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Acrospace
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 **Energy**

Maintenance Manual
5 1/4-INCH VENT VALVE
F646 Series

MMF646
Revision 2.0
11 February 2014

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REVISION RECORD

Keep this record in the front of the manual. When you get the revisions, put the revised pages in the manual. Write the revision number, date issued and your initials on this page.

REV NO.	PAGES AFFECTED	DESCRIPTION OF CHANGE	DATE	APPROVED BY
1.0	ALL	Initial Release	05/02/2000	
1.1	ALL	Revision 1.1	02/01/2008	
2.0	ALL	See DCN	02/11/2014	

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IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS!

This manual contains important instructions that shall be followed during installation and maintenance of the 5 1/4-Inch Vent Valve (valve). The following are general safety precautions that are not related to specific procedures and therefore do not appear elsewhere in this publication. These are recommended precautions that personnel must understand and apply during maintenance.

The valve is a mechanical device and can be dangerous if incorrectly operated or maintained.

Safety Alert Symbols

Safety alert symbols are used in this manual to identify potential or immediate personal injury hazards. The safety alert symbol words are explained below:



- indicates an imminently hazardous situation which, if not avoided, will result in injury or serious injury.



- indicates a potentially hazardous situation which, if not avoided, could result in injury or serious injury.



- indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.



- used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

WEAR PROTECTIVE CLOTHING

- Wear protective clothing (gloves, apron, etc.) approved for the materials and tools being used.

USE APPROVED SAFETY EQUIPMENT

- Use only approved equipment and make sure firefighting equipment is readily available.

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GIVE CLEANERS SPECIAL CARE

- When cleaners are being used read and follow the material safety data sheet (MSDS) instructions for correct handling.

Equipment Safety Information

The following safety information briefly discusses hazards peculiar to the equipment, which are likely to be encountered during maintenance activity.

GENERAL OPERATING LOCATION PRECAUTIONS

- Use only authorized replacement parts or hardware.
- Follow Lock-Out/Tag-Out procedures when working on the valve and make sure personnel protection equipment are used.

OPERATION AND MAINTENANCE OF FUEL SYSTEMS

- Protect all fuel lines from damage or puncture. Do not operate the valve if a fuel leak is detected.
- Do not use flammable solvents for cleaning parts.
- Check for tools, rags, or loose parts left in the area before resuming operation.
- Do not attempt to remove the switch from the system without first isolating it from the line pressure and venting all of the trapped internal pressure.

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INTRODUCTION

1. General

The information and procedures contained in this manual have been prepared to assist qualified repair personnel in off-aircraft maintenance of the 5 ¼ -Inch Vent Valve. The instructions provide information necessary to perform maintenance functions. The valve is manufactured by Meggitt (North Hollywood), Inc., 12838 Saticoy Street, North Hollywood, California 91605.

2. Scope

The instructions contained in this manual do not claim to cover all details or variations in equipment. They do not provide for every problem that could occur during installation, operation, or maintenance. If further information is required, contact Meggitt (North Hollywood), Inc., Product Support Department.

3. Standard Shop Practices

Use approved procedures and safety precautions to prevent damage to the equipment and injury to personnel.

4. Weights and Measurements

Weights and measurements in this manual are expressed in both English (U.S. customary) and Metric (SI) units.

5. Revision Service

This manual will be revised, as necessary, to reflect current information.

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DESCRIPTION AND OPERATION

1. Description

The 5 1/4-Inch Vent Valve (vent valve) (designed for mobile equipment tanks) complies with the DOT MC306 specifications and will mate with a standard 4-inch TTMA sump ring. It's venting capacity is 304,000 cubic feet/hour at 5 psi. Its cracking pressure is 3 psi. The vent valve is available in air and mechanically operated versions.

2. Operation

When bottom loading or off loading fuel, the vent valve poppet is lifted off of its seat by means of a mechanical push rod or by an air actuated piston.

3. Leading Particulars

For the leading particulars refer to [Table 1](#).

