

Automated Hydraulic Steering Kit Installation Guide


Kit P/N: ED-VHHP

Fits Versatile Tractor Models:

435 485 535



Read and Follow Safety Messages

- In these instructions, you will see the heading **WARNING** and the safety alert symbol . They indicate a hazardous situation that, if not avoided, could result in death or serious injury. The safety messages provide information to identify a hazard associated with potential injury.
- Before installing, operating, or performing maintenance or service on any part of the system:
 - Read and understand the Automated Hydraulic Steering Kit Installation Guide instructions and all of the safety information.
 - Read and understand the Automated Steering System User Guide.
- Do not allow anyone to operate without instruction.
- Keep these instructions and all related safety information with the manuals for your machine and other implements.

If you have questions or need assistance, contact your local dealer or distributor.

Overview

For the tractor models listed above, a steering hydraulics kit has been developed for your automated steering system.

The items in the kit are detailed in the table that follows the safety warnings below. After the kit table there is a step-by-step installation section.

Please read this manual thoroughly before beginning the installation.

WARNING:

To avoid serious injury or death during machine operation, install the appropriate kit for your machine make and model.

Machine Preparation

⚠ WARNING:

Inspect the machine and perform any needed maintenance (for example, contaminated hydraulic fluid) before installing the automated hydraulic steering kit. This kit cannot perform as intended on a machine that is not maintained properly. Errors in performance increase the risk of operator and bystander injury or death.

Failure to maintain clean hydraulic fluid and operational hydraulic components can cause loss of directional control resulting in serious injury or death.

To avoid serious injury, wear hand and eye protection and use wood or cardboard when checking for leaks.

Turn off the machine and power off the eDrive when installing or performing maintenance.





Before attempting to install hydraulics, park the machine on a clean level floor with adequate clearance to work all around.

Before you perform any drilling, cutting or fastening, ensure that no other machine components, such as hydraulic hoses or electrical wiring, will be damaged. Failure to follow this warning may cause physical injury and/or damage to the machine.






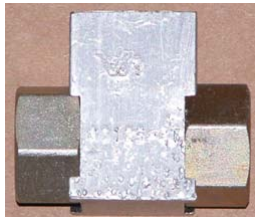

To prevent hydraulic system contamination, it is essential to thoroughly clean hydraulic system fittings and hose connections prior to disconnecting or removing. Use a spray cleaner such as 'Brake Clean' to prevent hydraulic system contamination. Note that o-rings used on ORB and ORFF type fittings, referred to in the Kit Contents section, may be damaged by solvent cleaners such as 'Brake Clean'. If a fitting is to be cleaned internally, the o-ring should first be removed and cleaned with a fiberless cloth.

Kit Contents

Unpack the installation kit and identify the required parts as shown.

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
A	760-0004	1	Assy, hyd. valve block - LS high flow (Hydraulic steering block)	
Bag 1 of 4 contains B and C				
B	760-2073	4	Adapter, hyd. #8maleJIC x #6maleORB (P, T, A and B ports on hydraulic steering block)	
C	760-2058	1	Adapter, hyd. 90 elbow - #6maleJIC x #6maleORB (Load sense port on hydraulic steering block)	
D	640-0049	1	Hyd block mnt	



Kit Contents (continued)

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
Bag 2 of 4 contains E and F				
E	675-2003	2	Bolt, 3/8NC x 1" Gr5 ZP	
	678-1054	4	Washer, narrow flat - 3/4"OD x 13/32"ID x 1/16" thk ZP	
	676-1035	2	Nut, nylock - 3/8NC ZP	
F	675-2005	2	Bolt, 3/8NC x 3-1/4" Gr5 ZP	
	675-1054	2	Washer, narrow flat - 3/4"OD x 13/32"ID x 1/16" thk ZP	
	675-1035	2	Nut, nylock - 3/8NC ZP	
Bag 3 of 4 contains G, H, and I				
G	760-2069	1	Adapter, hyd run tee - #8 ORFF	
H	760-2004	2	Adapter, hyd run tee - #10 ORFF	
I	760-2014	1	Adapter, hyd run tee - #12 ORFF	
Bag 4 of 4 contains J, K, L, and M				
J	760-0002	1	Hyd. valve, load shuttle - #6femORB	
K	760-2056	1	Adapter, hyd - #6maleJIC x #6maleORB	

Kit Contents (continued)

