

Automated Steering Kit Installation Guide


Kit: EDX-JD9000, P/N 911-2009-000

Fits John Deere Models:

9100	9120	9230
9200	9220	9330
9300	9320	9430
9400	9420	9530
	9520	9630
	9620	



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 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

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 kits 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 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.

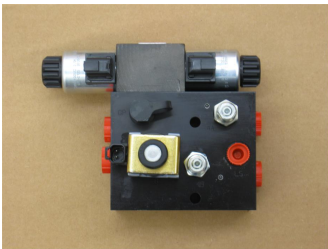



Before attempting to install any of the components, park the machine on a clean level floor with adequate clearance to work all around.

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	760-0021-000	1	Assy, hyd valve block - 35L/Proportional (Hydraulic steering block)	
Bag H1 contains HB and HC				
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)	
HD	640-0003-000	1	Hyd block mnt, JD9000	

Kit Contents - Steering Hydraulics (continued) Kit Contents - Steering Hydraulics (continued)

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
Bag H2 contains HE				
HE	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 HI, HJ, HK and HL				
HI	760-2069	2	Adapter, hyd run tee - #8ORFF	
HJ	760-2004	2	Adapter, hyd run tee - #10 ORFF	
HK	760-2001	2	Adapter, hyd - #10femORFF x #8maleORFF	
HL	760-2063	2	Adapter, hyd - #6maleJIC x M14maleORB	
Bag H5 contains HM, HN, HO, HP and HQ				
HM	760-0002	1	Hyd load shuttle - #6femORB	
HN	760-2058	1	Adapter, hyd 90 elbow - #6maleJIC x #6maleORB	
HO	760-2041	1	Adapter, hyd - #6maleORB x #6femJICswiv	

Kit Contents - Steering Hydraulics (continued)

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
HP	760-2049	1	Adapter, hyd 90 elbow - #6maleORFF x #6maleORB	
HQ	760-2053	1	Adapter, hyd - #6maleJIC x #6femORFFswiv	
HR	760-1007	2	Hose, hyd - 3/8" x 82", #6femJICswiv x #8femORFFswiv 90 elbow	
HS	760-1008	2	Hose, hyd - 3/8" x 80", #6femJICswiv x #6femJICswiv 90 elbow	
HT	760-1026	1	Hose, hyd - 1/4" x 43", #6femJICswiv both ends	
HU	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
Bag 710-0099-000 W1 contains WA to WJ				
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	

Kit Contents - Wheel Angle Sensor *(continued)*

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
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	
WK	675-0130-000	1	Clamp, 4.34"-4.03" Tbolt, SS	
WL	675-0131-000	1	Clamp, 4.84"-4.53" Tbolt, SS	
Bag W3 contains WM				
WM	675-2019	2	Bolt - 1/4NC x 1/2 Gr5 ZP	
	678-1053	2	Washer, flat - 1/4" ZP	
	676-1034	2	Nut, lock - 1/4NC ZP	
WN	640-0086-000	1	Bracket, WAS assembly mount	




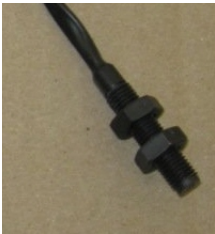


Kit Contents - Wheel Angle Sensor *(continued)*

WO	640-0101-000	1	Bracket, WAS rod mount
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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	Assembly, steering wheel switch	
SE	677-2002	4	Tie strap, 7" releasable	
SF	675-1138-000	1	Screw, self drilling - 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.

Remove the plastic plugs and install elbow adapter **HB** in the **LS** port and elbow adapters **HC** in the **P**, **T**, **A** and **B** ports (Figure 1).

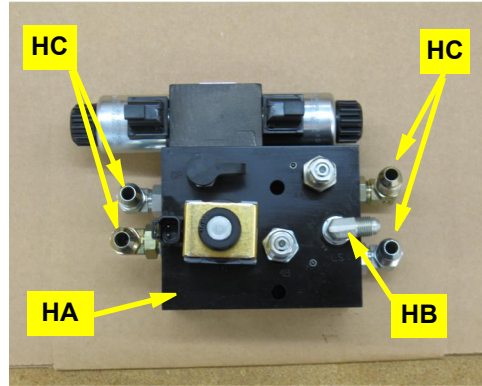


Figure 1: Prepared hydraulic block

2. Install the hydraulic steering block mounting bracket.

a. Locate the carriage bolts in the right rear fender of the tractor. Remove the top front carriage bolt (Figure 2a).

