Instruction Manual
For
Amron International, Inc.

Model 2820A-4003 & 4003E
Chamber Communicator

S/N_____

1380 Aspen Way, Vista California 92081-8349
United States of America
Phone: (760) 208-6500
Fax (760) 599-3857
email: sales@amronintl.com
web: www.amronintl.com

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1. INTRODUCTION

The Amron International AMCOM II 2820A-4003 and 2820A-4003E 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 (115/230 V_{AC}) internal battery charger. The 2820A-4003E has all the features of the 2820A-4003 but also includes a separate entertainment amplifier circuit. This circuit is used with the Amron Model 3130 Entertainment Speaker to provide audio entertainment to the chamber occupants.

The AMCOM II Chamber Communicators have independent volume controls for the operator, inner lock and output 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-4003 and 2820A-4003E can operate in 2-Wire or Full Duplex (4-Wire) modes as described later in this manual.

2. SPECIFICATIONS

2.1 Electrical

Input Impedance (Microphone Inputs)	250 Ohms
Frequency Response	300 – 10,000 Hz
Common Mode Rejection (minimum)	40 dB
Entertainment Input Impedance	>10 kOhms
Current Drain - Maximum Full Volume	3 Amps
Typical Quiescent	250 mAmps
Minimum Load Impedance	4 Ohm
Nominal Power Supply Voltage	12 VDC
Operational Supply Voltage	9 - 18 VDC
AC Operational Supply Voltage	90 – 260 VAC
AC Operational Frequency Range	47 - 440 Hz
Sensitivity (Input)	16 mVRMS
Maximum Output Power (4 Ohm Load, 14 Vdc)	20 Watts
Battery Life (typical)	20 Hours

2.2 Mechanical

Panel	Stainless Steel
Enclosure	Black Anodized Aluminum
Length	10.125 in. (25.7 cm)
Depth	7.5 in. (19.1 cm)
Height	7.5 in. (19.1 cm)
Weight with Battery	14 Lbs. (6.4 kg)

3. ACCESSORIES

Amron produces a series of accessories designed to operate with the AMCOM II chamber communicators.

3.1 Amron Heavy-Duty Headset - Model 2401-28

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 II chamber communicators and other accessories. It includes a six foot (1.8 meter) cord.

3.2 Amron Standard Headset - Model 2460-28

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 II chamber communicators and other accessories. It comes with a spiral cord that can be extended up to 8 feet (2.4 meters).

3.3 Amron Single Earpiece Headset – Model 2460SM-28

The Model 2460SM-28 is a single earpiece version of the Model 2460-28 headset. The single earpiece design allows the operator to hold conversations with other personnel without having to remove the headset.

3.4 Amron Chamber Headset - Model 2460-31R

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.

3.5 Amron Chamber Extension Cable – Model 2460-31R-25

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

3.6 Amron Remote Walk-and-Talk Module - Model 2822-28

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

3.7 Amron Remote Push-to-Talk Module - Model 2821-28

Designed for 2-Wire applications, the Model 2821-28 provides the operator with mobility while maintaining communications with the chamber occupants. It comes equipped with a small clip-on belt module that contains a Push-to-Talk switch, banana jacks for the headset, and 25 feet (7.6 meters) of lightweight flexible cable. Custom cable lengths are available.

3.8 Audio Adaptor Cable - Amron Part Number 180-1000-00

A 2 meter long cable with two RCA Phono plugs that connect the entertainment audio input to a standard 3.5 mm stereo phone plug which mates to the headphone jack of most common portable audio devices.

3.9 Amron Chamber Communication Box – Model 3113

The Model 3113 provides communications between the operator and chamber occupants. It includes a 15 Watt, 8 Ohm speaker for 2-Wire operation and includes a headset connector for Full Duplex (4-Wire) communications mounted in a die cast zinc housing with a gray epoxy powder coat.

3.10 Amron Chamber Speaker Box – Model 3114

The Model 3114 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 a gray epoxy powder coat with stainless steel front panel.

3.11 Amron Chamber Communication Box – Model 3115

The Model 3115 Chamber Communication Box provides all the features of the Model 3113 along with a speaker on/off switch. This switch allows private communication when using a headset. This box is approved for U.S. Navy chambers.

3.12 Amron Chamber Combo Box – Model 3125

The Model 3125 is a combination Chamber Communication and Electrical Junction Box. It is designed for inner lock functions and mounts directly to a chamber penetrator via a penetrator adaptor bushing. It includes a chamber talk-back speaker for 2-Wire communications, a speaker on/off switch, a headset jack for 4-Wire communications, chamber temperature probe, sound powered phone and bracket, and power connection circuit for chamber internal conditioning system and chamber scrubber.

3.13 Amron Chamber Combo Box – Model 3126

The Model 3126 is a combination Chamber Communication and Electrical Junction Box. It is designed for outer lock functions and mounts directly to a chamber penetrator via a penetrator adaptor bushing. It includes a chamber talk-back speaker for 2-Wire communications, a speaker on/off switch, a headset jack for 4-Wire communications and sound powered phone and bracket.

3.14 Amron Chamber Junction Box – Model 3127

The Model 3127 is an 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 that mates with the Model 3128 wiring harness.

3.15 Amron Chamber Wiring Harness – Model 3128

The Model 3128 Chamber Wiring Harness provides all the wiring connections to inner and outer locks. It includes all the wiring for communicators.

3.16 Amron Chamber Entertainment Speaker – Model 3130

The Model 3130 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.

4. LIMITED WARRANTY and SERVICE POLICY

4.1 Limited Warranty

Amron International, Inc. warrants that its products are free from defects in material and workmanship under normal use and service, for a period of 90 days from date of shipment as described in Amron International, Inc., literature covering this product. 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.

