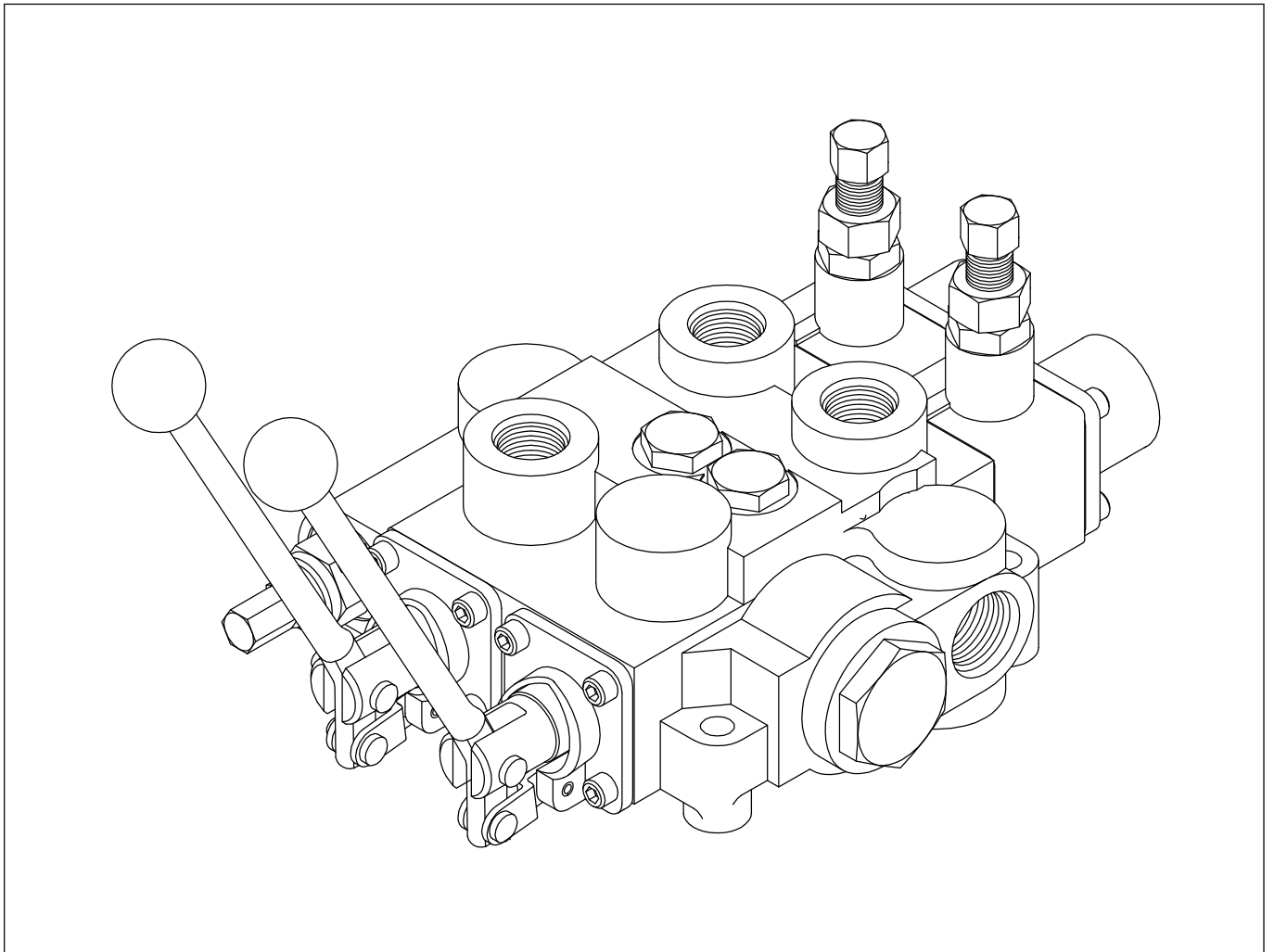


# RD5000 AUTOCYCLE DIRECTIONAL CONTROL VALVE PARTS MANUAL



PRINCE MANUFACTURING CORPORATION



Date: Sept. 2012

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## GENERAL SAFETY PRECAUTIONS FOR HYDRAULIC VALVES

1) ALL HYDRAULIC VALVES MUST BE PROPERLY INSTALLED INTO THE HYDRAULIC SYSTEM TO PREVENT PERSONAL INJURY AND/OR PROPERTY DAMAGE. FURTHER, THE IMPROPER SERVICING OF A VALVE MAY RESULT IN PERSONAL INJURY AND/OR PROPERTY DAMAGE. PLEASE READ AND UNDERSTAND ALL CATALOG AND SERVICE INFORMATION BEFORE STARTING. AS WITH ALL MECHANICAL WORK THE PROPER TOOLS, KNOWLEDGE, AND SAFETY EQUIPMENT ARE REQUIRED. ALWAYS WEAR SAFETY GLASSES.

2) MAKE SURE ALL PRESSURE HAS BEEN RELIEVED IN THE HYDRAULIC LINES BEFORE INSTALLING OR SERVICING A HYDRAULIC VALVE.



