*TB 5-4220-200-12-1

TECHNICAL BULLETIN

Operator an Unit Maintenance Instructions

F o r

OPEN CIRCUIT MILITARY SCUBA SYSTEM

***This manual supersedes TB 5-4220-200-10-1, dated 8 January 1979, including all changes.**

HEADQUARTERS, DEPARTMENT OF THE ARMY

15 JANUARY 1993

TECHNICAL BULLETIN

NO. 5-4220-200-12-1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON D.C., 15 January 1993

OPERATOR AND UNIT MAINTENANCE INSTRUCTIONS FOR OPEN CIRCUIT MILITARY SCUBA SYSTEM

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 the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, US Army Aviation and Troop Command, ATTN: AMSAT-I-MTS, 4300 Goodfellow Blvd., St. Louis, MO- 63120-01798. A reply will be furnished directly to you.

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Chapter 1 INTRODUCTION

Section I. GENERAL

1-1 SCOPE.

These instructions are for your use in operating and maintaining the open circuit Military SCUBA System (fig, 1-1), The instructions provide information on the theory of operation, pre-dive and post-dive checks and services, as well as periodic preventive maintenance services Also Included is unit maintenance of the equipment and descriptions of the components and their functions in relationship to other components.

1-2 MAINTENANCE RECORDS-AND DIVING RECORDS.

a. Maintenance Records will include periodic repairs of the regulator and tank block manifold assembly. semi annual or annual inspection of SCUBA tanks and periodic check of pressure gages against a master reference gage. DD Form 314 “Preventive Maintenance Schedule and Record” may be used at the discretion of the organizations commanding officer responsible for the conduct of diving operations TM 38-750 “The Army Maintenance Management System” describes the use of this form.

b. Diving Records will be maintained in accordance with procedures outlined in AR 611-75, “Section, Qualifications, Rating and Disrating of Marine Divers.” Each unit or activity authorized to conduct diving operations will maintain the “Diving Log” DA Form 1262-R. Each diver will maintain his “Diving Duty Summary Sheet” DA Form 3475-R.

1-3 EQUIPMENT SERVICE ABILITY CRITERIA (ESC).

This equipment is not covered by an ESC.

1-4 INSTRUCTION OF ARMY MATERIAL TO PREVENT ENEMY USE.

Procedures to be followed when capture or abandonment of the open circuit SCUBA System to an enemy is imminent are covered in TM 750-244-3. “Procedures for Destruction of Equipment to Prevent Enemy Use.”

1-5 ADMINISTRATIVE STORAGE.

Procedures to be followed will be found in TM 740 90 1 “Administrative Storage.”

Section II. DESCRIPTION AND DATA

1-6 DESCRIPTION AND PURPOSE.

a. Description. The open circuit Military SCUBA System is comprised of four major components as follows.

(1) Regulator, Air Pressure Demand: single hose, balanced first stage: conshelf XII or XIV (Arctic Explorer;) 3000 PSI operating pressure.

(2) Pressure Gauge. Divers regulator attachable: underwater adapted: 3000 PSI operating pressure.

(3) Tank Block, Divers: twin molychrome steel: galvanized exterior: reserve valve; and twin tank harness, 2475 PSI operating pressure. 71 2 AV cubic feet per tank.

(4) Gauge, Tank Pressure. Checks air supply before and after diving. 3000 PSI service with bleeder.

b. Purpose. This Divlng Equipment IS intended to be used in underwater Inspections. searching, clearing lines. minor repairs, recovery of cargo and reconnaissance.

1-7 DIFFERENCE MODELS.

All of the components of this open circuit SCUBA systems are manufactured by the U.S. Divers Company.

1-8 TABULATED DATA.

Tabulated Data is contained in Table 1-1

Table 1-1. TABULATED DATA

a. Pressure Demand Regulator.

(1) Model . . . . . Conshelf XII or XIV (Arctic Explorer) P/N 1088-00 or 1077-00

(2) NSN 4220-00-623-7280

(3) Operating Pressure . . . . . 3000 PSIG (Working)

(4) Intermediate Pressure . . . . . 130 ± 5 PSIG

b. Tank Block. Twin; Divers.

(1) Model . . . . . Part Number 0638 or 2800-00

(2) NSN 4220 00 033 6839

(3) Rated . . . . . 71.2 Cubic Feet @ 2475 PSI

(4) Diameter . . . . . 69 Inches

(5) Double Constant Reserve Valve . . . . . Part Number 0518-00

(6) Twin Tank Harness . . . . . Part Number 0812

C. Gauge Tank Pressure (Regulator Attachable)

(1) Model . . . . . Part Number 7036 or 28-074-00 (18181) or 7400-00 (94120)

(2) NSN 4220-01-003-2375

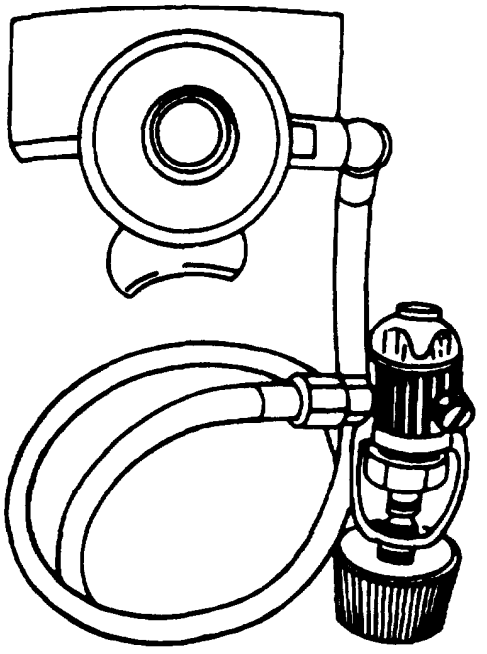
(3) High Pressure Gauge Accuracy . . . . . ± 50 PSI @ 500 PSIG ± 150 PSI @ 3000 PSIG

(4) Calibration Pressure . . . . . 03000 PSIG

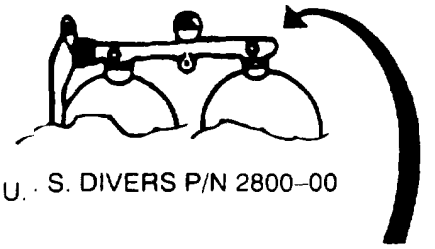
d. Pressure Gauge.

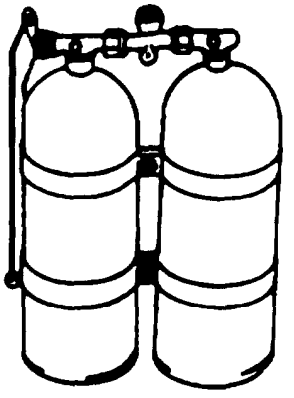
(1) Model . . . . . Part Number 7004

(2) NSN 4220-00-099-8024

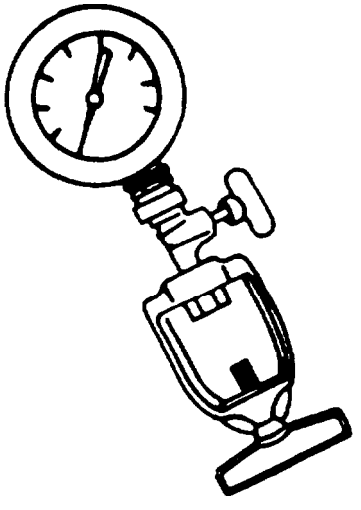


REGULATOR, SINGLE HOSE CONSHELF XII OR XIV ARCTIC EXPLORER P/N 1088-00 U. S. DIVERS

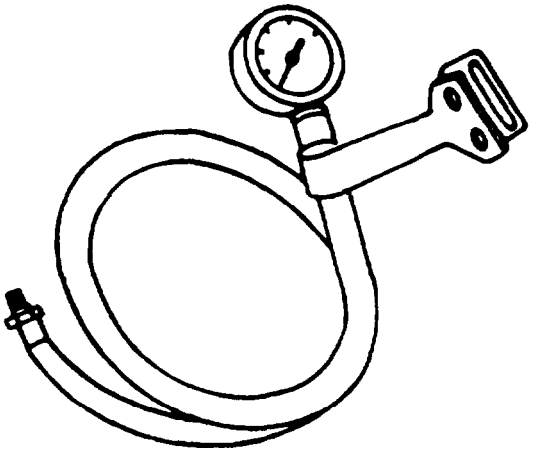




TANK BLOCK, DIVERS, GALVANIZED 2475 PSI. 71.2 CU. FT. EACH W/RESERVE VALVE. U. S P/N 0638-00



PRESSURE GAGE. 3.000 PSI U. S. DIVERS P/N 7004



GAGE TANK PRESS, UNDERWATER ADAPTED UNDER-SEA INDUSTRY P/N 132 OR U. S. DIVERS P/N 7036 OR 28-074-00/U.S. DIVERS 7400-00

Figure 1-1. Open Circuit Military SCUBA System

Chapter 2 OPERATING INSTRUCTIONS

Section I. THEORY OF OPERATIONS

2-1 GENERAL.

This section describes, locates, illustrates, and furnishes the diver with sufficient information for the proper operation of the components of the open circuit SCUBA system.

2-2 AIR-DEMAND REGULATOR (FIG. 2-1).

a. The Conshelf Arctic Explorer Regulator reduces high pressure cylinder air to ambient pressure using two separate stages that are joined together with an Intermediate pressure hose. The 1st stage regulator has a diaphragm operated, balanced high pressure valve to reduce cylinder pressure to 130 psig intermediate pressure. The 2nd stage regulator reduces the intermediate pressure to ambient breathing pressure with a downstream, diaphragm and lever operated demand valve.

b. When the diver inhales, a negative pressure is created inside the 2nd stage regulator, drawing diaphragm (47) inward, opening demand valve (36). This results in a drop in the intermediate pressure acting on diaphragm (20) inside the L. P. chamber. allowing mainspring (23) and pin (18) to push the 1st stage valve (14) open.

C. At the end of the inhalation cycle, the pressure on both sides of diaphragm (47) equalizes, and the diaphragm is outward allowing the 2nd stage valve (36) to close. Intermediate pressure acting on diaphragm (20) then increases to 130 psig, overriding the force of mainspring (23), allowing the 1st stage valve (14) to close.

d. The 1st stage valve (14) is "Balanced," meaning that the high pressure air surrounding it exerts no opening or closing force against the valve itself. The only forces acting on the valve are: the valve seating force of spring (13); and an intermittent opening force from mainspring (23) acting through pin (18). These are forces required for the normal operation of the valve. The purpose of the “balanced” valve is to maintain a constant, steady Intermediate pressure setting regardless of the drop in cylinder pressure from a full to an empty cylinder. This permits sensitive adjustment of the regulator for easy breathing at all cylinder pressures.

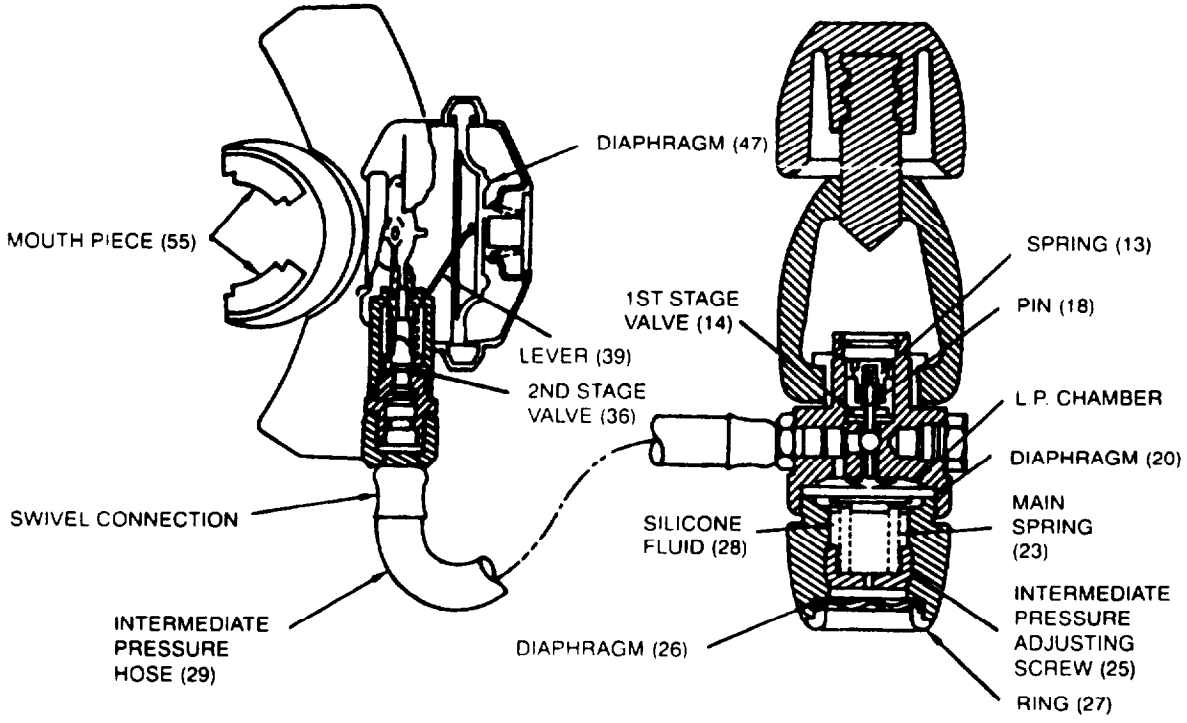


Figure 2-1. Air Demand Regulator

e. The 2nd stage valve (36) is “fail safe” meaning that due to its downstream design it will relieve overpressure in the Intermediate pressure hose (29) if leakage of 1st stage valve (14) should occur. This IS a safety feature.

f. Both the 1st stage and 2nd stage regulators are "depth compensating, " because their diaphragms (20) and (47) are always in contact with surrounding water pressure. These diaphragms sense any Increase or decrease in ambient water pressure, causing both 1st and 2nd stage valves (14) and (36) to adjust accordingly. This insures that air inhaled from the regulator always equals ambient water pressure regardless of changes in depth.

g. The Conshelf Arctic Explorer IS specially adapted for use in extremely cold waler due to its mainspring (23) cavity being filled with silicone fluid (28). This prevents the mainspring (23) from freezing up because of ice forming between the spring coils. The silicone fluid IS contained inside the spring cavity by means of a secondary diaphragm (26) capable of sensing changes in surrounding water pressure even when the 1st stage regulator is surrounded by as much as three-quarters of an inch of ice.

h. Removal or loosening of the diaphragm retaining ring (27) on the 1st stage regulator may result in a loss of silicone fluid and may render the regulator unfit for frigid water usage

i. Although the Arctic Explorer is designed for use in low temperature water, 2nd stage freeze-up and free-flow may occur when diving in fresh water below 38°F or salt water below 35°F if the regulator IS purged for longer than five seconds. This freeze and resultant free-flow is due to ice forming around the demand valve lever (39). If this condition is encountered, it is necessary to remove the regulator from the mouth. allowing water to enter the mouthpiece (55) to dissolve the ice deposits.

j. Also, in intensely cold surface temperatures while the regulator IS idle between dives, it should be kept in a dry location above 32°F to eliminate the possibility of ice forming in the 2nd stage demand mechanism.

2-3 TWIN CYLINDER VALVE MANIFOLD.

a. General. The basic function of the twin cylinder reserve valve is an ON OFF valve to control the air supplied from two diving cylinders, combined with an air reserve mechanism that begins restricting air flow at approximately 600 psig and shuts off flow at 500 psig. This warns a preoccupied diver that he IS low on air. He then actuates the reserve lever to breath the remaining air in his cylinder.

b. ON/OFF Valve. The ON/OFF valve is in the center and IS used to control the air supply from both cylinders. The ON/OFF valve mechanism consists of a nylon seat-disc in a metal retainer which screws down against a metal seat to shut off cylinder air. Turning the ON/OFF knob clockwise until finger tight shuts off cylinder air.

CAUTION

Never turn the knob more than finger tight as this will damage the disc in time. To open the valve, turn counterclockwise approximately two turns or less until it stops. (Never try to force it beyond this point.) Then turn valve clockwise from 1/4 to 1/2 turn and stop.

c. Constant Reserve. The constant reserve is located on the diver’s left cylinder. It allows a predetermined volume of air to remain entrapped in the left cylinder, while the right cylinder is breathed empty. When the reserve lever is pulled DOWN air is allowed to flow into the empty cylinder until pressure in both cylinders equalize.

d. Elbow Assembly (Tank Block P/N 0638). The elbow assembly has no moving parts. Its function is merely a threaded connector between the right cylinder and ON/OFF valve.

e. Use. Allow a short burst of air to clean out the filling port prior to attaching a regulator to the twin manifold. After the regulator is attached. open the ON/OFF valve and set the reserve lever in the “UP POSITION” for start of dive.

f. Filling Procedure. Allow a short burst of air to clean out the filling port prior to attaching the filling yoke, Turn the reserve lever to the “DOWN POSITION” to allow air to flow past the reserve mechanism, Attach filling yoke, open ON/OFF knob and fill cylinders. After filling. turn ON/OFF knob closed and remove the filling yoke. Turn levers to “UP POSITION” for storage.

2-4 TWIN CYLINDER HARNESS (FIG. 4-5).

a. General. A twin harness consists of two stainless steel “figure eight” bands, center bolted. Extruded rubber strips assure a non-slip contact against cylinder walls,

(1) Harness webbing is threaded through slots in the bands and held firmly in position by the clamping of bands against the cylinders. Two inch nylon webbing is used for comfort on the shoulder pads. Adjustable waist, chest. shoulder. and crotch straps are provided; straps are equipped with quick release “D” rings. All harness webbing and hardware is box stitched with heavy nylon thread.

(2) The harness assembly remains on the cylinders at all times. Reserve valve pull rod tabs are provided on each band.

b. Use. Support the cylinders at a comfortable height from the deck (or have a buddy hold them up) and slide first one arm then the other into the shoulder harness loops as if putting on a coat. Secure the chest strap with a quick release loop. Now stand up and adjust the shoulder strap D-rings so the cylinder hangs at a comfortable height on your back.

(I) Bring the crotch strap forward and insert the waist strap through the crotch strap loop end. Crotch strap length should be adjusted for snug, not tight, fit. Form a quick-release loop in the waist strap “D” ring and another in one of the shoulder strap "D" rings. The shoulder straps can be used to support the weight of the cylinders when they are being taken off the back.

(2) Push the reserve lever upward prior to diving to set reserve. When using a crotch strap, the weight belt must be put on last, over the top of the crotch strap, so the weight belt may be dropped in an emergency.

2-5 PRESSURE GAUGES.

CAUTION

Avoid sudden pressurization of gauges. Turn on air slowly with the gauge dial facing downward. Once the gauge IS under full pressure, swivel to read.

a. Tank Pressure Gauge Assembly (Regulator Attachable). This gauge provides the diver with a rapid readout of air pressure during operation. It is attached to the first stage regulator at the port identified by the LETTERS “HP” (see fig. 4-1). It should be worn in a comfortable manner and be easy to read when brought to position by the divers left hand.

b. Gauge, Tank Pressure. This gauge IS used in checking tank air pressure (out of water) and is required during tank filling operations. Its use in this operation is described in Chapter 5, FM 20-11-l) “Military Diving.” .

Section II. OPERATIONAL READINESS

2-6 GENERAL.

The minimum equipment which must be worn by divers during open circuit diving operations are listed in Section II and FM 20-11-1 “Military Diving Manual”. The standard accessories consisting of face mask, life preserver, knife, sheath. weight belt, swim fins. wrist watch and depth gage are identified in Supply Catalog SC 4220-97-CL-E11 .

2-7 OPERATIONAL CHECKS AND SERVICES.