4.2 Service Policy

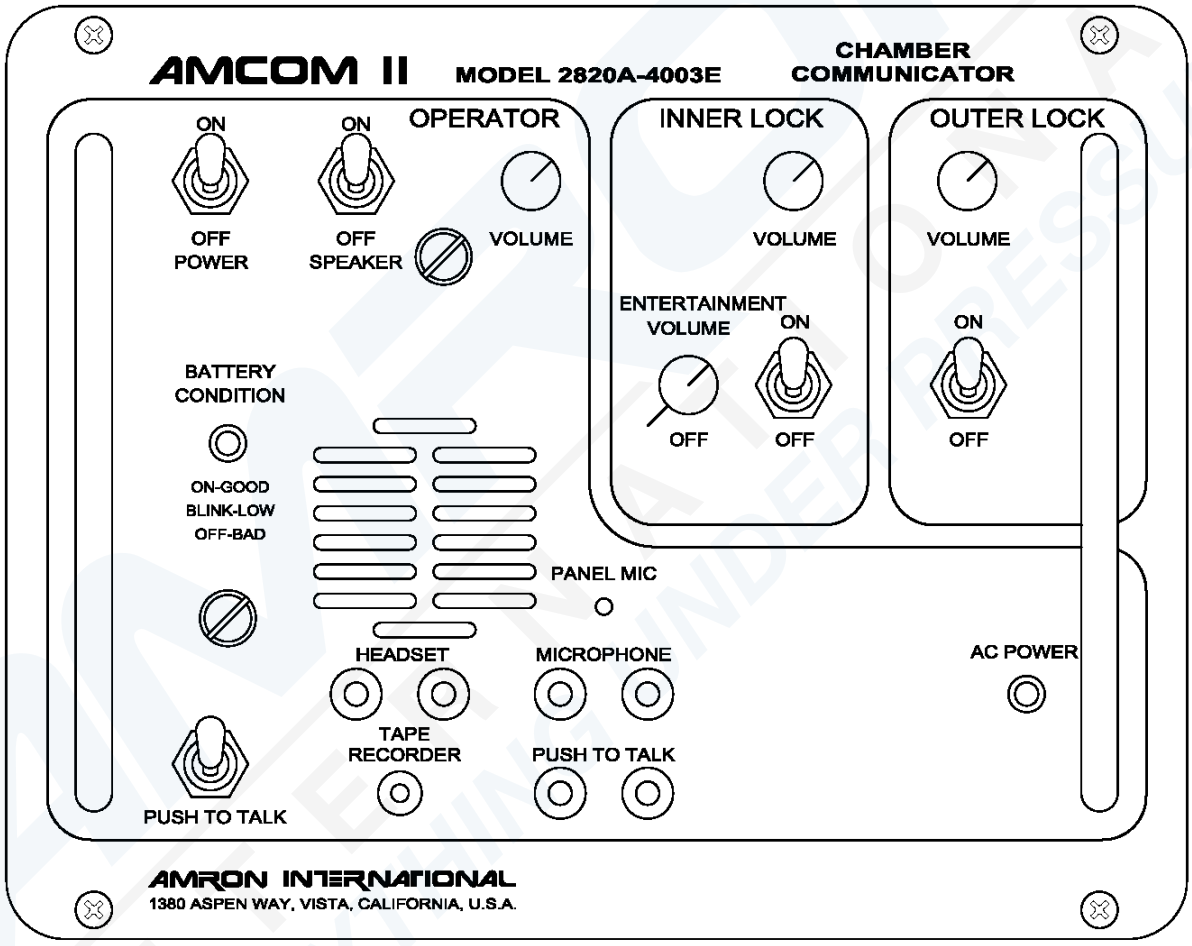
For technical assistance or to request a repair, please call (760) 208-6500, Monday – Friday, 8 a.m. to 5 p.m. PT. Have the model number and serial number handy and be prepared to offer as much information as possible about the problem.

Please do not return any product without obtaining a return authorization number. Detailed instructions will be provided at the time of request.

5. CONTROLS AND CONNECTIONS

Before using the 2820A-4003 and -4003E 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-4003 apply to the 2820A-4003E unless otherwise noted.

5.1 Operator and Lock Controls



5.1.1 **POWER SWITCH** – The power on/off control.

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

5.1.3 **PUSH-TO-TALK SWITCH** – 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.

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

5.1.5 **PANEL SPEAKER -** The panel speaker features a waterproof speaker that allows the tender 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.

5.1.6 **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.

5.1.7 **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.

5.1.8 **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 2820A-4003 battery be connected to AC power as soon as possible once the BATTERY CONDITION INDICATOR starts blinking.

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

5.1.10 **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.

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

5.1.12 **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.

5.1.13 **ENTERTAINMENT VOLUME (4003E 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.

5.2 Operator Connections

5.2.1 **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 5.6. 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 5.6. 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 tender 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 5.7. 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.

5.2.2 **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.

5.2.3 **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.

5.2.4 **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.

5.3 Back Panel Connections

5.3.1 **MS CONNECTOR** - There is a 14 pin MS Style connector located on the back panel that provides the electrical connection to the chamber. The pin functions are shown in the following table:

Pin Number	Function
K	Entertainment Speaker High (4003E Only)
L	Entertainment Speaker Low (4003E 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 -

5.3.2 **ENTERTAINMENT SPEAKER (4003E) -** This connection is only available on the 2820A-4003E. It is routed to a separate entertainment speaker, such as the Amron Model 3130, usually located in the Inner Lock.

5.3.3 **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 5.6.

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 5.6.

5.3.4 **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.

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

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

5.3.7 **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 18 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-4003 rechargeable sealed lead acid battery. If you use an external power supply, the maximum voltage needs to be limited to 15 Volts if the rechargeable battery is in the unit. If a higher voltage is to be used, it is advised that the battery be disconnected or removed from the communicator to prevent possible damage to the battery.

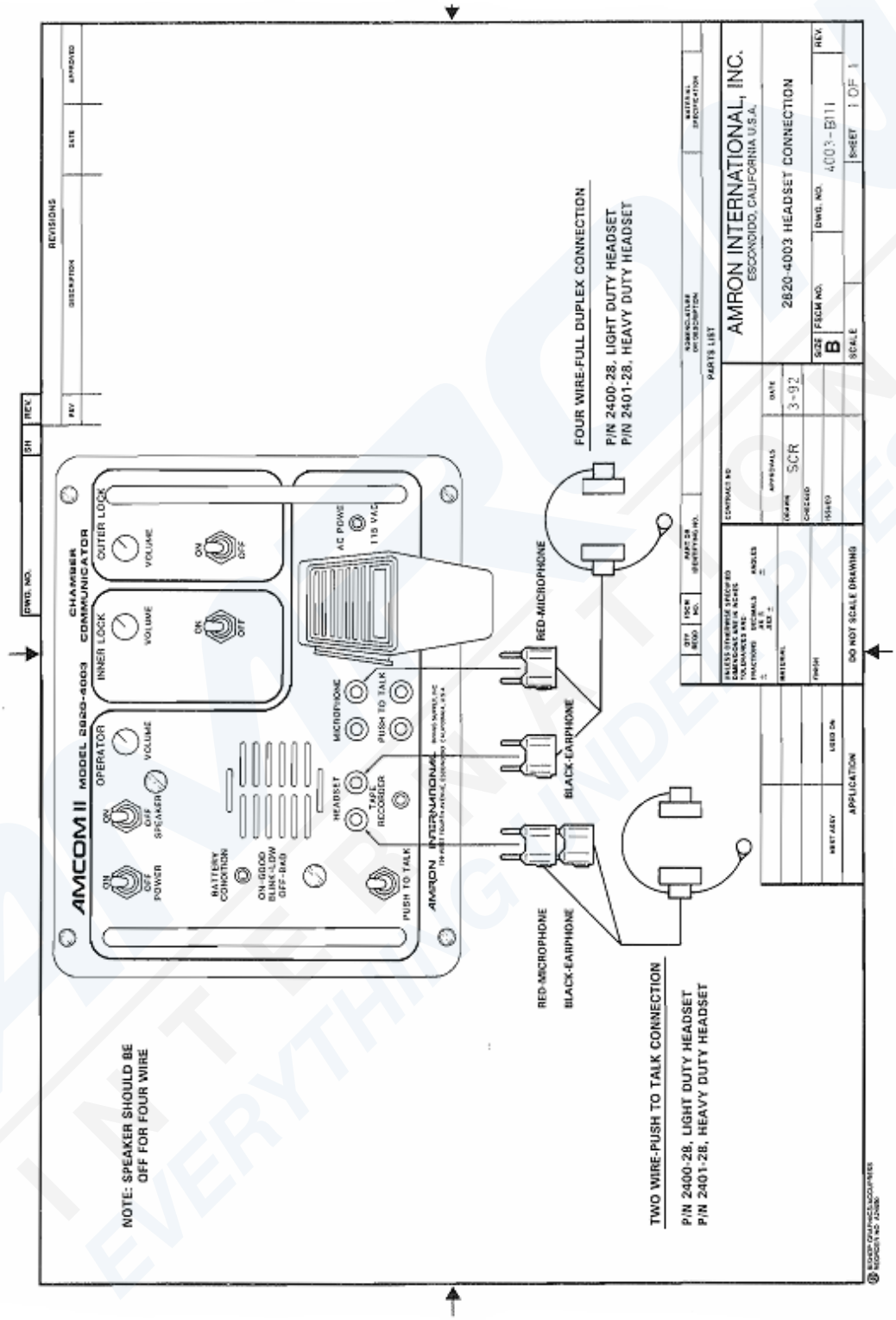
5.4 Entertainment Audio Input (4003E only)

