Instruction Manual
For
Amron International Diving Supply, Inc.

Model 8225-HP & 8225-HP2 AMCOMMAND II
Two Diver Air Control Systems

S/N_____

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SECTION

SECTION

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AIR CONTROL 1.1

High Pressure Input

Input Pressure Range ..... 500-3000 PSI with standard CGA850 Yoke Connections
***500-4500 PSI with optional 300 Bar DIN Adapters
Inlet Valve (Source Select).....2
Gauge - 0-5000 PSI ..... Accuracy +/- 1.5%
Check Valve, prevents reverse inlet flow 2
Input Filter, In Line Pre Regulator .....50 Micron
CGA850 Yoke connections with 6ft. High-pressure hose whips (standard).....2

***Available with optional 300 Bar DIN Adapters, Amron Part No. SAA5300

High Pressure Regulator, Tescom

Outlet Pressure Range.....0-265 PSI
High Flow ..... Cv = .24
Max Pressure .....4500 PSI

Low Pressure Input, with Check Valve

Max Pressure .....285 PSI
Inlet Connection (#6 JIC) 1
Diver Outlet Connection, (O2 Fitting) 2
Diver Outlet Valve 2
Air Pressure Gauge, 0-400 PSI ..... Accuracy +/- 1.5%
Over Pressure Relief Valve Set Pressure .....285 PSI

Universal Storage Block - CGA850 Yoke & 300 Bar DIN

HP hoses and CGA850 yokes or optional 300 BAR DIN connections are secured to universal storage blocks mounted on air control panel located inside of unit.

Panel

Material .....Stainless Steel
Powder Coating.....Black Textured Semi-Gloss Polyester
Silkscreen Graphics ..... Red, White & Blue

DEPTH MONITORING (PNEUMO) 1.2

Pneumo Gauge, 3D Precision

Mirrored Scale, 6 Inch 2
Range ..... Dual Scale 0-250 FSW/0-76 MSW
Divisions ..... 1 Foot
Accuracy ..... 0.25% of Full Scale

Pneumo Valve

Regulating Valve, KEL-F Seat 2

Outlet Connection

O2 Fitting Chrome Plated Brass 2

Low Pressure Alarm

Audio Range, 22.5-125 PSI ..... Factory Set at 100 PSI

Panel Material

Material ..... Aluminum
Powder Coating ..... Black Textured Semi-Gloss Polyester
Silkscreen Graphics ..... Yellow

COMMUNICATIONS 1.3

AMCOM II, Model 2825A-8225 2-Diver Communicator

Operating Voltage ..... 12 V DC
Power ..... Rechargeable Battery
or External Power ..... 12 VDC
Operating Time ..... Nominal 60 Hour
Charger ..... 110/220 Volt
Frequency Response ..... 300-7500 Hz
Audio Power ..... 12 Watt
Panel ..... Black Powder Coat over Stainless Steel with White Silkscreen Graphics

ENCLOSURE 1.4

Case Material

Pressure molded fiberglass, with aluminum and or stainless steel hardware. Includes carrying handle, latches, and stay hinge to lock unit in open position (upper section is locked upright in respect to lower section).

Case

Lid closed ..... 20" W x 14" D x 12" H
Lid Open ..... 20" W x 14" D x 21" H
Weight: ..... Approximately 70 lbs.
Color: ..... International yellow

DESCRIPTION 2.1

The AMRON AMCOMMAND II Model 8225-HP & 8225-HP2 is a portable self contained two diver high and low pressure air control, communication and depth monitoring (pneumo) system, for surface supplied diving operations. The system is designed to provide a central control point for the supply of breathing air to the divers, monitor the diver's depth, and provide two way communications between the divers and the surface. The system is a housed in a durable pressure fused fiberglass case, which provides a convenient, compact, rugged, professional system.

AIR CONTROL 2.2

The Air Control Section consists of two high pressure inputs, a single low pressure input, and two diver air connections.

Standard 3000 PSI MAX Input

Model 8225-HP & HP2 comes standard with 2 each CGA850 yokes attached to 6-foot long HP hoses. The CGA850 yoke limits the maximum input pressure to 3000 PSI.

Optional 4500 PSI MAX Input

Installing the 300 Bar DIN Adapters, Amron Part No. SAA5300, will increase the maximum input pressure limit to 4500 PSI. Simply remove CGA850 yoke nut and yoke from bleeder body, screw on 300 Bar DIN adapters, and tighten with a wrench.

Each input has a shut off valve and 0-5000 psi gauge.

Check valves provide protection against back flow of air from a full bottle to an empty, when switching HP bottles. High-pressure air is reduced to desired low pressure via a Tescom adjustable regulator. The input to the regulator is protected against contamination by a 50-micron filter. Regulator output pressure is adjustable over the range of 0 to 285 psi; a 2 1/2" 0-400 PSI gauge monitors the output pressure. The unit has an over pressurization relief valve, factory set to 285 psi.

The low-pressure input is #6 JIC (3/8), and has a check valve to permit simple switch over from low-pressure air to high-pressure air.

Divers air line connection is O_2 type fitting; control is via two 1/4 turn ball valves permitting unrestricted flow.

DEPTH MONITORING 2.3

The diver's pneumo connection is O_2 type fitting, pneumo valves are regulating type. Pneumo gauges are, 6" high precision 0.25% of full-scale accuracy, dual scale 0-250 FSW/0-76 MSW with 1 foot increments. Gauge protectors are provided for each pneumo gauge.

LOW PRESSURE ALARM MODULE 2.4

Low Pressure Alarm Module supplies a loud audio signal to alert the operator when a diver's air pressure falls below a preset limit of 100 PSIG.

COMMUNICATIONS 2.5

The diver communication system is based on the field proven AMRON Model 2825. The unit is powered from internal rechargeable gel cell batteries, battery charger provided. Operating time from fully charged battery is approximately 60 hours. Unit can also be operated from an external 12 V DC source, via charger jacks on the front panel. The communicator has a unique battery condition indicator; Steady GREEN light indicates battery voltage level is good. Blinking GREEN light indicates battery voltage is approaching a low level (approx 2-4 hours of operation remain). Steady RED light indicates battery voltage is below the level necessary to guaranty proper operation. WARNING: When Battery Condition indicator is steady RED light, communication will stop. The battery condition indicator also functions in the same manner when operating from an external power source.

Possibly the most useful feature of the AMCOMMAND communicator is the ability to operate the unit remotely. This feature allows the use of a hand held push to talk microphone (included), or a walk and talk type module (optional). This allows the tender (operator) to move about and still maintain contact with the divers.

The use of the noise canceling push to talk microphone automatically disconnects the speaker when talking to the divers cutting out the majority of the background noise, greatly improving the intelligibility of communications.

The communicator provides 12 watts voice power. This power level provides the volume necessary to communicate clearly even under difficult conditions. Standard controls include; power on/off, tender volume, diver volume, speaker on/off, 5-way binding post diver input, push to talk switch, headset/microphone jack, and remote push to talk jacks.

28/FDW Wireless Tender Option

Models 8225-HP/28/FDW & 8225-HP2/28/FDW Amcommand II comes with the Amron 2 Diver Deluxe Communications System with Wireless Tender. This feature allows the tender (operator) to be completely mobile around the dive sight while still remaining in constant contact with the divers. The wireless tender is a full duplex (SIMULCOM) system. The system comes complete with a built-in transceiver module with antenna and one wireless headset with clip-on belt module. The system allows unlimited headsets for listen only. The unit operates FM at 49 MHz. The range is up to 1/4 mile and uses one 9 volt battery.

DIVING SAFETY & REGULATIONS 3.1

Safe Diving does not happen by accident. There are few occupations in the world, which require such a broad range of knowledge and training as diving. There are many diverse factors, which can affect diving safety i.e., planning, weather, equipment, location, water conditions, as well as the type of work being done. The single most important factor in eliminating accidents is planning and attention to detail. Diving knowledge, training and experience are fundamental elements needed to execute a safe dive.

The following reference materials are recommended as sources of information for running a safe diving operation:

1. U.S. Department of Labor, OSHA Regulations 1910.401 Sub-part T–Commercial Diving Operations.

2. U.S. Navy Diving Manual.

3. Divers Handbook of Underwater Calculations.

Diving regulations

Several codes and regulations cover diving operations and procedures. In the United States most commercial diving operations are covered by the OSHA (Occupational Safety and Health Administration) regulations, or Individual State regulations, which are adopted from the federal regulations, and made a part of the civil code.

While government agencies are exempt from OSHA regulations, they generally fall under other regulations, which are similar or stricter than OSHA. If they are completely exempt, they must still abide by the procedures for operating a safe dive.

While no agency (within the U.S., for commercial diving operations) tests or approves equipment for use, they do establish minimum standards, which should be followed. The suitability of a given piece of equipment for a particular task is left to the supervisor of the dive. The following information is extracted from the OSHA regulations for commercial diving operations.

NOTE: The information is not presented as a direct or complete quotation, but rather as our interpretation of the regulations. Each diving supervisor should obtain a copy of these regulations for their own use.

Copies of the complete section of Commercial Diving Operations are available from Amron International for a nominal charge.

WARNING: DO NOT USE THE AMCOMMAND II FOR THE FOLLOWING

1. **Mixed gas diving operations with an oxygen level greater than 40%.**
2. **Oxygen or oxygen enriched breathing mixtures above 40%.**

The AMCOMMAND II is not designed or intended for these applications.

PERSONNEL REQUIREMENTS 3.2

1. Each dive team member shall have the experience or training necessary to perform assigned tasks in a safe and healthful manner. The person operating the AMCOMMAND II must be trained in the proper operating procedures, and emergency operating procedures.

2. It is the responsibility of the designated person in charge of the diving operation to be on-site at all times. He is responsible for all aspects of the diving operation affecting the safety and health of dive team members.

3. **The dive shall be terminated when:**
    1. A diver requests termination.
    2. A diver fails to respond to instructions.
    3. Diver communications are lost and can not be re-established quickly.
    4. A diver begins to use diver carried back-up breathing air, or location reserve breathing air.
    5. Operational conditions deteriorate to a point where safe diving can not be guaranteed.

AIR SUPPLY REQUIREMENTS 3.3

WARNING

Regardless of the type of air supply being used for surface supplied diving; the diver must always have a back-up supply of air. Generally this is in the form of a bailout bottle. The back-up air supply must be adequate to return the diver to the surface, if the dive requires in-water decompression this must be accounted for also.

1. The diver's air supply may originate from a low-pressure air compressor, high-pressure air cylinders, or a combination of both. Regardless of the source, the air must meet certain established standards of purity and must be supplied in an adequate volume for breathing.

2. The air supply requirements depend upon the specific factors of each dive such as depth, duration, level of exertion, and type of diving system (helmet/hat) being used. It is the dive supervisor's responsibility to ensure that an adequate supply of air is available and on site for the planned dive. This includes sufficient back-up air to safely return the diver to the surface in the event the primary supply of air is lost.

3. Low-pressure compressors used for breathing air should be specifically designed for diving. Compressors used to supply air to the divers shall be equipped with a volume tank which has a check valve on the inlet side, a pressure gauge, relief valve, drain valve, and a proper filtration system. The output of the air compressor system shall be tested for air purity every 6 months by means of an air sample.

4. Air compressor intakes shall be located away from and up-wind of, areas containing exhaust or other contaminants.

5. **NOTE: OSHA Regulations require** a decompression chamber capable of recompressing the diver at the surface to a minimum of 165 FSW (6 ATA) shall be available at the dive location for a surface-supplied air diving to depths deeper than 100 FSW.

CALIBRATION, SERVICE AND INSPECTION 3.4

1. Each depth gauge shall be dead weight tested or calibrated against a master reference gauge every 6 months, or if there is a discrepancy greater than two percent (2%) between any two equivalent gauges.

2. Each equipment modification, repair, test, calibration, or maintenance service shall be recorded by means of a tagging or logging system, and include the date and nature of work performed, and the name of the person performing the work. For your convenience a repair service log is provided at the end of this manual.

3. Equipment Inspection; Prior to each dive, the equipment shall be inspected and checked to ensure that it is in proper working order.

OPTIONS 4.1

Model 2821-28 Walk-and-Push-to-Talk (2-Wire Operation)

AMRON headset extension (remote walk and talk), with push-to-talk belt module, jacks for headset, 25 feet 1/4" O.D. cable. (Use with Model 2460-28 headset with boom microphone).

Model 2822-28 Remote Walk-and-Talk (4-Wire Operation)

AMRON headset extension (remote walk and talk), with belt module, jacks for headset, 25 feet 1/4" O.D. cable. (Use with Model 2460-28 headset with boom microphone).

Model 2460-28 Headset

Headset with boom microphone and color-coded dual banana plugs to mate to color-coded inputs on Amron communicators and accessory items.

Model 2829-01 Wireless Kit with Case

Wireless kit comes standard with a remote tender transceiver, wireless headset, wall charger, and case.

Model 2829-04 Wireless Headset

Wireless Headset with single ear muff and boom microphone. Full Duplex, includes voice-actuated transmitter.

Model 2405-28 Hand Held Microphone

Noise Canceling Hand Held Push to Talk Microphone.

Model SAA5300 300 Bar DIN Adapter

Converts a standard Amron CGA850 Yoke (3000 PSI) to 300 Bar DIN (4500 PSI) use.

LIMITED WARRANTY 5.1

AMRON INTERNATIONAL DIVING SUPPLY, INC. warrants that its products are free from defects in material and workmanship under normal use and service, as described in AMRON INTERNATIONAL DIVING SUPPLY, INC. literature covering this product, for a period of 90 days from date of shipment. 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 5.2

AMRON INTERNATIONAL encourages owners of equipment to call (760) 208-6500 for assistance if problems are encountered. Every effort will be made to assist in solving your problem. Equipment which must be returned to the factory for repairs should be safely packaged, insured, and shipped prepaid to:

Amron International, Inc.
1380 Aspen Way
Vista, Ca. 92081

Be sure to include the following information:

Your Name
Your Company
Shipping address
Phone Number
Contact Name

A short description of the problem is most helpful.

Valid in-warranty repairs will be made at no charge. Out-of-warranty repairs will be handled in the same fashion, except you will be advised of the repair charges before any work is done.

GENERAL 6.1

Before using the AMCOMMAND II Model 8225-HP or 8225-HP2, familiarize yourself with its operating controls and connections. For simplicity, the controls and connections are divided into three categories. The categories are Air Control, Pneumo, and Communications.

AIR CONTROL 6.2

The Air Control Section consists of a high-pressure section and a low-pressure section. The system is designed to supply breathing air to a diver through an umbilical. This is known as surface supplied diving. The air the divers are breathing is supplied from the surface.

A. High Pressure

Accepts breathing air from SCUBA bottles, or any other suitable source, i.e. high-pressure flasks. The pressure is reduced to a level suitable to the needs of the diver via a pressure-reducing regulator. The pressure required by the diver is determined by the type of helmet/hat being used and the depth the diver is working at. The general rule of thumb is bottom pressure plus over-bottom pressure required for a given type of diving hat/helmet. Consult your diving hat/helmet manufacture/manual for the requirement of the hat/helmet you are using.

The High Pressure Section has two inputs, complete with high-pressure hose whips, CGA850 SCUBA bottles yokes, and pressure reducing regulator.

Standard 3000 PSI MAX Input

All models comes standard with 2 each Amron CGA850 yokes attached to 6-foot long HP hoses. The CGA850 yoke limits the maximum input pressure to 3000 PSI.

Optional 4500 PSI MAX Input

Installing the 300 Bar DIN Adapters, Amron Part No. SAA5300, will increase the 8225-HP and 8225-HP2 to a maximum input pressure limit to 4500 PSI. Simply remove Amron CGA850 yoke nut and yoke from bleeder body, screw on 300 Bar DIN adapter, and tighten with a wrench.

1. Source select inlet valve handles are color coded Red and Blue to correspond to the Hose Whips which are also color-coded Red and Blue. This helps the operator identify which valve controls which tank. For maximum airflow, turn handle counter clockwise four (4) full turns. To shut-off valve, turn handle clockwise until it stops.
2. Inlet gauge reads actual input pressure of air source. Gauge pressure range is 0-5000 psi; accuracy is 1-1/2% of Full Scale.
3. Check valves, (HP section) prevents input air from one source flowing into a second lower pressure source when both source valves are open. This simplifies the switch over from one SCUBA bottle to another. NOTE: If both source valves are left open with full bottles the bottles will be drawn from equally.
4. The Amron CGA850 input yokes are standard with bleed valves and color-coded 6-ft. high-pressure hose whips. The CGA850 input yokes are limited to maximum pressures of 3000 PSI and fit standard SCUBA bottle valves.

AIR CONTROL (Continued) 6.2

5. A pre-regulator filter prevents debris from contaminating the regulator. Filter element is 50 micron.
6. High pressure TESCOM regulator(s) reduce pressure of incoming air from high-pressure bottles to a level required by diver's Hat/Helmet. To increase the diver's air pressure, turn knob clockwise to desired setting. To decrease the diver's air pressure, turn knob counter clock-wise.

Note: Regulator is a non-venting type, in order to reduce the set pressure, air must be flowing through the regulator.

B. Low Pressure

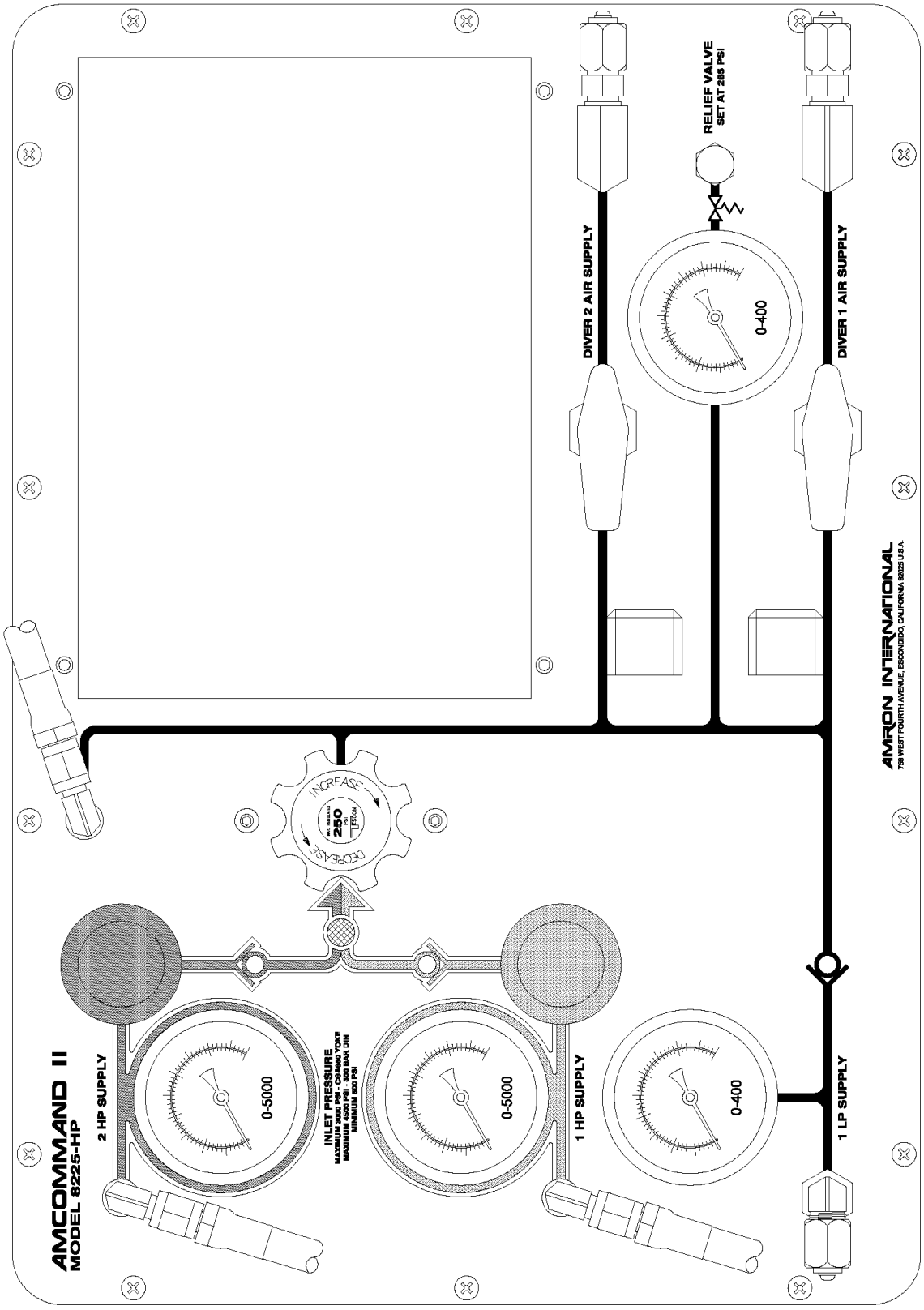
The Low Pressure Section consists of a LP input, low pressure output of regulator, LP gauge, and diver connection. A small portion of the LP air is also used when diver depth measurements are made.

Accepts breathing air from a low-pressure source i.e. a low pressure diving air compressor. Note: The low-pressure section does not regulate the air pressure to the diver. The compressor must be set to provide the proper pressure to the diver.

Breathing air from the low-pressure side of the regulator or the low-pressure input is routed to the diver's breathing air connections. A portion of the low-pressure air is used by the pneumo section for diver depth measurements.

1. Low pressure input, #6 JIC type fitting. (O_2 type fitting available).
2. Low-pressure check valve prevents the back flow of air from the HP regulator output into the LP air source. This also permits simple switch over from LP to HP air.
3. 1/4 Turn ball valve, controls flow of air to diver, ball valve permits unrestricted flow.
4. Divers air supply gauge reads air pressure to divers, 0-400 PSI.
5. Divers air supply outlet connection, O_2 (oxygen) type fitting. (37^o JIC optional).
6. Pressure relief valve, factory set for 285 PSI, vents excess pressure to atmosphere. Vent is located between diver output connections.

