

Automated Steering Kit Installation Guide

Kit: EDX-AC1300, P/N 911-2048-000


Fits Ag-Chem RoGator Sprayer Models:

900 1100 1300

***Note:** Four-wheel steering, if fitted, must be disengaged for the steering system to provide accurate guidance.*



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.

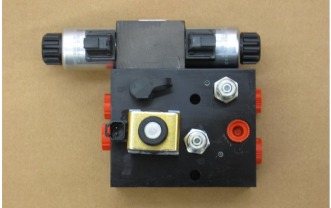



Before attempting to install any of the components, park the machine on a clean level floor with adequate clearance to work all around.

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.

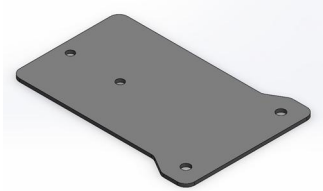


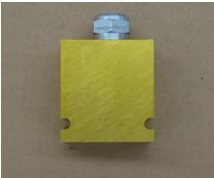



To prevent hydraulic system contamination, it is essential to thoroughly clean hydraulic system fittings and hose connections prior to disconnecting or removing. Use a degreasing solvent spray cleaner such as a brake cleaner to prevent hydraulic system contamination. Note that o-rings used on ORB and 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, HC and HD				
HB	760-2060-000	2	Adapter, hyd - #6maleJIC x #8maleORB (HA's P [pressure], T [tank] ports)	
HC	760-2061-000	2	Adapter, hyd 90 elbow - #6maleJIC x #8maleORB (HA's A and B [steering] ports)	
HD	760-2058-000	1	Adapter, hyd 90 elbow #6maleJIC x #6maleORB (HA's LS [load sense] port)	

Kit Contents - Steering Hydraulics (*continued*)

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
HE	640-0157-000	1	Hydraulic steering block mounting bracket (Mount HA)	
Bag H2 contains HF				
HF	675-2060-000	2	Bolt - 3/8NC x 4" Gr5, ZP	
	678-1054-000	2	Washer, flat - 3/8 ZP	
	676-1035-000	2	Nut, nylock - 3/8NC ZP (Mount HA and HG onto HE)	
Bag H4 contains HJ				
HJ	760-2069	4	Adapter, hyd run-tee - #8ORFF (Pressure, tank, and steering lines at orbital)	
HK	760-0009	1	Assembly, hyd dynamic load sense valve	
Bag H5 contains HL, HM and HN				
HL	760-2033	1	Adapter, hyd - #4maleORFF x #6maleORB (Source port in HK)	
HM	760-2056	1	Adapter, hyd - #6maleJIC x #6maleORB (Function port in HK, HO connects)	
HN	760-2082	1	Adapter, hyd 90 elbow - #6maleJIC x #4maleORB (LS port in HK, HR connects)	

Kit Contents - Steering Hydraulics (*continued*)




REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
HO	760-1022	1	Hose, hyd - 1/4" x 14", #6femJIC swivel x #4femORFF swivel (Jumper hose for load sense valve - orbital to HM)	
HP	760-1339-000	2	Hose, hyd - 3/8" x 75", #6femJIC 90 swivel x #8femORFF swivel (Pressure and tank hoses)	
HQ	760-1023-000	2	Hose, hyd - 3/8" x 58", #6femJIC swivel x #8femORFF 90 swivel (Steering hoses)	
HR	760-1142	1	Hose, hyd - 1/4" x 56", #6femJIC swivel both ends (Load sense hose)	
HS	677-2001	20	Tie strap, 11" heavy duty	

Kit Contents - Wheel Angle Sensor

Unpack the wheel angle sensor kit and identify the required parts as shown. Kit items are A, B, C etc. with a W (Wheel) prefix.

