

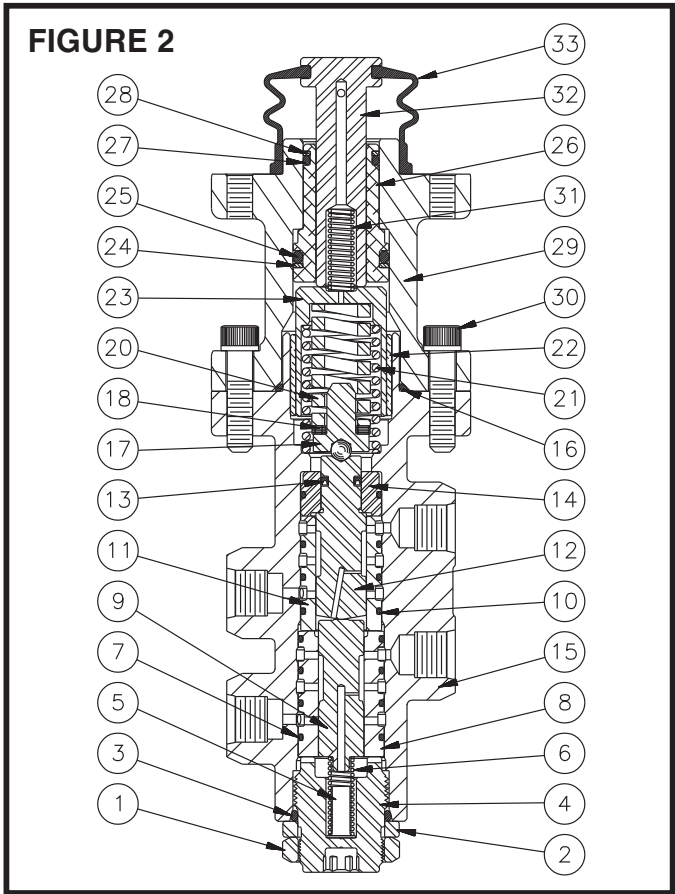
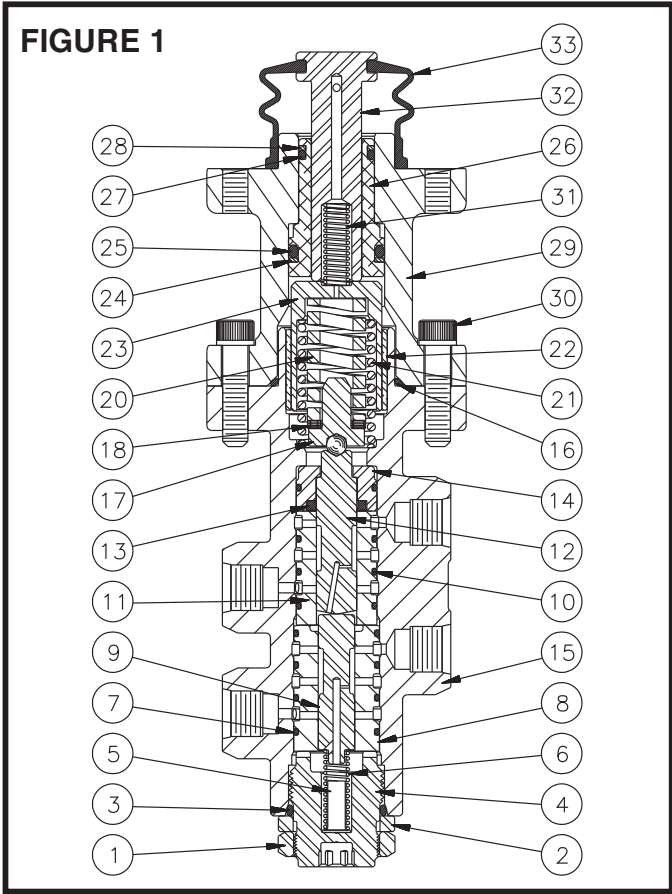
Tandem MODULATING VALVE with pilot apply



Service Instructions

TABLE 1 (Specifications)

Model Number	Brake Pressure Setting		Model Number	Brake Pressure Setting	
	bar	(PSI)		bar	(PSI)
06-464-400	82.7 ± 5.2	(1200 ± 75)	06-464-486	103.4 ± 5.2	(1500 ± 75)
06-464-402	151.7 ± 6.9	(2200 ± 100)	06-464-488	82.7 ± 5.2	(1200 ± 75)
06-464-404	69.0 ± 5.2	(1000 ± 75)	06-464-490	55.2 ± 5.2	(800 ± 75)
06-464-480	158.6 ± 5.2	(2300 ± 100)	06-464-958	103.4 ± 5.2	(1500 ± 75)
06-464-482	103.4 ± 5.2	(1500 ± 75)	06-464-970	103.4 ± 5.2	(1500 ± 75)
06-464-484	55.2 ± 5.2	(800 ± 75)	06-464-972	60.0 ± 5.2	(870 ± 75)



