

MODULATING VALVE (spool design) Service Instructions

Caterpillar Unit Number	Caterpillar Valve Assembly Number	Refer to Page	Caterpillar Unit Number	Caterpillar Valve Assembly Number	Refer to Page
110-3884	112-4801	2 & 3	139-5349	139-5350	4 & 5
* 112-3012	**130-6146	8 & 9	149-1907	119-6744	6 & 7
120-3932	119-6744	6 & 7	156-1590	112-4801	2 & 3
120-3934	119-6744	6 & 7	156-1697	112-4801	2 & 3
121-0902	119-6744	6 & 7	167-7822	139-5350	4 & 5
122-6603	119-6744	6 & 7	291-8382	304-9373	8 & 9
122-8455	134-7344	8 & 9	331-0704	353-5251	8 & 9
124-5810	119-6744	6 & 7	373-4532	365-4534	8 & 9
134-5099	112-4801	2 & 3			

* Replaced by 139-5349

** Replaced by 139-5350

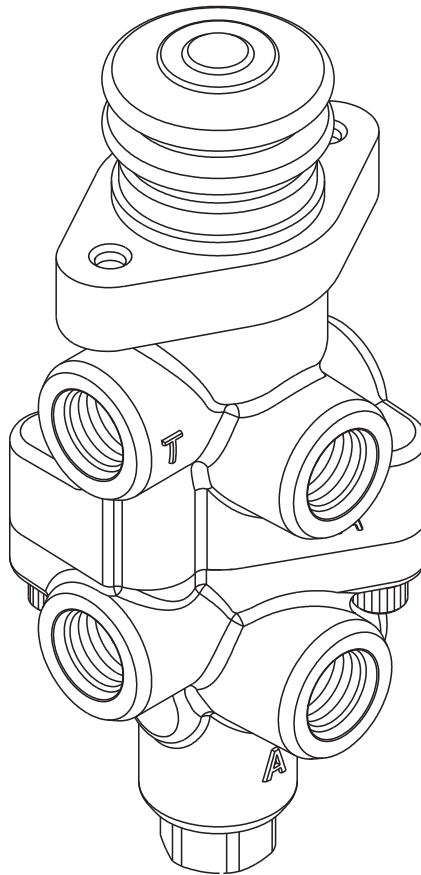
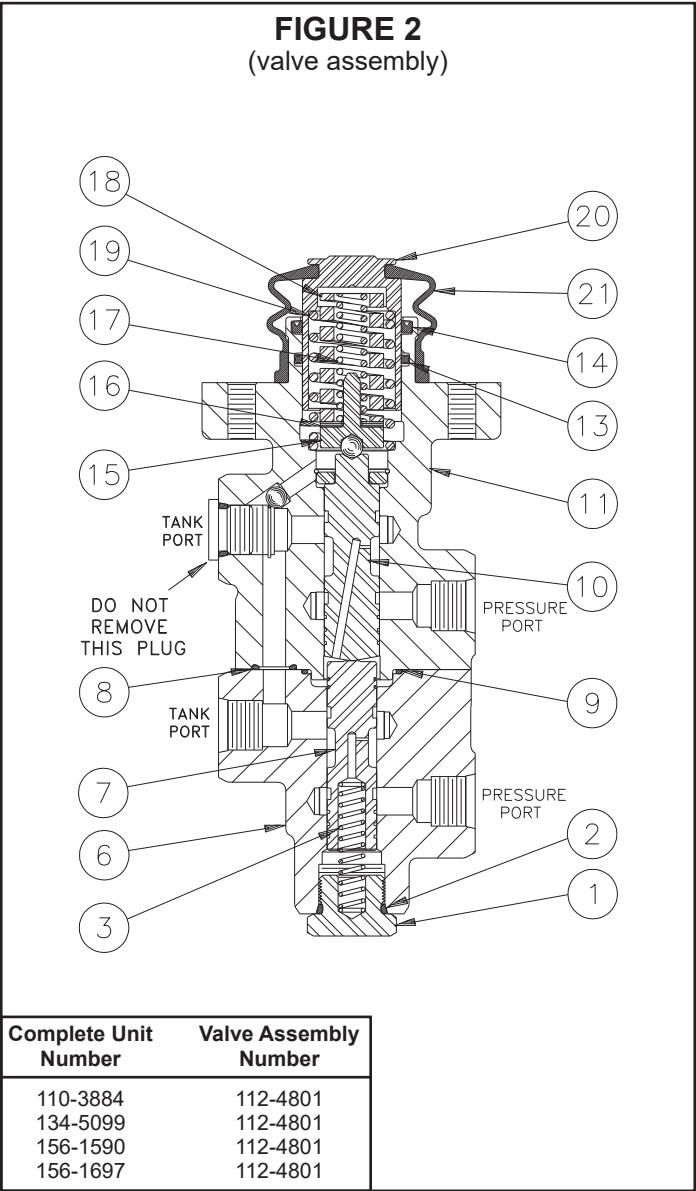


FIGURE 1

TABLE 1 (specifications)

Complete Unit Number	Value Assembly Number	Brake Pressure Setting	
		bar	(PSI)
110-3884	112-4801	69.8 ± 4.3	(1012.5 ± 62.5)
134-5099	112-4801	69.8 ± 4.3	(1012.5 ± 62.5)
156-1590	112-4801	69.8 ± 4.3	(1012.5 ± 62.5)
156-1697	112-4801	69.8 ± 4.3	(1012.5 ± 62.5)



⚠ WARNING

Installation and test note: Piston (20) must be retained mechanically. This will prevent it from blowing out at high velocity if an incorrect connection occurs from power source to tank ports. **Be sure the tank ports are connected directly to tank.** Failure to do this could result in serious injury or death.

