

Automated Steering Kit Installation Guide

Kit: EDX-SC4640, P/N 911-2041-000

Fits SpraCoupe Models:

3440		
3640		
4440	4450	4460
4640	4650	4660

Note: This kit is suitable for machines with and without a skid plate installed (see picture inset). There are slight variations to the WAS linkage installation for machines with a skid plate installed. The variations are made clear in the steps.



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

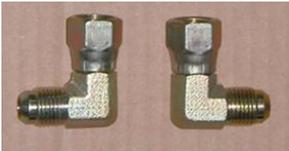
Unpack the hydraulics installation kit and identify the required parts as shown. Kit items are A, B, C etc. with an H (Hydraulic) prefix.

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
HA	760-0023-000	1	Assembly, hyd valve block - O.C. 15L\proportional (Hydraulic steering block)	
Bag H1 contains HB, HC, HD, HE and HF				
HB	760-2107-000	2	Adapter, hyd 90 elbow - #8maleJIC x #12maleORB (P [pressure] and EF [excess flow] ports in HA)	
HC	760-2106-000	1	Adapter, hyd - #8femJIC x #8femJIC SW union (Use with HB in pressure port)	
HD	760-2061-000	3	Adapter, hyd 90 elbow - #6maleJIC x #8maleORB (A and B [steering] and T [tank] ports in HA)	

Kit Contents - Steering Hydraulics *(continued)*

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
HE	760-2056-000	1	Adapter, hyd - #6maleJIC x #6maleORB (PP [pilot port] in HA)	
HF	760-2045-000	1	Adapter, hyd - plug #6maleORB (PPG [pilot port gauge] in HA)	
HG	640-0011-000	1	Hydraulic steering block mounting bracket (Mount HA using HH and HI)	
HH	640-0012-000	1	Hydraulic steering block hammer strap (Use with HI to attach HG to machine)	
Bag H2 contains HI				
HI	675-2007	2	Bolt, 3/8NC x 3/4" Gr5 ZP	
	676-1035	2	Nut, nylock - 3/8NC ZP (Use with HH to attach HG to machine)	
Bag H3 contains HJ				
HJ	675-2067-000	2	Bolt - 3/8NC x 6" Gr5, ZP	
	678-1054-000	2	Washer, flat - 3/8 ZP	
	676-1035-000	2	Nut, nylock - 3/8NC ZP (Mount HA and HK on HG)	
Bag H5 contains HN and HO				
HN	760-2077-000	1	Adapter, hyd run-tee - #8JIC (Tank boom line)	
HO	760-2054-000	3	Adapter, hyd run-tee - #6JIC (Use with HD in HA's tank port [1] and in the steering lines [2])	

Kit Contents - Steering Hydraulics (continued)

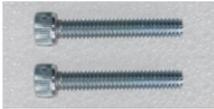
REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
HP	760-0001	1	Assembly, hyd - counterbalance valve, reactive	
Bag H6 contains HQ, HR and HS				
HQ	760-2061	2	Adapter, hyd 90 elbow - #6maleJIC x #8maleORB (HP's 'V' ports)	
HR	760-2060	2	Adapter, hyd - #6maleJIC x #8maleORB (HP's 'C' ports)	
HS	760-2055	2	Adapter, hyd - #6maleJIC x #6femJIC swivel (Use with HR in HP's 'C' ports)	
HT	760-1037	1	Hose, hyd - 3/8" x 46", #6femJIC swivel x #8femJIC 90 swivel (Tank hose)	
HU	760-1084	1	Hose, hyd - 3/8" x 42", #8femJIC swivel x #8maleJIC swivel (Excess flow hose)	
HV	760-1011	3	Hose, hyd - 1/4" x 14", #6femJIC swivel x #6femJIC swivel (Steering hoses - to/from HS [2] and pilot port to HO at HA)	

Kit Contents - Steering Hydraulics *(continued)*

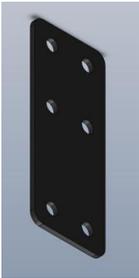
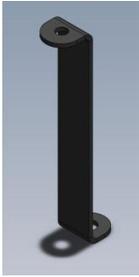
REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
HW	760-1082	2	Hose, hyd - 1/4" x 116", #6femJIC swivel x #6femJIC 90 swivel (Steering hoses - to/from HA)	
HX	677-2001	20	Tie strap, 11" heavy duty	