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Models: 06-464-400 06-464-482 06-464-958
 06-464-402 06-464-486 06-464-970
 06-464-480 06-464-488

DISASSEMBLY

(Refer to Figures 1 & 3)

NOTE

Spool (9)/sleeve (8) and spool (12)/sleeve (11) are matched sets and must not be intermixed with other parts.

1. Remove boot (33) from push rod (32). Remove push rod (32) and spring (31) from pilot housing (29) bore.
2. Separate pilot housing (29) and valve housing (15) by removing cap screws (30). Remove o-ring (16) from valve housing (15).
3. Remove piston (26) from pilot housing (29). **NOTE: Be careful not to scratch housing bore. A wooden dowel will help in this procedure.**
4. Remove o-rings (25 & 27) and back-up rings (24 & 28) from piston (26). **NOTE: Be careful not to damage o-ring and back-up ring grooves.**
5. Remove piston (23), springs (19, 20 & 21) and shim(s) (18) from valve housing bore. **NOTE: Not all models use spring (19). Some models use a 6.35 mm (0.25 in) spacer with shims. Note number of shim(s) being removed from housing.**
6. Bearing (22) should not be removed from housing bore. **NOTE: Excessive wear in both bearing (22) and piston (23) may require replacement.**
7. Remove retainer assembly (17) from housing bore. **NOTE: Ball is pressed into retainer.**
8. Loosen nut (1) and remove end plug (4) from housing. Remove spring (6), retainer (5), nut (1), washer (2), and o-ring (3) from end plug (4).
9. Remove spacer (14), sleeves (8 & 11) and spools (9 & 12) assembly from housing bore. This assembly must be removed through end plug (4) end of housing (15). **NOTE: Be careful not to scratch housing bore. A wooden dowel will help in this procedure.**
10. Separate spacer (14) and spools (9 & 12) from sleeves (8 & 11). **NOTE: Excessive wear on either spools (9 & 12) or sleeves (8 & 11) may require replacement.**
11. Remove o-ring (10) and cup (13) from spacer (14). Remove other o-rings (10) from sleeve (11) and o-rings (7) from sleeve (8).

ASSEMBLY

(Refer to Figures 1 & 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 cup (13) in spacer (14) and one new o-ring (10) on spacer (14). Note direction of cup.
3. Install other new o-rings (10) on sleeve (11) and new o-rings (7) on sleeve (8).
4. Lubricate spool (12) with clean system fluid and carefully insert into sleeve (11). Note direction of spool.
5. Insert spacer (14) into housing bore through end plug (4) end. Note direction of spacer.
6. Lubricate sleeve (11) and spool (12) assembly with clean system fluid and carefully insert into housing bore using a wooden dowel. Note direction of assembly.
7. Carefully insert sleeve (8) into housing until it rests against sleeve (11). Lubricate spool (9) with clean system fluid and carefully insert into sleeve (8). Note direction of spools and sleeves.
8. Install spring (6) and retainer (5) into housing bore.
9. Install end plug (4) and torque 10.9-20.3 N·m (96-180 lb·in) to seat sleeves. Then turn back end plug 1/4 turn and torque 1.1-6.8 N·m (10-60 lb·in). Install new o-ring (3), washer (2) and nut (1). Hold end plug and torque nut 67.8-81.4 N·m (50-60 lb·ft).
10. Install new o-ring (16) on valve housing (15).
11. Install retainer assembly (17) in housing. **NOTE: Depress retainer (17) until it bottoms on spacer (14). Spools (9 & 12) and retainer (17) should return when released. If the spools and retainer do not return when released, the bore of sleeves (8 & 11) were possibly damaged when installed.**
12. Install shim(s) (18), springs (19, 20 & 21) and piston (23) in valve housing bore. **NOTE: Not all models use spring (19). Some models use a 6.35 mm (0.25 in) spacer with shims. For proper brake pressure setting, install the same number of shims and spacer that were removed during disassembly. If spools (9 & 12), sleeves (8 & 11), or spring**

