

METRO AVIATION, INC.
1400 AIRPORT ROAD
DOWNTOWN AIRPORT #120
SHREVEPORT, LA 71107

REPORT #105M-100

OXYGEN SYSTEM
FILLING, SERVICING AND MAINTENANCE GUIDE

FOR

B0105

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MBB B0105 OXYGEN SYSTEM
SERVICING AND MAINTENANCE GUIDE

Description

1. The oxygen system consists of a 76.5 cu. Ft. aircraft type oxygen cylinder and regulator assembly mounted externally on the right hand side of the aircraft. A push pull shut off cable is located inside the cabin to allow the crew to control the flow of low-pressure oxygen to the medical accessory panel. A cylinder contents gauge is located above the right hand opera window to allow the crew to monitor the amount of oxygen available for use. The oxygen cylinder is serviced through a calibrated fill port to a nominal pressure of 1850 PSI @ 75 degree F. Low-pressure oxygen is supplied on demand at 45 to 65 PSI depending on altitude temperature and remaining contents in the cylinder.
Electrical load n/a

CAUTION: PRIOR TO INITIAL USE THE OXYGEN SYSTEM SHALL BE PURGED WITH OXYGEN FOR A PERIOD OF TEN (10) MINUTES BY INSERTING MASK FITTINGS AT EACH OF THE OUTLETS AND ALLOWING THE OXYGEN TO FLOW THROUGH SLOWLY.

Parts: For replacement parts consult Drawing List DL-105-1

Trouble Shooting

1. Tools and Equipment

CAUTION: Do not use any substitutes.

Name	Number	Manufacturer	Use
Sherlock Leak	Type CG	Puritan-Zep	For leak test
Detector	(MIL-L-25567A Type 1)	El Segundo, CA	fluid

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Servicing – Oxygen System

General

1. The oxygen filler valve is located adjacent to the contents gauge.
2. The oxygen system gauge should be checked for anticipated requirements before each flight.
3. Whenever pressure drops below necessary levels refill with Medical grade Oxygen or aviator's breathing oxygen Military Specification MIL-O-27210.

Charging Oxygen System

1. Remove oxygen filler valve cap and connect charging unit.
2. Charge the oxygen cylinder to proper PSI as indicated on cylinder placard and in accordance with Oxygen Cylinder Filling Pressure Table.

Initial Temp Degree F	Filling Pressure PSIG	Initial Temp Degree F	Filling Pressure PSIG	Initial Temp Degree F	Filling Pressure PSIG
0	1600	40	1775	90	2000
10	1650	50	1825	100	2050
20	1675	60	1875	110	2100
30	1725	70	1925	120	2150
		80	1950	130	2200

NOTE: Table filling pressure is based on oxygen cylinder filled to 1800 PSIG at 70 degree F.

3. Shut off oxygen supply, disconnect charging unit, install filler cap.

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Discharge Oxygen System

WARNING: THE DISCHARGE PROCEDURE SHOULD BE ACCOMPLISHED OUTDOORS. IF THE DISCHARGING IS DONE INDOORS, EXTREME CARE MUST BE EXERCISED TO PREVENT OXYGEN FLOW FROM COMING IN CONTACT WITH OILS, GREASE, CONTAMINATES AND ELECTRICAL SPARKS. THE AREA SHOULD BE ROPED OFF AND NO SMOKING OR OPEN FLAME ALLOWED IN OR NEAR THE AREA.

NOTE: Discharge of the oxygen system into the cabin area is not recommended.

1. Push oxygen control knob to ON position.
2. Insert fitting and hose in outlet in cabin and route hose outside cabin.

Purge Oxygen System

WARNING: WHENEVER COMPONENTS HAVE BEEN REMOVED AND/OR REPLACED OR OXYGEN SYSTEM HAS BEEN ALLOWED TO DEplete TO BELOW 50 PSI. THE SYSTEM MUST BE PURGED BEFORE CHARGING.

* Whenever a component has been removed or replaced the oxygen system must also be leak checked.