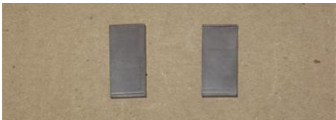




REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
Bag 710-0099-000 contains WA to WJ				
WA	720-0045-000#	1	WAS assembly	
WB	750-5002-000	1	Sensor, dual output, BEI (‘Wire connector’)	
WC	602-1087-000	1	Connector arm, steering	
WD	675-1191-000	2	Screw, mach, 8-32 x 3, PPH ZP	
WE	676-1054-000	4	Nut, nylock 8-32NC,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

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

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
WK	640-0158-000	1	WAS assembly mounting bracket	
WL	640-0159-000	1	WAS rod link bracket	
WM	675-2059-000	1	Bolt, 7/16" x 1-1/4", GR5, ZP (Use to mount WL onto machine)	

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.

See Appendix 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 (Figure 1):

- **HB** in the **P** and **T** ports
- **HC** in the **A** and **B** ports
- **HD** in the **LS** port

2. Install the steering block mounting bracket.

Locate the two rear bolts of the (retracted) left boom support arm (Figure 2 inset).

Using the two bolts, install hydraulic steering block mounting bracket **HE** (Figure 2).

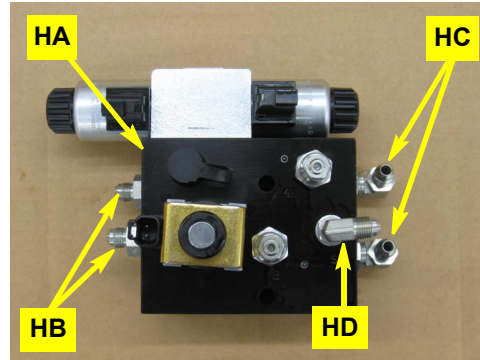


Figure 1: Prepared hydraulic block

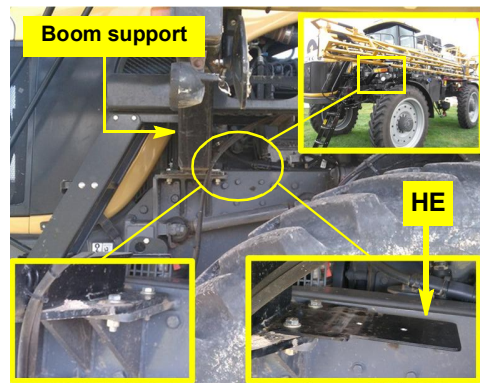


Figure 2 with insets: Installed steering block mounting bracket

3. Install the hydraulic steering block.

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

- Mount **HA** on **HG** with its left and right solenoids to the rear (so with its A and B steering ports outward)

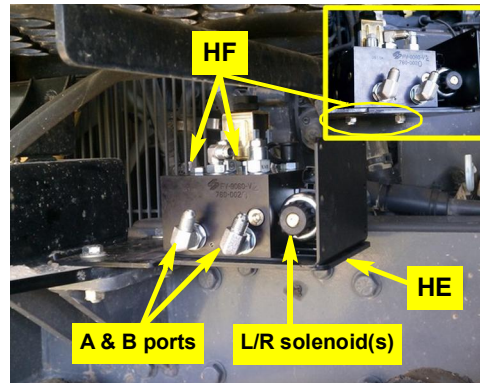


Figure 3: Installed steering block

4. **Prepare the load sense shuttle valve.**

Assemble load sense shuttle valve **HK** as follows (Figure 4):

- Adapter fitting **HM** in the function port (jumper hose **HO** connects)
- Adapter fitting **HN** in the **LS** port (to hydraulic block)
- Adapter fitting **HL** in the source port

5. **Disconnect the machine's pressure, tank and steering lines.**

NOTE: This section details the hydraulic installation on a machine that already has an additional, third-party hydraulic installation (so already has run-tees installed at the orbital - see Figure 5). If your machine does not already have additional hydraulic connections (run-tees) at the orbital, install the supplied run-tees directly at the orbital accordingly.

Locate the pressure, tank and steering connections and run-tees on the left side of the orbital (Figure 5, left [and center] image).

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.