Table 1 Leading Particulars

Service	Automotive and Aviation Fuels
Pressures	
Opening Pressure (minimum) (air operated).....	40 psi (276 kPaG)
Cracking Pressure.....	3 psi (21 kPaG)
Venting Flow Rate (maximum)	304,000 cubic feet/hour at 5 psi (2391 cubic meter/sec at 34 kPaG)

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4. Model Variations

Refer to [Table 2](#) for the available F646 series valve variations. Refer to the ILLUSTRATED PARTS LIST section for additional details.

Table 2 Model Variations

MOD LETTER	DESCRIPTION
Basic	5 1/4-inch air operated vent valve, 3 psig cracking pressure
A	Modified for manual pushrod operation
B	Adds air interlock (For Basic and Mods F, and N only)
C	Adds fire screen (For Mods A, G, H and J only)
D	Adds flexible vapor recovery hood, symmetrical ports on opposite sides, one plug furnished (For Basic and Mods B, F, and N only)
F	Adds Viton seals (For Basic and Mods B, D, and N only)
G	Adds stainless steel welding ring (For Mods A, C, and K only)
H	Adds aluminum welding ring (For Mods A, C, and K only)
J	Adds steel welding ring (For Mods A, C and K only)
K	Adds aluminum vapor recovery hood, gasket and attaching hardware (For Mods A, C, G, H, and J only)
M	Adds offset manual pushrod (For Mod A only)
N	Adds 1/8-inch NPT with 3/8-inch tube fitting for remote venting of spring cavity (For Basic, B, D, and F only)

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FAULT ISOLATION

1. General

This section contains fault isolation procedures for the valve. Operate the valve in accordance with the Operation section, if the valve fails to operate correctly refer to [Table 3](#) and select the appropriate action. [Table 3](#) identifies the Fault, Probable Cause and Corrective Action.

Table 3 Fault Isolation

FAULT	PROBABLE CAUSE	CORRECTIVE ACTION
Fuel in air cylinder	Damaged seal (IPL Figure 1 , 9)	Replace the seal.
Cargo spillage	Swollen seal (9)	Replace the seal.
	Damaged poppet seal (13)	Replace the seal.
Damaged seals in air cylinder	Damaged cylinder (6)	Replace the cylinder.

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DISASSEMBLY

1. Disassembling the Vent Valve (See [IPL Figure 1](#))

A. Disassembling the F646 – Air Operated Vent Valve

1. (Mod: D) Remove screw from clamp (31 and 33). Remove plug (32) from hood (30). Remove hood (30).
2. (Basic, Mod: B, D, F, N) Remove screw (8), washer (17) and poppet (2). Remove and discard packing (11).

CAUTION

USE CARE WHEN REMOVING THE PACKING (13), TO AVOID DAMAGING IT AND ITS SURROUNDING PARTS.

3. (Basic, Mod: B, D, F, N) Remove screws (16) and washers (17). Remove cylinder (6). Remove and discard packing (12) and seal (13).
4. (Basic, Mod: B, D, F, N) After removal of cylinder (6), compress the spring (3) and remove retainer (5). Remove seal and retainer (9); discard seal.
5. (Basic, Mod: B, D, F, N) Slide the shaft (4) along with piston (7) retainer (10), and spring (3) from body (1).
6. (Mod: N) If replacement is necessary, remove connector (48).

B. Disassembling the F646A – Mechanically Operated Vent Valve

1. (Mod: G, H, J) If replacement is necessary, remove nuts (36, 41), bolts (35, 40, 43), washers (38), gasket (37) and pan (34, 39, 42).

(Mod: K) If replacement is necessary, remove nuts (41), bolts (40), washer (38) and gasket (37) and hood (44).
2. (Mod: A, C, G-M) To replace poppet (2); remove screws (19) and plate (18). Remove screw (21), compress spring (3) and remove C-washer (20). Remove poppet (2). Remove and discard the packing (11). Be careful not to lose the clips (22) and the screws (23).

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3. (Mod: C) Remove ring (29) from the body (1). Remove screen (28).

NOTE: It is not necessary to remove screen (28) unless damage is noted.