WARNING: ESCAPING HYDRAULIC FLUID UNDER PRESSURE CAN HAVE SUFFICIENT FORCE TO PENETRATE SKIN, CAUSING SERIOUS PERSONAL INJURY. DO NOT USE YOUR HAND TO CHECK FOR HYDRAULIC LEAKS.

3) BEFORE INSTALLING OR SERVICING A HYDRAULIC COMPONENT MAKE SURE ALL WEIGHT HAS BEEN REMOVED FROM THE CYLINDERS OR MOTORS BEFORE DISCONNECTING HYDRAULIC LINES.



WARNING: DISCONNECTING THE HYDRAULIC LINES WHILE THE CYLINDER OR MOTOR IS UNDER LOAD MAY RESULT IN THE UNEXPECTED RAPID MOVEMENT OF MACHINE RESULTING IN SERIOUS PERSONAL INJURY.

4) DO NOT EXCEED THE OPERATING SPECIFICATIONS FOR PRESSURE, FLOW OR TEMPERATURE. ALL HYDRAULIC SYSTEMS REQUIRE A MEANS TO LIMIT THE MAXIMUM PRESSURE. THIS REQUIRES EITHER A PRESSURE RELIEF VALVE IN THE SYSTEM OR A PUMP THAT HAS PRESSURE COMPENSATION.



