Automated Steering Kit Installation Guide

Kit: EDX-JD4700, P/N 911-2025-000

Fits John Deere Sprayer Models:

4700 4710*

***Note:** *For 4710 models with serial numbers (S/N) 4001 and higher, the hydraulic installation is slightly different. The guide makes it clear where differences occur and what they are.*

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.

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.

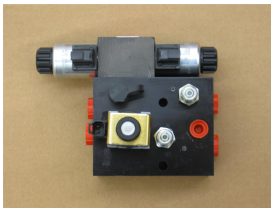
Before attempting to install any of the components, park the machine on a clean level floor with adequate clearance to work all around.

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.

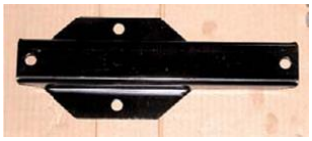
To prevent hydraulic system contamination, it is essential to thoroughly clean hydraulic system fittings and hose connections prior to disconnecting or removing. Use a degreasing solvent spray cleaner such as a brake cleaner to prevent hydraulic system contamination. Note that o-rings used on ORB and 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

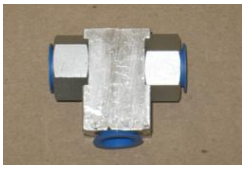
Unpack the hydraulics installation kit and identify the required parts as shown. Kit items are A, B, C etc. with an H (Hydraulic) prefix.

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
HA	760-0020-000	1	Assembly, hyd valve block - 15L\proportional (Hydraulic steering block)	
Bag H1 contains HB, HC and HD				
HB	760-2061-000	2	Adapter, hyd 90 elbow - #6maleJIC x #8maleORB (P and T ports on hydraulic steering block)	
HC	760-2060-000	2	Adapter, hyd - #6maleJIC x #8maleORB (A and B ports on hydraulic steering block)	
HD	760-2058-000	1	Adapter, hyd 90 elbow - #6maleJIC x #6maleORB (LS port on hydraulic steering block)	

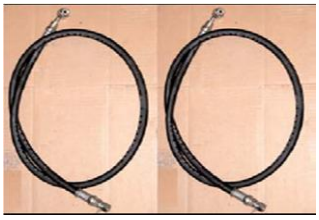
Kit Contents - Steering Hydraulics *(continued)*

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
HE	640-0015	1	Hydraulic steering block mounting bracket	
HF1	640-0014	1	Hydraulic steering block mounting bracket hammer strap (see also HF2) (Use with HE)	
HF2	640-0037	1	Hydraulic steering block mounting bracket hammer strap (see also HF1) (Use with HE - deeper alternative)	
Bag H2 contains HG and HH				
HG	675-2007-000 676-1035-000	2 2	Bolt - 3/8NC x 3/4" Gr5, ZP Nut, nylock - 3/8NC ZP (Connect HE and HF1 or HF2)	
HH	675-2060-000 678-1054-000 676-1035-000	2 2 2	Bolt - 3/8-16, 4.0, Gr5, ZP Washer, flat - 3/8 ZP Nut, nylock - 3/8NC ZP (Mount hydraulic steering block onto HE)	
Bag H4 contains HL, HM and HN				
HL	760-2046	4	Adapter, hyd run-tee - #6ORFF (Pressure, tank and steering ports in orbital)	
HM	760-2069	2	Adapter, hyd run-tee - #8ORFF (1. Alternative to HL in orbital's tank port) (2. Pressure connection at priority divider's excess flow port - 4710 series S/N 4001 and higher)	
HN	760-2064	1	Adapter, hyd - #8femORFF x #6maleORFF (Use with HM if HM used in orbital's tank port)	

Kit Contents - Steering Hydraulics *(continued)*

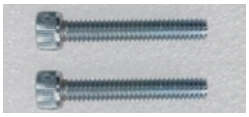
REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
Bag H5 contains HO, HP, HQ, HR, HS and HT				
HO	760-0002	1	Assembly, hyd load sense shuttle valve - #6femORB (All models)	
HP	760-2058	1	Adapter, hyd 90 elbow - #6maleJIC x #6maleORB (4700s and 4710s S/N# 4000 or lower)	
HQ	760-2040	1	Adapter, hyd 90 elbow - #6maleORB x #6femORFF swivel (4700s and 4710s S/N# 4000 or lower)	
HR	760-2048	1	Adapter, hyd - #6maleORFF x #6maleORB (4700s and 4710s S/N 4000 or lower)	
HS	760-2056	2	Adapter, hyd - #6maleJIC x #6maleORB (4710s S/N 4001 or higher)	
HT	760-2034	1	Adapter, hyd 90 elbow - #4maleORFF x #6maleORB (4710s S/N 4001 or higher)	
HU	760-1144	1	Hose, hyd - 1/4" x 6", #6femJIC swivel x #4femORFF 90 swivel (4710s S/N 4001 or higher; jumper hose for load sense line)	

Kit Contents - Steering Hydraulics *(continued)*

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
HV	760-1318-000	2	Hose, hyd - 3/8" x 35", #6femJIC swivel x #6femORFF 90 swivel (Tank hose - all models. Pressure hose - 4700s and 4710s S/N 4000 or lower - see HW)	
HW	760-1059	1	Hose, hyd - 3/8" x 96", #6femJIC swivel x #8femORFF 90 swivel (Pressure hose - 4710s S/N 4001 or higher)	
HX	760-1038	1	Hose, hyd - 1/4" x 40", #6femJIC swivel both ends (Load sense hose - 4700s and 4710s S/N 4000 or lower)	
HY	760-1145	1	Hose, hyd - 1/4" x 103", #6femJIC swivel both ends (Load sense hose - 4710s S/N 4001 or higher)	
HZ	760-1039	2	Hose, hyd - 1/4" x 48", #6femJIC swivel x #6femORFF 90 swivel (Steering hoses - all models)	
HAA	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.