4. (Mod: A, C, G-M) Slide down the assembled shaft (items 4, 5, 14, 15, 24, 25, 26 and 27) and spring (3) from body (1).
5. (Mod: A, C, G-M) Remove spring (3). Remove retainers (5 and 10) from shaft (4).
6. (Mod: A, C, G-M) Remove and discard cotter pin (26).
7. (Mod: A, C, G-M) Loosen nut (24) and socket (15) from threaded shaft (4) and remove shaft (4), pushrod (14), spring pin (25), and plug (27). Use a rubber mallet (or hammer) to remove the pin (25) and separate shaft (4) from pushrod (14). Remove plug (27).

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CLEANING

1. Cleaning Materials

Refer to [Table 4](#) for recommended cleaning materials. Suitable equivalent cleaning materials may be substituted for the items listed.

Table 4. Recommended Cleaning Materials

DESCRIPTION	SPECIFICATION	SOURCE
Alcohol, Isopropyl	ASTM D770	Commercially available
Bags, Plastic	-	Commercially available
Brush, Bristle, Stiff, Non-metallic	-	Commercially available
Pick, Teflon®	-	Commercially available
Solvent, Dry Cleaning	P-D-680, Type 2	Commercially available
Tissues, Lint-free	-	Commercially available

2. Cleaning Procedures



DRY CLEANING SOLVENT AND ISOPROPYL ALCOHOL ARE HAZARDOUS MATERIALS. BEFORE USE, READ AND FOLLOW THE MATERIAL SAFETY DATA SHEET (MSDS) INSTRUCTIONS FOR CORRECT HANDLING. FAILURE TO FOLLOW THIS WARNING MAY RESULT IN PERSONAL INJURY, LONG TERM HEALTH HAZARDS OR DEATH.

- A. Clean all metal parts by washing thoroughly in dry cleaning solvent. Remove stubborn deposits by scrubbing with a nonmetallic stiff bristle brush. Brush all threaded areas. Use a Teflon® pick to remove obstructions from the ports, the seal or packing grooves and the flow passages.
- B. Clean all of the non-metallic parts by wiping them with clean lint-free tissues slightly moistened with isopropyl alcohol.

NOTE: All parts must be free of corrosion, dirt, grease, oil or any other foreign matter.

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WEAR EYE PROTECTION WHEN USING COMPRESSED AIR. DO NOT DIRECT AIRSTREAM AT PERSONNEL OR LIGHT METAL PARTS.

- C. Dry the parts with clean lint-free tissues or clean, dry, compressed air.
- D. Package all of the clean parts in plastic bags.

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CHECK/INSPECTION

1. General

Under strong light and magnification, look at all parts in accordance with the general criteria specified in [Table 5](#).

Repair minor damage in accordance with local directives. If damage is major or beyond simple repair, replace the part.

2. Component Checks (Refer to [Table 5](#))

Table 5. Component Checks

DESCRIPTION (IPL Figure 1 Item Number)	INSPECTION CRITERIA
General	<p>Look at all parts as applicable for nicks, cracks, cuts, burrs, corrosion, breaks, scoring, chafing, scarring, deformation, dents, thread damage, or any other obvious defects. Make sure the ports, passages, recesses and sealing grooves are clean and not blocked.</p> <p>Make sure all sealing and seating surfaces are free from damage or corrosion.</p> <p>Look to make sure the ports, passages, recesses and sealing grooves are clean and not blocked.</p>

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REPAIR

1. General

Repairs normally will consist of replacing damaged or malfunctioning parts with new parts; however, this section outlines minor repair procedures permissible for component parts, and specifies mandatory replacement parts.

Minor repairs that do not affect the original function may be accomplished by using standard shop practices. Always replace packings removed during disassembly with new packings.

2. Repair Materials

Refer to [Table 6](#) for recommended repair materials. Suitable equivalent repair materials may be substituted for the items listed.

Table 6. Recommended Repair Materials

DESCRIPTION	SPECIFICATION	SOURCE
Cloth, Abrasive, Crocus, 600-grit	P-C-458	Commercially available

3. Repair or Replacement

- A. Replace all parts which are obviously cracked, worn, deformed, damaged beyond repair, or which do not meet check requirements and cannot be restored to serviceable condition by allowable repair.
- B. Polish out minor corrosion and surface damage on stainless steel parts with crocus abrasive cloth.
- C. After polishing, clean parts as specified in the CLEANING section.
- D. Clear minor thread damage with a thread restoring tool; replace all threaded components having crossed or stripped threads.

