PTM
international, inc.

# OIL TANK CAP SAFETY ADAPTER

## P/N PT8611A01

## COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST

**NOTE: This oil tank cap safety adapter is used on aircraft equipped with Pratt & Whitney JT8D-1, -1A, -1B, -7, -7A, -7B, -9, -9A, -11, -15, -15A, -17, -17A, -17R, -17AR, -209, -217, -217A, -217C and -219 engines.**

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**MAY 25/94**

## RECORD OF REVISIONS

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## RECORD OF TEMPORARY REVISIONS

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## SERVICE BULLETIN LIST

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## INTRODUCTION

This component Maintenance Manual fully describes the oil tank cap safety adapter assembly and the applicable procedures for testing, disassembly, renewal and repair, and reassembly. The technical staff at PTM International, Inc. will be pleased to advise on any questions regarding maintenance of the unit.

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## OIL FILLER AND VALVE

## DESCRIPTION AND OPERATION

1. Description

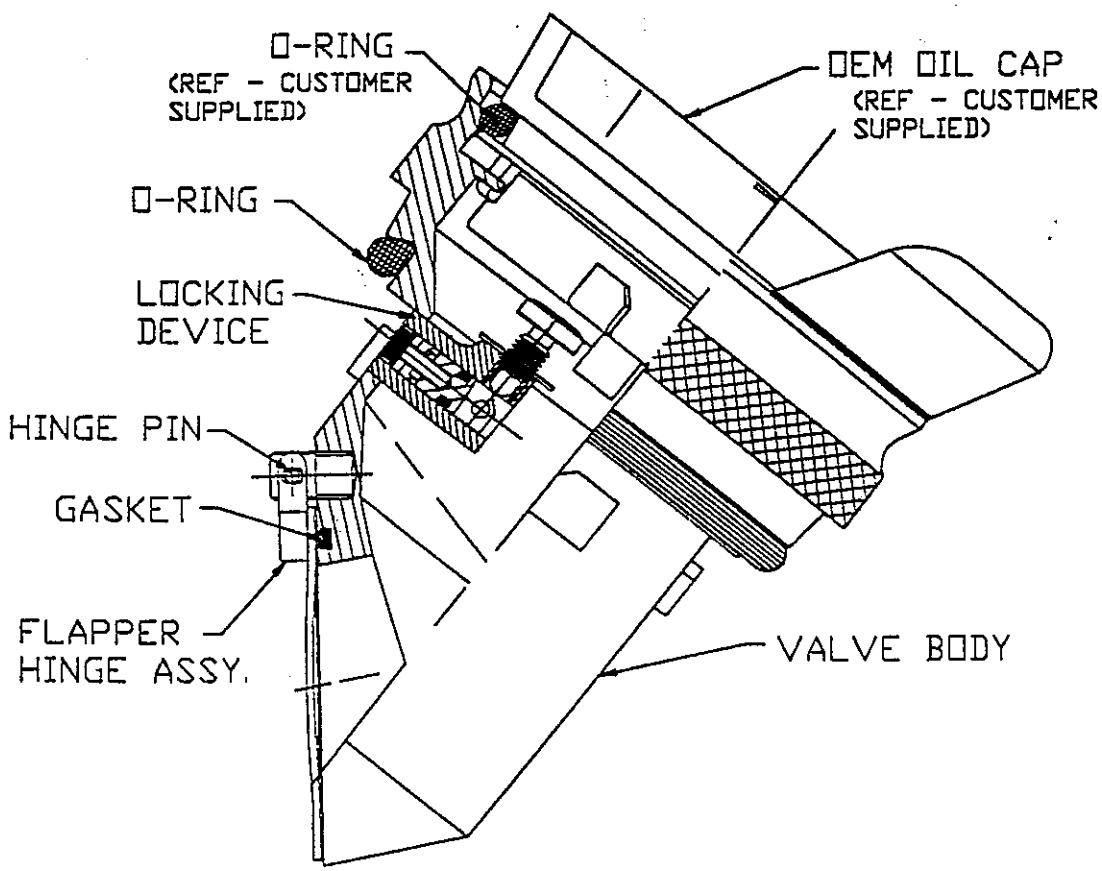
   A. The oil tank cap safety adapter prevents loss of engine oil when filler caps are improperly installed, are damaged, or are entirely missing. The unit is installed in the engine oil tank in place of the current filler cap, P/N 478843. No modifications of the engine are required; the unit is simply installed in the same manner as the cap and locked in place by a special locking mechanism. The original oil filler cap is inserted into the unit and locked in place in the usual manner.

