SeedMaster 2016 Models
Operator's Manual

www.seedmaster.ca

Date

SeedMaster unit Serial # Size / Spacing/ / /

Primary Owner

Last First

Farm name /Corporation

Land Location

Mailing

City P.O. Box

Province / Territory / State Postal / Zip Code

Phone Cell Phone Fax

Email

Dealer purchased from

Dealers for part pick-up

Shipping method to be used for Factory Direct shipments:

Please include a description to your farm from nearest town:

I hereby accept the terms and conditions of the SeedMaster Warranty listed on page 10:

Signature Date

To ensure prompt and organized warranty service, fill out and submit to:

SeedMaster

#1 South Plains Road West, Emerald Park, SK S4L 1C6

E-MAIL: warranty@seedmaster.ca

CUSTOMER WARRANTY REGISTRATION COPY

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OFFICE WARRANTY REGISTRATION COPY

SEED MASTER™

SM16 OPERATOR MANUAL 2016

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INTRODUCTION

Thank you for purchasing a new SeedMaster unit. This manual will assist you in becoming a safe and efficient operator. The crops you grow as a result of the proper use of the unit will be your reward for spending some time studying this manual.

If you encounter any problems, contact your dealer for clarification or correction. It is important to us and to you that all SeedMaster units maintain a solid reputation.

We are building our company's reputation not only on a quality product, but also on providing quality advice and fast response to service requirements. Our objective is to keep a high resale value on used units, so the positive image you pass on to your neighbors is as important to you as it is to us in the long term.

SAFETY

Please be SAFE! Carefully read and understand all safety alerts and warnings in this manual and all safety decals on the SeedMaster drill. Ensure that anyone who is going to use the SeedMaster drill reads and understands the Owner's Manual. We recommend that only mature and well-trained or experienced persons operate this product. We advise that periodic visual checks continue as a mandatory part of the implement operating procedure. Conduct regular maintenance checks on fasteners, hydraulic connections, etc. Always follow safety precautions. Serious INJURY or DEATH can result from improper operating practices

Safety notices are one of the primary ways to call attention to potential hazards.

This Safety Alert Symbol identifies important safety messages in this manual. When you see this symbol, carefully read the message that follows. Be alert to the possibility of personal injury or death.

- Read and understand the Operator's Manual and all safety signs before operation or maintenance.
- Do not allow riders on any part of the equipment.
- Install and properly secure all shields and guards before operating the seeder.
- Keep hands, feet, clothing, and hair away from moving and/or rotating parts.
- Beware of all power lines and other overhead obstructions. Know the transport height and width of your SeedMaster. Ensure that minimum safe working distances are maintained from any obstruction at all times.
- Before servicing, adjusting, repairing, refilling, or unplugging: stop the engine, remove the engine key, set the park brake, disengage the hydraulics and wait for all moving parts to stop.
- Ensure your seeder is properly marked as required by the local highway and transport authorities. Make sure the "Slow Moving Vehicle" sign, lights, and all reflectors are in place, clean, and visible to overtaking or oncoming traffic.
- Store a fully stocked first-aid kit in a visible, accessible place for use in case of an accident.
- Keep a fire extinguisher in an accessible location.
- Be sure that the area is clear of people before starting or moving your machine.
- Do not work around or under the raised wings, unless the wings are securely chained in the transport position.
- In the event that wheel and tire assemblies must be raised off the ground for maintenance, block the implement up securely.
- Use extreme caution when working around or with high-pressure hydraulic systems. Depressurize the system when connecting or disconnecting the hose couplers.
- Wear heavy gloves and eye protection when searching for suspected hydraulic leaks. If an injury occurs, seek immediate medical attention as infection and toxic reaction could develop.
- Use a piece of cardboard or wood (instead of hands) when searching for such leaks.

- Never wear baggy or frayed clothing, or hanging jewelry when working around or on any of the drive system components.
- When performing a product catch for meter calibration, keep hands and clothes well clear of rotating components. Be aware that when the hydraulics are activated, rotation may start unexpectedly at any time.
- We recommend that all maintenance and adjustments on the seeder be made when the implement wings are lowered.
- Store and transfer gasoline, solvents, cleaners, or any flammable liquids only in safety standard (i.e. CSA) approved containers.
- Clean and inspect all components in the hydraulic system on a regular basis.
- Replace all worn, cut, abraded, flattened, damaged, or crimped hoses and metal lines. Do not repair hydraulic components with tape, clamps, or cements. The system operates under extremely high pressure; such repairs will fail and create hazardous and unsafe conditions.
- Before applying pressure to the hydraulic system, make sure all connections are tight. Ensure lines, hoses, and couplings are not damaged.
- Ensure that the seeder is properly and safely connected to the tractor.
- Transport according to local regulations for width and height.
- Follow all road safety regulations for your state or province.
- Store the seeder on a firm, level surface.
- Store with wings down.
- Have a qualified tire dealer or service person perform tire maintenance. Failure to follow proper procedures when mounting a tire on a wheel or rim can cause an explosion that may result in serious injury or death.
- Keep safety decals and signs clean and legible at all times. Replace safety decals and signs that are missing or have become illegible.
- Ensure proper use of wing lock-up chains in transport.
- Always use hitch safety chain.
- Do not transport at high speeds on loose gravel behind a truck or a tractor.
- Do not transport with product in tanks.
- Ensure proper hook-up of safety lights.
- Maneuver machine to ensure castors are moving freely before going onto roads.
- Do not transport at speeds higher than that recommended on tires (25 mph or 40 kph).
- Check all transport wheel nuts after 100 miles and periodically thereafter. (See Chart below).
- Use proper tire inflation pressures (SEE TIRE TORQUE AND PSI SPECS, PAGE 11).

SEEDMASTER WARRANTY

This limited warranty supersedes all previous SeedMaster Manufacturing warranties and is exclusive with no other guaranties or warranties expressed or implied.

LIMITED Warranty – Subject to the terms and conditions below, SeedMaster Manufacturing Inc., Emerald Park Saskatchewan, warrants to its original retail purchaser that new SeedMaster equipment sold after the effective date of this limited warranty is free of defects in material and workmanship at the time it is shipped.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITIES AND FITNESS.

Within the warranty periods listed below, SeedMaster will repair or replace any warranted parts or components that fail due to such defects in material or workmanship.

SeedMaster shall honor warranty claims on warranted equipment listed below in the event of such a failure within the warranty time periods. All warranty time periods start on first of April, or the first of September of the first seeding season, after the original manufacturing date.

1. 2 Years parts replacement

All opener parts except tires and knives All hydraulic components

All electrical components All fasteners

2. 2 Year parts and labor Frame structural components

3. 1 Year (maximum 10000 acres) parts replacement

Seed knife failure Fertilizer knife failure

4. Pumps, motors, fans, tires, frame spindles and hubs and metering components are warranted separately by other original manufacturers.

SeedMaster Limited Warranty shall not apply to:

1. Road or field hazard to tires
2. Knife wear
3. Hub over heating due to high transport speed or poor service maintenance
4. Damage due to under or over inflated tires
5. Damage due to transport at high speeds
6. Damage due to transporting with loaded product tanks
7. Packer or wing wheel hubs and bearings when stored with wings up thru rain or snow events
8. Packer hubs and bearings when twine is allowed to build up on hub
9. Equipment that has been modified by any party other than SeedMaster, or equipment that has been improperly installed, improperly operated or misused based on industry standards, or equipment which has not had reasonable and necessary maintenance, or equipment which has been used for operation outside of the specifications for the equipment.
10. Items furnished by SeedMaster, but manufactured by others, such as fans, tires, motors. These items are covered by the manufacturer's warranty.
11. Damage due to improper hydraulic hook up
12. Damage due to pulling out of stuck position while product tanks are loaded

SEEDMASTER PRODUCTS ARE INTENDED FOR PURCHASE AND USE BY FARMERS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF SEEDING EQUIPMENT.

In the event of a warranty claim covered by this warranty, the exclusive remedies shall be, at SeedMaster's option: (1) repair; or (2) replacement; or, where authorized in writing by SeedMaster in appropriate cases, (3) the reasonable cost of repair or replacement at an authorized SeedMaster Dealer. SeedMaster's option of repair or replacement will be F.O.B. SeedMaster at Emerald Park Saskatchewan or F.O.B. at a SeedMaster Authorized SeedMaster Dealer as determined by SeedMaster. Therefore, no compensation or reimbursement for transportation costs of any kind will be allowed.

TO THE EXTENT PERMITTED BY LAW, THE REMEDIES PROVIDED HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES. IN NO EVENT SHALL SEEDMASTER BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOSS OF PROFIT), WHETHER BASED ON CONTRACT, TORT OR ANY OTHER LEGAL THEORY.

ANY EXPRESS WARRANTY NOT PROVIDED HEREIN AND ANY IMPLIED WARRANTY, GUARANTY OR REPRESENTATION AS TO PERFORMANCE, AND ANY REMEDY FOR BREACH OF CONTRACT TORT OR ANY OTHER LEGAL THEORY WHICH, BUT FOR THIS PROVISION, MIGHT ARISE BY IMPLICATION, OPERATION OF LAW, CUSTOM OF TRADE OR COURSE OF DEALING, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, WITH RESPECT TO ANY AND ALL EQUIPMENT FURNISHED BY SEEDMASTER IS EXCLUDED AND DISCLAIMED BY SEEDMASTER.

TIRE TORQUE AND PSI SPECS

TIRE SIZE	TORQUE REQUIREMENTS (FT. LBS.)	MAXIMUM PRESSURE RATING (PSI)
12.5L15 (8 PLY)	200	35
12.5L15 (12 PLY)	200	44
12.5L15 (Hwy)	200	90
18L26	350	35
380/65-16.5	200	72
750/65R26	450	35
800/65R32	450	35
15/55 - 17	200	90
Dual 710/70R38	750	23

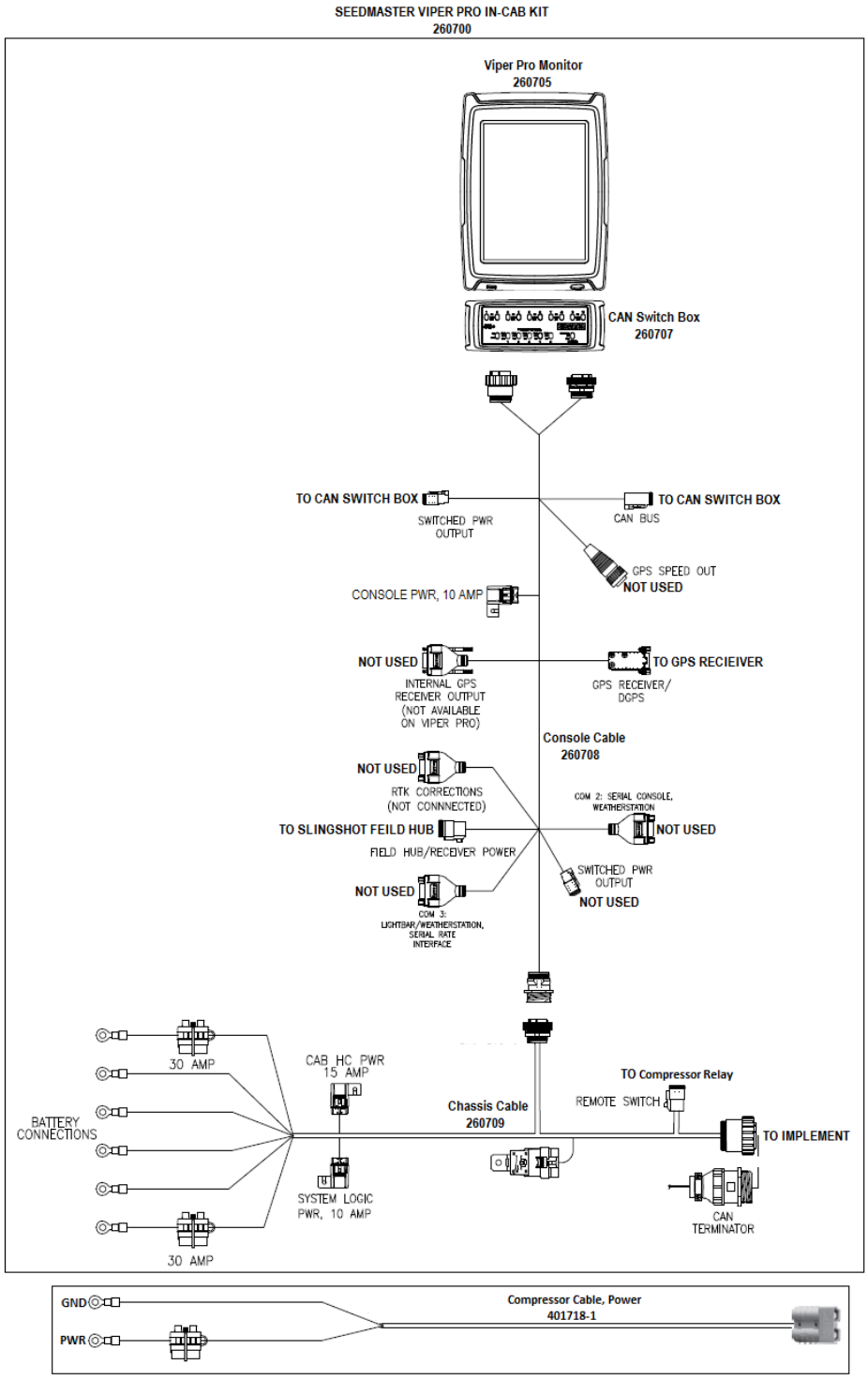
CAMOPLAST TRACKS

Camoplast tracks are optional for your SeedMaster Machine. Please visit the Camoplast web page to download the CPB-515 Operation and Maintenance Manual – TTS 45, 70, 80, 100 Series. OR click the link below:

CPB-515 Operation and Maintenance Manual:
https://techsupport.camso.co/uploads/publicdocs/CPB515_Operation_and_Maintenance_Manual_(OMM)_-_TTS_45-70-80-100_Series.pdf

IN-CAB ELECTRICAL HOOKUP

VIPER PRO IN-CAB HOOK UP



TRACTOR HYDRAULIC HOOKUP'S

SEEDMASTER MACHINE HYDRAULIC HOSES

HOSE MARKING CONVENTION: Hose marking has been changed in the 2016 model year to simplify connection. Each hose pair has been assigned a unique colour. The hose with 1 colour band is pressure, and the hose with 2 colour bands is return.

OPENER RAISE/LOWER HOSES: Direct Opener Lift & Lower Lines - The two 1/2" hydraulic lines with red colour bands are the opener lift and lower lines. The hose with 1 red band is opener down pressure. The hose with 2 red bands and the manual valve attached is the hose that is pressurized to raise the openers. The manual valve is used to lock the openers up for long transport and to facilitate unhooking under lift pressure. Open the valve after hooking hydraulics to tractor. **NOTE***: Tractor remote returns to neutral after raise / lower unless you are operating with Smart openers or Auto lift.*

SYSTEM PRESSURE HOSES: Green Tagged Lines - The two 1/2" hydraulic lines with the green colour bands are used to activate the block and raise and lower the wings. These lines are connected to one tractor remote. In the field operating position the remote for this set is locked-on to provide continuous pressure to the block via the line with 1 green band. Pressure should be set by using the tractor SCV flow control to adjust the pressure.

SEED AND FERT FAN HOSES ONFRAME: There may be one or two ¾" fan pairs. If you are running a SXX machine the single fan hoses will be tagged with 1x orange (pressure) and 2x orange (return). If you are running a SXG machine the seed fan hoses will be tagged with 1x orange (pressure) and 2x orange (return) and the fertilizer fan will be tagged with 1x purple (pressure) and 2x purple (return). **Ensure that you connect the right pair of hoses together on your tractor.**

CASE DRAIN HOSE: 2016 drill and tanks will be set up with **ONE** 1/2" case drain/return line (zero back pressure). This line has 1/2" NPT full open return coupler, through connections without any restriction or back pressure. Ensure this return line is routed to your tractor properly, without any possibility of back pressure. Improper connection may cause inaccuracies in operation and the possibility for severe damage.

HYDRAULIC CONNECTION REFERENCE CARDS

SeedMaster machines come in several different configurations. Please refer to your configuration below.

ToolBar (TXB ONLY) Hydraulic Hookup

TRACTOR REMOTE	HOSE PAIR PRESSURE	HOSE PAIR RETURN	HYDRAULIC FUNCTION
SCV 1 SEEDMASTER	1 RED ½" Line	2 RED ½" Line	OPENER PRESSURE
SCV 2 SEEDMASTER	1 GREEN ½" Line	2 GREEN ½" Line	SYSTEM PRESSURE
SCV 3 UNUSED			
SCV 4 UNUSED			
SCV 5 UNUSED			
CASE DRAIN SEEDMASTER	½" CASE DRAIN LINE		

OnFrame SXG Only Hydraulic Hookup

TRACTOR REMOTE	HOSE PAIR PRESSURE	HOSE PAIR RETURN	HYDRAULIC FUNCTION
SCV 1 SEEDMASTER	1 RED ½" Line	2 RED ½" Line	OPENER PRESSURE
SCV 2 SEEDMASTER	1 GREEN ½" Line	2 GREEN ½" Line	SYSTEM PRESSURE
SCV 3 SEEDMASTER	1 ORANGE ¾" LINE	2 ORANGE ¾" LINE	SEED FAN ONFRAME
SCV 4 SEEDMASTER	1 PURPLE ¾" LINE	2 PURPLE ¾" LINE	FERT FAN ONFRAME
SCV 5 UNUSED			
CASE DRAIN SEEDMASTER	½" CASE DRAIN LINE		

NOVA Only Hydraulic Hookup

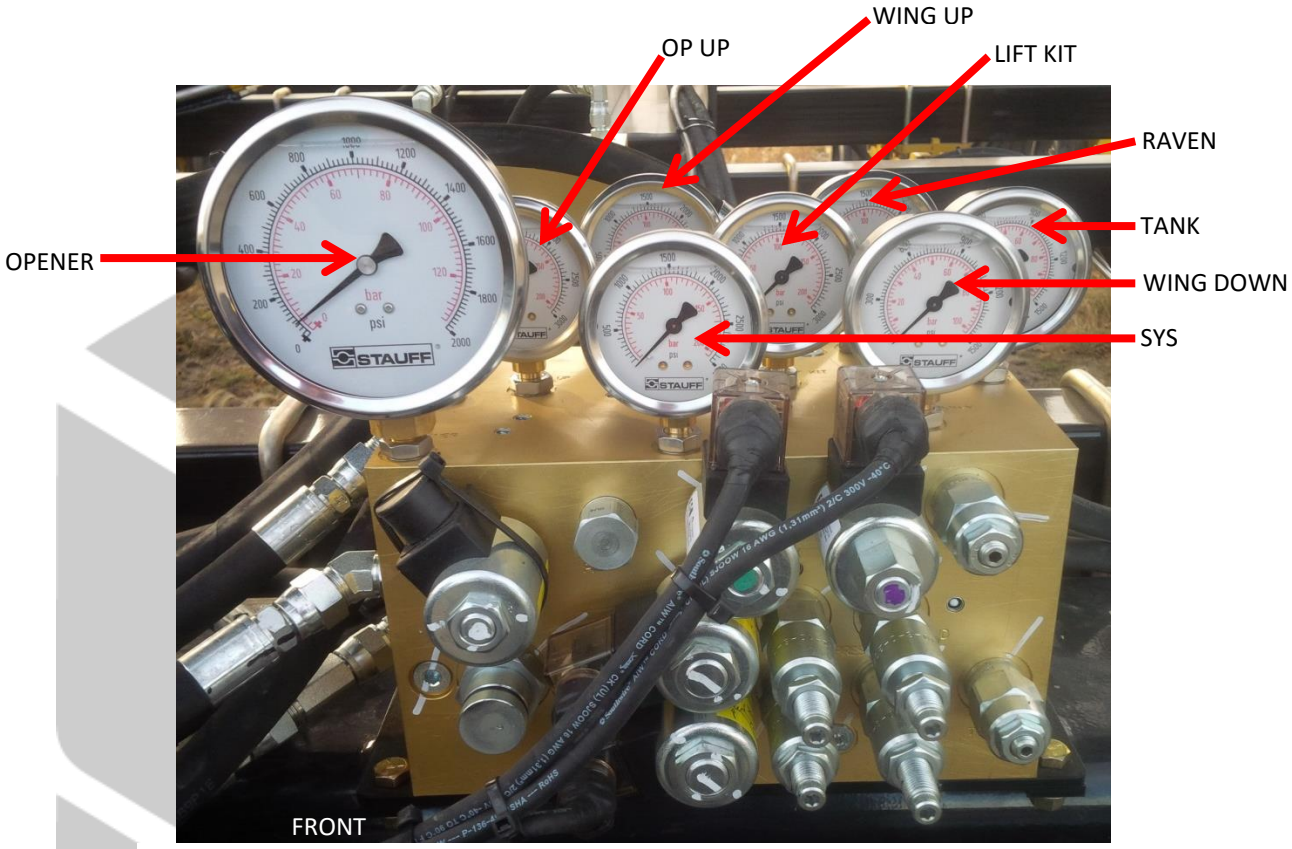
TRACTOR REMOTE	HOSE PAIR PRESSURE	HOSE PAIR RETURN	HYDRAULIC FUNCTION
SCV 1 SEEDMASTER	1 RED ½" Line	2 RED ½" Line	OPENER PRESSURE
SCV 2 SEEDMASTER	1 GREEN ½" Line	2 GREEN ½" Line	SYSTEM PRESSURE
SCV 3 SEEDMASTER	1 YELLOW ¾" LINE	2 YELLOW ¾" LINE	SEED FAN NOVA
SCV 4 SEEDMASTER	1 BLUE ¾" LINE	2 BLUE ¾" LINE	FERT FAN NOVA
SCV 5 UNUSED			
CASE DRAIN SEEDMASTER	½" CASE DRAIN LINE		

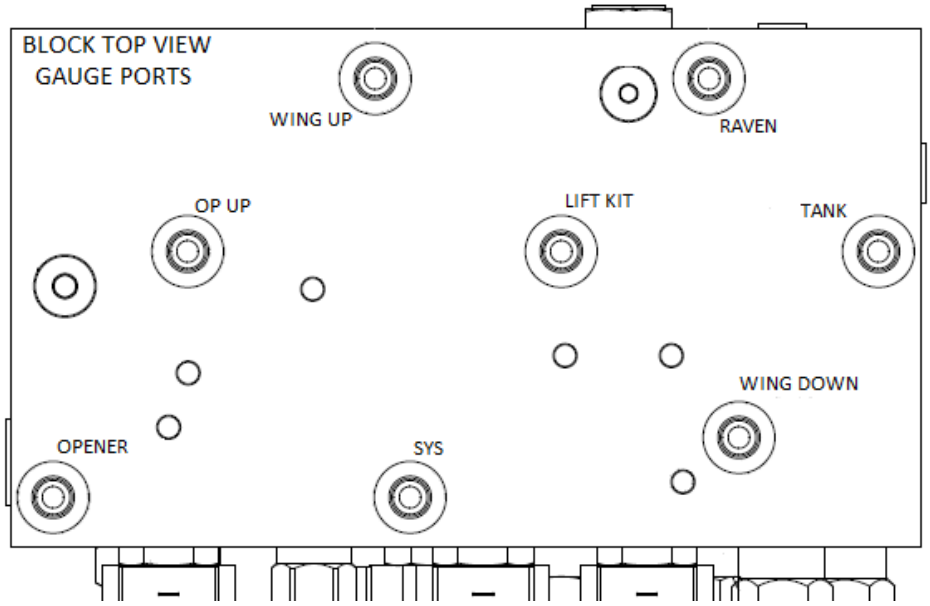
OnFrame SXX and NOVA Hydraulic Hookup

TRACTOR REMOTE	HOSE PAIR PRESSURE	HOSE PAIR RETURN	HYDRAULIC FUNCTION
SCV 1 SEEDMASTER	1 RED ½" Line	2 RED ½" Line	OPENER PRESSURE
SCV 2 SEEDMASTER	1 GREEN ½" Line	2 GREEN ½" Line	SYSTEM PRESSURE
SCV 3 SEEDMASTER	1 ORANGE ¾" LINE	2 ORANGE ¾" LINE	SEED FAN ONFRAME
SCV 4 SEEDMASTER	1 YELLOW ¾" LINE	2 YELLOW ¾" LINE	SEED FAN NOVA
SCV 5 SEEDMASTER	1 BLUE ¾" LINE	2 BLUE ¾" LINE	FERT FAN NOVA
CASE DRAIN SEEDMASTER	½" CASE DRAIN LINE		

MAIN HYDRAULIC BLOCK DETAILS

HYDRAULIC BLOCK GAUGES

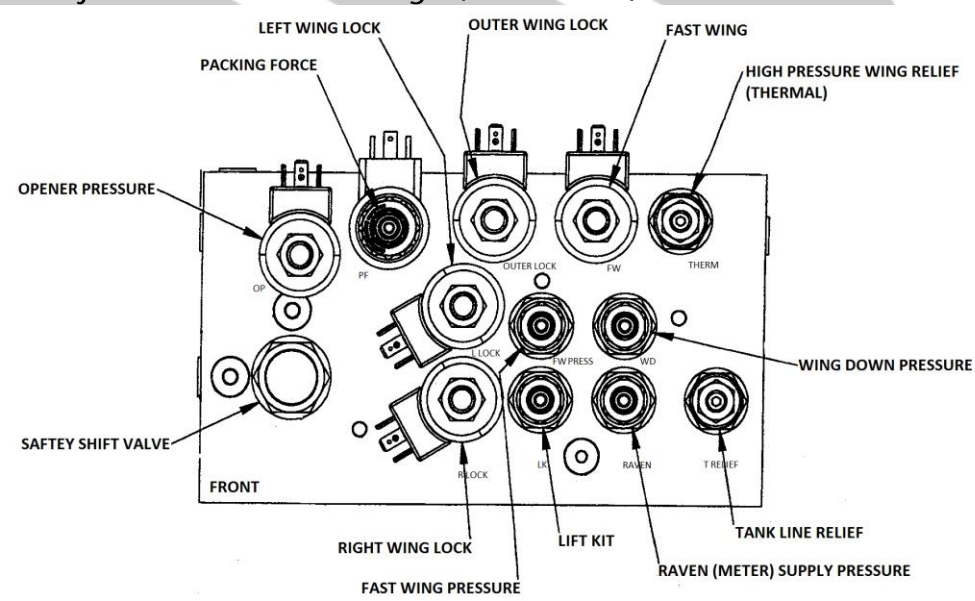




MAIN BLOCK GAUGES

OPENER: The OPENER gauge reads the amount of down pressure being applied to the Openers when they are down. 700-1300 psi; adjusted with in-cab switch; shanks must be pressured down to set. (900 psi is adequate for most fields).
OP UP: The OP UP gauge reads the amount of up pressure being applied to the Openers when they are lifted.
WING UP: The WING UP gauge reads the amount of pressure applied and required for lifting and should read 0 psi until folding up.
LIFT KIT: The LIFT KIT gauge reads the amount of pressure being applied to the lift kit cylinder during field operation.
RAVEN: The RAVEN gauge reads the amount of pressure being supplied to the hydraulic metering motors.
TANK: The TANK gauge reads the amount of pressure being returned to tank
WING DOWN: The WING DOWN gauge reads the amount psi being applied to the wings while they are down and in field operation.
SYS: The SYS gauge reads the amount of system pressure being applied to the system. System Pressure is the main pressure supply for the WING UP/DN, OPENER, LIFT KIT, RAVEN (METERING) circuits. 2500-3000 psi; indicates tractor working pressure to block

Diagram 2: Hydraulic Block Cartridges, Solenoids, and PWMs



MAIN BLOCK CARTRIDGES AND SOLENOIDS

OPENER PRESSURE SOLENOID: This is the main on/off solenoid for opener down pressure it activates opener down top up pressure while seeding; activate with opener UP/DN switch in cab. This solenoid is not applicable when SmartOpeners is present.
PACKING FORCE: This is a PWM valve to control the amount of pressure supplied to the opener down pressure.
LEFT WING LOCK: This on/off solenoid turns the oil flow on/off to the left wing cylinders.
RIGHT WING LOCK: This on/off solenoid turns the oil flow on/off to the right wing cylinders.
OUTER WING LOCK: This on/off solenoid turns the oil flow on/off to the outer wing cylinders.
FAST WING: This on/off solenoid turns the oil flow on/off to the inner wing cylinders.
HIGH PRESSURE WING RELIEF (THERMAL): High tank pressure cut off cartridge is preset set at **2500 PSI**
TANK LINE RELIEF: The tank line relief cartridge is preset at 450PSI. If the cartridge exceeds 450 PSI it will relieve to the atmosphere.
WINGDOWN PRESSURE: 180PSI (NOTE: PRESSURE SETTING MAY VARY TO SPECIFIC TRACTOR AND DRILL COMBINATION)

★Wing down pressure may need to be increased if the wings start to float and not contour correctly while in the seeding position.
★Wing down pressure may need to be decreased if the wings become too ridged while in the seeding position.
RAVEN (METER) SUPPLY PRESSURE: 2000 PSI
LIFT KIT: 500 PSI
FAST WING PRESSURE: 1500PSI
SAFETY SHIFT VALVE: The safety shift valve will shut the hydraulic flow off to the block, if back pressure reaches 80 PSI on tank line.

PRESSURE SETTING PROCEDURES

Setting Lift Kit Procedure (LIFT KIT)

The Lift Kit redistributes weight on the drill to lighten the front end, by transferring weight forward, off of the caster wheels, increasing floatation. It reduces stress on the hitch and frame when seeding in wet conditions. The oil supply for **the lift kit** is supplied from the system pressure.

- To adjust the Lift Kit pressures, loosen the jam nut on cartridge in port **LK** on the main block. Turn the cartridge in to increase the pressure and back out to decrease the pressure. When the desired pressure is set, tighten the jam nut back up

Setting WingDown Procedure (WINGDOWN PRESSURE)

The WingDown pressure is the amount of hydraulic pressure being applied to the inner and outer wing circuits; the oil supply for wing down is supplied from the system pressure. The WingDown Pressure is required to so the wings will contour the terrain while travel through the field.

- To adjust the **WINGDOWN PRESSURE**, loosen the jam nut on cartridge in port **WD** on the main block. Turn the cartridge in to increase the pressure and back out to decrease the pressure. When the desired pressure is set, tighten the jam nut back up.

Setting Wing Unfold Procedure (FAST WING PRESSURE)

The wing unfold pressure is the amount of hydraulic pressure being applied to the inner and outer wing circuits while the tool bar is unfolding. This is also known as the Fast Wing Pressure, if the wings are not unfolding the pressure will need to be increased. The oil supply for unfold pressure is supplied from the system pressure

- To adjust the **FAST WING PRESSURE**, loosen the jam nut on cartridge in port **FW PRESS** on the main block. Turn the cartridge in to increase the pressure and back out to decrease the pressure. When the desired pressure is set, tighten the jam nut back up.

Active Wing Brace Procedure

The Active Wing Brace supports the wing sections of the frame while in the field a hydraulic cylinder pulls the rear of the wing section forward this counteracts the draft while seeding. The hydraulic pressure comes from the opener cylinder hydraulic circuit. The higher the pressure is set to the active wing brace circuit the more it will pull the rear wing forward. When the packing pressure is increased, so is the amount of pull on the brace.

- **Adjusting the wing brace cylinder**: Start by unfolding the SM drill and activating the system pressure. Next pressure the openers down with the opener pressure switch and adjust the shank down hydraulic pressure of 1000psi, activating the active wing braces. After the system has been completely pressurized, remove the constant pressure from the drill, by returning the remote of the tractor to neutral. At this time, you will require a tape measure to be able to measure the cylinder rod length of the active wing brace cylinder. Measure the cylinder from the cap face to the rod clevis, when you have the measurement (Subtract ¼") allow a ¼" of cylinder stoke for tensioning the wing brace. With this measurement please install cylinder stoppers of that found length to the active wing brace cylinder.

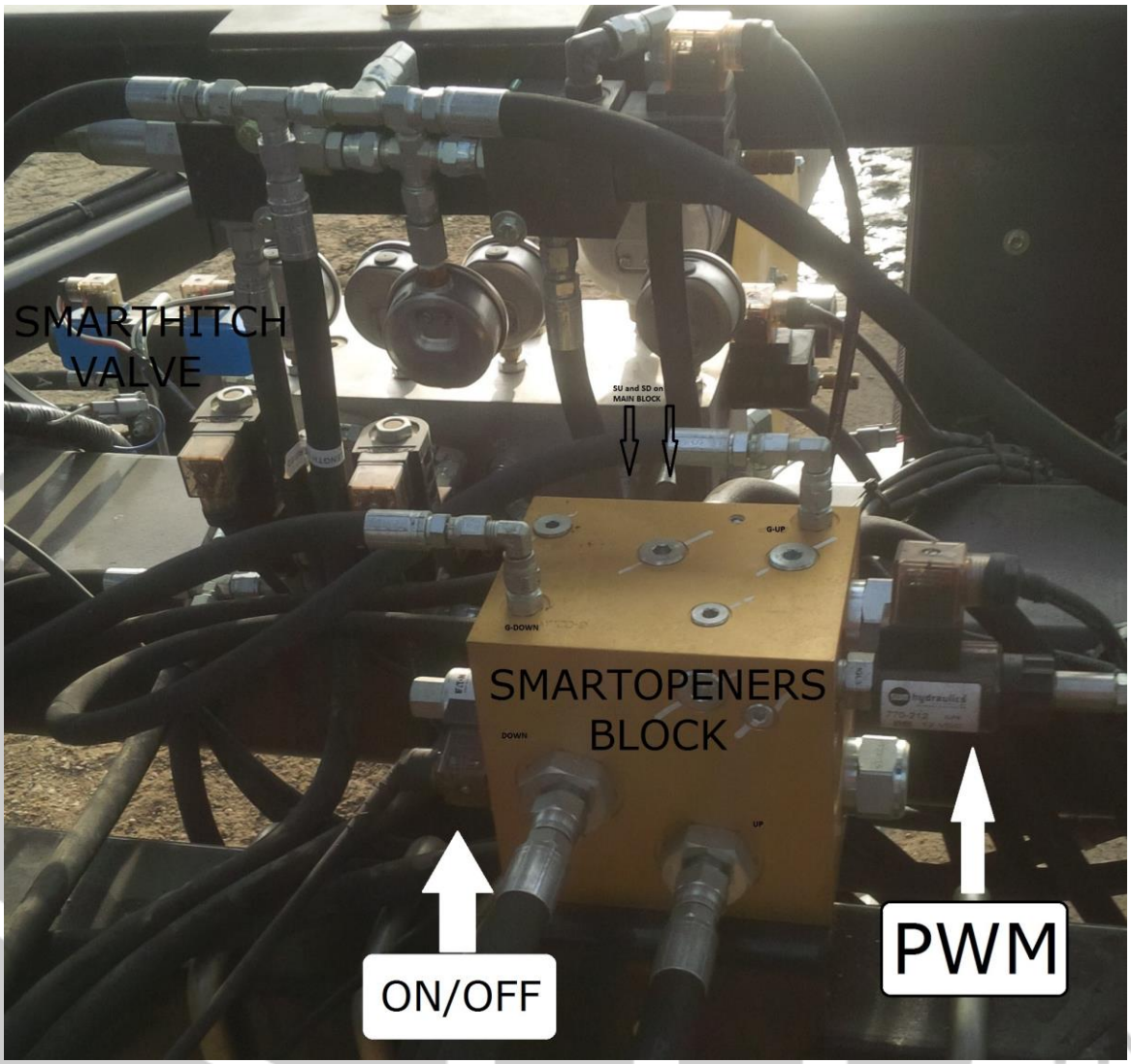
Meter Drive Pressure Setting Procedure (RAVEN (METER) SUPPLY PRESSURE)

The Meter Drive Pressure is the amount of hydraulic pressure allowed to the hydraulic metering drives. The torque to the metering drives increases as the pressure increases. Do not exceed 2200 psi. The oil supply **for RAVEN (METER) SUPPLY PRESSURE** is supplied from the system pressure.

- To adjust the **RAVEN (METER) SUPPLY PRESSURE**, loosen the jam nut on cartridge in port **RAVEN** on the main block. Turn the cartridge in to increase the pressure and back out to decrease the pressure. When the desired pressure is set, tighten the jam nut back up.

SMARTOPENERS HYDRAULIC BLOCK DETAILS

SMARTOPENERS HYDRAULIC BLOCK

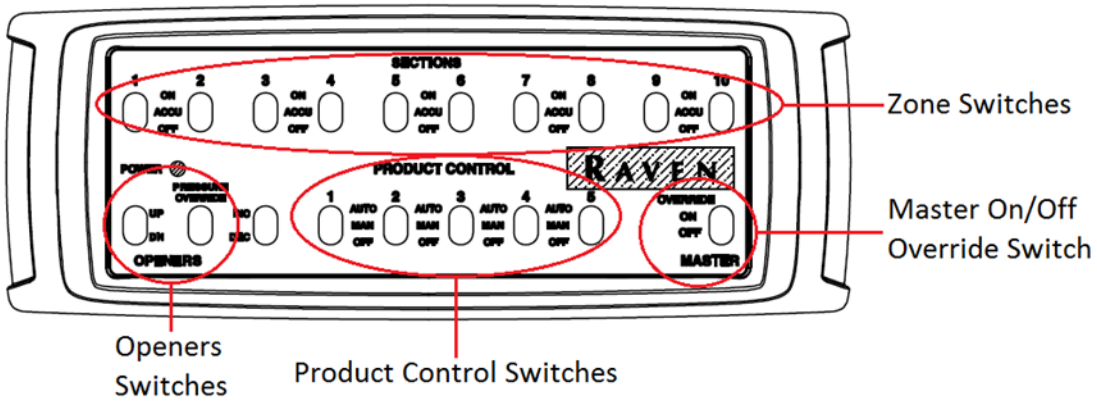


If your SeedMaster machine is equipped with a SmartOpeners Block, then your Opener raise and lower functions are controlled VIA the SmartOpeners Block. The Openers PWM valve for controlling the amount of pressure going to the openers is located on the SmartOpeners Block along with the Master ON/OFF solenoid and coil for turning the circuit on and off. The SmartOpeners block is located on the first rank behind the Main Block. With the SmartOpeners block you will leave your tractor's opener hydraulic remote engaged at all times. Recommended flow for this remote is 75% and greater. This is an optional feature for your SeedMaster machine, if it is not equipped with a Smart Openers Block, please contact your SeedMaster dealer for details about upgrading your machine to SmartOpeners.

TOOLBAR OPENERS OPERATION PROCEDURES

It will need to be determined what your machine setup is before choosing the correct operation for lifting and lowering the openers while making a turn in the field. There are three different options available.

1. **Standard Opener Operation** – Lift/Lower the openers with the tractors remote and opener up/down switch on the Raven Switch Box.
2. **SmartOpener Operation** – Lift/Lower the openers with the up/down switch on the Raven Switch Box.
3. **AutoLift Operation** – Lift/Lower the openers by manually switching section/zone switch 10 on the Raven Switch Box to ON to Lower the Openers and OFF to lift the Openers, NOTE that OPENER Switch will be in the DN position. Leave switch 10 in the "Accu" position and Openers switch DN to have the Openers automatically lift in an applied area and automatically lower in an un-applied



STANDARD OPENER OPERATION

LOWER, LIFTING THEN LOWERING THE OPENERS

1. CYCLE MASTER SWITCH FROM OFF TO ON AND LEAVE MASTER SWITCH "**ON**"
2. LOWER OPENERS WITH OPENER LIFT/LOWER TRACTOR REMOTE
3. OPENER LIFT/LOWER TRACTOR HYDRAULIC REMOTE MUST BE "**RETURNED TO NEUTRAL**" AFTER THE OPENERS HAVE LOWERED
4. TURN "OPENER" SWITCH TO "**DN**" ON RAVEN SWITCHBOX. METERS WILL TURN ON AUTOMATICALLY WHEN DRILL REACHES UN-APPLIED AREA
5. AFTER THE TOOLBAR IS COMPLETEY OVERLAPPED INTO AN APLLIED AREA
6. TURN "**OPENER**" SWITCH TO "**UP**" ON RAVEN SWITCHBOX
7. LIFT THE OPENERS WITH OPENER LIFT/LOWER TRACTOR REMOTE
8. COMPLETE THE TURN
9. LOWER THE OPENERS WITH THE LIFT/LOWER TRACTOR REMOTE
10. WHEN THE OPENERS START PRESSURING UP, RETURN THE OPENER LIFT/LOWER TRACTOR REMOTE TO THE NEUTRAL POSITION
11. TURN "**OPENER**" SWITCH TO "**DN**" ON RAVEN SWITCHBOX. METERS WILL TURN ON AUTOMATICALLY WHEN DRILL REACHES UN-APPLIED AREA

SMARTOPENER OPERATION

LOWER, LIFTING THEN LOWERING THE OPENERS

1. CYCLE MASTER SWITCH FROM OFF TO ON AND LEAVE MASTER SWITCH "**ON**"
2. LOCK ON REMOTE TO SUPPLY OPENERS WITH HYDRAULIC PRESSURE
3. LOWER THE OPENERS BY TURNING THE "**OPENER**" SWITCH TO "**DN**" ON RAVEN SWITCHBOX. METERS WILL TURN ON AUTOMATICALLY WHEN TOOLBAR REACHES UN-APPLIED AREA
4. AFTER THE TOOLBAR IS COMPLETEY OVERLAPPED INTO AN APLLIED AREA
5. TURN "**OPENER**" SWITCH TO "**UP**" ON RAVEN SWITCHBOX, OPENERS WILL LIFT
6. COMPLETE THE TURN
7. LOWER THE OPENERS BY TURNING THE "**OPENER**" SWITCH TO "**DN**" ON RAVEN SWITCHBOX. THE METERS WILL TURN ON AUTOMATICALLY WHEN TOOLBAR REACHES UN-APPLIED AREA

AUTOLIFT OPERATION

LOWER, LIFTING THEN LOWERING THE OPENERS

1. CYCLE MASTER SWITCH FROM OFF TO ON AND LEAVE MASTER SWITCH "**ON**"
2. LOCK ON REMOTE TO SUPPLY OPENERS WITH HYDRAULIC PRESSURE
3. PLACE THE SECTION/ZONE SWITCH **TEN** TO "ACCU", PLACE THE PRODUCT SWITCH TIED TO THE OPENERS INTO THE MANUAL POSITION or AUTO POSITION WITH A RATE CAL OF ZERO.
4. LOWER THE OPENERS BY TURNING THE "**OPENER**" SWITCH TO "DN" ON RAVEN SWITCHBOX. METERS WILL TURN ON AUTOMATICALLY WHEN TOOLBAR REACHES UN-APPLIED AREA
5. DRIVE INTO THE HEADLAND OR APPLIED AREA. WHEN THE ENTIRE TOOLBAR IS OVERLAPED THE OPENERS WILL AUTOMATICLY LIFT. WHEN ALL THE OPENERS HAVE LIFTED, TURN "**OPENER**" SWITCH TO "**UP**" ON RAVEN SWITCHBOX
6. C OMPLETE THE TURN
7. TURN "**OPENER**" SWITCH TO "**DN**" ON RAVEN SWITCHBOX. THE OPENERS WILL AUTOMATICLY GO INTO THE GROUND ONE SECOND BEFORE THE METERS TURN ON, THE METERS WILL TURN ON AUTOMATICALLY WHEN DRILL REACHES UN-APPLIED AREA

OPENER DETAILS

DEPTH

The opener is preset for seed and fertilizer depth. The seed depth is factory set at 3/4" below the packed surface and the fertilizer depth is factory set approximately 3/4" below and 1 ½" to the side of the seed.

