

TANDEM MODULATING VALVE

Service Instructions

TABLE 1 (Specifications)

Caterpillar Part Number	Valve Assembly Number	Repair Kit Number	Brake Pressure Setting	
			kPa	(PSI)
346-6901 (HO)	355-7411	360-4432	5950 ± 207	(863 ± 30)
380-2371 (HO)	n/a	360-4432	5950 ± 207	(863 ± 30)
386-1613 (HO)	n/a	435-0918	5516 ± 276	(800 ± 40)
390-0899 (HO)	355-7411	360-4432	5950 ± 207	(863 ± 30)
444-9775 (HO)	444-9777	360-4432	5950 ± 207	(863 ± 30)
490-1119 (HO)	380-2371	360-4432	5950 ± 207	(863 ± 30)
508-2953 (HO)	n/a	435-0918	6205 ± 173	(900 ± 25)
579-9712 (HO)	579-9707	360-4432	5950 ± 207	(863 ± 30)
631-8669 (HO)	631-8232	360-4432	5950 ± 207	(863 ± 30)
633-3625 (HO)	633-3626	360-4432	5950 ± 207	(863 ± 30)
986-9078 (HO)	355-7411	360-4432	5950 ± 207	(863 ± 30)

HO = mineral base hydraulic oil

DISASSEMBLY

(Refer to Figure 1)

NOTE

Housings (6 & 12) and spools (7 & 11) are manufactured as matched sets. These sets (housing and spool) should not be intermixed with other parts.

1. Remove boot (23) from retainer (21) and piston (18).
2. Remove retainer (21), piston (18), springs (17, 16, & 15), shim(s) (14), and retainer assembly (13) from housing (12).
NOTE: Be aware of the number of shim(s) being removed from housing.
3. Carefully remove cup (22), quad ring (19), and o-ring (20) from retainer (21). Note direction and order of cup (22) and quad ring (19). **NOTE: Be careful not to scratch or mar retainer bore.**
4. Remove end plug (1) and spring (3) from housing (6). Remove o-ring (2) from end plug (1).
5. Separate housings (6 & 12) by removing cap screws (4) and washers (5). Remove o-ring (8), spring (9), and retainer (10) from housings (6 & 12).
6. Carefully remove spools (7 & 11) from housings (6 & 12).
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 (11) and housing (12).

ASSEMBLY

(Refer to Figure 1)

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

1. Clean all parts thoroughly and allow to dry before assembling.
2. 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.**
3. Install new o-ring (8), spring (9), and retainer (10) on housings (6 & 12).
4. Reassemble housings (6 & 12) using cap screws (4) and washers (5). Use Loctite 242 on cap screws and torque

29.8-33.9 N·m (22-25 lb·ft). **NOTE: Make sure housings line up correctly and that o-ring (8), spring (9) and retainer (10) 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 47.5-61.0 N·m (35-45 lb·ft).
8. Carefully install new cup (22), new quad ring (19), and new o-ring (20) on retainer (21). Note direction and order of cup (22) and quad ring (19). **NOTE: Be careful not to scratch or mar retainer bore.**
9. Assemble springs (17, 16, & 15), shim(s) (14), and retainer assembly (13) in piston (18).
10. Carefully install retainer (21) over piston (18) and install retainer (21) assembly into housing (12). Torque retainer 81.4-101.7 N·m (60-75 lb·ft).
11. Install new boot (23) on retainer (21) and piston (18).

NOTE

After service, the valve must develop the pressure indicated in the specifications. Shim(s) (14) are used to obtain the correct pressure setting. Contact manufacturer if brake pressure setting is not able to be obtained.