This is a set of two RCA Phone jacks (color-coded red and white) 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).

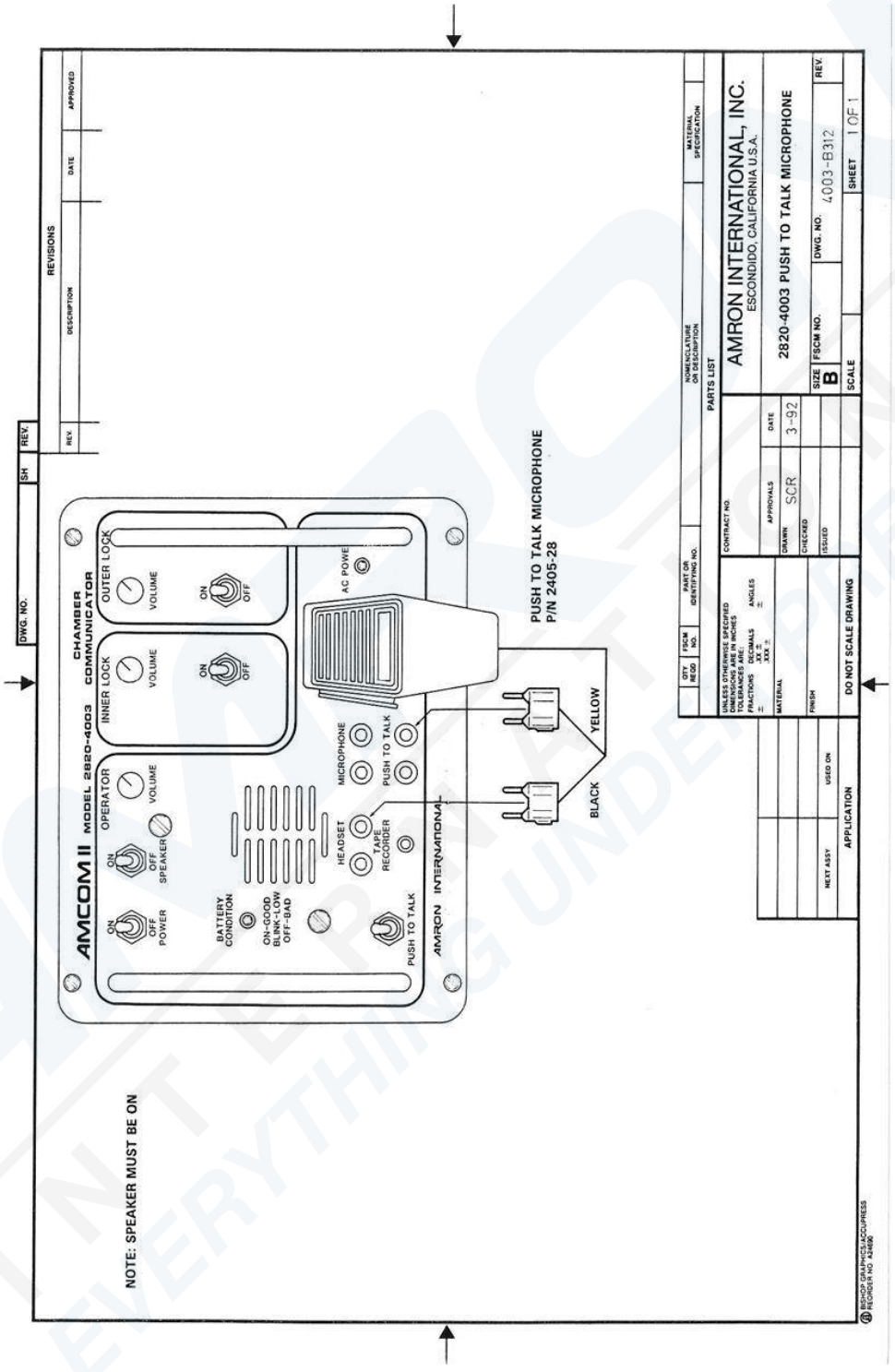
5.5 AC Power Inlet

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 47-440 Hz.