   B. The unit is designed as a check valve formed by a gravity-actuated hinged flapper that seals against a flat-faced Viton rubber gasket which surrounds the oil fill passage. The flapper pivots on a wear resistant pin and is retained in a clevis on the stainless steel sleeve by welds at both ends of the pin. The gasket has a T-shaped cross section and fits into a groove machined into the body with a matching T-shaped cross section.

2. Operation

   A. Oil servicing of the engine is accomplished by removing the oil filler cap and adding oil as required. The flapper will open when oil is poured into the filler; however it will normally remain closed by the action of gravity. In instances when oil system pressure may not be totally relieved, the flapper may need an assist in opening by pushing against it with a screw driver or other suitable device.

   B. In instances when the oil cap is damaged or missing, the oil system pressure retains the flapper against the gasket. This provides a positive seal in any flight attitude, even when the flapper is not subject to gravity-aided closure.




Sectional View of Oil Tank Cap Safety Adapter
Figure 1

## TESTING

1. Test Equipment and Materials

   A. Equipment

      (1) Pressure test vessel. PTC P/N 91PT155.

      (2) Pressure gage 0-30 psi.

      (3) Oil cap. PWC P/N 478843.

      (4) Pressure regulator.

      (5) Copper tubing.

      (6) O-ring. MS9388-331.

   B. Materials

      (1) Turbine oil. Mobil Jet 254 or equivalent. One quart.

2. Test Procedure

   A. Flapper leak check (cap not installed)

      (1) Install MS9388-331 O-ring on unit.

      (2) Coat gasket and O-ring with Mobil Jet 254.

      (3) Assemble unit into 91PT155 pressure vessel of test rig without oil cap installed.

      (4) Add Mobil Jet 254 or equivalent through filler neck to level at least 1/4" above top of flapper. Tilt unit to close flapper. Apply 5 to 10 psig air pressure to hold flapper closed.

      (5) Remove any oil from above flapper using syringe and/or absorbent material.

      (6) Lower pressure to 2.5 psig.

      (7) Inspect for oil leaks through flapper. Limit is 1.0 cc per minute.

(8) Reduce pressure to zero.

(9) Open flapper using suitable device such as a 1/8" diameter 6-inch long rod and validate that oil level covered flapper.

(10) Remove unit from test rig.

(11) Remove MS9388-331 O-ring.

B. Oil cap leak check.

(1) Install MS9388-331 O-ring on unit.

(2) Coat O-ring with Mobil Jet 254.

(3) Insert device to prevent flapper closure. (suggest 1/16 diameter piece of wire positioned to hold flapper open while not interfering with cap).

(4) Install oil cap O-ring, if required (oil cap 478843). Coat O-ring with Mobil Jet 254.

(5) Install oil cap in oil filler unit.

(6) Assemble unit into 91PT155 pressure test rig.

(7) Immerse vessel in water bath. Assure water totally covers oil filler unit.

(8) Apply air pressure of 10 psig.

(9) Inspect for leaks, indicated by bubbles. None permitted for one minute hold.

