Opener Down Pressure Kit
V300 Drill

Used with:

- All model year V300 drills

When you see this symbol, the subsequent instructions and warnings are serious - follow without exception. Your life and the lives of others depend on it!

General Information

These instructions explain how to install the Opener Down Pressure Kit. This Option provides dynamic hydraulic down force on the openers.

Refer to Figure 1

The kit replaces the level link arm ① (shown as a dotted line in the figure) with a hydraulic cylinder ②. The cylinder is controlled by a new valve assembly ③ and requires a new attachment point (lug) weldment ④.

These instructions apply to:

148-765A	Kit for Closed-Center Tractors
148-766A	Kit for Open-Center Tractors

Due to shipping regulations, the kit does not include any touch-up paint to restore the areas to be welded. Your Great Plains dealer can provide it as Great Plains part:

821-001C PAINT GP GREEN SPRAY CAN

If this part is not available in your locale, use a green exterior enamel paint close to Pantone 356.

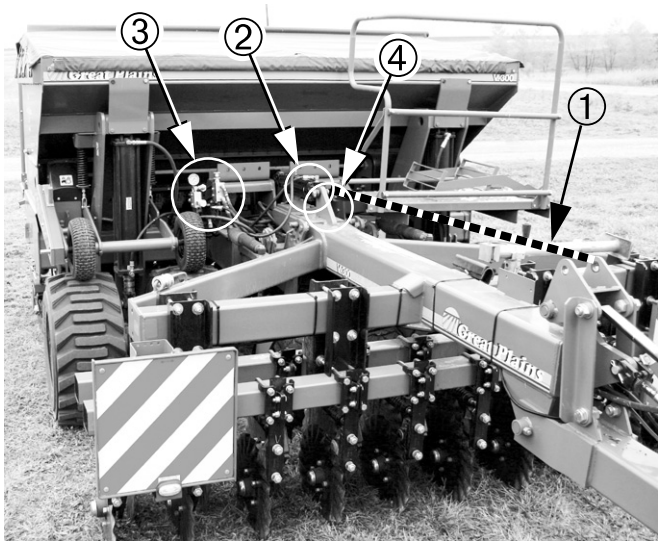


Figure 1 25165
Upgrade Overview

Before You Start

Each kit converts an entire drill. Inventory the contents per the "**Kit Parts List**" on page 24.

IMPORTANT !

Make sure you have the correct kit for your tractor's hydraulic system. If you have the incorrect kit, it will not operate properly and can result in equipment damage.

If necessary, move the implement to a well-lighted location suitable for disassembly. Make sure the ground/floor under the tractor is non-flammable.

Note: Many of the hydraulic components are shipped with protective caps. Leave these caps in place until connections are made, to protect threads and keep contaminants out of the hydraulic system.

CAUTION

There will be sparks from welding. Dry grass, wood floor, or areas with flammable fluid spills are not suitable locations for installing this upgrade.

Lower the drill.

Park and secure the tractor, but leave it connected.

"Left" and "Right" are facing in the direction of machine travel.

Have the following tools at hand:

- Wire or stick welder and welding tarps.
- Basic hand tools, including either adjustable open-end wrenches or a set of fractional inch sizes.
- Paste or liquid tetrafluorethylene (Teflon®) pipe sealant (do not use pipe tape).
- Fluid collection pan.

Installation

Remove Level Link Arm

Refer to Figure 2

1. With the drill lowered, the link level arm ① is in neither tension nor compression. Open the float lock lug ②.

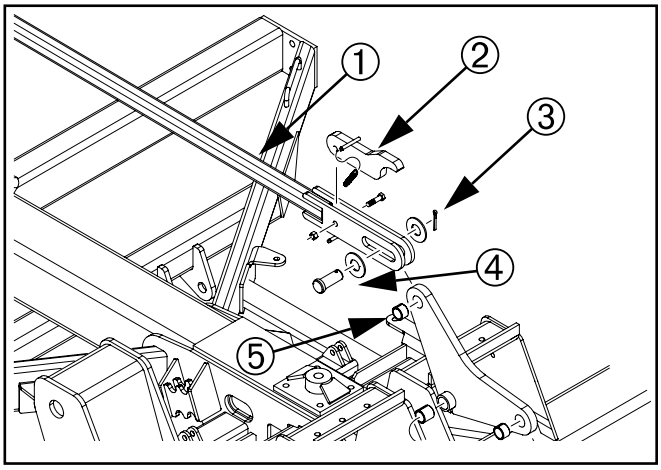


Figure 2 25166
Relax Level Link

Refer to Figure 3

2. At the forward end of the level link ①, remove bolt ② and nut ③. This bolt and nut, and the washers, are not re-used.

Refer to Figure 2

3. At the rear end of the link level arm, remove cotter pin ③ and clevis pin ④. The pins (and the washers) are not re-used.

Note: There is a bushing ⑤ in the rocker arm. Do not remove it.

4. Remove the level link ① arm from the drill. It is not re-used.

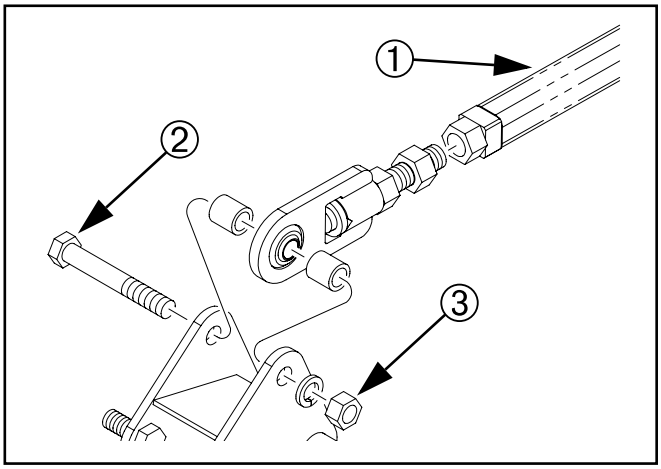


Figure 3 25167
Remove Level Link

Weld Lug

Refer to Figure 4

5. Select lug (25) 248-508D, (TOP LINK CYL LUG).
6. Temporarily position the new top link cylinder lug (25) against the pivot plate ① on the drill frame ②.
7. Center the lug (25) left-to-right, and push it as far back against the pivot plate ① as possible before it begins to ride up on the existing weld fillet. This may leave a vertical gap at ③.
8. Scribe the outline of the lug (25) on the pivot plate ①.
9. Brush or sand the paint from the inscribed area, plus ~1.3cm outside that area.

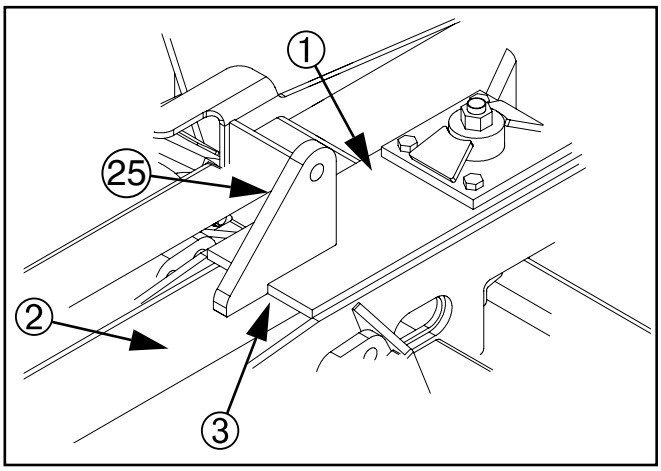


Figure 4 25168
Position Lug

CAUTION

Use caution when using tools that emit sparks such as welders. Wear suitable protective equipment. Do not use spark-emitting tools in areas where flammable or explosive materials may be present. Do not allow anyone to enter the path of sparks.

Refer to Figure 4

10. Protect any nearby hoses or cables with welding tarps.
11. Re-position the lug (25) as in step 7. Tack-weld the lug in two places. Re-check centering and 90 degree vertical alignment.
12. Make a high tensile strength 100% wire or stick weld around the entire base of the lug, with a fillet of approximately 1.3cm.
13. Allow lug to cool.
14. Brush or sand off any burrs or other weld artifacts, and paint. Apply a metal primer if a matching green exterior enamel paint is not immediately available.

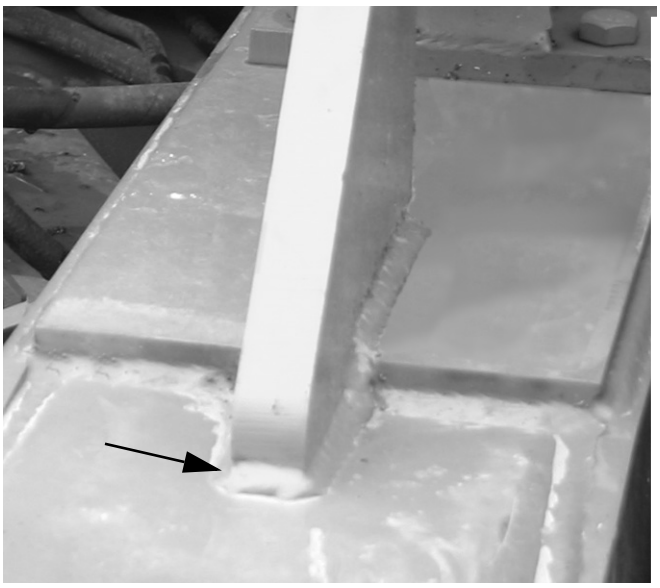


Figure 5 25169
Weld Lug

Drain Hydraulic System

This upgrade kit is inserted in the existing hydraulic system at two points. Removing the fittings at these two points will result in some loss of fluid (which is why it is important to perform this and later steps *after* the welding). The following steps minimize fluid loss.

15. Put the tractor hydraulic controls into “float” mode.
16. Shutdown the tractor hydraulic system.
17. Loosen the fitting at the top of the left lift cylinder, enough to let air enter at that point.
18. Set a collection pan under the right lift cylinder.
19. Loosen the fitting there enough to begin draining fluid into the pan.

Assemble Closed-Center Valves

This section is for the 148-765A Closed-Center (CC) kit. If you have the 148-766A Open-Center kit, see page 7.

Callout numbers are assigned from the "**Kit Parts List**" on page 24.

Assemble CC Down Pressure Control Valve

Refer to Figure 6

20. Select the (44) 810-301C, (VALVE PRESS REDUCING W/CHECK).

Note: The orientation of the valve is that the control knob faces Front and is toward the Bottom of the valve body.

21. Select a (58) 811-216C, (EL 3/4MJIC 9/16MORB). Screw the male O-ring boss end into the Top Front port of valve body (44). Adjust the JIC end to face Left and tighten jam nut.

22. Select the (65) 811-677C, (AD 9/16MORB 1/4FNPT). Screw the male O-ring boss end into the Top Rear port of valve body (44). Do not fully tighten.

23. Select a (52) 811-064C, (TE 9/16MJIC 9/16MJIC 9/16MORB). Screw the male O-ring boss end into the Rear port of valve body (44). Adjust the tee so the center port faces Right and tighten jam nut.

24. Select a (66) 841-077C, (EL 3/4FJIC 3/4MORB). Screw the female JIC end onto fitting (58). Adjust angle so that the ell points to the Rear, and tighten.

25. Select the (43) 810-300C, (PRESSURE GAUGE 3000 PSI). Apply TFE sealant to threads. Screw it into fitting (65). Tighten gauge to come as close as possible to suggested torque values, and still have gauge facing Forward.

26. Select a (52) 811-064C, (TE 9/16MJIC 9/16MJIC 9/16MORB). Screw the male O-ring boss end into the Bottom port of valve body (44). Adjust the tee so the center port faces Left and tighten jam nut.

27. Select a (52) 811-064C, (TE 9/16MJIC 9/16MJIC 9/16MORB). Screw the female JIC end onto fitting (52) on the Rear of valve body (44). Make the final turns to leave the open end facing down.

28. Select the (49) 810-554C, (FILTER INLINE 3/4FORB 3/4MJIC). Screw it onto fitting (66) and tighten.

Torque fittings and fasteners per "**Torque Values**" on page 23.

A cluster of arrows in each diagram shows directions (T) Top, (B) Bottom, (L) Left, (R) Right, (F) Front and (R) Rear.

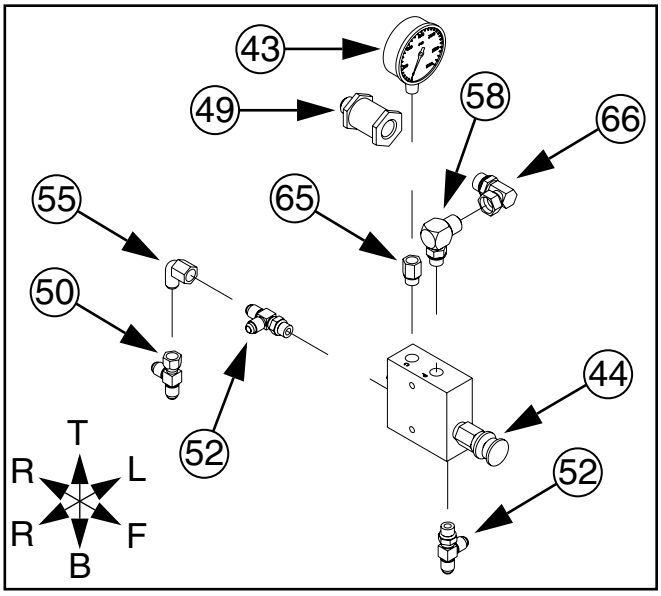


Figure 6 25170
CC Down Pressure Valve

Assemble CC Check Valve

Refer to Figure 7

29. Select the (47) 810-428C, (VALVE PO CHECK 4:1 W/9/16FORB).

Note: The ports of valve (47) are stamped with numbers “1”, “2” and “3”. Orient the valve so that Port ① is to the Left, port ② to the Right and port ③ to the Rear.

