Automated Steering Kit Installation Guide

Kit: EDX-NHTG, P/N 911-2019-000

Fits New Holland TG and *8000* Tractor Models*:

210	**215**	***T8010***	***T8020***
230	**245**	***T8030***	***T8040***
255	**275**	***T8050***	
285	**305**		

* From SN# JAW126070 onwards excluding suspended front axle models

* Excluding machines with AccuGuide option

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 tractor 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.

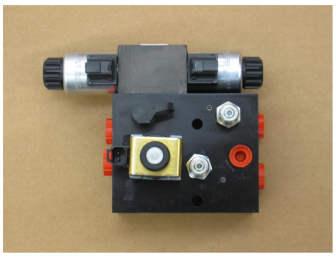
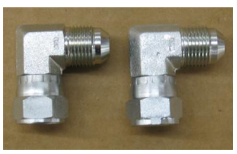
Before attempting to install any of the components, park the machine on a clean level floor with adequate clearance to work all around.

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	Assembly, hyd valve block - 35L/proportional (Hydraulic steering block) Assy, hyd valve block - 35L/Proportional (Hydraulic steering block)	
Bag H1 contains HB, HC, HD and HE				
HB	760-2080-000	2	Adapter, hyd 90 elbow - #8maleJIC x #8maleORB (P and T ports on hydraulic steering block)	
HC	760-2078-000	2	Adapter, hyd 90 elbow - #8maleJIC x #8femJIC (On HB in the P and T ports)	
HD	760-2060-000	2	Adapter, hyd #6maleJIC x #8maleORB (A and B ports on hydraulic steering block)	

Kit Contents - Steering Hydraulics *(continued)*

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
HE	760-2058-000	1	Adapter, hyd 90 elbow - #6maleJIC x #6maleORB (LS port on hydraulic steering block)	
HF	640-0092-000	1	Hydraulic steering block mounting bracket	
Bag H2 contains HG and HH				
HG	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	
Bag H3 contains HK and HL				
HK	760-2069	2	Adapter, hyd run-tee - #8 ORFF	
HL	760-2081	2	Adapter, hyd union tee - #8 STC	
HM	675-0081	1	Release tool, STC hydraulic fitting #6 (LS hose)	
HN	675-0080	1	Release tool, STC hydraulic fitting #8 (P and T hoses)	

Kit Contents - Steering Hydraulics *(continued)*

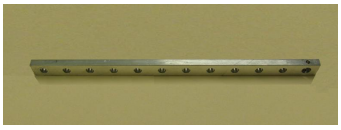
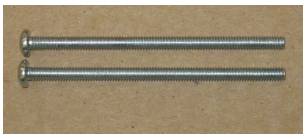
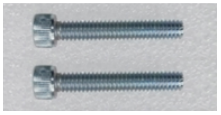
REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
Bag H4 contains HO, HP, HQ and HR				
HO	760-0009	1	Assembly, hyd dynamic load sense valve	
HP	760-2056	1	Adapter, hyd - #6maleJIC x #6maleORB	
HQ	760-2043	1	Adapter, hyd 90 elbow - #6maleORB x #6femSTC	
HR	760-2082	1	Adapter, hyd 90 elbow - #6maleJIC x #4maleORB	
HS	760-1087	1	Hose, hyd - 3/8" x 8", #6femJIC x #6maleSTC (LS 'jumper' hose)	
HT	760-1088	2	Hose, hyd - 1/2" x 8", #8maleSTC both ends (P and T 'jumper' hoses)	
HU	760-1314-000	2	Hose, hyd - 3/8" x 56", #6femJIC x #8femORFF 90 swivel (Steering hoses A and B)	
HV	760-1315-000	1	Hose, hyd - 1/2" x 66", #8femJIC swivel x #8maleSTC90 (Pressure hose)	

