



Essex Industries, Inc.
COMPONENT MAINTENANCE MANUAL

**TO: HOLDERS OF SUMP CHECK VALVE P/N 0130010300-1 & -7
OVERHAUL MANUAL**

REVISION NO. 2 DATED MAY 24/82

HIGHLIGHTS

Pages which have been revised are outlined below together with the highlights of the revision. Please delete the affected pages and enter Revision No. 2 dated May 24/82 to the Record of Revision Sheet.

Chapter/Section/Page	Description of Change	Effectivity
28-13-04 Cover Sheet	Revised to add Part No. 0130010300-9 & -11.	All Models
28-13-04 List of Effective Pages	Revised to indicate revised pages.	All Models
28-13-04 Pages 1 thru 11	Revised text figures and IPB as required to add 0130010300-9 & -11 valve coverage.	All Models

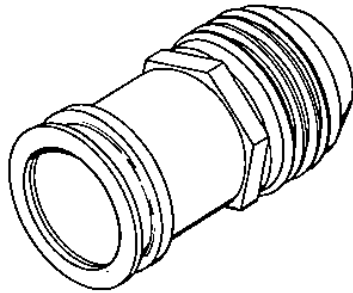


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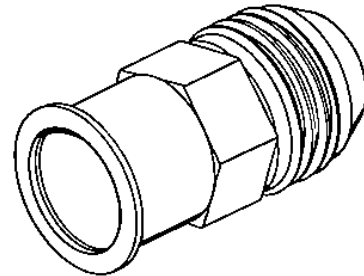
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SUMP CHECK VALVE

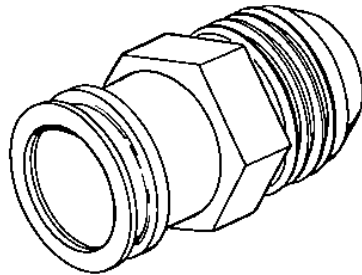
Part Number 0130010300-1, 0130010300-7
0130010300-9 & 0130010300-11



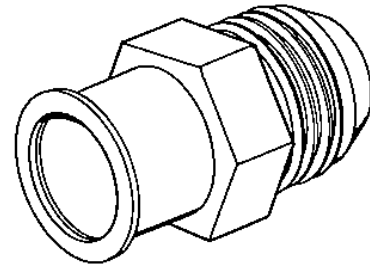
0130010300-1



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0130010300-9



0130010300-11

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LIST OF EFFECTIVE PAGES

PAGE	DATE
Title Page	May 24/82
List of Effective Pages	May 24/82
Record of Revisions	May 24/82
Record of Temporary Revisions	May 24/82
Service Bulletin List	May 24/82
Table of Contents	May 24/82
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SERVICE BULLETIN LIST

Service Bulletin	Incorp.	Service Bulletin	Incorp.



