Installation and User Guide

Cellular Commander

Rugged Cellular Telephone

GAI-TRONICS

.

Doc. No. 502-20-0180-001 Iss 1, Dec 2022 (GAI-ENG-808)

CONTENTS

1. Safety and Care Information

Please read these instructions thoroughly before starting installation. These products must be installed by competent personnel familiar with electrical and telephone installation.

Install equipment without modification and according to all applicable local and national electrical codes. Consult the National Electrical Code (NFPA 70), and local codes for specific requirements regarding your installation.

IMPORTANT! This phone cannot make calls to the public emergency services. It is not intended to be used to summon this type of emergency assistance, and will not make calls to any of the recognised emergency numbers such as 911. Dialling 911 or any other recognised emergency number (eg 112, 999 etc) will not result in a connected call, with or without a SIM installed. If it is necessary to make users aware of this restriction, it is the installer's responsibility to do so.

Operating environment

Make sure that no special regulation is in force that imposes restrictions on the use of mobile phones. Restrictions to mobile phones would also apply to this telephone. Most modern electronic equipment is shielded from radio frequency (RF) signals. However, certain electronic equipment may not be shielded against the RF signals from your phone.

High Temperatures

If the telephone is used in extremely high temperatures, and the network conditions force the unit to transmit at maximum power, the radio module will protect itself and will shut down after a period of time, terminating any call in progress. For example in an ambient temperature of 60°C (140°F), if the telephone is also transmitting at maximum power, the call duration may be limited to approximately 10 minutes. The telephone will force a cooling off period of 2 minutes, after which further calls will be possible

Pacemakers

Pacemaker manufacturers recommend that a minimum separation of 20 cm (8 inches) be maintained between a wireless phone and a pacemaker. The same restriction should apply to the body of the Cellular Commander and/or any external antenna of this phone, where fitted. If you have any reason to suspect that interference is taking place, switch off the phone immediately.

Installation and operation

The device should be installed and operated with a separation greater than 20cm (8 inches) between the enclosure of the Cellular Commander and the body of the user or nearby persons.

Hearing aids

The phone's radio signals may interfere with some hearing aids. In such cases move the antenna as far away as practical or consult your hearing aid supplier.

Other medical devices

Operation of any radio transmitting equipment, including the phone, may interfere with the function of inadequately protected medical devices. Consult a physician or the manufacturer of the medical device to determine if they are adequately shielded from external RF energy or if you have any questions. Switch off your phone in health care facilities when any regulations posted in these areas instruct you to do so. Hospitals or health care facilities may be using equipment that could be sensitive to external RF energy.

Radio transmission equipment

While GAI-Tronics cellular products are designed to conform to international standards regarding the acceptance of radio frequency interference, certain installation locations may interfere with their proper operation. We recommend that GAI-Tronics cellular equipment is not installed in close proximity to any equipment that generates RF signals (for example, radio transmitters), and is located as far as possible away from it or in a separate room**.**

Potentially explosive atmospheres

Do not install the phone or site the antenna in any area with a potentially explosive atmosphere and obey all signs and instructions. Areas with a potentially explosive atmosphere are often but not always clearly marked. They include chemical transfer or storage facilities; vehicles using liquefied petroleum gas (such as propane or butane): areas where the air contains chemicals or particles, such as grain, dust or metal powders.

2. Introduction

2.1. Welcome

For many years the GAI-Tronics Commander family of weather resistant telephones have provided communication in the most hostile and extreme environments. The Cellular Commander combines cellular connectivity with an internal battery backup facility and the exceptionally robust GAI-Tronics build quality that you expect.

In common with all members of the Commander range, the Cellular Commander casing is formed from glass-reinforced polyester to prevent rust and corrosion.

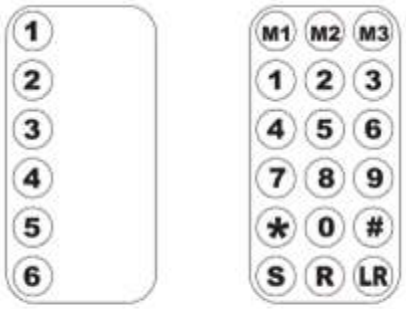
All push buttons are responsive and yet sealed against water or dust ingress. All fixing points for the Cellular Commander are concealed internally to ensure environmental sealing and also to deter damage or removal due to vandalism.

- Vandal resistant handset and cord
- Inductive coupler fitted as standard for hard of hearing
- Robust and weather resistant: IP65
- Range of keypad options
- Large, easy to see tactile buttons
- Programmable auto-dialler functions for dialling pre-stored numbers
- Wall, or pole mounting
- Simple installation
- External power supply supplied
- High capacity internal battery giving up to 6.6 hours talk time, 200 hours standby
- Remote programming and diagnostics via SMS
- Automatic acoustic path handset testing
- FCC compliant, PTCRB certified.

2.2. Keypad options

The Cellular Commander range is available with a full numeric keypad for manual dialling with 3 auto-dial buttons for dialling pre-stored numbers from a single button press, or with 6 auto-dial buttons. Alternatively, a zero-button version can be specified, whereupon the Cellular Commander is programmed to auto-dial a single number as soon as the handset is lifted.

The most common keypad layouts are shown below:



Auto-dial only (6 memory buttons shown)

Full numeric with 3 auto-dial memories (18 button)

Note: On full numeric keypad layouts (18 button) the 'R' button is reserved for future functionality.

3. Operation / Testing

Please note that, following power connection, there will be a delay while the telephone acquires the network before it can make or receive calls.

3.1. Making Calls

To make a call, lift the handset, wait for dial tone, dial required digits (or press required memory button or Last Number Redial where provided) and wait for connection.

The phone will play a confidence tone (similar to ring tone) while it is trying to place the call over the network.

If the telephone is set to dial on handset lift, no dial tone is heard prior to the confidence tone.

To end a call, replace the handset in its cradle.

If you do not replace the handset on the hook (when not in an active call), the dial- tone will cease after 150 seconds and the phone will enter a low-power idle state. The phone can still receive calls and SMS commands.

3.2. Receiving calls

To receive a call, lift the handset when ringing is heard.

Note: It is possible to configure the phone to inhibit incoming calls. If so configured, the sounder will not sound, but the phone can still receive SMS commands, acknowledge commands via SMS and communicate via USB.

3.3. Last Number Redial

(18 button versions only)

Lift the handset, press LR to redial the last dialled number.

3.4. Secrecy (Mute)

(18 button versions only)

During a call, press the 'S' button to mute the handset microphone.

Press the 'S' button again to enable the microphone.