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
L	760-2040	1	Adapter, hyd. 90 elbow - #6maleORB x #6femORFF	
M	760-2048	1	Adapter, hyd. - #6maleORB x #6maleORFF	
N	760-1233	1	Hose, hyd. - 1/2" x 122", #8femJIC x #10femORFF90 (Steering hose)	
O	760-1234	1	Hose, hyd. - 1/2" x 146", #8femJIC x #10femORFF90 (Steering hose)	
P	760-1235-000	1	Hose, hyd. - 1/2" x 70", #8femJIC90 x #12femORFF (Pressure hose)	
Q	760-1291-000	1	Hose, hyd. - 1/2" x 32", #8femJIC90 x #8femORFF (Tank hose)	
R	760-1294-000	1	Hose, hyd. - 1/4" x 18", #6femJIC x #6femJIC (Load sense hose)	

Kit Contents (*continued*)

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
S	051-0143	1	Cable, interface - 15 ft	
T	677-2001	20	Tie strap, 11" heavy duty	
U	710-0053	1	Kit, steering wheel switch (not shown)	

INSTALLATION

⚠ WARNING:

Before installing, disconnecting or repairing the hydraulic hoses and components, turn off the tractor and relieve all pressure from the hydraulic system by turning the steering wheel left and right. Failure to remove the pressure can result in serious injury or death from unexpected tractor movement.

To avoid burn injury when installing, disconnecting or repairing the hydraulic hoses and components, turn off the tractor and allow the system to cool down prior to touching the parts of the tractor that are heated.

To avoid burn or electric shock injury when installing or removing the kit, do not touch parts of the tractor that are heated or electrically energized.

1. Prepare the hydraulic steering block.

- a. Make sure the hydraulic steering block is clean and dust free.
- b. Install the small elbow adapter fitting **C** in the **LS** port and the larger adapter fittings **B** in the **P**, **T**, **A** and **B** ports (Figure 1).

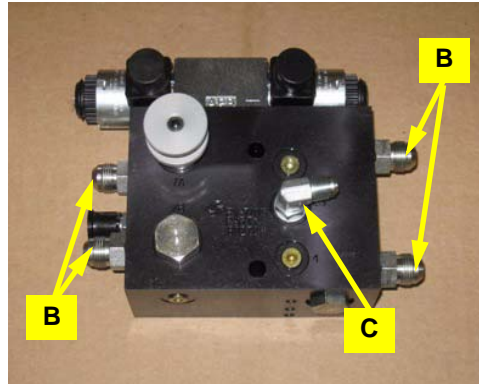


Figure 1: Prepared steering block

2. Mount the hydraulic steering block.

- a. Locate the two bracket mounting holes on the front side of the firewall. Relocate the horn to the mounting hole as shown (Figure 2a).

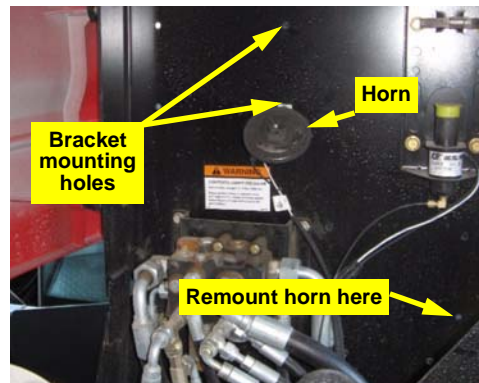


Figure 2a: Steering block and new horn mounting location

- b. Using provided hardware **E**, install the mounting bracket **D** against the firewall (Figure 2b).

NOTE:

*The bracket mounting holes in the firewall may not (i) be exactly where shown in Figure 2a, nor (ii) align with the holes in the mounting bracket **D**. In either case, use the mounting bracket as a template and drill two 3/8" holes in the location shown in Figure 2a and install bracket **D** as shown in Figure 2b.*

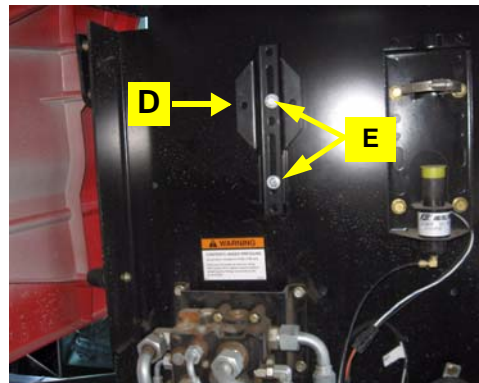


Figure 2b: Installed steering block mounting bracket (new drilled holes if necessary)

2. **Mount the hydraulic steering block (continued).**
- c. Using provided hardware **F**, attach the prepared hydraulic steering block **A**—with its **P** and **T** ports uppermost—to the mounting bracket **D** (Figure 2c).