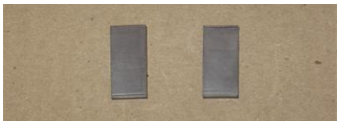
REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
Bag 710-0099-000 contains WA to WJ				
WA	720-0045-000#	1	WAS assembly	
WB	750-5002-000	1	Sensor, dual output, BEI	
WC	602-1087-000	1	Connector arm, steering	
WD	675-1191-000	2	Screw, mach, 8-32 x 3", PPH ZP	
WE	676-1054-000	4	Nut, nylock 8-32NC, ZP	
WF	675-1150-000	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)*.

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
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	
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	
Bag S1 contains SF				
SF	675-1138-000	1	Screw, 8-18 x 3/4" hex	

Installation - Automated Hydraulic Steering Kit

⚠WARNING:

Before installing, disconnecting or repairing the hydraulic hoses and components, turn off the machine and relieve all pressure from the hydraulic system by turning the steering wheel left and right. Failure to remove the pressure can result in serious injury or death from unexpected machine movement.

To avoid burn injury when installing, disconnecting or repairing the hydraulic hoses and components, turn off the machine and allow the system to cool down prior to touching the parts of the machine that are heated.

1. Prepare the hydraulic steering block.

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

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

- **HB** in the **P** and **T** ports
- **HC** in the **A** and **B** (steering) ports
- **HD** in the load sense port

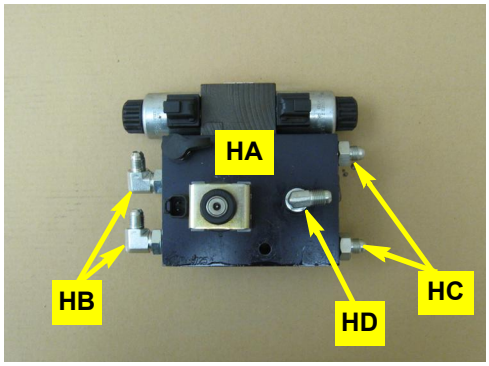


Figure 1: Prepared hydraulic block

2. Install the steering block mounting bracket.

Using hardware **HG** and hammer bracket **HF1** (or the deeper **HF2**, neither visible), install the steering block mounting bracket **HE** on the left side machine frame with its block flanges outward and its long section downward. Position the bracket's centerline 5" from the front face of the frame's platform mount (Figure 2).

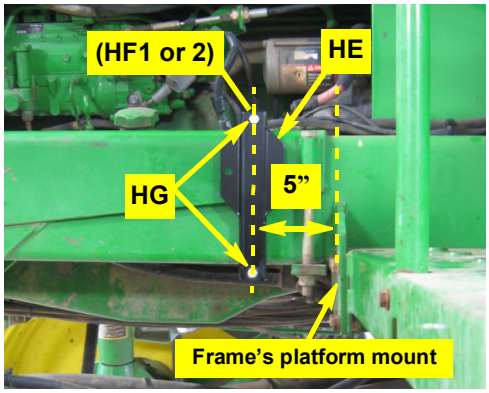


Figure 2: Installed steering block mounting bracket

3. Install the hydraulic steering block bracket.

Using hardware **HH**, mount hydraulic steering block **HA** on bracket **HE** as follows (Figure 3):

- **HA's P** and **T** ports upward

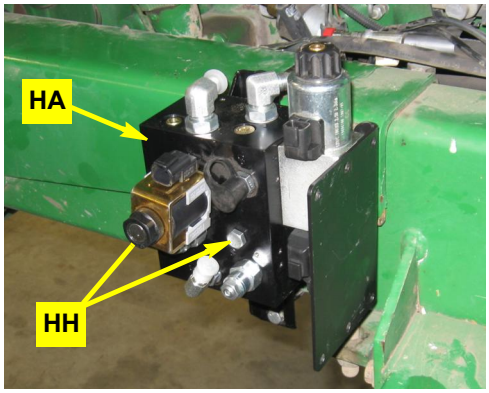


Figure 3: Installed steering block

4. Install the pressure and tank fittings.

NOTE: *There are two different pressure and tank fitting installation procedures. The first procedure (steps 4a to 4c) relates to all 4700 models and 4710 models with serial numbers (S/N) ending in 4000 or lower. The second procedure (steps 4d to 4f) relates to 4710 models with serial numbers 4001 and higher. Steps 5 and 6 also have alternative procedures for the different model groups.*

4700 models and 4710 models with S/N ending in 4000 or lower

a. Locate the steering orbital under the cab. On some models you will need to remove a shield to access the orbital (Figure 4a).

