

SmarTrax

Straight shot to easy steering



Supplement & Installation Manual

Caterpillar Challenger 35-55 Series

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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

Caterpillar Challenger 35-55 Series SmarTrax Kit Contents

Quantity	Item Description	Part Number
1	WELD., BRACKET, UNIV. HYD. MNTG., PART "A"	116-0159-527
1	HOSE, HYD., 1" ORFS (F) TO 9/16" JIC (F), 72" LG	214-1000-215
5	HOSE, HYD., 13/16" ORFS (F) TO 9/16" JIC (F). 72" LG	214-1000-468
1	SWITCH, PRESSURE, MICRO, 6-50 BAR ADJ. W/90° ELBOW	422-0000-075
1	FITTING, ELBOW, 45°, -6 JIC	333-0012-027
3	FITTING, TEE, -8 FFORX	333-0012-028
1	FITTING, TEE, -10 FFORX	333-0012-031
4	FITTING, ELBOW, 90°, -6 JIC	333-0012-042
6	FITTING, ADAPTER, STRAIGHT, 9/16" JIC TO 9/16" SAE O-RING	333-0012-045
1	FITTING, ELBOW, 90°, FFORX	333-0012-067
4	FITTING, ADAPTER, 13/16" ORFS (M) TO 9/16" SAE O-RING (M)	333-0012-082
2	FITTING, ELBOW, 45°, -8 ORFS	333-0012-102
2	FITTING, ADAP., STR., SWIVEL, 13/16" ORFS TO 3/4" JIC	333-0012-133
2	FITTING, ADAPT., STR., SWIVEL, 9/16" SAE TO 3/4" JIC	333-0012-255
3	VALVE, HYDRAULIC, SHUTTLE	334-0003-016
2	SCREW, 10-32 x 2 1/2"	311-0002-052
2	BOLT, 1/4-20 X 3"	311-0050-113
2	BOLT, 5/16-18 x 1"	311-0052-105
2	BOLT, HEX, 3/8"-16 UNC x 1 1/4"	311-0054-106
2	NUT, 1-4-20, ZINC PLATED, HEX	312-1001-033
2	NUT, 3/8-16	312-1001-037
2	NUT, LOCK, 10-32	312-4000-162
2	WASHER, #10	313-1000-014
2	WASHER, 5/16" LOCK, SPLIT, ZINC	313-1000-019
2	WASHER, LOCK, SPLIT, 3/8"	313-1000-022
4	WASHER, .344 ID x .688 OD x .065 THK	313-2300-012
4	WASHER, FLAT, 3/8"	313-2300-013
1	MANUAL, INSTALLATION, CAT 35-55 SERIES	016-0190-077
1	MANUAL, INSTALLATION, SMARTRAX	016-9001-013
1	LABEL, WARNING, DO NOT STEP	041-0159-688

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

1. Mount the valve on the left side of the machine between the engine and the steps. Use one of the existing holes and drill one new hole into the frame of the steps and attach the valve bracket.



2. Mount the valve to the bracket using the supplied hardware.

SmarTrax
Valve



CHAPTER

4

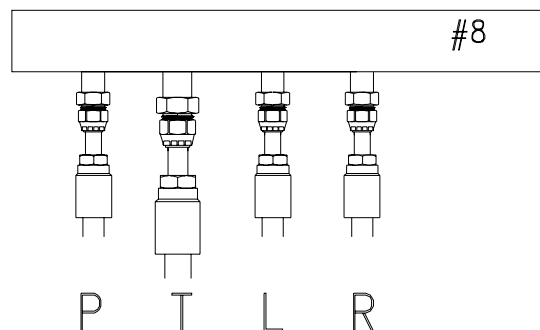
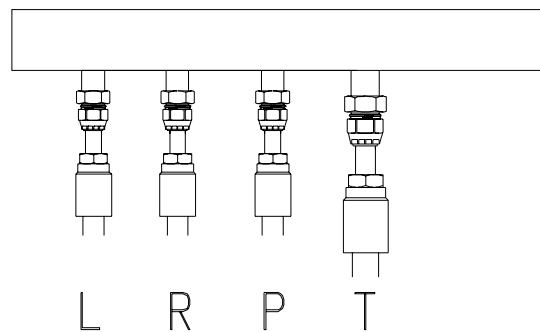
HYDRAULICS



