# SEEDMASTER – 2025

## E-SERIES CART – STANDARD TOOLBAR

# OPERATOR'S MANUAL

SEED MASTER™

# CONTENTS

# 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 because of the proper use of the unit will be your reward for spending some time studying this manual.

If problems arise, SeedMaster Manufacturing's dealership network can provide clarification and correction. It is important that all SeedMaster units maintain a solid reputation.

SeedMaster Manufacturing would like to take this opportunity to thank you, our valued customer, and our valued dealer, for showing your confidence in purchasing and representing a quality SeedMaster product.

# SAFETY

Please be SAFE! Carefully read and understand all safety alerts and warnings in this manual and all safety decals on SeedMaster products. Ensure that anyone who is going to use the SeedMaster product reads and understands the Operator's Manual. We recommend that only mature and well-trained or experienced people 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 machine.
- 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 product. Ensure that minimum safe working distances are always maintained from any obstruction.
- 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.
- 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 test for meter calibration, keep hands and clothes well clear of rotating components. 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 drill and/or cart are properly and safely connected to each other and the tractor.
- Transport per local regulations for width and height.
- Follow all road safety regulations for your state or province.
- Store the unit on a firm, level surface.
- 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.
- Always keep safety decals and signs clean and legible. Replace safety decals and signs that are missing or have become illegible.
- Always use hitch safety chain.
- Do not transport at high speeds, especially 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 cart steering axle is moving freely before going onto roads.
- Do not transport at speeds higher than that recommended on tires and hubs (25 mph or 40 kph).
- Check all transport wheel nuts after the initial 10 hours of use and periodically thereafter. (See PAGE 8).
- Use proper tire inflation pressures (SEE TIRE TORQUE AND PSI SPECS, PAGE 8).

# TIRE TORQUE AND PSI SPECS

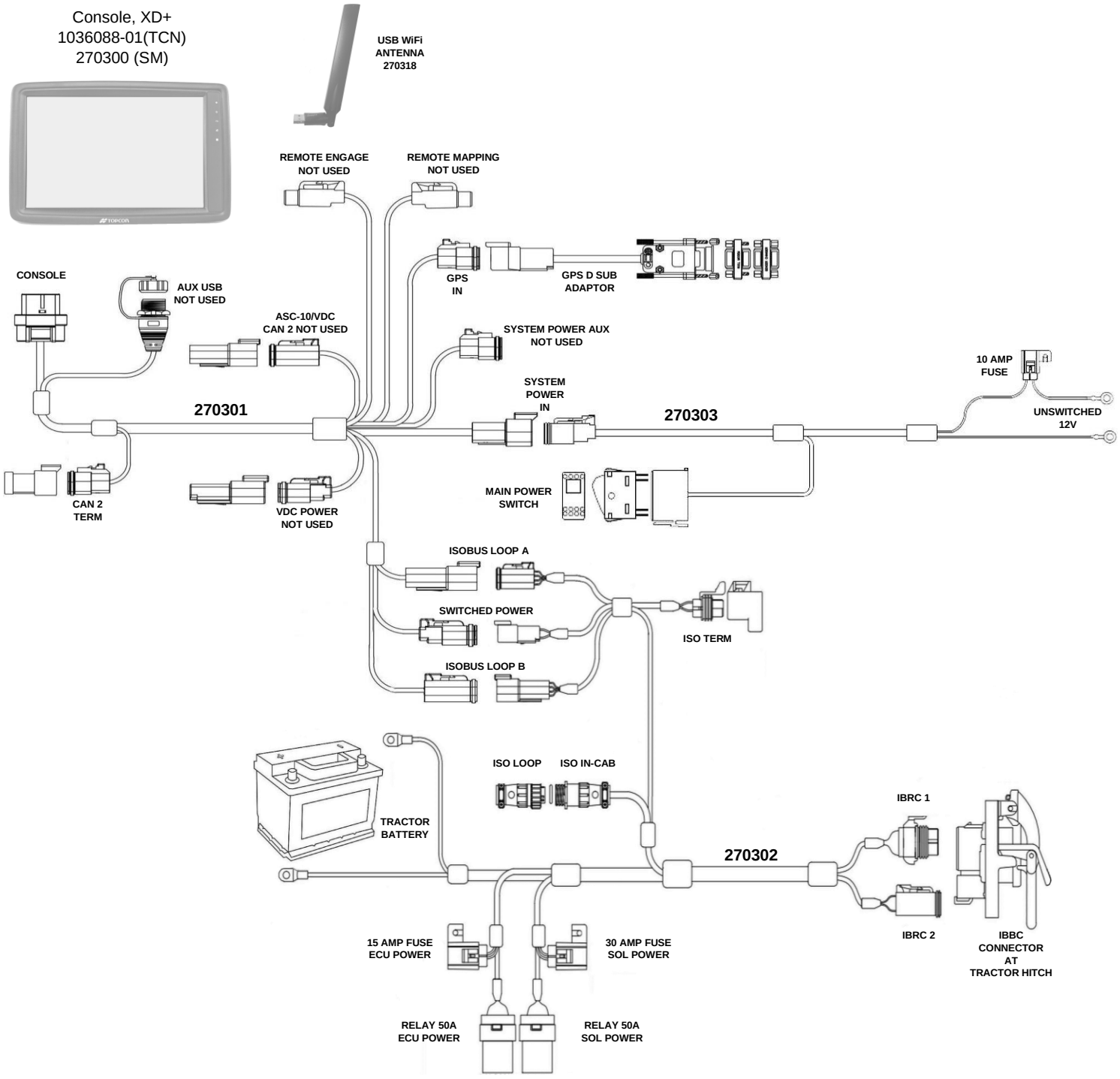
| TIRE SIZE | TORQUE REQUIREMENTS (FT. LBS.) | MAXIMUM PRESSURE RATING (PSI) |
|---|---|---|
| 380/55-16.5 | 200 | 72 |
| 31x13.5 | 200 | 60 |
| 750/65R26 | 450 | 35 |
| Single 800/70R38 | 450 | 15 |
| Dual 800/70R38 | 750 | 12 |

