



**Facet Filter No: 053650**  
**Boeing Part No: 10-60565-3**

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**Service and Technical Manual  
for  
Filter, Hydraulic, System "B" Return  
Bulletin No. FPD2300.1**

**March 1996**

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### I. Description of Operation

The function of the filter assembly is to filter all fluid returning to the hydraulic reservoir from System B.

The unit consists of a top head casting to which a bottom bowl is attached by means of a threaded coupling. This forms a pressure of 400 psi minimum.

The filter element is rated at 10 microns and consists of Facet Filter Products Division Microfil® medium which is pleated between layers of stainless steel mesh and supported by a perforated stainless steel core. Anodized aluminum end caps are epoxy bonded to the element.

All materials and fluid seals in the filter assembly are compatible with Skydrol 500 hydraulic fluid.

The head casting has five ports which are identified as follows:

Function	Port Number
Fluid Inlet	1
Pressure Fill	2
Outlet to Reservoir	3
To Thermostat	4
To Case Drain	5

Two cartridge type check valves are installed in the top head casting which prevent back flow along with mechanical shutoff valves which seal off the hydraulic system when the filter bowl is removed for element servicing. A relief valve is provided which allows the hydraulic fluid to bypass the filter element should it become clogged prior to regular servicing. The cracking pressure of this valve is 100 psi.

The fluid flow and valve functions are described schematically in Section V.

### II. General Procedures

#### A. Cleaning & Preparation of Parts Prior to Reassembly

**Note:** The following procedures, while routine in manner, should be performed carefully since the inadequate cleaning of filter components could introduce contaminants into the hydraulic system and hence affect its operation.

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### 1. **Cleaning of Metal Parts**

All metals parts should be washed with a suitable solvent such as trichloroethylene, carbon tetrachloride, or stoddard solvent prior to reassembly. After washing, the parts should be dried with a lint-free cloth, by blowing out with prefiltered air and then suitably protected from contamination (lint, fibers, etc.) until they are reassembled into the unit.

### 2. **Preparation of Metal Parts and Fluid Seals for Assembly**

Fluid seals or O-rings should be blown clean with prefiltered air and coated with Skydrol 500 hydraulic fluid or a thin film of HI-LO MS No.1 lubricant (Allube Corp, Glendale, CA) prior to assembly.

The mating or locating surfaces and threaded sections of metal parts should also be lubricated in a similar manner prior to reassembly.

## **B. Test Fluids**

Fluids other than Skydrol 500 should not be allowed to contact fluid or O-ring seals, nor should they be introduced into the filter assembly since their compatibility with the elastomeric seals contained therein is not guaranteed.

## **C. Inspection of Parts**

The threaded sections of metallic parts should be examined carefully prior to reassembly for wear, scoring, or mutilation. All parts with damaged threads should be replaced.

Fluid seals or O-rings should not be reused after disassembly regardless of condition, but should be replaced unless otherwise specified.

Scored, nicked, or otherwise damaged valve seats or sealing surfaces may be repaired by careful refinishing. Reworked components must pass the component tests specified in Section IV.

Respective portions of the filter assembly which have undergone servicing should be tested according to the procedures in Section IV.

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### III. Maintenance & Overhaul Procedure

Note: The parts referred to below by number (Plug No. 14 for example) are identified in Section V in the component diagrams.

#### A. Filter Element and Bowl Removal

To remove the filter bowl and element, unscrew bowl No. 2. Remove retainer No. 5 from bowl and remove element.

Remove O-ring No. 6 from filter head casting.

Reassemble in reverse order, torquing bowl No. 2 to the value shown in Section V. Lockwire components securely using lockwire No. 22 and lockwire seal No. 25.

#### B. Filter Element Replacement

The filter element is noncleanable and must be replaced at regular intervals. Install new replacement filter element using new O-ring No. 3 in groove at open end of element.

Always keep the filter element in its protective package until ready for installation.

#### C. Upstream Mechanical Shutoff Valve Removal and Servicing

Remove plug No. 14 and spring No. 12 from the head casting. Remove O-ring No. 13 from plug No. 14.

Remove valve No. 11 from the head casting and inspect the sealing faces for imperfections and foreign matter.

Replace or rework components as required and reassemble in reverse order.

Plug No. 14 should be torqued to the value shown in Section V and lockwired securely using lockwire No. 22 and lockwire seal No. 25.