It is rare that crop or field conditions warrant a change from these pre-set depths for cereals and oilseeds. We recommend initial seeding at the pre-set depth. The notches on the hub plate correspond to 1/4" changes in depth, with the inverted notch being the factory pre-set depth of 3/4". To change depth, simply loosen the nut on the slotted portion of the hub plate and rotate packer tire upwards to seed deeper or downwards to seed shallower.

Semi-pneumatic packer tires are a standard feature on all SeedMaster drills. There is no internal air pressure that needs to be checked.

The resulting dent the packer wheel leaves behind is dependent on soil type and soil hardness. The variation in dent depth does not affect the crop, since the seed depth is always monitored from the packed surface.

*Avoid temptation to harrow after seeding, as harrowing will reduce the uniformity of crop emergence and reduce yield potential. The dent left by the packer wheel and the loose soil tossed to the side as the openers move through the soil may appear rough at first glance, but you will find the residue and soil settles over time leaving just the ripple of the packer wheel. This dent provides several agronomic benefits.

Warning: Avoid turning your drill very short. The opener is designed to seed primarily in straight lines. A sharp turn will cause the openers to be dragged sideways, resulting in an improper seeding job and undue stress on the openers. Never turn so short that the inside openers move straight sideways or backwards.

Warning: Always store drill for extended periods of time in the unfolded wing position. This is to avoid water getting into the packer tire and wing wheel bearings.

This is very important for winter storage.

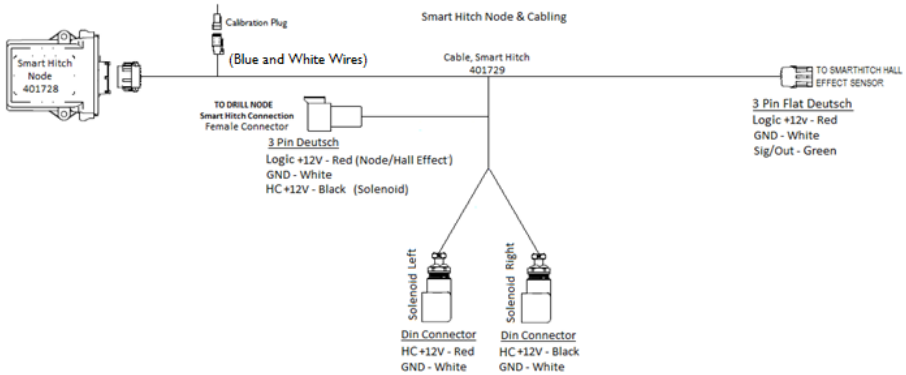
SMARTHITCH CALIBRATION

The SmartHitch raises and lowers with the Openers on your SeedMaster ToolBar. Open the Needle Valve on the Sensor Lift Cylinder ¾ of a turn, the amount you open the valve determines the speed the Smart Hitch raises and lowers at the headlands. Remove the 1" bolt on the hitch tongue before trying to operate the SmartHitch. Follow the steps below to perform a calibration on the SmartHitch.

1. Power up the Viper Pro
2. **Lower the Openers and SmartHitch**. Place a level across the SmartHitch disks to ensure the disks are level.
3. When both disks are perfectly level, **unplug High Current (HC) fuse** (15AMP/Blue Fuse) at Drill Node
4. **Unplug the calibration plug** (Blue and White Wire, see drawing below)
5. **Turn SmartHitch on**. (From the main screen on the Viper touch the Packing Pressure Area, then put a check mark in ON for the SmartHitch)
6. **Wait 15 seconds**
7. **Turn off SmartHitch** from the Packing Pressure Area on Viper Pro
8. **Plug the calibration plug back in** (Blue and White Wire)
9. **Plug HC fuse** back in
10. **Turn ON SmartHitch** from the Packing Pressure Area on Viper Pro
11. Test the operation for left and right and speed.
12. Left disk lifted should move hitch tongue to left side
13. Right disk lifted should move hitch tongue to right side

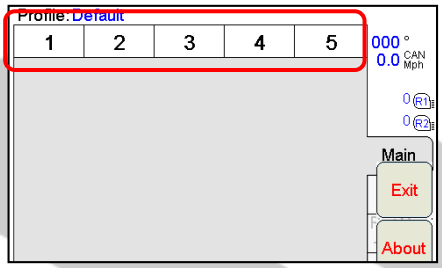
NOTE: When not in use turn the SmartHitch off, and lock up with Needle Valve on the Lift Cylinder

Adjusting the speed of the SmartHitch that it will operate while in the field: *If the speed is set to move at a high speed, moving it to quick can shift the tractor causing it to require an auto steer correction. Adjust the hydraulic flow to the SmartHitch directional block by using a 1/2" wrench to loosen the jam nut and a 5/32" Alan wrench to turn the flow needle valve in or out. Turning it out to increase speed and in to decrease speed.*

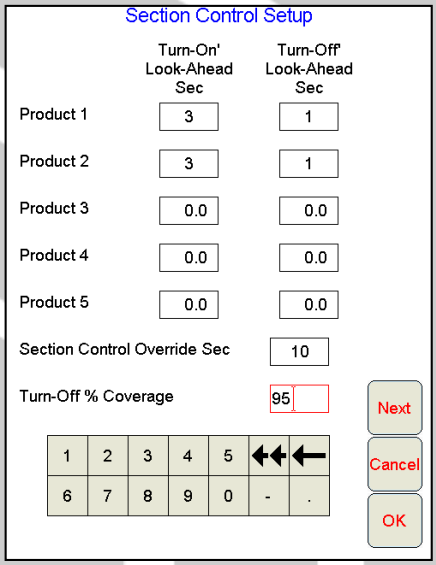


AUTO ZONE COMMAND SETUP

To access the Auto Zone Command Setup (Section Control Setup) page Touch within the Section Status area on the main screen to begin setting up the system.



The Section Control Setup screen will be displayed.

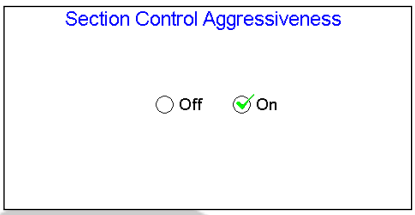


Turn-On/Turn-Off Look-Ahead
Depending upon the type of valve used to control products, control valves may take several seconds to adjust when opening or closing. To help compensate for the valve response time and lag due to filling or emptying product supply lines, the look-ahead values allow the Viper Pro to begin adjusting control valves for map zones and previously applied areas.
Note: The look-ahead times should always be entered as positive values.

Turn-On Look-Ahead: Enter the number of seconds ahead of the vehicle (based on vehicle speed) which the Viper Pro will scan for zone boundaries and changes when turning product application on.

Turn-Off Look-Ahead: Enter the number of seconds ahead of the vehicle (based on vehicle speed) which the Viper Pro will scan for zone boundaries and changes when turning product application off.

Note: *The Section Control Aggressiveness factor uses the turn-on and turn-off look-ahead values to adapt the responsiveness of the control valves for different driving styles and field conditions or layout. To set the section control aggressiveness factor, touch the Next button on the Section Control Setup screen and the Section Control Aggressiveness screen is displayed. ON is the recommended setting.*



Automatic Section Control Override Sec

The automatic section control Override feature allows the operator to momentarily apply product to a previously applied area while in a job. The override feature is useful to ensure product application in small unapplied areas near irregular headlands and previously applied areas. Enter the number of seconds to override automatic section control and apply product after the master switch is toggled to the 'OVERRIDE' position.

Note: *The time set as the override seconds does not start until the master switch returns to the on position. Hold the master switch in the override position to sustain the override countdown if desired.*

Turn-Off % Coverage

This value controls the percentage of the section width that must be inside a previously applied area in order for the section to turn off. The default value is 90%. This would require that 90% of a section (zone) be in a previously applied area before the Auto Zone Command system would turn off that zone.

Note: *If the value is set to 0%, the zone will not turn off automatically.*

Configuring Automatic Zone Command Control

1. Press the Section Status area in the main Viper screen. The Section Control Setup screen displays.
2. Using the screen keyboard, enter a value, in seconds, in the 'Turn-On' Look-Ahead field.
3. Using the screen keyboard, enter a value, in seconds, in the 'Turn-Off' Look-Ahead field.
4. Using the screen keyboard, enter a value, in percentage, in the 'Turn-Off'% Coverage field.
5. using the screen keyboard, enter a value, if desired, in seconds, in the Section Control Override Sec field.

Enabling Section Control Override

1. While in a job, press the Section Status area on the main screen. The Section Control Setup screen displays.
2. Using the on-screen keypad, enter a value, in seconds, in the Section Control Override Sec field.
3. During application, toggle the master switch on the Raven CAN switch box to the 'OVERRIDE' position.

Note: *The override feature affects all enabled products. The time set as the override seconds does not start until the master switch returns to the on position. Hold the master switch in the override position to sustain the override countdown if desired.*

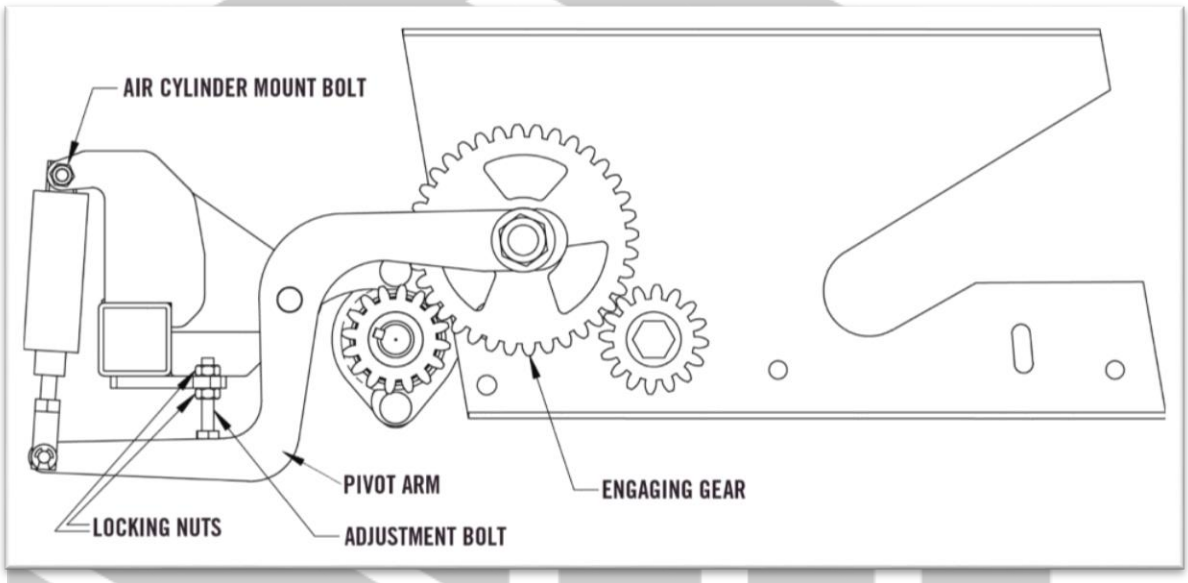
4. Each product enabled will resume application at the target rate for the programmed override countdown before the system will resume normal application control.

ONFRAME TANK

ZONE COMMAND METER BOX

The mechanical adjustments of the Zone Command Meter Box will be pre-set at the factory. *It is the owner's responsibility to ensure that Zone Command is functioning properly. SeedMaster is not responsible for misses or skips in product application.*
Periodic checks of moving components are necessary to ensure long term trouble-free operation. Please follow the instructions below:

Figure – Typical Zone Command mechanical components



Zone Command components also shown in the SeedMaster Tank Parts Manual.

1. Loosen the nut on the engagement gear so that the gear is able to freely slide in the slot holding it.
2. Turn the adjustment bolt until the engaging gear is allowed to fully mesh with both small gears.
3. Tighten the nut on the engaging gear, locking the position of the gear in place. While doing this, ensure that the gear is able to turn freely, while still being held snugly in place.
4. Manually extend air cylinder rod so that engaging gear is disengaged. Ensure gear doesn't have excessive side to side play, but is not so snug that it doesn't turn freely.
5. Turn the adjustment bolt until it is touching the pivot arm, and then give a last half turn to lift the engaging gear slightly off the smaller gears. This will prevent the gears from binding which causes excessive ear to gears.
6. Pull on bottom of air cylinder rod. Let go of the rod and cylinder should retract on its own. If air cylinder mount bolt is too tight, it may cause the pivot arm to not return to the seeding position.

ZONE COMMAND AIR COMPRESSOR

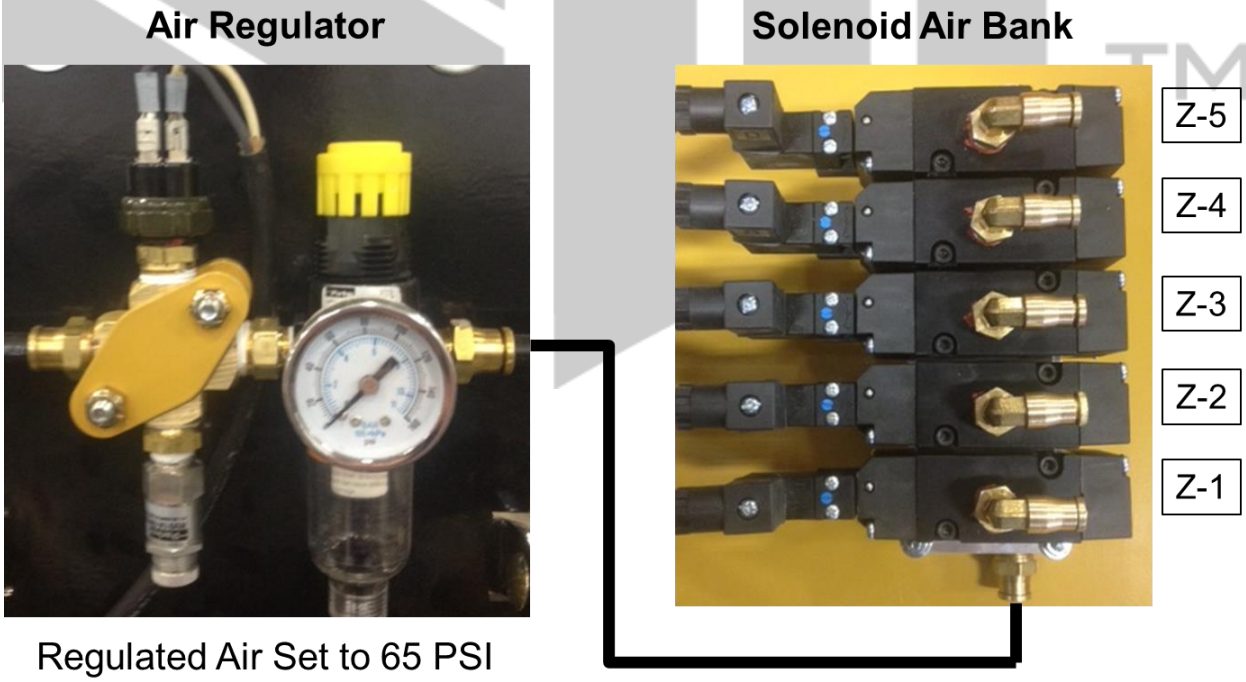
Zone Command is controlled pneumatically. Located on the drill is a compressor and air tank. The compressor is set to turn off when the pressure in the tank reaches 105 psi, and to turn on when the pressure falls below 85 psi. The regulator is used to reduce the tank pressure for the air cylinder. This regulator is factory set to 65 psi.

NOTE: Check and empty the water separator tank daily.

NOTE: Check and replace the air inlet filter on the compressor daily.

Ensure that the air filter is dry and not excessively dirty, or damage to the compressor will result.

Zone Command Air Compressor



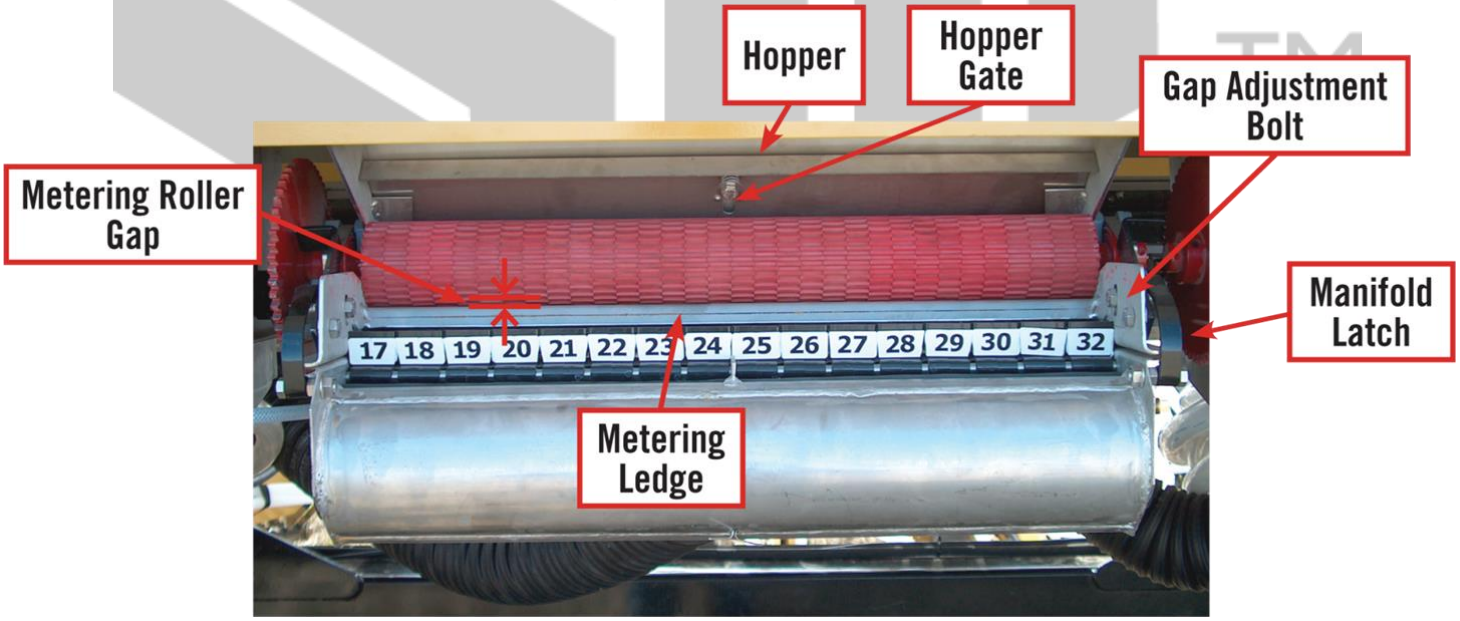
Zone Command Air Components

ONFRAME ROLLER TYPES

Refer to the table below for the type of roller and the gap setting for different types of products.

Roller Size	Gap	Large Seed	Density (lbs/bu)	Flow Rate (lbs/rev/venturi)
Grey Rollers	1/8"	Wheat, Durum	62	.116 (range .10 - .19)
Grey Rollers	1/8"	CPS wheat (Taber)	62	.125 (range .11 - .15)
Grey Rollers	1/8"	HRS wheat (Minto)	62	.141 (range .12 - .16)
Grey Rollers	1/8"	Barley (Manley)	50	.109 (range .10 - .12)
Grey Rollers	1/8"	Oats (Dumont)	40	.072 (range .06 - .085)
Grey Rollers	1/8"	Lentils (Laird)	63	.170 (range .14 - .20)
Black Rollers	3/8"	Peas (Sirius)	60	.140 (range .10 - .19)
Black Rollers	3/8"	Fertilizer	65	.113 (range .10 - .16)
Grey Rollers	1/8"	Fertilizer	65	.110 (range .10 - .13)
Roller Size	**Gap**	**Small Seed**	**Density**	**Flow Rate**
Red Roller	1/8"	Flax (Norman)	56	.045 (range .035 -
UltraPro	N/A	Canola (Sing. Treat)	50	.0057 (range .0035 -
Red Roller	1/8"	Mustard (Brown)	50	.057 (range .045 -

NOTE: *If excess amount of seed is being crushed by roller, increase roller gap. If excess pea kernels are being shot out, increase roller gap.*



ONFRAME METER REAR VIEW

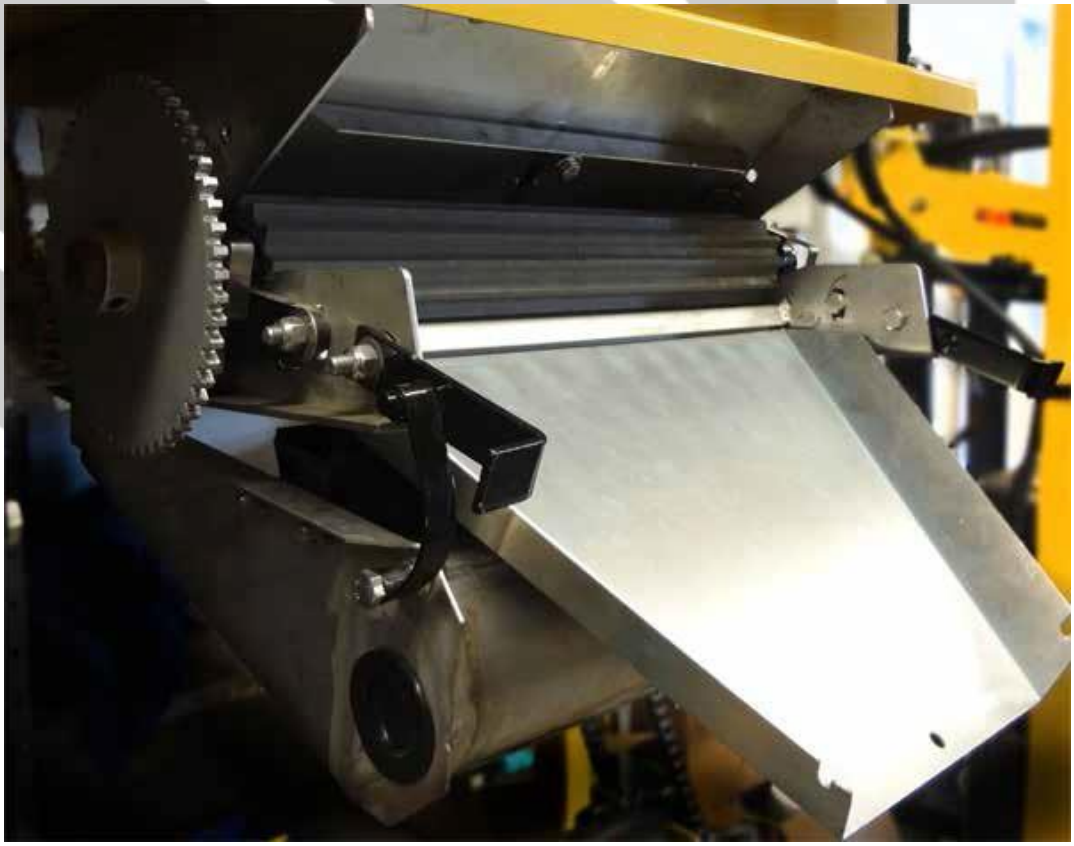
CALIBRATION PROCEDURE SET- UP (ON-BOARD TANK)

Check the metering rollers. Worn, encrusted, or dirty rollers will not meter accurately.
Check the metering roller gap. Ensure that the metering ledge is free of buildup. Product application rate is affected by the gap between the metering rollers and metering ledge.
***Note**: It is crucial that all metering roller gaps be exactly the same for each roller across the full drill width. For large seed use the black, rubber-tipped roller with a roller gap of 3/8" or wider; for all other seed rollers, use a roller gap of 1/8".*

To change roller gap:

- Loosen the gap adjustment bolts on both sides of the metering section.
- Insert appropriate width gauging spacers (e.g. drill bit) between the metering roller and metering ledge.
- Tighten the bolts securing the roller bearing assembly. Remove spacer from between metering roller and metering ledge.

⚠CAUTION Hoppers must contain material. Close all hopper gates except the one hopper bottom being used for calibration or use Zone Command controls to dispense product from the desired metering section. Be prepared to catch the material from one metering section in a container so it can be weighed at the end of the calibration.



Meter ready to collect product with catch tray setup

FAN PRESSURE GUIDELINES

Before starting for the day, run fans for a minimum of 10 minutes to dry moisture out of the hoses and venturis.

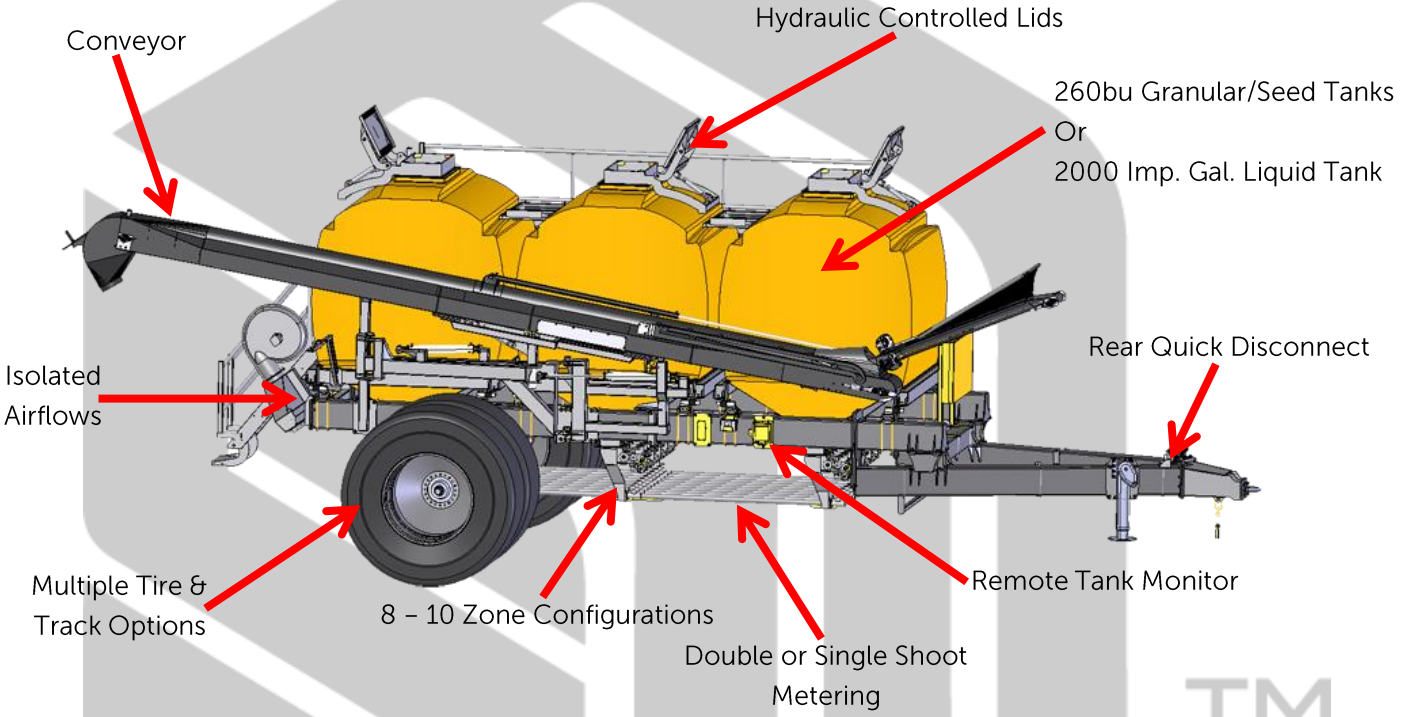
Use the following table as a guide for setting on-board tank fan pressures.

Product	Application Rate Lbs/ac	Drill Size Range Feet	Air Pressure Ounces	Air Pressure PSI	RPM
Fertilizer	50 to 100	30 to 48	11 to 13	0.69 to 0.81	4000
Fertilizer	100 to 200	30 to 48	12 to 15	0.75 to 1.00	4200 to
Fertilizer	200+	30 to 48	13 to 17	0.81 to 1.06	5000 +
Fertilizer	50 to 100	50 to 100	12 to 16	0.75 to 1.00	4200 to
Fertilizer	100 to 200	50 to 100	14 to 17	0.88 to 0.94	4500 to
Fertilizer	200+	50 to 100	17 +	1.06 to 1.31	5000 +
Wheat	80 to 130	30 to 48	12 to 14	0.75 to 0.88	4200 to
Wheat	80 to 130	50 to 100	14 to 17	0.88 to 1.06	4800 to
Barley	70 to 100	30 to 48	12 to 14	0.75 to 0.88	4200 to
Barley	70 to 100	50 to 100	14 to 17	0.88 to 1.06	4500 to
Canola	2 to 5	30 to 48	9 to 10	0.63 to 0.69	3500 to
Canola	2 to 5	50 to 100	10 to 11	0.69 to 0.75	3900 to 4100
Flax	40 to 55	30 to 48	10 to 11	0.63 to 0.75	3900 to
Flax	40 to 55	50 to 100	11 to 12	0.75 to 0.88	4100 to 4300
Peas	150 to 200	30 to 48	12 to 16	0.75 to 1.00	4200 to
Peas	150 to 200	50 to 100	15 to 18	0.94 to 1.12	4900 to

Pressure too LOW - Causes Potential Plugging in Lines
Pressure too HIGH - Product bounces or blows out of furrow

NOVA TANK

There are many different configurations of the NOVA tank. The image below illustrates a 780 NOVA and some of the many options and features the NOVA has to offer. This section of the operator's manual will explain the key features and the settings for the NOVA tank.

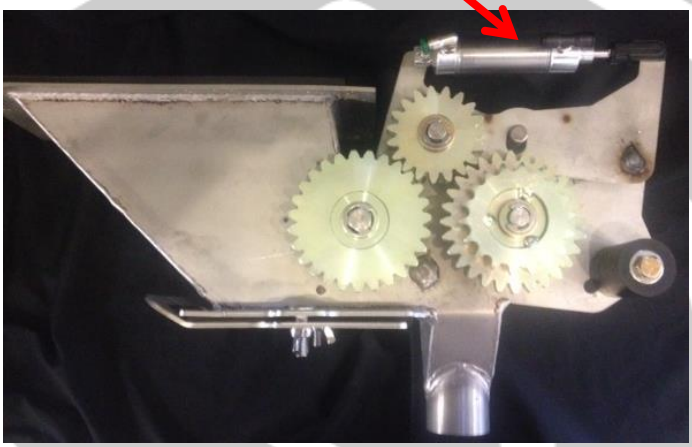


780 NOVA-10-D

NOVA ZONE COMMAND / METER BOX

Nova XP carts are setup as either an 8 zone or 10 zone cart depending on drill size. The number of meter boxes is typically the number of zones being operated as each meter is expelling product to an individual air stream and tower. The meter boxes are engaged and disengaged with an air cylinder. If an air cylinder is to fail it will fail to the engaged position. Each meter is setup with a sprocket selection to adjust the amount of product between 6 and 8 run outlet towers. This is to reduce the percent of error between towers and each run. The 8 run manifold will be configured to the 15-20 tooth sprockets on the side of the meter box to the main shaft and the 6 run manifold will be configured to the 20-15 tooth sprockets on the side of the meter box to the main shaft.

Air Cylinder for engaging and disengaging the meter's zone command



In the image above the meter box is configured for an 8 run manifold (15-20)

PNEUMATIC CONNECTIONS

Connect the 3/8" air hose at the Nova hitch to the push-on fitting located on the drill. A minimum of 65 psi pressure from the on-frame air receiver is requires to operate Zone Command. See compressor in OnFrame section of manual for more information.

NOVA PRODUCT SELECTION

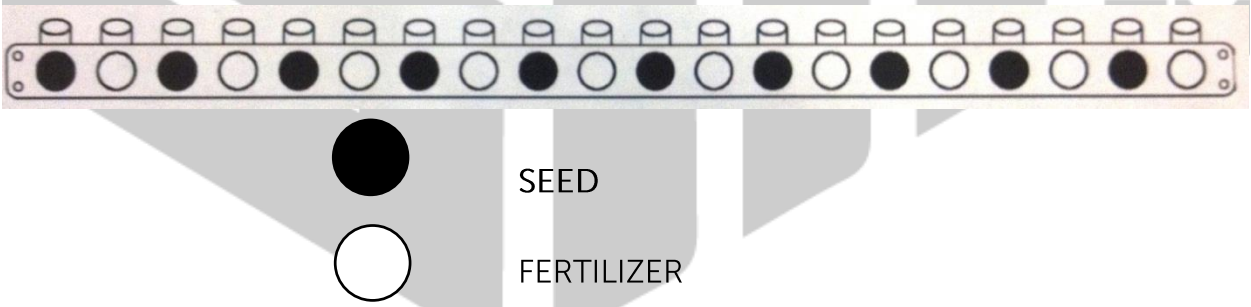
Under the dual-shoot, 10 zone Nova, there are 10 metering boxes and 20 hoses. 10 hoses lead to the fertilizer towers and 10 hoses lead to the seed towers.

Other Nova configurations are:

- Single-shoot, 10 zone (10 meters, 10 hoses)
- Dual-shoot, 8 zone (8 meters, 16 hoses)

SEED AND FERTILIZER RUNS, DUAL SHOOT, 10 RUN NOVA

Under each tank in a dual-shoot configuration, you will be able to choose to connect the meter to either fertilizer or seed runs. The seed runs start on the left side of the cart (looking from behind) and alternate between seed and fertilizer. Likewise, the fertilizer runs start on the right and alternate with seed runs.



SEED AND FERTILIZER RUNS LOOKING FORWARD FROM BACK OF CART

The 3 large tanks can be adjusted to provide product to either seed or fertilizer knives in a dual-shoot configuration.

If you would like to dispense product from a tank to the seed runs, connect the far left run to the far left meter, and then work your way across, connecting meters to every second run. If you would like to dispense product from a tank to the fertilizer runs, connect the far right run to the far right meter, and work your way across, connecting meters to every second run. Ensure that the runs that are not connected have a plug firmly installed with an airtight seal. Failure to create an airtight seal may cause an uneven seeding condition.

Always meter a small amount of product in a stationary position to ensure that each product is delivered in the desired seed or fertilizer knives.

To change from seed to fertilizer (or from fertilizer to seed), take all of the yellow plugs out and replace them with a flexible tube. Insert the yellow plugs where you disconnected flexible tubes.

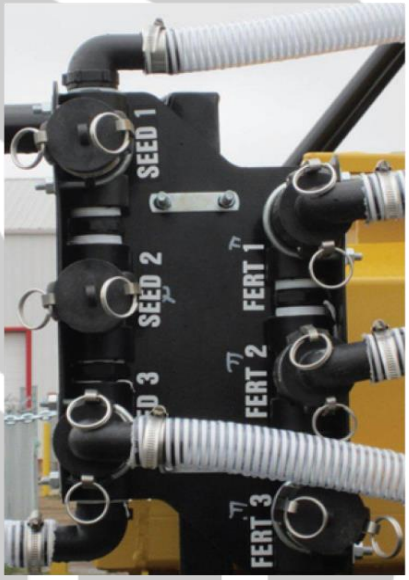
PRODUCT RUN SELECTION

FANS ON AIR SPLITTER

NOTE: The fan connected to the top of air splitter is the seed fan and the lower fan is the fertilizer fan.

NOVA PRESSURE AND TOP-UP AIR

When a tank is selected to meter to the seed or fertilizer knives, the top-up air must be set to match the proper fan. When the tank is metering to the seed knife, the top up air must come from the seed fan.



NOTE: When you change the product selection at the tank, do not forget to switch the top-up air at the same time.

INDIVIDUAL METER INSPECTION

It is possible to inspect meter parts while the tank is full of product.

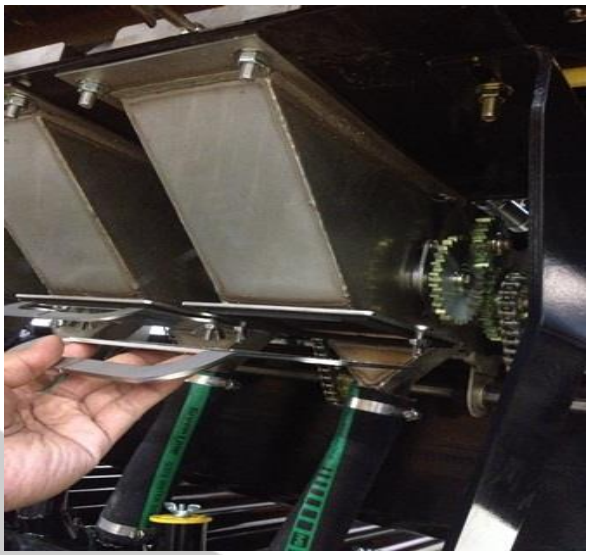
1. Shut off hydraulics to fans and metering.
2. Remove slide gate cover.

SLOT

SLOT COVER

3. Note internal wings are aligned with external wings for ease of assembly.
4. Loosen wing nut and turn exterior wings until parallel with the slot.
5. Insert slide gate and open meter bottom cover. (approximately 1 gal. of product will fall out)

SLIDE-IN GATE



BOTTOM COVER

6. Inspect metering.
7. Close bottom meter cover (ensure a good seal) and remove slide gate.
8. Reinstall slot cover, tightening wing nut while holding external wings in vertical position

NOTE: *Poor quality fertilizer or other foreign materials may cause uneven metering or damage to metering. Screening of all fertilizer products going into the Nova XP is highly recommended.*

WORK LIGHTS

There are three work lights on a Nova cart. One is located at the walkway, another is located at the signal light bracket and one is installed at the conveyor. The switch for the work light is mounted at the remote console box.

WORK LIGHT SWITCH

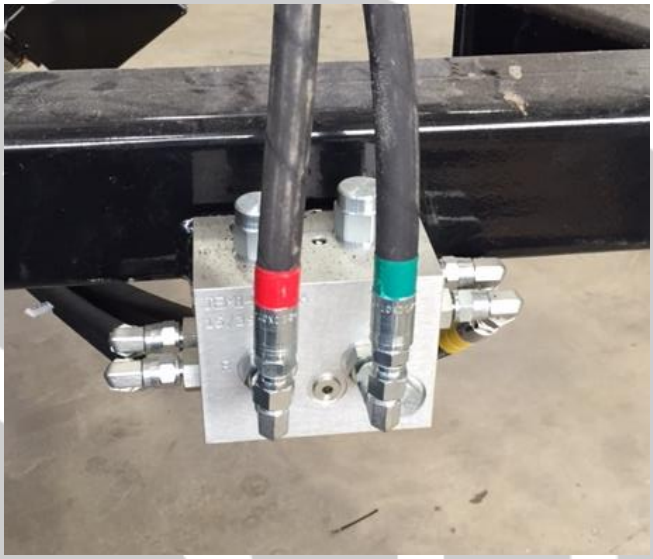
Note: *Protected by 10-amp fuse found in the main Nova electrical panel*

LID OPERATION

Automatically selects the highest hydraulic pressure fan source: The lids are designed to be held closed with hydraulic pressure when fans are in use (lid cylinders are being supplied with oil pressure to keep the lids closed).

Near the back of the cart (under the walkway) there is a selector valve. This valve will automatically select the fan that is running at a higher RPM. For example, if you are seeding canola, you should have the fan RPM turned down on the seed fan. This valve will ensure sufficient force to keep a tight seal on the lids.

Note: *We must ensure maximum seal is maintained on lids, for accurate metering rates.*



Lid Selection Valve

To open the lids, reverse the hydraulic remote for the fan that is pressurizing the lids. There is check valve on the fan return which will prevent the fan from turning backwards. All of the lids will open at once.

The lid selector valve will lock the lids from opening or closing, when the fans are shut off. Do not enter tanks without proper safety equipment and other personnel present. Never enter with equipment running or operating.

CONVEYOR

NOVA XP CONVEYOR

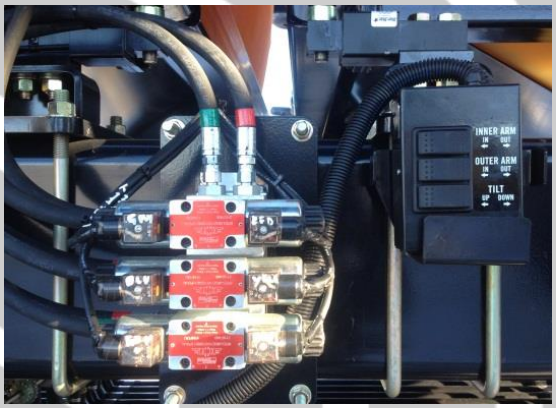
Similar to lid operation, to operate the conveyor you must reverse the hydraulic flow of the oil to the seed fan (pressure to white tagged hose). This will provide pressure to the conveyor hydraulics, which will be used to move the conveyor around the cart and provide flow for the conveyor motors. You may see the lids open when you reverse the fan flow depending on position of lid selector valve.

NOVA XP CONVEYOR CRADLE

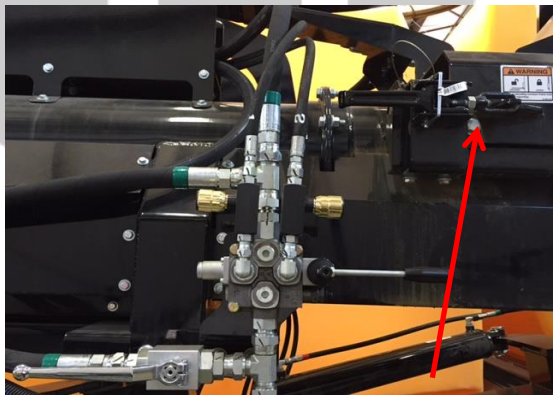
Use the following procedure to release the conveyor from its cradle:

1. Release the safety lock chain, and unpin the latch handle. Move latch handle to release the conveyor transport lock arm.

