

Maintenance Manual

BOTTOM LOADING COUPLER

F228 Series

MMF228

Revision 2.0
23 August 2013



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Meggitt Fuelling Products
Maintenance Manual (MMF228)
Bottom Loading Coupler – F228 Series

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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 Bottom Loading Coupler. 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 Coupler is a mechanical device and can be dangerous if not correctly 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.

COUPLER INSTALLATION AND OPERATION PRECAUTIONS

- The design of the piping system must provide adequate pressure to prevent exceeding the limits of the coupler.
- Make sure the coupler orientation is correct and install the coupler in-line with the flanges. Make sure the piping flanges are correctly positioned and spaced. Do not force the piping in order to fit the coupler.
- Make sure the coupler operates correctly after installation.
- Do not exceed the pressure limits of the coupler.

COUPLER MAINTENANCE PRECAUTIONS

- Do not loosen any fasteners or attempt to remove the coupler from the line until all pressure is isolated and released from the system.
- Use only authorized replacement parts or hardware.

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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 Bottom Loading Coupler. The instructions provide information necessary to accomplish 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 Bottom Loading Coupler (coupler) (see [Figure 1](#)) is a push-on pull-off one-hand operation coupler designed to mate with adapters conforming to API Standard RP1004. The major functional components of the coupler are the coupler body, the poppet, the operating handle, the bail, and the crank mechanism. A floating nose seal provides positive sealing under all normal operating conditions.

2. Operation

A. Connecting the Coupler to the Adapter

The coupler may be connected to the adapter by pressing it forward onto the adapter. This actuates the three locking lugs, and releases the spring-loaded shroud. The shroud slides forward and holds the locking lugs in their locked position.

B. Operating the Coupler

CAUTION

THE SLEEVE SEAL WILL BE DAMAGED IF THE COUPLER IS OPENED WITHOUT BEING CONNECTED TO AN ADAPTER.

When the coupler is connected to the adapter, it may be opened by rotating its operating handle to the OPEN position. To close the coupler, rotate its operating handle to the CLOSED position.

C. Disconnecting the Coupler from the Adapter

The coupler may be disengaged from the adapter by rotating its operating handle to the CLOSED position and pulling back on the bail arm to disengage the locking lugs.

