User Manual
For
Amron International, Inc.

**Models 2820A-02 & 2820A-03**
**AMCOM II Chamber Communicators**

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# 1 INTRODUCTION AND SPECIFICATIONS

## 1.1 INTRODUCTION

The Amron International AMCOM II 2820A-02 and 2820A-03 are full featured; two lock chamber communication systems that provide reliable, two-way communications between the chamber operator and occupants. Both models are used in conjunction with chamber talk back speakers such as the Amron Model 3113, 3114, 3115, 3125 or 3126. The AMCOM II chamber communicators include a rechargeable battery that maintains communication in the event of a power failure along with a universal input 90-264 VAC, 50-60 Hz internal power supply.

The 2820A-03 has all the features of the 2820A-02 but also includes a separate entertainment amplifier circuit. This circuit, used with the Amron Model 3130 Entertainment Speaker, provides audio entertainment to the chamber occupants.

The AMCOM II Chamber Communicators have independent volume controls for the operator, inner lock and outer lock. There are separate on-off controls for each lock and both models are supplied with the Amron Model 2405-28 Push-to-Talk microphone for use by the operator. The 2820A-02 and 2820A-03 can operate in 2-Wire or Full Duplex (4-Wire) modes as described later in this manual.

## 1.2 ELECTRICAL SPECIFICATIONS

| | |
|---|---|
| Input Impedance (Each Input) | 250 Ohms |
| Frequency Response | 300 - 10000 Hz |
| Common Mode Rejection | 40 dB Minimum |
| Current Drain Maximum Full Volume | 3 Amps |
| Minimum Quiescent | 0.190 Amps |
| Output Impedance | 4 Ohm |
| Power Supply Voltage | 12 VDC Nominal (9 VDC Min - 16 VDC Max) |
| AC Power Operating Range | 90-264 VAC, 50-60 Hz |
| Sensitivity (Input) | 0.5 mV |
| Output Power (RMS @ 4 Ohm Load, 12 VDC) | 10 Watts Audio |
| Battery Life | 45 Hours |

## 1.3 MECHANICAL SPECIFICATIONS

| | |
|---|---|
| Panel | Black Powder Coated Stainless Steel |
| Enclosure | Black Anodized Aluminum |
| Width | 10.1 in. (25.7 cm) |
| Depth | 7.5 in. (19.1 cm) |
| Height | 8.0 in. (20.3 cm) |
| Weight with Battery | 14 Lbs. (6.4 kg) |

## 1.4 MODEL 2820A-02 FRONT PANEL

All of the controls for the Model 2820A-02 are located on the front panel including the connectors for the operator handheld microphone or headset, tape recorder and auxiliary audio input. The 2820A-02 comes with the Amron Model 2405-28 PUSH-TO-TALK handheld microphone.

The 2820A-02 can be used in a stand-alone application or panel mounted. Four holes, located on the front panel, allow the unit to be securely mounted for a clean, professional look.

## 1.5 MODEL 2820A-02 REAR PANEL

The AC power cord and the chamber connectors are located on the rear panel of the 2820A-02. The Model 2820A-02 comes equipped with a sealed lead-acid rechargeable battery and an internal universal input (115/230 VAC) battery charger. The battery charger has medical grade electrical isolation for maximum safety to the chamber occupants.

# 2 ACCESSORIES

The following accessories are available for the AMCOM II communicator. Accessories can be ordered at any time.

## 2.1 MODEL 2460-28 AMRON STANDARD HEADSET (DUAL EAR MUFF)

The Model 2460-28 is a light and comfortable headset designed for extended wear at an economical price. It comes equipped with color-coded, dual banana plugs that mate directly to AMCOM communicators as well as a spiral cord that can be extended up to 8 feet (2.4 meters).

## 2.2 MODEL 2401-28 AMRON HEAVY-DUTY HEADSET (DUAL EAR MUFF)

The Model 2401-28 is a heavy-duty headset with boom microphone. It comes equipped with color-coded, dual banana plugs that mate directly to AMCOM communicators. It includes a 6-foot (1.8-meter) cord.

## 2.3 MODEL 2401SM-28 AMRON HEAVY DUTY HEADSET (SINGLE EAR MUFF)

The Model 2401SM-28 is a high-quality heavy-duty Telex headset with a single ear muff and boom microphone. It has superior sound quality and comes equipped with color-coded dual banana plugs, 6-foot (1.8-meter) cord, and mates directly to communicator.

## 2.4 MODEL 2460-31R AMRON CHAMBER HEADSET

The Model 2460-31R is a lightweight headset for use inside hyperbaric chambers. It comes equipped with a spiral cord that can be extended up to 8 feet (2.4 meters) and 4-pin connector that mates with chamber communication boxes.

## 2.5 MODEL 2460-31R-25 AMRON CHAMBER EXTENSION CABLE

The Model 2460-31R-25 provides a 25 foot (7.6 meters) extension cable to the Model 2460-31R chamber headset.

## 2.6 ADAPTOR CABLE - AMRON PART NUMBER 180-1000-00 (MODEL 2820A-03 ONLY)

Adapter cable is 6.5 feet (2 meter) long with two RCA Phono plugs that connect the auxiliary audio input to a standard 3.5 mm stereo phone plug which mates to the headphone jack of most common portable audio devices.

## 2.7 MODEL 2405-28 AMRON PUSH-TO-TALK MICROPHONE

The Model 2405-28 is a hand-held, noise-canceling, push-to-talk microphone that provides excellent sound quality to the occupant. It comes equipped with a spiral cord that can be extended up to 6 feet (1.8 meters).

## 2.8 MODEL 2821-28 AMRON REMOTE PUSH-TO-TALK MODULE

Designed for 2-Wire applications, the Model 2821-28 provides the operator with mobility around the dive site while maintaining communications with the occupant. It comes equipped with a small clip-on belt module that contains a push-to-talk switch, connector for the headset, and 25 feet (7.6 meters) of lightweight flexible cable. Custom cable lengths are available.

## 2.9 MODEL 2822-28 AMRON REMOTE WALK-AND-TALK MODULE

Designed for Full Duplex (4-Wire) applications, the Model 2822-28 provides the operator with mobility around the dive site while maintaining communications with the occupant. It comes equipped with a small clip-on belt module that contains the connectors for the headset, and 25 feet (7.6 meters) of lightweight flexible cable. Custom cable lengths are available.

## 2.10 MODEL 3110 AMRON CHAMBER SPEAKER

The Model 3110 Chamber Speaker includes a push-to-talk switch along with a headset connector. When the occupant(s) want to talk to the operator, the push-to-talk switch on the chamber speaker must be pressed, even if the headset is in use.

## 2.11 MODEL 3111 AMRON CHAMBER COMM BOX WITH PUSH TO CALL SWITCH

Chamber Comm Box with two-way speaker and call switch provides chamber to dive control communication. Headset jack is wired for conference style communications (duplex). Speaker is 15 Watts, 8 ohms. Optional headset permits conversation without disturbing other chamber occupants. Individual connections for headset and speaker allow DC to continue chamber monitoring while communicating with a person using the headset. The Push-to-Call switch activates a call indicator on the Amron Comm Routing Panel (CRP). The CRP activates an audio alarm and a visual indicator identifying the caller's location. Housing is die-cast zinc with gray epoxy powder coat.

## 2.12 MODEL 3112 AMRON BUNK BOX WITH ENTERTAINMENT CHANNEL SELECTOR

Bunk Box with Entertainment provides communication and two entertainment channels to individual bunks in a Saturation (SAT) or hyperbaric chamber. A headset is required. Communication can be Push-to-Call or full duplex. A Push-to-Call switch activates an indicator on an Amron Comm Routing Panel. Input connector is MS type 14 pin, male (MIL-C-5015). Headset connector is 4-pin audio female type. Housing is die-cast zinc with gray epoxy powder coat and stainless-steel front panel.

## 2.13 MODEL 3113 AMRON CHAMBER SPEAKER

The Model 3113 Chamber Speaker has all the features of the Model 3115 except for the speaker on/off switch.

## 2.14 MODEL 3114 AMRON CHAMBER TALK BACK SPEAKER

Talk back speaker provides 2-Wire communications between the operator and chamber occupants at an economical price. It includes a 5-Watt, 8 Ohm speaker with a 3-foot SJO 18 AWG cable mounted in a die cast zinc housing with an epoxy powder coat with stainless steel front panel.

## 2.15 MODEL 3115 AMRON CHAMBER SPEAKER

The Model 3115 Chamber Speaker allows the operator to monitor conversations within the chamber with the speaker wired in 2-WIRE mode. There is a speaker on/off switch that allows the occupants to turn off the speaker for private conversations. The operator can talk to the occupant(s) by using the PUSH-TO-TALK BUTTON or PUSH-TO-TALK JACK. The Model 3115 also features a headset jack wired in Full-Duplex (4-Wire) mode that allows an occupant

to use our standard 2460-31R or deluxe 2401-31R headset to talk to the chamber operator without the use of the PUSH-TO-TALK BUTTON or PUSH-TO-TALK JACK. This speaker is approved for US Navy chambers.

### 2.16 MODEL 3125 AMRON INNER-LOCK COMBO BOX

The Model 3125 features a talk-back speaker with on/off switch and headset jack that operates in the same manner as the Model 3115. It also includes a sound-powered phone with bracket, chamber temperature probe, scrubber power circuit wiring, chamber environmental conditioning unit wiring and electrical penetrator adaptor all together in a single pre-wired, pre-tested housing.

### 2.17 MODEL 3126 AMRON OUTER-LOCK COMBO BOX

The Model 3126 features a talk-back speaker with on/off switch and headset jack that operates in the same manner as the Model 3115. It also includes the sound-powered phone and bracket like the Model 3125 but does not have the additional chamber function wiring of the 3125.

### 2.18 MODEL 3127 AMRON CHAMBER OUTSIDE JUNCTION BOX

Outside chamber junction box for use with the Models 3125 and 3126 Combo Boxes. It includes a 12-pin electrical penetrator, mounting adaptor and MS connector. Aluminum housing with epoxy powder coat.

