

SmartTrax»»»

Straight shot to easy steering



Supplement & Installation Manual

Case IH FLX 4010, 4510, 4020, 4520

DISCLAIMER

While every effort has been made to ensure the accuracy of this document, Raven Industries assumes no responsibility for omissions and errors. Neither is any liability assumed for damages resulting from the use of information contained herein.

Raven Industries shall not be held responsible or liable for the effects of atmospheric conditions and sunspot activity on the performance of our products.

Raven Industries cannot guarantee the accuracy, integrity, continuity, or availability of the GPS signal from the US Department of Defense/NAVSTAR GPS satellites, the OmniSTAR correction service or the WAAS correction service.

Raven Industries accepts no responsibility for the use of the signal for other than the stated purpose. Raven Industries shall not be responsible or liable for incidental or consequential damages or a loss of anticipated benefits or profits, work stoppage or loss or impairment of data arising out of the use or inability to use the Smartrax or any of its components.

CHAPTER

1

INTRODUCTION

Congratulations on your purchase of the Raven SmarTrax system! This system is designed to provide cutting-edge, hands-free steering of your machine via GPS coordinates.



Below you will see the kit contents that you should have received with this SmarTrax kit.

Basic Kit Contents

CaseIH FLX 4010/4510/4020/4520 SmarTrax Kit Contents

Quantity	Item Description	Part Number
1	SENSOR ASSEMBLY, ROTARY WHEEL ANGLE 100°	063-0181-013
1	WLDMNT., BRACKET, UNIVERSAL HYD. MOUNTING, PART "A"	116-0159-527
1	WLDMNT, ARM SPS CASEIH FLX4x10	116-0159-668
1	WLDMNT, SPS TIE ROD CASEIH FLX4x10	116-0159-669
1	WLDMNT, MNTG., SPS CASEIH FLX4x10	116-0159-673
2	HOSE, HYD., 13/16" ORFS (F) 90° TO 9/16" JIC (F), 25" LG	214-1000-053
2	HOSE, HYD., 13/16" ORFS (F) 90° TO 9/16" JIC (F), 15" LG	214-1000-054
1	HOSE, HYD., 9/16" ORFS (F) TO 9/16" JIC (F), 25" LG	214-1000-055
1	SWITCH, PRES., MICRO, HD, 15-100 BAR ADJ. W. FTG.	422-0000-074
4	FITTING, ELBOW, 45° SWIVEL, 9/16" JIC M/F	333-0012-027
4	FITTING, ADAPTER, SWIVEL RUN TEE, 13/16" ORFS M/M/F	333-0012-028
2	FITTING, ELBOW, 90° SWIVEL, 9/16" JIC M/F	333-0012-042
4	FITTING, ELBOW, 90° SWIVEL, 13/16" ORFS M/F	333-0012-067
1	FITTING, ELBOW, 90° 9/16" ORFS (M) TO 7/16" O-RING (M)	333-0012-103
4	BOLT, 5/16-18 x 7/8" HEX HEAD	311-0052-104
4	BOLT, HEX, 3/8"-16 x 1/2"	311-0054-105
1	BOLT, HEX, 1/2-13 x 1 1/2"	311-0058-186
2	BOLT, HEX, M8 x 35mm LG	311-0070-020
4	NUT, 3/8-16	312-1001-037
1	NUT, 1/2-13 ZINC PLATED HEX	312-1001-043
6	WASHER, LOCK, 5/16"	313-1000-019
4	WASHER, LOCK, SPLIT, 3/8"	313-1000-022
4	WASHER, FLAT, 3/8"	313-2300-013
2	CLAMP, U-BOLT, 2.2" I.D. x 3.0" LG x 3/8-16	435-3003-046
1	VALVE, HYD., CLOSED CENTER, LS	334-0003-062
1	MANUAL, INSTALLATION	016-0190-023
1	MANUAL, INSTALLATION, SMARTRAX	016-9001-021
1	LABEL, WARNING, DO NOT STEP	041-0159-688
1	LABEL, WARNING, TAMPERING	041-0159-689
1	CABLE, HYDRAULIC SOLENOID / OVERRIDE	115-0171-466

CHAPTER

2

SAFETY

Hydraulic Safety Requirements



Important: Hydraulics are under pressure. Never attempt to open or work on a hydraulic system with the equipment running. Care should always be taken when first opening a system that was previously pressurized.

