

# ***SmartTrax***»»»

*Straight shot to easy steering*



**John Deere 7020 Series**

**Supplement & Installation Manual**

### **DISCLAIMER**

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

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## 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.

## John Deere 7020 Series SmarTrax Kit Contents

Quantity	Item Description	Part Number
1	KIT, LINEAR S.P.S.	063-0181-001
1	PLATE, MOUNTING, UNIVERSAL HYDRAULIC, PART "B"	107-0171-578
1	WELDMENT, BRACKET, UNIVERSAL HYD. MTG., PART "A"	116-0159-527
1	HOSE, HYDRAULIC, -6 JIC (F) TO -8 ORFS (F) 45°, 84" LG	214-1000-154
1	HOSE, HYDRAULIC, -8 ORFS (F) 90° TO -6 JIC (F) 22" LG	214-1000-160
1	HOSE, HYDRAULIC, -8 ORFS (F) 90° TO -6 JIC (F) 22" LG	214-1000-161
1	HOSE, HYDRAULIC, -6 JIC (F) TO -6 JIC (F) 50" LG	214-1000-361
1	HOSE, HYDRAULIC, -6 JIC (F) TO -6 ORFS 90° (F) 75" LG	214-1000-427
1	HOSE, HYDRAULIC, -6 ORFS (M) TO -6 JIC (F) 58" LG	214-1000-436
1	SWITCH, PRESSURE, MICRO, H.D., 15-100 BAR ADJ. W/FTGS.	422-0000-074
3	FITTING, ELBOW, 45° SWIVEL, -6 JIC M/F	333-0012-027
3	FITTING, ADAPTER, SWIVEL RUN TEE, -8 ORFS M/M/MF	333-0012-028
5	FITTING, ELBOW, 90° SWIVEL, -6 JIC M/F	333-0012-042
1	FITTING, ADAPTER, STRAIGHT, -6 NPT (M) TO -6 JIC (M)	333-0012-123
1	FITTING, ADAPTER TEE, -6 NPT M/F/F	333-0012-231
1	FITTING, ADAPTER, UNION TEE, -6 NPT (M) TO -6 JIC (M)	333-0012-237
4	BOLT, 5/16"-18 x 7/8" HEX HEAD	311-0052-104
4	BOLT, HEX, 3/8"-16 UNC x 1/2"	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	VALVE, HYDRAULIC, CLOSED CENTER LS	334-0003-062
1	MANUAL, INSTALLATION	016-0190-071
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

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### 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:

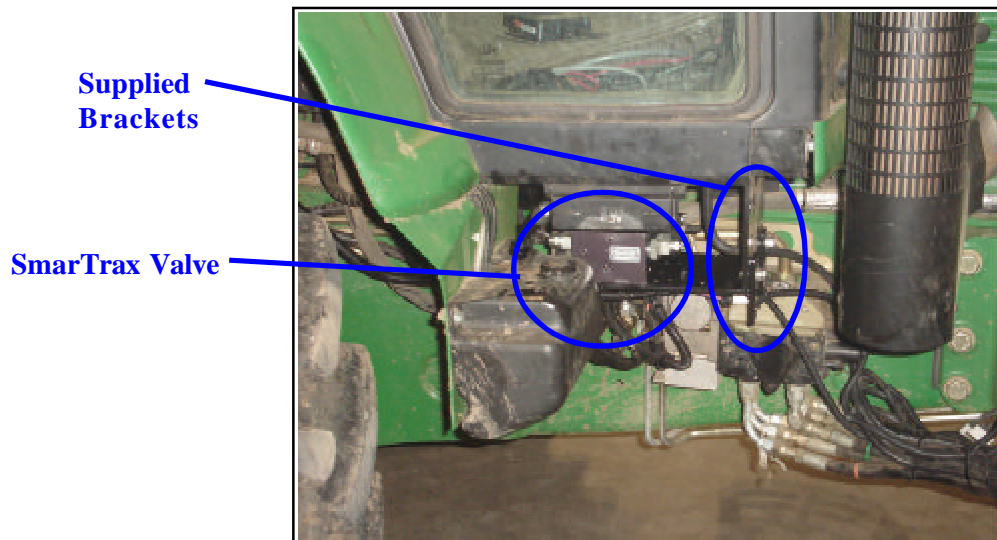
- ◆ **Via phone:** 1-800-243-5435
  
- ◆ **Via mail:**  
Raven Industries  
Flow Control Division  
205 E. 6th St.  
Sioux Falls, SD 57104
  
- ◆ **Via email:** [fcinfo@ravenind.com](mailto:fcinfo@ravenind.com)

## CHAPTER

# 3

### MOUNTING THE UNIVERSAL BRACKET AND VALVE

Using both parts of the universal bracket, mount the valve underneath the front right corner of the cab. Follow the instructions in the Universal Kit Manual for mounting the valve to the mounting bracket. Install the valve as far down as possible to give the most room above it.