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	2	Bolt, 5/16NC x 3/4" Gr5, ZP	
	678-1077-000	2	Washer, lock 5/16, ZP (Attach WA to WK)	

Kit Contents - Wheel Angle Sensor (continued)

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
WK	640-0146-000	1	WAS assembly mounting bracket (Attach WM using WO)	
WL	640-0164-000	1	Link rod mounting bracket (Use WN to attach)	
Bag W3 contains WM, WN and WO				
WM	675-0175-000	2	Clamp, 2.06" - 2.37" TBOLT, SS (Attach to WK using WN)	
WN	675-2072-000	1	Bolt, M10-1.5, 45MM, Gr8.8, ZP (Attach WL to machine)	
WO	675-2019	4	Bolt - 1/4NC x 1/2" Gr5 ZP	
	678-1053-000	4	Washer, flat - 1/4" ZP	
	676-1040-000	4	Nut, 1/4NC Gr5, ZP (Attach WM to WK)	

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	

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 B 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** in the **P** [pressure] and **EF** [excess flow] ports (* you will add fitting **HC** to **HB** in the **P** port later)
- **HD** in the **A** and **B** [steering] ports and **T** [tank] port (** you will add a run-tee **HO** to **HD** in the tank port later).
- **HE** in the **PP** [pilot pressure] port
- **HF** in the **PPG** [pilot pressure gauge] port

2. Prepare the hydraulic steering block for mounting on the machine.

With bracket **HG**'s long axis vertical and using hardware **HJ**, mount prepared hydraulic steering block **HA** as follows (Figures 2 and 3 - note that Figure 2 shows bracket/block assembly already mounted on the machine—which is the next step):

- Mount **HA** with its solenoids to the rear and vertical (so with the **A**, **B** and **EF** ports downward)

3. Mount the hydraulic steering block

Using hardware **HI** with hammer bracket **HH**, mount bracket **HG** (with steering block etc. attached) on the machine. Mount the assembly on the left side of the machine, in front of the cab (out-board from the starter motor - Figures 2 and 3).

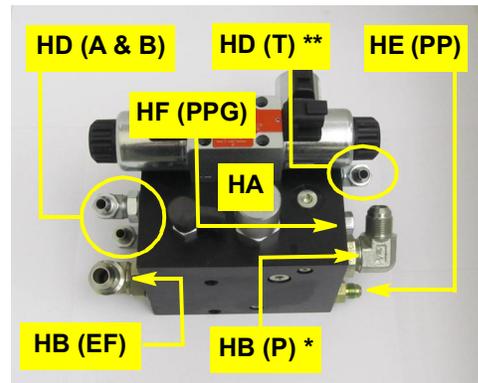


Figure 1: Prepared hydraulic block

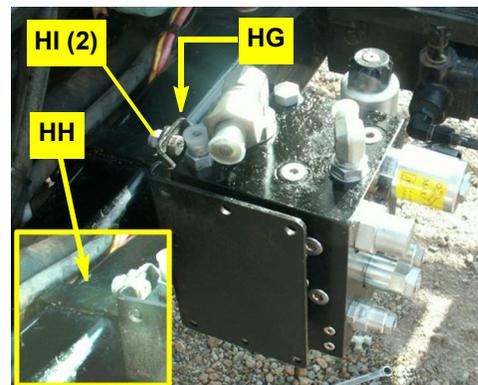


Figure 2: Steering block mounted

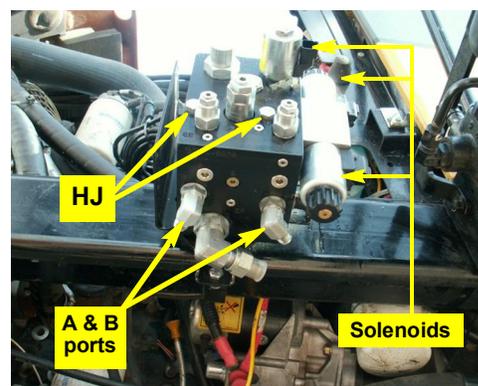


Figure 3: Steering block mounted

4. **Install the pressure, excess flow and tank fittings and hoses.**

- a. From under the left side of the machine, locate the junction of the rubber hose and the steel pipe in the pressure supply line for the boom hydraulics (Figure 4a-i). Disconnect the rubber hose from the steel pipe (Figure 4a-i inset) and route it forward to the fittings **HC/HB** in the pressure port in the hydraulic block (Figure 4a-ii - see note following).

