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Maintenance Manual

WATER SUMP CONTROL SWITCH

PART NUMBER:
F543B

Meggitt Fuelling Products
Maintenance Manual
Water Sump Control Switch F543B

LIST OF EFFECTIVE PAGES

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The total number of pages in this technical document is 17 consisting of the following:

Title, A, 1 – 15

TABLE OF CONTENTS

Meggitt Fuelling Products
Maintenance Manual
Water Sump Control Switch F543B

INTRODUCTION

1. General
This manual provides component maintenance shop instructions for the Water Sump Control Switch (switch).

2. Revision Service
This manual will be revised as necessary to show the current information.

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

DESCRIPTION AND OPERATION

1. Description
The Water Sump Control Switch (switch) (see IPL Figures 1 and 2) provides the means of detecting free water accumulation in filter/separators, storage tanks and other refueling system components. - The major functional components of the switch are the float, the switch, the switch actuating mechanism, the test lever, the sump and the plunger assembly. The fully enclosed sump is designed for remote installation.

2. Operation

A. Negligible Free Water Accumulation
When the accumulated free water in the sump is negligible, the specific gravity of the float is sufficient to keep it from floating, and the refueling system operates normally.

B. Excessive Free Water Accumulation
As free water accumulates, its higher specific gravity causes the float to move upward. When the free water accumulation is sufficient, float movement actuates its normally closed switch contacts to their open position, interrupting the circuit path for the control signal. When this occurs, the refueling system shuts down.

C. Refueling System Restart

When the refueling system has been shut down due to excessive free water accumulation in the water sump, operator action is required to drain the water. When the water has drained, the float will sink, the switch will close and complete the control signal, path and normal operation will resume.

D. Test Plunger Assembly

The test plunger assembly provides the means to verify proper operation of the switch. When the plunger is pushed inward, it manually lifts the float and actuates the switch, causing its normally closed contacts to open. An audible click is produced when the switch is actuated. The test plunger assembly should be used periodically, in accordance with the operator's established operating procedures.

3. Leading Particulars (Refer to Table 1)

Table 1. Leading Particulars
Service Automotive and Aviation Fuels and Water (Specific gravity: 0.83 maximum)
Operating Pressure 0 to 200 psi (0 to 1 380 kPa)
Switch Contact Rating Voltage 6 to 30 Volts DC Current Resistive 5 amperes Inductive 3 amperes In-Rush 24 amperes 125 to 250 Volts AC Current Resistive 5 amperes Inductive 5 amperes
Fluid Temperature 32 to 135°F (–37 to 57°C)
Ambient Temperature –65 to 160°F (–54 to 71°C)
Weight (approximate) 15 pounds (6,8 kg)

Meggitt Fuelling Products
Maintenance Manual
Water Sump Control Switch F543B

FAULT ISOLATION

1. General

Refer to Table 2 for fault isolation information. Locate suspected faulty component and take appropriate remedial action.

Table 2. Fault Isolation

FAULT	POSSIBLE CAUSE	CORRECTIVE ACTION
Switch will not close	Switch (9, IPL Figure 2) improperly adjusted	Adjust the rod (refer to **ASSEMBLY** section, paragraph __).
	Defective switch (9)	Replace the switch.
	Weight of float assembly (2) is incorrect	Check and correct the float weight (refer to **ASSEMBLY** paragraph __).

DISASSEMBLY

NOTE: Prior to disassembly, the vessel in which the water sump control switch is installed must be drained in accordance with the applicable instructions, and the water sump control switch must be disconnected and removed from the vessel.

1. Seal Replacement Parts Kits

Refer to the **ILLUSTRATED PARTS LIST** section for the Replacement Parts Kit information.

2. Disassembling the Water Sump Control Switch (Refer to IPL Figures 1 and 2)

A. Remove the nuts (27, IPL Figure 1), the washers (29), the bolts (26), the upper sump (1) and the spacer (3) from the lower sump (2). Remove the packings (17) from the packing grooves of the sumps. Remove the screws (22), the washers (21), the plate (25) and the packing (7) from the sump.

