



**Bulletin HY14-2712-M1/US**  
**Service and Parts Bulletin**  
**Model V70**

Effective: August 1, 2002  
Supersedes: Cat. No. GSD-1351 dated 4/85

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**Sectional Body**  
**Directional Control Valve**





## **WARNING**

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# **SECTION I INTRODUCTION**

This manual contains pertinent step-by-step maintenance instructions plus parts ordering information and a complete parts and service kit listing for the Model V70 Directional Control Valve.

If further assistance is required, contact your Gresen Distributor or Representative.

## **WARNING**

**MAXIMUM OPERATING PRESSURE:  
3500 PSI [242 bar]**

**MINIMUM FILTRATION REQUIRED:  
33 MICROMETRE**

## SECTION II DESCRIPTION

Gresen's Model V70 Directional Control Valves are available with five different types of work sections, plus various options to meet specific job specifications.

The following paragraphs describe the five work sections and options with reference to the parts illustrations in Section IV in this manual.

### **3-WAY, 3-POSITION WORK SECTION (Housing No. 8566)** (Refer to Figure 4-2).

Provides control of single acting cylinders or start and stop of non-reversible hydraulic motors where free-wheeling of motor is not required. The work port is blocked in neutral position.

### **4-WAY, 3-POSITION WORK SECTION (Housing No. 8566)** (Refer to Figure 4-3).

Provides control of double-acting cylinders without floating action plus hydraulic motor start, stop and reverse control where free-wheeling is not required. Work ports are blocked in neutral position.

### **4-WAY, 4-POSITION FLOAT WORK SECTION (Housing No. 8566)** (Refer to Figure 4-4).

Provides control of double acting cylinders requiring a floating action. Incorporated into the work section is a 4-position float positioner. Three positions are standard double-acting with spring return to neutral. The fourth position is detented to hold in float position (both work ports open to tank).

### **TANDEM (PRIORITY) SECTION, 3-WAY, 4-WAY, OR 4-WAY FLOAT (Housing No. 8567)** (Refer to Figure 4-5).

Allows any upstream valve sections to have priority. Only when the upstream sections are in neutral or metering position will oil be available to this section.

### **4-WAY, 4-POSITION REGENERATIVE WORK SECTION (Housing No. 8939)** (Refer to Figure 4-6).

Same as 4-way, 3-position work section except that the fourth "regeneration" position provides a large

volume of oil for fast cylinder action but with little force.

## **SPOOL ACTION OPTIONS**

### **SPRING RETURN TO NEUTRAL (standard)** (Refer to Figure 4-7).

Spool will return to neutral position from A or B power position when handle is released.

### **3-POSITION DETENT, "D" OPTION** (Refer to Figure 4-8 thru 4-9B).

Used when manual placement (no spring return to neutral) is desired in any of three positions—spool "in", spool "out", and neutral. An optional detent stop (Part No. 8790-001) may be used to convert spool actions to neutral and spool "out" detent positions only or for neutral and spool "in" detent positions only, thus giving a 2-position detent spool action.

### **ROTARY SPOOL POSITIONER, "W" OPTION** (Refer to Figure 4-11).

Movement of spool is controlled by a rotary movement of the handle. Allows 90° rotation of spool in each direction from center.

### **HYDRAULIC REMOTE POSITIONER** (Refer to Figure 4-13 thru 4-19).

Provides for hydraulic remote control of spool movement. A customer supplied hydraulic controller (Gresen Model HCJ, HCS, or HCF) will provide proportional spool positioning for precise spool metering.

### **HANDLE OPTIONS** (Refer to Figures 4-22 thru 4-26).

Provides a choice of either horizontal or vertical handle assemblies.

### **INLET AND OUTLET COVERS** (Refer to Section III, Parts Ordering Information).

### **WORK PORT CHECK AND RELIEF VALVE OPTIONS** (Refer to page 3-5).

## SECTION III MAINTENANCE

### REPLACING, ADDING OR REMOVING WORK SECTION ASSEMBLIES.

#### NOTE

For clarification, the side containing the inlet cover (the cover containing the main relief valve) will be called the left end of the valve assembly. (Refer to Figure 3-1.)

1. Before disassembly, it is suggested that each work section be marked numerically to avoid incorrect reassembly.

2. Remove four hex nuts (Item 27, Figure 4-1) from the right end of the valve assembly using a  $\frac{3}{4}$ " socket wrench.
3. Remove the outlet cover and each section by sliding from the valve assembly studs (Item 27, Figure 4-1).
4. If work sections are to be added or subtracted from the valve assembly, the four studs must be removed from the inlet cover and replaced with studs of proper length. (Refer to table on page 3-2).

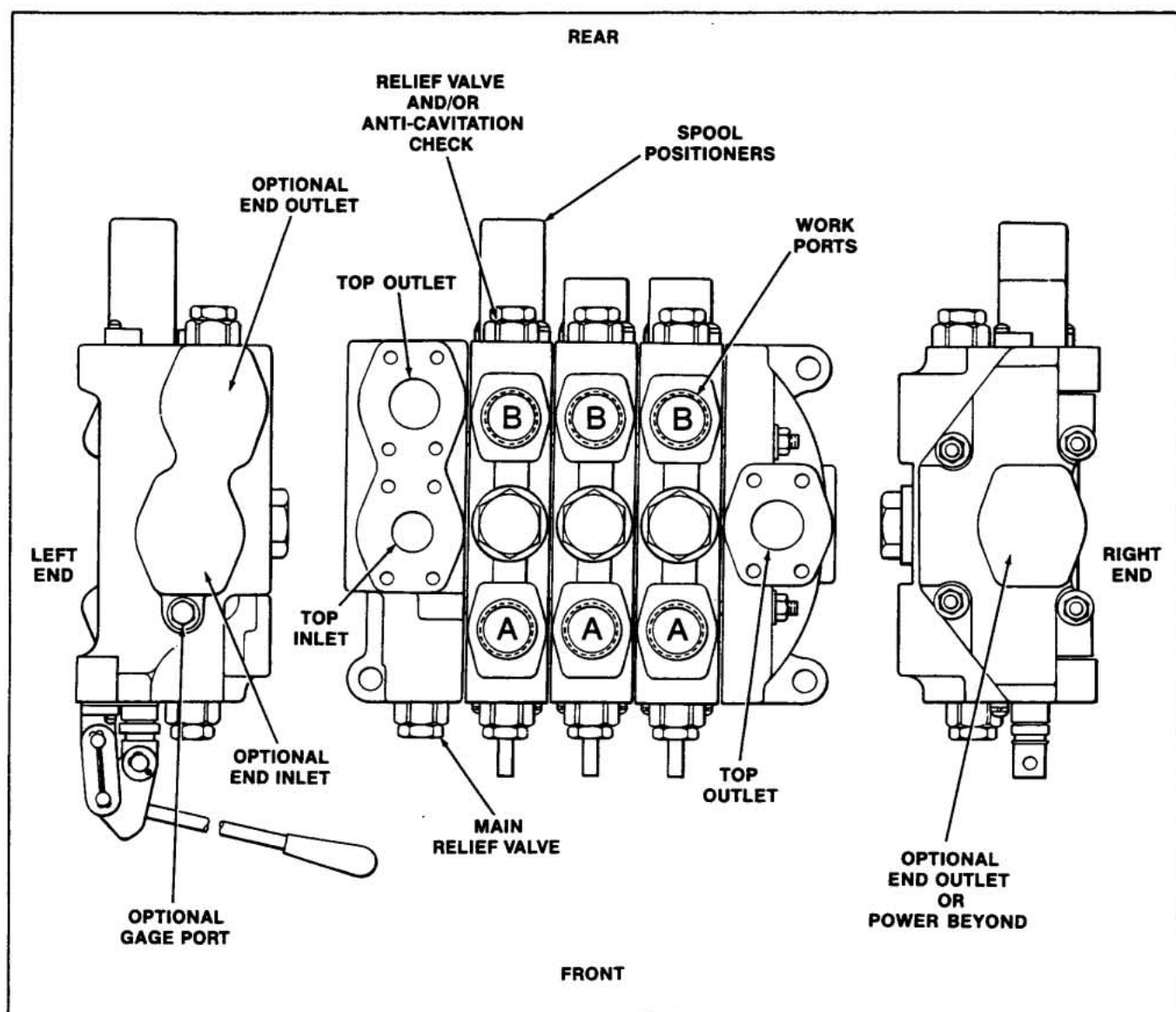


Figure 3-1. Schematic view of a typical Model V70 Control Valve Assembly.

**Table 3-1. Assembly Studs.**

NO. OF WORK SECTIONS	ASSEMBLY STUD KIT NO.
1	K-12012-A
2	K-12013
3	K-12014
4	K-12015
5	K-12016
6	K-12017

**NOTE**

No lock washers required! Studs are of stress-proof material and should be replaced only with original equipment replacement parts.

- Thoroughly clean O-ring counterbores and ground surfaces of each section.
- Replace the four O-ring seals, one Part No. 6842-001 and three Part No. 8329-001. Buna-N seals are standard. For optional Viton seals, contact the factory.
- Replace work sections on assembly studs in the same order in which they were removed. O-ring counterbores (with O-rings in place) should be to the right when facing "A" port or front side of the valve assembly.

**NOTE**

Use care in replacing valve sections to avoid dislodging O-rings from counterbores.

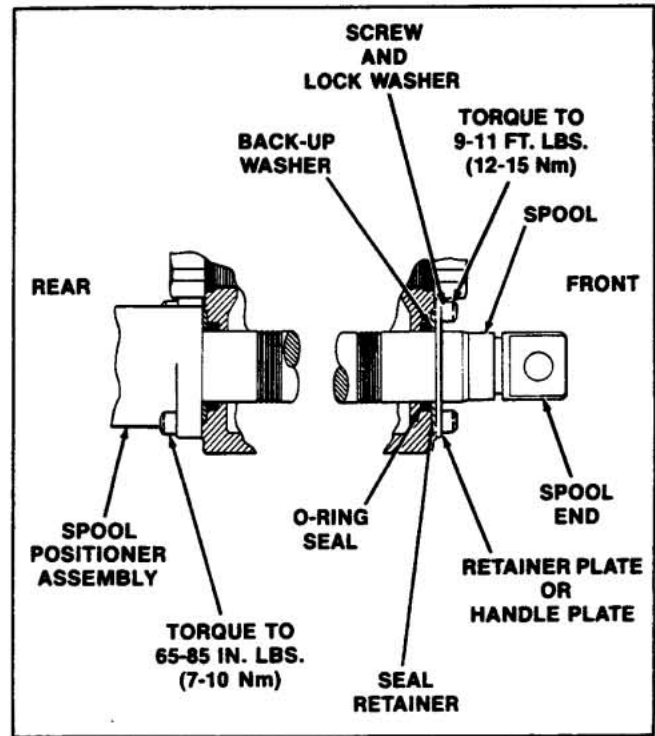
- When all work sections and the outlet cover are positioned on the assembly studs, replace stud nuts and tighten evenly to between 80-85 ft. lbs. torque (108-115 Nm).

**CAUTION**

If stud nuts are not tightened to the proper torque, 80-85 ft. lbs. (108-115 Nm), valve spools may bind or stick, or cause section seals to extrude.

**REPLACING SPOOL SEALS**

Figure 3-2 shows spool seal assembly—less the handle assembly. When the handle bracket is furnished, retainer plate and retainer screws are not used. Seal assembly is retained by handle bracket and its attaching parts (Refer to Figure 4-22). When hydraulic remote spool positioners are used, spool seal assemblies are not required. When float spool positioner is used, special spool seal assembly is required for positioner end of spool (Refer to Figure 4-10).



**Figure 3-2. Spool Seal Assembly.**

- Remove spool positioner assembly from rear of work section. Keep in order of disassembly.
- Remove complete handle bracket assembly or retainer and retainer screws from front of work section.

**CAUTION**

Do not remove the spool as the seals can be replaced externally. Prevent spool from turning or moving by running a rod through the hole in the spool end and using as a handle. Do not hold the spool with a wrench. This will destroy the finish and could cause spool bind.

- Remove seal retainers, back-up washers and O-ring seals.
- Thoroughly clean counterbore.
- Lightly oil new seals. Slide over valve spool and insert in seal counterbore.
- Reassemble parts in reverse order of disassembly.
- Torque bonnet screws and handle bracket or retainer plate screws to 9-11 ft. lbs. (12-15 Nm).

# PARTS ORDERING INFORMATION

## INLET COVER

Part No. 8565.

All inlet covers are machined to accept relief valve Model RP70 or NR (no relief) plug. If the outlet port is not machined, then the outlet port in the right or outlet cover must be used for a tank return line.

The inlet cover may be machined with several different combinations of port sizes and locations. Use the following porting chart to determine the proper machining modification number.

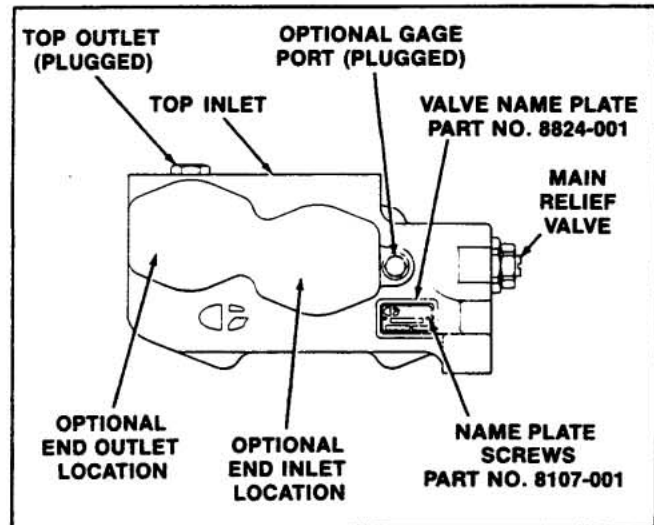
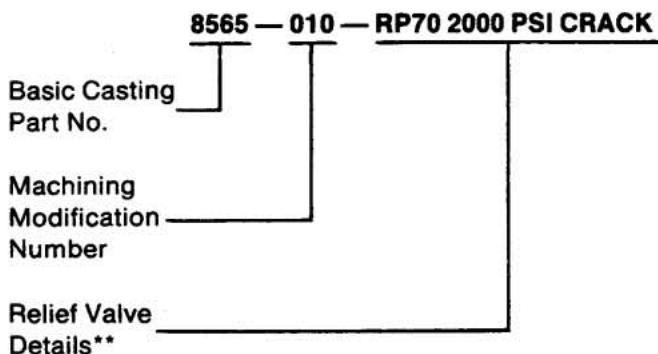


Figure 3-3. Inlet Cover Part No. 8565.

PORT LOCATION	SAE PORTS										
Top In*	SAE 20		SAE 20	SAE 20	SAE 24			SAE 24	SAE 24		
Top Out*			SAE 20	SAE 24				SAE 24	SAE 24		
End In		SAE 20				SAE 24	SAE 24			SAE 24	SAE 24
End Out										SAE 24	SAE 24
Gage Port					SAE 4		1/4" NPTF		1/4" NPTF	1/4" NPTF	SAE 4
Machining Modification Number	007	008	028	013	012	024	011	004	017	019	005
PORT LOCATION	SPLIT FLANGE PORTS										
Top In*	1 1/4" SF		1 1/2" SF	1 1/2" SF	1 1/2" SF			1 1/2" SF			
Top Out*								1 1/2" SF			
End In		1 1/4" SF				1 1/2" SF	1 1/2" SF		1 1/2" SF	1 1/2" SF	1 1/2" SF
End Out									1 1/2" SF	1 1/2" SF	1 1/2" SF
Gage Port	SAE 4	SAE 4		1/4" NPTF	SAE 4		SAE 4	1/4" NPTF		1/4" NPTF	SAE 4
Machining Modification Number	002	014	025	010	003	009	020	016	026	018	006

\*Top in and top out are cored holes. If not required, these ports will be machined and plugged with SAE 10 plugs.

## Ordering Example For Inlet Covers.



## \*\*Specify:

- Model number of relief valve to be used (Refer to page 3-5) and relief setting required.
  - "Crack" pressure is setting when relief is passing 1 GPM (3.8 litres/min.)
  - "Full flow" is pressure setting when relief is passing specified GPM (litres/min.).
 OR
- "NR" (no relief) if plug is to be installed.
 OR
- "Plastic Shipping Plug" if neither relief nor "NR" plug are required.



## OUTLET COVER Part No. 8545.

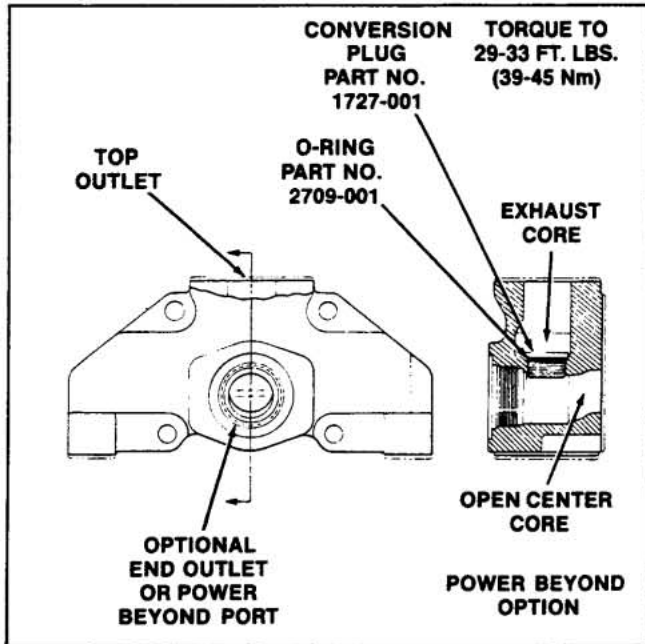


Figure 3-4. Outlet Cover Part No. 8545.

The top outlet port is cored, end outlet is optional. Example in Figure 3-4 is the optional power beyond version.

Standard machining provides a top outlet port for open center applications.

With the conversion plug installed, two options are available for the outlet cover... closed center or power beyond. For power beyond, the top outlet is the tank exhaust and the end outlet becomes the power beyond port (see Figure 3-4). For closed center, the top outlet is the tank exhaust and the end outlet (power beyond) port is plugged.

For plumbing convenience, the outlet port may be located in the inlet (left) cover. When it is, the top outlet port in the outlet (right) cover must be plugged to direct the exhausting oil back to the inlet cover.

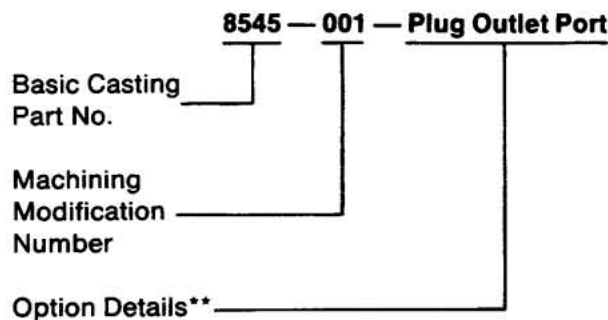
Use the following porting chart to determine the proper machining modification number for the No. 8545 outlet cover.

PORT LOCATION	SAE			SPLIT FLANGE			
Top Out*	SAE 24	SAE 24	SAE 24	1½" SF	SAE 24	1½" SF	1½" SF
End Out		SAE 20	SAE 24		1½" SF	1¼" SF	1½" SF
Machining Modification Number	001	009	004	003	008	006	007

\*Top outlet is a cored hole. If not required, port will be machined and plugged with SAE 24 plug.

**Note:** Internal core between open center and exhaust passages is always machined and tapped for SAE 14. This core is plugged for power beyond and closed center applications (see Figure 3-4).

Table 3-4. Ordering Example For Outlet Covers.