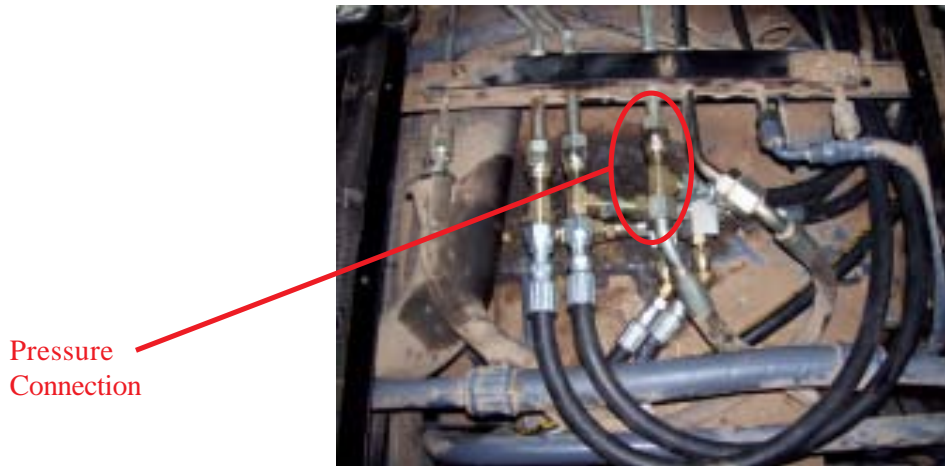
Important: Before starting the installation of the hydraulics, be sure to park the machine where it can be turned in place or able to drive straight to an open area without turning after installation is complete. The hydraulic lines will contain air after the installation and turning will be jerky and slightly erratic until the air is removed from the system.

Installing the Pressure Hose

1. Remove floor mat and floor panel to access hydraulic lines below cab.
2. Determine which of the 2 hose layouts below that your machine has by tracing the hose to the pump, machine steering valve, or tank line.

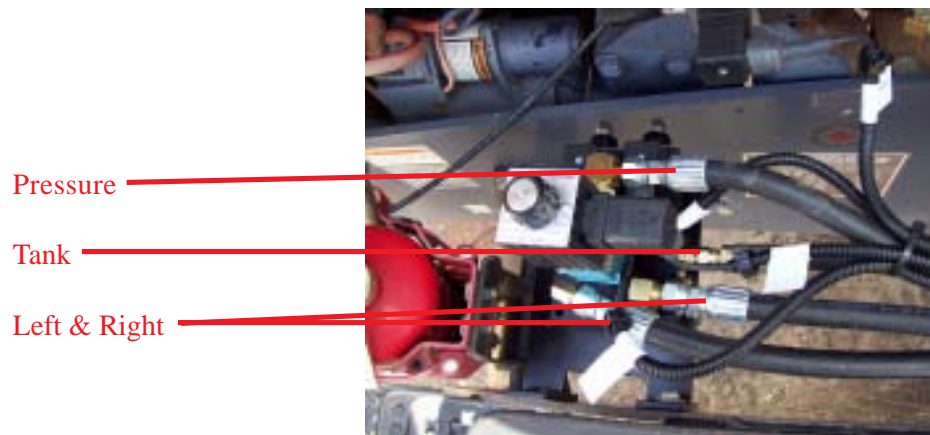


32. Locate pressure connection.



Pressure Connection

4. Disconnect the pressure line and install the supplied tee fitting. Re-connect the original pressure line.
5. Attach the supplied hose, P/N 214-1000-468, to the previously installed tee fitting.
6. Connect the hose to the P Port on the SmarTrax valve.



Pressure

Tank

Left & Right



Tank

Installing the Tank Hose

1. Locate the tank connection.
2. Disconnect the tank line, install the -10 tee fitting, and re-connect the tank line.
3. Attach the supplied tank hose, P/N 214-1000-215, to the tee fitting.
4. Attach the other end of the hose to the T Port on the SmarTrax valve.

