

Automated Steering Kit Installation Guide


Kit: EDX-JD7020, P/N 911-2018-000

Fits John Deere Tractor Models:

	7630
7720	7730
7820	7830
7920	7930



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 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 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.

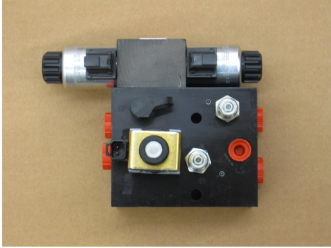



Before attempting to install any of the components, park the machine on a clean level floor with adequate clearance to work all around.

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.


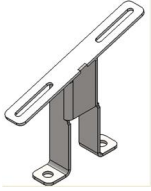
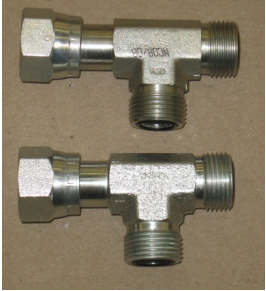

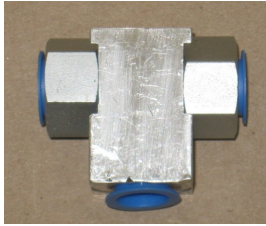
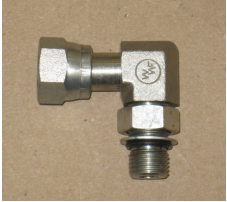

To prevent hydraulic system contamination, it is essential to thoroughly clean hydraulic system fittings and hose connections prior to disconnecting or removing. Use a spray cleaner such as 'Brake Clean' to prevent hydraulic system contamination. Note that o-rings used on ORB and ORFF type fittings, 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	Assembly, hyd valve block - 15L/proportional. (Hydraulic steering block)	
Bag H1 contains HB, HC and HD				
HB	760-2061-000	3	Adapter, hyd 90 elbow - #6maleJIC x #8maleORB (T, A and B ports on hydraulic steering block)	
HC	760-2060-000	1	Adapter, hyd #6maleJIC x #8maleORB (P port on hydraulic steering block)	
HD	760-2058-000	1	Adapter, hyd 90 elbow - #6maleJIC x #8maleORB (LS port on hydraulic steering block)	

Kit Contents - Steering Hydraulics *(continued)*

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
Bag H2 contains HE				
HE	675-2006-000	2	Bolt, 3/8NC x 3 3/4" Gr5, ZP	
	678-1054	2	Washer, flat - 3/8" ZP	
	676-1035	2	Nut, nylock - 3/8NC ZP	
HH	640-0103-000	1	T bracket (SMV sign to hydraulic steering block)	
Bag H3 contains HJ and HK				
HJ	760-2069	2	Adapter, hyd run tee - #8 ORFF	
HK	760-2063	2	Adapter, hyd - #6maleJIC x M14maleORB	
Bag H4 contains HL, HM, HN, HO and HP				
HL	760-0002	1	Assembly, hyd load shuttle - #6femORB	
HM	760-2040	1	Adapter, hyd 90 elbow - #6maleORB x #6femORFF swivel	
HN	760-2058	1	Adapter, hyd 90 elbow - #6maleJIC x #6maleORB	

Kit Contents - Steering Hydraulics (continued)





REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
HO	760-2049	1	Adapter, hyd - #6maleORFF x #6maleORB	
HP	760-2047	1	Adapter, hyd - #6maleORFF x #6femORFF swivel	
HQ	760-1311-000	1	Hose, hyd - 3/8" x 180", #6femJIC x #8femORFF 90 swivel (Steering hose - A or B)	
HR	760-1312-000	1	Hose, hyd - 3/8" x 172", #6femJIC swivel x #8femORFF 90 swivel (Steering hose - A or B)	
HS	760-1047	1	Hose, hyd - 3/8" x 29", #6femJIC swivel x #6femJIC 90 swivel (Pressure hose)	
HT	760-1310-000	1	Hose, hyd - 3/8" x 124", #6femJIC swivel (both ends) (Tank hose)	
HU	760-1004	1	Hose, hyd - 1/4" x 30", #6femJIC swivel (both ends) (Load sense hose)	
HV	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 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	
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	

Kit Contents - Wheel Angle Sensor *(continued)*

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
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 assembly to mounting bracket WN)	
WK	640-0104-000	1	WAS assembly mounting bracket	
WL	675-0129-000	1	WAS link clamp bracket, 1-5/8 1-1/2 Tbolt, SS	

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"Wx1"Lx1/8"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, eDrive steering wheel switch/cable	
SE	677-2002	4	Tie strap, 7" releasable	
Bag W1 contains SF				
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 **HA** is clean and dust free.

