Chapter 10 OXYGEN SYSTEM

(Completely revised)

LIST OF CONTENTS

Introduction

1. This chapter contains a brief description of the oxygen system installed in this aircraft, together with details of the servicing necessary to maintain the system in an efficient condition. An illustration of the system is also included. For a detailed description of the components used in the system, reference should be made to A.P.1275A, Vol.1 and A.P.1275G, Vol.1.

DESCRIPTION

General

2. The oxygen system of this aircraft consists of a "pressure demand" type of installation and an emergency supply. The demand supply is obtained from three high-pressure cylinders and is fed to the pilot's oxygen mask through a line filter, a reducing valve and a demand regulator. The cylinders are charged in-situ and a gauge in the cabin is provided to indicate the contents of the cylinders. The emergency supply is obtained from a small emergency set carried in the pilot's personal survival pack.

Oxygen cylinders

3. The three 750 litre oxygen cylinders are mounted in the front fuselage structure, two being mounted vertically with their valves uppermost between frames 4 and 6 on the starboard side of the aircraft, and

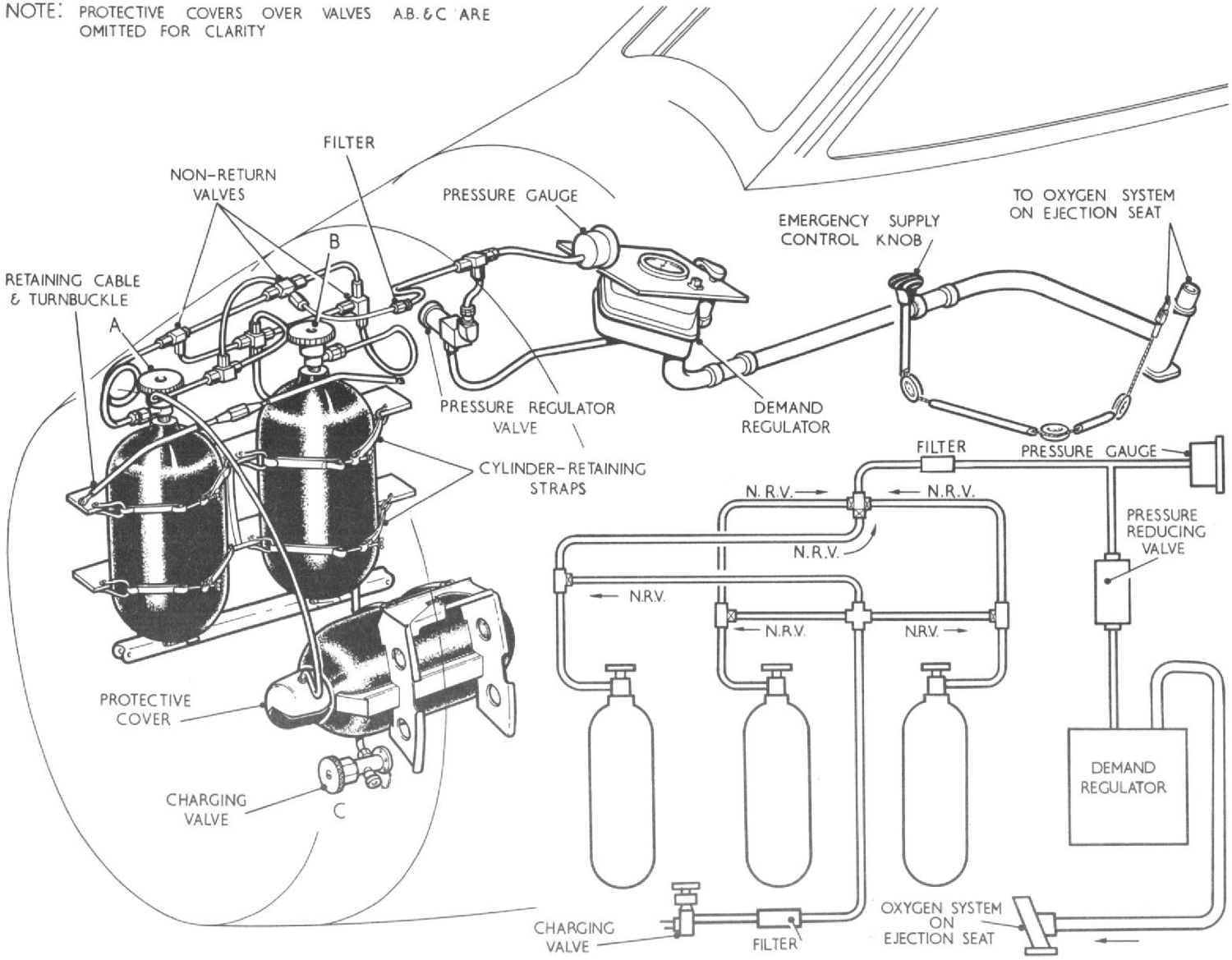

Fig.1. Oxygen installation and diagram

the other one on the port side, where it lies horizontally athwart frame 5 with its valve facing forward. Each starboard cylinder is clamped to supports on the structure by wing nut tensioned metal straps and rests on a support tube at the bottom. A retaining cable, tensioned by a turnbuckle, is passed over the top of the cylinders to prevent them from moving from the support tube. The cylinder on the port side of the aircraft is clamped by a pair of wing nut tensioned metal straps to a cradle which is itself secured to the aircraft structure, the cradle being so designed that it prevents endwise movement of the cylinder. The valve of each cylinder is fitted with a cover to protect it from oil and grease.

Pressure reducing valve

4. The pressure reducing valve, which reduces the pressure of the oxygen to the required value, is mounted in a clip bolted to the rear face of frame 7 on the starboard side of the aircraft.

Demand regulator

5. The demand regulator is located on the forward end of the cabin starboard shelf and is used to control the installation. The controls consist of an ON/OFF valve, an air cut-off lever and an emergency toggle switch, together with a pressure gauge and flow indicator. The operation of the regulator is fully automatic and, once turned on, supplies oxygen in accordance with the pilot's demand in direct relationship to his breathing rate and strength at all times from sea level to a cabin altitude of 50,000 feet. The regulator is described in A.P.1275G, Vol.1.

