# Hydraulic Kit Installation Guide

## Table 1 Component List

<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 5/8&quot; X 36&quot; -8F X -12F 90 DEG ORFS</td>
<td>F451TC-JSJC081210-36</td>
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<td>2.</td>
<td>HOSE ASSY, 1/4&quot; X 36&quot; -4F X -6F ORFS</td>
<td>F451TC-JCJC040604-36</td>
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<td>3.</td>
<td>HOSE ASSY 1/2&quot; 36&quot; -8F X -8F ORFS</td>
<td>F451TC-JCJC080808-36</td>
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<td>4.</td>
<td>ADAPTER - RUN TEE -12 ORFS</td>
<td>12 R6LO-S</td>
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<td>5.</td>
<td>ADAPTER, F-M, STREET ELBOW, 1/4&quot;</td>
<td>1/4 CD</td>
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<td>6.</td>
<td>TAPE TEFLOON 1/2&quot; x 520&quot;</td>
<td>511-0001-01</td>
<td>1</td>
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<td>7.</td>
<td>VALVE SHUTTLE SAE -6</td>
<td>500-0032-01</td>
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<td>8.</td>
<td>ADAPTER STRAIGHT -6 ORB X -6F ORFS</td>
<td>6 F650L-S</td>
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<td>9.</td>
<td>ADAPTER ELBOW -6 ORB X -6 ORFS</td>
<td>6 C50LO-S</td>
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<td>10.</td>
<td>ADAPTER -6M ORB X -6M ORFS</td>
<td>6 F50LO-S</td>
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<tr>
<td>11.</td>
<td>KIT CABLE TIE HOSE ID</td>
<td>200-0467-01</td>
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<td>12.</td>
<td>INSTALLATION MANUAL</td>
<td>602-0442-01</td>
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</table>
Special Requirements

Tools

This list consists of the tools required to complete the installation. The installer is assumed to have a complete set of common installation tools.

<table>
<thead>
<tr>
<th>Table 2 Required Tool List</th>
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<tbody>
<tr>
<td>Allen hex key ¼&quot;</td>
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<tr>
<td>Allen hex key 3/16&quot;</td>
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<tr>
<td>Allen hex key 5/32&quot;</td>
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<td>Allen hex key 1/8&quot;</td>
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</table>

Hydraulic Kit Installation Guide
Overview

**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**

SHOCK AND FIRE HAZARD

Avoid contact of hydraulic hose fittings with electrical terminals located on the firewall under the engine hood. Hydraulic hoses have a metallic braid and conduct electricity and will cause severe shorts if they contact the electrical terminals.

**CAUTION**

The engine hood is heavy and the removal requires at least two people. Do not attempt to lift and move the engine hood by yourself.

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 Models: Non-AccuGuide Ready and Non-IntelliSteer Ready**

- Case STX: 375, 425, 450, 500:
- New Holland TJ: 375, 425, 450, 500

This kit is for installation on these models only. If your vehicle is a different model, contact your dealer for the correct installation kit.
Steering Valve Installation

This Steering Valve Installation chapter information is provided in the following sections:

- Steering Valve Installation Procedure Overview
- Hose Diagram
- Internal Plug and Orifice Configuration
  - LS Drain Orifice
  - Pilot Pressure Drain Plug
  - Load Sense Drain Orifice Installation
- Install the Steering Valve
- Hydraulic Hose Connection Procedures
  - Connect the Pressure Hose
  - Connect the Tank Hose
  - Install the Shuttle Valve and LS Hose
  - Connect the Left Steering Hoses
  - Connect the Right Steering Hoses
  - Install the Pressure Transducer
  - Connect the SAM Harness to the Valve
- Steering Valve Installation Procedure Overview

Steering Valve Installation Procedure Overview

Note: You can use a fiberglass cable puller to make it easier to pull the hydraulic hoses and electrical cables through and around the vehicle.

1. Configure the valve by installing a LS bleed-down orifice.
2. Mount the valve on the tractor.
3. Connect seven hoses between the valve and the tractor.
4. Check for oil leaks.
5. Perform a functional test to confirm correct valve operation.

![WARNING](image)

**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.
Hose Diagram

The AutoSteer high flow valve has two internal plugs or orifices that must be either installed or removed to configure the valve or specific applications. Configure the valve before installing on the vehicle. See Figure below.