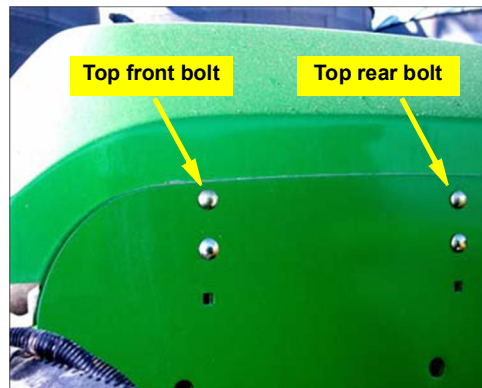


Figure 2a: Top carriage bolts right rear fender
Steering block mounting location

b. Install the hydraulic block mounting bracket **HD**, with its block mounting holes vertical, on the fender with the carriage bolt (Figure 2b).

NOTE: If the tractor is equipped with a weight carrier bracket you may need to install the steering block mounting bracket onto the fender at the top rear carriage bolt (Figure 2b, alternative location 1).

Also, if the tractor is equipped with weights on the rear fender, locate the bolt holes (circled) below the carriage bolts and mount the bracket there (Figure 2b, alternative location 2). You will need a carriage bolt similar to those used at the other two possible locations.

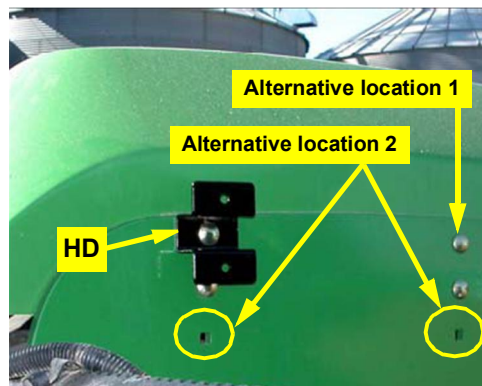


Figure 2b: Installed steering block mounting

3. **Install the hydraulic steering block.**
 - a. Place the hydraulic steering block **HA** against the bracket **HD** and secure with hardware **HE**. (Figure 3).

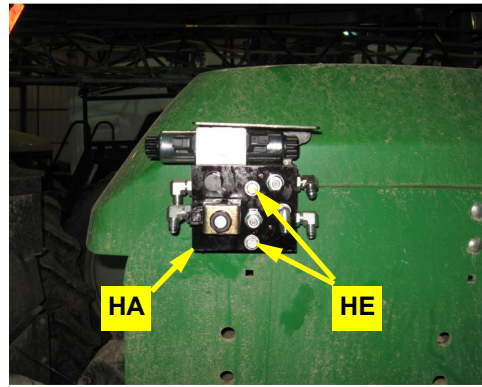


Figure 3: Installed steering block

4. **Install the steering output fittings.**

NOTE: Leave the run tees, installed in these steps, 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.

For the 00, 20 and 30 series tractors

- a. Locate the steering lines on the right side of the tractor on the center section above the right steering cylinder (Figure 4a). Disconnect the steering lines at the junction of the steel and rubber sections.

NOTE: Ensure that the steel lines are not subjected to any bending forces while installing and tightening fittings.

For the 00 and 20 series tractors

- b. Install the run tees **HI** between the steel and rubber sections of the steering lines (Figure 4b).

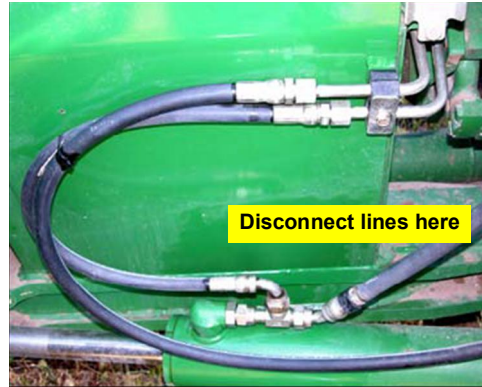


Figure 4a: Steering lines - junction of steel and rubber sections

For the 30 series tractors

- c. Install adapters **HK** on run tees **HJ** then install the run tee assemblies between the steel and rubber sections of the steering lines (Figure 4c).