Disconnect the machine's 90° pressure and tank hoses from the run-tees in the orbital's **P** and **T** ports (the upper two ports on the long side of the orbital body - Figure 5, center image).

Disconnect the machine's steering hoses from the run-tees in the orbital's steering ports (Figure 5, right image - note, one hose disconnected, one to be disconnected).

6. **Install the load sense jumper hose and load sense valve.**

Disconnect the machine's load sense hose from the bottom of the orbital and connect it to adapter **HL** in load sense valve **HK**. Install jumper hose **HO** between the load sense port in the orbital and connector **HM** (Figure 6, three images).

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

7. **Install steering run-tees and connect hoses at the orbital.**

- Install run-tees **HJ** at the run-tees in the orbital's steering ports from which you disconnected the machine's steering hoses at step 5 (Figure 7).
- Connect the machine's steering hoses to the run-tees **HJ** (to the stem of the front run-tee; to the open 'T' end of rear run-tee - Figure 7).
- Connect the 90° elbow ends of steering hoses **HQ** to the run-tees (Figure 7).

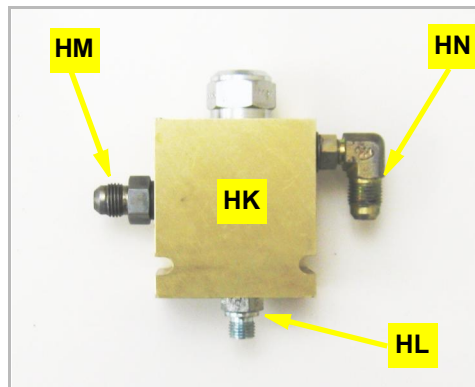


Figure 4: Prepared load sense valve

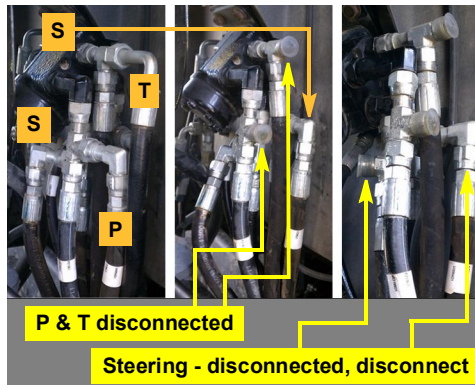


Figure 5 (left, center, right): P, T and steering run-tees and hoses at orbital

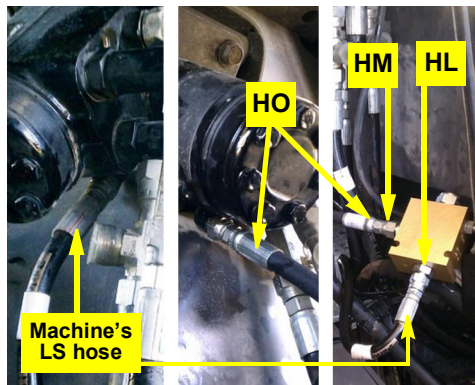


Figure 6 (left, center, right): Load sense hose disconnected/reconnected. Jumper hose installed.

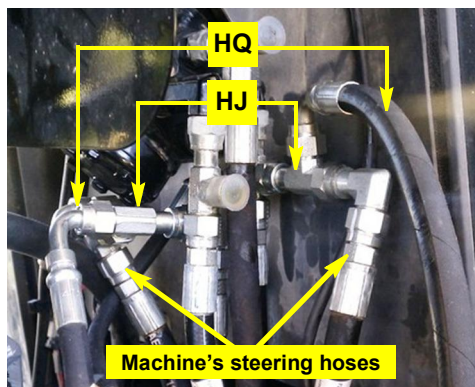


Figure 7: Steering run-tees installed and steering hoses connected/reconnected

8. **Install the pressure run-tee and connect pressure hoses at the orbital.**

- a. Install run-tee **HJ** at the run-tee in the orbital's pressure port (front of the two upper ports) - Figure 8).
- b. Connect the machine's pressure hose to the open 'T' end of **HJ** (Figure 8).
- c. Connect pressure hose **HP** to the stem of **HJ** (Figure 8).

