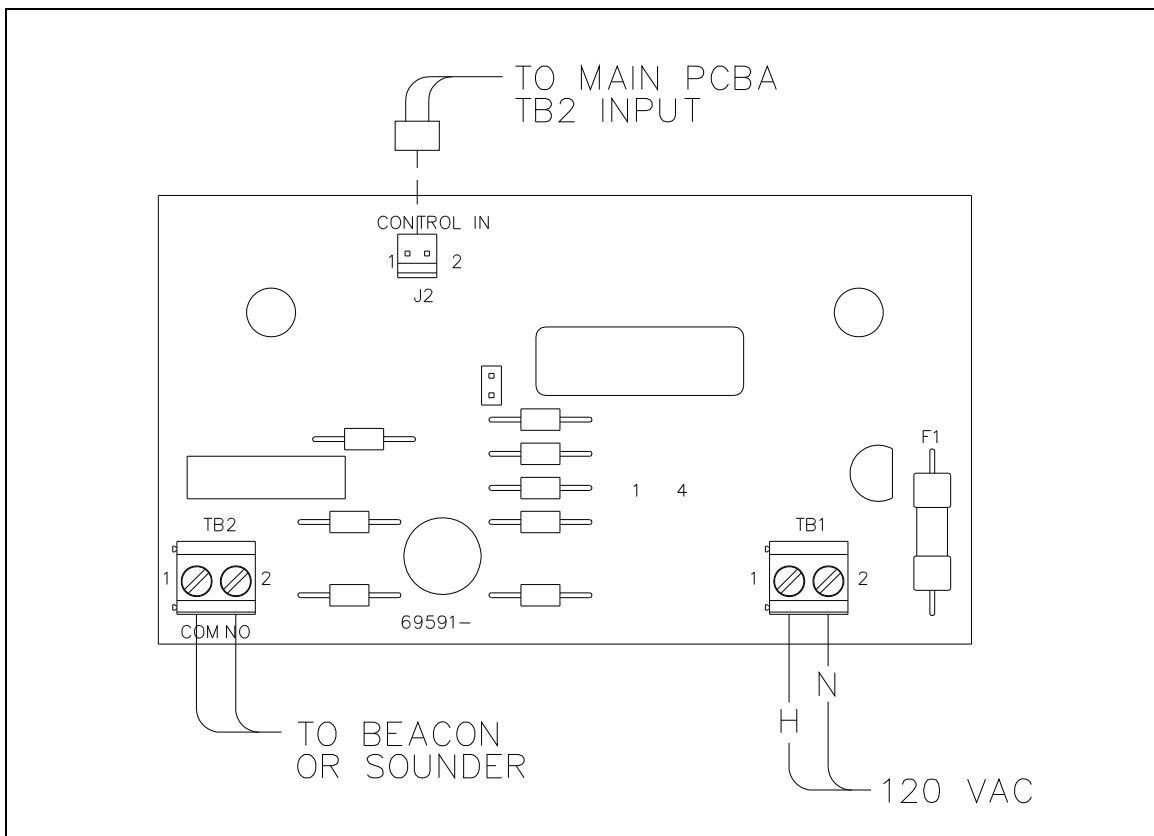
Figure 8. Ring Relay PCBA
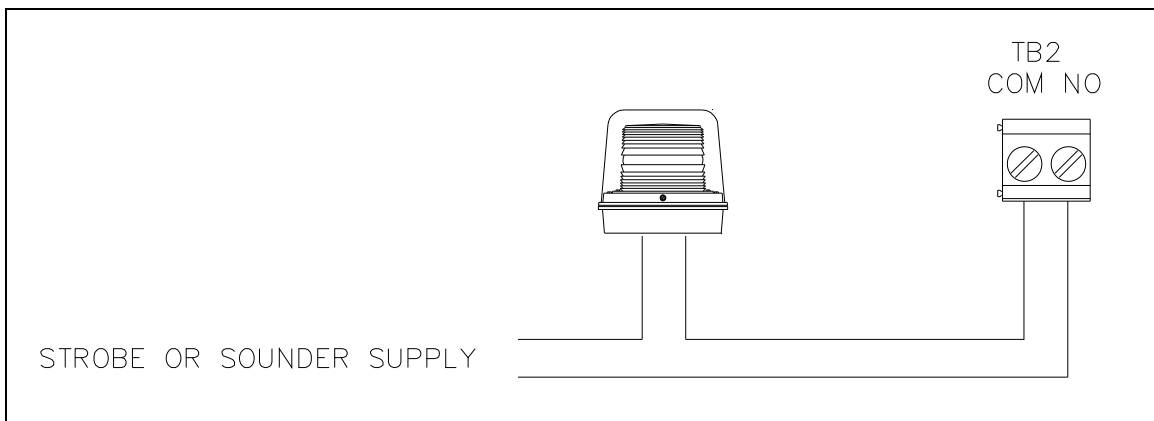
Figure 9. Strobe or Sounder Wiring

5. Connect the external sounder or beacon to TB2, for activation with an incoming telephone call.

6. Reconnect the communication cable between the Main PCBA and Ring Relay PCBA, if disconnected, before reattaching the front cover.

