

# Automated Steering Kit Installation Guide


*Kit: EDX-MF8400, P/N 911-2010-000*

## Fits AGCO, Challenger, and Massey Ferguson Tractor Models:

DT180A	MT635B	8450
DT200A	MT645B	8460
DT220A	MT655B	8470
DT240A	MT665B	8480



## 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 on the next page. 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.

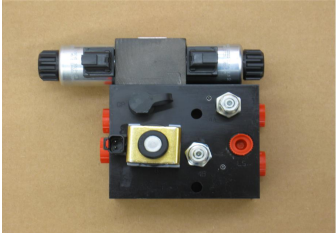



Before attempting to install any of the components, park the machine on a clean level floor with adequate clearance to work all around.

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.

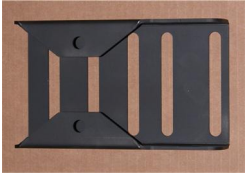



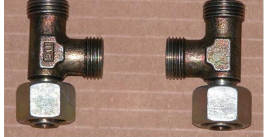



To prevent hydraulic system contamination, it is essential to thoroughly clean hydraulic system fittings and hose connections prior to disconnecting or removing. Use a degreasing solvent spray cleaner such as a brake cleaner to prevent hydraulic system contamination. Note that o-rings used on ORB and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

## Kit Contents - Steering Hydraulics





Unpack the 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)	
<b>Bag H1 contains HB, HC, and HD</b>				
HB	760-2058	1	Adapter, hyd 90 elbow - #6maleJIC x #6maleORB  (LS port on hydraulic steering block)	
HC	760-2060-000	2	Adapter, hyd - #6maleJIC x #8maleORB  (A and B ports on hydraulic steering block)	
HD	760-2080-000	2	Adapter, hyd 90 elbow - #8maleJIC x #8maleORB  (P and T ports on hydraulic steering block)	

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

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
HE	640-0093-000	1	Hydraulic steering block mount	
<b>Bag H2 contains HF and HG</b>				
HF	678-1055	2	Washer, flat - 5/16" ZP	
HG	675-2006-000	2	Bolt - 3/8NC x 3-3/4" Gr5 ZP	
	678-1054	2	Washer, narrow flat - 3/8" ZP	
	676-1035	2	Nut, nylock - 3/8NC ZP (Mount hydraulic steering block HA on HE)	
<b>Bag H4 contains HK and HL</b>				
HK	760-2028	2	Adapter, hyd run-tee - #18 LEO (Pressure and tank ports)	
HL	760-2013	2	Adapter, hyd run-tee - #12 LEO (Steering lines)	
<b>Bag H5 contains HM, HN, and HO</b>				
HM	760-2021	2	Adapter, hyd - #12maleJIC x #18femLEOswivel (Pressure and tank run-tees HK)	
HN	760-2051	1	Adapter, hyd - #6maleJIC x #10femLEOswivel (Load sense port)	
HO	760-2095	1	Adapter, hyd - #12 LEO nut	
	760-2096	1	Adapter, hyd - #12 LEO plug	

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


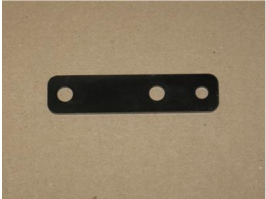



REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
HP	760-1243	2	Hose, hyd - 3/8" x 150", #6femJIC x #12femJIC elbow 90  (Steering hoses)	
HQ	760-1244	2	Hose, hyd- 1/2" x 28", #8femJIC x #12femJIC elbow 90  (Pressure and tank hoses)	
HR	760-1245	1	Hose, hyd - 1/4" x 18", #6femJIC x #6femJIC elbow 90  (Load sense hose)	
HS	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