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ASSEMBLY

1. Assembly Materials

Refer to [Table 7](#) for recommended assembly materials. Suitable equivalent materials may be substituted for the items listed.

Table 7. Recommended Assembly Materials

DESCRIPTION	SPECIFICATION	SOURCE
Petroleum jelly	--	Commercially available

2. Vent Valve Assembly (See [IPL Figure 1](#))

A. Lubrication

Before assembly, lightly lubricate all of the packings, seals and screw threads with petroleum jelly.

B. F646 – Air Operated Vent Valve Assembly

1. (Basic, Mod: B, D, F, N) Put new seal on seal and retainer (9) and put into the groove of body (1); secure with retainer (5).
2. (Basic, Mod: B, D, F, N) Put spring (3) in body (1). Put assembled shaft (items 4, 7 and 10) through the spring (3) into body (1).

CAUTION

DURING INSTALLATION, USE CARE AS TO NOT STRETCH OR CREASE THE SEAL (13).

3. (Basic, Mod: B, D, F, N) Put new seal (13) in the seal groove of piston (7).
4. (Basic, Mod: B, D, F, N) Put cylinder (6) and new packing (12) on body (1) and install screws (16) and washers (17).
5. (Basic, Mod: B thru N) Put new packing (11) in the packing groove of the shaft (4); put poppet (2) in body (1) and install screw (8) and washer (17).

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6. (Mod: D) Put screws in clamps (31 and 33) and secure hood (30) on body (1). Install plug (32) in hood (30).
7. (Mod: N) If removed; put connector (48) in body (1).

C. F646A – Mechanically Operated Vent Valve Assembly

1. (Mod: A, C, G-M) Align the holes of shaft (4) with the holes on pushrod (14); use a rubber mallet (or hammer) to install spring pin (25). Put nut (24) and socket (15) on shaft (4). Secure shaft (4), pushrod (14) and socket (15) with new cotter pin (26). Put plug (27) on pushrod (14).
2. (Mod: A, C, G-M) Put retainer (5 and 10) on shaft (4).
3. (Mod: A, C, G-M) Put assembled shaft (items 4, 5, 14, 15, 24, 25, 26 and 27) and spring (3) into body (1).
4. (Mod: C) If removed; put screen (28) in body (1) and install ring (29).
5. (Mod: A, C, G-M) Install poppet (2) in the body (1).
6. (Mod: A, C, G-M) Put C-washer (20) and new packing (11) in the packing groove of shaft (4) and install screw (21). Put plate (18) on body (1) and install screws (19). Put clips (22) and screws (23) into body (1).
7. (Mod: G, H, J) If removed; install nuts (36, 41), bolts (35, 40, 43), washer (38) and gasket (37) and pan (34, 39, 42).

(Mod: K) If removed; install nuts (41), bolts (40), washer (38) and gasket (37) and hood (44).

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ILLUSTRATED PARTS LIST

1. General

This section lists, describes, and illustrates all detail parts required for maintenance support of the 5 1/4-Inch Vent Valve.

2. Scope of Information

The parts list is arranged in the general order of disassembly. The listing is indented to show the relationship between each part and its next higher assembly. Item numbers used in the parts list are keyed to the corresponding numbers of the accompanying illustration.

A. MODIFICATION CODE

The modification code indicates the parts usage with respect to the end item. When the MOD column is blank, the part usage is applicable to all versions unless otherwise specified in the DESCRIPTION column.

B. How to Identify a Part

When the part number is known: Refer to the parts list for the item number, description, modification codes, and quantity. Refer to the illustration to make sure of the physical appearance and location of the part.

When the part number is not known: Examine the illustrations to identify the part by physical appearance and location. Refer to the accompanying parts list to get the part number, nomenclature, modification codes, quantity, etc.

