

Automated Steering Kit Installation Guide

Kit: EDX-CMX3, P/N 911-2004-000


Fits Case Tractor Models:

MX210	MX215
MX230	MX245
MX255	MX275
MX285	MX305

(SN# JAZ126070 - present)



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 your automated steering system documentation.
- 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 starting 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.

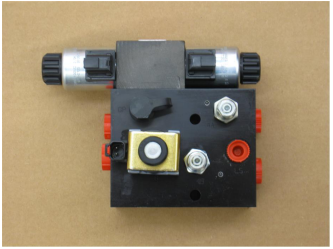



Before attempting to install any of the components, park the machine on a clean level floor with adequate clearance to work all around.

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 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 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, HC, HD, and HE				
HB	760-2058	1	Adapter, hyd 90 elbow - #6maleJIC x #6maleORB (HA's LS [load sense] port)	
HC	760-2080	2	Adapter, hyd 90 elbow - #8maleJIC x #8maleORB (HA's P [pressure] and T [tank] ports)	
HD	760-2060	2	Adapter, hyd - #6maleJIC x #8maleORB (HA's A and B [steering] ports)	

Kit Contents - Steering Hydraulics (continued)

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
HE	760-2078	1	Adapter, hyd 90 elbow - #8maleJIC x #8femJIC (HC in HA's P [pressure] port)	
HF	640-0092-000	1	Hydraulic steering block mounting bracket (Mount HA)	
Bag H2 contains HG				
HG	675-2006	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 HA on HF)	
Bag H3 contains HK and HL				
HK	760-2081	2	Adapter, hyd union tee - #8STC (Pressure and tank lines)	
HL	760-2069	2	Adapter, hyd run tee - #8ORFF (Steering lines)	
HM	675-0080	1	Tool, STC hyd fitting - #6 (Disconnect LS hose from orbital)	
	675-0081	1	Tool, STC hyd fitting - #8 (Disconnect pressure and tank hoses from orbital)	
HN	760-0009	1	Assembly, hyd dynamic load sense valve	

Kit Contents - Steering Hydraulics *(continued)*

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
Bag H4 contains HO, HP, and HQ				
HO	760-2056	1	Adapter, hyd - #6maleJIC x #6maleORB (Function port in HN, HR [from orbital] connects)	
HP	760-2082	1	Adapter, hyd 90 elbow - #6maleJIC x #4maleORB (LS port in HN, HV connects)	
HQ	760-2043	1	Adapter, hyd 90 elbow - #6maleORB x #6femSTC (Source port in HN)	
HR	760-1087	1	Hose, hyd - 3/8" x 8", #6femJIC x #6maleSTC (Connects orbital's LS port to HO)	
HS	760-1088	2	Hose, hyd - 1/2" x 8", #8maleSTC x #8maleSTC (Connects orbital's P and T ports to HK)	
HT	760-1253	2	Hose, hyd - 1/2" x 46", #8femJIC x #8maleSTC90 (Pressure and tank hoses)	
HU	760-1085	2	Hose, hyd - 3/8" x 86", #6femJIC x #8femORF90 (Steering hoses)	
HV	760-1019	1	Hose, hyd - 1/4" x 42", #6femJIC x #6femJIC (Load sense hose)	
HW	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

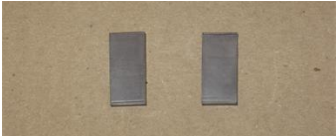


REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
Bag 710-0099-000 contains WA to WJ				
WA	720-0045-000#	1	WAS assembly	
WB	750-5002-000	1	Sensor, dual output, BEI (*Wire connector*)	
WC	602-1087-000	1	Connector arm, steering, long	
WD	675-1191-000	2	Screw, mach, 8-32 x 3", PPH, ZP	
WE	676-1054-000	4	Nut,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

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 (Attach WAS assembly to WL)	
WK	640-0070-000	1	WAS link rod mounting bracket (Attach to tie rod with WM using WN)	
WL	640-0072-000	1	WAS assembly mounting bracket	
Bag W3 contains WM and WN				
WM	675-0107-000#	2	Clamp, 1-1/2" polypropylene, EDX (Mount WK on tie rod)	
WN	675-2030-000	2	Bolt - 3/8NC x 3-1/2" 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 (Attach WK/WM to tie rod)	

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 (Only one required for this installation)	
SB	675-0077	1	Epoxy, Hardman 04001 - single double bub	
SC	602-1062	1	Bracket, steering wheel switch mounting	
SD	726-1054 OR 051-0443-10	1	Assy, steering wheel switch	
SE	677-2002	4	Tie strap, 7" releasable	

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.

See Appendix A for a schematic of the hydraulic circuits.

1. Prepare the hydraulic steering block.

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

Remove the plastic plugs from hydraulic steering block HA and install adapter fittings as follows (Figure 1):

- HB into the LS port.
- HC into the P and T ports.
- HD into the A and B ports
- HE onto adapter fitting HC on the P port.