Kit Contents - Steering Hydraulics *(continued)*

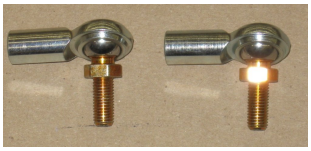
REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
HW	760-1316-000	1	Hose, hyd - 1/2" x 52", #8femJIC swivel x #8maleSTC90 (Tank hose)	
HX	760-1153-000	1	Hose, hyd - 1/4" x 69", #6femJIC swivel (both ends) (Load sense hose)	
HY	677-2001	20	Tie strap, 11" heavy duty	

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 WK)	
WK	640-0126-000	1	WAS assembly mounting bracket	
Bag W1 contains WL and WM				
WL	675-2050-000	2	Bolt M16-2.0 x 25mm, Gr 8.8 ZP	
	678-1056-000	2	Washer, narrow flat - 5/8 nominal	
			(Bolts bracket WK to axle if no fender bolts to use)	
WM	675-0132-000	1	WAS link clamp bracket, 1.62" - 1.87" 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"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/cable	
SE	677-2002	4	Tie strap, 7" releasable	

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 with inset):

- **HB** in the **P** and **T** ports (inset)
- **HC** onto **HB** (inset)
- **HD** in the **A** and **B** ports
- **HE** in the **LS** port

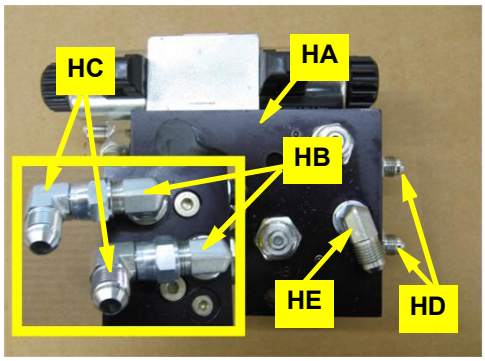


Figure 1 with inset: Prepared steering block

2. Mount the hydraulic steering block.

a. Locate and remove the bottom bolt of the cab's step bracket on the left side of the tractor (Figure 2a, left side). Using the bolt, install the hydraulic steering block mounting bracket **HF** (Figure 2a, right side). Set the bracket fully forward in its slot—hard up against the bolt.

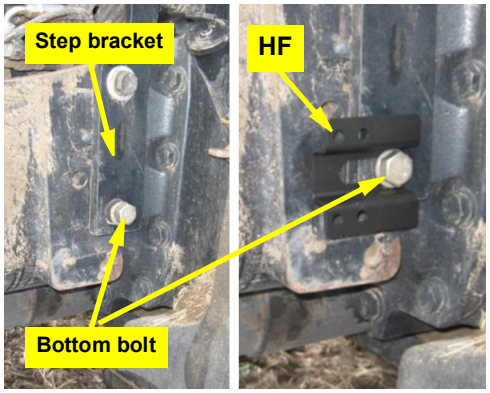


Figure 2a (Left and right): Steering block mounting location (L) and installed mounting (R)

b. Using hardware **HG** mount prepared hydraulic steering block **HA** against mounting bracket **HF**. Position the hydraulic block with its left/right solenoids upwards (Figure 2b).

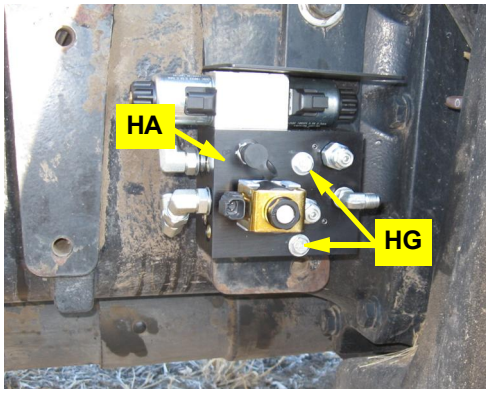


Figure 2b: Installed steering block

3. Prepare the load sense shuttle valve.

Assemble the load sense shuttle valve **HO** with fittings as follows (Figure 3):

- **HP** (for LS jumper hose **HS** from orbital)
- **HQ** (tractor's LS hose)
- **HR** (supplied LS hose **HX** to steering block)