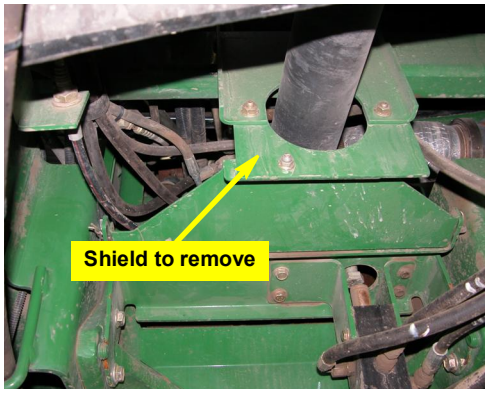


Figure 4a: Gaining access to orbital

b. Identify the machine's pressure and tank lines connected to the ports stamped P and T on the orbital casing (Figure 4b). (Disconnect and cap the right steering port R next to the P port to improve access - Figure 4c).

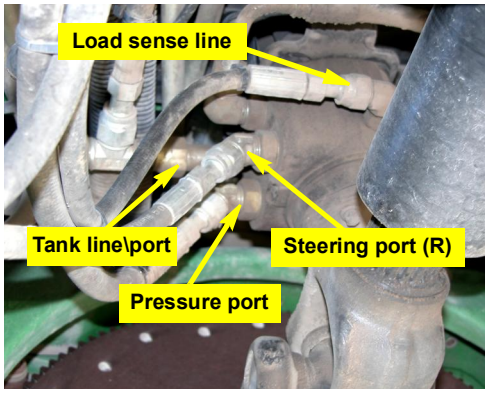


Figure 4b: Ports in the orbital

c. Disconnect the pressure and tank lines and install provided run-tee **HL** in the orbital's pressure port and either run-tee **HL** or the larger **HM** in the tank port (Figure 4c). If there is already a run-tee in the tank port, attach run-tee **HL** (or **HM**) in line (in series) with that run-tee. Reconnect the machine's pressure and tank lines (**P** and **T**) to the open 'T' ends of the newly installed run-tees (Figure 4c).

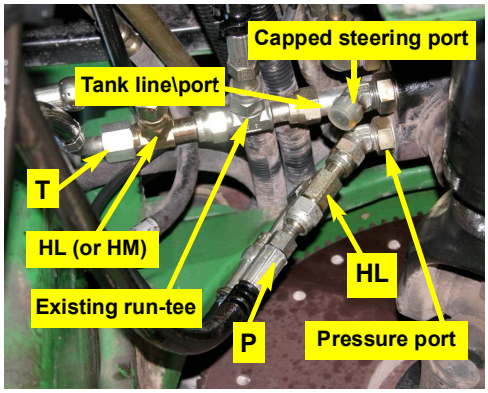


Figure 4c: Tank and pressure line run-tees at orbital. Machine's pressure (P) and tank (T) lines reconnected.

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.*

4710 models with S/N ending in 4001 or higher

d. Locate the steering orbital under the cab. On some models you will need to remove a shield to access the orbital (Figure 4a). Disconnect the machine's tank line from the orbital port marked T. (Disconnect and cap the right steering port R next to the P port to improve access - Figure 4d).

e. Install either run-tee **HL** or the larger **HM** in the tank port (Figure 4d). If there is already a run-tee in the tank port, attach run-tee **HL** (or **HM**) inline (in series) with that run-tee. Reconnect the machine's tank line to the open 'T' end of the newly installed run-tee (Figure 4d).

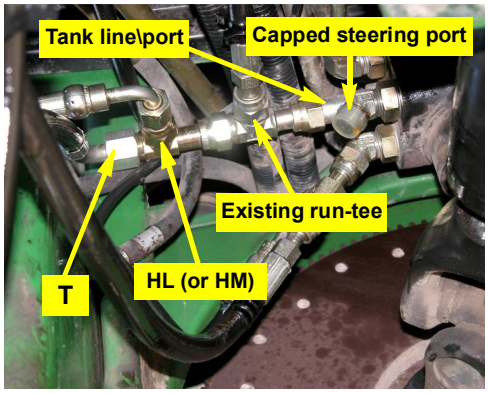


Figure 4d: Tank line (only) run-tee at orbital. Machine's tank line (T) reconnected.

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.*

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

4710 models with S/N ending in 4001 or higher *(continued)*

f. Locate the steering priority divider on the left side of the sprayer frame near the chemical inductor. Identify the run-tee attached to the excess flow **(EF)** outlet of the priority divider and disconnect the hose from the 'T' end of the run-tee (Figure 4e). Install run-tee **HM** then reconnect the disconnected hose to **HM**'s stem (Figure 4e inset). Run-tee **HM** will provide the pressure connection for the hydraulic control block.

