2- and 3-Section Folding Drill
Open Center Hydraulic Kit

Used with:

- 2S-2600, 2S-2600HD
- 3S-3000, 3S-3000HD
- 3S-4000, 3S-4000HD

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 an Open Center Hydraulic Kit, required for operating any of these drills with tractors having open-center hydraulics, or fixed-displacement hydraulic pumps.

These instructions apply to an installation of

Kit	Kit Description
194-143A	2600 3000 4000 OPEN-CTR HYDKIT

Note: Do not install this kit on a Point Row-equipped drill. These two options use the same mounting locations, cannot be co-located, and this kit does not upgrade Point Row hydraulics to open center operation.

Each kit converts an entire drill.

Tools Required

- current Operator and Parts manuals (see page 21)
- basic hand tools,
- liquid (not tape) pipe thread sealant,
- fresh hydraulic fluid, and;
- suitable tractor or hydraulic source for charging system and making initial adjustments.

Table of Contents

Installation steps vary for 2- and 3-section drills, and vary for older vs. newer 2-section drills.

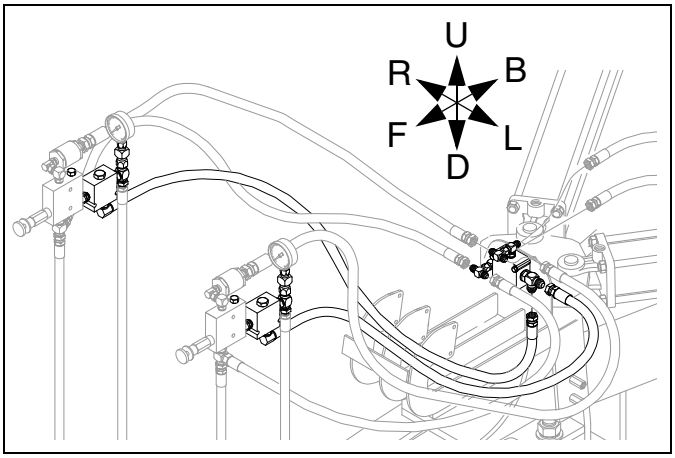
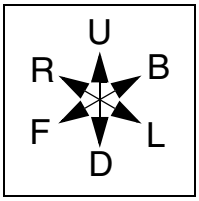


Figure 1: Parts
Kit (Black) / Existing (Gray) 27485

Notations and Conventions

"Left" and "Right" are facing in the direction of machine travel. An orientation rose in the line art illustrations shows the directions of Up, Back, Left, Down, Front and Right.



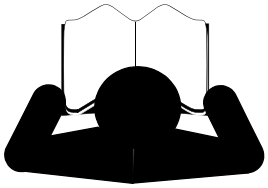
Call-Outs

① to ⑨	Single-digit callouts identify components in the currently referenced Figure or Figures. These numbers may be reused for different items from page to page.
11 to 24	Two-digit callouts in the range 11 to 24 reference new parts from the new parts lists beginning on page 22.
51 to 65	Two-digit callouts in the range 51 to 65 reference affected existing parts from the table on page 23. The descriptions match those in your Parts Manual. The narrative and table indicate any re-use of the parts.

Before You Start

Review the instruction for your drill, with the following objectives at each step:

- Documentation: Update your Operator and Parts manuals to current editions. See page 21.
- Inventory: examine any called-for items and make sure all parts are present.
- Comprehension: make sure you understand where each part or assembly is installed, and what tools are required for the task.

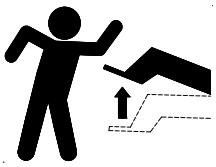


Pre-Assembly Preparation

Work Location

1. Move the drill to a location with:
   - adequate illumination,
   - suitable surface beneath (hydraulic fluid spills a re likely during disconnection of existing hoses), and;
   - access to tractor or hydraulic power.

Negative tongue weight hazard. Consult Operator manual before any unfolding or lift operations. Folding drills can have significant negative tongue weight when unfolded and raised. The tongue can fly up during opener lift, if using stationary hydraulic power to operate drill. Use any parking stands provided.



Slipping hazard - hydraulic fluid spill is likely during disconnection of existing system and during bleeding of new system. Clean up spills. Move carefully near removed or loosened fittings.

Prepare Drill

2. Unfold the drill.
3. Install any parking stands provided with drill.
4. Lower the openers.
5. Block the tires.

Refer to Figure 2

6. Release the pressure in the pressure control system by unlocking control disks and turning adjustment knobs fully counter-clockwise.
7. Slightly raise the openers, until pressure gauges read zero.
8. Set the tractor or hydraulic source circuits to Float. Do not disconnect until circuits are at 0 PSI.
9. Install the parking jack if unhitching.
10. Shut off tractor or hydraulic source.

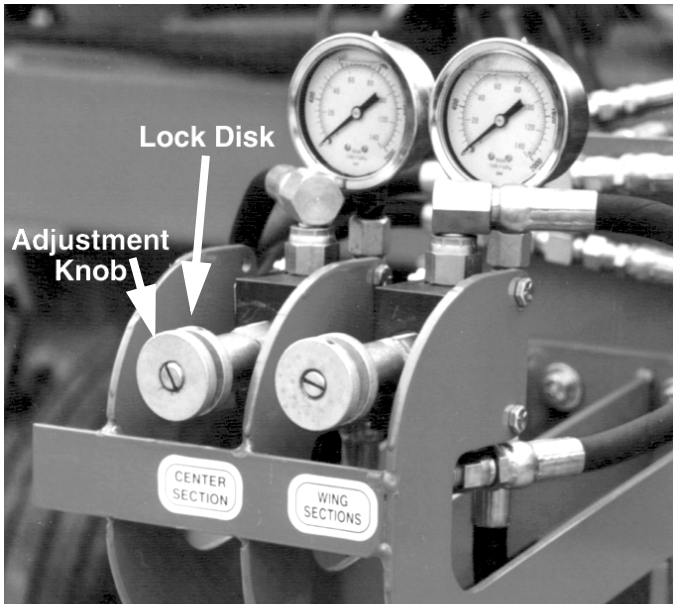


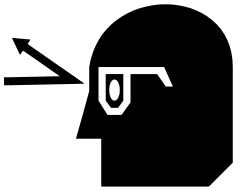
Figure 2 15557
Closed Center Controls

3S-3000 and 3S-4000 Installation

Step 11 through step 47 are for 3S-3000, 3S-3000HD, 3S-4000 and 3S-4000HD drills only. For 2S-2600 drills, installation instructions begin on page 9 (s/n DD1161-) or page 15 (2S2600HD or 2S-2600 s/n DD1162+).

3S Control Valve Disassembly

High pressure fluid hazard. Pressurized fluid may still be present. Escaping fluid under pressure can penetrate the skin, causing serious injury. Wear protective gloves and safety glasses or goggles when working with hydraulic systems. Crack fitting slowly. Use a piece of paper or cardboard, NOT BODY PARTS, to check for suspected leaks. If an accident occurs, seek immediate medical assistance from a physician familiar with this type of injury.



Refer to Figure 3

11. At each pressure control valve (52), remove and save:
    (51) 810-300C PRESSURE GAUGE 3000 PSI
    These gauges are re-installed at step 23.
12. At the top rear Port G of each pressure control valve (52), remove:
    (63) 811-677C AD 9/16MORB 1/4FNPT
    These two adapters are not re-used.
13. Select two new:
    (24) 811-675C PL 9/16MORB HEX HEAD
    Install these plugs in the top rear valve holes previously occupied by the gauge adapter. Tighten to 9/16ORB specification (see page 21). Do not use pipe thread sealant on these, or any ORB fittings.
14. At the rear lower Port R of each valve (52), disconnect the hose to the cylinder base ends:
    (65) 811-774C HH3/8R1 072 9/16FJIC
    These hoses are re-connected to new fittings at step 22. Note which hose is which (by where it is routed to), so that it can be reconnected to the correct (same) valve assembly after the new valves and fittings are installed.
15. Remove two:
    (56) 811-170C AD 9/16MORB 9/16MJIC
    These adapters are not re-used.

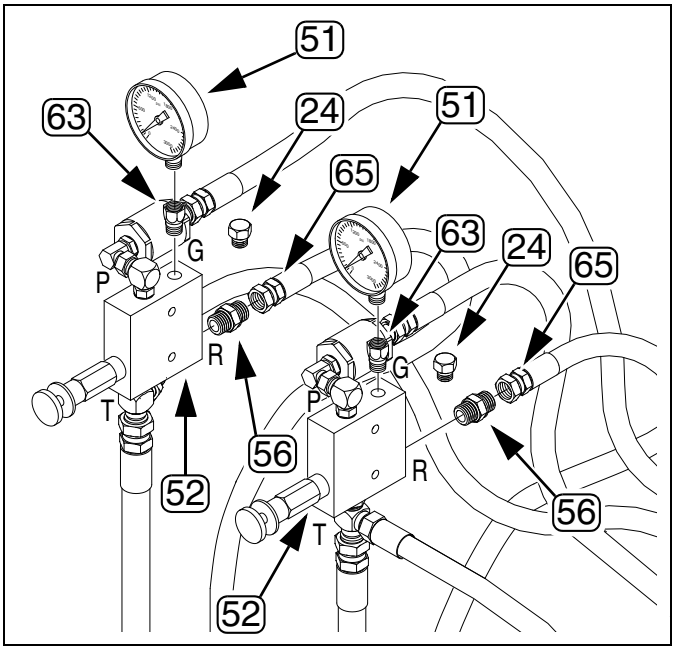


Figure 3
Disassemble 3S Valves
16302

3S Check Valve Installation

Refer to Figure 4

16. Select two new:
    (23) 811-636C AD 9/16MORB STRAIGHT UNION
    Make sure the jam nut is fully threaded onto the adapter.
17. At the lower rear valve Port R of each pressure control valve (52), screw in the union (23) end with the integral hex nut (NOT the end with the jam nut). Tighten to 9/16ORB specification.
18. Select two new:
    (16) 810-343C VALVE PO CHECK 2:1 W/9/16FORB

Note: These valves are stamped `85050146`, and if shaken gently, do not rattle.
(The third valve, assembled at step 25, is a shuttle valve, and does rattle.)

19. Screw Port 2 of each check valve (16) onto the other end of the adapter (23) installed at step 17. Turn until finger tight, then back off until the side of the valve with the hex head cartridge is Up and Port 3 is down. Tighten the jam nut to 9/16ORB specification.
20. Select two new:
    (20) 811-439C TE 9/16MORB 9/16MJIC 9/16MJIC
    This is the symmetrical MJIC/MORB tee. There are four of these in the kit.
21. Screw the MORB port of the tee (20) into the rear Port 1 of each check valve (16). Screw until finger tight, then back off until the JIC ports are vertical. Tighten the ORB jam nut to 9/16ORB specification.
22. Locate the disconnected hoses:
    (65) 811-774C HH3/8R1 072 9/16FJIC
    At the lower port of each new tee (20), reconnect the hose (65) to the cylinder base ends that was disconnected at step 14. Do not use pipe thread sealant on these or any JIC fittings. Tighten to 9/16JIC specification (see page 21).
23. Select two new NPT swivel adapters:
    (22) 811-582C AD 9/16FJIC 1/4FNPT
    and the saved gauges:
    (51) 810-300C PRESSURE GAUGE 3000 PSI
    Apply liquid pipe thread sealant to the gauge MNPT threads and screw the adapter (22) onto the gauge. Tighten to 1/4NPT torque specification (see page 21).
24. At each valve, screw the JIC end of the gauge assembly (22) onto the top port of the new tee (20). Orient the gauge to face forward, and tighten the JIC connection to JIC torque specification.

