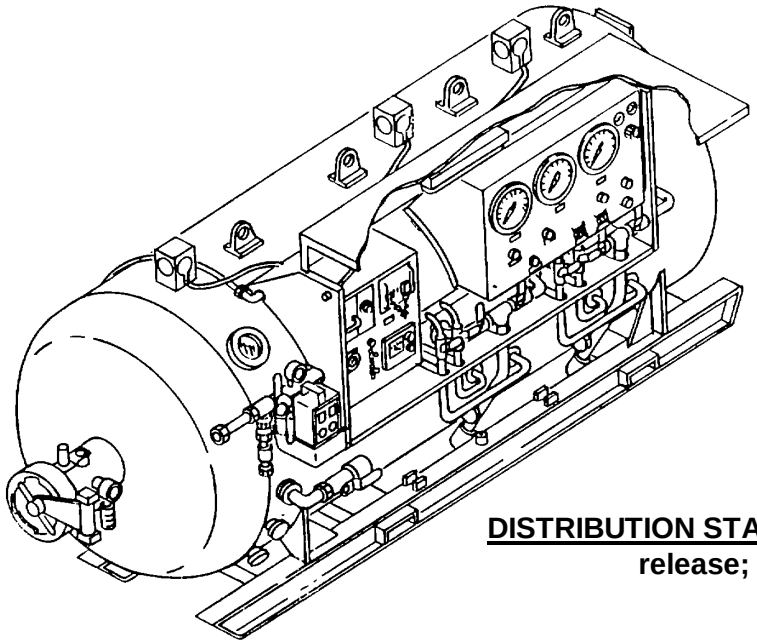
TECHNICAL MANUAL

OPERATOR, UNIT, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE MANUAL

RECOMPRESSION CHAMBER 3-PERSON NSN-4220-01-200-4797 MODEL RC-100-2 SERIAL NUMBERS 08-A-163 THRU 08-A-172



HEADQUARTERS, DEPARTMENT OF THE ARMY
30 DECEMBER 1992

CHANGE

NO. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 10 October 1996

Operator, Unit, Direct Support and General Support Maintenance Manual

RECOMPRESSION CHAMBER
3-PERSON
NSN-4220-01-200-4797
MODEL RC-100-2
SERIAL NUMBERS 08-A-163
THRU 08A-172

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C-7 and C-8	C-7 and C-8
C-11/(C-12 blank)	C-11/(C-12 blank)

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NO. 1

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Operator, Unit, Direct Support,
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Maintenance Manual

RECOMPRESSION CHAMBER
3-PERSON
NSN-4220-01-200-4797
MODEL RC-100-2
SERIAL NUMBERS 08-A-163
THRU 08-A-172

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5-29 and 5-30	5-29 and 5-30
E-1 and E-2	E-1 and E-2

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WARNING

Should the 3-Person Recompression Chamber be damaged it shall be repaired and recertified in accordance with ASME and National Board of Boiler and Pressure Vessel Inspectors requirements.

WARNING

In an enclosed compartment from which personnel cannot readily escape, fire is an ever present danger. In a pressurized, oxygen enhanced atmosphere, a spark from any source could cause rapid burning and/or an explosion. It is therefore mandatory that no spark producing device (matches, cigarette lighters, etc.) be taken into the chambers. Do not allow such items as metal helmets, boot or shoe cleats, or other metal objects to be worn or taken inside the chamber.

WARNING

Take all possible precaution to prevent static electric build up. Ensure that the chamber is electrically grounded. Ensure that the external electrical power source connected to the Chamber GFI is electrically grounded. Ensure that the external electrical power supplies, both 220 and 110 VAC, for the heater/chiller module have proper electrical grounds. Ensure that the heater/chiller unit, carbon dioxide scrubber unit, temperature probe, and folding bunk in the I/L are electrically grounded.

WARNING

Clothing containing oil, grease, or volatile substances of any kind shall not be worn or used in chamber.

Matches, cigarette lighters, lighted cigarettes, cigars, pipes, or flame shall not be carried into chamber at any time.

Do not use trichloroethylene or methyl chloroform in cleaning operations associated with any recompression chamber. Use of either chemical can result in death when operators are exposed to these contaminates under pressure. These contaminates are not water soluble. If contamination or suspected contamination occurs, immediately discontinue all chamber operations and notify the Army Diving liaison at the Naval Experimental Diving Unit, Panama City, FL 32407-5001, autovon 436-4351/commercial (903) 234-4351. The only acceptable cleaning agents are trisodium phosphate, or nonionic soaps, liquid Joy and liquid Ivory.

WARNING

It is mandatory that these operating procedures be followed in the sequence given. Failure to do so may result in damage to the equipment and/or injury or death to personnel.

WARNING

The operating procedures given are not intended to be used as therapeutic procedures. Treatment of patients is not within the scope of this manual. The following instructions and procedures are intended only to show the mechanical operation of the recompression chamber, complete information on operation is to be provided by the proper authorities.

WARNING

To prevent the spread of disease, serious injury and/or death, oxygen breathing systems must be maintained hygienically clean and free from dust, dirt, and all hydrocarbon contamination. Refer to oxygen system prework procedures para. 4-10 to avoid violating this warning.

WARNING

Do not attempt to open the outer M/L door while pressure is indicated on the M/L pressure gage. Serious injury or death may result.

WARNING

The use of lubricants other than those specified may result in fire and/or explosion causing serious injury or death. Use only those lubricants specified for use in a hyperbaric system.

WARNING

The GFI circuit breaker trips only when there is an electrical problem in the system. As a result there is a danger of serious injury or death. Immediately troubleshoot the electrical system to locate the problem, then push the reset switch.

WARNING

Do not breath the gaseous contents of a broken fluorescent tube. Leave area until gas dissipates. Warn others of mishap.

WARNING

Most ultraviolet lamps contain mercury. Extreme caution should be taken not to break the mercury vapor lamp which will contaminate the component or pipe being inspected and may also cause human injury. Should a mercury vapor lamp be broken, leave the area immediately. Do not breathe vapors. Warn all other personnel!

WARNING

Should the 3-Person Recompression Chamber be damaged during remove and install procedures to the extent that the integrity of the chamber shell is in doubt, and/or its ability to contain specified pressures without leak or rupture is questionable, it shall be repaired and recertified in accordance with ASEM and National Board of Boiler and Pressure Vessel Inspectors requirements.

WARNING

Serious injury or death may result from electrical shock. Ensure that the 220 and 110 VAC external electrical power sources are disconnected before working inside the heater/chiller module.

WARNING

Leave 1 1/2 threads exposed on fitting when applying teflon tape. This will ensure that no teflon tape will hang down inside the air system. Teflon tape should be wrapped in such a manner that when the fitting is tightened the tape will not loosen. Failure to wrap teflon tape correctly may result in contamination or blockage of the air system and subsequent possible injury or death to the diver.

WARNING

Death or serious injury may result if personnel fail to observe safety precautions when handling liquid refrigerant. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin-eye-contact is possible.

Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly poisonous and corrosive gas.

In accordance with Environmental Protection Agency regulations refrigerants cannot be discharged into the atmosphere. A refrigerant recovery and recycling unit must be used whenever discharging the refrigerant system.

Operation of the recovery/recycling unit must be by AUTHORIZED PERSONNEL ONLY.

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TECHNICAL MANUAL

NO. 5-4220-227-14

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 30 DECEMBER 1992

Operator, Unit, Direct Support, and General Support Maintenance Manual

RECOMPRESSION CHAMBER, 3-PERSON
NSN 4220-01-200-4797
(MODEL RC-100-2)
Serial Numbers 08-A-163 thru 08-A-172

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes, or if you know of a way to improve these procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual directly to: Commander, US Army Aviation and Troop Command, ATTN: AMSAT-I-MP, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798. You may also submit your recommended changes by E-mail directly to <mpmt%avma28@st-louis-emh7.army.mil>. A reply will be furnished directly to you. Instructions for sending an electronic 2028 may be found at the back of this manual immediately preceding the hard copy 2028.

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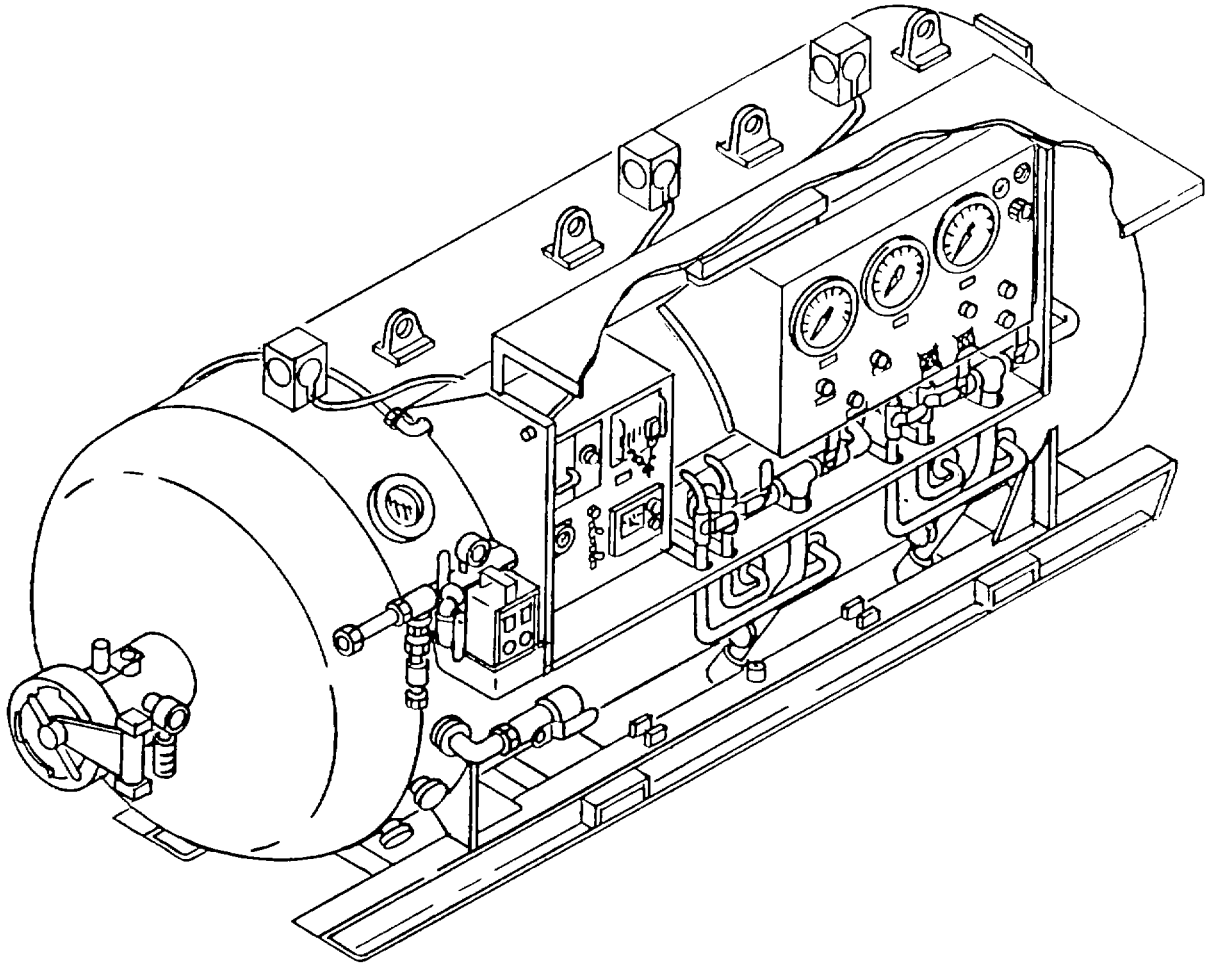


Figure 1-1. 3-Person Recompression Chamber.

CHAPTER 1

INTRODUCTION

OVERVIEW

This chapter contains general information pertaining to Recompression Chamber 3-Person, Model RC-100-2, and its components.

Section I. GENERAL INFORMATION

1-1. **Scope**. This manual contains operator's, unit, direct support and general support maintenance for Recompression Chamber 3-Person, Model RC-100-2 (figure 1-1).

1-2. **Maintenance Forms, Records and Reports**. Department of the Army forms and procedures used for equipment maintenance will be those prescribed in DA PAM 738-750, The Army Maintenance Management System (TAMMS).

1-3. **Destruction of Army Materiel to Prevent Enemy Use**. Refer to TM 750-244-3 for procedures to destroy Recompression Chamber to prevent enemy use.

1-4. **Preparation for Storage or Shipment**. Refer to Chapter 6, Section III, and TM 38-230 for procedures to place the equipment into storage and prepare equipment for shipment.

1-5. **Reporting Equipment Improvement Recommendations (EIR).** If your 3-Person Recompression Chamber needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Product Quality Deficiency Report). Mail it to us at: Commander, U.S. Army Aviation and Troop Command, ATTN: AMSAT-I-MDO, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798. We will send you a reply.

1-6. List of Abbreviations.

AC	alternating current
AF	Audio Frequency
AMDF	Army Management Data File
AMPS	Ampere(s)
BATT	Battery
BIBS	Built in Breathing System
CCU	Chamber Conditioning Unit
CO_2	Carbon Dioxide
DC	Direct Current
FSW	Feet of Sea Water
ft	Feet
GFI	Ground Fault Interrupter
GPM	Gallon Per Minute
hex	Hexagonal
HP	Horse Power
in.	Inch
I/L	Inner Lock
IA	Isopropyl Alcohol
ID	Inside Diameter
Kpa	Kilopascal
lb(s)	Pound(s)
LPM	Liter Per Minute
M/L	Medical Lock
MAP	Military Assistance Program
MED	Medium
MIC	Microphone
ml	Mili-liter
MOS	Military Occupational Specialty
NID	Non-ionic detergent
N.P.T.	National Pipe Thread
O/L	Outer Lock
0_2	Oxygen
OD	Outside Diameter
pH	Hydrogen Power
POA	Portable Oxygen Analyzer
POMCUS	Preposition of Material Configured to Unit Sets
psi	Pounds Per Square Inch
psig	Pounds Per Square Inch Gage
SCF	Standard Cubic Feet
SCFM	Standard Cubic Feet per Minute
SIMS	Selected Management System
TSP	Trosodium Phosphate
VAC	Volt, Alternating Current
VDC	Volts Direct Current
±	Plus or Minus
°	(as in 90° or 30°)-Degree(s)
5F	Degree(s) Fahrenheit
%	Percent

Section II. EQUIPMENT DESCRIPTION AND DATA

1-7. **Equipment Characteristics, Capabilities, and Features**. The RC-100-2, 3-Person Recompression Chamber is a completely self-contained recompression facility used to provide a maximum pressure of 100 psig, which is equivalent to the pressure attained at sea water depth of 225 feet. The chamber is mounted on a skid base and has inner and outer lifting eyes for moving the chamber. An electrical control panel, air flow control console, 0_2 oxygen supply and heater/chiller module, allows operators to monitor and supply/exhaust air to the chamber and provide heating/cooling fluids to a heater/chiller unit inside chamber to heat or cool the chamber interior.

a. The recompression chamber (figure 1-1) is an aluminum pressure vessel with two (2) compartments; a main inner lock and an (entry chamber) outer lock. Each lock contains air pressure adjusting valves, caisson pressure gauges, a three outlet and dump oxygen manifold, a primary and secondary communication system. The unit is equipped with one (1) safety relief valve, set to keep internal pressure from exceeding 105 PSIG. The recompression chamber is equipped with air supply and air vent valves for admitting or exhausting air from the chamber. Six (6) view ports, four (4) on inner lock and two (2) on the outer lock. Pressure gauges (caisson type), are supplied inside both locks. Three (3) pressure gauges are supplied on the outside instrumentation panel, two are piped to the inner lock and one to the outer lock. These gauges are calibrated for 100 PSIG and 225 feet of sea water (FSW) and are red lined at 165 FSW. The chamber is also equipped with a medical lock provisioning port, 12 in inside diameter x 18 in. long. This medical lock port enables those inside the chamber to be supplied with food, medication, and other essentials during recompression.

b. The inner lock contains a fire retardant fold up bunk on one side and an attendant bench on the opposite side, and a shelf above the inner door of the medical lock.

c. The chamber is equipped with hyperbaric lighting system, controlled from the outside electrical panel. Two (2) lights are provided in the inner lock and one (1) in the outer lock. Each light consists of a light pipe and adapter which penetrates the chamber wall and transmits light to the interior, a light source which slips over the light pipe and contains the bulb, heat absorbing lens in a heat dissipating enclosure, which is wired to the lighting control panel. The control panel contains all the power supply equipment and on-off switches.

d. All electricity operated equipment on the chamber is supplied with power by plugging in an external source of 110V, 60 Hertz power cable in the bottom of the exterior power panel.

e. The chamber is equipped with two (2) communications system. The primary communication system is an "AMCON" intercom system. This system is wired to internal speakers located in inner and outer locks. These speakers act as loud speakers and microphones to complete the communications. The inner lock speaker is provided with a plug in jack and is also supplied with a communication headset and microphone. The secondary communication system consists of three (3) sound powered, hand held telephones, one (1) each in each lock and one (1) at the outside control station.

f. The chamber is equipped with oxygen breathing system consisting of a high pressure oxygen pressure regulator, pressure gages for high and low pressure indication, isolation valves for inner and outer lock, oxygen manifold bibs in inner and outer locks. Each manifold bib is supplied with three (3) oxygen masks (overboard dump type). The dump gas is controlled by differential back pressure regulator located on the exterior control panel.

g. The chamber is equipped with manway doors on the inner and outer locks. These doors are self sealing (O-ring seals) and require only hand held force to obtain a seal at .5 FSW pressure.

h. The chamber is equipped with aluminum diamond tread floor plates. Each lock is provided with a drain port. These ports are supplied with an internal threaded plug, access is gained t by removing floor plates.

1-8. **Location and Description of Major Components.** (figure 1-2)

GROUND FAULT INTERRUPTER (1). Prevents electrical arcing by interrupting the circuit should a ground occur.

ELECTRICAL CONTROL PANEL (2). Controls the lighting, communications and oxygen system of the chamber.

CHAMBER CONTROL CONSOLE (3). Controls the oxygen flow to the chambers.

LIGHTING SYSTEM, HYPERBARIC (4). Supplies light to the inner lock (I/L) and outer lock (O/L) of chamber.

HEATER/CHILLER PENETRATOR (5). Allow access for service lines through chamber portal to heater/chiller and $C0_2$ scrubber.

SKIDS (6). Mounts chamber and provides for forklift access.

HEATER/CHILLER MODULE (7). Provides heating/cooling fluids to heater/chiller unit inside inner chamber.

0_2 OXYGEN SUPPLY (8). Supplies oxygen to chamber.

HEATER/CHILLER UNIT (9). Controls chamber air temperature.

CARBON DIOXIDE (CO_2) SCRUBBER (10). Controls the $C0_2$ content of pressurized chamber air.

COMMUNICATIONS SYSTEM (11). Inner lock two-way communication.

BUILT-IN-BREATHING SYSTEM (BIBS) (12). Provides O_2 through a three-way outlet I/L and overboard dump manifold.

COMMUNICATIONS SYSTEM (13). Outer lock two-way communication,

BUILT-IN-BREATHING SYSTEM (BIBS) (14). Provides oxygen through a three-way outlet O/L and overboard dump manifold.

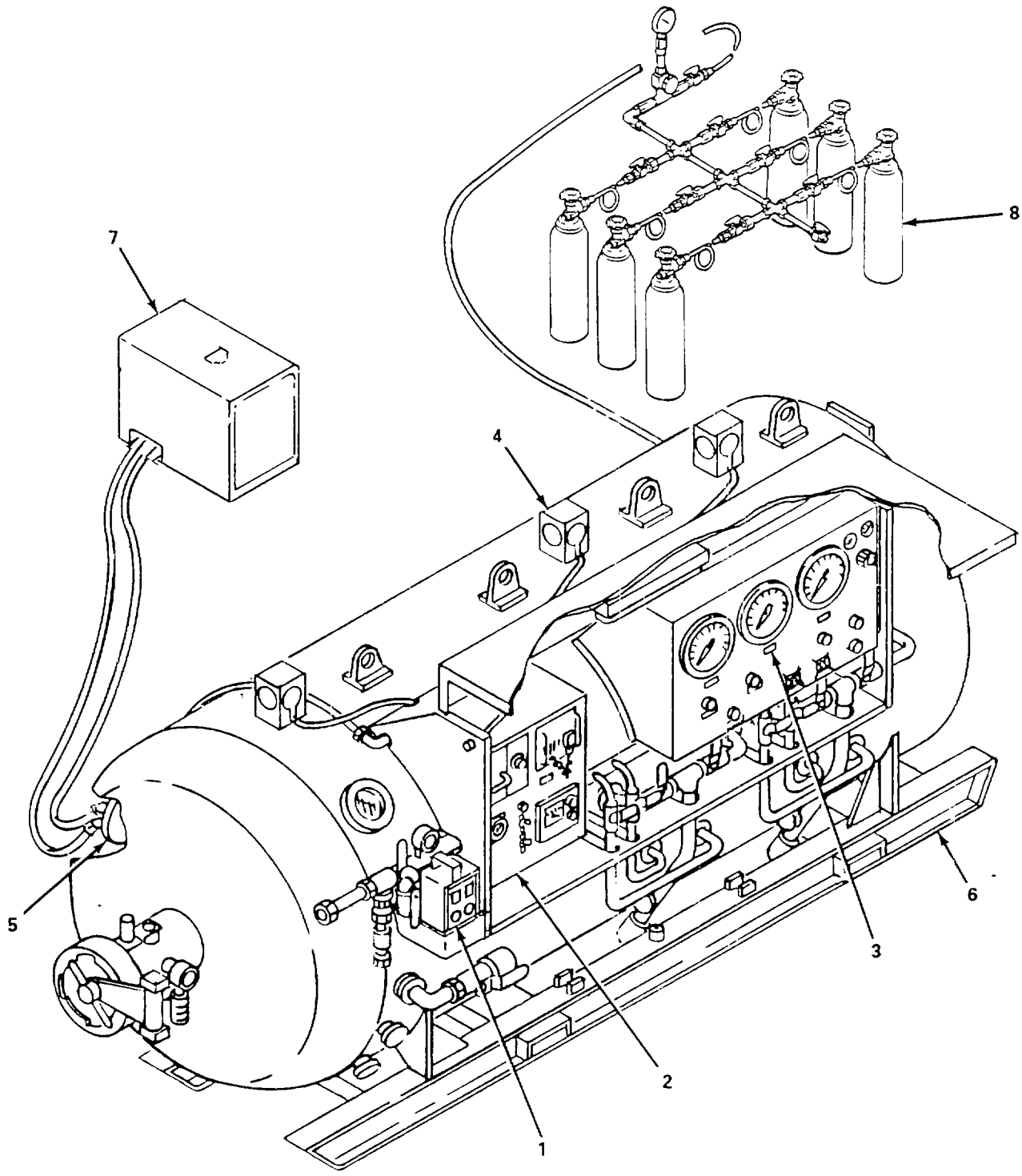


Figure 1-2. Location and Description of Major Components (Sheet 1 of 2).

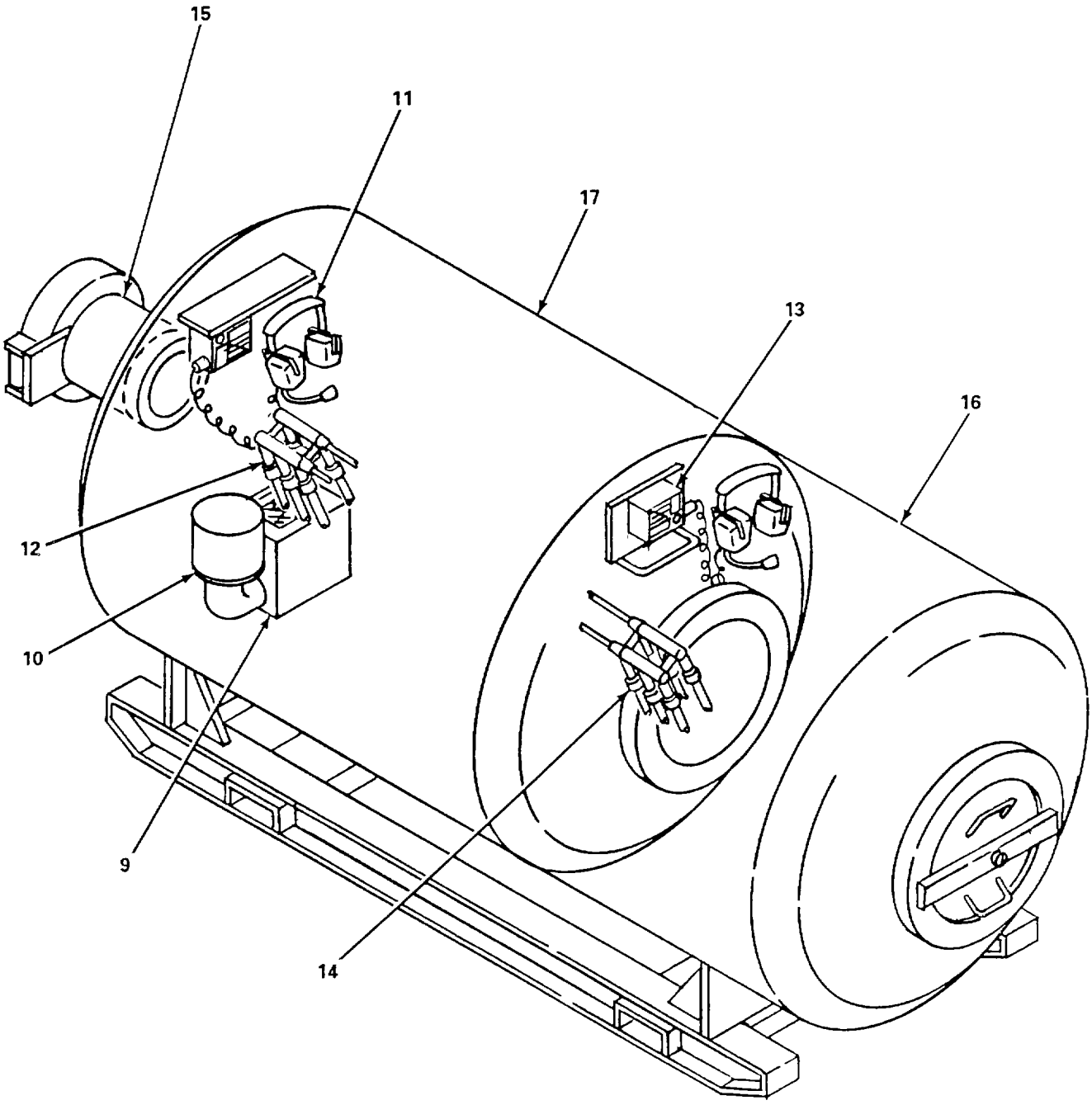


Figure 1-2. Location and Description of Major Components (Sheet 2 of 2).

MEDICAL LOCK (15). Provides access to I/L for small sustenance items and medical supplies.

OUTER LOCK (16). Allows personnel access to primary treatment area.

INNER LOCK (17). Contains primary pressurized treatment area.

1-9. Equipment Data.

a. Recompression Chamber.

Manufacturer	CVI Inc.
Model	RC-100-2*
Part Number	C-867-7300-81*
Weight	3000 lbs
Length	145 in.
Width	60 in.
Height	76 in.

b. Heater/Chiller Module.

Manufacturer	Amron International
Model	9000 ECS
Weight	175 lbs (79.38 Kg)
Length	19.5 in. (495.3 mm)
Width	27.0 in. (685.8 mm)
Height	30.25 in. (768.35 mm)

* As modified by Cage Code (80064) Drawing No. 330014.

c. Electrical Power Source Requirements. An electrical power source rated at 110 VAC, 60 Hertz, 20 Amps, is required to power the 3-person recompression chamber. This source is connected to the Ground Fault Interrupter (GFI). Two additional electrical power sources are required to power the heater/chiller module located left rear of, and behind the chamber. A 220 VAC, 60 Hertz, 20 Amp source is required to power the 3 HP electrical motor for the compressor, and a 110 VAC, 60 Hertz, 10 Amp source is required to power the 1/3 HP electrical motor for the fluid circulation pump.

d. *Compressed Air Supply Requirements*. (Ref. FM 20-11-1). A recompression treatment facility must have a primary and a secondary air supply system which satisfy the following requirements.

Primary - Sufficient air to pressurize the inner lock once to 165 feet and the outer lock twice to 165 feet and ventilate during one treatment.

Secondary - Sufficient air to pressurize the inner and outer locks once and ventilate for one hour at 70.4 SCFM.

Either system may consist of air banks or a suitable compressor or both. The primary recompression chamber support system must be capable of pressurizing the inner lock to a depth of 165 feet in three minutes. The required total capacity is calculated as follows:

(1) *Primary system capacity*.

$C_p = 5\ V_{11} + 10\ V_{01} + 45{,}390$

where

C_p	=	Minimum capacity of primary system in standard cubic feet (SCF)
V_{11}	=	Volume of inner lock in cubic feet
V_{01}	=	Volume of outer lock in cubic feet
5	=	Atmosphere equivalent to 165 FSW
10	=	Twice 5 atmospheres
45,390	=	total SCF of air required to ventilate during a treatment, table 4.

(2) *Secondary system capacity*.

$C_s = 5\ V_{11} + 5\ V_{01} + 4224$

where

C_s	=	Minimum capacity of secondary system, SCF
V_{11}	=	Volume of inner lock
V_{01}	=	Volume of outer lock
5	=	Atmosphere equivalent to 165 FSW
4224	=	Air required for maximum ventilation rate of 70.4 SCFM for 1 hour.

e. *Oxygen (02) Requirements*. Oxygen is supplied to the recompression chamber by the 02 supply manifold which provides piping and valves to hook-up six size D 0_2 cylinders, three of which may be replaced while the other three continue to provide uninterrupted service.

1-10. **Safety, Care, and Handling**. When operating or doing maintenance on 3-Person Recompression Chamber, take necessary precautions to ensure the safety of others as well as yourself. Avoid careless operating or maintenance habits which cause accidents to personnel and damage to the equipment. Observe all WARNING's, CAUTION's, and NOTE's in this manual. This equipment can be extremely dangerous if these instructions are not followed.

a. The recompression chamber is equipped with four lifting eyes located along top centerline. The chamber may be lifted by using two, either the inner or the outer, pair, of the lifting eyes. The chamber may also be moved with a forklift using the channels in the skid base. The estimated total weight of the unit is 3000 lbs. Care must be taken not to drop, dent, or puncture the chamber shell.

WARNING

Should the shell of the 3-Person Recompression Chamber be damaged, it shall be repaired and recertified in accordance with ASME and National Board of Boiler and Pressure Vessel Inspectors requirements.

b. The 3-Person Recompression Chamber is an enclosed area into which personnel must enter and remain for the duration of their recompression treatment. It is therefore mandatory that the chamber (inside and out) be maintained hygienically clean and uncluttered. Care must be taken to clean the chamber compartments on a regularly scheduled basis. See chapter 4, Section VI, for Unit Level Cleaning Procedures for Air and Oxygen Systems.

WARNING

In an enclosed compartment from which personnel cannot readily escape, fire is an ever present danger. In a pressurized, oxygen enhanced atmosphere, a spark from any source could cause rapid burning and/or an explosion. It is therefore mandatory that no spark producing device (matches, cigarette lighters, etc.) be taken into the chambers. Do not allow such items as metal helmets, boot or shoe cleats, or other metal objects to be worn or taken inside the chamber.

Take all possible precaution to prevent static electric build up. Ensure that the chamber is electrically grounded. Ensure that the external electrical power source connected to the Chamber GFI is electrically grounded. Ensure that the external electrical power supplies, both 220 and 110 VAC, for the heater/chiller module have proper electrical grounds. Ensure that the heater/chiller unit, carbon dioxide scrubber unit, temperature probe, and folding bunk in the I/L are electrically grounded.

c. While every effort is taken to make the personnel under treatment inside the chamber comfortable, such personal items as battery operated radios, shaving devices, etc., will not be taken inside.

Section III. PRINCIPLES OF OPERATION

1-11. **Technical Principles of Operation**. The following describes the theory of operation of the 3-Person Recompression Chamber.

a. Environmental Control. Figures 1-3 and 1-4 provide the flow and electrical diagrams of the 3-Person Recompression Chamber. The Recompression Chamber provides a controlled pressurized enclosure for the treatment of physiological disorders caused by inability of the human body to adjust to pressure changes. Air pressure in the outer and inner lock is controlled by air supply and air vent valves located in the external control panel. An external heater/chiller module supplies the internal heater/chiller unit with cooling/heating fluids to heat or cool the I/L of the chamber. The oxygen bottles with manifold, supplies the chamber with the needed oxygen.

b. Electrical and Communications Operation. Power for the chamber electrical system is brought to the unit through the GFI located outside of the chamber. A primary communications intercom system and internal speakers are the source of communications between personnel inside and outside of chamber. The chamber is supplied with a pressure relief safety valve, set to relieve when the internal pressure reaches 105 PSIG.

1-12. **ASME Certification**.

a. In accordance with the requirements of MIL-C-52988(ME) the recompression chambers are designed, fabricated, tested and certified in accordance with the requirements of the American Society of Mechanical Engineering (ASME) Code. The units are all registered with the National Board of Boiler and Pressure Vessel Inspectors, 1055 Crupper Ave., Columbus, Ohio 43229, phone number 614-888-8320.

b. Each unit is equipped with a welded in place, ASME Code nameplate, located on the chamber shell to the right of the control cabinet. This nameplate has the National Board registration number for each unit, which corresponds to the ASME Data Form U-1, manufacturers data report, filed for each unit.

c. Should it ever be required to obtain information concerning modifications or repairs to the pressure boundary of the chamber and it is deemed necessary to make the necessary repair or modifications in accordance with ASME Code and National Board requirements, it is advisable to contact the National Board.

d. The above information is included in this manual to inform all using personnel of these requirements from a safety aspect and also if it is desired to not void any ASME Code certifications.

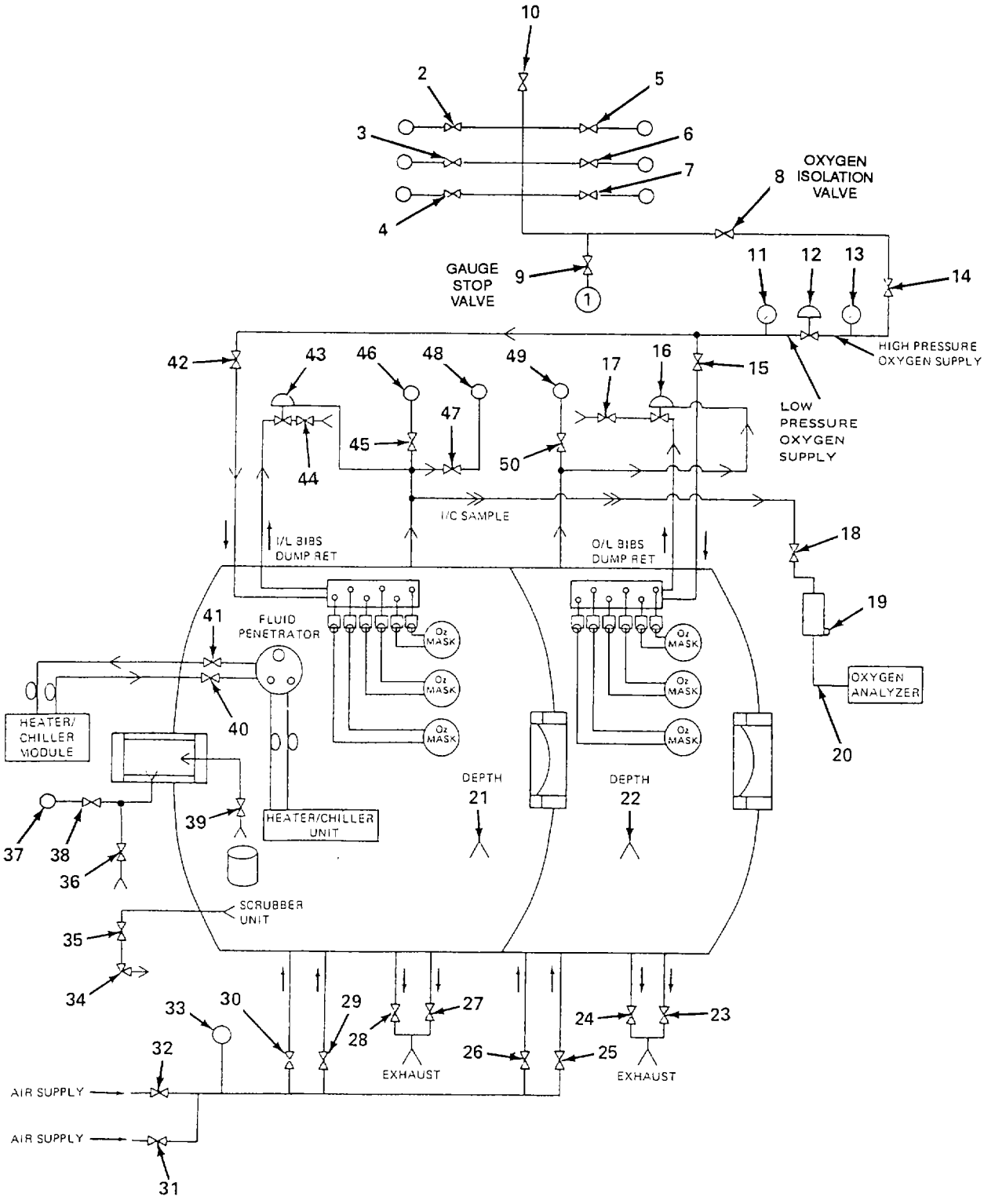


Figure 1-3. Flow Diagram (Sheet 1 of 3).

KEY TEXT LEGEND

Item	Reference Designation	Description
1.	OGA-028	High Pressure Oxygen (O_2) Gage (Manifold Pressure)
2.	OXH-030	High Pressure Oxygen (O_2) Supply Valve (Left Bank)
3.	OXH-031	High Pressure Oxygen (O_2) Supply Valve (Left Bank)
4.	OXH-032	High Pressure Oxygen (O_2) Supply Valve (Left Bank)
5.	OXH-033	High Pressure Oxygen (O_2) Supply Valve (Right Bank)
6.	OXH-034	High Pressure Oxygen (O_2) Supply Valve (Right Bank)
7.	OXH-035	High Pressure Oxygen (O_2) Supply Valve (Right Bank)
8.	OXH-029	High Pressure Oxygen (O_2) Isolation Valve
9.	OXH-027	Gage Stop Valve
10.	OXH-036	Oxygen (O_2) Manifold Vent Valve
11.	OGA-025	Low Pressure Oxygen ((O_2) Gage (Chamber Control Console-Right)
12.	OHL-024	Oxygen (O_2) Hand Loader (Regulator)
13.	OGA-026	High Pressure Oxygen (O_2) Gage (Chamber Control Console-Left)
14.	OXH-037	High Pressure Oxygen (O_2) Isolation Valve (Chamber Control Console Inlet, if installed)
15.	OXL-020	Low Pressure Oxygen (O_2) Supply Valve (O/L Right)
16.	OBR-023	Exhaust Back Pressure Oxygen (0_2) Regulator (O/L-Top Regulator)
17.	OEX-038	Exhaust Oxygen (O_2) Valve (O/L-Upper Muffler)
18.	ALP-014	Low Pressure Air Supply Isolation Valve (to O_2 Flow Meter)
19.	ALP-040	Low Pressure Air Supply Valve (for O_2 Flow Meter)
20.	----------	Oxygen (O_2) Analyzer Vent
21.	AGA-020	Depth Gage O/L (Inside Chamber)
22.	AGA-021	Depth Gage I/L (Inside Chamber)
23.	ELP-012	Exhaust Air Valve (O/L-Right)
24.	ELP-011	Exhaust Air Valve (O/L-Left)
25.	ALP-010	Low Pressure Air Supply Valve (O/L-Right)
26	ALP-009	Low Pressure Air Supply Valve (O/L-Left)

Figure 1-3. Flow Diagram (Sheet 2 of 3).

KEY TEXT LEGEND (Cont)

Reference Item	Designation	Description
27.	ELP-008	Exhaust Air Valve (I/L-Right)
28.	ELP-007	Exhaust Air Valve (I/L-Left)
29.	ALP-006	Low Pressure Air Supply Valve (I/L-Right)
30.	ALP-005	Low Pressure Air Supply Valve (I/L-Left)
31.	ALP-001	Low Pressure Air Supply Valve (on the 90° Elbow)
32.	ALP-002	Low Pressure Air Supply Valve (close to Chamber)
33.	AGA-003	Low Pressure Air Supply Gage (Air Manifold Pressure)
34.	APR-004	Chamber Pressure Relief Valve
35.	ALP-004	Chamber Pressure Relief Isolation Valve
36.	ELP-043	Exhaust Air Valve (M/L)
37.	AGA-044	Low Pressure Air Gage (M/L)
38.	ALP-046	Low Pressure Air Gage Stop Valve
39.	ALP-045	Low Pressure Air Valve (M/L-Inner Door)
40.	FLV-042	Fluid Supply Valve (Heater/Chiller Penetrator)
41.	FLV-041	Fluid Return Valve (Heater/Chiller Penetrator)
42.	OXL-021	Low Pressure Oxygen (O_2) Supply Valve (I/L Left)
43.	OBR-022	Back Pressure Regulator Oxygen (O_2) (I/L Bottom Regulator)
44.	OEX-037	Exhaust Oxygen (O_2) Valve (I/L Lower Muffler)
45.	ALP-013	Depth Gage Isolation Air Valve (I/L-Left)
46.	AGA-017	Depth Gage (I/L Chamber Control Console-Left)
47.	ALP-015	Depth Gage Isolation Air Valve (I/L-Right)
48.	AGA-018	Depth Gage I/L (Chamber Control Console-Middle)
49.	AGA-019	Depth Gage O/L (Chamber Control Console-Right)
50.	ALP-016	Depth Gage Isolation Air Valve (O/L)

Figure 1-3. Flow Diagram (Sheet 3 of 3).

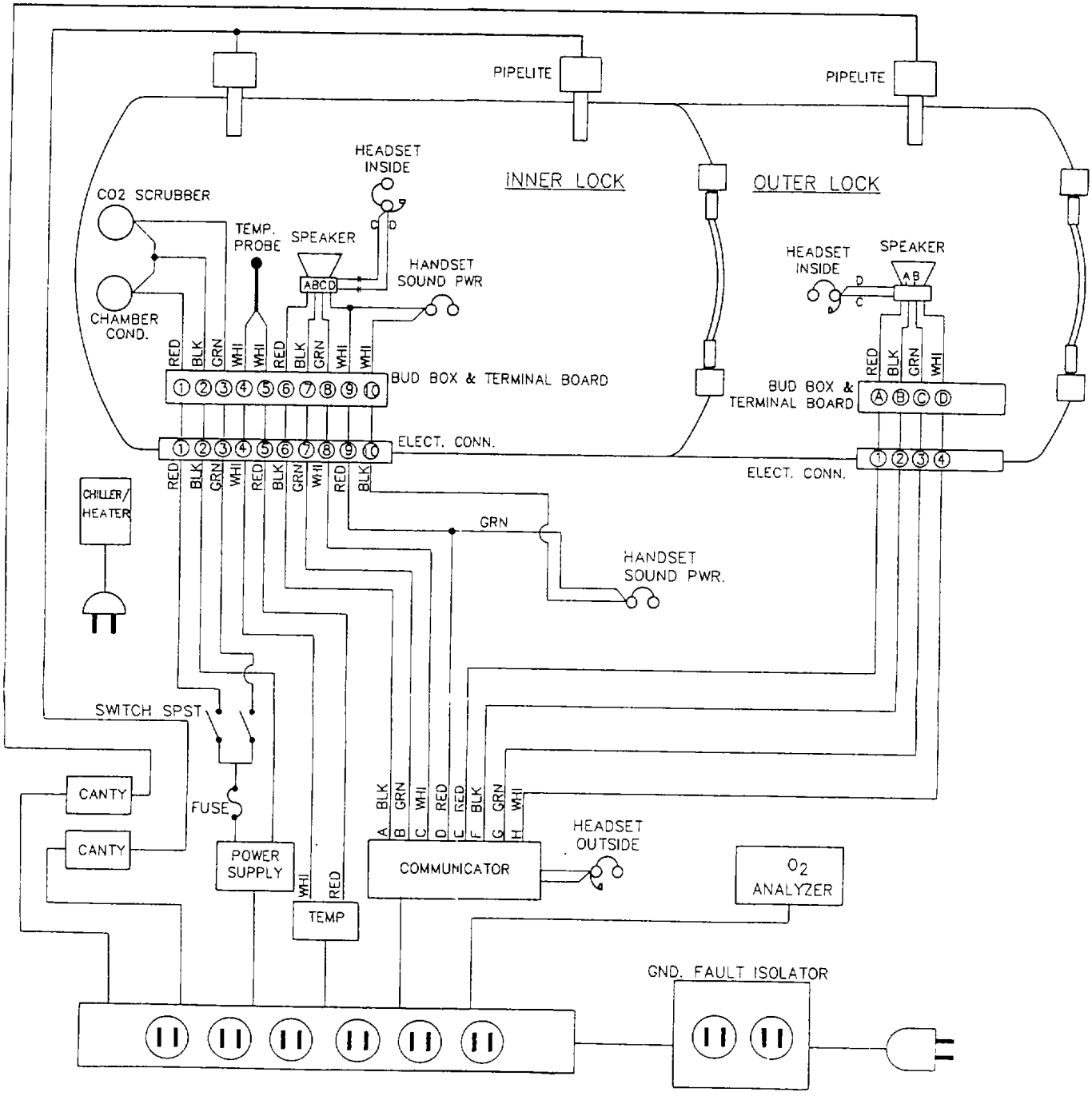


Figure 1-4. Electrical Diagram.

CHAPTER 2

OPERATING INSTRUCTIONS

OVERVIEW

This chapter provides information and procedures required by the operator to operate the 3-Person Recompression Chamber RC-100-2 safely and efficiently.

Section I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

2-1. **General.** This section contains a list of the operator's controls and indicators, a description of their function and their respective designation. The purpose of the description and designation is to provide adequate written guidance for the safe operation and maintenance of the chamber. The first three places of the designation describe the function of the component. The last three places of the designation give sequence number. For example XXX-000. The following table describes the function designators.

Table 2-1. Recompression Chamber Functional Designators.

AGA	-	Air Gage
ALP	-	Air, Low Pressure
ELP	-	Exhaust, Low
ARP	-	Air Pressure Relief
OXL	-	Oxygen, Low Pressure
OXH	-	Oxygen, High Pressure
OBR	-	Oxygen Back Pressure Regulator
OGA	-	Oxygen Gage
OHL	-	Oxygen Handloader
SWT	-	Electrical Switch
FLV	-	Fluid Valve
OEX	-	Oxygen Exhaust

2-2. Electrical Control Panel. (figure 2-1)

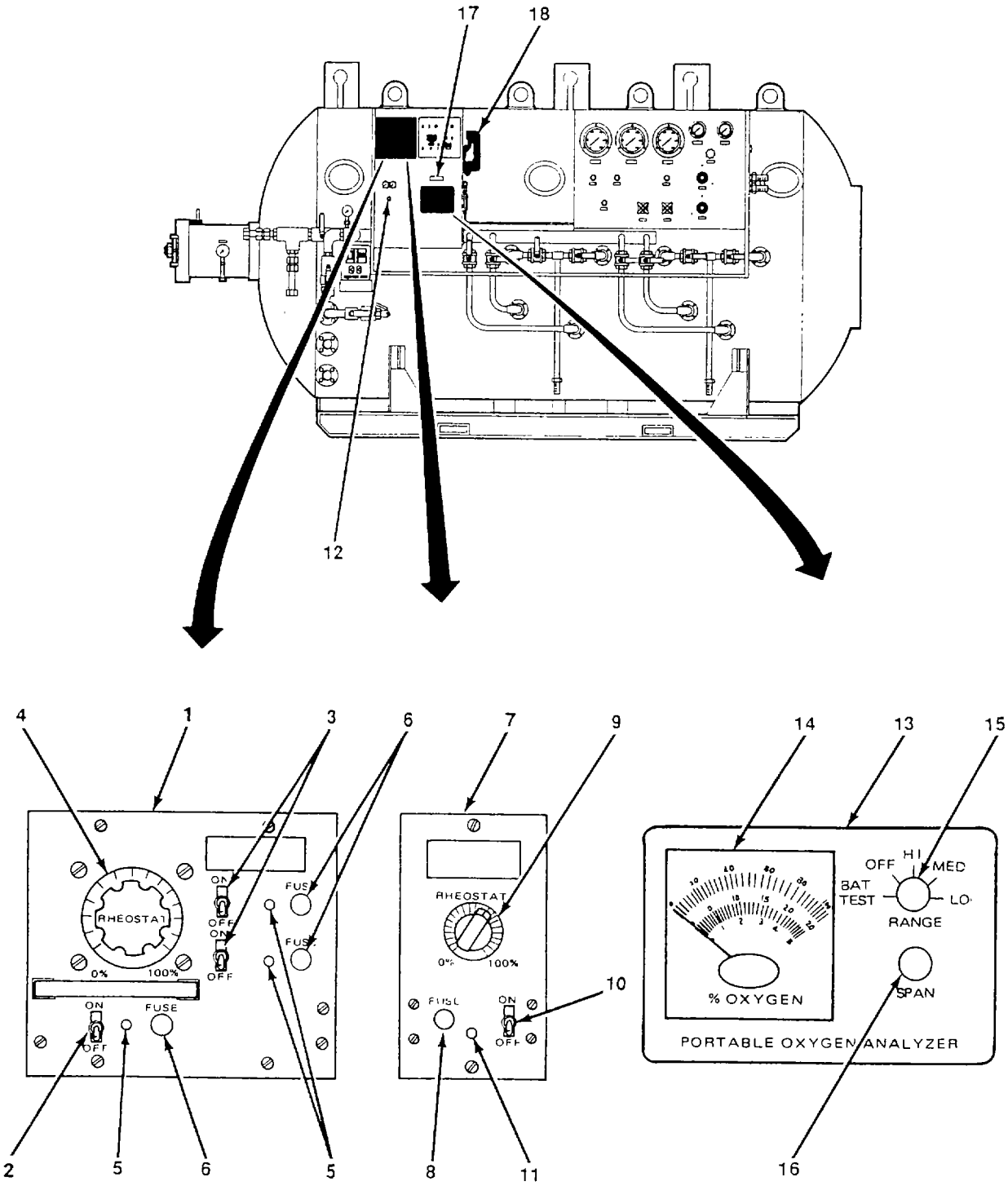


Figure 2-1. Electrical Control Panel Controls and Indicators (Sheet 1 of 2).

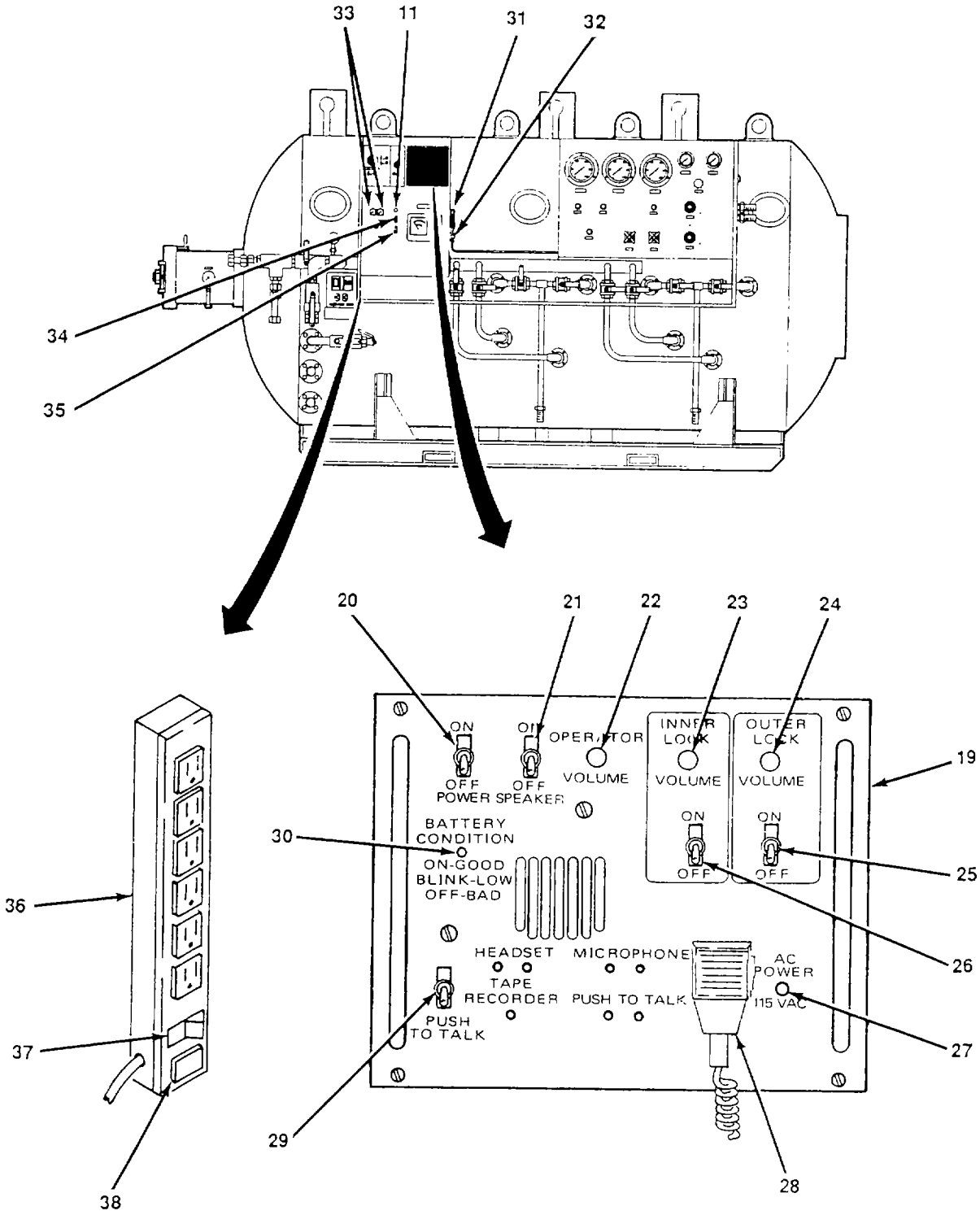


Figure 2-1. Electrical Control Panel Controls and Indicators (Sheet 2 of 2).

Key	Designator	Control or Indicator	Function or Use
1	NA	Power Supply (Lights, I/L)	Controls I/L lights.
2	SWT-001	Toggle Switch	ON/OFF - controls power supply circuit.
3	SWT-002	Toggle Switch	ON/OFF - controls I/L light circuit.
4	SWT-003	Variable Rheostat	Controls voltage to I/L lights.
5	NA	Indicator Lights (3 ea)	Light glows to indicate energized I/L light circuits.
6	NA	Fuseholders (3 ea)	Contains fuse for I/L lights.
7	NA	Power Supply	Controls O/L lights.
8	NA	Fuseholder	Contains fuse for O/L lights.
9	SWT-005	Variable Rheostat	Controls voltage to O/L lights.
10	SWT-004	Toggle Switch	ON/OFF - controls O/L light circuit.
11	NA	Indicator Light	Light glows to indicate energized O/L light circuit.
12	NA	Fuseholder	Contains fuse for chiller and scrubber fan circuits.
13	NA	Oxygen Analyzer	Analyzes % of oxygen in chamber air.
14	NA	Oxygen Meter	Indicates % of oxygen in chamber air.
15	SWT-006	Range Switch	Selects range of oxygen in air being tested or condition of battery.
16	SWT-007	Span Adjustment	Controls meter's indicating pointer.
17	NA	Digital Thermometer	Monitors temperature of chamber air.
18	NA	Sound Powered Phones	Secondary communications system.
19	NA	Communications Box	Primary communications system
20	SWT-008	Power Switch	ON/OFF - energizes communication set.
21	SWT-009	Speaker Switch	ON/OFF - energizes comm box speaker.
22	SWT-010	Volume Control	Controls volume of operator's speaker.
23	SWT-013	Volume Control	Controls volume of I/L speaker.

Key	Designator	Control or Indicator	Function or Use
24	SWT-014	Volume Control	Controls volume of O/L speaker.
25	SWT-011	Speaker Switch	ON/OFF - energizes O/L speaker circuit.
26	SWT-012	Speaker Switch	ON/OFF - energizes I/L speaker circuit.
27	NA	Indicator Light	Light glows when AC power circuit on comm box is energized.
28	SWT-015	Microphone Switch	PUSH-TO-TALK operator's microphone switch.
29	SWT-016	Speaker Switch	"Push to talk" operator's headset switch.
30	NA	Battery Condition Light	Light glows to indicate condition of battery.
31	NA	Flow Meter	Meters quantity of air sample to oxygen analyzer.
32	ALP-040	Flow Meter Valve	Regulates air sample flow rate.
33	NA	Stopwatches	Indicate time-lapse for procedures and treatments.
34	SWT-018	Toggle Switch	ON/OFF - to control C02 scrubber fan.
35	SWT-017	Toggle Switch	ON/OFF -to control chiller fan.
36	NA	Power Strip	Controls electrical power distribution.
37	SWT-019	Rocker Switch	Energizes power strip.
38	NA	Indicator Light	Light glows when power strip is energized.

2-3. Chamber Control Console. (figure 2-2)

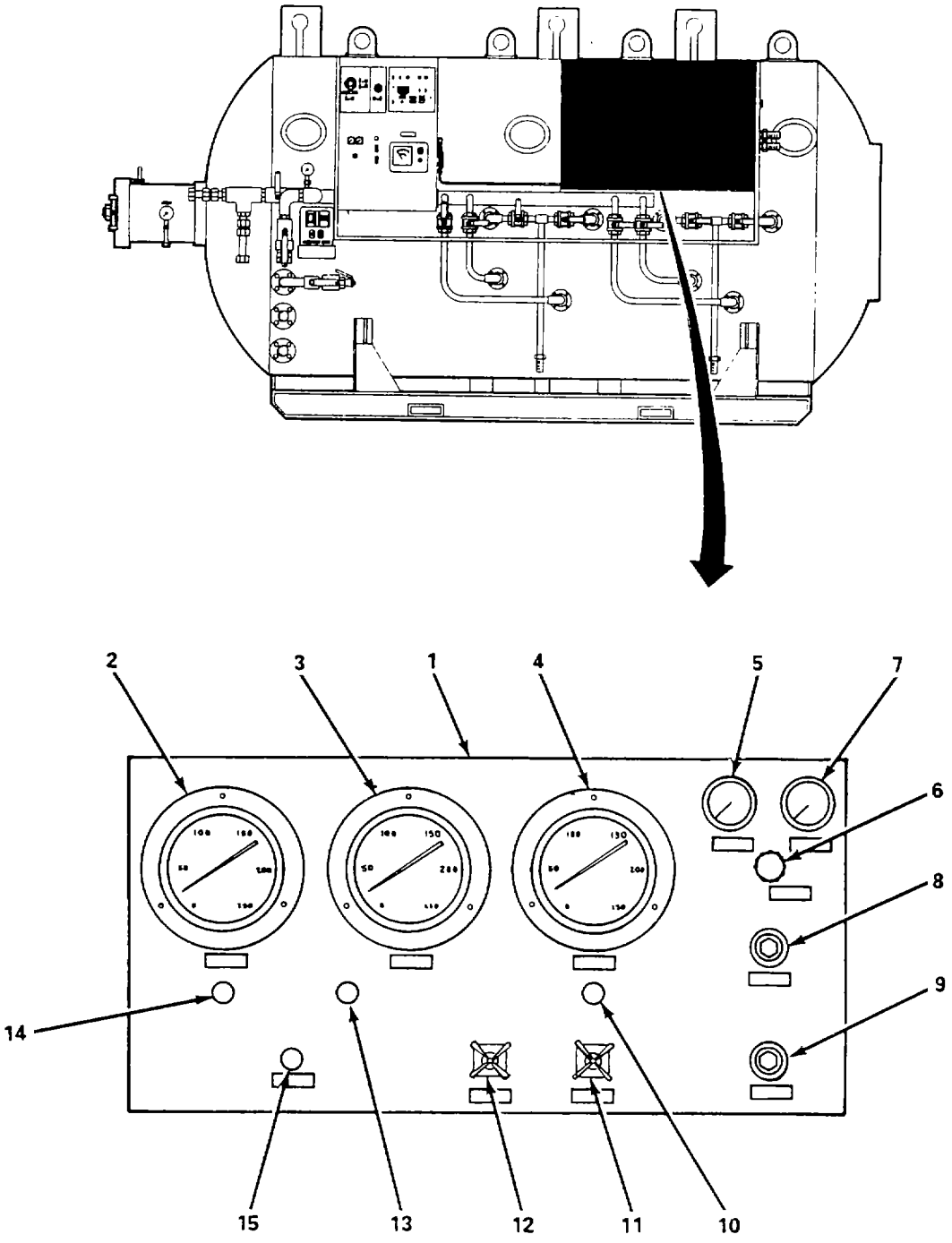


Figure 2-2. Chamber Control Console Controls and Indicators.

Key	Designator	Control or Indicator	Function or Use
1	NA	Chamber Control Console	Controls air and oxygen flow.
2	AGA-017	Depth Gage	Indicates I/L depth in FSW.
3	AGA-018	Depth Gage, Backup	Indicates I/L depth in FSW.
4	AGA-019	Depth Gage	Indicates O/L depth in FSW.
5	OGA-026	Oxygen Bank Gage	Indicates pressure of oxygen in supply cylinders.
6	OHL-024	Oxygen Pressure Regulator	Controls supply of oxygen to BIBS manifold.
7	OGA-025	Oxygen Manifold Gage	Indicates pressure of oxygen in BIBS manifold.
8	OBR-023	Oxygen Back Pressure Regulator	Controls oxygen overboard dump pressure from O/L.
9	OBR-022	Oxygen Back Pressure Regulator	Controls oxygen overboard dump pressure from I/L.
10	ALP-016	Needle Valve	Isolates depth gage from O/L pressure.
11	OXL-020	Needle Valve	Controls oxygen supply to BIBS manifold in O/L.
12	OXL-021	Needle Valve	Controls oxygen supply to BIBS manifold in I/L.
13	ALP-015	Needle Valve	Isolates depth backup gage from I/L pressure.
14	ALP-013	Needle Valve	Isolates depth gage from I/L pressure.
15	ALP-014	Needle Valve	Isolates oxygen flow meter from chamber air.

2-4. Gages, Valves, and Switches. (figure 2-3)

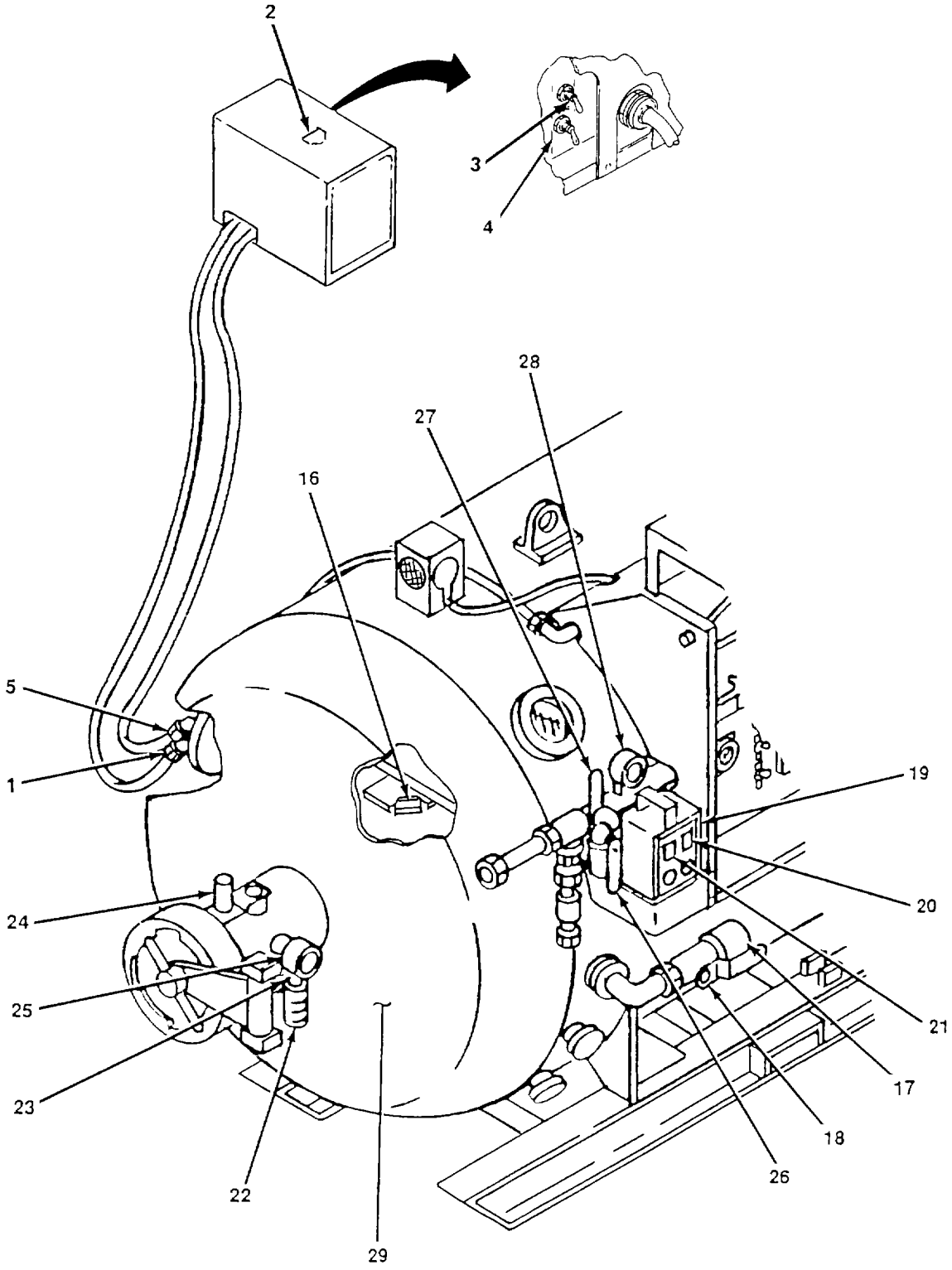


Figure 2-3. Gages, Valves, and Switches Controls and Indicators (Sheet 1 of 2).

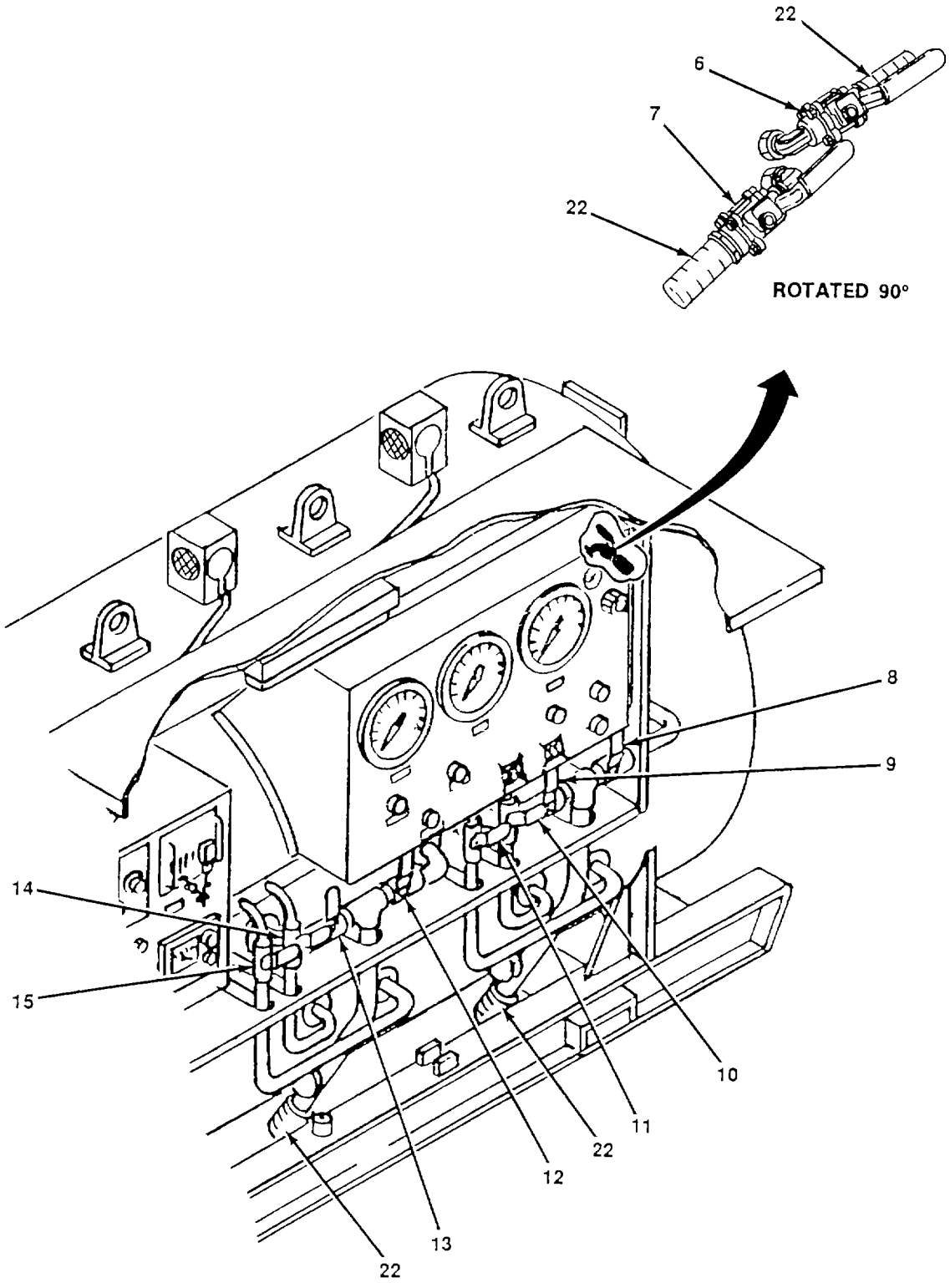


Figure 2-3. Gages, Valves, and Switches Controls and Indicators (Sheet 2 of 2).

Key	Designator	Control or Indicator	Function or Use
1	FLV-041	Ball Valve	Controls fluid return to heater/chiller module.
2	NA	Fluid Level Inspection Plate	Provides access to reservoir.
3	SWT-022	ON/OFF Switch	Heater chiller power supply.
4	SWT-023	HEAT/CHILL Switch	Selects heat or chill mode.
5	FLV-042	Ball Valve	Controls fluid supply to heater/chiller module.
6	OEX-038	Ball Valve	Controls oxygen exhaust from O/L.
7	OEX-037	Ball Valve	Controls oxygen exhaust from I/L.
8	ELP-012	Ball Valve	Control air exhaust from O/L.
9	ELP-011	Ball Valve	Controls air exhaust from O/L.
10	ALP-010	Ball Valve	Controls air supply to O/L.
11	ALP-009	Ball Valve	Controls air supply to O/L.
12	ELP-008	Ball Valve	Controls air exhaust from I/L.
13	ELP-007	Ball Valve	Controls air exhaust from I/L.
14	ALP-006	Ball Valve	Controls air supply to I/L.
15	ALP-005	Ball Valve	Controls air supply to I/L.
16	NA	Temperature Probe	Monitors chamber air temperature.
17	APR-004	Pressure Relief Valve	Controls chamber over pressurization.
18	ALP-004	Ball Valve	Control air to pressure relief valve.
19	NA	Ground Fault Interrupter (GFI)	Contains main circuit breaker.
20	SWT-020	Reset Switch	Main circuit breaker reset switch.
21	SWT-021	Test Switch	Push-to-test light glows to indicate circuit is energized.
22	NA	Silencer, Exhaust	Controls sound of exhausting air.
23	ELP-043	Ball Valve	Controls medical lock exhaust.
24	NA	Locking Handle	Position of handle indicates when door is locked.
25	AGA-044	Pressure Gage	Indicates internal air pressure of medical lock.
26	ALP-002	Ball Valve	Controls air supply to chamber.
27	ALP-001	Ball Valve	Controls air supply to chamber.
28	AGA-003	Pressure Gage	Indicates air supply manifold pressure.
29	ALP-045	Ball Valve	Controls medical lock pressurization from inside chamber

Section II. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

2-5. General. Operator PMCS are performed to ensure that the 3-person recompression chamber is ready for operation at all times. Perform the checks and services at the specified intervals.

a. Before you Operate. Always keep in mind the CAUTIONS and WARNINGS. Perform your before (B) PMCS prior to the equipment leaving its containment area or performing its intended mission.

b. While you Operate. Always keep in mind the CAUTIONS and WARNINGS. Perform your during (D) PMCS when the equipment is being used in its intended mission.

c. After you Operate. Be sure to perform your after (A) PMCS after the equipment has been taken out of its mission mode or returned to its containment area.

d. If your Equipment Fails to Operate. Troubleshoot with proper equipment. Report any deficiencies using the proper forms See DA Pam 738-750.

2-6. Purpose of PMCS Table. The purpose of the PMCS table is to provide a systematic method of inspecting and servicing the equipment. In this way, small defects can be detected early before they become a major problem causing the equipment to fail to complete its mission. The PMCS table is arranged with the individual PMCS procedures listed in sequence under assigned intervals. The most logical time (before, during, or after operation) to perform each procedure determines the interval to which it is assigned. Make a habit of doing the checks in the same order each time and anything wrong will be seen quickly. See paragraphs 2-7 and 2-9 for an explanation of the columns in table 2-1

2-7. Explanation of Columns. The following is a list of the PMCS table column headings with a description of the information found in each column

a. Item No. This column shows the sequence in which the checks and services are to be performed, and is used to identify the equipment area on the Equipment Inspection and Maintenance Worksheet, DA Form 2404.

b. Interval. This column shows a dot (.) when each check is to be done.

c. Item to be Inspected/Procedures. This column identifies the general area or specific part where the check or service is to be done, and explains how to do them.

d. Equipment is Not Ready/Available If. See paragraph 2-9.

2-8. Reporting Deficiencies. If any problem with the equipment is discovered during PMCS or while it is being operated that cannot be corrected at the operator/crew maintenance level, it must be reported. Refer to DA Pam 738-750 and report the deficiency using the proper forms.

2-9. Equipment is Not Ready/Available If Column. This column lists conditions that make the equipment unavailable for use because it is unable to perform its mission, or because it would represent a safety hazard. Do not accept or operate equipment with a condition in the "Equipment is Not Ready If" column.

Table 2-1. Operator Preventive Maintenance Checks and Services (PMCS).

NOTE

Within designated intervals, these checks are to be performed in the order listed.

If the equipment must be kept in continuous operation, check and service only those items that can be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shut down.

B - Before D - During A - After

Item No.	Interval B	Interval D	Interval A	Item to be Inspected. Procedure	Equipment Is Not Ready Available If
1	•	•	•	GFI. Press TEST button. Observe indicator light is off Press ON button. Observe indicator light is lit.	GFI inoperative.
2	•	•	•	Power Strip. Press circuit breaker switch. Observe indicator light is off. Press circuit breaker switch Observe indicator light is lit.	Power strip inoperative.
3	•			Interior Lights. Check all interior lights for function.	
4	•			Primary Communications System. Check the communications for proper function in both the I/L and O/L and without headsets.	System damaged or inoperative. Do not operate until repaired.
5	•			Secondary Communications System. Check sound powered phones for proper function.	Sound power phone damaged or inoperative.
6	•			Oxygen (02) Analyzer. Check 02 analyzer proper function.	
7	•			Carbon Dioxide (C02) Scrubber and Chiller Unit. Check CO2 scrubber and chiller blower units to ensure that both units are circulating air.	

Table 2-1. Operator Preventive Maintenance Checks and Services (PMCS) (Cont).

B - Before D - During A - After

Item No.	Interval B	Interval D	Interval A	Item to be Inspected. Procedure	Equipment Is Not Ready Available If
8	•			Absorbent. Check level of absorbent, if low, or crystals are blue, service scrubber assembly (para. 2-10).	Level of absorbent is low or crystals are blue
			•	After unit is used for treatment of personnel, service scrubber assembly (para. 2-10).	
9	•			Reservoir, Heater/Chiller Module. Check the fluid level of the reservoir. The fluid mixture is 25% propylene glycol, 75% water by volume.	
10	•			Battery, Communicator System. Disconnect communicator unit from AC power source. Observe battery low voltage indicator light. Light will flash when voltage falls to approximately 10 to 11 volts. If flashing occurs, battery must be recharged to 12 volts.	
11			•	Clothing and Materials. Wash fire resistant clothing and materials.	
12			•	Recompression Chamber. Wash inside and outside of chamber. (Inside only after extended operations.)	
13			•	Check that Masks are installed or plug is installed. Clean 02 Masks following use.	Oxygen Mask not cleaned. Do not use until cleaned.
14	•	•	•	Gages. Inspect for damaged pointers, cracked lenses, loose tube connections or loose wires, loose hardware, plus proper operation and normal readings during operation.	Gages damaged or inoperative. Do not operate until repaired.
15	•		•	Valves. Inspect for proper operation. Check for looseness, damage and missing parts.	Valves damaged or inoperative.

B - Before D - During A - After

Item No.	Interval B	Interval D	Interval A	Item to be Inspected. Procedure	Equipment Is Not Ready Available If
				WARNING Examine hoses before pressurizing. Worn or frayed hose may explode.	
16	•		•	Air Hose and Fittings. Inspect for wear, cracks, cuts, fraying, leaks and loose connections.	Air hose or fittings damaged. Do not operate with damaged hose or fittings.
17	•			Depth Gages. Zero the gage reading if not zeroed before use.	

2-10. Scrubber Service. (figure 2-4) The following procedures are performed to service scrubber assembly.

a. Unlatch two fasteners (1) and remove lid (2).

b. Remove and discard used absorbant from cannister (3).

c. Refill canister (3) with C02 absorbant.

NOTE

Double bag canister if not being used. Unbag before use of chamber.

d. Install lid (2) on canister (3).

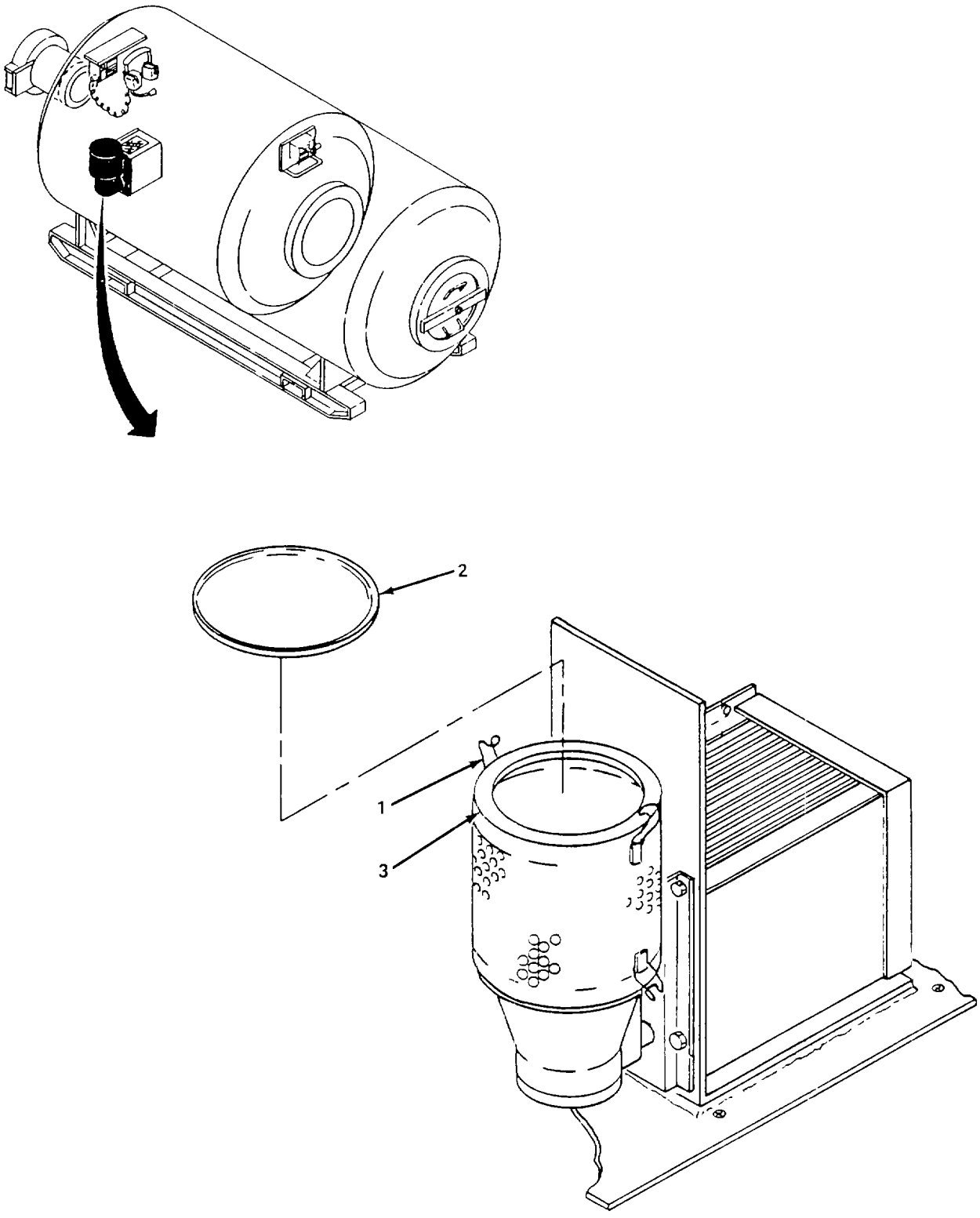


Figure 2-4. Scrubber Assembly, Service.

Section III. OPERATION UNDER USUAL CONDITIONS

2-11. General. This section contains step-by-step instructions for preparing the 3-Person Recompression Chamber for operation. Figure 2-5 must be used by the operator to ensure that the correct procedures are performed before, during, and after chamber operation.

2-12. Decals and Instruction Plates. The locations of the operating instructions or caution/warning decals and plates are illustrated in figures 2-6 through 2-9.

2-13. Startup Procedures. These procedures are required to prepare the chamber for operation (figure 2-10), and must be performed after a complete shutdown (para. 2-15).

WARNING

These procedures should only begin after the primary and secondary air systems, oxygen banks and heater/chiller unit are connected to the recompression chamber but not pressurized or activated Failure to do so may result in damage to the equipment and/or injury or death to personnel.

The operating procedures given are not intended to be used as therapeutic procedures. Treatment of patients is not within the scope of this manual. The following instructions and procedures are intended only to show the mechanical operation of the recompression chamber, complete information on operation is to be provided by the proper authorities.

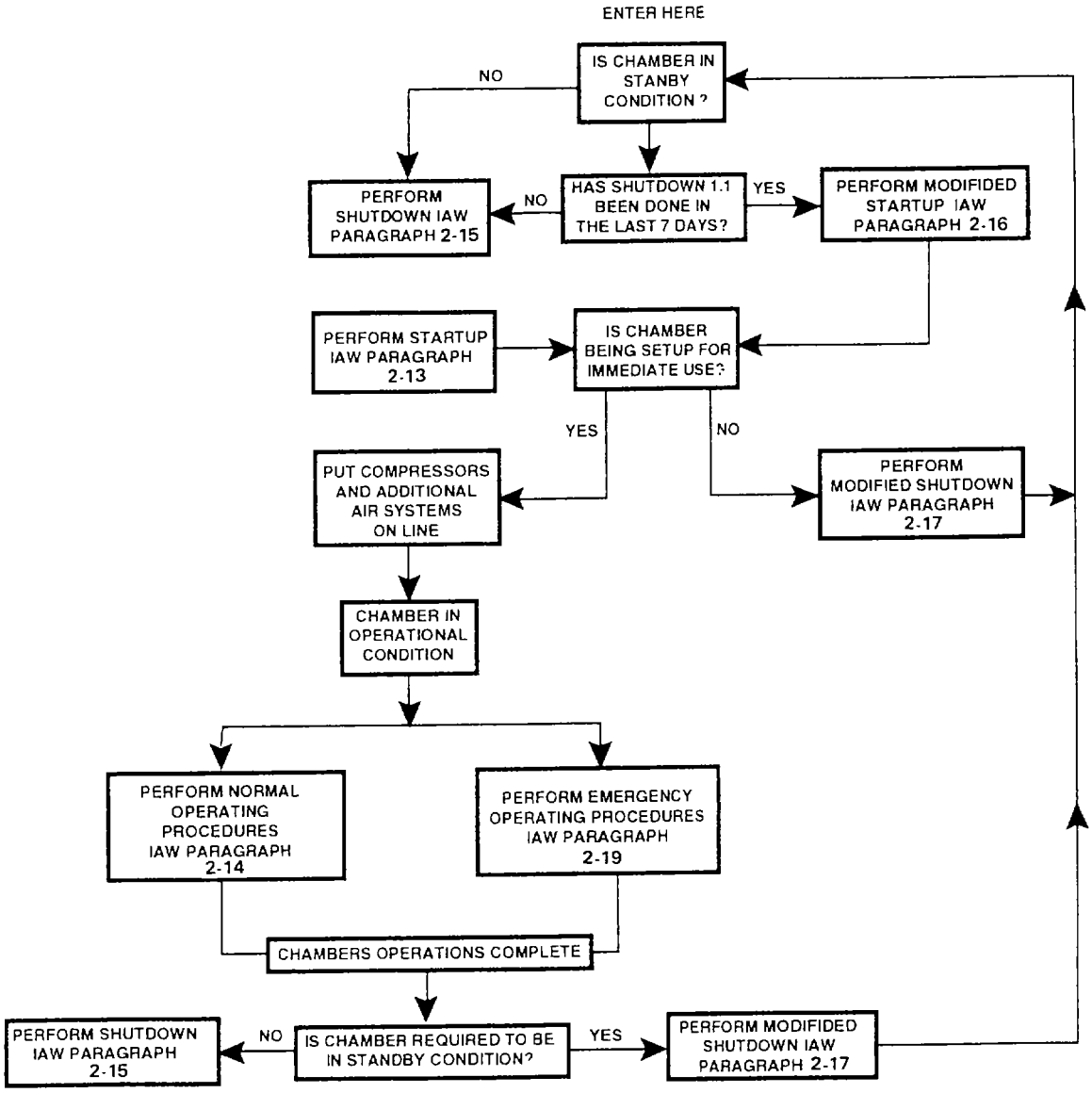
It is mandatory that these operating procedures be followed in the sequence given. Failure to do so may result in damage to the equipment and/or injury or death to personnel.

CAUTION

Hearing Protection is required when checking air system.

NOTE

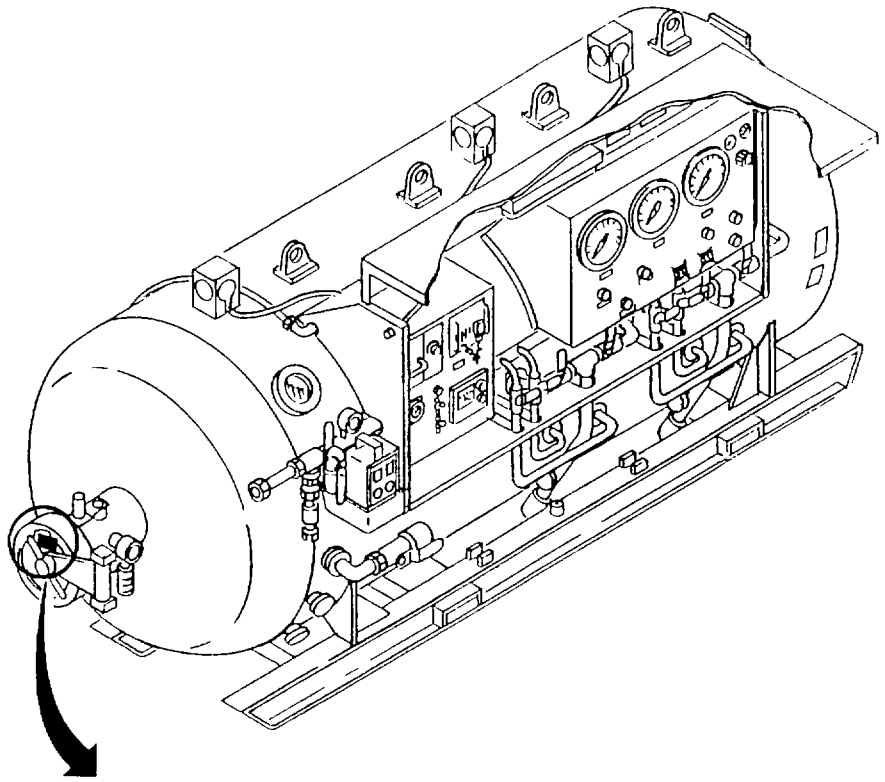
The primary air system is used to attain treatment depth and maintain the chamber at the desired flow rate. The primary air system is used with the secondary air system to rapidly Increase or decrease chamber air pressure.



*NOTES.

1. IF MAINTAINANCE NEEDS TO BE PERFORMED, SHUTDOWN MUST BE PERFORMED BEFORE AND AFTER MAINTAINANCE PROCEDURES.
2. IF A COMPLETE SHUTDOWN HAS BEEN DONE, A COMPLETE STARTUP MUST BE DONE.

Figure 2-5. Recompression Chamber Operating Procedure Flowchart.



CAUTION

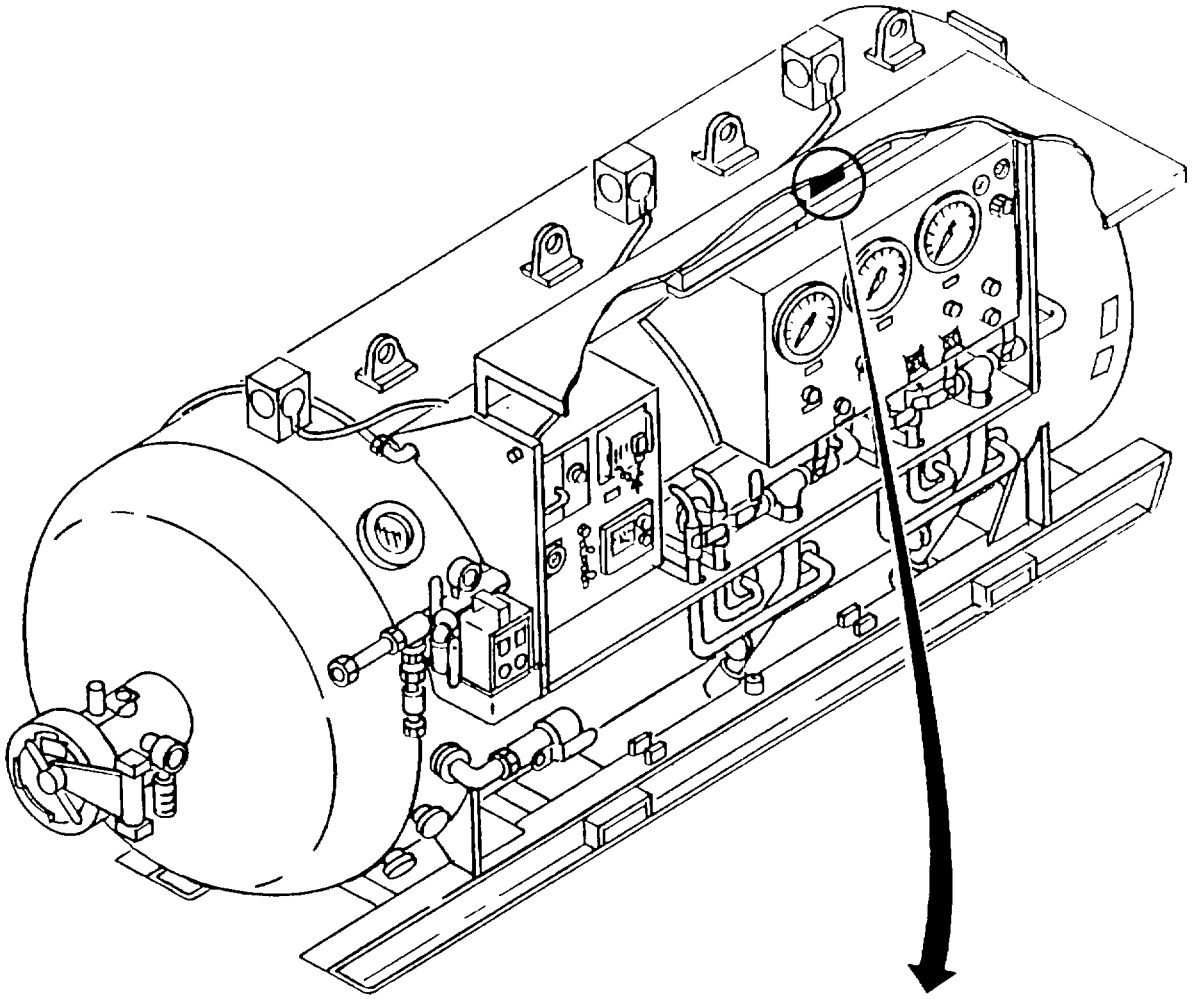
READ INSTRUCTION MANUAL PRIOR TO OPERATION.

STEP

1. CLOSE OUTER DOOR, ROTATE 30° CLOCKWISE.
2. CLOSE BALL VALVE EXA-5.
3. ASSURE LOCK PIN IS ENGAGED IN DOOR.
4. OPEN LPML-2 TO EQUALIZE PRESSURE.
5. INNER DOOR WILL OPEN ON EQUALIZATION.
6. REMOVE ARTICLES.
7. CLOSE INNER DOOR.
8. CLOSE LPML-2.
9. OPEN EXA-5 TO VENT LOCK PRESSUR.E
10. OPEN COUTER DOOR ROTATE 30° COUNTERCLOCKWISE.

NOTE: REFERENCE DESIGNATION MAY DIFFER BETWEEN CHAMBERS.

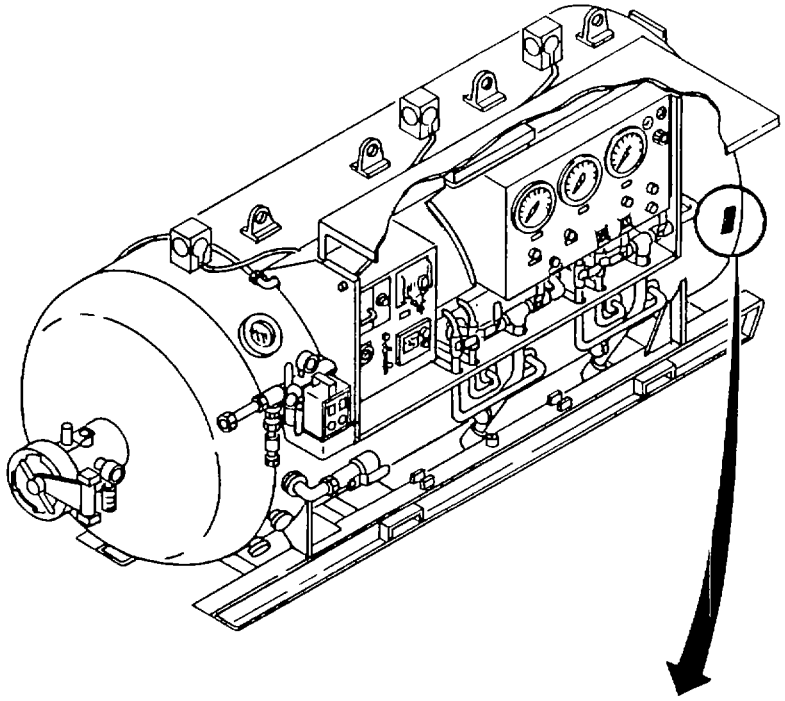
Figure 2-6. Door Procedure Plate.



WARNING

FIRE/EXPLOSION HAZARD
NO MATCHES, LIGHTERS ELECTRICAL
APPLIANCES OR FLAMMABLE MATERIALS
PERMITTED IN CHAMBER

Figure 2-7. Warning Plates.



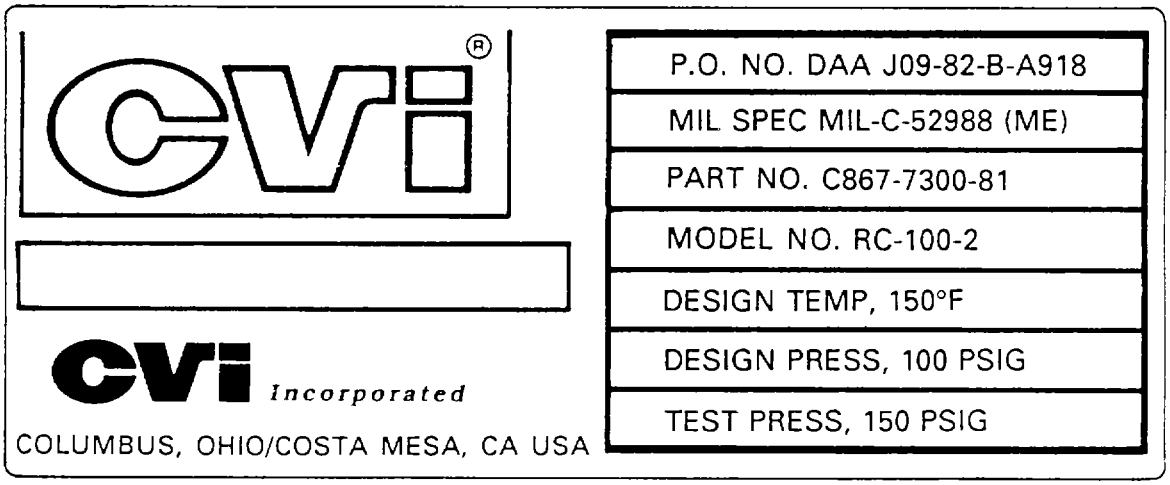
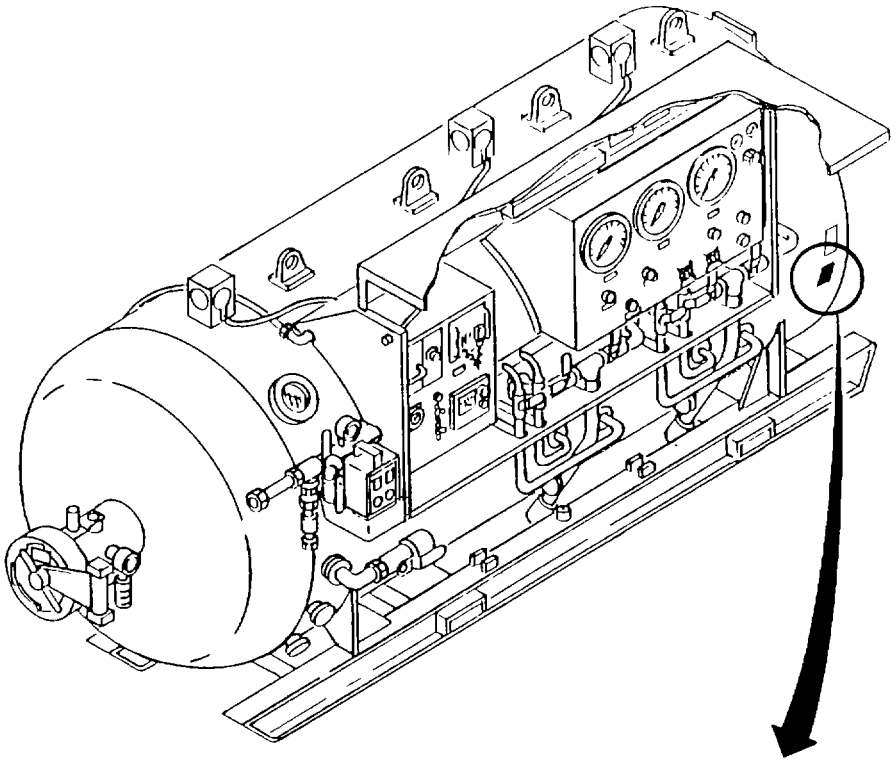


Figure 2-8. Manufacturer's Data Plates.



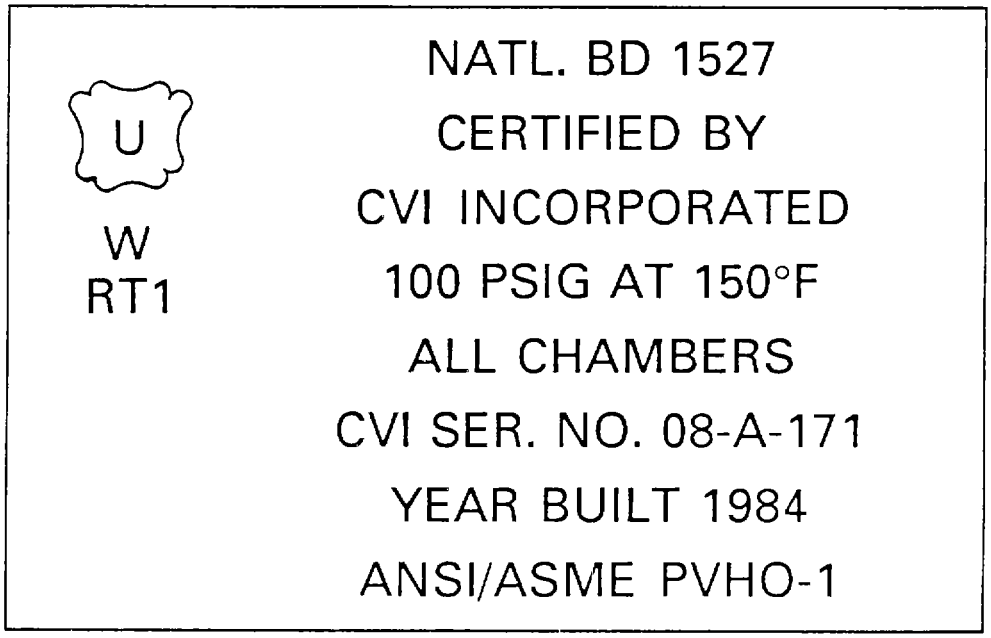


Figure 2-9. ANSI/ASME Certification Data Plate

Step	Component (Location)	Index No.	Procedure	Check	Note
1.	Primary Air System	NA	Pressurize system up to recompression chamber		
2.	Secondary Air System	NA	Pressurize system up to recompression chamber		
3.	ALP-001 (Console)	1	Open		
4.	ALP-002 (Console)	2	Shut		
5.	AGA-003 (Console)	3	Ensure air supply system pressure is acceptable (minimum 150 PSIG)		
6.	ALP-004 (Console))	4	Ensure relief gag valve is wired open with warning per FM 20-11-1		
7.	ALP-013 (Console)	5	Open		
8.	ALP-014 (Console)	6	Open		
9.	ALP-015 (Console)	7	Open		
10.	ALP-016 (Console)	8	Open		
11.	AGA-017 (Console)	9	Zero gage		
12.	AGA-018 (Console)	10	Zero gage		
13.	AGA-019 (Console)	11	Zero gage		
14.	OXH-030 through OXH-035	12 through 17	Shut		
15.	02 Bottle Valves	18	Open		
16.	OXH-030 02 Bank #1	12	Open		
17.	OXH-031 (O2 Bank #1)	13	Open		
18.	OXH-032 (02 Bank #1)	14	Open		
19.	OXH-027 (02 Bank)	15	Open and record bank #1 pressure from OGA-028 (19) here		

Figure 2-10. System Startup Checklist (Sheet 1 of 11).

Step	Component (Location)	Index No.	Procedure	Check	Note
20.	OXH-030 through OXH-032 (02 Bank)	12 through 14	Shut		
21.	OXH-033 (02 Bank #2)	16	Open		
22.	OXH-034 (02 Bank #2)	17	Open		
23.	OXH-035 (02 Bank #2)	18	Open		
24.	OGA-28 (02 Bank)	19	Record bank #2 pressure from OGA-028 here		
25.	OXH-033, OXH-034, OXH-035	16 through 18	Leave open if bank #2 is lower than bank #1, if not, shut		
26.	OXH-030, OXH-031, OXH-032	12 through 14	Leave shut unless bank #1 is lower pressure than bank #2		
27.	Oxygen Supply	NA	Bank # ___ is on line with ___ PSIG		
28.	OHL-024 (Console)	20	Dial in until OGA-025 reads 80-100 PSIG		
29.	OLP-020 (Console)	21	Open		
30.	OLP-021 (Console)	22	Open		
31.	OEX-037 (Console)	23	Open		
32.	OEX-038 (Console)	24	Open		
33.	Ground Fault Interrupter	25	Plug into power		
34.	SWT-020 (Console)	21	Turn on - push SWT-021 to test. SWT-020 should turn off automatically. Turn SWT-020 back on.		
35.	SWT-019 (Console)	26	Turn on		
36.	SWT-001 (Console)	27	Turn on		

Figure 2-10. System Startup Checklist (Sheet 2 of 11).

Step	Component (Location)	Index No.	Procedure	Check	Note
37.	SWT-002 (Console)	28	Turn both on		
38.	SWT-003 (Console)	29	Dial rheostat to desired lighting level		
39.	SWT-004 (Console)	30	Turn on		
40.	SWT-005 (Console)	31	Dial rheostat to desired lighting level		
41.	SWT-006	32	Turn switch to "BAT TEST" position to check battery. Then turn to "MED" and uncap sensor. Do not adjust.		
42.	SWT-008	33	Turn on		
43.	SWT-009 (Console)	34	Turn on		
44.	SWT-011 (Console)	35	Turn on		
45.	SWT-012 (Console)	36	Turn on		
46.	Communications (i/L & O/L)	37, 38 39	Check for function. Turn switch SWT-010, SWT-013 and SWT-014 to desired level		
47.	Sound Powered Phones	40	Check for function (I/L- O/L)		
48.	Fire Extinguisher	41	Check pressure 200 PSI		
49.	Battery Powered Lights (I/L)	42	Stowed in I/L, check for function		
50.	Hearing protection (I/L-O/L)	43	4EA in IL, 3EA in O/L		
51.	Fire Retardant Clothes	44	Stowed in I/L		
52.	Mattress, Pillow, Blankets	45	Stowed in I/L		
53.	Stainless Steel Buckets	46	Stowed in I/L (not required if fire extinguisher in I/L		
54	Tongue Depressor (I/L)	47	Stowed on shelf		

Figure 2-10. System Startup Checklist (Sheet 3 of 11).

Step	Component (Location)	Index No.	Procedure	Check	Note
55.	SWT-017 (Console)	48	Turn on, check heater/chiller fan for function, ensure canister is unbagged if chamber is to be used immediately.		
56.	SWT-018 (Console)	49	Turn on, check CO2 scrubber fan for function, ensure canister is unbagged if chamber is to be used immediately.		
57.	Oxygen Masks (I/L-O/L)	50	Unbag and check for function		
58.	Primary Medical Kit	51	Stowed in outer lock		
59.	Secondary Medical Kit	52	Ready for use, close to the chamber		
60.	Medical Lock Hatch (I/L)	53	Shut and dog		
61.	I/L Door	54	Open		
62.	SWT-007 (Console) then lock.	55	Adjust to red mark on analyzer scale Install sensor on flowmeter		
63.	FLV-042 (back of chamber)	56	Open		
64.	FLV-041 (back of chamber)	57	Open		
65.	Heater/Chiller Unit	58	Plugged into power - check coolant level		
66.	SWT-022	59	Turn on - record time from hourmeter into logbook, wait :01		
67.	SWT-023	60	Turn on - record PSI and temperature into logbook		
68.	Medical lock hatch - outside	61	Shut and dog		
69.	Stopwatches	62	Wind, start and leave running		
70.	Dive manual	NA	On station with all current updates		
71.	Charts, Pencils Repet Sheets	NA	On station and serviceable		
72.	Neuro Checklist Chamber Log	NA	On station and serviceable		
73.	Drager Test Kit Portable 0_2	NA	On station and serviceable		
			END OF PROCEDURE		

Figure 2-10. System Startup Checklist (Sheet 4 of 11).

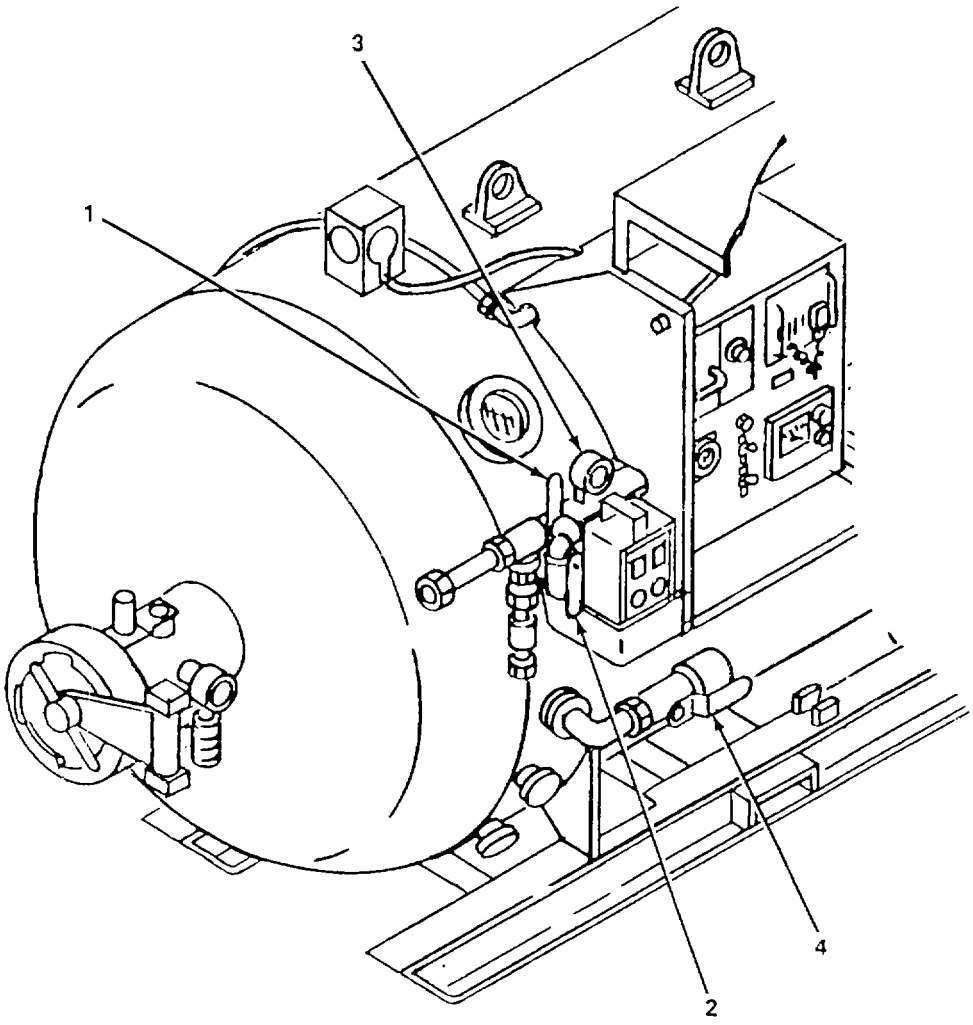


Figure 2-10. System Startup Checklist (Sheet 5 of 11).

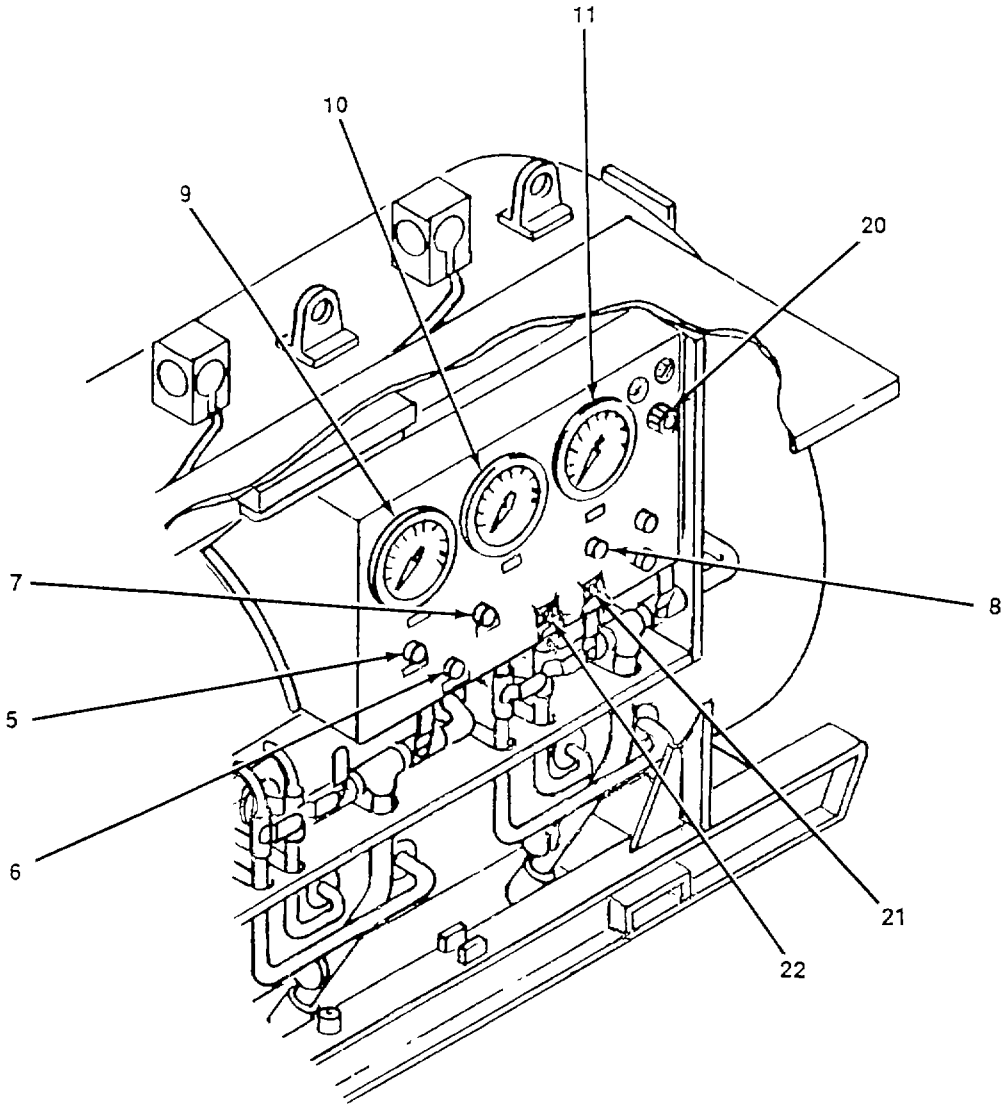


Figure 2-10. System Startup Checklist (Sheet 6 of 11).

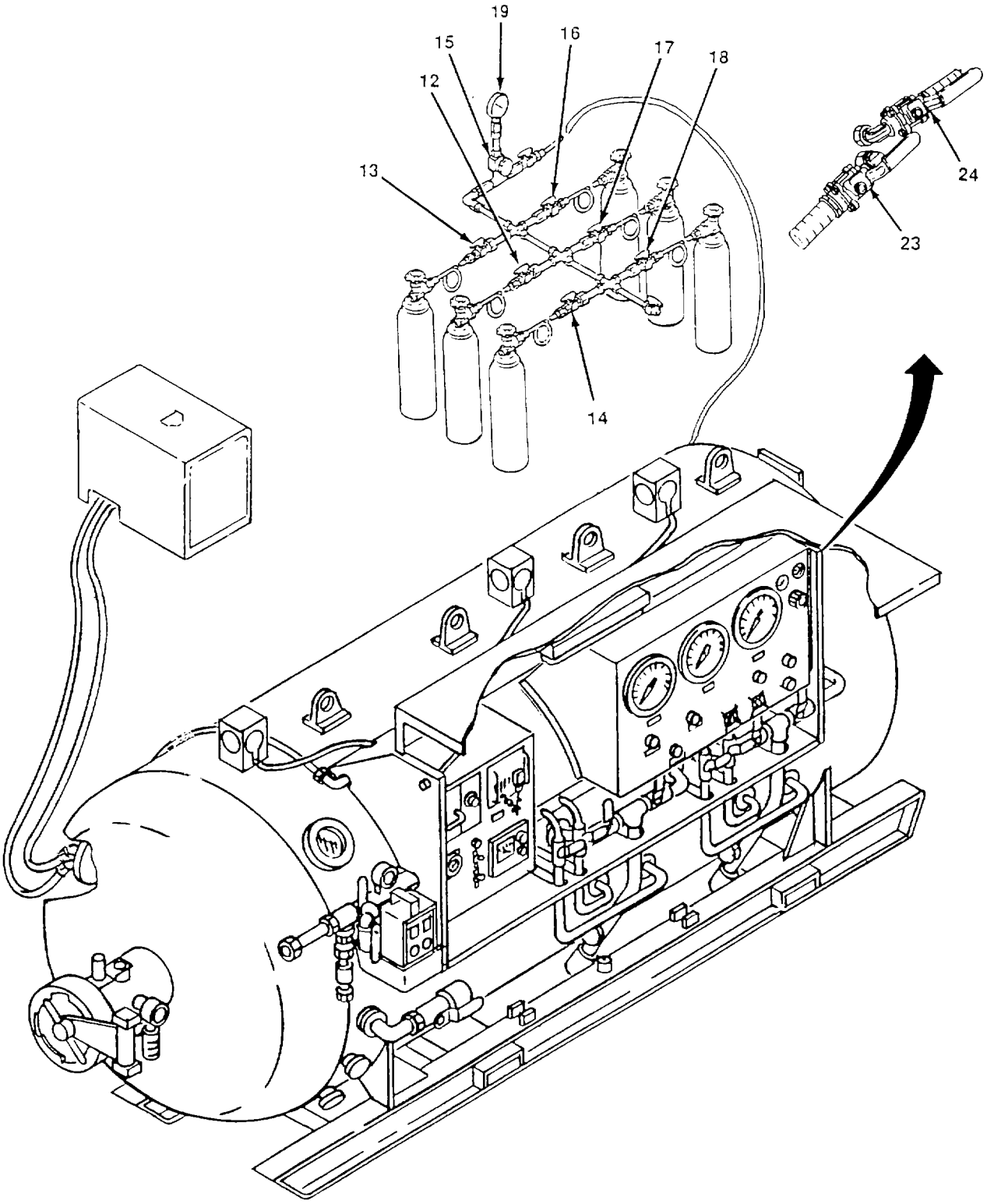


Figure 2-10. System Startup Checklist (Sheet 7 of 11).

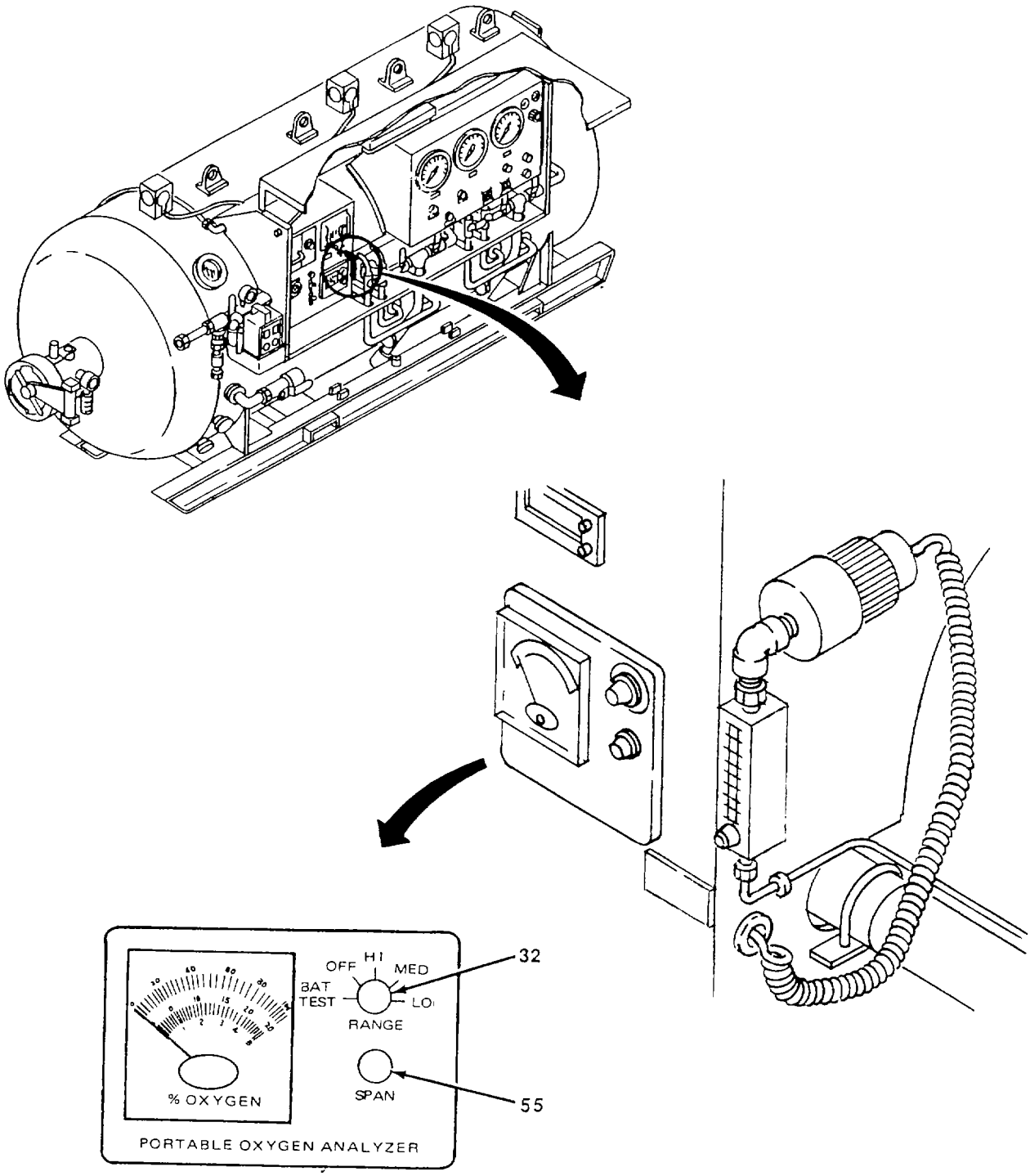


Figure 2-10. System Startup Checklist (Sheet 8 of 11).

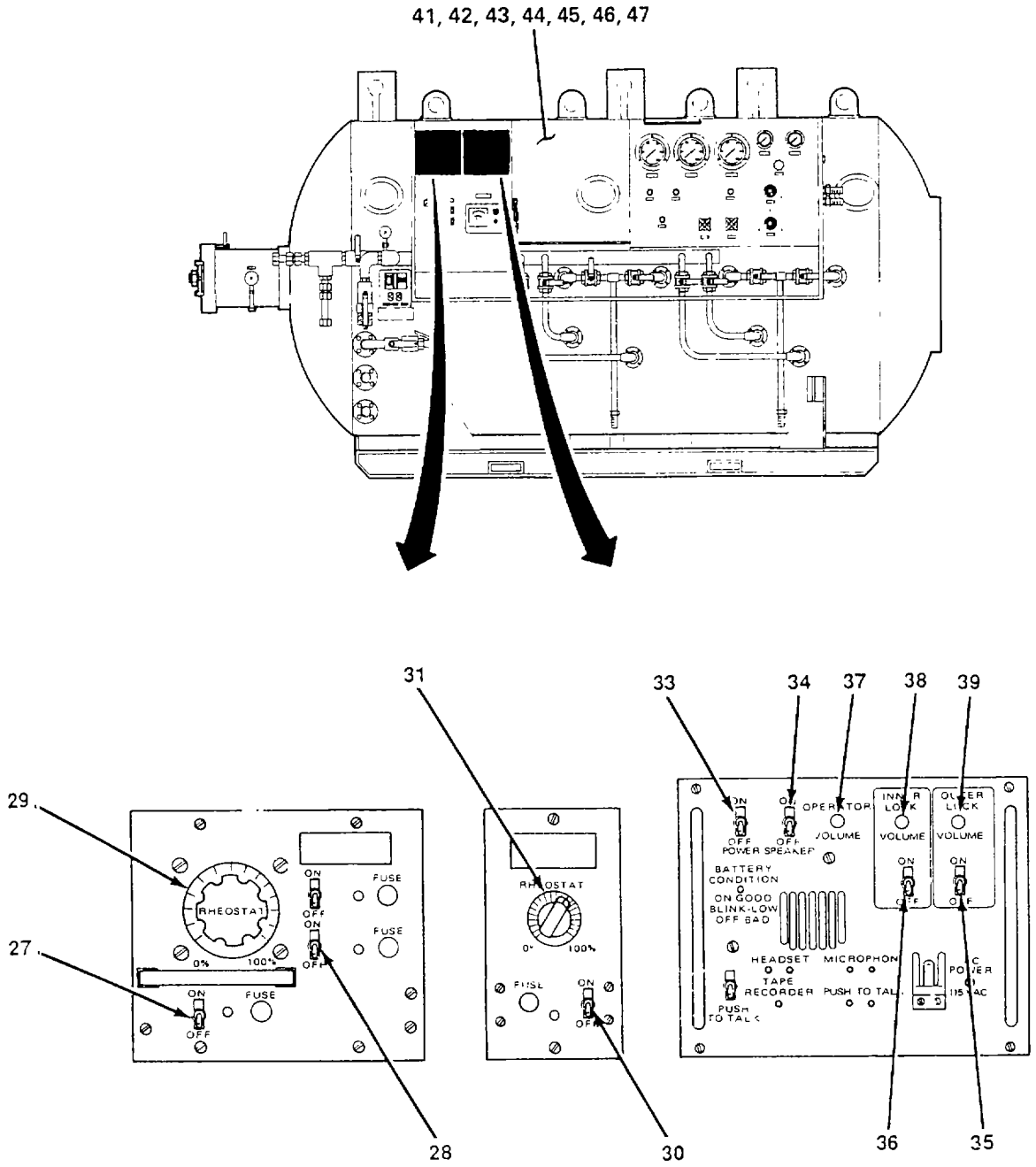


Figure 2-10. System Startup Checklist (Sheet 9 of 11).

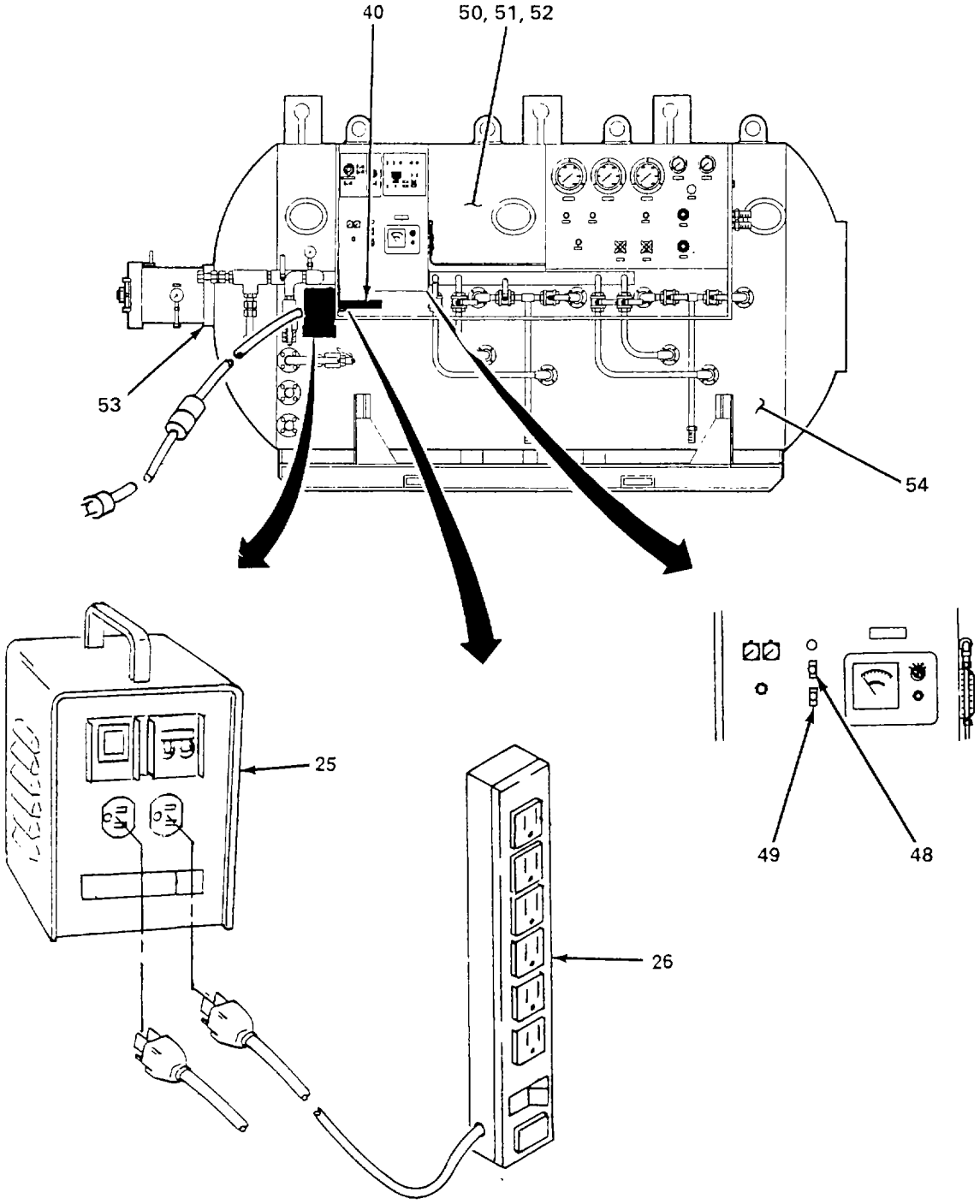


Figure 2-10. System Startup Checklist (Sheet 10 of 11).

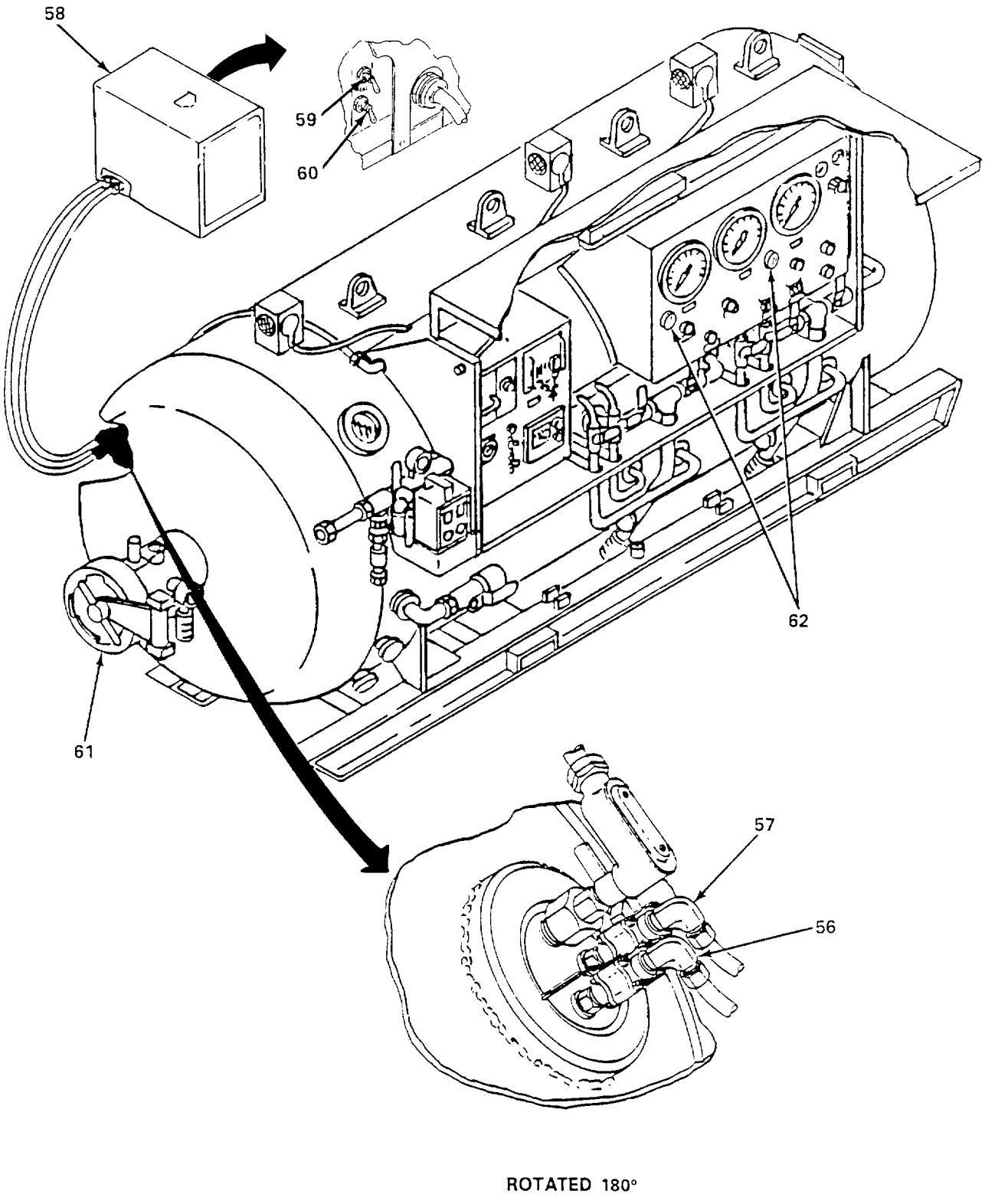


Figure 2-10. System Startup Checklist (Sheet 11 of 11).