**Helpful Hint:** Install the valve in place and then disconnect the two parts of the universal bracket and install the hoses onto the valve while it is not attached to the mounting plate. You should also set the left-to-right and right-to-left time on the valve before it is installed back on the other half of the universal plate.



Attach pressure switch to PS port on SmarTrax valve before mounting valve.



## CHAPTER

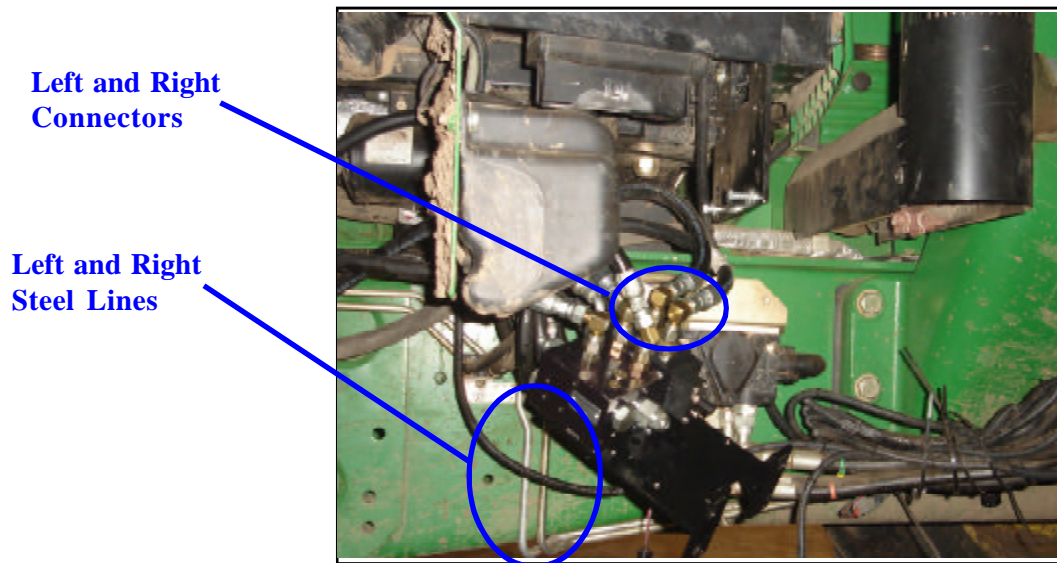
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## HYDRAULICS

### Installing the Left and Right Steer Hoses

Steel steering lines (right and left) attach to the steering cylinder, then run back along the right frame rail and end beside the SmarTrax valve where they connect to the hoses from the cab.

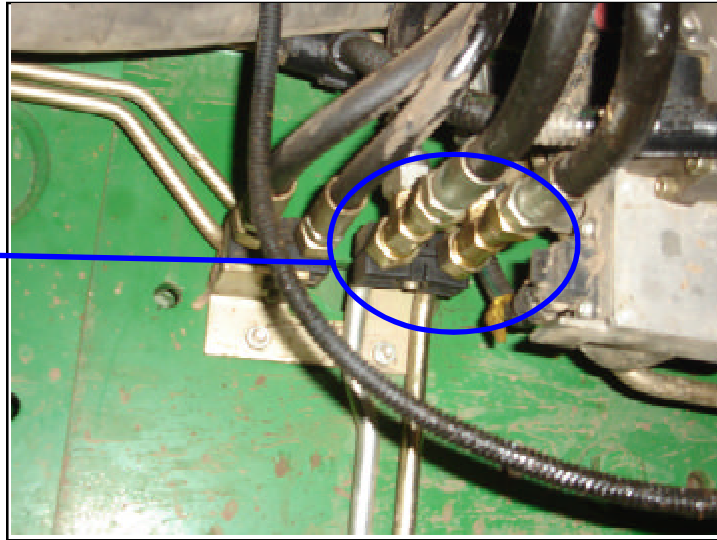
1. Trace the lines to determine which is left and which is right.



2. Disconnect the cab hoses from the steel lines, attach a supplied tee fitting, then re-attach the original hose.
3. Attach the supplied left hose (P/N 214-1000-160) to the left tee, then connect it to the A port on the SmarTrax valve using a 90° fitting.

