

SmarTrax»»»

Straight shot to easy steering



Ford NH 9280
W/O High Flow

Supplement & Installation Manual

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.



Basic Kit Contents

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

Miller MD SmarTrax Kit Contents

Quantity	Item Description	Part Number
1	Kit, S.P.S.	063-0181-003
1	Weldment, Brkt, Universal Hyd. Mounting, Part "A"	116-0159-527
1	Hose, Hyd., 3/4" JIC (F) to 1 1/16" JIC (F), 42"	214-1000-208
1	Hose, Hyd., 3/4" JIC (F) to 1 1/16" JIC (F), 24"	214-1000-209
1	Hose, Hyd., 9/16" JIC (F) to 3/4" JIC (F), 48"	214-1000-210
2	Hose, Hyd., 9/16" JIC (F) to 7/8" JIC (F), 36"	214-1000-211
1	Switch, Pres., Micro, HD, 15-100 Bar Adj., w/90° fitting	422-0000-074
1	Valve, Hyd., Open Center, PWM	334-0003-064
2	Ftg., Elbow, 45° Swivel, 9/16" JIC M/F	333-0012-027
3	Ftg., Elbow, 90° Swivel, 3/4" JIC M/F	333-0012-064
1	Ftg., Elbow, 90° Swivel, 1 1/16" JIC M/F	333-0012-099
2	Ftg., Elbow, 90° Swivel, 7/8" JIC M/F	333-0012-108
2	Ftg., Adapter, Swivel Run Tee, 7/8" JIC M/M/F	333-0012-113
2	Ftg., Reducer, 1 5/16" JIC (F) to 1 1/16" JIC (M)	333-0012-116
1	Ftg., Adapter, Swivel Run Tee, 1 5/16" JIC M/M/F	333-0012-117
4	Bolt, 5/16-18 x 7/8" Hex	311-0052-104
4	Bolt, Hex, 3/8"-16 UNC x 1"	311-0054-105
4	Nut, 3/8-16	312-1001-037
4	Washer, Lock, 5/16"	313-1000-019

Quantity	Item Description	Part Number
4	Washer, Lock, Split, 3/8"	313-1000-022
4	Washer, Flat, 3/8"	313-2300-013
1	Manual, Installation	016-0190-046
1	Manual, Installation, Smartrax	016-9001-008
1	Label, Warning, Do Not Step	041-0159-688
1	Label, Warning, Tampering	041-0159-689
1	Cable, Hydraulic Solenoid/Override	115-0171-466

Notes:

CHAPTER

2

SAFETY

Hydraulic Safety Precautions



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 Precautions

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

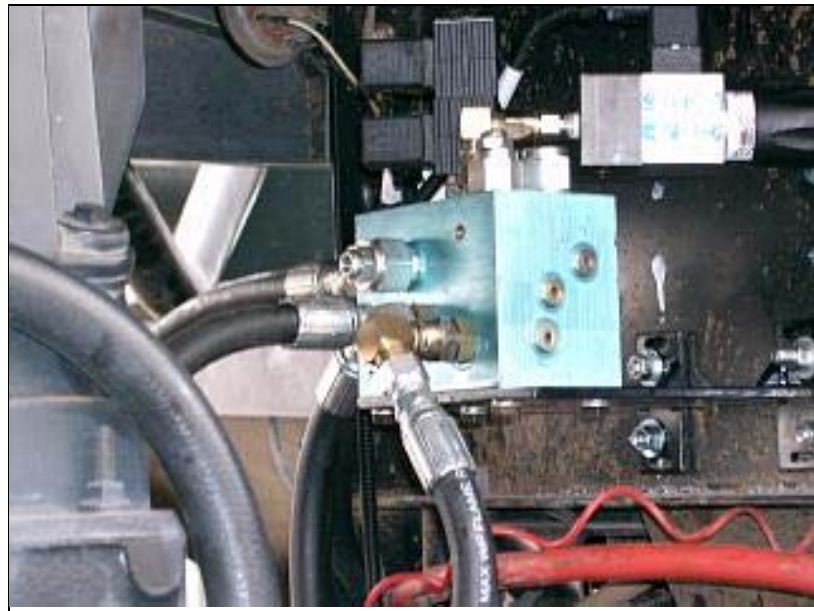
We welcome your feedback about this manual. If you have any comments or suggestions for improvement, please let us know by contacting our Customer Support Center by any of the following methods:

- **Via phone:** 1-800-243-5435
- **Via mail:**
Raven Industries
Flow Control Division
205 E. 6th St.
Sioux Falls, SD 57104
- **Via email:** fcinfo@ravenind.com

CHAPTER

3

MOUNTING THE UNIVERSAL BRACKET AND VALVE



Position the bracket on the steel hood support plate between the engine and the front of the cab. Drill holes to fit the mounting bracket pattern and attach the universal mounting bracket to the machine using the provided 1/2" hex-head bolts. Figure above shows the bracket mounted to the machine with the valve and hoses attached.