Charging valve

6. The charging valve, which is fitted with a protective cover to keep it free from oil and grease, is mounted on the forward face of frame 6, just below the rear oxygen cylinder on the starboard side of the aircraft. Access to the valve may be gained via the nose wheel aperture and the method of using the valve is described in A.P.1275G, Vol.1.

Contents pressure gauge

7. An oxygen pressure gauge, the dial of which is marked to indicate capacity instead of pressure, is provided to indicate the contents of the oxygen cylinders. It is mounted on the bottom of the starboard instrument panel in the cabin, just above the demand regulator.

Filters

8. Filters are incorporated in the pipe line from the charging valve to the cylinders and in the pipe line leading from the cylinders to the pressure gauge and reducing valve.

Non-return valves

9. Non-return valves are incorporated in the branch pipes from the charging line to the cylinders and in the pipe lines leading from the cylinders to the four-way connector from which the delivery pipe connects with the pressure gauge and reducing valve.

Operation

10. Oxygen leaves the cylinders at high pressure and passes through non-return valves and a filter to the pressure gauge and pressure reducing valve. Leaving the pressure reducing valve at the required pressure, the oxygen flows to the demand regulator where the correct amount of air, depending upon the aircraft's altitude, is added, and this air/oxygen mixture is fed through a pipe which terminates in a quick-release connection secured to the cabin floor at the starboard side of the pilot's seat. From this connection, a flexible pipe, clipped to the side of the seat and to the pilot's safety harness, is plugged into the pilot's oxygen mask assembly through a further quick-release connection. The lower of the quick-release connections is automatically disconnected when the seat is ejected, and the upper one when the pilot leaves the seat after ejection.

Emergency supply

11. The emergency oxygen equipment for use in the event of failure of the main supply, or during ejection, is installed in the pilot's personal survival pack. It consists of an installation utilizing a small 55 litre cylinder, which is automatically brought into use by a static line when pilot ejection action is taken, or by pulling a control knob on the side of the cabin starboard shelf when the main oxygen supply fails in flight.