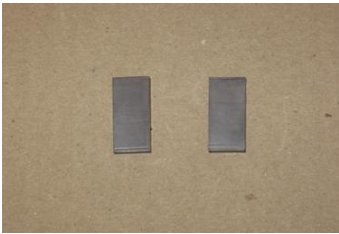




REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
<b>Bag 710-0099-000 contains WA to WJ</b>				
WA	720-0045-000#	1	WAS assembly	
WB	750-5002-000	1	Sensor, dual output, BEI	
WC	602-1087-000	1	Connector arm, steering, long	
WD	675-1191-000	2	Screw, mach, 8-32 x 3" PPH ZP	
WE	676-1054-000	3	Nut, nylock - 8/32NC ZP	
WF	675-1150-000	1	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	  (bolts WAS assy to mounting bracket WK)
	678-1077-000	2	Washer, lock 5/16, ZP	

**Kit Contents - Wheel Angle Sensor (continued)**

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
WK	640-0088-000	1	WAS assembly mounting bracket	
WL	640-0070-000	1	WAS rod mounting bracket	
<b>Bag W3 of 3 contains WM, WN, and WO</b>				
WM	675-0107-000#	2	Clamp, 1-1/2" polypropylene, EDX	
WN	675-2005	2	Bolt - 3/8NC x 3-1/4" Gr5 ZP	
	678-1054	2	Washer, narrow flat - 3/8" ZP	
	676-1035	2	Nut, nylock - 3/8NC ZP	
WO	678-1092-000	1	Washer, flat - 5/8"ID x 1"OD x 3/16" thk	

## 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 (Steering) 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	

# 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** into the LS port.
- Install straight adapter fittings **HC** into the A and B ports.
- Install elbow adapter fittings **HD** into the P and T ports.

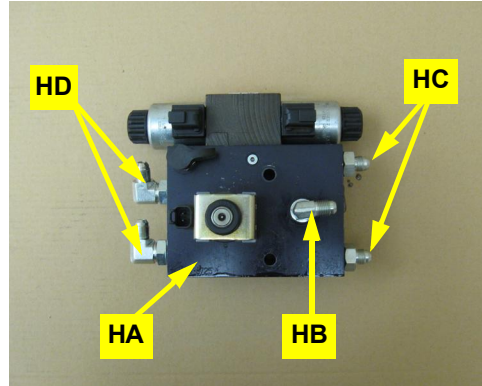


Figure 1: Prepared steering block

### 2. Mount the hydraulic steering block.

- a. Locate the two bolts at the rear of the tractor that attach the three-point top link retainer (Figure 2a).

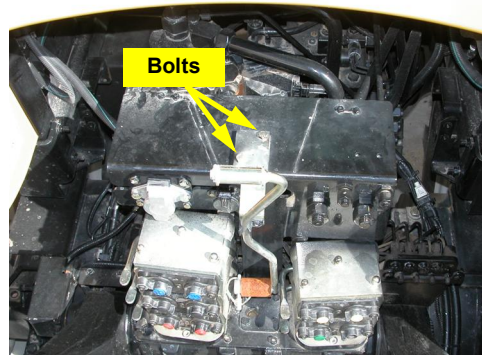


Figure 2a: Steering block mounting location

- b. Use the existing bolts with provided flat washers **HF** to secure mounting bracket **HE** to the tractor (Figure 2b).

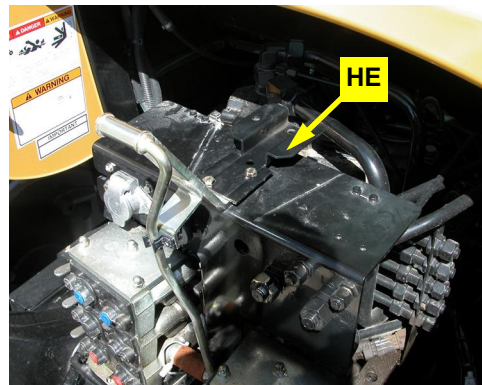


Figure 2b: Installed mounting bracket



2. **Mount the hydraulic steering block (continued).**
  - c. Attach the hydraulic steering block **HA** to its mounting bracket **HE** using hardware **HG**. (Figure 2d).
  - d. Figure 2d shows a gray control box that is used with eDriveX/XC controllers only. For detailed install instruction refer to the eDriveX/XC ECU install guide.