NOTE: Figure 4a-ii shows temporary connections between the machine's pressure hose and fitting **HB** in the P port of the hydraulic steering block. Use fitting **HC** here.

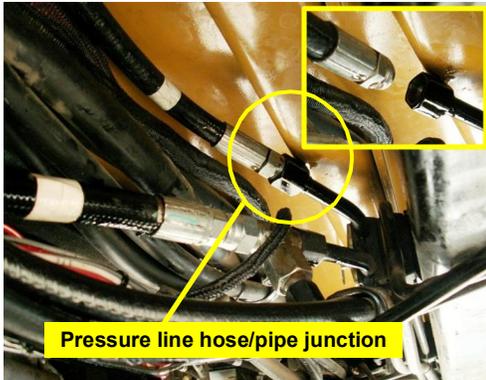


Figure 4a-i with inset: Boom hydraulics pressure line and (inset) rubber hose disconnected

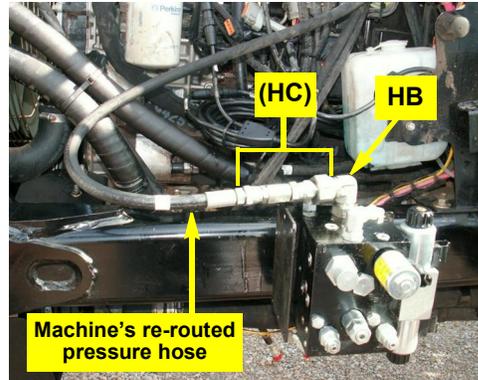


Figure 4a-ii: Machine's pressure hose re-routed and connected to the P port of the steering block

- b. Install excess flow hose **HU** between adapter **HB** in the excess flow port of the hydraulic steering block and the steel pipe in the pressure line you split at step a (Figure 4b).

NOTE: Figure 4b shows temporary connections between the excess flow hose **HU** and fitting **HB** in the EF port of the hydraulic steering block. Your hose will fit directly onto **HB**.

- c. Install run-tee **HO** (#6) on fitting **HD** in the T port of the hydraulic steering block (Figure 4c-i).

Disconnect the machine's rubber tank hose from the existing run-tee in the tank line below the pressure line you modified in step 4a above. Install run-tee **HN** (#8) between the rubber hose and the existing run-tee (Figure 4c-ii).

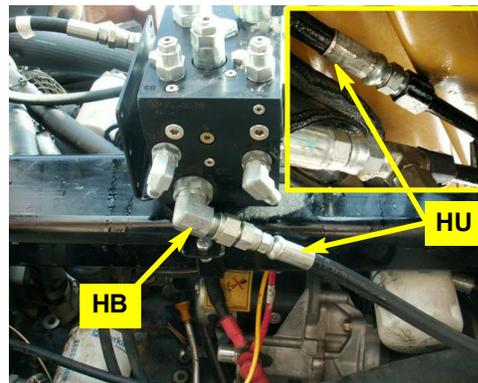


Figure 4b: Excess flow hose connected at block and (inset) to previously split pressure line