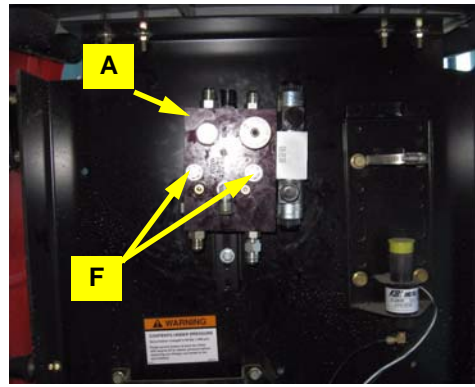


Figure 2c: Steering block - mounted

3. **Install the pressure and tank fittings.**
The hydraulic steering block will receive pressure from the hydraulic divider mounted on the front side of the firewall (Figure 3a).
- a. Disconnect the pressure line from the top left of the hydraulic divider (Figure 3a).

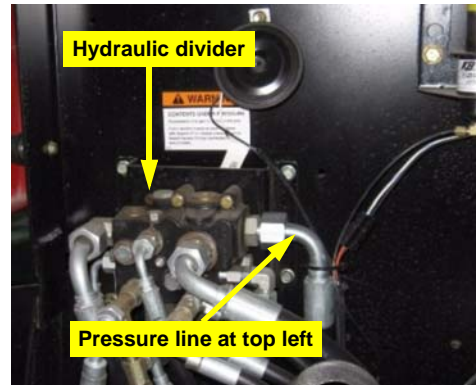


Figure 3a: Pressure line location

- b. Install the run tee **I** then reattach the pressure line to the end of it (Figure 3b).

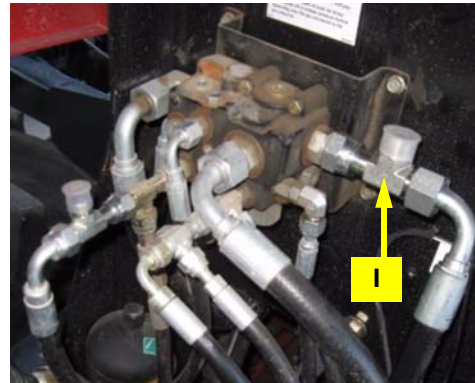


Figure 3b: Installed pressure line run tee

The hydraulic steering block will return tank flow to the reservoir via the hydraulic divider.

- c. Disconnect the tank line from the front of the hydraulic divider (Figure 3c).

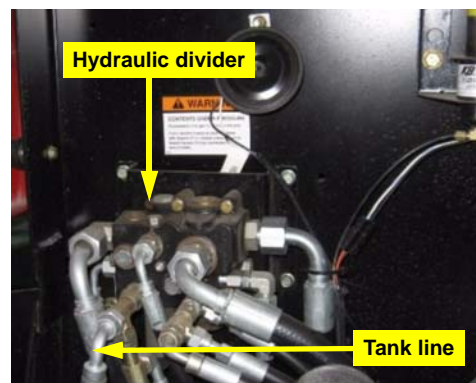


Figure 3c: Tank line location

3. **Install the pressure and tank fittings (continued).**

- d. Install the run tee **G** then reattach the tank line to the end of it (Figure 3d).

NOTE:

Leave the run tee fittings loose to allow for alignment when attaching hoses. Plastic caps placed on the open ends of the fittings will prevent excessive leakage prior to hose installation.

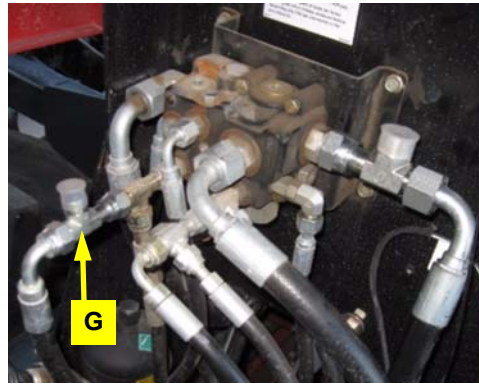


Figure 3d: Installed tank line run tee

4. **Install the load sense shuttle.**

- a. Assemble the load sense shuttle **J** with adapter fittings **K**, **L**, and **M** (Figure 4a).