\*\*If required specify:

- \_\_\_ Power Beyond
- \_\_\_ Closed Center
- \_\_\_ Plug Outlet Port (If both ports are machined, specify which port(s) to plug).

## WORK SECTIONS

The following information is necessary for proper specification for each Model V70 work section:

1. Circuit
2. Function of Section
3. Optional Features

4. Work Port Sizes
5. Work Port Options
6. Handle End Options

The chart shown below will help in identifying options available and the information needed for proper ordering. Refer to V70 sales catalog No. PC-1401 for complete information on available options.

<b>CIRCUIT</b>	<input type="checkbox"/> Parallel <input type="checkbox"/> Tandem		
<b>FUNCTION OF SECTION</b>	<input type="checkbox"/> 3-Way <input type="checkbox"/> 4-Way <input type="checkbox"/> 4-Way Float <input type="checkbox"/> 4-Way Regenerative		
<b>OPTIONAL FEATURES</b>	<input type="checkbox"/> Free Flow <input type="checkbox"/> 3-Position Detent <input type="checkbox"/> _____		
<b>WORK PORT SIZES "A" and "B" WORK PORTS</b>	<input type="checkbox"/> SAE 16 <input type="checkbox"/> SAE 20 <input type="checkbox"/> 1" SF <input type="checkbox"/> 1" BSP <input type="checkbox"/> 1 1/4" BSP		
<b>WORK PORT OPTIONS</b>	Specify for "A" and "B" work ports <input type="checkbox"/> NR, No Relief <input type="checkbox"/> Work Port Relief Valve _____ Specify: Model Number and Setting (PSI) at crack or full flow <input type="checkbox"/> Anti-Cavitation Check		
<b>HANDLE END OPTIONS*</b>	<table border="0"> <tr> <td> <input type="checkbox"/> LCHA, Less Complete Handle Assembly  <input type="checkbox"/> CVHA, Vertical Handle Assembly  <input type="checkbox"/> CHHA, Horizontal Handle Assembly  <input type="checkbox"/> LHO, Less Handle Only, includes link assembly  <input type="checkbox"/> HBO, Handle Bracket Only, less link assembly  <input type="checkbox"/> Spool Boot Assembly               </td> <td>                 Location  <input type="checkbox"/> "A" Port End  <input type="checkbox"/> "B" Port End               </td> </tr> </table>	<input type="checkbox"/> LCHA, Less Complete Handle Assembly <input type="checkbox"/> CVHA, Vertical Handle Assembly <input type="checkbox"/> CHHA, Horizontal Handle Assembly <input type="checkbox"/> LHO, Less Handle Only, includes link assembly <input type="checkbox"/> HBO, Handle Bracket Only, less link assembly <input type="checkbox"/> Spool Boot Assembly	Location <input type="checkbox"/> "A" Port End <input type="checkbox"/> "B" Port End
<input type="checkbox"/> LCHA, Less Complete Handle Assembly <input type="checkbox"/> CVHA, Vertical Handle Assembly <input type="checkbox"/> CHHA, Horizontal Handle Assembly <input type="checkbox"/> LHO, Less Handle Only, includes link assembly <input type="checkbox"/> HBO, Handle Bracket Only, less link assembly <input type="checkbox"/> Spool Boot Assembly	Location <input type="checkbox"/> "A" Port End <input type="checkbox"/> "B" Port End		

**NOTE:** Each spool is fitted to its work section housing at the factory and neither part can be purchased separately. Handle location can be changed by reversing spool in housing.

## RELIEF VALVES

### Main and Work Port

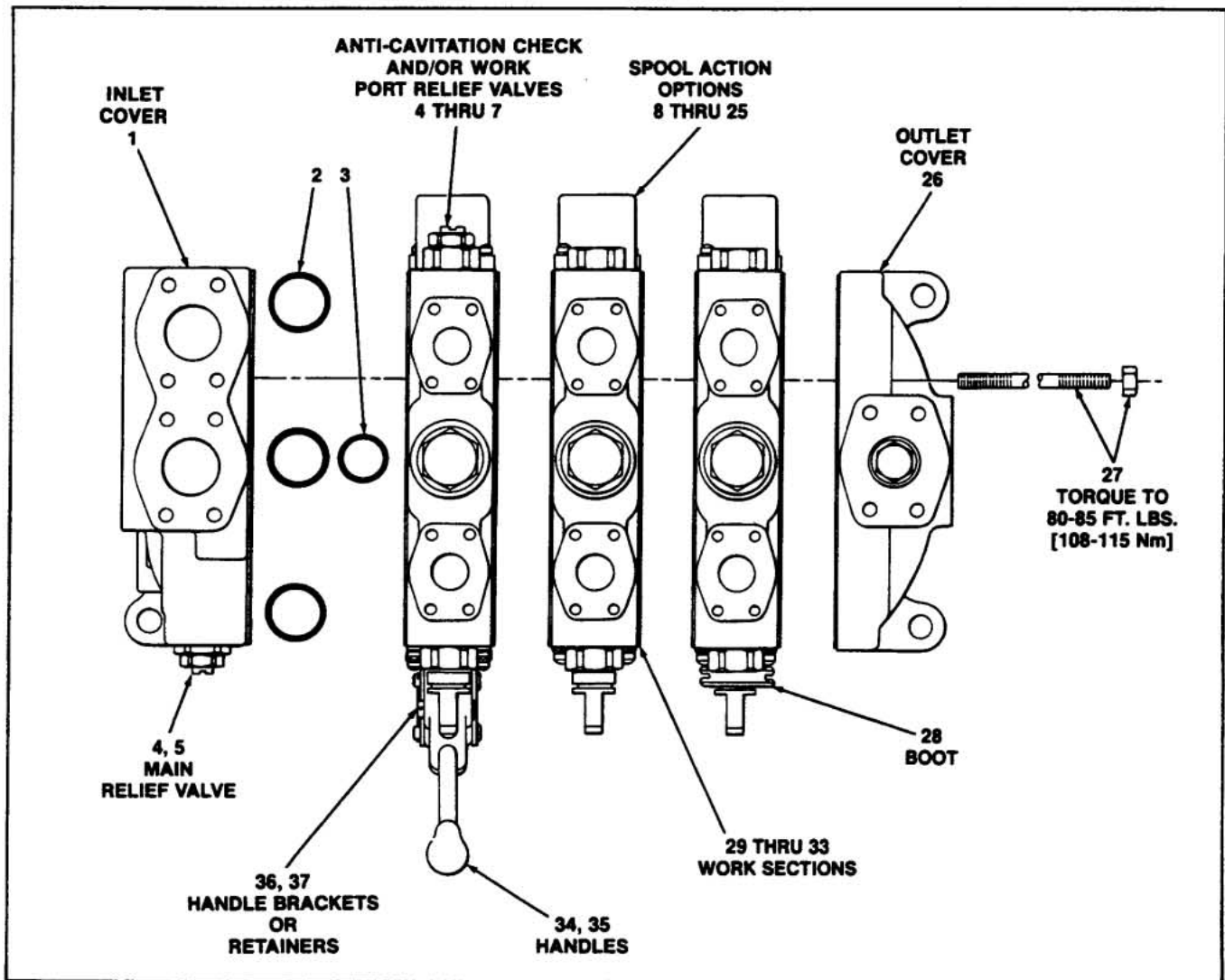
The adjacent chart identifies relief valve options available. Refer to Figures 4-27 thru 4-30 for service information.

Specify model number and setting (PSI) at crack or full flow.

DESCRIPTION	MODEL	
	MAIN	WORK PORT
Adjustable Relief Valve	RP70A	RP70A
Tamperproof Relief Valve	RP70N	RP70N
Anti-Cavitation Check		A/C
Combination Relief Valve and Anti-Cavitation Check		RP70A-AC, RP70N-AC

1. "Crack" pressure is setting when relief is passing 1 GPM (3.8 litres/min.).
2. "Full Flow" is pressure setting when relief is passing specified GPM (litres/min.).

## SECTION IV PARTS LISTING



**Figure 4-1. Model V70 Directional Control Valve, Typical Main Assembly.**

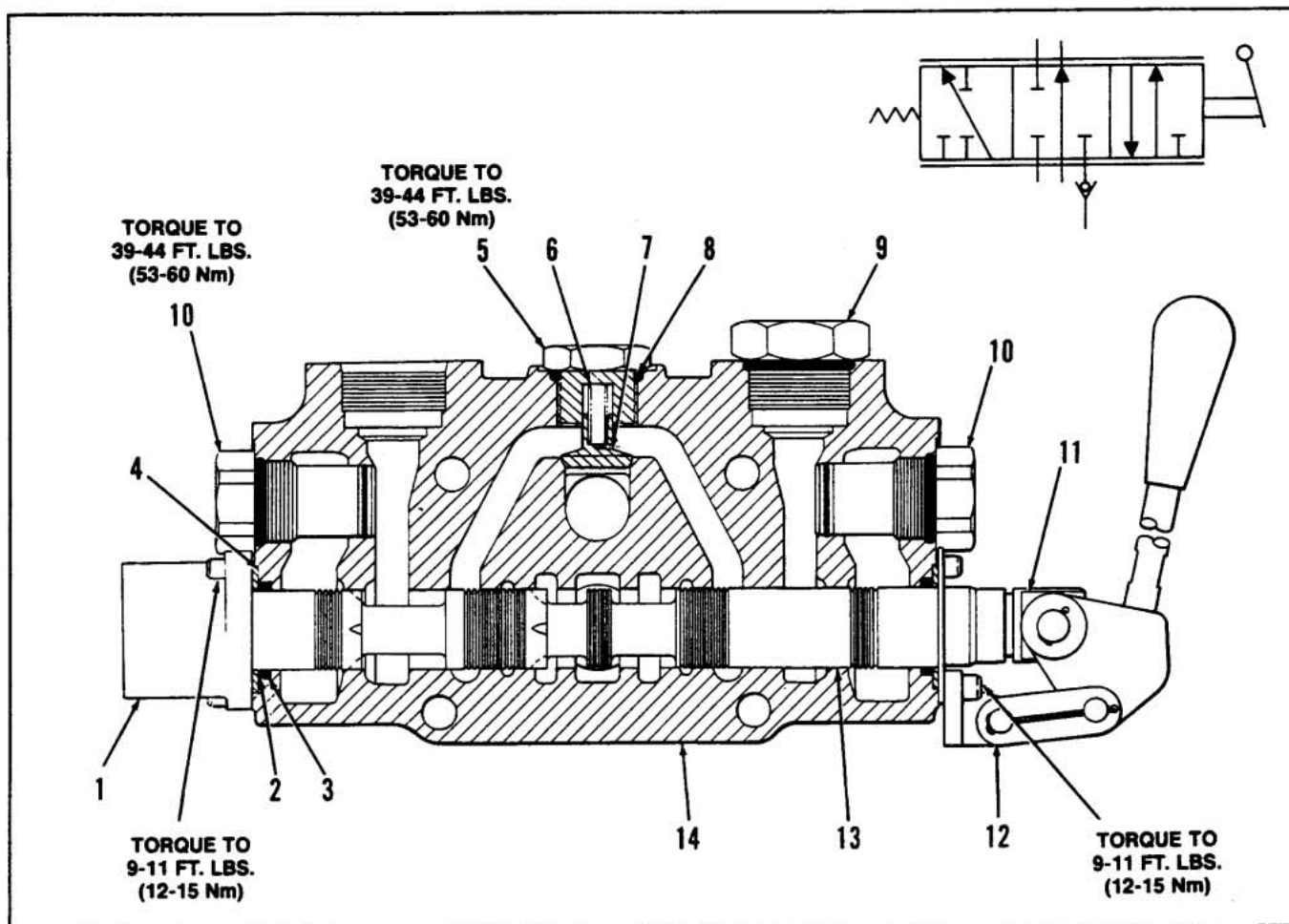
### MODEL V70 DIRECTIONAL CONTROL VALVE, TYPICAL MAIN ASSEMBLY

Item No.	Part No.	Description	Quantity Per Assembly
1	8565	COVER, Left, Inlet (Refer to page 3-3)	1
2	8329-001*	O-RING SEAL, Large	3 per section plus 3
3	6842-001*	O-RING SEAL, Small	
		Order K-12011 (Contains (3) Part No. 8329-001 and (1) Part No. 6842-001)	1 per section plus 1
4	K-12020	PLUG, No Relief (NR) (See Figure 4-27)	A/R
5		RELIEF, RP70	A/R
6		RELIEF and ANTI-CAVITATION COMBINATION	Refer to page 3-5
7		ANTI-CAVITATION CHECK	
8	K-12001-B	POSITIONER, Spring Return to Neutral, Standard (See Figure 4-7)	A/R
9	K-12002-B	POSITIONER, Spring Return to Neutral, HP (See Figure 4-7)	A/R
10	K-12006-B	POSITIONER, 3-Position Detent, "D" (See Figure 4-8)	A/R
11	K-12007-B	POSITIONER, 2-Position Detent, In (See Figure 4-9A)	A/R
12	K-12008-B	POSITIONER, 2-Position Detent, Out (See Figure 4-9B)	A/R

# **MODEL V70 DIRECTIONAL CONTROL VALVE, TYPICAL MAIN ASSEMBLY (Cont.)**

Item No.	Part No.	Description	Quantity Per Assembly
13	K-12004-B	POSITIONER, Float, Standard (See Figure 4-10)	A/R
14	K-12005-B	POSITIONER, Float, HP (See Figure 4-10)	A/R
15	K-12026-A	POSITIONER, Rotary, "W" (See Figure 4-11)	A/R
16	K-12027	POSITIONER, Regenerative, Standard (See Figure 4-12)	A/R
17	K-12028	POSITIONER, Regenerative, HP (See Figure 4-12)	A/R
18	K-12030-A	POSITIONER, Hydraulic Remote, "A" Port End (See Figure 4-13)	A/R
19	K-12029-A	POSITIONER, Hydraulic Remote, "B" Port End (See Figure 4-14)	A/R
20		POSITIONER, Hydraulic Remote, 3-Position Float or Regenerative, "A" Port End (See Figure 4-15)	A/R
21		POSITIONER, Hydraulic Remote, 4-Position Float or Regenerative, "A" Port End (See Figure 4-16)	A/R
22	K-12031-A	POSITIONER, Hydraulic Remote, Float or Regenerative, "B" Port End (See Figure 4-17)	A/R
23	K-12036-A	POSITIONER, Hydraulic Remote with Manual Override, "A" Port End (See Figure 4-18)	A/R
24	K-12037-A	POSITIONER, Hydraulic Remote with Manual Override, "B" Port End (See Figure 4-19)	A/R
25		MANUAL OVERRIDE, HRO Positioner (See Figure 4-20)	A/R
26	8545	COVER, Right, Outlet (See Page 3-4)	1
27		STUD and NUT ASSEMBLY (See table of page 3-2)	4
28	K-12023-A	BOOT, Spool Protector (See Figure 4-25)	A/R
29	8566	WORK SECTION, 3-Way, 3-Position (See Figure 4-2)	A/R
30	8566	WORK SECTION, 4-Way, 3-Position (See Figure 4-3)	A/R
31	8566	WORK SECTION, 4-Way, 4-Position Float (See Figure 4-4)	A/R
32	8567	WORK SECTION, Tandem, 3-Way, 4-Way, or 4-Way Float (See Figure 4-5)	A/R
33	8939	WORK SECTION, 4-Way, 4-Position Regenerative (See Figure 4-6)	A/R
34	K-12018-C	VERTICAL HANDLE ASSEMBLY (See Figure 4-22)	A/R
35	K-12019-B	HORIZONTAL HANDLE ASSEMBLY (See Figure 4-23)	A/R
36	K-12025-A	BRACKET, Handle (See Figure 4-26)	A/R
37	K-12024	RETAINER, Spool Seal (See Figure 4-24)	A/R

\*Buna-N seals are standard for all Gresen valve assemblies. For Viton seals contact the factory.



**Figure 4-2. 3-Way, 3-Position Work Section.**

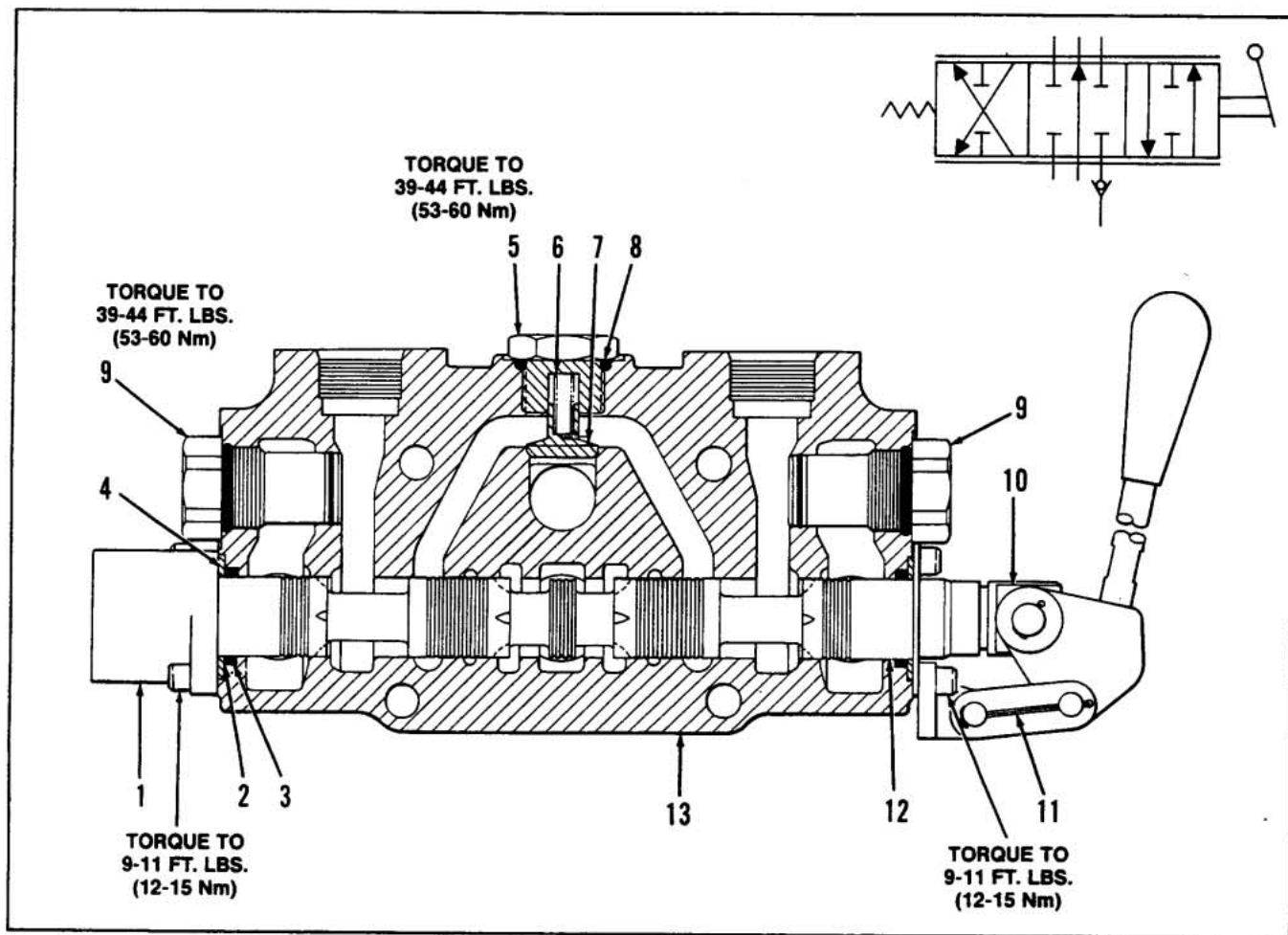
### 3-WAY, 3-POSITION WORK SECTION

Item No.	Part No.	Description	Quantity Per Section
	K-12010-A	SEAL KIT (Contains Items 2, 3 and 4)	
	K-12022	SERVICE KIT (Contains Items 5, 6, 7 and 8)	
1	K-12001-B	POSITIONER, Standard (See Figure 4-7)	1
	K-12002-B	POSITIONER, HP (See Figure 4-7)	1
2	8715-001	WASHER, Back-Up	2
3	11985-001*	SEAL, O-Ring	2
4	8561-001	RETAINER, Seal	2
5	8713-001	PLUG, Load Check	1
6	2796-001	SPRING	1
7	8714-001	POPPET, Load Check	1
8	2710-001*	SEAL, O-Ring	1
9		PLUG (See table on page 4-29 for Part No.)	1
10	K-12020-B	PLUG, NR (No Relief) (See Figure 4-27)	2
11	8719-001	SPOOL END	1
12		HANDLE, Bracket or Retainer (See Figures 4-22 thru 4-26)	1
13	8792-001	SPOOL, 3-Way	1
14	8566-XXX	HOUSING, 3-Way	1

**NOTE:** Spool and Housing are matched parts and are not sold separately. See page 3-5 ordering information. Handle location can be changed by reversing spool in housing and moving work port plug to opposite port.