Once the handset is replaced, it will automatically remove the microphone mute ready for the next call.

Note: The 'R' button is reserved for future functionality

4. Installation

4.1. Prior to Installation

Please ensure the following steps are taken prior to installation:

- **Survey the site** to ensure there is adequate cellular signal coverage on the selected network.
- **SIM card**: Obtain a suitable, unlocked SIM card for the network concerned – **IMPORTANT:** Ensure that the SIM is activated and not locked. If the SIM is locked there may not be a way of unlocking it from the telephone and it will not function. It is also recommended to disable voicemail on the SIM.
- **Power source**. Ensure that a suitable AC mains outlet is available for the supplied power supply.

4.2. Important Notes for Installers and Maintainers

- **Qualified personnel only**
  Cellular Commander telephones are supplied with a DC power adapter which requires connection to an AC mains outlet. The installation must only be carried out by appropriately qualified and trained personnel. Contact GAI-Tronics if installation service is required.
- **DC power adapter**
  The DC power adapter supplied as standard with the Cellular Commander telephone is for in-building use only. Where the Cellular Commander telephone is installed outside, the DC power adapter must be either installed in-building or correctly installed within an IP65 enclosure if located outside (enclosure not supplied). Route the power adapter DC output to the Cellular Commander telephone using suitable cabling.

- **Test tools required**
  During the testing and commissioning of the Cellular Commander telephone, the use of another mobile phone will be required in order to send status and configuration commands via SMS text messages. Alternatively, a laptop computer can be used connected to the internal USB port, see section 5.2.

- **Avoid contamination during installation**
  All possible measures must be taken to ensure water, fluid or dust does not contaminate the internal components of the telephone whilst unpacking, preparing and installing the telephone in inclement weather conditions or by negligence. Failure to do so may invalidate your warranty. Please retain any screws removed during installation or maintenance - make sure the correct screws are refitted to ensure the integrity of any seals.

- **Beware internal connections**
  The Cellular Commander is normally delivered with the ringer cable and internal battery cable disconnected. Beware of the cable connections between the case front and rear sections. Carefully separate the two sections.

  Similarly when assembling the case front and rear sections beware of the cable connections and ensure the cables do not get trapped in the seal between front and rear sections. This may lead to damaged leads and could significantly reduce the environmental protection offered to the internal components and will invalidate the warranty.

- **Emergency Services warning**
  This telephone is configured so that it cannot make a direct call to the emergency services. Check with your telephone service provider or infrastructure maintainer whether it is necessary to warn users, and if so provide a suitable warning notice.

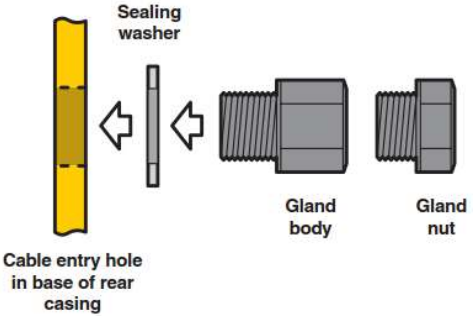
4.3. Preparing the Enclosure

Before mounting the telephone, check the cable routing and requirements. If glands are required, fit them to the case as follows:

1. Remove the RED blanking plug, leaving the other (usually BLACK) in place.
   Only fit a second gland if a separate cable is required to the phone.
2. Note that 2 plastic glands are supplied, but it is the installer's responsibility to select the correct type of gland for the application and cables used. The gland entries (and the supplied glands) are M20.
3. Select the appropriate sized gland:
   Use the smaller gland for cables diameters 4 - 7mm.
   Use the larger gland for cable diameters 8 - 13mm.

4. From the outside of the case, insert the selected gland into the threaded cable entry hole.

   IMPORTANT: Double check that the threads of the gland and the hole are correctly engaged and are not cross threaded. Hand tighten them at first. If there is any great resistance to tightening, STOP and check the threads. Only use a spanner to tighten the gland when you are certain of correct alignment. Take care not to overtighten.



   Tighten, so that its sealing washer is compressed against the enclosure surface.

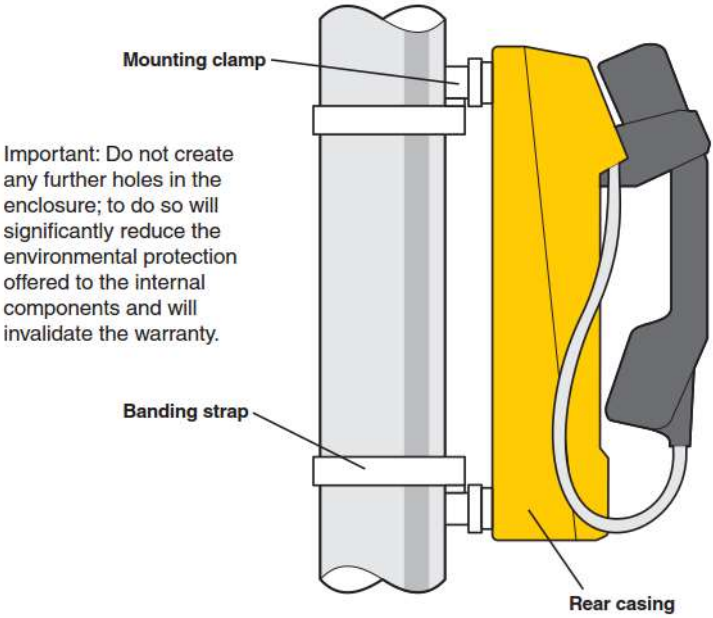
5. Proceed with chosen mounting method: pole, or wall.

4.3.1 Pole mounting

The optional mounting kit (No 100-02-0281-001) can be used to attach the Cellular Commander to round poles with diameters between 100mm and 200mm, or to square/rectangular section uprights with surface widths between 100mm and 150mm. For flat mounting on surfaces greater than 150mm across, use the wall mounting method.

Note: Banding straps (large scale worm-drive clamps) are not included in this kit and must be obtained separately. For details of where banding can be obtained, please refer to GAI-Tronics.