### 2.19 MODEL 3130 AMRON CHAMBER ENTERTAINMENT SPEAKER (MODEL 2820A-03 ONLY)

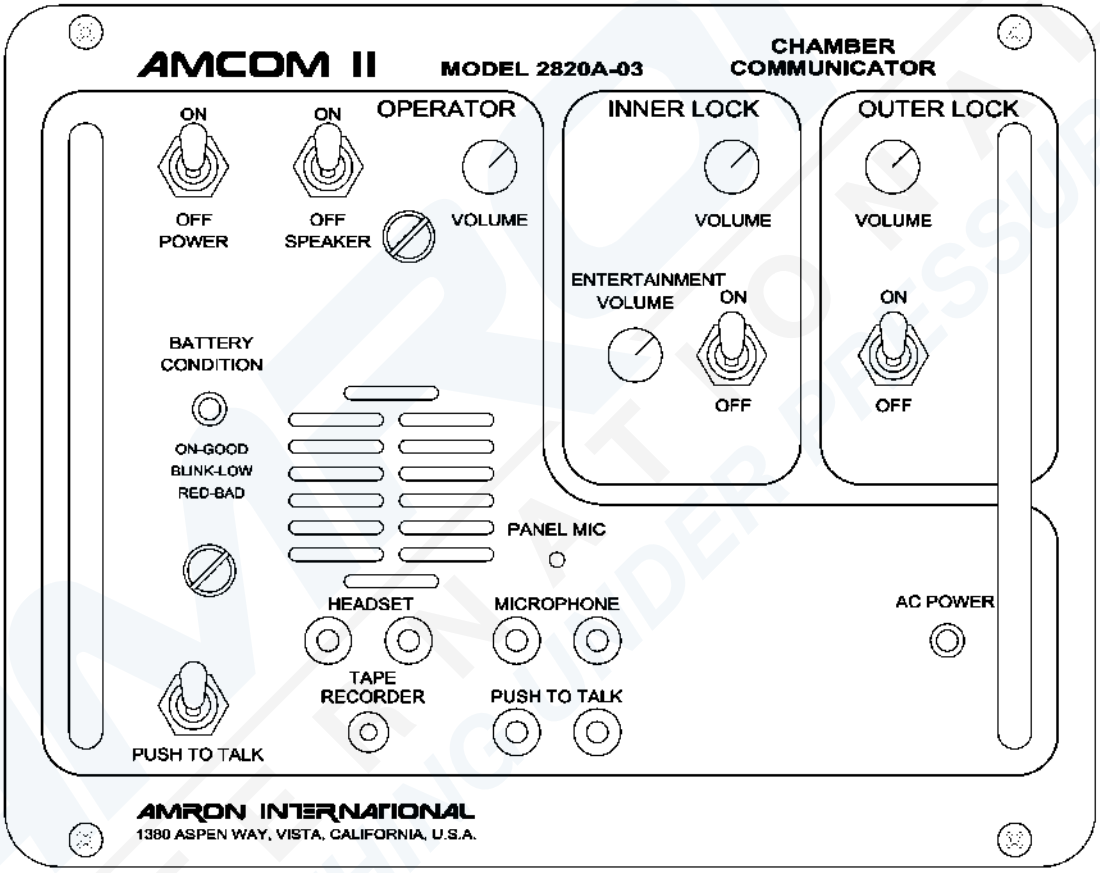
Chamber Entertainment Speaker includes a 15-Watt, 8 Ohm music quality speaker with Mylar impregnated cloth cone along with six 1/8-inch phone jacks for optional headset. It is mounted in aluminum housing with epoxy powder coat and stainless-steel speaker grill.

# 3 CONTROLS AND CONNECTIONS

Before using the 2820A-02 and 2820A-03 Chamber Communicator, the operator should be familiar with all the operating controls and connections. While reading this manual, you will find capitalized words such as PANEL SPEAKER. These words are to remind the reader that additional information can be found in this section of the manual. All sections that describe features or functions for the 2820A-02 apply to the 2820A-03 unless otherwise noted.

## 3.1 OPERATOR AND LOCK CONTROLS

The following controls are located on the front panel (2820A-03 shown below).




3.1.1 **POWER SWITCH** – This switch controls power to the unit.

3.1.2 **SPEAKER SWITCH** – This switch allows the operator to turn off the speaker. If the operator is using a headset, it may be necessary to turn off the speaker in order to prevent acoustic feedback.

3.1.3 **PUSH-TO-TALK BUTTON** – This switch allows the operator to talk to the chamber occupants when operating in the 2-Wire mode. It is not necessary to use this control in the Full Duplex (4-Wire) mode. When using Full Duplex mode, this control allows the operator to interrupt the audio entertainment by muting when the switch is pressed.

3.1.4 **OPERATOR VOLUME** – This control sets the volume for the PANEL SPEAKER and operator headset. Rotate this knob clockwise to increase the volume.

3.1.5 **PANEL SPEAKER -** The panel speaker features a waterproof speaker that allows the operator to monitor conversations in the chamber. The volume level is controlled by the OPERATOR VOLUME control and it can be turned off using the SPEAKER SWITCH.

3.1.6 **PANEL MIC** – A front panel mounted microphone is located next to the PANEL SPEAKER. It is used by the operator to communicate to chamber occupants. It is active when the SPEAKER SWITCH is on and the PUSH-TO-TALK SWITCH is pressed.

3.1.7 **AC POWER INDICATOR** – This LED is used by the operator to determine if the communicator is being AC powered. When the LED is off, the communicator is operating on battery power.

3.1.8 **BATTERY CONDITION INDICATOR** - This LED is used by the operator to determine the available battery level. A steady green light means that the battery level is sufficient to operate the unit. When the battery reaches approximately 3 hours of remaining life, the LED will start blinking at a rate of about once per second. The exact amount of time is dependent on the age and condition of the sealed lead acid battery. When the battery reaches its end-of-charge, the LED will turn off. It is advised that the battery be connected to AC power as soon as possible once the BATTERY CONDITION INDICATOR starts blinking.

3.1.9 **INNER LOCK VOLUME** – This control sets the volume for the inner lock speaker and/or headsets. Rotate this knob clockwise to increase the volume.

3.1.10 **INNER LOCK ON/OFF** – This switch allows the chamber operator to turn off all communications with the inner lock. It may be necessary to turn off the one or both locks in order to prevent acoustic feedback if the chamber door is open.

3.1.11 **OUTER LOCK VOLUME** – This control sets the volume for the outer lock speaker and/or headsets. Rotate this knob clockwise to increase the volume.

3.1.12 **OUTER LOCK ON/OFF** – This switch allows the chamber operator to turn off all communications with the outer lock. It may be necessary to turn off the one or both locks in order to prevent acoustic feedback if the chamber door is open.

3.1.13 **ENTERTAINMENT VOLUME (2820A-03 only)** – This control sets the volume for the audio entertainment speakers. Rotate this knob clockwise to increase the volume. The entertainment will be muted when the PUSH-TO-TALK SWITCH is pressed at any volume level.

## 3.2 OPERATOR CONNECTIONS

3.2.1 **OPERATOR HEADSET** - This is the dual banana jack (color-coded black) that functions as both an output (earphone) and input (microphone) for the operator as controlled by the PUSH-TO-TALK SWITCH and PUSH-TO-TALK JACK. With this connection, the operator can be wired in either 2-Wire or Full Duplex (4-Wire) mode regardless of the mode used for the chamber.

The operator is connected in 2-Wire mode by stacking both the earphone (black) and microphone (red) banana plugs into this OPERATOR HEADSET jack as shown in the wiring diagram in section 3.1. The chamber does not have to be connected in 2-Wire mode if the operator is in 2-Wire mode. In order to talk to the chamber occupants, the operator must use either the PUSH-TO-TALK SWITCH or PUSH-TO-TALK JACK. Since the headset microphone is not active until one of the push-to-talk methods is used, there is no chance for acoustic feedback to occur and outside conversation or noise is not transmitted to chamber and the PANEL SPEAKER can be left on. This may, for some situations, make for a better overall communication experience. If the operator requires more mobility, the Amron Model 2821-28 Remote Push-to-Talk Module can be used to extend the headset cable. It includes a push-to-talk button on a clip-on belt module and comes standard with 25 feet (7.6 meters) of cable (custom cable lengths are available).

To connect the operator in the Full Duplex (4-Wire) mode, connect the earphone (black) banana plug of the headset to this jack and the microphone (red) to the OPERATOR MICROPHONE jack (red) as shown in the wiring diagram in section 3.2. In this mode, the operator does not have to use the PUSH-TO-TALK SWITCH to communicate with chamber occupants who are also connected in the Full Duplex (4-Wire) mode. This configuration can be used even if the chamber is connected in 2-Wire mode. In that situation, the operator is required to use the PUSH-TO-TALK SWITCH or PUSH-TO-TALK JACK.

The headset microphone is always active which means that there can be acoustic feedback between the PANEL SPEAKER and the microphone if the operator is near the communicator. To prevent this, the PANEL SPEAKER can be turned off using the SPEAKER SWITCH. Another option is to move the operator away from the communicator by using the Amron Model 2822-28 Walk-and-Talk Module accessory. This allows the operator to communicate while other members of the crew listen using the PANEL SPEAKER. This module comes with 25 feet (7.6 meters) of cable (custom cable lengths are available).

The operator may also use the included Amron Model 2405-28 Push-to-Talk Microphone. This microphone comes with two color-coded banana plugs. The black plug goes into the OPERATOR HEADSET jack and the yellow plug goes in the PUSH-TO-TALK JACK as shown in the wiring diagram in section 3.3. To communicate with the chamber occupants, the operator presses the button on the side of the microphone. There is no chance of acoustic feedback since the PANEL SPEAKER is cut-off when the operator uses the microphone. When using the Push-to-Talk Microphone, the SPEAKER SWITCH must be turned on in order to hear the chamber.

3.2.2 **OPERATOR MICROPHONE** - This is a dual banana jack (color-coded red) that functions as the microphone input from the operator's headset. It is only used if the operator is in Full Duplex (4-Wire) mode.

3.2.3 **PUSH-TO-TALK JACK -** This is a dual banana jack (color-coded yellow) that allows for remote keying of the push-to-talk function of the communicator. The difference between using the PUSH-TO-TALK JACK and PUSH-TO-TALK SWITCH is that the switch allows the operator to communicate using the PANEL MIC. If both are used at the same time, the PANEL MIC is active. This allows a crew member to talk to the chamber occupants using the PANEL MIC even if the operator is away from the communicator using the Remote Push-to-Talk Module in 2-Wire mode.

3.2.4 **RECORDER OUTPUT** - This is a single RCA Phono jack (color-coded black) that provides a transformer isolated of both the operator and chamber communications. It is designed to drive the standard line-level inputs of audio or video recorders with input impedances as low as 600 Ohms.