***NOTE: All tires require re-torque after the initial 10 hours of in-field use. Subsequent checks should happen every 100 hours. Higher torque values may require a torque multiplier.***


*SEEDMASTER E860 E-SERIES CART*

# IN-CAB ELECTRICAL HOOKUP

## TOPCON XD+ IN-CAB HOOKUP



# HYDRAULIC HOOKUPS

## HYDRAULIC HOSES

**HOSE MARKING CONVENTION**: 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**: Red Tagged Lines – The two ⅝" Direct Opener Lift & Lower hydraulic lines with red colour bands are the opener lift and lower lines. These lines are connected to one tractor remote. The hose with 1 red band is opener down pressure. The hose with 2 red bands is pressurized to raise the openers. The openers are held up in transport with a Pilot Operated Check Valve. This maintains the pressure on the opener up pressure circuit for long transport and to facilitate unhooking under lift pressure. Leave the pressure engaged to operate the Openers. **NOTE***: See page 17 for operation instructions.*

**SYSTEM PRESSURE HOSES**: Green Tagged Lines - The two ⅝" hydraulic lines with 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, the operating position for this remote is locked on to provide continuous pressure to the block via the line with 1 green band. Pressure should be adjusted and set between 2600-3000 psi by using the tractor remote flow control.

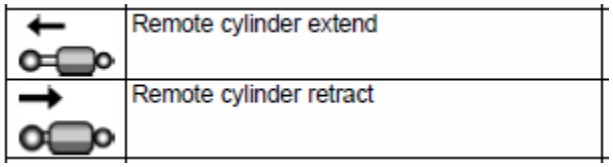
**SEED AND FERT FAN HOSES E-SERIES:** The seed fan hoses will be tagged with 1x yellow (pressure) and 2x yellow (return) and the fertilizer fan will be tagged with 1x blue (pressure) and 2x blue (return).

***Ensure that you connect the right pair of hoses together on your tractor.***

**CASE DRAIN HOSE**: E-Series tanks are set up with **ONE** ¾" case drain line (zero back pressure). This line has a ⅜" flat-faced coupler routed to the Main Hydraulic Block when paired with an SMS Toolbar. Improper connection or undersized return lines may cause inaccuracies in operation and the possibility for severe damage to the drill and tank's hydraulic systems. ***SeedMaster Manufacturing recommends using the factory connections provided with the drill and tank.***

# HYDRAULIC CONNECTION REFERENCE CARDS

SeedMaster Toolbars and E-Series carts can be paired or separate. Please refer to your configuration below. Ensure that you are hooking the pressure and return hoses to the appropriate remotes on your tractor: Pressure to Retract, Return to Extend.