1. Use a 5mm hex key to remove the three bolts that secure the front section of the enclosure to the rear section. Carefully separate the two sections. Beware of cable connections between the sections.
2. If fitted, remove the four rubber feet from the mounting holes of the rear casing.
3. Attach the pole mounting clamps (from the optional mounting kit) to the upper and lower holes of the rear casing. Use the M6 x 25 screws supplied in the kit and tighten them to a maximum torque of 4.5Nm (3.3lb ft)

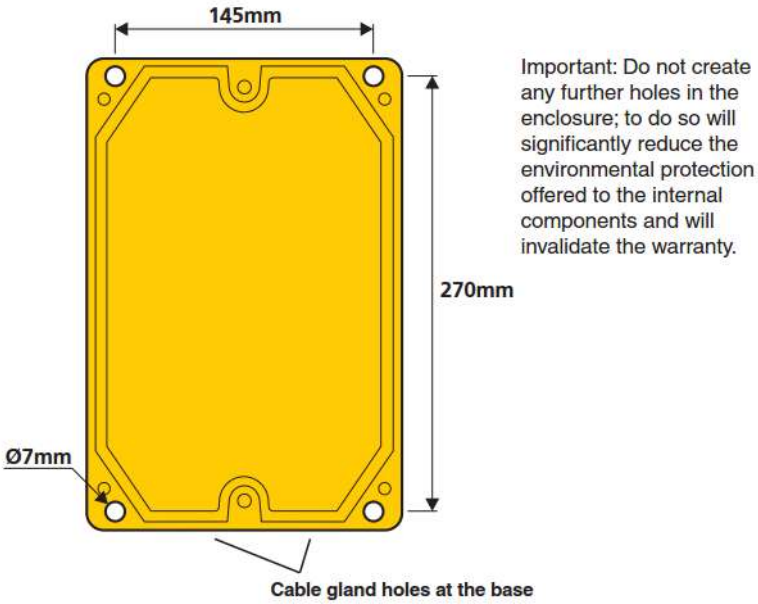


4. Ensure that the cable glands of the rear casing are facing downwards. Pass the first banding strap around the pole and also around the upper mounting clamp. Move the rear casing, upper clamp and strap assembly up or down the pole until it is at the correct height and then tighten the strap until it holds tight.
5. Pass the second banding strap around the pole and also around the lower mounting clamp.
6. If the position of the rear casing on the pole is correct, tighten both straps fully.
7. Trim off any excess band material. To deter unauthorised removal, once the mounting position has been double checked, the driving head of the band may also be sawn off.
8. Now please refer to the **SIM insertion and connections** section 4.5

4.3.2 Wall mounting

1. Use a 5mm hex key to remove the three bolts that secure the front section of the enclosure to the rear section. Carefully separate the two sections. Beware of cable connections between the sections.
2. If fitted, remove the four rubber feet from the mounting holes of the rear casing.
3. Mount the rear half of the moulded enclosure on a suitable vertical surface, (with screws/bolts suitable for the surface material) using the four 7mm (0.27in) diameter pre-drilled holes shown (ensure that the cable glands of the rear casing are facing downwards).

   Mounting hole spacing: 145 x 270mm (5.7 x 10.6 in)

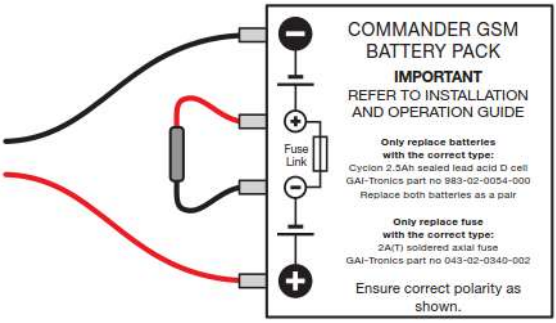


4. Now please refer to the **SIM insertion and connections** section 4.5

4.4. Internal Battery Pack Positioning

The positioning of the internal battery pack within the casing is to avoid any clashes with components on the underside of the front section.

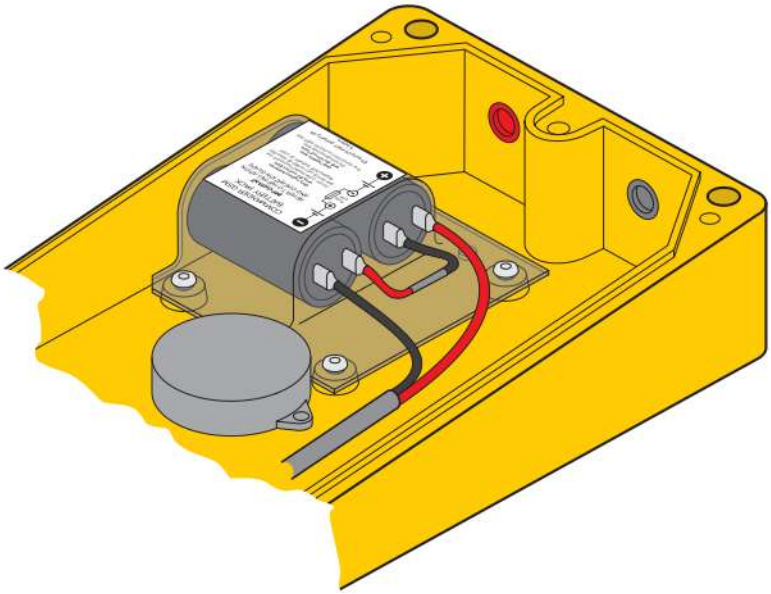
Care must be taken to connect the battery leads and fuse link as detailed on the label:



Always ensure the batteries are connected before connecting the DC power supply, or the batteries may not charge.

4.4.1 Battery Position - Wall and Pole Mounting

The Cellular Commander is supplied as standard with its internal batteries in the correct position for wall and pole mounting, as shown below. No adjustment is required to their position within the enclosure.



Important Safety Information

- Only replace batteries with the correct type: Cyclon 2.5Ah sealed lead-acid D cell. Replace both batteries as a pair.
- Only replace fuse with the correct type: 2A(T) soldered axial fuse
- Ensure correct polarity as shown.
- Always ensure the batteries are connected before connecting the DC power supply, or the batteries may not charge.

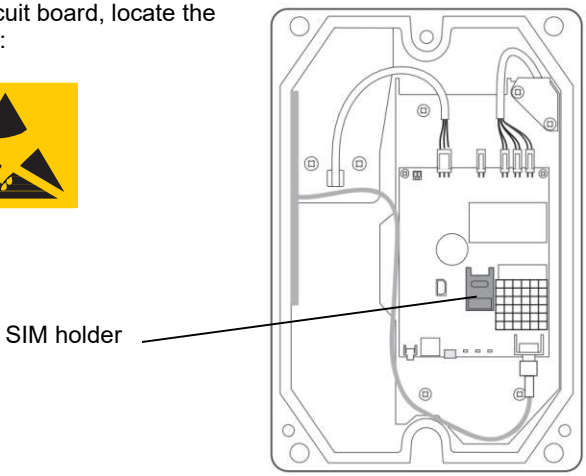
4.5. SIM Insertion and Connections

This section covers the internal connections and preparations necessary for operation.