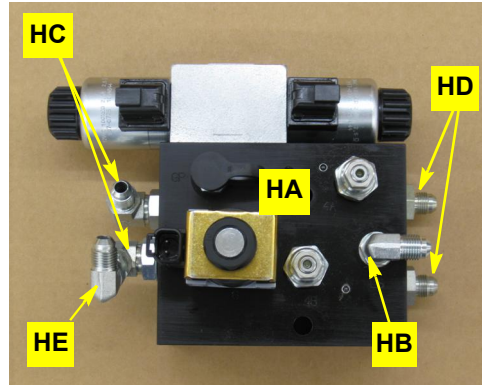


Figure 1a: Prepared hydraulic block

2. Install the steering output hoses.

a. Remove the side shield for better working access for the hydraulic installation (Figure 2a).

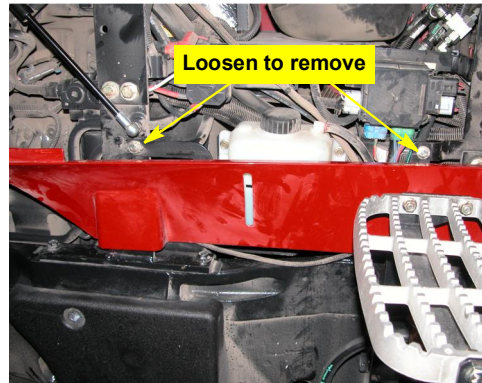


Figure 2a: Removing the side shield

b. Route the steering output hoses HU up from the steering cylinders, through the machine's frame, and to the left side of the machine near the fuel tank (Figure 2b-i). The hoses will follow a similar path to the machine's steering lines routed from the steering orbital to the front steering cylinders (Figure 2b-ii).

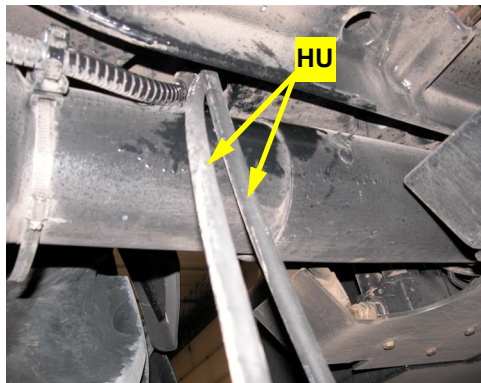


Figure 2b-i: Routing the steering output hoses - near the fuel tank



Figure 2b-ii: Routing the steering output hoses—following the machine's steering lines

3. Mount the hydraulic steering block.

- a. The hydraulic steering block will be mounted to the machine frame on the left side, below the cab, and beside the fuel tank. Locate and remove the lower of the two bolts securing the step mounting bracket to the machine frame (Figure 3a L - left side).

Using this bolt, secure the hydraulic block mounting bracket **HF** to the frame (Figure 3a R - right side).

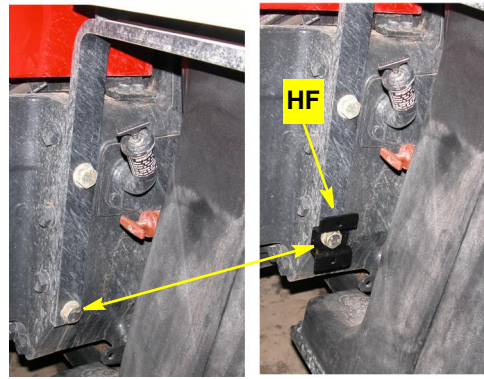


Figure 3a (L and R): Fitting the mounting bracket for the hydraulic block

- b. Attach the two pre-routed steering output hoses **HU** to the **A** and **B** ports of the hydraulic steering block (Figure 3b).
- c. Using hardware **HG** mount the hydraulic block **HA** on bracket **HF**.



Figure 3b: Connected steering output hoses (LS hose also shown connected - step 8)

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

- a. Locate the machine steering lines attached to the steering cylinders at the front axle (Figure 4a L and R).

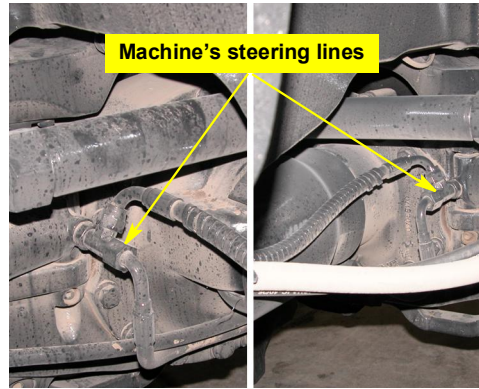


Figure 4a (L and R): Locating the steering lines

- b. Install the provided run-tees **HL** to the head end of the right and left steering cylinders (Figure 4b).