30. Select a (56) 811-170C, (AD 9/16MORB 9/16MJIC). Screw the male O-ring boss end into port ① of valve body (44).

31. Select a (56) 811-170C, (AD 9/16MORB 9/16MJIC). Screw the male O-ring boss end into port ③ of valve body (44).

32. Select a (62) 811-627C, (AD 9/16MORB 9/16FJIC). Screw the male O-ring boss end onto check valve assembly (47) at port ②. Tighten jam nut.

33. Screw the check valve assembly (47), onto the male JIC fitting at the Bottom of adjustment valve assembly (44). Rotate check valve assembly (47) so that port ③ faces Rear before tightening JIC nut.

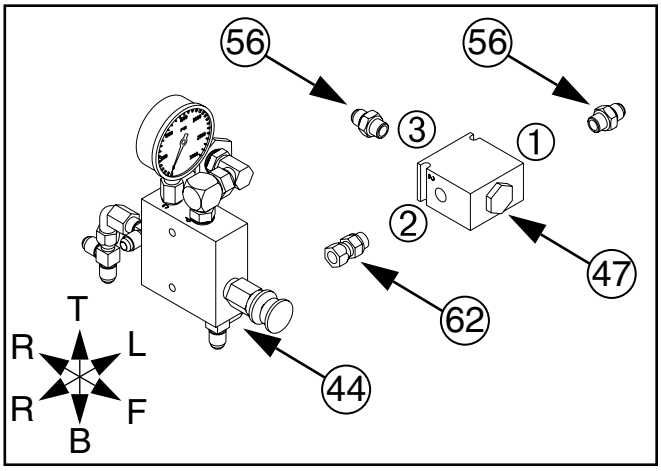


Figure 7 25171
CC Check Valve

Assemble CC Bypass Valve

Refer to Figure 8

34. Select the (48) 810-432C, (HYDRAULIC BYPASS VALVE).

Note: Orient the valve (48) so that the adjustment knob is on Top, toward Right and Front.

35. Select two (51) 811-063C, (EL 3/4MJIC 3/4MORB). Screw both into the Front ports of valve (48). Rotate each to point to the Left and down before tightening jam nuts.

36. Select a (59) 811-249C, (TE 9/16MJIC 3/4MORB 9/16MJIC). Screw the male O-ring boss end into the Rear Bottom port of valve (48). Point the center port of the tee down before tightening jam nut.

37. Select a (54) 811-133C, (AD 9/16MJIC 3/4MORB). Screw the male O-ring boss end into the Rear Top port of valve (48).

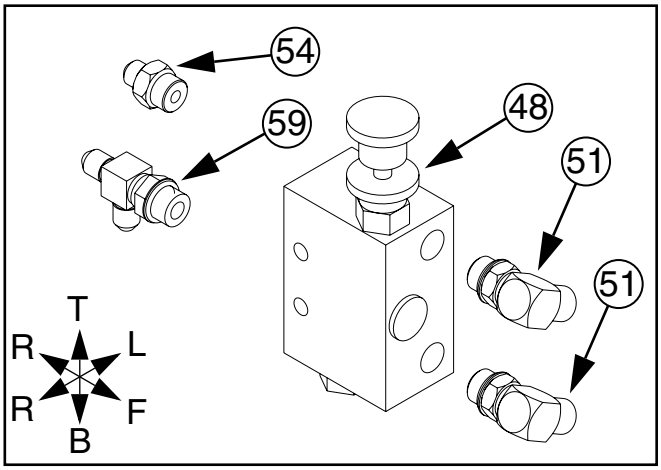


Figure 8 25172
CC Bypass Valve

Assemble CC Valves on Mount

Refer to Figure 9 & Figure 10. Figure 10 shown exploded for clarity.

38. Select the (23) 248-506D, (OPNR DOWN PRESSURE VALVE MNT). Orient it so that the smaller of the two vertical plates is to the Right, and the horizontal base plate is at the Bottom.

Note: Both valve assemblies mount on the Right side of the vertical plates. The check valve mounts under the base.

39. Align the mounting holes ① of the adjustment valve assembly (44) with the holes in the small vertical plate ②. Align the notches ③ in the check valve assembly (47) with the holes under the base plate ④. This two valve assembly mounts outside and under the mount.

40. Select two each:
(31) 802-551C, HHCS 1/4-20X2 1/4 GR5,
(39) 804-075C, WASHER FLAT 1/4 USS PLT,
(36) 804-006C, WASHER LOCK SPRING 1/4 PLT,
(32) 803-006C, NUT HEX 1/4-20 PLT.
From inside the mount, place a washer (39) on each bolt (31) and insert the bolt out through plate holes ②, into the holes ① in the adjustment valve (44) and loosely fit a lock washer (36) and nut (32).

41. Select two each:
(31) 802-551C, HHCS 1/4-20X2 1/4 GR5,
(36) 804-006C, WASHER LOCK SPRING 1/4 PLT,
(32) 803-006C, NUT HEX 1/4-20 PLT.
and four each:
(39) 804-075C, WASHER FLAT 1/4 USS PLT,
From inside the mount, place a washer (39) on each bolt (31), down through the plate hole ④ into the notches ③ of the check valve (47) and loosely fit another washer (39), lock washer (36) and nut (32).

42. Snug the valve assemblies (44)(47) against the mounting plate (23), seat bolts deeply in notches, and tighten all bolts and nuts.

43. Select two each:
(28) 802-024C, HHCS 3/8-16X3 GR5,
(37) 804-013C, WASHER LOCK SPRING 3/8 PLT
(33) 803-014C, NUT HEX 3/8-16 PLT
Select also six:
(40) 804-087C, WASHER FLAT 3/8 HARD ASTMF436
From the Left outside of the mount, insert each bolt (28) through one washer (40), then through the plate holes ⑥. Slide on two additional washers (40) as spacers, then the bypass valve assembly (48) via holes ⑤. Fasten with a lock washer (37) and a nut (33).

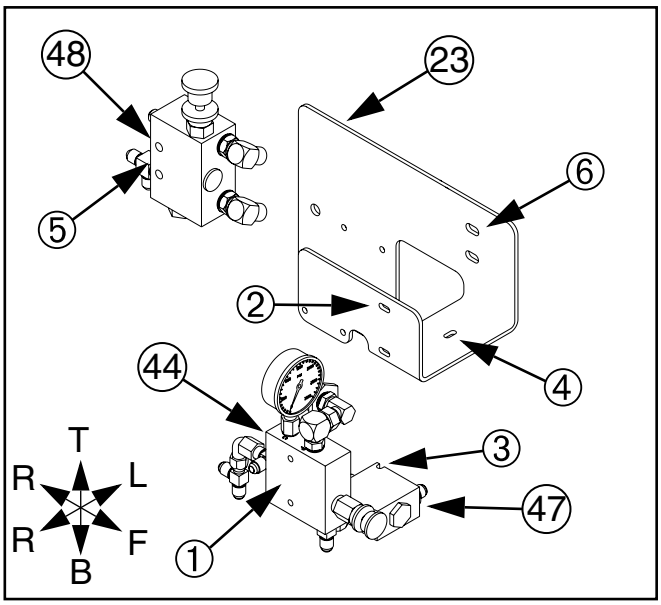


Figure 9 25173
Mount Closed Center Valves

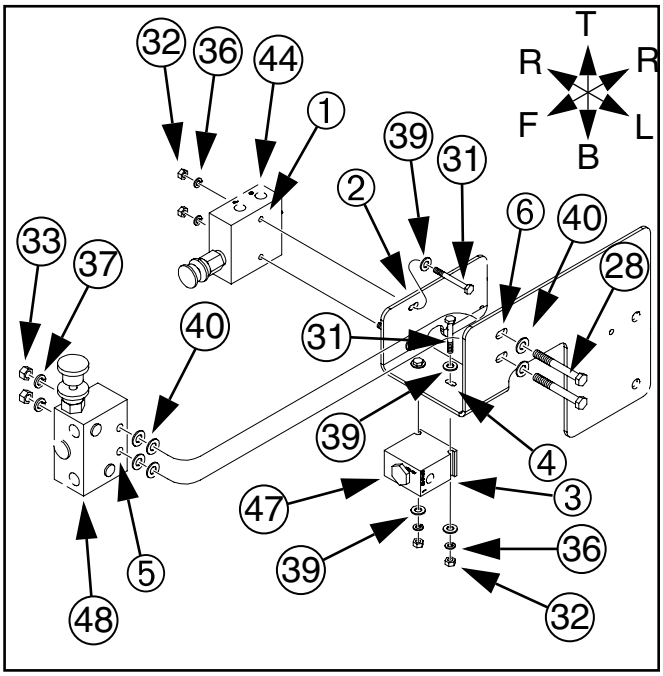


Figure 10 25174
Closed Center Fasteners

Assemble Open-Center Valve

This section is for the 148-766A Open-Center (OC) kit. If you have the 148-765A Closed-Center kit, see page 4.

Callout numbers are assigned from the "**Kit Parts List**" on page 24.

Assemble OC Down Pressure Control Valve and Shuttle Valve

Refer to Figure 6

44. Select the (44) 810-301C, (VALVE PRESS REDUCING W/CHECK). Orient it so that the control knob is on the Front, toward the Bottom.
45. Select a (58) 811-216C, (EL 3/4MJIC 9/16MORB). Screw the male O-ring boss end into the Top Front port of valve body (44). Adjust the JIC end to face Left and tighten jam nut.
46. Select a (64) 811-675C, (PL 9/16MORB HEX HEAD). Screw the plug into the Top Rear port of valve body (44) and tighten.
47. Select a (63) 811-636C, (AD 9/16MORB STRAIGHT UNION). Screw the male O-ring boss end into the Rear port of valve body (44) Do not fully tighten at this time.
48. Select a (52) 811-064C, (TE 9/16MJIC 9/16MJIC 9/16MORB). Screw the male O-ring boss end into the Bottom port of valve body (44). Adjust the tee so the center port faces Left and tighten jam nut.
49. Select a (66) 841-077C, (EL 3/4FJIC 3/4MORB). Screw the female JIC end onto fitting (58). Adjust angle so that the ell points to the Rear, and tighten.
50. Select the (49) 810-554C, (FILTER INLINE 3/4FORB 3/4MJIC). Screw it onto fitting (66) and tighten.
51. Select the (45) 810-343C, (VALVE PO CHECK 2:1 W/9/16FORB).

Note: The ports of valve (45) are stamped with numbers "1", "2" and "3". Orient the check valve so that port ② is to the Front, port ① to the Rear and port ③ at the Bottom.

52. Select a (56) 811-170C, (AD 9/16MORB 9/16MJIC). Screw the O-ring boss end into port ③ on the Bottom of check valve (45), and tighten.
53. Orient check valve (45) so that the hex nut is on Top. Lay the Right faces of entire assembly on a flat surface, and tighten union (63).

Torque fittings and fasteners per "**Torque Values**" on page 23.

A cluster of arrows in each diagram shows directions (T) Top, (B) Bottom, (L) Left, (R) Right, (F) Front and (R) Rear.

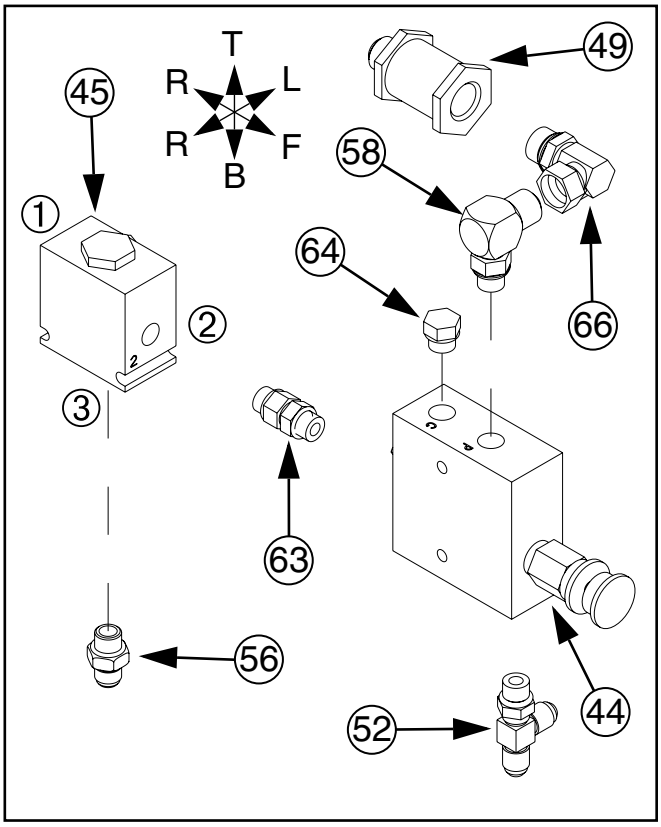


Figure 11 25175
OC Down Pressure Valve

Assemble OC Check Valve Group

54. Select a (47) 810-428C,
(VALVE PO CHECK 4:1 W/9/16FORB).

Note: The ports of check valve (47) are stamped with numbers “1”, “2” and “3”. Orient the valve so that Port ① is to the Left, port ② to the Right and port ③ to the Rear.