B. Remove the screw (16, IPL Figure 2), the washers (14 and 15) and the cover (13) from the switch housing (6).

C. Remove the screws (12), the washers (11), the switch (9) and the insulator (10) from the switch housing (6). Remove the washer (23) and the grommet (24) from the electrical wires of the switch.

D. Remove the screw (20) (switch adjustment) from the rod (19).

E. Remove the screws (22), the washers (21) and gently pull the switch housing (6) away from the sump (1). Using a suitable small diameter tool (a straightened large paper clip works well), push out the pin (5), and remove the switch housing and associated parts.

F. Remove the packing (7) from the switch housing (6).

G. Remove the retaining ring (18) and the packing (8) from the switch housing (6).

H. Remove the float (2) from the sump. Remove the pin (4) and the rod (19) from the sump.

I. Remove the plug (3.2) and the packing (3.1) from the float.

J. If there has been leakage from the plunger assembly (26), remove the plug (26.1) from the sump (1). Remove the ring (26.5) from the plunger (26.2). Remove the plunger (26.2), the backup ring (26.3), and the packings (26.4) from the plug.

CLEANING

1. Cleaning Materials

Refer to Table 3 for recommended cleaning materials. Suitable equivalent cleaning materials may be substituted for the items listed.

Meggitt Fuelling Products
Maintenance Manual
Water Sump Control Switch F543B

Table 3. Recommended Cleaning Materials		
DESCRIPTION	**SPECIFICATION**	**SOURCE**
Brush, Bristle, stiff, nonmetallic	– –	Commercially available
Dry Cleaning Solvent	P-D-680, Type 2	Commercially available
Pick, Teflon	– –	Commercially available
Plastic Bags	– –	Commercially available
Tissues, lint-free	– –	Commercially available

2. Cleaning Procedures

WARNING: DRY CLEANING SOLVENT IS FLAMMABLE AND TOXIC TO EYES, SKIN, AND RESPIRATORY TRACT. SKIN/EYE PROTECTION REQUIRED. AVOID REPEATED/PROLONGED CONTACT. USE ONLY IN WELL VENTILATED AREAS. GOOD GENERAL VENTILATION IS NORMALLY ADEQUATE. KEEP AWAY FROM OPEN FLAMES OR OTHER IGNITION SOURCES.

A. Clean all metal parts by washing thoroughly in dry cleaning solvent. Remove stubborn deposits by scrubbing with a nonmetallic stiff bristle brush. Use a Teflon pick to remove obstructions from ports, grooves and passages.

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

WARNING: WEAR EYE PROTECTION WHEN DRYING PARTS WITH COMPRESSED AIR. DO NOT DIRECT AIRSTREAM AT PERSONNEL OR LIGHT METAL PARTS.

B. Dry parts with clean lint-free tissues or clean, dry compressed air.

C. Package clean parts in plastic bags.

Meggitt Fuelling Products
Maintenance Manual
Water Sump Control Switch F543B

INSPECTION

1. General

A. Under strong light and magnification, visually check all parts in accordance with the general criteria specified in paragraph 2 below.

B. Repair minor damage in accordance with local directives. If damage is major or beyond simple repair, replace the part rather than attempt extensive repairs.

2. Component Checks (Refer to Table 4)

Table 4. Component Checks

DESCRIPTION (IPL Figure 1 Item Number)	CHECK CRITERIA
General	Visually check 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 that the ports, passages, recesses and sealing grooves are clean and unobstructed.
	Check all sealing and seating surfaces for damage or corrosion that would affect sealing.

Meggitt Fuelling Products
Maintenance Manual
Water Sump Control Switch F543B

ASSEMBLY

1. Overhaul and Seal Replacement Parts Kits

Refer to the **ILLUSTRATED PARTS LIST** section for the recommended seal and overhaul replacement parts kit information.

2. Assembly Materials

Refer to Table 5 for recommended assembly materials. Suitable equivalent materials may be substituted for the items listed.

Table 5. Recommended Assembly Materials

DESCRIPTION	SPECIFICATION	SOURCE
Grease, Silicone	33	Dow Corning (commercially available)
Thread Sealing Compound	Loctite NV	Loctite (commercially available)

3. Assembling the Water Sump Control Switch (Refer to IPL Figures 1 and 2)

A. Lubrication

Prior to assembly, lightly lubricate all of the packings, seals and screw threads with silicone grease (#33).