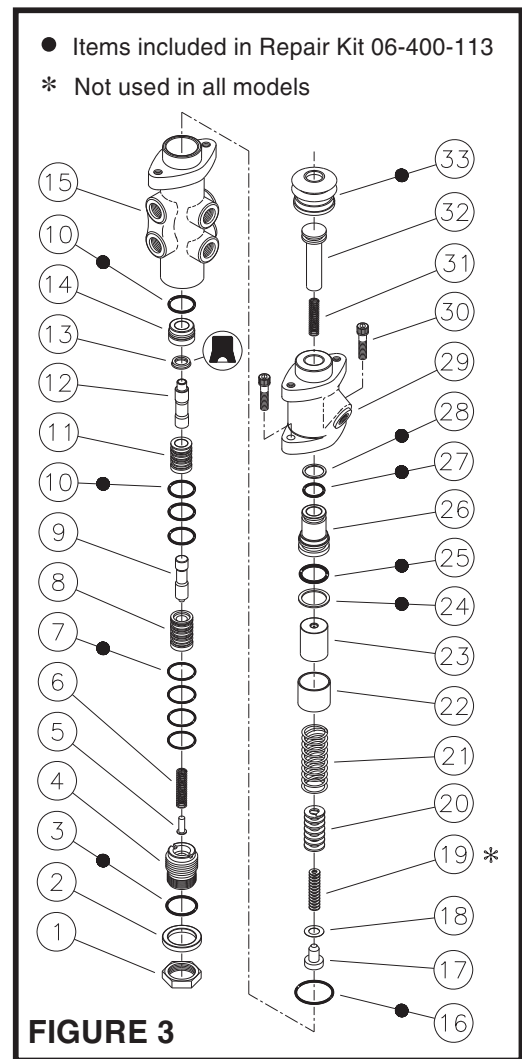


FIGURE 3

(21) were replaced, shim adjustment may be required.

13. Install new o-rings (25 & 27) and new back-up rings (24 & 28) on piston (26). Note order of back-up rings and o-rings.
14. Lubricate piston (26) with clean system fluid and insert into pilot housing (29) through valve housing (15) end. Be sure to install piston (26) as far as it will go into pilot housing bore.
15. Carefully attach pilot housing (29) to valve housing (15) using cap screws (30). Torque cap screws 24.4-29.8 N·m (18-22 lb·ft).
16. Install spring (31) and push rod (32) into pilot housing (29) bore.
17. Install new boot (33) on push rod (32).

DISASSEMBLY

(Refer to Figures 2 & 4)

NOTE

Spool (9)/sleeve (8) and spool (12)/sleeve (11) are matched sets and must not be intermixed with other parts.

1. Remove boot (33) from push rod (32). Remove push rod (32) and spring (31) from pilot housing (29) bore.
2. Separate pilot housing (29) and valve housing (15) by removing cap screws (30). Remove o-ring (16) from valve housing (15).
3. Remove piston (26) from pilot housing (29). **NOTE: Be careful not to scratch housing bore. A wooden dowel will help in this procedure.**
4. Remove o-rings (25 & 27) and back-up rings (24 & 28) from piston (26). **NOTE: Be careful not to damage o-ring and back-up ring grooves.**
5. Remove piston (23), springs (19, 20 & 21) and shim(s) (18) from valve housing bore. **NOTE: Not all models use spring (19). Some models use a 6.35 mm (0.25 in) spacer with shims. Note number of shim(s) being removed from housing.**
6. Bearing (22) should not be removed from housing bore. **NOTE: Excessive wear in both bearing (22) and piston (23) may require replacement.**
7. Remove retainer assembly (16) from housing bore. **NOTE: Ball is pressed into retainer.**
8. Loosen nut (1) and remove end plug (4) from housing. Remove spring (6), retainer (5), nut (1), washer (2), and o-ring (3) from end plug (4).
9. Remove spacer (14), sleeves (8 & 11) and spools (9 & 12) assembly from housing bore. This assembly must be removed through end plug (4) end of housing. **NOTE: Be careful not to scratch housing bore. A wooden dowel will help in this procedure.**
10. Separate spacer (14) and spools (9 & 12) from sleeves (8 & 11). **NOTE: Excessive wear on either spools (9 & 12) or sleeves (8 & 11) may require replacement.**
11. Remove o-ring (10) from retainer (14) cup (13) from spool (12). Remove other o-rings (10) from sleeve (11) and o-rings (7) from sleeve (8). **NOTE: Be careful not to damage cup and o-ring grooves or bore.**

ASSEMBLY

(Refer to Figures 2 & 4)