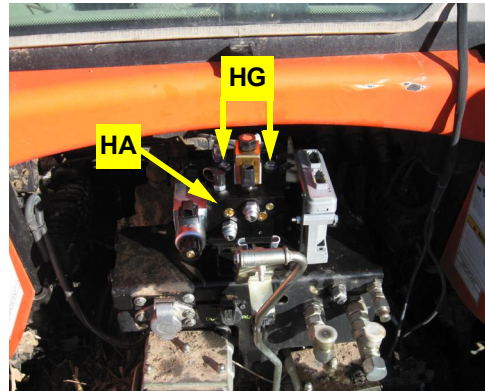


Figure 2d: Installed steering block

3. **Install the pressure, tank and load sense fittings.**
  - a. The hydraulic steering block will receive pressure, tank, and load sense connections from the capped ports at the rear of the tractor, above the hydraulic remote valves (Figure 3a).  
  
The bottom left port is the pressure port, the bottom right port is the tank port and the top right port is the load sense port (Figure 3a).

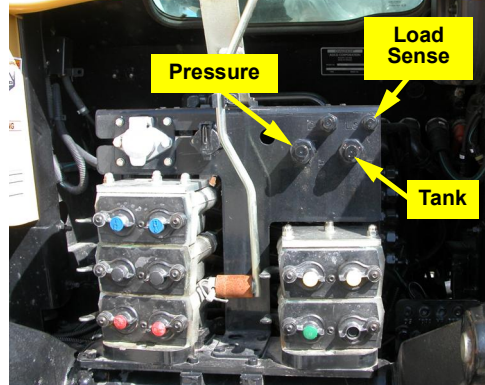


Figure 3a: Pressure, tank and load sense locations

- b. Remove the caps from the pressure, tank, and load sense ports and install run-tees **HK** in the pressure and tank ports. Install the removed caps on the stems of the run-tees and adapter fittings **HM** on the open 'T' ends of the run-tees. Install the adapter fitting **HN** to the load sense port (Figure 3b).

**NOTE:**

*If your tractor is equipped with a tee connection between the load sense port and the drain port (not used with automated steering), use the provided plug/nut **HO** to cap the exposed drain port once the tee is removed.*

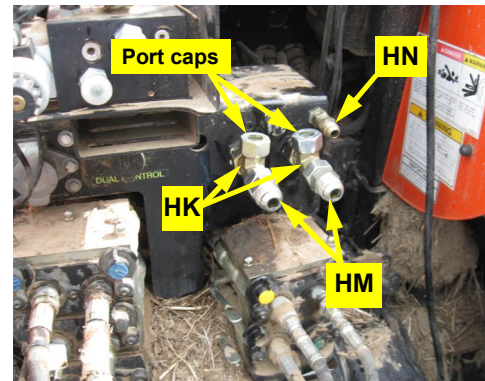


Figure 3b: Installed pressure and tank run-tees and fittings and load sense fitting. Reinstalled port caps.

4. **Install the pressure, tank and load sense hoses.**
  - a. Install the pressure and tank hoses **HQ** between fittings **HM** installed in step 3b and the respective **P** and **T** ports on the hydraulic steering block (Figure 4).
  - b. Install the load sense hose **HR** between the **LS** port of the hydraulic steering block and the load sense port on the tractor (Figure 4).

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

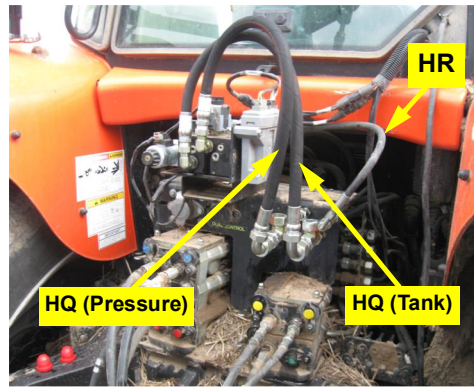


Figure 4: Installed pressure, tank and load sense hoses

5. **Install steering output fittings.**
  - a. Locate the left and right steering lines at the steering cylinder (Figures 5a-i and 5a-ii).