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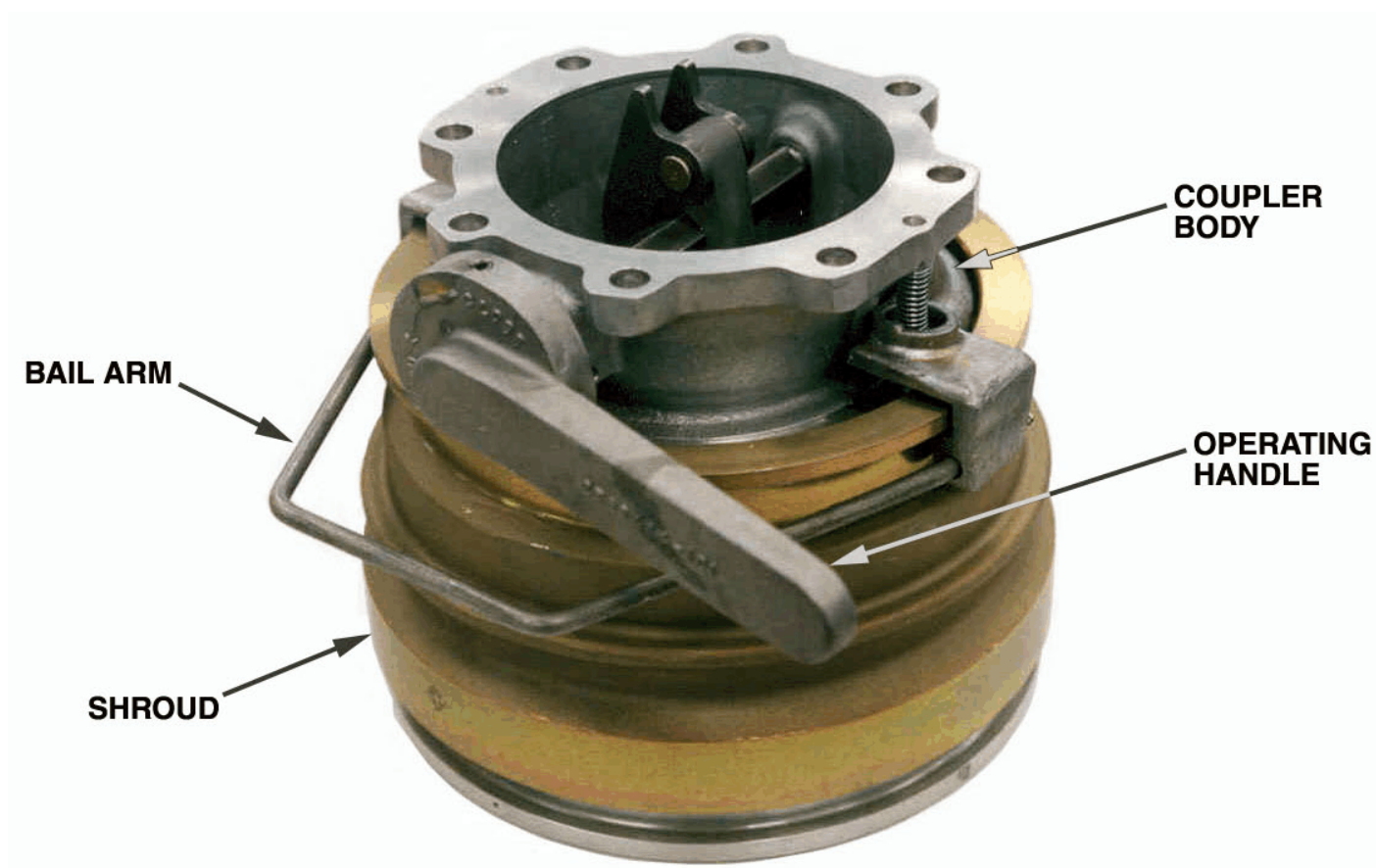


Figure 1. Bottom Loading Coupler

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3. Leading Particulars

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

Table 1. Leading Particulars

Service Fluid	Automotive and Aviation Fuels
Line Size	4-inch (101.6 mm)
Operating Pressure	
Working	0 to 120 psi (0 to 827 kPa)
Peak Surge	350 psi (2413.16 kPa)
Pressure Drop	4.7 psi (32.40 kPa) through F228/F433 at 1000 gpm (3785.41 lpm)
Fluid Temperature	-65 to 125°F (-54 to 51.66°C)
Ambient Temperature	-65 to 160°F (-54 to 71°C)
Key Dimensions	See Figure 3
Weight (approximate)	13.6 pounds (6.2 kg)

4. Model Variations

A. The basic F228 series coupler is equipped with standard seals. The Mod C variation utilizes Viton seals. The Mod E variation adds a stainless steel insert for heavy duty service (see [Figure 2](#)). Refer to the ILLUSTRATED PARTS LIST section for additional details.

B. Viton Seal Notes (Mod C Only)

1. Viton seals are not recommended for use in areas where the ambient temperature falls below 0°F (-18°C).
2. Viton seals are not recommended for use with diesel fuel because of the peroxides it contains.

