

Meggitt Fuelling Products
Avery-Hardoll
Whittaker Controls

Maintenance Manual

Water Slug Control Switch

F528/F528B Series

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On a revised page, the portion of text or illustrations affected by the change is indicated by a vertical line in the outer margin of the page. When a revision is issued, the entire document is reissued with the current revision number and date shown on all pages. For major revisions, the basic number is incremented. For minor revisions, the number following the decimal is incremented. Dates of issue for original and subsequent revisions are as follows:

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INTRODUCTION

1. General

This manual provides component maintenance shop instructions for the Water Slug 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 Slug Control Switch (switch) (see Figure 1) 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 sump and the plunger assembly.

2. Operation

A. Negligible Free Water Accumulation

When the accumulated free water slug 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.

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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 slug has drained, the float will sink, the switch will close and complete the control signal, path and normal operation will resume.

D. Plunger Assembly

The 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 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
In-Rush	24 amperes
125 to 250 Volts AC Current Resistive	5 amperes Inductive
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)

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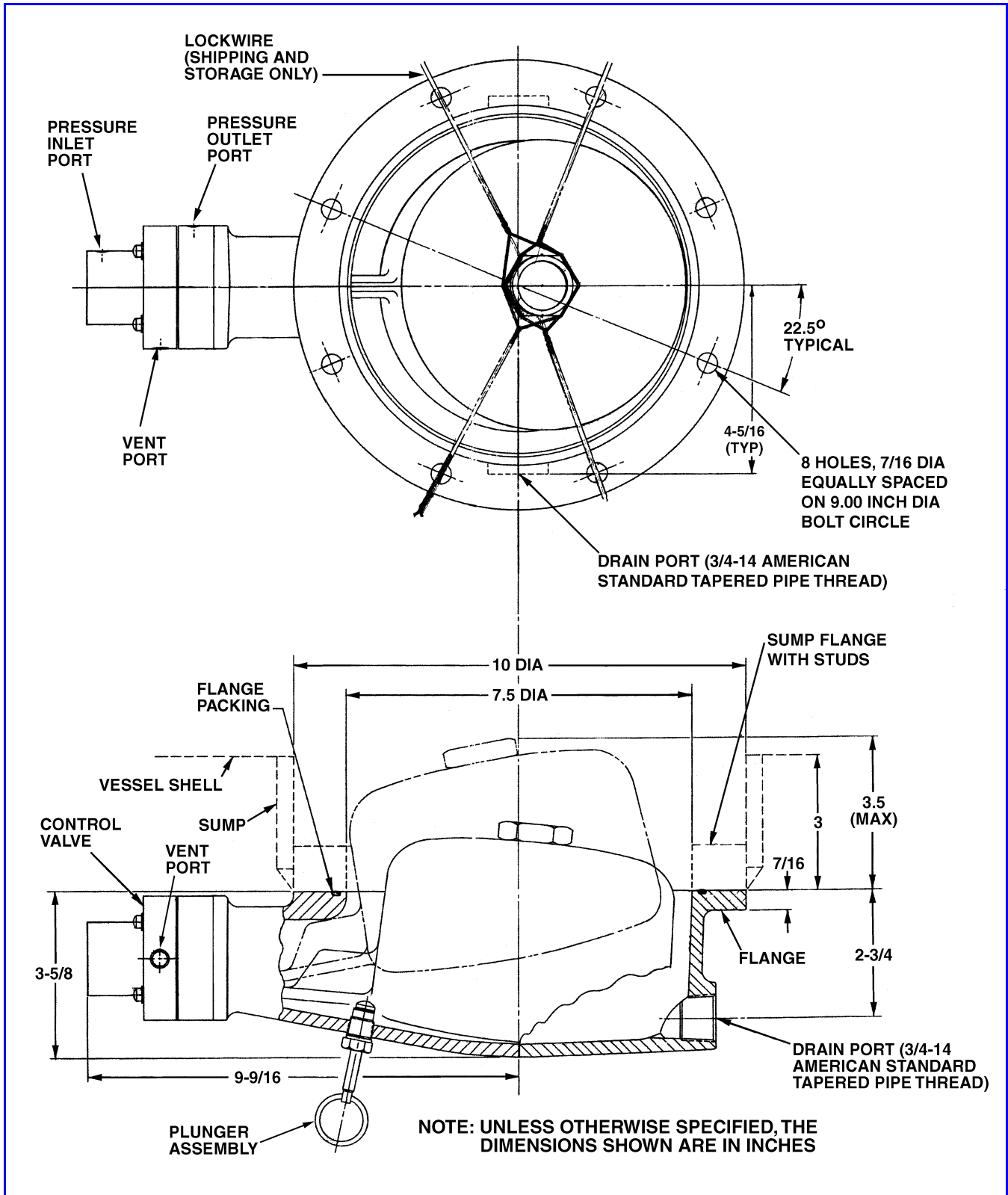