Complete Unit Number	Valve Assembly Number
110-3884	112-4801
134-5099	112-4801
156-1590	112-4801
156-1697	112-4801

CAUTION

The upper tank port is plugged.
DO NOT REMOVE THIS PLUG.

DISASSEMBLY

(Refer to Figures 2 and 3)

NOTE

Housings (6 & 11) and spools (7 & 10) are manufactured as matched sets. These sets (housing and spool) should not be intermixed with other parts.

1. Remove boot (21) from piston (20) and housing (11).
2. Remove piston (20), springs (19, 18, & 17), shim(s) (16), and retainer assembly (15) from housing (11).
NOTE: Be aware of the number of shim(s) being removed from housing.
3. Carefully remove cup (14) and seal (13) from housing (11) bore.
NOTE: Be careful not to scratch or mar housing bore.
4. Remove end plug (1) and spring (3) from housing (6). Remove o-ring (2) from end plug (1).
5. Separate housings (6 & 11) by removing cap screws (4) and washers (5). Remove o-rings (8 & 9) from housings (6 & 11).
6. Carefully remove spools (7 & 10) from housings (6 & 11). **NOTE: Be careful not to damage spools or housing bores.**

CAUTION

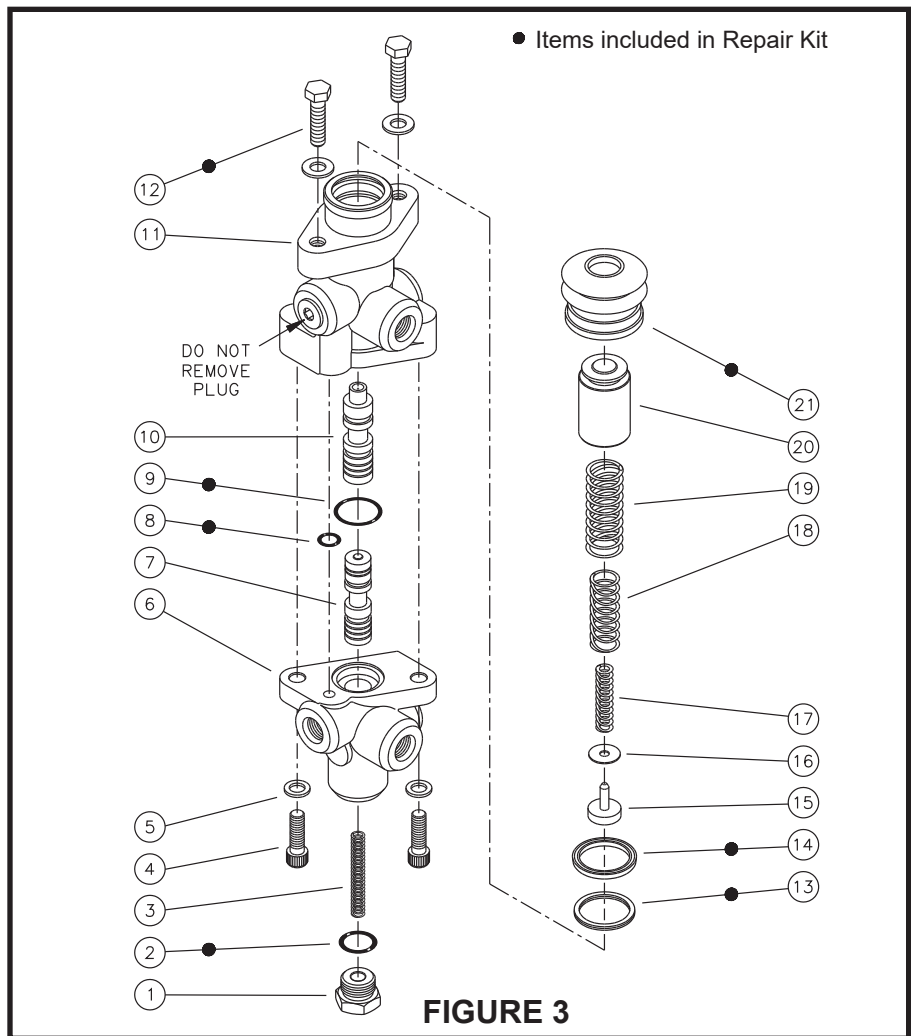
Do not intermix spools and housings. Spool (7) and housing (6) are a matched set as are spool (10) and housing (11).

ASSEMBLY

(Refer to Figures 2 and 3)

LUBRICATE ALL RUBBER COMPONENTS FROM REPAIR KIT WITH CLEAN TYPE FLUID USED IN THE SYSTEM.