2. Press the tilt button on the remote to tilt the conveyor up off the cradle.



3. Press the outer arm button to extend the cylinder and swing the arm out.
4. Use the inner arm, outer arm and tilt buttons to position the conveyor as desired.
5. The conveyor is equipped with hopper lock, ensure to unhook it before executing any movement of the hopper.



BALL VALVE HOPPER LOCK

To turn on the conveyor, open the ball valve to provide flow to the conveyor motor. Close the ball valve when done.

NOVA FAN PRESSURE GUIDELINES

Before starting for the day, run fans for a minimum of 10 minutes to dry moisture out of the hoses and venturis.

Use the following table as a guide for setting Nova fan pressures.

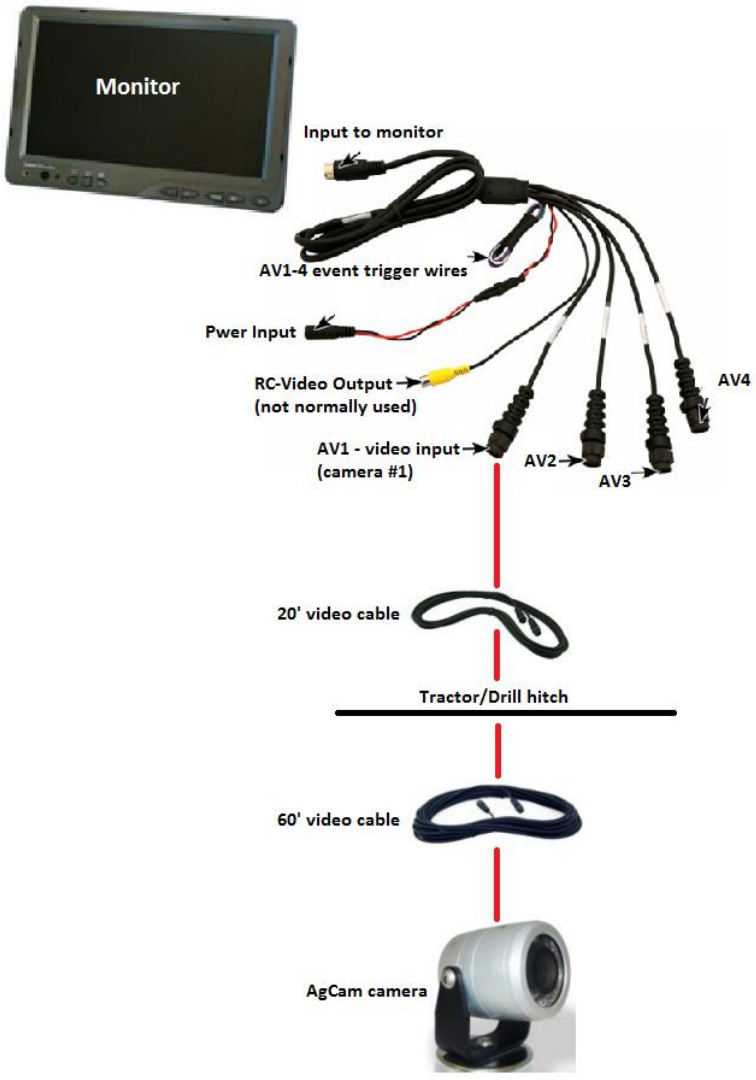
NOTE: AIR PRESSURES AND RPM'S ARE INICATED WITH NO PRODUCT FLOWING				
Product	Application Rate Lbs/ac	Drill Size Range Feet	Air Pressure Ounces	RPM (HIGH FLOW) BLACK FAN
Fertilizer	50 to 100	50 to 100	9 to 11	3350 to 3600
Fertilizer	100 to 200	50 to 100	11 to 13	3600 to 3950
Fertilizer	200+	50 to 100	13 +	4000 +
Wheat	80 to 130	50 to 100	12 to 14	3775 to 4075
Barley	70 to 100	50 to 100	11 to 13	3600 to 3950
Canola	2 to 5	50 to 100	7	3000
Flax	40 to 55	50 to 100	9 to 11	3350 to 3600
Peas	150 to 200	50 to 100	15 to 17	4100 to 4400

Pressure too LOW - Causes Potential Plugging in Lines

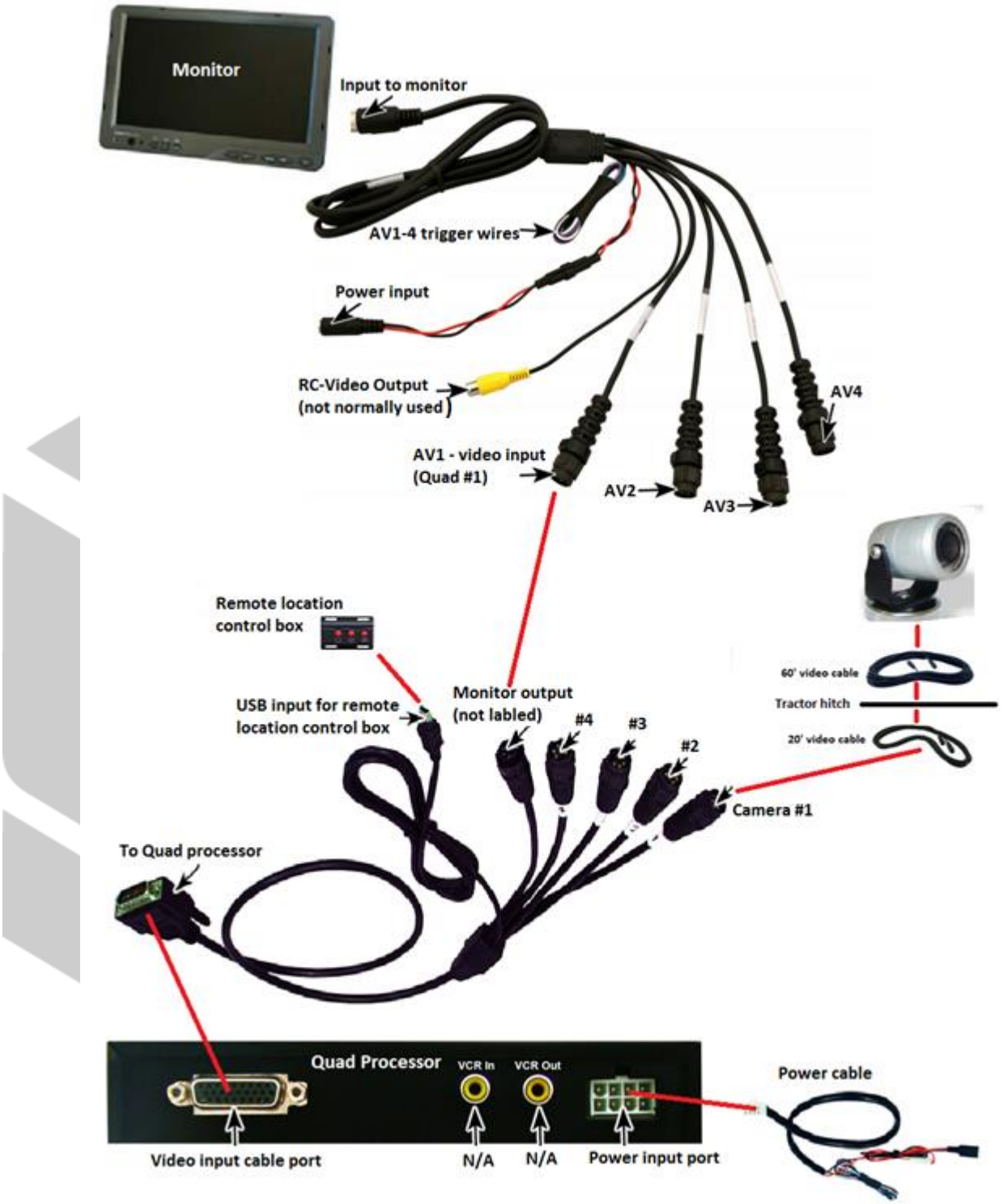
Pressure too HIGH – Product bounces or blows out of furrow

AG CAM OPERATION AND INSTALLATION GUIDE

AgCam Installation Diagram (without quad processor – 4 cameras maximum)



AgCam Installation Diagram with Quad Processor – 16 cameras maximum (4 quad processors)



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Remove your monitor carefully from packaging, and inspect all mounting hardware. Mounting location is the most important part of the monitor installation. Ensure maximum visual benefit from your AgCam system.

Keep in mind:

- Keep your monitor out of direct sunlight to prolong the life of the unit as well as ensure optimum visibility
- Ensure the monitor does not obstruct your view
- Ensure the monitor does not interfere with the normal operation of vehicle

Cable Installation & Mounting

There are two (2) lengths of cable with your camera system: One (1) 20' and one (1) 60'. If you would like to purchase different or additional cable lengths, please contact your dealer where you purchased your AgCam.

Camera Warnings

- NEVER RELY ON YOUR AGCAM AS A SAFETY FEATURE. It is up to your discretion to keep your road travel and other operations safe. Your AgCam will provide you with information only based on what it sees. Operation of machinery safety guidelines still apply.

The AgCam is equipped with an array of infrared light emitters which are invisible to the human eye. This feature will aid in low light conditions but has limitations. The effective range of the night vision feature is 1 to 45+ feet and will produce a monochrome image only. Do not attempt to drive machinery using this feature.

Cable Warnings

- Cable routing is important. Where you choose to run the cables should not interfere with the normal operation of the machine or any safety equipment.
- ALWAYS be aware of any "pinch points" or other potential hazards to the cable
- Secure all cables to vehicle/equipment using included cable clips, zip ties or other styled fasteners.
- If you intend to use your AgCam for short length PTO operated implement, avoid excess cable lengths if possible. When you decide on a location you should fix the camera to a permanent bracket using ¼ inch bolts, and attach any loose cable securely so there is no chance of entanglement in the PTO or other moving parts.

Power:

1. Attach the power input connector to your included 12v cig lighter adaptor or another suitable 12v power source.

- There is a small in-line glass fuse located on the red power wire. When replacing blown fuses, use a MAX 2amp glass fuse.
- There is a small glass fuse located inside the tip of the 12v portion of the power adaptor. When replacing blown fuses, use a MAX 4amp glass fuse.

Trigger Event Operations:

Camera selection - Event trigger wires are as follows:
Camera 1 – Green
Camera 2 – Purple
Camera 3 – Gray
Camera 4 – White

Event trigger wires can be attached to any 12v positive event. This will cause the monitor to change to that camera, regardless of the state of the monitor (i.e. ON/OFF or channel selection). The most recent event will be the primary display, so if two video channels (AV1 & AV2) are attached to an event output, the one that happens last will change the monitor to its respective camera view. The wires can be attached to any positive output 10.5v to 16.9v switch or supply to cause the monitor to automatically switch the unit to its respective channel camera. For example; if you were to attach the AV1 wire to a positive output from an unloading auger on a combine, the monitor would switch from channel 2, 3, or 4 to channel 1 when the auger is extended. The event circuit should be neutral in its normal state and change to HIGH (+12v) when the event is considered to be active.

MONITOR & REMOTE OPERATION

Turn the monitor on only after it has been securely mounted, supplied with power, and the cameras are connected. (9" Monitor shown. Actual button locations on 7" monitor may vary slightly)

1	Output jack	Headphone Jack
2-4 FOR USE ONLY WITH Quad Processor		
2	Full Screen	When connected to DM Quad, will show cameras 1/2/3/4 each time pressed.
3	Duplex Screen	When connected to DM Quad will show Camera 1 /4 and camera 2 /3 each time pressed.
4	Quad Screen	When connected to DM Quad will display all 4 cameras connected.
5	- Key	To decrease parameter.
6	+ Key	To increase parameter.
7	MENU	To switch menu selection, press multiple times. To go to next icon, use +.
8	AV Key	Switches between AV1, AV2, AV3, & AV4.
9	POWER	Turns monitor ON/OFF.
11-12 ports located on sides and bottom of monitor		
10	USB Port	Input for optional cable when using a computer connected to the VGA port (duplicates image from input device).
11	Quad Plug	USB female connector for Quad processor.
12	VGA Input	Input for VGA from computer or other console (duplicates image from input device).

REMOTE CONTROL OPERATION

	POWER ON/OFF
	Mute Enable/Disable sound
	Flip image left/right
	Flip image up/down
CH	Navigation arrows
MENU	Enters the Menu Also acts as "Enter" button in menu settings
MODE	Adjusts screen display modes
RESET	Reset your selection
TIMER	Enables timer that will turn off monitor
GRID	Super impose a grid on screen
16:9 4:3	Aspect ratio adjustment
SEL	A/V switching (camera selection)

STANDARD MENU SETTINGS

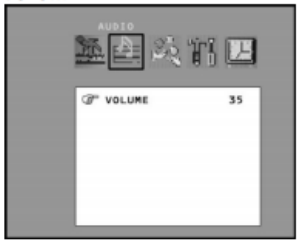
Press the MENU key on the monitor or remote. Use the – and + keys on the monitor or the Left and Right arrow keys on the remote to move through the icons at the top of the screen.

1. Use the MENU key on the monitor (up and down arrows on remote) to select an item under each section. Selected menu items turn red.
2. Use – or + on the monitor (left and right arrows on remote) to change the value of the highlighted item.
3. To exit: Press the – or + key on the monitor (left or right arrow on remote) multiple times until the menu goes away. Allow monitor to time out (approximately 5 seconds).

PICTURE

BRIGHT: Adjusts the brightness of the image.
CONTRAST: Adjusts the contrast of the image.
COLOR: Adjusts the color of the image.
TINT: Adjust tint of image (appears only when camera is plugged in).
RESET: Returns settings to default.

VOLUME



VOLUME: Adjusts the volume level.

OPTION

CAMERA 1: AV1 event trigger delay time.
CAMERA 2: AV2 event trigger delay time.
CAMERA 3: AV3 event trigger delay time.
CAMERA 4: AV4 event trigger delay time.
ROTATE: Inverts image on screen.

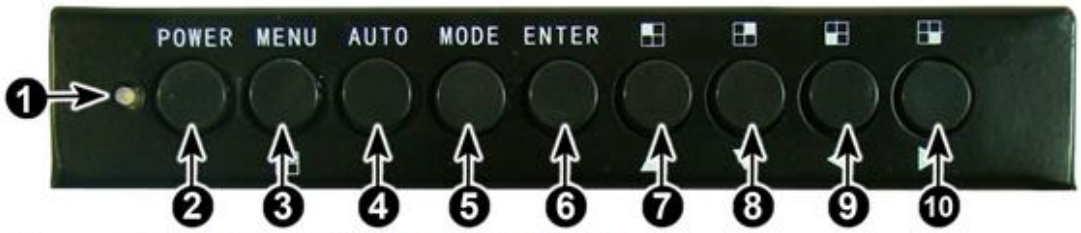
SYSTEM

LANG: Select your language (English default)
SOURCE: Adjusts the AV input source (AV1 default)
GUIDE LINES: Super imposes a grid on your monitor screen (select ON or OFF)

PRESET

SLEEP: Enables sleep timer delay setting (in minutes).
AV1: Enable (ON) or Disable (OFF) AV1.
AV2: Enable (ON) or Disable (OFF) AV2.
AV3: Enable (ON) or Disable (OFF) AV3.
AV4: Enable (ON) or Disable (OFF) AV4.
VGA: Enable (ON) or Disable (OFF) VGA input.

QUAD OPERATION



1. Power Indicator Light (RED=OFF/GREEN=ON).
2. **POWER** button turns your Quad ON/OFF.
3. **MENU** button displays quad menu options on your monitor .
4. **AUTO** button automatically cycles through available cameras (hold for 3 seconds).
5. **MODE** button toggles between monitor views: quad, single camera, or double camera mode.
6. **ENTER** button allows users to select a chosen menu option.

7-10. Brings cameras 1-4 to full screen -*AND*- Up/Down & Left/Right for menu operations.

Kit Includes Remote location control box. Box functions are the same as above 1-3 operations on 7" & 9" monitors.

7" & 9" MONITOR- REMOTE QUAD OPERATIONS		
1	Full Screen	When connected to Quad will show cameras 1/2/3/4 each time pressed.
2	Duplex Screen	When connected to Quad will show cameras 1 /2 and cameras 3 /4 each time pressed.
3	Quad Screen	When connected to Quad will display all four cameras connected.

OPERATION

1. Power on Quad by pushing the **POWER** button on the face of unit.

2. If you do not see video from your camera(s), try:

- Pushing the **MODE** button on the face of the Quad until you see your camera.
- Pushing the AV button on monitor or V1/V2 button on remote. Repeatedly pushing the AV button will cycle through the two video channels.

STANDARD QUAD MENU SETTINGS

1. Press and hold the **MENU** button for 3 seconds.
2. Use arrow buttons (7-10 on photo of Quad face under "Quad Operations") to select desired menu to adjust.
3. Use **ENTER** button (6 on Quad operation photo) to select desired option on any menu screen.
4. Use **MENU** button to exit out of any menu option.
5. Use ▲ and ▼ to move up and down through individual menu options.
6. Use ▶ and ◀ to change information on individual line items.

Press and hold MENU button for 3 seconds to exit menu setup.

SYSTEM SETUP:

DATE ..... Set your current date. YEAR:MONTH:DAY
TIME..... Set your current time. HOUR:MINUTE:SECOND
SYSTEM FORMAT ..... Video system NTSC/PAL selectable.
SYSTEM ID NUMBER..... Select unique ID # for Quad.
KEY LOCK ..... When set to ON position, only individual camera views available.
When set to OFF position, all functions available.
CAMERA PRIORITY..... Selects which camera would have priority if more than one event trigger is set at the same time. For example if camera 1 and camera 3 triggers are both activated at the same time the event 1 trigger will take priority over the other. Only applies to the event triggers if used.
VCR OUT ..... Select type of image will be output for video out.
POWER ON OUTPUT..... Selects the type of display image shown on power on.
If set to OFF, Quad won't automatically turn on when power is applied and POWER button will need to be pressed.
FACTORY RESET ..... Restores unit to factory preset options.

DISPLAY SETUP:

DISPLAY ON SCREEN ..... Press **ENTER** to "Check" what information is displayed on screen.

SCREEN POSITION..... **X:** ▶ moves screen to right, ◀ moves screen to left
Y: ▶ moves screen up, ◀ moves screen down

BORDER COLOR..... Press **ENTER** to select displayed border color.

TIME SETUP:

AUTO SEQUENCE TIME:

Auto sequence means the Quad box will show cameras 1,2,3&4 on full screen by turn. Default display time for each camera is one second. There are 2 ways to use the AUTO SEQUENCE function:

1) Press the AUTO key on Quad.
2) Press the ⊞ key on the key board, the screen will show Quad view, then press again the screen will rotate between cameras 1-4.

HOLD TIME SETUP..... Hold time means the camera image delay time on the screen after the trigger wire operation is over.

CAMERA SETUP:

CAMERA ..... Select cameras 1-4 to adjust
BRIGHTNESS..... ▶ Increases brightness
◀ Decreases brightness
CONTRAST..... ▶ Increases contrast
◀ Decreases contrast
SATURATION ..... ▶ Increases saturation
◀ Decreases saturation
HUE..... ▶ Increases hue
◀ Decreases hue
SHARPNESS..... ▶ Increases sharpness
◀ Decreases sharpness
MIRRORING ..... **OFF**=non mirrored
ON=mirrored image

Dakota Micro, Inc.
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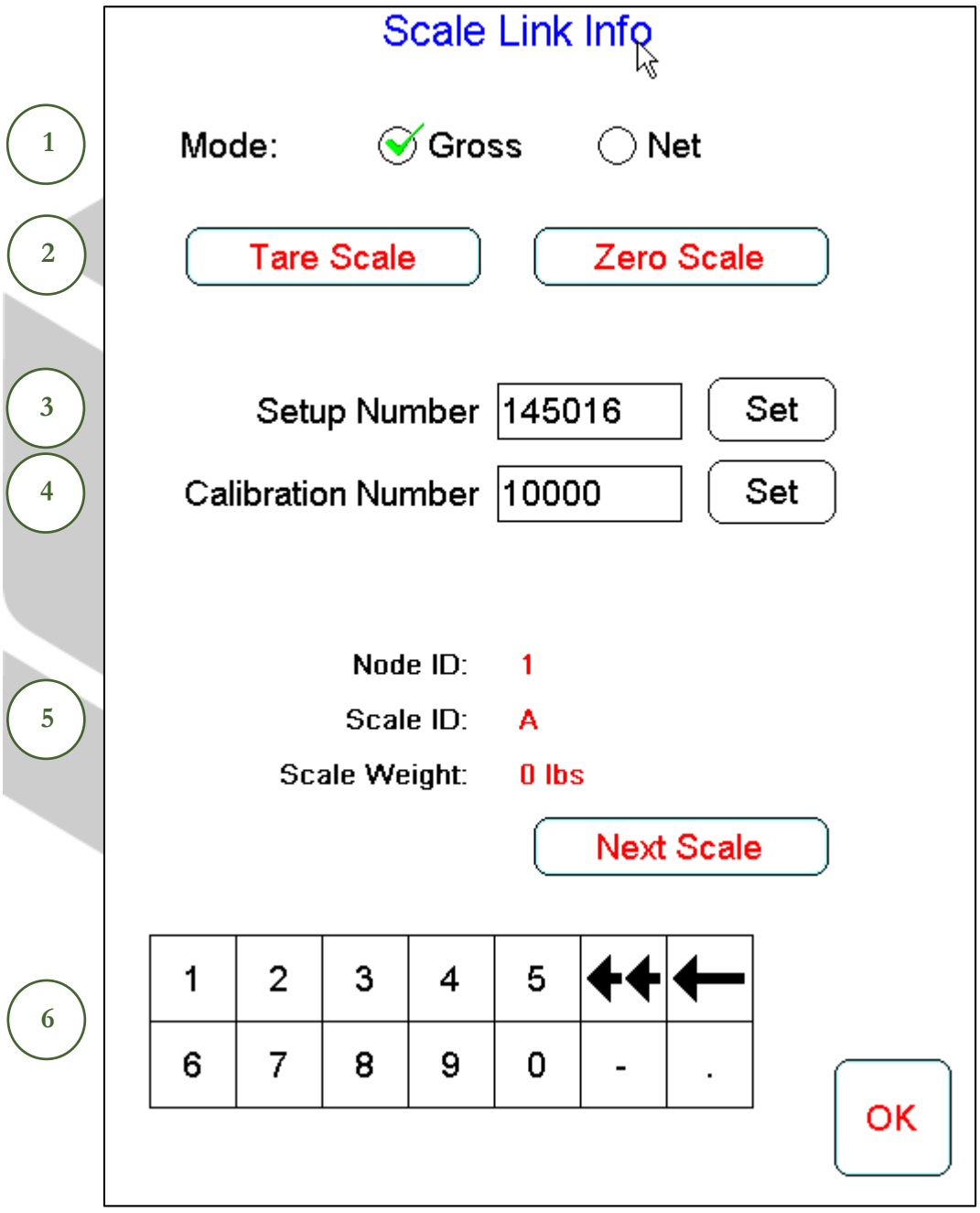
www.dakotamicro.com
8659 148th Ave. SE
Cayuga, ND 58013

SCALE LINK INFO SCREEN

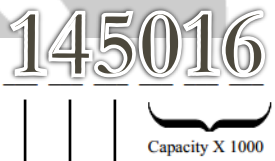
To access the Scale Link Info page from the main work screen,
press: **"Product Control" > "Miscellaneous" Area > "Load Cell" Button**



1. **Mode Area** – There are two mode options for the scales equipped on a SeedMaster Machine, "Gross" or Net".
   Gross: Default setting, Gross mode will display the total weight (bin and product weight) currently on the load cell.
   Net: Net mode will display the weight of the bin contents (product without bin).

2. **Tare and Zero Scale Buttons** – These buttons allow you to either Zero the scale out or Tare the scale.
   Tare: Touch the **Tare Scale** button to reset the current weight on the load cell (e.g. empty bin) to zero. It is recommended to check and set the tare as necessary prior to starting field operations each day to help ensure the most accurate operation.
   Zero: Touch the **Zero Scale** button to reset the current weight on the load cell to zero. It is recommended to zero the scale before any weight is placed on the load cell.

3. **Setup Number** – The setup number is used to determine the weigh method (LBS (default) or KG), the gain (predetermined @ 4), the weight count size (2LBS increments, 5LBS increments (default), ect) and the systems weight capacity (the maximum weight that a load could be, defaults @ 16,000LBS) The default Setup Number is 145016. The below cart explains each value and the range each setting has.



Weigh Method			
1	2	3	4 = lbs
5	6	7	8 = kg.
General	Slow	Fast	Lock-on

Gain			
Gain Setting	Max Signal (mV/V)		
	EZ 150 EZ 210 EZ 320	EZ II Rev. 0A, 0B, 0C Software	**EZ II Rev. 1.0 and Later Software**
1	**2.00**	3.0	**3.0**
2	**1.50**	1.5	**1.5**
3	**1.14**	.75	**1.5**
4	**.84**	.75	**.75**
5	**.47**	.38	**.75**
6	**1.90 (50Hz)**	3.0	**3.0**
7	**1.30 (50Hz)**	1.5	**1.5**
8	**.97 (50Hz)**	.75	**1.5**
9	**.66 (50Hz)**	.38	**.75**

Gain Setting Requirement

Gain must be set above the maximum mV/V output expected on a system.

Example: Four cell 50K-CT system, 2.5 mV/V @ 200,000 lb.
Expected maximum load is 100,000 lb (1.25mV/V).
Setting should be □2" (1.5mV/V).

Display Counts (0-9)									
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
.01 .02 .05 .1	**.2**	**.5**	**1**	**2**	**5**	**10**	**20**	**50**	**100**
8 **Select in long form only**									

4. **Calibration Number** – The calibration number is used to calibrate the scales for maximum accuracy. The default Calibration Number is 15,000. To accurately calibrate the scale, you will need a large amount of weight that has a known value. The more weight used to calibrate, the more accurate the results. Use the process below to determine the scales accuracy.

<u>Determining Calibration Number</u>
1. Zero the scale so the display reads zero.
2. Put the **Known Weight** on the scale platform and write down the **Displayed Weight**.
Perform the following equation to find the **Accurate Calibration Number**.

$$\frac{\text{Actual Known Weight X Existing Calibration Number}}{\text{Displayed Weight}}$$

Example:
Actual Known Weight 500lbs
Weight Display 550lbs
Existing Cal Number 15000
500 X 15000 / 550 = 13640

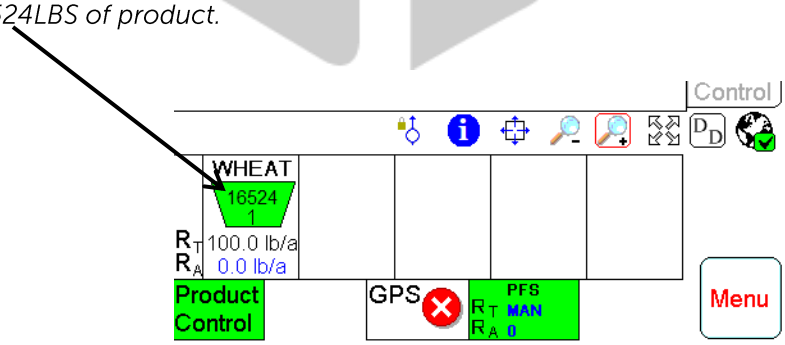
13640 is the "**Accurate Calibration Number**". The setup number does not change.

Repeat the above procedure to ensure accuracy

SeedMaster is not responsible for load cell inaccuracies. It is the owner's responsibility to ensure load cells are calibrated to an acceptable level of accuracy

5. **Scales Information Area** – This area displays information about each tank's scale. The scales are identified by a Node ID and Scale ID. The scales are always in order from Tank 1 (Product 1) up to Tank 5(Product 5). In the above picture we would be viewing Tank 1 (Product 1).
Node ID: The Node ID is linked to the Scale Link, either a SL130 or SL110 Scale Link. The SL130 is capable of up to 3 different Scales (Tanks/Products) the SL110 is capable of 1 Scale (Tank/Product).
Scale ID: The Scale ID determines what scale link the scale is tied to.
Scale Weight: The Scale weight displays the actual weight of the product in the tank. If the tank is empty and the Scale Weight is reading a valve, you would want to zero the scale out by pressing "Zero Scale" Button.
Next Scale Button: The Next Scale button allows you to move to the next scale or Tank/Product. Each Tank/Product has their own Setup Number and Calibration Number and each one is setup and calibrated individually.
6. **Key Board Area** – Use these keys to enter valves for areas that require an input valve.

Note: *Scale weight for each Tank/Product is displayed on the main work screen. The weight is located inside the corresponded products tank icon. See below for reference. For Tank 1/Product 1 it would be holding 16524LBS of product.*



REMOTE DISPLAY

READING TANK WEIGHT FROM REMOTE DISPLAY

Power on the remote display by pressing the blue button on the front of the remote display.

Press "SCALE".

Press "MONITOR".

Tank 1 shows 5095 lbs. of product within the tank. Tanks 2 and 3 are empty. Press "EXIT" to return to previous menu.

Press "EXIT" to exit.

Press and hold the blue button to power the remote display off when finished. **Never leave the remote display powered on when not in use.**

ZEROING TANK WEIGHT FROM REMOTE DISPLAY

Power on the remote display by pressing the blue button on the front of the remote display.

Press "SCALE".

Press "CAL".

Press "NEXT" to select which tank to zero. Ensure that the tank you are zeroing has no product within it. Press "ENTER" to select tank.

Press "ENTER" to zero tank weight. The tank should read zero weight.

Press "PREV" to exit.

Press "PREV" to exit.

Press “EXIT” to exit.

Press and hold the blue button to power the remote display off when finished. Never leave the remote display powered on when not in use.

CALIBRATION

GRANULAR SEED AND FERTILIZER

Because of the variation in seed sizes and seed treatments, it is important to calibrate your seed system to ensure desired seeding rate. Calibration verifies the actual product flow rate of your machine at the setting (roller size and gap) you choose. Variation in flow rate may be caused by:

- Changes in product density and/or flow characteristics.
- Damaged or worn metering rollers.
- Moisture content.
- Seed treatments.
- Kernel sizes.
- Buildup of material on roller or on metering ledge.

While calibrating, keep in mind:

- Hydraulics must be engaged to supply pressure to main block.
- Opener pressure switch must be ON to perform calibration.
- Enter the weight of product that you collect directly into the monitor. Do not perform any calculations - your Raven monitor will do it for you.

You can use the Viper monitor or the remote console for calibration. Please refer to page 43 of the Raven manual when calibrating using the Viper monitor. The remote monitor must be powered down when in field operation.

FERTILIZER QUALITY

Fertilizer dust and lumps within the product are troublesome to deal with.

- Lumps will plug the metering and should be screened out prior to loading tank.
- Fertilizer dust will gum-up venturis on humid days and will require extra cleaning through the day.
- Certain fertilizer types are more prone to gumming problems.

SEED QUALITY

- Seed must be free of lumps and foreign matter to avoid plugging.
- Extra-large seed (i.e. Kabouli peas) may need to be screened to remove extra-large kernels to avoid sporadic plugging.

SEEDMASTER APP

The SeedMaster Seed Rate Calculator is a two-part App, part one of the App will allow a grower too rapidly and effectively calculate a seed rate to achieve a desired plant population within a given field. Part one of the App will also allow a grower to calculate how many pounds of seed that is required and the total cost associated.

Part two of the App is associated with SeedMaster machines that are controlled by the Raven Viper in-cab monitor. A "cal weight" number controls the rate of the granular metering system. Every granular product requires a calibrated cal weight number to allow the product to be metered at the desired rate.

The Cal Weight Estimator will allow a grower to receive an estimated calibration number for a specific product being metered, meter type used, and drill width. SeedMaster recommends that an initial calibration catch test be performed to ensure calibration accuracy. The purpose of providing this tool is to alert a grower of a potential error during the calibration process before unwanted field results can occur. This tool will be especially valuable for new operators or when new products are metered.

The Cal Weight Info Submission will allow growers to very easily and quickly send their calibration information to SeedMaster. This will allow SeedMaster to provide a more accurate estimated calibration number to all users of the App. Not only will yourself benefit in the future, but all users of the App. All submissions are reviewed by SeedMaster to ensure validity before becoming a component of the Cal Weight Estimator.

The Cal Weight Note Book is a grower's own personal notebook with saved calibration values from his or her own specific machine(s). All Cal Weight submissions are automatically stored for the grower for future reference at any time.

ANDROID APP ON Google play

Download on the App Store

Part 1: Seed Rate Calculator

Figure 1: **Rate Tab**. Pg1 → Use the slider bars to set the desired values to determine your seed rate in LBS/ACRE.

Figure 2: **Rate Tab**. Pg2 → Use this page to as a guideline for target plants/ft and TWG.

Figure 3: **Cost Tab** → Use the slider bars to determine how much seed is required and an estimated cost.

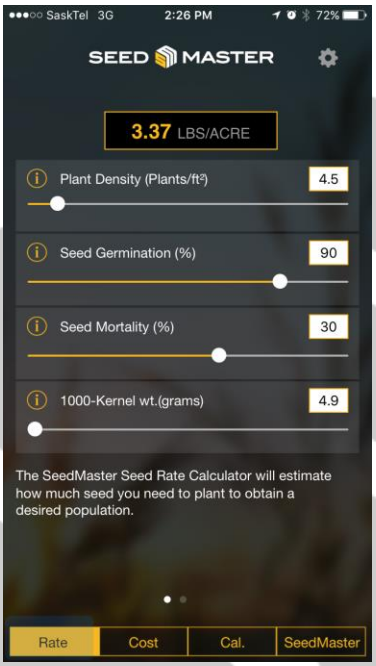


Figure 1

Figure 2

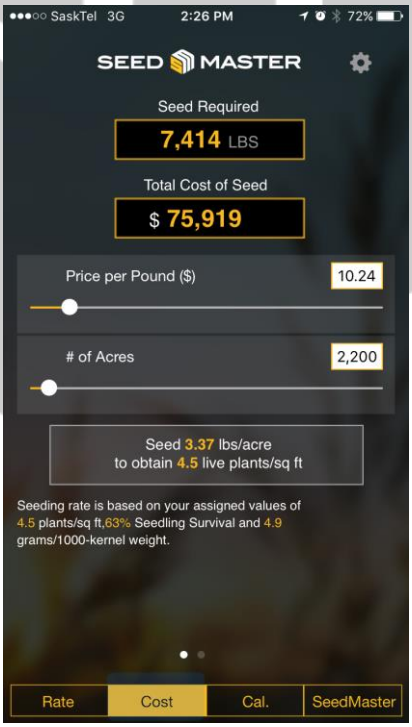


Figure 3

Part 2: Cal Weight Estimator

Figure 4: → Operator Liability Warring

Figure 5: **Cal. Tab.** Pg1 → Choose the product type, meter type and drill width to determine an estimated cal weight.

Figure 6: **Cal. Tab.** Pg2 → this page gives you the ability to submit your cal weights

Figure 7: **Cal. Tab.** Pg3 → Submitted cal weights get stored in the Cal Weight Note Book.

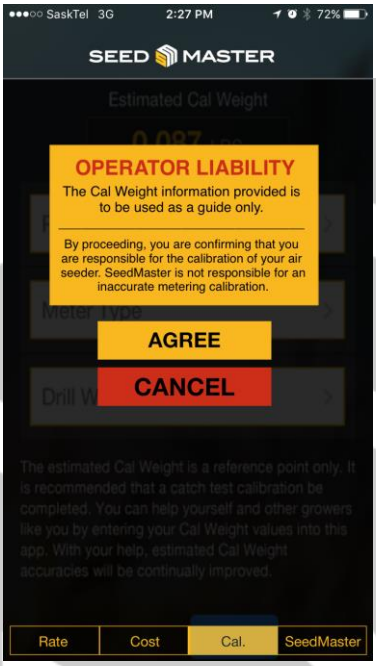


Figure 4

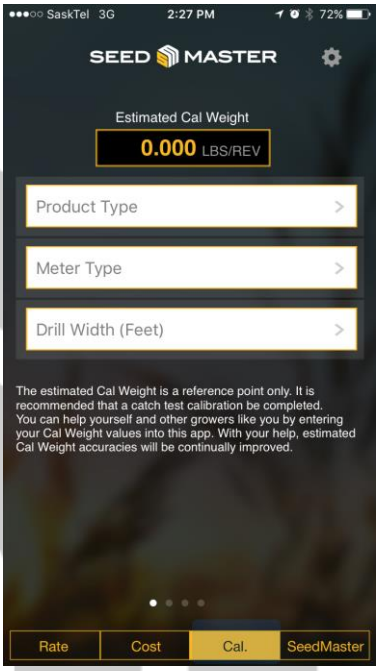


Figure 5

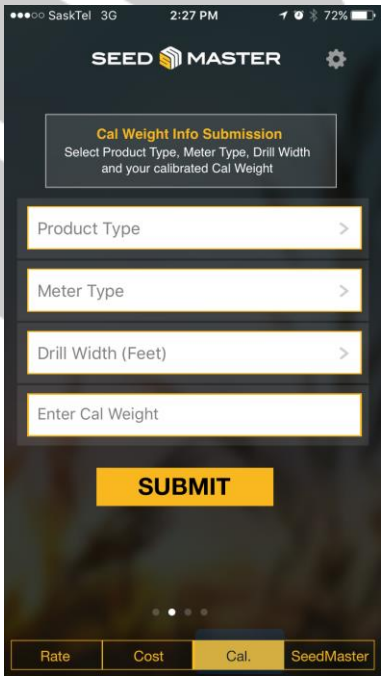


Figure 6

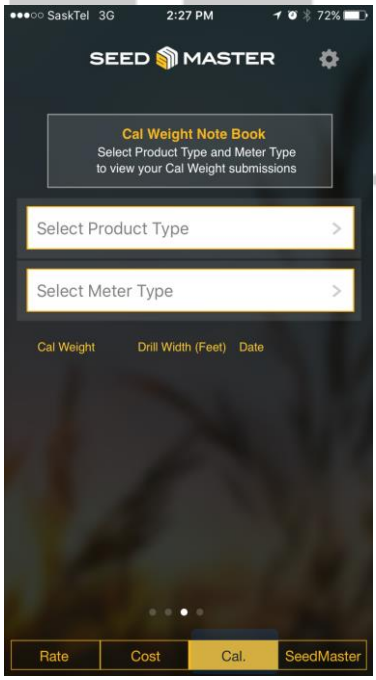


Figure 7

METER CALIBRATION USING REMOTE DISPLAY

Ensure that drill hydraulics are activated with normal system hydraulic pressure (2500 – 2900 PSI). The Viper monitor must be powered on and on the main menu. ("Exit to Menu").

Power on the remote display by pressing the blue button on the front of the remote display.

Press "BIN".

Press "NEXT" to select which bin or tank to calibrate. Press "ENTER" to select tank to be calibrated.

Take notice of "CAL WEIGHT". After calibration is successfully completed, a new "CAL WEIGHT" number will appear.

Press "BEGIN".

Press "NEXT" to move cursor to "SELECT SECTION". Now press "ENTER".

Press "ALL- OFF" to shut all zones off. The background behind the zone numbers should be dark as shown below indicating all zones are off.

Press “SEL”.

Press “RIGHT” or “LEFT” to select zone to catch product from. Zone 1 is on the left side of tank when standing behind tank looking forward towards tractor. Press “ON” to engage zone when you have the zone selected that you want to catch product from. Zone is selected when the background is not darkened behind zone number as show below. You only need to catch product from one zone for calibration.

Press both outside buttons simultaneously to ``EXIT``.

Again, press both outside buttons simultaneously to ``EXIT``.

Press ``PREV`` to move cursor to ``PRIME METER ROLLER`` and press ``ENTER``.

Set up to catch product from zone selected. Press ``START``

Press ``INC`` until meter begins to turn and dispense product at an adequate rate. ``PWM OUTPUT`` will increase as the ``INC`` button is pressed. Pressing the "INC" button will increase the hydraulic oil flow to the drive motor.

Press ``STOP`` when you are certain that the meter is fully primed. Now press "BACK". Empty the catch container and return into position to catch more product.

Press "NEXT" to move cursor to "START CALIBRATION" and press "ENTER".

Press "START" button. The meter will now begin to dispense product and "ROLLER REVOLUTIONS" will begin to count. Continue to dispense product until an adequate sample is obtained. The more product that is caught and weighed, the more accurate the calibration.

Press "STOP" when enough product is caught. Press "END".

Weigh the product that was caught and enter the weight in pounds into the remote monitor. Ensure that you subtract the weight of the catch container.
When you have successfully entered the catch weight in pounds, press the "RIGHT" button until the "SEND" button appears.

Press "SEND". The "CAL WEIGHT" number should update to a new number when you check it for the tank just calibrated. Always perform more than one calibration to ensure accuracy. Ensure that multiple calibrations produce a similar "CAL NUMBER" for the same tank calibration. If the "CAL NUMBER" differs greatly between calibrations on the same tank, an error occurred during calibration and the procedure should be repeated.

Press and hold the blue power button to power down the remote display when finished.

The remote monitor should never be left on when not in use.

METER CALIBRATION USING IN-CAB VIPER MONITOR

Use this guide to calibrate SeedMaster granular tanks using the in-cab Raven Viper monitor.

1. Set up to catch product from one metering zone.

2. Prime meter manually. Disengage meter drive with one hand by extending air cylinder and spin the meter with the other hand until the meter is fully primed.

Switch Box Set-up (attached directly below in-cab Viper Monitor)

3. Turn "Master" switch to the **OFF** position.

4. If switch box is equipped with "Opener UP/DN" switch, place in the **UP** position.

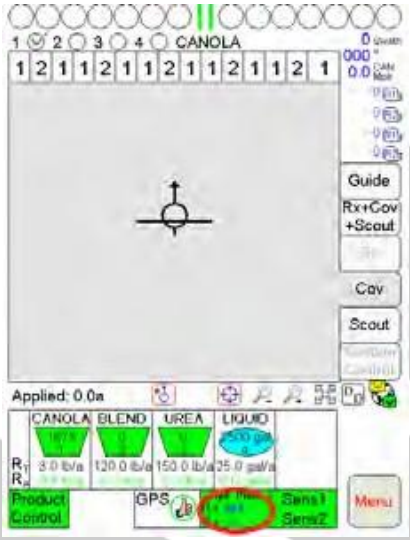
5. Turn "Sections" switch to the **ON** position for the zone from which you are set up to catch product **(If switch activates 2 zones, you must catch from both zones).** Turn all other zones to the **OFF** position.

