

Chapter 6

COMBINED FILLER, BUILD-UP, VENT AND RELIEF VALVE
(Part No. OP.7290)

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LEADING PARTICULARS

Ref. No.	...	...	...	...	...	...	...	...	...	6D/—
Weight	...	...	...	...	...	...	...	...	...	1.8 lb
Dimensions (overall)	...	...	...	...	...	...	...	...	...	6.8 × 6.25 × 2.3 in.
Relief valve operating pressure	...	...	...	...	...	...	...	...	...	200 lb/in ²

Introduction

1. This combined filler, build-up, vent and relief valve (fig. 1) is normally fitted to certain liquid oxygen converter package assemblies. The valve is the filling medium for the container of the package assembly and also enables the gas within the container to be vented to atmosphere during the filling operation. The valve reverts to a build-up condition automatically when filling is completed and the ground filling connector is disconnected. In the build-up condition, an integral relief valve operates if the system pressure exceeds 200 lb/in².

DESCRIPTION

2. A filler head is screwed into one end of the valve (fig. 2) and locked by two set screws which, in turn, are locked with locknut cement. The head is of light-alloy and has a central passage which, at the inlet end, is tapered and houses a Fluon insert in an annular groove. Three bayonet-type slots round the head provide attachment for the ground filling connector, and secure a cover assembly when the filling connector is disconnected.
3. A valve drive shaft passes through the body of the valve and is fitted with a spring-loaded sleeve plunger which is secured by a shaft cap located in the bore of the filler head. The opposite end of the shaft is fitted with a build-up and vent valve head; this is a double-headed valve of Fluon moulded

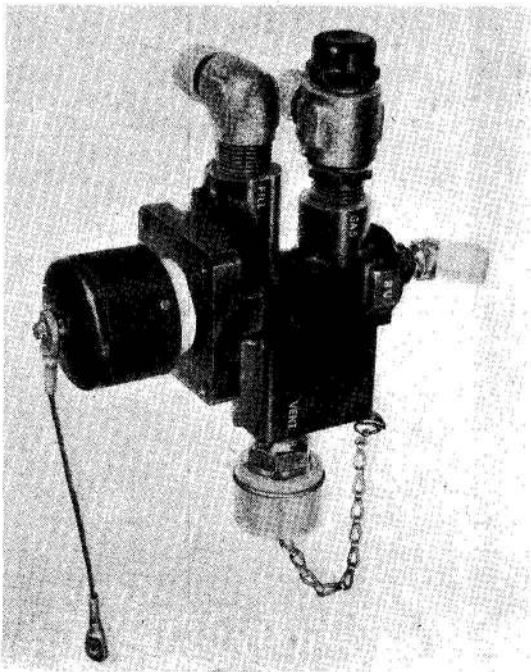


Fig. 1. Combined filler, build-up, vent and relief valve

to an insert which is screwed on to the end of the shaft. The shaft extends into a valve seat housing, and the build-up and vent valve head occupies a position between two valve seats. The inner of these is a vent valve seat which is sealed by an O-ring and located by a retaining ring. The outer seat is a build-up valve seat and has a mounting flange through which it is secured to the end of the valve body by screws and washers. The body of the seat is fitted with a 45° elbow connection, inscribed BU, and carries an O-ring to form a seal with the valve body. A spring interposed between a flange on the build-up and vent valve head, and a shoulder on the outer valve seat, imposes a bias on the valve head so that normally the vent valve is closed and the build-up valve open.

4. A branch passage within the valve body interconnects the filler head with an outlet housing fitted with a check valve and a 90° elbow connection

inscribed FILL. The check valve is fitted with an O-ring and is located by a hold-down sleeve; the sleeve, valve head and spring are secured by a washer and a retaining ring.

5. A second 90° elbow connection inscribed GAS is secured to a special adapter by a cap nut, and the special adapter is screwed into a passage which connects with the build-up and vent valve housing.

6. A relief valve assembly, consisting of a valve seat, ball, spring and adjusting screw assembled to a valve body, is bolted to one side of the main body so that the relief valve seat penetrates a passage extending to the build-up and vent valve housing. A quick-disconnect plug is screwed into the relief valve body and, through passages in both the main body and the relief valve body, is in communication with the outlet side of the relief valve and with a small chamber on the outlet side of the vent valve. Sealing between this chamber and the filler head housing is by means of a seal fitted to the shaft.