1. Clean all parts thoroughly before assembling.
2. Install new o-rings (8 & 9) in proper o-ring pockets on housings (6 & 11).
3. Lubricate spool (10) with clean system fluid and carefully slide into bottom end of housing (11) bore. Note direction of spool (10). **NOTE: Spool must slide freely into bore. If either part is damaged, a new valve assembly may be required.**



4. Reassemble housings (6 & 11) using cap screws (4) and washers (5). Use Loctite 242 on cap screws and torque 27.1-33.9 N·m (22-25 lb·ft).
NOTE: Make sure housings line up correctly and that o-rings (8 & 9) remain in the pockets during assembly.
5. Lubricate spool (7) with clean system fluid and carefully slide into housing (6) bore. Note direction of spool (7).
NOTE: Spool must slide freely into bore. If either part is damaged, a new valve assembly may be required.
6. Install new o-ring (2) on end plug (1).
7. Install spring (3) and end plug (1) into housing (6). Torque end plug 47.5-54.2 N·m (35-40 lb·ft).
8. Carefully install new cup (14) and new seal (13) into housing (11) bore. Note direction and order of cup and seal. **NOTE: Be careful not to scratch or mar housing bore.**
9. Assemble springs (19, 18, & 17), shim(s) (16) and retainer assembly (15) in piston (20).
10. Carefully install piston (20) assembly into housing (11) bore.

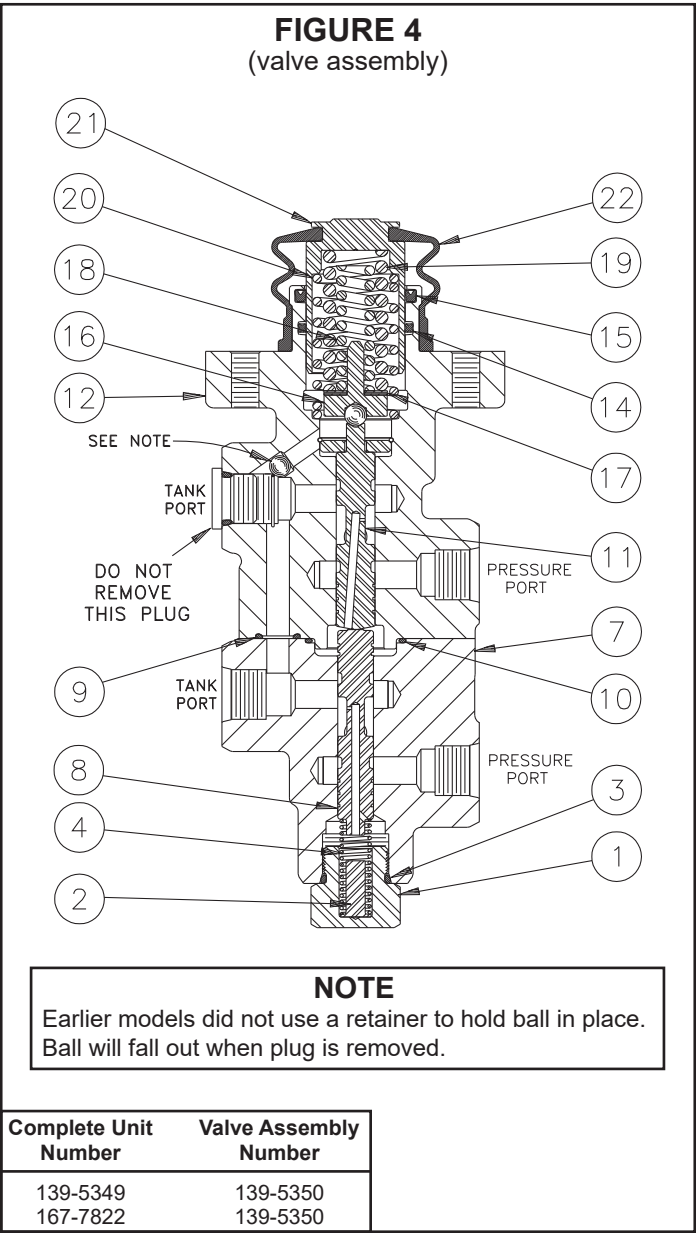
11. Install new boot (21) on housing (11) and piston (20).
12. When reinstalling pedal actuated valve use new hex cap screws (12), 5/16-18UNC SAE grade 8. Torque cap screws 24.4-29.8 N·m (18-22 lb·ft).

NOTE

After service, the valve must develop the pressure indicated in the specifications, TABLE 1. Shim(s) (16) are used to obtain the correct pressure setting. Contact dealer if brake pressure setting is not able to be obtained.

TABLE 2 (specifications)

Complete Unit Number	Value Assembly Number	Brake Pressure Setting	
		bar	(PSI)
139-5349	139-5350	103.4 ± 5.2	(1500 ± 75)
167-7822	139-5350	103.4 ± 5.2	(1500 ± 75)



WARNING

Installation and test note: Piston (21) must be retained mechanically. This will prevent it from blowing out at high velocity if an incorrect connection occurs from power source to tank ports. **Be sure the tank ports are connected directly to tank.** Failure to do this could result in serious injury or death.

Complete Unit Number	Valve Assembly Number
139-5349	139-5350
167-7822	139-5350

CAUTION

The upper tank port is plugged.
DO NOT REMOVE THIS PLUG.