## 3.3 BACK PANEL CONNECTIONS

3.3.1 **MS CONNECTOR** - There is a 14 pin MS Style connector located on the back panel that provides the electrical connection to the chamber. The mating connector part number is MS-3106A-20-27S. The pin functions are shown in the following table:

| MS CONNECTOR PIN OUT IDENTIFICATIONS | |
|---|---|
| **PIN NUMBER** | **FUNCTION** |
| K | Entertainment Speaker High (-03 Only) |
| L | Entertainment Speaker Low (-03 Only) |
| E | Outer Lock Microphone High |
| F | Outer Lock Microphone Low |
| G | Outer Lock Earphone High |
| H | Outer Lock Earphone Low |
| A | Inner Lock Microphone High |
| B | Inner Lock Microphone Low |
| C | Inner Lock Earphone High |
| D | Inner Lock Earphone Low |
| I | External Power + |
| J | External Power - |

3.3.2 **ENTERTAINMENT SPEAKER (2820A-03 ONLY) -** This connection is only available on the 2820A-03. It is routed to a separate entertainment speaker, such as the Amron Model 3130, usually located in the Inner Lock.

3.3.3 **OUTER MICROPHONE** - This connection functions as both an output (earphone) and input (microphone) for the outer lock occupants as controlled by the PUSH-TO-TALK SWITCH and PUSH-TO-TALK JACK. Using this connection, the chamber can be wired in either 2-Wire or Full Duplex (4-Wire) mode regardless of the mode used for the operator.

To connect the chamber in Full Duplex (4-Wire) mode, connect the chamber headset microphone pin to this connection as shown in section 3.6.

To connect the chamber in 2-Wire mode, connect the talk-back speaker, such as the Amron Model 3114 Chamber Speaker Box to this connection. You can have a mixed Full Duplex and 2-Wire by having both a talk-back speaker and headset jack by using the Amron Model 3115 Chamber Communicator Box as shown in section 3.6.

3.3.4 **OUTER EARPHONE** - This connection functions as the output for the chamber headset earphone. It is only used when the chamber is in Full Duplex (4-Wire) mode.

3.3.5 **INNER MICROPHONE** - This connection has the same function as the OUTER MICROPHONE but for the inner lock.

3.3.6 **INNER EARPHONE** - This connection has the same function as the OUTER EARPHONE but for the inner lock.

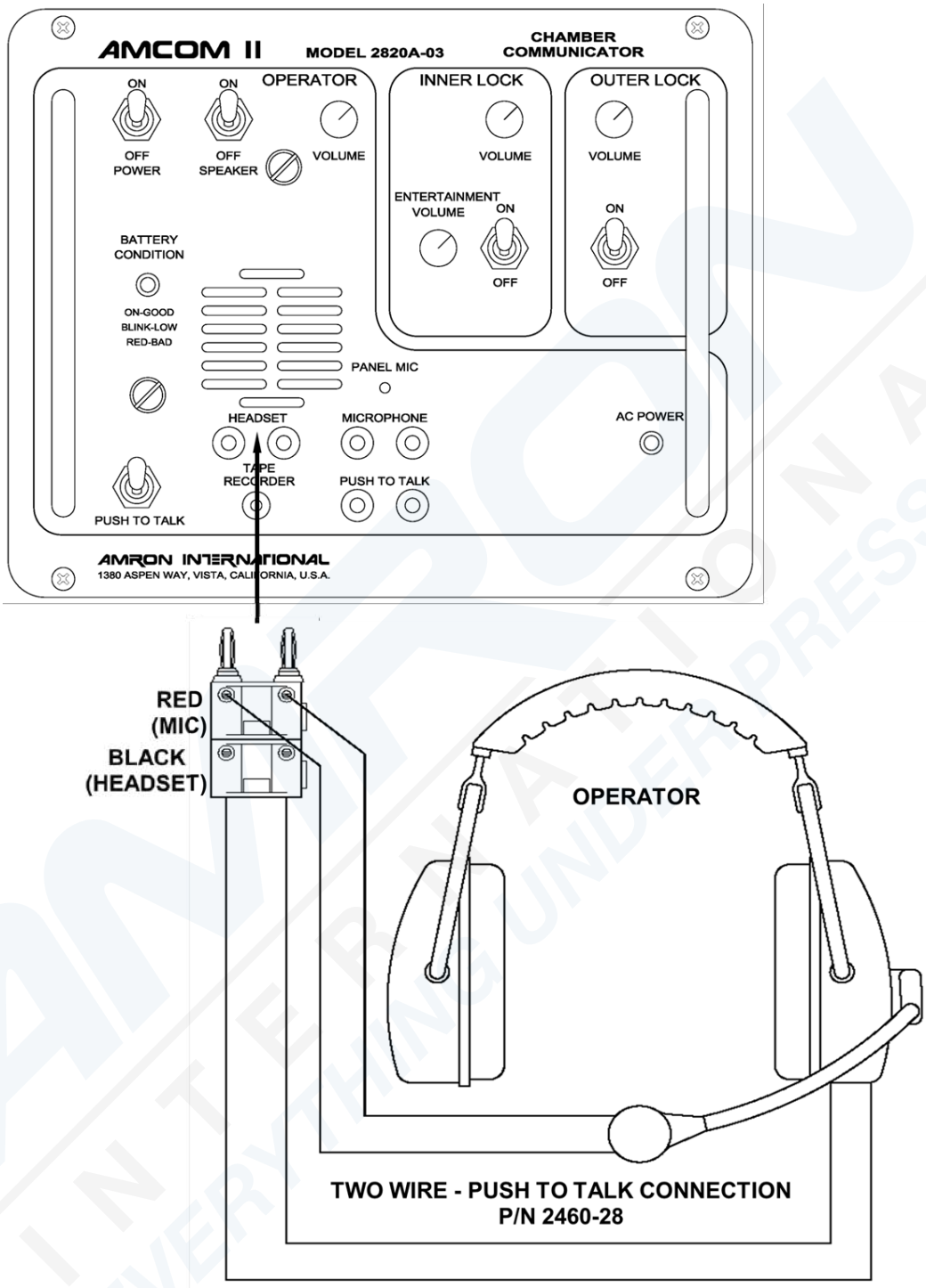
3.3.7 **EXTERNAL POWER** - The communicator can be powered using an external battery or power supply via this connection. The input voltage must be between 9 and 16 VDC and must be able to supply a peak current of 3 Amps for proper operation. The following warning should be followed when using the EXTERNAL POWER connection. A minimum wire size of 18 AWG and maximum wire run of 3 feet (1 meter) is recommended.

**WARNING: The EXTERNAL POWER input can be used to recharge the 2820A-02 & 2820A-03 rechargeable sealed lead acid battery. If you use an external power supply, the maximum voltage needs to be limited to 9-16 Volts.**

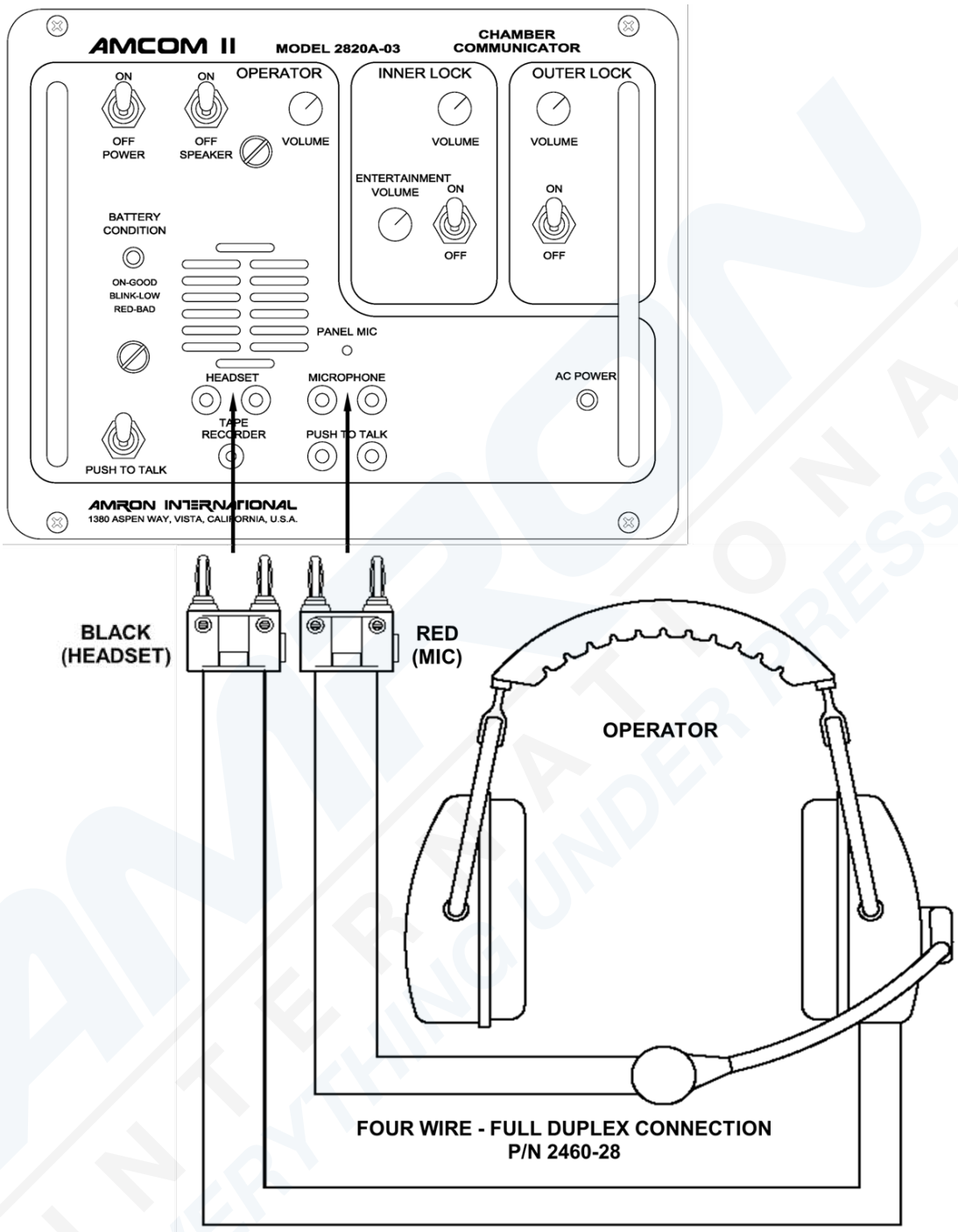
3.3.8 **ENTERTAINMENT AUDIO INPUT (2820A-03 ONLY)** - This is a set of two RCA Phone jacks that provides a means to connect an external audio signal for chamber occupant's entertainment. Although this input will accept a stereo audio source, it will be converted into a monaural signal before going to the chamber. The earphone output of most MP3 players can be connected to this input using an adaptor cable like the Amron Audio Adaptor Cable (Amron Part Number 180-1000-00).