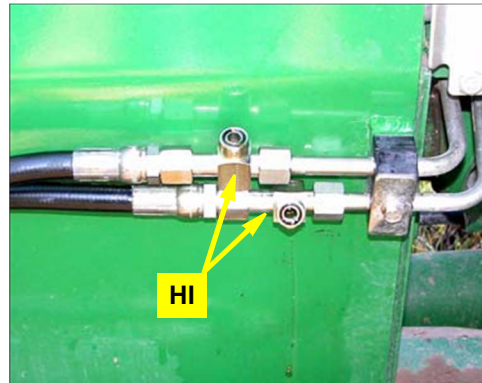


Figure 4b: Run tees installed in steering lines (00 and 20 series)

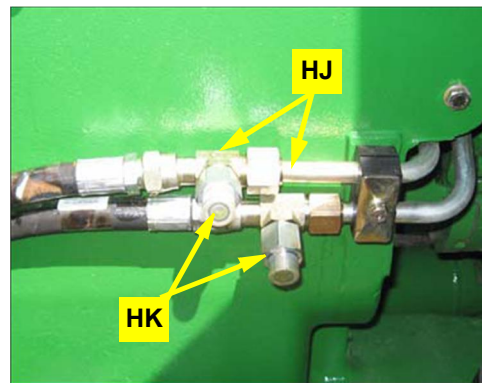


Figure 4c: Adapters and run tees installed in steering lines (30 series)

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

For the 00 and 20 series tractors

- a. Connect the steering output hoses **HR** to the run tees **HI** installed in step 4. Route the hoses up to the hydraulic steering block. To prevent entanglement with articulating parts of the tractor, route the hoses adjacent to other tractor plumbing, and secure with heavy duty tie straps **HU** (Figure 5a).
- b. Connect the steering hoses **HR** to the fittings **HC** in the **A** and **B** ports on the hydraulic steering block (Figure 5b).

For the 30 series tractors

- a. Connect the steering output hoses **HR** to fittings **HK** fitted to the run tees **HI** installed in step 4. Route the hoses up to the hydraulic steering block. To prevent entanglement with articulating parts of the tractor, route the hoses adjacent to other tractor plumbing and secure with heavy duty tie straps **HU** (Figure 5a).
- b. Connect the steering hoses **HR** to the fittings **HC** in the **A** and **B** ports on the hydraulic steering block (Figure 5b).

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

- a. Remove the test port fittings from the ports marked **P** and **T** on the top plate of the tractor hydraulic remote valves. Install adapter fittings **HL** in both ports (Figure 6a-i - showing **HL** only in **P** port).

See Figures 6a-ii to 6a-iv for the location of the **P** and **T** ports on optional top plates.

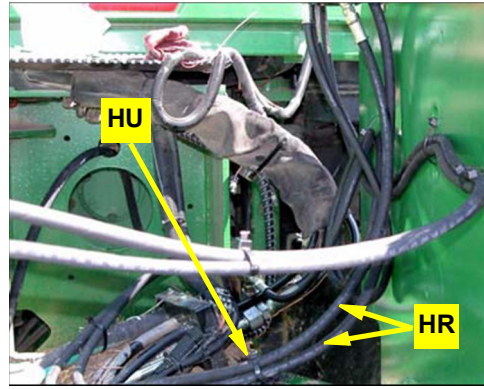


Figure 5a: Steering output hoses routed and secured between run tees and steering block

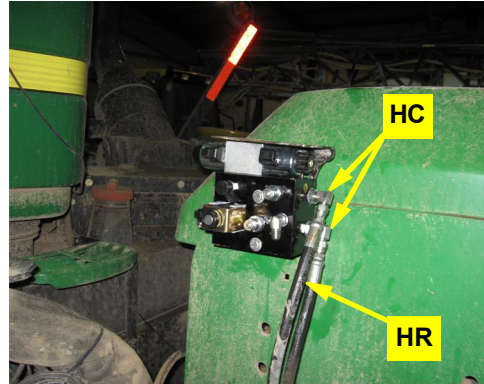


Figure 5b: Steering output hoses connected at steering block

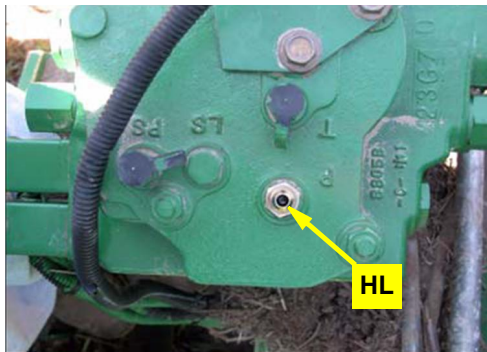


Figure 6a-i: Adapter fitting in remote valves top plate P port. Repeat for T port