**Std Toolbar Only Hydraulic Hookup**

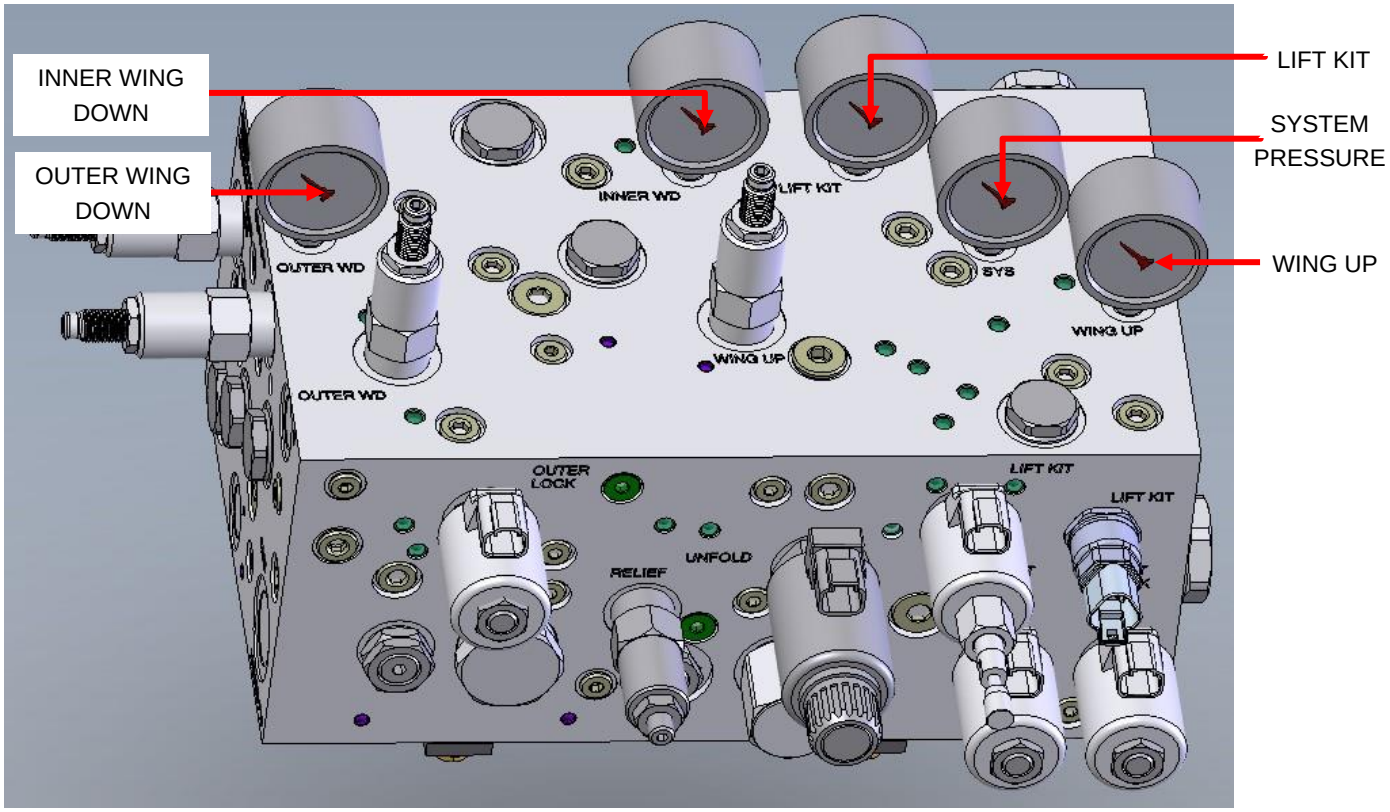
| TRACTOR REMOTE | HOSE PAIR PRESSURE | RETURN | HYDRAULIC FUNCTION |
|---|---|---|---|
| SCV 1 SEEDMASTER | 1 RED ⅝" Line | 2 RED ⅝" Line | OPENER PRESSURE |
| SCV 2 SEEDMASTER | 1 GREEN ⅝" Line | 2 GREEN ⅝" Line | SYSTEM PRESSURE |
| SCV 3 UNUSED | | | |
| SCV 4 UNUSED | | | |
| SCV 5 UNUSED | | | |
| CASE DRAIN SEEDMASTER | ¾" CASE DRAIN LINE | | |