\*Buna-N seals are standard for all Gresen valve assemblies. For viton seals, contact the factory.

\*\*When 3-position or 2-position detent positioners are used, order K-12009 in place of K-12010. When hydraulic remote positioners are used, spool seal assemblies are not required.



**Figure 4-3. 4-Way, 3-Position Work Section.**

#### 4-WAY, 3-POSITION WORK SECTION

Item No.	Part No.	Description	Quantity Per Section
	K-12010-A	SEAL KIT (Contains Items 2, 3 and 4)	
	K-12022	SERVICE KIT (Contains Items 5, 6, 7 and 8)	
1	K-12001-B	POSITIONER, Standard (See Figure 4-7)	1
	K-12002-B	POSITIONER, HP (See Figure 4-7)	1
2	8715-001	WASHER, Back-Up	2
3	11985-001*	SEAL, O-Ring	2
4	8561-001	RETAINER, Seal	2
5	8713-001	PLUG, Load Check	1
6	2796-001	SPRING	1
7	8714-001	POPPET, Load Check	1
8	2710-001*	SEAL, O-Ring	1
9	K-12020-B	PLUG, NR (No Relief) (See Figure 4-27)	2
10	8719-001	SPOOL END	1
11		HANDLE, Bracket or Retainer (See Figures 4-22 thru 4-26)	1
12	8718-001	SPOOL, 4-Way	1
13	8566-XXX	HOUSING, 4-Way	1

**NOTE:** Spool and Housing are matched parts and are not sold separately. See page 3-5 for ordering information. Handle location can be changed by reversing spool in housing.

\*Buna-N seals are standard for all Gresen valve assemblies. For viton seals contact the factory.

\*\*When 3-position or 2-position detent positioners are used, order K-12009 in place of K-12010. When hydraulic remote positioners are used, spool seal assemblies are not required.



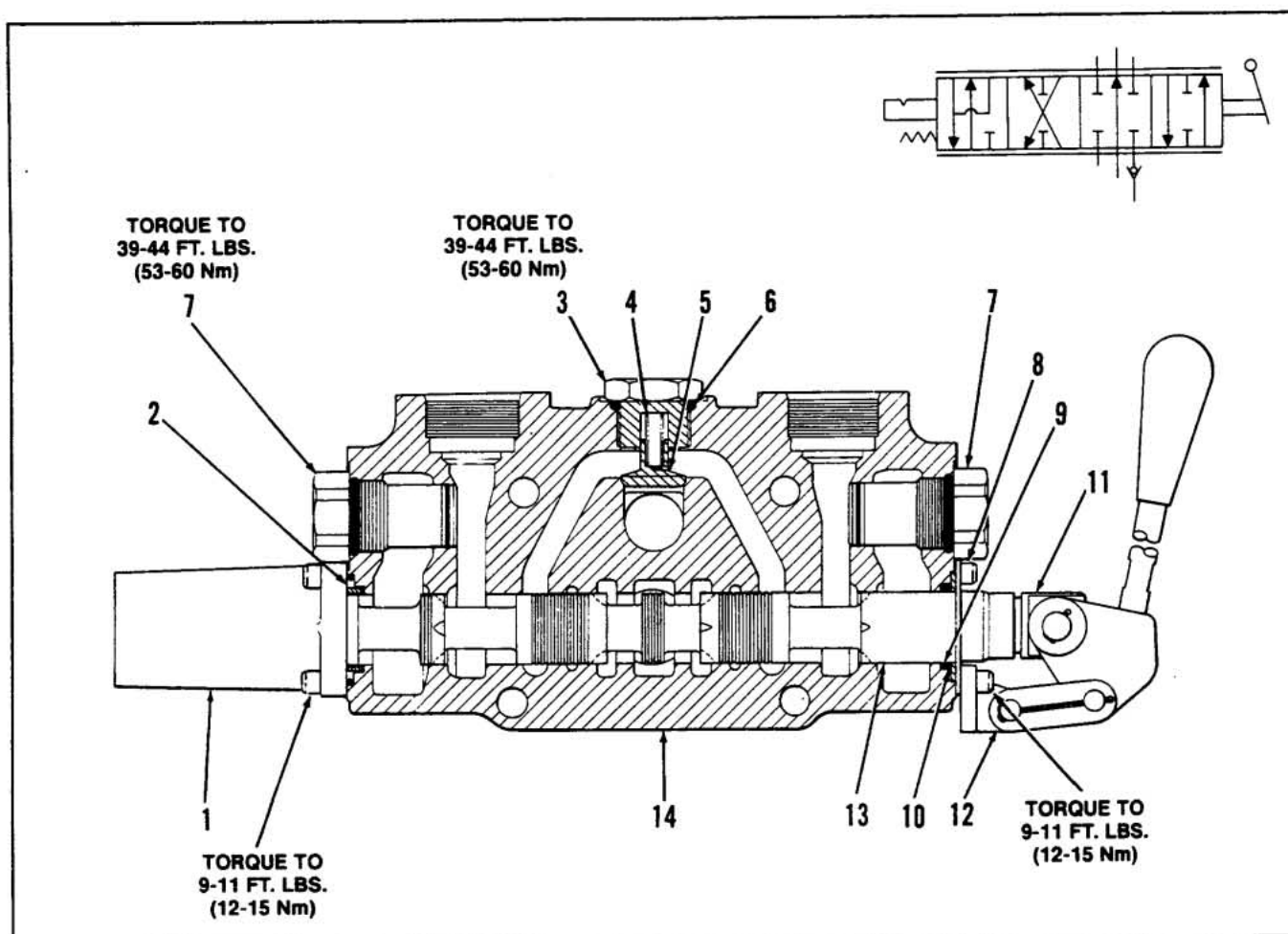


Figure 4-4. 4-Way, 4-Position Float Work Section.

#### 4-WAY, 4-POSITION FLOAT WORK SECTION

Item No.	Part No.	Description	Quantity Per Section
	K-12022	SERVICE KIT (Contains items 3, 4, 5 and 6)	
1	K-12004-B	POSITIONER, Float, Standard (See Figure 4-10)	1
	K-12005-B	POSITIONER, Float, HP (See Figure 4-10)	1
2		SPOOL SEAL ASSEMBLY, Bonnet End (See Figure 4-10)	1
3	8713-001	PLUG, Load Check	1
4	2796-001	SPRING	1
5	8714-001	POPPET, Load Check	1
6	2710-001*	SEAL, O-Ring	1
7	K-12020-B	PLUG, NR (No Relief) (See Figure 4-27)	2
8	8561-001	RETAINER, Seal	1
9	11985-001*	SEAL, O-Ring	1
10	8715-001	WASHER, Back-Up	1
11	8719-001	SPOOL END	1
12		HANDLE, Bracket or Retainer (See Figures 4-22 thru 4-26)	1
13	10750-001	SPOOL, 4-Way, Float	1
14	8566-XXX	HOUSING, 4-Way, Float	1

Not sold separately order K-12022

See Note

**NOTE:** Spool and Housing are matched parts and are not sold separately. See page 3-for ordering information. Handle location can be changed by reversing spool in housing.

\*Buna-N seals are standard for all Gresen valve assemblies. For viton seals contact the factory.

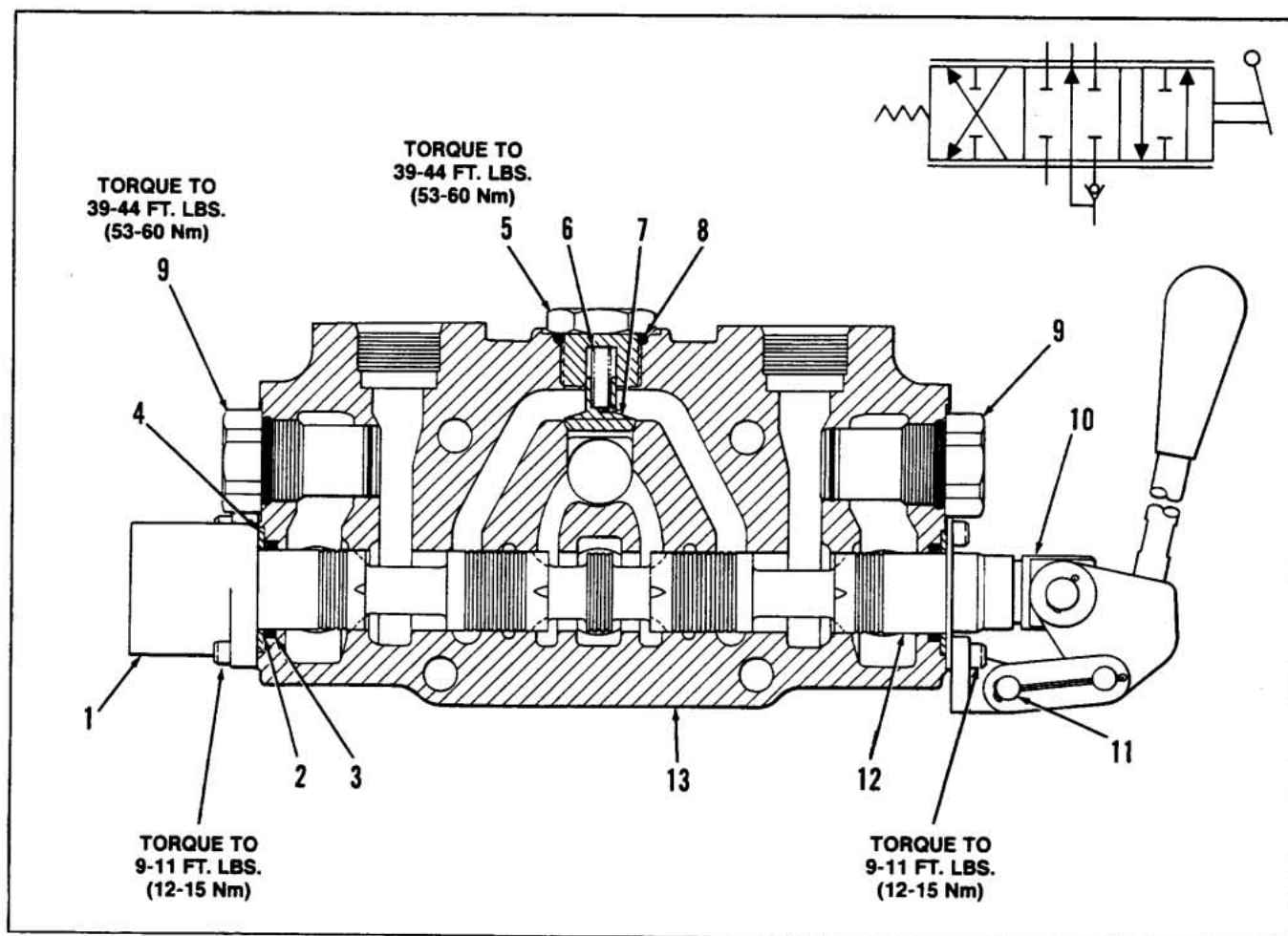


Figure 4-5. 4-Way, 3-Position Tandem Work Section.

#### 4-WAY, 3-POSITION TANDEM WORK SECTION

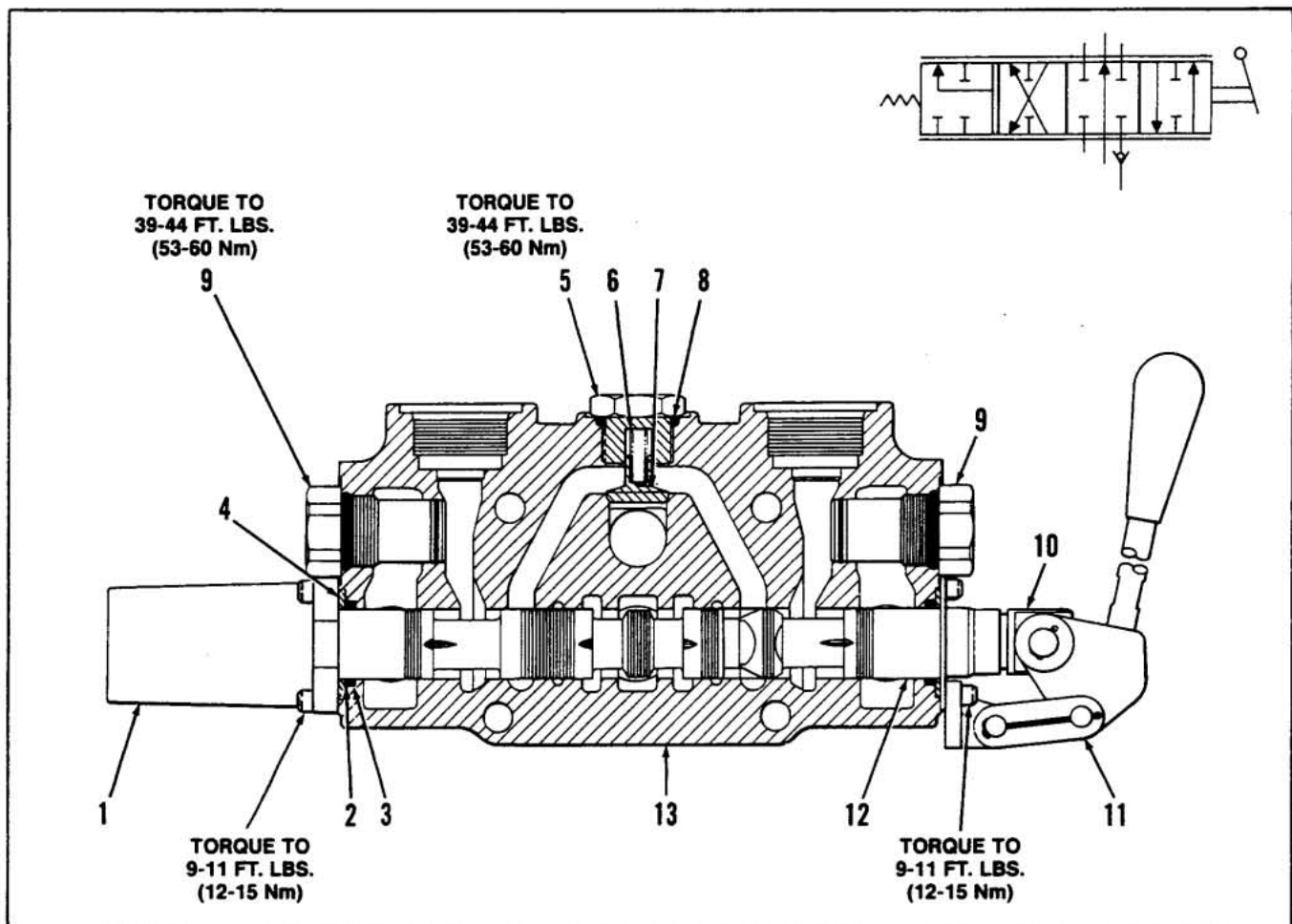
Item No.	Part No.	Description	Quantity Per Section
	K-12010-A	SEAL KIT (Contains Items 2, 3 and 4)	
	K-12022	SERVICE KIT (Contains Items 5, 6, 7 and 8)	
1	K-12001-B	POSITIONER, Standard (See Figure 4-7)	1
	K-12002-B	POSITIONER, HP (See Figure 4-7)	1
2	8715-001	WASHER, Back-Up	2
3	11985-001*	SEAL, O-Ring	2
4	8561-001	RETAINER, Seal	2
5	8713-001	PLUG, Load Check	1
6	2796-001	SPRING	1
7	8714-001	POPPET, Load Check	1
8	2710-001*	SEAL, O-Ring	1
9	K-12020-B	PLUG, NR (No Relief) (See Figure 4-27)	2
10	8719-001	SPOOL END	1
11		HANDLE, Bracket or Retainer (See Figures 4-22 thru 4-26)	1
12	8718-001	SPOOL, 4-Way	1
13	8567-XXX	HOUSING, 4-Way Tandem	1

**NOTE:** Spool and Housing are matched parts and are not sold separately. See page 3-5 for ordering information. Handle location can be changed by reversing spool in housing.

\*Buna-N seals are standard for all Gresen valve assemblies. For viton seals contact the factory.

\*\*When 3-position or 2-position detent positioners are used, order K-12009 in place of K-12010. When hydraulic remote positioners are used, spool seal assemblies are not required.