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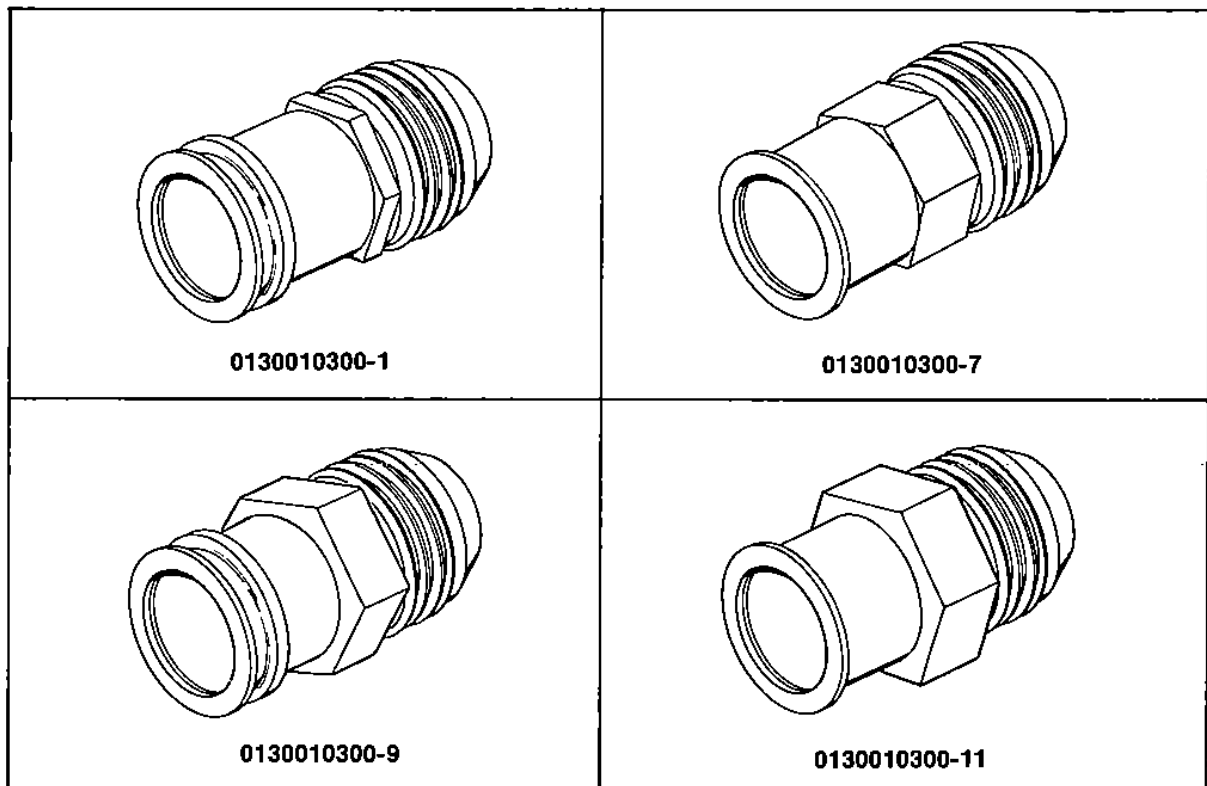


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1. Description and Operation.

A. Physical Description (See figure 9.)

- (1) Sump Check Valves, part numbers 0130010300-1, 0130010300-7, 0130010300-9 and 0130010300-11 are poppet type check valves identical in construction except for outlet port configuration. The 0130010300-1 and 0130010300-9 outlet are per GAMA JT175-075 and the 0130010300-7 and 0130010300-11 outlet are per WIGGINS WS190-12. (See figure 1.)
- (2) The Sump Check Valve consists of five parts: a body, (6, 6A, 6B or 6C figure 9) poppet and seat assembly (5), spring (4), guide (3) and retaining ring (2).
- (3) The valve body (6, 6A, 6B or 6C) contains an internal seat for the poppet valve and an external tapered seat at the inlet end. The outlet end of the body (6, figure 9) has an internal groove for the spiral retaining ring (2), to secure internal parts. External threads are located near the inlet end, with a 7/8-inch hex (across flats) just aft of the threaded area.
- (4) The poppet and seat assembly (5) is held on its seat in the body (6) by the spring (4). An extension of the poppet slides in the bore of spring guide (3) to maintain poppet alignment.



**Sump Check Valve
Figure 1**

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B. Operation

- (1) The valve is a normally-closed check valve which permits sump fuel to flow in only one direction, thus preventing reverse flow.
- (2) The poppet (5, figure 9) is opened by the pressure of fuel against the poppet through the 1/2-inch diameter opening at the inlet end of the valve, when fuel pressure overcomes the force of the spring (4).

C. Leading Particulars

Figure 2 lists principal capabilities and characteristics of the check valve.

