

## CHAPTER 13

## ANTI-'G' SYSTEM

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## Introduction

1. This chapter contains a brief description of the anti-'G' system installed in this aircraft to supply and control the pilot's anti-'G' suit. The necessary servicing information required to maintain the system in an efficient condition is also included, together with an illustration of the installation. The use of an anti-'G' suit raises the pilot's blackout level, considerably reduces

fatigue, caused by repeated application of 'G' and enables him to carry out 'all round' observations at high 'G'. For a detailed description of the components used, reference should be made to A.P.1182E, Vol.1, Sect.1, Chap.10. The type and mark number of the components not given in this chapter will be found listed in the Leading Particulars at the front of this volume.

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## DESCRIPTION

### General

2. The anti-'G' system installed in this aircraft consists of two high-pressure air bottles, which when brought into action by the operation of an ON/OFF selector valve automatically supply air to inflate the pilot's anti-'G' suit when 'G' loads are applied. The air from the bottles is fed via an air filter, a selector valve, a pressure reducing valve and an anti-'G' valve; all of which are interconnected by a system of pipe-lines to a quick-release connection located on a flexible hose clipped to the ejection seat. From this connection a further flexible hose extends to the pilot's anti-'G' suit quick-release connection. A pressure gauge is provided to indicate the pressure in the air bottles. The bottles are charged in-situ via the valve used when charging the hydraulic emergency air bottles.

### Air bottles

3. The two spherical air bottles are located side by side above the hydraulic emergency air bottles behind the ejection seat. They are clamped by wing nut tensioned straps to support structure mounted to the forward face of frame 14, with the pipe connections facing forwards near the top of each bottle.

### Charging valve

4. The standard A.G.S.1200 charging valve is located in the front fuselage structure on the starboard side just aft of frame 16 and is the same valve as used for charging the hydraulic emergency air bottles. A non-return valve is provided in the pipe-line between the charging valve and the air bottles to prevent a return flow from the anti-'G'

system into the hydraulic emergency air system. The charging valve is fully described in A.P.4303Z, Vol.1, Sect.4, Chap.1.

### Air filter

5. The Dunlop ACO.7273 air filter is clamped to the forward face of frame 14 just to starboard of the air bottles and is provided to ensure that only clean air is supplied to the sensitive reducing and anti-'G' valves in the system. The construction of the air filter is fully described in A.P.1641E, Vol.1, Sect.2, Chap.11.

### Pressure gauge

6. The Mk.14KK pressure gauge, which is tapped into the system between the air filter and the selector valve to indicate the pressure in the air bottles, is located on a bracket attached to the fuselage structure above the cabin starboard shelf. The construction and method of operation of this gauge is fully described in A.P.1275A, Vol.1, Sect.3, Chap.7.

### Selector valve

7. The ON/OFF selector valve, which is lever-operated and used to bring the anti-'G' system into operation, is located on the cabin starboard shelf just aft of frame 10. The valve is fully described in A.P.4303C, Vol.1, Sect.6, Chap.3, Appendix 1.

### Pressure reducing valve

8. The pressure reducing valve, which lowers the air pressure to the required operating value for the anti-'G' valve, is mounted in clips bolted to the cabin floor below the cabin starboard shelf just aft of frame 10. The valve is fully described in A.P.4303Z,

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Vol.1, Sect.4, Chap.9.

#### Anti-'G' valve

9. The anti-'G' valve is mounted on the cabin starboard shelf just aft of the selector valve. The valve is mounted vertically with the test push-button projecting through the shelf. It automatically controls the anti-'G' suit pressure depending upon the 'G' loads applied perpendicular to the line of flight. The test push-button allows the pilot to manually inflate his suit either for checking the operation of the system or as an anti-fatigue measure during flight. The valve is fully described in A.P.4303C, Vol.1, Sect.4, Chap.14.