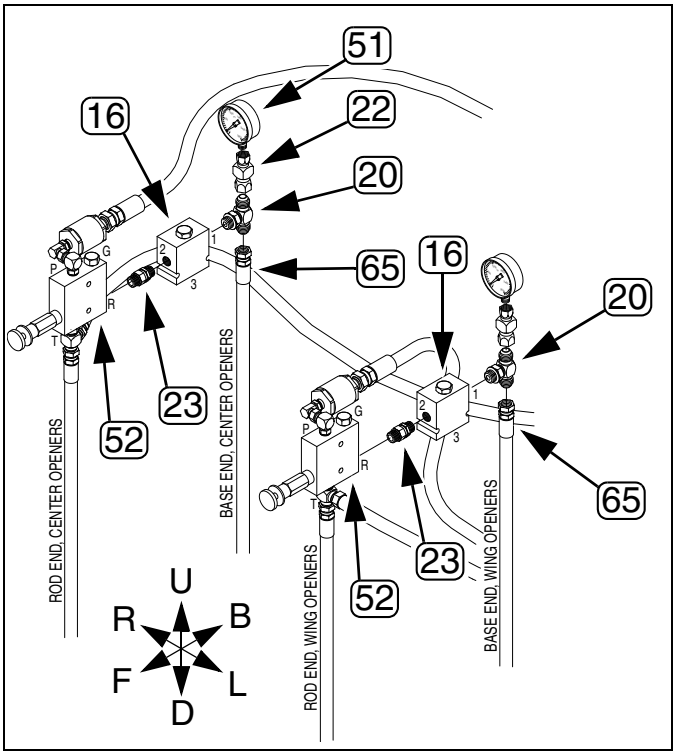


Figure 4
Install 3S Check Valves

3S Shuttle Valve Assembly

Refer to Figure 5

25. Select one new:
    [17] 810-344C VALVE SHUTTLE 9/16FORB PORTS

Note: This valve is stamped `85005468`, and the internal shuttle rattles if the valve shaken gently. When mounted on the drill, Port 1 will be to drill Right.

26. Select one new:
    [18] 811-064C TE 9/16MJIC 9/16MJIC 9/16MORB
    This is the asymmetrical MJIC/MORB tee. There is only one of these in the kit.

27. Screw the ORB end of the tee [18] into Port 2 of the valve [17]. Orient the center JIC port of the tee down, and tighten the ORB jam nut to ORB torque specification.

28. Select two new:
    [20] 811-439C TE 9/16MORB 9/16MJIC 9/16MJIC
    This is the symmetrical MJIC/MORB tee.

29. Screw the center ORB ports of these tees [20] into Ports 1 and 3 of the valve [17]. Orient the end JIC ports to point Front and Back, and tighten the ORB jam nut to ORB torque specification.

30. Select two new:
    [19] 811-193C TE 9/16FJIC 9/16MJIC 9/16MJIC
    Screw the center FJIC ports of these tees [19] onto the Front-facing ports of the just installed tees [20]. Orient the MJIC ports of tees [19] to point Left and Right, and torque to JIC specification. Set valve aside until step 37.

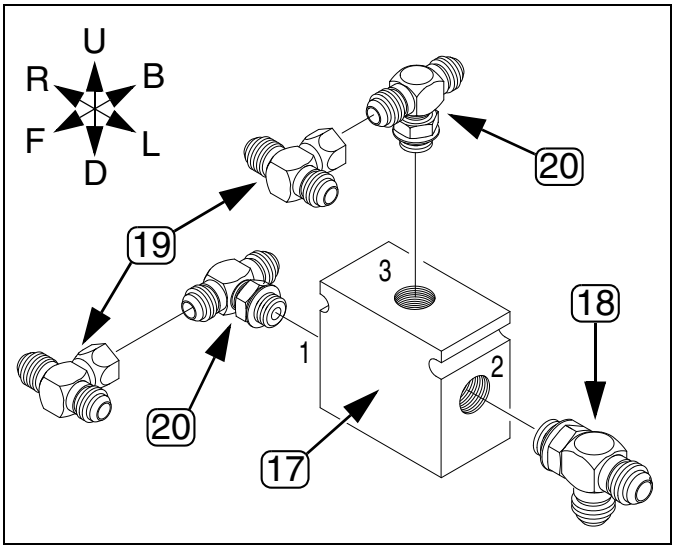


Figure 5
Assemble 3S Shuttle Valve

18742

3S Shuttle Bulkhead Disassembly

Refer to Figure 6

31. Mark the hose [58] connected to the center port of the top tee “Lower”.

32. Mark the hose [59] connected to the center port of the bottom tee “Raise”.

33. At their FJIC fittings, disconnect all six hoses ([58], [59], ④) at the two bulkhead tees:
    [60] 811-312C TE 9/16MJIC

Note: It is not necessary to identify the forward four hoses ④. They are identified by length and source when reconnected.

34. Remove the two tees [60]. They are not re-used.

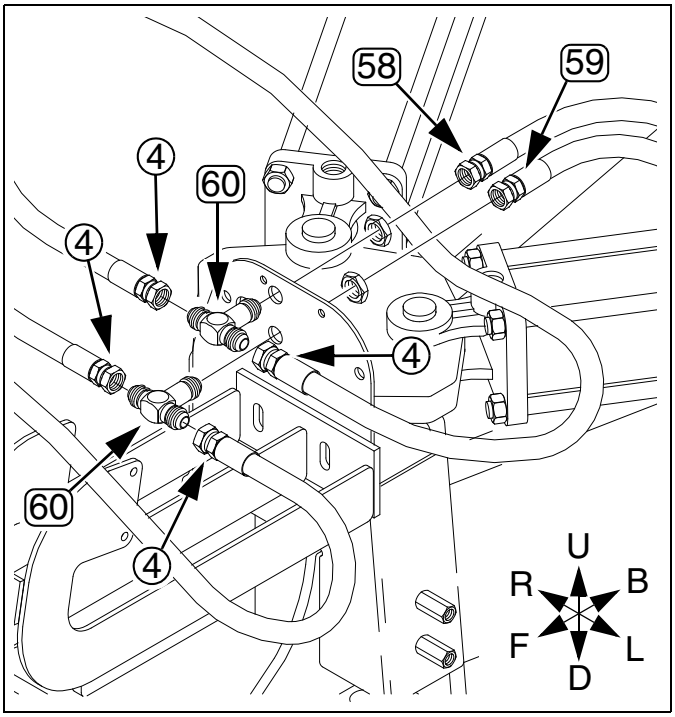


Figure 6
Remove Old 3S Bulkhead Tees

18743

3S Shuttle Valve Installation

Refer to Figure 7

35. Select two sets of:
    ⑫ 802-551C HHCS 1/4-20X2 1/4 GR5
    ⑮ 804-075C WASHER FLAT 1/4 USS PLT
    ⑭ 804-006C WASHER LOCK SPRING 1/4 PLT
    ⑬ 803-006C NUT HEX 1/4-20 PLT
36. Place a flat washer ⑮ on each bolt ⑫, and insert the bolts through the top holes of the bulkhead ④. Place a lock washer ⑭ and nut ⑬ on the end of the the threads. Spin the nut on just a few turns.
37. Select the shuttle valve ⑰ assembled at step 25. With Port 1 to drill Right, place the valve against the bulkhead ④ between the bolts ⑫ and under the washers ⑮. Tighten the nuts ⑬ to torque specifications.

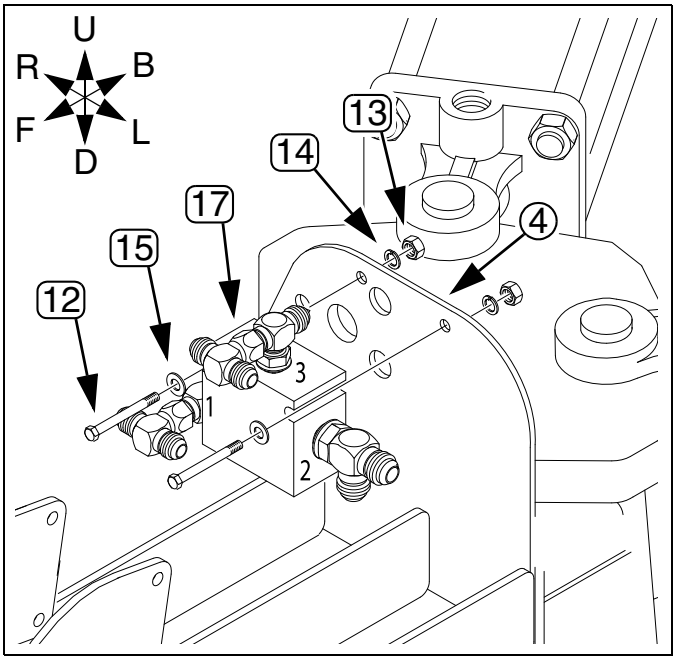


Figure 7 18749
Install 3S Shuttle Valve

3S Shuttle Valve Hoses

Step 38 through step 42 re-connect the hoses disconnected at step 31.

Refer to Figure 8 on page 7

38. Identify the two existing 20in or 21in hoses ㊼ connected to the top Ports P of the pressure control valves.

    Re-connect the other end of these hoses to the left and right ports of the top swivel tee ⑤ at the shuttle valve ⑰ Port 3.
39. Identify the two existing 18in hoses ㊷ connected to the bottom Port T tee of the pressure control valves.

    Re-connect the other end of these hoses to the lateral ports of the right forward swivel tee ⑥ at the shuttle valve ⑰ Port 1.
40. Identify the tractor circuit hoses ㊽ and ㊾ marked at step 31.
41. Connect the “Lower” hose ㊽ to the rear port ⑦ of the top tee at the shuttle valve ⑰ Port 3.

Note: If the drill is equipped with a filter, this is the hose connected from the filter.

42. Connect the “Raise” hose ㊾ to the rear port ⑧ of the right side tee at the shuttle valve ⑰ Port 1. This port is not visible in the Figure.
43. Select two new:
    ㉑ 811-531C HH1/4R2 018 9/16FJIC9/16MORB90
44. Connect the 90 degree ORB end of these hoses to the bottom Port (3) of each check valve ⑯.
45. Route the JIC end of each hose to the JIC ports of the tee ⑱ at the left Port 2 of the shuttle valve ⑰.
46. Tighten all hose connections to torque specifications.
47. Continue at “**Closeout**” on page 21.

