

# ***SmartTrax***»»» *Straight shot to easy steering*



Supplement & Installation Manual

**GVM Prowler**

### **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

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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.

## GVM Prowler SmarTrax Kit Contents

Quantity	Item Description	Part Number
1	Kit, SPS	063-0181-001
1	Cable, Hydraulic Solenoid/Override	115-0171-466
1	Weldment, Bracket, Univ. Hyd. Mtg., Part "A"	116-0159-527
1	Switch, Press., Micro, HD, 15-100 Bar Adj.	422-0000-074
1	Valve, Hyd., Open Center, PWM	334-0003-064
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
4	Washer, Lock, Split, 3/8"	313-1000-022
4	Washer, Flat, 3/8"	313-2300-013
1	Manual, Installation	016-0190-020
1	Manual, Installation, Smartrax	016-9001-008
1	Label, Warning, Do Not Step	041-0159-688
1	Label, Warning, Tampering	041-0159-689
2	Ftg., Elbow, 90° Swivel, -6 JIC M/F	333-0012-042
3	Ftg., Adapter, Swivel Run Tee, -6 JIC M/M/F	333-0012-043
2	Ftg., Elbow, 90° Swivel, -8 JIC M/F	333-0012-064
1	Hose, Hyd., 8JF -8 48" 8JF	214-1000-133
1	Hose, Hyd., 8JF90S -6 60" 6JF	214-1000-134
3	Hose, Hyd., 8JF90S -6 96" 6JF	214-1000-135
1	Hose, Hyd., 8JF90S -8 96" 8JF	214-1000-136
2	Hose, Hyd., 6JF90S -6 48" 6JF	214-1000-139

## 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:**  
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- ◆ **Via email:** [fcdinfo@ravenind.com](mailto:fcdinfo@ravenind.com)

## CHAPTER

# 3

### MOUNTING THE UNIVERSAL BRACKET AND VALVE

#### **Mounting the Universal Bracket**

Attach the universal mounting bracket on the right side of the machine using the provided 1/2" hex head bolts. (See pictures below). Drill holes to fit the mounting bracket pattern in the welded gusset between the right side frame rail and the cross-member support. The picture on page 6 shows the bracket mounted to the machine with the valve attached.



Wheel Angle Sensor and hydraulic valve are mounted on the right side of the machine. Valve control cables are run along the frame up into the cab through the trap door in the floor board.



Hydraulic valve and pressure switch looking in from left side wheel well.



## Mounting the Hydraulic Valve and Pressure Switch

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.



**Helpful Hint:** 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 valve.



## CHAPTER

# 4

## HYDRAULICS

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### Hose Routing & Connections

New hoses should be run so they follow the routing of the old hoses. Use the machines existing rubber-covered rings (shown in picture below) on the underside of the frame to assist in routing.

Valve mounting bracket attached to frame gusset



Hoses routed through rings

## **Pressure Hose**

Remove the existing pump to orbital hose from the machine and connect the provided pressure hose (P/N 214-1000-133) with the straight adapter end to the pump. Route the hose along the frame to the P-Port on the Smartrax valve. Attach the end to the P port on the Raven Smartrax valve using a 90° fitting if necessary.

## **Excess Flow Hose**

Attach a 90° elbow adapter fitting to the EF port on the Smartrax valve and connect the straight end of the excess flow hose (P/N 214-1000-136) to the EF port on the Smartrax valve. Connect the 90° fitting end of the hose to the open pressure port on the steering orbital.

## **Tank Port to Orbital Hose**

Disconnect the existing hose from the orbital to the hydraulic tank manifold. On the orbital, attach the 90° elbow of the tank port to orbital hose (P/N 214-1000-135) directly to the orbital tank port. On the Raven Steering Control Valve, attach a tee fitting to the 'T' port. Connect the end of the Tank Port to Orbital hose to the tee fitting.