#### Quick-release connections

10. The airframe portion of the anti-'G' system terminates in a quick-release socket, which mates with a plug attached to a length of kinkproof hose clipped to the port side of the ejector seat. This latter hose terminates in a quick-release plug to which, when in use, the pilot's anti-'G' suit is connected. When not in use the hose is stowed in a blanking socket mounted to the port side of the seat pan. When ejection action is taken, the airframe portion of the system is automatically disconnected at the quick-release connection in the pipe clipped to the seat and when the pilot leaves the seat after ejection, his suit is automatically disconnected at the quick-release connection on the suit. Illustrations and a description of the suit are given in A.P.4470, Sect.2, Chap.4.

#### Operation

11. The operation of the system, once selected for use, is fully automatic as the pressure applied to

the suit is controlled by the sensitive anti-'G' valve, which is opened to an amount depending upon the 'G' loads applied. When the anti-'G' valve opens, high pressure air flows from the bottles through the air filter and selector valve to the pressure reducing valve. At this valve the pressure is reduced to the required operating pressure and the air then flows, via the open anti-'G' valve, to inflate the suit. When normal flight is resumed the anti-'G' valve closes, to shut off the supply to the suit which becomes deflated, via exhaust ports in the anti-'G' valve.

#### SERVICING

##### General

12. The servicing necessary to maintain the system in an efficient condition, consists of keeping the installation clean, ensuring that the exhaust ports in the anti-'G' and pressure reducing valves are free from obstruction, together with a check of the pipelines and components for leaks, damage and security. The quick-release connections should be examined to ensure that they are correctly assembled to the flexible hose and that the hose and connections are undamaged. The air filter should also be drained and its felt filter pad cleaned as described in para.13 and reference made to the pressure gauge in the cockpit to ensure that the air bottles are fully charged. If necessary the bottles should be recharged to the pressure quoted in the Leading Particulars, the procedure being described in Section 2, Chapter 2 of this publication. The only other servicing necessary is the serviceability and operational tests of the components, which will be found in the Air Publications previously referred to in para.4 to 10.

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## Draining air filter

13. The air filter should be drained periodically, while compressed air is present, by unscrewing the drain plug at the bottom of the filter one complete turn. When this is done, oil and water, if present will be ejected through the drain hole at the bottom of the filter body. The filter should also be dismantled regularly to enable the felt filter pad to be cleaned, but before this is done the pressure in the air bottles must be dissipated by opening the bleed valve at the neck of each bottle.

## REMOVAL AND ASSEMBLY

### General

14. The procedure for removing the anti-'G' valve, reducing valve, selector valve, air filter and pressure gauge is obvious, but care must be taken to ensure that the air pressure in the air bottles is dissipated, by opening the bleed valves situated at the neck of each bottle, before the pipe-lines are disconnected. Whenever any component is removed from the system or when pipe-lines are disconnected for any reason it is essential that the pipe ends and connections on the units are blanked off to prevent the entry of foreign matter. This is important as any dirt etc. in the pipe-lines or units will cause damage to the sensitive reducing and anti-'G' valves. Before re-connecting a component the pipe-lines must be blown through with

clean dry air to ensure that they are scrupulously clean. The method of removing the air bottles is given in the following paragraph.

### Air bottles

15. Access to the air bottles, which are located behind the ejector seat, is obtained from within the cabin. The method of removing them is as follows:-

- (1) Dissipate the pressure in the air bottles, by unlocking and opening the bleed valves located on the neck of each bottle.
- (2) Unscrew the pipe couplings at the neck of each bottle and gently ease the pipes away, until they are clear of the bottles. Blank off the pipe ends and bottle connections.
- (3) Unlock and slacken off the wing nuts on the straps around each bottle.
- (4) Disengage the straps and remove the bottles, taking care that they do not foul or damage any pipe-lines and installations behind the seat.

### NOTE...

The method of refitting the air bottles is a reversal of the above procedure, ensuring that the bleed valves are fully closed and locked before recharging the system.



