



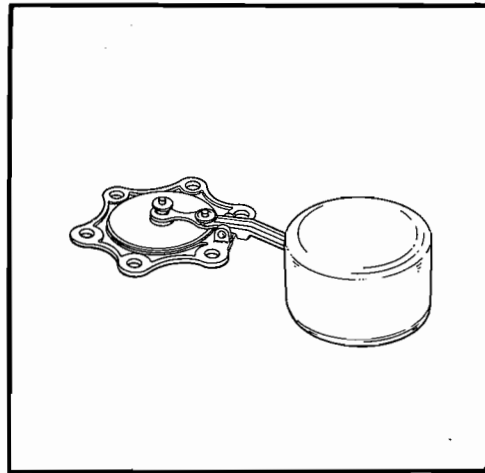
ESSEX CRYOGENICS INDUSTRIES

8213 GRAVOIS AVE.
ST. LOUIS, MISSOURI 63123

OVERHAUL MANUAL

FUEL CLIMB VENT VALVE

Part Number 0800010100-5



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Dec 15/70



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Overhaul Manual
P/N 0800010100

LIST OF EFFECTIVE PAGES

<u>PAGE</u>	<u>DATE</u>
Title Page	Dec 15/70
List of Effective Pages	Dec 15/70
Record of Revisions	Dec 15/70
Record of Temporary Revisions	Dec 15/70
Service Bulletin List	Dec 15/70
Table of Contents	Dec 15/70
1 Thru 12	Dec 15/70



ESSEX CRYOGENICS INDUSTRIES

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Overhaul Manual
P/N 0800010100

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8213 GRAVOIS AVE.
ST. LOUIS, MISSOURI 63123

**Overhaul Manual
P/N 0800010100**

TABLE OF CONTENTS

	Page
1. Description and Operation	1
2. Disassembly	4
3. Cleaning	5
4. Inspection	5
5. Repair	6
6. Assembly	7
7. Fits and Clearance (Not applicable)	7
8. Testing	7
9. Trouble Shooting	10
10. Storage Instructions	11
11. Special Tools, Fixtures and Equipment (Not applicable)	11
12. Illustrated Parts List	12

28-12-01

Table of Contents

Dec 15/70



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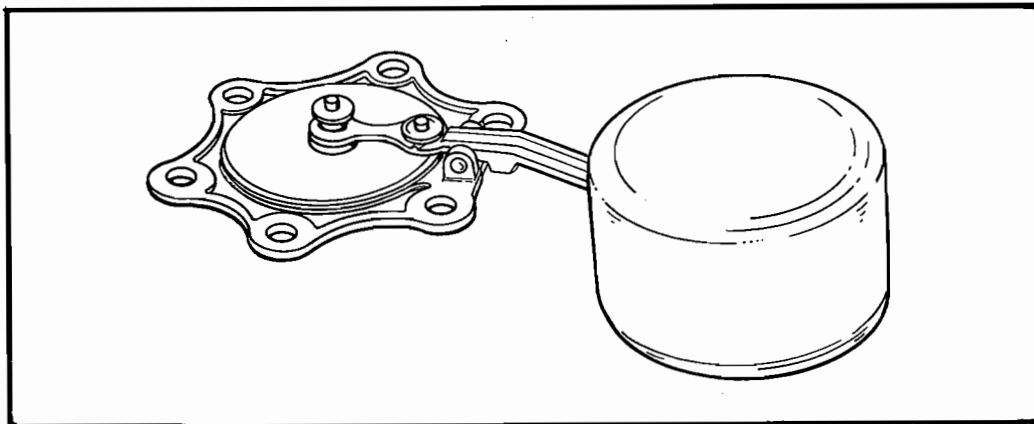
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Overhaul Manual
P/N 0800010100

1. Description and Operation

A. Physical Description

- (1) The Fuel Climb Vent Valve is a simple, float-operated valve designed to supply an air vent for the wing fuel tanks.
- (2) The valve consists of four basic parts, or assemblies, as follows:
 - (a) Door and float assembly (4, figure 8).
 - (b) Mounting flange (5, figure 8).
 - (c) Pin (2, figure 8) with split end — for attaching float arm to flange. (5)
 - (d) Flat washer (3, figure 8).
- (3) The valve door is attached to the float lever so that when the float drops only a short distance the edge of the door will be tilted a small amount to permit venting. Knife-edge contact between the arm and a flat washer attached through a spacer to the door provides sensitivity of operation. Whenever the float drops to the extent of its travel, the end of the lever lifts the door at the center and raises it to an angle of approximately 30-degrees.
- (4) A rubber ring is cemented in a groove near the outer edge of the door to provide an effective seal against the flange when the door is closed.