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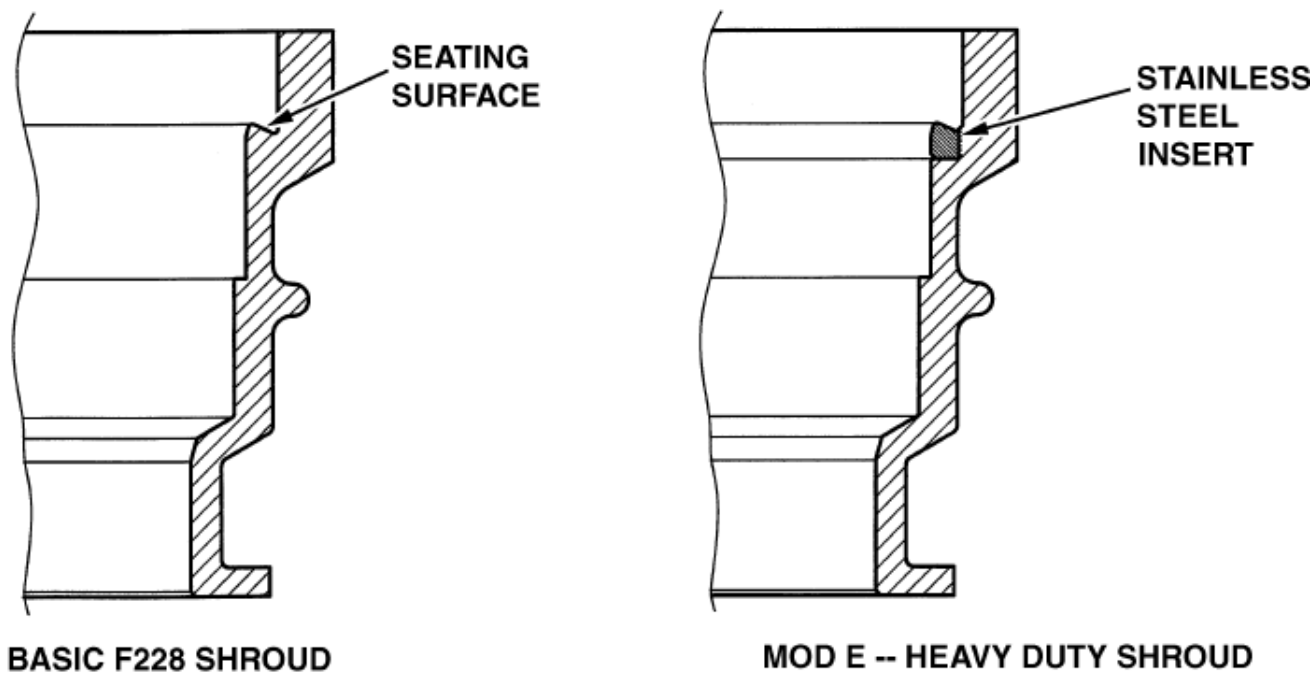


Figure 2. Shroud Variations

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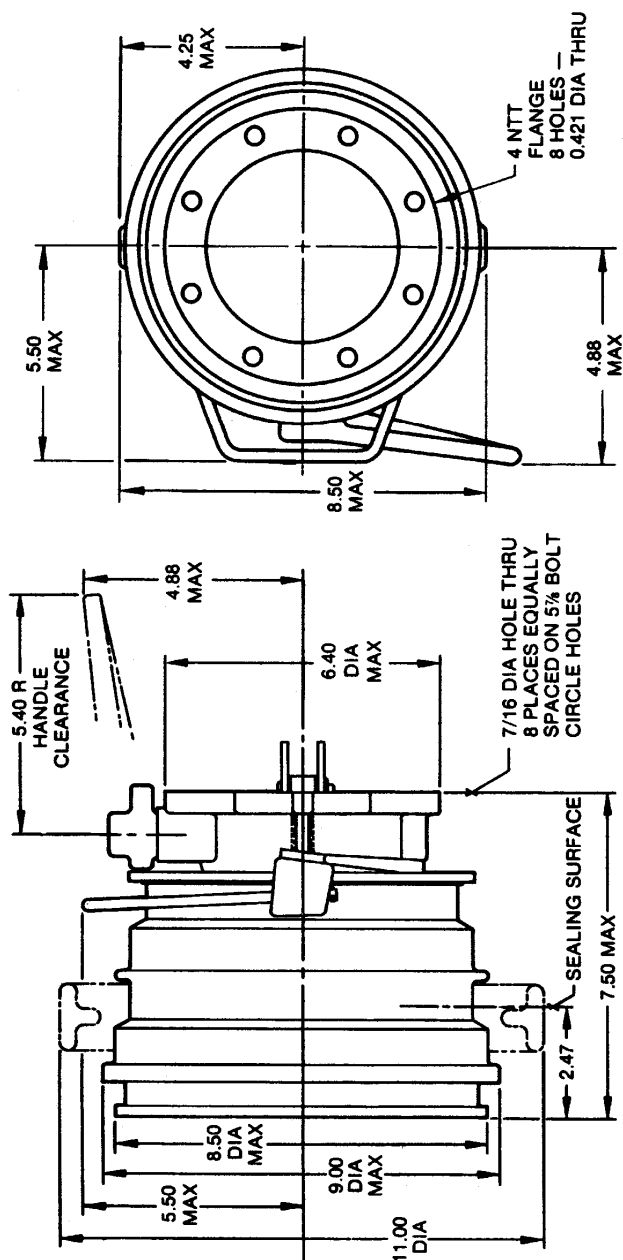
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NOTE: ALL DIMENSIONS SHOWN ARE IN INCHES.

