GAI-TRONICS®
A HUBBELL COMPANY

# Model 227-005, 247-005, 257-005, and 277-005 SMART Auto-Dial Handset Telephones

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## 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.

## Product Overview

### Telephones

GAI-Tronics Self-Monitoring and Reporting Technology (SMART) Telephones incorporate leading-edge technology to provide optimum performance and flexibility. When used with GAI-Tronics' Telephone Management Application (TMA), the health and activity of each telephone is monitored and reported. For complete details, please refer to the user guide included with TMA (Part No. 12509-037).

This manual applies to the following GAI-Tronics SMART Telephones that include a volume control push button and a noise-canceling handset:

| Model | Description |
|-------|-------------|
| 227-005 | **Tough SMART Telephone,** weather and vandal-resistant, cast aluminum enclosure with spring-loaded door and armored handset cord. |
| 247-005 | **Rugged Indoor SMART Telephone**, high-impact, glass-reinforced polyester enclosure and Hytrel® handset cord. |
| 257-005 | **Rugged Weatherproof SMART Telephone**, high-impact, glass-reinforced polyester enclosure with door and Hytrel® handset cord. |
| 277-005 | **Flush-Mount Indoor SMART Telephone**, heavy-gauge brushed stainless steel front panel and armored handset cord. |

All SMART Telephones are line-powered and can be connected to any of the following:

- Central Office (CO) line to the Public Switched Telephone Network (PSTN)
- 24 V dc or 48 V dc analog station port of Private Branch Exchange (PBX), Private Automatic Branch Exchange (PABX) or KSU.

Connection may not be made to pay telephone extensions or shared service (party) lines.

Each telephone requires a minimum line current of 20 mA for proper operation.  For operation below −4º F (−20° C), GAI-Tronics offers a plug-in power supply (120 V ac required), which will allow operation to −40° C.  Please refer to page 18.

The SMART Telephones provide the flexibility to address a diverse range of applications.  A wide variety of functions can be achieved by altering the configuration data stored in the telephone's non-volatile memory.  These configuration options include:

- Pre-programmed auto-dial telephone numbers

- Call termination method (automatic or manual)

- Maximum call duration

- Answering options

Values for these functions are initially programmed during factory testing.  These settings can be changed remotely from a touch-tone telephone, manually (with an integral or portable keypad), or via TMA.

## Telephone Management Application (TMA)

GAI-Tronics' TMA software is a maintenance data collection and reporting tool that allows users to view and report the health of the SMART Telephones.  SMART Telephones can function with or without the TMA software application installed.  The decision to use TMA can be made at any time and is not needed for telephone operation.  Installation of TMA is not required until system monitoring is desired.

When used with TMA, each telephone will typically be polled to determine the health of the unit and report the following:

- Stuck push buttons

- Cut handset cord

- Microprocessor health

- Line interrupt (power)

The basic TMA package (Model 12509-037) includes a single line transceiver for polling a single telephone at a time.  With each telephone requiring approximately 90 seconds to relay its health status to TMA, the ability to poll multiple telephones simultaneously may become very important in larger systems.  A TMA expansion kit (Model 12509-036) is available and is required for each additional connected telephone line, with a maximum of eight lines allowed.  This allows a maximum of eight telephones to be polled simultaneously.  A dedicated PC is strongly recommended for TMA operation.

A dedicated telephone line per SMART Telephone is required when using TMA in its typical "polling" operation.  Although it is not recommended, SMART Telephones can share a telephone line with the understanding that if two or more telephones are put into use simultaneously, the line current could drop sufficiently to disconnect the telephone call completely.  This will depend on the line current, the length of the cable run, and the condition of the telephone cable.  When sharing a telephone line using TMA, the telephone must be scheduled to "call-in" instead of being polled by TMA.

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 be programmed to generate an auto-dial maintenance call when certain sensor events are discovered.  Access to the SMART Telephone settings is restricted through the use of the maintenance access PIN, which should be disclosed only to trained maintenance personnel.

**Existing TMA Application (pre-version 7.4.1 software)**

We strongly recommend any existing operating TMA system be upgraded to 7.4.1 (or greater).  Although the -005 series SMART telephones will function with pre-version 7.4.1 TMA software, upgrading to 7.4.1 will allow users to take advantage of any new SMART and TMA features.  Version 7.4.1 is backward compatible with the -003 series SMART telephones so there will be no interruption in the reporting operation.  Refer to the TMA User Guide, no. 42004-440, for specific programming instructions.  This manual can be found on our website at www.gai-tronics.com.

**TMA Upgrade (free)**

GAI-Tronics offers a free upgrade to customers currently utilizing a TMA system that is operating from a pre 7.4.1 version.  To take advantage of this free upgrade, please visit our website at www.gai-tronics.com:

- Click on the TMA SOFTWARE UPGRADE button on the left side of the home page.  This will take you to the upgrade landing page.

- Following the instructions on the landing page, you are instructed to click the SOFTWARE UPGRADE button.  This will prompt a request to enter a passcode.  This passcode can be obtained from your local sales representative or by contacting our Service Department at 1-800-492-1212, prompt no. 2.

- Continue to follow instructions as noted.

# Standard Operation

## Volume Control Button

The volume control button on the front panel of each telephone is used to control the handset receiver volume.  The handset volume is pre-set/pre-programmed into each telephone to provide an initial handset volume when the handset is removed from its cradle.  Each press of the button will increase the volume in 5-dB increments until the maximum volume is attained.  When the volume has reached maximum, another button press will drop the volume to its minimum level.  This is considered to be a "round robin" method of volume control.  The telephone will return to its pre-programmed volume setting when the handset is returned to its cradle.

## Receiving a Call

When the telephone rings:

1.  Lift the handset.

2.  Converse with the caller.

3.  When finished, hang up the handset.

## Placing a Call

To place a call:

1.  Lift the handset.

2.  The telephone automatically dials a pre-programmed number.

3.  Converse with the person answering the call.

4.  When finished, hang up the handset.

## Disconnecting a Call

There are several methods by which a SMART Telephone's call can be disconnected.  The disconnect methods include the following:

- **Remote disconnect of a call** – Called party transmits either a "##" or "*99" DTMF control command.

- **Automatic disconnect:**
  - All calls; loop current-drop disconnect
  - All calls; maximum call duration timeout (configurable from 1 minute to 4.5 hours)
  - All voice calls; call progress tones (i.e., busy signal/fast busy, or reorder, tone) and, when enabled, dial tone.

Refer to the "Programming" section on page 24 and to the TMA User Guide for factory defaults and available options.

# Installation

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

## Safety Guidelines

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

- Do not install telephone wiring during a lightning storm.

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

- **Install a UL Listed lightning arrestor** on any telephone installed where the telephone or telephone cable is at risk of being exposed to lightning strikes.  The lightning arrestor must be installed as close as possible to maximize the protection.  It must not be installed within the enclosure supplied with the telephone.  Please consult our Service Center at 800-492-1212 for further information.

- Do not install telephone jacks in wet locations unless the jack is specifically designed for wet locations.

- Do not touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.

## General Installation Guidelines

As previously noted, the preferred system configuration is a dedicated telephone line for each -005 SMART Telephone. This is an actual **requirement** when using TMA in its typical "polling" operation.

Although it is not recommended, it is recognized that certain system operations and interconnecting wiring require that multiple telephones share a single line. This is permissible with the understanding that if two or more telephones sharing the same line are put into use simultaneously, the line current could drop sufficiently to disconnect the call completely. Additional "line sharing" or "party line" configuration issues could include sporadic telephone operation, difficulties with programming, or premature disconnection of calls. A GAI-Tronics Model 12600-*xxx* Line Current Booster assembly may be a viable solution for improving the effects of low line current.

If line sharing is required, it is strongly recommended that all telephones on the line are the -005 SMART Telephone series. The maximum number of telephones on the line depends on operating and idle line current and the amount of time a SMART Telephone remains off hook. In this installation, each -005 SMART series telephone must be reconfigured to prevent auto answer and must be programmed to "call-in" to TMA for data collection (if TMA is being utilized).

Due to difference in circuit operation, sharing a telephone line between a -005 series SMART Telephone and a -003 series SMART Telephone is specifically not recommended. There can be many line and operational conditions in play that could make this type of installation a "hit or miss" proposition.

## High Noise Area Installation

Installing a SMART Telephone in a high noise area may require the use of an external audible or visual device for ringing notification.  Utilizing one of these devices differs from an installation utilizing a standard analog telephone.  Typical analog telephones utilize the telephone line ring voltage (90 V ac) to activate the ringer in the telephone.  Typical installation of a peripheral ring notification device for a standard analog telephone would include connecting a ring relay across the telephone line and using it to activate the notification device.