Prior to placing the equipment into operation the diver wiII conduct pre-dive checks and services listed in Table 2-1 Upon completion of diving operations “Post -dive checks and Services.” Table 2-2 will be completed.

2-8 SCUBA TANK FILLING.

Prior to charging SCUBA cylinders refer to paragraph 2 3f Charge cylinders in accordance with instructions contained in Chapter 5 of FM 20-11-1, “Military Diving Manual”

Table 2-1. PRE-DIVE PREVENTIVE MAINTENANCE CHECK AND SERVICES

B-PRE-DIVE (OUT OF WATER) TIME REQUIRED: 0.3

D-PRE-DIVE (IN WATER) TIME REQUIRED: 0.1

Interval and Sequence		Items to be Inspected Procedure	Work Time M/H
B	D		
1		ALL EQUIPMENT	
		Check to insure that all components (para 1 -7) are on hand. Inspect for rust, sand and other foreign materials.	0.1
2		TANKS	
		Inspect for cracks, dents, loose or damaged exterior parts Insure that reserve lever IS n the unactivated (UP) position to indicate the tanks are filled and ready for use, Inspect manifold for visible damage.	0.1
		Check tank pressure with diver’s pressure gauge. Tank pressure must not exceed 2250 PSIG unless there is a plus sign after the current hydrastatic test date which, would allow for a 10% overfill.	
		Inspect harness quick-release mechanism and adjust straps for secure, comfortable it.	
3		REGULATOR	
		Inspect cap assembly O-Ring and filter for damage and foreign material. Check for proper seating, leaks and proper breathing resistance. With the first stage regulator cap assembly seated over the body filter assembly opening, attempt to breathe from he second stage regulator. Any air received indicates an air leak in the first or second stage regulator. Inspect hose for punctures and dry rot. Tug gently on hose to insure secure connections.	0.1
		(IN WATER CHECKS)	
	4	REGULATOR	
		Inspect for leaks and proper breathing resistance	0.1
	5	HARNESS	
		Inspect for proper fit.	
	6	BUOYANCY	
		Check for neutral buoyancy.	
		WARNING	
		If there are any doubts concerning correct operation of any components, do not dive until they have been checked.	

Table 2-2. POST DIVE PREVENTIVE MAINTENANCE CHECK AND SERVICES

A-POST DIVE CHECK AND SERVICES
TIME REQUIRED 0.6

Interval and Sequence	Items to be Inspected Procedure	Work Time M/H
A		
1	TANKS	
	Turn tank manifold to OFF position. Turn manifold reserve lever to activate (DOWN) position to warn personnel that the tanks have been used.	
2	REGULATOR	
	Push in on the purge button and release. If free flow on very little flow occurs, see troubleshooting table 4-3 for instructions. Reduce pressure in the regulator and detach the 1st stage from the manifold.	0.1
3	ALL EQUIPMENT	
	CAUTION	
	Do not press purge button on the second stage regulator when rinsing the equipment.	
4	CLEAN	
	Rinse all equipment with fresh water to remove salt deposits and other foreign material. Wipe equipment dry with a soft cloth.	0.2
5	OPERATION (CHECK)	
	Reconnect major components and conduct operational check. Disconnect major components.	0.2
6	STORAGE	
	Store equipment in a dry. cool area Do not hang equipment by rubber components.	0.1

Chapter 3 OPERATORS MAINTENANCE INSTRUCTIONS

Section I. MAINTENANCE PROCEDURES

3-1 GENERAL.

This Section describes the preventive maintenance to be performed by the diver using the equipment. It contains instructions for conducting weekly preventive maintenance including: inspectron, testing, cleaning and servicing the equipment as prescribed in the Maintenance Allocation Chart of Appendix D.

3-2 WEEKLY PREVENTIVE MAINTENANCE.

Refer to Table 3-1 for "Weekly Preventive Maintenance Procedures."

3-3 TROUBLESHOOTING PROCEDURES.

The operator (diver) will utilize applicable parts of the "Troubleshooting Procedures" listed in Table 4-3, Chapter 4 for functions prescribed by the Maintenance Allocation Chart, Appendix D.

3-4 CLEANING AND SERVICING.

a. Demand Regulator. After each dive rinse off the entire regulator with fresh water. With cap (3) fig. 4-l in place allow water to flow inside the mouthpiece (21) fig. 4-2 and out the exhaust tube (9). Do not push the purge button (2) while rinsing or water will enter the 2nd stage valve (15) and flow into the 1st stage regulator. Also, flow water inside the box top (5) through the side holes to flush out any entrapped sand or dirt. After washing, polish the chrome with a rough towel.

b. Twin Cylinder Valve Manifold. Clean the valve assembly with fresh water after use. Use a soft, clean cloth to dry all surfaces of the valve. Open the ON/OFF knob slightly, allowing air to blow out any remaining water from the outlet pot-t. Periodically lubricate the exposed O-Ring around the filling port with silicone grease.

(1) Inspect this O-Ring between dives for nicks. cuts or imbedded sand and dirt.

(2) With the cylinders depressurized periodically inspect the two coupling nuts (P/N 0636) holding the manifold assembly together. These nuts must be wrench tight to prevent leakage. Examine the reserve pull-rod and straighten any bending that occurred during use or transport.

c. Twin Cylinder and Harness. Wash the outside of the cylinders and twin harness assembly with fresh water after use. Periodically inspect figure eight band clamp bolts for tightness. Bent reserve lever tabs can be reformed by inserting the rod and forming the tab over the rod.

d. Pressure Gauges. Wash the divers depth gauge in fresh water after every dive. Avoid banging against hard objects. Dry the gauge thoroughly before storage. Store gauges in a cool, dry place.

Section II. REPAIR PARTS, TOOLS, SUPPLIES, AND TEST EQUIPMENT

3-5 GENERAL.

This Section locates and identifies the repair parts, standard tools, equipment and supplies authorized the operator (diver) to complete the prescribed preventive maintenance checks and services.

3-6 REPAIR PARTS AND SUPPLIES.

Repair parts are identified in Section II thru Section VI of Appendix E. Expendable material and supplies are located in Appendix F. The letter "C" in the Maintenance level column Indicates items intended for divers use.

3-7 TOOLS AND TEST EQUIPMENT.

Standard Tools are identified in Section VlII of Appendix E. Special Tools are listed in Section IX and Test Equipment is contained in Section X. Observe the assigned maintenance level code "C."

Table 3-1. WEEKLY PREVENTIVE MAINTENANCE CHECKS AND SERVICES

W-WEEKLY
TOTAL MANHOURS REQUIRED 0.5

Sequence Number	Item to be Inspected Procedure	Work Time M/H
1	TANKS	
	Inspect tanks, manifold assembly. tank stabilizer bands, for rust. corrosion and damage. Tighten exterior screws. bolts, and nuts carefully after inspecting for thread damage. Inspect harness straps for wear or damage. Insure that tanks. manifold and harness are free of dirt, verdigris and other foreign matter. Check tanks to verify next required hydrostatic test (every 5 years). Verify next required internal (visual) tank inspection.	0.1
2	DEMAND REGULATOR	
	Inspect hose for dry rot, cuts; hose connectors for proper seating and thread damage. Clean filter and inspect for damage. Conduct air leakage test: with the first stage regulator cap assembly seated, attempt to breathe from the second stage regulator. Any air received indicates an air leak in the first or second stage regulator	0.1
3	GAUGES	
	Inspect rubber gauge cover for dry rot and cuts. Inspect for broken glass. Check against a master reference gauge for operational accuracy. Inspect hose for dry rot and cuts; hose connectors for proper seating and thread damage Insure that gauges are free of dirt and verdigris.	0.1
4	OPERATIONAL CHECK	0.1
	Connect the major components and conduct operational check. Be alert for unusual operation or condition; i.e., air leakage. or improper breathing resistance. Conduct an air leakage test with ample air supply in the tanks and the manifold valve control in the “on” position; then submerge the equipment in water and check for air leaks.	
5	STORAGE	0.1
	Dry the equipment and store in a dry cool well ventilated area.	

Chapter 4 UNIT MAINTENANCE INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF MATERIAL

4-1 GENERAL.

The services performed upon receipt of a new or used open circuit Military SCUBA System are the responsibility of the using organization.

4-2 !NSPECTING AND SERVICING THE EQUIPMENT

The using organization will inspect the system for completeness against items listed in Table 1-1 "Tabulated Data" and Section III "Basic Issue Items" of Appendix B. Any evidence of damage, or missing components or parts will be listed at once and reported to the proper authority for corrective action.

a. Demand Regulator. Complete procedures 1 through 3 of Table 4-1. Following reassembly of regulator conduct applicable pre-dive checks and services, Table 2-1.

b. Twin Tank Block Assembly. Complete procedures 1 through 4 of Table 4-1. Following reassembly perform applicable pre-dive checks and services Table 2-1.

C. Pressure Gauges. Conduct semi-annual check and services, Item 2, Table 4-2.

Section II. REPAIR PARTS, TOOLS, SUPPLIES, AND TEST EQUIPMENT

4-3 GENERAL.

This section locates and identifies the repair parts, standard tools, special tools, equipment and supplies authorized the organization in the maintenance support of the open circuit SCUBA System.

4-4 REPAIR PARTS AND-SUPPLIES.

Repair Parts are located in Section II thru Section VII Appendix E. Supplies are listed in Section II Appendix F.

4-5 TOOLS AND TEST EQUIPMENT.

Standard Tools are identified in Section VIII of Appendix E. Special Tools are listed in Section IX and Test Equipment is listed in Section X.

Section III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

4-6 GENERAL.

This section prescribes cleaning and lubrication instruction, and inspection procedures as well as the annual and semi-annual checks and services in tables 4-1 and 4-2.

4-7 CLEANING AND LUBRICATION.

a. Cleaning.

CAUTION

Do not use nitric acid on plastic or rubber parts.

Clean all metal parts, except those with plastic or rubber parts, in a water and nitric acid solution (item 5, App. F). which contains no more than 15 to 20% nitric acid. Do not allow the metal parts to remain in the acid solution for more than 5 minutes. To remove extra thick verdigris use the wire brush on chrome plated surfaces. After cleaning, rinse each metal part in water and sodium bicarbonate (15 to 20%) solution to neutralize the acid. Rinse in fresh water and dry with a soft dry cloth. Wash each rubber and plastic part with warm soapy water. Rinse in fresh water and dry with a soft dry cloth.

b. Lubrication. No lubrication is required.

4-8 ANNUAL AND SEMI-ANNUAL CHECK AND SERVICES.

Table 4-1 contains the instructions for conducting annual preventive maintenance. Table 4-2 contains Instructions for completing semi-annual preventive maintenance.

4-9 INSPECTION PROCEDURES.

a. O-Rings - Inspect for dry rot. damage, and distortion; replace if necessary.

b. Gaskets - Inspect for damage and loss of compressron capabilities; replace if necessary.

c. Rubber Parts - Inspect for dry rot, tears, distortion; replace if necessary

d. Plastic Parts - Inspect plastic parts for depressions. cracks, other damage; replace if necessary.

e. Filter - Inspect for distortion, pin holes, rust and other damage; replace if necessary.

f. Metal Part - Inspect for dents. rust cracks, and other damage; replace if necessary.

Table 4-1. ANNUAL UNIT PREVENTIVE MAINTENANCE CHECKS AND SERVICES

TOTAL MANHOURS REQUIRED 3.2

Sequence Number	Functions to be Performed Procedure	Work Time M/H
1	DISASSEMBLY	
	Disassemble all components of the open circuit SCUBA system in accordance with disassembly instructions in Section V and Section VI.	0.8
	Clean all parts as needed in accordance with cleaning instructions in Section III. paragraph 4-7.	
	Inspect and replace parts as necessary in accordance with inspection instructions in Section III, paragraph 4-8.	
2	REASSEMBLY AND ADJUSTMENT	
	Reassemble and adjust the system in accordance with Section V and Section VI.	1.8
3	OPERATIONAL CHECK	
	Perform step 4 of Table 3-1 “Weekly Preventive Maintenance Checks and Services”.	0.1
4	INTERNAL TANK INSPECTION (VISUAL)	
	Perform inspection in accordance with instructions contained in Section VI, 4-18.	0.5

Table 4-2. SEMI-ANNUAL UNIT PREVENTIVE MAINTENANCE CHECK AND SERVICES

TOTAL MANHOURS REQUIRED 0.2

Sequence Number	Functions to be Performed Procedure	Work Time M/H
		0.5
	PRESSURE GAUGE TEST	
	Test gauges in accordance with a Master Reference Gauge. Refer to TB 9-6685-319-50, "Calibrating Procedures for Indicating Dial Gauges". If meter accuracy is not within tolerance level prescribed in , Section VII. paragraph 4, dispose of pressure gauge and replace with a new one.	0.2
	NOTE The master reference gauge shall be calibrated annually in accordance with TB 43-180, "Calibration Requirements for the Maintenance of Army Material."	

Section IV. TROUBLESHOOTING

4-10 GENERAL.

This section contains troubleshooting information for locating and correcting the operating troubles which may develop in the Open Circuit SCUBA System. Each malfunction for an individual component or system is identified by a list of probable causes and corrective actions to be taken to restore the component or system to an operational status. Perform the test/inspections according to the cited references.

4-11 TROUBLESHOOTING INSTRUCTIONS.

Refer to Table 4-3. This table provides troubleshooting instructions for the unit maintenance level.

NOTE

Before you use this table, be sure you have performed all applicable operating checks.

Table 4-3. TROUBLESHOOTING - UNIT

A. AIR DEMAND REGULATOR TROUBLESHOOTING INSTRUCTIONS

ITEM NO.	MALFUNCTION	PROBABLE CAUSE	CORRECTIVE ACTION
1	Air free flow (won't shut off).	a. Purge button (fig. 4-2) (2) jammed open.	a. Remove and clean. (Section Ill, para 4-7).
		b. Lever (fig. 4-2) (18) set too high.	b. Readjust lever (18), (Section V, para 4-14c).
		c. Lever (fig. 4-2) (18) bent	c. Replace lever (18).
		d. First stage regulator failure (fig. 4-1).	d. Replace first stage regulator disc and retainer (14), (Section V, para 4-13b).

Table 4-3. TROUBLESHOOTING - UNIT (CONT)

A. AIR DEMAND REGULATOR TROUBLESHOOTING INSTRUCTIONS (CONT)

ITEM NO.	MALFUNCTION	PROBABLE CAUSE	CORRECTIVE ACTION
2	Weak purge flow.	a. Lever (fig. 4-2) (18) out of adjustment.	a. Readjust lever (18). Section V. para 4-14c).
		b. Lever (fig. 4-2) (18) bent.	b. Replace lever (18). (Section V. para 4-14b).
3	Hard to breath.	a. Lever (fig. 4-2) (18) out of adjustment.	a. Readjust lever (18). (Section V, para 4-14c).
		b. First stage regulator intermediate pressure set too low (fig. 4-1).	b. Readjust the first stage regulator adjusting screw (27). (Section V, para 4-13c).
		c. First stage regulator filter (fig. 4-1) (8) restricting the flow of air.	c. Clean or replace first stage regulator filter (8). (Section Ill. para 4-7).
4	Hissing sound from the second stage regulator.	a. Lever (fig. 4-2) (18) out of adjustment.	a. Readjust lever (18). (Section V. para 4-14c).
		b. First stage regulator intermediate pressure set too high (fig. 4-1).	b. Readjust first stage regulator adjusting screw (27). (Section V, para 4-13c).
		c. Disc and Retainer (fig. 4-1), (14) and (15) first stage regulator dirty, damaged or worn.	c. Clean or replace (Section Ill, para 4-7).
		d. Inlet fitting (fig. 4-2) (12) dirty, damaged or worn.	d. Clean or replace (Section Ill. para 4-7 or Section V, para 4-14b).
		e. Second stage regulator hose assembly O-Ring (fig. 4-2) (28) . damaged.	e. Remove and replace (Section V, para 4-14b).
		f. Second stage regulator inlet fitting O-Ring (fig. 4-2) (13) damaged.	f. Remove and replace (Section V, para 4-14b).
5	High pressure leak from the first stage regulator.	a. First stage regulator disc and retainer (fig. 4-l) (14) dirty. damaged. or worn.	a. Clean or replace (Section III. para 4-7).
		b. Verdigris build up on the first stage regulator disc and retainer (fig. 4-1) (14) and the regulator body interior walls (fig. 4-1) (15).	b. Clean or replace. (Section III, para 4-7).

Table 4-3. TROUBLESHOOTING - UNIT (CONT)

A. AIR DEMAND REGULATOR TROUBLESHOOTING INSTRUCTIONS (CONT)

ITEM NO.	MALFUNCTION	PROBABLE CAUSE	CORRECTIVE ACTION
6	Air leakage (submerge pressure regulator in water to locate source of leak).	a. Second stage regulator diaphragm (fig. 4-2) (6) damaged. or improper seal between the box top (fig. 4-2) (5) and the box bottom (fig. 4-2) (11).	a. Check and replace if necessary. (Section V, para 4-14b).
		b. Loose rim clamp (fig. 4-2) (6).	b. Tighten rim clamp screw (7), (Section V, para 4-14b).
		C. Loose inlet fitting (fig. 4-2) (12).	c. Tighten inlet fitting (12), (Section V, para 4-14b).
		d. inlet fitting O-Ring (fig. 4-2) (13) dirty, damaged, or worn.	d. Clean or replace (Section III, para 4-7).
		e. First stage regulator spring retainer (fig. 4-1) (26).	e. Tighten spring retainer (26), (Section V, para 4-13b).
		f. First stage regulator plug screws (fig. 4-1) (17) and 4-1) (18) loose.	f. Tighten plug screw.
		g. First stage regulator plug screw O-Rings (fig. 4-1) (16) and (19) dirty or damaged.	g. Clean or replace (Section III, para 4-7).
		h. Hose connectors (fig. 4-2) (25) and (27) loose or damaged.	h. Tighten hose connections or replace hose (26).
		i. Hose O-Rings (fig. 4-2) (24) and (28) dirty, damaged, or worn.	i. Clean or replace O-Ring (Section III. para 4-7).
		j. Hose (fig. 4-2) (26) cracked or worn.	j. Replace hose (26).
7	Water Leakage.	a. Exhaust valve (fig 4-2) (10) dirty, damaged, or worn.	a. Clean of replace (Section III, para 4-7), or Section V, para 4-14b).
		b. Check points listed under “air leakage,” A and B item No. Six.	
		C. Mouthpiece torn or Loose band (Mouthpiece).	

