# CAN Switch Box™ Installation and Operation Guide

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# Overview

The Raven CAN Switch Box is designed to interface with Raven CAN control consoles and field computers such as the Viper Pro, Envizio Pro, or SCS 5000 and offer product and section control features at the operator's finger tips.

<table>
<tr><td align="center">CAN Switch Box<br>for Application Systems<br>(P/N 063-3001-002)</td><td align="center">CAN Switch Box<br>for OmniSeed Systems<br>(P/N 063-3001-008)</td></tr>
</table>

The CAN Switch Box features:

- Internal boom sense and speed node and CANbus terminator for simplified cabling and installation. The CAN Switch Box provides section status information (based upon switch positions) to the product control console or field computer for section mapping and rate control adjustments.

- Ten section switches for quick boom or implement section control

- Five product control switches for quick product control mode selection

- A Master/Override switch for full boom or implement control

- An Increase/Decrease switch for quick application rate adjustments

- A Logic Power LED

- In addition to the above features, the CAN Switch Box for use with OmniSeed systems offers implement control switches for raising and lowering the seed tube openers and controlling the down pressure on the shanks.

## Care and Maintenance

Refer to the following items when selecting a mounting location for the CAN Switch Box and Raven control console.

- The switch box is not weatherproof. Mount the switch box inside of the machine cab or driver compartment within easy reach of the driver or operator.

- The switch box should be mounted in a location where it will not be jarred during normal equipment operation. Keep the console and switch box clear of moving elements within the cab.

- Route all cables to avoid pinching, kinking or damaging the cable and to avoid tripping hazards.

# Installation

Refer to the following sections to install the console specific mounting bracket and to connect the CAN Switch Box.

## Mounting the CAN Switch Box

### Viper Pro Bracket (P/N 107-0171-847)

**Note:** The Viper Pro mounting bracket may be used to mount the CAN Switch Box either above or below the Viper Pro field computer.

1. Attach the two tapped half clamps (P/N 107-0171-541) to the mounting bracket (P/N 107-0171-847) using the four flat head screws (P/N 311-0002-011).

2. Attach the mounting bracket to the Viper Pro field computer using four flat head bolts (P/N 311-0002-302).

3. Attach the CAN Switch Box to the mounting bracket using two 5/16" screws (P/N 311-0001-007).



4. Mount the Viper Pro and CAN Switch Box to a sturdy post or bar in the cab using the remaining half clamps (P/N 107-0171-540) and 7/8" hex bolts (P/N 311-0049-104).

## Envizio Pro XL Bracket (P/N 107-0172-197)

**Note:** The supplied mounting bracket must be attached to the Envizio Pro XL so that the CAN Switch Box is mounted below the field computer.

1. Set the mounting bracket over the mounting posts on the back of the field computer.

2. Set the RAM mounting arm over the mounting plate and secure using the screws supplied with the field computer.



3. Align the CAN Switch Box with the remaining predrilled holes and secure using screws supplied with the switch box.

## Envizio Pro or Envizio Pro II Bracket (P/N 107-0171-841)

**Note:** The supplied mounting bracket must be attached to the Envizio Pro or Envizio Pro II field computer so that the CAN Switch Box is mounted below the field computer.

1. Set the mounting bracket over the mounting posts on the back of the field computer.

2. Set the RAM mounting arm over the mounting plate and secure using four screws (P/N 311-0007-015).



3. Align the CAN Switch Box with the remaining predrilled holes and secure using two lock washers (P/N 313-4000-007) and two screws (P/N 311-0001-007).

## SCS 4000/5000 Series Bracket (P/N 107-0171-958)

**Note:** The SCS 4000/5000 Series bracket must be attached to the console so that the CAN Switch Box is mounted above the control console.

1. Attach the two tapped half clamps to the mounting plate provided with the SCS console.

2. Align the CAN Switch Box mounting bracket (P/N 107-0171-958) with the mounting posts on the back of the SCS console.

3. Set the mounting plate over the bracket and secure using the four 1" hex bolts (P/N 311-0050-105).



4. Attach the CAN Switch Box to the mounting bracket using two mounting screws (P/N 311-0001-007).

# Cable Connections

The CAN Switch Box connects to the control console and CANbus system with either the SCS 5000 series chassis interface cable (P/N 115-0171-959) or the Viper Pro/Envizio Pro chassis interface cable (P/N 115-0172-001).