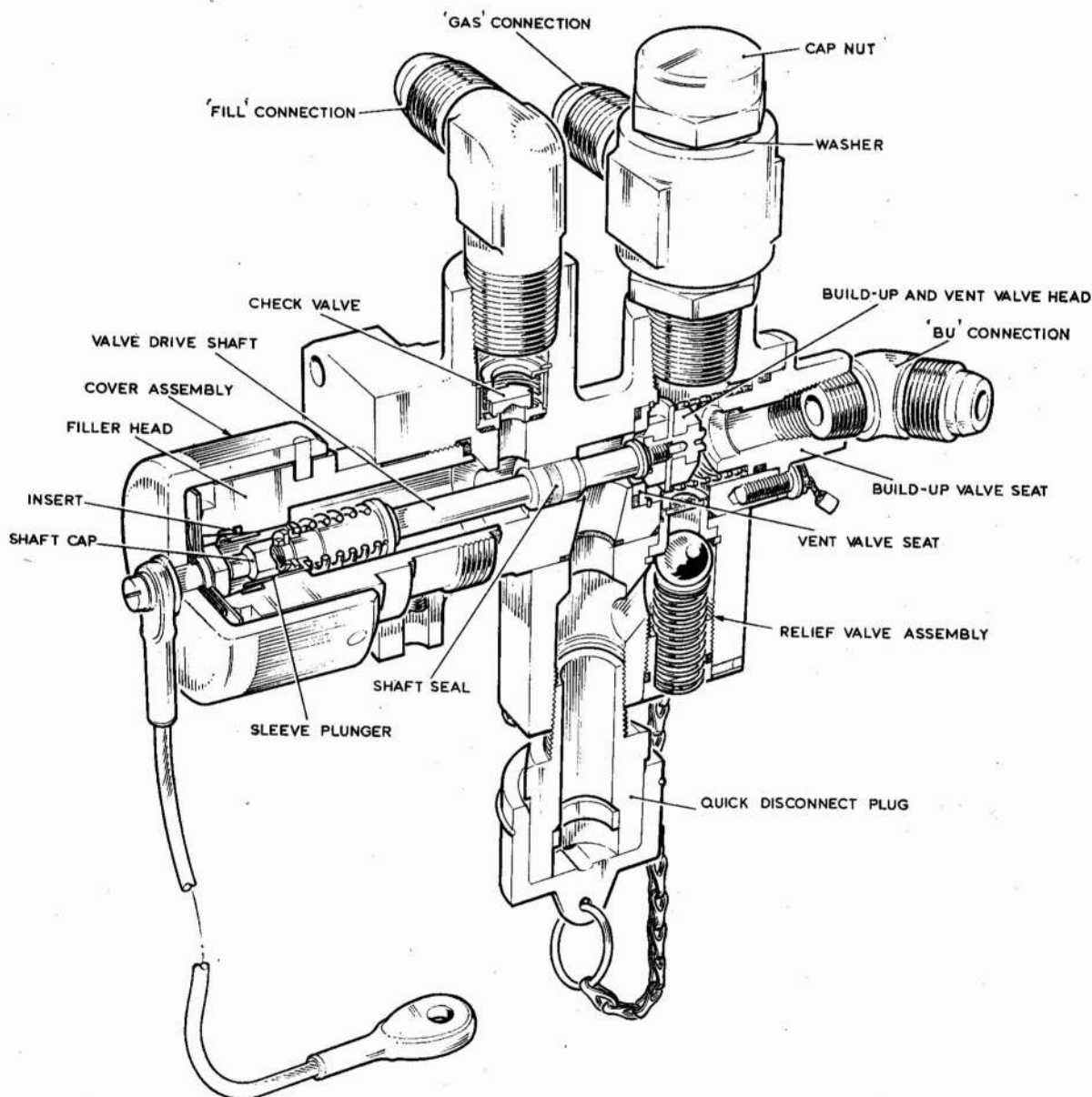


Fig. 2. General arrangement

RESTRICTED

OPERATION

7. A schematic diagram of the valve is shown in fig. 3. The filler head cover is removed by applying light pressure and turning counter-clockwise. When the connector of the liquid oxygen ground charging hose is connected to the filler head, a probe integral with the hose connector depresses the valve drive shaft, thereby closing the build-up valve and opening the vent valve. Liquid oxygen passes into the valve under pressure, unseats the check valve and is discharged through the 90° elbow connection inscribed FILL. When the valve is connected to a converter assembly, a pipeline interconnects the FILL connection with a connection on the lower side of the container. A pipeline from the top of the container is connected to the 90° elbow connection inscribed GAS, and the gas within the container passes through the open vent valve to the vent connection on the relief valve assembly.

8. When the charging hose is disconnected, the valve drive shaft assumes its original position, hence the build-up valve opens and the vent valve closes. The relief valve is then incorporated in the pressure build-up circuit of the associated system.

INSTALLATION

9. If it is required to test the valve before installation, apply the standard serviceability tests (App. 1). The valve is to be installed in accordance with the instructions contained in the relevant aircraft air publication. When the valve is to be fitted to a converter package assembly, reference should be made to the appropriate chapter in Section 4.

10. Protective caps and covers must not be removed until immediately before making the connections, and it is particularly important to ensure that connections are clean and free of moisture before being connected.

WARNING . . .

Many materials, particularly oil and grease, are subject to spontaneous combustion when exposed to undiluted oxygen under pressure. Precautions must be taken, therefore, to exclude oil, grease, dust and metal particles from the valve.