DISASSEMBLY

(Refer to Figures 4 and 5)

NOTE

Housings (7 & 12) and spools (8 & 11) are manufactured as matched sets. These sets (housing and spool) should not be intermixed with other parts.

1. Remove boot (22) from piston (21) and housing (12).
2. Remove piston (21), springs (20, 19, & 18), shim(s) (17), and retainer assembly (16) from housing (12).
NOTE: Be aware of the number of shim(s) being removed from housing.
3. Carefully remove cup (15) and seal (14) from housing (12) bore.
NOTE: Be careful not to scratch or mar housing bore.
4. Remove end plug (1), retainer (2), and spring (4) from housing (7). Remove o-ring (3) from end plug (1).
5. Separate housings (7 & 12) by removing cap screws (5) and washers (6). Remove o-rings (9 & 10) from housings (7 & 12).
6. Carefully remove spools (8 & 11) from housings (7 & 12). **NOTE: Be careful not to damage spools or housing bores.**

CAUTION

Do not intermix spools and housings. Spool (8) and housing (7) are a matched set as are spool (11) and housing (12).

ASSEMBLY

(Refer to Figures 4 and 5)

LUBRICATE ALL RUBBER COMPONENTS FROM REPAIR KIT WITH CLEAN TYPE FLUID USED IN THE SYSTEM.

1. Clean all parts thoroughly before assembling.
2. Install new o-rings (9 & 10) in proper o-ring pockets on housings (7 & 12).
3. Lubricate spool (11) with clean system fluid and carefully slide into bottom end of housing (12) bore. Note direction of spool (11).
NOTE: Spool must slide freely into bore. If either part is damaged, a new valve assembly may be required.

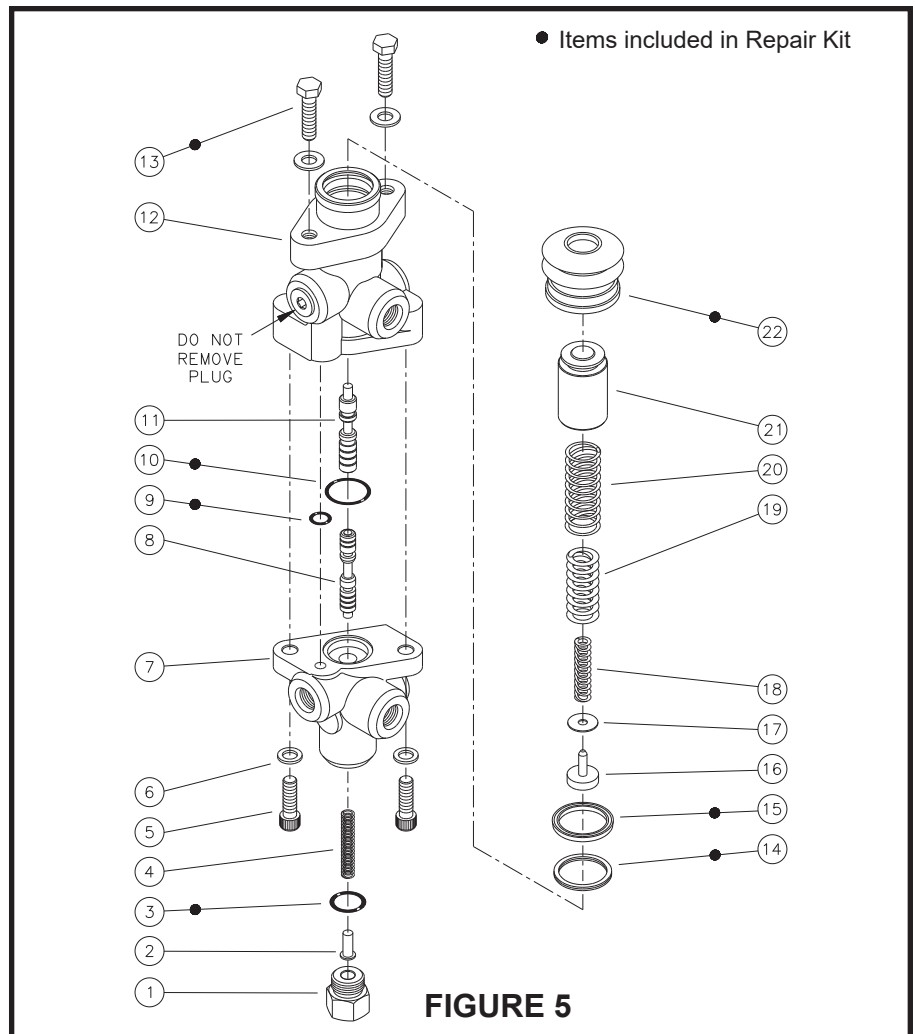


FIGURE 5

4. Reassemble housings (7 & 12) using cap screws (5) and washers (6). Use Loctite 242 on cap screws and torque 27.1-33.9 N·m (22-25 lb·ft).
NOTE: Make sure housings line up correctly and that o-rings (9 & 10) remain in the pockets during assembly.
5. Lubricate spool (8) with clean system fluid and carefully slide into housing (7) bore. Note direction of spool (8).
NOTE: Spool must slide freely into bore. If either part is damaged, a new valve assembly may be required.
6. Install new o-ring (3) on end plug (1).
7. Install spring (4), retainer (2) and new end plug (1) into housing (7). Torque end plug 47.5-54.2 N·m (35-40 lb·ft).
8. Carefully install new cup (15) and end seal (14) into housing (12) bore. Note direction and order of cup and seal.
NOTE: Be careful not to scratch or mar housing bore.
9. Assemble springs (20, 19, & 18), shim(s) (17) and retainer assembly (16) in piston (21).
10. Carefully install piston (21) assembly into housing (7) bore.