6. Turn "Product Control" switch to **AUTO** position for product tank # that you are calibrating.

Tractor Hydraulics

7. Engage tractor hydraulics to green/red remote pair to supply hydraulic pressure to main hydraulic block located on front of toolbar. Set system pressure at 2500-2900psi.

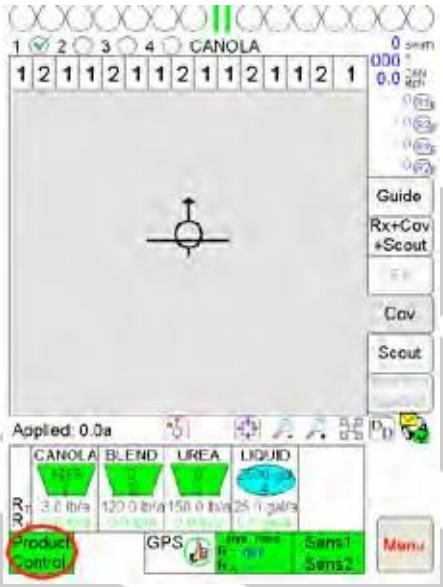
8 Press the below indicated area of the main work screen. If the screen does not change, proceed to step #11.



9 Select "Off".

10 Select OK.

11. From the main work screen, press **Product Control**.



12. Press within the "Miscellaneous" area.

13. Enter a "Self Test" speed of 5.0.

14. Ensure that "Remote Master" is not checked.

15 Press OK.

16 Select product tank # that you are calibrating.

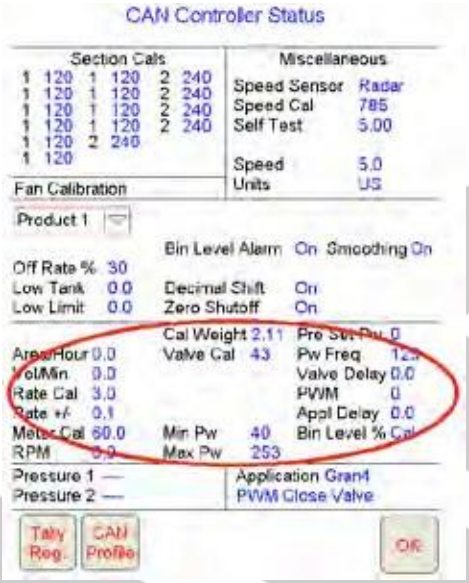
17 Press OK.

18 Press within the "Cal Weight" area.

19 Change the "Cal Weight" number to 0.1 when calibrating canola or similar sized seed. All other seed sizes (wheat, granular fertilizer, peas, etc.) enter a "Cal Weight" number of 2.0 or check the cal weight with your SeedMaster APP.

20 Press "OK"

21. Press within the "Cal Weight" area

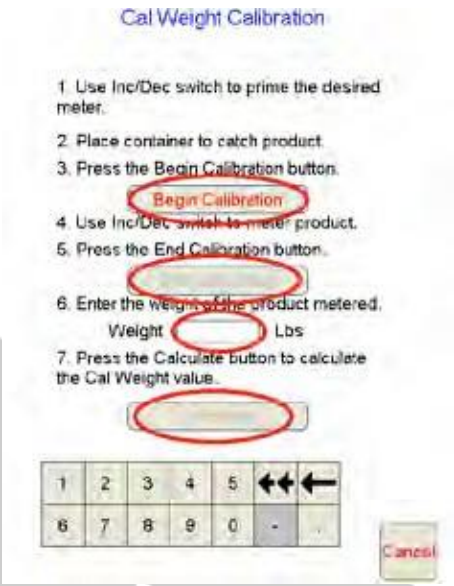


22. Press "Calibration Assistance".

23. Ignore point #1 on screen.

24. Press "Begin Calibration".

25. Ignore point #4 on screen.



26. **Ensure no person is near the meters.** On the switch box below Viper monitor, turn "Master" switch to the **ON** position.

27. Turn "Master" switch to the **OFF** position when adequate sample is collected. The larger the sample collected, the more accurate the catch test.

28. Press **End Calibration**.

29. Weigh the product sample caught and subtract the weight of the catch container. Enter this exact weight in pounds on the Viper monitor.

30. Press **Calculate**.

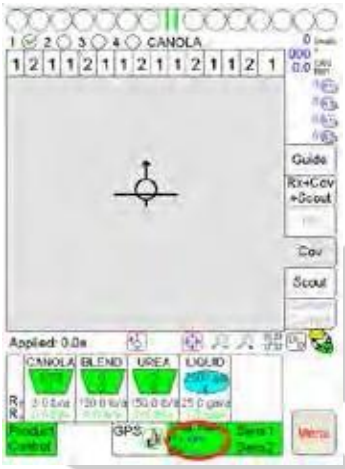
31. A new "Cal Weight" # will display on the Viper screen.

32. Repeat the calibration procedure for a second time starting with Step #22 to ensure a similar "Cal Weight" # is attained. This ensures an accurate calibration was attained

33 Press OK.

34 Press OK.

35. Press the below indicated area of the main work screen.



36. Press "Auto" if running the Auto Adjust Packing Force Sensor in Automatic Mode. All other scenarios, press "Man".

37. Press OK.

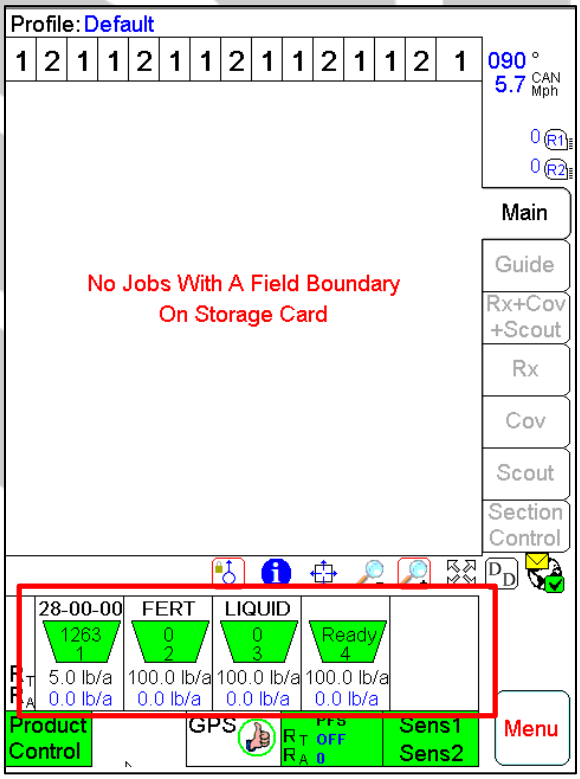
You have successfully completed the calibration procedure. Repeat procedure for each individual granular tank.

SMARTCAL OPERATION

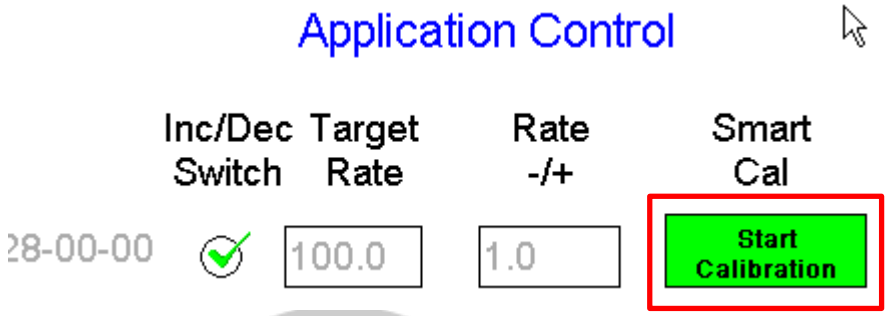
SeedMaster Machines equipped with Load Cells are capable of Auto Calibration on granular products. The SmartCal Auto Calibration feature will maintain one to three percent accuracy on granular products. Auto Calibration software continuously reads the actual weight loss in each tank and compares that to how much weight should be lost if the calibration was perfect. Then it makes the necessary metering adjustments either up or down, spins the rollers faster or slower to move it closer to perfect. The SmartCal feature will become more accurate with more acres because an increasing amount of ground-truth data is fed into the system. A heavy bulky product, such as granular fertilizer going down at a high rate, gives the system enough feedback so that it self-calibrates quickly and accurately, while a light weight product, such as canola seed going down at a low rate, takes more acres to dial in.

Note: *Before using the SmartCal feature it is recommended to perform a product calibration on each product via the catch procedure, either using the Viper Pro or the Remote Tank Calibration Display. The initial product calibrations will determine the Cal Weight for the products being metered. This will allow for a more accurate SmartCal.*

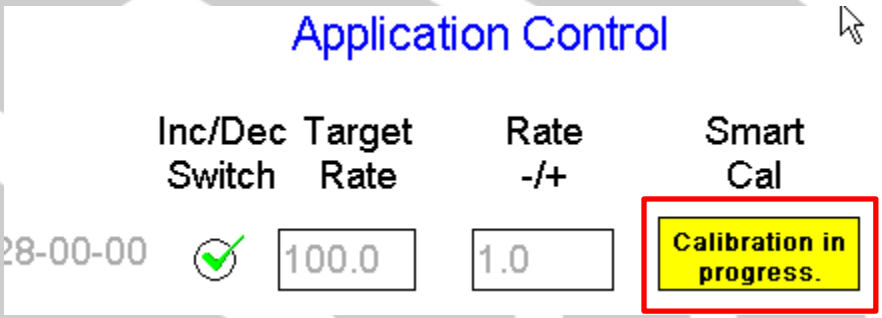
Performing a SmartCal: To Begin the SmartCal procedure, park the machine and touch inside the tank area on the main screen to access the Application Control page. If the system detects movement, it will not allow the SmartCal to begin.



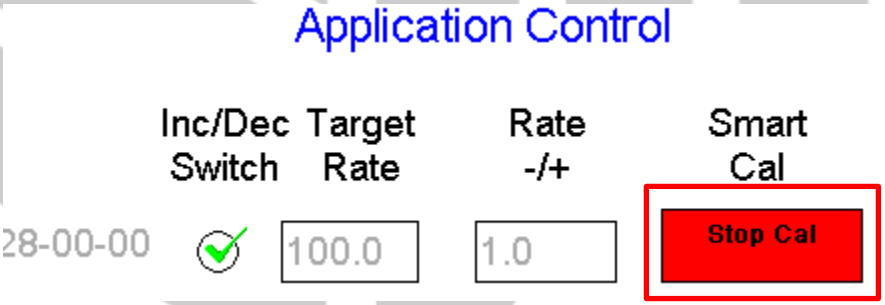
1. From the Application Control Page, touch "Start Calibration" for the product(s) you would like to perform a SmartCal on. You have now initiated the SmartCal procedure for those products.



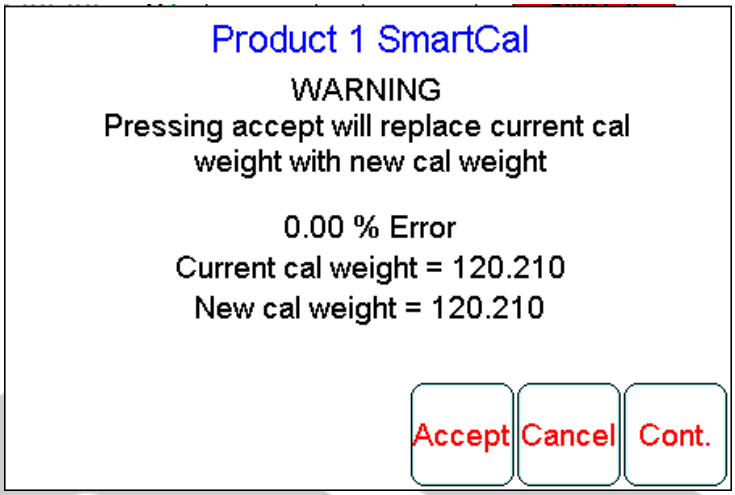
2. You will now begin seeding as per normal operation. While the machine is moving and you are seeding the SmartCal with indicate that "Calibration in progress" for the product(s) in the Auto Calibration mode.



3. When you feel you have seeded an accurate amount of acres for the product(s) you are calibrating you will need to stop the machine to end the calibration procedure.
4. With the vehicle in the parked position you will need to access the Application Control page to stop the calibration process. Touch in the tank area then touch "Stop Cal" for the desired product(s).



5. After you touch Stop Cal you will get a pop up window with the results of the SmartCal for the product chosen. The pop up box will indicate what product the results are for.



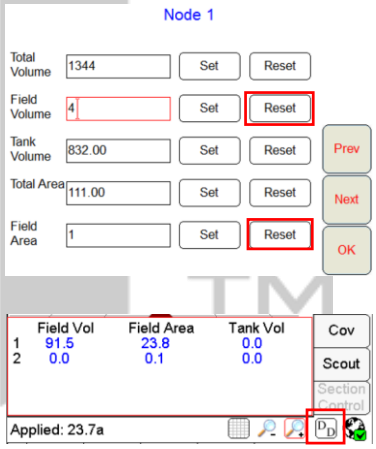
6. The pop up warring will display the % Error for the current cal weight to the new cal weight. You will have the option to accept the changes, cancel the changes or continue the SmartCal procedure for a larger sample.
7. If you "Accept" the SmartCal changes it will apply the new cal weight value to the associated product.
8. If you "Cancel" the SmartCal changes it will throw out the changes and leave the cal weight value unchanged.
9. If you "Cont." with the SmartCal it will allow you to take a bigger sample.
10. If you were doing multiple SmartCal procedures, you will repeat steps 4 to 9 for the next product.

***Note**: You can initiate a SmartCal at any time while you are in a job and perform as many SmartCal's to the product(s) as you feel necessary.*

ONE ACRE CATCH TEST

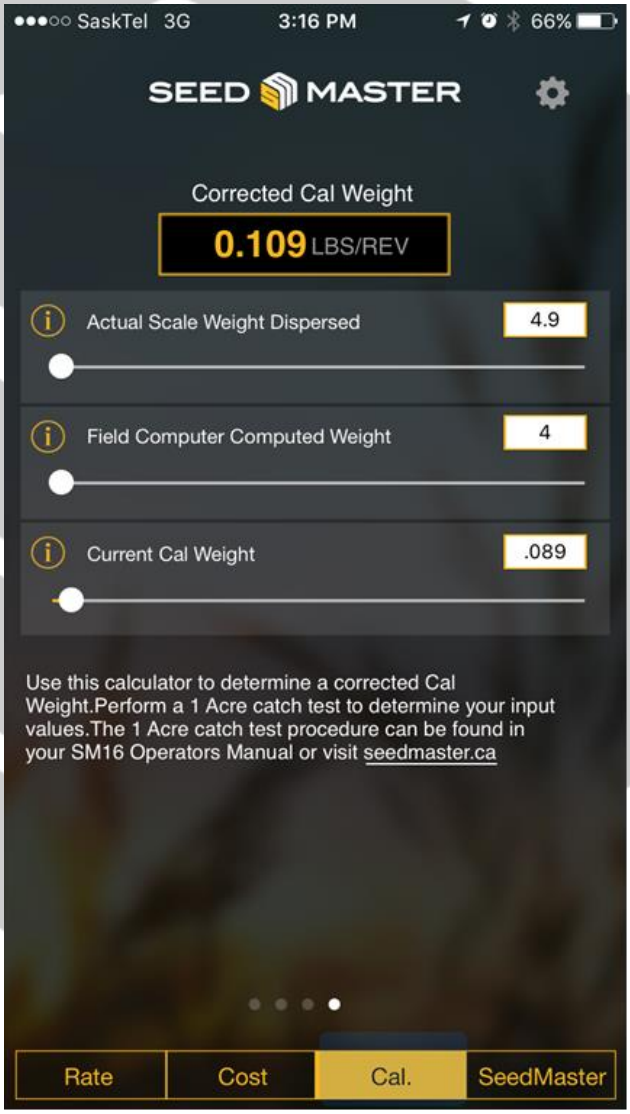
The One Acre catch test is a quick and easy way to double check your cal weight value. Before starting the One Acre catch test ensure that you have a catch tray, pails for catching and transferring product and a digital scale for weighing the product.

1. Zero the digital scale
2. Prepare the meter that you will be catching out of by placing the pail underneath the catch tray.
3. **Switch Box Setup**: Shut the **MASTER SWITCH OFF and PUT THE OPENER SWITCH TO DOWN**. Set the switches for the product and zone that you will be catching from. **Example**: If you are catching product from product tank one and zone one. Turn ALL the product and zone switches OFF. Then turn ZONE 1 all the way to the ON position. Then switch Product 1 switch to AUTO.
4. **Enter a self-test speed**: Touch **Product Control** Then **Miscellaneous** Then **Enter 5** into self-test speed. **Touch OK then OK.**
5. **Set your desired Rate Cal application.**
   ***NOTE**: FOR HIGHER RATE APPLICATIONS SET THE TARGET TO **25LBS** AND FOR CANOLA SET TARGET RATE TO **4LBS**. YOU WILL ALSO NEED TO BE SURE THAT YOU HAVE SET THE CORRECT CAL WEIGHT. USE THE SEEDMASTER APP TO GET A STARTING CAL WEIGHT. SEE PAGE 61 FOR MORE INFO.*
6. **Zero out the weight for the product you are catching:** Touch **Product Control** then touch **Tally Reg.** Touch **NEXT, NEXT** until you are on the product that you will be catching from. It is displayed at the top of the screen as NODE 1 thru 5. NODE 1 is PRODUCT 1 and so forth. When you have reached your desired product/node then touch **RESET for FIELD VOLUME** AND **FIELD AREA.**



7. **Touch OK, OK then the DD button.** If the Field and Tank Vol are not showing up touch inside the Display Data area until you see the Field Vol and Field Area and Tank Vol.
8. When you are ready to catch product **TURN THE MASTER SWTICH ON.** *NOTE: Ensure that you have system pressure before turning the master switch on. Product will be expelled when you turn the master switch on.*
9. At the moment the **Field Area reaches 1** acre turn the Master Switch OFF immediately.
10. Take note of your Field Volume, and your Cal Weight (found on product control page)
11. Go and weigh the amount of product, in LBS that was dispersed from the meter.

12. Using the SeedMaster APP go to the Corrected Cal Weight Page (PAGE 4) under the Cal. tab of the app.
13. Enter the Actual Scale Weight Dispersed (Digital Scale reading)
14. Enter the Field Computer Computed Weight (Field Volume)
15. Enter Current Cal Weight (On product control Page)
16. The calculator with display a Corrected Cal Weight. You will go into the product control page and manually enter this cal weight into the corresponding product.
17. Repeat this process at least one or two times.



JOB CREATION

TURNING ON IN-CAB VIPER AND JOB CREATION

Follow this procedure to properly turn on the in-cab Viper monitor and to create a job. A job is required to record as-applied information so that it can be recalled at a later date.

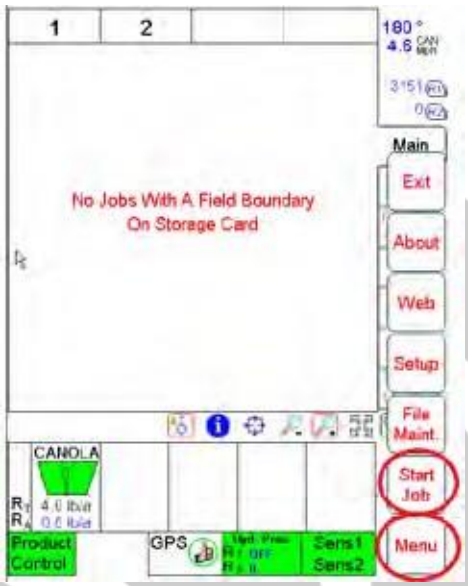
1. Press blue button on the bottom right side of in-cab Viper monitor.

2. Select **Start Viper**.

3. Select **OK**.

4. A GPS signal is required to open a job and record as-applied data. You should see the "thumbs up" picture as shown below when a proper GPS signal is recognized. If you see a "Red X" instead of the "thumbs up", please refer to your Raven OmniSeed Viper Pro Manual – "GPS Comm Port Setup" on page 175.

5. Select **Menu**.
6. Select **Start Job**.



7. Select **New Job** to begin a new job. If you are continuing work on a previously started job, select **From File**.

8. Use the keyboard to select a name that you would like for the as-applied data.

9. Ensure "Product Application", "Swath Guidance", and "Section Control" is selected.
10. Select **Next**.

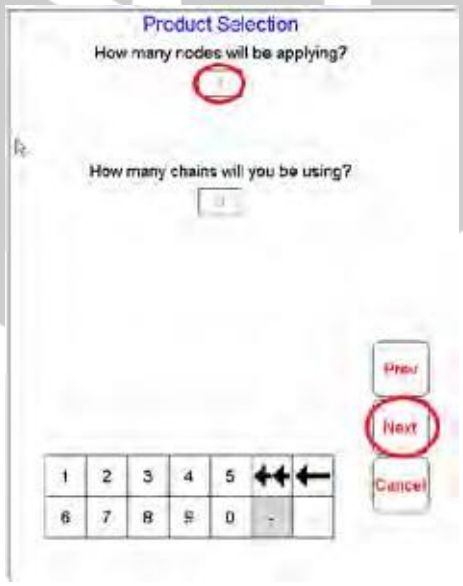
11. Select "Straight AB".
12. Select **Next**.

13. Select "Standard Section Control". This will allow Zone Command to automatically turn metering sections on/off depending on whether the drill is in an area of the field that has been previously applied. To utilize FLIP in conjunction with Zone Command, please see FLIP procedure within this manual.

14. Select **Next**.

15. Always select the maximum number of products that your machine is capable of applying at one time, even if you will not be using all of your tanks for this job.

16. Select **Next**.



17. Name the product in each tank appropriately. Select **Next** to name product in next tank. When the final product is named, select **OK**.

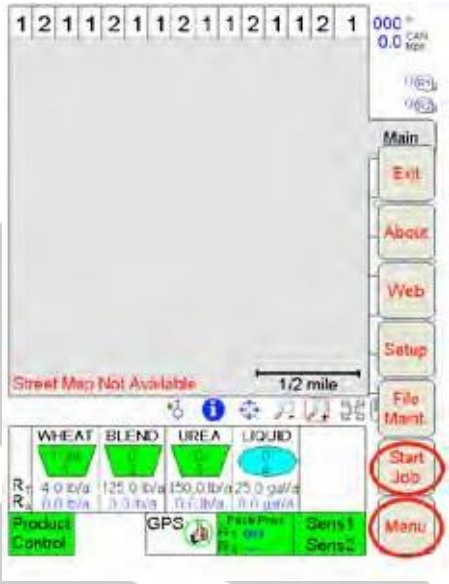
18. If you are applying a product based on a previously loaded VR prescription map, select "VRC" and then "Browse" to recall the specific map for product that you are naming.

19. When you are positioned within the field that you want to seed, select "Open Now".

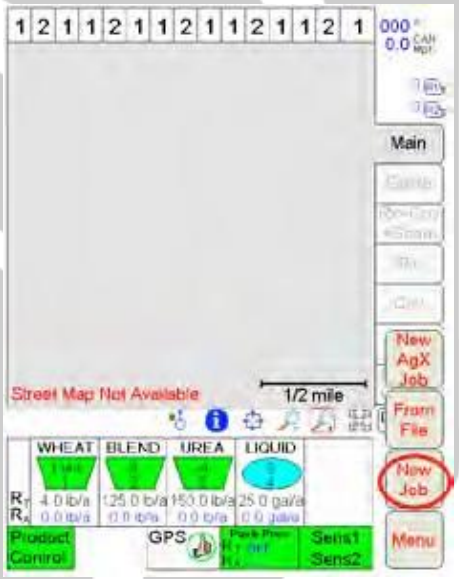
You have successfully opened a job.

FLIP PROCEDURE

1. From the main work screen, select **Menu**. Then select **Start Job**.



2. Select **New Job**.



3. Name the as-applied map something that makes sense to you so that it can be recalled later if desired. Ensure that "Product Application", "Swath Guidance", and "Section Control" are checked. Then Select **Next**.

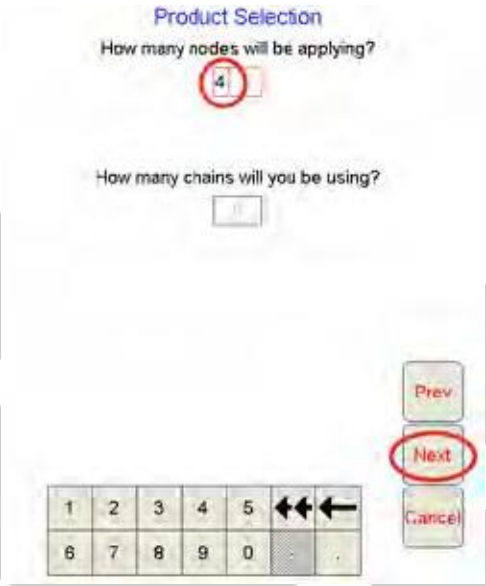
4. Select the swath pattern to be used. Most likely "Straight AB" will be selected.

5. Select **Next**.

6. If starting a new field, select "Create Section Control No-Apply Map". If you are recalling a FLIP map from a previous season, select "Load Section Control Map". Then select **Next**.

7. Choose a name that you will recall in the future when loading the FLIP map for that particular field. Ensure that "Create No-Apply Boundary" is selected. Then select **Next**.

8. Always select the maximum number of products that your seeding system is capable of applying, even if you will be using fewer than the maximum number of tanks for the current job. Then select **Next**.



9. Name the products in each tank as per normal. Select "VRC" if you want to load a variable rate prescription map that was previously loaded onto your Viper monitor. Then select **Next**. Name products in all tanks appropriately.

10. When you have finished naming your final product, select **OK**.

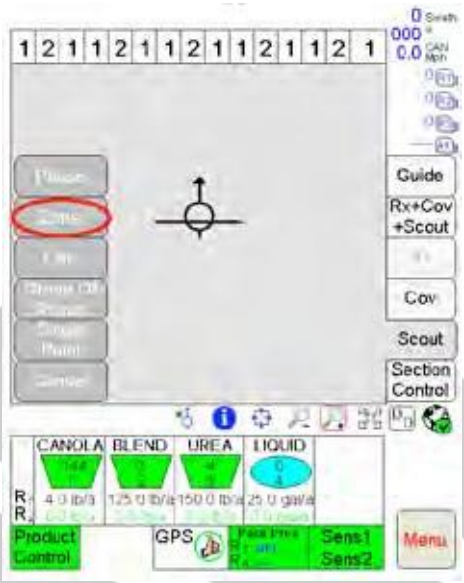
11. When you are positioned in the correct field, press **Open Now**.

12. Position your air seeder in the location where you want to begin seeding. This will be along the outside headland pass.

13. Select the "Scout" tab.

14. Select "Record".

15. Select "Zone".



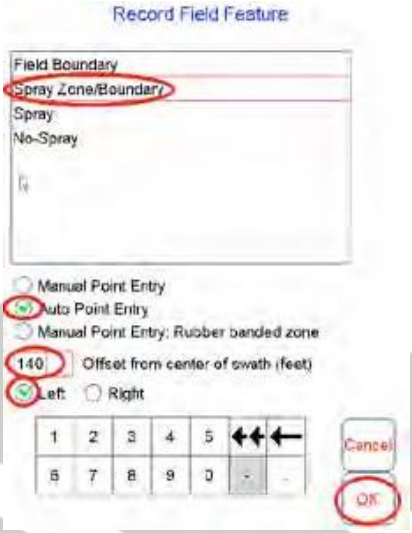
16. Select "Spray Zone/Boundary".

17. Ensure "Auto Point Entry" is selected.

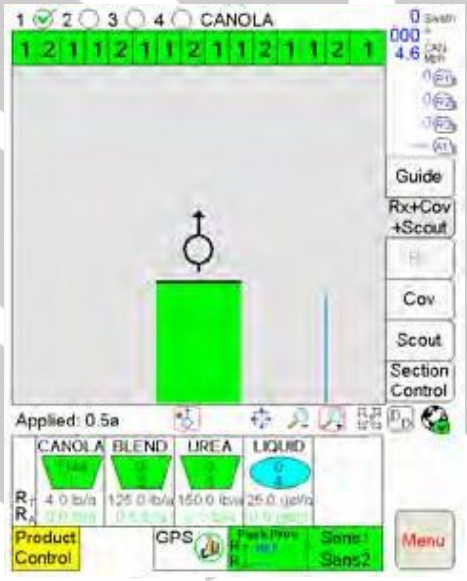
18. The "Offset from center of swath (feet)" should be 1.5 times the working width of the seeding implement minus 10 feet. Ex. 100' wide toolbar X 1.5 = 150 – 10 = 140. This will create a single virtual pass that is just less than the full working width of the seeder. In most cases, one virtual pass will be sufficient but if two virtual passes are required, enter an offset of 2.5 times the working width of the implement minus 10' (240'). Subtracting 10' allows for easier application of the virtual pass while ensuring no product misses.

19. Select "Right" when traveling clockwise around the field boundary. Select "Left" when traveling counter clockwise around the field boundary.

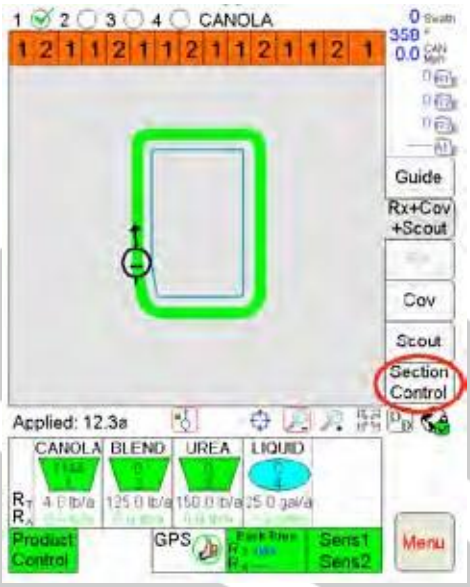
20. Select **OK**.



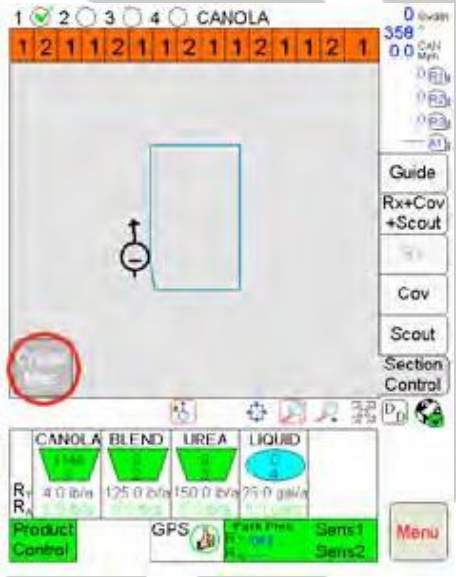
21. Seed the outside headland pass as per normal on any screen view tab. The zone switches on the switch box can be in the "ACCU" mode or the "ON" mode. The product control switches should be in the "AUTO" position. Turn the "MASTER" switch to the ON position when you are ready to apply product and begin seeding. Completely seed the outside headland pass without seeding any other areas of the field.



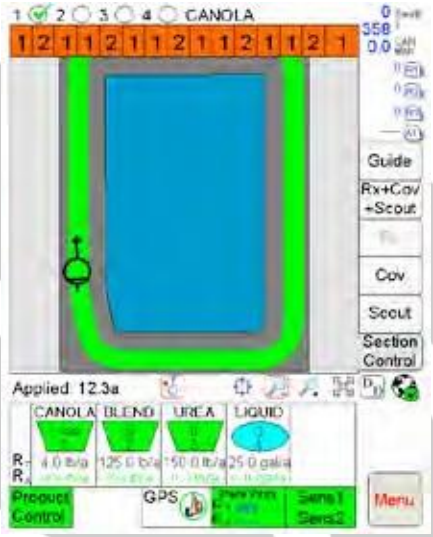
22. When you have completed the outside headland pass, stop your drill where you began seeding. Press the "Section Control" tab.



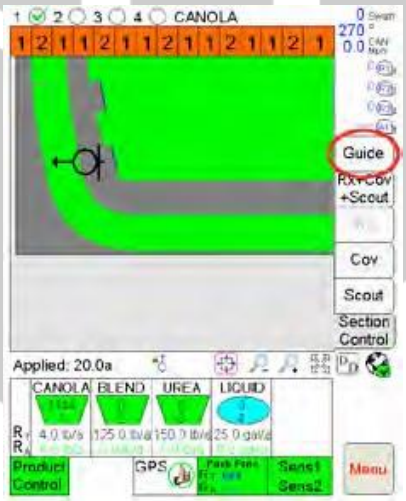
23. Press "Create Map".



24. You are now ready to seed the AB passes of the field. The green represents the area of the field that has been seeded. The grey area is the "No Apply" area or "Virtual Pass" of the field. When the zone switches are in the "ACCU" position, the zones will automatically shut product off as they enter the grey portion of the field map. The blue area of the field represents the "Apply Area" of the field.



25. When the AB lines are completed, you can go ahead and seed the second headland pass. Place all of the zone switches in the "ON" position on the switchbox and seed the full last implement pass. It may be helpful to seed the FLIP pass while viewing the within "Guide" tab.



26. The field should now be completely seeded. The job can now be closed. The FLIP map for the field is automatically saved so that it can be recalled next time the field is seeded or another FLIP map for the same field can be created. If you recall the FLIP map from a previous season, both headlands will be seeded last after all AB lines are seeded.

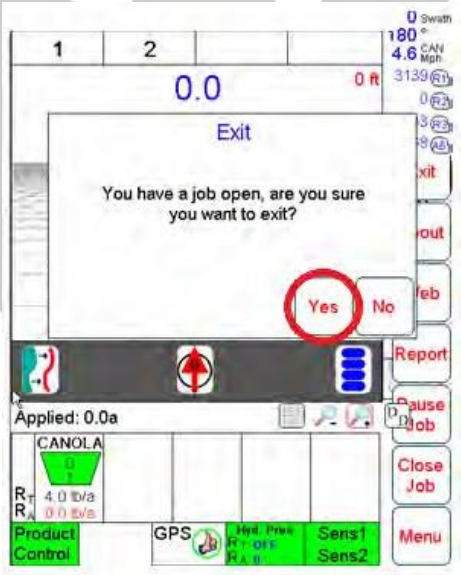
SHUTDOWN OF IN-CAB VIPER MONITOR

Follow this procedure to properly turn off your in-cab Viper monitor while a job is open. Failure to follow this procedure may result in lost job information or damage to your Viper in-cab monitor.

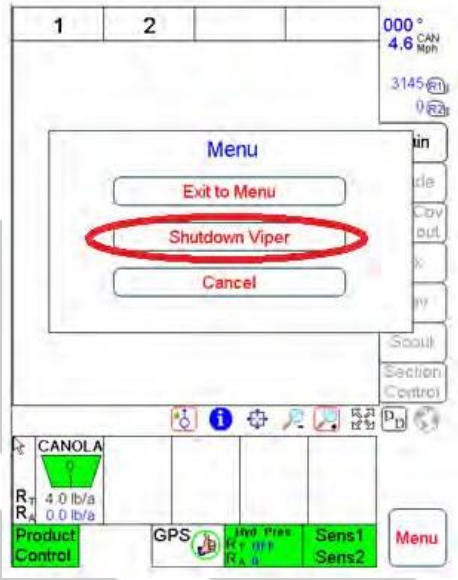
1. Select "Menu".

2. Select "Exit".

3. Select "Yes". As-applied information will be saved in the Viper in-cab monitor under previously selected names (when the job was opened).



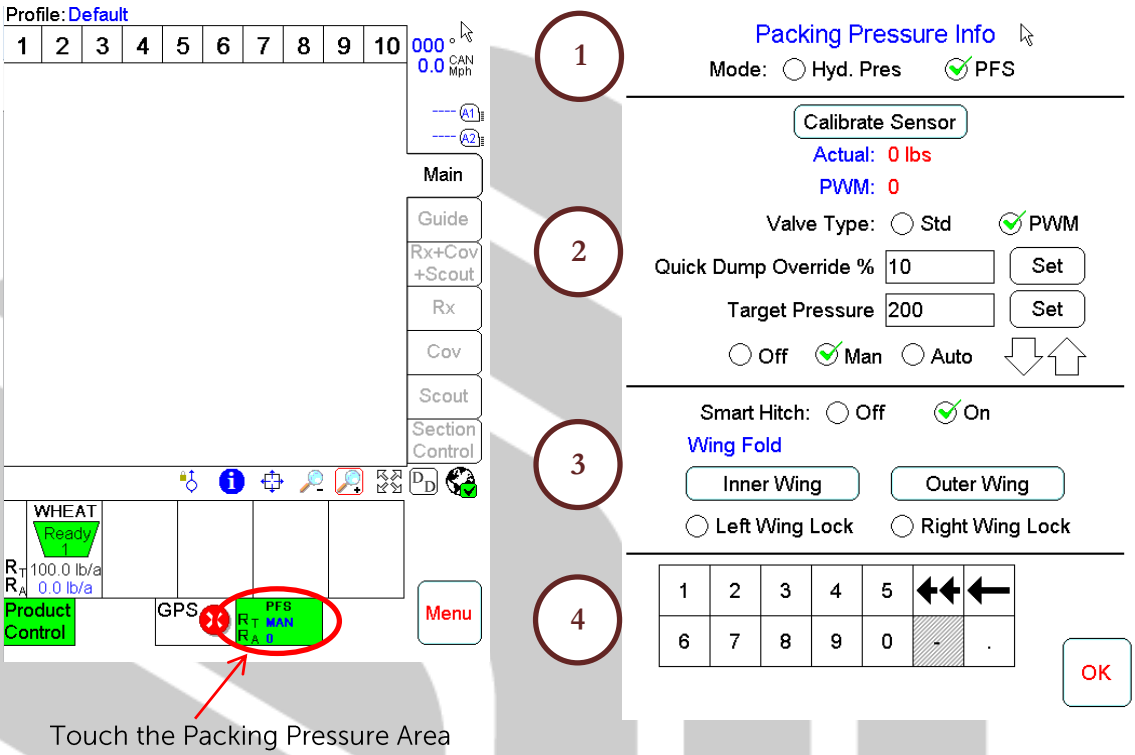
4. Select "Shutdown Viper".



You have successfully shut down your in-cab Viper monitor.

PACKING PRESSURE INFO SCREEN AREA (DRILL NODE)

See the picture below (right) and the corresponding numbers next to the screen shot for a description of the Packing Pressure Info screen.



1. **Mode Area** – There are two packing pressure options to choose from. Touch the corresponding option that is equipped on your machine.
   Hyd. Pres: If there is a hydraulic Pressure Transducer installed on the main block on the tool bar you will choose this option. This transducer is plumbed into the opener down circuit to display the tool bars packing pressure.
   PFS: Auto Adjust Packing Force Sensor. If there is a PFS installed on one of the openers, you will choose this option. The PFS will be installed on a middle opener located on the main frame of the tool bar. The PFS will determine how much packing force is on the opener.

2. **Sensor Settings Area** – This area consists of the openers pressure settings.
   Calibrate Sensor Button: With the openers raised and the hydraulic remotes disengage. Press the "Calibrate Sensor" button to zero out either the hydraulic pressure transducer or the PFS.
   Actual Reading: This reading will display either the hydraulic pressure transducers actual PSI reading or how many pounds of force are on the PFS sensor on the opener.
   PWM Reading: This reading will display the current position of the PWM valve.
   Valve Type Setting: There are two valve type options to choose from. Std (Standard Valve) or PWM (Pulse Width Modulation Valve). SeedMaster systems only use PWM valves. Choose PWM.

Quick Dump Override % setting: The CAN Switch Box is equipped with a pressure override switch. This switch will allow you to override your target pressure by a percentage. This will reduce the amount of pressure to the openers. Use a lower percentage value to reduce the pressure significantly. For example, if the Target Pressure is set 100LBS and the Quick Dump Override % is set at 10% and the override switch is switch to the override position it will drop the Target Pressure to 10LBS. To set the desired enter the percentage of override desired and touch the "Set" button.

Target Pressure setting: If the machine is equipped with a hydraulic pressure transducer the target pressure will be the desired amount of packing pressure to the openers. For example, if the desired amount of packing pressure is 1200PSI enter 1200 and touch the "Set" button. If the machine is equipped with a PFS the target pressure will be the desired amount of pounds to the openers. For example, if the desired amount of LBS is 150LBS enter 150 and touch the "Set" button.
NOTE:
The Target Pressure setting also allows the system to invert the +12v signal logic for the Openers UP/DN switch. To invert the logic so a +12v signal is present when the Opener Switch is in the UP position. Enter 3906 into the target pressure then touch set. The Master and Opener UP/DN Switch will need to be cycled before the change takes place. The signal is now considered to be inverted.

To change the logic back to standard logic. Enter 3905 into the target pressure then touch set. The Master and Opener UP/DN Switch will need to be cycled before the change takes place. The signal is now considered to be standard opener logic.

Off/Man/Auto settings: The system is equipped with a PWM valve for controlling the hydraulic pressure to the openers when they are in the down position. When the "Off" radio button is selected the PWM will not control, when the radio button is in the "Man" position this puts the packing pressure into manual mode, use the up and down arrows to increase or decrease the amount of down pressure to the openers. When the radio button is in the "Auto" position this puts the packing pressure into an automatic mode. In Auto the system will automatically adjust the packing pressure to keep it at the desired "Target Pressure". When slowing down or speeding up or changing ground conditions the system will read the amount of pressure on the openers and adjust up or down as required. This is the recommended setting.

3. **Smart Hitch / Wing Fold Area** – This area consists of turning the smart hitch on or off and control the wing functions.
   Smart Hitch: If the machine is equipped with a Smart Hitch use the ON/OFF areas to toggle the Smart Hitch ON or OFF.
   Outer Wing Fold Button: Push this button to unfold the outer wings.
   Inner Wing Fold Button: Push this button to unfold the inner wings.
   Left Wing Lock radio Button: When the outer wings are unfolding or folding up use this radio button to lock the left wing into its current position. Uncheck the radio button to unlock the wing.
   Right Wing Lock radio Button: When the outer wings are unfolding or folding up use this radio button to lock the right wing into its current position. Uncheck the radio button to unlock the wing.

4. **Key Board Area** – Use these keys to enter valves for areas that require an input value.

VIPER SETTINGS

AIR CART AND PRODUCT CONTROLLER NODE SETUP

Configuring the Air Cart Node

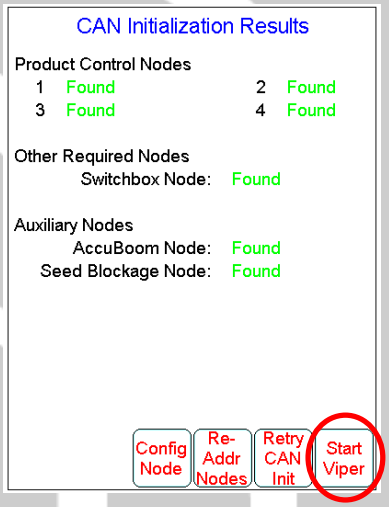
The air cart node should be set up for the maximum number of bins capable of being controlled by the Zone Command system. It is recommended to disconnect the product controller node from the CANbus network during the initial setup of the air cart node. Refer to the following procedures to set up the air cart node on the CANbus network.