AIR CONTROL FRONT PANEL, MODEL 8225-HP 6.3



DEPTH MONITORING (PNEUMO) 6.4

The Pneumo Fathometer section is used to measure the diver's depth. Pneumo readings are made by pressurizing the diver's pneumo hose; air is forced through the pneumo hose until all water is displaced. The air is then shut off, and the pressure is read on a high accuracy gauge calibrated in FSW (feet of seawater). See Section 8, Page 33, Par. 12 for details. The system components are:

1. Diver pneumo valve (yellow handle) controls the air supply to the pneumo Fathometer system, one for each diver.

2. Pneumo gauge, dual scale 0-250 FSW/0-76 MSW, mirrored scale, 6 inch, high precision, 0.25% of full scale accuracy, one for each diver.

3. Diver pneumo outlet connections are O_2 (oxygen) type fittings. (37^o JIC fitting optional).

LOW PRESSURE ALARM 6.5

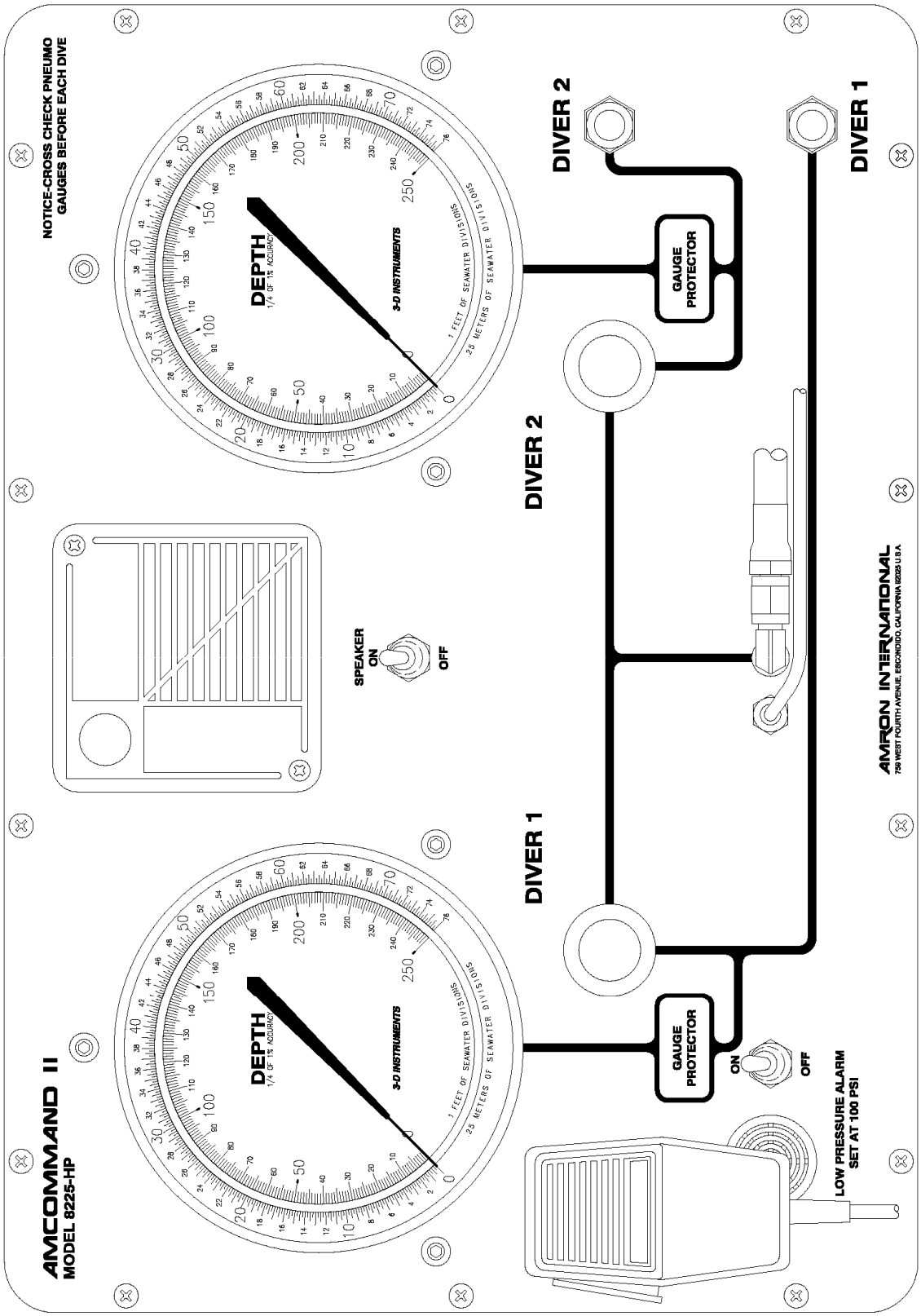
Monitors the diver's air pressure. Alarm is factory set to 100 PSI, when pressure drops below the set point the audio alarm is turned on.

1. ON/OFF switch turns alarm on or off as desired.

2. Audio transducer emits audio tone at 2900 Hz at a level of 90 dB.

3. Pressure switch, (internal) adjustable 25 to 300 PSI set point. Factory set to 100 PSI.

PNEUMO FRONT PANEL, MODEL 8225-HP 6.6



COMMUNICATIONS 6.7

Two-way communications with divers. High power folded acoustic horn, provides ample volume for noisy environments. Speaker is mounted in the optimum plane to direct sound to the operator.

1. Speaker, 15 watt folded acoustic horn, with talk-back capability.
2. Speaker ON/OFF switch allows operator to shut speaker off when using headset.
3. Speaker automatically disconnects when using the hand-held push to talk microphone. This eliminates excessive background noise resulting in clear tender to diver communication.
4. Diver to tender and tender to diver voice communication, via a communications cable in the diver's umbilical.

Tender Controls

1. "ON/OFF" power switch - applies power to the unit from internal batteries or an external power source.
2. "Push to talk" switch allows tender to diver communication.
3. "Diver to Tender volume" - is the volume control from diver to tender. Rotate clockwise to increase volume from diver.
4. Tender to Diver volume" - controls tender volume to the diver. Rotate clockwise to increase volume to diver.
5. "Hand Held Microphone" - convenient method to talk to divers, automatically activates the push to talk function and disconnects the talk back speaker reducing background noise. This feature significantly improves intelligibility.

Tender Connections

1. "Headset Jack" - Dual banana jack (black color) connection for headset, hand held microphone or remote push to talk module (Model 2821-28). Provides walk/ talk capability.
2. "Microphone Jacks" - Dual banana jack (red color) connection for headset microphone.
3. "Remote Push To Talk Jacks" - Dual banana jack (yellow color) connection for remote push to talk module (Model 2821-28), or hand held microphone.

Diver controls (separate controls for each diver)

1. "Tender to Diver Volume" - Adjusts volume from Tender to Diver.
2. "Diver to Tender Volume" - Adjust volume from Diver to Tender.
3. "Diver ON/OFF" - cuts off diver, spring-loaded switch returns to ON when released.
4. "Diver Cross-talk" - Permits one diver to talk to the other when operating in the 2-wire mode.

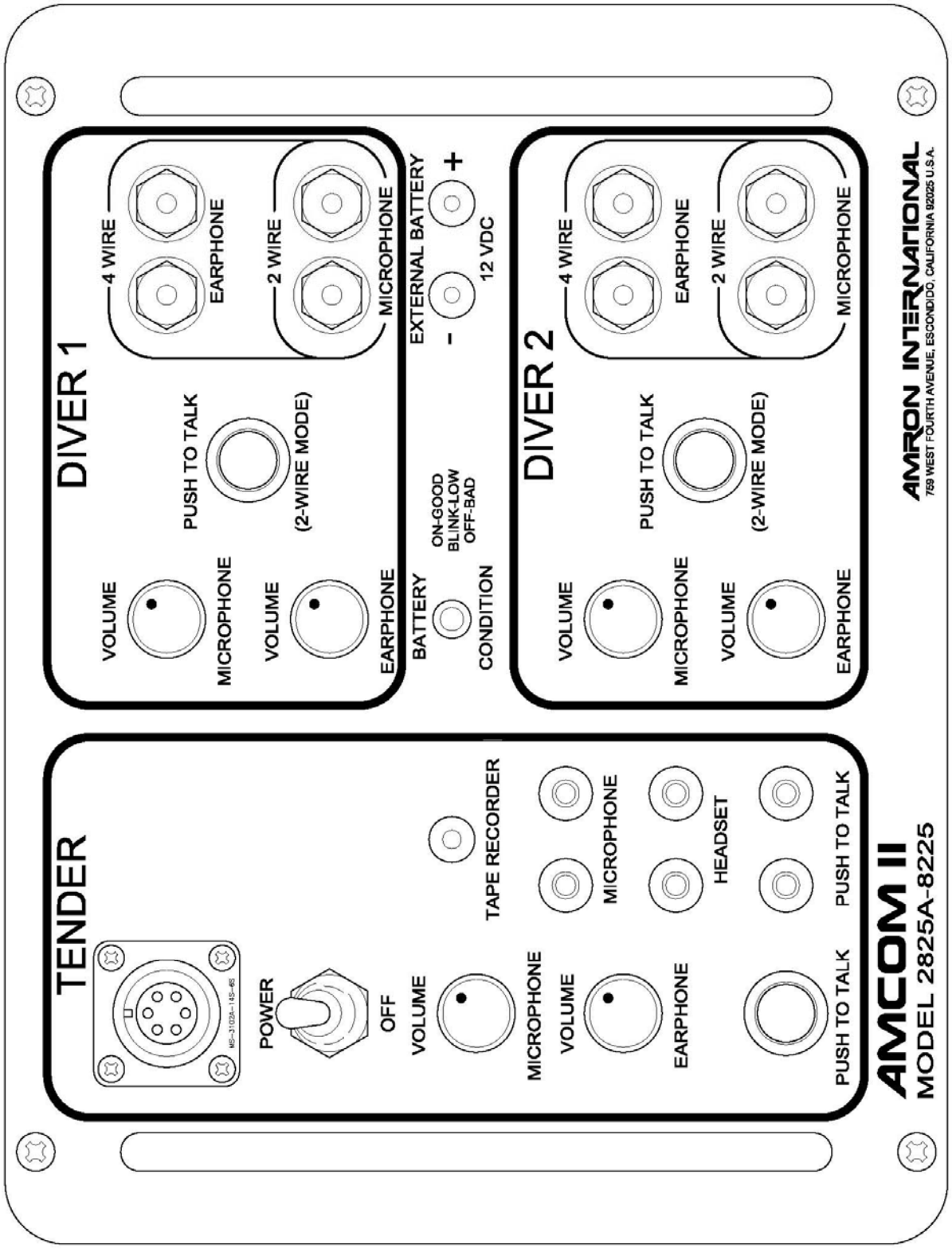
Diver Connections

1. "Diver Input, Microphone" - Dual 5-way binding post connection to diver's umbilical (used for both microphone and speakers when operating in the 2-wire mode).
2. "Diver Output, Earphone" - Dual 5-way binding post connection to Diver's umbilical, (used for earphone connection when operating in the Simulcom Mode).

Power Connections

1. "Battery Charger/External Power, Jacks" - red = positive, black = negative. Tip jack connection for battery charger or external battery.
2. "Battery Condition Indicator, LED" - LED light indicates Power On by a steady light. Blinking light, battery has reached a low level (2-4 hours of operation remain, when light first began to blink). Light goes out when battery voltage has dropped to a point where the reliable operation of the unit can no longer be guaranteed.

COMMUNICATOR FRONT PANEL, MODEL 2825A-8225 6.8



PRE-DIVE SET-UP 7.1

1. Place AMCOMMAND II on flat surface that can support the unit. Select a working area which is secure, stable, convenient, and suitable for use during the period of the dive.
2. Open unit and remove both yokes and color coded high pressure hose whips from the storage position. Conduct a visual inspection of unit to insure no damage has occurred during transportation to the job site, or since the last time the unit was used.
3. Attach each yoke to a scuba cylinder by screwing down until finger tight. Note: be sure the bleeder valve on each yoke is in the closed position. (Note: do not turn the cylinder's air on at this time).
4. If available, a low pressure compressor should be used as the primary air supply and scuba cylinders used as a back-up air source. Note: Low pressure compressors used for breathing air should be specifically designed for diving.
5. All hose whips should be clear of debris and have their open ends taped, capped or plugged when not in use.
6. Flush out low pressure hose whip before connecting to the AMCOMMAND II to prevent debris from entering system.
7. Attach hose whip to LP supply inlet fitting. Note: When tightening, USE TWO WRENCHES place one wrench on inlet fitting and hold, turn hose fitting with a second wrench making sure not to over tighten.

PRE-DIVE CHECK OUT 7.2

1. Be sure both the high pressure valves, pneumo valve, and air supply valves are in the off (closed) position.
2. Regulator should be set to a low pressure, turn knob counter clockwise until the knob stops.
3. Turn the Diver output valves and pneumo valves to off position.
4. With the yoke bleeder valve in closed position, turn on high pressure air at both SCUBA or breathing air cylinders. NOTE: Always open high pressure valves slowly, allow system to fill slowly before opening valves for maximum flow. Check the pressure level of both HP supply's.
5. Turn on 1 HP supply valve by turning counter clockwise four (4) full turns. Note: 2 HP supply valve should be in the off position and used as a back-up.

Caution: If both HP valves are opened at the same time, both air supplies will be used simultaneously. This will result in both bottles being empty at the same time. The purpose of the two supply's is to alternate between the two bottles. Use one of the bottles until it reaches 500 PSI, then switch to the second bottle. With a full bottle on line, you can then replace the first bottle with a full unit.

6. Note the cylinders air pressure by reading the HP supply gauges.
7. Adjust regulator to desired setting by turning knob while monitoring the diver air supply gauge. Clockwise increases the set pressure.

Note: regulator setting is determined by: required over-bottom pressure for manufacturer's helmet or mask plus the bottom pressure relating to the diver's depth. See section 10-3 for gauge pressure verses depth chart.

PRE-DIVE PNEUMO TEST 7.3

The AMCOMMAND II Pneumo section has gauge protectors to protect the pneumo gauges from over pressurization. However it is good operating practice to use a procedure which will not damage the gauges when operating a system without gauge protectors. Using a standard procedure will permit the operator to use a different system without gauge protectors and operate the system correctly.

Pneumo gauge with a range of 250 FSW/76 MSW has an equivalent full-scale pressure rating of 111.25 PSI. If you exceed this pressure by a significant amount you will cause a permanent change in the calibration of the gauge. If you exceed 111 PSI by 100% you will destroy the gauge. Procedure for checking the pneumo gauges:

1. Pressurize the LP section of the Amcommand II; reduce the output pressure of the regulator to a pressure less than 100 PSI.

2. Open the Diver output valve momentarily to reduce the pressure and check the action of the regulator. Check to see that the output of the regulator stays at less than 100 PSI.

3. Open Pneumo valve slowly, while watching the depth gauge, check that the gauge needle is slowly rising and that air is exhausting through the divers pneumo connection (or diver's pneumo hose if connected).

4. Close valve; check depth gauge to see that it reads zero. The gauge should be within +/- 10 feet of zero. Zero will be affected by changes in atmospheric pressure and/or changes in altitude. If zero is off by more than 10 feet and there has not been a significant change in either atmospheric pressure or altitude, suspect that the gauge has been subjected to over-pressurization and may have suffered damage. Cross-check the gauge or have the gauge calibrated before using.

5. Seal the output of the pneumo section. This can be done by capping off the Pneumo output, or preferable sealing the end of the pneumo hose. Pressurize the Pneumo to 200 FSW and close the blow-down valve. This reading should hold, with out a decrease in reading. If the reading decreases you have a leak in the system, correct before proceeding.

6. Cross-checking the pneumo gauges. Either connect the pneumo outputs together, or connect the pneumo hoses together and pressurize the system, both gauges should read the same. If the gauges differ by more than 2%, have the defective gauge calibrated. Gauge calibration should be compared at several points over the range of the gauge, with both increasing and decreasing pressure. As a minimum check the gauges over the range which the gauge will be used.

PRE-DIVE TESTING COMMUNICATIONS 7.4

1. Always test the communications between the AMCOMMAND II and divers before each dive. Connect the diver's umbilical to the diver communicator, and the hat/helmet to the umbilical.

2. Turn power to "ON" position.

3. Set "Tenders Volume" at mid scale. While diver is speaking, adjust to a comfortable level.

4. Set "Divers Volume" at mid scale. Talk to diver, and adjust until diver can hear tender at a comfortable level. If you are using a 2-wire system you must use the "Push To Talk" switch, or the push to talk "Hand held Microphone".

5. Become familiar with the "Push to Talk" switch by pushing the switch when talking to the diver. **Note:** If switch is depressed, tender can not hear diver. Diver cannot hear tender if tender does not actuate the "Push to Talk" switch.

6. Check Diver two or the standby diver communication.

CONNECTING DIVER UMBILICAL 7.5

1. Remove protective caps and attach diver air supply and diver pneumo hose fittings to corresponding outlets. Note: When tightening, place one wrench on outlet fitting and one wrench on hose fitting. Tighten hose fitting, making sure not to over tighten.

2. Blow out divers air supply hose to insure no debris is in the line before connecting to a helmet or mask.

Connect the communication cable (surface end) to the two binding posts located on the right side of radio. Wires should be well fastened to the binding posts and not touching each other (bare wire). We strongly recommend the use of dual banana plugs attached to the top side end of the umbilical. This ensures a good connection and reduces the possibility of shorts and/or intermittent connections. Attach divers end to helmet or mask.

Test the operation of the system.

LOW PRESSURE SUPPLY 7.6

Test LP supply with low pressure compressor.

Note: Adjust diver air supply pressure at compressor. The AMCOMMAND's LP supply system by-passes the regulator, therefore, can not control air pressure entering system, or the pressure to the diver.

LOW PRESSURE BREATHING AIR (Primary Supply) 8.1

Low Pressure Compressor (Primary supply), High Pressure (Backup). In this mode of operation the divers breathing air is being supplied by an LP compressor, the HP Supply is use as a back-up supply. Having the HP supply as a backup does not eliminate the requirement for a bailout source of air.

In the event the LP air source fails, it is a simple matter to switch over to HP Air. Turn “ON” the HP source by opening the HP-1 valve. Check the diver’s air supply pressure.

HIGH PRESSURE BREATHING AIR (Primary Supply) 8.2

In this mode of operation the divers breathing air is being supplied by via high pressure breathing air source. This could include SCUBA tanks (singles or twins), high pressure storage cylinders, or a bank of high-pressure storage cylinders.

Caution!

Maximum input pressure limit of 3000 PSI when using standard CGA850 yokes.
Maximum input pressure limit of 4500 PSI when using optional 300 Bar DIN adapters.

The High Pressure breathing system is designed to allow the rotation of bottles as they are consumed. Operate the system using a single bottle until the bottle pressure has dropped to approximately 500 PSI, then switch to the next bottle. Repeat this procedure alternating between HP-1 and HP-2, changing bottles as they are used. The HP input system has check valves, which prevent back-flow between the bottles. This facilitates switching between bottles.

Example:
If you have two bottles connected to the system and you are using bottle HP-1, bottle HP-2 is “OFF”, when HP-1 reaches 500 PSI, you may switch to HP-2 by opening the valve for HP-2. The system will draw air from the higher of the two sources, HP-2. You can then turn HP-1 “OFF”, and change the bottle connected to source HP-1. This procedure ensures an uninterrupted supply of air to the diver.

After turning HP-1 off, turn the bottle valve off, open bleed valve on the yoke and bleed the pressure. Release the yoke and replace the empty bottle with a full bottle. Close the bleed valve and turn Scuba cylinder on and verify the bottle is full.

Another method of changing bottles is to leave both valves on the system in the “ON” position. Use the SCUBA bottle valves as the ON/OFF control for selecting which bottle is in use. This reduces the number of valves, which must be open and closed for each change of bottles. If you use this procedure, you should monetarily open the new bottle and check the gauge to ensure the bottle is full, then close bottle to prevent the system from using air from both bottles at the same time.

HIGH PRESSURE BREATHING AIR (Primary Supply) (cont'd) 8.2

1. When planning your dive you must take into consideration the amount of time a given bottle will last, and the number of bottle changes, which will be necessary during the dive. There are two options that can be used to accommodate dives that will have a high consumption of air.

2. Use twin tanks instead of singles. Use a high volume cylinder (250 - 300 cubic feet) of breathing air; these can generally be rented from a welding gas supplier, or supplier of industrial gases. Make sure you specify breathing air, and request certification. These cylinders can be also be manifolded quite easily. Generally the charge for rental is very competitive in cost and usually includes delivery to the job site.

Note: When using high-pressure cylinders, care must be exercised in the handling, transport and storage of it. Make sure all personnel involved are instructed in the proper procedures. If you have any questions regarding the proper procedures contact your supplier.

PRE-OPERATION CHECK LIST 8.3

1. Diver dressed and ready except hat/helmet
2. Divers umbilical organized
3. LP Compressor running and at pressure.
4. LP Alarm in "ON" position.
5. HP source connected and ready, HP-1 and HP-2 valves "OFF"
6. Zero Pneumo Gauges.
7. Diver air ON, Purge diver Hat/Helmet.
8. Diver dons hat/helmet.
9. Diver communicator ON, Comm check.
10. Diver air check.
11. Diver enters water.
12. Record the starting time of the dive

During the dive the tender shall maintain voice communication with the diver at all times. Tender shall monitor diver's air pressure and breathing rate.

PNEUMO READINGS 8.4

During the dive the tender shall monitor the diver's depth, recording the depth and time at depth. The procedure for measuring depth is as follows.

13. Advise the diver that a pneumo reading is to be taken.

14. The diver will place the end of the pneumo hose at the point at which the measurement shall be taken. Diver will advise the tender he is ready for the pneumo reading.

15. Slowly open the Pneumo valve corresponding to the diver whose depth is being measured. The Pneumo gauge reading will increase and stabilize at a value greater than the depth of the diver. The value will depend upon the flow rate, and pressure drop over the length of the pneumo hose. The diver will advise the tender of bubbles coming from the end of the hose.

16. Close the pneumo valve, the reading will to decrease to the value of the diver's depth. Once the reading has stabilized, this is the depth at the end of the pneumo hose.

Note: Pneumo readings can be used for several purposes i.e., measuring the diver's depth, depth to a particular point under water, vertical distance from one underwater object to another. The accuracy of the measurement is plus or minus 0.625 feet of seawater, (+/- 7.5 inches). This represents an overall accuracy of +/- 1/4 of 1% of the full-scale value of the depth gauge. To maintain this accuracy the gauges must be calibrated every 6 months.