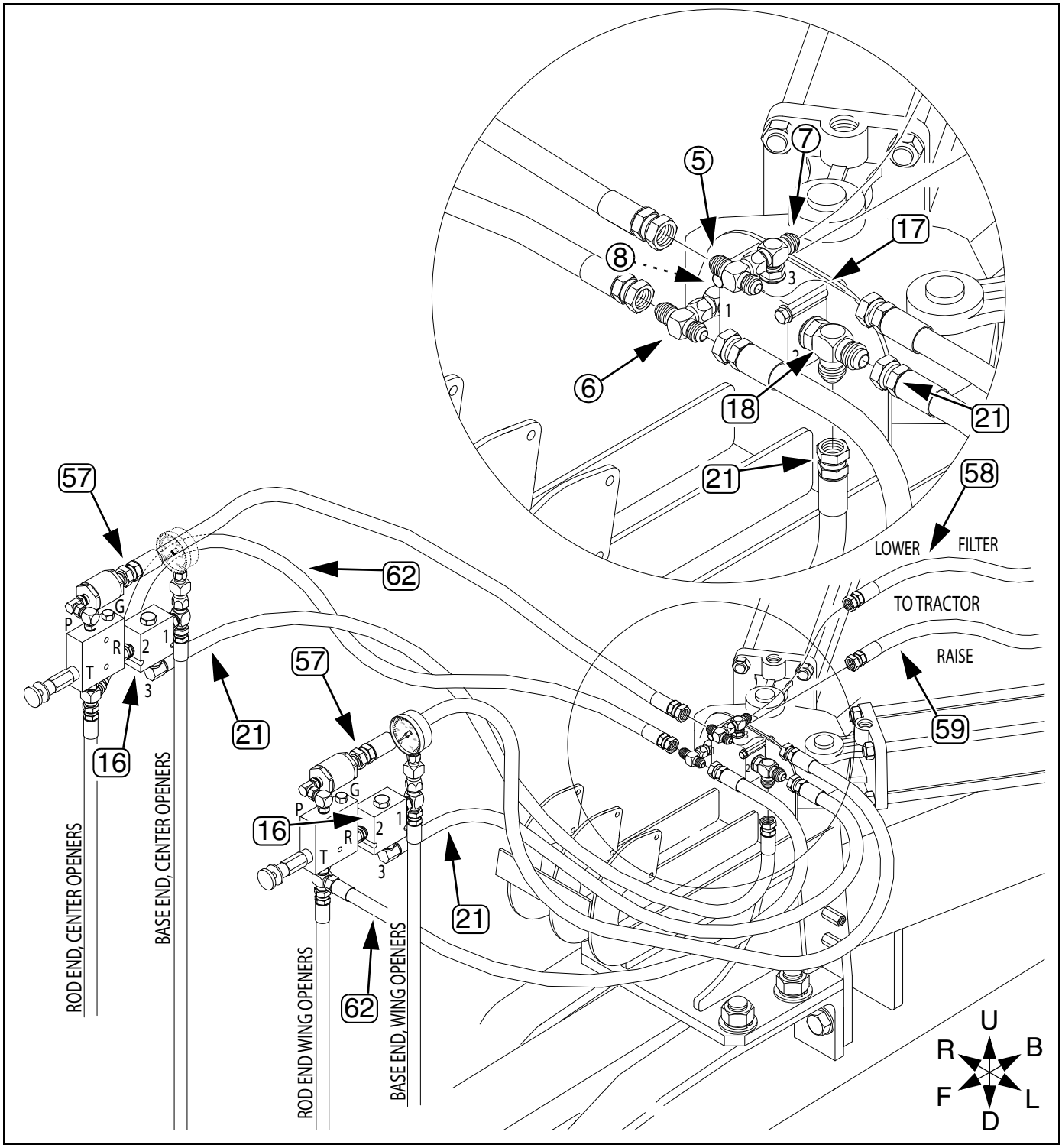


Figure 8
3S Shuttle Valve Hose Routing

3S-3000 and 3S-4000 Hydraulic Schematic

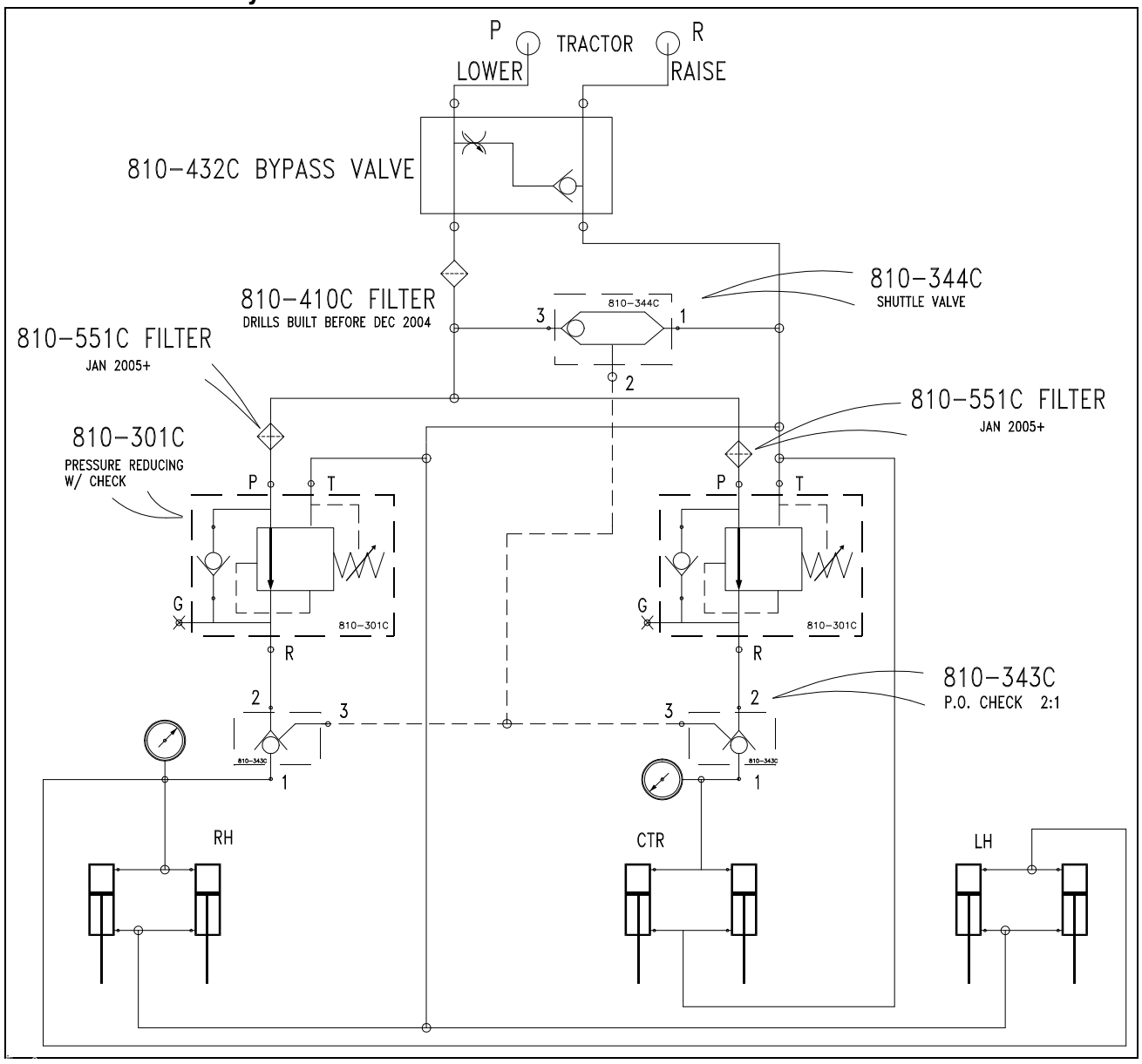


Figure 9
3S Hydraulics

3S Drill Vintages

	Drills built in December 2004 and Earlier	Drills Built in January 2005 or Later
3S-3000	s/n S1699-	s/n S1700+
3S-4000	s/n YY1310-	s/n YY1131+

2S-2600 DD1161- Installation

Step 48 through step 87 are for 2S-2600 drills serial number 1161 or lower. For 2S-2600 drills serial number DD1162 and higher, installation instructions begin on page 15. For 3S-3000 and 3S-4000 drills, installation instructions begin on page 3.

2S DD1161- Control Valve Disassembly

High pressure fluid hazard. Pressurized fluid may still be present. Escaping fluid under pressure can penetrate the skin, causing serious injury. Wear protective gloves and safety glasses or goggles when working with hydraulic systems. Crack fitting slowly. Use a piece of paper or cardboard, NOT BODY PARTS, to check for suspected leaks. If an accident occurs, seek immediate medical assistance from a physician familiar with this type of injury.

Refer to Figure 10

48. At each pressure control valve (52), remove and save:
    (51) 810-300C PRESSURE GAUGE 3000 PSI
    These gauges are re-installed at step 60.
49. At the top rear Port G of each pressure control valve (52), remove:
    (63) 811-677C AD 9/16MORB 1/4FNPT
    These two adapters are not re-used.
50. Select two new:
    (24) 811-675C PL 9/16MORB HEX HEAD
    Install these plugs in the top rear valve holes previously occupied by the gauge adapter. Tighten to 9/16ORB specification (see page 21). Do not use pipe thread sealant on these, or any ORB fittings.
51. At the rear lower Port R of each valve (52), disconnect the hose to the cylinder base ends:
    (61) 811-696C HH3/8R1 092 9/16FJIC
    These hoses are re-connected to new fittings at step 59. Note which hose is which (by where it is routed to), so that it can be reconnected to the correct (same) valve assembly after the new valves and fittings are installed.
52. Remove two:
    (56) 811-170C AD 9/16MORB 9/16MJIC
    These adapters are not re-used.

No 2S-2600HD models are DD1161-. DD1161- drills have a pilot operated check valve ((53) in the Affected Parts list on page 23), under the Center valve, for opener lock up. 2S-2600HD and DD1162+ drills have a counterbalance valve (Affected Part (54)).

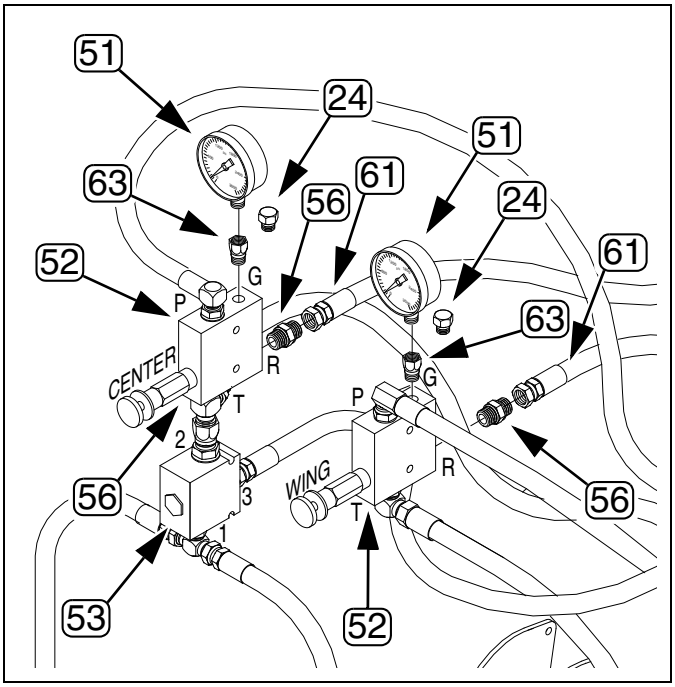


Figure 10 18760
Disassemble 2S DD1161- Valves

2S DD1161- Check Valve Installation

Refer to Figure 11

53. Select two new:
    (23) 811-636C AD 9/16MORB STRAIGHT UNION
    Make sure the jam nut is fully threaded onto the adapter.
54. At the lower rear valve Port R of each pressure control valve (52), screw in the union (23) end with the integral hex nut (NOT the end with the jam nut). Tighten to 9/16ORB specification.
55. Select two new:
    (16) 810-343C VALVE PO CHECK 2:1 W/9/16FORB

Note: These valves are stamped `85050146`, and if shaken gently, do not rattle.
(The third valve, assembled at step 62, is a shuttle valve, and does rattle.)