**Std Toolbar and E-Series Hydraulic Hookup**

| TRACTOR REMOTE | HOSE PAIR PRESSURE | RETURN | HYDRAULIC FUNCTION |
|---|---|---|---|
| SCV 1 SEEDMASTER | 1 RED ⅝" Line | 2 RED ⅝" Line | OPENER PRESSURE |
| SCV 2 SEEDMASTER | 1 GREEN ⅝" Line | 2 GREEN ⅝" Line | SYSTEM PRESSURE |
| SCV 3 SEEDMASTER | 1 YELLOW ¾" LINE | 2 YELLOW ¾" LINE | SEED FAN E-SERIES |
| SCV 4 SEEDMASTER | 1 BLUE ¾" LINE | 2 BLUE ¾" LINE | FERT FAN E-SERIES |
| SCV 5 UNUSED | | | |
| CASE DRAIN SEEDMASTER | ¾" CASE DRAIN LINE | | |

# MAIN HYDRAULIC BLOCK DETAILS

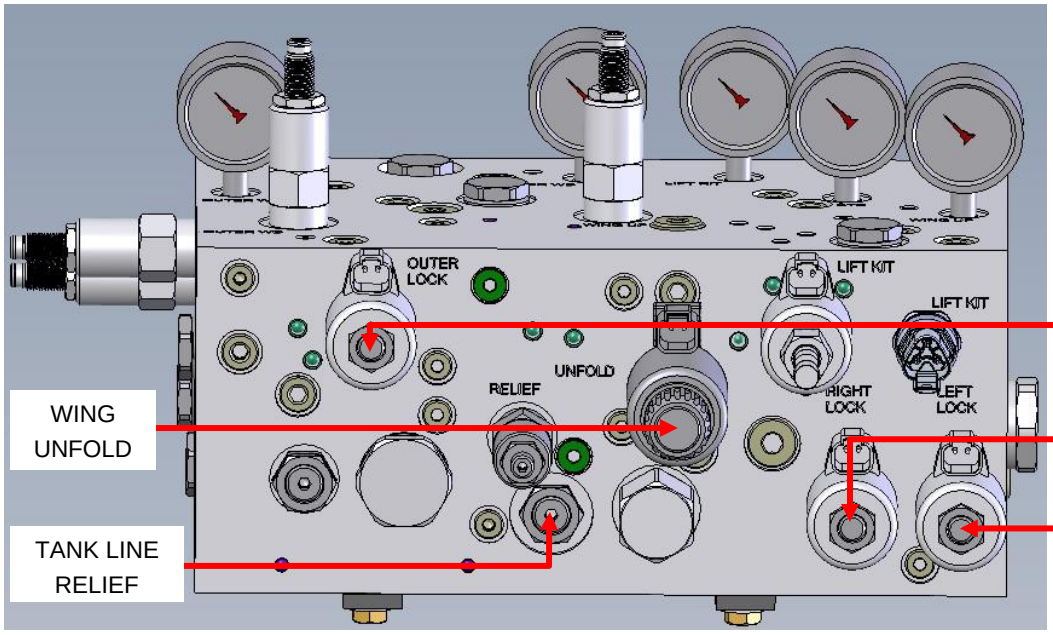
## HYDRAULIC BLOCK GAUGES

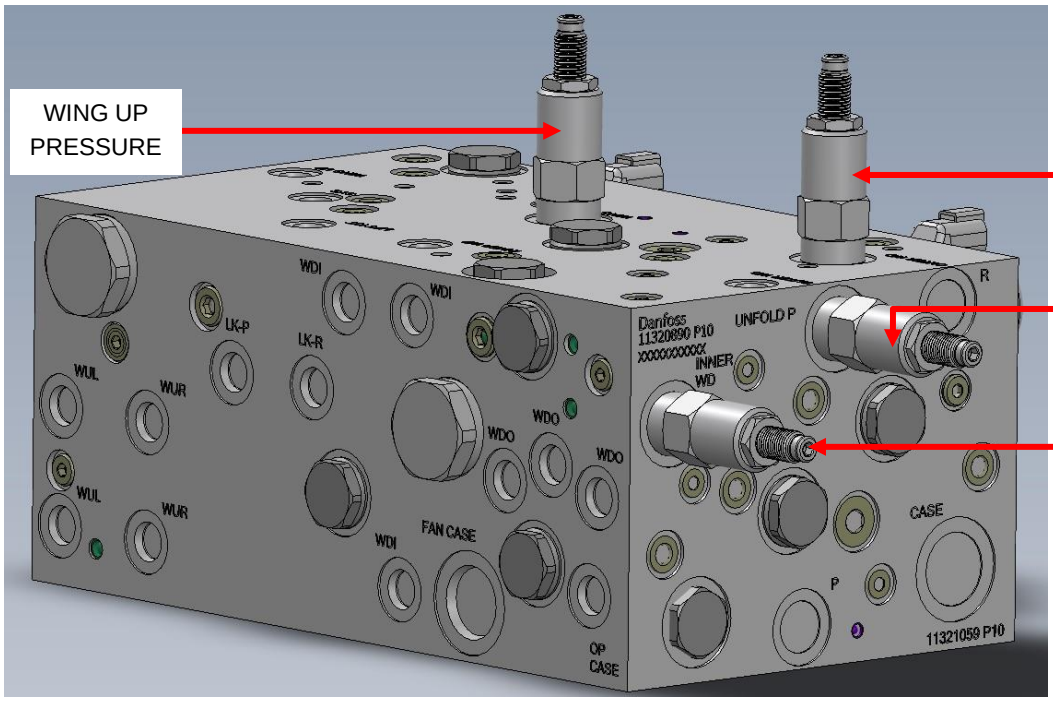



## MAIN BLOCK GAUGES

**OUTER WING DOWN**: The OUTER WING DOWN gauge reads the amount of pressure being applied to the outer wings while they and the openers are down and in field operation.
**INNER WING DOWN**: The INNER WING DOWN gauge reads the amount of pressure being applied to the inner wings while they and the oppeners are down and in field operation.
**LIFT KIT:** The LIFT KIT gauge reads the amount of pressure being supplied to the lift kit.
**SYSTEM PRESSURE:** The gauge labeled “SYS” on the main block reads the amount of system pressure being applied to the system. System Pressure is the main pressure supply for the WING UP. INNER and OUTER DOWN, and LIFT KIT, circuits. 2600-3000 psi indicates tractor working pressure to block. Pressure fluctuation can indicate back pressure or lack of flow to the circuit. Adjust tractor flow as necessary to hold within range.