Figure 3. Envelope Dimensions

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FAULT ISOLATION

1. General

This section contains fault isolation procedures for the coupler. Operate the coupler in accordance with the Operation section, if the coupler fails to operate correctly refer to [Table 2](#) and select the appropriate action. [Table 2](#) identifies the Fault, Probable Cause and Corrective Action.

Table 2. Fault Isolation

FAULT	PROBABLE CAUSE	CORRECTIVE ACTION
Leakage past poppet when closed	Damaged or worn seat (bonded) on sleeve (5)	Check condition and replace sleeve as necessary
Nose seal leakage	Damaged or worn nose seal (3)	Check condition and replace nose seal as necessary.
Leakage past sleeve	Damaged or worn packing (6)	Check condition and replace packing as necessary.
Leakage around operating handle shaft	Damaged or worn packing (15)	Check condition and replace packing as necessary.

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SPECIAL TOOLS

1. General

Refer to [Table 3](#) for the special tools recommended for maintenance of the coupler. Equivalent tools may be substituted for the items listed.

Table 3. Recommended Overhaul Replacement Parts

PART NUMBER	DESCRIPTION	APPLICATION
2702058	Adapter (API RP1004)	To drain the coupler/hose before removal.

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DISASSEMBLY

1. Replacement Parts Kits

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

2. Disassembling the Coupler

- A. Using an API-style adapter (p/n 2702058, or equivalent) without a poppet, release locking lugs (24) and drain the coupler.
- B. Unbolt the coupler from the adapter or hose connection. Remove the API-style adapter from the coupler.
- C. Manually release locking lugs (24) and slide sleeve assembly (5) forward.



THE SLEEVE ASSEMBLY IS SPRING-LOADED. USE CARE WHEN RELEASING THE SPRING FORCE.

- D. Rotate operating handle (10) to OPEN and release spring force on sleeve assembly (5).
- E. Remove pin (23), washer (20), and clevis pin (21) to release poppet (17), and remove poppet (17) from the coupler body (1).
- F. Remove sleeve assembly (5) from coupler body (1).

Note: If the sleeve assembly is difficult to remove; put the coupler body (1) face down and gently tap out sleeve assembly (5) from the inlet side.

- G. Remove wave washers (7) from coupler body (1).
- H. Pry retainer (4) from sleeve assembly (5). Remove nose seal (3) from the sleeve assembly (5). Remove wiper (32) and packing (6) from the sleeve assembly (5).
- I. Lift bail arm (27), rotate operating handle (10) to CLOSED and loosen setscrew (25).
- J. Drive pin (8) out of coupler body (1). Remove operating handle assembly from coupler body (1).

Note: For assembly reference; note down the relative positions of crank (16) and links (18).