Each SMART Telephone, however, is factory programmed for auto answer.  In this mode, the SMART Telephone utilizes the telephone line ring voltage for only a fraction of a second to auto answer and activate its own internal circuitry.  The SMART Telephone then creates its own ringing audible signal, no longer requiring the line ring voltage.  If an external device is required for ringing notification in a SMART Telephone installation, it should be connected to one of the SMART Telephone's two external outputs.  One of these outputs can be programmed to "follow the ringer" and provide opening and closing with a standard ring cycle.  This eliminates the need for a ring relay and allows a standard bell or strobe/light to be used for notification.  (An interposing relay may be required depending on the device's current requirement.)

**NOTE:**  If multiple -005 SMART series telephones are connected to a single line and are configured not to auto answer, a standard analog telephone application now exists.  This means that an external ringing notification would require the installation of a ring relay device as previously mentioned for typical analog telephone operation.  Refer to the "Auto-answer Configuration" section on page 19 for details on disabling the auto-answer function.

## Security Hardware

Models 227-005 and 277-005 are vandal-resistant, with the front panel for each telephone attached to its enclosure with security screws.  A GAI-Tronics Model 233-001 Security Screwdriver or Torx T-25 security head tip (sold separately) is recommended for installing the security screws.  Model 247-005 and 257-005 Telephones' front panels are attached with standard Phillips head screws.

## Conduit Installation Details (Applicable to Models 247-005 and 257-005)

GAI-Tronics recommends installing telephone lines in conduit to protect against accidental damage and vandalism.  To prevent moisture from entering the enclosure, we strongly recommend the following:

- Conduit should enter the enclosure from the bottom.

- If entered from the top, the conduit <u>must</u> be internally sealed to prevent moisture ingress.

- Sealed fittings should be installed at all cable entry points.

- Silicone sealant or equivalent should be applied around and inside all conduit entries.
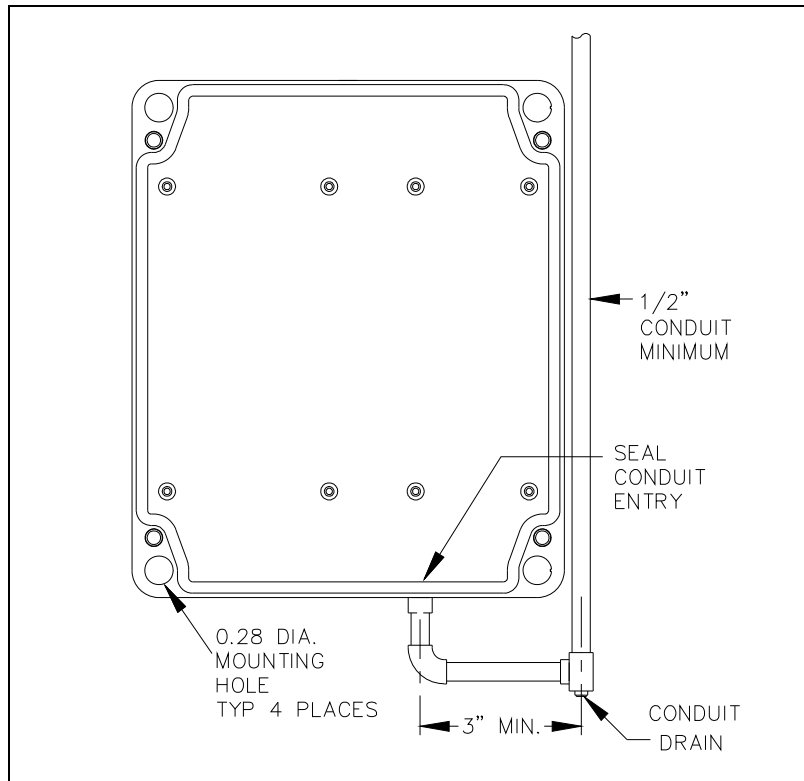
Refer to Figure 1 and Figure 2.

Figure 1.  Bottom entry conduit installation details (RECOMMENDED for non-metallic enclosures)
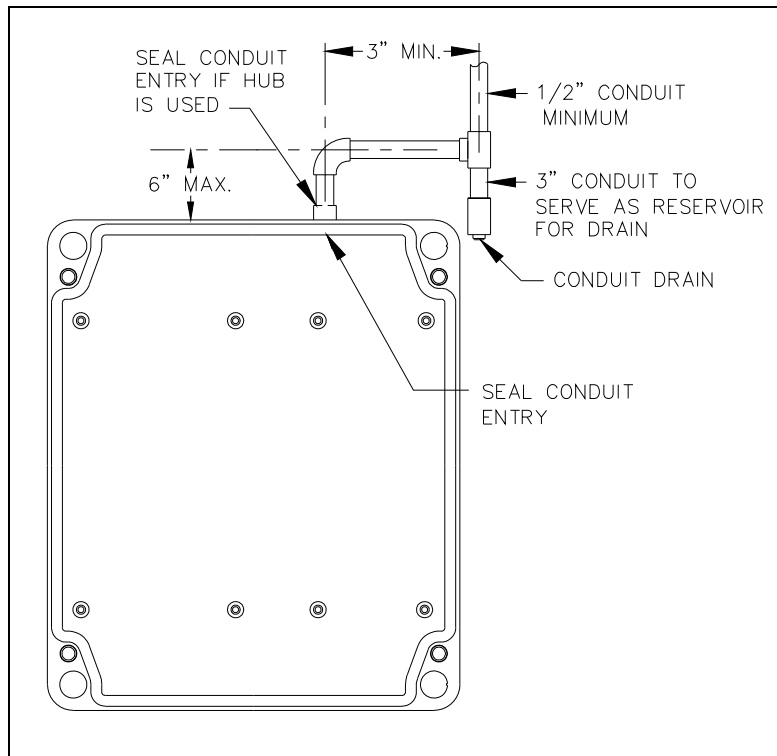


Figure 2.  Top entry conduit installation details (NOT RECOMMENDED)

## Model 227-005

The mounting and wiring instructions for the Model 227-005 SMART Telephone are as follows:
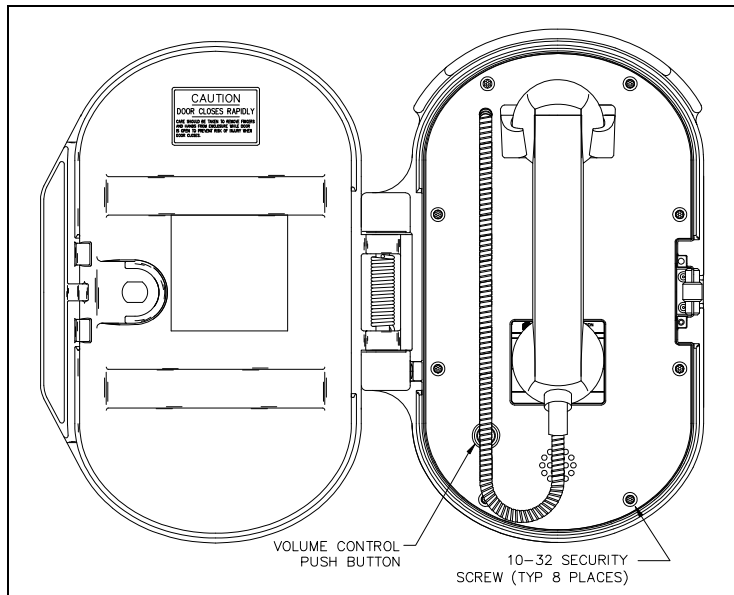


Figure 3.  Model 227-005 SMART Telephone with spring loaded door in the open position

1.  Remove the eight security screws from the front panel.  Remove the front panel and set aside.
    **NOTE:**  There is a 7-foot half-modular telephone cord attached to the PCBA on the rear.

2.  There are eight mounting holes in the back of the enclosure in two 4-hole patterns.  Determine which hole pattern will be used for mounting. See Figure 5.

    - For best results, use the 7.875 × 4.0-inch hole pattern for mounting to a wall (outside pattern).

    - Use the 5.25 × 4.0-inch hole pattern when using the Model 232-001 Pole Mounting Kit (inside pattern).

3.  Insert four hole plugs (provided) in the unused holes.

4.  Position the enclosure on the mounting surface and secure it with four fasteners.

    - The holes in the telephone enclosure accept 3/8-inch screws or bolts.

    - The Model 232-001 Pole Mounting Kit includes four
      3/8-16 × 1-inch shoulder bolts with Teflon seal washers.

    ⚠ **NOTE** ⚠  Use only the round head, hexagon head, or pan head screws that are provided.
    **Do not** use screws designed to be countersunk for mounting the enclosure.

5.  Install a conduit fitting in one of the 1/2-inch NPT conduit entrances provided at both the top and bottom of the unit, and insert the conduit into the fitting.  (The bottom location is preferred.  See Figure 4.)  Plug the unused access hole using the 3/8-inch Allen drive plug provided.