When using the pneumo system to measure the diver's depth for use in determining decompression requirements, please note:

1. Definitions of terms, PAR 7.1

DEPTH - When used to indicate the depth of a dive means the maximum depth attained by any part of the diver during the dive, measured in feet of seawater.

2. Selection of Decompression Schedule, PAR 7.2.3.

(A) Always select the schedule depth to be equal to or the next depth greater than the actual depth to which the dive was conducted, and

(B) Always select the schedule bottom time to be equal to or the next longer bottom time than the actual bottom time of the dive.

3. Rules During Ascent, PAR 7.4.1

Decompression Stop Depth - The diver's chest should be located as close as possible to the stop depth.

The above information is quoted from the U.S. NAVY DIVING MANUAL, Chapter 7, Air Decompression.

DIVER COMMUNICATIONS 8.5

The AMCOM SERIES II can be operated in two basic modes of operation. The conventional method of operation is known as 2-wire, this allows the diver to be heard by the tender, but requires the operator/tender to actuate the Push-To-Talk switch in order to talk to the diver. The modern method of operation allows two way conversations to be carried on simultaneously. Amron calls this method of operation “SIMULCOM”. The diver and tender can talk to each other as you would on a telephone. The same applies to diver to diver conversations. Amron tries to encourage the use of SIMULCOM for superior communications and safety.

The Model 2825A-8225 has the capability of 2-wire and/or Simulcom (4 wire) communication modes. Simulcom and 2-wire can be used simultaneously (mixed), divers on Simulcom, tender on 2-wire.

2-Wire communication is defined as a single communication path, the diver is the priority signal path, tender listens to diver. Signal reversing is accomplished by pushing the Push-To-Talk switch; diver hears tender. Often times a 4-conductor (4 wires) common cable is used with 2 wires tied together as a pair (This is done for redundancy.), however this is still a 2-wire system.

Simulcom 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 Simulcom like communication is the telephone. This permits the freedom of natural communication, lower system noise, and diver to diver communication without having to attempt Crosstalk switching.
For an in depth discussion on Simulcom refer to SIMULCOM, WHAT, WHY, AND HOW!, located at the end of the operation section of this manual.

2-WIRE OPERATION 8.6

Refer to Figure 3.

1. Connect the comm cable from the divers to Diver 1 and/or Diver 2, Microphone (inputs) under the words 2-wire. Wires should be well fastened to the binding posts and not touching each other. A good method of attachment is to use a dual banana plug (AMRON P/N 14001B). If more than one diver is connected to any microphone (Input), (Diver 1 or Diver 2), those divers on the same two terminals will not be able to Crosstalk.

The earphone connection is not used by the divers. The earphone jacks can be used to operate a remote speaker, both diver and tender conversations will be heard.

2. In 2-wire the tender must press the Push-To-Talk switch to be heard. If you are using the (optional) AMRON Remote Walk and Talk, Model 2821-28, the tender may press the Push-To-Talk switch on the belt module.

3. **Volume Controls** - Set all volume controls to mid scale.

Tender Volume Controls

A. Divers to Tender - Adjust to comfortable level.
B. Tender to Divers - Adjust to comfortable level.

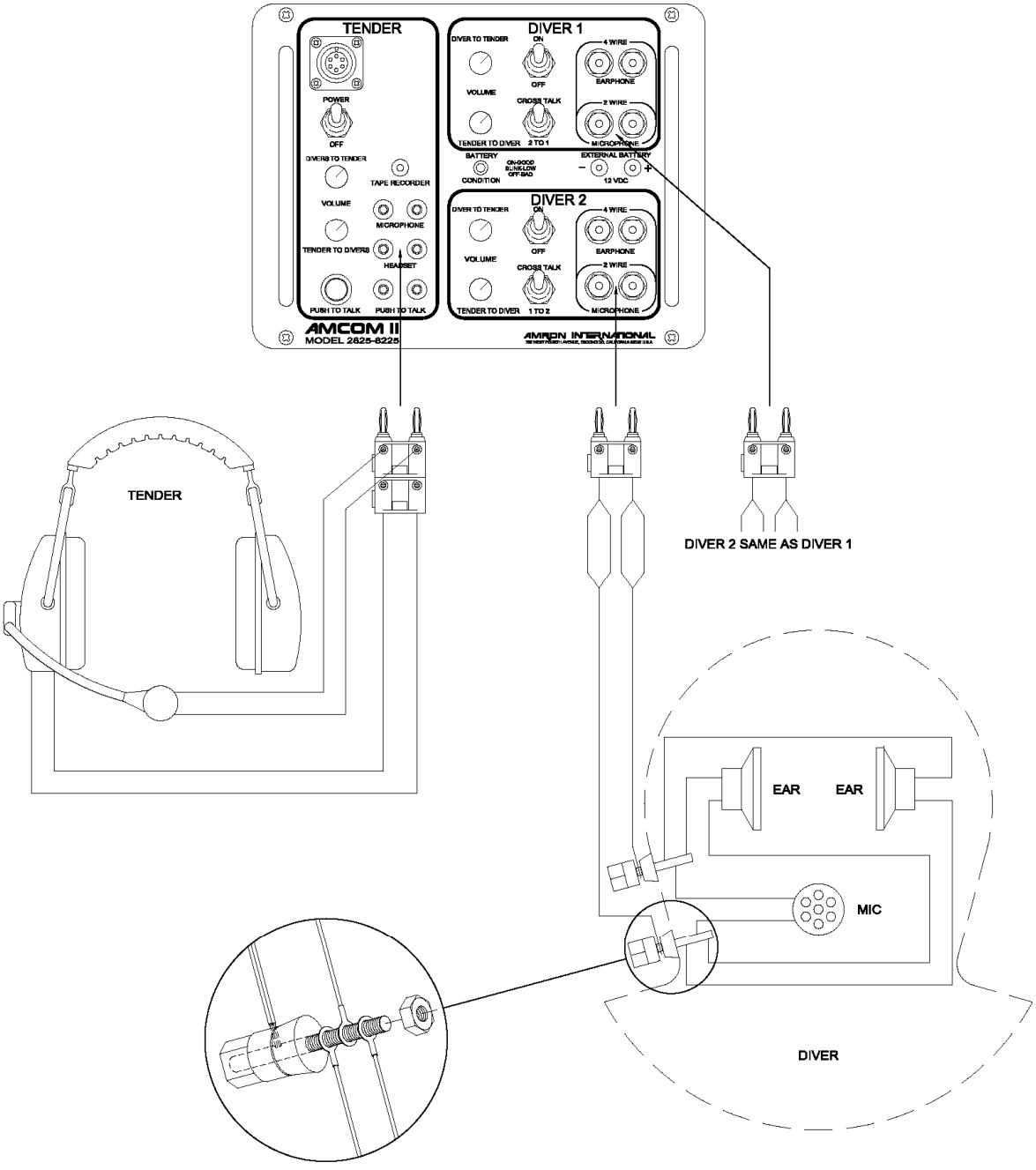
Diver 1 Volume Controls

A. Tender to Diver - Adjust to comfortable level.
B. Diver to Tender - Adjust to comfortable level.

Diver 2 Volume Controls

C. Tender to Diver - Adjust to comfortable level.
D. Diver to Tender - Adjust to comfortable level.

DIAGRAM, SET-UP INSTRUCTIONS (Figure 3) 8.7



SIMULCOM (4-Wire) Operation 8.8

Refer to Figure 4.

A. Connect the two wires from the diver's microphone to the Microphone (Input) Diver
B. Connect the two wires from diver's earphones to the Earphone (Inputs) Diver 1.
C. Repeat the same for Diver 2.
D. Connect tender headset earphones (black dual banana plug) to headset (input).
E. Connect headset microphone (red dual banana plug) to tender microphone.
F. Turn speaker off to avoid acoustic feedback.
G. Operation with speaker is possible by extending tender's headset away from the speaker. Use AMRON Model 2822-28 headset extension cable (25 foot).

Note: When operating with a standby diver who does not have his hat/helmet on, acoustic feedback (squeal) may occur. This can be avoided by turning his volume down (Diver to Tender), which cuts off his microphone, yet will enable him to monitor the diver/tender conversation through his hat/helmet earphones. Or you can disconnect (UN-plug) his microphone circuit that will disable his microphone.

1. **Volume Controls**

   Set all volume controls at mid scale. Tender should don headset and talk to himself. If adjustments are required, increase or decrease volume (controls). This will establish a system volume level.

2. **Tender Volume Controls**

   A. Divers To Tender - Use as a master control.
   B. Tender to Divers - Use as a master control.

Have divers talk, while tender adjusts to a comfortable listening level. Tender then talks, and diver determines a comfortable listening level having the tender adjust as needed.

3. **Diver 1 Volume Controls**

   A. Diver to Tender - Diver talks, while tender adjusts to a comfortable listening level.
   B. Tender to Diver - Tender talks and diver determines a comfortable listening level.

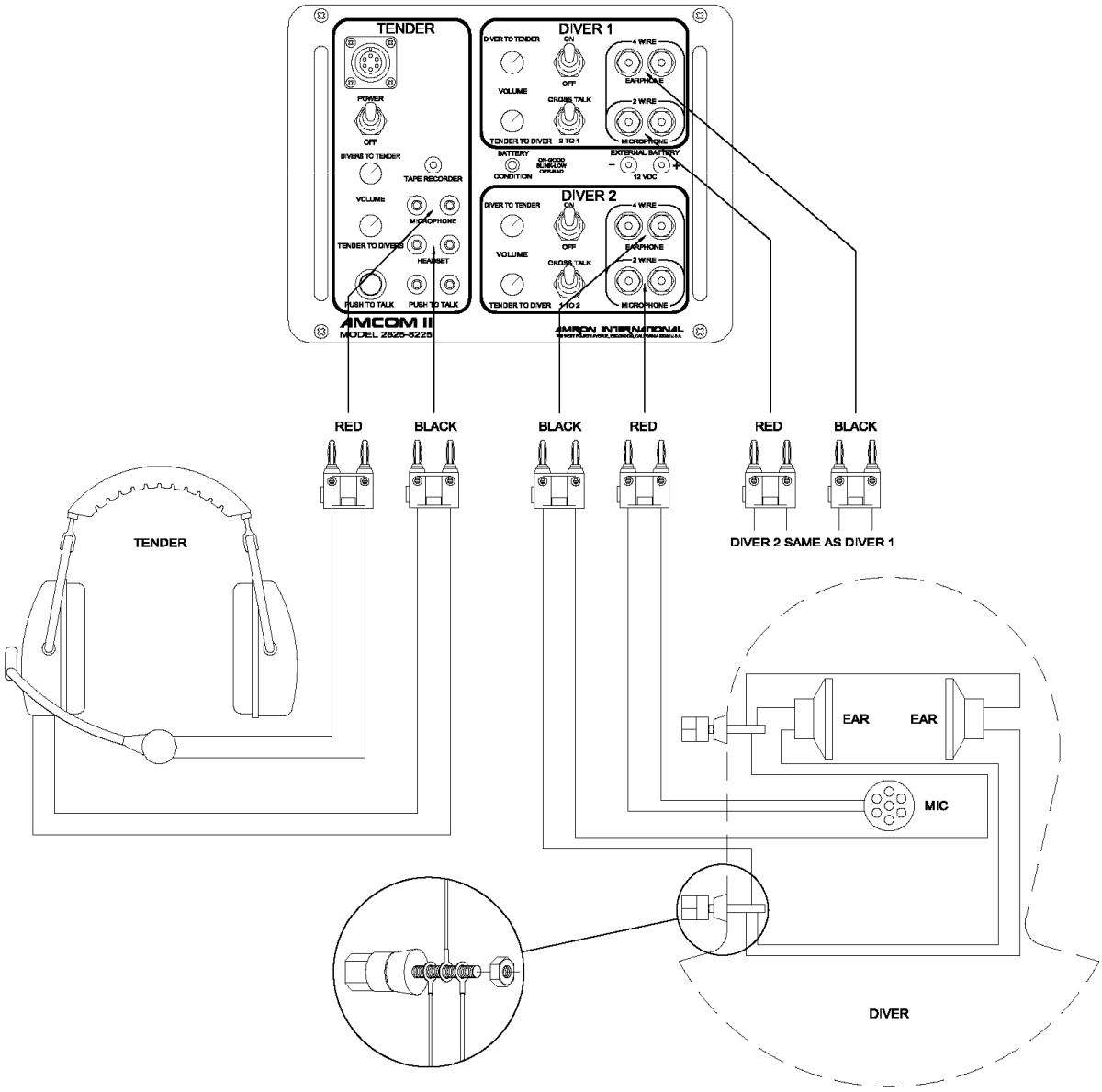
After adjusting Diver 1 controls, repeat the procedure with Diver 2 controls.

4. **Diver 2 Volume Controls**

   A. Diver To Tender - Same as Diver 1.
   B. Tender To Diver - Same as Diver 1.

If conditions change as a group, the tender volume controls can be used as master volume control.

DIAGRAM, SIMULCOM 4-Wire Connection, Model 2825-8225 (Figure 4) 8.9



SIMULCOM – WHAT, WHY AND HOW ? 8.10

Simulcom is a communications system designed from the “ground-up” to take advantage of the current “state of the art” in semiconductor technology and to provide superior diver hard wire communication.

First, the advantages and then an explanation of What, Why, and How.

1. 285% more signal is obtained from the divers microphone, (using your existing 8 ohm microphone) than the maximum attainable signal on 2-wire mode!

2. No cumbersome push to talk required!

3. No special diver communication wire required!

4. Diver hears himself talk resulting in clear and concise speech!

5. Diver to diver communication without having to operate any controls. Just like a telephone!

These advantages are real and can be readily demonstrated. The system is simple, easy to operate, and easy to trouble shoot (in fact, easier than 2-wire once you understand what’s happening).

SIMULCOM pays off in good communication, which after all these years is still a goal some have yet to achieve. Better communication means higher production, safer diver conditions, and less down time.

Now that we have made these claims, allow us to explain why and how. First, let’s define some basic industry terms so that we can all start from the same point.

1. “2-Wire is used almost exclusively in the diving industry. It is technically defined as a single communication path, a minimum of 2 wires. Normally, the diver is the priority path (tender listens to diver).Signal reversing is accomplished by pushing the ”Push to talk" switch (diver hears tender).Generally, most diver comm cables have 4 wires i.e., “Army surplus comm-cable”. Most often the wires are twisted together to create a pair, this is still a 2-wire system. The tying together is done for redundancy.

2. “4-Wire” communication is defined as a dual communication path -- a signal path (a pair of wires) for up-link as in 2-wire and a separate signal path (a pair of wires) for downlink. This allows voice communications to go in both directions at the same time.

3. A common example of “4-wire” like communications is the telephone. A telephone system that required a push to talk would be antiquated today. Another example is a system called “Round-Robin”. “Round-Robin” is a step in the right direction, however, only a half step. It has several advantages and some disadvantages which we will get into later.

   Remember SIMULCOM and round robin are not the same.

What is SIMULCOM? 8.11

It is a dual signal path system, with special amplifiers to take care of the problems associated with “Round-Robin”. It allows everyone on the circuit to talk to each other just as if you were on a telephone.

Why are special amplifiers needed?

One of the big problems with “Round-Robin” is oscillation, also known as feedback. This can occur in two ways.

The first is acoustic feedback that occurs when you have an “Open” microphone next to an “On” speaker. What happens is a “Noise” comes out of the speaker, which is then picked up by the microphone amplified and sent back to the speaker that now is a larger noise. This process repeats itself until the amplifier hits the “Rails” (the signal is as large as the amplifier can handle).The solution to this problem is to turn down the amplifier and put someone’s head between the speaker and microphone.(Grey matter does not transmit sound well).

The second problem is much more difficult to deal with. With two communication paths (up-link and down-link) one path is carrying a large signal (to drive the speakers) and one path a small signal (from the microphone).The signal to the speaker may be several volts, say 4.0 V and the typical output of a microphone may be 0.004 V. As you can see the large signal may be 1000 times larger than the small one. If part of this signal couples across, we again have feedback.

One solution is to use shielded pairs to prevent this cross coupling. It is effective but expensive. Another solution is to use an amplifier that has common mode rejection. This basically means if the signal on both wires is the same, the amplifier will ignore it, if the signal is different, it will amplify it. So with Simulcom we ignore the “Common” signals and look for and amplify the “Different” signal from the microphone. This is a simplification of CMR designs and an over-simplification of the many design rules one must abide by when designing circuits for CMR.

This technology is not new to the electronics industry; it has been used quite extensively since the late 60’s in signal processing systems. Current technology produces integrated circuits that make this easier to implement. The AMCOM Series of diver communications is the first designed to implement this technology for diver communication.

There are several other advantages to this system as implemented in the AMCOM II series.

1. Because we use an independent amplifier for each circuit, i.e., Diver 1, Diver 2, and Tender, we run each microphone to its own amplifier. This allows us to preserve CMR and provide less loading for each microphone. Let us explain - in two-wire operation we have each diver with one mic and two speakers all tied together. When you talk into the microphone it puts out a signal which we are going to amplify. Part of this signal is absorbed by each earphone, one earphone across a mic reduces the output of the microphone by 50%, the second earphone further reduces the signal to 35%.So by splitting the microphone from the earphones we have an immediate 2.85 times larger signal from the microphone. As you can see for the same signal level out we can turn down the gain (less noise is amplified) the system stability is better with a tremendous improvement in clarity.

WHAT IS SIMULCOM (Continued) 8.11

2. Doesn't the same thing happen with "Round-Robin"? **No!**
With "Round-Robin" you split the mic and earphones, but stack all the mics together. The microphones load each other and you are right back where you started. Also, you have another problem - the headset used by the tender usually has 600-ohm earphones and a 50-ohm microphone. With two diver mics we have an impedance of 4 ohms which really loads the tender mic and the 600 ohm earphones tend to be rather low so you end up with a volume imbalance as well as low signal levels from the diver & tender microphones.

So it sounds as though it might be worth trying?

How do you go about doing it?

Okay - step by step:

1. First you must have a AMCOM II Series Communicator
2. You must have 4 wires in your comm cable.
3. You must have 4 wires to your hat/helmet, (i.e., Marsh Marine connector or such).

With those three things we can begin:

1. Install male marsh-marine 4-pin connector in hat/helmet. Attach black and white wires to binding post and both speakers. Attach red and green wires to leads from microphone. It doesn't matter which color goes to which lead. Use 8-32 x 1/4 S/S screw and nuts, cover each with tape or shrink tubing. You are now finished with the diving hat/helmet.

2. Install a 4 pin female marsh-marine connector on diver's end of comm cable. Red and green to light colored pair of common cable; black and white to black pair of common-cable. You are now finished with this step.

3. Install a black dual banana plug to black pair of wires on tender end of diver common-cable and attach red dual banana plug to lighter color pair of wires. If you don't have red dual banana plugs, red tape will serve to identify that pair as the mic circuit.

You are finished!

TO OPERATE AND/OR CHECK OUT SIMULCOM 8.12

1. Attach hat to umbilical.

2. Attach common-cable to AMCOM II, red banana plug to Diver 1 mic, black banana plug to Diver 1 earphone.

3. Don hat and talk to yourself. If you hear your voice over the earphones, the system is working correctly.

To revert back to 2-wire, remove black banana plug from earphone jacks (AMCOM II) and plug into top of mic banana plug (red).

To recap, we now have a system where diver 1's microphone is connected to Diver 1 microphone input of the AMCOM II. Diver 1's earphone is connected to the earphone for diver 1. All features such as diver push to talk switch and independent volume controls of the AMCOM II remain intact. Tender uses a headset that is plugged into the tender mic and headset jacks. With the AMCOM II system you can mix 2-wire/simulcom systems, for example, Diver 1 and 2 could be Simulcom while Tender can be 2-wire (no headset - use speaker for tender). Or, one diver can be 2-wire and one can be Simulcom. Just remember if any one person is on two wire you must use the push to talk (PTT) for that diver to hear or for the tender to talk.

Note: The PTT switch over-rides diver conversations (see operating guide for details).

Other configurations which can be implemented with Simulcom systems:

1. Remote station for equipment operator, or second tender on 2-wire or Simulcom.

2. Several remote stations with any combination of 2-wire or Simulcom.

MECHANICAL 9.1

This section is divided into two parts, the first deals with the mechanical and the second deals with the electronics.
Refer to the functional block diagram while reading this section.

1. HP-1 and HP-2, high-pressure input has a maximum input pressure limit of 3000 PSI when using standard CGA850 SCUBA yokes with bleed valves and color coded hose protectors.

Installing the optional 300 Bar DIN Adapter (Amron Part No. SAA5300) will increase the units maximum input pressure limit to 4500 PSI. Simply remove CGA850 yoke nut and yoke from bleeder body, screw on 300 Bar DIN adapter, and tighten with a wrench.

The SCUBA yokes can also be removed for connection directly to a high-pressure bank with a maximum pressure limit of 4500 PSI. The hose fitting is 1/4 inch 37^{o} flare, Female swivel.

2. HP gauges, 0-5000 PSI, 1-1/2% of full-scale accuracy.

3. HP valves, shut-off type, 4 turns opens to full flow, S/S stem with KEL-F seat for positive shut off, and Viton O-rings.

4. HP check valves, 1/3 PSI cracking pressure.

5. HP filter, inline 50-micron filter element.

6. HP regulator(s), self-contained, direct acting, spring loaded, diaphragm operated pressure-reducing regulator. Control pressures are obtained by adjusting the control knob. Pressure INCREASES are made by a clockwise rotation while pressure DECREASES are made by a counter-clockwise rotation.

Note: Regulator is a non-venting design and adjustments to decrease the set pressure will not occur unless there is flow through the regulator. If the diver is not on line adjustment can be made by opening the pneumo valve slightly while adjusting the regulator. All final adjustments should be made in the clockwise direction in order to insure the most accurate set point.

When operating in cold weather (40^{o} to 45^{o} F and below), regulator icing may occur. This is caused by moisture condensing and freezing, this can and will cause blockage in the regulator. Increasing the pressure will temporally clear the blockage by lifting the valve seat to allow the ice to blow through. If this happens terminate the dive immediately. The following information provides a guide to the causes and procedures that can reduce the possibility of icing.