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### **D. Relief Valve Removal and Servicing**

Remove filter element and bowl according to Section IIIA. Remove nipple No. 7 and tabwasher No. 8 from the head casting. Remove spring No. 9 and relief valve No. 10 from relief valve cavity in head casting.

Inspect relief valve sealing faces and relief valve seat in head casting for imperfections or foreign matter. Replace or rework components as required.

Reassemble in reverse order replacing tabwasher No. 8. The nipple No. 7 should be torqued to the value specified in Section V and locked securely by bending the tabs on tabwasher No. 8 into the proper position.

### **E. Downstream Shutoff Valve Removal and Servicing**

Remove adapter No. 21 from the head casting. Remove O-ring No. 13 from adapter No. 21.

Remove spring No. 20 and valve No. 19 from the head casting. Inspect valve sealing faces and valve seat in head casting for imperfections or foreign matter. Replace or rework components as required and reassemble in reverse order.

Adapter No. 21 should be torqued to the value shown in Section V and lockwired securely using lockwire 22 and lockwire seal No. 25.

### **F. Check Valve Removal and Servicing**

Remove screws No. 16 and withdraw check valve No. 15 from check valve cavity in head casting.

Remove O-ring No. 17 from check valve and replace. Remove O-ring No. 18 and replace if defective.

Inspect check valve flapper seal for imperfections or foreign matter. Replace check valve assembly if flapper seal is defective.

Reassemble in reverse order, torquing screws No. 16 to the value specified in Section V. Lockwire screws No. 16 using lockwire No. 22 and lockwire seal No. 25.

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### IV. Component Test Procedures & Inspection

Note: Skydrol 500 hydraulic fluid must be used for the following test and should be held at a temperature of  $80^{\circ}\text{F}\pm 10^{\circ}\text{F}$  during testing unless otherwise noted.

#### A. Filter Assembly

If any component in the filter assembly has been removed for servicing, the following test should be performed prior to the reinstallation of the assembly into the aircraft.

When all other fluid ports suitably plugged and trapped air bled off from the filter assembly, a fluid pressure of 200 psi should be applied to inlet port No. 1 in the head casting. This pressure should be held for a period of two minutes, reduced to zero, and then reapplied for another two minutes.

This procedure should then be repeated again except that the fluid pressure should be 2 psi.

If leakage occurs during this test, the leaking component should be removed from the filter and its respective O-ring or fluid seal and sealing surfaces be inspected for imperfections or foreign matter.

After reassembly, the above pressure test should be repeated.

#### B. Filter Element

The filter element is of the noncleanable type and should not be reused.

Replacement filter elements have been thoroughly flow tested by the manufacturer and no further testing is required.

Always keep the filter element in its protective package until ready for installation.

#### C. Upstream Mechanical shutoff Valve

With the filter bowl and element removed, fluid port No. 2 blocked and all trapped air removed from the upstream region of the head casting, apply a fluid pressure of 2 psi to port No. 1 for three minutes. Inspect the head casting assembly No. 27 for leakage from the region of shutoff valve No. 11.

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If leakage is in excess of 20 drops per minute, the valve should be removed and inspected according to Section IIIC making the necessary repairs.

The shutoff valve should then be retested as outlined above.

### **D. Relief Valve**

With the filter bowl and element removed and port No. 2 blocked, bleed off all trapped air and apply a fluid pressure of 50 psi to inlet port No. 1. Gradually increase this pressure until a fluid flow of 3 cc per minute (60 drops per minute) is established through the relief valve or from nipple No. 7. The pressure at which this occurs is the relief valve cracking pressure and should be  $100 \pm 5$  psi.

The fluid pressure should then be increased until a substantial flow (2 gpm minimum) is obtained from nipple No. 7. The inlet pressure should then be gradually reduced until a fluid flow of 2 cc per minute (40 drops per minute) appears at nipple No. 7. The pressure at which this occurs is the relief valve reseating pressure and should be no lower than 90 psi.

If the relief valve does not operate within the specifications listed above, all relief valve components should be removed and inspected according to Section IIID, replacing the necessary components. The relief valve should then be retested after reassembly.