2-14. Normal Operating Procedures. These procedures are required to operate the chamber. The following steps are to be followed to insure the proper and continued operation of the equipment (figure 2-1 1).

NOTE

Refer to the normal operating procedures in the associated support items of equipment for primary and secondary air supply systems.

a. Pressurizing and Depressurizing Chamber.

b. Ventilating the Chamber.

c. Analyzing Chamber Oxygen.

d. Conditioning Chamber Atmosphere.

e. Pressurizing Medical Lock to Depth.

f. Depressurizing Medical Lock to Surface.

a. Pressurizing and Depressurizing Chamber

Step	Component (Location)	Index No.	Procedure	Check	Note
INNER LOCK PRESSURIZATION					
1.	I/L Door	1	Shut		
2.	ALP-005 or ALP-006	2, 3	Open and monitor descent on AGA-017 (4) or AGA-018 (5) to desired depth **WARNING** Do not exceed 165 FSW for manned operations.		
OUTER LOCK PRESSURIZATION			**NOTE** Outer lock cannot be pressurized unless inner lock is pressurized		
1.	O/L Door	6	Shut		
2.	ALP-009 or ALP-010	7, 8	Open and monitor descent on AGA-019 (9) to desired depth **WARNING** Do not exceed I/L depth.		
INNER LOCK DEPRESSURIZATION					
	ELP-007 or ELP-008	10,11	Open and monitor ascent on AGA-017 (4) or AGA-018 (5) to desired depth.		
OUTER LOCK DEPRESSURIZATION					
	ELP-011 or ELP-012	12, 13	Open and monitor ascent on AGA-019 (9) to desired depth.		
- - - - - END OF PROCEDURE - - - - -					

Figure 2-11. Normal Operating Procedures Checklist (Sheet 1 of 9).

b. Ventilating the Chamber.

Step	Component (Location)	Index No.	Procedure	Check	Note
	INNER LOCK				
	ALP-005 and ELP-007 (Console)	2, 9	Open simultaneously and maintain depth on AGA-017 (4) or AGA-018 (15),		
	OUTER LOCK				
	ALP-009 and ELP-011 (Console)	7, 11	Open simultaneously and maintain depth on AGA-019 (9).		
	- - - - -END OF PROCEDURE - - - - -				

Figure 2-11. Normal Operating Procedures Checklist (Sheet 2 of 9).

c. Analyzing Chamber Oxygen.

Step	Component (Location)	Index No.	Procedure	Check	Note
1.	ALP-040 (Console)	14	Open at depth until a flow of 200CC is maintained		
2.	Oxygen Analyzer	15	Read level of oxygen from analyzer scale		
------END OF PROCEDURE-----					

Figure 2-11. Normal Operating Procedures Checklist (Sheet 3 of 9).

d. Conditioning Chamber Atmosphere.

Step	Component (Location)	Index No.	Procedure	Check	Note
1.	CO2 Canister (I/L)	16	Remove bag and install on scrubber.		
2.	SWT-017 (Console)	17	Turn on		
3.	SWT-018 (Console)	18	Turn on		
4.	Temperature	19	Monitor temperature of chamber.		
------END OF PROCEDURE-----					

Figure 2- 1. Normal Operating Procedures Checklist (Sheet 4 of 9).

e. Pressurizing Medical Lock to Depth.

Step	Component (Location)	Index No.	Procedure	Check	Note
1.	Medical Lock Door (I/L)	20	Shut and dogged.		
2.	ALP-045 (I/L)21		Shut		
3.	AGA-044 (Med Lock Ext.)	22	Observe to be 0 PSIG.		
4.	Medical Lock Door	23	Undog, open, load necessary equipment supplies in. Shut and dog.		
			WARNING Ensure all equipment/supplies are compatible with hyperbaric environment.		
5.	ELP-043 (Med Lock Ext.)	24	Shut		
6.	ALP-045 (I/L)21		Open and pressurize medical lock to chamber depth		
			WARNING Watch for loss of chamber depth.		
7.	Medical Lock Door (I/L)	20	Undog, open and recover contents.		
8.	Medical Lock Door	23	Shut and dog.		
9.	ALP-045(I/L)	21	Shut		
------END OF PROCEDURE-----					

Figure 2-11. Normal Operating Procedures Checklist (Sheet 5 of 9).

f. Depressurizing Medical Lock to Surface.

Step	Component (Location)	Index No.	Procedure	Check	Note
1.	Medical Lock comparing AGA-044 (22) and AGA-017 (4).	25	Ensure medical lock is at depth by		
2.	ALP-045 (I/L)21		Open		
3.	Medical Lock Door (I/L) shut and dog.	20	Undog, open and load contents, then		
4.	ALP-045 (I/L)	21	Shut		
5.	ELP-043	24	Open and depressurize medical lock to surface. **CAUTION** If chamber depth starts to drop, secure ELP-043 (24) and investigate for leaks.		
6.	Medical Lock Door	23	Undog, open and remove contents, then shut and dog door.		
7.	ELP-043	24	Shut		
------END OF PROCEDURE-----					

Figure 2-11. Normal Operating Procedures Checklist (Sheet 6 of 9).

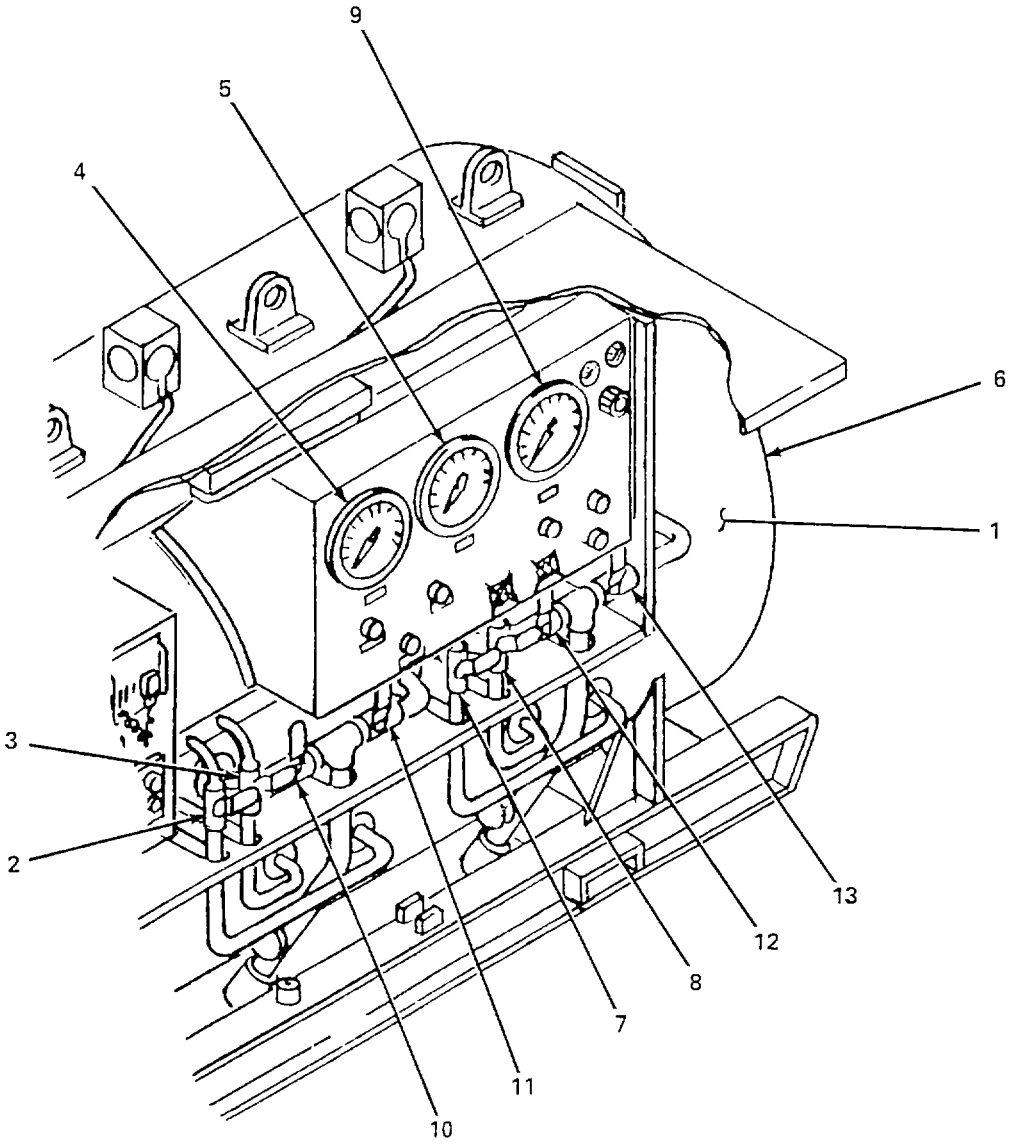


Figure 2- 11. Normal Operating Procedures Checklist (Sheet 7 of 9).

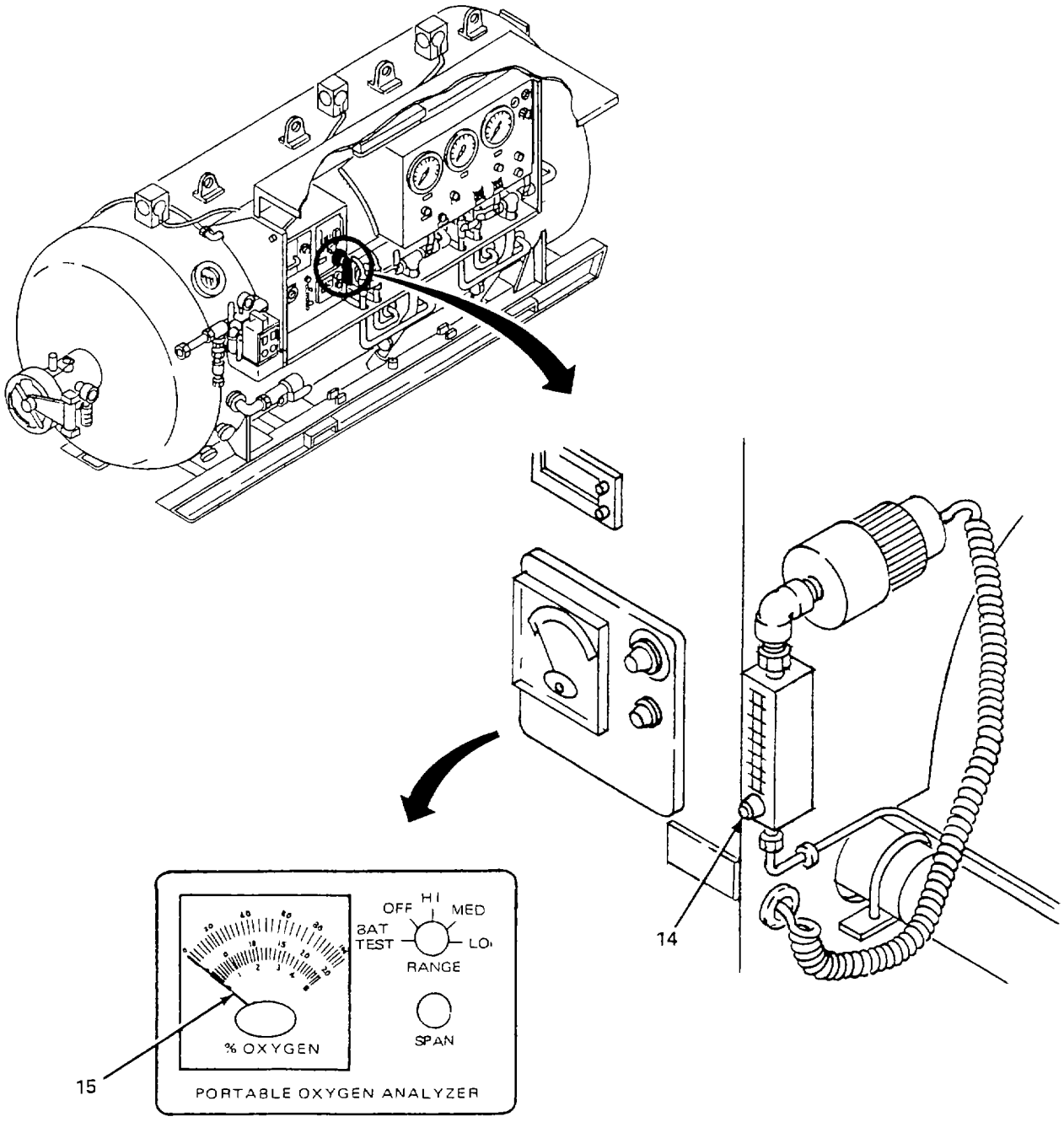


Figure 2-11. Normal Operating Procedures Checklist (Sheet 8 of 9).

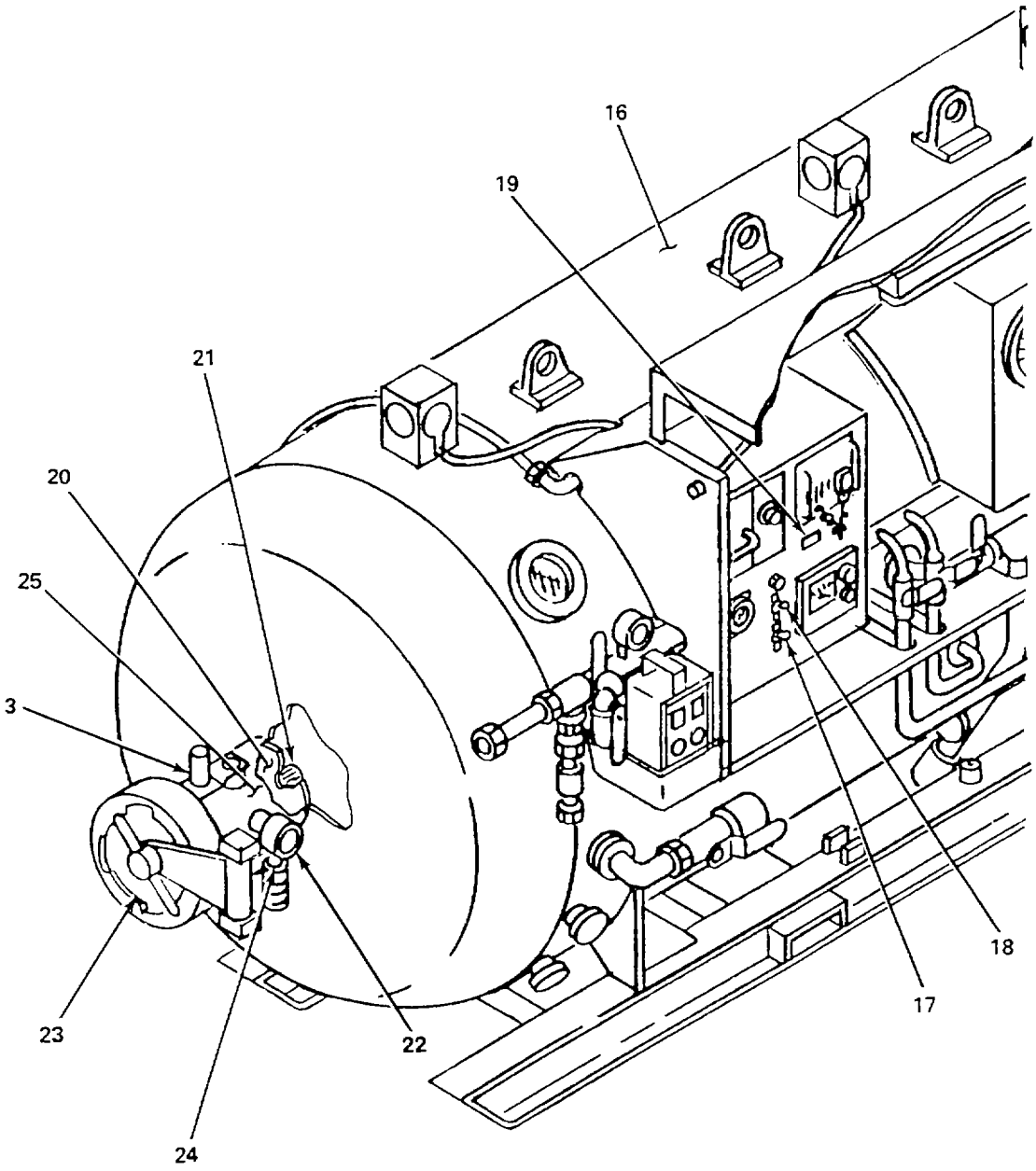


Figure 2-11. Normal Operating Procedures Checklist (Sheet 9 of 9).

2-15. Shutdown Procedures. These procedures must be performed as follows:

- Every seven days
- Prior to maintenance
- After maintenance
- To place the system in a down condition.

The following steps are to be followed to insure the proper and continued operation of the equipment (figure 2-12).

NOTE

1. Refer to the shut down procedures in the associated support items of equipment for primary and secondary air supply systems.

2. On discretion of dive supervisor, disconnect air source - plug, cap, or double bag the ends.

Step	Component (Location)	Index No.	Procedure	Check	Note
1.	Primary Air System	NA	Depressurize system up to chamber.		
2.	Secondary Air System	NA	Depressurize system up to chamber.		
3.	ALP-001 (left side of chamber)	1	Shut		
4.	ALP-002 (left side of chamber)	2	Shut		
5.	ALP-004 (left side of chamber)	3	Wired open		
6.	ALP-005 (Console)	4	Shut		
7.	ALP-006 (Console)	5	Shut		
8.	ELP-007 (Console)	6	Shut		
9.	ELP-008 (Console)	7	Shut		
10.	ALP-009 (Console)	8	Shut		
11.	ALP-010 (Console)	9	Shut		
12.	ELP-011 (Console)	10	Shut		
13.	ELP-012 (Console)	11	Shut		
14.	ALP-013 (Console)	12	Shut		
15.	ALP-014 (Console)	13	Shut		
16.	ALP-015 (Console)	14	Shut		
17.	ALP-016 (Console)	15	Shut		
18.	OHL-024 (Console)	16	Shut		
19.	Oxygen Bottle Valves	17	Shut		
20.	OXH-036 (02 Banks)s)	18	Open until OGA-028 reads 0 PSIG then shut		

Figure 2-12. Shutdown Procedures Checklist (Sheet 1 of 7).

Step	Component (Location)	Index No.	Procedure	Check	Note
21.	OXH-027 (02 Bank)	19	Shut		
22.	OXH-029 (02 Bank)	20	Shut		
23.	OEX-037 (Console)	21	Shut		
24.	OEX-038 (Console)	22	Shut		
25.	OLP-039 (02 Masks)	23	Bleed down I/L and O/L 02 BIBS until OGA-025 (24) reads 0 PSIG, then shut.		
26.	Medical Lock Hatch (I/L)	25	Shut and dog.		
27.	ALP-045 (I/L)	26	Shut		
28.	Oxygen Masks (I/L and O/L)	27	Clean per FM 20-11-1 and bag.		
29.	OXL-020 (Console)	28	Shut		
30.	OXL-021 (Console)	29	Shut		
31.	AGA-044 (Med Lock Ext.)	30	Observe to be 0 PSIG.		
32.	Medical Lock Door (outer)	31	Shut and dog		
33.	ELP-043 (Med Lock Ext.)	32	Shut		
34.	SWT-003 and SWT-005 (Console)	33, 34	Turn to zero - let light cool for 5 min.		
35.	SWT-008 (Console)	35	Turn off.		
36.	SWT-022 (Htr/Chiller)	36	Turn off - wait :01 then do step 37.		
37.	SWT-023 (Htr/Chiller)	37	Turn off - record time from hourmeter in logbook.		
38.	FLV-041 (back of chamber)	38	Turn off.		
39.	FLV-042 (back of chamber)	39	Turn off.		
40.	SWT-017 (Console)	40	Turn off.		
41.	SWT-018 (Console)	41	Turn off.		

Figure 2-12. Shutdown Procedures Checklist (Sheet 2 of 7).

Step	Component (Location)	Index No.	Procedure	Check	Note
42.	SWT-006 (Console)	42	Turn off.		
43.	ALP-040 (Console)	43	Shut		
44.	SWT-002 (Console)	44	Turn off.		
45.	SWT-001 (Console)	45	Turn off.		
46.	SWT-019 (Console)	46	Turn off.		
47.	SWT-020 (Console)	47	Turn off.		
48.	Chamber LogNA		Ensure log is completely filled out.		
------END OF PROCEDURE-----					

Figure 2-12. Shutdown Procedures Checklist (Sheet 3 of 7).

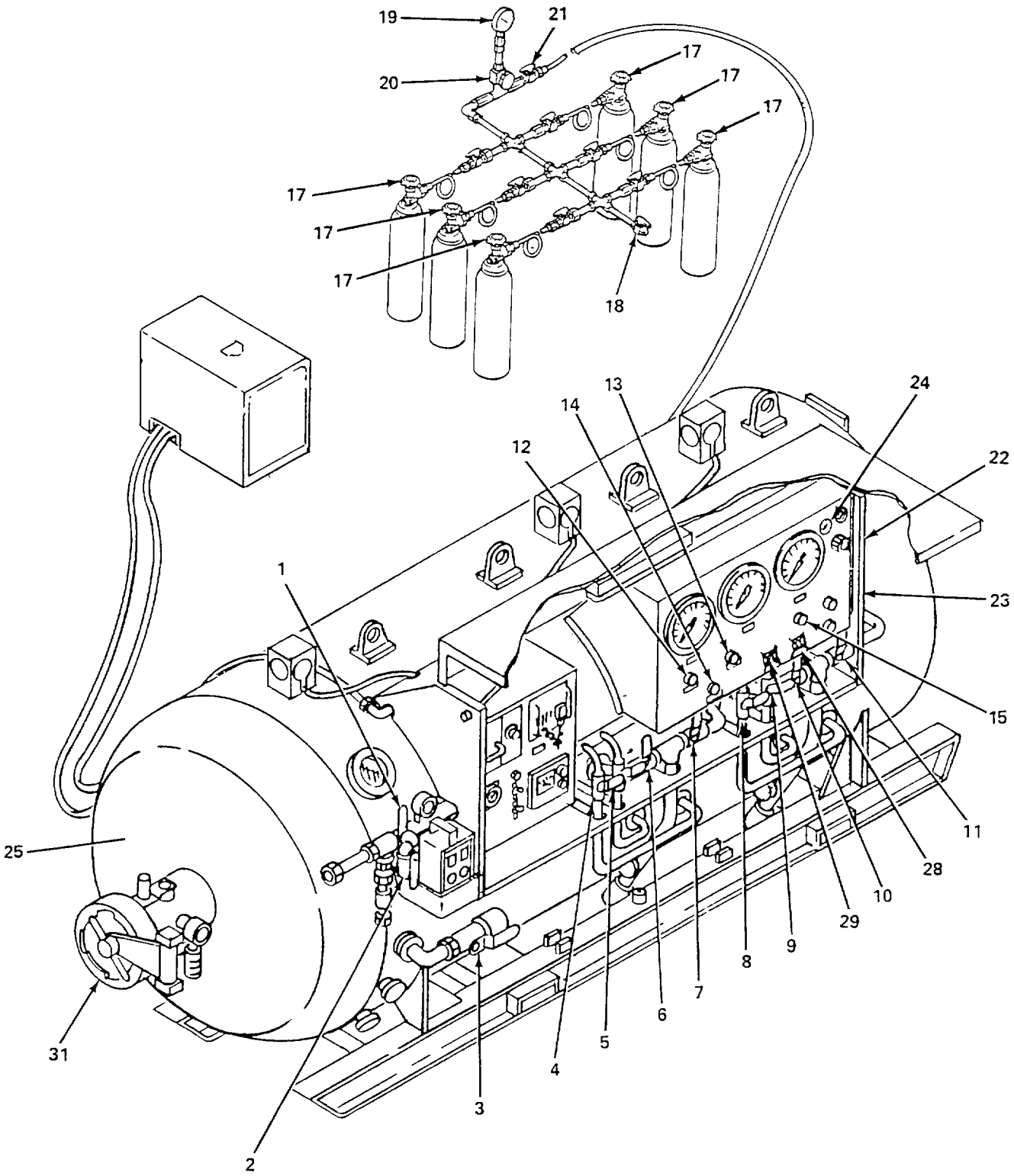


Figure 2-12. Shutdown Procedures Checklist (Sheet 4 of 7).

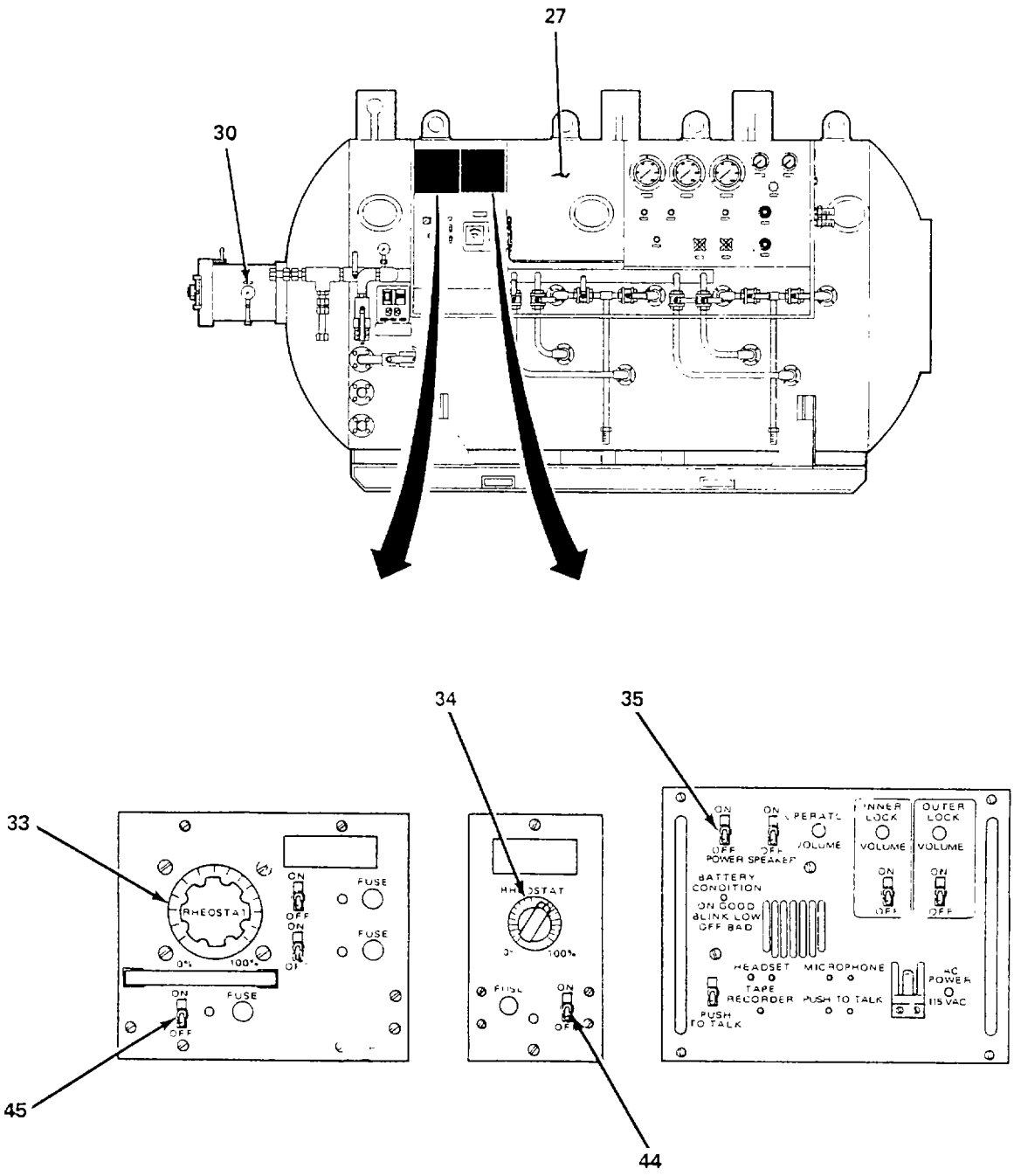


Figure 2-12. Shutdown Procedures Checklist (Sheet 5 of 7).

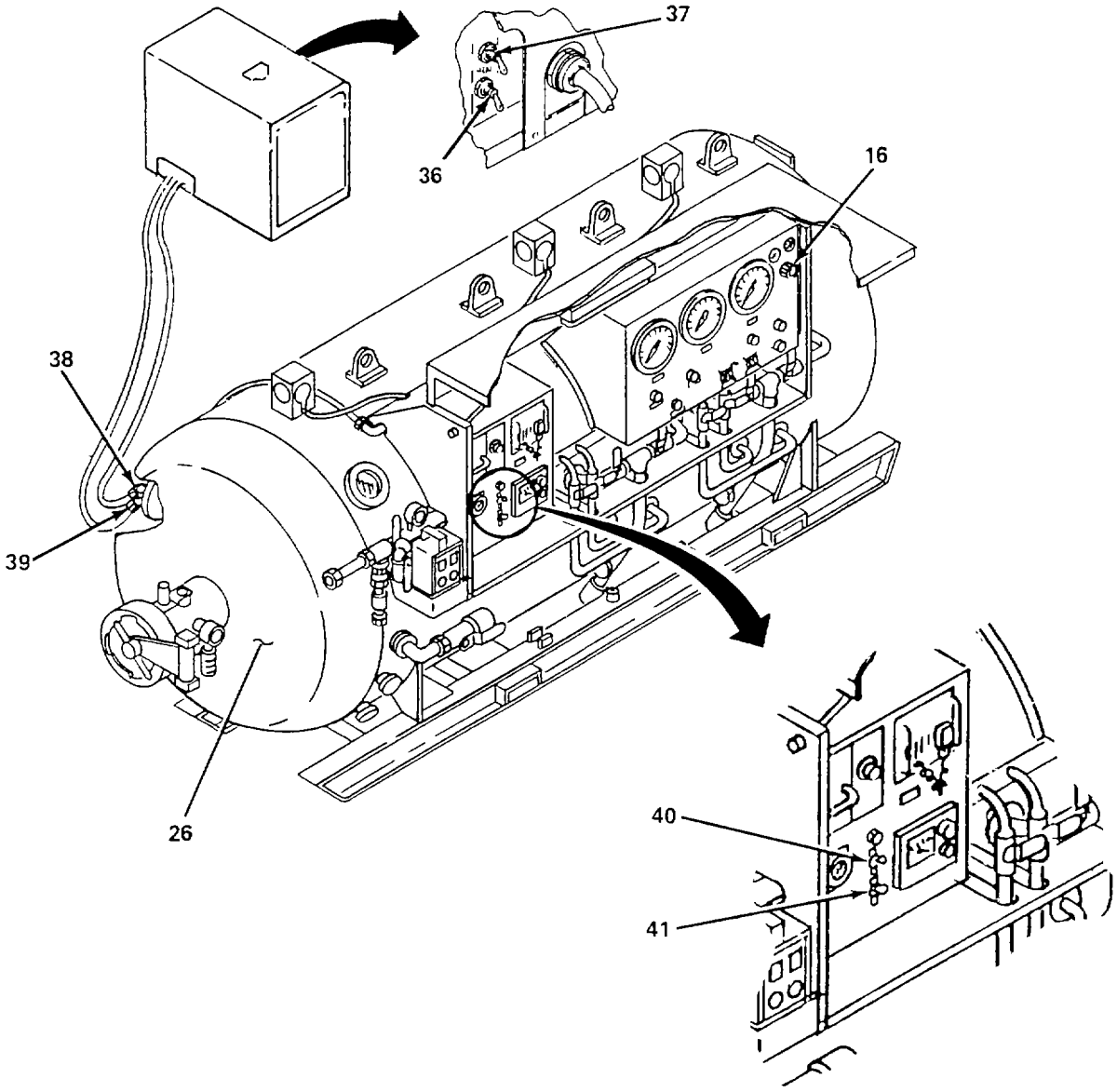


Figure 2-12. Shutdown Procedures Checklist (Sheet 6 of 7).

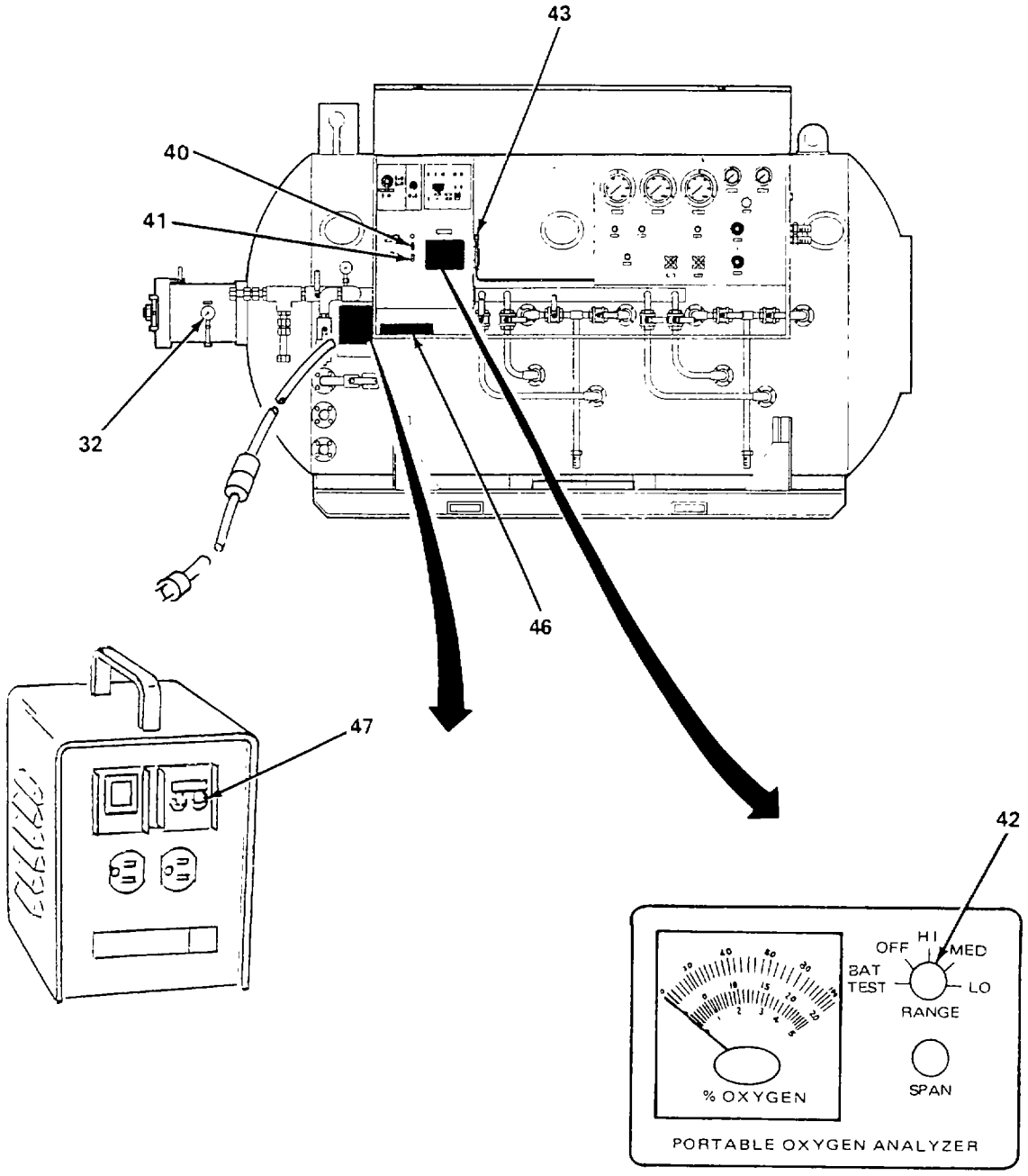


Figure 2-12. Shutdown Procedures Checklist (Sheet 7 of 7).

2-16. Modified Startup Procedures. These procedures are required to restart the equipment after modified or temporary shutdown procedures have been performed (figure 2-13) and the chamber placed in standby

Step	Component (Location)	Index No.	Procedure	Check	Note
1.	SWT-022	1	Turn on - record time from hourmeter into logbook, wait :01		
2.	SWT-023	2	Turn on - record PSI and temperature (if applicable) into logbook.		
3.	OXH-033, OXH-034, OXH-035	3, 4, 5	Shut		
4.	Oxygen Bottle Valves	6	Open slowly.		
5.	OGA-028 (0_2 Bank)	7	Record bank #1 pressure from OGA-028 here		
6.	OXH-030, OXH-031, OXH-032	8,9,10	Shut		
7.	OXH-033 through OXH-035 (0_2 Bank)	3, 4, 5	Open		
8.	OGA-028 (0_2 Bank)	7	Record bank #2 pressure from OGA-028 here		
9.	OXH-033, OXH-034, OXH-035	3, 4, 5	Leave open if bank #2 is lower than bank #1, if not, shut.		
10.	OXH-030, OXH-031, OXH-032	8,9,10	Leave shut unless bank #1 is lower pressure than bank #2		
11	Oxygen Supply		Bank # ____is on line with_____PSIG		
12	OXH-029	11	Open		
13	OHL-024 (Console)	12	Dial in until OGA-025 (13) reads 80-100 PSI.		
14.	OLP-020, OLP-021 (Console)	14,15	Open		

Figure 2-13. Modified Startup Procedures Checklist (Sheet 1 of 5).

Step	Component (Location)	Index No.	Procedure	Check	Note
15.	SWT-019 (Console)	16	Turn on		
16.	SWT-001 (Console)	17	Turn on		
17.	SWT-004 (Console)	18	Turn on		
18.	SWT-008 (Console)	19	Turn on		
19.	SWT-003, SWT-005 (Console)	20, 21	Dial to desired lighting level.		
20.	SWT-006 (Console)	22	Uncap, install sensor, turn to "MED".		
21.	Communications, Sound Powered Phones (I/L-O/L)	23	Check for function. Turn switch SWT-010 (24), SWT-013 (25) and SWT-014 (26) to desired level		
22.	Fire Extinguisher (I/L)	27	Check pressure 200 PSI.		
23.	Battery Powered Lights (I/L)	28	Stowed in I/L, check for function		
24.	Hearing Protection, Fire Retardant Clothes, Pillow, Mattress Blankets, Stainless Buckets.	29	Stowed in I/L		
25	Charts, Repet Sheets, Pencils Chamber Log, Drager Kit	NA	On Site		
------END OF PROCEDURE-----					

Figure 2-13. Modified Startup Procedures Checklist (Sheet 2 of 5).

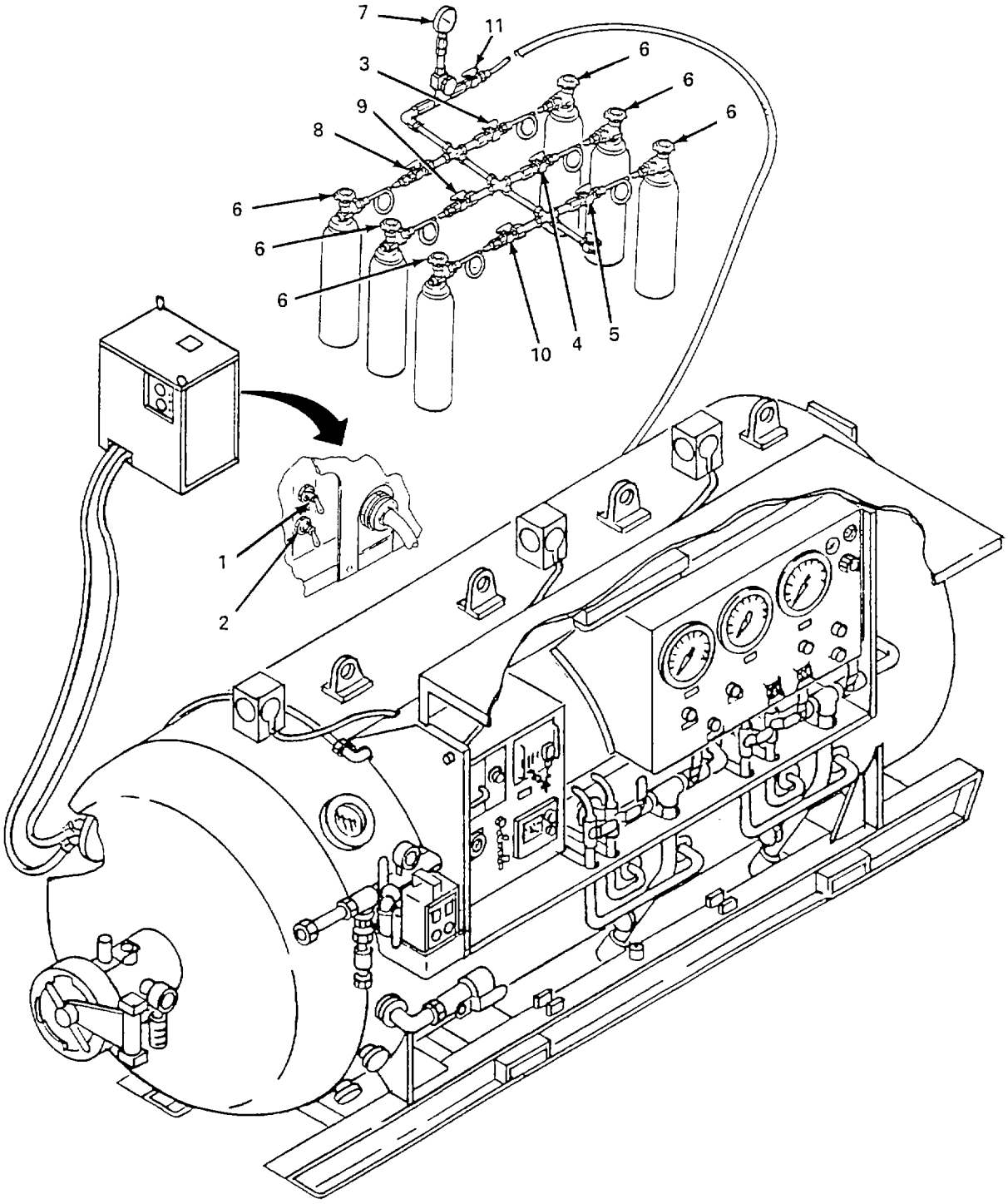


Figure 2-13. Modified Startup Procedures Checklist (Sheet 3 of 5).

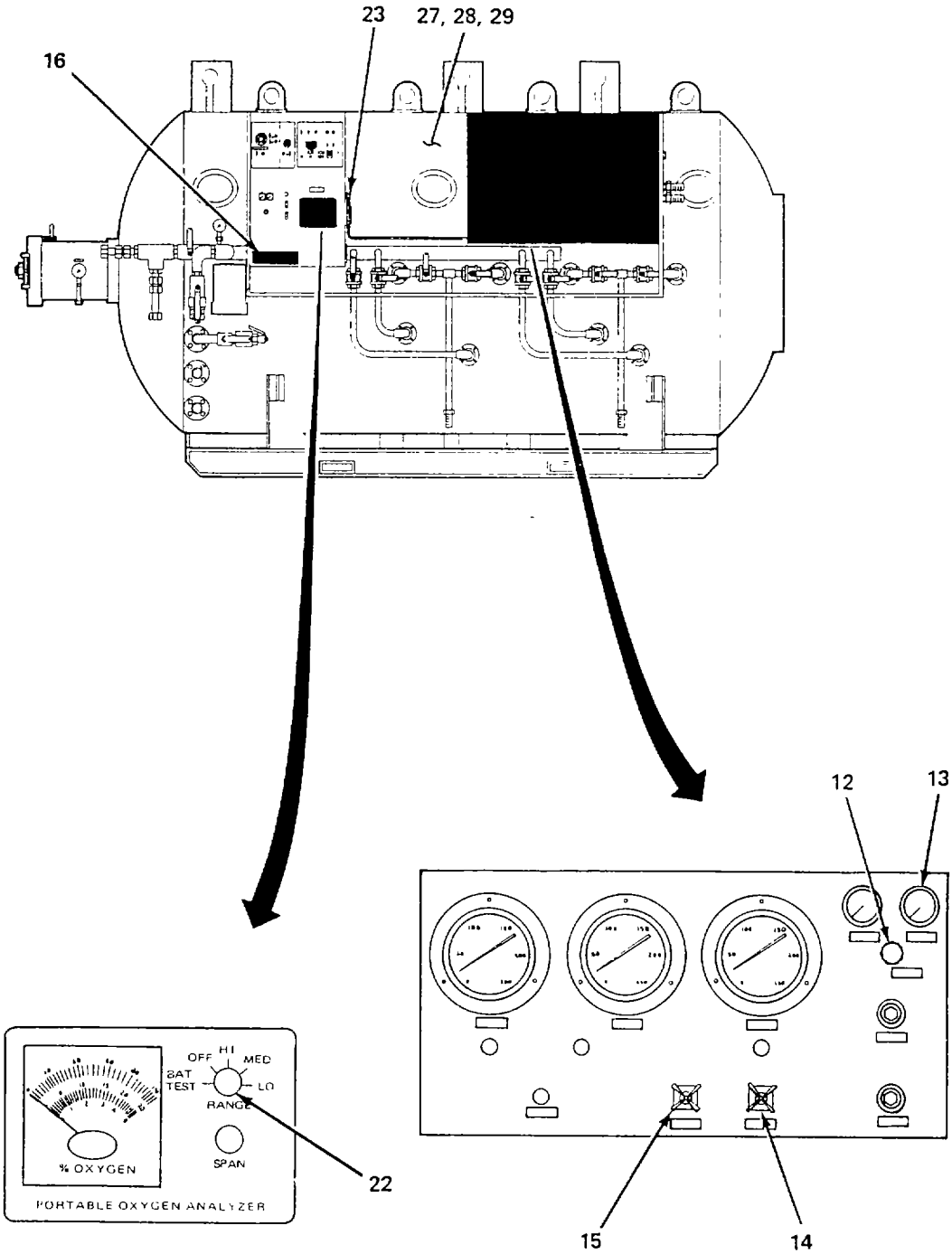


Figure 2-13. Modified Startup Procedures Checklist (Sheet 4 of 5).

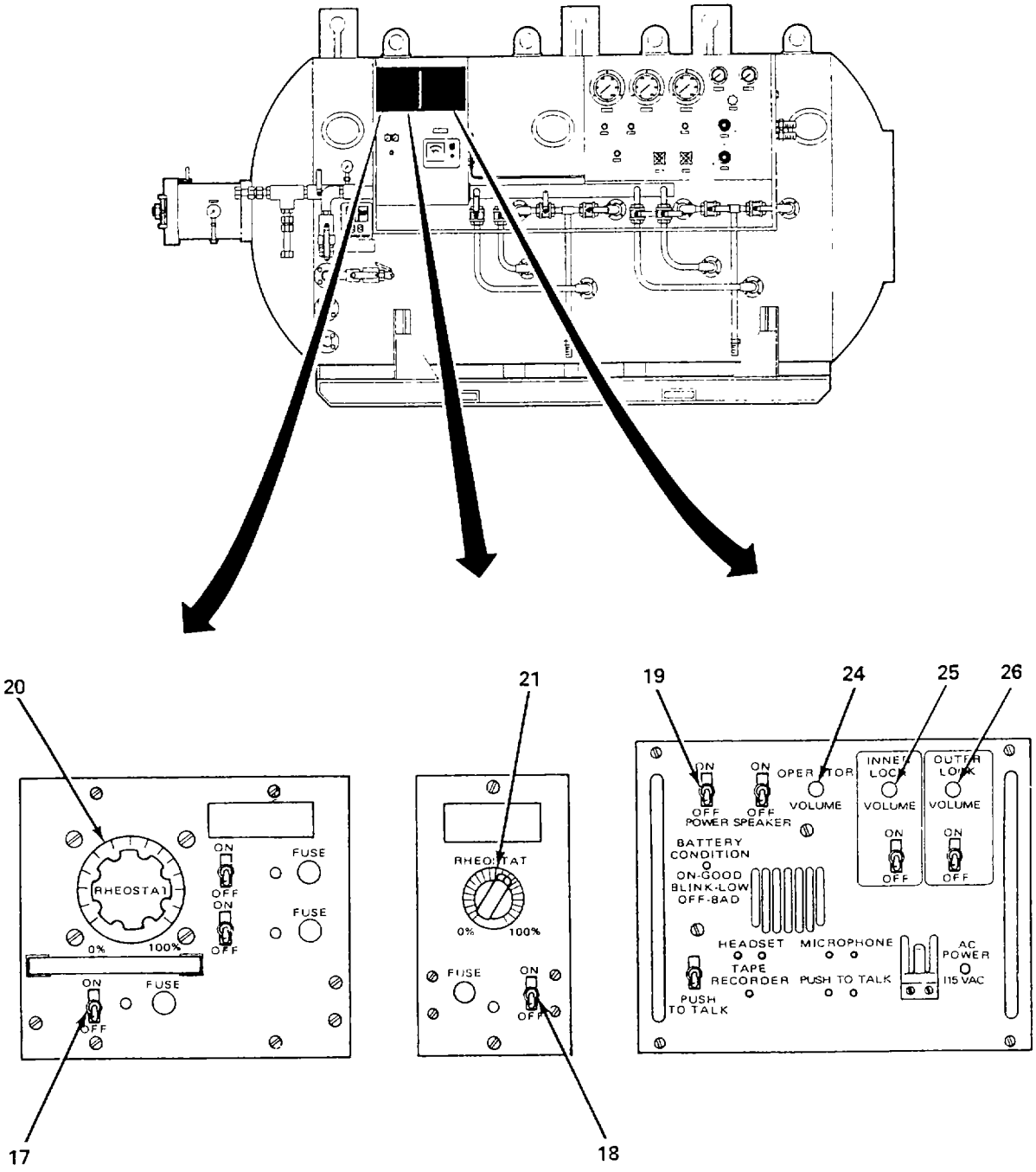


Figure 2-13. Modified Startup Procedures Checklist (Sheet 5 of 5).

2-17. Modified Shutdown Procedures. These procedures are required to bring the equipment to a temporary shutdown or standby status (figure 2-14).

NOTE

Refer to the modified shutdown procedures in the associated support items of equipment for primary and secondary air supply systems.

Step	Component (Location)	Index No.	Procedure	Check	Note
1	SWT-003 (Console)	1	Turn down to zero		
2.	SWT-005 (Console)	2	Turn down to zero.		
3.	SWT-023 (Htr/Chiller)	3	Turn off, wait :01 then do step 4.		
4.	SWT-022 (Htr/Chiller)	4	Turn off, record time from hourmeter into logbook.		
5.	Oxygen Bottle Valves	5	Shut all bottle valves on both banks.		
6.	OXH-029 (0_2 Bank)	6	Shut		
7.	SWT-001 (Console)	7	Turn off		
8.	SWT-004 (Console)	8	Turn off		
9.	SWT-008 (Console)	9	Turn-off		
10.	SWT-019 (Console)	10	Turn off		
11.	SWT-006 (Console)	11	Turn off, cap sensor.		
12	OHL-024 (Console)	12	Back off		
13.	OLP-020 (Console)	13	Shut		
14.	OLP-021 (Console)	14	Shut		
15.	Chamber Log	NA	Ensure log is completely filled out.		
16.	Charts, Repet Sheets, Pencils	NA	Replenish as necessary		
17.	Dive Manual	NA	On site		
18.	Portable 0_2 Drager Kit	NA	Replenish as necessary.		

Figure 2-14. Modified Shutdown Procedures Checklist (Sheet 1 of 5).

Step	Component (Location)	Index No.	Procedure	Check	Note
19.	Neuro Checklist	NA	Replenish as necessary		
20.	Oxygen Bottles	NA	Replenish as necessary		
------END OF PROCEDURE-----					

Figure 2-14. Modified Shutdown Procedures Checklist (Sheet 2 of 5).

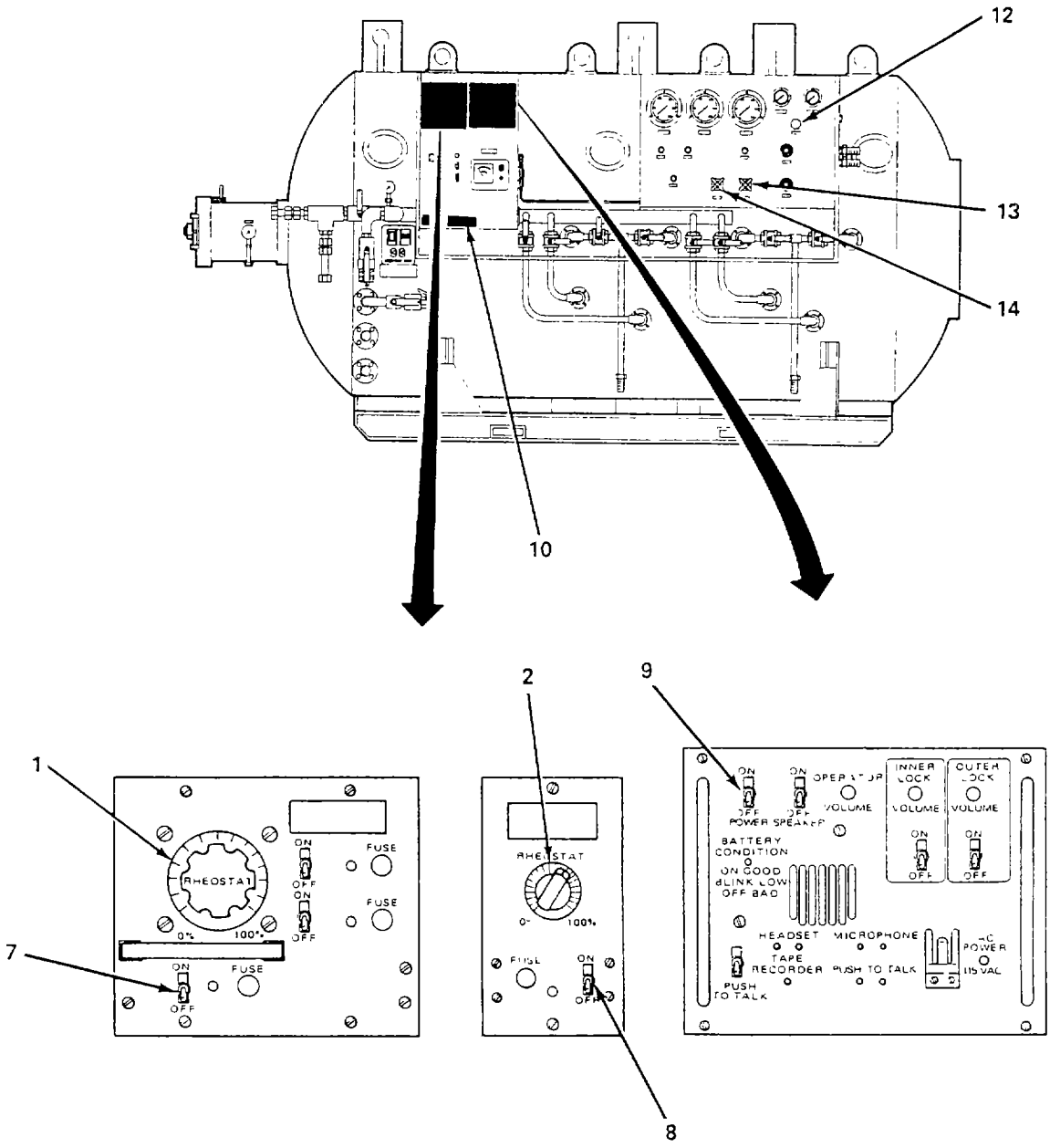


Figure 2-14. Modified Shutdown Procedures Checklist (Sheet 3 of 5).

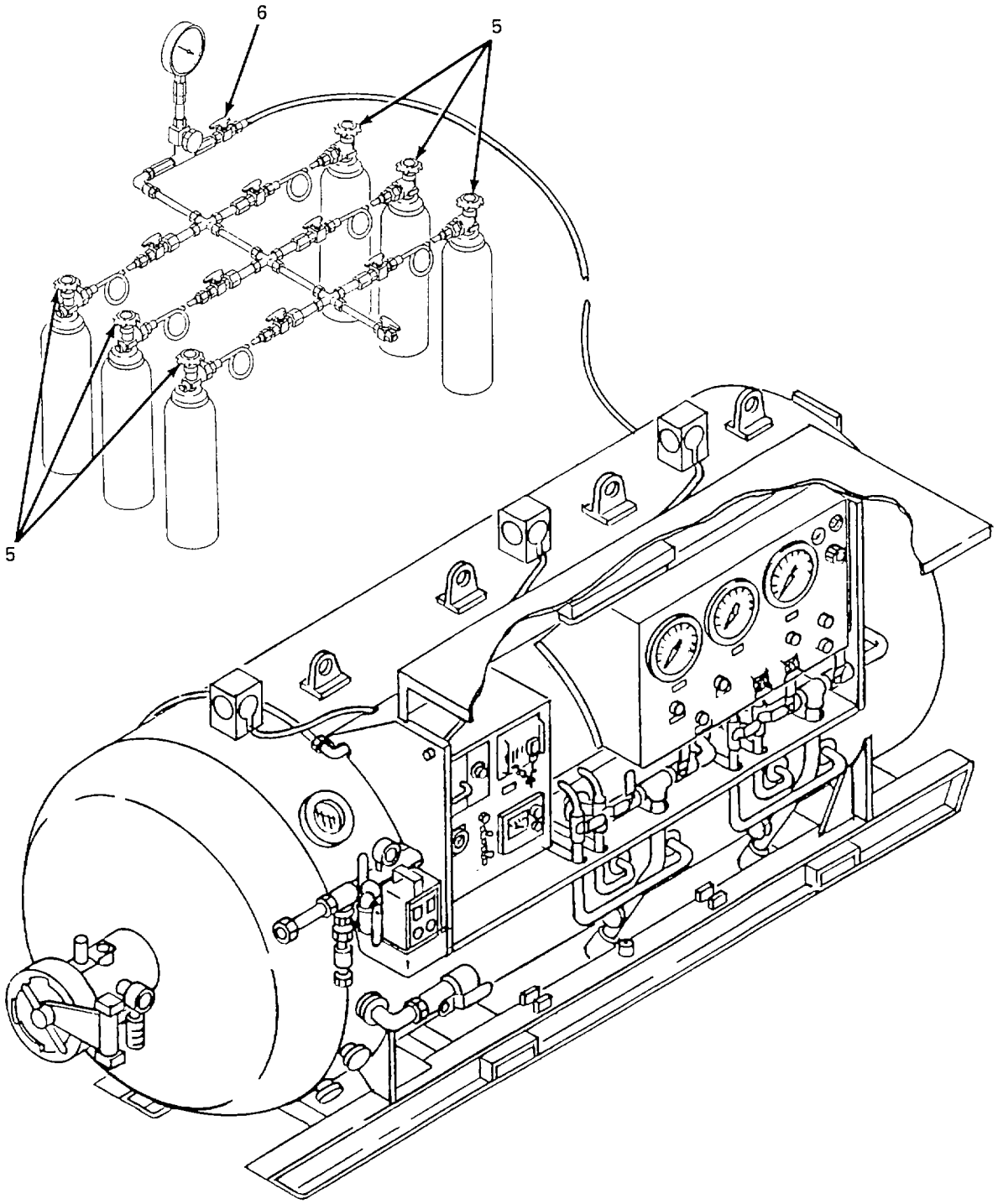


Figure 2-14. Modified Shutdown Procedures Checklist (Sheet 4 of 5).

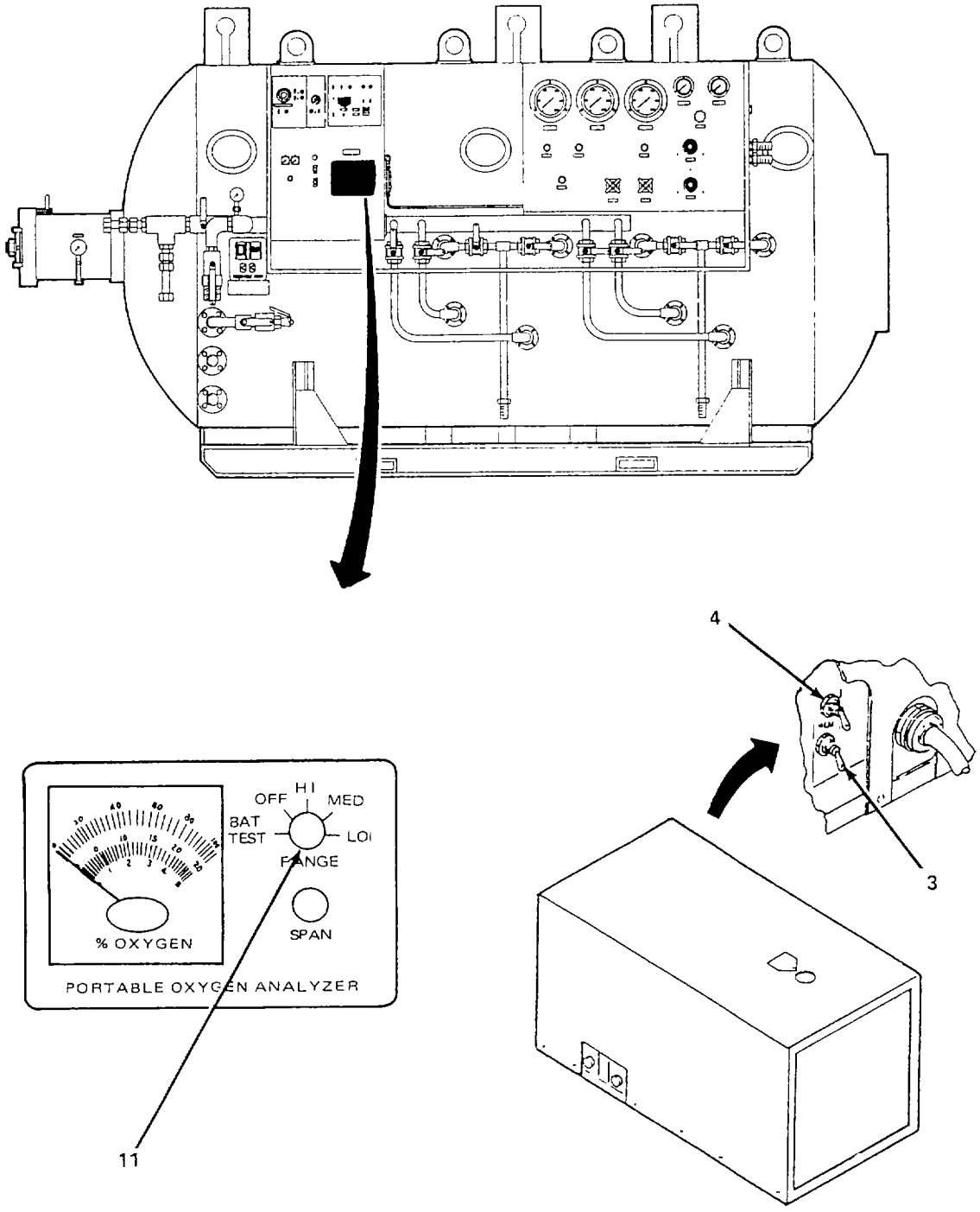


Figure 2-14. Modified Shutdown Procedures Checklist (Sheet 5 of 5).

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

2-18. General. This section includes instructions for actions necessary to operate equipment under unusual conditions. All chamber operations must be conducted IAW U.S. Army Dive Manual FM 20-11-1.

2-19. Emergency Procedures. These procedures are for emergency conditions that may arise during operation of the system (figure 2-15). All potential emergencies are not covered in this manual. Refer to FM 20-11-1 for other possible emergencies and abort procedures if necessary. The following procedures are covered:

a. Loss of Primary Air.

b. Loss of Electrical Power.

c. Loss of Chamber Depth.

d. Increase in Chamber Depth.

e. Loss of Primary Oxygen Supply.

f. Contaminated Breathing Source

g. Fire in the Inner Lock.

h. Loss of Depth Gage in Inner Lock.

a. Loss of Primary Air.

Step	Component (Location)	Index No.	Procedure	Check	Note
1.	ALP-001 (Console)	1	Shut		
2.	ALP-002 (Console)	2	Open		
3.	Secondary Air Supply		Ensure supply is on line and working per unit operating procedures.		
4.	Primary Air Supply restore as soon as possible.		Investigate loss of primary air and		
------END OF PROCEDURE-----					

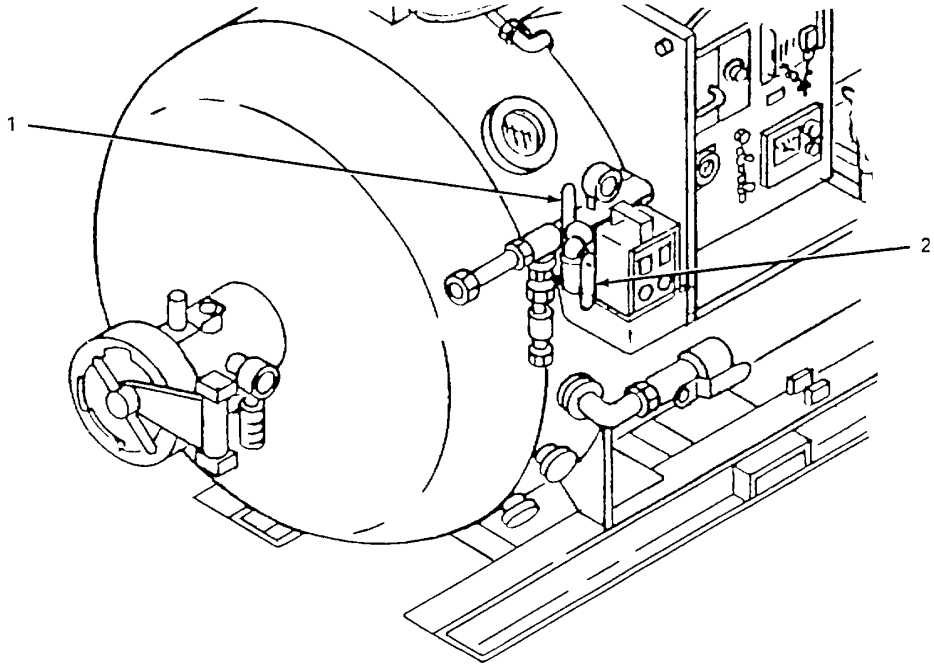


Figure 2-15. Emergency Procedures Checklist (Sheet 1 of 8).

b. Loss of Electrical Power.

Step	Component (Location)	Index No.	Procedure	Check	Note
1.	Oxygen Bibs (I/L-O/L)	NA	Remove bibs.		
2.	Battery Powered Lights (I/L)	NA	Turn on.		
3.	Electrical Power	NA	Investigate loss of power and restore as soon as possible.		
			----- END OF PROCEDURE -----		

Figure 2-15. Emergency Procedures Checklist (Sheet 2 of 8).

c. Loss of Chamber Depth.

Step	Component (Location)	Index No.	Procedure	Check	Note
1.	ALP-005 (Console)	1	Open to maintain depth on AGA-017 (2) or AGA-018 (3)		
2.	ALP-006	4	Open if necessary.		
3.	ELP-007, ELP-008 I/L Exhaust	5, 6	Shut		
4.	ELP-011, ELP-012 O/L Exhaust	7, 8	Shut		
5.	OBR-022, OBR-023 (Console)	9, 10	Back off completely if necessary		
6.	Oxygen Bibs (I/L-O/L)	NA	Remove bibs.		
			----- END OF PROCEDURE-----		

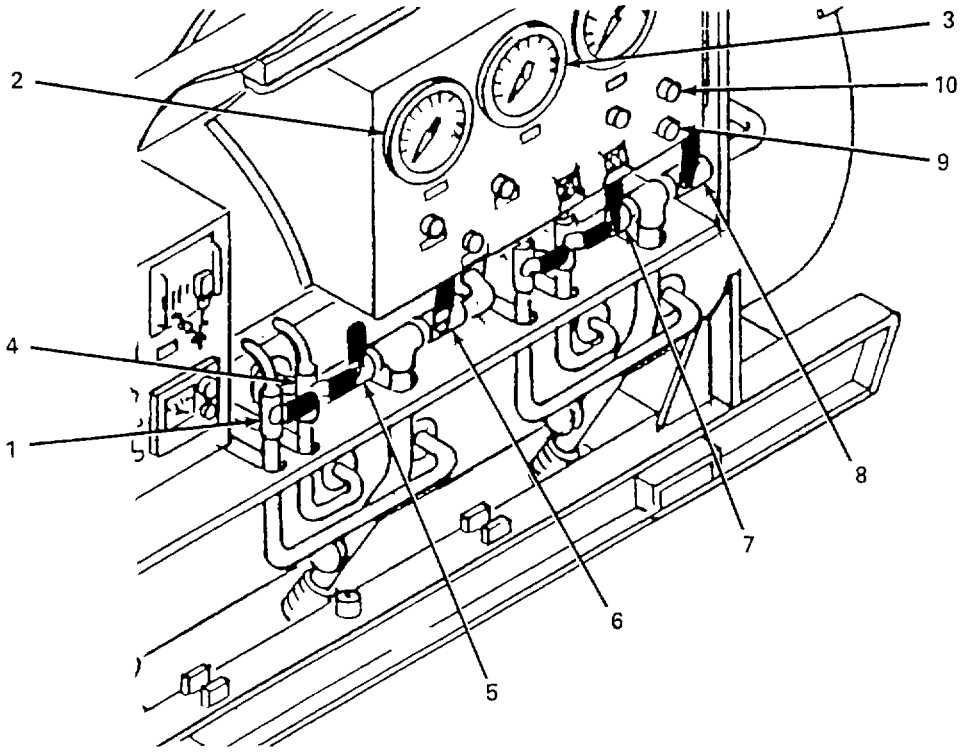


Figure 2-15. Emergency Procedures Checklist (Sheet 3 of 8).

d. Increase in Chamber Depth.

Step	Component (Location)	Index No.	Procedure	Check	Note
1	ELP-007 (Console)	1	Open and maintain depth on AGA-017 or AGA-018 (3).		
2.	ALP-005, ALP-006 I/L Supply	4, 5	Shut		
3.	ALP-009, ALP-010 O/L Supply	6, 7	Shut		
------END OF PROCEDURE-----					

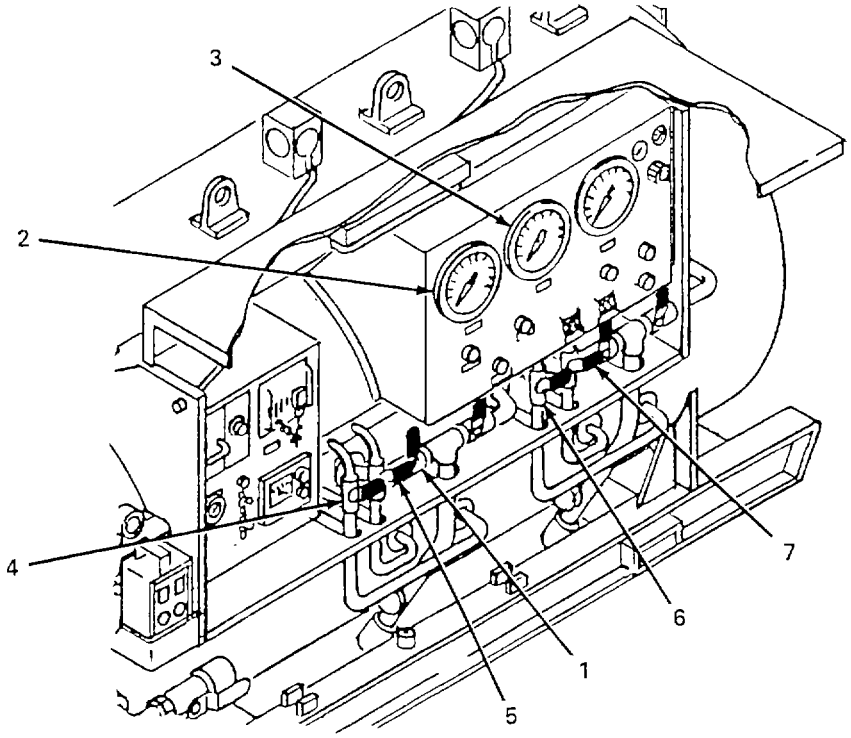


Figure 2-15. Emergency Procedures Checklist (Sheet 4 of 8).

e. Loss of Primary Oxygen Supply.

Step	Component (Location)	Index No.	Procedure	Check	Note
LOSS OF OXYGEN BANK #1					
1.	OXH-030, OXH-031, OXH-032 (0_2)	1,2, 3	Shut and tag "STBY".		
2.	OXH-033, OXH-034, OXH-035 (0_2)	4, 5, 6	Open and tag "IN USE".		
3.	Oxygen Bank #1	NA	Replace cylinders - leave bank tagged "STBY".		
LOSS OF OXYGEN BANK #2					
1.	OXH-033, OXH-034, OXH-035 (02)	4, 5, 6	Shut and tag "STBY".		
2.	OXH-030, OXH-031, OXH-032 (02)	1,2, 3	Open and tag "IN USE".		
3.	Oxygen Bank #2	NA	Replace cylinders - leave bank tagged "STBY".		
------END OF PROCEDURE-----					

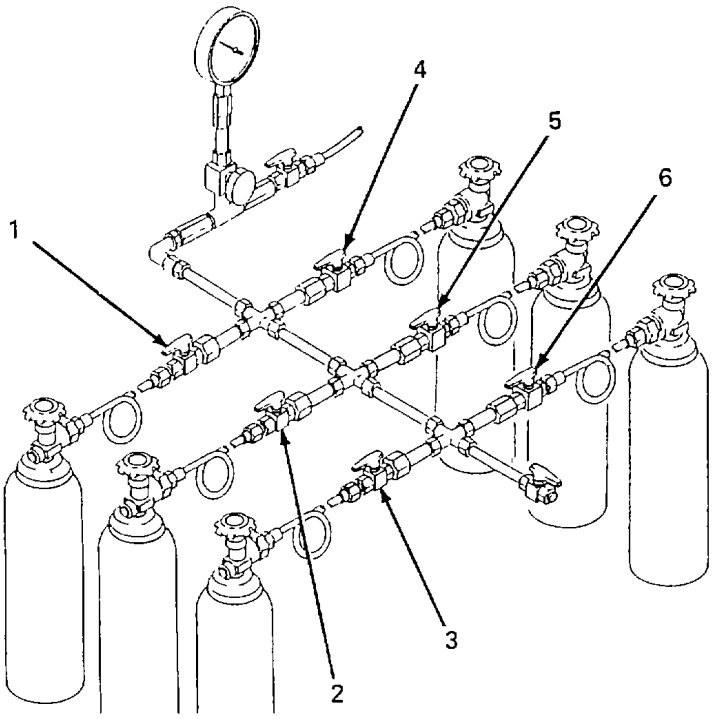


Figure 2-15. Emergency Procedures Checklist (Sheet 5 of 8).

f. Contaminated Breathing Source.

Step	Component (Location)	Index No.	Procedure	Check	Note
1.	ALP-001 (Console)	1	Shut		
2.	ALP-002 (Console)	2	Open		
3.	Chamber		Ventilate I/L continuously IAW FM 20-11-1.		
-----END OF PROCEDURE-----					

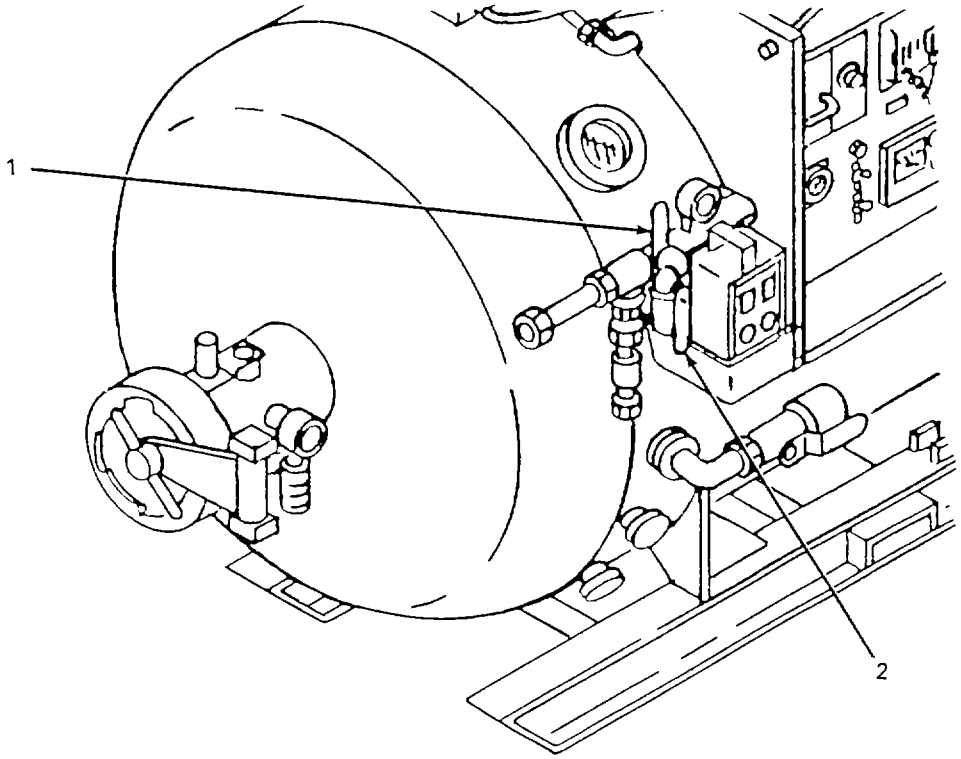


Figure 2-15. Emergency Procedures Checklist (Sheet 6 of 8).

g. Fire in the Inner Lock.

Step	Component (Location)	Index No.	Procedure	Check	Note
1.	OXL-020 and OXL-021 (Console)	1, 2	Shut		
2.	SWT-017 (Console)	3	Turn off.		
3.	SWT-018 (Console)	4	Turn off.		
4.	ELP-007 (Console)	5	Open as necessary to maintain depth.		
5.	Chamber Occupants	NA	Move to outer lock if possible.		
6	Inner Lock Door	6	Shut		
7.	Chamber Occupants	NA	Fight fire.		
------END OF PROCEDURE-----					

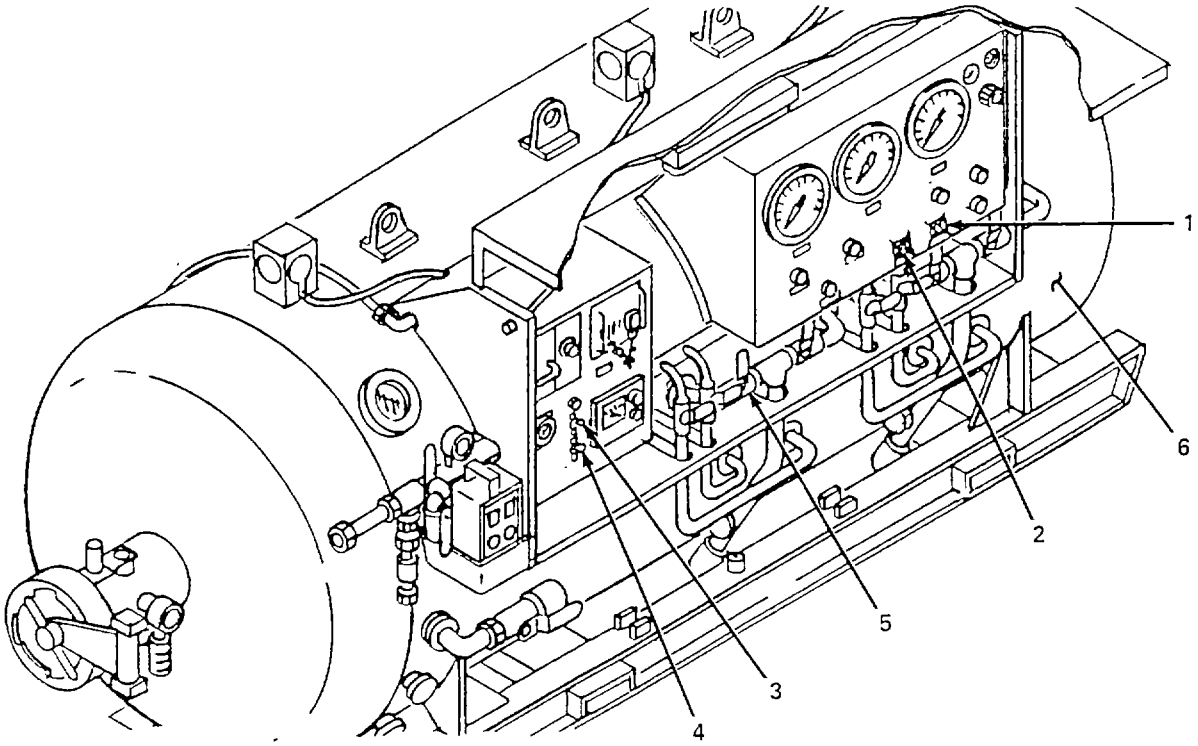


Figure 2-15. Emergency Procedures Checklist (Sheet 7 of 8).

h. Loss of Depth Gage in Inner Lock.

Step	Component (Location)	Index No.	Procedure	Check	Note
1.	ALP-013 (Console)	1	Shut if appropriate.		
2.	ALP-015 (Console)	2	Shut if appropriate.		
------END OF PROCEDURE-----					

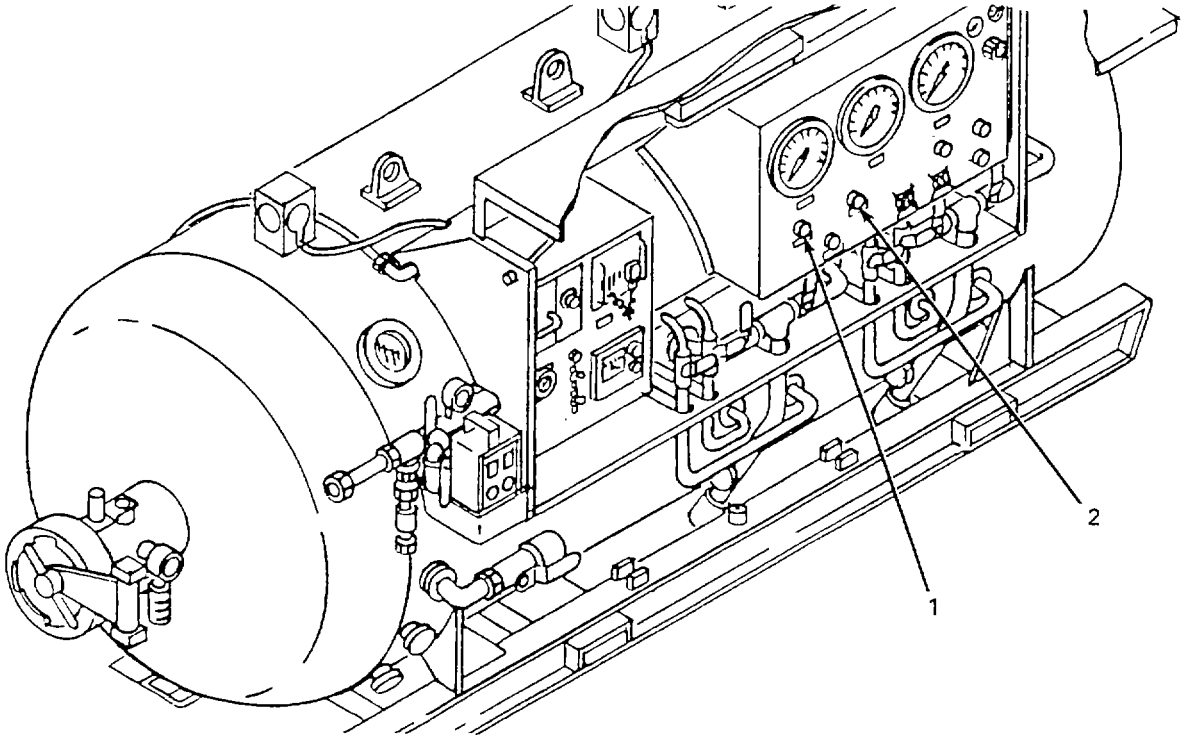


Figure 2-15. Emergency Procedures Checklist (Sheet 8 of 8).

CHAPTER 3

OPERATOR MAINTENANCE

OVERVIEW

This chapter contains information for troubleshooting and maintenance of the 3-Person Recompression Chamber by operator level maintenance personnel.

Section I. LUBRICATION INSTRUCTIONS

WARNING

The use of lubricants other than those specified may result in fire and/or explosion causing serious injury or death. Use only those lubricants specified for use in a hyperbolic system.

3-1. **General**. Keep all lubricants in closed containers and store in a clean dry area away from excessive heat. Do not allow dust, dirt, or other foreign matter to mix with the lubricants. Keep the lubrication equipment clean and ready for use. Before lubricating the 3-Person Recompression Chamber, wipe all lubrication points to remove dirt and grease. After lubricating, clean all lubrications points of any spilled or excessively applied lubricant to prevent accumulation of dirt and foreign matter. Keep all external surfaces and parts not requiring lubrication free of lubricants.

3-2. **Lubrication Order (LO)**. A separate LO for the 3-Person Recompression Chamber is not required.

3-3. **Lubrication Instructions**. All lubrication of the 3-person recompression chamber is performed by Unit, Direct Support or General Support Maintenance Personnel, and is covered in detail in appropriate maintenance procedures

Section II. OPERATOR TROUBLESHOOTING PROCEDURES

There are no operator maintenance troubleshooting procedures. Refer to Chapter 4 Unit Maintenance, Section IV, Unit Troubleshooting Procedures in this manual.

Section III. OPERATOR MAINTENANCE PROCEDURES

There are no operator maintenance procedures. Refer to Chapter 4 Unit Maintenance, Section V, Unit Maintenance Procedures in this manual.

CHAPTER 4

UNIT MAINTENANCE

OVERVIEW

This chapter contains information for troubleshooting and maintenance of 3-Person Recompression Chamber by Unit level personnel.

Section I. REPAIR PARTS; SPECIAL TOOLS; TEST, MEASUREMENT AND DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT

4-1. **Common Tools and Equipment**. For authorized common tools and equipment, refer to the modified Table of Organization and Equipment (MTOE) applicable to your unit.

4-2. **Special Tools, TMDE, and Support Equipment**. For a listing of special tools, TMDE, and support equipment authorized for use on this equipment, refer to the Repair Parts and Special Tools List, TM 5-4220-227-24P and the maintenance allocation chart (MAC), Appendix B of this manual.

4-3. **Repair Parts**. Repair parts are listed and illustrated in the Repair Parts and Special Tools List for 3-Person Recompression Chamber, TM 5-4220-227-24P.

Section II. SERVICE UPON RECEIPT

Paragraph Page

4-4. **General**. This section provides the information required for the unit maintenance technician to insure that the equipment will be adequately inspected, serviced, and operationally tested before it is subjected to its normal everyday use.

4-5. **Handling**. The recompression chamber is equipped with four lifting lugs located on the top centerline. The chamber may be lifted by using any two pairs of lugs, inner or outer pair. The chamber may also be moved with a forklift using the channels in the skid base. The estimated total weight of the unit is 3000 lbs.

NOTE

Prior to uncrating the equipment, carefully examine the shipping crate for signs of damage incurred during transit, report immediately any external damage to appropriate authorities.

If relocation of chamber is anticipated, retain all packing and crating materials for future use.

4-6. **Removal of Crating**. Remove crating and packing material. View ports are covered with fiberboard, taped in place. Oxygen masks and sound powered phones are packed in a separate cardboard box, located inside the I/L.

4-7. **Location of Chamber**. Figures 4-1 and 4-2 show the overall dimensions of the unit. In selecting a location for the chamber, provide clearance for personnel access into the chamber; clearance for injured or disabled personnel on a stretcher, opening the M/L door, and for the swinging of the control cabinet hood assembly The unit is equipped with four tie down lugs located at each corner of the chamber. These connect to skid support points

4-8. **Air Supplies and Exhaust**. Remove plastic pipe plugs and tape. Connect air supply with S-fitting. Connection is a male (external) 1 1/16-inch - 17 threads per inch, submarine thread. Remove packing materials, polyethylene, and tape from exhaust ports.

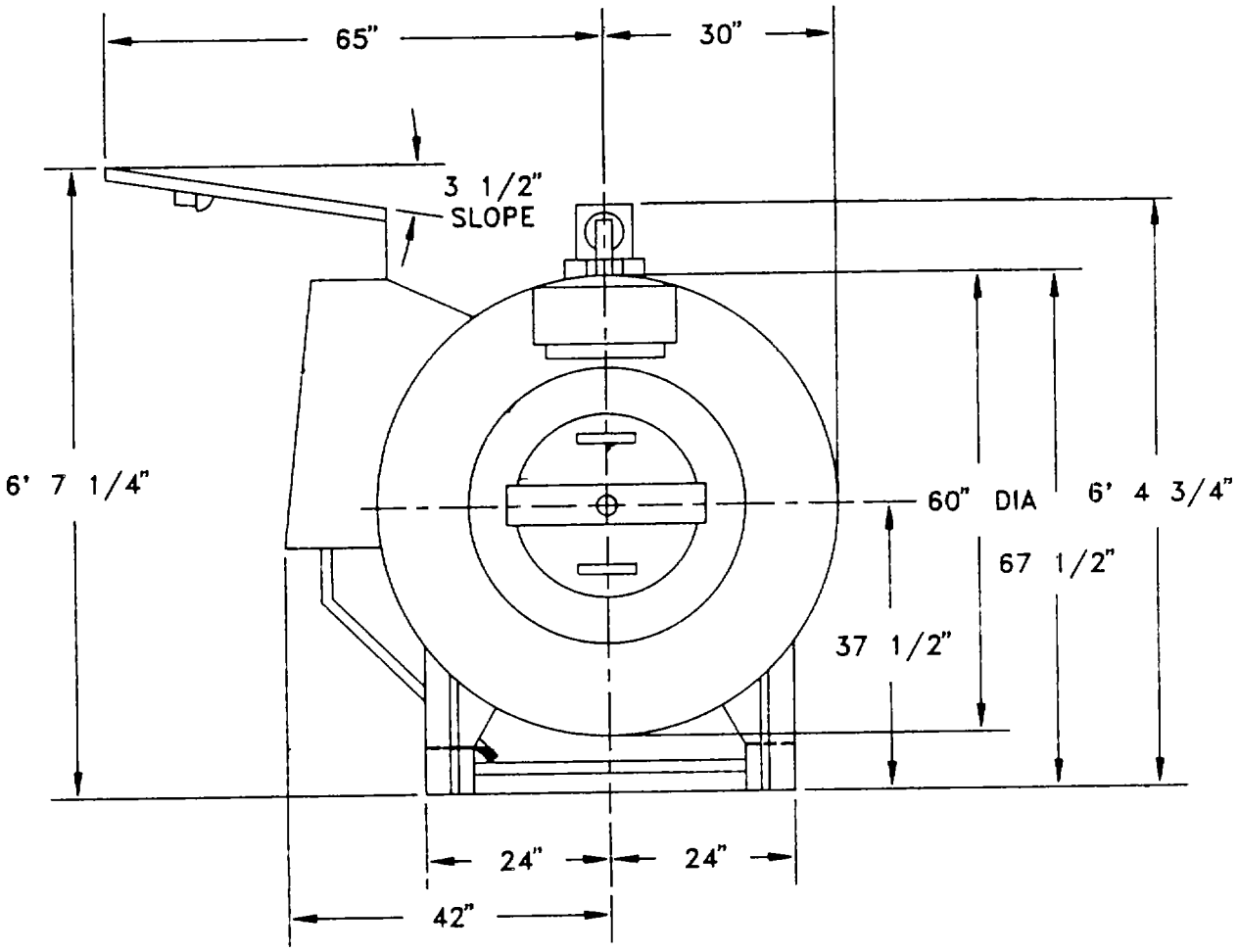


Figure 4-1. End View.

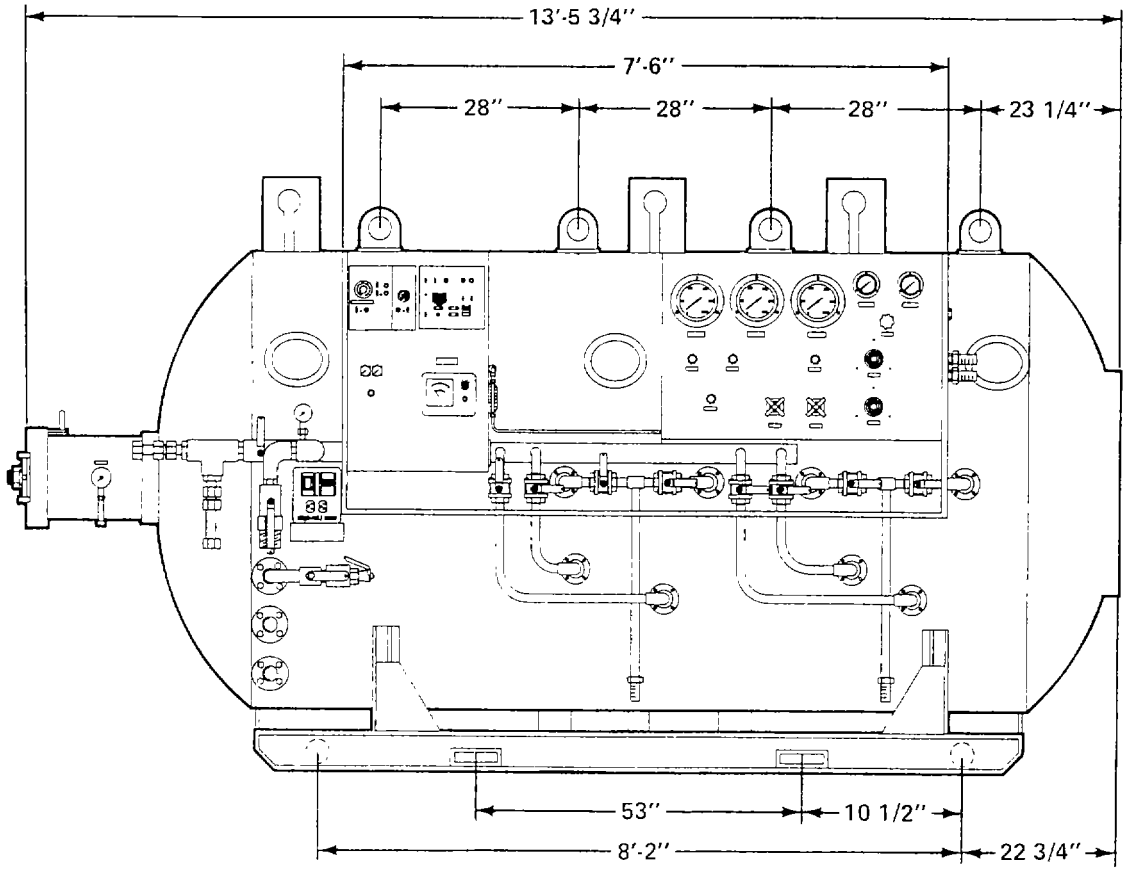


Figure 4-2. Elevation View.

WARNING

To prevent the spread of disease, serious injury and/or death, oxygen breathing systems must be maintained hygienically clean and free from dust, dirt, and all hydrocarbon contamination. Refer to oxygen system prework procedures para. 4-10 to avoid violating this warning.

4-9. **Oxygen Supply.** Remove plastic pipe plug from the High Pressure Oxygen Supply fitting on the right hand side of chamber console. Retain plug for sealing system when not in service. Connection is female 1/2-inch, National Pipe Thread (N.P.T.). Care should be exercised to not contaminate the oxygen system with oil or other hydrocarbons.

4-10. **Oxygen System Prework Checks.**

Prior to start of work on any component of the oxygen breathing system ensure that:

a. The external surface of the component parts of the oxygen system and the adjacent area are free from dust, dirt, and all hydrocarbon contamination.

b. The tools used to work on O_2 systems are maintained hygienically clean and free from dust, dirt, and all hydrocarbon contamination Do not lend or use these tools for any other purpose.

c. The oxygen system is open and exposed to any possible contamination for as little time as possible.

d. The component replacement parts have been maintained hygienically clean and free from dust, dirt, and all hydrocarbon contamination.

e. An adequate supply of clean plastic bags and bag ties approved for this purpose are readily available.

f. All personnel involved in the maintenance of these O_2 breathing systems are properly trained in maintaining O_2 clean conditions.

During work on any component of the oxygen breathing system ensure that:

a. Plastic bags, pipe (tubing) caps and/or plugs are NOT removed from any component UNTIL immediately ready to install that particular component or ready to make that particular connection. (See step c. above.)

b. All pipe (tubing) caps and/or plugs are retained sealed in plastic bags for future use Do not reuse plastic bags.

c. Care is taken not to bend or crimp tubing. Damaged tubing must be repaired or replaced

d. Teflon thread sealing tape is used on external threads to prevent leaks and ensure tight connection.

e. Components and tubing connections are properly aligned before connection is made to prevent cross-threading. Start nuts on threads several turns by hand before using wrench.

f. All exposed pipe, tube, or hose open ends are double bagged, plugged or capped off as soon as components are disconnected, whether the parts are to remain on the chamber or stored away for future use.

g. All component parts with mounting hardware are placed in double bags and sealed as soon as possible after the component is removed.

After working on any component of the oxygen breathing system ensure that:

a. All tools are picked up, cleaned, and properly stored away.

b. All materials (bits of teflon tape, etc.) have been removed from the work area.

c. Leak test using nonionic soap solution is performed and all leaks detected are repaired.

d. All serviceable components are tagged, double bagged, sealed and stored in a clean area.

e. All components are inspected for cleanliness and cleaned if necessary. Refer to cleaning procedures for Air/Oxygen Systems.

f. All repairable but non serviceable components are tagged, double bagged, sealed and turned in for repair.

g. All non repairable components have been properly and expediently disposed off.

4-11. **Chamber Doors (I/L and O/L).**

CAUTION

Travel bars should only be used during transportation of the unit.

The chamber doors are secured in the closed position with an aluminum travel bar (channel section), which is held with a winged bolt. During operation of the unit, secure channels to the skid base using the winged bolt.

4-12. **Primary Communications Systems.** The communication unit is mounted on the electrical control panel. Plug in the power cord to the six plug power strip (SPRPM) located on the bottom of the electrical control panel.

4-13. **Secondary Communication System.** The sound powered telephones are packed inside the I/L. Unpack and mount into their respective holders. The phone headsets are provided with cable jacks and require only to be plugged in at each station.

4-14. **Oxygen Breathing Masks.** The chamber is provided with six 02 breathing masks, packed separately inside the chamber. The masks plug into the oxygen manifold built in breathing system (BIBS) located in both the I/L and O/L. Supply connection are 1/8-inch N.P.T. and outlet connections are 3/8-inch N.P.T. Chambers are equipped with quick-disconnect type couplings.

4-15. **Internal Hardware.** All other hardware mounted inside the chamber is fully assembled and installed prior to shipment. A careful visual examination should be made of the hardware at this time. Also a check should be conducted to ensure all packing materials have been removed

4-16. **Electrical Connections.**

a. *110 Volt Power Cable*. Connect GFI power cables to 110 VAC, 20 Amp, 60 Hertz external power source. Connect the SPRPM directly to the GFI. Connect the following components to the power strip:

(1) Hyperbolic Light Assembly Power Supply.

(2) Direct Current Power Supply.

(3) Oxygen Analyzer.

(4) Communications Box

(5) Digital Thermometer.

(6) Overhead panel fluorescent light.

b. *220 VAC Power Cable and 110 VAC*. Connect the 220 VAC, 20 Amp, and, if applicable, the 110 VAC, 20 Amp power cables to the heater/chiller module.

Section III. UNIT PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

Paragraph Page

4-17. **General.** To ensure that the 3-Person Recompression Chamber is always ready for operation, it must be inspected so that any defects can be discovered and corrected before they result in damage or failure. Regular inspection will ensure the 3-Person Recompression Chamber is fully operational and reliable.

a. *Weekly* (W) PMCS shall be performed once each week.

b. *Monthly* (M) PMCS shall be performed once each month.

c. *Yearly* (Y) PMCS shall be performed once each year.

d. *If Your Equipment Fails to Operate*. Troubleshoot with proper equipment. Report deficiencies using the proper forms See DA PAM 738-750.

4-18. **Preventive Maintenance Checks and Services Procedures.** Table 4-1 describes preventive maintenance required for the 3-Person Recompression chamber. Table 4-1 consists of five columns, containing the following

a. *Item Number*. Checks and services are numbered in order of performance. These numbers will be used in the TM Number Column on DA Form 2404 (Equipment Inspection and Maintenance Worksheet) when recording results of preventive maintenance checks and services.

b. *Interval*. The columns headed W, M, and Y contain dots (•) opposite the proper checks.

c. *Items To Be Inspected*. Items listed in this column are identified by their common names.

d. *Procedures*. This column contains all information required to accomplish checks and services.

WARNING

Clothing containing oil, grease, or volatile substances of any kind shall not be worn or used in chamber.

Matches, cigarette lighters, lighted cigarettes, cigars, pipes, or flame shall not be carried into chamber at any time.

Do not use trichloroethylene or methyl chloroform in cleaning operations associated with any recompression chamber. Use of either chemical can result in death when operators are exposed to these contaminates under pressure. These contaminates are not water soluble. If contamination or suspected contamination occurs, immediately discontinue all chamber operations and notify the Army Diving liaison at the Naval Experimental Diving Unit, Panama City, FL 32407-5001, autovon 436-4351/commercial (903) 234-4351. The only acceptable cleaning agents are trisodium phosphate, or nonionic soaps.

Table 4-1 Unit Preventive Maintenance Checks and Services (PMCS).

W - Weekly M- Monthly Y - Yearly

Item No.	Interval W	Interval M	Interval Y	Item to be Inspected.	Procedures
1	*			Outer Lock Door	Inspect preformed packing seals for nicks, cuts and lubrication.
			*		Remove preformed packing, clean seat in door, relubricate and install.
2	*			Inner Lock Door	Inspect preformed packing seal for nicks, cuts and lubrication.
			*		Remove preformed packing, clean seat in door, relubricate and install.
3	*			Medical Lock Inner Door	Inspect preformed packing seal for nicks, cuts and lubrication.
			*		Remove preformed packing, clean seat in door, relubricate and install.

Table 4-1. Unit Preventive Maintenance Checks and Services (PMCS) (Cont).

W - Weekly M- Monthly Y - Yearly

Item No.	Interval W	M	Y	Item to be Inspected.	Procedures
4	*			Medical Lock Outer Door	Inspect preformed packing seal for nicks, cuts and lubrication.
			*		Remove preformed packing, clean seat in door, relubricate and install.
5	*			Chamber Lights	Check lights for proper operation. If lights are inoperative, refer to para. 4-41.
6	*			Communication	Check inner and outer lock headsets for proper operation. If headset is inoperative, refer to para. 4-46.
7	*			Sound Powered Phones	Push button and check phone for proper operation. If phones are inoperative, refer to para. 4-47.
8	*			Oxygen Analyzer	Place RANGE switch to BAT TEST and observe meter. If needle is not in battery limit area, recharge or replace.
9	*			Heater/Chiller Unit and Scrubber Assembly Blowers	Check that all power indicator lights function and both units are circulating air.
10	*			Recompression Chamber	Inspect inside and outside of chamber after extended operation and clean per para. 4-56. Conduct pressure test on chamber per FM 20-11-1.
11	*			Valves, Air Supply and Exhaust, Inner and Outer Locks	Pressurize inner and outer locks to 20 feet of sea water and operate inner and outer lock valves. Inspect valves for leaks and that valves turn easily. Lubricate if necessary.
12	*			Deck Plates	Inspect deck plates for corrosion. Clean, refer to para. 4-27.
13		*		Oxygen Mask	Inspect and service mask. Refer to para. 4-50.
14		*		Dual Hoses	Inspect for cuts, nicks and cracks and replace if damaged.

Table 4-1. Unit Preventive Maintenance Checks and Services (PMCS) (Cont).

W - Weekly M- Monthly Y - Yearly

Item No.	Interval W	M	Y	Item to be Inspected.	Procedures
15		*		High Pressure Hoses	Inspect for cuts, nicks and cracks and replace if damaged.
16		*		Heater/Chiller Unit	Inspect fins for cracks, dirt and grease. If unit is inoperative, refer to para. 5-13.
17		*		Scrubber Assembly	Inspect canister for clogged holes and damage. If canister is inoperative, refer to para. 5-13.
18			*	View Port Assembly	Inspect retaining bolts for proper torque. Refer to Appendix F, torque limits.
19			*	Shell Penetrates	Inspect retaining bolts for proper torque. Refer to Appendix F, torque limits.
20			*	Gages	Check for calibration dates on pressure relief valve and all pressure gages on chamber inside and out. Refer to para. 6-6.
21	*			Cots	Inspect for attachment of cotter pin and chain. Inspect for attachment of grounding strip. Refer to paragraph 4-26.
22	*			GFI	Press TEST button to test. Circuit breaker should trip. Reset to up position (ON).
23	*			Medical Lock Assembly	Check for proper operation of door and locking pin assembly.
24			*	Skid	Check for corrosion and loose bolts.
25			*	Air System (Hoses, Gages, Penetrators, Pipe Fittings, Valves)	Check for leaks. Apply soapy solution to all connections and fittings and check for bubbles at full operating pressure.

4-19. **Service of Door Seals.**

a. *Chamber Inner and Outer Lock Doors*. (figure 4-3)

NOTE

Procedure is the same for both doors.

(1) Open door (1) and gently pry preformed packing (2) from door seat (3).

(2) Replace preformed packing if severely nicked or cut.

(3) Lubricate preformed packing to be installed using halocarbon grease (Appendix E, Item 13).

(4) Install preformed packing (2) in door seat (3) and close door (1). Door should close and lock easily.

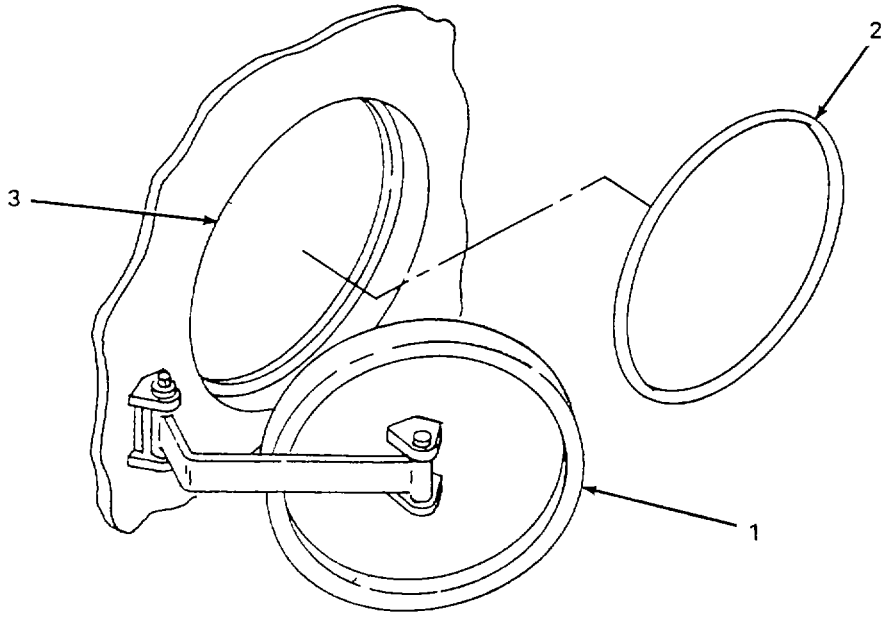


Figure 4-3. Service of Chamber Inner and Outer Door Seals.

b. *Medical Lock Outer Door*. (figure 4-4)

(1) Open door (1) and gently pry preformed packing (2), seal ring (3) and second preformed packing (4) from seat in medical lock door frame assembly (5).

NOTE

Twelve springs (6) are loose in door seal when packing is removed.

(2) Replace preformed packings and seal ring if severely nicked or cut

(3) Lubricate preformed packing to be installed using halocarbon grease (Appendix E, Item 13).

(4) Replace spring (6) if removed, preformed packing (4), seal ring (3) and second preformed packing (2).

(5) Close door (1) and lock. Check to see that it operates and locks smoothly.

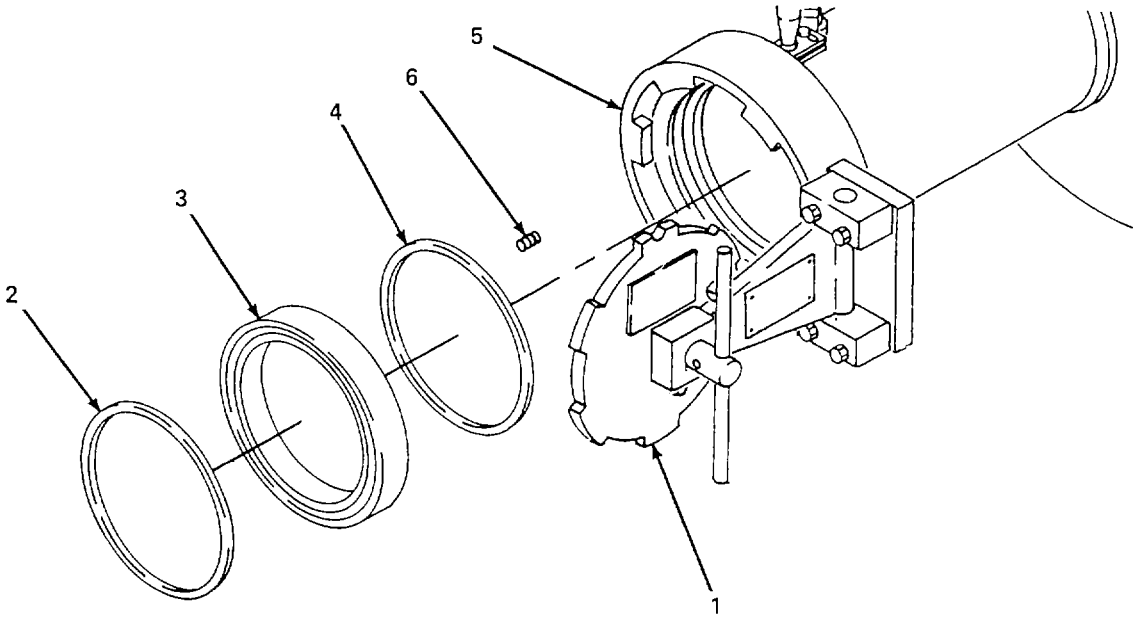


Figure 4-4. Service of Medical Lock Outer Door Seals.

d. Medical Lock Inner Door. (figure 4-5)

(1) Open door (1) and gently pry preformed packing (2) from door seat (3).

(2) Replace preformed packing If severely nicked or cut.

(3) Lubricate preformed packing to be installed using halocarbon grease (Appendix E, Item 13).

(4) Install preformed packing (2) in door seat (3) and close door (1). Door should close and lock easily.

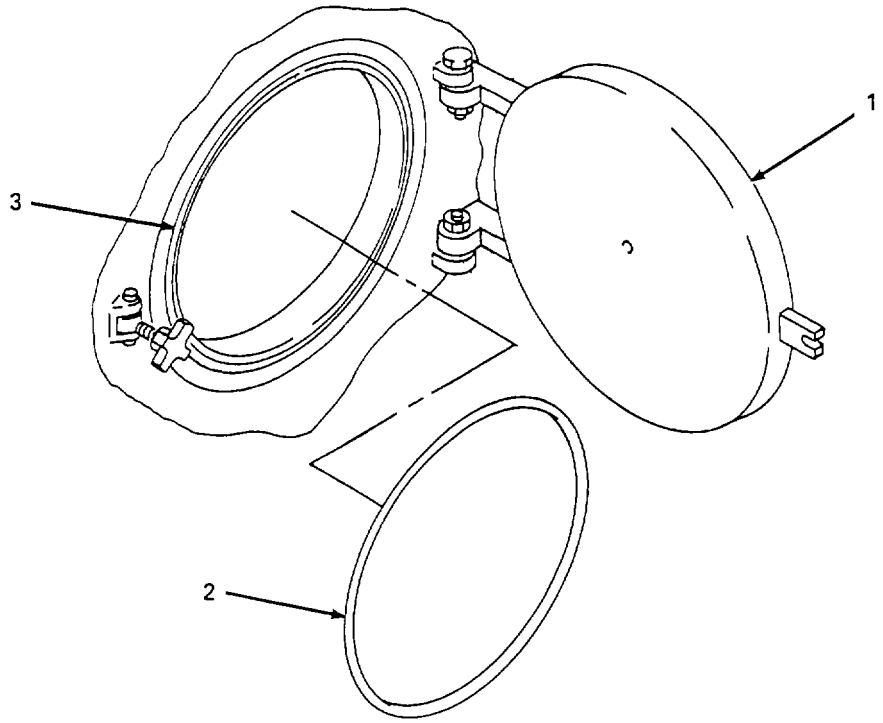


Figure 4-5. Service of Medical Lock Inner Door Seals.

Section IV. UNIT TROUBLESHOOTING PROCEDURES

Paragraph Page

4-20. **General.** This section contains troubleshooting procedures to determine the probable cause of observed equipment malfunctions. Test or inspections are provided to isolate the faulty component and corrective actions are provided to eliminate the malfunction.

4-21. **Unit Troubleshooting Procedures.** Refer to symptom index to locate the troubleshooting procedures for the observed malfunction. Table 4-2 lists the common malfunctions that may occur during the operation or maintenance of the recompression chamber. Perform the tests or inspections, and the recommended corrective action in the order listed in the troubleshooting table. If the malfunction is corrected by a specific corrective action, do not continue with the remaining steps, if any, of the troubleshooting procedures. If the malfunction is not corrected by the listed corrective actions, notify your supervisor.

SYMPTOM INDEX

Symptom Page

NOTE

Prior to performing troubleshooting, assure that all electrical components are plugged into the power strip and the power strip circuit breaker is not tripped. Check that power strip is plugged into the GFI and the GFI is not tripped.

Table 4-2. Unit Troubleshooting Procedures.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

1. RECOMPRESSION CHAMBER INNER LOCK (I/L) FAILS TO PRESSURIZE.

Step 1. Check primary inner lock depth gage, and isolator valve. Valve may be in off position blocking pressure to the gage

Open primary II/L depth gage isolator valve.

Step 2. Check secondary I/L depth gage isolator valve. Valve may be in off position blocking pressure to the gage.

Open secondary I/L depth gage isolator.

Step 3. Instruct tender inside I/L to inspect I/L door and door seal. An obstruction in doorway may prevent the door from closing and forming a seal.

Instruct tender to remove the obstruction from the doorway and to close and hold the door shut until pressure build-up of 0.5 FSW inside the I/L forces the door seal to hold

Table 4-2. Unit Troubleshooting Procedures (Cont).

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

1. RECOMPRESSION CHAMBER INNER LOCK (I/L) FAILS TO PRESSURIZE (Cont).

Step 4. Instruct tender to inspect the 02 BIBS manifold in both the I/L and O/L O_2 masks may be missing and O_2 BIBS manifold connectors may not be plugged.

Connect O_2 masks to BIBS manifold or plug BIBS manifold connectors.

Step 5. Instruct tender to inspect M/L inner door and door seal. An obstruction in doorway may prevent the door from closing and forming a seal and the M/L pressurization valve may be open.

Instruct the tender to close the M/L pressurization valve and/or remove obstruction from M/L doorway holding closed until pressure build-up of .5 FSW in the inner lock forces the door to seal.

Step 6. Check ELP-007 I/L primary and ELP-008 secondary air exhaust valves.

These valves may be open or they are malfunctioning. Close I/L primary and secondary valves. Replace malfunctioning valves.

Step 7. Check ALP-002 primary and ALP-001 secondary chamber air manifold supply valves. These valves may be closed or malfunctioning.

Open primary and secondary chamber air manifold supply valves. These valves may be closed or malfunctioning.

Step 8. Check AGA-003, the chamber manifold pressure gage. When the air supply manifold is fully pressurized and the gage is functioning properly, the gage should indicate 200 PSIG maximum manifold pressure.

If the gage indicates 0 PSIG manifold pressure proceed to next step. Replace the air supply manifold pressure gage if it is malfunctioning.

Step 9. Refer to the appropriate technical manuals for the associated items of equipment to restore an adequate air supply to the air supply manifold. Then, pressurize the I/L locks to 40 PSIG (92 FSW) and leak test the chamber using a nonionic soap and soft bristle brush on all fittings, preformed packings, and joints.

Report all leaks to GS Chamber air pressure should not drop lower than 145 FSW (65 PSIG) after it has been pressurized to 1 65 FSW (73.4 PSIG) and held for one hour.

Step 10 Repeat steps 1 thru 9 to troubleshoot the O/L.

Table 4-2. Unit Troubleshooting Procedures (Cont).

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

2. RECOMPRESSION CHAMBER SLOWLY LOSES AIR PRESSURE.

NOTE

This procedures requires two persons.

Step 1. Systematically open and close ELP-011, ELP-012, the O/L primary and secondary exhaust valves, ELP-007, ELP-008, the I/L primary and secondary exhaust valves, and ALP-045 the M/L pressurizing valve while observing the depth gages to indicate which valve is leaking.

Operate valves from full open to full closed position several times to dislodge any foreign matter that may be in valve body. If valves still malfunction, notify Direct Support Maintenance.

Step 2. Inspect for loss of air through the chamber penetrators, door seals, etc.

Maintain chamber depth and notify proper level of maintenance.

3. RECOMPRESSION CHAMBER OVER PRESSURIZES.

Step 1. Insure that ALP-005, ALP-006, the I/L and ALP-009, ALP-010, O/L primary and Secondary air supply valves are closed.

Open the primary exhaust valves. Adjust the valves to maintain the desired depth and flow rate.

Step 2. Check digital temperature gage over a span of 15 minutes for temperature variation. A sharp increase in temperature will cause an increase in chamber pressure.

Vent pressure as directed in step 1 Energize and regulate heater/chiller system.

4. DIGITAL TEMPERATURE GAGE FAILS TO COME ON OR INDICATES FAULT READINGS.

Step 1. Ensure that the power strip is energized and the temperature gage is plugged in. Reset power strip circuit breaker if necessary.

If gage is still malfunctioning, proceed to next step.

Table 4-2. Unit Troubleshooting Procedures (Cont).

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

4. DIGITAL TEMPERATURE GAGE FAILS TO COME ON OR INDICATES FAULT READINGS (Cont).

Step 2. Disconnect the temperature probe wires from the temperature probe (in chamber). Temperature gage reading should cycle up to display EEE (error reading).

Replace probe and lead wires if cracked or insulation is dried out. If gage still malfunctions, report fault to Direct Support Maintenance.

5. COMMUNICATIONS SYSTEM FAILS TO FUNCTION.

Step 1. No communication with either lock.

Check power to power strip. Ensure that communication box is plugged into power strip. Check communication box fuses. If no power, replace box. If power, go to next step.

NOTE

To gain access to fuses, raise cover lid and remove top panel on communication box.

Step 2. Replace speakers.

6. OXYGEN (O_2) ANALYZER FAILS TO FUNCTION.

Step 1. Set RANGE switch to BAT. TEST.

If reading is outside limits, replace batteries.

Step 2. Clean sensor cell contacts using pencil eraser

If malfunction continues, go to next step.

Step 3. Replace sensor cell.

If malfunction continues, notify Direct Support Maintenance of faulty analyzer.

7. TOTAL ELECTRICAL POWER FAILURE.

Step 1. Check external power source connection to the chamber Ground Fault Isolator (GFI). The 110 VAC, 60 Hertz power source connection may be broken causing total chamber electrical power failure.

Check that GFI TEST light is lit and RESET switch is in ON (up) position,

Table 4-2. Unit Troubleshooting Procedures (Cont).

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

7. TOTAL ELECTRICAL POWER FAILURE (Cont).

WARNING

The GFI circuit breaker trips only when there is an electrical problem in the system. As a result there is a danger of serious injury or death. Immediately troubleshoot the electrical system to locate the problem, then push the reset switch.

Step 2. Check GFI. The GFI is the main circuit breaker for the recompression chamber. Total power failure results when it is tripped

Disconnect the chamber console overhead fluorescent light and the GFI extension power strip. Push GFI RESET switch and observe GFI indicator light to ensure that the GFI is receiving electrical power from the external power source. To ensure the proper operation of the GFI, push the TEST switch. This should trip the GFI circuit breaker. Set the RESET switch to up position again before going on to next step.

Step 3. Reconnect chamber console fluorescent light to the GFI. The fluorescent light circuit may be shorted out. If the fluorescent tube illuminates, go on to next step. If it does not check GFI circuit breaker. The GFI circuit breaker may have tripped by the act of plugging in the fluorescent light receptacle plug.

If this is the case, notify Direct Support Maintenance.

Step 4. Disconnect all circuits connected to the GFI power strip and reconnect the power strip to the GFI. Move the rocker switch on the power strip to ON position. Observe that indicator light in rocker switch glows. This shows that the circuit is energized. If indicator light glows, proceed to next step. If indicator light does not glow, the GFI circuit breaker may have tripped, indicating that the fault lies in the power strip, wiring, or receptacle plug.

In that case, notify Direct Support Maintenance.

Step 5. After ensuring that the power strip circuit breaker has not tripped, reconnect each of the five circuits that were disconnected from the GFI power strip in step 4. While reconnecting each circuit, observe which circuit trips the GFI circuit breaker. This will isolate the faulty circuit.

Troubleshoot the circuit(s) which caused the power strip reset switch to trip or the GFI circuit breaker to trip.

Table 4-2. Unit Troubleshooting Procedures (Cont).

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

8. HEATER/CHILLER OR SCRUBBER FAIL TO OPERATE.

Step 1. Check fuse on panel.

Replace blown fuse.

Step 2. Place scrubber switch on panel to ON. Scrubber fan should rotate. Place heater/chiller switch on panel to ON. Heater/chiller fan should rotate.

If either scrubber or heater/chiller fails to operate, notify Direct Support Maintenance.

Step 3. Both scrubber and heater/chiller fail to operate.

DC power is faulty. Notify Direct Support Maintenance.

9. HEATER/CHILLER FAILS TO OPERATE.

Step 1. Inspect fluid output, check valve. It may be stuck in the closed position causing low output pressure.

Refer to General Support Maintenance.

NOTE

For additional information, see figure 6-16 Heater/Chiller Module Flow Diagram.

Step 2. Inspect valves at the chamber penetrator. They may be closed or partly closed causing low output pressure

Open valves.

Step 3. Inspect fluid level in reservoir. It may be low and causing low output pressure.

Add fluid.

Step 4. Inspect pump fuse. It may be blown, interrupting electrical power to the pump.

Replace fuse.

Table 4-2. Unit Troubleshooting Procedures (Cont).

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
10. CHAMBER LIGHTS FAIL TO ILLUMINATE.
Step 1. Ensure that chamber lights are plugged into power strip. Plug in if unplugged.
Step 2. Check fuses on the light power source. Replace blown fuses.
Step 3. Listen for sound of fan on light source. a. If sound is heard, but there is no light, replace bulb. b. If no fan is heard, replace light source. c. If problem persists, notify Direct Support Maintenance.
11. DEPTH GAGE INDICATES FAULTY PRESSURE READINGS.
Step 1. Check ALP-013, ALP-015 and ALP-016the depth gage isolator valves. These valves may be closed or malfunctioning. Operate from full closed to full open several times. If valve is still malfunctioning, notify Direct Support Maintenance.
Step 2. Equalize pressure in the I/L and O/L. All I/L and O/L depth gages (AGA-020, AGA-021, AGA-017, AGA-018, AND AGA-019) should indicate the same pressure. Cross-check all the gage indications to locate the faulty gage. Replace the faulty gage.

Section V. UNIT MAINTENANCE PROCEDURES

4-22. **General.** This section contains unit level maintenance procedures as authorized by the maintenance allocation chart in Appendix B of this manual.

4-23. **Soap Test.** Whenever replaced, all gages, valves, pipe fittings and similar components shall be tested for leakage.

a. Brush soapy water solution over joint or fitting.

b. Apply normal operating pressure and inspect for soap bubbles.

c. If soap bubbles appear, remove pressure and tighten joint or fitting.

d. Retest with soapy water solution.

4-24. Depressurization Valve and Gage (Medical Lock).

This task covers:
Replace

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Valve
Pressure Gage

Materials/Parts (Cont)

Bands, Rubber (Item 4, Appendix E)
Bags, Plastic (Item 3, Appendix E)
Tape, Teflon (Item 21, Appendix E)

Equipment Condition

Chamber shut down (para. 2-15).

Replace. (figure 4-6)

WARNING

To prevent the spread of disease, serious injury and/or death, oxygen breathing systems must be maintained hygienically clean and free from dust, dirt, and all hydrocarbon contamination. Refer to oxygen system prework procedures para. 4-10 to avoid violating this warning.

(1) Remove silencer (1) from fitting (2).

(2) Remove fitting (2) from valve (3).

(3) Remove valve (3) from tee fitting (4).

(4) Remove gage (5) from tee fitting (4).

(5) Remove tee fitting (4) from chamber.

WARNING

Leave 1 1/2 threads exposed on fitting when applying teflon tape. This will ensure that no teflon tape will hang down inside the air system. Teflon tape should be wrapped in such a manner that when the fitting is tightened the tape will not loosen. Failure to wrap teflon tape correctly may result in contamination or blockage of the air system and subsequent possible injury or death to the diver.

(6) Apply teflon tape to all pipe threads.

(7) Install tee fitting (4) on chamber.

(8) Install gage (5) on tee fitting (4).

(9) Install valve (3) on tee fitting (4).

(10) Install fitting (2) on valve (3).

(11) Install silencer (1) on fitting (2).

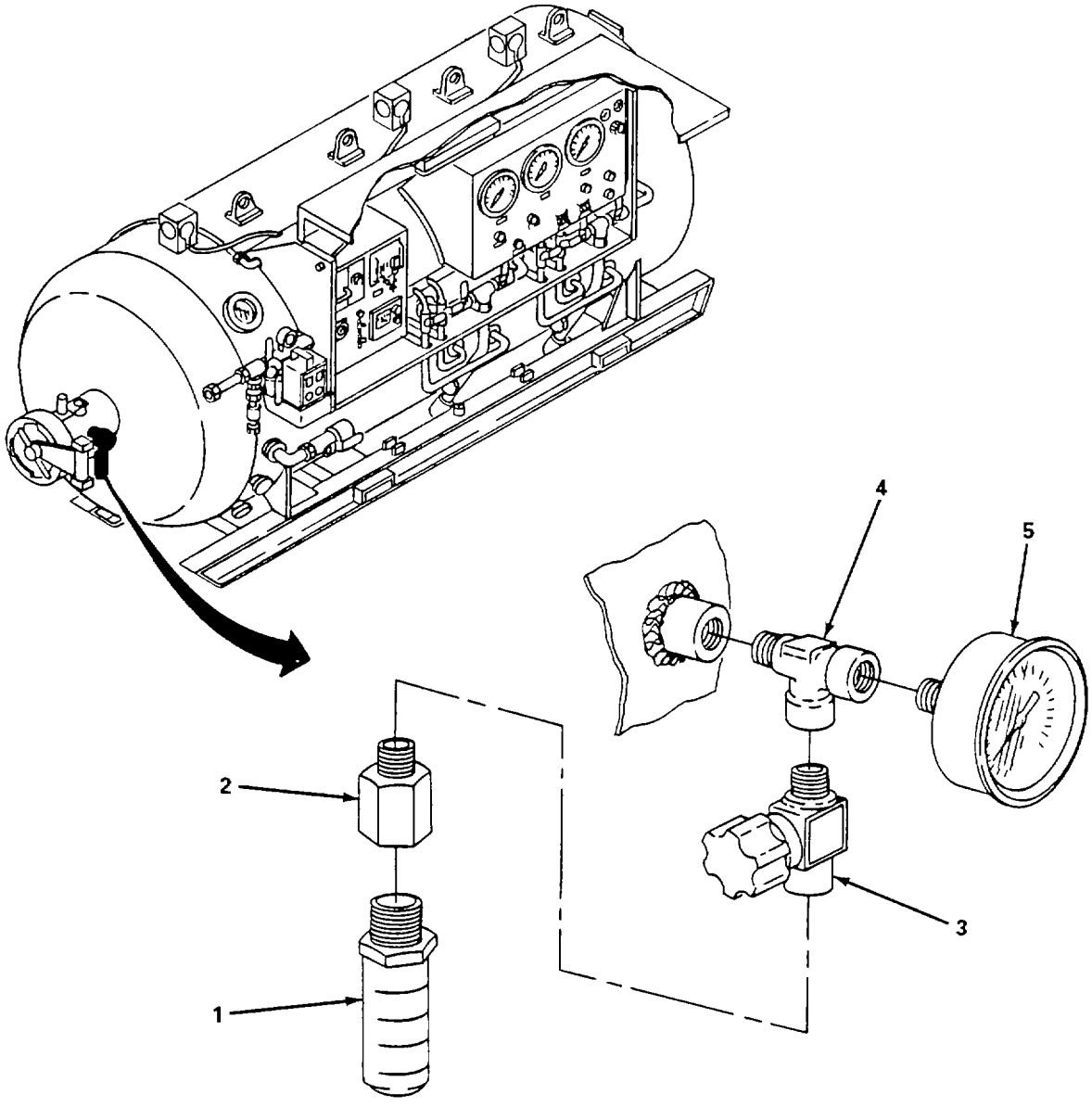


Figure 4-6. Depressurization Valve and Gage, Replace.

4-25. Pressurization Valve (Inner Lock Door)

This task covers: **Replace**

INITIAL SETUP

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Depressurization Valve

Materials/Parts (Cont)

Bands, Rubber (Item 4, Appendix E)
Bags, Plastic (item 3, Appendix E)
Tape, Teflon (Item 21, Appendix E)

Equipment Condition

Chamber shut down (para. 2-15).

Replace. (figure 4-7)

(1) Remove pressurization valve (1) from inner lock door (2).

WARNING

Leave 1 1/2 threads exposed on fitting when applying teflon tape. This will ensure that no teflon tape will hang down inside the air system. Teflon tape should be wrapped in such a manner that when the fitting is tightened the tape will not loosen. Failure to wrap teflon tape correctly may result in contamination or blockage of the air system and subsequent possible injury or death to the diver.

(2) Apply teflon tape to threads of valve (1) and install on inner lock door (2).