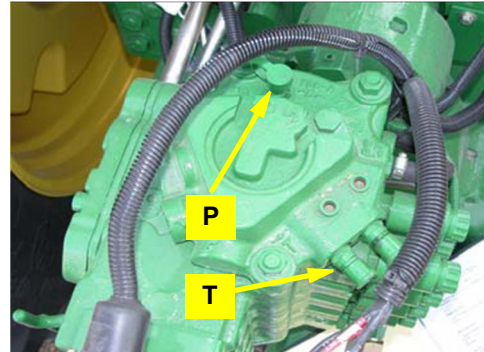


Figure 6a-ii: P and T ports, optional top plate 2

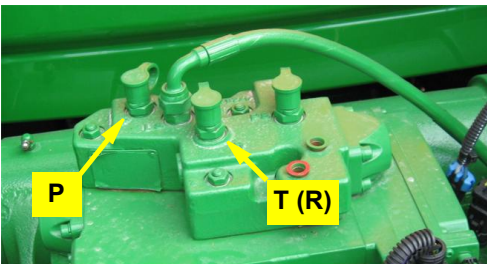


Figure 6a-iii: P and T (R) ports, optional top plate 3

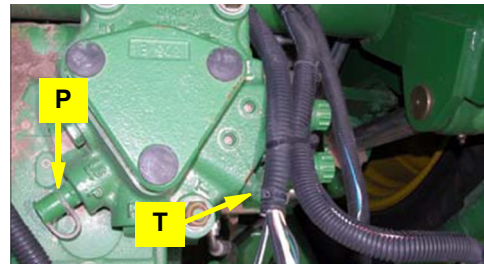


Figure 6a-iv: P and T ports, optional top plate 4

6. Install the tractor pressure and tank fittings (continued).

- b. If your tractor is equipped with the high-flow hydraulic option (5-remote valve stack) do not use the **P** test port on the top plate of the tractor hydraulic remote valves. Instead, install adapter fitting **HL** in the test port on the left side of the valve stack between the bottom three and top two valves (left and right photos in Figure 6b). This will supply pressure to the hydraulic steering block.

Install the other adapter fitting **HL** in the **T** test port on the top plate (Figures 6a-i to 6a-iii).

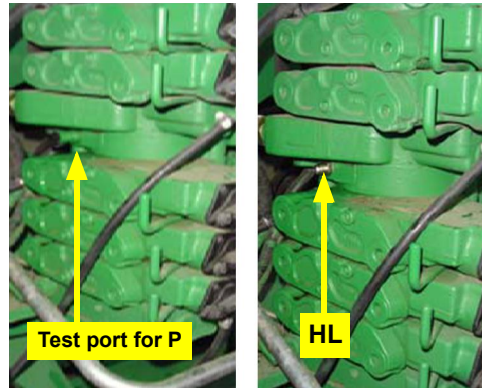


Figure 6b: Test port for pressure (left photo). Test port with fitting (right photo)

7. Install the load sense shuttle valve and fittings.

- a. Assemble the load sense shuttle valve **HM** with the adapter fittings **HN**, **HO** and **HP** (Figure 7a).

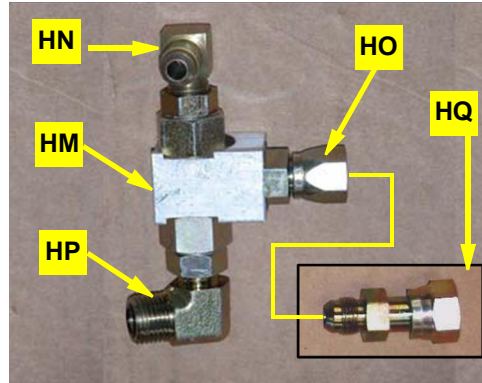


Figure 7a: Assembled load sense shuttle valve

- b. Locate the tractor load sense line towards the front of the rear section. Disconnect the line at the junction of the steel line and the rubber hose. Connect the steel line to shuttle valve adapter **HP** and the rubber hose to adapter **HQ** installed in shuttle valve adapter **HO** (Figure 7b). Do not allow grease and dirt to enter the fittings.