55. Select a (56) 811-170C,
(AD 9/16MORB 9/16MJIC).
Screw the male O-ring boss end into port ① of valve body (47).

56. Select a (56) 811-170C,
(AD 9/16MORB 9/16MJIC).
Screw the male O-ring boss end into port ③ of valve body (47).

57. Select a (62) 811-627C,
(AD 9/16MORB 9/16FJIC).
Screw the male O-ring boss end onto check valve assembly (47) at port ②. Tighten jam nut.

58. Screw the check valve assembly (47), onto the male JIC fitting at the Bottom of adjustment valve assembly (44). Rotate check valve assembly (47) so that port ③ faces Rear before tightening JIC nut.

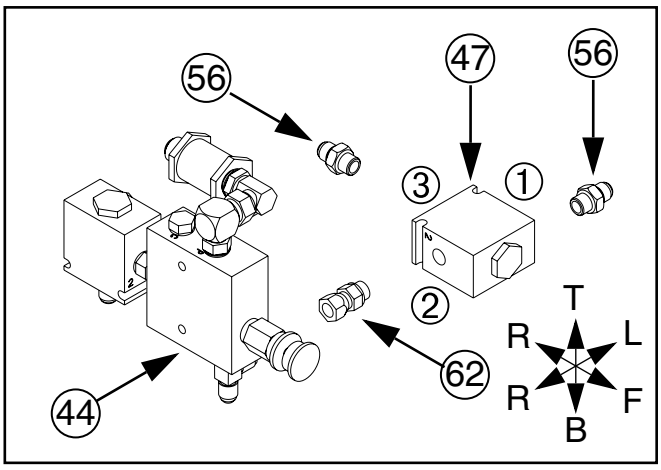


Figure 12
OC Check Valve
25176

Assemble the OC Gauge Tree

Refer to Figure 13

59. Select a (60) 811-439C,
(TE 9/16MORB 9/16MJIC 9/16MJIC).
Orient the tee end ports up and down. The O-ring boss port will face Front in final assembly.

60. Select a (61) 811-582C,
(AD 9/16FJIC 1/4FNPT).
Screw JIC end onto the Top of fitting (60). Tighten.

61. Select a (50) 811-061C,
(TE 9/16MJIC 9/16MJIC 9/16FJIC).
Screw female JIC end onto the Bottom of fitting (60). Orient the side port to point Left, and tighten.

62. Select a (55) 811-169C,
(EL 9/16MJIC 9/16FJIC).
Screw it onto the center port off tee fitting (50). Orient the male end to point down and slightly forward, and tighten.

63. Select a (50) 811-061C,
(TE 9/16MJIC 9/16MJIC 9/16FJIC).
Screw female JIC end onto the Bottom of fitting (50). Orient the side port to point Right. Tighten.

64. Select a (43) 810-300C,
(PRESSURE GAUGE 3000 PSI).
Apply pipe compound and screw into fitting (61). Tighten so that the gauge faces Front.

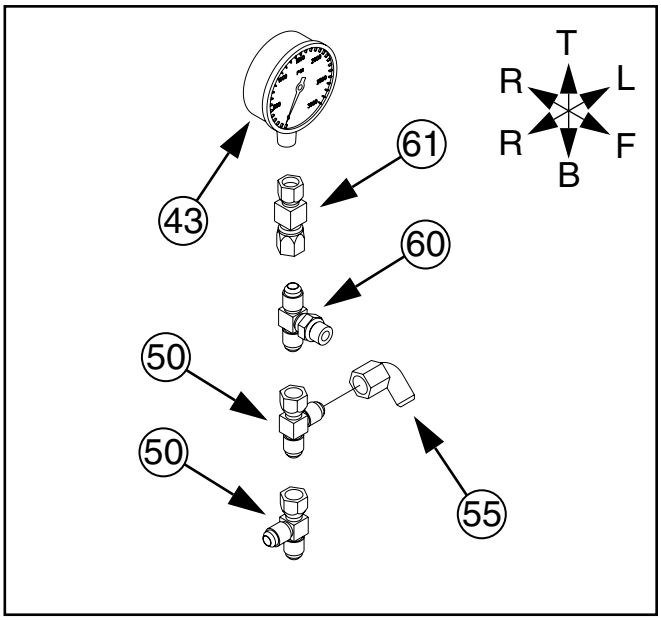


Figure 13
OC Gauge Tree
25177

Connect Gauge Tree to Valve Assembly

Refer to Figure 14

65. Screw the center port of tee (60) onto the Rear port ① of adjustment valve (45).

66. Orient gauge tree so that gauge is on Top.Tighten the connection between tee (60) and check valve (45) port ①.

Assemble OC Bypass Valve Group

Refer to Figure 15

67. Select a (48) 810-432C, (HYDRAULIC BYPASS VALVE).

Note: Orient the valve (48) so that the adjustment knob is on Top, toward Right and Front.

68. Select two (51) 811-063C, (EL 3/4MJIC 3/4MORB). Screw both into the Front ports of valve (48). Rotate each to point to the Left and down before tightening jam nuts.

69. Select a (59) 811-249C, (TE 9/16MJIC 3/4MORB 9/16MJIC). Screw the male O-ring boss end into the Rear Bottom port of valve (48). Point the center port of the tee down before tightening jam nut.

70. Select a (59) 811-249C, (TE 9/16MJIC 3/4MORB 9/16MJIC). Screw the male O-ring boss end into the Rear Top port of valve (48). Point the center port of the tee Right and down before tightening jam nut.

71. Select a (50) 811-061C, (TE 9/16MORB 9/16MJIC 9/16MJIC). Screw the male O-ring boss end into the Rear Top port of the Bottom tee (59).

72. Select a (55) 811-169C, (EL 9/16MJIC 9/16FJIC). Screw female JIC end into the center (Bottom) port of tee (50)

73. Select the (46) 810-344C, (VALVE SHUTTLE 9/16FORB PORTS).

Note: The ports of valve (46) are stamped with numbers “1”, “2” and “3”. Orient the shuttle valve so that port ① is to the Front, port ② to the Rear and port ③ at the Bottom.

74. Select a (53) 811-065C, (EL 9/16MJIC 9/16MORB). Screw the male ORB end into the Rear port ② of shuttle valve (46). Orient the JIC end to point down.

75. Select a (56) 811-170C, (AD 9/16MORB 9/16MJIC). Screw the male ORB end into the Bottom port ③ of shuttle valve (46) and tighten.

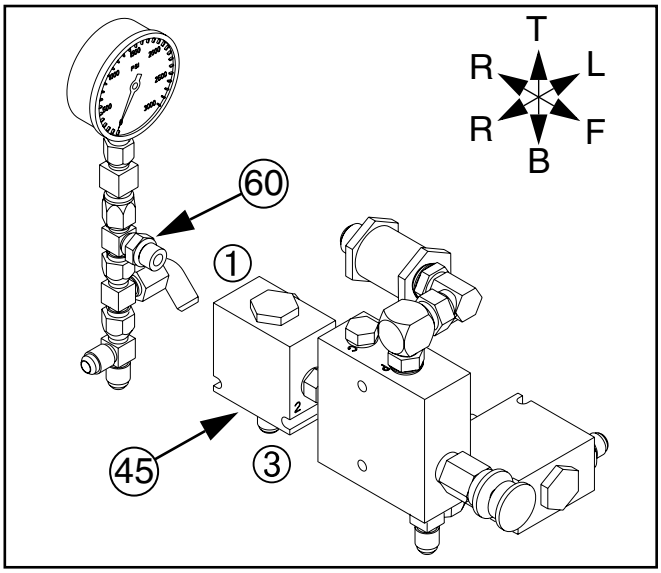


Figure 14 25178
OC Gauge Tree to Valves

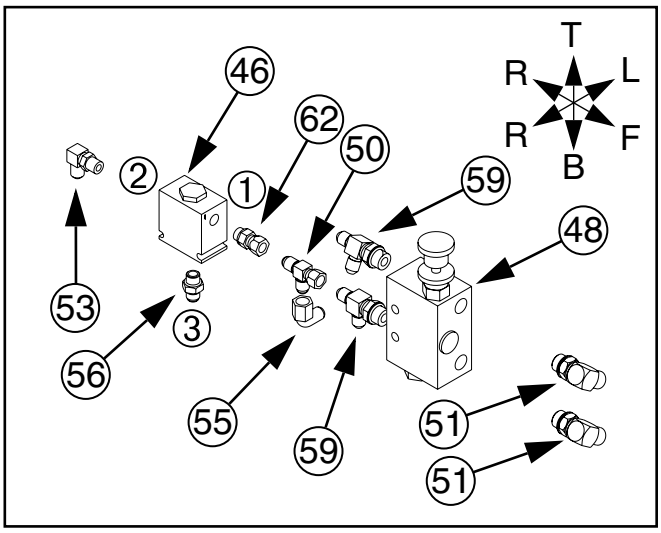


Figure 15 25179
OC Bypass Valve Group

76. Select a (62) 811-627C, (AD 9/16MORB 9/16FJIC). Screw the male ORB end into Front port ① of shuttle valve (46) and tighten.

77. Mate the shuttle valve (46) group to the bypass valve (48) group at fittings (62) and (50). Tighten, so that valve (46) port ③ is down, and both valves align when their Left sides are on a flat surface.

Assemble OC Valves on Mount

Refer to Figure 16

78. Select the (23) 248-506D, (OPNR DOWN PRESSURE VALVE MNT). Orient it so that the smaller of the two vertical plates is to the Right, and the horizontal base plate is at the Bottom.

Note: Both valve assemblies mount on the Right side of the vertical plates. The check valve mounts under the base.

79. Position the adjustment valve assembly (44) so that:
    - The mounting holes (44) of the adjustment valve align with the holes ① in the small vertical plate.
    - The notches (45) in the shuttle valve align with the holes ② with the holes in the small vertical plate.
    - The notches (47) in the check valve align with the holes ③ in the mount base.

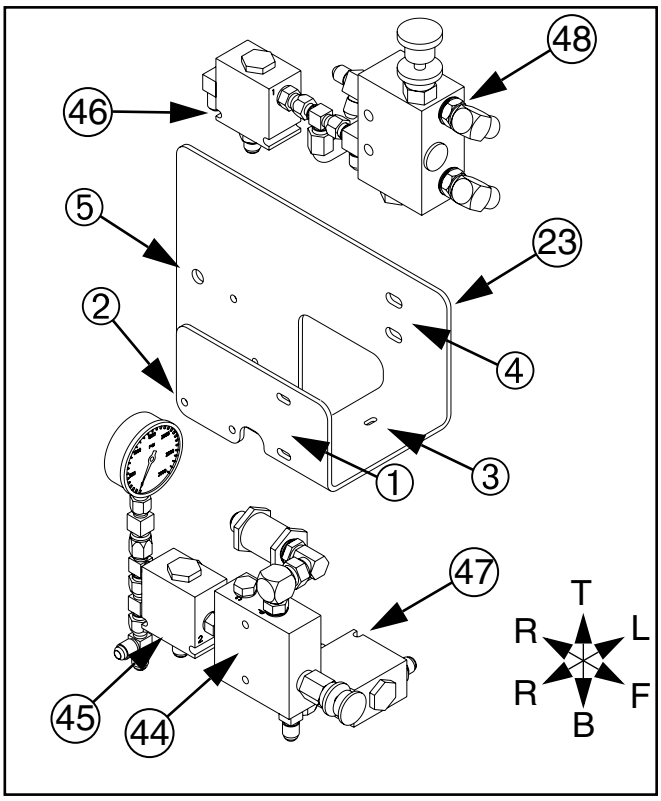


Figure 16 25180
Mount Open Center Valves

Refer to Figure 17, shown exploded for clarity.

80. Select two each:
(31) 802-551C, HHCS 1/4-20X2 1/4 GR5,
(39) 804-075C, WASHER FLAT 1/4 USS PLT,
(36) 804-006C, WASHER LOCK SPRING 1/4 PLT,
(32) 803-006C, NUT HEX 1/4-20 PLT.
Insert the bolt (31) through the valve (44), and then the mount (23) plate holes ①. Loosely fit a flat washer (39), lock washer (36) and nut (32).

81. Select two each:
(31) 802-551C, HHCS 1/4-20X2 1/4 GR5,
(39) 804-075C, WASHER FLAT 1/4 USS PLT,
(36) 804-006C, WASHER LOCK SPRING 1/4 PLT,
(32) 803-006C, NUT HEX 1/4-20 PLT.
Insert the bolt out through the mount (23) holes ②, into the shuttle valve notches (45). Loosely fit a flat washer (39), lock washer (36) and nut (32).

82. Select two each:
(31) 802-551C, HHCS 1/4-20X2 1/4 GR5,
(36) 804-006C, WASHER LOCK SPRING 1/4 PLT,
(32) 803-006C, NUT HEX 1/4-20 PLT,
and four each:
(39) 804-075C, WASHER FLAT 1/4 USS PLT,
From inside the mount (23), place a washer (39) on each bolt (31), down through the plate hole ③ into the check valve notches (47). Loosely fit another flat washer (39), lock washer (36) and nut (32).