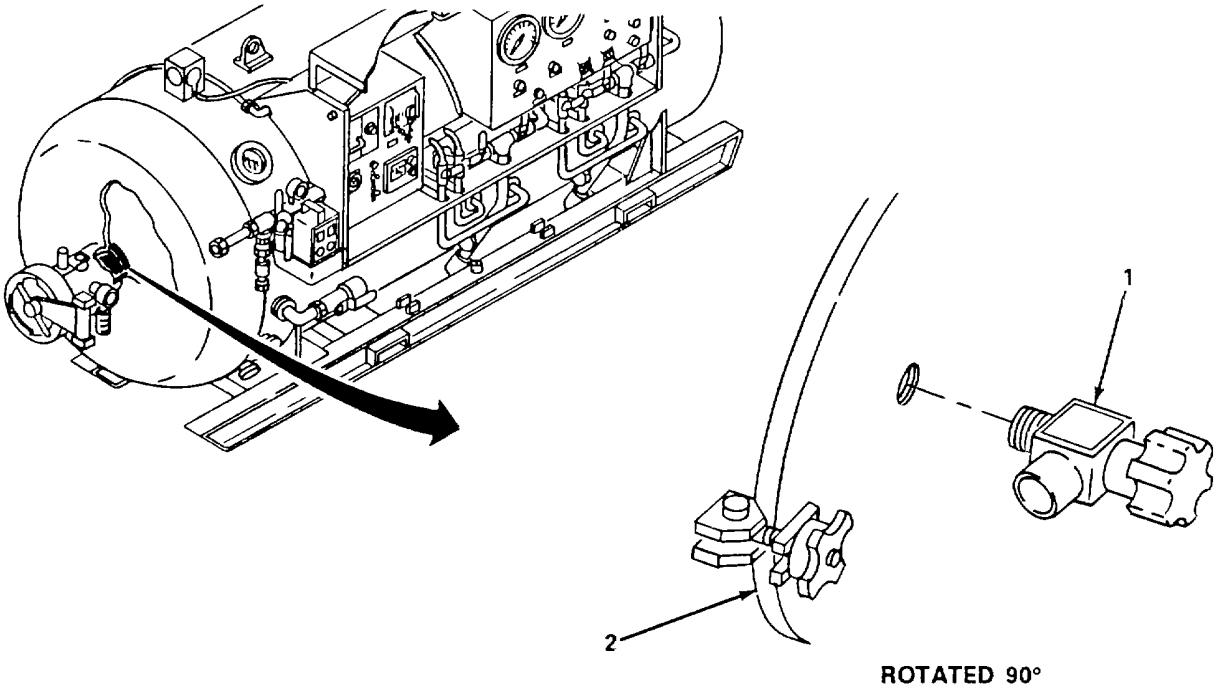


Figure 4-7. Pressurization Valve (Inner Lock Door), Replace.

4-26. Cot Assemblies (I/L).

This task covers: **Replace**

INITIAL SETUP

Tools	*Materials/Parts*
General Mechanic's Tool Kit (NSN 5180-00-177-7033)	Cot Assemblies

Replace. (figure 4-8)

NOTE

There are two cot assemblies in the chamber. Replacement of each is the same.

(1) Remove two hinge pins (1) securing cot supports (2) to support angles (3).

(2) Remove bolt (4) and ground strap (5).

(3) Remove three bolts (6) and two clamps (7) and remove cot assembly (8).

(4) While holding cot assembly (8) in place, install two clamps (7) and secure with three bolts (6).

(5) Install bolt (4) and ground strap (5).

(6) Install two hinge pins (1) securing cot supports (2) to support angles (3).

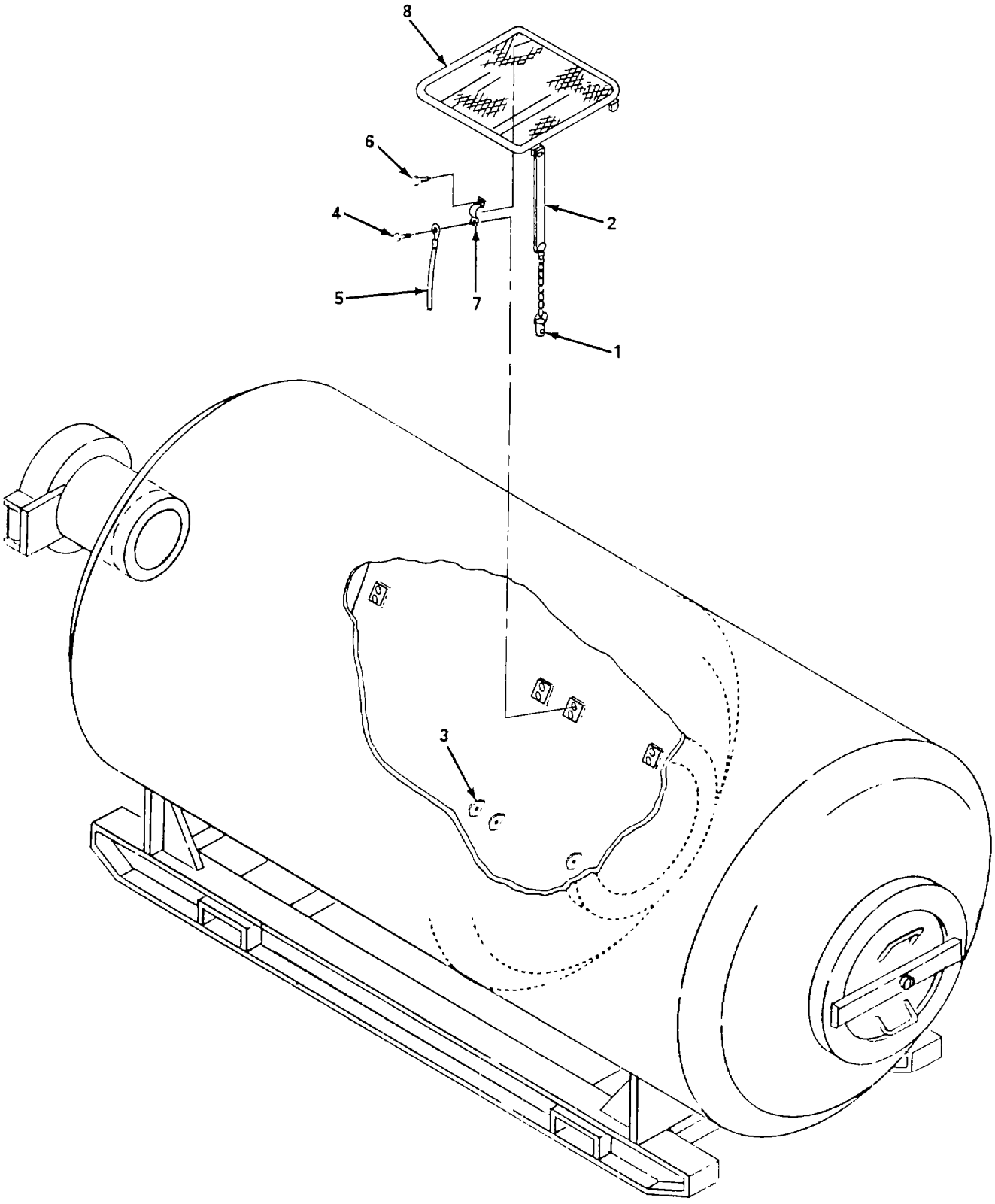


Figure 4-8. Cot Assemblies, Replace.

4-27. Deck Plates

This task covers: **Replace**

INITIAL SETUP:

Tools	*Materials/Parts*
General Mechanic's Tool Kit (NSN 5180-00-177-7033)	Deck Plate I/L Deck Plate O/L

Replace. (figure 4-9)

(1) Remove four screws (1) and remove O/L deck plate (2).

(2) Remove six screws (3) and remove I/L deck plate (4).

(3) Remove two screws (5) and remove I/L deck plate (6).

(4) Install I/L deck plate (6) and secure with two screws (5).

(5) Install I/L deck plate (4) and secure with six screws (3).

(6) Install O/L deck plate (2) and secure with four screws (1).

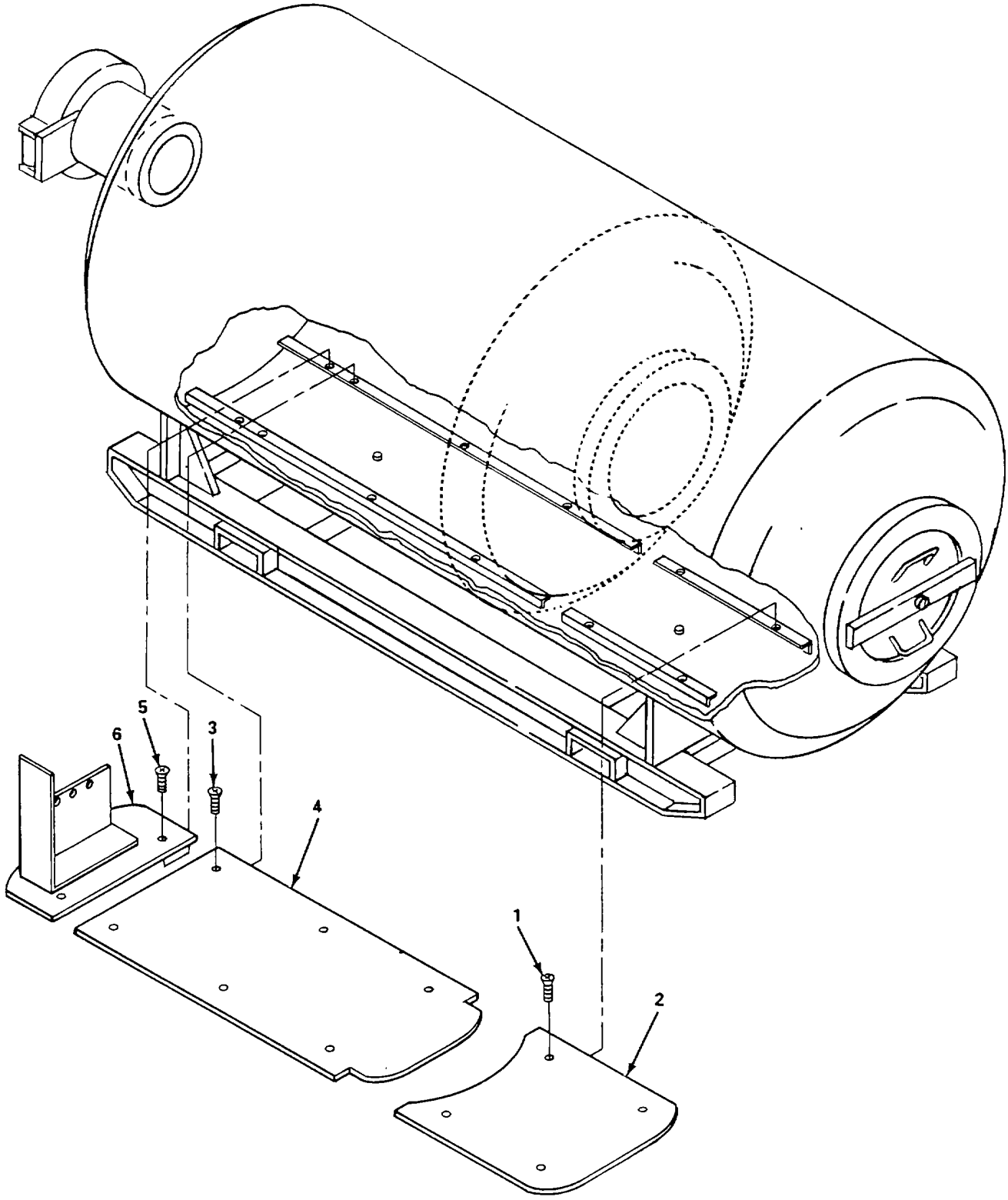


Figure 4-9. Deck Plates, Replace.

4-28. Heater/Chiller Module.

This task covers: Replace

INITIAL SETUP

Tools	*Materials/Parts*
General Mechanic's Tool Kit (NSN 5180-00-177-7033)	Heater/Chiller Module Propylene Glycol (Item 10, Appendix E)

Replace. (figure 4-10)

(1) Move heater/chiller switch (1) on heater/chiller module (2) to OFF position and disconnect power cord (3) from 220 Vac electrical power source.

(2) Close water valve (4) and return valve (5).

(3) Loosen fitting nut (6) and remove supply hose (7) from elbow (8) and drain fluid into suitable container.

(4) Loosen fitting nut (9) and remove return hose (10) from elbow (11) and drain fluid into suitable container.

(5) Remove the heater/chiller module.

(6) Place heater/chiller module (3) next to chamber heater/chiller penetrator.

(7) Install return hose (10) on elbow (11) and tighten fitting nut (9).

(8) Install supply hose (7) on elbow (8) and tighten fitting nut (6).

(9) Add propylene glycol/water mixture 25% to 75% to reservoir (12) if necessary, to replace fluid lost during removal procedure.

(10) Open water return valve (5) and supply valve (4).

(11) Connect power cord (3) on heater/chiller module (2) to 220 Vac electrical power source.

(12) Move heater/chiller switch (1) to ON position, allowing compressor and fluid pump to build up pressure.

CAUTION

If hoses are removed from unit, the system must be bled down. Loosen connector on outlet hose (7). Bleed air, then tighten. Refill reservoir (12).

(13) Check connections for fluid leaks.

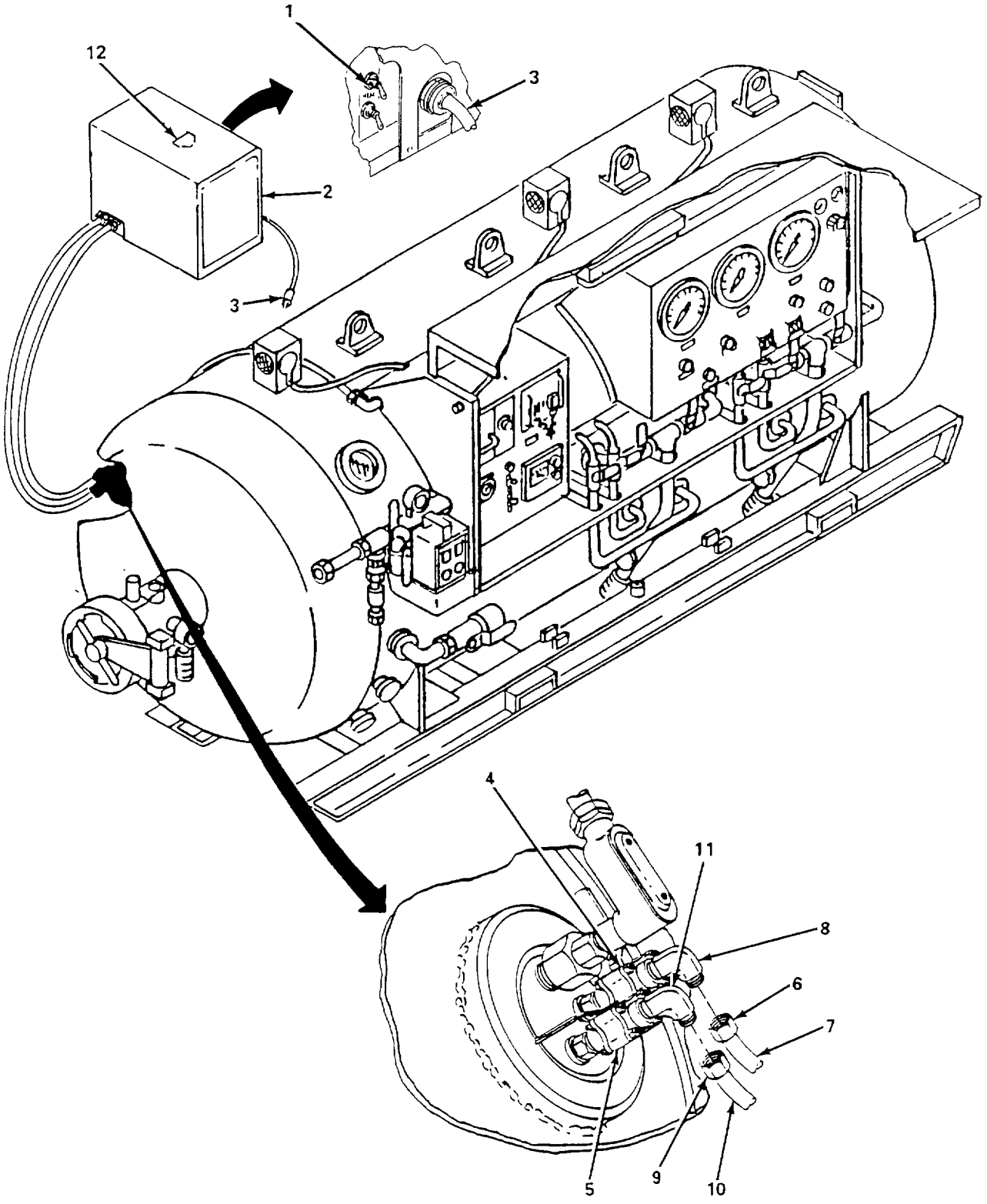


Figure 4-10. Heater/Chiller Module, Replace.

4-29. Pressure Relief Valve Assembly

This task covers: Replace

INITIAL SETUP

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Pressure Relief Valve Assembly
Preformed Packing
Leak Test Compound (Item 7, Appendix E)

Materials/Parts (Cont)

Bands, Rubber (Item 4, Appendix E)
Bags, Plastic (Item 3, Appendix E)
Grease, Halocarbon (Item 13, Appendix E)

Equipment Condition

Chamber shut down (para. 2-15).

Replace. (figure 4-11)

WARNING

To prevent the spread of disease, serious injury and/or death, oxygen breathing systems must be maintained hygienically clean and free from dust, dirt, and all hydrocarbon contamination. Refer to oxygen system prework procedures para. 4-10 to avoid violating this warning.

(1) Remove four nuts (1), lockwashers (2), and bolts (3).

(2) Remove pressure relief valve assembly (4) and preformed packing (5).

(3) Lubricate preformed packing (5) and place in groove in flange (6).

(4) Install pressure relief valve assembly (4) on flange (6) and secure with four bolts (3), lockwashers (2), and nuts (1).

(5) Pressurize system, and using test compound, check for leaks.

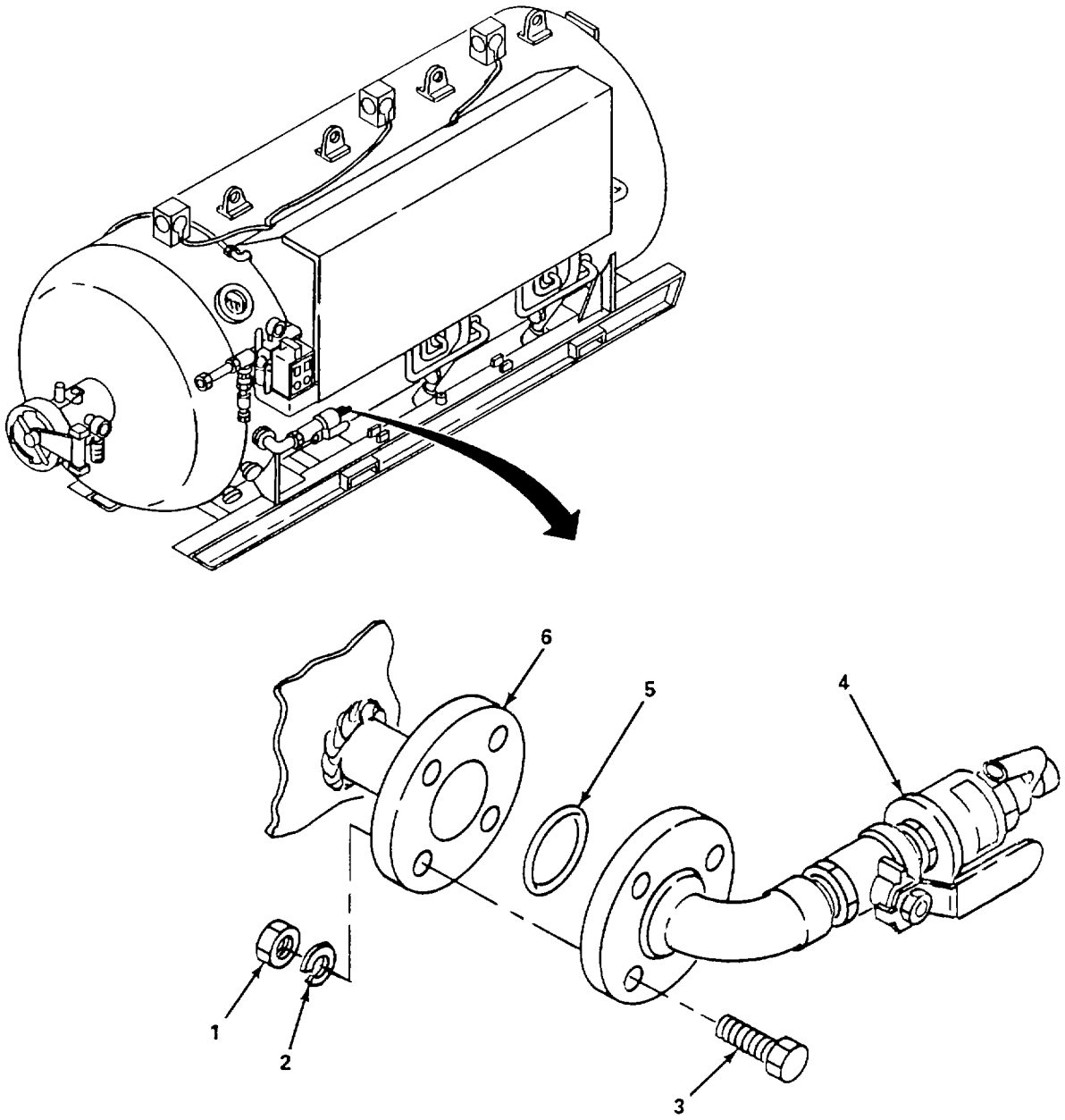


Figure 4-11. Pressure Relief Valve Assembly, Replace.

4-30. Water Valves (3/4 in.).

This task covers: **Replace**

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Valve
Repair Kit
Detergent, Nonionic (Item 8, Appendix E)

Materials/Parts (Cont)

Distilled Water (Item, 9, Appendix E)
Cloth, Lint Free (Item 6, Appendix E)
Tape, Teflon (Item 21, Appendix E)

Equipment Condition

Chamber shut down (para. 2-15).

a. *Replace*. (figure 4-12)

NOTE

There are two heater/chiller fluid valves. The replacement of the supply valve or return valve is the same.

(1) Position valve (1) to the closed position and ensure that the heater/chiller module electrical power switch is in the OFF position.

(2) Loosen fitting nut (2) and remove line (3).

(3) Keep the open end of fluid hose elevated above the level of heater/chiller module to prevent draining the system.

(4) Remove elbow (4) from valve (1).

(5) Remove valve (1) from nipple (5).

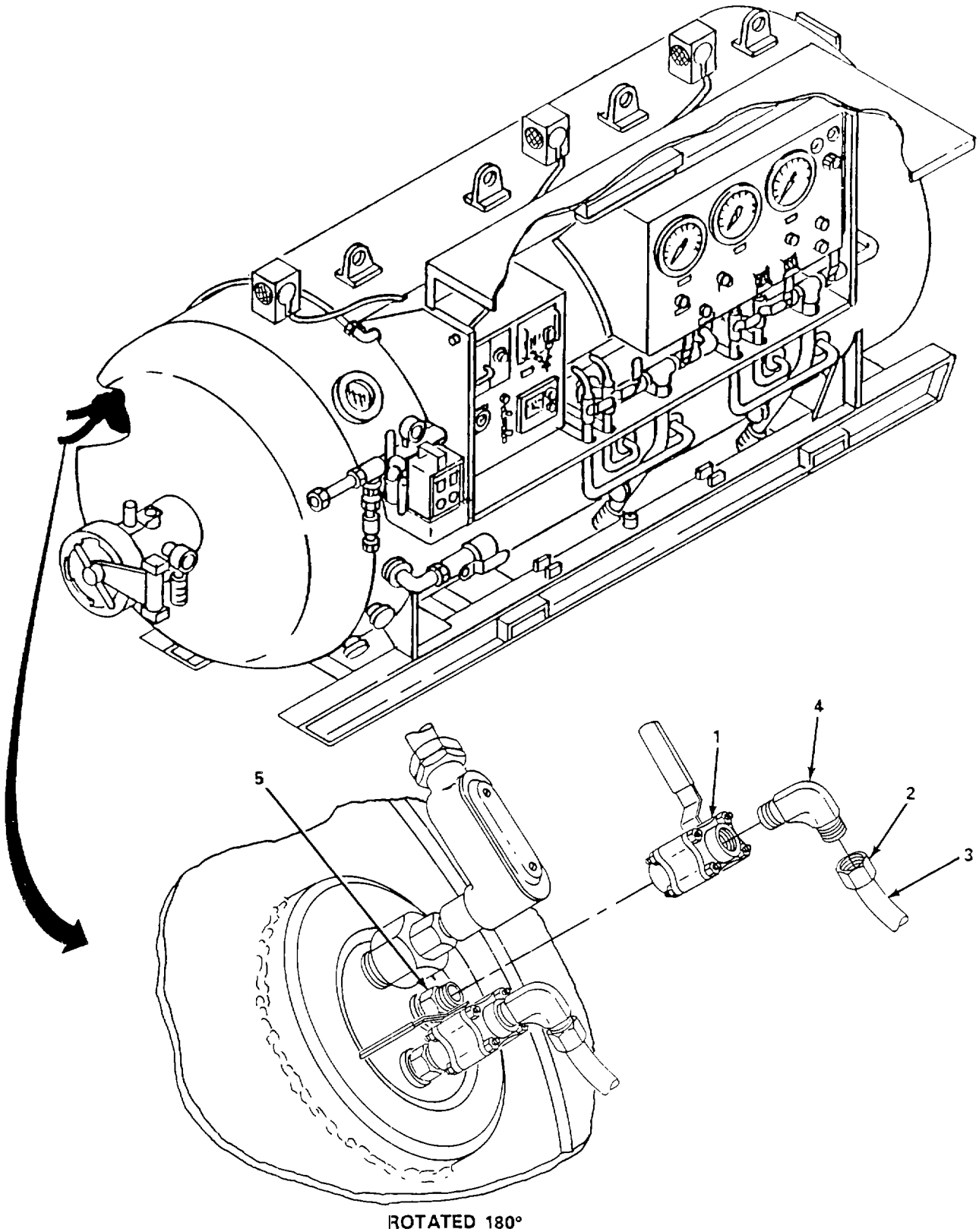


Figure 4-12. Water Valves (3/4 In.), Replace.

4-30. Water Valves (3/4 in.) (Cont).

WARNING

Leave 1 1/2 threads exposed on fitting when applying teflon tape. This will ensure that no teflon tape will hang down inside the air system Teflon tape should be wrapped in such a manner that when the fitting is tightened the tape will not loosen. Failure to wrap teflon tape correctly may result in contamination or blockage of the air system and subsequent possible injury or death to the diver.

(6) Apply teflon tape to all pipe threads.

(7) Install valve (1) on nipple (5).

(8) Install elbow (4) on valve (1).

(9) Install line (3) and tighten fitting nut (2).

(10) Open valve (1) and start up heater/chiller module to pressure check the system.

b. *Repair*. (figure 4-13)

(1) Remove heater/chiller fluid valve, see para. a. above.

(2) Remove nut (1), stem spring (2), plate (3), stop plate (4), handle (5), and spring (6).

(3) Remove nut (7), two stem springs (8), gland (9), packing support (10), top packing (11), and bottom packing (12).

(4) Remove eight nuts (13), four stud bolts (14), and two flanges (15) from body (16).

(5) Remove two preformed packings (17), seat springs (18), seats (19), support rings (20) and ball (21) from body (16).

(6) Remove stem (22), and two stem bearings (23) from body (16).

(7) Clean all components using nonionic detergent cleaner and rinse with clean distilled water.

(8) Inspect all items and replace all items that are bent, cracked, worn, or otherwise damaged.

(9) Install two stem bearings (23) on stem (22) and install stem into body (16).

(10) Install ball (21), two support rings (20), seats (19), seat springs (18), and preformed packings (17) in body (16).

(11) Install two flanges (15) on body (16) and secure with four stud bolts (14) and eight nuts (13).

(12) Install bottom packing (12), top packing (11), packing support (10), glands (9), two stem springs (8), and nut (7).

(13) Install spring (6), handle (5), stop plate (4), plate (3), stem spring (2), and nut (1).

(14) Install heater/chiller fluid valve, see para. a above.

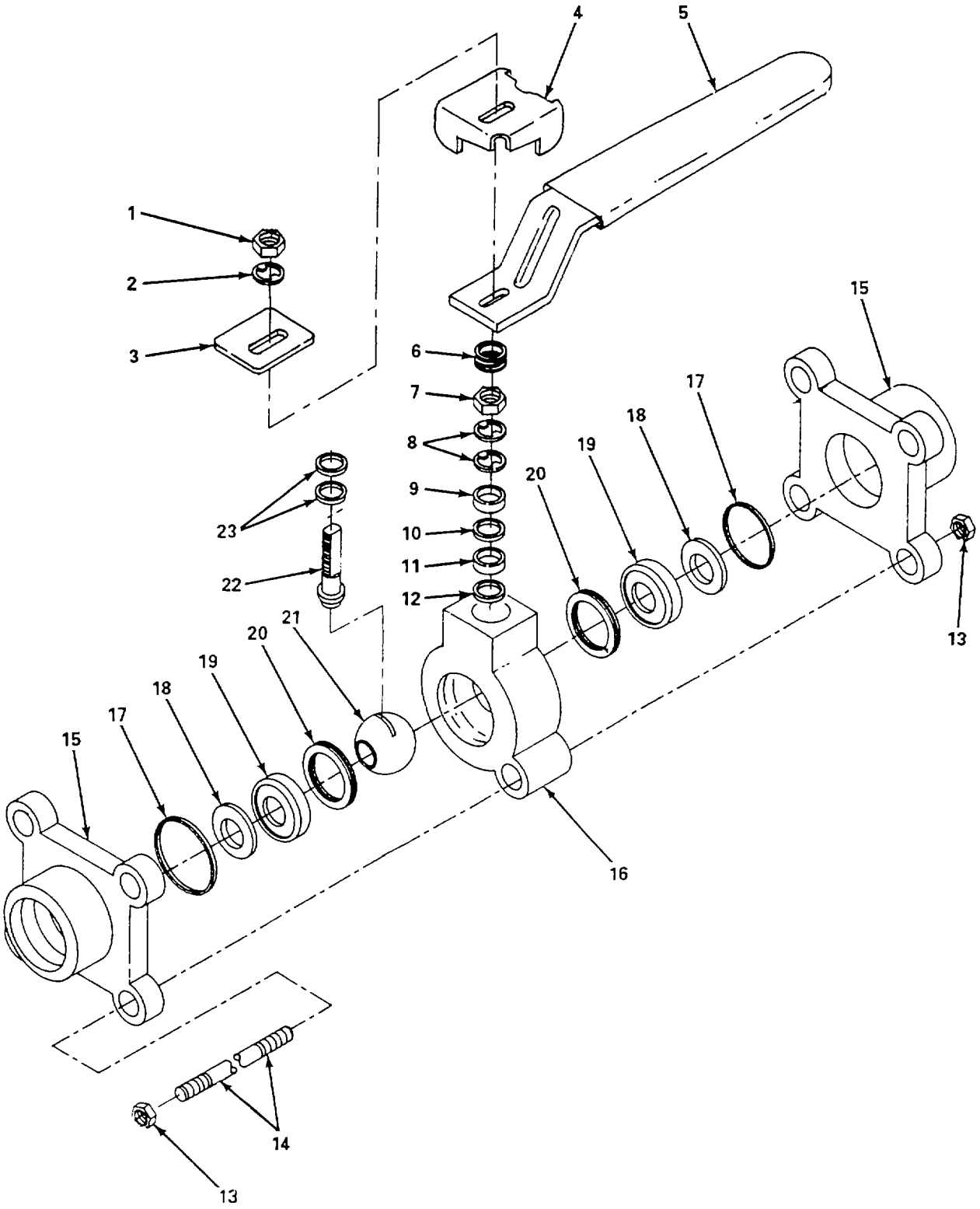


Figure 4-13. Heater/Chiller Fluid Valves Repair.

4-31. Hoses.

This task covers: **Replace**

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)
5-Gallon Container

Equipment Condition

Chamber shut down (para. 2-15).

Materials/Parts

Hoses (Supply and Return Line)
Ethylene Glycol (Item 10, Appendix E)

Replace. (figure 4-14)

(1) Move heater/chiller switch (1) on the heater/chiller module (2) to OFF position and disconnect power cord (3) from the 220 Vac electrical power source.

(2) Close heater/chiller fluid supply valve (4) and return valve (5).

(3) Loosen fitting nut (6) and remove heater/chiller fluid supply hose (7) from elbow fitting (8) and drain fluid into suitable container.

(4) Loosen fitting nut (9) and remove supply hose (7) from supply hose connection (10) on heater/chiller module (2).

(5) Loosen fitting nut (11) and remove heater/chiller fluid return hose (12) from elbow fitting (13) and drain fluid into suitable container.

(6) Loosen fitting nut (14) and remove return hose (12) from return hose connection (15) on heater/chiller module (2).

(7) Install return hose (12) on return hose connection (15) and tighten fitting nut (14).

(8) Install return hose (12) on elbow fitting (13) and tighten fitting nut (11).

(9) Install supply hose (7) on supply hose connection (10) and tighten fitting nut (9).

(10) Install supply hose (7) on elbow fitting (8) and tighten fitting nut (6).

(11) Add ethylene glycol/water mixture 25% to 75% to reservoir (16), if necessary, to replace fluid lost during removal procedure.

(12) Open heater/chiller fluid supply valve (4) and return valve (5).

(13) Connect power cord (3) on heater/chiller module (2) to 220 Vac electrical power source.

(14) Move heater/chiller switch (1) to the ON position, allowing compressor and fluid pump to build up pressure.

(15) Check connections for fluid leaks.

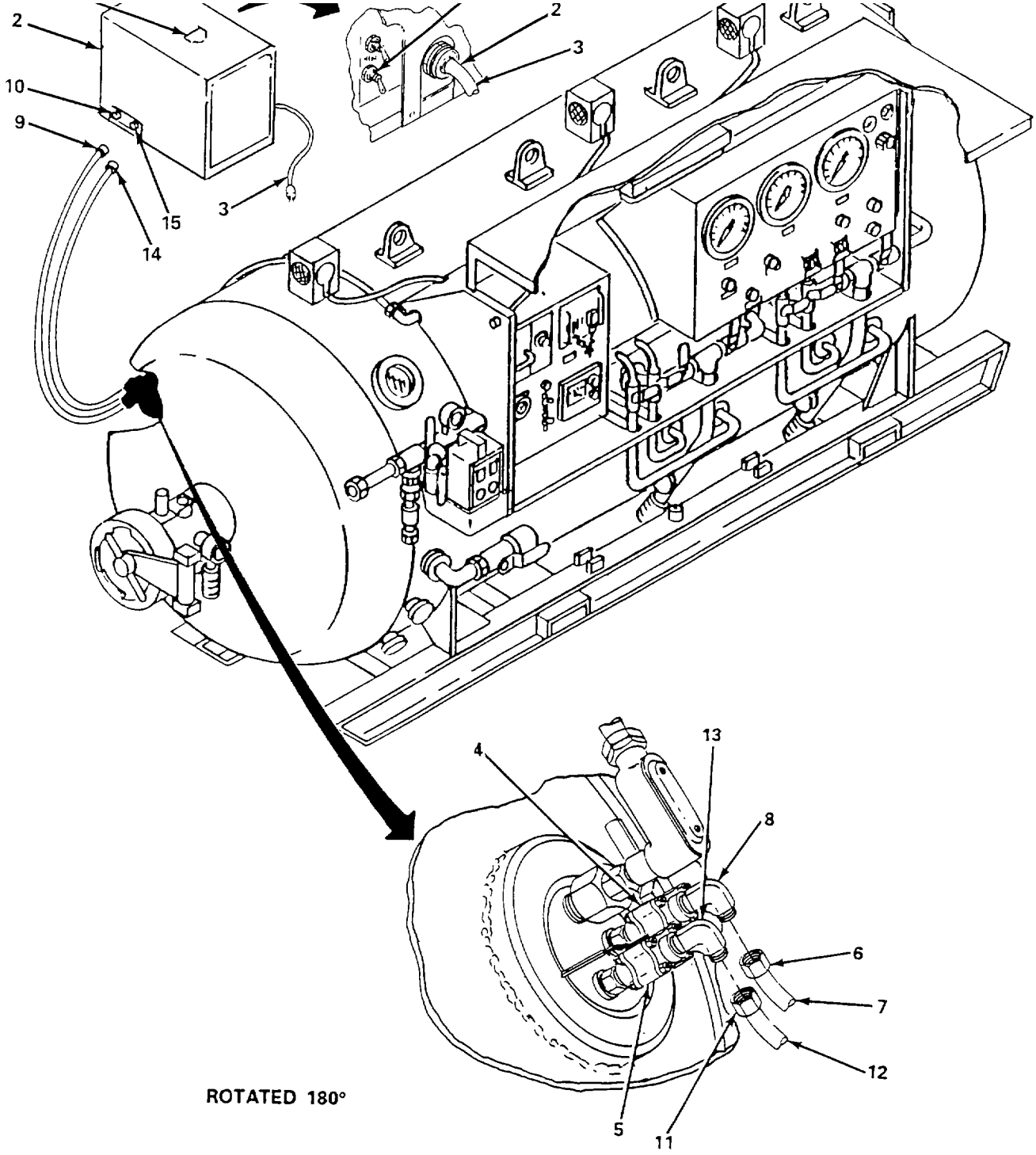


Figure 4-14. Hoses, Replace.

Figure 4-14. Hoses, Replace.

4-32. Power Supply, 28V

This task covers: **Replace**

INITIAL SETUP

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Power Supply

Equipment Condition

Chamber shut down (para. 2-15).
Double Light power source removed (para. 4-38)

Equipment Condition (Cont)

Single light power source removed (para. 4-40).
Communicator assembly removed (para. 4-43).
Portable oxygen analyzer removed (para. 4-34).
Thermocouple meter and temperature probe removed (para. 4-35).

Personnel Required:

Two

Replace. (figure 4-15)

(1) Unlatch two latches (1), open enclosure door (2) and install two supports (3), and pins (4).

(2) Remove electrical plug (5) from six plug receptacle power module (6).

(3) Remove ten nuts (7), lockwashers (8), and screws (9) and pull control panel cover (10) out far enough to reach power supply (11).

(4) Tag and disconnect electrical leads (12) from switches (13) and fuse (14).

(5) Remove electrical control panel cover (10).

(6) Tag and disconnect electrical lead (15) from terminal board (16) on power supply (11).

(7) Remove four screws (17) and remove power supply (11).

(8) Install power supply (11) and secure with four screws (17).

(9) Connect electrical leads (15) to terminal board (16) on power supply (11).

(10) Hold control panel

(11) Install electrical control panel cover (10) and secure with ten screws (9), lockwashers (8), and nuts (7).

(12) Install electrical plug (5) into six plug receptacle power module (6).

(13) Remove two pins (4), supports (3), close enclosure door (2), and secure with two latches.

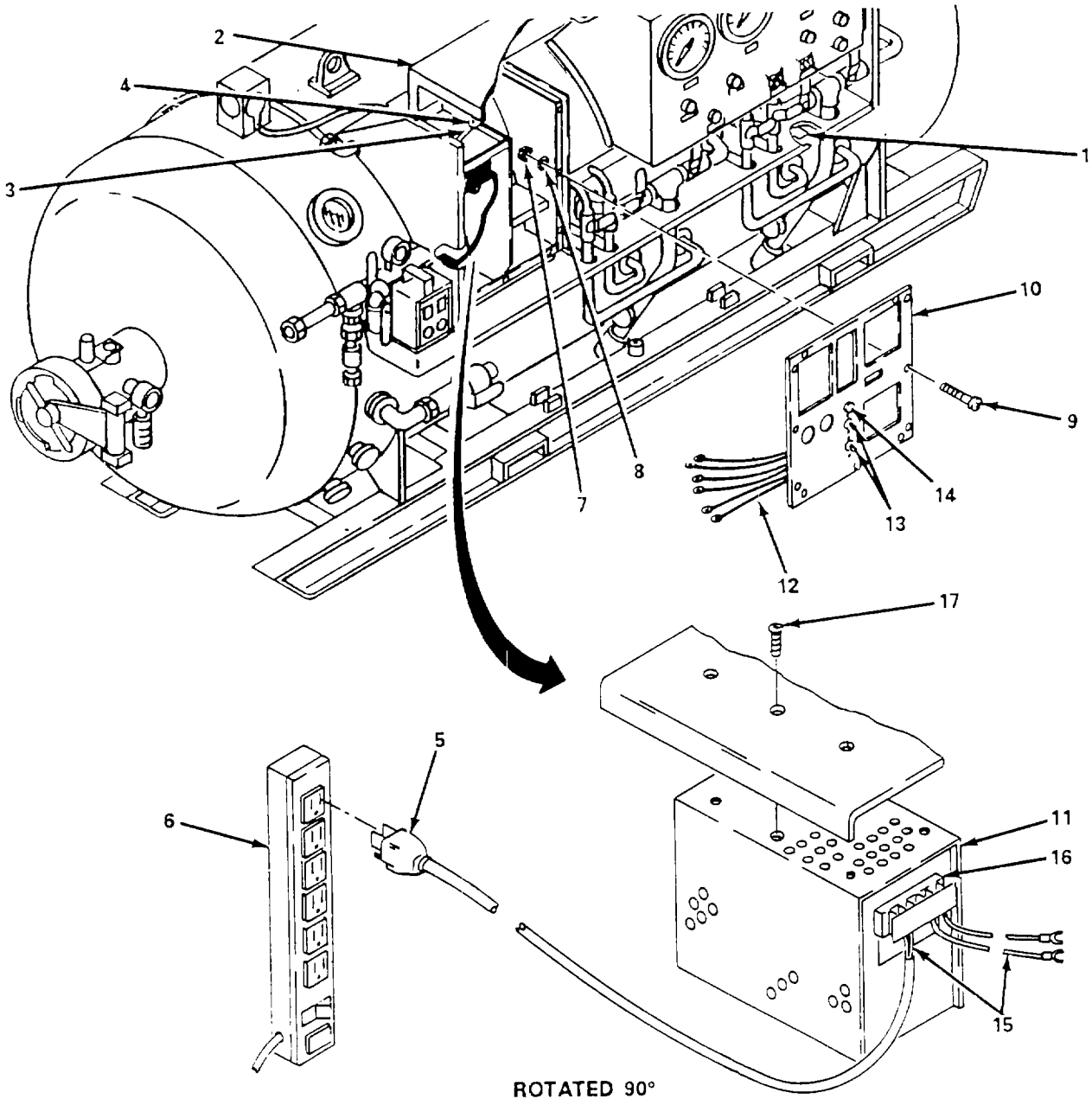


Figure 4-15. Power Supply, 28V, Replace.

FOLLOW-ON MAINTENANCE
(1) Install double light power source (para. 4-38).
(2) Install single light power source (para. 4-40).
(3) Install communication Assembly (para 4-43).
(4) Install portable oxygen analyzer (para. 4-34).
(5) Install thermocouple meter and temperature probe (para. 4-35).

4-33. Scrubber Assembly.

This task covers: **Replace**

INITIAL SETUP

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Equipment Condition

Chamber shut down (para. 2-15).
Heater/chiller unit removed (para. 4-28).

Materials/Parts

Scrubber Assembly
Bag, Plastic (Item 3, Appendix E)
Band, Rubber (Item 4, Appendix E)

Replace. (figure 4-16)

(1) Unlatch two latches (1) and remove scrubber canister (2) and gasket (3).

(2) Disconnect electrical lead (4).

(3) Remove four bolts (5) and washers (6) that secures adapter plate (7) to bracket (8) and remove adapter plate.

(4) Remove four nuts (9) and lockwashers (10) and remove scrubber assembly (11) and bushings (12).

(5) Install scrubber assembly (11) and four bushings (12) on adapter plate (8) and secure with four lockwashers (10) and nuts (9).

(6) Install adapter plate (7) on bracket (8) and secure with four bolts (5) and washers (6).

(7) Connect electrical lead (4).

(8) Install gasket (3) and scrubber canister (2) on scrubber assembly (11) and secure with two latches (1).

(9) Check operation of scrubber fan.

FOLLOW-ON MAINTENANCE
Install heater/chiller unit (para. 4-28).

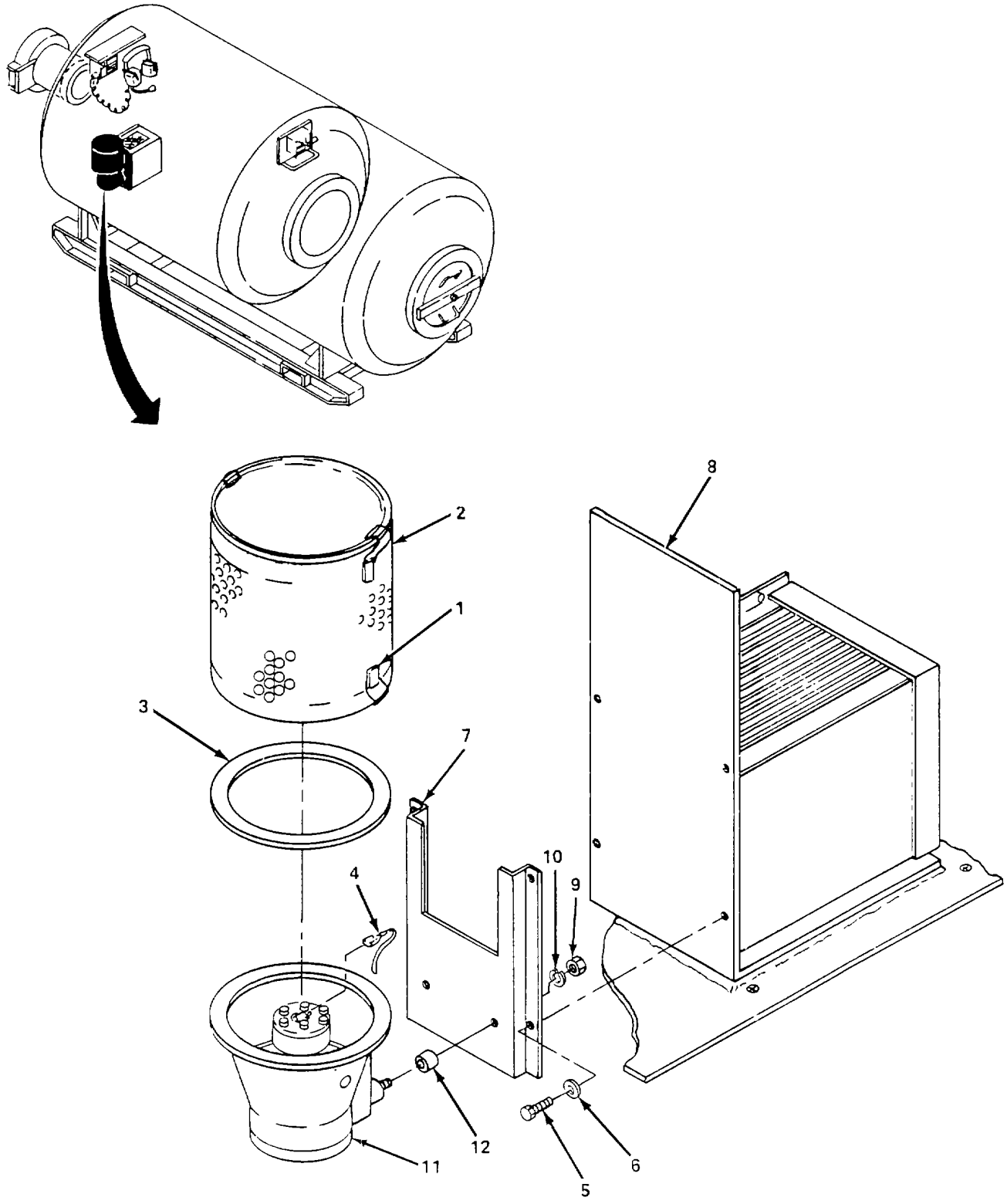


Figure 4-16. Scrubber Assembly, Replace.

4-34. Portable Oxygen Analyzer (POA).

This task covers: Replace

INITIAL SETUP

Tools	*Materials/Parts*
General Mechanic's Tool Kit (NSN 5180-00-177-7033)	Portable Oxygen Analyzer

Replace. (figure 4-17)

(1) Unlatch two latches (1), open hood assembly door (2) and install two supports (3), and pins (4).

(2) Disconnect portable oxygen analyzer electrical power cable (5) from the power strip (6).

(3) Using handle, pull oxygen analyzer (7) out of control panel (8) far enough to set it down on chamber shelf.

(4) Remove electrical cable (5) from panel (8).

(5) Remove rubber grommet (9) from hole in side panel of control panel (8).

(6) Slide probe assembly (10) through hole in side panel, and install black protective cap (11) on probe assembly (10).

(7) Remove analyzer (7) from control panel (8).

(8) Remove black protective cap (11) from probe assembly and slide probe assembly (10) through hole in side panel (8).

(9) Install rubber grommet (9) in hole in side panel of control panel (8).

(10) Position analyzer close to opening in control panel (8).

(11) Route electrical power cable (5) through hole in panel (8).

(12) Slide analyzer (7) into control panel (8).

(13) Connect electrical power cable (5) to power strip (6).

(14) Remove two pin (4), supports (3), close hood assembly door (2), and secure with two latches (1).

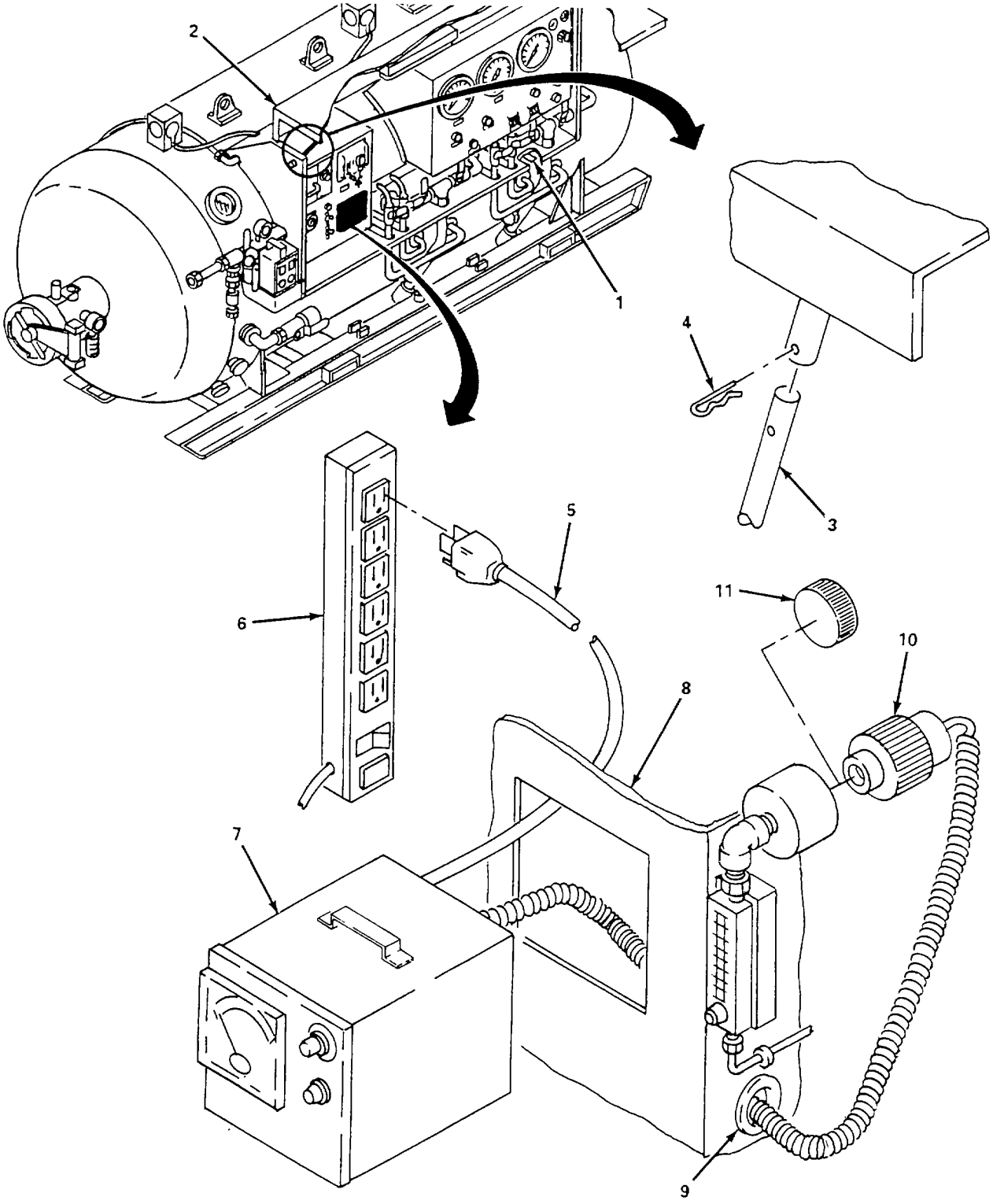


Figure 4-17. Portable Oxygen Analyzer (POA), Replace.

4-35. Thermocoupler Meter and Temperature Probe.

This task covers: Replace

INITIAL SETUP

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Equipment Condition

Chamber shut down (para. 2-15).

Materials/Parts

Digital Thermocouple Meter
Temperature Probe

Replace. (figure 4-18)

(1) Unlatch two latches (1), open hood assembly door (2), and install two supports (3) and pins (4)

(2) Disconnect the power strip electrical plug (5) from the GFI (6).

(3) Loosen two cross head screws (7) and carefully pull off plastic face plate (8).

(4) Pull digital thermocouple meter (9) out of electrical control panel (10) far enough to provide access to the electrical leads (11) connected to the back of the meter.

(4) Tag and remove electrical leads (11) and remove meter (9).

(5) Disconnect probe (12) from quick disconnect (13).

(6) Install temperature probe (12) into quick disconnect (13).

(7) Connect electrical leads (11) to meter (9) and remove tags.

(8) Install meter into electrical control panel (10).

(9) Install plastic face plate (8) and secure with two cross head screws (7)

(10) Connect power strip electrical plug (5) to the GFI (6).

(11) Remove two pins (4), supports (3), close hood assembly door (2) and secure with two latches (1).

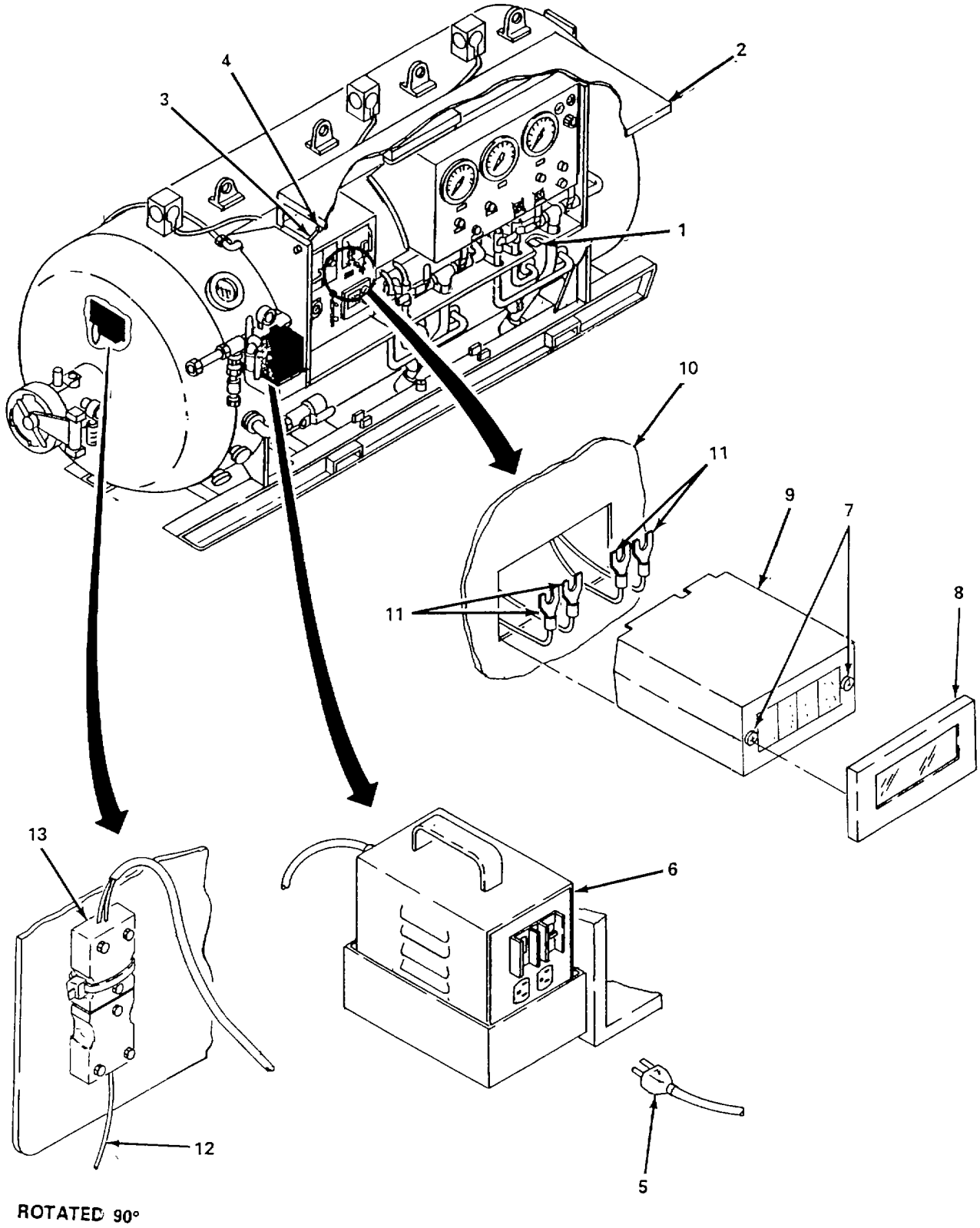


Figure 4-18. Thermocoupler Meter and Temperature Probe, Replace.

4-36. Ground Fault Interrupter.

This task covers: **Replace**

INITIAL SETUP

Materials/Parts	*Equipment Condition*
Ground Fault Interrupter	Chamber shut down (para. 2-15).

Replace. (figure 4-19)

(1) Disconnect external power source (1) from GFI (2).

(2) Disconnect the power strip electrical plug (3) from GFI (2).

(3) Disconnect the fluorescent electrical plug (4) from GFI (2).

(4) Using GFI lifting handle (5) remove GFI from holding bracket (6).

(5) Using GFI lifting handle (5), install GFI into holding bracket (6).

(6) Connect the fluorescent electrical plug (4) to GFI (2).

(7) Connect the power strip electrical plug (3) to GFI (2).

(8) Connect external power source (1) to GFI (2).

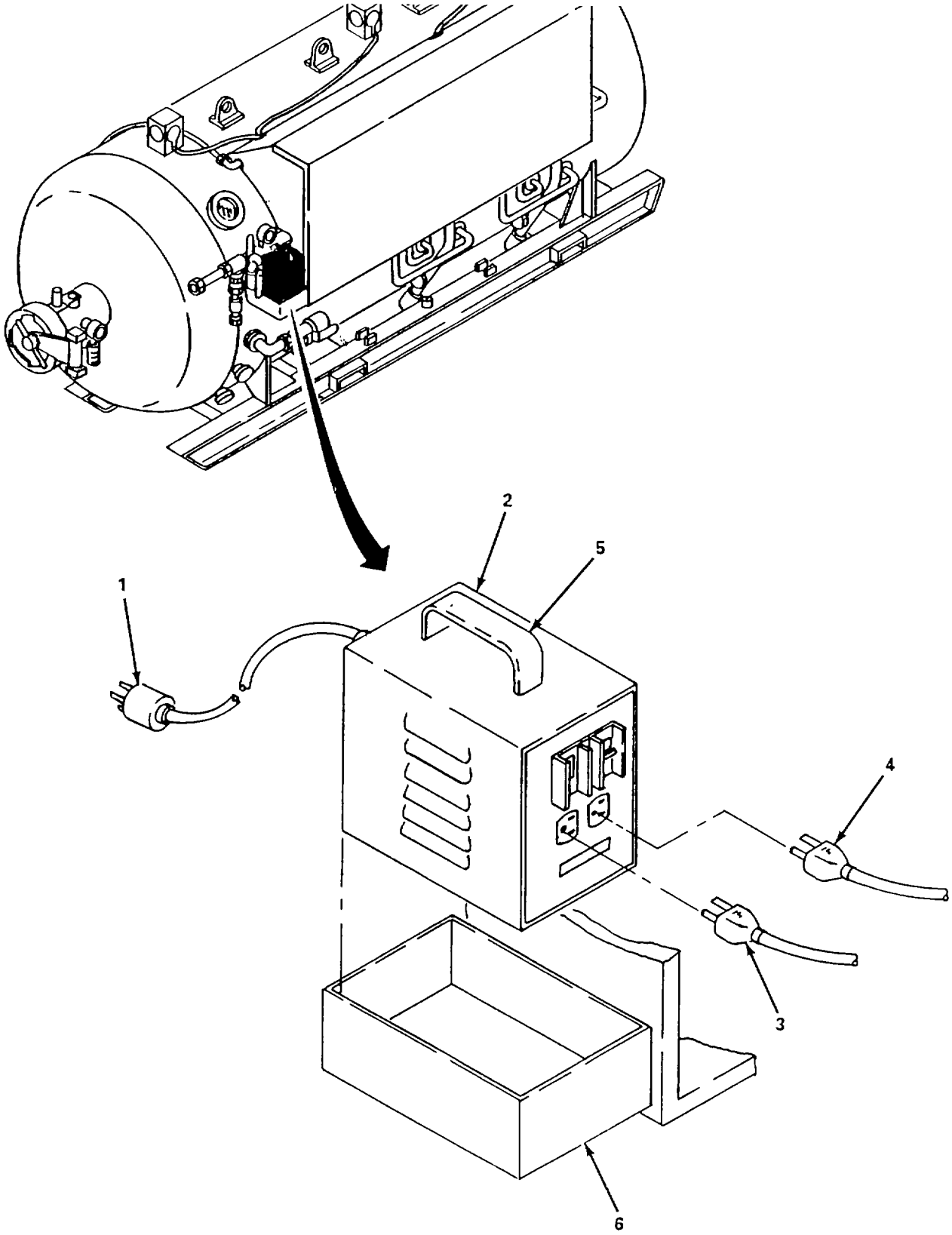


Figure 4-19. Ground Fault Interrupter, Replace.

4-37. Six Plug Receptacle Power Strip.

This task covers: **Replace**

INITIAL SETUP

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Equipment Condition

Chamber shut down (para. 2-15).

Materials/Parts

Power Strip

Replace. (figure 4-20)

(1) Disconnect the power strip electrical plug (1) from the GFI (2).

(2) Tag and disconnect all electrical plugs (3) from power strip (4).

(3) Remove two screws (5) and remove power strip (4).

(4) Install the power strip (4) and secure with two screws (5).

(5) Connect all electrical plugs (3) to power strip (4).

(6) Connect the power strip electrical plug (1) to the GFI (2).

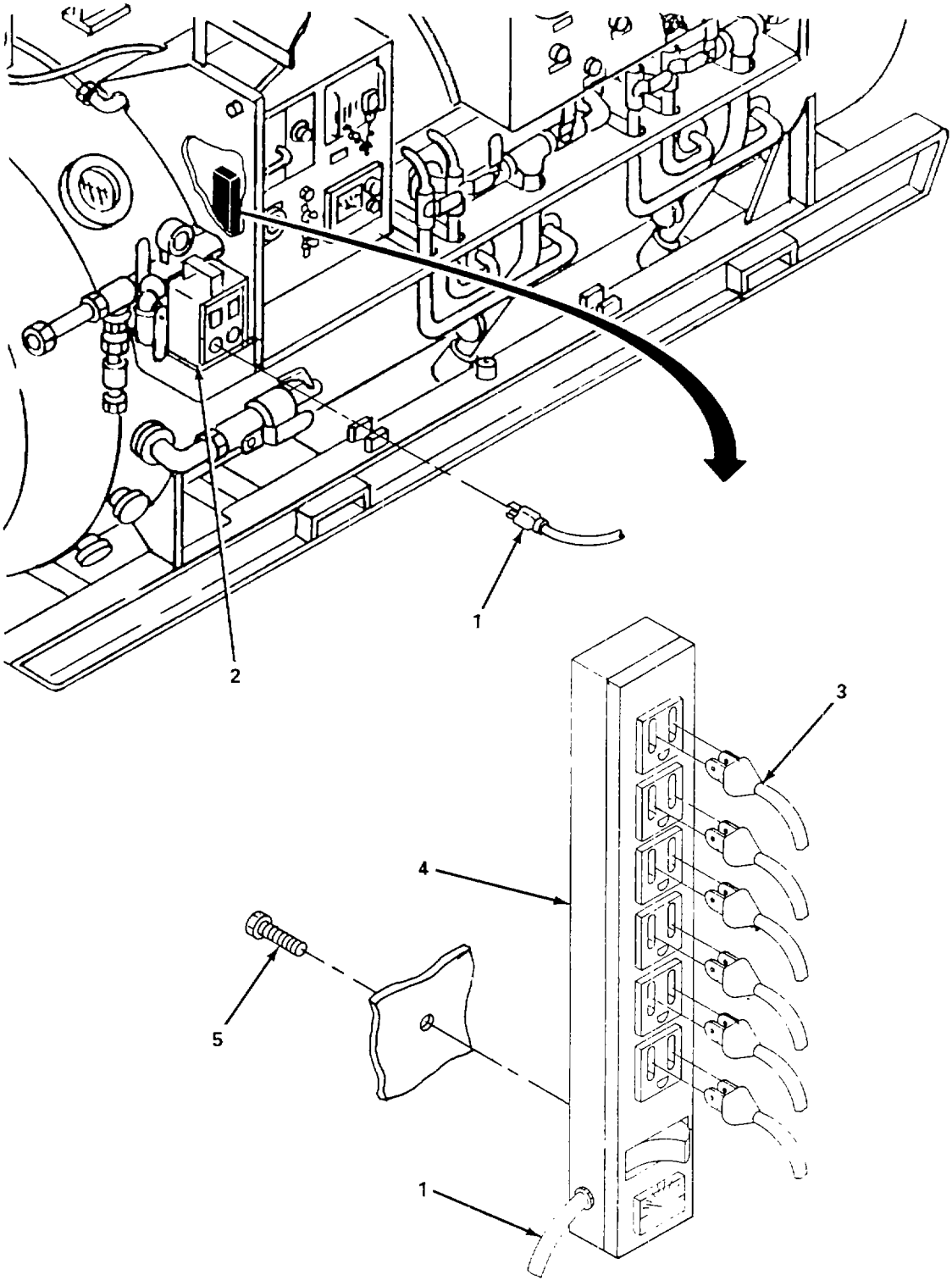


Figure 4-20. Six Plug Receptacle Power Strip, Replace.

4-38. Double Light Power Supply (Inner Lock).

This task covers: **Replace**

INITIAL SETUP

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Equipment Condition

Chamber shut down (para. 2-15).

Materials/Parts

Double Light Power Supply
Fuses

a. *Replace*. (figure 4-21)

(1) Unlatch two latches (1), open hood assembly door (2) and install two supports (3) and pins (4).

(2) Remove electrical plug (5) from six plug receptacle power strip (6).

(3) Remove two electrical connectors (7) from two light sources (8).

(4) Remove four screws (9) and remove double light power supply (10) from control panel (11).

(5) Install double light power supply (10) into control panel (11) and secure with four screws (9).

(6) Install two electrical connectors (7) on two light sources (8).

(7) Install electrical plug (5) into six plug receptacle power module (6).

(8) Remove two pins (4), supports (3), close hood assembly door (2) and secure with two latches (1).

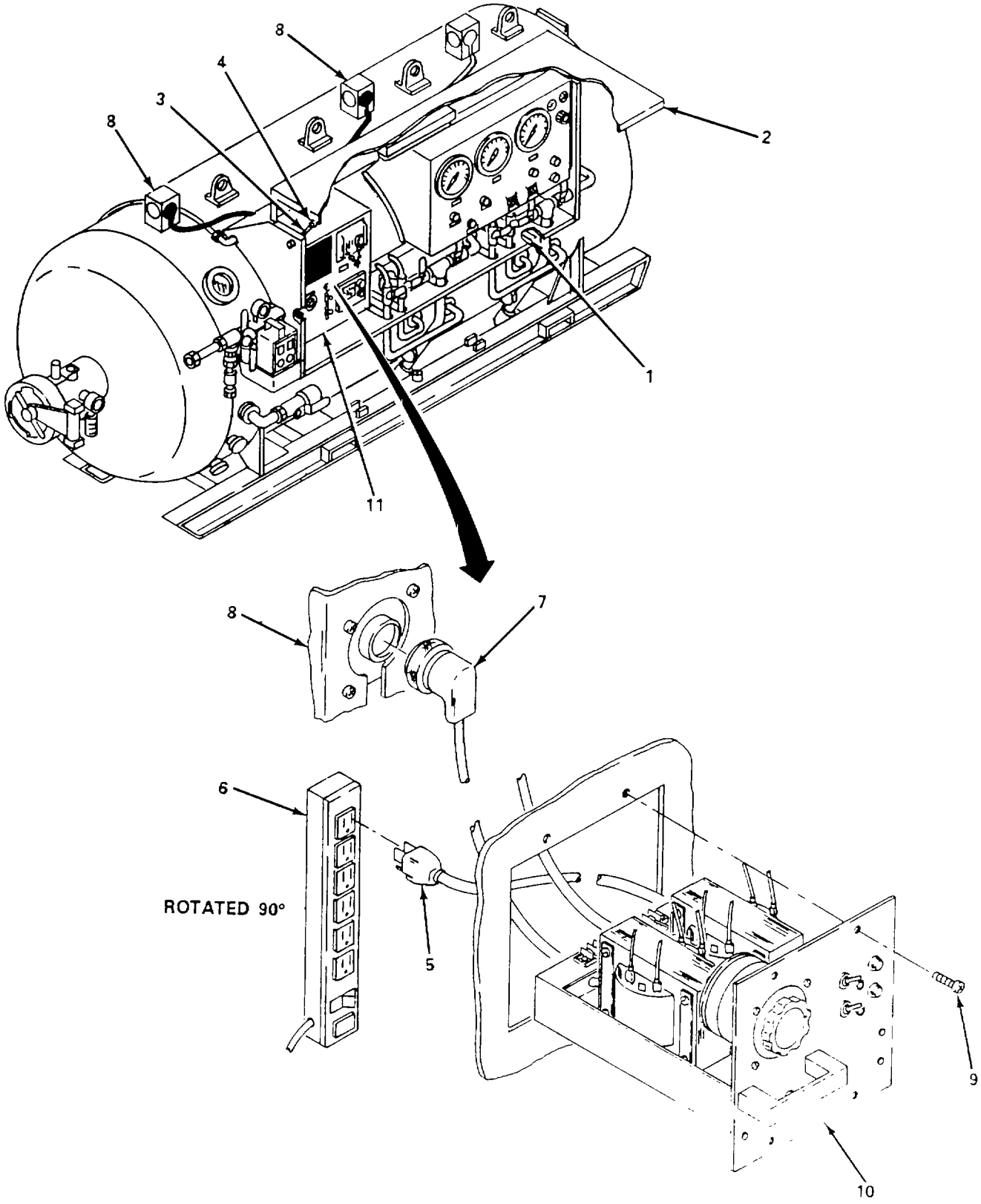


Figure 4-21. Double Light Power Supply (Inner Lock), Replace.

4-38. Double Light Power Supply (Inner Lock) (Cont).

b. *Repair* (figure 4-22).

NOTE

There are three fuses. Replacement of each fuse is the same.

(1) Tag and disconnect electrical lead (1).

(2) Twist and remove fuse (2).

(3) Remove nut (3) and fuse holder (4).

(4) Install fuse holder (4) in cover (5) and secure with nut (3).

(5) Install fuse (2) and connect electrical lead (1).

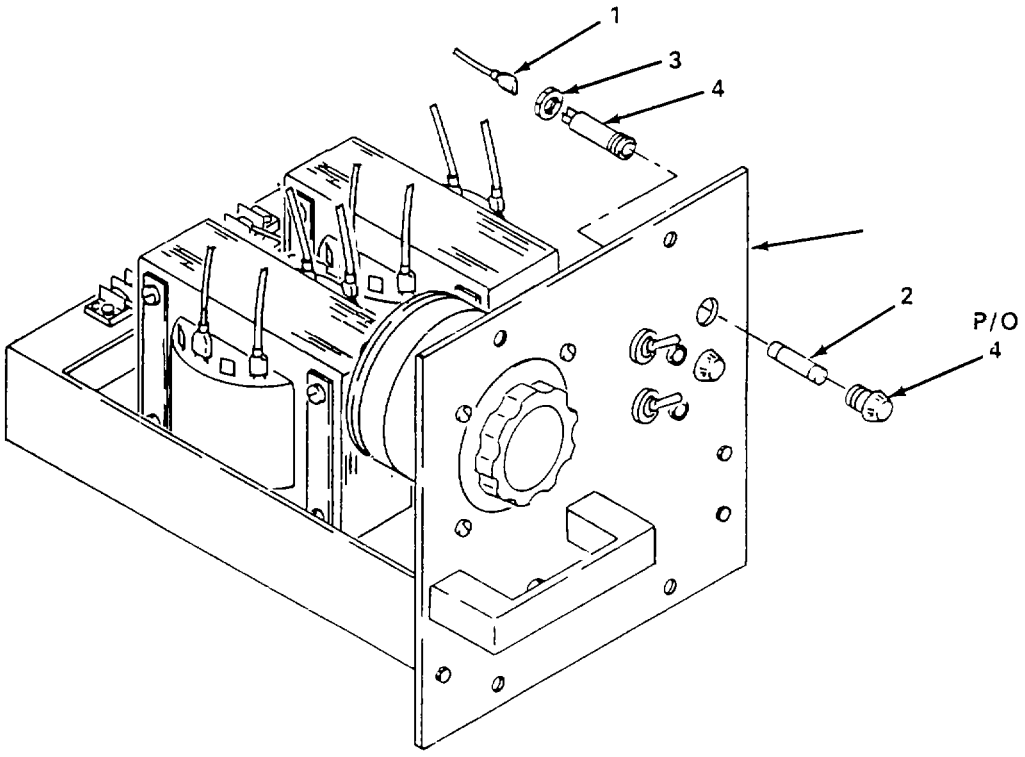


Figure 4-22. Double Light Power Supply (Inner Lock) Fuse, Replace.

4-39. Light Source

This task covers:

a. Replace **b. Repair**

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Light Source
Lamp

Equipment Condition

Chamber shut down (para. 2-15).

a. *Replace*. (figure 4-23)

NOTE

There are three light sources. Replacement of each light source is the same.

(1) Unlatch two latches (1), open hood assembly door (2) and install two supports (3) and pins (4).

NOTE

Each light source has its own ON/OFF switch.

(2) Move ON/OFF toggle switch (5) for the light to be replaced to the OFF position and turn RESET switch (6) on GFI OFF (down).

(3) Disconnect the electrical connector (7) from the light source (8).

(4) Remove four bolts (9) and washers (10) and remove cover (11).

(5) Loosen nut (14) and pull light source (8) off of light probe (12).

(6) Loosen light probe fitting nut (13) and remove light probe (12).

(7) Install light probe (12) and tighten light probe fitting nut (13).

(8) Install light source (8) on light probe (12) and tighten nut (14).

(9) Install cover (11) and secure with four bolts (9) and washers (10).

(10) Connect electrical connector (7) to light source (8).

(11) Turn RESET switch (6) on GFI to ON (up) and move ON/OFF toggle switch (5) to ON position.

(12) Remove two pins (4), supports (3), close hood assembly door (2), and secure with two latches (1).

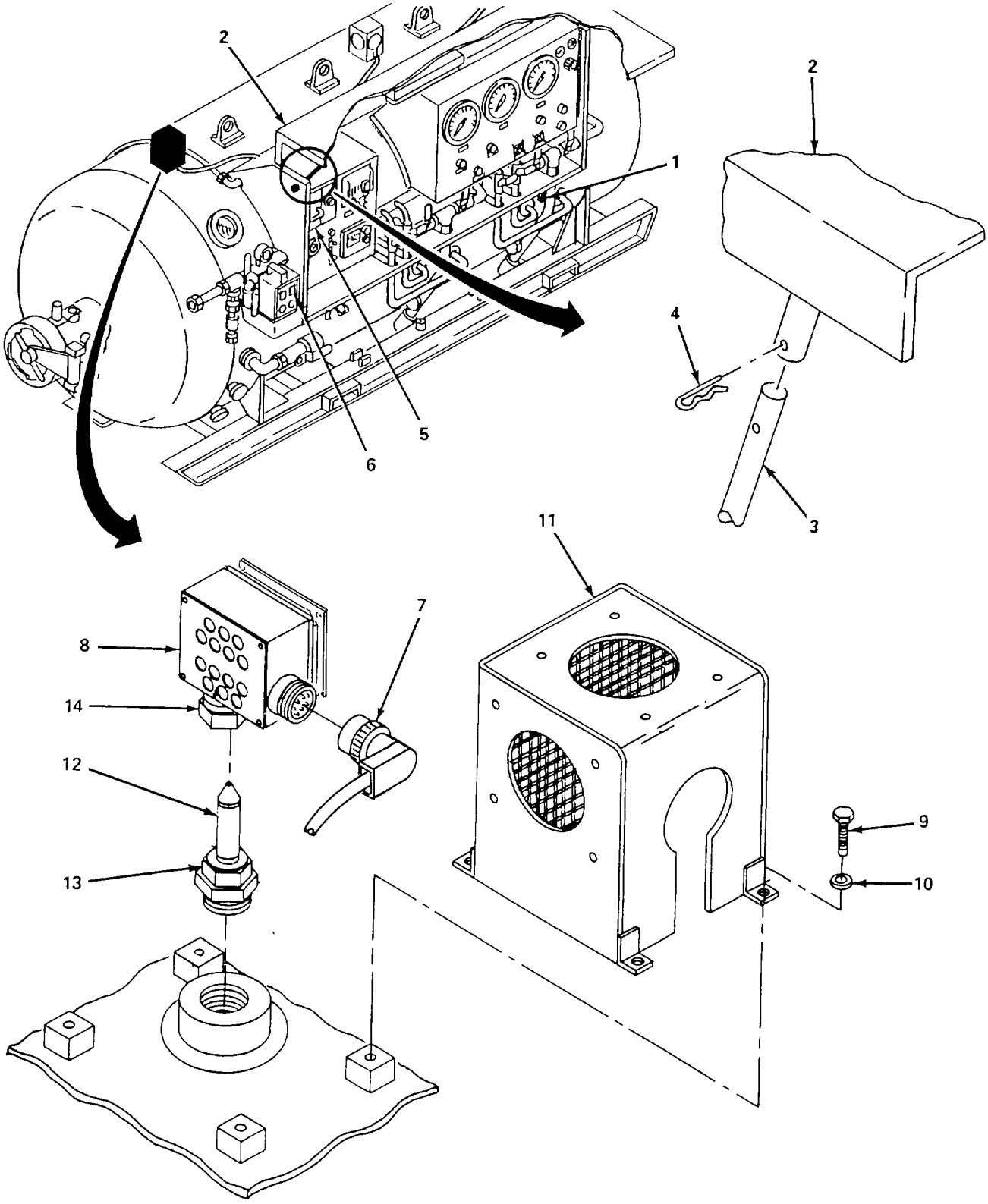


Figure 4-23. Light Source, Replace.

4-39. Light Source (Cont).

b. *Repair*. (figure 4-24)

(1) Remove light source cover (step 4, para. a. above).

(2) Remove four screws (1) and remove cover (2).

(3) Lift lamp ejector lever (3) away from lamp (4) and remove lamp.

(4) Install lamp (4) In socket (5) and snap lamp ejector lever (3) over body of lamp.

(5) Install cover (2) and secure with four screws (1).

(6) Install light source cover (step 9, para a. above).

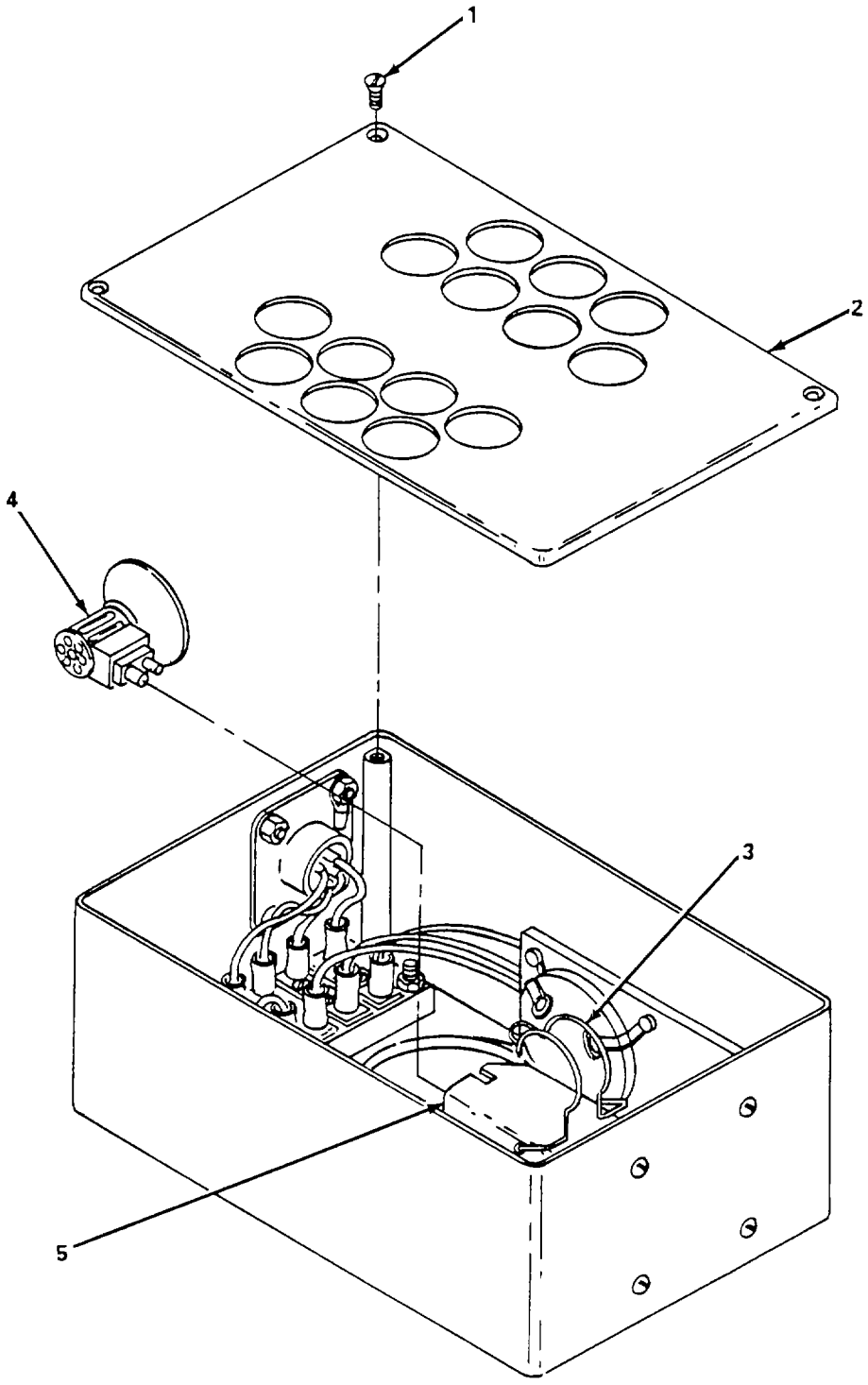


Figure 4-24. Light Source, Repair.

4-40. Single Light Power Supply (Outer Lock).

This task covers:

a. Replace **b. Repair**

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Single Light Power Supply
Detergent, Nonionic (Item 8, Appendix E)

Materials/Parts (Cont)

Distilled Water (Item 9, Appendix E)
Cloth, Lint-free (Item 6, Appendix E)

Equipment Condition

Chamber shutdown (para. 2-15).

a. *Replace.* (figure 4-25)

(1) Unlatch two latches (1), open hood assembly door (2) and install two supports (3) and pins (4).

(2) Remove electrical plug (5) from six plug receptacle power strip (6).

(3) Remove electrical connector (7) from light source (8).

(4) Remove two screws (9) and remove single light power supply (10) from control panel (11).

(5) Install single light power supply (10) into control panel (11) and secure with two screws (9).

(6) Install electrical connector (7) on light source (8).

(7) Install electrical plug (5) into six plug receptacle power module (6).

(8) Remove two pins (4), supports (3), close hood assembly door (2) and secure with two latches (1).

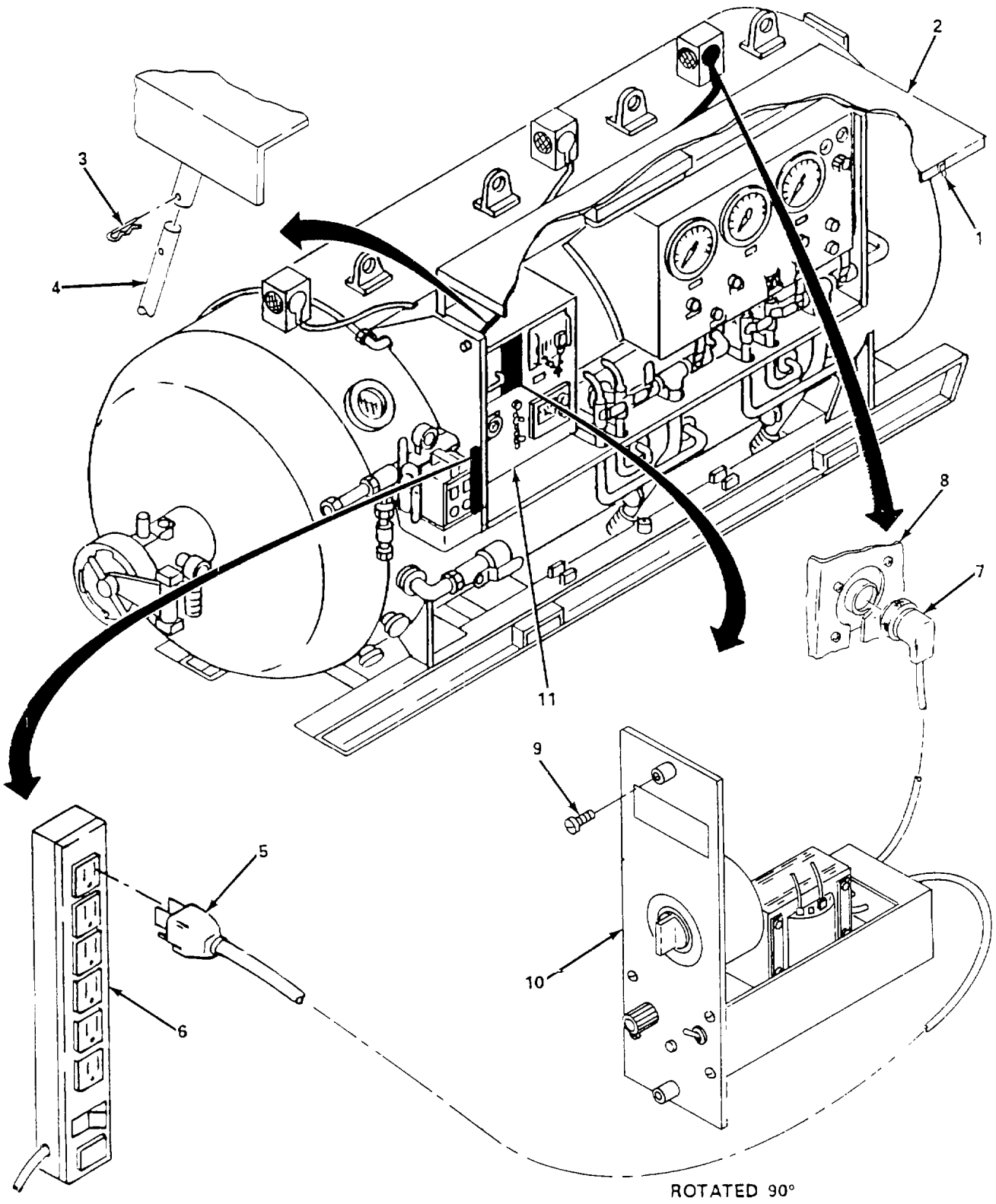


Figure 4-25. Single Light Power Supply (Outer Lock), Replace.

5-40. Single Light Power Supply (Outer Lock) (Cont).

b. *Repair*. (figure 4-26)

(1) Tag and disconnect electrical leads (1).

(2) Twist and remove fuse (2).

(3) Remove nut (3) and fuse holder (4).

(4) Install fuse holder (4) in cover (5) and secure with nut (3).

(5) Install fuse (2) and connect electrical lead (1).

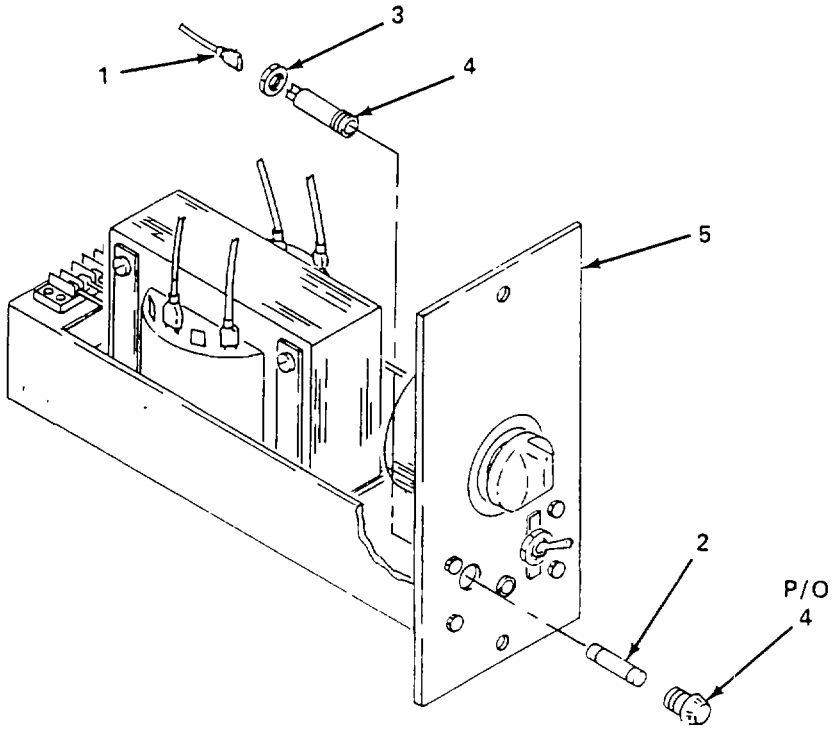


Figure 4-26. Single Light Power Supply (Outer Lock) Fuse, Replace.

4-40. Single Light Power Supply (Outer Lock).

This task covers:

a. Replace **b. Repair**

INITIAL SETUP:

Tools	*Materials/Parts*
General Mechanic's Tool Kit (NSN 5180-00-177-7033)	Fluorescent Light Assembly Detergent, Nonionic (Item 8, Appendix E) Distilled Water (Item 9, Appendix E) Cloth, Lint-free (Item 6, Appendix E)

a. *Replace*. (figure 4-27)

(1) Unlatch two latches (1), open hood assembly door (2), and in stall two supports (3) and pins (4).

(2) Remove electrical plug (5) from the GFI (6).

(3) Remove eleven screws (7) and remove light assembly (8) from housing (9).

(4) Remove four nuts (10), lockwashers (11), and screws (12) and remove housing (9) and light assembly (8).

(5) Position housing (9) on enclosure door (2) and secure with four screws (12), lockwashers (11), and nuts (10).

(6) Install light assembly (8) into housing (9) and secure with eleven screws (7).

(7) Install electrical plug (5) into GFI (6).

(8) Remove two pins (4), supports (3), close hood assembly door (2) and secure with two latches (1).

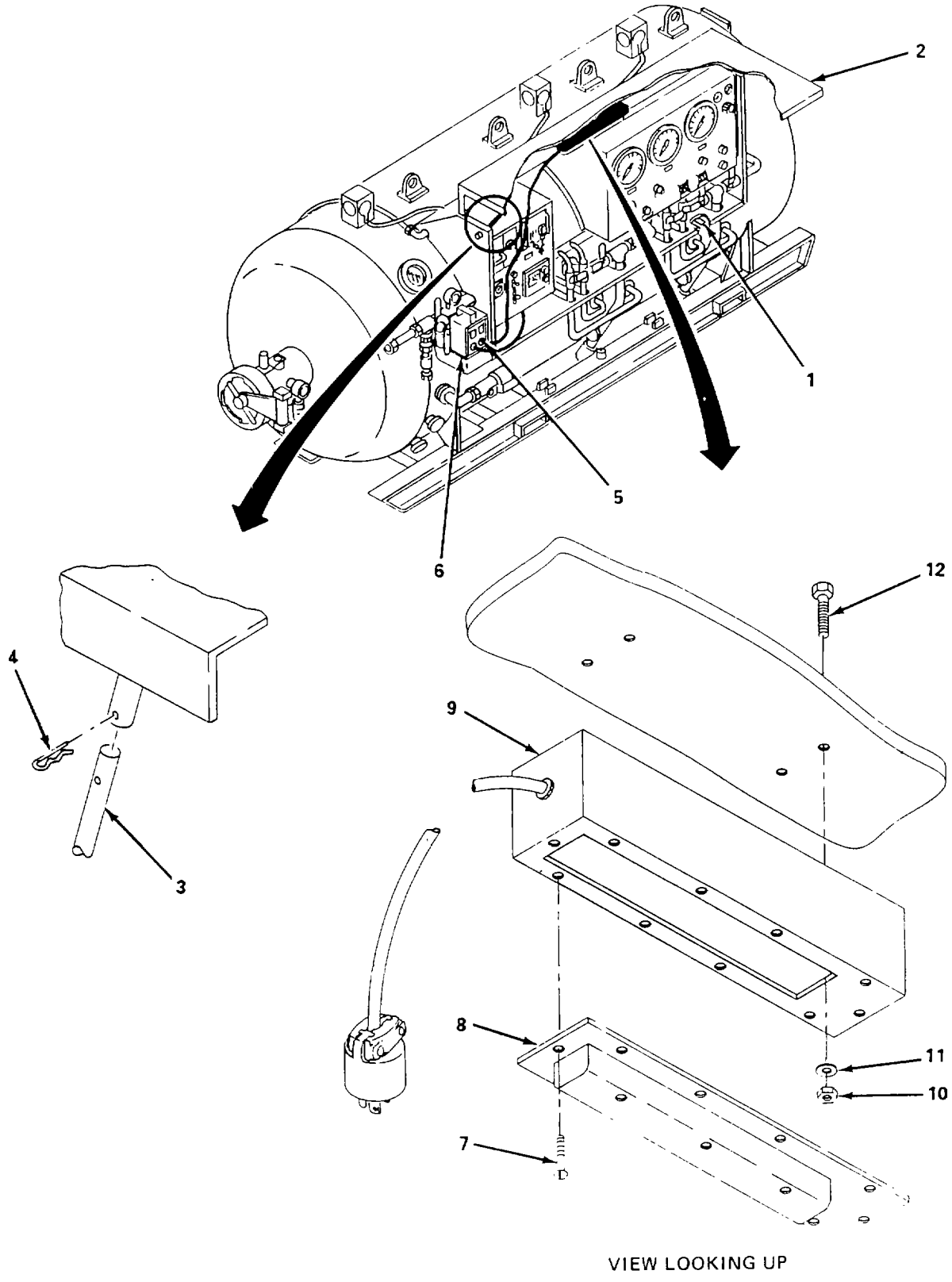


Figure 4-27. Fluorescent Light Assembly, Replace.

4-41. Fluorescent Light Assembly (Cont).

b. *Repair.* (figure 4-28)

(1) Loosen three screws (1) and remove cover (2).

(2) Remove three plastic washers (3), spacer (4), and gaskets (5) from screws (1).

(3) Remove tube (6) from light assembly (7) and remove clip (8) from tube.

(4) Inspect all components and replace all components that are damaged.

(5) Install clip (8) on tube (6) and install tube into light assembly (7).

(6) Install three gaskets (5) on screws (1) and install screws in cover (2), and install spacers (4) and plastic washers (3).

(7) Install cover (2) on light assembly (7) and tighten screws (1).

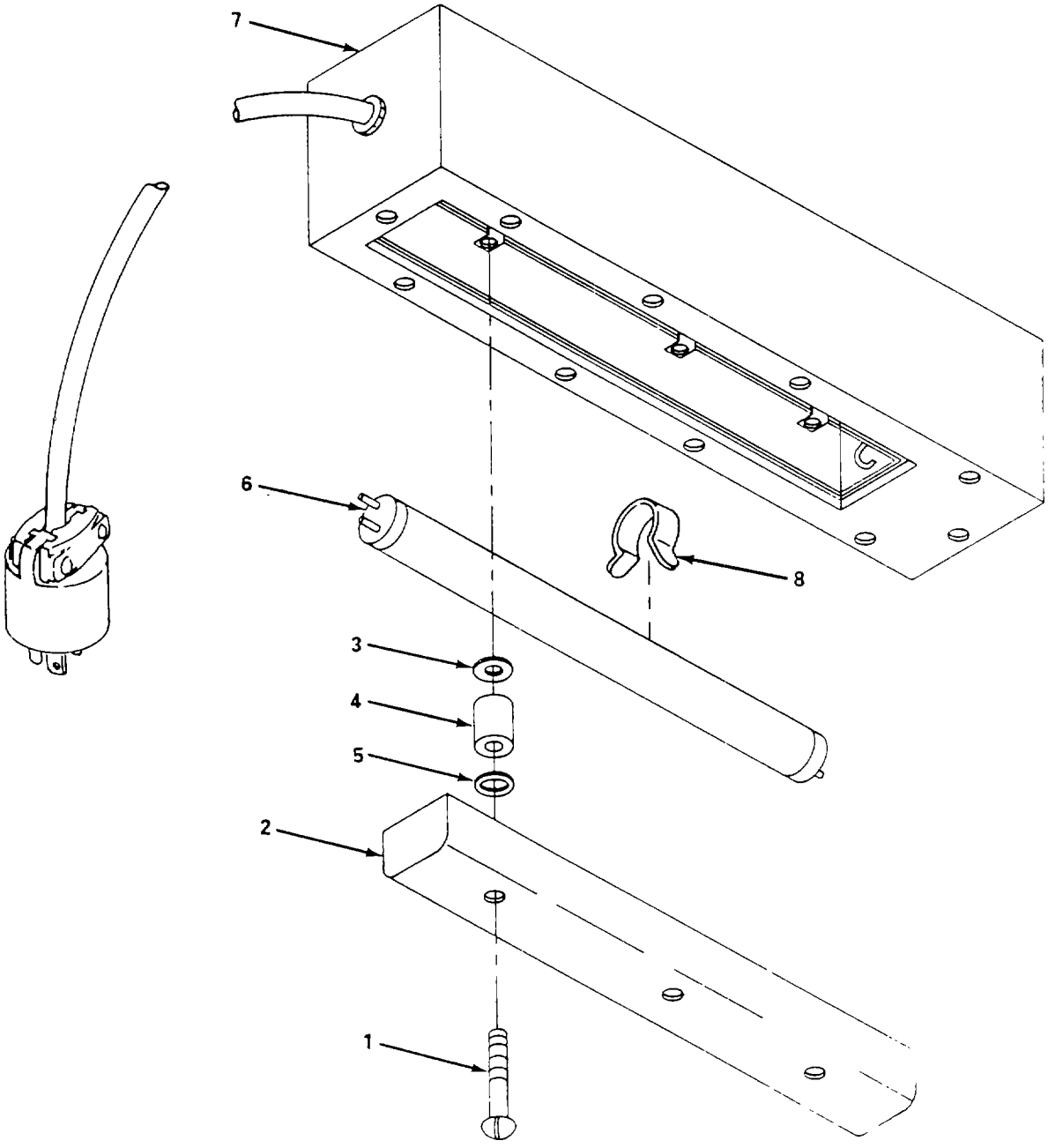


Figure 4-28. Fluorescent Light Assembly, Repair.

4-42. Wiring Harness

This task covers:

Repair

INITIAL SETUP:

Materials/Parts

Fuse

Repair. (figure 4-29)

(1) Remove fuse holder (1) and cartridge fuse (2).

(2) Inspect for blown fuse.

(3) Install good fuse (2) and secure with fuse holder (1).

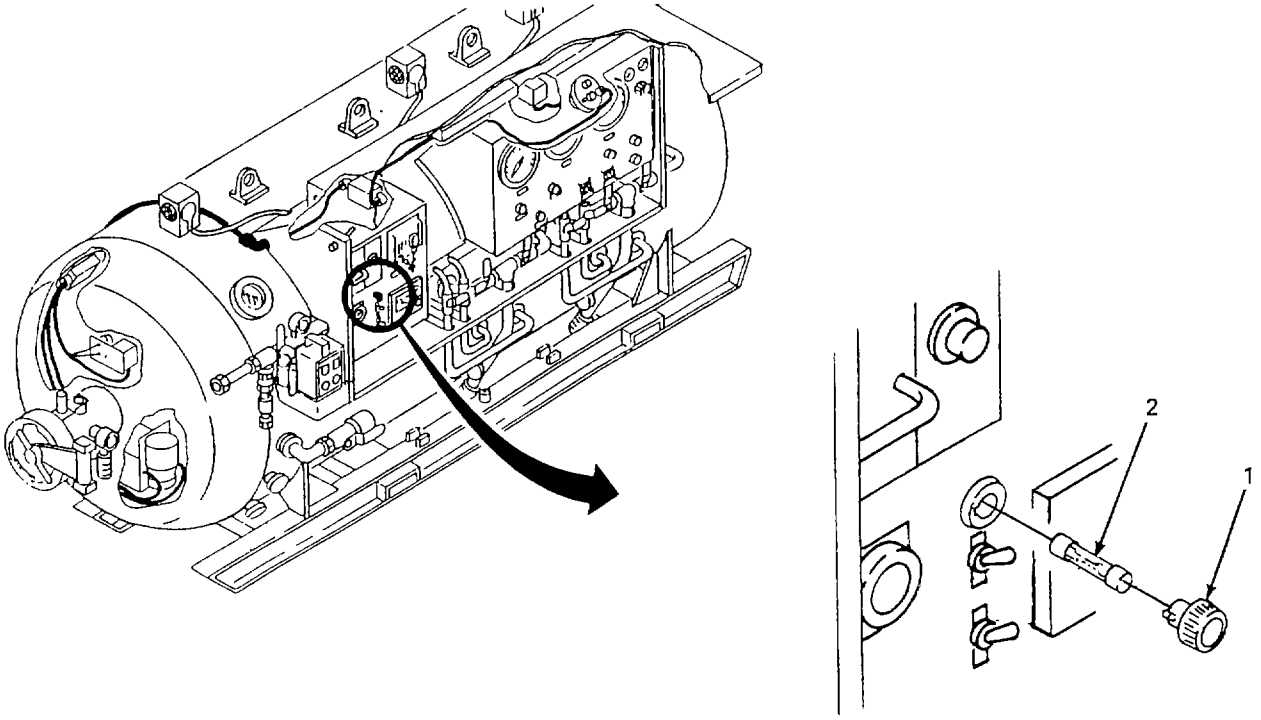


Figure 4-29. Wiring Harness, Fuse Replace.

4-43. Communicator Assembly

This task covers:
Replace

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Personnel Required

Two

Materials/Parts

Communicator Assembly

Replace. (figure 4-30)

(1) Unlatch two latches (1), open hood assembly door (2), and install two supports (3) and pins (4).

(2) Disconnect communicator assembly electrical plug (5) from the power strip (6).

(3) Disconnect hand held MIC (7) from communicator assembly (8).

(4) Disconnect hand held MIC cables (9) from communicator assembly (8).

(5) Remove four screws (10) and pull communicator assembly (8) out far enough to provide access the back of the assembly to disconnect electrical cable.

(6) Disconnect electrical cable (11) from J-6 connector.

(7) Remove communicator assembly (8) from control panel (12).

(8) Connect electrical cable (11) to J-6 connector.

(9) Install communicator assembly (8) into control panel (12) and secure with four screws (10).

(10) Connect hand held MIC cables (9) to communicator assembly (8).

(11) Connect hand held MIC to communicator assembly (8).

(12) Connect communicator assembly electrical plug (5) to power strip (6).

(13) Remove two pins (4), supports (3), close hood assembly door (2), and secure with two latches (1).

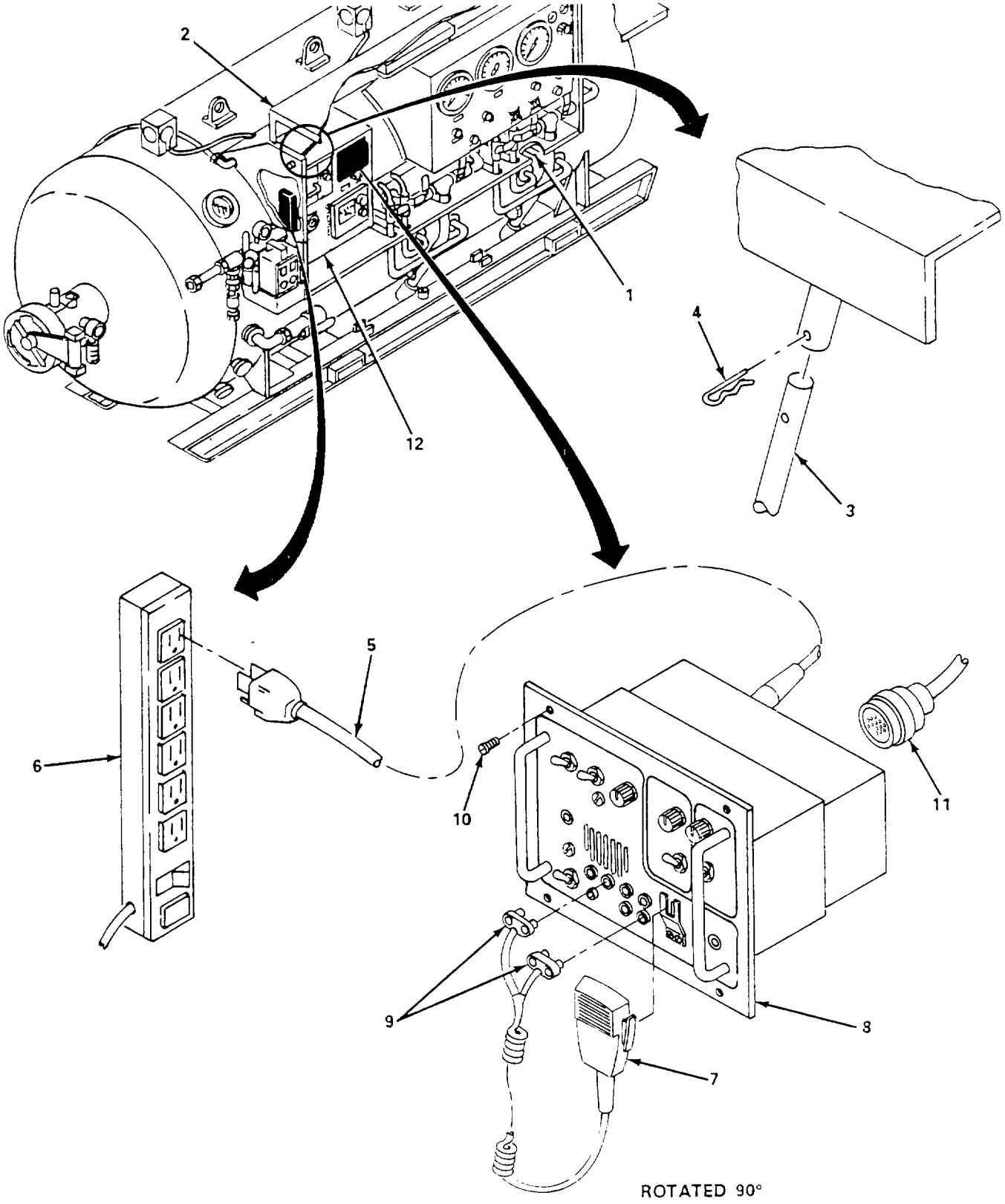


Figure 4-30. Communicator Assembly, Replace.

4-44. Battery Card and Case

This task covers:

Repair

INITIAL SETUP:

Materials/Parts

Fuses

Repair. (figure 4-31)

NOTE

There are two fuses. Replacement of each fuse is the same.

(1) Unlatch two latches (1), open hood assembly door (2), and install two supports (3) and pins (4).

(2) Disconnect communicator assembly electrical plug (5) from the power strip (6).

NOTE

Fuses are accessible from open top of panel.

(3) Remove fuse cap (7) and fuse (8) from fuse holder (9).

(4) Inspect fuse to determine if it is blown.

(5) Install good fuse (8) and cap (7) on fuse holder (9).

(6) Connect communicator assembly electrical plug (5) to power strip (6).

(7) Remove two pins (4), supports (3), close hood assembly door (2), and secure with two latches (1).

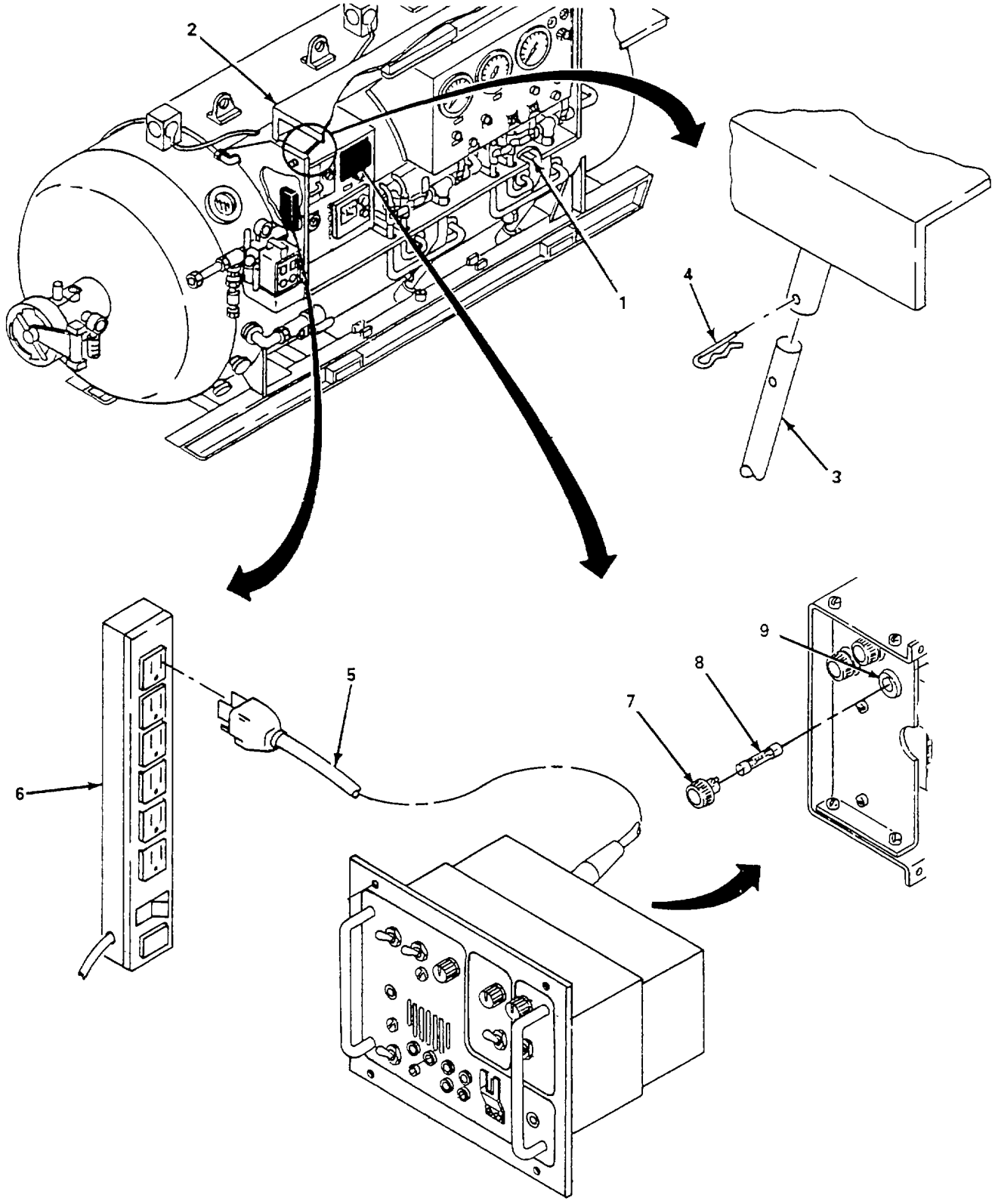


Figure 4-31. Battery Card and Case, Fuse Replacement.

4-45. Microphone

This task covers:

Replace

INITIAL SETUP:

Materials/Parts

Microphone

Replace. (figure 4-32)

(1) Unlatch two latches (1), open hood assembly door (2), and install two supports (3) and pins (4).

(2) Disconnect microphone cables (5) from chamber communicator assembly (6).

(3) Remove microphone (7) from bracket (8).

(4) Install microphone (7) from bracket (8).

(5) Connect microphone cables (5) on chamber communicator assembly (6).

(6) Remove two pins (4), supports (3), close hood assembly door (2), and secure two latches (1).

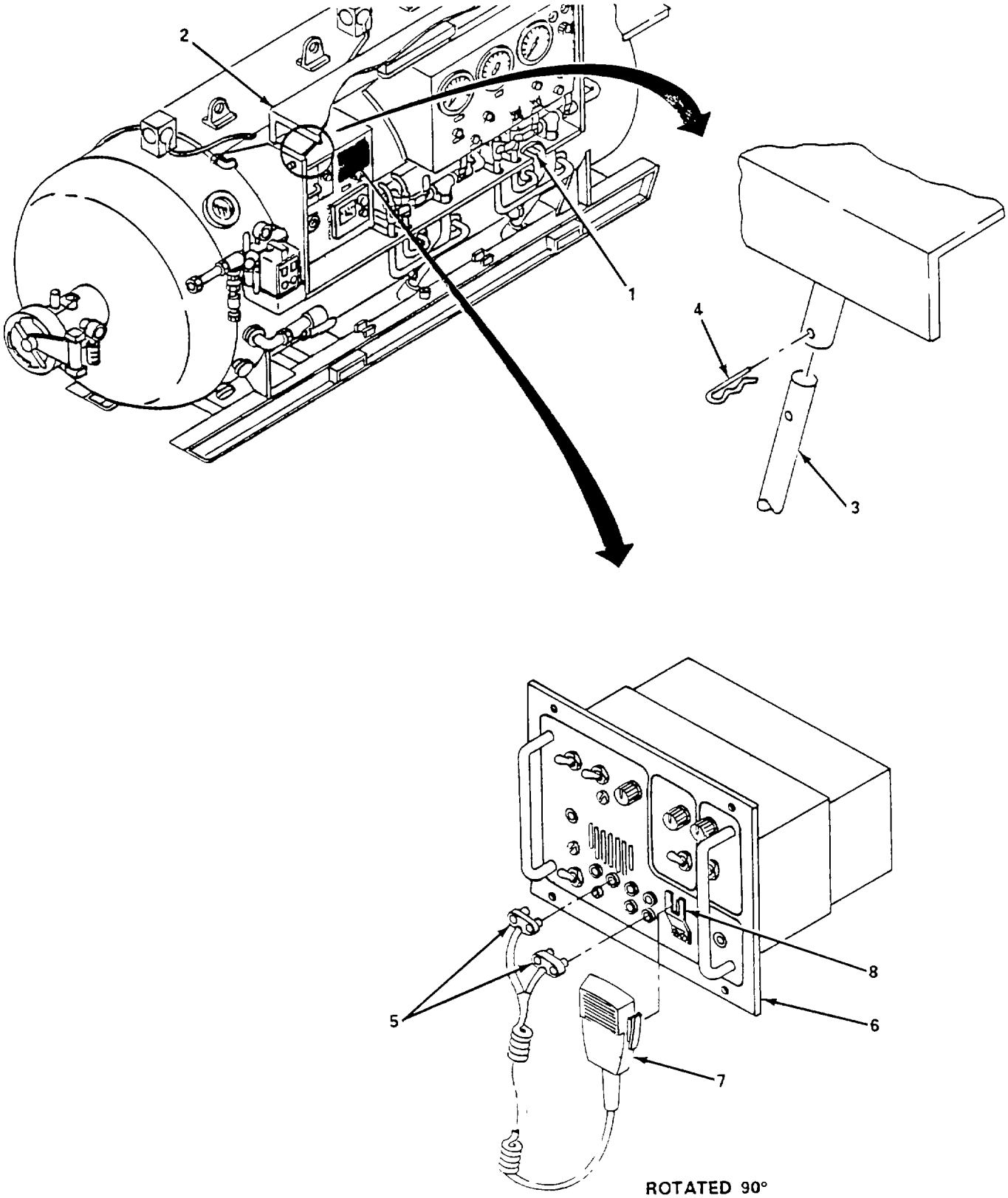


Figure 4-32. Microphone, Replace.

4-46. Headset

This task covers:

Replace

INITIAL SETUP:

Materials/Parts	*Equipment Condition*
Headset	Chamber shut down (para. 2-15).

Replace. (figure 4-33)

NOTE

There are two headsets, one in the O/L and one in the I/L. Replacement of each headset is the same.

(1) Remove connector (1) from speaker (2) and remove headset (3).

(2) Install headset (3) by inserting connector (1) into speaker (2).

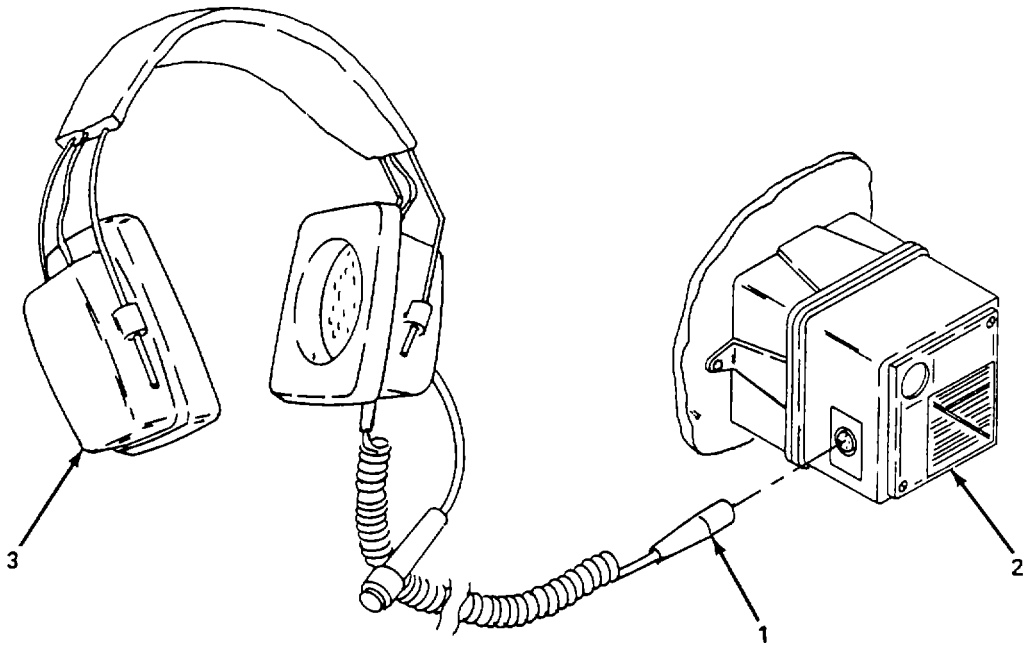


Figure 4-33. Headset, Replace.

4-47. Sound Powered Phones and Bracket

This task covers:
Replace

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Equipment Condition

Chamber shut down (para. 2-15)

Materials/Parts

Sound Powered Phone
Bracket

Replace. (figure 4-34)

NOTE

There are two sound powered phones. One in the I/L and the other is mounted on the side of the control panel. The replacement of each one is the same.

(1) Unlatch two latches (1), open hood assembly door (2), and install two supports (3) and two pins (4).

(2) Pull phone plug (5) from wall socket (6).

(3) Remove sound powered phone (7) from bracket (8).

(4) Remove two nuts (9), lockwashers (10), washers (11), and bolts (12) and remove bracket (8).

(5) Install bracket (8) and secure with two bolts (12), washers (11), lockwashers (10), and nuts (9).

(6) Hang sound powered phone (7) on bracket (8).

(7) Install phone plug (5) into wall socket (6).

(8) Remove two pins (4), supports (3), close hood assembly door (2) and secure with two latches (1).

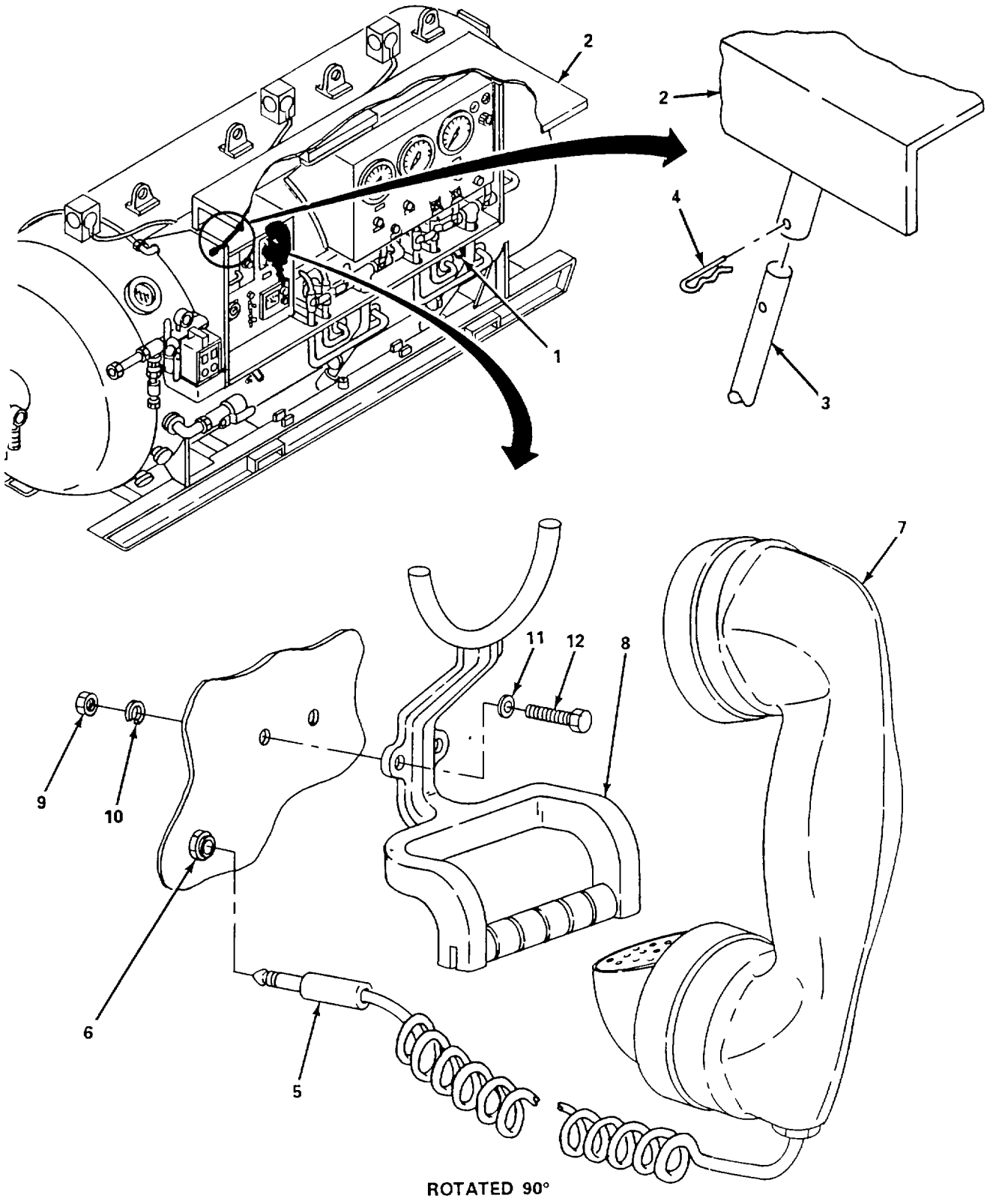


Figure 4-34. Sound Powered Phones and Bracket, Replace.

4-48. Speakers, I/L and O/L

This task covers:
Replace

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Equipment Condition

Chamber shut down (para. 2-15).

Materials/Parts

Speaker

Replace. (figure 4-35)

NOTE

There are two speakers, one in the O/L and one in the I/L. Replacement of the speaker is the same.

(1) Unlatch two latches (1), open hood assembly door (2), and install two supports (3) and pins (4).

(2) Set I/L and O/L speaker toggle switches (5) to OFF position.

(3) Disconnect electrical connector (6) from speaker (7).

(4) Remove two nuts (8), lockwashers (9), and screws (10) that secures speaker (7) to wall bracket (11) and remove speaker

(5) Position speaker (7) on wall bracket (11) and secure with two screws (10), lockwashers (9), and nuts (8).

(6) Connect electrical connector (6) to speaker (7).

(7) Set I/L and O/L speakers toggle switches (5) to ON position and check operation of speaker, and set volume control (12).

(8) Remove two pins (4), supports (3), close hood assembly door (2), and secure with two latches (1).

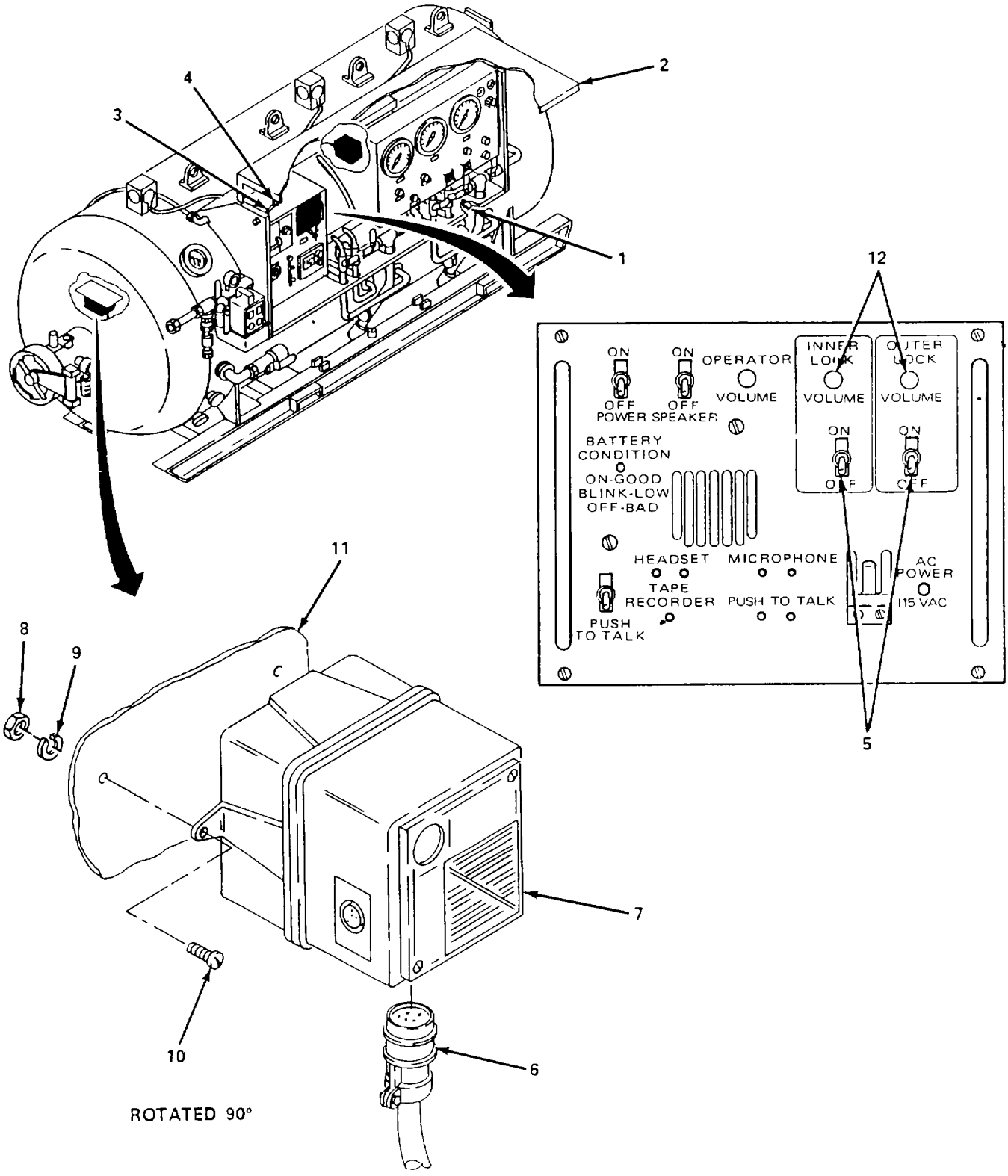


Figure 4-35. Speakers, I/L and O/L, Replace.

4-49. O_2K Bottles and Manifold

This task covers:
Replace

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Band, Rubber (Item 4, Appendix E)
Bags, Plastic (Item 3, Appendix E)
Tape, Teflon (Item 21, Appendix E)

Equipment Equipment

Chamber shut down (para. 2-15).

Replace. (figure 4-36)

WARNING

To prevent the spread of disease, serious injury and/or death, oxygen breathing systems must be maintained hygienically clean and free from dust, dirt, and all hydrocarbon contamination. Refer to oxygen system prework procedures para. 4-10 to avoid violating this warning.

NOTE

Ensure system is depressurized prior to beginning this task.

(1) Close six valves (1) on the six 02 bottles (2).

(2) Open ten valves (3) on manifold (4) and vent the manifold.

(3) Remove manifold (4) from chamber (5) by removing fitting (6) from chamber.

WARNING

Leave 1 1/2 threads exposed on fitting when applying teflon tape. This will ensure that no teflon tape will hang down inside the air system. Teflon tape should be wrapped in such a manner that when the fitting is tightened the tape will not loosen. Failure to wrap teflon tape correctly may result in contamination or blockage of the air system and subsequent possible injury or death to the diver.

(4) Apply teflon tape to all pipe threads.

(5) Install fitting (6) of manifold (4) on chamber (5).

(6) Close ten valves (3) on manifold (4).

(7) Open six valves (1) on the six 02 bottles (2).