NOTE: *If the machine is fitted with a single steering cylinder then the run-tee fittings must be installed, one each, at both ends of the cylinder.*

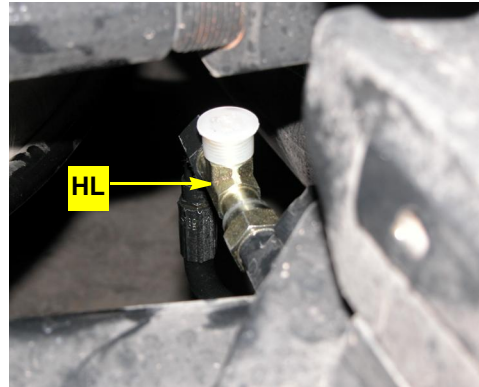


Figure 4b: Installed run-tee

- c. Attach the pre-routed steering output hoses **HU** to the branches of the run-tees **HL** (Figure 4c).

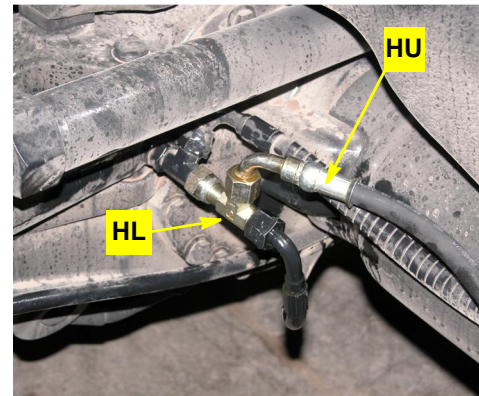


Figure 4c: Connected steering output hoses

- d. Secure the hoses to other machine plumbing using heavy tie straps provided (Figure 4d).

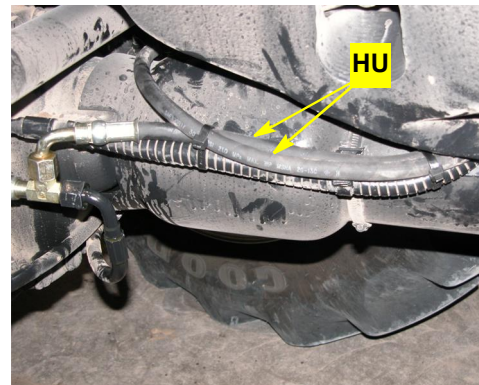


Figure 4d: Steering hoses secured with ties

5. **Assemble, disassemble STC (Snap-to-Connect) fittings.**

- a. The pressure, tank and load sense connections on the machine's steering orbital are made with STC (snap-to-connect) fittings. Use STC release tool **HM** to disconnect these fittings (Figure 5a).
- b. Insert the right-sized tool **HM** (#6 or #8) behind the rubber release sleeve of the STC connection. The two halves of the connection can then be pulled apart (Figure 5b).
- c. To assemble an STC connection, insert the male connector to the female and push together until the connections click. Verify the connection has been made successfully by pulling the connection.

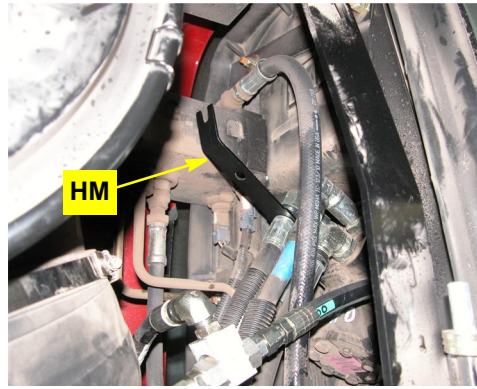


Figure 5a: Releasing STC fitting

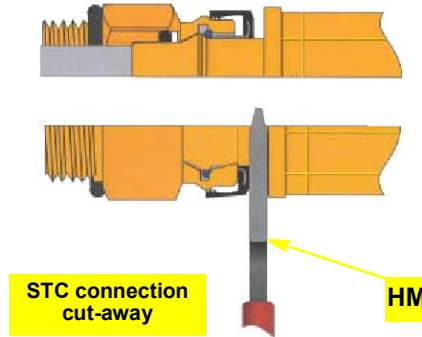


Figure 5b: Using the STC release tool

6. **Prepare the load sense valve.**

Assemble load sense valve **HN** as follows (Figure 6):

- Adapter fitting **HO** in the function port (jumper hose **HR** connects)
- Adapter fitting **HP** in the **LS** port (**HV** to hydraulic block connects)
- Adapter fitting **HQ** in the source port (machine's load sense hose connects)

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

- a. Locate the load sense hose on the left side of the steering orbital (Figure 7a-i). Using the smaller #6 STC release tool **HM**, disconnect the load sense hose from the steering orbital and reconnect it to adapter **HQ** of the prepared load sense shuttle (Figure 7a-ii).