### **E. Downstream Shutoff Valve**

With a plugged check valve installed in place of downstream check valve No. 15 and with ports No. 4 and No. 5 blocked, apply a fluid pressure of 2 psi to port No. 3. Inspect the head casting for leakage through shutoff valve No. 19 or from nipple No. 7.

If leakage is in excess of 20 drops per minute, the shutoff valve should be removed and inspected according to Section IIIE, making the necessary repairs.

The shutoff valve should then be retested as outlined above.



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### **F. Check Valves**

#### **1. Upstream Check Valve**

With the filter bowl and element removed, apply a fluid pressure of 2 psi to port No. 2. This pressure should be held for a period of two minutes and reduced to zero. This test should then be repeated except with a fluid pressure of 50 psi.

If leakage in excess of 20 drops per minute appears at inlet port No. 1, upstream check valve No. 15 should be removed and inspected according to Section IIIF.

The above test should be repeated after the necessary servicing or check valve replacement.

#### **2. Downstream Check Valve**

With the filter bowl and element removed and port No. 2 blocked, apply a fluid pressure of 2 psi to port No. 1. This pressure should be held for a period of two minutes and then reduced to zero. This test should then be repeated except with a fluid pressure of 50 psi.

If leakage in excess of 20 drops per minute appears at ports No. 3, 4 or 5, downstream check valve No. 15 should be removed and inspected according to Section IIIF.

The above test should be repeated after the necessary servicing or check valve replacement.