## **Replacement Tank Hose**

Connect the 90° elbow of the Replacement Tank hose (P/N 214-1000-134) to the remaining open port on the tank port tee fitting on the Smartrax block. Connect the other end of the hose to the return oil manifold where the original tank to orbital hose was connected

## **Replacement Right Steer and Left Steer Hose**

Disconnect the original right and left steering hoses from the orbital and the tee connection going to the steering cylinder. Connect the 90° ends of the Replacement Right (P/N 214-1000-135) and Left Steer (P/N 214-1000-135) hoses directly to the orbital. Attach tee fittings to the A and B ports on the Raven Steering Control Valve. Connect the open end of the Replacement Right Steer hose to an open end of the B-Port tee fitting. Attach the Replacement Left Steer hose to an open end of the A-Port tee fitting.



Excess Flow Hose

Replacement Left Steer hose

Replacement Right Steer hose

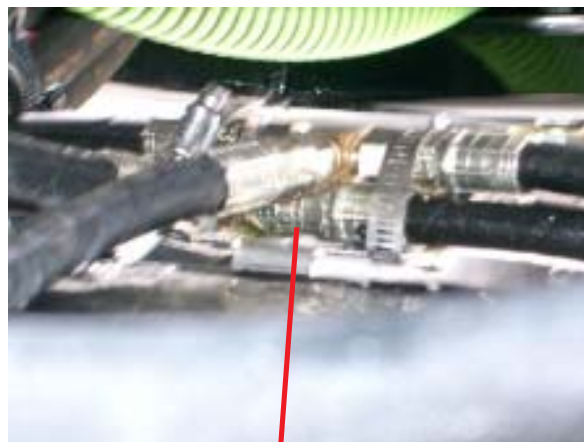
Tank port to orbital hose

### **A-Port to Left Steer Hose**

Connect the 90° end of the A-Port to Left Steer hose (P/N 214-1000-139) to the open tee port on the SmarTrax valve A Port. Connect the other end of the hose to the existing tee for the left steer cylinder.

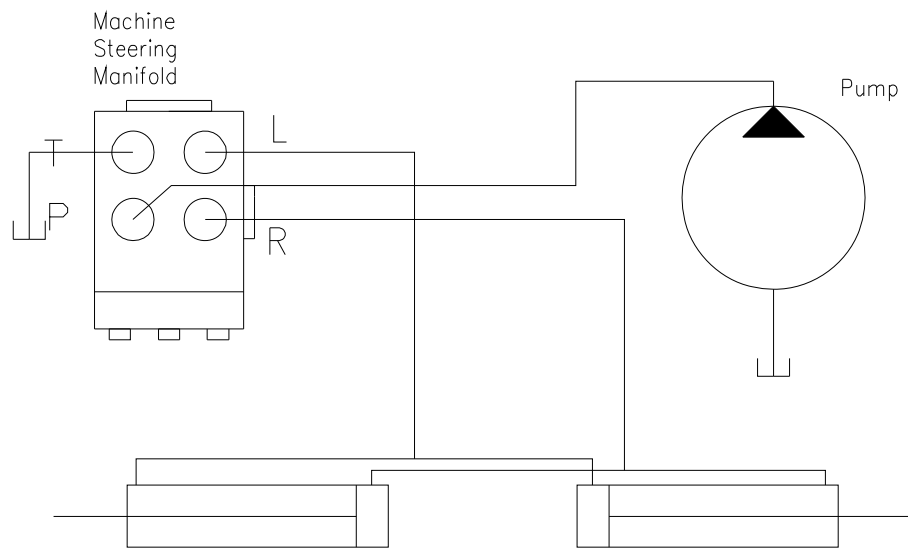
### **B-Port to Right Steer Hose**

Connect the 90° end of the B-Port to Right Steer hose (P/N 214-1000-139) to the open tee port on the SmarTrax Valve B Port. Connect the other end of the hose to the existing tee for the right steer cylinder