Figure 2. Water Slug Control Switch – Interface Dimensions

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) improperly adjusted	Adjust the switch (refer to ASSEMBLY section, paragraph 3J).
	Defective switch (9)	Replace the switch.
	Weight of float assembly (2) is incorrect	Check and correct the float weight (refer to ASSEMBLY paragraph 3B).

DISASSEMBLY

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

1. Replacement Parts Kits

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

2. Disassembling the Water Slug Control Switch (Refer to IPL Figure 1)

- A. Remove the packing (17) from the packing groove of the sump (1).
- C. Remove the screw (16), the washers (14 and 15) and the cover (13) from the switch housing (6).
- D. 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.
- E. Remove the screw (20) (switch adjustment) from the rod (19).

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- F. 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.
- G. Remove the packing (7) from the switch housing (6).
- H. Remove the retaining ring (18) and the packing (8) from the switch housing (6).
- I. Remove the float (2) from the sump. Remove the pin (4) and the rod (19) from the sump.
- J. Remove the plug (2.2) and the packing (2.1) from the float (2).
- K. 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.

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.

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- 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.

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.
Float (2)	Check for weight of 4.15 (± 0.05) pounds (1,87 to 1,90 kg) (including the packing (2.1) and the plug (2.2))
Switch (9)	Check for positive make and break of continuity when the switch is actuated.

ASSEMBLY

1. 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 Slug Control Switch (Refer to IPL Figure 1)

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) with water to a weight of 4.15 (± 0.05) pounds (1,87 to 1,90 kg) (including the packing (2.1) and the plug (2.2)).
- 2) Install the packing (2.1) 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).

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- 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.

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TESTING

NOTE: Prior to testing, the vessel in which the water slug control switch is installed must be drained in accordance with the applicable instructions, and the entire assembly 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 slug control switch from the container and blow it dry with shop air.
- E. Immerse the entire assembly 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.