The cause of icing is moisture in the breathing air combined with a cold temperature, and high flow rates. Cold air containing moisture is particularly prone to icing. First, air that is cold will support less moisture before condensing occurs. Second, the colder the air is the closer it is to the freezing point. Third, when air passes an expansion point (the regulator control valve) it is further cooled. The combination of these three factors causes the icing.

To reduce the chance of regulator icing, use the following procedures.

MECHANICAL (cont'd) 9.1

6A. Make sure the breathing air source is dry. Scuba cylinders should be filled from a compressor with a good filtration system. The air source for the filling compressor should be from outdoors, and the filling of the tanks should be done on a cold dry day.

6B. Place the AMCOMMAND II and the bottles in a warm location. This can be a temporary shelter with a portable heater.

7. Relief Valve, factory set to 285 PSI. This valve is set to relief the system pressure in the event the regulator should fail to control the pressure. The exhaust port for this valve is located between the diver output connections. If this valve should ever vent during a dive, the dive should be terminated immediately. Correct the cause of the problem before using the system again. You can control the outlet pressure by using the input valve (HP-1 or HP-2) as a throttle valve, closing the valve to reduce the pressure to the system. Open the valve slightly upon reaching the approximate pressure required, adjust the valve slightly to match the flow required by the diver. You can advise the diver to go to free flow, which will maintain a constant flow rate making it easier to control the pressure.

8. LP input, the input is straight forward using a check valve to eliminate the need for another panel valve and facilitate switching from LP to HP air.

9. Output gauge, monitors the pressure to the diver. Gauge range is 0-400 PSI, 1-1/2% of full-scale accuracy.

10. Diver output valves, 3/8 inch ball valves, 1/4 turn full open, unrestricted flow -- One valve for each diver.

11. Low-pressure alarm, monitors diver's breathing air pressure, audio alarm is factory set to come on at 100 PSI. Accuracy is +/-15 PSI. Audio alarm set point is internally set, and can be adjusted to turn on anywhere between 30 and 285 PSI. Audio output is approximately 90 dB at 2900 Hz. The alarm has an ON/OFF switch to disable the alarm. The diver communicator supplies power for the audio alarm. Power is available regardless of whether the communicator is on or not.

12. Pneumo Fathometer system, the depth measurement system consists of the two depth gauges, blow down valves, output connections, and gauge protectors. The operation of the pneumo system is based upon the density of seawater that is 64.043 lb/ft3. The weight of a column of sea water one inch, by one inch, by one foot in height is .44473 (64.043 lbs. divided by 144 sq. inches). For underwater calculations this is rounded off to three places or .445 lbs. per square inch. Therefore by measuring the pressure, we can calculate the depth. To avoid doing the calculation we use a very accurate gauge that reads the pressure in pounds per square inch, but has the dial calibrated in Feet of Seawater.

Note: Fresh water has a density of 62.366 lbs/ft3, therefore the same calculations equals .433 lbs. per square inch. These differences must be taken into consideration when diving in fresh water, particularly decompression stops. See Section 10 for fresh water vs. sea water tables, "Diver's Handbook of Underwater Calculations", or U.S. Navy Diving Manual for additional information regarding fresh water diving.

MECHANICAL (cont'd) 9.1

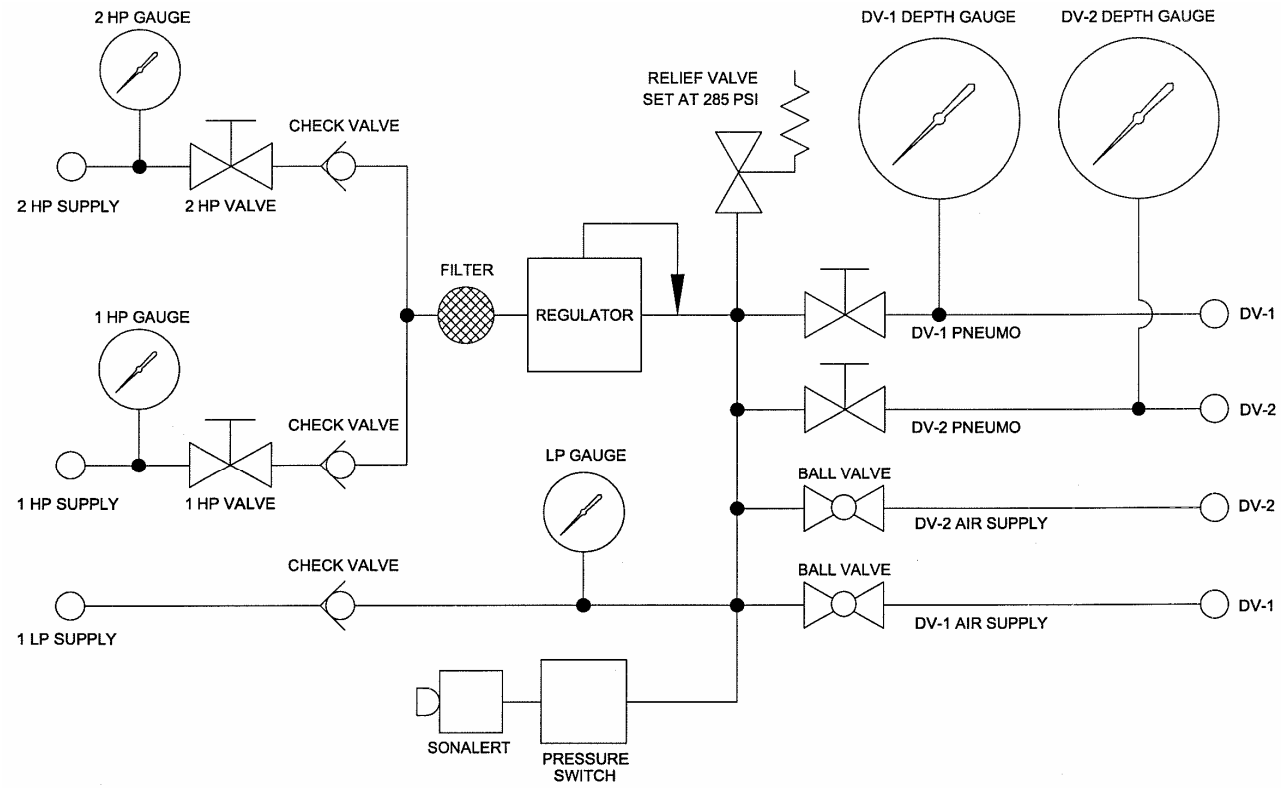
The pneumo system operates on the bases of a tube extending from the surface of the water to the depth at which the measurement is going to be taken. Air (pressurized) is forced into the tube, until all the water is forced out of the tube. In fact, bubbles of air will come out of the end hose. The air is then shut OFF, (this eliminates any additional pressure from flow) the pressure will then stabilize equal to the pressure at the end of the hose. The pressure in the hose will then equal the pressure at the end of the hose, and the depth.

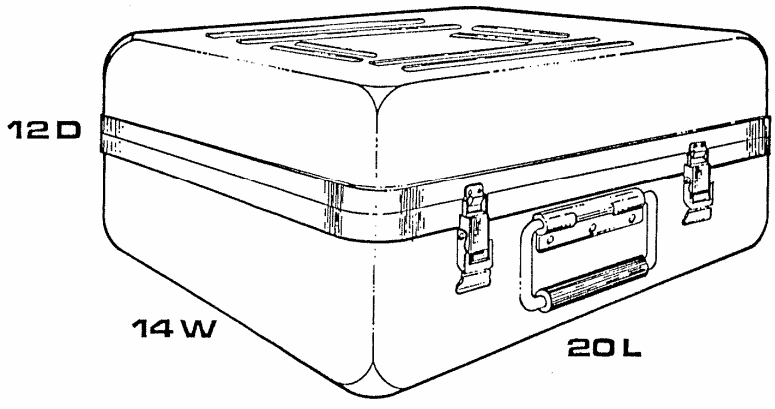
The pressure is then read on a very accurate gauge. The dial of the gauge is calibrated in Feet of Seawater rather than Pounds per Square Inch (PSI), eliminating the need to convert from PSI to FSW.

The pneumo gauges have a 6-inch dial, dual scale 0-250 FSW/0-76 MSW, with 1-foot calibration increments. The accuracy of the gauge is 0.25% of full scale. Gauges are supplied with calibration certificates traceable to the National Bureau of Standards. The gauges must be Calibrated every six months to guaranty their accuracy. Gauges should be cross checked before every dive, if there is a discrepancy of more than 2% between gauges, the gauges must be calibrated before being placed in service.

Pneumo valves, one for each diver, shut off type valve, KEL-F seat for positive shut-off.
Pneumo gauge protectors, each pneumo gauge is protected by an automatic valve which is factory set to shut off all pressure to the gauge when the pressure reaches or exceed the set point. The set point for a slow rising pressure is approximately 10% above full scale, 122 PSI. Fast rising pressures will be shut off at a lower pressure. The gauge protector will automatically release when the pressure is reduced. The gauge protector also includes a gauge snubber to protect the gauge from pulsations (shocks) in the pressure applied to the gauge.

FLOW DIAGRAM, MODEL 8225-HP 9.2





ELECTRICAL 9.3

The diver communicator is fundamentally an intercom, providing two way communication between the diver and the tender or operator. The Model 2825A-8225 can be operated in two different modes; 2-wire requires the use of the push-to-talk switch or Simulcom (4-wire) where voice conversations are the same as a telephone. In the Simulcom method of operation all persons on the system will be able to talk to each other, just as a party line phone system.

Although Simulcom requires the use of four wires, it does not require a special grade or type of cable. Standard diver umbilical wire (Army surplus cable) will work very effectively. Once implemented the system is very easily maintained and simple to use.

The 2825A-8225 incorporates another unique feature, the Push to talk, hand held microphone with automatic speaker cutout. This feature cuts out the talk back speaker when the tender is using the hand-held microphone. This eliminates the background noise found around most diving operations. Compressors, cranes and other construction equipment noise is effectively blocked out of conversation to the diver, reducing or eliminating “come back” or “say again”.

Another innovation of the AMCOM series of diver communication systems is the design of the diver-input connections. The 5-way binding posts are spaced to except dual banana plugs. We strongly recommend the use of dual banana plugs as a measure to improve reliability of the communication system. Also all connections should be soldered, bare copper wire corrodes very quickly, however wire which has been tinned (soldered) is almost impervious to corrosion. A system properly designed and implemented will provide years of satisfactory service. The Talkback speaker has been located in the pneumo panel for two reasons. The first is space; the second is to place the speaker in an optimum position in relation to the tender.

Refer to the functional block diagram (figure 4) and schematics while reading this section.

SIGNAL INPUT - U1, U2, and U3, are differential input amplifiers that accept dynamic microphone level signals (1 to 10mv.) And amplify them. Signals common to both inputs are rejected, common mode rejection, (CMR).

VOLUME CONTROL - The input amplifier output signal is attenuated through tender volume control R103 and diver volume control R107, and R108.Each individual microphone signal can be adjusted before going to mixer U4.

MIXER - U4 is a unity gain-inverting amplifier that mixes microphone inputs from diver and tender. The output of mixer is then used to drive the pre-drivers.

PRE-DRIVER AND INVERTOR- U5 is a dual operational amplifier. The first amplifier is a unity gain inverting pre-driver and its signal goes directly to U6, one of the two audio power amplifiers. The second amplifier of U5 inverts at unity gain the signal from the first amplifier and feeds it to U7, the second power amplifier.

ELECTRICAL (cont'd) 9.3

AUDIO POWER AMPLIFIERS - U6 and U7 are audio power amplifier integrated circuits connected in a bridge configuration. The output "floats" at approximately 6 volts and should never be connected to ground. The amplified audio "output" signal is directed to divers or tender through relays K1 and K2.

BIAS LEVEL - Resistor R39 and diode determine the bias voltage for the amplifiers U1, U2, U3, U4, and U5.It should be 4.3 Volts measured to ground +/- 10%.

AUDIO OUTPUT VOLUME CONTROLS - R104, R105 and R106 attenuate output levels to diver earphone and tender headset.

2-WIRE OPERATION - Input audio signals from divers are amplified through the circuitry described previously, and directed to the tender's headset and speaker through relays K1 and K2.When tender actuates the push to talk switch, tender's speaker and headset are connected through relay K1 to microphone input. Divers are connected to audio output through relays K1 and K2.

SWITCHES - S1 AND S2 break connections to diver microphone jacks. Crosstalk switches S3 and S4 connect appropriate diver microphones to audio output.

SIMULCOM (4-wire) - Tender and diver microphone are connected to amplifier inputs at all times. Tender headset and diver earphone are connected to audio output at all times.

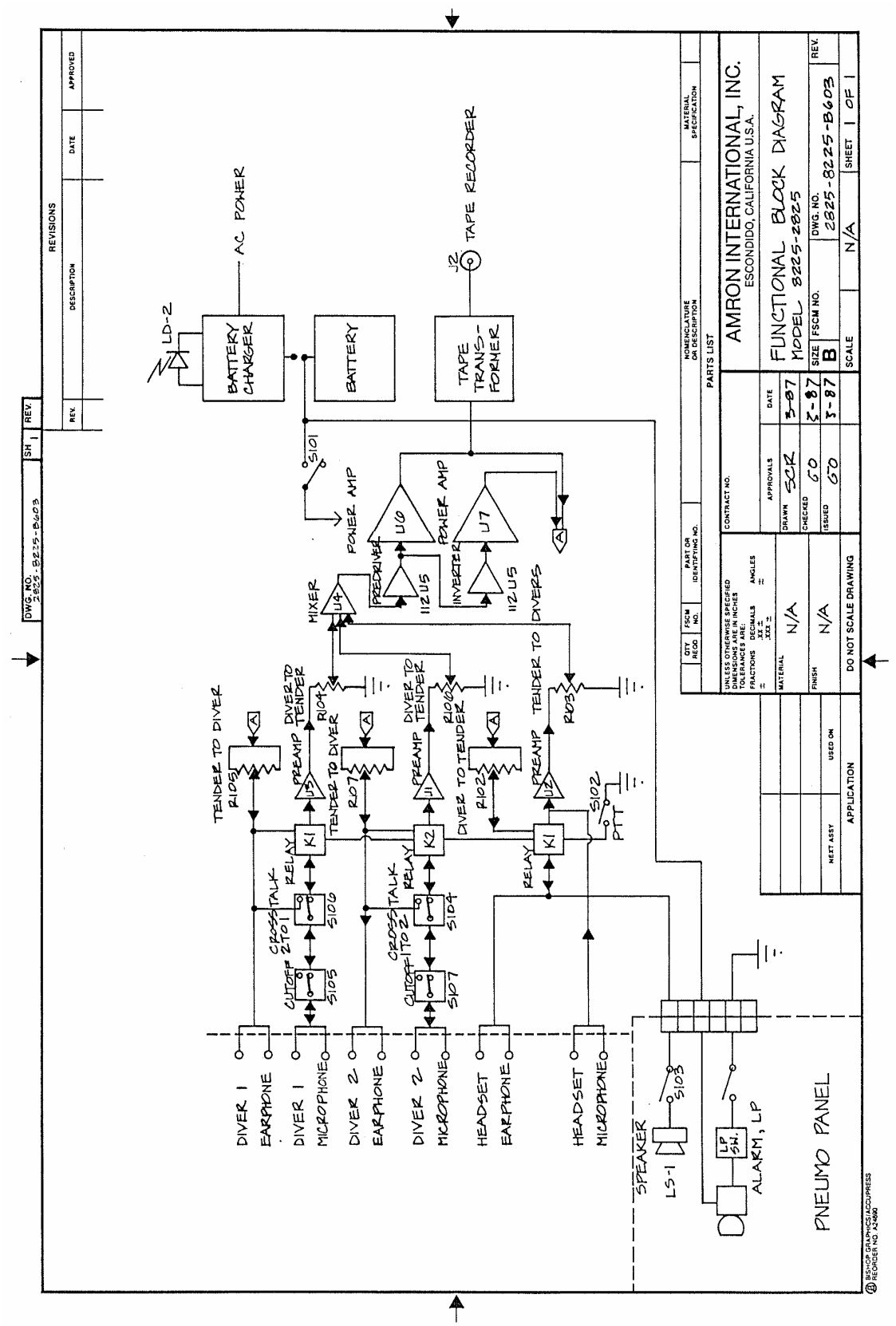
BATTERY CHARGER - Maintains batteries at full float charge of 13.8 To 14.4 Volts. Front panel AC power "LED", indicates when AC power is applied to unit. Charger protects batteries from overcharge by automatically switching to float charge when batteries are fully charged.

BATTERY SENSE CIRCUIT - Electronically senses voltage from battery. Controls panel "LED" (battery condition indicator) which indicates; steady light - battery is Good, blinking light - low battery, no light - below reliable operational range or no voltage. Sense points, above 11 volts +/- .25 volts = Good (steady light). 11.0 to 10.0 volts +/- .25 volts = Low (blinking light). Below 10.0 +/- .25 volts = Bad, battery is below reliable operating range. Rechargeable batteries should not be operated below their normal operating voltage, permanent damage can occur. They should not be left in a non-charged state.

We strongly recommend the batteries be put on charge and left on charge when not in use. This will solve two problems, one - the unit will always be ready to be put in service, and second - it ensures the batteries will be charged as soon as the unit is returned from the field. Cold weather operation, expect reduced battery performance under cold condition, also discharged batteries are subject to freezing and damage. The capacity of the battery will be reduced by approximately 40% at temperatures of 0^{o}F . Charging of the batteries should be done within the temperature range of 32^{o}F to 104^{o}F. The ideal temperature for recharging is between 50^{o}F to 86^{o}F.

Battery Life - Several factors effect the life of the battery. These factors are discharge rate, depth of discharge, charge rate, operating temperature, and storage temperatures. The general rule of thumb is 300 charge cycles, or 3 years. The failure of the battery is not a complete catastrophic failure at the end of its life but a general deterioration in performance over the life of the battery.

FUNCTIONAL BLOCK DIAGRAM, MODEL 2825-8225 9.4



REVIEW OF SCHEDULED MAINTENANCE 10.1

The inherent quality of your AMC0MMAND II will provide years of continuous failure-free service, if properly used and maintained.

1. Before and after each dive; Do Functional test, clean and inspect for damage.

2. Every 6 months; calibrate, Functional test, clean and inspect for damage.

3. Every 12 months; in addition to the normal 6-month maintenance, service filter, leak test and check adjustments.

4. Every 36 months; in addition to the normal annual service replace all seals, gaskets, soft goods, and batteries.

In addition to the above scheduled maintenance, there are three important areas of user care that will determine the length of service you can expect from your equipment.

1. Take care of your equipment, protect it, and handle it with care during transportation to the job site. Ensure the equipment is protected. Select a work area where the equipment will be out of everyone's way, so that it doesn't get knocked over.

2. Clean your equipment, after the work is done at the job site, clean up the equipment. If you are on an extended work program, have the equipment operators clean the equipment during slow work periods. Cleaning involves wiping off the dirt hot soapy water and a soft cloth. Soft Scrub, paint thinner, mineral spirits & turpentine can be used, if necessary, to clean only the case. Clean the terminals (diver communicator connections), use a solution of mild vinegar and a small brush.

3. Charge the batteries after each use; preferably leave the unit on charge when the equipment is not in use.

SCHEDULED MAINTENANCE 10.2

1. Before and after each Dive; Inspect for any damaged parts, broken gauges, condition of high-pressure hose whip (inspect for cuts, abrasion, or general deterioration). Functional test of unit prior to dive, after dive record operator comments regarding maintenance required.

2. Every 6 Months, complete the before and after each dive inspection. Each diver Pneumo gauge must be calibrated. Calibrate against dead weight tester, or reference gauge. Pressure test PNEUMO section and repair any and all leaks. Record the results of inspection and gauge calibration.

SCHEDULED MAINTENANCE- (cont'd) 10.2

Every 12 months, complete the above tests plus the following:

1. Remove high-pressure valve stems, inspect, clean, lubricate (use Christolube grease, Amron part No. MCG-111-20Z) and install. Check valve seat, threads, packing material for signs of wear or deterioration, replace if necessary.

2. Remove Filter element and inspect. If filter element is dirty make a determination as to where the contamination is coming from. Check the air source being used to determine where the contamination is coming from and correct. If filter is contaminated, remove high pressure section and clean all valves, inspect for signs of wear and deterioration, replace those parts which show signs of deterioration, clean and reassemble.

3. Check regulator action, check regulator maximum pressure, should be greater than 265 PSI.

4. Check relief valve actuation and shut off. Should vent at 285 PSI, close at 280 PSI sealing bubble tight.

5. Check action of pneumo gauge protectors, should shut off at 122 PSI +/- 5 lbs., on slow rising pressure.

6. Check operation of LOW-PRESSURE alarm adjust if necessary. Should turn on at 100 PSI +/- 5 lbs., turn off at 110 PSI +/- 5 lbs.

7. Check all valves for bubble tight shut off. Replace seats as needed.

8. Leak test all fittings, Pressure test PNEUMO section.

9. Check accuracy of all gauges.

10. Record the results of the above tests.

Every three years, in addition to the above test:

1. Replace all soft goods, seals, gaskets and batteries.

2. Record the results of the above tests.

GENERAL INFORMATION 11.1

Normal shop tools and procedures apply for all repairs.

During this section when you are instructed to remove a part or make an adjustment, you are first to remove all pressure from the system, or as a minimum from the section you are working on.

Tubing and Tube Fittings -- repair, assembly, and inspection procedures. The common cause of leaks on tube fittings are debris, cracks, and deformed tube flares. Tube fittings, on initial make up tighten 1-1/4 turns from finger tight. To remake tube fittings, tighten finger tight plus 1/8 turn. Care must be used when disassembling tube fittings to ensure the fitting is held while the tube nut is turned.

Pipe Fittings, the most common cause of leaks on pipe fittings is over tightened. Before installing pipe fittings, remove all old Teflon tape, use stiff bristle brush. Replace Teflon tape by wrapping 1-1/2 turns of 1/2 inch tape, counter-clockwise on the threaded portion of the fitting. Use care when installing Teflon tape, leave one full turn of thread exposed and uncovered. This insures that a piece of tape does not get cut off and enter the system during the installation of the fitting.