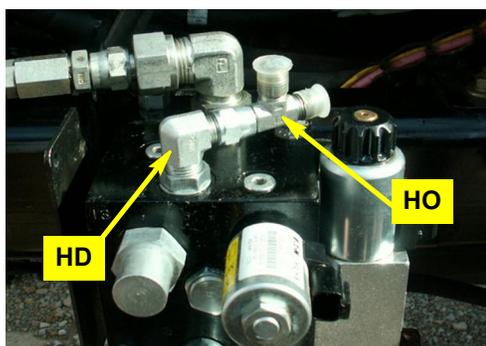


Figure 4c-i: Run-tee installed on T port fitting

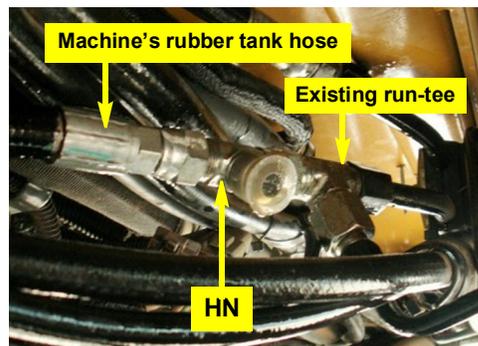


Figure 4c-ii: Run-tee installed in tank line, tank hose reconnected

4. **Install the pressure, excess flow and tank fittings and hoses (continued).**

d. Connect the straight end of tank hose **HT** to the open 'T' end of run-tee **HO** installed at the hydraulic steering block (on **HD** - Figure 4d) and the elbow end to the stem of run-tee **HN** installed in the machine's tank line (Figure 4d inset).

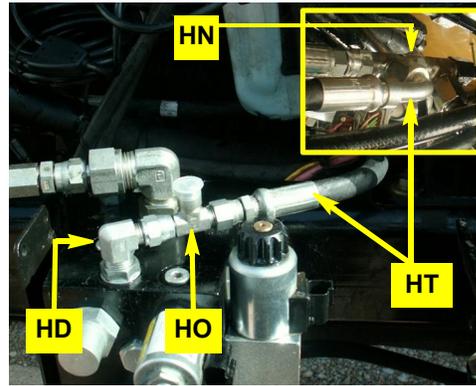


Figure 4d: Tank hose connected at steering block and (inset) to run-tee added to tank line

e. Install hose **HV** (one of three) between fitting **HE** in the **PP** port of the hydraulic steering block and the stem of run-tee **HO** (Figure 4e).

NOTE:

*This re-directs unused pressure back to the tank. Ensure you have fitted plug **HF** in the PPG port of the hydraulic steering block.*

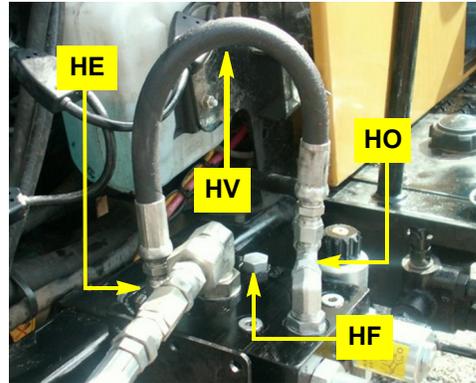


Figure 4e: Installed 'pressure re-direct' hose

5. **Prepare the counterbalance valve.**

NOTE:

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

Prepare counterbalance valve **HP** by installing adapter fittings as follows (Figure 5):

- **HQ** in the valve's 'V' ports
- **HR** in the valve's 'C' ports
- **HS** on adapters **HR**

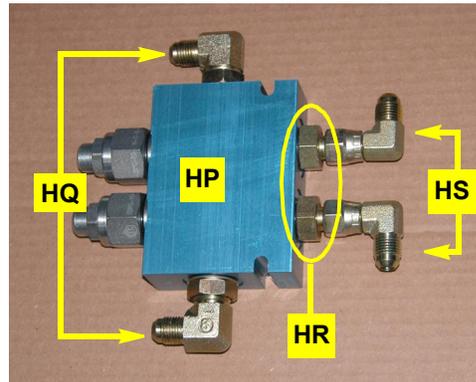


Figure 5: Prepared counterbalance valve

6. **Install the steering output fittings and hoses and counterbalance valve.**

a. Locate the machine's steering lines in front of the machine under the hood (Figure 6a). Disconnect the steering lines from the stems of the existing run-tees and install run-tees **HO** (Figure 6a inset - you will connect hoses to the run-tees later).