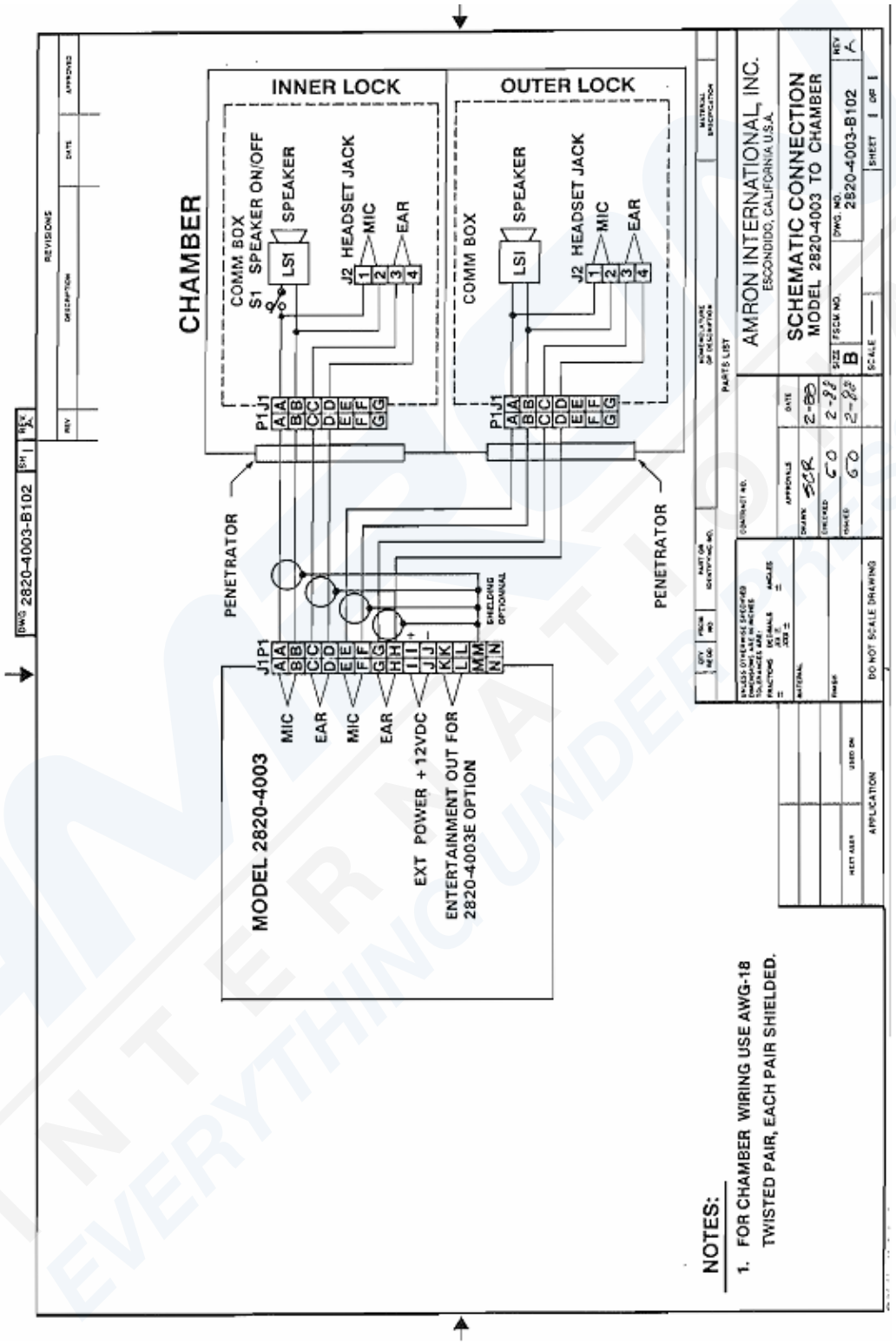
5.6 Drawing, Operator Headset Connections



5.7 Drawing, Push-to-Talk Connections



5.8 Drawing, 2820A-4003 to Chamber Wiring



6. INSTALLATION AND OPERATION

6.1 Operation

Before operating the communicator, it should be securely mounted to the panel. The panel cutout dimensions are shown in section 9.6.

6.2 Charging the Battery

The Models 2820A-4003 and 4003E 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 115 and 230 VAC lines without the user having to make any adjustments.

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.

The operating time for a fully charged battery is approximately 20 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.

6.3 Initial Power on - Battery Condition Check

Turn all the volume controls to minimum and turn on the POWER SWITCH. The state of the battery is shown on the BATTERY CONDITION INDICATOR as follows:

- A steady green light indicates the battery has sufficient voltage to operate the unit.
- A blinking green light indicates the battery is low and will need charging shortly, two hours of operating time remain.
- A steady red light indicates the battery voltage is too low to operate the unit. Communication should stop.

The BLINKING GREEN light provides a warning that the battery is low and should be changed or recharged before starting the chamber operation. When the indicator starts BLINKING GREEN, there is, depending on age of the battery and the ambient temperature, approximately 3 hours of remaining charge. A battery that has not been used for a long period of time will exhibit a higher voltage than the actual charge state. This is known as surface

charge and will quickly dissipate once the unit is turned on. It is recommended that the unit be left on for 5 minutes before relying on the BATTERY CONDITION INDICATOR.

6.4 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.

6.5 Modes of Operation

The Models 2820A-4003 and 2820A-4003E 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.

Full Duplex (4-Wire) 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 are cut off when the other is talking. 4-Wire does require the chamber occupant, as well as the operator, to wear headsets.

6.6 Setting the Volume Controls

6.6.1 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.

6.6.2 4-Wire 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.

7. MAINTENANCE

The following section describes the procedures for checking the operation of your 2820A-4003 & 4003E chamber communicator, general maintenance procedures, and how to troubleshoot common problems.

7.1 Chamber Communicator Check Procedures

The following are a series of step-by-step procedures to perform a functional check of your communicator. Use the appropriate procedure for the chamber communicator wired either 2-Wire or Full Duplex (4-Wire) mode.

7.1.1 FULL DUPLEX (4-WIRE CHECK)

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

- Set all volume controls to the mid-scale (halfway) position.
- Turn the SPEAKER SWITCH off to avoid acoustic feedback.
- 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.

- 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.
- Plug the microphone lead into the OPERATOR MICROPHONE (red) jack and the headset lead into the OPERATOR HEADSET (black) jack.
- 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.
- Go into the chamber inner lock and don the chamber headset
- Talk into the microphone. You should be able to hear yourself in the headset.
- Repeat in the outer lock.
- 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.

7.1.2 2-Wire Check

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

- Set all the volume controls to the mid-scale (halfway) position.
- Turn the SPEAKER SWITCH off to avoid acoustic feedback.
- 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.
- 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.
- Have the person in the chamber talk into the talk-back speaker. Verify you can hear them. Adjust the OPERATOR VOLUME as necessary.
- Repeat steps 4 and 5 in the outer lock.
- Insert the hand-held black plug into the TENDER 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.

7.2 General Maintenance

The chamber communicator is 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. Make sure it is securely mounted on the panel and the mounting screws are tight. Make sure the mating MS connector on the back panel is fully seated and the retaining ring is tight.
2. Clean the communicator after use or when needed.
3. When using a rechargeable battery, the battery should be recharged after use or as soon as possible when the BATTERY CONDITION INDICATOR starts blinking.

7.3 Recommended Maintenance Schedule

7.3.1 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.

7.3.2 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.

7.3.3 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 SWITCH and volume controls for smooth operation.
- Recharge the battery if the system is in storage and not regularly connected to AC power.
- Perform the 2-Wire and Full Duplex (4-Wire) system checks as described in section 7.1.

7.3.4 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.

7.3.5 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.

8. TROUBLESHOOTING

Most problems are usually simple issues that can often be found by careful inspection of the chamber communicator and wiring. The following section will describe the troubleshooting procedure for several common issues.

8.1 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.

8.2 Low-Battery Indication

The BATTERY CONDITION INDICATOR indicates the battery level or state-of-charge by monitoring the battery voltage. The battery voltage can be measured independently using a Voltmeter by measuring the voltage across the PUSH-TO-TALK JACK. The voltage has to be 9 Volts or greater for the communicator 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.

Before replacing either battery, the battery connections should be checked by opening the battery compartment and inspecting the wires. Verify that the wires are firmly attached and that the RED wire is connected to the positive terminal and that the BLACK wire is connected to the negative terminal.

8.3 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 8.2.

If the battery and battery connections appear good and the communicator fails the check-out procedure, then remove the screws holding the front panel. Remove the screw holding the front panel the chassis and 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 F1 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 the same

type: 3.15 Amp, 250V, Fast Acting. Reconnect the chassis to the front panel; re-install the communicator into the panel and re-test the communicator. If the communicator still appears dead, contact Amron per section 4.2 for further assistance.

