# Hydraulic Kit Installation Guide

<table>
<thead>
<tr>
<th>Item</th>
<th>Component</th>
<th>Part Number</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>HOSE ASSY. 3/8&quot; X 110&quot; -8F ORFS X -8F ORFS 90 DEG</td>
<td>F451TC-JC9080806-110</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>HOSE ASSY. 3/8&quot; X 110&quot; -6F ORFS X -8F ORFS 90 DEG</td>
<td>F451TC-JC9060806-110</td>
<td>1</td>
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<tr>
<td>3.</td>
<td>HOSE ASSY. 1/4&quot; X 95&quot; -4F X -4M ORFS</td>
<td>F451TC-JCJ0040404-95</td>
<td>1</td>
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<tr>
<td>4.</td>
<td>HOSE ASSY. 1/4&quot; X 110&quot; -4F X -4F 45 DEG. ORFS</td>
<td>F451TC-JCJ040404-110</td>
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<tr>
<td>5.</td>
<td>HOSE ASSY. 3/8&quot; X95&quot; -6F X -8F ORFS</td>
<td>F451TC-JCJC060806-95</td>
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<tr>
<td>6.</td>
<td>ADAPTER -RUN TEE ORFS F-M-M -8</td>
<td>8_R6LO-S</td>
<td>4</td>
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### 500-0353-01 Kit

<table>
<thead>
<tr>
<th>Item</th>
<th>Component</th>
<th>Part Number</th>
<th>Qty</th>
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</thead>
<tbody>
<tr>
<td>7.</td>
<td>ADAPTER STRAIGHT 3/8”M NPT X -8M ORFS</td>
<td>8_FLO_S</td>
<td>1</td>
</tr>
<tr>
<td>8.</td>
<td>ADAPTER SWIVEL 3/8”M NPT -6F ORFS</td>
<td>6-6_F6L-S</td>
<td>4</td>
</tr>
<tr>
<td>9.</td>
<td>KIT CABLE TIE HOSE ID</td>
<td>200-0467-0</td>
<td>3</td>
</tr>
<tr>
<td>10.</td>
<td>ADAPTER REDUCER -6M X -8F ORFS</td>
<td>8-6_TRLON-S</td>
<td>1</td>
</tr>
<tr>
<td>11.</td>
<td>INSTRUCTIONS HOSE KIT CR-980</td>
<td>602-0476-01</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: Items 7, 8 & 10 are included in the hose kit for application on other vehicle models and are not used in this installation.

### 200-0457-02 Hydraulic Valve Kit

<table>
<thead>
<tr>
<th>Item</th>
<th>Component</th>
<th>Part Number</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Valve Assembly</td>
<td>500-0287-02</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>Harness Pressure Transducer</td>
<td>201-0404-01</td>
<td>1</td>
</tr>
<tr>
<td>3.</td>
<td>Pressure Transducer</td>
<td>500-0274-02</td>
<td>1</td>
</tr>
</tbody>
</table>
Tools

This list consists of special tools required to complete the installation. A complete set of common installation tools is assumed.