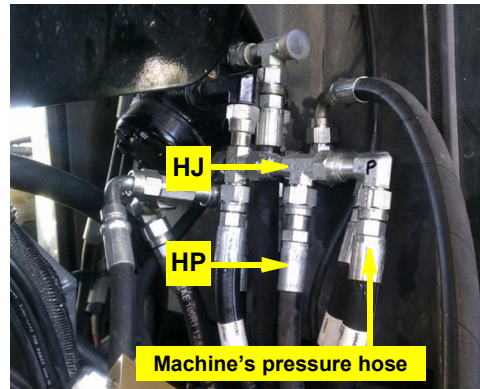


Figure 8: Pressure run-tee installed, pressure hoses connected/reconnected

9. **Install the tank run-tee and connect tank hoses at the orbital.**

- a. Install run-tee **HJ** at the run-tee in the orbital's tank port (rear of the two upper ports - Figure 9).
- b. Connect the machine's tank hose to the open 'T' end of **HJ** (Figure 9).
- c. Connect tank hose **HP** to the stem of **HJ** (Figure 9).

NOTE:

*In the next steps, route all hoses from the orbital/load sense valve to the steering block with other sprayer plumbing, free from entanglement and secured with heavy tie straps **HS**. Securely tighten all hose fittings and connections when hose installation is complete.*

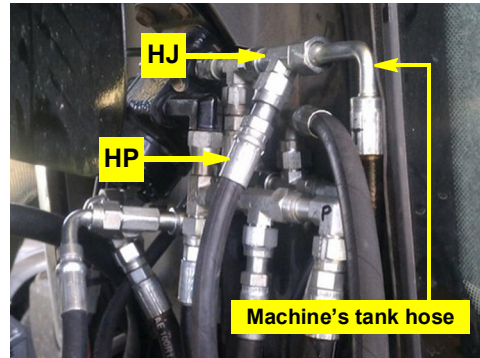


Figure 9: Tank run-tee installed, pressure hoses connected/reconnected

10. **Connect the load sense hose, steering, pressure and tank hoses to the hydraulic steering block.**

- a. Install the load sense hose **HR** between adapter **HN** in load sense valve **HK** (Figure 10a) and adapter **HD** in the **LS** port of the hydraulic steering block (Figure 10b, right image).

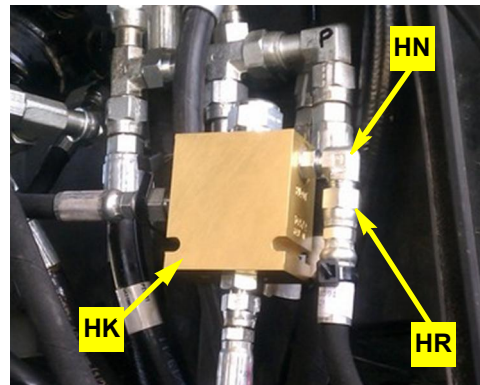


Figure 10a: Load sense hose (to steering block) installed at load sense valve

- b. Connect the pressure and tank hoses **HP** to adapter fittings **HB** in the **P** and **T** ports of the hydraulic steering block (Figure 10b, left image).
- c. Connect the steering hoses **HQ** to adapter fittings **HC** in the **A** and **B** ports of the hydraulic steering block (Figure 10b, right image).

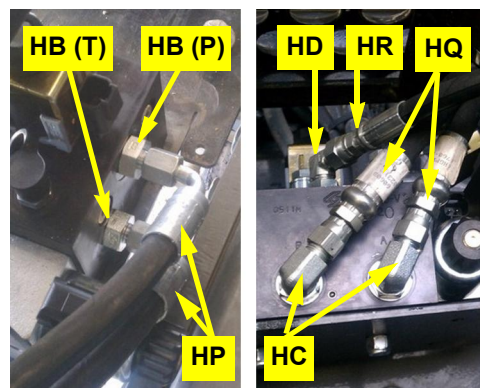


Figure 10b (left and right): Pressure and tank hoses (left) and load sense and steering hoses (right) at steering block

11. 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.