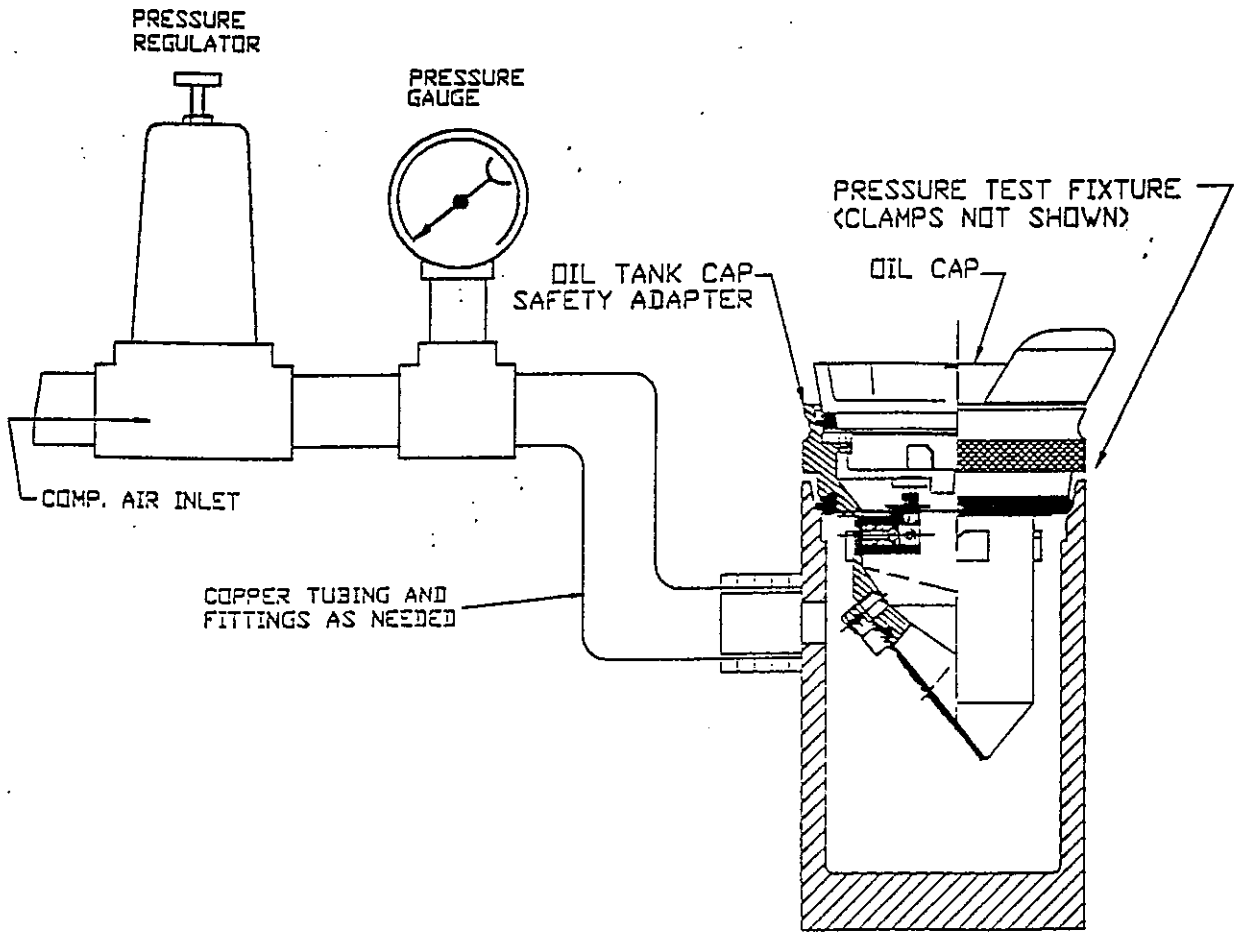
(10) Reduce pressure to zero.

(11) Remove unit from water bath.

(12) Remove cap.

(13) Remove flapper disabling device.

(14) Remove MS9388-331 O-ring.




Test Setup
Figure 2

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## DISASSEMBLY

1. General

A. The procedure to totally disassemble the unit is described below. Disassembly should only be conducted to the level necessary to correct test or check discrepancies or to comply with the user's component maintenance program.

B. Refer to the IPL for item numbers quoted in the following instructions.

2. Disassembly Procedure

A. Remove O-ring (10).

CAUTION: BE CAREFUL NOT TO DAMAGE RETENTION GROOVE IN REMOVING GASKET.

B. Remove gasket (20) by carefully prying out of its retention groove using a pointed tool. Discard removed gasket.

C. Flapper hinge assembly (40) removal from body (130):

CAUTION: WHEN REMOVING RETENTION WELDS, REMOVE MINIMUM MATERIAL. DO NOT REDUCE CLEVIS WIDTH EXCEPT SPECIFICALLY AT TACK WELD LOCATIONS.

1. Mill pin retention tack welds to .005 to .010 below surface on both sides of hinge clevis.

2. Drift out pin (30) using 1/16 diameter punch.

3. Remove flapper hinge assembly (40).

D. Lock Assembly Removal

1. Remove screw (50) and lock clip (60).

2. Remove tack weld retaining socket-head screw (70) to block (80) and remove screw and block.

3. Push plunger (90) and pin (110) through body being careful to catch compression springs (100).

4. Remove two compression springs (100) if they did not fall out during removal of plunger.

5. Remove pin (110) from plunger.

6. Remove O-ring (120) from plunger and discard.

## CLEANING

1. Cleaning Agents

   Stoddard Solvent mineral spirits. (Federal specification P-D-680) or equivalent.