    **NOTE: Use silicone sealant or equivalent around and inside all conduit entries.**
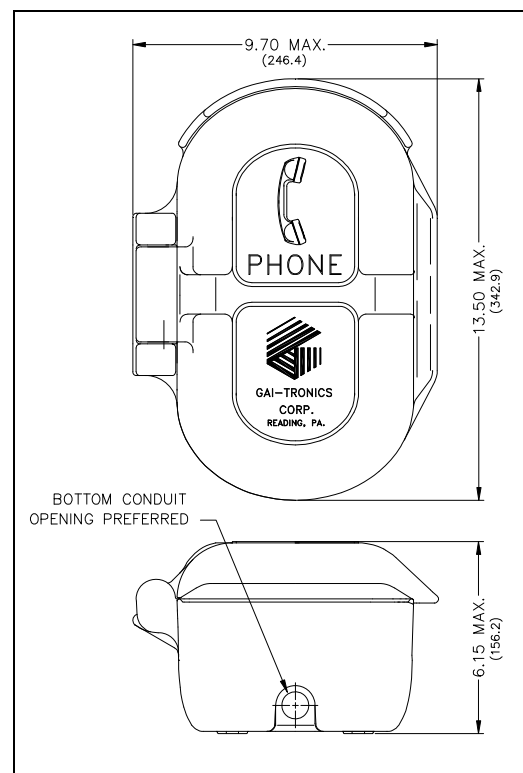


Figure 4.  Model 227-005 Outline

6.  Pull the telephone line through the conduit and into the enclosure.  Connect the telephone line to the customer-supplied telephone line surge suppressor (if applicable) and modular jack (USOC RJ11 or CA11A) provided with the unit.
    **NOTE:**  The modular jack may be mounted inside the telephone.  Telephone line connections directly to TB1 are acceptable.

7.  Allow the telephone a minimum of 35 seconds to initialize.

8.  Using the "Setup" section of this manual,

    • Configure the hardware as required.  Refer to the "Hardware Configuration" section on page 19 for details.

    • Adjust the audio levels, if necessary.  Refer to Figure 13 for Receiver Volume and Microphone Sensitivity potentiometer locations.

9.  Verify operation by calling to and from another telephone.



Figure 5.  Model 227-005 Mounting Details

10. Replace the front panel assembly, and secure using the eight front panel security screws.

## Model 247-005

1.  Remove the four screws from the front panel.  Remove the front panel and set aside.
    **NOTE:**  There is a 7-foot half-modular telephone cord attached to the PCBA on the rear.
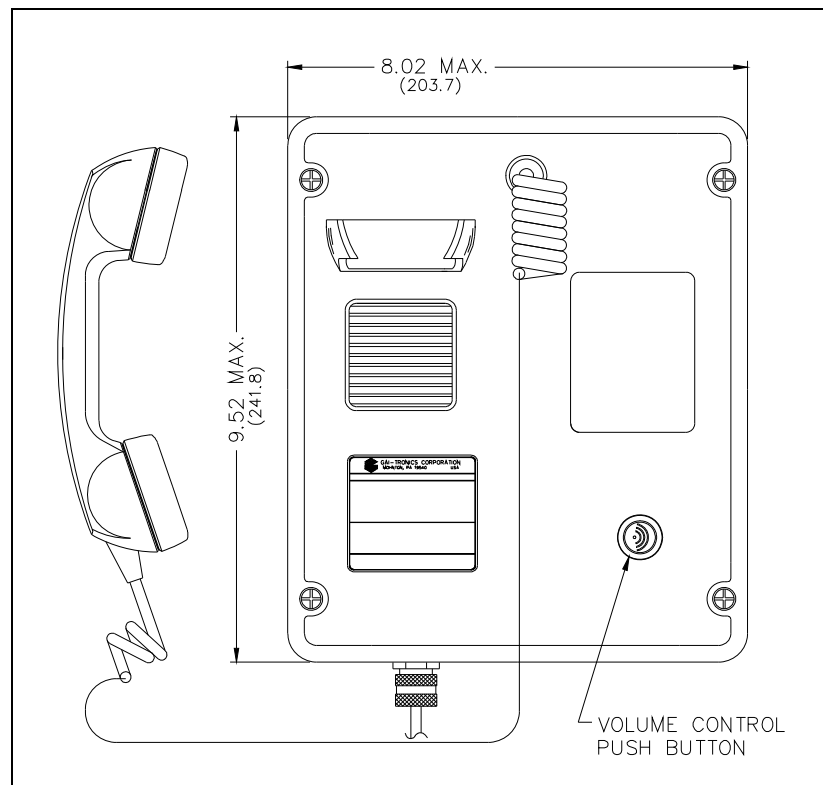


Figure 6.  Model 247-005 SMART Auto-Dial Telephone

2.  There are four mounting holes in rear enclosure.  Mount the enclosure to the wall using either four
    ¼-20 machine screws with washers and nuts or four #14 wood screws of the appropriate length,
    depending on the mounting surface.

3.  Drill a 0.688-diameter hole at either drill spot on the bottom of the rear enclosure, and attach the
    gland bushing.

4.  Fish the free end of the telephone cord through the gland bushing.

5.  Connect the telephone line to the customer-supplied telephone line surge suppressor (if applicable)
    and modular jack (USOC RJ11 or CA11A) provided with the unit.
    **NOTE:**  The modular jack may be mounted inside the telephone.  Telephone line connections directly
    to TB1 are acceptable.

6.  Allow the telephone a minimum of 35 seconds to initialize.

7.  Using the "Setup" section of this manual,

    - Configure the hardware as required.  Refer to the "Hardware Configuration" section on page 19 for details.

    - Adjust the audio levels, if necessary.  Refer to Figure 13 for Receiver Volume and Microphone Sensitivity potentiometer locations.

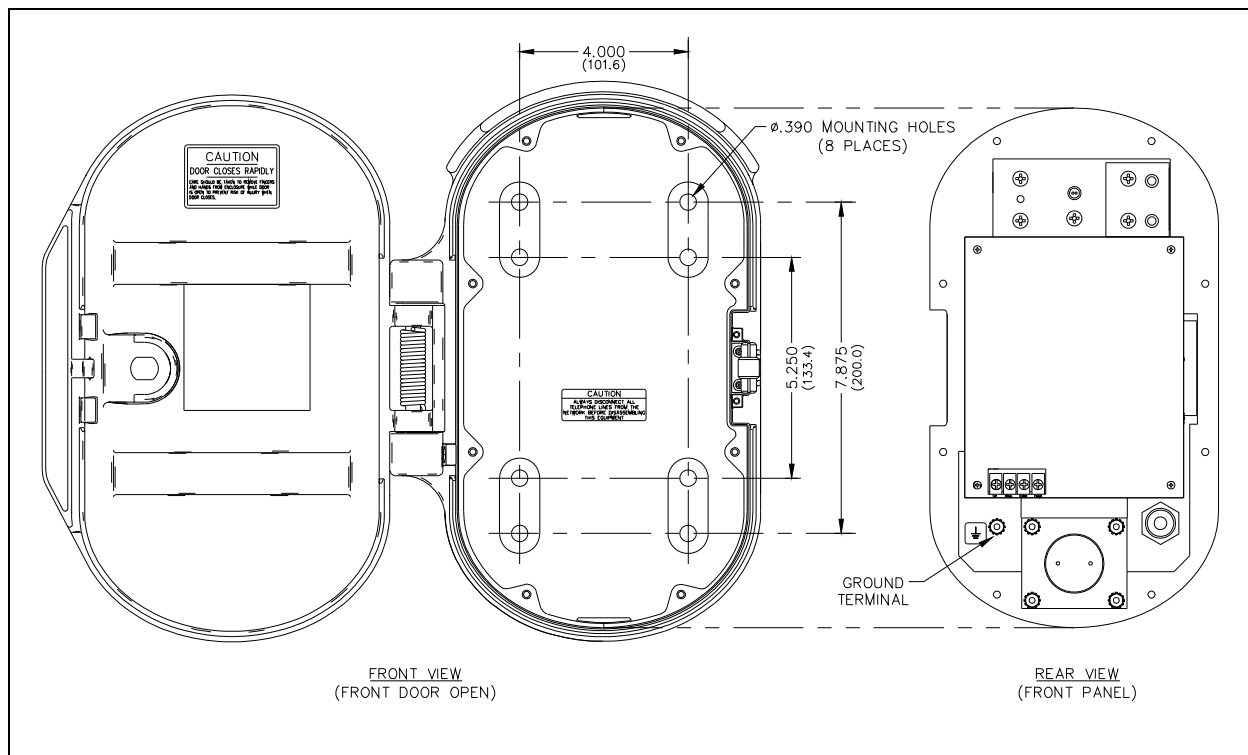8.  Verify operation by calling to and from another telephone.