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

1. Clean all parts thoroughly before assembling.
2. Install one new o-ring (10) on spacer (14) and new cup (13) on spool (12). Note direction of cup.
3. Install other new o-rings (10) on sleeve (11) and new o-rings (7) on sleeve (8).
4. Lubricate spool (12) with clean system fluid and carefully insert into sleeve (11). Note direction of spool.
5. Carefully insert spacer (14) into housing bore through end plug (4) end. Note direction of spacer.
6. Lubricate sleeve (11) and spool (12) assembly with clean system fluid and carefully insert into housing bore using a wooden dowel. Note direction of assembly.
7. Carefully insert sleeve (8) into housing until it rests against sleeve (11). Lubricate spool (9) with clean system fluid and carefully insert into sleeve (8). Note direction of spools and sleeves.
8. Install spring (6) and retainer (5) into housing bore.
9. Install end plug (4) and torque 10.9-20.3 N·m (96-180 lb·in) to seat sleeves. Then turn back end plug 1/4 turn and torque 1.1-6.8 N·m (10-60 lb·in). Install new o-ring (3), washer (2) and nut (1). Hold end plug and torque nut 67.8-81.4 N·m (50-60 lb·ft).
10. Install new o-ring (16) on valve housing (15).
11. Install retainer assembly (17) in housing. **NOTE: Depress retainer (17) until it bottoms on spacer (14). Spools (9 & 12) and retainer (17) should return when released. If the spools and retainer do not return when released, the bore of sleeves (8 & 11) were possibly damaged when installed.**
12. Install shim(s) (18), springs (19, 20 & 21) and piston (23) in housing bore. **NOTE: Not all models use spring (19). Some models use a 6.35 mm (0.25 in) spacer with shims. For proper brake pressure setting, install the same number of shims and spacer that were removed during disassembly. If spools (9 & 12), sleeves (8 & 11), or spring**

● Items Included in Repair Kit 06-400-113

* Not used in all models

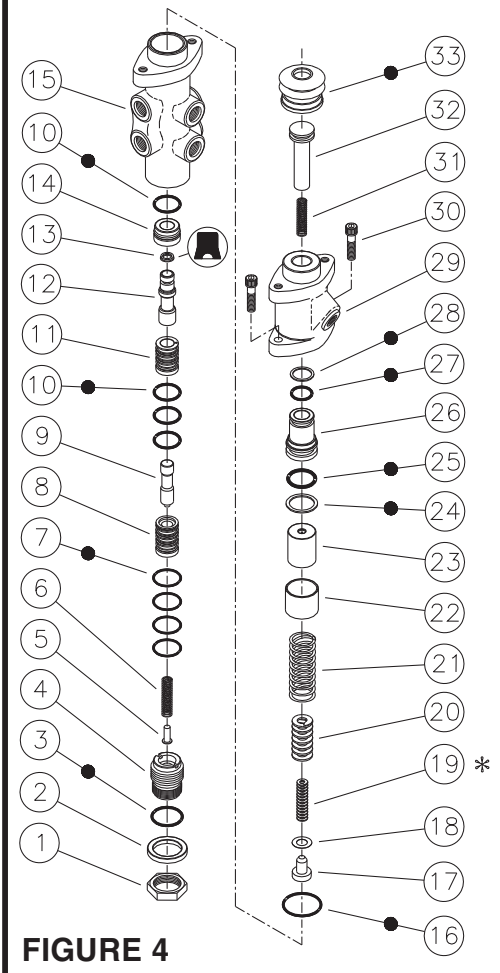


FIGURE 4

(21) were replaced, shim adjustment may be required.

13. Install new o-rings (25 & 27) and new back-up rings (24 & 28) on piston (26). Note order of back-up rings and o-rings.
14. Lubricate piston (26) with clean system fluid and insert into pilot housing (29) through valve housing (15) end. Be sure to install piston (26) as far as it will go into pilot housing bore.
15. Carefully attach pilot housing (29) to valve housing (15) using cap screws (30). Torque cap screws 24.4-29.8 N·m (18-22 lb·ft).
16. Install spring (31) and push rod (32) into pilot housing (29) bore.
17. Install new boot (33) on push rod (32).

BLEEDING

Brake lines should be bled very carefully as soon as the valve is installed in the machine. Air in the system will not allow the brakes to release properly and may severely damage them.

1. Start engine and allow accumulator to reach full charge. Shut down engine, then slowly apply and release brakes, waiting one minute between applications until brakes will not apply. Repeat this step three times.
2. Operate engine to maintain accumulator pressure within working limits throughout the bleeding procedure.

3. Open bleeder screw at wheel closest to brake valve and apply brakes cautiously until all air is bled out of line. Then close bleeder screw. Repeat this step at each wheel, moving to the next farthest wheel from the brake valve each time, as follows:
 - a. Left front
 - b. Right front
 - c. Right rear
 - d. Left rear
4. Release brake pressure for at least one (1) minute.