1. Charge the oxygen system.
2. Move aircraft outdoors if possible. If unable to move aircraft outdoors make sure area is roped off, no smoking or open flame permitted in the area, no grease or lubricant near area, cabin door and foul weather windows open.
3. Plug all masks into outlets and purge system by allowing the oxygen to flow for at least 10 minutes. Smell the oxygen flowing from the outlets and continue to purge until the oxygen is odorless. Refill cylinder as required during and after purging.

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Maintenance Practices

1. Tools and Equipment

NOTE: No substitutes may be used instead of the following items unless prior approval had been given.

Name	Number	Manufacturer	Use
Anti-seize Compound	MIL-T-5542	Commercially available	To lubricate threads & fittings
Trichlorethylene	MIL-T-7003	Commercially available	To clean oxygen lines
Naphatha	TT-N-95		Flush oxygen lines
Anti-Icing	MIL-F-5566		Flush oxygen lines

2. General Maintenance Precautions

- A. Before any maintenance is performed on the oxygen system personnel should read and thoroughly understand the following. Careful adherence to these instructions will aid in maintaining a trouble-free system.
- B. If maintenance is performed on the aircraft oxygen system, or on any other system in the aircraft requiring removal of any oxygen system component, strict adherence to the following procedures and precautions is required.

WARNING: DO NOT PERMIT SMOKING OR OPEN FLAME NEAR AIRCRAFT WHILE MAINTENANCE IS BEING PERFORMED ON THE OXYGEN SYSTEM. ASSURE ALL ELECTRICAL POWER IS DISCONNECTED AND THAT THE AIRCRAFT IS PROPERLY GROUNDED. IN ADDITION, OIL, GREASE & SOLVENTS MAY BURN OR EXPLODE SPONTANEOUSLY WHEN CONTACTED BY OXYGEN UNDER PRESSURE.

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- (1) Use extreme caution to assure every port on the system is kept thoroughly clean and free of water, oil, grease, and solvent contamination.
- (2) Cap all openings immediately upon removal of any component. Do not use tape or caps, which will induce moisture.
- (3) Lines & fittings shall be clean & dry. One of the following methods may be used to clean lines.
 - (a) A vapor degreasing solution of stabilized trichloroethylene conforming to Specification MIL-T-7003, followed by blowing tubing clean & dry with a jet of nitrogen gas (BB-N411) Type 1, Class 1, grade A or Technical Argon (MIL-A-18455).

CAUTION: MOST AIR COMPRESSORS ARE OIL LUBRICATED, AND A MINIMUM AMOUNT OF OIL MAY BE CARRIED BY THE AIR STREAM. A WATER LUBRICATED COMPRESSOR SHOULD BE USED TO BLOW TUBING CLEAN ONLY WHEN NITROGEN OR ARGON ARE NOT AVAILABLE. THE AIR MUST BE CLEAN, DRY AND FILTERED.

- (b) Flush with naphtha conforming to Specification TT-N-95, then blow clean and dry with clean, dry, filtered air. Flush with anti-icing fluid conforming to MIL-F-5566 or anhydrous ethyl alcohol. Rinse thoroughly with fresh water and dry with a jet of nitrogen gas (BB-N-411) Type 1, Class 1, Grade A or Technical Argon (MIL-A-18455).
- (c) Flush with hot inhibited alkaline cleaner until free from oil and grease. Rinse with fresh water & dry with a jet of nitrogen gas (BB-N-411) Type 1, Class 1, Grade A or technical argon (MIL-A-18455).

NOTE: Cap all lines immediately after drying.

- (d) All compounds used on fittings must conform to MIL-T-5542. No compounds shall be used on flared fittings or swage lock fittings. Compounds are used only on the first three threads of male fittings. No compound or tape is used on coupling sleeves, or outside of the flares. Use only S1465 Teflon lubricating tape on threads.

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- (e) Maintenance personnel must assure that their hands are free of dirt or grease prior to installation of oxygen tubing or fittings.
- (f) All tools used for installation of oxygen tubes or fittings must be free of dirt, grease, or oils.

WARNING: USE NON-SPARKING TOOLS.