Installing the Left, Right, and Pressure Switch Hoses

1. Locate the left and right steer lines.
2. Label and disconnect the left and right steer lines.



Helpful Hint: It is not overly important to keep track of the left and right steer lines when connecting them to the SmarTrax valve, as the left and right electrical connections can be interchanged. However, do make sure that the original machine left and right lines (with the tees installed) are connected to the same port on the steering unit after the SmarTrax installation.

Left & Right Steer Lines

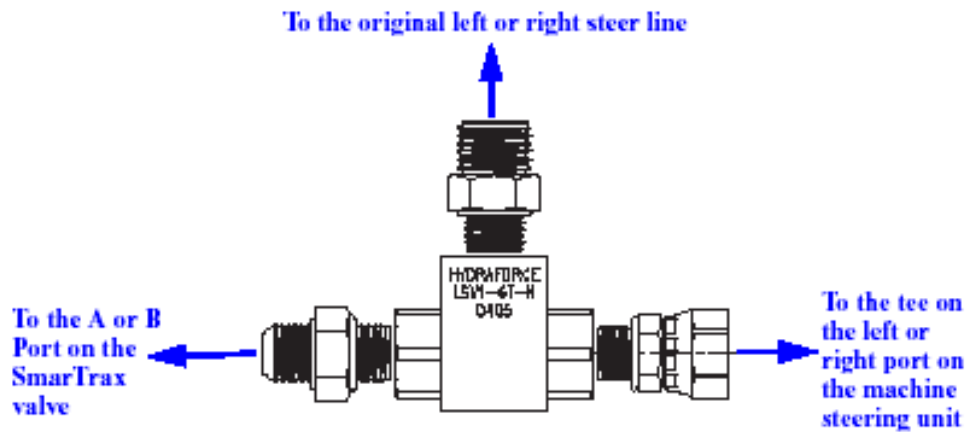


3. Attach the tee fittings to the open ports.
4. Attach the pressure switch hoses, P/N 214-1000-468, to the run fitting of the tee.

5. Insert the three -6 JIC to -6 SAE O-Ring fittings into one of the provided shuttle checks as shown.



6. Attach the pressure switch hoses to the sides of the shuttle (either side is fine). Be sure to use the 90° fitting, if needed.
7. Attach the pressure switch to the top of the shuttle.
8. Mount the pressure switch to the left side engine panel above the step platform using the supplied hardware.
9. On the remaining two shuttle valves, insert fittings as shown below.



10. Using the supplied ORFS (F) to JIC (M) adapter, attach the shuttle checks to the branch fittings on the tees installed on the left and right steer ports.



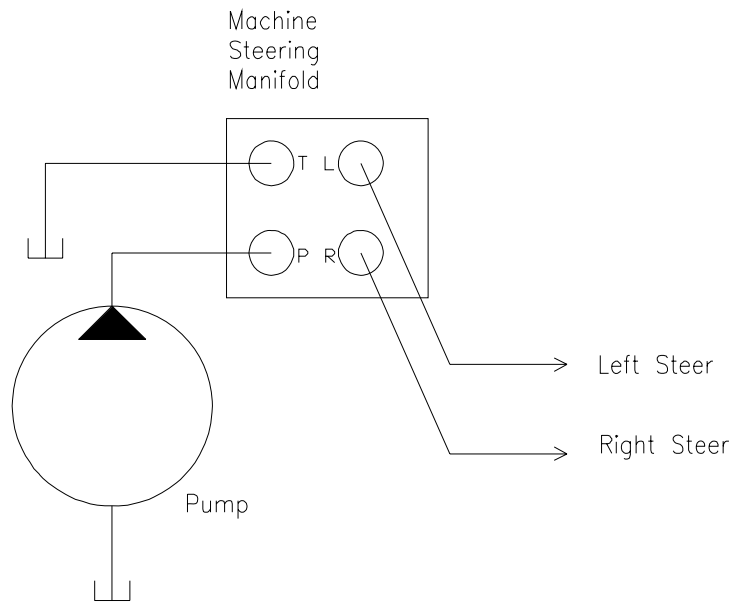
11. Attach the original left and right hoses to the top of the corresponding shuttle check.
12. Attach the supplied left and right hoses to the remaining open port on the shuttle check.
13. Route the hoses to the SmarTrax valve. Attach the left hose to the A Port and the right hose to the B Port using a 45° fitting, if necessary.



