

RAVEN



SMARTRAX SUPPLEMENT
INSTALLATION MANUAL
AG CHEM 1903 TERRAGATOR

117-0190-037

SmartTrax 
Straight shot to easy steering

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.



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 CONTROL DIVISION
205 East Sixth Street - P.O. Box 5107 - Sioux Falls, South Dakota 57117-5107
E-mail: fcinfo@ravenind.com
www.ravenprecision.com
Toll-free: 800-243-5435 - Fax: 605-331-0426

Supplement Installation Manual, Ag Chem 1903 Terragator #016-0190-037 Rev A 08/04

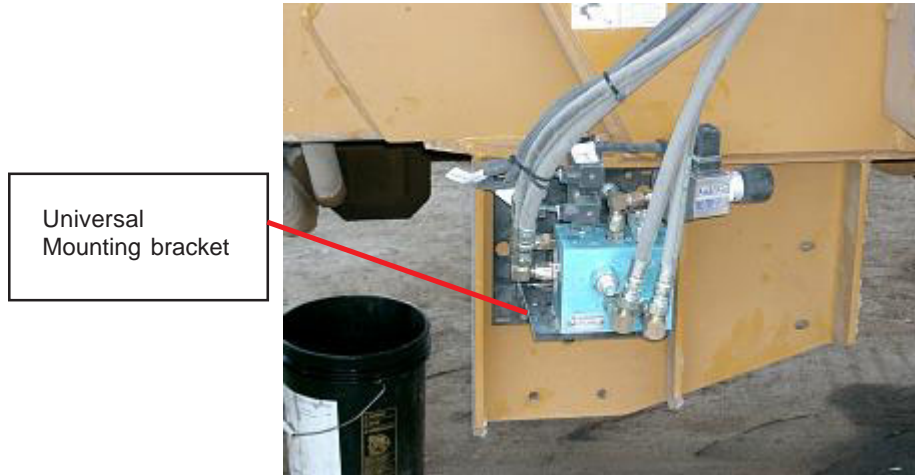
TABLE OF CONTENTS

1903 without POWER BEYOND	2
MOUNTING THE UNIVERSAL BRACKET	2
MOUNTING THE STEERING POSITION SENSOR	2
MOUNTING THE HYDRAULIC VALVE	3
MOUNTING THE PRESSURE SWITCH	3
HOSE CONNECTIONS AND ROUTING	4
PRESSURE HOSE	5
EXCESS FLOW HOSE	5
TANK PORT HOSE	5
LEFT STEER HOSE	5
RIGHT STEER HOSE	6
1903 with POWER BEYOND	7
MOUNTING THE UNIVERSAL BRACKET	7
MOUNTING THE STEERING POSITION SENSOR	7
MOUNTING THE HYDRAULIC VALVE	8
MOUNTING THE COUNTERBALANCE VALVE, PRESSURE SWITCH & NEEDLE VALVE	8
HOSE CONNECTIONS AND ROUTING	8
PRESSURE HOSE	9
EXCESS FLOW HOSE	9
TANK PORT HOSE	9
NEEDLE VALVE HOSE	9
CB TO LEFT STEER HOSE	10
CB TO RIGHT STEER HOSE	10
B-PORT TO COUNTERBALANCE HOSE	10
A-PORT TO COUNTERBALANCE HOSE	10

1903 without POWER BEYOND

MOUNTING THE UNIVERSAL BRACKET

Position the bracket on the steel support beam beneath the frame under the cab. Drill holes to fit the mounting bracket pattern and attach the universal mounting bracket to the machine. Figure below shows the bracket mounted to the machine with the valve and hoses attached. **NOTE: The mounting bracket may need to be altered to allow the valve to fit in small spaces. Additional bolts and nuts may be needed to properly mount the bracket and valve.**



MOUNTING THE STEERING POSITION SENSOR

Figures below shows the approximate mounting position of the steering position sensor. Attach the steering position sensor to the right side steering cylinder using the provided band clamps, screws and brackets. **NOTE: It may be necessary to fabricate a shield so that mud and debris do not hit the sensor during operation.**



Rear portion of the steering cylinder



Front portion of the steering cylinder

NOTE: A hole in the boot will need to be cut for the linear sensor to slide through.

MOUNTING THE HYDRAULIC VALVE

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.

MOUNTING THE PRESSURE SWITCH

Connect the pressure switch to the steering assist valve port marked "PS".