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- K. Remove pin (11) out of operating handle (10). Remove operating handle (10), washer (35), wiper (12), bushing (13), washers (14) and packing (15) from the shaft (9).
- L. Remove cotter pin (34), washer (20) and clevis pin (21) from crank (16) and links (18).
- M. Remove cotter pins (28) to remove bail arm (27) from bail (26).
- N. Remove spring pin (33), pins (30), springs (31) and washers (29) from coupler body (1).
- O. Remove bail (26) from coupler body (1).
- P. Remove shroud (2) and wiper (19) from coupler body (1).
- Q. Remove springs (22) and locking lugs (24) from the coupler body (1).

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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 HARZARDOUS 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 of the metal parts by washing them thoroughly in dry cleaning solvent. Remove any stubborn deposits by scrubbing them with a non-metallic stiff bristle brush. Use a Teflon® pick to remove any blockage from the ports, grooves and 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 paragraph 2.

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	INSPECTION CRITERIA
General	Look at the parts for; nicks, cracks, cuts, burrs, corrosion, breaks, scoring, chafing, scarring, deformation, dents, thread damage, serration damage, or other damage. Make sure the ports, passages, recesses, and grooves are clean and are not blocked. Make sure all sealing and seating surfaces are free from damage or corrosion.
Nose Seal (3)	Make sure nose seal is free from any damage or excessive wear.
Sleeve Assembly (5)	Make sure the bonded seal on the sleeve assembly is free from any damage or excessive wear.
Clevis Pins (21)	Make sure there are no wear grooving from contact with the links (18).

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ASSEMBLY

1. Replacement Parts Kits

Refer to the ILLUSTRATED PARTS LIST section for recommended replacements parts information.

2. Repair Materials

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

Table 6. Recommended Assembly Materials

DESCRIPTION	SPECIFICATION	SOURCE
Petroleum Jelly	--	Commercially available
Thread Locking Compound	Loctite, Grade 242	Commercially available

3. Assembling the Coupler

A. Lubrication

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

B. Assembly Procedure (See [IPL Figure 1](#))

- See [Figure 4](#) and install the springs (22) and locking lugs (24) in the coupler body (1) as follows:

CAUTION

USE CARE WHEN USING LONG NOSE PLIERS, TO AVOID DAMAGING THE SPRING. THE WIRE SHALL NOT BE MARKED OR SCRATCHED.

Note: Long nose pliers can be used to close the spring loop during installation of a spring in the body.

- Push the loop of the spring (22) into the hole in the body (1), with the two tangs resting on the top surface. Push the spring in as far as possible, so the two tangs contact the body surface. The loop of the spring shall be a tight press fit in the hole.

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- b. Position the locking lug (24) in its groove of the body (1), spring anchor end inward to contact the ends of the two tangs of the spring (22). Lift and place the ends of the spring tangs into the groove of the locking lug. Press the locking lug inward and rotate it into position. Make sure the two spring tangs are in their correct positions and the locking lug rotates freely.

Note: Do steps; a and b to the remaining springs (22) and locking lugs (24).

2. Install wiper (19) in the wiper groove of shroud (2).
3. Put the coupler body (1) on the API-style adapter (p/n 2702058, or equivalent) used during disassembly of the coupler. Put shroud (2) on coupler body (1).
4. Install bail (26) on coupler body (1).
5. Install washers (29), pins (30), springs (31) and spring pin (33) on the coupler body (1).
6. Install bail arm (27) on bail (26) and secure with cotter pins (28).
7. Put links (18) on crank (16) and install clevis pin (21), washer (20) and cotter pin (34).

CAUTION

BEFORE INSTALLING THE PIN (11), MAKE SURE ALL BURRS ARE REMOVED. BURRS MAY DAMAGE THE PACKING (15) AND CAUSE LEAKAGE.

8. Install washers (14), packing (15), bushing (13), wiper (12), washer (35) and operating handle (10) on shaft (9). Install pin (11).

Note: The pin (11) must be flush or below the surface of the handle (10).