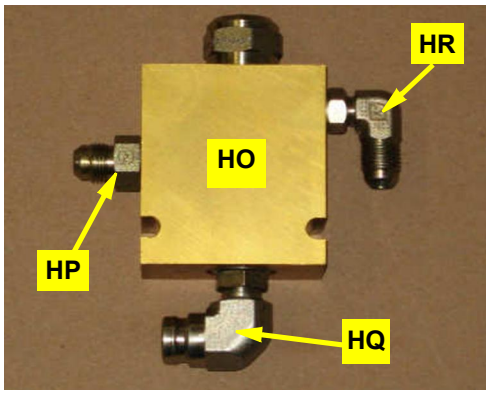


Figure 3: Prepared load sense shuttle valve

4. Install the load sense, pressure and tank fittings.

NOTE: *The pressure, tank and load sense connections on the tractor steering orbital are made with STC (snap-to-connect) fittings that require a special tool (supplied) to be released. If you are familiar with disconnecting and connecting STC fittings continue at 4a. Otherwise continue here.*

To release an STC connection: Insert the proper size STC release tool behind the rubber release sleeve (Figures 4-i and 4-ii) and pull the two halves of the connection apart.

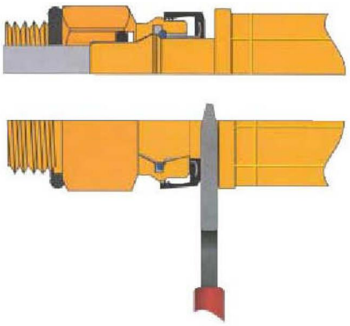


Figure 4-i: STC connections


Figure 4-ii: An STC release tool in use

To make an STC connection: Insert the male connector into the female and push together until they click. The connection is successful if the two halves cannot be pulled apart without the use of a release tool.

a. Locate the tractor's small load sense hose on the left side of the steering orbital (Figure 4a). Using release tool **HM**, disconnect the load sense hose from the orbital.

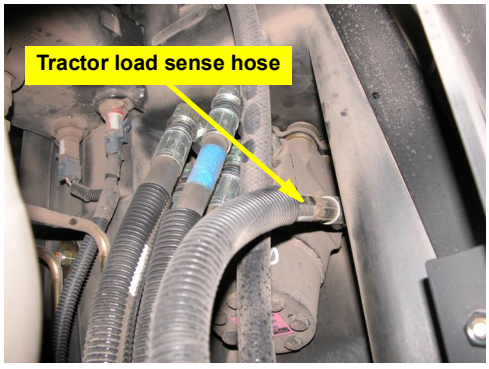


Figure 4a: Load sense hose at orbital

b. Reconnect the tractor's load sense hose to adapter **HQ** on the load sense shuttle (Figure 4b).

Install jumper hose **HS** between the steering orbital and adapter **HP** in the load sense shuttle (Figure 4b).

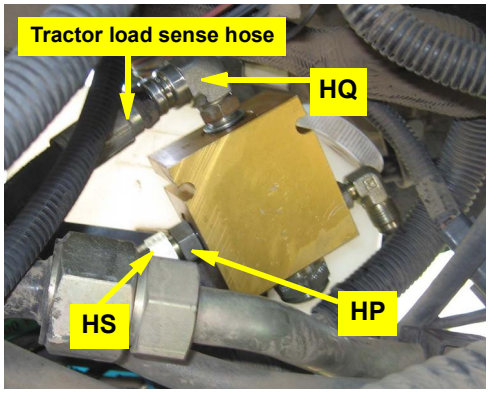


Figure 4b: Connections at load sense shuttle

NOTE: *You use the jumper hose to get clear of the orbital and into space for installation of the load sense shuttle.*

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

4. Install the load sense, pressure and tank fittings *(continued)*.

c. Locate the pressure and tank hose connections at the P and T ports on the orbital and, using the release tool **HN**, disconnect the hoses (Figure 4c).