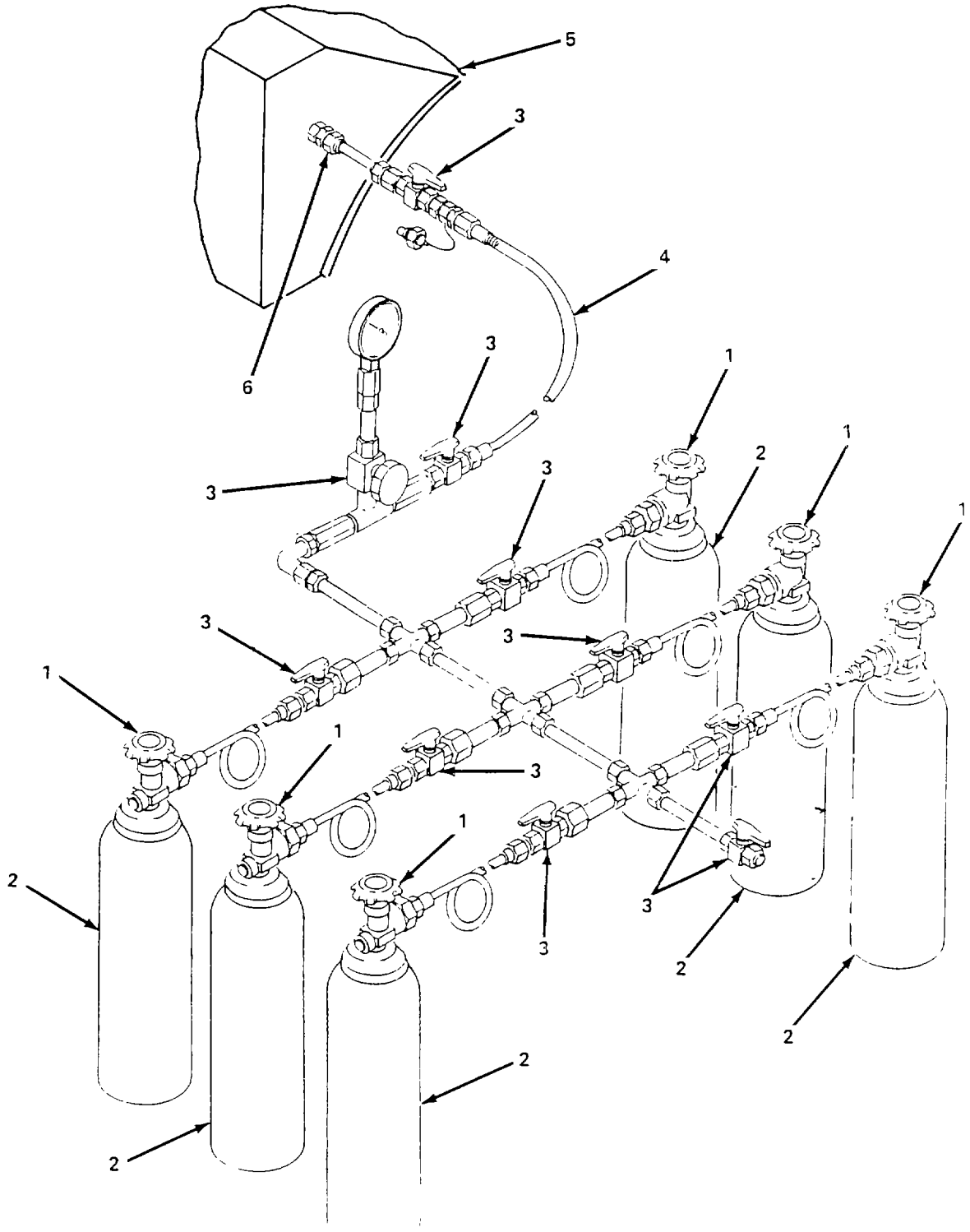


Figure 4-36. 0_2 K Bottles and Manifold, Replace.

4-50. Oxygen Inhalator Mask Assembly.

This task covers: Replace

INITIAL SETUP:

Tools	*Materials/Parts*
General Mechanic's Tool Kit (NSN 5180-00-177-7033)	Oxygen Inhalator Mask Bands, Rubber (Item 4, Appendix E) Bags, Plastic (Item 3, Appendix E)

Replace. (figure 4-37)

WARNING

To prevent the spread of disease, serious injury and/or death, oxygen breathing systems must be maintained hygienically clean and free from dust, dirt, and all hydrocarbon contamination. Refer to oxygen system prework procedures para. 4-9 to avoid violating this warning.

NOTE

If chamber is pressurized, send in the oxygen mask through M/L.

(1) Disconnect inhalator oxygen supply hose (1) from BIBS manifold (2) at quick disconnect fitting (3).

(2) Disconnect inhalator oxygen exhaust hose (4) from BIBS manifold (2) at quick disconnect fitting (5).

(3) Remove inhalator mask assembly (6) with supply and exhaust hoses attached. Double bag inhalator mask assembly (6).

CAUTION

If inhalator masks are not immediately replaced with new masks, install the plugs provided to keep system closed and prevent chamber air pressure from escaping through BIBS.

(4) Unbag new inhalator mask assembly (6).

(5) Connect inhalator oxygen exhaust hose (4) to BIBS manifold (2), and quick disconnect fitting (5)

(6) Connect inhalator oxygen supply hose (1) to BIBS manifold (2), and quick disconnect fitting (3).

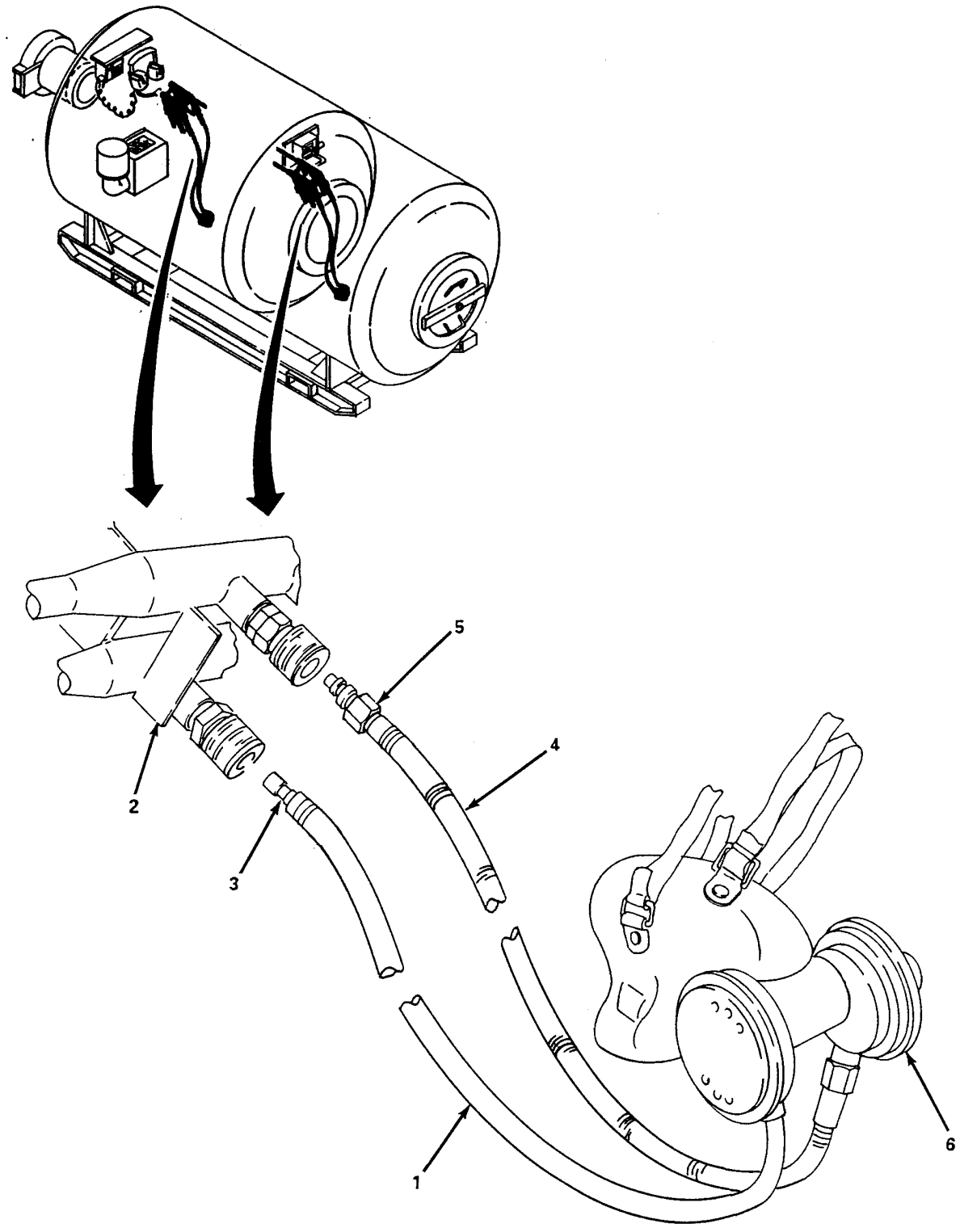


Figure 4-37. Oxygen Inhalator Mask, Replace.

Section VI. UNIT LEVEL CLEANING PROCEDURE FOR DIVING LIFE SUPPORT AIR SYSTEMS

4-51. **General.** This section covers the cleaning procedures for diving life support air systems. The importance of maintaining a diver's air breathing system in a clean and operable condition cannot be over emphasized. This procedure provides basic steps and methods for removing and installing components and piping, and provides the simplified methods for cleaning small components, pipes and hoses for air systems, and methods for cleaning component soft goods.

4-52. **Determining System Cleanliness.** A periodic inspection of the air system will verify system cleanliness. If a system is suspected of contamination, a hydrocarbon analysis, a particulate sample may be taken or a gas sample may be drawn to determine the level of system cleanliness. These samples can be coordinated through the U.S. Army Troop Command, ATTN: AMSTR-MMPSM, 4300 Goodfellow Blvd , St. Louis, Missouri 63120-1798.

4-53. **Clean Area.** All cleaning for life support air systems to be performed on components and piping shall be cleaned in a "clean area." This area shall be isolated from oil, grease, paper, lint particles and other airborne contaminates. It shall be as free as possible of dust and debris. Work benches shall be covered with easily cleaned surfaces such as stainless steel, synthetic rubber, vinyl linoleum or formica. Floor shall be non-dusting. Walls and ceiling shall be covered with washable vinyl, latex paint or polyurethane-based paint.

4-54. **Removing and Installing System Components or Piping.** The following steps are guidelines for the removal and installation of piping or components from or into a clean system. In general, common sense and clean work habits must prevail at all times to maintain system cleanliness. Prior to the removal of any pipe or component, appropriate maintenance forms are to be completed and approved.

a. Removal. Extreme care shall be used in the removal of any component or pipe from a clean system to avoid introducing any contamination. To eliminate any chance of contamination, the following steps shall be adhered to:

(1) Secure the system by closing valves and controls both upstream and downstream of the component or pipe to be removed. The components shall be tagged to insure that gas is not brought on line.

(2) Removal of all debris from the intended area of assembly or disassembly such as dirt, dust, loose paint, and grease is mandatory. This includes cleaning the pipe or component which is to be removed and the adjacent components or piping.

(3) Wipe all of the external surfaces of components and piping with detergent or alcohol solvent to remove grease or dirt.

(4) All personnel shall have clean hands.

(5) All tools used in the removal must be clean and grease-free.

(6) Remove component or piping.

(7) Immediately bag or seal all exposed ends of system with plastic.

b. *Installation or Reinstallation.*

(1) The new component or cleaned pipe shall be wrapped or double bagged. If not, the item shall be returned for cleaning.

(2) The component or piping shall be removed from bagging and shall be inspected for damage at the mating surfaces, threads, or connecting surfaces and any primary surface. Inspect for dust or minor particle contamination, and remove with lint-free rag.

(3) Mating components and pipe shall have protection materials or plugs removed.

(4) Mating surfaces, preformed packings and threads shall be coated lightly with an approved lubricant. Threaded surfaces must be coated to prevent galling of threads at assembly.

(5) A pressure test shall be performed to verify that there are no leaks and that the correct fittings have been installed in the system.

4-55. **Pre-Cleaning of Components or Piping.** Upon receipt of new components not cleaned or components and pipe removed from the system for cleaning, the item shall be pre-cleaned. Doing this shall prepare the component for final cleaning. Pre-cleaning will be accomplished in an area separate from the clean area. The pre-cleaning will include but is not limited to the following:

a. All wrapping shall be removed.

b. Loose paint, rust, brackets, panels, tags, supports and other such items shall be removed.

c. If hydrocarbons and/or other contaminants are known to have been introduced into the component or piping, a thorough degreasing procedure shall be initiated Trisodium phosphate (TSP) or non-ionic detergent (NID) may be used.

d. Visually inspect the pre-cleaned articles under bright light to ensure that all gross contamination has been removed.

e. Bag all components and ends of pipe with plastic to await cleaning.

4-56. **Cleaning Method Non-Ionic Detergent.** This method outlines the cleaning procedures for oil-free cleaning of metallic/nonmetallic components or assemblies using non-ionic detergent. This procedure is only to be used if there is no equipment available to conduct the TSP cleaning method.

a. Cleaning Components or Assemblies (excluding hose assemblies).

CAUTION

Chemical protective gloves should be worn to prevent skin irritation from detergent and hot water.

(1) Disassemble components down to the smallest parts. Separate soft goods and clean as specified in paragraph 4-58.

(2) Clean each component by scrubbing with a non-ionic detergent solution (1/2 teaspoon 2.4 mL) detergent to 1 gallon (3.8 L) water using a nylon bristle brush and clean cloths.

(3) Rinse with distilled water at 125 degrees F (54 degrees C) until effluent shows no visible signs of detergent.

(4) Collect some of the water rinsed over the items in a flask that can be fitted with a rubber stopper. Shake the flask for a few seconds and if any bubbles form and remain on the surface of the water in the flask, continue to rinse item until no bubbles form and remain in the sample flask.

(5) Purge with dry, oil-free nitrogen until visually dry, or allow to air dry. The following dated and signed records shall be maintained:

(a) Identification of all parts cleaned.

(b) Results of shake test.

(6) Reassemble as outlined on assembly or component drawing.

(7) Double bag all components in plastic and close securely.

b. Cleaning Hose Assemblies.

(1) Clean hose assemblies in accordance with the following steps using the specific materials and utilizing proper equipment. Pre-clean hose assemblies outside the clean area by rinsing externally with distilled water

(2) Most hose assemblies will not lend themselves to disassembly. Disassemble to maximum extent without removing fittings or clamps.

(3) The cleaning solution shall be made by adding 1/2 ounce (14.7 mL) non-ionic detergent to each 80 gallons (302.8 L) or distilled water.

(4) Heat the cleaning solution to 120 degrees F (49 degrees C) and circulate through the hose assembly for 30 minutes at a flow rate of not less than 1 gallon (3.8 L) per minute.

(5) Rinse the hose assembly with distilled water heated to 125 degrees F (52 degrees C) for 30 minutes minimum at a flow rate of not less than 1 gallon (3.8 L) per minute. Do not recirculate the water.

(6) Perform a shake test by collecting a 1000 mL sample of rinse water in a flask that can be fitted with a rubber stopper. Shake the flask for a few seconds and if any bubbles form and remain on the surface of the water in the flask, continue to rinse the hose until no bubbles form and remain in the sample flask.

(7) Purge hose assembly with clean, dry, oil-free nitrogen (preferably heated to 200 degrees F (93 degrees C)) until all visible signs of water are absent. Continue drying process for 1 to 2 hours after initial purge.

NOTE

At no time shall the upstream purge pressure for all hose assemblies exceed 100 psig (6895 millibars).

(8) After drying, cover each hose end with a clean plastic bag to maintain internal cleanliness. Secure the bag with 1 inch (2.5 cm) wide tape.

(9) When components and systems have been reassembled an air sample shall be taken to verify cleanliness.

4-57. **Cleaning Method Trisodium Phosphate (TSP).** This method is the preferred method if all equipment is available. A steam/hot water cleaner that has adjustable siphon control for cleaning applications works well.

a. For components the following steps should be followed:

WARNING

The TSP cleaning solution is harmful to eyes and skin. Wear chemical protective apron, gloves and goggles/face shield when handling or working with the solution.

(1) Prepare a solution consisting of 2 pounds (0.9 kg) TSP, 0.5 ounces (14.7 mL) non-ionic detergent and 80 gallons (302.8 L) of distilled or deionized water.

(2) Heat solution to 165 degrees F (74 degrees C) mixing occasionally during the heating.

(3) Disassemble components down to the smallest parts (separate and clean soft goods and aluminum parts as specified in paragraph 4-58) and soak in the solution for 10 minutes minimum, 30 minutes maximum.

(4) After soaking, clean the parts in the ultrasonic cleaner until all visible traces of contaminate dirt or grease are gone.

(5) For components too large for an ultrasonic cleaner, scrub the parts with a nylon bristle brush until all visible traces of contaminate dirt or grease are gone.

(6) Rinse all parts in running hot distilled water or deionized water until all visual traces of cleaning solution are removed.

(7) Draw 10 mL sample. Agitate or rinse water to observe for soap bubbles. If any soap bubbles are present, repeat steps (6) and (7) until no bubbles are observed.

(8) Blow dry components with clean air, nitrogen or helium.

(9) Reassemble components using an approved lubricant.

(10) Bag and seal or tape closed all components and ends of pipe or hoses with plastic until ready for reinstallation.

b. For cleaning pipe or tubing the following procedures should be followed:

(1) Determine the volume of cleaning solution estimating the length of pipe or hose to be cleaned and the size of the pipe to be cleaned. Look up the appropriate pipe/tube size and then the corresponding volume (in cubic inches) per one foot length in table 4-3. Multiply that volume by the estimated length to be cleaned. After the total volume is calculated, multiply the answer in cubic inches by .00433. After the total volume is calculated, multiply the answer in cubic inches by 00433 to obtain the number of gallons to fill the system. Determine applicable flow rate from table 4-4 and multiply flow rate by thirty (30) to compute number of gallons required to pump through the system. Add volume required to fill system and the volume required to pump through the system for the total volume of cleaning solution required.

Table 4-3. TSP Cleaning Solution Volume.

Pipe/Tube Size in (cm)	Volume of 1 Foot (30 cm) Length
1/4 (0.6 cm)	0.6 cubic inches (9.7 cm3)
3/8 (1.0 cm)	1.3 cubic inches (21.7 cm3)
1/2 (1.3 cm)	2.4 cubic inches (38.6 cm3)
3/4 (1.9 cm)	5.3 cubic inches (86.9 cm3)
1 (2.5 cm)	9.4 cubic inches (154.5 cm3)
1-1/2 (3.8 cm)	21.2 cubic inches (347.6 cm3)
2 (5.1 cm)	37.7 cubic inches (617.9 cm3)

(2) Prepare a solution at a ratio of 2 pounds (0.9 kg) of TSP, 0.5 ounces (14.7 mL) non-ionic detergent for each 80 gallons (302.8 L) of distilled or deionized water as determined.

(3) Heat solution to 165 degrees F (74 degrees C) mixing occasionally during the heating.

(4) Pump the cleaning solution through the pipe/tubing for 30 minutes at a rate listed in table 4-4 using the solution pump, and maintain constant temperature at all times. It may be necessary with some piping configurations to cap or plug some openings and alternate with others to maintain even flow of cleaning solution to all segments of the pipe. If you run out of cleaning solution prior to the 30 minutes listed, prepare another volume of cleaning solution.

Table 4-4. Cleaning Solution Flow Rate.

Tube Size (inches)	GPM	Pipe Size (inches)	GPM
1/4 (0.6 cm)	1/2	1/4 (0.6 cm)	2
3/8 (1.0 cm)	2	3/8 (1.0 cm)	3
1/2 (1.3 cm)	3 3/4	1/2 (1.3 cm)	5 1/2
3/4 (1.9 cm)	6 3/4	3/4 (1.9 cm)	9 1/2
1 (2.5 cm)	12 1/2	1 (2.5 cm)	15 1/2
		1 1/4 (3.1 cm)	23
		1 1/2 (3.8 cm)	35
		2 (5.1 cm)	50

(5) Pump hot distilled or deionized water through the system to rinse until all visible traces of cleaning solution are removed.

(6) Draw 10 mL sample. Agitate to observe for soap bubbles. If any soap bubbles are present, repeat step (5) until no bubbles are observed.

(7) Blow dry parts or components with clean, dry, oil-free nitrogen (preferably heated to 200 degrees F (93.3 degrees C)) until all visible signs of water are absent. Maintain process for 1 to 2 hours after initial purge.

(8) Double bag and seal or tape closed all components and ends of pipe or hoses with plastic until ready for reinstallation.

c. Hoses shall be cleaned as specified in paragraph 4-56.

4-58. **Cleaning Component Soft Goods**. The following isopropyl alcohol method is provided for the cleaning of the soft goods and aluminum parts of system components. The method for non-ionic detergent is the same procedure as that in paragraph 4-56.

CAUTION

Ensure ventilation is adequate and avoid breathing vapors.

Personnel should wear chemical protective gloves to prevent skin irritation when contact with isopropyl alcohol Is necessary.

Isopropyl alcohol shall be maintained in a covered container to preclude excess concentrations in the air for fire protection. The cover should be removed only for placement or removal of soft goods.

NOTE

Table 4-5 lists all compatible cleaning agents for general soft goods used in the Army diving systems. Only the isopropyl alcohol procedure is listed below.

a. Soak component soft goods or aluminum parts in a tray of isopropyl alcohol for 10 minutes maximum.

b. Wipe each piece of soft good individually with wipes soaked in isopropyl alcohol. Do this until all dirt and foreign matter is visually removed.

c. Rinse soft goods with fresh isopropyl alcohol.

d. Blow dry with air, nitrogen, or helium.

Table 4-5. Cleaning Agents Comparable with Soft Goods.

Soft Goods	Freon PCA MIL-C-81302B	TSP O-S-642	NID MIL-D-16791	IA TI-I-735A
Adiprene C	X		X	
Adiprene L	X		X	
Buna N	X	X	X	X
Buna S	X	X	X	X
Butyl			X	X
Delrin	X	X	X	
Epoxy Resin	X		X	
Kel-f	X	X	X	X
Hypalon 40	X		X	
Kralartic	X		X	
Lexan	X		X	
Lucite	X		X	
Neoprene W	X		X	
Nylon		X		X
Polyethylene 7050	X	X	X	X
Polyethylene 9140	X	X	X	X

Table 4-5. Cleaning Agents Comparable with Soft Goods (Cont).

Soft Goods	Freon PCA MIL-C-81302B	TSP O-S-642	NID MIL-D-16791	IA TI-I-735A
Polyvinyl Chloride	X	X	X	X
Surlyn A	X		X	
Teflon TFE	X	X	X	X
Teflon FEP	X	X	X	X
Thiokol FA	X		X	X
Viton A	X	X	X	X
Viton B	X	X	X	X
Zytel 101	X		X	
Ethylene Propylene		X	X	X

X - Solvent is compatible with soft goods.
Blank - Solvent is not compatible with soft goods.

4-59. **Hydrocarbon Inspection and Analysis.**

a. *Visual Method.* By definition, visibly clean is the absence of all particulate and non-particulate matter visible to the normal, unaided (except for corrected vision) eye. Particulate is identified as matter of miniature size with observable length, width and thickness. Non-particulate is film matter without definite dimension. Examples of visual inspection are:

(1) A clean cloth placed over the discharge end may collect particulates and debris when air or nitrogen is blown through the system.

(2) A component that has been "in service" may have visible signs of grease, dirt, etc.

(3) Absorption of oil or grease on a clean filter paper from a surface wipe.

b. *Ultraviolet Light Method.* The ultraviolet method for detecting hydrocarbons may be employed in different ways.

WARNING

Most ultraviolet lamps contain mercury. Extreme caution should be taken not to break the mercury vapor lamp which will contaminate the component or pipe being inspected and may also cause human injury.

(1) *Direct inspection:* The component may be examined directly with the ultraviolet light. By passing the component under the ultraviolet light, hydrocarbon surface contamination may exhibit fluorescence where some hydrocarbons exist.

(2) *Inspection of cleaning solution when detergent is used.* Used cleaning solution collected in a clean beaker when agitated will form bubbles. These bubbles, under ultraviolet light, may exhibit fluorescence.

4-60. **Documentation and Record Keeping.**

a. This diving system must retain certain records and documents to substantiate safety standards. The individual operating the clean area being directly involved with system maintenance should therefore be required to maintain records documenting cleaning operations in a systematic manner.

b. The purpose of this section is to set forth a guide for documentation and record keeping involved in cleaning operations and in no way intends to impose restrictions on the amount of paperwork a unit feels it requires to operate safely.

c. A sequential record should be maintained of components cleaned (i.e., regulators, pipe, and/or any component) affecting reentry into a certified system. It should include a written record of all cleaning analyses and testing accomplished as per this procedure. A data sheet should be completed for items cleaned and tested per this procedure. All other information which pertains to the cleaning and/or testing of a particular item shall be attached to or referenced on the data sheet. Such information should include, but not be limited to outside laboratory reports, vendor data, etc. The completed data sheet(s) will then be attached to the REC Report and referenced in the remarks column on the Reentry Control Log

d. It is possible that certain data and results will apply to more than one data sheet. For example, it is possible that a sample for gaseous contaminants will be taken by sampling an entire system This system will consist of numerous items, each having its own data sheet. To assure complete documentation, reference the results of the gaseous contamination analysis on each affected data sheet.

e. As a minimum the data sheet should reflect the following information:

(1) Unit

(2) Date

(3) Name of Point of Contact

(4) Description of Cleaning Performed

(5) Person Performing the Cleaning

(6) Results of any Analysis

(7) Description of Item Being Cleaned

(8) Part Number/NSN

(9) Remarks

CHAPTER 5

DIRECT SUPPORT MAINTENANCE

OVERVIEW

This chapter contains information for troubleshooting and maintenance of the 3-Person Recompression Chamber by direct support maintenance personnel.

Section I. REPAIR PARTS; SPECIAL TOOLS, TEST, MEASUREMENT AND DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT

5-1. **Common Tools and Equipment.** For authorized common tools and equipment, refer to the modified Table of Organization and Equipment (MTOE) applicable to your unit.

5-2. **Special Tools, TMDE, and Support Equipment.** For a listing of special tools and support equipment authorized for use on this equipment, refer to the Repair Parts and Special Tools List of this manual, and the maintenance allocation chart (MAC), Appendix B of this manual.

5-3. **Repair Parts.** Repair parts are listed and illustrated in the Repair Parts and Special Tools List for 3-Person Recompression Chamber, TM 5-4220-227-24P.

Section II. DIRECT SUPPORT TROUBLESHOOTING

5-4. **General.** This section contains troubleshooting procedures to determine the probable cause of observed equipment malfunctions. Test or inspections are provided to isolate the faulty component and corrective actions are provided to eliminate the malfunction.

5-5. Direct Support Troubleshooting Procedures. Table 5-1 lists the common malfunctions that may be found during operation. Refer to symptom index to locate the troubleshooting procedures for the malfunction. This manual cannot list all malfunctions that may occur, nor all test or inspections and corrective actions. If a malfunction is not corrected by listed corrective actions, notify your supervisor.

SYMPTOM INDEX

Table 5-1. Direct Support Troubleshooting Procedures.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. RECOMPRESSION CHAMBER SLOWLY LOSES AIR PRESSURE.

Perform leak test on door seals, view ports, oxygen/air penetrator parts, heater/chiller/fluid and electrical penetrator parts, accessory blanking plate parts, air supply and exhaust manifold penetrator parts, valves and piping.

a. Repair or report malfunction to General Support Maintenance as required.

b. Make adjustments to air supply source to insure adequate air supply.

2. RECOMPRESSION CHAMBER OVERPRESSURIZES.

Step 1. Ensure that the ALP-005, ALP-006 I/L and ALP-009, ALP-010 O/L primary and secondary air supply valves are closed and then check operation of ELP-007, ELP-008 I/L and ELP-011, ELP-012 O/L primary and secondary air exhaust valves. These valves may be closed tight preventing any air flow through the chamber.

Open ELP-007 and ALP-005, the primary exhaust valves. Adjust the valves to produce the desired depth and flow rate.

Step 2. Check ALP-004 pressure relief isolator valve. This valve may be closed, preventing flow of pressure to APR-004 the pressure relief valve.

Open ALP-004 pressure relief isolator valve. It should be secured in the open position with safety wire.

Table 5-1. Direct Support Troubleshooting Procedures (Cont).

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

3. HEATER/CHILLER FAILS TO FUNCTION.

Step 1. Inspect motor contactor. It may prevent the pump from operation.

Notify General Support Maintenance of faulty contactor.

Step 2. Inspect the 1/3 HP motor. It may be the cause of the pump not operating.

Notify General Support Maintenance of faulty motor.

Step 3. Check Freon level in sight glass. If air bubbles persist longer than one minute, Freon is low.

Notify General Support Maintenance for addition of Freon.

Step 4. Freon level lowers after being replaced.

Notify General Support Maintenance to check for leaks.

Step 5. Check filters. If there is a noticeable temperature difference between input and output lines, filters may be clogged.

Notify General Support Maintenance to replace filters.

Step 6. Check expansion valve for frost. Internal overload relay may have tripped.

Allow time to reset.

Step 7. Check compressor for frost. Expansion valve may have failed causing fluid not to cool.

Notify General Support Maintenance to replace expansion valve.

Step 8. Check for 220 Vac across condenser for motor contractor. This may cause the condenser fan not to operate.

a. If voltage is not present, check power cord to source.

b. If voltage is present, notify General Support Maintenance to replace fan motor contactor.

Step 9. Inspect condenser fan motor. Check voltage across connections. Fan will not run if voltage is not present.

If voltage is present, but motor does not operate, notify Direct Support Maintenance to replace condenser fan motor.

Section III. DIRECT SUPPORT MAINTENANCE PROCEDURES

5-6. **General.** This section contains direct support maintenance procedures as authorized by the maintenance allocation chart in Appendix B of this manual.

5-7. Medical Lock (M/L) Outer Door Assembly.

This task covers: a. Replace b. Repair

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Medical Lock Outer Door Assembly
Flanged Bearing Bushings, Hinge
Flanged Bearing Bushing, Handle
Detergent Nonionic (Item 8, Appendix E)

Materials/Parts (Cont)

Lint Free Cloth (Item 6, Appendix E)
Distilled Water (item 9, Appendix E)
Grease, Halocarbon (Item 13, Appendix E)

Equipment Condition

Chamber shut down (para. 2-15)

a. Replace. (figure 5-1)

(1) Unlock lock pin assembly (1) and turn handle (2) counter clockwise to unlock door assembly (3).

(2) Remove four nuts (4), lockwashers (5) and bolts (6) and remove door assembly (3).

(3) Position door assembly (3) and secure with four bolts (6), lockwashers (5) and nuts (4).

(4) Turn handle (2) clockwise to lock door assembly (3) and lock, lock pin assembly (1).

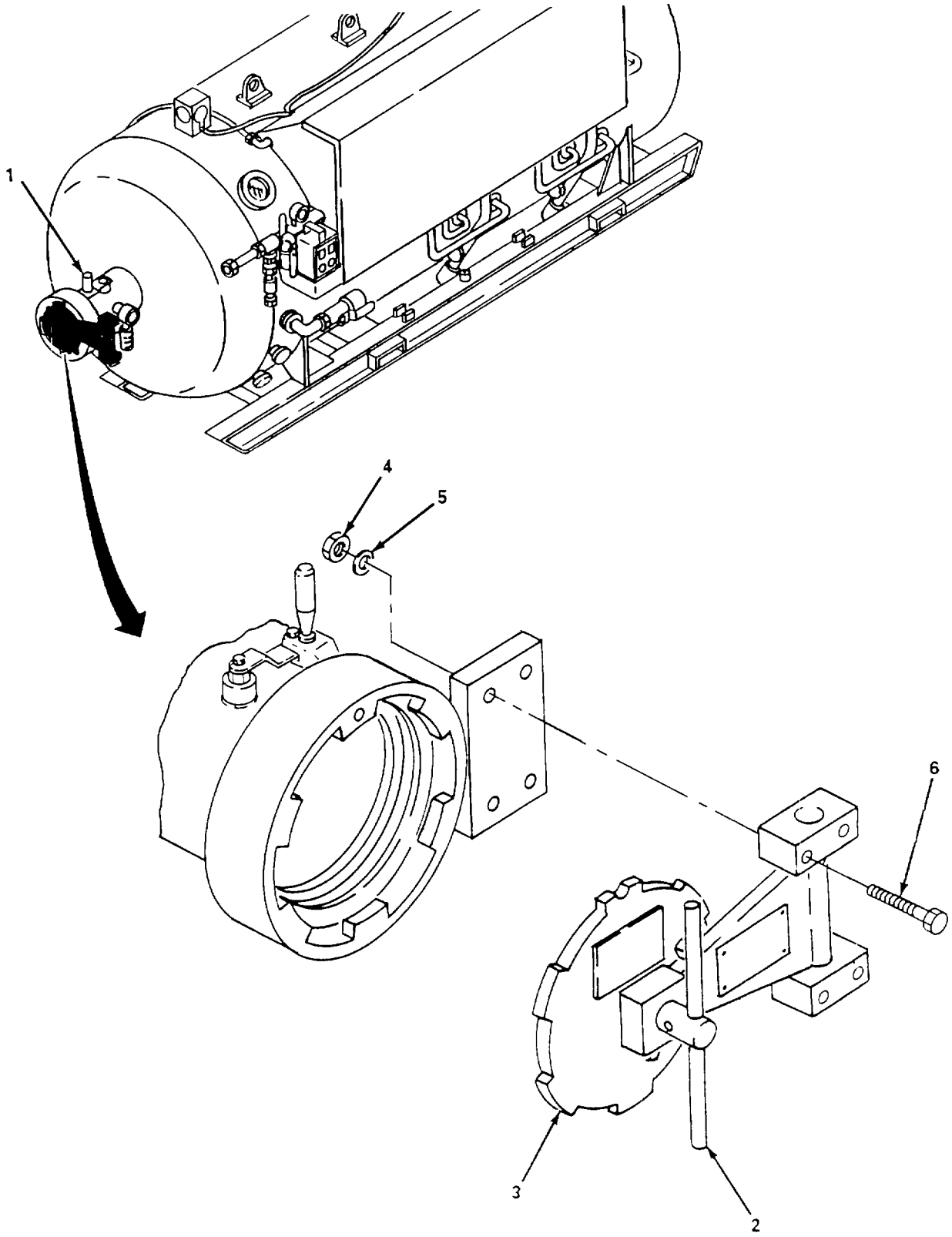


Figure 5-1. Medical Lock (M/L) Outer Door Assembly, Replace.

5-7. **Medical Lock (M/L) Outer Door Assembly (Cont).**

b. *Repair*. (figure 5-2)

(1) Remove door assembly, see para. a. above.

(2) Remove two hinge supports (1) from hinge assembly (2).

(3) Remove two flanged bearing bushing (3) from hinge supports (1).

(4) Remove tapered pin (4) from handle assembly (5).

(5) Hold door assembly (6) and remove handle assembly (5) from hinge assembly (2).

(6) Remove door assembly (6) with flanged bearing bushing (7).

(7) Remove flanged bearing bushing (7).

(8) Clean all components using nonionic detergent cleaner and rinse with clean distilled water.

(9) Inspect all items and replace all items that are bent, cracked, worn or otherwise damaged.

(10) Using lint free cloth, remove grease from handle assembly (5), hinge assembly (2) and door assembly (6).

(11) Apply grease to flanged bearing bushing (7) and install on door assembly (6).

(12) Install door assembly (6) into hinge assembly (2).

(13) Install handle assembly (5) while lining up holes for tapered pin (4).

(14) Install tapered pin (4) into handle assembly (5).

(15) Install two flanged bearing bushings (3) in hinge supports (1).

(16) Install two hinge supports (1) on hinge assembly (2).

(17) Install door assembly, see para. a. above.

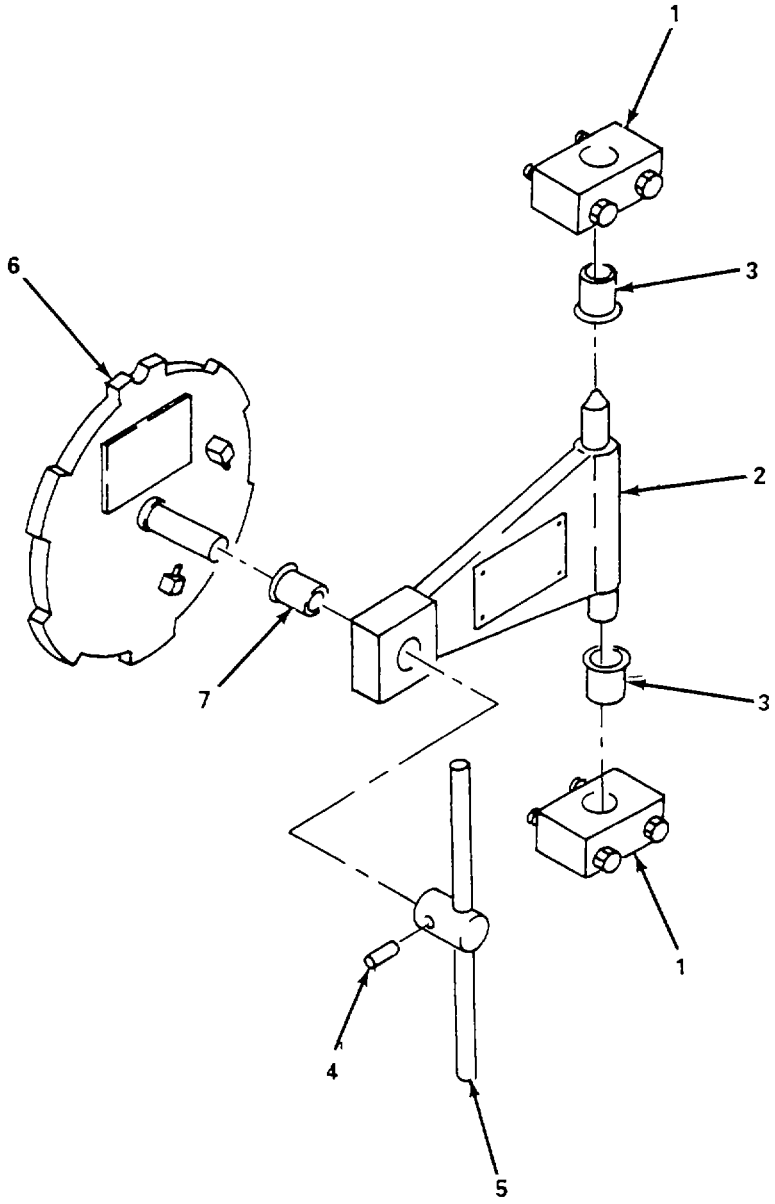


Figure 5-2. Medical Lock (M/L) Outer Door Assembly, Repair.

5-8. Medical Lock (M/L) Inner Door Assembly.

This task covers: a. Replace b. Repair

INITIAL SETUP:

Tools

General Mechanics Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Medical Lock Inner Door Assembly
Valve Repair Kit
Preformed Packing Seal
Detergent, Nonionic (Item 8, Appendix E)

Materials/Parts (Cont.)

Distilled Water (Item 9, Appendix E)
Teflon Tape (Item 21, Appendix E)
Cloth, Lint Free (Item 6, Appendix E)
Grease, Halocarbon (Item 13, Appendix E)

Equipment Condition

Chamber shut down (para. 2-15).

a. *Replace*. (figure 5-3)

(1) Loosen knob (1) and rotate swing bolt (2) away from inner lock door (3).

(2) Remove four nuts (4), two washers (5) and two allen head screws (6) and remove inner lock door (3).

(3) Install inner lock door (3) and install two allen head screws (6), two washers (5), and four nuts (4) but do not tighten. Adjust nuts to allow doors to swivel on bolt hinge.

(4) Rotate swing bolt (2) to hook through door bracket (7) and tighten knob (1).

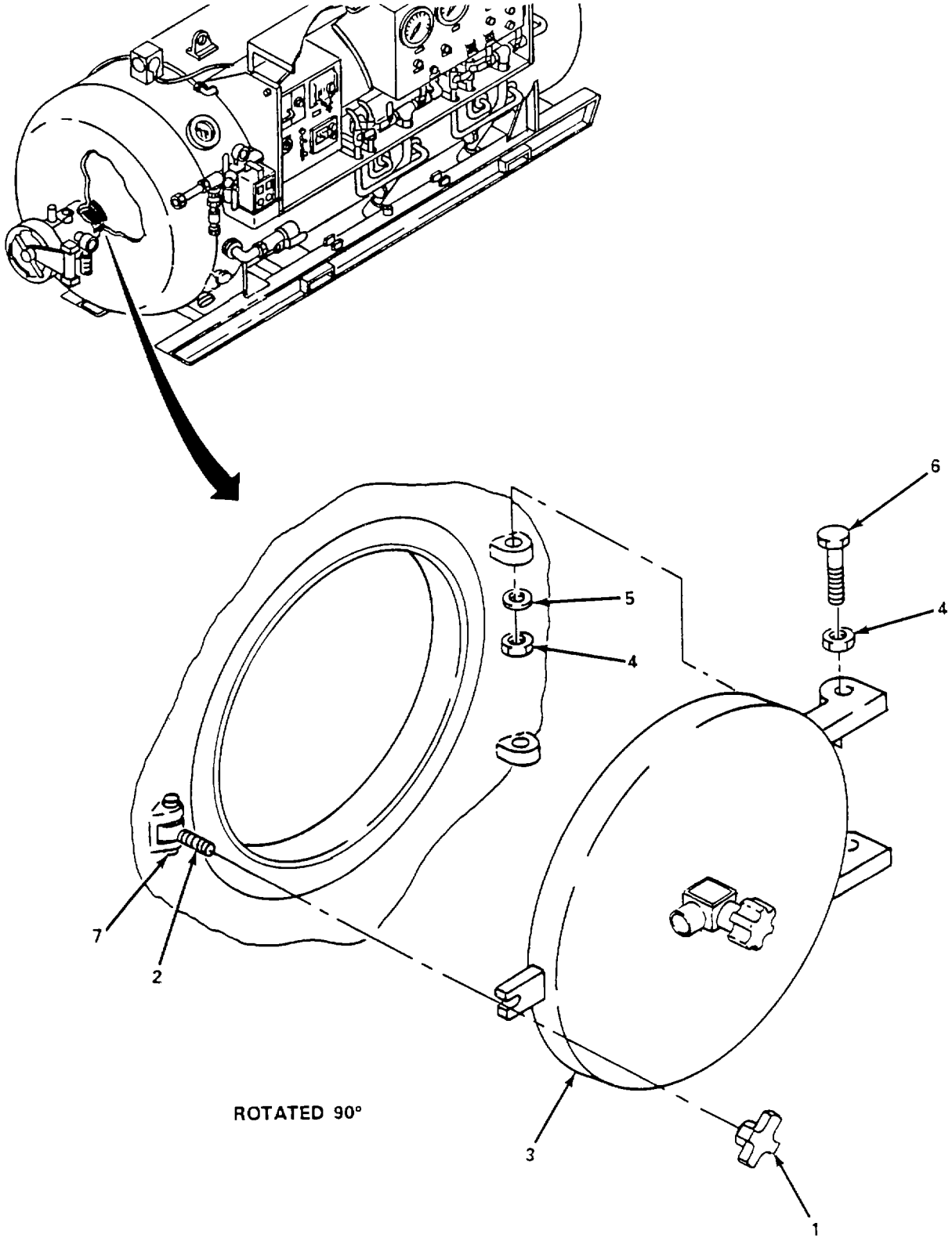


Figure 5-3. Medical Lock (M/L) Inner Door Assembly, Replace.

5-8. **Medical Lock (M/L) Inner Door Assembly (Cont)**

b. *Repair*. (figure 5-4)

(1) Remove medical lock inner door assembly, see para. a. above.

(2) Remove knob (1) and washer (2) from hold bolt (3).

(3) Remove nut (4), allen head screw (5) and hold bolt (3) from fitting (6).

(4) Remove and save valve (7) from inner door (8).

(5) Remove preformed packing (9) from seal groove in medical lock.

(6) Clean all components using nonionic detergent cleaner and rinse with clean distilled water.

(7) Using lint free cloth, remove grease from seal groove and clean groove.

(8) Apply grease to seal groove and preformed packing (9) and install preformed packing in seal groove.

(9) Apply teflon tape to threads on valve (7) and install on valve on inner door (8).

WARNING

Leave 1 1/2 threads exposed on fitting when applying teflon tape. This will ensure that no teflon tape will hang down inside the air system. Teflon tape should be wrapped in such a manner that when the fitting is tightened the tape will not loosen. Failure to wrap teflon tape correctly may result in contamination or blockage of the air system and subsequent possible injury or death to the diver.

(10) Install hold bolt (3) in fitting (6) and secure with allen head screw (5) and nut (4).

(11) Install washer(2) and knob (1) on hold bolt (3).

(12) Install medical lock inner door assembly, see para. a. above.

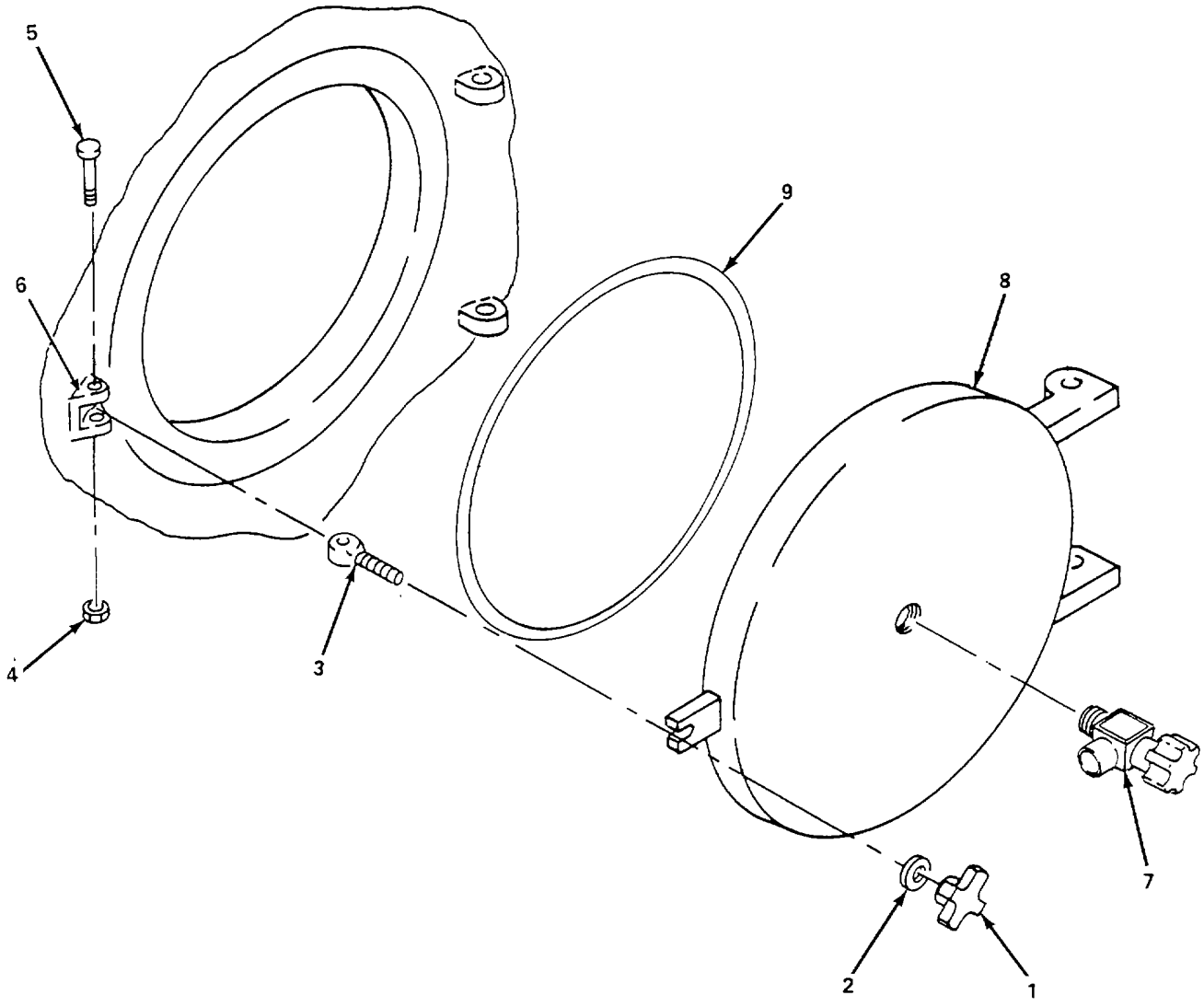


Figure 5-4. Medical Lock (M/L) Inner Door Assembly, Repair.

5-9. **Pressure Relief Valve.**

This task covers: Replace

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Pressure Relief Valve
Bands, Rubber (Item 4, Appendix E)

Materials/Parts (Cont)

Bags, Plastic (Item 3, Appendix E)
Tape, Teflon (Item 23, Appendix E)

Equipment Condition

Chamber shut down (para. 2-15).

Replace. (figure 5-5)

(1) Remove pressure relief valve (1) from ball valve (2).

WARNING

Leave 1 1/2 threads exposed on fitting when applying teflon tape. This will ensure that no teflon tape will hang down inside the air system. Teflon tape should be wrapped in such a manner that when the fitting is tightened the tape will not loosen. Failure to wrap teflon tape correctly may result in contamination or blockage of the air system and subsequent possible injury or death to the diver.

(2) Apply teflon tape to threads on pressure relief valve (1) and install valve on ball valve (2).

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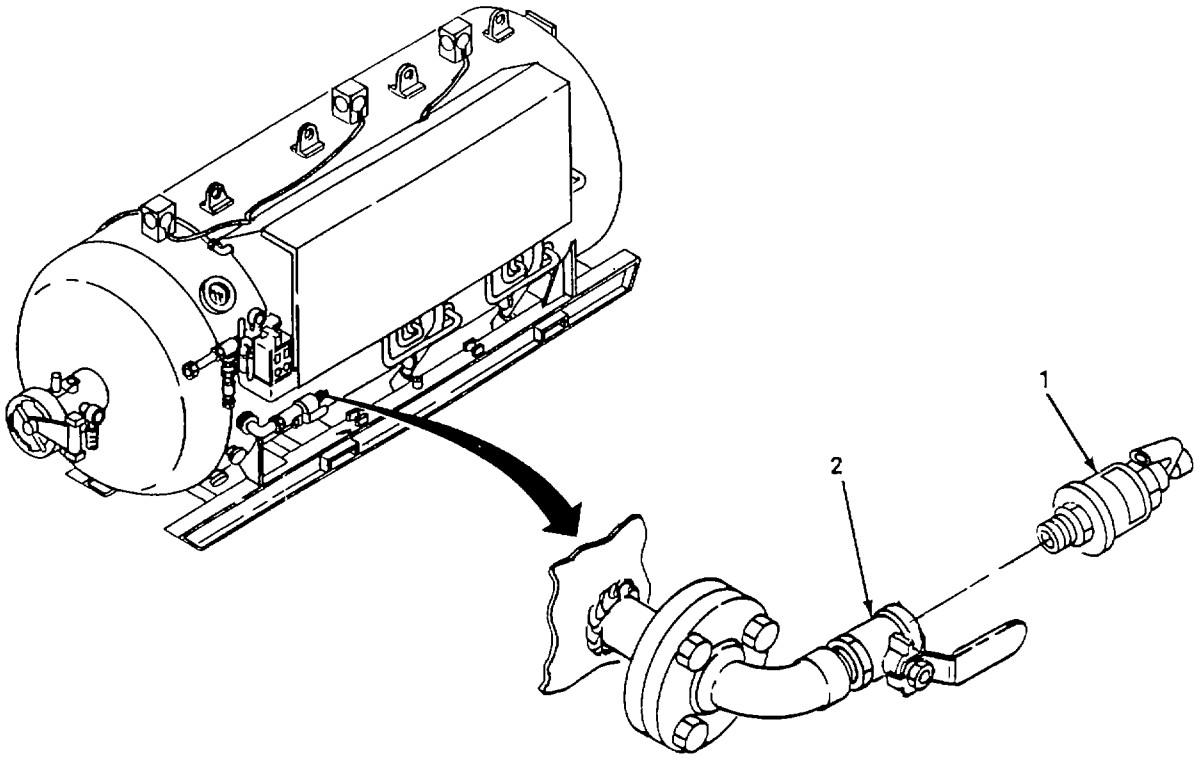


Figure 5-5. Pressure Relief Valve, Replace.

5-10. **Ball Valve 3/4 Inch (Pressure Relief Valve Assembly).**

This task covers: a. Replace b. Repair

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Ball Valve 3/4 Inch
Valve Kit
Packing
Bands, Rubber (Item 4, Appendix E)
Bags, Plastic (Item 3, Appendix E)

Materials/Parts (Cont)

Detergent, Nonionic (Item 8, Appendix E)
Distilled Water (Item 9, Appendix E)
Cloth, Lint-Free (Item 6, Appendix E)
Tape, Teflon (Item 21, Appendix E)

Equipment Condition

Chamber shut down (para. 2-15).
Pressure relief valve removed (para. 5-9).

a. Replace. (figure 5-6)

WARNING

To prevent the spread of disease, serious injury and/or death, oxygen breathing systems must be maintained hygienically clean and free from dust, dirt, and all hydrocarbon contamination. Refer to oxygen system prework procedures para. 4-10 to avoid violating this warning.

(1) Remove ball valve (1) from nipple (2).

WARNING

Leave 1 1/2 threads exposed on fitting when applying teflon tape. This will ensure that no teflon tape will hang down inside the air system. Teflon tape should be wrapped in such a manner that when the fitting is tightened the tape will not loosen. Failure to wrap teflon tape correctly may result in contamination or blockage of the air system and subsequent possible injury or death to the diver.

(2) Apply teflon tape to all pipe threads .

(3) Install ball valve (1) on nipple (2).

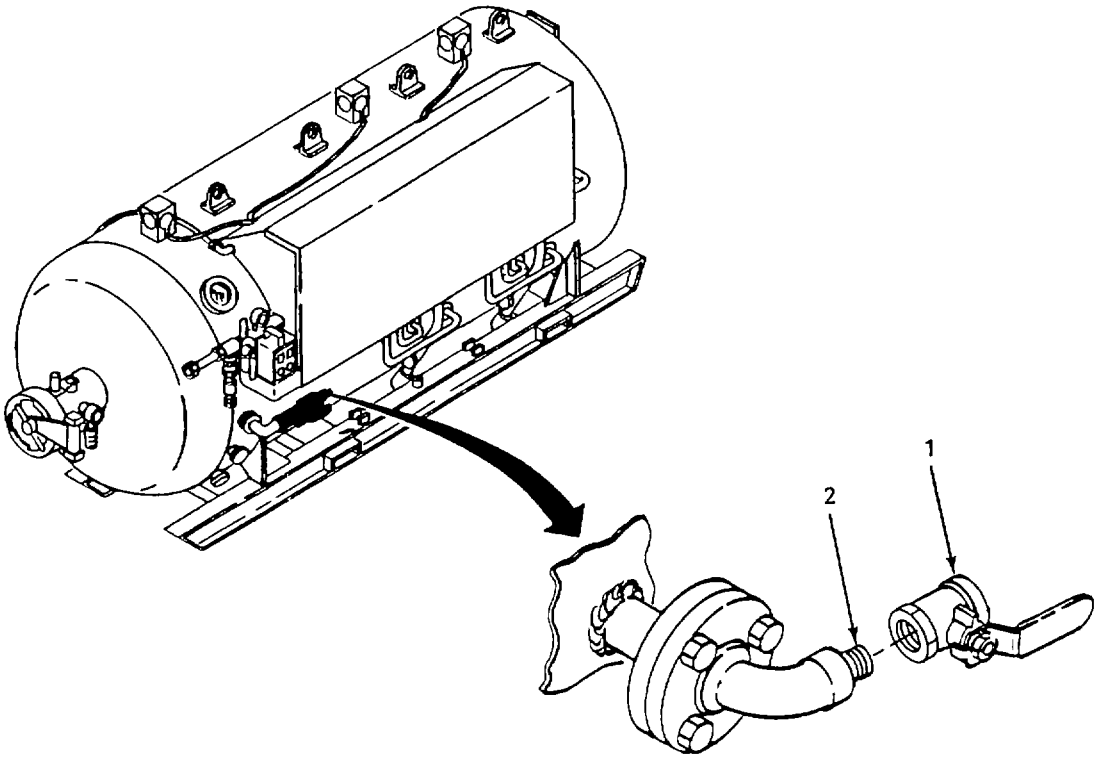


Figure 5-6. Ball Valve 3/4 Inch, Replace.

5-10. **Ball Valve 3/4 Inch (Pressure Relief Valve Assembly) (Cont).**

b. *Repair*. (figure 5-7)

(1) Remove ball valve, see para. a. above.

(2) Remove lever nut (1) and remove handle (2).

(3) Remove stem gland screw (3), packing (4), stem (5) and thrust seal washer (6) from body (7).

(4) Remove retainer (8), two teflon seats (9) and ball (10) from body (7).

(5) Clean all components using nonionic detergent cleaner and rinse with clean distilled water.

(6) Inspect all components, replace all components that are bent, cracked, worn or otherwise damaged.

(7) Install two teflon seats (9), ball (10) and retainer (8) in body (7).

(8) Install thrust seal washer (6), stem (5), packing (4) and stem gland screw (3) into body (7).

(9) Install handle (2) and secure with lever nut (1).

FOLLOW-ON MAINTENANCE
Install pressure relief valve (para. 5-9).

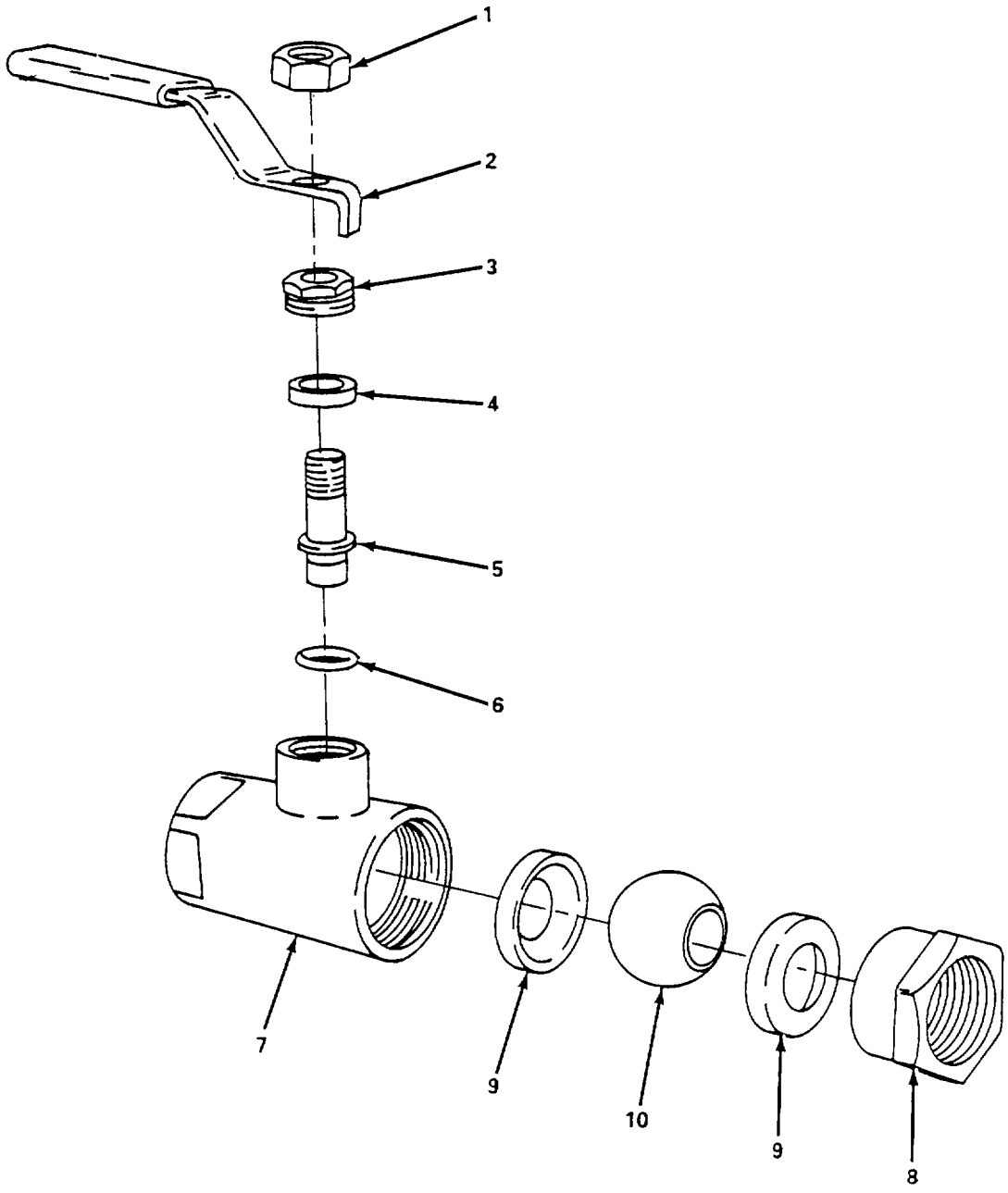


Figure 5-7. Ball Valve 3/4 Inch, Repair.

5-11. **Skid Assembly, Chamber.**

This task covers: Replace

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Skid

Equipment Condition

Chamber shut down (para. 2-15) and disconnected from air supply.
0_2 K bottles and manifold disconnected (para. 4-49).
Heater/chiller disconnected (para. 4-28).
External electrical power disconnected (para. 4-36).

Replace. (figure 5-8)

WARNING

Use two outer lifting brackets or two inner lifting brackets because of chamber center of gravity. Do NOT use one inner and one outer bracket to lift chamber.

(1) Connect the sling (1) to lifting device suitable for lifting over 3,000 lbs. and position crane directly over the chamber.

(2) Connect sling legs to chamber lifting eyes (3).

(3) Lift chamber only enough to take the chamber weight off the mounting hardware.

(4) Remove sixteen nuts (4), thirty two washers (5), ground wire (6), and sixteen screws (7) that secure chamber (8) to skid (9).

(5) Lift the chamber high enough to remove skid. Remove skid.

(6) Position the skid on the floor. Note that the fork lift channels (10) are positioned closer to one end of the skid in order to balance the chamber on the fork lift. Place this "short" end under the manway door end of the chamber.

(7) Lower chamber only far enough to align holes and insert sixteen screws (7), ground wire (6), and washers (5).

(8) Install sixteen washers (5) and nuts (4). Torque nuts per appendix F.

(9) Lower boom and disconnect sling (1) from lifting eyes (3) and remove lifting device.

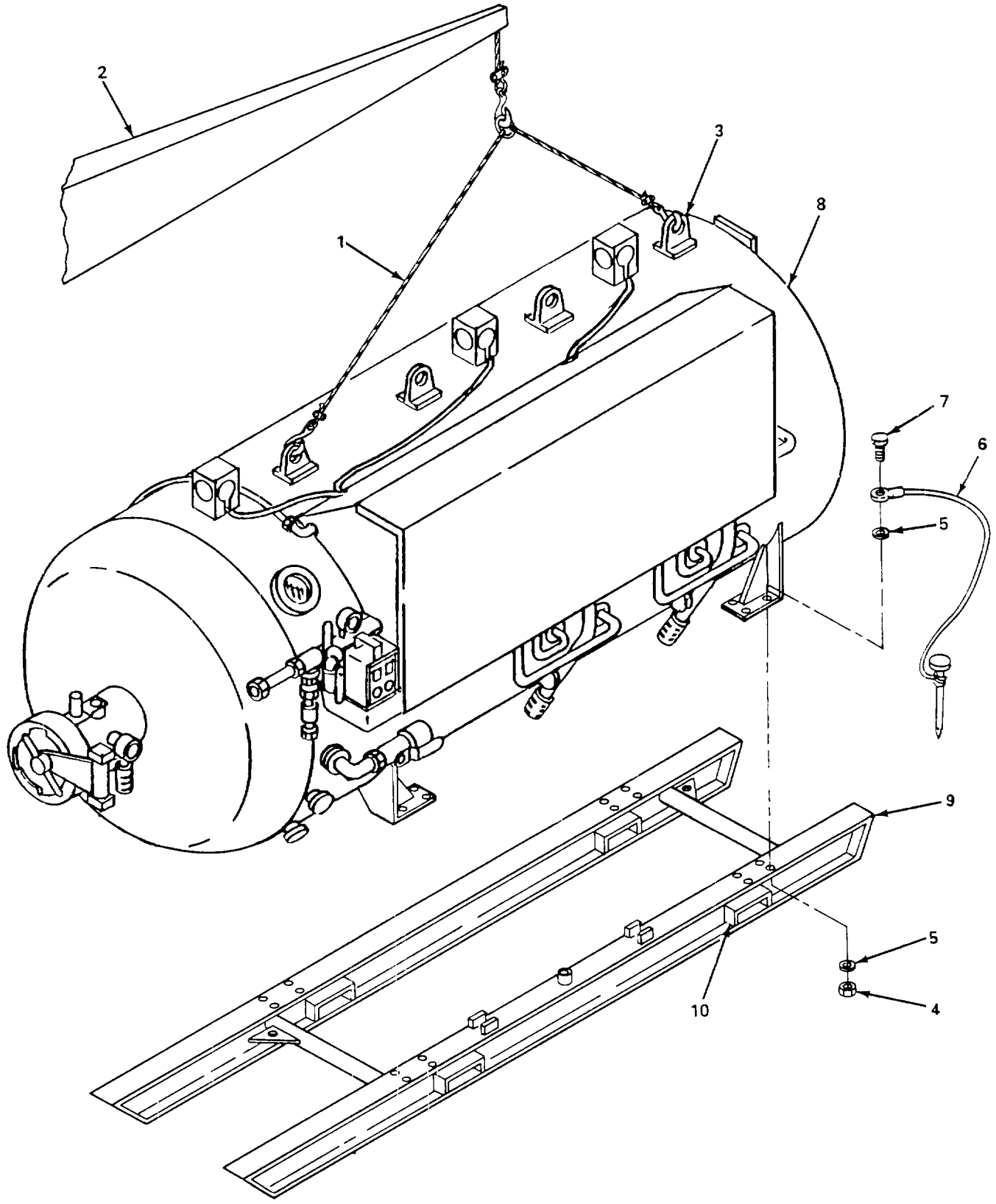


Figure 5-8. Skid Assembly Chamber, Replace.

5-12. Chamber Instrument Panel and Hood Assembly.

This task covers: a. Replace

INITIAL SETUP

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Chamber Control Console (CCC) Enclosure

Personnel Required

Two

Equipment Condition

Chamber shut down (para. 2-15).
Depth gages removed (para. 5-46).
Oxygen pressure gages removed (para. 5-30).
Pressure regulator removed (para. 5-31).
Back pressure regulator removed (para. 5-32).
Shutoff valves removed (para. 5-33).
Isolator valves removed (para. 5-34).
Fluorescent light assembly removed (para. 4-41).
External electrical power disconnected (para. 4-36).

Replace. (figure 5-9)

(1) Unlatch two latches (1), open hood assembly door (2) and install two supports (3) and pins (4).

(2) Remove six nuts (5), lockwashers (6) and bolts (7).

(3) Remove two pins (4) and support (3) and remove hood assembly door (2).

(4) Drill out rivets (8) securing warning (9) and flow chart (10) data plates from hood assembly door (2).

(5) Remove two nuts (11), lockwashers (12) and screws (13).

(6) Remove four nuts (14), lockwashers (15) and screws (16) and remove angle (17) and manifold tray (18)

CAUTION

Ensure that personnel are on hand to hold chamber instrument panel when attaching hardware is removed.

(7) Remove four nuts (19), washers (20) and screws (21) that secures chamber instrument panel (22) to hood assembly frame (23).

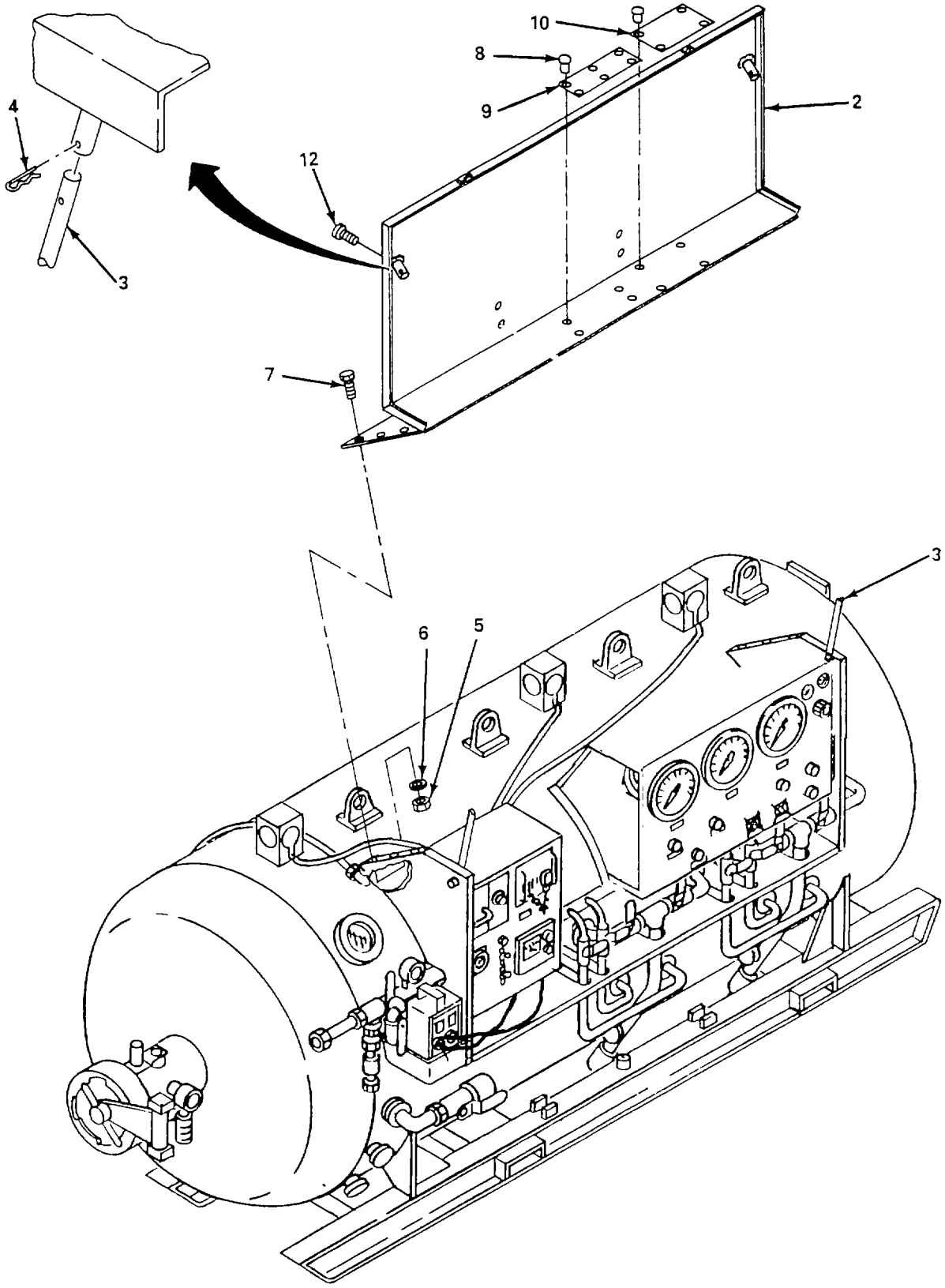


Figure 5-9. Chamber Instrument Panel and Hood Assembly Enclosure, Replace (Sheet 1 of 2).

5-12. Chamber Instrument Panel and Hood Assembly (Cont).

(8) Remove chamber instrument panel (22).

(9) Install chamber instrument panel (22) and secure with four screws (21), washers (20) and nuts (19).

(10) Install manifold tray (18) and angle (17) and secure with four screws (16), lockwashers (15) and nuts (14).

(11) Install two screws (13), lockwashers (12) and nuts (11).

(12) Install warning (9) and flow chart (10) data plates and secure with rivets (8).

(13) Position hood assembly door (2) and secure with six bolts (7), lockwashers (6) and nuts (5).

(14) Install two supports (3) and pins (4) in hood assembly door (2).

(15) Remove two pins (4), supports (3), close hood assembly door (2) and secure with two latches (1).

FOLLOW-ON MAINTENANCE
(1) Install isolator valves (para. 5-34).
(2) Install shutoff valves (para. 5-33).
(3) Install back pressure regulator (para. 5-32).
(4) Install pressure regulator (para. 5-31).
(5) Install oxygen pressure gages (para. 5-30).
(6) Install depth gages (para. 5-46).
(7) Install fluorescent light assembly (para. 4-41).
(8) Reconnect external electrical power (para. 4-36).

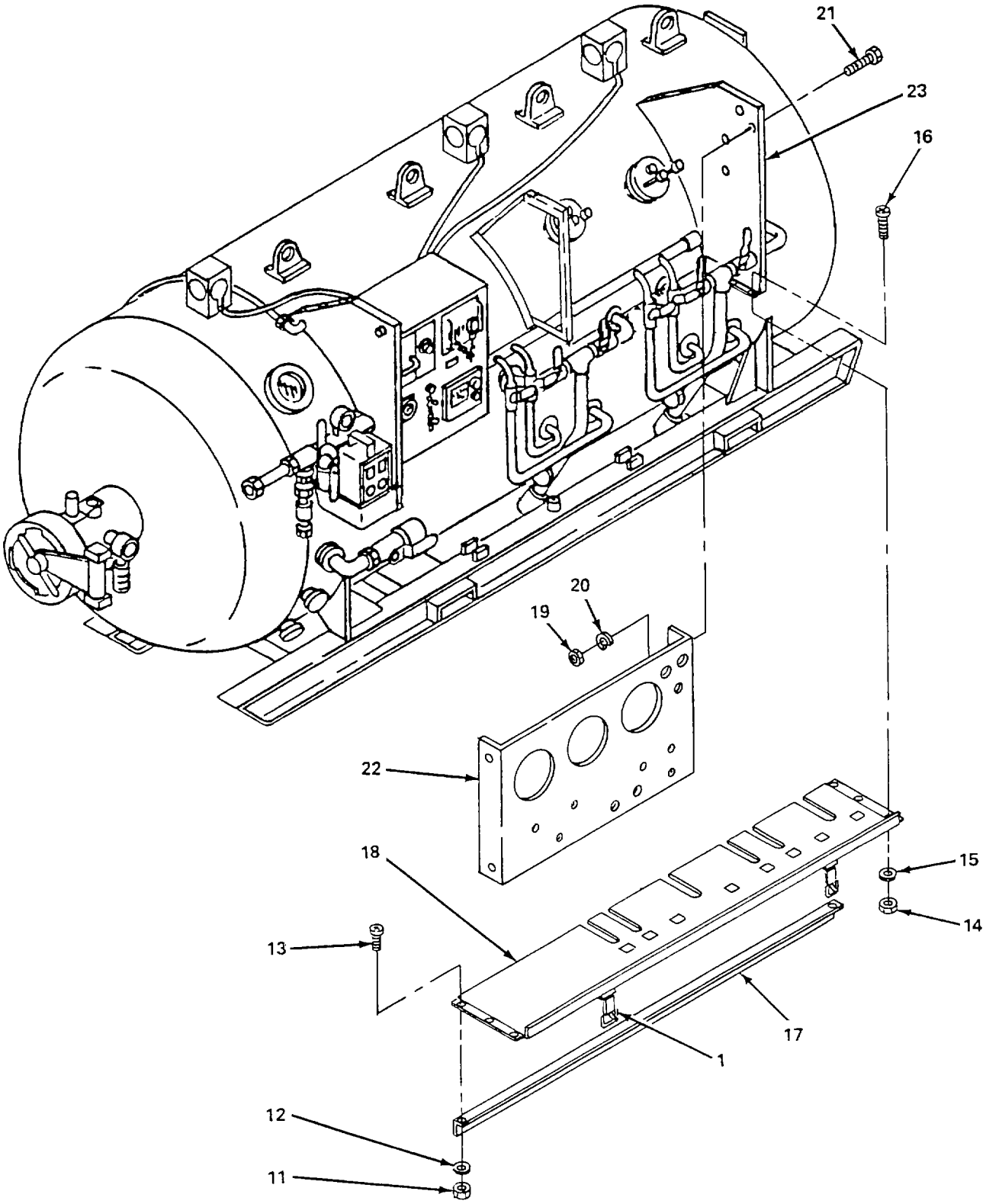


Figure 5-9. Chamber Instrument Panel and Hood Assembly Enclosure, Replace (Sheet 2 of 2).

5-13. Heater/Chiller Unit (CCU-03).

This task covers: a. Replace

INITIAL SETUP

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Equipment Condition

Chamber shut down (para. 2-15).

Materials/Parts

Heater/Chiller Unit

Replace. (figure 5-10)

(1) Unlatch two latches (1), open hood assembly door (2) and install two supports (3) and pins (4).

(2) Move heater/chiller fluid supply valve (5) and return valve (6) to the fully closed position.

(3) Move scrubber fan switch (7) and chiller fan switch (8) to OFF position.

(4) Remove six nuts (9), lockwashers (10) and bolts (11) that secure the heater/chiller unit (12) to the deck plate bracket (13).

(5) Remove heater/chiller unit (12) from deck plate bracket (13).

(6) Disconnect electrical connector (14) from heater/chiller unit (12).

CAUTION

Keep the open ends of the fluid hoses raised above the level of the unit to prevent draining the unit.

(7) Loosen fittings (15) and (16) and remove heater/chiller unit fluid supply hose (17) and return hose (18).

(8) Position replacement heater/chiller unit (12) close to scrubber assembly (19).

(9) Install heater/chiller unit fluid supply hose (17) and return hose (18) and tighten fittings (16) and (15).

(10) Connect electrical connector (14) to heater/chiller unit (12).

(11) Slide heater/chiller unit into position against deck plate bracket (13).

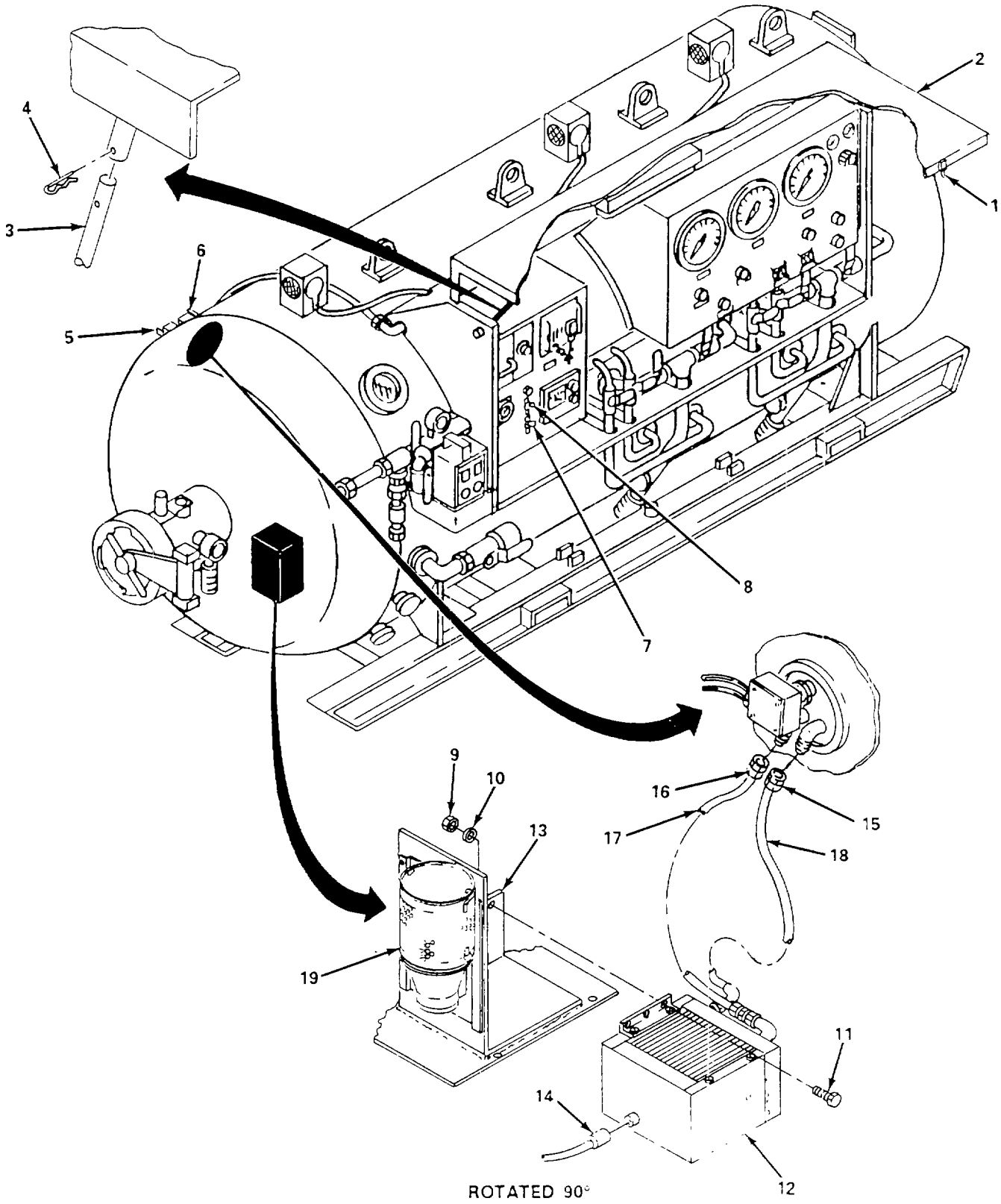


Figure 5-10. Heater/Chiller Unit (CCU-03), Replace.

(12) Install six bolts (11), lockwashers (10) and nuts (9).

(13) Add propylene glycol water 25% to 75% mix to fill reservoir in heater/chiller module, and open the penetrator fluid supply valve (5) and return valves (6).

(14) Start up the heater/chiller module to purge the fluid system.

(15) Add additional fluid mixture after purging the system.

(16) Start up the heater/chiller module and run it through a heat and then a cooling cycle, checking for leaks and ensuring smooth operation of the unit.

(17) Move the heater/chiller fan switch (8) to the ON position and run fan motor for several minutes to ensure proper operation.

(18) Remove two pins (4), support (3), close hood assembly door (2) and secure with two latches (1).

5-14. Heater/Chiller Unit Motor.

This task covers: a. Replace

INITIAL SETUP

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Equipment Condition

Heater/chiller unit removed (para. 4-28).

Materials/Parts

Heater/Chiller Unit Motor

Replace. (figure 5-11)

(1) Remove four screws (1) and lockwashers (2).

(2) Remove six screws (3) lockwashers (4) and remove front housing piece (5).

(3) With one hand supporting the coil assembly (6), remove four screws (7), coil assembly (6) and two nut plates (8) from housing assembly (9).

(4) Remove six screws (10) and lockwashers (11) and remove motor assembly (12).

(5) Remove screw (13) and lockwashers (14) and remove fan blade (15).

(6) Install fan blade (15) on motor assembly (12) and secure with screw (13) and lockwasher (14).

(7) Install motor assembly (12) and secure with six screws (10) and lockwashers (11).

(8) With one hand supporting coil assembly (6) and one nut plate (8), install coil assembly (6) in housing assembly (9) and secure with two screws (7). Install second nut plate (8) and secure with two screws (7).

(9) Install front housing piece (5) and secure with six screws (3) and lockwashers (4).

(10) Install four screws (1) and lockwasher (2).

FOLLOW-ON MAINTENANCE
Install heater/chiller unit (para. 4-28).

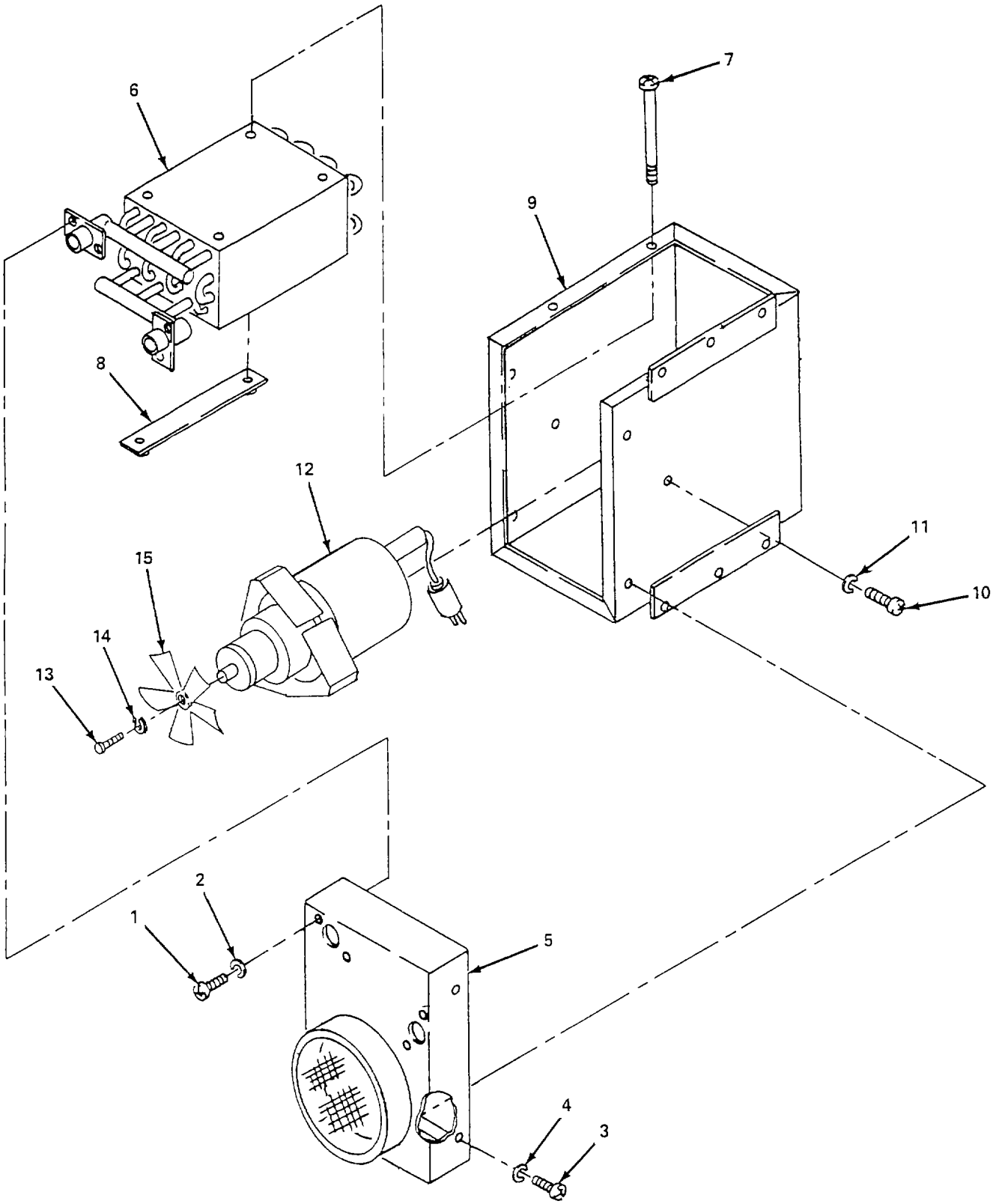


Figure 5-11. Heater/Chiller Unit Motor, Replace.

5-15. Scrubber Assembly, Motor

This task covers: a. Replace

INITIAL SETUP

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Equipment Condition

Chamber shut down (para. 2-15).
Scrubber assembly removed (para. 4-33).

Materials/Parts

Scrubber Assembly Motor

Replace. (figure 5-12)

(1) Disconnect electrical plug (1) from motor (2).

(2) Remove fan guard (3) from scrubber assembly housing (4).

(3) Loosen fan blade set screw (5) and remove fan blade (6) from motor shaft.

(4) Loosen set screw (7) and remove motor (2) from scrubber assembly housing (4).

(5) Install motor (2) into scrubber assembly housing (4) and tighten set screw (7).

(6) Install fan blade (6) on motor shaft and tighten set screw (5).

(7) Install fan guard (3) on scrubber assembly housing (4).

(8) Connect electrical plug (1) to motor (2).

FOLLOW-ON MAINTENANCE
Install scrubber assembly (para. 4-33).

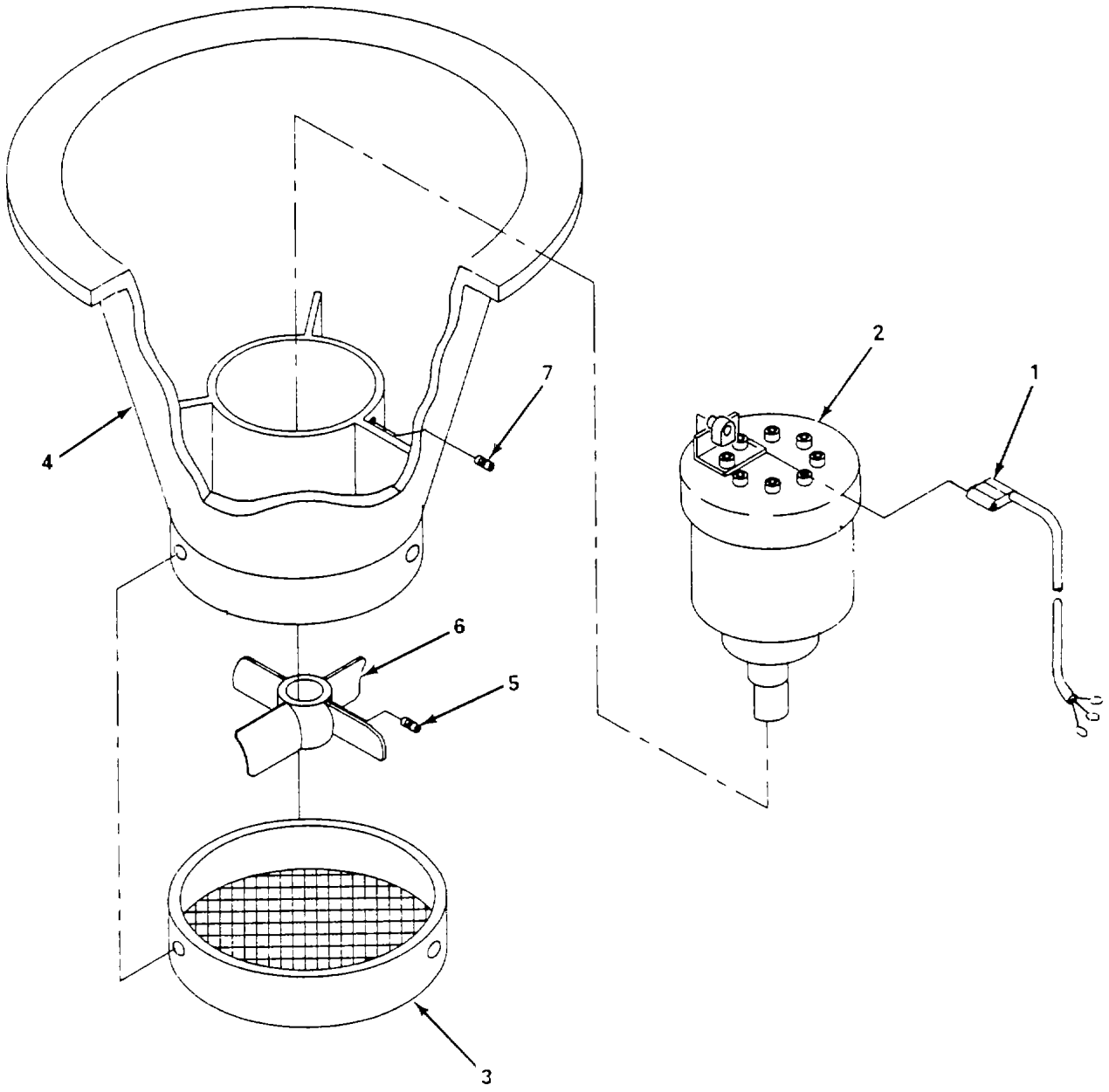


Figure 5-12. Scrubber Assembly Motor, Replace.

5-16. Portable Oxygen Analyzer Battery

This task covers: a. Replace

INITIAL SETUP

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)
Soldering Gun (NSN 3439-00-542-0396)

Equipment Condition

Portable oxygen analyzer removed
(para. 4-34).

Materials/Parts

Battery
Solder, Rosin Core (Item 20, Appendix E)

Replace. (figure 5-13)

(1) Remove two screws (1) and remove front cover (2) from housing (3).

(2) Tag and unsolder electrical leads (4) from battery leads (5).

(3) Remove four nuts (6) and screws (7) and remove two batteries (5) and four clamps (8).

(4) Install two batteries (5) and four clamps (8) and secure four screws (7) and nuts (6).

(5) Solder electrical leads (4) to two battery leads (5).

(6) Install front cover (2) on housing (3) and secure with two screws (1).

FOLLOW-ON MAINTENANCE
Install portable oxygen analyzer (para. 4-34).

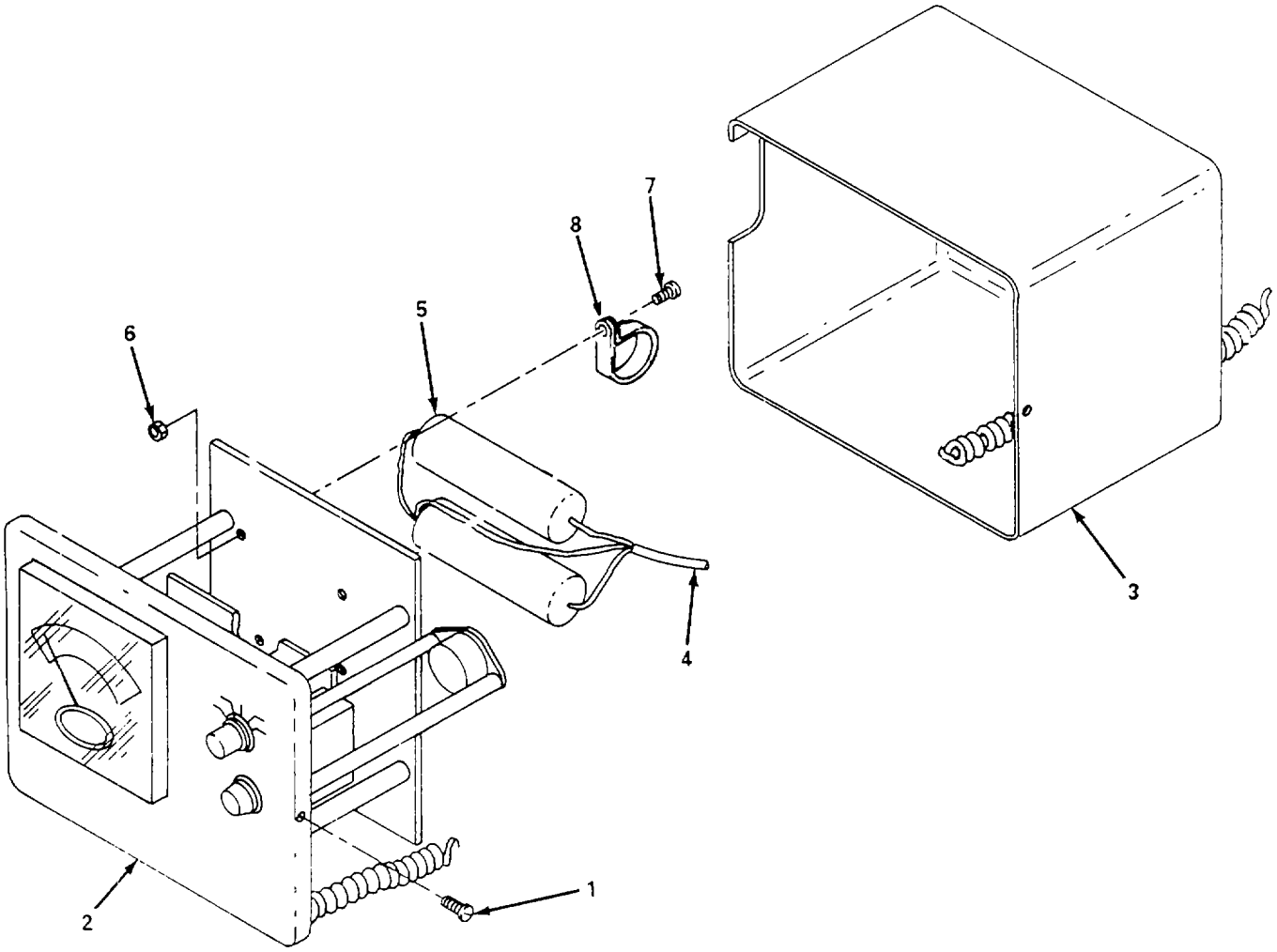


Figure 5-13. Portable Oxygen Analyzer Battery, Replace.

5-17. Portable Oxygen Analyzer Probe Assembly

This task covers: a. Replace b. Repair

INITIAL SETUP

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Equipment Condition

Portable oxygen analyzer removed (para. 4-34).

Materials/Parts

Probe Assembly

a. Replace. (figure 5-14)

(1) Remove two screws (1) and remove front cover (2) from housing (3).

(2) Tag and disconnect electrical leads (4) and remove probe assembly (5) from housing (3).

(3) Insert probe assembly electrical leads (4) through hole in back of housing (3).

(4) Connect electrical leads (4) to analyzer.

(5) Install front cover (2) on housing (3) and secure with two screws (1).

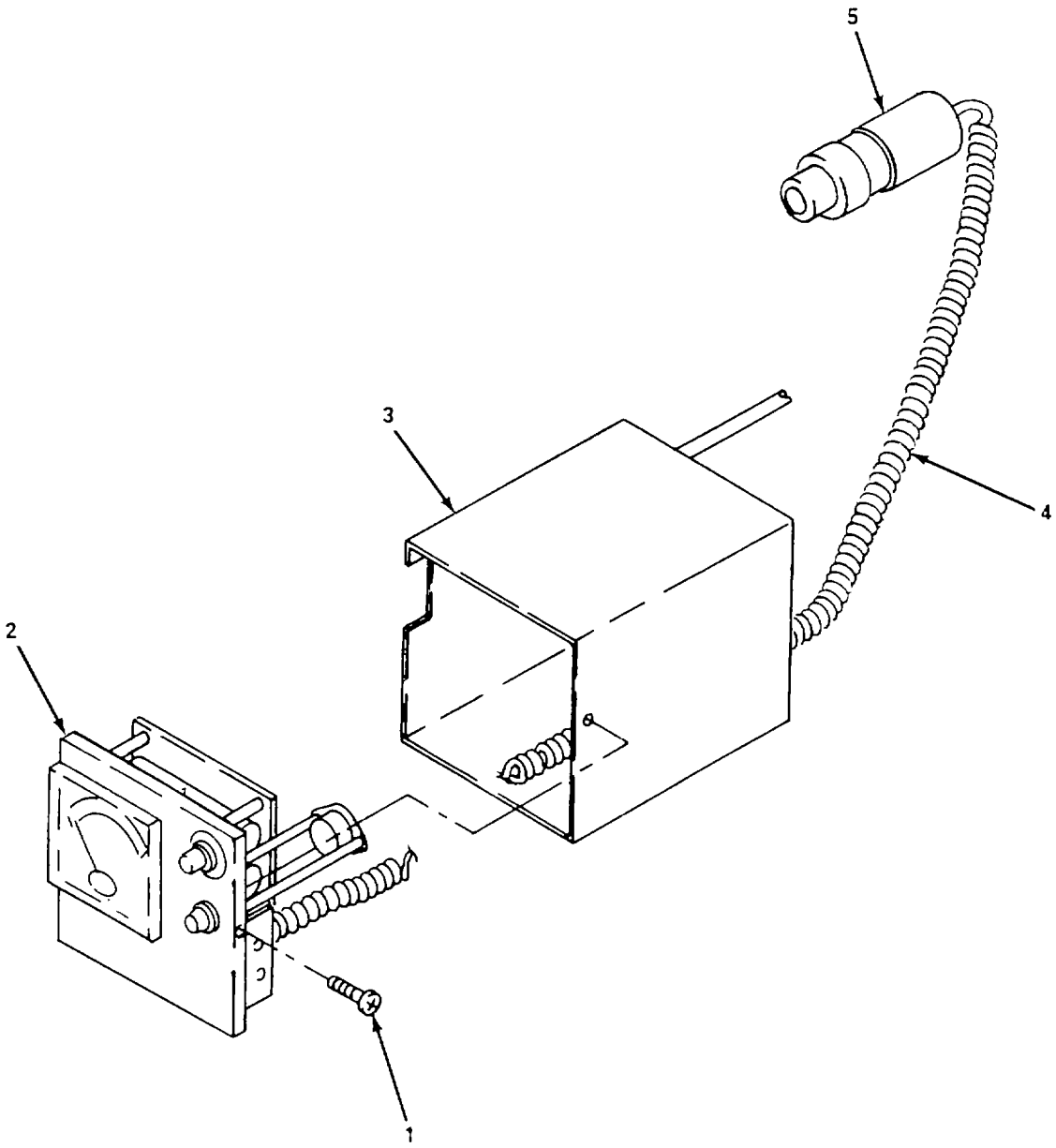


Figure 5-14. Portable Oxygen Analyzer Probe Assembly, Replace.

5-17. Portable Oxygen Analyzer Probe Assembly (Cont).

b. Repair. (figure 5-15)

(1) Remove portable oxygen analyzer probe assembly (para. a. above).

(2) Unscrew cap (1) with gasket and screws inside) from probe body housing (2)

(3) Remove cell assembly (3) from housing (2).

(4) Remove two screws (4) that secure contact plate assembly (5), and thermostat (6) into the housing (2).

(5) Remove electrical leads (7) from contact plate (5) and thermostat (6) and remove contact plate and thermostat.

(6) Remove two screws (8) securing back cover (9) to housing (2).

(7) Remove and discard cable clamp (10) from cable (11) and slide back cover (9) off cable.

(8) Clean all components using nonionic detergent cleaner and rinse with clean distilled water.

(9) Inspect all components and replace all components that are bent, cracked, worn, or otherwise damaged.

(10) Install back cover (9) on cable (11) and secure with cable clamp (10).

(11) Install back cover (9) into housing (2) and secure with two screws (8).

(12) Install cable (11) through housing (2) and connect electrical leads (7) to contact plate (5) and thermostat (6).

(13) Install thermostat (6) and contact plate (5) and secure with two screws (4).

(14) Install cell assembly (3) into housing (2).

(15) Install cap (1) (with gasket and screen inside) into housing (2).

(16) Install portable oxygen analyzer probe assembly (para. a. above).

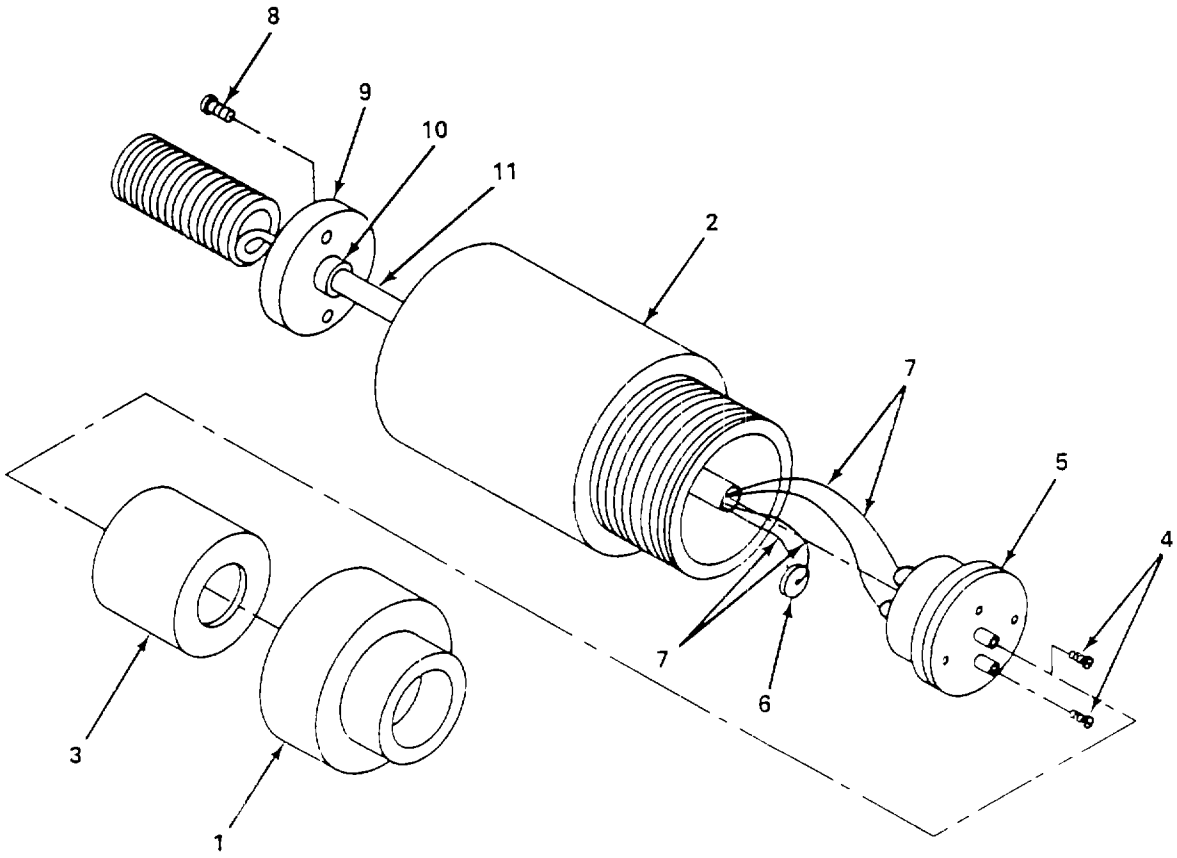


Figure 5-15. Portable Oxygen Analyzer Probe Assembly, Repair.

5-18. Flow Meter.

This task covers: a. Replace

INITIAL SETUP

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Flow Meter
Bands, Rubber (Item 4, Appendix E)

Materials/Parts (Cont)

Bags, Plastic (Item 3, Appendix E)
Tape, Teflon (Item 21, Appendix E)

Equipment Condition

Chamber shut down (para. 2-15).

Replace. (figure 5-16)

(1) Unlatch two latches (1) open enclosure (2) and install two supports (3) and pins (4).

(2) Close the ALP-014 flow meter isolator valve (5).

(3) Loosen fitting nut (6) and disconnect chamber air supply tubing (7) from elbow (8) on bottom of flow meter (9).

(4) Remove elbow (8) from flow meter (9)

(5) Disconnect microfuel cell fitting (10) from flow meter (9).

(6) Remove two screws (11) and remove flow meter (9) from mounting bracket (12).

(7) Position flow meter (9) on mounting bracket (12) and secure with two screws (11).

(8) Position flow meter (9) on mounting bracket (12) and secure with two screws (11).

WARNING

Leave 1 ½ threads exposed on fitting when applying teflon tape. This will ensure that no teflon tape will hang down inside the air system. Teflon tape should be wrapped in such a manner that when the fitting is tightened the tape will not loosen. Failure to wrap teflon tape correctly may result in contamination or blockage of the air system and subsequent possible injury or death to the diver.

(9) Apply teflon tape to all pipe threads.

(10) Install microfuel cell fitting (10) on top of flow meter (9).

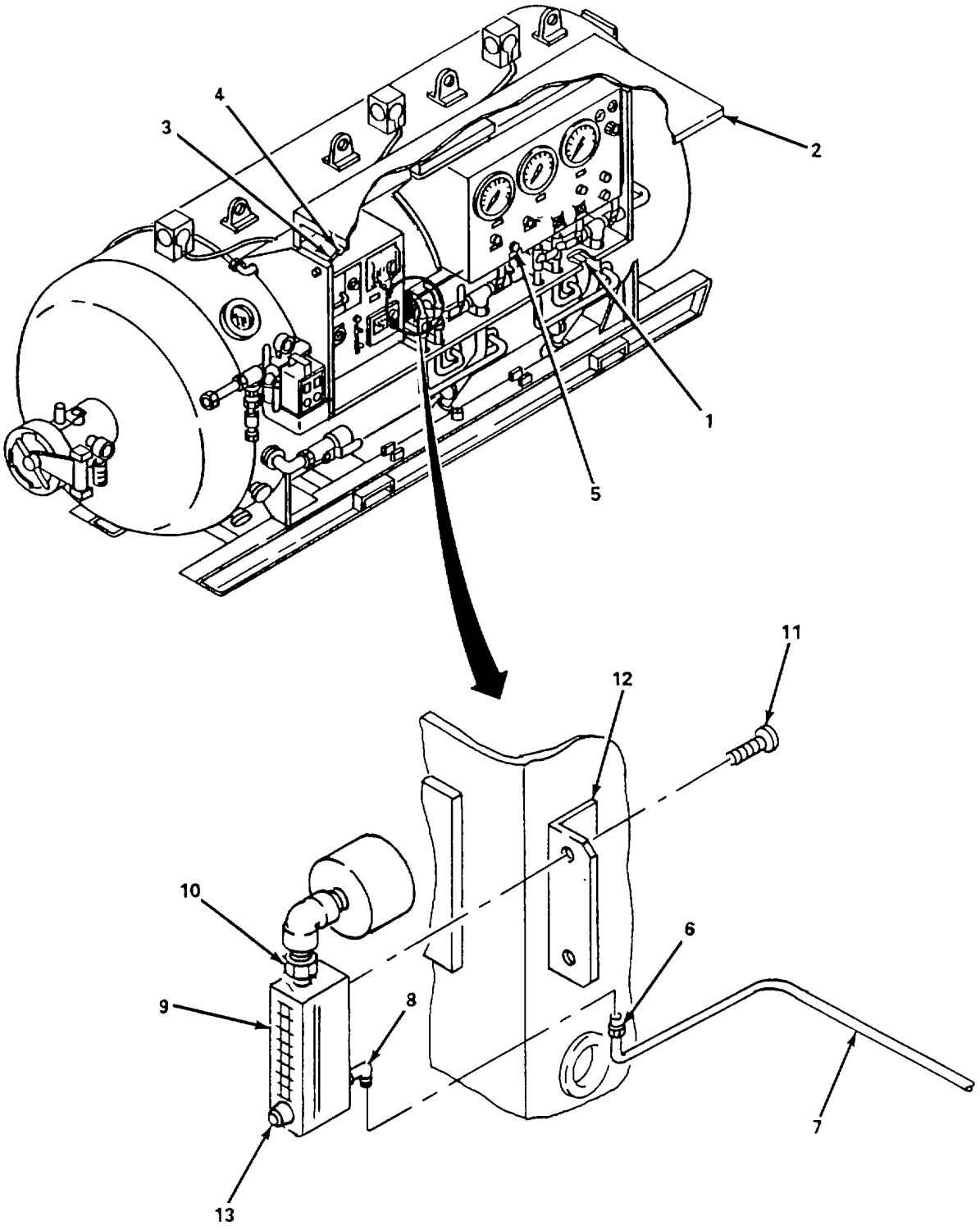


Figure 5-16. Flow Meter, Replace.

(11) Install elbow (8) on flow meter (9) and install chamber air supply tubing fitting nut (6) on elbow.

(12) Ensure that flow metering valve (13) is closed. Then open the ALP-014 flow meter isolator valve (5).

(13) Remove two pins (4), supports (3), close enclosure door (2) and secure with two latches (1).

5-19. Double Light Power Supply (Inner Lock).

This task covers: a. Replace

INITIAL SETUP

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Switch
Indicator Light
Variac Unit
Transformer
Light Cords

Materials/Parts (Cont)

Power Cord
Distilled Water (Item 9, Appendix E)
Cloth, Lint-free (Item 6, Appendix E)
Detergent, Nonionic (Item 7, Appendix E)

Equipment Condition

Chamber shut down (para. 2-15).
Double Light Power Supply (I/L) removed (para. 4-38).

Repair.

(1) Replace switch. (figure 5-17)

NOTE

There are three switches. Replacement of each switch is the same.

(a) Tag and disconnect electrical leads (1).

(b) Remove nut (2) and plate (3) and remove switch (4).

(c) Install switch (4) in cover (5) and secure with plate (3) and nut (2).

(d) Connect electrical leads (1).

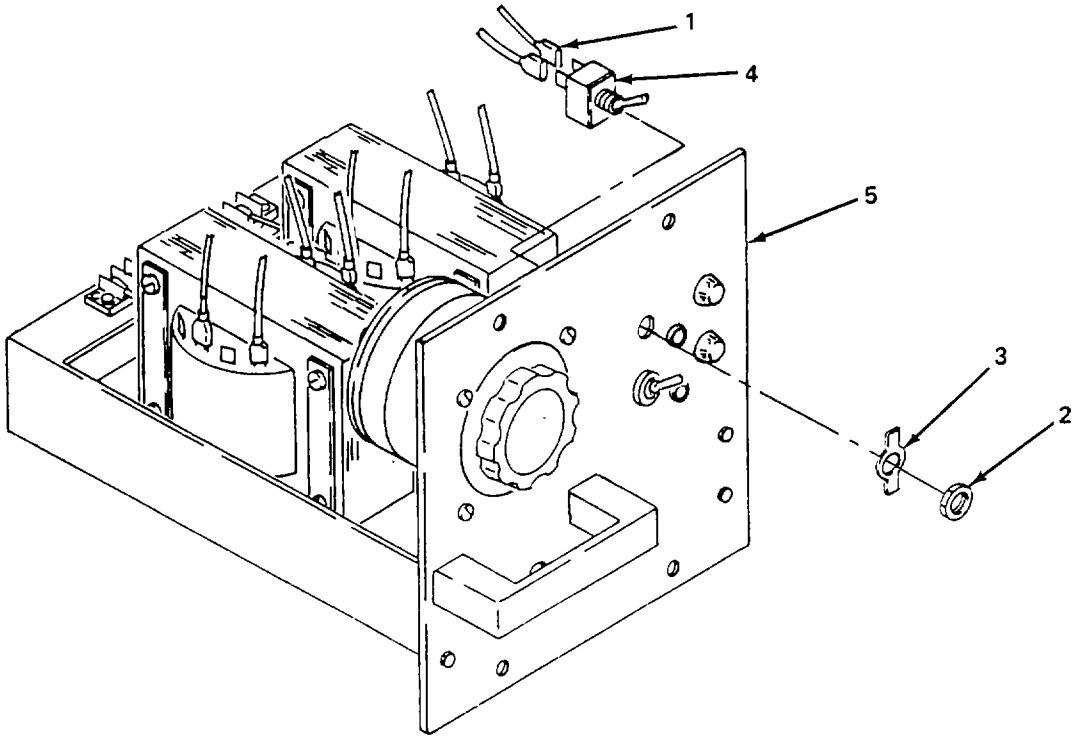


Figure 5-17. Double Light Power Supply (Inner Lock) Switch, Replace.

5-19. Double Light Power Supply (Inner Lock) (Cont).

(2) Replace indicator light. (figure 5-18)

NOTE

There are three indicator lights. Replacement of each light is the same.

(a Tag and disconnect electrical leads (1).

(b Remove nut plate (2) and remove indicator light (3).

(c) Install indicator light (3) in cover (4) and secure with nut plate (2).

(d) Connect electrical leads (1).

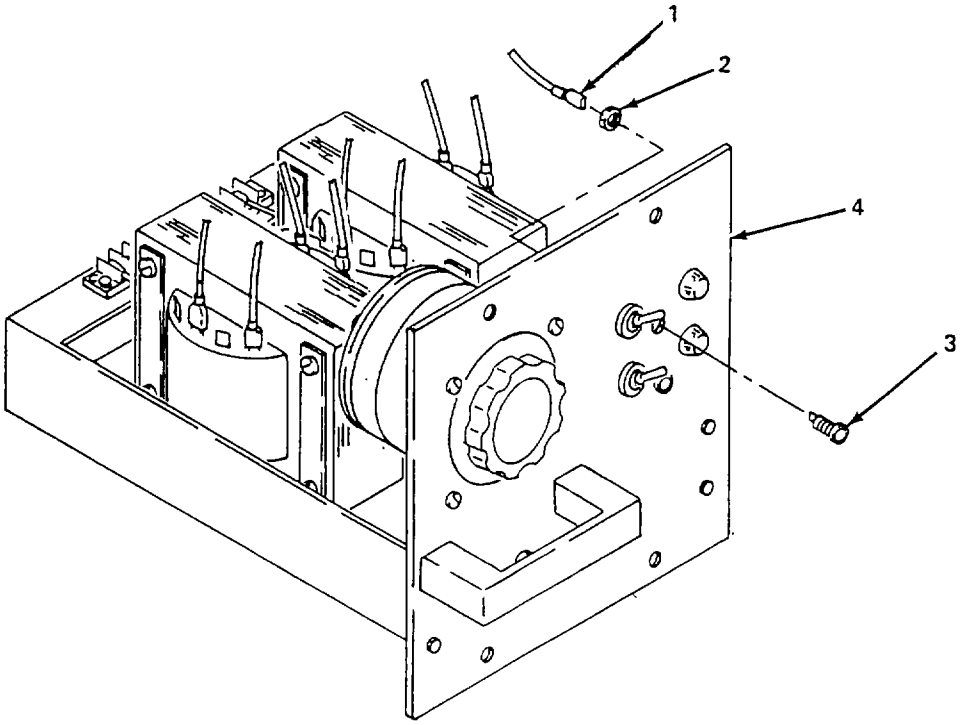


Figure 5-18. Double Light Power Supply (Inner Lock) Indicator Light, Replace.

5-19. Double Light Power Supply (Inner Lock) (Cont).

(3) *Replace variac unit*. (figure 5-19)

(a) Tag and disconnect electrical lead (1).

(b) Remove knob (2) from variac unit (3).

(c) Remove four nuts (4), washers (5) and screws (6) and remove variac unit (3).

(d) Install variac unit (3) on cover (7) and secure with four screws (6), washers (5) and nuts (4).

(e) Install knob (2) and connect electrical leads (1).

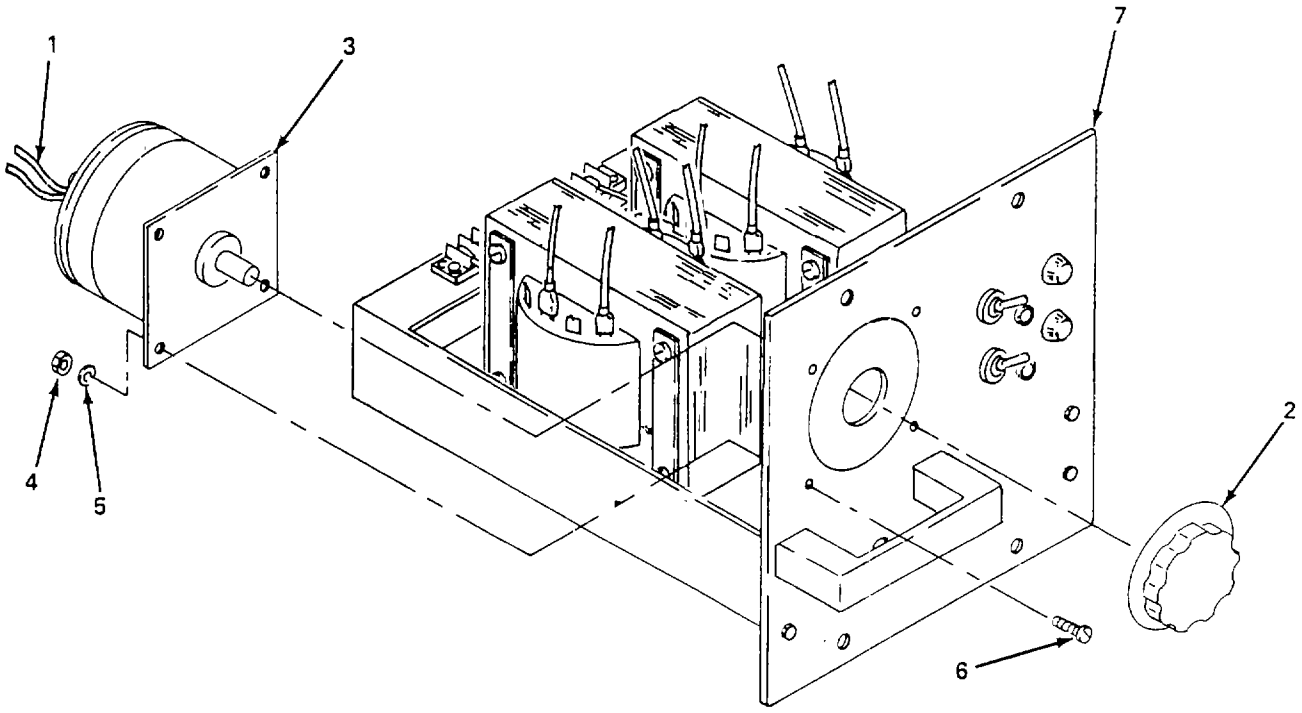


Figure 5-19. Double Light Power Supply (inner Lock) Variac Unit, Replace

5-19. Double Light Power Supply (Inner Lock) (Cont).

(4) *Replace transformer*. (figure 5-20)

NOTE

There are two transformers. Replacement of each transformer is the same.

(a) Tag and disconnect electrical leads (1).

(b) Remove four screws (2) and remove transformer (3).

(c) Install transformer (3) on plate (4) and secure with four screws (2).

(d) Connect electrical leads (1).

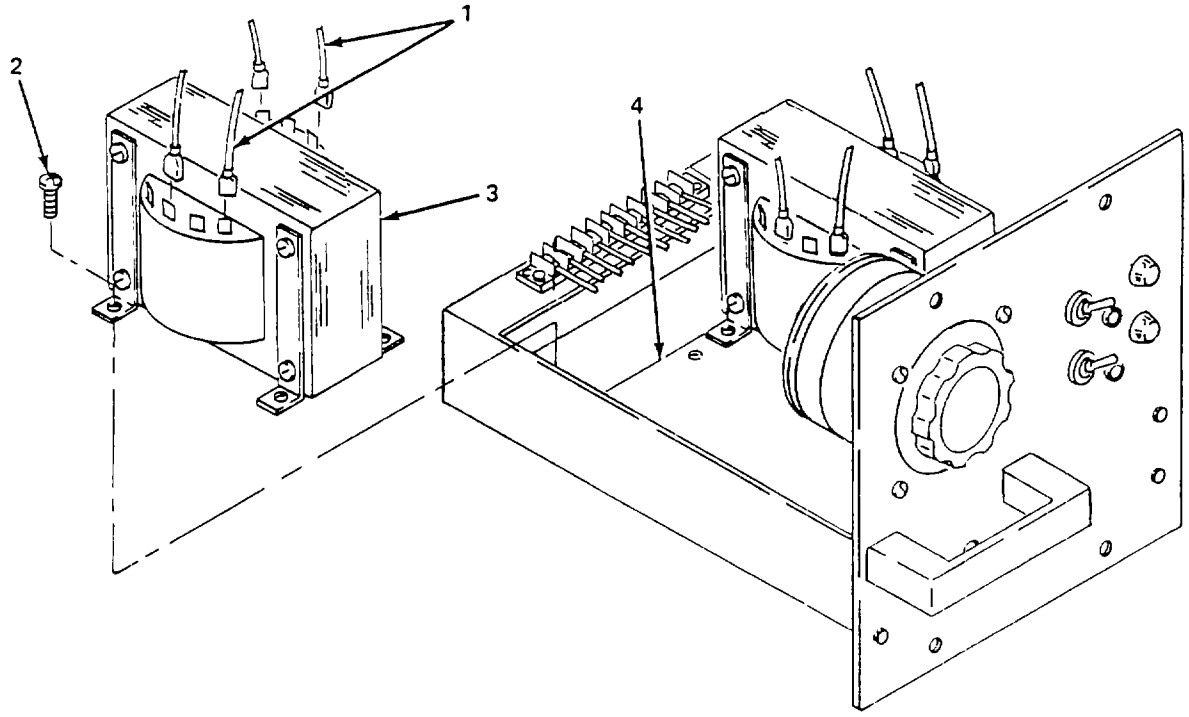


Figure 5-20. Double Light Power Supply (Inner Lock) Transformer, Replace.

5-19. Double Light Power Supply (Inner Lock) (Cont).

(5) *Replace power and light cords*. (figure 5-21)

NOTE

There are two light cords and one power cord. Replacement of each cord is the same.

(a) Tag and disconnect electrical lead (1) from terminal board (2).

(b) Connect electrical leads (1) to terminal board (2).

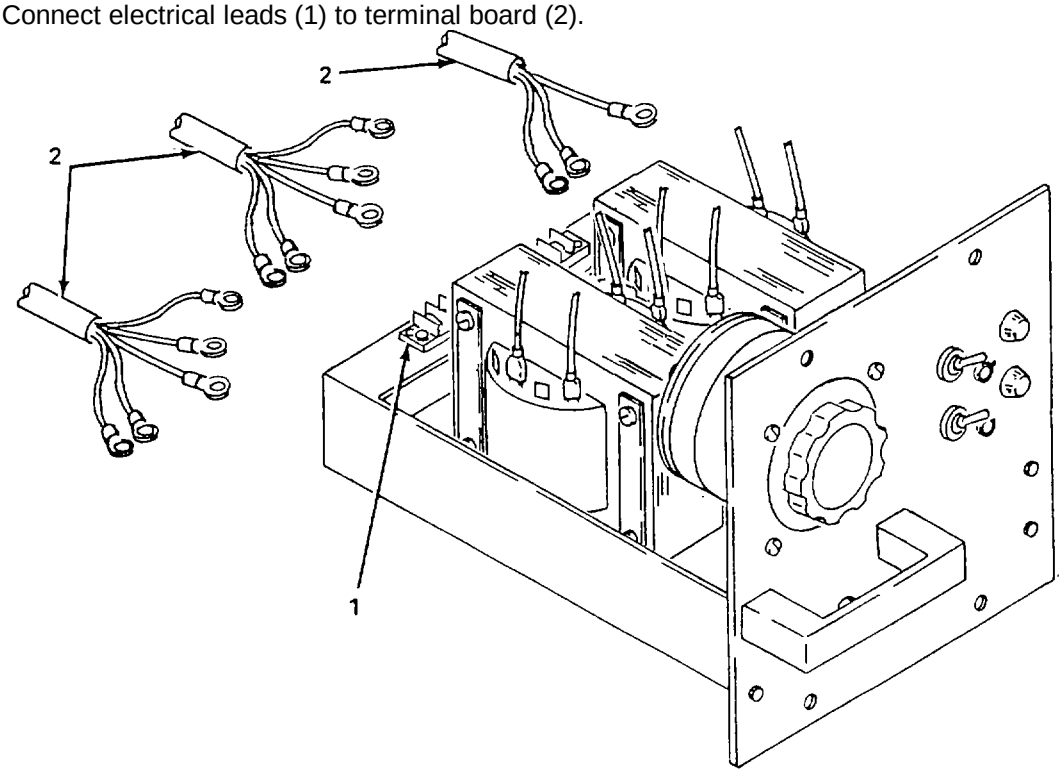


Figure 5-21. Double Light Power Supply (Inner Lock) Power and Light Cords, Replace.

FOLLOW-ON MAINTENANCE:
Install double light power supply (para. 4-38).

5-20. Light Source.

This task covers: Repair

INITIAL SETUP

Tools	*Materials/Parts (Cont)*
General Mechanic's Tool Kit (NSN 5180-00-177-7033)	Distilled Water (Item 8, Appendix E) Cloth, Lint-free (Item 5, Appendix E)
Materials/Parts	*Equipment Condition*
Light Source Detergent, Nonionic (Item 7, Appendix E)	Chamber shut down (para. 2-15) Light source removed (para. 4-39).

Repair. (figure 5-22)

NOTE

There are three light sources. Repair of each light source is the same.

(1) Remove pipe nut (1) and fitting nut (2) from light probe (3).

(2) Remove gland nut (4) and ferrules (5) and (6).

(3) Remove four screws (7) and remove cover (8).

(4) Lift lamp ejector lever (9) away from lamp (10).

(5) Remove lamp ejector lever (9) from lamp socket (11).

(6) Remove lens (12) from lens and thermocouple assembly (13).

(7) Tag and disconnect electrical leads (14) from terminal board (15).

(8) Remove two screws (16) and remove lens and thermocouple assembly (13).

(9) Tag and disconnect electrical leads (17) from connector (18).

(10) Remove four nuts (19), washers (20) and screws (21) and remove connector (18).

(11) Tag and disconnect electrical leads (22) from terminal board (15).

(12) Remove four nuts (23), washers (24) and screws (25) and remove fan (26).

(13) Clean all components using nonionic detergent cleaner and rinse with clean distilled water.

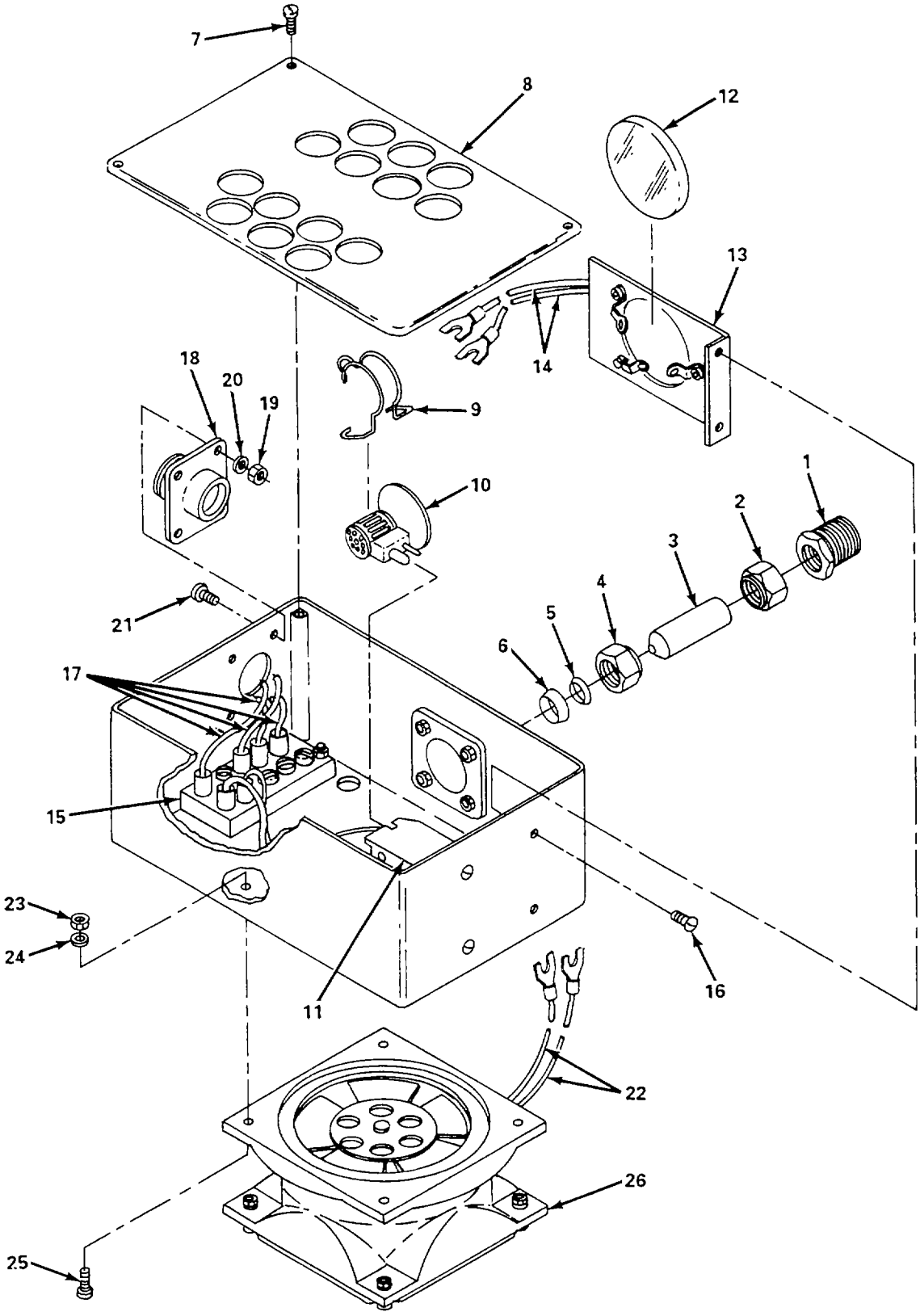


Figure 5-22. Light Source, Repair.

WARNING

Leave 1 1/2 threads exposed on fitting when applying teflon tape. This will ensure that no teflon tape will hang down inside the air system. Teflon tape should be wrapped in such a manner that when the fitting is tightened the tape will not loosen. Failure to wrap teflon tape correctly may result in contamination or blockage of the air system and subsequent possible injury or death to the diver.

(14) Apply teflon tape to all pipe threads.

(15) Install fan (26) and secure with four screws (25), washer (24) and nuts (23).

(16) Connect electrical leads (22) to terminal board (15).

(17) Install connector (18) and secure with four screws (21), washers (20) and nuts (19).

(18) Connect electrical leads (17) to connector (18).

(19) Install lens and thermocouple assembly (13) and secure with two screws (16).

(20) Connect electrical leads (14) to terminal board (15).