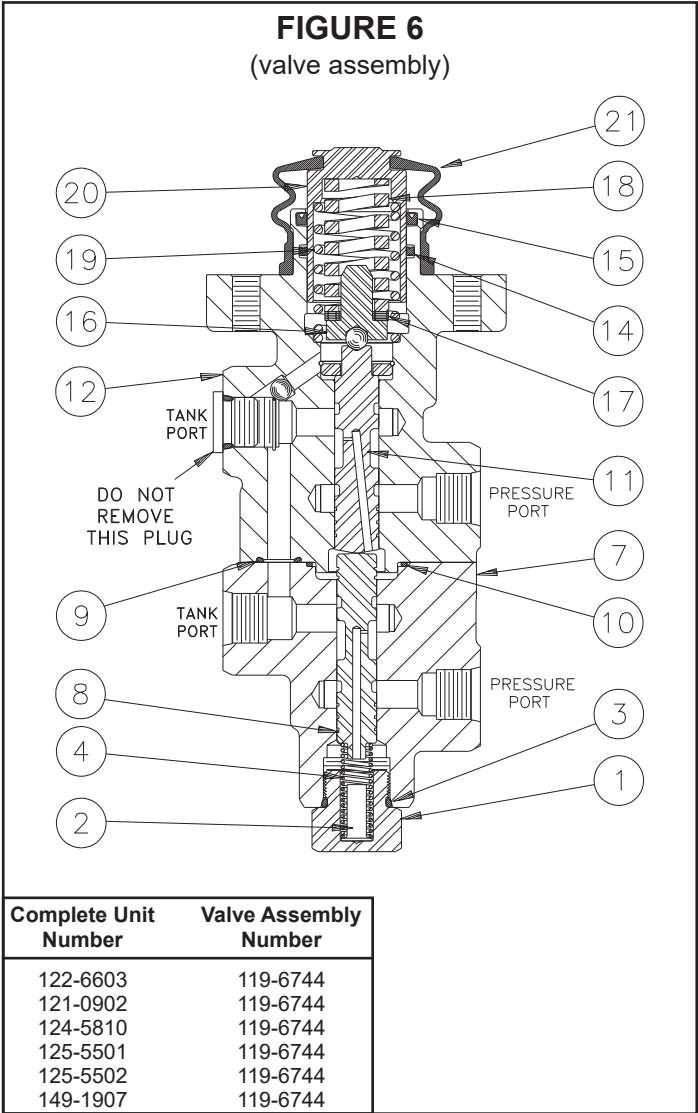
11. Install new boot (22) on housing (12) and piston (21).
12. When reinstalling pedal actuated valve use new hex cap screws (13), 5/16-18UNC SAE grade 8. Torque cap screws 24.4-29.8 N·m (18-22 lb·ft).

NOTE

After service, the valve must develop the pressure indicated in the specifications, TABLE 2. Shim(s) (17) are used to obtain the correct pressure setting. Contact dealer if brake pressure setting is not able to be obtained.

TABLE 3 (specifications)

Complete Unit Number	Value Assembly Number	Brake Pressure Setting	
		bar	(PSI)
121-0902	119-6744	69.8 ± 4.3	(1012.5 ± 62.5)
122-6603	119-6744	69.8 ± 4.3	(1012.5 ± 62.5)
124-5810	119-6744	69.8 ± 4.3	(1012.5 ± 62.5)
125-5501	119-6744	69.8 ± 4.3	(1012.5 ± 62.5)
125-5502	119-6744	69.8 ± 4.3	(1012.5 ± 62.5)
149-1907	119-6744	69.8 ± 4.3	(1012.5 ± 62.5)



⚠ WARNING

Installation and test note: Piston (20) must be retained mechanically. This will prevent it from blowing out at high velocity if an incorrect connection occurs from power source to tank ports. **Be sure the tank ports are connected directly to tank.** Failure to do this could result in serious injury or death.

Complete Unit Number	Valve Assembly Number
121-0902	119-6744
122-6603	119-6744
124-5810	119-6744
125-5501	119-6744
125-5502	119-6744
149-1907	119-6744

CAUTION

The upper tank port is plugged.
DO NOT REMOVE THIS PLUG.

DISASSEMBLY

(Refer to Figures 6 and 7)

NOTE

Housings (7 & 12) and spools (8 & 11) are manufactured as matched sets. These sets (housing and Spool) should not be intermixed with other parts.