4. Attach the supplied right hose (P/N 214-1000-161) to the right tee, then connect it to the B Port on the SmarTrax valve using a 90° fitting.

**Left and Right  
Steel Tees**

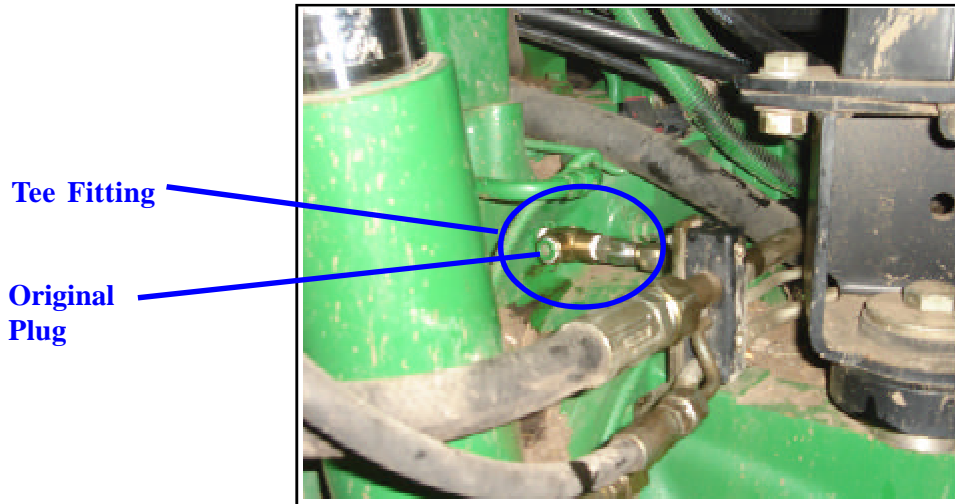


## **Installing the Tank Hose**

1. Remove the plug from the top right side of the rear differential housing on the tractor.
2. Apply thread sealant to the male threads of the supplied M/F/F tee.
3. Install the supplied tee fitting into the differential (where the plug was removed from).

4. Install the adapter fitting onto the end port of the tee. Install the plug removed from step 1 into the open port.

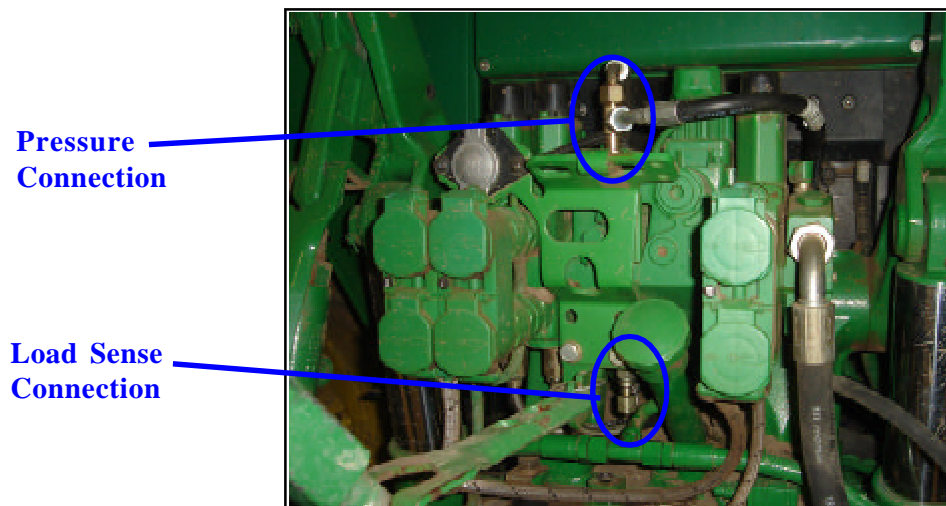
NOTE: This port is commonly used as a tank return for towed implements. If this port isn't going to be used for a towed implement, the tee fitting & plug can be discarded and only the adapter fitting used.



5. Attach the supplied tank hose (P/N 214-1000-361) to the tee using a 90° fitting, route it to the SmarTrax valve, and attach it to the T Port using a 90° fitting.