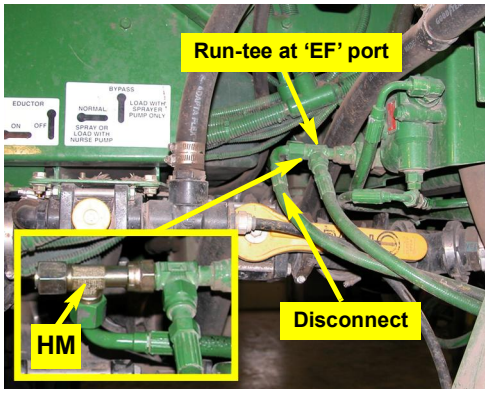


Figure 4e with inset: Pressure run-tee installed at priority divider

5. Prepare and install the load sense shuttle valve.

NOTE: *Follow steps 5a and 5b for all 4700 models and 4710 models with serial numbers (S/N) ending in 4000 or lower. Follow steps 5c and 5d for 4710 models with serial numbers 4001 and higher.*

4700 models and 4710 models with S/N ending in 4000 or lower

a. **A**ssemble load sense shuttle valve **HO** as follows (Figure 5a):

- Adapter fitting **HQ** in the load sense function port
- Adapter **HR** in the source port (the stem)
- Adapter **HP** in the load sense port (to hydraulic steering block)

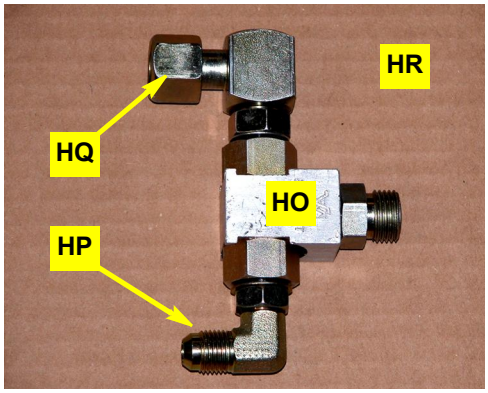


Figure 5a: Prepared load sense shuttle valve

b. Locate the load sense port on the side of the steering orbital (Figure 4b**)**. Remove the load sense hose and connect shuttle valve adapter **HQ** to the orbital fitting. Reconnect the machine's load sense hose to adapter **HR** in the shuttle's source port (Figure 5b).

NOTE: *Figure 5b shows steering run-tees HL already installed. You will install these run-tees at step 7.*

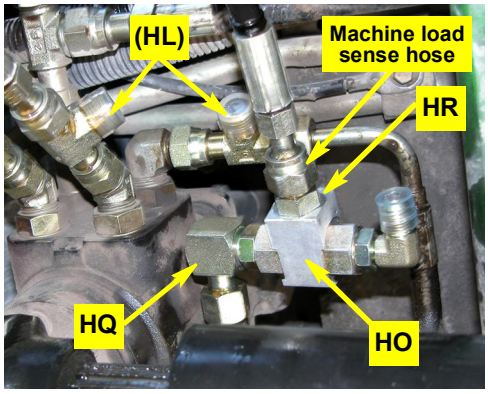


Figure 5b: Installed load sense shuttle valve. Machine's load sense hose reconnected.

4710 models with S/N ending in 4001 or higher

c. Assemble load sense shuttle valve **HO** as follows (Figure 5c):

- Adapter fittings **HS** in the source (the stem) and the LS (to hydraulic steering block) port.
- Extension (jumper) hose **HU** onto **HS** in the source port.
- Adapter **HT** in the function port

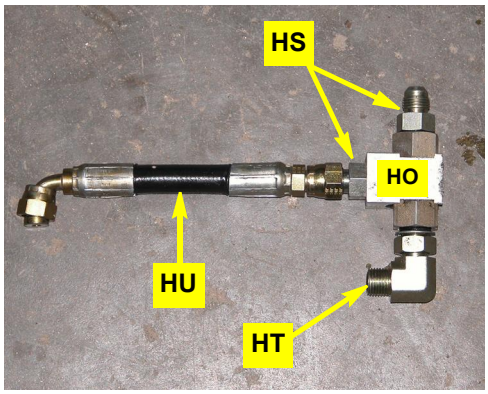


Figure 5c: Prepared load sense shuttle valve

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

4710 models with S/N ending in 4001 or higher *(continued)*

d. Locate the machine's load sense line on the bottom of the hydraulic pump under the sprayer, behind the transmission (Figure 5d inset). Disconnect the hose from the valve block and connect jumper hose **HU** (and the load sense shuttle valve) to the valve block fitting. Reconnect the machine's load sense hose to adapter **HT** in the load sense shuttle (Figure 5d).

NOTE: *Figure 5d shows load sense hose HY already installed. You will install HY at step 6.*

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

NOTE: *Follow steps 6a and 6b for all 4700 models and 4710 models with serial numbers (S/N) ending in 4000 or lower. Follow steps 6c to 6e for 4710 models with serial numbers 4001 and higher.*

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

4700 models and 4710 models with S/N ending in 4000 or lower

a. Install pressure and tank hoses **HV** between the open stems of run-tees **HL** (or **HL** and **HM***) installed at the orbital in step 4c (Figure 6a) and fittings **HB** in the **P** and **T** ports on the top (as mounted) of the hydraulic steering block (Figure 6c). *If you used the bigger run-tee **HM** for the tank line, use adapter **HN** between the hose and the run-tee.

b. Install load sense hose **HX** between fitting **HP** in the load sense shuttle valve (Figure 6b) and the fitting **HD** in **LS** port of the hydraulic steering block (Figure 6c).