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 45° to any of the WAS housing **WA** sides (Figure 1a).
- b. Cut six holes off WAS arm **WC** at the opposite end from the WAS shaft mounting hole (Figure 1b).
- 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).

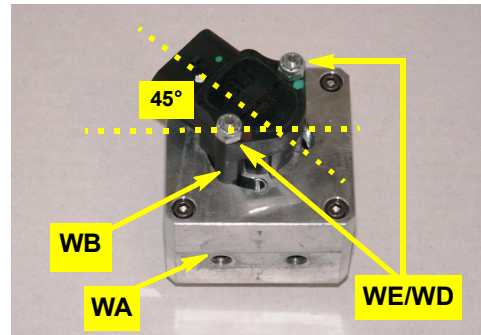


Figure 1a: Prepared WAS housing/connector

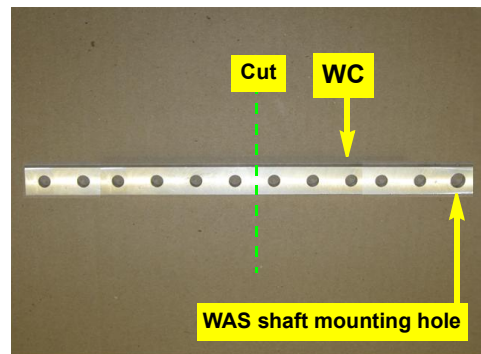


Figure 1b: WAS arm preparation

NOTE:

Before you cut the rod at step d, screw the provided nuts **WH** onto the threaded rod **WG** 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 threaded rod **WG** to 2-3/4" long (Figure 1d-i - not to scale) then screw swivel rod ends **WI** onto the cut rod to achieve a center-to-center stud measurement of 4" (Figure 1d-ii - not to scale). Leave **WH** loose until you complete linkage adjustment at step 2f.

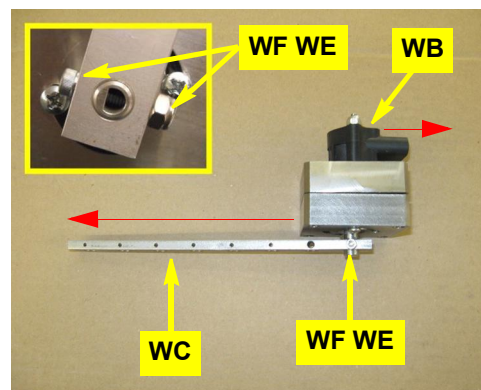


Figure 1c with inset: WAS arm installed

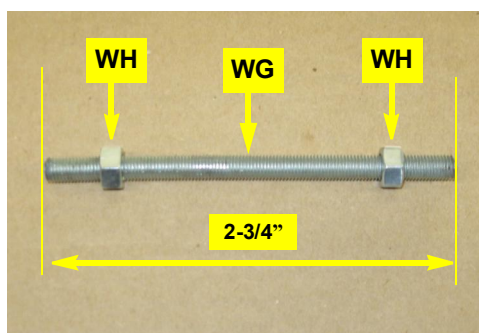


Figure 1d-i: Threaded link rod preparation

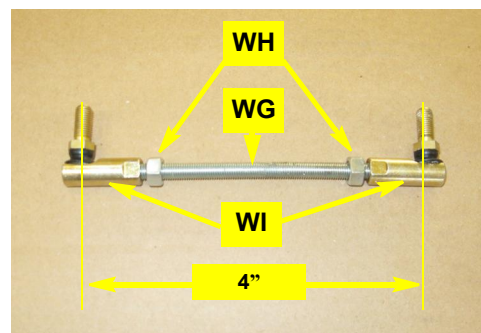


Figure 1d-ii: Assembled threaded link rod

2. Mount the wheel angle sensor.

NOTE:

Figures in this section show prototype brackets. They differ slightly from the brackets in your kit but are installed the same way.