⚠WARNING⚠ —Any external equipment connected to the ring relay PCBA must be rated for the hazardous area where it is located. Improper installation or equipment may cause a safety hazard and consequent injury or property damage.

PCBA Hardware Configuration

The following sections explain the PCBA hardware configuration options and identify the necessary jumper settings to enable or disable each option. GAI-Tronics recommends reading the following sections to select the desired parameters before making changes. Keep a record of the settings. Specific hardware configurations control the following options (see Figure 7 on page 8 for the jumper locations).

Auto-answer Configuration

Factory Setting: Auto-answer feature enabled.

The Auto-answer feature enables or disables the automatic answering of an incoming call, which allows TMA to monitor the health of this telephone via polling. When the Auto-answer feature is enabled, the telephone automatically answers the call and attempts to communicate with TMA.

- *Enable*: Place jumper J14 in position **EN**.

- *Disable*: Place jumper J14 in position **DIS**. (Do not use this setting except under the direction of GAI-Tronics personnel.)

NOTE: Remote programming and using GAI-Tronics' TMA on a PC to contact the telephone requires the *auto-answer* feature to be enabled.

Polarity Configuration

Factory Setting: Non-polarity sensitive

This telephone can be configured to be polarity or non-polarity sensitive. With the non-polarized setting, the telephone operates with the telephone line's positive terminal connected to either the tip or the ring. With the polarized setting, the telephone only operates with the telephone line's positive terminal connected to the tip.

- *Non-polarity Sensitive*: Place jumper J6 in position **NON**.

- *Polarity Sensitive*: Place jumper J6 in position **POL**.

DTMF Gain Select Configuration

Factory Setting: Low Gain selected

Two gain selections are available in the DTMF detection circuit. In most installations, the low gain setting is recommended. The high gain setting may be necessary if the telephone is not responding to manual or TMA-generated DTMF commands.

- *Low Gain Selected*: Place jumper J17 in position **LO**.

- *High Gain Selected*: Place the J17 jumper in position **HI**.

Low-Power Mode Configuration

Factory Setting: Low-Power Mode Disabled

For installations where minimal loop current is available, the telephone's performance may be improved by enabling this feature. Symptoms of minimal loop current include low speaker volume and/or momentary muting of audio. In most applications, however, the low-power mode should be disabled. Enable the low-power mode by installing the following three jumpers: J21, J22, and J23.

- *Low-Power Mode Enabled*: Jumpers installed at J21, J22, and J23.

- *Low-Power Mode Disabled*: Jumpers NOT installed at J21, J22, and J23.

Auxiliary Outputs

Each telephone includes two isolated solid-state switches capable of switching a maximum of 48 V dc, 125 mA or 28 V $_{RMS}$ ac, 80 mA $_{RMS}$. Terminal block TB2 (OUT1) and TB5 (OUT4), on the main PCBA, provide connections for the auxiliary outputs (see Figure 7).

Output 1 connects to terminal block TB2, on the main PCBA (see Figure 7). This output activates at the start of an incoming call and extinguishes upon lifting the handset from its cradle (call answered). This output activates with a cadence of 2 seconds ON followed by 4 seconds OFF during this time interval.

NOTE: This output is not available on models containing the ring relay option.

Output 4 connects to terminal block TB5, on the main PCBA (adjacent to TB2). This output is remotely controllable via an appropriate DTMF command. Use this remote-control output to activate or control a door latch, gate relay solenoid, alarm, etc. from the called party location.

Extreme Cold Temperature Operation

GAI-Tronics' 352 Series Division 1 SMART telephones can operate in extremely cold temperatures ranging to −40 ºC. Operation at these temperatures requires a 5 V dc power supply for the telephone.

To connect the power, remove the jumper from header P17 pins 3 and 4 and plug it into the adjacent J18 header (see Figure 7).

Front Cover Installation

After completing all connections and adjustments, inspect and clean the machined flange joint surfaces of both the cover and the box. Surfaces must be smooth, free of nicks, scratches, dirt, or any foreign particle build-up that may 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-lb. Do not omit any cover bolts. Use only the bolts supplied with the enclosure.