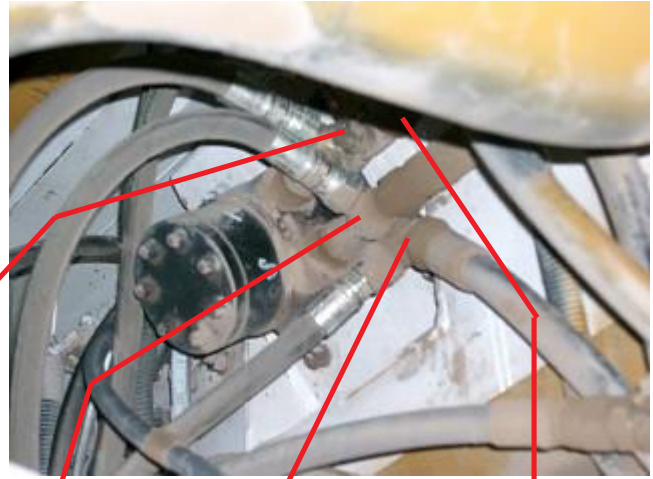


Pressure Switch

HOSE CONNECTIONS AND ROUTING



Hose routing from steering assist valve to steering orbital



After removing the pressure hose, connect the supplied 90° elbow. The pressure port hose connects to EF port on steering assist valve.

Supplied tee - Supplied hose runs to B-Port on steering assist valve.

Supplied tee - Supplied hose runs to A-Port on steering assist valve.

Supplied tee and elbow - supplied hose runs to tank port on steering assist valve.

Pressure Hose

Remove the existing pump to orbital hose from the orbital, and attach it to the “P” port on the steering assist valve. It may be necessary to use the provided 90-degree 3/4” JIC elbow fittings and extension hose to ensure the hoses are routed properly.

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, pressure port, connecting in the same location as the original pressure hose. It may be necessary to use the provided 90-degree 3/4” JIC elbow fittings to ensure the hoses are routed properly.

Tank Port Hose

Remove the existing tank to orbital hose at the orbital and attach a provided 3/4” tee fitting to the orbital. Re-connect the original hose to the tee fitting. Connect one end of the supplied tank hose to the “T” port on the Raven steering control valve and the other end to the remaining open port to the tee on the orbital.

Left Steer Hose

Remove the hose attached to the left steer port of the orbital and attach a provided 3/4” tee fitting to the orbital. Re-connect the hose to the tee fitting. Connect one end of the supplied left steer hose to the open port on the tee and the other end to the “A” port on the steering assist valve. It may be necessary to use the provided 90-degree 9/16” JIC elbow fittings on the steering assist valve to ensure the hoses are routed properly.

Right Steer Hose

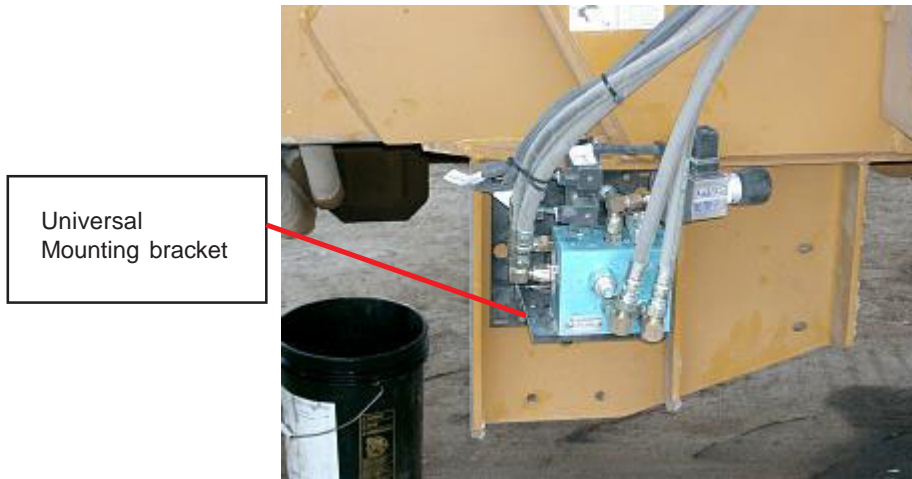
Remove the hose attached to the right steer port of the orbital and attach a provided 3/4" tee fitting to the orbital. Re-connect the hose to the tee fitting. Connect one end of the supplied right steer hose to the open port on the tee and the other end to the "B" port on the steering assist valve. It may be necessary to use the provided 90-degree 9/16" JIC elbow fittings on the steering assist valve to ensure the hoses are routed properly.

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.

1903 with POWER BEYOND

MOUNTING THE UNIVERSAL BRACKET

Position the bracket on the steel support beam beneath the frame under the cab. Drill holes to fit the mounting bracket pattern and attach the universal mounting bracket to the machine. Figure below shows the bracket mounted to the machine with the valve and hoses attached. **NOTE: The mounting bracket may need to be altered to allow the valve to fit in small spaces. Additional bolts and nuts may be needed to properly mount the bracket and valve.**



MOUNTING THE STEERING POSITION SENSOR

Figures below shows the approximate mounting position of the steering position sensor. Attach the steering position sensor to the left side steering cylinder using the provided band clamps, screws and brackets. **NOTE: It may be necessary to fabricate a shield so that mud and debris do not hit the sensor during operation.**



Rear portion of
the steering
cylinder



Front portion of
the steering
cylinder

NOTE: A hole in the boot will need to be cut for the linear sensor to slide through.