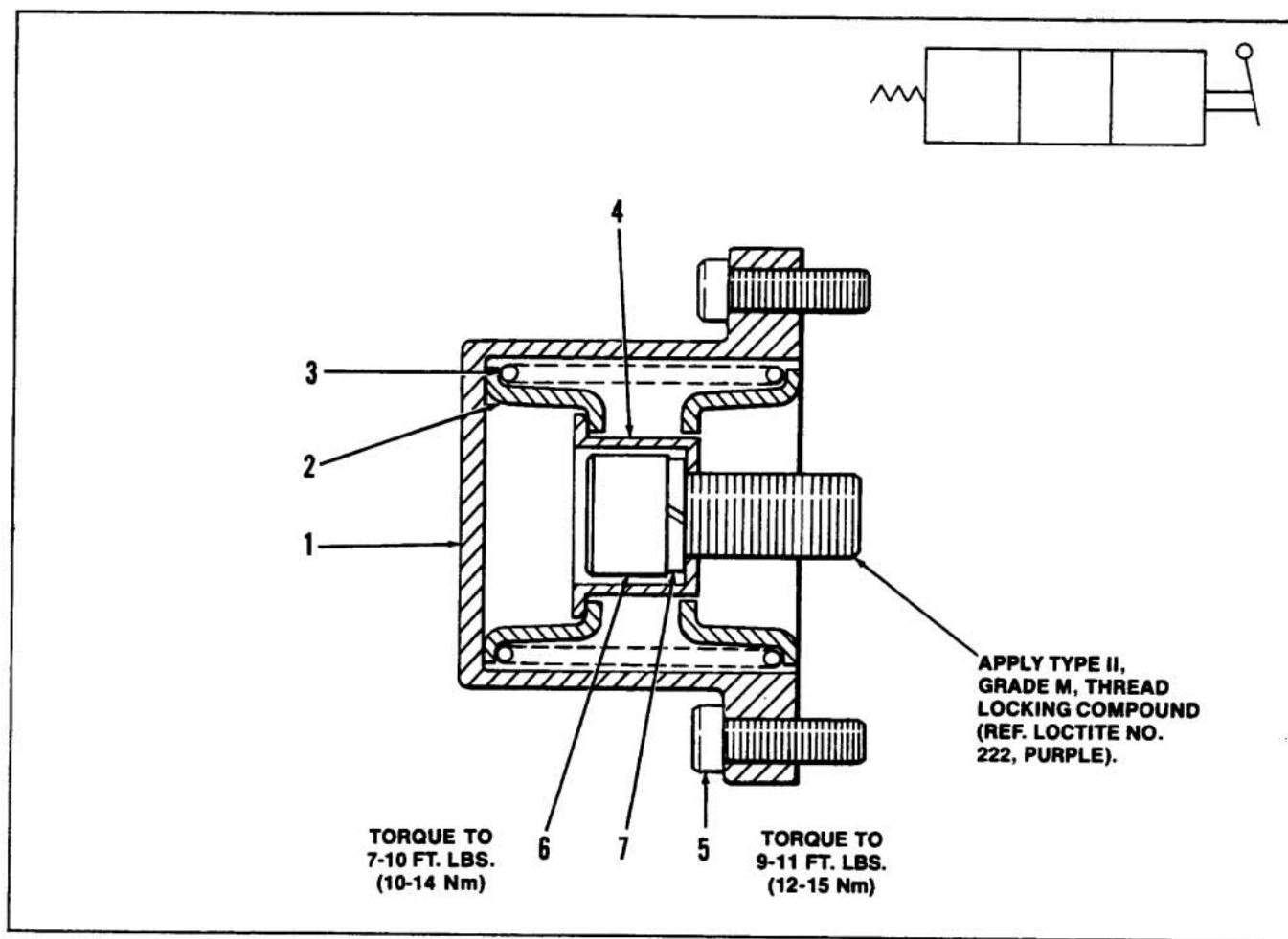
**Figure 4-6. 4-Way, 4-Position Regenerative Work Section.**

#### 4-WAY, 4-POSITION REGENERATIVE WORK SECTION

Item No.	Part No.	Description	Quantity Per Section
	K-12010-A	SEAL KIT (Contains Items 2, 3 and 4)	
	K-12022	SERVICE KIT (Contains items 5, 6, 7 and 8)	
1	K-12027	POSITIONER, Regenerative, Standard (See Figure 4-12)	1
	K-12028	POSITIONER, Regenerative, HP (See Figure 4-12)	1
2	8715-001	WASHER, Back-Up	2
3	11985-001*	SEAL, O-Ring	2
4	8561-001	RETAINER, Seal	2
5	8713-001	PLUG, Load Check	1
6	2796-001	SPRING	1
7	8714-001	POPPET, Load Check	1
8	2710-001*	SEAL, O-Ring	1
9	K-12020-B	PLUG, NR (No Relief) (See Figure 4-27)	2
10	8719-001	SPOOL END	1
11		HANDLE, Bracket or Retainer (See Figures 4-22 thru 4-26)	1
12	10851-001	SPOOL, Regenerative	1
13	8939-XXX	HOUSING, 4-Way, Regenerative	1

**NOTE:** Spool and Housing are matched parts and are not sold separately. See page 3-5 for ordering information. Handle location can be changed by reversing spool in housing.

\*Buna-N seals are standard for all Gresen valve assemblies. For viton seals contact the factory.

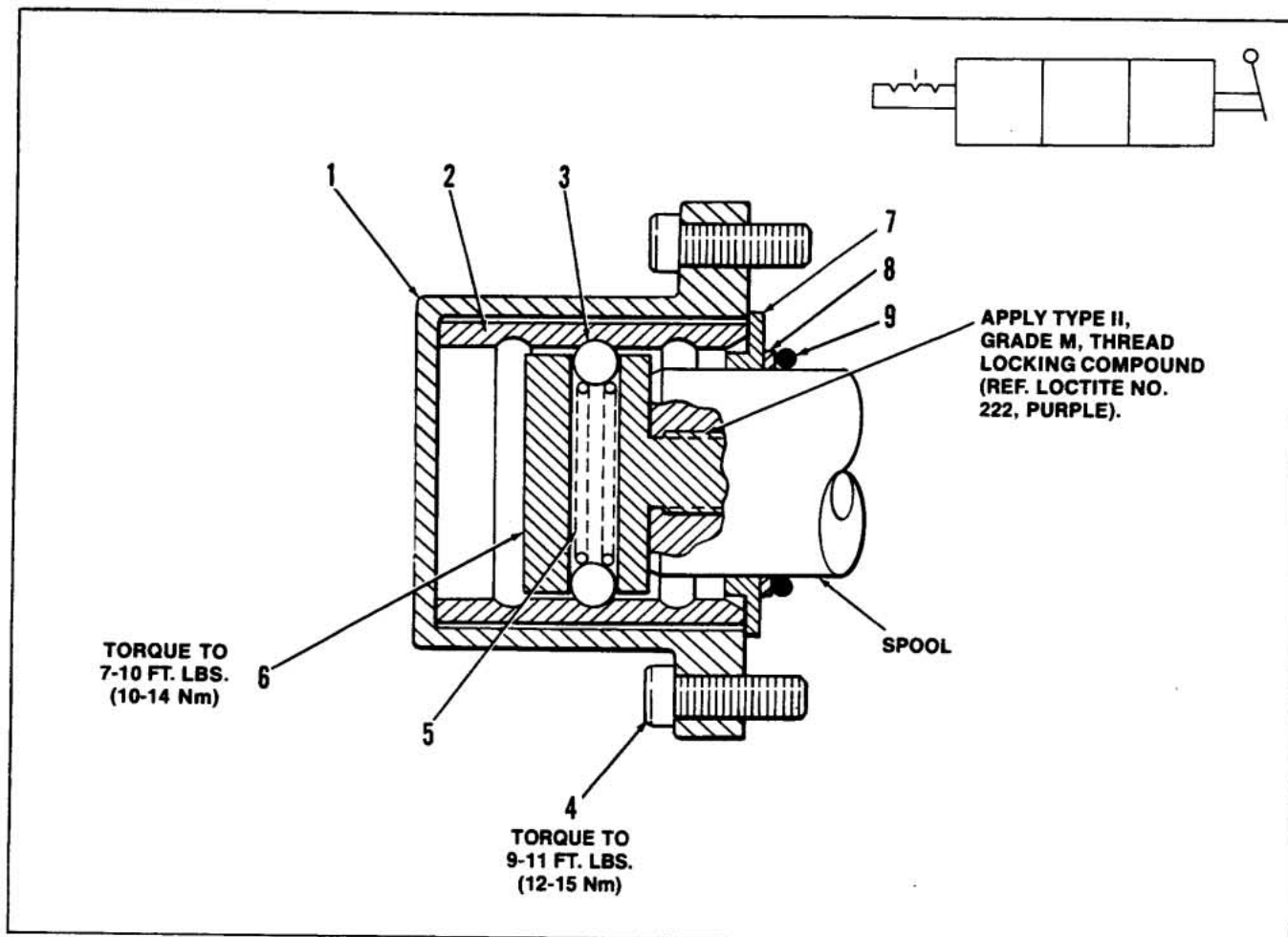


**Figure 4-7. Spring Return to Neutral Positioner.**

#### SPRING RETURN TO NEUTRAL POSITIONER

Item No.	Part No.	Description	Quantity Per Assembly
	K-12001-B	REPLACEMENT KIT, Standard (Contains all items listed below)	
	K-12002-B	REPLACEMENT KIT, HP (Contains all items listed below)	
1	8532-001	BONNET	1
2	8558-001	COLLAR, Stop	2
3	8716-001	SPRING, Standard	1
	8935-001	SPRING, HP	1
4	8717-001	COLLAR, Spool	1
5	9161-407	SCREW, HSHC	2
6	3731-318	SCREW	1
7	9285-208	WASHER, Lock	1

**NOTE:** Standard positioners for applications up to 2500 PSI. HP positioners for applications over 2500 PSI.



**Figure 4-8. 3-Position Detent Positioner.**

### 3-POSITION DETENT POSITIONER

Item No.	Part No.	Description	Quantity Per Assembly
	K-12006-B	REPLACEMENT KIT (Contains all items listed below)	
1	8532-001	BONNET	1
2	8786-001	SLEEVE, Detent, 3-position	1
3	514-001	BALL, Steel	2
4	9161-407	SCREW, HSHC	2
5	8787-001	SPRING	1
6	8788-001	RETAINER, Detent	1
7	8795-001	RETAINER, Seal	1
8	8715-001	WASHER, Backup	1
9	11985-001	SEAL, O-Ring	1

**NOTE:** Order K-12009 for complete spool seal kit (Contains items 7, 8 and 9 plus spool seal assembly for handle end).

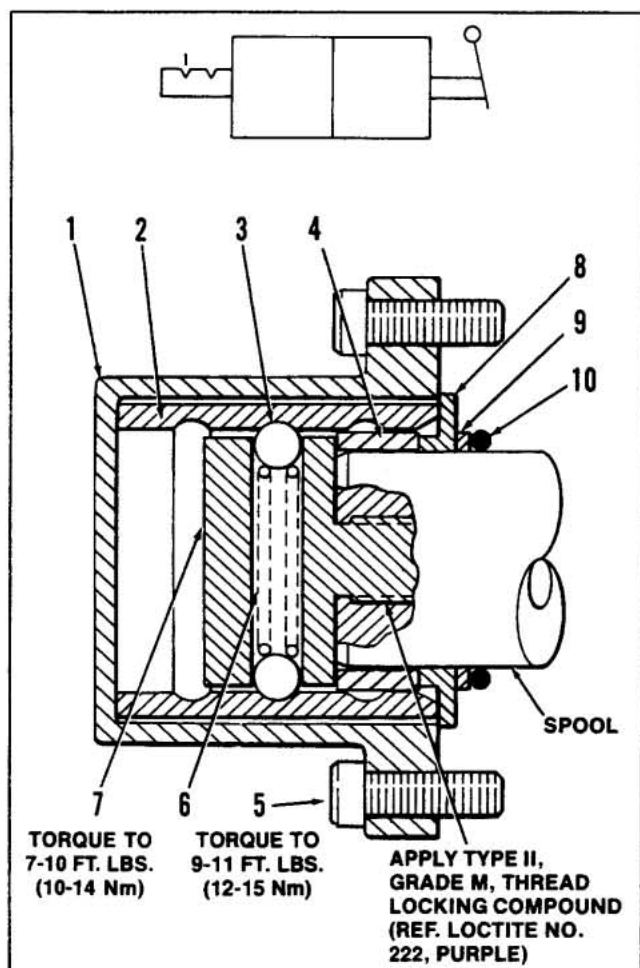


Figure 4-9A. 2-Position Detent "In" Positioner.

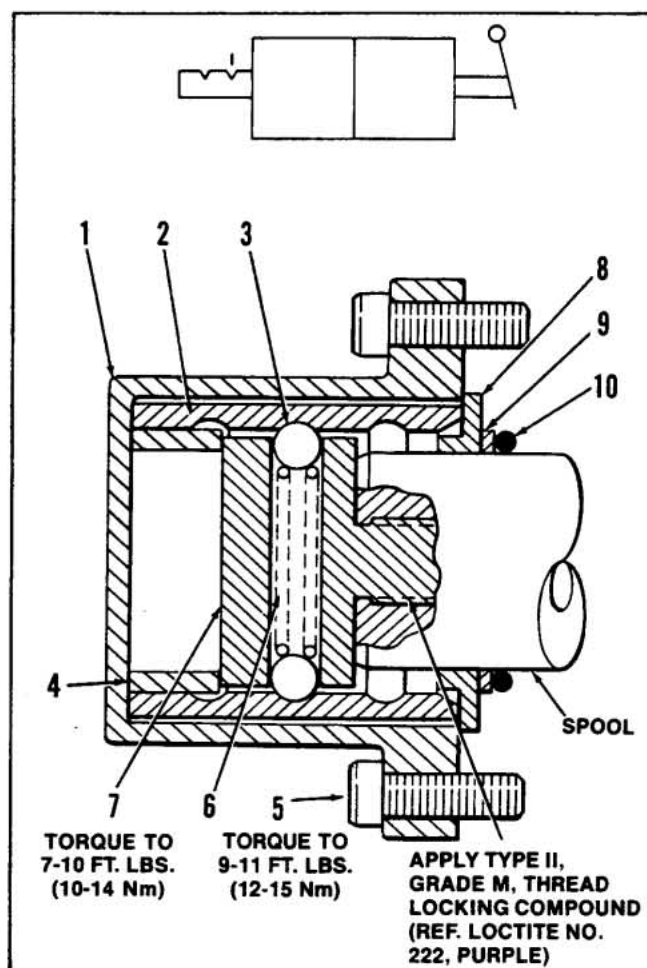


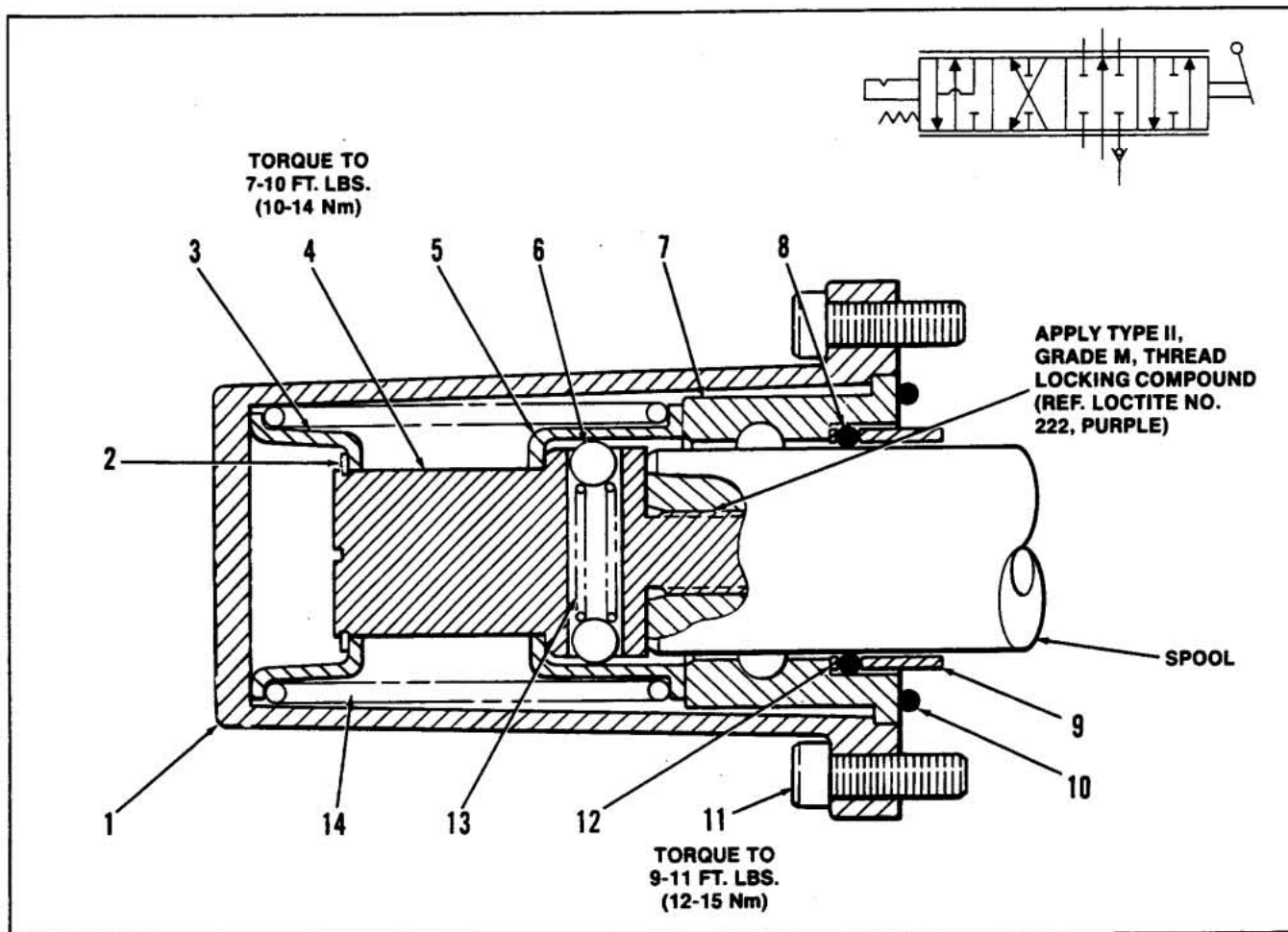
Figure 4-9B. 2-Position Detent "Out" Positioner.

### 2-POSITION DETENT POSITIONER

Item No.	Part No.	Description	Quantity Per Assembly
	K-12007-B	REPLACEMENT KIT, In (Contains all items listed below)	
	K-12008-B	REPLACEMENT KIT, Out (Contains all items listed below)	
1	8532-001	BONNET	1
2	8786-001	SLEEVE, Detent, 3-Position	1
3	514-001	BALL, Steel	2
4	8790-001	SLEEVE, 2-Position Detent	1
5	9161-407	SCREW, HSHC	2
6	8787-001	SPRING	1
7	8788-001	RETAINER, Detent	1
8	8795-001	RETAINER, Seal	1
9	8715-001	WASHER, Backup	1
10	11985-001	SEAL, O-Ring	1

See Note

**NOTE:** Order K-12009 for complete spool seal kit (Contains items 8, 9, and 10 plus spool seal assembly for handle end).



**Figure 4-10. 4-Position Float Positioner.**

#### 4-POSITION FLOAT POSITIONER

Item No.	Part No.	Description	Quantity Per Assembly
	K-12004-B	REPLACEMENT KIT, Standard (Contains all items listed below)	
	K-12005-B	REPLACEMENT KIT, HP (Contains all items listed below)	
1	8546-001	BONNET	1
2	8779-001	RETAINING RING	1
3	8558-001	COLLAR, Stop	1
4	8780-001	RETAINER, Detent	1
5	8558-002	COLLAR, Stop	1
6	3089-001	BALL, Steel	2
7	8781-001	SLEEVE, Float Detent	1
8	11985-001*	SEAL, O-Ring	1
9	8782-002	SLEEVE	1
10	9000-132*	SEAL, O-Ring	1
11	9161-407	SCREW, HSHC	4
12	8715-001	WASHER, Back-Up	1
13	8783-001	SPRING	1
14	8784-002	SPRING, Standard	1
	8936-002	SPRING, HP	1

See Note

**NOTE:** Standard positioners for applications up to 2500 PSI. HP positioners for applications over 2500 PSI.

\*Buna-N seals are standard for all Gresen valve assemblies. For viton seals contact the factory.