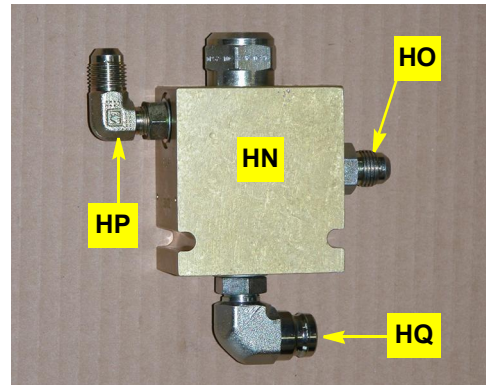


Figure 6: Prepared load sense shuttle

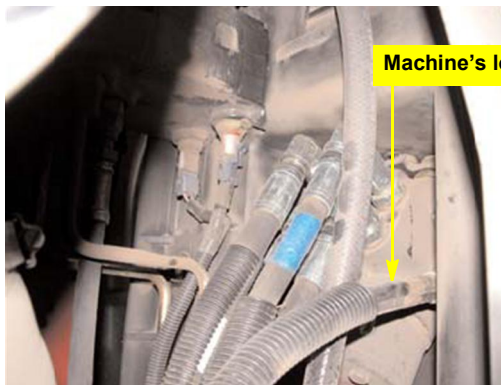


Figure 7a-i: Load sense hose at orbital

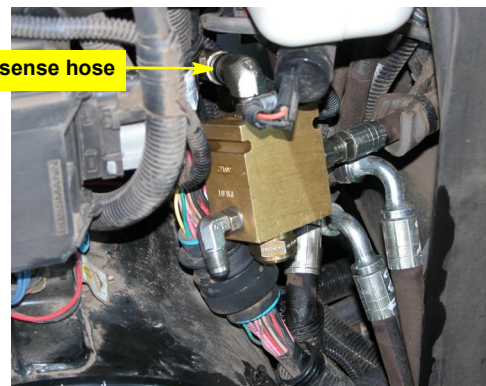


Figure 7a-ii: Load sense hose connected to load sense shuttle

7. **Install the load sense, pressure and tank jumper hoses and fittings (continued).**

- b. Install hoses **HR** between the load sense fitting on the steering orbital and adapter **HO** on the load sense shuttle (Figures 7b-i and 7b-ii).

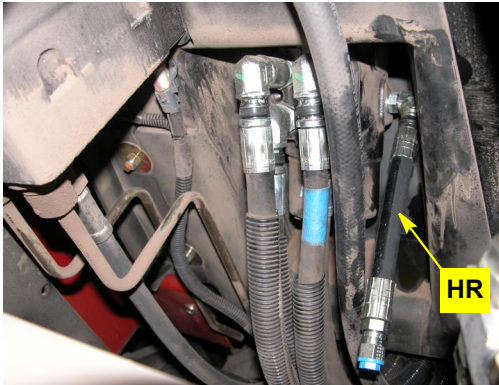


Figure 7b-i: Hose connected at orbital

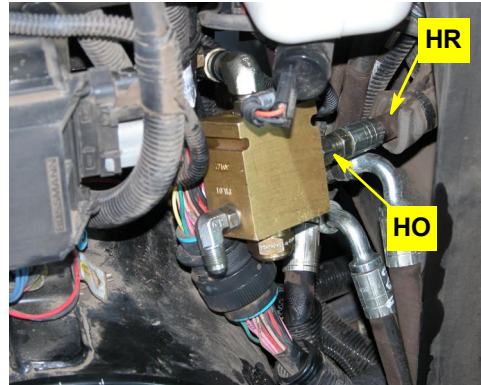


Figure 7b-ii: Hose connected at load sense shuttle

- c. Locate the pressure and tank ports on the machine's steering orbital stamped **P** and **T** on the casting. Using the larger #8 STC release tool **HM**, disconnect the pressure and tank hoses from the orbital (Figure 7c).

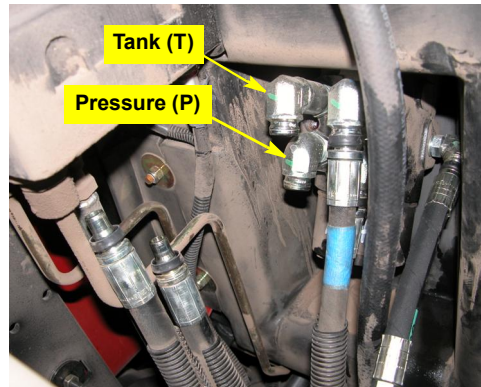


Figure 7c: Tank and pressure hoses disconnected

- d. Install a jumper hose **HS** between the pressure and tank fittings on the orbital and a 'T' end of a union run-tee **HK**. Reconnect the machine's pressure and tank hoses to the open 'T' end of **HK** (Figure 7d).

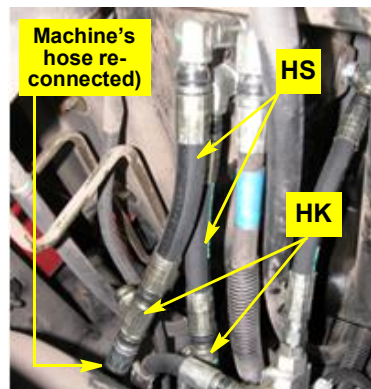


Figure 7d: Jumper hoses connected to T and P ports at orbital. Machine's hoses reconnected at union tees (one shown).

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

- a. Connect the provided load sense hose **HV** between the **PILOT** port (fitting **HP**) of the load sense valve **HN** and the **LS** port of the hydraulic steering block (Figures 8a-i and 8a-ii).