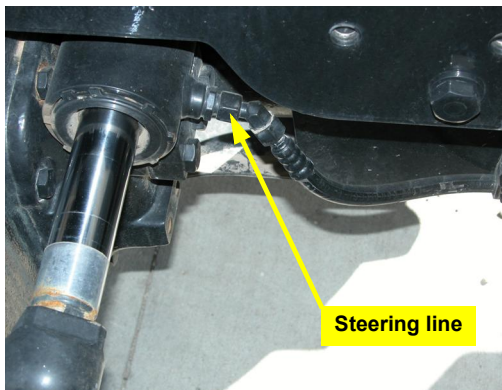


Figure 5a-i: Steering line, left side

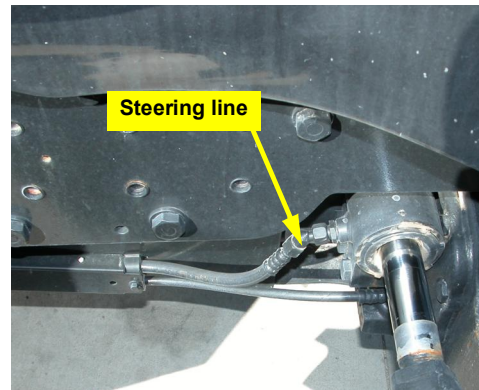


Figure 5a-ii: Steering line, right side

- b. Install the run-tees **HL** between the rubber and steel hydraulic lines on the left and right ends of the steering cylinder (Figures 5b-i and 5b-ii).

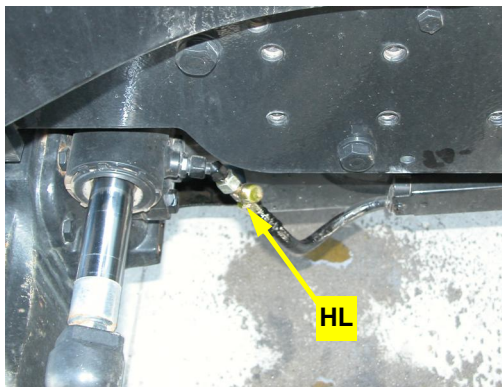


Figure 5b-i: Installed run-tee, left side

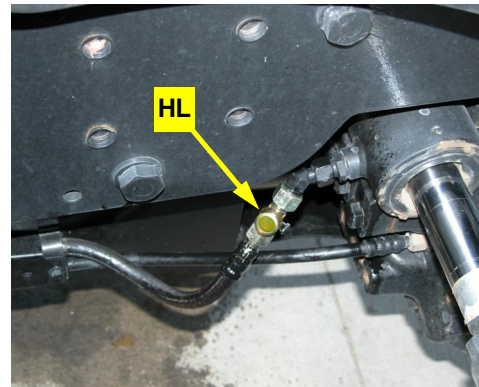


Figure 5b-ii: Installed run-tee, right side

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

6. **Install the steering output hoses.**

- a. Connect the steering output hoses **HP** to the branches on the left and right steering run-tees installed at step 5 (Figures 6a-i and 6a-ii).

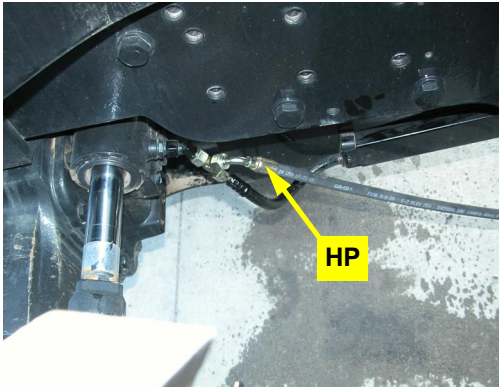


Figure 6a-i: Installed steering output hose - left side

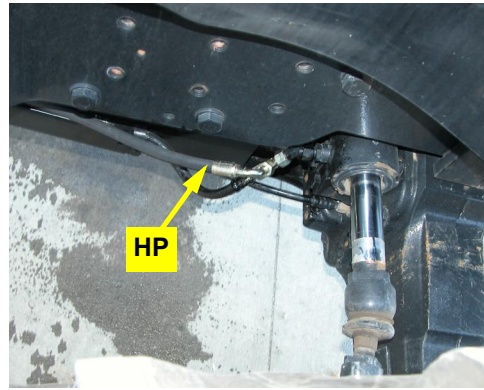


Figure 6a-ii: Installed steering output hose - right side

- b. Route the steering hoses with the existing steering lines, under the tractor cab and to the hydraulic steering block (Figures 6b-i and 6b-ii).