B. Assembling the Float Assembly

1) Fill the float (2, IPL Figure 2) with water to a weight of 4.15 (±0.05) pounds (1,87 to 1,90 kg) (including the packing (3.1) and the plug (3.2).

2) Install the packing (2.4) on the plug (2.2). Apply thread sealant (Loctite NV) to the threads of the plug. Install the plug in the float (2) and tighten it securely.

C. Install the rod (19) and the pin (4) on the float (2). Carefully install the float in the sump (1).

D. Install the packing (8) and the retaining ring (18) (prongs outward) in the switch housing (6). Install the packing (7) in the packing groove of the switch housing.

E. Insert the rod (19) on the float (2) through the retaining ring (18) and the packing (8) in the switch housing (6). Line up the pivot pin hole of the switch housing with the holes in the arm of the float and install the pin (5).

F. Make sure that the packing (7) is correctly seated in its groove on the switch housing (6). Secure the switch housing to the sump with the screws (22) and the washers (21).

G. Thread the screw (20) (switch adjustment) into the rod (19), so that its head is approximately 0.14 inch (3,5 mm) from the end of the rod.

H. Install the grommet (24) in the hole of the washer (23). Insert the electrical wires of the switch (9) through the grommet. Install washer, grommet and wires in the switch housing (6).

I. Install the insulator (10) and the switch (9) in the switch housing (6) and secure them with the screws (12) and the washers (11).

J. Adjusting the Switch (9)

1) Connect a test light and voltage source (0.5 ampere maximum) between in series with the switch.

2) Raise the float (2) to within 1/4-inch (6 mm) of its upper limit of travel. The test light should be on.

NOTE: A wire inserted into the hole in the head of the screw (20) can be used to turn it.

3) Adjust the screw (20) outward (counterclockwise) until the test light goes off.

4) Lower the float and observe the test light. The light must come on before the float reaches its lower travel limit.

5) Slowly raise the float until the test light goes off. The float must be within 1/4-inch (6 mm) of its upper travel limit.

6) Repeat the adjustment until the requirements are satisfied.

K. Install the cover (13) and secure it with the screw (16) and the washers 14 and 15). Tighten the screw securely.

L. Assembling the Plunger Assembly

Install the plunger (26.2) with new packings (26.4) and a new backup ring (26.3) in the plug (26.1). Install the ring (26.4) on the plunger.

M. Install the plunger assembly (26) in the sump (1). Tighten the plug (26.1) securely.

N. Install the packings (17, IPL Figure 1) in the packing grooves of the sumps (1 and 2). Assemble the sumps with the spacer (3) and secure them by installing the bolts (26), the washers (29) and the nuts (27). Tighten the nuts securely.

O. Install the packing (7) in the packing groove of the plate (25). Install the plate on the sump (1) and secure it with the screws (22) and the washers (23). Tighten the screws securely.

TESTING

NOTE: Prior to testing, the vessel in which the water sump control switch is installed must be drained in accordance with the applicable instructions, and the switch must be disconnected and removed from the vessel.

1. Leakage and Functional Test

A. Connect a test light and voltage source (0.5 ampere maximum) between in series with the switch electrical wires. The test light should come on.

WARNING: AVIATION FUEL IS FLAMMABLE AND TOXIC TO YOUR EYES, YOUR SKIN, AND YOUR RESPIRATORY TRACT. SKIN AND EYE PROTECTION IS REQUIRED. AVOID REPEATED OR PROLONGED CONTACT. KEEP AWAY FROM OPEN FLAMES OR OTHER IGNITION SOURCES.

B. Immerse the switch with its mounting flange horizontal and facing upward in a container of clean aviation fuel.

C. The float must remain at its lower travel limit. The test light must remain on.

D. Turn off the voltage source. Remove the water sump control switch from the container and blow it dry with shop air.

E. Immerse the switch with its mounting flange horizontal and facing upward in a container of clean water. Turn on the voltage source.

F. The float should rise to its upper travel limit. The test light must go off.

G. Manually push the float to its lower travel limit and hold it down. The test light must come on.

H. Release the float. The float should rise to its upper travel limit. The test light must go off.

I. Manually push the float to its fully down position and hold it down. The test light must come on.

L. Remove the test voltage and disconnect the test light circuit. Remove the switch from the container and thoroughly dry it with shop air.