<table>
<thead>
<tr>
<th>Allen Hex Key 1/4”</th>
<th>11/16” open wrench</th>
<th>16mm open wrench</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allen Hex Key 3/16”</td>
<td>5/8” open wrench</td>
<td>17mm open wrench</td>
</tr>
<tr>
<td>Allen Key 5/32”</td>
<td>9/16” open wrench (2x)</td>
<td>18mm open wrench</td>
</tr>
<tr>
<td>Allen Hex Key 1/8”</td>
<td>1/2” open wrench</td>
<td>19mm open wrench</td>
</tr>
<tr>
<td>15/16” open wrench</td>
<td>7/16” open wrench</td>
<td>22mm open wrench</td>
</tr>
<tr>
<td>7/8” open wrench</td>
<td>1/2” 12 point ratcheting wrench</td>
<td>24mm open wrench</td>
</tr>
<tr>
<td>13/16” open wrench</td>
<td>15/16” socket wrench</td>
<td>18mm socket wrench</td>
</tr>
<tr>
<td>3/4” open wrench</td>
<td>13mm open wrench</td>
<td>22mm socket wrench</td>
</tr>
<tr>
<td>Breaker bar for 24mm socket</td>
<td>Hacksaw with steel cutting blade</td>
<td>24mm socket wrench</td>
</tr>
<tr>
<td>Torque wrench for 18/24/30mm sockets</td>
<td>Wire cutter small</td>
<td>30mm socket wrench</td>
</tr>
<tr>
<td>#1 Phillips screwdriver</td>
<td>Cleaning brush</td>
<td>5000 psi Pressure Gauge with a Short Hose and 1/8” Test Port Coupler that meets the SAE J1502 standard.</td>
</tr>
<tr>
<td>#2 Phillips screwdriver</td>
<td>Ten foot (3 meter) ladder</td>
<td>Tape measure (12ft minimum)</td>
</tr>
<tr>
<td>Cleaning rags</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Overview

These instructions provide the procedure for installing the Novariant hydraulic system for the supported vehicles listed below. There may be some variations in the vehicles depending on the vehicles options.

**Note:** Only technicians trained for hydraulic valve installations should perform the installation procedures in this guide. If the vehicle requires a hydraulic steering valve to be installed, ensure a trained technician is available for the installation.
Supported Vehicles

The following models have been confirmed to be compatible with this Hydraulic Installation Kit:

**Supported New Holland Combines**

- CR 9040, CR 9060, CR 9070, CR 9080
- CR 940, CR 960, CR 970, CR 980
- CX 8040, CX 8060, CX 8070, CX 8080, CX 8090
- CX 820, CX 840, CX 860, CX 880
- CX 720, CX 740, CX 760, CX 780

Note: This hose kit is also used for Case AFX combine installations. For installations on Case AFX combines, refer to the Case AFX installation instructions available in a separate manual. Contact your AutoSteer dealer for details.

Steering Valve Installation

This Steering Valve Installation section contains the following:

- Configure the Steering Valve
- Mount the Steering Valve
- Install the Hydraulic Hoses and Fittings

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**WARNING**

High-Pressure Fluid Hazard

Read this manual before installation. Wear hand and eye protection while performing hydraulic system maintenance. Relieve hydraulic system pressure before servicing the hydraulic system.
Configure the Steering Valve

1. Before installing valve, ensure the valve has the factory default configuration.
2. Use a 3/16” Allen key to remove the four cover screws.

**Note:** The ports in the second illustration are upside-down relative to the ports in the first illustration.

Use this illustration and the following table to identify the Steering Valve assembly hydraulic connection function.

**Note:** The ports shown here are upside-down relative to the illustration above.

<table>
<thead>
<tr>
<th>Hose Adapter</th>
<th>Fitting Type/Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRESS = PUMP PRESSURE</td>
<td>-8 ORFS</td>
</tr>
<tr>
<td>TANK = TANK / RETURN</td>
<td>-6 ORFS</td>
</tr>
<tr>
<td>LS ORBITROL = LS FROM ORBITROL</td>
<td>-4 ORFS</td>
</tr>
<tr>
<td>LS OUT = LS (to Priority Valve)</td>
<td>-4 ORFS</td>
</tr>
<tr>
<td>LEFT = LEFT STEERING CYLINDER</td>
<td>-6 ORFS</td>
</tr>
<tr>
<td>RIGHT = RIGHT STEERING CYLINDER</td>
<td>-6 ORFS</td>
</tr>
<tr>
<td>GP = DIAGNOSTICS PORT</td>
<td>1/8” (SAEJ1502)</td>
</tr>
<tr>
<td>TRANS = PRESSURE TRANSDUCER</td>
<td>-4 SAE ORB.</td>
</tr>
</tbody>
</table>
Configure the Steering Valve

For this installation, the Steering Valve can be installed and connected to the Orbitrol with the factory default plug and orifice settings. This illustration shows the correct internal plug configurations in positions 13A, 13B, and 13C. The plug position identification is stamped on the valve block.