56. Screw Port 2 of each check valve (16) onto the other end of the adapter (23) installed at step 54. Turn until finger tight, then back off until the side of the valve with the hex head cartridge is Up and Port 3 is down. Tighten the jam nut to 9/16ORB specification.
57. Select two new:
    (20) 811-439C TE 9/16MORB 9/16MJIC 9/16MJIC
    This is the symmetrical MJIC/MORB tee. There are four of these in the kit.
58. Screw the MORB port of the tee (20) into the rear Port 1 of each check valve (16). Screw until finger tight, then back off until the JIC ports are vertical. Tighten the ORB jam nut to 9/16ORB specification.
59. Locate the disconnected hoses:
    (61) 811-696C HH3/8R1 092 9/16FJIC
    At the lower port of each new tee (20), reconnect the hose (61) to the cylinder base ends that was disconnected at step 51. Do not use pipe thread sealant on these or any JIC fittings. Tighten to 9/16JIC specification (see page 21).
60. Select two new NPT swivel adapters:
    (22) 811-582C AD 9/16FJIC 1/4FNPT
    and the saved gauges:
    (51) 810-300C PRESSURE GAUGE 3000 PSI
    Apply liquid pipe thread sealant to the gauge MNPT threads and screw the adapter (22) onto the gauge. Tighten to 1/4NPT torque specification (see page 21).
61. At each valve, screw the JIC end of the gauge assembly (22) onto the top port of the new tee (20). Orient the gauge to face forward, and tighten the JIC connection to JIC torque specification.

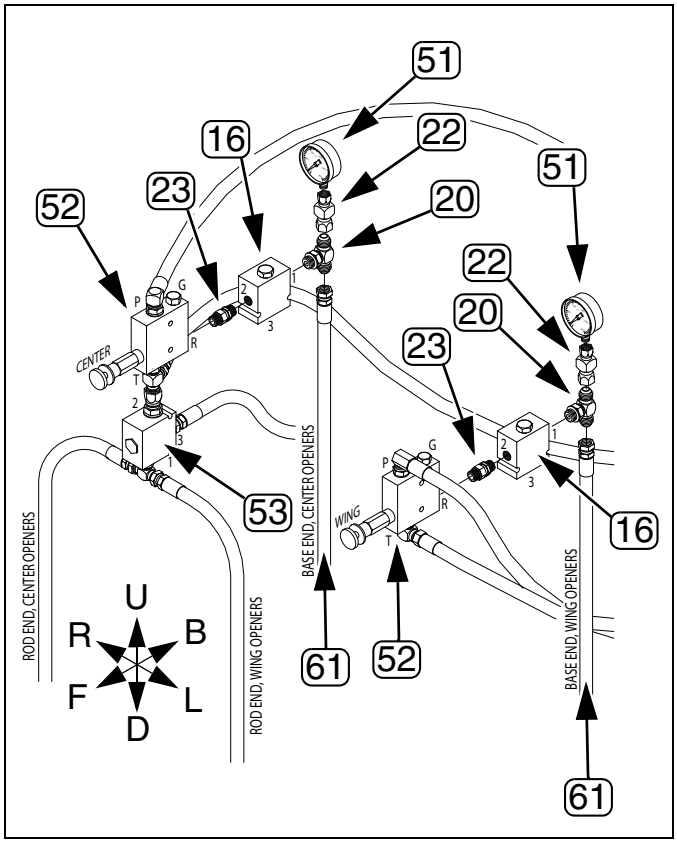


Figure 11 18761
Install 2S DD1161- Check Valves

2S DD1161- Shuttle Valve Assembly

Refer to Figure 12

62. Select one new:
    (17) 810-344C VALVE SHUTTLE 9/16FORB PORTS

Note: This valve is stamped 85005468, and the internal shuttle rattles if the valve shaken gently. When mounted on the drill, Port 1 will be to drill Right.

63. Select one new:
    (18) 811-064C TE 9/16MJIC 9/16MJIC 9/16MORB
    This is the asymmetrical MJIC/MORB tee. There is only one of these in the kit.

64. Screw the ORB end of the tee (18) into Port 2 of the valve (17). Orient the center JIC port of the tee down, and tighten the ORB jam nut to ORB torque specification.

65. Select two new:
    (20) 811-439C TE 9/16MORB 9/16MJIC 9/16MJIC
    This is the symmetrical MJIC/MORB tee.

66. Screw the center ORB ports of these tees (20) into Ports 1 and 3 of the valve (17). Orient the end JIC ports to point Front and Back, and tighten the ORB jam nut to ORB torque specification.

67. Select two new:
    (19) 811-193C TE 9/16FJIC 9/16MJIC 9/16MJIC
    Screw the center FJIC ports of these tees (19) onto the Front-facing ports of the just installed tees (20). Orient the MJIC ports of tees (19) to point Left and Right, and torque to JIC specification. Set valve aside until step 73.

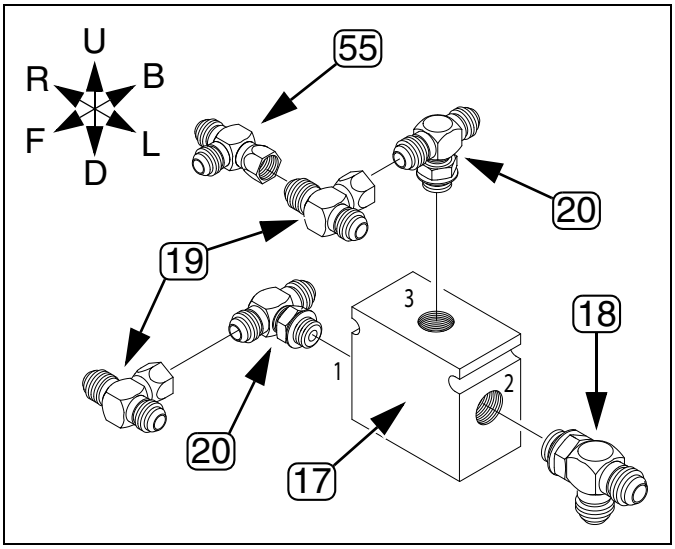


Figure 12 Assemble
2S DD1161- Shuttle Valve
18777

2S DD1161- Bulkhead Disassembly

Refer to Figure 13

68. Mark the hose (58) connected to the center port of the top tee “Lower”.

69. Mark the hose (59) connected to the center port of the bottom tee “Raise”.

70. At their FJIC fittings, disconnect all seven hoses ((58), (59), (5)) at the two bulkhead tees:
    (60) 811-312C TE 9/16MJIC

Note: It is not necessary to identify the forward five hoses (5). They are identified by length and source when reconnected.

71. Remove the tee with one Female port:
    (55) 811-061C TE 9/16MJIC 9/16MJIC 9/16FJIC

72. Remove the two all-Male tees (60). They are not re-used.

Refer to Figure 12

73. Attach this tee (55) to the right end of the top forward Port 3 tee on the shuttle valve (17).

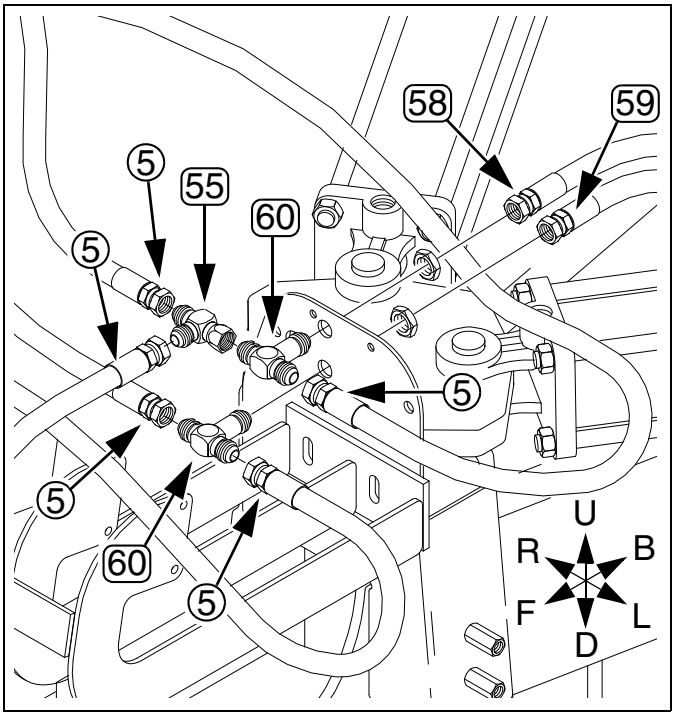


Figure 13 Remove Old
2S DD1161- Bulkhead Tees
18776

2S DD1161- Shuttle Valve Installation

Refer to Figure 14

74. Select two sets of:
    (12) 802-551C HHCS 1/4-20X2 1/4 GR5
    (15) 804-075C WASHER FLAT 1/4 USS PLT
    (14) 804-006C WASHER LOCK SPRING 1/4 PLT
    (13) 803-006C NUT HEX 1/4-20 PLT
75. Place a flat washer (15) on each bolt (12), and insert the bolts through the top holes of the bulkhead ④. Place a lock washer (14) and nut (13) on the end of the the threads. Spin the nut on just a few turns.
76. Select the shuttle valve (17) assembled at step 62. With Port 1 to drill Right, place the valve against the bulkhead ④ between the bolts (12) and under the washers (15). Tighten the nuts (13) to torque specifications.

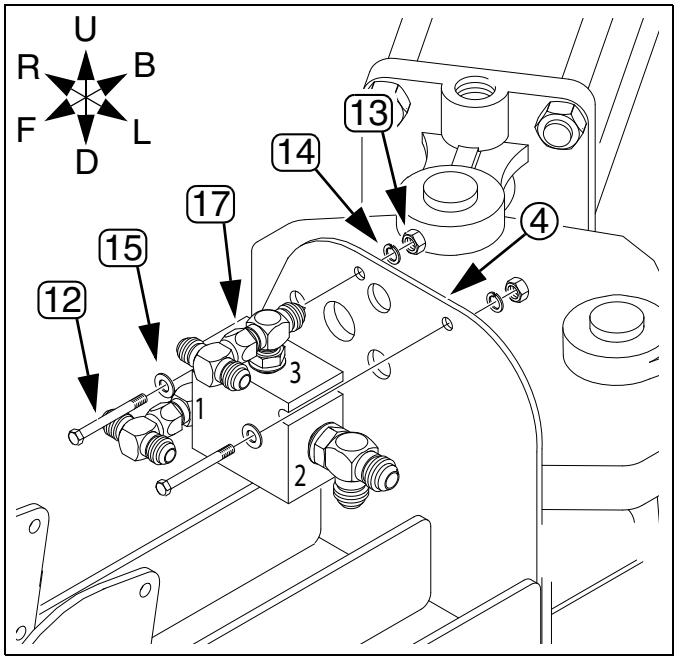


Figure 14 18774
Install 2S DD1161- Shuttle Valve

2S DD1161- Shuttle Valve Hoses

Step 77 through step 82 re-connect the hoses disconnected at step 70.

