

# Automated Steering Kit Installation Guide


*Kit: EDX-JD8000, P/N 911-2006-000*

## Fits John Deere Tractor Models:

8100	8200	8300	8400
8110	8210	8310	8410



## 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 this installation guide
  - 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 manual for your machine and other implements.

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

## Overview

A series of equipment specific kits has been developed to work in conjunction with your automated steering system. For the machine models listed above, these kits contain the components for:

- the steering hydraulics
- the wheel angle sensor (WAS)
- the steering wheel switch (SWS - for steering override)

The items in each kit are detailed in the tables that follow the safety warnings below. After the kit tables, there are four step-by-step installation sections, one for each of the kits.

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 Steering Hydraulic Installation 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 automated steering controller when installing or performing maintenance.

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

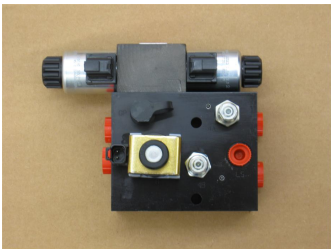


Before you perform any drilling, cutting or fastening, ensure that no other machine components, such as hydraulic hoses or electrical wiring, will be damaged. Failure to follow this warning may cause physical injury and/or damage to the machine.

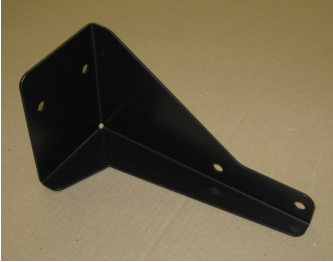
To prevent hydraulic system contamination, it is essential to thoroughly clean hydraulic system fittings and hose connections prior to disconnecting or removing. Use a spray cleaner such as 'Brake Clean' to prevent hydraulic system contamination.

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 - Steering Hydraulics


Unpack the hydraulics installation kit and identify the required parts as shown. Kit items are A, B, C etc. with an H (Hydraulic) prefix.


REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
HA	760-0020-000	1	Assy, hyd valve block - 15L/Proportional  (Hydraulic steering block)	
<b>Bag H1 contains HB and HC</b>				
HB	760-2058	1	Adapter, hyd 90 elbow - #6maleJIC x #6maleORB  (LS port on hydraulic steering block)	
HC	760-2061-000	4	Adapter, hyd 90 elbow - #6maleJIC x #8maleORB  (P,T, A and B ports on hydraulic steering block)	

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
HD	640-0002	1	Hyd block mnt, JD8000	

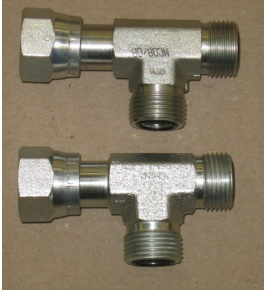
**Bag H2 contains HE, HF, and HG**


HE	675-2015	2	Bolt, flanged - 12m1.75 x 30 Gr10.9 YZ	
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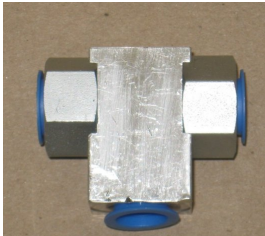
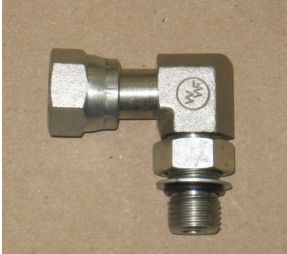


HF	675-2014	2	Bolt, flanged - 10m1.5 x 35 Gr10.9 YZ	
	676-1038	2	Nut, flanged - 10m1.5 YZ	







HG	675-2006	2	Bolt - 3/8NC x 3 3/4" Gr5 ZP	
	678-1054	2	Washer, narrow flat - 3/4"OD x 13/32"ID x 1/16" thk ZP	
	676-1035	2	Nut, nylock - 3/8NC ZP	

**Bag H4 contains HK, HL, HM, and HN**

HK	760-2069	2	Adapter, hyd run tee - #8 ORFF	
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HL	760-2070	1	Adapter, hyd 90 elbow - #8maleORFF x #8fORFF	
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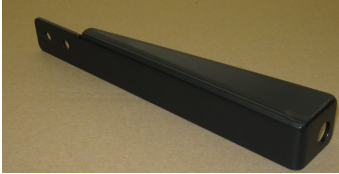
REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
HM	760-2063	2	Adapter, hyd - #6maleJIC x M14maleORB	
HN	760-2054	1	Adapter, hyd run tee - #6 JIC	
<b>Bag H5 contains HO, HP, HQ, HR, and HS</b>				
HO	760-0002	1	Hyd load shuttle - #6femORB	
HP	760-2040	1	Adapter, hyd 90 elbow - #6maleORB x #6femORFFswiv	
HQ	760-2067	1	Adapter, hyd - #8maleORFF x #6maleORB	
HR	760-2056	1	Adapter, hyd - #6maleJIC x #6maleORB	

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
HS	760-2064	1	Adapter, hyd - #8femORFF x #6maleORFF	
HT	760-1001	2	Hose, hyd - 1/4" x 148", #6femJIC x #8femORF	
HU	760-1003	1	Hose, hyd - 1/4" x 16", #6femJIC x #6femORF90	
HV	760-1004	1	Hose, hyd - 1/4" x 30", #6femJIC x #6femJIC	
HW	760-1002	2	Hose, hyd - 3/8" x 36", #6femJIC x #6femJIC	
HX	677-2001	20	Tie strap, 11" heavy duty	

## Kit Contents - Wheel Angle Sensor

Unpack the wheel angle sensor kit and identify the required parts as shown. Kit items are A, B, C etc. with a W (Wheel) prefix.