83. Snug the valve assembly (44)(45)(47) against the mounting plate (23), seat all bolts deeply in notches, and tighten all bolts and nuts.

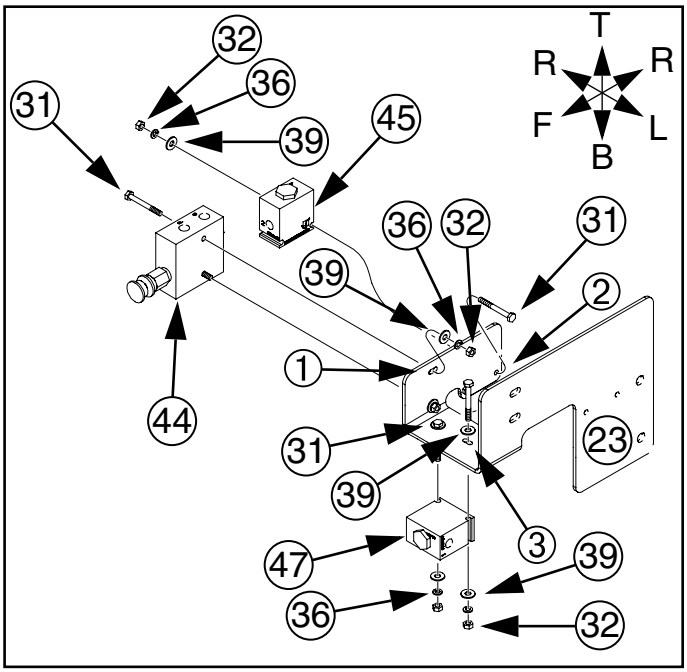


Figure 17 25181
Open Center Fasteners (R)

Refer to Figure 18

84. Select two each:
(28) 802-024C, HHCS 3/8-16X3 GR5,
(37) 804-013C, WASHER LOCK SPRING 3/8 PLT
(33) 803-014C, NUT HEX 3/8-16 PLT
Select also six:
(40) 804-087C, WASHER FLAT 3/8 HARD ASTMF436
From the Left outside of the mount, insert each bolt (28) through one washer (40), then through the plate holes ④. Slide two additional washers (40) as spacers, then the bypass valve assembly (48). Fasten with a lock washer (37) and a nut (33).

85. Select two each:
(31) 802-551C, HHCS 1/4-20X2 1/4 GR5,
(39) 804-075C, WASHER FLAT 1/4 USS PLT,
(36) 804-006C, WASHER LOCK SPRING 1/4 PLT,
(32) 803-006C, NUT HEX 1/4-20 PLT.
From outside the mount, insert each bolt (31), then through the plate hole ⑤ into the notches of the shuttle valve (46) and loosely fit a flat washer (39), lock washer (36) and nut (32).

86. Snug the valve assembly (48)(46) against the mounting plate (23), seat all bolts deeply in notches, and tighten all bolts and nuts.

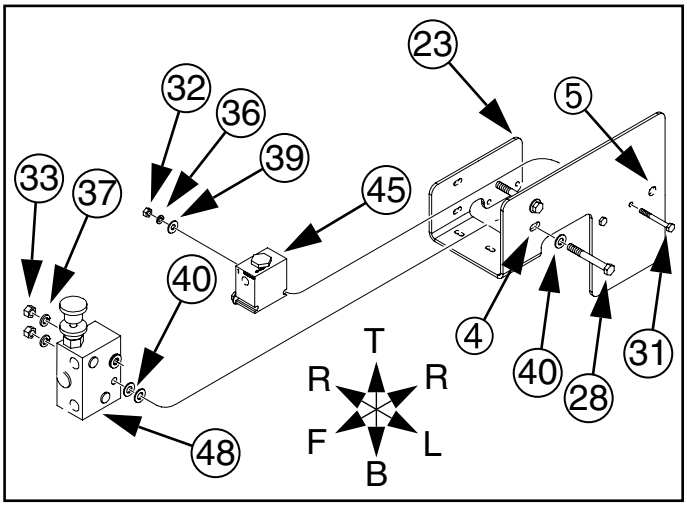


Figure 18 25182
Open Center Fasteners (L)

Install Cylinder

The (42) 810-162C cylinder is supplied with 1in pins and cotter pins in the base end. There may also be a pin in the rod end. There may also be one or two washers on each pin. These parts are not called out separately.

87. Select the (42) 810-162C,
(CYL 3.5X8X1.25 ROD (TIE ROD)).
Leave the protective caps in the ports.
88. If present, remove the pre-installed pin from the rod end of the cylinder (42). This pin, cotter pin and any washer(s) are not re-used.
89. Remove the pre-installed pin ① from the base end of the cylinder (42). Save all parts.
90. Mount the base end of cylinder (42) on the frame lug (25) welded earlier. Re-insert the pin components removed in step 89 and secure the cotter pin.
91. Select the (67) 890-005C,
(BUSHING CYL 1 1/4 X 1 X 1).
Insert it inside the existing bushing in the rocker arm ②.
92. Select the:
(24) 248-507D, CYLINDER PIN and
(27) 800-245C, SNAP RING EXT 1 5304
93. Remove the protective caps from the cylinder ports. Extend and rotate the rod (42) until the clevis holes align with the top hole in the rocker arm ②.
94. Insert pin (24), attaching rod (42) to rocker arm ②.
95. Insert snap ring (27) in between the right face of the rocker arm and the right lug of the clevis of rod (42). Fully seat the snap ring.
96. Select two (57) 811-171C,
(EL 3/4MORB 9/16MJIC) ells.
Install the O-ring boss ends in the cylinder ports. Before tightening, adjust the base end fitting to point Right and slightly toward the Rear (approximately aimed at the valve assembly location). Adjust the rod end fitting to point Right and Front.

Refer to Figure 20

97. Select the (12) 148-768S,
(5.625 CYL DEPTH CHNL ASSY).
Place it over the cylinder (42) rod, and slide to the Rear up against the clevis end.
98. Select the (30) 802-114C,
(HHCS 3/8-16X2 1/2 GR5) and
(35) 803-078C,
(NUT LOCK 3/8-16 NYLON INSERT).
Insert the bolt (30) in the depth channel (12) and secure it with the lock nut (35).

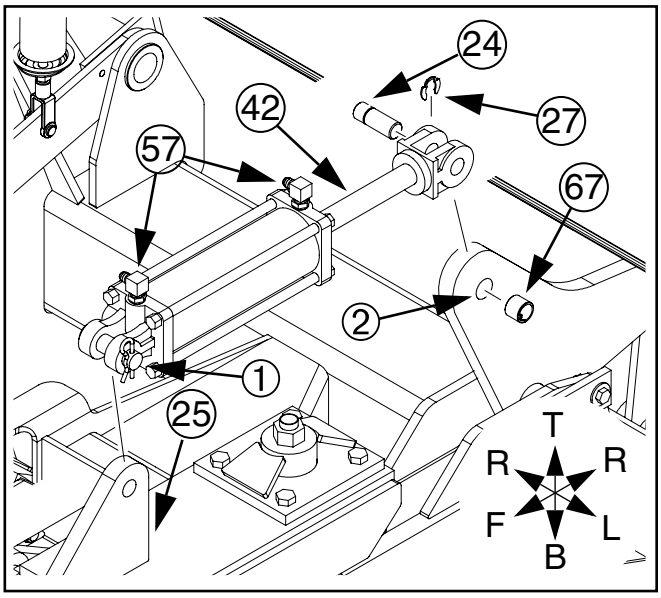


Figure 19 25183
Down Pressure Cylinder

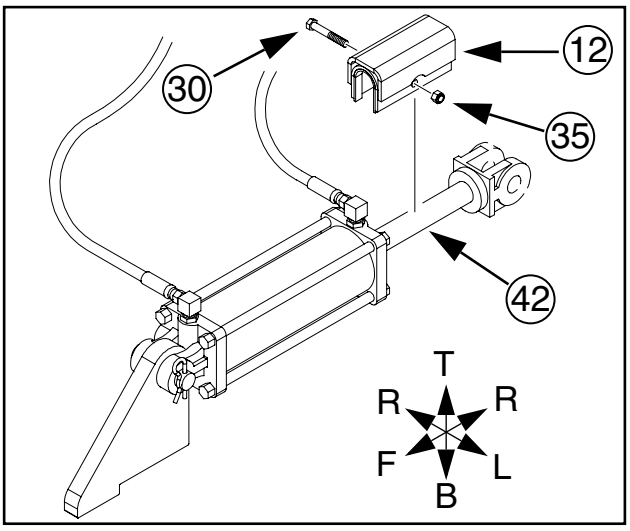


Figure 20 25184
Cylinder Channel

Install Valve Assembly

Refer to Figure 21 (Closed Center valve assembly shown, but Open Center mounting shown - both are similar.)

The valve mounting bracket (23) itself mounts, via two holes, to the right side of the right weight hanger ①.

99. Select the two (29) 802-082C, (HHCS 1/2-13X1 3/4 GR5) bolts, and insert them through the valve assembly mounting plate (23).

Note: If you are installing the Closed Center kit, omit next step. Resume with step 101.

100. Select the four (41) 804-113C, (WASHER FLAT 1/2 USS HARD PLT). Slide them over the bolts (29).

101. Move the entire valve mount assembly (23) Left, so the bolts (29) pass through the holes in the weight hanger ①.

102. Select two each (38) 804-015C, (WASHER LOCK SPRING 1/2 PLT) and (34) 803-020C, (NUT HEX 1/2-13 PLT), and tighten them onto the bolts.

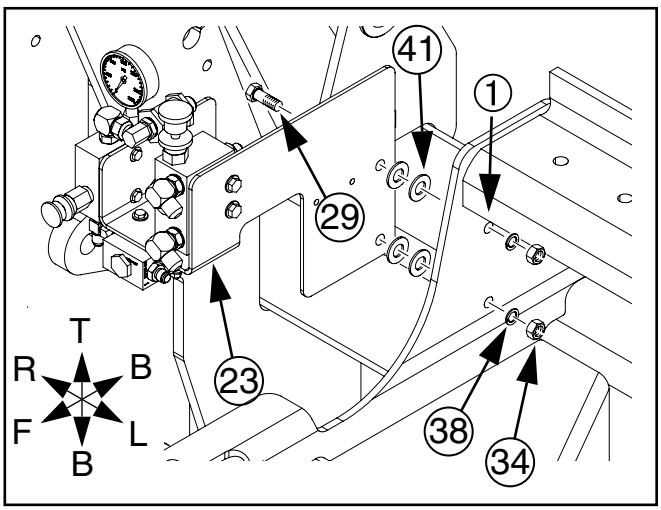


Figure 21 25135
Mount Valve Assembly

Attach Closed-Center Hoses

This page is for the 148-765A Closed-Center kit. If you have the 148-766A Open-Center kit, skip to page 15.

Refer to Figure 22. Although the valve assembly is complete at this step, this figure is shown in exploded view to clarify bottom and rear connections.

103. **A**. Select a 43cm hose (18) 811-702C, (HH3/8R2 017 9/16FJIC).
Attach one end to the bottom port of the tee on the bottom of adjustment valve (44). Attach the other end to the bottom (center) port of the tee at the rear lower port of bypass valve (48).

104. **B**. Select the 1.1m hose (20) 811-922C, (HH3/8R2 045 9/16FJIC).
Attach one end to the end/rear/bottom port of the tee at the end of the fitting tree at the rear port of adjustment valve (44). Attach the other end to the fitting at the base end of the down pressure cylinder (42).

105. **C**. Select a 43cm hose (18) 811-702C, (HH3/8R2 017 9/16FJIC).
Attach one end to the rear port (#3) of the check valve (47) under the mounting bracket. Attach the other end to the fitting at the rear (center) port of the tee at the end of the fitting tree at the rear port of adjustment valve (44).

106. **D**. Select the 56cm hose (21) 811-926C, (HH3/8R2 022 9/16FJIC).
Attach one end to the left port (#1) of the check valve (47) under the mounting bracket. Attach the other end to the fitting at the rod end port of the down pressure cylinder (42).

107. Not shown:
Disconnect the “to tractor”/raise hose ① at the top (base end) of the left lift cylinder ②.
E. Shown:
Connect the “to tractor”/raise hose ① to the fitting at the front bottom port of bypass valve (48).

108. Select an ell (57) 811-171C, (AD 9/16MORB 9/16MJIC).
Remove the existing ell at the top (base end) of the left lift cylinder ②. Replace it with ell (57).

109. **F**. Select the 2.7m hose (17) 811-699C, (HH3/8R2 106 9/16FJIC).
Attach one end to the rear port of the tee at the rear lower port of bypass valve (48). Attach the other end to the fitting ②,(57) at the top (base end) of the left lift cylinder.