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

Programming

All SMART telephone models are programmable. GAI-Tronics initially programs the telephone's default settings during manufacturing and testing. Change the default settings after installing the SMART telephone to implement different options. This manual provides instructions for programming basic features to initially set up the telephone from another touch-tone telephone.

More advanced programming requires a PC and the TMA software. For programming using the TMA terminal, refer to the TMA software manual (Part No. 12509-037), or contact the GAI-Tronics' Field Service Department.

⚠️ **NOTE** ⚠️—Use a handset telephone exclusively when programming the SMART telephone remotely. Using a speakerphone for programming may lead to incorrect settings due to background noise. (Using a cellular telephone is also not recommended.)

Enter Programming Mode

Read the entire Programming section and carefully plan the programming before beginning the process. Write down the key sequence from the *Command* column of Table 1, Basic Programming Commands, for the necessary features. Documenting the programming information helps enter the key sequence at a steady pace and provides a record of the telephone's settings.

Complete the following steps to enter the programming sequence from a remote DTMF telephone:

1. Call the SMART telephone to program. (Do not use a cellular telephone.)

2. Listen for a confirmation tone during ringing, which signals that the telephone has answered.

3. Press ******* to enter programming mode.

4. Wait two seconds.

5. Enter ****0000** (0000 is the factory default maintenance PIN #.)

    NOTE: After sending the maintenance PIN # to the telephone, entering ***20** provides confirmation of maintenance access to the telephone. If access is granted, the telephone responds with six DTMF digits.
    If access is denied, the telephone responds with two DTMF digits. Repeat step 5 again to request access again.

6. Complete the necessary programming (see the Basic Programming section for options).

7. Listen for a confirmation tone at the end of each programming sequence, which indicates the programming change was accepted.

    ⚠ **NOTE** ⚠—Delays during programming greater than 5 seconds cause a programming time-out. If this occurs, you will hear a beep before the programming sequence is completed and you must reenter the sequence.

8. When finished programming, press ***99** to exit the programming mode.

Basic Programming—Call Time-out

Enter the following programming command from any touch-tone telephone. The telephone indicates acceptance of a data transfer command by transmitting an audible DTMF return code tone.

The call time-out feature limits call duration from 1 minute to 4.5 hours. Set the time limit by entering a number from 120 to 32400. This number represents the number of half-second increments of duration. Entering 0 results in a call time-out of 4.5 hours.

1. Enter ***37<120~32400>#** to assign a time limit or change the existing time limit.

*37	Data transfer command
<120~32400>	Call duration (60–16,200 seconds, 0 = 4.5 hours) – See example below.
#	End of sequence indicator

2. Multiply the desired time limit, in minutes, by 120 to determine the call duration.
    Example: For a call duration of 5 minutes:

3. 5 minutes × 120 = **600**

4. Therefore, enter the character string ***37600#**, and the telephone returns a DTMF check-digit.

Table 1. Basic Programming Commands

Command	Return	Description	Default Setting
*37<120~32400>#	c	Write Call Time-out (120–32400 × ½ sec, 0 disables)	10 minutes

The **c** in the above return field is the success tone (DTMF check digit).

Operation

Models 352-101 and 352-102 Handset Operation

1. Lift the handset to place a call.

2. Adjust the handset receiver volume control, on the front cover keypad, to the desired level by pressing the volume control push button.

    NOTE: Pressing the volume control push button increases the volume in 5-dB increments. The volume starts at 0 dB and increases to a maximum volume of 20 dB. Pressing the volume control push button a fifth time returns the volume to 0 dB.