8.4 Low Volume

Check the volume control settings and adjust if necessary. Check the occupant connections and verify that the occupant and operator are connected as intended. Verify the wires and connector are clean and tight (see section 5.3.1 for additional information). Check the BATTERY CONDITION INDICATOR and test the battery per section 8.2 if necessary. If the communicator fails the check-out procedure, contact Amron per section 4.2 for further assistance.

8.5 Garbled Voice to the Chamber

The LOCK VOLUME control is set too high. Reduce the volume until the voice signal clears. If this does not solve the problem, check the chamber speaker or headset earphone for corrosion or other defect. Replace if necessary. If the operator is using a headset, remove the headset and communicate to the chamber by pressing the PUSH-TO-TALK BUTTON and talking into the PANEL MIC. If this solves the problem then the operator headset may be wet or defective. If the operator is using the PANEL MIC to talk to the chamber, check the PANEL MIC for any accumulated dirt and clean if necessary. If these steps do not solve the problem then contact Amron per section 4.2 for further assistance.

8.6 Garbled Voice to the Operator

The OPERATOR VOLUME control is set too high. Reduce the volume until the voice signal clears. If this does not solve the problem, check the chamber talk-back speaker or headset microphone for corrosion or other defect. Replace if necessary. If the operator is using a headset, remove the headset and listen to the chamber 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 contact Amron per section 4.2 for further assistance.

8.7 Chamber Cuts Off

This is usually caused by an intermittent connection between either the chamber and the communicator or the internal chamber wiring and the talk-back speaker or chamber headset. Check all connections to verify that they are clean and tight. If the problem continues, substitute the chamber to communicator cable with a known good cable. If this solves the issue, then the original cable is damaged and needs to be replaced or repaired. If none of these solutions fixes the problem, contact Amron per section 4.2 for further assistance.

8.8 Feedback – 4-Wire Mode

There are two forms of feedback that can affect the 2820A-4003: 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 the chamber 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 OUTER LOCK VOLUME control stops the feedback, then the problem is likely in the headset located in the outer lock. Common sources are feedback between the operator's headset microphone and the PANEL SPEAKER. If the operator wants to operate with the headset and leave the PANEL SPEAKER on, Amron recommends the tender move away from the 2820A-4003 by using the Amron Model 2822-28 Remote Walk-and-Talk Module. This module provides an "extension" cord for the tender headset.

Crosstalk is caused by signal leakage between the microphone and earphone wires in the chamber wiring. 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 chamber communication wiring should be replaced. Amron strongly recommends the use of the twisted, shielded wire pairs for all communication cables to prevent cable crosstalk.

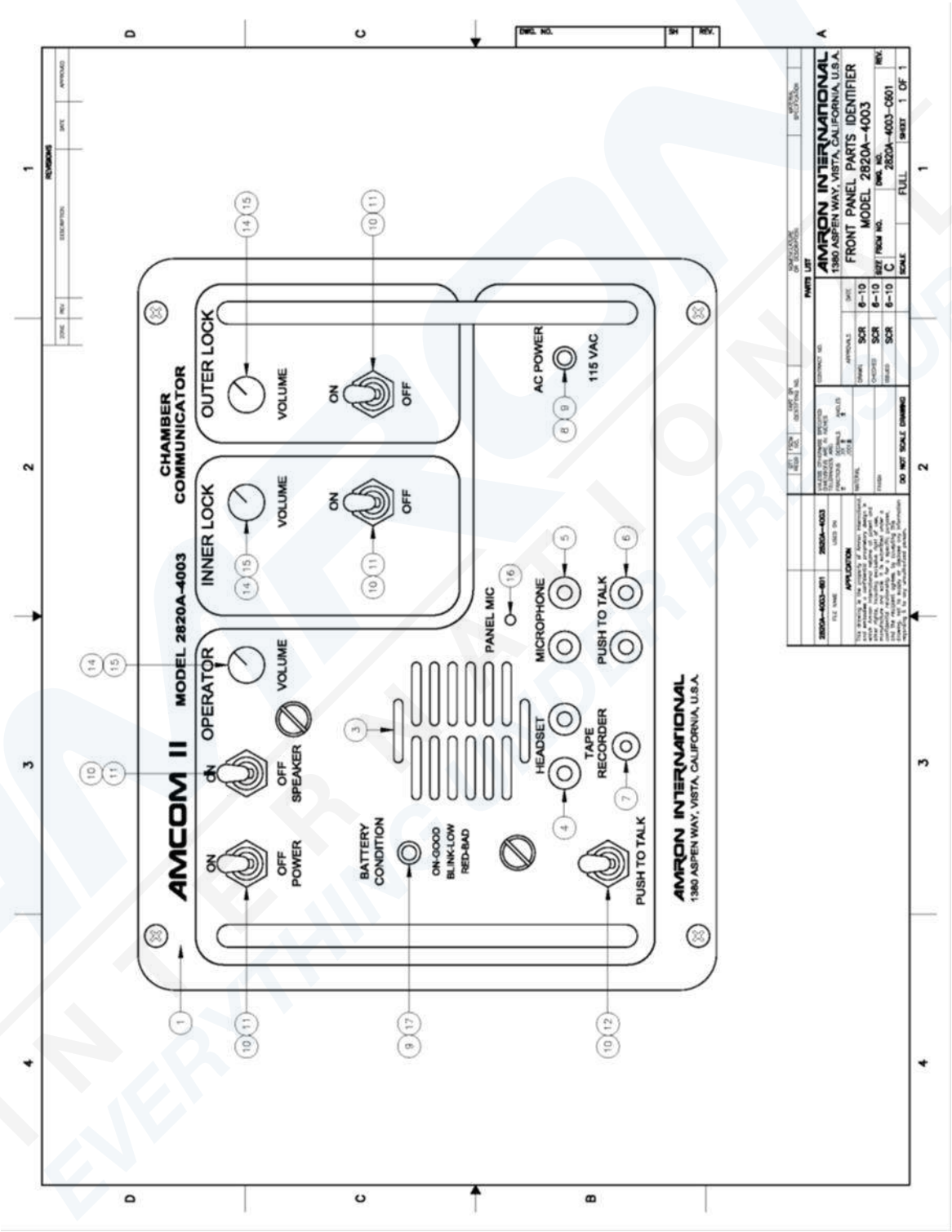
8.9 Push-To-Talk Does Not Work

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 MIC with the PUSH-TO-TALK SWITCH, 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 as described in section 8.3. If that does not resolve the problem then contact Amron per section 4.2 for further assistance.

