

Chapter 10 OXYGEN SYSTEM

LIST OF CONTENTS

	<i>Para.</i>		<i>Para.</i>
<i>Introduction</i>	1	<i>Operation</i>	10
		<i>Emergency supply</i>	11
DESCRIPTION		SERVICING	
<i>General</i>	2	<i>General</i>	12
<i>Oxygen cylinders</i>	3	<i>Filters</i>	13
<i>Pressure reducing valve</i>	4		
<i>Demand regulator</i>	5	REMOVAL AND ASSEMBLY	
<i>Charging valve</i>	6	<i>General</i>	14
<i>Contents gauge</i>	7	<i>Oxygen cylinders</i>	15
<i>Filters</i>	8	<i>Assembly (general)</i>	16
<i>Non-return valves</i>	9	<i>Lubrication</i>	17

ILLUSTRATIONS

	<i>Fig.</i>
<i>Oxygen installation</i>	1

Introduction

1. This chapter contains a description of the oxygen system together with details of the servicing necessary to maintain the installation in an airworthy 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 the relative equipment publication. ▶

DESCRIPTION

General

2. The oxygen system of this aircraft consists of a pressure demand type of installation and an emergency supply for both pilots. The demand supply is obtained from four high

pressure cylinders and is fed to the pilots' oxygen masks via a line filter, a pressure reducing valve and demand regulators. The four cylinders are provided with a common in-situ charging valve and a gauge is provided to indicate the contents of the cylinders. The emergency supply is obtained from emergency oxygen sets, one of which is attached to each pilot's ejection seat.