Note: Plug 13C is only found on valves manufactured before November 2013. On newer valves that do not have plug 13C, ignore all references to 13C.

Note: Contact customer service before attempting other types of hydraulic installations that are not covered in this manual.

Note: Do not install this Steering Valve on other vehicles without the appropriate installation manual. Incorrect valve configuration and wrong hose connections on other types of steering systems can cause immediate severe pump damage.

The table below shows a plug and orifice configuration summary.

<table>
<thead>
<tr>
<th>Type of Installation</th>
<th>13A</th>
<th>13B</th>
<th>13C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factory Default Configuration</td>
<td>Plug</td>
<td>Open</td>
<td>Plug</td>
</tr>
<tr>
<td>Orbitrol Hookup Installation</td>
<td>Plug</td>
<td>Open</td>
<td>Plug</td>
</tr>
</tbody>
</table>

1. Remove the front valve cover using a 3/16” hex key to loosen the four screws.

2. Identify the three threaded plugs. (The arrow shows 13A which is not shown but located on the side of the valve)
Mount the Steering Valve

1. Identify the Steering Valve mounting location.

2. The Steering Valve mounting position is on the vehicle left-hand side below the grain tank.

3. Place standard washers on the kit supplied M8 x 20 mounting bolts.

4. Place the kit supplied M8 x 20 bolts through the vehicle frame into the two elongated mounting bracket holes.
5. Place the “S” bracket over the bolts.
   
   **Note:** The bolts only fit in the larger “S” bracket holes.

6. Place the large kit supplied M8 flat washers over the bolts with nuts.

7. Tighten the mounting bolts using a 13mm socket, ratchet and 13mm wrench.

8. Place the Steering Valve on the “S” bracket and secure it with the four mounting bolts.

9. Tighten the mounting bolts using a 1/2” wrench.

10. The Steering Valve is now mounted.
Install the Hydraulic Hoses and Fittings

1. Place identical colored cable ties at each hydraulic hose end to positively identify the hose as shown in the table below.

<table>
<thead>
<tr>
<th>Cable Tie(s)</th>
<th>Hose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Red</td>
<td>Pressure</td>
</tr>
<tr>
<td>1 Green</td>
<td>Tank/Return</td>
</tr>
<tr>
<td>1 Blue</td>
<td>LS Orbitrol</td>
</tr>
<tr>
<td>1 Grey</td>
<td>LS Out</td>
</tr>
<tr>
<td>1 Yellow</td>
<td>Steer right</td>
</tr>
<tr>
<td>1 Orange</td>
<td>Steer Left</td>
</tr>
</tbody>
</table>

New Holland CR CX Combine

Hose Diagram After Installing AutoSteer

- AUTOSTEER Hose
- Vehicle Hose

HOSE DIAGRAM AFTER INSTALLING AUTOSTEER

1. Place identical colored cable ties at each hydraulic hose end to positively identify the hose as shown in the table below.
Install the Hydraulic Hoses and Fittings

2. Locate the vehicle steering Orbitrol position for hose connection.

3. Identify the location of the Load Sense Pressure and Tank/Return lines.
Install the Hydraulic Hoses and Fittings

4. Identify the location of the Left and Right steering connections.

5. Connect the AutoSter Tank/Return line to the existing return line using a Tee adapter connected directly to the Orbitrol tank port.
   
   **Note:** Oil will rush out fairly quickly when the Tank line is opened. You may want to drain the reservoir before opening the fitting.

6. Use a 15/16” wrench to tighten the fitting.

7. Connect the Pressure line to the existing pressure line using a Tee adapter connected directly to the Orbitrol pressure port.