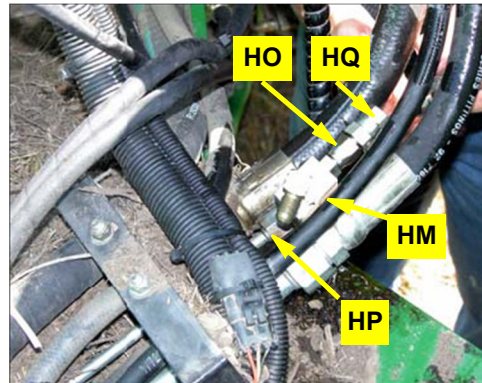


Figure 7b: Load sense shuttle valve location - rubber hose not yet connected.

8. Install the pressure, tank, and load sense hoses.

- a. Install the pressure and tank hoses **HS** between the tractor **P** and **T** ports (see step 6) and the **P** and **T** ports on the hydraulic steering block. Use tie straps **HU** as required to secure hoses (Figures 8a-i and 8a-ii).

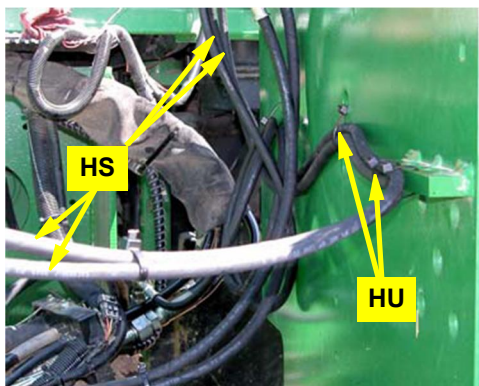


Figure 8a-i: Hose routing between tractor P and T ports and steering block

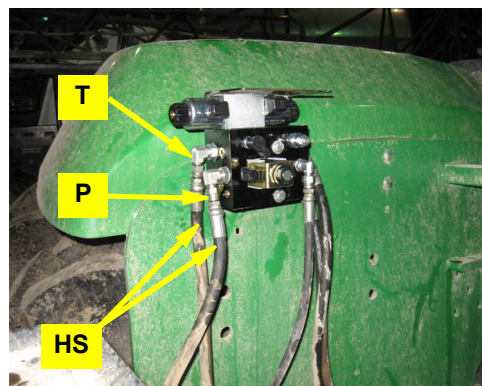


Figure 8a-ii: P and T hoses connected at steering block

Install the pressure, tank, and load sense hoses (continued).

- b. Install the load sense hose **HT** between the **LS** port on the hydraulic steering block and load sense shuttle valve adapter **HN** (Figure 8b).

Make sure all hoses are routed properly and free from entanglement. Use heavy duty tie straps **HU** as needed.

9. **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.

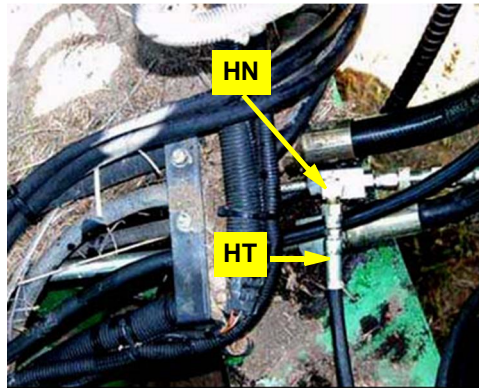


Figure 8b: Load sense hose at shuttle

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 **WE** (nuts) and **WD** (bolts - not shown), attach the WAS wire connector **WB** to the WAS housing **WA**. Install the bolts up through the bottom of the housing. The WAS wire connector **WB** can be mounted 45° to any of the WAS housing **WA** sides (Figure 1a).
- b. Cut four holes off the WAS arm **WC** at the opposite

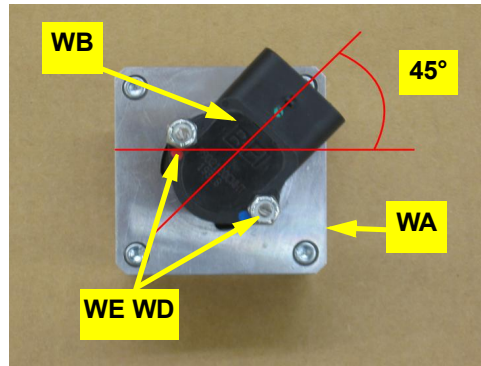


Figure 1a: Prepared WAS housing/connector

- c. Attach the WAS arm **WC** to the WAS assembly using the provided hardware **WF** (screw) and **WE** (nut). Mount the arm in the same direction as the WAS wire connector **WB** (Figure 1c).