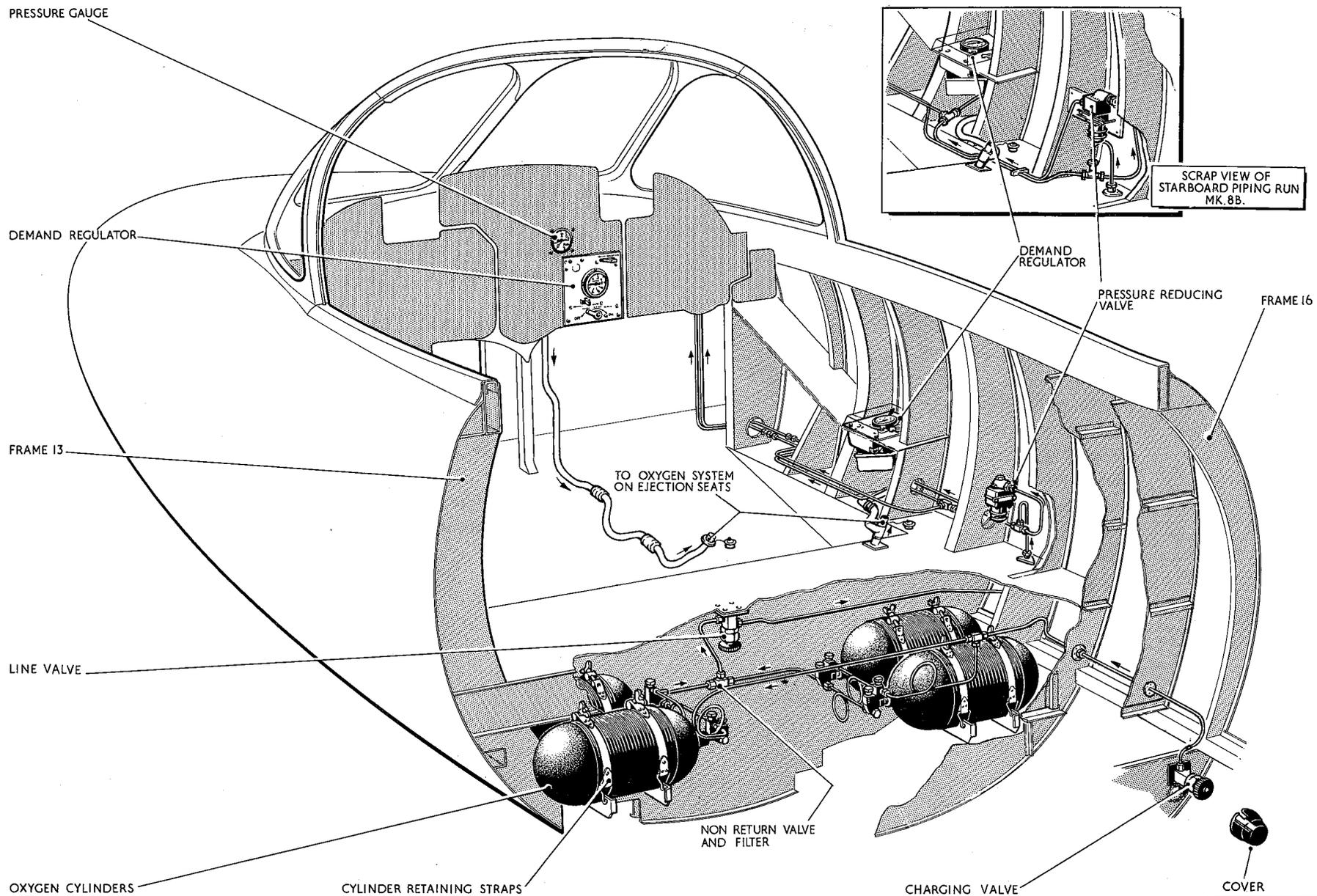


Fig.1. Oxygen installation

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Oxygen cylinders

3. The four 750 litres oxygen cylinders are arranged in pairs on either side of the front fuselage structure between frames 12 and 14. They are mounted horizontally with their outlets innermost and are retained in their mountings by wing-nut tensioned straps.

Pressure reducing valve

4. The pressure reducing valve, which lowers the oxygen pressure to the required value and feeds oxygen to the two demand regulators, is mounted on the aft face of frame 12, above the starboard pair of cylinders. On Mk.8B aircraft it is mounted between frames 12 and 13, above the starboard cylinders.

Demand regulators

5. Two oxygen demand regulators are used to control the system, one mounted on the centre instrument panel, and the other on the cabin starboard shelf. The controls consist of an ON-OFF valve, an air cut-off lever and an emergency toggle switch, together with a flow and blinker indicator. The operation of the regulators is fully automatic and, once turned on, supply oxygen in accordance with their respective pilot's demand in direct relationship to his breathing rate at all times from sea level up to 50 000 feet.

Charging valve

6. The in-situ charging valve, which is fitted with a protective cover to ensure that it is kept free from oil and grease, is located on the starboard side of the fuselage, just aft of frame 16. Access to the valve may be obtained via the radio bay access doors and the method of using the valve is described in the relative equipment publication. ▶

Contents gauge

7. The oxygen contents gauge is mounted above the oxygen regulator on the centre instrument panel and indicates the contents of the oxygen cylinders.

Filters

8. Filters are incorporated in the pipe lines from the charging valve to the cylinders and in the pipe line from the three-way connection to the line valve.

Non-return valves

9. Non-return valves are incorporated in the pipe lines from the cylinders to the three-way connection from which the delivery pipe connects with the line valve.

Operation

10. Oxygen leaves the oxygen cylinders at high pressure and passes through non-return valves and a filter to a line valve located on the underside of the cabin floor, just aft of

frame 12. This valve is permanently wired in the open position, and is only closed when it is desired to disconnect the pipe couplings, or remove any of the components of the system forward of the cylinders. From the line valve, oxygen passes to a tee-piece from which it passes to both the contents gauge on the centre instrument panel and the pressure reducing valve. Leaving the reducing valve at the required pressure, the oxygen flows to the demand regulators where the correct amount of air, depending on the aircraft's altitude is added. This oxygen and air mixture then flows to the quick-release connections located on the cabin floor adjacent to the ejection seats. From each of these connections, a flexible pipe, clipped to the side of the respective ejection seat and pilot's safety harness, is plugged into the pilot's mask assembly by means of 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 system, or during ejection, utilises small 55 litres cylinders, one of which is fitted to each pilot's seat. The equipment is brought into use automatically when ejection action is taken, or may be manually operated when the main system fails in flight, by pulling the manual control handle which is located on the right-hand side of each seat pan.