5. Apply brakes, holding pedal down ten (10) seconds; then release pressure for one (1) minute. Repeat this step two more times.
6. Repeat step 3.
7. Check for system leaks and be sure of proper brake operation.

SERVICE CHECKS FOR 464 SERIES TANDEM PEDAL VALVES

BRAKES SLOW TO APPLY

1. No or improper gas charge in accumulator
 1. **Check gas charge**
2. Brakes not properly adjusted
 2. **Adjust brakes**
3. Inoperative brakes
 3. **Check brakes**
4. Hydraulic lines or fittings leaking
 4. **Check for leaks and repair**
5. Inoperative automatic adjuster (Goodrich Hi-torque Brakes only)
 5. **Check adjuster operation**
6. Damaged hydraulic brake lines
 6. **Check lines for dents that restrict flow of oil**

BRAKES WON'T RELEASE

1. Pedal angle out of adjustment
 1. **Check for proper pedal angle**
2. Inoperative brakes
 2. **Check brakes**
3. Inoperative automatic adjusters
 3. **Check operation of adjusters**
4. Inoperative brake valve
 4. **Replace brake valve**

INSUFFICIENT BRAKES

1. No oil or low oil level in tank
 1. **Check oil level in tank**
2. Brakes not properly adjusted
 2. **Check brake adjustment**
3. Oil or grease on brake lining
 3. **Clean or install new linings**

SERVICE DIAGNOSIS

(Refer to Figures 1 through 4)

BRAKES WILL NOT RELEASE COMPLETELY

1. Piston (23) sticking.
2. Pedal angle out of adjustment
3. Spring (6) broken.

BRAKE WON'T RELEASE

1. Binding spools (9 & 12).
2. Damaged sleeves (8 & 11).
3. Piston (23) binding.

4. Brake line damaged
 4. **Check lines and replace**
5. Inoperative automatic adjusters
 5. **Check operation of adjusters**
6. No or improper gas charge in accumulator
 6. **Check gas charge**
7. Inoperative brakes
 7. **Check brakes**
8. Brake valve inoperative
 8. **Replace valve**

EXCESSIVE BRAKING

1. Inoperative brakes
 1. **Check brakes**
2. Inoperative brake valve
 2. **Replace brake valve**

BRAKES WILL NOT RELEASE COMPLETELY

1. Brakes not properly adjusted
 1. **Adjust brakes**
2. Inoperative brakes
 2. **Check brakes**
3. Pedal angle out of adjustment
 3. **Adjust pedal angle**
4. Inoperative wheel cylinders
 4. **Replace wheel cylinders**
5. Inoperative automatic adjuster
 5. **Check operation of adjusters**
6. Air in brakes (when automatic adjusters used Goodrich Hi-torque Brakes only)
 6. **Bleed brakes**

NO BRAKES

1. Piston (23) binding.
2. Broken spring (20).

EXCESSIVE BRAKING

1. Too many shims (18) installed in valve.

EXCESSIVE ACCUMULATOR LEAKAGE WHEN BRAKES ARE APPLIED

1. Damaged spools (9 & 12).
2. Damaged sleeves (8 & 11).
3. O-rings (7 or 10) leaking.

7. Inoperative brake valve
 7. **Replace brake valve**
8. Back pressure on return line too high
 8. **Remove restriction**

NO BRAKES

1. No oil in hydraulic system
 1. **Check oil level in tank**
2. Broken or damaged brake line
 2. **Check lines for breaks or damaged condition**
3. Brakes not properly adjusted
 3. **Adjust brakes**
4. Inoperative system relief valve
 4. **Check pressure in pressure line to valve**
5. Worn pump
 5. **Check pressure in pressure line to valve**
6. Inoperative automatic adjuster
 6. **Check brake line pressure**
7. Inoperative or worn brakes
 7. **Check brakes**
8. Inoperative brake valve
 8. **Replace brake valve**

PEDAL KICKBACK WHEN BRAKES ARE APPLIED

1. Air in brakes
 1. **Bleed brakes**

EXCESSIVE ACCUMULATOR LEAKAGE WHEN BRAKES ARE NOT BEING USED

1. Damaged spools (9 & 12).
2. Damaged sleeves (8 & 11).
3. O-ring (7 or 10) leaking.
4. Spring (6) broken.

INSUFFICIENT BRAKES

1. Broken pressure regulating spring (20). Boot cut, allowing dirt to accumulate under piston (23) flange.