SERVICING

11. Do not attempt to dismantle any part of the valve or to make adjustments to the relief valve setting. The relief valve adjusting screw is locked with a set screw after setting by the manufacturers, and the cavity above the set screw is filled with a sealing compound.

12. A valve suspected of being defective should be subjected to the standard serviceability tests (App. 1) and, if it fails the tests, should be disposed of in accordance with current Service procedure.

13. Immediately a valve is removed from an assembly or installation, protective caps (Part No. BMS.1170/A) must be fitted to the two 90° elbow connections and a protective cap (Part No. BMS.123/A) must be fitted to the 45° elbow connection. The protective cap assembly (Part No. OP.18861/1) must be fitted to the vent disconnect coupling and the cover assembly (Part No. OP.16924/1), must be connected to the filler head.

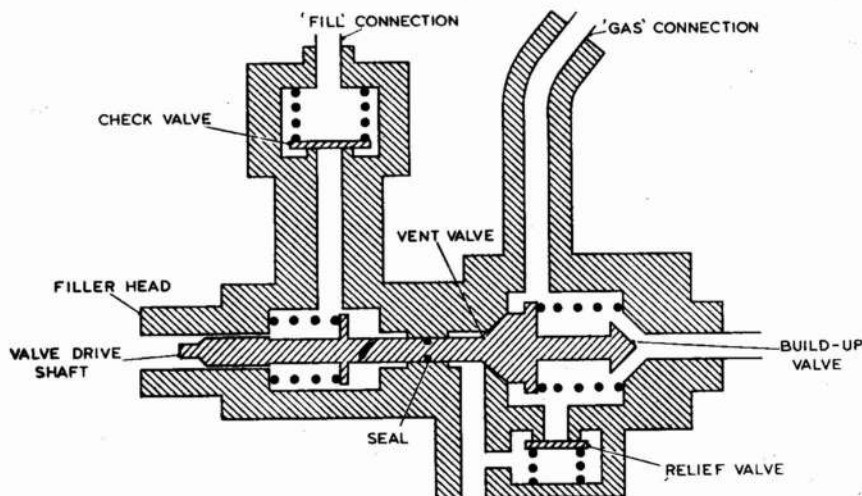


Fig. 3. Schematic diagram

Appendix 1

STANDARD SERVICEABILITY TESTS

for

COMBINED FILLER, BUILD-UP, VENT AND RELIEF VALVE

(Part No. OP.7290)

Introduction

1. The tests detailed in this appendix should be applied before the valve is connected to a converter system, when the serviceability of the valve is in doubt and at the appropriate examination periods at Equipment Depots.

Test equipment

2. The test equipment required is as follows:—
 - (1) Breathing oxygen test supply (250 lb/in²)
 - (2) Flowmeter, 25 to 500 cm³/min (Ref. No. 6C/3150)
 - (3) Pressure gauge, 0 to 250 lb/in² (Ref. No. 6C/263)
 - (4) Special adapter (Part No. TE.11230).

Particulars of tests

3. The tests are to be applied under normal room temperature (+15°C) and pressure (29.92 in. Hg) conditions. The gas used for the tests must be breathing oxygen, and soap solution for 'no leakage' tests must be prepared in accordance with the instructions contained in Part 1, Sect. 2, Chap. 1. Care must be taken to prevent the solution entering the unit, and the unit must be dried thoroughly after each test. All tests should be applied with the filler head of the valve horizontal.

WARNING . . .

Many materials, particularly oil and grease, are subject to spontaneous combustion when exposed to undiluted oxygen under pressure. Precautions must be taken therefore, to exclude oil, grease, dust and metal particles from the unit and the test equipment.

TEST PROCEDURE

Mechanical tests

4. Connect and remove the valve filler cap and, similarly, connect and remove the connector of a

liquid oxygen dispenser. The connecting and removal operations, in both instances, should be accomplished without undue effort.

Flow tests

5. Apply a low pressure (about 2.0 lb/in²) to the connection labelled BU. There should be a free flow of oxygen only from the connection labelled GAS.

6. Connect the special adapter (Part No. TE.11230) to the filler head and apply a low pressure (about 2.0 lb/in²) to the connection labelled GAS. There should be a free flow of oxygen only from the vent connection.

7. With the special adapter (Part No. TE.11230) connected to the filler head, apply a pressure of 3.0 lb/in² (approx) to the filler head. There should be a free flow of oxygen only from the FILL connection.

Check valve leak test

8. Connect the special adapter (Part No. TE.11230) to the filler head and interconnect the adapter with the 25 to 500 cm³/min flowmeter. Apply a pressure between 150 and 170 lb/in² to the FILL connection and measure the leakage from the filler head. The maximum permissible leakage is 50 cm³/min.

Relief valve tests

9. With the cover fitted to the filler head and BU connection blanked, connect the 25 to 500 cm³/min flowmeter to the vent connection and apply a pressure of 170 lb/in² to the GAS connection. The maximum permissible leakage from the vent connection is 200 cm³/min.

10. Remove the flowmeter and increase the pressure to 220 lb/in². The relief valve should vent freely.

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