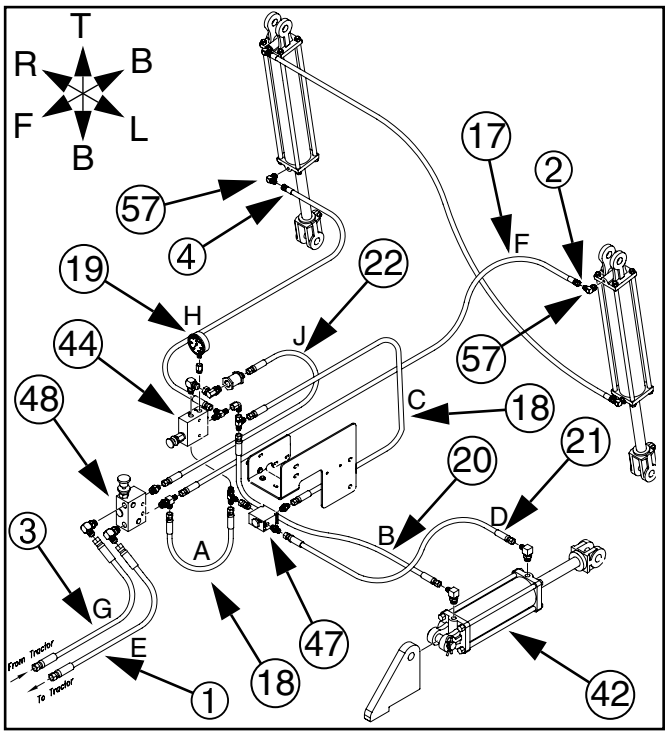


Figure 22 25128
Closed Center Hoses

110. Not shown:
Disconnect the “from tractor”/lower hose ③ at the bottom (rod end) of the right lift cylinder ④.
G. Shown:
Connect the “from tractor”/lower hose ③ to the fitting at the front top port of bypass valve (48).

111. Select an ell (57) 811-171C, (AD 9/16MORB 9/16MJIC).
Remove the existing ell at the bottom (rod end) of the right lift cylinder ④. Replace it with ell (57)

112. **H**. Select a 1.3m hose (19) 811-705C, (HH3/8R2 050 9/16FJIC).
Attach one end to the right-facing center port of the tee at the rear port of adjustment valve (44). Attach the other end to the fitting ④,(57) at the bottom (rod end) of the right lift cylinder.

113. **K**. Select the 38cm hose (22) 841-136C, (HH3/8R2 015 9/16FJIC 3/4FJIC).
Connect one end to the in-line filter on the adjustment valve assembly (44). Attach the other end to the top rear port of the bypass valve (48).

Attach Open-Center Hoses

This page is for the 148-766A Open-Center kit. If you have the 148-765A Closed-Center kit, use page 14.

Refer to Figure 23. Although the valve assembly is complete at this step, this figure is shown in exploded view to clarify bottom and rear connections.

114. **A**. Select a 43cm hose (18) 811-702C, (HH3/8R2 017 9/16FJIC).
Attach one end to the bottom port of the tee on the bottom of adjustment valve (44). Attach the other end to the bottom (center) port of the tee at the rear lower port of bypass valve (48).

115. **B**. Select a 43cm hose (18) 811-702C, (HH3/8R2 017 9/16FJIC).
Attach one end to the fitting on the bottom port (#3) of the shuttle valve (46) on the rear of the bypass valve (48). Attach the other end to the center/bottom port of the tee on the rear upper port of bypass valve (48).

116. **C**. Select a 43cm hose (18) 811-702C, (HH3/8R2 017 9/16FJIC).
Attach one end to the ell on the rear port (#1) of the shuttle valve (46) on the rear of the bypass valve (48). Attach the other end to the fitting on the bottom port (#3) of the shuttle valve (46) on the rear of the adjustment valve (44).

117. **D**. Select the1.1m hose (20) 811-922C, (HH3/8R2 045 9/16FJIC).
Attach one end to the bottom end fitting port of the gauge tree (42). Attach the other end to the fitting at the base end of the down pressure cylinder (42).

118. **E**. Select a 43cm hose (18) 811-702C, (HH3/8R2 017 9/16FJIC).
Attach one end to the rear port (#3) of the check valve (47) under the mounting bracket. Attach the other end to the left-facing (center) port of the tee in the middle of the gauge fitting tree (42).

119. **F**. Select the56cm hose (21) 811-926C, (HH3/8R2 022 9/16FJIC).
Attach one end to the left port (#1) of the check valve (47) under the mounting bracket. Attach the other end to the fitting at the rod end port of the down pressure cylinder (42).

120. Not shown:
Disconnect the “to tractor”/raise hose ① at the top (base end) of the left lift cylinder ②.
G. Shown:
Connect the “to tractor”/raise hose ① to the fitting at the front bottom port of bypass valve (48).

121. Select an ell (57) 811-171C, (AD 9/16MORB 9/16MJIC).
Remove the existing ell at the top (base end) of the left lift cylinder ②. Replace it with ell (57).

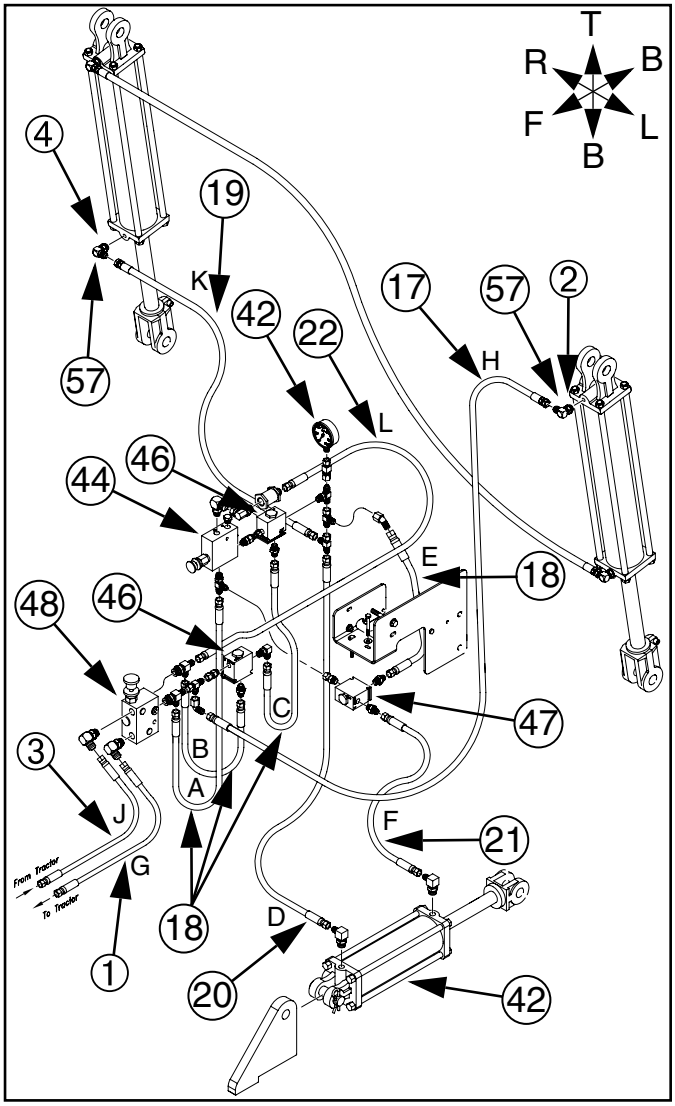


Figure 23 25131
Open Center Hoses

Refer to Figure 24

122. **H**. Select the 2.7m hose (17) 811-699C, (HH3/8R2 106 9/16FJIC).
Attach one end to the ell at the tee in the fitting tree between bypass valve (48) and its shuttle valve (46). Attach the other end to the fitting ②,(57) at the top (base end) of the left lift cylinder.

123. Not shown:
Disconnect the "from tractor"/lower hose ③ at the bottom (rod end) of the right lift cylinder ④.
J. Shown:
Connect the "from tractor"/lower hose ③ to the fitting at the front top port of bypass valve (48).

124. Select an ell (57) 811-171C, (AD 9/16MORB 9/16MJIC).
Remove the existing ell at the bottom (rod end) of the right lift cylinder ④. Replace it with ell (57)

125. **K**. Select a 1.3m hose (19) 811-705C, (HH3/8R2 050 9/16FJIC).
Attach one end to the right-facing (center) port of the tee low in gauge fitting tree (42). Attach the other end to the fitting ④,(57) at the bottom (rod end) of the right lift cylinder.

126. **L**. Select a 38cm hose (22) 841-136C, (HH3/8R2 015 9/16FJIC 3/4FJIC).
Connect one end to the in-line filter on the adjustment valve assembly (44). Attach the other end to the top rear port of the bypass valve (48).

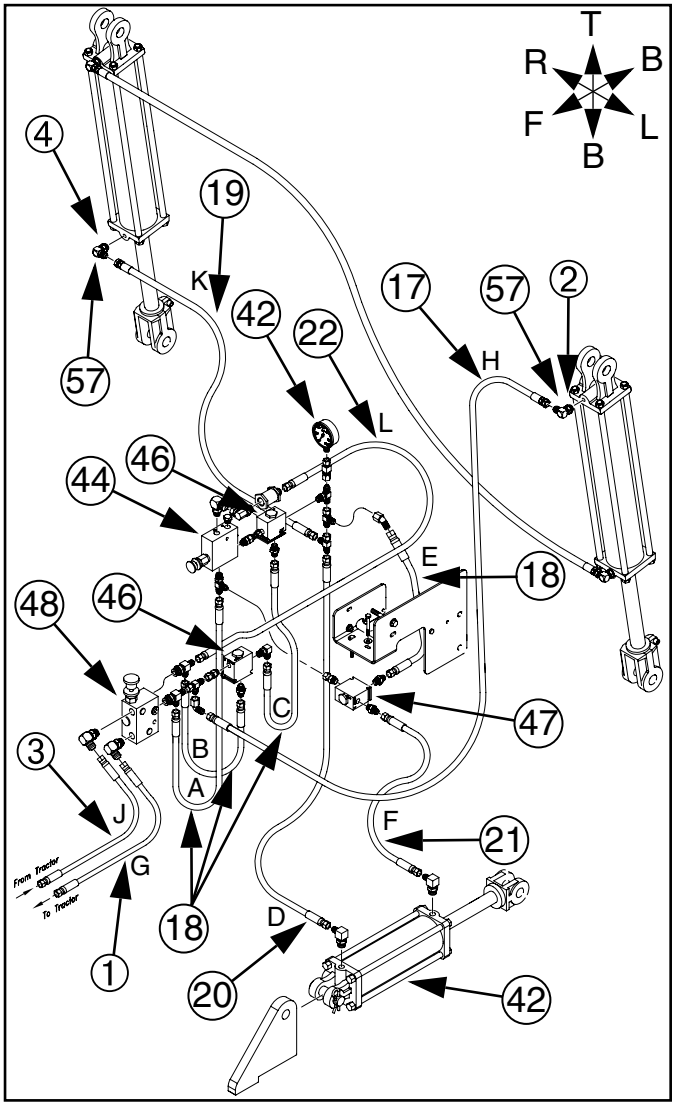


Figure 24 25131
Open Center Hoses

Purge and Re-phase System

WARNING

Escaping fluid under pressure can have sufficient pressure to penetrate the skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic lines. Use a piece of paper or cardboard, NOT BODY PARTS, to check for leaks. Wear protective gloves and safety glasses or goggles when working with hydraulic systems. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene will result.

Refer to Figure 25

127. Close the Bypass valve (48) (turn fully clockwise).
128. Close the Adjustment valve (44) (turn fully clockwise), and open (clockwise) on full turn.
129. Purge the hydraulic system of air per the instructions in the Operator's Manual.
130. Re-phase the lift cylinders per the instructions in the Operator's Manual.
131. Inspect the system for leaks. Raise and lower drill once or twice, and note where the new hoses rub other implement components, or need to be protected from other moving parts.

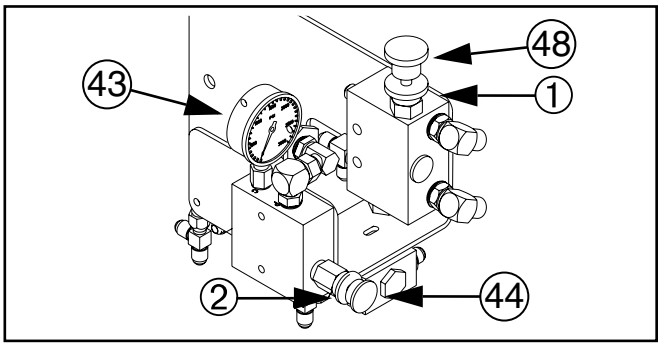


Figure 25 25185
Closed Center Valves

Post-Installation Lift Cycle

The gauge wheel lift cylinders are on the same circuit as the new pressure compensating system (although the lift cylinders do not rely on the compensated pressure). Be aware of, and check, the new lift/lower sequencing.

Raising:

a. Gauge wheels lift drill.
b. Opener sub-frame lifts openers.

Lowering:

a. Gauge wheels lower drill onto cylinder stops of gauge wheel cylinders.
b. Opener sub-frame lowers opener to the ground and pressure compensating valve pressurizes openers to selected setting.

132. Select ties (26) 800-035C,
(CABLE TIE .31X28 8DIA 120LB).
Secure the new hoses as necessary to protect them in field operations.

Calibrate Bypass Valve (CC only)

Refer to Figure 26

If your tractor has Open Center hydraulics, refer to "**Open Center Operation**" on page 21. If you are unsure what type of hydraulic system is on your tractor, contact your tractor manufacturer.

Note: Refer to "**Post-Installation Lift Cycle**" on page 17 to know what to expect the drill to do as hydraulics are cycled.

Tractors with Pressure Compensating Closed Center Hydraulics (PC Closed)

133. Release locking disk ①. Close bypass valve (48) for no oil flow by turning knob on valve clockwise completely. Tighten locking disk ①. Always operate the drill with the bypass valve closed.

Tractors with Load Sensing Closed Center Hydraulics (LS Closed) or Pressure Flow Compensating (PFC) Systems

IMPORTANT !