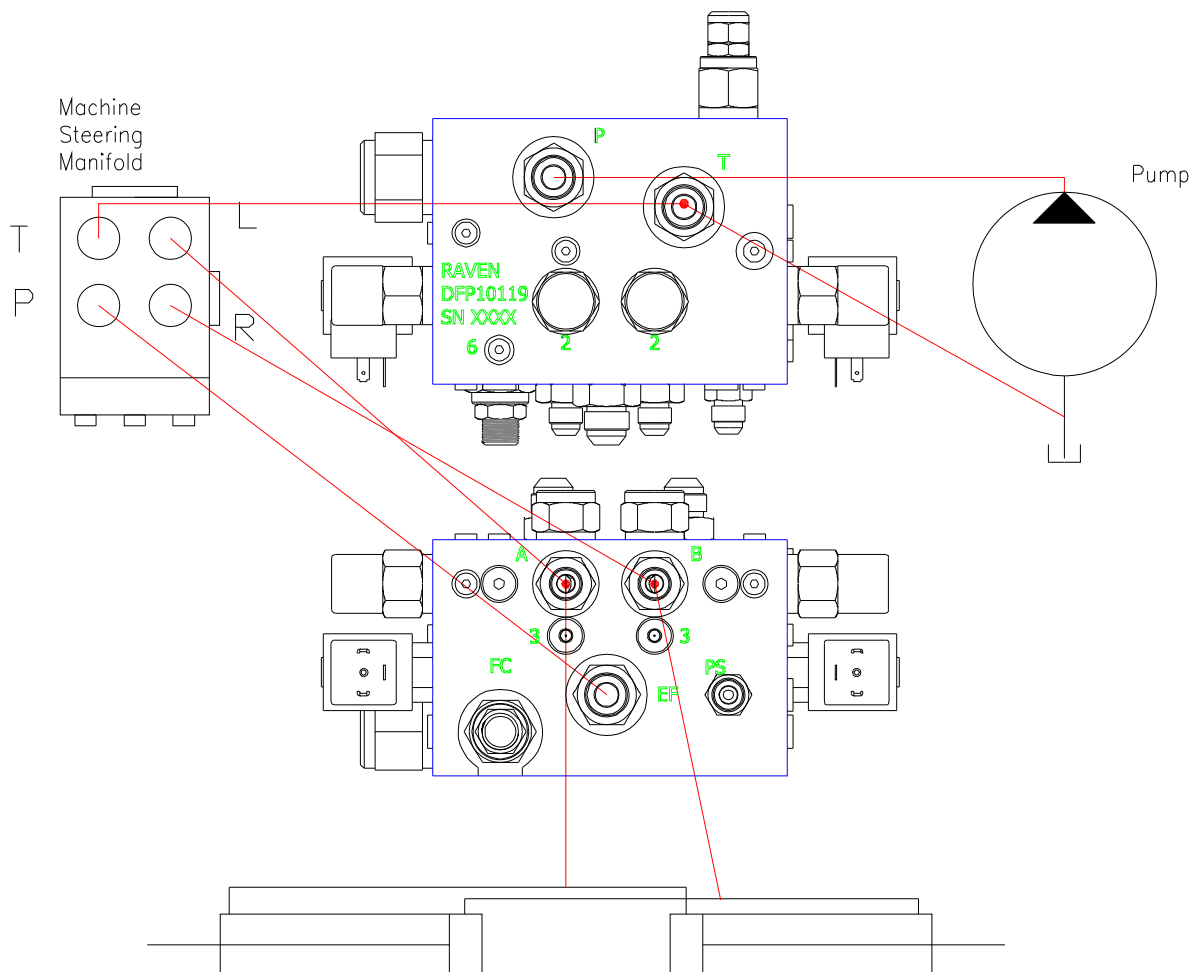


“A” port to Left Steer and “B” port to Right Steer are routed to the tees on the left and right steering cylinders.

### Before Smartrax Installation



### After Smartrax Installation



**Notes:**

## CHAPTER

# 5

### STEERING POSITION SENSOR INSTALLATION

#### **Linear Steering Position Sensor Mounting**

\*See Installation sheet found in the S.P.S. box for further mounting instructions.



The wired end of the wheel angle sensor is attached to the right steering cylinder using band clamps, screw and lock-nuts, and the mounting bracket.



The other end of the wheel angle sensor is attached to the moving arm of the steering linkage using the provided band clamps, screw, and locknuts, and the mounting bracket.



## CHAPTER

# 6

### START-UP PROCEDURES

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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.



**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.



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