Refer to Figure 15 on page 13

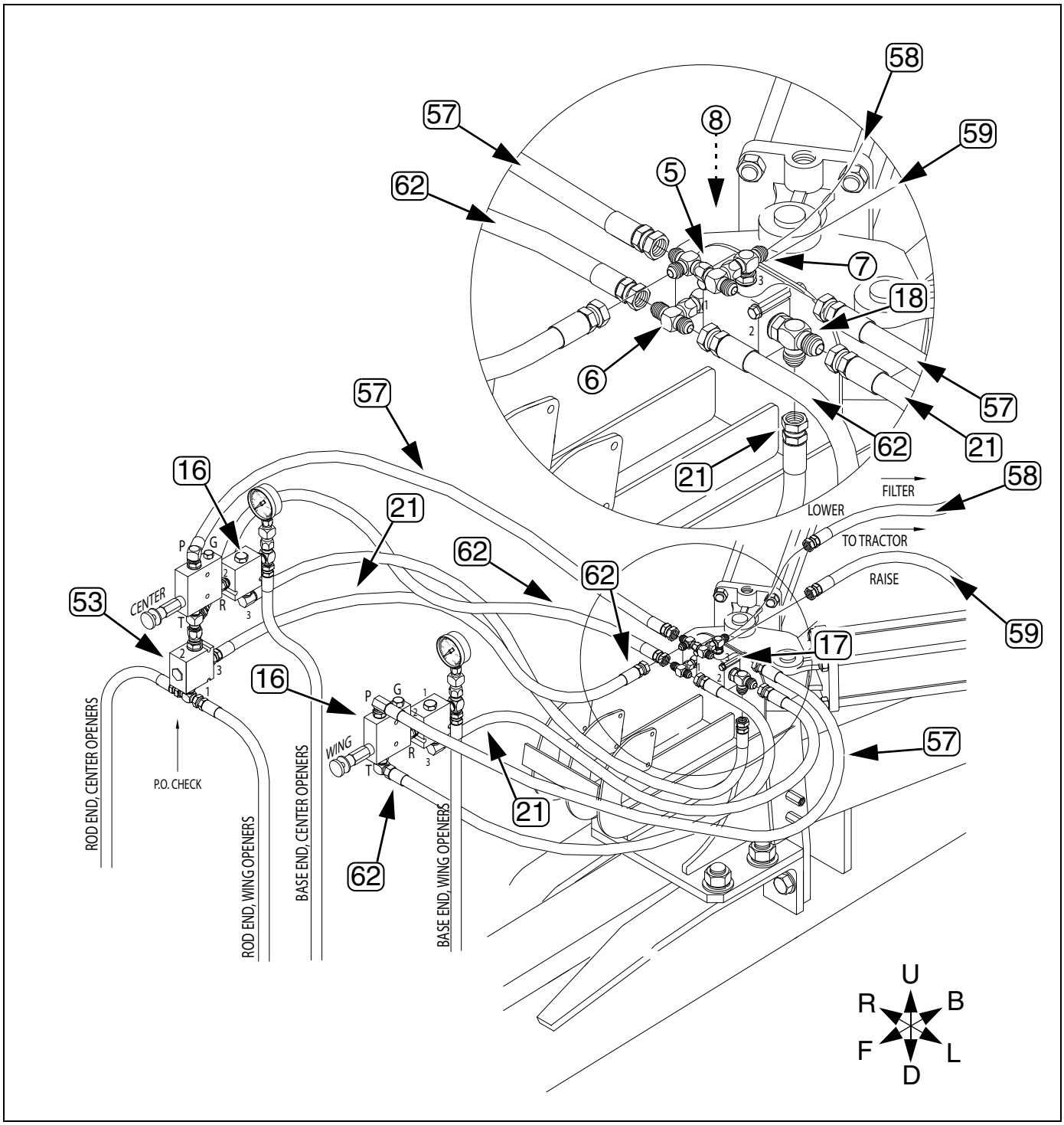
77. Identify the two existing 20in or 21in hoses (57) connected to the top Ports P of the pressure control valves.

    Re-connect the other end of these hoses to the left and right ports of the top tee assembly ⑤ at the shuttle valve (17) Port 3.
78. Identify the 18in hose (62) connected to the rear Port 3 of the previously existing P.O.Check valve (53). Connect the free end of this hose to the forward facing port of the top tee assembly ⑤ at the shuttle valve (17) Port 3.
79. Identify the two existing 18in hoses (62) connected to the bottom Port T of each pressure control valves.

    Re-connect the free end of these hoses to the lateral ports of the right forward swivel tee ⑥ at the shuttle valve (17) Port 1.
80. Identify the tractor circuit hoses (58) and (59) marked at step 68.
81. Connect the “Lower” hose (58) to the rear port ⑦ of the top tee at the shuttle valve (17) Port 3.

Note: If the drill is equipped with a filter, this is the hose connected from the filter.

82. Connect the “Raise” hose (59) to the rear port ⑧ of the right side tee at the shuttle valve (17) Port 1. This port is not visible in the Figure.
83. Select two new:
    (21) 811-531C HH1/4R2 018 9/16FJIC9/16MORB90
84. Connect the 90 degree ORB end of these hoses to the bottom Port 3 of each check valve (16).
85. Route the JIC end of each hose to the JIC ports of the tee (18) at the left Port 2 of the shuttle valve (17).
86. Tighten all hose connections to torque specifications.
87. Skip to “**Closeout**” on page 21.



18762

Figure 15
2S DD1161- Shuttle Valve Hose Routing

2S-2600 DD1161- Hydraulic Schematic

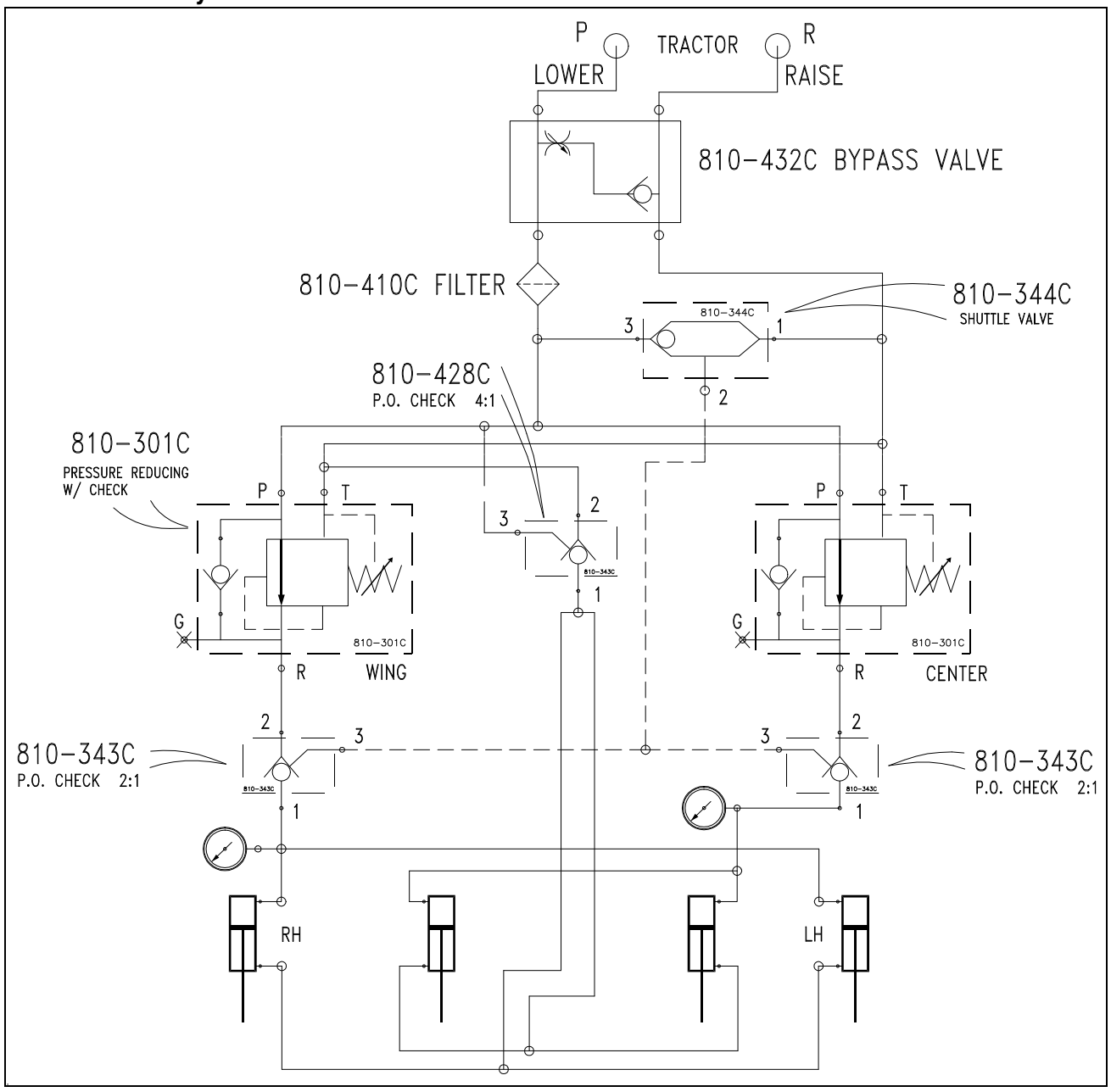


Figure 16
2S DD1161- Hydraulics

2S-2600 HD & DD1162+ Installation

Step 88 through step 131 are for 2S-2600 drills serial number 1162 or higher. For 2S-2600 drills serial number DD1161 and lower, installation instructions begin on page 9. For 3S-3000 and 3S-4000 drills, installation instructions begin on page 3.

2S DD1162+ Control Valve Disassembly

High pressure fluid hazard. Pressurized fluid may still be present. Escaping fluid under pressure can penetrate the skin, causing serious injury. Wear protective gloves and safety glasses or goggles when working with hydraulic systems. Crack fitting slowly. Use a piece of paper or cardboard, NOT BODY PARTS, to check for suspected leaks. If an accident occurs, seek immediate medical assistance from a physician familiar with this type of injury.