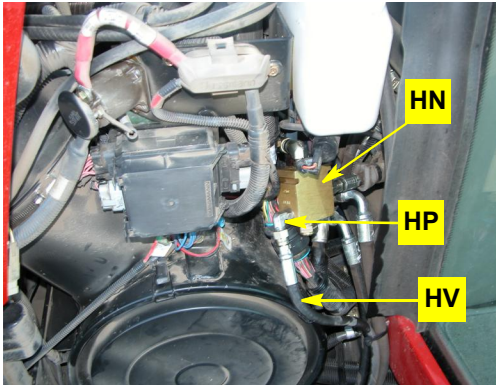


Figure 8a-i: Load sense hose connected to load sense valve

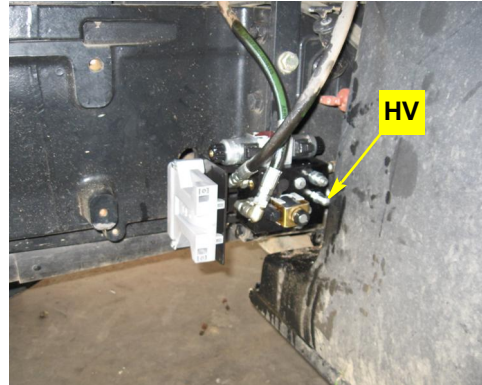


Figure 8a-ii: Load sense hose connected to the hydraulic block (P and T hoses also connected - see next step)

- b. Install a pressure/tank hose **HT** between the stem of its respective union tee **HK** (installed at step 7d) and the **P** and **T** ports of the hydraulic steering block respectively (Figures 8b-i and 8b-ii).

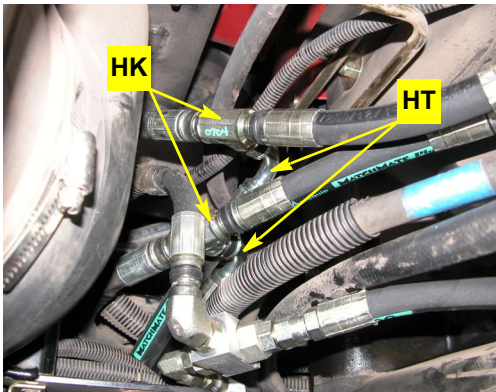


Figure 8b-i: Pressure and tank hoses connected to union tees

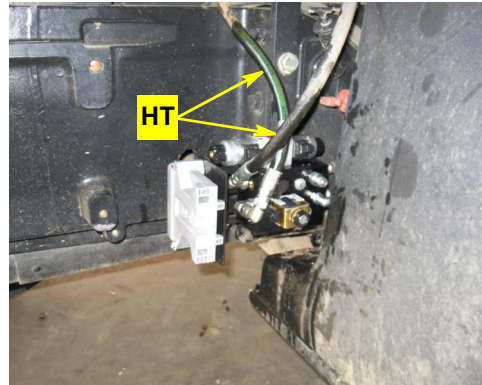


Figure 8b-ii: Pressure and tank hoses connected to hydraulic block

NOTE:

Be sure hoses are routed to avoid entanglement to promote problem-free operation (Figure 8c).

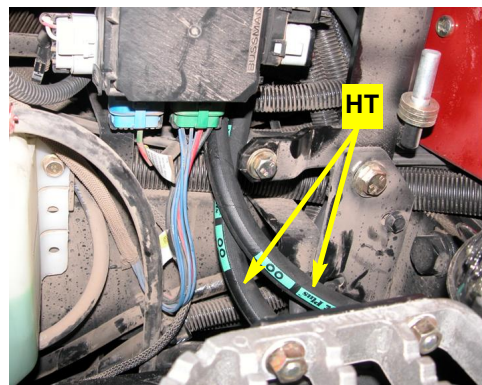


Figure 8c: Well-routed pressure and tank hoses

9. Verify operation.



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 machine and make certain that it is safe to operate.
- b. Start the machine and check hydraulic connections for any leaks.

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 hardware **WD** (screw) and **WE** (nut), 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).

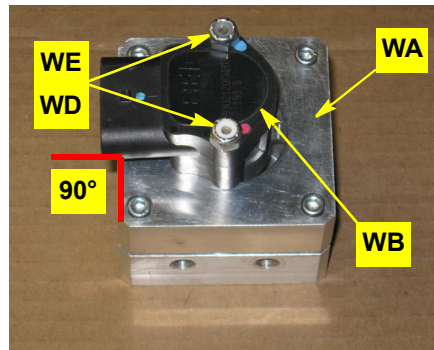


Figure 1a: Mounted WAS wire connector

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

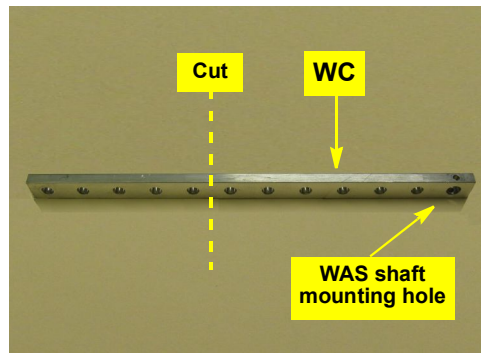


Figure 1b: WAS arm preparation

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

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. Cut the provided threaded rod **WG** 2-7/8" 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 4-1/8" (Figure 1d-ii). Leave **WH** loose until you complete linkage adjustment at step 2f.

