TABLE 1 (Specifications)

Model Number	Repair Kit Number	Brake Pressure Setting	
		bar	(PSI)
20-100-901	06-400-116	86.2 ± 3.5	(1250 ± 50)

Single MODULATING VALVE with pilot apply (464 Series)

Service Instructions

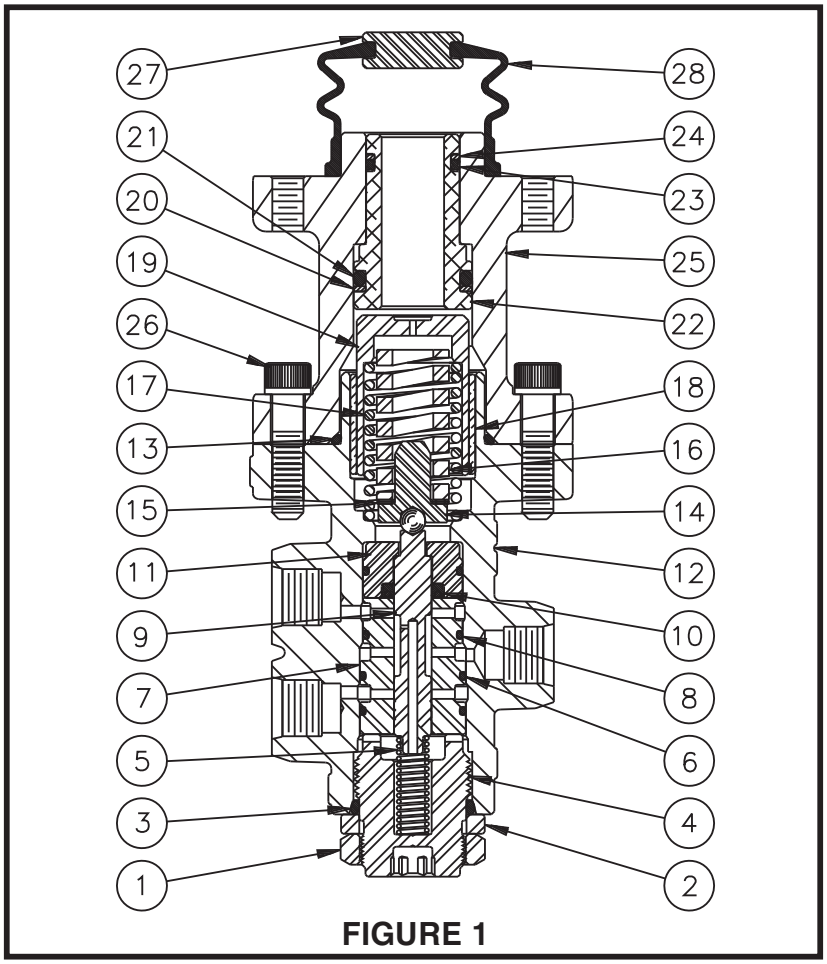

FIGURE 1

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Form No. 81-464-005 Revised 2009-09-23

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Model: 20-100-901

DISASSEMBLY
(Refer to Figures 1 & 2)

NOTE
Spool (9)/sleeve (7) are a matched set and should not be intermixed with other parts.

1. Remove boot (28) and plug (27) from pilot housing (25).
2. Separate pilot housing (25) and valve housing (12) by removing cap screws (26). Remove o-ring (13) from valve housing (12).
3. Remove piston (22) out bottom side of pilot housing (25). **NOTE: Be careful not to scratch or mar housing bore. A wooden dowel will help in this procedure.**
4. Remove quad ring (23), o-ring (21) and back-up rings (20 & 24) from piston (22). **NOTE: Be careful not to damage grooves in piston (22).**
5. Remove piston (19), springs (16 & 17) and shim(s) (15) from housing bore.
6. Bearing (18) need not be removed from housing bore. **NOTE: Excessive wear in both bearing (18) and piston ton (19) may require relacement.**
7. Remove retainer assembly (14) from housing bore. **NOTE: Ball is pressed into retainer.**
8. Loosen nut (1) and remove end plug (4) from housing. Remove spring (5), nut (1), washer (2), and o-ring (3) from end plug (4).
9. Remove spacer (11), sleeve (7) and spool (9) assembly out bottom side of housing (12). **NOTE: Be careful not to scratch or mar housing bore. A wooden dowel will help in this procedure.**
10. Separate spacer (11) and spool (9) from sleeve (7). **NOTE: Excessive wear on either spool (9) or sleeve (7) may require replacement.**
11. Remove o-ring (8) and cup (10) from spacer (11). Remove other o-ring (8) and o-rings (6) from sleeve (7). **NOTE: Be careful not to damage cup and o-ring grooves or bore.**

ASSEMBLY
(Refer to Figures 1 & 2)

LUBRICATE ALL RUBBER COMPONENTS FROM REPAIR KIT, PISTON (22), SPOOL (9) AND SLEEVE (7) WITH CLEAN TYPE FLUID USED IN THE SYSTEM.