Refer to Figure 17

88. At each pressure control valve (52), remove and save:
    (51) 810-300C PRESSURE GAUGE 3000 PSI
    These gauges are re-installed at step 106.
89. At the top rear Port G of each pressure control valve (52), remove:
    (63) 811-677C AD 9/16MORB 1/4FNPT
    These two adapters are not re-used.
90. Select two new:
    (24) 811-675C PL 9/16MORB HEX HEAD
    Install these plugs in the top rear valve holes previously occupied by the gauge adapter. Tighten to 9/16ORB specification (see page 21). Do not use pipe thread sealant on these, or any ORB fittings.
91. At the rear lower Port R of each valve (52), disconnect the hose to the cylinder base ends:
    (61) 811-696C HH3/8R1 092 9/16FJIC
    These hoses are re-connected to new fittings at step 104. Note which hose is which (by where it is routed to), so that it can be reconnected to the correct (same) valve assembly after the new valves and fittings are installed.
92. At the tee:
    (55) 811-061C TE 9/16MJIC 9/16MJIC 9/16FJIC
    Identify the hose:
    (62) 811-631C HH3/8R1 018 9/16FJIC
    from Port 3 of counterbalance valve (54). Disconnect the hose at tee (60). Remove and save the tee. It is re-installed at step 102.
93. Remove two:
    (56) 811-170C AD 9/16MORB 9/16MJIC
    These adapters are not re-used.

DD1162+ drills (which includes all 2S-2600HD models) have a counterbalance valve ((54) in the Affected Parts list on page 23), under the Center valve, for opener lock up. DD1161- drills have a counterbalance valve (Affected Part (53)).

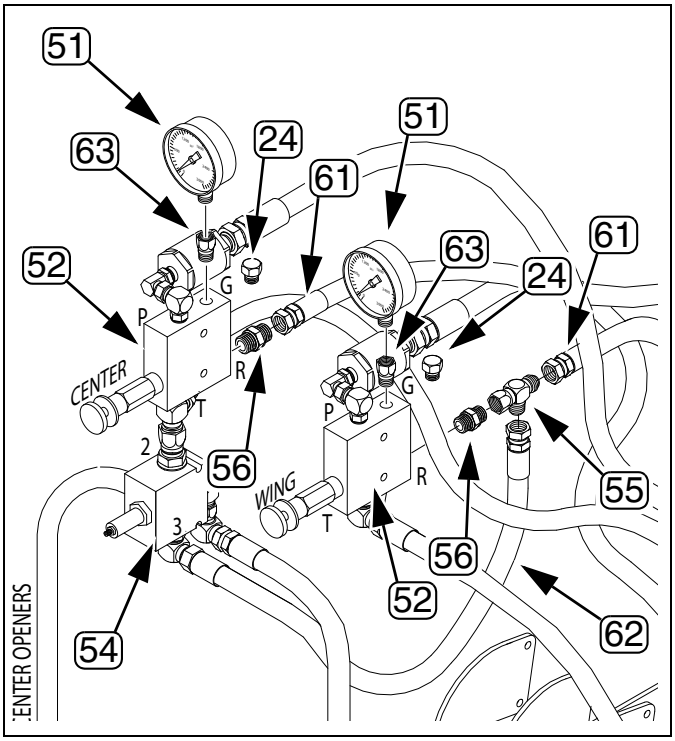


Figure 17 22687
Disassemble 2S DD1162+ Valves

2S DD1162+ Check Valve Installation

Refer to Figure 18

94. Select one new:
    23 811-636C AD 9/16MORB STRAIGHT UNION
    Make sure the jam nut is fully threaded onto the adapter.
95. At the lower rear valve Port R of pressure control valve 52 that connects to WING, screw in the union 23 end with the integral hex nut (NOT the end with the jam nut). Tighten to 9/16ORB specification.
96. Select one new of each:
    811-627C AD 9/16MORB 9/16FJIC
    811-064C TE 9/16MJIC 9/16MJIC 9/16MORB
97. Connect tee 18 to adjoining fitting 25. At the lower rear valve Port R of pressure control valve 52 that connects to CENTER, screw in the tee 18 9/16MORB end with the integral hex nut (NOT the end with the jam nut). Tighten to 9/16ORB specification.
98. Select two new:
    16 810-343C VALVE PO CHECK 2:1 W/9/16FORB

Note: These valves are stamped `85050146`, and if shaken gently, do not rattle.
(The third valve, assembled at step 108, is a shuttle valve, and does rattle.)

99. Screw Port 2 of each check valve 16 onto the other end of the adapter 23 installed at step 95. Turn until finger tight, then back off until the side of the valve with the hex head cartridge is Up and Port 3 is down. Tighten the jam nut to 9/16ORB specification.
100. Select two new:
    20 811-439C TE 9/16MORB 9/16MJIC 9/16MJIC
    This is the symmetrical MJIC/MORB tee. There are four of these in the kit.
101. Screw the MORB port of the tee 20 into the rear Port 1 of each check valve 16. Screw until finger tight, then back off until the JIC ports are vertical. Tighten the ORB jam nut to 9/16ORB specification.
102. Select the tee saved at step 92:
    55 811-061C TE 9/16MJIC 9/16MJIC 9/16FJIC
    Secure it to the bottom port of the tee 20 on the right (Center) pressure control valve. Orient the side port to face left. Do not use pipe thread sealant on these or any JIC fittings. Tighten to 9/16JIC specification (see page 21)
103. Locate the disconnected hose:
    62 811-631C HH3/8R1 018 9/16FJIC
    Connect the free end to the bottom port of tee 55.
104. Locate the disconnected hose:
    61 811-696C HH3/8R1 092 9/16FJIC
    from the base end of the center cylinders.
    Reconnect this hose 61 to bottom port of the tee 55 installed at step 102 on the right/Center valve.
105. Locate the disconnected hose:
    61 811-696C HH3/8R1 092 9/16FJIC
    from the base end of the wing (outer) cylinders.
    Reconnect this hose 61 to bottom port of the tee 20 installed at step 100 at the left/Wing valve.
106. Select two new NPT swivel adapters:
    22 811-582C AD 9/16FJIC 1/4FNPT
    and the saved gauges:
    51 810-300C PRESSURE GAUGE 3000 PSI
    Apply liquid pipe thread sealant to the gauge MNPT threads and screw the adapter 22 onto the gauge. Tighten to 1/4NPT torque specification (see page 21).
107. At each valve, screw the JIC end of the gauge assembly 22 onto the top port of the new tee 20. Orient the gauge to face forward, and tighten the JIC connection to JIC torque specification.

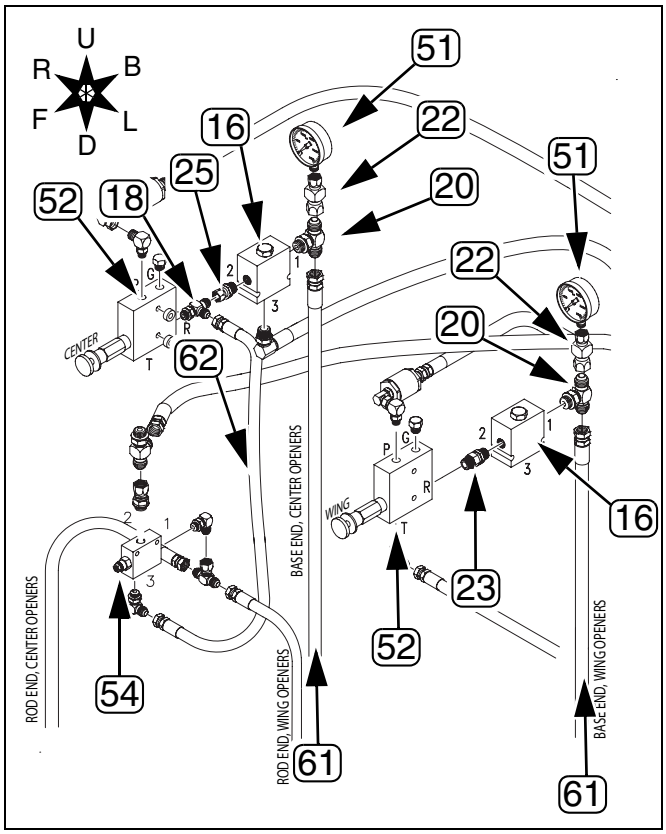


Figure 18
Install 2S DD1162+ Check Valves
38093

2S DD1162+ Shuttle Valve Assembly

Refer to Figure 19

108. Select one new:
    ⑰ 810-344C VALVE SHUTTLE 9/16FORB PORTS

Note: This valve is stamped `85005468`, and the internal shuttle rattles if the valve shaken gently. When mounted on the drill, Port 1 is to drill Right.

109. Select one new:
    ⑱ 811-064C TE 9/16MJIC 9/16MJIC 9/16MORB
    This is the asymmetrical MJIC/MORB tee. There is only one of these in the kit.

110. Screw the ORB end of the tee ⑱ into Port 2 of the valve ⑰. Orient the center JIC port of the tee down, and tighten the ORB jam nut to ORB torque specification.

111. Select two new:
    ⑳ 811-439C TE 9/16MORB 9/16MJIC 9/16MJIC
    This is the symmetrical MJIC/MORB tee.

112. Screw the center ORB ports of these tees ⑳ into Ports 1 and 3 of the valve ⑰. Orient the end JIC ports to point Front and Back, and tighten the ORB jam nut to ORB torque specification.

113. Select two new:
    ⑲ 811-193C TE 9/16FJIC 9/16MJIC 9/16MJIC
    Screw the center FJIC ports of these tees ⑲ onto the Front-facing ports of the just installed tees ⑳. Orient the MJIC ports of tees ⑲ to point Left and Right, and torque to JIC specification. Set valve aside until step 117.

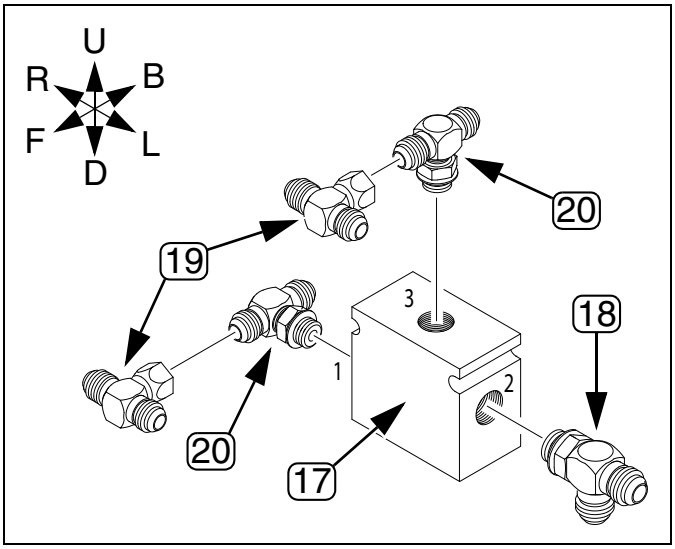


Figure 19 Assemble
2S DD1162+ Shuttle Valve

22692

2S DD1162+ Bulkhead Disassembly

Refer to Figure 20

114. Mark the hose ㊽ connected to the center port of the top tee “Lower”.

115. Mark the hose ㊾ connected to the center port of the bottom tee “Raise”.

116. At their FJIC fittings, disconnect all seven hoses (㊽, ㊾, ④) at the two bulkhead tees:
    ㊿ 811-312C TE 9/16MJIC

Note: It is not necessary to identify the forward four hoses ④. They are identified by length and source when reconnected.