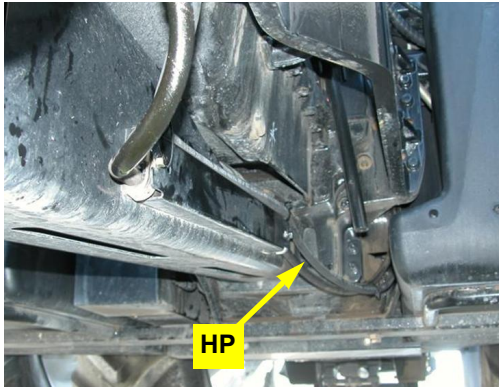


Figure 6b-i: Routed steering output hose - left side

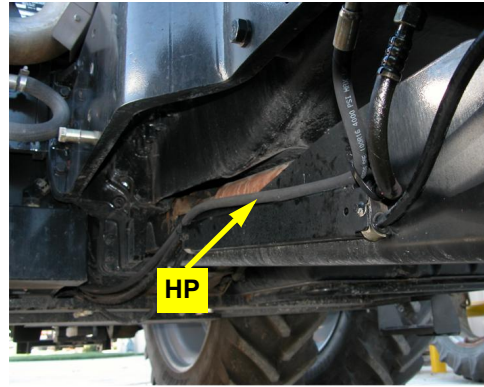


Figure 6b-ii: Routed steering output hose - right side

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

- c. Connect the steering output hoses **HP** to the **A** and **B** ports on the hydraulic steering block (Figure 6c).

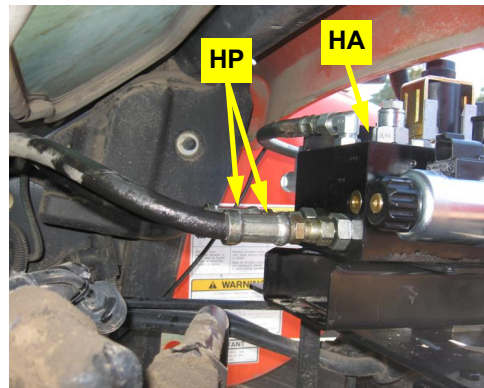


Figure 6c: Installed steering hoses at steering block

7. **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.

- Using the provided hardware **WD** and **WE**, attach the WAS wire connector (sensor) **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 **WA** sides (Figure 1a).

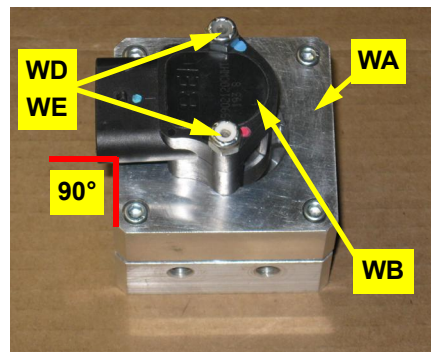


Figure 1a: Mounted WAS wire connector

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

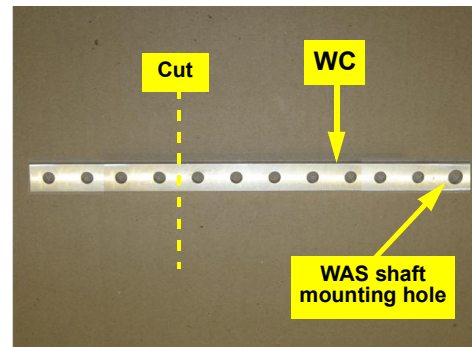


Figure 1b: WAS arm preparation

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

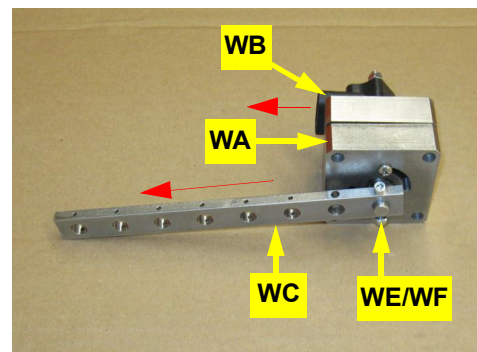


Figure 1c: Attached WAS arm

## NOTE:

Before cutting the rod **WG** at step 1d, screw the provided lock 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.