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
<b>Bag 710-0099-000 contains WA to WJ</b>				
WA	720-0045-000#	1	WAS assembly	
WB	750-5002-000	1	Sensor, dual output, BEI	
WC	602-1087-000	1	Connector arm, steering, long	
WD	675-1191-000	2	Screw, mach, 8-32 x 3 PPH ZP	
WE	676-1054-000	4	Nut, nylock - 8/32NC ZP	
WF	675-1150-000	2	Screw, 8-32 x 1", Allen socket cap, ZP	
WG	675-2031-000	1	Threaded rod, 5/16-24 x 12"	
WH	676-1053-000	4	Nut, 5/16-24 standard ZP	
WI	760-0018-000	2	Rod end swivel with stud, 5/16-24	

WJ	675-2010	2	Bolt - 5/16NC x 3/4 Gr5 ZP	
	678-1077-000	2	Washer, lock 5/16, ZP (bolts WAS assy to mounting bracket WN)	
<b>Bag W3 contains WK and WL</b>				
WK	675-0106-000	2	Clamp, 1-1/4" polypropylene, EDX	
WL	675-2005	2	Bolt - 3/8NC x 3-1/4" Gr5 ZP	
	676-1035	2	Nut, nylock - 3/8NC ZP	
	678-1054	2	Washer, narrow flat - 3/4"OD x 13/32"ID x 1/16" thk ZP	
WM	640-0070-000	1	WAS rod mount, EDX-JD8000	
WN	640-0104-000	1	EDX WAS housing mount, EDX-JD8000	

## Kit Contents - Steering Wheel Switch

Unpack the steering wheel switch kit and identify the required parts as shown. Kit items are A, B, C etc. with an S (Switch) prefix.

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
SA	478-0008	2	Magnet, flex - 1/2"W x 1"L x 1/8"T, plain, 1	
SB	675-0077	1	Epoxy, Hardman 04001 - single double bub	
SC	602-1062	1	Bracket, steering wheel switch mounting	
SD	726-1054 or 051-0443-10	1	Assy, steering wheel switch	
SE	677-2002	4	Tie strap, 7" releasable	
SF	675-1138-000	1	Screw, 8-18 x 3/4 Hex	



# Installation - Automated Hydraulic Steering Kit

## **⚠ WARNING:**

Before installing, disconnecting or repairing the hydraulic hoses and components, turn off the machine 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 machine movement.

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

### 1. Prepare the hydraulic steering block.

**NOTE:** Make sure the hydraulic steering block is clean and dust free.

Prepare the hydraulic steering block **HA** as follows (Figure 1):

- Install adapter fitting **HB** in the LS port.
- Install adapter fittings **HC** in the P, T, A and B ports.

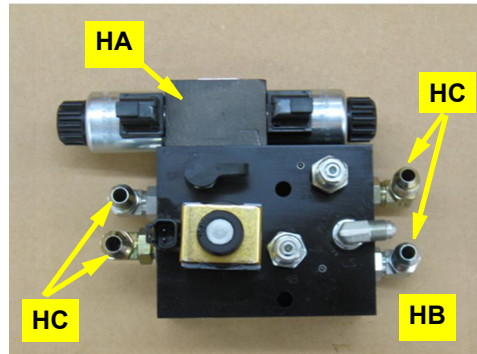


Figure 1: Prepared steering block

### 2. Reposition the test port.

Locate the hydraulic test port at the right rear side of the tractor. Loosen the fittings, and rotate the test port slightly to the left to allow clearance for the mounting bracket (Figure 2). Retighten the test port fittings.



Figure 2: Retightening test port fittings (port rotated)

### 3. Install the mounting brackets.

Install the hydraulic steering block mounting bracket **HD** on the rear tractor casting as shown in Figure 3. Some tractor models have threaded holes, while others have drilled through holes. Use the mounting hardware in group **HE** or **HF**, depending on the type of holes on your machine (Figure 3).

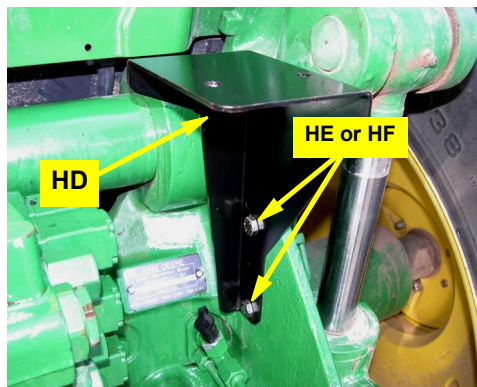


Figure 3: Installed steering block mounting

4. **Install the hydraulic steering block.**

Using hardware in group **HG** install the block **HA** to bracket **HD**. Install the steering output fittings (Figure 4).