To remove a panel from the case (either the upper, lower, or communicator), first disconnect the electrical cable from the communicator and the pneumo hose from the lower panel. Turn the MS connector on the communicator counter-clockwise to loosen, when the locking ring is turning free pull up on the connector to remove. You will also need to remove the air hose connecting the lower panel to the upper panel. Loosen the fitting on the lower panel, use two wrenches, and disconnect the hose.

Remove the Diver communicator before attempting to remove the lower panel. Loosen and remove the four screws on the front panel of the communicator. Lift communicator out of panel and set aside. Remove the lower panel by removing the screws from around the perimeter of the panel. The lower panel can now be removed from the case. When the lower panel is removed the case will want to tip over backwards because of the unbalanced weight, support the upper panel or remove the stay hinge and lay the upper panel down.

Removing the upper panel is the same procedure as the lower. To install the panel back in the case, install all screws before tightening any of the screws. This allows the panel to be shifted to facilitate the alignment of the screw holes in the panel.

AIR CONTROL 11.2

HP GAUGES, inspect for leaks, any leak other than the input fitting is cause to replace the gauge. Internal leaks may cause the gauge face to bulge, if this occurs replace gauge. Inspect gauge blow-out plug for damage. Check accuracy of gauge against reference gauge. Gauges are not repairable, nor can they be adjusted, discard and replace if problems are encountered.

HP VALVES are repairable, remove stem by removing handle and stem packing nut, unscrew stem. Inspect stem, stem screw threads, valve body screw threads, brass packing washer, Viton O-ring, and stem seat (KEL-F). Repair kits are available and include a complete stem assembly. Lubricate stem screw threads and Viton O-ring with Chris-o-lube grease, install stem assembly, and permanently tighten packing nut.

AIR CONTROL (cont'd) 11.2

HP CHECK VALVES, repairable, Maintenance Kit available from Amron and contain Viton seat and spring. When checking for leaks, be sure to check valve body to end of fitting.

HP-FILTER, replaceable element, Maintenance Kit available from Amron and contain element, body gasket, and retainer spring. Check with soap and water to ensure filter is not leaking.

HP-REGULATOR - problems and possible causes. Refer to figure while reading this section. If the regulated pressure continues to rise at lock-up with no change in the control knob setting suspect damaged or dirty main valve seat (item 20) or damaged valve stem (item 18). Bleed inlet pressure and inspect seat and valve stem by removing back cap (item 13), an audible leak through bonnet (item 8). Check torque on bonnet ring (item 6) and diaphragm nut and inspect diaphragm (item 11) for damage or excessive wear. If outlet pressure drops off rapidly with very small flow demand, check that valve stem support (item 22) has not been inadvertently left out after previous disassembly or that filter has not been clogged by and excessively contaminated supply.

REPAIR KITS are available in two configurations. Soft goods repair kit, P/N 389-6906 includes Items 11 diaphragm, 14 "O"-ring, 15 "O"-ring, and 20 seats. The Standard repair kit, P/N 389-6907 includes all the items in the soft goods kit and the following items, 7 washer, and 18 valve stem.

DISASSEMBLY AND ASSEMBLY OF THE REGULATOR

1. Remove regulator from system
2. Turn CONTROL KNOB (item 3) counter-clockwise to insure removal of all spring force on the DIAPHRAGM (item 11).
3. Secure regulator in vise with the BACK CAP (item 13) on the bottom.
4. Remove mounting bracket (item 5).
5. Remove BONNET RING (item 6). DIAPHRAGM (item 11) and associated parts can now be disassembled.
6. Remove BACK CAP (item 13) by using 1-1/8" wrench. Valve stem (item 18) and associated parts are removed with the back cap.

The above steps provide the disassembly procedures, to reassemble, simply reverse these procedures. Torque Diaphragm nut to between 45-50 inch pounds, and the Bonnet Ring to between 50-55 foot pounds. Lubricate the "O"-rings, bonnet ring and back cap.

RELIEF VALVE, Check the operation of the vent valve by pressurizing the system until the vent begins to relieve the pressure. Decrease the pressure to stop the venting action, valve should stop bubble tight. If the relief valve does not operate correctly remove and disassemble, inspect. Replace any defective parts or clean, lubricate and reassemble.

To disassemble the relief valve, remove valve from system. In the output side of the valve there is a set screw, remove it. There is a second set screw under the first screw. The second set screw is the actual adjustment for the set point. The first screw is a locking screw that locks the adjusting screw at the set point.

AIR CONTROL (cont'd) 11.2

RELIEF VALVE (cont'd)
There is another set screw at the other end of the valve, removing this allows the valve to be completely disassembled. When taking the valve apart be sure to lay the parts out in the order in which they were removed to facilitate assembly. Reverse the order to assemble. Pressurize the valve to check the setting of the valve. Remove the pressure and adjust as necessary to set the pressure. Turning the screw clockwise increases the pressure at which the valve will relieve.

LP INPUT CHECK VALVE, Same as the HP check valves except for size. During test insure that the valve is not leaking by pressurizing the HP section and check the LP input for air leaking out of the input.

DIVER'S PRESSURE GAUGE, same as HP pressure gauges.

DIVER'S OUTPUT VALVES, 1/4 turn ball valves, to test, pressurize the input and turn the valves off, check that no air is leaking past the valve. The valves are repairable; they use Teflon seats which can be replaced. A maintenance kit is available from Amron. To replace, remove valve from system. Remove end pieces from valve, remove valve stem packing nut and remove stem. Teflon ball seal and stem packing can now be removed and replaced. To assemble, reverse process.

DEPTH MONITORING 11.3

PNEUMO VALVES are repairable, remove stem by removing handle and stem packing nut, unscrew stem. Inspect stem, stem screw threads, valve body screw threads, brass and Teflon packing washer, and stem seat (KEL-F). Repair kits are available and include a complete stem assembly. Lubricate stem screw threads with Christolube grease, install stem assembly, and permanently tighten packing nut.

PNEUMO GAUGE PROTECTOR valves are not field repairable. The procedure for setting the valves is to pressurize the pneumo system slowly using the HP regulator. The gauge protector should shut off pressure to the pneumo gauge at about the zero set point screw (110% of full scale). Do not exceed a pressure equal to Zero on the pneumo gauge. If the gauge protector has not shut off the pressure by this time, either the protector is defective or not adjusted properly. To adjust loosen the lock nut on the side of the gauge protector valve and adjust the slotted screw on the valve. Turning the screw in (clockwise) increase the pressure at which the valve locks the pressure out. Set the lock-out to occur at about the zero adjusting screw, tighten lock nut and retest.

PNEUMO GAUGES are not field repairable nor are there any adjustments which can be made in the field. Check to make sure the blow-out plugs are in place. Calibrate every 6 months. Check the zero position of the gauge a displaced zero is evidence of a gauge that has been subjected to over-pressurization.

NOTE: Check the gauge before using, if there is any question about the gauges integrity, have the gauge calibrated. Normal variations in zero are caused by variations barometric pressure or changes in altitude. These variations normally will not exceed 10 feet.

DEPTH MONITORING (cont'd) 11.3

LOW PRESSURE ALARM, To adjust the set point of the low pressure alarm, loosen the locking ring on the pressure switch. Rotate the body of the switch clockwise to increase the set pressure. The set point of the switch is very sensitive to adjustment and requires patience and a steady hand. Tighten lock and recheck set point. Variation between increasing pressure and decreasing pressure trip point is about 15 PSI. Check the set point in the decreasing direction.

DIVER COMMUNICATIONS 11.4

Diver Radio Field Check Procedures

The following are procedures to allow a functional check in the field of your radio, using only a headset. These steps check all communication functions of the radio in both 2-wire and Simulcom modes. This means that if your radio checks with these steps, any communication problems should be somewhere else in the system, such as umbilical, connections, speakers, and/or microphone.

QUICK SIMULCOM CHECK

This brief procedure checks diver radio functions in Simulcom: set all volume controls at mid-scale, turn unit on.

1. Identify headset microphone lead and headset earphone lead. Plug into dual banana jack adapters. (Usually the microphone plug is red.)

2. Plug in headset microphone to "Tender" "Microphone" (input) and headset earphone to "Tender" "Headset" (input/output). You should be able to hear yourself talk. This verifies tender circuit.

3. Move headset microphone to "Diver 1" "Microphone" (input) and headset earphones to "Diver 1" "Earphone" (output). You should be able to hear yourself talk. This verifies diver 1circuit.

4. Move headset microphone to "Diver 2" "Microphone" (input) and headset earphones to "Diver 2" "Earphone" (output). You should be able to hear yourself talk. This verifies diver 2 circuit.

The basic SIMULCOM function of the diver radio has now been checked.

COMPREHENSIVE 2-WIRE AND SIMULCOM CHECK

Set all volume controls at mid-scale, turn power on.

1. Identify headset microphone lead and headset earphone lead. Plug into dual banana jack adapters. (Usually the microphone plug is red.)
2. Plug headset earphone into "Tender" "Headset" (output) and the headset microphone into "Tender" "Microphone" (input). Turn power on, speaker off. Put on headset and speak into microphone, listening for your own voice. Adjust diver to tender volume, and check that controls respond and there is adequate volume. If you can talk to yourself, then tender circuit is operating properly.

DIVER COMMUNICATIONS (cont'd) 11.4

"Diver 1" Down-link Check

1. Move headset earphone plug from "Headset" (output) to "Microphone" "Diver 1". Talk into headset while pressing the "Push to Talk" switch. You should be able to talk to yourself with plenty of volume as long as the "Push to Talk" switch is depressed. This verifies 2-wire communication from tender to "Diver 1" and the function of relay K1.

2. Move headset earphone plug from "Microphone" (input) "Diver 1" to "Earphone" (output) "Diver 1". Talk into headset. There should be plenty of volume. This checks earphone output for diver 1, Simulcom.

"Diver 2" Down-Link Check

1. Move headset earphone plug from "Diver 1" "Earphone" (output) to "Microphone" (input) "Diver 2". Talk into headset while pressing the "Push to Talk" switch. You should be able to talk to yourself with plenty of volume as long as the "Push to Talk" switch is depressed. This verifies 2-wire communication from tender to "Diver 2" and the function of relay K2.

2. Move headset earphone plug from "Microphone" (input) "Diver 2" to "Earphone" (output) "Diver 2". Talk into headset. There should be plenty of volume. This checks earphone output for diver 2, Simulcom.

Tender's Speaker Down-Link Check

1. Unplug headset from "Microphone" (input) and turn "Speaker" on. Press "Push to Talk" and talk into speaker. You should hear yourself in headset earphones. This verifies speaker section of relay K1. Turn speaker off.

"Diver 1" Up-Link Check

1. Place headset microphone into "Microphone" (input) "Diver 1" and headset earphone plug in "Tender" "Headset" (output). Talk into headset. You should hear yourself in the headphones with plenty of volume. Press "Diver 1" "On/Off" while talking, when switch is depressed your voice should cut out. This verifies "Diver 1" "Microphone" (input), relay K1, and "Diver 1" "On/Off" switch.

"Diver 2" Up-Link Check

1. Move headset microphone into "Microphone" (input) "Diver 2". Talk into headset. You should hear yourself in the headphones with plenty of volume. Press "Diver 2" "On/Off" while talking, when switch is depress your voice should cut out. This verifies "Diver 2" "Microphone" (input), relay K1 and "Diver 2" "On/Off" switch.

Crosstalk Check

1. Move headset microphone plug to "Microphone" (input) "Diver 1". Press "Crosstalk DV-2 to DV-1" switch and talk into headset. You should hear yourself while the "Crosstalk" switch is depressed. This checks the "Crosstalk" function diver 2 talking to diver 1.

2. Move headset microphone plug to "Microphone" (input) "Diver 2", move headset earphone plug to "Diver 1" "Microphone" (input). Press "Crosstalk 1 to 2" switch and talk into headset. You should hear yourself while the "Crosstalk" switch is depressed. This checks the "Crosstalk" function, diver 1 talking to diver 2.

PROBLEMS AND THEIR POSSIBLE CAUSES 11.5

Unit Does Not Operate

Check to see that unit is turned on, (speaker and headset switch). Check that battery condition is ok, (battery condition indicator). Check to see that connections are proper, correct if necessary. Use diver radio field check procedure to determine if problem is within the unit or elsewhere within the communication system. Check to see that internal P.C. Card connectors are properly seated, there should be no gap between the bottom of the connector housing and the circuit card. Push connector down and recheck.

Low Volume

Check volume control settings, adjust if desired. Check diver connections, correct if bad. Use diver radio field check procedure. Check for low batteries.

Garbled Voice to Diver

Tender volume to diver is set too high, reduce volume. Divers earphones corroded or defective, replace it. Tender's microphone (speaker) defective or full of moisture, empty water out of speaker or replace tender headset. Check diver comm. cable and connections.

Garbled Voice to Tender

The diver volume to tender is set too high, reduce volume. Tender's headset is marginal, speaker has water in it, and diver's microphone is marginal, damaged comm. cable or connections. Substitute with known good units to determine exact problem and correct.

Diver Cuts Out

Check for intermittent connection, substitute system components with known good units to determine exact problem and correct fault.

Connections

Most diver communications problems are caused by bad connections. The time spent in making good connections will result in years of good communications. All connections must be soldered to last for any period of time. Copper wire must be tinned as a minimum, it is strongly suggested that dual banana plugs be used for topside connections. This provides a convenient and secure connection which will last for several years if treated with a reasonable amount of care.

All cable splices must be soldered, splices should be staggered, covered with shrink tubing preferably shrink tubing with an adhesive sealant, and a general splice cover to protect the connections. Potting of splices is a very good and professional approach, however not necessary to create a reliable splice.

Push to Talk Does Not Function But Tender Hears Diver (2 wire only)

Check connection to tender headset microphone if used. Check battery condition indicator to be steady green. The first function to fail because of low batteries is the actuation of the push-to talk function. Find which push to talk switch is not working (PTT All Divers, PTT-Diver 1 & PTT-Diver 2). It could be a broken wire on the switch terminals or a bad connection with PC card.

PROBLEMS AND THEIR POSSIBLE CAUSES (cont'd) 11.5

Diver Hears Tender But Tender Cannot Hear Diver, or Volume Is Very Low

Check to see if diver is connected to microphone and not earphone. Check to see that volume levels are not turned down. Inspect diver connections, hat components.

Feedback

These situations may cause feedback, tender's speaker on while headset is connected, unused diver communications connected to system, damaged Comm. cable or connections, (open or shorted wires or connections). Feedback can be caused by leakage between microphone wires and earphone wires in the umbilical. Leakage can be determined by a continuity test between the wires. Resistance for a new cable should be in excess of 10 Meg ohms. In a situation where the Comm. cable is damaged, reduce volume to diver as low as possible (reduce side tone), or go to 2-wire operation until cable can be repaired.

Distortion

Distortion may be caused by several conditions - volume is adjusted too high, system is on the verge of feedback, marginal components (earphones or microphone). Check by substitution, replace defective components. Note: When operating with a standby diver who does not have his hat/helmet on, acoustic feedback or distortion may occur. Correct by turning his volume down or disconnecting his Comm. cable (at least his microphone, which will reduce overall system noise).

DIVING LOG, U.S. NAVY (CHART) 12.1

DIVING CHART - AIR

Date			
NAME OF DIVER 1	DIVING APPARATUS	TYPE DRESS	EGS (PSIG)
NAME OF DIVER 2	DIVING APPARATUS	TYPE DRESS	EGS (PSIG)
TENDERS (DIVER 1) AND		TENDERS (DIVER 2) AND	
LEFT SURFACE (LS)	DEPTH (fsw)	REACHED BOTTOM (RB)	DESCENT TIME
LEFT BOTTOM (LB)	TOTAL BOTTOM TIME (TBT)	TABLE & SCHEDULE USED	TIME TO FIRST STOP
REACHED SURFACE (RS)	TOTAL DECOMPRESSION TIME (TDT)	TOTAL TIME OF DIVE (TTD)	REPETITIVE GROUP

DESCENT	ASCENT	DEPTH OF STOPS	DECOMPRESSION TIME WATER	DECOMPRESSION TIME CHAMBER	TIME WATER	TIME CHAMBER
		10			L / R	
		20			L / R	
		30			L / R	
		40			L / R	
		50			L / R	
		60			L / R	
		70			L / R	
		80			L / R	
		90			L / R	
		100			L / R	
		110			L / R	
		120			L / R	
		130			L / R	

PURPOSE OF DIVE	REMARKS
DIVER'S CONDITION	DIVING SUPERVISOR

REPETITIVE DIVE WORKSHEET 12.2

REPETITIVE DIVE WORKSHEET

I. PREVIOUS DIVE:

_____ minutes ☐ Standard Air Table

_____ feet ☐ No-Decompression Table

_____ repetitive group designation

II. SURFACE INTERVAL:

_____ hours _____ minutes on surface.

Repetitive group from I _____

New repetitive group from surface

Residual Nitrogen Timetable _____

III. RESIDUAL NITROGEN TIME:

_____ feet (depth of repetitive dive)

New repetitive group from II. _____

Residual nitrogen time from

Residual Nitrogen Timetable _____

IV. EQUIVALENT SINGLE DIVE TIME:

_____ minutes, residual nitrogen time from III.

+_____ minutes, actual bottom time of repetitive dive.

=_____ minutes, equivalent single dive time.

V. DECOMPRESSION FOR REPETITIVE DIVE:

_____ minutes, equivalent single dive time from IV.

_____ feet, depth of repetitive dive

Decompression from (check one):
☐ Standard Air Table ☐ No-Decompression Table
☐ Surface Table Using Oxygen ☐ Surface Table Using Air
☐ No decompression required

Decompression Stops: _____ feet _____ minutes

_____ feet _____ minutes

_____ feet _____ minutes

_____ feet _____ minutes

_____ feet _____ minutes

Scheduled used _____

Repetitive group _____

NO DECOMPRESSION LIMITS 12.3

(NON-REPETITIVE DIVES ONLY)
U.S. NAVY DIVING MANUAL (AIR DECOMPRESSION)

DEPTH FSW	BOTTOM TIME (min)
40	200
50	100
60	60
70	50
80	40
90	30
100	25
110	20
120	15
130	10
140	10
150	5
160	5
170	5
180	5
190	5

NOTE: OSHA REGULATIONS REQUIRE: A decompression chamber capable of recompressing the diver at the surface to a minimum of 165 FSW (6 ATA) shall be available at the dive location for: A) Surface-supplied air-diving to depths deeper than 100 FSW.

GAUGE PRESSURE FOR DEPTH OF SEAWATER & FRESH WATER 12.4

(GAUGE PRESSURE IN PSI)

DEPTH IN FEET	FRESH WATER	SEAWATER
10	4.33	4.45
20	8.66	8.90
30	12.99	13.35
40	17.32	17.80
50	21.65	22.25
60	25.98	26.70
70	30.31	31.10
80	34.64	35.60
90	38.97	40.05
100	43.30	44.50
110	47.63	48.95
120	51.96	53.40
130	56.29	57.85
140	60.62	62.30
150	64.95	66.75
160	69.28	71.20
170	73.61	75.65
180	77.94	80.10
190	82.27	84.55
200	86.60	89.00

EQUIVALENT DEPTHS OF SEAWATER & FRESH WATER 12.5

DEPTH (FEET OF SEAWATER)	EQUIVALENT DEPTH (FEET OF FRESH WATER)
10	10.30
20	20.60
30	30.90
40	41.20
50	51.50
60	61.80
70	72.10
80	82.40
90	92.70
100	103.00
110	113.30
120	123.60
130	133.90
140	144.20
150	154.50
160	164.80
170	175.10
180	185.40
190	195.70
200	206.00

DRAWINGS & SCHEMATICS 13.0

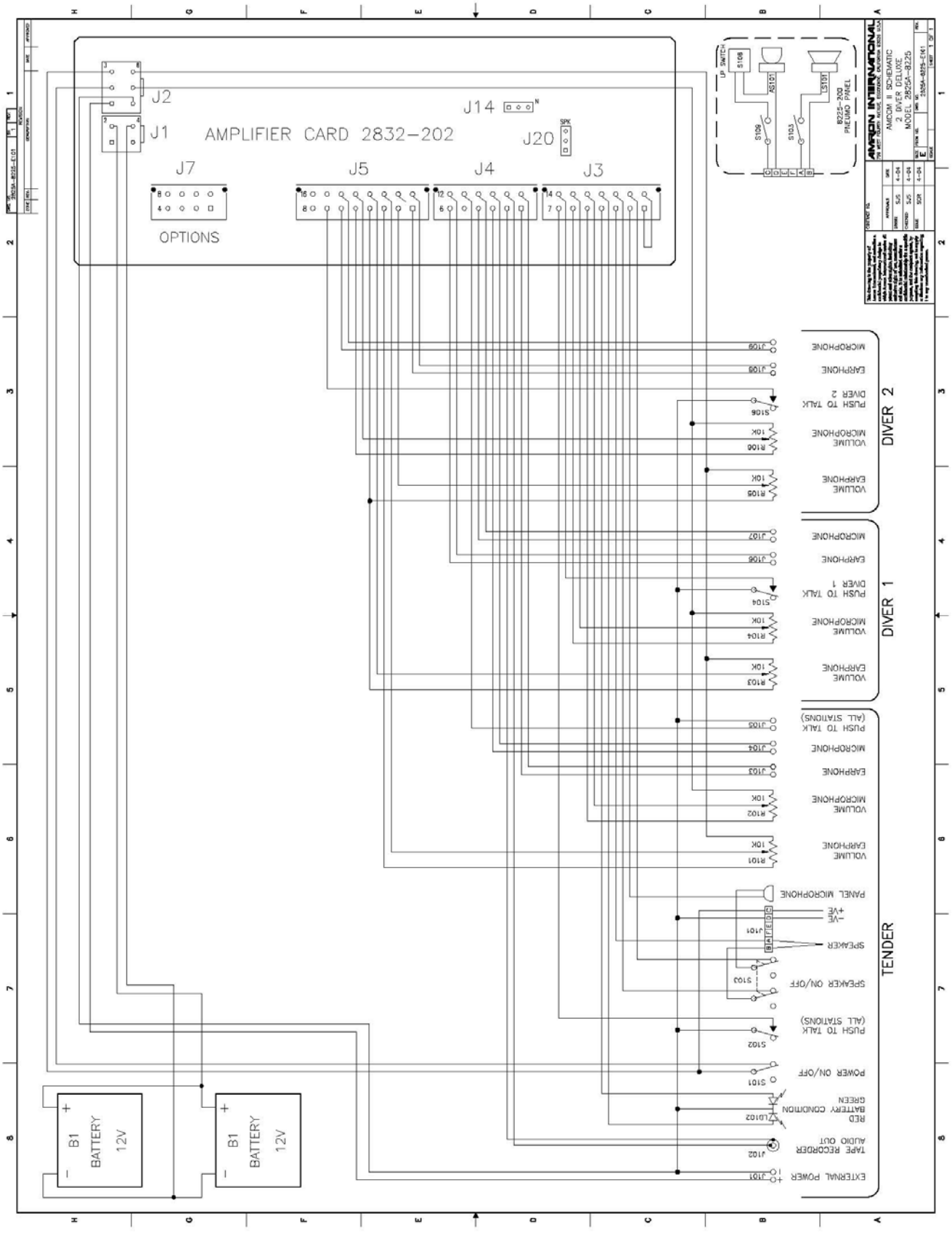
General

The following drawings illustrate the electrical and mechanical details of the diver communication unit. The corresponding parts lists for each drawing are detailed in the parts lists section.