Fluids	
Operating	Turbine fuel JP-4, per MIL-T-5624G. Commercial turbine fuel, per ASTM-D1655. Fuels A or B with BIOBOR-JF additives of 270 PPM. Aviation gasoline with up to 30% aromatics.
Test Fluid	Stoddard Solvent, per Federal Spec. P-D-680.
Ambient Temperature	-65° F to +160° F
Altitude	-1000 to 42,000 ft.
Shock	10G - 15G (any direction)
Rated Flow	10 gpm
Cracking Pressure (1/2 of 1% of rated flow)	0.7 psi, (Diff.) max.
Pressure Drop (at rated flow)	2.0 psi, max.
Leakage (@/2.0 psig, applied in check direction)	1.0 cc/min.-max.
System Pressure	0 to 60 psig
Normal Operating System Pressure ..	22 - 30 psig

Leading Particulars
Figure 2 (Sheet 1 of 2)

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Proof Pressure	330 psig
Burst Pressure	500 psig
Dimensions	
Length	2.0 in.
Diameter (max., across threads)	1.062
Inlet Fitting	Per MS33656-12 (except for internal configuration)
Weight	0.08 pounds (0130010300-1 and 0130010300-7) 0.102 pounds (0130010300-9) 0.098 pounds (0130010300-11)

NOTE: 0130010300-1 Serial Nos. 101 and up manufactured by Essex Industries, Inc., St. Louis, Missouri. Prior units manufactured by Harris Manufacturing Company, Inc., St. Louis, Missouri. All items are interchangeable. All valves are now manufactured by Essex Industries, Inc., St. Louis, Missouri.

Leading Particulars
Figure 2 (Sheet 2 of 2)

2. Disassembly (See figure 9.)

NOTE: See Testing, for operational test and trouble shooting to establish the condition of unit or most probable cause of malfunction. This is to determine the extent of disassembly required without completely tearing down and rebuilding the unit. If unit checks OK, return unit to service.

- A. Remove the spiral retaining ring (2, figure 9) from groove in outlet end of body (6). This is easily accomplished by inserting a small screwdriver blade, pocket-knife blade, or other sharp object, carefully under tapered end of the ring and prying it out of the groove. As soon as the end of the ring emerges, slide the screwdriver (or removing tool) around the ring until it is free of the groove.

CAUTION: EXERCISE CARE TO AVOID NICKING THE BODY (6) OR RETAINING RING GROOVE.

- B. Hold the body (6) in one hand and allow internal parts to slide out into the other hand.

3. Cleaning (See figure 9.)

- A. Remove and discard the O-ring seal from the external groove at the outlet end of the body.
- B. Immerse all parts in clean Stoddard Solvent (Specification P-D-680) and, with a small, medium bristle brush, wash parts thoroughly.

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C. Dry the parts with filtered, compressed air.

CAUTION: EXERCISE CARE DURING CLEANING AND HANDLING PARTS TO AVOID DAMAGE TO THE SEATING AREA OF THE POPPET ASSEMBLY (5, FIGURE 9). ANY INDENTATIONS OR SCRATCHES AT THE SEATING AREA WOULD BE REASON FOR REJECTION OF THE ASSEMBLY.

NOTE: Equivalent substitutes may be used for listed items.

Stoddard Solvent	Federal Spec. P-D-680
Mozel 18 solvent	Mozel Chemical Co., St. Louis, Mo.

**Cleaning Materials
Figure 3**

4. Check (See figure 9.)

A. When checking the Sump Check Valve, it should be remembered that only three basic modes of failure are likely to occur.

These are as follows:

- (1) The poppet and seat assembly (5, figure 9) could jam in the closed position.
- (2) The poppet and seat assembly (5) might not return to the closed position.
- (3) The poppet and seat assembly (5) might leak although it appears to be closed.

B. Check the valve as follows:

- (1) Check for foreign material trapped inside the unit.
- (2) Check all parts for mechanical damage. Make sure the body (6, figure 9) is free of dents or distortion.
- (3) Visually check the spring (4) for distortion, collapse and breaks. If the spring appears to be in good condition, it can be re-used as it will receive a final test during the performance tests of the complete check valve assembly.
- (4) Examine the poppet and seat assembly (5) for scratches or nicks on the seating surface. Check for a groove in the seating area. Either of these conditions will require replacement of the poppet and seat assembly (5).
- (5) Check the poppet and seat assembly (5) for dents or other mechanical damage. Replace if damaged.
- (6) Check the spring guide (3) for nicks or any form of mechanical damage. Replace if damaged.