Table 4-3. TROUBLESHOOTING - ORGANIZATIONAL (CONT)

6. DIVER'S TANK BLOCK TROUBLESHOOTING INSTRUCTIONS (P/N 0638)

ITEM NO.	MALFUNCTION	PROBABLE CAUSE	CORRECTIVE ACTION
1	Air leak from center yoke output connector (fig. 4-3) (7).	a. Nipple and disc (fig. 4-3)(10).	a. Replace nipple and disc (10). (Section VI. para 4-16b).
		b. Main stem (fig. 4-3)(11) damaged.	b. Replace main stem (11), (Section VI, para 4-16b).
2	Air leak from center yoke connector (fig. 4-3(6) and (8).	a. Connector (fig. 4-3)(6) loose.	a. Tighten connector (6).
		b. Connector (fig. 4-3)(8) loose.	b. Tighten connector (8).
		c. Insert washer (fig. 4-3)(22) damaged.	c. Replace insert washer (22) (Section VI, para 4-16b).
		d. Reserve elbow insert (fig. 4-3)(21) damaged.	d. Replace reserve elbow insert (21) (Section VI, para 4-16b).
3	Air leak from the ON/OFF handle.	a. Main stem gasket (fig. 4-3)(12) damaged.	a. Replace main stem gasket (12). (Section VI, para 4-16b).
		b. Main stem O-Ring (fig. 4-3)(13) damaged.	b. Replace main stem O-Ring (13). (Section VI, para 4-16b).
		c. Bonnet back-up ring (fig. 4-3)(14) damaged.	c. Replace bonnet back-up ring (14), (Section VI. para 4-16b).
		d. Bonnet O-Ring (fig. 4-3)(15) damaged.	d. Replace bonnet O-Ring (15), (Section VI, para 4-16b).
		e. Bonnet (fig. 4-3)(16) damaged.	e. Replace bonnet (16), (Section VI, para 4-16b)
4	Air leak from tanks.	a. Elbows (fig. 4-3)(5) or (30) loose.	a. Tighten elbows (5) or (30) as appropriate.
		b. O-Ring (fig. 4-3)(4) or (26) damaged.	b. Replace O-Ring (4) or (26) as appropriate. (Section III, para 4-8 and Section VI, para 4-16b).
5	No reserve air supply.	a. Reserve disc and retainer (fig. 4-3)(25) worn or damaged.	a. Replace reserve disc and retainer (25), (Section VI, para 4-16b).
		b. Insert spring (fig. 4-3)(23) damaged.	b. Replace insert spring (23). (Section VI, para 4-16b).
		c. Pin and plunger spring (fig. 4-3) (31) damaged.	c. Replace pin and plunger spring (31). (Section VI, para 4-16b).

Table 4-3. TROUBLESHOOTING - UNIT (CONT)

B. DIVER'S TANK BLOCK TROUBLESHOOTING INSTRUCTIONS (P/N 0636) (CONT)

ITEM NO.	MALFUNCTION	PROBABLE CAUSE	CORRECTIVE ACTION
6	Reserve lever inoperative.	a. Pin and plunger (fig. 4-3)(32) damaged.	a. Replace pin and plunger (32), (Section VI, para 4-16b).
		b. Reserve stem (fig. 4-3) (33) loose or damaged.	b. Tighten or replace reserve stem (33), (Section VI, para 4-16b).
7	Air leak from reserve lever.	a. Reserve gasket (fig. 4-3) (34) damaged.	a. Replace reserve gasket (34), (Section VI, para 4-16b).
		b. Reserve O-Ring (fig. 4-3) (35) damaged.	b. Replace reserve O-Ring (35), (Section VI, para 4-16b).
		c. Reserve back-up ring (fig. 4-3) (36) damaged.	c. Replace reserve back-up ring (36), (Section VI, para 4-16b).

C. DIVER'S TANK BLOCK TROUBLESHOOTING INSTRUCTIONS (P/N 2800-00)

ITEM NO.	MALFUNCTION	PROBABLE CAUSE	CORRECTIVE ACTION
1	Air leak from manifold output connector (fig. 4-4) (21).	a. Seat (fig. 4-4) (23).	a. Replace seat (23) (Section VI, para 4-17b).
		b. Main stem (fig. 4-4) (24) damaged	b. Replace main stem (24), (Section VI, para 4-17b).
2	Air leak from the ON/OFF handle.	a. Main stem gasket (fig. 4-4) (25) damaged	a. Replace main stem gasket (25), (Section VI, para 4-17b).
		b. Main stem O-Ring (fig. 4-44) (26) damaged.	b. Replace main stem O-Ring (26), (Section VI, para 4-17b).
		c. Bonnet back-up ring (fig. 4-4) (27) damaged.	c. Replace bonnet back-up ring (27), (Section VI, para 4-17b).
		d. Bonnet O-Ring (fig. 4-4) (28) damaged.	d. Replace bonnet O-Ring (28), (Section VI, para 4-17b).
		e. Bonnet (fig. 4-4) (29) damaged.	e. Replace bonnet (29), (Section VI, para 4-17b).

Table 4-3. TROUBLESHOOTING - ORGANIZATIONAL (CONT)

C. DIVER'S TANK BLOCK TROUBLESHOOTING INSTRUCTIONS (P/N 2800-00) (CONT)

ITEM NO.	MALFUNCTION	PROBABLE CAUSE	CORRECTIVE ACTION
3	Air leak from tanks.	a. Manifold (fig. 4-4) (21) loose	a. Tighten manifold (21) as appropriate.
		b. O-Ring (fig. 4-4) (5) or (10) damaged.	b. Replace O-Ring (5) or (10) as appropriate. (Section III, para 4-8 and Section VI, para 4-17b).
4	No reserve air supply.	a. Reserve stem (fig. 4-4) (18) worn or damaged.	a. Replace reserve stem (18), (Section VI. para 4-17b).
		b. Reserve bonnet (fig. 4-4) (13) damaged.	b. Replace reserve bonnet (13), (Section VI, para 4-17b).
		c. Reserve assembly (fig. 4-4) (20) damaged.	c. Replace reserve assembly (20). (Section VI, para 4-17b).
5	Reserve lever inoperative.	a. Reserve bonnet (fig. 4-4) (13) damaged.	a. Replace reserve bonnet (13). (Section VI, para 4-17b).
		b. Reserve stem (fig. 4-4) (18) loose or damaged.	b. Tighten or replace reserve stem (18). (Section VI, para 4-17b).
6	Air leak from reserve lever.	**a.** Reserve gasket (fig. 4-4) (16) damaged.	a. Replace reserve gasket (16), (Section VI, para 4-17b).
		b. Reserve O-Ring (fig. 4-4) (15) damaged.	b. Replace reserve O-Ring (15) (Section VI, para 4-17b).
		c. Reserve back-up ring (fig. 4-4) (14) damaged.	c. Replace reserve back-up ring (14), (Section VI, para 4-17b).

Section V. DEMAND REGULATOR

4-12 GENERAL

This section contains the disassembly/reassembly and adjustment instructions for the Air Pressure Demand Regulator (single hose) which is a two stage regulator with automatic pressure compensating abilities. It has a capability of arctic operation without freezing.

4-13 FIRST STAGE REGULATOR (FIG. 4-1).

a. First Stage Regulator Disassembly.

(1) Mount the first stage regulator in a soft jaw vise. Tighten the jaws of the vise securely against the flat sections on the spring retainer (fig. 4-1) (26).

NOTE

An alternate method may be used to hold the first stage regulator by inserting a spent 38 gram CO_2 cartridge into any of the open parts in the body.

(2) Untie and remove the cap assembly (3).

(3) With tool 1588-13 remove the cap assembly O-Ring (4) from the cap assembly (3).

(4) Unscrew and remove the knob (2).

(5) With a 9/16 inch open end wrench, unscrew and remove hose assembly (fig. 4-2) (26) from the first stage regulator.

(6) With tool 1588-13, remove O-Ring (fig. 4-2) (24) from the connector (25).

(7) If the tank pressure gauge is connected, use a 5/8 inch open end wrench, and unscrew and remove hose connector (fig. 4-6) (6). With tool 1588-13 remove O-Ring (fig. 4-6) (7).

(8) When the tank pressure gauge is not connected, with a 1/2 inch open wrench, unscrew and remove the plug screw (17) on P/N 0638 or high pressure adapter (30) on P/N 2800-00, (fig. 4-1) located below the letters HP.

(9) With a 1/2 inch open end wrench, unscrew and remove the plug screw auxiliary (18).

(10) With tool 1588-13, remove the plug screw O-Ring auxiliary (19).

(11) Position the first stage regulator in the soft jaw vise so that the yoke (6) is facing upward and tighten the jaws of the vise securely against the flat sections in the middle area of the regulator body (15).

(12) On regulator P/N 1088-00, use an adjustable open end size 15 wrench, straddle one of the yoke legs with the wrench. Unscrew and remove the yoke retainer (5) and yoke (6). On regulator P/N 1077-00, use circlip pliers to remove yoke retainer ring (31) and yoke (6).

(13) With circlip pliers (P/N 111-00) remove filter retainer ring (7) while at the same time placing one finger over the filter assembly opening of the regulator body (15) to prevent springs (9 and 13) from ejecting parts of the filter assembly (8) thru (12). Remove filter (8), filter assembly spring (9), spring block (10), back-up ring (11), spring block O-Ring (12), and disc and retainer spring (13).

(14) With tool 1588-13. remove the spring block O-Ring (12), and (plastic) back-up ring (11) from the spring block (10).

(15) With needle nose pliers, remove disc and retainer (14) and pin (20).

(16) Reposition the regulator body (15) in the soft jaw vise so the filter assembly opening is pointing downward and tighten the vise securely against the flat sections of the spring retainer (26).

(17) Hold the spring retainer with a 1-1/4 inch open end wrench and with a two prong spanner wrench, unscrew and remove the retainer ring (29). Using tool 1588-13, remove the secondary diaphragm (28). Remove the regulator from the vise and pour out silicone fluid. (Do not reuse silicone fluid.) Reposition the regulator body (15) in the soft jaw vise so the filter assembly openings point downward, and tighten the vise securely against the flat sections of the regulator body (15).

(18) With a 1-3/8 inch open end wrench, unscrew and remove the spring retainer (26) from the regulator body (15). With a 5/16 inch flat tip screwdriver, unscrew and remove adjusting screw (27) from the spring retainer (26). Remove adjustment spring (25).

(19) With needle nosed pliers, remove the diaphragm spring pad (24)

(20) With tool 1588-13, remove the diaphragm gasket (23) and diaphragm (22).

(21) Remove the regulator body (15) from the vise and reposition the regulator body so that the filter assembly opening is pointing upward. Gently tap the regulator body against a soft, flat surface. This wiII cause the pin support (21) to come out.

NOTE

This completes the disassembly instructions. Proceed to Section III. paragraphs 4-7 and 4-6 for cleaning, inspection and lubrication of parts.

b. First Stage Regulator Reassembly.

(1) Insert (plastic) back-up ring (11) into the spring block (10). Install spring block O-Ring (12) into the spring block (10).

(2) Mount the first stage regulator body (15) in a soft jaw vise with the filter assembly opening pointing downward.

(3) Insert the pin support (21) with the pin support shaft inserted into the body of the first stage regulator (15).

(4) Insert the diaphragm (22) into the regulator body (15). Insure that the diaphragm is properly seated in the regulator body.

NOTE

If old diaphragm is reinstalled it must be positioned as before disassembly.

(5) Insert the diaphragm gasket (23) into the regulator body.

(6) Place the diaphragm spring pad (24) on top of the diaphragm (22). Insure that the largest flat surface is next to the diaphragm.

(7) Screw the spring retainer (26) into the regulator body (15). until there is evidence of pressure on the spring retainer. Using a 1-3/8 inch open end wrench, tighten the spring retainer securely.

(8) Place the adjustment spring (25) on the diaphragm spring pad (24)

(9) Screw the adjusting screw (27) into the spring retainer (26) several turns.

(10) Reposition the first stage regulator body (15) in the soft jaw vise so the filter assembly opening is facing upward. Tighten the jaws of the vise securely against the flat sections in the regulator body.

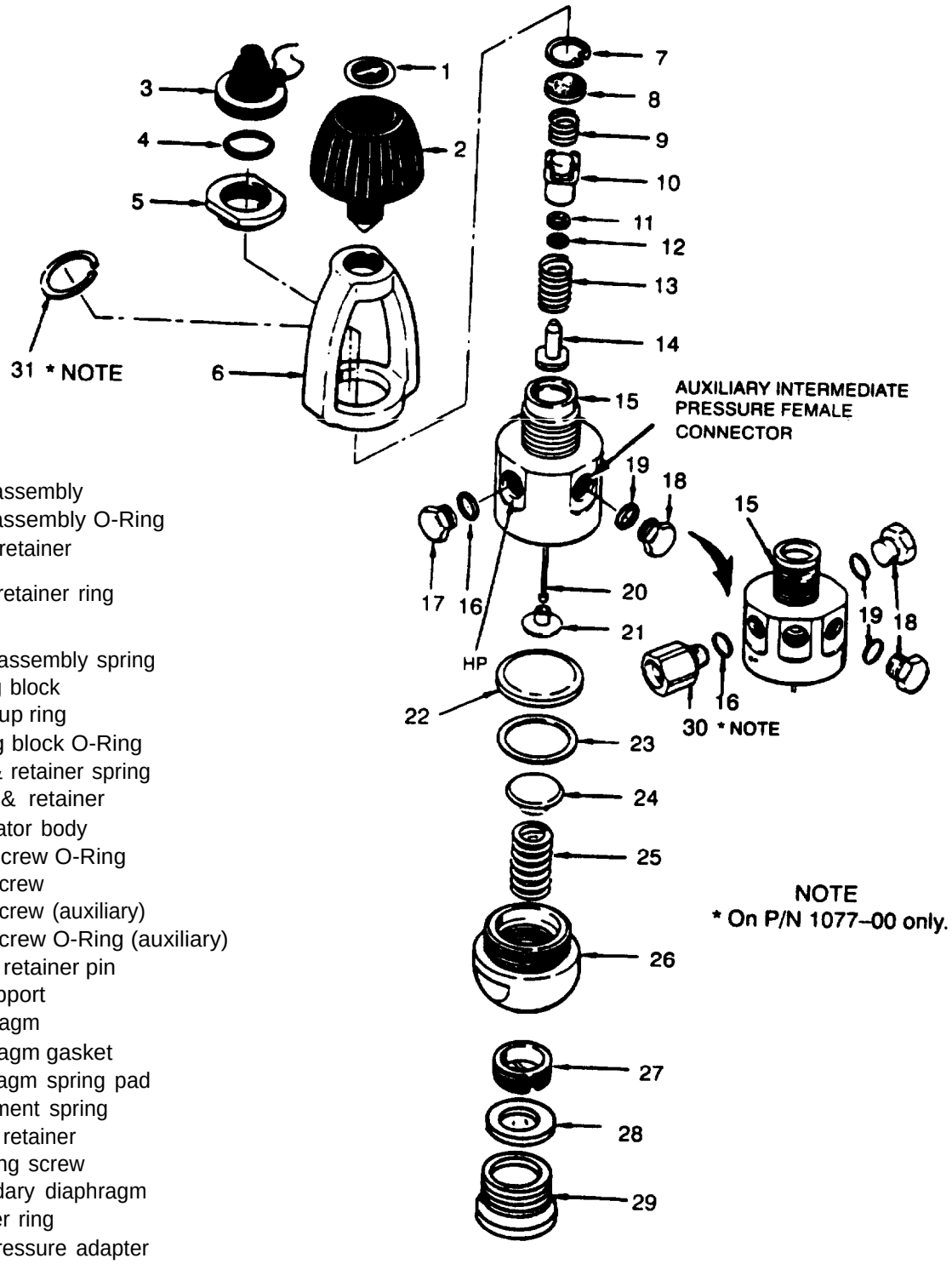
(11) With needle nosed pliers, insert the largest end of the pin (20) into the opening in the regulator body (15) as seen when looking into the filter assembly opening, and seat it in the small interior opening of the regulator body.

(12) With the needle nosed pliers, place the disc and retainer (14) on the pin (20). Insure that the disc and retainer pin (20) is properly seated inside the disc and retainer (14).

(13) Reposition the regulator body in the soft jaw vise so the filter assembly opening is pointing upward and tighten the vise securely against the flat section of the spring retainer (26).

(14) Insert the disc and retainer spring (13).

(15) Insert the spring block assembly (10, 11, and 12) into the disc and retainer spring (13). Insure the opening in the spring block assembly is facing downward.



1. Decal
2. Knob
3. Cap assembly
4. Cap assembly O-Ring
5. Yoke retainer
6. Yoke
7. Filter retainer ring
8. Filter
9. Filter assembly spring
10. Spring block
11. Back-up ring
12. Spring block O-Ring
13. Disc & retainer spring
14. Disc & retainer
15. Regulator body
16. Plug screw O-Ring
17. Plug screw
18. Plug screw (auxiliary)
19. Plug screw O-Ring (auxiliary)
20. Disc & retainer pin
21. Pin support
22. Diaphragm
23. Diaphragm gasket
24. Diaphragm spring pad
25. Adjustment spring
26. Spring retainer
27. Adjusting screw
28. Secondary diaphragm
29. Retainer ring
30. High pressure adapter
31. Yoke retainer ring

Figure 4-1. First Stage Regulator (P/N 1088-00 and P/N 1077-00)

(16) Place the filter assembly spring (9) on top of the spring block assembly (10, 11, and 12).

(17) Drop spring (13), spring block (10), spring (9). and filter (6) into body (15).

(16) On P/N 1088-60. place the yoke (6) on the regulator body (15). Position and tighten the yoke retainer (5) until there is evidence of pressure. On P/N 1077-00, install the yoke retainer ring (31) on the regulator body (15) using circlip pliers.

(19) With a 1 inch open end wrench, straddle one leg of the yoke (6) and tighten the yoke retainer (5) securely.

(20) Install the cap assembly O-Ring (4) in the cap assembly to the yoke by encircling one leg of the yoke with the strings and passing the cap through the strings.

(21) On the hose (fig. 4-2) (26) that connects the first and second stage regulator install O-Ring (24) on connector (25). Install O-Ring (fig. 4-6) (7) on connector (6), if the tank pressure gauge is used. If the pressure gauge is not used install the O-Ring (fig. 4-1) (16) on the tank plug screw (17).

(22) Attach hose (5) of the tank pressure gauge or the plug screw (17) to the female connector located above the letters HP, and tighten securely.

(23) Install hose (fig. 4-2) (26) with the second stage regulator attached, to the low pressure female connector of the regulator body (fig. 4-1) (15) and tighten securely.

(24) Remove the first stage regulator from the vise.

NOTE

Proceed with the first stage regulator adjustment (para c below).

(25) Position the first stage regulator in a soft jaw vise so the spring retainer (fig. 4-1) (26) is pointing upward. Tighten the vise jaws securely against the flat sections of the spring retainer.

(26) Install the secondary diaphragm (26) in the spring retainer (26) with the center tip pointing upward.

(27) Install retainer ring (29) on the spring retainer (26). Using a two prong spanner wrench, tighten the retainer ring (29) securely.

(26) Install the plug screw (16) into the auxiliary low pressure female connector.

(29) Remove the first stage regulator from the vise.

(30) Place the yoke knob (2) onto the yoke (6) and tighten three or four turns so that it seats in the pointed end of the cap assembly (3).

(31) Reconnect major components and conduct an operational check in accordance with steps 2 and 4 of the Weekly Prevention Maintenance Checklist Table 3-1.

C. First Stage Regulator Adjustment.

Do not connect the pressure test gauge P/N 1116-00 to the H.P. Port as possible injury could occur to personnel and/or the equipment could be damaged.

(1) Install the pressure test gauge (part 111600) to the auxiliary intermediate pressure female connector.

(2) Attach the first stage regulator to a 2500 ± 50 PSIG air supply and ensure the filter assembly is pointing downward.

(3) Open the bleeder screw on the pressure test gauge (Part 111600).

(4) Turn on the air supply. After the flow of air begins, slowly close the pressure test gauge bleeder screw. The test gauge needle should indicate 130 ± 5 PSIG.

(5) Using a flat tip 5/16 inch screwdriver, rotate adjusting screw (fig. 4-1) (27) as required for an indication of 130 ± 5 PSIG on the test pressure gauge. Press the purge button, and repeat until no further adjustment is necessary.

(6) Pour new silicone fluid (item 10, App. F) into spring retainer (26) until the fluid level reaches within 1/8 inch below top of spring retainer.

(7) Press the purge button and recheck the pressure test gauge several times to check stability of setting. If correct pressure holds for one minute, adjustment is complete. Turn off the high pressure air supply and slowly open the pressure test gauge bleeder screw. Disconnect the first stage regulator from the high pressure supply and remove the pressure test gauge.

NOTE

Proceed to the first stage reassembly instructions, (para b (26). above). Care should be exercised to prevent spillage of the silicone fluid.