Note: A plug and an orifice are shipped with the valve in a small plastic bag.
LS Drain Orifice

A drain orifice is provided with the valve and must be installed when a load sense drain is required to de-stroke the pump on vehicles that do not already have a built-in LS drain orifice.

Pilot Pressure Drain Plug

A blind plug is provided with the valve and must be installed inside the valve when the Tank line on the vehicle has a pressure above 160psi. The drain plug, when installed, isolates the solenoid’s pilot pressure from the tank line. An external drain hose connecting the drain port directly to a low pressure tank port must always be installed when the drain plug is installed in the valve.

Note: Failure to install the drain plug and drain hose as described in this manual when the Tank pressure is greater than 160psi will result in the valve remaining in AutoSteer mode and locking out manual steering whenever the engine is running. Always measure the Tank pressure before completing the installation in order to determine if the drain plug and external drain hose are required. On some tractors a pressure spike only occurs in the tank line when an implement is lowered or when the power beyond system is also powering a hydraulic motor on the implement.

Load Sense Drain Orifice Installation

The valve block has a factory installed blind plug between the Load Sense circuit and the Tank line. This internal plug must be replaced by an orifice plug to allow the Load Sense pressure to drain to tank to de-stroke the pump when the valve is not turning the wheels. Install the LS drain orifice before installing the valve on the tractor because it is easier to do this off the tractor on a work bench.

Note: If valve is installed on a machine, you must turn off any electrical power to the valve and relieve hydraulic pressure in all hoses to avoid drained oil spillage that could present a hazard. Any accumulators must be isolated from the system or the fluid exhausted to reservoir. Any overhead or pressurized reservoirs must be isolated from system. Make sure no cylinders are elevated or pressurized.
Load Sense Drain Orifice Installation

1. First remove the proportional valve using 3/16” Allen key as shown in the figure to gain access to the external plug. The internal plug or orifice is installed inside the valve block and you must first remove the external plug.

2. Remove the small internal plug using a 1/8” Allen key. Replace with the small orifice plug supplied with the valve (see the second figure). The orifice plug looks just like the blind plug but has a small 0.031” hole in its center. Install the external plug that was previously removed.

Note: Never leave the valve without either a plug or orifice in this position. If no plug or orifice is installed here, all the Load Sense oil will drain directly to the tank line inside the valve and the pump will never be stroked up. AutoSteer will not work without a plug or orifice here, although manual steering will be normal.
3. Clean all surfaces before installing the proportional steering valve. Inspect all the O-Rings for damage and replace O-Ring if it is cut or deformed. Secure the O-Rings in their grooves using grease. Check if the small O-Ring in the corner is installed.

4. Carefully lower the proportional valve onto the main valve block while aligning the four mounting screws with the four threaded holes on the block as shown.
5. Torque the four screws securing the valve in a cross pattern. Check if all parts have been installed on the valve block.

6. Inspect the valve for oil leaks immediately after it is installed on the machine and the engine is turned on.

**Note:** Most oil leaks will be caused by defective O-Rings or O-Rings that get damaged during assembly. Replace damaged O-Rings until the valve has zero leakage.

7. Test the AutoSteer and manual steering after the valve has been serviced or after plugs have been installed or removed.

**Note:** Changes to plugs and orifices can have a dramatic affect on the steering response, so a complete steering calibration must be performed whenever a plug or orifice is installed or removed.

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**Install the Steering Valve**

1. To open the engine hood to gain access to the valve mounting location, first locate the latch on the front grill.
Install the Steering Valve

2. Move the latch lever and swing open the front grill sideways.

3. Grab the two release bars as shown in the first figure, compress them together

4. Pull the hood forward to open the engine.

5. Locate the valve mounting position under the steering Orbitrol.

**Note:** Clean the steering Orbitrol, hose fittings and surrounding areas before starting the installation to avoid possible oil contamination.
6. Identify the four bolts that secure the Orbitrol bracket. These bolts will be used to secure the AutoSteer valve bracket.

7. Install the AutoSteer valve bracket in the position shown under the Orbitrol. Secure using the four existing hex bolts. The bracket should clear the steering hoses.