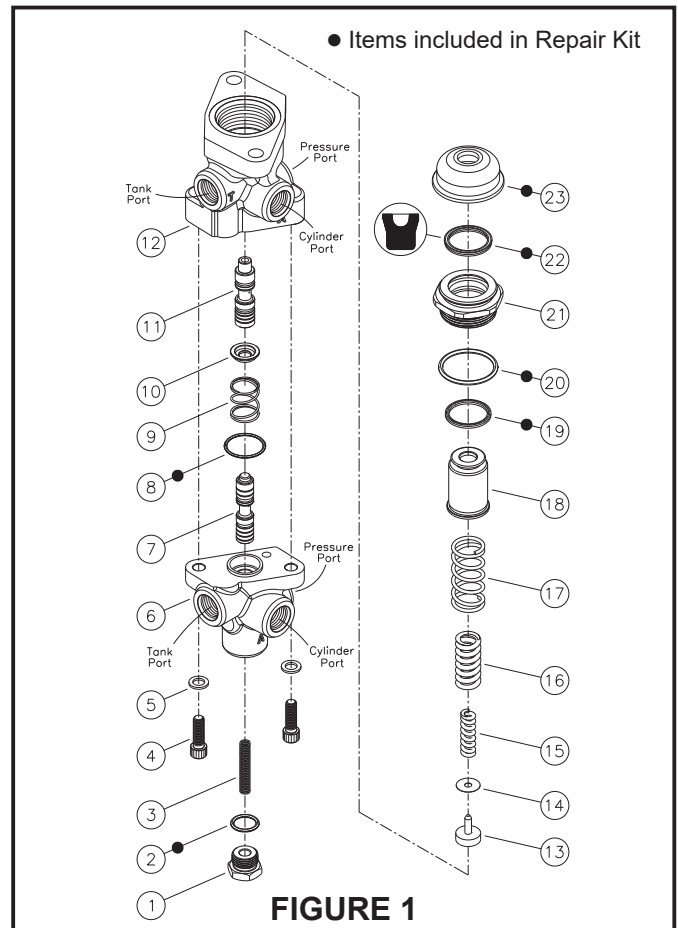


FIGURE 1

TABLE 2 (Specifications)

Caterpillar Part Number	Valve Assembly Number	Repair Kit Number	Brake Pressure Setting	
			kPa	(PSI)
564-4959 (HO)	565-7211	360-4432	12500 ± 435	(1813 ± 63)

HO = mineral base hydraulic oil

DISASSEMBLY

(Refer to Figure 2)

NOTE

Housings (7 & 13) and spools (8 & 12) are manufactured as matched sets. These sets (housing and spool) should not be intermixed with other parts.

1. Remove boot (24) from retainer (22) and piston (19).
2. Remove retainer (22), piston (19), springs (18, 17, & 16), shim(s) (15), and retainer assembly (14) from housing (13).
NOTE: Be aware of the number of shim(s) being removed from housing.
3. Carefully remove cup (23), quad ring (20), and o-ring (21) from retainer (22). Note direction and order of cup (23) and quad ring (20). **NOTE: Be careful not to scratch or mar retainer bore.**
4. Remove end plug (1), retainer (3), and spring (4) from housing (7). Remove o-ring (2) from end plug (1).
5. Separate housings (7 & 13) by removing cap screws (5) and washers (6). Remove o-ring (9), spring (10), and retainer (11) from housings (7 & 13).
6. Carefully remove spools (8 & 12) from housings (7 & 13).
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 (12) and housing (13).

ASSEMBLY

(Refer to Figure 2)

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

1. Clean all parts thoroughly and allow to dry before assembling.
2. Lubricate spool (12) with clean system fluid and carefully slide into bottom end of housing (13) bore. Note direction of spool (12). **NOTE: Spool must slide freely into bore. If either part is damaged, a new valve assembly may be required.**
3. Install new o-ring (9), spring (10), and retainer (11) on housings (7 & 13).
4. Reassemble housings (7 & 13) using cap screws (5) and washers (6). Use Loctite 242 on cap screws and torque 29.8-33.9 N·m (22-25 lb·ft). **NOTE: Make sure housings line up correctly and that o-ring (9), spring (10) and retainer (11) 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 (2) on end plug (1).
7. Install retainer (3), spring (4), and end plug (1) into housing (7). Torque end plug (1) 47.5-61.0 N·m (35-45 lb·ft).
8. Carefully install new cup (23), new quad ring (20), and new o-ring (21) on retainer (22). Note direction and order of cup (23) and quad ring (20). **NOTE: Be careful not to scratch or mar retainer bore**

9. Assemble springs (18, 17, & 16), shim(s) (15), and retainer assembly (14) in piston (19).
10. Carefully install retainer (22) over piston (19) and install retainer (22) assembly into housing (13). Torque retainer 81.4-101.7 N·m (60-75 lb·ft).
11. Install new boot (24) on retainer (22) and piston (19).