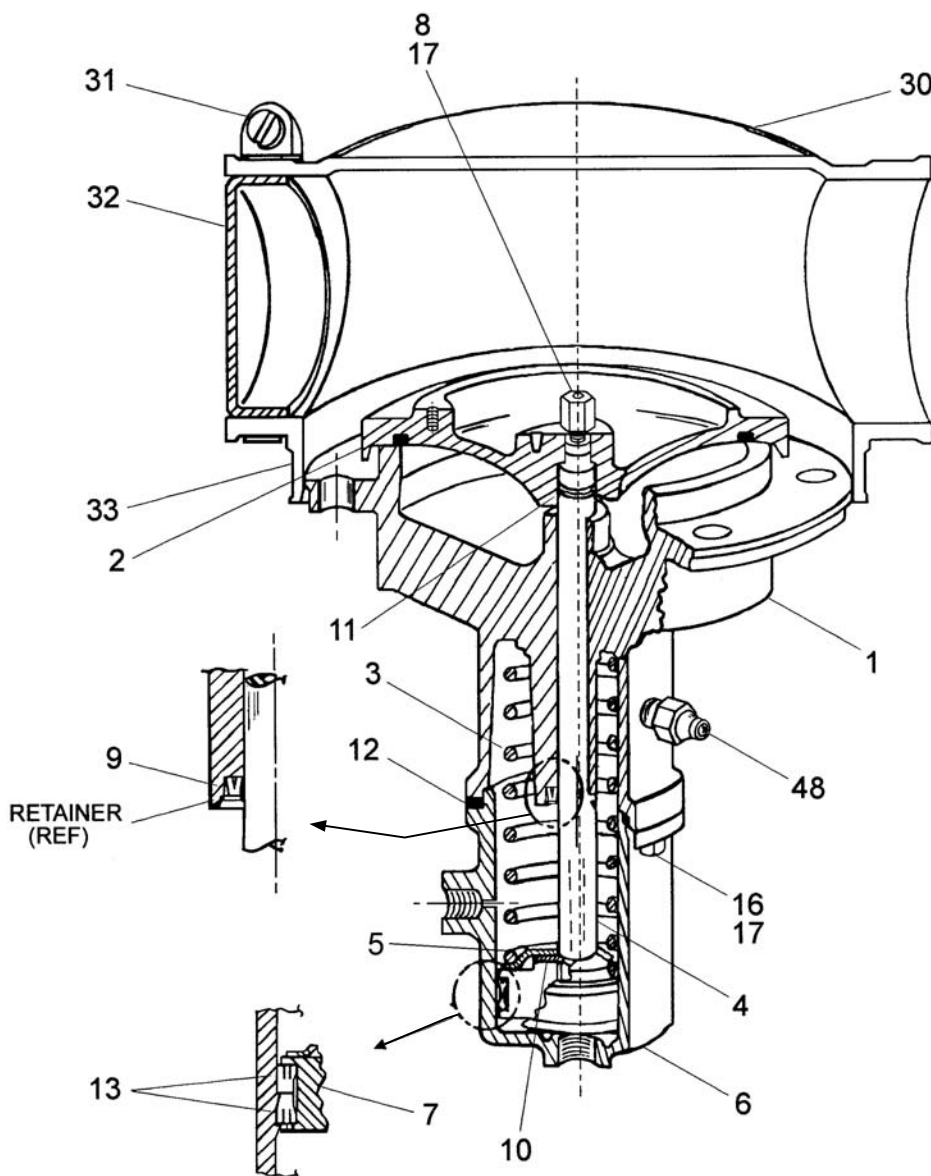
C. Abbreviations

ASSY	Assembly
FIG.	Figure
REF	Reference Item
IPL	Illustrated Parts List
MOD	Modification