To connect the CAN Switch Box:

1. Connect the 4-pin Deutsch connector on the console or interface cable to the CANbus port on the back of the CAN Switch Box.

2. Connect the 2-pin Deutsch connector on the console or interface cable to the switched power port on the back of the CAN Switch Box.



3. If connecting to a Viper Pro or Envizio Pro using the chassis interface cable (P/N 115-0172-001), connect the round, 3-pin connector on the interface cable to the speed sensor port on the back of the CAN Switch Box.

**Note:** If the CAN Switch Box is connected as instructed above, the switch box will be powered on or off using the Raven console or field computer switched power. Refer to the console or field computer manual for instructions to properly power down the console.

# CAN Switch Box Operation

**Important:**  The CAN Switch Box must be used as the primary control interface for section, master or product control status.

**Make sure to toggle the master switch to the off position when closing or exiting a job to avoid unintentional product application once the field computer or control console closes application management functions.** It is also good practice to shut off product and section switches when the application system is not being used.

The CAN Switch Box puts the section and product control modes right at the operator's finger tips.

Refer to the following sections for detailed operation of the CAN Switch Box:



## Logic Power LED

This LED indicates the status of CAN logic power into the CAN Switch Box. This LED should be on (solid) during normal operation.

The Logic Power LED will begin flashing if low logic power is supplied to the CAN Switch Box. Troubleshoot the logic power system before proceeding with operations.

If this LED is not lit when the Raven console or field computer is powered up, troubleshoot the CANbus system before starting any system operations.

## Increase/Decrease Flow Switch

**Note:**  The INC/DEC switch only controls the selected product in automatic or manual mode. Refer to the field computer or control console manual for more information on selecting products during application.

For selected products set to automatic control mode, the INC/DEC switch is used to increase or decrease the target rate of products selected and actively displayed on the console or field computer.

In order for this switch to work properly, a 'Rate Bump' (Rate +/-) value must be programmed for each product. Refer to the control console or field computer operation manual for more information on programming this feature.

For selected products set to manual control mode, holding the INC/DEC switch will open or close the product control valve, increasing or decreasing the flow of product respectively. Refer to the control console or field computer operation manual for instructions on programming products or switching a product to manual mode.

# Master/Override Switch

The master switch toggles all section switches on or off. When the master switch is in the 'ON' position, each section will function according to the corresponding section switch (see the "3-Way Selectable Section Switches" below). Toggle the master switch to the 'OFF' position to turn all boom or implement sections off.

Hold the master switch to the 'OVERRIDE' position to temporarily override any sections controlled by an optional AccuBoom system on.

# 3-Way Selectable Section Switches

The section switches may be used to toggle up to ten individual sections. Raven field computers are also capable of controlling additional sections using the section mapping feature to group sections to the same switch. Refer to the field computer *Installation and Operation Manual* for additional information.

**Note:** Envizio Pro software version 3.5 or newer or a Viper Pro controlling an OmniSeed system are required to access section mapping. Contact a local Raven dealer for additional information.

Each of the ten section switches may be toggled individually to one of the three following positions:

• ON - manually control the section on. AccuBoom control of the section is disabled and will not automatically control this section based on coverage, zone maps or field boundaries.

• ACCU - AccuBoom automatic section control is enabled for the section. If installed and properly set up for the active job, the AccuBoom features will automatically turn sections on or off based upon previous coverage, zone maps or field boundaries created or active in the job.

  Refer to the control console or field computer operation manual for more information about using the AccuBoom system.

• OFF - manually control the section off. This section will remain off regardless of AccuBoom control features.

**Note:** Leave the section switch in the off position for any sections not connected or controlled by the Raven control console or field computer.

# Product Control Switches

Each of the five product control switches may be toggled individually to one of the three following positions:

• AUTO - The product rate will automatically be controlled by the product control console or field computer based on the vehicle speed and programmed target rate. Refer to the control console or field computer operation manual for information on programming a target rate for controlled products.

• MAN - The product rate must be manually controlled by the operator. The Raven control console or field computer will not adjust product rate based on vehicle speed or section status.

• OFF - The programmed product is off. Corresponding control valves, injection pumps or spinners will remain closed or will not run regardless of section or master switch changes.

# CAN Switch Box for OmniSeed Systems

The CAN Switch Box for use with OmniSeed systems (P/N 063-3001-008) feature two additional switches configured for controlling seeder implement functions via a drill control node connected to the OmniSeed CANbus control system.