Remove the plastic plugs and install adapters as follows (Figure 1):

- **HB** in the **A**, **B** and **T** ports
- **HC** in the **P** port
- **HD** in the **LS** port

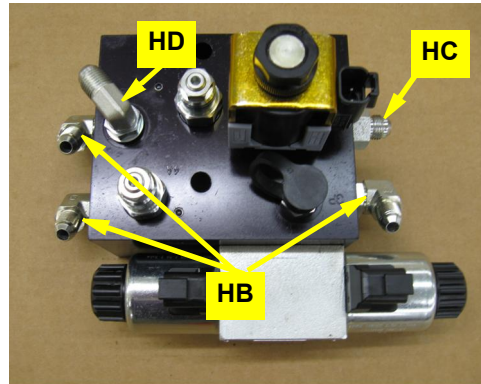


Figure 1: Prepared steering block

2. Mount the hydraulic steering block.

- a. Remove the SMV (slow moving vehicle) triangle from the rear of the tractor (Figure 2a inset).

Enlarge the top bolt hole in the exposed bracket to 3/8" (Figure 2a). Using the steering block as a template, mark then drill a second 3/8" hole in the SMV bracket (the holes center-to-center will be 2-7/8").

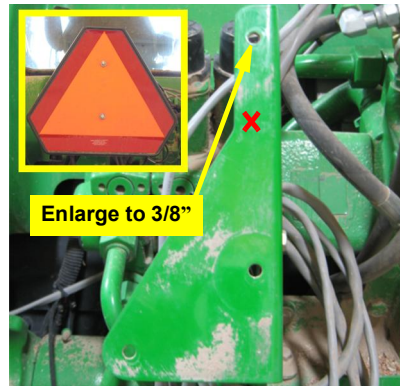


Figure 2a (with inset): Steering block mounting location

- b. Using hardware **HE** (not visible) mount (i) the new SMV bracket **HH** and (ii) the hydraulic steering block **HA** against the original SMV bracket. Install the hydraulic block with its left/right solenoids downwards (Figure 2b).

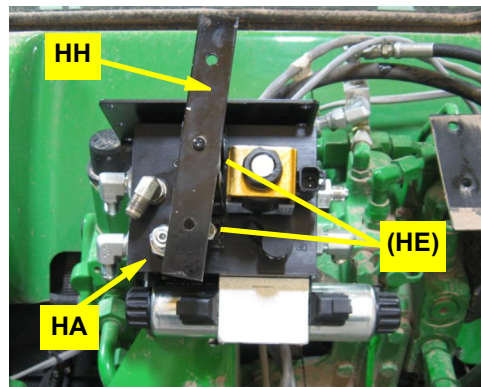


Figure 2b: Installed hydraulic steering block and new SMV sign bracket

3. **Install the steering output fittings.**

Locate the tractor steering lines at the steering cylinder on the front axle of **MFWD** models or inside the left tractor frame of **2WD** models. Install run-tee fittings **HJ** into the steering lines (Figures 3-i and 3-ii with insets). Leave run-tees loose to allow for alignment when attaching hoses.

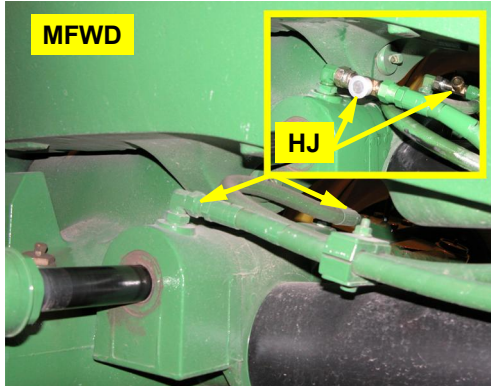


Figure 3-i with inset: **MFWD** - installed steering run-tees

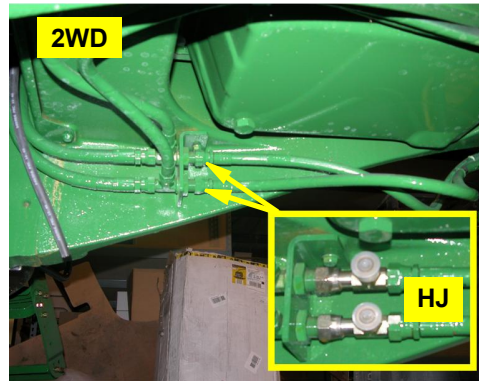


Figure 3-ii with inset: **2WD** - installed steering run-tees

NOTE:

Plastic caps placed on the open ends of the fittings will prevent excessive leakage prior to hose installation.

4. **Install the steering output hoses.**

- a. Connect elbow fitting of steering hoses **HQ** and **HR** to the run-tee fittings **HJ** installed in step 3 (Figures 4a-i and 4a-ii). (Connect the longer hose, **HQ**, to the right-side run-tee.)

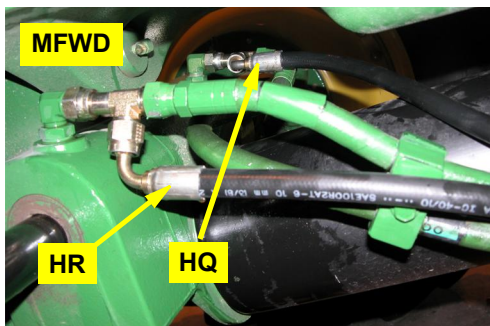


Figure 4a-i: **MFWD** - installed steering output hoses

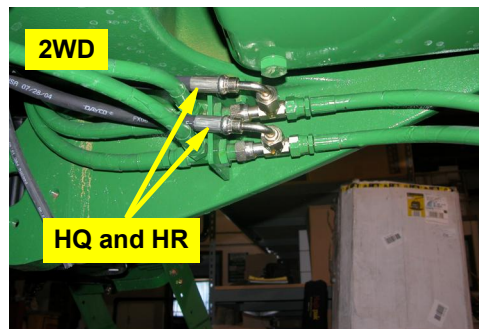


Figure 4a-ii: **2WD** - installed steering output hoses

NOTE:

*The steering hoses will have excess length when used on **2WD** models. Use heavy tie straps **HV** to secure any excess length to prevent entanglement.*

- b. Tie the hoses together using the heavy tie straps **HV**. Continuing the use of tie straps **HV**, route the steering hoses back to the tractor steering lines (Figure 4b, left image) then under the cab (Figure 4b - right image) and back to the hydraulic steering block.

NOTE:

*The routing of the hoses varies slightly between **MFWD** and **2WD** models. In either case, use heavy tie straps **HV** and secure hoses to existing tractor plumbing.*

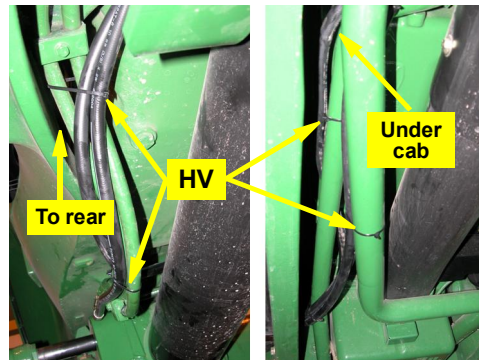


Figure 4b - left and right images: Tied steering hoses routed back to the steering block

4. **Install the steering output hoses (continued).**
- c. Connect hoses **HR** and **HQ** to the fittings **HB** in the A and B ports of the hydraulic steering block (Figure 4c).

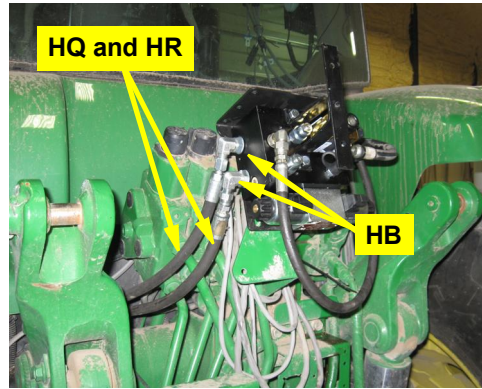


Figure 4c: Steering hoses connected to steering block A and B ports. (You will install the other hoses at step 7.)