3. Dial the desired number.

4. After completion of the call, place the handset on-hook.
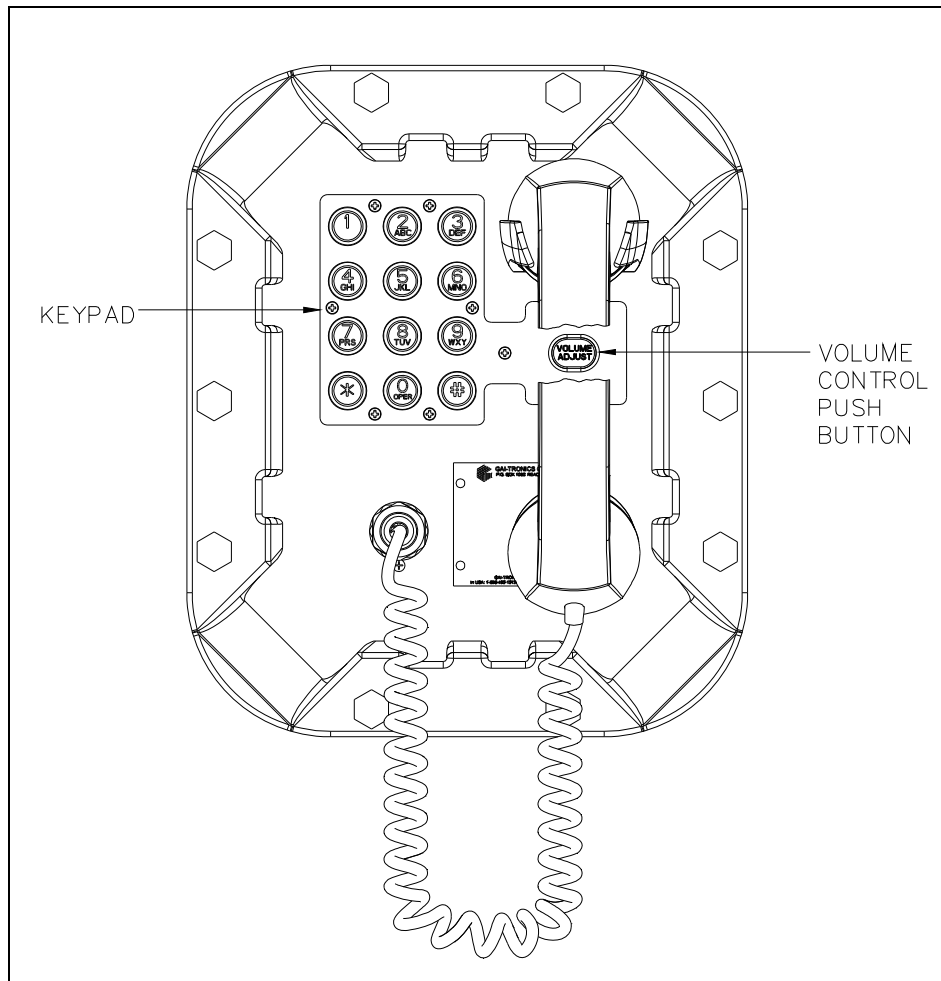
Figure 10. Models 352-101 and 352-102

Models 352-103 and 352-104 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.
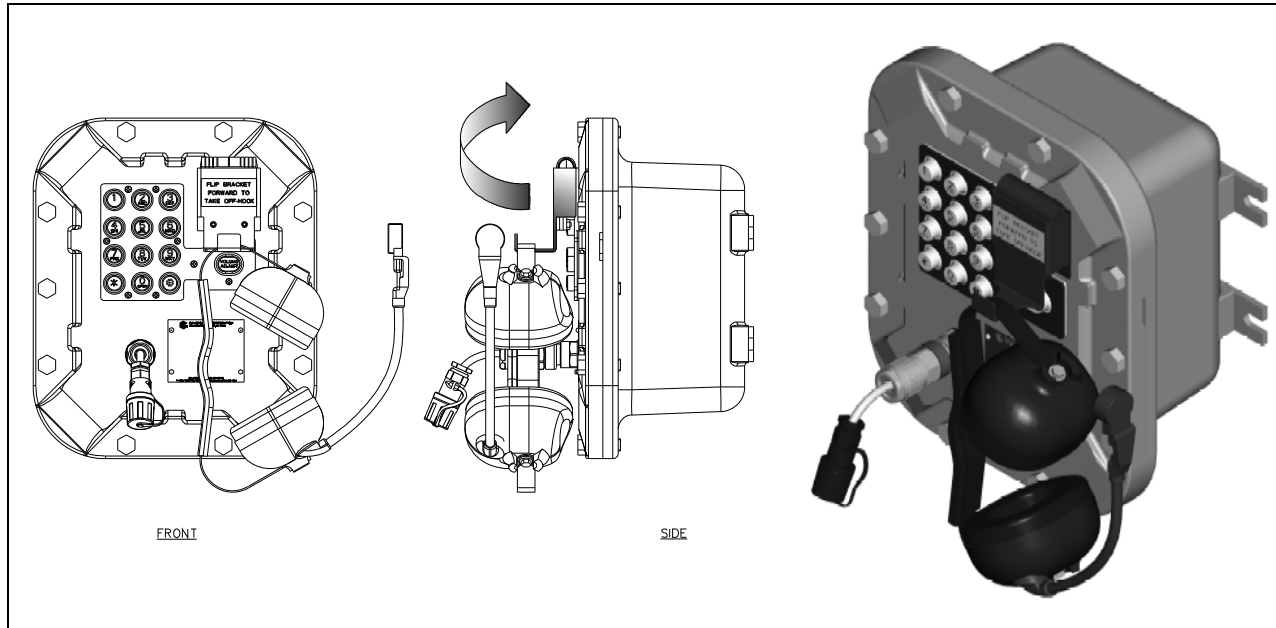
Figure 11. Models 352-103 and 352-104

2. To place a call, remove the headset from the headset activation bracket and flip the headset bracket forward to its preset position (see Figure 11).