ILLUSTRATED PARTS LIST

1. General

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

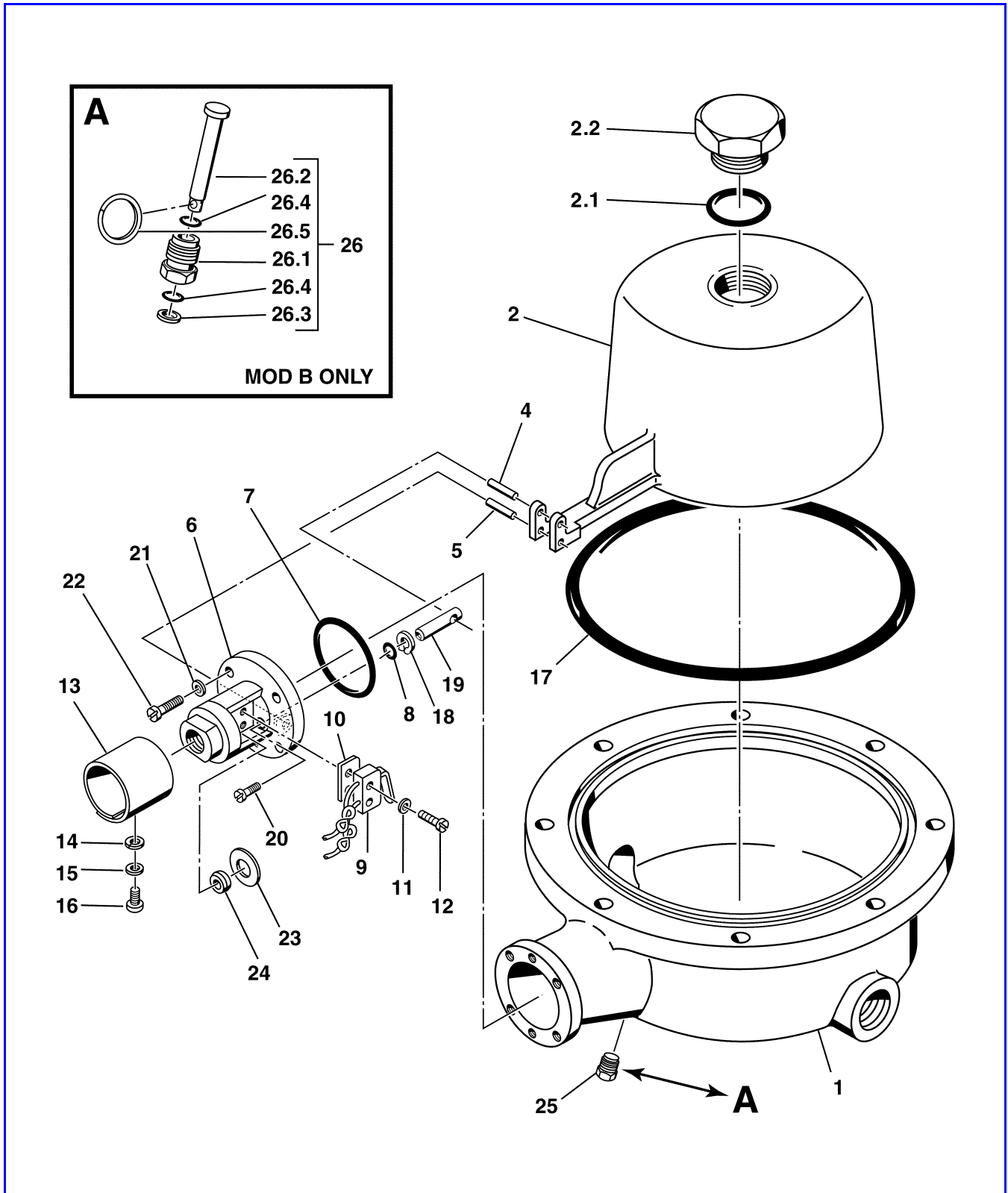
2. Scope of Information

A. The parts list 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.

B. Abbreviations

ASSY	Assembly.
FIG.	Figure.
REF	Reference item.

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IPL Figure 1. Water Slug Control Switch

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FIG. ITEM	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	USAGE CODES	UNITS PER ASSY
1	F528	SWITCH, WATER SLUG CONTROL	A	REF
	F528B	SWITCH, WATER SLUG CONTROL	B	REF
1	F60W1622-2	• SUMP (Aluminum alloy)		1
	931021-102	• SUMP (Aluminum alloy)		1
2	F60W1757	• FLOAT ASSEMBLY		1
2.1	CMS29512-16	• • PACKING, PREFORMED		1
2.2	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	2661058BD007	• 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	CMS35333-39	• WASHER, LOCK		4
22	CAN503-10-10	• SCREW, MACHINE		4
23	F60W1958	• WASHER, FLAT		1
24	CMS35489-4	• GROMMET		1
25	CAN932-4	• PLUG	A	1
26	2691216	• PLUNGER ASSEMBLY	B	1
26.1	2691215	• • PLUG	B	1
26.2	2691214	• • PLUNGER	B	1
26.3	CMS28774-011	• • RING, BACKUP	B	1
26.4	2661058BD011	• • PACKING, PREFORMED	B	2
26.5	1X3/32	• • RING, SPLIT	B	1
	RR138	• • RING, SPLIT (Alternate for 1X3/32)	B	1

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REPLACEMENT PARTS KITS AVAILABLE		
KIT PART NUMBER	DESCRIPTION	ITEMS IN KIT (IPL Figure 1)
KITF528-1	Seal Replacement	4, 7, 8, 17, 26.3, 26.4
KITF528-2	Overhaul	4, 7, 8, 17, 18, 24, 26.3, 26.4

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REPLACEMENT PARTS KITS AVAILABLE

KIT PART NUMBER	DESCRIPTION	ITEMS IN KIT (IPL Figure 1)
KITF528-1	Seal Replacement	4, 7, 8, 17, 26.3, 26.4
KITF528-2	Overhaul	4, 7, 8, 17, 18, 24, 26.3, 26.4