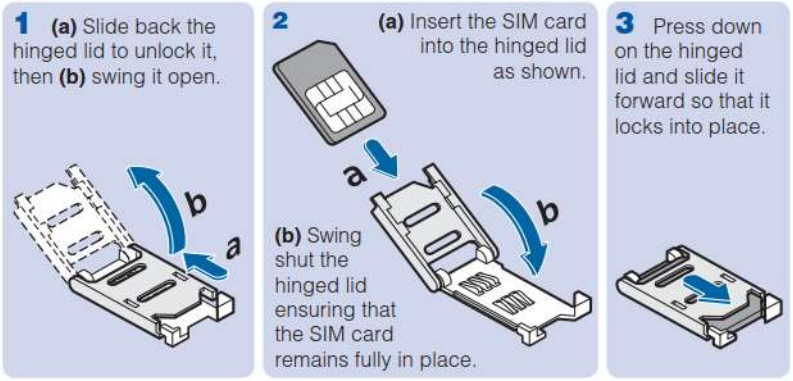
1. If the front casing is still in place, use a 5mm hex key to remove the three bolts that secure the front section of the enclosure to the rear section. Carefully separate the two sections. Beware of cable connections between the sections.

   Note: During installation it will be necessary to make several connections across from the rear enclosure to the front enclosure. When mounted vertically, ask a colleague to hold the front enclosure while connections are made to it.

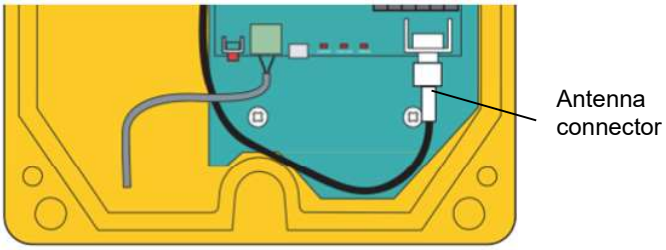
2. On the main circuit board, locate the SIM card holder:



3. Carefully install a valid SIM card into the holder:



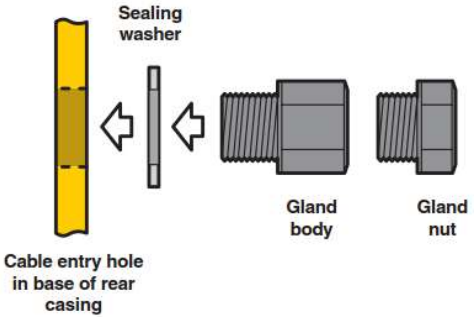
4. The antenna is fixed to the inside of the case and is supplied pre-connected to the main circuit board by a short cable with a coaxial connector (SMA type).



5. Mount/locate the supplied power adapter in a suitable location. **WARNING** only use the supplied power adapter otherwise damage may occur to the unit.

6. Two cable glands are supplied: A smaller gland for cable diameters 4 to 7mm and a larger one for cable diameters 8 to 13mm. Please see 'Preparing the enclosure' in section 4.3.

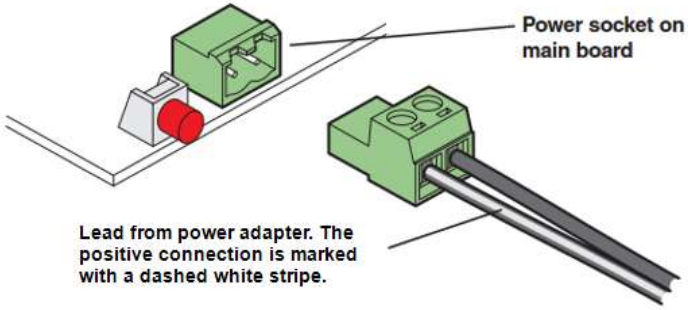
   Note: If only one gland entry is to be used, use the one with the red temporary cap. Ensure that the black blanking plug fitted to the other gland position remains securely in place.



7. Place the sealing washer onto the thread of the gland body and, from the outside of the casing, carefully screw the gland clockwise into the threaded hole of the casing so that the sealing washer becomes slightly compressed against the outer surface of the casing. Do not overtighten.

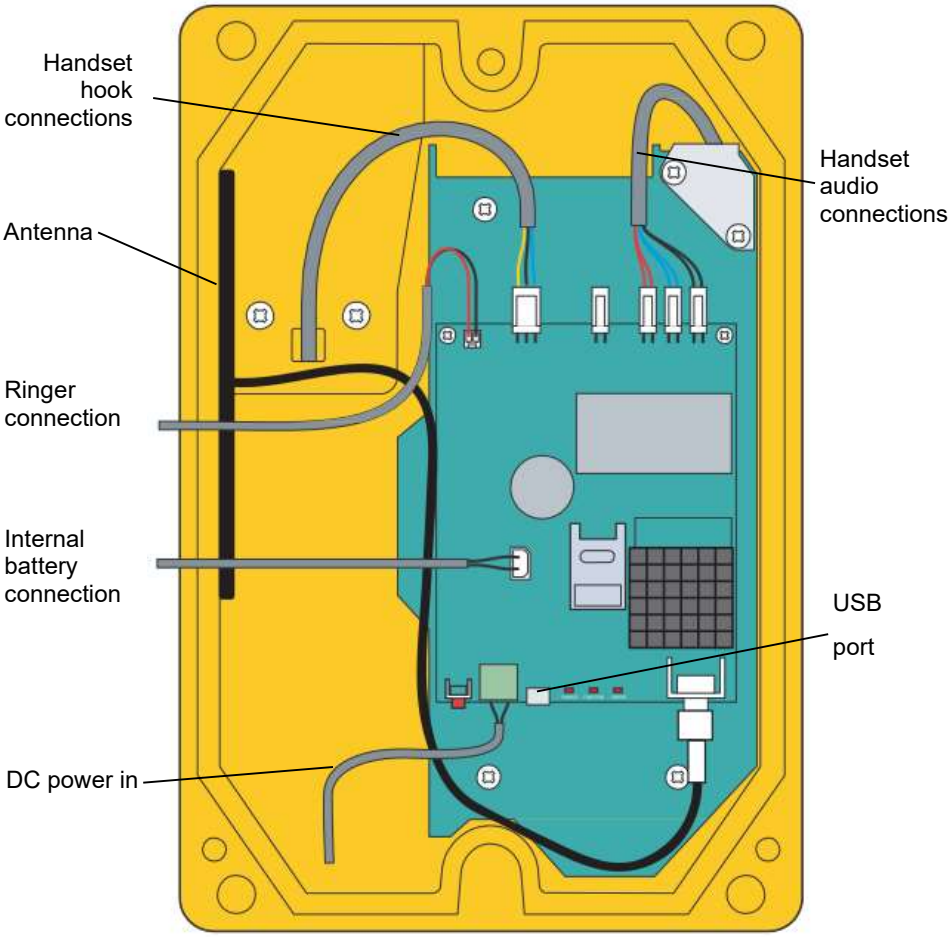
8. Feed the DC supply cable through the cable gland nut and gland body at the base of the rear casing. Once sufficient cable is within the casing, tighten the gland nut sufficiently to clamp the cable to make a seal.