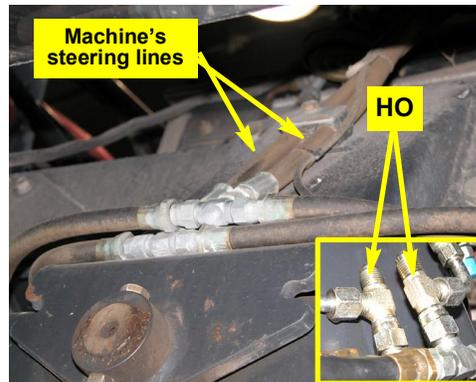


Figure 6a: Run-tees installed in steering lines

6. **Install the steering output fittings and hoses and counterbalance valve (continued).**
- b. Connect the straight ends of output steering hoses **HW** to fittings **HD** in the **A** and **B** ports of the hydraulic steering block (Figure 6b) and the elbow ends to the stems of run-tees **HO** (Figure 6b inset).

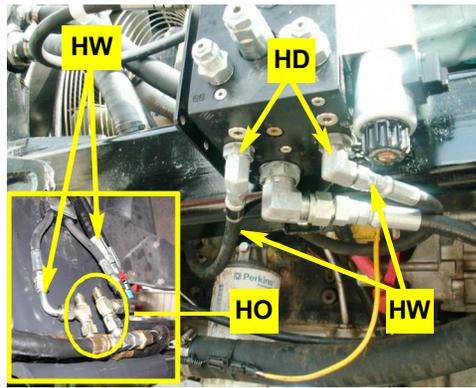


Figure 6b: Steering hoses connected at block and (inset) at run-tees

NOTE: When completing the following steps be sure to maintain the original hydraulic circuits. Each disconnected steering hose must reconnect to its original steering line through the correct counterbalance valve *V_n/C_n* pair and their respective run-tees. Marking hoses before disconnection will assist with reconnections.

- c. Connect one end of each short steering hose **HV** to the open 'T' end of each run-tee **HO** and the other end to fittings **HS** in the 'C' ports of the counterbalance valve **HP** (Figure 6c).
- d. Connect the machine's steering lines (disconnected at step 6a) to fittings **HQ** in the 'V' ports of counterbalance valve **HP** (Figure 6d).

NOTE: Use heavy tie straps **HX** (not shown) as necessary to secure the hoses and the counterbalance valve.

7. **Verify operation.**

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

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

- a. Tighten all connections and clean up the installation area around the 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.

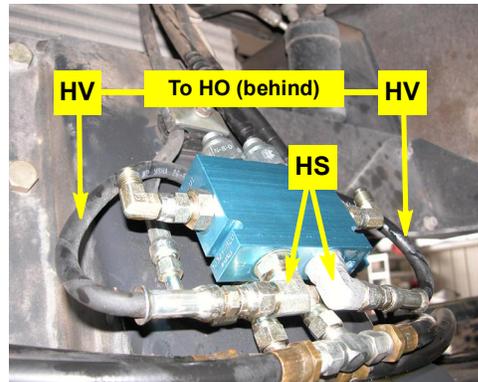


Figure 6c: Short steering hoses installed between run-tees HO (not visible) and 'C' ports of counterbalance valve.

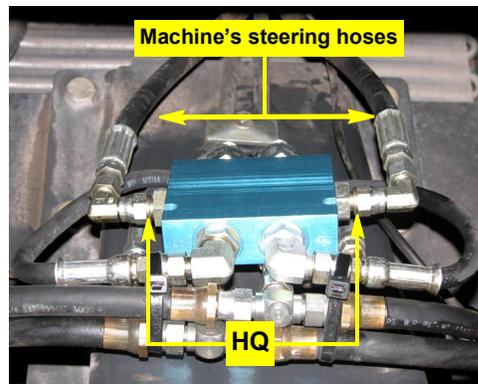


Figure 6d: Machine's steering hoses connected to 'V' ports of counterbalance valve

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 **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. Wire connector **WB** can be mounted 90° to any of **WA**'s sides (Figure 1a).