**WING UP:** The WING UP gauge reads the positive amount of “up” pressure applied to the wing circuit to account for tractor backpressure.

# MAIN BLOCK VALVES, SOLENOIDS, AND PWMS




**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.
**WING UNFOLD:** This on/off solenoid turns the oil flow on/off to the inner wing cylinders.
**TANK LINE RELIEF:** The tank line relief cartridge is preset at 440 psi. If the cartridge exceeds 440 psi it will relieve to the case drain. If the case drain is not hooked up, a special coupler will relieve to atmosphere. This valve does not require adjustment.
**WING UP PRESSURE:** This applies pressure to the up portion of the wing cylinders to allow for fine adjustment of the differential pressure between the up and down circuits. It does not require adjustment.
**INNER WING-DOWN PRESSURE:** This relief valves sets the down pressure applied to the inner (main) wings of the drill. This pressure will vary with the various tractor and drill combinations.
**OUTER WING-DOWN PRESSURE:** This relief valve sets the down pressure applied to the outer wings of the drill. This pressure will vary with the various tractor and drill combinations.

★**Wing-Down pressures may need to be increased if the wings start to float and not contour correctly while in the seeding position or if a positive Wing-Up pressure is detected.**
★**Wing-Down pressures may need to be decreased if the wings become too rigid while in the seeding position.**
★**Wing-Down pressures are only active when the openers are pressured in the down position.**
**LIFT KIT:** See Lift Kit procedure on page 23.
**UNFOLD PRESSURE:** See procedure below.