When disconnecting the hydraulic hoses or when purging is required, be aware that the hydraulic oil within the machine system may be extremely hot and under high pressure. Caution must be exercised. Any work carried out on the hydraulic system must be performed in accordance with the machine manufacturer's approved maintenance instructions. Raven Industries recommends that appropriate protective equipment be worn when working on the hydraulic system. Objects or materials that are able to bypass the machine's hydraulic filtration system will adversely reduce performance and possibly damage the hydraulic valves.

Electrical Safety Requirements

Do not reverse the power leads. Doing so will cause severe damage to the equipment. Always check to make sure that the power leads are connected to the right polarity as marked. Ensure that the power cable is the last cable to be connected.

Contacting Raven Industries

We welcome your feedback about this manual. If you have any comments or suggestions for improvement, please let us know by contacting our Customer Support Center by any of the following methods:

- ◆ **Via phone:** 1-800-243-5435

- ◆ **Via mail:**
Raven Industries
Flow Control Division
205 E. 6th St.
Sioux Falls, SD 57104

- ◆ **Via email:** fcdinfo@ravenind.com

CHAPTER

3

MOUNTING THE UNIVERSAL BRACKET AND VALVE

Installing the Hydraulic Bracket

1. The mounting location of the bracket will be on the plate just forward of the steering orbital.



Mounting location for Hydraulic Valve

2. Mount the bracket to the machine using the supplied bolts.
3. Use the existing bolt used to mount the antifreeze tank to attach one point of the bracket and mark an additional hole location and drill out second mounting hole in plate.

Notes:

CHAPTER

4

HYDRAULICS

Hose Routing & Connections

In this step, five hydraulic hoses will be run from the tractor steering orbital motor to the auto-steering control valve.

The following list explains each hose and their routing location:

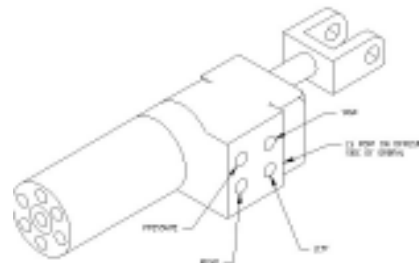
- ◆ **Pressure Hose** - This hose runs from an added tee at the pressure port of the orbital to the port labeled 'P' on the steering control valve.
- ◆ **Tank Hose** - This hose runs from an added tee on the tank port of the orbital to the port labeled 'T' on the steering control valve.
- ◆ **Left Steer Hose** - This hose runs from an added tee on the left port of the orbital to the port labeled 'A' on the steering control valve.
- ◆ **Right Steer Hose** - This hose runs from an added tee on the right port of the orbital to the port labeled 'B' on the steering control valve.
- ◆ **LS-Steer** - This hose connects directly to the LS port on the orbital and runs to the port labeled 'LS-STEER' on the steering control valve.

The FLX 4x10 steering orbital is located underneath the hood, and mounted directly to the steering column, which runs through the firewall of the cab.



Helpful Hint: Before tightening the provided hoses to the steering orbital, it is easiest to leave the hose fittings loose on the orbital end and then run the hose to its proper port on the steering control valve. By doing this, it will allow the hoses to rotate and bend properly around corners.

CH8 FLX430
HYDRAULIC ORBITAL SCHEMATIC



Installing the Left Steer Hose

1. Begin by removing the hose on the LEFT port of the steering orbital.
2. Once the hose is removed, install one of the four provided tee fittings.
3. Re-connect the original left steer hose to the straight portion of the tee fitting.

Left steer port is located beside this fitting.



Left steer hose connection to orbital tee fitting

4. Install the provided left steer hose (P/N 214-1000-053), by connecting the 90° fitting of the hose to the 90° portion of the tee fitting.
5. Run the left steer hose to the port labeled 'A' on the steering control valve.

Installing the Right Steer Hose

1. Begin by removing the hose on the RIGHT port of the steering orbital.
2. Once the hose is removed, install one of the four provided tee fittings.
3. Re-connect the original right steer hose to the straight portion of the tee fitting.

Right steer port is located beside this fitting.