4-14 **SECOND STAGE** REGULATOR **(FIG.** 4-2).

a. Second Stage Regulator Disassembly.

(1) With a flat tip 3/16 inch screwdriver, loosen and remove the rim clamp screw (fig. 4-2) (7) and rotate the rim clamp (6) so a wrench can be placed on the inlet fitting (12).

(2) With a 3/4 inch open end wrench applied to the inlet fitting (12) and a 11/16 inch wrench applied to the hose connector (27), unscrew and remove hose assembly (26) from the second stage regulator.

(3) With tool 1588-13, remove O-Ring (28) from the hose connector (27).

(4) With a 3/4 inch open end wrench, unscrew and remove the inlet fitting (12).

(5) With tool 1588-13, remove the inlet fitting O-Ring (13).

(6) Remove rim clamp (6), box top (5). and diaphragm (6).

(7) Place the box top (5) on a flat surface with the interior of the box top facing upward. With circlip pliers remove retainer ring (3). Remove the purge button (2) and button spring (4).

(8) Place the retainer wrench (part 1100-05) on the disc retainer (15). Rotate the retainer wrench until the four prongs of the wrench enter the four slots on the head of the retainer (15). Using a 1/4 inch box wrench, hold nut (20) and rotate retainer wrench counterclockwise until the nut is flush with the end of the disc retainer threaded stem. Grasp the box bottom (ii) firmly and apply forward pressure on the retainer wrench. This will permit lever (18) to drop down. Forward pressure can be maintained by placing the knurled end of the retainer wrench in the palm of the hand, placing the thumb underneath the box bottom air intake, and placing the index and middle finger over the box bottom rim. Lift up and remove lever (18) from the grooved interior sections of the box bottom.

(9) Remove disc (14), disc retainer (15), and disc and retainer spring (16) by rotating the retainer wrench counterclockwise, while holding nut (20) with a 1/4 inch box wrench.

(10) Remove nut (20), spacer (19) and washer (17).

(11) With tool 1588-13, press the inner edge of the head of the disc retainer (15) and remove the disc (14).

(12) Using a diagonal cutter, cut mouthpiece clamp (22). Remove the mouthpiece clamp (22), and the mouthpiece (21).

(13) Apply hot water (approximately 110° F) to the connecting area of the exhaust tube (9) for approximately five minutes, then pull outward on one end of the tube until it separates from the box bottom (11).

(14) Pull the exhaust valve (10) out of the box bottom (11).

(15) Proceed to Section III. paragraphs 4-7 and 4-8 for cleaning, inspection, and lubrication of parts.

b. Second Stage Regulator Reassembly.

(1) Place the box bottom (fig. 4-2) (11) rim on a flat surface. Install exhaust valve (10) in the box bottom.

(2) Place exhaust tube (9) in hot water (approximately 110° F) for five minutes. Stretch the exhaust tube over the flange of the box bottom (11).

(3) Install the neck strap (23), if used.

(4) Install the mouthpiece (21) on the box bottom (11), and secure the mouthpiece clamp (22).

(5) Insert the disc (14) into the head of the disc retainer (15). Insert disc retainer spring (16), disc (14), and disc retainer (15) into the air inlet opening in the box bottom (11).

(6) Place the retainer wrench on the disc retainer (15). Insure that the four prongs of the wrench enter the four slots of the disc retainer (15).

(7) Apply and maintain forward pressure on the disc retainer (15). This IS accomplished by placing the knurled end of the retainer wrench in the palm of the hand, placing the index and middle finger over the box bottom rim.

(8) Install washer (17), spacer (19), and nut (20) on the threaded stem of the disc retainer (15). Momentarily release the pressure on the disc retainer, but do not remove the retainer wrench.

(9) Using a 1/4 inch box wrench, hold nut (20) and rotate the retainer wrench clockwise five turns.

(10) Using the retainer wrench, apply and maintain pressure on the disc retainer (15). Install lever (18) between washer (17), and spacer (19), and seat the lever in the grooved interior section in the box bottom (11). Rotate the retainerwrench 2-1/2 turns while holding nut (20) with a 1/4 inch box wrench. Remove the retainer wrench.

(11) Place the inlet fitting O-Ring (13) on the shortest threaded section of the inlet fitting (12), and install the inlet fitting to the box bottom (11). (Do not attempt to install the longest threaded section of the inlet fitting (12) to the box bottom (11), because it will result in damage to the inlet fitting and box bottom threads.) Using a 3/4 inch open end wrench, tighten inlet fitting (12) securely.

(12) Install O-Ring (28) on the connector (27).

(13) Attach the connector (27) to the inlet fitting (12). Using an 11/16 inch open end wrench, tighten the connector securely.

NOTE

Proceed with the adjustment, para c below.

(14) Place the diaphragm (8) into the box bottom (11) so both rubber tabs of the diaphragm straddle lever (18), and will not interfere with its movement.

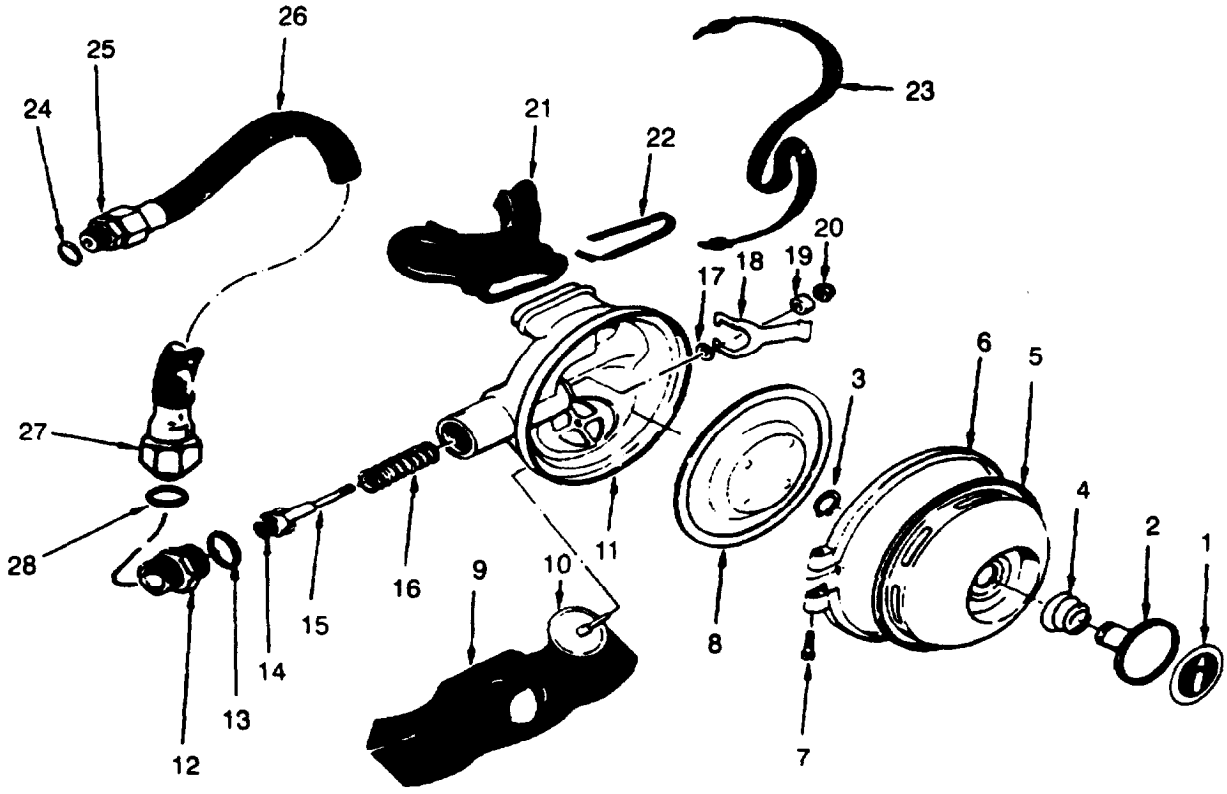
(15) Place the purge button (2) on a flat surface with the shaft pointing upward. Position the purge button spring (4) so the purge button shaft enters the smallest spring opening first.

(16) Insert the purge button (2) shaft through the exterior opening of the box top (5).

(17) With circlip pliers, install retainer ring (3) in the grooved shaft of the purge button (2).

(18) Seat the box top (5) on top of the box bottom (11).

(19) Install the rim clamp (6) with its opening facing the inlet fitting (12). Position and tighten the rim clamp screw (7) with a flat tip 3/16 inch screwdriver.



1. Decal
2. Button
3. Retainer ring
4. Button spring
5. Box top
6. Rim clamp
7. Rim clamp screw
8. Diaphragm
9. Exhaust tube
10. Exhaust valve
11. Box bottom
12. Inlet fitting
13. Inlet fitting O-Ring
14. Disc (Not replaced separately, part of disc & retainer 15.
15. Disc retainer
16. Disc retainer spring
17. Washer
18. Lever
19. Spacer
20. Nut
21. Mouthpiece
22. Mouthpiece clamp
23. Strap
24. O-Ring (to first stage regulator)
25. Connector (to second stage regulator)
26. Hose (with connectors)
27. Connector (to second stage regulator)
28. O-Ring (to second stage regulator)

Figure 4-2. Second Stage Regulator

(20) With the equipment assembled, connect the first stage regulator to a high pressure air supply. Turn on the air supply to the first stage regulator and check for air leakage in the second stage regulator.

(21) Push in on the purge button (2) and release. If free flow or very little flow occurs, see troubleshooting section for instructions.

(22) Test breath the second stage regulator. If free flow or hard breathing occurs, see troubleshooting section for instructions.

(23) Turn off the air supply, press purge button (2) and disconnect the first stage regulator from the air supply.

(24) Reconnect major components and conduct an operational check in accordance with steps 2 and 4 of the Weekly Preventive Maintenance Checklist table 3-1.

c. Second Stage Regulator Adjustment.

Attempts to turn disc and retainer with a screwdriver applied to the slotted end will cause damage.

(1) Place the blade of a flat tip 5/32 inch offset (45" bend in shank) in the slot of the threaded end of the disc retainer (15), fig. 2, using a 1/4 inch box wrench, adjust nut (20) until lever (18) is flush with the box bottom (11) rim.

(2) Connect the first stage regulator to a high pressure air supply. Turn on the air supply and check for air leakage. If leakage occurs, turn off the air supply. Using the tools specified in Step (1). loosen nut (20) until the air supply can be turned on without air leakage.

(3) With the first stage regulator providing 130 ± 5 PSIG air supply to the second stage regulator, proper adjustment of lever (18) is accomplished by adjusting nut (20) until a six inch metallic ruler will touch both sides of the box bottom (11) and lever (18) at the same time. Press and release the lever and recheck the lever setting, and readjust until no further adjustment is necessary. Disconnect the first stage regulator from the air supply.

NOTE

Proceed with the reassembly instructions in b (14) above.

Section VI. TANK BLOCK ASSEMBLY (Fig. 4-3, 4-4, and 4-5)

4-15 GENERAL.

This section contains the disassembly and reassembly of the tank block manifold assembly, and the twin tank harness. It further provides instructions, paragraph 4-18, for completing the annual internal (visual) inspection of SCUBA tanks.

4-16 TANK BLOCK ASSEMBLY (P/N 0638).

a. Tank Block Manifold Disassembly.

NOTE

Insure the On-Off valve handle (18) is open and reserve lever (39), fig. 4-3, is in the down position prior to disassembly.

(1) Bleed off all air inside the tanks. Place the tank block on a flat surface so the repairman is facing the manifold assembly and the center yoke O-Ring (9) is visible.

(2) Pull the looped end of the pull rod (fig. 4-5) (18) upward until it is released from the lower stabilizer band assembly clip (14). Push the middle of the push rod downward until the pull rod is released from the top stabilizer band assembly clip (14).

(3) Rotate the tanks so the repairman is facing the manifold assembly and the pull rod is hanging down.

(4) Lift and turn the pull rod until it is parallel to the manifold. Push the pull rod until it is disconnected from the reserve lever (fig. 4-3) (39).

NOTE

Care should be exercised in handling tanks after the stabilizer bands are removed to prevent damage to the manifold assembly.

(5) With a 1/2 inch box wrench applied to the top stabilizer band nut (fig. 4-5) (8) and a 3/8 inch ratchet, with 4 inch extension, and a 1/2 inch socket applied to the head of the bolt, unscrew and remove the top stabilizer band bolt (fig. 4-5) (6), nut (8). and washers (7).

(6) Rotate the tanks on a flat surface so the repairman is facing the bottom of the tanks.

(7) With a 1/2 inch box wrench applied to the bottom stabilizer band nut (11), and a 3/8 inch ratchet with 4 inch extension, and a 1/2 inch socket applied to the head of the bolt (9), unscrew and remove the bottom stabilizer band bolt (9), and washers (10), and the abdominal strap slide bar (16).

(8) Tilt the bottom of the tanks upward and remove the stabilizer bands from the tanks.

(9) Rotate the tanks as the repairman is facing the manifold assembly.

(10) With a 1-1/8 open end wrench, unscrew and disconnect the center yoke (fig. 4-3) (7) from the elbow (5) and reserve elbow (30).

(11) Insert tool 1588-13 along the outer edge of the center yoke O-Ring (9). Rotate tool 1588-13 under the O-Ring (9) and remove the O-Ring.

(12) Position the center yoke (7) in a soft jaw vise with the On-Off handle (18) pointing upward.

(13) With a modified screwdriver, fig. 4-8 (1/2 inch flat tip), unscrew and remove the On-Off nut (fig. 4-3) (20). Remove the On-Off handle spring (19).

(14) Remove the On-Off handle (18) and the On-Off handle washer (17).

(15) With a 3/4 inch open end wrench, unscrew and remove the bonnet assembly (13) through (16). Push inward on the threaded end of the main stem (11) and remove the main stem from the bonnet (16).

(16) With tool 1588-13 remove the main stem 0-Ring (13), bonnet back-up ring (14), bonnet O-Ring (15). Remove the main stem gasket (12).

(17) With a 5/16 inch flat tip screwdriver, unscrew and remove the nipple and disc (10). Turning the center yoke upside-down so the nipple and disc will fall out.

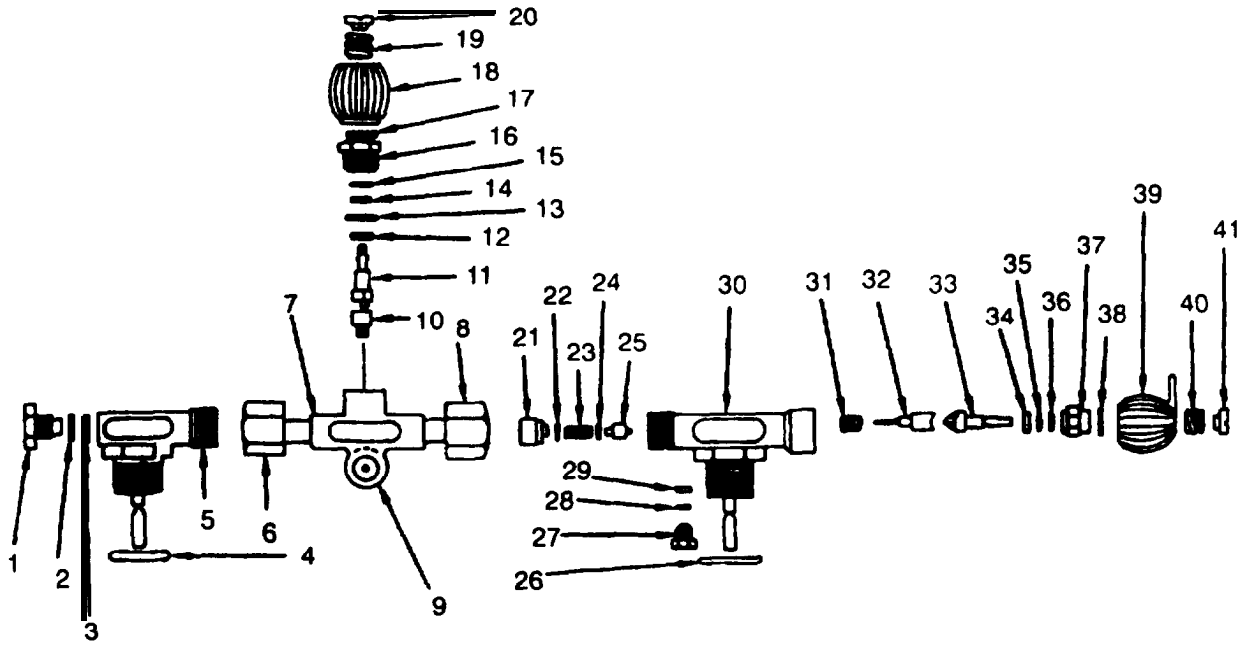
(18) With a 7/32 inch allen wrench, unscrew and remove the reserve elbow insert (21). Rotate the reserve elbow to allow insert spring (23), disc and retainer washer (24), and the reserve disc and retainer (25) to fall out. With tool 1588-13 remove insert washer (22) from the reserve elbow.

(19) With a modified screwdriver (1/2 inch flat tip), unscrew and remove reserve lever nut (41) and reserve lever spring (40). Remove reserve lever (39) and reserve lever washer (38).

(20) With a 3/8 inch ratchet and a 1/2 inch deep well socket, unscrew, and remove the reserve bonnet assembly (35) through (37). Push on the threaded end of the reserve stem (33) and remove the reserve stem from the reserve bonnet (37).

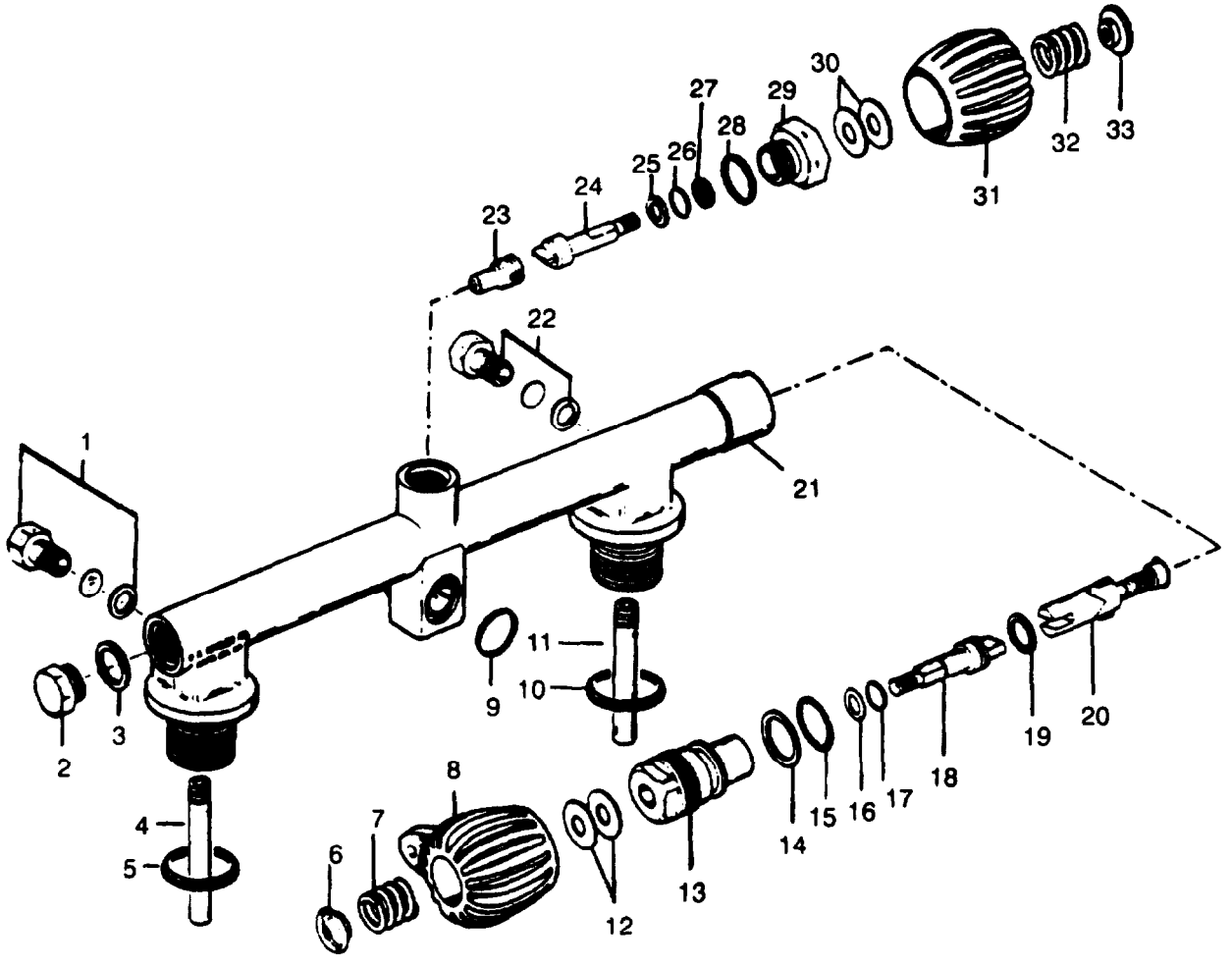
(21) With tool 1588-13 remove reserve gasket (34) from the reserve stem, reserve O-Ring (35), and reserve back-up ring (36) from the reserve bonnet.