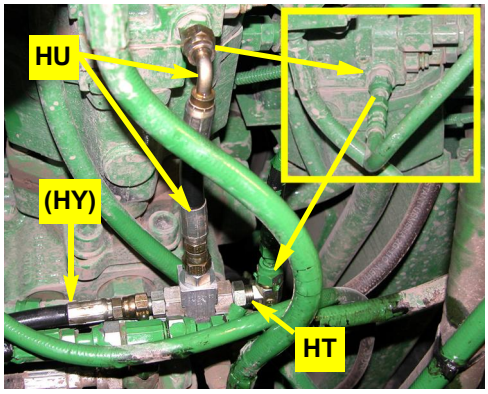


Figure 5d with inset: Installed load sense shuttle valve. Machine's load sense hose reconnected.

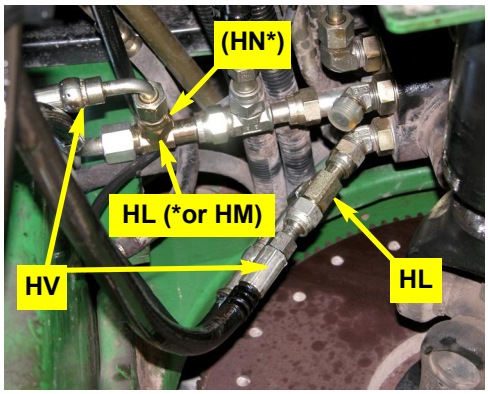


Figure 6a: Pressure and tank hoses connected at the run-tees at the orbital

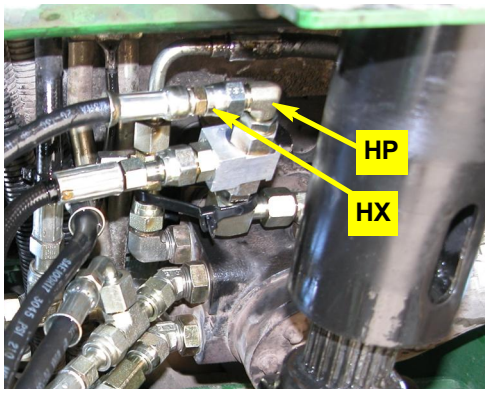


Figure 6b: Load sense hose connected at the load sense valve at the orbital

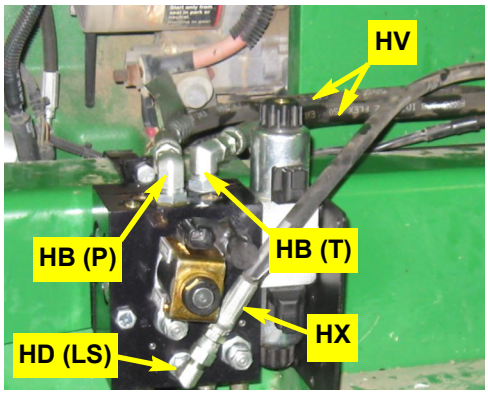


Figure 6c: Pressure, tank and load sense hoses connected at the steering block

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

4710 models with S/N ending in 4001 or higher

c. Install pressure hose **HW** between the open 'T' end of run-tee **HM** installed at step 4f (Figure 6d) and fitting **HB** in the **P** port on the top (as mounted) of the hydraulic steering block (Figure 6g).

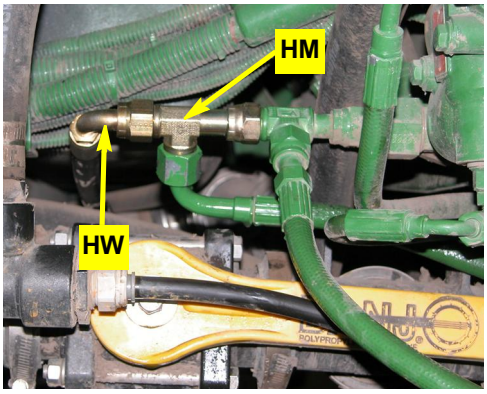


Figure 6d: Pressure hose connected at run-tee at priority divider

d. Install tank hose **HV** between the open stem of run-tee **HL** or **HM***) installed at the orbital in step 4e (Figure 6e) and fitting **HB** in the **T** port on the top (as mounted) of the hydraulic steering block (Figure 6g). *If you used the bigger run-tee **HM** for the tank line, use adapter **HN** between the hose and the run-tee.

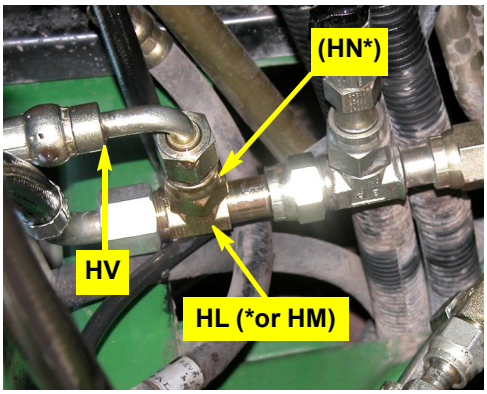


Figure 6e: Tank hose connected at run-tee at orbital

e. Install the load sense hose **HY** between adapter **HS** in the load sense shuttle valve **HO** (Figure 6f) and fitting **HD** in the **LS** port of the hydraulic steering block (Figure 6g).