3.3.9 **AC POWER INLET** - This is a standard IEC type C14 AC Power Inlet. The communicator is shipped with a NEMA 5-15 power cable but the communicator will accept AC input voltages from 90-264 VAC with a frequency 50-60 Hz.

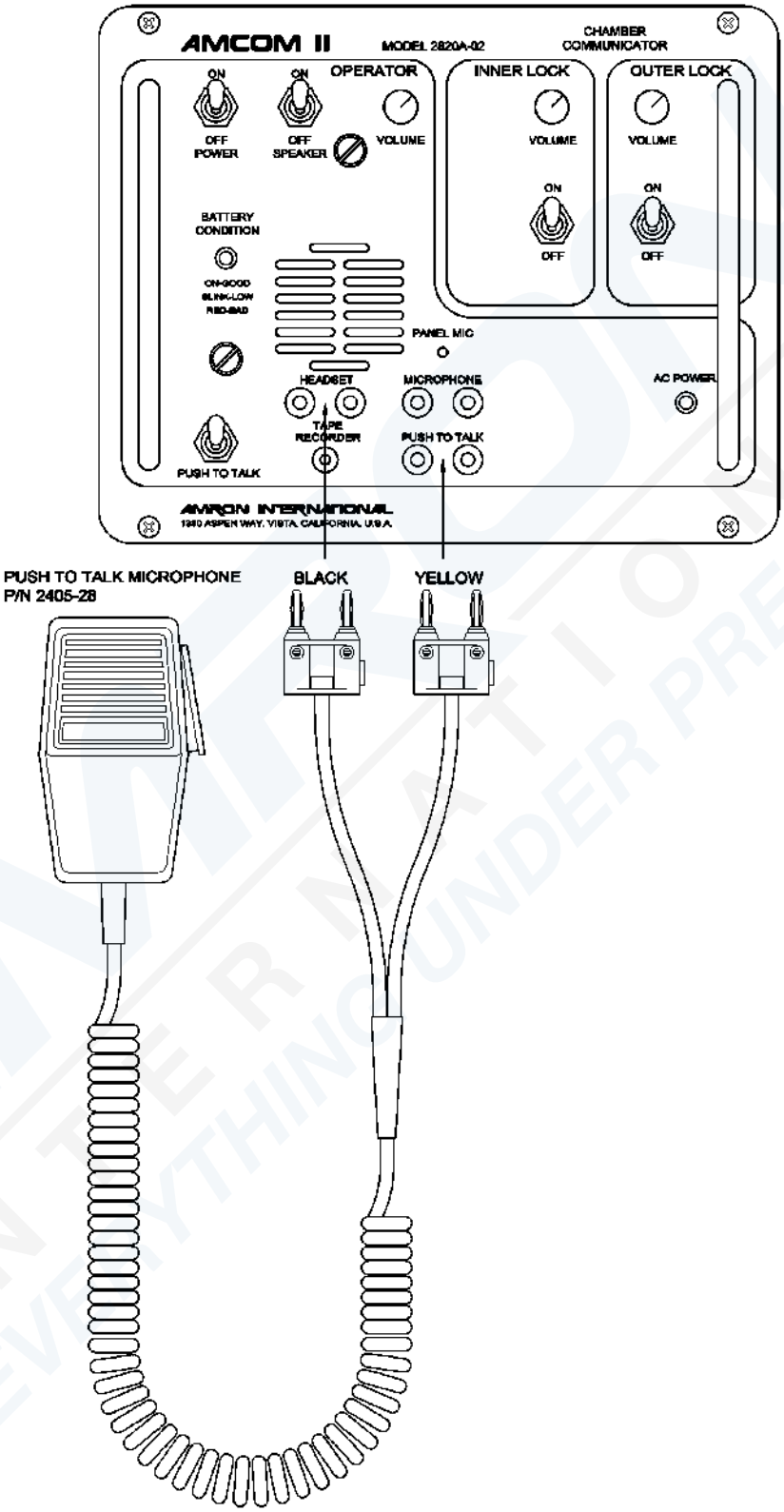
### 3.1 DRAWING, 2-WIRE CONNECTIONS



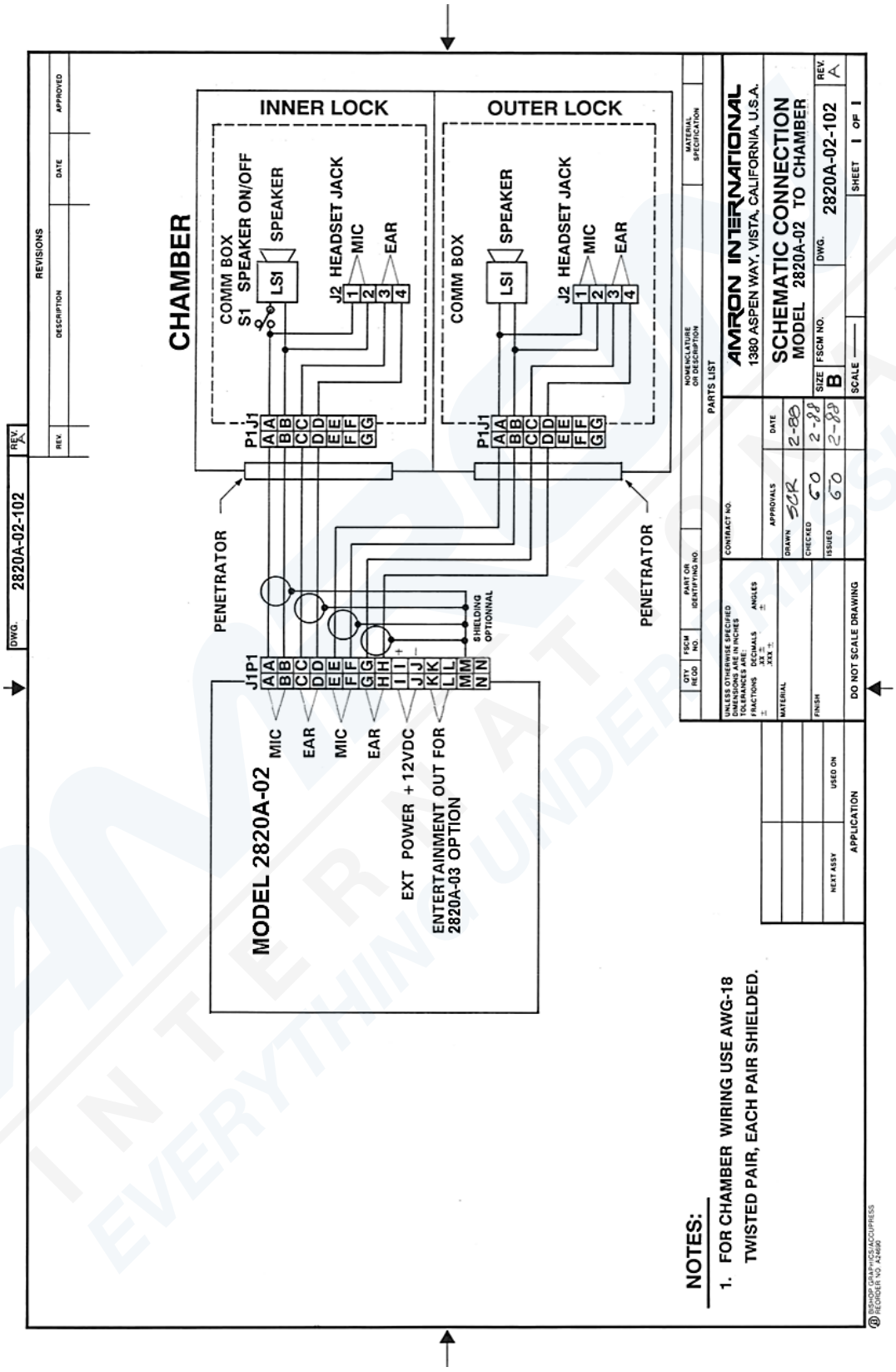
### 3.2 DRAWING, FULL DUPLEX (4-WIRE) CONNECTIONS



## 3.3 DRAWING, PUSH-TO-TALK CONNECTIONS



### 3.4 DRAWING, 2820A-02 & 2820A-03 TO CHAMBER WIRING DIAGRAM



# 4 INSTALLATION AND OPERATION

Securely mount the communicator to the panel before operating the communicator. See section 7.4 for panel cutout dimensions.

## 4.1 OPERATING ON AC POWER

The communicator is normally operated on AC power using the internal battery as backup in case of power failures. The internal power supply is designed with medical grade electrical isolation to prevent possible injuries due to electrical leakage. If external power is supplied through the EXTERNAL POWER connection on the MS connector, it should have the same type of isolation to prevent possible electrocution.

## 4.2 BATTERY CHARGING

4.2.1 The Models 2820A-02 and 2820A-03 are supplied with a sealed lead acid back up battery. To charge the battery, insert the AC power cord to the AC inlet located on the back of the communicator. The internal battery charger is able to operate on AC input voltages from 90-264 VAC with a frequency 50-60 Hz. without the user having to make any adjustments.

4.2.2 The internal battery charger is designed to charge the battery in float mode so the charger can be left on indefinitely, without damage, to ensure the battery is fully charged and the unit is ready to use. A fully discharged battery will take approximately 10 hours to reach full charge (depending on the age of the battery and the surrounding temperature). To ensure maximum service life, the battery should be fully charged at least once every six months.

4.2.3 The operating time for a fully charged battery is approximately 45 hours. The exact operating time depends on the age of the battery and the ambient temperature. The sealed lead acid battery used in the communicator has a service life of 300 full charge/discharge cycles or 3 years. The BATTERY CONDITION INDICATOR will start to blink when the battery has approximately 3 hours operating time remaining. To maximize the service life, the battery should be recharged as soon as possible after the indicator starts to blink. When the battery reaches the full discharge state, the BATTERY CONDITION INDICATOR will turn off and the communicator will shut down.

