Automated Steering Kit Installation Guide

Kit: EDX-JD4720, P/N 911-2024-000

Fits John Deere Sprayer Model:

4720

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 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.

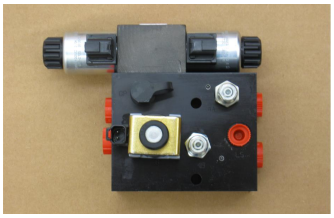
Before attempting to install any of the components, park the machine on a clean level floor with adequate clearance to work all around.

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.

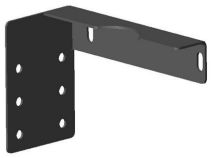
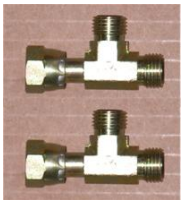
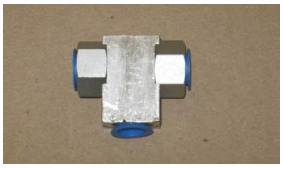
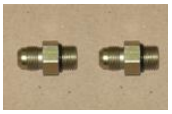
To prevent hydraulic system contamination, it is essential to thoroughly clean hydraulic system fittings and hose connections prior to disconnecting or removing. Use a degreasing solvent spray cleaner such as a brake cleaner to prevent hydraulic system contamination. Note that o-rings used on ORB and 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 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 and HC				
HB	760-2061-000	4	Adapter, hyd 90 elbow - #6maleJIC x #8maleORB (P [pressure], T [tank] and A and B ports on hydraulic steering block)	
HC	760-2058-000	1	Adapter, hyd 90 elbow #6maleJIC x #6maleORB (LS port on hydraulic steering block)	

Kit Contents - Steering Hydraulics *(continued)*

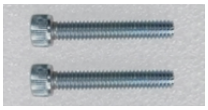
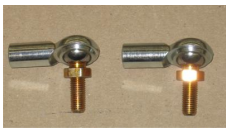
REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
HD	640-0116-000	1	Hydraulic steering block mounting bracket	
Bag H2 contains HE and HF				
HE	675-2009-000	2	Bolt - 5/16NC x 1-1/4" Gr5, ZP	
	678-1055-000	4	Washer, flat - 5/16 ZP	
	676-1036-000	2	Nut, nylock - 5/16NC ZP	
			(Replace factory washer reservoir fasteners)	
HF	675-2006-000	2	Bolt - 3/8NC x 3-3/4" Gr5, ZP	
	678-1054-000	2	Washer, flat - 3/8 ZP	
	676-1035-000	2	Nut, nylock - 3/8NC ZP	
			(Mount hydraulic steering block onto HD)	
Bag H4 contains HJ, HK and HL				
HJ	760-2069	1	Adapter, hyd run-tee - #8ORFF	
			(Pressure line)	
HK	760-2046	1	Adapter, hyd run-tee - #6ORFF	
			(Tank/return line)	
HL	760-2030	2	Adapter, hyd run-tee - #4ORFF	
			(Steering lines)	
Bag H5 contains HM, HN and HO				
HM	760-0002	1	Assembly, hyd load sense shuttle valve - #6femORB	
HN	760-2056	2	Adapter, hyd - #6maleJIC x #6maleORB	

Kit Contents - Steering Hydraulics *(continued)*

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
HO	760-2033	1	Adapter, hyd - #4maleORFF x #6maleORB	
HP	760-1144	1	Hose, hyd - 1/4" x 6", #6femJIC swivel x #4femORFF 90 swivel (Jumper hose for load sense line)	
HQ	760-1148	1	Hose, hyd - 3/8" x 84", #6femJIC swivel x #8femORFF swivel (Pressure hose)	
HR	760-1149	1	Hose, hyd - 3/8" x 69", #6femJIC swivel x #6femORFF swivel (Tank hose)	
HS	760-1150	1	Hose, hyd - 1/4" x 72", #6femJIC swivel both ends (Load sense hose)	
HT	760-1146	1	Hose, hyd - 1/4" x 127", #6femJIC swivel x #4femORFF 90 swivel (Steering hose - left side)	
HU	760-1147	1	Hose, hyd - 1/4" x 138", #6femJIC swivel x #4femORFF 90 swivel (Steering hose - right side)	
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.