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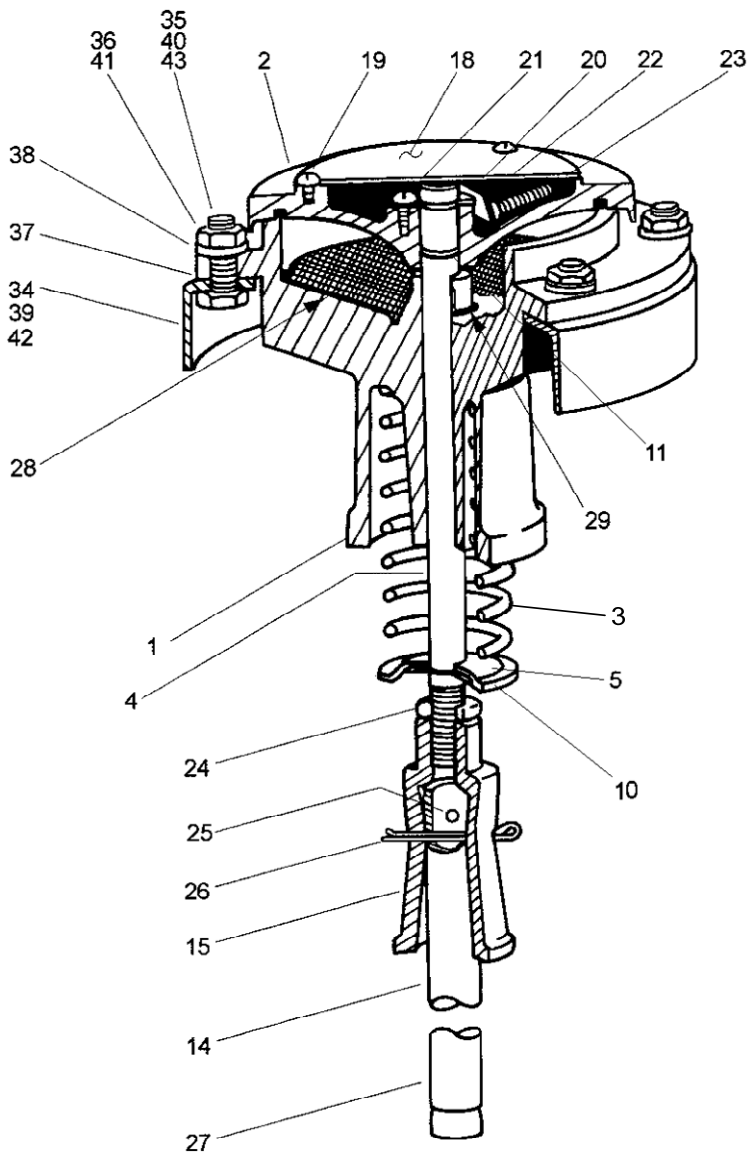
AIR-OPERATED

IPL Figure 1. Air Operated Vent Valve (Sheet 1 of 2)

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MECHANICALLY-OPERATED

IPL Figure 1. Mechanically Operated Vent Valve (Sheet 2)

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FIG. ITEM	PART NUMBER	DESCRIPTION	MOD CODES	UNITS PER ASSY	
					1 2 3 4 5 6 7
F646 VENT VALVE, 5 1/4-INCH					
1	1	2734793-101	. BODY, VALVE	Bsc, B, D, F	1
		2734794-101	. BODY, VALVE	A, C, G-M	1
		2734793-103	. BODY, VALVE	N	1
	2	2734795-1	. POPPET, VALVE.....	Bsc, B-D, G-N	1
		2734795-2	. POPPET, VALVE.....	F	1
		2734796-1	. POPPET, VALVE.....	A	1
		2734796-2	. POPPET, VALVE.....	AF	1
	3	2734797	. SPRING, COMPRESSION.....		1
	4	2753251	. SHAFT	Bsc, B, D, F, N	1
		2753252	. SHAFT	A, C, G-M	1
	5	2734800	. RETAINER.....		1
	6	2734805-1	. CYLINDER.....	Bsc, D, F, N	1
		2734805-2	. CYLINDER.....	B	1
	7	2804012-101	. PISTON.....	Bsc, B, D, F, N	1
	8	2734807	. SCREW, MACHINE.....	Bsc, B, D, F	1
		CAN515C416-8	. SCREW, MACHINE.....	N	1
	9	27344912-1+H5005-87	. DELETED (SUPERSEDED BY 2804095-101).....	Bsc, B, D, N	1
		27344912-2+H5005-87	. DELETED (SUPERSEDED BY 2804095-102).....	F	1
		2804095-101	. SEAL AND RETAINER..... (SUPERSEDES 27344912-1+H5005-87)	Bsc, B, D, N	1
		2804095-102	. SEAL AND RETAINER..... (SUPERSEDES 27344912-2+H5005-87)	F	1
	10	2753253	. RETAINER.....		1
	11	2661058A013	. PACKING, PREFORMED.....	Bsc, A-E, G-N	1
		2661058AF013	. PACKING, PREFORMED.....	F	1
	12	2661058A148	. PACKING, PREFORMED.....	Bsc, B, D, N	1
		2661058AF148	. PACKING, PREFORMED.....	F	1