- a. Locate the steering lines under the tractor and behind the front axle (Figure 5a).

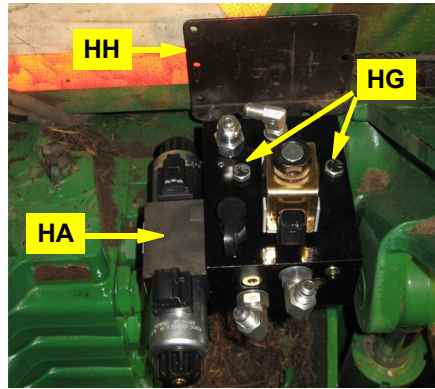


Figure 4: Installed steering block.

- b. Install run-tee fittings **HK** at the junction of the steel and rubber portions of the steering lines (Figure 5b).

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.

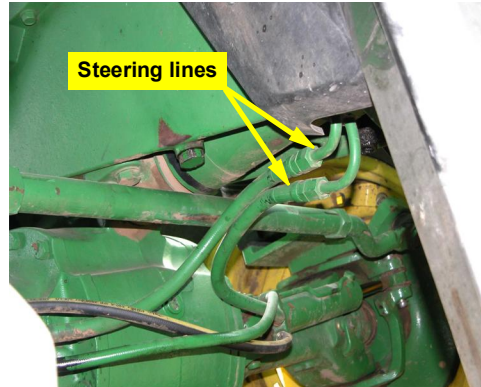


Figure 5a: Steering lines - steel to rubber junction

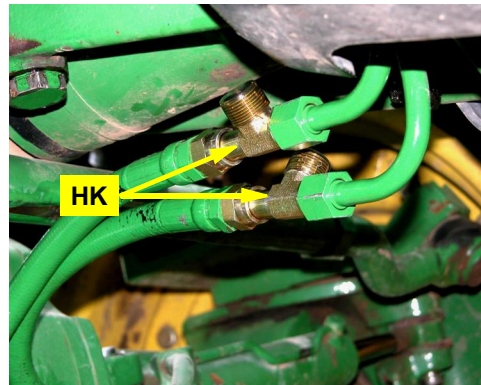


Figure 5b: Run-tees installed in steering lines

5. **Install the steering output hoses.**

- a. Remove the side engine access panel on the left side of the tractor (Figure 6a).

**NOTE:**

*Make sure that plastic caps are inserted in the hose end fittings to prevent dirt from entering during hose routing. A piece of stiff wire may be useful to guide the hose during the routing step.*

- b. Route the two steering hoses **HT** up from underneath the tractor near where the run-tees are installed (Figure 6b). Install the smaller hose end fittings at the back of the tractor.

Run one hose at a time up inside the tractor frame and to the left of the engine flywheel. There is a small track between the existing steel lines and the frame where the steering hoses **HT** should be run as to not make contact with the flywheel. A small corner of the plastic flywheel cover may be trimmed to allow extra clearance for the hoses (Figure 6b).

- c. Once the steering hoses **HT** are routed to the top side of the tractor frame, connect the steering hoses to the run-tees **HK** installed in **step 5** (Figure 6c).

- d. If necessary, use the extra elbow fitting **HL** to properly align the steering hoses and run-tees (Figure 6d).



Figure 6a: Removing the engine access panel

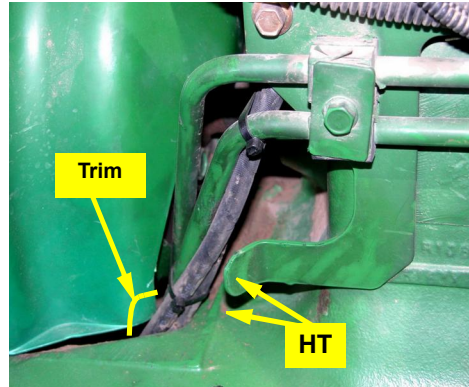


Figure 6b: Routed and tied steering hoses

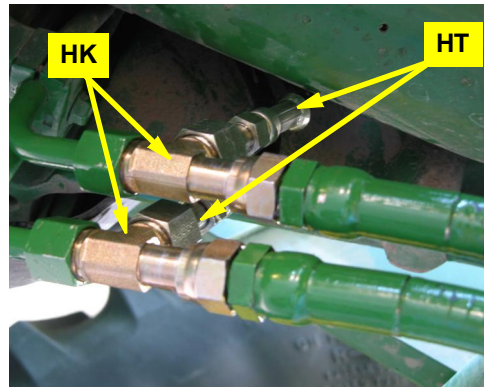


Figure 6c: Steering hoses connected at run-tees

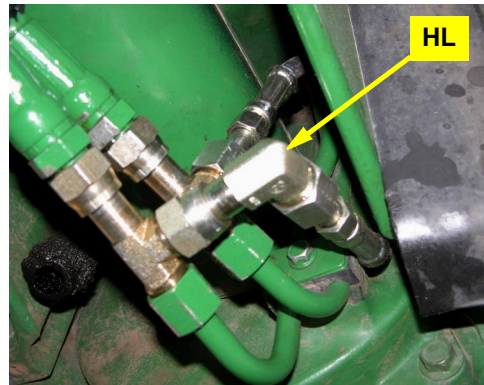


Figure 6d: Extra elbow fitting used at one run-tee (if required)

6. **Install the steering output hoses (continued).**

e. Continue routing the steering hoses on the top side of the tractor following along the existing steel steering lines and under the tractor cab rearward to the hydraulic steering block. Carefully check the hose routing for clearance of moving parts and secure with the provided heavy tie straps **HX** (Figure 6e).