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5. Repair

- A. Repairs consist of replacement of damaged or worn parts.
- B. Always install a new O-ring in the external groove of the body (6, figure 9) when installing the check valve assembly.

6. Assembly (See figure 9.)

NOTE: Prepare a clean area on the assembly bench and cover the surface with a clean shop towel.

- A. Place the body (6, figure 9) in a vertical position, with the inlet (threaded) end down.
- B. Insert the poppet and seat assembly (5) into the body (6), with seat tip downward.
- C. Place the spring (4) in the body (6), making sure that the spring fits around the outside of the poppet and seat assembly (5) without interference.
- D. Position the spring guide (3) with the chamfered end up and insert it into the spring (4) and body (6).
- E. Push the guide (3) down flush with the outlet end of body (6), raise the assembly from the bench and push inward on the seating (Teflon) tip of the poppet (5). The poppet should not bind and should return to the seat each time it is released.
- F. Install the retainer ring (2) in the groove of the body (6). Make sure it is fully seated in the groove.

7. Fits and Clearances — Not applicable.

8. Testing (Operational Test and Trouble Shooting)

- A. Equipment and Materials for Testing.

NOTE: Equivalent substitutes may be used for listed items.

Equipment/Materials	Description
Test Chamber and water tank (See figure 5.)	Capable of submerging the check valve in clean water with provisions for sealing the outlet port and connecting the inlet port to a controlled air pressure source.
Air Pressure source	Regulated, filtered air supply capable of supplying a pressure up to 350 psig.

Test Equipment and Materials
Figure 4 (Sheet 1 of 2)

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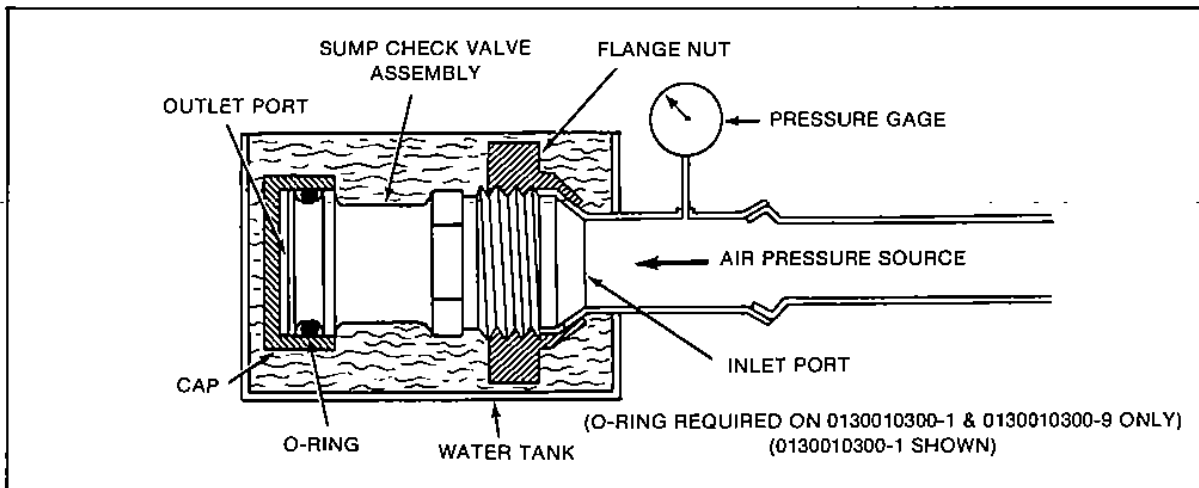
Equipment/Materials	Description
Valves	As required to control the sources of air and test fluid.
Gages	A pressure gage to read in excess of 350 psig. A low reading gage (0 to 5 or 10 psig). A water manometer.
Test Fluid	Stoddard Solvent (Spec. P-D-680). JP-4 fuel, per Spec. MIL-T-5624 may be used as test fluid instead of Stoddard solvent.
Graduate	A graduate calibrated in cubic centimeters for measuring fluid leakage.
Waste Container	To catch waste fluid during pressure cracking tests.