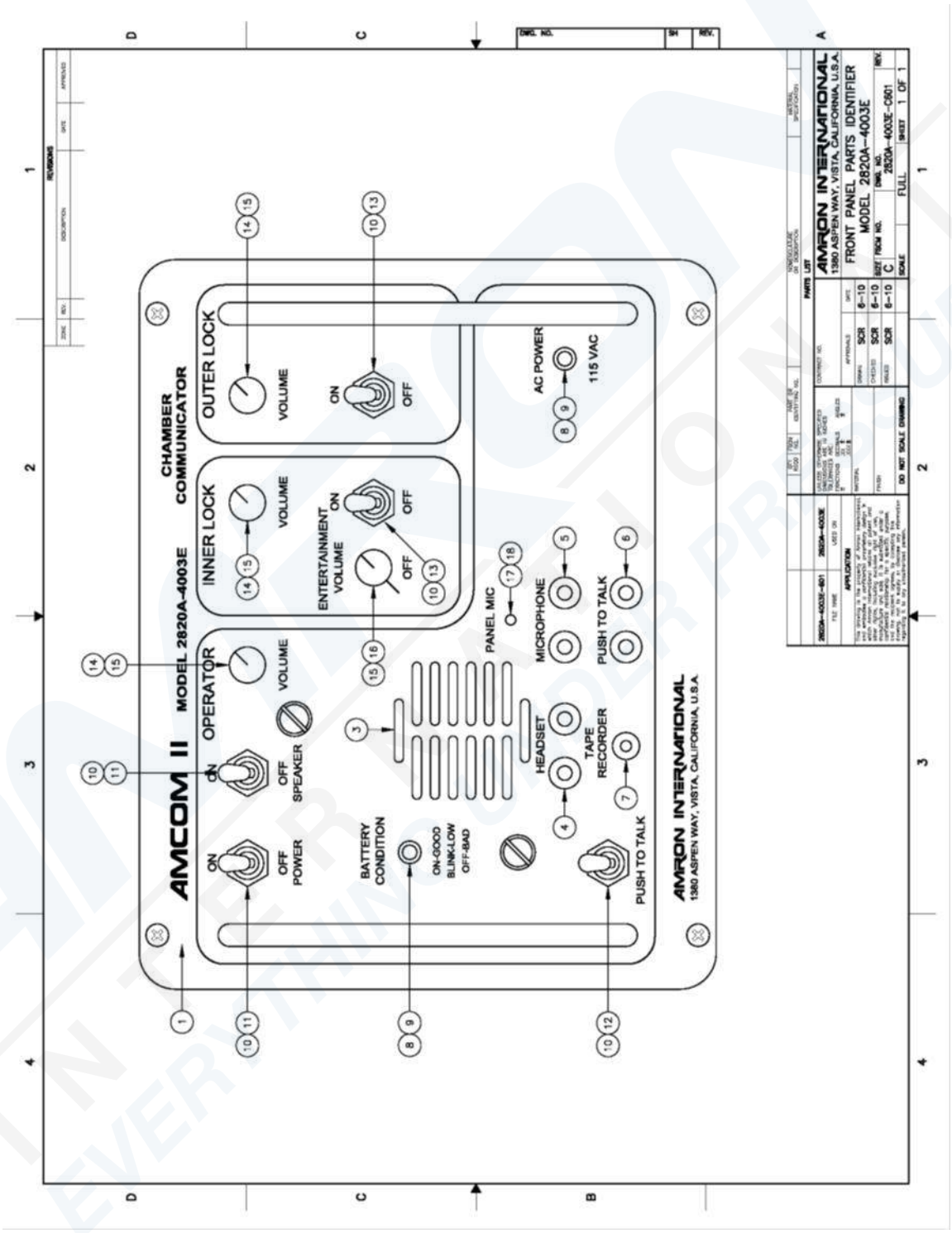
9. DRAWINGS

The following drawings illustrate the electrical and mechanical details of the AMCOM II Diver Communications. The corresponding parts lists for each drawing are detailed in the parts lists section, or are included as part of the drawing.

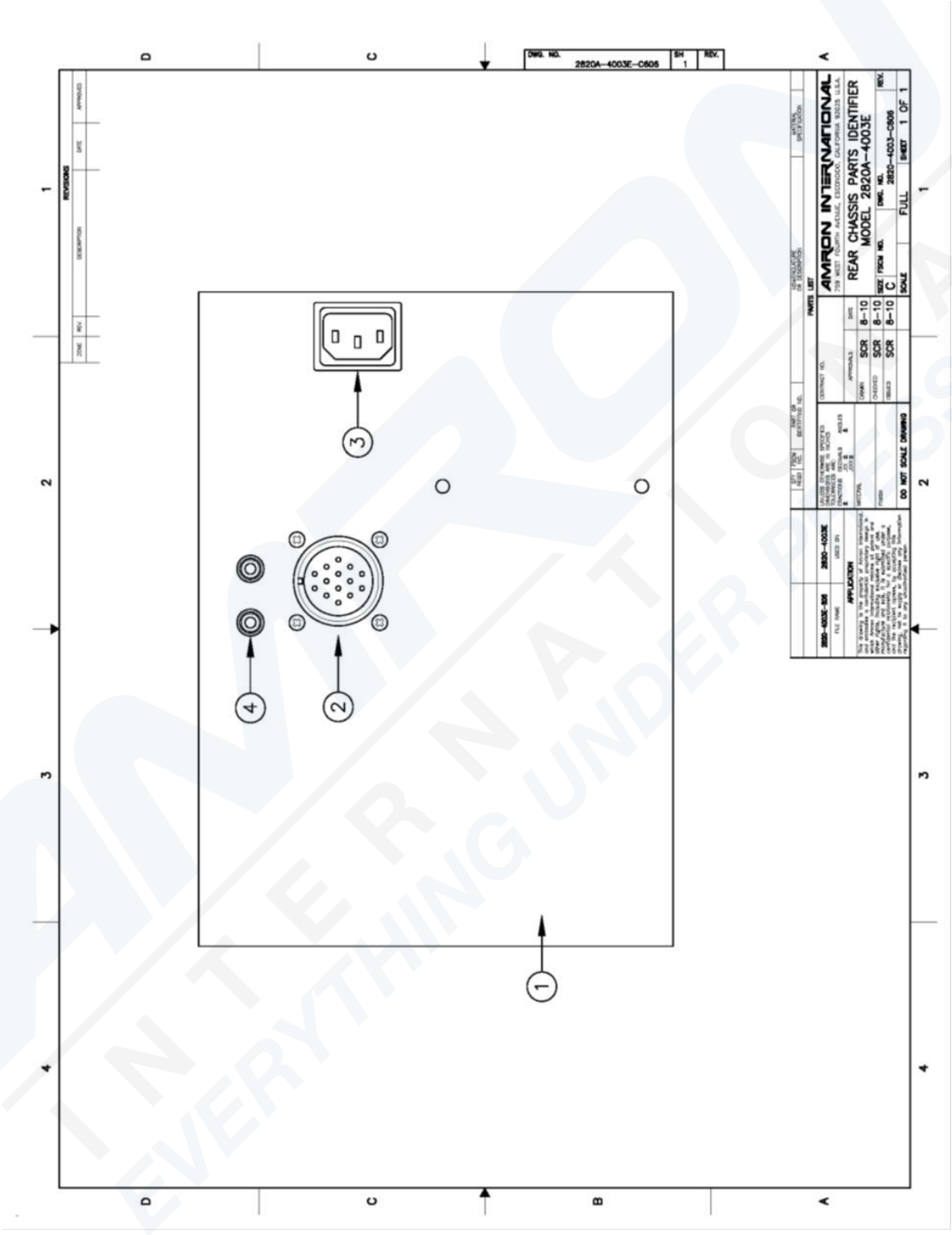
9.1 Front Panel Parts Locator, Model 2820A-4003