(22) Rotate the tank until the pin and plunger (32) and the pin and plunger spring (31) fall out of the reserve elbow.



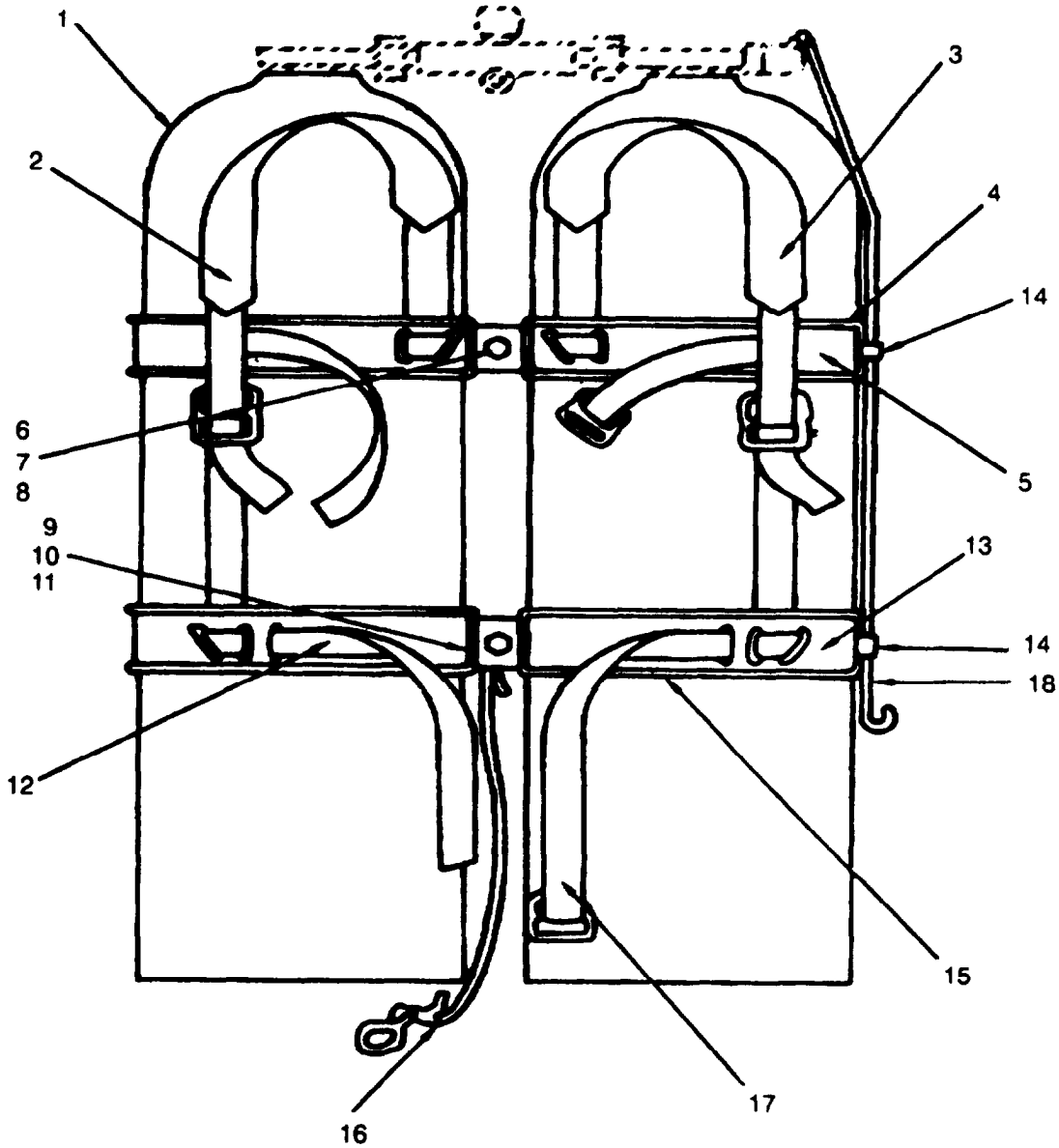
1. Safety plug screw (2250 PSIG)
2. Safety disc (2250 PSIG)
3. Safety disc washer
4. Elbow G-Ring
5. Elbow
6. Center yoke connector
7. Center yoke (with connectors)
8. Center yoke connector
9. Center yoke G-Ring
10. Nipple & disc
11. Main stem
12. **Main stem gasket**
13. Main stem O-Ring
14. Bonnet back-up ring
15. Bonnet O-Ring
16. Sonnet
17. On - off handle washer
18. On - off handle
19. On - off handle spring
20. On - off handle nut
21. Reserve elbow insert
22. Insert washer
23. Insert spring
24. Disc & retainer washer
25. Reserve disc & retainer
26. Reserve elbow O-Ring
27. Reserve elbow safety plug screw (2250 PSIG)
28. Reserve elbow safety
29. Reserve elbow safety disc washer
30. Reserve elbow
31. Pin & plunger spring
32. Pin & plunger
33. Reserve stem
34. Reserve gasket
35. Reserve O-Ring
36. Reserve back-up ring
37. Reserve bonnet
38. Reserve lever washer
39. Reserve lever
40. Reserve lever spring
41. Reserve lever nut

Figure 4-3. Tank Block Manifold (P/N 8838)



1. Safety disk assembly (Consists of plug, disc and washer)
2. Plug
3. Gasket
4. Dip tube
5. O-ring
6. Reserve lever nut
7. Reserve lever spring
8. Reserve lever
9. Manifold O-ring
10. O-ring
11. Dip tube
12. Reserve lever washer
13. Reserve bonnet
14. Reserve back-up ring
15. Reserve O-ring
16. Reserve gasket
17. Stem O-ring
18. Reserve stem
19. Reserve stem washer
20. Reserve assembly
21. Manifold
22. Safety disk assembly (Consists of plug, disc and washer)
23. Seat
24. Main stem
25. Main stem gasket
26. Main stem O-ring
27. Bonnet back-up ring
28. Bonnet O-ring
29. Bonnet
30. On-Off handle washer
31. On-Off handle
32. On-Off handle spring
33. On-Off handle nut

Figure 4-4. Tank Block Manifold (P/N 2800-00)



1. Tank (72 cu. ft.)
2. Right shoulder strap
3. Left shoulder strap
4. Stabilizer band cushions
5. Top stabilizer band
6. Stabilizer band bolt
7. Stabilizer band washer
8. Stabilizer band nut
9. Stabilizer band bolt
10. Stabilizer band washer
11. Stabilizer band nut
12. Right waist strap
13. Bottom stabilizer band
14. Pull rod clips
15. Stabilizer band cushion
16. Abdominal strap & slide bar
17. Left waist strap
18. Pull rod

Figure 4-5. Tank Block With Twin Tank Harness

(23) With a 1/2 inch open wrench, unscrew and remove the reserve safety plug screw (27). With tool 1588-13, remove the safety disc (28). and the reserve elbow safety washer (29).

(24) Place the tank in a tank vise. With a (narrow) 1-1/4 inch open end wrench, unscrew and remove the reserve elbow (30). Remove the tank from the vise.

(25) Remove the reserve elbow O-Ring (26).

(26) Place the other tank in a tank vise.

(27) With a 1/2 inch open end wrench, unscrew and remove the safety plug screw (1).

(28) With tool 1588-13, remove the safety disc (2) and the safety disc washer (3).

(29) With a (narrow) 1-1/4 inch open end wrench, unscrew and remove the elbow (5) from the tank. Remove the tank from the vise.

(30) Remove the elbow O-Ring (4).

NOTE

This completes the tank block manifold disassembly. Proceed to paragraphs 4-7 and 4-8 for cleaning, inspection, and lubrication of parts.

b. Tank Block Manifold Reassembly.

NOTE

If the safety discs (fig. 4-3) (2) and (28) and the safety washers (3) and (29) were removed, replace both items with new ones.

(1) Insert and seat the safety disc washer (3), then the safety disc (2) into elbow (5).

(2) Screw safety plug (1) into elbow (5).

(3) Repeat steps (1) and (2) for the reserve elbow (30), for the installation of parts (27) through (29).

(4) Place the elbow O-Ring (4) on the threaded end of the elbow (5) that connects to the tank.

(5) Place one of the tanks in a tank vise. Screw elbow (5) into the tank and tighten hand tight. Remove the tank from the tank vise.

(6) Position the reserve elbow (30) in a soft jaw vise with the externally threaded opening pointing upward.

(7) Insert the disc and retainer washer (24) on the longest stem of the disc and retainer (25). With needle nose pliers, insert and seat the disc and retainer (25) inside the externally threaded end of the reserve elbow (30).

(8) Place the insert washer (22) inside the reserve elbow (30) so it seats on the ledge.

(9) Place the insert spring (23) inside the reserve elbow.

(10) Place reserve elbow insert (21) so the concave section is pointing upward. With a 7/32 inch allen wrench tighten the reserve elbow insert securely.

(11) Position the reserve elbow (30) in a soft jaw vise so the end without external threading is pointing upward.

(12) Insert the pin and plunger spring (31).

(13) Insert the pin and plunger (32). Insure that the protruding guides on the side of the pin and plunger fit into the vertical grooves.

(14) Place the reserve bonnet (37) on a flat surface with the threaded opening facing upward.

(15) Insert the reserve back-up ring (36) and insure proper seating.

(16) Place reserve gasket (34), and reserve O-Ring (35) on the threaded end of the reserve stem (33)

(17) Install reserve stem (33) inside the reserve elbow (30) so the threaded end is pointing upward. Insure that the reserve stem is seated inside the grooved head of the pin and plunger (32).

(18) Place the reserve bonnet (37) on top of the reserve stem (33). Screw the reserve bonnet into the reserve elbow (30). With a 3/8 inch ratchet and a 1/2 inch deep well socket, tighten the reserve bonnet securely.

(19) Place the reserve lever washer (36) on the reserve stem (33).

(20) Place the reserve lever (39) on the reserve stem (33). Insure that the notch inside the reserve lever (39) is positioned to fit inside the cut away rim of the reserve elbow (30).

(21) Place the reserve lever spring (40) inside the reserve lever (39).

(22) Place the reserve lever nut (41) on the reserve lever spring (40).

(23) With the modified screwdriver (1/2 inch Flat Tip) apply pressure and tighten the reserve lever nut (41) securely to the reserve stem (33). Remove the reserve elbow from the vise.

(24) Place the reserve elbow O-Ring (26) on the threaded end of the reserve elbow (30) that screws into the tank.

(25) Place tank in the tank vise. Screw the reserve elbow (30) into the tank. and tighten hand tight. Remove the tank from the tank vise.

(26) Position the center yoke (7) in a soft jaw vise so the On-Off control opening is pointing upward.

(27) Place the nipple and disc (10) inside the top opening of the center yoke (7). With a 5/16 inch screwdriver turn the nipple and disc one complete turn.

(28) Place the bonnet (16) on a flat surface with the threaded end pointing upward.

(29) Insert the bonnet O-Ring (15), and bonnet back-up ring (14) into the bonnet (16). With tool 1588-13 insure that the bonnet back-up ring is seated on the internal lower ledge of the bonnet.

(39) Install the main stem gasket (12) and main stem O-Ring (13) on the threaded end of the main stem (11).

(31) Place the main stem (11) into the center yoke (7) with the threaded end pointing upward. Insure that the main stem seats inside the grooved head of the nipple and disc (10).

(32) Place the threaded end of the bonnet (16) on the center yoke (7), and tighten securely with a 3/4 inch open end wrench.

(33) Place the On-Off handle washer (17) on the bonnet (16).

(34) Place the On-Off handle (18) on top of the On-Off handle washer (17), and seat on the squared section of the main stem (11).

(35) Place the On-Off handle spring (19) inside the On-Off handle (18).

(36) Place the On-Off handle nut (20) on the On-Off handle spring (19). With a modified screwdriver (1/2 inch flat tip) tighten On-Off handle nut (20) securely.

(37) Remove the center yoke (7) from the vise.

(38) Position both tanks on a flat surface with the safety plug screws (1) and (27) pointing downward, and the threaded ends of the elbows (5) and (30) pointing toward each other.

(39) With the center yoke output connector facing upward and the flat surface of the center yoke in line with the flat surface of the elbow, screw the center yoke connector (6) on to the elbow (5).

(40) Screw the center yoke connector (8) on to the reserve elbow (30) and tighten securely with a 1-1/8 inch open end wrench.

(41) Rotate the tanks so the repairman faces the bottom of the tanks.

(42) Lift the bottom of the tanks and place on the lower lateral abdominal region of the repairman's body. With the stabilizer band cushions (Figure 4-5) (4) and (15) shoulder straps (2) and (3), and waist straps (12) and (17) in position, slide the stabilizer bands (5) and (13) down and over the tanks. Insure the pull rod clips (14) are positioned so they are located on the reserve lever side. Position the top stabilizer band approximately 5-1/4 inches from the top of the tanks, and the bottom stabilizer band approximately 6-1/2 inches from the bottom of the top stabilizer band.

(43) Place the stabilizer band washer (10) on the stabilizer band bolt (9). Insert the bolt through the bottom stabilizer band (13), abdominal strap webbed end (16), and through the other side of the bottom stabilizer band. Insure the threaded end of the stabilizer band bolt (9) is pointing away from the diver. Place the stabilizer band washer (10) and stabilizer band nut (11) on the threaded end of the stabilizer band bolt (9).

(44) With a 1/2 inch box wrench applied to the stabilizer band nut (11), and a 3/8 inch ratchet with 4 inch extension, and a 1/2 inch socket applied to the head of the stabilizer band bolt (9), tighten the nut securely.

(45) Rotate the tanks so the repairman is facing the manifold assembly.

(46) Place stabilizer band washer (7) and stabilizer band nut (8) on the threaded end of the stabilizer band bolt (6) and hand tighten.

(47) With a 1/2 inch box wrench applied to the stabilizer band nut (8), and a 3/8 inch ratchet with 4 inch extension, and a 1/2 inch socket, applied to the head of the stabilizer band bolt (6), tighten securely.

(48) Install and seat the center yoke O-Ring (fig. 4-3) (9) in the center yoke (7).

(49) Insert the hook end of the pull rod (fig. 4-5) (18) in reserve lever (fig. 4-3) (39). Turn and push the pull rod into the top pull rod clip (fig. 4-5) (14) and then the bottom pull rod clip (14).

4-17 TANK BLOCK ASSEMBLY (P/N 2800-00).

a. Tank Block Manifold Disassembly.

NOTE

Insure the On-Off valve handle (31) is open and reserve lever (8), fig. 4-4, is in the down position prior to disassembly.

(1) Bleed off all air inside the tanks. Place the tank block on a flat surface so the repairman is facing the manifold assembly and the manifold O-Ring (9) is visible.

(2) Pull the looped end of the pull rod (fig. 4-5) (18) upward until it is released from the lower stabilizer band assembly clip (14). Push the middle of the push rod downward until the pull rod is released from the top stabilizer band assembly clip (14).

(3) Rotate the tanks so the repairman is facing the manifold assembly and the pull rod is hanging down.

(4) Lift and turn the pull rod until it is parallel to the manifold. Push the pull rod until it is disconnected from the reserve lever (fig. 44) (8).

NOTE

Care should be exercised in handling tanks after the stabilizer bands are removed to prevent damage to the manifold assembly.

(5) With a 1/2 inch box wrench applied to the top stabilizer band nut (fig, 4-5) (8) and a 3/8 inch ratchet, with 4 inch extension, and a 1/2 inch socket applied to the head of the bolt, unscrew and remove the top stabilizer band bolt (fig. 4-5) (6). nut (8). and washers (7).

(6) Rotate the tanks on a flat surface so the repairman is facing the bottom of the tanks.

(7) With a 1/2 inch box wrench applied to the bottom stabilizer band nut (11). and a 3/8 inch ratchet with 4 inch extension, and a 1/2 inch socket applied to the head of the bolt (9), unscrew and remove the bottom stabilizer band bolt (9). and washers (10), and the abdominal strap slide bar (16).

(8) Tilt the bottom of the tanks upward and remove the stabilizer bands from the tanks.

(9) Rotate the tanks as the repairman is facing the manifold assembly.

(10) Insert tool 1588-13 along the outer edge of the manifold O-Ring (Figure 44) (9). Rotate tool 1586-13 under the O-Ring (9) and remove the O-Ring.

(11) With a modified screwdriver, fig. 4-6 (112 inch flat tip). unscrew and remove the On-Off nut (fig. 4-4). (33). Remove the On-Off handle spring (32).

(12) Remove the On-Off handle (31) and the On-Off handle washers (30).

(13) With a 3/4 inch open end wrench, unscrew and remove the bonnet assembly (26) through (29). Push inward on the threaded end of the main stem (24) and remove the main stem from the bonnet (29).

(14) With tool 1588-13 remove the main stem O-Ring (26), bonnet back-up ring (27), bonnet O-Ring (28). Remove the main stem gasket (25).

(15) With a 5/16 inch flat tip screwdriver, unscrew and remove the seat (23). Turn the manifold (21) upside down so the seat will fall out.

(16) With a modified screwdriver (1/2 inch flat tip), unscrew and remove reserve lever nut (8) and reserve lever spring (7). Remove reserve lever (8) and reserve lever washers (12).

(17) With a 3/8 inch ratchet and a 1/2 inch deep well socket, unscrew, and remove the reserve bonnet assembly (13) through (15). Push on the threaded end of the reserve stem (18) and remove the reserve stem from the reserve bonnet (13).

(18) With tool 1668-13 remove reserve gasket (16) from the reserve stem, reserve O-Ring (15), and reserve back-up ring (14) from the reserve bonnet.

(19) Rotate the tank until the reserve assembly (20) falls out of the manifold (21).

(20) With a 1/2 inch open wrench, unscrew and remove the safety disc assemblies (1) and (22). With tool 1586-13, remove the safety disc, and the safety washer.

(21) With a 1/2 inch open end wrench, remove plug (2) and gasket (3).

(22) Place the tank in a tank vise. With a narrow 1-1/4 inch open end wrench, remove the manifold (21).

(23) Remove dip tubes (4) and (11) and O-Rings (5) and (10).