SERVICING

WARNING

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

General

12. The servicing necessary to maintain the oxygen system in an efficient condition, consists of keeping the installation free from oil and grease, checking that the cylinders are fully charged, that the line valve is in the fully open position and that it is effectively wire-locked in that position to eliminate any possibility of it closing in flight. If components are removed, and are not to be immediately replaced, the open ends of the pipes must be protected by blanking connections (*Ref. No. 6D/237*), and on tee-pieces, etc., blanking unions (*Ref. No. 6D/1437*) should be used. It is important to ensure that after the reassembly of any components or pipe lines, any arrows existing on such components or pipes point in the direction of flow, as otherwise the system will be rendered inoperative. Access to the charging valve can only be obtained after removal of the protective cover. The method of charging the cylinders is described in the relative equipment publication. ▶

An examination of the system should be made for signs of damage and to ensure that the components are securely mounted. The quick release connections and the emergency oxygen static lines should be examined to ensure that they are correctly assembled. When an ejection seat is removed, or either pilot's demand tube is disconnected from the aircraft's quick-release connection, a plug, fastened by balloon cord, must be inserted into the connection to prevent the entry of dirt or other foreign matter into the system. When re-connecting the demand tube to the aircraft's quick-release connection the clip should be tightened to give a pull off load of about 30 lb. The only other servicing required is the standard serviceability and operational tests of the pipelines and components, a description of which will be found in the relative equipment publication. ▶

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. These filters, are small and may easily be mislaid, lost or forgotten. It is essential, therefore, to ensure that they are refitted when pipe lines are re-assembled. It is important that they are fitted the right way round, i.e. so that the direction of flow through the filter is from the closed end to the open end of the filter. ▶

REMOVAL AND ASSEMBLY

General

14. The procedure for removing the reducing valve, the regulator, contents gauge and charging valve is obvious, but care must be taken to ensure that the line valve is closed before any pipes or components are disconnected. The procedure for changing the oxygen cylinders is described in the following paragraph.

Oxygen cylinders

15. Access to the oxygen cylinders may be obtained after removing the armament or radio access door located between frames 12 and 14 in undersurface of the front fuselage. The procedure for changing the cylinders is as follows:—

- (1) Remove the locking wire from the line valve and turn it to the closed position. ▶
- (2) Disconnect the oxygen supply pipe at the oxygen regulator mounted on the centre panel, slowly open the line valve to permit oxygen to escape from the oxygen cylinders, under the control of the line valve, until the gauge indicates that the cylinders are empty.
- (3) Reconnect the oxygen supply pipe to the regulator, fully open the line valve and ensure that it is wirelocked in this position. ▶

- (4) Uncouple the three pipes from the five-way piece on each cylinder, remove the free lengths of pipe and gently ease the remaining pipes away until they are clear of the cylinders.
- (5) Remove the locking wire from the wing nuts tensioning the straps around each cylinder and unscrew the wing nuts until the straps are loose enough to permit withdrawal of the cylinders. Remove the cylinders.
- (6) Place the new (*empty*) cylinders in position and reverse the removal operations (4) and (5). When the cylinders are correctly installed, re-

charge the system as described in A.P.1275G, Vol.1.

Assembly (general)

16. During the assembly of the system, ensure that the arrows on the components or pipe lines point in the direction of flow, that the pipe line filters have been refitted, and fitted the right way round (*para.13*). After assembly, ensure that all unions are wire locked, and that the line valve is turned to the fully ON position prior to locking with wire. Check that the blanking plugs secured with balloon cord have been inserted in the quick release connections on the cabin floor. Finally,

check that no oil or grease exists anywhere in the system.

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 on to fittings.



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