Test Equipment and Materials
Figure 4 (Sheet 2 of 2)

Perform verification tests of the check valve as follows:

B. Proof and External Leakage Test. (See figure 5.)

- (1) Install an O-ring, of the same part number as used in mounting the check valve, in the groove at the outlet end of valve assembly.
- (2) Cap the outlet port with a cap that will slide over the O-ring and withstand the test pressure. (See figure 5.)



Test Hookup — External Pressure and Leakage
Figure 5

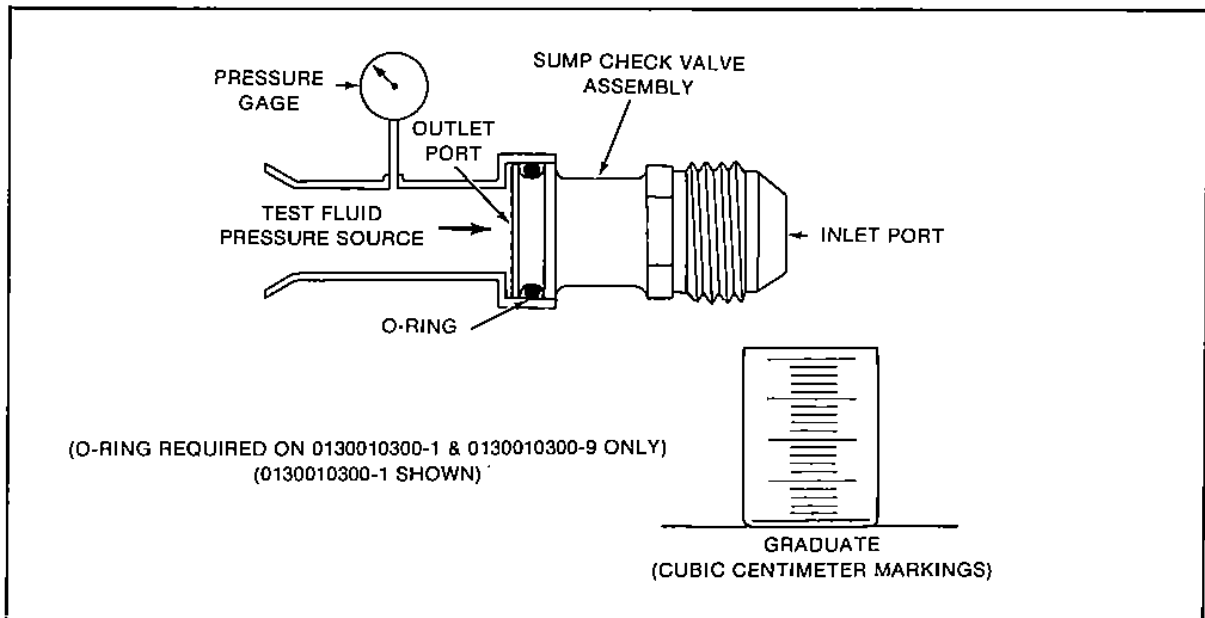
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- (3) Install the Sump Check Valve in a test fixture constructed as shown in figure 5. Fill the reservoir with clean water.
- (4) Apply an air pressure of between 330 and 345 psig to the inlet port for one minute (minimum). There shall be no distortion of the valve body nor external leakage.



Test Hookup — Internal Pressure & Leakage
Figure 6

- (5) If the body (6, figure 9) is visibly distorted during this test, or if leakage occurs (observed by air bubbles) valve must be repaired or replaced.