(24) Remove the tanks from the vise.

NOTE

This completes the tank block manifold disassembly. Proceed to paragraphs 4-7 and 4-6 for cleaning, inspection, and lubrication of parts.

b. Tank Block Manifold Reassembly.

NOTE

If the safety disc assemblies (1) and (22) are removed, replace both items with new ones.

(1) Install safety disc assemblies (1) and (22). Install washer then the disc.

(2) Position the manifold in a soft jaw vise with the reserve lever end pointing upward.

(3) Insert reserve assembly (20). Insure that the protruding guides on the side of the reserve assembly fit into the vertical grooves.

(4) Place the reserve bonnet (13) on a flat surface with the threaded opening facing upward.

(5) Insert the reserve back-up ring (14) and insure proper seating.

(6) Place stem O-Ring (17), reserve gasket (16). and reserve O-Ring (15) on the threaded end of the reserve stem (18).

(7) Place reserve stem washer (19) on reserve stem (18).

(8) Install reserve stem (18) inside the manifold so the threaded end is pointing upward. Insure that the reserve stem is seated inside the grooved head of the reserve assembly (20).

(9) Place the reserve bonnet (13) on top of the reserve stem (18). Screw the reserve bonnet into the manifold (21). With a 3/8 inch ratchet and a 1/2 inch deep well socket, tighten the reserve bonnet securely.

(10) Place the reserve lever washers (12) on the reserve stem (16).

(11) Place the reserve lever (8) on the reserve stem (18). Insure that the notch inside the reserve lever (8) is positioned to fit inside the cut away rim of the manifold (21).

(12) Place the reserve lever spring (7) inside the reserve lever (8).

(13) Place the reserve lever nut (6) on the reserve lever spring (7).

(14) With the modified screwdriver (1/2 inch Flat Tip) apply pressure and tighten the reserve lever nut (6) securely to the reserve stem (18). Remove the reserve elbow from the vise.

(15) Install plug (2) and gasket (3).

(16) Position the manifold (21) in a soft jaw vise so the On-Off control opening is pointing upward.

(17) Place the seat (23) inside the top opening of the manifold (21). With a 5/16 inch screwdriver turn the seat (23) one complete turn.

(18) Place the bonnet (29) on a flat surface with the threaded end pointing upward.

(19) Insert the bonnet O-Ring (28), and bonnet back-up ring (27) into the bonnet (29). With tool 1586-13 insure that the bonnet back-up ring is seated on the internal lower ledge of the bonnet.

(20) Install the main stem gasket (25) and main stem O-Ring (26) on the threaded end of the main stem (24).

(21) Place the main stem (24) into the manifold (21) with the threaded end pointing upward. Insure that the main stem seats inside the grooved head of the seat (23).

(22) Place the threaded end of the bonnet (29) on the manifold (21) and tighten securely with a 3/4 inch open end wrench.

(23) Place the On-Off handle washers (30) on the bonnet (29).

(24) Place the On-Off handle (31) on top of the On-Off handle washers (30), and seat on the squared section of the main stem (24).

(25) Place the On-Off handle spring (32) inside the On-Off handle (31).

(26) Place the On-Off handle nut (33) on the On-Off handle spring (32). With a modified screwdriver (1/2 inch Rat tip) tighten On-Off handle nut (33) securely.

(27) Remove the manifold (21) from the vise.

(28) Install O-Rings (5) and (10) on threaded ends of manifold (21) that connect to tanks.

(29) Install disk tubes (4) and (11) on manifold (21).

(30) Place tanks in tank vise.

(31) Install manifold (21) on tanks and tighten

(32) Remove tanks from tank vise.

(33) Position both tanks on a flat surface.

(34) Rotate the tanks so the repairman faces the bottom of the tanks.

(35) Lift the bottom of the tanks and place on the lower lateral abdominal region of the repairman's body. Refer to figure 4-5. With the stabilizer band cushions (4) and (15), shoulder straps (2) and (3). and waist straps (12) and (17) in position, slide the stabilizer bands (5) and (13) down and over the tanks. Insure the pull rod clips (14) are positioned so they are located on the reserve lever side. Position the top stabilizer band approximately 5-1/4 inches from the top of the tanks, and the bottom stabilizer band approximately 6-1/2 inches from the bottom of the top stabilizer band.

(36) Place the stabilizer band washer (10) on the stabilizer band bolt (9). Insert the bolt through the bottom stabilizer band (13), abdominal strap webbed end (16), and through the other side of the bottom stabilizer band. Insure the threaded end of the stabilizer band bolt (9) is pointing away from the diver. Place the stabilizer band washer (10) and stabilizer band nut (11) on the threaded end of the stabilizer band bolt (9).

(37) With a 1/2 inch box wrench applied to the stabilizer band nut (11). and a 3/8 inch ratchet with 4 inch extension, and a 1/2 inch socket applied to the head of the stabilizer band bolt (9), tighten the nut securely.

(38) Rotate the tanks so the repairman is facing the manifold assembly.

(39) Place stabilizer band washer (7) and stabilizer band nut (8) the threaded end of the stabilizer band bolt (6) and hand tighten.

(40) With a 1/2 inch box wrench applied to the stabilizer band nut (8), and a 3/8 inch ratchet with 4 inch extension, and a 1/2 inch socket, applied to the head of the stabilizer band bolt (6), tighten securely.

(41) Install and seat the manifold O-Ring (fig. 4-4) (9) in the manifold (21).

(42) Insert the hook end of the pull rod (fig. 4-5) (18) in reserve lever (fig. 4-4) (8). Turn and push the pull rod into the top pull rod clip (fig. 4-5) (14) and then the bottom pull rod clip (14).

4-18 INTERNAL INSPECTION (VISUAL) OF SCUBA TANKS.

a. General. These instructions contain procedures for the internal inspection of SCUBA tanks utilized with the Open Circuit Military SCUBA System. They include but are not limited to information pertaining to inspection standards, inspection frequencies and the cleaning, handling and condemning of SCUBA tanks.

b. Purpose. The purpose of the visual tank inspection IS to detect corrosion. contamination, and conditions which weaken the tank or could impair valve or regulator operation.

C. Criteria. To pass the inspection, the tank shall be examined, in accordance with limits established in Compressed Gas Association Pamphlet C-6, to be essentially free of:

(1) General corrosion (flash rust, a light haze of fine rust, is permissible if it covers less than 10% of the internal surface).

(2) Pitting.

(3) Blisters in the lining.

(4) Abnormal odor or deposits, and

(5) Evidence of any mechanical defects.

d. Inspection Period. A tank that is used constantly in salt water and is filled anywhere around salt air. should be inspected every six months. Tanks used mostly in fresh water should be inspected annually.

e. Preparation.

(1) Cylinders shall be cleaned for inspection so that the inside and outside surfaces and all conditions can be observed. This shall include removal of scale and caked paint from the exterior and the thorough removal of internal scale.

(2) Remove the valve manifold, tank harness and hardware in accordance with paragraph 4-16.

CAUTION

If the valve manifold is not removed correctly valves on new tanks can be ruined. Tank valves should not be removed unless the proper tools are available. Tanks with tapered pipe threads should be locked into a chain vise. A big, wide-jawed wrench should be used to remove the valve. The wrench should be used across the face or valve opening on a valve without flats for a wrench. If the wrench is used on the side of the opening, the face will be crushed and will form an oval hole. If the wrench is too narrow, it will dig into the valve. A tank is ready for inspection when all attachments are removed.

f. Internal Inspection of Steel Tanks. Using the inspection light (item 6, Section X, Appendix E) make a close and thorough inspection around the perimeter of the tank continuing down to the bottom. An internal visual examination should show the tank free from excessive corrosion, pitting, or dangerous defects. The tank should be free of moisture, rust, carbon, slag, pits, scale, and loose material. A perfect tank is sometimes called **a** cherry tank; it is smooth, clean, shiny, and dry.

(1) When water is found in a tank during visual inspection it should be cleaned or thoroughly rinsed in fresh water, and warm air dried. Any rust. even light rust, should be removed by tumbling. Any rust will cause problems because it will eventually break loose and contaminate the valve. Then it will enter the regulator and damage the valve seats. Most foreign particles are sharp and will quickly damage the valve and regulator.

(2) A rusty, heavily scaled tank should be tumbled and reinspected. If it is apparent that the rust cannot be removed without excessive tumbling, and it is heavily pitted; the tank should be condemned. Sometimes the pits cannot be seen until the scale is removed.

g. Forms of Corrosion.

(1) Uniform Corrosion. During uniform corrosion, the metal surface corrodes evenly. The metal becomes thinner in all areas and eventually fails. if uniform corrosion were the only type of corrosion found in SCUBA tanks, it would take a relatively long time for the cylinder walls to corrode all over to the point where they were dangerously thin.

(2) Pitting Corrosion is one of the more serious forms of corrosion. It is localized and can quickly cause holes to be formed in the metal. These holes may be fairly large or very small. In most cases. they are small with the hole diameter being about the same as the depth. Also, pits are usually hidden by surface corrosion products. They may extend deeply into the metal body so that the sub-surface damage is often greater than is indicated by surface appearance.

If pitting occurs in diving cylinders, the damage effect can be very severe. Once the pit has started to form, the rate of corrosion attach may continuously increase and easily penetrate the cylinder wall in a relatively short time. Sometimes the pit may cause local thinning in a large section of the cylinder wall, or even act as **a** stress riser that could cause catastrophic failure of a pressurized tank.

h. New Tank Inspection. A brand new tank sometimes will have factory slag on the walls in small patches. The patches of slag are areas that were missed when the tank was sand blasted. Slag is created when the tank is galvanized on the outside. It is heated to about 850°. If there is any foreign material in the tank. it will be fried and become very harsh material on the walls. The material will slowly, but surely. come off over a period of time. It may take years to completely come out of the tank. When it flakes off the tank, it travels through the valve, up into the regulator and damages the valve seats.

i. Carbon in Tanks. If the inside of the tanks is dry and black, it is covered with carbon. A very close look at the carbon on the bottom will detect a sparkle. The carbon is actually activated charcoal that has come from a compressor filter. The top of the filter must be packed very well with a material that will not allow the loose fine charcoal to travel through the compressor system. This problem does not exist with cartridge type filters.

Carbon is not detrimental to the tank, but is to the valve and regulator. Carbon will eventually build up on internal moving parts and block valves from closing.

j. Internal Cleaning. If following the inspection it is determined that a tank requires internal cleaning and hydrostatic testing it must be evacuated to a higher level of maintenance. Commercial facilities qualified to provide these services may be utilized.

k. Recording the Inspection. After the tank has been inspected prepare an entry in the user's equipment record containing the following minimum information:

(1) Date of Inspection (Day, month, and year).

(2) Inspector's Identification.

(3) The statement "This SCUBA Tank has been visually inspected and shows no significant corrosion. or mechanical defects."

(4) Signature of the inspector.

l. Contaminated Valves. The tank valve is a natural trap for rust and salt. Even though a tank is cleaned, rust or salt may be trapped in the valve passages. During operation, these remaining particles in the valve may loosen and travel into the regulator and cause damage to internal parts, Therefore, if any loose deposits are found in the tank, the valve should be disassembled, cleaned, lubricated, and defective parts replaced. This will insure a clean system throughout,

m. Installing Manifold After Tank Inspection. Reassemble and install the valve manifold assembly in accordance with paragraph 4-16 or 4-17.

NOTE

If a valve is too tight to screw in by hand, a wrench should NOT be used to start it down. It is an O-Ring seal and the threads on the tank should be retapped. If a wrench is used to force the valve in, the threads on the brass valve will be stripped. If full air pressure is put into a tank with a valve that has stripped threads, the valve may be forced out. The same care should be used when installing a valve in an aluminum tank.

Teflon tape should not be wrapped around valve threads that have an O-Ring seal. The teflon will not form a seal. Small pieces of teflon can get into the valve and regulator and under valve seats.

n. Reassembly of Twin Tank Block. Install bands. hardware, twin tank harness and reserve valve rod and clips in accordance with paragraph 4-16 or 4-17.

Section VII. PRESSURE GAUGES

4-19 GENERAL.

This section contains instructions for the inspection and maintenance of both tank pressure gauges (fig. 1-1 furnished with the open circuit SCUBA system. Operational use of these gauges are located in paragraph 2-5, Chapter 2.

4-20 INSPECTION.

Gauges will be checked for accuracy in accordance with Table 4-2, item 2. Meter accuracy must be within the following tolerance levels: ± 50 PSI at 500 PSIG and ± PSI at 3000 PSIG. If a gauge does not meet these requirements replace with a new gauge.

4-21 REPAIR.

a. Tank Pressure Gauge Assembly (Regulator Attachable). Item (1), (3), (5), (7) and (8) (fig. 4-6) may be replaced when required. Do not attempt to repair the pressure gauge (1) cover (2) or fittings (4) and (6).

b. Gauge Tank Pressure. Do not attempt to repair this gauge. If defective replace with a new one.

Section VIII. LONG TERM STORAGE

4-22 GENERAL.

This section contains long term storage (in excess of 180 days) instructions for all components of this system.

4-23 DEMAND REGULATOR.

For prolonged storage of the regulator, an airtight plastic bag is used to maintain the life of the rubber parts. The regulator and hose must be thoroughly dried before storage. Place it in the bag, suck all air from the bag, and twist on a lock wire to seal it closed. Store it in a dry place.

4-24 TWIN TANK BLOCK ASSEMBLY.

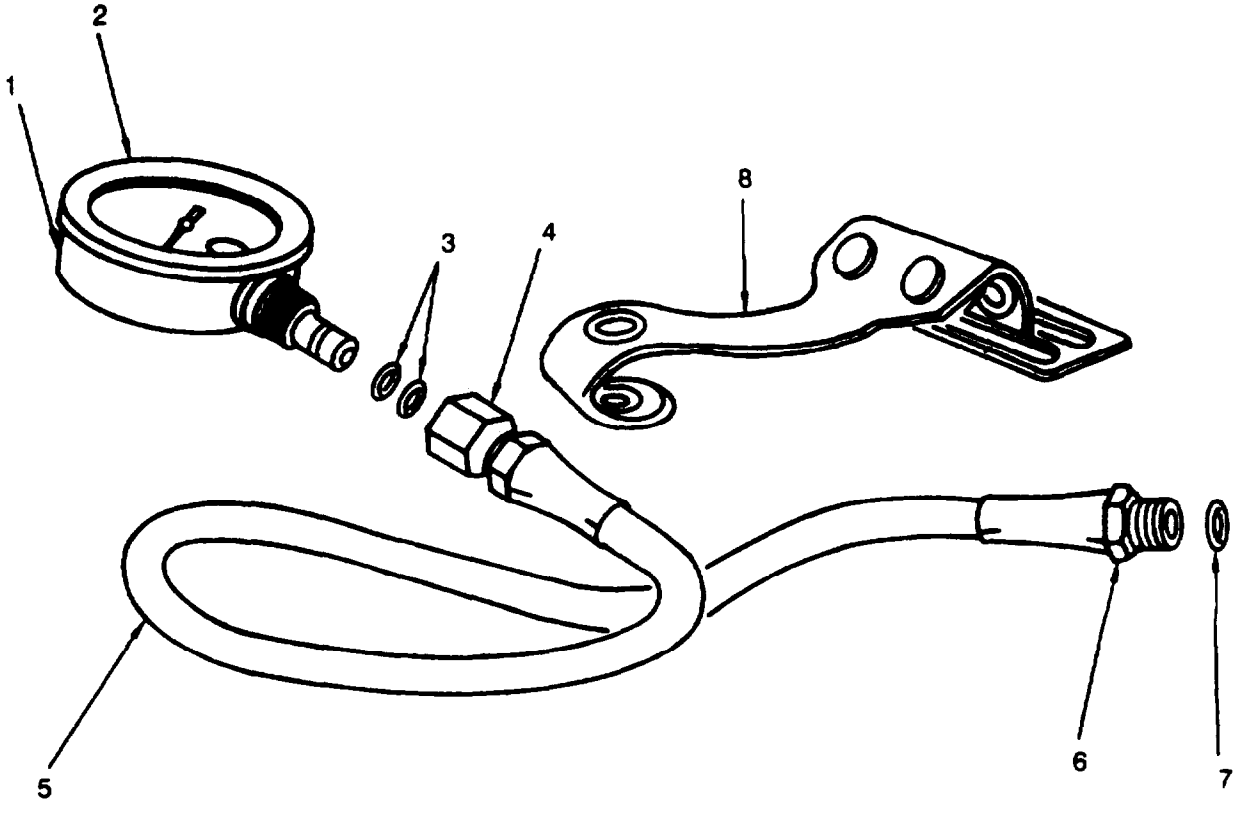
For prolonged storage place the complete assembly (including valve manifold and harness assembly) in a plastic bag and store in an upright position.

CAUTION

Each cylinder should contain air pressure from 50 to 100 PSI. Store in a cool place.

4-25 PRESSURE GAUGES.

Place each gauge in an airtight plastic bag. This will increase the life of the rubber components of the gauge.



1. Pressure gauge
2. Cover assembly
3. O-Rings
4. Connector, gauge
5. Hose
6. Connector, regulator
7. O-Ring
8. Strap

Figure 4-6. Tank Pressure Gauge (Regulator Attachable)

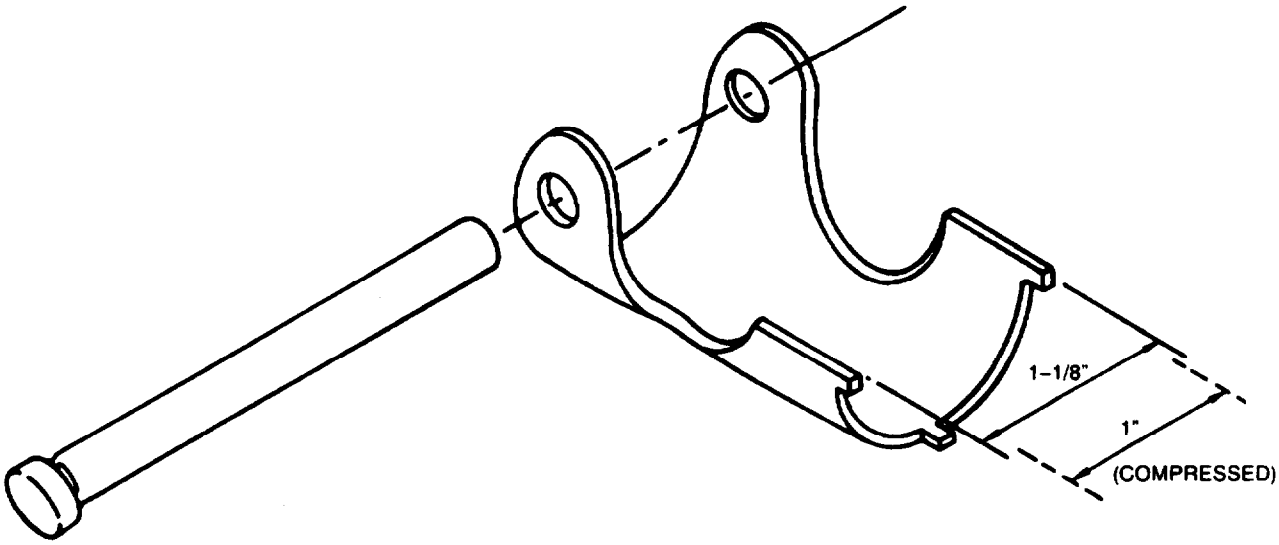


Figure 4-7. Modified Spanner Wrench

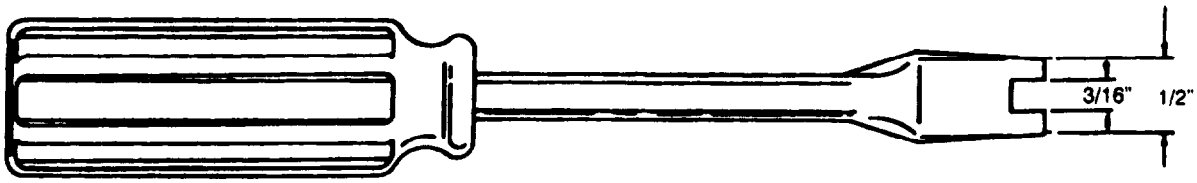


Figure 4-8. Modified Screwdriver

Chapter 5 MATERIAL USED IN CONJUNCTION WITH MAJOR ITEM

Section I. DIVING EQUIPMENT SETS, SCUBA SUPPORT

5-1 GENERAL.