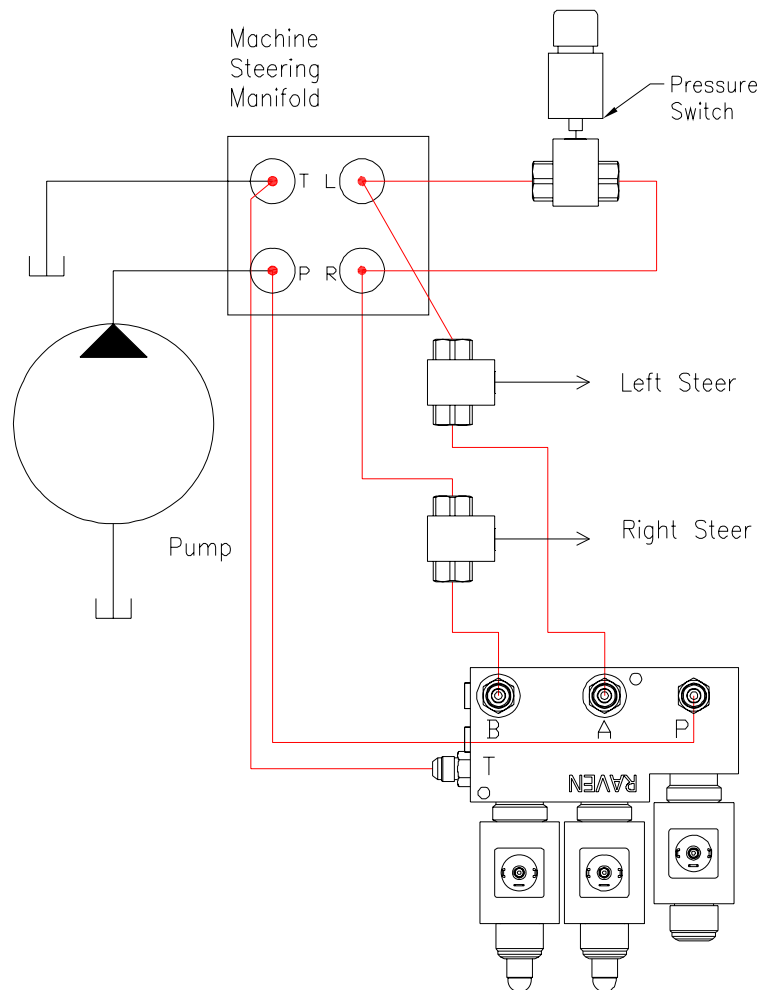
(A) Left &
(B) Right
Steer Lines



Before Smartrax Installation



After Smartrax Installation



CHAPTER

5

SENSOR MOUNTING

Mounting the Yaw Sensor

1. Screw the yaw sensor directly into the floor of the cab, beside the steering console.



Helpful Hints:

- ◆ Do not mount the yaw sensor to the floor covering, mount it only to the floor.
 - ◆ The sensor can be rotated in any position as long as it is flat on the floor.
2. Attach the ends of the cable to the three coils on the SmarTrax valve. Connect the left cable to the middle coil (next to the A Port), the right cable to the coil next to the B Port, and the LS to the coil next to the P Port.
 3. Connect the override wire to the pressure switch mounted on the fire-wall. Be sure to install the gasket onto the pressure switch.
 4. Route the cable into the side access, connect it to the yaw sensor, then connect it to the SmarTrax controller.

Notes:

CHAPTER

6

START-UP PROCEDURES

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



Important: Before starting or trying to turn on the machine, clear the surrounding area of all objects and people. Machine can turn in place unexpectedly if hoses are installed incorrectly.

- ◆ If you are inside a building, back the machine out without turning the wheel.
- ◆ Once you are in a clear area, turn the wheel slowly side to side to remove air from the hydraulic lines. The machine may not steer with the steering wheel on the first few attempts upon initial startup.
- ◆ Be sure the machine is steering normally and that all air is out of the hydraulic lines before attempting to calibrate the SmarTrax system.
- ◆ Adjust the pressure switch to the most responsive setting. Refer to the Universal Kit Manual for 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.

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