# PRESSURE SETTING PROCEDURES

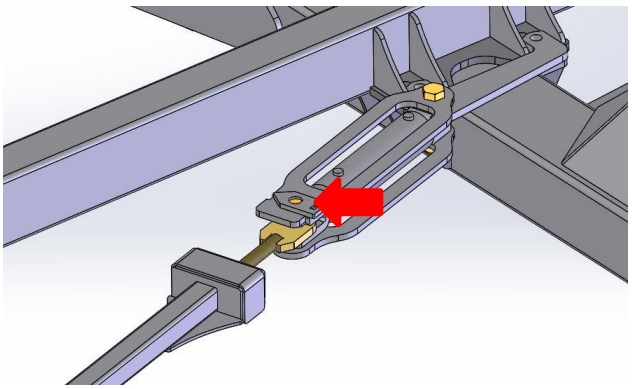
**Setting Wing-Down Procedure (INNER AND OUTER WING-DOWN PRESSURE)**
The Wing-Down pressure is the amount of hydraulic pressure being applied to the inner and outer wing circuits; the oil supply is supplied from the system pressure and only active when the openers are pressured down. Wing-Down Pressure is required so the wings will contour while travelling through the field. To mitigate back pressure variables, the valve labeled “Wing Up” is now used to apply pressure to the wing-up circuit on the drill. This valve is factory preset and will read 600-700 PSI when System Pressure is applied. This valve should ***NOT*** be adjusted. SeedMaster Wing-Down Pressure is a differential value. To determine your net value, subtract your displayed wing-up pressure from your current wing-down pressure. (ie. 880 PSI wing-down – 700 PSI wing-up = 180 PSI net wing-down).

- To adjust the **INNER WING-DOWN PRESSURE**, ensure the openers are lowered, loosen the jam nut on the cartridge in port **INNER WD** on the main block. Turn the cartridge in to increase the pressure, and out to decrease the pressure. When the desired pressure is set, re-tighten the jam nut.
- To adjust the **OUTER WING-DOWN PRESSURE**, ensure the openers are lowered, loosen the jam nut on the cartridge in port **OUTER WD** on the main block. Turn the cartridge in to increase the pressure, and out to decrease the pressure. When the desired pressure is set, re-tighten the jam nut.

**Setting Wing Unfold Pressure Procedure (UNFOLD PRESSURE)**
The wing unfold pressure relief valve applies boosted hydraulic pressure supplied from the System Pressure to the inner wing circuit while the tool bar is unfolding. If the wings are not unfolding the pressure will need to be increased. This pressure should only be increased to the point that the wings just begin to unfold. As soon as movement begins, the pressure is adequate.

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

**Active Wing Brace Check**
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 counteracting 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 square. When the packing pressure is increased, so is the amount of pull on the brace to a set maximum.



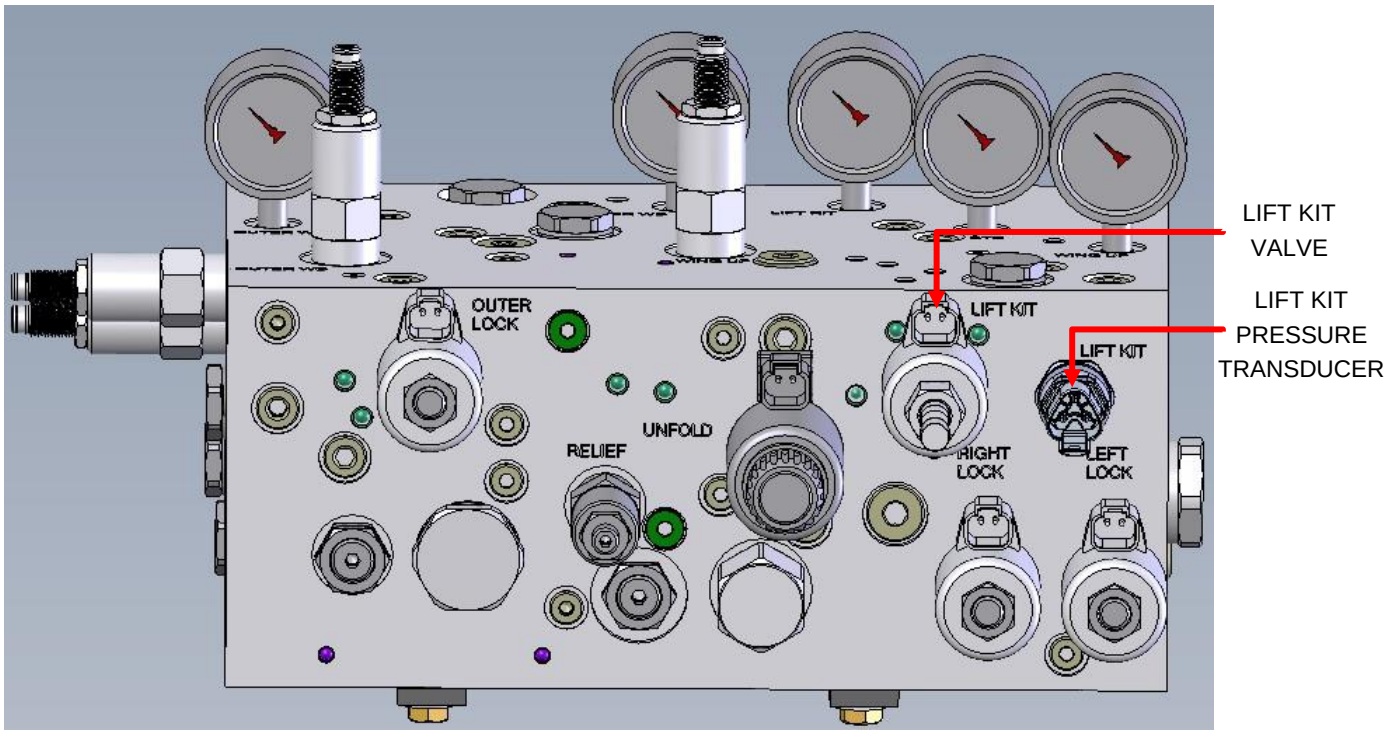
- **Adjusting the wing brace**: Start by unfolding the SM drill and activating the system pressure. Next, pressure the openers down with the opener pressure switch and adjust the shank down hydraulic pressure to 1000psi, activating the active wing braces. After the system has been completely pressurized, inspect each wing brace cylinder indicator. They should be fully retracted against the plate limiter. If not, please adjust the length of the active wing brace using the threaded link. The braces should be periodically checked to ensure proper adjustment. This will ensure your frame integrity remains true and helps increase the longevity of your machine.