Diving Equipment Sets used in conjunction with the open circuit SCUBA system are identified in Appendix C.

5-2 OPERATION AND MAINTENANCE

The operating and maintenance instructions for these Diving Equipment Sets are contained in commercial Technical Manuals ovenpacked with each related set.

Section II. AIR COMPRESSORS AND RECOMPRESSION CHAMBER

5-3 GENERAL.

Two different air compressors and a portable recompression chamber not in support sets, are used in support of open circuit SCUBA. These items are identified in Appendix C.

5-4 AIR COMPRESSORS.

a. The small portable 5.1 CFM gasoline driven air compressor is used to support smaller SCUBA operations. Only one twin tank block is charged at a time by connecting a filler hose direct to the compressor.

b. The 24 CFM, 3200 PSI air compressor is used to supply high pressure air to a cascading manifold (trailer mounted) with four filling stations.

5-5 RECOMPRESSION CHAMBER (LIGHTWEIGHT).

a. This portable one man recompression chamber is to be used to provide a means for on-site emergency treatment for diving accidents and will enable an injured diver to receive treatment while being transported to a larger treatment facility.

b. Operating and maintenance instructions for the Chamber will be included in the commercial manual.

Appendix A. REFERENCES

A-1 FORMS AND RECORDS.

Selection, Qualifications, Rating and Disrating of Marine Divers ..... AR 611-75
Diving Log ..... DA Form 1262-R
Diving Duty Summary Sheet ..... DA Form 3475-R
Preventive Maintenance Schedule and Record ..... DD Form 314
The Army Maintenance Management System ..... TM 38-750

A-2 MAINTENANCE.

Military Diving, Vols. 1 and 2 ..... FM 20-11-1
Compressed Gas Association, "Standard for Visual Inspection of Compressed Gas Cylinders" ..... Pamphlet C-6
Compressed Gas Association, "Suggestions for the Care of High Pressure Air Cylinders for Underwater Breathing." ..... Pamphlet P-5

A-3 PRESERVATION AND PACKAGING.

Diving Equipment Sets: Packaging ..... Military Specification ML-D-52838 (ME)

A-4 SHIPMENT AND STORAGE.

Administrative Storage of Equipment ..... TM 740-93-3

A-5 SUPPORTING EQUIPMENT,

Diving Equipment Set, SCUBA, Open Circuit, 1 man ..... SC 4220-97-CL-E09
Diving Equipment Set, SCUBA, Individual Swimmers Support ..... SC 4220-97-CL-E11
Diving Equipment Set, Photographic Support ..... SC 4220-97-CL-E12
Diving Equipment Set. SCUBA, Support Type A ..... SC 4220-97-CL-E13
Diving Equipment Set, SCUBA, Support Type B ..... SC 4220-97-CL-E14

Appendix B. COMPONENTS OF END ITEM (COEI) AND BASIC ISSUE ITEMS (BII) LISTS

Section I. INTRODUCTION

B-1 SCOPE. This Appendix Lists integral components, of and basic issue items for the Open Circuit Military SCUBA System to help your inventory items required for safe and efficient operation.

B-2 GENERAL. This End Item List is divided into the following sections:

a. Section II. Integral Components of the End Item. These items, when assembled, comprised the Open Circuit Military SCUBA System and must accompany it whenever it is transferred or turned in. Figure 1-1 and paragraph 1-8 will help you identify these items.

b. Section III. Basic Issue Items (BII). These are the minimum essential items required to place the Open Circuit Military SCUBA System in operation and to perform emergency repairs. Although shipped separately packed they must accompany the Open Circuit Military SCUBA System whenever it is transferred between accountable officers.

B-3 EXPLANATION OF COLUMNS.

a. Illustration. This column is divided as follows:

(1) Figure number indicates the figure number of the illustrations on which the item is shown.

(2) Item Number. The number used to identify item called out in the illustration.

b. National Stock Number. The National Stock Number assigned to the item and which will be used for requisitioning.

c. Part Number. Indicates the primary number used by the manufacturer.

d. Description. Indicates the Federal item name.

e. Location. The physical location of the item listed in relation to its higher assembly.

f. Quantity required (CITY Req'd). The quantity of each item required for a complete major item or in respect to BII the minimum quantity required for initial repair part support.

Section II. INTEGRAL COMPONENTS OF END ITEM

Illustration (a) Figure No.	Illustration (b) Item No.	National Stock Number	Part Number	Description	Location	Qty Req
1-1		4220-00-623-7280	1088-00	Regulator		1
1-1		4220-00-099-8024	7004	Gage, Tank		1
1-1		4220-00-033-6839	0638	Tank Block		1
1-1		4220-01-003-2375	7036	Gage, Divers		1
1-1			2800-00	Tank Block		1

Section III. BASIC ISSUE ITEMS

Illustration (a) Figure No.	Illustration (b) Item No.	National Stock Number	Part Number	Description	Location	Qty Reg.
4-1	20	5315-01-168-8992	1053-23	Pin	1st stage regulator	
4-1	22	4820-00-714-3516	1000-29	Diaphragm	1st stage regulator	1
4-1	23	5330-00-776-7020	8210-01	Gasket	1st stage regulator	1
4-1	14	4220-01-192-4544	1053-20	Disc and Retainer	1st stage regulator	1
4-1	12	5330-01-013-5832	8200-06	O-Ring	1st stage regulator	1
4-1	10		8280-06	Back-up Ring	1st stage regulator	1
4-1	8	1386-00-776-7023	1051-06	Filter	1st stage regulator	1
4-1	7	5365-00-476-9637	8630-51	Retaining Ring	1st stage regulator	1
4-2	8	4220-00-195-0128	1037-32	Diaphragm	2nd stage regulator	1
4-2	20	5310-01-194-8727	1025-10	Nut, Lock	2nd stage regulator	1
4-2	15	4820-01-192-7907	1049-08	Disc and Retainer	2nd stage regulator	1
4-2	13	5330-00-397-4501	8200-14	O-Ring	2nd stage regulator	1
			1100-05	Wrench, Ret.	Special tool	1

NOTE: The Manufacturer's Federal Code for all the above items is (94120)

Appendix C. EQUIPMENT USED IN CONJUNCTION WITH THE OPEN CIRCUIT MILITARY SCUBA SYSTEM

Section I. INTRODUCTION

C-1. SCOPE. This appendix lists additional items you may require in the support of the Open Circuit Military SCUBA System.

C-2. GENERAL. This list identifies items that do not have to accompany the Open Circuit Military SCUBA System but are required to support it depending on the authorizations to you by either CTA, MTOE, TDA, or JTA.

C-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.

Section II. EQUIPMENT USED IN CONJUNCTION WITH THE OPEN CIRCUIT MILITARY SCUBA SYSTEM

National Stock Number	Supply Catalog or Part Number and FSCM	Nomenclature	U/M	Qty Auth
4220-01-023-0246	SC 4220-97-CL-E13 (19099)	Diving Equipment Set, SCUBA, Support Type A DEV. Z23498	ST	See Para C-2
4220-00-569-8809	SC 4220-97-CL-E11 (19099)	Diving Equipment Set, SCUBA, Swimmers Support DEV. Z23493	ST	See Para C-2
4220-01-023-1701	SC 4220-97-CL-E14 (19099)	Diving Equipment Set, SCUBA, Support Type B DEV. Z23500	ST	See Para C-2
4220-01-023-1702	SC 4220-97-CL-E12 (19099)	Diving Equipment Set, SCUBA, Photographic Set DEV. Z23494	ST	See Para C-2
NYA	NYA	Air Compressor, 24 CFM 3200 PSI, W/24 HP DSL. ENG. DEV. Z17159	EA	See Para C-2
NYA	NYA	Air Compressor, 5.1 CFM 3200 PSI,W/5 HP Gas Eng. DEV. Z17163	EA	See Para C-2
NYA	NYA	Chamber, Recompression, lightweight; DEV. Z14736	EA	See Para C-2

Appendix D. MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

D-1 GENERAL.

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

b. Section II designates overall responsibility for the performance of maintenance functions on the identified end item or component and the work measurement time required to perform the functions by the designated maintenance level. The implementation of the maintenance functions upon the end item or component will be consistent with the assigned maintenance functions.

c. Section Ill lists the tools and test equipment required for each maintenance function as referenced from Section II.

d. Section IV contains supplemental instructions or explanatory notes for a particular maintenance function.

D-2 EXPLANATION OF COLUMNS IN Section II.

a. Group Number, Column (1). A number is assigned to each group in a topdown breakdown sequence. The applicable groups are listed in the MAC in disassembly sequence beginning with the first group removed.

b. Assembly Group, Column (2). This column contains a brief description of the components of each numerical group.

c. Maintenance Functions, Column (3). This column lists the functions to be performed on the items listed in Column 2. The lowest maintenance level authorized to perform these functions is indicated by a symbol in the appropriate column. The symbol designators for the various maintenance levels are as follows:

C - Operator or crew.
O - Unit Maintenance.
F - Direct Support Maintenance.
H - General Support Maintenance.
D - Depot Maintenance.

The maintenance functions are defined as follows:

(1) Inspect. To determine serviceability of an item by comparing its physical, mechanical, and electrical characteristics with established standards through examination.

(2) Test. To verify serviceability and detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

(3) Service. Operations required periodically to keep an item in proper operating condition, i. e., to clean, to preserve, to drain, to paint, or to replenish fuel lubricants, hydraulic fluids, or compressed air supplies.

(4) Adjust. To maintain within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

(5) Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

(6) 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 comparison 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.

(7) Install. The act of emplacing, seating, or fixing into position an item, part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

(8) Replace. The act of substituting a serviceable like type part, subassembly, or module (component or assembly) for an unserviceable counterpart.

(9) Repair. The application of maintenance services (inspect, test, service, adjust, align, calibrate. or 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.

(10) 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 a like-new condition.

(11) 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.

d. Maintenance Level, Column (4). This column is made up of subcolumns for each category of maintenance. Work time figures are listed in these subcolumns for the lowest level of maintenance authorized to perform the function listed in column 3. These figures (shown directly below the symbol) indicate the average active time required to perform the maintenance function at the indicated category of maintenance under typical field operating condition.

e. Tools and Equipment, Column (5). This column is provided for referencing by code, the special tools and test equipment (Section Ill) required to perform the maintenance functions (Section II).

f. Remarks, Column (6). This column should contain a letter code in alphabetical order which shall be keyed to the remarks contained in Section IV.

D-3 EXPLANATION OF COLUMNS IN Section Ill.

a. Reference Code. This column consists of an Arabic number listed in sequence from column (5) of Section II. The number references the special tools and test equipment requirements.

b. Maintenance level. This column shows the lowest level of maintenance authorized to use the special tools or test equipment.

C. Nomenclature. This column lists the name or identification of the tools or test equipment.

d. National/NATO Stock Number. This column is provided for the NSN of special tools and test equipment listed in the nomenclature column.

e. Tool Number. This column lists the manufacturer's code and part number of tools and test equipment.

D-4 EXPLANATION OF COLUMNS IN Section IV.

a. Reference Code. This column consists of a letter code in alphabetical order which is keyed to column 6 of Section II.

b. Remarks. This column lists information pertinent to the maintenance function being performed, as indicated on the MAC. Section II.

Section II. MAINTENANCE ALLOCATION CHART

GROUP NUMBER	COMPONENT ASSEMBLY	MAINTENANCE FUNCTION	MAINTENANCE					TOOLS AND EQUIPMENT	REMARKS
			UNIT		DS	GS	DEPOT		
			C	O	F	H	D		
1	Tank Block	Inspect	0.1						
		Test	0.1						
		Service	0.1					1, 2	A, B
		Adjust	0.1						
		Replace		0.1					
		Repair		0.5				3	C
	Reserve Valve	Overhaul		3.0					
	Tanks	Inspect		0.5				4	D
		Test					4. 0		E
		Service					3. 0		F
Test	Regulator, Demand Type, Single Hose, 3000 PSI	Inspect	0.1						
		Test	0.1						G
		Service	0.1						
		Adjust		0.3				5, 6, 7, 12	H
		Replace	0.2						
		Repair		1.5				7, 8, 9	I
Test	Gauge, Tank Pressure	Inspect	0.1						J
		Test		0.2					
		Replace		0.1					
Test	Gauge, Divers Pressure	Inspect	0.1						
		Test		0.2					
		Replace		0.1					

Section III. TOOLS AND TEST EQUIPMENT REQUIREMENTS

(1) REFERENCE CODE	(2) MAINTENANCE CATEGORY	(3) NOMENCLATURE	(4) NATIONAL NATO STOCK NUMBER	(5) TOOL NUMBER
1	C	Gauge, Tank Pressure	4220-01-003-2375	28-074-000 (Under Sea, Inc.) 7400-00 (US Divers)
2	C	Gauge, Diver's Pressure	4220-00-099-8024	7004
3	O	Screwdriver, Off set, 5/32"	5120-00-287-2129	
4	O	Pressure Test Gauge	N/A	1116-00
5	O	Adapter	N/A	1100-01
6	O	Hose Assembly	N/A	1048-04
7	O	Plastic Tool (PFI)	N/A	1588-13
8	O	Wrench, HP Block Assy Guide	N/A	1110-00
9	O	Wrench, Retainer	N/A	1100-05
10	O	Screwdriver (Modified)	5120-00-227-7338	
11	O	Wrench, Set, Spanner (Modified)	5120-00-277-9075	
12	O	Wrench, Open End	5120-00-203-4808	

Section IV. REMARKS

REFERENCE CODE	REMARKS
A	Refer Code 1, Section III. Regulator Attachable and underwater adapter to indicate TANK AIR PRESSURE.
B	Refer Code 2, Section Ill. Used to indicate tank air pressure (tank servicing).
C	Refer Code 3, Section III. Modify screw driver in accordance with Figure 4-8.
D	Annual visual internal tank inspection.
E	Hydrostatic test of 5/3 times the maximum allowable working pressure of the tanks every 5 years.
F	Clean tanks internally if required upon completion of reference Code D above.
G	Upon reassembly of the first stage regulator insure the mainspring cavity is filled with silicone fluid P/N 1088-55 to prevent "freezing up" of the mainspring.
H	Adjust the first stage intermediate pressure to pressure setting of 130 ± 5 PSIG.
I	Refer Code 10. Section III. Modify wrench set and spanner in accordance with Figure 4-7.
J	Test gauge, tank pressure at least every 6 months against a calibrated master reference gauge.
K	Test gauge, divers pressure at least every 6 months against a calibrated master reference gauge.

Appendix E. REPAIR PARTS, STANDARD TOOLS, SPECIAL TOOLS AND TEST EQUIPMENT

Section I. INTRODUCTION

E-1 SCOPE.

This appendix includes listings of repair parts, tools, and test equipment required in the maintenance support of the Open Circuit SCUBA System. Section II through Section VI contain repair parts applicable to all the major components of the system except the tank pressure gauge P/N 7004. Section III and Section VIII list the standard and special tools, respectively, used with the equipment and Section X contains testing equip ment.

E-2 EXPLANATION OF LISTINGS

a. Column 1 - Item Number. In Section II through Section VI this number represents the applicable Figure (identified in Section title) sequence number. In Section VII through Section X this column represents the item sequence number.

b. Column 2 - Maintenance Level. This column identifies the lowest level of maintenance that requires the item.

C - Operator (diver).
O - Unit Maintenance.

c. Column 3 - NSN/Part Number & CAGEC. This column contains assigned National Stock Numbers and/or the manufacturer's part number and Commercial and Government Entity Code (CAGEC) for use in requisitioning the item.

d. Column 4 - Description. This column provides a short description to identify the item.

e. Column 5 - Unit of Measure (U/M). Indicates the standard or basic quantity by which the listed is used in performing the actual maintenance function.

SECTION II. REPAIR PARTS LISTING FOR FIRST STAGE REGULATOR, (Fig. 4-1) (P/N 1088-00 AND 1077-00)

(1) ITEM NO.	(2) MAINT LEVEL	(3) NSN/PART NO. AND CAGEC	(4) DESCRIPTION	(5) U/M
1	C	1088-75	Decal	EA
*1	C	1081-85	Decal	EA
2	C	4220-01-192-7685/ 1075-06	Knob	EA
3	C	4240-00-776-7040/ 1010-12	Cap Assembly	EA
4	C	8201-12	Cap Assembly O-Ring	EA
*4	C	5330-01-176-7915/ 8201-20	Cap Assembly O-Ring	EA
5	O	1053-10	Yoke Retainer	EA
6	O	1077-01	Yoke	EA
*6	O	4220-01-192-7686/ 7004-11	Yoke	EA
7	O	5365-00-476-9637/ 8630-51	Filter Retainer Ring	EA
8	O	1386-00-776-7023/ 1051-06*	Fitter	EA
9	O	5360-01-012-2651/ 1046-13	Fitter Assembly Spring	EA
10	O	5360-01-196-0176/ 1053-24	Spring Block	EA
11	O	8280-06	Back-up Ring	EA
*11	O	5330-01-191-8141/ 8280-05	Back-up Ring	EA
12	O	5330-01-013-5832/ 8200-06	Spring Block O-Ring	EA
13	O	5360-01-170-2999/ 1046-04	Disc and Retainer Spring	EA
*13	O	1015-04	Disc and Retainer Spring	EA
14	O	4220-01-192-4544/ 1053-20	Disc and Retainer	EA
15	O	1053-03	Regulator Body	EA
*15	O	4220-01-192-7688/ 1053-33	Regulator Body	EA
16	O	5330-00-202-1282/ 8200-11	Plug Screw O-Ring	EA
17	C	1053-17	Plug Screw	EA
18	C	1053-17	Plug Screw	EA

SECTION II. REPAIR PARTS LISTING FOR FIRST STAGE REGULATOR, (Fig. 4-1) (P/N 1088-00 AND 1077-00) - Continued

(1) ITEM NO.	(2) MAINT LEVEL	(3) NSN/PART NO. AND CAGEC	(4) DESCRIPTION	(5) U/M
*18	C	4240-01-122-3573/ 9109-12	Plug Screw	EA
19	C	5330-00-202-1282/ 8200-11	Plug Screw O-Ring	EA
20	C	5315-01-168-8992/ 1053-23	Pin	EA
21	O	4220-00-714-3315/ 1000-27	Pin Support	EA
*21	O	1017-27	Pin Support	EA
22	O	4820-00-714-3516/ 1000-29	Diaphragm	EA
*22	O	1034-29	Diaphragm	EA
23	O	5330-00-776-7020/ 8210-01	Diaphragm Gasket	EA
*23	O	8210-26	Diaphragm Gasket	EA
24	O	4820-01-166-0901/ 1053-28	Diaphragm Spring Pad	EA
*24	O	1017-28	Diaphragm Spring Pad	EA
25	O	1000-40	Adjustment Spring	EA
*25	O	1020-40	Adjustment Spring	EA
26	O	5330-01-253-0696/ 1088-51	Spring Retainer	EA
27	O	5305-01-024-3088/ 1053-29	Adjusting Screw	EA
*27	O	1015-49	Adjusting Screw	EA
28	O	1088-53	Secondary Diaphragm	EA
29	O	1088-51	Retainer Ring	EA
*29	O	5365-01-253-0787/ 1088-54	Retainer Ring	EA
*30	O	1017-85	High Pressure Adapter	EA
*31	O	5365-01-191-8101/ 8610-68	Yoke Retainer Ring	EA
Not Ill.	O	4220-01-253-0698/ 1088-55	Silicone Fluid	OZ
Not Ill.	O	FRK-A81 *P/N 1077-00 ONLY	Parts Kit, Scuba Regulator	KT

NOTE: The manufacturer's federal code for all the above repair parts is (94120) except the Scuba Regulator Parts Kit, FRK-A81, which is (14619).