Fuel Climb Vent Valve
Figure 1



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8213 GRAVOIS AVE.
ST. LOUIS, MISSOURI 63123

Overhaul Manual
P/N 0800010100

B. Operation

- (1) The Fuel Climb Vent Valve incorporates controlled capabilities for opening against an over-pressure on the top side of the door.
- (2) Under conditions of low pressure loading (0.30 psid minimum) exerted against the top side of the door, and the float above the fuel level in the tank, the door will be tipped slightly and will allow excess air to be removed from the fuel tank.
- (3) As the fuel level in the tank increases, due to transfer from other tanks, the door will be forced to a closed position and form a leak-proof seal.

C. Leading Particulars

Figure 2 lists principal capabilities and characteristics of the 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
	Hard water
	Air

Leading Particulars
Figure 2 (Sheet 1 of 2)

28-12-01

Page 2
Dec 15/70

**ESSEX CRYOGENICS INDUSTRIES**8213 GRAVOIS AVE.
ST. LOUIS, MISSOURI 63123**Overhaul Manual
P/N 080010100**

Ambient temperature	-65° F to +160° F
Shock	15G (any direction)
System pressure	0 to 3.0 psig
Proof pressure	20.0 psig
Burst pressure	50.0 psig
Leakage (max., valve submerged)	10 drops per minute at 3 psig
Pressure drop (w/10.0 pounds/min. air flow, at 17.8 psia, 70° F)	2.1 in. JP-5 (max.)
Altitude	-1,000 ft. to 50,000 ft.
Mounting Altitude	Horizontal, w/airplane in level flight (approx.) and float toward centerline of aircraft.
Cracking pressure (w/pressure acting on top of door & fuel level below float)	0.30 psi (diff.) minimum
Dimensions	
Length	8.8 in.
Width	4.5 in.
Height	2.2 in.
Weight	0.36 lbs.

NOTE: ITEM Serial Numbers 201 and up manufactured by Essex Cryogenics Industries, Inc., St. Louis, Missouri. Prior units manufactured by Harris Manufacturing Co., Inc., St. Louis, Missouri. All items are interchangeable.

Leading Particulars
Figure 2 (Sheet 2 of 2)

28-12-01
Page 3
Dec 15/70



ESSEX CRYOGENICS INDUSTRIES

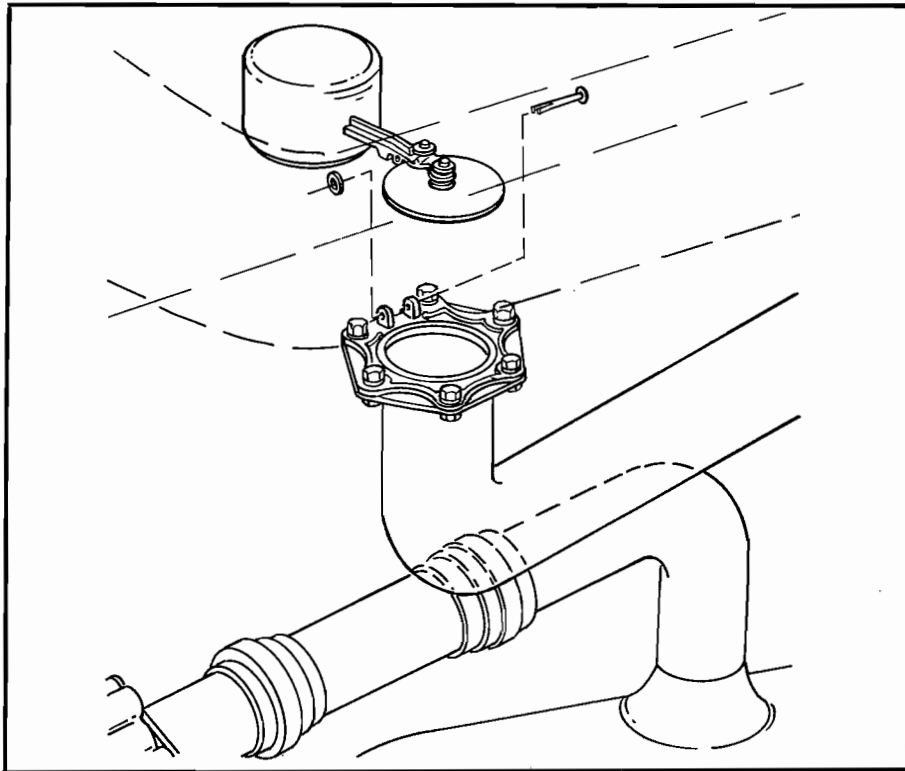
8213 GRAVOIS AVE.
ST. LOUIS, MISSOURI 63123