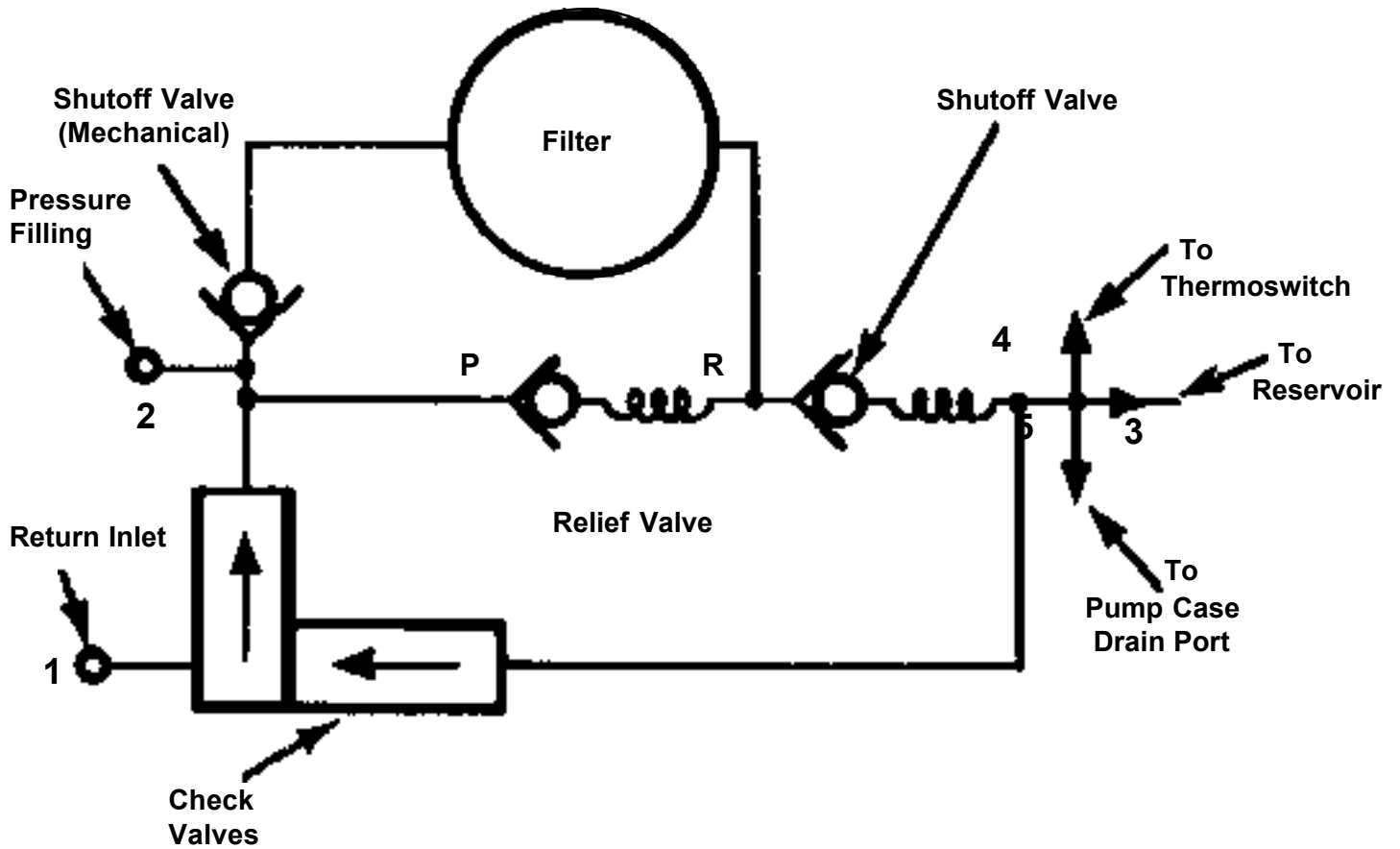
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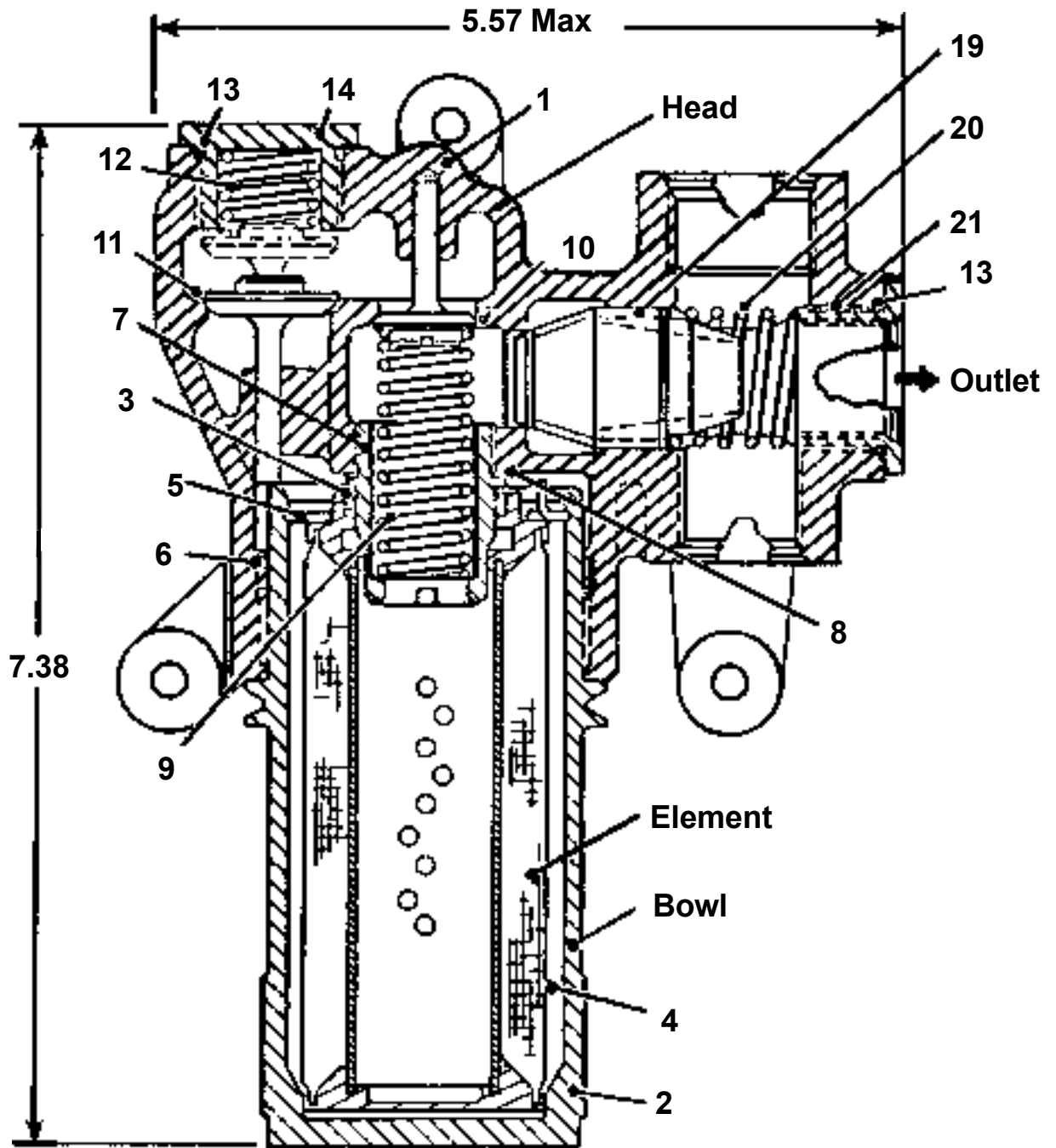
**V. Flow Schematics**  
**and**  
**Component Diagrams**