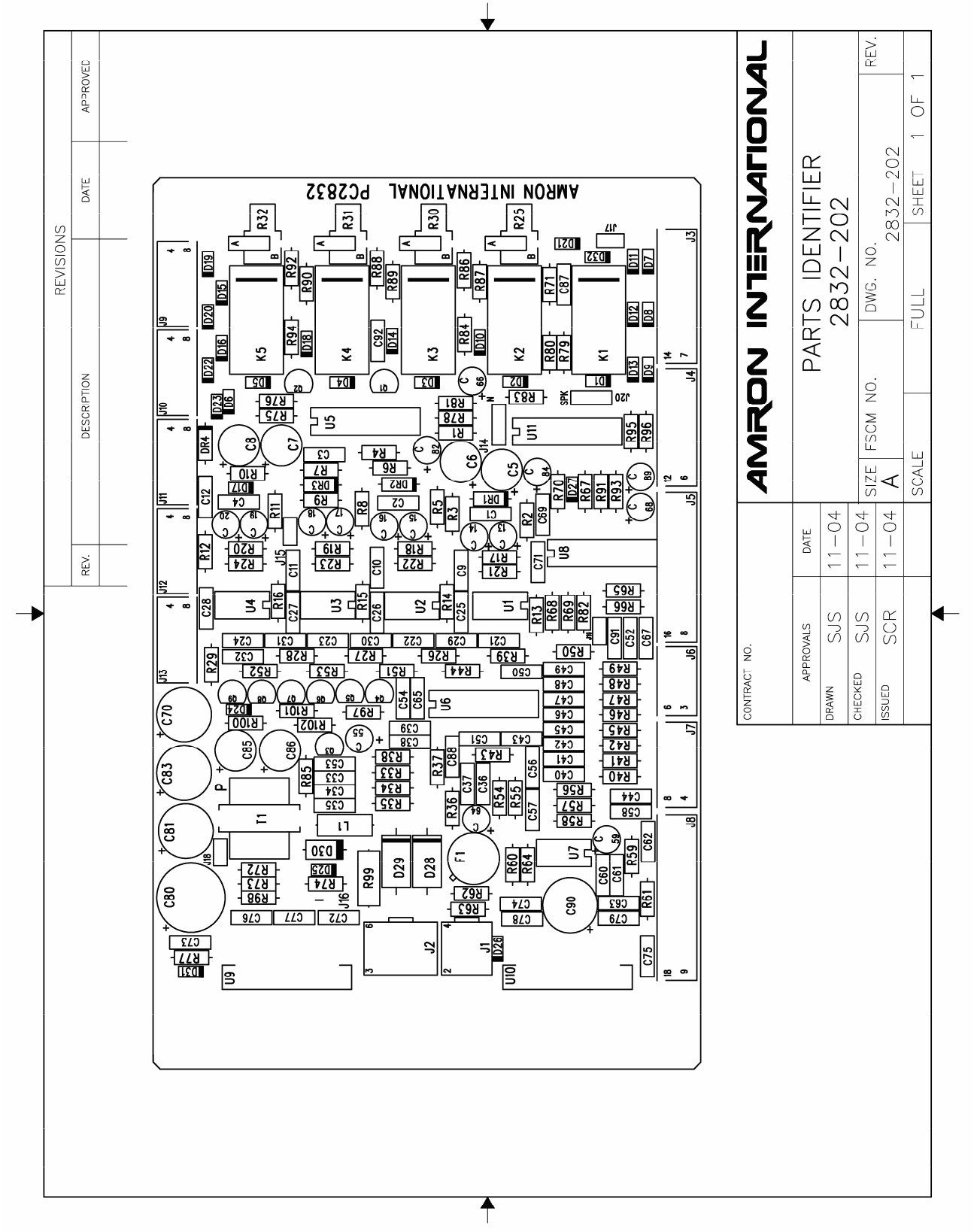
Revisions

As drawings are updated, information about changes is incorporated into a revision sheet. This revision sheet appears in the manual immediately after the drawings. It lists the drawing number, the reference designator of the part or parts involved, a description of the revision, and the effective serial number of the change. With this information the technician can determine the correct drawing for the current version, and any previous version, of the unit covered by this manual. If the revision is applicable for all versions of the unit, it is not included in the revision notice, as the change applies to all units.

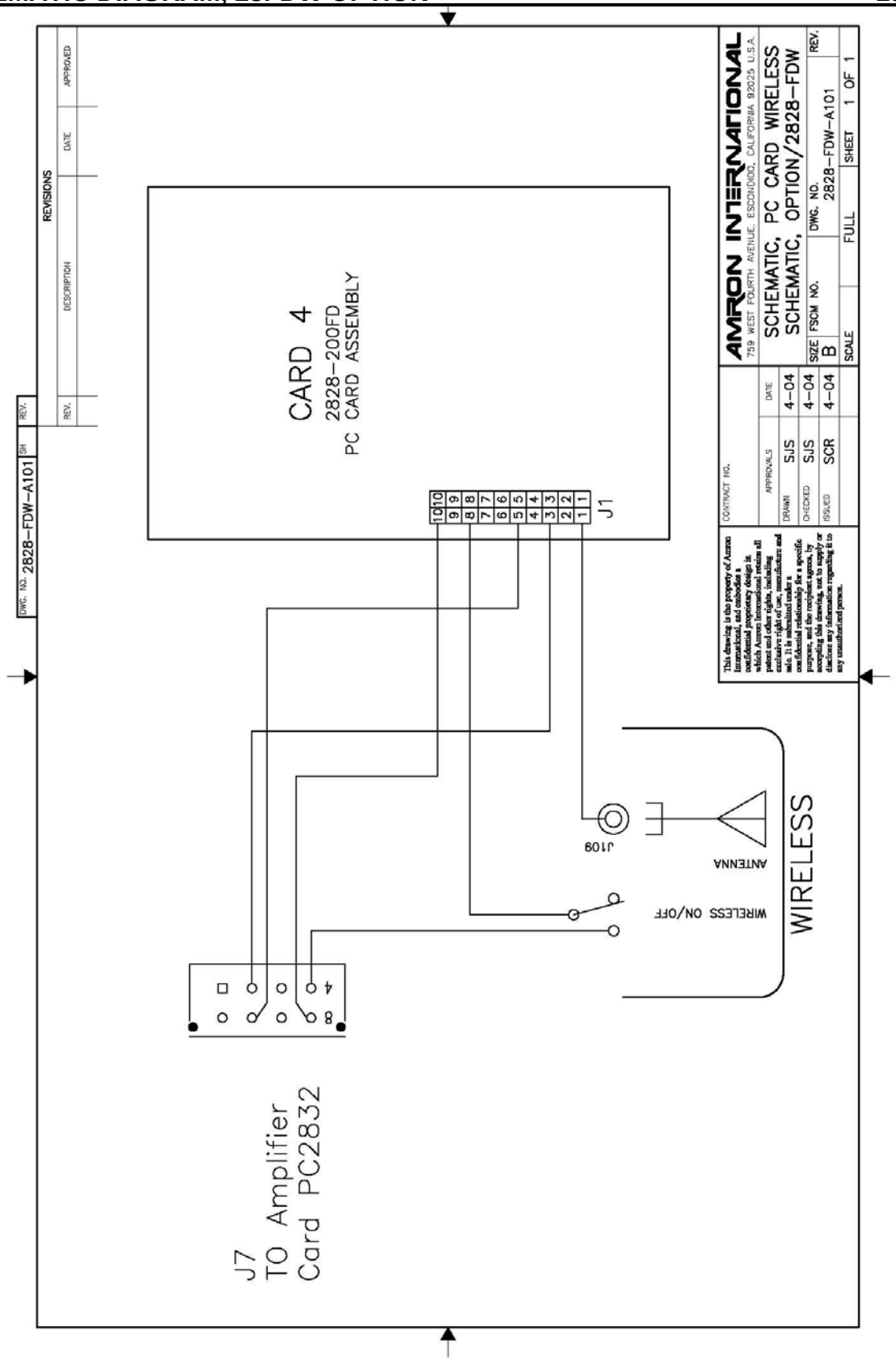
SCHEMATIC DIAGRAM, MODEL 2825A-8225 13.1



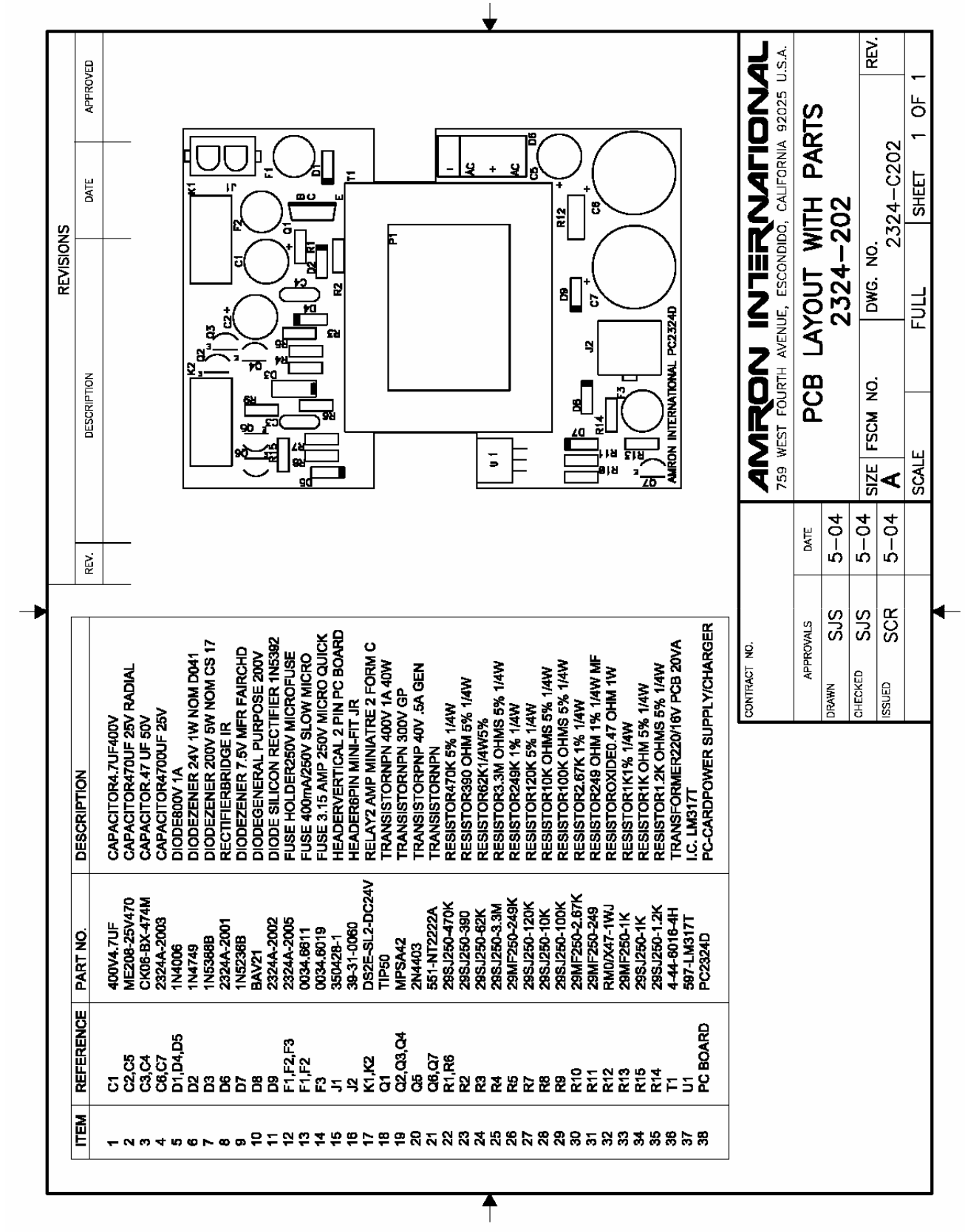
PARTS IDENTIFIER, 2832-202 13.2



SCHEMATIC DIAGRAM, 28FDW OPTION 13.3

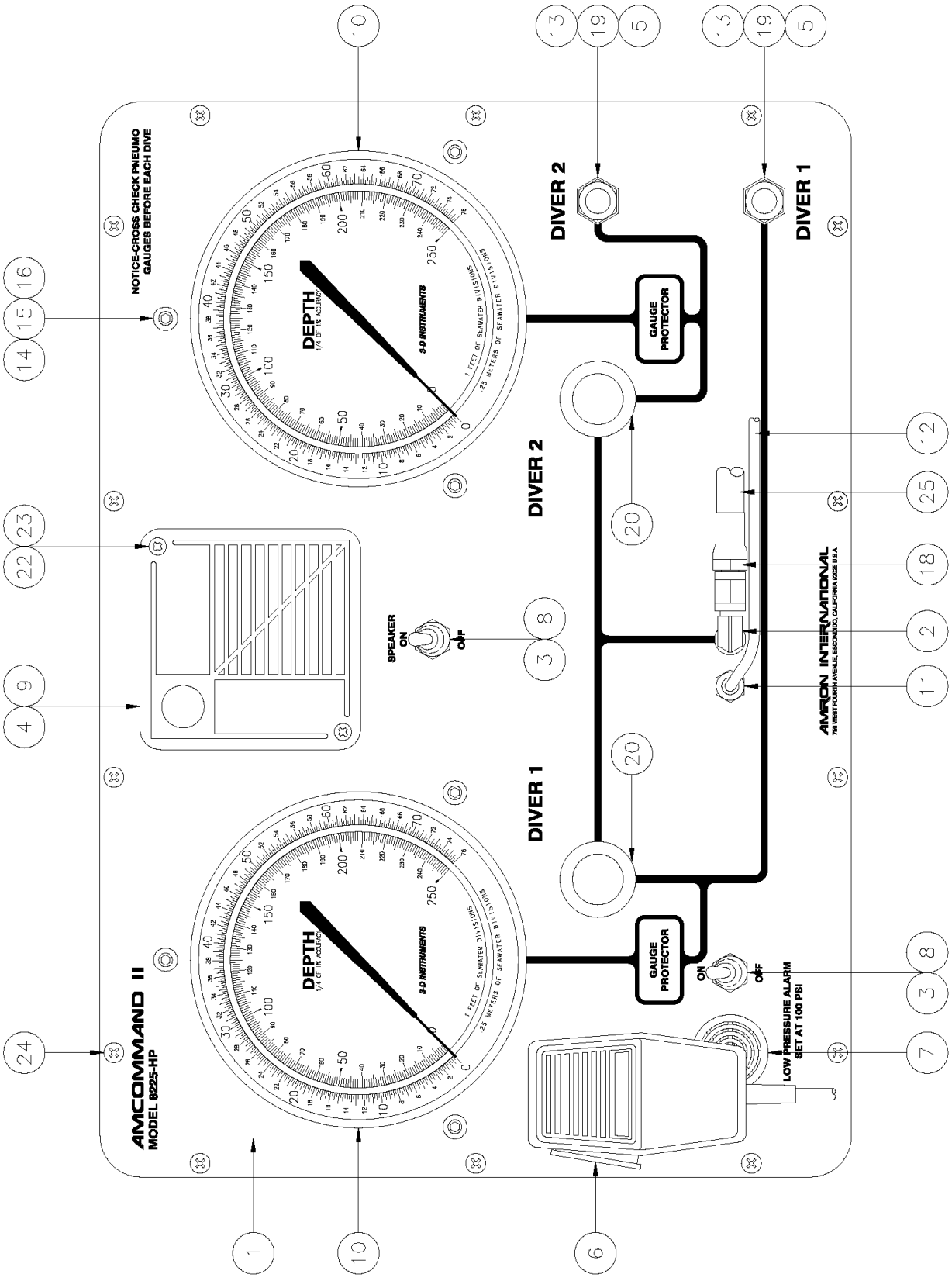


SCHEMATIC & PARTS LOCATOR, MODEL 2324-202 13.4

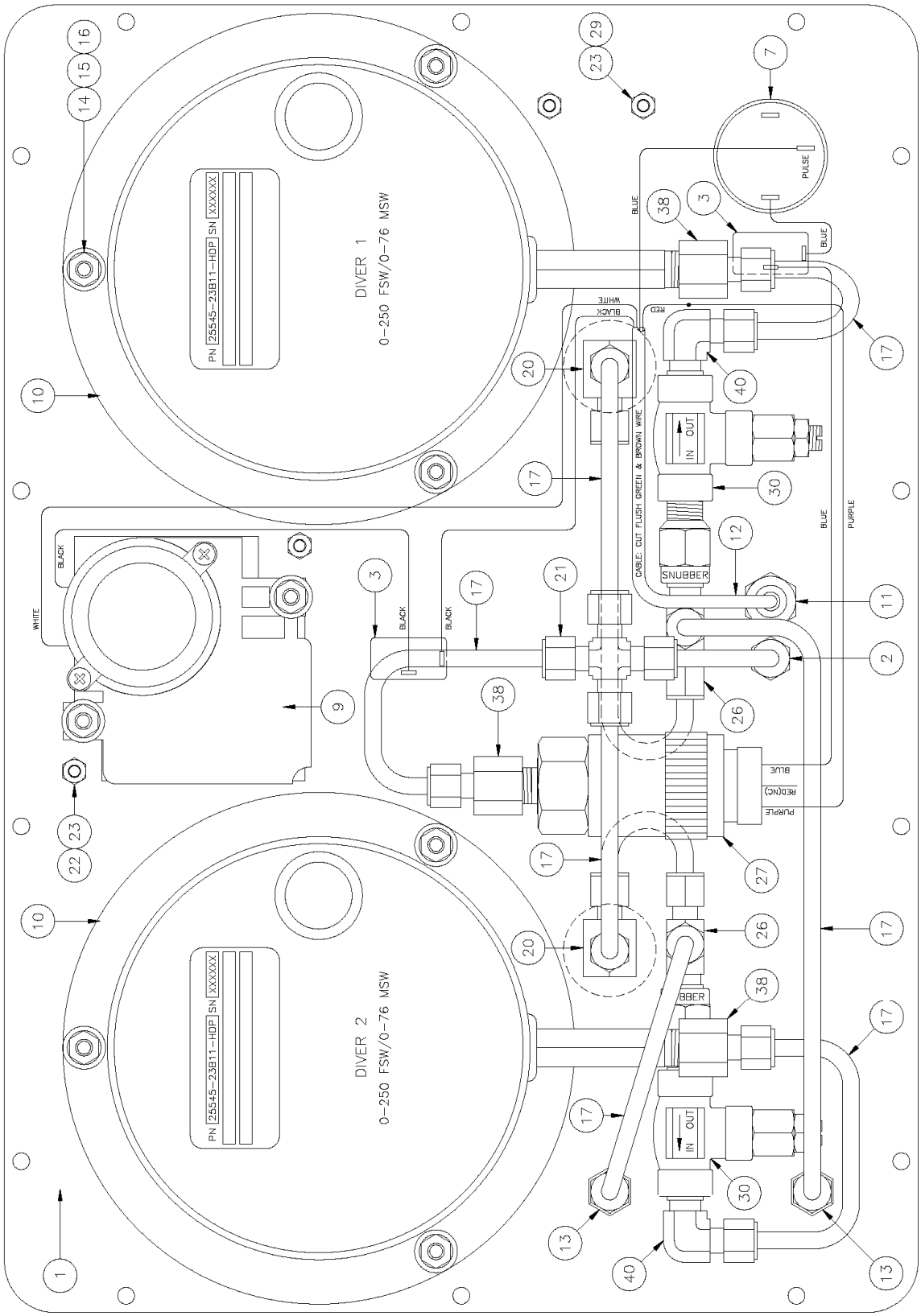


ITEM	REFERENCE	PART NO.	DESCRIPTION
1	C1	400V4.7UF	CAPACITOR4.7UF400V
2	C2,C5	ME208-25V470	CAPACITOR470UF 25V RADIAL
3	C3,C4	CK06-BX-474M	CAPACITOR.47 UF 50V
4	C6,C7	2324A-2003	CAPACITOR4700UF 25V
5	D1,D4,D5	1N4006	DIODE800V 1A
6	D2	1N4749	DIODEZENER 24V 1W NOM D041
7	D3	1N5388B	DIODEZENER 200V 5W NOM CS 17
8	D6	2324A-2001	RECTIFIERBRIDGE IR
9	D7	1N5236B	DIODEZENER 7.5V MFR FAIRCHD
10	D8	BAV21	DIODEGENERAL PURPOSE 200V
11	D9	2324A-2002	DIODE SILICON RECTIFIER 1N5392
12	F1,F2,F3	2324A-2005	FUSE HOLDER250V MICROFUSE
13	F1,F2	0034.6611	FUSE 400mA/250V SLOW MICRO
14	F3	0034.6019	FUSE 3.15 AMP 250V MICRO QUICK
15	J1	350428-1	HEADERVERTICAL 2 PIN PC BOARD
16	J2	39-31-0060	HEADER6PIN MINI-FIT JR
17	K1,K2	DS2E-SL2-DC24V	RELAY2 AMP MINIATRE 2 FORM C
18	Q1	TIP50	TRANSISTORNPN 400V 1A 40W
19	Q2,Q3,Q4	MPSA42	TRANSISTORNPN 300V GP
20	Q5	2N4403	TRANSISTORPNP 40V .5A GEN
21	Q6,Q7	551-NT2222A	TRANSISTORNPN
22	R1,R6	29SJ250-470K	RESISTOR470K 5% 1/4W
23	R2	29SJ250-390	RESISTOR390 OHM 5% 1/4W
24	R3	29SJ250-62K	RESISTOR62K1/4W5%
25	R4	29SJ250-3.3M	RESISTOR3.3M OHMS 5% 1/4W
26	R5	29MF250-249K	RESISTOR249K 1% 1/4W
27	R7	29SJ250-120K	RESISTOR120K 5% 1/4W
28	R8	29SJ250-10K	RESISTOR10K OHMS 5% 1/4W
29	R9	29SJ250-100K	RESISTOR100K OHMS 5% 1/4W
30	R10	29MF250-2.67K	RESISTOR2.67K 1% 1/4W
31	R11	29MF250-249	RESISTOR249 OHM 1% 1/4W MF
32	R12	RMOX47-1WJ	RESISTOROXIDE0.47 OHM 1W
33	R13	29MF250-1K	RESISTOR1K1% 1/4W
34	R15	29SJ250-1K	RESISTOR1K OHM 5% 1/4W
35	R14	29SJ250-1.2K	RESISTOR1.2K OHMS 5% 1/4W
36	T1	4-44-6016-4H	TRANSFORMER220/16V PCB 20VA
37	U1	597-LM317T	I.C. LM317T
38	PC BOARD	PC2324D	PC-CARDPOWER SUPPLY/CHARGER