C. Internal Leakage Test (See figure 6.)

- (1) Insert the outlet end of the check valve into a tube that will seal on the O-ring as shown in figure 6. Use a graduate calibrated in cubic centimeters to catch any fluid that escapes from the inlet end of the valve.
- (2) With inlet port open and graduate in position to catch any fluid that might leak from the valve, apply a fluid pressure (Stoddard solvent, Specification P-D-680 or JP-4 fuel) of 2.0 ± 0.1 psig at the outlet port of the check valve. Cycle the test fluid pressure from zero (closed) to 2.0 psig (open) six cycles (minimum).
- (3) With fluid pressure of 2.0 ± 0.1 psig applied steadily at outlet port, allow it to remain for two minutes (minimum). Leakage at the inlet port during this test shall not exceed 1.0 cc/min.
- (4) Notate the actual leakage during the preceding test.

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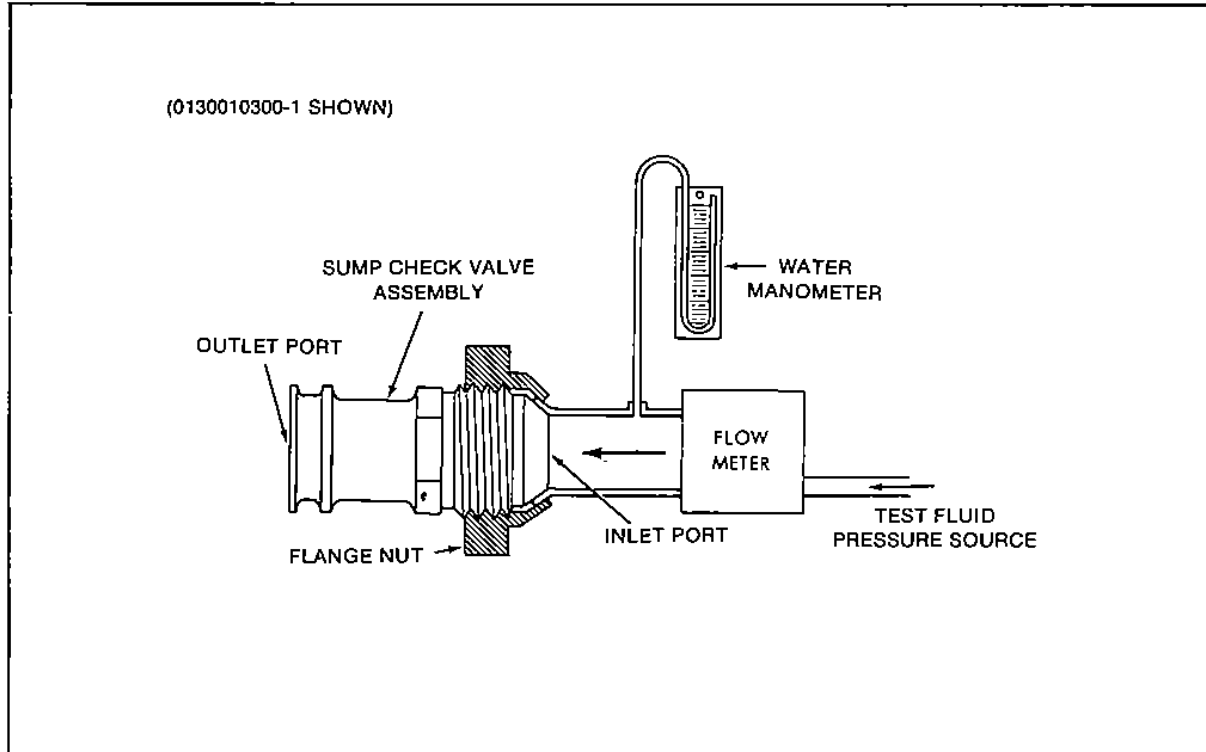
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D. Cracking and Reseat Pressure Test. (See figure 7.)

NOTE: Make sure this test is performed with the check valve mounted horizontally, as shown in figure 7. Leave the outlet port open. Catch waste fluid in a container.