Overhaul Manual
P/N 0800010100

2. Disassembly (See figure 3.)

NOTE: Removal of the Fuel Climb Vent Valve mounting flange (5, figure 8) is not necessary. Therefore, it is recommended that the flange (5) be left attached unless visual inspection reveals some form of damage.

- A. Provide access to the vent valve to be removed (depending upon the valve location).
- B. With small pliers, squeeze the spread ends of pin (2, figure 8) together and hold the flat washer (3) and door and float assembly (4) to keep them from falling into the fuel tank and withdraw the pin (2). (See figure 3.)
- C. Remove the door and float assembly (4, figure 8).



Method of Removing Door and Float Assembly,
Leaving the Mounting Flange Attached
Figure 3

28-12-01

Page 4

Dec 15/70



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8213 GRAVOIS AVE.
ST. LOUIS, MISSOURI 63123

Overhaul Manual
P/N 0800010100

3. Cleaning

- A. Immerse the door and float assembly (4, figure 8) in any one of the cleaning solvents listed in figure 4 and agitate the assembly until clean.
- B. Dry the door and float assembly (4, figure 8) with filtered compressed air.

Stoddard Solvent	Spec. P-D-680
Jet Fuel	Spec. MIL-T-5624G
Gasoline	Commercially available

Cleaning Materials
Figure 4

4. Inspection

- A. When inspecting any part of the Fuel Climb Vent Valve, it should be remembered that only two basic modes of failure are possible. They are as follows:
 - (1) The valve will not close to stop venting the fuel tank.
 - (2) The valve will not open to vent the tank.
- B. Inspect the valve as follows:
 - (1) Inspect the passage between the lugs of the flange (5, figure 8) to which the float arm (4) is attached. There should be no foreign material in this area. Also examine the sealing surface of flange (5) and door (4) for foreign material. Any foreign material in these areas would prevent the valve from closing fully.

28-12-01

Page 5
Dec 15/70



ESSEX CRYOGENICS INDUSTRIES

8213 GRAVOIS AVE.
ST. LOUIS, MISSOURI 63123

Overhaul Manual P/N 080010100

- (2) Inspect the door and float assembly (4, figure 8) visually for bent, broken or damaged parts. Give particular attention to the following:
 - (a) Check for loose rivets in the door, and any binding at the location of the two rivets. If either of the flat washers, under swaged ends of rivets can be moved by hand, replace the door and float assembly (4, figure 8).
 - (b) Inspect the seal for chipped seal surface or if any portion of seal is loose in the door. Replace the door and float assembly (4) if either of these conditions is present.
 - (c) Inspect the float visually for any indication of fuel-soaked condition. If the surface of the float is damaged, with discoloration of the float in the area of the damage, it indicates that leakage has occurred. Replace the door and float assembly (4).
- (3) Inspect the flange (5, figure 8) which was not removed, for warpage, wear in pin holes, or any visual form of damage. It is unlikely that the flange would require replacement. Any damage that would make replacement necessary, or wear in pin holes, would be easily detected by visual inspection.
- (4) Perform a further inspection of the door seal by pressing it lightly against a piece of flat ground glass and checking for continuous contact. If contact is not continuous, replace the door and float assembly (4).
- (5) Support the door and float assembly (4, figure 8) at the bearing (pin) hole and float the assembly in water. At least 1.30 inches of the float should be exposed. If the float sinks deeper than this dimension in the water, replace the door and float assembly (4).