(21 Install lens (12) on lens and thermocouple assembly (13).

(22 Snap ejector lever (9) over the body of the lamp (10).

(23) Install cover (8) and secure with four screws (7).

(24) Install ferrules (5) and (6) tapered side up in toward light source assembly and tighten gland nut (4).

(25) Install light probe (3) and tighten fitting nut (2).

(26) Install pipe nut (1).

FOLLOW-ON MAINTENANCE
Install light source (para. 4-39).

5-21. Single Light Power Supply (Outer Lock).

This task covers: a. Replace

INITIAL SETUP

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Single Light Power Supply
Detergent, Nonionic (Item 8, Appendix E)

Materials/Parts (Cont)

Distilled Water (Item 9, Appendix E)
Cloth, Lint-free (Item 6, Appendix E)

Equipment Condition

Chamber shut down (para. 2-15).
Single light power supply removed (para. 4-40).

Repair.

(1) Replace switch. (figure 5-23)

(a) Tag and disconnect electrical leads (1).

(b) Remove nut (2) and plate (3) and remove switch (4).

(c) Install switch (4) in cover (5) and secure with plate (3) and nut (2).

(d) Connect electrical leads (1).

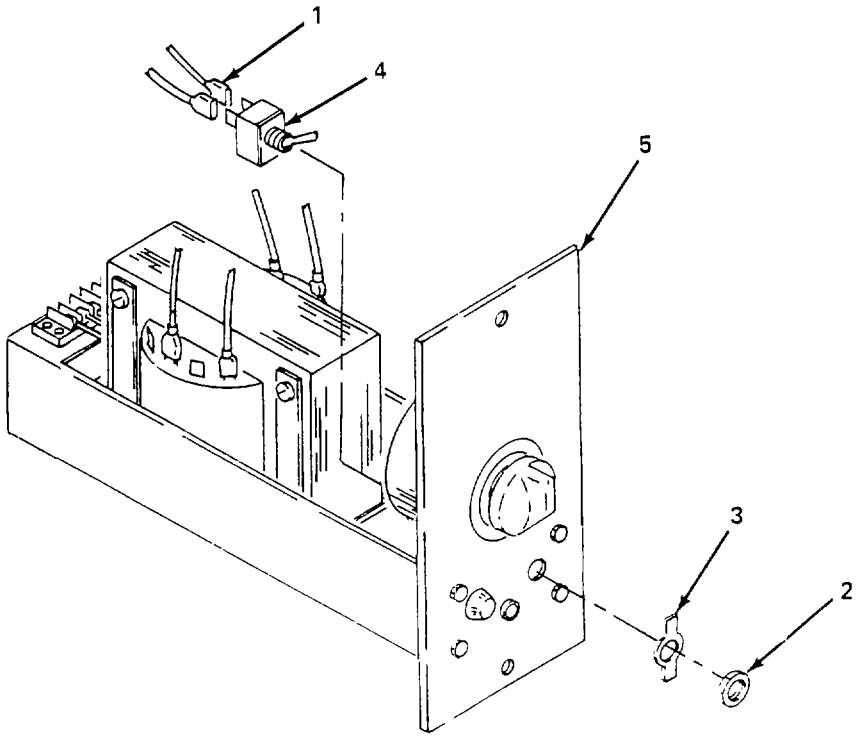


Figure 5-23. Single Light Power Supply (Outer Lock) Switch, Replace.

5-21. **Single Light Power Supply (Outer Lock) (Cont).**

(2) *Replace indicator light. (figure 5-24)*

(a) Tag and disconnect electrical leads (1).

(b) Remove nut (2) and remove indicator light (3).

(c) Install indicator light (3) in cover (4) and secure with nut (2).

(d) Connect electrical leads (1).

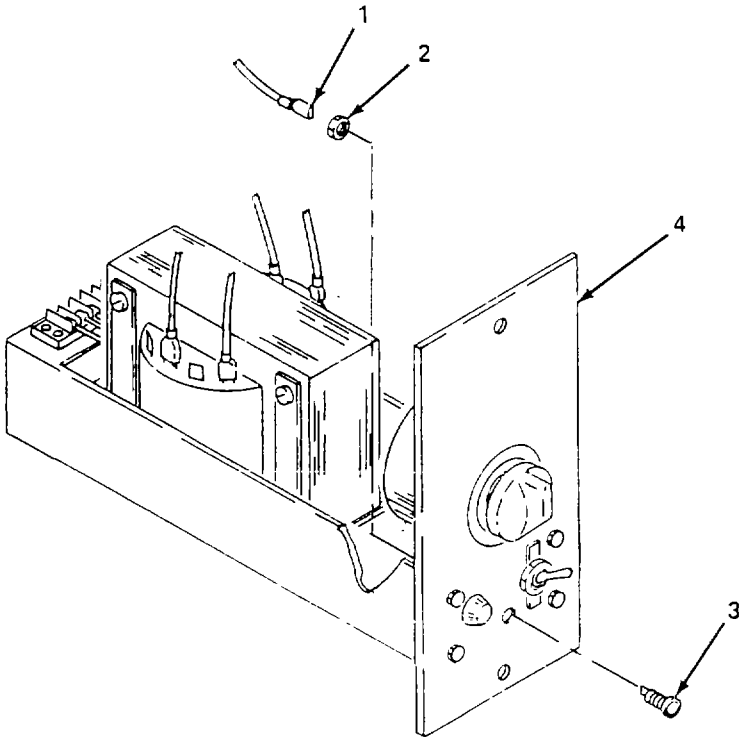


Figure 5-24. Single Light Power Supply (Outer Lock) Indicator Light, Replace.

5-21. **Single Light Power Supply (Outer Lock) (Cont).**

(3) *Replace variac unit*. (figure 5-25)

(a) Tag and disconnect electrical leads (1).

(b) Remove knob (2) from variac unit (3).

(c) Remove nut (4) and remove variac unit (3).

(d) Install variac unit (3) on cover (5) and secure with nut (4).

(e) Install knob (2) and connect electrical leads (1).

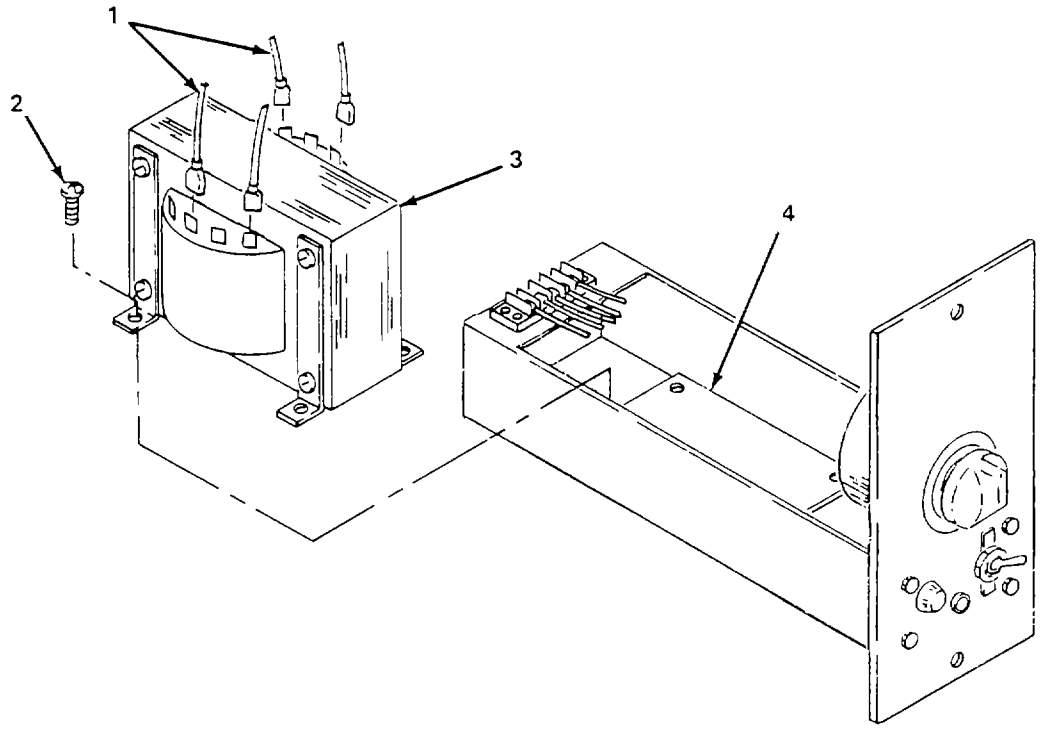


Figure 5-25. Single Light Power Supply (Outer Lock) Variac Unit, Replace.

5-21. **Single Light Power Supply (Outer Lock) (Cont).**

(4) *Replace transformer*. (figure 5-26)

(a) Tag and disconnect electrical leads (1).

(b) Remove four screws (2) and remove transformer (3).

(c) Install transformer (3) on plate (4) and secure with four screws (2).

(d) Connect electrical leads (1).

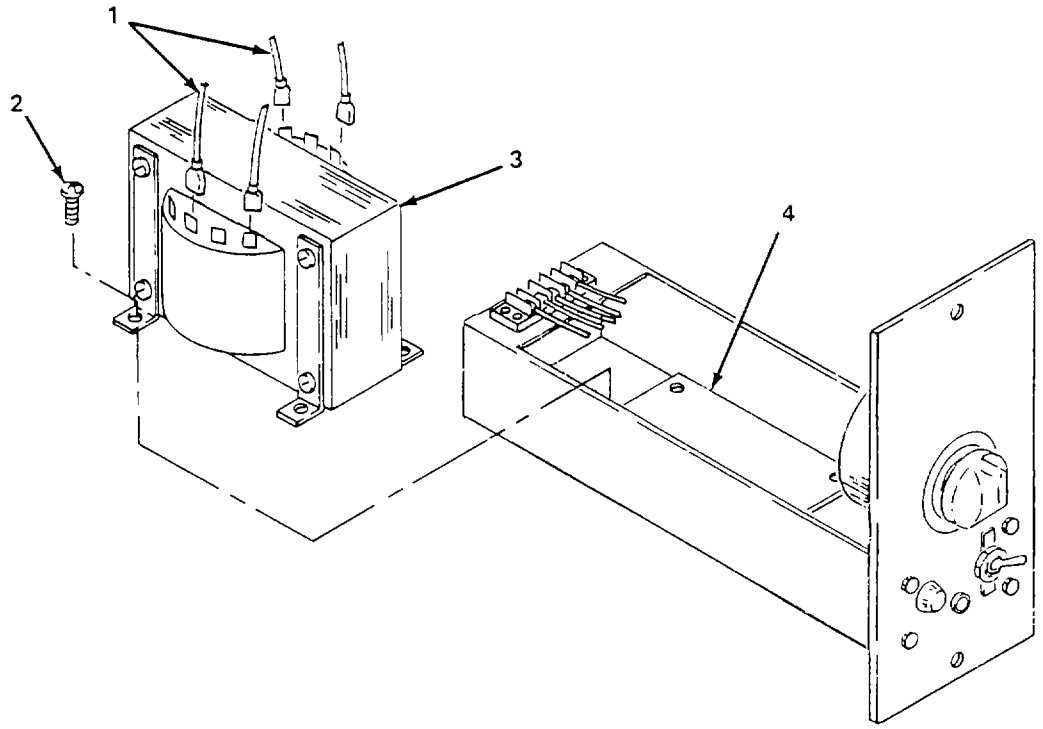


Figure 5-26. Single Light Power Supply (Outer Lock) Transformer, Replace.

5-21. **Single Light Power Supply (Outer Lock) (Cont).**

(5) *Replace power and light cords.* (figure 5-27)

NOTE

There are two cords, one light and one power cord. Replacement of each cord is the same.

(a) Tag and disconnect electrical lead (2) from terminal board (1).

(b) Connect electrical leads (2) to terminal board (1).

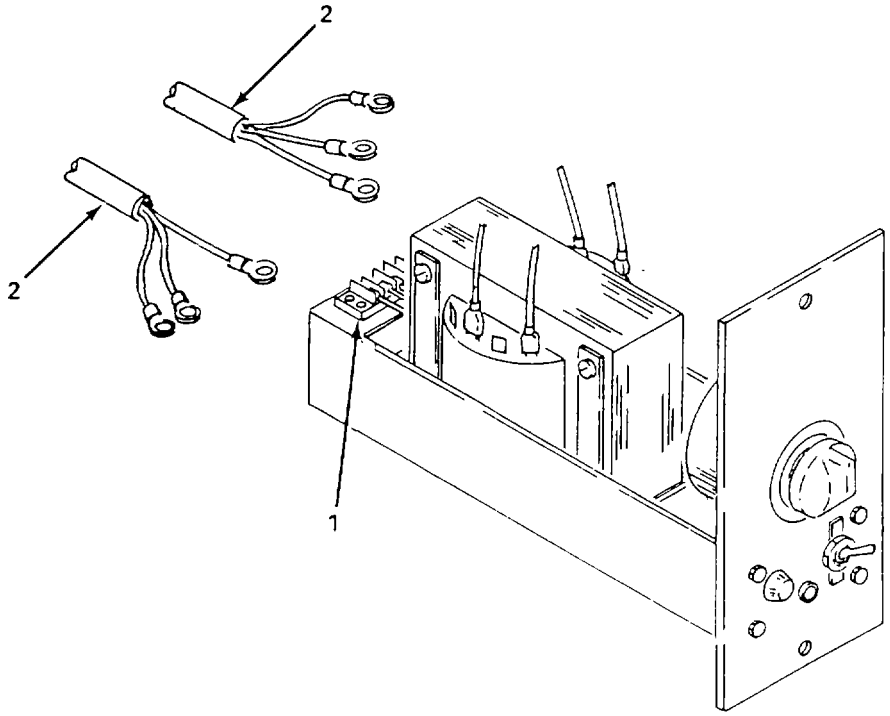


Figure 5-27. Single Light Power Supply (Outer Lock) Power and Light Cords, Replace.

FOLLOW-ON MAINTENANCE:
Install single light power supply (para. 4-40).

5-22. Fluorescent Light.

This task covers: Repair

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Fluorescent Light Assembly
Cloth, Lint-Free (Item 6, Appendix E)

Materials/Parts (Cont)

Detergent, Nonionic (Item 8, Appendix E)
Distilled Water (Item 9, Appendix E)

Equipment Condition

Fluorescent light removed (para. 4-41).

Repair. (figure 5-28)

NOTE

Fluorescent light is partially disassembled when removed.

(1) Remove lock (1) securing lampholder (2) to fluorescent lamp enclosure (3).

(2) Remove gasket (4) from enclosure (3).

(3) Remove 11 screws (5) securing enclosure (3) to housing (6) and separate enclosure from housing.

(4) Tag and disconnect electrical leads (7) from electrical plug (8).

(5) Remove starter (9) from starter socket (10).

(6) Tag and disconnect electrical leads (11) from starter socket (10).

(7) Remove two screws (12) and washers (13) and remove bracket (14) with starter socket (10).

(8) Remove two screws (15) and remove starter socket (10) from bracket (14).

(9) Tag and disconnect electrical lead (16) from ballast (17).

(10) Remove two screws (18) and washers (19) and remove ballast (17).

(11) Tag and disconnect electrical band (20) from receptacle (21).

(12) Remove two screws (22) and remove receptacle (21).

(13) Clean all components using nonionic detergent cleaner and rinse with clean distilled water.

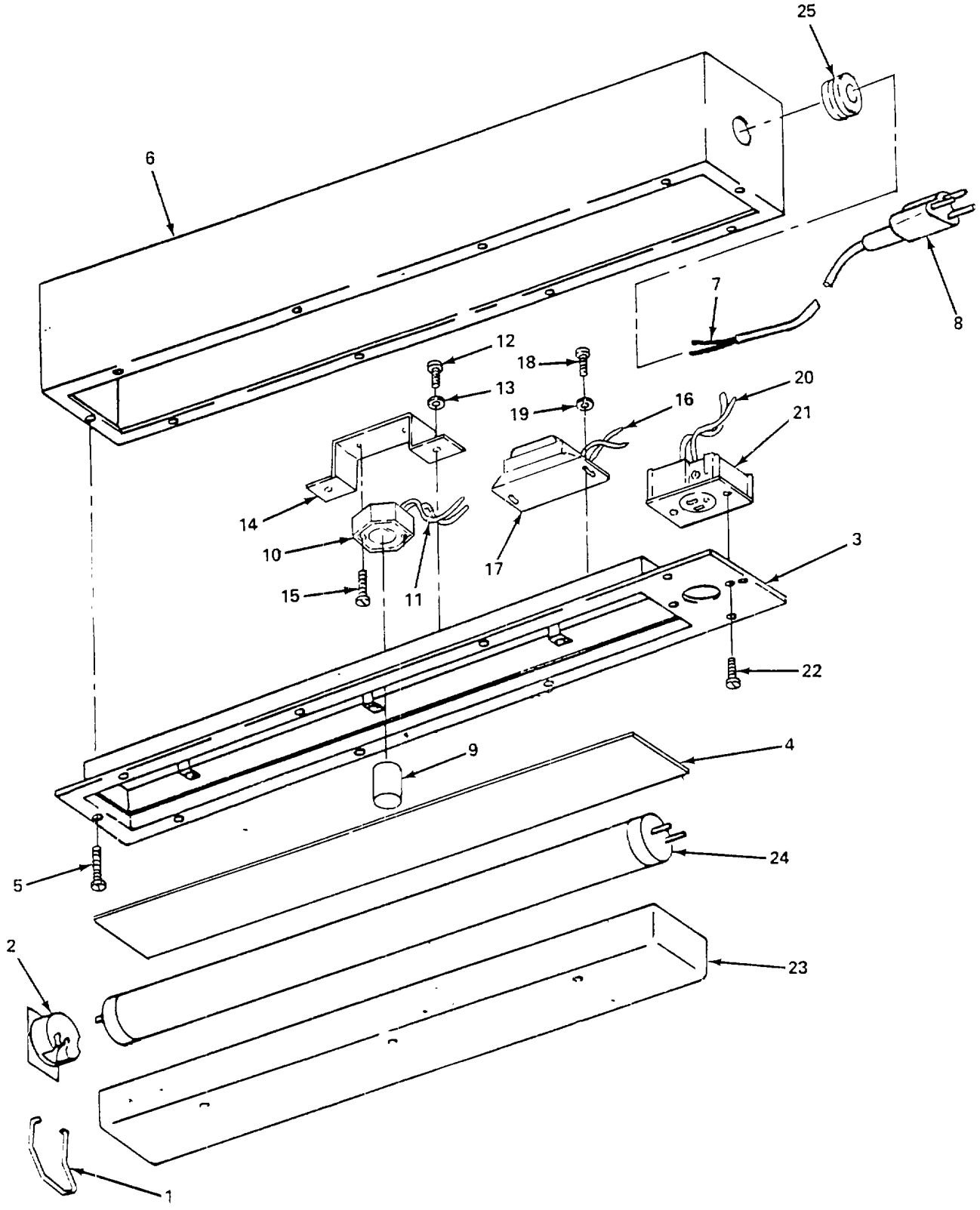


Figure 5-28. Fluorescent Light, Repair.

5-22. **Fluorescent Light (Cont).**

(14) Inspect window (23) and replace if cracked or otherwise damaged.

(15) Inspect fluorescent lamp (24) and replace if burned out, or otherwise damaged.

(16) Inspect grommet (25) and replace if cracked, dried out, or otherwise damaged.

(17) Inspect lampholder (2) and starter socket (10), and replace if cracked or otherwise damaged.

(18) Inspect ballast (17) and replace if burned out or damaged.

(19) Install enclosure (3) and housing (6) and replace if cracked, bent, or otherwise damaged.

(20) Inspect electrical cord (8) and replace if burned, wires frayed, or otherwise damaged.

(21) Install receptacle (21) and secure with two screws (22).

(22) Connect electrical leads (20) to receptacle (21).

(23) Install ballast (17) and secure with two screws (18) and washers (19).

(24) Connect electrical leads (16) to ballast (17).

(25) Install starter socket (10) on bracket (14) and secure with two screws (15).

(26) Install bracket (14) and secure with two screws (12) and washers (13).

(27) Connect electrical leads (11) to starter socket (10).

(28) Install starter (9) into starter socket (10).

(29) Install electrical plug (8) and connect electrical lead (7).

(30) Install enclosure (3) on housing (6) and secure with 11 screws (5).

(31) Install lamp holder (2) and secure with lock (1).

FOLLOW-ON MAINTENANCE
Install fluorescent light (para. 4-41).

5-23. **Wiring Harness.**

This task covers:	**a.** Test	**b.** Replace	**d.** Repair

INITIAL SETUP:

Tools	*Materials/Parts*
General Mechanic's Tool Kit (NSN 5180-00-177-7033) Multimeter (NSN 6625-01-139-2512)	Wiring Harness

a. *Test*. (figure 5-29)

NOTE

Wiring harness removed for test. See para. b.

(1) Perform point to point continuity test on wiring harness (1).

(2) Replace or repair a defective wiring harness (1).

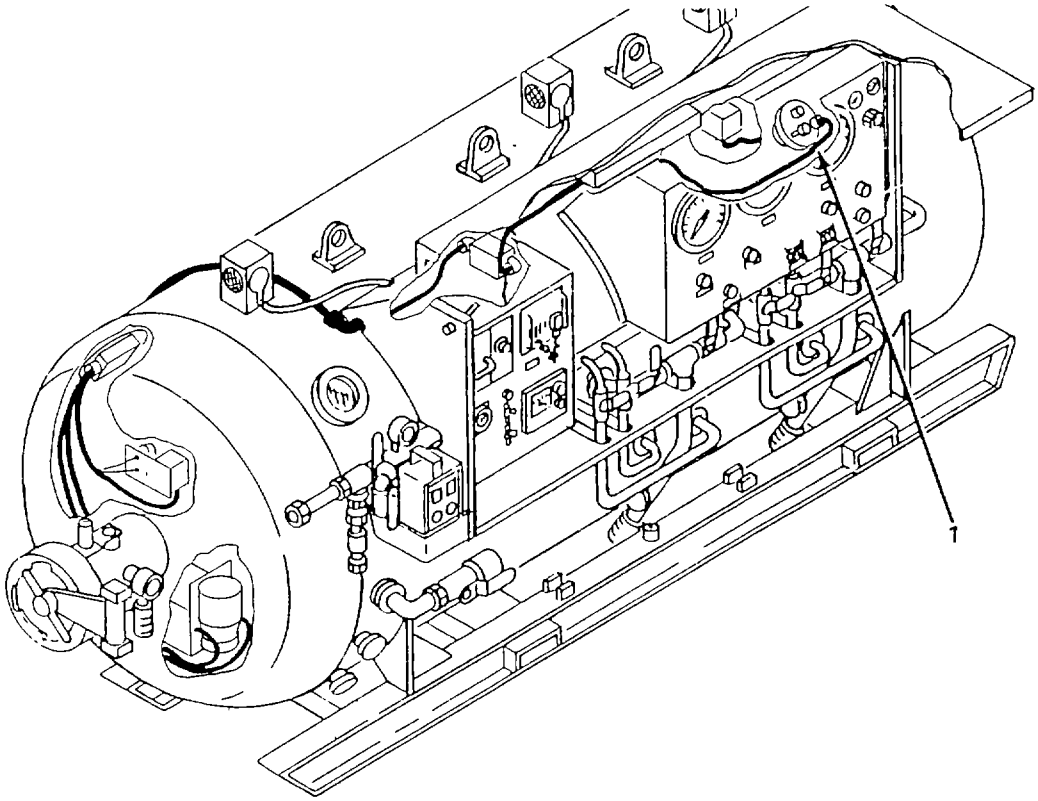


Figure 5-29. Wiring Harness, Test.

5-23. **Wiring Harness (Cont).**

b. *Replace*. (figure 5-30)

(1) Remove connector (1) from speaker (2) and tag and disconnect wires (3) from connector (1).

(2) Remove four screws (4) and remove cover (5) from junction box (6).

(3) Tag and disconnect wires (3) from terminal board (7) and pull wires through shell penetrator (8) and remove wires.

(4) Remove four screws (9) and remove cover (10) from junction box (11).

(5) Tag and disconnect wires (12) from terminal board (13).

(6) Remove cables (14) and (15) from scrubber assembly (16) and heater chiller unit (17).

(7) Remove connector (18) from speaker (19) and tag and disconnect wires (20).

(8) Tag and disconnect wires (21) from jack (22) and remove wires (20) and (21).

(9) Tag and disconnect wires (23) from terminal board (7) and (13) and remove wires (23).

(10) Remove connector (24) from communication box (25) and tag and disconnect wires (26) from connector.

(11) Tag and disconnect wires (27) from jack (28), power supply (29), and thermocoupler meter (30).

(12) Tag and disconnect wires (27) from terminal board (7) and remove wires.

(13) Tag and disconnect wires (31) from switches (32).

(14) Tag and disconnect wires (31) from terminal board (7).

(15) Connect wires (31) to terminal board (7) and switches (32).

(16) Connect wires (27) to terminal board (7)

(17) Connect wires (27) to thermocoupler meter (30), power supply (29), and jack (28).

(18) Connect wires (26) to connector (24) and install connector to communication box (25).

(19) Install wires (23) in conduit and connect wires to terminal boards (13) and (7).

(20) Connect wires (21) to jack (22).

(21) Connect wires (20) to connector (18) and install connector on speaker (19).

(22) Install wires (12) to terminal board (13).

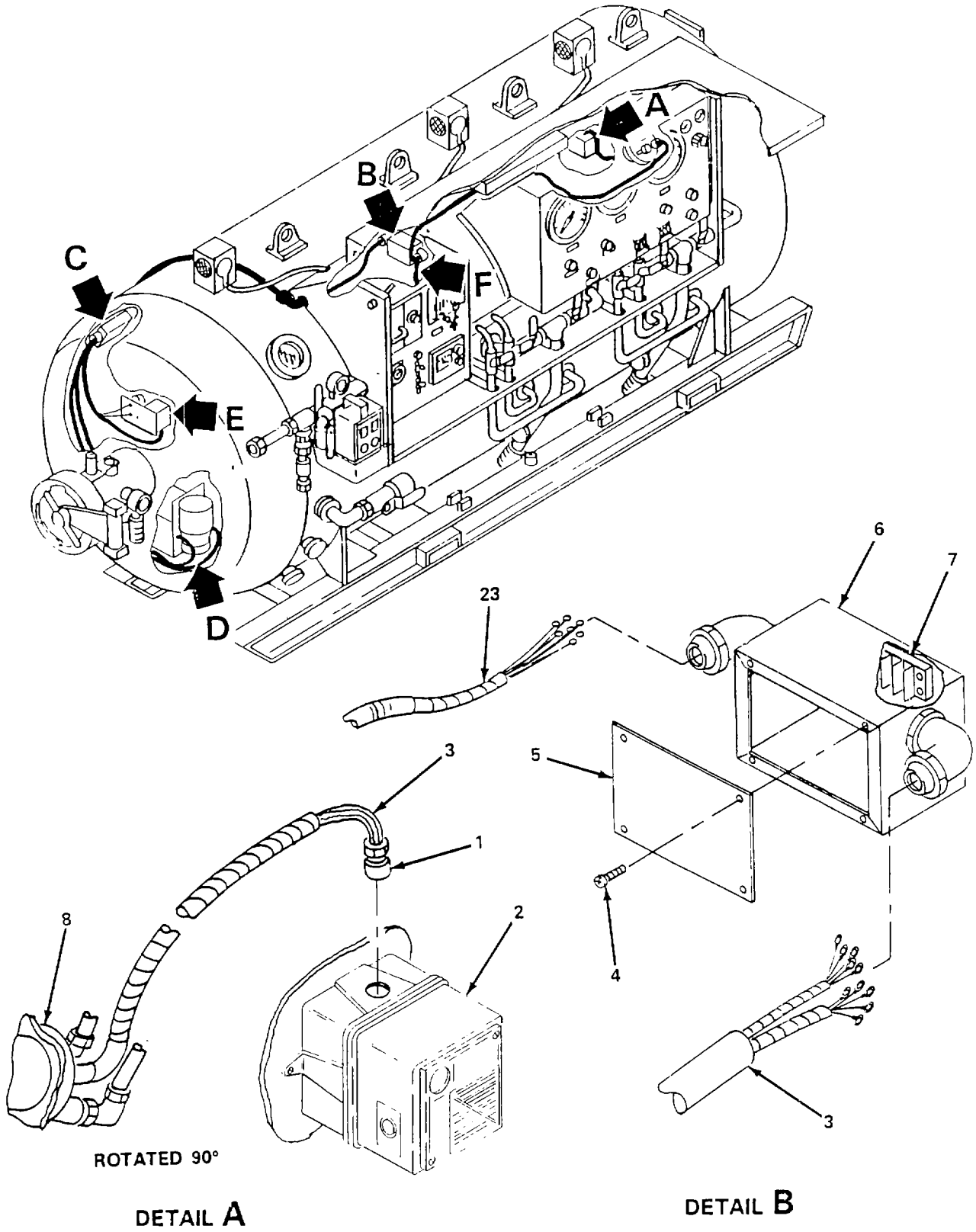


Figure 5-30. Wiring Harness, Replace (Sheet 1 of 3).

5-23. **Wiring Harness (Cont).**

(23) Install cables (14) and (15) and connect them to scrubber assembly (16) and heater chiller unit (17).

(24) Install cover (10) on junction box (11) and secure with four screws (9).

(25) Connect wires (3) to terminal board (7).

(26) Route wires (3) through shell penetrator (8) and connect wires to connector (1).

(27) Install connector (1) on speaker (2).

(28) Install cover (5) on junction box (6) and secure with four screws (4).

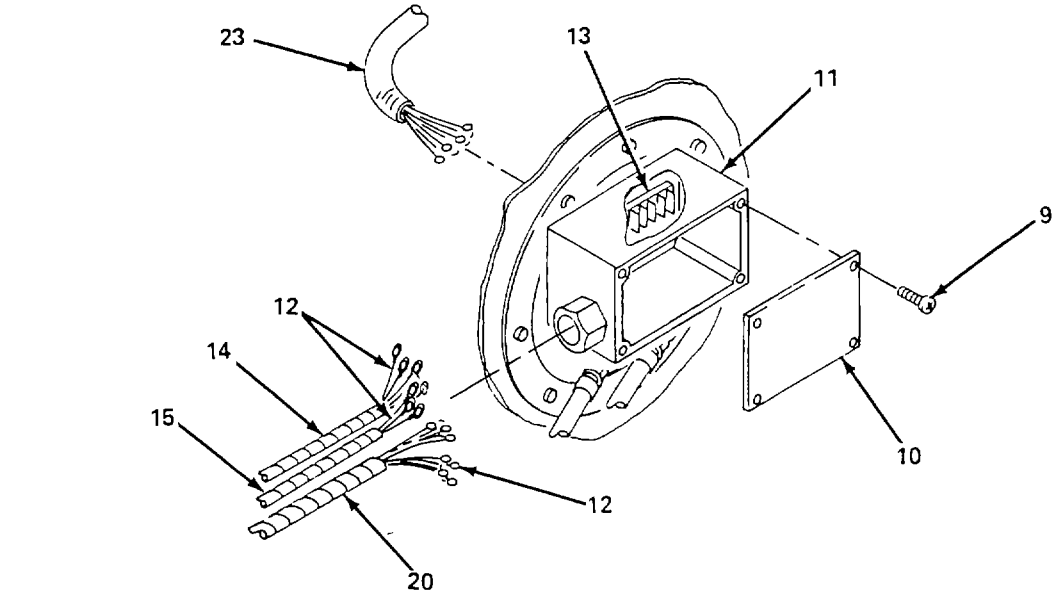
c. *Repair*.

(1) Inspect wiring harness.

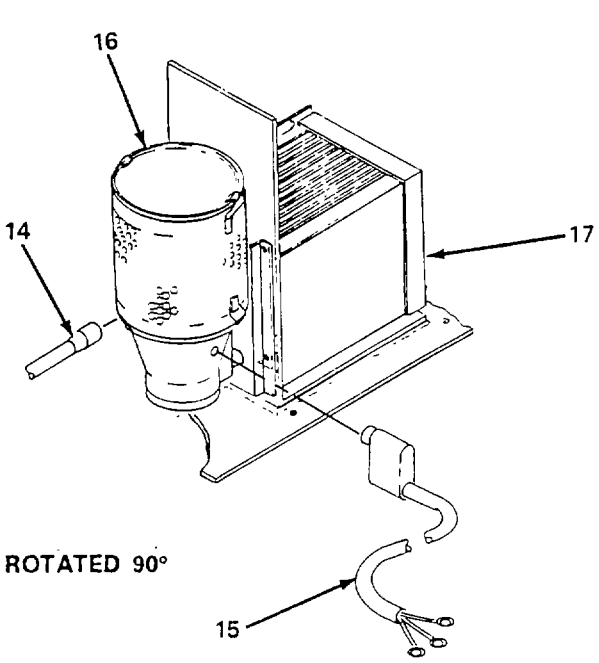
(2) Refer to TM 5-4220-227-24P for materials to manufacture wiring harness.

(3) Replace any terminal lugs or connectors that are missing or damaged.

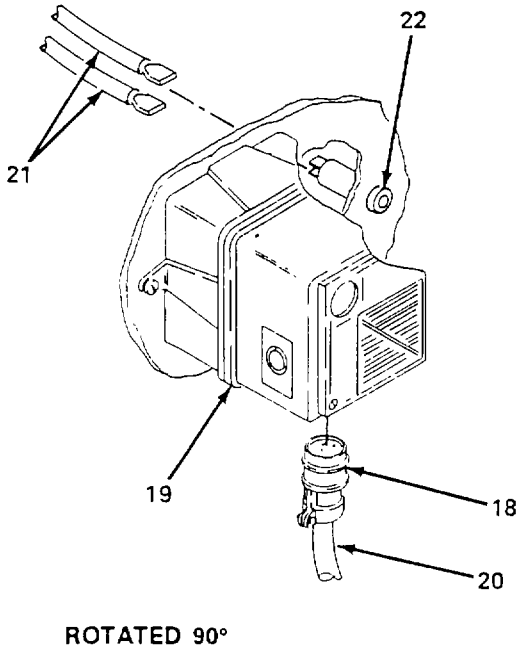
(4) Replace any wire that has burnt, cracked, or otherwise damaged insulation.



DETAIL C



DETAIL D



DETAIL E

Figure 5-30. Wiring Harness, Replace (Sheet 2 of 3).

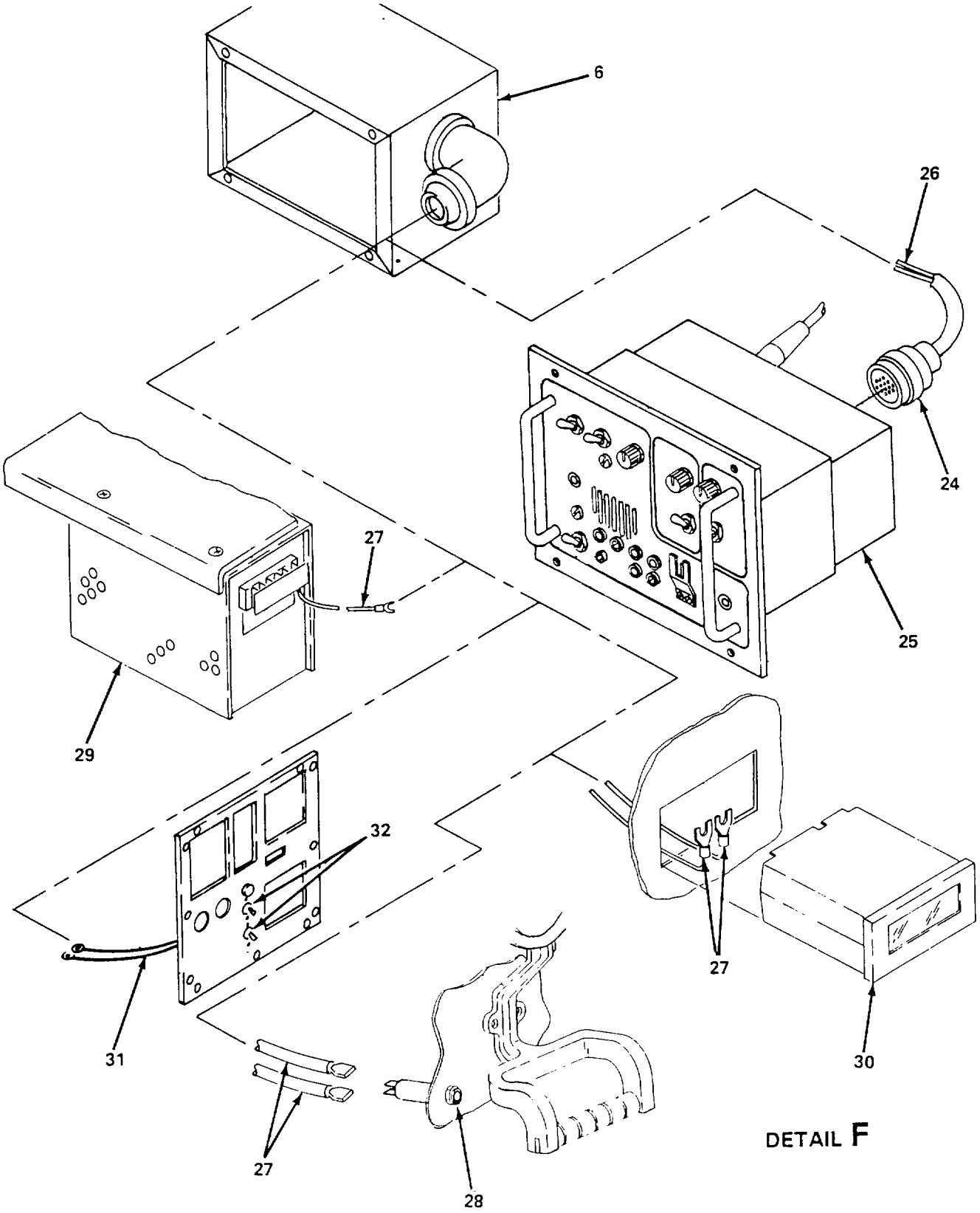


Figure 5-30. Wiring Harness, Replace (Sheet 3 of 3).

5-24. Front Panel Chassis Assembly.

This task covers: a. Replace b. Repair

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)
Soldering Gun

Equipment Condition

Communicator assembly removed (para. 4-43).

Materials/Parts

Front Panel Chassis Assembly

a. *Replace*. (figure 5-31)

(1) Remove four screws (1) and washers (2) and remove top and bottom plates (3) and (4).

(2) Remove four screws (5) and washers (6) and remove front panel chassis assembly (7) and two handles (8) from case (9).

NOTE

If repair by replacement of a panel mounted component is needed, remove only the wire leads to the component to be replaced. Access to panel rear for component replacement may, in most cases, be obtained by removal of top or bottom panel.

(3) Tag and disconnect wires from chassis assembly components.

(4) Reconnect all wires to chassis assembly components and remove tags.

(5) Install front panel chassis assembly (7) and two handles (8) on case (9) and secure four screws (5) and washers (6).

(6) Install top and bottom plates (3) and (4) and secure with four screws (1) and washers (2).

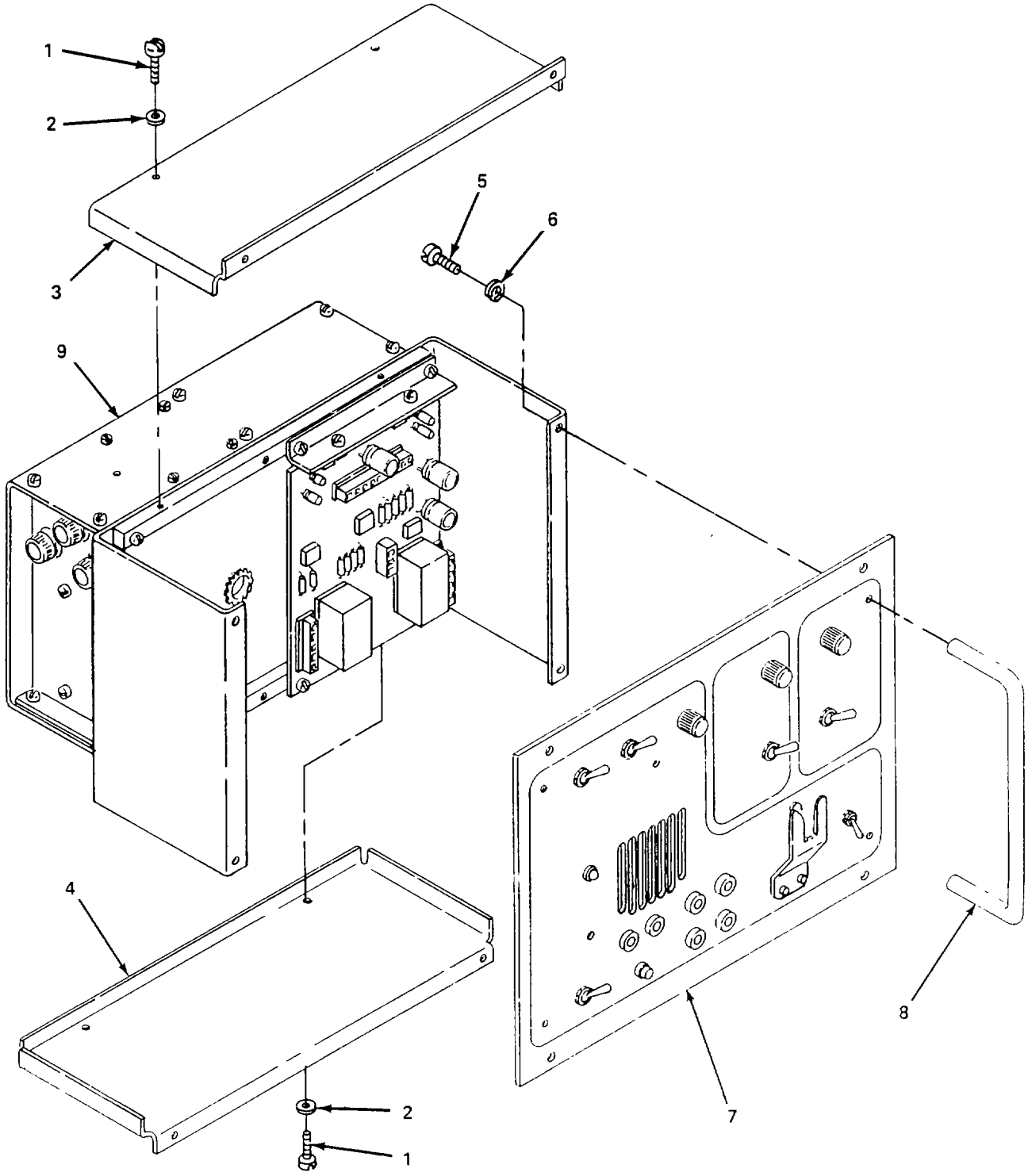


Figure 5-31. Front Chassis Assembly, Replace.

5-24. **Front Panel Chassis Assembly (Cont).**

b. *Repair.*

(1) *Replace switch*. (figure 5-32)

NOTE

There are five switches. Replacement of each switch is the same.

(a) Remove front panel chassis assembly (para. a. above).

(b) Remove nut (1) and remove switch (2).

(c) Remove nut (3) from switch (2).

(d) Install nut (3) on switch (2).

(e) Install switch (2) on panel chassis assembly (4) and secure with nut (1).

(f) Install front panel chassis assembly (para. a. above).

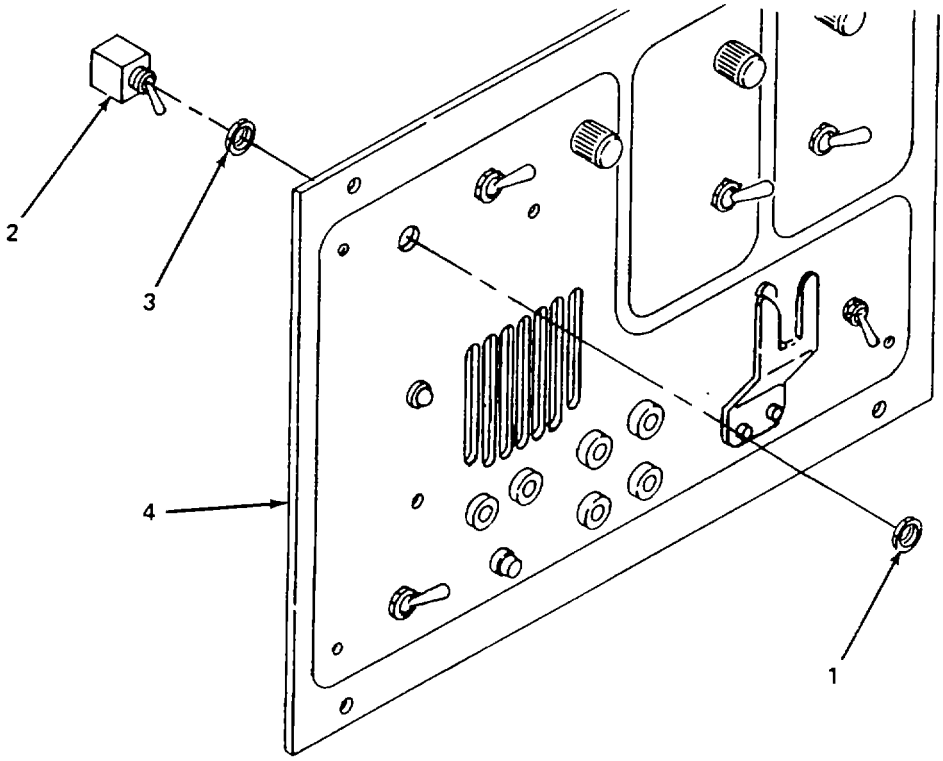


Figure 5-32. Front Panel Chassis Assembly Switch, Replace.

(2) *Replace potentiometer and rheostats.* (figure 5-33)

NOTE

There are two rheostats and one potentiometer.

(a) Remove front panel chassis assembly (para. a. above).

(b) Loosen setscrew (1) and remove knob (2).

(c) Remove nut (3) and remove potentiometer (4).

NOTE

Step (d) and (e) is for potentiometer only.

(d) Remove nut (5) from potentiometer (4).

(e) Install nut (5) on potentiometer (4).

(f) Install potentiometer (4) on panel chassis assembly (6) and secure with nut (3).

(g) Install knob (2) and tighten setscrew (1).

(h) Install front panel chassis assembly (para. a. above).

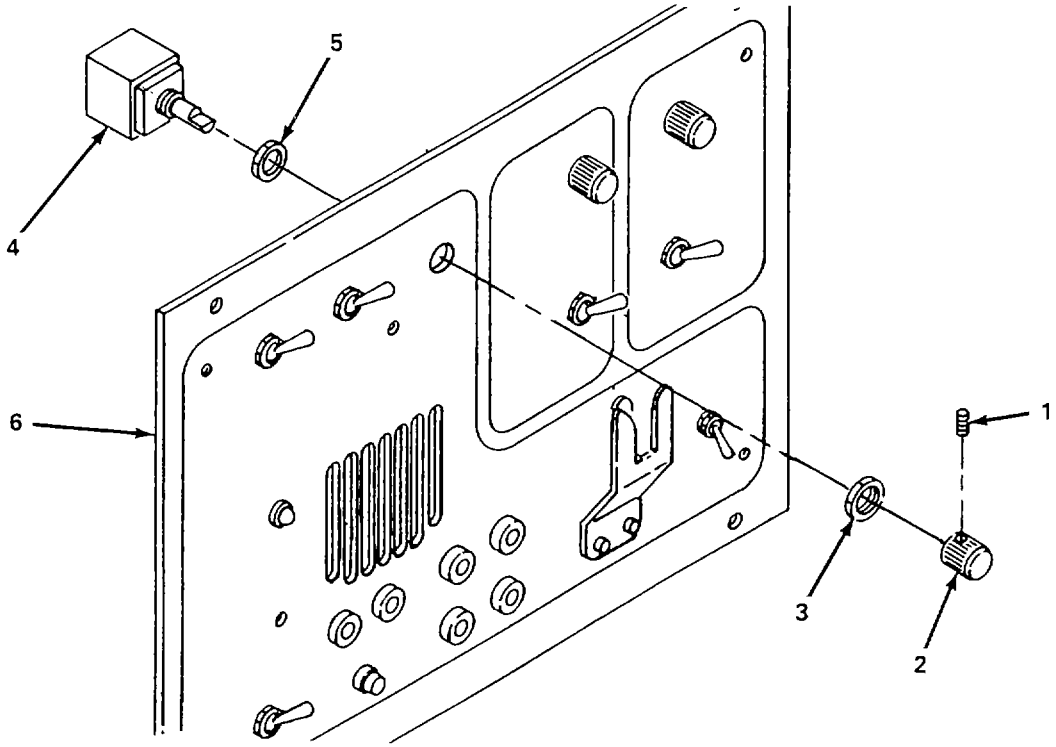


Figure 5-33. Front Panel Chassis Assembly Potentiometer and Rheostat, Replace.

5-24. **Front Panel Chassis Assembly (Cont).**

(3) *Replace indicator light*. (figure 5-34)

NOTE

There are two indicator lights. Replacement of each light is the same.

(a) Remove front panel chassis assembly (para. a. above).

(b) Remove nut (1) from lens (2) and remove lens and transparent lead (3).

(c) Install lens (2) on panel chassis assembly (4) and install transparent lead (3) and nut (1).

(d) Install front panel chassis assembly (para. a. above).

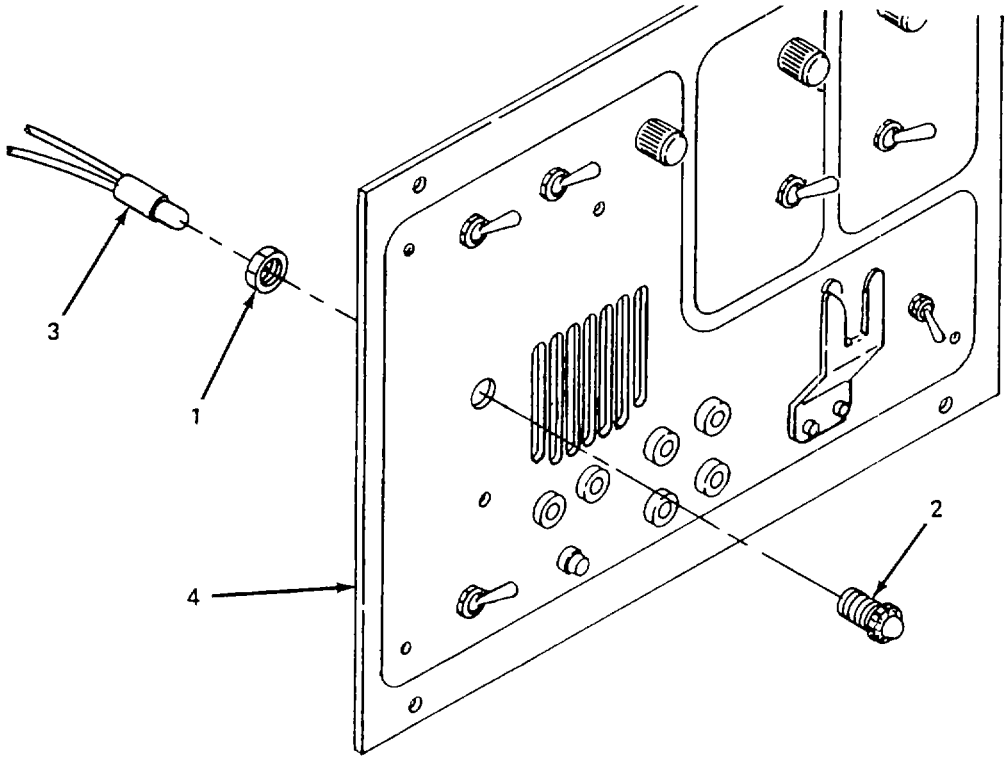


Figure 5-34. Front Panel Chassis Assembly Indicator Light, Replace.

(4) *Replace ban and jack.* (figure 5-35)

NOTE

There are six banana jacks. Replacement of each jack is the same.

(a) Remove front panel chassis assembly (para. a. above).

(b) Remove nut (1) and remove jack (2).

(c) Install jack (2) on panel chassis assembly (3) and secure with nut (1).

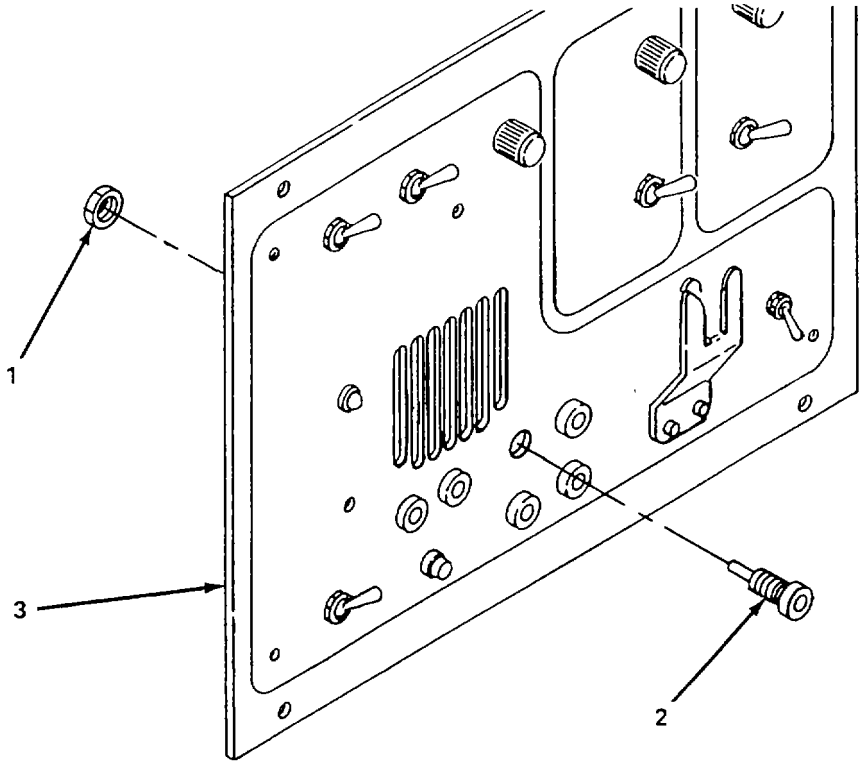


Figure 5-35. Front Panel Chassis Assembly Banana Jack, Replace.

5-24. **Front Panel Chassis Assembly (Cont).**

(5) *Replace phone plug.* (figure 5-36)

(a) Remove front panel chassis assembly (para. a. above).

(b) Remove jack (1) and plug (2).

(c) Remove nut (3) from plug (2).

(d) Install nut (3) on plug (2).

(e) Install plug (2) on panel chassis assembly (4).

(f) Install jack (1) on plug (2).

(g) Install front panel chassis assembly (para. a. above).

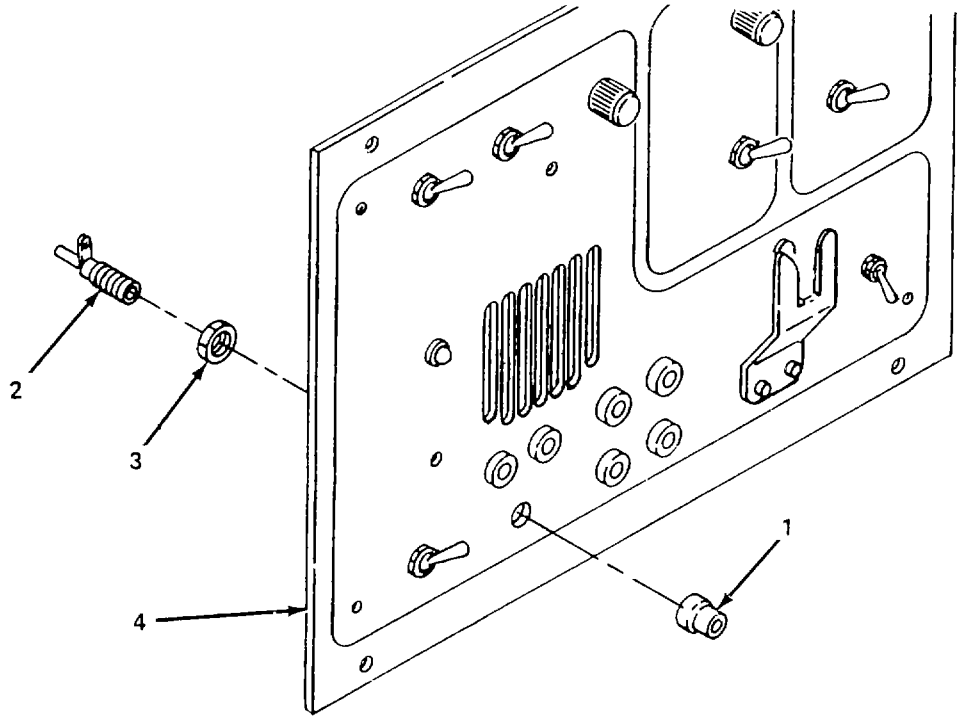


Figure 5-36. Front Panel Chassis Assembly Phone Jack, Replace.

(6) *Replace microphone holder*. (figure 5-37)

(a) Remove front panel chassis assembly (para. a. above).

(b) Remove two nut (1), washers (2) and screws (3).

(c) Remove microphone holder (4) from panel chassis assembly (5).

(d) Install microphone holder (4) on panel chassis assembly (5) and secure with two screws (3), washers (2), and nut (1).

(e) Install front panel chassis assembly (para. a. above).

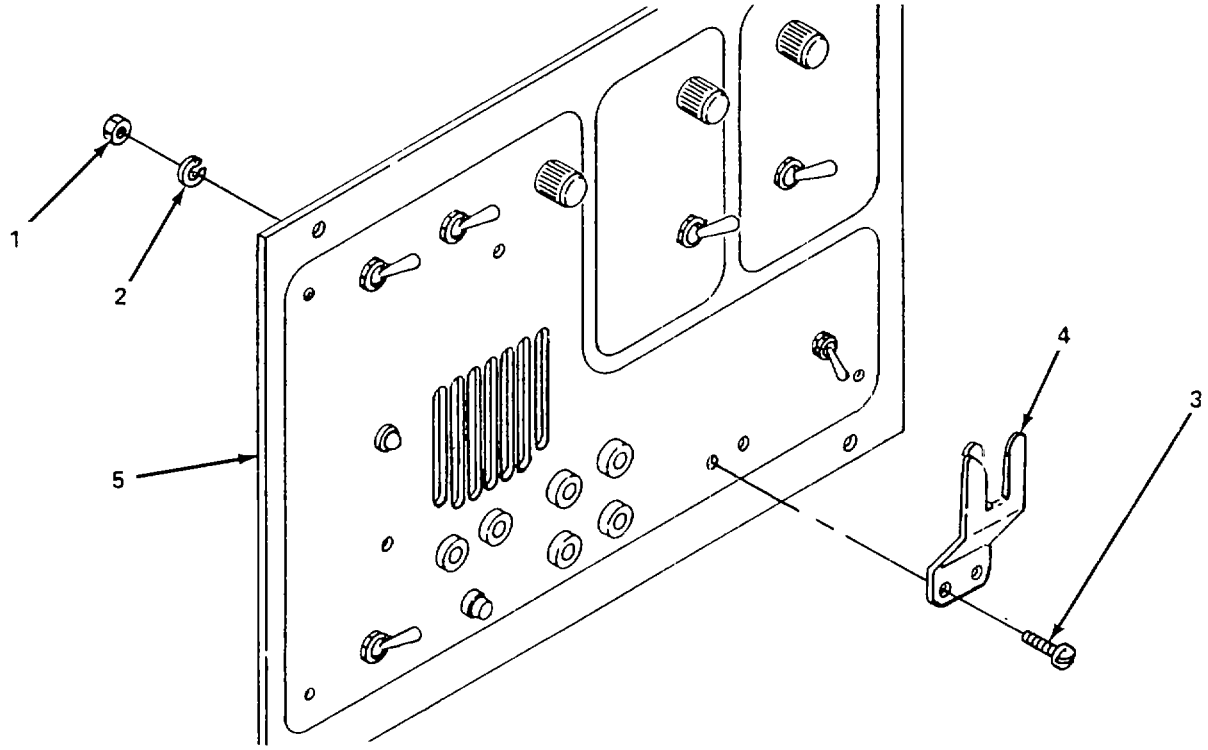


Figure 5-37. Front Panel Chassis Assembly Microphone Holder, Replace.

5-24. **Front Panel Chassis Assembly (Cont).**

(7) *Replace power speaker assembly.* (figure 5-38)

(a) Remove front panel chassis assembly (para. a. above).

(b) Tag and disconnect wires from power speaker assembly (1).

(c) Remove two nuts (2), four washers (3), and two screws (4) and remove power speaker assembly (1).

(d) Install power speaker assembly (1) on panel chassis assembly (5) and secure with two screws (4), four washers (3) and two nuts (2).

(e) Connect wires to power speaker assembly (1).

(f) Install front panel chassis assembly (para. a. above).

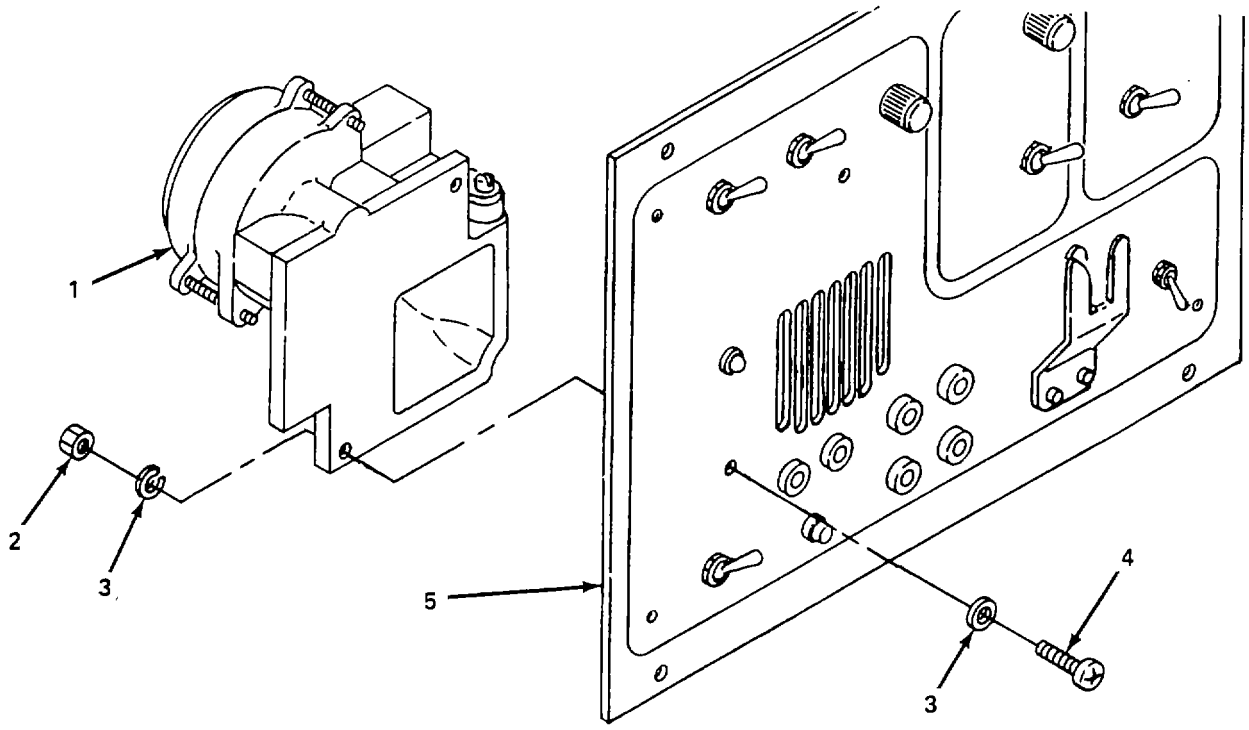


Figure 5-38. Front Panel Chassis Assembly Power Speaker Assembly, Replace.

FOLLOW-ON MAINTENANCE
Install communicator assembly (para. 4-43).

5-25. **Circuit Card.**

This task covers: **Replace**

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Equipment Condition

Front panel chassis assembly removed (para. 5-24).

Materials/Parts

Circuit Card

Replace. (figure 5-39)

(1) Tag and disconnect wires from circuit card (1).

(2) Remove two screws (2) and washers (3) and remove circuit card (1).

(3) Install circuit card (1) on power speaker assembly (4) and secure with two screws (2) and washers (3).

(4) Connect wires to circuit card (1).

FOLLOW-ON MAINTENANCE
Install front panel chassis assembly (5-24).

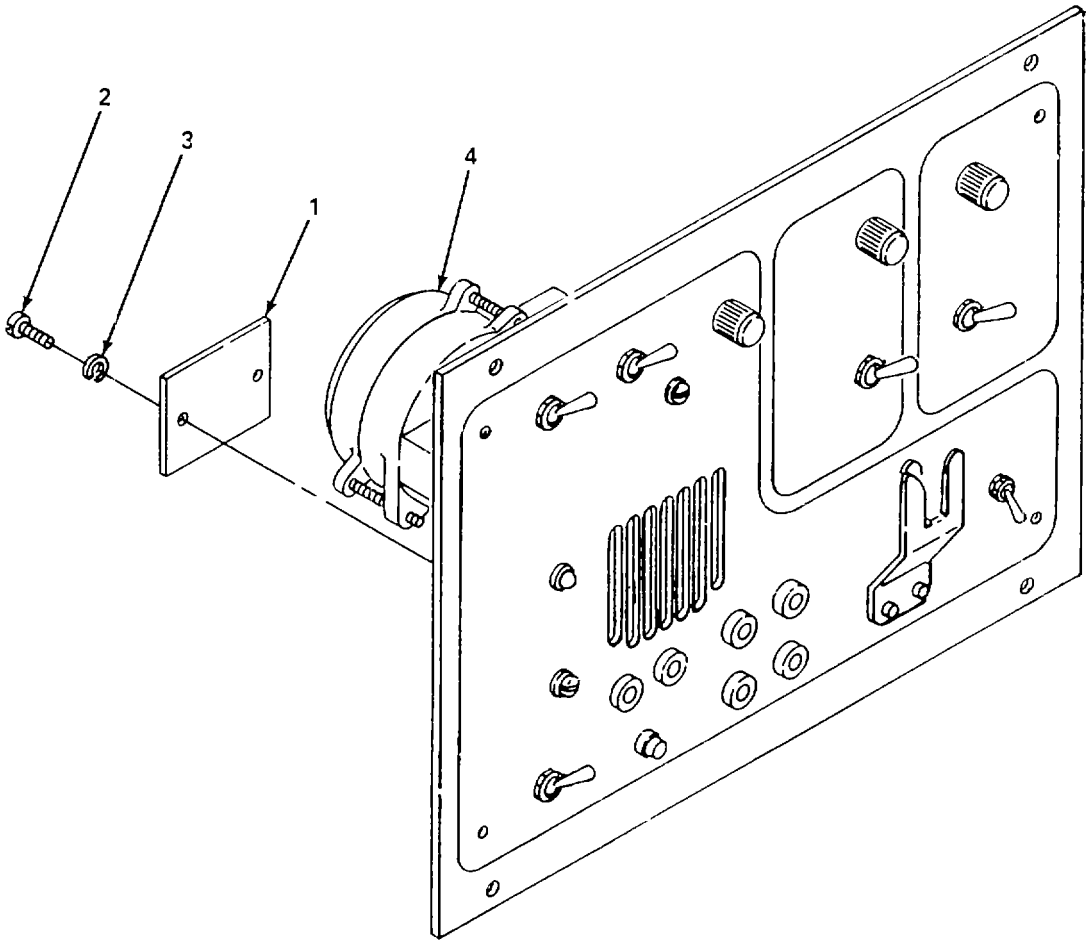


Figure 5-39. Circuit Card, Replace.

5-26. **Battery Sense Card Assembly.**

This task covers: Replace

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Equipment Condition

Front panel chassis assembly removed (para. 5-24).

Materials/Parts

Battery Sense Card Assembly

Replace. (figure 5-40)

(1) Tag and disconnect wires from circuit card (1).

(2) Remove four screws (2) and washers (3) and remove bracket (4) and circuit card (1) from two brackets (5).

(3) Install circuit card (1) and bracket (4) on two brackets (5) and secure with four washers (3) and screws (2).

(4) Connect wires to circuit card (1).

FOLLOW-ON MAINTENANCE
Install front panel chassis assembly (5-24).

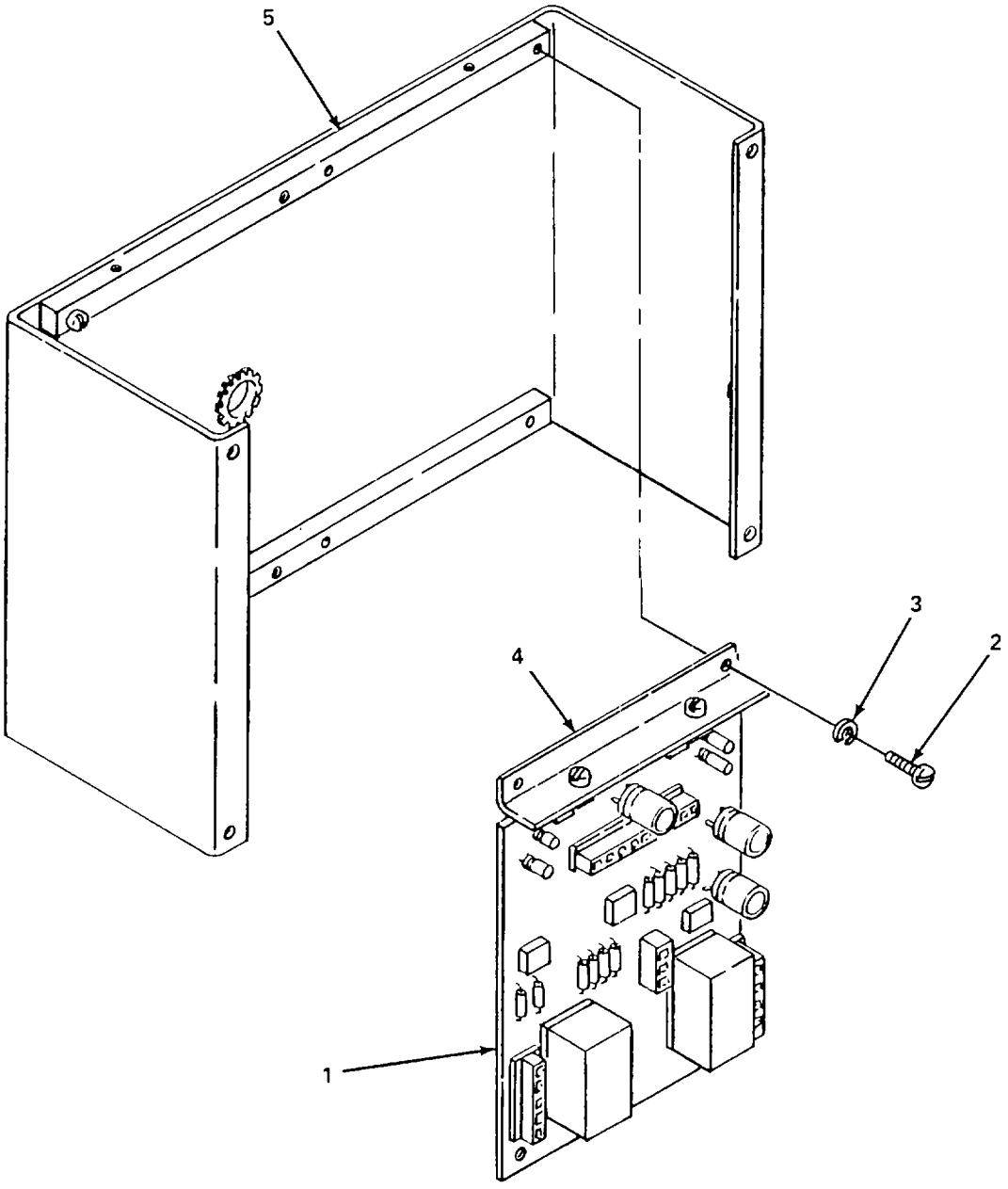


Figure 5-40. Battery Sense Card Assembly, Replace.

5-27. **Battery Card and Case.**

This task covers:

a. Replace **b. Repair**

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Equipment Condition

Communicator assembly removed (para. 4-43).

Materials/Parts

Battery Card and Case

a. *Replace.* (figure 5-41)

(1) Remove eight screws (1) and washers (2) and separate battery card and case (3) from housing (4).

(2) Tag and disconnect wires from battery card and case (3) and remove case.

(3) Position battery card and case (3) near housing (4) and connect wires to battery card and case.

(4) Install battery card and case (3) on housing (4) and secure with eight screws (1) and washers (2).

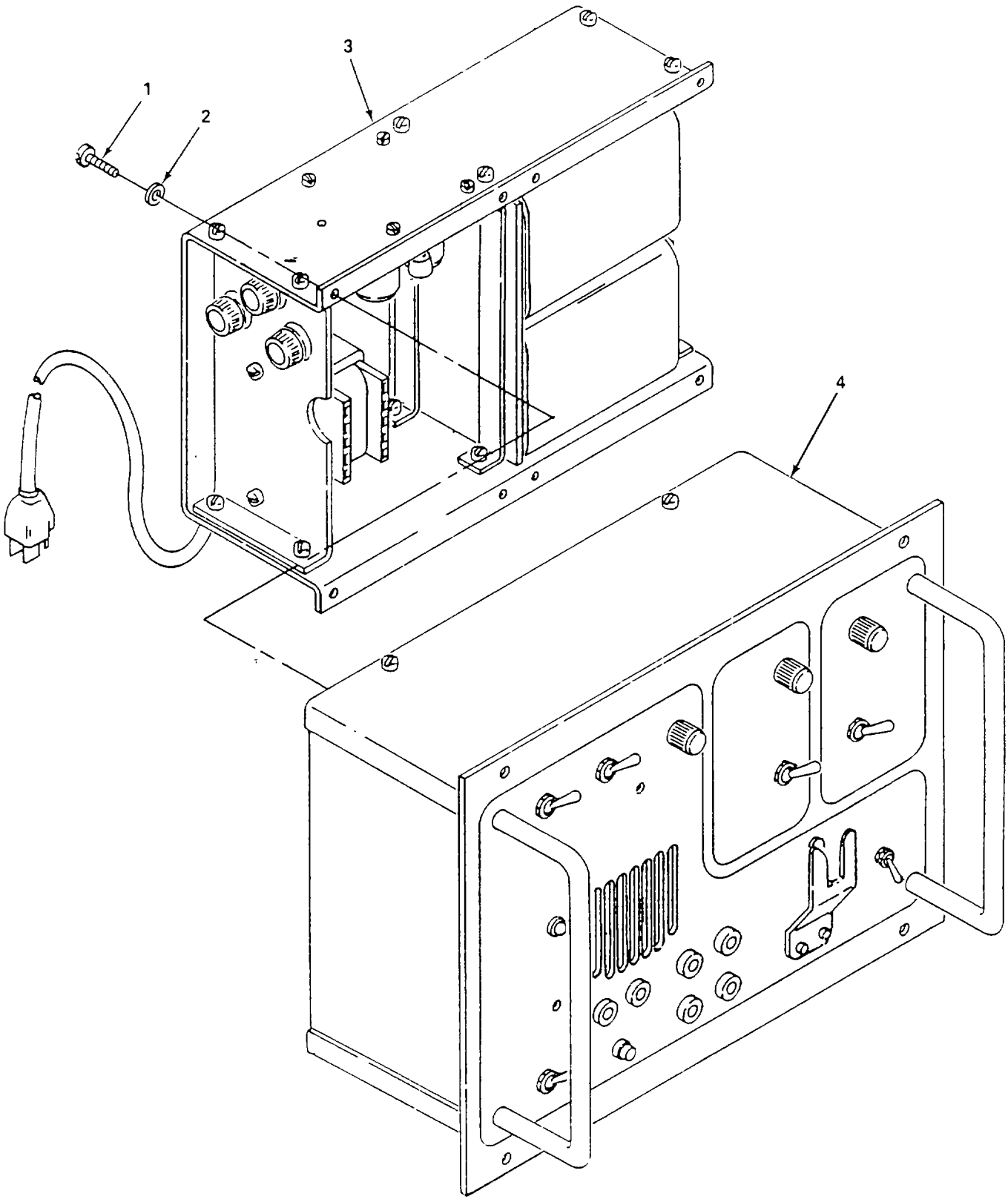


Figure 5-41. Battery Card and Case, Replace.

5-27. **Battery Card and Case (Cont).**

b. *Repair.*

(1) *Replace batteries*. (figure 5-42)

NOTE

There are two batteries. Replacement of each battery is the same.

(a) Remove battery card and case (para. a. above).

(b) Remove four nuts (1), lockwashers (2) and screws (3) and remove battery box bracket (4).

(c) Remove battery (5) from battery card and case (6).

(d) Install battery (5) in battery card and case (6).

(e) Install battery box bracket (4) and secure with four screws (3), lockwashers (2) and nuts (1).

(f) Install battery card and case (para. a. above).

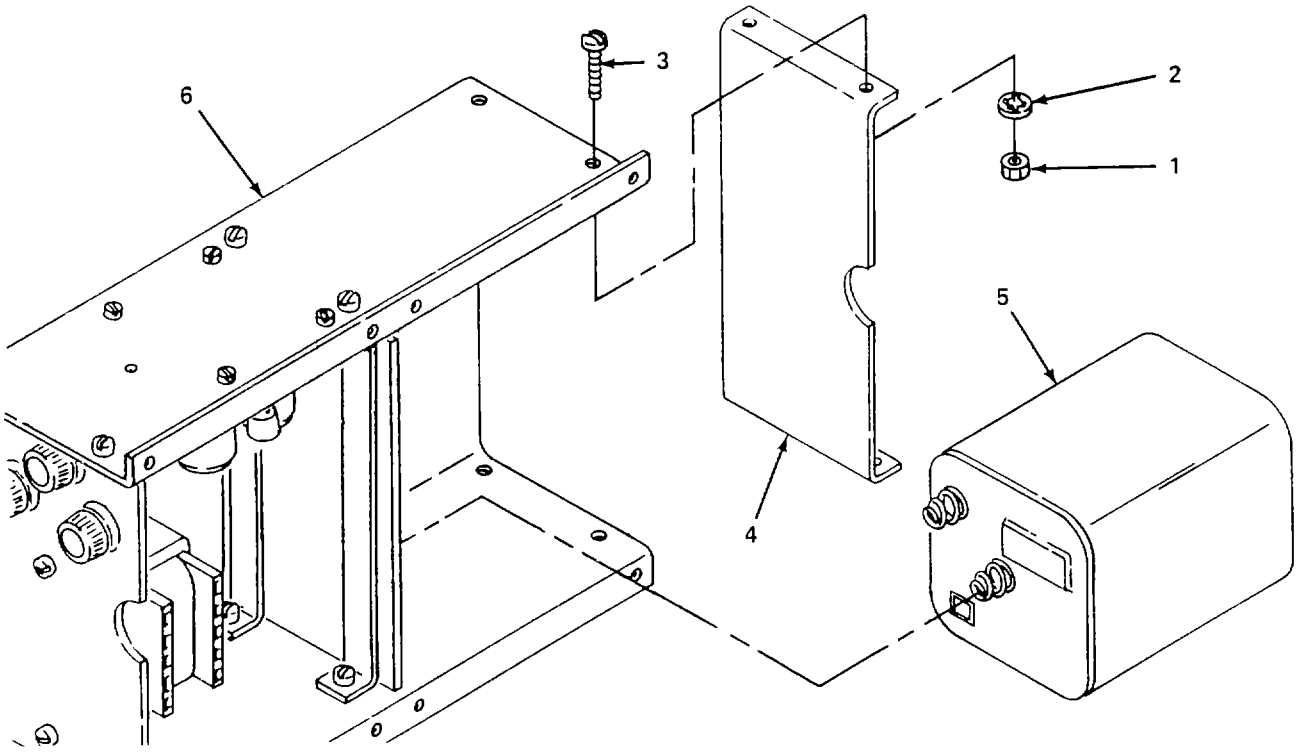


Figure 5-42. Battery Card and Case, Replace.

(2) *Replace battery contact P.C. card.* (figure 5-43)

(a) Remove battery card and case (para. a. above).

(b) Tag and disconnect wires from battery contact P.C. card (1).

(c) Remove four nut (2), lockwashers (3), and screws (4) and remove battery contact P.C. card (1).

(d) Install battery contact P.C. card (1) in battery card and case (5), and secure with four screws (4), lockwasher (3), and nuts (2).

(e) Connect wires to battery contact P.C. card (1).

(f) Install battery card and case (para. a. above).

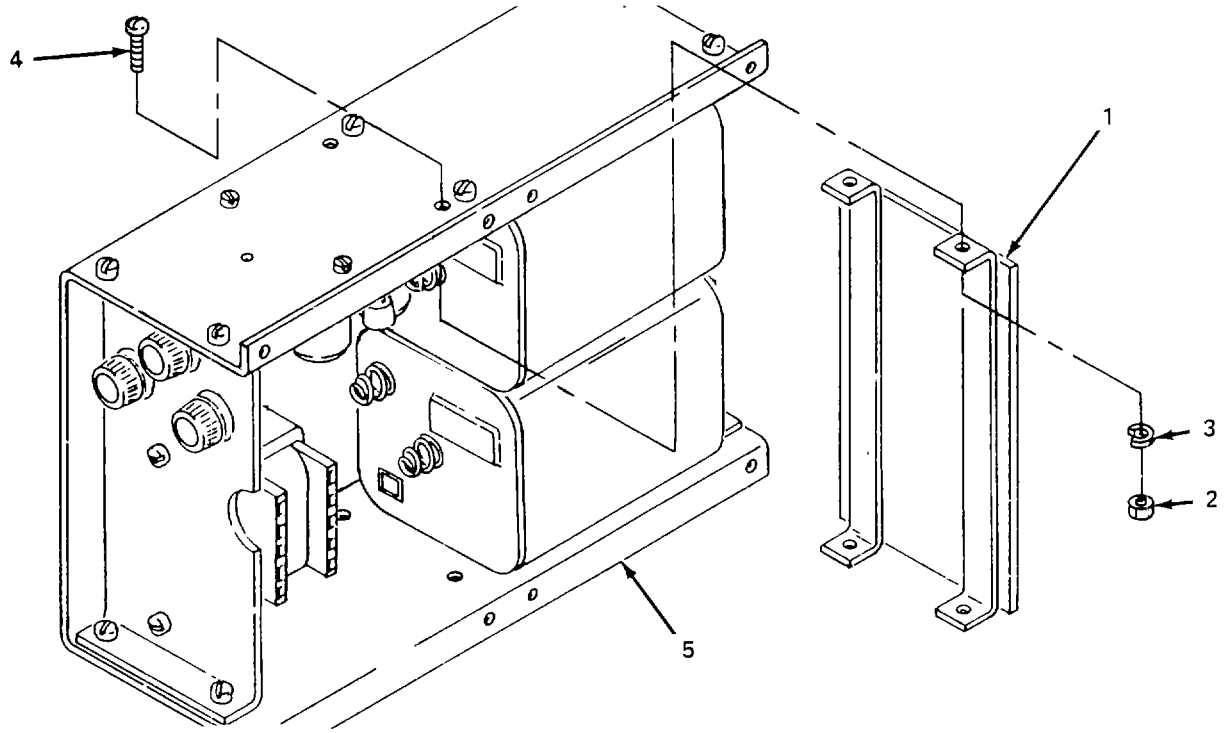


Figure 5-43. Battery Card and Case Battery Contact P.C. Card, Replace.

5-27. Battery Card and Case (Cont).

(3) *Replace fuse holder.* (figure 5-44)

NOTE

There are two fuse holders. Replacement of each fuse holder is the same.

(a) Remove battery card and case (para. a. above).

(b) Tag and disconnect wires to fuse holder (1).

(c) Remove fuse cap (2) and fuse (3) from fuse holder (1).

(d) Remove nut (4) and remove fuse holder (1).

(e) Install fuse holder (1) in card box bracket (5) and secure with nut (4).

(f) Install fuse (3) and cap (2) on fuse holder (1).

(g) Connect wires to fuse holder (1).

(h) Install battery card and case (para. a. above).

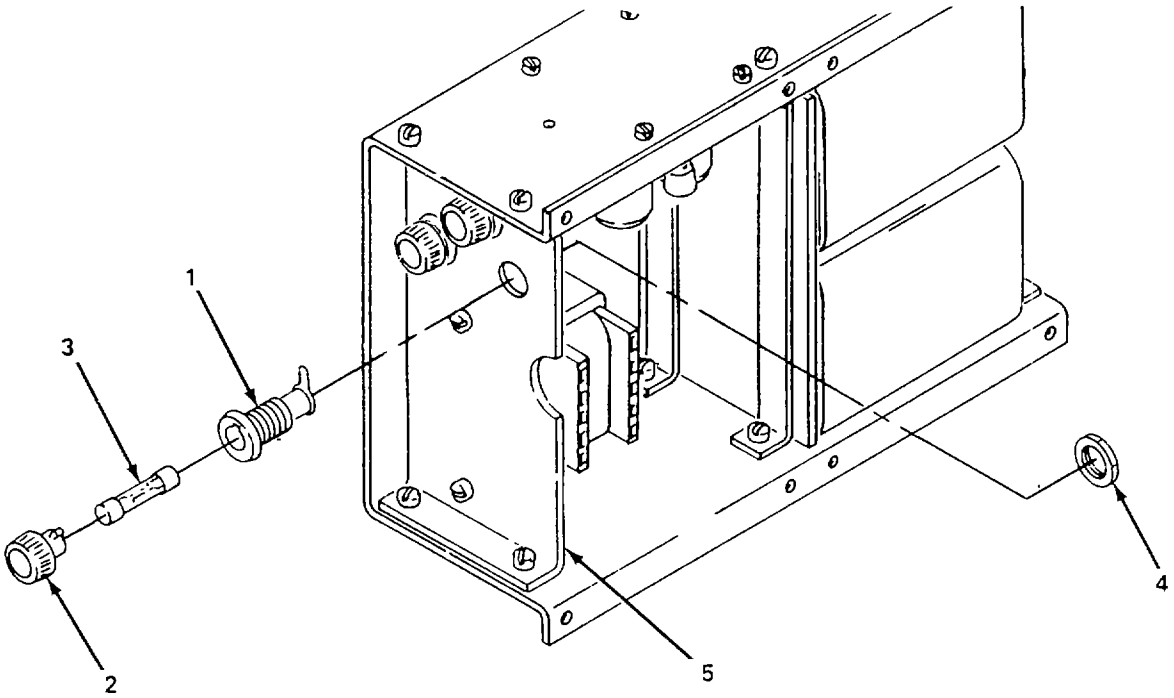


Figure 5-44. Battery Card and Case Fuse Holder, Replace.

(4) *Replace power transformer.* (figure 5-45)

(a) Remove battery card and case (para. a. above).

(b) Tag and disconnect wires from power transformer (1).

(c) Remove two nut (2), lockwashers (3) and screws (4) and remove power transformer (1).

(d) Install power transformer (1) on card box bracket (5) and secure with two screws (4), lockwashers (3) and two nuts (2).

(e) Connect wires to power transformer (1).

(f) Install battery card and case (para. a. above).

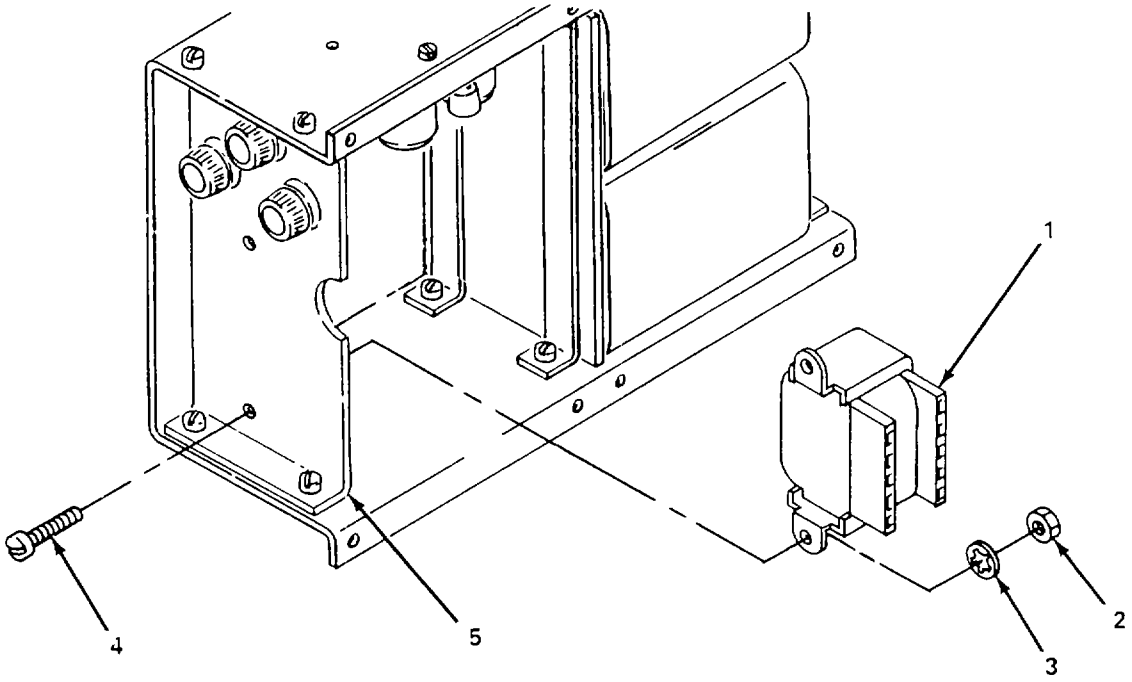


Figure 5-45. Battery Card and Case Power Transformer, Replace.

5-27. Battery Card and Case (Cont).

(5) *Replace battery charger P.C. card assembly.* (figure 5-46)

(a) Remove battery card and case (para. a. above).

(b) Tag and disconnect wires from charger P.C. card assembly (1).

(c) Remove four nuts (2), lockwashers (3), and screws (4) and remove battery charger P.C. card assembly (1).

(d) Install battery charger P.C. card assembly (1) on housing (5) and secure with four screws (4), lockwashers (3) and nuts (2).

(e) Install battery card and case (para. a. above).

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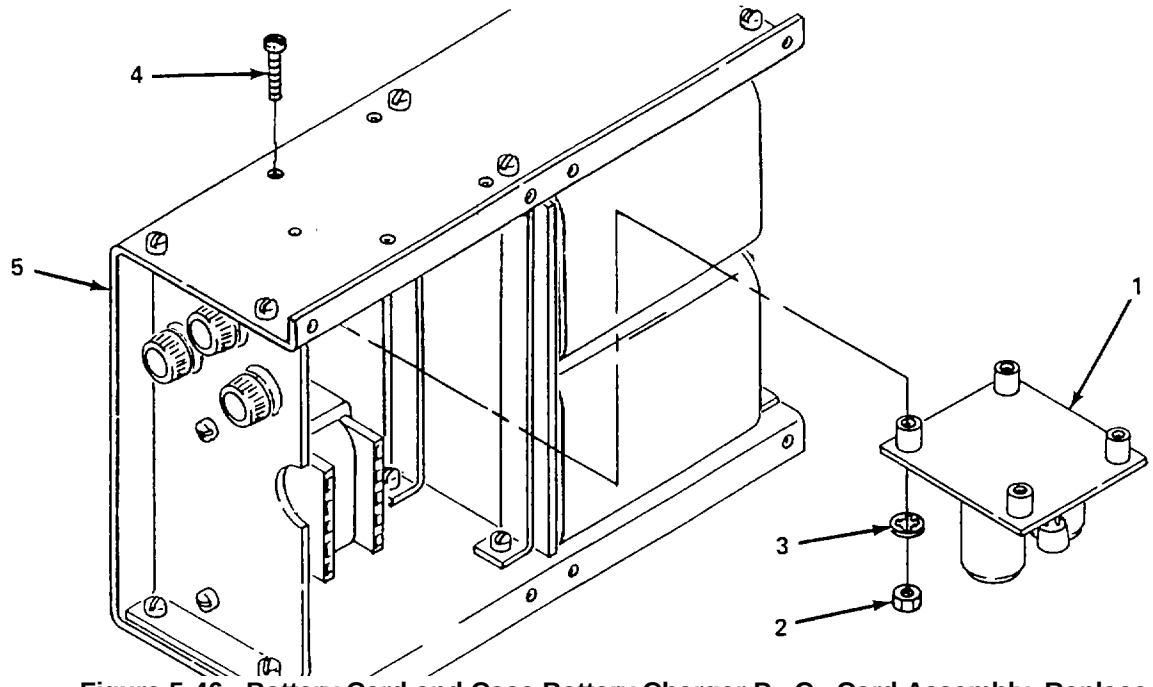


Figure 5-46. Battery Card and Case Battery Charger P. C. Card Assembly, Replace.

FOLLOW-ON MAINTENANCE
Install communicator assembly (para. 4-43).

5-28. O_2 "K" Bottles/Manifold.

This task covers:

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Bands, Rubber (Item 4, Appendix E)
Bags, Plastic (Item 3, Appendix E)
Tape, Teflon (Item 21, Appendix E)

Equipment Condition

Chamber shut down (para. 2-15)
O_2 "K" bottles/manifold removed (para. 4-49).
Gage removed (para. 5-29).

Repair. (figure 5-47)

WARNING

To prevent the spread of disease, serious injury and/or death, oxygen breathing systems must be maintained hygienically clean and free from dust, dirt, and all hydrocarbon contamination. Refer to oxygen system prework procedures para. 4-10 to avoid violating this warning.

NOTE

Hoses are tested hydrostatically every three years and replaced every ten years.

(1) Remove bushing (1), reducer (2), connector (3), and reducer (4).

(2) Remove shutoff valve (5), coupling cap (6), quick disconnect coupling (7), hose coupling (8), and adapter (9).

(3) Remove two hose end connectors (10) and flex hose (11).

(4) Remove isolation valve (12), hex nipple (13), reducing bushing (14), connector (15), ball valve (16), and tee (17).

(5) Remove hex nipple (18), elbow (19) and adapter (20).

NOTE

There are six O_2 bottles, and the piping for each one removed is the same.

(6) Remove steel tubing (21), reducer bushing (22), flex hose (23), isolator valve (24), steel tubing (25), and cross (26).

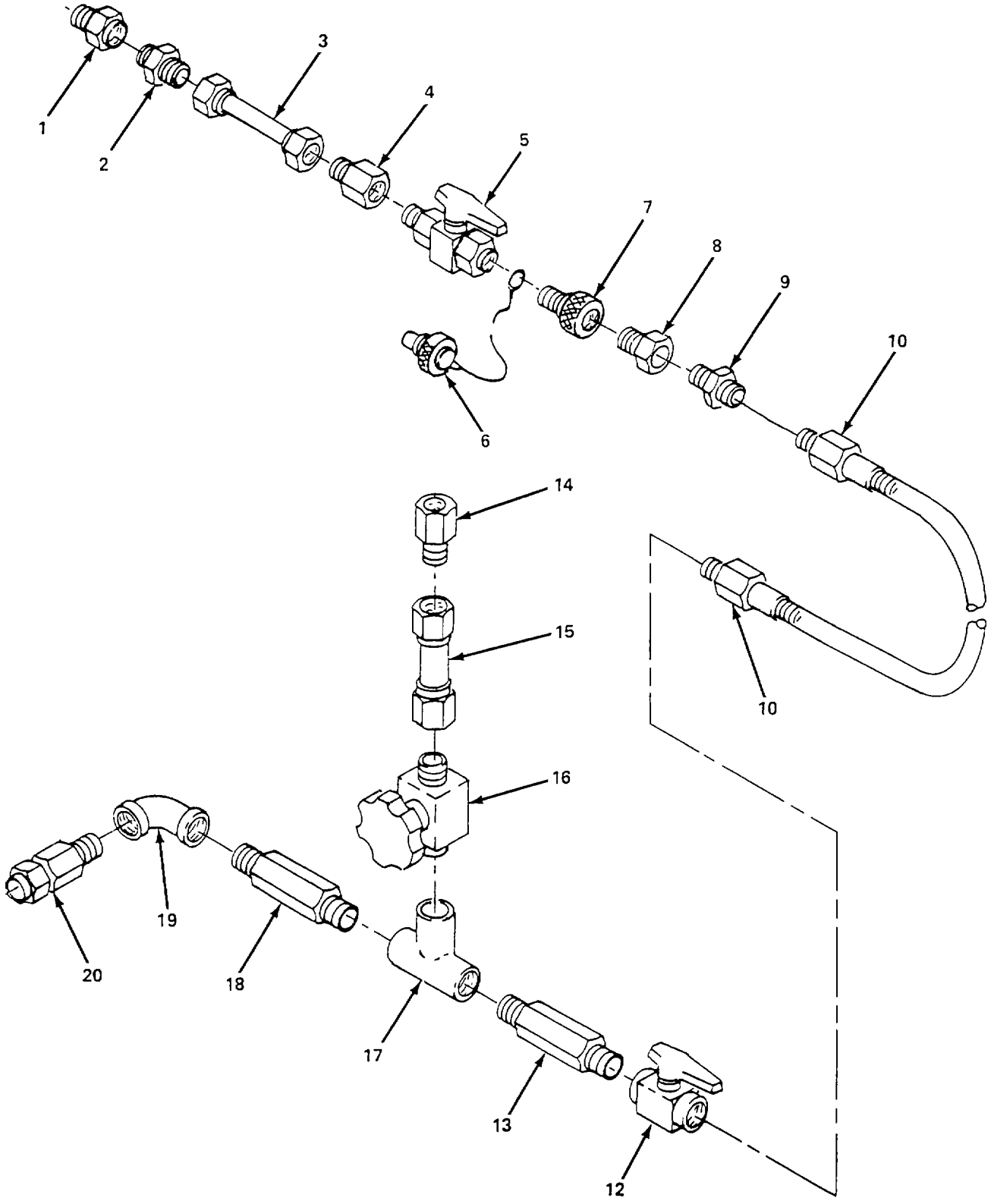


Figure 5-47. O_2 "K" Bottles/Manifold, Repair (Sheet 1 of 2).

5-28. 02 "K" Bottles/Manifold (Cont).

(7) Remove steel tubing (27) and bleed off valve (28).

(8) Clean all components with nonionic detergent cleaner and rinse with clean distilled water.

(9) Install all components and replace any component that has stripped threads, cracked, bent, or otherwise damaged.

WARNING

Leave 1 1/2 threads exposed on fitting when applying teflon tape. This will ensure that no teflon tape will hang down inside the air system. Teflon tape should be wrapped in such a manner that when the fitting is tightened the tape will not loosen. Failure to wrap teflon tape correctly may result in contamination or blockage of the air system and subsequent possible injury or death to the diver.

(10) Apply teflon tape to all pipe threads.

(11) Install bleed valve (28) on steel tubing (27).

NOTE

There are six O_2 bottles and the piping for each one is installed the same.

(12) Install cross (26), steel tubing (25), isolator valve (24), flex hose (23), reducer bushing (22), and steel tubing (21).

(13) Install adapter (20), elbow (19), and hex nipple (18).

(14) Install tee (17), ball valve (16), connector (15), and reducing bushing (14).

(15) Install hex nipple (13), isolator valve (12), two hose end connectors (10) and hose (11).

(16) Install adapter (9), hose coupling (8), quick disconnect coupling (7), and coupling cap (6).

(17) Install shutoff valve (5), reducer (4), connector (3), reducer (2), and bushing (1).

FOLLOW-ON MAINTENANCE
(1) Install gage (para. 5-29).
(2) Install O_2 "K" bottles/manifold (para. 4-49).

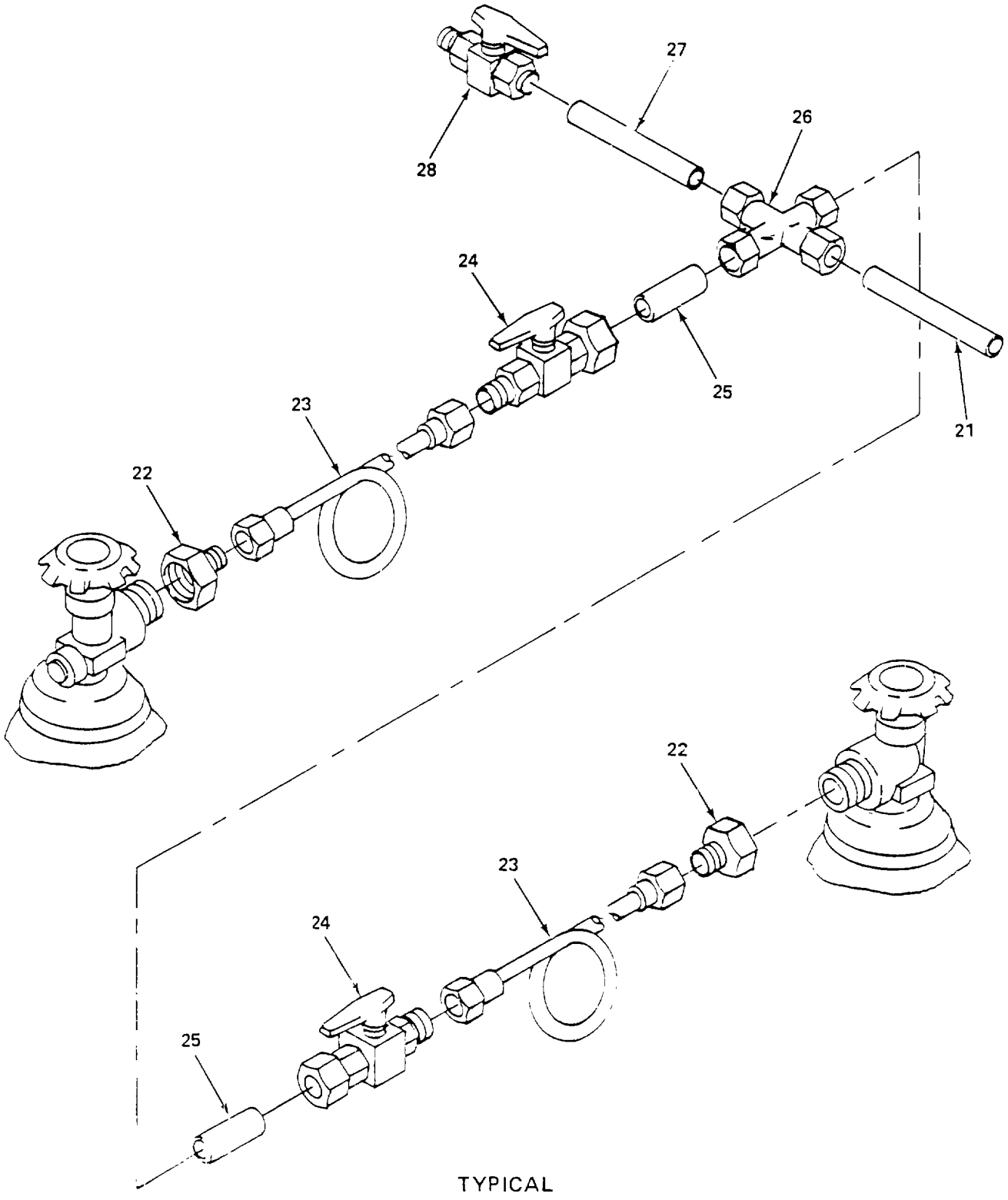


Figure 5-47. O_2"K" Bottles/Manifold, Repair (Sheet 2 of 2).

5-29. Gage (O_2 "K" Bottles/Manifold).

This task covers:

Replace

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Gage
Bands, Rubber (Item 4, Appendix E)

Materials/Parts (Cont)

Bags, Plastic (Item 3, Appendix E)
Tape, Teflon (Item 21, Appendix E)

Equipment Condition

Chamber shut down (para. 2-15)

Replace. (figure 5-48)

WARNING

To prevent the spread of disease, serious injury and/or death, oxygen breathing systems must be maintained hygienically clean and free from dust, dirt, and all hydrocarbon contamination. Refer to oxygen system prework procedures para. 4-10 to avoid violating this warning.

(1) Close valve (1) on manifold (2).

(2) Remove gage (3).

WARNING

Leave 1 1/2 threads exposed on fitting when applying teflon tape. This will ensure that no teflon tape will hang down inside the air system. Teflon tape should be wrapped in such a manner that when the fitting is tightened the tape will not loosen. Failure to wrap teflon tape correctly may result in contamination or blockage of the air system and subsequent possible injury or death to the diver.

(3) Apply teflon tape to all pipe threads.

(4) Install gage (3) on manifold (2).

(5) Open valve (1).

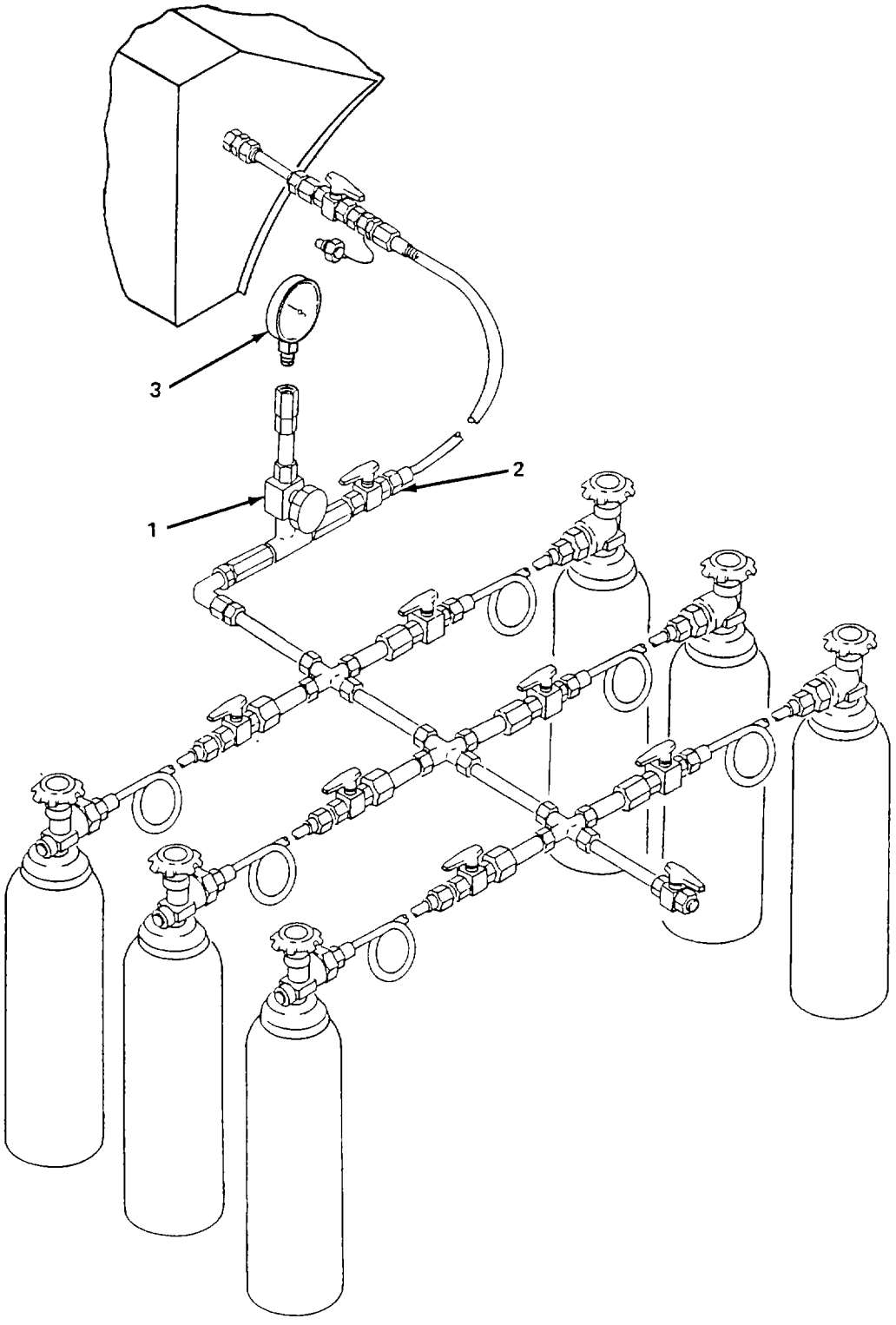


Figure 5-48. Gage (O_2 "K" Bottles/Manifold), Replace.

5-30. Oxygen Pressure Gages.

This task covers:
Replace

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Pressure Gage 0-4500
Pressure Gage 0-150
Bands, Rubber (Item 4, Appendix E)

Materials/Parts (Cont)

Bags, Plastic (Item 3, Appendix E)
Tape, Teflon (Item 21, Appendix E)

Equipment Condition

Chamber shut down (para. 2-15).

Replace. (figure 5-49)

WARNING

To prevent the spread of disease, serious injury and/or death, oxygen breathing systems must be maintained hygienically clean and free from dust, dirt, and all hydrocarbon contamination. Refer to oxygen system prework procedures para. 4-10 to avoid violating this warning.

CAUTION

Use two wrenches to remove and install all piping components to avoid damage.

NOTE

Ensure system is depressurized prior to beginning this task.

Gain access OGA-025 the low pressure O_2 gage and OGA-026 the high pressure O_2 gage by reaching over the top of and down behind the instrument panel.

(1) Unlatch two latches (1) open enclosure (2) and install two supports (3) and pins (4).

(2) Loosen fitting nut (5) and remove line (6) from fitting (7).

(3) Remove fitting (7) from low pressure gage (8).

(4) Loosen fitting nut (9) and remove line (10) from fitting (11) on elbow (12).

(5) Loosen and remove elbow (12) from high pressure gage (13).

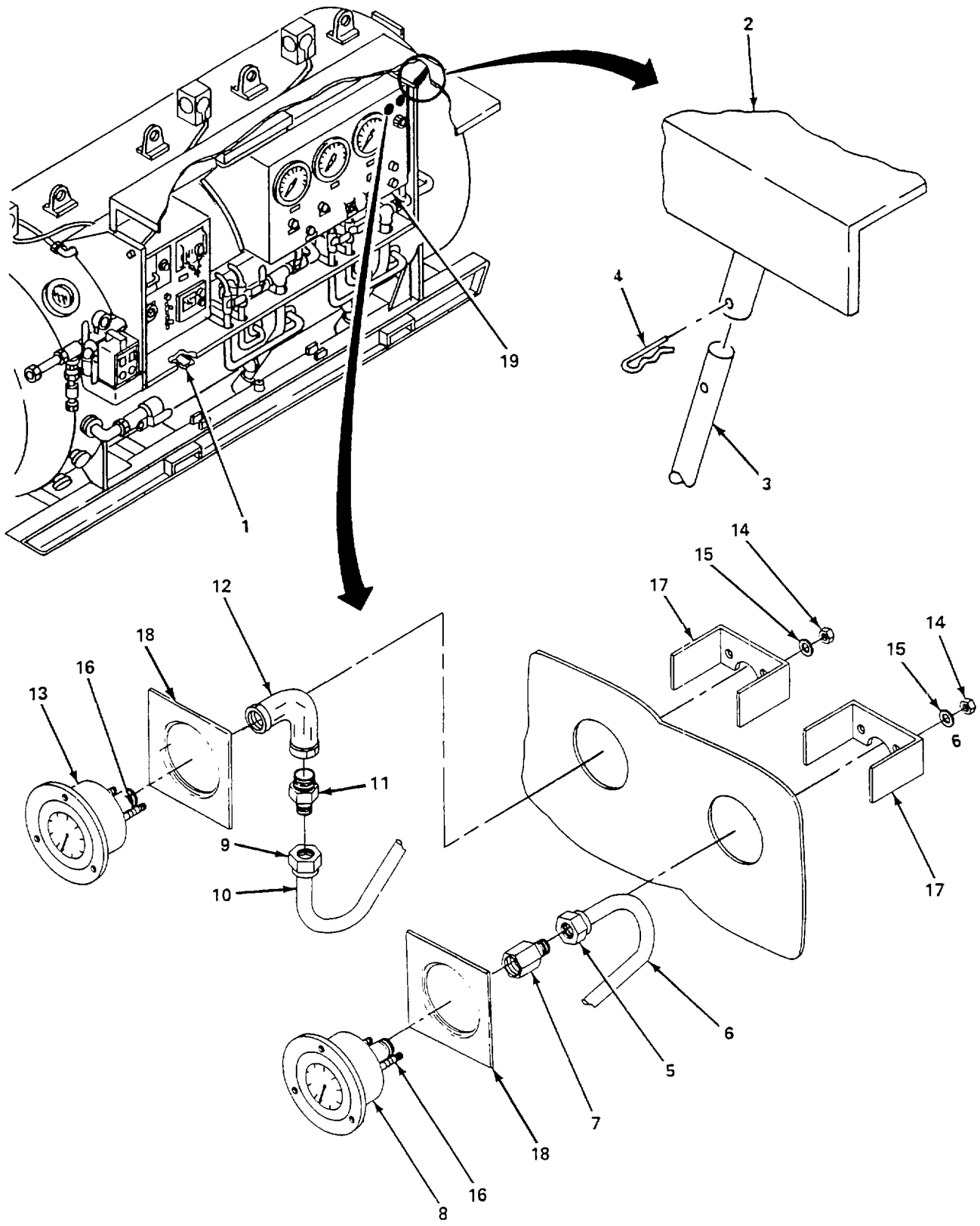


Figure 5-49. Oxygen Pressure Gages, Replace.

(6) Remove four nuts (14) and washers (15) from gage mounting studs (16) and two brackets (17), plate (18), low pressure gage (8), and high pressure gage (13).

(7) Install low pressure gage (8) and high pressure gage (13) and two plate (18) on chamber control console (19) and secure with two brackets (17), four washers (15) and nuts (14).

WARNING

Leave 1 1/2 threads exposed on fitting when applying teflon tape. This will ensure that no teflon tape will hang down inside the air system. Teflon tape should be wrapped in such a manner that when the fitting is tightened the tape will not loosen. Failure to wrap teflon tape correctly may result in contamination or blockage of the air system and subsequent possible injury or death to the diver.

(8) Apply teflon tape to all pipe threads.

(9) Install elbow (12) on high pressure gage (13).

(10) Install fitting (11) on elbow (12).

(11) Install line (10) on fitting (11) and tighten fitting nut (9).

(12) Install fitting (7) on low pressure gage (8).

(13) Install line (6) on fitting (7) and tighten fitting nut (5).

(14) Pressurize system and check for leaks, and new gage for proper operation.

(15) Remove two pin (4), supports (3), close enclosure door (2) and secure with two latches (1).

5-31. Pressure Regulator.

This task covers:
Replace

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Pressure Regulator
Bands, Rubber (Item 4, Appendix E)

Materials/Parts (Cont)

Bags, Plastic (Item 3, Appendix E)
Tape, Teflon (Item 21, Appendix E)

Equipment Condition

Chamber shut down (para. 2-15).

Replace. (figure 5-50)

WARNING

To prevent the spread of disease, serious injury and/or death, oxygen breathing systems must be maintained hygienically clean and free from dust, dirt, and all hydrocarbon contamination. Refer to oxygen system prework procedures para. 4-10 to avoid violating this warning.

CAUTION

Use two wrenches to remove and install all piping components to avoid damage.

NOTE

Ensure system is depressurized prior to beginning this task.

Gain access to OHL-024 the O_2 hand loader (regulator) by reaching over the top of and down behind the instrument panel.

(1) Unlatch two latches (1) open enclosure door (2) and install two supports (3) and pins (4).

(2) Loosen two fittings (5) and remove lines (6) and (7).

(3) Loosen two fitting nuts (8) and remove lines (9) and (10).

(4) Remove hole plug (11), retaining ring (12) and hand knob (13).

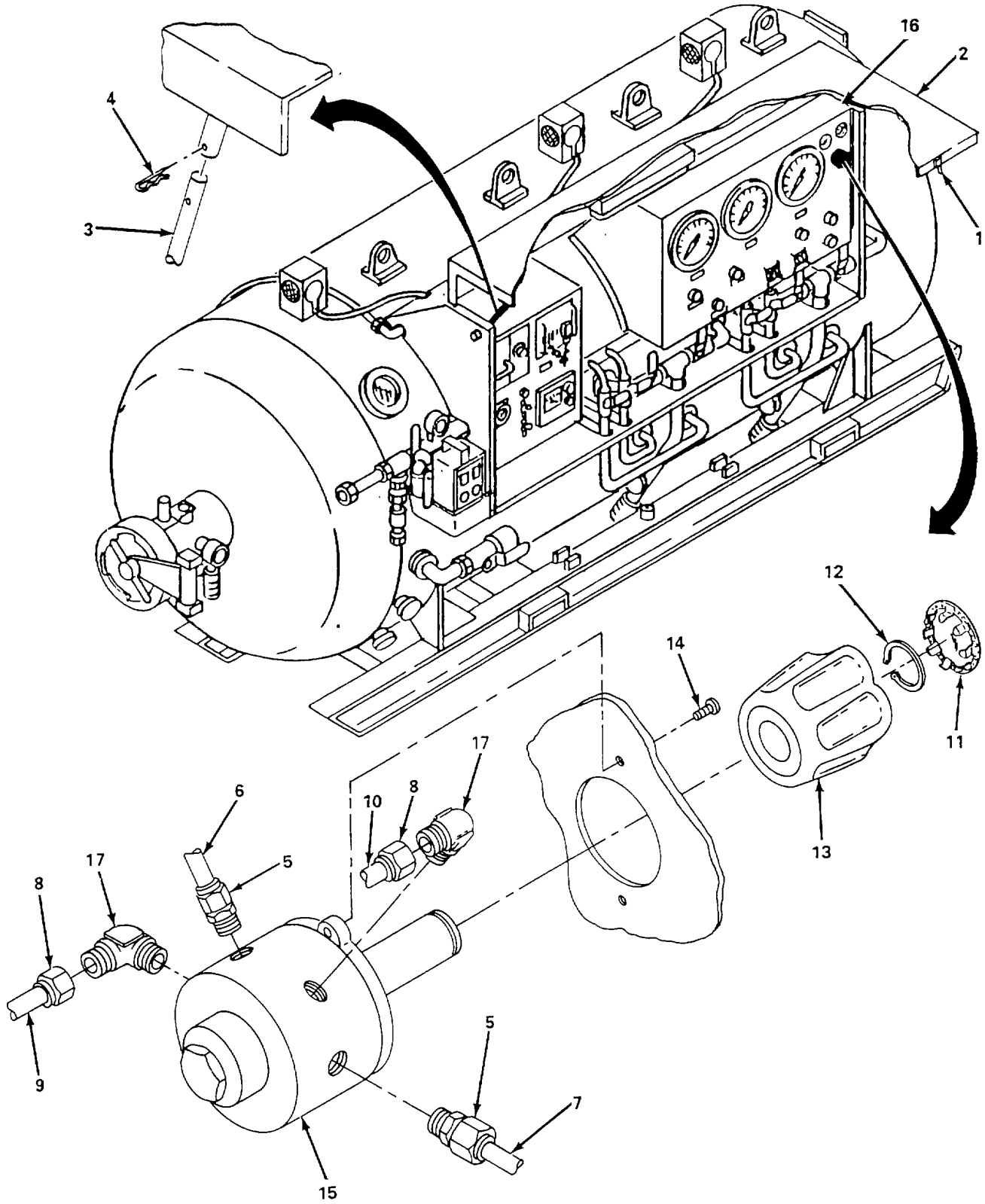


Figure 5-50. Pressure Regulator, Replace.

(5) Remove two screws (14) and remove pressure regulator (15) from chamber control console (16).

(6) Remove two elbows (17) from pressure regulator (15).

(7) Install two elbows (17) on pressure regulator (15).

(8) Position regulator (15) in chamber control console (16) and secure with two screws (14).

(9) Install hand knob (13) retaining ring (12) and hole plug (11).

WARNING

Leave 1 1/2 threads exposed on fitting when applying teflon tape. This will ensure that no teflon tape will hang down inside the air system. Teflon tape should be wrapped in such a manner that when the fitting is tightened the tape will not loosen. Failure to wrap teflon tape correctly may result in contamination or blockage of the air system and subsequent possible injury or death to the diver.

(10) Apply teflon tape to all pipe threads.

(11) Install lines (9) and (10) on elbows (17) and tighten two fitting nuts (8).

(12) Install lines (6) and (7) on regulator (15) and tighten fittings (5).

(13) Pressurize system and check connection for leaks, check regulator for proper operation.

(14) Remove two pins (4), supports (3), close enclosure door (2) and secure with two latches (1).

5-32. Back Pressure Regulators.

This task covers:
Replace

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Equipment Condition

Chamber shut down (para. 2-15).

Materials/Parts

Back Pressure Regulator
Bands, Rubber (Item 4, Appendix E)
Bags, Plastic (Item 3, Appendix E)
Tape, Teflon (Item 21, Appendix E)

Replace. (figure 5-51)

WARNING

To prevent the spread of disease, serious injury and/or death, oxygen breathing systems must be maintained hygienically clean and free from dust, dirt, and all hydrocarbon contamination. Refer to oxygen system prework procedures para. 4-10 to avoid violating this warning

CAUTION

Use two wrenches to remove and install all piping components to avoid damage.

NOTE

Ensure system is depressurized prior to beginning this task.

Gain access to OBR-022 the exhaust O_2 regulator from the I/L, and OBR-023 the exhaust O_2 regulator from the O/L by reaching under the bottom of and up behind the instrument panel. OBR-022 must be removed first to gain access to OBR-023. Replacement of OBR-023 is the same as OBR-022.

(1) Unlatch two latches (1), open enclosure door (2) and install two supports (3) and pins (4).

(2) Loosen fitting nut (5) and remove line (6).

(3) Loosen two fitting nuts (7) and remove two lines (8) and (9).

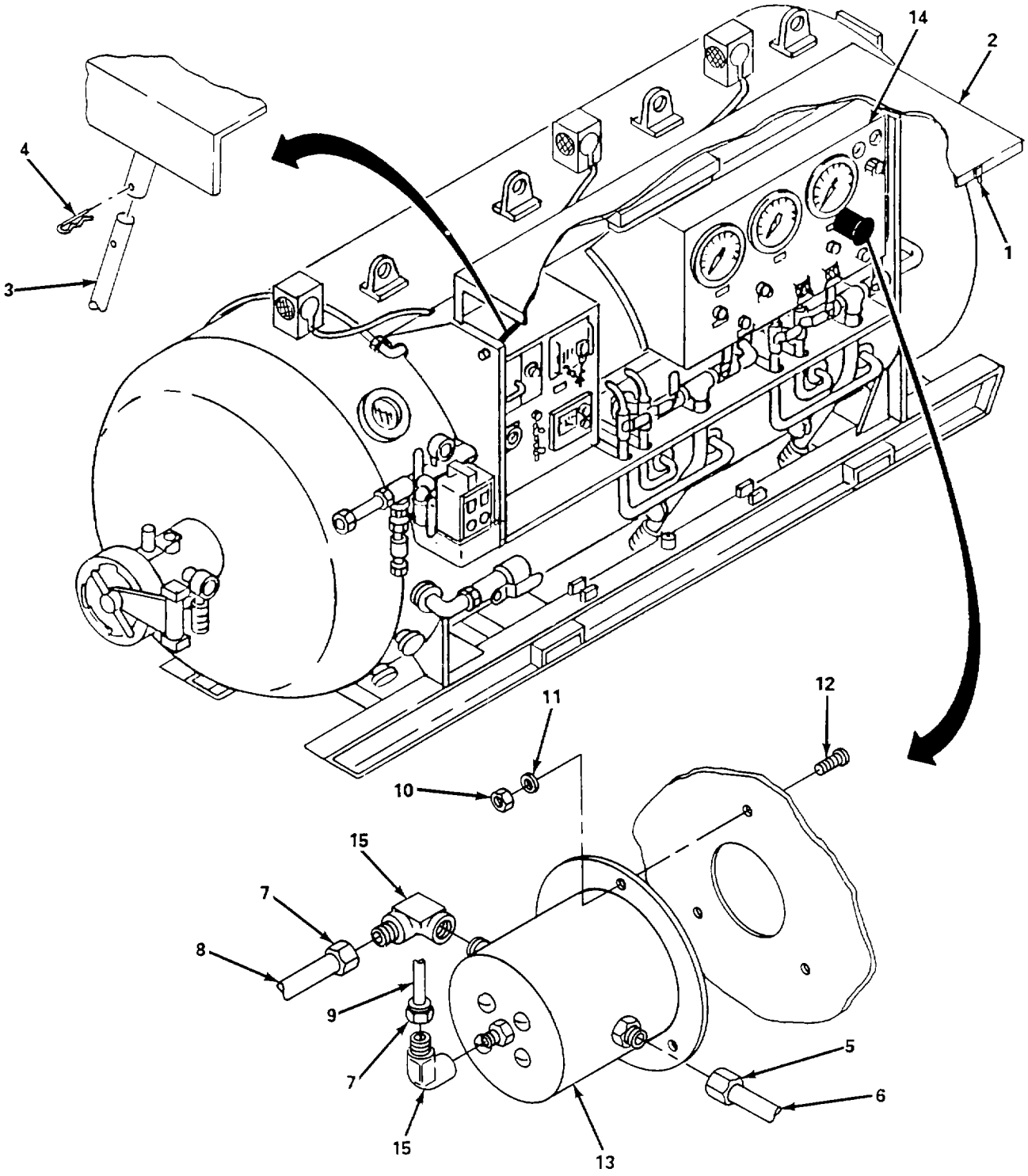


Figure 5-51. Back Pressure Regulators, Replace.

(4) Remove three nuts (10), washers (11) and screws (12) that secure back pressure regulator (13) to chamber control console (14).

(5) Remove back pressure regulator (13).

(6) Remove two elbows (15) from regulator (13).

WARNING

Leave 1 1/2 threads exposed on fitting when applying teflon tape. This will ensure that no teflon tape will hang down inside the air system. Teflon tape should be wrapped in such a manner that when the fitting is tightened the tape will not loosen. Failure to wrap teflon tape correctly may result in contamination or blockage of the air system and subsequent possible injury or death to the diver.

(7) Apply teflon tape to all pipe threads.

(8) Install three elbows (15) on regulator (13).

(9) Position back pressure regulator (13) in the chamber control console (14) and secure with three screws

(12) washers (11) and nuts (10).

(10) Install two lines (8) and (9) and tighten two fitting nuts (7).

(11) Install line (6) and tighten fitting nut (5).

(12) Pressurize system, and check connections for leaks. Check regulator for proper operation.

(13) Remove two pins (4), supports (3), close enclosure door (2) and secure with two latches (1).

5-33. Shutoff Valves (Oxygen).

This task covers:
Replace

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Shutoff Valve
Bands, Rubber (Item 4, Appendix E)
Bags, Plastic (Item 3, Appendix E)
Tape, Teflon (Item 21, Appendix E)

Equipment Condition

Chamber shut down (para. 2-15).

Replace. (figure 5-52)

WARNING

To prevent the spread of disease, serious injury and/or death, oxygen breathing systems must be maintained hygienically clean and free from dust, dirt, and all hydrocarbon contamination. Refer to oxygen system prework procedures para. 4-10 to avoid violating this warning.

CAUTION

Use two wrenches to remove and install all piping components to avoid damage.

NOTE

Ensure system is depressurized prior to beginning this task.

Gain access to OXL-021 the I/L low pressure O_2 supply valve, and OXL-020 the O/L O_2 supply valve by reaching up from bottom and behind the instrument panel. Replacement of the OXL-021 and OXL-020 is the same.

(1) Unlatch two latches (1), open enclosure door (2) and install two supports (3) and pins (4).

(2) Remove nut cap (5) and lockwasher (6) that secures the valve handle (7) to valve (8) and remove handle.

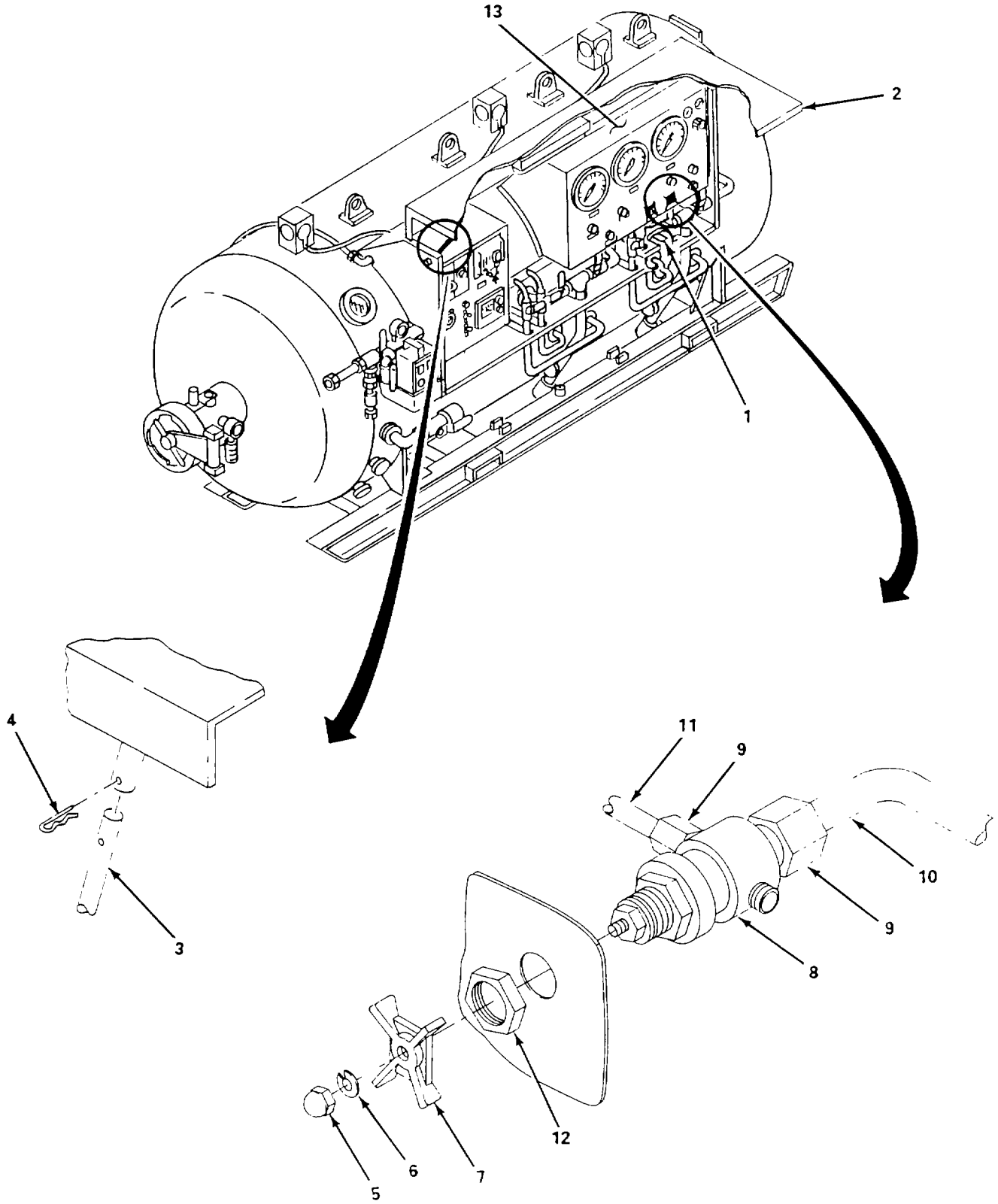


Figure 5-52. Shutoff Valve (Oxygen), Replace.

(3) Remove two fitting nuts (9) and remove lines (10) and (11).

(4) Remove bulk head nut (12) and remove shutoff valve (8) from rear of chamber control console (13).

(5) Install shutoff valve (8) in chamber control console (13) and secure with bulkhead nut (12).

WARNING

Leave 1 1/2 threads exposed on fitting when applying teflon tape. This will ensure that no teflon tape will hang down inside the air system. Teflon tape should be wrapped in such a manner that when the fitting is tightened the tape will not loosen. Failure to wrap teflon tape correctly may result in contamination or blockage of the air system and subsequent possible injury or death to the diver.