9. Assemble the crank (16) (with the links) and the operating handle assembly in the coupler body (1).
10. Make sure the operating handle (10) and links are in the correct position (see [IPL Figure 1](#)). Apply thread locking compound (Grade 242) to the threads of setscrew (25) and install in crank (16). Tighten setscrew (25) to lock its position on shaft (9).
11. To secure shaft assembly (13 thru 18); drive pin (8) into the pin bore on coupler body (1).

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12. Put nose seal (3) in the applicable groove on sleeve assembly (5) and secure with retainer (4). Put wiper (32) and packing (6) in the applicable grooves on sleeve assembly (5).
13. Install wave washers (7), sleeve assembly (5) and poppet (17) in the coupler body (1). Connect links (18) to poppet (17) with clevis pin (21), washer (20), straight pin (23) and cotter pin (34).
14. Turn the operating handle from OPEN to CLOSED several times to make sure correct operation.
15. Turn the operating handle to CLOSED. Slide the shroud (2) toward the operating handle until the locking lugs (24) engage.

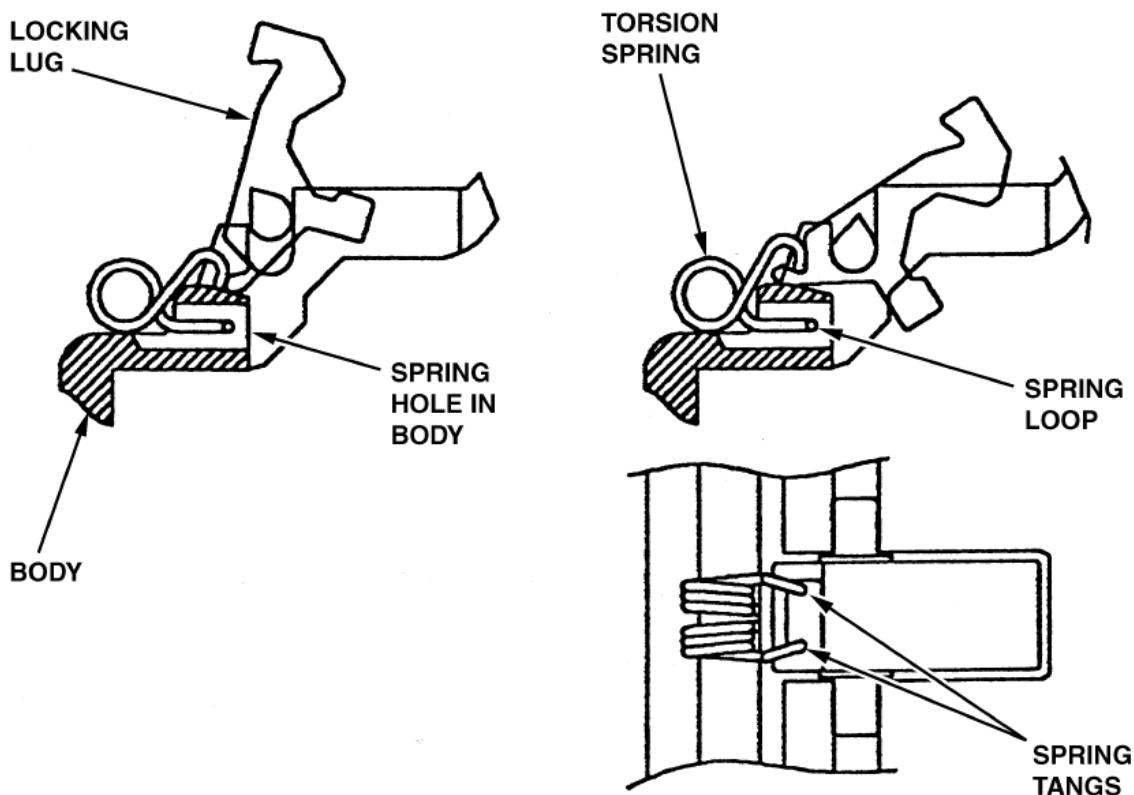


Figure 4. Springs and Locking Lugs Installation

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ILLUSTRATED PARTS LIST

1. General

This section lists, describes, and illustrates all detail parts required for maintenance support of the Bottom Loading Coupler.