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**Figure A -  
Fluid Flow and Valve Function Schematic Diagram**

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**Figure B -**  
**Filter Assembly Cross Section**

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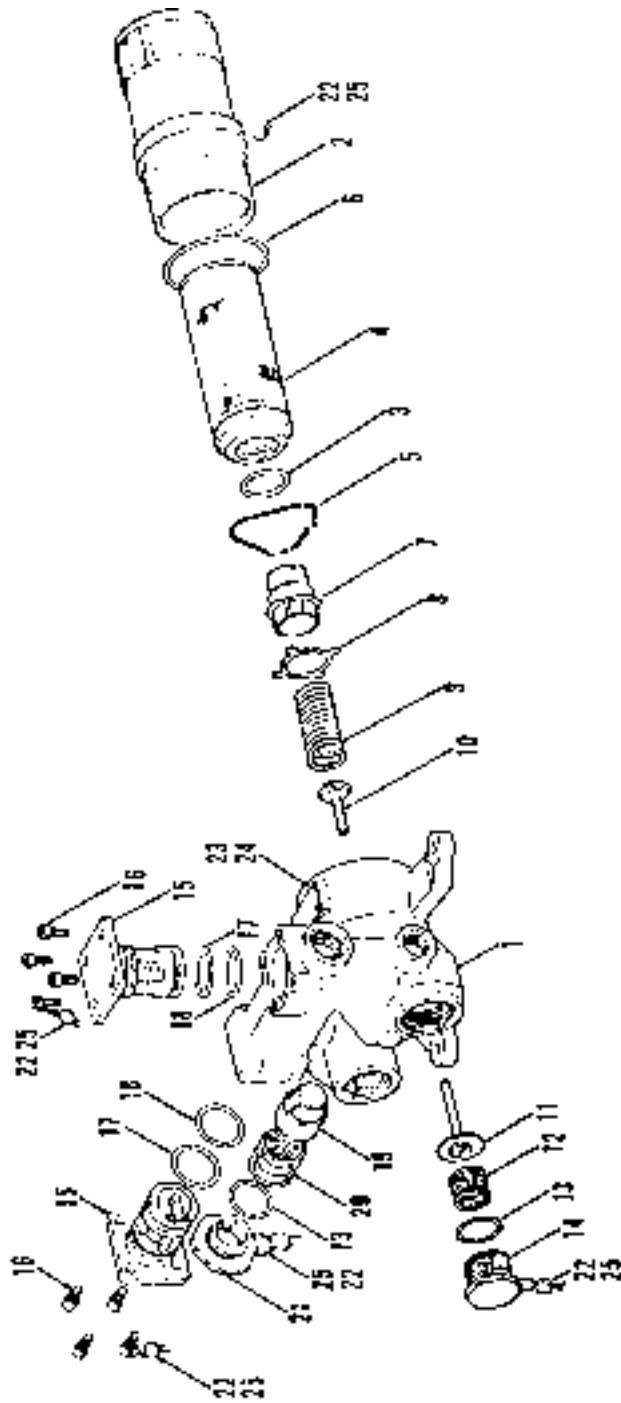


Figure C -  
Filter Assembly Exploded View (Component Ident)