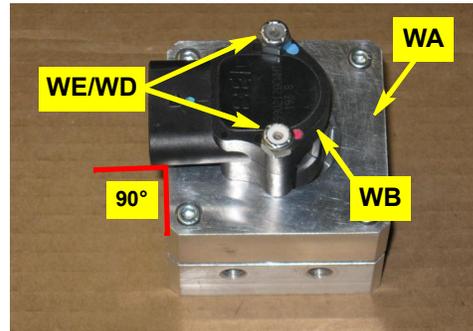


Figure 1a: Prepared WAS housing/connector

- b. Cut four holes (no skid plate) or five holes (with skid plate) off WAS arm **WC** at the opposite end from the WAS shaft mounting hole (Figure 1b).

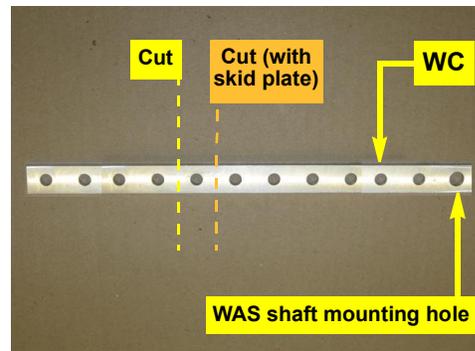


Figure 1b: WAS arm preparation

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

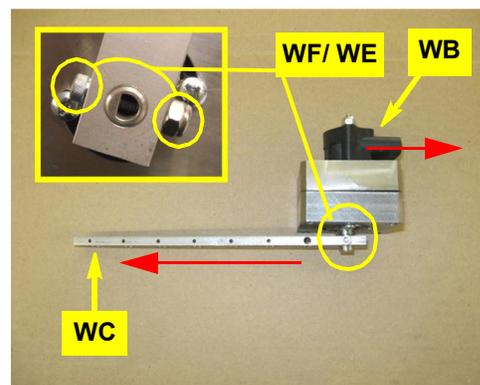


Figure 1c with inset: WAS arm installed

- d. Screw two nuts **WH** and the two swivel rod ends **WI** onto threaded rod **WG** to achieve a center-to-center stud measurement of 13-1/4" (Figure 1d). Leave **WH** loose until you complete linkage adjustment at step 3c.

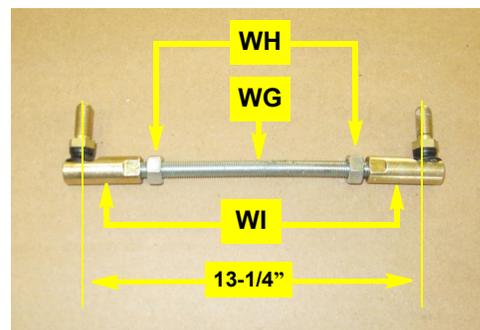


Figure 1d: Assembled threaded link rod

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

NOTE: Some figures in this section show prototype brackets in use. Your supplied parts will look slightly different (as shown in the kit table on page 7).

a. Using hardware **WO** attach the two clamps **WM** on WAS assembly mounting bracket **WK**. Attach the clamps with their threads/nut pointing away from the two 5/16" holes (Figure 2a).

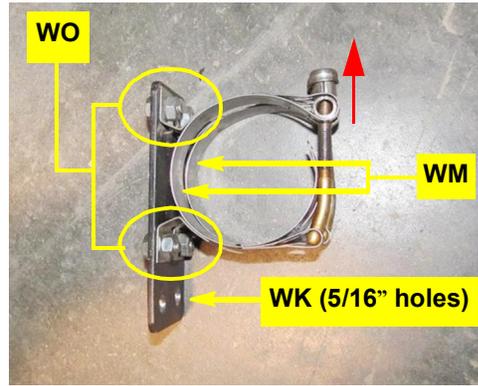


Figure 2a: WAS assembly mounting

b. Release clamps **WM** and install them on the left steering cylinder as follows (Figure 2b):

- Set the inner edge of the inner clamp 4-3/4" from the piston rod end of the cylinder
- Set bracket **WK** on the front of the cylinder, perpendicular to the ground and with its 5/16" holes downward