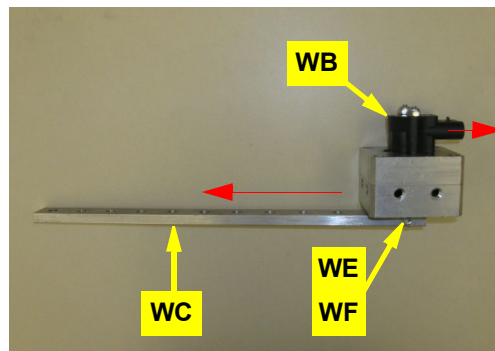


Figure 1c: Attached WAS arm

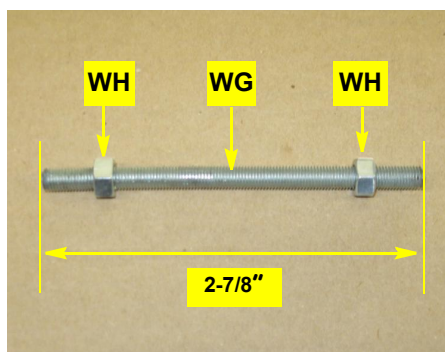


Figure 1d-i: Cut threaded rod

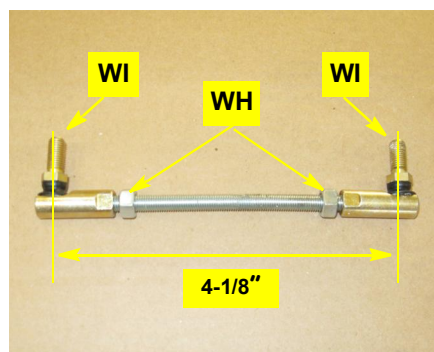


Figure 1d-ii: Assembled threaded rod

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

a. Locate the tie rod on the left hand side of the steering axle (Figure 2a).

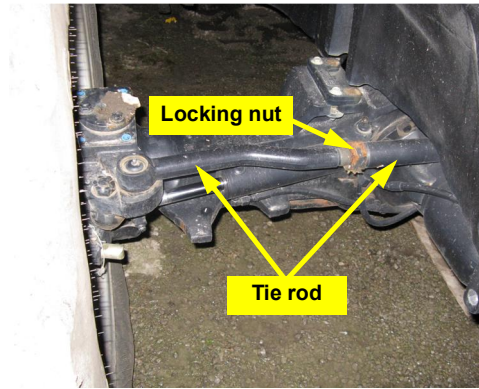


Figure 2a: Tie rod and locking nut location

b. Attach plastic clamps **WM** and bracket **WK** to the tie rod with hardware **WN** next to the locking nut (Figure 2b).

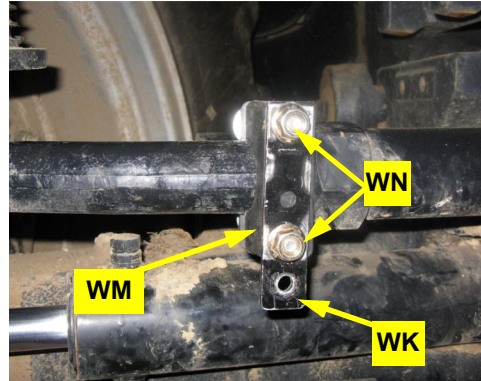


Figure 2b: Installed WAS clamp and bracket

c. Locate the front axle differential cover bolts on the back of the axle. Loosen the bolt indicated in Figure 2c-i just enough to slide the bracket **WL** behind the bolt (Figure 2c-ii).

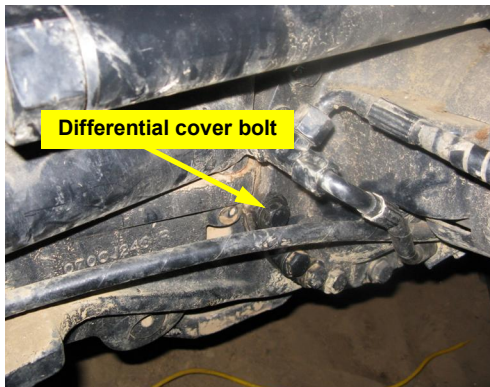


Figure 2c-i: Differential cover bolt to loosen

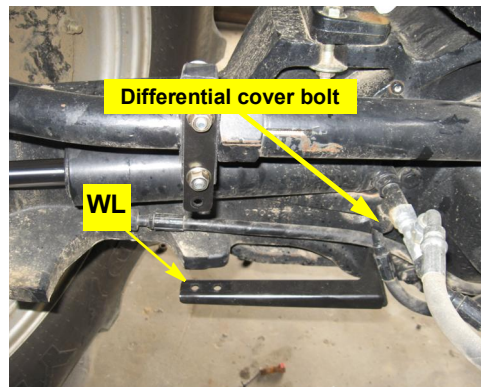


Figure 2c-ii: Installed WAS mounting bracket

d. Attach the assembled WAS from steps 1a through 1c to bracket **WL** using bolts **WJ** (under the bracket, not shown) with the WAS connector facing the center of the machine. The top of the WAS assembly should be approximately 1" from the bottom of the steering cylinder (Figure 2d).