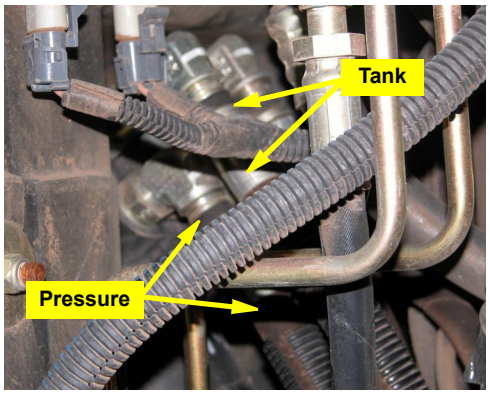


Figure 4c: Pressure and tank hoses at orbital

d. Connect jumper hoses **HT** to the P and T ports on orbital then connect a 'T' end of each run-tee **HL** to the open end of each jumper hose. Reconnect the tractor's pressure and tank hoses to the stem of the run-tees (Figure 4d).

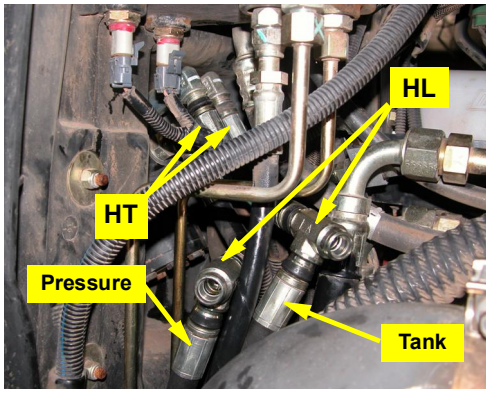


Figure 4d: P and T jumper hoses and run-tees

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

a. Connect load sense hose **HX** (not shown) to adapter **HR** in the load sense shuttle (Figure 5a). Using heavy tie straps **HY**, route the hose to the hydraulic steering block.

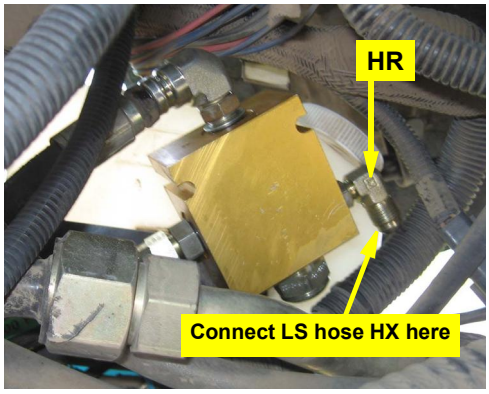


Figure 5a: Load sense hose at load sense shuttle

b. Connect the pressure hose **HV** to the run-tee **HL** connected (by jumper hose **HT**) to the P port on the orbital.

Connect tank hose **HW** to the other run-tee connected (by the other jumper hose) to the T port in the orbital (Figure 5b). Using heavy tie straps **HY**, route the hoses to the hydraulic steering block.

NOTE: *Route all hoses with other tractor plumbing, free from entanglement and for problem-free operation. Use the heavy tie straps **HY** as required.*

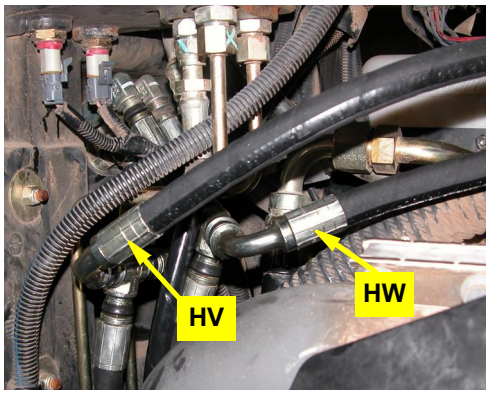


Figure 5b: Pressure and tank hoses at run-tees

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

c. Connect the load sense hose **HX** to adapter **HE** in the LS port of the hydraulic steering block. Connect pressure and tank hoses **HV** and **HW** to adapters **HC** on adapters **HB** in the P and T ports on the hydraulic steering block (Figure 5c).