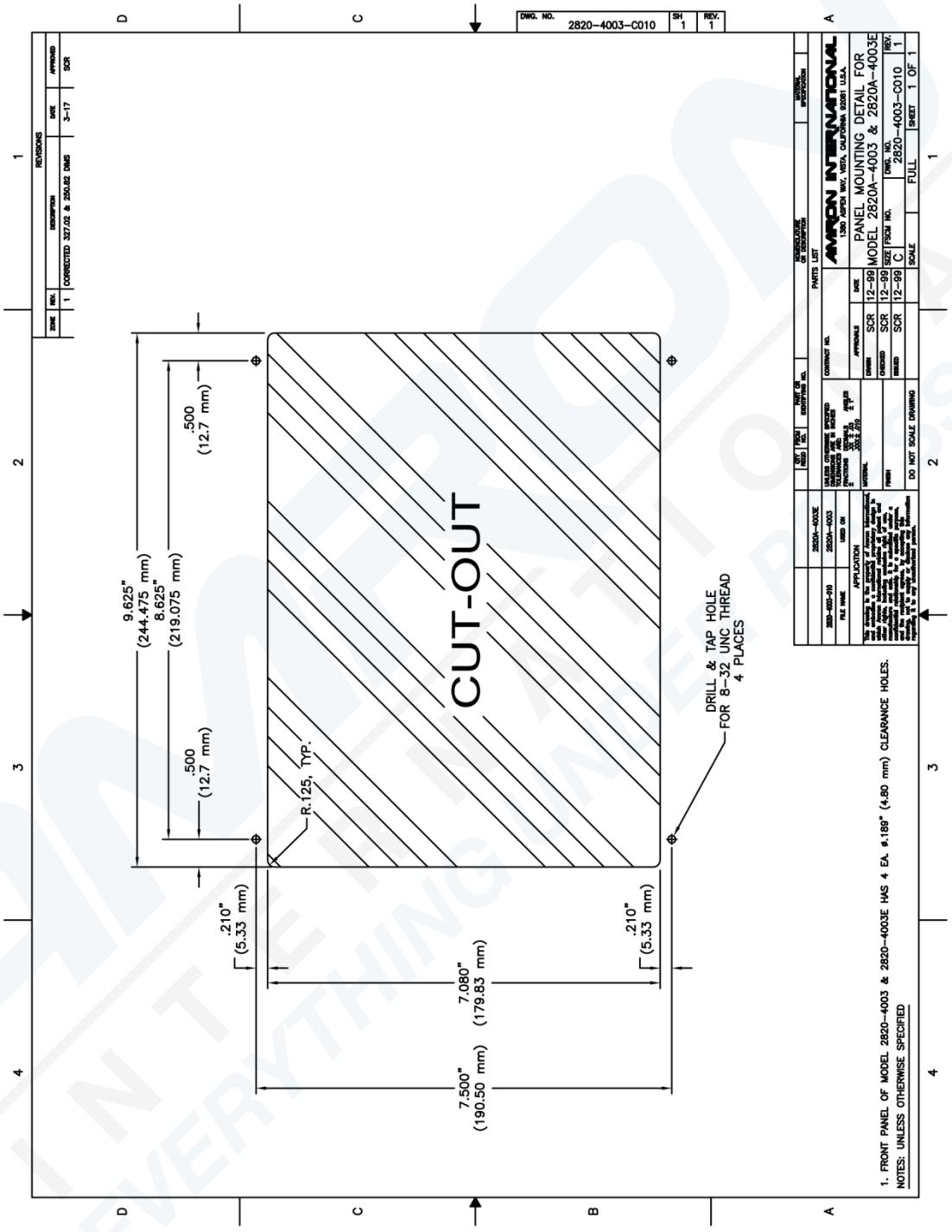
9.2 Front Panel Parts Locator, Model 2820A-4003E



9.3 Rear Panel Parts Locator, Models 2820A-4003 & 2820A-4003E



9.4 Mounting Detail, Models 2820A-4003 & 2820A-4003E



10. 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 hyperbaric 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, communicator model number, and serial number. Failure to provide sufficient information may hinder our ability to fill your parts orders promptly and correctly.

10.1 Model 2820A-4003 Top Assembly

Reference	Part Number	Description
1	570-1008-22	P.C CARD ASSEMBLY
2	*NOT AVAILABLE FOR SALE	FRONT PANEL ASSEMBLY WIRED
3	*NOT AVAILABLE FOR SALE	CHASSIS ASSEMBLY
4	2405-28	MICROPHONE PUSH TO TALK
5	2-520194-2	SLIDE TERM. (18/22).032 X .187
6	8-32X3/8SSPHP	SCREW 8-32X 3/8IN SS PH PHILL
7	8-32X1/4SSPHP	SCREW 8-32X1/4IN SS PH PHILL
8	8ISW	WASHER NO 8 INTERNAL STAR S/S
9	8FWF	WASHER FLAT FIBER NO 8
10	2890-05	BATTERY 12VDC SLIDE TERM. GEL
11	8-32X3/4KTSB	SCREW, KNURLED THUMB BRASS
12	2820A-4003/MANUAL	OPERATIONS MANUAL
13	MS-3106A-20-27S	MS CONN CABLE 4 PIN F
14	MS-3057-12A	MS CABLE CLAMP 20/22 SHELL
15	492	HANDLE ROUND 1.5X5.5X5/16
16	P-2392	CORD, AC EURO 3 COND
17	10-32X1/2SSPHP	SCREW, 1032X1/2” SS PH PL
18	10LWSSS	WASHER SPLIT LOCK NO 10 S/S
19	3500	CABLE TIE NY 3/32IN X 3.5IN
20	ME161-2003	JACK PHONO W/NYL WSHRS NKL/BLK
21	*NOT AVAILABLE FOR SALE	J2 CABLE ASSEMBLY
22	*NOT AVAILABLE FOR SALE	SHORTY BUSHING .750 HOLE
23	8511-30-00	CLIP CORD WHITE STYLE C2A
24	TAT-1/8	HEAT SHRINK TUBING 1/8IN BLACK