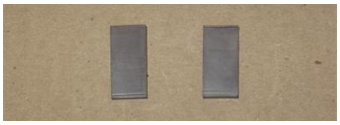
REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
Bag 710-0099-000 contains WA to WJ				
WA	720-0045-000#	1	WAS assembly	
WB	750-5002-000	1	Sensor, dual output, BEI	
WC	602-1087-000	1	Connector arm, steering	
WD	675-1191-000	2	Screw, mach, 8-32 x 3", PPH ZP	
WE	676-1054-000	4	Nut, nylock 8-32NC, ZP	
WF	675-1150-000	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	
WI	760-0018-000	2	Rod end swivel with stud, 5/16-24	
WJ	675-2010 678-1077-000	2 2	Bolt, 5/16NC x 3/4" Gr5 ZP Washer, lock 5/16, ZP (Attach WAS assembly to WK)	 

Kit Contents - Wheel Angle Sensor *(continued)*

WK	640-0117-000	1	WAS assembly mounting bracket	
WL	675-0136-000	2	Clamp, 2.43" - 2.74" Tbolt, SS (Attach WK to steering cylinder)	
WM	640-0118-000	1	WAS rod link bracket	
Bag W3 contains WN				
WN	675-1139-000	4	Screw, 1/4-20 x 1/2", hex cap, SS	
	676-1040-000	4	Nut, 1/4NC Gr5 ZP (Mount WK on WL)	

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" thk, 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	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 from hydraulic steering block **HA** and install adapter fittings **HB** in the **P**, **T, A** and **B** ports and adaptor fitting **HC** in the LS port (Figure 1):

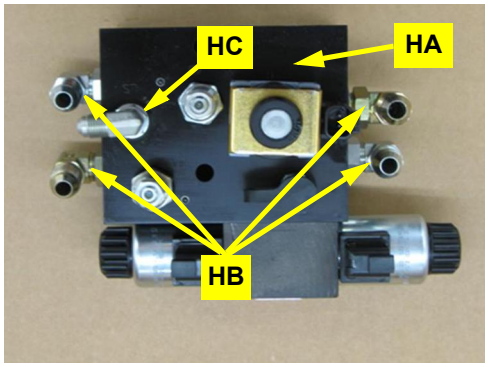


Figure 1: Prepared hydraulic block

2. Install the steering block mounting bracket.

Locate the windshield washer reservoir below the front of the cab on the left side (Figure 2 left inset).

Remove the two bolts holding the reservoir and using hardware **HE**, resecure the reservoir with hydraulic steering block mounting bracket **HD** behind it. Mount **HD** with its block mounting face inward and downward (Figure 2 and right inset).

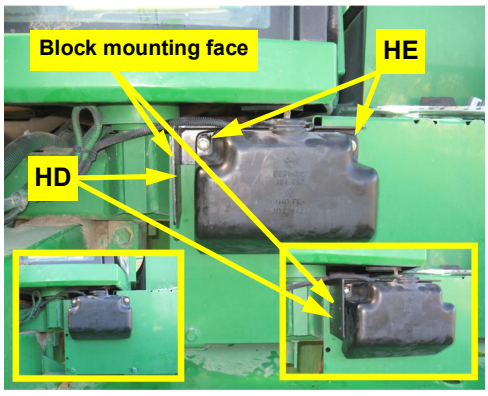


Figure 2 with insets: Installed steering block mounting bracket

3. Install the hydraulic steering block and steering controller mounting bracket.

Using hardware **HF**, attach hydraulic steering block **HA** to bracket **HD** as follows (Figure 3 with inset):

- Mount **HA** with its solenoids vertical (so forward with **P** and **T** ports upward).
- Figure 3 shows bracket **HG** which may or may not be used in your installation. If bracket **HG** did come with your installation kit then disregard.

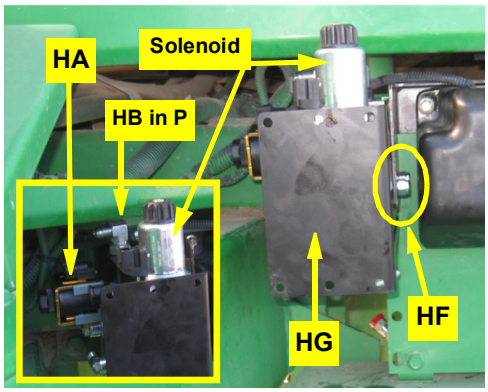


Figure 3: Installed steering block

4. Install the pressure fitting.

Locate the steering priority valve on the left side of the sprayer frame near the chemical inductor. (Figure 4). Remove the hose on the end of the run-tee attached to the excess flow outlet of the priority divider and install run-tee **HJ** (Figure 4 inset). Reconnect the hose to the open T end of the new run-tee (Figure 4 inset).