## 4.3 MODES OF OPERATION

The Models 2820A-02 & 2820A-03 have the ability to operate in either 2-Wire or Full Duplex (4-Wire). Both the chamber and the operator can be connected in either mode and a combination of modes can be used. If either the chamber or the operator is wired in 2-Wire mode, the operator must use a push-to-talk, either the PUSH-TO-TALK SWITCH or PUSH-TO-TALK JACK, when talking to the chamber. Using either push-to-talk method will cut off the entertainment speaker.

**2-WIRE** communication is defined as a single communication path, normally the chamber is the priority signal path – operator listens to chamber. Signal reversing is accomplished by pushing the PUSH-TO-TALK SWITCH – chamber hears the operator. Since only one person can talk at a time, there is a level of discipline that goes with using 2-Wire mode in order to obtain clear communications. One advantage of 2-Wire is that the operator's microphone is not active unless one of the two push-to-talk controls, PUSH-TO-TALK SWITCH or PUSH-TO-TALK JACK, are active. This eliminates any possible acoustic feedback between the operator's microphone and the PANEL SPEAKER. It also prevents noise from the outside reaching the chamber occupants and allows the operator to communicate with other crew members without involving the chamber occupants.

If using the Amron Remote Walk-and-Talk, Model 2821-28, the operator may press the Push-To-Talk Switch on the belt module to speaker to the chamber occupants.

**4-WIRE** (Full Duplex) communication is defined as a dual communication path, a signal path (a pair of wires) for up-link and a signal path (a pair of wires) for down link. A common example of Full Duplex communication is the telephone. Full Duplex (4-Wire) has the advantage of natural communication without having to use the PUSH-TO-TALK SWITCH. This keeps the operator's hands free to perform other task. It does not require the same level of discipline to achieve clear communications that 2-Wire does. It has the advantage that neither the chamber occupants nor the operator is cut off when the other is talking. 4-Wire does require the chamber occupant, as well as the operator, to wear headsets.

To use Full Duplex (4-Wire) mode, the operator must use a headset and connect per the wiring diagram in section 3.4. When not wearing a headset, the operator will have to use the PUSH-TO-TALK BUTTON to communicate to the chamber occupants. The operator can also use the PUSH-TO-TALK BUTTON to cut off the AUDIO AUXILIARY INPUT signal even if the operator is connected in Full Duplex (4-Wire) mode. When the operator uses a headset, the SPEAKER SWITCH should be turned off to prevent acoustic feedback.

Acoustic feedback can also be avoided by moving the operator away from the communicator by using the Amron Model 2822-28 Remote Walk-and-Talk Module with 25-foot-long cable.

### 4.3.1 2-WIRE OPERATION

Turn power switch to ON, turn speaker switch to ON, and adjust all volume controls to mid-scale. The operator has to depress PUSH-TO-TALK BUTTON in order to the chamber occupants. Operator and chamber occupants talk to each other while the operator adjusts volume controls. Adjusting the lock volumes is easier if the other LOCK ON/OFF switch is turned off.

**OPERATOR VOLUME** – While chamber occupant(s) are talking, the operator adjusts this volume control to a comfortable hearing level at the PANEL SPEAKER or operator headset.

**LOCK VOLUME** – While operator is talking into the PANEL MIC or hand-held microphone and depressing PTT switch, the operator adjusts this volume control to a comfortable level.

### 4.3.2 4-WIRE (FULL DUPLEX) OPERATION

Turn power switch to ON; turn speaker switch to OFF; adjust volume controls to mid-scale. The operator and chamber occupants use headsets. While talking to each other, the operator adjusts volume controls as below:

**OPERATOR VOLUME** – While the chamber occupant is talking, the operator adjusts this volume control to a comfortable hearing level.

**LOCK VOLUME** – While the operator is talking, the operator adjusts this volume control to a comfortable level for the chamber occupants. This should be conducted on each lock individually with the other lock turned off during adjustment process.

# 5 MAINTENANCE

## 5.1 GENERAL MAINTENANCE

The 2820A-02 and 2820A-03 chamber communicators are designed to provide years of continuous, failure-free service when properly used and maintained. There are a few important things that the user can do to extend the life of their equipment

1. Handle the communicator with care. Do not throw it around or drop it. Select a work area where the communicator and wire connecting to it are out of everyone's way so it is not knocked over.

2. When using a rechargeable battery, the battery should be recharged after use or as soon as possible when the BATTERY CONDITION INDICATOR starts blinking.

## 5.2 RECOMMENDED MAINTENANCE SCHEDULE

The following sections outline the recommended scheduled maintenance.

### 5.2.1 DAILY MAINTENANCE

Wipe off any accumulated dirt on the front panel or connectors using a clean, damp cloth. Pay particular attention to where the various front panel components attach to the panel.

### 5.2.2 WEEKLY MAINTENANCE

Wipe off any accumulated dirt on the front panel or connectors using a clean, damp cloth. Pay particular attention to where the various front panel components attach to the panel. Inspect the PUSH-TO-TALK SWITCH and volume controls for smooth operation. Inspect the PUSH-TO-TALK BUTTON, binding posts and volume controls for smooth operation.

### 5.2.3 SIX MONTH CHECK

Wipe off any accumulated dirt on the front panel or connectors using a clean, damp cloth. Pay particular attention to where the various front panel components attach to the panel. Inspect the PUSH-TO-TALK BUTTON, binding posts and volume controls for smooth operation.

1. Inspect the PUSH-TO-TALK SWITCH and volume controls for smooth operation.

2. Recharge the battery if the system is in storage and not regularly connected to AC power.

3. Perform the 2-Wire and Full Duplex (4-Wire) system checks as described in section 6.1.

### 5.2.4 YEARLY CHECK

For maximum service life, it is recommended that the chamber communicator be sent back to Amron for a yearly check. Every three years it is recommend the rechargeable battery be replaced.

### 5.2.5 LONG TERM STORAGE

If the communicator is to be stored for a period greater than 30 days, it is recommended that it be stored in a cool dry location. Make sure that the POWER SWITCH is turned off during storage. The communicator should be stored connected to the AC power if possible to ensure that the communicator will be fully charged and ready to use when needed.

# 6 TROUBLESHOOTING

The following section describes the procedures for checking the operation of your 2820A-02 & 2820A-03 chamber communicators, general maintenance procedures, and how to troubleshoot common problems.

## 6.1 CHAMBER COMMUNICATOR CHECK PROCEDURES

The following are a series of step-by-step procedures to perform a functional check of your communicator using only a headset. These steps check all communication functions of the communicator in both 2-Wire and Full Duplex (4-Wire) mode. If the communicator checks out using these procedures, then any communication problems are probably located somewhere else in the system setup.

### 6.1.1 2-WIRE CHECK

This procedure checks the communicator functions in the 2-Wire mode.

1. Set all the volume controls to the mid-scale (halfway) position.
2. Set all the volume controls to the mid-scale (halfway) position.
3. Turn the SPEAKER SWITCH off to avoid acoustic feedback.
4. Turn on the communicator and verify the BATTERY CONDITION INDICATOR is on or blinking. If the LED does not come on at all, then replace or recharge the battery. If that does not resolve the problem, then go to the troubleshooting to determine the cause.
5. Have a second person enter the chamber inner lock. Press the PUSH-TO-TALK SWITCH and talk into the PANEL MIC. Verify the person in the chamber can hear you. Adjust the INNER LOCK VOLUME as necessary.
6. Have the person in the chamber talk into the talk-back speaker. Verify you can hear them. Adjust the OPERATOR VOLUME as necessary.
7. Repeat steps 4 and 5 in the outer lock.
8. Insert the hand-held black plug into the OPERATOR HEADSET JACK (black). Insert the yellow plug into the PUSH-TO-TALK JACK (yellow). Press the push-to-talk button and talk into the hand-held microphone. Verify that the person in the chamber can hear you. Remove the hand-held microphone and turn off the SPEAKER SWITCH.

### 6.1.2 FULL DUPLEX (4-WIRE) CHECK

This procedure checks the communicator functions in the Full Duplex (4-Wire) mode.

1. Set all volume controls to the mid-scale (halfway) position.
2. Turn the SPEAKER SWITCH off to avoid acoustic feedback.
3. Turn on the communicator and verify the BATTERY CONDITION INDICATOR is on or blinking. If the LED does not come on at all, then replace or recharge the battery. If that does not resolve the problem, then go to the troubleshooting section to determine the cause.
4. Identify the microphone and headset leads. When using an Amron headset, the microphone is the red banana plug and the headset is the black banana plug.
5. Plug the microphone lead into the OPERATOR MICROPHONE (red) jack and the headset lead into the OPERATOR HEADSET (black) jack.
6. Don the headset and talk into the microphone. You should be able to hear yourself in the headset. Adjust the OPERATOR VOLUME control and verify the level can be adjusted to a comfortable level.
7. Go into the chamber inner lock and don the chamber headset
8. Talk into the microphone. You should be able to hear yourself in the headset.
9. Repeat in the outer lock.
10. If used, connect a source device, such as a MP3 player, to the ENTERTAINMENT AUDIO INPUT. Set the volume control of the device to low and start playing music. The music should be heard in chamber entertainment speaker. Adjust the volume as required. Verify that the music is cut off when the PUSH-TO-TALK SWITCH is pressed.

    This completes the check of the Full Duplex (4-Wire) function of the communicator. If at any point in the test you were not able to hear yourself in the headset as indicated by the test, refer to the troubleshooting section to determine the cause.

## 6.2 CONNECTION ISSUES

Most communicator problems are caused by bad connections. Making good connections will result in years of good communications. For longer life, all chamber connections to the MS connector should be soldered and copper wire must be tinned. It is strongly suggested that dual banana plugs be used for operator connection to provide convenient and secure connections. Make sure the MS connector is completely seated and the retaining ring is tight. If you experience issues, remove the MS connector and inspect for dirt or corrosion; repair or replace if necessary.

## 6.3 LOW BATTERY INDICATION

The BATTERY CONDITION INDICATOR indicates the battery level or state-of-charge by monitoring the battery voltage. The voltage has to be 9 Volts or greater for the communicator with rechargeable battery to operate. It is recommended that the communicator be recharged for at least 10 hours if the measured voltage is less than 12 Volts (depending on the age of the battery and the surrounding temperature). If the BATTERY CONDITION INDICATOR indicates a low, (blinking LED) or bad (off LED) after charging, then either the battery is bad and needs to be replaced or the charger has malfunctioned.