8. Use a 15/16” wrench to tighten the fitting.
**Install the Hydraulic Hoses and Fittings**

**Note:** The Load Sense hydraulic line is connected in series with the Steering Valve. Refer to the *New Holland CR CX Hydraulic Diagram* above.

9. Disconnect the Load Sense hose from the Orbitrol.

10. Connect the Steering Valve Load Sense Orbitrol hose to the Orbitrol Load Sense port using a 11/16 and 5/8 wrench.

11. Connect the Steering Valve Load Sense Out (LS Out) hose to the previously disconnected Orbitrol Load Sense hose.

12. Locate the Left and Right steering line connection fittings.

13. The steering lines are connected to the existing steering lines using Left and Right Run Tee adapters.

14. Tighten the fittings using a 7/8” and 15/16” wrench.
Install the Hydraulic Hoses and Fittings

15. Route hoses to the Steering Valve and secure them using cable ties.
    Note: Ensure the hoses are not rubbing on any sharp surfaces.

16. Remove the Steering Valve cover by removing four screws using a 3/16 Allen wrench.

17. Connect the LS OUT hose to the Steering Valve LS OUT port.
18. Connect the LS Orbitrol hose to the Steering Valve LS ORBITROL port.
19. Connect the TANK hose to the Steering Valve TANK port.
20. Connect the PRESSURE hose to the Steering Valve PRESS port.
21. Connect the LEFT STEER hose to the Steering Valve LEFT port.
22. Connect the RIGHT STEER hose to the Steering Valve RIGHT port.

23. Tighten all the hydraulic hose fittings on each hose end.
24. Install the threaded Pressure Transducer into the Steering Valve Trans port.
25. Tighten the Pressure Transducer using a 3/4 inch wrench or 22mm socket depending on transducer type.
26. Verify all hose connections and confirm they are connected to the correct ports at each hose end before starting the engine.
27. Turn on the engine momentarily (3-4 seconds) then turn off the engine.
28. Check for oil leaks.
29. Turn the engine on long enough to enable you to turn the steering wheel one turn right and one turn left.
30. Turn the engine off.
31. Check for oil leaks.
32. The Steering Valve and hoses are now installed.

**Note:** When the entire AutoSteer installation is complete, the Steering Valve Relief Valve must be adjusted. Refer to the Adjust the Relief Valve section of the Post-Installation Procedures below for complete instructions.

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### Post System Installation Procedures

This section provides information in the following sub-sections:

- Verify the Vehicle is Ready for AutoSteer
- Adjust the Relief Valve

Once the entire AutoSteer system, including the Display and Display Harnesses, have been installed on the vehicle, the procedures and notes provided in this section must be followed to complete the installation and prepare the vehicle for full AutoSteer capabilities.

### Verify the Vehicle is Ready for AutoSteer

- Ensure all connectors are properly coupled.
- Power ON the AutoSteer system.
- Verify installation and system operation.

Once the entire AutoSteer system, including the Display and Display Harnesses, have been installed on the vehicle, the procedures and notes provided in this chapter must be followed to complete the installation and prepare the vehicle for full AutoSteer capabilities.

### Adjust the Relief Valve

The steering valve has a built-in Load Sense Relief Valve that limits the maximum pump pressure when using the AutoSteer system. The Pressure Relief Valve must be adjusted after the entire AutoSteer system has been installed and the system has been checked for hydraulic leaks. The Display and all harnesses must be connected prior to performing this procedure.

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**WARNING**

**High-Pressure Fluid Hazard**

Read this manual before installation. Wear hand and eye protection while performing hydraulic system maintenance. Relieve hydraulic system pressure before servicing the hydraulic system.
WARNING

Do not stand close to the wheels and do not move the machine while you are adjusting the Relief Valve. Turn off the engine and engage the parking brake before standing under or next to the machine.
Adjust the Relief Valve

**Note:** The steering valve is shown on a bench without the hydraulic hoses connected for ease of viewing the adjustment process. When you adjust the relief valve (bottom arrow), the adjustment is performed with the valve mounted on the vehicle and the hydraulic hoses connected.