CAUTION: WITH OXYGEN BOTTLE CHARGED, DO NOT MOVE CONTROL TO THE ON POSITION WITH OUTLET PORTS (LOW PRESSURE) OPEN TO ATMOSPHERE. DAMAGE TO REGULATOR METERING POPPET MAY OCCUR.

CAUTION: WHENEVER A COMPONENT OF THE OXYGEN SYSTEM HAS BEEN REMOVED, RE-INSTALLED, REPLACED OR SYSTEM HAS BEEN DISASSEMBLED IN ANY WAY, THE OXYGEN SYSTEM MUST BE LEAK CHECKED AND PURGED.

C. Do not attempt to charge the cylinder if any of the following conditions exists:

- (1) Contaminated or corroded fitting on servicing cylinder or filler valve.
- (2) Cylinder out of hydrostatic test date.
- (3) Cylinder bears no D.O.T. designation.
- (4) Cylinder completely empty after shut-off valve has been turned off for a length of time. Must be completely disassembled and inspected in an FAA approved facility before charging.

D. To assist in cylinder identification, the following information is reflected on each oxygen cylinder.

- (1) Cylinder specification followed by service pressure such as “ICC-3AA1800 or ICC-3HT1850” will be stamped on the shoulder or neck of each cylinder.

NOTE: Effective January 1, 1970, all newly manufactured cylinders are stamped “DOT” (Department of Transportation) in lieu of “ICC” (Interstate Commerce Commission).

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- (2) Cylinder serial number will be stamped below or directly following the cylinder specification.
- (3) Hydrostatic test date will be stamped directly below the original manufacture date and shall include the month and year of the hydrostatic test date.

Adjustment/Test

1. Tools and Equipment

NOTE: No substitutes may be used instead of the following items unless prior approval has been given.

Name	Number	Manufacturer	Use
Sherlock Leak Detector	Type CG (MIL-L-25567A)	Puritan-Zep El Segunda, CA	For leak test fluid
Pressure Gage (0-100-PSIG)		Commercially available	To check oxygen flow pressure

2. Leak Test Oxygen System

- (1) Charge the oxygen system.
- (2) Allow thirty minutes for cylinder pressure to stabilize between 1750 and 1800 PSIG, indicated on pressure gage.
- (3) Record the cylinder pressure and ambient temperature.
- (4) After 24 hours, record cylinder pressure and ambient temperature. Maximum allowable pressure drop is 50 PSIG (correcting from temperature change, using formula of $\pm 1 \text{ Degree} = 3.4 \text{ PSIG}$).
- (5) If the pressure drop derived from the formula in the preceding step exceeds 50 PSIG, test the oxygen system for leakage by applying detector fluid type CG-1 or equivalent to all fittings and connections and observe for formation of bubbles.
- (6) Remove all traces of solution and repair or replace leaky fitting and repeat the preceding procedures.

**MBB B0105 OXYGEN SYSTEM
INSPECTION REQUIREMENTS**

Discrepancies	Cylinder Classification					
	ICC-3AA 1800			ICC-3HT-1850		
Isolated pitting or corrosion (Depth)	.020	2	3	.010	2	3
Local pitting or corrosion or line Corrosion (Depth)	.010	3	4	.005	3	4
General corrosion Cuts, Digs, Gouges (Depth)	Not allowed	5		Not allowed	5	
Dents (Depth)	.010	6		.005	6	
Fire damage	.062	7		.031	7	
Bulges	.062	7		.031	7	
	Not allowed	8		Not allowed	8	
	Not allowed	9		Not allowed	9	

1. Isolated pits of small cross section involving loss of wall thickness by corrosive media. Small isolated pits with a maximum depth as shown are acceptable.
2. If depth exceeds figure shown, cylinder must be returned to the manufacturer for disposition.
3. Local pitting or corrosion or line corrosion involving loss of wall thickness by corrosive media with a pattern of pits, which are connected to others in a band or line. A small area with a minimum depth as shown is acceptable. Areas extending beyond 3 inches in diameter or 4 inches long shall be considered general corrosion.
4. General corrosion (sometimes accompanied by pitting) involving loss of wall thickness by corrosive media covering a considerable area. Cylinder must be returned to the manufacturer for hydrostatic testing.
5. Deformation caused by contact with a sharp object cutting or upsetting the material of the cylinder, decreasing the wall thickness. Maximum defect permissible without corrective action. If this depth is exceeded, the cylinder must be returned to the manufacturer for removal of defects and verification of cylinder strength by hydrostatic testing.