2. Cleaning Procedure

   Note: The unit may be cleaned in the assembled condition or disassembled.

   Thoroughly clean all components in Stoddard Solvent mineral spirits.

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## CHECK

1. Check Procedure

   A. Visually check the body (130) screw (50), block (80) and plunger (90) for damage. In particular the spherical end of the screw and the tapered end of the plunger must be free of nicks and burrs. Minor external damage may be treated as detailed in Repair No. 1.

   B. Examine gasket for cuts or scores. Replace damaged gasket.

   C. Examine flapper sealing face for scores and scratch damage. Replace damaged flappers as detailed in Repair No. 2.

   D. Examine plunger O-ring (120) for cuts or scores. Replace damaged O-ring as detailed in Assembly.

   E. Determine degree of hinge pin wear as follows: Place flapper in closed position against gasket. Push and pull flapper toward and away from retaining lug. If movement is in excess of .035 in. the pin should be replaced by procedure noted in Repair No. 2.

   F. Check flapper to gasket sealing contact in a darkened room by shining a flash light parallel to the gasket/flapper interface. Replace distorted flappers as detailed in Repair No. 2.

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## REPAIR

I. Repair No. 1 - Repair of Minor Surface Corrosion or Wear

A. Materials

Grade 240 emery cloth.

B. Repair Procedure

1. Polish out slight external damage with grade 400 or finer emery cloth.

II. Repair No. 2 - Replacement of Flapper or Pin

A. Materials

18-8 SS Weld wire.

B. Repair Procedure

1. Remove flapper and pin as noted in Disassembly.

2. Remove gasket as noted in Disassembly and discard.

NOTE: Gasket must be removed, regardless of its condition. If it is not removed it will be damaged by the welding heat used for pin retention.

3. Install new flapper or new pin as noted in Assembly.

4. Install new gasket as noted in Assembly.

III. Repair No. 3 - REPLACEMENT OF PLUNGER O-RING

A. Materials:

None.

B. Repair Procedure:

1. Remove damaged O-ring.

2. Install new MS9388-006 O-ring on plunger shaft.

B. Repair Procedure: continued

3. Measure diameter of mating hole in body. (Reference .220 dia.)

4. Grind outside diameter of O-ring, while mounted on shaft, to provide a slip fit in the mating hole.

## ASSEMBLY (INCLUDING STORAGE)

1. Special Tools, Equipment and Material

| Item No. | Description | Remarks |
|---|---|---|
| 1. | ETO-25 | For lubricating gasket and O-ring before installation. |
| 2. | Test rig | For testing unit. |
| 3. | Oil Cap | For testing unit. |
| 4. | O-ring | For testing unit. |

2. General

A. Refer to Fig. 3 for the item numbers quoted in the following assembly procedure.

3. Assembly Procedure

A. Installing new flapper or new pin on sleeve.

(1) Clean the outside faces of the clevis on the flapper hinge assembly (40) where the pin retention weld will be made. Use 400 grit emery cloth or equivalent.

(2) Position flapper, hinge assembly (40) clevis to dovetail with lug on body (130).

(3) Insert pin (30) through hinge clevis and body lug holes. Position pin to be centered in clevis.

(4) Apply approximate 1/32 in. weld bead at both ends of hinge pin hole on clevis outside faces. Use gas tungsten arc per welding using 18-8 SS weld filler.

B. Installing Gasket in Body

(1) Coat gasket (20) and sleeve retention groove with ETO-25 or equivalent.

(2) Align gasket (20) over retention groove.

(3) Press ID of gasket (20) into groove by hand. Avoid force in circumferential direction.

(4) Press OD of gasket (20) into groove by progressively pressing around OD with a suitable tool such as a small screw driver modified to remove sharp corners at its tip.

(5) Check fit of flapper to gasket in a darkened room by shining a light beam parallel to the plane of the gasket face. Correct any gap by "wringing" gasket face against a flat smooth surface.