Setting up the Control Channels

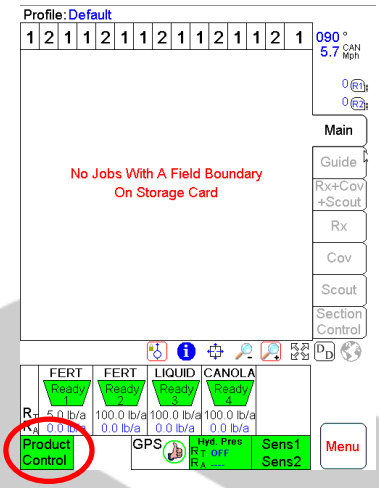
Initially, the air cart node is configured to provide five control channels for the Zone Command system. It is recommended to remove control channels to configure the node for the maximum number of bins used with the air seeder system or to make control channels available for a product controller node to control liquid product application with the Zone Command system.

To remove control channels from the air cart node:

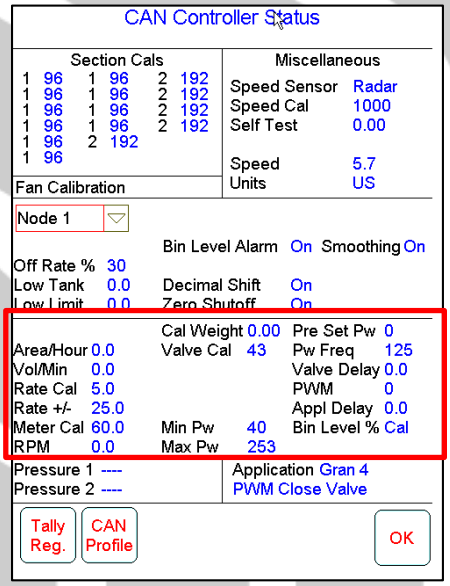
1. From the CAN Initialization Results prompt, select the **Start Viper** option and allow the Viper Pro application to initialize.



2. From the Viper Pro main screen, touch the **Product Control** button in the lower, left corner of the Viper Pro display.



3. The first node settings screen for the selected control channel will be displayed. Touch in the area where it displays Cal Weight.



4. Touch the **Next** button along the right side of the screen to display the second node settings screen.
5. Touch the displayed valve cal value. Using the on-screen keyboard, enter a valve cal value of '900#' where # is the desired number of control channels assigned to the air cart node. For example, enter a value of '9005' in the valve cal to enable all five control channels on the air cart node.
6. Touch the **OK** button until the Viper Pro main screen is displayed.
7. Select the **Menu** button in the lower, right corner of the display and select the **Exit, Exit to Menu** options.
8. When the Program Selection Menu screen displays, select the **SEEDMASTER v3.##.##** option to restart the Viper Pro application. The CAN Initialization Results screen will display again.
9. Verify that the appropriate control channels are displayed before touching the **Start Viper** button.

Configuring the Product Controller Node

The product controller node maybe configured on the Zone Command system to control liquid/nh3 product(s) application during seeding operations. When configuring the product controller node to the Raven CANbus, the network may need to be readdressed to properly detect and address the node on the network.

***Note**: Make sure that the air cart node is properly configured before performing any configuration to the product controller node.*

1. Power up the Viper Pro field computer.
2. If the product controller node requires a readdress, the Viper Pro will display a prompt indicating so. If you are prompted to Re-Address CAN Nodes follow setups 3 to 6. If you are not prompted to Re-Address CAN Nodes skip to step 7.
3. Touch **Yes**. The Re-Address CAN Nodes screen displays.
4. Cycle power to the air cart node.

***Note**: To power cycle a node, temporarily disconnect the 5-amp logic power fuse located on the air cart node cable.*

5. Touch the **Next** button on the Viper Pro to re-address the product controller node. Remove the 5-amp logic power fuse located on the product controller cable.

6. Touch the **Finish** button to finish re-addressing nodes on the CANbus. The Viper Pro will re-initialize the CANbus system using the new node addresses and display the CAN Initialization Results screen. The "AccuBoom Node" entry indicates that the field computer has recognized the product controller node.
7. Touch the **Config. Node** button to reconfigure the number of control channels available on the product controller node. Choose the number of Liquid/NH3 product(s) being added to the system.
8. Touch **Start Viper** when the appropriate number of control channels are displayed as 'Found' on the CAN Initialization Results screen.

ZONE SETUP

SeedMaster machines with Zone Command require Zone Setup so that the automatic Zone control works correctly and accurately. It will need to be dertermined what the SeedMaster machine setup is. SeedMaster has created a spead sheet that will calcualte the Zone setup measurments and Zone mapping information. The section summary created by the spread sheet provideds the required inforamtion to enter into the Viper Pro for Zone setup. To obtain a copy of the Section Layout Cheat Sheet please contact SeedMaster.

Note: *For the example below the machine setup is a 300 S5X-R-80-12 with a 820-10-D Nova*

Using the "Section Layout Cheat Sheet"

1.) Open the Section Layout Cheat Sheet.
2.) Detemine the machine setup and choose the tab at the bottom of the spread sheet. – *10Sect_Nova_With_5Sect_OB*
3.) Determine the Machine Row Spacing and enter it in the space provided below Row Spacing colum – 12
4.) Determine and enter the Number of Runs for the OnFrame Tank(s) Zones – *Zone 1 = 16 Runs, Zone 2 = 16 Runs, Zone 3 = 16 Runs, Zone 4 = 16 Runs and Zone 5 = 16 Runs.*
5.) Determine the Number of Runs for the Nova Tank Zones – Zone 1 = 8 Runs, Zone 2 = 8 Runs, Zone 3 = 8 Runs, Zone 4 = 8 Runs, Zone 5 = 8 Runs, Zone 6 = 8 Runs, Zone 7 = 8 Runs, Zone 8 = 8 Runs, Zone 9 = 8 Runs and Zone 10 = 8 Runs.

Total Width	# of Openers	Drill Width	Row Spacing	Total # of Zones	# of OnBoard/Liquid Zones	# of Nova Zones
960	80	80.0	12	15	5	10

	ONBOARD OR LIQUID				
Zone # (L to R)	1	2	3	4	5
Enter # of Runs	16	16	16	16	16

NOVA										
Zone # (L to R)	1	2	3	4	5	6	7	8	9	10
Enter # of Runs	8	8	8	8	8	8	8	8	8	8

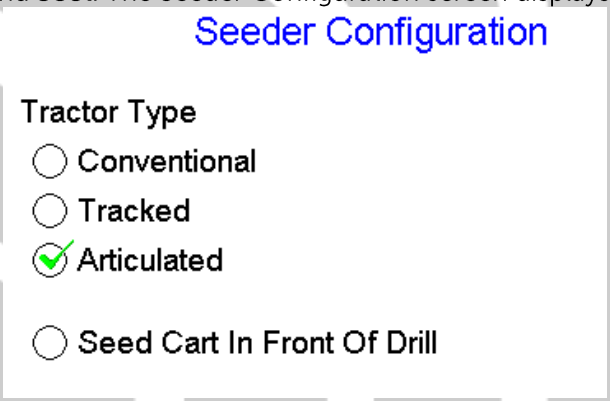
ZONE SUMMARY					
Viper Boom	Width	L/R	Wired As	Display Character	Switch Number
1	96	-432	1	1	1
2	192	-384	11	2	6
3	96	-336	2	1	1
4	96	-240	3	1	2
5	192	-192	12	2	7
6	96	-144	4	1	2
7	96	-48	5	1	3
8	192	0	13	2	8
9	96	48	6	1	3
10	96	144	7	1	4
11	192	192	14	2	9
12	96	240	8	1	4
13	96	336	9	1	5
14	192	384	15	2	10
15	96	432	10	1	5

Now that the Zone Summary information has been determined you will now begin to setup the Viper Pro monitor.

Zone Setup

The Viper Pro must be configured for the specific vehicle and SeedMaster Machine being used for seeding applications. To ensure the best possible results, the Zone Setup Wizard should be completed if any part of the seeding system (i.e. tractor or drill) is changed.

1.) Select **Menu**, **Setup**, and **Sect**. The Seeder Configuration screen displays.



2.) Select the tractor type that best describes the vehicle used to pull the seeder during actual seeding operation. Select one of the following tractor types:
- Conventional - Standard wheeled tractor with front wheel steering.
- Tracked - Tractor with a set of continuous tracks instead of wheels.
- Articulated - Tractor steered by articulating at a pivoting joint.

3.) If the seed or air cart is pulled in front of the drill, select the **Seed Cart in Front of Drill** option.

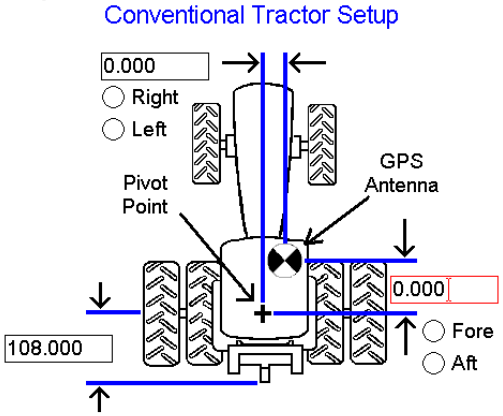
4.) Touch the **Next** button in the lower right corner to advance to the selected tractor type setup screen.

Tractor Setup

The tractor setup screens configure the relative locations of the GPS antenna, the control point or hitch, and the pivot point. These points may be different for the specific tractor type selected.

Note: *All measurements should be taken with respect to the pivot point of the vehicle. If required, set the fore/aft or left/right selections with respect to the pivot point and facing toward the front of the vehicle. Be sure to enter each measurement in the units displayed above the on-screen keypad.*

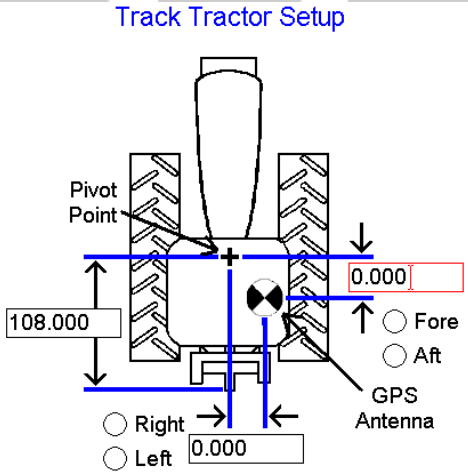
Conventional Tractor Setup



Note: *The pivot point of a conventional tractor is the center of the rear axle.*

1.) Enter the left/right offset of the GPS antenna from the pivot point. The left/right offset must be measured parallel to the vehicle rear axle.
2.) To determine the offset direction, at the pivot point and facing toward the front of the vehicle, is the antenna to the left or to the right? Select the direction of the left/right offset.
3.) Enter the fore/aft offset of the GPS antenna from the pivot point. The fore/aft offset must be measured perpendicular to the vehicle rear axle.
4.) To determine the offset direction, at the pivot point and facing toward the front of the vehicle, is the antenna in front (fore) or behind (aft) of the pivot position? Select the direction of the fore/aft offset.
5.) Measure the distance from the pivot point (center of the rear axle) to the control point or hitch.
6.) Touch the **Next** button and continue to the *Drill Setup* section.

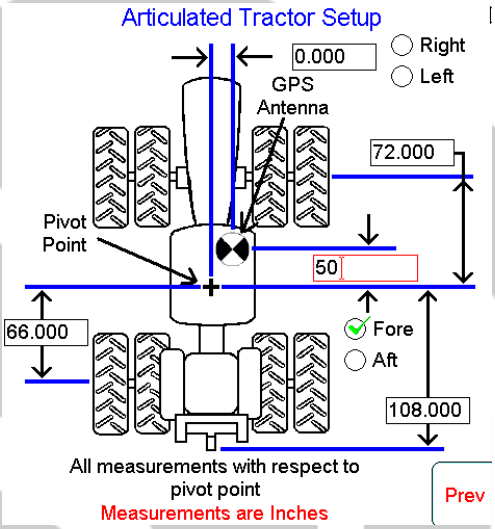
Tracked Tractor



Note: *The pivot point of a tracked tractor is in the center of the track length on the center-line of the vehicle.*

1.) Enter the left/right offset of the GPS antenna from the pivot point. The left/right offset must be measured perpendicular to the direction of forward travel.
2.) To determine the offset direction, at the pivot point and facing toward the front of the vehicle, is the antenna to the left or to the right? Select the direction of the left/right offset.
3.) Enter the fore/aft offset of the GPS antenna from the pivot point. The fore/aft offset must be measured parallel to the direction of forward travel.
4.) To determine the offset direction, at the pivot point and facing toward the front of the vehicle, is the antenna in front (fore) or behind (aft) of the pivot position? Select the direction of the fore/aft offset.
5.) Measure the distance from the pivot point (center of track length) to the control point or hitch.
6.) Touch the **Next** button and continue to the *Drill Setup* section.

Articulated Tractor

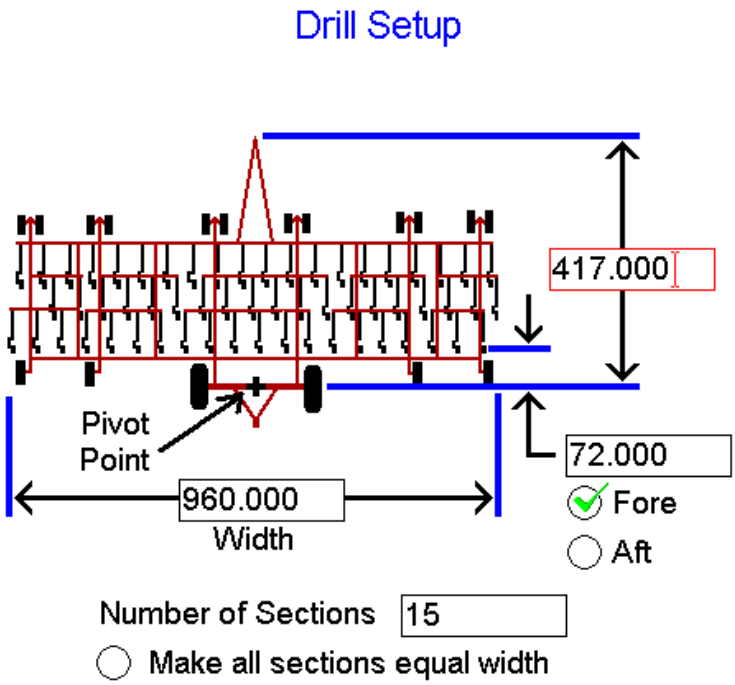


Note: The pivot point of an articulated tractor is center of the articulation joint.

1.) Enter the left/right offset of the GPS antenna from the pivot point. The left/right offset must be measured perpendicular to the direction of forward travel.
2.) To determine the offset direction, at the pivot point and facing toward the front of the vehicle, is the antenna to the left or to the right? Select the direction of the left/right offset.
3.) Enter the fore/aft offset of the GPS antenna from the pivot point. The fore/aft offset must be measured parallel to the direction of forward travel.
4.) To determine the offset direction, at the pivot point and facing toward the front of the vehicle, is the antenna in front (fore) or behind (aft) of the pivot position? Select the direction of the fore/aft offset.
5.) Measure the distance from the pivot point to the center of the front axle.
6.) Measure the distance from the pivot point to the center of the rear axle.
7.) Measure the distance from the pivot point (center of track length) to the control point or hitch.
8.) Touch the **Next** button and continue to the *Drill Setup* section.

Drill Setup

The Drill Setup screen configures the Viper Pro for the specific drill used with the Zone Command system.



Note: The pivot point of the drill is located between the implement wheels.

1.) Enter the total width of the drill as specified from the Section Layout Cheat Sheet, under "Total Width".

Total Width	# of Openers	Drill Width	Row Spacing	Total # of Zones	# of OnBoard/Liquid Zones	# of Nova Zones
960	80	80.0	12	15	5	10

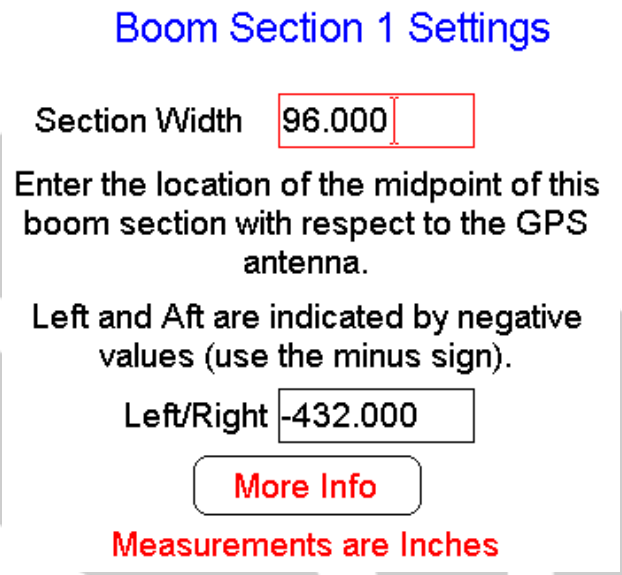
2.) Measure the distance from the implement hitch to the drill pivot point (center of the implement axle).
3.) Measure the fore/aft offset of the drill pivot point (center of implement axle) to the rear most row of openers. The fore/aft offset must be measured parallel with the direction of forward travel.
4.) Select the direction of the opener offset from the implement pivot point. To determine the offset direction, at the drill pivot point and facing toward the front of the vehicle, are the openers in front (fore) or behind (aft) of the drill pivot position? Select the direction of the fore/aft offset.
5.) Enter the number of sections (zones) specified from the Section Layout Cheat Sheet, under "Total # of Zones".
6.) Touch the **Next** button on the Drill Setup screen and proceed to the *Section (Zone) Settings* section to continue the Zone Command system configuration on the field computer.

Section (Zone) Settings

Configuring zones on the field computer is critical for the Zone Command system to control granular and liquid zones correctly during seeding operations. To properly map coverage for each product and shutoff zone, the Viper Pro requires that zones be programmed from the left to right side of the implement based upon the zone midpoint.

Note: Use the Zone Summary that was created from the Section Layout Cheat Sheet.

1.) After the Drill Setup screen, the Boom Section Settings screen will be displayed for the first zone.



2.) Touch the "Section Width" value and use the on-screen keyboard to enter the width of the section furthest to the left on the drill or implement. From the zone summary start on Viper Boom 1 and so on.

3.) Touch the "Left/Right" value and use the on-screen keyboard to enter the left or right offset of the section from the center of the implement or drill. If the section offset is to the left of the implement or drill center line, enter a negative value for the "Left/Right" value.

ZONE SUMMARY					
Viper Boom	**Width**	**L/R**	**Wired As**	**Display Character**	**Switch Number**
1	96	-432	1	1	1

*Note: When programming zones for control by the Zone Command system, zones **must** be programmed from left to right, based upon the section midpoints, on the implement or drill width. When programming zones, be sure to start with the zone centered furthest left on the implement. While programming zones for the Zone Command system, be sure to keep record of zone settings programmed on the Viper Pro. The programmed zones must be "mapped" to section (zone) switches later in the programming process and it is critical for system performance to properly match zones and control switches.*

4.) Touch the Next button and continue to set up section (zone) widths and offsets as necessary until all section (zone) widths and offsets have been entered on the field computer.

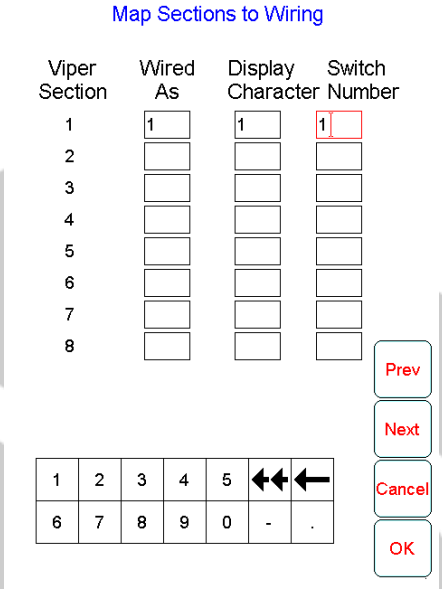
5.) On the last section (zone) setting screen, touch the Next button to display the Boom Setup Summary screen. Review the section (zone) settings and ensure all zones have been programmed correctly before selecting the Next button.

Proceed to the Map Sections to Wiring for Switch Box Controls section and continue setting up Zone Command.

Map Sections to Wiring for Switch Box Controls

Note: Use the Section Summary that was created from the Section Layout Cheat Sheet. Mapping zones on the Zone Command system is a two part process. Complete the following procedures for the granular and liquid shut-off zones as necessary before proceeding to the Section Selection.

1.) Pressing the **Next** button on the Boom Setup Summary screen will advance to the Map Sections to Wiring screen.



The Map Sections to Wiring screen requires the operator to program the zone wiring for each of the products and also allows the operator to set the desired on-screen display character and the Raven CAN switch box switch number for controlling the zone.

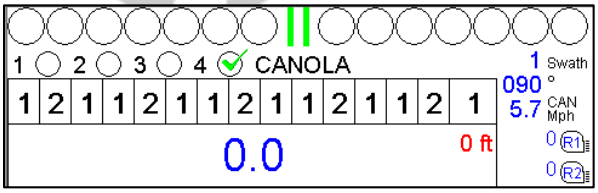
*Note: It may be necessary to use the **Next** and **Prev** buttons on the Map Sections to Wiring screen to view additional zones during the mapping process. Be sure to review the entered values before touching the **OK** button to save the displayed settings. Use the Zone Summary that was created from the Section Layout Cheat Sheet to enter the Wired As, Display Character and Switch Number.*

ZONE SUMMARY					
Viper Boom	**Width**	**L/R**	**Wired As**	**Display Character**	**Switch Number**
1	96	-432	1	1	1

2.) Touch the "Wired As" value for the first Viper Boom section and enter the Wired As displayed for Viper Boom 1.

3.) Next, enter the desired "Display Character" for the Zones. See Zone Summary for reference.

Note: The display character value is displayed at the top of the display on the main screen during seeding operations.

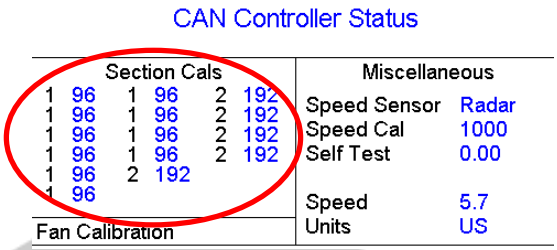


4.) Complete the mapping of the Zones; enter the switch number associated with each product on the Raven CAN switch box. Touch the "Switch Number" value for Viper Boom 1 and use the on-screen keypad to enter a value of '1."

5.) Touch "OK" to complete the Map Sections to Wire portion of the setup.

Section Selection

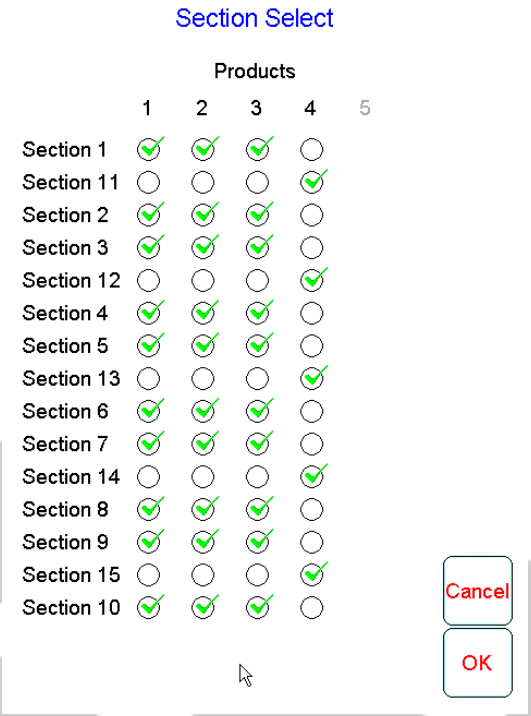
The Section Select screen displays available products along the top of the screen and the previously configured zones along the left side of the screen. Section Select page assigns products to zones. It will need to be determined what products are controlled by what zone. To access the "Section Select Page": Touch **Product Control** on the main screen then the **Section Cals** Area.



Note: By using the Zone Summary page it can be determined what Zones are associated to the corresponding tanks. The below example shows that the dark orange color represents the Nova Tank and the yellow color represents the OnBoard Tank.

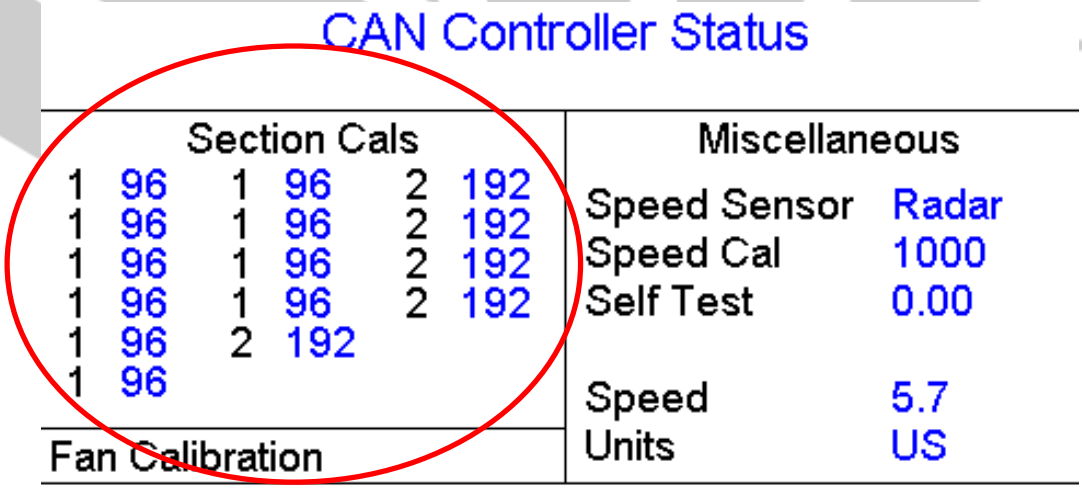
ZONE SUMMARY					
Viper Boom	Width	L/R	Wired As	Display Character	Switch Number
1	96	-432	1	1	1
2	192	-384	11	2	6
3	96	-336	2	1	1
4	96	-240	3	1	2
5	192	-192	12	2	7
6	96	-144	4	1	2
7	96	-48	5	1	3
8	192	0	13	2	8
9	96	48	6	1	3
10	96	144	7	1	4
11	192	192	14	2	9
12	96	240	8	1	4
13	96	336	9	1	5
14	192	384	15	2	10
15	96	432	10	1	5

Note: The section number displayed is the 'Wired As' value programmed during the Map Sections to Wiring.



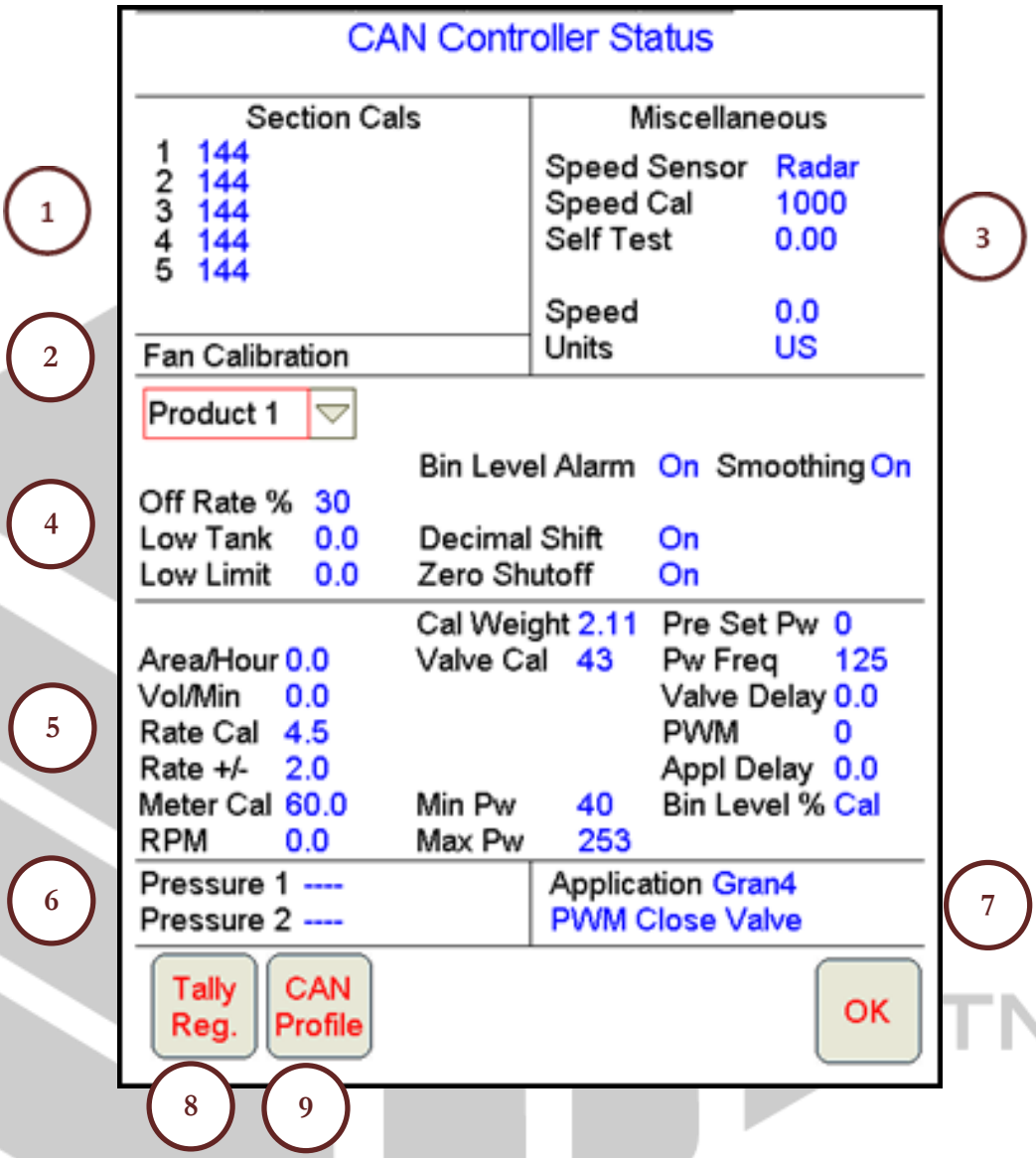
1.) Locate the Zones configured for the Nova Tank.
2.) To associate the Nova Tank Products to individual zones, select the Section number in each row and the product in each column. In this example the Nova Tank represents products 1, 2 and 3.
3.) Locate the Zones configured for the OnBoard Tank.
4.) To associate the OnBoard Tank(s) Products to individual zones, select the Section number in each row and the product in each column. In this example the OnBoard Tank(s) represents product 4.
5.) Touch "OK" to complete the Zone Setup.

Note: Review the Section Cals area to determine that the Zones are in order.



PRODUCT CONTROL SETUP

To access the Product Control Setup page from the main work screen, press "Product Control" located in the very bottom left hand corner of the screen.



It is important to setup each product that will be used on your machine.

Note: Areas 1,2,3,6 are global settings in such that the settings in these areas apply to all Viper Pro operations. Areas 4, 5, 7 are local settings to the selected product. The selected product is displayed in the top left hand corner of area 4. To change what product settings are being displayed, touch the down arrow beside the product displayed and select the desired product.

1. Section Cals Area – The Section Cals Area displays an overview of the current zone section widths and mapped display characters. Review the Zone Setup Section under "Section Selection" for details on configuring the implement.

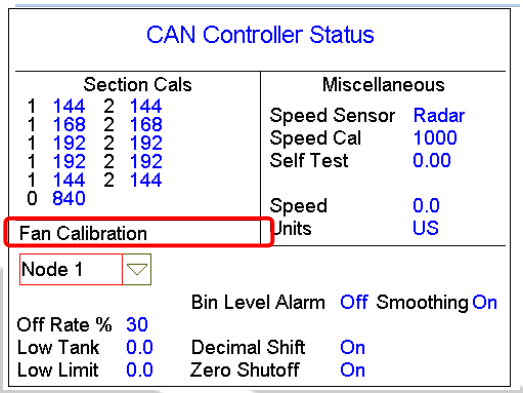
2. Fan Calibration Area – Touching in this area will take you to the Fan Calibration page. The Fan Calibration page setups up the Fan Sensor Cal values and Air Pressure Cal Value. You can also set Fan Alarms from this page.

3. **Miscellaneous Area** – The **Miscellaneous Settings** Area displays an overview of current selections for the display units, speed sensor, Speed Cal Value (Set at 1000 for GPS Speed), current vehicle speed and Self-Test for simulating speed when sitting stationary. Information about the CANbus nodes is also accessible by touching within this area.
4. **Product Area** – This area allows you to choose what product settings are being displayed. By changing the product it will change the settings displayed for each product. In this area you change different alarm settings.
5. **Product Calibration Values Area** – This area allows you to change specific calibration values for the product selected in the Product Area. These calibration values allow for fine tuning the hydraulic motor controlling that specific product. Use this area with caution as changing these values can drastically change the performance of the Hydraulic Motor and product application can be altered and become unstable.
6. **Pressure Area** – This area is a static display of liquid pressure sensors if they are present on the system.
7. **Application Area** – This area allows you to change the type of application that particular product is, it also you to change the Valve Type that is being controlled.
8. **Tally Reg Button** – Touch the Tally Registers button to view or reset application volume and area tallies for each node or product or the Viper Pro odometer. See page 108 of the Raven OmniSeed Manual for more details.
9. **CAN Profile Button** – A CAN Profile may be used to copy or back up the settings for nodes on the CANbus. Use a CAN profile to quickly reset or restore settings for various seed types or products controlled with the Viper Pro field computer.

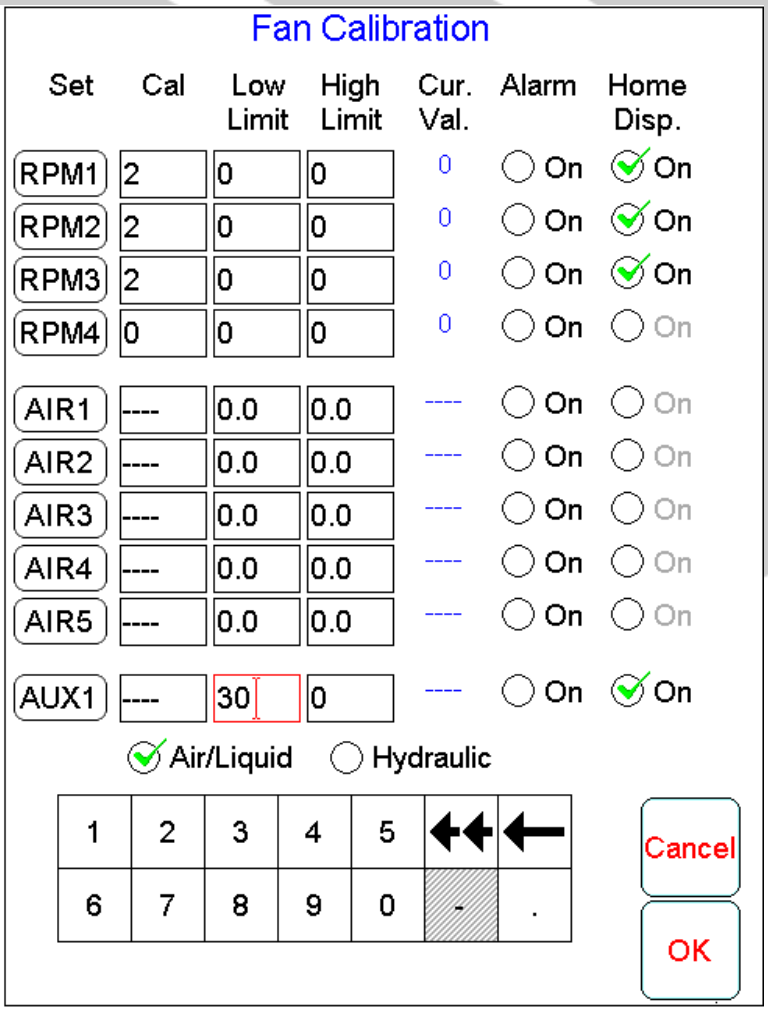
NOTE: FOR MORE ADVANCED PRODUCT CONTROL SETTINGS AND FEATURES PLEASE REFER TO THE RAVEN OMNISEED MANUAL CHAPTER 8 PAGES 137 through 155.

FAN CALIBRATION SETUP

To access the Fan Calibration Page Touch within the Product Control area on the main screen then from the CAN Controller Status page touch the Fan Calibration Area.



The Fan Calibration screen will be displayed.



RPM 1, RPM 2, RPM 3, and RPM 4: There are 4 available outputs for the FAN RPMs. Depending on the machine configuration RPM 1 through 4 can be configured several different ways. To determine what fan is tied to what are RPM, turn on the seed fan then note the RPM speed under current cal. NOTE: The **cal** number needs to be set to two. A cal number of 2 indicates two bolt heads on the fan and that is what the RPM sensor reads.

Low Limit: The low limit setting refers to the FAN RPM. Enter a low limit that the FAN could spin without plugging. If the Fan RPM goes below the set limit the system will shut off the meter drives reducing the risk of plugging. The low limit will also prevent the product meter from spinning if the FAN is not turning.

High Limit: The high limit setting refers to the FAN RPM. Enter a high limit that the FAN could spin without seed bounce. The high limit will only alarm you if the RPM is greater than the set valve. It does not shut off the meter it only alarms.

Cur Val: Displays the current value of the Fan RPM

Alarm: A check mark indicated that the Low/High Limit alarms are turned on. Remove the check mark to shut off the Low/High Limit alarms.

Home Display: If there is a check mark in the home display it will display the value on the main page when operating in the field. Note that only 4 values can be displayed on the main screen.

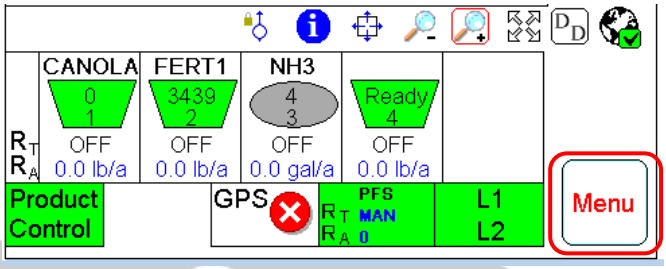
AIR 1, AIR 2, AIR 3, AIR 4, AIR 5: NOT USED

AUX 1: The Auxiliary 1 output is used to determine the PSI of the regulated air on the Air Compressor. A Low Limit of 30 is entered from factory; this sets the low limit so if an airline gets damaged or the compressor fails the system will alarm the operator. The zone command system relies on the air system to operate correctly.

AGTRON RUN BLOCKAGE SETUP

The Viper Pro will monitor seed or product flow during seeding operations. If an obstruction is detected, the field computer will display information from the sensors to help the operator quickly locate the obstruction.

The status of the seed blockage sensor system is displayed at the bottom of the Viper Pro display.

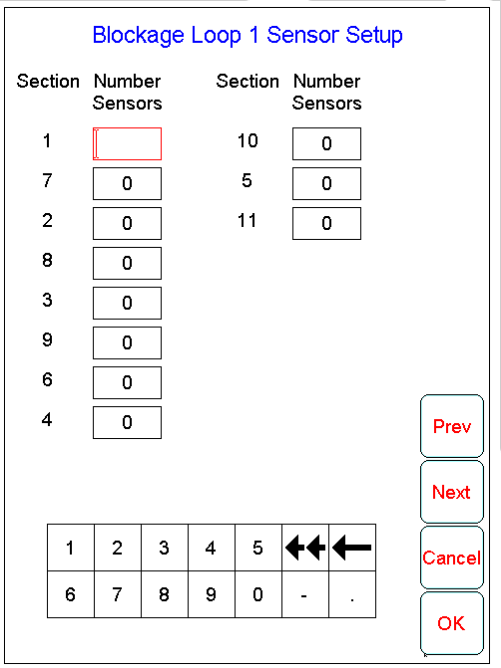


The field computer may be connected to two separate sensor loops with up to 120 sensors per loop to monitor seed flow at a single distribution tower or individual openers across the drill depending upon the level of system monitoring desired.

Configuring Blockage Sensor Loops

To properly monitor the seed delivery system, the Viper Pro must be configured for the number of seed blockage sensors installed in each section of the drill.

1. Review the Zone Setup section on page 83 to configure the air seeder and drill and touch the **Next** button on the Section Width Setup screen to display the Blockage Loop 1 Sensor Setup screen.



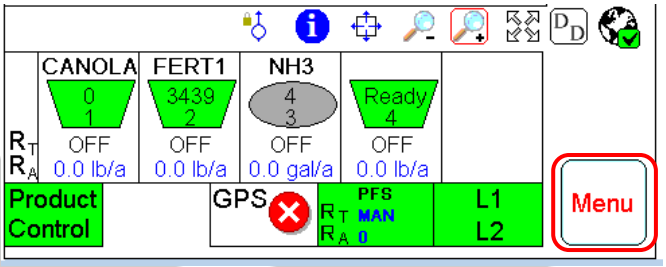
2. Touch the **Number Sensors** field and use the on-screen keypad to enter the number of sensors in loop 1 for each configured section of the drill.
   ***Note**: Only enter values for the number of configured sections on the drill. Leave the value at zero for any unused sections.*
3. Touch the **Next** button and repeat the above process to configure sensor loop 2 if applicable.
4. Touch the **OK** button to complete the section calibration and save the entered settings.