Failure to use the bypass valve on load-sensing tractors may cause major tractor damage.

134. Release locking disk ①. Close bypass valve (48) for no oil flow by turning knob on valve clockwise completely. Tighten locking disk ①.

135. With tractor at half throttle, adjust flow-control valve on tractor so openers raise and lower at a reasonable speed. Keep tractor at one-half throttle for remaining steps.

Note: Faster opener raise/lower increases potential for oil over-heating, excess wear and tractor damage.

136. Engage tractor hydraulics and lower openers. Lock hydraulic lever on tractor for continuous operation.

137. Release locking disks ① and ②. Adjust pressure-control valve (44) for opener down pressure so gauge (43) is at 1800 psi.

138. While watching gauge (43), slowly turn knob on bypass valve (48) counterclockwise. Adjust bypass valve (48) just until needle on gauge (43) begins to move down from 1800 psi. Use locking disk ① to lock bypass valve at this setting. (See also note below.)

139. Adjust pressure-control valve (44) to desired opener down pressure per "**Closed Center Field Operation**" on page 19. Tighten locking disk ②.

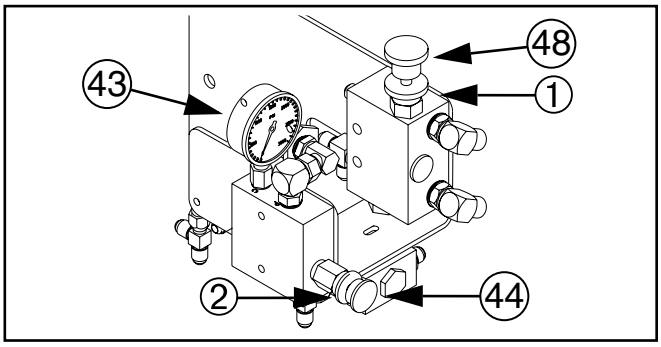


Figure 26 25185
Closed Center Valves

Note: The higher the bypass pressure, the greater the potential for oil over-heating and tractor damage. At the same time, for proper opener operation the bypass valve must be set at least 300 psi above the opener down-pressure setting when the tractor is at one-half throttle. Therefore, you should set the bypass valve as low as possible while staying at least 300 psi above the opener down pressure setting.

While 1800 psi is a good starting point for setting the bypass valve, if you consistently operate the drill with low opener down pressure you can set the bypass valve below 1800 psi. If you consistently operate the drill with very high opener down pressure, you may need a bypass-valve setting above 1800 psi.

Operation

Closed Center Field Operation

The openers are mounted on floating opener frames which follow the contour of the ground while maintaining constant opener down pressure.

1. Lower the opener frames by pushing FORWARD on the tractor remote hydraulic lever. The remote lever must be LOCKED OPEN in this position to provide constant pressure/flow to the openers.

   John Deere tractors with Sound-Gard ® Body: Use lever lock clip, John Deere part number R52667, to lock lever forward. See your tractor dealer for clip purchase and installation.

   John Deere 7000 Series tractors: Rotate valve detent selector to motor position to lock lever in forward position.

   John Deere 8000 Series tractors: Set timer to continuous. Push lever forward until detent clicks.

   Case-IH Magnum tractors: Lock lever forward in detent position. You may need to turn up detent pressure to its maximum setting. Do not tie hydraulic lever past detent position with a strap. See your tractor dealer for hydraulic-system details.

   Other tractors: Lock lever forward in detent position. You may need to turn up detent pressure to maximum or use a mechanical detent holder to hold lever forward. See your tractor dealer for proper means of providing constant flow to openers.

Refer to Figure 27

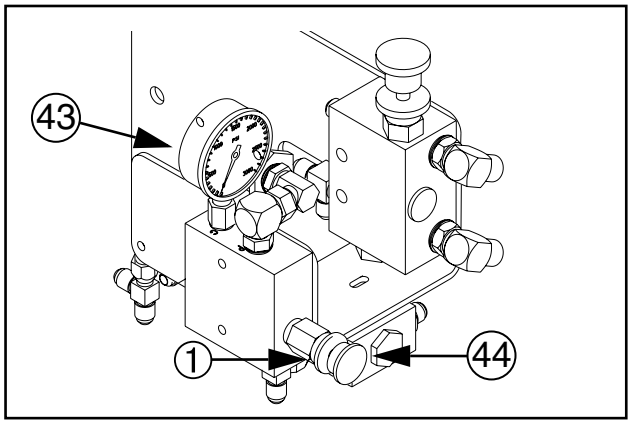


Figure 27 25185
Closed Center Valves

2. With the tractor hydraulic lever locked forward, release the lock disk ①, turn the knob on the pressure control valve (44) as shown in Figure 27. Watch the pressure gauge (43) and dial in the desired pressure on the openers. Clockwise increases the pressure and counterclockwise decreases pressure. Once the pressure is set, lock the knob with the lock disk ①.

Note: Refer to "**Post-Installation Lift Cycle**" on page 17 to know what to expect the drill to do as hydraulics are cycled.

The recommended pressure range for drilling is between 200 psi and 1400 psi. Setting the opener down pressure above 1600 psi will raise the drive wheels off the ground when the seed box is empty causing skips and poor seed metering. See the following table for the relationship between psi and down force.

The following down-forces are per-opener, with no extra weight on the hangers (at the lower down-force values). Higher down-force values may require weights on the hangers. Consult the Operator's Manual for further information.

Adjustment Valve Table		
System PSI	Down Force	
	Pounds	Kg
200	62	137
300	77	170
400	84	185
500	96	212
600	110	243
700	123	272
800	139	306
900	155	341
1000	173	380
1100	194	427
1200	217	479
1300	249	548
1400	268	591

Refer to Figure 28

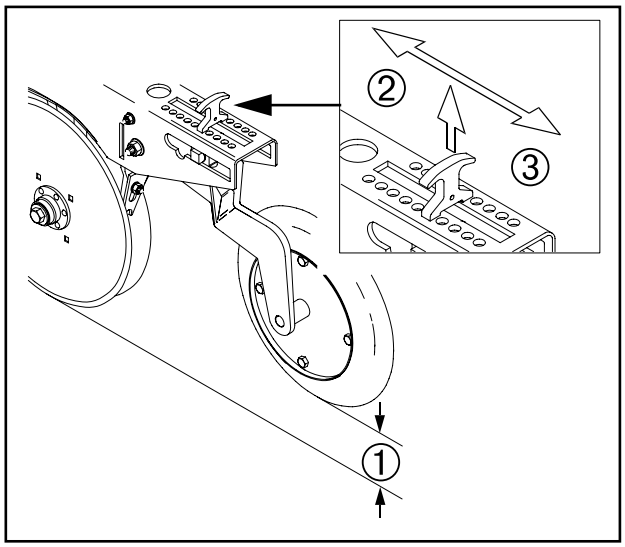


Figure 28 15659
Opener Adjustment

3. After the opener pressure is set, opener depth ① is controlled by the press wheel adjustment. Attached to the rear of each opener is one of several optional press wheels. The press wheels close the furrow and gently press soil over the seed while also providing depth control for the opener. To adjust the position of the press wheel, which automatically changes the seeding depth of the opener, lift the "T" handle located on top of the opener and slide it forward ② or rearward ③ until the seeding depth is correct, as shown in Figure 2-10. Moving the handle forward ② plants shallower while moving the handle rearward ③ plants deeper. A spring loaded pin holds the "T" handle at the setting to maintain the proper depth. Lift the opener frames slightly to take the pressure off the "T" handles when adjusting the press wheel depth.

Note: The opener pressure setting controls the soil firming pressure on the press wheel as well as the disk penetrating force. DO NOT use more opener down pressure than necessary to obtain the desired opener penetration and to maintain the proper firming action over the seed. Set the planting depth with the depth controlling press wheel and only use enough opener pressure to cut the proper seed groove and maintain the desired soil firming action. Excessive opener force will lead to excessive wear and damage of the opener components.

Priority Flow Hydraulic Systems

On some tractors with load-sensing hydraulics, the circuit #1 is capable of taking nearly 100 percent of available hydraulic flow. Operating the openers or markers on circuit #1 will starve the other circuit, making one function inoperable.

To operate markers and constant opener down pressure at the same time, connect the openers to circuit #2 and the markers to circuit #3.

Note: On some tractors with very positive remote hydraulic checks, a slight increase in the reading on the pressure gauges may occur after the tractor remote lever is returned to neutral. This is caused by back pressure on the opener cylinders and should be ignored. The NET OPERATING PRESSURE on the opener cylinders is maintained at the pressure you selected while the tractor remote lever was held forward–not at the "apparently increased" pressure. Reactivating the tractor lever forward will confirm this.

Open Center Operation

This section covers Non-Active Hydraulic Systems -Tractors with open-center hydraulic systems or fixed-displacement hydraulic pumps.

If your tractor has Closed Center hydraulics, refer to "**Closed Center Field Operation**" on page 19. If you are unsure what type of hydraulic system is on your tractor, contact your tractor manufacturer.

Refer to Figure 29

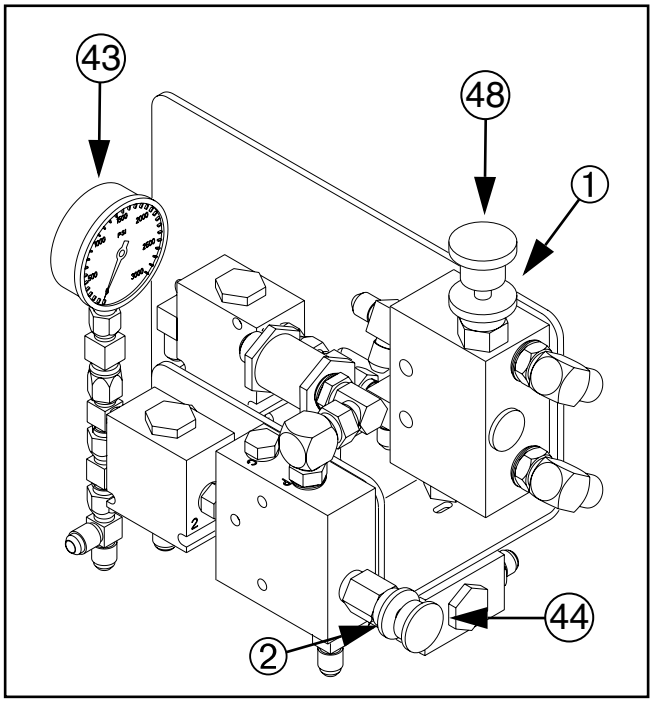


Figure 29 25186
Open Center Valves

Note: Refer to "**Post-Installation Lift Cycle**" on page 17 to know what to expect the drill to do as hydraulics are cycled.

1. Release locking disk ①. Close bypass valve (48) for no oil flow by turning knob on valve clockwise completely. Always operate the drill with the bypass valve closed. Lock disk ①.

2. Lower the opener frames by pushing FORWARD on the tractor remote hydraulic lever. The remote lever must be TEMPORARILY LOCKED OPEN in this position while the pressure adjustment is being made to provide constant pressure and flow to the openers.

   John Deere tractors with Sound-Gard ® Body: Use lever lock clip, John Deere part number R52667, to lock lever forward. See your tractor dealer for clip purchase and installation.

   John Deere 7000 Series tractors: Rotate valve detent selector to motor position to lock lever in forward position.

   John Deere 8000 Series tractors: Set timer to continuous. Push lever forward until detent clicks.

   Case-IH Magnum tractors: Lock lever forward in detent position. You may need to turn up detent pressure to its maximum setting. Do not tie hydraulic lever past detent position with a strap. See your tractor dealer for hydraulic-system details.

   Other tractors: Lock lever forward in detent position. You may need to turn up detent pressure to maximum or use a mechanical detent holder to hold lever forward. See your tractor dealer for proper means of providing constant flow to openers.

3. Release locking disk ②. With the tractor hydraulic lever locked forward, turn the knob on the pressure control valve (44) as shown in Figure 29. Watch the pressure gauge (43) and dial in the desired pressure on the openers. Clockwise increases the pressure, and counterclockwise decreases pressure. Once the pressure is set, lock each knob with the lock disk ②. The recommended pressure range for drilling is between 200 psi and 1400 psi. Setting the opener down pressure above 1600 psi. will raise the drive wheels off the ground when the seed box is empty causing skips and poor seed metering. See the following table for the relationship between psi and down force..

Adjustment Valve Table		
System PSI	Down Force	
	Pounds	Kg
200	62	137
300	77	170
400	84	185
500	96	212
600	110	243
700	123	272
800	139	306
900	155	341
1000	173	380
1100	194	427
1200	217	479
1300	249	548
1400	268	591

As a general starting point, set hydraulic down pressure to 800 psi. For most field conditions, adjust down pressure between 200 and 1400 psi. Setting the opener down pressure above 1600 psi. will raise the drive wheels off

the ground when the seed box is empty causing skips and poor seed metering. Refer to the chart on the previous page for approximate force at the openers for a given pressure setting.

4. After the opener pressure is set, RETURN THE TRACTOR REMOTE HYDRAULIC LEVER TO ITS NEUTRAL POSITION. This “locks in” the previously selected pressure and the opener frames remain in a fixed position.