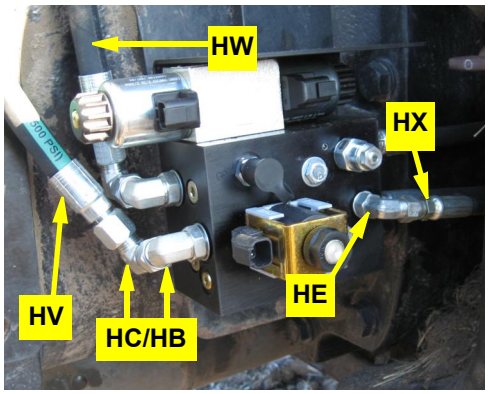


Figure 5c: LS, P and T hoses at steering block

6. Install the steering output fittings.

Locate the tractor steering lines near the left side of the frame under the fuel filter (Figure 6). Install run-tee fittings **HK** in the steering lines at the junctions of the rubber and steel lines (Figure 6 inset).

Leave the run-tees loose to allow for alignment when attaching hoses.

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

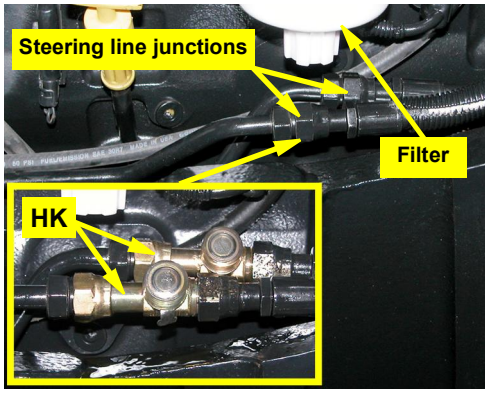


Figure 6 with inset: Steering line junctions and installed run-tees

7. Install the steering output hoses.

a. Connect the elbow ends of steering hoses **HU** to run-tees **HK**. Using heavy tie straps **HY**, route the hoses inside the step bracket, back over the fuel tank mount, down between the tractor frame and the fuel tank then forward to the hydraulic steering block (Figures 7a and 7b).

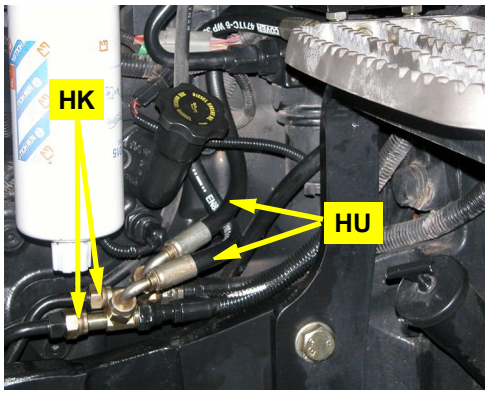


Figure 7a: Steering hoses connected to run-tees

b. Connect the steering hoses **HU** to adapters **HD** (not visible) in the A and B ports of the hydraulic steering block (Figure 7b and Figure 8).

NOTE: *Route all hoses with other tractor plumbing, free from entanglement and for problem-free operation. Use the heavy tie straps **HY** as required.*

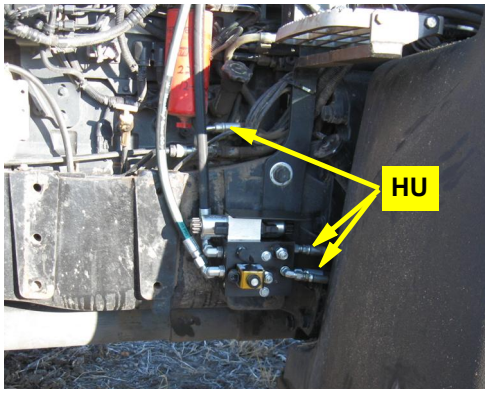


Figure 7b: Steering hoses routed to and installed at the steering block

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.

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 **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).