## Installing the Pressure and Load Sense Hoses

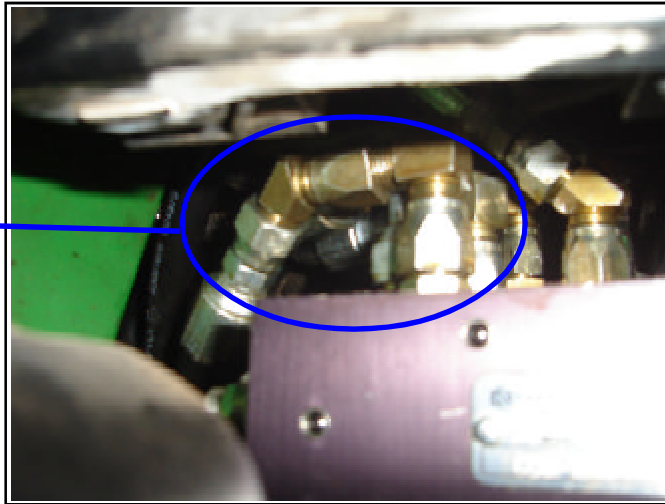
1. Disconnect the load sense line from the bottom of the hydraulic manifold that has the hydraulic quick disconnects on the back of the tractor.



2. Attach the supplied LS extension hose (P/N 214-1000-436) to the original load sense line.

3. Pull the line down towards the SmarTrax valve, below the cab on the right side.
4. Route hose to the SmarTrax valve and attach it to the LS Steer Port.
5. Attach the hose (P/N 214-1000-427) to the original load sense port on the hydraulic manifold on the back of the tractor.
6. Route the hose to the SmarTrax valve and attach it to the LS PV Port using a 90° and 45° fitting, if necessary.

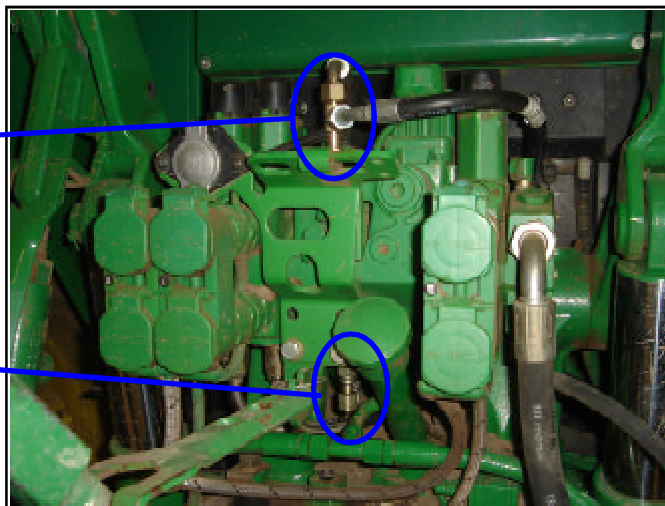
**90 & 45 Degree Fitting on the LS PV Port**



7. The pressure line connects to the top of the hydraulic manifold on the back of the tractor. Remove the pressure line and insert a tee fitting.
8. Re-attach the original pressure line.
9. Attach the supplied pressure line (P/N 214-1000-154) to the tee fitting, route it up to the SmarTrax valve, and attach it to the P Port using a 45° fitting.