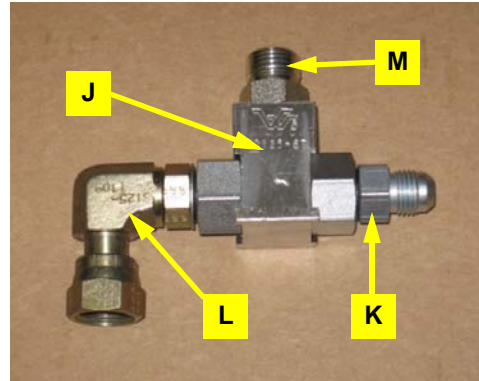


Figure 4a: Assembled load sense shuttle

- b. Locate the front hydraulic pump on the front left side of the engine. Locate the load sense line (Figure 4b).

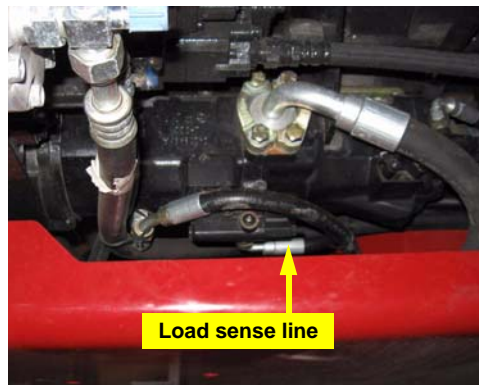


Figure 4b: Load sense line at pump

- c. Trace the load sense line to the hydraulic divider mounted on the front side of the firewall. Disconnect the load sense line from the corresponding run tee (Figure 4c).

NOTE:

The load sense line could be the first or the second straight line from the hydraulic divider. It is the second one in Figure 4c.

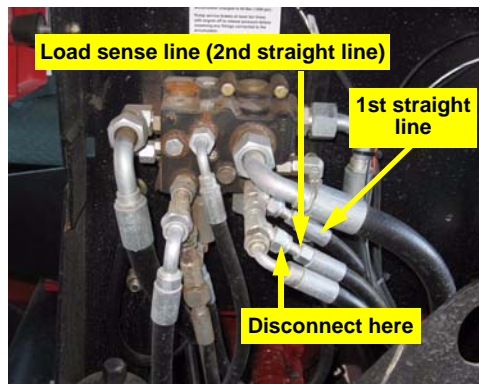


Figure 4c: Load sense line at divider

4. **Install the load sense shuttle (continued).**

- d. Install the female elbow fitting **L** of the load sense shuttle **J** to the branch of the load sense run tee (Figure 4d).
- e. Reattach the removed load sense line to the load sense shuttle fitting **M** (Figure 4d).

NOTE: Leave the load sense shuttle connections loose to allow for easier installation. Tighten them after all connections are made.

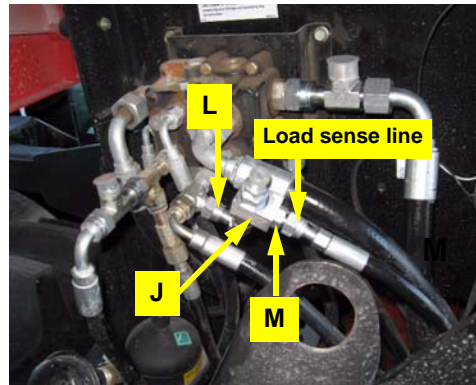


Figure 4d: Installed load sense shuttle

5. **Install the pressure, tank and load sense hoses.**

- a. Install the pressure hose **P** between the **P** port of the hydraulic steering block and the run tee **I** installed at the hydraulic divider valve (Figures 5a and 5b).
- b. Install the tank hose **Q** between the **T** port of the hydraulic steering block and the run tee **G** installed at the hydraulic divider valve (Figures 5a and 5b).
- c. Install the load sense hose **R** between the **LS** port on the hydraulic steering block to the fitting **K** on the load sense shuttle (Figures 5a and 5c).

NOTE: All hoses should be routed with other tractor plumbing free from entanglement and secured with the heavy duty tie straps **T** provided.