3. Adjust the handset receiver volume control, on the front cover keypad, to the desired level by pressing the volume control push button.

   NOTE: Pressing the volume control push button increases the volume in 5-dB increments. The volume starts at 0 dB and increases to a maximum volume of 20 dB. Pressing the volume control pushbutton a fifth time returns 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 completing 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 (see Figure 12).
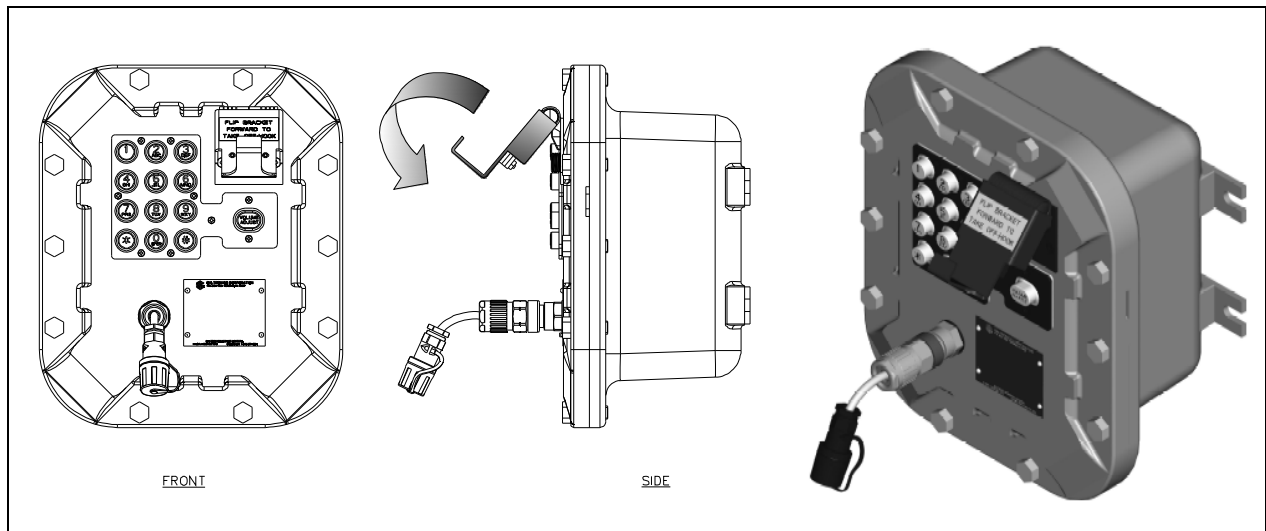
Figure 12. Models 352-103 and 352-104—Headset Disconnection

Maintenance

Contact a regional service center for a return authorization number (RA#) if the equipment requires service. Ship equipment prepaid to GAI-Tronics with an RA# and a purchase order number. GAI-Tronics makes repairs or provides replacement in accordance with our warranty policy if the equipment is under warranty. Please include a written explanation of all the 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 with identifying the closest Regional Service Center.

Specifications

TMA Compatibility profile type .... Type A Handset

Electrical

Minimum loop current (48 V dc only) .... 20 mA

Volume control .... five steps (0 dB, 5 dB, 10 dB, 15 dB, 20 dB)

Inter-digit pause .... 100 ms

Signaling tone (DTMF) .... 100 ms tone duration

Supervisory dc voltage .... 24 V dc or 48 V dc

Network interface .... loop start

Auxiliary output (isolated solid-state switch) .... 48 V dc @ 125 mA

28 V $_{RMS}$ ac @ 80 mA $_{RMS}$

Ring Relay PCBA output mechanical relay contact .... 250 V ac @ 5 A

30 V dc @ 5 A

Network signaling .... DTMF

Ringer Equivalence Number (REN) 0.5B

Environmental

Operating temperature .... −4 ºF to +140 ºF (−20 ºC to +60 ºC)

Humidity .... 90% non-condensing

Mechanical

Enclosure .... cast aluminum with aluminized lacquer paint

Handset cord .... G-style handset with PVC 6-foot extended length (standard)

Connections... internal screw-type barrier terminal blocks

Dimensions, outside....................................... 10.25 W × 12.25 H × 9.50 D in (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 lb (13.6 kg)

Net weight.. 28.0 lb (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.