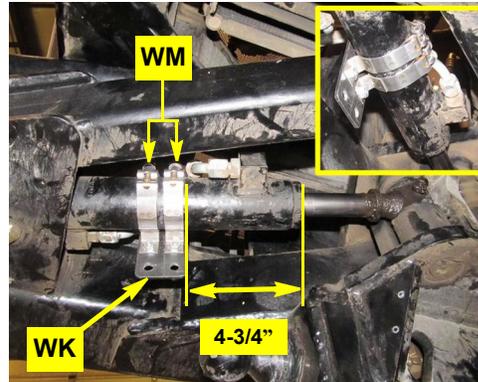


Figure 2b with inset: WAS assembly mounting installed

c. Using bolts **WJ**, attach the WAS assembly from step 1 on the front face of bracket **WK** with wire connector **WB** uppermost and pointing to the right side of the machine (Figure 2c).

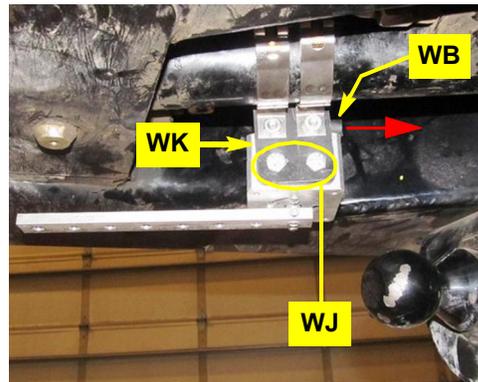


Figure 2c: WAS assembly installed

3. **Mount the link rod bracket and link rod.**

a. Using bolt **WN** (in place of the machine's original bolt), install link rod bracket **WL** on the base of the steering linkage's upper swivel plate, adjacent to the split-pinned/castellated nut for the left side tie rod's inner ball joint (no skid plate) or the right side tie rod's inner ball joint (with skid plate). Point the bottom of the bracket toward the rear (Figure 3a with inset).

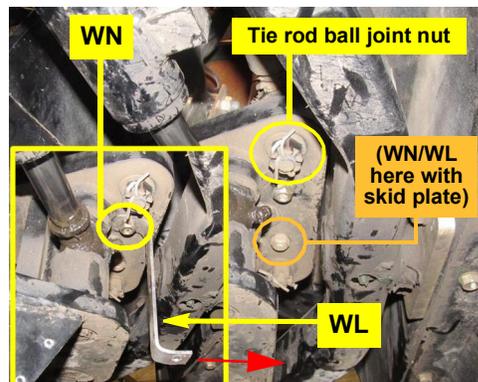


Figure 3a with inset: WAS link rod bracket installed

3. **Mount the link rod bracket and link rod (continued).**

NOTE:

In Figures 3b-i to 3c-ii, the link rod swivel at the bracket (WL) end is the only one shown pointing downward. For machines with and without a skid plate, install your swivels downward into both WL and WC.

b. Using hardware **WH** install the link rod assembly from step 1 between the last hole of WAS arm **WC** and the bottom flange of **WL**. Set the swivel studs downward into **WC** and **WL** (not as shown with the swivel upward into **WC** in Figure 3b-i or upward at both ends in Figure 3b-ii). Leave swivel nuts **WH** loose.

c. 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 3c-i and 3c-ii).