1. Remove boot (21) from piston (20) and housing (12).
2. Remove piston (20), springs (19 & 18), shim(s) (17) and retainer assembly (16) from housing (12). **NOTE: Be aware of the number of shim(s) being removed from housing.**
3. Carefully remove cup (15) and seal (14) from housing (12) bore. **NOTE: Be careful not to scratch or mar housing bore.**
4. Remove end plug (1), retainer (2), and spring (4) from housing (7). Remove o-ring (3) from end plug (1).
5. Separate housings (7 & 12) by removing cap screws (5) and washers (6). Remove o-rings (9 & 10) from housings (7 & 12).
6. Carefully remove spools (8 & 11) from housings (7 & 12). **NOTE: Be careful not to damage spools or housing bores.**

CAUTION

Do not intermix spools and housings. Spool (8) and housing (7) are a matched set as are spool (11) and housing (12).

ASSEMBLY

(Refer to Figures 6 and 7)

LUBRICATE ALL RUBBER COMPONENTS FROM REPAIR KIT WITH CLEAN TYPE FLUID USED IN THE SYSTEM.

1. Clean all parts thoroughly before assembling.
2. Install new o-rings (9 & 10) in proper o-ring pockets on housings (7 & 12).

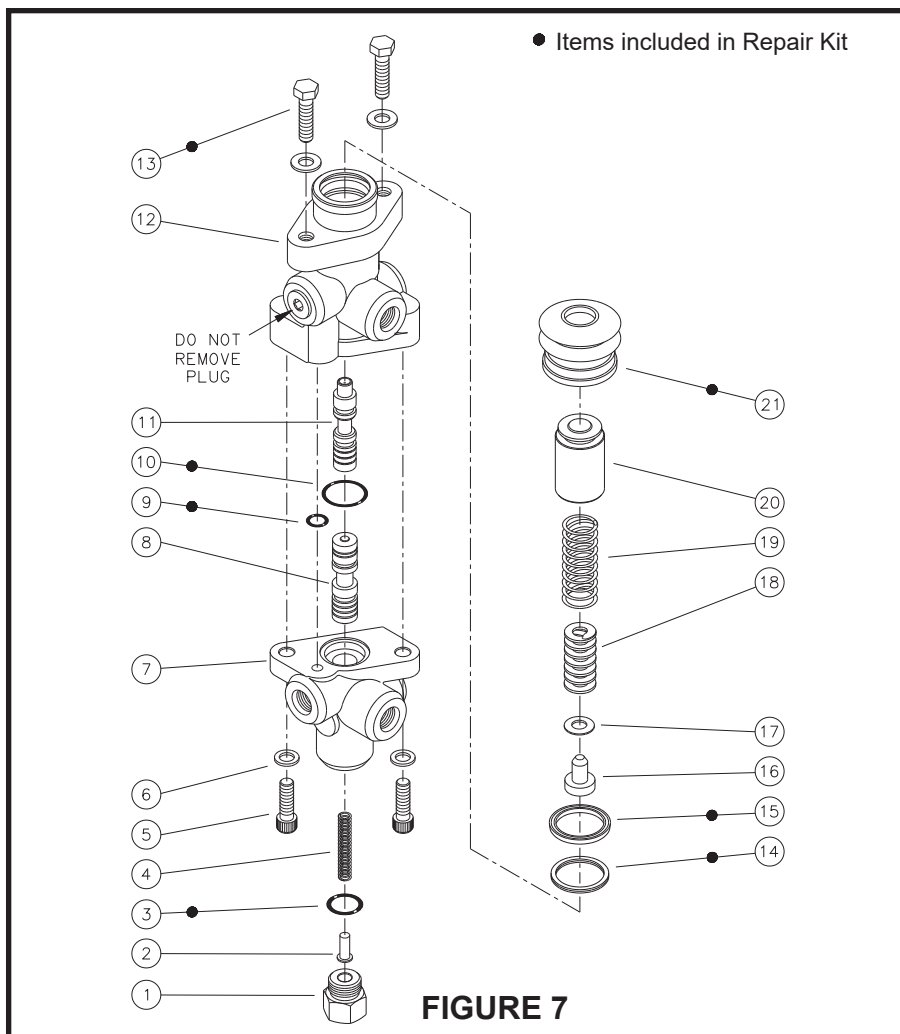


FIGURE 7

3. Lubricate spool (11) with clean system fluid and carefully slide into bottom end of housing (12) bore. Note direction of spool (11). **NOTE: Spool must slide freely into bore. If either part is damaged, a new valve assembly may be required.**
4. Reassemble housings (7 & 12) using cap screws (5) and washers (6). Use Loctite 242 on cap screws and torque 27.1-33.9 N·m (22-25 lb·ft). **NOTE: Make sure housings line up correctly and that o-rings (9 & 10) remain in the pockets during assembly.**
5. Lubricate spool (8) with clean system fluid and carefully slide into housing (7) bore. Note direction of spool (8). **NOTE: Spool must slide freely into bore. If either part is damaged, a new valve assembly may be required.**
6. Install new o-ring (3) on end plug (1).
7. Install spring (4), retainer (2) and end plug (1) into housing (7). Torque end plug 47.5-54.2 N·m (35-40 lb·ft).