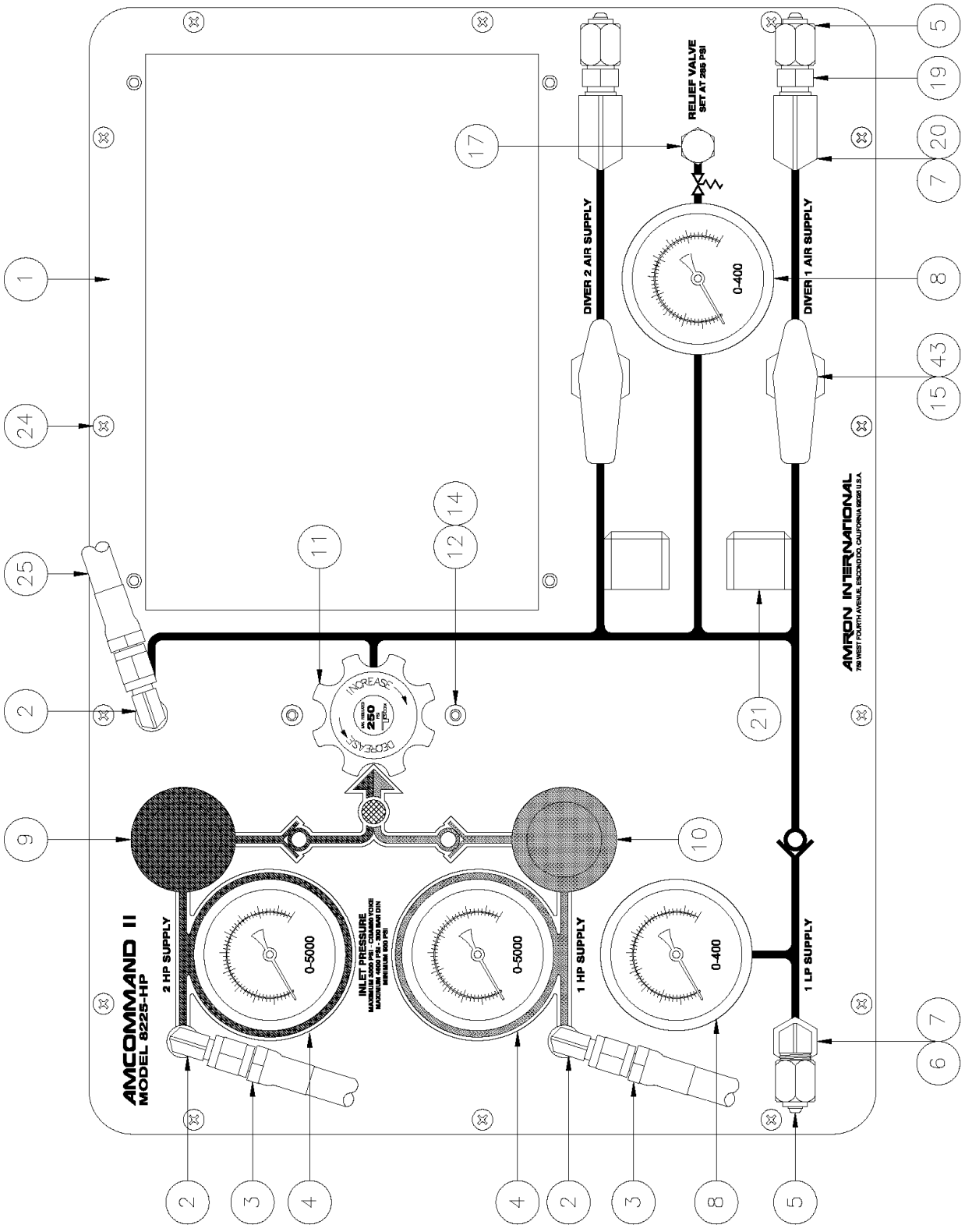
PARTS LOCATOR, MODEL 8225-200 (Pneumo Front Panel) 13.5



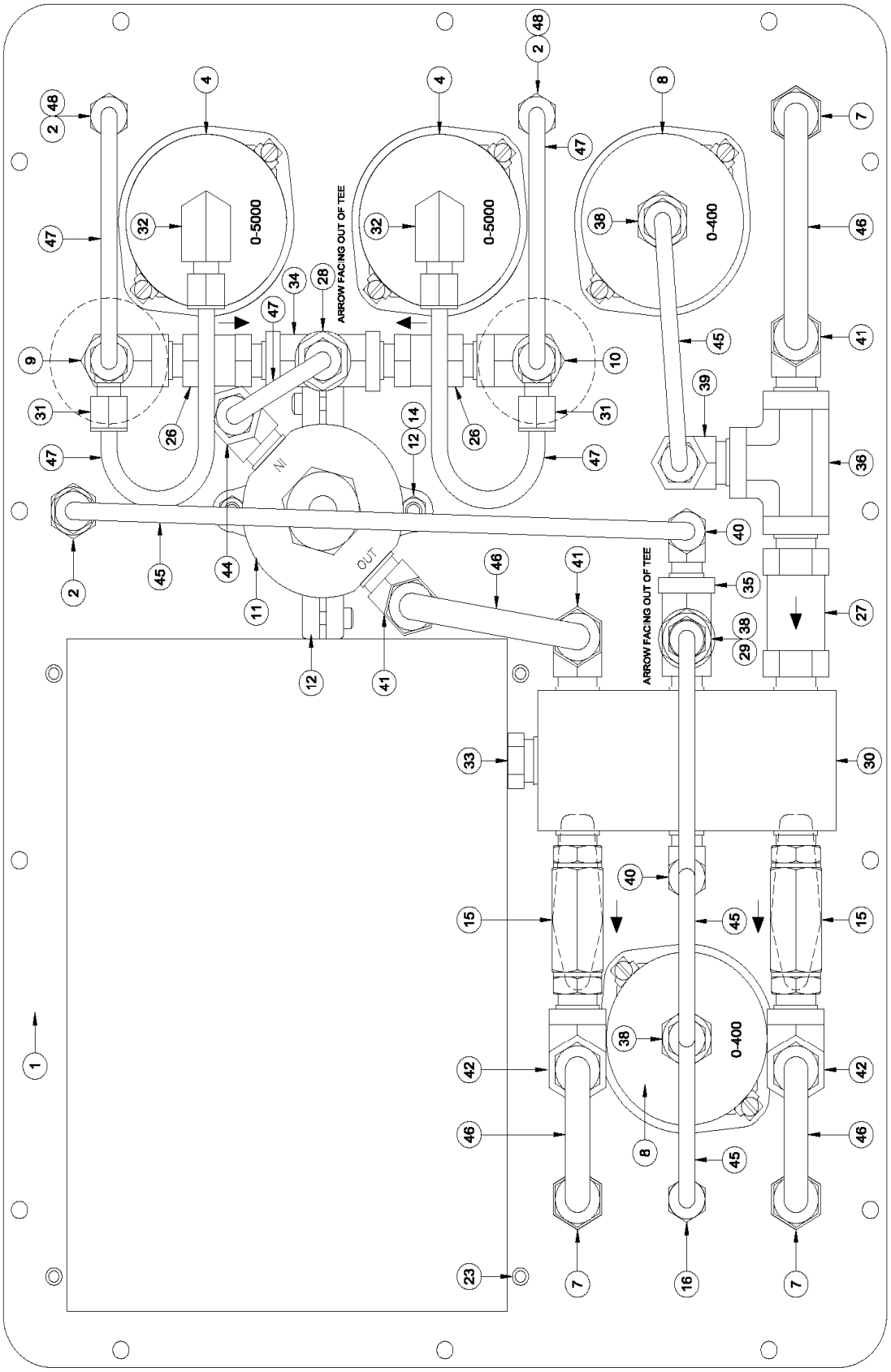
PARTS LOCATOR, MODEL 8225-200 (Pneumo Back Panel) 13.6



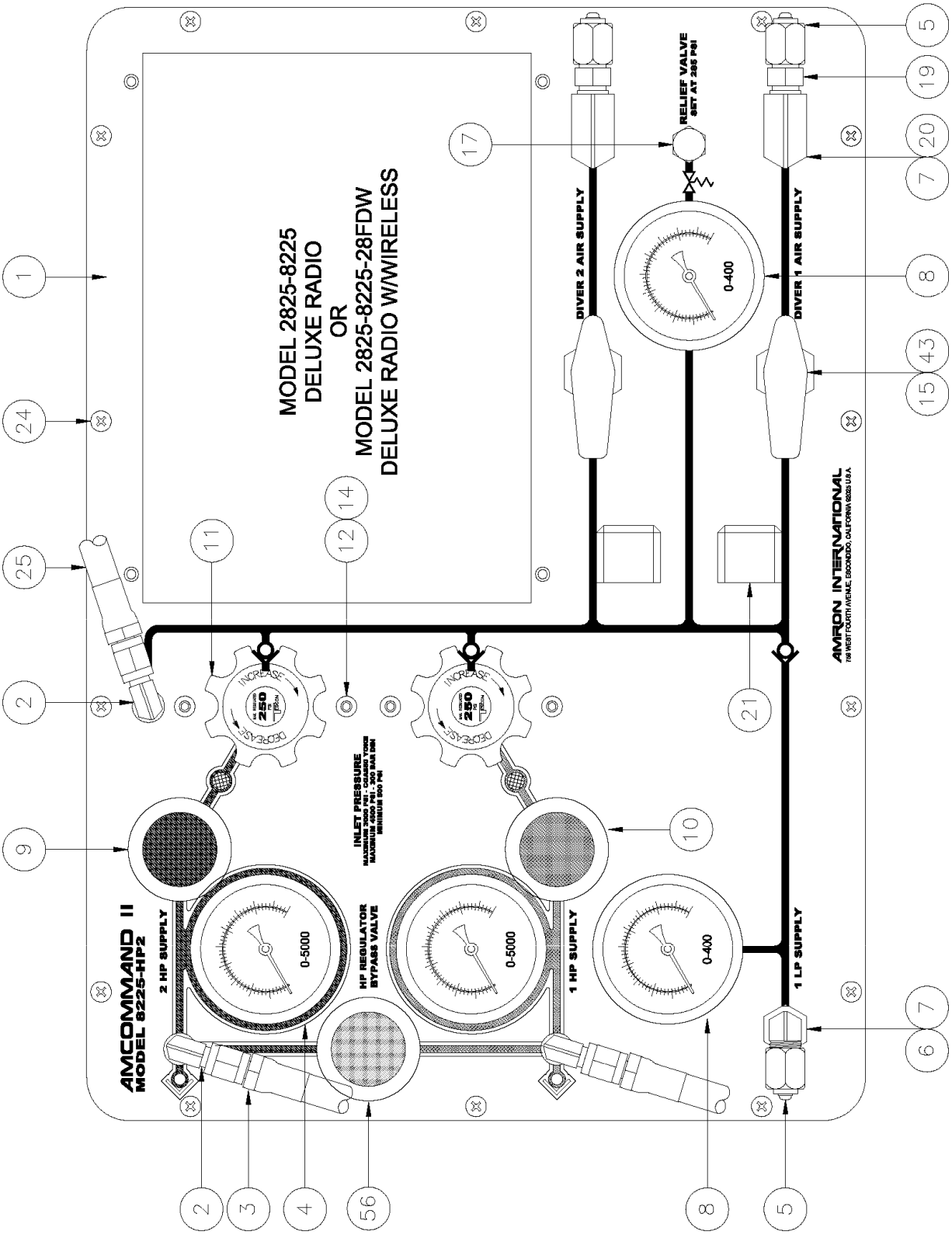
PARTS LOCATOR, MODEL 8225-400HP (Air Control Front Panel) 13.7



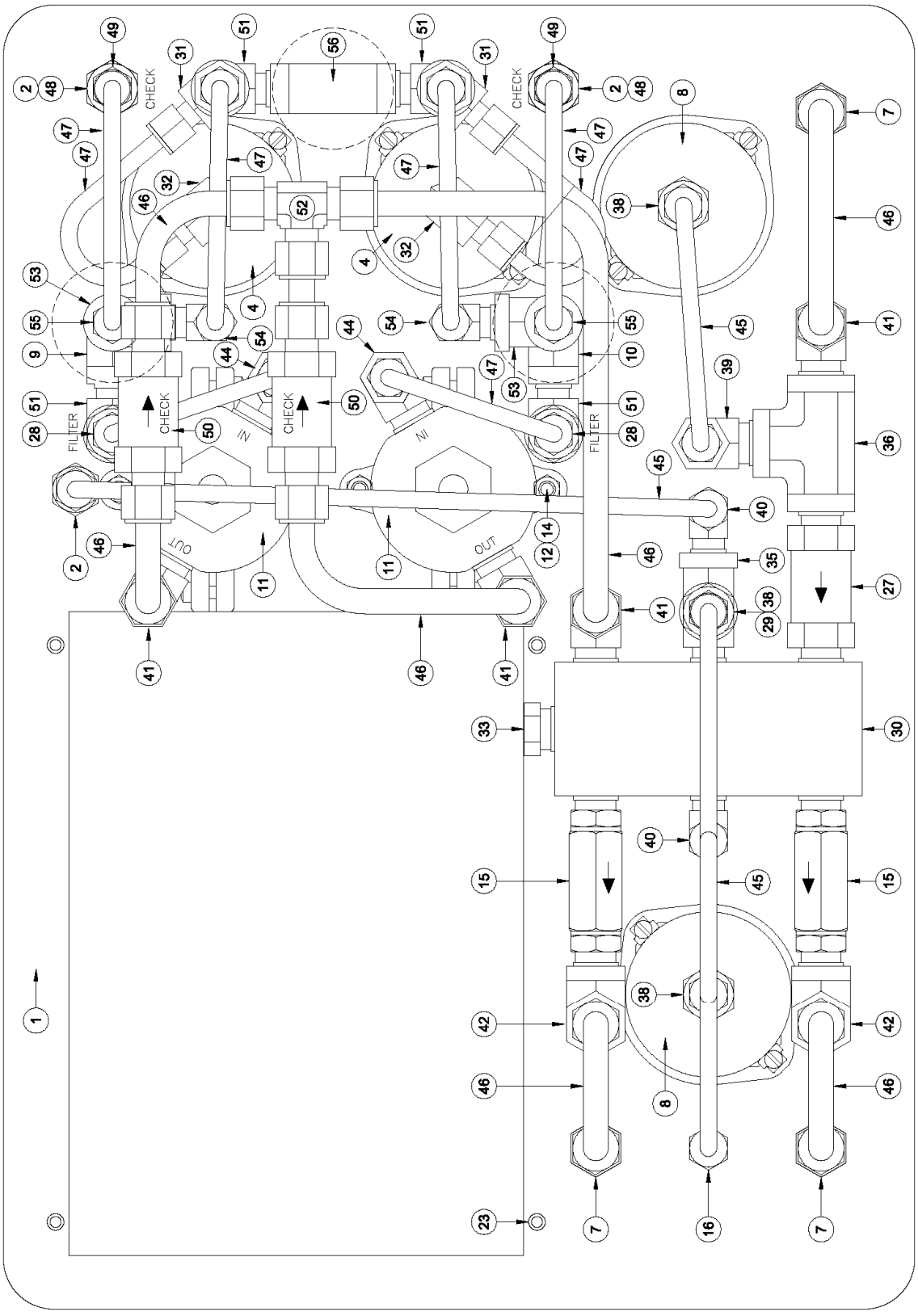
PARTS LOCATOR, MODEL 8225-400HP (Air Control Back Panel) 13.8



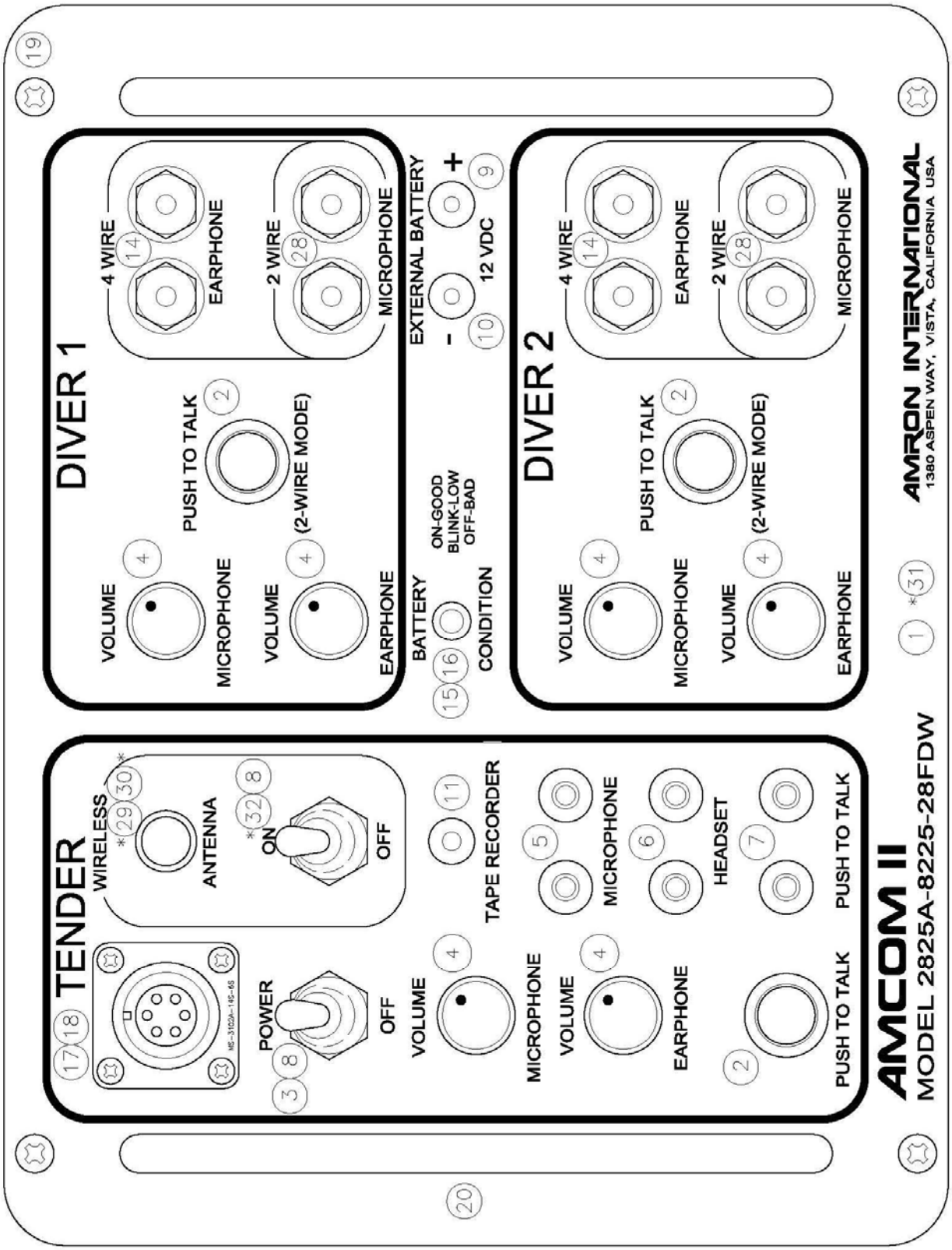
PARTS LOCATOR, MODEL 8225-400HP2 (Air Control Front Panel) 13.9



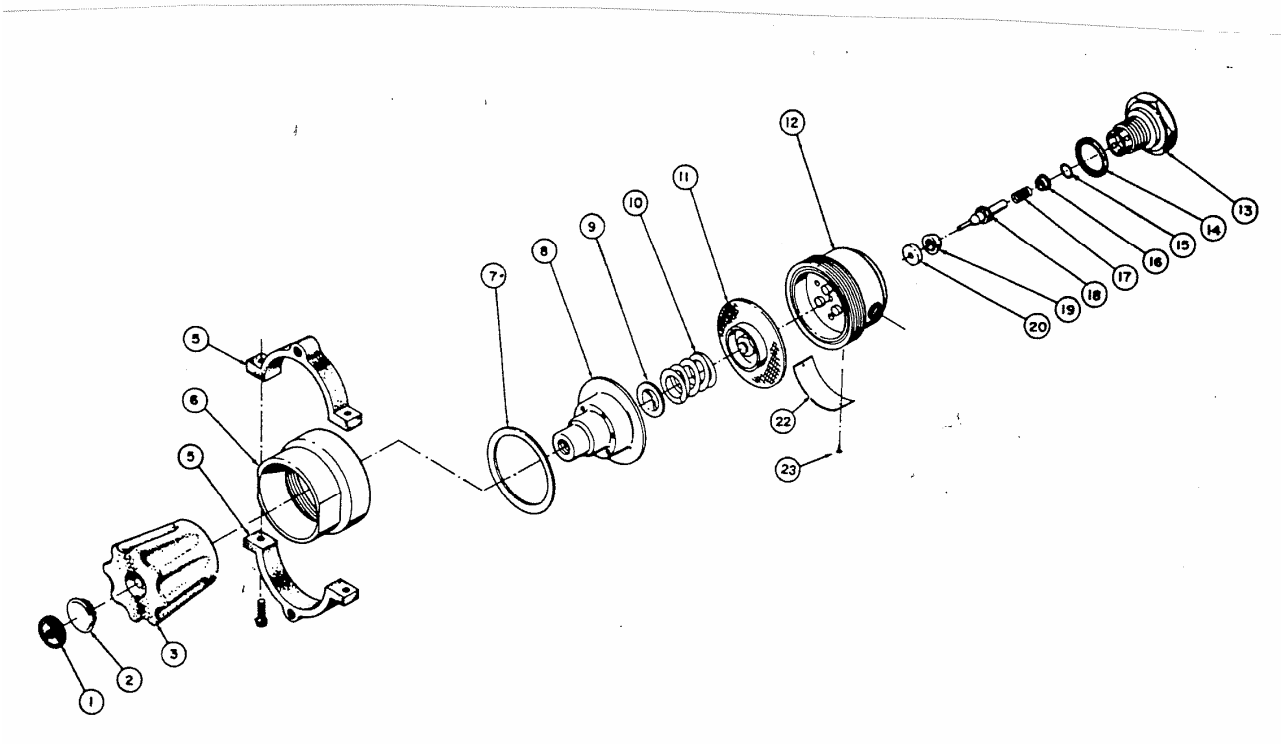
PARTS LOCATOR, MODEL 8225-400HP2 (Air Control Back Panel) 13.10



PARTS LOCATOR, MODEL 2825A-8225-28FDW (Diver Communications) 13.11



PARTS LOCATOR, MODEL 8000-0201 (Regulator) 13.12



GENERAL 14.0

The following parts lists include all 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 diver communicator as of the printing date. If a different part was used in a previous build, details of the parts change are included in the revision listing sheet. This will enable you to determine the correct replacement part. If the new part is the recommended replacement part for all units, the old part is not listed in the revision listing.