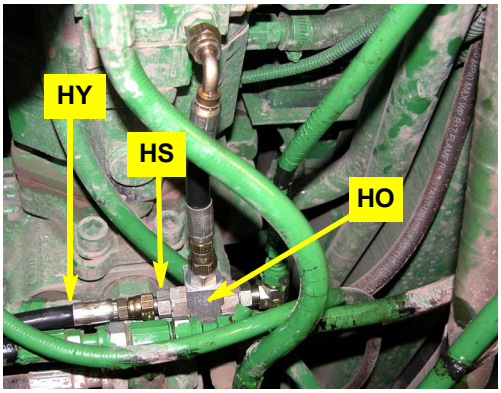


Figure 6f: Load sense hose connected at the load sense valve near the hydraulic pump

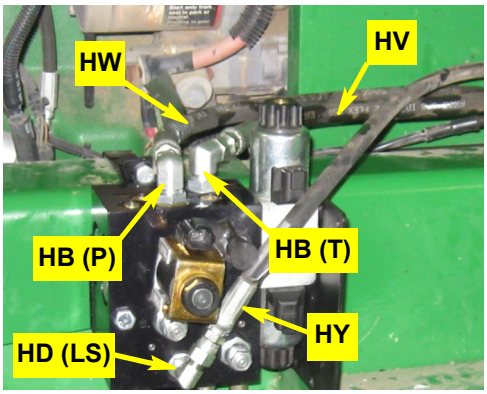


Figure 6g: Pressure, tank and load sense hoses installed at steering block

7. Install the steering output fittings and hoses.

a. Identify the machine's steering ports stamped L and R on the orbital casing. Disconnect the steering lines if not already disconnected. Install run-tees **HL** in the steering ports. Reconnect the machine's steering lines to the open 'T' ends of the run-tees (Figure 7a - you will connect steering hoses **HZ** at the next step).

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.*

b. Connect steering hoses **HZ** to the stems of run-tees **HL** (Figure 7a) then route them under the machine's frame up to the hydraulic steering block. Connect the hoses to adapters **HC** in the **A** and **B** ports at the bottom (as mounted) of hydraulic steering block (Figure7b).

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

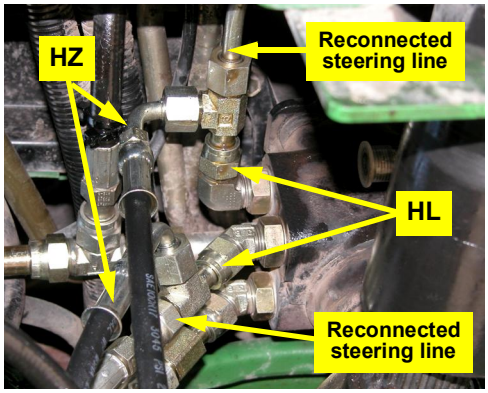


Figure 7a: Steering run-tees and hoses at orbital. Machine's steering lines reconnected.

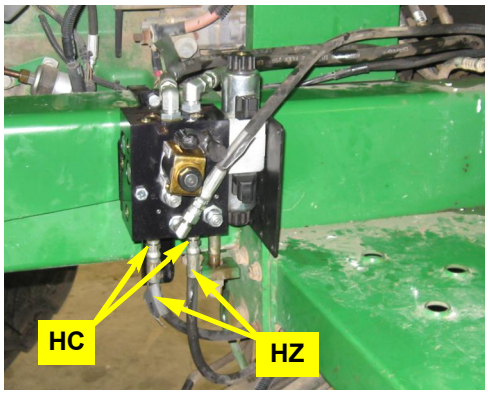


Figure 7b: Steering hoses connected at steering block

8. Verify operation.

⚠WARNING: *During tests of the hydraulic system, the machine may move unexpectedly. Be prepared for machine movement to avoid injury.*

Keep others away and stay clear of mechanical steering linkages to prevent serious injury or death from pinch point hazards while manually operating the hydraulic steering circuit.

a. Tighten all connections and clean up the installation area around the machine and make certain that it is safe to operate.

b. Start the machine 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 **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).

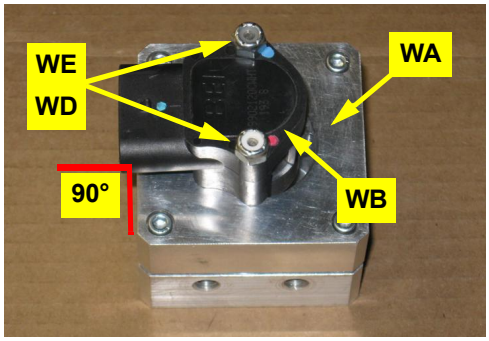


Figure 1a: Prepared WAS housing\connector

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

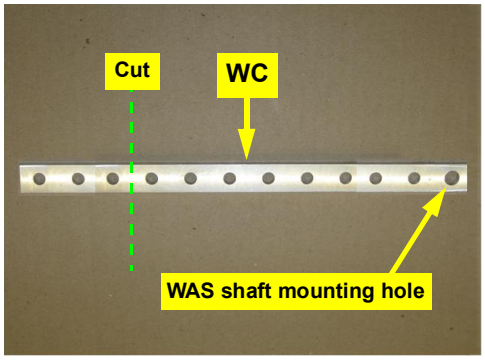


Figure 1b: WAS arm preparation

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).