(6) Apply teflon tape to shutoff valve pipe threads.

(7) Install two lines (10) and (11) and tighten two fitting nuts (9).

(8) Install valve handle (7) on valve (8) and secure with lockwasher (6) and nut cap (5).

(9) Pressurize system, and check connections for leaks. Check shutoff valve for proper operation.

(10) Remove two pins (4), supports (3), close enclosure door (2) and secure with two latches (1).

5-34. Isolator Valves.

This task covers:
Replace

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Equipment Condition

Chamber shut down (para. 2-15).

Materials/Parts

Isolator Valve
Bands, Rubber (Item 4, Appendix E)
Bags, Plastic (Item 3, Appendix E)
Tape, Teflon (Item 21, Appendix E)

Replace. (figure 5-53)

WARNING

To prevent the spread of disease, serious injury and/or death, oxygen breathing systems must be maintained hygienically clean and free from dust, dirt, and all hydrocarbon contamination. Refer to oxygen system prework procedures para. 4-10 to avoid violating this warning

CAUTION

Use two wrenches to remove and install all piping components to avoid damage.

NOTE

There are four isolator valves. Replacement of each valve is the same.

(1) Unlatch two latches (1), open enclosure door (2) and install two supports (3) and pins (4).

(2) Loosen setscrew (5) and remove knob (6) from isolator valve (7).

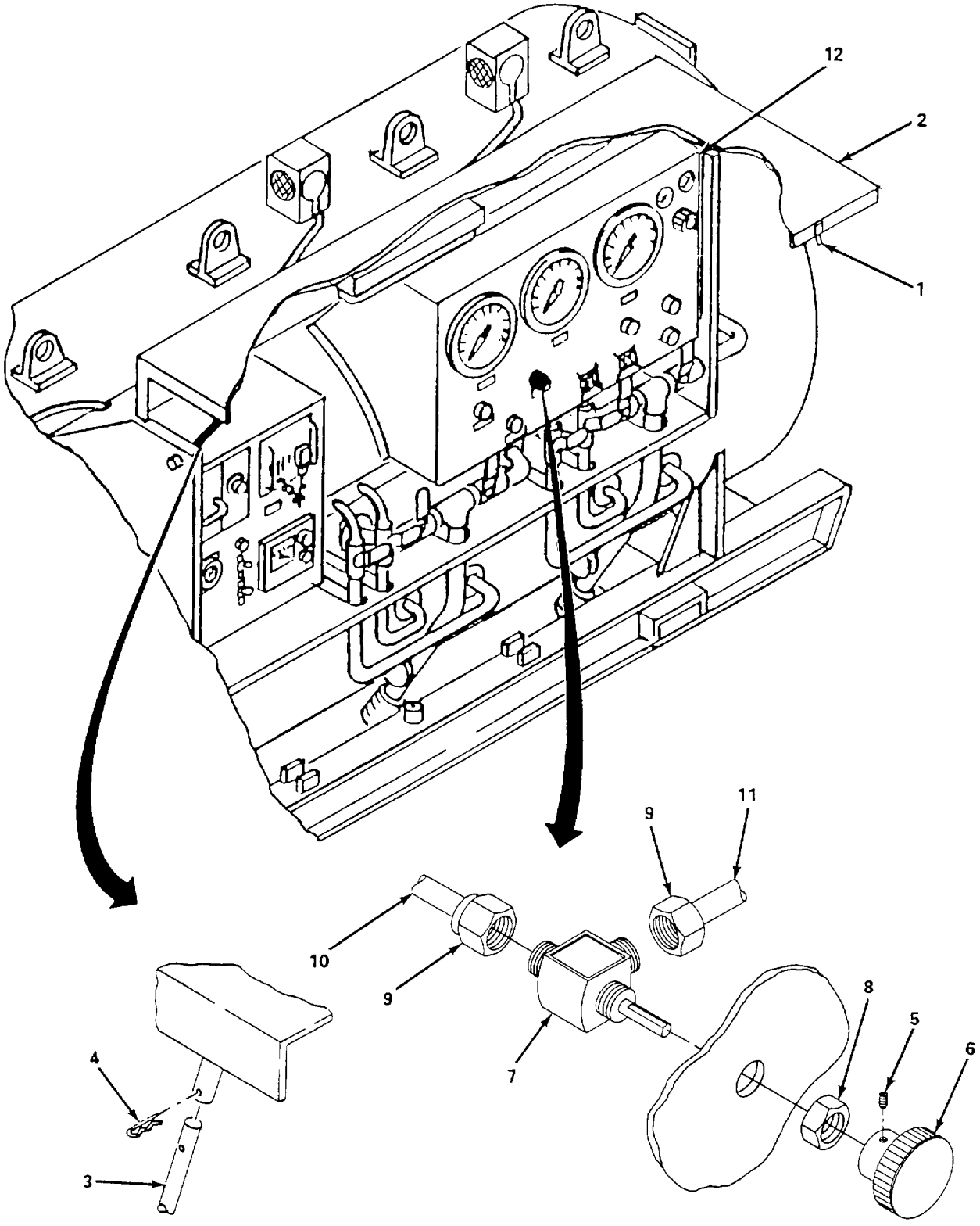


Figure 5-53. Isolator Valves, Repair.

(3) Remove nut (8) from isolator valve (7).

(4) Remove two fitting nuts (9) and remove lines (10) and (11).

(5) Remove isolator valve (7) from chamber control console (12).

WARNING

Leave 1 1/2 threads exposed on fitting when applying teflon tape. This will ensure that no teflon tape will hang down inside the air system. Teflon tape should be wrapped in such a manner that when the fitting is tightened the tape will not loosen. Failure to wrap teflon tape correctly may result in contamination or blockage of the air system and subsequent possible injury or death to the diver.

(6) Apply teflon tape to all pipe threads.

(7) Install isolator valve (7) on chamber control console (12).

(8) Install lines (10) and (11) and tighten two fitting nuts (9).

(9) Install nut (8) in isolator valve (7).

(10) Install knob (6) on isolator valve (7) and tighten setscrews (5).

(11) Pressurize system and check connections for leaks.

(12) Remove two pins (4), supports (3), close enclosure door (2), and secure with two latches (1).

5-35. Dump Valves.

This task covers:
Replace b. Repair

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Ball Valve
Valve Kit
Detergent, Nonionic (Item 9, Appendix E)
Cloth, Lint Free (Item 6, Appendix E)

Materials/Parts (Cont)

Bands, Rubber, (Item 4, Appendix E)
Bags, Plastic (Item 3, Appendix E)
Tape, Teflon (Item 21, Appendix E)
Distilled Water (Item 8, Appendix E)

Equipment Condition

Chamber shut down (para. 2-15).

a. Replace. (figure 5-54)

WARNING

To prevent the spread of disease, serious injury and/or death, oxygen breathing systems must be maintained hygienically clean and free from dust, dirt, and all hydrocarbon contamination. Refer to oxygen system prework procedures para. 4-10 to avoid violating this warning

CAUTION

Use two wrenches to remove and install all piping components to avoid damage.

NOTE

Ensure system is depressurized prior to beginning this task.

The reference designators of the dump valves being removed are OEX-038 exhaust O_2 valve, O/L and OEX-037 exhaust O_2 valve I/L.

There are two dump valves and silencers. Replacement of each one is the same.

(1) If necessary for removal of valve, remove nut (1), stem spring (2), plate (3), stop plate (4), handle (5), spring (6) from valve (7).

(2) Hold elbow fitting (8) and remove valve (7) from elbow fitting (8)

(3) Remove silencers (9) from valve (7).

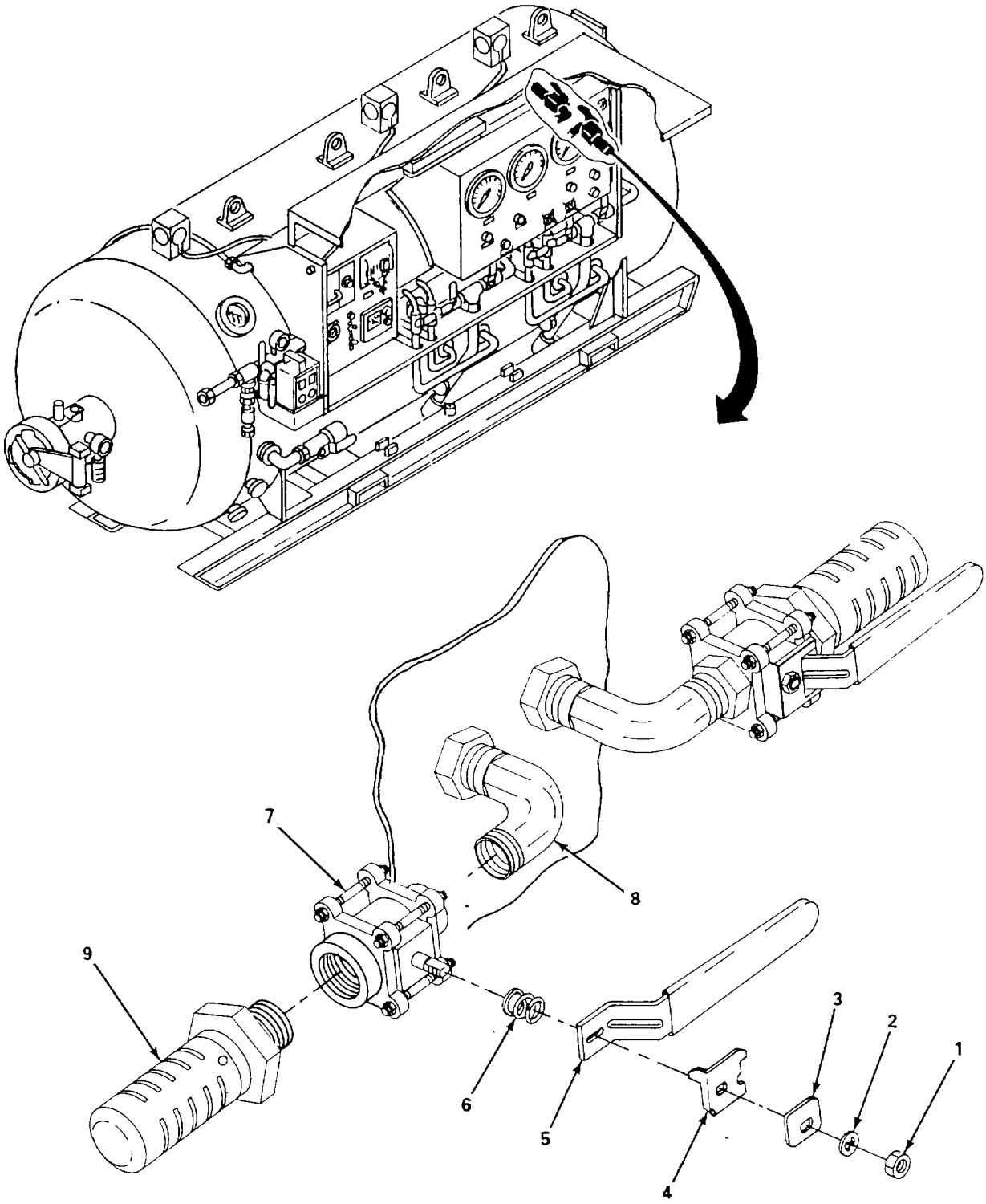


Figure 5-54. Dump Valves and Silencers, Replace.

5-35. Dump Valves (Cont).

WARNING

Leave 1 1/2 threads exposed on fitting when applying teflon tape. This will ensure that no teflon tape will hang down inside the air system. Teflon tape should be wrapped in such a manner that when the fitting is tightened the tape will not loosen. Failure to wrap teflon tape correctly may result in contamination or blockage of the air system and subsequent possible injury or death to the diver.

(4) Apply teflon tape on all pipe threads.

(5) Install silencer (9) on valve (7).

(6) Hold elbow fitting (8) and install valve (7) on elbow fitting (8).

(7) If removed, install spring (6), handle (5), stop plate (4), plate (3), and stem spring (2) on valve (7).

(8) Pressurize system and check corrections for leaks. Check valves for proper operation.

b. *Repair.* (figure 5-55)

(1) Remove dump valve (para. a. above).

(2) If not removed, remove nut (1), stem spring (2), plate (3), stop plate (4), handle (5), and spring (6).

(3) Remove nut (7), two stem springs (8), gland (9), packing support (10), top packing (11), and bottom packing (12).

(4) Remove eight nuts (13), four stud bolts (14), and two flanges (15) from body (16).

(5) Remove two preformed packings (17), seat spring (18), seats (19), support rings (20), and ball (21) from body (16).

(6) Remove stem (22) and two stem bearings (23) from body (16).

(7) Clean all components using nonionic detergent cleaner and rinse with clean distilled water.

(8) Inspect all items and replace all items that are bent, cracked, worn, or otherwise damaged.

(9) Install two stem bearings (23) on stem (22) and install stem into body (16).

(10) Install ball (21), two support rings (20), seats (19), seat springs (18), and preformed packings (17) in body (16).

(11) Install two flanges (15) on body (16) and secure with four stud bolts (14) and eight nuts (13).

(12) Install bottom packing (12), top packing (11), packing support (10), gland (9), two stem springs (8), and nut (7).

(13) Install spring (6), handle (5), stop plate (4), plate (3), stem spring (2), and nut (1).

(14) Install dump valve (para. a. above).

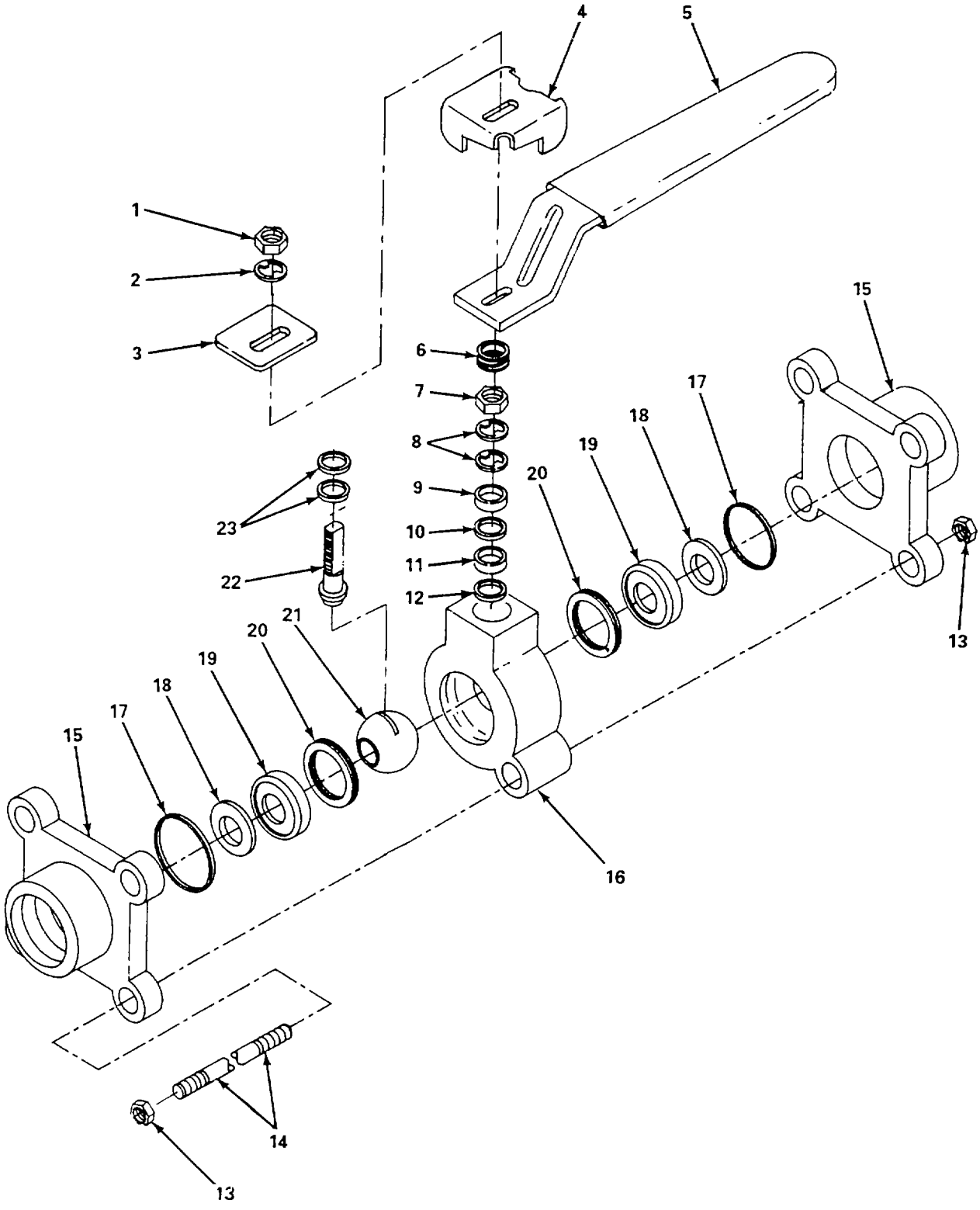


Figure 5-55. Dump Valves, Repair.

5-36. Oxygen BIBS Manifold.

This task covers:
Replace

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Oxygen BIBS Manifold
Bands, Rubber (Item 4, Appendix E)

Materials/Parts (Cont)

Bags, Plastic (Item 3, Appendix E)
Tape, Teflon (Item 21, Appendix E)

Equipment Condition

Chamber shut down (para. 2-15).

Replace. (figure 5-56)

WARNING

To prevent the spread of disease, serious injury and/or death, oxygen breathing systems must be maintained hygienically clean and free from dust, dirt, and all hydrocarbon contamination. Refer to oxygen system prework procedures para. 4-10 to avoid violating this warning.

CAUTION

Use two wrenches to remove and install all piping components to avoid damage.

NOTE

There are two BIBS manifolds, one in the O/L and the other in the I/L. Replacement of each manifold is the same.

(1) Remove three quick disconnect fittings (1) from the oxygen supply side of manifold (2).

(2) Remove three quick disconnect fittings (3) from the oxygen return side of manifold (2).

(3) Loosen two fittings (4) and remove lines (5) and (6).

(4) Remove four nuts (7), lockwashers (8), and bolts (9) and remove manifold (2) from bracket (10).

(5) Install manifold (2) and secure with four bolts (9), lockwashers (8), and nuts (7).

(6) Install lines (5) and (6) on manifold (2) and tighten two fittings (4).

(7) Install three quick disconnect fittings (3) on oxygen return side of manifold (2).

(8) Install three quick disconnect fittings (1) on oxygen supply side of manifold (2).

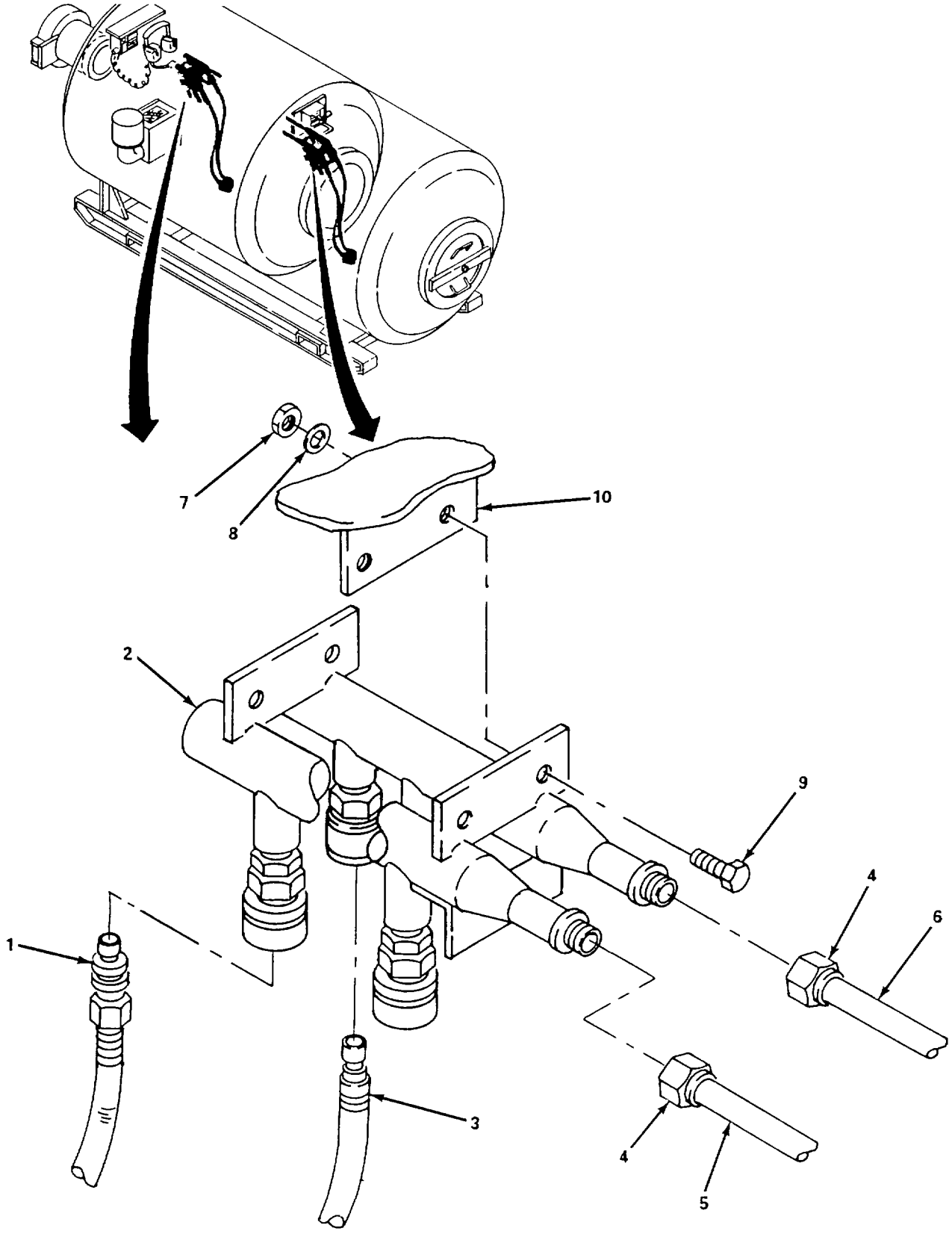


Figure 5-56. Oxygen BIBS Manifold, Replace.

5-37. Inhalator Mask Assembly.

This task covers: Repair

INITIAL SETUP

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Faceseal Assembly
Harness
Retrofit Kit
Manifold Preformed Packing
Lubricant
Cloth, Line Free (Item 6, Appendix E)

Materials/Parts (Cont)

Bands, Rubber (Item 4, Appendix E)
Bags, Plastic (Item 3, Appendix E)
Distilled Water (Item 9, Appendix E)
Detergent, Nonionic (Item 8, Appendix E)

Equipment Condition

Inhalator mask assembly removed (para. 4-50).
Dual hose assembly removed (para. 5-39).
Inhalator mask demand/exhaust regulator removed (para 5-38).

Repair. (figure 5-57)

WARNING

To prevent the spread of disease, serious injury and/or death, oxygen breathing systems must be maintained hygienically clean and free from dust, dirt, and all hydrocarbon contamination. Refer to oxygen system prework procedures para. 4-10 to avoid violating this warning.

(1) Remove manifold (1) and manifold preformed packing (2) from faceseal (3).

(2) Remove straps (4) if damaged.

(3) Clean all components using nonionic detergent cleaner and rinse with clean distilled water.

(4) Inspect all components and replace all components that are bent, cracked, worn, or otherwise damaged.

(5) Apply lubricant to preformed packing (2) and place into groove in faceseal (3).

(6) Install manifold (1) on faceseal (3).

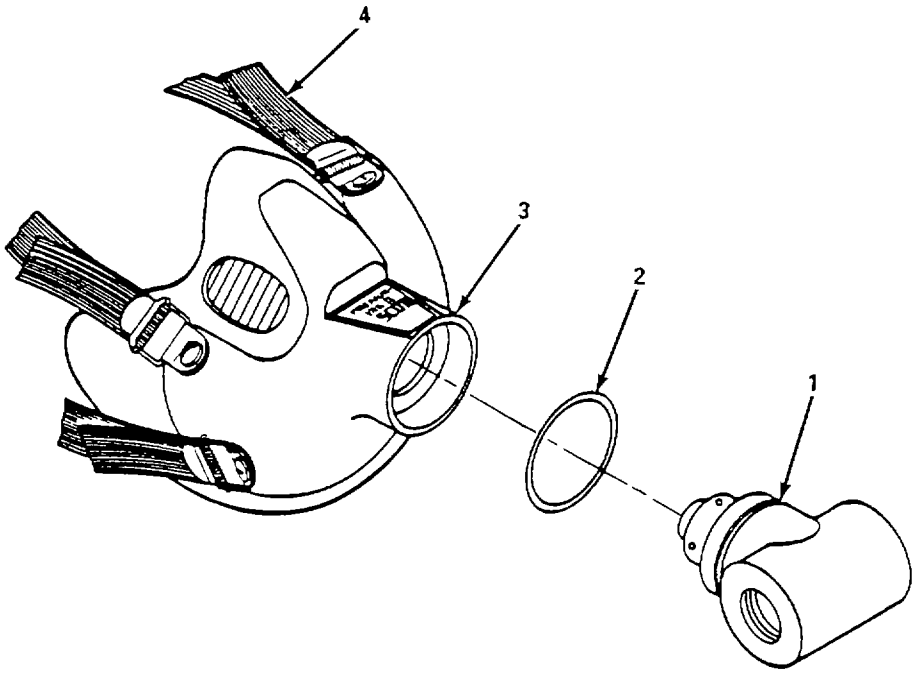


Figure 5-57. Inhalator Mask Assembly, Repair.

FOLLOW-ON MAINTENANCE
(1) Install inhalator mask demand/exhaust regulators (para. 5-38).
(2) Install dual hose assembly (para. 5-39).
(3) Install inhalator mask assembly (para. 4-50).

5-38. Inhalator Mask Demand/Exhaust Regulators

This task covers: Replace

INITIAL SETUP

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Inhalator Mask Demand/Exhaust Regulators
Regulator to Manifold Preformed Packing
Grease, Halocarbon (Item 13, Appendix E)
Pin Locking Tool

Materials/Parts (Cont)

Bands, Rubber (Item 4, Appendix E)
Bags, Plastic (Item 3, Appendix E)

Equipment Condition

Inhalator mask assembly removed (para. 4-50).
Dual hose assembly removed (para. 5-39).

Replace. (figure 5-58)

WARNING

To prevent the spread of disease, serious injury and/or death, oxygen breathing systems must be maintained hygienically clean and free from dust, dirt, and all hydrocarbon contamination. Refer to oxygen system prework procedures para. 4-10 to avoid violating this warning.

NOTE

Procedures for replacement of demand regulator and exhaust regulator are the same for both. Demand regulator replacement is used to illustrate procedure.

(1) Insert pin locking tool (drift) in hole (1) in manifold (2) and rotate demand regulator (3) until tool end drops into detent in regulator (regulator no longer turns freely).

(2) Unscrew and remove demand regulator (3) and preformed packing (4).

(3) Apply grease to preformed packing (4) and install into groove in manifold (2).

(4) Install demand regulator (3) on manifold (2) and insert pin locking tool (drift) in hole (1) in manifold (2). Rotate regulator until tool end drops into detent (regulator no longer turns freely).

(5) Rotate demand regulator (3) clockwise until tightly mounted on manifold (2).

(6) Remove pin locking tool. Check that demand regulator (3) rotates freely.

(7) Follow same procedure to replace exhaust regulator (5) and preformed packing (6).

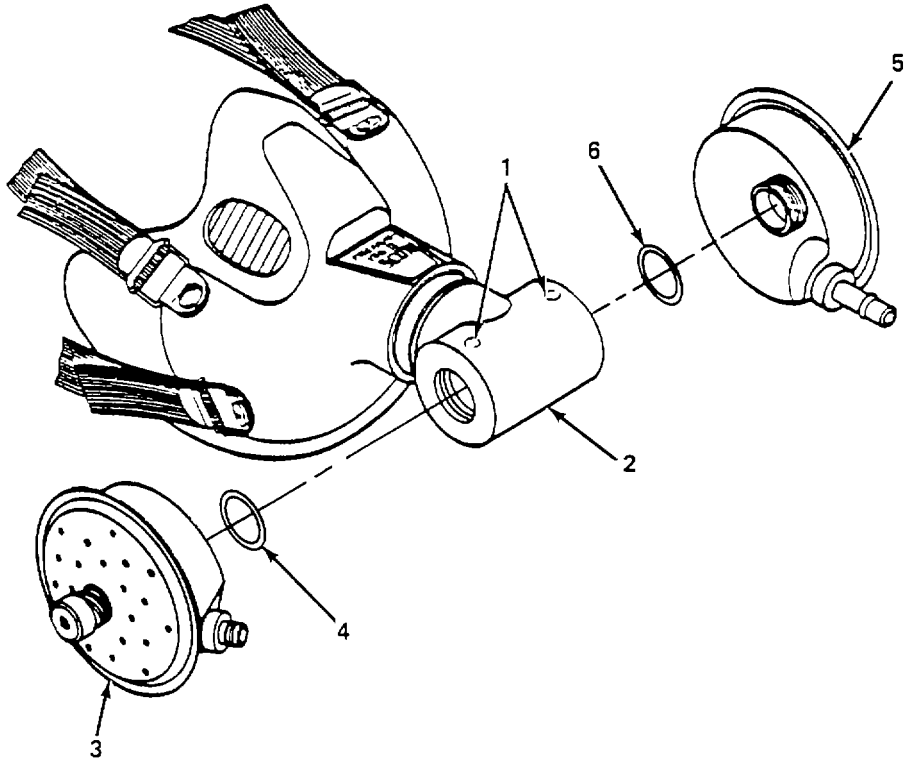


Figure 5-58. Inhalator Mask Demand/Exhaust Regulators, Replace.

FOLLOW-ON MAINTENANCE
(1)Install dual hose assembly (para. 5-39).
(2)Install inhalator mask assembly (para. 4-50).

5-39. Dual Hose Assembly.

This task covers: Replace **b. Repair**

INITIAL SETUP

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Dual Hose Assembly
Hose Clamps (2)
Gasket
Cloth, Lint-Free (Item 6, Appendix E)

Materials/Parts (Cont)

Distilled Water (Item 9, Appendix E)
Bands, Rubber (Item 4, Appendix E)
Bags, Plastic (Item 3, Appendix E)
Detergent, Nonionic (Item 8, Appendix E)

Equipment Condition

Inhalator mask assembly removed (para. 4-50).

a. Replace. (figure 5-59)

WARNING

To prevent the spread of disease, serious injury and/or death, oxygen breathing systems must be maintained hygienically clean and free from dust, dirt, and all hydrocarbon contamination. Refer to oxygen system prework procedures para. 4-10 to avoid violating this warning.

NOTE

If the chamber is pressurized, the oxygen inhalator dual hose assembly may be passed in through M/L.

(1) Loosen fitting nut (1) from mask demand regulator connection (2) and remove supply hose (3) and gasket (4). Discard gasket.

(2) Remove hose clamp (5) from exhaust regulator connection (6) and remove exhaust hose (7). Discard hose clamp.

(3) Install exhaust hose (7) on exhaust regulator connection (6) and secure with new hose clamp (5).

(4) Install supply hose (3) and new gasket (4) on mask demand regulator connection (2) and tighten fitting (1).

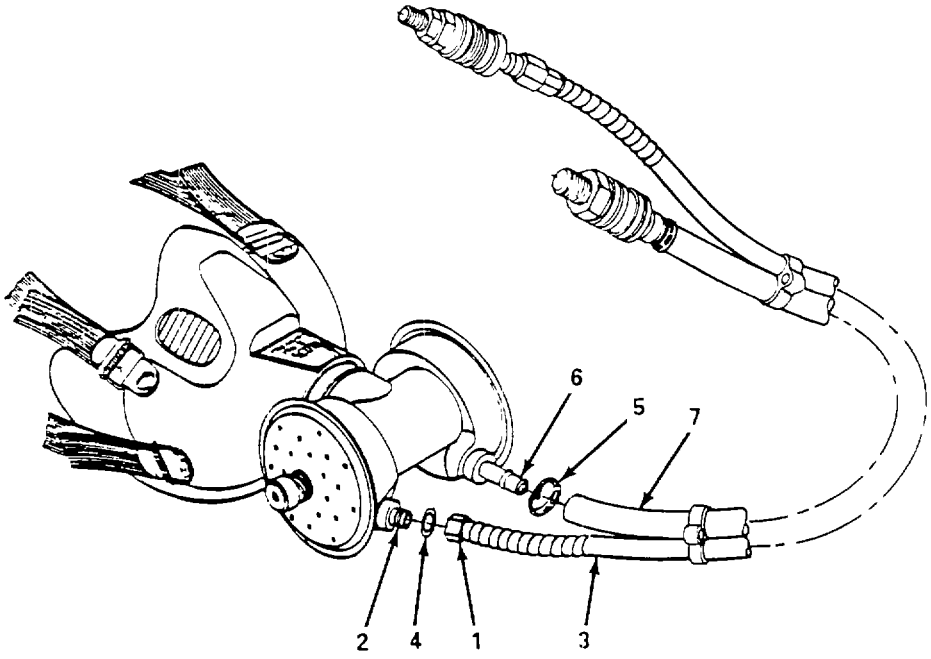


Figure 5-59. Dual Hose Assembly, Replace.

5-39. Dual Hose Assembly (Cont).

b. Repair. (figure 5-60)

(1) Remove dual hose assembly (para. a. above). Discard hose clamp.

(2) Remove hose clamp (1) from exhaust hose (2).

(3) Remove quick disconnect socket (3) from exhaust hose plug (4).

(4) Remove hose clamp (5) from exhaust hose (2) and remove exhaust hose plug (4). Discard hose clamp.

(5) Remove quick disconnect socket (6) from demand hose plug (7).

(6) Remove demand hose plug (7) from demand hose (8).

(7) Clean all components using nonionic detergent cleaner and rinse with clean distilled water.

(8) Inspect all components and replace all components that are bent, cracked, worn, or otherwise damaged.

(9) Install demand hose plug (7) on demand hose (8).

(10) Install quick disconnect socket (6) on demand hose plug (7).

(11) Install new hose clamp (5) on exhaust hose (2).

(12) Install exhaust hose plug (4) on exhaust hose (2) and secure with hose clamp (5).

(13) Install quick disconnect socket (3) on exhaust hose plug (4).

(14) Install new hose clamp (1) on exhaust hose (2).

(15) Install dual hose assembly (para. a. above).

FOLLOW-ON MAINTENANCE
Install inhalator mask assembly (para. 4-50).

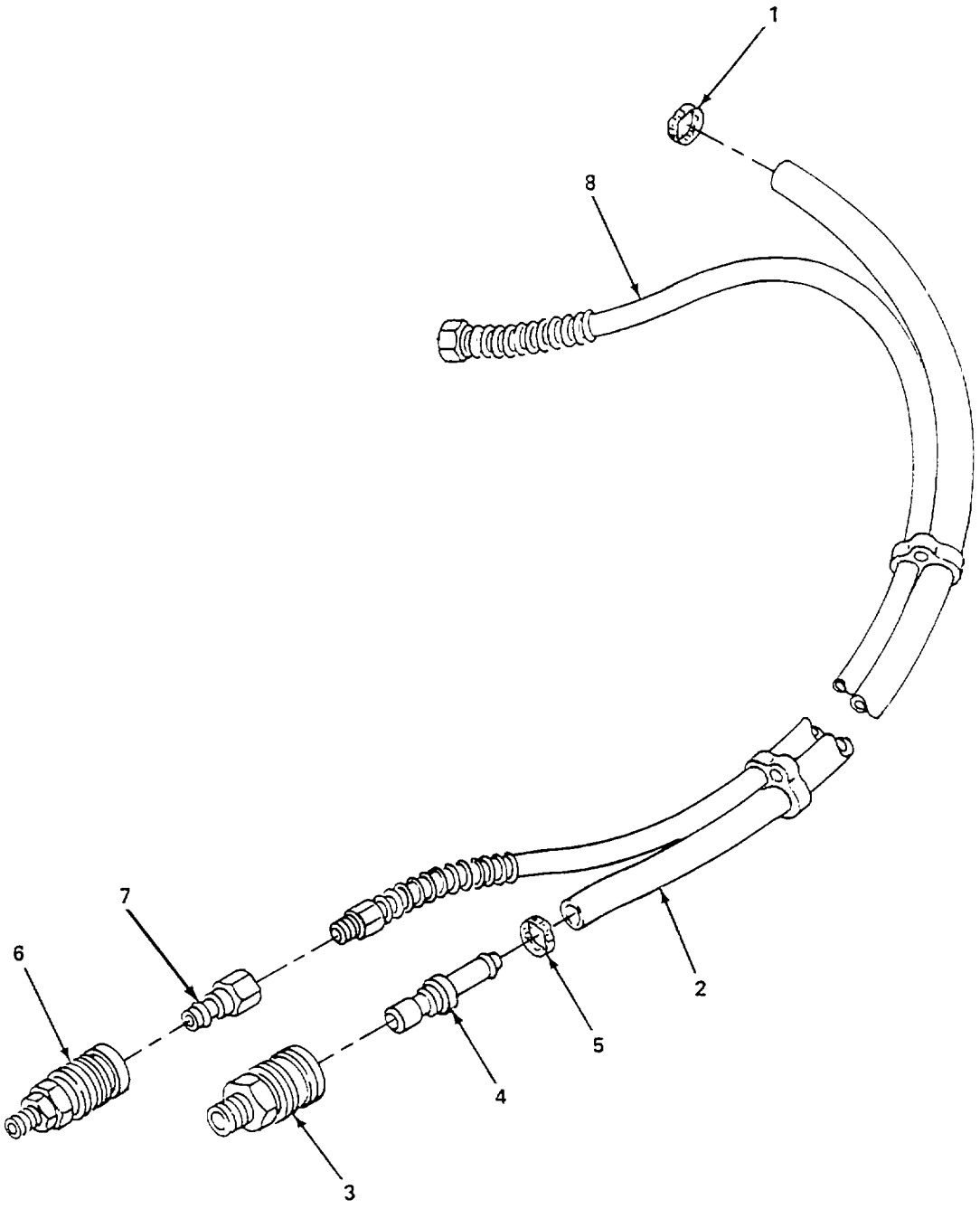


Figure 5-60. Dual Hose Assembly, Repair.

5-40. O^2 and Air Piping.

This task covers: Repair **b. Install**

INITIAL SETUP

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)
Tubing Bender Set

Materials/Parts

1/4 in. Stainless Steel Tubing
1/4 in. Stainless Steel Tubing Connectors
Teflon Tape (Item 21, Appendix E)
Detergent, Nonionic (Item 9, Appendix E)
Water, Distilled (Item 8, Appendix E)

Materials/Parts (Cont)

Bags, Plastic (Item 3, Appendix E)
Cloth, Lint-Free (Item 6, Appendix E)
Bands, Rubber (Item 4, Appendix E)

Personnel Required

Three

Equipment Condition

Chamber shut down (para. 2-15).

a. Replace. (figure 5-61)

WARNING

To prevent the spread of disease, serious injury and/or death, oxygen breathing systems must be maintained hygienically clean and free from dust, dirt, and all hydrocarbon contamination. Refer to oxygen system prework procedures para 4-10 to avoid violating this warning.

CAUTION

Use two wrenches to remove and install all piping components to avoid damage.

NOTE

For ease of maintenance it is best to remove the chamber control console with the oxygen manifold intact.

(1) Unlatch two latches (1) open enclosure door (2) and install two supports (3) and pins (4).

(2) Ensure all oxygen bottle valves and the high pressure oxygen isolation valve (5) are closed.

(3) Close isolator valves ALP-013 (6), ALP-015 (7), ALP-016 (8) AND ALP-014 (9).

(4) Loosen fitting nut (10) and remove manifold (11).

(5) Remove two dump valves and silences OEX-037 (12) and OEX-038 (13) with silencers intact, refer to para. 5-35.

(6) Loosen fitting nut (14) and remove line (15).

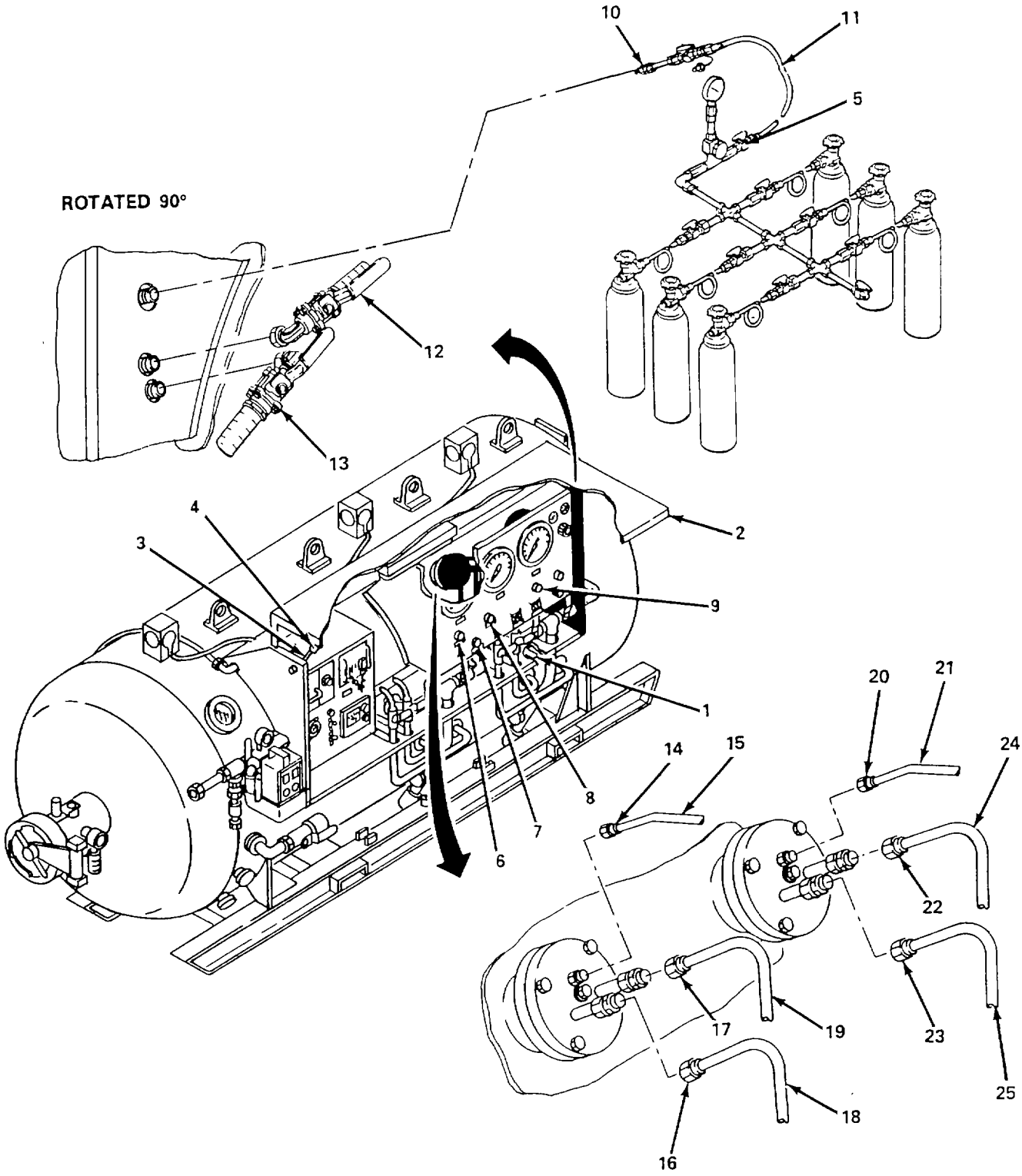


Figure 5-61. 0_2 and Air Piping, Removal (Sheet 1 of 2).

5-40. 0_2 and Air Piping (Cont).

(7) Loosen fitting nuts (16) and (17) and remove lines (18) and (19).

(8) Loosen fitting nut (20) and remove line (21).

(9) Loosen fitting nuts (22) and (23) and remove lines (24) and (25).

CAUTION

- Ensure that personnel are on hand to hold the chamber control console when attaching hardware is removed.
- Ensure space is readily available to place the console in a manner to prevent damage to the manifold tubing attached to the back of the console or the gages and valves attached to the front.
- Ensure that the console is placed in a clean work area. Refer to para. 4-10. Oxygen System Prework Procedures.

(10) Remove four nuts (26), washers (27), and screws (28) that secure the chamber control console (29) to the enclosure frame (30).

(11) Remove console (29) from enclosure frame (30).

NOTE

For removal of valves, regulators and gages, refer to individual procedures.

There are two lines going to the BIBS manifold in the O/L and I/L. Removal of each line is the same.

(12) Loosen fitting nuts (31) and (32) and remove line (33).

(13) Loosen fitting nuts (34) and (35) and remove line (36).

(14) Check all connectors and tubing sections for wear or damage. Replace any lines by loosening the two fitting nuts and removing the line.

(15) If any line is unserviceable, cut new tubing and bend to required shape using old line as a template.

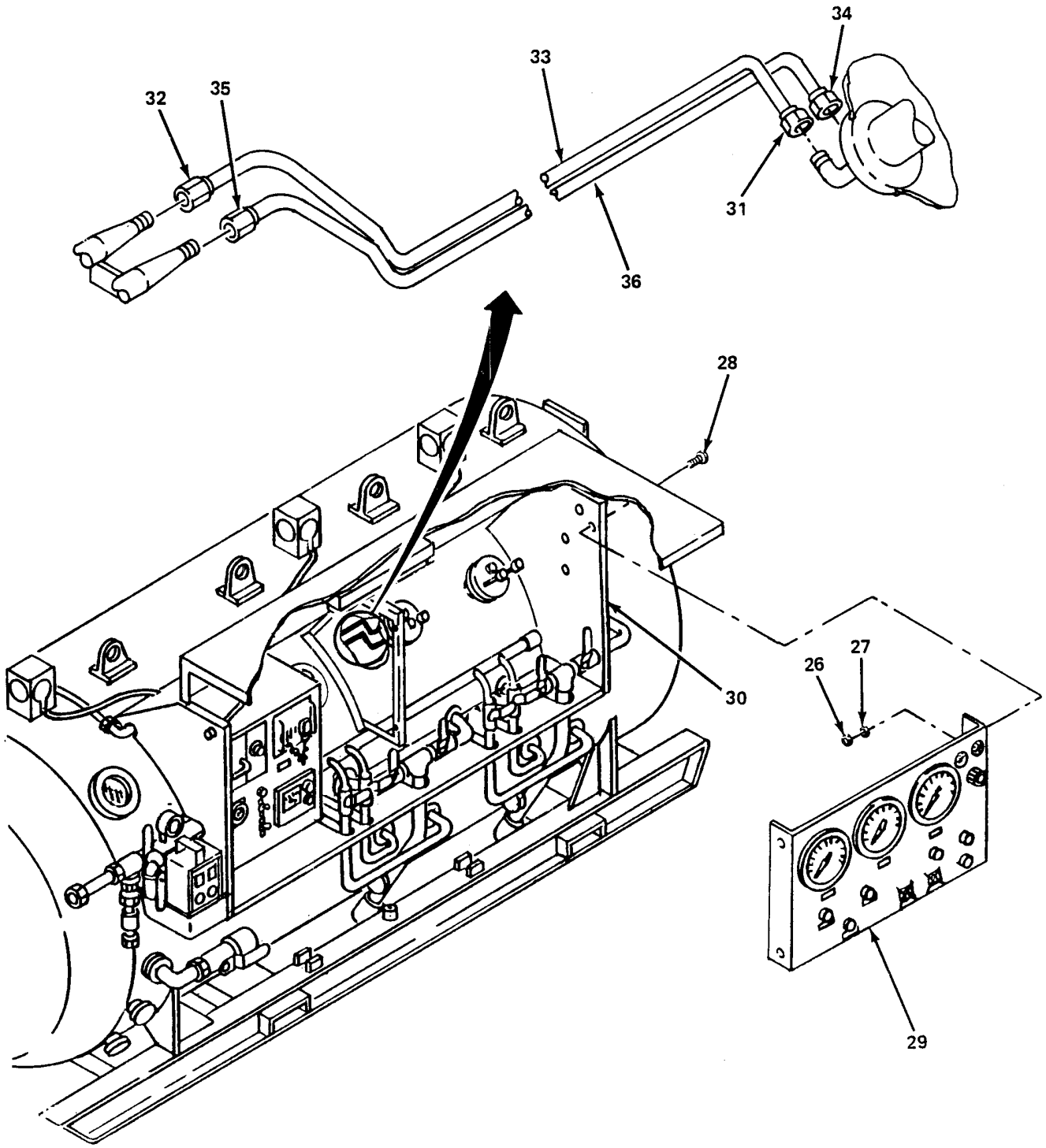


Figure 5-61. 0_2 and Air Piping, Removal (Sheet 2 of 2).

5-40. 0_2 and Air Piping (Cont).

b. Install. (figure 5-62)

WARNING

Leave 1 1/2 threads exposed on fitting when applying teflon tape. This will ensure that no teflon tape will hang down inside the air system. Teflon tape should be wrapped in such a manner that when the fitting is tightened the tape will not loosen. Failure to wrap teflon tape correctly may result in contamination or blockage of the air system and subsequent possible injury or death to the diver.

(1) Apply teflon tape to all pipe threads.

NOTE

There are two lines going to the BIBS manifold in the O/L and I/L. Installation of each line is the same.

(2) Install line (1) and tighten fitting nuts (2) and (3).

(3) Install line (4) and tighten fitting nuts (5) and (6).

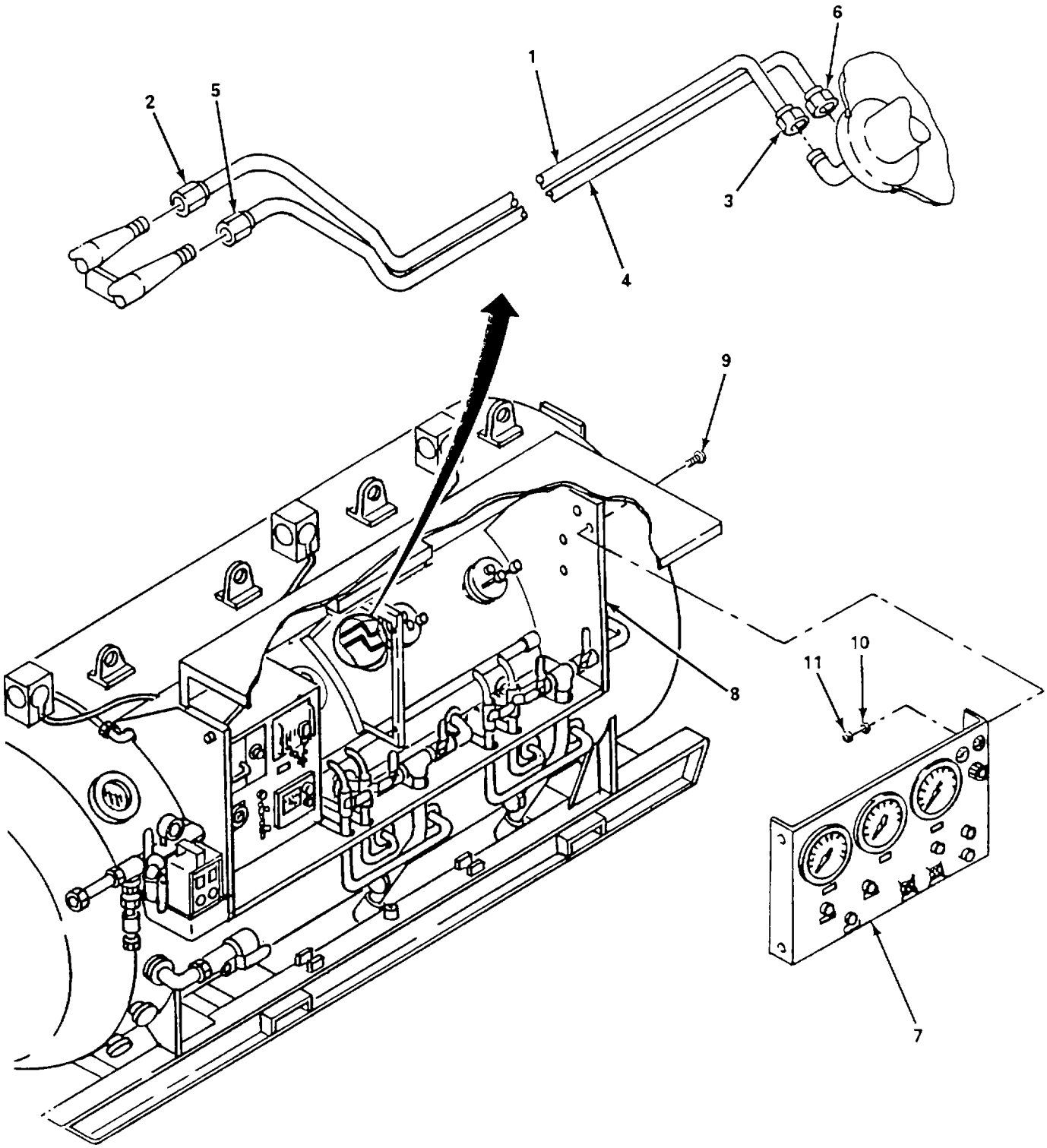


Figure 5-62. 0_2 and Air Piping, Installation (Sheet 1 of 2).

5-40. 0_2 and Air Piping (Cont).

NOTE

For installation of valves, regulators and gages, refer to individual procedures.

(4) Install chamber control console (7) on enclosure frame (8) and secure with four screws (9), washers (10) and nuts (11).

(5) Install lines (12) and (13) and tighten fitting nuts (14) and (15).

(6) Install lines (16) and tighten fitting nuts (17).

(7) Install lines (18) and (19) and tighten fitting nuts (20) and (21).

(8) Install line (22) and tighten fitting nut (23).

(9) Install two dump valves and silencers OEX-038 (24) and OEX-037 (25). Refer to para. 5-35.

(10) Install fitting (26) secure manifold (27).

(11) Open isolator valves ALP-014 (28), ALP-016 (29), ALP-015 (30) and ALP-013 (31).

(12) Open high pressure oxygen isolation valve (32) and oxygen bottle valves.

(13) Pressurize system and check for leaks and proper operation.

(14) Remove two pins (33), supports (34), close enclosure door (35) and secure with two latches (36).

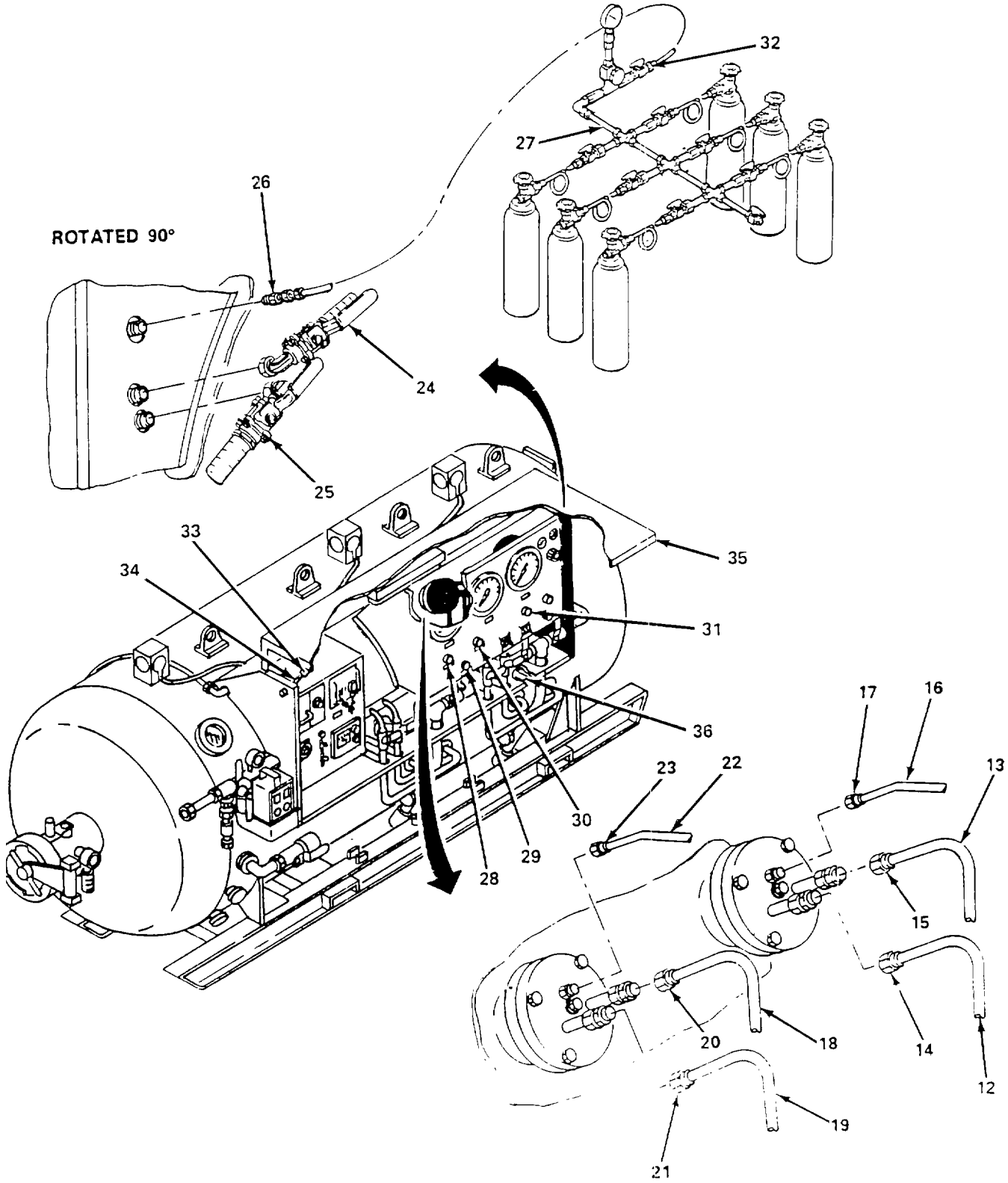


Figure 5-62. 0_2 and Air Piping, Installation (Sheet 2 of 2).

5-41. Air Supply Manifold.

This task covers: Replace

INITIAL SETUP

Tools

General Mechanic's Tool Kit

(NSN 5180-00-177-7033)

Materials/Parts

Air Supply Manifold
Pipe Clamp
Valve 3/4 in.
Tubing 3/4 in. (Stainless Steel)

Materials/Parts (Cont)

Preformed Packing
Lubricant (Item 13, Appendix E)
Bands, Rubber (Item 4, Appendix E)
Bags, Plastic (Item 3, Appendix E)
Tape, Teflon (Item 21, Appendix E)

Equipment Condition

Chamber shut down (para. 2-15).

Replace. (figure 5-63)

WARNING

To prevent the spread of disease, serious injury and/or death, oxygen breathing systems must be maintained hygienically clean and free from dust, dirt, and all hydrocarbon contamination. Refer to oxygen system prework procedures para. 4-10 to avoid violating this warning.

CAUTION

Use two wrenches to remove and install all piping components to avoid damage.

NOTE

Ensure system is depressurized prior to beginning this task.

(1) Unlatch two latches (1), open enclosure door (2) and install two supports (3) and pins (4).

(2) Remove six nuts (5), lockwashers (6), and screws (7) and remove enclosure manifold tray (8) and angle (9).

(3) Remove two fittings (10), tee (11), and fitting (12).

(4) Remove two low pressure air supply valves (13) and (14).

(5) Remove low pressure air supply gage (15).

(6) Remove elbow (16), fitting (17), elbow (18), nipple (19), tee (20), elbow and fitting (21), and reducer (22).

(7) Remove six nuts (23) and washers (24), and remove three U-bolts (25) from brackets (26).

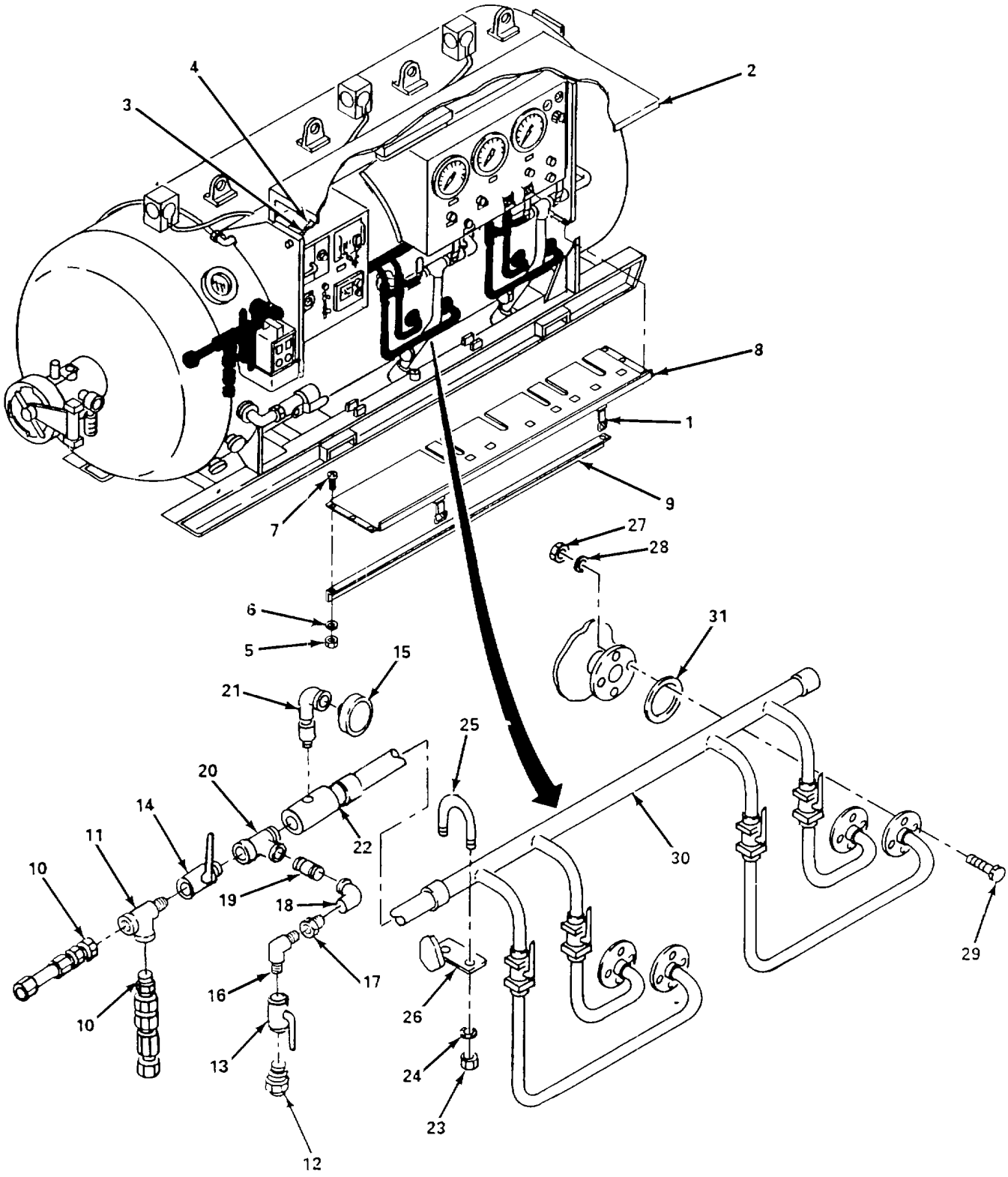


Figure 5-63. Air Supply Manifold, Replace.

(8) Remove 16 nuts (27), washers (28), and bolts (29) and remove air supply manifold (30) and four preformed packings (31).

(9) Install air supply manifold (30) and four preformed packings (31) and secure with 16 bolts (29), washers (28) and nuts (27).

(10) Install three U-bolts (25) on bracket (26) and secure with six washers (24) and nuts (23).

WARNING

Leave 1 1/2 threads exposed on fitting when applying teflon tape. This will ensure that no teflon tape will hang down inside the air system. Teflon tape should be wrapped in such a manner that when the fitting is tightened the tape will not loosen. Failure to wrap teflon tape correctly may result in contamination or blockage of the air system and subsequent possible injury or death to the diver.

(11) Apply teflon tape to all pipe threads.

(12) Install reducer (22), elbow and fitting (21), tee (20), nipple (19), elbow (18), fitting (17), and elbow (16).

(13) Install low pressure air supply gage (15).

(14) Install two low pressure air supply valves (13) and (14).

(15) Install two fittings (10), tee (11), and fitting (12).

(16) Install angle (9) and enclosure manifold way (8) and secure with six screws (7), lockwashers (6), and nuts (5).

(17) Pressurize system and check for leaks.

(18) Remove two pins (4), supports (3), close enclosure door (2), and secure with two latches (1).

5-42. Ball Valves ¾ Inch (Air Supply Manifold).

This task covers: Replace **b. Repair**

INITIAL SETUP

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Ball Valve 3/4 inch
Valve Kit

Materials/Parts (Cont)

Bands, Rubber (Item 4, Appendix E)
Bags, Plastic (Item 3, Appendix E)
Tape, Teflon (Item 21, Appendix E)
Cloth, Lint Free (Item 6, Appendix E)
Detergent, Nonionic (Item 8, Appendix E)
Distilled Water (Item 9, Appendix E)

a. Replace. (figure 5-64)

WARNING

To prevent the spread of disease, serious injury and/or death, oxygen breathing systems must be maintained hygienically clean and free from dust, dirt, and all hydrocarbon contamination. Refer to oxygen system prework procedures para. 4-10 to avoid violating this warning.

CAUTION

Use two wrenches to remove and install all piping components to avoid damage.

NOTE

This procedure is typical for all 3/4 inch valves on the air supply manifold. Remove only the suspected faulty valve. It is not necessary to remove the entire air supply manifold to replace a valve.

(1) Hold connector (1) of valve (2) and remove pipe (3).

(2) Remove valve (2).

(3) Hold connector (4) of valve (5) and remove pipe (3).

(4) Remove valve (5).

(5) Hold connector (7) of valve (8) and remove pipe (9).

(6) Remove valve (8).

(7) Hold connector (10) of valve (11) and remove pipe (12).

(8) Remove valve (11).

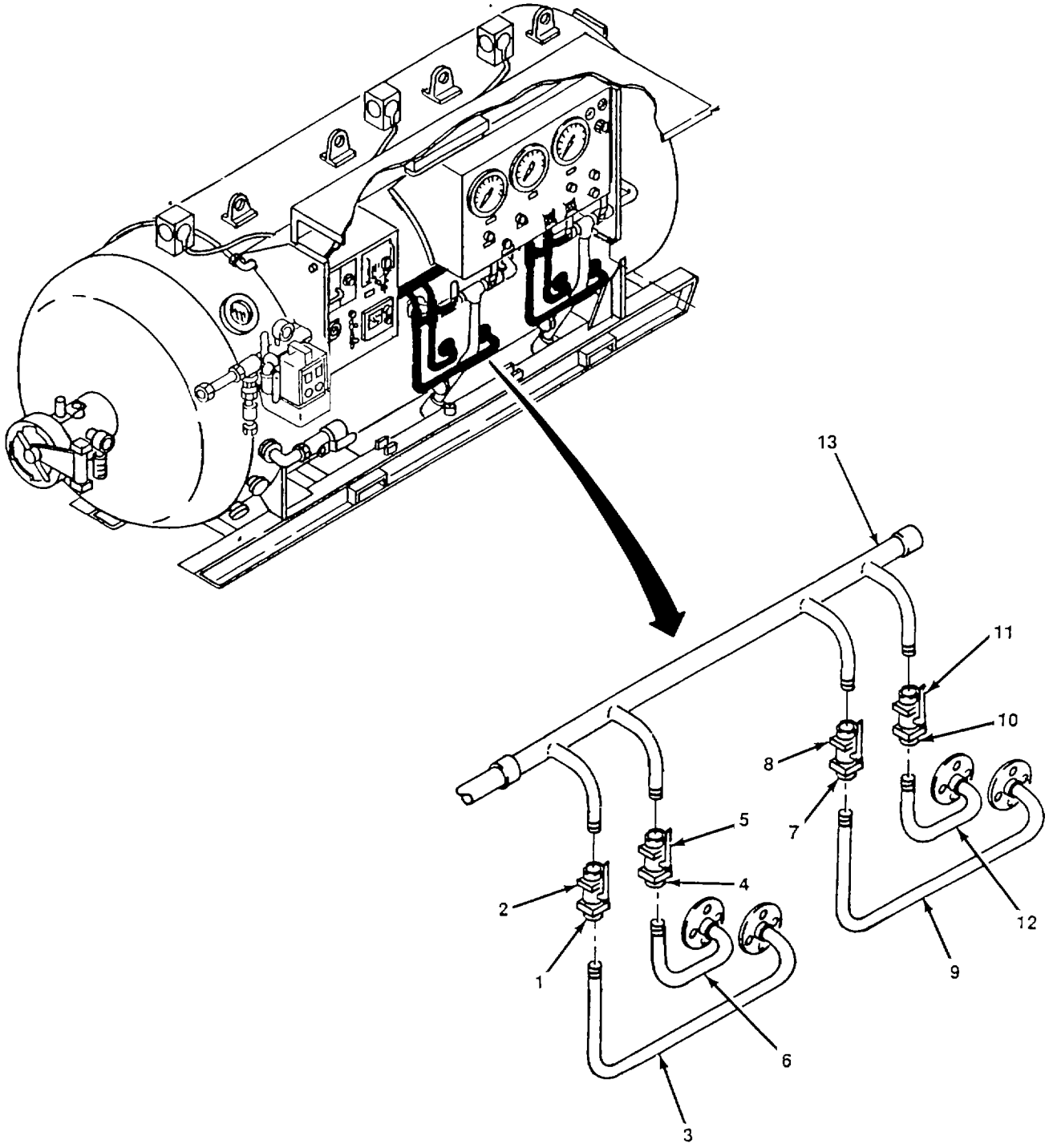


Figure 5-64. Ball Valve 3/4 Inch, Replace.

5-42. Ball Valves 3/4 Inch (Air Supply Manifold) (Cont).

WARNING

Leave 1 1/2 threads exposed on fitting when applying teflon tape. This will ensure that no teflon tape will hang down inside the air system. Teflon tape should be wrapped in such a manner that when the fitting is tightened the tape will not loosen. Failure to wrap teflon tape correctly may result in contamination or blockage of the air system and subsequent possible injury or death to the diver.

(9) Apply teflon tape to all pipe threads.

(10) Install valve (11) and pipe (12) on manifold (13).

(11) Install valve (8) and pipe (9) on manifold (13).

(12) Install valve (5) and pipe (6) on manifold (13).

(13) Install valve (2) and pipe (3) on manifold (13).

(14) Pressurize system and check for leaks.

b. Repair. (figure 5-65)

NOTE

There are four ball valves. The repair of each valve is the same.

(1) Remove ball valves (para. a. above).

(2) Remove four nuts (1), bolts (2), connectors (3) and (4), and indicator tag (5) from valve body (6).

(3) Remove and discard two teflon seats (7).

(4) Remove ball (8) from valve body (6).

(5) Remove lever nut (9) and handle (10) from valve body (6).

(6) Remove gland nut (11) from stem (12).

(7) Remove and discard two teflon packings (13) and remove stem (12).

(8) Clean all components using nonionic detergent cleaner and rinse with clean distilled water.

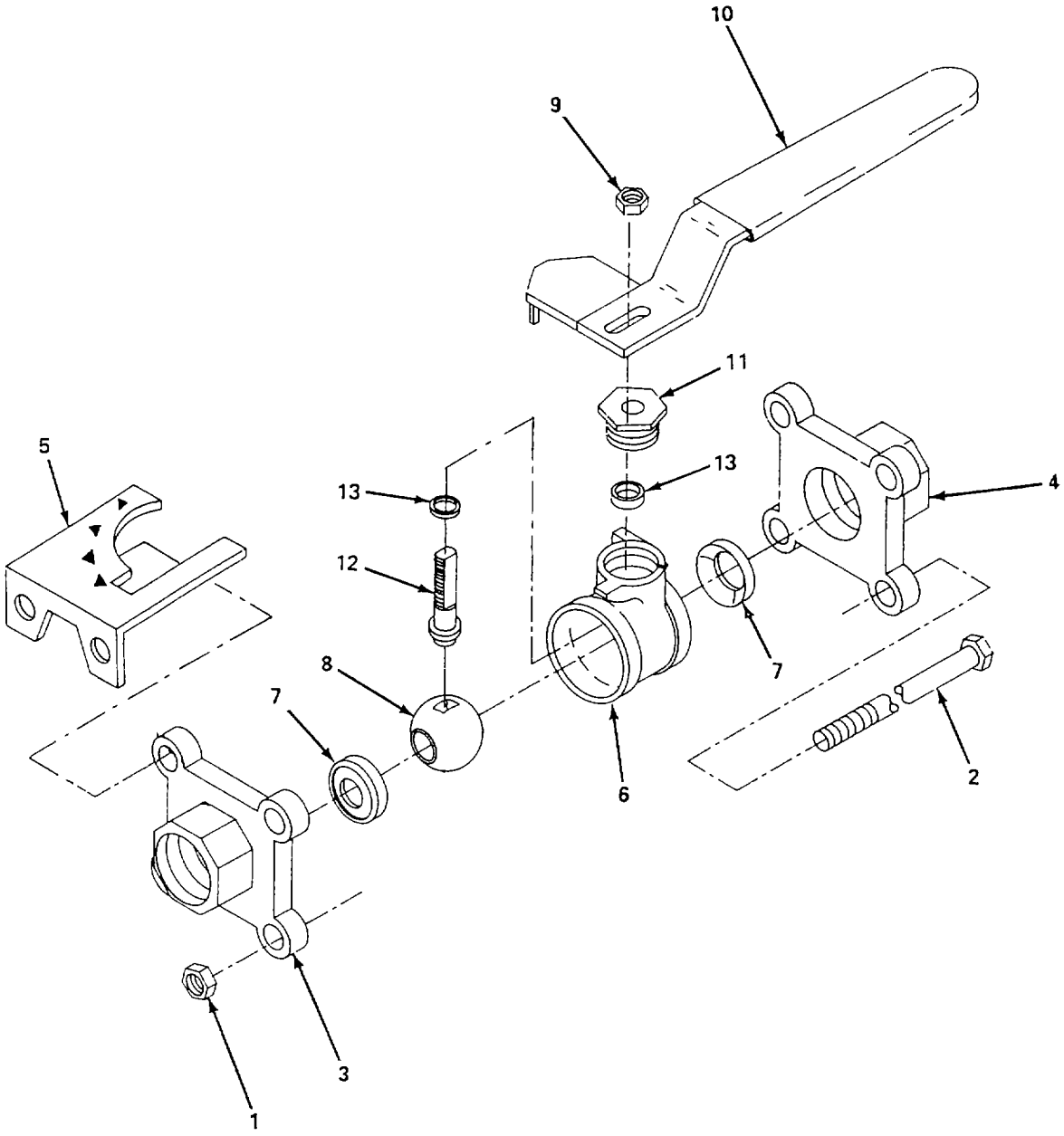


Figure 5-65. Ball Valve 3/4 Inch, Repair.

(9) Inspect all items and replace all items that are bent, cracked, worn, or otherwise damaged.

(10) Install teflon packing (13) in valve body (6).

(11) Install stem (12) into valve body (6) and place teflon packing (13) onto stem.

(12) Install gland nut (11) on stem (12).

(13) Install handle (10) onto stem (12) and secure with lever nut (9).

(14) Install ball (8) and two teflon seats (7) in body valve (6).

(15) Install connectors (3) and (4) and indicator tag (5) and secure with four bolts (2) and nuts (1).

(16) Install ball valve (para. a. above).

5-43. Ball Valves 1 Inch (Air Supply Manifold).

This task covers: Replace **b. Repair**

INITIAL SETUP

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Ball Valve 1 inch
Ball Seats (2)

Materials/Parts (Cont)

Bands, Rubber (Item 4, Appendix E)
Bags, Plastic (Item 3, Appendix E)
Tape, Teflon (Item 21, Appendix E)
Cloth, Lint Free (Item 6, Appendix E)
Detergent, Nonionic (Item 8, Appendix E)
Distilled Water (Item 9, Appendix E)

a. Replace. (figure 5-66)

WARNING

To prevent the spread of disease, serious injury and/or death, oxygen breathing systems must be maintained hygienically clean and free from dust, dirt, and all hydrocarbon contamination. Refer to oxygen system prework procedures para. 4-10 to avoid violating this warning.

CAUTION

Use two wrenches to remove and install all piping components to avoid damage .

NOTE

This procedure is typical for both 1 inch valves on the air supply manifold. Remove only the suspected faulty valve. It is not necessary to remove the entire air supply manifold to replace a valve.

(1) Remove two fittings (1), tee (2), and fitting (3).

(2) Remove two valves (4).

WARNING

Leave 1 1/2 threads exposed on fitting when applying teflon tape. This will ensure that no teflon tape will hang down inside the air system. Teflon tape should be wrapped in such a manner that when the fitting is tightened the tape will not loosen. Failure to wrap teflon tape correctly may result in contamination or blockage of the air system and subsequent possible injury or death to the diver.

(3) Apply teflon tape to all pipe threads.

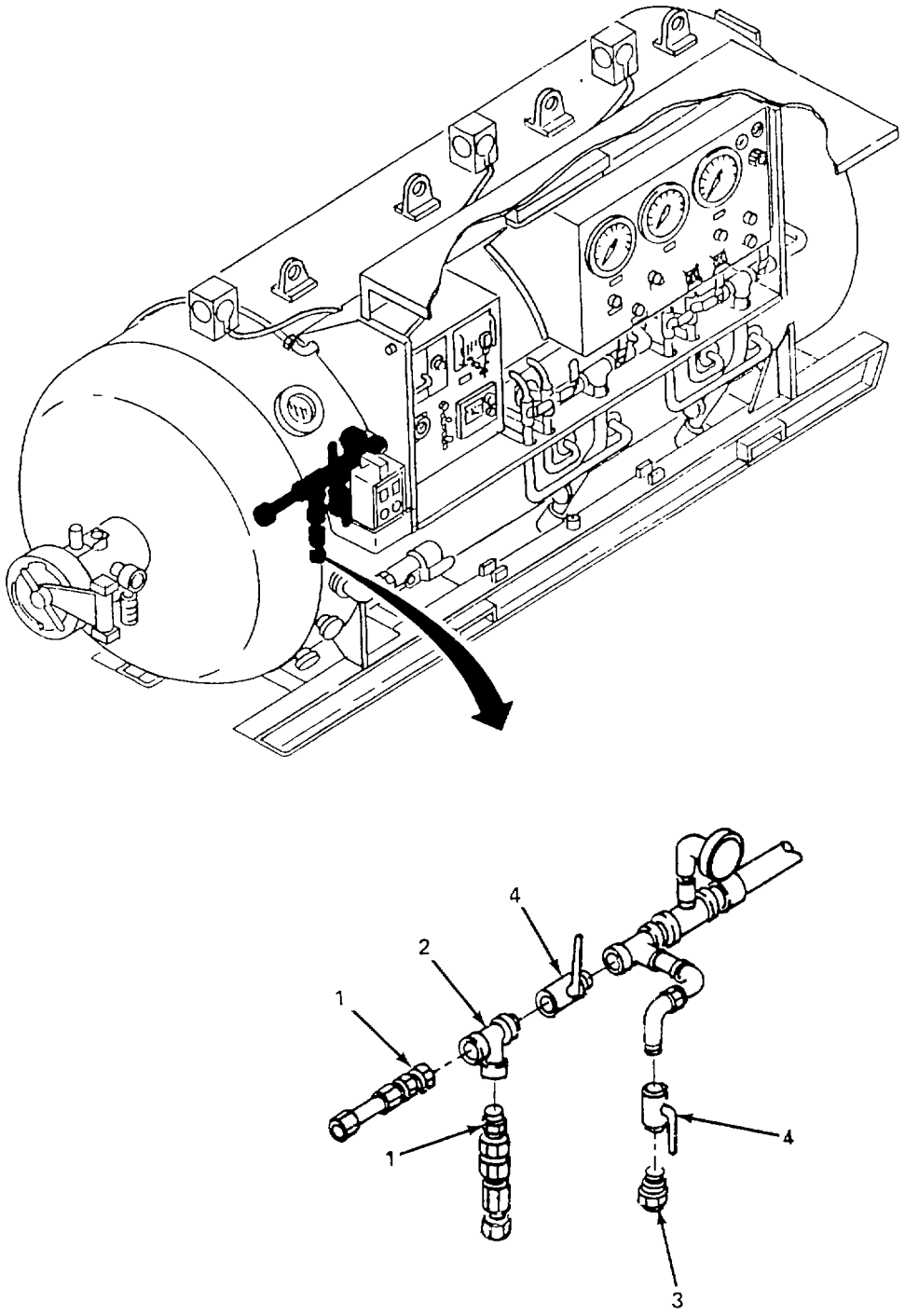


Figure 5-66. Ball Valve 1 Inch, Replace.

5-43. Ball Valves 1 Inch (Air Supply Manifold) (Cont).

(4) Install two valves (4), fitting (3), tee (2), and two fittings (1).

(5) Pressurize system and check for leaks.

b. Repair. (figure 5-67)

NOTE

There are two ball valves. The repair of each valve is the same.

(1) Remove ball valves (para. a. above).

(2) Remove nut (1) and lever and grip (2).

(3) Remove gland nut (3), stem bearing (4), stem (5) and stem packing (6). Discard packing.

(4) Remove retainer (7), ball seat (8), valve ball (9) and ball seat (10) from valve body (11). Discard ball seats.

(5) Clean all components using nonionic detergent cleaner and rinse with clear distilled water.

(6) Inspect all items and replace all items that are bent, cracked, worn or otherwise damaged.

(7) Install ball seat (10), valve ball (9), ball seat (8) in valve body (11) and secure with retainer (7).

(8) Install stem packing (6) on valve body (11).

(9) Install stem (5) and stem bearing (4) and secure with gland nut (3).

(10) Install lever and grip (2) on stem (5) and secure with nut (1).

(11) Install ball valve (para. a. above).

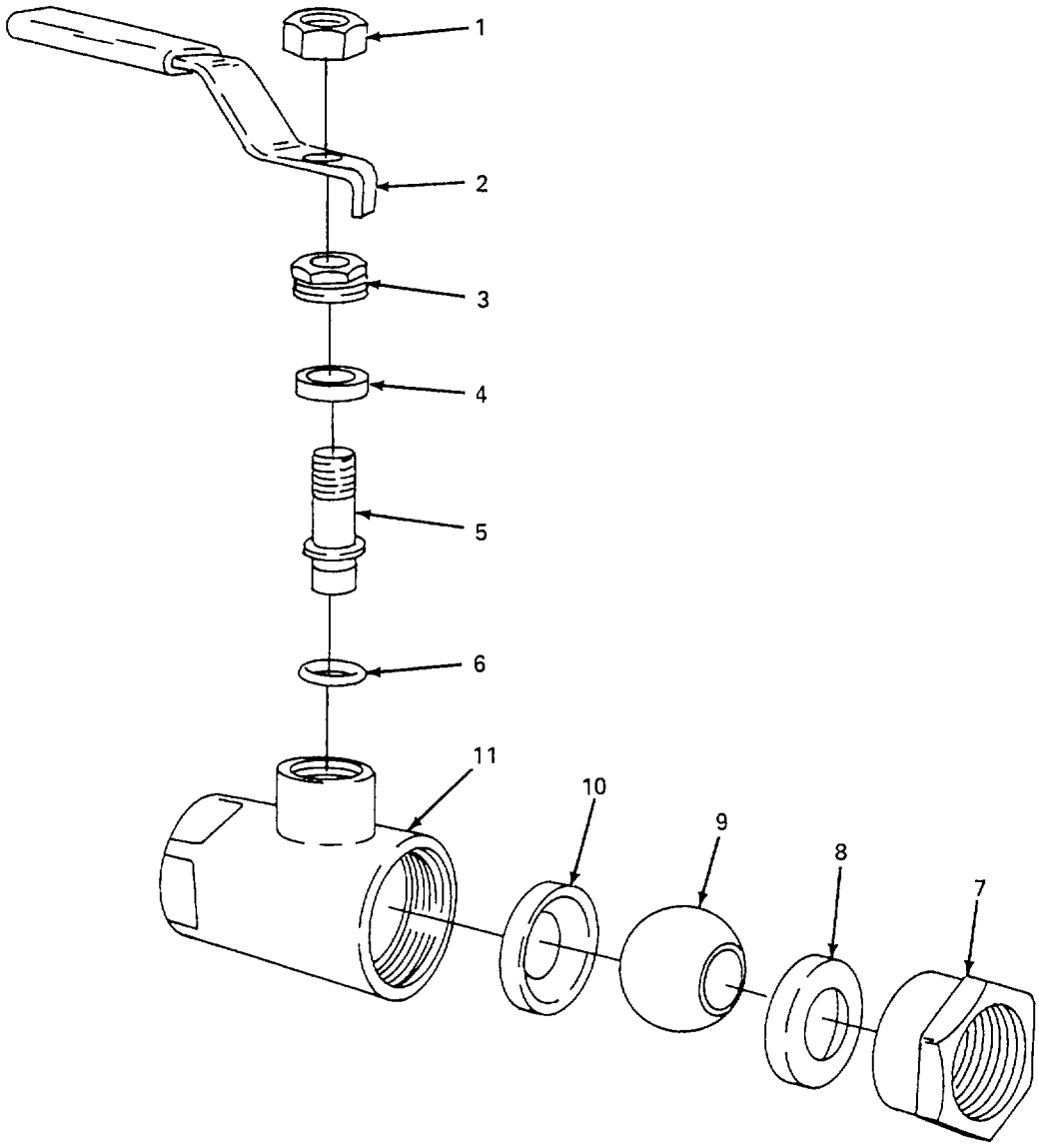


Figure 5-67. Ball Valve 1 Inch, Repair.

5-44. Air Exhaust Manifold.

This task covers: Replace

INITIAL SETUP

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Manifold
Preformed Packing
Grease, Halocarbon (Item 13, Appendix E)

Materials/Parts (Cont)

Bands, Plastic (Item 4, Appendix E)
Bags, Plastic (Item 3, Appendix E)

Equipment Condition

Chamber shut down (para. 2-15).
Air supply manifold removed (para. 5-41).

Replace. (figure 5-68)

WARNING

To prevent the spread of disease, serious injury and/or death, oxygen breathing systems must be maintained hygienically clean and free from dust, dirt, and all hydrocarbon contamination. Refer to oxygen system prework procedures para. 4-10 to avoid violating this warning.

CAUTION

Use two wrenches to remove and install all piping components to avoid damage.

NOTE

Ensure system is depressurized, prior to beginning this task. There are two air exhaust manifolds. The replacement of each manifold is the same.

(1) Remove two nuts (1), washer (2), and U-bolt (3).

(2) Remove four nuts (4), bolts (5) and remove air exhaust manifold (6) and preformed packing (7).

(3) Install air exhaust manifold (6) and preformed packing (7), and secure with four bolts (5), and nuts (4).

(4) Install U-bolt (3) on bracket (8) and secure with two washers (2) and nuts (1).

(5) Pressurize system and check for leaks.

FOLLOW-ON MAINTENANCE
Install air supply manifold (para. 5-41).

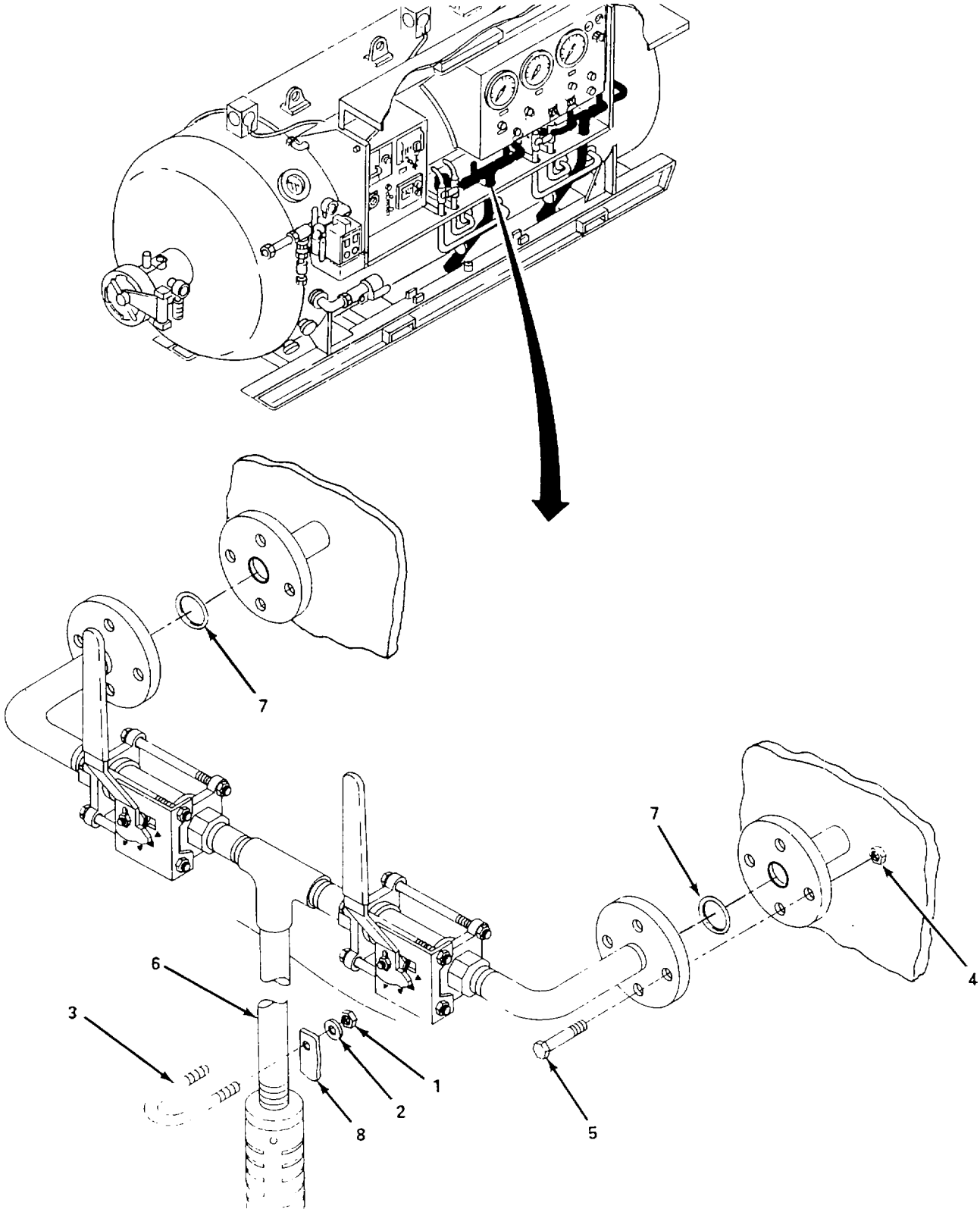


Figure 5-68. Air Exhaust Manifold, Replace.

5-45. Ball Valves 1 1/4 Inch (Air Exhaust Manifold).

This task covers: a. Replace b. Repair

INITIAL SETUP

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Ball Valve 1 1/4 Inch
Valve Kit
Detergent, Nonionic (Item 8, Appendix E)
Distilled Water (Item 9, Appendix E)

Materials/Parts (Cont)

Cloth, Lint Free (Item 6, Appendix E)
Bands, Plastic (Item 4, Appendix E)
Bags, Plastic (Item 3, Appendix E)
Tape, Teflon (Item 21, Appendix E)

Equipment Condition

Air exhaust manifold removed (para. 5-44).

Replace. (figure 5-69)

WARNING

To prevent the spread of disease, serious injury and/or death, oxygen breathing systems must be maintained hygienically clean and free from dust, dirt, and all hydrocarbon contamination. Refer to oxygen system prework procedures para. 4-10 to avoid violating this warning.

CAUTION

Use two wrenches to remove and install all piping components to avoid damage.

(1) Hold connector (1) and remove pipe (2).

(2) Remove valve (3) from manifold (4).

(3) Hold connector (5) and remove pipe (6).

(4) Remove valve (7) from manifold (4).

WARNING

Leave 1 1/2 threads exposed on fitting when applying teflon tape. This will ensure that no teflon tape will hang down inside the air system. Teflon tape should be wrapped in such a manner that when the fitting is tightened the tape will not loosen. Failure to wrap teflon tape correctly may result in contamination or blockage of the air system and subsequent possible injury or death to the diver.

(5) Apply teflon tape to all pipe threads.

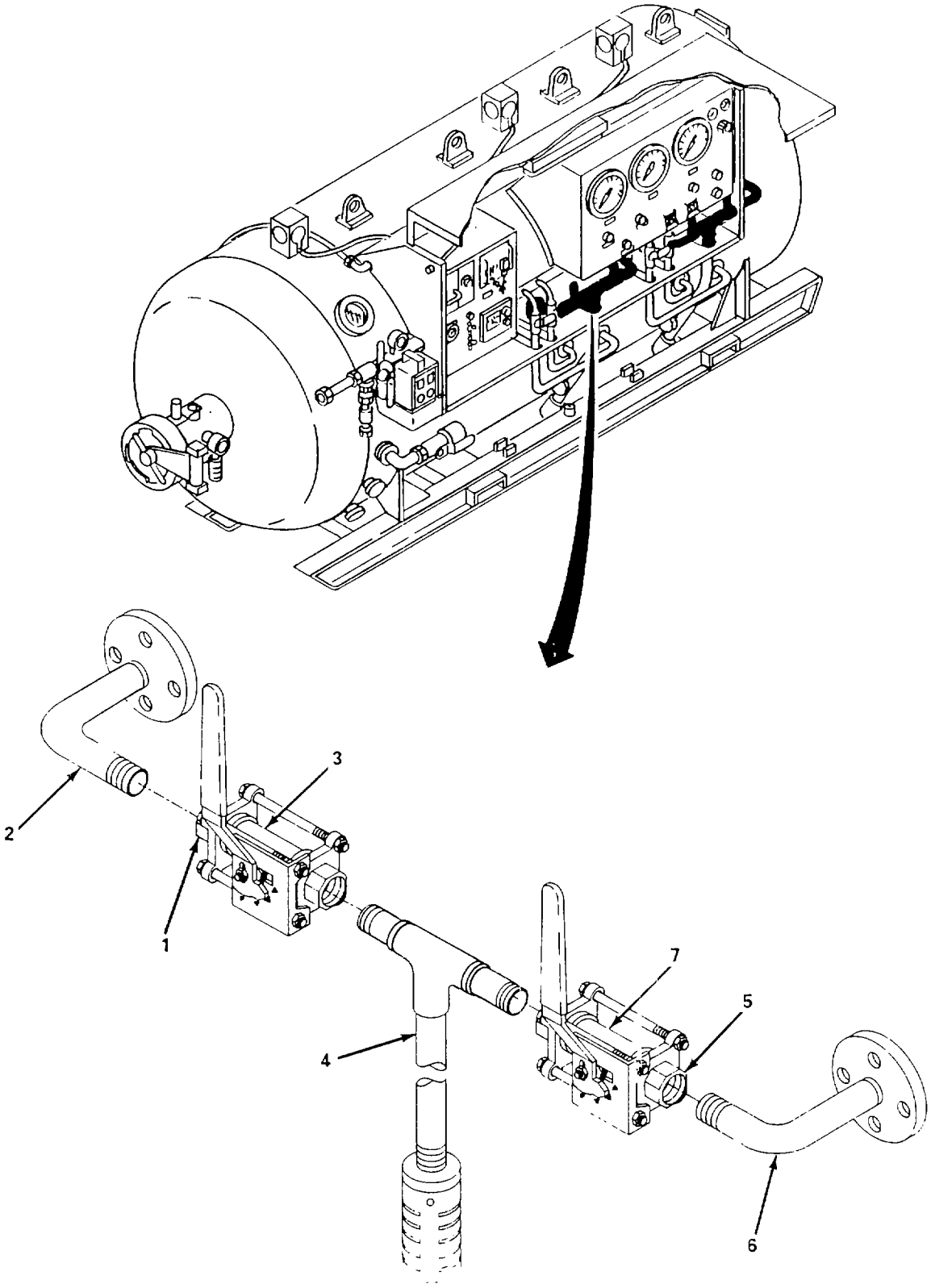


Figure 5-69. Ball Valve 1 1/4 Inch, Replace.

5-45. Ball Valves 1 1/4 Inch (Air Exhaust Manifold) (Cont).

(6) Install valve (7) and pipe (6) on manifold (4).

(7) Install valve (3) and pipe (2) on manifold (4).

b. Repair. (figure 5-70).

NOTE

There are six ball valves. The repair of each valve is the same.

(1) Remove ball valve (para. a. above).

(2) Remove four nuts (1), bolts (2), connector (3) and (4), and indicator tag (5) from valve body (6).

(3) Remove and discard two teflon seats (7).

(4) Remove ball (8) from valve body (6).

(5) Remove lever nut (9) and handle (10) from valve body (6).

(6) Remove gland nut (11) from stem (12) and remove stem (12).

(7) Remove and discard two teflon packings (13).

(8) Clean all components using nonionic detergent cleaner and rinse with clean distilled water.

(9) Inspect all items and replace all items that are bent, cracked, worn, or otherwise damaged.

(10) Place one teflon packing (13) onto stem (12) and install stem (12) into valve body (6).

(11) Install second teflon packing (13) in valve body (6).

(12) Install gland nut (11) on stem (12).

(13) Install handle (10) onto stem (12) and secure with lever nut (9).

(14) Install ball (8) and two teflon seats (7) in body valve (6).

(15) Install connectors (3) and (4) and indicator tag (5) and secure with four bolts (2) and nuts (1).

(16) Install ball valve (para. a. above).

FOLLOW-ON MAINTENANCE
Install air exhaust manifold (para. 5-44).

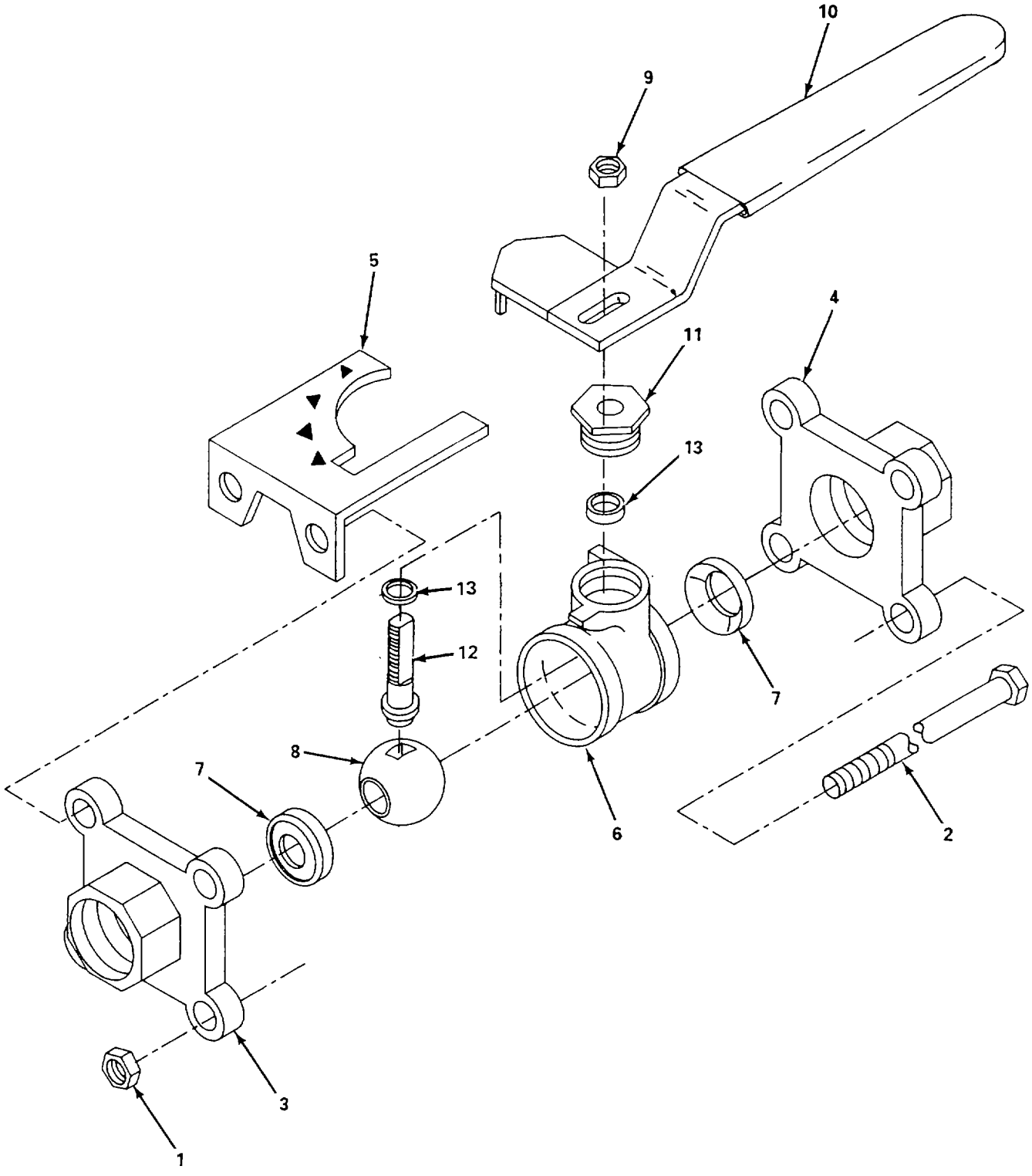


Figure 5-70. Ball Valve 1 1/4 Inch, Repair.

5-46. Depth Gages.

This task covers: Replace

INITIAL SETUP

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Depth Gage
Bands, Rubber (Item 4, Appendix E)

Materials/Parts (Cont)

Bags, Plastic (Item 3, Appendix E)
Tape, Teflon (Item 21, Appendix E)

Equipment Condition

Chamber shut down (para. 2-15)

Replace. (figure 5-71)

WARNING

To prevent the spread of disease, serious injury and/or death, oxygen breathing systems must be maintained hygienically clean and free from dust, dirt, and all hydrocarbon contamination. Refer to oxygen system prework procedures para. 4-10 to avoid violating this warning.

NOTE

There are three depth gages. Replacement of each gage is the same.

(1) Unlatch two latches (1), open enclosure door (2) and install two supports (3) and pins (4).

(2) Close isolator valve (5) to the depth gage (6).

(3) Disconnect fitting (7) from rear center of the depth gage (6).

CAUTION

Hold the depth gage securely in place as the last screw is removed. Do not crimp or bend tubing.

(4) Remove three nuts (8), lockwashers (9), and screws (10) and remove depth gage (6) from chamber control console (11).

(5) Remove adapter (12) from rear of depth gage (6).

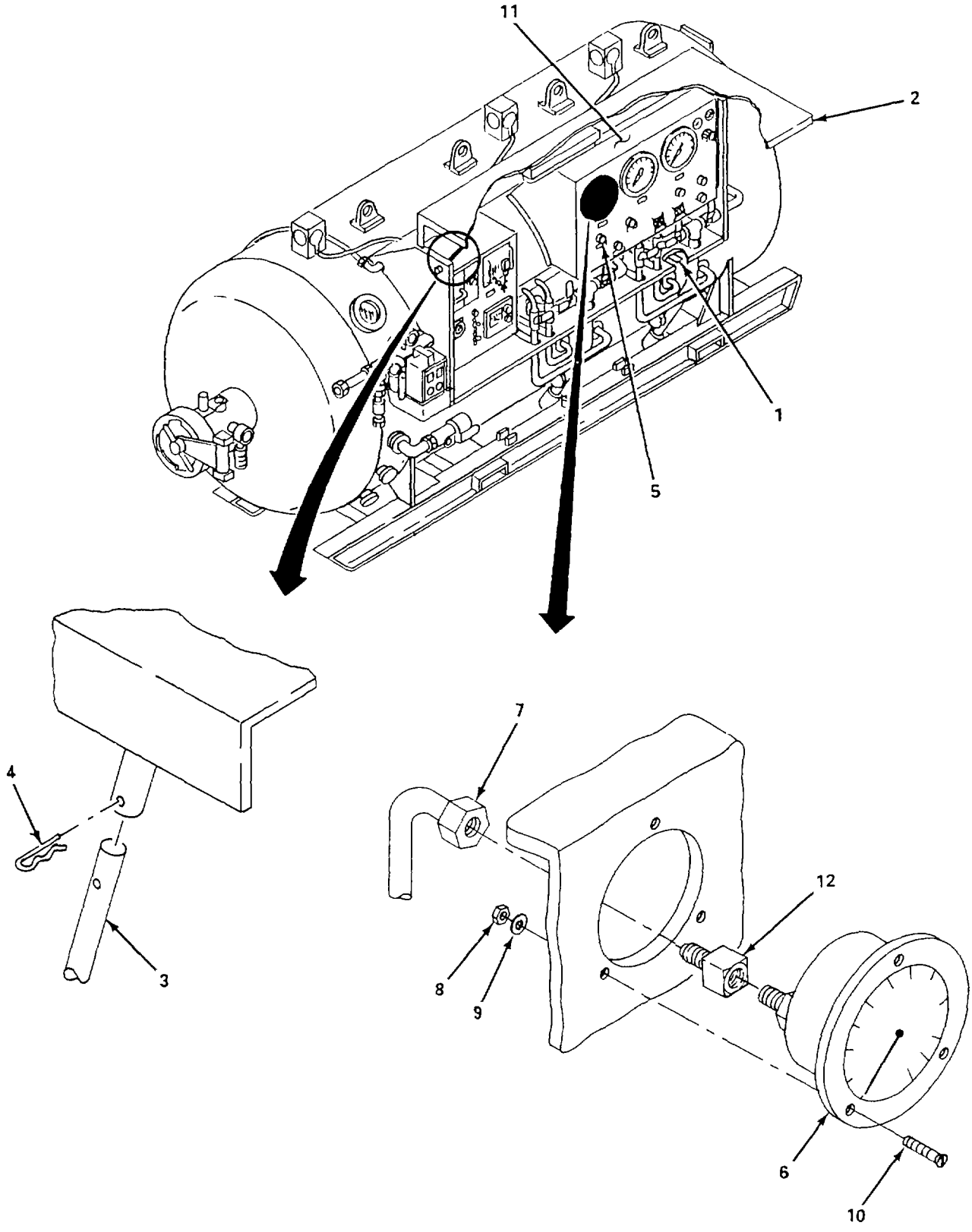


Figure 5-71. Depth Gages, Replace.

WARNING

Leave 1 1/2 threads exposed on fitting when applying teflon tape. This will ensure that no teflon tape will hang down inside the air system. Teflon tape should be wrapped in such a manner that when the fitting is tightened the tape will not loosen. Failure to wrap teflon tape correctly may result in contamination or blockage of the air system and subsequent possible injury or death to the diver.

(5) Apply teflon tape to all pipe threads.

(6) Install adapter (12) on new depth gage (6).

(7) Install gage (6) in place and hand tighten fitting (7) making sure not to cross-thread.

(8) Install three screws (10), lockwashers (9), and nuts (8).

(9) Tighten fitting (7) on depth gage (6).

(10) Open isolator valve (5) to depth gage (6).

(11) Remove two pins (4), supports (3), close enclosure door (2), and secure with two latches (1).

5-47. Caisson Gages.

This task covers: Replace

INITIAL SETUP

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Equipment Condition

Chamber shut down (para. 2-15).

Materials/Parts

Caison Gage

Replace. (figure 5-72)

NOTE

There are two caisson gages, one in the O/L and the other in the I/L. Replacement of each gage is the same.

(1) Remove three nuts (1), lockwashers (2), and screws (3).

(2) Remove caisson gage (4) from bracket (5).

(3) Install caisson gage (4) on bracket (5) and secure with three screws (3), lockwashers (2), and nuts (1).

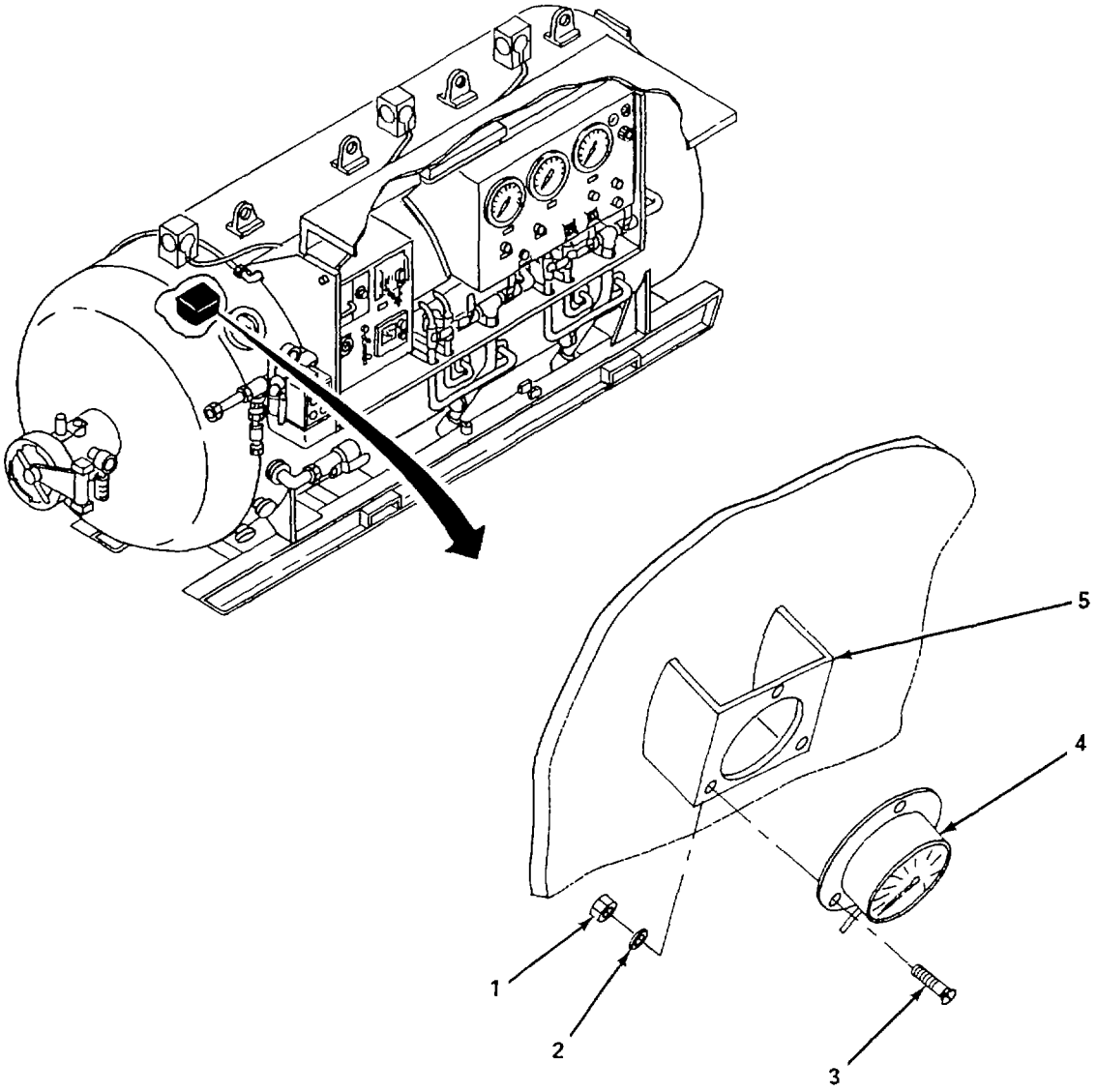


Figure 5-72. Caisson Gages, Replace.

CHAPTER 6

GENERAL SUPPORT MAINTENANCE INSTRUCTIONS

OVERVIEW

This chapter provides for maintenance of the 3-Person Recompression Chamber by General Support maintenance personnel.

Section I. REPAIR PARTS; SPECIAL TOOLS; TEST, MEASUREMENT, DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT

6-1. Special Tools, TMDE, and Support Equipment. For a listing of special tools, TMDE, and support equipment authorized for use on this equipment, refer to the Repair Parts and Special Tools List, TM 5-4220-227-24P and the maintenance allocation chart (MAC), appendix B of this manual.

6-2. Repair Parts. Repair parts are listed and illustrated in the Repair Parts and Special Tools List for 3-Person Recompression Chamber, TM 5-4220-227-24P.

Section II. GENERAL SUPPORT MAINTENANCE PROCEDURES

6-3. General. This section contains general support maintenance procedures as authorized by the MAC in appendix B of this manual.

6-4. Inner/Outer Lock Door Assembly.

This task covers: a. Replace b. Repair

INITIAL SETUP

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Inner/Outer Lock Door Assembly
Preformed Packing
Grease (Item 13, Appendix E)

Materials/Parts (Cont)

Cloth, Lint Free (Item 6, Appendix E)
Detergent, Nonionic (Item 8, Appendix E)
Distilled Water (Item 9, Appendix E)

Equipment Condition

Chamber shut down (para. 2-15).

a. Replace. (figure 6-1)

NOTE

Before beginning procedure, mark doors TOP and/or BOTTOM to aid in correct installation. The inner and outer lock doors are the same. Replacement of door is the same.

(1) Remove cotter pin (1) from hinge pin assembly (2). Discard cotter pin.

(2) Holding door assembly (3), remove hinge pin assembly (2) from bulkhead hinge block (4) and hinge assembly (5) along with hinge bushings (6) and (7). Discard worn bushings.

(3) Remove door assembly (3).

(4) Using lint free cloth, remove old grease from hinge pin assembly (2), hinge assembly (5) and bulkhead hinge block (4)

(5) Apply grease to bushings (6) and (7).

(6) Install bushings (6) and (7) in hinge assembly (5).

(7) Install hinge pin assembly (2) through bulkhead hinge block (4) and through hinge assembly (5).

(8) Install cotter pin (1) through hinge pin assembly (2).

(9) Lubricate and install new preformed packing (8).

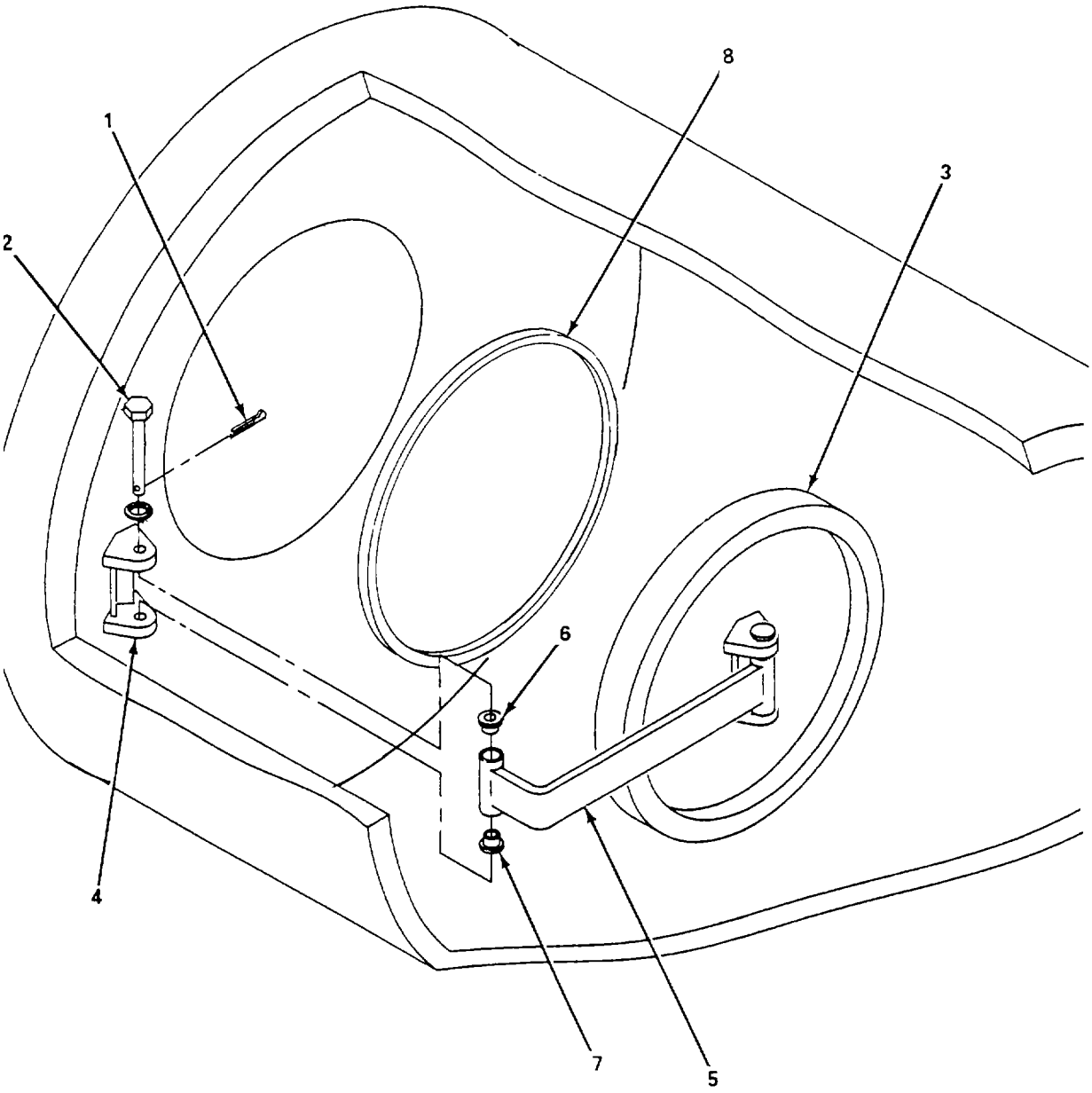


Figure 6-1. Inner/Outer Lock Door Assembly, Replace.

6-4. Inner/Outer Lock Door Assembly.

b. *Repair*. (figure 6-2)

(1) Remove door assembly (para. a. above).

(2) Remove cotter pin (1) and hinge pin assembly (2) from door assembly hinge block (3), and remove hinge assembly (4).

(3) Remove two bushings (5).

(4) Clean all components using nonionic detergent cleaner and rinse with clean distilled water.

(5) Inspect all items and replace all items that are bent, cracked, worn, or otherwise damaged.

(6) Apply grease to two bushings (5) and install in hinge assembly (4).

(7) Install hinge assembly (4) in door assembly hinge block (3) and install hinge pin assembly (2).

(8) Install cotter pin (1) in hinge pin assembly (2).

(9) Install door assembly (para. a. above).

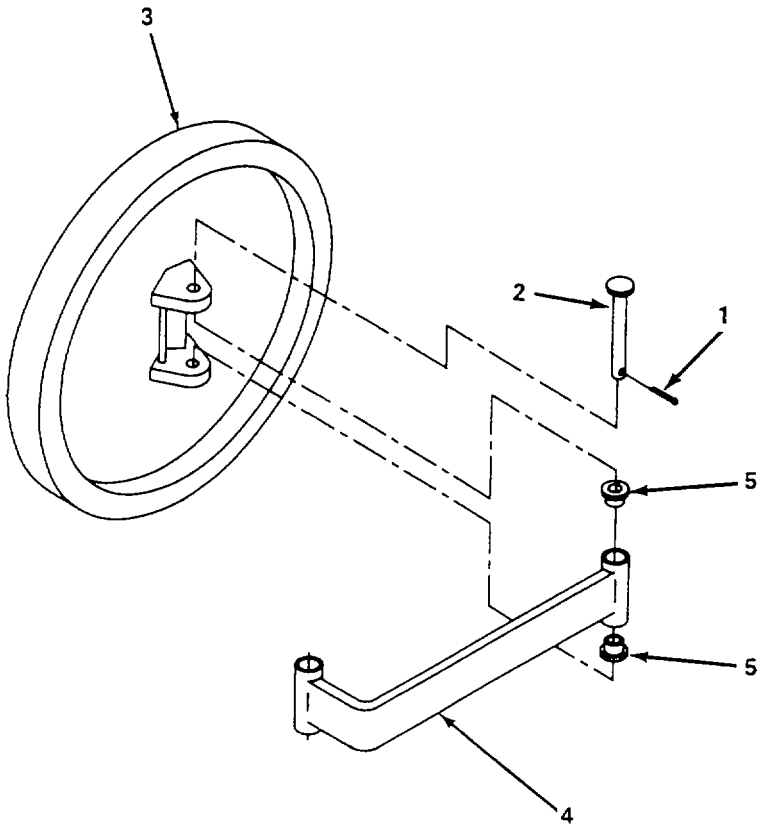


Figure 6-2. Inner/Outer Lock Door Assembly, Repair.

6-5. Medical Lock Assembly.

This task covers: Repair

INITIAL SETUP

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Medical Lock Assembly
Lock Pin Assembly
Distilled Water (Item 9, Appendix E)

Materials/Parts (Cont)

Preformed Packing
Cloth, Lint Free (Item 6, Appendix E)
Detergent, Nonionic (Item 8, Appendix E)

Equipment Condition

Medical lock shut down (para. 2-15).

Repair. (figure 6-3)

(1) Remove seal ring (1) from the medical lock assembly (2).

(2) Remove two preformed packings (3) from seal ring (1).

(3) Remove nut (4), lockwasher (5), and remove handle (6).

(4) Remove nut (7), lockwasher (8), two washers (9), and bolt (10) and remove lock pin (11) from lock arm (12).

(5) Remove screw (13), washers (14), lock arm (12), washer (15), and fitting (16).

(6) Clean all components using nonionic detergent cleaner and rinse with clean distilled water.

(7) Inspect all item and replace all items that are bent, cracked, worn, or otherwise damaged.

(8) Install fitting (16), washer (15), lock arm (12), washer (14), and screws (13).

(9) Install lock arm (12) in lock pin (11) and secure with bolt (10), two washers (9), lockwasher (8), and nut (7).

(10) Install handle (6) on lock pin (11) and secure with lockwasher (5) and nut (4).

(11) Install two preformed packings (3) on seal ring (1).

(12) Install seal ring (1) in medical lock assembly (2).

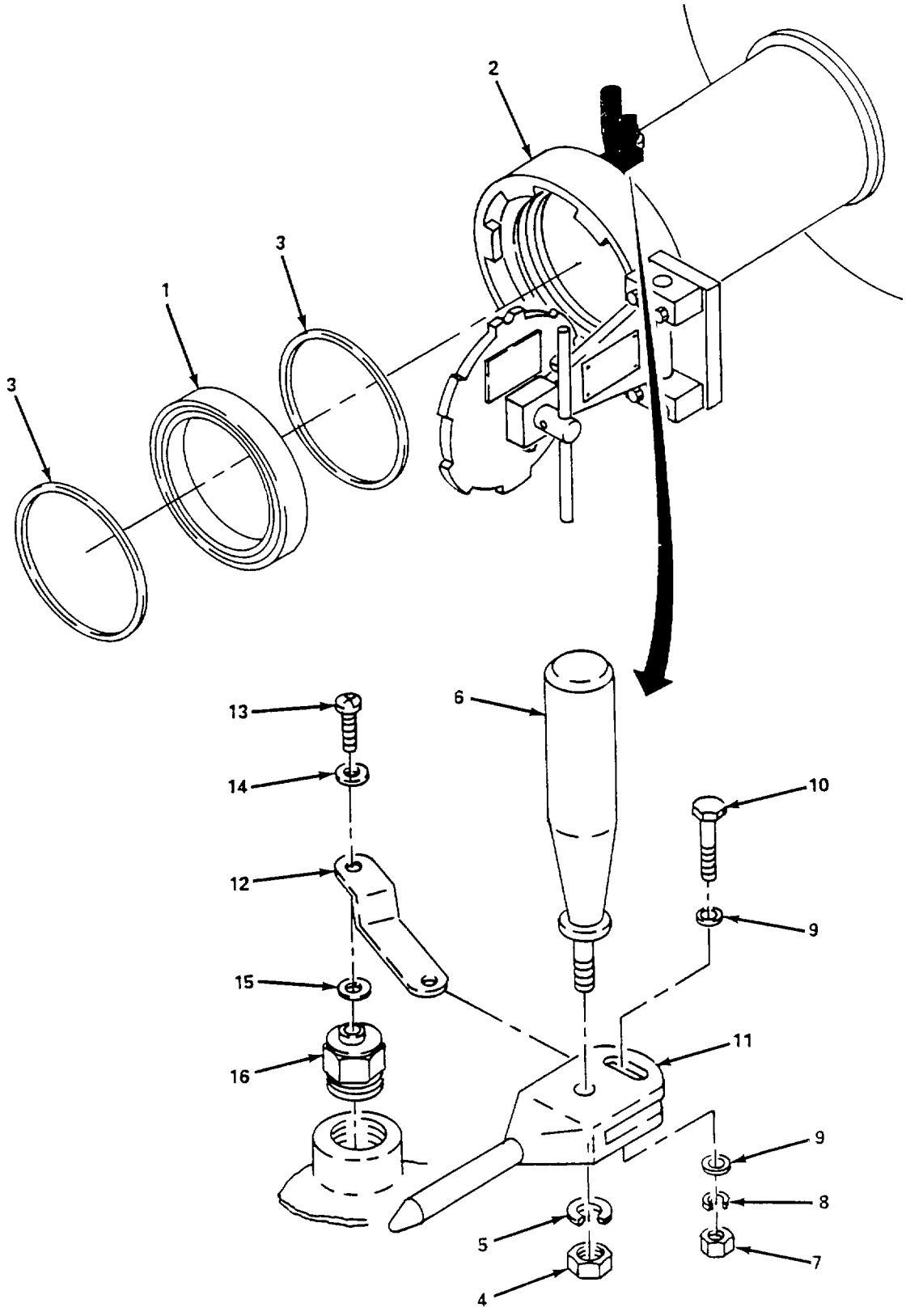


Figure 6-3. Medical Lock Assembly, Repair.

6-6. Calibration of Gages and Valves.

This task covers: Calibrate

Calibrate.

NOTE

This procedure applies to Depressurization Valve and Gage, Pressure Relief Valve, Pressure Gages 02 (HP/LP), Depth Gage and Caisson Gage.

All gages are calibrated according to TB 9-4220-216-35, Calibration Procedure for Pressure Gages used with Diving Equipment (General).

6-7. View Port Assembly.

This task covers: a. Replace b. Repair

INITIAL SETUP

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

View Port Assembly
Gasket
Preformed Packing
Detergent, Nonionic (Item 8, Appendix E)
Distilled Water (Item 9, Appendix E)

Materials/Parts (Cont)

Cloth, Lint Free (Item 6, Appendix E)
Halocarbon Grease (Item 13, Appendix E)

Personnel Required

Two

Equipment Condition

Chamber shut down (para. 2-15).

a. Replace. (figure 6-4)

NOTE

There are four view port assemblies. Replacement of each view port is the same.

(1) Remove eight screws (1), plate (2), and seal (3).

(2) Then have second person on outside, gently tap and/or push with his hand on view port assembly until person inside can remove window lens (4) and gasket (5) from mounting flange (6).

(3) Install gasket (5), window lens (4), and seal (3) on mounting flange (6).

(4) Install plate (2) and secure with eight screws (1).

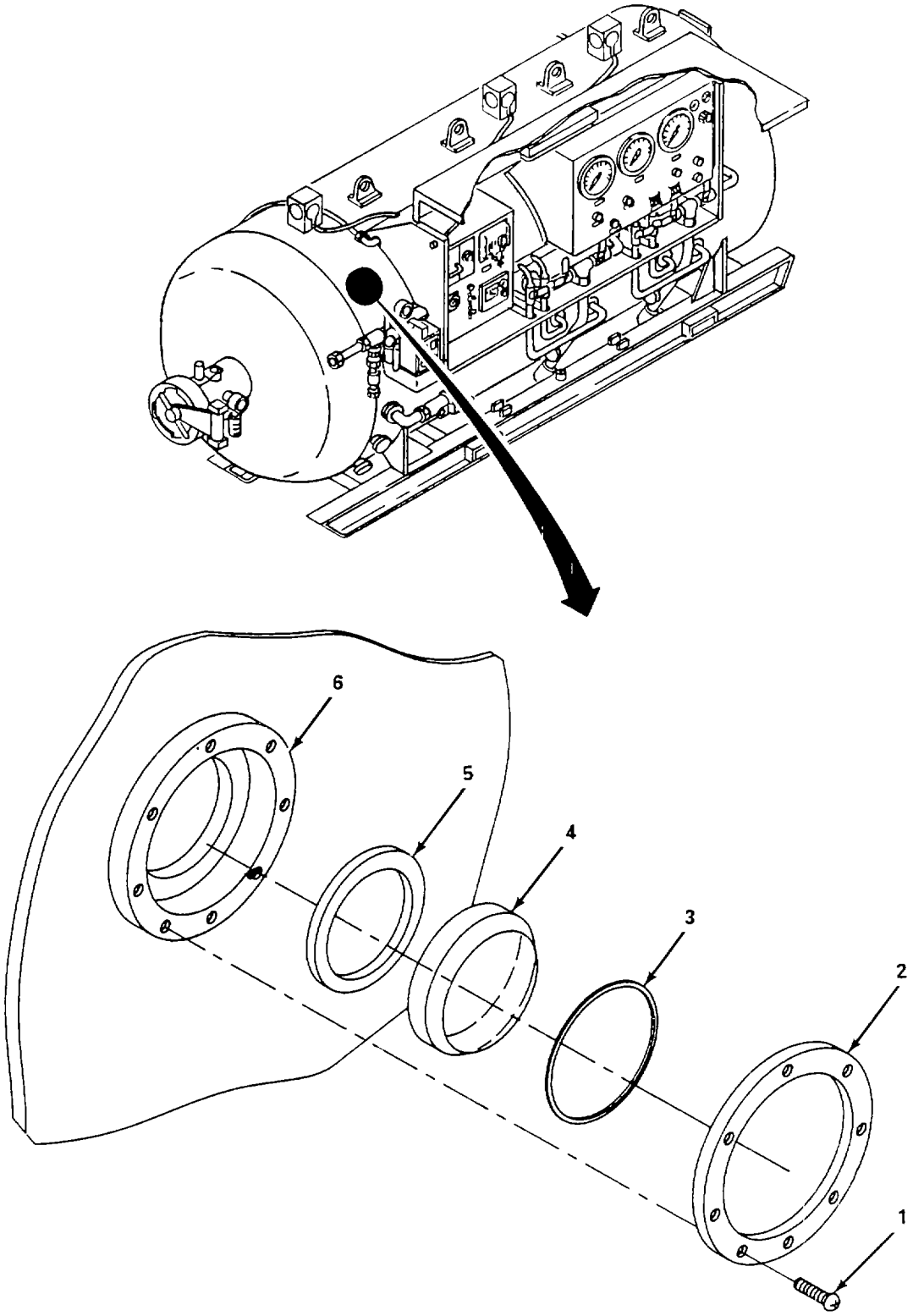


Figure 6-4. View Port Assembly, Replace.

6-7. View Port Assembly (Cont).

b. *Repair*. (figure 6-5)

NOTE

The view port assembly is disassembled to remove.

(1) Remove view port assembly (para. a. above).

(2) Clean all components using nonionic detergent cleaner and rinse with clean distilled water.

(3) Inspect mounting flange (1) and replace if bent, cracked, or otherwise damaged.

(4) Inspect window lens (2) for crack and replace if cracked or otherwise damaged.

(5) Apply grease to gasket (3) and preformed packing (4).

(6) Install view port assembly (para. a. above).