MOUNTING THE HYDRAULIC VALVE

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.

MOUNTING THE COUNTERBALANCE VALVE, PRESSURE SWITCH, and NEEDLE VALVE

NOTE: A new bracket must be fabricated to attach the counterbalance valve to the machine. Attach the counterbalance valve to the bracket and secure the bracket to the machine. (Typical mounting location is below the cab on the right side of the machine.)

Connect the pressure switch with the tee fitting to the Brake port of the counterbalance valve using the elbow fittings provided. Attach an elbow fitting to the remaining open port of the tee in the pressure switch. Connect the needle valve to that elbow fitting.

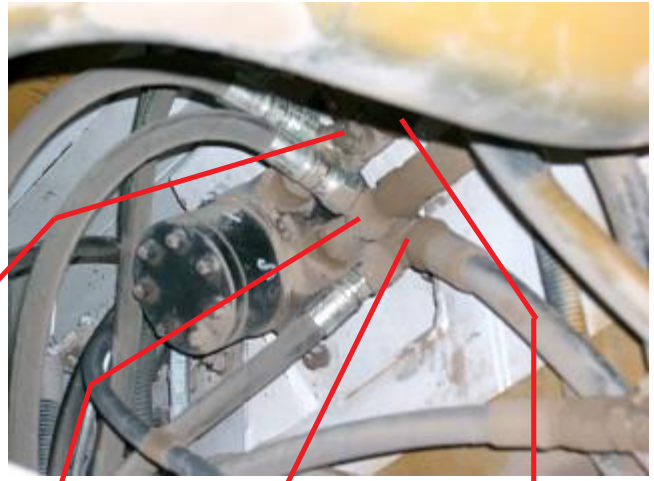
HOSE CONNECTIONS AND ROUTING



Counterbalance Valve mounting location.



Hose routing from steering assist valve to steering orbital



After removing the pressure hose, connect the supplied 90° elbow. The pressure port hose connects to EF port on steering assist valve.

Supplied tee - Supplied hose runs to B-Port on steering assist valve.

Supplied tee - Supplied hose runs to A-Port on steering assist valve.

Supplied tee and elbow - supplied hose runs to tank port on steering assist valve.

Pressure Hose

Remove the existing pump to orbital hose from the orbital, and attach it to the “P” port on the steering assist valve. It may be necessary to use the provided 90-degree 3/4” JIC elbow fittings and extension hose to ensure the hoses are routed properly.

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, pressure port, connecting in the same location as the original pressure hose. It may be necessary to use the provided 90-degree 3/4” JIC elbow fittings to ensure the hoses are routed properly.

Tank Port Hose

Remove the existing tank to orbital hose at the orbital and attach a provided 3/4” tee fitting to the orbital. Re-connect the original hose to the tee fitting. Install a 9/16” JIC tee fitting to the “T” port on the steering assist valve. Connect one end of the tank hose to this tee and the other end to the remaining open port on the tee on the orbital.

Needle Valve Hose

Attach the needle valve to the open branch on the tee connected to the “T” port on the steering assist valve. Attach the other end to the open port on the pressure switch. It may be necessary to use one of the provided elbow fittings to ensure the tee is routed properly.



Supplied 90° elbow connected to pressure port, hose connects to EF port on steering assist valve.

Supplied tee - Supplied hose runs to B-Port on steering assist valve.

Supplied tee - Supplied hose runs to A-Port on steering assist valve.

Supplied tee and elbow - supplied hose runs to tank port on steering assist valve.

CB to Left Steer Hose

Remove the hose attached to the left steer port of the orbital. Connect the proper end of the CB to Left Steer to the elbow on the “A” port on the side of the counterbalance valve with the brake port. Connect the remaining loose end of the CB to Left Steer hose to the Left Steer port on the steering orbital.

CB to Right Steer Hose

Remove the hose attached to the right steer port of the orbital. Connect the proper end of the CB to Right Steer to the elbow on the “B” port on the side of the counterbalance valve with the brake port. Connect the remaining loose end of the CB to Right Steer hose to the Right Steer port on the steering orbital.

B-Port to Counterbalance Hose

Install a provided 9/16” JIC tee fitting to the “B” port on the steering assist valve. Connect the right steer hose that was disconnected from the orbital to one of the open ports on the tee. Connect the proper end of the B-port to Counterbalance hose to the remaining open port of the tee. Connect the remaining open end of the hose to the “B” port on the side of the Counterbalance valve that doesn’t have the brake port.

A-Port to Counterbalance Hose

Install a provided 9/16” JIC tee fitting to the “A” port on the steering assist valve. Connect the right steer hose that was disconnected from the orbital to one of the open ports on the tee. Connect the proper end of the A-port to Counterbalance hose to the remaining open port of the tee. Connect the remaining open end of the hose to the “A” port on the side of the Counterbalance valve that doesn’t have the brake port.

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.