NOTE: *Leave run-tees 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.*

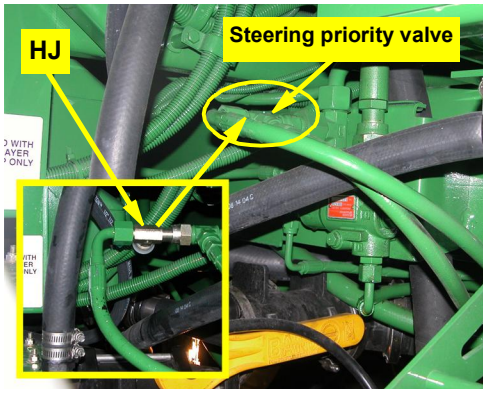


Figure 4 with inset: Pressure run-tee at priority valve, existing hose reconnected

5. Install the tank fitting.

NOTE: *On 2006 and earlier models there is a loose orifice disk in the end of the hydraulic filter inlet hose. This orifice disk must remain in the end of the hose when you reconnected it to the run-tee you install (Figure 5-i). For 2007 and later models, see Figure 5-ii.*

Locate the hydraulic filter under the center of the sprayer, near the transmissions (Figures 5-i).

(See Note above). Remove the hose from the filter inlet and install run-tee **HK** (Figure 5-ii inset). Reconnect the hose to the open T end of the run-tee (Figure 5-ii inset)

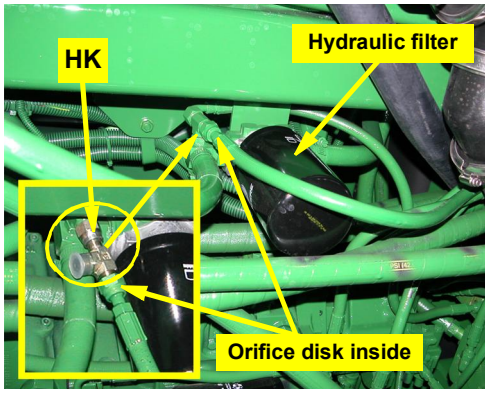


Figure 5-i: Tank run-tee, 2006 and earlier models

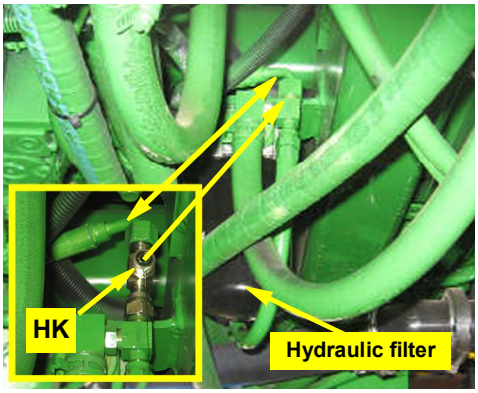


Figure 5-ii: Tank run-tee, 2007 and later models

6. Prepare and install the load sense shuttle valve.

NOTE: *The load sense shuttle installation for 2006 and earlier models is different from the installation for 2007 and later models. See steps 6a and 6b for the 2006 installation, steps 6c and 6d for the 2007 installation.*

a. **2006 and earlier -** assemble load sense shuttle valve **HM** as follows (Figure 6a):

- Adapter fittings **HN** in the function and load sense ports (the T ends)
- Adapter **HO** in the source port (stem end)
- Extension (jumper) hose **HP** onto either **HN** fitting

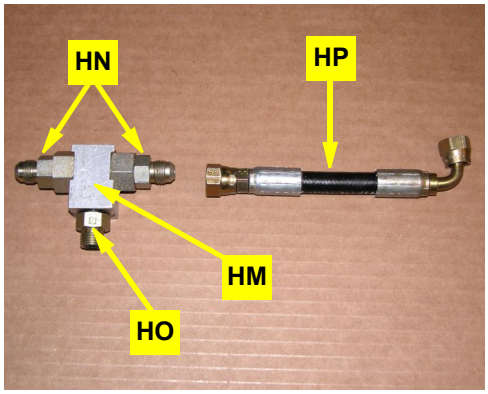


Figure 6a: Load sense valve, 2006 and earlier models

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

b. Locate the sprayer load sense line on the bottom of the hydraulic valve block under the sprayer, behind the transmission (Figure 6b). Disconnect the hose from the valve block and install the prepared load sense shuttle **HM** using extension hose **HP** (Figure 6b inset). Reconnect the sprayer load sense hose to shuttle adapter **HO** (Figure 6b inset).