8. Carefully install new cup (15) and new seal (14) into housing (12) bore. Note direction and order of cup and seal. **NOTE: Be careful not to scratch or mar housing bore.**
9. Assemble springs (19 & 18), shim(s) (17) and retainer assembly (16) in piston (20).
10. Carefully install piston (20) assembly into housing (12) bore.
11. Install new boot (21) on housing (12) and piston (20).
12. When reinstalling pedal actuated valve use new hex cap screws (13), 5/16-18UNC SAE grade 8. Torque cap screws 24.4-29.8 N·m (18-22 lb·ft).

NOTE

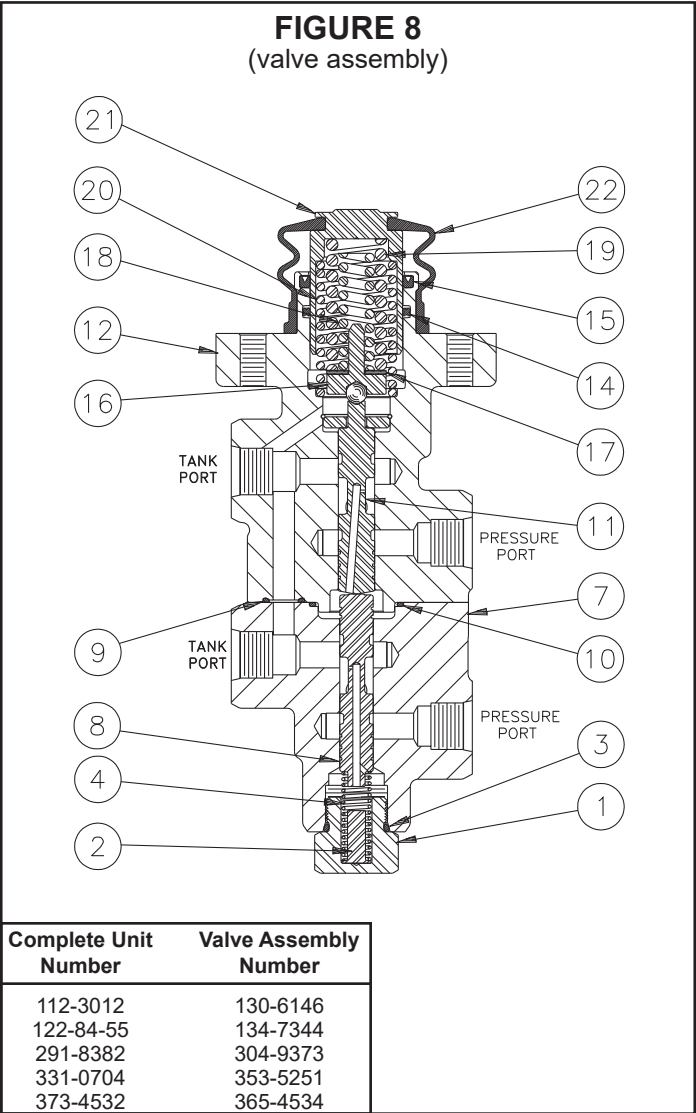
After service, the valve must develop the pressure indicated in the specifications, TABLE 3. Shim(s) (17) are used to obtain the correct pressure setting. Contact dealer if brake pressure setting is not able to be obtained.

TABLE 4 (specifications)

Complete Unit Number	Value Assembly Number	Brake Pressure Setting	
		bar	(PSI)
*112-3012	** 130-6146	103.4 ± 5.2	(1500 ± 75)
122-8455	134-7344	158.6 ± 6.9	(2300 ± 100)
291-8382	304-9373	137.9 ± 6.9	(2000 ± 100)
331-0704	353-5251	58.6 ± 5.2/-3.5	(850 ± 75/-50)
373-4532	365-4534	110.3 ± 5.2	(1600 ± 75)

* Replaced by 139-5349

** Replaced by 139-5350



⚠ WARNING

Installation and test note: Piston (21) must be retained mechanically. This will prevent it from blowing out at high velocity if an incorrect connection occurs from power source to tank ports. **Be sure the tank ports are connected directly to tank.** Failure to do this could result in serious injury or death.

Complete Unit Number	Valve Assembly Number
112-3012	130-6146
122-8455	134-7344
291-8382	304-9373
331-0704	353-5251
373-4532	365-4534

DISASSEMBLY

(Refer to Figures 8 and 9)

NOTE

Housings (7 & 12) and spools (8 & 11) are manufactured as matched sets. These sets (Housing & Spool) should not be intermixed with other parts.

1. Remove boot (22) from piston (21) and housing (12).
2. Remove piston (21), springs (18, 19 & 20), shim(s) (17), and retainer assembly (16) from housing (12).
NOTE: Be aware of the number of shim(s) being removed from housing.
3. Carefully remove cup (15) and seal (14) from housing (12) bore.
NOTE: Be careful not to scratch or mar housing bore.
4. Remove end plug (1), retainer (2), and spring (4) from housing (7). remove o-ring (3) from end plug (1).
5. Separate housings (7 & 12) by removing cap screws (5) and washers (6). Remove o-rings (9 & 10) from housings (7 & 12).
6. Carefully remove spools (8 & 11) from housings (7 & 12). **NOTE: Be careful not to damage spools or housing bores.**

CAUTION

Do not intermix spools & housings. Spool (8) and housing (7) are a matched set as are spool (11) and housing (12).