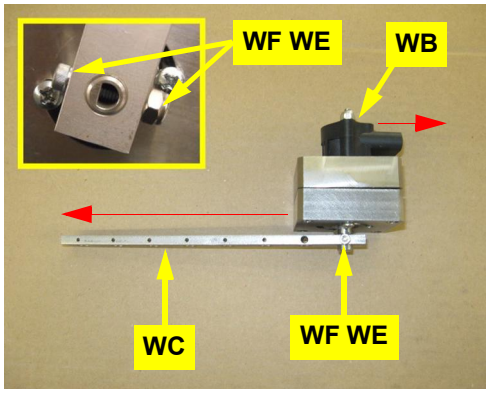


Figure 1c with inset: WAS arm installed

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

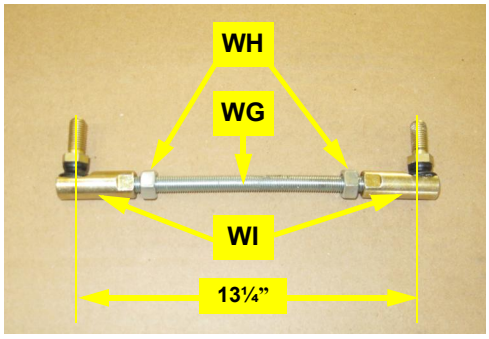


Figure 1d: Assembled threaded rod link

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).

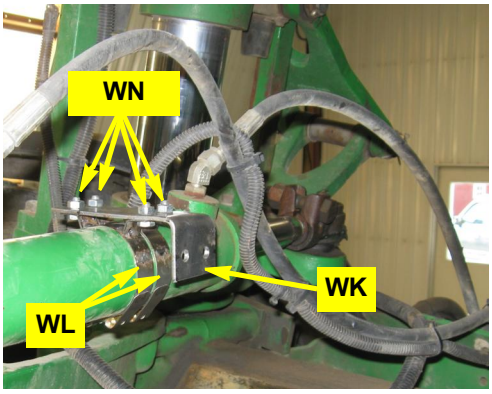


Figure 2a: WAS mounting bracket installed

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).

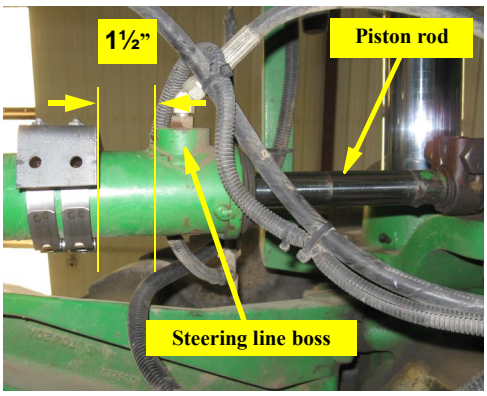


Figure 2b: WAS mounting bracket positioned

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).

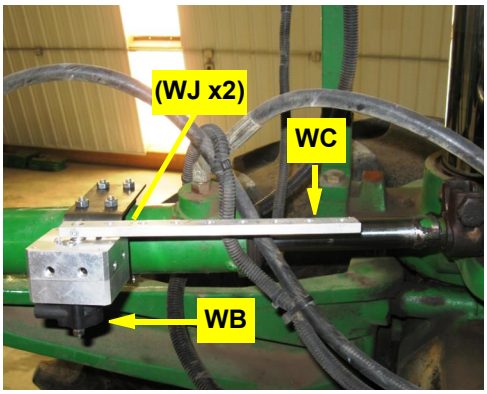


Figure 2c: WAS assembly installed

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).

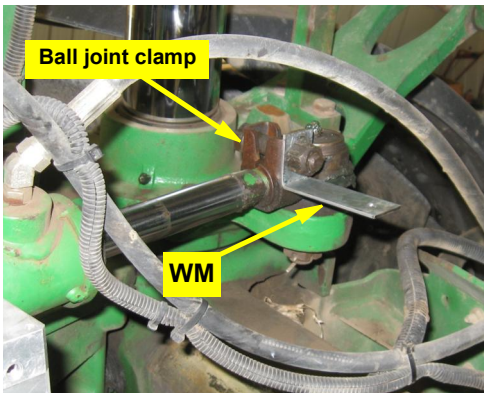


Figure 2d: WAS rod link bracket installed

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.