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
IPL	Illustrated Parts List
MOD	Modification
NP	No Longer available

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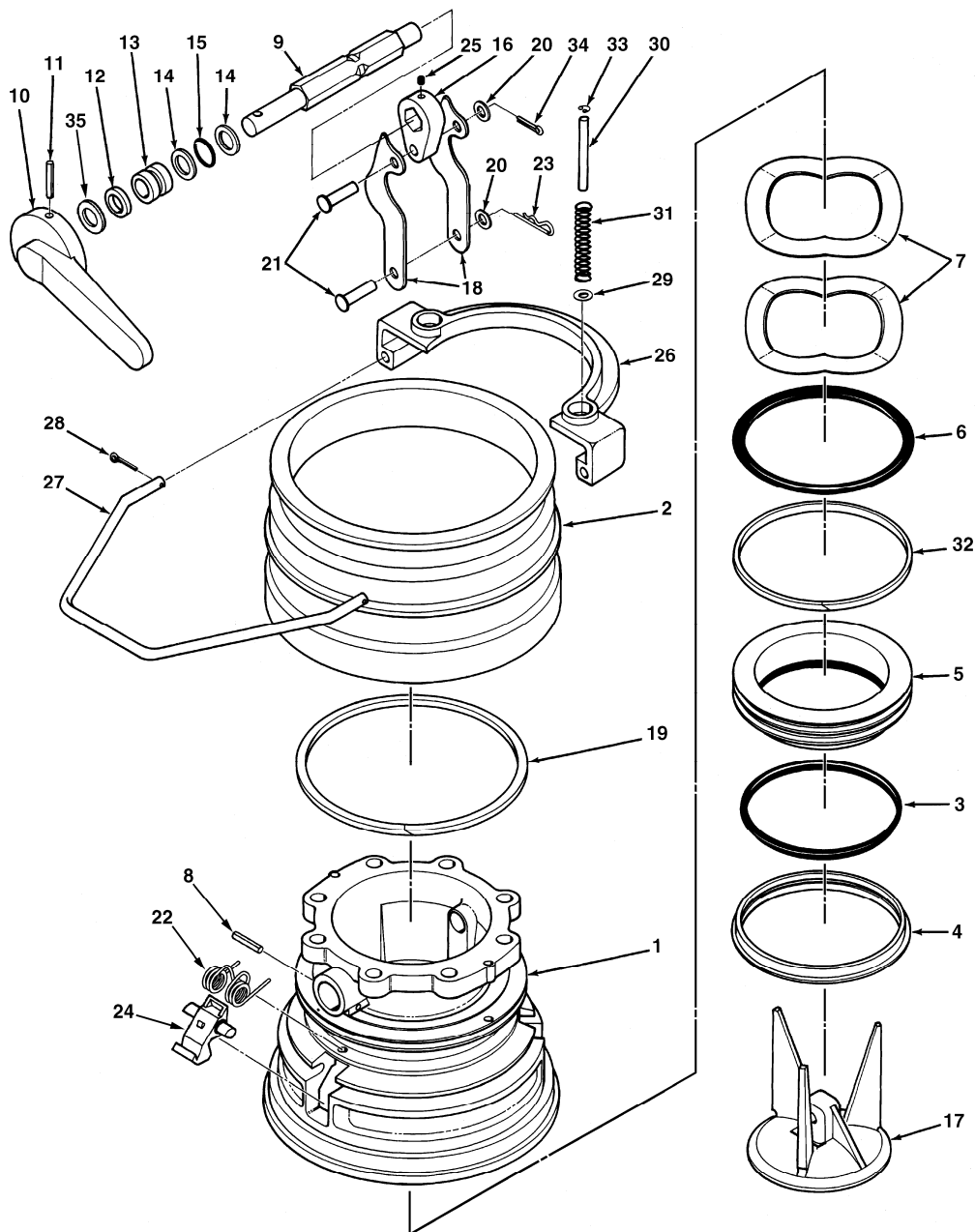
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IPL Figure 1. Bottom Loading Coupler