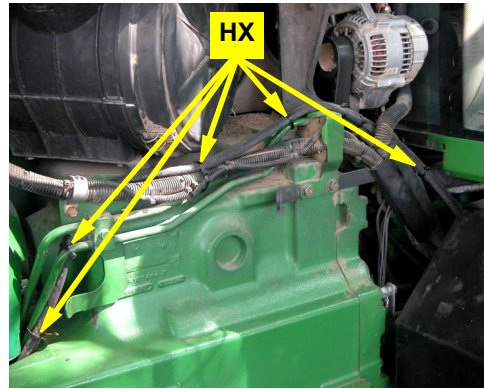


Figure 6e: Steering hoses with tie straps

f. Connect the steering hoses **HT** to the **A** and **B** ports of the hydraulic steering block mounted in step 4 (Figure 6f). Securely tighten all steering output hose fittings, both at the front run-tees and at the rear block.

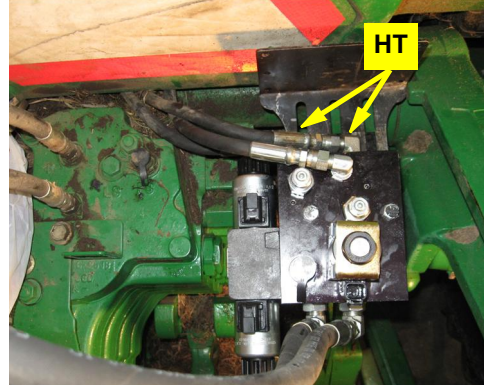


Figure 6f: Steering hoses connected at steering block A and B ports (LS hose also shown connected)

7. **Install the tractor pressure and tank fittings.**

a. Remove test port fittings from the ports labeled **P** and **T** on the top plate of the tractor hydraulic remote valves. Install adapter fittings **HM** in both ports (Figure 7a).

b. If the tractor is equipped with a Power Beyond kit, remove the small steel line connecting the **T** and **LS** ports (Figure 7b-i). Replace the elbow in the **T** port with an adapter fitting **HM** and run-tee **HN**. Install the short hydraulic hose **HU** between the **T** and **LS** ports as shown (Figure 7b-ii). Make certain to reinstall the orifice disk on the elbow end of **HU** in the same way as previously installed in the steel line.

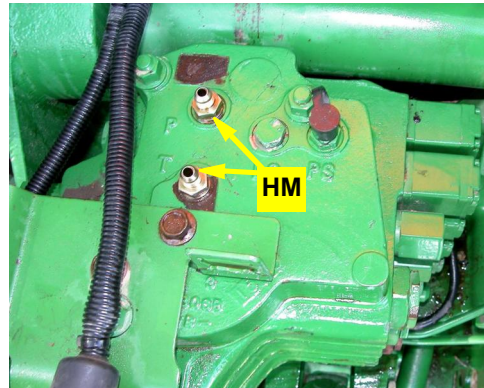


Figure 7a: Fittings installed at P and T test ports (no Power Beyond)

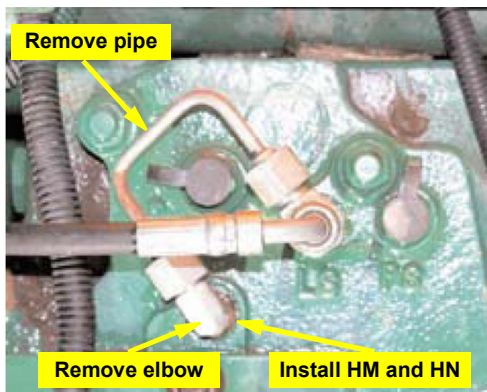


Figure 7b-i: Power Beyond. Steel T to LS line

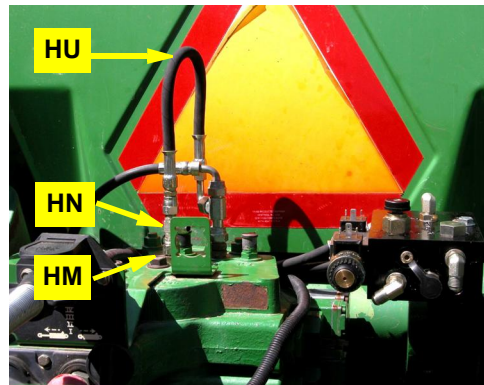


Figure 7b-ii: Power Beyond. Run-tee and hose installed between T and existing LS run-tee

**8. Install the tractor load sense shuttle and fittings.**

- a. Assemble the load sense shuttle **HO** with the included fittings **HP**, **HQ**, and **HR** (Figure 8a).