Seed Monitor Setup

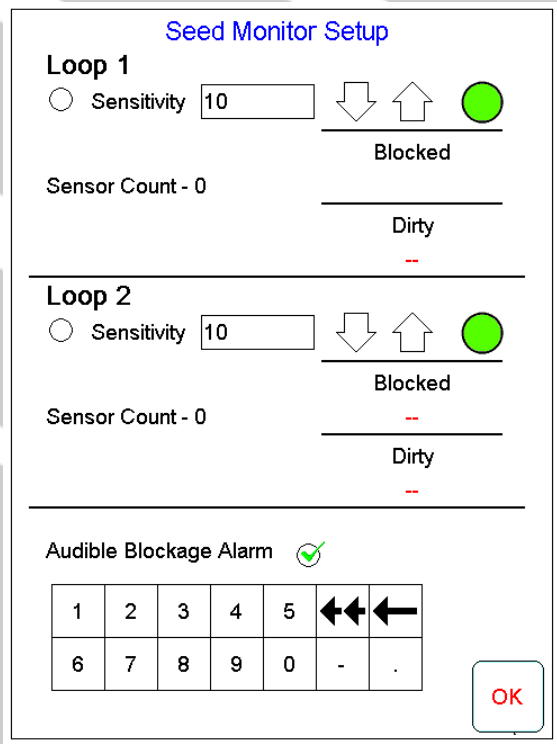
Each seed sensor loop may be configured individually to allow the Viper Pro system to accurately monitor the status of separate delivery systems (e.g. seed or product tubes) and alert the operator to obstructions in either delivery system.

To setup the seed monitoring system:

1. Touch the seed blockage sensor status area on the main screen.



The Seed Monitor Setup screen will be displayed.



2. The Seed Monitor Setup screen displays the following information for sensors in Loop 1 and Loop 2.

Enable Sensor Loops. Touch the radio button in front of the sensitivity field to enable sensor loops.

Sensitivity: Use the sensitivity value to set the approximate number of seeds per second which each sensor in the loop should detect when the system is operating normally. If a sensor does not detect the set value for seeding rates, the system will display a blockage or obstruction and indicate which sensor is detecting the error. The default sensitivity value is 15.

To adjust the sensitivity, either:

- Touch the current sensitivity value and use the keypad at the bottom of the screen to enter a new sensitivity value, or
- Use the up or down arrows to the right of the sensitivity value to increase or decrease the sensitivity value in smaller increments.

Status: The status indicator displays the status of seed or product flow in the seed tubes. The seed blockage status will display:

 Green when the system is operating normally.

 Yellow when a product blockage or dirty sensor is detected in the system. Check the indicated sensor locations in the Blocked display and clear any obstructions as necessary during operation.

 Red if a communication issue is detected with the seed blockage sensors. Check sensor assemblies and cables for disconnected or damaged parts and replace parts as necessary.

***Note**: The seed blockage sensor status area on the main screen will provide the same status displays for each sensor loop as described above to allow the operator to monitor the seed blockage system throughout the seeding operation.*

Sensor Count: Check that the programmed sensor count for loop 1 and loop 2 matches the number of sensors installed on the drill. To adjust the number of sensors, refer to the Configuring Blockage Sensor Loops section on page 2.

Blocked: When a blockage is detected in loop 1 or loop 2, the sensor number(s) which detect an obstruction or blockage will be displayed in this area. Check these sensor locations for obstructions in the line to clear the blockage condition.

***Note**: To help locate blockages during operation more quickly, it is recommended to number the sensors. Refer to the seed blockage sensor installation instructions for details on numbering the sensors.*

Dirty: Sensors may need to be cleaned periodically during seeding operations to ensure that the system is accurately detecting the flow of seed or product through seed tubes. Check and clean the indicated sensor(s) to ensure optimal system performance.

When monitoring particularly dirty seed types or products, it may be necessary to clean each sensor in the loop when the system indicates a sensor or sensors in the loop are dirty.

Setting the Sensitivity

Refer to the following table to set and adjust the sensitivity setting for each loop for a specific seeding operation.

Sensitivity (cont.)	Seeds per Second
0a	Loop Off
1b	1 Seed every 30 seconds
5b	1 Seed every 20 seconds
10b	1 Seed every 10 seconds
15	1
20	7
30	17
40	27
50	44
60	80

Sensitivity (cont.)	Seeds per Second (cont.)
70	148
80	281
90	539
100	1043
110	2019
120	4400
121	4800
122	5300
123	6400
124	7000

a. A sensitivity setting of zero will disable the sensor loop and blockage alarms.
b. A sensitivity value less than 15 will allow the sensor loop to scan for longer than 1 second periods to count seeds down to one seed per 30 seconds.

The best obstruction and blockage detection is achieved when the sensitivity is set as high as possible without encountering a constant alert condition. To set the sensitivity for a specific seeding operation:

1. Ensure that the system is clear of obstructions.
2. Select and enter a sensitivity value from the table above and begin seeding. Ensure that the system continues to display a normal operating condition at the initial setting.

***Note**: If the seed blockage sensors consistently display a blockage alert, select a lower initial sensitivity value before proceeding.*

3. Increase the sensitivity until the seed blockage system indicates a blockage.
4. Decrease the sensitivity by 3 to 5 units at a time until the field computer no longer indicates blockage conditions.

***Note**: Do not decrease the sensitivity value below the initial value. Check the indicated sensor locations and clear any obstructions and repeat the above procedure if the sensitivity value is decreased below the initial setting.*

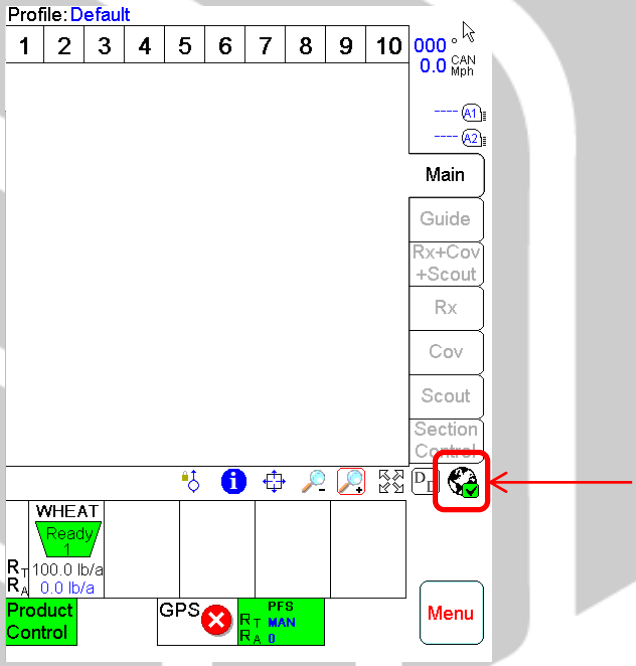
SLINGSHOT REGISTRATION & REMOTE SERVICE

The Viper Pro field computer, with a Slingshot Field Hub, allows the operator to wirelessly transfer application data back to the home or office and transfer prescription data from the office to the field without the hassle of driving back and forth between locations. This feature also adds the ability to allow service technicians and support specialists to remotely control the Viper Pro field computer, help is now just a touch away.

Via the Field Hub wireless router, the Viper Pro can also be used to keep up-to-date with the latest weather forecasts or crop prices from internet web sites while still managing product application.

Wireless Communication Status

The status of wireless communications is displayed on the Viper Pro main screen in the tool bar below the map.

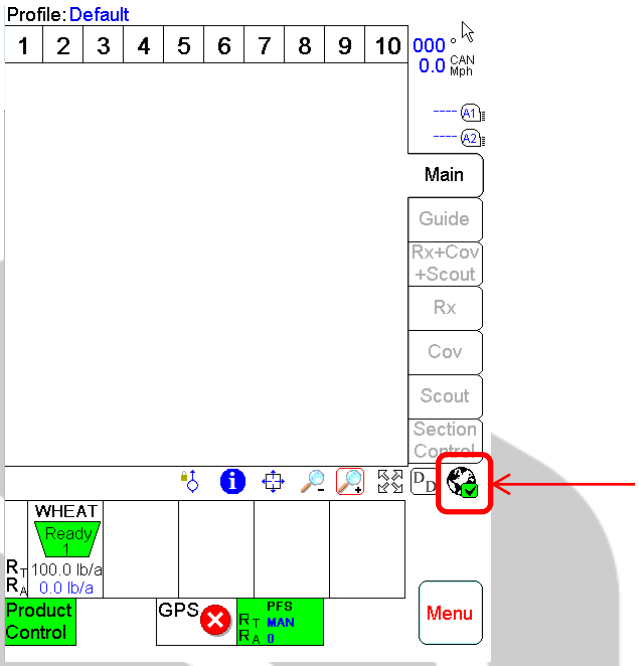


The following icons may be displayed in the wireless status area:

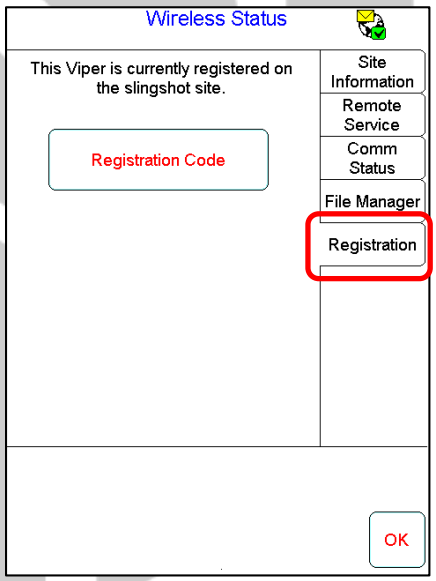
	No Device Connected - No supported wireless device is connected to the ethernet port on the Viper Pro. This icon is also displayed if wireless communication is unavailable or has been lost.
	Communication OK - The status of wireless communication is good and no errors or alarms are present.
	Communication Error - An error has occurred with wireless communication or during a file transfer.
	Communication Lost or Unavailable - This icon will be displayed if the registration process has not been successfully completed.

Registering the Viper Pro to the slingshot Field Hub

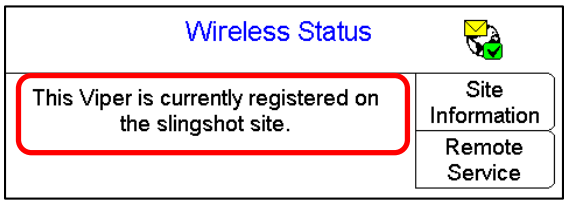
1. Touch the Wireless Communication status Icon



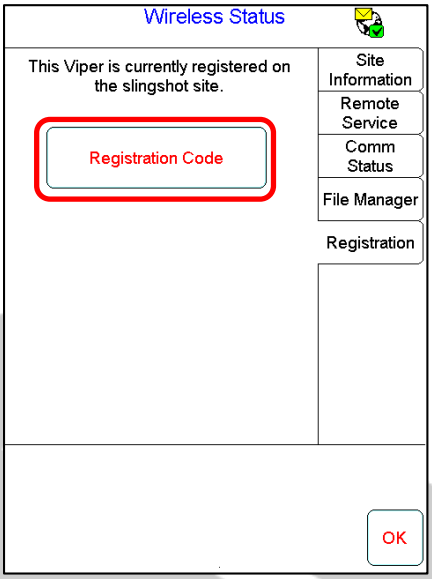
2. Touch the **Registration** Tab



Note: If the Viper Pro is has been previously registered it will indicate so on the top of the screen. If you did not perform the registration please follow the steps below to re-register your Viper Pro display.



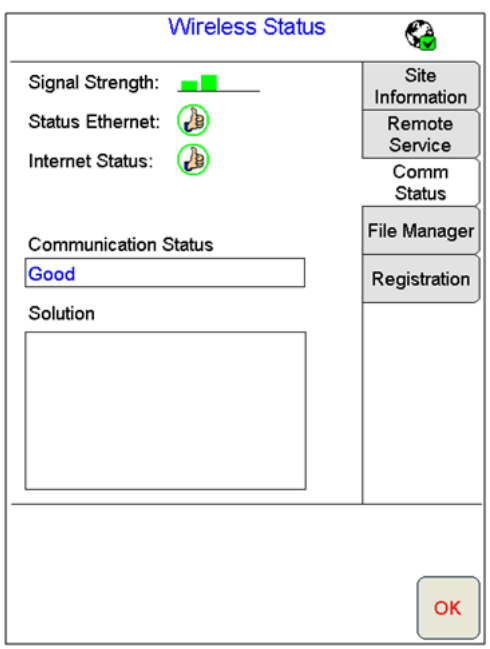
3. Touch the "**Registration Code**" Button



Note: *If the Viper Pro was previously registered you will get a "Re-Registration Warning", you will want to touch "YES" if you are performing a Re- Registration.*

4. You will get a pop up indicating that you are going to register the Viper Pro, touch "YES.
   Note: *The registration process will now automatically link your Viper Pro display to your slingshot Field Hub. The automatic registration process can take up to five minutes.*

5. The registration process is complete
6. To ensure the registration process was successful touch on the "Comm Status" tab. The Wireless Status screen will be displayed, ensure that you have good signal strength, and all the thumbs are up. See below.

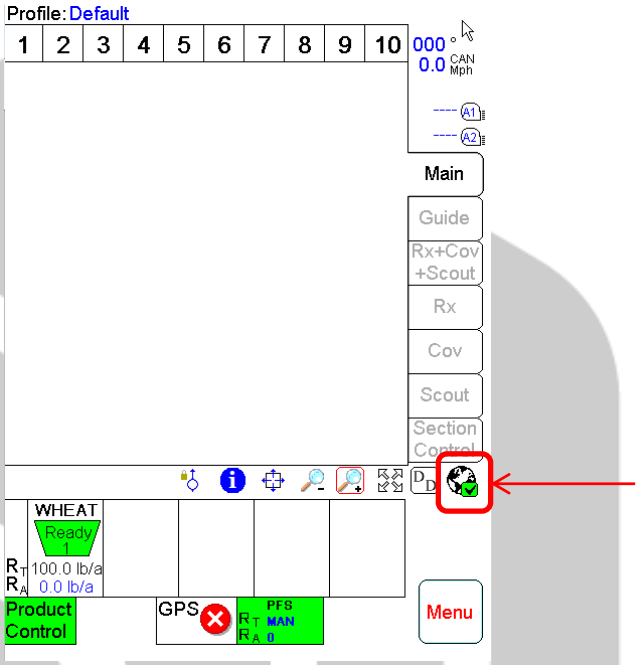


Preforming Remote Service

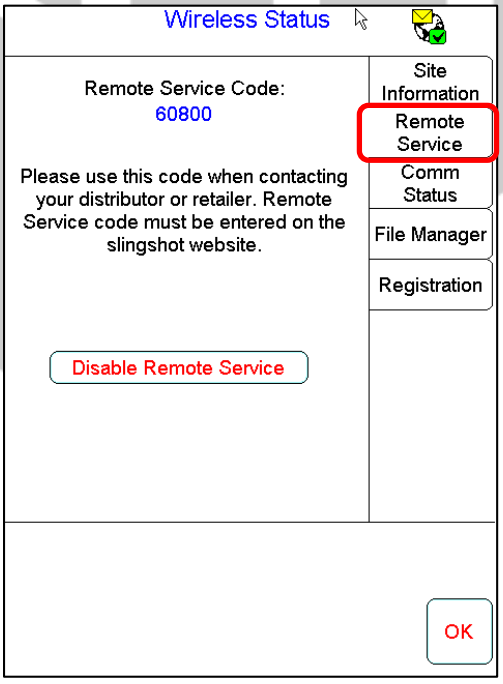
Remote Service is a two-part operation. It requires someone at the Field Computer and some in a remote location at a PC. The person at the field computer will initiate the field computer for remote service and the person remotely will log into the Viper Pro Field Computer.

Enabling Remote Service:

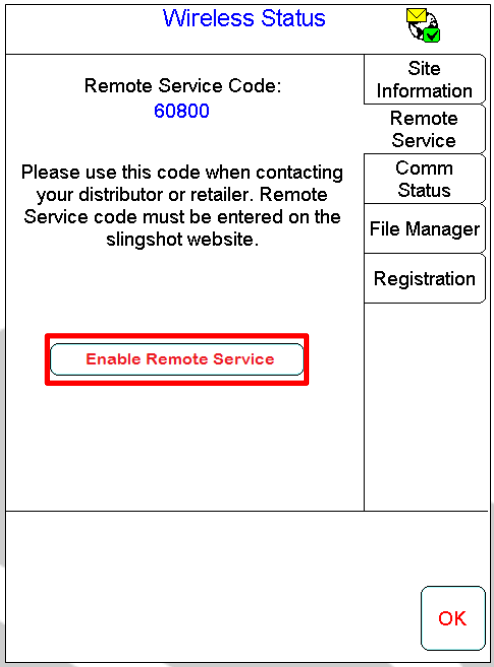
1. Touch the Wireless Communication status Icon



2. Touch the "Remote Service" Tab

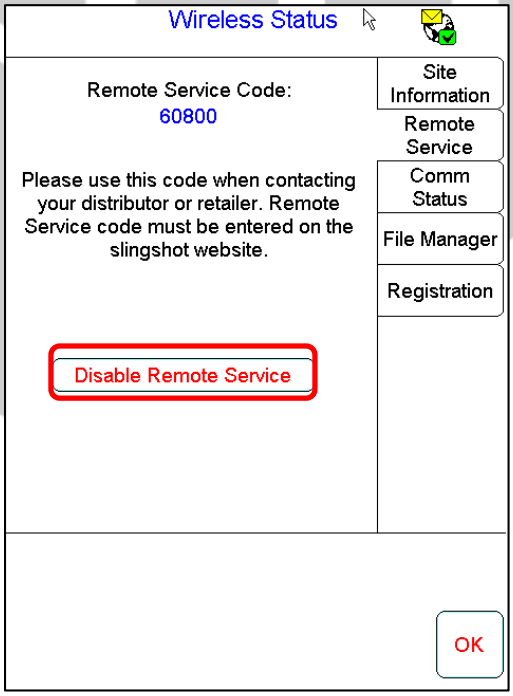


3. Touch the "Enable Remote Service" Button



Note: After touching Enable Remote Service you will get a popup screen indicating that "Remote Service has started successfully", Touch "OK"

4. Remote Service is now active. You will need to provide the Remote Service code to the person that will be logging in remotely. You will receive a pop up every 15 minutes reminding you that remote service is still active.
5. To disable remote service, touch the "Disable Remote Service" Button.



Remotely logging into a Viper Pro Field Computer:

Note: Before you start this process you will need a Raven Slingshot Account. To obtain a Raven Slingshot Account go to www.ravenslingshot.com and click on "Request Account"

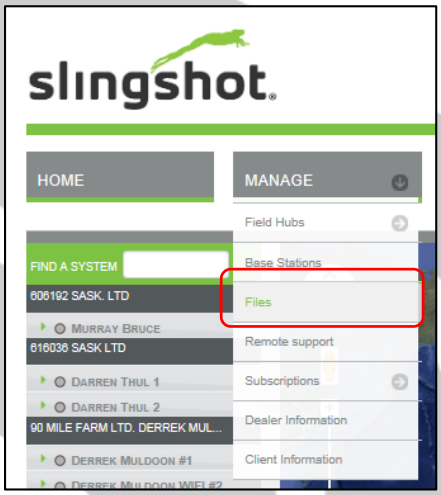
1. To login into your Raven Slingshot Account go to www.ravenslingshot.com and click on "Log In"
2. You will enter your user name and password to login.
3. Once you are logged in click on "Manage" then "Remote Support".
4. You will now need to get the service code from the person in front of the Viper Pro field Computer
5. From the Remote Support Page you will now enter the Service Code and click GO.
6. You should now be logged into a remote Viper Pro Field Computer.

Note: If your log in is unsuccessful you may need to update your PC's java.

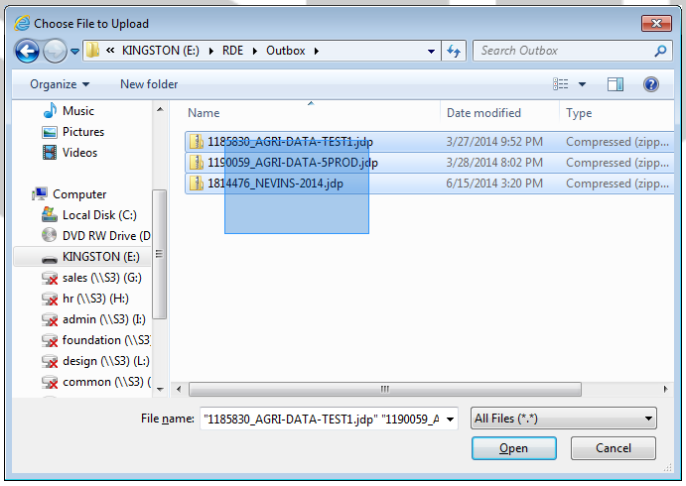
SLINGSHOT FILE TRANSFER

TRANSFERING JOBS FROM USB TO COMPUTER

1.) Plug in your USB drive with the saved jobs
2.) Log into your slingshot web account. www.slingshot.com
3.) Click "Manage"
4.) Click "Files"



5.) Click "IMPORT FILE"
6.) Click "MY LIBRARY"
7.) Browse to the USB drive with the saved jobs
    a. Click on the USB drive on the right side then browse to the Outbox
    b. Highlight all of the Job files that you would like to import to slingshot
    c. Click Open

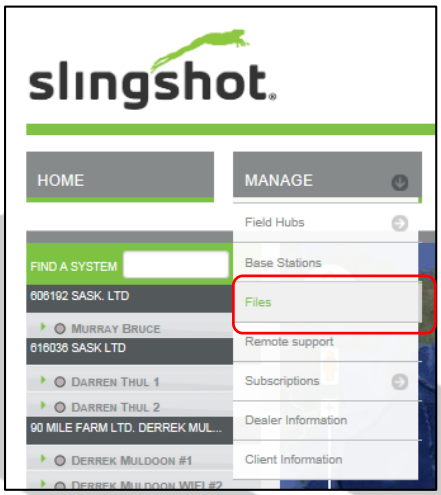


"

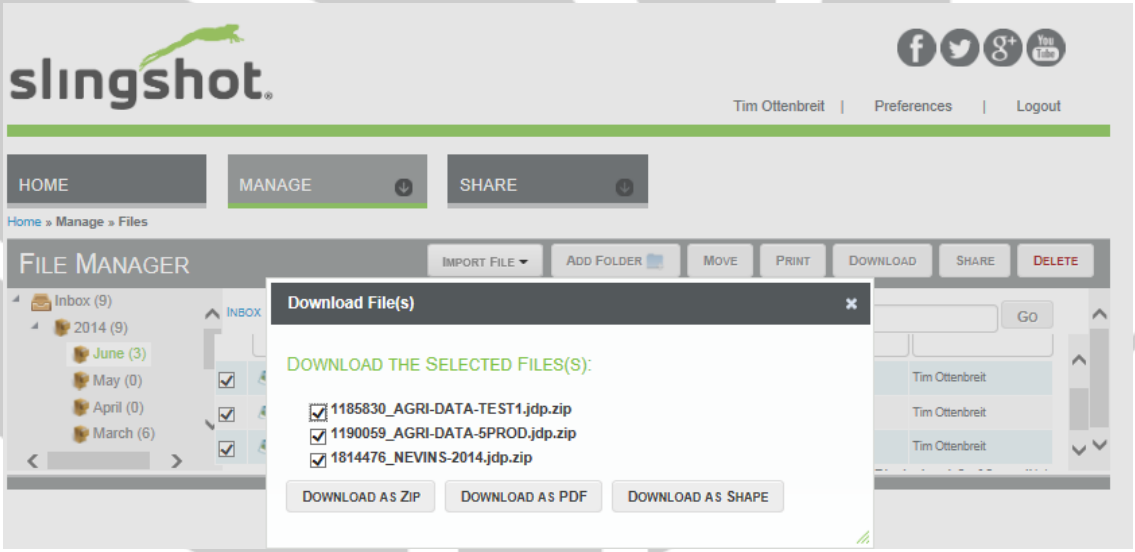
8.) Your files will begin to transfer to your slingshot account. Depending on the amount of files and your internet speed this could take up to 60 minutes.
9.) You will now see your files on your slingshot account

EXPORTING JOBS AS SHAPE FILES

1.) Log into your slingshot web account. www.slingshot.com
2.) Click "Manage"
3.) Click "Files"



4.) Place a check mark in all of the files that you would wish to export as shape files
5.) After checking off the files click "Download"
6.) A new window will pop up click "Download as Shape"



7.) A new window will pop up and allow you to save the files to your chosen destination. Its recommended to save the files to your desktop so they can easily be found.
8.) The folder will save to your desktop as zip folder. You will need to unzip the main folder.
9.) Inside the main folder you will find all of your job files. Each Job file is in a zipped format with shape files inside.

VIPER PRO FILE MAINTENANCE

File Maintenance can be defined as the process of archiving specific files from the Viper Pro and deleting files that are no longer needed.

It is recommended that the user perform this maintenance at the end of each day. If this is not possible, maintenance should be performed at least once a week.

File maintenance ensures that the Viper Pro system can perform at optimal efficiency by removing files that are no longer needed. Maintenance also safeguards valuable information from being lost in the event that a file is damaged or corrupted, since files will be archived on a personal computer or laptop for future reference.

All Viper Pro job files are stored in memory located inside the Viper Pro. The storage location for these files is of a fixed size and will hold a large, but limited, number of files. File maintenance should be conducted on a regular basis to ensure sufficient storage space is available for future jobs.

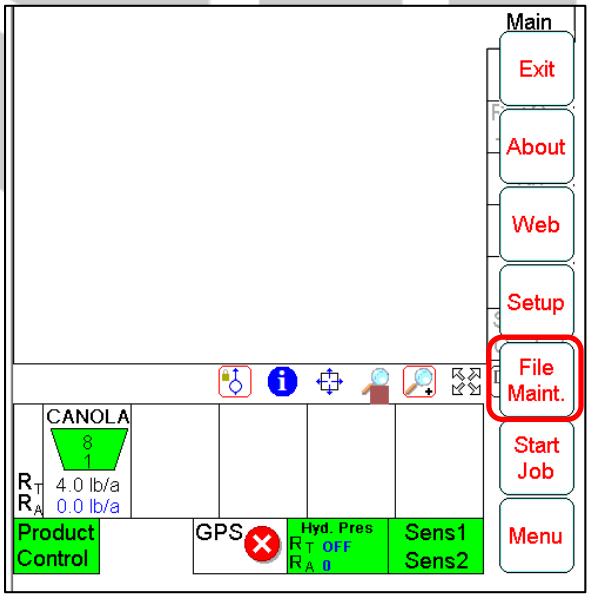
Files can be loaded onto the Viper Pro or downloaded from the Viper Pro using an external USB thumb drive. Insert the USB thumb drive into the USB connector located in the lower left hand corner of the Viper Pro.

Note: Do not leave the USB flash drive in the front USB connector while operating the machine. Insert the USB flash drive into the front USB connector only to perform file maintenance.

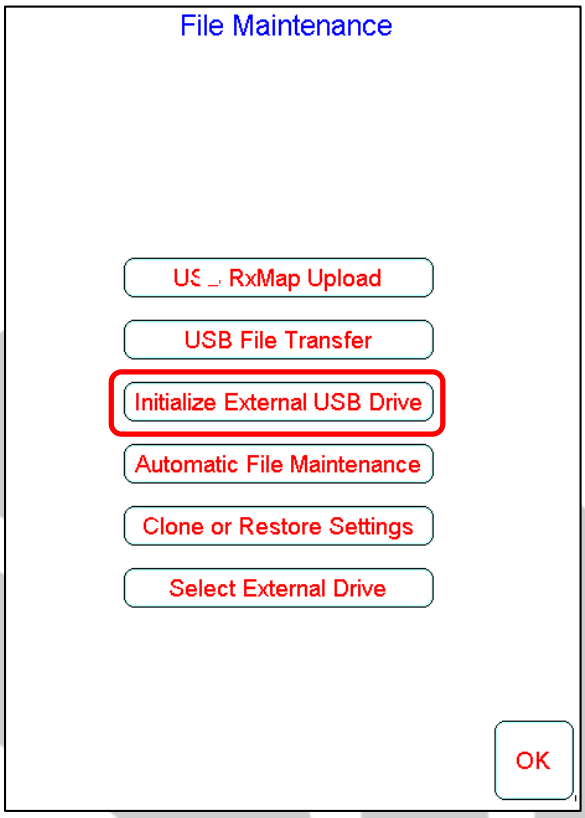
Preparing a USB Flash Drive for File Maintenance

The USB flash drive must be prepared with the necessary file folders to simplify file maintenance. To populate the thumb drive with the necessary file folders, do the following:

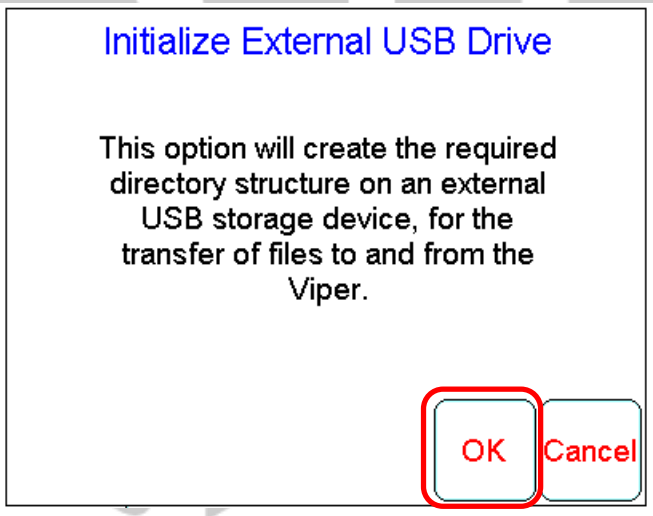
1. Start Viper Pro.
2. Insert a clean formatted USB flash drive into the front USB port and touch **Menu** then **File Maint.**



3. Select **Initialize External Storage**.



4. The Following screen will be displayed. Touch **OK**. The necessary file folders will be loaded onto the thumb drive.



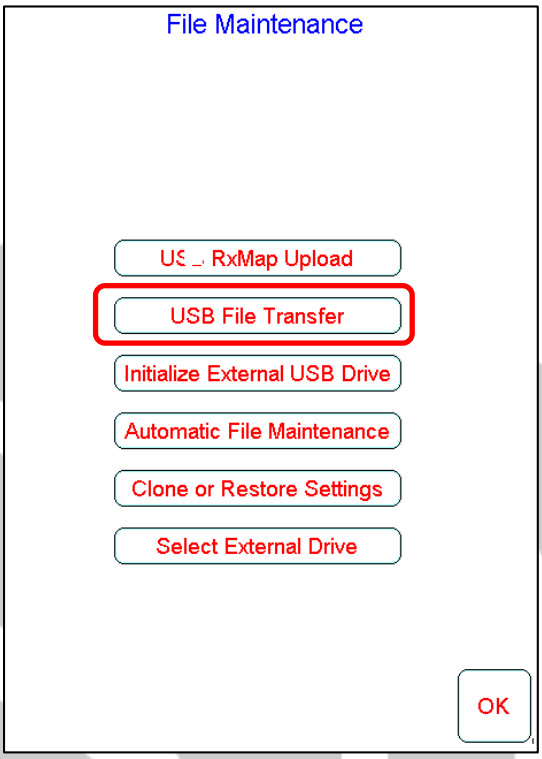
5. "External storage device initialized successfully" will be displayed. Touch **OK** to return to the File Maintenance main menu.

The USB flash drive will now be populated with the necessary file folders needed by the Viper Pro.

Exporting Jobs to a USB Drive

To access the File Maintenance feature:

1. Touch **Menu** on the Viper Pro main screen.
2. Select **File Maint**. The following file maintenance options will be displayed. Select **"USB File Transfer"**

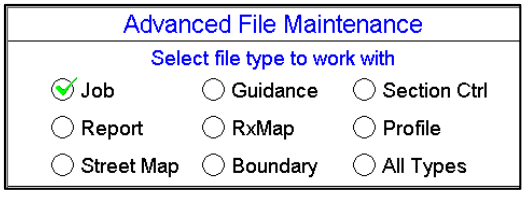


The USB File Transfer feature allows the machine operator to select specific files to copy, move or delete from a connected USB drive or internal memory.

Note: *Completed job files transferred to a USB flash drive may be uploaded to the Slingshot website using a free user account. The website may be used to edit and archive completed job files or to export a shapefile format of the job information for use in third party software systems. Refer to the Uploading Reports to the Slingshot Website section on page 219in the Raven OmniSeed Manual, for information on uploading files from a USB flash drive. If a Slingshot Field Hub is connected to the Viper Pro field computer, files may be transferred to the Slingshot website via the wireless connection. Refer to the Wireless File Transfer section on page 212 in the Raven OmniSeed Manual for details.*

3. The Advanced File Maintenance screen will display.

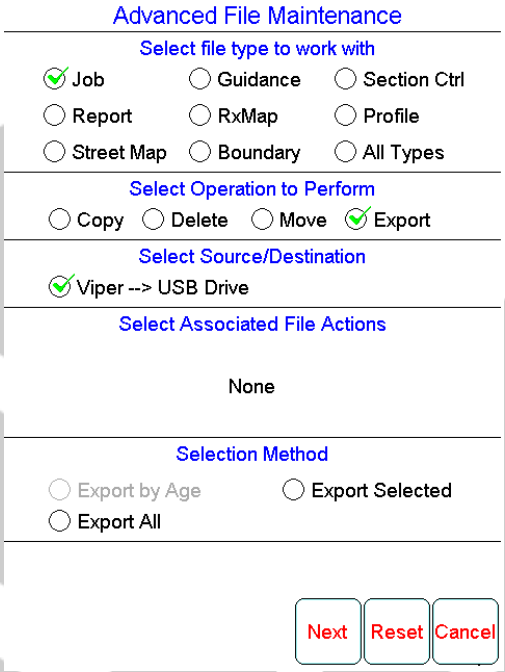
Note: *Touch the **Reset** button at the bottom of the Advanced File Maintenance screen to clear all Selections and begin the advanced file maintenance setup again. Select the **Cancel** button to return to the File Maintenance screen.*



4. *Select "Job"*
5. *Select "Export"*

Note: Export - Selecting the export option to transfer a job data package .zip file to the connected USB flash drive. The file will be transferred to the RDE Outbox folder and may then be transferred to the Slingshot web site via a home or office PC.

6. *Select "Viper → USB Drive"*
7. *Select "Export All"*



8. Finally, touch the **Next** button to begin the file maintenance operation.
9. The File Export Operation will begin.

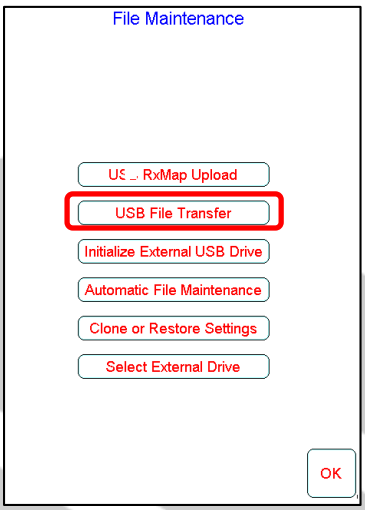
Note: The File Export Operation could take up to 45 Mins.

10. When the File Export Operation is competed you will see a pop up box indicating that the Export operation succeeded. **Press "OK".** Then touch "Cancel" to return to the File Maintenance screen.

Deleting Jobs from the Viper Pro

To access the File Maintenance feature:

1. Touch **Menu** on the Viper Pro main screen.
2. Select **File Maint**. The following file maintenance options will be displayed. Select **"USB File Transfer"**

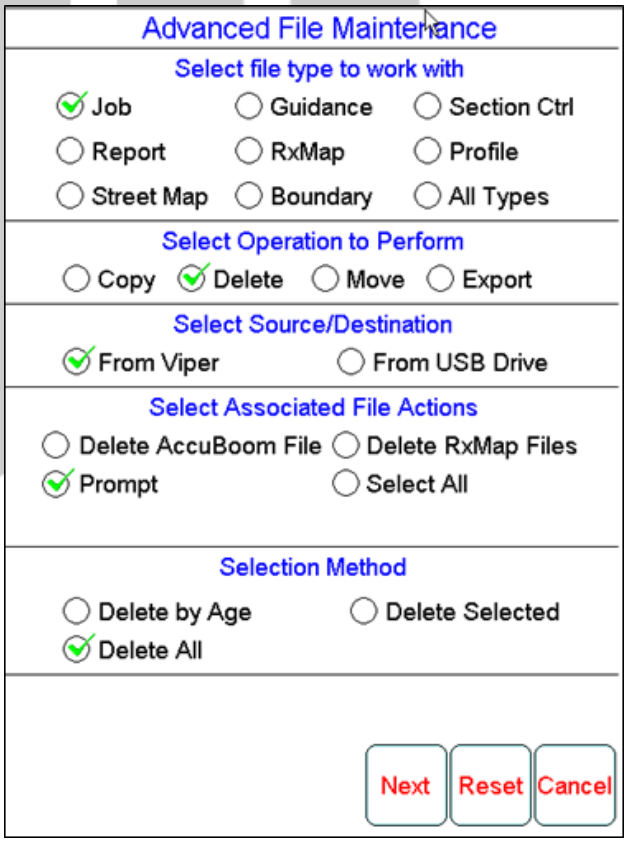


The USB File Transfer feature allows the machine operator to select specific files to copy, move or delete from a connected USB drive or internal memory.

3. The Advanced File Maintenance screen will display.

Note: *Touch the **Reset** button at the bottom of the Advanced File Maintenance screen to clear all Selections and begin the advanced file maintenance setup again. Select the **Cancel** button to return to the File Maintenance screen.*

4. Select "Job"
5. Select "Delete"
6. Select "From Viper"
7. Select "PROMPT"
8. Select "Delete All"
9. Select "Next"
10. You will get a File Maintenance Warning about delete the jobs. Select "OK"
11. The Job files will begin to delete from the Viper Pro. When the jobs have been deleted successfully you get a pop up screen indicating that the "Delete operation succeeded", touch "OK".
12. Touch "Cancel" to return to the File Maintenance screen



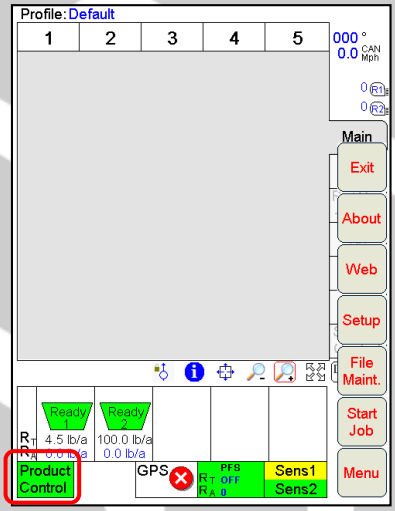
SOFTWARE UPDATES

RECORD VIPER MONITOR SETTINGS

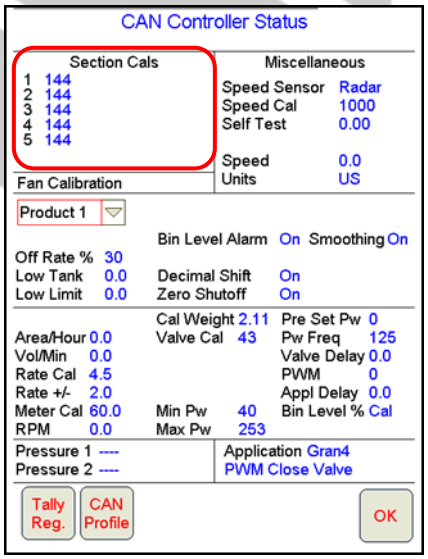
Before updating your Viper Pro it is required to record all important settings that will be erased during the update process. **It is very important to save a copy of all the settings outlined so that they can be used again.** Failure to re-enter correct settings wil result in unsatisfactory tank operation.

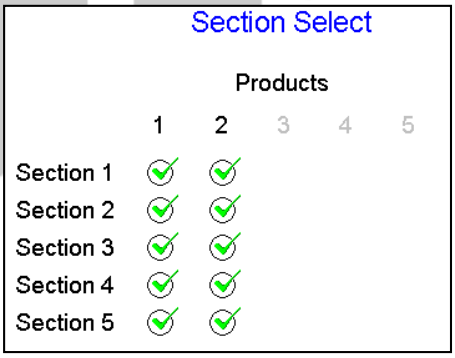
Recording Section Cals:

Press "**Product Control**".



1. Press within the "**Section Cals**" area.

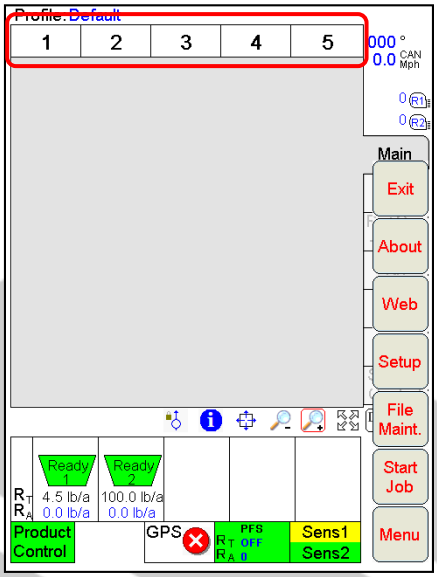




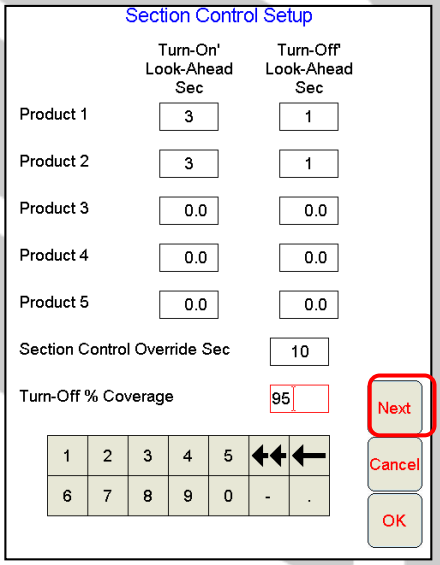
Record all circles that have a check mark seleted and which ones do not. Then press "OK". Then press "OK" one more time to return to the main work screen.

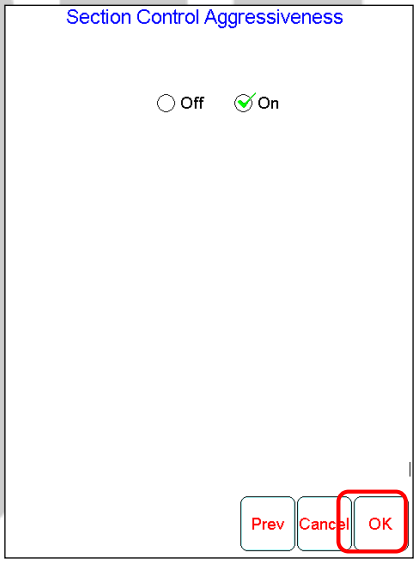
Recording Zone Control Settings:

1. Press within any of the zone on/off indications.



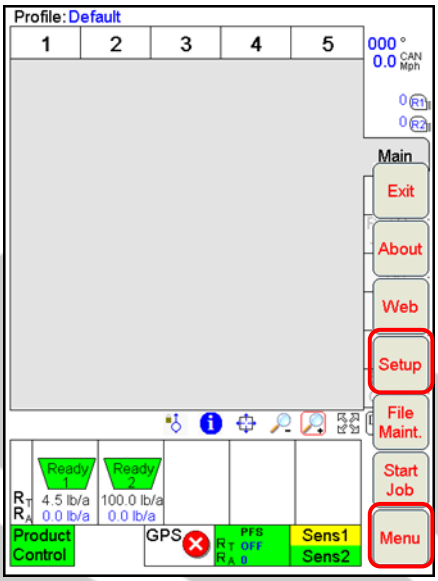
2. *Record all settings within this page.* Then press "**Next**". Record Settings, Then Press "**OK**".