## 6.4 CHECK BATTERY CONDITION

**NOTE: YOU MUST DISCONNECT THE AC POWER CORD FROM AC POWER BEFORE CHECKING THE BATTERY CONDITION.**

1. Disconnect AC power cord from AC power inlet located on side of case.
2. Turn communicator power switch “ON” and observe the battery condition indicator. The battery indicator will display the condition of the battery.
   - “STEADY GREEN” light indicates the battery has sufficient voltage to operate the unit.
   - “BLINKING GREEN” light indicates the battery is low and will need charging shortly, three hours of operating time remain.
   - “STEADY RED” light indicates the battery voltage is too low to operate the unit. Communication should stop.

   **NOTE**: A battery unused for a period of time will typically display a higher voltage when initially powered on, but; will dissipate rapidly. This condition known as “surface charge” is the result of a load placed on the battery causing the voltage to drop quickly. It is a good idea to leave the unit on for five minutes before relying upon the Battery Condition indicator.
3. Reconnect AC power cord to AC power inlet located on side of case.

## 6.5 CHECK BATTERY VOLTAGE

1. Disconnect AC power cord from AC power inlet located on side of case.
2. Access battery by following steps 1 through 7 of section 6.6 (next section).
3. Connect multimeter leads directly to the 12V battery and select DC Voltage.
4. Turn communicator Power Switch “ON” and read voltage on multimeter. If voltage reads 11.5V or less, charge the battery. If the battery’s voltage continues to drop quickly, replacing the battery may be necessary.
5. Reinstall communicator by following steps 12 through 19 of section 6.6 (next section).

## 6.6 BATTERY INSTALLATION

The 2820A-02 and 2820A-03 are supplied with a single 12V gel-cell sealed lead-acid battery. To remove and install the battery:

1. Turn off communicator.
2. Disconnect AC power cord from AC power inlet located on side of case.
3. Disconnect all cables.
4. Remove (4) each 8x32 Phillips pan head screws from front panel.
5. Lift communicator out of chamber control panel and place on a flat clean surface.
6. Remove (4) each 8x32 Phillips pan head screws with star washers from rear chassis (2 each on top and bottom of chassis adjacent to rear of front panel).
7. Carefully separate rear chassis from battery box.
8. Disconnect the two slide terminals from battery (Black terminal from negative and red terminal from positive).
9. Lift out battery noting the position of battery.
10. Replace with new battery placing it in the same position as old battery.
11. Reconnect the two slide terminals to battery (Red terminal to positive first and then black terminal to negative).
12. Place rear chassis on top of battery box being careful not to pinch or damage any wires.
13. Reinstall the (4) each 8x32 Phillips pan head screws with star washers to chassis (2 each on top and bottom of chassis and hand tighten).
14. Perform Power On - Battery Check (see section 6.4.1 for details).
15. Install communicator back into chamber control panel.
16. Reinstall the (4) each 8x32 Phillips pan head screws to front panel to secure communicator into chamber control panel and hand tighten.
17. Reconnect AC power cord to AC power inlet located on side of case.
18. Allow battery to charge for 4 hours (charging time may vary depending on the age of the battery and the surrounding temperature).
19. Reconnect all cabling. The communicator is ready to use while charging.

## 6.7 UNIT NOT OPERATING

The most common reason that a chamber communicator appears to be dead when the POWER SWITCH and SPEAKER SWITCH are turned on, is a bad or loose battery. Check the battery per section 6.4. If the battery is good, then disconnect any chamber wiring and perform the communicator check out procedure per section 6.1.

If the battery and battery connections appear good and the communicator fails the check-out procedure, then remove the screws holding the front panel. Lift the front panel up carefully as the panel components are connected to a Printed Circuit Assembly (PCA) by a wire harness. Verify that the connectors on the PCA are firmly seated. Check that the wire harnesses are soldered to the various connectors, controls, and speaker. There should be no loose wires in the system. Remove the fuse from the PCA. It is marked FH1 and is a cylindrical component. Verify that the fuse is good by checking the continuity with a multi-meter. If the fuse is open, replace with a same type: 3.15 Amp, 250V, Fast Acting. Close the front panel; re-install the screws and re-test the communicator. If the communicator still appears dead, contact Amron for further assistance.

## 6.8 LOW VOLUME

Check the volume control settings and adjust if necessary. Check the chamber connections and verify that the chamber and operator are connected as intended. Verify the wires and connectors are clean and tight. Check the BATTERY CONDITION INDICATOR and test the battery if necessary. If the problem persists, disconnect the chamber wiring and perform the communicator check out procedure per section 6.1. If the communicator fails the check-out procedure, contact Amron for further assistance. If the communicator checks out, then the problem is likely in either the chamber wiring, the wiring of the chamber speaker(s), or an occupant's headset.

## 6.9 GARBLED VOICE TO THE CHAMBER

The CHAMBER VOLUME control is set too high. Reduce this control until the voice signal clears. If this does not solve the problem, check the chamber speaker and/or headsets for corrosion or other defect. Replace if necessary. If the operator is using a headset, remove the headset and communicate to an occupant by pressing the PUSH-TO-TALK BUTTON and talking into the PANEL SPEAKER. If this solves the problem then the operator headset may be wet or defective. If these steps have not solved the problem, then disconnect the chamber wiring and perform the communicator check out procedure per section 6.1. If the communicator fails the check-out procedure, contact Amron for further assistance. If the communicator checks out, then the problem is likely in the chamber wiring.

## 6.10 GARBLED VOICE TO THE OPERATOR

The OPERATOR VOLUME control is set too high. Reduce this control until the voice signal clears. If this does not solve the problem, check the chamber speaker or occupant's headset microphone for corrosion or other defect. Replace if necessary. If the operator is using a headset, remove the headset and listen to the occupant using the PANEL SPEAKER. If this solves the problem then the operator headset may be wet or defective. If these steps have not solved the problem, then disconnect the chamber wiring and perform the communicator check out procedure per section 6.1. If the communicator fails the check-out procedure, contact Amron for further assistance. If the communicator checks out, then the problem is likely in the chamber wiring.

### 6.11 CHAMBER CUTS OFF

This is usually caused by an intermittent connection between either the chamber wiring and the chamber communicator or the cable penetrator and the chamber speaker or occupant headset. Check all connections to verify that they are clean and tight. If the problem continues, then substitute the communication cable with a known good cable. If this solves the issue, then the communication cable is damaged and needs to be replaced or repaired. If none of these solutions fixes the problem then contact Amron further assistance.

### 6.12 FEEDBACK - FULL DUPLEX (4-WIRE) MODE

There are two forms of feedback that can affect the 2820A-02: acoustic feedback and cable crosstalk. Acoustic feedback occurs when an active microphone is close enough to pick up and amplify the signal from a speaker or earphone. The required distance between the microphone and speaker/earphone is dependent on the volume setting and the amount of acoustic isolation. For example, an operator headset left sitting on a work table my cause acoustic feedback. When the operator dons the headset at the same volume level, the acoustic feedback will no longer occur. The operator's head provides acoustic isolation between the microphone and earphone of the headset. The same is true for an occupant’s headset microphone and earphone.

To troubleshoot acoustic feedback issues first determine the source. One way to quickly determine the source of the acoustic feedback is to cover each active microphone with your hand one at a time. Another method is to adjust the volume controls one at a time. The volume control that stops the feedback indicates the source. For example, if the CHAMBER VOLUME control stops the feedback, the problem is likely in an occupant’s headset or chamber speaker. Common sources are feedback between the operator's headset microphone and the PANEL SPEAKER of the 2820A-02. If the operator wants to operate with the headset and leave the PANEL SPEAKER on, Amron recommends the operator move away from the 2820A-02 by using the Amron Model 2822-28 Remote Walk-and-Talk Module. This module provides an "extension" cord for the operator headset allowing the operator to operate away from the 2820A-02.

Crosstalk is caused by signal leakage between the microphone and earphone wires in the communications cable. In a good cable with all the wires open (not connected) the resistance between any two wires should be greater than 10 Meg-Ohms. Over time, the cable can be damaged and this resistance drops to the point that crosstalk can occur. When this occurs, the communication cable in the umbilical should be replaced. For a temporary solution, you can try swapping the position of the occupant’s earphone wires on the CHAMBER EARPHONE jack. If you are using a banana plug, simply unplug the chamber earphone and rotate by 180 degrees before reconnecting. If this does not solve the problem and the chamber wiring cannot be immediately replaced, then operate in 2-Wire mode until a replacement umbilical can be used. Amron strongly recommends the use of the shield, twisted pair communication cables.