C. Installing Locking Mechanism

(1) Assemble new O-ring (120) to plunger (90) if O-ring requires replacement. Grind outside diameter of O-ring (120) to produce slip fit in locking device hole as described in Repair 3.

(2) Install pin (110) through hole in plunger. Center pin and orient flats to face interior of body.

(3) Insert two compression springs (100) into body locking device.

(4) Insert plunger (90) and pin (110) into body locking part from interior, threaded end inserted first. Assure flats on pin face interior of body.

(5) Insert block (80) into body locking port from exterior, small countersink first while restraining plunger (90) from being pushed into interior of body.

(6) Install socket-head cap screw (70) through block and engage and tighten into plunger (90).

(7) Weld socket-head cap screw (70) to block (80) with a small tungsten arc tack weld using 18-8 SS weld wire. Confine weld to small spot at socket OD. Avoid weld protrusion into hexagonal socket.

4. Storage After Assembly

A. Enclose the unit in a polyethylene bag and place in a suitable cardboard box.

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## SPECIAL TOOLS FIXTURES AND EQUIPMENT

1. The following table lists the special tools and equipment required for complete maintenance of the unit.

NOTE: Equivalent substitutes may be used for listed items.

| Tool Item No. | Tool Part No. | Description | Remarks |
|---|---|---|---|
| 1. | 091PT071 | Pressure Test Fixture | For leak testing flapper seal. |
| 2. | MS9388-331 | Pressure Vessel O-ring | For installation on unit during pressure testing. |
| 3. | Pratt & Whitney 478843 | Oil cap | For leak testing cap-to-unit interface. |
| 4. | MS9388-331 | Oil cap O-ring | For cap leak test. |

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# ILLUSTRATED PARTS LIST

## INTRODUCTION

1. Purpose

This section provides illustrations and parts breakdown of all parts of the assembly(ies) shown on the title page which can be disassembled, repaired or replaced and reassembled.

2. Explanation and Usage of Section

A. FIG. ITEM (Figure and Item Number) Column. Item numbers may be prefixed by a hyphen, be suffixed by a letter, or be a combination of both (-10, 10A, -10B). The hyphen prefix indicates that a part is not illustrated in the exploded view. The letter suffix is a variant that indicates an item is similar to the item preceding it.

B. PART NUMBER Column. This column lists PTC, vendor, and government standard part numbers. A series of letters in the column indicate nonprocurable subassemblies not having a part number. The last part listed in a series of similar parts is the most recent part.