Note: Prior to attaching the steering assist valve to the mounting bracket, remove the existing T-port fitting and install the provided larger fitting..

Position the hydraulic valve on the universal bracket over the top of the proper hole pattern. Secure the valve to the bracket using the provided metric bolts and lock washers.



Note: It may be necessary to drill additional holes in the mounting bracket if the valve is not in an accessible position.

Attach the pressure switch to the PS-port on the Steering Assist valve using the provided JIC fittings.

CHAPTER

4

HYDRAULICS



Pressure Hose

Remove the existing pump to orbital hose from the orbital and the tee on the priority valve. Attach a provided #12 JIC to #16 JIC adapter fitting to the tee. Connect proper end of the provided Pressure hose to the fitting and the remaining end to the P-port on the Steering Assist valve. (214-1000-208)



Tee on tank return manifold (below pressure priority valve)

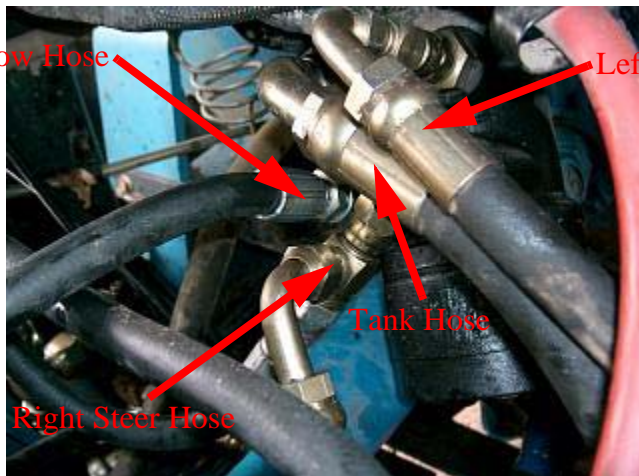
Tank Port Hose

Remove the existing tank to orbital hose at the return oil manifold and attach a provided #16 JIC tee fitting to the manifold. Re-connect the hose to the tee fitting. Install a #16 to #12 adapter fitting to the tee. Connect one end of the Tank hose to this fitting and the other end to the T-port on the Steering Assist Valve. (214-1000-210)



Note: It is important to trace the hoses so that the pressure and tank hoses are not accidentally swapped for each other. This will cause valve failure. If the Left and Right Steer hoses are swapped, the machine will steer opposite to the desired direction..

Excess Flow Hose



Excess Flow Hose

Attach a 90-degree elbow adapter fitting to the EF port on the steering assist valve and connect one end of the Excess Flow hose to the fitting. Connect the remaining open end of the Excess Flow hose to the steering orbital, on the open pressure port. (214-1000-209)

Left Steer Hose

Remove the hose attached to the Left Steer port of the orbital. Attach a provided #10 JIC tee fitting to the orbital and attach the original hose to an open port on the tee. Connect the provided Left Steer hose to the remaining open port on this tee and attach the other end to the A port on the Steering Assist Valve. (214-1000-211)

Right Steer Hose

Remove the hose attached to the Right Steer port of the orbital. Attach a provided #10 JIC tee fitting to the orbital and attach the original hose to an open port on the tee. Connect the provided Right Steer hose to the remaining open port on this tee and attach the other end to the B-port on the Steering Assist Valve. (214-1000-211)

Notes:

C H A P T E R

5

**STEERING POSITION SENSOR & WIRING
HARNESS INSTALLATION**



The figure above shows the approximate mounting position of the steering position sensor. Attach the steering position sensor to the right side steering cylinder and rear frame cross member.



Note: It may be necessary to fabricate a mounting bracket to properly position the sensor. The figures below show the ends of the sensor and their respective fabricated mounting brackets.



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.
- Time the wheels for full left to right and right to left of approximately 8-12 seconds. Refer to the Universal Kit Manual for instructions on this.
- 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.



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.