Meggitt Fuelling Products
Maintenance Manual
Water Sump Control Switch F543B

ILLUSTRATED PARTS LIST

1. General

This section lists, describes, and illustrates all detail parts required for maintenance support of the Water Sump Control Switch.

2. Scope of Information

A. The parts list is indentured 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.

B. Abbreviations

ASSY	Assembly.
FIG.	Figure.
REF	Reference item.

Meggitt Fuelling Products
Maintenance Manual
Water Sump Control Switch F543B

FIG. ITEM	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	MOD CODES	UNITS PER ASSY
1	F543B	SWITCH, WATER SUMP CONTROL		REF
1	F60W1622-2	· SUMP (Aluminum alloy)		1
2	F528B	· SWITCH, WATER SUMP CONTROL (See IPL Figure 2 for details)		1
3	F61W2186	· SPACER		1
7	2661058A133	· PACKING, PREFORMED		1
17	2661058A266	· PACKING, PREFORMED		1
21	CMS35338-39	· PACKING, PREFORMED		4
22	CAN503-10-10	· SCREW, MACHINE		4
25	F61W2207	· PLATE		1
26	CMS90727-66	· BOLT, MACHINE		8
27	CMS35690-628	· NUT, HEX		8
29	CAN935-616	· WASHER, LOCK		8
30	CAN932-4	· PLUG		1

Meggitt Fuelling Products
Maintenance Manual
Water Sump Control Switch F543B

FIG. ITEM	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	MOD CODES	UNITS PER ASSY
2	F528B	SWITCH, WATER SUMP CONTROL	B	REF
1	F60W1622-2	· SUMP (Aluminum alloy)		1
	931021-102	· SUMP (Aluminum alloy) (Alternate for F60W1622-2)		1
2	F60W1757	· FLOAT ASSEMBLY		1
4	CMS29512-16	· · PACKING, PREFORMED		1
5	CAN814-16D	· · PLUG		1
4	79-012-062-0687	· PIN, SPRING		1
5	F60W1627	· PIN, HINGE		1
6	F60W1760	· HOUSING, SWITCH		1
7	2661058A133	· PACKING, PREFORMED		1
8	21661058BD007	· PACKING, PREFORMED		1
9	F60W1761	· SWITCH		1
10	AT10063	· INSULATOR		2
11	CAN935B2	· WASHER, LOCK		2
12	CAN515B2-8	· SCREW, MACHINE		2
13	F60W1763	· COVER		1
14	CAN960C6	· WASHER, FLAT		1
15	CAN935-6	· WASHER, LOCK		1
16	CAN515-6-5	· SCREW, MACHINE		1
17	2661058A266	· PACKING, PREFORMED		1
18	5000-37H	· RING, RETAINING		1
19	F60W1758	· ROD		1
20	NK500A2-8	· SCREW, SELF-LOCKING		1
21	CMS35338-39	· WASHER, LOCK		4
22	CAN503-10-10	· SCREW, MACHINE		4
23	F60W1958	· WASHER, FLAT		1
24	CMS35489-4	· GROMMET		1

Meggitt Fuelling Products
Maintenance Manual
Water Sump Control Switch F543B

FIG. ITEM	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	MOD CODES	UNITS PER ASSY
26	2691216	· PLUNGER ASSEMBLY		1
26.1	2691215	· · PLUG		1
26.2	2691214	· · PLUNGER		1
26.3	CMS28774-011	· · RING, BACKUP		1
26.4	2661058BD011	· · PACKING, PREFORMED		2
26.5	1X3/32	· · RING, SPLIT		1
	RR138	· · RING, SPLIT (Alternate for 1X3/32)		1

REPLACEMENT PARTS KITS AVAILABLE		
KIT PART NUMBER	DESCRIPTION	ITEMS IN KIT
	Seal Replacement	7, 17, IPL Figure 1; 4, 7, 8, 17, 26.3, 26.4, IPL Figure 2
	Overhaul	7, 17, IPL Figure 1; 4, 7, 8, 17, 18, 24, 26.3, 26.4, IPL Figure 2