5. Install the steering valve on top of the bracket in the position shown. Only two mounting holes on the valve will align with the slotted holes on the bracket. These will be used to secure the valve.
Install the Steering Valve

6. Insert two long mounting screws with washers and locknuts in the two positions shown to secure the valve to the bracket. Before tightening these screws, slide the valve towards the cab by pushing against it so that it clears the electrical connectors located in front of the valve. The bracket has slotted holes that allow several different mounting positions but you want the valve to be as far as possible from the electrical connector.

Note: The valve mounting screws are shipped with the valve.
Hydraulic Hose Connection Procedures

This figure shows the hydraulic connections. You can refer to these diagrams as you are connecting the hydraulic components.

Connect the Pressure Hose

**Note:** Before starting the hose installation, put a catch pan or cloth under the Orbitrol to catch the oil that will drip when the hose fittings are opened.

1. Identify the Pressure hose on the left side of the steering Orbitrol.
Connect the Pressure Hose

2. Install the Pressure Hose shown in the illustration.

3. Loosen the pressure hose end from the Orbitrol and set aside. Collect any oil leaks as necessary.

4. Install a Run Tee adapter on the Orbitrol pressure port and re-install the pressure hose to the bottom of the run tee.

5. Connect the AutoSteer pressure hose to the side of the run tee adapter and route the hose down towards the AutoSteer valve port labeled "P". Route the hose under the valve and confirm that it does not interfere with any rotating parts.

6. Connect the AutoSteer pressure hose to the port labeled "P" on the right side of the valve.

Connect the Tank Hose

7. Identify the Tank hose on the left side of the steering Orbitrol.
1. Install the Tank Hose as shown.
2. Loosen the tank hose end from the Orbitrol and set aside. Collect any oil leaks as necessary.
3. Install a Run Tee adapter on the Orbitrol tank port and re-install the tank hose to the bottom of the run tee.
4. Connect the AutoSteer tank hose to the side of the run tee adapter and route the hose down towards the AutoSteer valve port labeled "T".

5. Connect the AutoSteer tank hose to the port labeled "T" on the right side of the valve. Route the hose under the valve and confirm that it does not interfere with any rotating parts.

Install the Shuttle Valve and LS Hose

A small shuttle valve must be installed on the Orbitrol to share load sense between the steering Orbitrol and the Autosteer valve. The shuttle valve is supplied in the hose kit. The shuttle valve must be pre-assembled with the correct hose adapters before installing the valve on the tractor.
Install the Shuttle Valve and LS Hose

1. Assemble the Shuttle valve shown in the illustration.
2. Install a -6 elbow adapter to the center port.
3. Install a -6 straight female hose adapter to one side port.
4. Install a -6 straight male hose adapter to the other side port.

5. Identify the Load Sense hose on the left side of the Orbitrol. It is the smaller diameter hose as shown.
6. Disconnect the LS hose from the Orbitrol and set it aside. Collect any oil that leaks as necessary.

7. Install the shuttle valve on the Orbitrol’s LS port as shown.
8. One side port must be connected to the LS port on the Orbitrol using the straight female adapter.
9. Reconnect the tractor’s Load Sense hose to the center port on the shuttle valve using an elbow adapter.
10. Connect the AutoSteer LS hose to the other side port on the shuttle valve using a straight adapter.
11. The hoses must drop down and not force the valve. If necessary, loosen the LS elbow adapter on the Orbitrol to rotate the elbow for better hose routing.
12. Tighten all hose fittings and adapters.
**Install the Shuttle Valve and LS Hose**

13. Connect the other end of the AutoSteer LS hose to the port labeled "LS" on the AutoSteer valve. Route the hose under the valve and confirm that it does not interfere with any rotating parts such as the engine drive shaft.

14. Tighten all hose adapters and hose fittings on this side of the valve.

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**Connect the Left Steering Hoses**

1. Identify the left steering hose on the steering Orbitrol.

2. Disconnect this hose from the Orbitrol and move it towards the AutoSteer valve where it will be connected.
3. Connect this left steering hose to the port labeled "L" on the AutoSteer valve. This "steer out" hose will now take oil from the AutoSteer valve towards the left steering cylinder.