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7. Deformations caused by contact with blunt objects in such manner that the thickness of the metal is not impaired. The major diameter of the dent must be equal to or greater than 32 times the depth of the dent. Sharper dents (or deeper dents) than this are considered too abrupt and must be returned to the cylinder manufacturer for disposition.
8. Fire damage is indicated by charring or burning or sintering of the metal, charring or burning of the paint, distortion of the cylinder, functioned safety relief devices, melting of valve parts, etc. Cylinders must be returned to the cylinder manufacturer for disposition.
9. Bulged cylinders are not acceptable. Cylinders must be returned to the cylinder manufacturer for disposition.

NOTE: The above data may be used to determine that oxygen cylinders are acceptable for services. This criteria should be used prior to charging cylinders.

Inspection Criteria for Acceptance of Oxygen Cylinder
Figure 3

C. Hydrostatic Test Oxygen System Cylinder.

- (1) Standard weight (ICC or DOT-3AA 1800) cylinder must be hydrostatically tested to $5/3$ their working pressure every five years starting with the date of the last hydrostatic test.

NOTE: These test requirements are established by the Interstate Commerce Commission Code of Federal Regulations, Title 49, Chapter 1, Paragraph 173.34.

- (2) Standard weight (ICC or DOT-3AA 1800) cylinders have no life limitations and may be used until they fail hydrostatic testing.
- (3) Light weight (ICC or DOT-3HT 1850) cylinders must be hydrostatically tested to $5/3$ their working pressure every three years starting with the date of the last hydrostatic test.

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- (4) Light weight (ICC or DOT-3HT 1850) cylinders must be retired from service after twenty four years or 4380 filling cycles after date of manufacture, whichever occurs first.

NOTE: As defined by D.O.T. order 8000.40 dated 2 June 1977, cylinders which remain charged or partially charged on the due date of its hydrostatic test may remain in service beyond the test date providing the cylinder is retested prior to its next full or partial filling.

Inspection/Check

Inspect Oxygen System Components

- (1) A careful visual inspection of the oxygen cylinder should be performed during routine maintenance and periodic inspections. If any bad dents, scratches or areas of corrosion are found, the cylinders must be checked per the Inspection Criteria for Acceptance of Oxygen Cylinder, Figure 3.

NOTE: If the acceptability of the cylinder is questionable after using inspection criteria, do not hesitate to return cylinder to manufacturer.

- (2) High pressure lines should be inspected for scratches, dents, cracks, deep gouges if a leak is indicated. Lines should be tested to not less than 3000 PSIG if trouble is indicated.

WARNING: WHENEVER COMPONENTS HAVE BEEN REMOVED AND REPLACED OR OXYGEN SYSTEM HAS BEEN ALLOWED TO DEplete TO BELOW 50 PSIG, THE SYSTEM MUST BE PURGED IN ACCORDANCE WITH PURGING PROCEDURES BEFORE CHARGING THE SYSTEM.

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Cleaning/Painting

Cleaning Oxygen System Components

A. Cleaning Filler Valve

- (1) The filler valve should be cleaned with trichlorethylene MIL-T-703.
- (2) Clean Freon MIL-C-8638 or alcohol may be used as an alternate.

B. Cleaning Regulator and Cylinder

- (1) Clean regulator and cylinder with a clean cloth.

C. Cleaning Oxygen Masks and Hoses

- (1) Clean the mask and hoses with a mild solution of soap and water. Rinse thoroughly with clean water and allow to dry.

NOTE: Ensure all soap is removed by rinsing. Masks may be disinfected with a hospital type antiseptic spray or Zep Aero SBT-12