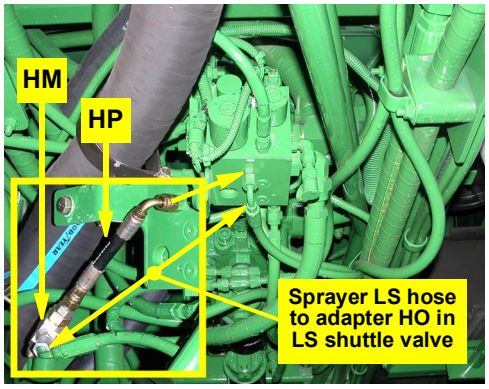


Figure 6b with inset: Extension hose and load sense valve installed, 2006 and earlier models

c. **2007 and later** - assemble load sense shuttle valve **HM** as follows (Figure 6c):

- Adapter fittings **HN** in the source (stem end) and function (T end)
- Adapter **HO** in the function port (other T end)
- Extension (jumper) hose **HP** onto **HN** in the source port.

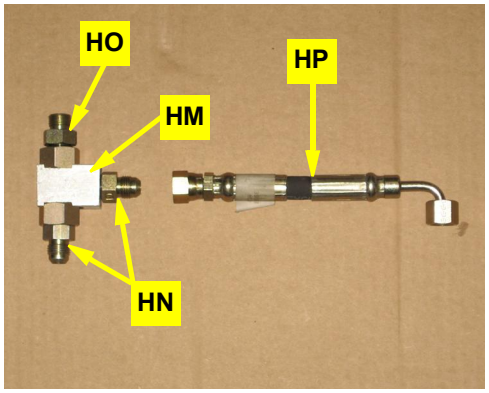


Figure 6c: Load sense valve, 2007 and later models

d. Locate the sprayer load sense line on the hydraulic pump behind the hydrostatic transmissions (Figure 6d). Disconnect the hose from the pump and install the prepared load sense shuttle **HM** using extension hose **HP** (Figure 6d inset). Reconnect the sprayer load sense hose to shuttle adapter **HO** (Figure 6d inset).

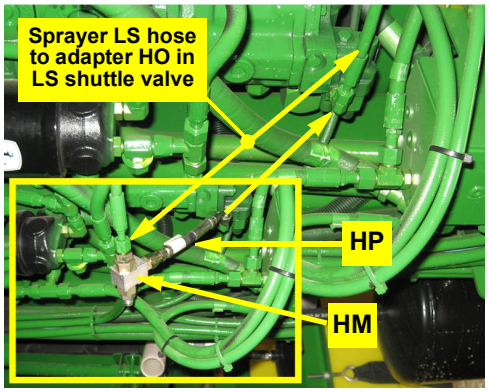


Figure 6d with inset: Extension hose and load sense valve installed, 2007 and later models

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

NOTE: *Route all hoses with other sprayer plumbing free from entanglement and secured with heavy tie straps **HV**. Securely tighten all hose fittings and connections when hose installation is complete.*

a. Install the pressure hose **HQ** between the open stem of run-tee **HJ** installed at step 4 (Figure 7a) and fitting **HB** in the **P** port on the top (as mounted) of the hydraulic steering block (Figure 7e).

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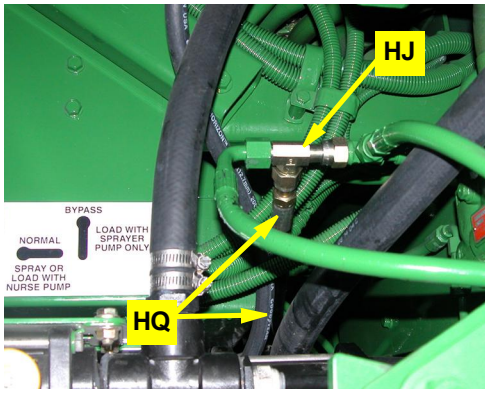

Figure 7a: Pressure hose installed at run-tee

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

b. Install the tank hose **HR** between the open stem of run-tee **HK** installed at step 5 (Figure 7b) and fitting **HB** in the **T** port on the top (as mounted) of the hydraulic steering block (Figure 7e).

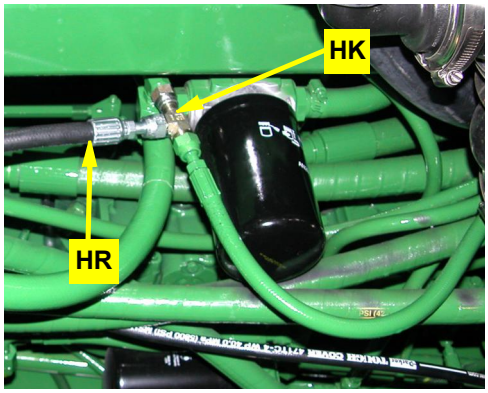

Figure 7b: Tank hose installed at run-tee

c. Install the load sense hose **HS** between adapter **HN** in the open **T** end of the load sense shuttle valve **HM** (Figure 7c - 2006 model shown) and fitting **HC** in the **LS** port in the front (as mounted) of the hydraulic steering block (Figure 7e).