4. Refer to the hose diagram above to understand the required hose connections before proceeding with the installation.

5. Connect a new short AutoSteer hose from the Left steer port on the Orbitrol to the port labeled "SL" on the AutoSteer valve. Route the hose under the valve. This "steer in" hose completes the installation of the two left steering hoses.
1. Identify the right steering hose on the steering Orbitrol.

2. Disconnect this hose from the Orbitrol and move it towards the AutoSteer valve where it will be connected.

3. Connect this right steering hose to the port labeled "R" on the AutoSteer valve. This "steer out" hose will now take oil from the AutoSteer valve towards the right steering cylinder.

4. Connect a new short "steer in" AutoSteer hose from the Right port on the Orbitrol to the port labeled "SR" on the AutoSteer valve. Route the hose under the valve. This completes the installation of the two right steering hoses.
Connect the Right Steering Hoses

Note: All hoses must be routed in a protected position and must not touch the engine drive shaft or flywheel that pass under the valve. Confirm that all hoses are not touching moving parts and secure with cable ties. The illustration shows the actual drive shaft that passes under the valve where several hoses are routed.

Install the Pressure Transducer

1. Install the NPT/ORB thread adapter on the valve in the position shown, and then install the transducer on the adapter.

2. Connect the 3-pin connector from the valve harness to the pressure transducer. The connector has a latch and must be correctly oriented.

Note: You may also install the provided elbow adapter to position the transducer closer to the valve in a more protected position. Apply 2 turns of Teflon tape when assembling NPT threaded connections that do not have an O-ring. Do not apply Teflon tape to threaded connections that use an O-Ring.
Steering Valve Installation Checklist

1. Mounting screws that secure the Steering Valve are tight.
2. LS bleed orifice has been installed in the valve.
3. Pressure hose is connected to correct port on AutoSteer valve & Orbitrol.
4. Tank hose is connected to correct port on AutoSteer valve and Orbitrol.
5. Shuttle valve is installed on the LS port on the Orbitrol.
6. LS hose is connected to the shuttle valve.
7. The right steer-in hose is connected.
8. The right steer-out hose is connected.
9. The left steer-in hose is connected.
10. The left steer-out hose is connected.
11. All hose connections match the hose diagram.
12. All hose connections are tight.
13. The pressure transducer is installed on the valve.
14. All hoses are routed in a protected position and secured with cable ties.

Hydraulic Leak Check

On completion of installing the entire AutoSteer system, the system needs to be checked for leaks. Follow the procedure below to check for leaks.

1. Clear any bystanders away from the vehicle. If there is a hydraulic leak, they could be injured.
2. Put the vehicle into Park and/or set the parking brake to prevent the vehicle from moving.
3. Turn the vehicle over for a few seconds and if the vehicle starts, immediately shut it down.
4. Walk around the vehicle and check all the hydraulic fittings that were opened. Look for any oil leaks.
5. Once all leaks have been repaired, or if none are found, start the vehicle again and let it run at a low idle.

Note: If an oil leak is noticed during any part of this test, immediately shut down the vehicle and repair the leak.

Note: The front wheels will move when the steering wheel is turned. Make sure the vehicle will not strike anything or anyone before continuing. If necessary, move the vehicle to an open area.
6. Take the vehicle out of Park and/or remove the parking brake. Turn the steering wheel manually to the right and left stops two or three times to get any air out of the hoses.

7. Confirm the front wheels turn in the correct direction and the vehicle steers the same as it did before the system was installed.

8. Put the vehicle back into Park and/or reset the parking brake. Shut down the vehicle, walk around it again, and check for any hydraulic leaks.

9. Once the leaks have been repaired, or if none are found, start the vehicle again and let it run at a low idle.

10. Take the vehicle out of Park and/or remove the parking brake. Move the vehicle to an open, flat area and leave the vehicle in Park.

11. Power up the Display and navigate to the **Hydraulic Valve** window from the **Steering Components** window.

12. Command the vehicle to turn Right and then Left a few times. The vehicle should steer in the direction it is commanded. If the vehicle rotates in the wrong direction, the hoses were attached to the wrong ports on the AutoSteer valve and need to be switched.

13. Power down the Display, put the vehicle back into Park and/or reset the parking brake, and shutdown the vehicle.

14. Once again check the vehicle for hydraulic leaks and repair any that are found.