9.  Complete the installation by attaching the front panel assembly to the rear enclosure using the four front panel screws, 10–12 in-lbs. of torque recommended.
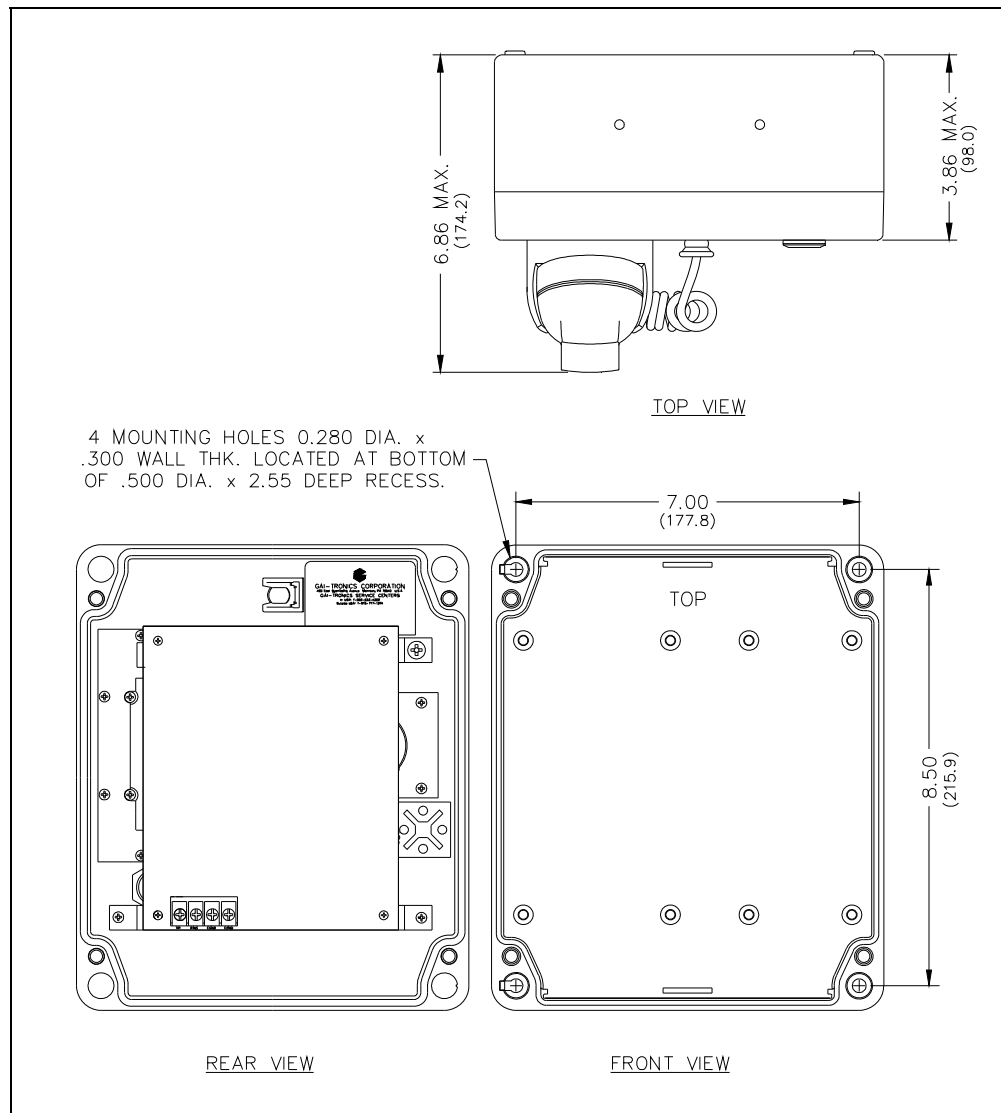


Figure 7.  Model 247-005 Mounting Details

## Model 257-005

1.  Open the front door and remove the four outer screws from the mid-section.  Carefully pull the enclosure apart until encountering a slight resistance on the left side.
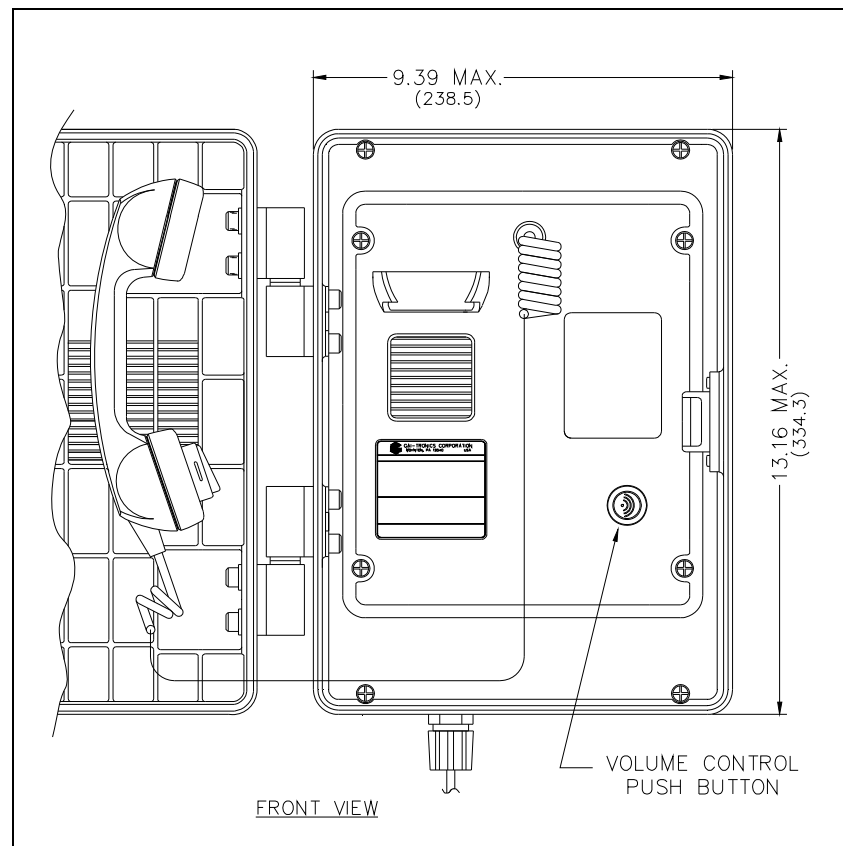


Figure 8.  Model 257-005 SMART Auto-Dial Telephone Outline
(Front door open)

2.  Pull on the left side of the enclosure until the hinge plugs pull loose to separate the front and rear halves.  Set the front half of the enclosure aside.

3.  There are four mounting holes in the rear enclosure.  Mount the enclosure on the wall using four ¼-20 machine screws with nuts and washers or #14 wood screws of appropriate length for the mounting surface.

4.  Drill a 0.688-diameter hole at either drill spot on the bottom of the rear enclosure, and attach the gland bushing.

5.  Reinsert the hinge pins to attach the front half of the enclosure.  Fish the free end of the telephone cord through the gland bushing.

6.  Connect the telephone line to the customer-supplied telephone line surge suppressor (if applicable) and modular jack (USOC RJ11 or CA11A) provided with the unit.
    **NOTE:**  The modular jack may be mounted inside the telephone.  Telephone line connections directly to TB1 are acceptable.

7.  Allow the telephone a minimum of 35 seconds to initialize.

8.  Using the "Setup" section of this manual,

    - Configure the hardware as required.  Refer to the "Hardware Configuration" section on page 19 for details.

    - Adjust the audio levels, if necessary.  Refer to Figure 13 for Receiver Volume and Microphone Sensitivity potentiometer locations.