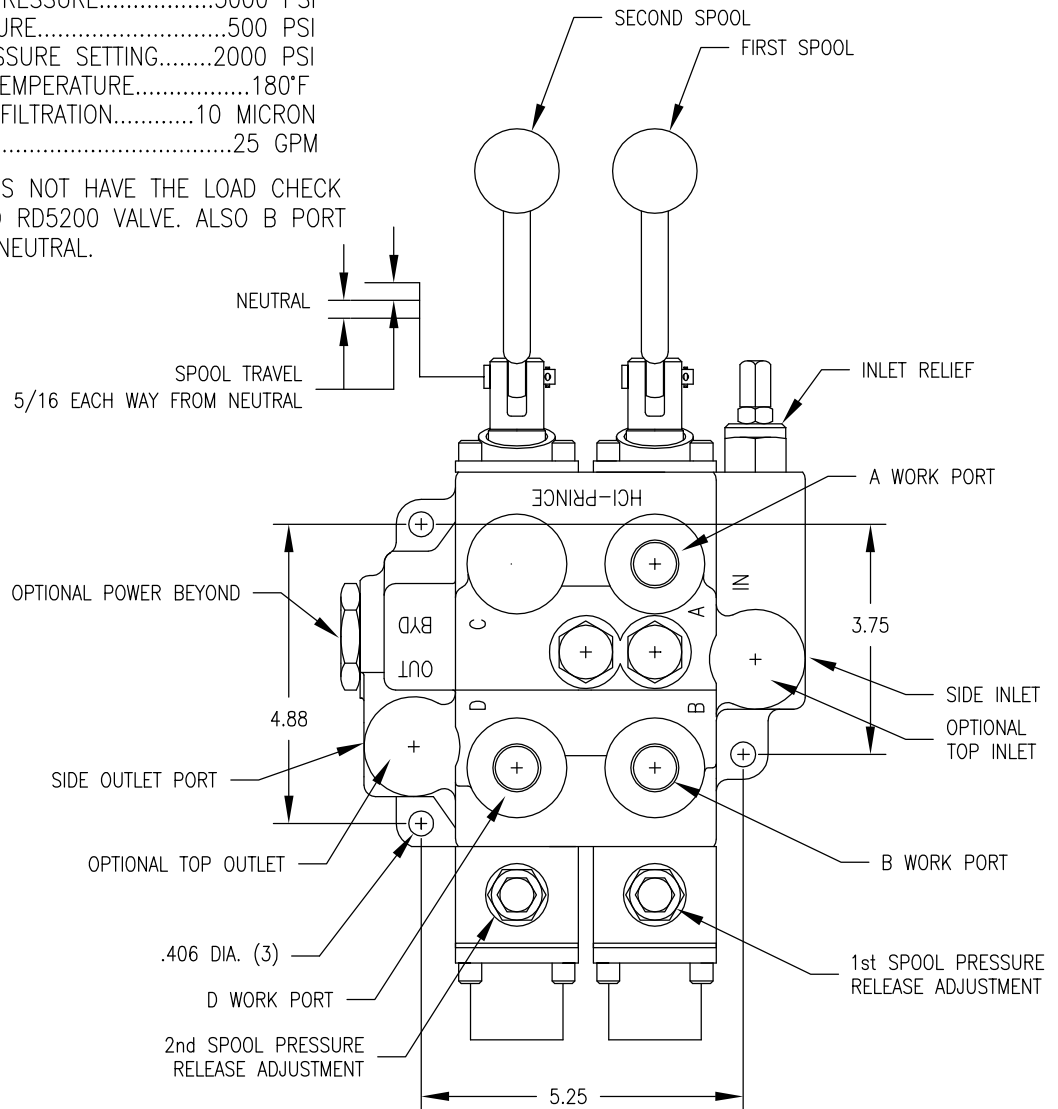
WARNING: OVERPRESSURE MAY CAUSE SUDDEN AND UNEXPECTED FAILURE OF A COMPONENT IN THE HYDRAULIC SYSTEM RESULTING IN SERIOUS PERSONAL INJURY. ALWAYS USE A GAUGE WHEN ADJUSTING A RELIEF VALVE.

# AUTO CYCLE VALVE PORT IDENTIFICATION

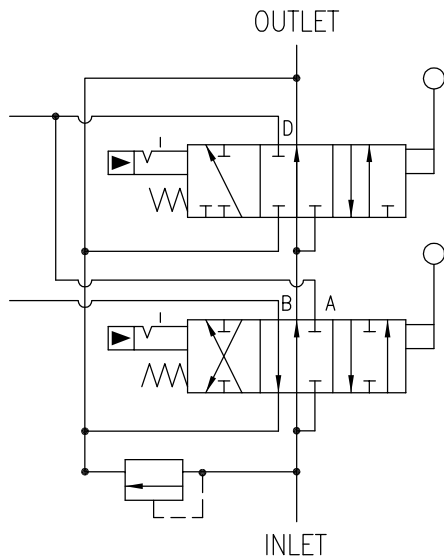
## AUTO CYCLE VALVE SPECIFICATIONS

MAXIMUM OPERATING PRESSURE.....3000 PSI  
 MAXIMUM TANK PRESSURE.....500 PSI  
 MAXIMUM DETENT PRESSURE SETTING.....2000 PSI  
 MAXIMUM OPERATING TEMPERATURE.....180°F  
 RECOMENDED SYSTEM FILTRATION.....10 MICRON  
 FLOW RATING .....25 GPM

NOTE: THIS VALVE DOES NOT HAVE THE LOAD CHECK  
 FEATURE OF STANDARD RD5200 VALVE. ALSO B PORT  
 IS OPEN TO TANK IN NEUTRAL.