Refer to Figure 12

117. Attach this tee ㊺ to the right end of the top forward Port 3 tee on the shuttle valve ⑰.

118. Remove the two all-Male tees ㊿. They are not re-used.

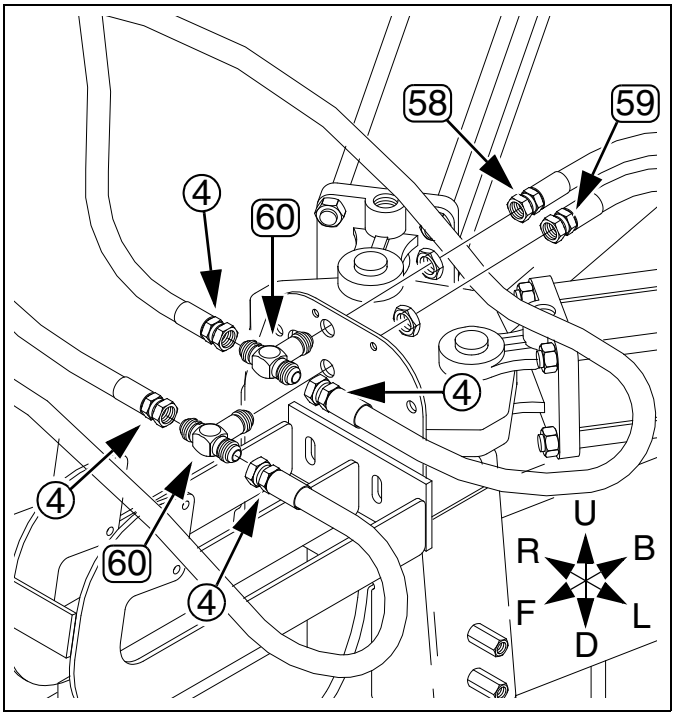


Figure 20 Remove Old
2S DD1162+ Bulkhead Tees

22689

2S DD1162+ Shuttle Valve Installation

Refer to Figure 21

119. Select two sets of:
    (12) 802-551C HHCS 1/4-20X2 1/4 GR5
    (15) 804-075C WASHER FLAT 1/4 USS PLT
    (14) 804-006C WASHER LOCK SPRING 1/4 PLT
    (13) 803-006C NUT HEX 1/4-20 PLT
120. Place a flat washer (15) on each bolt (12), and insert the bolts through the top holes of the bulkhead ⓧ. Place a lock washer (14) and nut (13) on the end of the the threads. Spin the nut on just a few turns.
121. Select the shuttle valve (17) assembled at step 62. With Port 1 to drill Right, place the valve against the bulkhead ④ between the bolts (12) and under the washers (15). Tighten the nuts (13) to torque specifications.

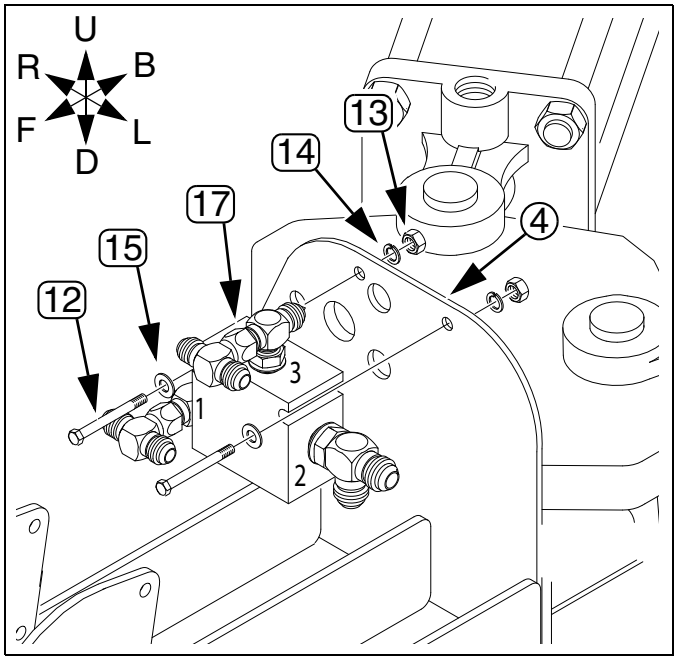


Figure 21 18774
Install 2S DD1162+ Shuttle Valve

2S DD1162+ Shuttle Valve Hoses

Step 77 through step 82 re-connect the hoses disconnected at step 70.

Refer to Figure 22 on page 19

122. Identify the two existing 20in or 21in hoses (57) connected to the top Ports P of the pressure control valves.

    Re-connect the other end of these hoses to the left and right ports of the top tee assembly ⑤ at the shuttle valve (17) Port 3.

123. Identify the two existing 18in hoses (62) connected to the bottom Port T of each pressure control valve.

    Re-connect the free end of these hoses to the lateral ports of the right forward swivel tee ⑥ at the shuttle valve (17) Port 1.

124. Identify the tractor circuit hoses (58) and (59) marked at step 68.
125. Connect the “Lower” hose (58) to the rear port ⑦ of the top tee at the shuttle valve (17) Port 3.

Note: If the drill is equipped with a filter, this is the hose connected from the filter.

126. Connect the “Raise” hose (59) to the rear port ⑧ of the right side tee at the shuttle valve (17) Port 1. This port is not visible in the Figure.
127. Select two new:
    (21) 811-531C HH1/4R2 018 9/16FJIC9/16MORB90
128. Connect the 90 degree ORB end of these hoses to the bottom Port 3 of each check valve (16).
129. Route the JIC end of each hose to the JIC ports of the tee (18) at the left Port 2 of the shuttle valve (17).
130. Tighten all hose connections to torque specifications.
131. Skip to “**Closeout**” on page 21.