10.2 Model 2820A-4003E Top Assembly

Reference	Part Number	Description
1	570-1008-22	P.C CARD ASSEMBLY
2	*NOT AVAILABLE FOR SALE	FRONT PANEL ASSEMBLY WIRED
3	*NOT AVAILABLE FOR SALE	CHASSIS ASSEMBLY
4	2405-28	MICROPHONE PUSH TO TALK
5	2-520194-2	SLIDE TERM. (18/22).032 X .187
6	8-32X3/8SSPHP	SCREW 8-32X 3/8IN SS PH PHILL
7	8-32X1/4SSPHP	SCREW 8-32X1/4IN SS PH PHILL
8	8ISW	WASHER NO 8 INTERNAL STAR S/S
9	8FWF	WASHER FLAT FIBER NO 8
10	2890-05	BATTERY 12VDC SLIDE TERM. GEL
11	8-32X3/4KTSB	SCREW, KNURLED THUMB BRASS
12	2820A-4003/MANUAL	OPERATIONS MANUAL
13	MS-3106A-20-27S	MS CONN CABLE 14 PIN F
14	MS-3057-12A	MS CABLE CLAMP 20/22 SHELL
15	492	HANDLE ROUND 1.5X5.5X5/16
16	P-2392	CORD, AC EURO 3 COND
17	10-32X1/2SSPHP	SCREW, 1032X1/2” SS PH PL
18	10LWSSS	WASHER SPLIT LOCK NO 10 S/S
19	3500	CABLE TIE NY 3/32IN X 3.5IN
20	ME161-2003	JACK PHONO W/NYL WSHRS NKL/BLK
21	*NOT AVAILABLE FOR SALE	J2 CABLE ASSEMBLY
22	*NOT AVAILABLE FOR SALE	SHORTY BUSHING .750 HOLE
23	8511-30-00	CLIP CORD WHITE STYLE C2A
24	TAT-1/8	HEAT SHRINK TUBING 1/8IN BLACK

10.3 2820A-4003-400M Front Panel Assembly

Reference	Part Number	Description
1	2820A-4003-001*	FRONT PANEL 2820A-4003
3	SA818	SPEAKER 8 OHM 15 WATT
4	1498-103	JACK BANANA BLACK
5	1498-102	JACK BANANA RED
6	1498-107	JACK BANANA YELLOW
7	ME161-2003	JACK PHONO W/NYL WSHRS NKL/BLK
8	LEDGREEN	LED GREEN BRITE
9	LEDHOLDER-BLK.25	MOUNTING CLIP FOR 5MM LED
10	SWB-0001	BOOT, TOGGLE SOFT GRAY
11	SW-201	SWITCH TOGGLE ON/OFF DPDT
12	SW-208	SWITCH TOGGLE DPDT-MOMENTARY
14	KLN-500B-1/4	KNOB BLACK AL .5DIA .25IN SHAFT
15	91A1AB24B15	POTENTIOMETER 10K LINEAR
16	24XX-MIC	MICROPHONE ASSEMBLY ELECTRET
17	LT2462-24-D51	LED BI-COLOR RED/GREEN
18	1/4-20NUTSSL	NUT NYLOK 1/4-20
19	1/4-20X1.25HSBHC	SCREW 1/4-20 X 1.25IN S/S
20	1/4FWSS	WASHER FLAT 1/4 304 S/S

10.4 2820A-4003E-400M Front Panel Assembly, Entertainment

Reference	Part Number	Description
1	*NOT AVAILABLE FOR SALE	FRONT PANEL 2820A-4003
3	SA818	SPEAKER 8 OHM 15 WATT
4	1498-103	JACK BANANA BLACK
5	1498-102	JACK BANANA RED
6	1498-107	JACK BANANA YELLOW
7	ME161-2003	JACK PHONO W/NYL WSHRS NKL/BLK
8	LEDGREEN	LED GREEN BRITE
9	LEDHOLDER-BLK.25	MOUNTING CLIP FOR 5MM LED
10	SWB-0001	BOOT, TOGGLE SOFT GRAY
11	SW-201	SWITCH TOGGLE ON/OFF DPDT
12	SW-208	SWITCH TOGGLE DPDT-MOMENTARY
14	KLN-500B-1/4	KNOB BLACK AL .5DIA .25IN SHAFT
15	91A1AB24B15	POTENTIOMETER 10K LINEAR
16	24XX-MIC	MICROPHONE ASSEMBLY ELECTRET
17	LT2462-24-D51	LED BI-COLOR RED/GREEN
18	1/4-20NUTSSL	NUT NYLOK 1/4-20
19	1/4-20X1.25HSBHC	SCREW 1/4-20 X 1.25IN S/S
20	1/4FWSS	WASHER FLAT 1/4 304 S/S
21	M-2786	NUT A/B POTS

10.5 2820A-4003-500C Chassis Assembly

Reference	Part Number	Description
1	4003-005	BRACKET SUPPORT RAIL
2	*NOT AVAILABLE FOR SALE	CHASSIS BATTERY BOX-UNIVERSAL
3	*NOT AVAILABLE FOR SALE	CHASSIS UNIVERSAL CARD
4	MS-3102A-20-27P	MS CONN BULKHEAD 14 PIN M
5	4NUTSSL	NUT LOCKING 4-40 S/S
6	8ISW	WASHER NO 8 INTERNAL STAR S/S
7	8NUTSS	NUT 8-32 S/S
8	4-40X3/8SSPHP	SCREW 4-40 3/8IN S/S PH PHIL
9	8-32X1/4SSPHP	SCREW 8-32 1/4IN S/S PH PHIL
10	8-32X5/8SSPHP	SCREW 8-32 5/8IN S/S PH PHIL
11	8NUTSSL	NUT LOCKING 8-32 S/S
12	MFCCA-1/2	SPONGE1/2CC ADH BLK 42INX70IN
13	2823-6003	CHARGER CHASSIS ASSEMBLY
14	GEE62F-C0	GROMMET EDGING BLACK
15	*NOT AVAILABLE FOR SALE	HARNESS 9” POWER ENTRY

10.6 2820A-4003-FS-01 Field Spares Kit, 2820A-4003

Reference	Part Number	Description	Quantity
1	SW-201	SWITCH TOGGLE ON/OFF DPDT	1
2	SW-208	SWITCH TOGGLE DPDT-MOM	1
3	1498-102	JACK BANANA RED	2
4	1498-103	JACK BANANA BLACK	2
5	1498-107	JACK BANANA YELLOW	2
6	SWB-0001	BOOT, TOGGLE SOFT GRAY	2
7	91A1AB24B15	POTENTIOMETER 10K LINEAR	1
8	KLN-500B-1/4	KNOB BLACK AL .5DIA .25IN SHAFT	1
9	M-2786	NUT A/B POTS	2
10	8-32X3/4KTSB	SCREW, KNURLED THUMB BRASS	2
11	34.6617	FUSE 1.6A/250V SLOW MICRO	2
12	34.6019	FUSE 3.15A/250V MICRO QUICK	2
13	LEDGREEN	LED GREEN BRITE	1
14	LT2462-24-D51	LED; BI-COLOR RED/GREEN	1
15	LEDHOLDER-BLK.25	MOUNTING CLIP FOR 5MM LED	2

10.7 2820A-4003/4003E Optional Spares

Reference	Part Number	Description	Quantity
1	570-1008-22	P.C CARD ASSEMBLY	1
2	2823-6003	CHARGER CHASSIS ASSEMBLY	1
3	2405-28	MICROPHONE PUSH TO TALK	1
4	2890-05	BATTERY 12VDC SLIDE TERM. GEL	1