- Cut the provided threaded rod **WG** 5 1/4" long (Figure 1d-i) then screw the lock nuts **WH** and swivel rod ends **WI** onto the cut threaded rod to achieve a center-to-center stud measurement of 6 1/2" (Figure 1d-ii). Leave **WH** loose until you complete linkage adjustment at step 2e.

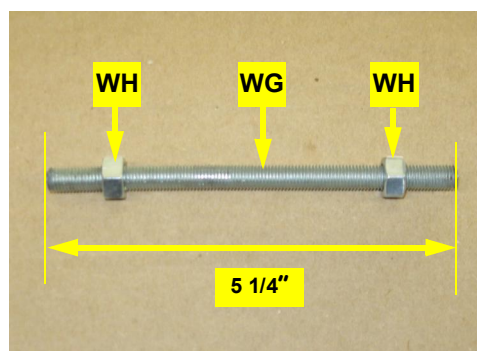


Figure 1d-i: Cut threaded rod with lock nuts

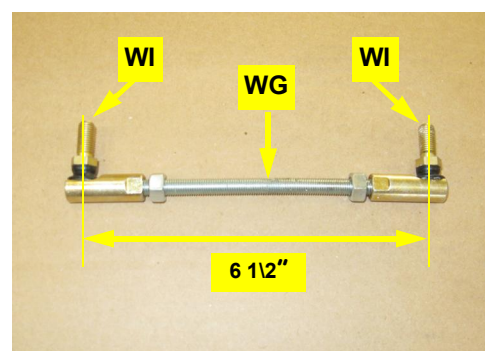


Figure 1d-ii: Assembled threaded rod

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

- a. Locate the front axle differential housing on the tractor. Remove the middle vertical differential bolt on the right side of the axle (Figure 2a).

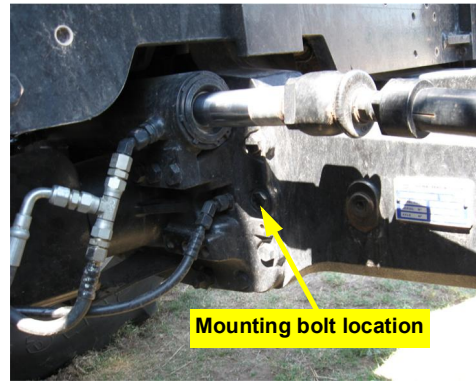


Figure 2a: Differential bolt location

- b. Using the removed differential bolt, attach bracket **WK** to the axle. Place washer **WO** between the differential housing and the bracket **WK**. Align the bracket parallel to the axle (Figure 2b).

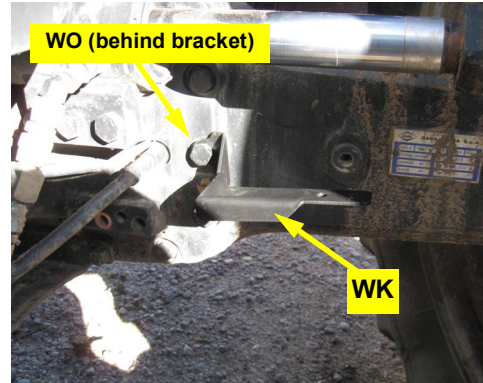


Figure 2b: Installed bracket with spacing washer

- c. Attach the plastic clamp **WM** and the bracket **WL** to the tie rod with provided hardware **WN** with **WL**'s linkage hole at the bottom (Figure 2c).