5. Repair

- A. Repairs consist of replacement of parts or assemblies.
- B. Always replace the pin (2, figure 8) when re-installing door and float assembly (4).

28-12-01

Page 6
Dec 15/70



ESSEX CRYOGENICS INDUSTRIES

8213 GRAVOIS AVE.
ST. LOUIS, MISSOURI 63123

**Overhaul Manual
P/N 0800010100**

6. Assembly

A. Attach the door and float assembly (4, figure 8) to the flange (5) as follows: (See also figure 3.)

(1) Place the door and float assembly (4, figure 8) carefully in position on the flange (5) and insert a new pin (2). Place the flat washer (3) on the pin at the split end.

(2) Using a small screwdriver inserted in pin slot, spread ends of pin (2) equally until ends are spread to a width of 0.30 inch.

B. Move the arm from full open to closed position to make sure no binding occurs in any position.

C. Close the opening used to provide access to the valve.

7. Fits and Clearances — Not applicable.

8. Testing

NOTE: Since the flange (5, figure 8) is not removed from the aircraft for servicing, the door and float assembly (4) must be tested prior to assembly (paragraph 6).

A. Install the door and float assembly (4, figure 8) in a test fixture (pressure chamber) of the type shown in figure 5.

B. Proof Test

(1) With pressure chamber lid open, attach the door and float assembly (4, figure 8) to the mating flange (5) inside the chamber.

(2) Close and seal the chamber cover and fill the chamber with Stoddard Solvent (Specification P-D-680) until it is visible in the upper sight glass.

(3) Apply regulated air pressure to the chamber gradually until the pressure gage indicates 20 (+2, -0) psig.



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8213 GRAVOIS AVE.
ST. LOUIS, MISSOURI 63123

**Overhaul Manual
P/N 0800010100**

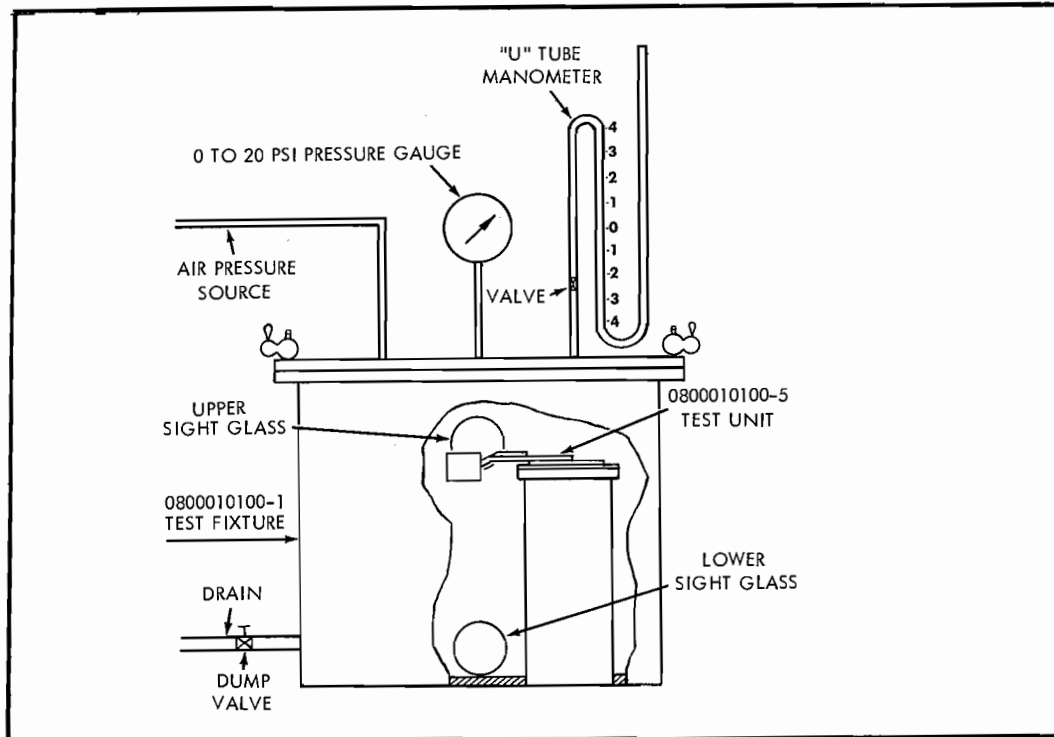
- (4) Maintain this pressure for one minute while checking for leakage. Leakage shall not exceed 0.5 cc (ten drops) per minute.