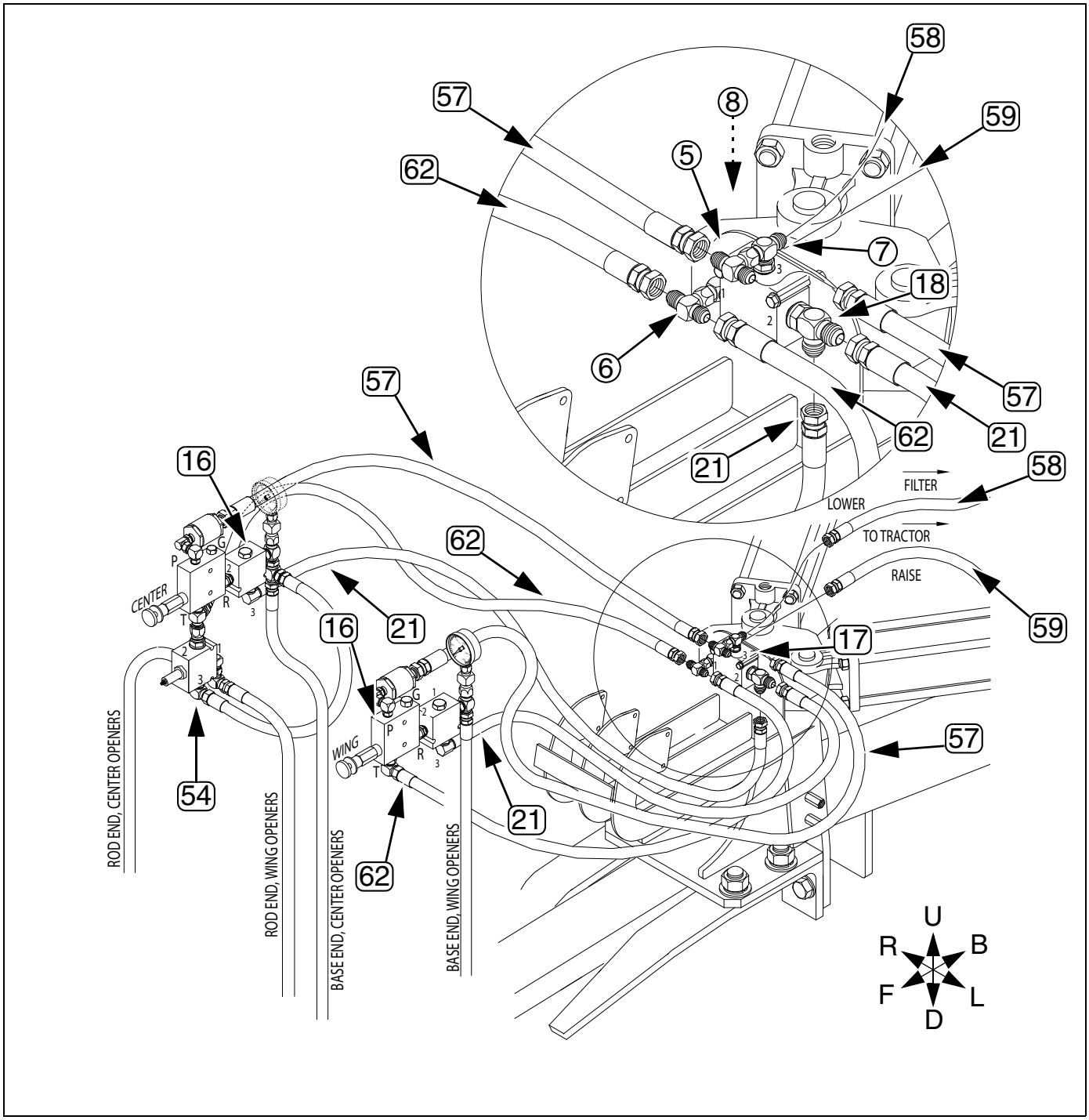


Figure 22
2S DD1162+ Shuttle Valve Hose Routing

22690

2S-2600 DD1162+ Hydraulic Schematic

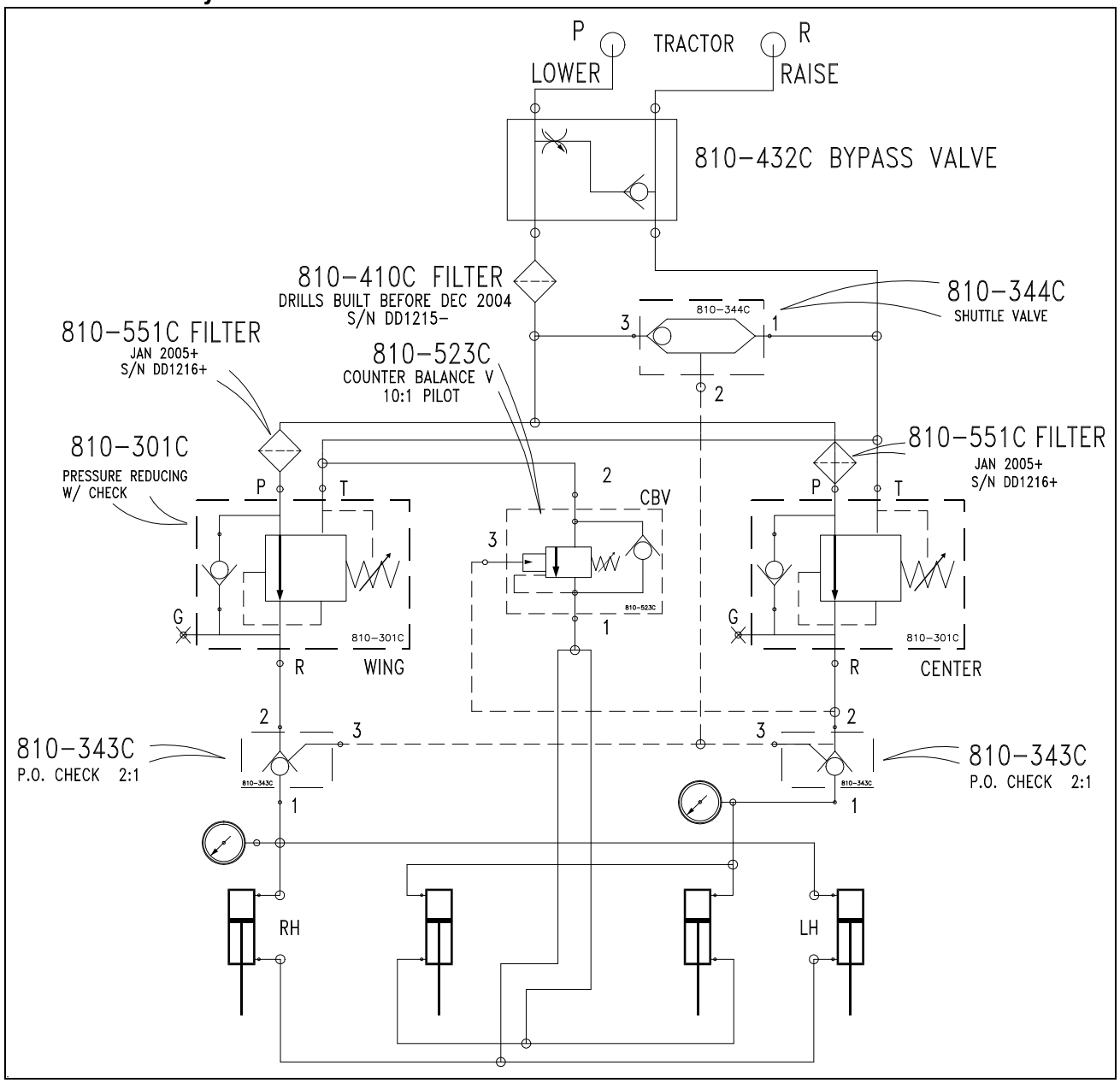


Figure 23
2S DD1162+ Hydraulics

Closeout

132. Connect the drill to the tractor or other hydraulic power source.
133. Perform the Opener Lift Bleeding steps from your updated drill Operator manual.
134. Clean any excess hydraulic fluid from all new connections.
135. Remove lift locks and cycle the lift system several times. Use a sheet of cardboard to check for leaks at all new connections.

Setup

136. Initial setup for the opener down-pressure system is found in the updated Operator manual. Check the Setup, Operations and Adjustments sections. The topic may be titled "**Open Center**" or "**Non-Active Hydraulic**" systems.
137. Review Operations information prior to first use of the updated drill.
138. Raise and fold the drill. Install any lift and transport locks.

Appendix

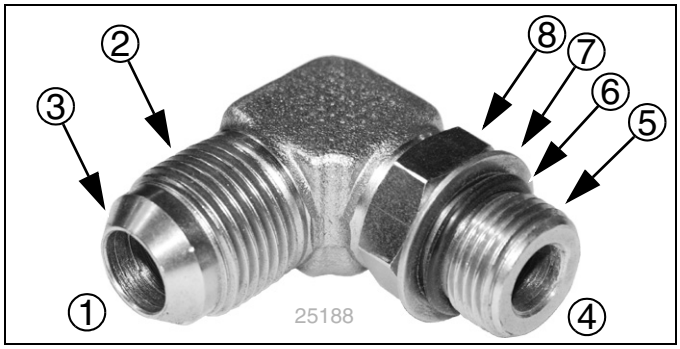
Torque Values

Fastener/Fitting	Ft-Lbs	N-m
1/4 NPT	1.5-3.0 turns past finger tight	
1/4-20 GR5	8	11
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

Current Manuals

Drill Model	Operator	Parts
2S-2600 DD1161-	195-200M-A	195-200P
2S-2600 DD1162+	195-200M-A	195-200P
2S-2600HD	195-069M	195-069P
3S-3000	195-110M-A	195-110P
3S-3000HD	195-068M	195-068P
3S-4000	195-242M-A	195-242P
3S-4000HD	195-067M	195-067P

Connector Identification



① **JIC** - Joint Industry Conference (SAE J514)
Note straight 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.

New Parts

This manual covers the installation of two different hold-down kits. Parts are listed for each kit separately. Quantities are units (“ea”).

The part call-out numbers in this list match all Figures in these installation instructions. Part descriptions match those in your updated Parts Manual.

Kit Contents

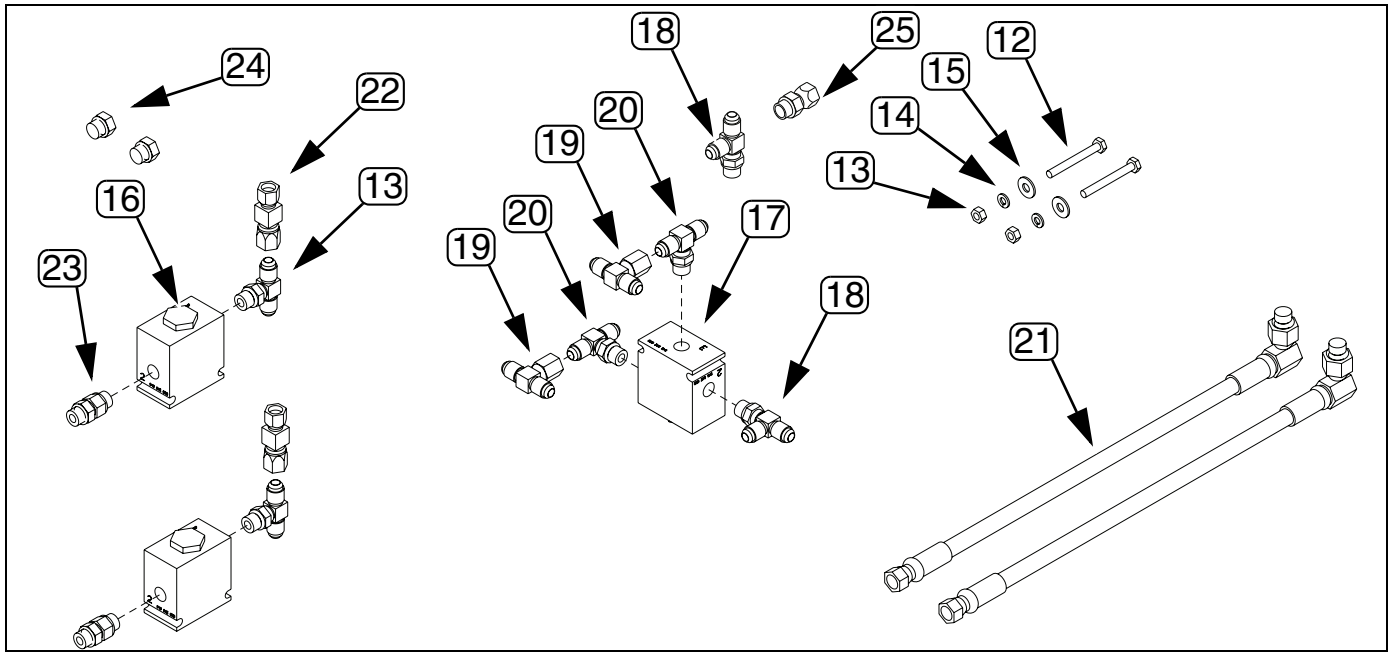


Figure 24
Kit Parts ID

27496

Callout	Kit Qty	Part Number	Part Description
11	1	194-149M	3S-3000 OPEN-CTR HYD ASSY MAN
12	2	802-551C	HHCS 1/4-20X2 1/4 GR5
13	2	803-006C	NUT HEX 1/4-20 PLT
14	2	804-006C	WASHER LOCK SPRING 1/4 PLT
15	2	804-075C	WASHER FLAT 1/4 USS PLT
16	2	810-343C	VALVE PO CHECK 2:1 W/9/16FORB
17	1	810-344C	VALVE SHUTTLE 9/16FORB PORTS
18	2	811-064C	TE 9/16MJIC 9/16MJIC 9/16MORB
19	2	811-193C	TE 9/16FJIC 9/16MJIC 9/16MJIC
20	4[a]	811-439C	TE 9/16MORB 9/16MJIC 9/16MJIC
21	2	811-531C	HH1/4R2 018 9/16FJIC9/16MORB90
22	2	811-582C	AD 9/16FJIC 1/4FNPT
23	2	811-636C	AD 9/16MORB STRAIGHT UNION
24	2	811-675C	PL 9/16MORB HEX HEAD
25	1	811-627C	AD 9/16MORB 9/16FJIC

a. 1 of the 4 tees is provided for 2S drills and is not required for 3S installation.

Existing Parts Affected

The following existing parts are involved in the kit installation.

The Disposition column indicates whether the part is left in place, moved or not re-used.

Callout	Part No.	Part Description	Part Disposition
51	810-300C	PRESSURE GAUGE 3000 PSI	Removed and re-installed
52	810-301C	VALVE PRESS REDUCING W/CHECK	Modified in place.
53	810-428C	VALVE PO CHECK 4:1 W/9/16FORB	Left in place.
54	810-757C	VALVE COUNTER BAL 10:1 9/16FOB	Left in place.
55	811-061C	TE 9/16MJIC 9/16MJIC 9/16FJIC	Removed and re-installed.
56	811-170C	AD 9/16MORB 9/16MJIC	Removed. Not re-used.
57	811-286C 811-632C	HH3/8R2 020 3/4FJIC 9/16FJIC HH3/8R1 021 9/16FJIC9/16MORB90	One end reconnected at new fitting.
58	-	“Lower” hose (part varies with drill vintage)	One end reconnected at new fitting.
59	-	“Raise” hose (part varies with drill vintage)	One end reconnected at new fitting.
60	811-312C	TE 9/16MJIC	Removed. Not re-used.
61	811-696C	HH3/8R1 092 9/16FJIC	One end reconnected at new fitting.
62	811-631C	HH3/8R1 018 9/16FJIC	One end reconnected at new fitting.
63	811-677C	AD 9/16MORB 1/4FNPT	Removed. Not re-used.
64	811-713C	HH3/8R2 147 9/16FJIC	Reconnected at new fittings.
65	811-774C	HH3/8R1 072 9/16FJIC	Reconnected at new fittings.

Abbreviations

AD	adapter
BRG	Bearing
BRKT	Bracket
CTR	Center
DD	Double Disk
DEG	Degree
FLG	Flanged
GA	Gauge
GR5	Grade 5
HEX	Hexagonal
HH	Hydraulic Hose
HHCS	Hex Head Cap Screw (Bolt)
HLD	Hold
HSG	Housing
HYD	Hydraulic
JIC	Joint Industry Conference (Female/Male)
MACH	Machine
MAN	Manual

MM	Millimeter
MTG	Mounting
NPT	National Pipe Thread (Female/Male)
NYL	Nylock
OPNR	Opener
ORB	O-Ring Boss (Female/Male)
ORB90	ORB on 90 degree elbow
PL	Plug
PLT	Plated
PO	Pilot Operated
PRESS	Pressure
RHSNB	Round Head Shank Neck Bolt
RIBB	Ribbed
SAE	Society of Automotive Engineers (standards)
TE	Tee
USS	United States Standard (heavy duty standard)
W/	With

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