9.  Verify operation by calling to and from another telephone.

10. Complete the installation by attaching the mid-section using the four panel screws, 10–12 in-lbs. of torque recommended.
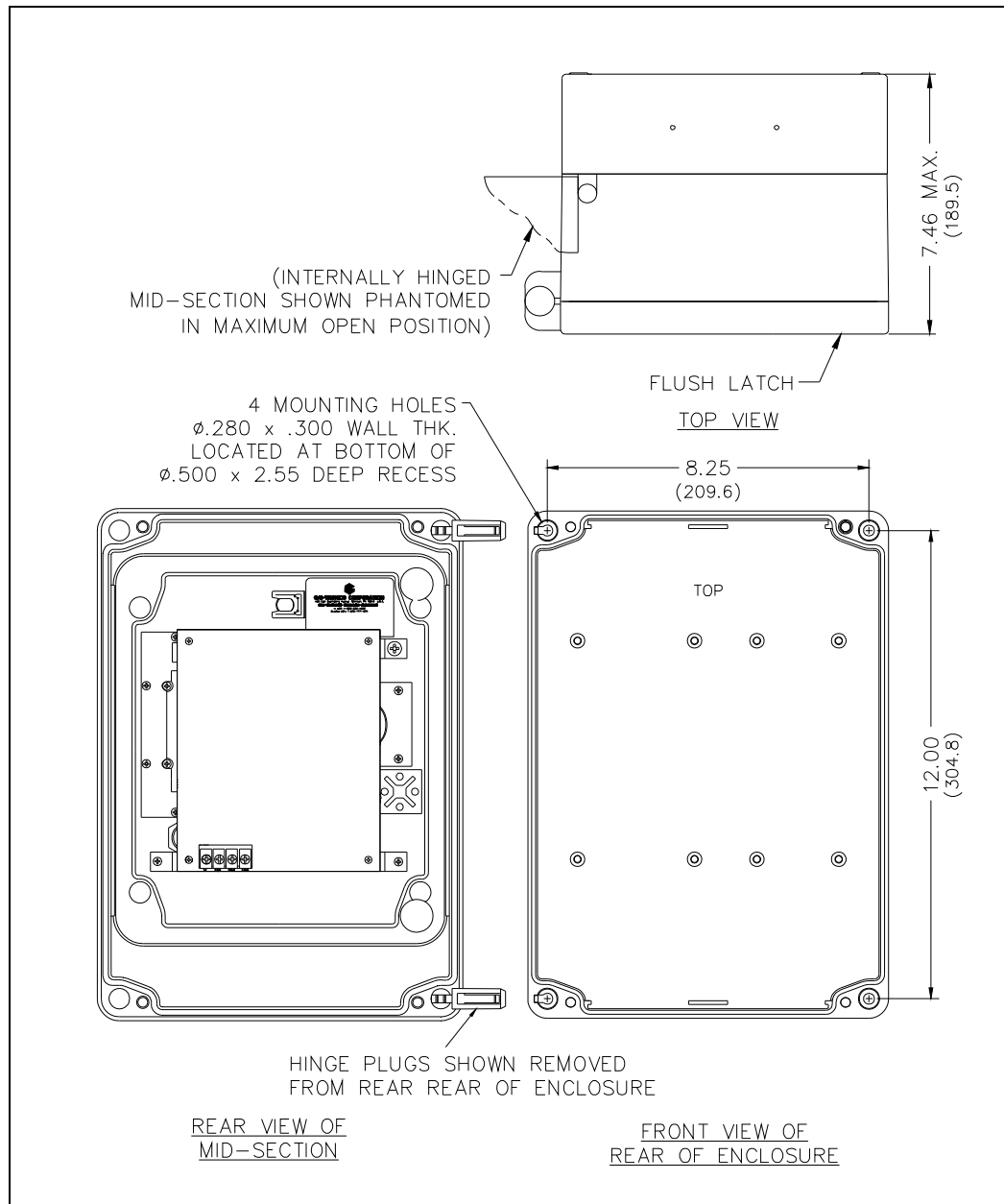


Figure 9.  Model 257-005 Mounting Details

## Model 277-005
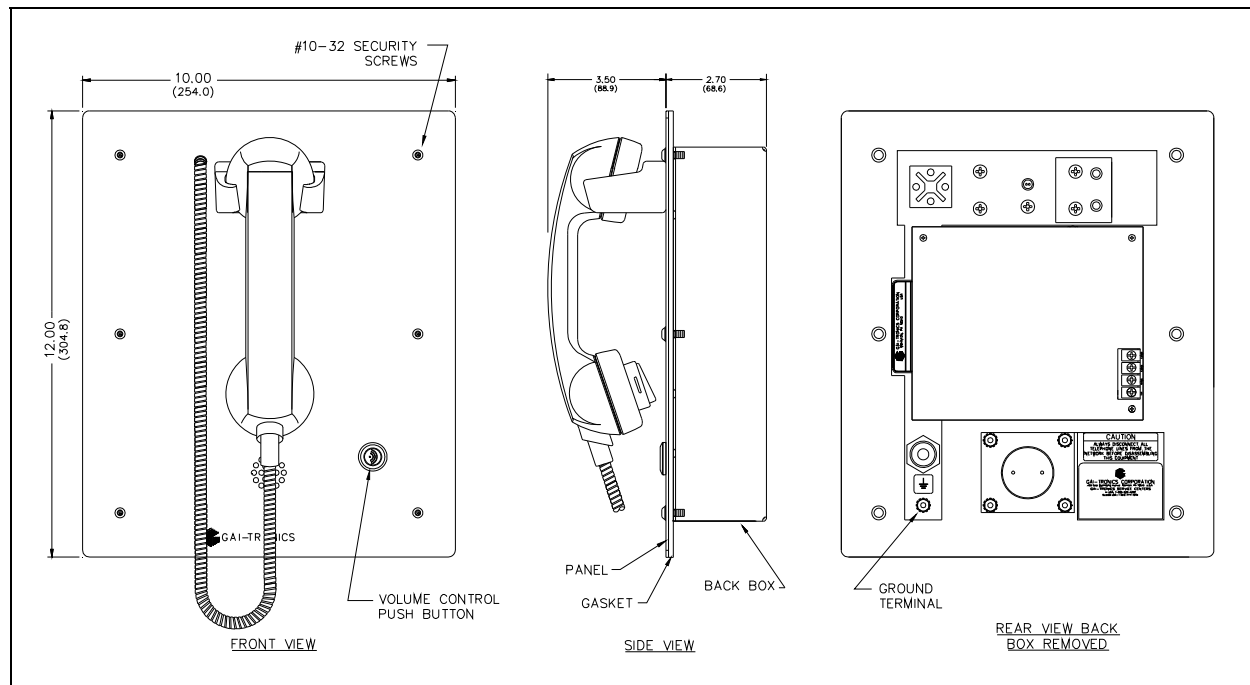


Figure 10.  Model 277-005 Outline Drawing

**Stanchion or Flush-mount Applications**

1.  When mounting in a GAI-Tronics Model 234 Series Stanchion or for flush-mount installations, the supplied back box must be used to mount the Model 277-005 Telephone.  Mount the back box to the structure using the appropriate hardware.  Refer to Figure 11 cutout dimensions.

2.  If mounted outdoors, install the telephone line suppressor (customer-supplied) on the telephone line.

3.  Remove the tapered plug from either of the cable entry holes in the back box, and install the telephone line and cable fitting.
    **NOTE:**  Telephone line connections directly to TB1 are acceptable.

4.  If using the modular jack, remove the cover, and connect the telephone line's tip (+) wire to the green wire on the modular jack, and the ring (−) wire to the red wire on the modular jack.  Replace the modular jack cover.

5.  Connect the telephone's modular plug to a USOC RJ11 or CA11A (Canada) modular connector or (if applicable) the telephone line suppressor.  (An inline coupler is provided for use, if necessary.)

6.  Allow the telephone a minimum of 35 seconds to initialize.

7.  Using the "Setup" section of this manual,

    - Configure the hardware as required.  Refer to the "Hardware Configuration" section on page 19 for details.
    - Adjust the audio levels, if necessary.  Refer to Figure 13 for Receiver Volume and Microphone Sensitivity potentiometer locations.

8.  Verify operation by calling to and from another phone.

9.  Complete the installation by attaching the front panel assembly to the rear enclosure mounting flanges using the six supplied #10-32 security screws and washers, 10–12 in-lbs. of torque recommended.

### Surface-Mount Applications

**NOTE:**  The back box is not required for use with the Model 236 Series or Model 238-001 Surface-Mount Enclosure and should be removed.

1.  Drill or punch conduit entries.

    ⚠ **WARNING** ⚠  **To prevent accidentally damaging equipment, drill all holes before mounting the telephone.**

2.  Use silicone sealant or equivalent around the telephone gasket and the mounting surface for an effective perimeter seal.  This is particularly important if the mounting surface is uneven.

3.  Install the telephone line suppressor (customer-supplied) on the telephone line, if applicable.

4.  If using the modular jack, remove the cover, and connect the telephone line's tip (+) wire to the green wire on the modular jack, and the ring (−) wire to the red wire on the modular jack.  Replace the modular jack cover.

5.  Connect the telephone's modular plug to a USOC RJ11 or CA11A (Canada) modular connector or (if applicable) the telephone line suppressor.  (An inline coupler is provided for use, if necessary.)

6.  Allow the telephone a minimum of 35 seconds to initialize.

7.  Using the "Setup" section of this manual,

    - Configure the hardware as required.  Refer to the "Hardware Configuration" section on page 19 for details.
    - Adjust the audio levels, if necessary.  Refer to Figure 13 for Receiver Volume and Microphone Sensitivity potentiometer locations.