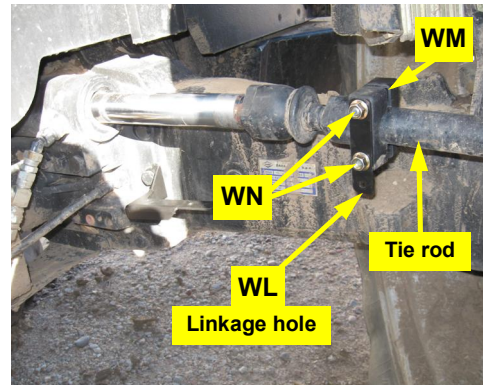


Figure 2c: Installed WAS clamp and bracket

- d. Attach the assembled WAS to the bottom side of the bracket **WK** using provided hardware **WJ**. Face the wire connector **WB** to the center of the tractor (Figure 2d).

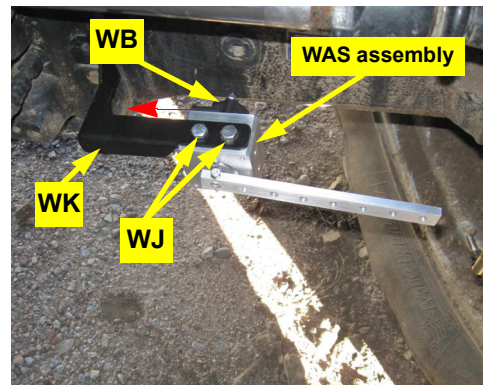


Figure 2d: Installed WAS assembly

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

- e. Using the remaining hardware **WH**, install the assembled WAS linkage from step 1d between the rod bracket **WL** and the last hole in the WAS connector arm **WC**. Install the linkage with the swivel studs inward but leave the swivel stud nuts **WH** loose (Figure 2e).
- f. With all hardware **WH** loose, slowly turn the wheels full left lock then full right lock (Figures 2f-i and 2f-ii). Check that the linkage moves freely without binding and adjust the linkage if necessary.
- g. When the linkage does move freely and without binding, tighten hardware **WH** on the rod and the swivels.

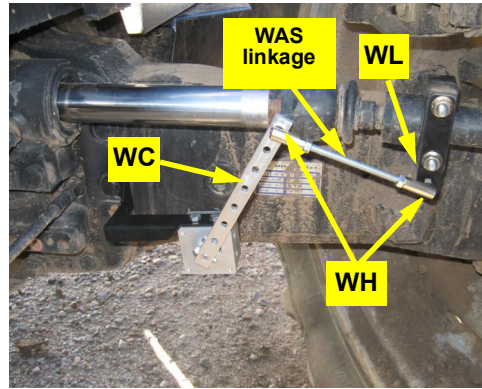


Figure 2e: Installed linkage



Figure 2f-i: Installed WAS - full left lock



Figure 2f-ii: Installed WAS - full right lock

# Installation - Steering Wheel Switch (SWS)

## 1. Install the steering wheel switch.

- a. Locate the bottom steering console panel and remove it (Figure 1a).

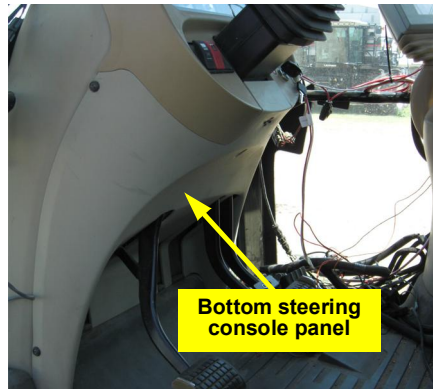


Figure 1a: Console panel location

- b. Locate the steering shaft shield and flange (Figure 1b).

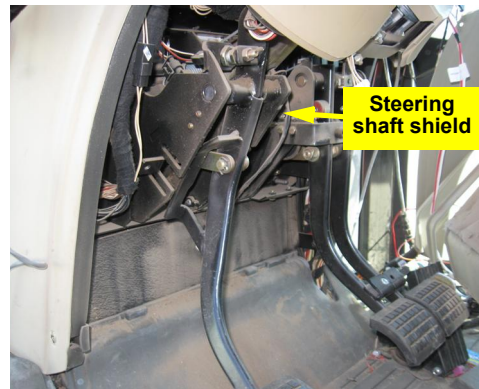


Figure 1b: Console panel removed. Steering shaft shield (not shown) between pedal mounts

- c. Drill a 3/8" hole in the sensor arm SC at the opposite end from the pre-drilled 5/16" hole. Put a 90° bend in the end of the sensor arm with the 3/8" hole (Figure 1c).