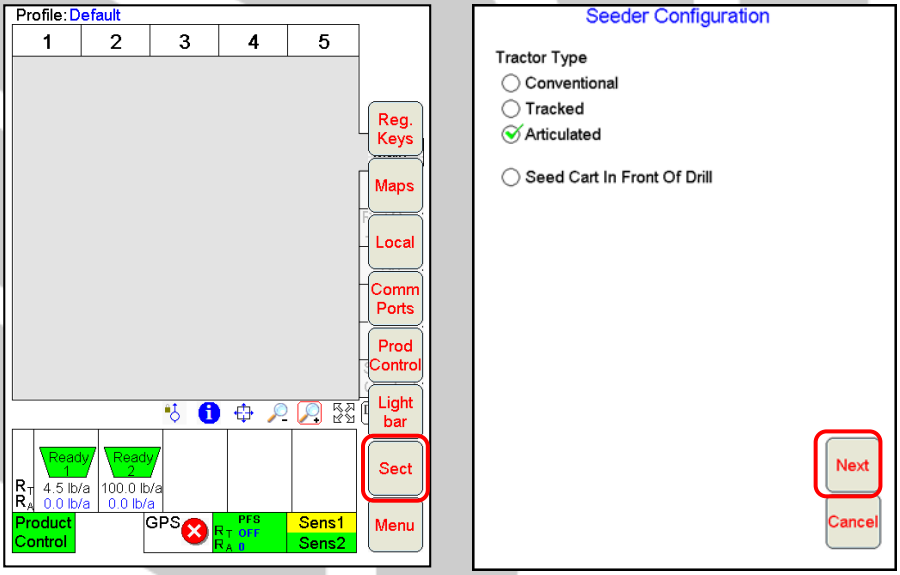


Recording Machine Setup Measurements:

1. Press "**Menu**". Then press "**Setup**".



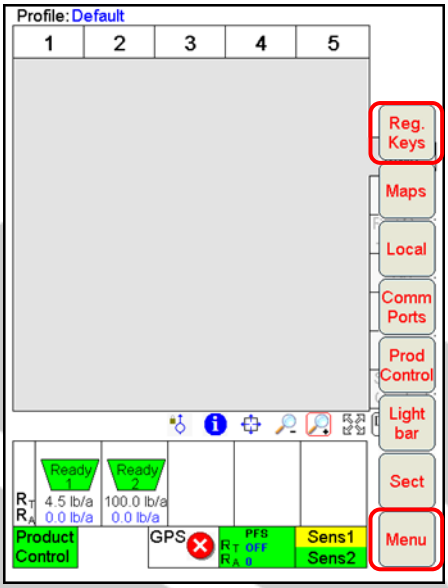
2. Press "**Sect**".



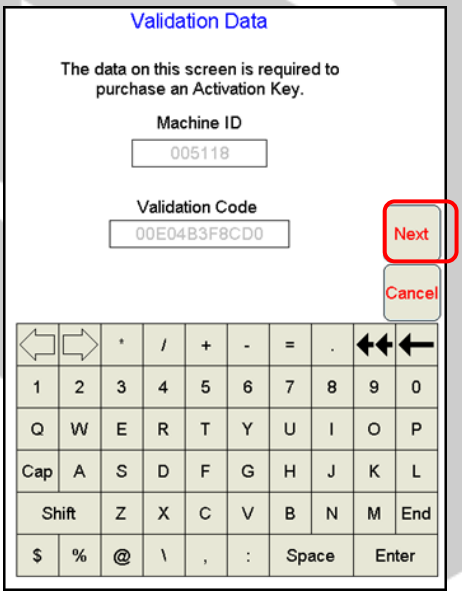
Record all numbers entered and all boxes that are checked or not checked. Select "Next" and make recordings from next page. Continue to select "Next" after recordings are made for each page. Depending on drill set-up, there may be up to 14 pages of information to record. Be diligent in recording accurate settings so that they can be re-entered later. When you get to the last page to record, selecting "Next" will not be an option. Press "OK". This will return you to the main work screen. ***Ensure all page settings are being recorded.***

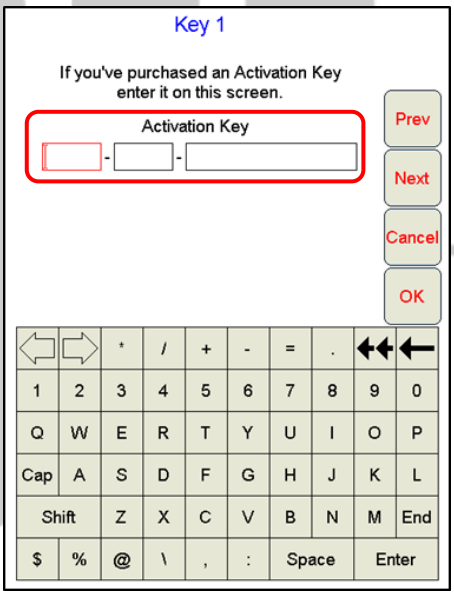
Recording OmniSeed Activation Key:

1. Press "**Menu**". Press "**Setup**".
2. Press "**Reg Keys**".



3. Press "**Next**".

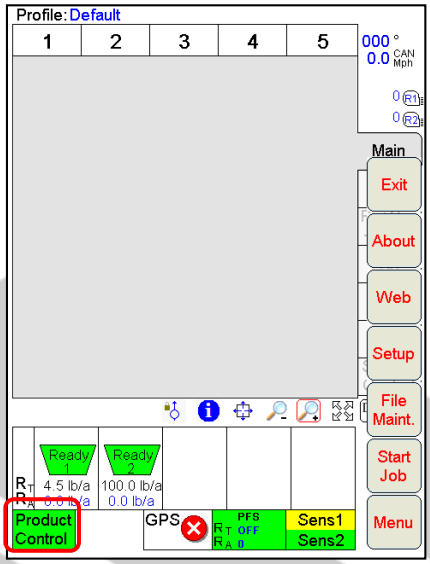




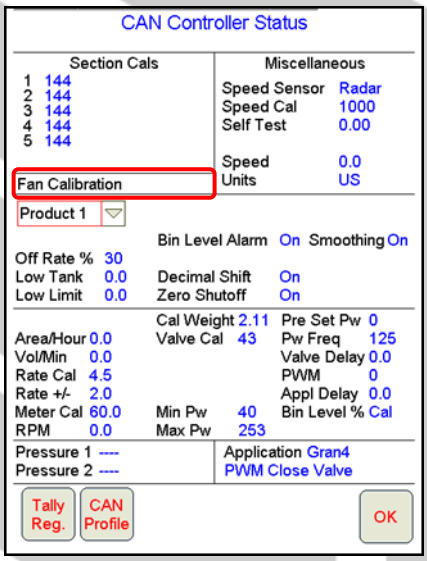
Record the OmniSeed activation key. Press "OK" when finished.

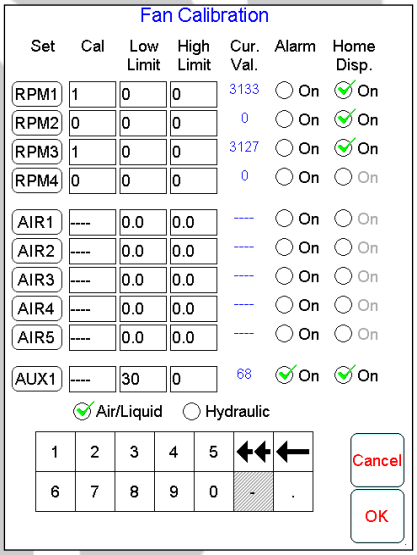
Recording Fan Calibration Settings:

1. Press "**Product Control**".



2. Press within the "**Fan Calibration**" area.

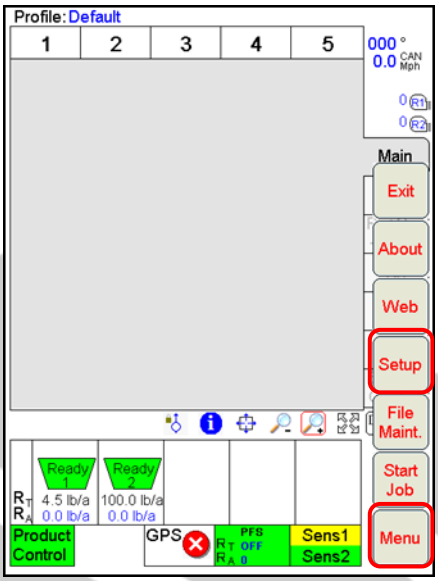




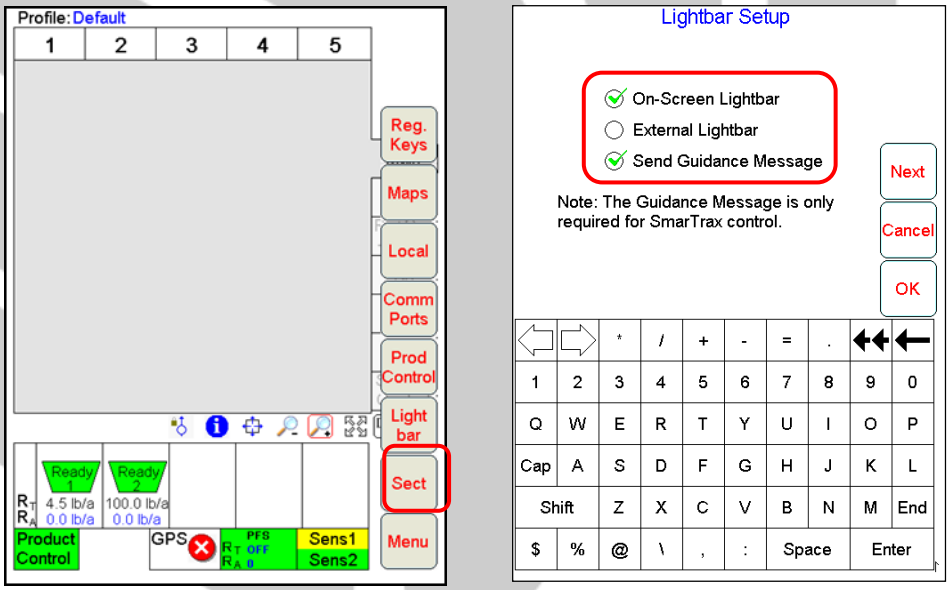
Record all numbers entered and all boxes that are checked. See the above right image .
Press "**OK**" and "**OK**" again. This will return you to the main work screen.

Recording Lightbar Setup Settings:

1. Press "**Menu**". Then press "**Setup**".



2. Press "**Light bar**".



Record all boxes that are checked. See the above right image . Lightbar Setup ensures that you will have 3D as-applied mapping. Press "**OK**". This will return you to the main work screen.

You have now recorded all of the settings that will be lost during the software upgrade.

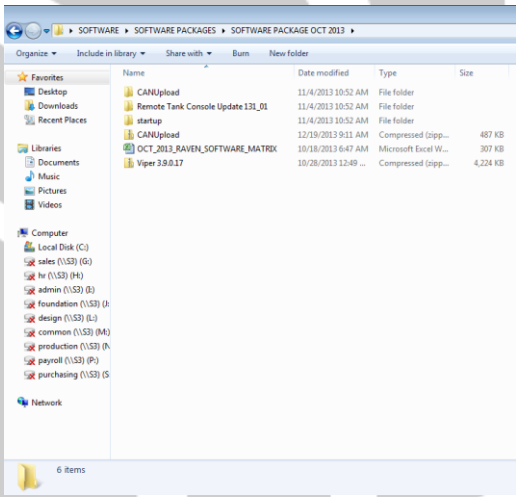
UPDATING THE VIPER PRO

It is the owner's responsibility to ensure that the latest Raven software is downloaded onto their Viper Pro monitor. Expect to update software before each seeding season. As SeedMaster continues to improve its product line, software changes are unavoidable. There is no cost for software updates. Your drill needs to be connected to your tractor to successfully complete the updates.

SeedMaster always keeps the latest Raven Software on its website. You will require a USB stick that has been cleaned of all files on it. Please follow the procedure below to successfully update your Raven Software.

1. Copy and paste ftp://seedmaster.ca into your web browser (Internet Explorer is the easiest to use).
   Login: **customer**
   Password: **customerstm**
2. Open the "Raven Updates" folder
3. Open "Raven Software" folder
4. Copy and paste or drag and drop all files within "Raven Software" folder to a clean USB stick.

   This can be accomplished as follows. Highlight the top left folder. Hold the shift key and use the arrow buttons to highlight all folders within "Raven Software" folder. With the cursor over the highlighted files, right click and then select "copy". Insert your USB stick into your computer and open to view files on memory stick. Erase any files on the stick. Right click and select "paste" to put all files needed onto your USB stick. The memory stick is now ready to insert into your Viper monitor for updating software. The files on your memory stick should look similar to picture below.



***Note**: This software package is used to update nodes as well.*

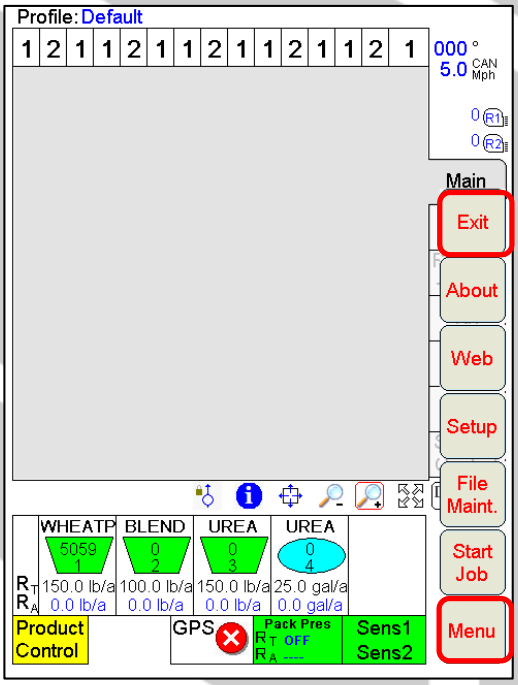
Note: Before performing the software update to the Viper Pro is it required to perform File Maintenance and Record Viper Monitor settings. See "File

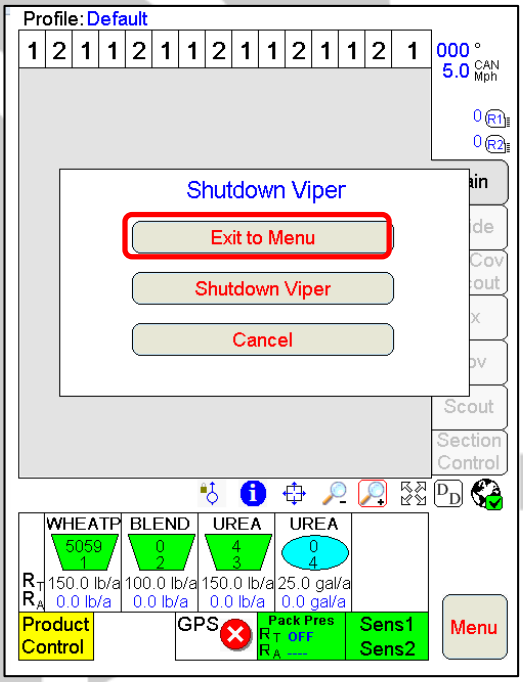
Maintenance" for instructions on performing File Maintenance. Also see "Record Viper Monitor Settings" for instructions on what settings to record.

5. Power on the Viper as per normal to get to the main work screen. Your drill electrical connections have to be connected to your tractor. This is so you can load the OmniSeed Program after updating your Viper Pro.

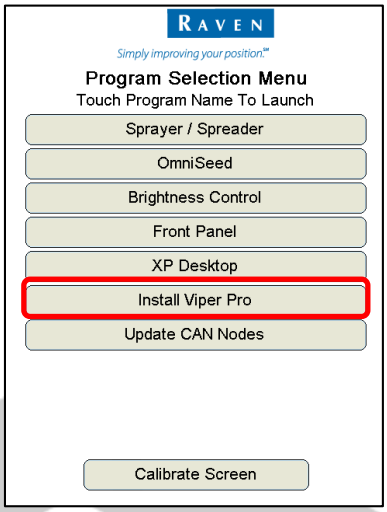
6. Insert your USB stick into the Viper as shown below.

7. If the Viper was on and you were in the OmniSeed program Press "Menu".
8. Press "Exit".
9. Press "Exit to Menu".

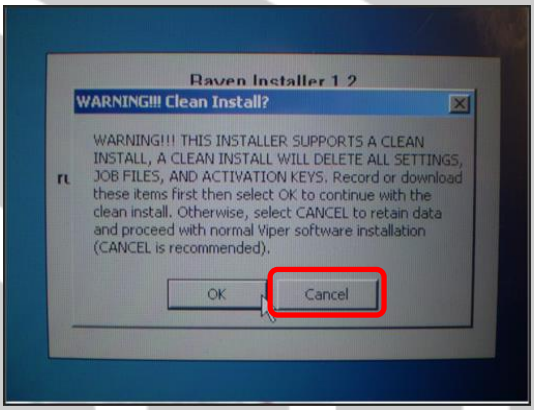




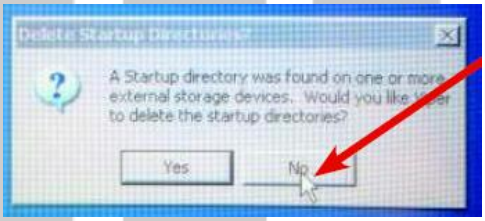
10. Press "Install Viper Pro". The software update process will begin.
    ***Note**: If "Install Viper Pro" was not an option, your memory stick has not been set up properly.*



11. A popup window will be displayed indicating that the Viper will be wiped clean of all of its settings. Press "**CANCEL**".
    NOTE: A CLEAN INSTALL IS NOT NECCASARY.



12. After the software has successfully loaded onto the Viper Pro you will get a popup window indicating that a startup directory was found on the USB drive. This is the Viper Pro software. You don't want to delete it from your USB drive. Press "**NO**".



You have successfully updated your Viper Pro. You must now re-enter the settings that you had previously recorded. It is very important that all settings get reentered into the Viper properly. Once all settings have been re-entered, please refer to "Viper Monitor and Node Software Check" to ensure software has been updated properly.

UPDATING NODE SOFTWARE

SeedMaster machines consist of several nodes on the CANBus Network. The Air Cart (OmniSeed) Node, Product Controller Node, Drill (OmniSeed) Node and Raven Switchbox Node are all capable of being programmed VIA the Viper Pro Display.

Note: *Updating a CAN Node may erase the current settings in the node. To retain setting and calibration dada, be sure to write down all settings stored by the node(s) being updated. Also be sure that the machine is running before preforming any software updates.*

The CAN Update program and node updates are available by contacting SeedMaster.

To Update CAN Nodes

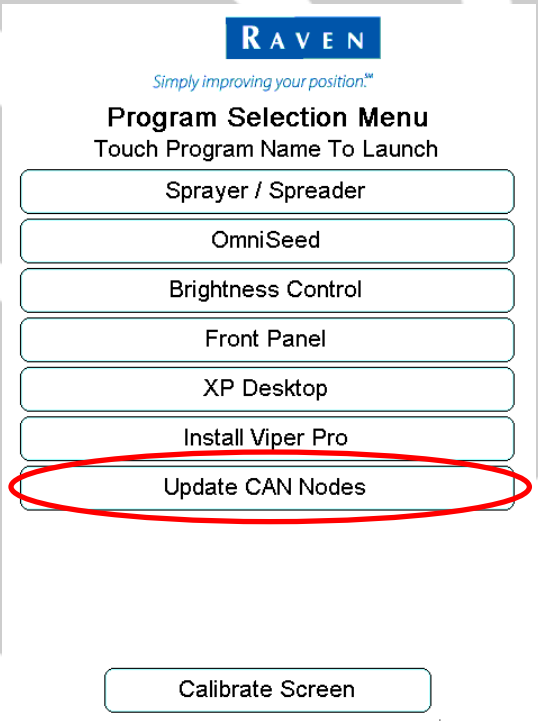
1. Start the Viper Pro and access the Program Selection Menu screen.

Note: *If the console is already powered up, touch the* ***Menu*** *button and select* ***Exit****. Select the* ***Exit to Menu o****ption on the Exit Viper screen.*

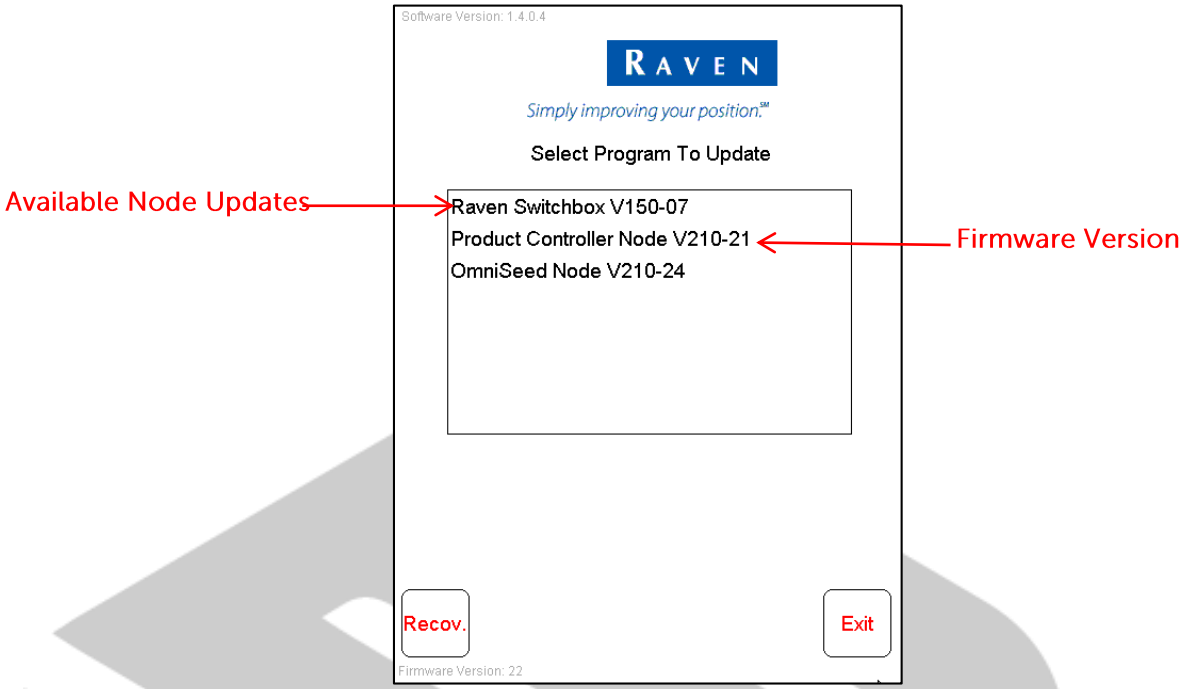
2. Insert the USB flash drive with the CAN Update program and required .hex files into an available USB port on the Viper Pro console.

Note: *The CanUpload Folder is required to be on the Root Directory of the USB Drive.*

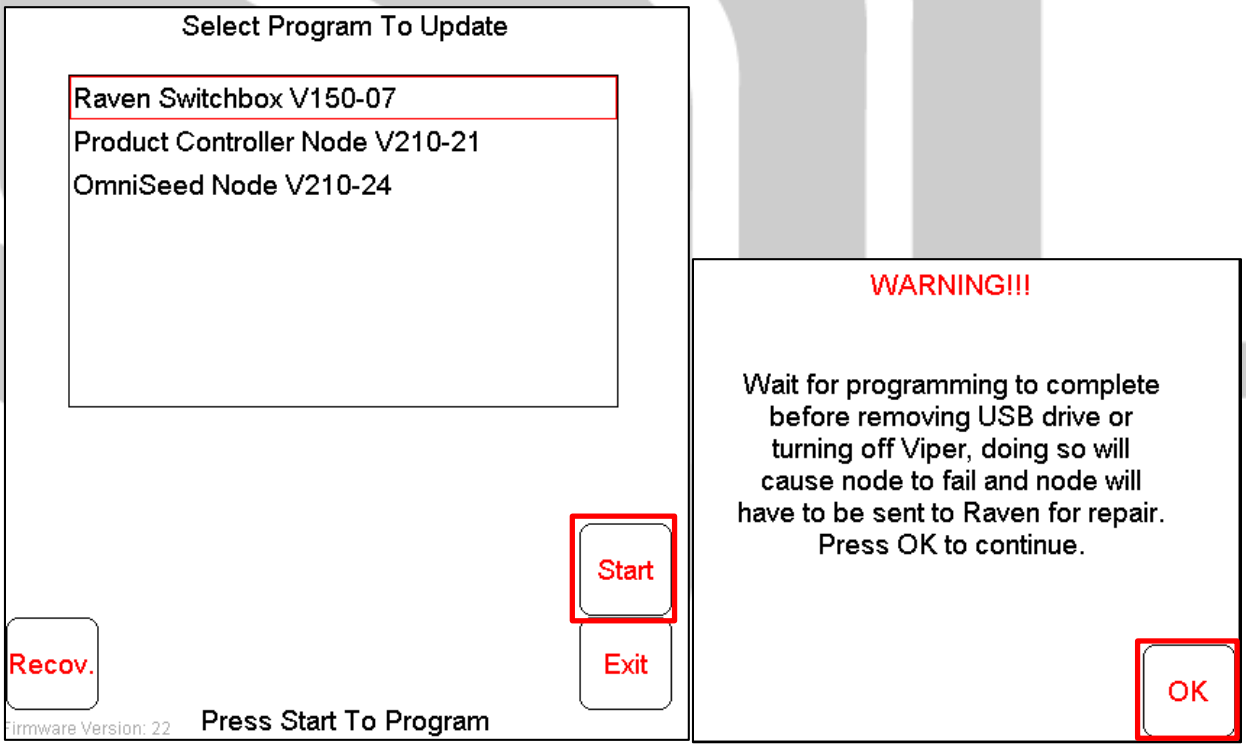
3. On the Program Selection Menu screen, select the option labeled "**Update CAN Nodes**" to begin the CAN Update Program.



4. The Update CAN Nodes screen displays a list of available node updates. This screen also displays the firmware version to which each node will be updated if the update is applied.



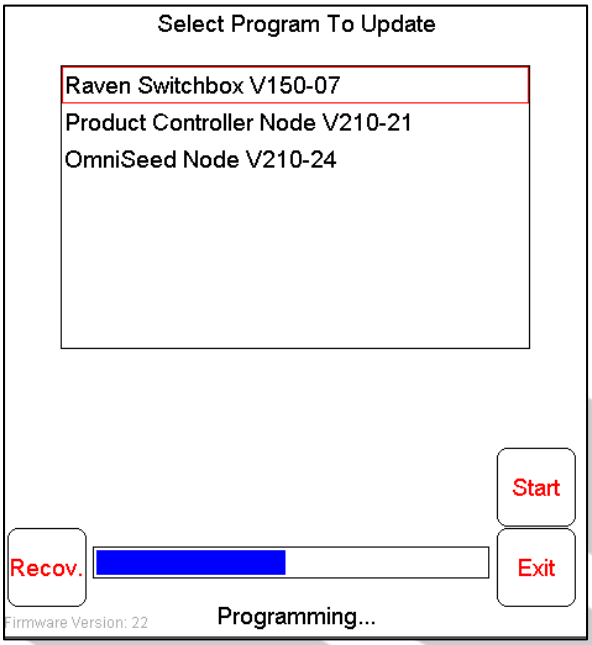
5. Updating the **Raven Switchbox** Node, Select **"Raven Switchbox"** from the list then touch "**Start**" button in the lower right corner of the screen to begin update. You will get a Warning pop up box, touch **"OK"** to continue updating the Switchbox.

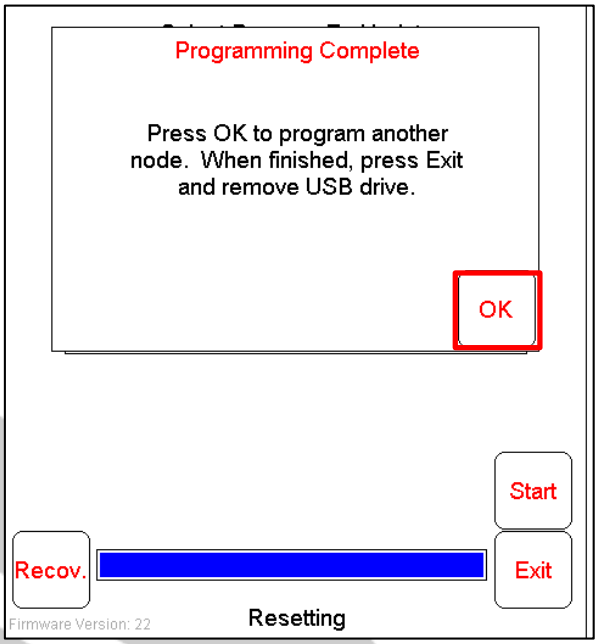


Note: *The Viper Pro may take several minutes to prepare and apply the software update to the node.*

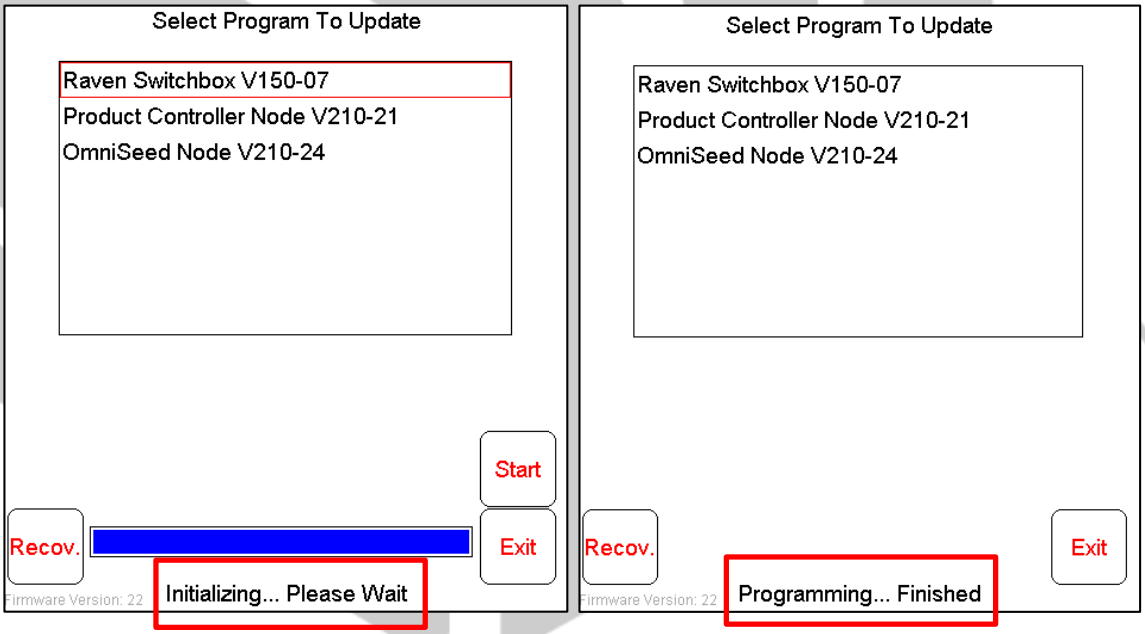
6. After Selecting OK the Node will begin the update procedure, it will erase the current programming first then begin programming the node. Once the programming is complete you will get a pop up box indicating that the programming is complete, touch **"OK"**.

Note: *If the programming fails please see steps 15 – 20.*



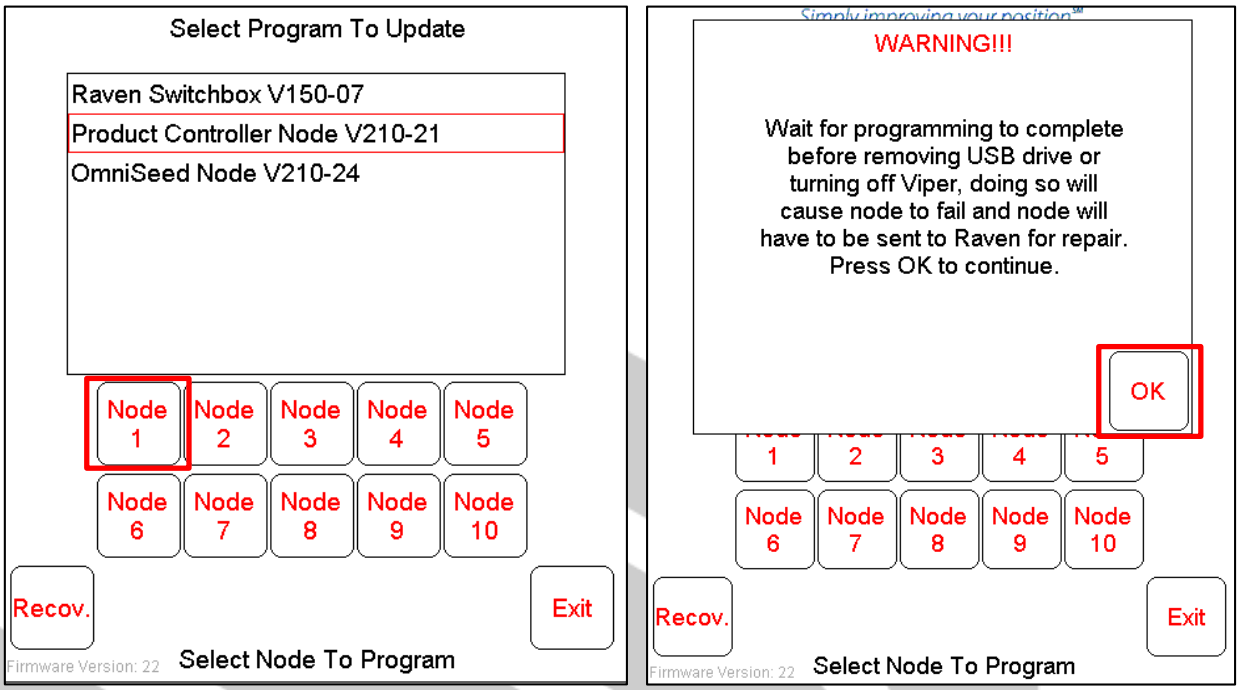


7. After touching OK the program will initialize, it will indicate this at the bottom of the screen. Wait till the program initializes, once its complete it will indicate that the programing is finished.



Note: To continue updating nodes continue to the next step.

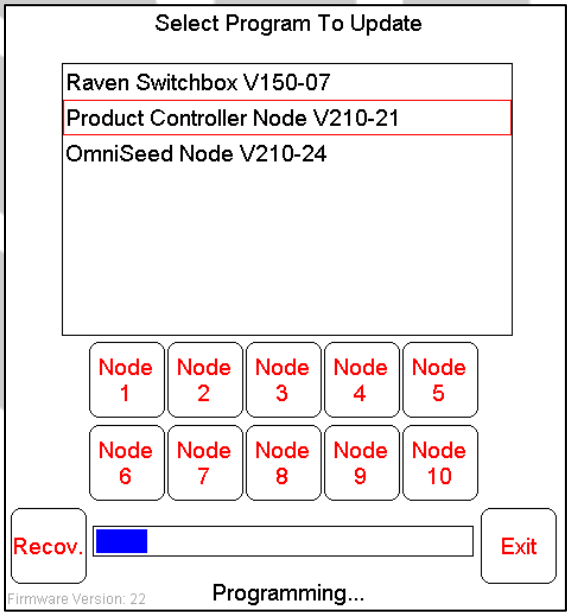
8. Updating the **Product Controller Node**, Select **"Product Controller Node"** from the list then touch the **"Node 1"** button. You will get a Warning pop up box, touch **"OK"** to continue updating the Product Controller Node. ***Note: It is important that you choose Node 1 as you could lock up the node and it may become unusable.***



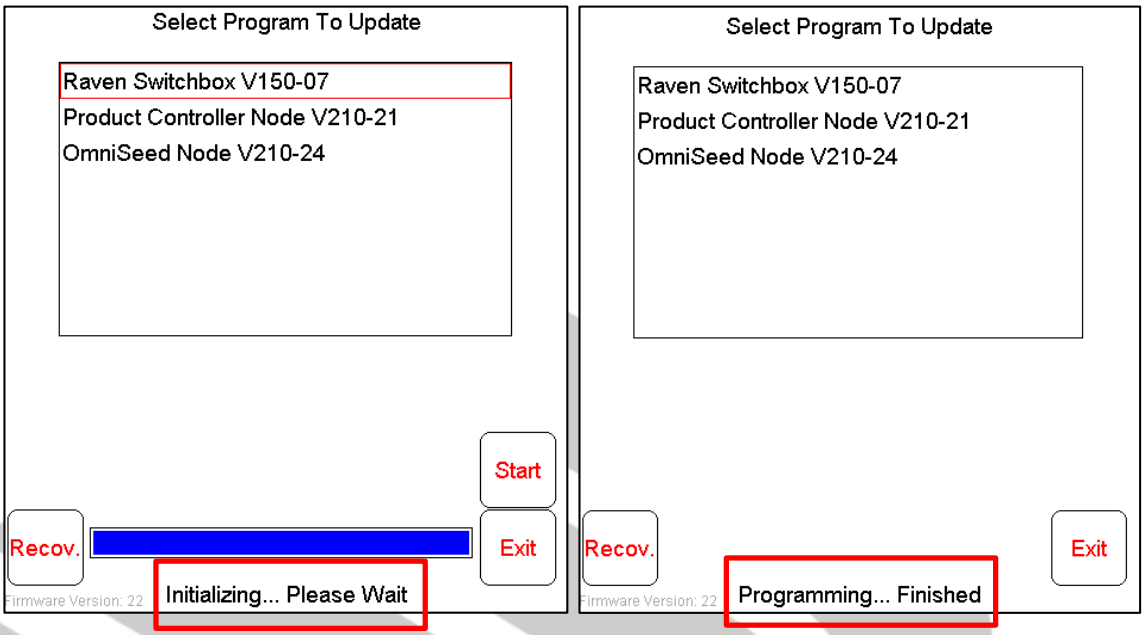
Note: The Viper Pro may take several minutes to prepare and apply the software update to the node.

9. After Selecting OK the Node will begin the update procedure, it will erase the current programming first then begin programming the node. Once the programming is complete you will get a pop up box indicating that the programming is complete, touch "OK".

Note: If the programming fails please see step 18.

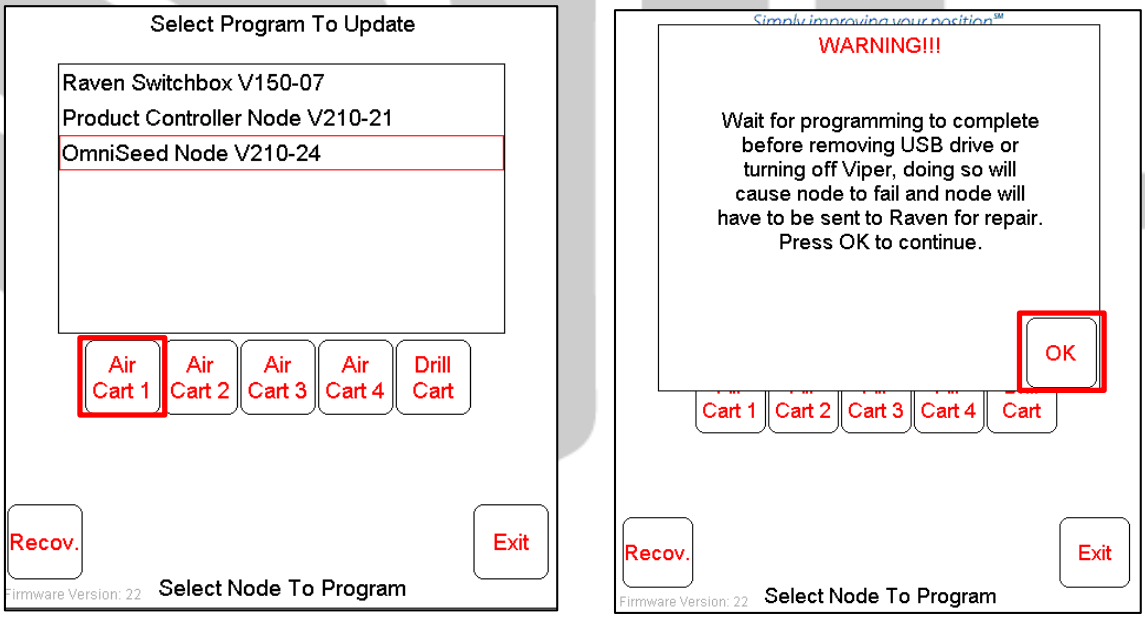


10. After touching OK the program will initialize, it will indicate this at the bottom of the screen. Wait till the program initializes, once its complete it will indicate that the programing is finished.



Note: To continue updating nodes continue to the next step.