Cracking and Reseat Pressure Test
Figure 7

- (1) Mount the check valve in a test hookup similar to the diagram in figure 7. Make sure the inlet port is sealed in the tube between the flowmeter and check valve.
 - (2) Apply a fluid pressure (Stoddard Solvent, or JP-4 fuel) slowly to the inlet port of the check valve until the fluid flow is between 190 and 195 cc/min., as registered on the flowmeter. The inlet pressure, as shown on the manometer shall not exceed 0.7 psig (19.4 inches of water). Notate the actual pressure, with the flow steady at between 190 — 195 cc/min.
 - (3) Increase the fluid flow to 220 cc/min. (minimum) then decrease the flow slowly until it reaches 30 cc/min. The pressure at which 30 cc/min. is observed shall be 0.7 psig (19.4 inches of water) maximum. The minimum reseat pressure shall be zero psig. Notate the actual reseat pressure.
- E. If the check valve passes successfully the leakage tests outlined in sub-paragraphs B, C and D, it may be used immediately or prepared for storage as outlined in the Storage section. If the valve fails any one (or more) of these tests, disassemble the unit and replace any part that inspection reveals to be defective. Reassemble the unit and perform all tests again outlined in the Testing Section.

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Malfunction	Probable Cause	Corrective Action
Check valve jams in closed position.	Foreign material trapped inside the valve.	Disassemble and clean the valve.
	Mechanical damage (Internal or external)	Replace damaged parts.
Failure of poppet to close.	Broken spring (4)	Replace the spring (4).
	Mechanical damage to poppet (5).	Replace the poppet and seat assembly (5).
	Mechanical damage inside body (6).	Replace the body (6).
	Nicks on guide, or distorted guide (3).	Replace the spring guide (3).
Check valve leaks.	Distorted spring (4).	Replace the spring (4).
	Mechanical damage to poppet (5).	Replace poppet and seat assembly (5).
	Mechanical damage to seat in body (6).	Replace the body (6).
	Foreign material trapped in body (6) or on seat (5).	Disassemble and clean the check valve thoroughly.

Trouble Shooting
Figure 8

9. Trouble Shooting

NOTE: See Testing for Operational Test and Trouble Shooting.

10. Storage Instructions

A. Unless the check valve is scheduled for immediate installation, it shall be preserved immediately after testing as follows:

- (1) Flush interior of check valve with engine corrosion preventive compound, Specification MIL-C-6529, type III.
- (2) Protect inlet and outlet port openings with polyethylene bags, Specification MIL-B-22205, Type III. Secure the bags to the check valve with two to three turns of cloth-backed, waterproof adhesive tape, Specification PPP-T-0060C, Type III, Class 1.

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B. Package the Check Valve as follows:

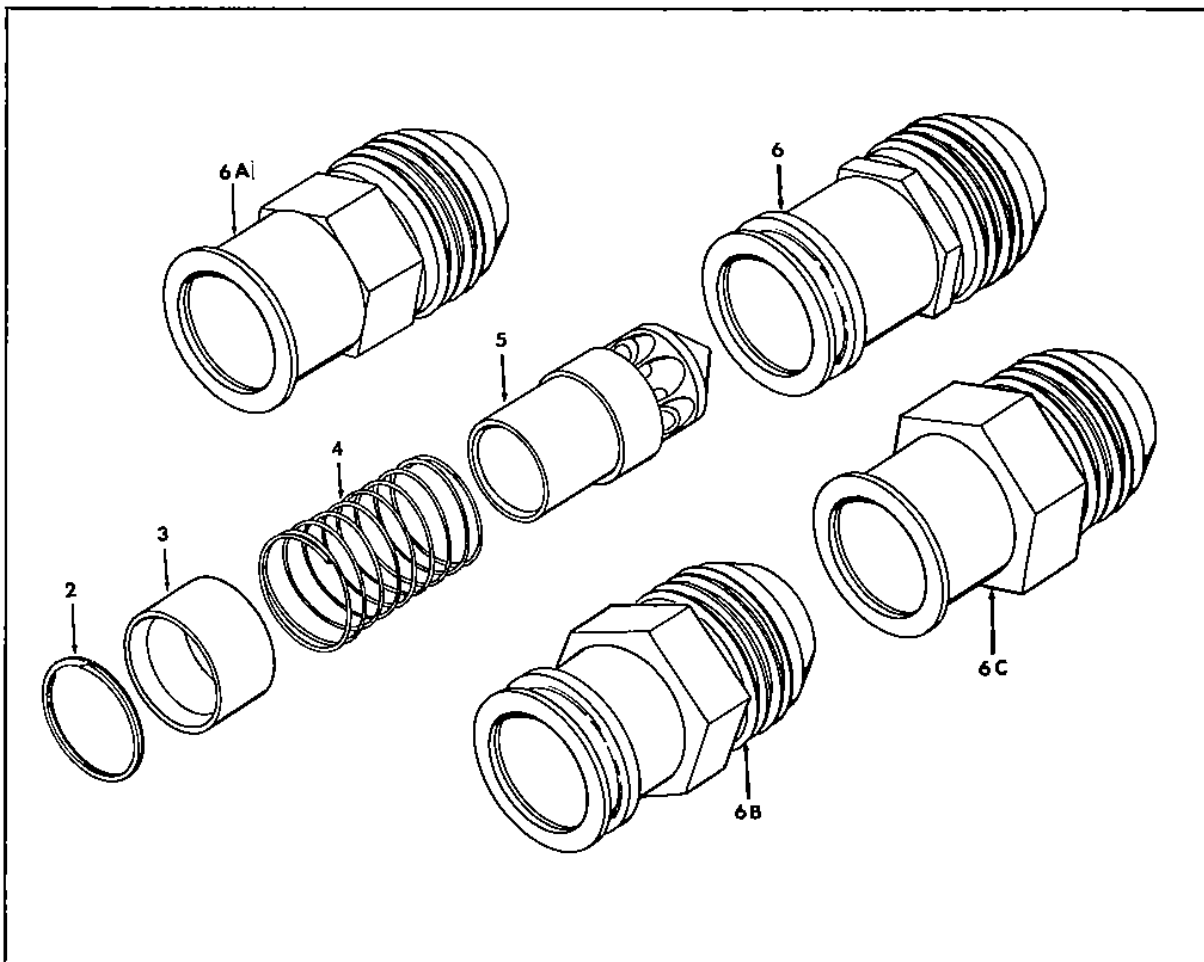
- (1) Wrap the preserved check valve by heat sealing it in moisture-vaporproof, Kraft foil, barrier bags, Specifications MIL-B-117, Type II, Class E.
- (2) Pack protected units in individual boxes or padded cartons, as further protection for storage and handling.

C. Storage

- (1) Keep check valves in original cartons until ready for installation.
- (2) Store units indoors, protected from extremes of temperature and moisture.

11. Special Tools, Fixtures and Equipment — Not applicable.

12. Illustrated Parts List



Sump Check Valve
Figure 9

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Fig.	Item	Part Number	1 2 3 4 5 6 7 Nomenclature	Effect Code	Units Per Assy.
9	-1	0130010300-1	Valve - Sump Check	A	RF
		0130010300-7	Valve - Sump Check	B	RF
		0130010300-9	Valve - Sump Check	C	RF
		0130010300-11	Valve - Sump Check	D	RF
	2	RR71S	Ring, Retaining (Ramsey Corp.)		1
	3	0130010304-1	Guide, Spring		1
	4	0130010308-1	Spring, Compression		1
	5	01300103B1-1	Poppet and Seat Assy.		1
	6	0130010301-1	Body, Valve	A	1
	6A	0130010301-3	Body, Valve	B	1
	6B	0130010301-5	Body, Valve	C	1
	6C	0130010301-7	Body, Valve	D	1
	Items Not Illustrated				

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