Locate the load sense test port (that you repositioned at step 2) under the hydraulic block mounting. Trace that fitting forward through the back casting of the tractor. You will install the load sense shuttle at the junction of the fitting coming through the casting and the hydraulic load sense hose that continues on to the tractor hydraulic pump (Figure 8b).

- b. Disconnect the tractor's load sense hose and install adapter fitting **HS** at the casting fitting (Figure 8b).
- c. Connect female swivel elbow **HP** on the load sense shuttle to adapter **HS** on the casting (Figure 9b).
- d. Reconnect the tractor's load sense hose to adapter **HQ** on the load sense shuttle (Figure 9b). Be careful not to allow grease and dirt to enter the fittings (Figure 9b).

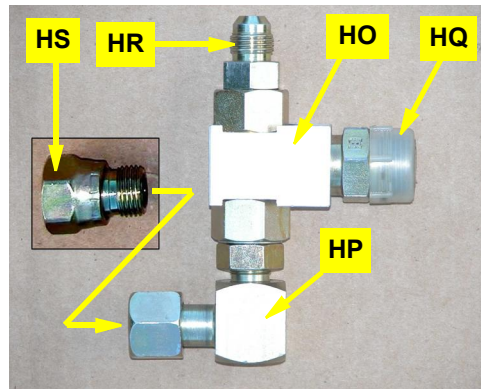


Figure 8a: Assembled load sense shuttle

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

- a. Install the pressure and tank hoses **HW** between the tractor's **P** and **T** ports and the **P** and **T** ports of the hydraulic steering block (Figure 9a).

**NOTE:** *With the Power Beyond option, connect the **HW (T)** hose to the open end of run-tee **HN** installed at 7b.*

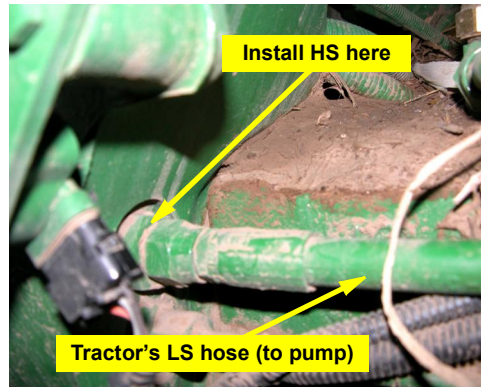


Figure 8b: Load sense shuttle location

- b. Install the load sense hose **HV** between the **LS** port of the hydraulic steering block (Figure 9a) and the open end of the load sense shuttle **HR** installed in **step 8** (Figure 9b).

Make sure all hoses are routed properly and free from entanglement. Use heavy tie straps **HX** as needed. Securely tighten all hydraulic hose fittings and adapters.

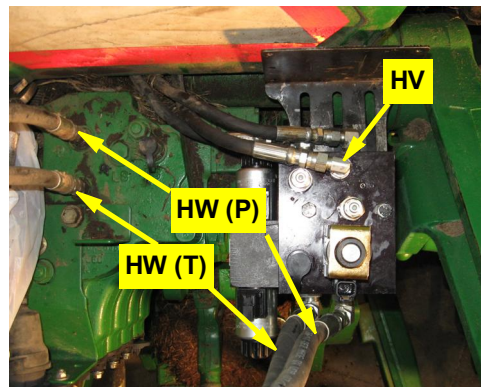


Figure 9a: Installed P and T (and LS) hoses - with no Power Beyond (see Note after step 9a)

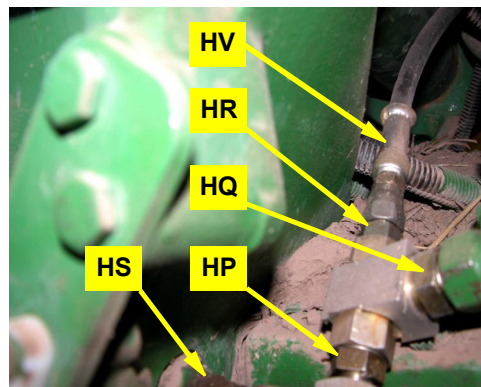


Figure 9b: Installed load sense shuttle

## 10. Verify operation.

### **⚠️ WARNING:**

*During tests of the hydraulic system, the machine may move unexpectedly. Be prepared for machine 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 connections and clean up the installation area around the tractor and make certain that it is safe to operate.
- b. Start the tractor and check hydraulic connections for any leaks.
- c. Rotate the steering wheel from one extreme to the other and back.

# Installation - Wheel Angle Sensor (WAS)

## ⚠ WARNING:

Switch off the machine's engine while installing or adjusting the WAS. 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.

### 1. Prepare the wheel angle sensor.

- a. Using the provided hardware **WD** and **WE**, attach the WAS **WB** to the WAS housing **WA**. Install the bolts up through the bottom of the housing. The WAS wire connector **WB** can be mounted 90° to any of the WAS housing sides (Figure 1a).