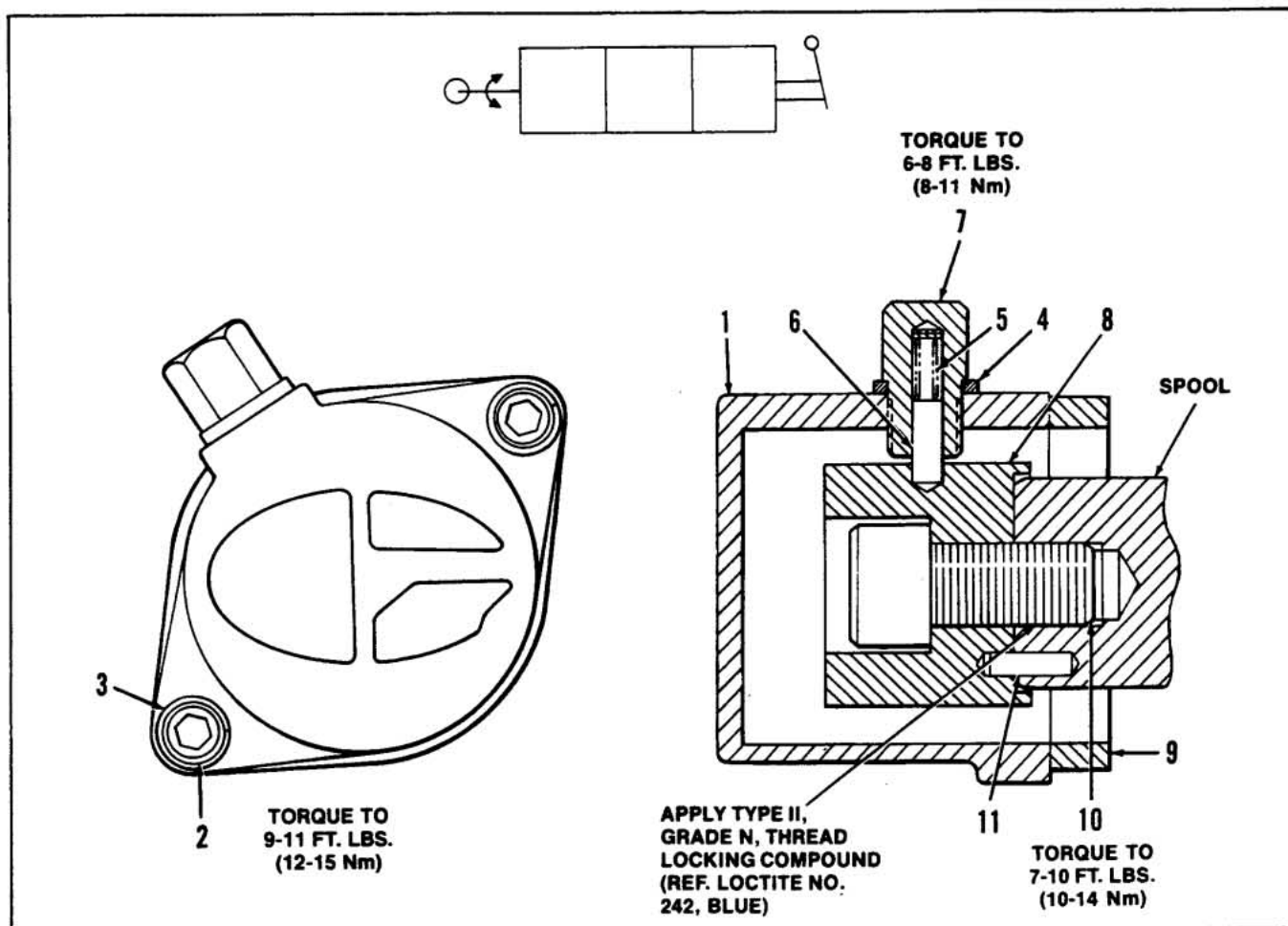


Figure 4-11. Rotary Positioner.

#### ROTARY POSITIONER

Item No.	Part No.	Description	Quantity Per Assembly
	K-12026-A	REPLACEMENT KIT (Contains all items listed below)	
1	8532-002	BONNET	1
2	3731-103	SCREW	2
3	9285-004	WASHER, Lock	2
4	8743-001	WASHER	1
5	8808-001	SPRING	1
6	2676-001	PIN, Detent	1
7	10292-001	CAP, Rotary Detent	1
8	10130-001	BODY, Rotary Cam	1
9	10129-001	SPACER	1
10	3731-318	SCREW	1
11	0888-001	PIN, Dowel	1

**NOTE:** Apply heavy duty, general purpose grease, to the helical groove of Cam Body (Item 8) and Pin (Item 6). Identification notch on opposite end of spool must be at 12 o'clock location when spool is in neutral position.

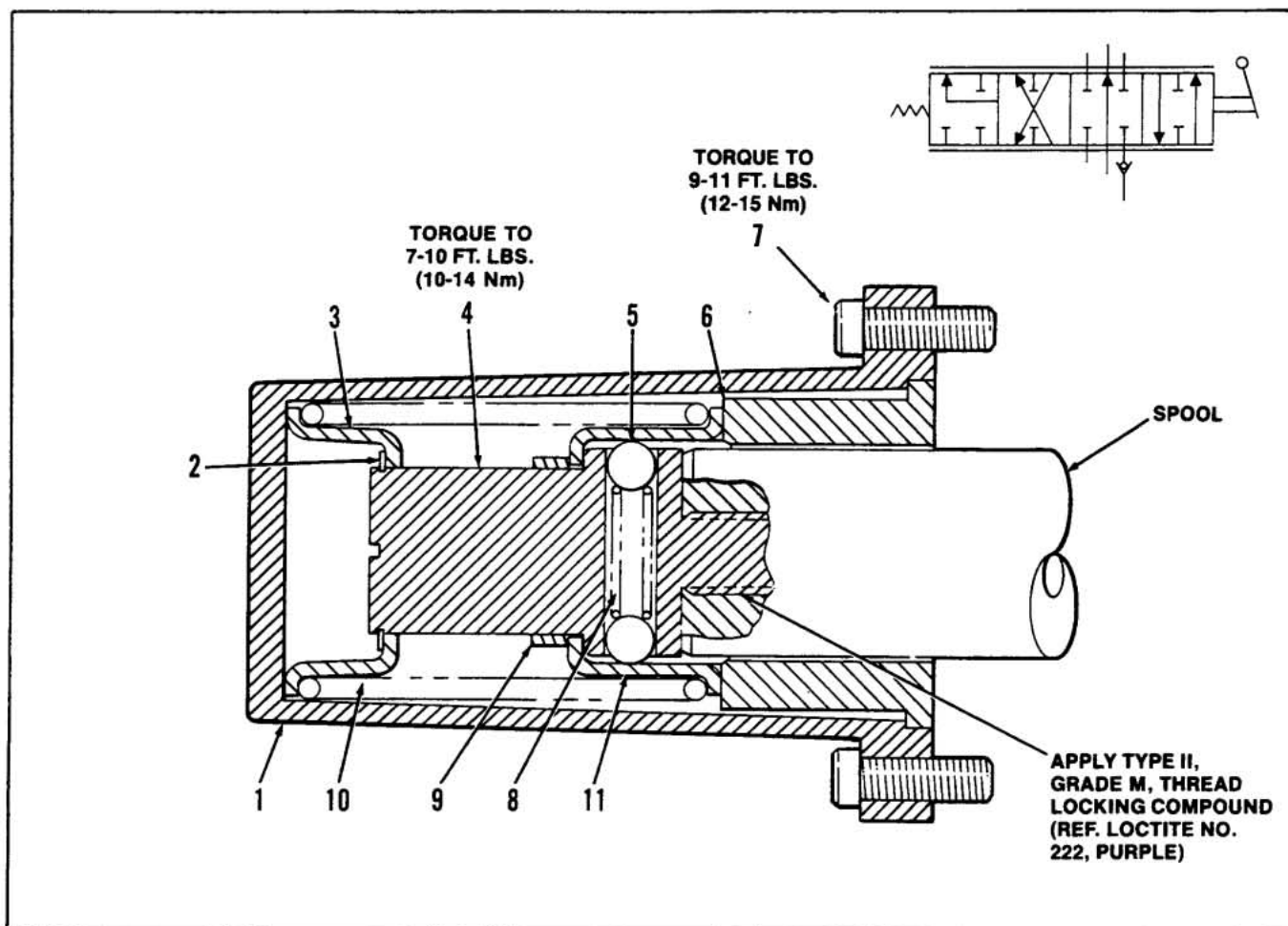


Figure 4-12. Regenerative Spool Positioner.

#### REGENERATIVE SPOOL POSITIONER

Item No.	Part No.	Description	Quantity Per Assembly
	K-12027	REPLACEMENT KIT, Standard (Contains all items listed below)	
	K-12028	REPLACEMENT KIT, HP (Contains all items listed below)	
1	8546-001	BONNET	1
2	8779-001	RING, Retaining	1
3	8558-001	COLLAR, Stop	1
4	8780-001	RETAINER, Detent	1
5	3089-001	BALL	2
6	10854-001	SLEEVE	1
7	9161-407	SCREW, HSHC	4
8	8783-001	SPRING	1
9	10853-001	SPACER	1
10	8784-002	SPRING, Standard	} See Note
	8936-002	SPRING, HP	
11	8558-002	COLLAR, Stop	1

**NOTE:** Standard positioners for applications up to 2500 PSI. HP positioners for applications over 2500 PSI.

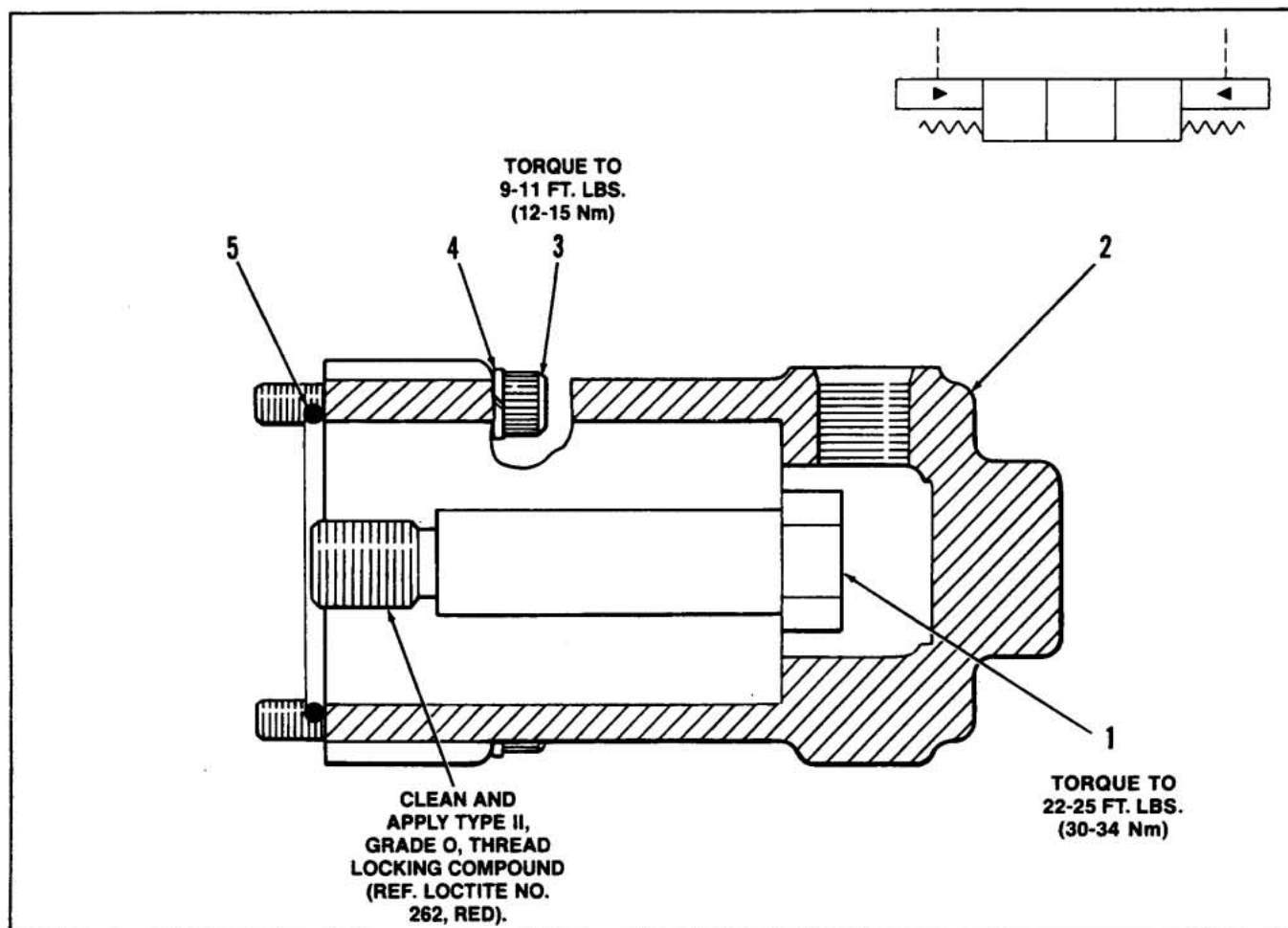


Figure 4-13. Hydraulic Remote Positioner ("A" Port End).

FOR ASSEMBLIES MANUFACTURED  
AFTER JAN. 1, 1983.

#### HYDRAULIC REMOTE POSITIONER ("A" PORT END)

Item No.	Part No.	Description	Quantity Per Assembly
	K-12030-A	REPLACEMENT KIT (Contains all items listed below)	
1	10841-001	SPUD, Positioner	1
2	10834-001	BONNET	1
3	3731-104	SCREW, HSHC	4
4	9285-004	WASHER, Lock	4
5	9000-132*	SEAL, O-Ring	1

\*Buna-N seals are standard for all Gresen valve assemblies. For viton seals contact the factory.



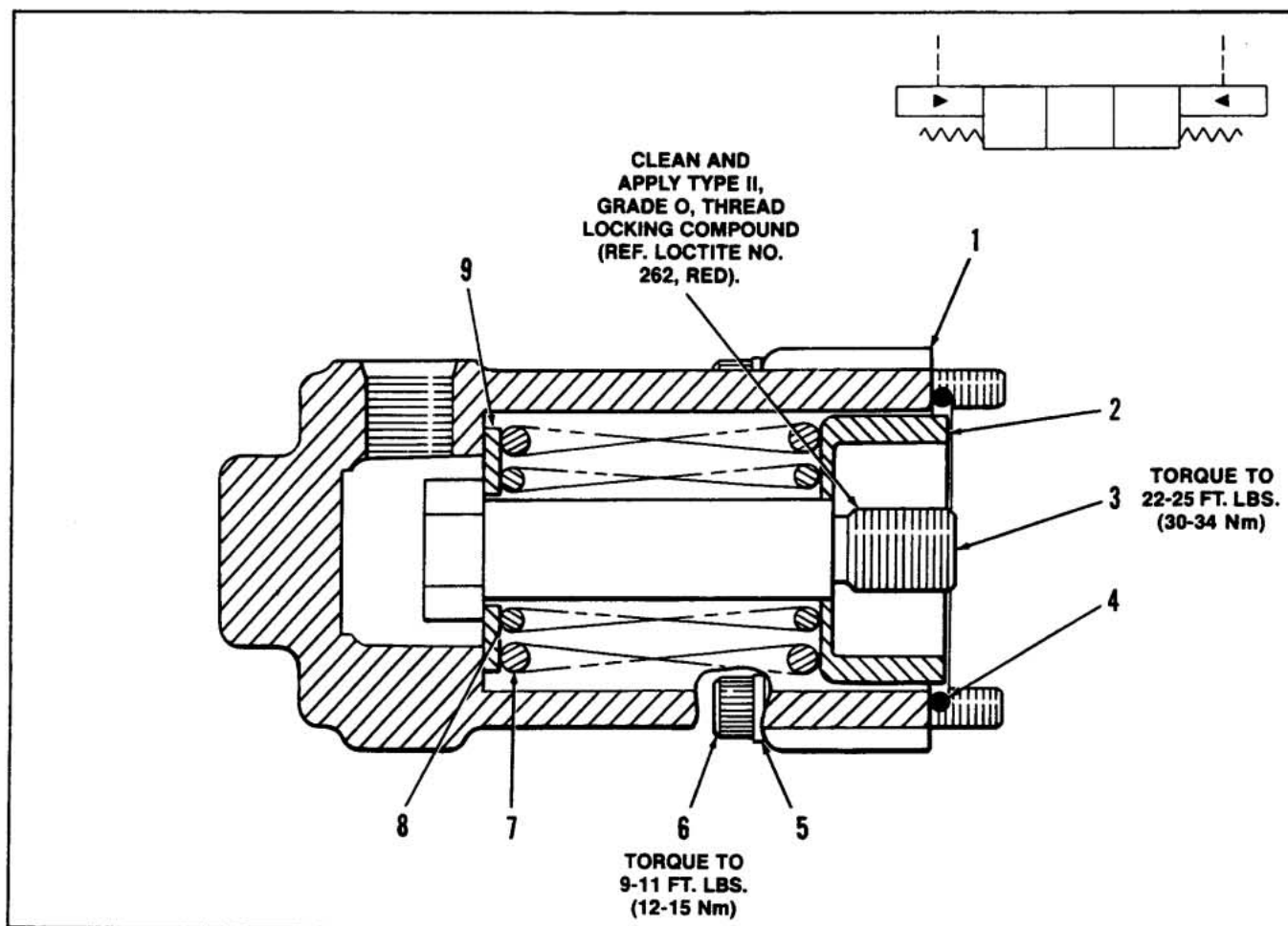


Figure 4-14. Hydraulic Remote Positioner ("B" Port End)

FOR ASSEMBLIES MANUFACTURED AFTER JAN. 1, 1983.

#### HYDRAULIC REMOTE POSITIONER ("B" PORT END)

Item No.	Part No.	Description	Quantity Per Assembly
	K-12029-A	REPLACEMENT KIT (Contains all items listed below)	
1	10834-001	BONNET	1
2	10840-001	COLLAR, Stop	1
3	10841-001	SPUD, Positioner	1
4	9000-132*	SEAL, O-Ring	1
5	9285-004	WASHER, Lock	4
6	3731-104	SCREW, HSHC	4
7	10842-001	SPRING	1
8	10843-001	SPRING	1
9	10831-001	SPACER	1

\*Buna-N seals are standard for all Gresen valve assemblies. For viton seals contact the factory.

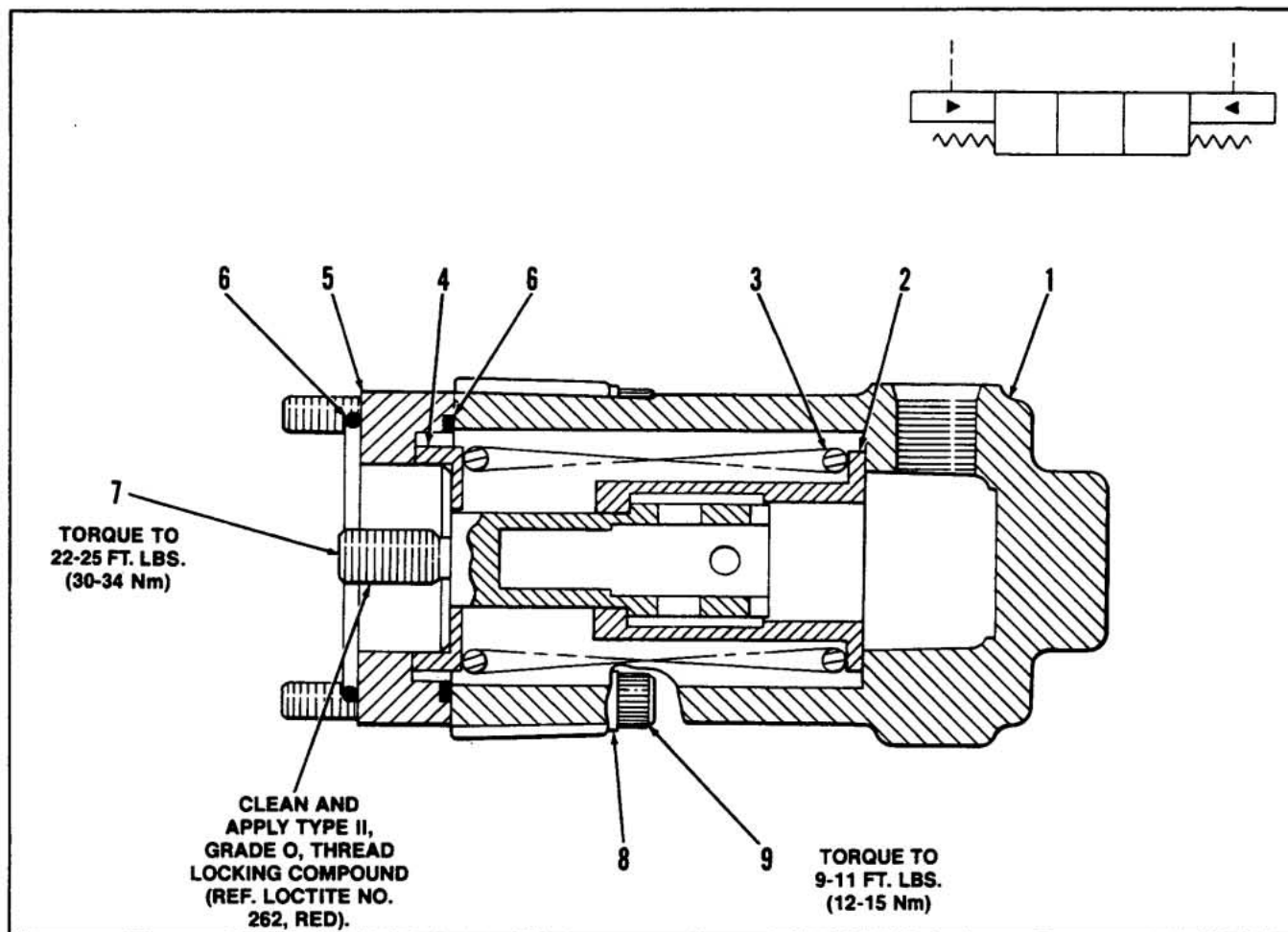


Figure 4-15. 3-Position Float or Regenerative Hydraulic Remote Positioner ("A" Port End).