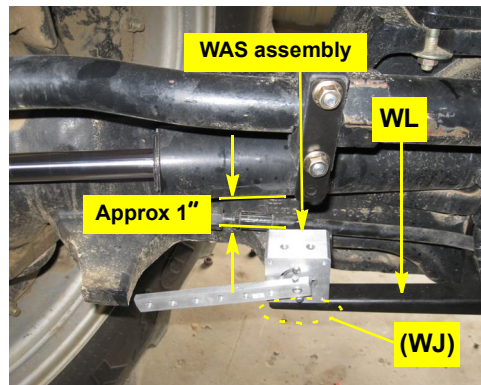


Figure 2d: Installed WAS assembly

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

- e. Using the remaining nuts **WH**, install the assembled WAS linkage from step 1d between the rod bracket **WK** 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 nuts **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 nuts **WH** on the rod and the swivels.

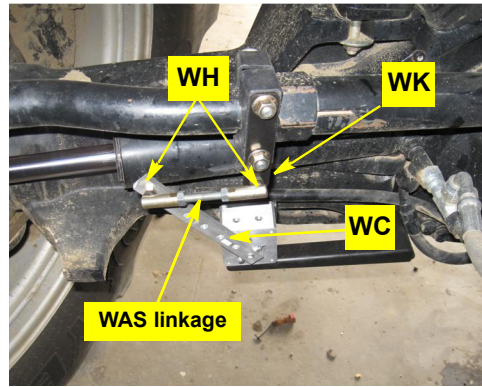


Figure 2e: Installed linkage



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

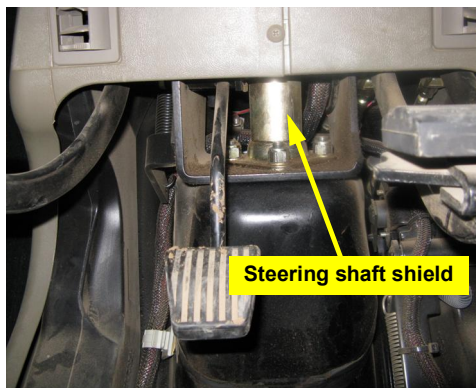


Figure 1a: Shielded steering shaft

- 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 to 3/8" (Figure 1b).

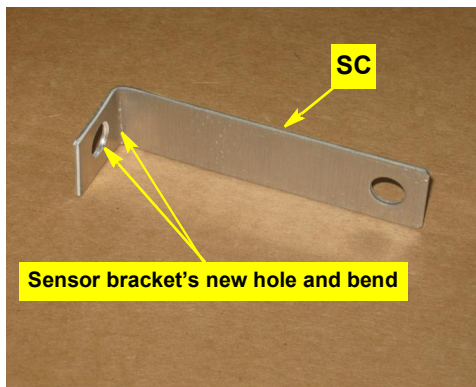


Figure 1b: Newly drilled/bent sensor bracket

- 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.

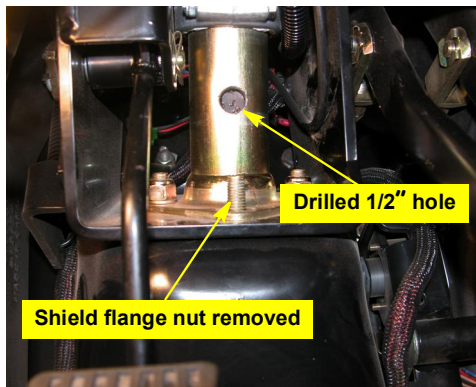


Figure 1c: Drilled shaft shield and installed magnets

- 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 1d).
- e. Align the sensor **SD** with the magnets and adjust the sensor face to 1/8" to 1/4" from the magnets (Figure 1d).