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### Parts List

Item No.	Part No.	Nomenclature	Units per Assy
1	048686	Head Assembly	1
2	458651	Bowl	1
3	049409	O-ring Element NAS 1611-214	1
4	053655	Element Assembly Boeing P/N 10-60569-1	1
5	048656	Retainer	1
6	049406	O-ring Bowl NAS 1611-140	1
7	048652	Nipple	1
8	569593	Washer - Tab	1
9	048685	Spring	1
10	048659	Valve - Bypass	1
11	048657	Valve - Shutoff	1
12	048684	Spring	1
13	049415	Gasket - Adaptor NAS 1612-12	2
14	048654	Plug	1
15	045618	Check Valve Boeing P/N 10-60567-1	2
16	049317	Screw	8
17	049408	O-ring Check Valve NAS 1611-213	2
18	049407	O-ring Check NAS 1611-212	2
19	048658	Valve - Shutoff - Assembly	1
20	048683	Spring	1
21	049162	Adapter	1
22	568997	Lockwire	AR
23	053717	Name Plate	1
24	29054	Drive Screw AN 535-0-2	4
25	048983	Seal - Lockwire	5

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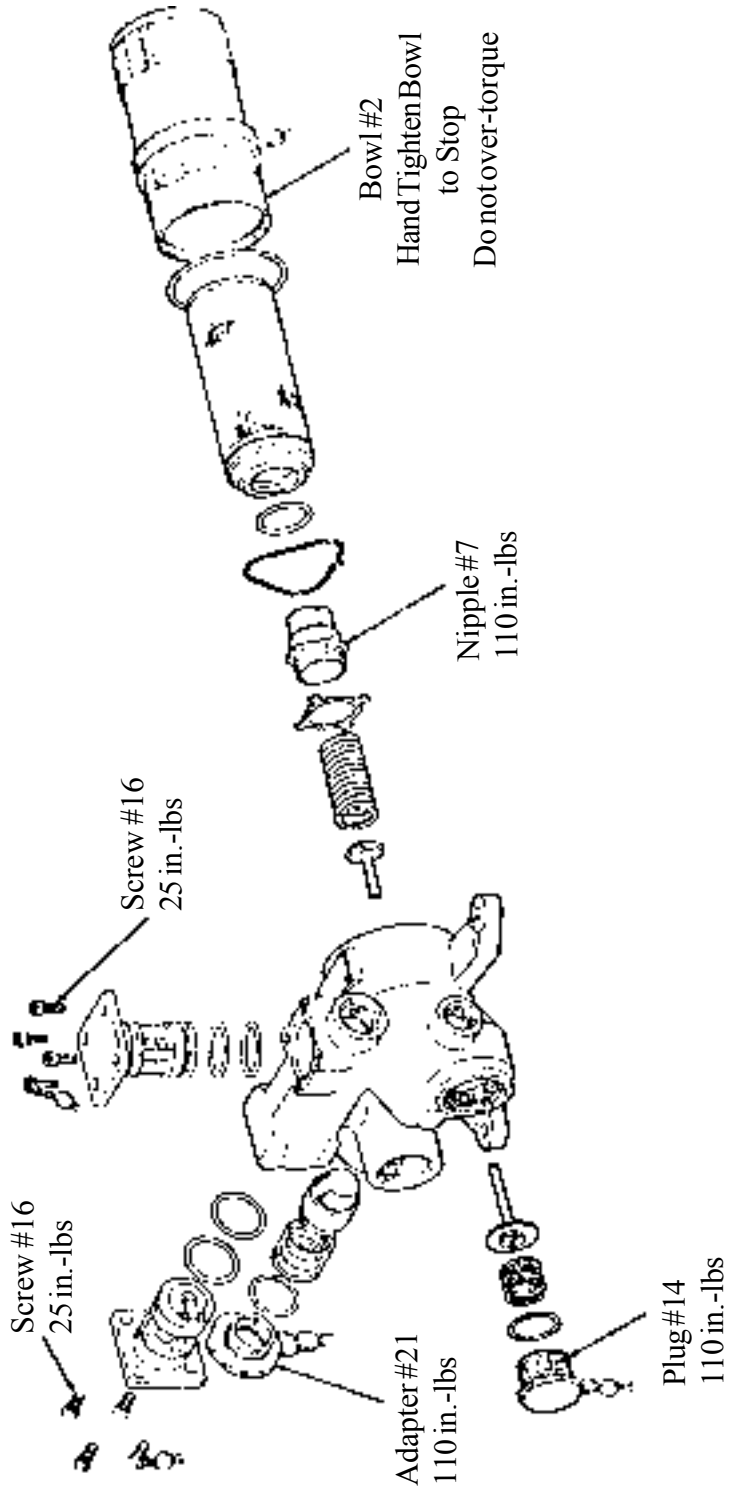


Figure D - Installation Torque Values