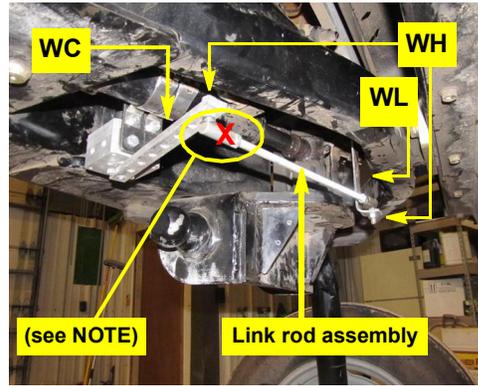


Figure 3b-i: Link rod installed - no skid plate

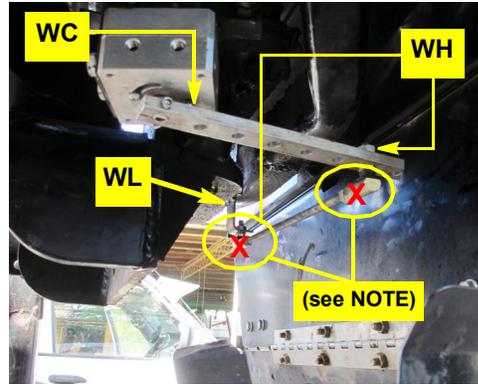


Figure 3b-ii: Link rod installed - with skid plate

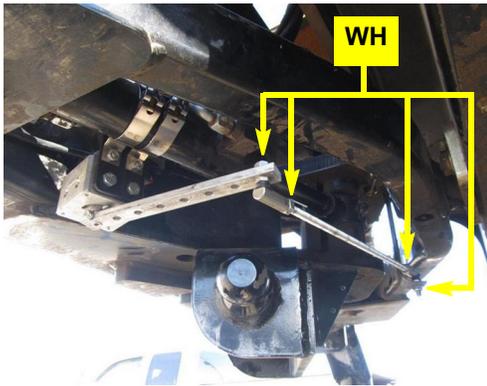


Figure 3c-i: Left lock (your swivels will both be downward)



Figure 3c-ii: Right lock

d. When the linkage does move freely and without binding, tighten hardware **WH** on the rod and the swivels (Figure 3c-i).

Installation - Steering Wheel Switch (SWS)

1. Prepare the switch bracket and switch.

Drill a 3/8" hole in the switch bracket **SC** at the opposite end from the existing switch hole (the same distance [x] from the end of the bracket as the existing hole is from its end - Figure 1). Install switch **SD** in the pre-drilled hole (Figure 1 inset).

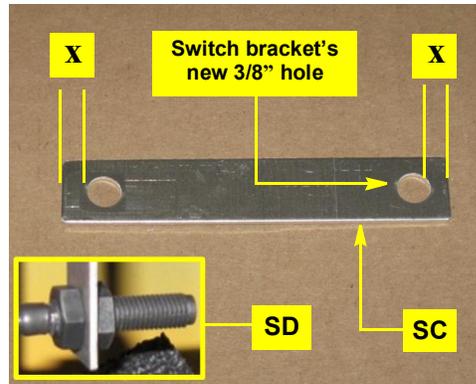


Figure 1 with inset: Newly drilled switch bracket and (inset) switch installed

2. Install the switch and magnets, adjust the switch.

- a. Remove the lower bolt of the two in the left side lower steering column support bracket (Figure 2a inset). Using the bolt, mount bracket **SC**, with switch **SD** installed, on the column support bracket.

Clean two magnet-size areas on the steering shaft, 180° apart, in line with the sensor tip of the switch.

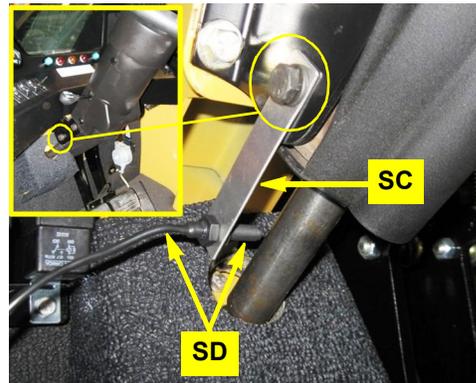


Figure 2a with inset: Mounting the switch, determining magnet positions

- b. Using the two-part epoxy **SB**, attach magnets **SA** to the two cleaned areas of the steering shaft, centering them on the sensor tip (Figure 2b).
- c. Adjust the sensor face to be 1/8" to 1/4" from the magnets (Figure 2b).

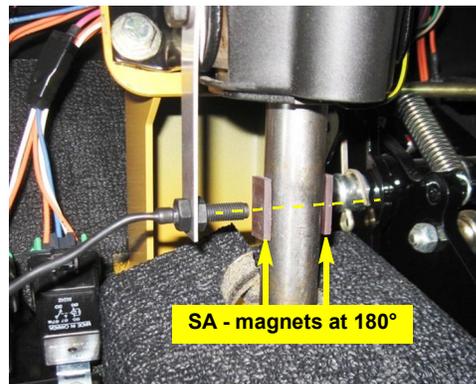


Figure 2b: Magnets installed, sensor tip adjusted

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Appendix A - Hydraulic Circuits