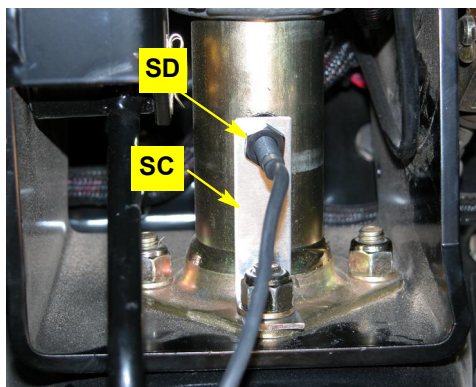
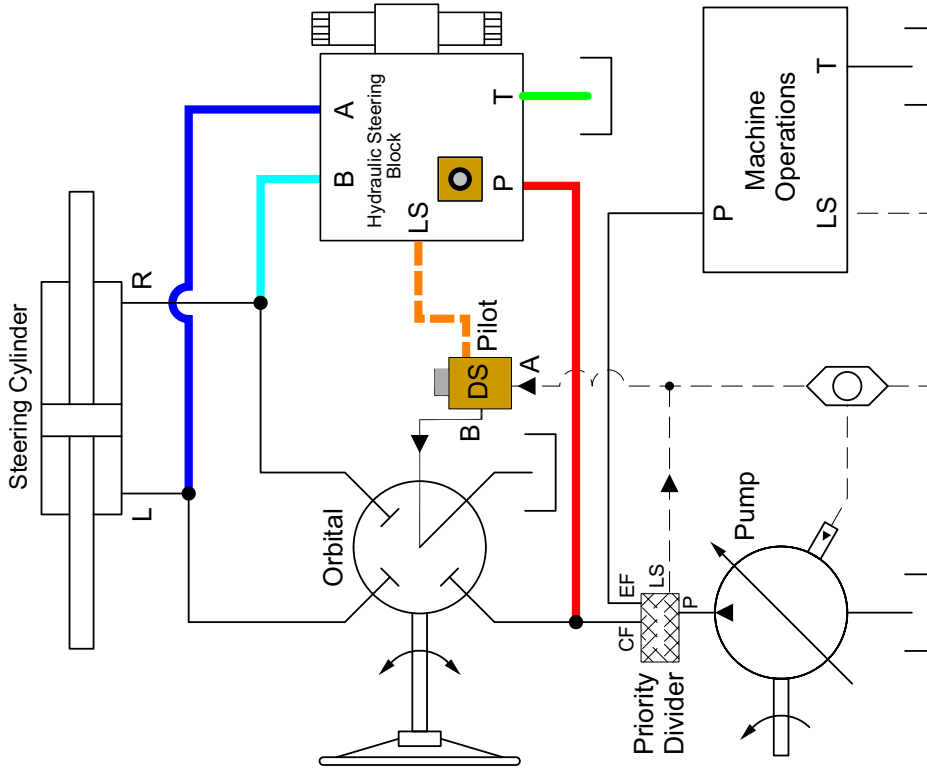


Figure 1d: Installed sensor arm

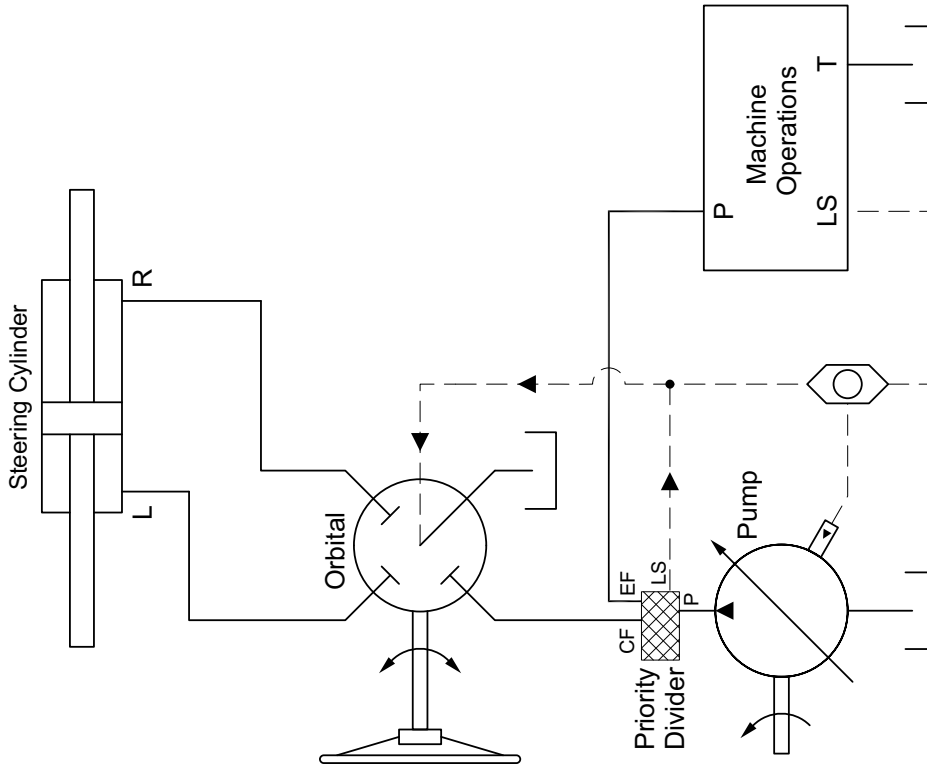
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Appendix A - Hydraulic Circuits

With AutoSteer



Without AutoSteer



Legend

- █ Tank
- █ Pressure
- █ A - Steering Line
- █ B - Steering Line
- █ Load Sense
- DS Dynamic Load Sense Shuttle