5. **Install the pressure and tank fittings.**
- a. Remove the lower test port from the hydraulic valve stack at the rear of the tractor (Figure 5a). Install adapter fitting **HK** (Figure 5a inset). This will be used as the pressure supply of the system.

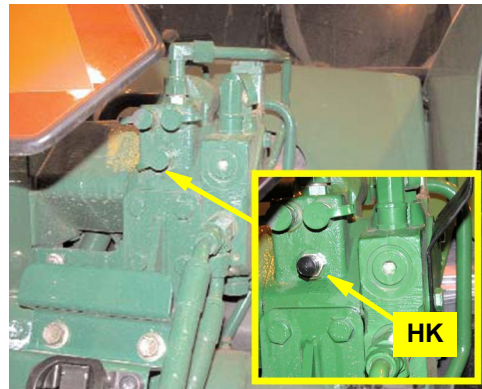


Figure 5a with inset: Installed pressure fitting

- b. Locate the hydraulic filter under the left side of the cab. Remove the test port from the filter head (Figure 5b) and install adapter **HK** (Figure 5b inset). This will be used as the tank return of the system.



Figure 5b with inset: Installed tank fitting

6. **Prepare and install the load sense shuttle valve.**
- a. Assemble the load sense shuttle valve **HL** with fittings **HM**, **HN** and **HO**. Connect **HP** to **HO** (Figure 6a).

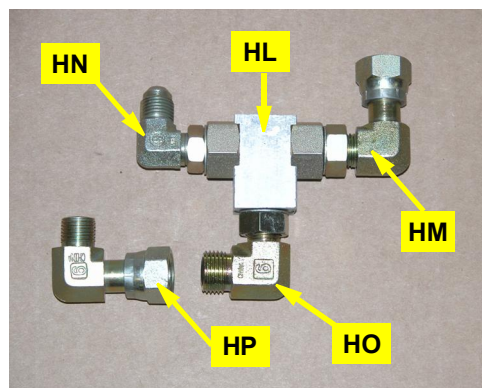


Figure 6a: Prepared load sense shuttle valve

6. **Prepare and install the load sense shuttle valve**
(continued).

b. Locate the tractor's metal load sense line on top of the hydraulic valve stack and disconnect it from the elbow fitting in the casting (Figure 6b).

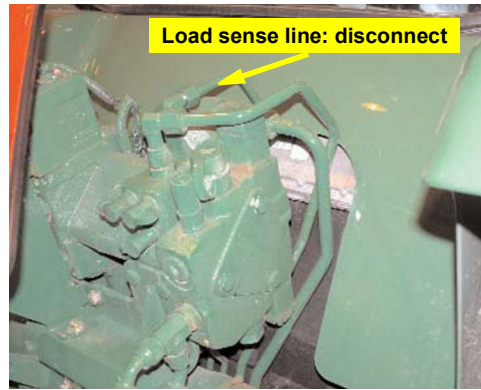


Figure 6b: Disconnecting the load sense line

c. Install the load sense shuttle valve as follows (Figure 6c):

- Connect adapter **HM** to the elbow from which you disconnected the tractor load sense line at step b (loosen and reposition the elbow as necessary).
- Connect adapter **HP**, connected to **HO** in the load sense shuttle valve, to the tractor load sense line you disconnected at step b.

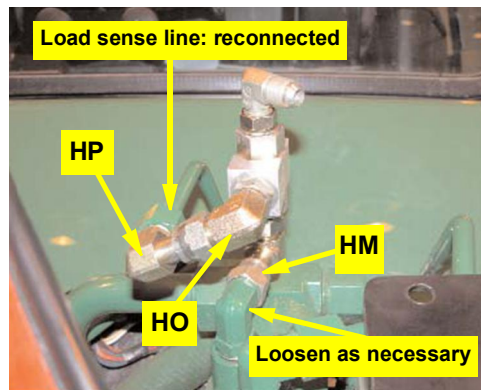


Figure 6c: Installed load sense shuttle valve

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

a. Install the pressure hose **HS** between the adapter fitting **HK** installed in the hydraulic valve stack (at step 5a) and the P port of the hydraulic steering block (Figure 7b).

b. Install the tank hose **HT** between the adapter fitting **HK** installed at the hydraulic filter head (at step 5b) and the T port of the hydraulic steering block (Figures 7a and 7b). Route and tie the hose along the right side of the frame, under the cab then out to the steering block.

c. Install the load sense hose **HU** between adapter **HN** in the load sense shuttle valve and the LS port of the hydraulic control block (Figure 7b).