**Note:** Contact a local Raven dealer for more information about drill control nodes and other OmniSeed control hardware options and features.



Openers Switch     Down Pressure Override Switch

## Openers Switch

Toggle the openers switch to raise (UP) or lower (DN) the seed shanks during field operations.

**Note:** If the packing pressure settings on the field computer are set to automatic or manual control, the system will automatically shut off products and seed rate control sections when the shanks are raised. If packing pressure control is set to off, the openers switch will only raise and lower the shanks without changing product or section status.

## Packing Pressure Override Switch

The OmniSeed system allows an operator to set the target packing pressure and an override pressure for use during a field operation.

When the Pressure Override switch is in the down position, the OmniSeed system will control based upon the target packing pressure setting. Toggle the Pressure Override to the up position to engage the override pressure setting.

# Troubleshooting

## General Issues

| Issue | Possible Cause | Solution |
|---|---|---|
| Console or field computer does not power up | No power to console | Check chassis cable battery connections. |
| | | Check chassis cable fuses. |
| Logic power LED not lit | No power to CAN Switch Box | Check CAN Switch Box switched power connection. |
| | | Ensure console or field computer is powered on. |
| | | Check chassis cable power and ground connections. |
| | | Check chassis cable fuses. |
| Console or field computer not detecting CAN nodes | CAN Switch Box not connected to CANbus | Check CANbus connector on CAN Switch Box. |
| | | Check CAN connections and cabling. |
| | | Check CAN terminator on end of CANbus line. |
| | | Check for +12 volts on switched power connector. |
| | Console not set up for CANbus control | Verify that the console or field computer product control configuration is set to CAN. |
| Boom valves do not turn on | Faulty CAN high current power connection | Verify high current (HC) power LED on product controller node is lit. If LED not lit, refer to troubleshooting information in control console or field computer manual. |
| Boom sections do not turn off | Remote section switches in incorrect position | Remote section switches must be in the OFF position to allow the CAN Switch Box to control sections. |

# Setup Issues

| Issue | Possible Cause | Solution |
|---|---|---|
| Previous calibration data lost | Poor CAN connections | Refer to the "CAN Troubleshooting" section on page 11. |

# Job Issues

| Issue | Possible Cause | Solution |
|---|---|---|
| Section status displays as inactive | CAN Switch Box switches in the off position | Toggle the section and master switches to the on position. |
| | Automatic section control enabled but sections do not turn on | Check the speed sensor connection on the back of the CAN Switch Box. |
| | | Move vehicle into a previously unapplied area and maintain a speed of at least 0.7 mph [1.1 km/h]. |
| | | Enable the Override feature on the control console or field computer |
| Section status does not turn green (ON) when sections enabled | Master switch must be toggled off at power-up | Cycle the master switch off then back on. |
| | Sections not properly configured | Verify section setup on the control console or field computer. |
| | Nodes not programmed properly | Verify all node calibration data is entered. |
| Product function switches do not work | Master switch must be toggled off at power-up | Cycle the master switch off then back on. |
| | Product application turned off | Toggle product control switches to AUTO or MAN mode to turn product(s) on. |

| Issue | Possible Cause | Solution |
|---|---|---|
| Product applied to zero rate zones | Bed creep | Adjust hydraulic valve and valve calibration settings to stop bed creep. Refer to the control console or field computer operation manual. |
| | Wrong valve type installed | A fast close or PWM close valve must be selected to shut off product application in zero rate zones. Refer to field computer or control console manual for more information about selecting valve type. |
| | Incorrect valve setting | Check valve or PWM settings. |
| | Section switches toggled on in zero rate zones | Toggle the section switches to the ACCU or OFF positions. |
| Sections enabled but field computer not recording coverage | Remote section switches left in the ON position | Toggle all remote section switches to the off position. Remote switches will override the section switch status and automatic section control features. |

# CAN Troubleshooting

Although the control algorithm is located within the CAN node(s), the same troubleshooting techniques that apply to traditional hard wired control systems still apply to a CANbus control network. CAN allows for modularization of the control system, but the behavior of the system remains the same. Flow and speed sensors, the control valve and any boom valves, are used in the same manner.