1. Clean all parts thoroughly before assembling.
2. Install new cup (10) in spacer (11) and one new o-ring (8) on spacer (11). Note direction of cup (10).
3. Install new o-rings (6) on larger diameter end of sleeve (7) and one new o-ring (8) on smaller diameter end of sleeve (7).
4. Carefully insert spool (9) into sleeve (7). Note direction of spool.
5. Insert spacer (11) into housing bore through end plug (4) end. Note direction of spacer (11).
6. Carefully insert sleeve (7) and spool (9) assembly into housing bore using a wooden dowel. Note direction of assembly.
7. Install spring (5) into housing bore.
8. Install end plug (4) and torque 10.85-20.34 N·m (96-180 lb·in) to seat sleeves. Then turn back end plug 1/4 turn and torque 1.13-6.78 N·m (10-60 lb·in). Install new o-ring (3), washer (2) and nut (1). Hold end plug (4) and torque nut (1) 67.80-81.36 N·m (50-60 lb·ft).
9. Install new o-ring (13) on valve housing (12).
10. Install retainer assembly (13) in housing. **NOTE: Depress retainer (13) until it bottoms on spacer (11). Spool (9) and retainer (13) should return when released. If the spool and retainer do not return when released, the bore of sleeve (7) was possibly damaged when installed.**
11. Install shim(s) (15), springs (16 & 17) and piston (19) in housing bore. **NOTE: Be sure to install the same number of shims as were removed during disassembly. If spool (9), sleeve (7), or spring (17) were replaced, shim adjustment may be required.**
12. Install new quad ring (23), new o-ring (21) and new back-up rings (20 & 24) on piston (22). Note order of back-up rings, o-ring and quad ring.

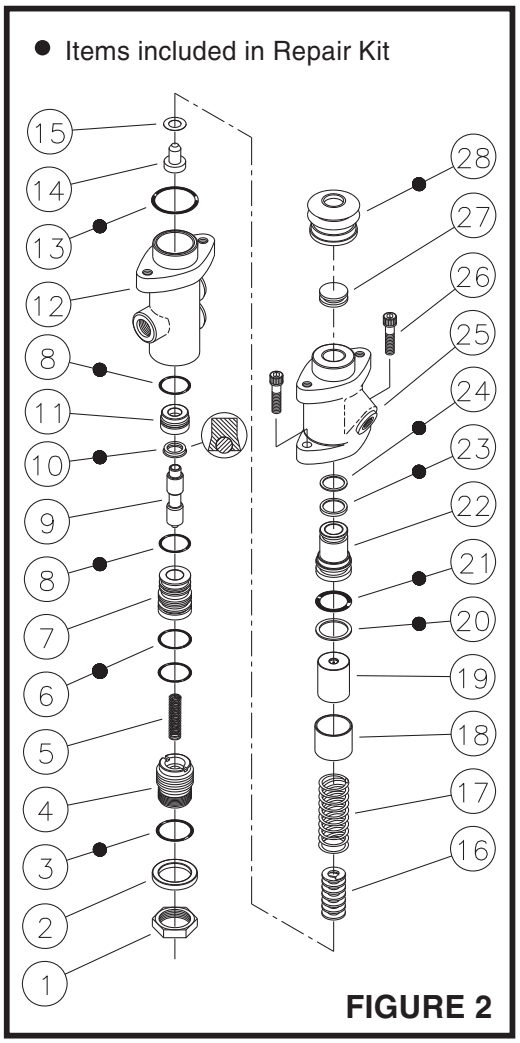

FIGURE 2

13. Install piston (22) into pilot housing (25) through valve housing (12) end. Be sure to install piston (22) as far as it will go into pilot housing bore.
14. Carefully attach pilot housing (25) to valve housing (12) using cap screws (26). Torque cap screws (26) 29.8-33.9 N·m (22-25 lb·ft).
15. Install new boot (28) and plug (27) on housing (25).

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 SINGLE 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**
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**
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**

SERVICE DIAGNOSIS

(Refer to Figures 1 & 2)

BRAKES WILL NOT RELEASE COMPLETELY

1. Piston (19) sticking
2. Pedal angle out of adjustment
3. Spring (5) broken

BRAKE WON'T RELEASE

1. Binding spool (9)
2. Damaged sleeve (7)
3. Piston (19) binding

NO BRAKES

1. Piston (19) binding
2. Broken spring (16)

EXCESSIVE BRAKING

1. Too many shims (15) installed in valve

EXCESSIVE ACCUMULATOR LEAKAGE WHEN BRAKES ARE APPLIED

1. Damaged spool (9)
2. Damaged sleeve (7)
3. O-rings (6) leaking
4. O-rings (8) leaking

EXCESSIVE ACCUMULATOR LEAKAGE WHEN BRAKES ARE NOT BEING USED

1. Damaged spool (9)
2. Damaged sleeve (7)
3. O-rings (6) leaking
4. Spring (5) broken

INSUFFICIENT BRAKES

1. Broken pressure regulating spring (16)
2. Boot cut, allowing dirt to accumulate under piston (19) flange