CIRCUIT DIAGRAM FOR RD523MMEE5A1A1



NOTE: THIS VALVE IS FACTORY TESTED AND  
 SET. NO ADJUSTING SHOULD BE NECESSARY.  
 IN A NEW INSTALLATION MAKE SURE ALL AIR  
 IS OUT OF LINES BEFORE MAKING  
 ADJUSTMENTS. CYCLE CYLINDER UNTIL  
 OPERATION STABILIZES. DO NOT ADJUST  
 IMMEDIATELY UPON INSTALLATION.



STANDARD AUTOCYCLE VALVES, AND POWER BEYOND

RD522MMEE5A1A1

THIS AUTOCYCLE VALVE HAS 3/4 NPTF END INLET AND OUTLET PORTS, 1/2 NPTF WORK PORTS, HIGH PRESSURE ADJUSTABLE RELIEF (1500 PSI - 3000 PSI) PRESET AT 2000 PSI, AND A STANDARD LEVER HANDLE.

RD522MMEE5A4B1

THIS AUTOCYCLE VALVE HAS 3/4 NPTF END INLET AND OUTLET PORTS, 1/2 NPTF WORK PORTS, HIGH PRESSURE ADJUSTABLE RELIEF (1500 PSI - 3000 PSI) PRESET AT 2000 PSI, A STANDARD LEVER HANDLE, AND POWER BEYOND CAPABILITIES (SEE BELOW).

RD523MMEE5A1A1

THIS AUTOCYCLE VALVE HAS 3/4 NPTF END INLET AND OUTLET PORTS, 3/4 NPTF WORK PORTS, HIGH PRESSURE ADJUSTABLE RELIEF (1500 PSI - 3000 PSI) PRESET AT 2000 PSI, AND A STANDARD LEVER HANDLE.

RD523MMEE5A4B1

THIS AUTOCYCLE VALVE HAS 3/4 NPTF END INLET AND OUTLET PORTS, 3/4 NPTF WORK PORTS, HIGH PRESSURE ADJUSTABLE RELIEF (1500 PSI - 3000 PSI) PRESET AT 2000 PSI, A STANDARD LEVER HANDLE, AND POWER BEYOND CAPABILITIES (SEE BELOW).

3/4 POWER BEYOND PLUG #660312004 MODELS RD522MMEE5A4B1 AND RD523MMEE5A4B1 ONLY. INSTALLING THIS PLUG PROVIDES FOR A HIGH PRESSURE POWER BEYOND PORT. THIS WOULD BE USED IF A VALVE IS TO BE ADDED DOWN STREAM. PLEASE NOTE THE OUTLET MUST BE CONNECTED TO TANK. WHEN SPOOLS ARE IN NEUTRAL THE INLET IS CONNECTED TO POWER BEYOND PORT.

ITEM	QTY	PART NO.	DESCRIPTION
1	1		AUTO CYCLE VALVE BODY
2	1	SEE NOTE	FIRST SPOOL
3	1	SEE NOTE	SECOND SPOOL
4	4	670500010	SPOOL SEAL BACK-UP
5	4	240000213*	213 O-RING
6	1	660312003	CONVERSION PLUG
7	2	660150039	COMPLETE HANDLE KIT
8	1	660250002	RELIEF CART.
9	1	240000116*	116 O-RING
10	1	240019015*	015 BACK-UP
11	1	240000015*	015 O-RING
12	2	240000908*	908 O-RING
13	2	671600001	LOAD CHECK PLUG
14	2	624890001	DETENT BODY
15	1	670700004	SPOOL SLEEVE
16	2	671400001	STOP CUP (INNER)
17	2	670300001	SPRING
18	2	671400011	STOP CUP (OUTER)
19	2	670500004	WASHER
20	2	170003019	CAP SCREW
21	2	670500005	END CAP
22	8	170003019	CAP SCREW
23	2	230009009	STEEL BALL
24	2	671100012	PISTON SLEEVE
25	2	671100011	PISTON
26	2	671600052	RETAINER PLUG
27	2	671100016	SPRING ADAPTER
28	2	670300033	SPRING
29	2	671800013	JAM NUT
30	2	671900016	ADJ. SCREW
31	2	240019008*	008 BACK-UP WASHER
32	2	240016068*	O-RING
33	2	240016736*	O-RING
34	2	240019007*	007 BACK-UP WASHER
35	2	240019014*	014 BACK-UP WASHER
36	2	240000014*	014 O-RING
37	2	240016737*	013 O-RING
38	2	240019013*	013 BACK-UP WASHER
39	2	240000006*	006 O-RING
40	1	670700044	SPOOL SLEEVE
41	1	200300104	ORB PLUG