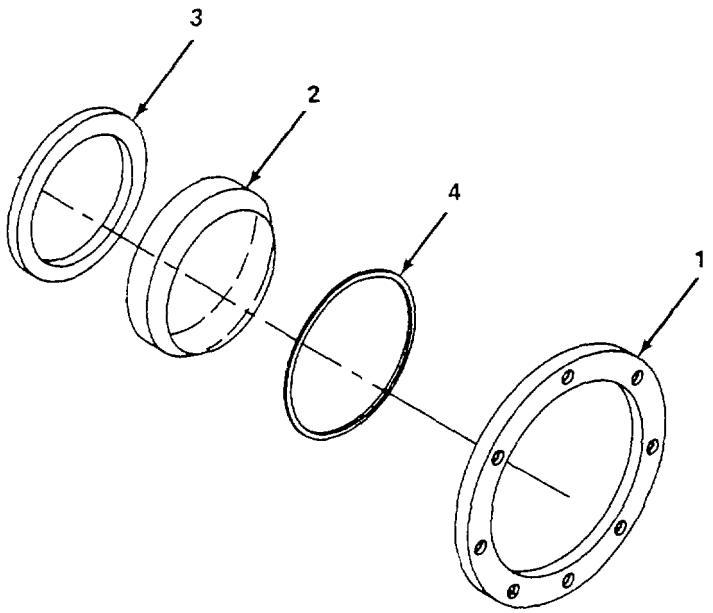


Figure 6-5. View Port Assembly, Repair.

6-8. Shell Penetrators.

This task covers:

a. Replace Electrical and Water Penetrator
b. Replace Oxygen Penetrator
c. Replace Electrical/O2 Penetrator
d. Replace Blank Penetrator
e. Repair Electrical and Water Penetrator
f. Repair Oxygen Penetrator
g. Repair Electrical/O2 Penetrator
h. Repair Blank Penetrator

INITIAL SETUP

Tools

General Mechanic's Tool Kit (NSN 5180-00-177-7033)
Soldering Gun

Materials/Parts

Blank Penetrator
Gasket
Preformed Packing
Cloth, Lint-Free (Item 6, Appendix E)
Grease (Item 13, Appendix E)

Materials/Parts (Cont)

Detergent, Nonionic (Item 8, Appendix E)
Distilled, Water (Item 9, Appendix E)

Personnel Required

Two

Equipment Condition

Chamber shut down (para. 2-15).
Water valves removed (para. 4-30).

a. <u>*Replace Electrical and Water Penetrator*</u>. (figure 6-6)

(1) Remove two screws (1) and remove cover (2) from junction box (3).

(2) Remove two screws (4) and remove cover (5) from conduit elbow (6).

(3) Tag and disconnect wires from junction box (3) and from conduit elbow (6).

(4) Remove conduit elbow (6) from fitting (7).

(5) Remove self-locking nuts (8) and remove junction box (3).

(6) Remove two fittings (7) and preformed packing (9) from two fittings (10).

(7) Remove two fittings (10) from penetrator plate (11).

(8) Remove two fittings (12) from penetrator plate (11).

(9) Loosen two fitting nuts (13) and remove lines (14).

(10) Remove two elbows (15) from penetrator plate (11).

(11) Remove eight screws (16) and remove mounting flange (17) and preformed packing (18).

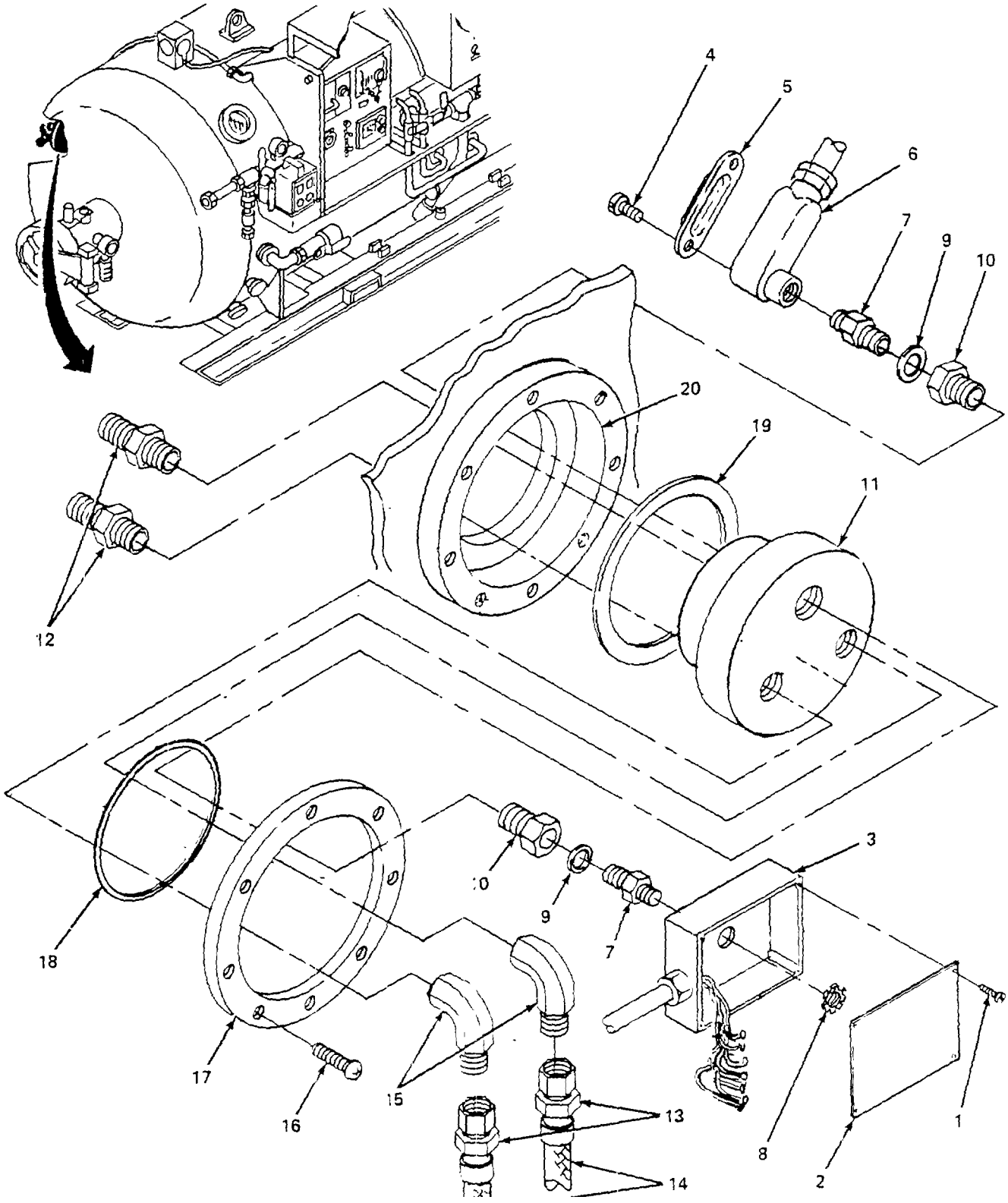


Figure 6-6. Electrical and Water Penetrator, Replace.

6-8. Shell Penetrators (Cont).

(12) Have mechanic outside tapping and/or pushing with his hand on penetrator plate (11) inward so that penetrator plate can be removed from inside of chamber.

(13) Remove and discard gasket (19).

(14) Install gasket (19) in penetrator flange (20).

(15) Install penetrator plate (11) and preformed packing (18).

(16) Install mounting flange (17) and secure with eight screws (16).

(17) Install two elbows (15) on penetrator plate (11).

(18) Install two lines (14) and tighten fitting nuts (13).

(19) Install two fittings (12) on penetrator plate (11).

(20) Install two fittings (10), preformed packing (9), and fitting (7) on penetrator plate (11).

(21) Install junction box (3) and secure with self-locking nut (8).

(22) Install conduit elbow (6) on fitting (7).

(23) Connect wires in conduit elbow (6) and junction box (3).

(24) Install cover (5) and secure with two screws (4).

(25) Install cover (2) and secure with two screws (1).

b. *Replace Oxygen Penetrator*. (figure 6-7)

(1) Unlatch two latches (1), open enclosure door (2), and install two supports (3) and pins (4).

(2) Loosen two fitting nuts (5) and remove lines (6) and (7) and fitting nuts (5).

(3) Loosen fitting nut (8) and remove line (9) and fitting (10).

(4) Remove plug (11) from male tube connector (12).

(5) Remove remove male tube connector (12).

(6) Remove four nuts (13) and bolts (14) and remove flange (15) and preformed packing (16).

(7) Install preformed packing (16) and flange (15) and secure with four bolts (14) and nuts (13).

(8) Install male tube connector (12).

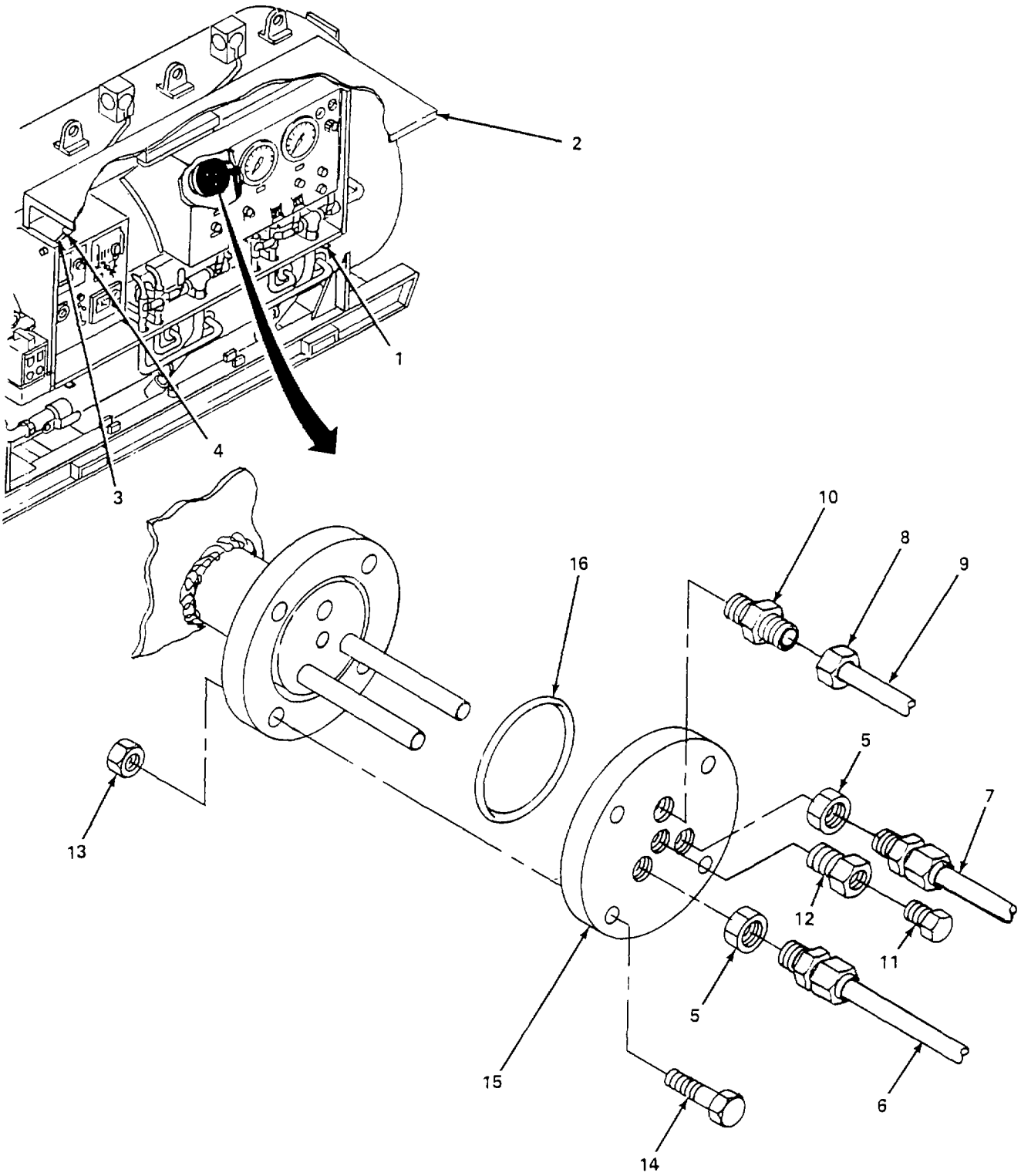


Figure 6-7. Oxygen Penetrator, Replace.

6-8. Shell Penetrators (Cont).

(9) Install plug (11) into male tube connector (12).

(10) Install fitting (10) and line (9) and tighten fitting nut (8).

(11) Install two fitting nuts (5).

(12) Install two lines (6) and (7) and tighten fitting nuts (5).

(13) Remove two pins (4), supports (3), close enclosure door (2), and secure with two latches (1).

c. Replace Electrical/02 Penetrator. (figure 6-8)

(1) Unlatch two latches (1), open enclosure door (2), and install two supports (3) and pins (4).

(2) Loosen two fitting nuts (5) and remove lines (6) and (7) and fitting nuts (5).

(3) Loosen fitting nut (8) and remove line (9) and fitting (10).

(4) Remove plug (11) from speakers (12).

(5) Desolder wires from connector (11).

(6) Remove spiral wrap (13).

(7) Remove electrical penetrator (14) from fitting (15) and pull wires out.

(8) Remove preformed packing (16) and fitting (15).

(9) Remove four nuts (17) and bolts (18) and remove flange (19) and preformed packing (20).

(10) Install preformed packing (20) and flange (19) and secure with four bolts (18) and nuts (17).

(11) Install fitting (15) and preformed packing (16).

(12) Insert wires through penetrator and install electrical penetrator (14) on fitting (15).

(13) Solder wires on connector (11).

(14) Install spiral wrap (13).

(15) Install connector (11) on speakers (12).

(16) Install fitting (10) and line (9) and tighten fitting nut (8).

(17) Install two fitting nuts (5).

(18) Install two lines (6) and (7) and tighten fitting nuts (5).

(19) Remove two pins (4), supports (3), close enclosure door (2) and secure with two latches (1).

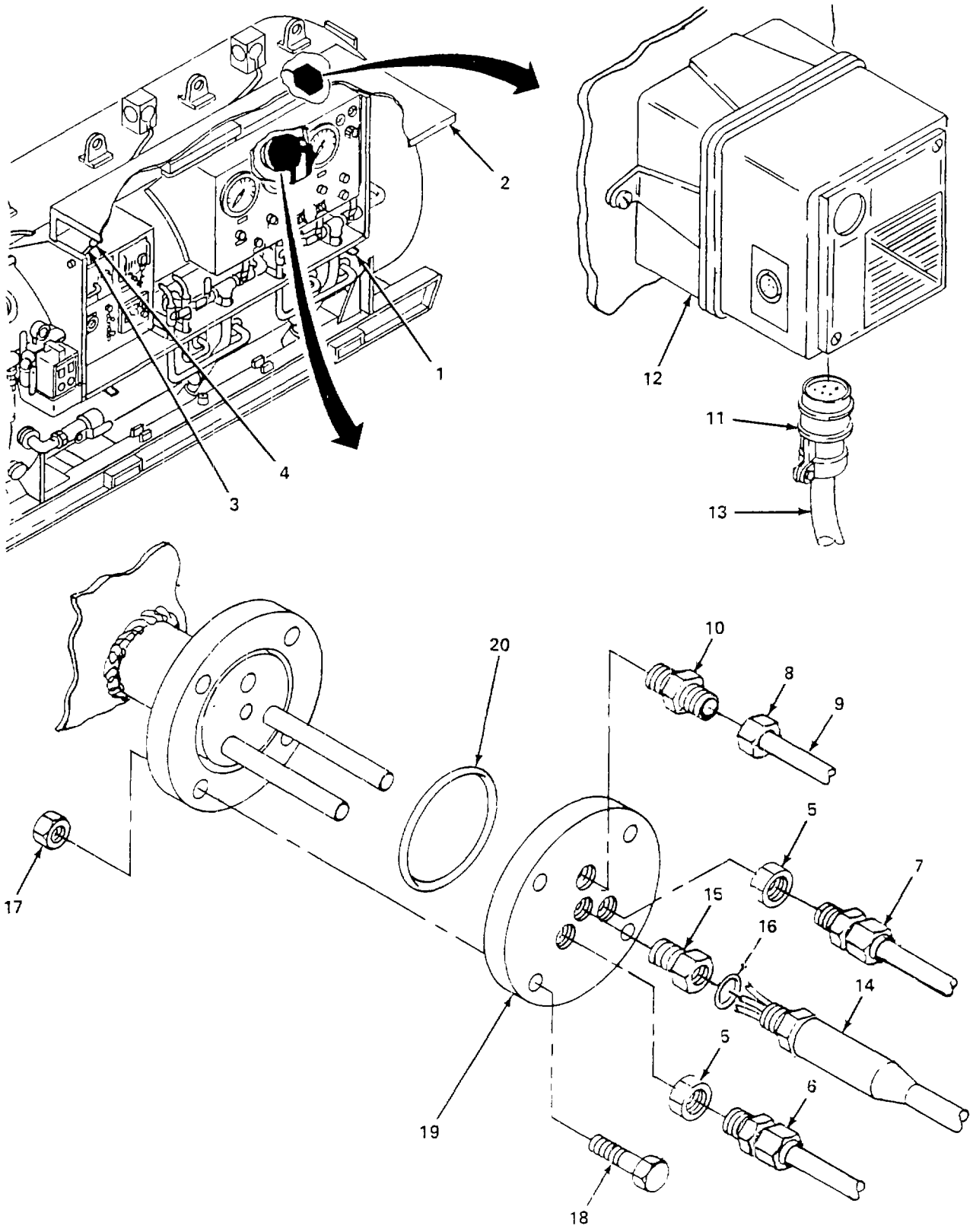


Figure 6-8. Electrical/O_2 Penetrator, Replace.

6-8. Shell Penetrators (Cont).

d. *Replace Blank Penetrator*. (figure 6-9)

(1) Remove four nuts (1), lockwashers (2), and bolts (3).

(2) Remove cover blank plate (4) and preformed packing (5).

(3) Install preformed packing (5) and cover blank plate (4) and secure with four bolts (3), lockwasher (2), and nuts (1).

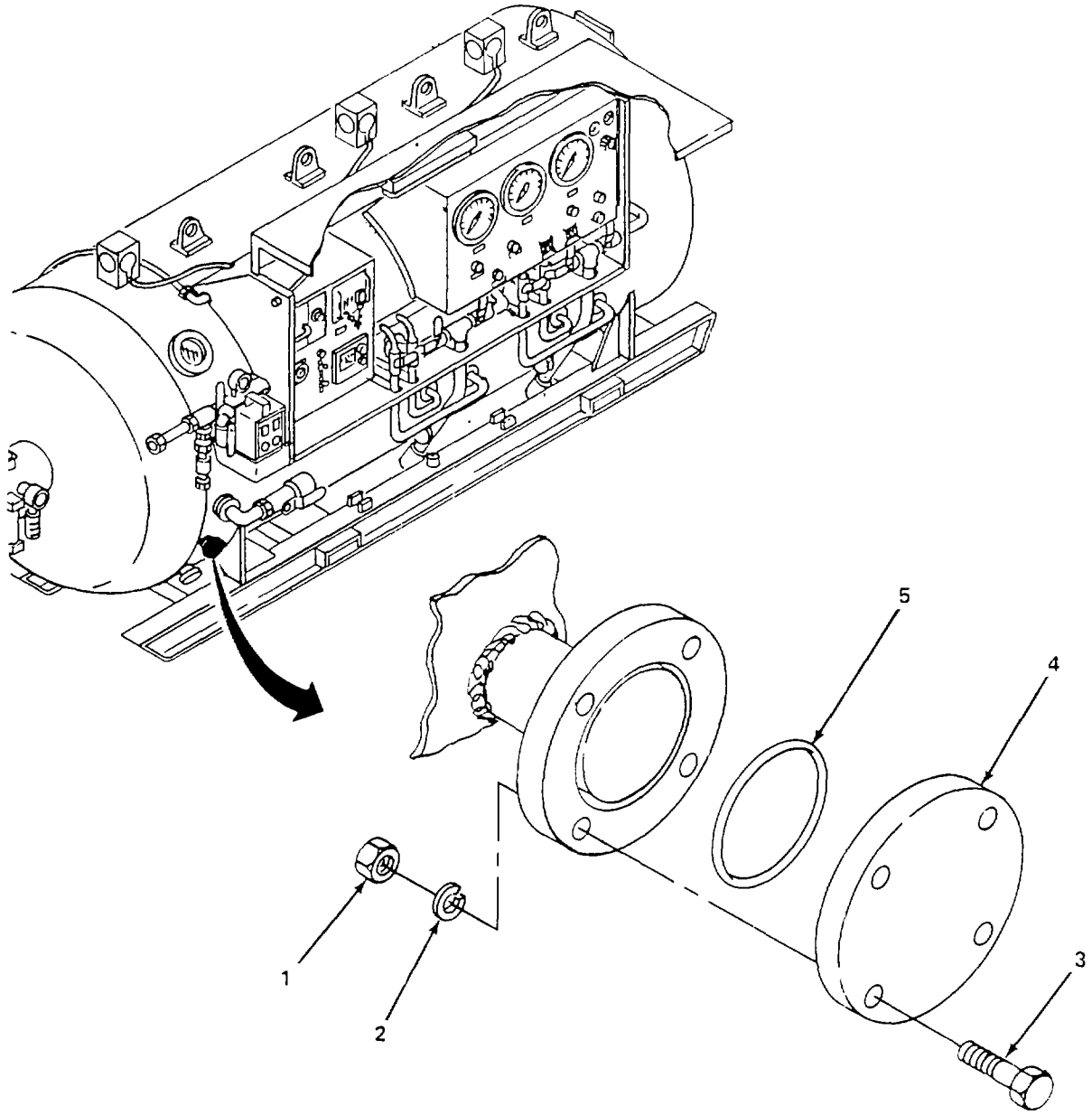


Figure 6-9. Blank Penetrator, Replace.

6-8. Shell Penetrators (Cont).

e. *Repair Electrical and Water Penetrator*. (figure 6-10)

(1) Remove electrical and water penetrator (para. a. above).

(2) Clean all components using nonionic detergent cleaner and rinse with clean distilled water.

(3) Inspect mounting flange (1) and replace if bent, cracked, stripped threads, or otherwise damaged.

(4) Inspect elbow (2) and fittings (3), (4), and (5), and replace if stripped threads, cracks, or otherwise damaged.

(5) Inspect penetrator plate (6) and replace is stripped threads, bent, cracked, or otherwise damaged.

(6) Apply grease to gasket (7) and preformed packing (8) and (9).

(7) Install electrical and water penetrators (para. a. above).

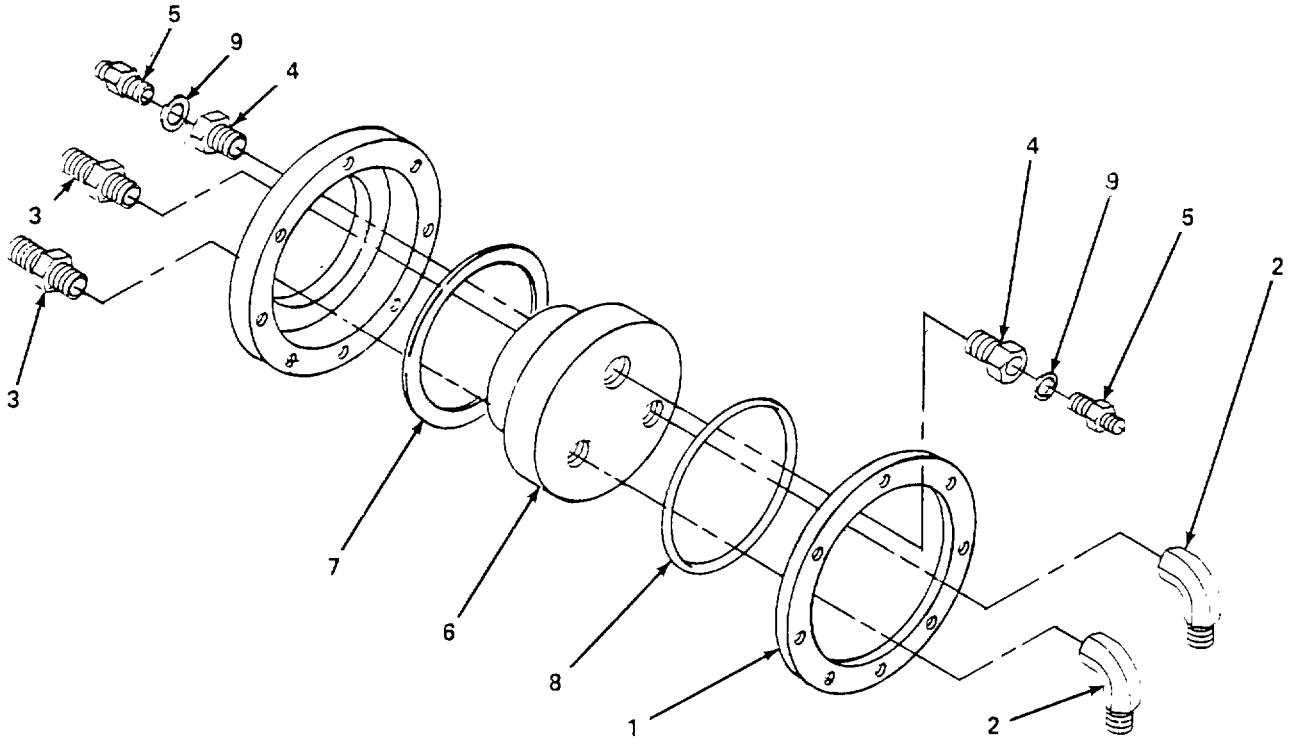


Figure 6-10. Electrical and Water Penetrators, Repair.

f. *Repair Oxygen Penetrator*. (figure 6-11)

(1) Remove oxygen penetrator (para. a. above).

(2) Clean all components using nonionic detergent cleaner and rinse with clean distilled water.

(3) Inspect flange (1) and replace if stripped threads, bent, cracked, or otherwise damaged.

(4) Inspect two tube unions (2), male tube connector (3), fitting (4), and plug (5), and replace if stripped threads, bent, cracked, or otherwise damaged.

(5) Apply grease to preformed packing (6).

(6) Install oxygen penetrator (para. b. above).

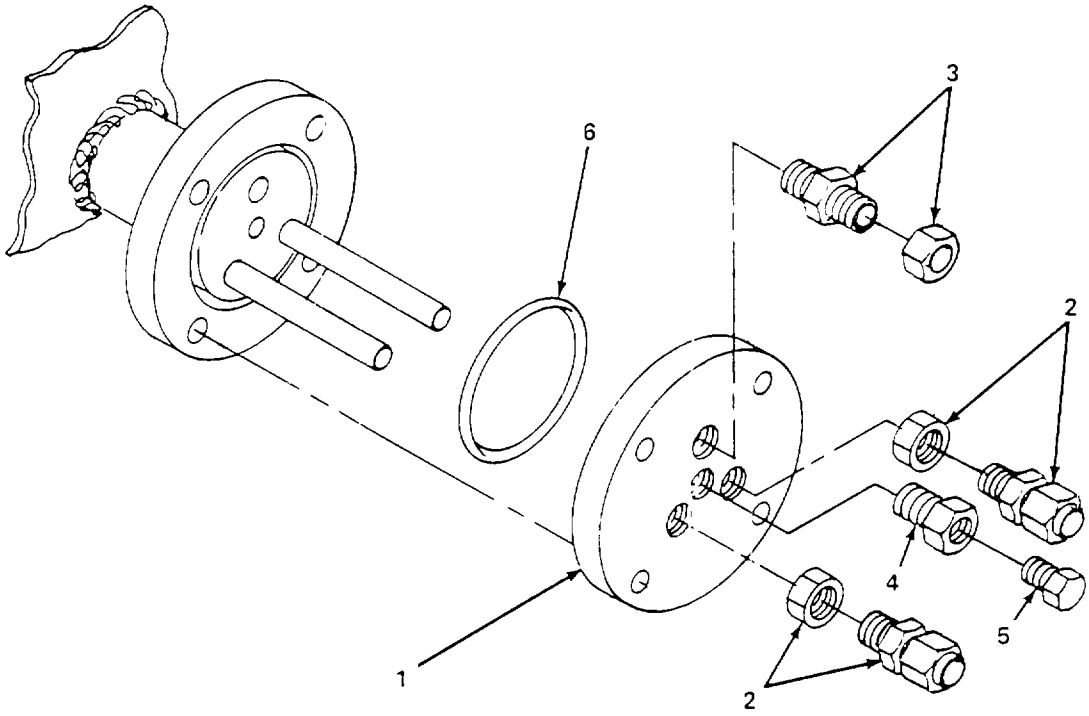


Figure 6-11. Oxygen Penetrator, Repair.

6-8. Shell Penetrators (Cont).

g. *Repair Electrical/O_2 Penetrator*. (figure 6-12)

(1) Remove electrical/O_2 penetrator (para. c. above).

(2) Clean all components using nonionic detergent cleaner and rinse with clean distilled water.

(3) Inspect flange (1) and replace if stripped threads, bent, cracked, or otherwise damaged.

(4) Inspect two tube unions (2), male tube connector (3), fitting (4) and replace if stripped threads, bent, cracked, or otherwise damaged.

(5) Inspect electrical penetrator (5) and replace if stripped threads, cracked, or otherwise damaged.

(6) Apply grease to two preformed packings (6).

(7) Install electrical/O_2 penetrator (para. c. above).

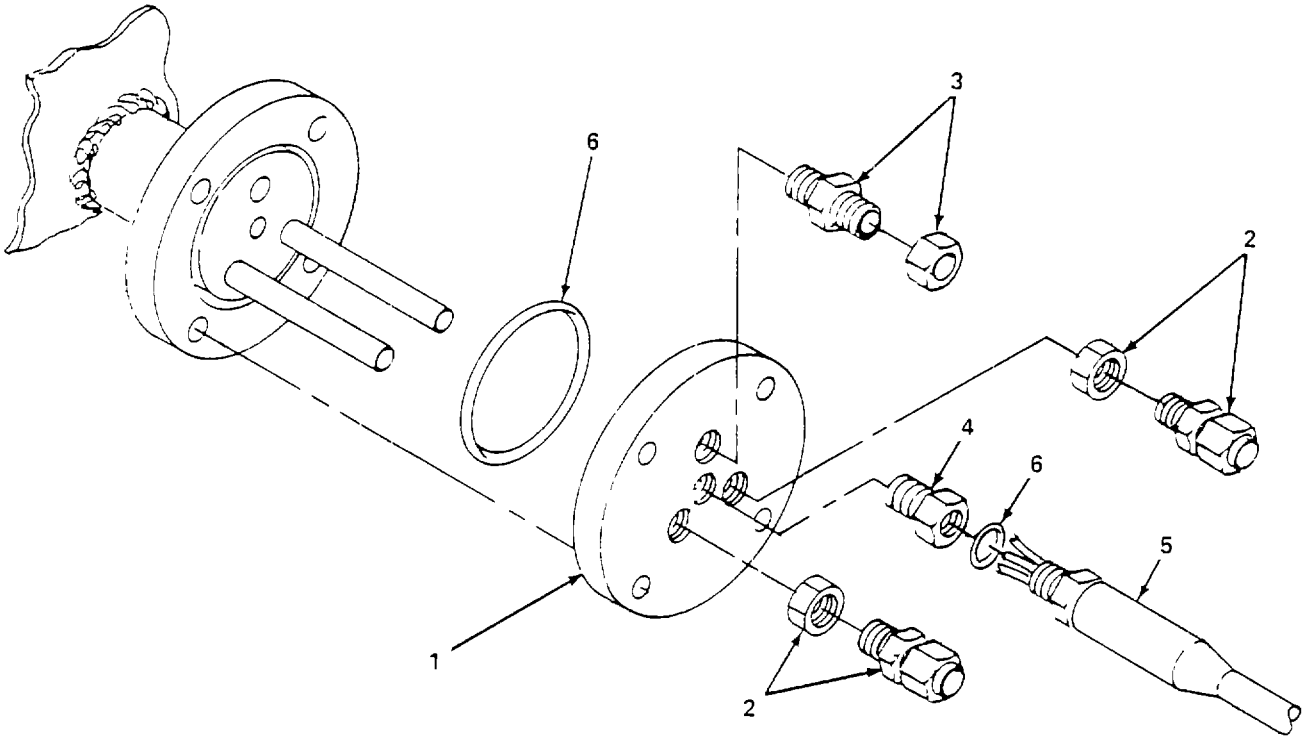


Figure 6-12. Electrical/O_2 Penetrator, Repair.

h. *Repair Blank Penetrator*. (figure 6-13)

(1) Remove blank penetrator (para. d. above).

(2) Clean all components using nonionic detergent cleaner and rinse with clean distilled water.

(3) Inspect cover, blank plate (1) and replace if stripped threads, bent, cracked, or otherwise damaged.

(4) Apply grease to preformed packing (2).

(5) Install blank penetrator (para. d. above).

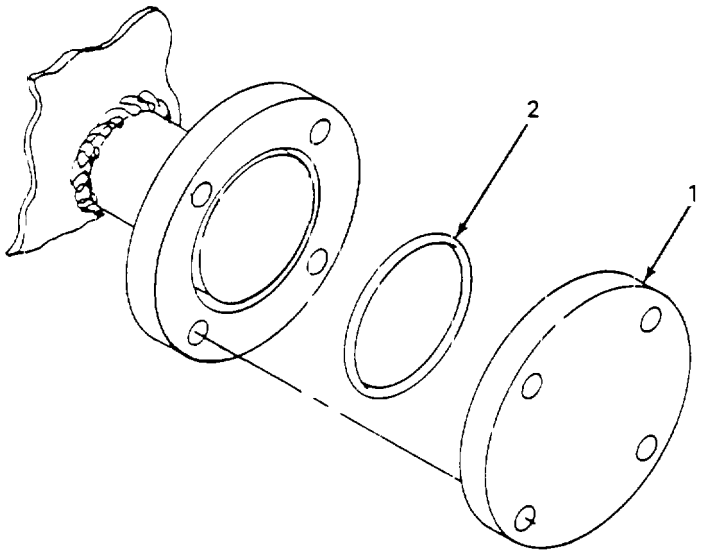


Figure 6-13. Blank Penetrator, Repair.

6-9. PRESSURE RELIEF VALVE.

This task covers:

a. Repair **b. Calibrate**

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Pressure Relief Valve
Bands, Rubber (Item 4, Appendix E)
Bags, Plastic (Item 3, Appendix E)

Materials/Parts (Cont)

Detergent, Nonionic (Item 8, Appendix E)
Cloth, Lint-Free (Item 6, Appendix E)
Distilled Water (Item 9, Appendix E)

Equipment Condition

Pressure relief valve removed (para. 5-9).

a. *Repair.* (figure 6-14)

(1) Remove rivet (1) and lever (2) from left cap (3).

(2) Remove seal (4), screw (5) and remove left cap (3).

(3) Remove left nut (6) from stem (7).

(4) Remove seal (8), screw (9), (10), and (11) from body (12).

(5) Remove nozzle (13), top spring step (14), spring (15), and bottom spring step (16) from stem (7).

(6) Remove stem (7) from nozzle (13).

(7) Remove retainer (17), locknut retainer (18), ball (19), control ring (20), and ring (21) from nozzle (13).

(8) Remove locknut compression screw (22) and locknut (23) from body (12).

(9) Clean all components using nonionic detergent cleaner and rinse with clean distilled water.

(10) Inspect all components and replace any component that is bent, cracked, worn or otherwise damaged.

(11) Install locknut (23) and locknut compression (22) on body (12).

(12) Install ring (21), control ring (20), ball (19), locknut retainer (18) and retainer (17) on nozzle (13).

(13) Install stem (7) in nozzle (13).

(14) Install bottom spring step (16), spring (15) and top spring step (14) on stem (7).

(15) Install nozzle (13) with stem (7) in body (12).

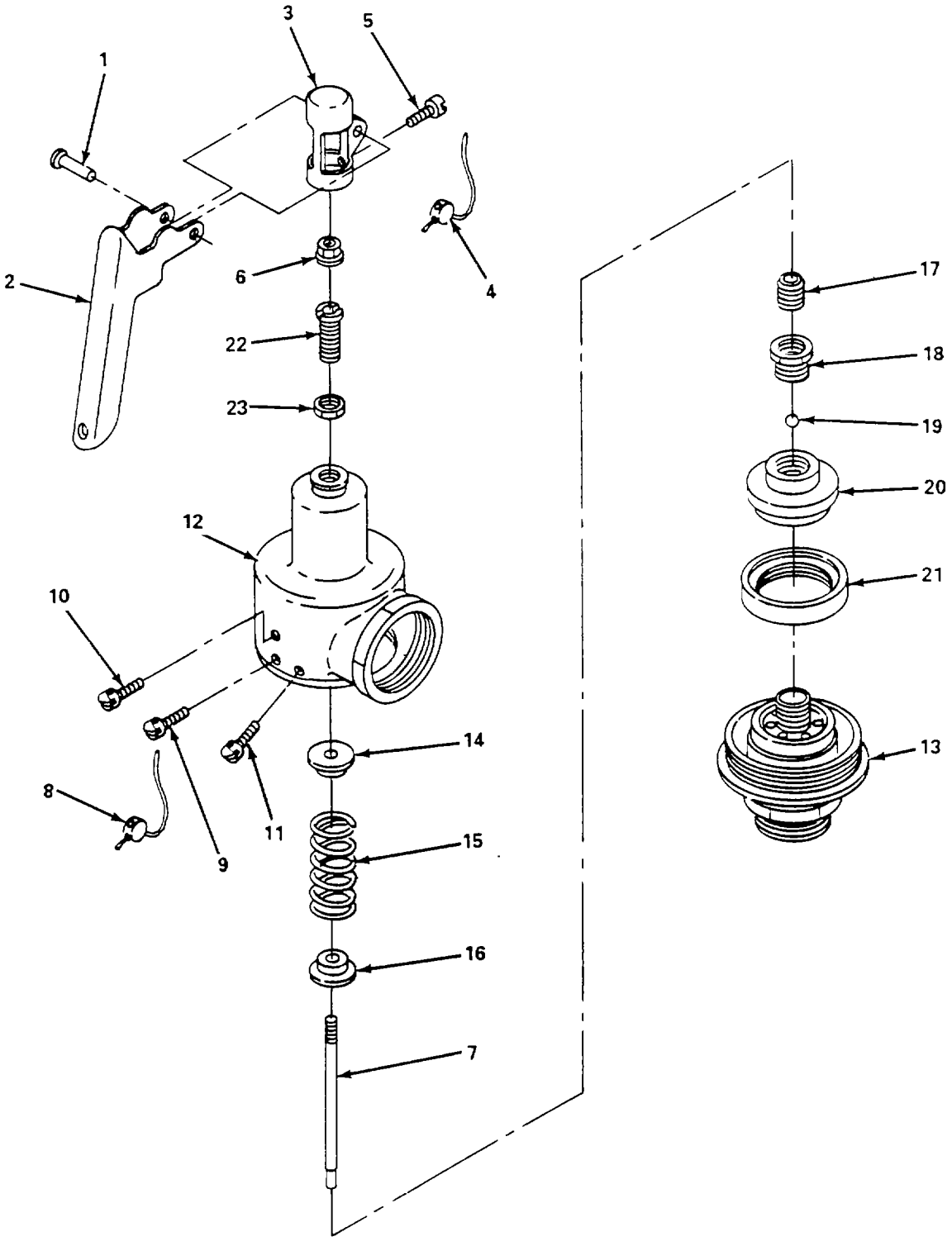


Figure 6-14. Pressure Relief Valve, Repair.

(16) Install screw (11), (10), and screw (9) and install seal (8).

(17) Install left nut (6), left cap (3), and screw (5).

(18) Install seal (4).

(19) Install lever (2) and secure with rivet (1).

(20) Bag valve until ready to install.

b. *Calibrate*. Refer to paragraph 6-6.

FOLLOW-ON MAINTENANCE
Install pressure relief valve (para. 5-9).

6-10. Skid.

This task covers: Repair

INITIAL SETUP:

Tools

General Mechanic's Tool Kit (NSN 5180-00-177-7033)

Repair. (figure 6-15)

(1) Repair cracks in skid (1) by welding. Refer to TM 9-237 for welding instructions.

(2) Inspect two travel bar hold down fittings (2) and replace if threads are stripped or fittings are otherwise damaged.

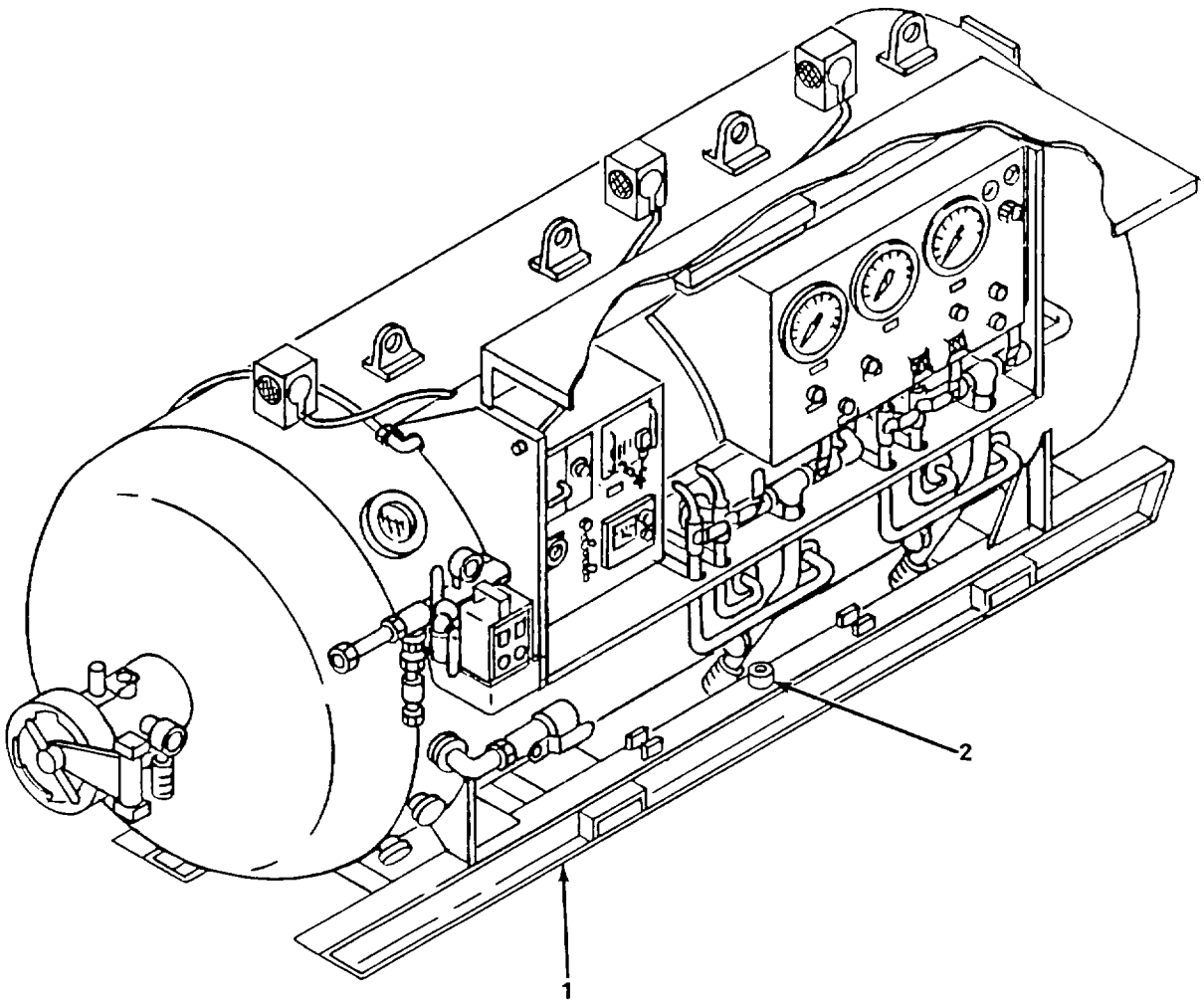


Figure 6-15. Skid, Repair.

6-11. Heater/Chiller Module.

This task covers: Repair

INITIAL SETUP

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)
Recovery and Replacing Unit, Refrigerant

Materials/Parts

Coil Element
Evaporator Coil

Materials/Parts

Ethylene Glycol (Item 10, Appendix E)
Refrigerant-22 (Item 23, Appendix E)

Equipment Condition

Heater/chiller module removed (para. 4-28).

Repair. Refer to the heater/chiller module flow diagram (figure 6-16) and electrical schematic (figure 6-17) when repairing the heater/chiller module.

WARNING

Death or serious injury may result if personnel fail to observe safety precautions when handling liquid refrigerant. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin-eye-contact is possible.

Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly poisonous and corrosive gas.

NOTE

In accordance with Environmental Protection Agency regulations refrigerants cannot be discharged into the atmosphere. A refrigerant recovery and recycling unit must be used whenever discharging the refrigerant system.

Operation of the recovery/recycling unit must be by AUTHORIZED PERSONNEL ONLY.

6-11. Heater/Chiller Module (Cont).

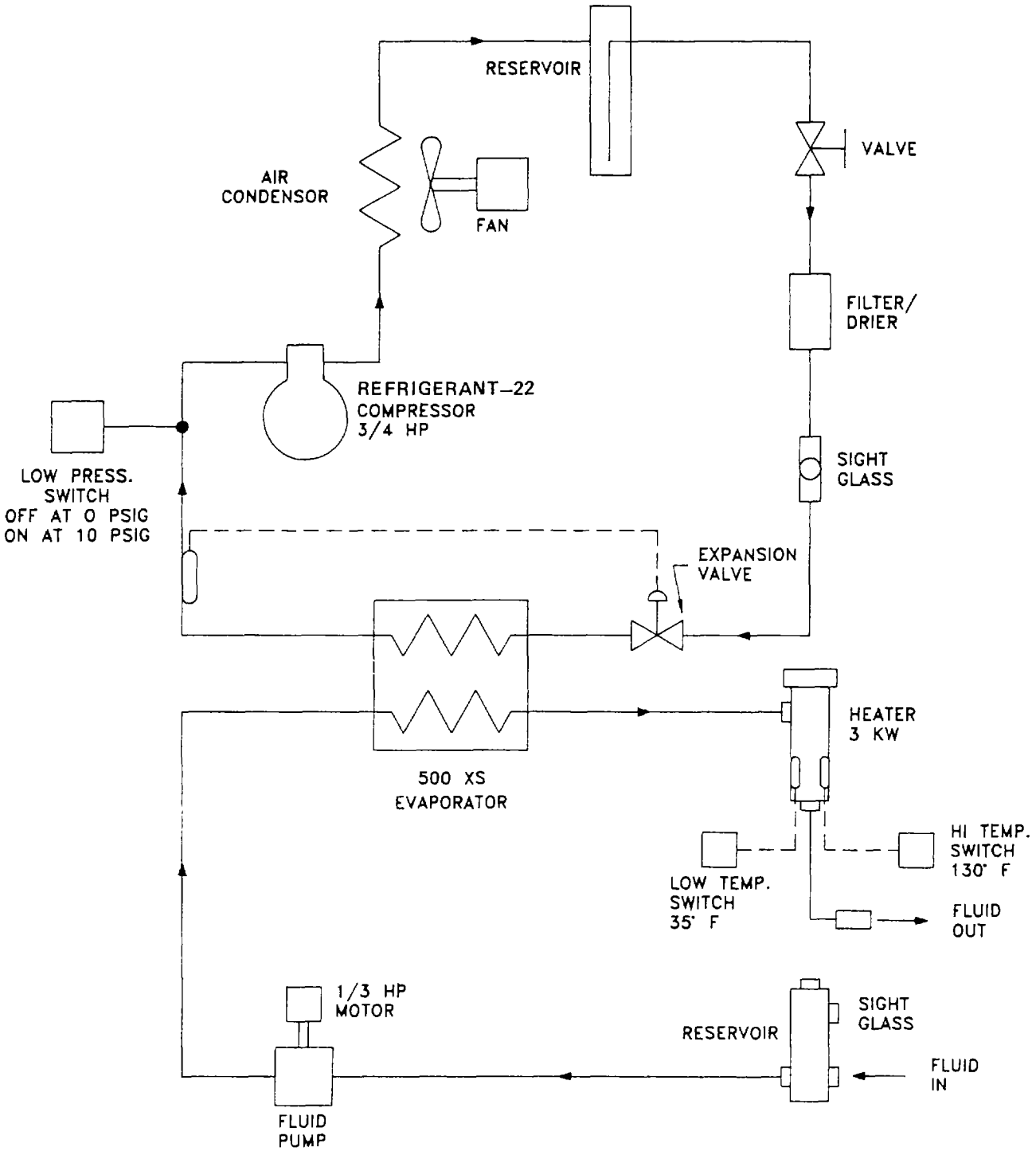


Figure 6-16. Heater/Chiller Module Flow Diagram.

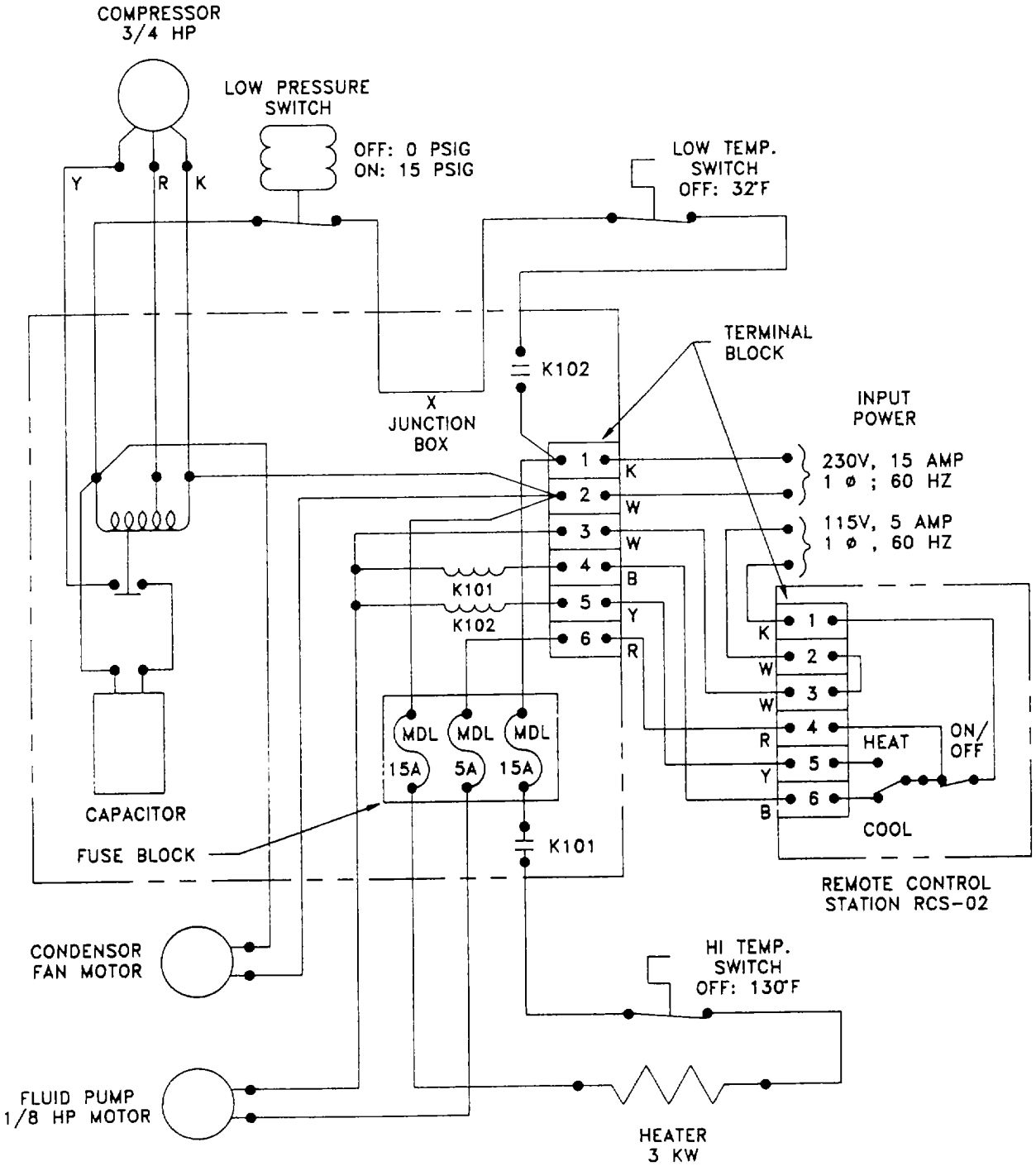


Figure 6-17. Heater/Chiller Module Electrical Schematic.

6-11. Heater/Chiller Module (Cont).

(1) *Replacement of heating element*. (figure 6-18)

(a) Remove 14 screws (1) and remove cover (2).

(b) Remove two screws (3) and remove cover (4).

(c) Tag and disconnect electrical plug leads (5) from control box (6).

(d) Remove two self-locking nut (7) and remove electrical plug (8).

(e) Remove two screws (9) and lockwashers (10) and remove bracket (11).

(f) Remove four screws (12) and lockwashers (13) and remove two brackets (14).

(g) Remove two screws (15) and remove cover (16) from junction box (17).

(h) Tag and disconnect four wires (18).

(i) Remove two self-locking nuts (19) and remove two connectors (20).

(j) Remove heating element (21).

(k) Clean all components using nonionic detergent cleaner and rinse with clean distilled water.

(l) Inspect all components and replace any component that is burnt, cracked, stripped threads or otherwise damaged.

(m) Install heating element (21).

(n) Install two connectors (20) and secure with two self-locking nuts (19).

(o) Connect four wires (18) to junction box (17).

(p) Install cover (16) on junction box (17) and secure with two screws (15).

(q) Install two brackets (14) and secure with four screws (12) and lockwashers (13).

(r) Install bracket (11) and secure with two screws (9) and lockwashers (10).

(s) Install electrical plug (8) and install two self-locking nuts (7).

(t) Connect electrical plug leads (5) in control box (6).

(u) Install cover (4) and secure with two screws (3).

(v) Install cover (2) and secure with 14 screws (1).

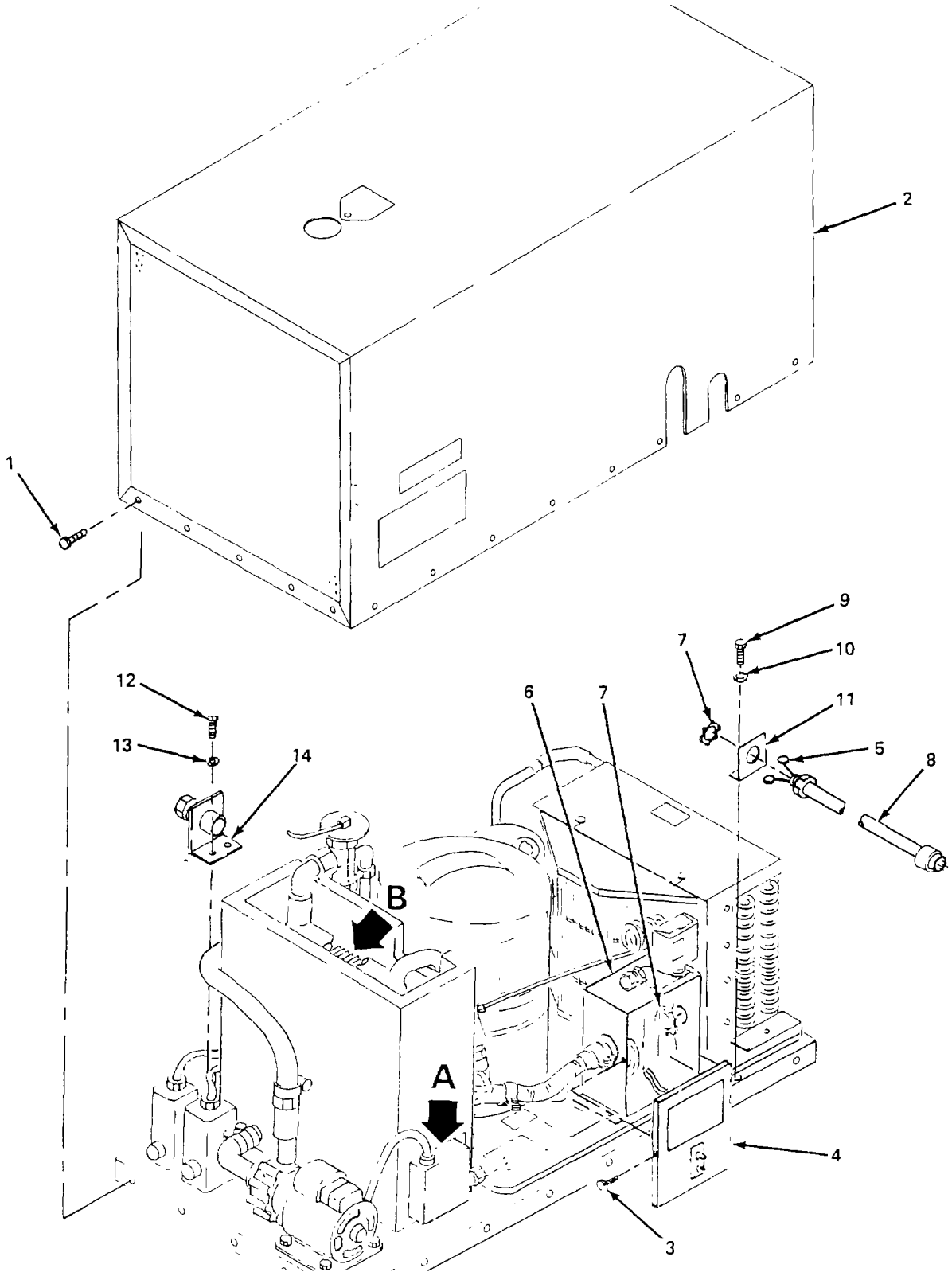


Figure 6-18. Heater/Chiller Module, Repair (Sheet 1 of 3).

6-11. Heater/Chiller Module (Cont).

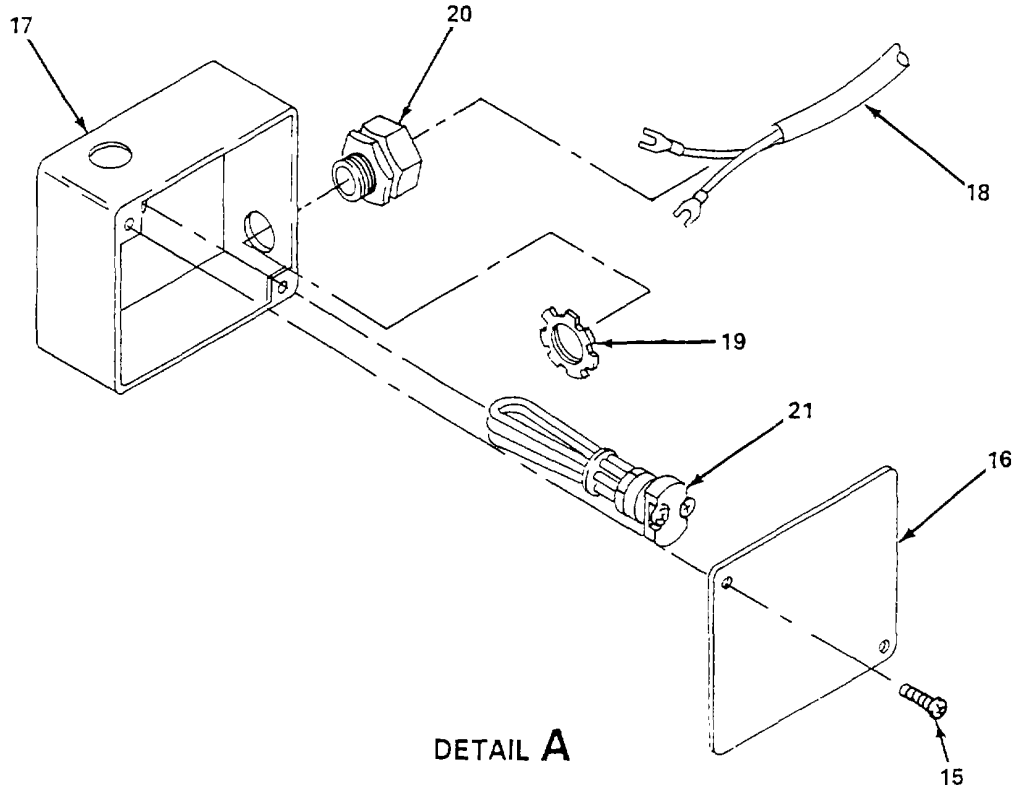


Figure 6-18. Heater/Chiller Module, Repair (Sheet 2 of 3).

(2) Replacement of evaporator coil. (figure 6-18)

(a) Discharge refrigerant-22 from system.

(b) Carefully unwrap insulation from discharge pipe of evaporator coil (1) and thermal expansion valve probe (2).

(c) Break refrigerant line by loosen nut (3) on discharge side of thermal expansion valve (4).

(d) Loosen nut (5) on input side of compressor (6).

(e) Carefully lift evaporator coil (7) out of reservoir (8).

(f) Clean evaporator coil using nonionic detergent cleaner and use with clean distilled water.

(g) Inspect evaporator coil for damage. Test for refrigerant leaks. Replace if damaged.

(h) Carefully install evaporator coil (7) into reservoir (8).

(i) Reconnect and tighten nut (5) on input side of compressor (6).

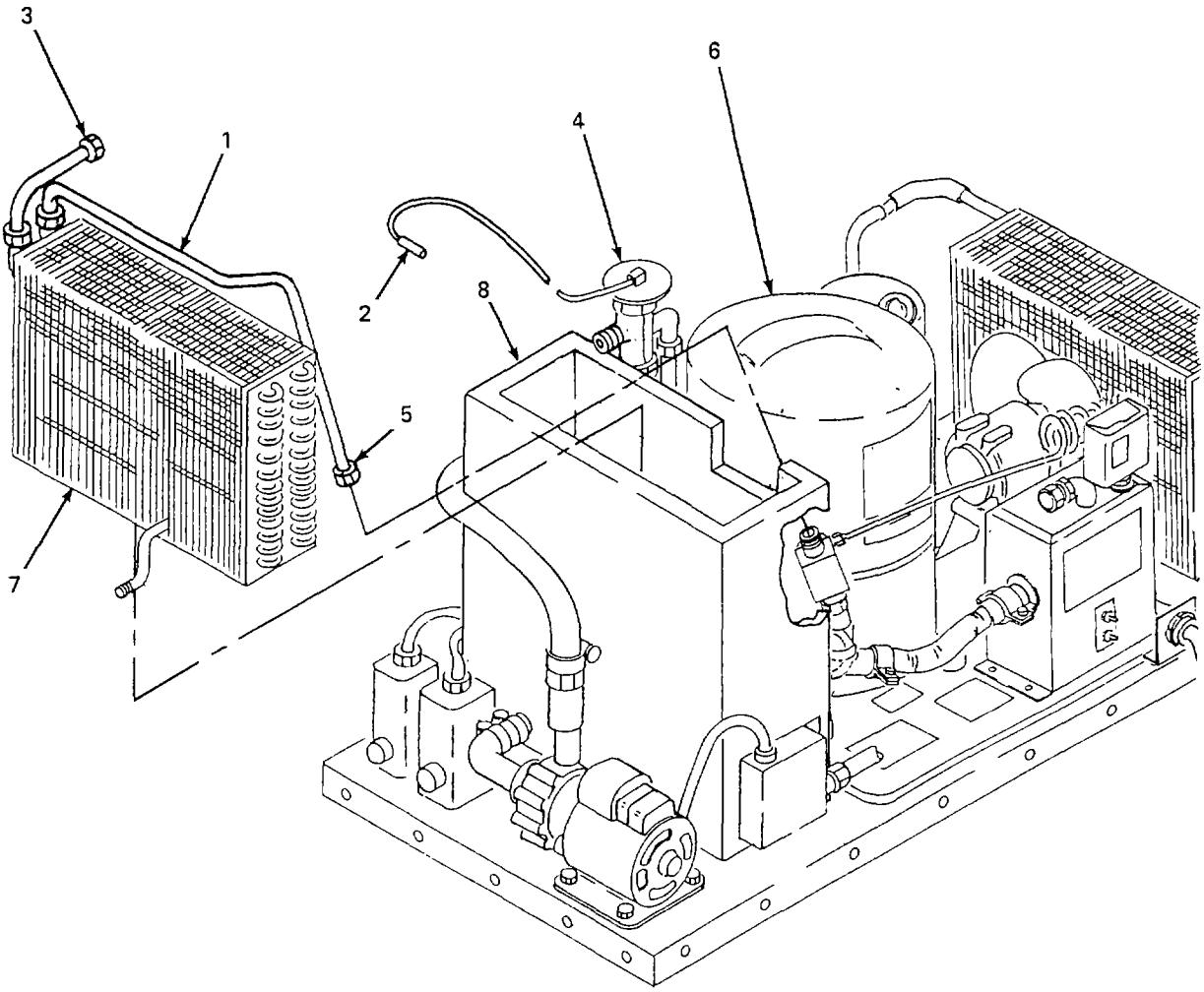
(j) Reconnect and tighten nut (3) on discharge side of thermal expansion valve (4).

(k) Rewrap insulation around discharge pipe of evaporator coil (1) and thermal expansion valve probe (2).

NOTE

The system must be evacuated before charging. Use only Refrigerant-22 to charge the unit. If available, use recycled refrigerant.

(l) Recharge unit.



DETAIL B

Figure 6-18. Heater/Chiller Module, Repair (Sheet 3 of 3).

FOLLOW-ON MAINTENANCE
Install heater/chiller module (para. 4-28).

6-12. Condensing Unit Hermetic.

This task covers: a. Replace b. Repair

INITIAL SETUP

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)
Recovery and Recycling Unit, Refrigerant

Materials/Parts

Condensing Unit Hermetic
Band, Rubber (Item 4, Appendix E)
Bags, Plastic (Item 3, Appendix E)

Materials/Parts

Cloth, Lint-Free (Item 6, Appendix E)
Distilled Water (Item 9, Appendix E)
Detergent, Nonionic (Item 8, Appendix E)
Tape, Teflon (Item 21, Appendix E)
Refrigerant-22 (Item 23, Appendix E)

Equipment Condition

Heater/chiller module removed (para. 4-28).

a. <u>*Replace*</u>. (figure 6-19)

WARNING

Death or serious injury may result if personnel fail to observe safety precautions when handling liquid refrigerant. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin-eye-contact is possible.

Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly poisonous and corrosive gas.

NOTE

In accordance with Environmental Protection Agency regulations refrigerants cannot be discharged into the atmosphere. A refrigerant recovery and recycling unit must be used whenever discharging the refrigerant system.

Operation of the recovery/recycling unit must be by AUTHORIZED PERSONNEL ONLY.

(1) Remove 14 screws (1) and remove cover (2).

(2) Remove six nuts (3), washers (4), and bolts (5).

(3) Loosen fitting nut (6) and separate from line (7).

(4) Loosen fitting (8) and separate from line (7).

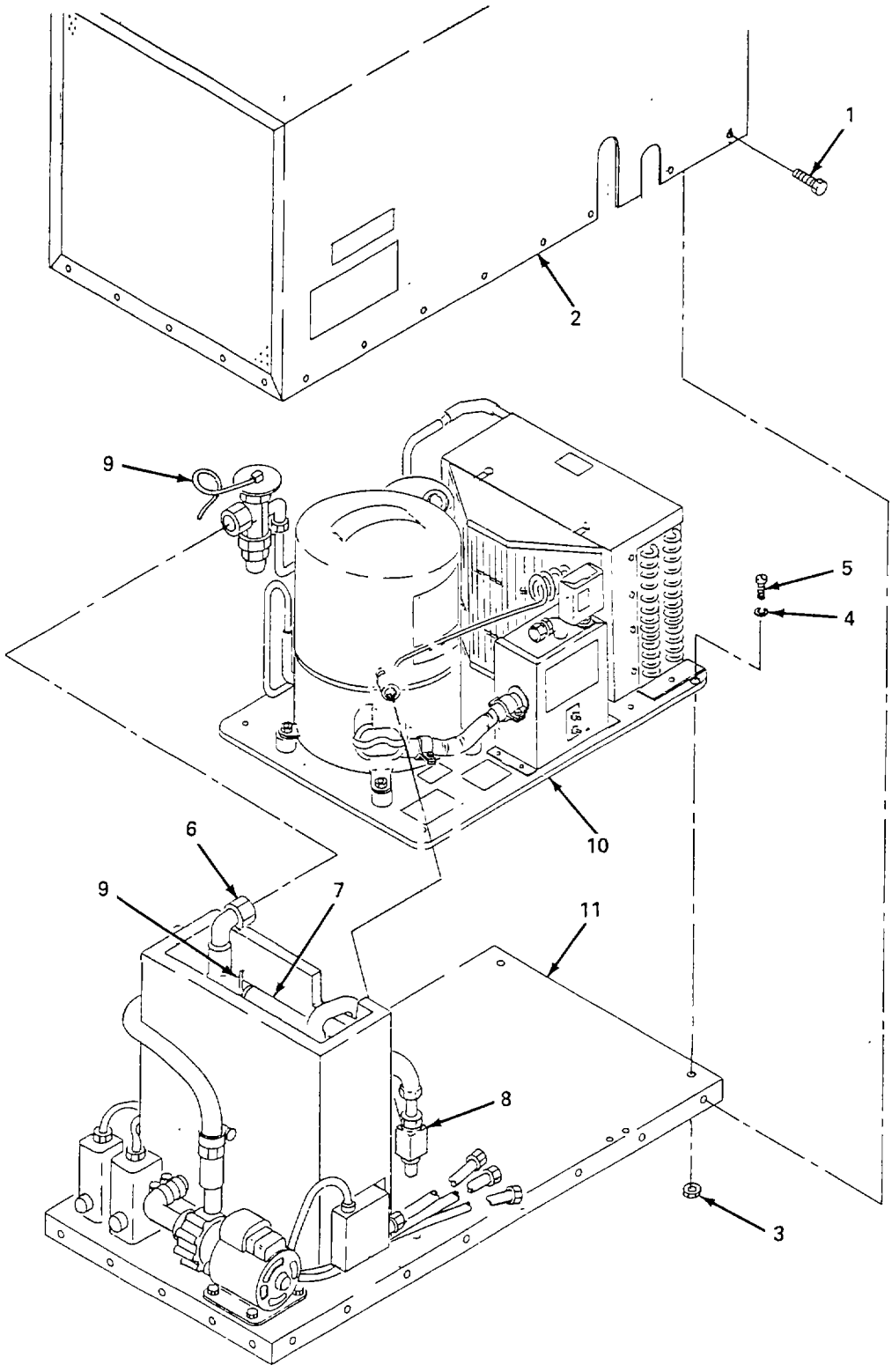


Figure 6-19. Condensing Unit Hermetic, Replace.

6-12. Condensing Unit Hermetic (Cont).

(5) Remove insulation and separate probe (9) from line (7).

(6) Remove condensing unit (10) from module base (11).

(7) Install condensing unit (10) on module base (11).

(8) Install line (7) on probe (9) and wrap with insulation.

(9) Install fitting (8) and tighten fitting (8) and nut (6).

(10) Install six bolts (5), washers (4) and nuts (3).

(11) Install cover (2) and secure with 14 screws (1).

b. *Repair*.

(1) *Replace fan motor*. (figure 6-20).

(a) Remove four bolts (1) and remove fan guard (2).

(b) Remove four blind head screws (3) and remove fan motor (4).

(c) Remove fan blade (5) from fan motor (4).

(d) Remove four screws (6) and bracket (7) from fan motor (4).

(e) Remove two screws (8) and remove conduit bracket (9).

(f) Loosen screw (10) on connector (11) and remove connector.

(g) Remove two anti-short bushings (12) and flex conduit (13).

(h) Install two anti-short bushings (12) and flex conduit (13).

(i) Install connector (11) on conduit (13) and tighten screw (10).

(j) Install conduit bracket (9) and secure with two screws (8).

(k) Install bracket (7) on fan motor (4) and secure with four screws (6).

(l) Install fan blade (5) on fan motor (4).

(m) Install fan motor (4) and secure with four blind-head screws (3).

(n) Install fan guard (2) and secure with four bolts (1).

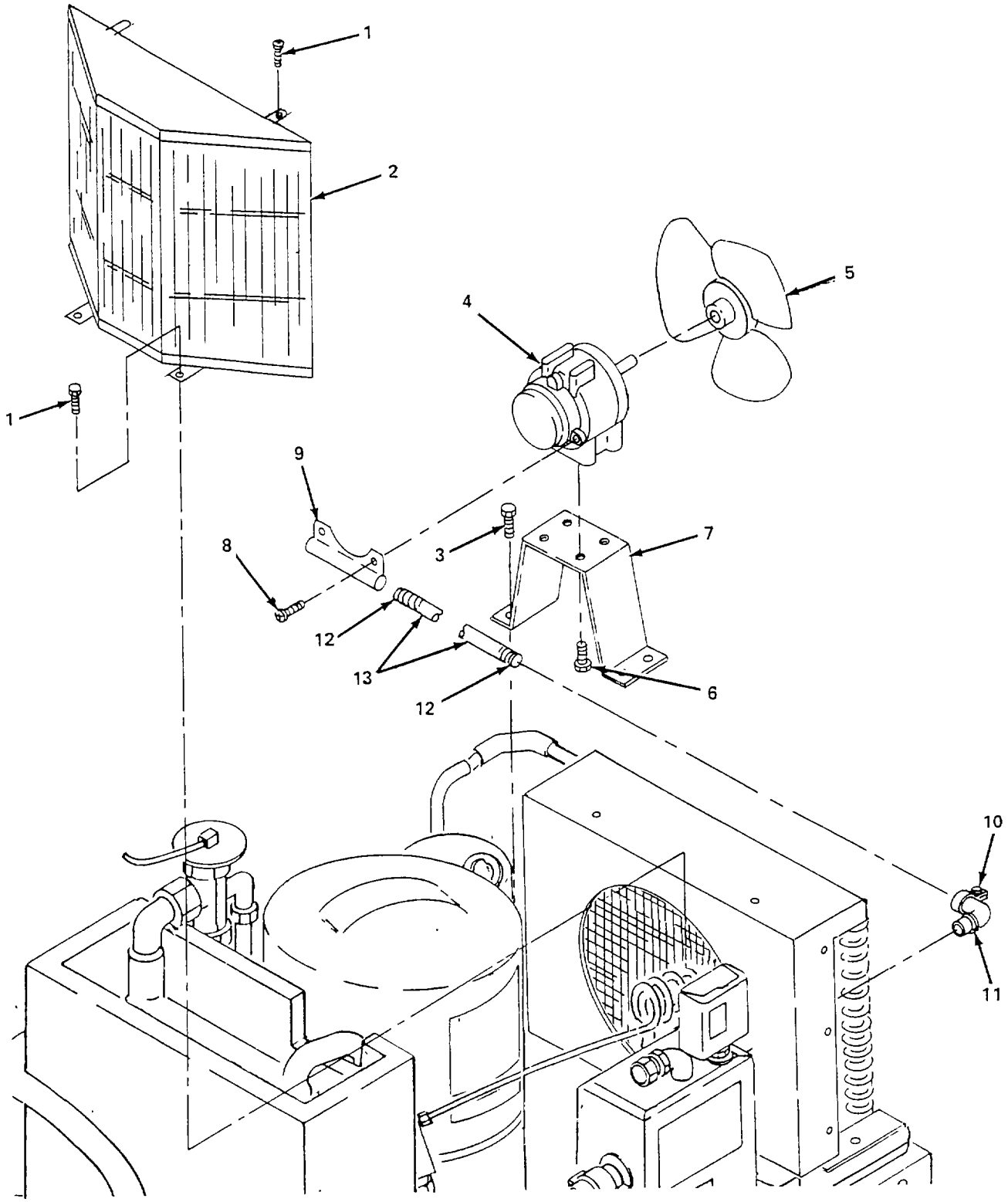


Figure 6-20. Condensing Unit Hermetic Fan Motor, Replace.

6-12. Condensing Unit Hermetic (Cont).

(2) *Replace condenser*. (figure 6-21).

(a) Remove shroud (para. 6-15).

(b) Remove condensing unit hermetic (para. a. above).

(c) Desolder tube discharge connector (1) and liquid tube (2).

(d) Remove two self-lock nuts (3), bolts (4) and remove condenser (5).

(e) Install condenser (5) and secure with two bolts (4) and self-locking nuts (3).

(f) Solder liquid tube (2) and tube discharge connector (1) to condenser (5).

(g) Install condensing unit hermetic (para. a. above).

(h) Install shroud (para. 6-15).

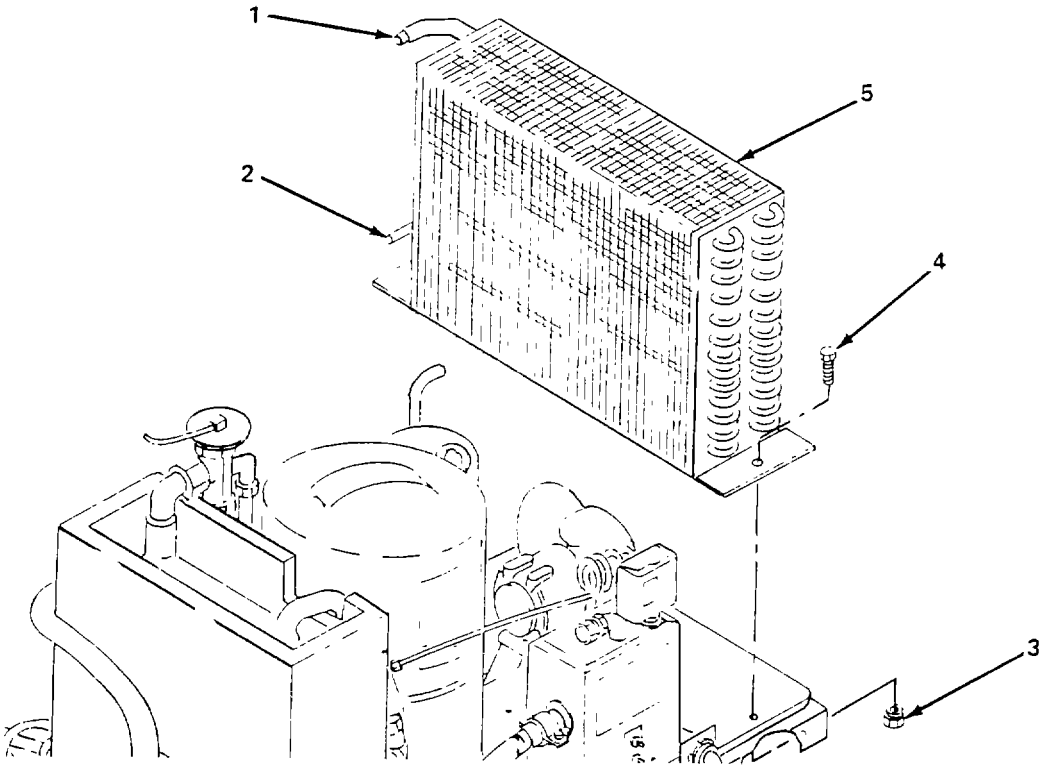


Figure 6-21. Condensing Unit Hermetic Condenser, Replace.

(3) *Replace receiver tank*. (figure 6-22).

(a) Remove condensing unit hermetic (para. a. above).

(b) Loosen fitting nut (1) and remove line (2).

(c) Desolder liquid tube (3) from receiver tank (4).

(d) Remove nut (5) and lockwasher (6) and remove receiver tank (4).

(e) Install receiver tank (4) and secure with lockwasher (6) and nut (5).

(f) Solder liquid tube (3) to receiver tank (4).

(g) Install line (2) and tighten fitting nut (1).

(h) Install condensing unit hermetic (para. a. above).

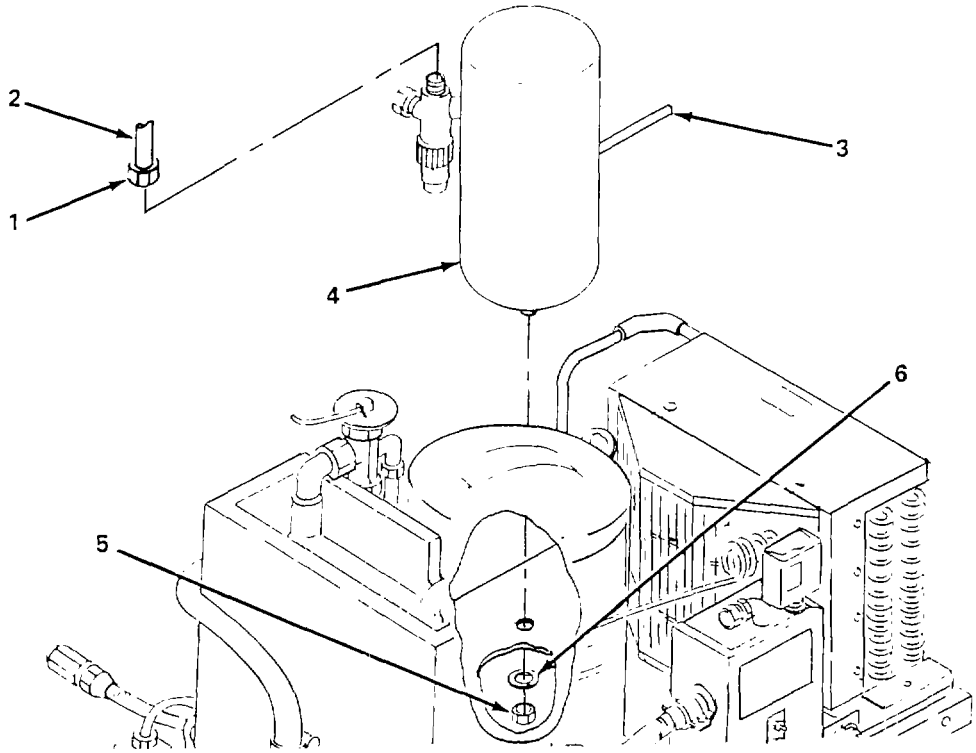


Figure 6-22. Condensing Unit Hermetic Receiver Tank, Replace.

6-12. Condensing Unit Hermetic (Cont).

(4) *Replace compressor*. (figure 6-23).

(a) Remove condensing unit hermetic (para. a. above).

(b) Desolder tube (1) from tube discharge connector (2).

(c) Remove screw (3) and tube clip (4).

(d) Remove four nuts (5), lockwashers (6), grommets (7), locknuts (8), and studs (9) and remove compressor (10).

(e) Install four studs (9), locknuts (8), and grommets (7).

(f) Install compressor (10) and secure with lockwashers (6), and nuts (5).

(g) Install tube clip (4) and screw (3).

(h) Solder tube (1) on tube discharge connector (2).

(i) Install condensing unit hermetic (para. a. above).

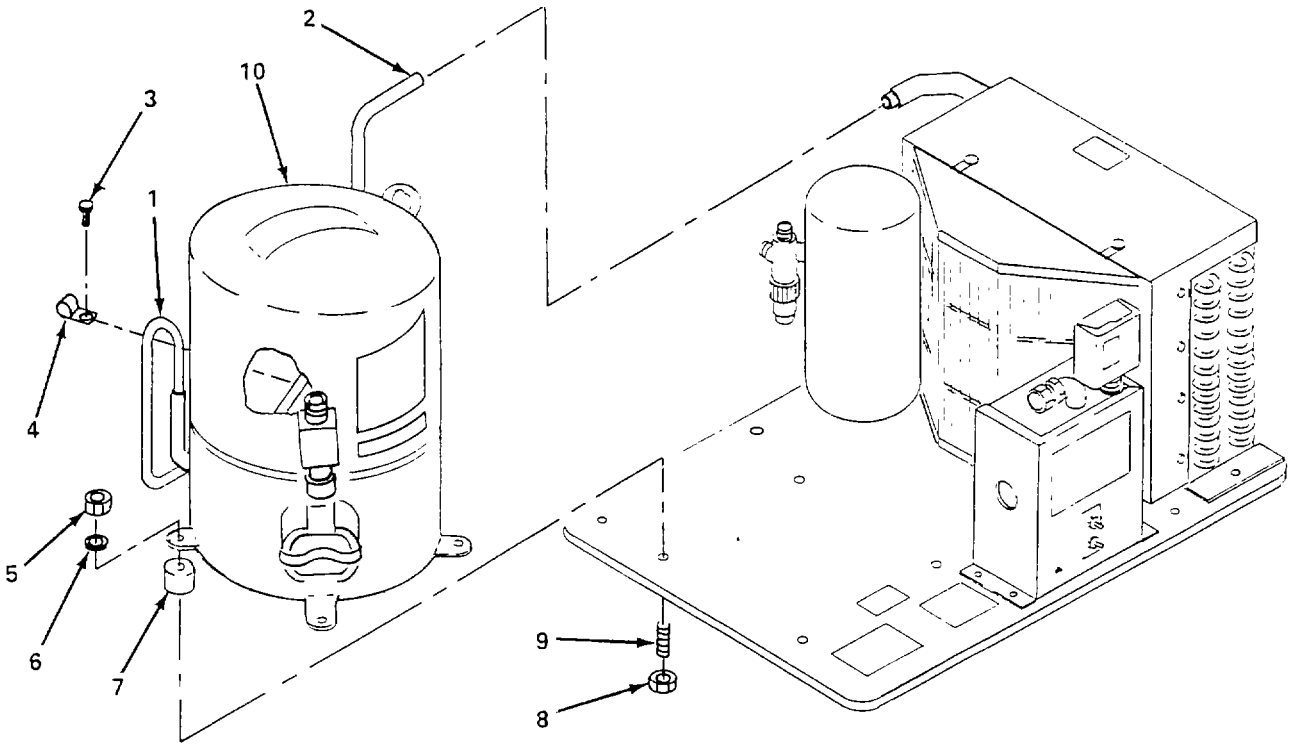


Figure 6-23. Condensing Unit Hermetic Compressor, Replace.

(5) *Replace filter and sight glass line*. (figure 6-24).

(a) Remove condensing unit hermetic (para. a. above).

(b) Remove coil (1) and loosen fitting nut (2) and remove from expansion valve (3) from line (4).

(c) Loosen fitting nut (5) and remove line (4).

(d) Loosen fitting nut (6) and remove from expansion valve (3).

(e) Desolder flare filter drier (7) and sight glass (8) from line (4).

(f) Solder sight glass (8) and flare filter drier (7) on line (4).

(g) Install expansion valve (3) and tighten fitting nut (2).

(h) Install coil (1).

(i) Install line (4) and tighten fitting nuts (6) and (5).

(j) Install condensing unit hermetic (para. a. above).

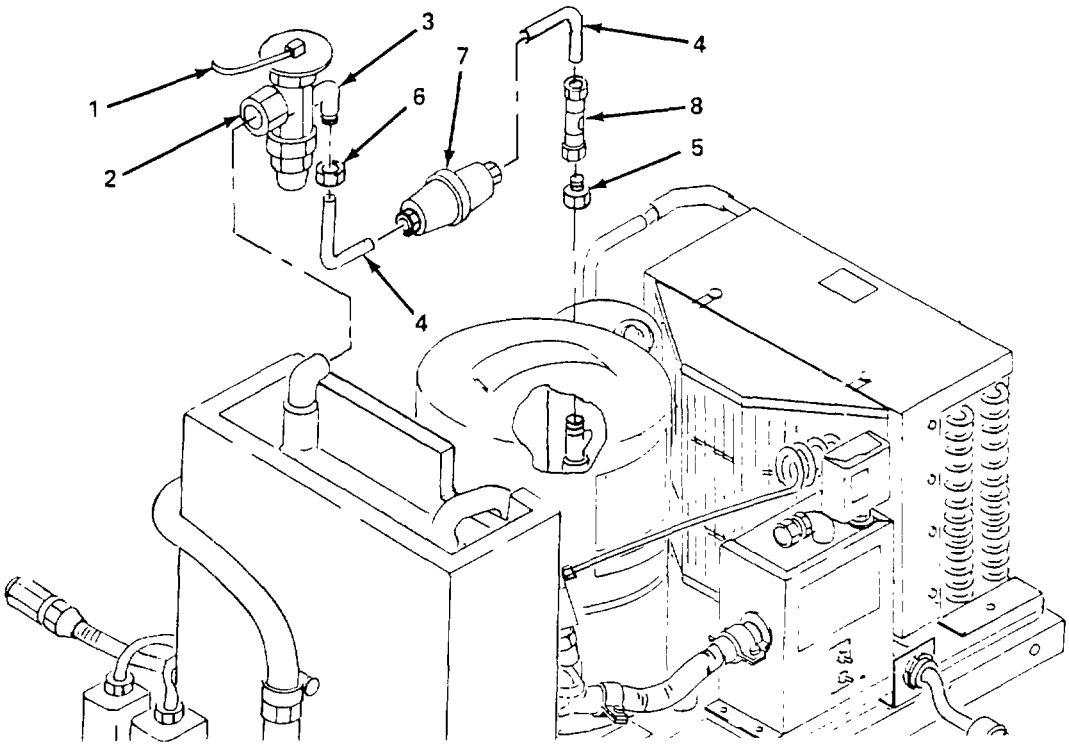


Figure 6-24. Condensing Unit Hermetic Filter and Sight Glass Line, Replace.

FOLLOW-ON MAINTENANCE
Install heater/chiller module (para. 4-28).

6-13. Low Pressure Control.

This task covers: Replace

INITIAL SETUP

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Low Pressure Control
Band, Rubber (Item 4, Appendix E)

Materials/Parts (Cont)

Bags, Plastic (Item 3, Appendix E)
Tape, Teflon (Item 21, Appendix E)

Replace. (figure 6-25)

(1) Remove 14 screws (1) and remove cover (2).

(2) Remove pressure connector assembly (3) from compressor (4).

(3) Remove two screws (5) and remove cover (6) from control box (7).

(4) Tag and disconnect two wires (8) from control box (7).

(5) Remove connector assembly (9) and reducer washer (10) from control box (7) and remove pressure control (11).

(6) Loosen captive screw (12) and remove cover (13).

(7) Remove rigid conduit (14) from connector assembly (15).

(8) Remove connector assembly (15) from pressure control (11).

(9) Install connector assembly (15) on pressure control (11).

(10) Install rigid conduit (14) on connector assembly (15).

(11) Install cover (13) and secure with captive screw (12).

(12) Install connector assembly (9), reducer washer (10), and rigid conduit (14) with pressure control (11) on control box (7).

(13) Connect two wires (8) on control box (7).

(14) Install cover (6) and secure with two screws (5).

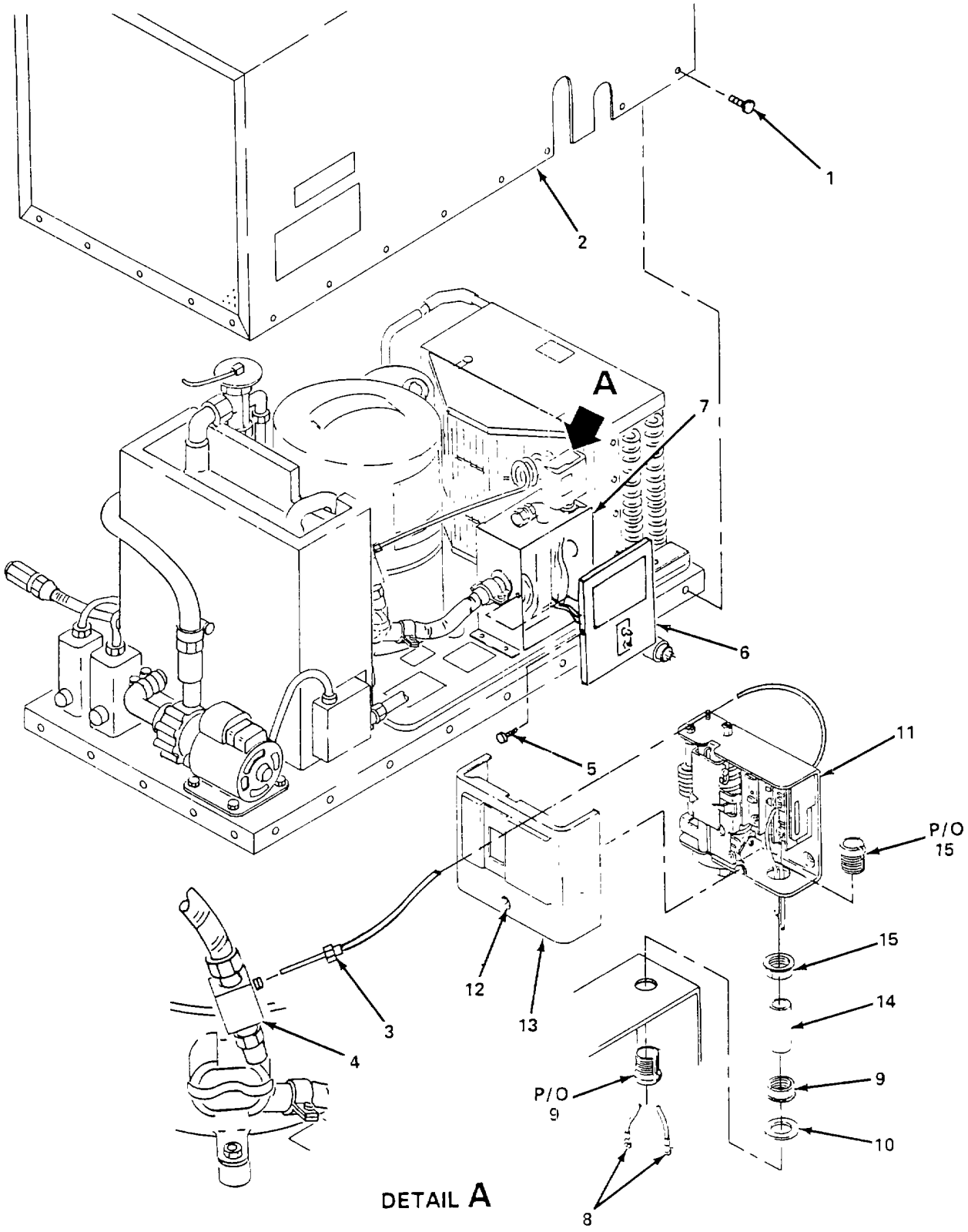


Figure 6-25. Low Pressure Control, Replace.

WARNING

Leave 1 1/2 threads exposed on fitting when applying teflon tape. This will ensure that no teflon tape will hang down inside the air system. Teflon tape should be wrapped in such a manner that when the fitting is tightened the tape will not loosen. Failure to wrap teflon tape correctly may result in contamination or blockage of the air system and subsequent possible injury or death to the diver.

(15) Apply teflon tape to pressure connector assembly (3) threads.

(16) Install pressure connector assembly (3) on compressor (4).

(17) Install cover (2) and secure with 14 screws (1).

6-14. Control Box Assembly.

This task covers: a. Replace b. Repair

INITIAL SETUP

Tools

General Mechanic's Tool Kit (NSN 5180-00-177-7033)
Multimeter

Equipment Condition

Low pressure control removed (para. 6-13).

Materials/Parts

Control Box Assembly

a. *Replace*. (figure 6-26)

(1) Remove two screws (1) and remove cover (2).

(2) Tag and disconnect wires (3) from control box (4).

(3) Remove five self-locking nut (5) and remove five connector (6).

(4) Remove two screws (7) and remove control box (4).

(5) Install control box (4) and secure with two screws (7).

(6) Install five connectors (6) and secure with five self-locking nuts (5).

(7) Connect 14 wires (3) to control box (4).

(8) Install cover (2) and secure with two screws (1).

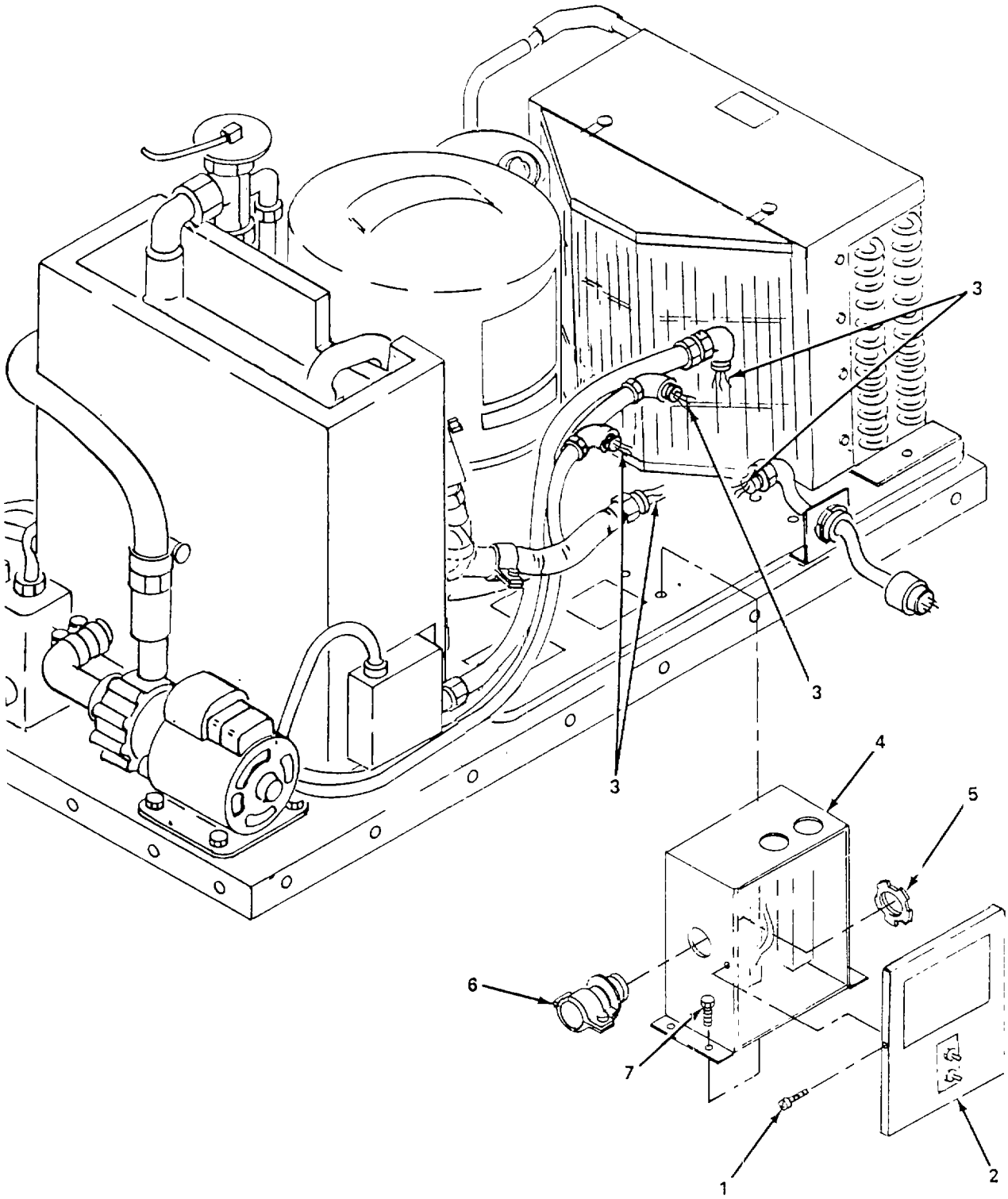


Figure 6-26. Control Box, Replace.

6-14. **Control Box Assembly.**

b. Repair.

(1) *Test relay*. (figure 6-27)

(a) Remove cover of control box (para. a. above).

WARNING

Serious injury or death may result from electrical shock. Ensure that the 220 and 110 Vac external electrical power sources are disconnected before working inside the heater/chiller module.

(b) Apply power to chamber. Using a multimeter, test for voltage across terminals 1 and 2 of relay (refer to schematic, figure 6-27).

(c) Turn SWT-022 ON and check for voltage across terminals S and M. If no voltage is read, replace relay.

(d) Disconnect chamber from power source.

(e) Replace cover of control box (para. a. above).

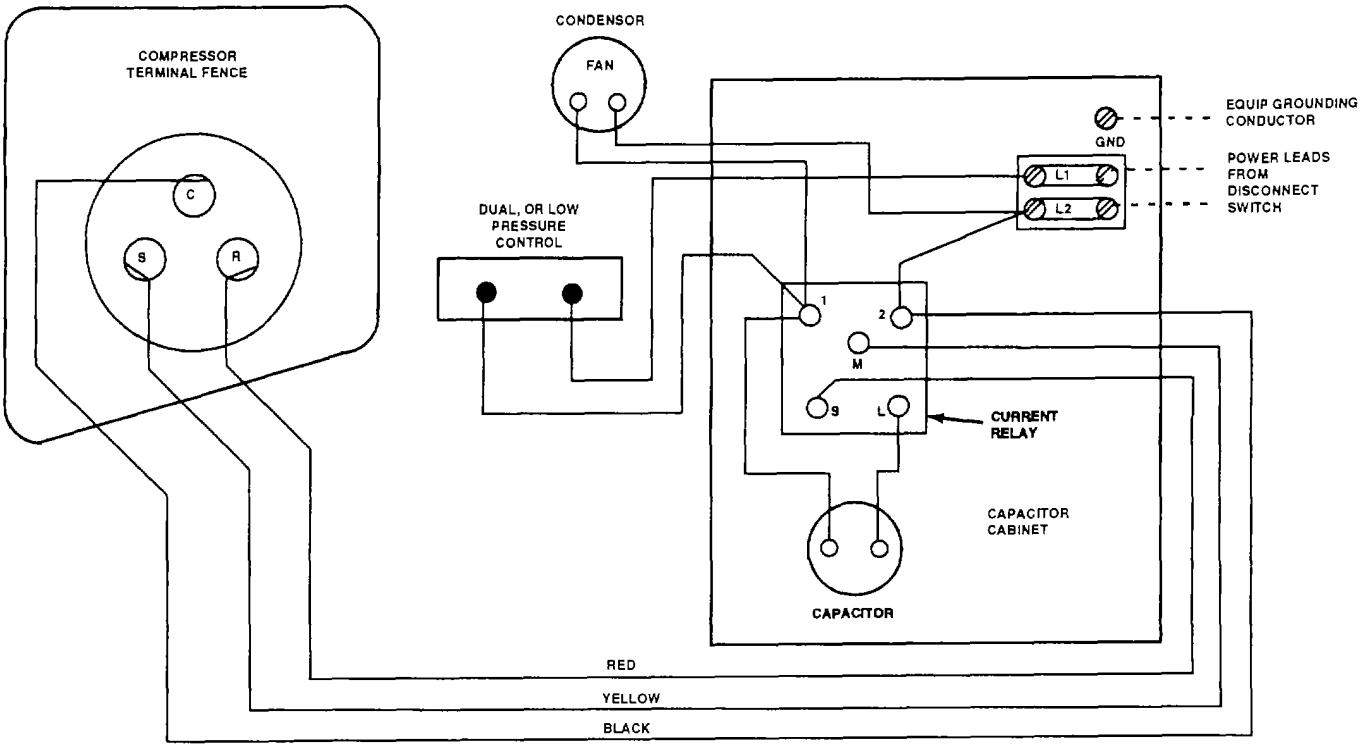


Figure 6-27. Control Box Electrical, Schematic.

6-14. **Control Box Assembly.**

(2) *Replace toggle switch*. (figure 6-28)

NOTE

There are two toggle switches in Control Box Assembly, replacement is for both.

(a) Remove two screws (1) and pull cover (2) away from box (3).

(b) Tag and disconnect leads going to switch (4).

(c) Remove nut (5) and remove switch (4).

(d) Install new switch (4), ensure switch is properly orientated, and secure with nut (5).

(e) Connect and untag leads to switch (4).

*(f) I*nstall cover (2) on control box (3) and secure with two screws (1).

(3) *Replace relay*. (figure 6-28)

(a) Remove two screws (1) securing cover (2) and pull cover (2) away from box (3).

(b) Tag and disconnect leads going to relay (6).

(c) Remove screws (7) and remove relay (6).

(d) Install new relay (6) and secure with screws (7).

(e) Connect and untag leads to relay (6).

(f) Install cover (2) on control box (3) and secure with two screws (1).

(4) *Replace terminal board*. (figure 6-28)

(a) Remove two screws (1) securing cover (2) and pull cover (2) away from box (3).

(b) Tag and disconnect leads from terminal boards (8).

(c) Remove screws (9) and remove terminal boards (8) and insulator (10).

(d) Inspect insulator (10) and replace if cracked or otherwise damaged.

(e) Install insulator (10) and new terminal boards (8) and secure with screws (9).

(f) Connect and untag leads to terminal boards (8).

(g) Install cover (2) on control box (3) and secure with two screws (1).

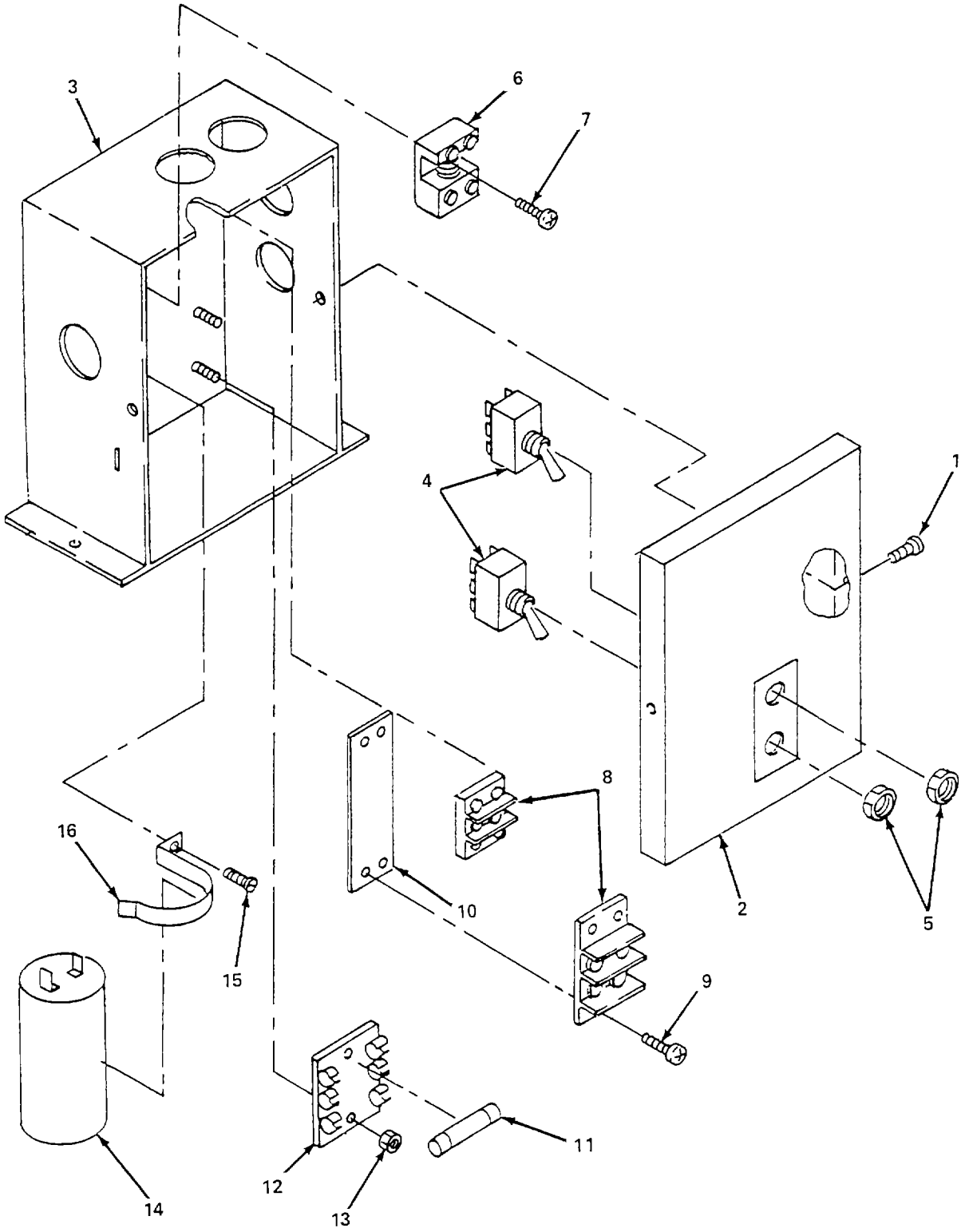


Figure 6-28. Control Box, Repair.

(5) *Replace fuse block*. (figure 6-28)

(a) Remove two screws (1) and pull cover (2) away from box (3).

(b) Tag and remove three fuses (11).

(c) Tag and disconnect leads from fuse block (12).

(d) Remove two nuts (13) and remove fuse block (12).

(e) Install new fuse block (12) and secure with two nuts (13).

(f) Connect and untag leads to fuse block (12).

(g) Install three fuses (11) as tagged.

(h) Install cover (2) on control box (3) and secure with two screws (1).

(6) *Replace capacitor*. (figure 6-28)

(a) Remove two screws (1) and pull cover (2) away from box (3).

(b) Tag and disconnect leads from capacitor (14).

(c) Remove screw (15) and strap (16) and remove capacitor (14).

(d) Install new capacitor (14) and secure with strap (16) and screw (15).

(e) Connect and untag leads to capacitor (14).

(f) Install cover (2) on control box (3) and secure with two screws (1).

FOLLOW-ON MAINTENANCE
Install low pressure control (para. 6-13).

6-15. **Shroud Assembly.**

This task covers:

a. Replace

INITIAL SETUP:

Tools	*Materials/Parts*
General Mechanic's Tool Kit (NSN 5180-00-177-7033)	Shroud Assembly

Replace. (figure 6-29)

(1) Remove 14 screws (1) and remove cover (2).

(2) Remove two screws (3) and (4) and remove fan guard (5).

(3) Remove two shroud clips (6).

(4) Remove six screws (7) and remove shroud (8).

(5) Install shroud (8) and secure with six screws (7).

(6) Install two shroud clip (6).

(7) Install fan guard (5) and secure with two screws (3) and (4).

(8) Install cover (2) and secure with 14 screws (1).

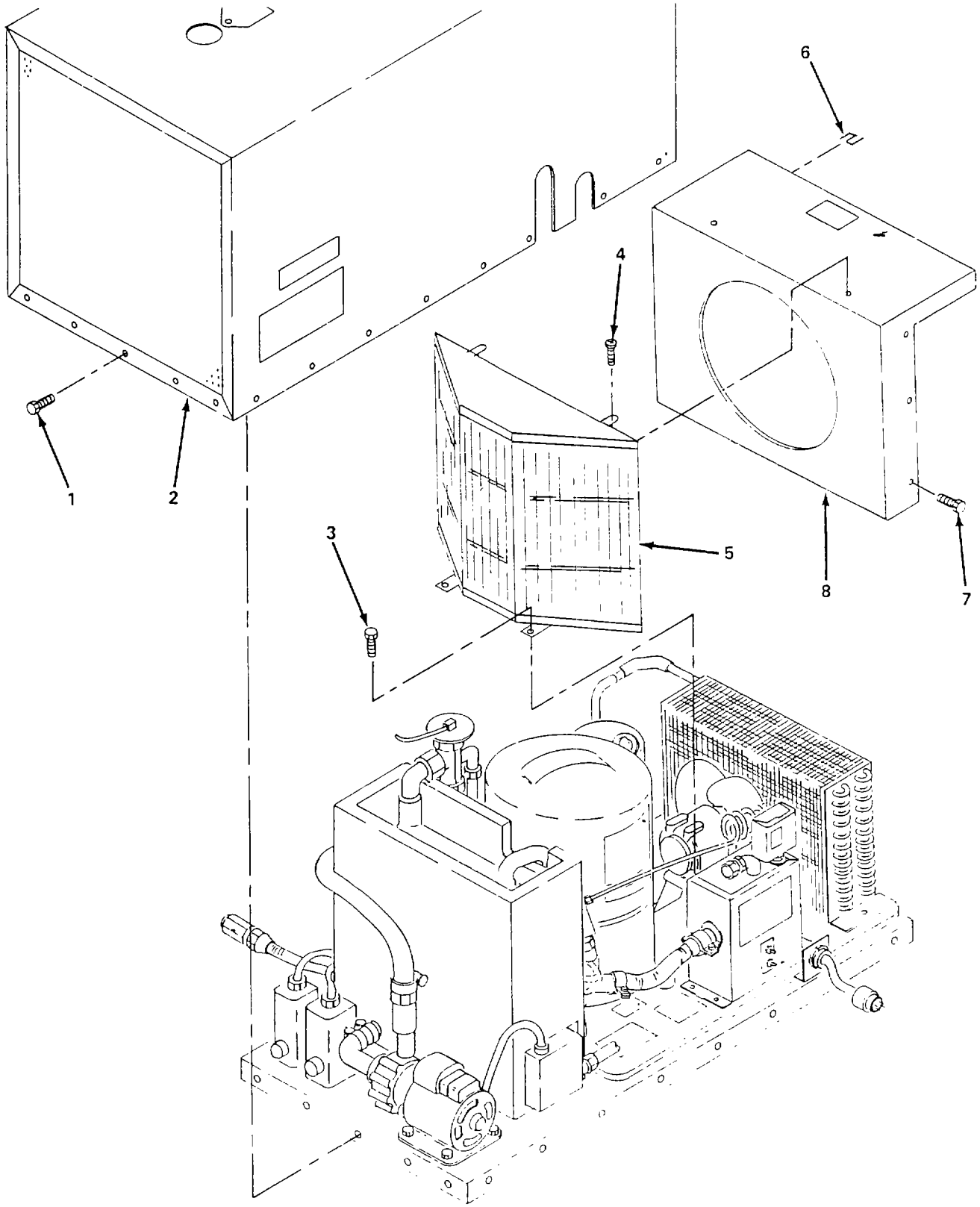


Figure 6-29. Shroud Assembly, Replace.

6-16. **Pump Assembly.**

This task covers:

a. Replace **b. Repair**

INITIAL SETUP:

Tools	*Materials/Parts*
General Mechanic's Tool Kit (NSN 5180-00-177-7033)	Pump Assembly Detergent, Nonionic (Item 8, Appendix E) Distilled Water (Item 9, Appendix E) Cloth, Lint-Free (Item 6, Appendix E)

a. Replace. (figure 6-30)

WARNING

Serious injury or death may result from electrical shock. Ensure that the 220 VAC external electrical power sources are disconnected before working inside the heater/ chiller module.

(1) Remove 14 screws (1) and remove cover (2) from heater/chiller module (3).

(2) Tag and disconnect electrical leads (4) from junction box (5).

(3) Loosen screw (6) on clamp (7) and remove supply hose (8) from fitting (9).

(4) Remove fitting (9) from collar (10) and remove collar from pump (11).

(5) Remove four nuts (12), washers (13), and bolts (14).

(6) Loosen screw (15) on clamp (16) and remove return hose (17) from elbow (18).

(7) Remove pump (11) and remove elbow (18) and fitting (19) from pump.

(8) Install fitting (19) and elbow (18) on pump (11).

(9) Install pump (11) in place and install return hose (17) on elbow (18) and tighten screw (15) on clamp (16).

(10) Install four bolts (14), washers (13), and nuts (12).

(11) Install collar (10) and fitting (9) on pump (11).

(12) Install supply hose (8) on fitting (9) and tighten screw (6) on clamp (7).

(13) Connect electrical leads (14) to junction box (5).

(14) Install cover (2) and secure with 14 screws (1).

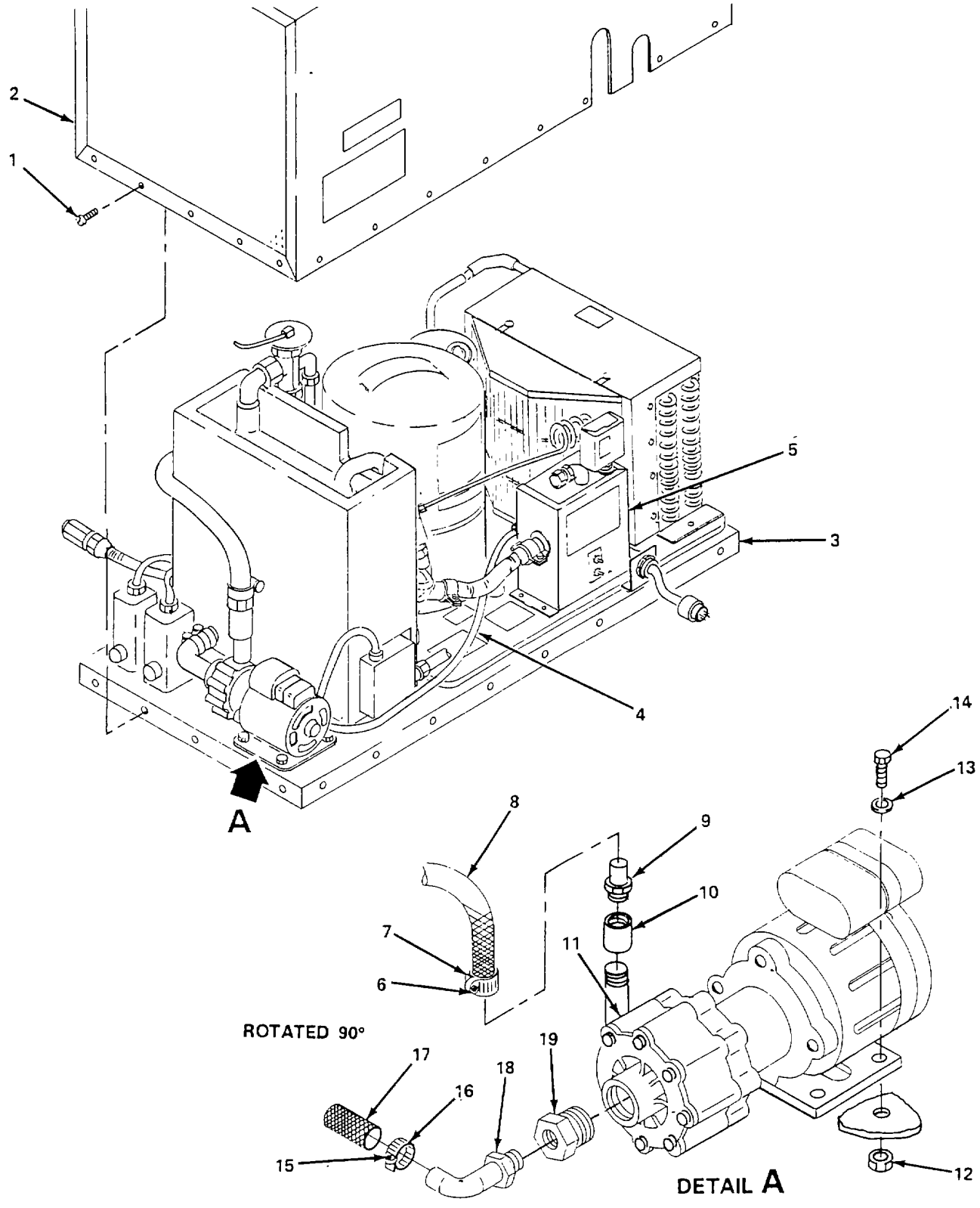


Figure 6-30. Pump Assembly, Replace.

6-16. **Pump Assembly (Cont).**

b. *Repair.* (figure 6-31)

(1) Remove pump assembly (para. a. above).

(2) Remove seven screws (1) and washer (2) that secures cover (3), pump housing (4), and remove cover.

(3) Remove preformed packing (5) ceramic thrust washer (6) from housing (4).

(4) Remove impeller-magnet assembly (7) from housing (4) and remove spindle (8).

(5) Remove drive magnet assembly (9) from motor bracket (10).

(6) Remove four nuts (11) and lockwashers (12), and remove motor bracket (10) from motor (13).

(7) Clean all components using nonionic detergent cleaner and rinse with clean distilled water.

(8) Inspect all components and replace any components that are bent, cracked, worn, or otherwise damaged.

(9) Install motor bracket (10) on motor (13) and secure with four lockwashers (12) and nuts (11).

(10) Install drive magnet assembly (9) in motor bracket (10).

(11) Install spindle (8) into impeller-magnet assembly (7) and install into housing (4).

(12) Install ceramic thrust washer (6) and preformed packing (5) into housing (4).

(13) Install housing (4) and secure with seven screws (1) and washers (2).

(14) Install pump assembly (para. a. above).

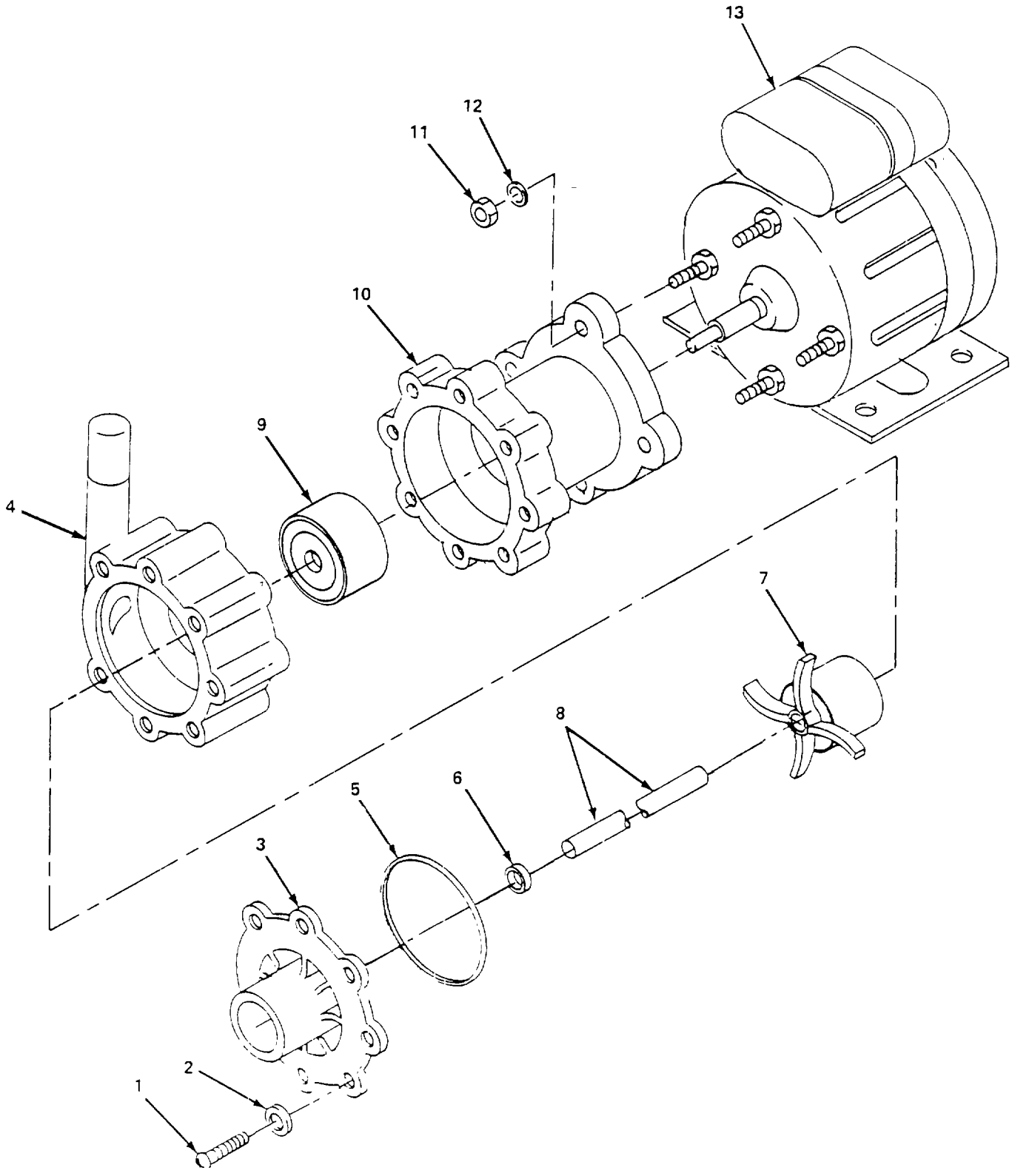


Figure 6-31. Pump Assembly, Repair.

6-17. **High Temperature Control Unit.**

This task covers:

a. Replace **b. Repair**

INITIAL SETUP:

Tools	*Materials/Parts*
General Mechanic's Tool Kit (NSN 5180-00-177-7033)	High Temperature Control Unit Detergent, Nonionic (Item 8, Appendix E) Water, Distilled (Item 9, Appendix E) Cloth, Lint-Free (Item 6, Appendix E)

a. *Replace*. (figure 6-32)

(1) Remove 14 screws (1) and remove cover (2).

(2) Remove packing nut assembly (3) from reservoir (4).

(3) Loosen captive screw (5) from cover (6).

(4) Tag and disconnect two wires (7) from control unit (8).

(5) Remove cable connector (9) and remove two wire (7).

(6) Remove two screws (10) and remove control unit (8).

(7) Install control unit (8) and secure with two screws (10).

(8) Install two wires (7) through cable connector (9) and install connector on control unit (8).

(9) Connect two wires (7) to control unit (8).

(10) Set high temperature to 130°F (54°C) by adjusting control knob (11).

(11) Install cover (6) and tighten captive screw (5).

(12) Install packing nut assembly (3) on reservoir (4).

(13) Install cover (2) secure with 14 screws (1).

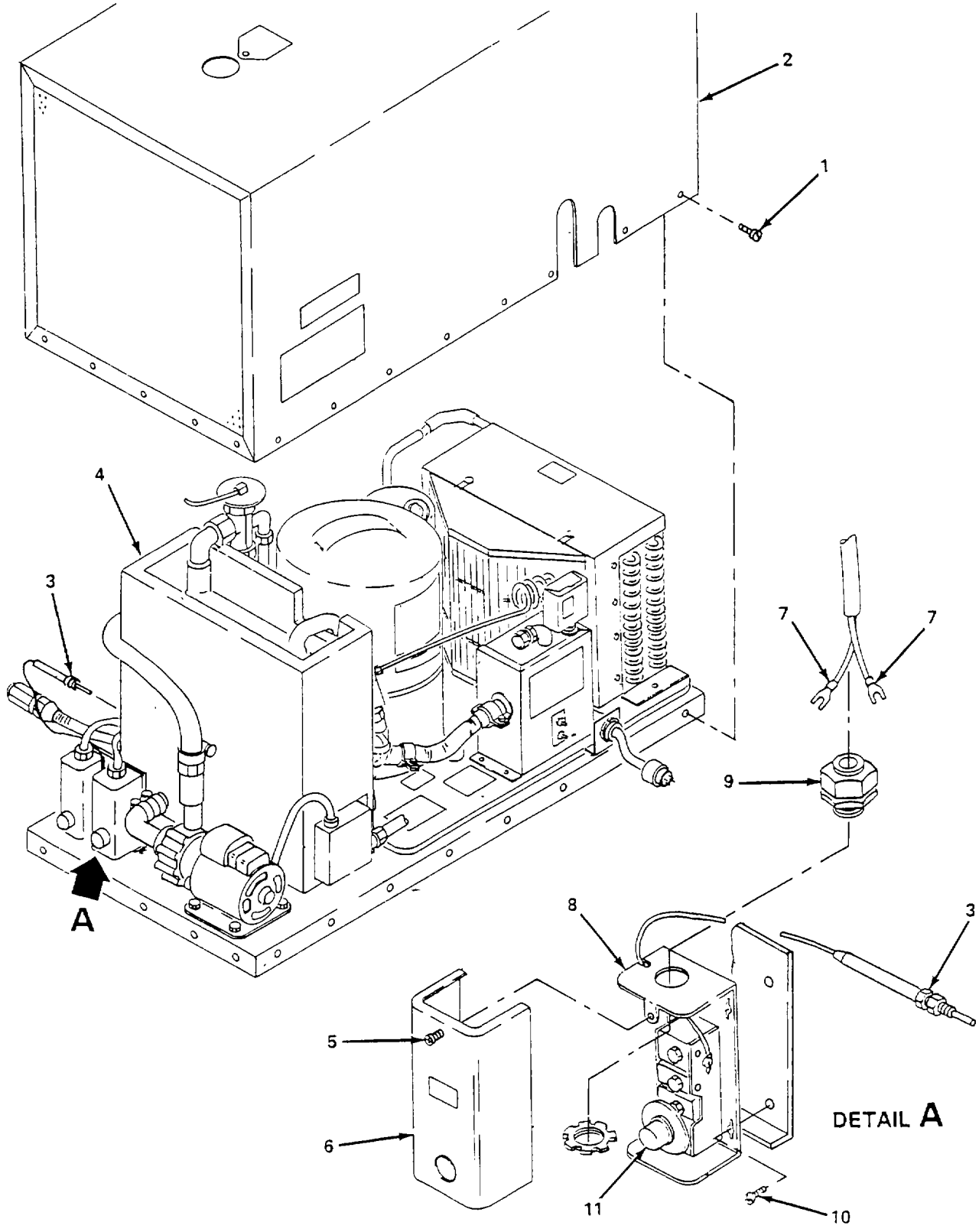


Figure 6-32. High Temperature Control Unit, Replace.

6-17. **High Temperature Control Unit (Cont).**

b. *Repair.* (figure 6-33)

(1) Remove high temperature control unit (para. a. above).

(2) Remove packing nut assembly (1) from bulb well (2).

(3) Loosen two captive screws (3) and remove cover (4).

(4) Remove screw (5) and clamp (6) and remove bulb well (2) from control unit (7).

(5) Clean all components using nonionic detergent cleaner and rinse with clean distilled water.

(6) Inspect bulb well (2) and replace if cracked, nicks or otherwise damaged.

(7) Inspect packing nut assembly (1) and replace if threads are stripped, cracked or otherwise damaged.

(8) Install bulb well (2) and secure with clamp (6) and screws (5).

(9) Install cover (4) and tighten two captive screws (3).

(10) Install packing nut assembly (1) on bulb well (2).

(11) Install high temperature control unit (para. a. above).

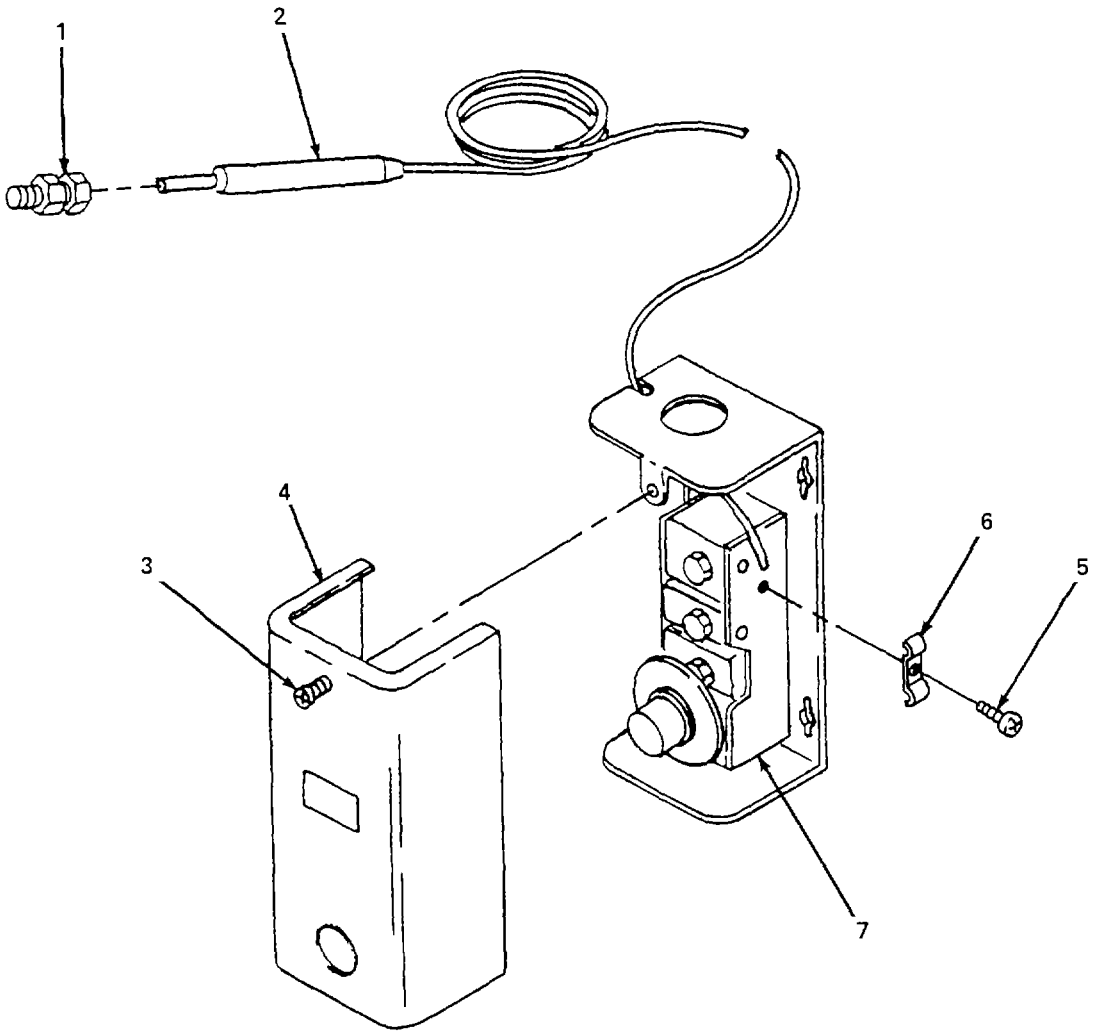


Figure 6-33. High Temperature Control Unit, Repair.