NOTE

After service, the valve must develop the pressure indicated in the specifications. Shim(s) (14) are used to obtain the correct pressure setting. Contact manufacturer if brake pressure setting is not able to be obtained.

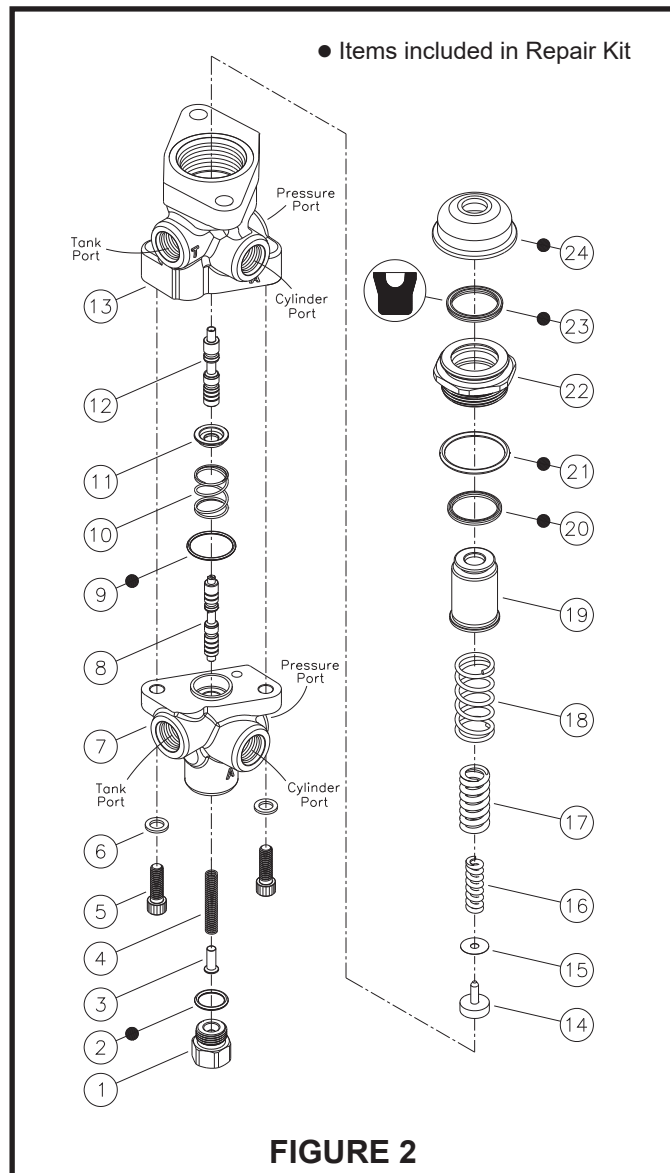
**FIGURE 2**

TABLE 3 (Specifications)

Caterpillar Part Number	Repair Kit Number	Brake Pressure Setting	
		kPa	(PSI)
388-6321 (HO)	435-0918	5516 +276/-172	(800 +40/-25)
435-3890 (HO)	435-0918	5516 +276/-172	(800 +40/-25)
466-1764 (HO)	435-0918	6206 +310/-207	(900 +45/-30)
576-2755 (HO)	435-0918	7688 ± 345	(1115 ± 50)
590-1887 (HO)	435-0918	7688 ± 345	(1115 ± 50)

HO = mineral base hydraulic oil

DISASSEMBLY

(Refer to Figure 3)

NOTE

Housings (6 & 12) and spools (7 & 11) are manufactured as matched sets. These sets (housing and spool) should not be intermixed with other parts.

1. Remove boot (23) from retainer (21) and piston (18).
2. Remove retainer (21), piston (18), springs (17, 16, & 15), shim(s) (14), and retainer assembly (13) from housing (12).
NOTE: Be aware of the number of shim(s) being removed from housing.
3. Carefully remove cup (22), quad ring (19), and o-ring (20) from retainer (21). Note direction and order of cup (22) and quad ring (19). **NOTE: Be careful not to scratch or mar retainer bore.**
4. Remove end plug (3) and spring (5) from housing (6). Remove o-ring (4) from end plug (3).
5. Separate housings (6 & 12) by removing cap screws (1) and washers (2). Remove o-ring (8), spring (9) and retainer (10) from housings (6 & 12).
6. Carefully remove spools (7 & 11) from housings (6 & 12).
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 (11) and housing (12).