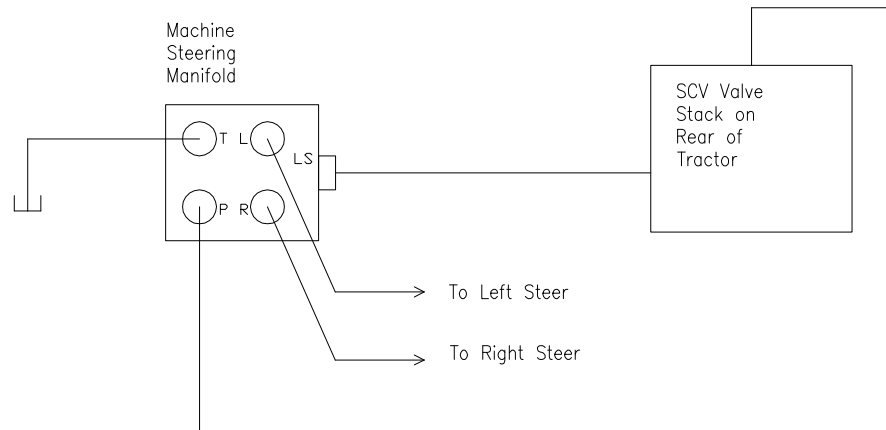
**Pressure Connection**

**Load Sense Connection**

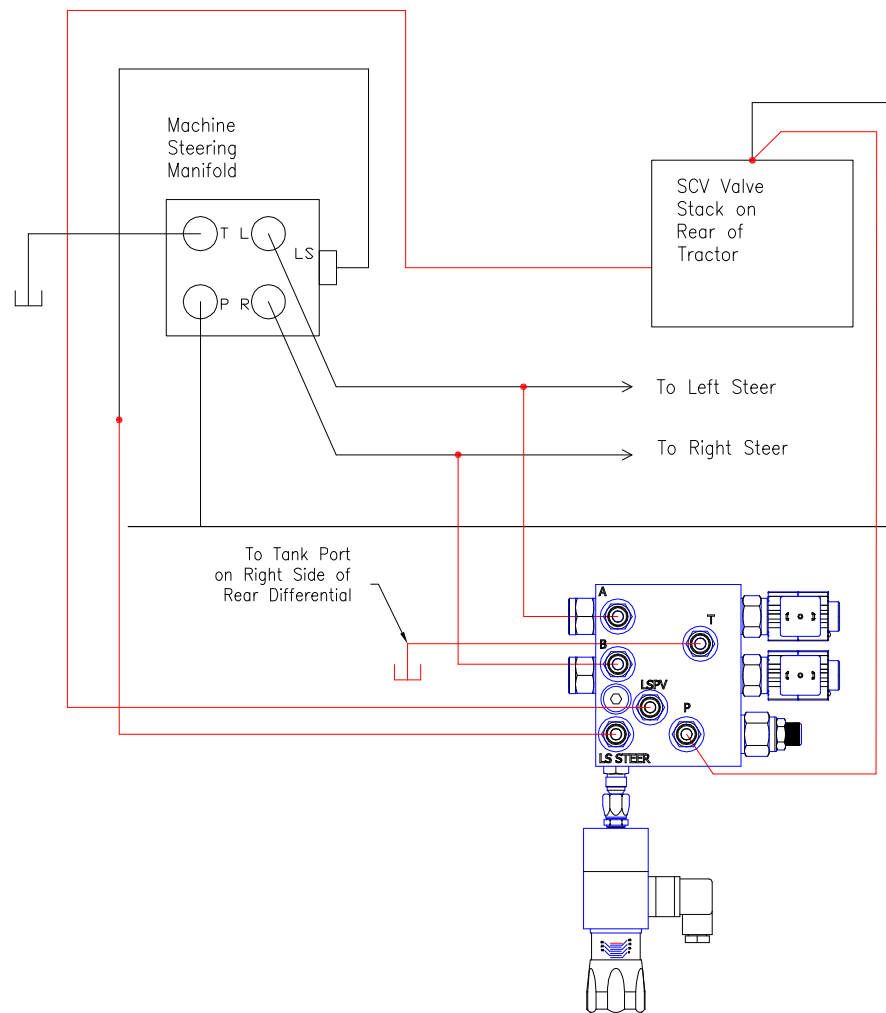


10. If not already attached, install pressure switch onto PS Port on SmaTrax valve.

Before Smartrax Installation



After Smartrax Installation



**Notes:**

## CHAPTER

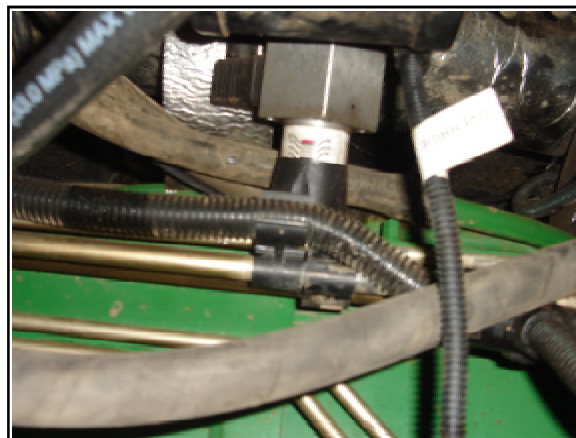
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## STEERING POSITION SENSOR & WIRING HARNESS INSTALLATION

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### Mounting the Steering Position Sensor (SPS)

1. Install the steering position sensor on the right side of the front axle, using the bottom right bolt of the differential housing and the wheel stop bolt.



**Important:** Be sure not to over extend or over compress the steering position sensor when turning the wheels.



2. Attach the cable to the SPS, valve, and pressure switch, then route it into the cab of the tractor.
3. Be sure to secure the wiring harness away from the moving parts and heat sources.
4. Be sure the rubber gasket is installed on the pressure switch connection.



## 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.
- ◆ Time the wheels for full left to right and right to left of approximately 6 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.



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