9. Once the power cable is within the enclosure, attach the supplied green two- pin plug onto the conductors as shown below and tighten the two screws. The positive wire of the DC power cable is identified by a dashed white stripe. The circuitry is protected against incorrect polarity.



10. With the power adapter switched off, connect the power plug to the socket on the main circuit board as shown above.
11. Always ensure the batteries are connected before connecting the DC power supply, or the batteries may not charge.

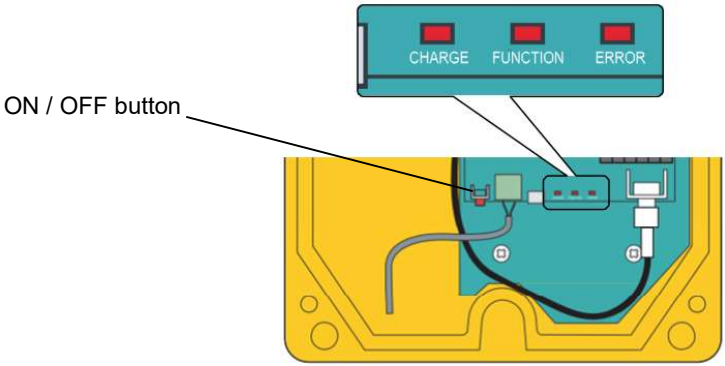
12. Double check that all internal connections are correct:



13. Once all connections have been checked, the phone should be ready for initial switch on and testing. Please see the indications and testing sections on the following pages.

4.6. LED indications and operating states

Located at the base of the main circuit board are three red LED indicators that provide useful status information.



Note that, to save power, the LEDs will all go off after 5 minutes of inactivity. Lifting the handset briefly will make them come back on.

The indicator functions are as follows:

- CHARGE - On, whenever external power is first applied.
- FUNCTION - Indicates the current operation. See the table below.
- ERROR - Indicates problems with operation. See the table below.

FUNCTION	ERROR	Meaning
Off	Off	Phone switched OFF. (or power save mode – lift handset briefly to be certain)
Short/fast	Off	Initialising/searching.
Short/slow	Off	Standby – ready for use.
Long/fast	Off	Incoming call.
On	Off	Call in progress.
Off	Long/Fast	SIM card is locked, PIN code required. *
Long/fast	Long/Fast	SIM card is blocked, PUK code required. *
Short/slow	Short/slow	Weak signal.
Off	Short/slow	Insufficient power to operate but charging.

FUNCTION	ERROR	Meaning
Off	On	Fault, such as no SIM.
On	On	Momentary indication to acknowledge a press of the On/Off button

* Unless the Cellular Commander is a version with a full numeric keypad, it is not possible to rectify these faults from the telephone itself. Please ensure that the SIM is not locked (or blocked) prior to use.

4.7. Switch on and test

1. Once the SIM card has been fitted and DC power connected, press and hold the red on/off button located next to the power connector. The FUNCTION and ERROR indicators will both light and will then go off, when this occurs release the button. The FUNCTION indicator will flash rapidly to indicate that the phone is initialising and is searching for a valid mobile network.
2. After several seconds, the FUNCTION indicator should flash less frequently to indicate that a call may be made or received. If there is an error, for example no SIM installed, the ERROR indicator will light. See the table on the previous page for a full list of indicator conditions.
3. Using a mobile phone, send an SMS status command to the phone requesting the current status. Use the following format for your outgoing message:

   1234STAT

   (where 1234 is the default PIN code.) The reply should be similar to the following:

   State: 14
   Signal: -89dBm
   Supply: 12.2V
   Bat: 4.191V
   Temperature
   Now: 20
   Min: 18
   Max: 26
   No fault
   Ver: 1.46

4. If all is well with the status response, record the information for reference, to compare with later status reports.
5. Close and seal the enclosure:
   a. Carefully place the front casing onto the rear, taking care not to dislodge or trap any of the internal cables.

b. Insert the three hex bolts and use a 5mm hex key to tighten the bolts.

c. Check that a good weatherproof seal exists between the front and rear casings.

6. Make a call to the phone to ensure the sounder operates. Then make an outgoing call from the phone to an external number. This will only be possible on a phone with a full keypad otherwise auto-dial numbers will first need to be programmed, see section 5.

For many installations, the steps outlined so far will result in a fully functioning phone.

However, the Cellular Commander is also highly customisable for many situations. Detailed configuration is made possible by either sending specially formatted SMS messages from another phone or by connecting a computer via the USB port. For details, please see section 5.

4.8. Switching the phone off (power down)

If the phone is to be shipped, stored, or the SIM changed, press and hold the pushbutton until the FUNCTION and ERROR indicators extinguish. The phone will now be in the Off (Charge Only) state.

4.9. Operating states of the phone

The Cellular Commander has the following operating states:

- On - The phone is fully powered and ready to make and receive calls.
- Charge only - This is the state that the phone will enter when external DC power is applied. If power is removed, the phone will enter the “Off” state.
- Off - This is the state in which the phone is shipped from the factory to prevent battery drain in transit and storage.

The SIM card should only be fitted or removed if the telephone is in the OFF state.

If the phone is “Off” and has sufficient battery power or is in “Charge only” mode, pressing the on/off pushbutton will put the phone into the “On” state.

The “On” state is remembered, regardless of the amount of charge in the battery or the availability of DC supply.

If the ERROR indicator is flashing Short/Slow, leave the external DC power connected to fully charge the battery, or at least until the ERROR indicator stops flashing.

Note: to fully charge the battery may take in excess of 5 hours depending on the current charge state of the battery.

If the phone is “On” and the battery charge becomes exhausted, the phone will turn off. Once the external DC supply is restored, the phone will automatically enter the “On” state and also start charging the battery.

5. Programming, configuration and diagnostics

The Cellular Commander has numerous features that can be configured using commands sent to it either via SMS messages from another phone or by a computer connected to the internal USB port. Most commands entered via the USB port are also accepted while the phone is in charge only mode, i.e. switched off but still powered by an external DC power source.