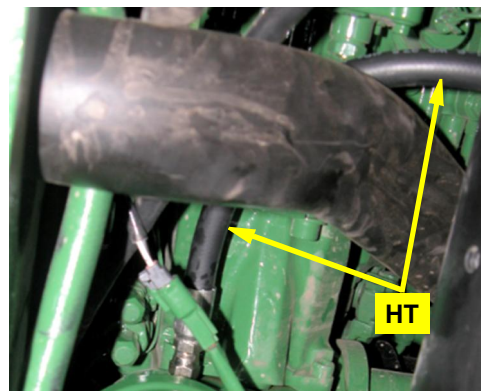


Figure 7a: Tank hose connected at filter head

NOTE: Route all hoses with other tractor plumbing free from entanglement and secure with heavy tie straps (HV).

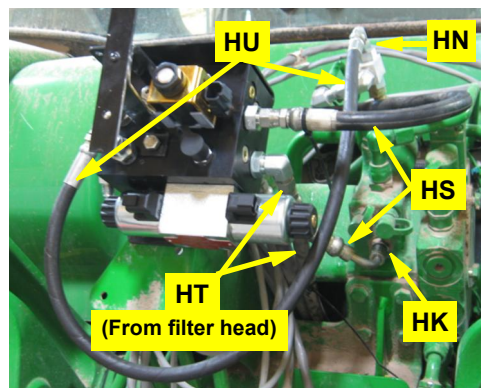


Figure 7b: Pressure, tank and load sense hoses installed at steering block

8. 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.

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 **WE** (nuts) and **WD** (bolts - not visible), attach the WAS wire connector (sensor) **WB** to the WAS housing **WA**. Install the bolts up through the bottom of the housing. Mount the WAS wire connector **WB** at 90° to any of the WAS housing **WA** sides (Figure 1a).

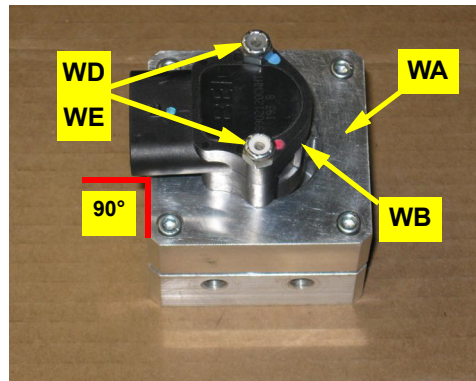


Figure 1a: Prepared WAS housing/connector

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

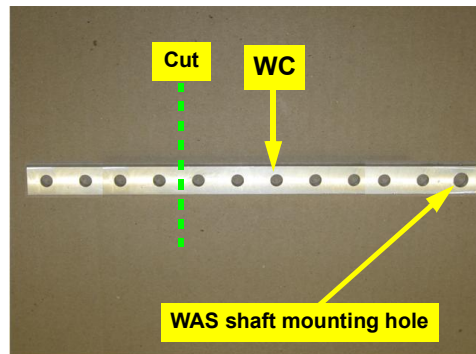


Figure 1b: WAS arm preparation

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

NOTE:

Before you cut the threaded rod **WG** 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. Cut the threaded rod **WG** to 5-5/8" (Figure 1d-i) then screw the swivel rod ends **WI** onto the cut rod to achieve a center-to-center stud measurement of 6-7/8" (Figure 1d-ii). Leave **WH** loose until you complete linkage adjustment at step 2e.