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FIG. ITEM	PART NUMBER	DESCRIPTION	MOD CODES	UNITS PER ASSY
1 13	4022-3S	. SEAL.....	Bsc, B, D, N	1
	4022-3SV-1	. SEAL (ALT 4022-3SV).....	F	1
	4022-3SV	. SEAL (ALT TO 4022-3SV-1)	F	RF
14	4052-16	. PUSHROD.....	A, C, G-M	1
15	4052-4	. SOCKET	A, C, G-M	1
16	CMS35307-306	. SCREW, MACHINE.....	Bsc, B, D, F, N	4
17	CMS35338-139	. DELETED (SUPERSEDED BY CMS35333-40).....	Bsc, B, D, F, N	5
	CMS35333-40	. WASHER, LOCK (SUPERSEDES CMS35338-139)....	Bsc, B, D, F, N	5
18	2734801	. PLATE.....	A, C, G-M	1
19	CAN502C10-4	. SCREW, MACHINE.....	A, C, G-M	3
20	2734802	. WASHER, C.....	A, C, G-M	1
21	CAN515C416-8	. SCREW, MACHINE.....	A, C, G-M	1
22	2734803	. CLIP.....	A, C, G-M	2
23	CAN520-10-20	. SCREW, MACHINE.....	A, C, G-M	2
24	CAN316-9R	. NUT, HEX.....	A, C, G-M	1
25	CMS171658	. PIN, SPRING.....	A, C, G-M	1
26	CMS24665-359	. PIN, COTTER.....	A, C, G-M	1
27	4052-16-1	. PLUG.....	A, C, G-M	1
28	2734911	. SCREEN, FIRE.....	C	1
29	5105-87	. RING, RETAINING.....	C	1
30	2731807-1	. HOOD.....	D	1
31	5656	. CLAMP.....	D	2
32	2733418	. PLUG.....	D	1
33	56152	. CLAMP.....	D	1
34	2753349-101	. PAN, WELD (CRES).....	G	1
35	2753350-103	. BOLT, MACHINE.....	G	8
36	CMS35691-39	. NUT, HEX.....	G	8
37	2753351-101	. GASKET.....	G, H, J, K	1

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Energy products

Meggitt Fuelling Products
Maintenance Manual (MMF646)
5 1/4-Inch Vent Valve – F646 Series

FIG. ITEM	PART NUMBER	DESCRIPTION	MOD CODES	UNITS PER ASSY
1 -37A	2753351-101	. GASKET (Only 1 required when combined with Mods G, H, J)	K	1
38	CNAS1598C8Y	. WASHER, SEALING (Mod K: not required when combined with Mods G, H, J)	G, H, J, K	8
39	2753349-102	. PAN, WELD (ALUMINUM)	H	1
40	2753350-101	. BOLT, MACHINE.....	H	8
41	CMS35691-37	. NUT, HEX (Mod K: not required when combined with Mods G, H, J).....	H, J, K	8
42	2753349-103	. PAN, WELD (STEEL)	J	1
43	2753350-102	. BOLT, MACHINE (Mod K: not required when combined with Mods G, H, J)	J, K	8
- 44	2721347-2	. HOOD ASSY, (ALUMINUM)	K	1
- 45	RR850	. . RING, RETAINING (SPIROLOX)	K	1
- 46	2721388	. . COVER	K	1
- 47	MS29513-370	. . PACKING	K	1
48	68NTA6-2	. CONNECTOR, MALE.....	N	1

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