5.1. Sending Commands by SMS

The first four characters of an SMS command must be the phone PIN code (the default is 1234). This is then followed by the command(s).

NOTE the PIN code referred to in this manual is a security code specifically for programming the GAI-Tronics GSM telephone via SMS commands – it is not a lock code and is not related to the SIM card. It is not required for making or receiving calls.

Example 1: 1234STAT will return status information about the phone.

Example 2: 1234CFG5=1 configures the phone to inhibit incoming calls.

Notes for SMS commands

- You can enter a space character after the PIN for clarity; this will be ignored by the phone.
- All commands that do not implicitly require a response are automatically replied to with a summary of the phone status. This automatic reply may be suppressed by placing a full-stop character after the pin number. For example, 1234.cfg5=1 will change the configuration without replying. An error in the command will always result in a reply.
- Commands may be concatenated by entering a semicolon delimiter, for example 1234CFG5=1;STAT
- Commands are not case sensitive.
- To read multiple parameters, a suffix wild card may be used, for example: CFG*?
- Always wait for the response from each SMS command or request before sending the next one.

5.2. Sending Commands via USB port

Note that the preferred method for sending commands is normally SMS. Use of USB commands requires a degree of technical skill, a familiarity with serial

communications protocols, including the use of a suitable communication program (for example Hyperterminal (not supplied)). A micro USB connector lead (not supplied) will be required to connect the phone to a suitable USB port.

IMPORTANT: Before connecting the Cellular Commander to a computer via USB, ensure the Silicon Labs USB device driver software has been downloaded from

www.silabs.com/products/mcu/pages/usbtouartbridgevcpdrivers.aspx

Ensure that the correct version for your operating system is installed.

Configure a suitable communication program to connect to the virtual COM port assigned to the USB driver. Connect at 115200bps 8/N/1.

The first three characters of a USB programming command must be AT! This is then followed by the command(s).

Example 1: AT!STAT<cr> where <cr> is a carriage return/enter

Example 2: AT!CFG5=1<cr> sets the phone to inhibit incoming calls.

Notes for USB commands

- The AT! Commands are specific to this product range and are not related to the Hayes™ AT command set
- Commands may be concatenated by entering a semicolon delimiter, for example AT!CFG5=1;STAT<cr>

5.3. List of Commands (for use with either SMS or USB)

STATn Returns the status of the phone. If n is omitted, it is interpreted as zero.

STAT (or STAT0) for general status, useful during installation:

State: **s** (phone state, see table below)
Signal: -89dBm
Supply: 12.2V
Bat: 4.191V
Temperature – (in degrees Celsius)
Now: 20
Min: 18
Max: 26
No fault/Fault
Ver: 1.46

Note that normally the signal should be between -90 and -50, the reported supply voltage nominally should be 12V, and the Battery should be between 4.00 and 4.40V.

If a fault is shown, send stat1 for more details.

State (**s**) value returned from a STAT0 command:

Value	Meaning
1	Outside operating temperature limits.
2	Charge only.
3	Insufficient power to operate in solar charge mode.
4	Error condition, communication failure with wireless module.
5	Phone is initialising.
6	Checking SIM present.
7	No SIM installed.
8	Checking SIM lock.
9	Waiting for SIM PIN.
10	Waiting for SIM PUK.
11	Post SIM unlock initialisation phase.
12	Settle time for reading SMS memory.
13	Flushing SMS memory.
14	Ready for call (**always in this state when replying via SMS**)

STAT1 for information about faults:

Hook: On/Off
Power break: No/Yes
Loop: OK/Fault
Acoustic loop: Pass/Fail
Keyboard: OK/x stuck
Battery: OK/Fault

Explanation of stat1 fault results:
Hook: On = normal, Off = the handset is off its cradle
Power break: No = normal, Yes = power has been interrupted
Loop: OK = normal, Fault = the handset integrity loop is broken, meaning that the handset has been detached or vandalised
Acoustic loop: Pass = normal, Fail = either the microphone or earpiece is not responding, ie the handset is faulty or blocked.
Keyboard: OK = normal, x stuck = a pushbutton is permanently stuck in, preventing anyone from using the pushbuttons.
Battery: OK = normal, Fault = the battery is not holding charge properly, even if it has the correct voltage.

STAT2 returns all status information in a single string of text, intended to be read by a computer. See the paragraph on **CFG9** for explanation.

Note that, when sent using SMS, the **STAT0** and **STAT2** commands also return the IMEI number of the phone.

CLRTEMP Clears the maximum and minimum temperature memories (as a result, they will initially show the current actual temperature).

CFGn=x Read and write configuration setting.

CFG0 My number sending. Determines whether the phone number is declared to the destination being called:

x => 0 Use the setting defined by the network (default).

x => 1 Number is always sent (if supported by the network).

x => 2 Number is always withheld.

Eg CFG0=0

CFG1 Dial delay for models with a keypad. Determines the delay after dialling the last digit until the call is made:

x => 1 to 9 seconds (default is 3).

Eg CFG1=3

CFG5 Call restrictions:

x => 0 No restriction (default).

x => 1 Inhibit incoming calls.

x => 2 Inhibit outgoing calls.

x => 3 Inhibit incoming and outgoing calls.

Eg CFG5=0

CFG6 Call Timer. Limit the duration of a call. When 30 seconds of restricted call time remains, a beep is heard in the handset to warn the caller:

x => 0 to 120 minutes (default is 0, no restriction).

Eg CFG6=7

CFG7 Auto dial. This configuration can be used for all models but is specifically for use with the zero-button keypad phone to enable the 'Auto-dial on lifting the handset' feature:

x => 0 Normal dialling that requires digits to be dialled (default).

x => 1 Dials number stored in memory location 10, see PNUM command (programming memory locations).

Eg CFG7=0

CFG9 Automatic sending of SMS status. The status of the phone may be sent automatically when an error event occurs

and also regularly at specified time. The time is set with the “STIME” command and the destination number for the SMS is set with “PNUM11”. Note that the feature will not work if both of these are not set correctly. Also note that the telephone must receive at least one "CLOCK" command to synchronise its clock to the SMS server time.

x => 0 No status or error report (default).

x => 1 Report status and error condition when an error occurs.

x => 2 Report status and error condition when an error occurs and also status with or without errors at time or period specified.