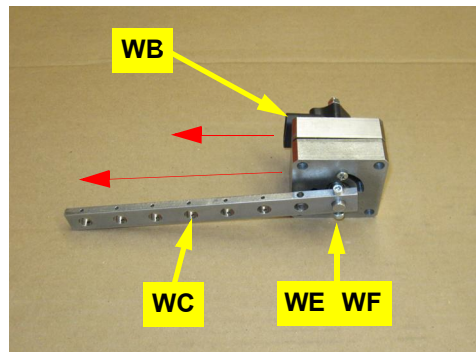


Figure 1c: Attached WAS arm

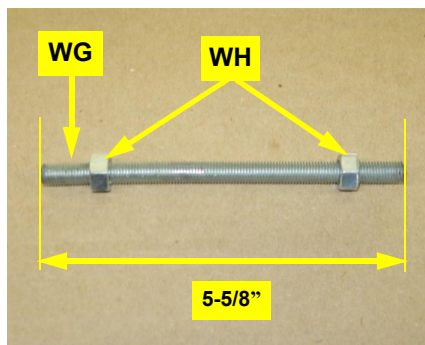


Figure 1d-i: Cut threaded rod

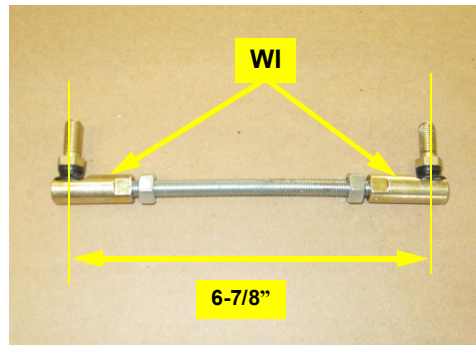


Figure 1d-ii: Assembled WAS link

2. **Mount the wheel angle sensor.**

a. Remove the bolt immediately in front of the axle stop on the right hand side of the steering axle (Figure 2a). Using the bolt, install WAS mount **WK**. (The bolt will not be visible from the front of the machine - Figure 2a inset and Figure 2b).

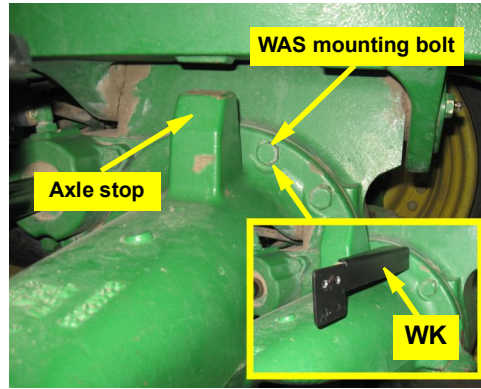


Figure 2a with inset: Installed WAS mount

b. Using hardware **WJ** install the WAS assembly on its mount **WK** (figure 2b). Mount the assembly:

- On the back face of the mount end
- In the top two holes of **WK**
- With the connector arm **WC** at the bottom
- With the wire connector (sensor) **WB** facing the tractor frame

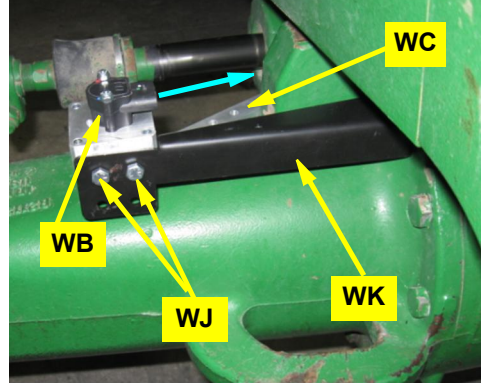


Figure 2b: Installed WAS assembly

c. Install WAS link clamp bracket **WL** around the right side tie rod (Figure 2c). Install the clamp:

- With its screw at the bottom
- Against the tie rod adjustment clamp ($7\frac{3}{4}$ " from the center of the bracket to the center of the tie rod ball joint)
- With the tabs tilted 15° forwards as indicated (Figure 2c inset)

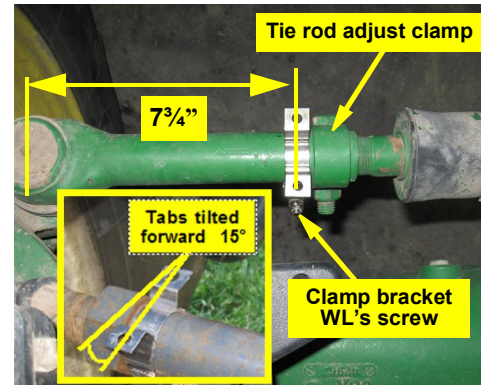


Figure 2c with inset: Installed link clamp and bracket

d. Using the remaining hardware **WH** (not visible) install the assembled WAS linkage from step 1d between the clamp bracket **WL** and the last hole in the connector arm **WC**. Install the linkage:

- In the front hole of the clamp bracket
- With the swivel studs pointing downwards. Leave the swivel nuts **WH** loose (Figure 2d)

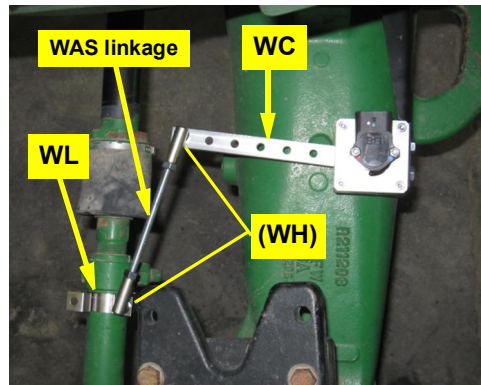


Figure 2d: Installed WAS linkage

2. **Mount the wheel angle sensor (continued.)**
- e. With all hardware **WH** loose, slowly turn the wheels full left lock then full right lock. Check that the linkage moves freely without binding and adjust the linkage as necessary (Figures 2e-i and 2e-ii).



Figure 2e-i: WAS at full left lock



Figure 2e-ii: Full right lock

- f. 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 hole already drilled in the aluminum bracket SC (Figure 1a).

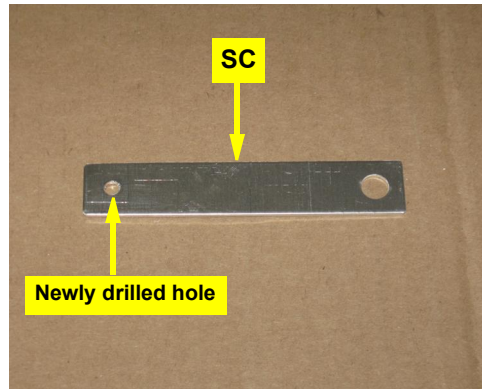


Figure 1a: Newly drilled sensor bracket

- 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). (You will connect SD to ECU SWS cabling in the ECU installation section.)

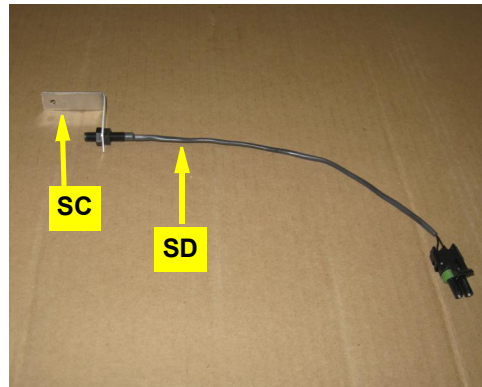


Figure 1c: Sensor installed in sensor bracket

2. Attach the magnets to steering shaft.

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

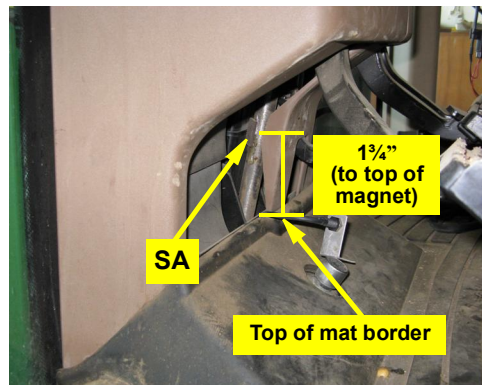


Figure 2: Magnets installed

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 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 1/2” from magnets.

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

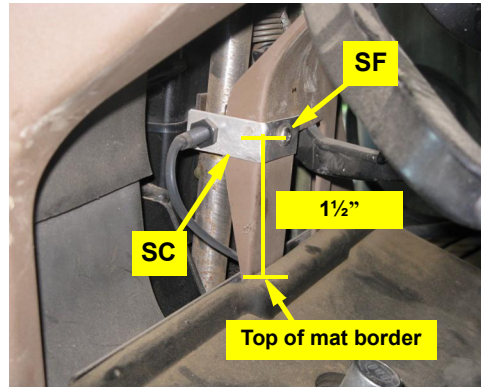


Figure 3: Installed sensor/bracket

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