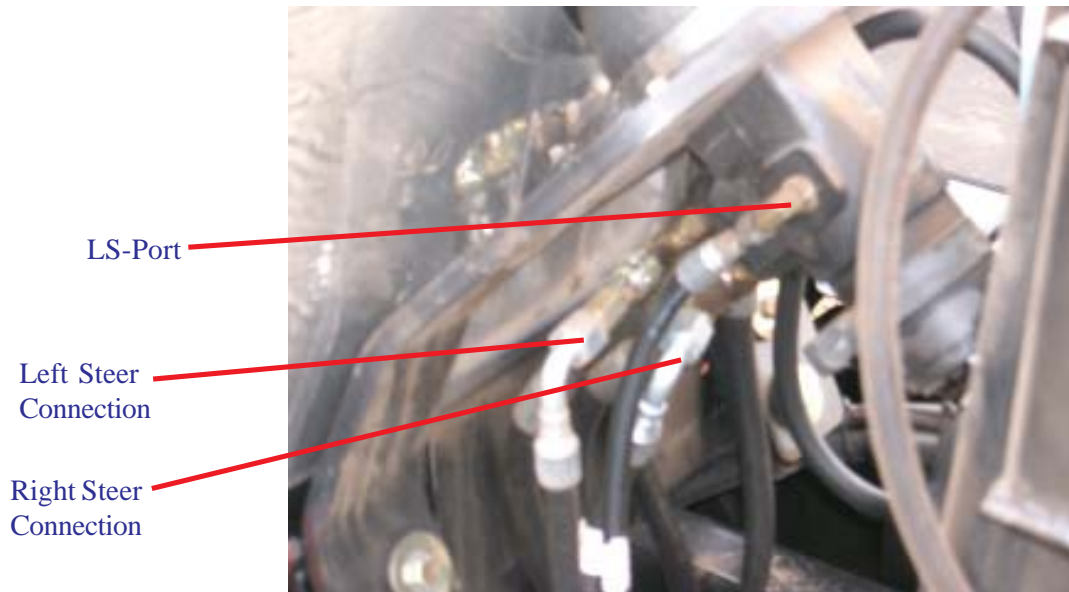


Right steer hose connection to orbital tee fitting

4. Install the provided right steer hose (P/N 214-1000-053), by connecting the 90° fitting of the hose to the 90° portion of the tee fitting.
5. Run the right steer hose to the port labeled 'B' on the steering control valve. Follow the same hose routing as before.

Installing the LS-PV Hose

1. Remove fitting from the LS-PV port on the SmarTrax valve. Install the supplied -6 ORFS (M) to -4 ORB (M) fitting.
2. Remove the LS hose on the orbital motor.
3. Once the hose is removed, connect the end of the hose that was removed from the steering orbital to the 'LS-PV' port on the steering control valve.



LS Line connection point to steering orbital

Installing the Pressure Hose

1. Begin by removing the hose on the PRESSURE port of the steering orbital.
2. Once the hose is removed, install one of the four provided tee fittings.
3. Re-connect the original pressure hose to the straight portion of the tee fitting.

Pressure port with the tee fitting installed. Port is directly behind fitting shown.



Pressure hose connection to orbital tee fitting

4. Install the provided pressure hose (P/N 214-1000-054), by connecting the 90° fitting of the hose to the 90° portion of the tee fitting.
5. Run the pressure hose to the port labeled 'P' on the steering control valve. Follow the same hose routing as before.

Installing the Tank Hose

1. Begin by removing the hose on the TANK port of the steering orbital.
2. Once the hose is removed, install one of the four provided tee fittings.
3. Re-connect the original tank hose to the straight portion of the tee fitting.

Tank port with the tee fitting installed. Port is directly behind fitting shown.



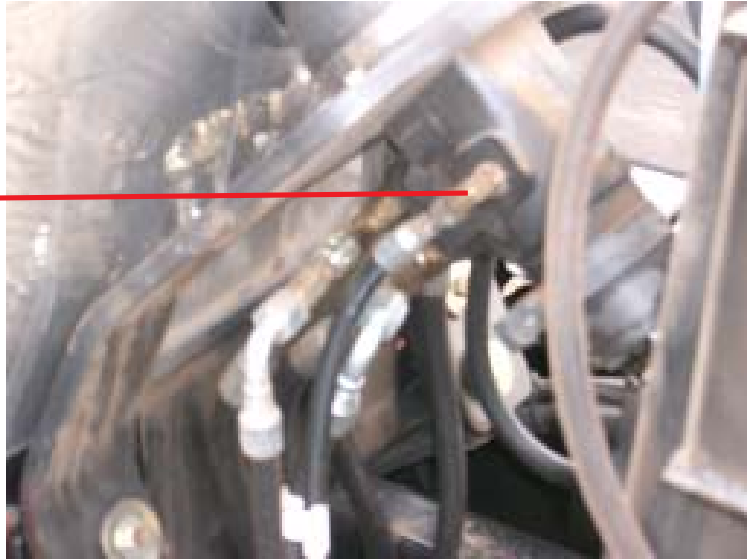
Tank hose connection to orbital tee fitting

4. Install the provided tank hose (P/N 214-1000-054), by connecting the 90° fitting of the hose to the 90° portion of the tee fitting.
5. Run the tank hose to the port labeled 'T' on the steering control valve. Follow the same hose routing as before.