C. Leak Test

- (1) Reduce the air pressure in the chamber (figure 5) to 0 (zero) psig, then increase pressure to 3.0 (± 0.5) psig.
- (2) Maintain this pressure for at least two minutes and, starting at the end of one minute, check for leakage. Maximum leakage is 0.5 cc (ten drops) per minute.

D. Cracking Test

- (1) Increase the air pressure to 5.0 (+2, -0) psig and, while maintaining air pressure, drain the Stoddard Solvent from test chamber until the level is visible in the lower sight glass.



**Pressure Test Chamber
Figure 5**



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8213 GRAVOIS AVE.
ST. LOUIS, MISSOURI 63123

Overhaul Manual P/N 0800010100

- (2) Monitor the pressure carefully in the chamber with the pressure gage and water manometer and reduce the pressure gradually until the valve cracks open.
 - (3) The minimum cracking pressure is 0.3 psig (8.3 inches of water).
- E. If the door and float assembly (4, figure 8) fails any of the preceding tests, replace it.
- F. If the door and float assembly (4, figure 8) conforms to the preceding tests, remove it from the test chamber (figure 5) and prepare it for storage or immediate installation in the aircraft fuel tank.
- G. Equipment and Materials for Test

<u>Equipment/Materials</u>	<u>Description</u>
Pressure test chamber	Capable of supplying 20 psig air pressure on Stoddard Solvent. (See figure 5.)
Gages	Pressure gage capable of measuring air pressure from 0 to 20 psig.
Air pressure source	A water manometer. A pressure-regulated filtered air supply, from 0 to above 20 psig.
Valves	One globe dump valve in chamber drain pipe. One shutoff valve in line between chamber and manometer.
Test fluid	Stoddard Solvent (Spec. P-D-680)

Test Equipment and Materials
Figure 6



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ST. LOUIS, MISSOURI 63123

**Overhaul Manual
P/N 0800010100**

9. Trouble Shooting

Malfunction	Probable Cause	Corrective Action
Excessive leakage from door seal during test in "Testing" paragraphs.	Damaged seal.	Replace door and float assembly (4, figure 8)
	Warped door.	Replace door and float assembly. (4, figure 8)
	Binding at rivets.	Replace door and float assembly. (4, figure 8)
	Fuel-soaked float.	Replace door and float assembly. (4, figure 8)
	Foreign material on sealing surface.	Remove foreign material and clean surfaces.
Valve door does not "crack" during tests "Testing" paragraphs.	Severe wear in pin holes.	Replace door and float assembly (4, figure 8) and/or flange (5) as required.
	Wear at "knife" edges on float arm.	Replace door and float assembly. (4, figure 8)

**Trouble Shooting
Figure 7**



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8213 GRAVOIS AVE.
ST. LOUIS, MISSOURI 63123

Overhaul Manual
P/N 0800010100

10. Storage Instructions

A. Unless the valve is scheduled for immediate installation, the door and float assembly (4, figure 8) should be preserved and packaged as follows:

- (1) Place the door and float assembly (4, figure 8) in a polyethylene bag.
- (2) Flush the interior of bag with aircraft engine corrosion preventive compound, Type III (ready mixed) per Specification MIL-C-6529 (Type III).
- (3) Cap bag opening as described in Specification MIL-B-22205, Type III.
- (4) Wrap the preserved valve by heat-sealing it in moisture-vapor-proof, Kraft foil, barrier bag, per Specification MIL-B-117, Type II, Class E.

B. Storage

- (1) Enclose packaged-wrapped units in individual boxes or padded cartons.
- (2) Protect units from extreme temperatures or moisture, by storing indoors in original cartons until used.