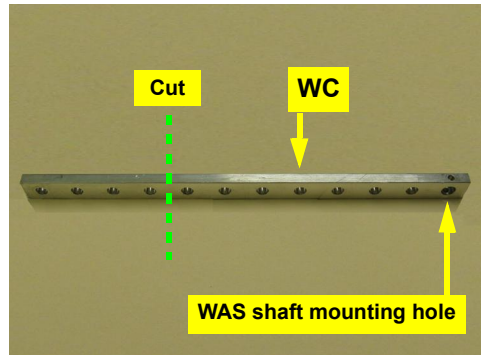


Figure 1b: WAS arm preparation

NOTE:

*Before you cut the rod at step 1d, 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.*

- d. **9000 Series:** Cut the provided threaded rod **WG** to 9½" long then screw the swivel rod ends **WI** onto the cut threaded rod to achieve a center-to-center stud measurement of 10¾" (Figures 1d-i and 1d-ii). Leave **WH** loose until you complete linkage adjustment at step 2g.

9020 and 9030 Series: Do not cut the threaded rod **WG**. Screw the swivel rod ends **WI** onto the threaded rod to achieve a center-to-center stud measurement of 13¼" (Figure 1d-ii). Leave **WH** loose until you complete linkage adjustment at step 2g.

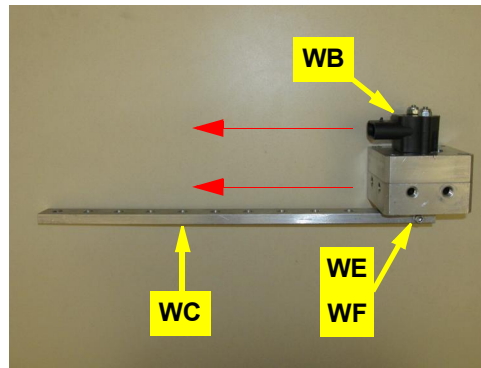


Figure 1c: Attached WAS arm

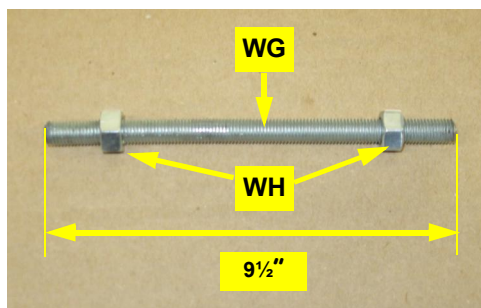


Figure 1d-i: Cut threaded rod (9000 only)

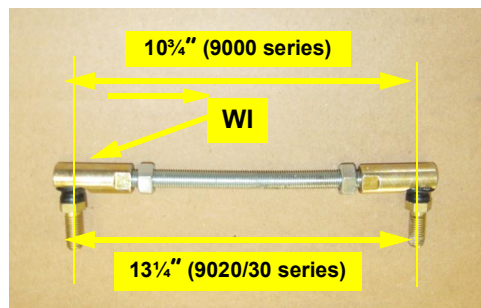


Figure 1d-ii: Assembled threaded rod (9000 - 9020/30)

2. **Mount the wheel angle sensor.**
- a. Locate the two pin bolts at the ram end of the left steering cylinder near the tractor articulation point. Remove the two pin bolts. **DO NOT REMOVE THE RETAINING PLATE** (Figure 2a with inset).

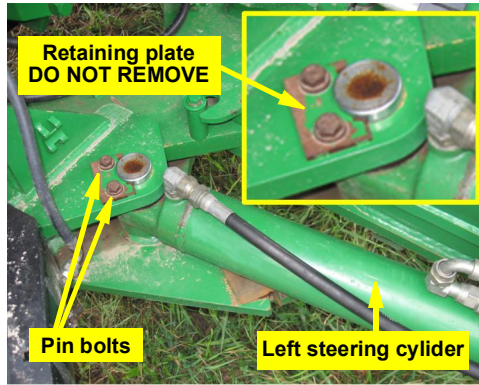


Figure 2a: Pin bolts and retaining plate at ram end of left steering cylinder. Retaining plate also inset.

- b. Using the removed pin bolts, install the WAS assembly mounting bracket **WN** (Figure 2b).