SERVICING

General

12. The servicing of the oxygen system consists of ensuring that the installation is free from oil and grease, checking that the oxygen cylinders are fully charged and that the cylinder valves are in the fully open position, and periodically cleaning the filters. The method of charging the oxygen cylinders is described in A.P. 1275G, Vol.1. The valves are accessible only after removing their protective covers. An examination of the system should be made for signs of damage and to ensure that all components are securely mounted. If cylinders are removed, and are not to be immediately replaced, the open ends of pipes are to be protected by blanking connections *(Ref.No.6D/237)*, and on tee-pieces etc., blanking unions *(Ref.No. 6D/1497)* should be used, It is important, after the assembly of any components or pipe lines, to ensure that any arrows existing on such components or pipes point in the direction of flow. The quick-release connections and the emergency oxygen cylinder static line should be checked to ensure that they are correctly assembled. The emergency control on the side of the cabin starboard shelf should be checked for freedom of movement. The maximum pull-off load, with the system completely assembled, should not exceed 30 lb. When the pilot's ejection seat is removed, or when the pilot's demand tube is disconnected from the aircraft's quick-release connection, a plug, fastened by balloon cord, must be inserted into this connection to prevent the ingress of foreign matter. The only other servicing necessary is the standard serviceability and operational tests of the components, details of which will be found in A.P.1275A, Vol.1 and A.P.1275G, Vol.1.

WARNING

No oil or grease must be allowed to come into contact with the oxygen cylinders or any part of the system. It is important, therefore, to ensure that the protective covers provided for the cylinder valves and charging valve are replaced immediately after servicing.

Filters

13. At those periods laid down in the Servicing Schedule, the filters incorporated in the pipe lines *(para.8)*, accessible only after disconnection of the pipe connections, should be examined for cleanliness and renewed, if necessary. Care must be taken to ensure that the filters are not lost or mislaid and that they are refitted the right way round, i.e., so that the direction of flow is towards the closed end of the filter.

REMOVAL AND ASSEMBLY

General

14. The procedure for removing the reducing valve, oxygen regulator, pressure gauge and charging valve is obvious, but care must be taken to ensure that the valves on the oxygen cylinders are turned to the fully OFF position before any pipe lines or components are disconnected. The procedure for the changing of the oxygen cylinders is described below.

Oxygen cylinders

15. Access to the oxygen cylinders is from within the nose wheel bay. The procedure for changing the cylinders is as follows:-

(1) Remove the protective cover from each cylinder valve.

(2) Turn the valve on each cylinder to the fully OFF position.

(3) Unscrew the pipe coupling at the neck of each cylinder and carefully ease the pipes away until they are clear of the cylinders.

(4) Cut the locking wire securing the wing nuts on the straps around each cylinder, slacken off the wing nuts and disengage the straps. *(In the case of the starboard cylinders also slacken off the retaining cable at the top of the cylinders sufficiently to free the cylinders).*

(5) Remove the cylinders.

(6) Place three fully-charged cylinders in position and reverse the operations given for removal above. After refitting the pipe couplings, turn the valves on the cylinders to the fully-open

position and replace the protective covers. Finally, wire-lock the wing nuts securing the cylinder retaining straps and the turnbuckle tensioning the starboard cylinders restraining cable with 22 s.w.g. stainless steel locking wire to Specification D.T.D. 161 or 189.

Replacement of emergency oxygen control cable

16. If it is necessary to replace the emergency oxygen control cable on Pre-Mod.282 or Post-Mod.967 aircraft, a new link from the control cable to the connection on the emergency oxygen bottle may be required. The cable without any slack is offered up to the link and the appropriate hole in the link in alignment with the cable eye fitting noted. The excess length of link should be trimmed off as shown in the Vol.2 leaflet.

Lubrication

17. The following lubricants should be used on the installation:-

XG-273 for emergency control cables.
ZX- 22 for locking and sealing the inlet adaptor, 6D/1647, in the demand regulator.

◀Distilled water may be used as a lubricant when assembling flexible hoses to fittings.▶