- a. Locate and loosen the bolts at the round end of the upper bracket on the left steering arm. From the outside in, slide WAS assembly bracket **WK** under the bolt washers (so with the vertical side outward) and secure (Figure 2a with inset).
- b. Locate the threaded bolt hole on the top of the left side sliding axle just outside the axle sleeve (when axle fully retracted). Using hardware **EN**, install link rod bracket **WL** with its back to the axle sleeve (so with its rod hole pointing outward - Figure 2b with inset).
- c. Using hardware **WJ**, mount the WAS assembly from step 1 on the inner face of bracket **WK**. Mount the WAS assembly with wire connector **WB** uppermost and pointing to the front center of the machine (Figure 2c with inset).
- d. Using hardware **WH**, install the link rod assembly from step 1 between the last hole in WAS arm **WC** and bracket **WL**. Set the swivel stud upward into **WC**, downward into **WL** (Figure 2d). Leave swivel nuts **WH** loose.
- e. With all hardware **WH** loose, slowly turn the wheels full left lock (Figure 2e, left image) then full right lock (Figure 2e, right image). Check that the linkage moves freely without binding and adjust the linkage as necessary. (**Note:** Both Figure 2e images show the WAS cable already connected to **WB**. You will connect the WAS cable later.)

When the linkage does move freely and without binding, tighten hardware **WH** on the rod and the swivels (Figure 2d).

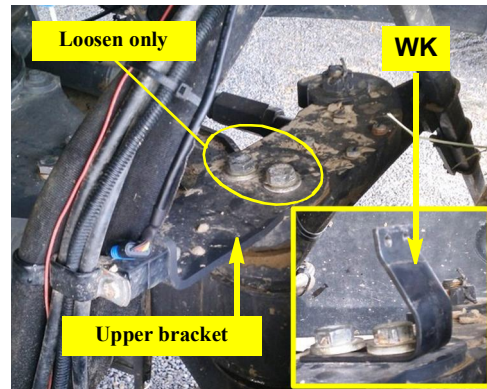


Figure 2a with inset: WAS mounting bracket installed



Figure 2b with inset: WAS link rod mounting bracket installed

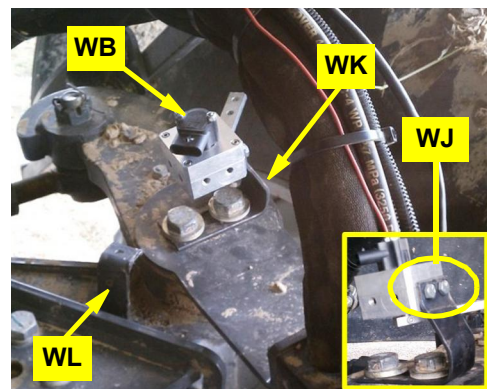


Figure 2c with inset: WAS assembly installed

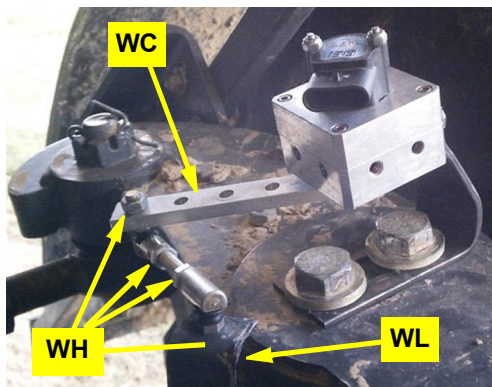


Figure 2d: WAS link rod assembly installed



Figure 2e: Full left lock (left image) and full right lock (right image)

Installation - Steering Wheel Switch (SWS)

1. Prepare the switch bracket.

Prepare the steering wheel switch bracket SC as follows (Figure 1 - not to scale):