These are matched parts and are not sold separately.

ADJUSTING CARTRIDGE 660330002

DETENT REPAIR KIT 660130007 (ITEMS 23-38)

\*SEAL KIT 660552002

NOTE: THIS VALVE IS FACTORY TESTED AND SET. NO ADJUSTING SHOULD BE NECESSARY. IN A NEW INSTALLATION MAKE SURE ALL AIR IS OUT OF LINES BEFORE MAKING ADJUSTMENTS. CYCLE CYLINDER UNTIL OPERATION STABILIZES. DO NOT ADJUST IMMEDIATELY UPON INSTALLATION.

RD523MME5A4B1

1st SPOOL PRESSURE RELEASE  
DETENT ADJUSTMENT

2nd SPOOL PRESSURE RELEASE  
DETENT ADJUSTMENT

PLEASE NOTE:  
BEFORE REMOVING SPOOLS OR SPOOL  
SLEEVES ITEMS 15 & 40, THE PRESSURE  
RELEASE DETENT PARTS 25-34 AND BALL  
ITEM 23 MUST BE REMOVED. ALSO SPOOL  
AND SPOOL SLEEVE MUST BE IN PLACE  
BEFORE INSTALLING THESE PARTS.

TORQUE 9-11 FT-LBS  
INSTALL WITH LOCTITE 242

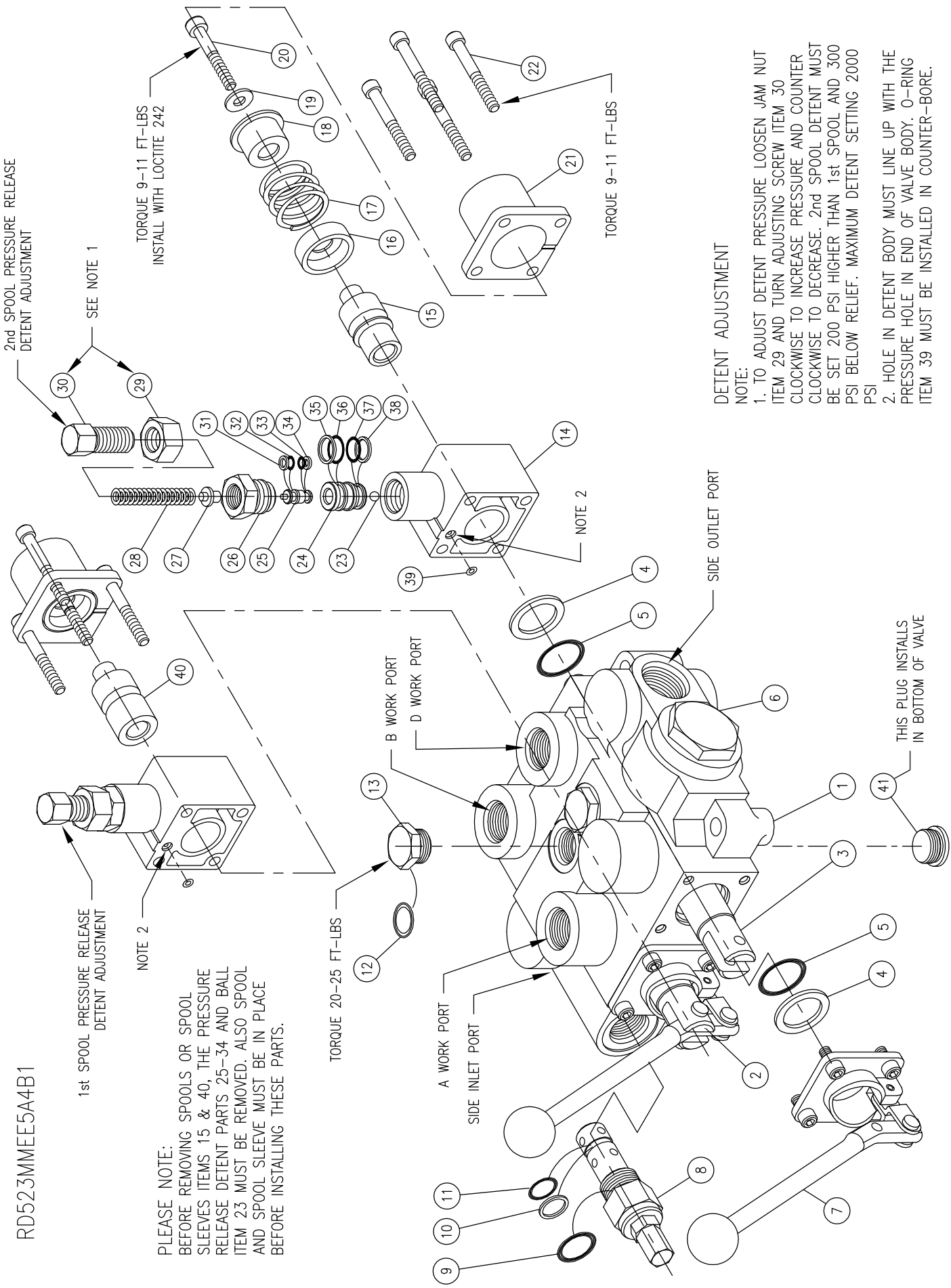
TORQUE 9-11 FT-LBS

TORQUE 20-25 FT-LBS

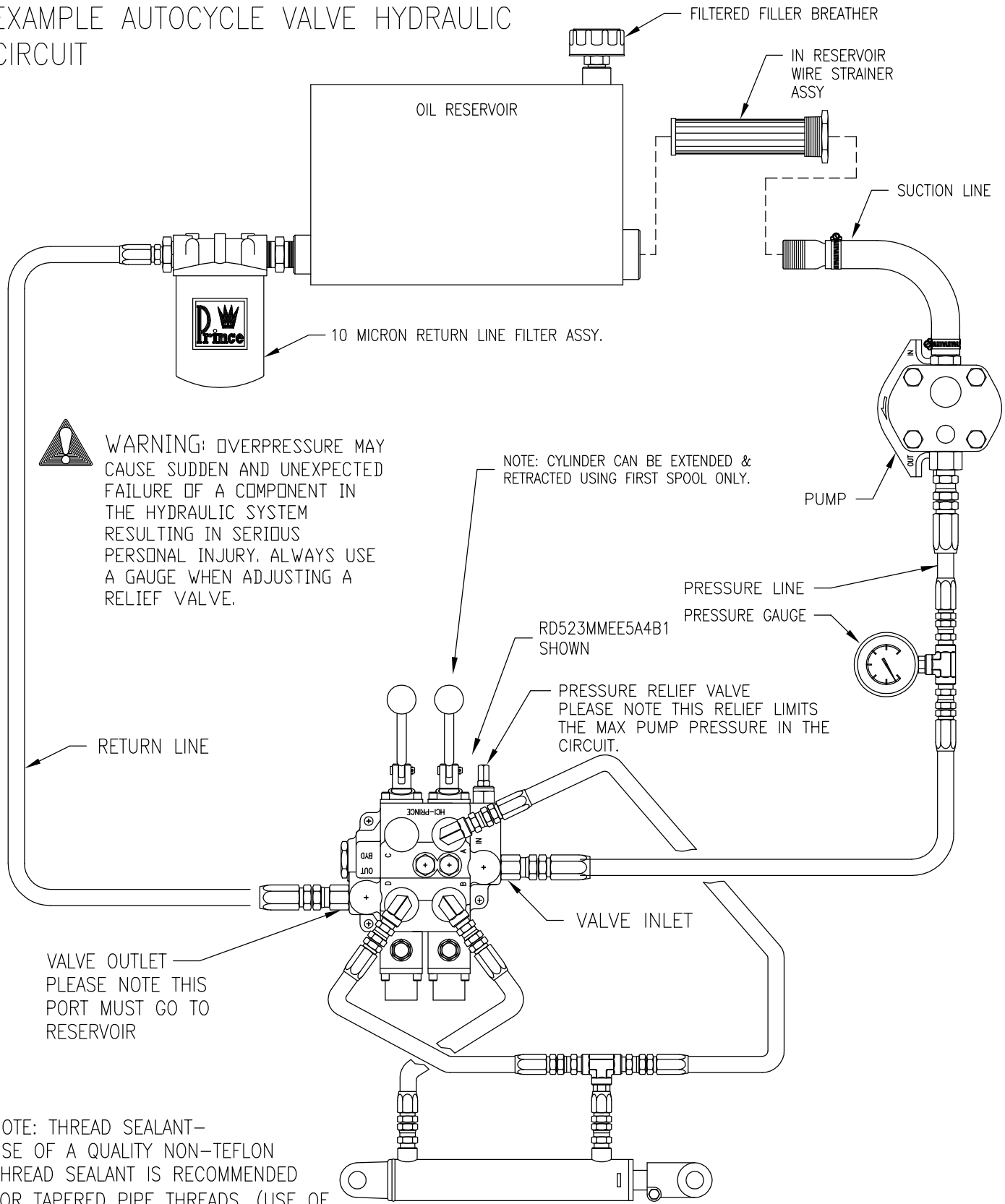
DETENT ADJUSTMENT  
NOTE:

1. TO ADJUST DETENT PRESSURE LOOSEN JAM NUT ITEM 29 AND TURN ADJUSTING SCREW ITEM 30 CLOCKWISE TO INCREASE PRESSURE AND COUNTER CLOCKWISE TO DECREASE. 2nd SPOOL DETENT MUST BE SET 200 PSI HIGHER THAN 1st SPOOL AND 300 PSI BELOW RELIEF. MAXIMUM DETENT SETTING 2000 PSI
2. HOLE IN DETENT BODY MUST LINE UP WITH THE PRESSURE HOLE IN END OF VALVE BODY. O-RING ITEM 39 MUST BE INSTALLED IN COUNTER-BORE.

THIS PLUG INSTALLS  
IN BOTTOM OF VALVE



# EXAMPLE AUTOCYCLE VALVE HYDRAULIC CIRCUIT



**WARNING:** OVERPRESSURE MAY CAUSE SUDDEN AND UNEXPECTED FAILURE OF A COMPONENT IN THE HYDRAULIC SYSTEM RESULTING IN SERIOUS PERSONAL INJURY. ALWAYS USE A GAUGE WHEN ADJUSTING A RELIEF VALVE.

NOTE: CYLINDER CAN BE EXTENDED & RETRACTED USING FIRST SPOOL ONLY.

PLEASE NOTE THIS RELIEF LIMITS THE MAX PUMP PRESSURE IN THE CIRCUIT.

PLEASE NOTE THIS PORT MUST GO TO RESERVOIR

NOTE: THREAD SEALANT— USE OF A QUALITY NON-TEFLON THREAD SEALANT IS RECOMMENDED FOR TAPERED PIPE THREADS. (USE OF TEFLON TAPE IS NOT RECOMMENDED.)

NOTE: THIS VALVE IS FACTORY TESTED AND SET. NO ADJUSTING SHOULD BE NECESSARY. IN A NEW INSTALLATION MAKE SURE ALL AIR IS OUT OF LINES BEFORE MAKING ADJUSTMENTS. CYCLE CYLINDER UNTIL OPERATION STABILIZES. DO NOT ADJUST IMMEDIATELY UPON INSTALLATION.