8.  Verify operation by calling to and from another phone.

9.  Complete the installation by attaching the front panel assembly to the mounting flanges of the Model 236 Series or 238-001 Surface-Mount Enclosure using the six supplied #10-32 security screws and washers, 10–12 in-lbs. of torque recommended.
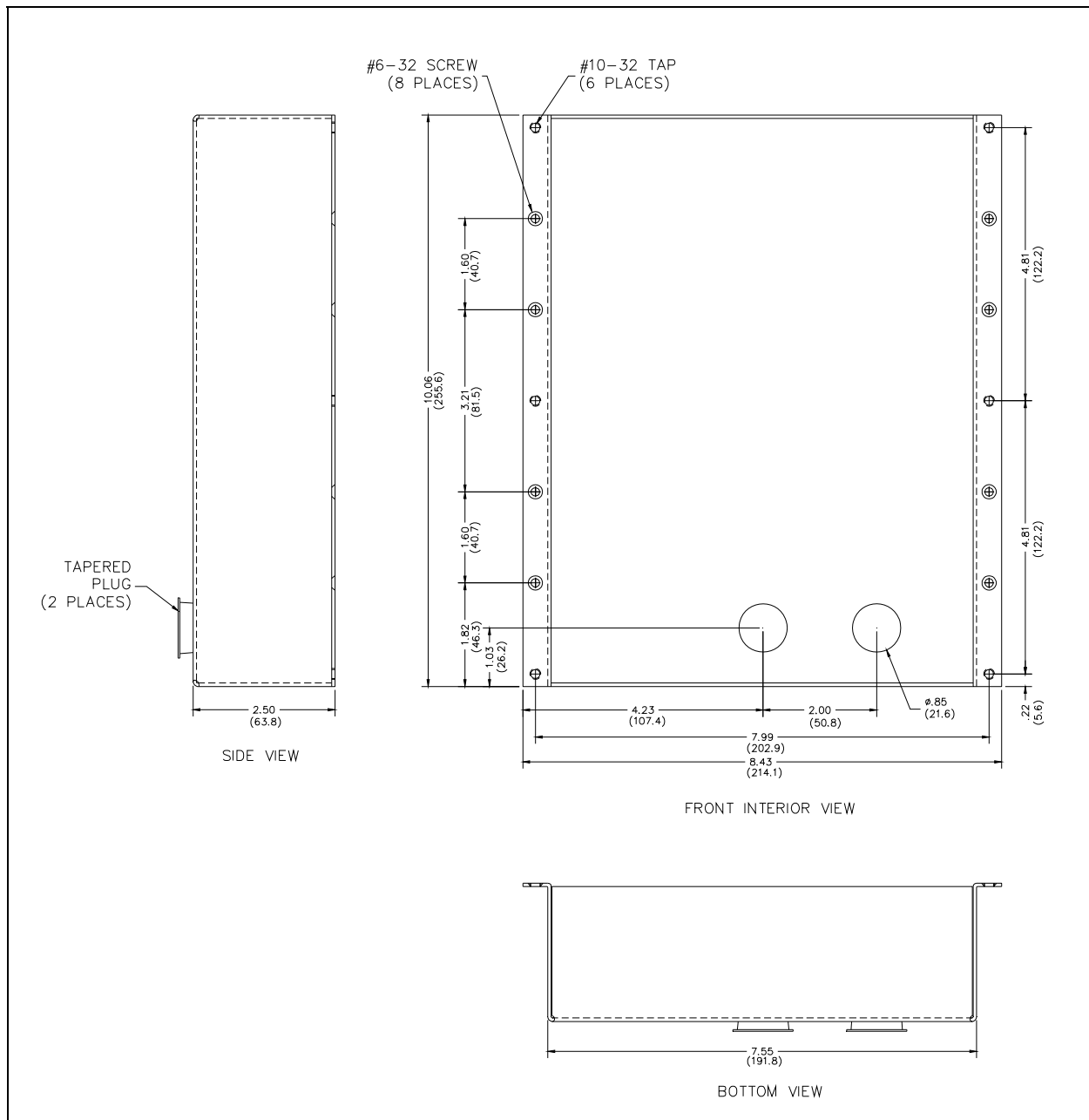
Figure 11.  Model 277-005 Mounting Details

## External Power for Lower Operating Temperatures

The Model 40404-045 Plug-In Power Supply is available (sold separately) to ensure stable operation between −20º C and −40º C.  The 40404-045 requires 120 V ac input and provides a 5 V dc output to the unit's amplifier circuits.  The 40404-045 is provided with a connectorized, 4-foot power cable that plugs into P17 on the telephone PCBA.

# Setup

## Hardware Configuration

The hardware configuration options are explained in detail in the following sections and the necessary jumper settings are identified to enable or disable each option.  We recommend reading the following sections, recording the desired parameters, and then making the necessary changes.  We also recommend that you make a record of your settings.  The following options are controlled by specific hardware configurations.  See Figure 13 on page 23 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 phone via polling with SMART operation enabled.  When the Auto-answer feature is enabled, the phone automatically answers the call and attempts to communicate with TMA.  If the caller is not TMA, the telephone automatically transitions to a standard two-way communication.

*Enable*: J14 jumper in position EN.

*Disable*: J14 jumper in position DIS (Use this setting only if "call-in" data collection operation is desired.)

**NOTE:**  The Auto-answer feature must be enabled to allow the GAI-Tronics' Telephone Management Application PC to contact the telephone or to allow remote Touch Tone programming.

### 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 regardless of tip and ring polarity.  With the polarized setting, the telephone only operates with the telephone line's positive terminal connected to the tip.  Use the Polarity Sensitive setting to allow a line voltage reversal disconnect signal to disconnect the call.

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

*Polarity Sensitive*: J6 jumper on 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*: J17 jumper in position LO.

*High Gain Selected*: J17 jumper in position HI.

### Password Enable Configuration

*Factory Setting*: Password Enabled (position EN)

Jumper J9 is required to be in the factory set position.  Do not remove the jumper from the PCBA.

**Command Select Configuration**

*Factory Setting*: Auto

Jumper J20 is required to be in the factory set position.  Do not remove the jumper from the PCBA.

**AUX2 Input Configuration**

*Factory Setting*: AUX2

Jumper J12 selects an option to use the AUX2 input (TB7) for the cradle hookswitch connection.  This alternate hookswitch wiring to AUX2 would be used in place of the normal hookswitch connection to clips E3–E4.  This is convenient if the 69577 PCBA is used to replace a 69411 PCBA in a 2*xx*-003 SMART Telephone, or any custom SMART Handset Telephone.

*Hookswitch connects to clips E3–E4:*  J12 in position AUX2.

*Hookswitch connects to AUX2*:  J12 in position HKSW.

**Low-Power Mode Configuration**

*Factory Setting*: Low-Power Mode Disabled

For some installations in which only minimal loop current is available, the performance of the telephone may be improved by enabling this feature.  Symptoms of minimal loop current may include low speaker volume and/or momentary muting of audio.  In the majority of applications, however, the low-power mode should be disabled.  The low-power mode is enabled 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.

**Hardware Settings**

Table 1.  Hardware Settings Table

| Function | Default Settings | | User Settings | |
|---|---|---|---|---|
| | Setting | Jumper/Position | Setting | Jumper/Position |
| Auto-answer | Enabled | J14/EN | | |
| Password Protection | Enabled | J9/EN | Not Applicable | |
| Line Polarity | Non-polarized | J6/NON | | |
| Command Select | Auto | J20/AUTO | Not Applicable | |
| DTMF Gain Select | Low Gain | J17/LO | | |
| AUX2 input is available for other functions (Hookswitch wires to clips E3-E4) | AUX2 | J12/AUX2 | | |
| Low-Power Mode | Disabled | J21, J22, J23 not installed | | |

**Handset Receiver Volume Adjustment**

The VOLUME push button on the front panel allows the user to select one of five preset volume levels.  At its factory default setting, the volume level at the start of a call will be the lowest of the five preset levels.  Each momentary press of the VOLUME button bumps the level up one step; from the topmost level, a button press resets the volume to its lowest level.  This provides for an adjustment range of more than 20 dB SPL.

The group of five available volume levels can be shifted with the handset receiver potentiometer R89.  Refer to Figure 13.  If adjustment is desired, adjust R89 while the ambient noise level is low (and prior to securing the front panel assembly).

After R89 is set to a suitable level (when the surrounding noise is low), one additional setting is available from the TMA location.  In the "Behavior" section of the Phone Management Form, the setting "Initial Handset Volume" determines which of the five preset levels the telephone selects at the start of a call.

The factory setting is 0, the lowest receiver audio level.  Changing this "Initial Handset Volume" setting may be useful if the ambient noise near the telephone is typically high.  By choosing one of the higher initial levels, the telephone user may not need to bump the level up for every call made since the audio level will already be at some comfortable higher level.

**Handset Microphone Sensitivity Adjust**

The handset microphone sensitivity can be changed with the Mic Vol potentiometer, R88.  Refer to Figure 13.  If adjustment is desired, adjust R88 prior to securing the front panel assembly.

## 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 $mA_{RMS}$.  TB2 (OUT1) and TB5 (OUT4) on the SMART Telephone PCBA provide the connections for the auxiliary outputs.  Refer to Figure 13 for the location of TB2 and TB5.

The auxiliary output OUT1 (TB2) allows for control of external electric devices such as a ringing indicator lamp.  This isolated contact output activates while the telephone sounds its ringer at the start of an incoming call and will extinguish when the handset is lifted from its cradle (call answered).

The auxiliary output OUT4 (TB5) can be remotely controlled via an appropriate DTMF command.  This remote control output could be used to activate or control a door latch, gate relay solenoid, alarm, etc. from the called party location.

Auxiliary Control Example: Output 4, Used for Gate Entry

A Model 227-005 SMART Telephone is installed at the entrance to a gated/secure community.  A visitor or delivery person approaches the gate and places a call to the security office.  Upon verification of approved entry, the security guard presses the pre-programmed, DTMF "open gate" command.  This command causes the SMART telephone's OUT4 relay contact to close for a pre-programmed amount of time then release.  The SMART Telephone will acknowledge acceptance of this activation command with a short beep.  If the beep is not initially received, retry the command.