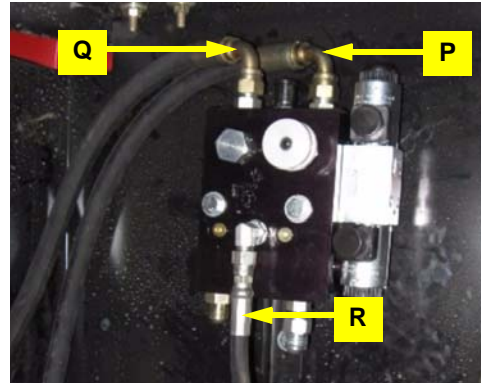


Figure 5a: Installed pressure, tank and load sense hoses at steering block

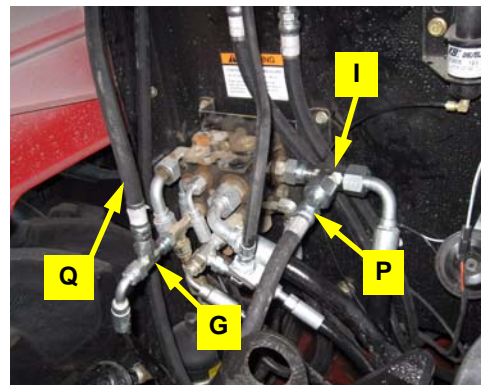


Figure 5b: Installed pressure and tank hoses at hydraulic divider

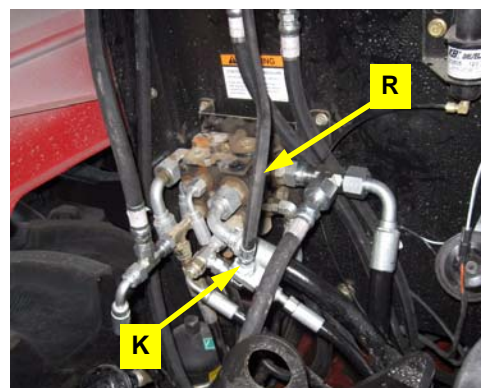


Figure 5c: Installed load sense hose at load sense shuttle

6. Install the steering output fittings.

- a. Locate the left steering cylinder in the middle of the tractor (Figure 6a).

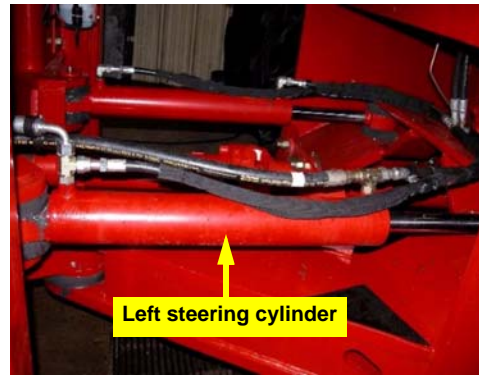


Figure 6a: Steering output location

- b. Install the run tees **H** at the steering lines at each end of the steering cylinder (Figure 6b).

NOTE: Leave the run tee fittings loose to allow for alignment when attaching hoses. Plastic caps placed on the open ends of the fittings will prevent excessive leakage prior to hose installation.

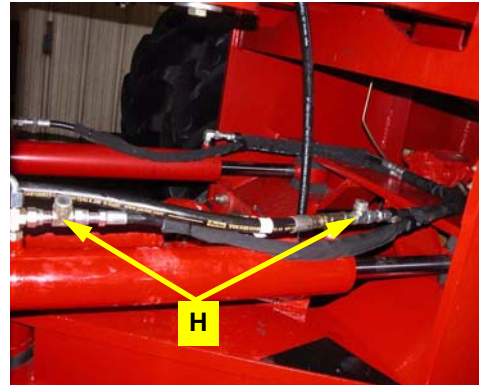


Figure 6b: Installed steering output run tees

7. Install the steering output hoses.

Install the hydraulic steering hoses **N** and **O** between the **A** and **B** ports on the hydraulic steering block and the run tees **H** installed at the steering cylinder. The longer steering line **O** connects to the back run tee (Figures 7a and 7b).

NOTE: All hoses should be routed with other tractor plumbing free from entanglement and secured with the heavy duty tie straps **T** provided.