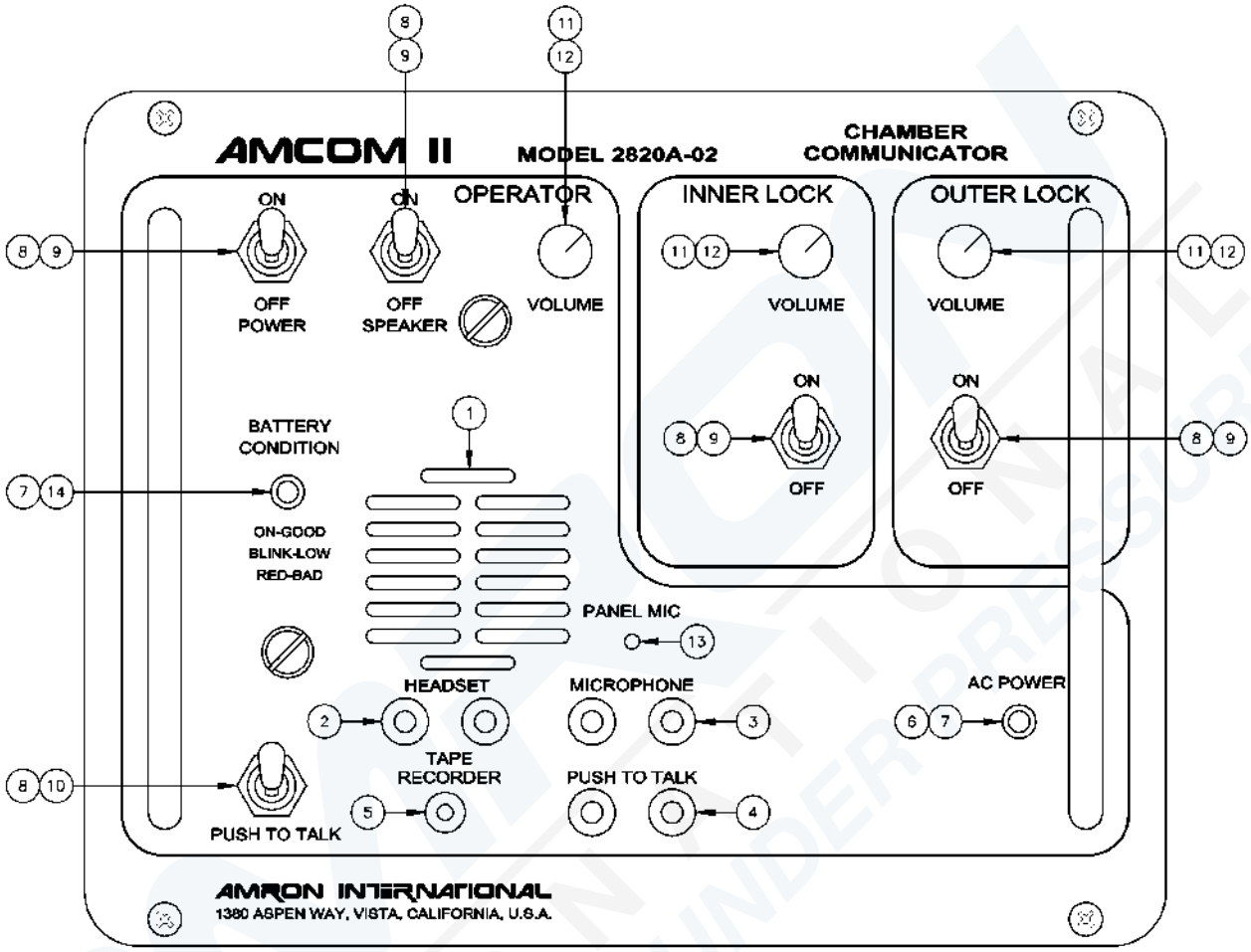
### 6.13 PUSH-TO-TALK DOES NOT WORK

If used, check the connection to the handheld microphone. A common issue is that the yellow banana plug is not properly seated in the PUSH-TO-TALK JACK. If the operator is using the PANEL SPEAKER as the microphone with the PUSH-TO-TALK BUTTON, make sure the SPEAKER SWITCH is turned on. If neither of these solves the problem, there could be a broken wire inside the chamber communicator. Open the front panel and inspect. If that does not resolve the problem then contact Amron for further assistance.

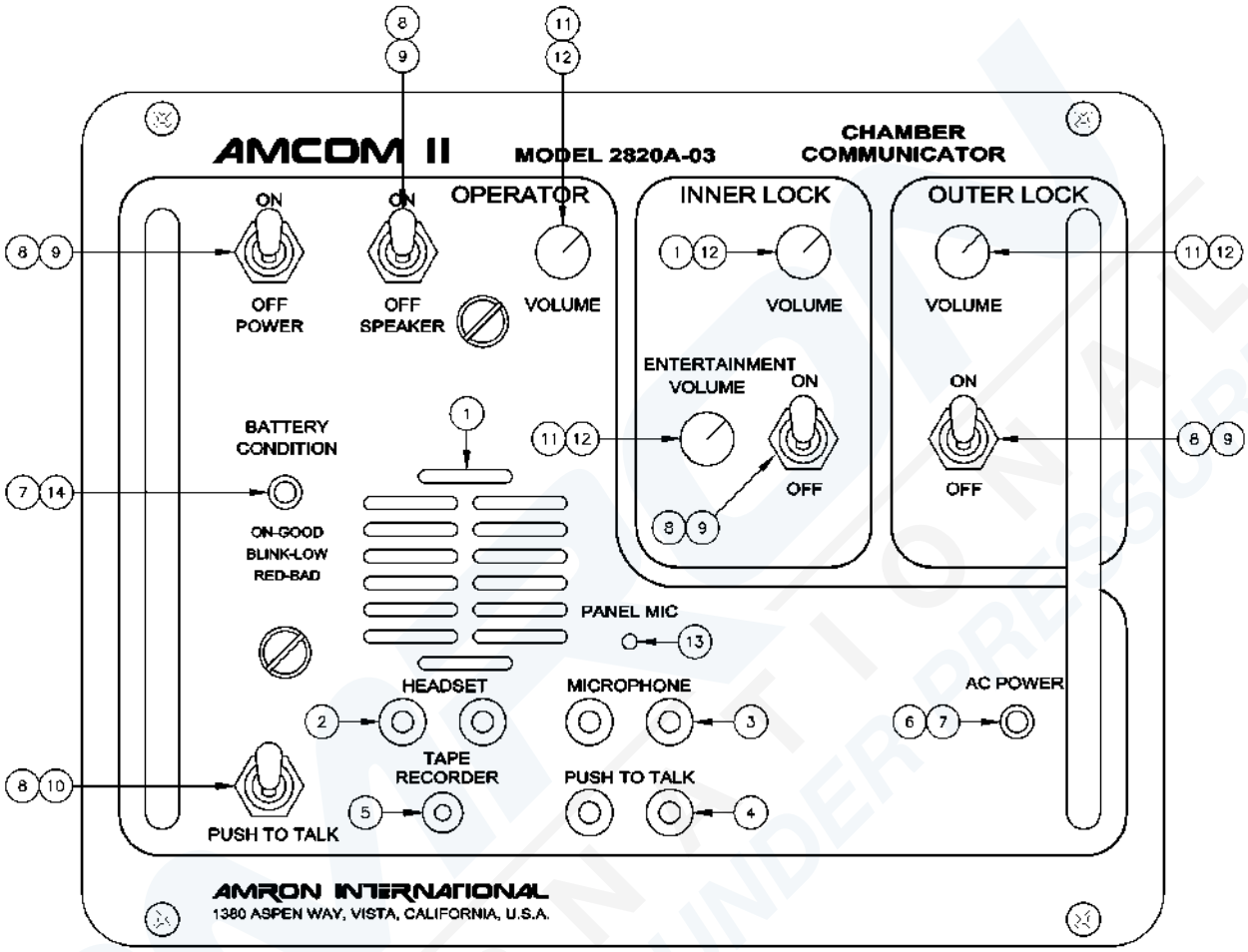
## 7 DRAWINGS

The following drawings illustrate the electrical and mechanical details of the chamber communication unit. The corresponding parts lists for each drawing are detailed in the parts lists section, or are included as part of the drawing. All drawings are at their current revision level as of the date of printing. Amron reserves the rights to revise the documentation without notification.

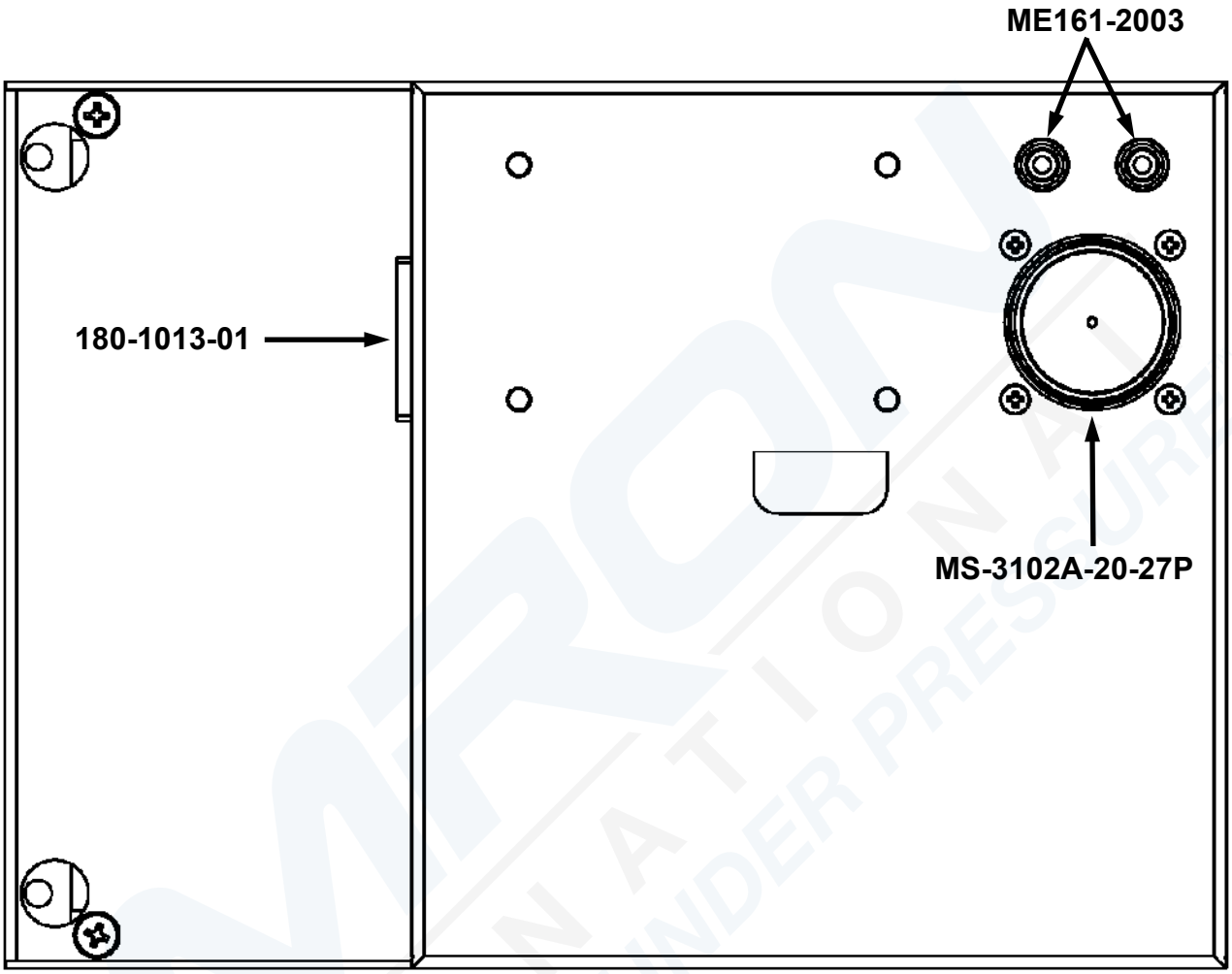
## 7.1 FRONT PANEL PARTS LOCATOR, MODEL 2820A-02