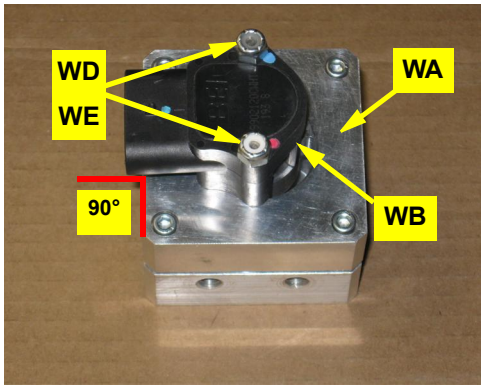


Figure 1a: Prepared WAS housing/connector

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

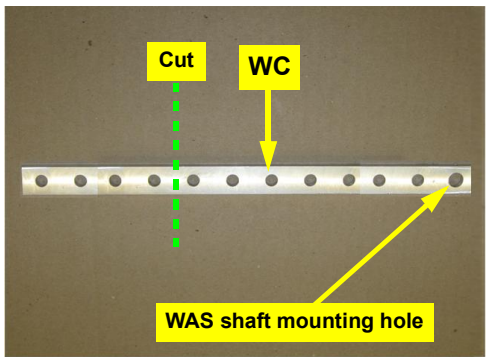


Figure 1b: WAS arm preparation

c. Attach the WAS arm **WC** to the WAS using the provided hardware **WE** (nut) and **WF** (screw). 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.*

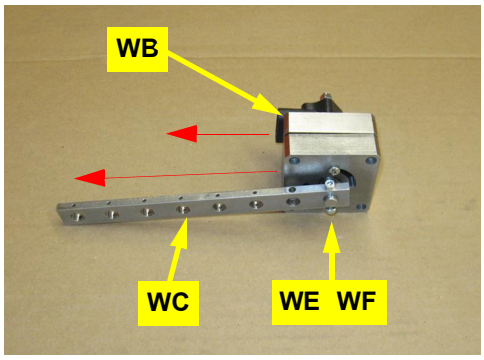


Figure 1c: Attached WAS arm

d. Cut the threaded rod **WG** to 4-1/2" (Figure 1d-i) then screw the swivel rod ends **WI** onto the cut rod to achieve a center-to-center stud measurement of 5-3/4" (Figure 1d-ii). Leave **WH** loose until you complete linkage adjustment at step 2.

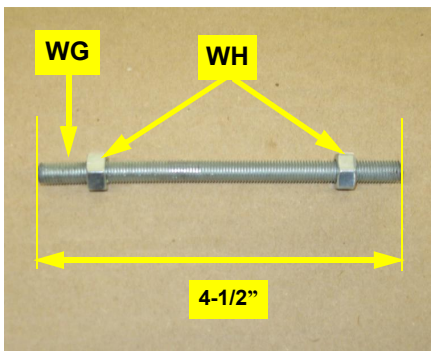


Figure 1d-i: Cut threaded rod

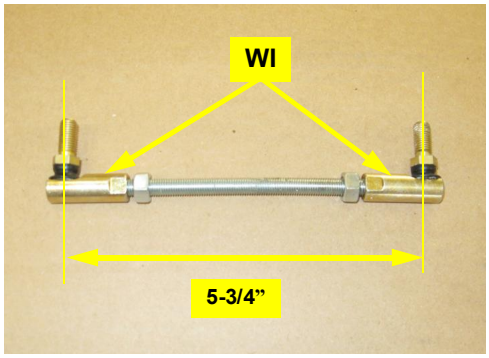


Figure 1d-ii: Assembled WAS link

2. Mount the wheel angle sensor.

NOTE: *You will mount the WAS assembly bracket **WK** on the front of the steering axle on the right side. You will use the bolt holes for the front fender bracket (which your tractor may or may not have). If your tractor has front fenders, use the existing fender bracket bolts, otherwise use hardware **WL**.*

*Also, if your tractor has fenders, install the WAS assembly (**WA**, **WB** etc.) on its bracket **WK** (using **WJ** - see step b) before you install **WK** on the steering axle at step a.*

a. Using hardware **WL** (or the two existing bolts), install WAS mounting bracket **WK** between the bolts (or fender bracket) and the axle (Figure 2a and inset). Install the bracket as follows:

- In from the left so that the offset in the bracket is upwards and rearwards
- Between the fender bracket (if fitted) and the axle
- Hard up against the bolts
- With the WAS assembly already installed if fender bracket fitted

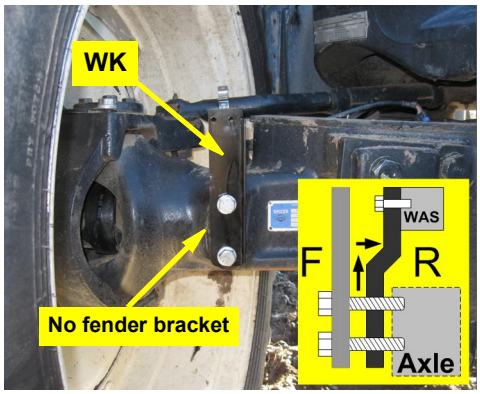


Figure 2a with inset: Installed WAS mounting without fender bracket and with (inset)

NOTE: *The bracket **WK** in these step 2 figures is a prototype. Yours will have slotted holes so you can slide it between the bolts and the axle.*

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

- On the back face of the mount **WK**
- With the connector arm **WC** at the top
- With the wire connector (sensor) **WB** facing the tractor wheel

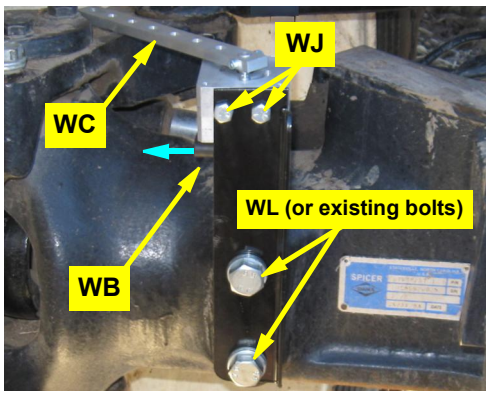


Figure 2b: Installed WAS assembly

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

- With its screw at the bottom
- 3¼" center-to-center from the tie rod ball joint
- With the tabs tilted 15° forwards (Figure 2c inset)

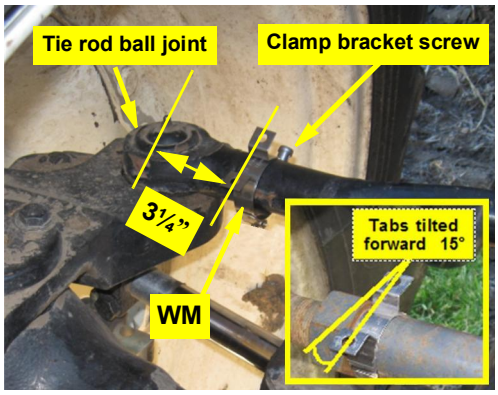


Figure 2c with inset: Installed link clamp

d. Using the remaining hardware **WH** install the assembled WAS linkage from step 1d between the clamp bracket **WM** and the last hole in the connector arm **WC** (Figure 2d). Install the linkage:

- In the front hole of the clamp bracket
- With the swivel studs pointing downwards

Leave the swivel nuts **WH** loose.

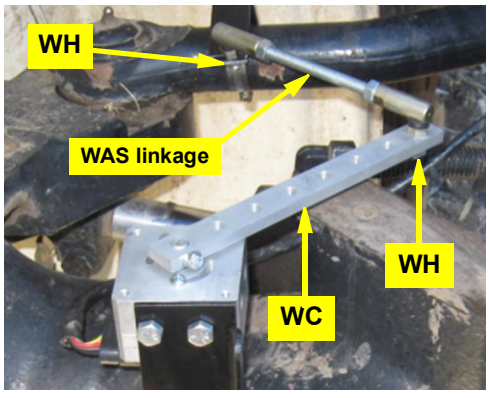


Figure 2d: Installed WAS linkage

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. Install the steering wheel switch.

a. Locate the steering shaft under the steering console near the cab floor. The shaft is surrounded with a metal shield (Figure 1a).