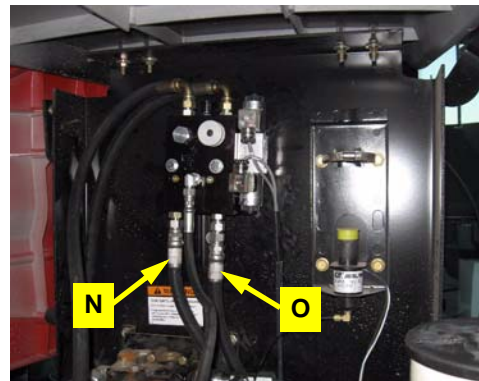


Figure 7a: Installed steering hoses at steering block

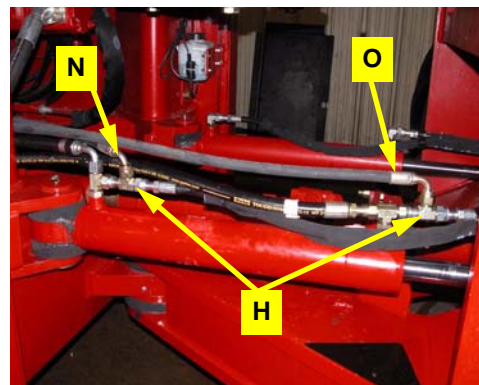


Figure 7b: Installed steering hoses at steering cylinder run tees

8. Install the valve control cable.

Route the valve control cable **S** from the hydraulic steering block under the cab and through the access hole on the right rear corner of the cab (Figures 8a and 8b).

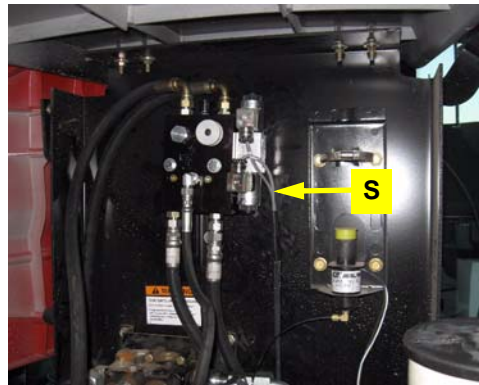


Figure 8a: Valve cable installed at steering block

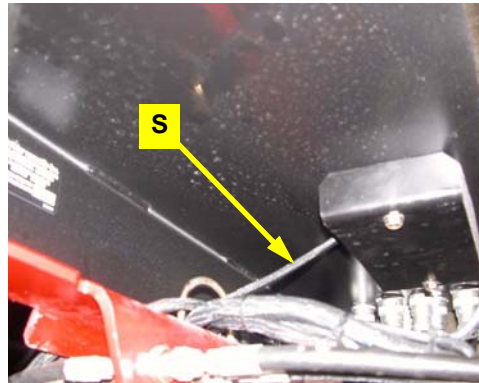


Figure 8b: Valve cable routed through the cab access hole

9 Verify operation and set automated steering control rate.

⚠ WARNING:

During tests of the hydraulic response, the tractor may move unexpectedly. Be prepared for vehicle movement to avoid injury.

Keep others away and stay clear of mechanical steering linkages to prevent serious injury or death from pinch point hazards while manually operating the hydraulic steering circuit.

- a. Tighten all the connections and clean up the installation area around the machine and make certain that it is safe to operate.
- b. Start the machine and check all the hydraulic steering connections for leaks.
- c. Rotate the steering wheel from one extreme to the other and back.
- d. Adjust the automated steering oil flow control knob to a starting position of $1\frac{3}{4}$ turns from completely closed. To adjust the knob (Figure 9):
 - Turn clockwise to reduce flow.
 - Turn counter clockwise to increase flow.
- e. The coils on the hydraulic steering block have manual push button overrides. Push either manual override to move the steering wheels all the way to one extreme (Figure 9).

NOTE: *To activate the manual overrides, a tool such as a small screwdriver or allen wrench must be inserted into the end of the coil to depress the override button.*

- f. While pressing the override button of the other coil, count the number of seconds for the steering wheels to move all the way in the opposite direction (Figure 9).
- g. Adjust the automated steering oil flow control to achieve an end-to-end steering cycle time of approximately 40 seconds. Use the knurled locking nut to secure the final flow control setting.

10. Complete automated steering electronic installation and setup:

Refer to the owner's manual supplied with your automated steering system to complete the electronic installation and setup.

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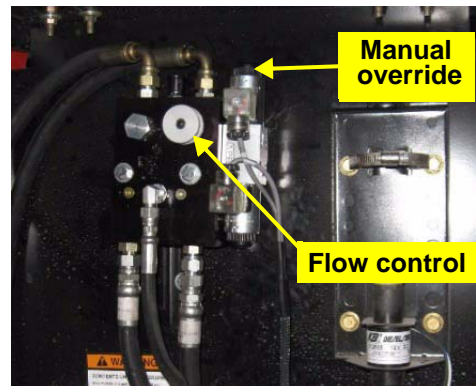


Figure 9: Steering block manual override and flow control button