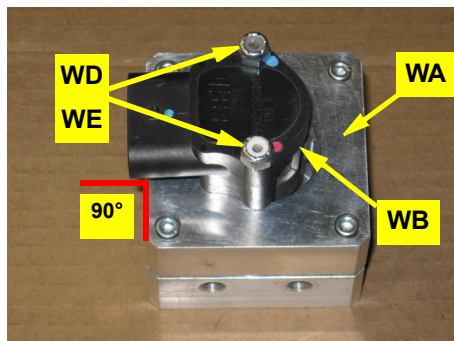


Figure 1a: Prepared WAS housing/connector

- b. Cut four holes off the WAS arm **WC** at the opposite end from the WAS shaft mounting hole (Figure 1b).

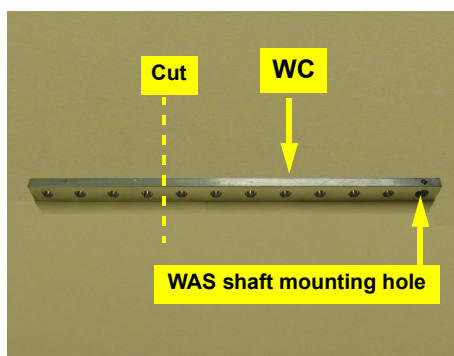


Figure 1b: WAS connector arm preparation

- c. Using hardware **WE** (nut) and **WF** (screw), attach the cut WAS arm **WC** to the WAS assembly. The arm should be mounted in the same direction as the WAS wire connector **WB** (Figure 1c).

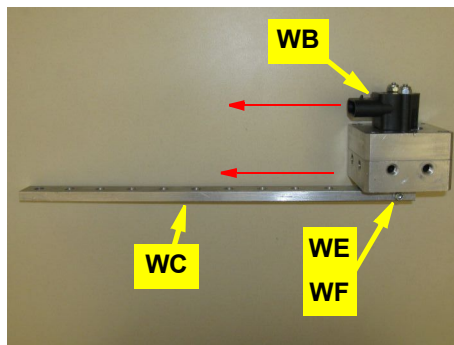


Figure 1c: Attached WAS arm

- d. Check which axle type your tractor has. The axle type determines the length of the cut threaded rod and assembled threaded rod (Figures 1d-i and 1d-ii).

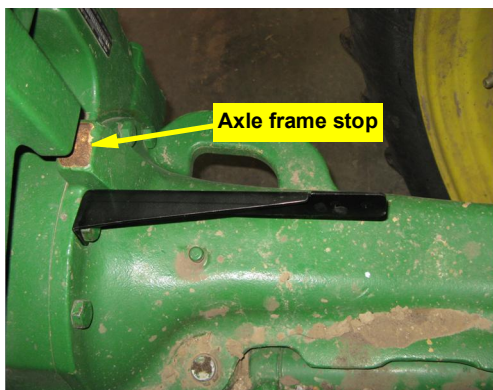


Figure 1d-i: 1st axle type

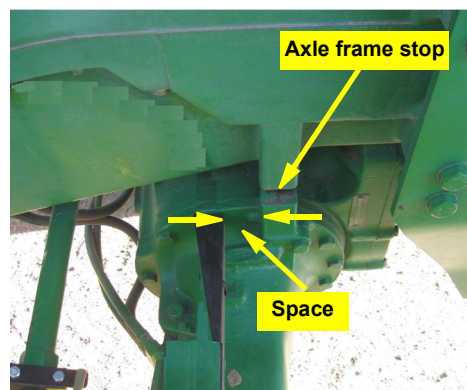


Figure 1d-ii: 2nd axle type

1. Prepare the wheel angle sensor (continued).

**NOTE:**

Before you cut the threaded rod **WG** at step 1e, screw the provided nuts **WH** onto the rod so that they are inside the cut you will make. After you have cut the rod, the nuts can help clean the threads.

- e. For axles with housing bolts close to the axle frame stop (1st axle type) cut the rod to be  $5\frac{3}{4}$ " long (Figure 1e-i)

For axles with housing bolts further away from the axle frame stop (2nd axle type) cut the rod to be  $2\frac{3}{4}$ " long (Figure 1e-ii).

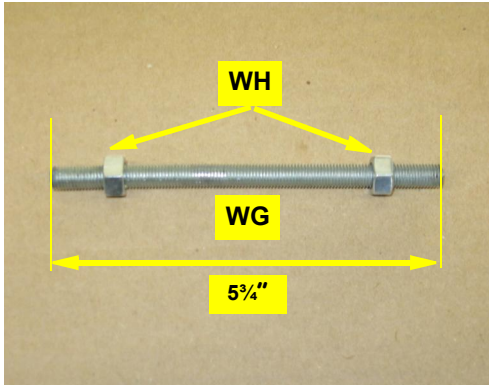


Figure 1e-i: Cut threaded rod - 1st axle type

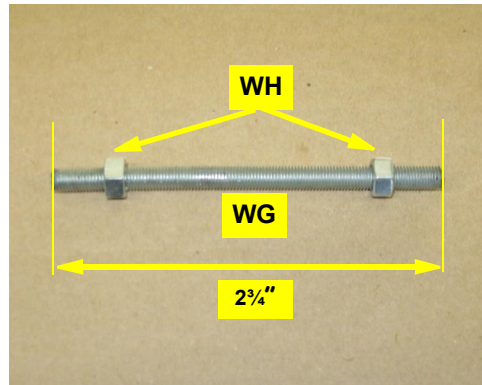


Figure 1e-ii: Cut threaded rod - 2nd axle type

- f. Screw the lock nuts **WH** and swivel rod ends **WI** onto the cut threaded rod **WG**. For axles with housing bolts close to the axle frame stop (1st axle type) set the center-to-center stud measurement to 7" (Figure 1f-i). Leave **WH** loose until you complete linkage adjustment at step 2e.