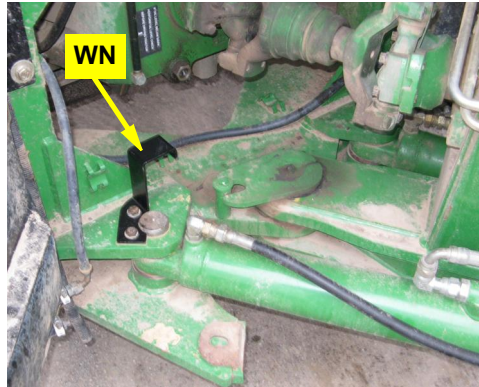


Figure 2b: Installed WAS mounting bracket

- c. Using hardware **WJ**, install the WAS assembly from step 1 to bracket **WN** with the wire connector at the bottom and facing the front right corner of the tractor (Figure 2c).

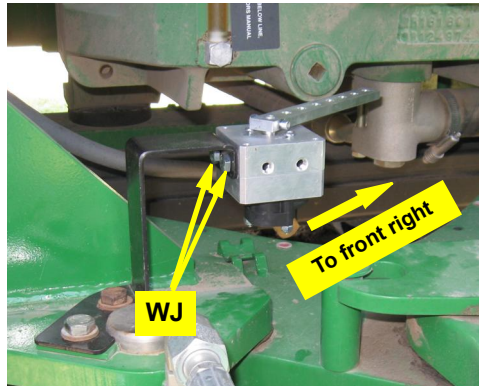


Figure 2c: Installed WAS assembly

- d. Using hardware **WM**, attach clamp **WK** (or **WL** - depending on the diameter of the steering cylinder) to the inside face of the long side of rod bracket **WO** (Figure 2d).

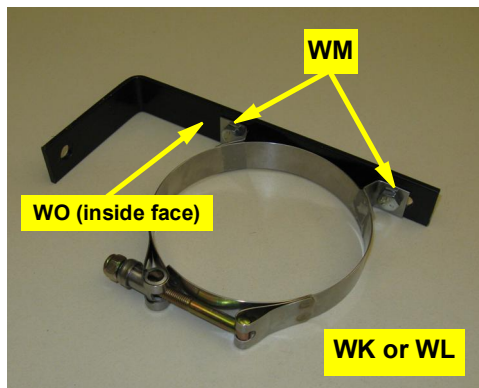


Figure 2d: Assembled clamp and rod bracket

2. **Mount the wheel angle sensor (continued).**

e. **9000 series:** Attach the clamp and bracket assembly **WK** (or **WL**)/**WO** to the left steering cylinder 8" from the center of the cylinder pin. Have the clamp bolt between the cylinder and the articulation linkage. Be sure bracket **WO** is vertical (Figure 2e-i).

9020 and 9030 series: Attach the clamp and bracket assembly **WK** (or **WL**)/**WO** to the left steering cylinder 12" from the center of the cylinder pin. Have the clamp bolt between the cylinder and the articulation linkage. Be sure bracket **WO** is vertical (Figure 2e-ii).

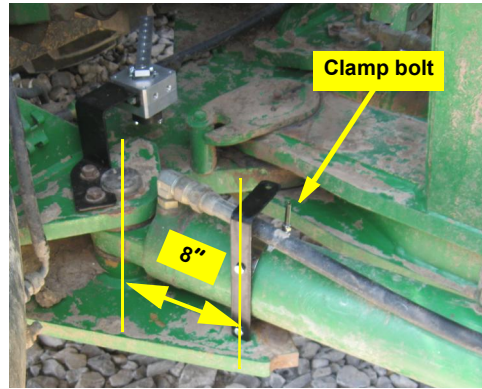


Figure 2e-i: Installed rod bracket assembly (9000 series)

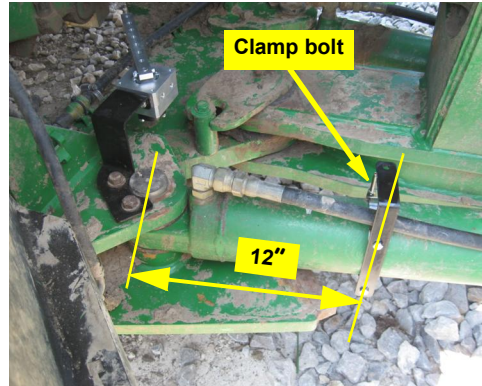


Figure 2e-ii: Installed rod bracket assembly (9020/30 series)

f. Using the remaining hardware **WH** (not visible), install the assembled WAS linkage from step 1d between the rod bracket **WO** and the last hole in the WAS connector arm **WC**. Install the linkage with the swivel studs point downwards but leave nuts **WH** loose (Figure 2f - 9020/30 series shown).

g. With all hardware **WH** loose, slowly turn the wheels full left lock then full right lock (Figures 2g-i and 2g-ii). Check that the linkage moves freely without binding and adjust the linkage if necessary.