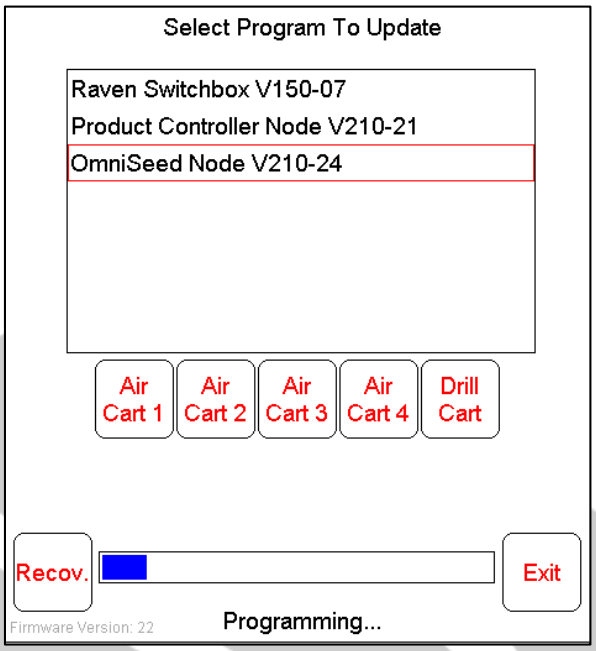
11. Updating the **Air Cart Node**, Select **"OmniSeed Node"** from the list then touch the **"Air Cart 1"** button. You will get a Warning pop up box, touch **"OK"** to continue updating the Air Cart Node. ***Note: It is important that you choose Air Cart 1 as you could lock up the node and it may become unusable.***



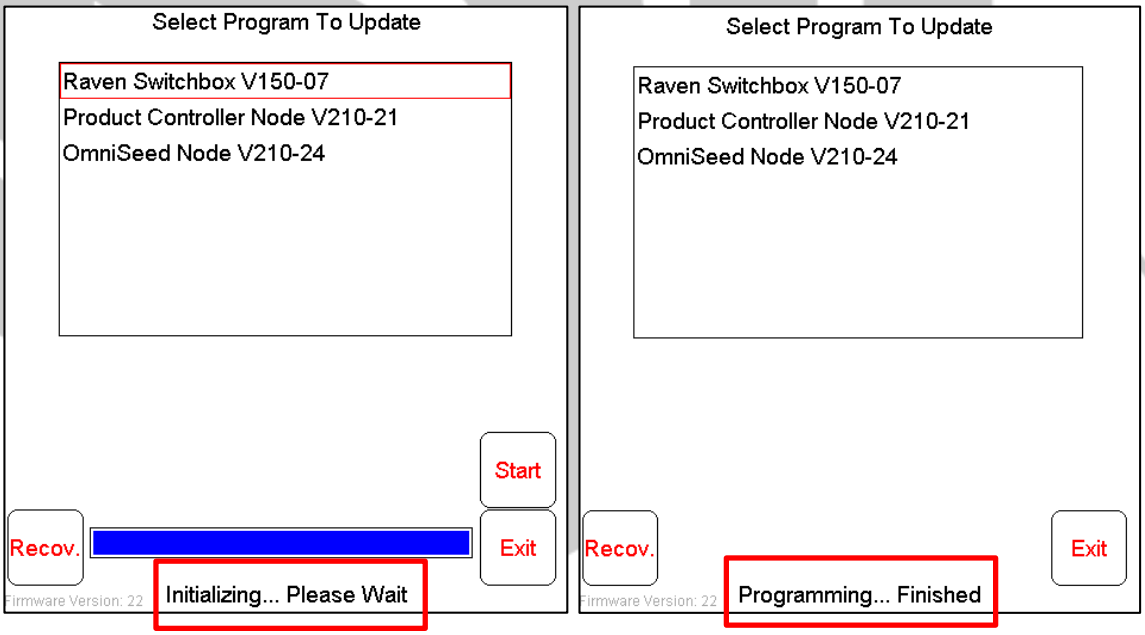
Note: *The Viper Pro may take several minutes to prepare and apply the software update to the node.*

12. After Selecting OK the Node will begin the update procedure, it will erase the current programming first then begin programming the node. Once the programming is complete you will get a pop up box indicating that the programming is complete, touch **"OK"**.

Note: *If the programming fails please see step 18.*

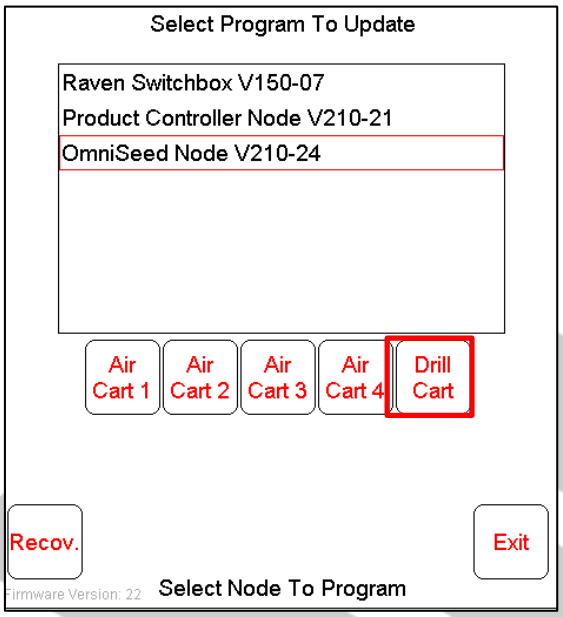


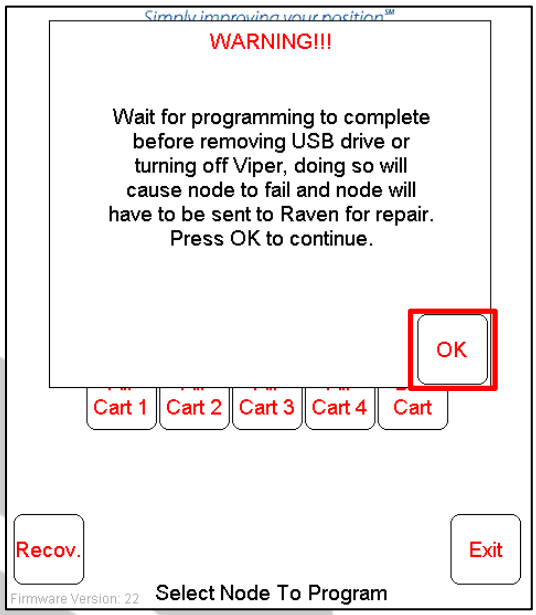
13. After touching OK the program will initialize, it will indicate this at the bottom of the screen. Wait till the program initializes, once its complete it will indicate that the programing is finished.



Note: To continue updating nodes continue to the next step.

14. Updating the **Drill Node**, Select **"OmniSeed Node"** from the list then touch the **"Drill Cart"** button. You will get a Warning pop up box, touch **"OK"** to continue updating the Drill Node. *Note: It is important that you choose Drill Cart as you could lock up the node and it may become unusable.*

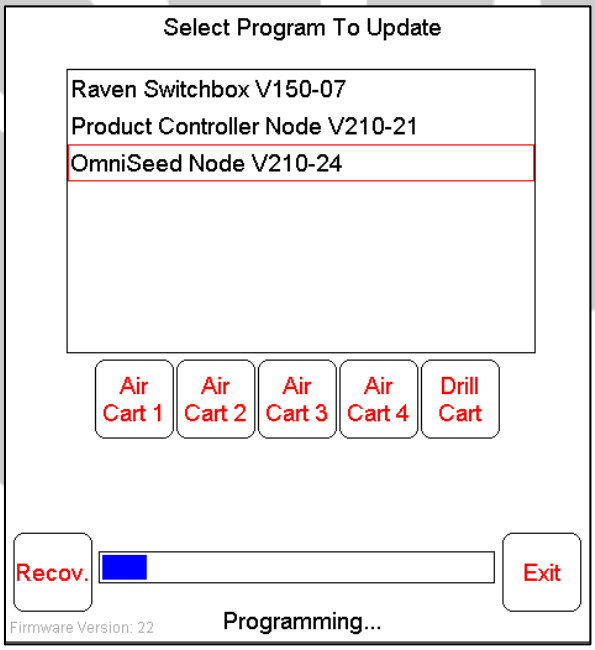




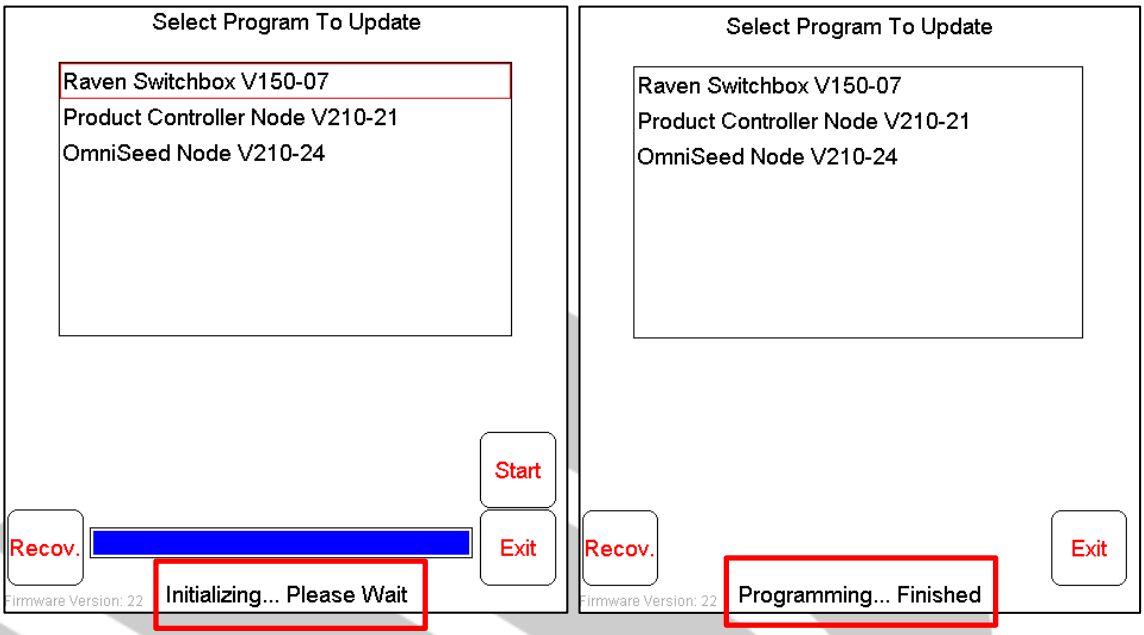
Note: *The Viper Pro may take several minutes to prepare and apply the software update to the node.*

15. After Selecting OK the Node will begin the update procedure, it will erase the current programming first then begin programming the node. Once the programming is complete you will get a pop up box indicating that the programming is complete, touch "OK".

Note: *If the programming fails please see step 18.*



16. After touching OK the program will initialize, it will indicate this at the bottom of the screen. Wait till the program initializes, once its complete it will indicate that the programing is finished.



17. Node updates are complete.

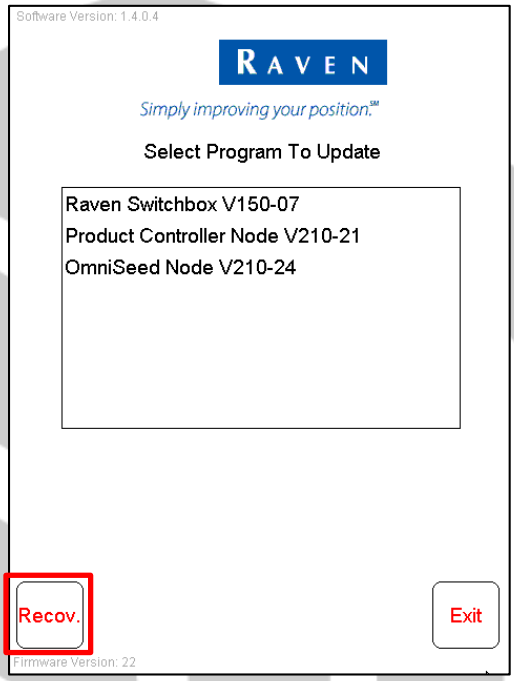
Note: *During the update process it is sometimes common for the node update to time out, if the node update times out during software installation follow steps 18 to 21.*

18. If the node update times out it will display an error that it has timed out, press "OK" on this pop up box. It will then ask you to retry the installation choose "YES". The Node may timeout several times before taking the software. If it times out more than 10 times then you will have to choose "NO".
    NOTE: If the node will not take the software after ten tries, you will have to select no. After selecting no exit out of the update program and shut down the Viper then turn of the Machine. After everything is shut down for a short time then start the machine then turn the Viper monitor back on.
19. You will not have to recover the node. Follow the Recovering a Node procedure below.

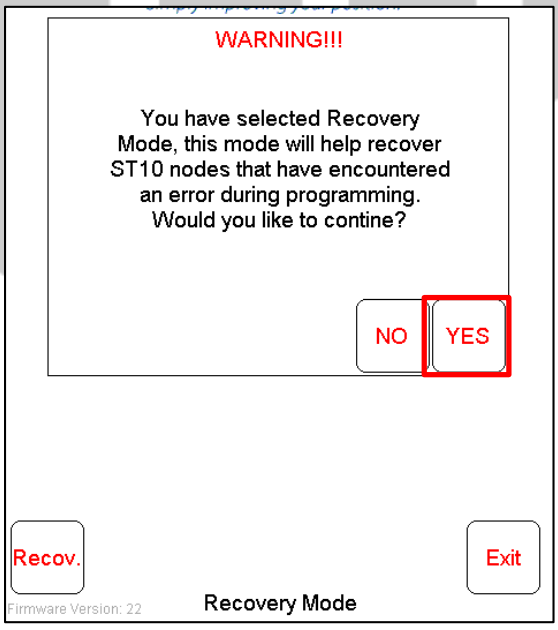
RECOVERING A NODE

1. On the Program Selection Menu screen, select the option labeled "**Update CAN Nodes**" to begin the CAN Update Program.

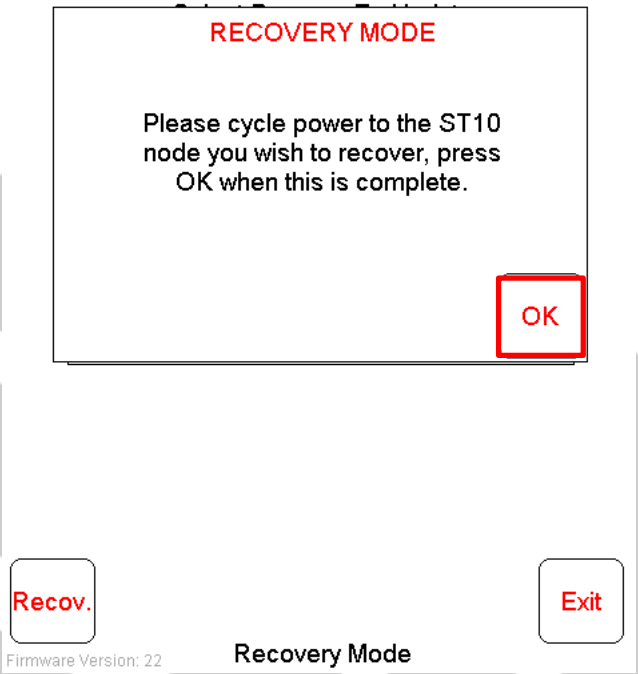
2. From the Update CAN Nodes screen you will choose the **"Recov."** Button in the bottom left hand corner to enter Node recovery mode.



3. After choosing the Recov. Button you will get a pop up warning. You will want to select "YES" to continue the recovery process.



4. After choosing "YES" you will now enter the Recovery Mode. From this point you will need to go cycle the power to the node that is in need of recovering. Remove and replace the 5AMP fuse from the appropriate node cable to cycle the power. After cycling power to the node you will to recover, press **"OK"**.

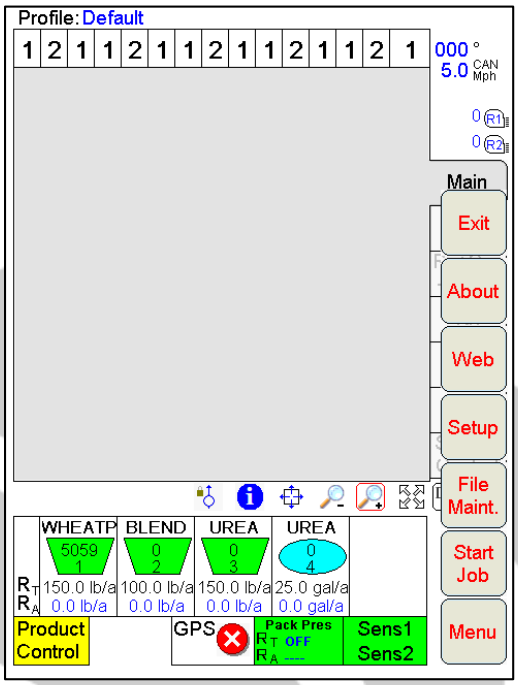


5. After selecting "OK" you will pop up a warning indicating that you need to choose the correct hex file from the list for the node you are recovering. It is important to choose the correct node as the node can become unusable of the correct software is not selected.
6. Choose the correct node and follow the steps above for updating a particular node.

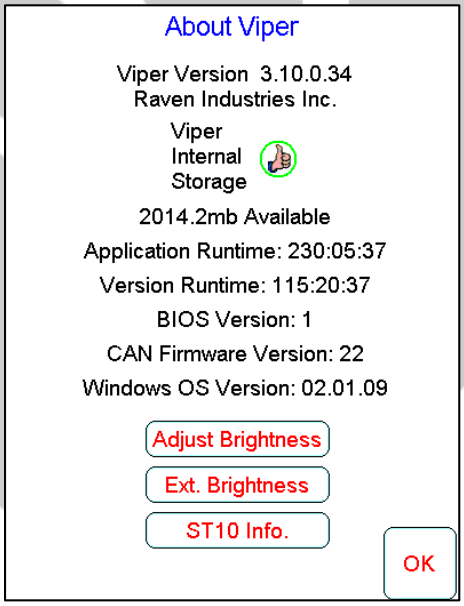
VIPER MONITOR AND NODE SOFTWARE CHECK

Procedure to view the current Viper Pro Software

1. Press "Menu", and then press "About".

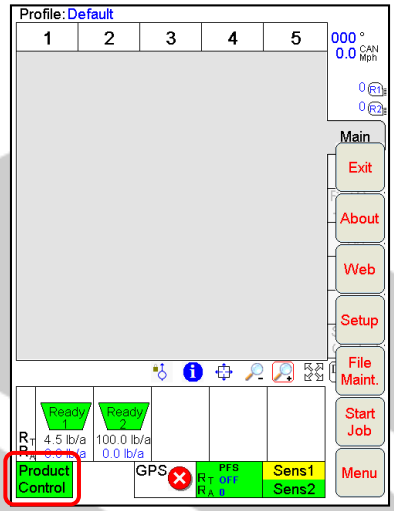


2. The Viper software version will be displayed. Press "OK".

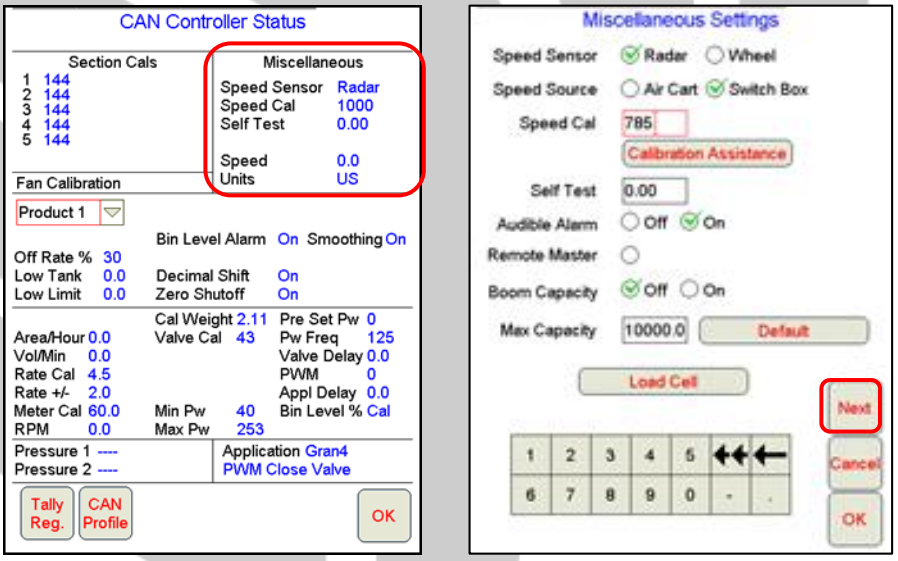


Procedure to view the current Node Software Versions

1. Press "**Product Control**".



2. Press within the "**Miscellaneous**" area. Then press "**Next**".



Below is an example of what should be seen. It will vary depending on particular drill set-up.

- Switchbox Node software should be 1.52.01 (268).
- If the Product is a granular tank, software should be 2.20.05 (308).
- If the Product is a Liquid or NH3 tank, software should be 2.20.26 (279).
- AccuBoom software should be 2.20.26 (279).
- Drill Node software should be 2.30.08 (308).

3. Press "**OK**" to return to the "CAN Controller Status" Screen, press "**OK**" again to return to the main run screen.
4. Software check completed.

Note: *The Software Versions Displayed is intended for reference only. The version numbers will change based on the software update package. Please check the software matrix file located in the Software Update Package to cross reference the software versions.*

3rd Party GPS

The Viper Pro system requires a GPS differential correction from a GPS receiver. The GPS receiver that connects to the Viper Pro is required to output the correct NEMA strings. The NEMA strings required are:

- GGA @ 10hz
- VTG @ 10hz
- RMC or ZDA @ 1HZ

with a minimum BAUD Rate Setting of 19200bps.

After the correct patch cable is installed to the Viper Pro main console harness (Connection is labeled DGPS, it is a 9pin Male RS232 connector) and the 3rd party GPS receiver has been correctly configured. It is a simple procedure on the Viper Pro to connect the GPS receiver.

From the Main Screen of the Viper Pro touch the **MENU** button then touch the **SETUP** button then touch the **COMM PORTS** button then touch the **AUTO BAUD** button. The Viper will atomically configure itself to the set baud rate of the 3rd party GPS receiver. Touch **OK** and return to the main run screen, you should see a GPS thumbs up Icon now.

Commonly used 3rd Party GPS Patch Cables

- Trimble 750/1000 Trimble Part # ZTN67091
- Trimble 500 Trimble Part # 62749
- Trimble 262 Trimble Part # 55224
- Trimble 372 Trimble Part # ZTN50166
- GreenStar 2/ITC John Deere Part # PF80754
- Starfire 3000 receiver John Deere Part # PF90350, PFP10470, PF80722

Please refer to your 3rd party GPS receiver manual or Dealer for instructions on setting up NEMA strings and outputting GPS. The part numbers are used as guidelines please consult your GPS dealer before ordering any of the above cables.

Note: If you are connecting to a Raven DGPS receiver, the receiver will be configured to output the correct NEMA strings to your Viper Pro Field Computer. Raven DGPS receivers are also available for purchase. Please contact your ACE Advisor for more details.

SPRAYER/SPREADER MODE

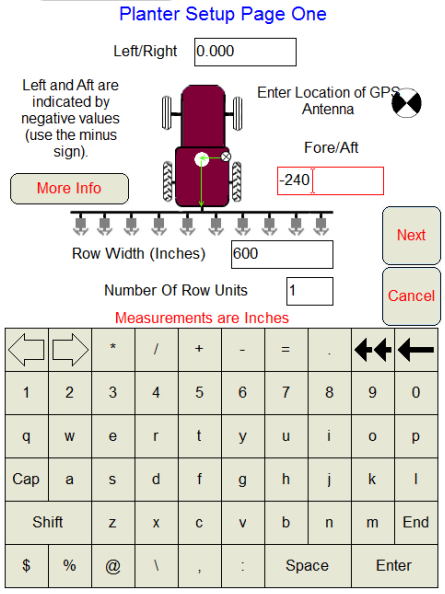
Your SeedMaster Viper Pro has the ability to perform as applied mapping and AutoSteer (if equipped) when you are doing field work such as heavy harrows. Please follow the procedure below to setup the implement for field work.

Setting the control type:

1. From the Main Menu choose "**Sprayer/Spreader**" mode
2. Touch "**Menu**"
3. Touch "**Setup**"
4. Touch "**Prod Control**"
5. From the Select Controller Screen choose "**AccuRow**", (note: you may need to touch the down arrow to scroll to the bottom of the page where AccuRow is located.
6. Touch "**OK**".
7. You will get a Controller Setup pop up window. *"You have changed the Controller. You must re-start the Viper program now"*. Touch "**OK**"
8. You will get a Shutdown Viper pop up window. Touch "**Exit to Menu**"
9. From the Main Menu choose "**Sprayer/Spreader**" mode
10. Your Viper will now be set for AccuRow mode, this mode allows for AutoSteer and As-Applied Mapping

Setting the implement width

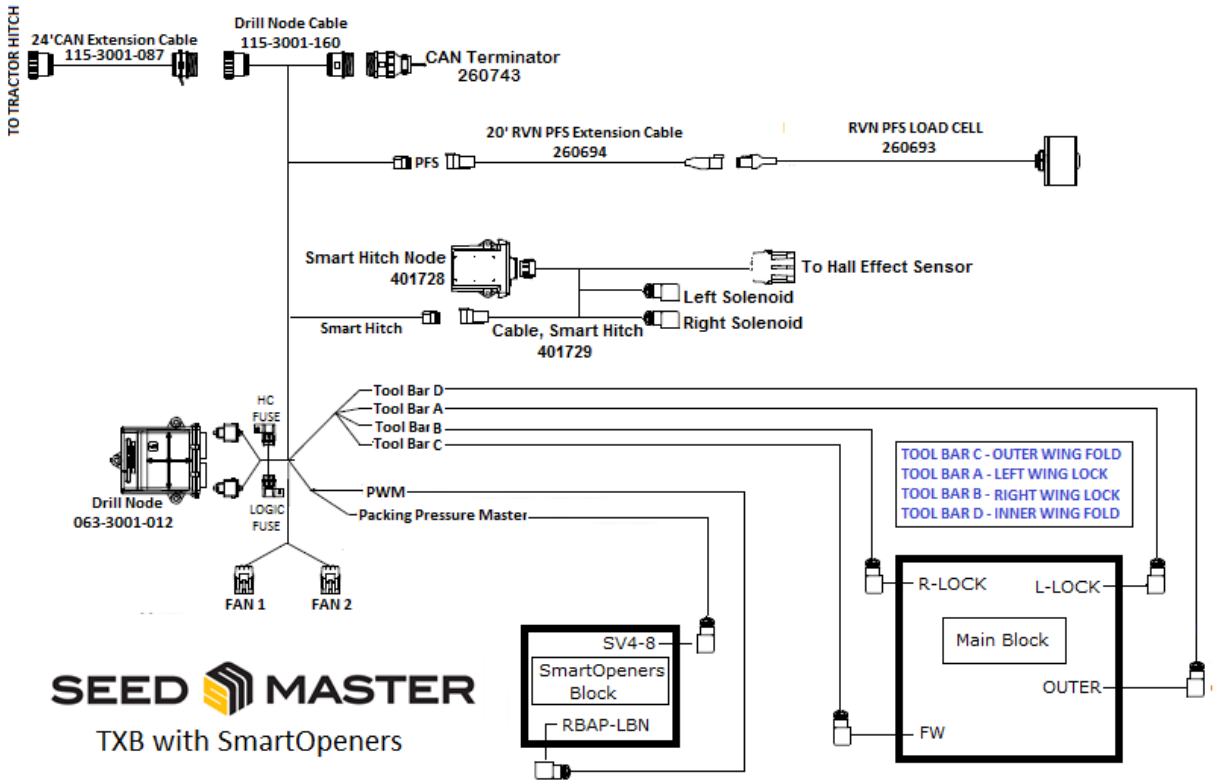
1. From the Main Menu choose "**Sprayer/Spreader**" mode
2. Touch "**Menu**"
3. Touch "**Setup**"
4. Touch "**Planter**"
5. You now need to enter the mapping measurements.
    a. **Left**/Right = 0
    b. **Fore/Aft = -240** (note: a minus sign is required for proper mapping, the minus sign indicates that the map will be behind the tractor, the 240 indicates that the map will paint 20 Feet behind the GPS antenna)
    c. **Row Width (Inches) = "YOUR IMPLEMT WIDTH IN INCHES"** (For example if you are pulling 50 foot harrows you will enter 600 inches)
    d. **Number of Row Units = 1**
    e. Touch **"Next"**
    f. The next setup page will ask how many sections you will be controlling. **Enter 1 then touch "Next"**
    g. On the summary page touch "**OK**"



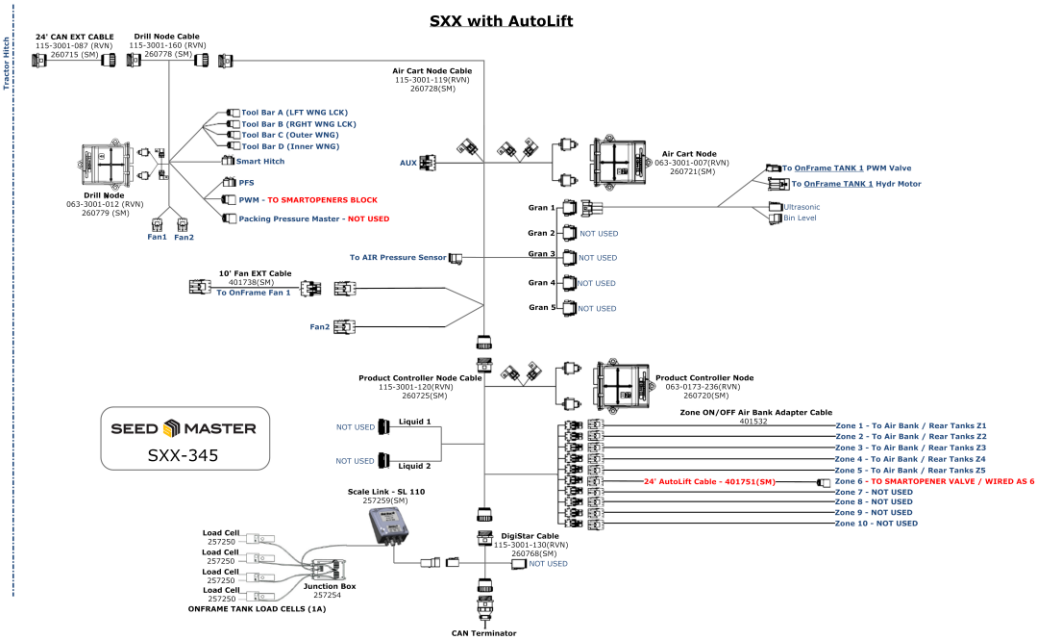
Note: Product Switch one on the switch box will need to be placed in the MAN (manual) position and Section Switch one will need to be placed in the "ACCU" position. Before starting a job place the Master switch to OFF. After you have started a job (refer to operator's manual to start a job) you will use the master switch to turn the mapping on and off.

SYSTEM ELECTRICAL DRAWING

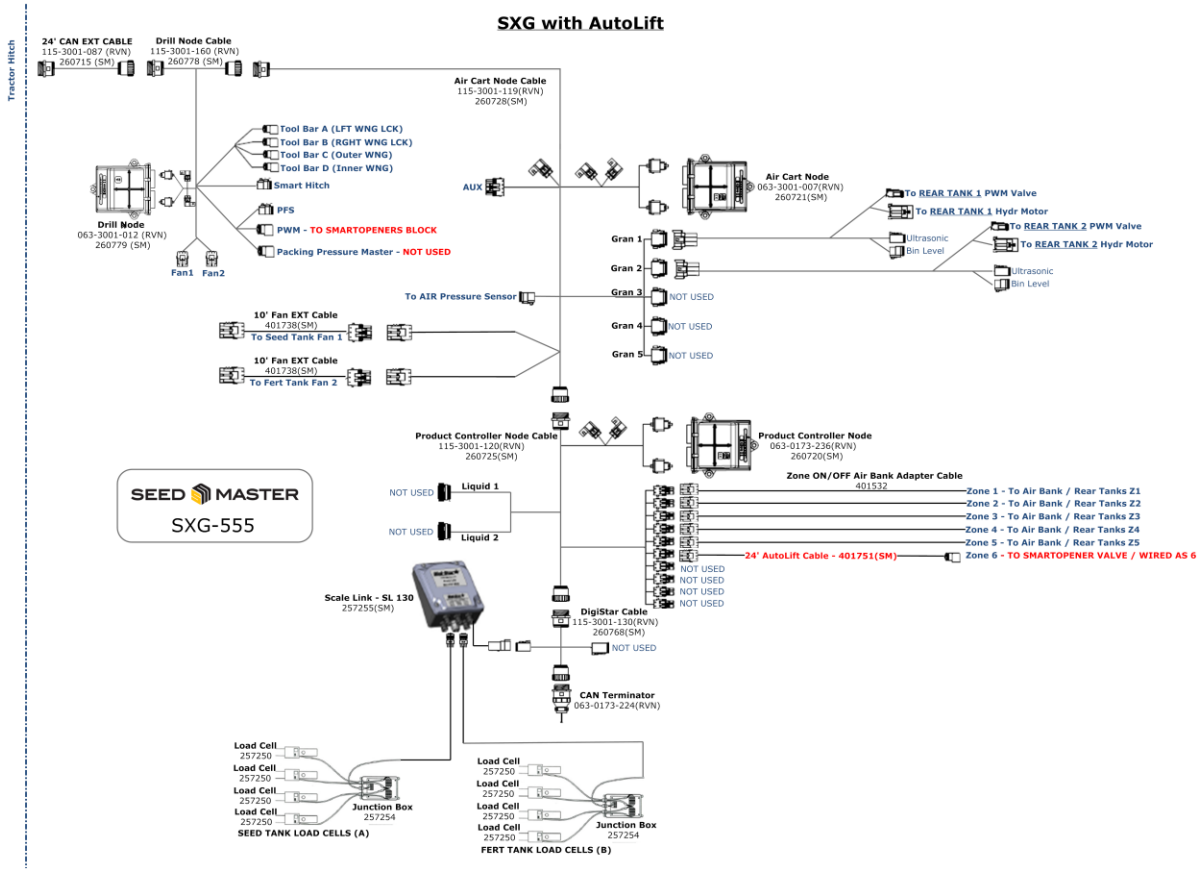
TXB



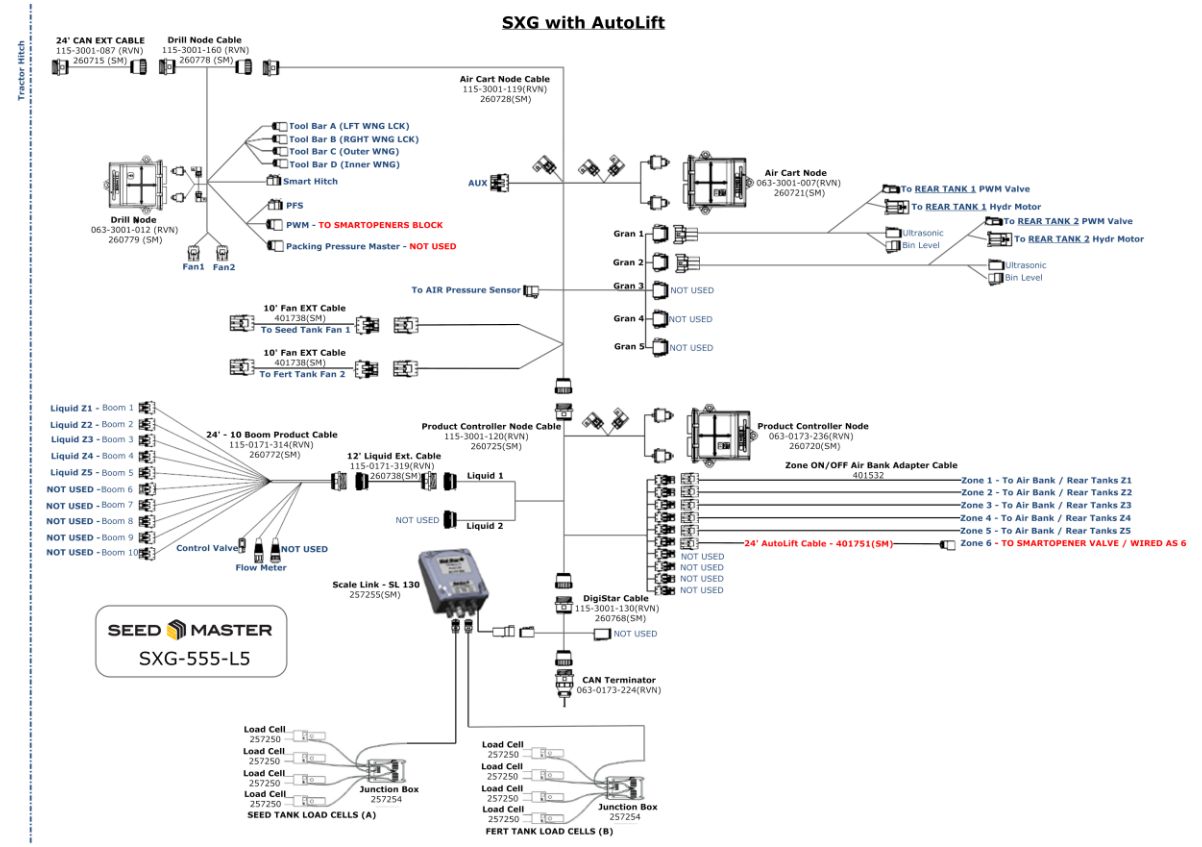
SXX345



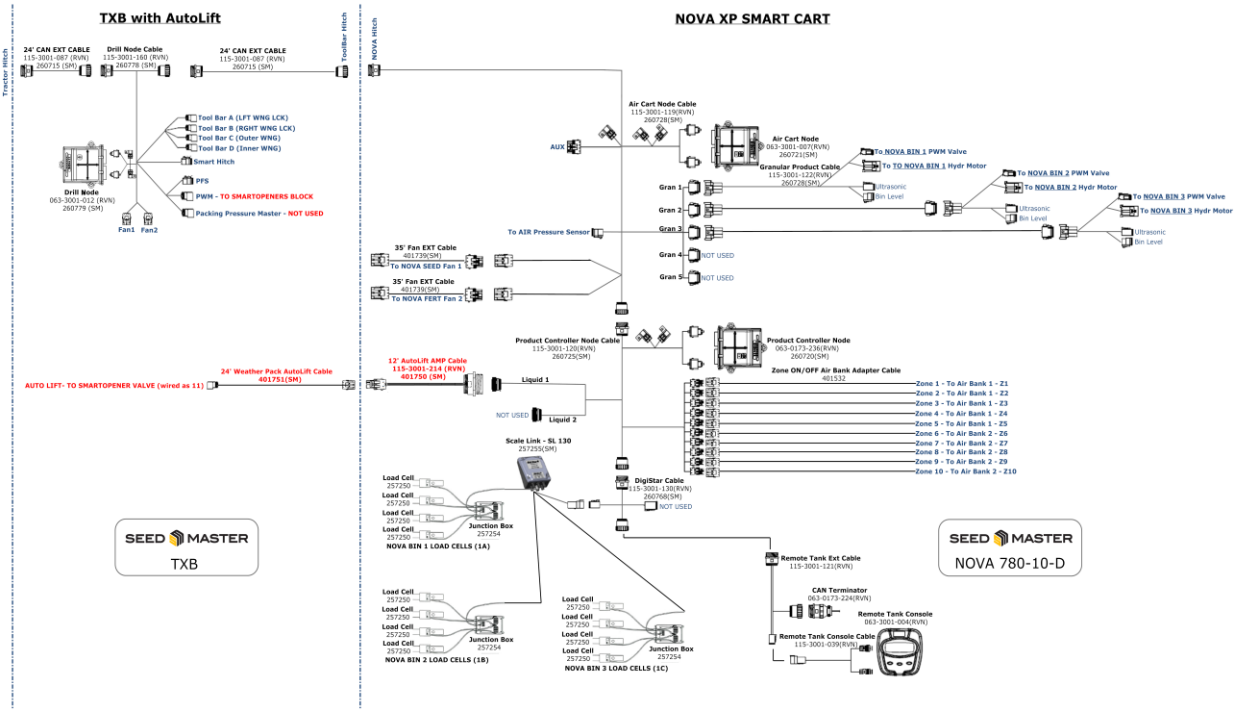
SXG555



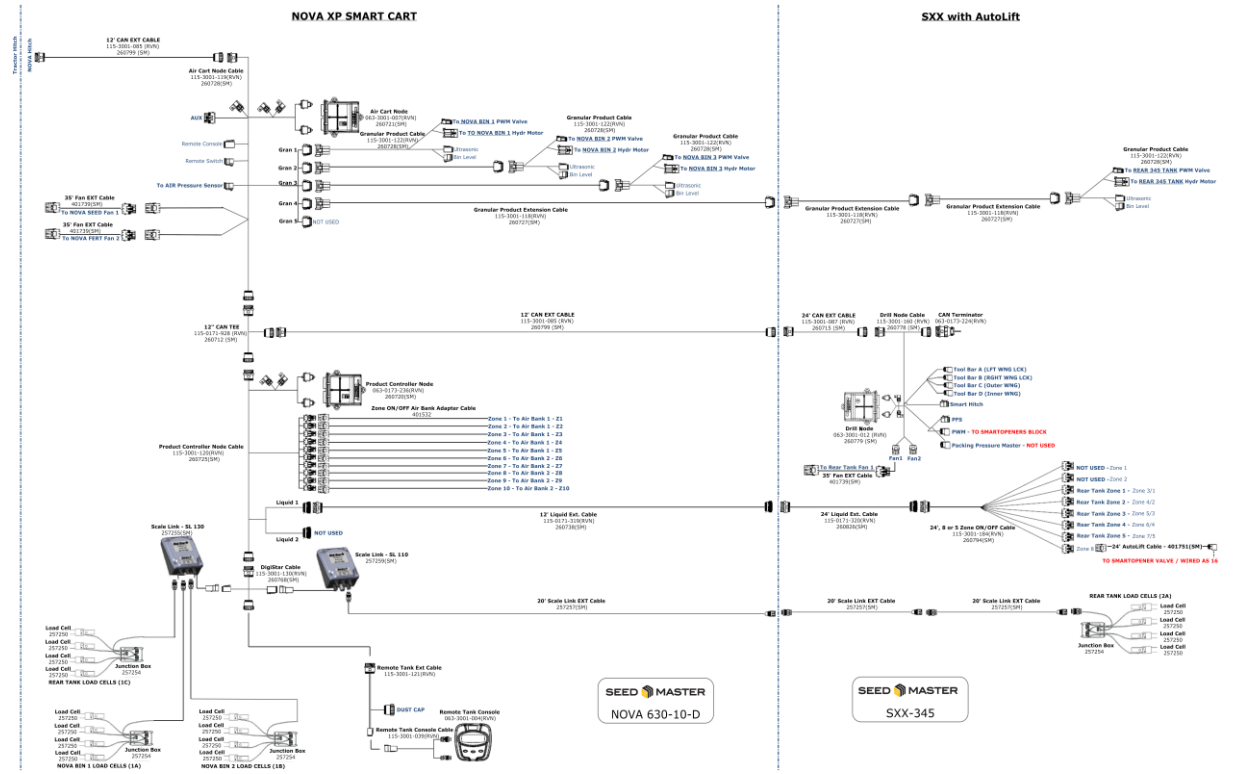
SXG555 & SEEDMASTER LIQUID



NOVA XP 780



NOVA 630 + SXX345



DIGISTAR SCALE LINK SL130