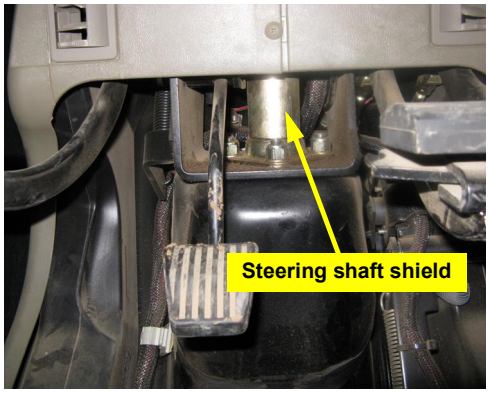


Figure 1a: Shielded steering shaft

b. Drill a 3/8” hole in the sensor bracket **SC** at the opposite end from the sensor hole. Put a 90° bend in the end just drilled (Figure 1b).

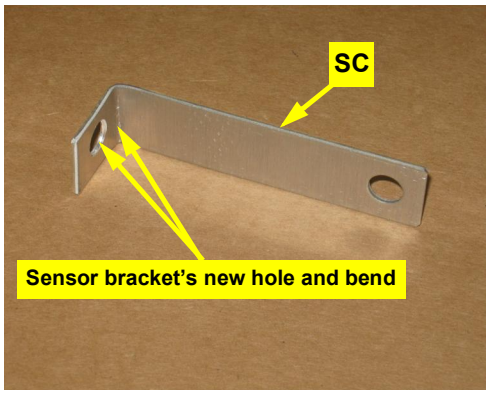


Figure 1b: Newly drilled/bent sensor bracket

c. Remove the bottom steering shaft shield flange nut. Using the bent sensor arm as a template, drill a 1/2” hole in the steering shaft shield (Figure 1c).

Cut the magnet **SA** in half. Using the two-part epoxy **SB**, attach one half of the magnet to the inner steering shaft. Turn the shaft 180° and attach the other half magnet.

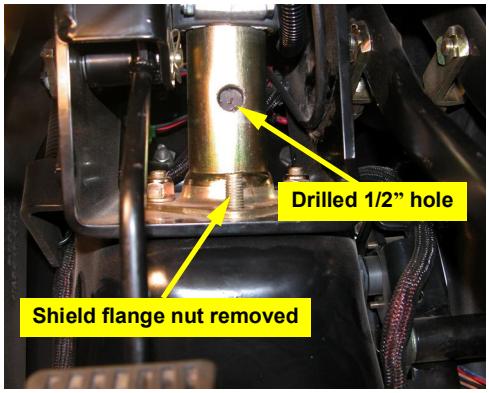


Figure 1c: Drilled shaft shield and installed magnets

d. Attach sensor **SD** to the bracket **SC**. Fasten the sensor arm to the steering shaft shield flange with the nut removed at 1c (Figure 1c).

e. Align the sensor **SD** with the magnets and, by adding bends to the bracket and using the adjustment nuts, set the sensor face to 1/4” to 1/2” from the magnets (Figure 1d).

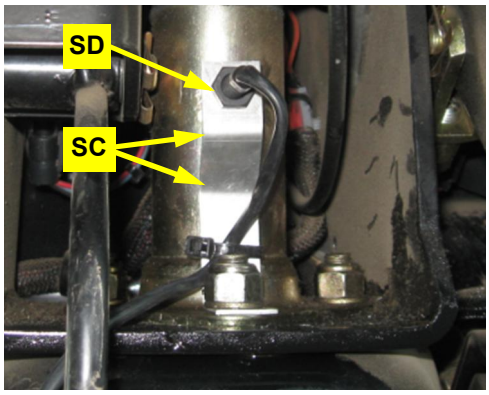


Figure 1d: Installed and adjusted sensor arm