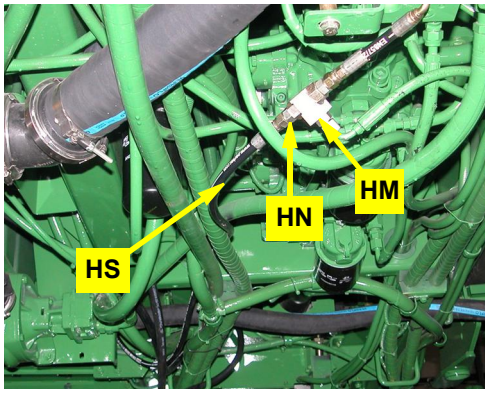

Figure 7c: Load sense hose installed at load sense valve

d. Using tie straps **HV**, route the hoses under the machine and up to the hydraulic steering block on the left front of the cab (Figure 7d).

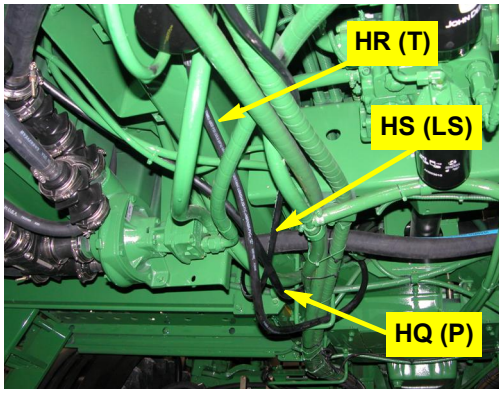

Figure 7d: Pressure, tank and load sense hoses routed along and up to steering block

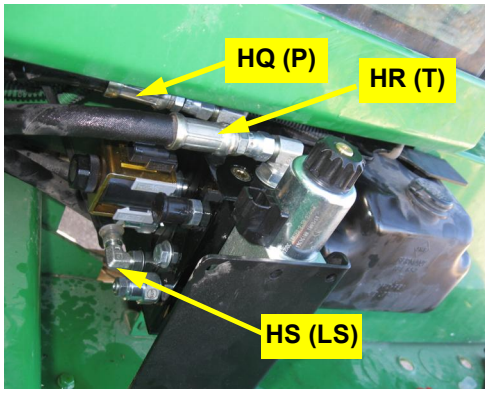

Figure 7e: Pressure, tank and load sense hoses installed at steering block

8. Install the steering output fittings.

Install run-tees **HL** at the head ends of the left and right steering cylinders (Figures 8a-i and 8a-ii with insets). Reconnect the steering lines to the open T end of each run-tee (Figure insets).

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

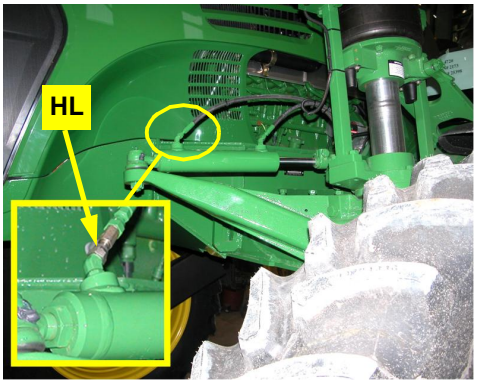

Figure 8a-i with inset: Steering run-tee at left steering cylinder

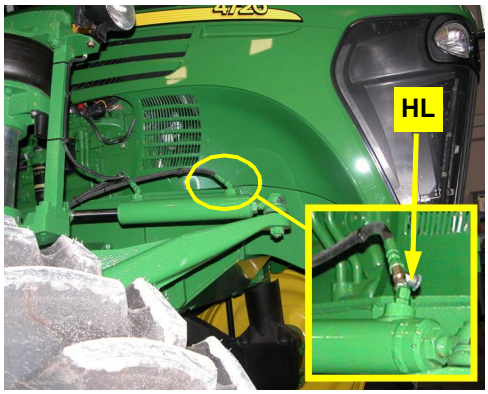

Figure 8a-ii with inset: Steering run-tee at right steering cylinder

9. Install the steering output hoses.

NOTE: *When installing the steering hoses route them to/from the hydraulic steering block, inside the sprayer frame to/from the steering cylinders, crossing the longer **HU** to/from the right side.*

Route hoses with the sprayer's steering lines to allow for suspension flex and axle adjustment.