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

28-12-01

Page 11
Dec 15/70

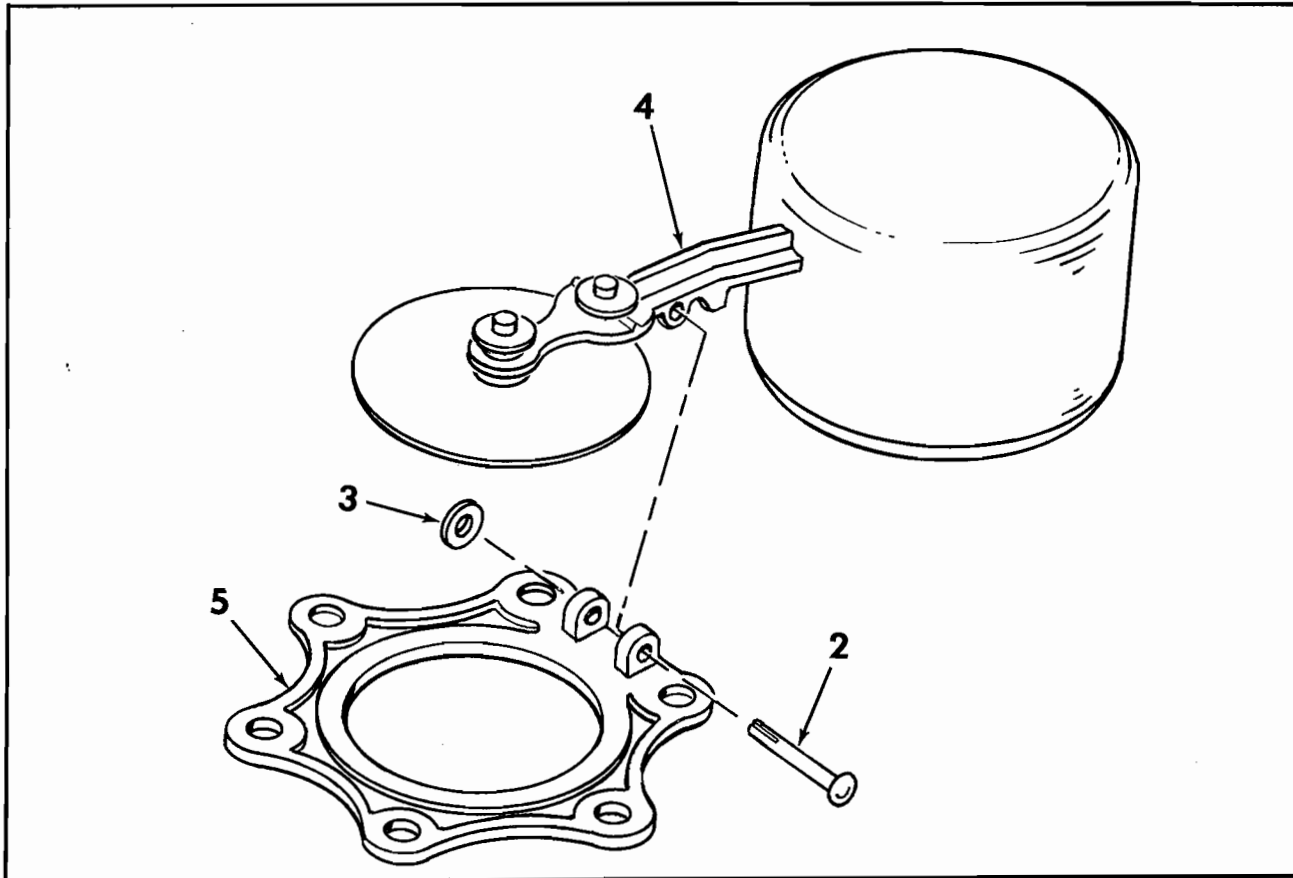


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8213 GRAVOIS AVE.
ST. LOUIS, MISSOURI 63123

Overhaul Manual
P/N 080010100

12. Illustrated Parts List



Fuel Climb Vent Valve
Figure 8

Fig.	Item	Part Number	1 2 3 4 5 6 7	Nomenclature	Effect Code	Units Per Assy.
8	-1	0800010100-5		Valve - Fuel Climb Vent		RF
	2	0800010106-3		Pin, Straight		1
	3	AN960C4		Washer, Flat		1
	4	08000101B2-1		Door and Float Assy.		1
	5	0800010101-1		Flange, Mounting		1

- Item Not Illustrated