Since the contact is rated at 125 mA, an interposing relay will be required that, when energized, will switch a higher voltage to a gate solenoid and cause the gate to open.  Refer to Figure 12 below.
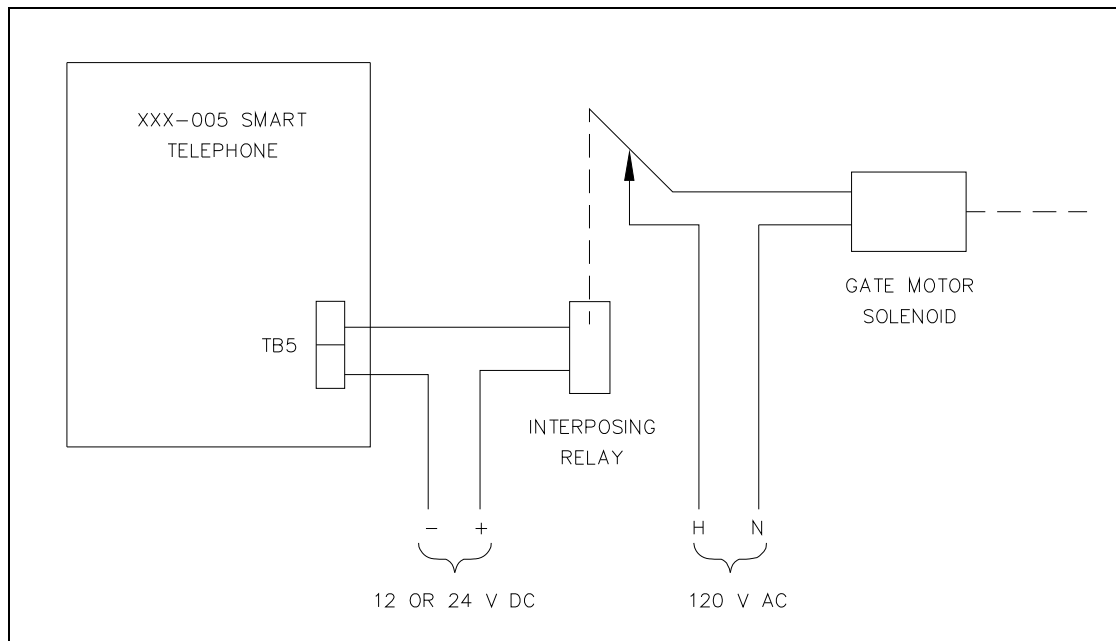


Figure 12.  Example of SMART Telephone Installed for Gate Operation

The output pulse duration (closure) and the DTMF code used as the "open gate" command are user programmable.  Refer to the "Phone Properties / Behavior" section in TMA.
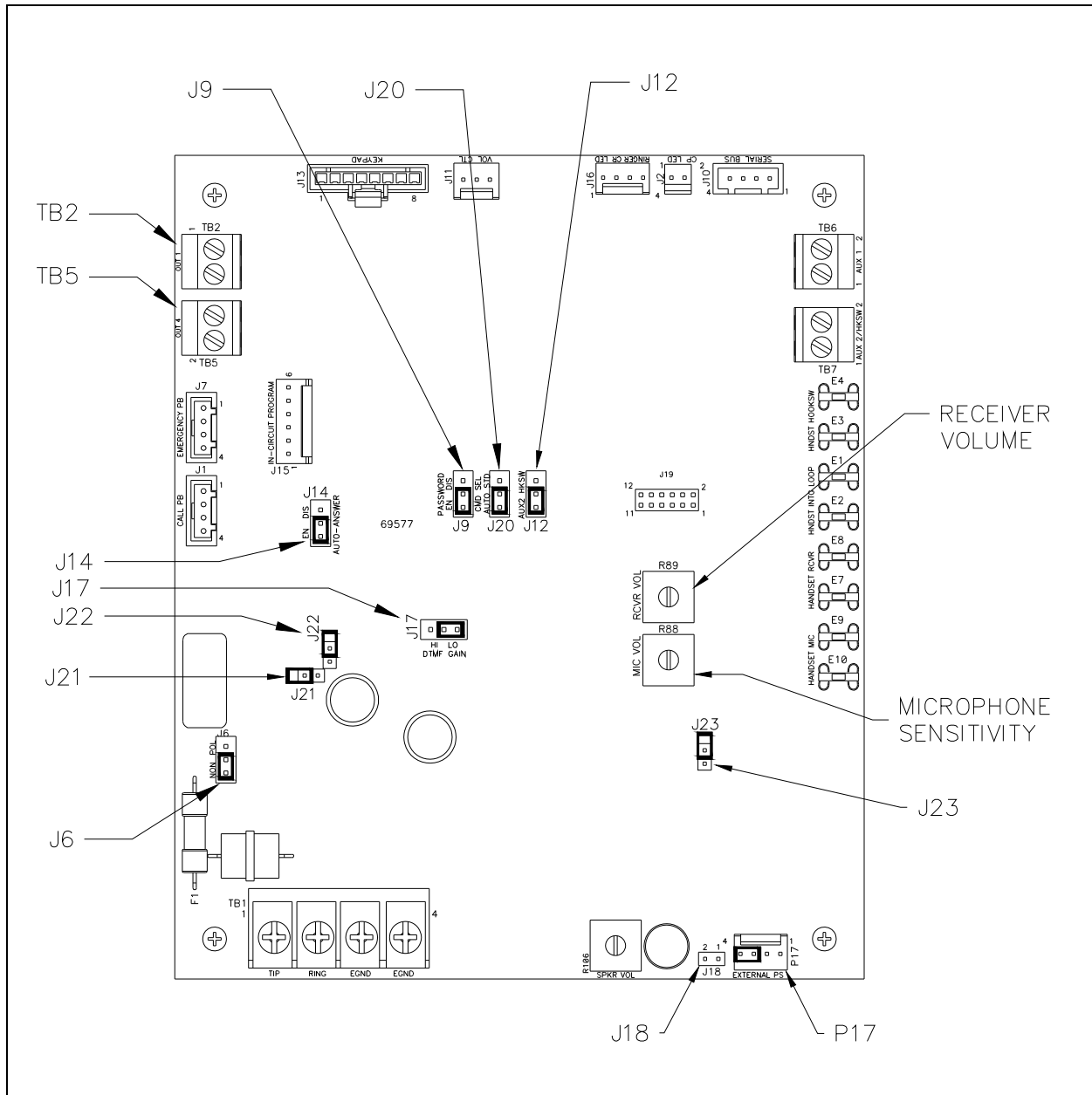
Figure 13.  SMART Telephone PCBA

# Programming

All SMART Telephone models are programmable. The telephone settings are initially programmed during manufacturing and testing. After the SMART Telephone is installed, you have the option of changing the default settings. This manual provides instructions for programming basic features needed to initially set up the telephone from another touch-tone telephone.

More advanced programming requires a PC and the TMA software. For programming using TMA, refer to the user guide included with the software, or contact the GAI-Tronics Field Service Department.

### ⚠ NOTE ⚠

Use a handset telephone exclusively when programming the SMART Telephone remotely. If a speakerphone is used for programming background noise could lead to the incorrect settings. (Cellular telephone is not recommended.)

### Enter the Programming Mode

Read the entire "Programming" section and carefully plan your programming before beginning the process. Write down the key sequence from the *Command* column of Table 2, Basic Programming Commands, for the features that you need. Having your programming information written down allows you to enter the key sequence at a steady pace.

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

1. Call the SMART Telephone to be programmed. (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 the 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** will allow for 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. If access is denied, repeat step 5 to again request access.

6. Complete the desired programming. Refer to the "Basic Programming" 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**

The following programming command can be entered from any touch-tone telephone. Acceptance of a data transfer command is indicated via a return code transmitted as an audible DTMF tone.

**Auto-dial Memory**

When the handset is lifted from the cradle, the SMART Telephone dials a pre-programmed telephone number (the primary number). If the call cannot connect (line busy, no answer), the phone will redial using the first backup (roll-over) number. If again the call cannot connect, the phone will redial using the second backup (roll-over) number. This sequence will continue until either the call is answered, or the programmed number of retries is reached.

Use the **\*1** command to program these three (or six) auto-dial numbers. The three auto-dial telephone numbers are labeled as 1 (primary), 2 (first roll-over), and 3 (second roll-over) and are shown as Cradle Hookswitch: Bank 1 in TMA. You can program these for three different numbers, or set them to the same telephone number.

Each auto-dial memory storage location accommodates up to 24 characters.

To enter the auto-dial number into memory storage, or to change the number in storage, enter **\*11<N><CHAR>#**

| | |
|---|---|
| **\*1** | Data transfer command |
| **1<N>** | Auto-dial memory location, N = 1, 2, or 3 |
| **<CHAR>** | Telephone number to be stored in memory location (up to 24). Valid entries are 0–9 and the following two-digit codes: \*1 provides a 0.6-second pause in the dialing sequence; \*2 provides a DTMF #; and \*\* provides a DTMF \*. |
| **#** | End-of-string indicator |

The command \*1115551212#, for example, sets the primary number to 555-1212.