Install steering hoses **HT** and **HU** between adapters **HB** in the **A** and **B** ports on the bottom (as mounted) of the hydraulic steering block (Figure 9-i) and the open stems of run-tees **HL** (Figures 9-ii and 9-iii insets). Install the shorter **HT** at the left cylinder, the longer **HU** at the right cylinder.

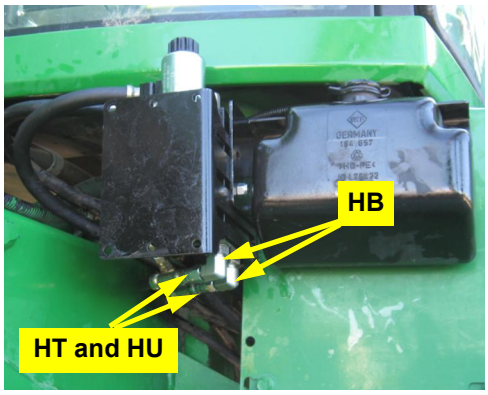

Figure 9-i: Steering hoses connected at steering block

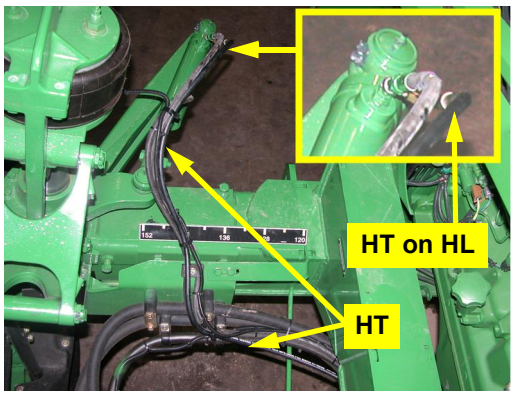

Figure 9-ii with inset: Left side steering hose connected (inset) and routed to steering block

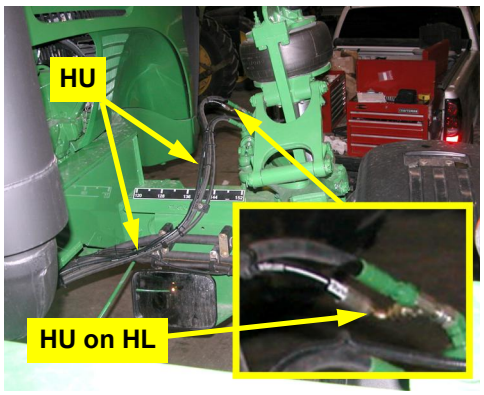

Figure 9-iii with inset: Right side steering hose connected (inset) and routed to steering block

10. 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 machine and make certain that it is safe to operate.

b. Start the machine 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 **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).

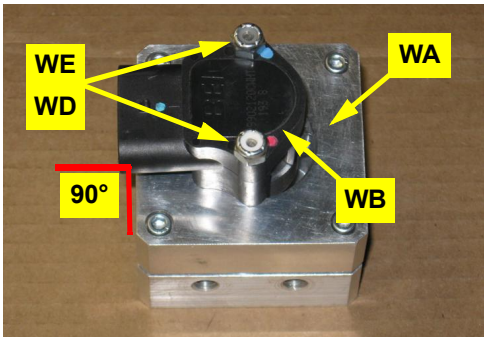

Figure 1a: Prepared WAS housing\connector

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

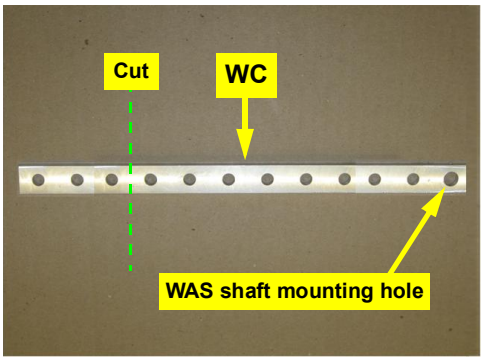

Figure 1b: WAS arm preparation

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

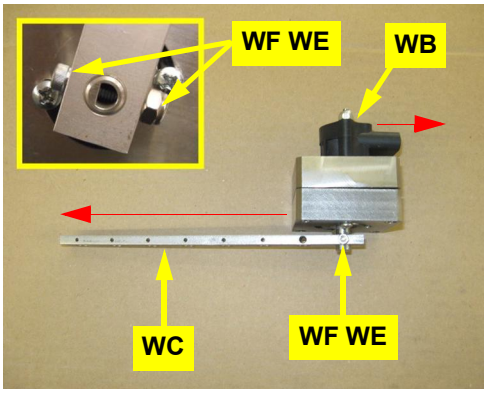

Figure 1c with inset: WAS arm installed

d. Screw the lock nuts **WH** and the swivel rod ends **WI** onto rod **WG** to achieve a center-to-center stud measurement of 13¼" (Figure 1d). Leave **WH** loose until you complete linkage adjustment at step 2.