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FIG. ITEM	PART NUMBER	DESCRIPTION	MOD CODES	UNITS PER ASSY
COUPLER, BOTTOM LOADING				
1	F228	COUPLER, BOTTOM LOADING		REF
1	2773209-101	. BODY, COUPLER		1
2	2773207-101	. SHROUD		1
2A	971027-101	. SHROUD (WITH STAINLESS STEEL INSERT).....	E	1
3	2672292-1	. SEAL, NOSE		1
3A	2672292-2	. SEAL, NOSE (VITON).....	C	1
4	2672293	. RETAINER		1
5	2763489-101	. SLEEVE ASSEMBLY		1
5A	2763489-102	. SLEEVE ASSEMBLY (VITON).....	C	1
6	2661058BD350	. PACKING, PREFORMED		1
6A	2661058AF350	. PACKING, PREFORMED (VITON).....	C	1
7	W4997-050	. WASHER, WAVE		2
8	CMS171594	. PIN, SPRING.....		1
9	2763496-101	. SHAFT, HANDLE		1
10	2763484-101	. HANDLE, OPERATING.....		2
11	CMS171660	. PIN, SPRING.....		1
12	2763494-101	. WIPER		1
13	2763492-101	. BUSHING		1
14	2763493-101	. WASHER.....		2
15	2661058A207	. PACKING, PREFORMED		1
15A	2661058AF207	. PACKING, PREFORMED (VITON).....	C	1
16	2733269-1	. CRANK.....		1
17	2763483-101	. POPPET		1
18	2763497-102	. LINK.....		2
19	CMS28932C20-8	. WIPER.....		1
20	CAN960-516L	. WASHER, FLAT.....		2
21	CMS20392-4C33	. PIN, CLEVIS.....		2

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FIG. ITEM	PART NUMBER	DESCRIPTION	MOD CODES	UNITS PER ASSY
COUPLER, BOTTOM LOADING				
1 22	941016-101	. SPRING (SEE SERVICE BULLETIN 76).....		3
	2763491-101	. SPRING (REPLACED BY PN 941016-101).....		NP
23	98335A054	. PIN, STRAIGHT		1
24	2763487-101	. LUG, LOCKING		3
25	LP565A428H4	. SETSCREW		1
26	2773211-101	. BAIL		1
27	2773212-101	. ARM, BAIL.....		1
28	CMS24665-210	. PIN, COTTER.....		2
29	CAN960-416L	. WASHER, FLAT.....		2
30	2773214-101	. PIN		2
31	LC042E17	. SPRING, COMPRESSION.....		2
32	CMS28932C15-5	. WIPER		1
33	CMS16625-2025	. PIN, SPRING.....		2
34	CMS24665-300	. PIN, COTTER.....		1
35	CAN960-916L	. WASHER, FLAT		1

- Not Illustrated

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Meggitt Control Systems

Our product competencies & services:
Aerospace products | Thermal management solutions | Train control & control systems | Electro-mechanical products
Ground fuelling products | Energy products | Aftermarket services

MEGGITT
smart engineering for
extreme environments



Energy products

Meggitt Fuelling Products Maintenance Manual (MMF228) Bottom Loading Coupler – F228 Series

REPLACEMENT PARTS KITS AVAILABLE		
KIT PART NUMBER	APPLICABLE TO	ITEMS IN KIT (IPL Figure 1)
KITF228-102	Standard (Buna-N) Seals	3, 6, 15
KITF228-103	Standard (Buna-N) Overhaul	3, 5, 6, 8, 11, 12, 13, 15, 19, 21, 23, 25, 28, 30, 33
KITF228-104	Viton Conversion	3A, 5A, 6A, 15A
KITF228-106	Viton Overhaul	3A, 5A, 6A, 8, 15A 11, 12, 13, 19, 21, 23, 25, 28, 30, 33
KITF228-107	Viton Seals	3A, 6A, 15A

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