### 3-POSITION FLOAT OR REGENERATIVE HYDRAULIC REMOTE POSITIONER ("A" PORT END)

Item No.	Part No.	Description	Quantity Per Assembly
	K-12034-A	REPLACEMENT KIT, Float (Contains all items listed below)	
	K-12035-A	REPLACEMENT KIT, Regenerative (Contains all items listed below)	
1	10834-001	BONNET	1
2	10836-001	SLIDE, Feel, Float	1
	10839-001	SLIDE, Feel, Regenerative	1
3	10830-001	SPRING	1
4	10829-001	SPACER	1
5	10837-001	SPACER, Bonnet	1
6	9000-132*	SEAL, O-Ring	2
7	10838-001	SPUD, Feel	1
8	9285-004	WASHER, Lock	4
9	3731-107	SCREW, HSHC	4

\*Buna-N seals are standard for all Gresen valve assemblies. For viton seals contact the factory.

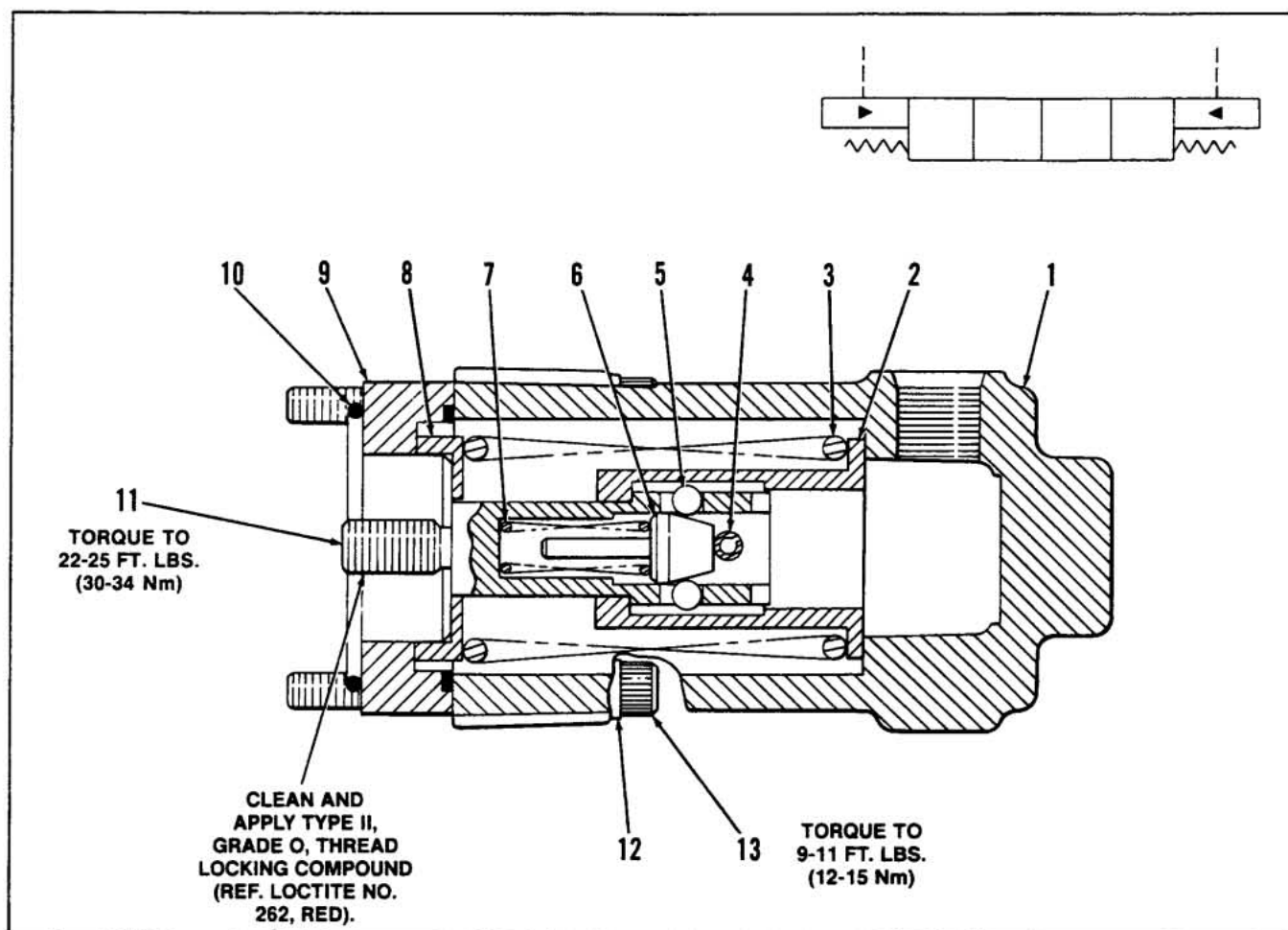
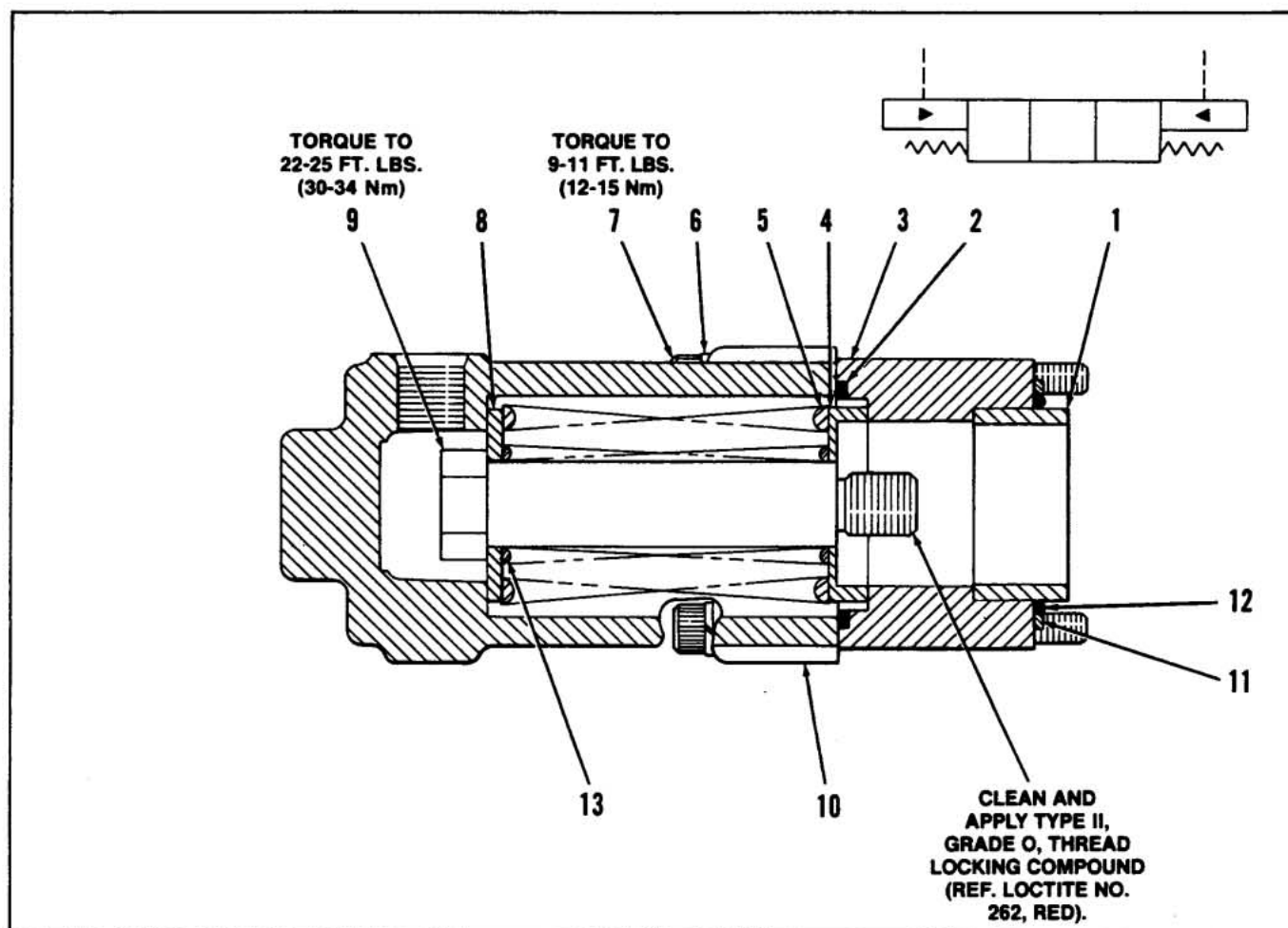


Figure 4-16. 4-Position Float or Regenerative Hydraulic Remote Positioner ("A" Port End).

4-POSITION FLOAT OR REGENERATIVE HYDRAULIC REMOTE POSITIONER ("A" PORT END)

Item No.	Part No.	Description	Quantity Per Assembly
		REPLACEMENT KIT, Float (Contains all items listed below)	
		REPLACEMENT KIT, Regenerative (Contains all items listed below)	
1	10834-001	BONNET	1
2	10836-001	SLIDE, Feel, Float	1
	10839-001	SLIDE, Feel, Regenerative	1
3	11104-001	SPRING	1
4	9370-611	PIN, Spring	1
5	1700-001	BALL, Steel	2
6	11105-001	PLUNGER, Ball	1
7	11106-001	SPRING	1
8	10829-001	SPACER	1
9	10837-001	SPACER, Bonnet	1
10	9000-132*	SEAL, O-Ring	2
11	10838-001	SPUD, Feel, Float	1
12	9285-004	WASHER, Lock	4
13	3731-107	SCREW, HSHC	4

\*Buna-N seals are standard for all Gresen valve assemblies. For viton seals contact the factory.

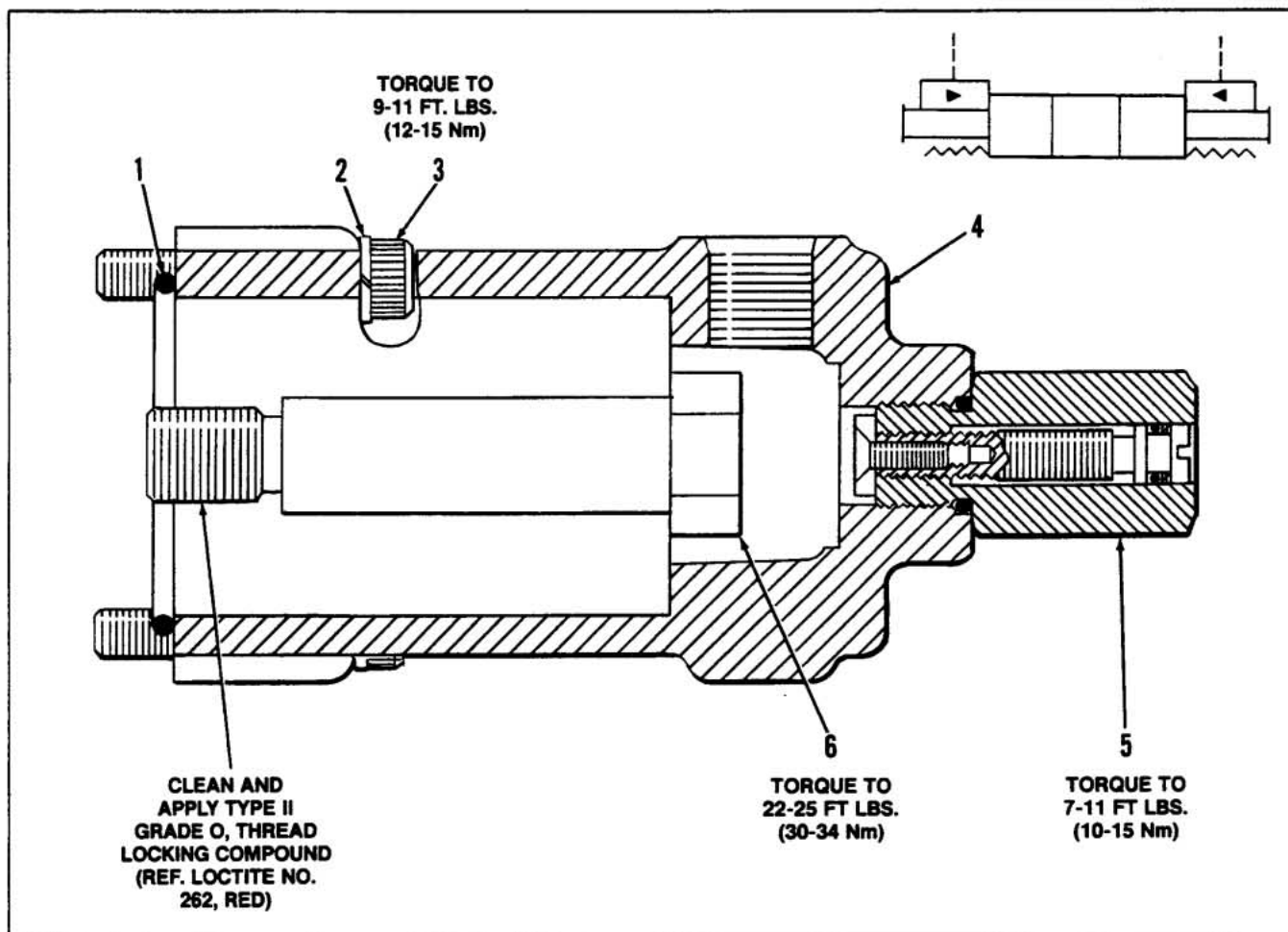


**Figure 4-17. Float or Regenerative Hydraulic Remote Positioner ("B" Port End)**

**FLOAT OR REGENERATIVE HYDRAULIC REMOTE POSITIONER ("B" PORT END)**

Item No.	Part No.	Description	Quantity Per Assembly
	K-12031-A	REPLACEMENT KIT (Contains all items listed below)	
1	10827-001	SLEEVE	1
2	9000-132*	SEAL, O-Ring	1
3	10828-001	SPACER, Bonnet	1
4	10829-001	SPACER	1
5	10830-001	SPRING	1
6	9285-004	WASHER, Lock	4
7	3731-110	SCREW, HSHC	4
8	10831-001	SPACER	1
9	10832-001	SPUD, Positioner	1
10	10834-001	BONNET	1
11	10833-001	SPACER, Seal	1
12	9000-128*	SEAL, O-Ring	1
13	10835-001	SPRING	2

\*Buna-N seals are standard for all Gresen valve assemblies. For viton seals contact the factory.



**Figure 4-18. Hydraulic Remote Positioner with Manual Override ("A" Port End)**

**HYDRAULIC REMOTE POSITIONER WITH MANUAL OVERRIDE ("A" PORT END)**

Item No.	Part No.	Description	Quantity Per Assembly
	K-12036-A	REPLACEMENT KIT (Contains all items listed below)	1
1	9000-132*	SEAL, O-Ring	1
2	9285-004	WASHER, Lock	1
3	3731-104	SCREW, HSHC, 1/4-20 by 1.5 inch long	4
4	10834-002	BONNET	4
5	11194-001	OVERRIDE, Manual HR (See Figure 4-20)	1
6	10841-001	SPUD, Positioner	1

\*Buna-N seals are standard for all Gresen valve assemblies. For Viton seals contact the factory.

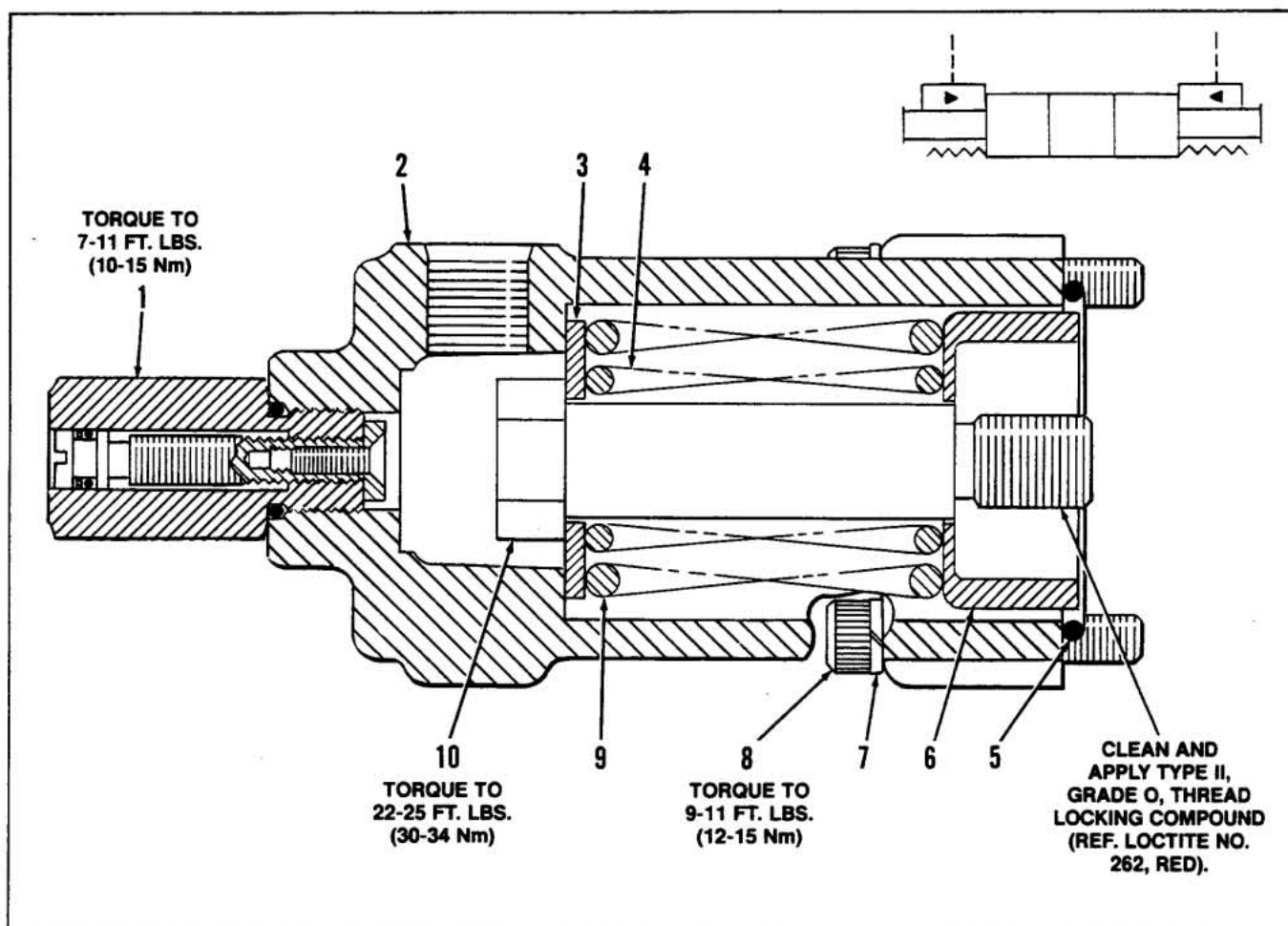


Figure 4-19. Hydraulic Remote Positioner with Manual Override ("B" Port End)

#### HYDRAULIC REMOTE POSITIONER WITH MANUAL OVERRIDE ("B" PORT END)

Item No.	Part No.	Description	Quantity Per Assembly
	K-12037-A	REPLACEMENT KIT (Contains all items listed below)	
1	11194-001	OVERRIDE, Manual HR (See Figure 4-20)	1
2	10834-002	BONNET	1
3	10831-001	WASHER	1
4	10843-001	SPRING	1
5	9000-132*	SEAL, O-Ring	1
6	10840-001	COLLAR, Stop	1
7	9285-004	WASHER, Lock	4
8	3731-104	SCREW, HSHC, 1/4-20 by 1.5 inch long	4
9	10842-001	SPRING	1
10	10841-001	SPUD, Positioner	1

\*Buna-N seals are standard for all Gresen valve assemblies. For Viton seals contact the factory.