For axles with housing bolts further away from the axle frame stop (2nd axle type) set the center-to-center stud measurement to 4" (Figure 1f-ii). Leave **WH** loose until you complete linkage adjustment at step 2e.

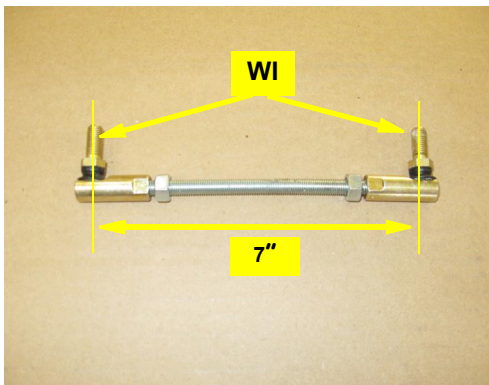


Figure 1f-i: Assembled threaded rod - 1st axle type

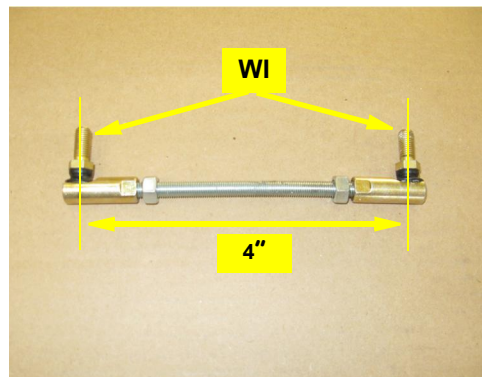


Figure 1f-ii: Assembled threaded rod - 2nd axle type



2. **Install the WAS.**

**NOTE:**

*In the following section the photos are of the first axle type where the WAS mounting bracket bolt is close to the axle frame stop. If your tractor has the second axle type, mount the bracket accordingly.*

- a. Locate the top front axle bolt, next to the axle stop, on the right side of the tractor. Install the WAS mounting bracket **WN** here (Figures 2a-i and 2a ii)

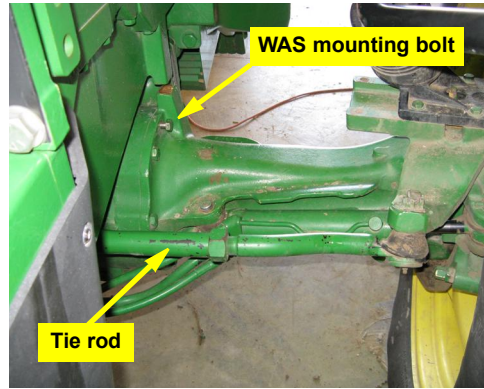


Figure 2a-i: WAS mounting bracket location



Figure 2a-ii: Installed WAS mounting bracket

- b. Use the provided hardware **WL** to install the clamp **WK** and rod mount **WM** to the tie rod next to the lock nut (Figure 2b).

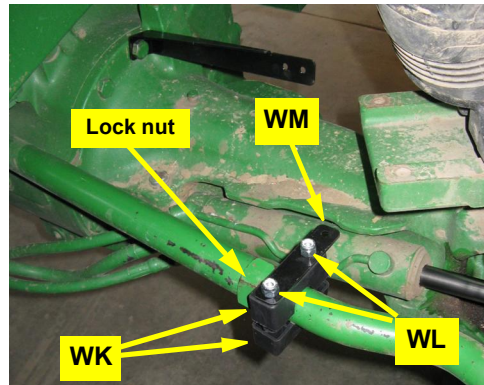


Figure 2b: Installed link clamp and bracket

- c. Use the provided hardware **WJ** to attach the WAS assembly to the bracket **WN**. Make sure the WAS connector is facing towards the tractor centerline (Figure 2c).

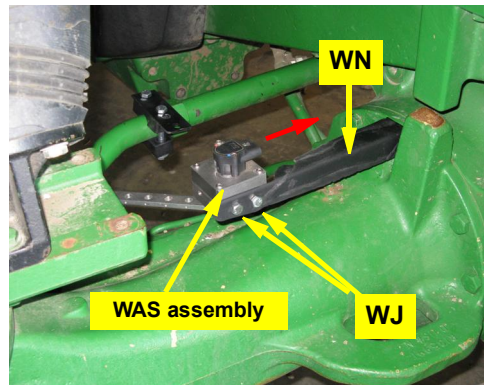


Figure 2c: Installed WAS assembly

2. **Install the WAS (continued).**

- d. Using the remaining hardware **WH**, install the assembled WAS linkage from step 1f between the rod bracket **WM** and the last hole in the WAS connector arm **WC**. Install the linkage with the swivel studs downwards but leave the swivel stud nuts **WH** loose (Figure 2d).