To Order Replacement Parts Contact:

Amron International Diving Supply, Inc.
1380 Aspen Way
Vista, California, 92081 U.S.A.

Telephone: (760) 208-6500
Fax: (760) 599-3857
Email: sales@amronintl.com
Website: www.amronintl.com

When ordering replacement parts, you should give as much information as possible to enable us to supply the correct part you need. This information should include the reference designator, description value, part number, radio model number, and serial number. Failure to provide sufficient information may result in our inability to fill your parts orders promptly and correctly. Part numbers should always include a description as a double check for you and us, to be sure you are getting the parts you desire.

AMCOMAND II AIR CONTROL SYSTEM, MODEL 8225-HP 14.1

Reference	Part No.	Description
1	8225-200	Pneumo Panel Assembly, 8225-HP
2	8225-300	Case, Air Control & Pneumo System
3	8225-400HP	A/C Panel Assembly, 8225-HP
4	8225-500	HP Yoke/Hose Assembly
5	HP4FS16	16IN HP WHIP;NO4 JIC X NO4 JIC
6	2825A-8225	AMCOM II Deluxe Communicator
	2832-202-01	P.C. Card Assembly - Amcom II
	2405-28	Hand Held Microphone P-T-T
	2823-602	Charger Assembly

AMCOMAND II AIR CONTROL SYSTEM, MODEL 8225-HP2 14.2

Reference	Part No.	Description
1	8225-200	Pneumo Panel Assembly
2	8225-300	Case, Air Control & Pneumo System
3	8225-400HP2	A/C Panel Assembly, 8225-HP2
4	8225-500	HP Yoke/Hose Assembly
5	HP4FS16	16IN HP WHIP;NO4 JIC X NO4 JIC
6	2825A-8225	AMCOM II Deluxe Communicator
	2832-202-01	P.C. Card Assembly - Amcom II
	2405-28	Hand Held Microphone P-T-T
	2823-602	Charger Assembly

8225-200 PNEUMO PANEL ASSEMBLY 14.3

Reference	Part No.	Description
14	1/4-20 NUTSS	Nut, 1/4-20 S/S
15	1/4-20 X1.25HSBHC	Screw 1/4 x 20 x 1.25 S/S
16	1/4FWSS	Washer, Flat S/S
17	1/4LWSS	Washer, Lock Split 1/4" S/S
10	25545-23B11-HDP	Gauge Pneumo 6", 250 FSW
11	3237	Bushing, Strain Relief
19	MA-742	Pipe Fitting, Adapter-O2 x 1/4
20	4Z-V4AK-B-YEL	Valve, Pneumo Shut-off *
08	5168	Switch, Seal Toggle Shaft
03	7580K6	Switch, Toggle SPST
05	8200-016	Cap, Dust with Retainer #6
01	8225-002	Panel, Pneumo
04	8225-006	Cover, Front 8225 Speaker
12	8446	Cable, 6 Conductor 2-18 Ga. 4-22
40	CBZ-B-4-4	Elbow, Male ¼" x ¼ NPT, Brass
38	GBZ-B-4-4	Connector, Female 1/4 Brass
13	GH2BZ-B-4-4	Connector, Female Bulkhead 1/4
21	KBZ-B-4	Cross, Union 1/4" Brass
27	96211-BB4	Switch, Pressure 22.5-125 PSI
30	PLV-255B30150G	Gauge Protector, Adjustable
26	RBZ-B-4-4-4	Tee, Male Run ¼
18	HP4FS16	16IN HP WHIP;NO4 JIC X NO4 JIC
09	SA818	Speaker, 4 ohm/15 watt
07	273-068	Alarm, Audio
02	WEBTX-B-4	Elbow, Bulkhead Union Brass
29	8-32x1/2SSPHP	Screw, 8-32 x1/2" SS PHP
23	#8NUTSSL	Nut, Locking 8-32 SS
22	8-32x1SSFHP	Screw, 8-32 x 1" SS FH
06	2405-28	Microphone, Push-to-Talk
24	10-32x1/2SSPHP	Screw, 10-32 x 1/2" S/S
17	CUTUS1/4	Copper Tubing, ¼"
*	822091-B	Repair Kit for 4Z-V4AK-B-YEL

N/S = Not shown
*** = Repair Kit**

8225-300 CASE ASSEMBLY 14.4

Reference	Part No.	Description
N/S	R419-5961	Fiberglass Case 19x14x11.5
N/S	8200-004	Bracket, Short
N/S	8200-006	Bracket, Long Front
N/S	8225-009	Bracket, Short w/left notch
N/S	8225-010	Bracket, Short w/ right notch
N/S	38-206-08-16	Rivet, Drive Blind
N/S	GCCN1/16x3/4	Gasket, Neoprene CC 1/16x3/4"
N/S	6-32x5/8SSPHP	Screw, 6-32x5/8" SS PH P
N/S	#6NUTSSL	Nut, Locking 6-32 S/S
N/S	#6FWSS	Washer, Flat S/S
N/S	10-32x1/2SSPHP	Screw, 10-32x1/2" SS PH P
N/S	SN/DECAL	Decal, Serial Number

N/S = Not shown

8225-400HP AIR CONTROL PANEL ASSEMBLY, MODEL 8225-HP 14.5

Reference	Part No.	Description
01	8225-001	Panel, Front Model 8225
02	WEBTX-B-4	Elbow, Bulkhead Union Brass
03	72HP	HP Hose, ¼" x 72" Long, #4 JIC, 5000 PSI
04	701725205000	Gauge, 0-5000 PSI w/Clamp
05	8200-016	Cap, Dust with retainer #6
06	VTX-B-6	Elbow, Male 45 Degree body only
07	GH2BZ-B-6-4	Connector, Bulkhead 3/8 Tube x ¼ FNPT
08	70172520400	Gauge, 0-400 PSI w/Clamp
09	4FV6AKVSS-B2500-KRY	Valve, Viton Angle Fem Pipe, Blue*
10	4FV6AKVSS-R2500-KRY	Valve, Viton Angle Fem Pipe, Red*
11	26-1512-26-277	Regulator, Pressure 5000/265
12	10-32x7/8HSBHC	Screw, 10-32 x 1" Hex Socket Button
14	#10NUTSSL	Nut, Locking #10 S/S
15	6M-B6LJ-BP	Valve, Ball 3/8" MNPT Brass*
16	FBZ-B-4-4	Connector, Male 1/4
17	8600-014	Diffuser, Vent Cap
19	MA-742	Adapter, 02 x 1/4 MNPT Brass Chrome
20	CD-B-1/4	Elbow, Street 90 Degree 1/4 Brass
21	8225-004	Bracket, Yoke for 8225
23	ATB2-832	NutSert, 8-32 Thread
24	10-32x1/2SSPHP	Screw, 10-32 x 1/2" S/S PH P
25	HP4FS16	16IN HP WHIP;NO4 JIC X NO4 JIC
26	4M-C4L-1/3-SS	Check Valve, S/S, ¼ MNPT 1/3 PSI*
27	6M-C6L-1-B	Check Valve, Brass, 3/8 MNPT, 1 PSI*
28	4M4Z-F4L-50-SS	Filter, 1/4 50 Micron*
29	4CPA2-150-B	Valve, Relief Adjustable*
30	8225-005	Manifold, A/C Model 8225
31	RBZ-SS-4-4-4	Tee, Male Run 1/4 S/S
32	DBZ-SS-4-4	Elbow, Female, 1/4 S/S
33	HP-B-3/8	Plug, Hex 3/8
34	MMO-SS-1/4	Tee, Female 1/4 S/S
35	MRO-B-1/4	Tee, Street (male on run) 1/4
36	MMO-B-3/8	Tee, Female 3/8 Brass
38	GBZ-B-4-4	Connector, Female 1/4 Brass
39	CBZ-B-4-6	Elbow, Male 1/4 Tube x 3/8 NPT, Brass
40	CBZ-B-4-4	Elbow, Male 1/4 x 1/4 Brass
41	CBZ-B-6-6	Elbow, Male 3/8 Brass
42	DBZ-B-6-6	Elbow, Female 3/8 Brass

8225-400HP AIR CONTROL PANEL ASSEMBLY (Continued) 14.5

Reference	Part No.	Description
43	#8PANELNUT	Panel Nut, #8 Air Control
44	CBZ-SS-4-6	Elbow, Male 1/4 Tube x 3/8 NPT, S/S
45	CUTUS1/4	Copper Tubing, Soft, ¼" x .028 Wall
46	CUTUS3/8	Copper Tubing, Soft, 3/8" x .032 Wall
47	SSTUS1/4X035316	316L S/S Tubing, ¼" x .035 Wall
48	AP50C-4	Copper Seal, #4 JIC
N/S	8-32x1/2SSFHP	Screw, 8-32 x 1/2" S/S FH P

8225-400HP2 AIR CONTROL PANEL ASSEMBLY, MODEL 8225-HP2 14.6

Reference	Part No.	Description
01	8225-HP2-001	Panel, Front Model 8225-HP2
02	WEBTX-B-4	Elbow, Bulkhead Union Brass
03	8225-500	HP Hose Assy, 72" x ¼"JIC, 5000 PSI
04	701725205000	Gauge, 0-5000 PSI w/Clamp
05	8200-016	Cap, Dust with retainer #6
06	VTX-B-6	Elbow, Male 45 Degree body only
07	GH2BZ-B-6-4	Connector, Bulkhead 3/8 Tube x ¼ FNPT
08	70172520400	Gauge, 0-400 PSI w/Clamp
09	4FV6AKVSS-B2500-KRY	Valve, Angle Fem Pipe, Viton, Blue*
10	4FV6AKVSS-R2500-KRY	Valve, Angle Fem Pipe, Viton, Red*
11	26-1512-26-277	Regulator, Pressure 5000/265
12	10-32x7/8HSBHC	Screw, 10-32 x 1" Hex Socket Button
14	#10NUTSSL	Nut, Locking #10 S/S
15	6M-B6LJ-BP	Valve, Ball 3/8" MNPT Brass*
16	FBZ-B-4-4	Connector, Male 1/4
17	8600-014	Diffuser, Vent Cap
19	MA-742	Adapter, 02 x 1/4 MNPT Brass Chrome
20	CD-B-1/4	Elbow, Street 90 Degree 1/4 Brass
21	8225-004	Bracket, Yoke
23	AKB2-832-80	Insert, 8-32 Thread
24	10-32x1/2SSPHP	Screw, 10-32 x 1/2" S/S PH P
25	HP4FS16	16IN HP WHIP;NO4 JIC X NO4 JIC
27	6M-C6L-1-B	Check Valve, Brass, 3/8 MNPT, 1 PSI*
28	4M4Z-F4L-50-SS	Filter, 1/4 50 Micron*
29	4CPA2-150-B	Valve, Relief Adjustable*
30	8225-005	Manifold, Air Control
31	RBZ-SS-4-4-4	Tee, Male Run 1/4 S/S
32	DBZ-SS-4-4	Elbow, Female, 1/4 S/S
33	HP-B-3/8	Plug, Hex 3/8
34	MMO-SS-1/4	Tee, Female 1/4 S/S
35	MRO-B-1/4	Tee, Street (male on run) 1/4
36	MMO-B-3/8	Tee, Female 3/8 Brass
38	GBZ-B-4-4	Connector, Female 1/4 Brass

8225-400HP2 AIR CONTROL PANEL ASSEMBLY (Continued) 14.6

Reference	Part No.	Description
39	CBZ-B-4-6	Elbow, Male 1/4 Tube x 3/8 NPT, Brass
40	CBZ-B-4-4	Elbow, Male 1/4 Tube x ¼ MNPT, Brass
41	CBZ-B-6-6	Elbow, Male 3/8 Tube x 3/8 MNPT, Brass
42	DBZ-B-6-6	Elbow, Female 3/8 Tube x 3/8 FNPT, Brass
43	#8PANELNUT	Panel Nut, #8 Air Control
44	CBZ-SS-4-6	Elbow, Male 1/4 Tube x 3/8 NPT, S/S
45	CUTUS1/4	Copper Tubing, Soft, ¼" x .028 Wall
46	CUTUS3/8	Copper Tubing, Soft, 3/8" x .032 Wall
47	SSTUS1/4X035316	316L S/S Tubing, ¼" x .035 Wall
48	AP50C-4	Copper Seal, #4 JIC
49	4Z-C4L-1/3-SS	Check Valve, S/S, ¼ CPI 1/3 PSI*
50	6Z-C6L-1-B	Check Valve, S/S, 3/8 CPI, 1 PSI*
51	CD-SS-1/4	Elbow, Street ¼"NPT, S/S
52	JBZ-B-6-6-6	Tee, 3/8" Tube, Brass
53	MRO-SS-1/4	Tee, Street ¼"NPT, S/S
54	CBZ-SS-4-4	Elbow, Male 1/4 Tube x ¼ MNPT, S/S
55	FBZ-SS-4-4	Connector, Male ¼ Tube x ¼ MNPT, S/S
56	4FV6LKVSS-W2500-KRY	Valve, Inline Fem Pipe, Viton, White*
N/S	8-32x1/2SSFHP	Screw, 8-32 x 1/2" S/S FH P
*	822188-SS	Repair Kit, for P/N 4FV6AKVSS-B2500-KRY, 4FV6AKVSS-R2500-KRY, 4FV6LKVSS-W2500-KRY
*	802065-4	Repair Kit, for P/N 6M-C6L-1-B
*	802045	Repair Kit, for P/N 4M-C4L-1/3-SS
*	802040	Repair Kit, for P/N 6M-C6L-1-B
*	KIT-F4-50-V	Repair Kit, for P/N 4M4Z-F4L-50-SS
*	389-6906	Soft Goods Kit, for P/N 26-1512-26-277
*	389-6907	Repair Kit, for P/N 26-1512-26-277

N/S = Not Shown
*** = Repair Kit**

8225-500 YOKE/HOSE ASSEMBLY 14.7

Reference	Part No.	Description
N/S	72HP	Hose Assembly, 72" HP (5000)
N/S	FTX-B-4-4	Male Connector, #4 JIC x ¼ MNPT
N/S	9913-02	Yoke & Bleeder Assembly
N/S	RP75-BLUE	Hose Protector, Blue
N/S	RP75-RED	Hose Protector, Red

N/S = Not Shown

26-1512-26-277 REGULATOR, PRESSURE REDUCING 14.8

Reference	Part No.	Description
2	8515-250	Plug, Hole
3	1150	Assembly, Control Knob
5	1129	Assembly, Mounting Bracket
6	212-1	Ring, Bonnet
7	1181	Washer
8	1619	Assembly, Bonnet
9	60986	Button, Spring
10	60984	Spring, Load
11	2645	Diaphragm *
12	2821-1	Body, Regulator
13	5180-1	Cap, Back
14	5200-002107	O-ring *
15	5200-000087	O-ring*
16	1186-6	Retainer, Valve Spring **
17	5378	Spring **
18	5840-6	Stem, Valve **
19	6633	Filter
20	6850	Seat*
	389-6906	Soft Goods Kit (*)
	389-6907	Repair Kit, includes Soft Goods Kit (* & **)

2825A-8225-400M FRONT PANEL ASSEMBLY 14.9

Reference	Part No.	Description
01	8225A-003	Panel, Front Amcom II
02	PBSWITCH	Switch, Push Button SPST (mom)
03	7580K6	Switch, Toggle SPST
04	P16NP-10K	Potentiometer, 10K ohms with knobs
05	1498-102	Jack, Banana Red
06	1498-103	Jack, Banana Black
07	1498-107	Jack, Banana Yellow
08	5168	Seal, Half Boot, Toggle
09	105-0602-001	Jack, Tip Red
10	105-0603-001	Jack, Tip Black
11	ME161-2003	RCA Phono Jack
14	14002B	Binding Post, Black
15	LEDHOLDER-BLK.25	Mounting Clip, for 5mm LED
16	LT2462-24-D51	LED, BI-Color Red/Green
17	MS-3102A-14S-6S	MS Connector, Bulkhead 6 Pin Female
18	4-40x3/8SSPHP	Screw, 4-40x3/8" SS PH P
20	492	Handle, Round 1.5X5.5X5/16
28	14002R	Binding Post, Red
*29,30	2829-08	Antenna
*31	8225A-013	Panel, Front with Wireless Tender
*32	7580K6	Switch, Toggle SPST
N/S	10LWSSS	Washer Split Lock No10 S/S
N/A	4NUTSSL	Nut, locking 4-40 S/S
N/S	10-32x1/2SSPHP	Screw, 10-32x1/2" SS PH P

N/S Not Shown
N/A Not Applicable
*** Wireless Tender (Optional)**

2405-28 MICROPHONE, Push to Talk 14.10

Reference	Part No.	Description
N/S	2405-28	Microphone, Hand Held PTT
N/S	14001B	Jack, Banana Dual Black
N/S	14001Y	Jack, Banana Dual Yellow
N/S	1772	Cable, Microphone
N/S	3500	Cable Tie, Nylon 3/32" x 3.5"

2823-602 EXTERNAL CHARGER ASSEMBLY 14.11

Reference	Part Number	Description
1	2823-6002	Charger Chassis Assy
2	2324-021	Cover, Model 2823-602
4	LEDGREEN	LED, Green brite
5	LEDHOLDER-BLK.25	Mounting Clip, for 5mm LED
6	WP-165	Wire, 16 awg Red
7	WP-167	Wire, 16 awg Black
8	530-105-0772-1	Plug, Tip Red
9	530-105-0773-1	Plug, Tip Black
10	517-SJ-5003	Rubber, Bumper
11	4-24X1/4SSPHP	Screw, Self-tapping #4
12	P-2392	Power Cord, 3 cond
13	528-1017	Bushing, Strain Relief
14	4300-0704	AC Inlet
15	8/18-22	Terminal, Ring
16	8NUTSSL	Nut, locking 8-32 S/S
16	1-480698-0	Connector, 2 Circuit
17	350550-3	Contact, Socket
18	39-01-2060	Receptacle, 6 pin
19	39-00-0039	Terminal, Female Crimp

RECOMMENDED SPARE PARTS 14.12

Reference	Part Number	Description	Qty.
01	802045	Repair Kit, for P/N 4M-C4L-1/3-SS	2
02	802065-4	Repair Kit, for P/N 6M-C6L-1-B	2
03	822188-SS	Repair Kit, for P/N 4FV6AKVSS-B2500-KRY, 4FV6AKVSS-R2500-KRY, 4FV6LKVSS-W2500-KRY	2
04	KIT-F4-50-V	Repair Kit, for P/N 4M4Z-F4L-50-SS	1
05	802040	Repair Kit, for P/N 6M-C6L-1-B	1
06	822091-B	Repair Kit for P/N 4Z-V4AK-B-YEL	2
07	389-6906	Soft Goods Kit, for P/N 26-1512-26-277	1
08	389-6907	Repair Kit, for P/N 26-1512-26-277	1
09	72HP	Hose Assembly, 72" HP (5000)	1
11	14002B	Binding Post, Black	2
12	14002R	Binding Post, Red	2
13	1498-102	Jack, Banana Red	2
14	1498-103	Jack, Banana Black	2
15	1498-107	Jack, Banana Yellow	2
16	5168	Switch, Seal Toggle Shaft	6
17	7580K6	Switch, Toggle SPST	2
18	PBSWITCH	Switch, Push Button SPST (mom)	1
20	2890-05	Battery, 12 Volt, 7 Ah	2
21	14001B	Plug, Dual Banana Black	4
22	14001Y	Plug, Dual Banana Yellow	4
23	14001R	Plug, Dual Banana Red	4
N/S	2832-202-01	Amplifier Card Assembly	1
N/S	2405-28	Hand Held Microphone P-T-T	1

REPAIR AND MAINTENANCE LOG 15.1

Model: 8225-HP(2) **Serial Number:** _____

Date unit was placed in service: _____

Date of Service	Description of Service	Service By

GAUGE CALIBRATION LOG 15.2

Gauge Model: 25545-23B11-HDP Serial Number: _____

Date unit was placed in service: _____

Calibration Date	Serial Number Comments	Calibrated By