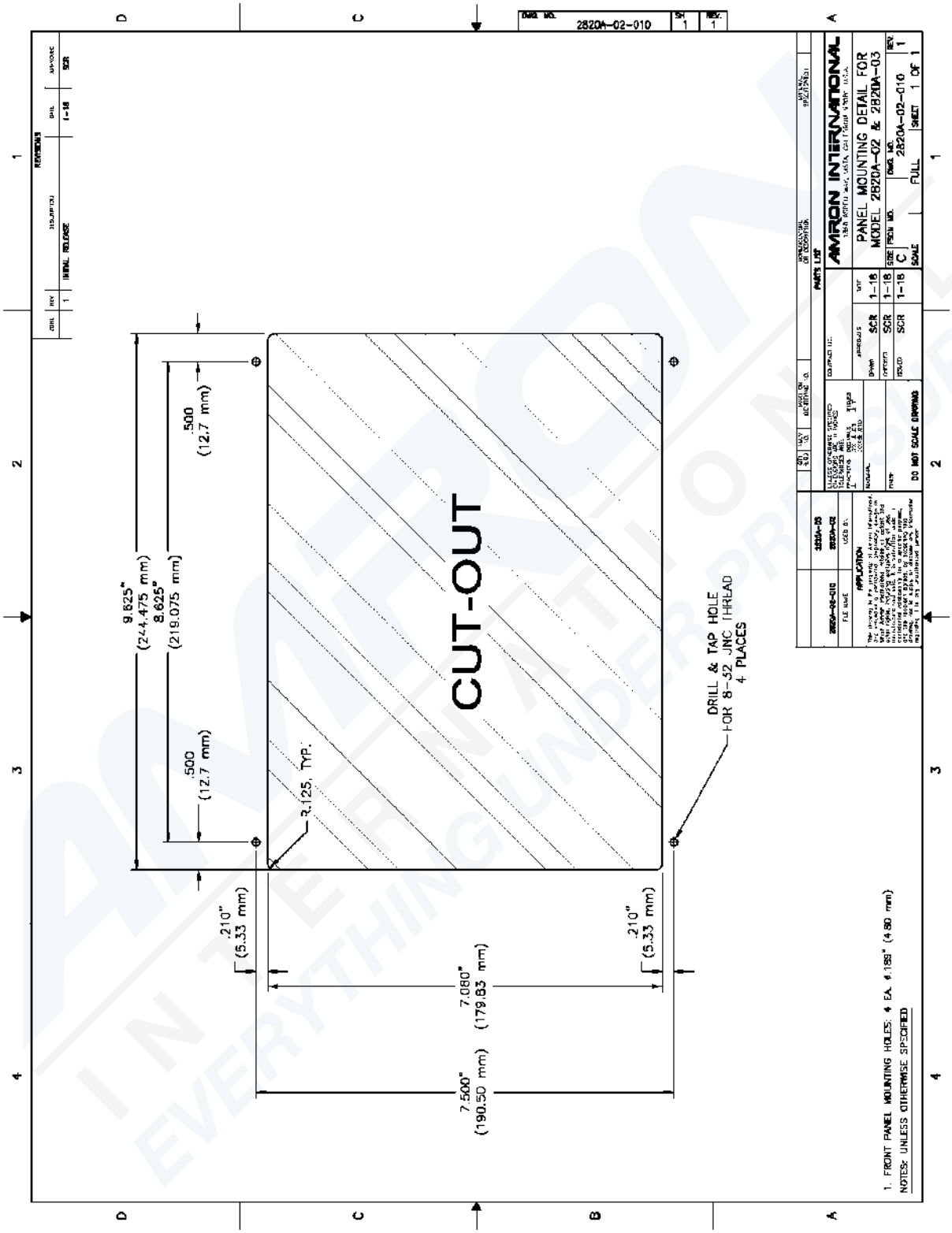
## 7.2 FRONT PANEL PARTS LOCATOR, MODEL 2820A-03



## 7.3 REAR PANEL PARTS LOCATOR, MODELS 2820A-02 & 2820A-03



## 7.4 MOUNTING DETAIL, MODELS 2820A-02 & 2820A-03



# 8 PARTS LISTS

The parts lists include both mechanical and electrical parts. The following information will be useful in interpreting data which is not self-explanatory.

**REVISIONS**

The parts lists in this manual are for the current model of communicator as of the printing date.

To Order Replacement Parts Contact:

Amron International, Inc.
1380 Aspen Way, Vista, California, 92081 U.S.A.
Telephone: (760) 208-6500 Fax: (760) 599-3857
Email: sales@amronintl.com
Web: www.amronintl.com

When ordering replacement parts, you should give as much information as possible to enable us to supply the correct part. This information should include the part number, description, reference designator, value, radio model number, and serial number. Failure to provide sufficient information may hinder our ability to fill your parts orders promptly and correctly.

## 8.1 MODELS 2820A-02 & 2820A-03

| PART # | DESCRIPTION |
|---|---|
| 570-1008-22 | 2-DV AMPLIFIER PC CARD, CHAMBER |
| 2820A-02-400 | FRONT PANEL ASSEMBLY |
| 2820A-03-400 | FRONT PANEL ASSEMBLY |
| 4003-502 | CHASSIS ASSEMBLY |
| 2405-28 | HAND HELD MICROPHONE, PUSH TO TALK |
| 190-0101-00 | POWER SUPPLY |
| 2890-05 | BATTERY, 12 VDC, RECHARGEABLE |
| P-2392 | CORD, AC EURO 3 COND |

## 8.2 2820A-02 & 2820A-03 FRONT PANEL COMPONENTS

| REF | PART # | DESCRIPTION |
|---|---|---|
| 1 | SA818 | SPEAKER 8 OHM 15 WATT |
| 2 | 1498-103 | JACK BANANA BLACK |
| 3 | 1498-102 | JACK BANANA RED |
| 4 | 1498-107 | JACK BANANA YELLOW |
| 5 | ME161-2003 | JACK PHONO W/NYL WSHRS NKL/BLK |
| 6 | LEDGREEN | LED GREEN BRITE |
| 7 | LEDHOLDER-BLK.25 | MOUNTING CLIP FOR 5MM LED |
| 8 | SWB-0001 | BOOT, TOGGLE SOFT GRAY |
| 9 | SW-201 | SWITCH TOGGLE ON/OFF DPDT |
| 10 | SW-208 | SWITCH TOGGLE DPDT-MOMENTARY |

| REF | PART # | DESCRIPTION |
|---|---|---|
| 11 | KLN-500B-1/4 | KNOB BLACK AL .5DIA .25IN SHAFT |
| 12 | 91A1AB24B15 | POTENTIOMETER 10K LINEAR |
| 13 | 24XX-MIC | PANEL MICROPHONE ASSEMBLY |
| 14 | LT2462-24-D51 | LED BI-COLOR RED/GREEN |

### 8.3 2820A-02 & 2820A-03 REAR CHASSIS COMPONENTS

| PART # | DESCRIPTION |
|---|---|
| MS-3106A-20-27S | MS CONN CABLE 14 PIN F |
| ME161-2003 | JACK PHONO W/NYL WSHRS NKL/BLK |
| 180-1013-01 | CABLE ASSY AC POWER MODULE |

### 8.4 28XXA-FS-03 FIELD SPARES KIT, 2820A-02 & 2820A-03

| PART # | DESCRIPTION | QTY |
|---|---|---|
| SW-201 | SWITCH TOGGLE ON/OFF DPDT | 1 |
| SW-208 | SWITCH TOGGLE DPDT-MOM | 1 |
| 1498-102 | JACK BANANA RED | 2 |
| 1498-103 | JACK BANANA BLACK | 2 |
| 1498-107 | JACK BANANA YELLOW | 2 |
| SWB-0001 | BOOT, TOGGLE SOFT GRAY | 2 |
| 91A1AB24B15 | POTENTIOMETER 10K LINEAR | 1 |
| KLN-500B-1/4 | KNOB BLACK AL .5DIA .25IN SHAFT | 1 |
| M-2786 | NUT A/B POTS | 2 |
| 8-32X3/4KTSB | SCREW, KNURLED THUMB BRASS | 2 |
| 0034.6019 | FUSE 3.15A/250V MICRO QUICK | 2 |
| LEDGREEN | LED GREEN BRITE | 1 |
| LT2462-24-D51 | LED; BI-COLOR RED/GREEN | 1 |
| LEDHOLDER-BLK.25 | MOUNTING CLIP FOR 5MM LED | 2 |

### 8.5 2820A-02 & 2820A-03 OPTIONAL SPARES

| PART # | DESCRIPTION | QTY |
|---|---|---|
| 570-1008-22 | P.C CARD ASSEMBLY | 1 |
| 190-0101-00 | POWER SUPPLY | 1 |
| 2405-28 | MICROPHONE PUSH TO TALK | 1 |
| 2890-05 | BATTERY 12VDC SLIDE TERM. GEL | 1 |

## 9 LIMITED WARRANTY AND SERVICE POLICY

# Amron International, Inc.

## LIMITED WARRANTY & SERVICE POLICY

### LIMITED WARRANTY

AMRON INTERNATIONAL, INC., (Amron) warrants that its manufactured products are free from defects in material and workmanship under normal use and service for a period of one year from date of shipment as described in Amron's literature covering this product. Oxygen Treatment Hoods and accessories are excluded and limited to 90 days. Amron's obligation under this warranty is limited to the repair of or replacement, at Amron's option, of defective material. This warranty shall not cover defects which are the result of misuse, negligence, accident, repair or alterations.

### SERVICE POLICY

For technical assistance or to request a repair, please complete one of the following:

- *Amron Communicator Repair* : https://www.amronintl.com/communicator-repair-form
- *Repair Request* (all other products): https://www.amronintl.com/repair-form
- Call (760) 208-6500, Monday – Friday, 8 a.m. to 5 p.m. PST.

Both MODEL NO. and SERIAL NO. are required fields to be entered on the *Amron Communicator Repair Request* form and can be found on the products identification label as shown below.

"Sample" Product Identification Label

*Do not* return any product without obtaining a RMR (Return Materials Request). Detailed return instructions will be provided at the time of request.

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