SECTION III. REPAIR PARTS LISTING FOR SECOND STAGE REGULATOR (Fig. 4-2) (P/N 1088-00 AND 1077-00)

(1) ITEM No.	(2) MAINT LEVEL	(3) NSN/PART NO. AND CAGEC	(4) DESCRIPTION	(5) U/M
1	C	1088-75	Decal	EA
*1	C	1081-85	Decal	EA
2	O	1037-04	Button	EA
*2	O	1037-06	Button	EA
3	O	5365-01-191-8103/ 8600-37	Retainer Ring	EA
4	O	5360-01-012-2715/ 1027-08	Button Spring	EA
5	O	4220-01-127-5010/ 1070-01	Box Top (BARE)	EA
6	O	1019-14	Rim Clamp	EA
*6	O	5340-01-191-8102/ 3901-47	Rim Clamp	EA
7	O	8340-20	Rim Clamp Screw	EA
*7	O	5305-01-191-2356/ 8340-23	Rim Clamp Screw	EA
8	O	4220-00-195-0128/ 1037-32	Diaphragm	EA
9	O	4220-01-191-7857/ 1049-20	Exhaust Tube	EA
*9	O	1049-41	Exhaust Tube	EA
10	O	4220-00-195-0130/ 1051-39	Exhaust Valve	EA
11	O	4220-01-192-7691/ 1049-22	Box Bottom	EA
12	O	4730-01-192-4393/ 1049-02	Inlet Fitting	EA
13	O	5330-00-397-4501/ 8200-14	Inlet Fitting O-Ring	EA
14	O	1058-10	Disc (Part of Disc & Retainer Assy)	EA
*14	O	1085-10	Disc	EA
15	O	4820-01-192-7907/ 1049-08	Disc Retainer (14 & 15 is an assy)	EA
*15	O	1049-03	Disc Retainer	EA
16	O	5360-00-202-1687/ 1085-04	Disc Retainer Spring	EA

SECTION III. REPAIR PARTS LISTING FOR SECOND STAGE REGULATOR (Fig. 4-2) (P/N 1088-00 AND 1077-00) - Continued

(1) ITEM NO.	(2) MAINT LEVEL	(3) NSN/PART NO. AND CAGEC	(4) DESCRIPTION	(5) U / M
17	O	5310-01-197-4478/ 8450-22	Washer	EA
18	O	1037-29	Lever	EA
*18	O	3040-01-192-5718/ 1085-13	Lever	EA
*18	O	1076-05	Lever (Cold Water)	EA
19	O	5365-01-194-9039/ 1025-17	Spacer	EA
*19	O	1076-06	Spacer (Cold Water)	EA
20	O	5310-01-194-8727/ 1025-10	Nut	EA
21	C	4220-01-121-0512/ 1058-78	Mouthpiece	EA
*21	C	1058-89	Mouthpiece	EA
*21	C	1058-79	Mouthpiece (Cold Water)	EA
22	C	5340-00-476-6916/ 1049-13	Mouthpiece Clamp	EA
23	C	1058-76	Strap	EA
24	C	5330-00-202-1282/ 8200-11	O-Ring (to First Stage Regulator)	EA
25			Connector (to First Stage Regulator	
26	C	4720-00-388-9878/ 1048-04	Hose (with Connectors)	EA
27			Connector (to Second Stage Regulator	EA
28	C	5330-00-202-1283/ 8200-10	O-Ring (to Second State Regulator)	EA
Not Ill.	O	FRK-A81 *P/N 1077-00 ONLY	Parts Kit, Scuba Regulator	KT

NOTE: The manufacturer's federal code for all the above repair parts is (94120) except the Scuba Regulator Parts Kit, FRK-A81, which is (14819).

SECTION IV. REPAIR PARTS LISTING FOR TANK BLOCK MANIFOLD (P/N 0638), (Fig. 4-3)

(1) ITEM NO.	(2) MAINT LEVEL	(3) NSN/PART NO. AND CAGEC	(4) DESCRIPTION	(5) U/M
1	O	9205-02	Safety Plug Screw (2250 PSIG)	EA
2	O	0527-18	Safety Disc (2250 PSIG)	EA
3	O	8210-19	Safety Disc Washer	EA
4	O	8202-14	Elbow O-Ring	EA
5	O	0518-02	Elbow	EA
6			Center Yoke Connector	EA
7	O	0502-02	Center Yoke (with Connectors)	EA
8			Center Yoke Connector	EA
9	C	8201-12	Center Yoke O-Ring	EA
10	O	0525019	Nipple and Disc	EA
11	O	0525021	Main Stem	EA
12	O	0502-34	Main Stem Gasket	EA
13	O	8200-10	Main Stem O-Ring	EA
14	O	8285-10	Bonnet Back-Up Ring	EA
15	O	9570-07	Bonnet O-Ring	EA
16	O	0502-33	Bonnet	EA
17	O	8450-58	On-Off Handle Washer	EA
18	O	0525-41	On-Off Handle	EA
19	O	0501-07	On-Off Handle Spring	EA
20	O	0525-05	On-Off Handle Nut	EA
21	O	0518-05	Reserve Elbow Insert	EA
22	O	0518-06	Insert Washer	EA
23	O	0502-20	Insert Spring	EA
24	O	0517-06	Disc and Retainer Washer	EA
25	O	0518-24	Reserve Disc and Retainer	EA
26	O	8202-14	Reserve Elbow O-Ring	EA
27	O	9205-02	Reserve Elbow Safety Plug Screw (2250 PSIG)	EA
28	O	0527-18	Reserve Elbow Safety Disc (2250 PSIG)	EA
29	O	8210-19	Reserve Elbow Safety Disc Washer	EA
30	O	0518-01	Reserve Elbow	EA

SECTION IV. REPAIR PARTS LISTING FOR TANK BLOCK MANIFOLD (P/N 0638), (Fig. 4-3) - Continued

(1) ITEM NO.	(2) MAINT LEVEL	(3) NSN/PART NO. AND CAGEC	(4) DESCRIPTION	(5) U/M
31	O	0502-15	Pin and Plunger Spring	EA
32	O	0502-27	Pin and Plunger	EA
33	O	0502-24	Reserve Stem	EA
34	O	0502-34	Reserve Gasket	EA
35	O	5330-00-202-1283/ 8200-10	Reserve O-Ring	EA
36	O	8285-10	Reserve Back-Up Ring	EA
37	O	0517-05	Reserve Sonnet	EA
38	O	8450-58	Reserve Lever Washer	EA
39	O	0525-40	Reserve Lever	EA
40	O	0501-07	Reserve Lever Spring	EA
41	O	0525-05	Reserve Lever Nut	EA
	O	FRK-028	Parts Kit, Tank Manifold	KT

NOTE: The manufacturer's federal code for all of the repair parts is (94120) except the Parts Kit, Tank Manifold, FRK-028, which is (14819).

SECTION V. REPAIR PARTS LISTING FOR TANK BLOCK MANIFOLD (P/N 2800-00), (Fig. 4-4)

(1) ITEM NO.	(2) MAINT LEVEL	(3) NSN/PART NO. AND CAGEC	(4) DESCRIPTION	(5) U/M
1	O	0502-41	Safety Disc Assembly (3000 PSIG), (Consists of plug disc, and washer)	EA
1	O	0502-42	Safety Disc Assembly (2250 PSIG), (Consists of plug, disc, and washer)	EA
2	O	0502-21	Plug	EA
3	O	8210-11	Gasket	EA
4	O	0518-21	Dip Tube	EA
5	O	6202-14	O-Ring	EA
6	O	0525-18	Reserve Lever Nut	EA
7	O	0501-07	Reserve Lever Spring	EA
8	O	2800-40	Reserve Lever	EA
9	O	5330-01-176-7915/ 8201-20	Manifold O-Ring	EA
10	O	8202-14	O-Ring	EA
11	O	0518-21	Dip Tube	EA
12	O	8450-58	Reserve Lever Washer	EA
13	O	0525-15	Reserve Bonnet	EA
14	O	8285-15	Reserve Back-Up Ring	EA
15	O	8200-15	Reserve O-Ring	EA
16	O	8210-14	Reserve Gasket	EA
17	O	8200-10	Stem O-Ring	EA
18	O	0525-14	Reserve Stem	EA
19	O	8450-21	Reserve Stem Washer	EA
20	O	0525-08	Reserve Assembly	EA
21	O		Manifold	
22	O	0502-41	Safety Disc Assembly (3000 PSIG), (Consists of plug, disc and washer)	EA
22	O	0502-42	Safety Disc Assembly (2250 PSIG), (Consists of plug, disc and washer)	EA
23	O	2800-13	Seat	EA
24	O	0525-21	Main Stem	EA
25	O	9210-19	Main Stem Gasket	EA
26	O	8200-10	Main Stem O-Ring	EA
27	O	8285-10	Bonnet Back-Up Ring	EA
28	O	9570-07	Bonnet O-Ring	EA

SECTION V. REPAIR PARTS LISTING FOR TANK BLOCK MANIFOLD (P/N 2800-00), (Fig. 4-4) - Continued

(1) ITEM NO.	(2) MAINT LEVEL	(3) NSN/PART NO. AND CAGEC	(4) DESCRIPTION	(5) U/M
29	O	0502-33	Bonnet	EA
30	O	8450-58	On-Off Handwheel Washer	EA
31	O	0525-41	On-Off Handwheel	EA
32	O	0501-07	On-Off Handwheel Spring	EA
33	O	0525-18	On-Off Handwheel Nut	EA
Not Ill.	O	FRK-028	Parts Kit, Tank Manifold	KT

NOTE: The manufacturer's federal code for all of the above repair parts is (94120) except the Parts Kit, Tank Manifold, FRK-028, which is (14819).

SECTION VI. REPAIR PARTS LISTING FOR TWIN TANK BLOCK AND HARNESS (Fig. 4-5)

(1) ITEM NO.	(2) MAINT LEVEL	(3) NSN/PART NO. AND CAGEC	(4) DESCRIPTION	(5) U/M
1	O	0637-79	Tank (72 cu. ft.)	EA
2	O	0812-33	Right Shoulder Strap	EA
3	O	0812-32	Left Shoulder Strap	EA
4	O	0812-40	Stabilizer Band Cushions	EA
5	O	0812-43	Top Stabilizer Band	EA
6	O	8380-17	Stabilizer Band Bolt	EA
7	O	0812-45	Stabilizer Band Washer	EA
8	O	8500-03	Stabilizer Band Nut	EA
9	O	8380-17	Stabilizer Band Bolt	EA
10	O	0812-45	Stabilizer Band Washer	EA
11	O	8500-03	Stabilizer Band Nut	EA
12	O	0812-29	Right Waist Strap	EA
13	O	0812-44	Bottom Stabilizer Band	EA
14	O		Pull Rod Clips	EA
15	O	0812-40	Stabilizer Band Cushion	EA
16	O	0812-31	Abdominal Strap and Slide Bar	EA
17	O	0812-29	Left Waist Strap	EA
18	O	RJ	Pull Rod	EA

NOTE: The manufacturer's federal code for all of the above repair parts is (94120).

SECTION VII. REPAIR PARTS LISTING FOR TANK PRESSURE GAUGE (REGULATOR ATTACHABLE), (Fig. 4-6)

(1) ITEM NO.	(2) MAINT LEVEL	(3) NSN/PART NO. AND CAGEC	(4) DESCRIPTION	(5) U/M
1	O	7036-30	Gauge, Tank Pressure	EA
2			Cover	EA
3	O	8200-04	O-Rings (2)	EA
4			Connector, Gauge	EA
5	O	7036-13	Hose Assembly	EA
6			Connector, Regulator	EA
7	O	8200-11	O-Ring	EA
8	O	7036-05	Strap Assembly	EA

NOTE: The manufacturer's federal code for all of the above repair parts is (94120).

SECTION VIII. STANDARD TOOLS (NOT ILLUSTRATED)

(1) ITEM NO.	(2) MAINT LEVEL	(3) NSN/PART NO. AND CAGEC	(4) DESCRIPTION	(5) U/M
1	O	7920-00-267-1215	Brush, Sott Wire	EA
2	O	5120-00-241-3179	Key, Socket Head Screw 7/32"	EA
3	O	5120-00-288-9717	Pliers, Circlip 6"	EA
4	O	5120-00-293-0048	Pliers, Circlip 6"	EA
5	O	5110-00-806-9551	Pliers, Diagonal	EA
6	O	5120-00-184-9403	Pliers, Needle Nose	EA
7	O	5210-00-234-5223	Ruler, Steel Machinist	EA
8	O	5120-09-260-4837	Screwdriver, Flat Tip 3/16" x 8"	EA
9	O	5120-00-596-8653	Screwdriver, Flat Tip	EA
10	O	5120-00-287-2129	Screwdriver, Offset 5/32 " x 3" lg.	EA
11	O	5120-00-234-8910	Screwdriver, Flat Tip 5/16"	EA
12	O	5120-00-322-6231	Socket Wrench Set 3/8" Drive	EA
13	O	5120-00-180-0647	Vise, Pipe	EA
14	O	5120-00-184-8552	Wrench, Open End Double	EA
15	O	5120-00-184-8553	Wrench, Open End Double Head 7/16" x 1/2 "	EA
16	O	5120-00-184-8555	Wrench, Open End Double Head 9/16"x 5/8"	EA
17	O	5120-00-184-8557	Wrench, Open End Double Head 11/16" x 3/4"	EA
18	O	5120-00-184-8560	Wrench, Open End Double Head 15/16" x 1"	EA
19	O	5120-00-288-9997	Wrench Open End w/Box End 1/4	EA
20	O	5120-00-277-2694	Wrench, Open End Double Head 1-1/8"- 1-1/4"	EA
21	O	5120-00-277-2691	Wrench, Open End 1-3/8"	EA
22	O	5129-00-288-8708	Wrench, Open End 1-3/8"	EA
23	O	5120-00-423-6728	Wrench, Open End, Adjustable, Size 15	EA

SECTION IX. SPECIAL TOOLS

(1) ITEM NO.	(2) MAINT LEVEL	(3) NSN/PART NO. AND CAGEC	(4) DESCRIPTION	(5) U/M
1	C	1588-13 (17925)	Plastic Tool (PFI)	EA
2	O	5120-00-227-7338	Screwdriver, Flat Tip 1/2" (fig. 4-8)	EA
3	O	5120-00-277-9075	Wrench Set, Spanner 1-1/8" x 1-1/4"	EA
4	C	5120-00-203-4808	Wrench, Open End (thin body) 1-1/4"	EA
5	C	1100-05 (94120)	Wrench, Retainer	EA
6	C	1110-00 (94120)	Circlip Pliers	EA
7	O	0525-85 (14819)	Wrench, Valve	EA
8	O	0530-35 (14819)	Tool, Valve Handle Retainer	EA
9	O	1070-81 (14819)	Tool, Seat Assembly	EA
10	O	1100-05 (14819)	Wrench, Second Stage, Disc & Retainer	EA
11	O	1110-00 (14819)	Guide, High Pressure Block Assembly	EA
12	O	1112-00 (14819)	Wrench, Dented Ring	EA
13	O	1114-00 (14819)	Wrench, Diaphragm Bonnet Socket	EA
14	O	1115-00 (14819)	Wrench, Allen	EA
15	O	1117-00 (14819)	Wrench, Hex	EA
16	O	1119-00 (14819)	Pincers	EA
17	O	1127-00 (14819)	Wrench, Reserve Bonnet	EA
18	O	42000 (14819)	Tumbler, Dual Tank	EA
19	O	42050 (14819)	Beads, Ceramic	EA

SECTION X. TEST EQUIPMENT

(1) ITEM NO.	(2) MAINT LEVEL	(3) NSN/PART NO. AND CAGEC	(4) DESCRIPTION	(5) U/M
1	O	1116-00 (94120)	Pressure Test Gauge	EA
2	O	1100-01 (94120)	Adapter	EA
3	O	1048-04 (94120)	Hose Assembly	EA
4	C	4220-00-099-8024/ 7004 (94120)	Diver's Pressure Gauge	EA
5	C	4220-01-003-2375	Tank Pressure Gauge	EA
6	O	6230-00-245-2194	Flashlight, w/Flex Stem	EA
7	O	MK1V-A (14819)	Test Stand, Regulation Test and Evaluation Unit	EA
8	O	TC100 (14819)	Chamber, Pressure Test	EA
9	O	T28B (14819)	Cleaner, Ultrasonic w/Heater	EA
10	O	72466 (14819)	Scale, Weighing	EA
11	O	1-150 (63022)	Light, Visual Inspection Cylinder Examining Fiber Optics	EA

Appendix F. EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

F-1 SCOPE.

This appendix listsexpendable supplies. and materials you will need to operate and maintain the Open Circuit Military SCUBA System. These items are authorized to you by CTA50-970.

F-2 EXPLANATION OF COLUMNS.

a. Column 1 - Item Number. This number IS assigned to the entry in the listing.

b Column 2 -Maintenance Level. This column identifies the lowest level of maintenance that requires the item.

C - Operator (diver).
O - Unit Maintenance.

c. Column 3 - NSN Part Number and CAGEC. This column contains assigned National Stock Numbers and/or the manufacturer's part number and Commercial and Government Entity Code (CAGEC) for use in requisitioning the item.

d. Column 4 - Description. This column provides a short description to identity the item.

e. Column 5 - Unit of Measure (U/M). lndicates the standard or basic quantity by which the listed item is used in performing the actual maintenance function.

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NO.	(2) MAINT LEVEL	(3) NSN/PART NO AND CAGEC	(4) DESCRIPTION	(5) U/M
1	C	8030-00-889-3535	Tape. Antiseizing. 1/4" W	RL
2	C	6505-00-754-0374	Providone Iodine Sol	CN
3	C	7920-00-401-8034	Cloth. Cleaning (100 per box)	BX
4	O	2011 (53600)	Measuring Cup. 16 oz.	EA
5	O	6810-00-237-2918	Nitric Acid (5 Pints)	BTL
6	O	6810-00-264-6618	Sodium Bicarbonate (5 lb box)	BX
7	O	841500-266-8679 OR	Rubber Gloves, Blk. Size 9	PR
8	O	8415-00-266-8677 OR	Rubber Gloves, Blk. Size 10	PR
9	O	8415-00-266-8675	Rubber Gloves, Blk. Size 11	PR
10	C	1088-55 (94120)	Silicone Fluid (10 oz. cn)	CN

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General, United States Army
Chief of Staff

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TM 9-1430-550-34-1	7 Sep 72 .	Unit of Radar Set AN/MPQ-50 Tested at the HFC

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PAGE NO	PARAGRAPH	FIGURE NO	TABLE NO	IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
9-19		9-5		"B" Ready Relay K11 is shown with two #9 contacts. That contact which is wired to pin 8 of relay K16 should be changed to contact #10.
21-2	step 1C	21-2		Reads Multimeter B indicates 600 K ohms to 9000 K ohms. Change to read: Multimeter B indicates 600 K ohms minimum. Reason Circuit being checked could measure infinity. Multimeter can read above 9000 K ohms and still be correct.

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