Note: On some tractors with very positive remote hydraulic checks, a slight increase in the reading on the pressure gauges may occur after the tractor remote lever is returned to neutral. This is caused by back pressure on the opener cylinders and should be ignored. The NET OPERATING PRESSURE on the opener cylinders is maintained at the pressure you selected while the tractor remote lever was held forward–not at the “apparently increased” pressure. Reactivating the tractor lever forward will confirm this.

Each time the drill is lowered, hold the tractor remote hydraulic lever forward for a few seconds to recharge the circuit, then return it to its neutral position. The tractor and drill should be on level ground when you return the tractor lever to neutral.

The open center hydraulic kit allows the tractor operator to momentarily operate the opener down pressure circuit as an active circuit. When approaching a mound or valley where active hydraulics is desirable, the tractor operator can MOMENTARILY PUSH THE TRACTOR REMOTE HYDRAULIC LEVER FORWARD which will allow the opener frames to follow the uneven terrain with constant opener down pressure. As soon as the drill returns to level ground RETURN THE TRACTOR REMOTE HYDRAULIC LEVER TO ITS NEUTRAL POSITION to “lock in” the preset pressure once again. DO NOT activate the tractor remote hydraulic lever for more than 20 seconds at a time, once every 2 minutes. Always wait until the tractor and drill are on level ground before returning the tractor remote hydraulic lever to its neutral position. The tractor remote hydraulic lever can be momentarily bumped forward any time on level ground to assure the preset pressure is correctly locked in and to reset the system if it has not been operated for a long period of time.

Note: The opener pressure setting controls the soil firming pressure on the press wheel as well as the disk penetrating force. DO NOT use more opener down pressure than necessary to obtain the desired opener penetration and to maintain the proper firming action over the seed. Set the planting depth with the depth controlling press wheel and only use enough opener pressure to cut the proper seed groove and maintain the desired soil firming action. Excessive opener force will lead to excessive wear and damage of the opener components.

Refer to Figure 30f

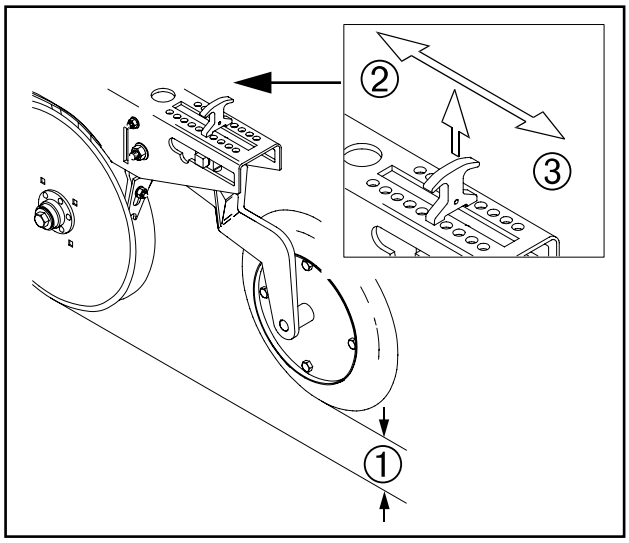


Figure 30 15659
Opener Adjustment

5. After the opener pressure is set, opener depth ① is controlled by the press wheel adjustment. Attached to the rear of each opener is one of several optional press wheels. The press wheels close the furrow and gently press soil over the seed while also providing depth control for the opener. To adjust the position of the press wheel, which automatically changes the seeding depth of the opener, lift the “T” handle located on top of the opener and slide it forward ② or rearward ③ until the seeding depth is correct, as shown in Figure 2-10. Moving the handle forward ② plants shallower while moving the handle rearward ③ plants deeper. A spring loaded pin holds the “T” handle at the setting to maintain the proper depth. Lift the opener frames slightly to take the pressure off the “T” handles when adjusting the press wheel depth.

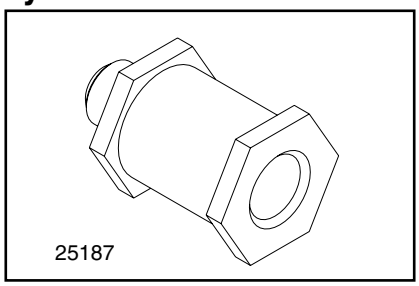
6. After opener down pressure is set, return tractor hydraulic lever to neutral. This locks in the selected pressure, and opener frames will remain fixed in this position.

IMPORTANT !

Open-center tractors and tractors with fixed-displacement pumps are not designed to provide a continuous supply of pressurized oil to remote valves. Locking hydraulic lever forward on these tractors can cause overheating of hydraulic oil and tractor damage. After setting opener down pressure, always return hydraulic lever to neutral.

Maintenance

In-Line Hydraulic Filter



If raising or lowering times slow noticeably, check the in-line filter, and clean as necessary.

To clean the filter:

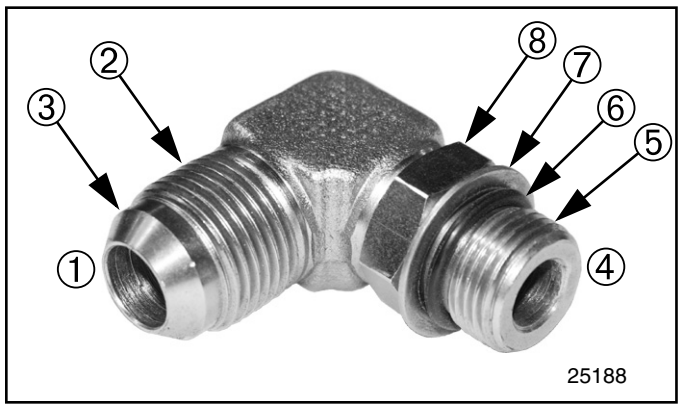
1. Set tractor's opener down-force hydraulic circuit to float.
2. Shut down tractor.
3. Loosen connections at the in-line filter and allow a few minutes for drain-back.
4. Disconnect and cap the hose to the filter.
5. Disassemble the filter in place.
6. Remove the 50 micron screen. Wash with solvent and use compressed air to dislodge any debris.

Note: If the filter screen needs to be replaced, order an 810-553C from your Great Plains dealer.

7. Reassemble filter and reconnect hose.
8. Complete a hydraulic system purge and re-phase per your Operator's manual.

Installation Reference Information

Connector Identification



① **JIC** - Joint Industry Conference (SAE J514)
Note straiight threads ② and the
37° cone ③ on "M" fittings (or 37° flare on "F").

④ **ORB** - O-Ring Boss (SAE J514)
Note the straight threads ⑤ and,
elastomer O-Ring ⑥.
Fittings needing orientation, such as the ell above, also have a washer ⑦ and
jam nut ⑧ ("adjustable thread port stud")

\- **NPT** - National Pipe Thread (not shown)
have tapered threads, no cone/flare, no O-ring.

Torque Values		
Fastener/Fitting	**Ft-Lbs**	**N-m**
1/4 NPT	1.5-3.0 turns past finger tight	
1/4-20 GR5	8	11
3/8-16 GR5	31	42
1/2-13 GR5	76	105
9/16 JIC	18-20	24-27
9/16 ORB w/jam nut	12-16	16-22
9/16 ORB straight	18-24	24-32
3/4 JIC	27-39	37-53
3/4 ORB w/jam nut	20-30	27-41
3/4 ORB straight	27-43	37-58

Kit Parts List

Opener Down Pressure Kits

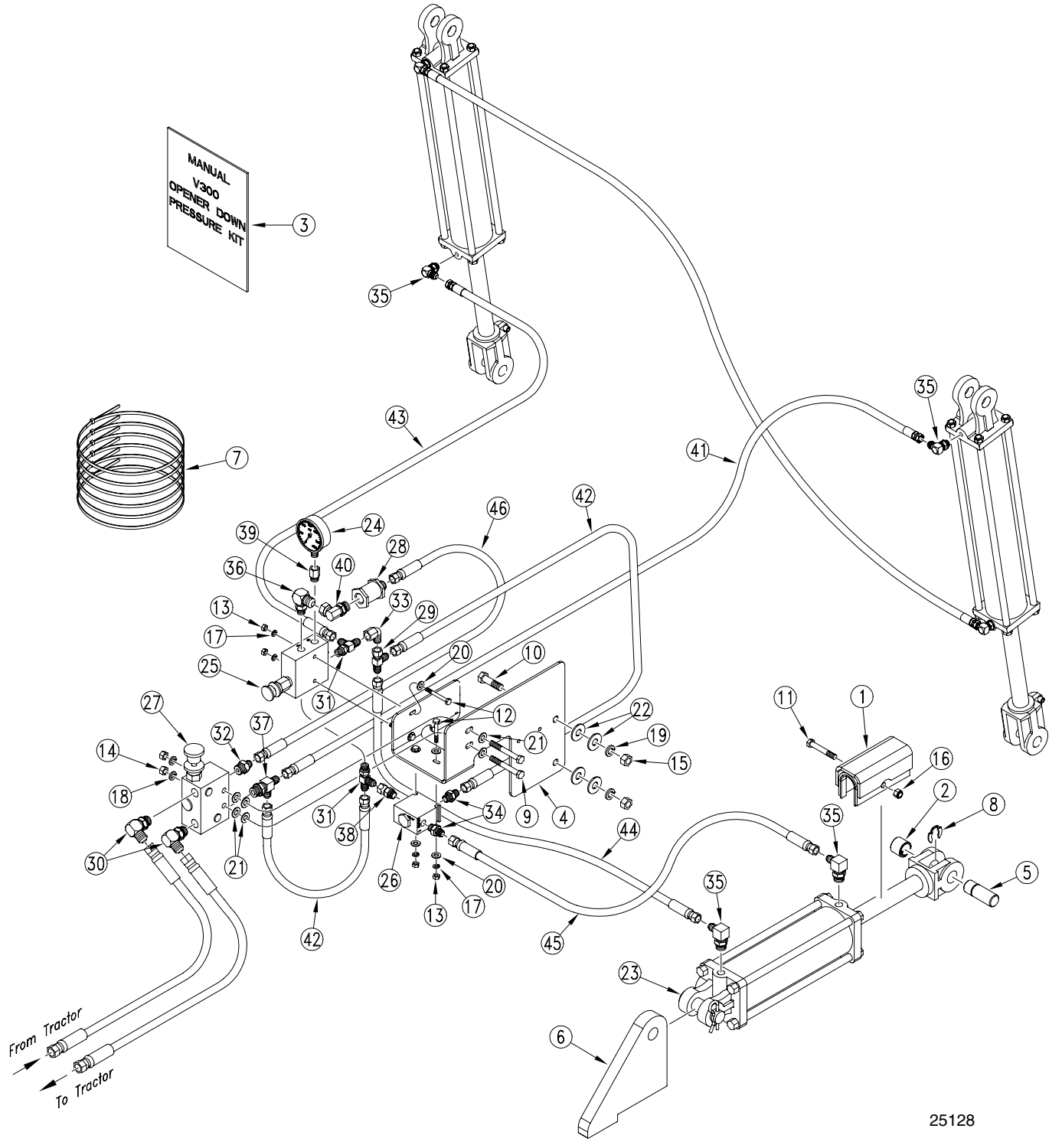
The part call-out numbers in this list match all Figures in the installation instructions, but not the support parts lists starting on page 26. Your kit includes:

(Callout) Part No.	Quantity per 401-		Part Description
	-765A	-766A	
(11) 148-771M	1	1	This manual
(12) 148-768S	1	1	5.625 CYL DEPTH CHNL ASSY
(13) 113-357D	2	2	RUBBER CYL LOCK CHANNEL PAD
(14) 148-767H	1	1	5.625 CYL DEPTH CHNL WLMT
(15) 148-769V	1	0	VALVE ASSY- C.C. HOSE BUNDLE
(16) 148-770V	0	1	VALVE ASSY- O.C. HOSE BUNDLE
(17) 811-699C	1	1	HH3/8R2 106 9/16FJIC
(18) 811-702C	2	4	HH3/8R2 017 9/16FJIC
(19) 811-705C	1	1	HH3/8R2 050 9/16FJIC
(20) 811-922C	1	1	HH3/8R2 045 9/16FJIC
(21) 811-926C	1	1	HH3/8R2 022 9/16FJIC
(22) 841-136C	1	1	HH3/8R2 015 9/16FJIC 3/4FJIC
(23) 248-506D	1	1	OPNR DOWN PRESSURE VALVE MNT
(24) 248-507D	1	1	CYLINDER PIN
(25) 248-508D	1	1	TOP LINK CYL LUG
(26) 800-035C	6	6	CABLE TIE .31X28 8DIA 120LB
(27) 800-245C	1	1	SNAP RING EXT 1 5304
(28) 802-024C	2	2	HHCS 3/8-16X3 GR5
(29) 802-082C	2	2	HHCS 1/2-13X1 3/4 GR5
(30) 802-114C	1	1	HHCS 3/8-16X2 1/2 GR5
(31) 802-551C	4	8	HHCS 1/4-20X2 1/4 GR5
(32) 803-006C	4	8	NUT HEX 1/4-20 PLT
(33) 803-014C	2	2	NUT HEX 3/8-16 PLT
(34) 803-020C	2	2	NUT HEX 1/2-13 PLT
(35) 803-078C	1	1	NUT LOCK 3/8-16 NYLON INSERT
(36) 804-006C	4	8	WASHER LOCK SPRING 1/4 PLT
(37) 804-013C	2	2	WASHER LOCK SPRING 3/8 PLT
(38) 804-015C	2	2	WASHER LOCK SPRING 1/2 PLT
(39) 804-075C	6	10	WASHER FLAT 1/4 USS PLT
(40) 804-087C	6	6	WASHER FLAT 3/8 HARD ASTMF436
(41) 804-113C	4	4	WASHER FLAT 1/2 USS HARD PLT
(42) 810-162C	1	1	CYL 3.5X8X1.25 ROD (TIE ROD)
(43) 810-300C	1	1	PRESSURE GAUGE 3000 PSI