ASSEMBLY

(Refer to Figures 8 and 9)

LUBRICATE ALL RUBBER COMPONENTS FROM REPAIR KIT WITH CLEAN TYPE FLUID USED IN THE SYSTEM.

1. Clean all parts thoroughly before assembling.
2. Install new o-rings (9 & 10) in proper o-ring pockets on housings (7 & 12).
3. Lubricate spool (11) with clean system fluid and carefully slide into bottom end of housing (12) bore. Note direction of spool (11).
NOTE: Spool must slide freely into bore. If either part is damaged, a new valve assembly may be required.

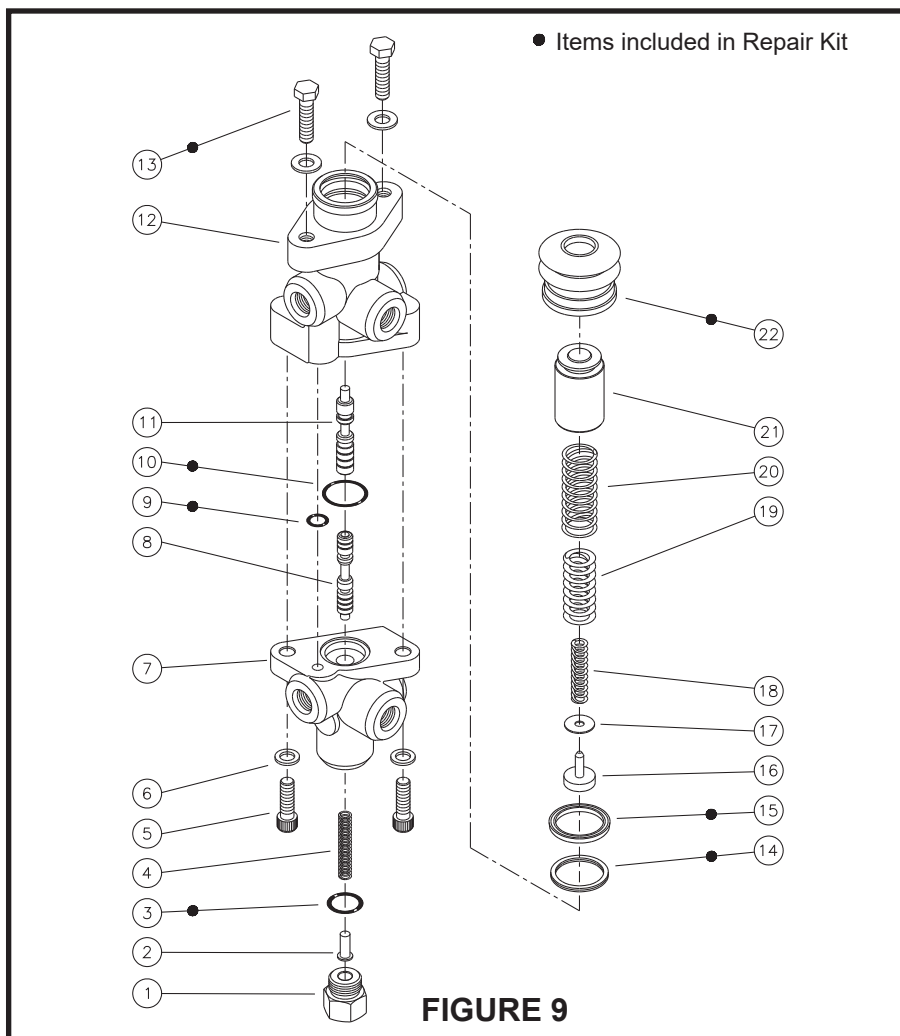


FIGURE 9

4. Reassemble housings (7 & 12) using cap screws (5) and washers (6). Use Loctite 242 on cap screws and torque 27.1-33.9 N·m (22-25 lb·ft).
NOTE: Make sure housings line up correctly and that o-rings (9 & 10) remain in the pockets during assembly.
5. Lubricate spool (8) with clean system fluid and carefully slide into housing (7) bore. Note direction of spool (8).
NOTE: Spool must slide freely into bore. If either part is damaged, a new valve assembly may be required.
6. Install new o-ring (3) on end plug (1).
7. Install spring (4), retainer (2), and end plug (1) into housing (7). Torque end plug 47.5-54.2 N·m (35-40 lb·ft).
8. Carefully install new cup (15) and new seal (14) into housing (12) bore. Note direction and order of cup and seal. **NOTE: Be careful not to scratch or mar housing bore.**
9. Assemble springs (18, 19 & 20), shim(s) (17), and retainer assembly (16) in piston (21).
10. Carefully install piston (21) assembly into housing (12) bore.
11. Install new boot (22) on housing (12) and piston (21).
12. When reinstalling pedal actuated valve use new hex cap screws (13), 5/16-18UNC SAE grade 8. Torque cap screws 24.4-29.8 N·m (18-22 lb·ft).

NOTE

After service, the valve must develop the pressure indicated in the specifications, TABLE 4. Shim(s) (17) are used to obtain the correct pressure setting. Contact dealer if brake pressure setting is not able to be obtained.