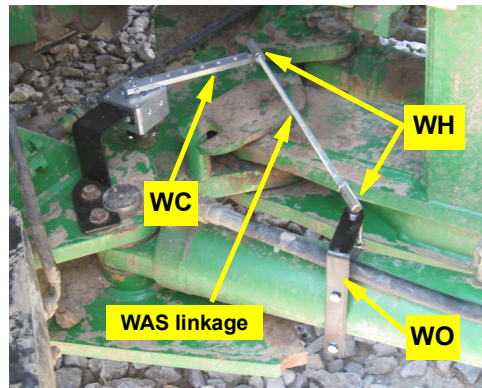


Figure 2f: Installed WAS linkage (9020/30)



Figure 2g-i: Full left lock (9020/30)



Figure 2g-ii: Full right lock (9020/30)

h. When the linkage does move freely and without binding, tighten hardware **WH** on the rod and the swivels.

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 aluminum bracket SC (Figure 1a).

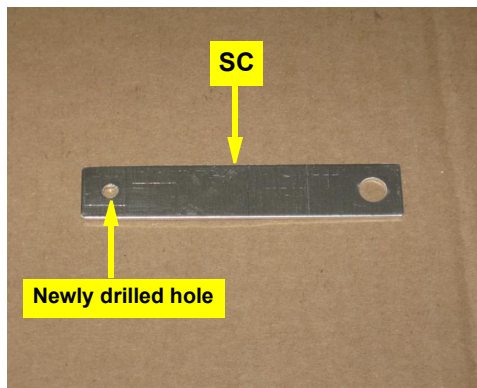


Figure 1a: Newly drilled sensor bracket

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



Figure 1b: Newly bent sensor bracket

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

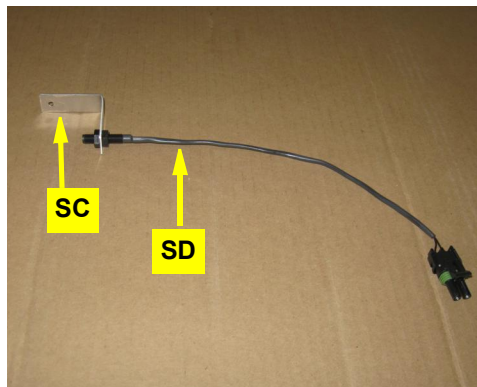


Figure 1c: Sensor installed in sensor bracket

2. Attach the magnets to steering shaft.

- a. The magnets will be installed on the steering shaft with the top of the magnet 1 3/4" 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).

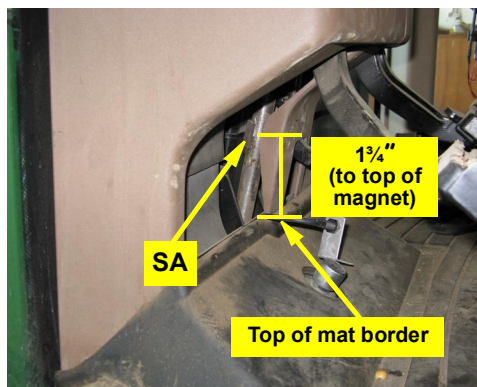


Figure 2: Magnets installed

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-drilling screw **SF**, attach the aluminum bracket/sensor **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.*

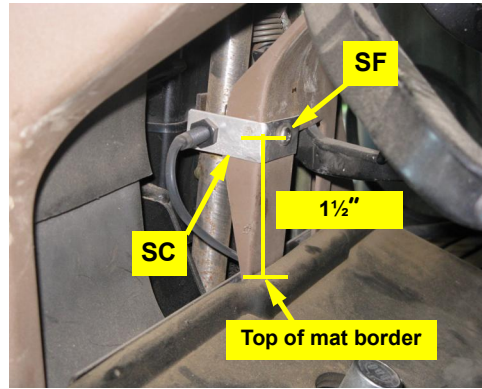


Figure 3: Installed sensor/bracket

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