6-18. **Low Temperature Control Unit.**

This task covers:

a. Replace **b. Repair**

INITIAL SETUP:

Tools	*Materials/Parts*
General Mechanic's Tool Kit (NSN 5180-00-177-7033)	Low Temperature Control Unit Detergent, Nonionic (Item 8, Appendix E) Water, Distilled (Item 9, Appendix E) Cloth, Lint-Free (Item 6, Appendix E)

a. *Replace*. (figure 6-34)

(1) Remove 14 screws (1) and remove cover (2).

(2) Remove packing nut assembly (3) from reservoir (4)

(3) Loosen captive screw (5) from cover (6).

(4) Tag and disconnect two wires (7) from control unit (8).

(5) Remove cable connector (9) and remove two wire (7).

(6) Remove two screws (10) and remove control unit (8).

(7) Install control unit (8) and secure with two screws (10).

(8) Install two wires (7) through cable connector (9) and install connector on control unit (8).

(9) Connect two wires (7) to control unit (8).

(10) Set low temperature to 32°F (0°C) by adjusting control knob (11).

(11) Install cover (6) and tighten captive screw (5).

(12) Install packing nut assembly (3) on reservoir (4).

(13) Install cover (2) secure with 14 screws (1).

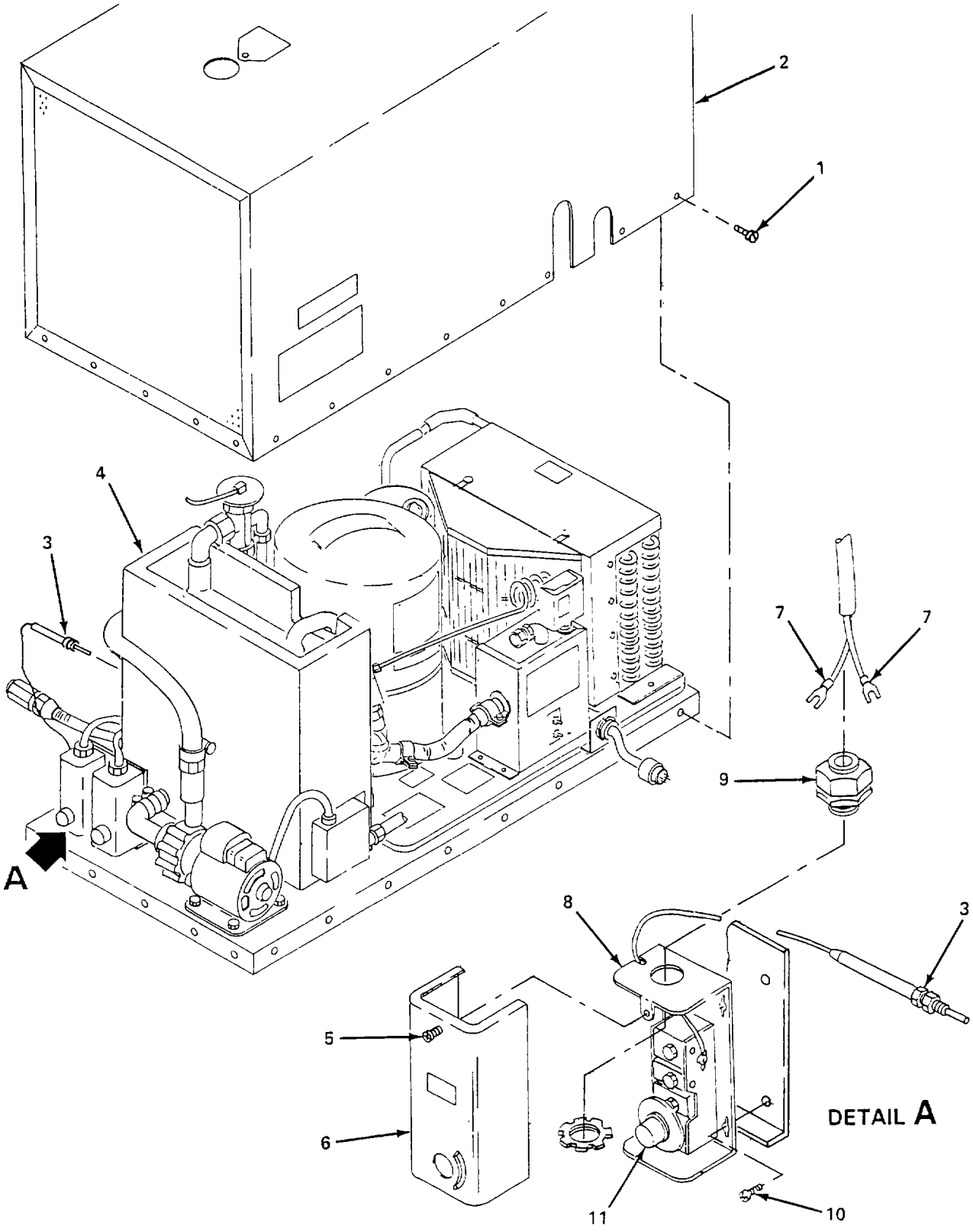


Figure 6-34. Low Temperature Control Unit, Replace.

6-18. **Low Temperature Control Unit (Cont).**

b. *Repair*. (figure 6-35)

(1) Remove high temperature control unit (para. a. above).

(2) Remove packing nut assembly (1) from bulb well (2).

(3) Loosen two captive screws (3) and remove cover (4).

(4) Remove screw (5) and clamp (6) and remove bulb well (2) from control unit (7).

(5) Clean all components using nonionic detergent cleaner and rinse with clean distilled water.

(6) Inspect bulb well (2) and replace if cracked, nicks or otherwise damaged.

(7) Inspect packing nut assembly (1) and replace if threads are stripped, cracked or otherwise damaged.

(8) Install bulb well (2) and secure with clamp (6) and screws (5).

(9) Install cover (4) and tighten two captive screws (3).

(10) Install pack nut assembly (1) on bulb well (2).

(11) Install high temperature control unit (para. a. above).

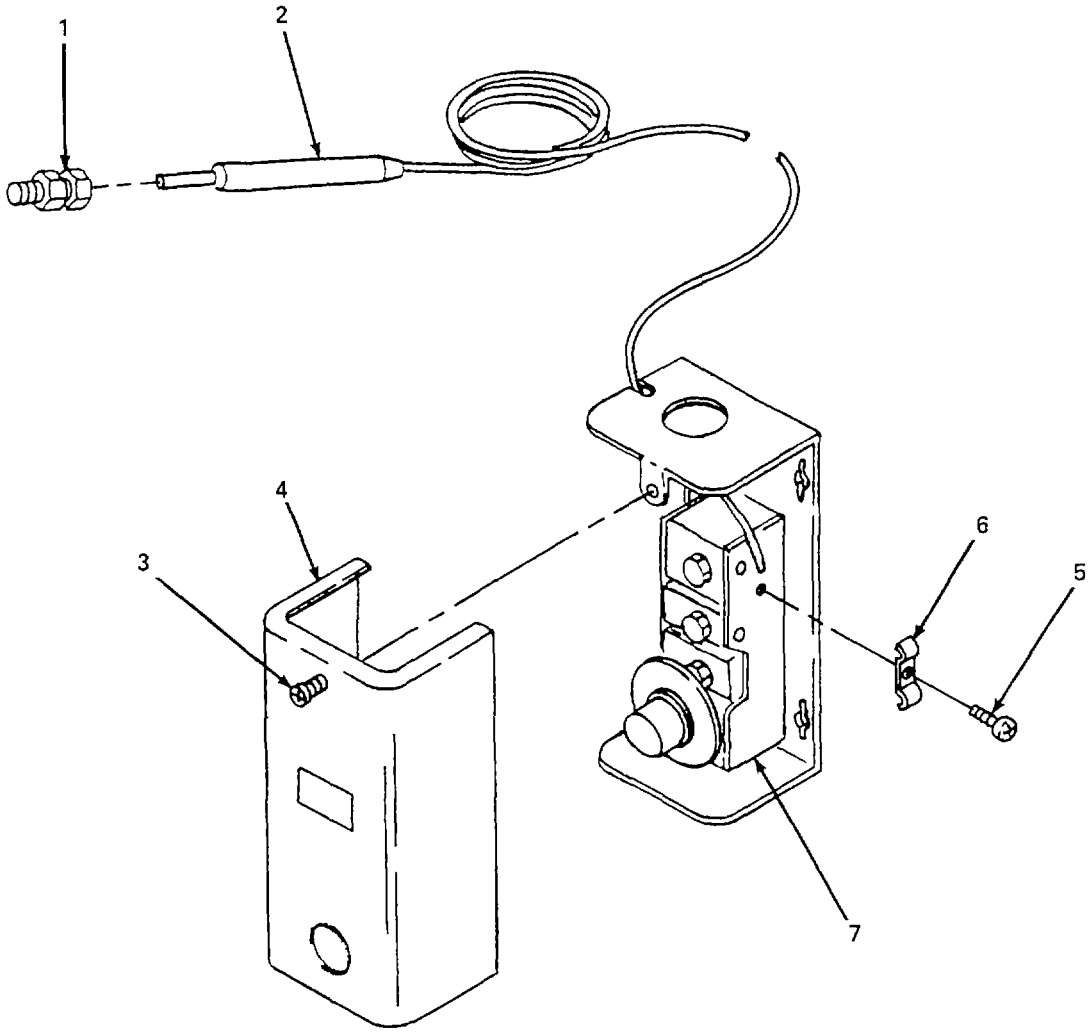


Figure 6-35. Low Temperature Control Unit, Repair.

6-19. **Motor (CO_2 Scrubber Assembly).**

This task covers:

Repair

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Scrubber Assembly Motor
Cloth, Lint-Free (Item 6, Appendix E)

Materials/Parts

Detergent, Nonionic (Item 8, Appendix E)
Distilled Water (Item 9, Appendix E)

Equipment Condition

Scrubber assembly motor removed (para. 5-15).

Repair. (figure 6-36)

(1) Remove eight screws (1), connector stop (2) ,and remove end plate (3) and preformed packing (4)

(2) Remove three screws (5), circuit motor control board assembly (6), and spacer (7) from end plate (3).

(3) Remove roller bearing (8), six washers (9) from end plate (3).

(4) Remove nut (10) and male connector (11) from end plate (3).

(5) Tag and disconnect electrical bands (12) from motor assembly stator (13) and remove stator.

(6) Remove retaining ring (14) and (15), and remove bearing sleeve (16) and roller bearing (17).

(7) Remove preformed packing (18) and (19), setscrew (20) and magnetic disc switch (21) from shaft (22) and remove shaft.

(8) Remove rotor housing (23) from stator housing (24).

(9) Clean all components using nonionic detergent cleaner and rinse with clean distilled water.

(10) Inspect all items and replace all items that are bent, burnt, cracked, worn, or otherwise damaged.

(11) Install rotor housing (23) in stator housing (24).

(12) Install shaft (22) in rotor housing (23) and install magnetic disc switch (21) and secure with setscrew (20).

(13) Install preformed packing (19) and (18).

(14) Install roller bearing (17), bearing sleeve (16) and secure with retaining rings (15) and (14).

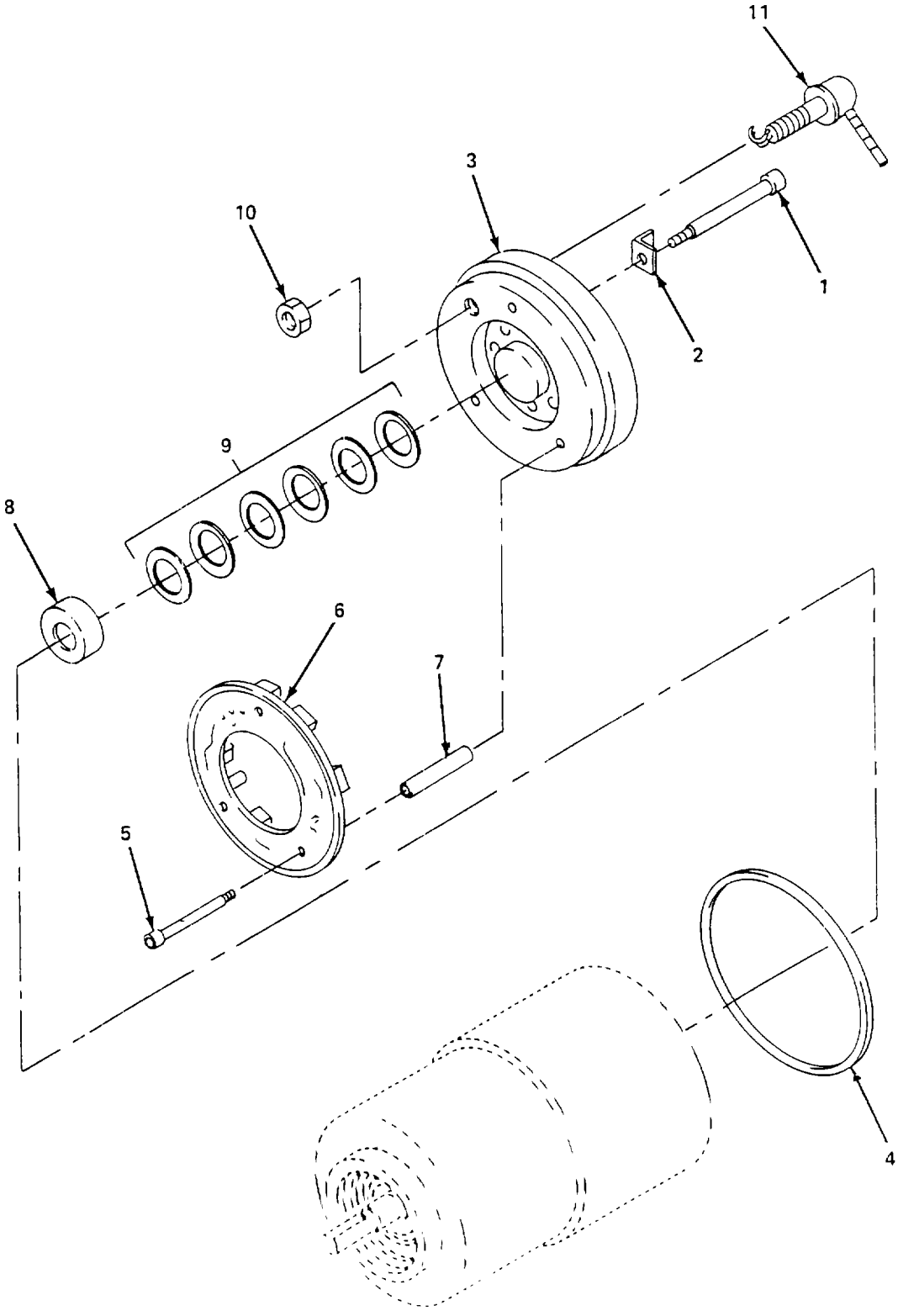


Figure 6-36. Motor, Repair (Sheet 1 of 2).

6-19. **Motor (CO_2 Scrubber Assembly) (Cont).**

(15) Install motor assembly stator (13) into stator housing (24).

(16) Connect electrical leads (12) to motor control board assembly (6).

(17) Install male connector (11) in end plate (3) and secure with nut (10).

(18) Install six washers (9) and roller bearing (8) in end plate (3).

(19) Install spacer (7), motor control board assembly (6) on end plate (3), and secure with three screws (5).

(20) Install preformed packing (4), end plate (3) and secure with connector stop (2) and eight screws (1).

FOLLOW-ON MAINTENANCE
Install scrubber assembly motor (para. 5-15).

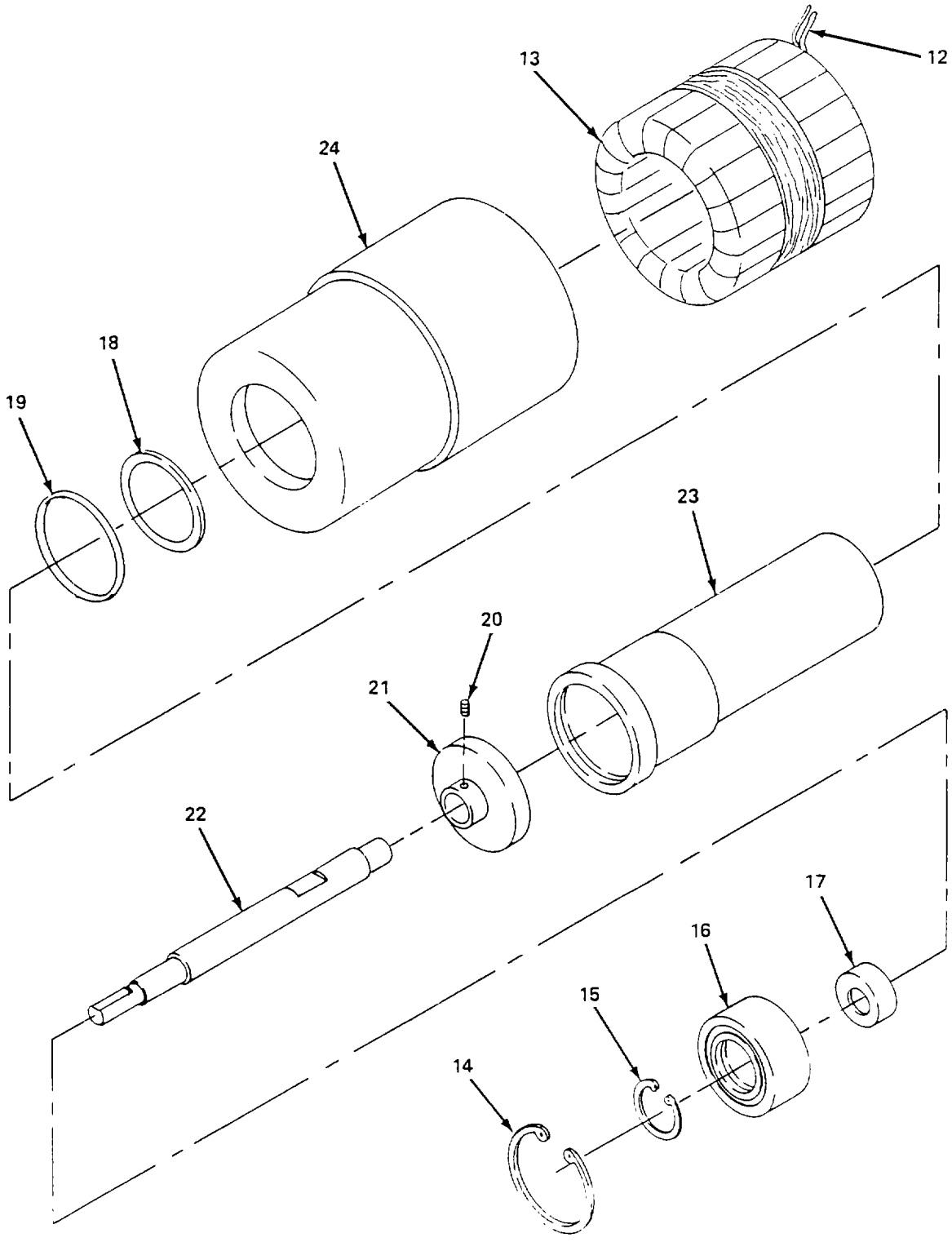


Figure 6-36. Motor, Repair (Sheet 2 of 2).

6-20. **Portable Oxygen Analyzer.**

This task covers:

Repair

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)
Solder Gun

Materials/Parts

Portable Oxygen Analyzer
Solder, Rosin Core (Item 20, Appendix E)
Cloth, Lint Free (item 6, Appendix E)

Materials/Parts (Cont)

Detergent, Nonionic (Item 8, Appendix E)
Distilled Water (Item 9, Appendix E)

Equipment Condition

Chamber shut down (para. 2-15).
Portable oxygen analyzer removed (para. 4-34).
Portable oxygen analyzer battery removed (para. 5-16).

Repair. (figure 6-37)

(1) Remove two screws (1) and separate front cover (2) from housing (3).

(2) Tag and unsolder electrical leads (4) from electrical components on front cover (2) and remove probe leads (5).

(3) Remove four screws (6) and remove battery holder assembly (7) and stand off bumpers (8).

NOTE

When removing electrical leads to remove a component, refer to schematic (figure 6-38). Tag and remove leads only as required.

(4) Remove four nuts (9) and remove P.C. board (10).

(5) Remove two nuts (11) and remove transformer (12).

(6) Remove power inlet assembly (13).

(7) Remove range knob (14) and nut (15) and remove switch (16).

(8) Remove span knob (17) and nut (18) and remove potentiometer (19).

(9) Remove four nuts (20) and lockwashers (21) and remove meter (22) from cover (2).

(10) Clean all components using nonionic detergent cleaner and rinse with clean distilled water.

(11) Inspect all components and replace all components that are bent, cracked, worn, or otherwise damaged.

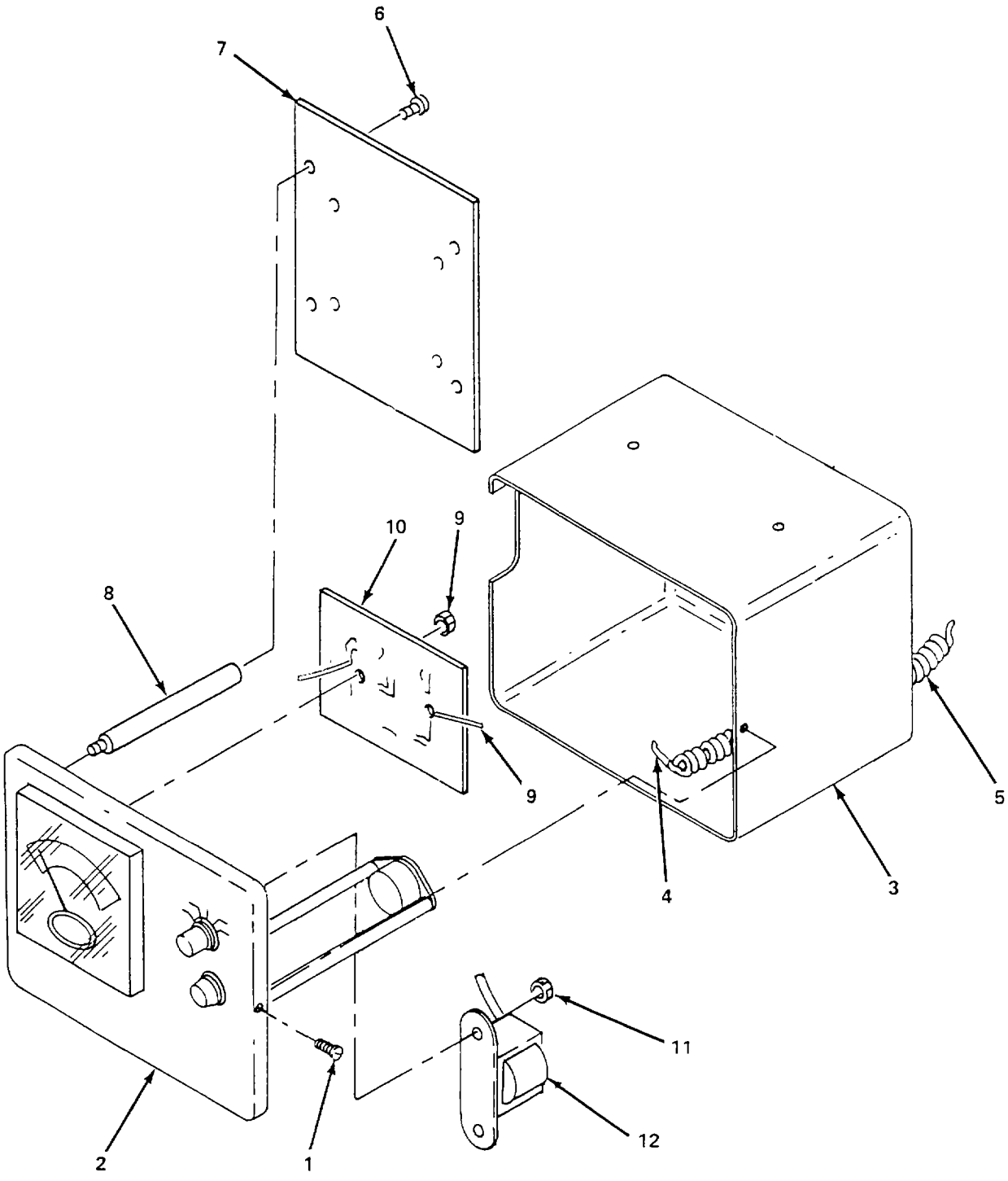


Figure 6-37. Portable Oxygen Analyzer, Repair (Sheet 1 of 2).

6-20. **Portable Oxygen Analyzer (Cont).**

NOTE

Refer to schematic (figure 6-38) to replace electrical leads when replacing a component.

(12) Install meter (22) on cover (2) and secure with four lockwashers (21) and nuts (20).

(13) Install potentiometer (19) and secure with nut (18) and span knob (17).

(14) Install switch (16) and secure with nut (15) and range knob (14).

(15) Install power inlet assembly (13).

(16) Install transformer (12) and secure with two nuts (11).

(17) Install P.C. board (10) and secure with four nuts (9).

(18) Install four stand off bumpers (8), battery holder assembly (7) and secure with four screws (6).

(19) Install probe electrical wire (5) through housing (3) and connect electrical leads (4) to cover (2).

(20) Install cover (2) on housing (3) and secure with two screws (1).

FOLLOW-ON MAINTENANCE
(1) Install oxygen analyzer battery (para. 5-16).
(2) Install portable oxygen analyzer (para. 4-34).

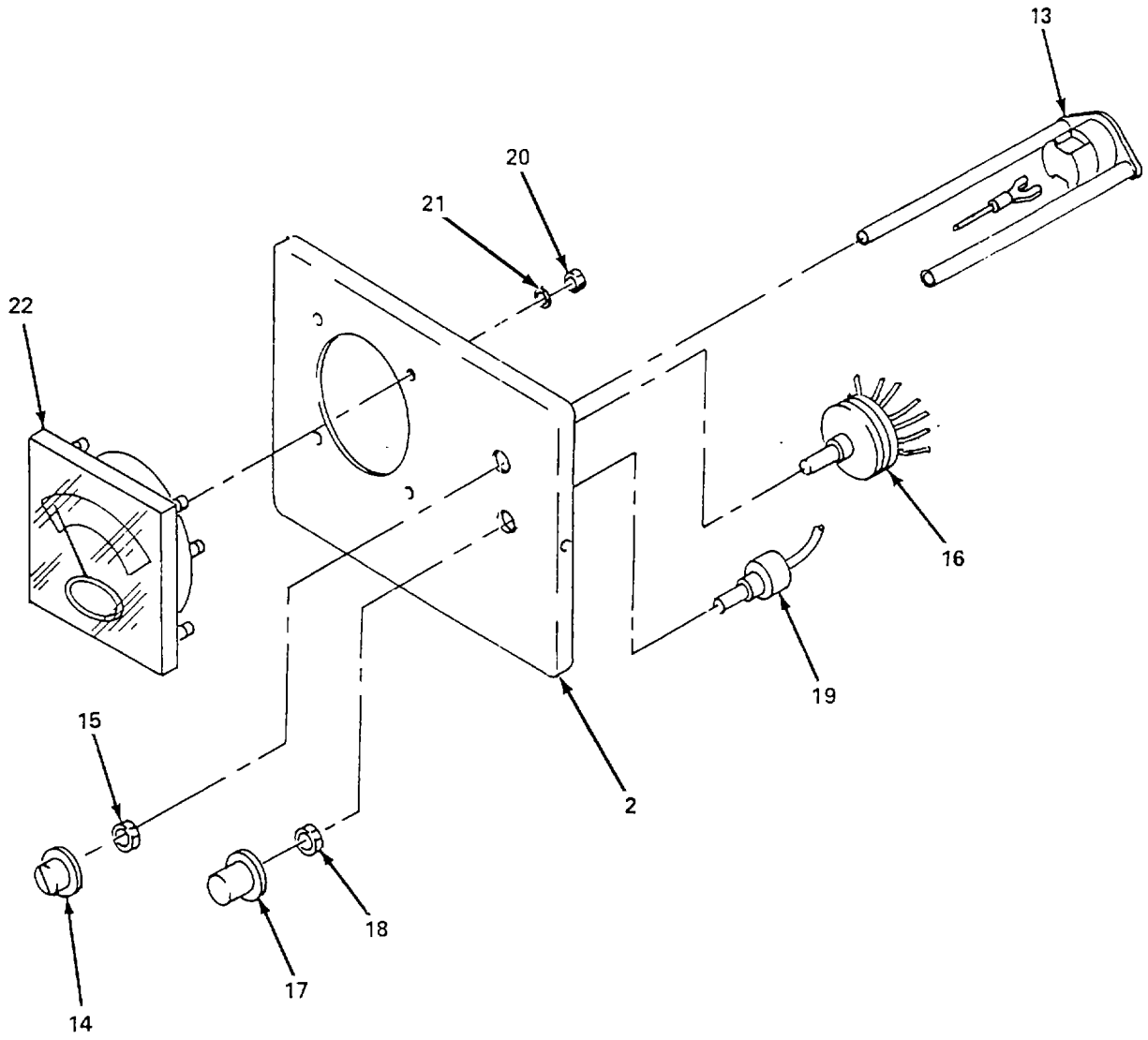


Figure 6-37. Portable Oxygen Analyzer, Repair (Sheet 2 of 2).

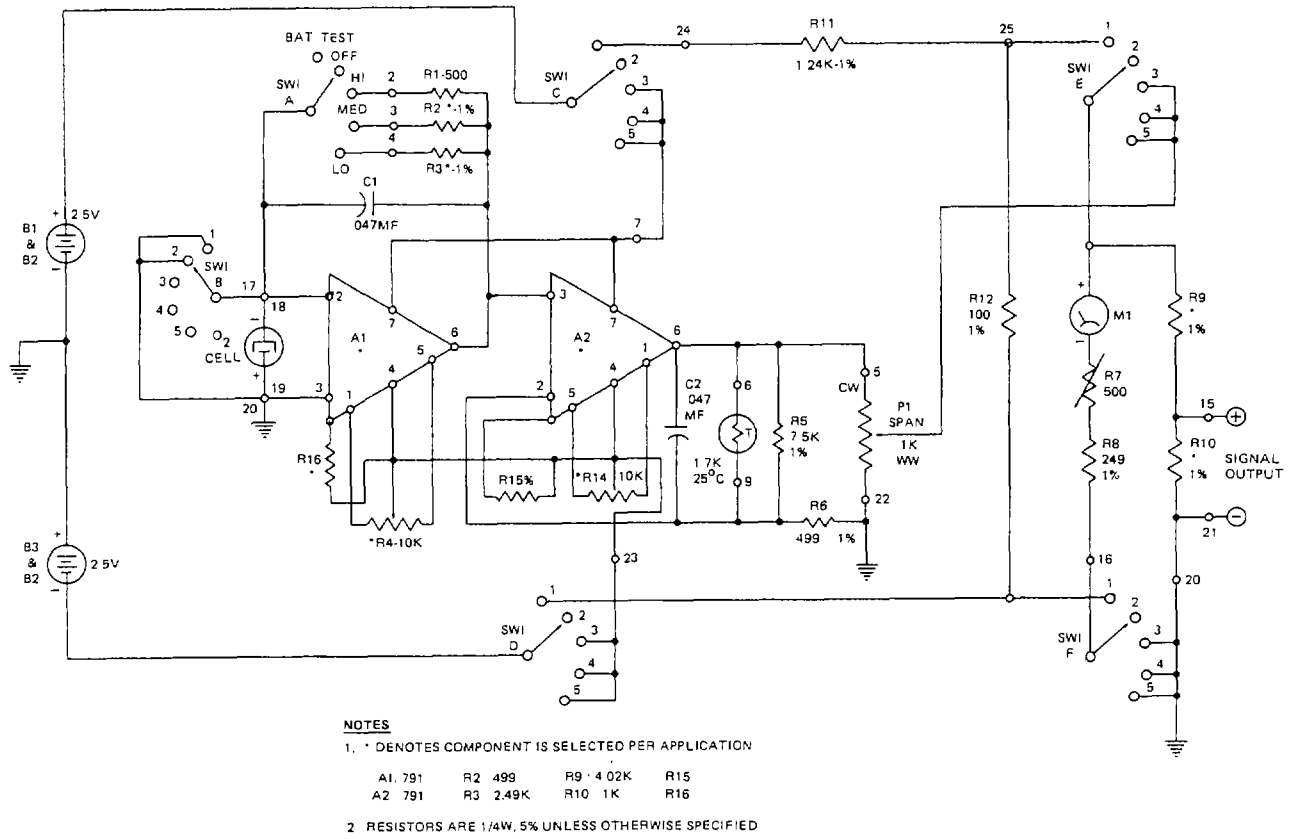


Figure 6-38. Portable Oxygen Analyzer, Schematic.

6-21. **Pressure Regulator.**

This task covers:
Repair

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Valve Kit, Standard
Valve Kit, Soft Goods
Pressure Regulator
Detergent, Nonionic (Items, Appendix E)

Materials/Parts (Cons)

Bands, Rubber (Item 4, Appendix E)
Bags, Plastic (Item 3, Appendix E)
Cloth, Lint Free (Item 6, Appendix E)
Distilled Water (Item 9, Appendix E)

Equipment Condition

Pressure regulator removed (para. 5-31).

Repair. (figure 6-39)

WARNING

To prevent the spread of disease, serious injury and/or death, oxygen breathing systems must be maintained hygienically clean and free from dust, dirt, and all hydrocarbon contamination. Refer to oxygen system prework procedures para. 4-10 to avoid violating this warning.

(1) Remove hole plug (1), retaining ring (2), and name plate (3) and remove handknob (4).

(2) Remove screw (5), bonnet (6), three thrust washers (7).

(3) Remove screw (8), spring (9), and rod vent valve (10) from adjusting screw (11).

(4) Remove adjusting screw (11), spring cap assembly (12), washer (25), and load spring (13).

(5) Remove seat retainer (14), vent valve seat (15), vent valve (16), spring (17), and nut (18).

(6) Remove preformed packing (19), back-up sensor (20), preformed packing (21), sensor (22), preformed packing (23), and button (24).

(7) Remove connector (26), roll pin (27), venturi tube (28), and plate (29).

(8) Remove orifice (30), preformed packing (31) from regulator body (32).

(9) Remove valve cap (33), valve seat (34) from valve (35).

(10) Remove valve (35), valve spring (36), washer (37), and ring retainer (38).

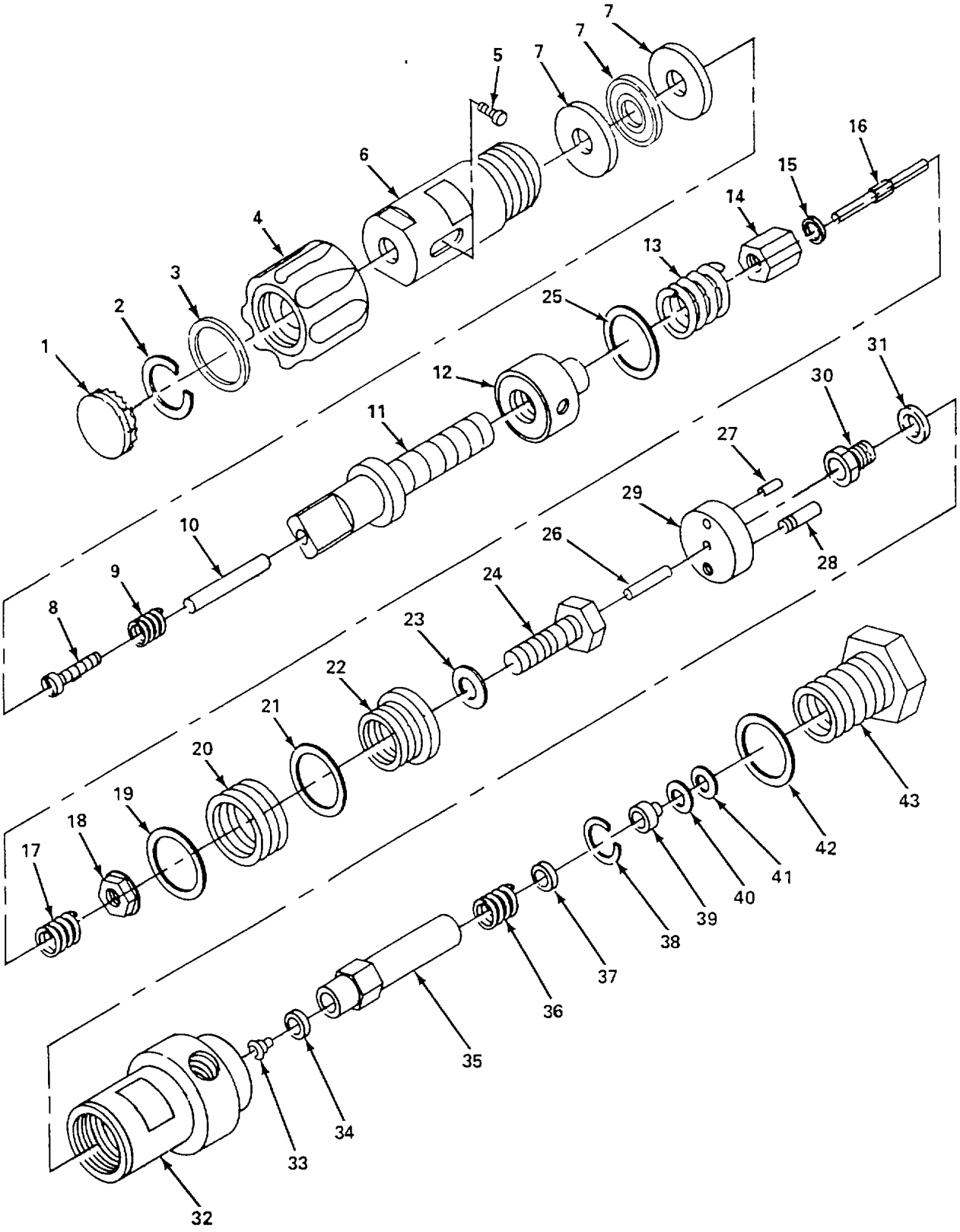


Figure 6-39. Pressure Regulator, Repair.

(11) Remove retaining plate (39), preformed packing (40), back-up ring (41), preformed packing (42) and valve cap (43).

(12) Clean all components using nonionic detergent cleaner and rinse with clean distilled water.

(13) Inspect all items and replace all items that are bent, cracked, worn, or otherwise damaged.

(14) Install valve cap (43), preformed packing (42), back-up ring (41), preformed packing (40), and retaining plate (39).

(15) Install ring retainer (38), washer (37), valve spring (36), and valve (35).

(16) Install valve (35), valve seat (34), and valve cap (33).

(17) Install preformed packing (31) and orifice (30) in regulator body (32).

(18) Install plate (29), venturi tube (28), roll pin (27), and connector (26).

(19) Install button (24), preformed packing (23), sensor (22), preformed packing (21), preformed packing (19), and back-up sensor (20).

(20) Install nut (18), spring (17), vent valve (16), vent valve seat (15) and seat retainer (14).

(21) Install load spring (13), spring cap assembly (12), washer (25), and adjusting screw (11).

(22) Install rod bent valve (10), spring (9), screw (8) into adjusting screw (11).

(23) Install three thrust washers (7) in bonnet (6) and screw (5).

(24) Install handknob (4), name plate (3), retaining ring (2) and hole plug (1).

FOLLOW-ON MAINTENANCE
Install pressure regulator (para. 5-31).

6-22. Back Pressure Regulators.

This task covers: Repair

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)
Wrench, Torque (NSN 5120-00-227-2540)

Materials/Parts

Valve Kit, Standard
Valve Kit, Soft Goods
Grease, Halocarbon (Item 13, Appendix E)

Materials/Parts (Cont)

Bands, Rubber (Item 4, Appendix E)
Bags, Plastic (Item 3, Appendix E)
Cloth, Lint Free (Item 6, Appendix E)
Detergent, Nonionic (Item8, Appendix E)
Distilled Water (Item 9, Appendix E)

Equipment Condition

Back pressure regulator removed (para. 5-32).

Repair. (figure 6-40)

WARNING

To prevent the spread of disease, serious injury and/or death, oxygen breathing systems must be maintained hygienically clean and free from dust, dirt, and all hydrocarbon contamination. Refer to oxygen system prework procedures para. 4-10 to avoid violating this warning.

NOTE

There are two back pressure regulators. Replacement of each regulator is the same.

(1) Remove four screws (1) and remove cover (2).

(2) Remove six screws (3) securing dome (4) to regulator body (5), and remove dome (4).

(3) Remove center seal diaphragm (6), preformed packing (7), back-up diaphragm (8), diaphragm (9), spring (10), valve stem cap (11), washer (12), shaft force (13), preformed packing (14), valve stem (15), back-up diaphragm (16) from the center nut diaphragm (17).

(4) Remove center nut diaphragm (17) from regulator body (5).

(5) Remove preformed packing (18), balance piston (19), seat retainer (20), and valve seat (21) from regulator body (5).

(6) Remove six screws (22) that secures balance dome (23) to regulator body (5) and remove balance dome.

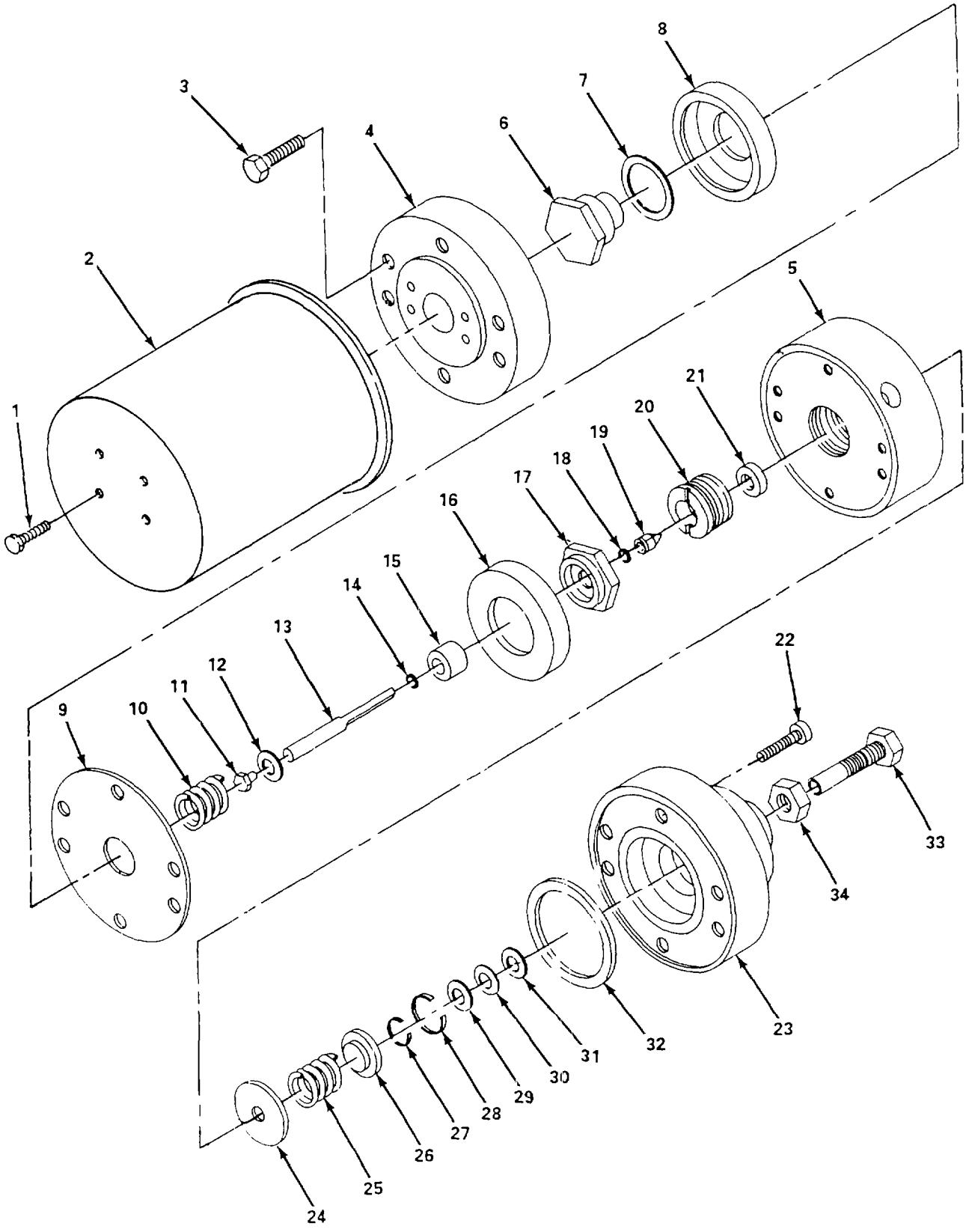


Figure 6-40. Back Pressure Regulators, Repair.

(7) Remove button spring (24), spring (25), button spring (26), ring retainer (27), ring retainer (28), washer (29), preformed packing (30), ring backup (31) from balance dome (23).

(8) Remove preformed packing (32) from balance dome (23).

(9) Remove bolt (33) and nut (34) from balance dome (23).

(10) Clean all components using nonionic detergent cleaner and rinse with clean distilled water.

(11) Inspect all items and replace all items that are bent, cracked, worn, or otherwise damaged.

(12) Install bolt (33) and nut (34) into balance dome (23).

(13) Lubricate all preformed packings.

(14) Install preformed packing (32) into balance dome (23).

(15) Install ring backup (31), preformed packing (30), washer (29), ring retainer (28), ring retainer (27), button spring (26), spring (25), and button spring (24) into balance dome (23).

(16) Install balance dome (23) on regulator body (5) and secure with six bolts (22).

(17) Install valve seat (21), seat retainer (20), balance piston (19), and preformed packing (18) into regulator body (5). Torque seat retainer to 95-100 in. lbs.

(18) Install center nut diaphragm (17) into regulator body (5).

(19) Install backup diaphragm (16), valve stem (15), preformed packing (14), shaft force (13), washer (12), valve stem cap (11), spring (10), diaphragm (9), backup diaphragm (8), preformed packing (7) and center seal diaphragm (6) into center nut diaphragm (17). Torque valve stem cap to 45-50 in. lbs. Torque center seal diaphragm to 80-85 in. lbs.

(20) Install dome (4) onto regulator body (5) and secure with six screws (3). Torque screws to 170-180 in lbs.

(21) Install cover (2) and secure with four screws (1).

FOLLOW-ON MAINTENANCE
Install back pressure regulator (para. 5-32)

6-23. Oxygen Shutoff Valve.

This task covers: Repair

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)
Bags, Plastic (Item 3, Appendix E)

Materials/Parts

Shutoff Valve
Valve Kit
Detergent, Nonionic (Item 8, Appendix E)
Distilled Water (Item 9, Appendix E)

Materials/Parts (Cont)

Cloth, Lint Free (Item 6, Appendix E)
Bands, Rubber (Item 4, Appendix E)
Leak Test Compound (Item 7, Appendix E)

Equipment Condition

Shutoff valve removed (para. 5-33).

Replace. (figure 6-41)

WARNING

To prevent the spread of disease, serious injury and/or death, oxygen breathing systems must be maintained hygienically clean and free from dust, dirt, and all hydrocarbon contamination. Refer to oxygen system prework procedures para. 4-10 to avoid violating this warning.

NOTE

- Shutoff valve is partially disassembled when removed.
- Bonnet has left hand thread.

(1) Remove bonnet (1), backup ring (2), and preformed packing (3) from body (4).

(2) Hold bonnet (1) and turn valve stem (5) clockwise and remove seat (6) and preformed packing (7).

(3) Remove gland nut (8).

(4) Remove stem (5), and guide assembly (9) from bonnet (1).

(5) Remove seal retainer (10) and stem seal (11) from bonnet (1).

(6) Loosen nut (12) and remove guide assembly (9) and nut (12).

(7) Clean all components with nonionic detergent and rinse thoroughly with distilled water.

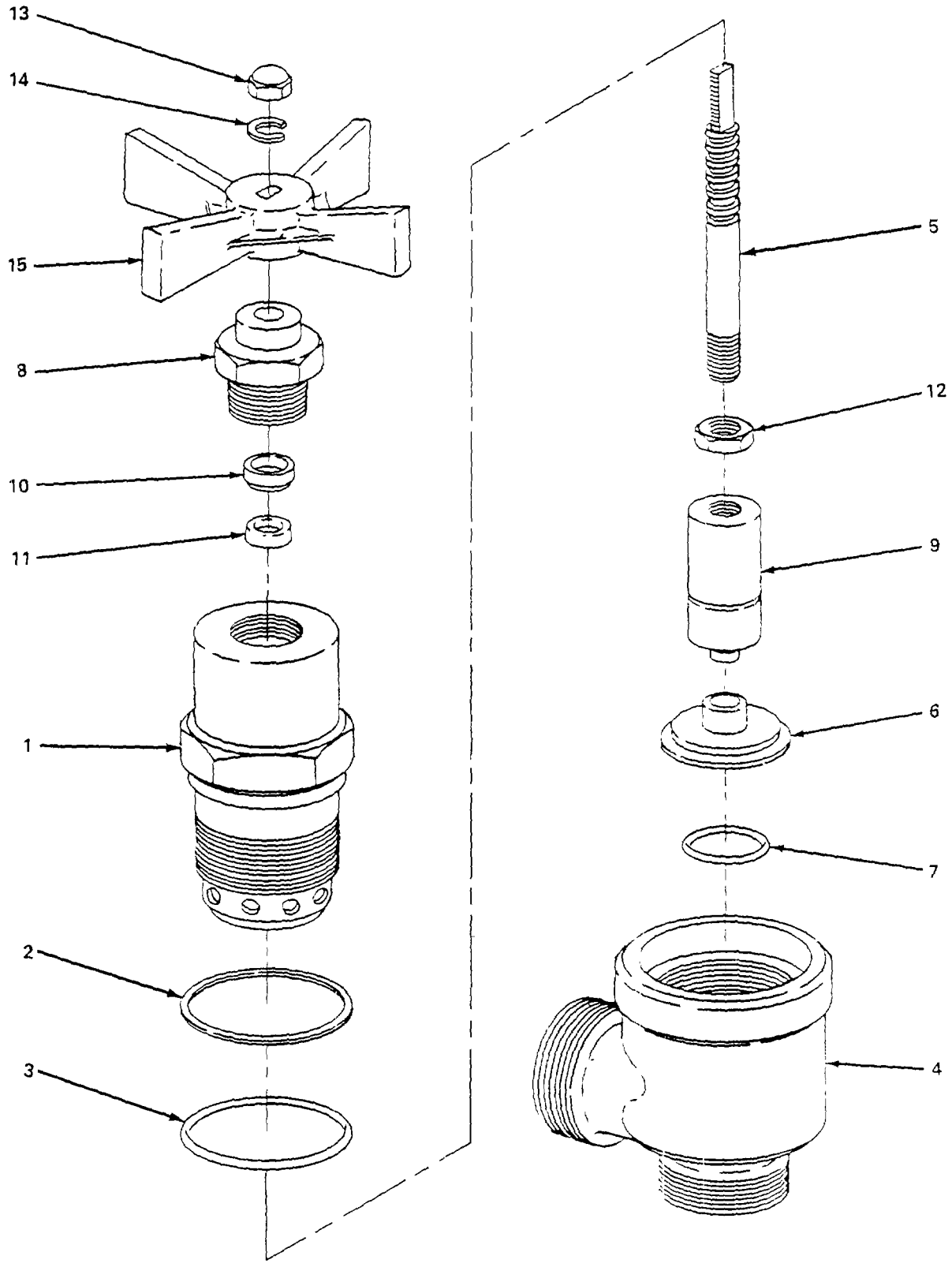


Figure 6-41. Oxygen Shutoff Valve, Repair.

(8) Inspect bonnet (1) and body (4) and replace if threads are stripped, or bonnet (1) or body (4) is cracked or otherwise damaged.

(9) Inspect valve stem (5) and replace if threads are stripped or valve stem (5) is worn or bent.

(10) Inspect seat (6) and replace if sealing surfaces are pitted, corroded or seat is worn, cracked, or otherwise damaged.

(11) Inspect acorn nut (13), lockwasher (14), and handle (15) and replace if threads are stripped, or lockwasher (14) and handle (15) are cracked or otherwise damaged.

(12) Install new stem seal (11) and seal retainer (10) in bonnet (1).

(13) Install nut (12) and guide assembly (9) on valve stem (5) and tighten nut (12).

(14) Install valve stem (5) in bonnet (1) and secure with gland nut (8).

(15) Install seat (6) in bonnet (1). Ensure seat (6) is seated fully in bonnet (1).

(16) Install new preformed packing (7) in body (4).

(17) Install backup (2) and new preformed packing (3) on bonnet (1).

NOTE

Bonnet has left hand threads.

(18) Install bonnet (1) in body (4) and tighten securely.

FOLLOW-ON MAINTENANCE
Install shutoff valve (para. 5-33).

6-24. Isolator Valve.

This task covers: Repair

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Isolator Valve
Detergent, Nonionic (Item 8, Appendix E)

Materials/Parts (Cont)

Distilled Water (Item 9, Appendix E)
Cloth, Lint Free (Item 6, Appendix E)

Equipment Condition

Chamber shut down (para. 2-15).
Isolator valve removed (para. 5-34)

Repair. (figure 6-42)

(1) Remove setscrew (1) and remove knob handle (2).

(2) Remove nut (3), upper gland (4), packing (5), and lower gland (6).

(3) Remove stem (7) from body (8).

(4) Remove panel nut (9).

(5) Clean all components using nonionic detergent cleaner and rinse with clean distilled water.

(6) Inspect all components and replace and damaged parts.

(7) Install panel nut (9) on body (8).

(8) Install stem (7) in body (8).

(9) Install lower gland (6), packing (5), upper gland (4), and secure with nut (3).

(10) Install knob handle (2) and secure with setscrew (1).

FOLLOW-ON MAINTENANCE
Install isolator valve (para. 5-34).

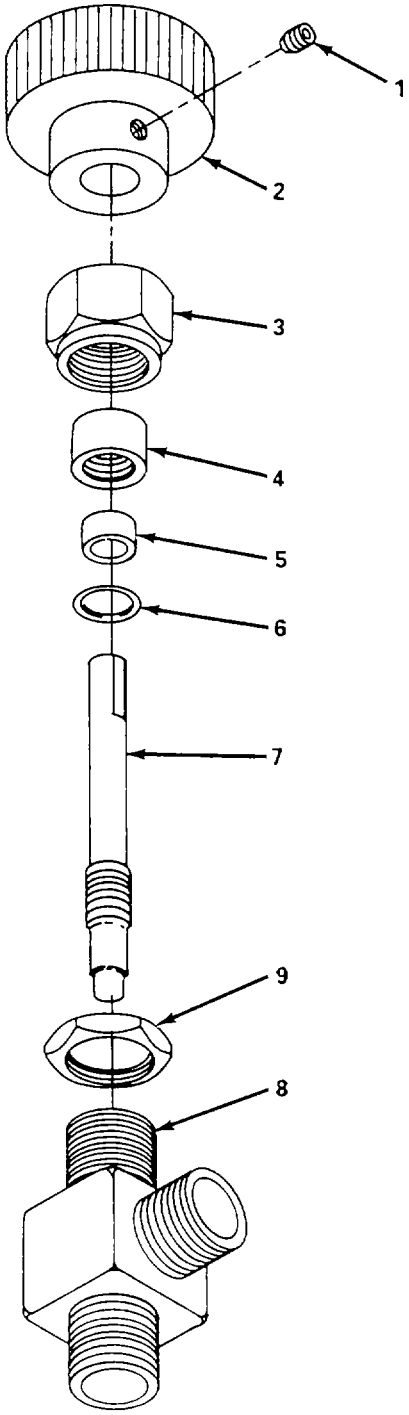


Figure 6-42. Isolator Valve, Repair.

6-25. Demand and Exhaust Regulators.

This task covers: Repair

INITIAL SETUP:

Tools

General Mechanic's Tool Kit
(NSN 5180-00-177-7033)

Materials/Parts

Demand and Exhaust Regulators
Detergent, Nonionic (Item 8, Appendix E)
Distilled Water (Item 9, Appendix E)
Bags, Plastic (Item 3, Appendix E)

Materials/Parts (Cont)

Cloth, Lint Free (Item 6, Appendix E)
Bands, Rubber (Item 4, Appendix E)

Equipment Condition

Inhalator mask assembly removed (para. 5-37).
Dual hose assembly removed (para. 5-39).
Demand and Exhaust Regulators removed (para. 5-38).

Repair. (figure 6-43)

WARNING

To prevent the spread of disease, serious injury and/or death, oxygen breathing systems must be maintained hygienically clean and free from dust, dirt, and all hydrocarbon contamination. Refer to oxygen system prework procedures para. 4-10 to avoid violating this warning.

(1) Exhaust regulator.

(a) Remove clamp (1) from case (2).

(b) Remove cover (3) from case (2) and remove diaphragm (4).

(c) Remove exhalation valve (6) and valve spring (5).

(d) Clean all components using nonionic detergent cleaner and rinse with clean distilled water.

(e) Inspect all components and replace all components that are bent, cracked, worn, or otherwise damaged.

(f) Install valve spring (5) and exhalation valve (6) in case (2).

(g) Install diaphragm (4) in case (2) and install cover (3) and secure with clamp (1).

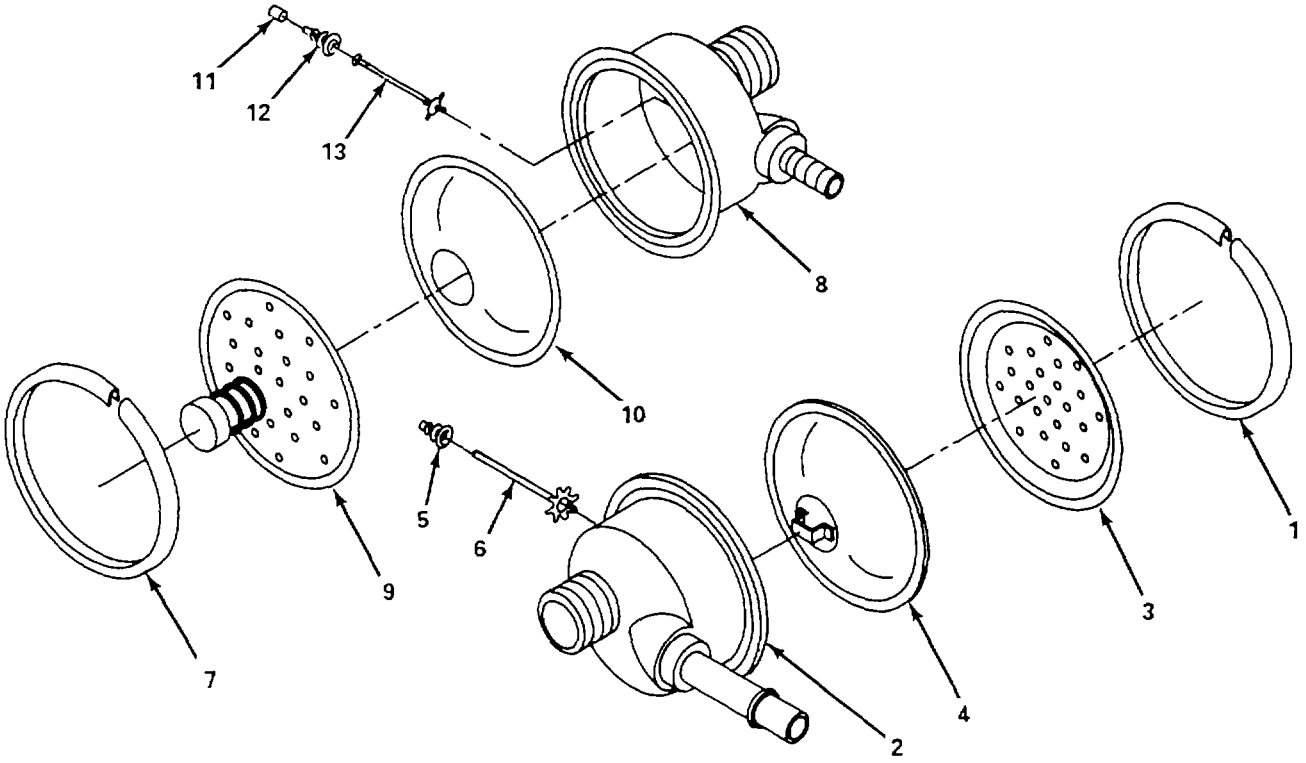


Figure 6-43. Demand and Exhaust Regulators, Repair.

(2) Demand regulator. (figure 6-43)

(a) Remove clamp (7) from case (8).

(b) Remove cover (9) from case (8) and remove diaphragm (10).

(c) Remove clamp (11), valve spring (12), and valve stem (13).

(d) Clean all components using nonionic detergent cleaner and rinse with clean distilled water.

(e) Inspect all components and replace all components that are bent, cracked, worn, or otherwise damaged.

(f) Install valve stem (13), valve spring (12), and secure with clamp (11).

(g) Install diaphragm (10) in case (8) and install cover (9) and secure with clamp (7).

FOLLOW-ON MAINTENANCE
(1) Install demand and exhaust regulator (para. 5-38).
(2) Install dual hose assembly (para. 5-39).
(3) Install inhalator mask assembly (para. 5-37).

Section III. PREPARATION FOR STORAGE OR SHIPMENT

6-26. Preservation and Packaging.

a. Preservation and packaging shall fall into one of two categories; Level A or Level B. The following criteria shall be used to determine the level:

(1) Level A shall be used for the following situations:

(a) National emergencies.

(b) All POMCUS shipments.

(c) All FMS and MAP shipments.

(d) Whenever storage is expected to exceed five years.

(2) Level B shall be used in all other instances.

b. Level A and B preservation and packaging requirements shall be obtained from Sector 16 of the AMDF. If Sector 16 lacks specific data, or if the AMDF is unavailable, the contracting officer shall be notified immediately.

c. If an item comes in its own reusable metal container, that container shall be used regardless of level.

6-27. Packaging of Kits. Kits shall be packaged in accordance with MIL-STD-794, Appendix E. If items within the kit package are individually wrapped, each wrap shall be marked with the part number of the enclosed item.

6-28. Packing. Shipments to CONUS destinations shall be packed in accordance with ASTM-D-3951-82. Other shipments shall be packed Level A or B (paragraph 6-1) as noted below:

NOTE

If an item comes in its own reusable metal container, that container shall be used regardless of level.

a. Level A shipments shall be packed in snug-fitting, wood-cleated, plywood boxes conforming to PPP-B-601 (overseas).

b. Level B shipments shall be packed in snug-fitting, wood-cleated, plywood boxes conforming to PP-B-601 (domestic) or in snug-fitting fiberboard containers conforming to PPP-B-636 (weather-resistant). The type of container used shall be determined by the weight limitation of the box specifications.

c. *Specific Packing Requirement for the 3-Person Recompression Chamber.*

(1) Wrap all BII, COEI and AAL items in bubble pack, and tape closed.

(2) Place these items into a box, tape box closed, and secure box to inside of chamber.

(3) Coat all hose and pipe couplings with non-hydrocarbon preservative and double bag with polyethylene.

(4) Secure chamber doors with aluminum travel bars (held with wing nuts).

(5) Cover view ports with fiber board, and tape in place.

(6) Crate chamber.

6-29. Government-Furnished Containers. If Government-furnished containers are not in a new condition, they shall be refurbished to a degree and at a cost to be negotiated. Criteria for inspection and classification shall be in accordance with TB 55-8100-200-24.

6-30. Marking.

a. Shipments shall be marked in accordance with MIL-STD-129.

b. Exterior shipping containers of Selected Item Management System (SIMS) material shall be marked with SIMS Projection Code Disc labels in accordance with the MIL-STD-129. The contracting officer shall supply the labels on request. The requestor shall specify the quantity required and the label size (3 x 3 or 9 x 9 in.) desired.

6-31. Materiel Condition Tags.

NOTE

These instructions apply to those items that required reporting (DA Form 2410) per TB 55-1500-307-24, and to all overhauled items.

Tags attached to the exterior of a package or container must be fully protected from weather and hauling damage.

a. A DD Form 1574, Serviceable Materiel Condition Tag shall be securely attached directly to the item. A duplicate tag shall be securely attached to the exterior of the package or container.

b. A DD Form 1577-2, Unserviceable (Reparable) Tag shall be used in the event that an overhaul contractor is required to return an unserviceable, reparable item to Army storage.

c. To prepare a DD Form 1574 or DD Form 1577-2, complete the appropriate blocks as follows:

(1) NSN, PART NUMBER AND ITEM DESCRIPTION-Self explanatory.

(2) SERIAL NUMBER/LOT NO. -Enter serial number if applicable.

(3) UNIT OF ISSUE-Self explanatory.

(4) QUANTITY-Self explanatory.

(5) INSPECTION ACTIVITY-Enter the name of the activity certifying the condition of the item.

(6) CONDITION CODE-Enter the condition Code A.

(7) INSPECTOR'S NAME OR STAMP AND DATE-Self explanatory.

(8) CONTRACTOR OR PURCHASE ORDER NUMBER-Self explanatory.

(9) REMARKS-The following entries are mandatory: DA FORM 2410 control number, time since new, and the time since last overhauled. This information should be extracted for the DA Form 2410. Items not requiring a DA Form are exempt from this requirement.

(10) NEXT INSPECTION DUE/OVERAGE DATE-Not applicable.

(11) REASON FOR REPARABLE CONDITION-(DD Form 1577-2 only): Self explanatory. Include the item number and serial number.

APPENDIX A

REFERENCES

A-1. Scope. This appendix contains all forms, lubrication orders, pamphlets and technical manuals referenced in this manual.

A-2. Forms.

Equipment Inspection and Maintenance Worksheet ..... DA Form 2404
Recommended Changes to Publications ..... DA Form 2028-2
Transportation Discrepancy Report (TDR) ..... SF 361
Report of Discrepancy (ROD) ..... SF 364
Quality Deficiency Report (QDR) ..... SF 368
Component Cleanliness Data Sheet ..... Form A
Unserviceable (Repairable) Tag ..... DD Form 1577-2
Serviceable Material Condition Tag ..... DD Form 1574
Component Removal and Repair/Overall Record ..... DA Form 2410
Maintenance Request ..... DA Form 2407

A-3. Pamphlets.

The Army Maintenance Management System (TAMMS) ..... DA Pam 738-750
Consolidated Index of Army Publications and Blank Forms ..... DA Pam 25-30

A-4. Technical Manuals.

Operator's Manual for Welding Theory and Application ..... TM 9-237
Preservation, Packaging, and Packing of Military Supplies and Equipment ..... TM 38-230
Procedures for Destruction of Equipment to Prevent Enemy Use ..... TM 750-244-3
Repair Parts and Special Tools List ..... TM 5-4220-227-24P

A-5. Technical Bulletins.

Calibration Procedure for Pressure Gages used with Diving
Equipment (General) ..... TB 9-4220-216-35
Material Condition Tags ..... TB 55-1500-307-24
Government Furnished Containers ..... TB 55-8100-200-24
Calibration of Gages ..... TB 43-180
Calibration of Gages ..... TB 750-25-1

A-6. Other Publications.

Military Diving ..... FM 20-11-1
Warning and First Aid Data ..... FM 21-11
Calibration of Gages ..... AR 750-25
Calibration of Gages ..... DA PAM 700-20
The Army Maintenance Management System ..... DA PAM 738-750

Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items)	CTA 50-970
Inspection and Maintenance of Compressed Gas Cylinders	MIL-STD-1411
Abbreviations for Use on Drawings, Specifications, Standards, and in Technical Manuals	DOD-STD-12
Standard Program Management Systems Materials Identification Guide	SPMIG
Packing, Commercial	ASTM D 3951-82
Boxes, Wood, Cleated-Plywood	PPP-B-601
Boxes, Shipping Fiberboard	PPP-B-636
Marking for Shipping and Storage	MIL-STD-129
Packaging of Kits	MIL-STD-794
Calibration of Pressure Gages	AIG 239/11295 8208

APPENDIX B

MAINTENANCE ALLOCATION CHART

B-1. General. This appendix provides a summary of the maintenance operations for the Recompression Chamber, Diver's. It authorizes levels of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

B-2. Maintenance Functions. Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

b. Test. To verify serviceability and to detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

d. Adjust. To maintain, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to the specified parameters.

e. Aline. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Install. The act of emplacing, seating, or fixing into position an item, part, module (component or assembly) in a manner to allow the proper functioning of the equipment or system

h. Replace. The act of substituting a serviceable like type part, subassembly, or module (component or assembly) for an unserviceable counterpart.

i. Repair. The application of maintenance services (inspect, test, service, adjust, align, calibrate, replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

j. Overhaul. That maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. *Rebuild*. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours, miles, etc.) considered in classifying Army equipments/components.

B-3. Column Entries

a. *Column 1, Group Number*. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

b. *Column 2. Component/Assembly*. Column 2 contains the noun names of components, assemblies subassemblies, and modules for which maintenance is authorized.

c. *Column 3. Maintenance Functions*. Column 3 lists the functions to be performed on the item listed in column 2. When items are listed without maintenance functions, it is solely for purpose of having the group numbers in the MAC and RPSTL coincide.

d. *Column 4. Maintenance Level.* Column 4 specifies, by the listing of a "work time" figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform that maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance levels, appropriate "work time" figures will be shown for each level. The number of task-hours specified by the "work time" figure represents the average time required to restore an item (assembly, subassembly, component, module, end item or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. Subcolumns of column 4 are as follows:

UNIT

C - Operator/Crew
O - Unit

INTERMEDIATE

F - Direct Support
H - General Support

DEPOT

D - Depot

e. *Column 5. Tools and Equipment*. Column 5 specifies by code, those common tool sets (not individual tools) and special tools, test, and support equipment required to perform the designated function.

f. *Column 6. Remarks*. Column 6 contains an alphabetic code which leads to the remark in section IV, Remarks, which is pertinent to the item opposite the particular code.

B-4. Tool and Test Equipment Requirements (Sect. III and IV)

a. Tool or Test Equipment Reference Code. The numbers in this column coincide with the numbers used in the tools and equipment column of the MAC. The numbers indicate the applicable tool or test equipment for the maintenance functions.

b. Maintenance Level. The codes in this column indicate the maintenance level allocated the tool or test equipment.

c. Nomenclature. This column lists the noun name and nomenclature of the tools and test equipment required to perform the maintenance functions.

d. National/NATO Stock Number. This column lists the National/NATO stock number of the specific tool or test equipment.

e. Tool Number. This column lists the manufacturer's part number of the tool followed by the Federal Supply Code for manufacturers (5-digit) in parentheses.

B-5. Remarks (Sect. IV)

a. Reference Code. This code refers to the appropriate item in section II, column 6.

b. Remarks. This column provides the required explanatory information necessary to clarify items appearing in sections II and V.

Section II. MAINTENANCE ALLOCATION CHART FOR RECOMPRESSION CHAMBER, DIVER'S

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			Unit		Direct Support	General Support	Depot		
Group Number	Component/ Assembly	Maintenance Function	C	O	F	H	D	Tools	Remarks
01	CHAMBER SHELL	Inspect	1.0						
		Test	1.0						
		Service	4.0					1	
		Repair		0.8	1.6	2.1		1 thru 10	A
0101	DOORS OUTER LOCK, INNER LOCK	Inspect		0.5					
		Service		0.5					
		Replace				1.0		1	
		Repair				1.0		1	
0102	MEDICAL LOCK ASSEMBLY	Inspect		0.2					
		Repair				1.0		1	
010201	OUTER MEDICAL LOCK DOOR	Inspect		0.5					
		Service		0.5					
		Replace			1.5			1,8	
		Repair			2.0			1	C
010202	DEPRESSUR-IZATION VALVE AND GAGE	Inspect	0.1						
		Calibrate				1.0			
		Replace		0.5				1	
010203	INNER MEDICAL LOCK DOOR	Inspect		0.3					
		Service		0.5					
		Replace			1.5				
		Repair			0.5			1	
010204	PRESSURIZATION VALVE	Replace		0.5				1	
0103	COT ASSEMBLIES	Inspect		0.3					
		Replace		1.0				1	
0104	DECK PLATES	Inspect		0.2					
		Replace		0.5				1	
0105	VIEW PORT ASSEMBLY	Inspect		0.3					
		Replace				1.5		1	
		Repair				1.5		1,8	

Section II. MAINTENANCE ALLOCATION CHART FOR RECOMPRESSION CHAMBER, DIVER'S

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			Unit		Direct Support	General Support	Depot		
Group Number	Component/ Assembly	Maintenance Function	C	O	F	H	D	Tools	Remarks
0106	SHELL	Inspect		0.5					
	PENETRATORS	Replace				1.0		1,8	
		Repair				1.0		1	
0107	PRESSURE	Inspect	0.1						
	RELIEF VALVE	Replace		0.5				1	
	ASSEMBLY								
010701	PRESSURE RELIEF	Replace			0.5			1	
	VALVE	Repair				1.0		1	
		Calibrate				1.0			
010702	BALL VALVE,.	Replace			0.5			1	
	3/4 IN	Repair			0.5			1	
0108	SKID ASSEMBLY,	Inspect		0.5					
	CHAMBER	Replace			3.0			1,8	
		Repair				4.5		1	B
0109	CHAMBER CONTROL	Replace			4.0				
	CONSOLE (CCC)								
	AND ENCLOSURE								
02	ENVIRONMENTAL	Inspect	0.3						
	GROUP	Service	1.0						
		Replace			3.5			1	A
		Repair		0.7	1.2	2.3		1	C
0201	HEATER/CHILLER	Inspect		0.3					
	MODULE	Service	0.5						
		Replace		1.0				1	
		Repair				3.8		1	C
020101	CONDENSING,	Replace				1.0		1	
	UNIT HERMETIC	Repair				2.5		1	C
02010101	PRESSURE	Replace				0.5		1	
	CONTROL								

Section II. MAINTENANCE ALLOCATION CHART FOR RECOMPRESSION CHAMBER, DIVER'S

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			Unit		Direct Support	General Support	Depot		
Group Number	Component/ Assembly	Maintenance Function	C	O	F	H	D	Tools	Remarks
02010102	CONTROL BOX	Replace Repair				0.5 0.5		1	 C
02010103	SHROUD ASSEMBLY	Replace				1.0		1	
020102	PUMP ASSEMBLY	Replace Repair				1.0 0.5		1 1	
020103	TEMPERATURE CONTROL HIGH	Replace Repair				1.0 1.0		1 1	
020104	TEMPERATURE CONTROL LOW	Replace Repair				1.0 1.0		1 1	
0202	VALVES (3/4 in.) WATER	Replace Repair		0.3 1.0				1, 3 1, 8	
0203	HOSES	Replace		0.5				1	
0204	CHAMBER CONDITIONING UNIT (CCU-03)	Inspect Replace Repair	0.3		 1.5 2.0			 1 1	
020401	MOTOR	Replace			1.5			1	
0205	POWER SUPPLY, 28V	Replace		1.0				1	
0206	C02 SCRUBBER ASSEMBLY	Inspect Service Replace Repair	0.2 0.5	 1.0	 1.0			 1, 8 1	 A
020601	MOTOR	Replace Repair			1.0	 2.0		1 1	

Section II. MAINTENANCE ALLOCATION CHART FOR RECOMPRESSION CHAMBER, DIVER'S

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			Unit		Direct Support	General Support	Depot		
Group Number	Component/ Assembly	Maintenance Function	C	O	F	H	D	Tools	Remarks
0207	PORTABLE OXYGEN ANALYZER	Inspect	0.1						
		Test		0.2					
		Replace		1.0				1,2	
		Repair			0.3	3.5		1, 2, 6	C
020701	BATTERY	Test		0.3					
		Replace		0.3				1,10	
020702	PROBE ASSEMBLY	Replace			0.3			1,10	F
		Repair			0.3			1, 10	
0208	FLOW METER (.5-5.0 SCFH)	Replace			0.5			1	
0209	THERMO COUPLER METER AND TEMPER-ATURE PROBE	Replace		0.5				1	
03	ELECTRICAU LIGHTING SYSTEM	Replace			8.0			1	
		Repair		0.5	1.9			1	A
0301	GROUND FAULT INTERRUPTER	Test	0.2						F
		Replace		0.2				1	
0302	SIX PLUG RECEPTACLE POWER STRIP	Test	0.2						
		Replace		0.5				1	
0303	DOUBLE LIGHT POWER SUPPLY (INNER LOCK)	Replace		1.0				1	
		Repair		0.5	2.5			1	
0304	LIGHT SOURCE	Replace		0.5				1, 8	
		Repair		0.3	1.0			1	
0305	SINGLE LIGHT POWER SUPPLY (OUTER LOCK)	Replace		0.5				1	
		Repair		0.3	1.0			1	

Section II. MAINTENANCE ALLOCATION CHART FOR RECOMPRESSION CHAMBER, DIVER'S

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			Unit		Direct Support	General Support	Depot		
Group Number	Component/ Assembly	Maintenance Function	C	O	F	H	D	Tools	Remarks
0306	FLUORESCENT LAMP ASSEMBLY	Replace Repair		0.5 0.2	 1.0			 1	
0307	WIRING HARNESS	Test Replace Repair		 0.3	1.0 1.5 3.0			 1 1	 H
04	COMMUNICATIONS SYSTEM INTER COM	Replace		1.5				1	A
0401	COMMUNICATOR ASSEMBLY (2820-4003)	Test Replace Repair	0.1	 0.5	 4.5			 1 1,2, 6, 10	 A
040101	FRONT PANEL CHASSIS ASSEMBLY	Replace Repair			1.0 1.5			1 1	 C
040102	CIRCUIT CARD ASSEMBLY	Replace			1.0			1	
040103	BATTERY SENSE CARD ASSEMBLY	Replace			1.0			1	
040104	BATTERY CARD AND CASE	Replace Repair		 0.3	1.0 1.5			1 1	C H
0402	MICROPHONE	Replace		0.1					
0403	HEADSET	Replace		0.1					
0404	SOUND POWERED PHONE AND BRACKET	Replace		0.2				1	
0405	SPEAKERS	Replace		0.7				1	

Section II. MAINTENANCE ALLOCATION CHART FOR RECOMPRESSION CHAMBER, DIVER'S

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			Unit		Direct Support	General Support	Depot		
Group Number	Component/ Assembly	Maintenance Function	C	O	F	H	D	Tools	Remarks
05	OXYGEN (O_2) SYSTEM	Replace Repair				10.0 2.1		 1	 A
0501	O_2 "K" BOTTLES/ MANIFOLD	Inspect Replace Repair	0.3	 0.2	 3.0			 1	
050101	GAGE 0-5000 PSI	Inspect Calibrate Replace	0.1		 1.0	 1.0		 1	
050102	HOSE, O_2 HIGH PRESSURE (HP)	Inspect Test		0.3		 1.0			 I
0502	PRESSURE GAGES,O_2 (HP/LP)	Inspect Calibrate Replace	0.1		 0.5	 1.0		 1	
0503	PRESSURE REGULATOR O_2	Replace Repair			1.0	 4.0		1,3 1,8	
0504	BACK PRESSURE REGULATOR O_2	Replace Repair			1.0	 4.0		1,3 1, 8	
0505	VALVES, O_2 SHUTOFF	Replace Repair			1.0	 1.5		1,3 1	
0506	VALVE, ISOLATOR	Replace Repair			0.3 0.5			1 1	
0507	DUMP VALVE, ASSEMBLY	Replace Repair			0.3 0.5			1,3 1,8	
0508	MANIFOLD, BIBS, O_2	Inspect Replace	0.3		 0.3			 1	

Section II. MAINTENANCE ALLOCATION CHART FOR RECOMPRESSION CHAMBER, DIVER'S

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			Unit		Direct Support	General Support	Depot		
Group Number	Component/ Assembly	Maintenance Function	C	O	F	H	D	Tools	Remarks
0509	INHALATOR	Inspect	0.5						
	MASK	Service	2.0						
	ASSEMBLY, O_2	Replace		0.1				1	
		Repair			0.8			1	C
050901	DEMAND	Replace			0.4			1	
	REGULATOR O_2	Repair				1.5		1	
050902	EXHAUST REGU-	Replace			0.4			1	
	LATOR, O_2	Repair				1.5		1	
050903	DUALHOSE	Replace			0.4			1	
	ASSEMBLY	Repair			1.0				
0510	O_2 PIPING	Replace			2.0				
06	AIR SYSTEM	Inspect		0.5					
		Replace			3.5			1	
0601	AIR SUPPLY	Inspect		0.5					
	MANIFOLD	Replace			2.0			1,8	
		Repair			1.0			1	C
060101	VALVE, AIR	Replace			0.3			1,3	
	SUPPLY 3/4 IN.	Repair			1.0			1,8	
060102	VALVE, AIR	Replace			0.3			1,3	
	SUPPLY 1 IN.	Repair			1.0			1,8	
0602	AIR EXHAUST	Inspect		0.5					
	MANIFOLD	Replace			2.0			1,8	
		Repair			1.3			1,3	C
060201	VALVES (1 1/4 IN.)	Replace			0.3			1,3	
		Repair			0.1			1,8	
0603	AIR PIPING	Replace			2.0			1, 10	C, J

Section II. MAINTENANCE ALLOCATION CHART FOR RECOMPRESSION CHAMBER, DIVER'S

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			Unit		Direct Support	General Support	Depot		
Group Number	Component/ Assembly	Maintenance Function	C	O	F	H	D	Tools	Remarks
07	DEPTH GAGES	Inspect	0.1						
		Calibrate				1.0			
		Replace			0.5			1	
08	CAISSON GAGES	Calibrate				1.0			
		Replace			0.5			1	

SECTION III. TOOL AND TEST EQUIPMENT REQUIREMENTS
FOR

RECOMPRESSION CHAMBER, DIVER'S

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/ NATO STOCK NUMBER	TOOL NUMBER
1	O	General Mechanic's Tool Kit	5180-00-177-7033	
2	O, F	Multimeter	6625-00-999-6282	
3	F	Wrench, Monkey	5120-00-264-3793	
4	O, H	Flashlight, Explosion Proof	6230-00-299-3035	
5	F	Scribe	5120-00-221-7063	
6	F	Crimper, Electrical	5120-00-278-2923	
7	O	Mirror, Inspection	5120-00-278-9926	
8	O	Torque Wrench, 1/2 in. sq dr 0-150 lb-ft	5120-00-247-2540	
9	F	Soldering Gun	3439-00-542-0396	
10	F	Tubing Bender Set		
11	H	Recovery and Recycling Unit, Refrigerant	4130-01-338-2707	17500B (07295)

Section IV. REMARKS

REFERENCE CODE	REMARKS
A	Repair is limited to replace or repair of major assemblies.
B	Repair is by welding/brazing.
C	Repair is by replacement of subcomponent.
D	Every six months remove valve and test.
E	Adjust is by adjusting temperature and pressure controls.
F	Self test.
G	Replacement of lamp at unit level.
H	Repair at unit level is replacement of fuse only.
I	Hydrostatically test high pressure hoses six years from manufacturer's data and annually thereafter until failure of hydrostatic test.
J	Hydrostatically test low pressure hoses in accordance with Military Diving Manual FM 20-11-1.

APPENDIX C

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS

Section I. INTRODUCTION

C-1. Scope.

This appendix lists components of end item and basic issue items for the 3-Person Recompression Chamber to help you inventory items required for safe and efficient operation.

C-2. General.

The Components of End Item and Basic Issue Items Lists are divided into the following sections.

a. *Section II. Components of End Item*. This listing is for informational purposes only, and is not authority to requisition replacements. The items are part of the end item, but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between properly accounts. Illustrations are furnished to assist you in identifying the items.

b. *Section III. Basic Issue Items*. These are the minimum essential items required to place the 3-Person Recompression Chamber in operation. The illustrations will assist you with hard-to-identify items. This manual is your authority to request/requisition replacement B11, based on TOE/MTOE authorization of the end item.

C-3. Explanation of Columns.

The following provides an explanation of columns found in the tabular listings:

a. *Column (1). Illustration Number (Illus Number)*. This column indicates the number of the illustration in which the item is shown.

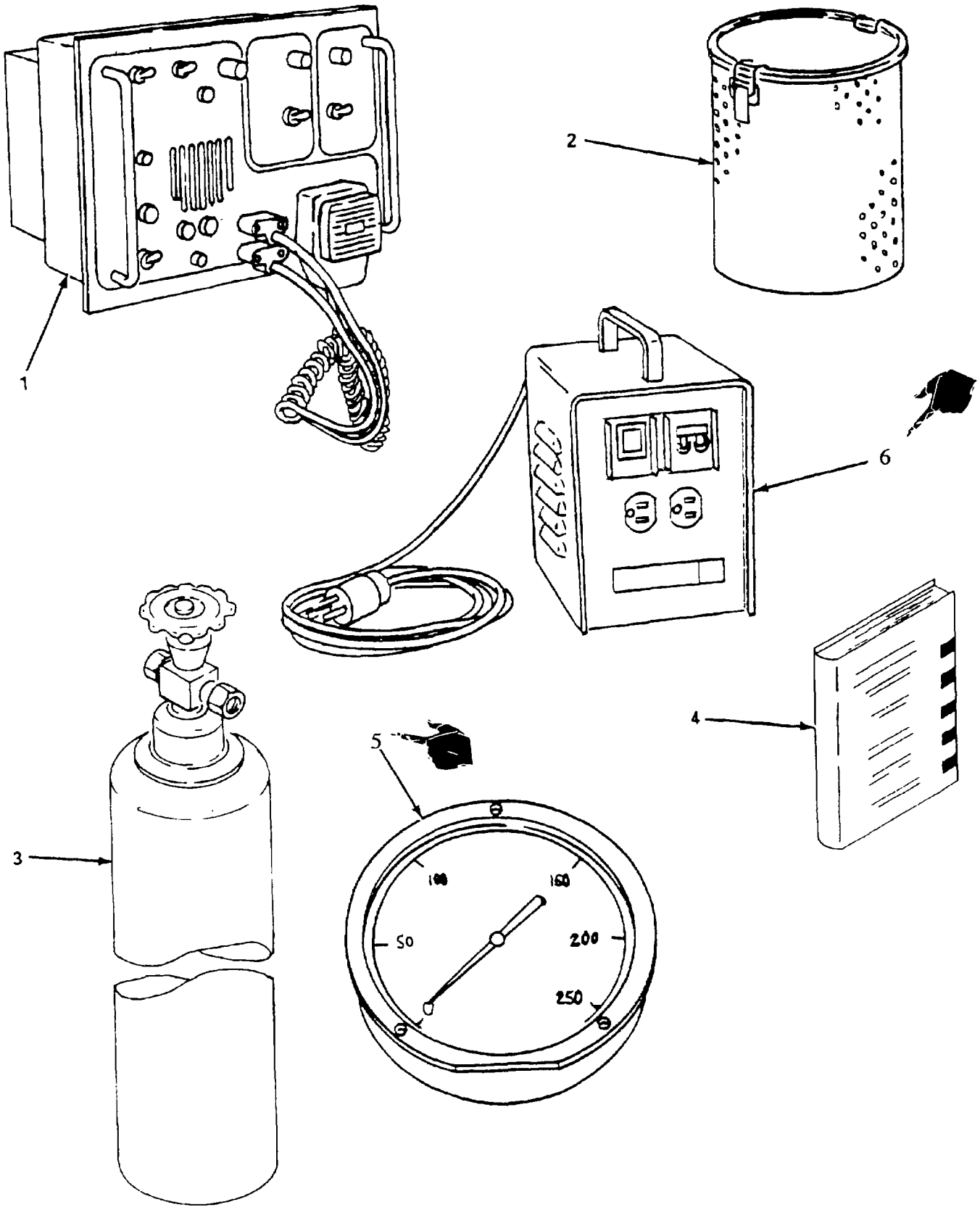
b. *Column (2). National Stock Number*. Indicates the National Stock Number assigned to the item and will be used for requisitioning purposes.

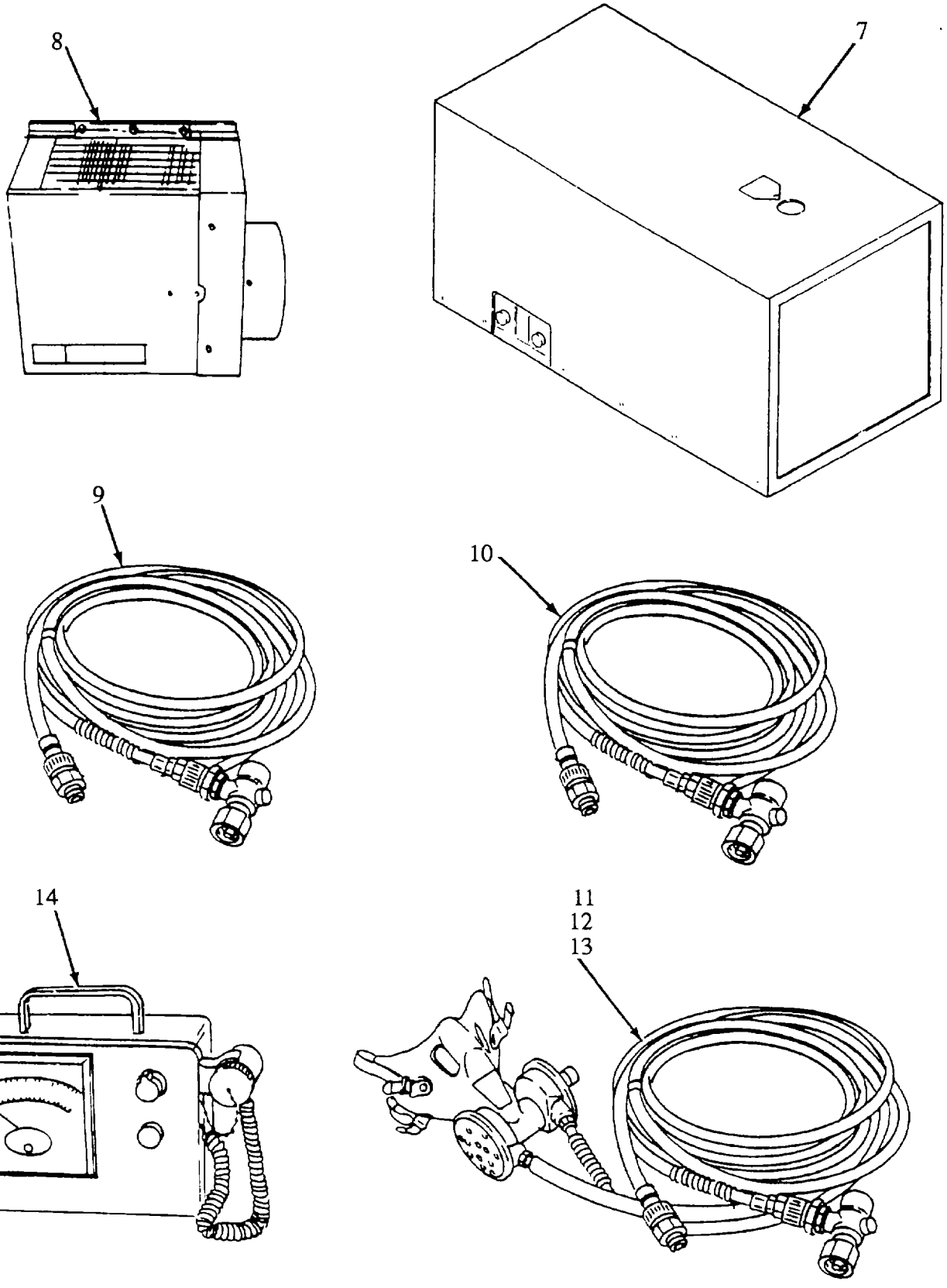
c. *Column (3). Description*. Indicates the Federal item name, and, if required, a minimum description to identify and locate the item. The last line for each item indicates the FSCM (in parentheses) followed by the pan number.

d. *Column (4). Unit of Measure (U/M).* Indicates the measure used in performing the actual operational/maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e g, ea, in., pr).

e. *Column (5). Quantity Required (QTY RQF).* Indicates the quantity of the item authorized to be used with/on the equipment.

Section II COMPONENTS OF END ITEMS

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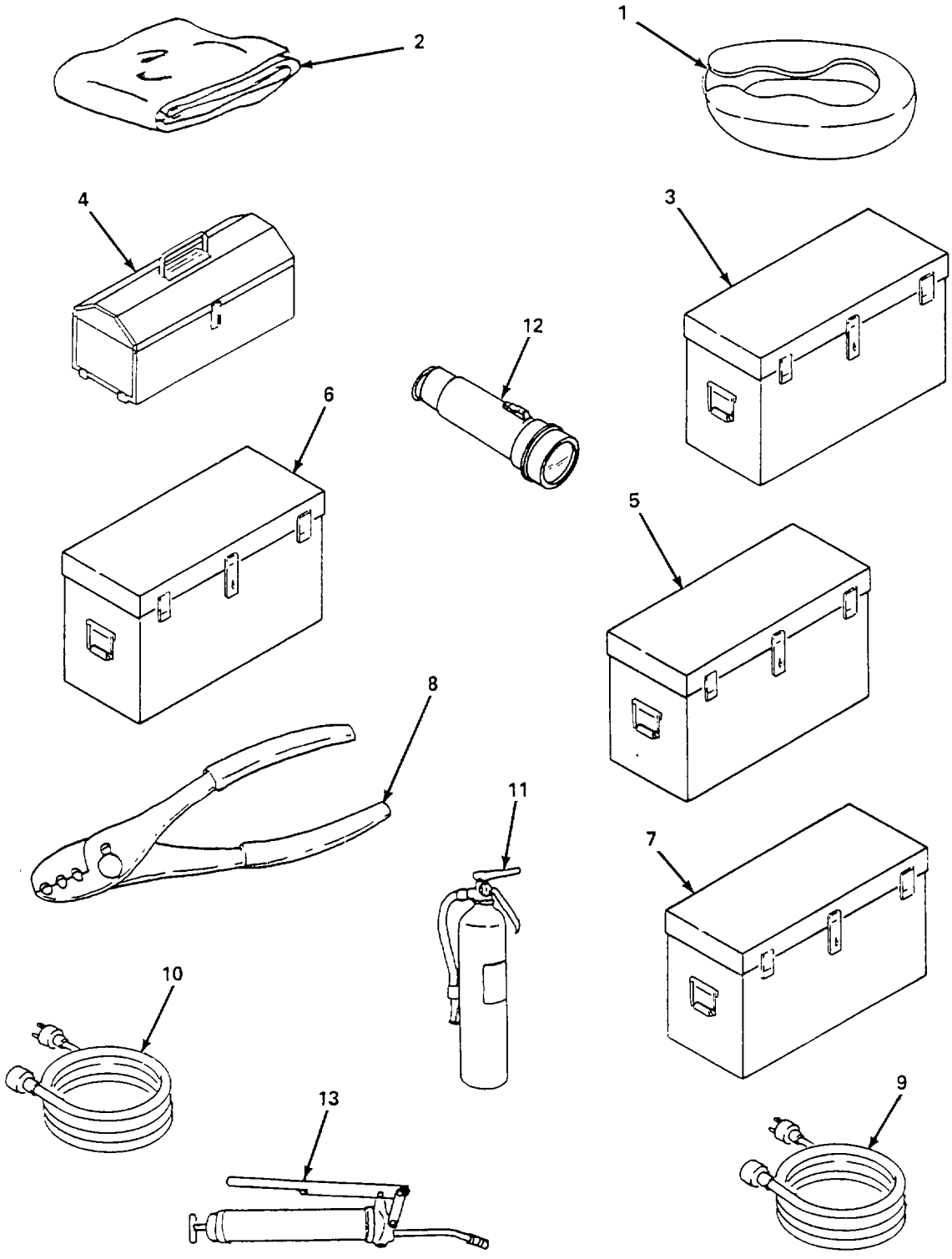
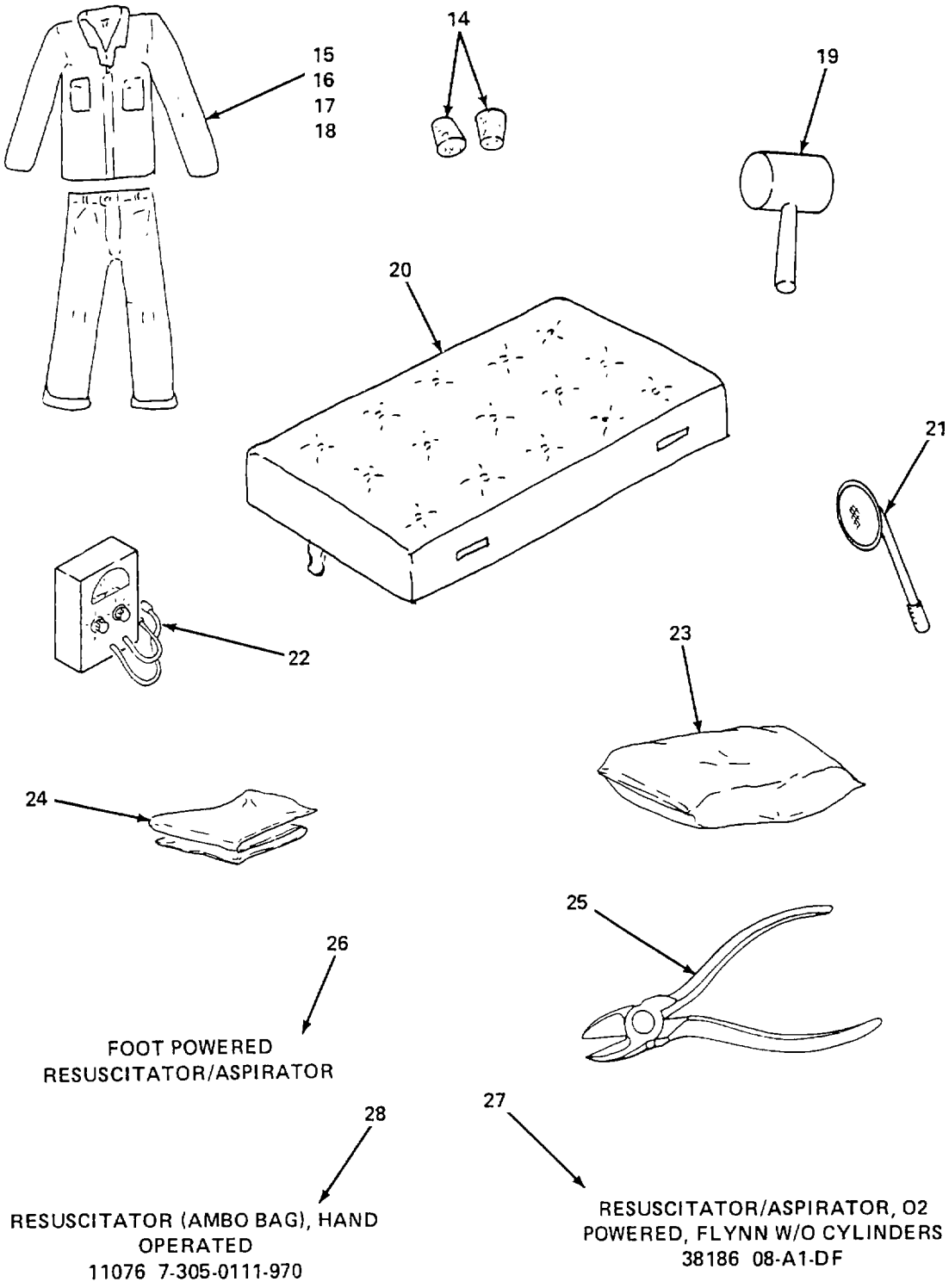
(1) Illus Number	(2) National Stock Number	(3) Description CAGE and Part Number	Usable On Code	(4) U/M	(5) Qty Rqr
1		Box, Communications 2820-4003		EA	1
2		CO2, Scrubber DH-21		EA	1
3	8120-00-151-9757	Cylinder, Oxygen, W/K-Valve (200 Cu Ft, 1800 PSI, DOT No. 3AA1800		EA	6
4		FM 20-11-1, Military Diving NAVSEA 0994-LPOO1-9010		EA	1
5	6685-01-212-2763	Gage, Divers, 0-250 FSW 25646 23821		EA	3
6		Ground Fault Interrupter Woodhead 1670		EA	1
7		Heater/Chiller Module CCM-04		EA	1
8		Heater/Chiller Unit CCU-02		EA	1
9	4720-00-230-6533	Hose, Low Pressure, 50-Ft		EA	4
10		Hose, Oxygen HD, 50-Ft, 3000 PSI		EA	2
11	4220-01-173-5385	Mask, Diver's, Inhalator, Long 53655 803139-01-03		EA	2
12	4220-01-173-5384	Mask, Diver's, Inhalator, Med 53655 803139-01-02		EA	2
13		Mask, Diver's Inhalator, short 53655 803139-01-01		EA	2
14		Oxygen Analyzer 320 B/RC		EA	1

Section III. BASIC ISSUE ITEMS

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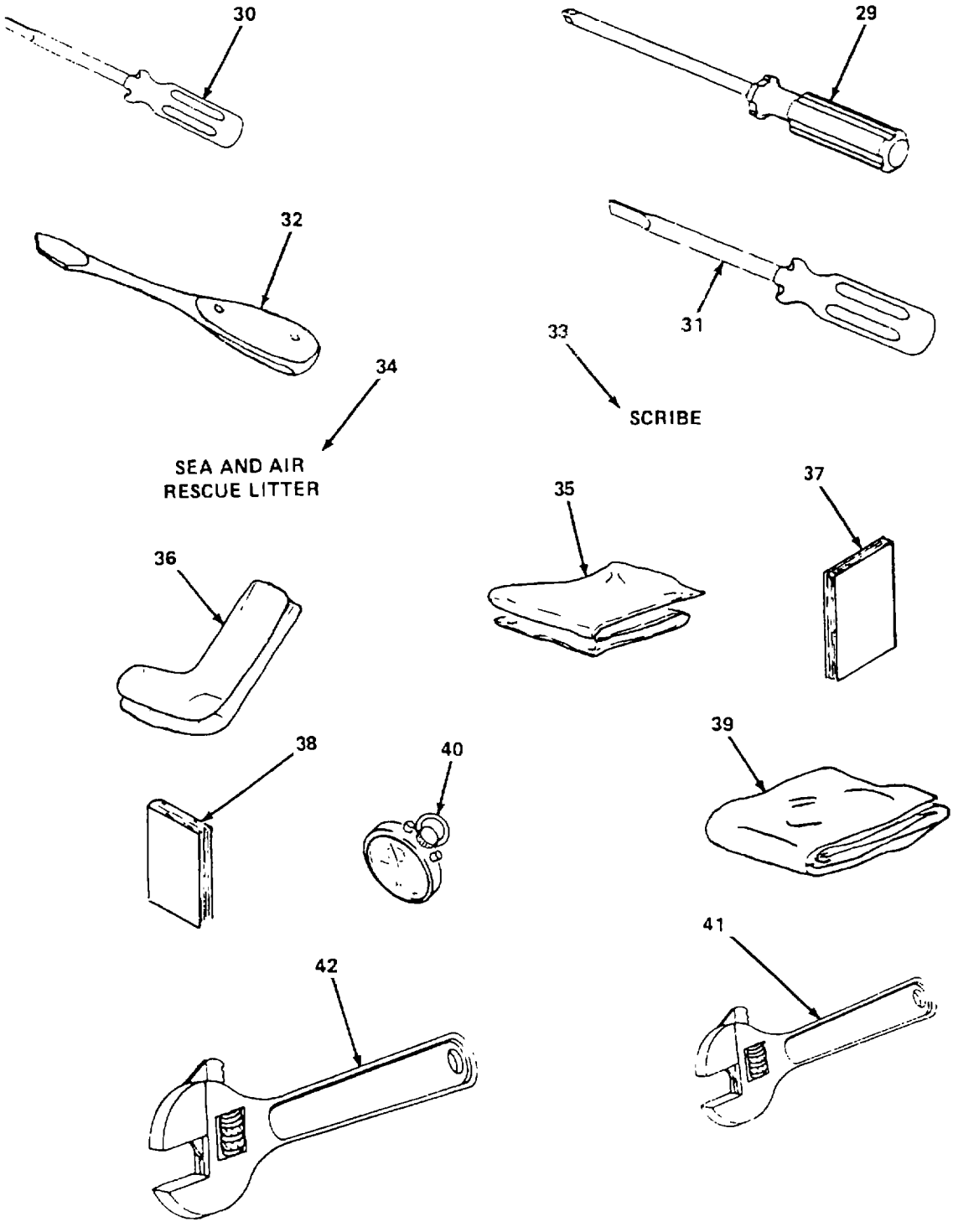
26
FOOT POWERED
RESUSCITATOR/ASPIRATOR
28
RESUSCITATOR (AMBO BAG), HAND
OPERATED
11076 7-305-0111-970
27
RESUSCITATOR/ASPIRATOR, O2
POWERED, FLYNN W/O CYLINDERS
38186 08-A1-DF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SCRIBE
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SEA AND AIR
RESCUE LITTER
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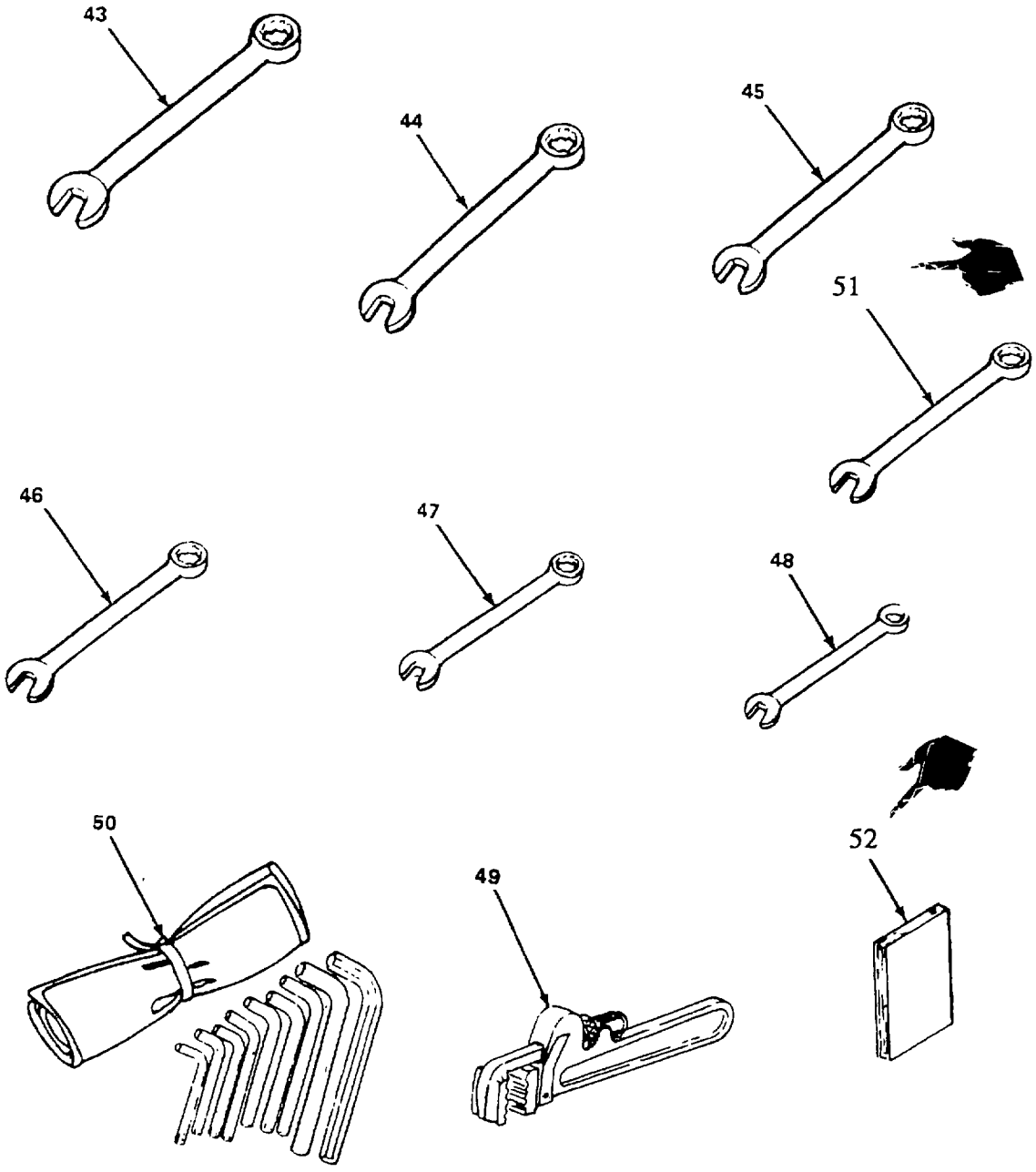
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(1) Illus Number	(2) National Stock Number	(3) Description CAGE and Part Number	Usable On Code	(4) U/M	(5) Qty Rqr
1	6530-01-225-2055	Bedpan, (13093) 543446		ea	2
2		Blanket, Fire Retardant, FSP 9200		ea	3
3	6545-00-914-3490	Box, Storage, Aluminum 4 Cu Ft (81349) MIL-C-0016775			
4	5140-00-587-5558	Box, Tool (81348)		ea	1
5	6645-00-914-3460	Chest, 1.5 Cu Ft (81348)		ea	1
6	6645-00-914-3490	Chest, 30 x 18 x 1 2-inch, 4.0 Cu Ft (81348)		ea	1
7	6645-00-118-6248	Chest, 30 x 18 x 19-inch, 6.0 Cu Ft (81348)		ea	1
8	5120-00-278-2923	Crimper, Electrical (81348)		ea	1
9		Extension Cord, 110V, 100 Ft (81348)		ea	1
10		Extension Cord, 220V, 100 Ft (81348)		ea	1
11		Extinguisher, Fire (63753) 240		ea	1
12	6230-00-299-3035	Flashlight, Explosion Proof (80244) MIL-F-3747, TY3, ST1		ea	4
13	4930-00-965-0288	Gun, Lubricating, Hard (81348)		ea	1
14	4240-00-022-2946	Hearing Protectors (81348)		ea	8
15		Jumper, 2 PC, V-Neck, SM, FSP 9509S		ea	2
16		Jumper, 2 PC, V-Neck, Med, FSP 9509M		ea	3
17		Jumper, 2 PC, V-Neck, LG, FSP 9509L		ea	3
18		Jumper, 2 PC, V-Neck, X-LG, FSP 9509XL		ea	2
19	5120-00-293-3398	Mallet, Rawhide (81348)		ea	1
20		Mattress, Fire Retardant, FSP 9203		ea	1
21	5120-00-278-9926	Mirror, Inspection (81348)		ea	1
22	6625-00-999-6282	Multimeter (81348)		ea	1

(1) Illus Number	(2) National Stock Number	(3) Description CAGE and Part Number	Usable On Code	(4) U/M	(5) Qty Rqr
23		Pillow, Fire Retardant, FSP 9205		ea	1
24		Pillow Case, Fire Retardant, FSP 9206		ea	2
25		Pliers, Diagonal Cutting (28536)		ea	1
26	6515-00-890-1818	Resuscitator/Aspirator, Foot Powered (81349)		ea	1
27	6515-01-061-7811	Resuscitator/Aspirator, 02 Powered, Flynn w/o Cylinders (38186) 08-A1-DF		ea	1
28		Resuscitator (AMBO BAG), Hand Operated (11076) 7-305-0111-970		ea	1
29	5120-00-237-3174	Screwdriver, Crosstip (81348)		ea	1
30	5120-00-227-1356	Screwdriver, Light (81348)		ea	1
31	5120-00-227-7333	Screwdriver, Heavy Duty (81348)		ea	1
32	5120-00-243-0314	Screwdriver, Normal (81348)		ea	1
33	5120-00-221-7063	Scribe (81348)		ea	1
34	6530-01-187-0104	Sea and Air Rescue Litter (64249) 402		ea	1
35		Sheet, Fire Retardant, FSP 9204		ea	2
36		Socks, Fire Retardant, FSP 9505		ea	5
37		TM 5-4220-227-14		ea	1
38		TM 5-4220-227-24P		ea	1
39		Towel, Fire Retardant, FSP 9507		ea	4
40	6645-00-126-0286	Watch, Stop (81349) 542-801		ea	4
41	5120-00-264-3795	Wrench, Adjustable, 6-inch (81348)		ea	1
42	5120-00-264-3796	Wrench, Adjustable, 12-inch (81348)		ea	1
43	5120-00-228-9505	Wrench, Combination, 7/16-inch (81348)		ea	1
44	5120-00-228-9506	Wrench, Combination, 1/2-inch (81348)		ea	1

(1) Illus Number	(2) National Stock Number	(3) Description CAGE and Part Number	Usable On Code	(4) U/M	(5) Qty Rqr
45	5120-00-228-9507	Wrench, Combination, 9/16-inch (81348)		EA	1
46	5120-00-228-9508	Wrench, Combination, 5/8-Inch (81348)		EA	1
47	5120-00-228-9510	Wrench, Combination, 3/4-Inch (81348)		EA	1
48	5120-00-228-9514	Wrench, Combination, 1-Inch (81348)		EA	1
49	5120-00-262-3991	Wrench, Pipe, 18-Inch (81348)		EA	1
50	5120-00-729-6392	Wrench, Set, Hex (Allen) (81348)		EA	1
51	5120-00-203-4806	Wrench, Open End, Air		EA	1
52	7530-00-222-3524	Book, Record, Fuled		EA	1

***U.S. GOVERNMENT PRINTING OFFICE: 1997 - 554-024/60065**

APPENDIX D

ADDITIONAL AUTHORIZATION LIST

Section I. INTRODUCTION

D-1. Scope. This appendix lists additional items you are authorized for the support of the 3-Person Recompression Chamber.

D-2. General. This list identifies items that do not have to accompany the Recompression Chamber and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA, or JTA.

D-3. Explanation of Listing. National stock numbers, descriptions, and quantities are provided to help you identify and request the additional items you require to support this equipment. The items are listed in alphabetical sequence by item name under the type document (i.e., CTA, MTOE, TDA, or JTA) which authorizes the item(s) to you.

Section II. ADDITIONAL AUTHORIZATION LIST

National Stock Number	Description FSCM and Part Number	Usable on Code	U/M	Qty Auth
4240-00-022-2946	Protector, Aural	DCW	Pr	1
6515-01-050-0208	16 GA I.V. Cat Heater			4
6515-01-047-9557	18 GA I.V. Cat Heater			3
6515-01-050-9958	20 GA I.V. Cat Heater			2
6515-00-913-7709	Band-Aids 3 in. x 3/4 in.			12
6510-00-754-2834	18 GA Needles			3
6515-00-754-2836	20 GA Needles			1
6515-00-754-2838	21 GA Needles			4
6515-00-299-8748	Oropharyngeal Airway Size 2 Child			1
6515-00-300-2900	Oropharyngeal Airway Size 5 Adult			1
6515-00-922-9201	O_2 Connector			1
6510-00-203-5500	Adhesive Tape Surgical Sleeve, 4 ea 1/2 in., 3 ea 1 in., 2 ea 2 in., 1 ea 4 in.			1

National Stock Number	Description FSCM and Part Number	Usable on Code	U/M	Qty Auth
6510-00-890-1369	Tape, Paper 1/2 in.			4
6510-00-890-1370	Tape, Paper 1/2 in.			1
6515-01-152-5661	Nasopharyngeal Airway 34 FR			2
6515-01-244-5749	Nasopharyngeal Airway 32 FR			2
6515-00-364-4800	Iris Scissors			1
6515-00-334-6800	Forleps, Kelly, Straight			1
6515-00-344-7800	Knife, Handle No. 3			1
6515-00-926-8955	Penrose Drain			1
6515-00-935-4041	Suture Silk, 4-0			1
575040 (IVAC)	Cutter, Maxi-Drip 20 Drops per ML			1
6515-00-118-1341	Cutter, Mini-Drip 60 Drops per ML			1
6515-00-324-5500	Depressor, Tongue, Wood			15
6515-01-062-0904	Afrin			1
6515-01-010-0307	Betadine Swabs			7
6510-00-058-4421	2 x 2's Sterile Gauze			13
6510-00-148-9770	4 x 4's Sterile Gauze			2
6530-00-772-5935	Scrub Brush			1
6515-00-754-0406	Syringe 6 CC			1
6515-00-754-0412	Syringe 12 CC			1
6515-00-724-4606	Syringe 20 CC			1
6515-00-935-4065	Salem Sump Tube 18 FR			2
6515-00-660-0010	Knife Blade No. 11			1
6515-00-660-0008	Knife Blade No. 15			1

National Stock Number	Description FSCM and Part Number	Usable on Code	U/M	Qty Auth
6505-01-182-8013	Normal Saline 1000 CC			1
6505-00-083-6537	Lactated Ringers 1000 CC D5W			1
6515-00-926-9150	Heilich Valve			1
6515-00-935-5821	Ace Wrap Bandage Elastic 3 in.			2
6510-00-935-5822	Ace Wrap Bandage Elastic 4 in.			2
6510-00-935-5823	Ace Wrap Bandage Elastic 6 in.			2
6515-01-035-7962	Stopcock, 3-Way			2
6515-00-782-6516	Extension Tubing, I.V.			2
6515-00-334-3800	Hemastats, Curved Kelly			2
6515-01-149-8840	Gloves, Surgical Size 7			2
6515-01-149-8841	Gloves, Surgical Size 7 1/2			2
6515-01-149-8842	Gloves, Surgical Size 8			2
6515-01-149-8843	Gloves, Surgical Size 8 1/2			2
6510-00-201-1755	Triangular Bandage			4
6510-00-786-3736	Alcohol Pads			1
6510-00-203-6010	Moleskin			1
6515-00-926-2089	Razor Surg. Prep			1
6505-00-104-8061	Domeborro			2
6505-01-328-1895	Verapamil			1
6515-01-254-7625	Defibrelator and Monitor			1
6510-01-112-6414	Gauze, Petrolatum			4
6505-00-785-4357	Ointment, Lidocaine			
6515-00-374-2220	Steth Bell Dia Combo		Ea	1

National Stock Number	Description FSCM and Part Number	Usable on Code	U/M	Qty Auth
6515-00-458-8416	Cath/Con Suct Endo Pl Disp 18 Fr		Ea	2
6515-00-616-5052	Laryngoscope Infant, Child, Adult Macintosh		Ea	1
6515-00-823-7846	Suture Absorb Sz 000		Pg	3
6515-00-864-8864	Stopcock Intra Disp		Ea	6
6515-00-865-2687	Suture Silk Non-Abs Sz 000		Pg	3
6515-00-967-6984	Suture Silk Sz 4-0		Pg	3
6515-01-003-2368	Needle Multi 20ga 1 1/2 In.		Ea	10
6515-01-008-5209	Cath - Needle Unit 14ga		Ea	8
6515-01-008-7943	Resusitation Hand Operated		Ea	1
6515-01-034-0365	Cath - Needle Unit 18ga		Ea	8
6515-01-036-9034	Tube Endo 7.5mm		Ea	2
6515-01-036-9035	Tube Endo 8.5mm		Ea	2
6515-01-039-4884	Sphygmomanometer Aner		Ea	1
6515-01-050-6370	Cath Needle Unit 16ga		Ea	8
6515-01-058-5952	Airway Esop Adult		Ea	1
6515-01-121-0986	Stocking Anti Embol Ex 1g		Pg	1
6515-01-121-0987	Stocking Anti Embol Sm		Pg	1
6515-01-121-0989	Stocking Anti Embol Med		Pg	1
6515-01-121-0991	Stocking Anti Embol Lg		Pg	1
6530-00-105-8649	Bagurine Collect		Ea	2
6515-00-332-3300	Forceps Endo Tube Magill		Ea	1
6530-00-770-9220	Basin Emesis or Steel		Ea	2
6530-00-771-0225	Basin Wash Steel		Ea	2

National Stock Number	Description FSCM and Part Number	Usable on Code	U/M	Qty Auth
6630-00-145-1137	Tube Blood Collecting Vacuum Plain 7ml		Ea	4
6630-00-145-1143	Tube Blood Collecting Vacuum Plain 15ml		Ea	4
6515-00-299-8297	Mask Oronasal Resusi - Anesthesia Lg		Ea	1
6515-00-347-2200	Mask Oronasal Resusi - Anesthesia Med		Ea	1
	LSP Portable Resusitator, P/N 418057		Ea	1
	Oxygen Cylinder, P/N 416315		Ea	2
	Oxygen Transfiller, P/N 441169		Ea	1
	Suction System, P/N 428101		Ea	1
	Thermometer Disp, P/N 422040		Ea	10
6505-00-083-6537	Ringer Inj Lactate 12S		Bx	1
6505-00-083-6544	Sodium Chloride INJ12S		Bx	1
6505-00-127-2923	Dopamine Hyd Inj		Am	5
6505-00-133-4449	Epinephrine Inj 1CC 10		Bx	1
6505-00-137-5891	Diazepam Inj 2CC 10S		Bx	2
6505-00-139-4348	Phenytoin Sod Inj 10S		Bx	1
6505-00-139-4548	Calcium Chl Inj 10S		Bx	.5
6505-00-148-7177	Ciphenydr Hydroch Inj		Bx	1
6505-00-148-9814	Furosemide Inject 5S		Bx	1
6505-00-334-4478	Diazoxide Inj		Am	2
6505-00-598-6116	Lidocaine Hcl Inj, 1%, 50ML		Bt	1
6505-00-753-9615	Triprolidine Tab 100		Bt	10
6505-00-889-6653	Mannitol Inj 50ML		Am	2
6505-00-963-5355	Dexam Sod Phos Inj 5CC		Bt	5

National Stock Number	Description FSCM and Part Number	Usable on Code	U/M	Qty Auth
6505-00-982-9196	Povidone 10D Oint 1 Oz		Tu	6
6505-00-985-7301	Acetaminophen Tablets, 0.325GM, 1000's		Bt	1
6505-01-014-1378	Neomycin Sulfate 10ML		Pg	6
6505-01-079-6651	Pheny Hyd Nas Sol		Pg	6
6505-01-092-0420	Sodium Bic Inj 10ML 10		Bx	.5
6505-01-094-4482	Bretylium Tosylate Inj		Am	2
6510-00-018-6184	Pad, Nonadherent, 2x3 In. 100's		Pg	1
6510-00-782-2698	Sponge, Surgical, 8 Ply, Gauze, 4x4 In., 200		Pg	5
6510-00-890-1372	Adhtape Sur lx10 12S		Pg	1
6510-00-913-7909	Band Ad 3-4x31N300S		Bx	1
6515-00-105-0744	Tube, Endoctracheal, Radio. Murphy, 7.OMM, 10S		Pg	1
6515-00-105-0815	Tube, Endoctracheal, Radio. Murphy, 10MM, 10S		Pg	1
6515-00-140-0888	Intr Inj Se W/ONEED48S		Pg	1
6515-00-165-6544	Otoscop Cpht Se Batty		Se	1
6515-00-168-6894	Split, Finger, Aluminum 12S		Pg	1
6515-00-168-6913	Syringe Lu Disp5000100		Pg	1
6515-00-299-8297	Mask, Oronasal, Resus & Anesthesia, Large		Ea	1
6515-00-299-8356	Catheter, Urethal, Ballon, 5ML Bag, 16FR		Ea	2
6515-00-299-8679	Catheter Uret R-T 14FR		Ea	2
6515-00-308-5400	Bag, Ear Inflating, Politzer, 80Z		Ea	1
6515-00-324-5500	Depressor, Tongue, Wood, 1 OOS		Bx	2
6515-00-332-3300	Forceps, Endotracheal Tube, Magill		Ea	1
6515-00-337-2400	Forceps, Splinter, Tweezers, 3-1/2 In.		Ea	2

National Stock Number	Description FSCM and Part Number	Usable on Code	U/M	Qty Auth
6515-00-337-7800	Forceps, Tissue, Adson, 4-1/2 In 1-VS-2 Teeth		Ea	1
6515-00-340-6700	Hammer, Reflex Testing, Taylor 8 In.		Ea	2
6515-00-341-9100	Holder, Suture Needle, Hegar-Mayo 6 In.		Ea	1
6515-00-343-8100	Knife Ear Bay Cur Buck		Ea	1
6515-00-343-8600	Knife, Ear, Myringotome, Straight, Sexton		Ea	1
6515-00-347-2200	Mask, Oronasal, Rub, Resus/Anesth Med Adult		Ea	1
6515-00-348-7350	Needle Aspir 13GA31-2		Bx	1
6515-00-352-9600	Nipper, Ingrown Toenail, Concave, 5-1/2 In.		Ea	1
6515-00-363-4100	Saw, Finger Ring		Ea	1
6515-00-363-4150	Blade, Finger Ring Saw		Ea	1
6515-00-363-8840	Scissors, Bandage Angular, Lister, 7-1/4 In.			

APPENDIX E

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTIONS

E-1. Scope. This appendix lists expendable supplies and materials you need to operate and maintain the 3-Person Recompression Chamber. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

E-2. Explanation of Columns.

a. *Column (1) - Item Number*. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use Oil, Item 1, App. E").

b. *Column (2) - Level.* This column identifies the lowest level of maintenance that requires the listed item. (Enter as applicable).

C - Operator/Crew
O - Unit Maintenance
F - Direct Support Maintenance - Intermediate Maintenance
H - General Support Maintenance - Intermediate Maintenance
D - Depot Maintenance

c. *Column (3) - National Stock Number*. This is the National stock number assigned to the item; use it to request or requisition the item.

d. *Column (4) - Description*. Indicates the Federal item name, and, if required, a description to identify the item. The last line for each item indicates the Federal Supply Code for manufacturer (FSCM) in parentheses followed by the part numbers.

e. *Column (5) - Unit of Measure (U/MA).* Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

(1) ITEM NO	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
1	O	6810-00-983-8551	Alcohol, Isopropyl (81348) TT1735	qt
2	O	8415-00-281-7813	Apron, Rubber, Small (81349) MIL-A-2334	ea
	O	8415-00-281-7814	Apron, Rubber, Medium (81349) MIL-A-2334	ea
	O	8415-00-281-7815	Apron, Rubber, Large (81349) MIL-A-2334	ea
3	O	8105-00-837-7757	Bag, Plastic, 12 in. x 12 in. Interlocking Seal (58536) A-A-1779	bx
4	O	7510-00-243-3434	Bands, Rubber (81349) ZZ-R-1415	bx
5	O	8030-00-205-6511	Brush, Soft Bristle	ea
6	O	7920-00-044-9281	Cloth, Lint Free (81349) MIL-C-85043	bx
7	O	6850-00-621-1819	Compound, Leak Test, O_2 MIL-L-25567, Type 2	gl
8	O	7930-00-282-9699	Detergent, Nonionic, MIL-D-16791, Type I (80244)	gl
	O	7930-00-985-6911	Detergent, Nonionic, MIL-D-16791, Type I (80244) 5-Gal Can	cn
9	O	6810-00-297-9540	Distilled Water, Technical (96906) MS36300-5	5 gal.
10	O	6810-00-394-3555	Propylene Glycol	55 gal.
	O	6810-01-181-7121	Propylene Glycol	1 gal.
11	O	8415-00-266-8677	Gloves, Rubber (81349) ZZ-G-381 Size 10	pr
12	O	4240-00-764-5152	Goggles	ea
13	O	9150-00-754-2760	Grease, General Purpose (Halocarbon)	cn
14	O	6830-00-808-9531	Oxygen, Bulk	gl
15	O	8040-00-225-4548	Sealant, Adhesive, General	oz
16	O	6810-00-141-6078	Phosphate, Trisodium (81348) 0-S-642	lb

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(1) ITEM NO.	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
17	0	7920-00-205-1711	Rag, Wiping, 50/G (58536) A-A-531	ea.
18	0	4240-00-240-5141	Shield, Face, MIL-S-3126 (81349)	ea
19	0	6505-01-113-0110	Sodasorb, High Performance	ea
20	0	3439-00-269-9610	Solder, Rosin Core	
21	0	8030-00-889-3535	Tape, Teflon, MIL-T-27730 (81348), 1/2 In.	
	0	8030-00-889-3534	Tape, Teflon, MIL-T-27730 (81348), 1/4 In.	ea
22	0		Tie-Wrap	ea
23	H	6850-00-837-9927	Monochlorodifluoromethane, Technical: w/cylinder 22 lb (Refrigerant-22) BB-F-1421, type 22 (81348)	cy

APPENDIX F

TORQUE LIMITS

F-1. General. Table F-1 provides torque limits to be observed when installing attaching hardware.

Table F-1. Torque Limits.

Self-Locking Nut Breakaway Torque Valves			
Thread Size	Minimum Breakaway Torque (In.-Lbs)	Thread Size	Minimum Breakaway Torque (In.-Lbs)
10-32	2.0	5/8-18	32.0
1/4-28	3.5	3/4-16	50.0
5/16-24	6.5	7/8-14	70.0
3/8-24	9.5	1-12 .	90.0
7/16-20	14.0	1-1/8-12	117.0
1/2-20	18.0	1-1/4-12	143.0
9/16-18	42.0		

NOTE

To determine breakaway torque, thread nut onto screw or bolt until at least two threads stick out. Nut shall not make contact with a mating part. Stop the nut. Torque necessary to begin turning nut again is the breakaway torque. Do not reuse self-locking nuts that do not meet minimum breakaway torque.

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Subject — Paragraph

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Q

R

INDEX (Cont)

By Order of the Secretary of the Army:

GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official:

MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army
03288

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The following format must be used if submitting an electronic 2028. The subject line must be exactly the same and all fields must be included; however only the following fields are mandatory: 1, 3, 4, 5, 6, 7, 8, 9, 10, 13, 15, 16, 17, and 27.

From: "Whomever" <whomever@avma27.army.mil>
To: mpmt%avma28@st-louis-emh7.army.mil

Subject: DA Form 2028

1. ***From:*** Joe Smith
2. *Unit:* home
3. ***Address:*** 4300 Park
4. ***City:*** Hometown
5. ***St:*** MO
6. ***Zip:*** 77777
7. ***Date Sent:*** 19-OCT-93
8. ***Pub no:*** 55-2840-229-23
9. ***Pub Title:*** TM
10. ***Publication Date:*** 04-JUL-85
11. *Change Number:* 7
12. *Submitter Rank:* MSG
13. ***Submitter FName:*** Joe
14. *Submitter MName:* T
15. ***Submitter LName:*** Smith
16. ***Submitter Phone:*** 123-123-1234
17. ***Problem:*** 1
18. *Page:* 2
19. *Paragraph:* 3
20. *Line:* 4
21. *NSN:* 5
22. *Reference:* 6
23. *Figure:* 7
24. *Table:* 8
25. *Item:* 9
26. *Total:* 123
27. ***Text:***

This is the text for the problem below line 27.

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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 decagram = 10 grams = .35 ounce
1 hectogram = 10 decagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	Newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	Newton-meters	1.356	metric tons	short tons	1.102
pound-inches	Newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

THEN...JOT DOWN THE DOPE ABOUT IT ON THIS FORM. CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL.

SOMETHING WRONG WITH PUBLICATION

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE

BE EXACT PIN-POINT WHERE IT IS

PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.

IN THIS SPACE, TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT.

PRINTED NAME, GRADE OR TITLE AND TELEPHONE NUMBER	SIGN HERE

TEAR ALONG • PERFORATED LINE

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PREVIOUS EDITIONS ARE OBSOLETE.

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

PIN: 070862-002