- Cut an offset $\frac{1}{2}$ " deep slot in the opposite end from the pre-drilled hole
- Cut the slot $\frac{3}{16}$ " from one edge of the bracket, $\frac{1}{8}$ " from the other edge (Figure 1 inset)
- Put a 90°, downward bend in the bracket 1- $\frac{1}{4}$ " from the slotted end
- Put a slight clockwise twist (approx 22°) toward the thicker ($\frac{3}{16}$ ") side of the slot

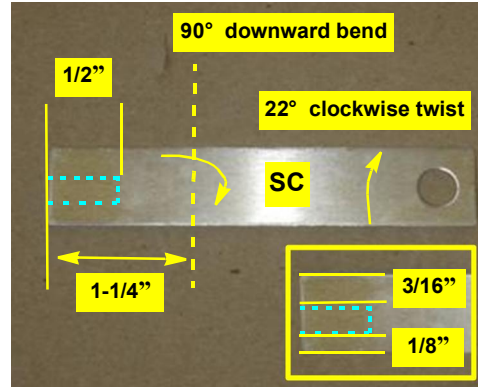


Figure 1 with inset: Prepared steering wheel switch bracket (not to scale)

2. Install the switch bracket, switch and magnets.

NOTE:

Figures 2a to 2c show an Allen bolt holding the sensor bracket SC. Your machine may have a hex head bolt in this location (Figure 2a left inset).

- Locate and loosen the bolt to the right of the tilt gas strut on the metal steering column frame (Figure 2a). Slide the prepared steering wheel switch bracket SC under the bolts's washer and tighten the bolt (Figure 2a insets). Adjust the bend and twist so that the switch hole aligns with the steering shaft.
- Install switch SD in bracket SC (Figure 2b)
- Using the two-part epoxy SB attach the magnets SA

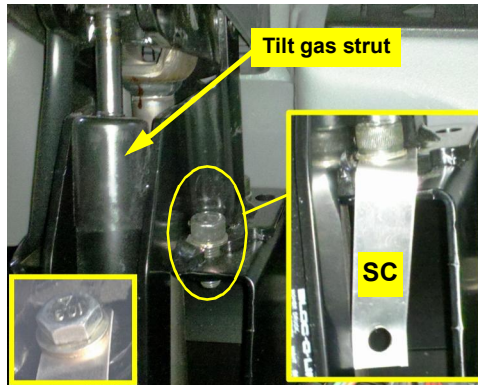


Figure 2a with inset: Installed switch bracket

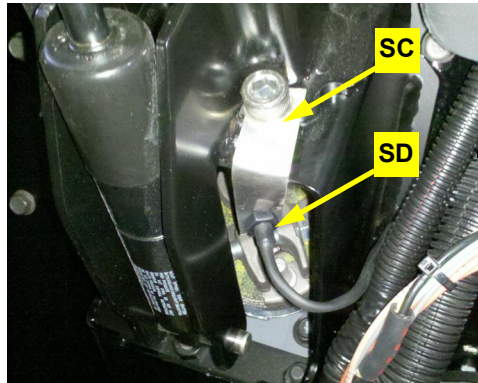


Figure 2b: Installed switch

180° apart on the steering shaft. Align the center of the magnets with the tip of the switch sensor (Figure 2c).

- Adjust the switch so that the sensor face is $\frac{1}{8}$ " to $\frac{1}{4}$ " from the magnets.

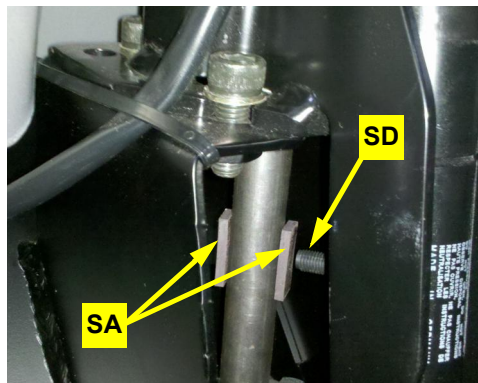


Figure 2c: Installed magnets

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Appendix - Hydraulic Circuits