Eg CFG9=2

Note, this automated status message is a "STAT2" message intended to be read by a computer. It is a single string of text consisting of 15 codes with values, separated by commas, (0: <value>, 1:<value>, 2: <value>, …. eg:

STAT2: 0:-75, 1:11.95, 2:4.28, 3:22, 4:-6, 5:37, 6:1/3/1.46, 7:0, 8:0, 9:0, 10:0, 11:0, 12:0, 13:0, 14: 357749031743900

Where the codes are:

0 = Signal in dBm (eg -75)

1 = Supply voltage in volts (eg 11.95)

2 = Battery voltage (eg 4.28)

3 = Temperature now (in Celsius) (eg 22)

4 = Minimum temperature recorded (eg -6)

5= Maximum temperature recorded (eg 37)

6 = Model/HW ver./Firmware ver. (eg 1/3/1.46)

7 = Hook switch state (0 is on-hook, 1 is off-hook)

8 = Power break (0 for none, otherwise 1. Cleared on read)

9 = Handset hardware loop state (0 for OK, 1 for fault)

10 = Acoustic loop test (0 for pass, 1 for fail, 2 for test not applicable)

11 = Keyboard (0 is OK, 1:n for fail where n is the key number)

12 = Call state (0 for idle, 1 for call in progress,)

13 = Battery state (0 for OK, 1 for fault)

14 = IMEI (eg 357749031743900)

Note that faults are shown in the codes between 7 and 13.

For a more human-readable summary of faults, use STAT1 if required.

The error condition(s) which initiate(s) automatic sending of status are selected with CFG22

CFG12 Maximum dialled number length. The maximum number of digits to be accepted can be defined.

x => 1 to 20 (default is 20).

Eg CFG12=20

CFG15 Activate relay for ring indication. One of the relays may be used to activate an external sounder. The relays switch at selected ring cadence.

x => 0 No action (default).

x => 1 Use relay 1 with ring cadence.

x => 2 Use relay 1 continuously.

x => 3 Use relay 2 with ring cadence.

x => 4 Use relay 2 continuously.

Eg CFG15=0

Note *relays are a special order option and are not fitted as standard*

CFG19 Earpiece level. The output level may be changed.

x => 0 -7.55dB

x => 1 Normal level (default)

x => 2 +4.15.

x => 3 +8.3dB.

x => 4 +12.45dB.

Eg CFG19=1

CFG20 Microphone gain. The microphone gain may be increased in three steps of 4dB.

x => 0 Normal level (default).

x => 1 +4dB.

x => 2 +8dB.

x => 3 +12dB.

Eg CFG20=0

CFG22 Error conditions to report.

The value of CFG22 sets which faults will report when CFG9=1.

Fault	Weight	Default	Bit
Handset loop failure	1	1	0
Stuck key	2	1	1
Battery failure	4	1	2
Low battery	8	1	3
Not used	16	1	4
Power break	32	0	5

The value is set by adding together the weights of the required functions. For example to enable fault reporting on handset loop and battery failure only (weights 1 & 4) the command would be CFG22=5.

The default is 31 (all errors report except power break). To report all errors, CFG22 should be set to 63.

Notes:

- A stuck key is determined by a key being held down for in excess of one minute.
- Battery failure is determined by an abnormal rate of change of the battery voltage when subjected to charge current.
- Low battery is when there is less than 20% charge remaining.
- Power break is when power is lost (when previously externally powered).

- Error states remain until cleared with CLRFAULT or INIT commands.

AUTO Shorthand way of combining PNUM10=n and CFG7=1, where n is the phone number. This is used for setting the phone number to be automatically called when lifting the handset, on the zero button keypad version. Example: auto=01283xxxxxx

CLOCK Only via SMS, sets the clock to the time recorded in the SMS delivery from the mobile network. For setting via USB, see ETSI +CCLK

CLRFAULT Clears any fault condition without restarting the phone

CLRTEMP Clears the maximum and minimum temperature memories (as a result, they will initially show the current actual temperature).

INIT Restarts the phone (cold boot).

OUTn ON/OFF Sets the output of relay n (1 or 2) on or off. If a single bistable relay is installed, selecting relay one or two will make no difference.

Eg OUT1 ON

***Note** relays are a special order option and are not fitted as standard*

PHPIN Read (only via USB) and write phone PIN, fixed length of 4 digits (default 1234).

PNUMn **Programming Memory Locations**: Is used to read or write phone numbers stored in the phone memory locations. There are twelve memory locations in total. Ten of the locations (n=0 to n=9) are reserved for storing the phone numbers for memory keys/buttons on an appropriate keypad.

NOTE: **Memory button 1 (or M1) is programmed with command PNUM0**, M2 is programmed with PNUM1, M3 with PNUM2 etc.

For example to store a phone number in memory 1 (location n=0) the command is:

pnum0=01283500400

The SMS command will be acknowledge by pnum being sent via SMS, unless a stop character is inserted after the PIN number (eg 1234.pnum….).

To read or check the number stored in any one of the locations send the following SMS command, for example to check location n=0 send: 1234pnum0? (Or to read all stored numbers send SMS command 1234pnum*?) The phone will respond via SMS with a particular stored number or all stored numbers

depending on the command sent, for example PNUM0:01283500400.

PNUM10 - Programming the Auto-dial Number: Location n=10 is reserved for the phone number to be Auto-dialled as soon as the handset is lifted off-hook; primarily for the zero button model. To program location n=10 follow the same format as above, for example: pnum10=01283500400 Note: CFG7=1 must also be configured to enable the auto-dial feature. Alternatively the programming of PNUM10 and the setting of CFG7=1 can automatically be combined by using the shorthand command AUTO=nnnn (where here nnnn is the phone number), for example: auto=01283500400

PNUM11 - Programming the Number to receive automatic SMS reports: Location n=11 is reserved for the phone number to which automated SMS reports will be sent if enabled by CFG9.

Example PNUM11=01283500400

STIME Time to send daily or interval status SMS, set in 24h format HHMM. For example: STIME=2315 will send status once per day at 23:15. Default 0000, meaning no timed report will be sent.

Values between 2400 and 3600 can be set, resulting in reports being sent automatically more than one per day, for example STIME=2415 will send status every 15 minutes, STIME=2600 will send status every 2 hours.

Note that this relies on the CLOCK command having been sent at least once since power up.

VER Returns the firmware version number.

6. Troubleshooting

Use the following section to diagnose and remedy various common fault conditions.

6.1. Phone not responding to 1234stat0 request via SMS:

- With handset removed from cradle is there a dial tone indicating the unit is ready to make a call or pulsing dial tone indicating no network connectivity?
- With the faceplate removed check if any of the internal indicator lights are illuminated, if not, lift handset from cradle, do indicator lights come on? If yes see Indicator functions under section 4.5 and the various FUNCTION and ERROR Light scenarios below;
- Check the unit is switched on by pressing the On/Off button, see section 4.7.