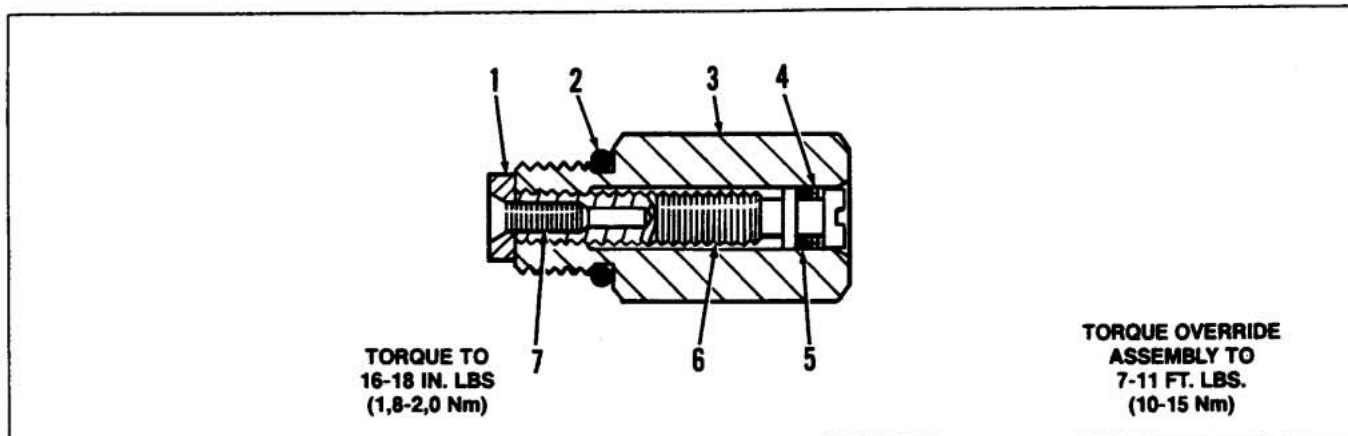


Figure 4-20. Manual Override for HRO Positioner

#### MANUAL OVERRIDE FOR HRO POSITIONER

Item No.	Part No.	Description	Quantity Per Assembly
1	11197-001	STOP, Travel	1
2	2705-001*	SEAL, O-Ring	1
3	11198-001	BODY, Override	1
4	9021-008	RING, Back-up	1
5	3191-001*	SEAL, O-Ring	1
6	11196-001	SCREW, Release	1
7	11195-001	SCREW, Machine	1

\*Buna-N seals are standard for all Gresen valve assemblies. For Viton seals contact the factory.

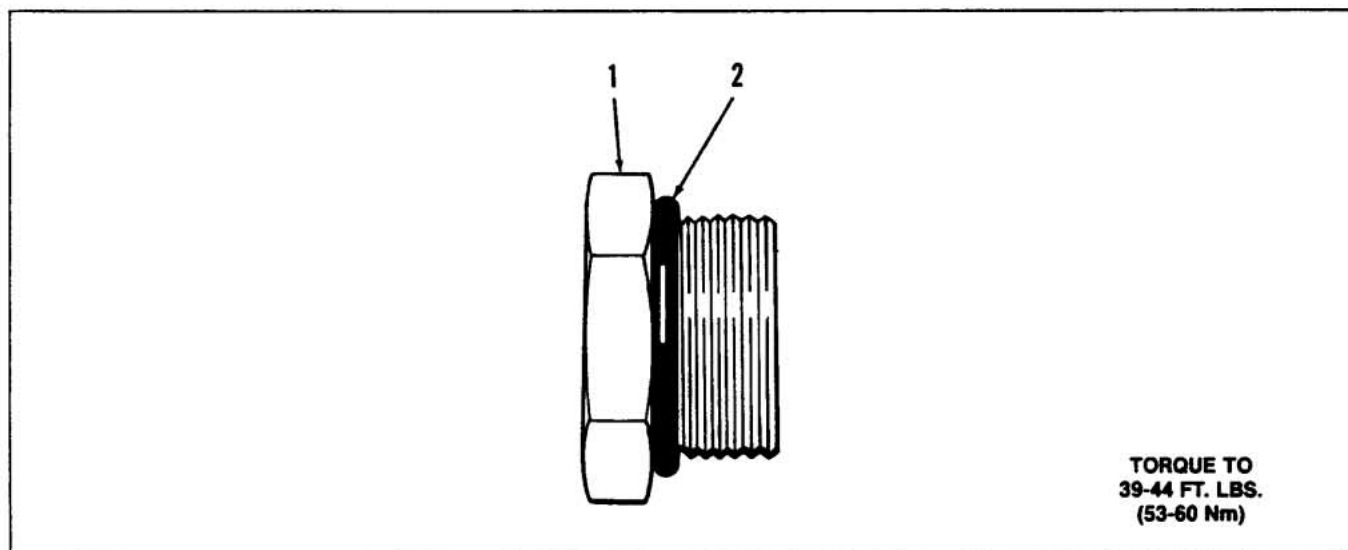


Figure 4-21. No Load Check Plug.

#### NO LOAD CHECK PLUG

Item No.	Part No.	Description	Quantity Per Assembly
	K-7009-A	REPLACEMENT KIT (Contains Items 1 & 2)	
1	1629-001	PLUG	1
2	2710-001*	SEAL, O-Ring	1

\*Buna-N seals are standard for all Gresen valve assemblies. For viton seals contact the factory.

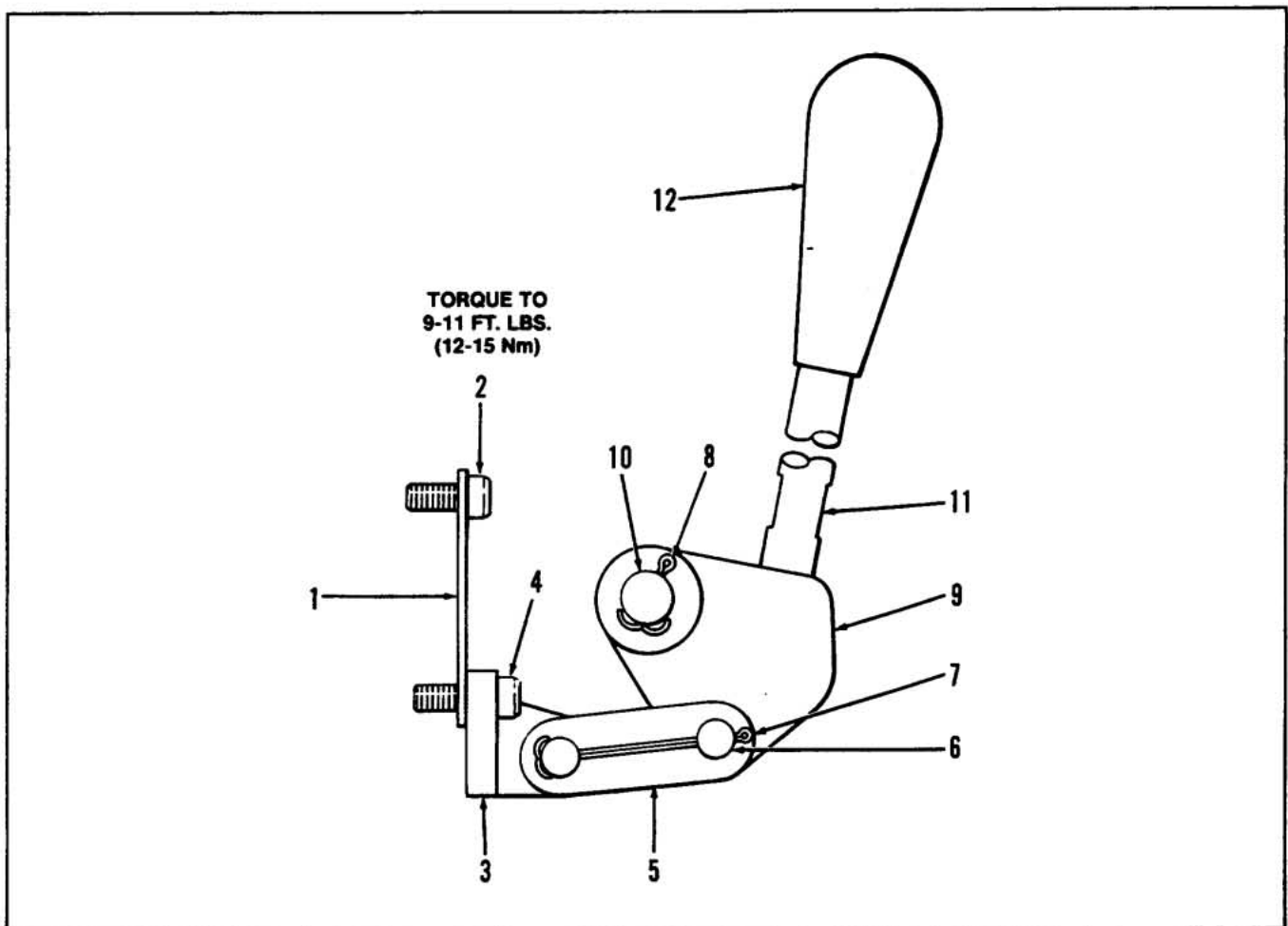
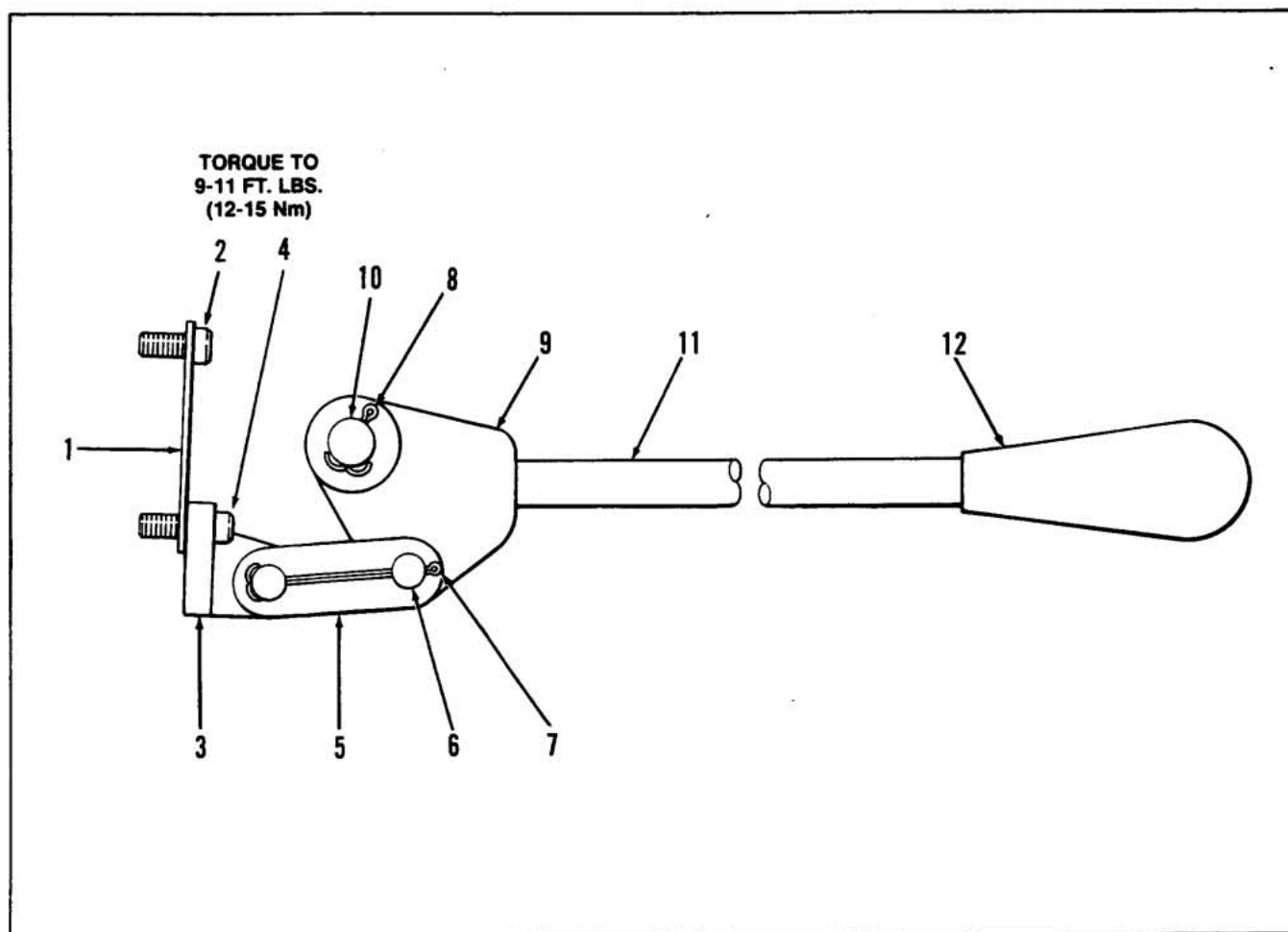


Figure 4-22. Vertical Handle Assembly (CVHA).

#### VERTICAL HANDLE ASSEMBLY (CVHA)

Item No.	Part No.	Description	Quantity Per Assembly
	K-12018-C	REPLACEMENT KIT (Contains all items listed below)	
	K-12041	REPLACEMENT KIT (Contains items 5 thru 10)	
1	8993-001	PLATE, Handle	1
2	3731-098	SCREW, HSHC	2
3	8530-001	BRACKET, Handle	1
4	9161-407	SCREW, HSHC	2
5	8562-001	PLATE, Link	2
6	8720-001	PIN, Link	2
7	1474-001	PIN, Cotter	1
8	9340-504	PIN, Cotter	1
9	8531-001	LINKAGE, Control Handle	1
10	8721-001	PIN, Clevis	1
11	8722-001	HANDLE, Control	1
12	8723-001	KNOB, Black Plastic	1





**Figure 4-23. Horizontal Handle Assembly (CHHA).**

#### **HORIZONTAL HANDLE ASSEMBLY (CHHA)**

<b>Item No.</b>	<b>Part No.</b>	<b>Description</b>	<b>Quantity Per Assembly</b>
	<b>K-12019-B</b>	<b>REPLACEMENT KIT (Contains all items listed below)</b>	
1	8993-001	PLATE, Handle	1
2	3731-098	SCREW, HSHC	2
3	8530-001	BRACKET, Handle	1
4	9161-407	SCREW, HSHC	2
5	8562-001	PLATE, Link	2
6	8720-001	PIN, Link	2
7	1474-001	PIN, Cotter	1
8	9340-504	PIN, Cotter	1
9	8531-002	LINKAGE, Control Handle	1
10	8721-001	PIN, Clevis	1
11	8722-001	HANDLE, Control	1
12	8723-001	KNOB, Black Plastic	1

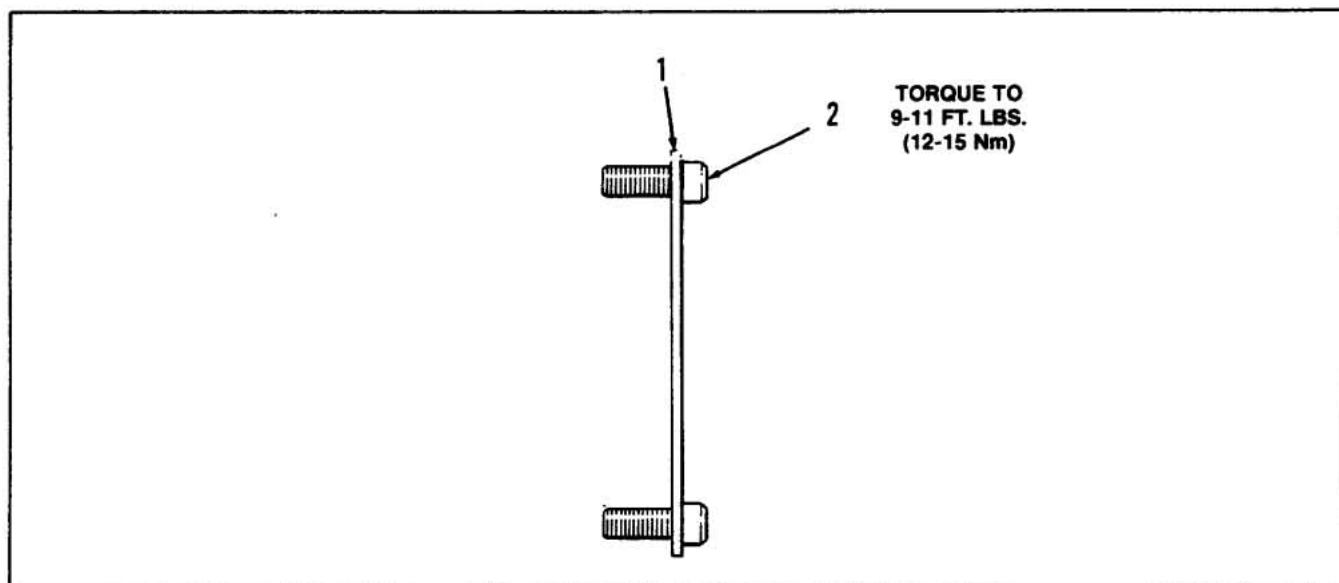


Figure 4-24. Spool Seal Retainer.