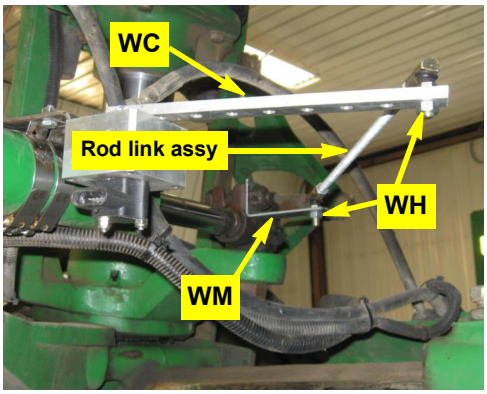


Figure 2e: Rod link assembly installed

NOTE: *Use tie straps **HAA** to keep the cylinder hoses clear of the moving WAS linkage.*

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).

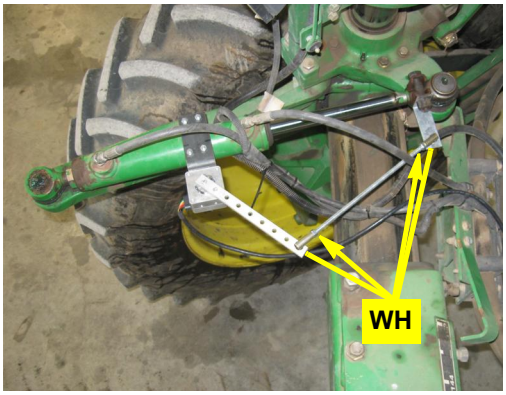


Figure 2f-i: Full left lock


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 (Figure 2f-i).

Installation - Steering Wheel Switch (SWS)

1. Install the steering wheel switch.

a. Locate the lower steering column shroud (it partially encloses the steering shaft and has a slot for the tilt pedal). Use the left side forward-pointing corner of the shroud (Figure 1a - circled) as the measurement reference point in steps c and d.

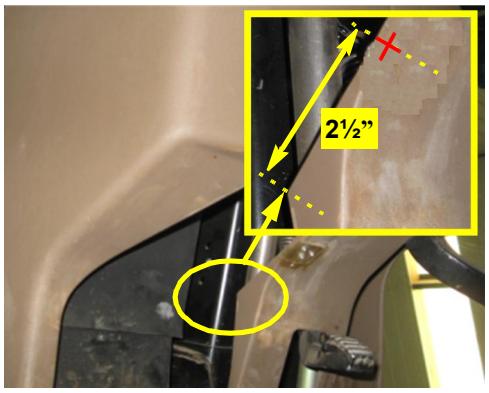


Figure 1a with inset: Switch bracket mounting location - see step c

b. Put a 90° bend in the switch bracket **SC** 2¾” from the pre-drilled end then drill a 5/32” hole in the center of the short section (Figure 1b).

c. Using the bent, drilled bracket **SC** as a template, drill a 5/32” hole in the shroud 2½” up from its corner (Figure 1a inset).

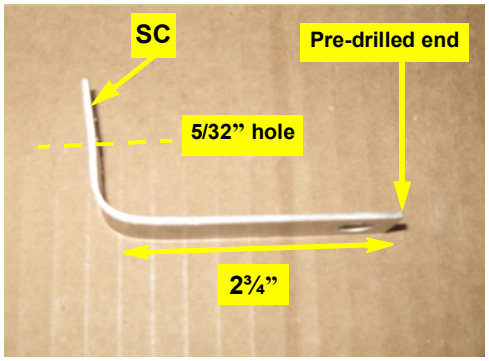


Figure 1b: Bent and drilled switch bracket

d. Clean magnet-size areas on two sides of the steering shaft, their centers 3” up from the corner of the shroud (Figure 1c). Using the two-part epoxy **SB**, attach magnets **SA** 180° apart on the steering shaft (with their centers 3” from the corner of the shroud - (Figure 1c).

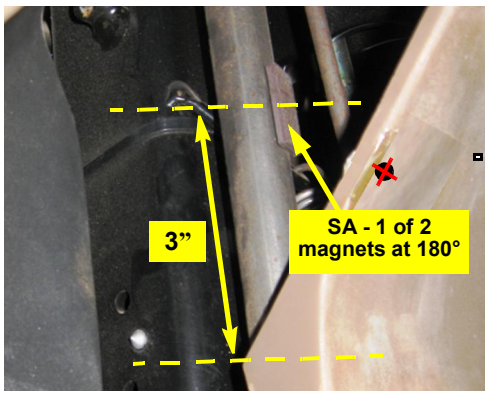


Figure 1c: Installed magnet(s)

e. Install switch **SD** in its bracket **SC**. Using hardware **SF** install the bracket/switch assembly (Figure 1d). You will later connect **SD’s** cable to ECU cable **EF**.

f. 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 inset).

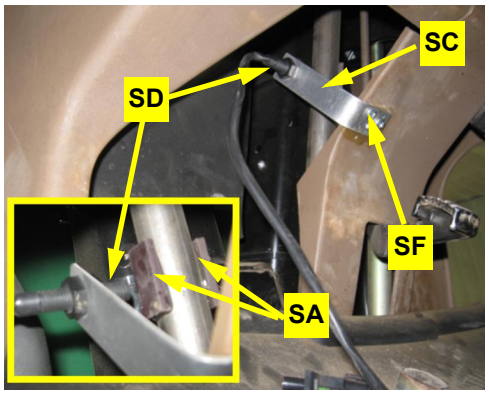


Figure 1d with inset: Installed switch bracket, switch, and adjusted sensor