After each auto-dial memory storage location is successfully programmed, the phone returns a system-generated DTMF check-digit.

If the phone is installed on a ring down telephone line, clear the first auto-dial memory using the command \*111#.

**Call Time-out**

The call time-out feature, which is used to limit the duration of calls, can be set between 1 minute and 4.5 hours.  The time limit is set by entering a number from 120 to 32400.

This number represents the number of 0.5-second increments of duration.  Entering 0 results in a call time-out of 4.5 hours.

Enter **\*37<120~32400>#** to assign a time limit, or change an 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 |

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

5 minutes $\times$ 120 = **600**

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

Table 2.  Basic Programming Commands

| Command | Return | Description | Default Setting |
|---|---|---|---|
| \*37<120~32400># | c | Write Call Time-out (120–32400 $\times$ ½ sec, 0 sets to maximum) | 10 minutes |

'c' in the above return fields is the success tone (DTMF check-digit).

# Maintenance

## Service

If your SMART Telephone requires service, contact your GAI-Tronics Regional Service Center for technical support or to obtain a return authorization number (RA#).  Equipment returned to GAI-Tronics should be shipped prepaid with a return authorization number marked on the carton.  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.

## Preventive Maintenance for Model 277-005

Stainless steel does not typically require maintenance to prevent corrosion from occurring.  Different installation locations may require more regular maintenance than others, depending on the environment and exposure to airborne contaminants.  The following maintenance steps should be performed on a regular basis or when corrosion is first noticed on your Model 277-005.

### Cleaning

- For general cleaning, wipe the surface with a cleanser or a cleanser and water mixture.  Any cleanser that is safe for glass is usually safe for stainless steel.  Wipe dry.

- If corrosion or rusting is noticed, remove with a non-abrasive commercial cleanser and water.  Rub stained areas in the same direction as the existing grain.  Stubborn stains may be removed with a magnesium oxide, ammonia, and water paste.  Wipe clean with water rinse and dry.

### Prevention

Automotive wax provides the best results in preventing corrosion on stainless steel.  Simply apply wax, let dry to a haze, and buff to a shine with a clean dry cloth.  This application should protect the telephone surface for many months as it will allow natural reformation of the chromium oxide layer.

**Do NOT use steel wool, sandpaper, mineral acids, bleaches, or chlorine cleansers on the stainless surface.**

# Specifications

TMA Compatibility profile type ...................................................................................... Type A Handset

## Electrical

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

Operation ...................................................................................................................................... Loop start

Volume control ......................................... Five steps, in accord with 704.3, Volume Control Telephones
(ADA-ABA Guidelines, July 2004)

Auxiliary outputs (isolated solid state switch)............................................................. 48 V dc @ 125 mA
28 $V_{RMS}$ @ 80 $mA_{RMS}$

## Mechanical

Operating temperature range (refer to page 18).................................. −4º F to +140º F (−20º C to +60º C)

Relative humidity................................................................................................... to 95%, no condensation

### Model 227-005

Construction

    Enclosure.................................................... Thick-walled cast aluminum with protective gray coating

    Panel ........................................................................................ 0.125-inch brushed aluminum

Handset/cord ....................................................... G-style with 19-inch armored cord and internal lanyard

Dimensions ......................................................................................... 13.50 H × 9.70 W × 6.15 D inches

Mounting................................................................................................ Eight 0.39-inch diameter holes

Weight.......................................................................................................................................... 14.5 lbs.

### Model 247-005

Construction.............................................................................. High impact, glass-reinforced polyester

Handset/cord ........................................................... 6-foot Hytrel® cord with noise-canceling microphone

Dimensions .......................................................................................... 9.50 H × 8.00 W × 6.90 D inches

Mounting............................................................................................... Four 0.28-inch diameter holes

Weight.............................................................................................................................................. 4.8 lbs.

### Model 257-005

Construction.............................................................................. High impact, glass-reinforced polyester

Handset/cord ........................................................... 6-foot Hytrel® cord with noise-canceling microphone

Dimensions ......................................................................................... 13.20 H × 9.40 W × 7.40 D inches

Mounting.............................................................................................. Four 0.28-inch diameter holes

Weight............................................................................................................................................10.0 lbs.

**Model 277-005**

Construction

    Front panel......................................................... 14-gauge (0.075 inch) type 304 brushed stainless steel

    Back box......................................... 16-gauge (0.060) cold-rolled steel with black polyurethane finish

Handset/cord .......................................................... G-style with 29-inch armored cord and internal lanyard

Dimensions

    Front panel...................................................................... 12.00 H × 10.00 W inches (305 × 254 mm)

    Back box (overall) ..................................... 10.06 H × 8.43 W × 2.50 D inches (256 × 214 × 63.5 mm)

    Cutout for mounting back box............................................ 10.13 H × 7.63 W inches (257 × 194 mm)

Weight.......................................................................................................................... 7.0 lbs. (3.18 kg)

## Approvals

Safety of Information Technology Equipment ...................................................... UL 60950 & CSA 60950

Enclosures for Electrical Equipment........................................................................................................ 3R

Model 247-005: Indoor use only

## 47 CFR Part 68

Certification Number ........................................................................................... US: ADGTE05BGTC2010

Ringer Equivalence Number.................................................................................................................... .5B

Network connection (USOC).............................................................................................................. RJ11

## IC Information (Canada)

IC Certification Number ...................................................................................................... 822B-GTC 2011

Ringer Equivalence Number.................................................................................................................... .5B

Connection Method.......................................................................................................................... CA11A

## User Instructions (USA)

This equipment complies with Part 68 of the FCC rules and the requirements adopted by the ACTA. On this equipment is a label that contains, among other information, a product identifier in the format US:AAAEQ##TXXXX. If requested, this number must be provided to the telephone company.

A plug and jack used to connect this equipment to the premises wiring and telephone network must comply with the applicable FCC Part 68 rules and requirements adopted by the ACTA. A compliant telephone cord and modular plug is provided with this product. It is designed to be connected to a compatible modular jack that is also compliant. See installation instructions for details.

The REN is used to determine the number of devices that may be connected to a telephone line. Excessive RENs on the telephone line may result in the devices not ringing in response to an incoming call. In most but not all areas, the sum of the RENs should not exceed five (5.0). To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company. For products approved after July 23, 2001, the REN for this product is part of the product identifier that has the format US:AAAEQ##TXXXX. The digits represented by ## are the REN without a decimal point (e.g., 03 is an REN of 0.3). For earlier products, the REN is separately shown on the label.

If this equipment [GAI-Tronics telephone] causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the operation of the equipment. If this happens the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

If trouble is experienced with this equipment [GAI-Tronics telephone], for repair or warranty information, please contact GAI-Tronics Corporation at 800-492-1212 or www.gai-tronics.com. If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.

This equipment uses a telephone handset and it is hearing aid compatible.

## User Instructions (Canada) CP-01, Issue 8, Part I: Section 14.1

**NOTICE:** The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements as prescribed in the appropriate Terminal Equipment Technical Requirements document (s). The Department does not guarantee the equipment will operate to the user's satisfaction. Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations. Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment. Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

### ⚠ CAUTION ⚠

**Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.**

### CP-01, Issue 8, Part I: Section 14.2

**NOTICE:** The **Ringer Equivalence Number** (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all the devices does not exceed 5.

## Replacement Parts

| Part No. | Description | 227-005 | 247-005 | 257-005 | 277-005 |
|---|---|:---:|:---:|:---:|:---:|
| 233-001 | Model 233-001 Security Screwdriver | ■ | | | ■ |
| 12562-110 | PCBA Replacement Kit (SMART Handset) | ■ | ■ | ■ | ■ |
| 13707-008 | Ringer | ■ | ■ | ■ | ■ |
| 12542-002 | Security Screws (Torx – T25), ½-inch, Pack of 15 | | | | ■ |
| 12516-002 | Security Screws (Torx – T25), ½-inch, Pack of 10 | ■ | | | |
| 12516-001 | Phillips Head Screws, 1-1/8 inches, Pack of 10 | | ■ | ■ | |
| 10113-020 | Handset Assembly with Armored Cord, 15-inch | ■ | | | |
| 10113-021 | Handset Assembly with Armored Cord, 29-inch | | | | ■ |
| 10113-022 | Hytrel® Cord Handset Assembly, 6-foot | | ■ | ■ | |
| 12512-001 | Hookswitch/ Assembly Kit (plastic) | | ■ | ■ | |
| 12512-002 | Hookswitch/ Assembly Kit (metallic) | ■ | | | ■ |
| 12576-126 | Front Panel Replacement Kit | ■ | | | |
| 12576-128 | Front Panel Replacement Kit | | ■ | ■ | |
| 40404-045 | Optional Plug-in Power Supply | ■ | ■ | ■ | ■ |

# 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.