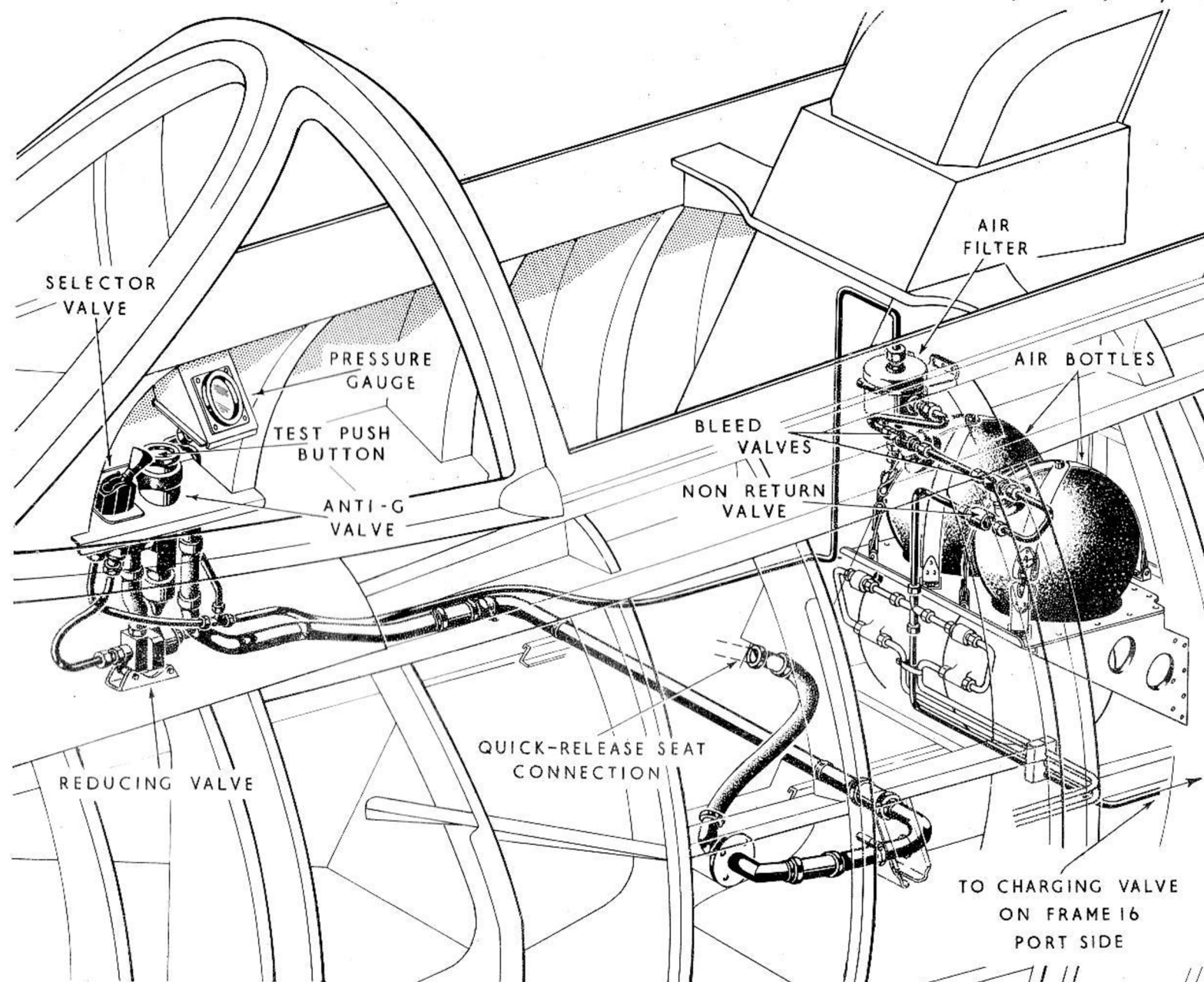


FIG. 1 ANTI-G SYSTEM

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