The following are some common causes for communication failures:

| Issue | Possible Cause | Solution |
|---|---|---|
| Console or CANbus cannot find nodes | Switch Box is not properly connected | Check switched power connection. |
| | | Check the CANbus connection to the Switch Box and reinitialize the console to detect the Switch Box nodes. |
| | | Ensure console is powered on. |
| | No power to Switch Box | Check chassis cable power and ground connections. |
| | Weak or dirty power to CAN nodes | Verify at least +10V DC is present on the switched power connector. |
| | Corrosion in CAN connections | Disconnect and clean the cable connections |
| | CANbus not terminated properly | Check the CAN Terminator(s) |

# LIMITED WARRANTY

## WHAT DOES THIS WARRANTY COVER?

This warranty covers all defects in workmanship or materials in your Raven Applied Technology Division product under normal use, maintenance, and service when used for intended purpose.

## HOW LONG IS THE COVERAGE PERIOD?

Raven Applied Technology products are covered by this warranty for 12 months from the date of retail sale. In no case will the Limited Warranty period exceed 24 months from the date the product was issued by Raven Industries Applied Technology Division. This warranty coverage applies only to the original owner and is non-transferable.

## HOW CAN I GET SERVICE?

Bring the defective part and proof of purchase to your Raven dealer. If the dealer approves the warranty claim, the dealer will process the claim and send it to Raven Industries for final approval. The freight cost to Raven Industries will be the customer's responsibility. The Return Materials Authorization (RMA) number must appear on the box and all documentation (including proof of purchase) must be included inside the box to be sent to Raven Industries.

## WHAT WILL RAVEN INDUSTRIES DO?

Upon confirmation of the warranty claim, Raven Industries will (at our discretion) repair or replace the defective product and pay for the standard return freight, regardless of the inbound shipping method. Expedited freight is available at the customer's expense.

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## WHAT IS NOT COVERED BY THIS WARRANTY?

Raven Industries will not assume any expense or liability for repairs made outside our facilities without written consent. Raven Industries is not responsible for damage to any associated equipment or products and will not be liable for loss of profit, labor, or other damages. The obligation of this warranty is in lieu of all other warranties, expressed or implied, and no person or organization is authorized to assume any liability for Raven Industries.

**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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# EXTENDED WARRANTY

## WHAT DOES THIS WARRANTY COVER?

This warranty covers all defects in workmanship or materials in your Raven Applied Technology Division product under normal use, maintenance, and service when used for intended purpose.

## DO I NEED TO REGISTER MY PRODUCT TO QUALIFY FOR THE EXTENDED WARRANTY?

Yes. Products/systems must be registered within 30 days of retail sale to receive coverage under the Extended Warranty. If the component does not have a serial tag, the kit it came in must be registered instead.

## WHERE CAN I REGISTER MY PRODUCT FOR THE EXTENDED WARRANTY?

To register, go online to www.ravenhelp.com and select Product Registration.

## HOW LONG IS THE EXTENDED WARRANTY COVERAGE PERIOD?

Raven Applied Technology products that have been registered online are covered for an additional 12 months beyond the Limited Warranty for a total coverage period of 24 months from the date of retail sale. In no case will the Extended Warranty period exceed 36 months from the date the product was issued by Raven Industries Applied Technology division. This Extended Warranty coverage applies only to the original owner and is non-transferable.

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## HOW CAN I GET SERVICE?

Bring the defective part and proof of purchase to your Raven dealer. If the dealer approves the warranty claim, the dealer will process the claim and send it to Raven Industries for final approval. The freight cost to Raven Industries will be the customer's responsibility. The Return Materials Authorization (RMA) number must appear on the box and all documentation (including proof of purchase) must be included inside the box to be sent to Raven Industries. In addition, the words "Extended Warranty" must appear on the box and all documentation if the failure is between 12 and 24 months from the retail sale.

## WHAT WILL RAVEN INDUSTRIES DO?

Upon confirmation of the product's registration for the Extended Warranty and the claim itself, Raven Industries will (at our discretion) repair or replace the defective product and pay for the standard return freight, regardless of the inbound shipping method. Expedited freight is available at the customer's expense.

## WHAT IS NOT COVERED BY THE EXTENDED WARRANTY?

Raven Industries will not assume any expense or liability for repairs made outside our facilities without written consent. Raven Industries is not responsible for damage to any associated equipment or products and will not be liable for loss of profit, labor, or other damages. Cables, hoses, software enhancements, and remanufactured items are not covered by this Extended Warranty. The obligation of this warranty is in lieu of all other warranties, expressed or implied, and no person or organization is authorized to assume any liability for Raven Industries.

**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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