Installing the LS-Steer Hose

1. Begin by connecting the supplied LS-STEER hose (P/N 214-1000-055) to the 'LS' port on the steering orbital.
2. Once the hose is connected, route the hose back to the steering control valve.
3. Attach to the load sense port.

Load Sense
Port



LS-STEER Line connection point to steering orbital

4. Attach pressure switch directly to the 'PS' port on the SmarTrax valve.

CHAPTER

5

STEERING POSITION SENSOR

Installing the Steering Position Sensor (SPS)

1. Larger Rotary Steering Position Sensor bracket mounts using the base end bolt of the left hand steering cylinder and the mounting tab on the back of the left leaf spring mount.



Mounting
Area



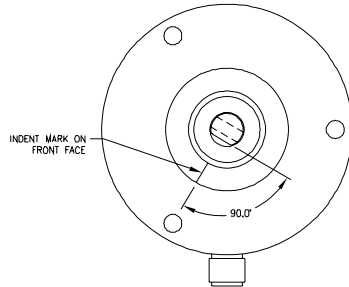
Front Mounting
Bolt



Rear Mounting Tab

2. Smaller bracket clamps to steering tie rod.

3. Attach rotary sensor to larger bracket first. Mount sensor with shaft pointing down and notch on the face of the sensor pointing towards the rear of the machine. Orient shaft so flat side is 90° from notch. Tighten arm onto shaft of sensor so it points towards rear of machine when mounted.



With wheels straight, sensor shaft should be in this position.

4. Attach bracket to machine using the existing hyd. cylinder bolt and the supplied one for the mount tab.
5. With machine wheels pointing straight forward, slide shaft of smaller bracket through slot on sensor arm. Then clamp to tie rod in a position where the arm points directly towards rear of machine.

CHAPTER

6

START-UP PROCEDURES

After installing the SmarTrax on your machine, always follow these start-up procedures.

- ◆ Make sure the Steering Position Sensor does not over-extend or over-compress when turning the wheels.
- ◆ Turn the wheels fully from side to side numerous times to remove air from the hydraulic system.
- ◆ Adjust the pressure switch to the most responsive setting. Refer to the Universal Kit Manual for instructions on this.



Important: Time the wheels for a full left to right and right to left time of approximately 6 seconds. Refer to the Universal Kit Manual for additional instructions on this.

Notes:



RAVEN INDUSTRIES LIMITED WARRANTY

WHAT IS COVERED?

This warranty covers all defects in workmanship or materials in your Raven Flow Control Product under normal use, maintenance, and service.

HOW LONG IS THE COVERAGE PERIOD?

This warranty coverage runs for 12 months from the purchase date of your Raven Flow Control Product. This warranty coverage applies only to the original owner and is not transferrable.

HOW CAN YOU GET SERVICE?

Bring the defective part, and proof of date of purchase, to your local dealer. If your dealer agrees with the warranty claim, he will send the part, and proof of purchase to his distributor or to Raven for final approval.

WHAT WILL RAVEN INDUSTRIES DO?

When our inspection proves the warranty claim, we will, at our option, repair or replace the defective part and pay for return freight.

WHAT DOES THIS WARRANTY NOT COVER?

Raven Industries will not assume any expense or liability for repairs made outside our plant without written consent. We are not responsible for damage to any associated equipment or product and will not be liable for loss of profit or other special damages. The obligation of this warranty is in lieu of all other warranties, expressed or implied, and no person is authorized to assume for us any liability. Damages caused by normal wear and tear, misuse, abuse, neglect, accident, or improper installation and maintenance are not covered by this warranty.

RAVEN



Raven Industries
Flow Controls Division
P.O. Box 5107
Sioux Falls, SD 57117-5107

Toll Free 800-243-5435
Fax 605-331-0426
www.ravenprecision.com
fcinfo@ravenind.com

Notice: This document and the information provided are the property of Raven Industries, Inc. and may only be used as authorized by Raven Industries, Inc. All rights reserved under the copyright laws.