#### SPOOL SEAL RETAINER

Item No.	Part No.	Description	Quantity Per Assembly
	K-12024	REPLACEMENT KIT (Contains Items 1 & 2)	
1	8560-001	PLATE, Retainer	1
2	3731-098	SCREW, HSHC	2

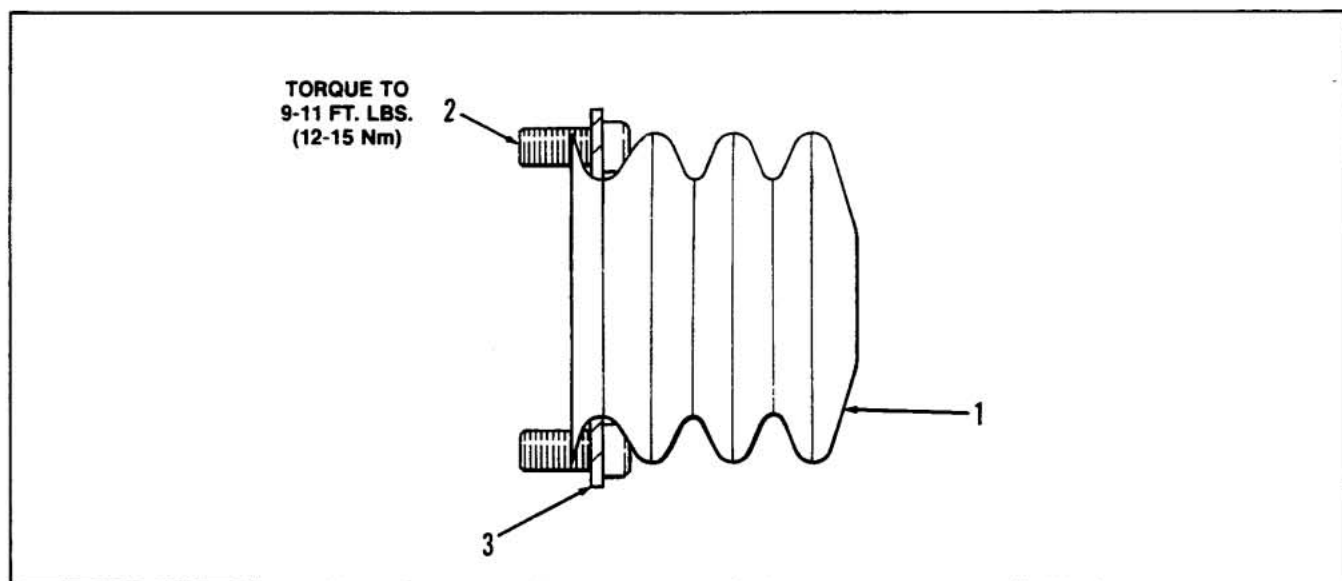


Figure 4-25. Spool Protector Boot.

#### SPOOL PROTECTOR BOOT

Item No.	Part No.	Description	Quantity Per Assembly
	K-12023-A	REPLACEMENT KIT (Contains Items 1, 2, and 3)	
1	8992-001	BOOT, Dust	1
2	3731-098	SCREW, HSHC	4
3	8993-001	RETAINER, Boot	1

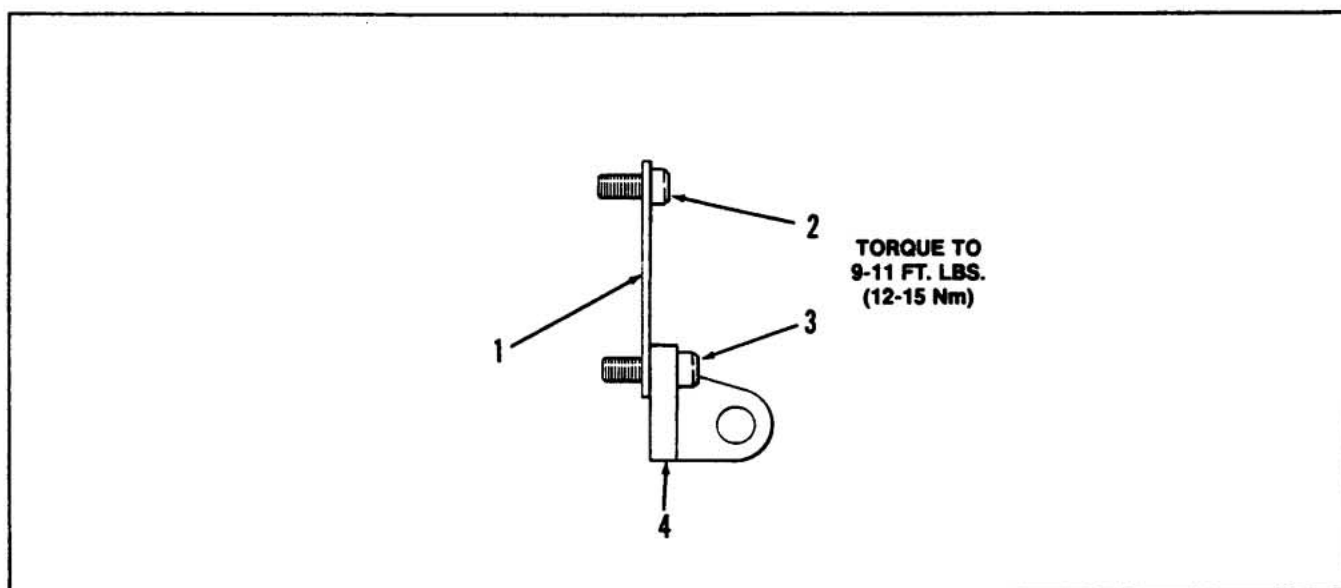


Figure 4-26. Bracket Assembly.

#### HANDLE BRACKET ASSEMBLY

Item No.	Part No.	Description	Quantity Per Assembly
	K-12025-A	REPLACEMENT KIT (Contains all items listed below)	
1	8993-001	PLATE, Handle	1
2	3731-098	SCREW, HSHC	2
3	9161-407	SCREW, HSHC	2
4	8530-001	BRACKET, Handle	1

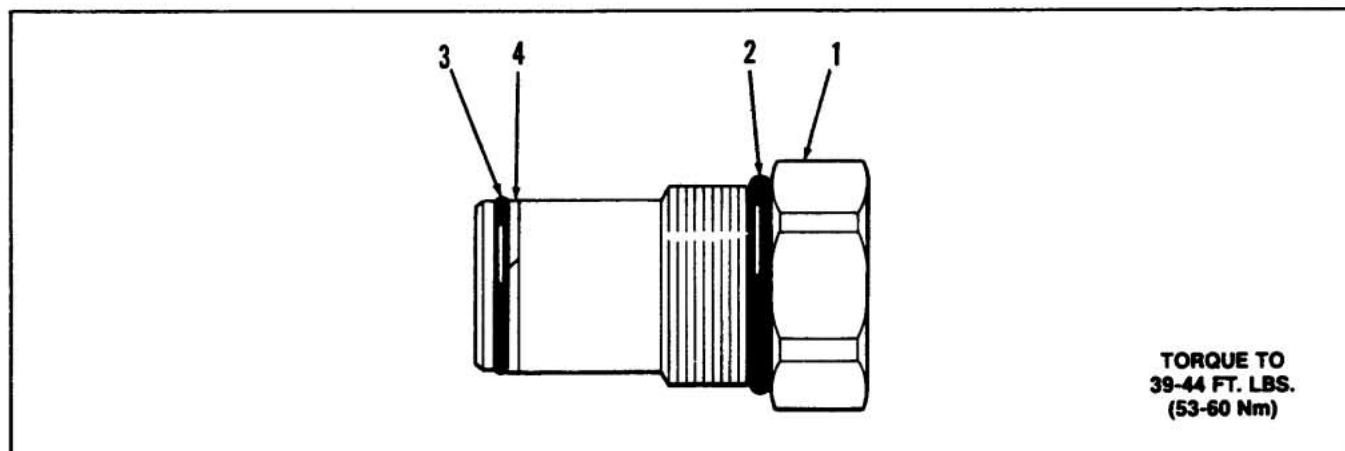


Figure 4-27. No Relief "NR" Plug (Main and Work Port Relief Valves).

#### NO RELIEF "NR" PLUG (MAIN AND WORK PORT RELIEF VALVES)

Item No.	Part No.	Description	Quantity Per Assembly
	K-12020-B	REPLACEMENT KIT (Contains all items listed below)	
1	8794-001	PLUG, NR V70	1
2	2710-001*	SEAL, O-Ring	1
3	7028-001*	SEAL, O-Ring	1
4	9021-022	RING, Back-Up, Split	1

\*Buna-N seals are standard for all Gresen valve assemblies. For viton seals contact the factory.

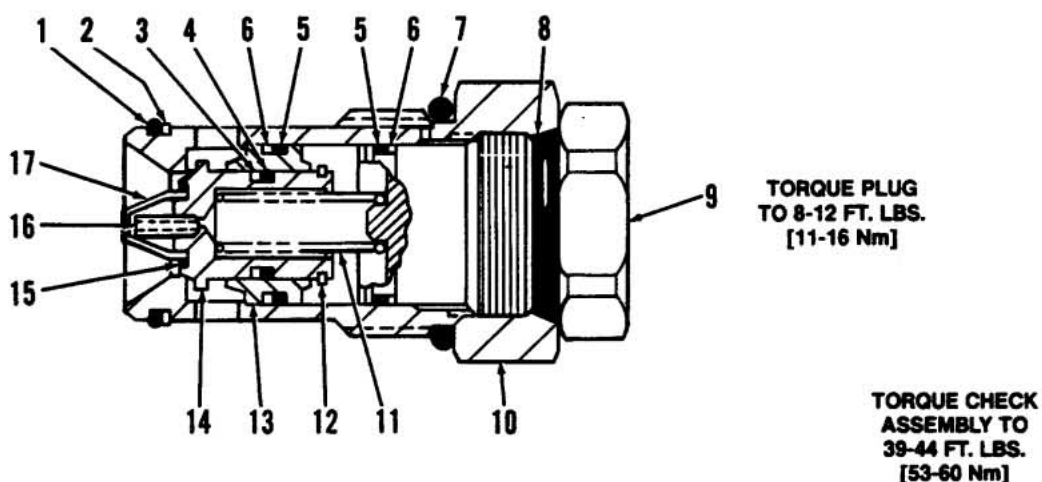


Figure 4-28. Anti-Cavitation Check Assembly.

### ANTI-CAVITATION CHECK ASSEMBLY

Item No.	Part No.	Description	Quantity Per Check
	K-12021-D	REPLACEMENT KIT (Contains all items listed below)	
	K-12038-B*	SEAL KIT (Contains items 1 thru 8)	
1	7028-001*	SEAL, O-Ring	1
2	9021-022	RING, Back-Up, Split	1
3	0682-001	RING, Back-Up, Cut	1
4	7495-001*	SEAL, O-Ring	1
5	6814-001*	SEAL, O-Ring	2
6	9021-019	RING, Back-Up, Split	2
7	2710-001*	SEAL, O-Ring	1
8	2708-001*	SEAL, O-Ring	1
9	8796-001	PLUG, Anti-Cav.	1
10	8724-001	BODY, Anti-Cav.	1
11	10361-001	SPRING	1
12	8732-001	RING, Retaining	1
13	11046-001	PISTON, Anti-Cav.	1
14	11047-001	POPPET	1
15	11199-001	RING, Retaining	1
16	11048-001	PIN, Spirol	1
17	11049-001	SCREEN, Filter	1

Not sold separately  
Order K-12038-B\*

#### NOTE

Due to close tolerances on working parts, Anti-Cavitation Check is not field serviceable. If service other than seal replacement is required, contact the factory.

\*Buna-N seals are standard for all Gresen valve assemblies. For Viton seals contact the factory.

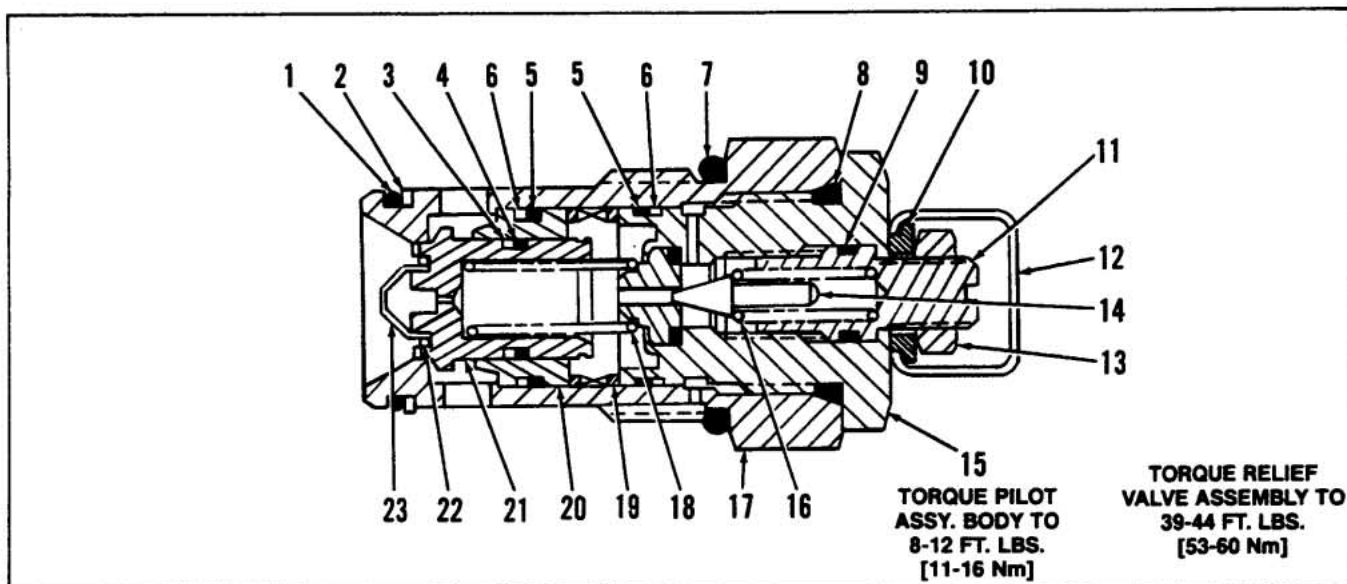


Figure 4-29. Model RP70 Pilot Operated Relief Valve.

### MODEL RP70 PILOT OPERATED RELIEF VALVE

Item No.	Part No.	Description	Quantity Per Relief
	K-12040-A*	SEAL KIT (Contains items 1 thru 9)	
1	7028-001*	SEAL, O-Ring	1
2	9021-022	RING, Back-Up, Split	1
3	0692-001	RING, Back-Up, Cut	1
4	7495-001*	SEAL, O-Ring	1
5	6814-001*	SEAL, O-Ring	2
6	9021-019	RING, Back-Up, Split	2
7	2710-001*	SEAL, O-Ring	1
8	2708-001*	SEAL, O-Ring	1
9	6884-001*	SEAL, O-Ring	1
10	10035-001	WASHER, RP70N (Shown)	1
	10852-006	WASHER, ID, RP70A (Not Shown)	1
11	8956-001	SCREW, Adjustment	1
12	10034-001	COVER, Tamperproof (RP70N Only)	1
13	9302-006	NUT, Hex Jam, 3/8"-24	1
14	8475-001	POPPET, Relief	1
15	11061-001	BODY, Pilot Assembly	1
16	10059-001	SPRING, Pilot	1
17	8724-001	BODY, Relief	1
18	10361-001	SPRING	1
19		SPRING	1
20	11046-001	PISTON	1
21	11047-001	POPPET, Relief	1
22	11199-001	RING, Retaining	1
23	11671-001	SCREEN, Filter	1

**NOTE**

Due to close tolerances on working parts, Model RP70 is not field serviceable. If service other than seal replacement is required, contact the factory.

\*Buna-N seals are standard for all Gresen valve assemblies. For Viton seals contact the factory.

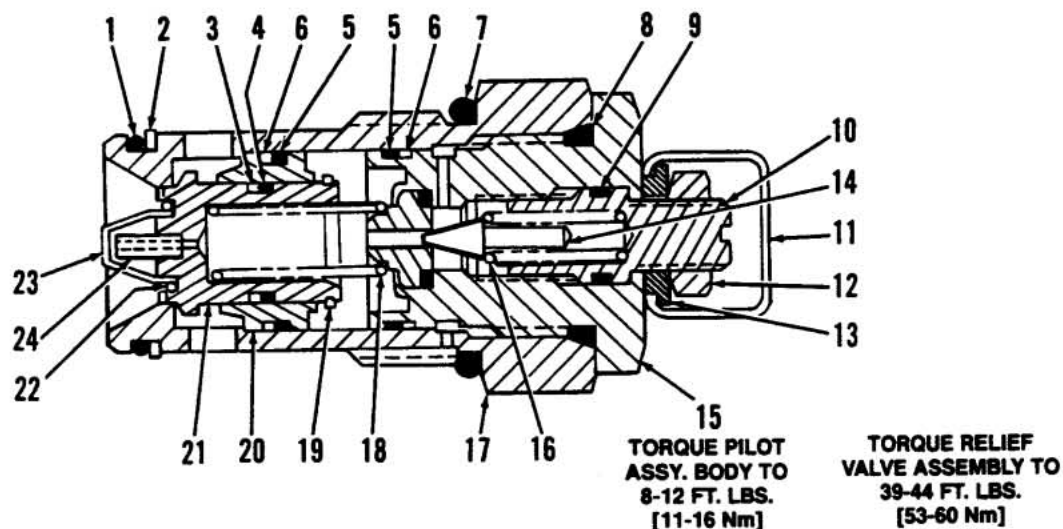


Figure 4-30. Model RP70-AC Combination Relief and Anti-Cavitation Check.

#### MODEL RP70-AC COMBINATION RELIEF and ANTI-CAVITATION CHECK

Item No.	Part No.	Description	Quantity Per Relief
	K-12040-A*	SEAL KIT (Contains items 1 thru 9)	
1	7028-001*	SEAL, O-Ring	1
2	9021-022	RING, Back-Up, Split	1
3	0682-001	RING, Back-Up, Cut	1
4	7495-001*	SEAL, O-Ring	1
5	6814-001*	SEAL, O-Ring	2
6	9021-019	RING, Back-Up, Split	2
7	2710-001*	SEAL, O-Ring	1
8	2708-001*	SEAL, O-Ring	1
9	6884-001*	SEAL, O-Ring	1
10	8956-001	SCREW, Adjustment	1
11	10034-001	COVER, Tamperproof (RP70N-AC Only)	1
12	9302-006	NUT, Hex Jam, 3/8"-24	1
13	10035-001	WASHER, RP70N-AC (Shown)	1
	10852-007	WASHER, ID, RP70A-AC (Not Shown)	1
14	8475-001	POPPET, Relief	1
15	11061-001	BODY, Pilot Assembly	1
16	10059-001	SPRING, Pilot	1
17	8724-001	BODY, Relief	1
18	10361-001	SPRING	1
19	8732-001	RING, Retaining	1
20	11046-001	PISTON, Anti-Cav.	1
21	11047-001	POPPET, Relief	1
22	11199-001	RING, Retaining	1
23	11049-001	SCREEN, Filter	1
24	11048-001	PIN, Spirol	1

Not sold separately  
Order K-12040-A\*

#### NOTE

Due to close tolerances on working parts, Model RP70-AC is not field serviceable. If service other than seal replacement is required, contact the factory.

\*Buna-N seals are standard for all Gresen valve assemblies. For Viton seals contact the factory.

### Standard Buna-N Seals and O-Rings

All standard Gresen products utilize Buna-N seals which are compatible with petroleum base, water-in-oil emulsions, and water-glycol. Phosphate ester type fire-resistant fluids will cause Buna-N seals to swell. This swelling is not normally detrimental to static seals, but will be a problem for dynamic seals such as valve spool seals. Swelling of these seals can result in binding. The temperature range of Buna-N seals is  $-40^{\circ}\text{F}$  to  $+200^{\circ}\text{F}$  ( $-40^{\circ}\text{C}$  to  $+93^{\circ}\text{C}$ ) for continuous operation.

### Optional Viton Seals and O-Rings

Viton seals are recommended for most applications that use phosphate ester type fluids. Viton seals are also recommended for applications that have a continuous operating temperature of  $+200^{\circ}\text{F}$  ( $+93^{\circ}\text{C}$ ) or more. For information on Viton Seals for Model V70 Control Valves, contact the factory.

**Table 4-1. Port Plugs and Seals.**

Port Size	Plug Part No.	Seal Part No.
SAE 4	8102-001	7830-001
SAE 10	1458-001	2707-001
SAE 14	1727-001	2709-001
SAE 16	1629-001	2710-001
SAE 20	6280-001	6281-001
SAE 24	8905-001	3640-001
1/4" NPTF	0017-001	----



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