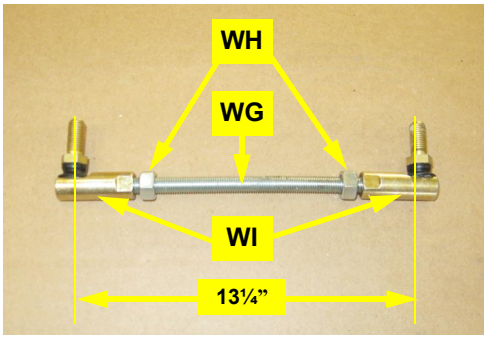

Figure 1d: Assembled threaded rod link

2. Mount the wheel angle sensor.

NOTE: *The figures in this section show prototype brackets and fittings. Install your brackets and fittings as described.*

a. Using hardware **WN**—nuts on top—install bracket **WK** on the two clamps **WL**.

Mount **WK** so that its short side (the WAS assembly mounting face) is opposite **WL**'s nuts and downward (Figure 2a).

Mount the clamp/bracket assembly **WK/WL** on the right side steering cylinder. Mount the assembly with **WK**'s short side inward and perpendicular to the ground (Figure 2a).

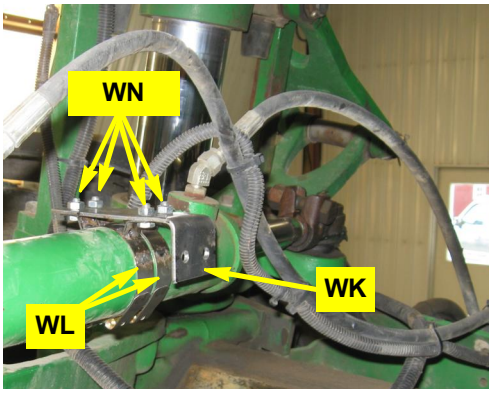

Figure 2a: WAS mounting bracket installed

b. Position and tighten the clamp assembly so that the rearmost edge of **WK** is 1½" from the forward edge of the steering line boss (at the piston rod end of the cylinder) (Figure 2b).

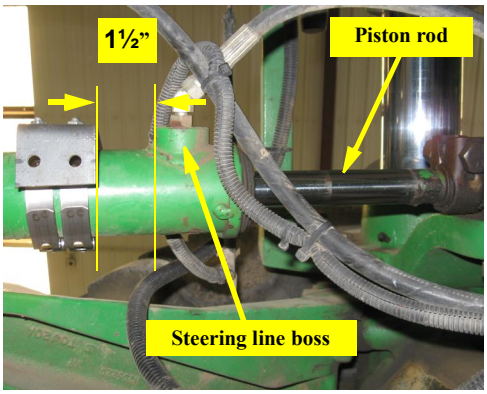

Figure 2b: WAS mounting bracket positioned

c. Using hardware **WJ** (not visible)**,** mount the WAS assembly from step 1 on the inner face of bracket **WK.** Mount the WAS assembly with the wire connector of **WB** pointing forward and the WAS arm **WC** toward the rear of the machine (Figure 2c).

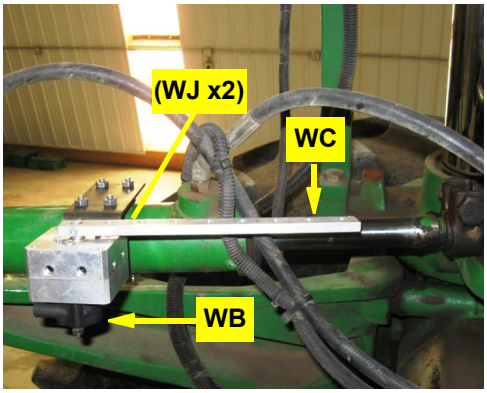

Figure 2c: WAS assembly installed

d. Mount rod link bracket **WM** on the steering cylinder ball joint clamp bolt at the end of the cylinder piston rod. Mount the bracket with its long side inward and below the clamp bolt (Figure 2d).