## OPERATION:

This valve is a modified RD-5200 two spool valve that can be used to automatically cycle a single hydraulic cylinder. The spools and the valve body have been modified to provide this function. Both spools have the pressure release detent spool attachment. The valve is shown connected to a cylinder in the circuit on page 6. The B port is connected to the base of the cylinder. The A and D ports are tied together and connected to the rod end of the cylinder. The C port is plugged. At the beginning of the cycle the cylinder is fully retracted. To begin the cycle both handles are pulled back. Oil is directed to the B port and the cylinder will extend until it reaches the end of its stroke. At this point the pressure will build to the detent release pressure and the first spool will center to neutral. The spool will also center if the load pressure reaches the detent setting of 1500 PSI. Now the oil will go through the open center core to the second spool and is directed out the D port to retract the cylinder. When the cylinder reaches the full retract position the pressure will build to the detent release pressure and the spool will center to neutral. This completes the cycle. To begin next cycle both handles are again manually pulled back. This valve does not have the load check feature of standard valves. Also the B port is open to tank in the neutral position. The cylinder can also be manually retracted by moving 1st spool in.

NOTE: THIS VALVE IS FACTORY TESTED AND SET. NO ADJUSTING SHOULD BE NECESSARY. IN A NEW INSTALLATION MAKE SURE ALL AIR IS OUT OF LINES BEFORE MAKING ADJUSTMENTS. CYCLE CYLINDER UNTIL OPERATION STABILIZES. DO NOT ADJUST IMMEDIATELY UPON INSTALLATION.

## TO TEST OPERATION:

Pull both spools out to cycle cylinder. The first spool detent should release at 1500 PSI  $\pm$ 200 PSI and the second should release at 1700 PSI  $\pm$ 200 PSI. The relief should be set at 2000 PSI. It is necessary for the first spool detent to be set at least 200 PSI lower than the second spool otherwise, both spools may center when cylinder reaches full extend. Also the second spool detent must be set 300 PSI below the relief pressure. The maximum detent setting is 2000 PSI. To adjust detent release pressure loosen jam nut item 29 (see page 5) and turn adjusting screw item 30 clockwise to increase pressure and counter clockwise to decrease pressure.

## TROUBLE SHOOTING: (SEE SAFETY PRECAUTIONS Page 2) CHECK OIL LEVEL FIRST!

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
1st or 2nd spool detent will not hold.	1. Detent set too low. 2. Detent sleeve worn. 3. Damaged detent parts.	1. Adjust as described above 2. Rotate detent item 40 or 15 by removing handle and rotating spool 180°, Or replace. 3. See repair kit 660130007.
2nd spool detent kicks out with 1st spool when cylinder fully extends.	2nd spool detent not set 200 PSI above 1st as described above.	Adjust as described above
1st spool detent will not kick out.	1. Worn pump. 2. Detent set to high 3. Damaged detent parts. 4. Relief set to low.	1. Check pressure at valve inlet and oil level. 2. Adjust as described above 3. See repair kit 660130007. 4. Adjust as noted above.
2nd spool detent will not kick out.	1. Worn pump. 2. Detent set to high 3. Damaged detent parts. 4. Relief set to low.	1. Check pressure at valve inlet and oil level. 2. Adjust as described above 3. See repair kit 660130007. 4. Adjust as noted above.
Erratic cylinder operation.	1. Worn pump. 2. Air in lines. 3. Loose parts.	1. Check pressure at valve inlet and oil level. 2. Bleed air & cycle cylinder several times. 3. Check item 20 if loose clean & reinstall. Spool travel each way from neutral should be 5/16".
Leakage at spool end.	1. Cut or damaged o-ring. 2. High pressure on tank port.	1. Replace. Spool seal (item 5). 2. Max. outlet port pressure is 500 PSI. (outlet must go to tank)
Leakage at detent.	1. Cut or damaged o-ring.	1. Replace seals (seal kit 660552002).
Leakage between body & detent body.	1. Cut or damaged o-ring. 2. Loose cap screws (item 22).	1. Inspect item 39 and spool seal. 2. Tighten.



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