- If still no Indicator Lights on, check the unit is connected to an external DC power source. If necessary check the input voltage is nominally 5.9V DC.
- If it is known no external DC power source is connected check the internal battery is physically connected and if necessary check the terminal voltage coming from the battery pack is greater than 3.75V. If the voltage is below this value the unit could be in auto-shut off mode and the internal battery will need to be charged. Connect the external DC power source and allow the battery to charge for a minimum of 30 minutes, full charge will take in excess of 5 hours.
- If there is no voltage present across the internal battery terminals check if the in line battery fuse has been blown? If the fuse has blown, check the internal battery leads have been connected with the correct polarity, if not remedy and replace the in line battery fuse assembly. NOTE: This assembly is a safety component and MUST ONLY be replaced with the correct in line fuse assembly from GAI-Tronics.

6.2. ERROR light is permanently ON

- Check the SIM card has been installed and has been installed correctly, see section 4.5.

6.3. ERROR light flashing Long/Fast

- This indicates the SIM card is locked and a PIN code is required to unlock it. The PIN code can only be entered via the USB connection using the command: AT+CPIN

6.4. FUNCTION and ERROR lights flashing Long/Fast

- This indicates the SIM card is blocked and a PUK code is required from the service provider to unblock. The PUK code can only be entered via the USB connection using the command: AT+CPIN
- Alternatively, to check the operation of the installation, try another SIM card, remembering to switch off before changing the SIM and to switch on, once complete, to initialise the unit and new SIM correctly.

6.5. FUNCTION and ERROR lights flashing Short/Slow

- This indicates a weak network signal.
- If the unit has responded to the 1234stat0 SMS command, then compare the results of the reported signal with the table below.
- If the unit is not responding to the 1234stat0 SMS command connect a laptop or similar computer to the internal USB port. Please see the preconditions for using the USB port in section 5.2.
- Signal level – the following is a guide to the received signal level along with suggestion action to take.

Signal	Comment	Action Required
-104 to -100dBm	Very weak signal, connection not reliable	Essential to re-site the unit and/or install an external antenna.
-99 to -90dBm	Poor signal, connection should be reliable but speech may be subject to interruption due to signal fading effects	Performance should be improved by re-siting the unit and/or installing an external antenna
-89 to -70dBm	Good signal condition	None specifically, re-siting the unit and/or installing an external antenna may give further improvement
-70 to -50dBm	Very good signal condition	None

7. Maintenance

Cellular Commander requires very little maintenance in normal use, but please take note of the following to ensure that the telephone is kept in good working order:

7.1. Diagnostic check

Perform a regular status check by sending an SMS:

1234stat

Where 1234 is the PIN code.

The telephone will send back comprehensive information to assist maintenance and repair. Compare this information with that recorded earlier to check if anything has changed that might indicate a problem.

7.2. Batteries

The batteries fitted to Cellular Commander are long-life, high performance batteries with an expected service life of 10 years under normal use.

They must only be replaced by the correct type, ordered from GAI-Tronics, and must always be replaced as a pair.

They are each held in place with 2 cable ties, and must be connected and linked by a fuse as shown in section 4.4.

Dispose of batteries in accordance with Federal, State, & Local Regulations. Do not incinerate. Batteries should be shipped to a reclamation facility for recovery of the metal and plastic components as the proper method of waste management.

8. Aftercare

The purchase of your GAI-Tronics product does not end our commitment to you.

In addition to our warranty obligations, GAI-Tronics are able to offer various levels of maintenance packages, installation and commissioning packages and technical support, from ad-hoc repairs to full maintenance contracts.

By choosing GAI-Tronics as your aftercare provider you are ensured of manufacturer expertise and ISO 9001-certified quality control standards throughout the life of the product.

We can also supply a full range of accessories including mounting posts, beacons and high-volume sounders.

Contact GAI-Tronics for details. https://www.hubbell.com/gai-tronics/en

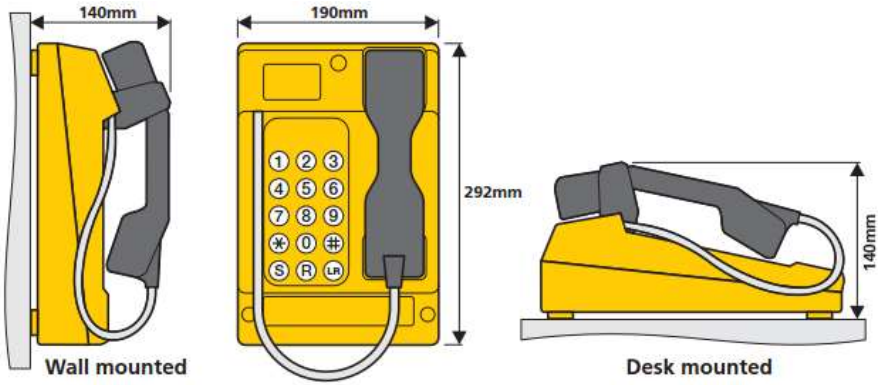
9. Technical Specifications

Operational Requirements	
GSM Systems.	• LTE bands 2, 4, 5, 12, & 66.
Signal sensitivity	-90dBm for reliable operation
Not suitable for connection to:	• 2G or 3G Networks
Product features	
Power supply	• 5.9Vdc @ 3.6W. • Includes a 110 – 240Vac to 5.9Vdc power adapter
Batteries	Internal high capacity, deep discharge lead-acid rechargeable. 2 x 2V 2.5Ah sealed cell
Hookswitch	Electronic with no external moving parts
Ringer loudness	70dBA @ 1m
Handset	Suitable for inductive coupling to Hearing Aids having a `T' switch position. Tested to ETS 300-381
Monitored faults and sensors	• Hookswitch • Handset integrity loop • Power break • Acoustic path test • Stuck button • Battery condition • Supply voltage • Ambient temperature
Monitoring method	• Remote interrogation by SMS

Environmental limits	
Temperature:	Operating: -20ºC to +60ºC (-4°F to +140°F) Storing: -40ºC to +70ºC (-40°F to +158°F)
Relative Humidity	Up to 95% (non-condensing)
Ingress Protection	Up to IP65
Physical characteristics	
Casing material	Glass reinforced polyester
Handset Material	Cycoloy (2800) with stainless steel or polyester curled cord.
Weight	3.5kg (7.7lbs)

Dimensions

140mm x 190mm x 292mm
(5.5 x 7.5 x 11.5in)



10. Regulatory Compliance

FCC	Contains FCC ID: 2A8ZW-COMMANDER *Note: 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.*

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