(Callout) Part No.	Quantity per 401-		Part Description
	-765A	-766A	
(44) 810-301C	1	1	VALVE PRESS REDUCING W/CHECK
(45) 810-343C	0	1	VALVE PO CHECK 2:1 W/9/16FORB
(46) 810-344C	0	1	VALVE SHUTTLE 9/16FORB PORTS
(47) 810-428C	1	1	VALVE PO CHECK 4:1 W/9/16FORB
(48) 810-432C	1	1	HYDRAULIC BYPASS VALVE
(49) 810-554C	1	1	FILTER INLINE 3/4FORB 3/4MJIC
(50) 811-061C	1	3	TE 9/16MJIC 9/16MJIC 9/16FJIC
(51) 811-063C	2	2	EL 3/4MJIC 3/4MORB
(52) 811-064C	2	1	TE 9/16MJIC 9/16MJIC 9/16MORB
(53) 811-065C	0	1	EL 9/16MJIC 9/16MORB
(54) 811-133C	1	0	AD 9/16MJIC 3/4MORB
(55) 811-169C	1	2	EL 9/16MJIC 9/16FJIC
(56) 811-170C	2	4	AD 9/16MORB 9/16MJIC
(57) 811-171C	4	4	EL 3/4MORB 9/16MJIC
(58) 811-216C	1	1	EL 3/4MJIC 9/16MORB
(59) 811-249C	1	2	TE 9/16MJIC 3/4MORB 9/16MJIC
(60) 811-439C	1	1	TE 9/16MORB 9/16MJIC 9/16MJIC
(61) 811-582C	0	1	AD 9/16FJIC 1/4FNPT
(62) 811-627C	1	2	AD 9/16MORB 9/16FJIC
(63) 811-636C	0	1	AD 9/16MORB STRAIGHT UNION
(64) 811-675C	0	1	PL 9/16MORB HEX HEAD
(65) 811-677C	1	0	AD 9/16MORB 1/4FNPT
(66) 841-077C	1	1	EL 3/4FJIC 3/4MORB
(67) 890-005C	1	1	BUSHING CYL 1 1/4 X 1 X 1

Support Parts - V300 Drill, Closed-Center Down-Pressure

The part call-out numbers in this section do not match the merged list in the installation instructions.

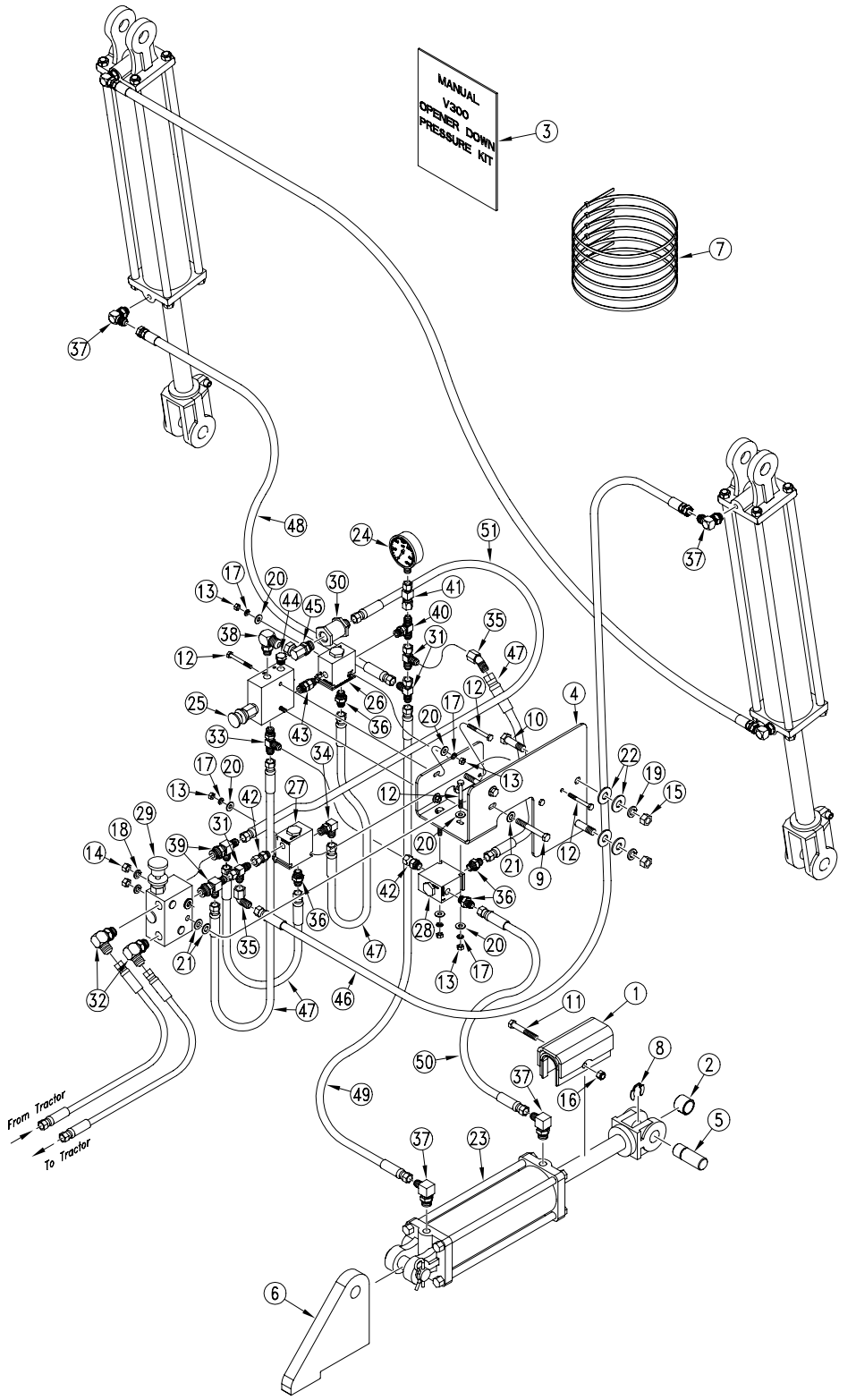


Closed Center Down-Pressure Components

Ref.	Part No.	Part Description	Comment
1	148-768S	5.625 CYL DEPTH CHNL ASSY	
2	890-005C	BUSHING CYL 1 1/4 X 1 X 1	
3	148-771M	MANUAL 04 HOSE SUPPORT UPDATE	
4	248-506D	OPNR DOWN PRESSURE VALVE MNT	
5	248-507D	CYLINDER PIN	
6	248-508D	TOP LINK CYL LUG	
7	800-035C	CABLE TIE .31X28 8DIA 120LB	
8	800-245C	SNAP RING EXT 1 5304	
9	802-024C	HHCS 3/8-16X3 GR5	
10	802-082C	HHCS 1/2-13X1 3/4 GR5	
11	802-114C	HHCS 3/8-16X2 1/2 GR5	
12	802-551C	HHCS 1/4-20X2 1/4 GR5	
13	803-006C	NUT HEX 1/4-20 PLT	
14	803-014C	NUT HEX 3/8-16 PLT	
15	803-020C	NUT HEX 1/2-13 PLT	
16	803-078C	NUT LOCK 3/8-16 NYLON INSERT	
17	804-006C	WASHER LOCK SPRING 1/4 PLT	
18	804-013C	WASHER LOCK SPRING 3/8 PLT	
19	804-015C	WASHER LOCK SPRING 1/2 PLT	
20	804-075C	WASHER FLAT 1/4 USS PLT	
21	804-087C	WASHER FLAT 3/8 HARD ASTMF436	
22	804-113C	WASHER FLAT 1/2 USS HARD PLT	
23	810-162C	CYL 3.5X8X1.25 ROD (TIE ROD)	
24	810-300C	PRESSURE GAUGE 3000 PSI	
25	810-301C	VALVE PRESS REDUCING W/CHECK	
26	810-428C	VALVE PO CHECK 4:1 W/9/16FORB	
27	810-432C	HYDRAULIC BYPASS VALVE	
28	810-554C	FILTER INLINE 3/4FORB 3/4MJIC	
29	811-061C	TE 9/16MJIC 9/16MJIC 9/16FJIC	
30	811-063C	EL 3/4MJIC 3/4MORB	
31	811-064C	TE 9/16MJIC 9/16MJIC 9/16MORB	
32	811-133C	AD 9/16MJIC 3/4MORB	
33	811-169C	EL 9/16MJIC 9/16FJIC	
34	811-170C	AD 9/16MORB 9/16MJIC	
35	811-171C	EL 3/4MORB 9/16MJIC	
36	811-216C	EL 3/4MJIC 9/16MORB	
37	811-249C	TE 9/16MJIC 3/4MORB 9/16MJIC	
38	811-627C	AD 9/16MORB 9/16FJIC	
39	811-677C	AD 9/16MORB 1/4FNPT	
40	841-077C	EL 3/4FJIC 3/4MORB	
41	811-699C	HH3/8R2 106 9/16FJIC	
42	811-702C	HH3/8R2 017 9/16FJIC	
43	811-705C	HH3/8R2 050 9/16FJIC	
44	811-922C	HH3/8R2 045 9/16FJIC	
45	811-926C	HH3/8R2 022 9/16FJIC	
46	841-136C	HH3/8R2 015 9/16FJIC 3/4FJIC	

Support Parts - V300 Drill, Open-Center Down-Pressure

The part call-out numbers in this section do not match the merged list in the installation instructions.



Open Center Down-Pressure Components

Ref.	Part No.	Part Description	Comment
1	148-768S	5.625 CYL DEPTH CHNL ASSY	
2	890-005C	BUSHING CYL 1 1/4 X 1 X 1	
3	148-771M	MANUAL 04 HOSE SUPPORT UPDATE	
4	248-506D	OPNR DOWN PRESSURE VALVE MNT	
5	248-507D	CYLINDER PIN	
6	248-508D	TOP LINK CYL LUG	
7	800-035C	CABLE TIE .31X28 8DIA 120LB	
8	800-245C	SNAP RING EXT 1 5304	
9	802-024C	HHCS 3/8-16X3 GR5	
10	802-082C	HHCS 1/2-13X1 3/4 GR5	
11	802-114C	HHCS 3/8-16X2 1/2 GR5	
12	802-551C	HHCS 1/4-20X2 1/4 GR5	
13	803-006C	NUT HEX 1/4-20 PLT	
14	803-014C	NUT HEX 3/8-16 PLT	
15	803-020C	NUT HEX 1/2-13 PLT	
16	803-078C	NUT LOCK 3/8-16 NYLON INSERT	
17	804-006C	WASHER LOCK SPRING 1/4 PLT	
18	804-013C	WASHER LOCK SPRING 3/8 PLT	
19	804-015C	WASHER LOCK SPRING 1/2 PLT	
20	804-075C	WASHER FLAT 1/4 USS PLT	
21	804-087C	WASHER FLAT 3/8 HARD ASTMF436	
22	804-113C	WASHER FLAT 1/2 USS HARD PLT	
23	810-162C	CYL 3.5X8X1.25 ROD (TIE ROD)	
24	810-300C	PRESSURE GAUGE 3000 PSI	
25	810-301C	VALVE PRESS REDUCING W/CHECK	
26	810-343C	VALVE PO CHECK 2:1 W/9/16FORB	
27	810-344C	VALVE SHUTTLE 9/16FORB PORTS	
28	810-428C	VALVE PO CHECK 4:1 W/9/16FORB	
29	810-432C	HYDRAULIC BYPASS VALVE	
30	810-554C	FILTER INLINE 3/4FORB 3/4MJIC	
31	811-061C	TE 9/16MJIC 9/16MJIC 9/16FJIC	
32	811-063C	EL 3/4MJIC 3/4MORB	
33	811-064C	TE 9/16MJIC 9/16MJIC 9/16MORB	
34	811-065C	EL 9/16MJIC 9/16MORB	
35	811-169C	EL 9/16MJIC 9/16FJIC	
36	811-170C	AD 9/16MORB 9/16MJIC	
37	811-171C	EL 3/4MORB 9/16MJIC	
38	811-216C	EL 3/4MJIC 9/16MORB	
39	811-249C	TE 9/16MJIC 3/4MORB 9/16MJIC	
40	811-439C	TE 9/16MORB 9/16MJIC 9/16MJIC	
41	811-582C	AD 9/16MORB 1/4FNPT	
42	811-627C	AD 9/16MORB 9/16FJIC	
43	811-636C	AD 9/16MORB STRAIGHT UNION	
44	811-675C	PL 9/16MORB HEX HEAD	
45	841-077C	EL 3/4FJIC 3/4MORB	
46	811-699C	HH3/8R2 106 9/16FJIC	
47	811-702C	HH3/8R2 017 9/16FJIC	
48	811-705C	HH3/8R2 050 9/16FJIC	
49	811-922C	HH3/8R2 045 9/16FJIC	
50	811-926C	HH3/8R2 022 9/16FJIC	
51	841-136C	HH3/8R2 015 9/16FJIC 3/4FJIC	

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