ASSEMBLY

(Refer to Figure 3)

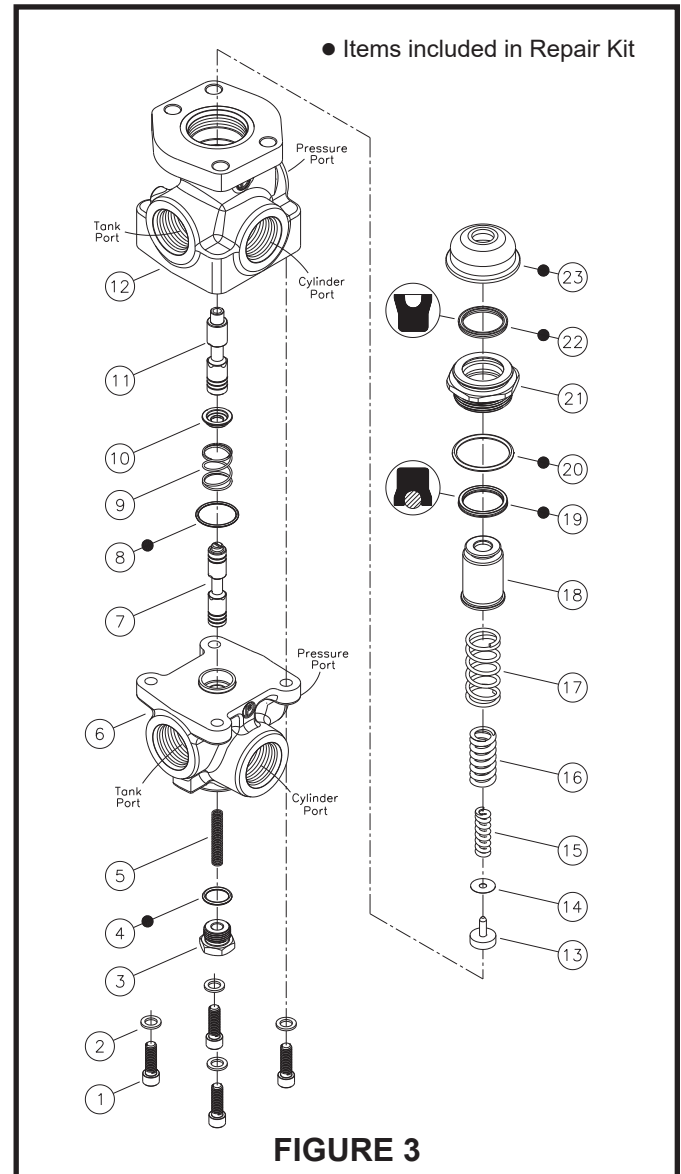
LUBRICATE ALL RUBBER COMPONENTS FROM REPAIR KIT WITH CLEAN TYPE FLUID USED IN THE SYSTEM.

1. Clean all parts thoroughly and allow to dry before assembling.
2. 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.**
3. Install new o-ring (8), spring (9), and retainer (10) on housings (6 & 12).
4. Reassemble housings (6 & 12) using cap screws (1) and washers (2). Use Loctite 242 on cap screws and torque 29.8-33.9 N·m (22-25 lb·ft). **NOTE: Make sure housings line up correctly and that o-ring (8), spring (9), and retainer (10) 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 (4) on end plug (3).
7. Install spring (5) and end plug (3) into housing (6). Torque end plug (3) 47.5-61.0 N·m (35-45 lb·ft).

8. Carefully install new cup (22), new quad ring (19), and new o-ring (20) on retainer (21). Note direction and order of cup and quad ring. **NOTE: Be careful not to scratch or mar retainer bore.**
9. Assemble springs (17, 16, & 15), shim(s) (14) and retainer assembly (13) in piston (18).
10. Carefully install retainer (21) over piston (18) and install retainer (21) assembly into housing (12). Torque retainer 81.4-101.7 N·m (60-75 lb·ft).
11. Install new boot (23) on retainer (21) and piston (18).

NOTE

After service, the valve must develop the pressure indicated in the specifications. Shim(s) (14) are used to obtain the correct pressure setting. Contact manufacturer if brake pressure setting is not able to be obtained.

**FIGURE 3**