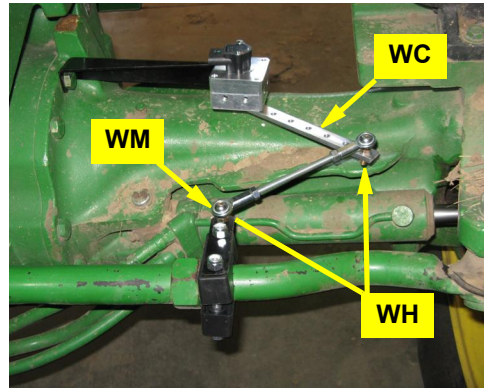


Figure 2d: WAS linkage rod connected

- e. With all hardware **WH** loose, slowly turn the wheels full left lock then full right lock (Figures 2e and 2f). Check that the linkage moves freely without binding and adjust the linkage if necessary.
- f. When the linkage does move freely and without binding, tighten hardware **WH** on the rod and the swivels.



Figure 2e: Full left lock



Figure 2f: Full right lock

# Installation - Steering Wheel Switch (SWS)

## 1. Prepare the aluminum bracket.

- a. Drill a 3/16" hole in the opposite end from the already drilled hole in the sensor bracket **SC** (Figure 1a).

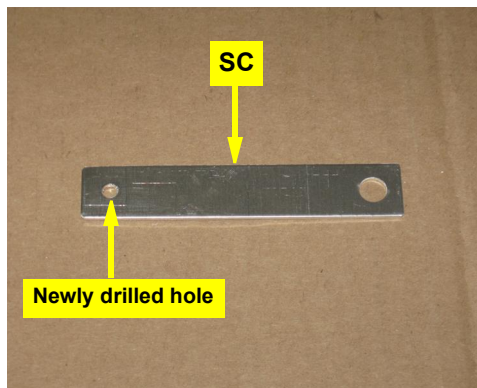


Figure 1a: Newly drilled sensor bracket

- b. Put a 90° bend in the center of sensor bracket **SC** (Figure 1b).



Figure 1b: Newly bent sensor bracket

- c. Connect sensor **SD** to sensor bracket **SC** (Figure 1c).

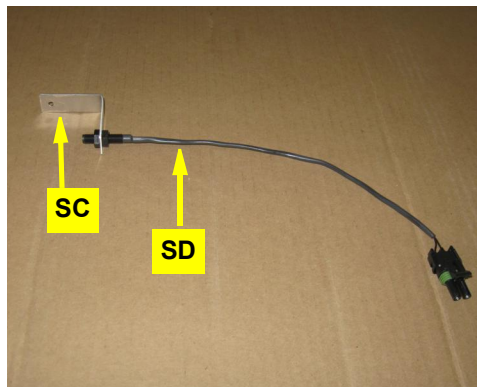


Figure 1c: Sensor installed in sensor bracket

## 2. Attach the magnets to steering shaft.

- a. The magnets will be installed on the steering shaft with the top of the magnet 1/4" from the top of the mat border. Clean this area thoroughly.
- b. Mix epoxy **SB** as directed on package.
- c. Using the epoxy, attach both magnets **SA** 180° from each other on the steering shaft (Figure 2).

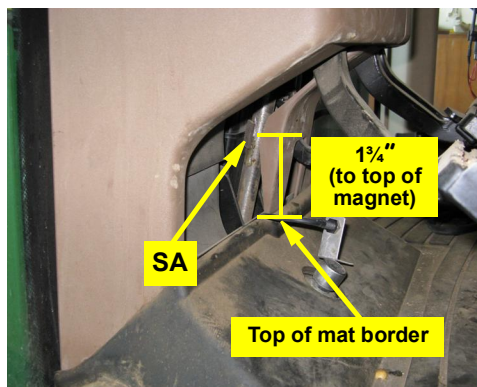


Figure 2: Magnets installed

3. **Attach the aluminum bracket and sensor.**
  - a. Measure 1½" up the plastic steering shaft cover from the top of the mat border.
  - b. Using self-tapping screw **SF** provided, attach sensor bracket **SC** to the plastic cover at the point you measured (Figure 3).
  - c. Using the two plastic nuts on the sensor position the sensor tip 1/8" to 1/4" from magnets.

**NOTE:** *After installation, turn the steering wheel to check for clearance between magnets and sensor.*

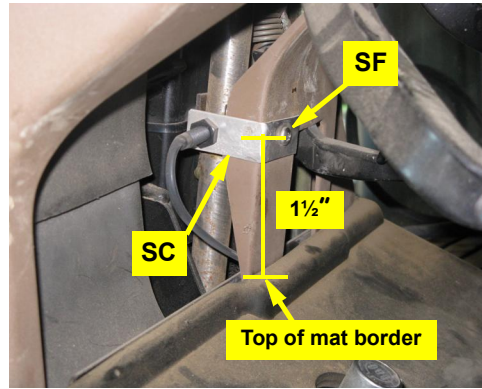


Figure 3: Installed sensor bracket and sensor

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