C. AIRLINE PART NUMBER Column. This column is left blank for airline use.

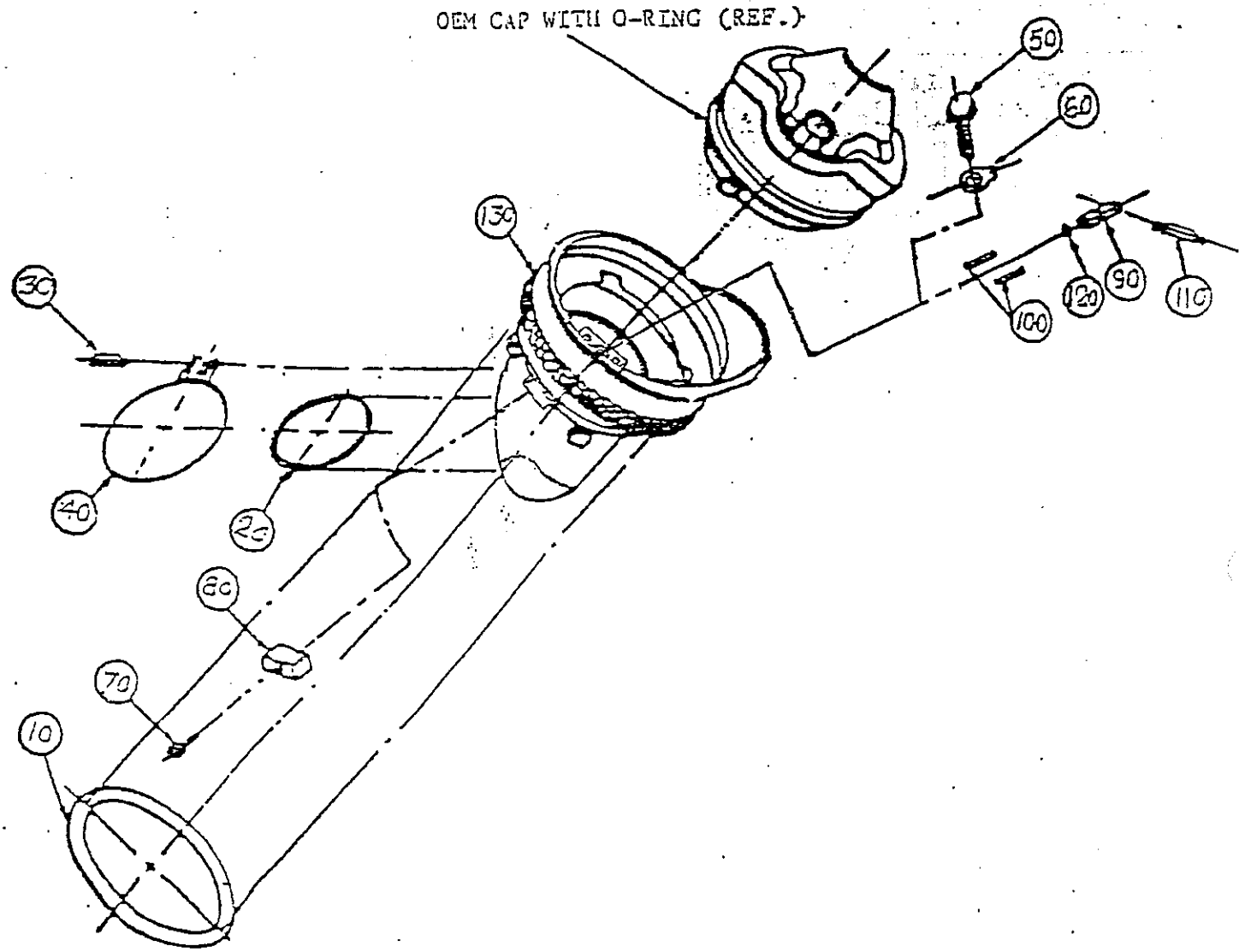
D. NOMENCLATURE Column. This column identifies items by the manufacturer's drawing nomenclature. Additional modifiers and/or dimensions may also be included. The vendor codes (five numbers or letters preceded by an uppercase V) or a service bulletin number (prefixed by the uppercase letters SB).

E. EFF CODE column. Reference letters (A, B, C, etc.) are assigned in the EFF CODE column to each top assembly. The reference letter of the applicable top assembly is also shown in the EFF CODE column for each detail part and subassembly except that no reference letter is shown for detail parts and subassemblies used on all top assemblies.

F. UNITS PER ASSEMBLY column. This column shows the total number of units required per assembly, per subassembly, and per subassembly as applicable. For bulk items, the letters AR indicate "as required". The letters RF indicate the item is listed for reference purposes.

## VENDOR CODES

| Vendor Code | Vendor Name and Address |
|---|---|
| 77445 | Pratt and Whitney Canada<br>1000, Marie-Victorin<br>Longueuil, Quebec Canada J4G1A1 |
| 74197 | Associated Spring<br>18 Main Street<br>Bristol, CT 06010 |




Oil Tank Cap Safety Adapter
Figure 1 - IPL

| FIG. ITEM | PART NUMBER | AIRLINE PART NO. | NOMENCLATURE | EFF CODE | UNIT PER ASSY |
|---|---|---|---|---|---|
| 1 | PT8611A01 | | Oil Tank Cap Safety Adapter | | 1 |
| 10 | MS9388-331 | | O-Ring | | 1 |
| 20 | PT8611-16 | | Gasket | | 1 |
| 30 | PT8611-15 | | Hinge Pin | | 1 |
| 40 | PT8611-5 | | Flapper Hinge Assy. | | 1 |
| 50 | PT8611-9 | | Screw | | 1 |
| 60 | PT8611-20 | | Lock Clip | | 1 |
| 70 | MS1699S-1 | | Socket-head Screw | | 1 |
| 80 | PT8611-8 | | Block | | 1 |
| 90 | PT8611-11 | | Plunger | | 1 |
| 100 | C0088-012-0620M | | Compression Spring | | 2 |
| 110 | PT8611-12 | | Plunger Pin | | 1 |
| 120 | MS9388-006 (modified) | | O-Ring | | 1 |
| 130 | PT8611-1 | | Valve Body | | 1 |

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