**Note:** Turn off the engine before attaching a pressure gauge. (The top arrow shows the Pressure Gauge Test Port.)

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1. Remove the Steering Valve cover by removing the four screws with a 3/16” Allen wrench.
2. Install a 5000 psi (350 bar) pressure gauge on the Steering Valve diagnostics port labeled as GP. Use a short extension hose on the pressure gauge if necessary for easier reading.
3. Clear any bystanders from around the vehicle to prevent anyone getting injured when the steering wheels are moved in the following steps.
4. Put transmission into “neutral” or “park” position and turn on the hand brake.
5. Start the engine and leave it at low idle.
6. Immediately check for oil leaks on all hose connections that were opened. With a 1/2” wrench and 5/32” Allen wrench, loosen the jam nut holding the pressure relief valve adjustment screw.
7. With a 1/2” wrench and 5/32” Allen wrench, loosen the jam nut holding the pressure relief valve adjustment screw.
8. Observe the standby pump pressure shown on the pressure gauge. The standby pressure should be around 200 PSI (14 Bar) to 500 PSI (34 Bar).

**Note:** If standby pump pressure is zero, less than 100psi (7 bar), or very high, such as 3000psi (210 bar) you might have a plumbing error. Standby pump pressure reaching the steering system must be always low when the steering system is not moving the wheels.
9. Clear any bystanders from around the vehicle because you will be moving the steered wheels in the next step.

10. Power up the AutoSteer Display.

11. Follow the instructions in the Display user manual to navigate to the Vehicle window from the AutoSteer Setup screen. Select Steering Components, and then select Hydraulic Valve. If the safety screen requirements have been met, press the Continue button.

**Note:** The active vehicle must be a "standard hydraulic" type in order to successfully complete Step 11. The default vehicle on a new system works. However, if the system has been moved from another vehicle, a new vehicle profile may need to be created and selected before starting Step 11.

12. Press the Steer Right button to command the wheels to turn to the right. Allow the steering axle to reach the right stop and hold it there.

13. The maximum pump pressure allowed by the AutoSteer valve will be displayed on the pressure gauge.

14. Stop the steer right command, straighten out the wheels, set the engine to low idle and ensure the vehicle transmission is in Park.

**Note:** Do not adjust the Pressure Relief Valve with the system commanding a vehicle turn. During a commanded turn the Steering Valve and hoses are under maximum pressure creating a high pressure leak or explosion hazard.

**Note:** The steering valve in the illustration is shown on a bench without the hydraulic hoses connected for ease of viewing the adjustment process. When you adjust the relief valve, the adjustment is performed with the valve mounted on the vehicle and the hydraulic hoses connected.

15. Turn off the engine after Step 14, so the Relief Valve is not being adjusted with the engine running.

**Note:** The AutoSteer Display may be reset due to low voltage each time the engine is started. If this happens the Display should be turned off each time before starting the engine and then turned on after starting the engine.

16. Adjust the Relief Valve screw clockwise to increase pressure and counter-clockwise to decrease pressure with a 5/32” Allen wrench.

17. Repeat Step 10. through Step 16. until the maximum steering pressure in AutoSteer mode at Step 13. is 2400psi +/- 100 psi. (167 bar +/- 7 bar).

18. Once the Pressure Relief Valve has been adjusted properly, retighten the jam nut with a 1/2” (or 17mm wrench depending on valve type) while holding the adjustment screw with a 5/32” Allen wrench to lock it into place.
19. Record the final maximum pressure the Pressure Relieve Valve is set to: _____________________________ PSI (Bar).

20. Shut down the AutoSteer Display, turn off the engine, and remove the pressure gauge from the Steering Valve by sliding the sleeve on the quick release coupler.