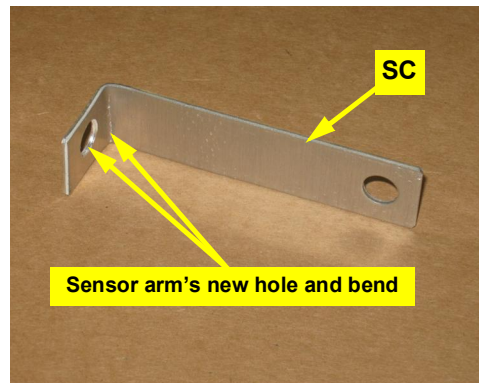


Figure 1c: Sensor arm with new hole and bend

- d. Remove the bottom left or right steering shaft shield flange bolt or nut. Using the bent sensor arm as a template, drill a 1/2" hole in the steering shaft shield (Figure 1d). (See NOTE after step 1f.)
- e. 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 of the magnet to the steering shaft.

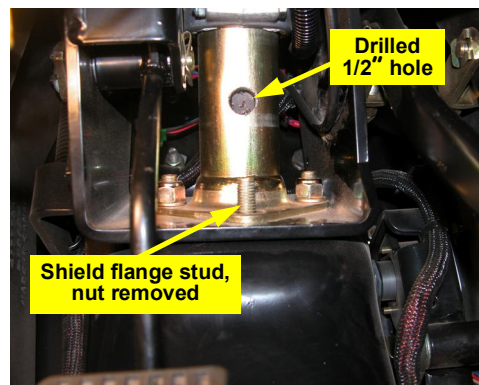


Figure 1d: Shield flange stud and drilled hole



1. **Install the steering wheel switch (continued).**
- f. Fit the sensor **SD** to the sensor arm **SC**, and then use the removed flange bolt or stud to attach the assembled sensor and sensor arm to the flange (Figure 1e).

**NOTE:**

*If there is insufficient access to drill the shield in line with the bolt or stud (as shown in Figure 1d), bend and twist the sensor arm as required and drill the hole between the bolts or studs. Mount the sensor arm and sensor as shown the Figure 1e inset.*

- g. Align the sensor **SD** with the magnets and adjust the sensor face to 1/8" to 1/4" from the magnets.
- h. Route the sensor **SD**'s cable down to the cab floor
- i. Refit the bottom steering console panel.

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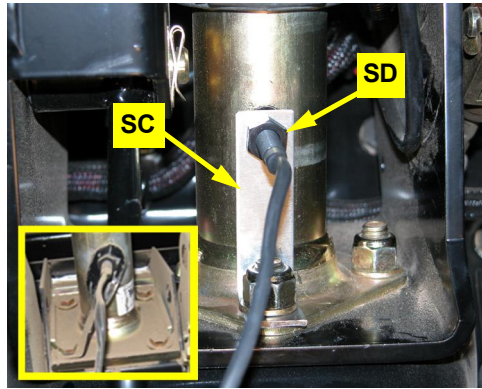


Figure 1e: Installed sensor assembly (see Note after step 1f)

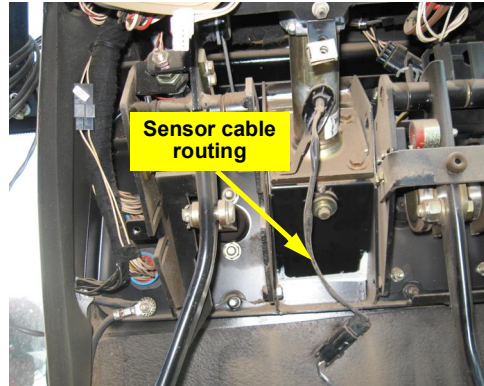


Figure 1f: Sensor cable routed to cab floor