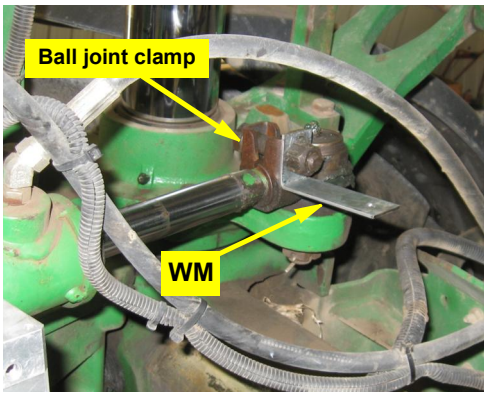

Figure 2d: WAS rod link bracket installed

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

e. Using hardware **WH**, install the rod link from step 1 between the last hole in WAS arm **WC** and bracket **WM**. Set the swivel studs downward at both ends (Figure 2e). Leave swivel nuts **WH** loose.

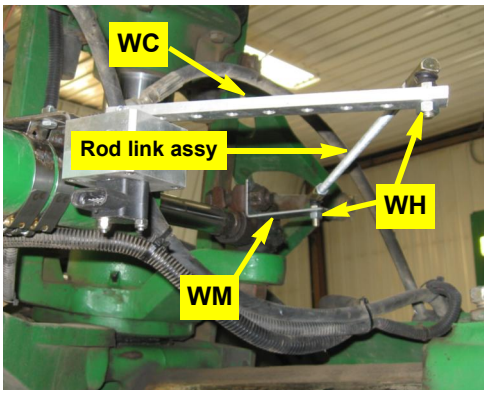

Figure 2e: Rod link assembly installed

f. 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 2f-i and 2f-ii).


Figure 2f-i: Full left lock


Figure 2f-ii: Full right lock

g. 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 column bracket screw inside the lower left opening of the cab front panelling (Figure 1a). Remove the screw and retain (Figure 1a inset).

Figure 1a with inset: Switch bracket mounting location

b. Drill a 1/4” hole in sensor bracket **SC** at the opposite end to the pre-drilled sensor hole. Put a 30° bend (approx), 1” from each end of the bracket (making a long flat ‘Z’ shape) (Figure 1b).

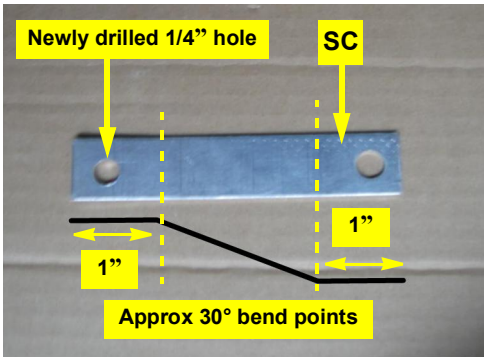

Figure 1b: Drilled sensor bracket - to be bent

c. Using the two-part epoxy **SB**, attach magnets **SA** 180° apart on the steering shaft. Align the center of the magnets with the center of the hole you exposed by removing the screw at step a (Figure 1c).

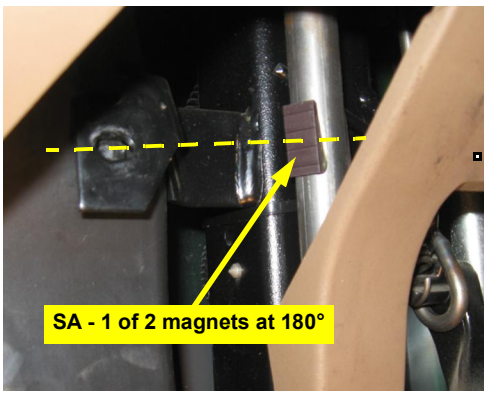

Figure 1c: Installed magnet(s)

d. Install switch **SD** in its bracket **SC**. Using the screw you removed at step a, install the bracket/switch assembly (Figure 1d).

Route **SD**’s cable back to the left side and using an **SE** tie strap, secure it to the switch bracket.

e. Align switch **SD**’s sensor with the magnets **SA** and adjust the sensor face to 1/8” to 1/4” from the magnets.

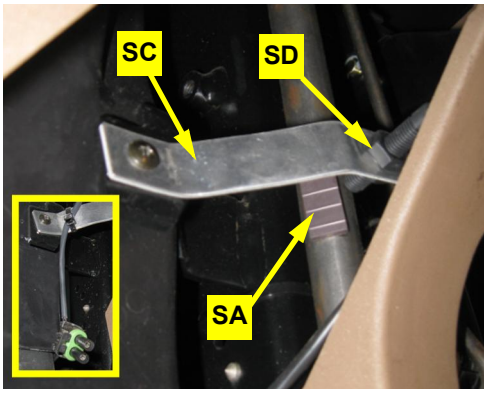

Figure 1d with inset: Installed sensor bracket and sensor, sensor connector tied (inset).