# LIFT KIT OVERVIEW

**LIFT KIT:** The Lift Kit is designed to decrease the weight on the main frame front caster wheels during field operation. It is hydraulically operated utilizing supply oil from the main hydraulic block. The Lift Kit increases floatation by redistributing weight from the front caster wheels of the drill forward to the tractor hitch and backwards to the rear of the drill. The reduced weight and draft on the drill then adds weight and traction to the rear of the tractor. It also reduces stress on the hitch and frame of the drill when seeding in wet conditions.

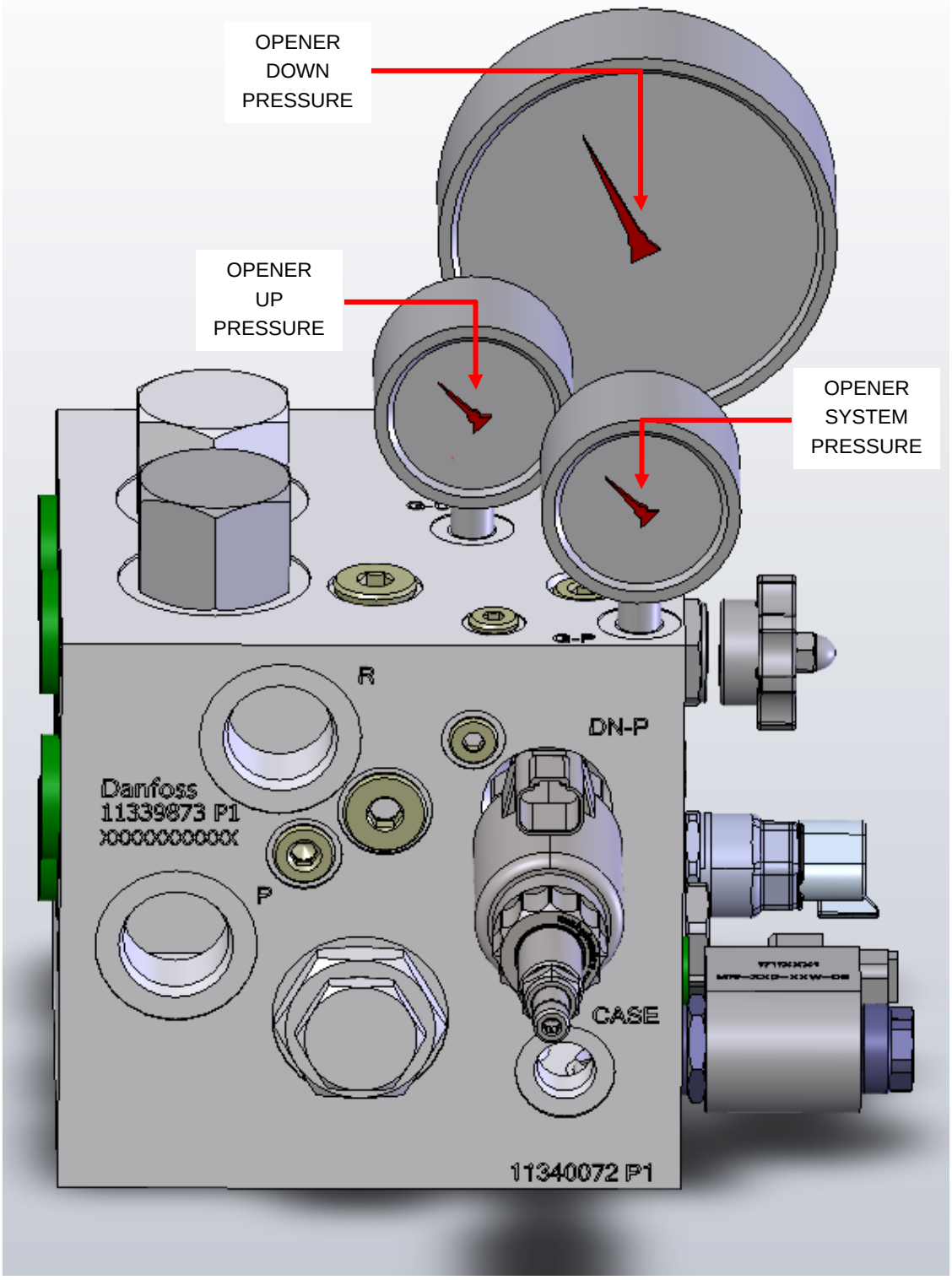
**Lift Kit Pressure Settings (Proportional Relief Valve)**

- See page 23 for in-cab pressure readout, pressure adjustment, and operating modes for this feature.

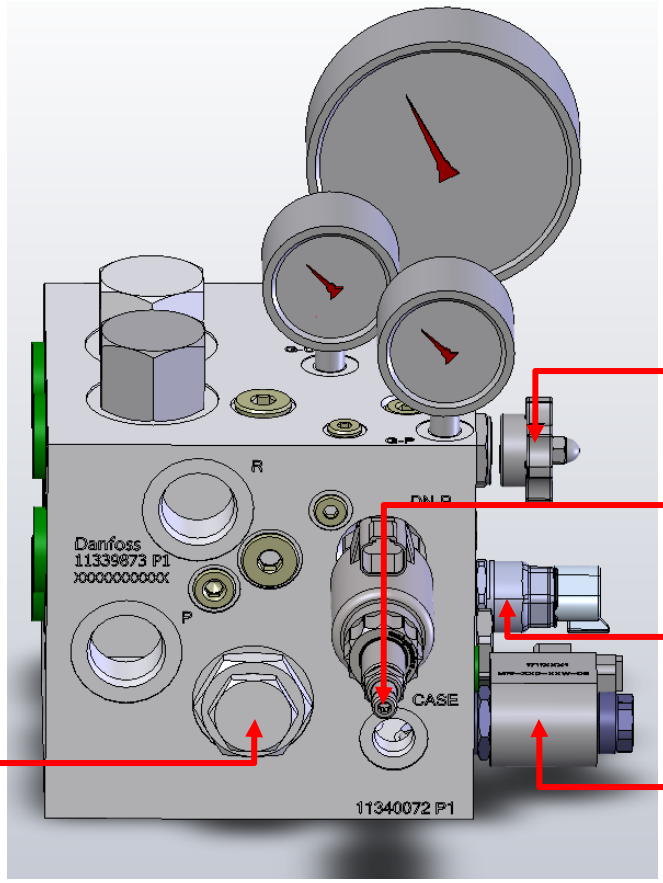


# OPENER HYDRAULIC BLOCK DETAILS AND OPERATION

## OPENER HYDRAULIC BLOCK GAUGES



# OPENER BLOCK VALVES, SOLENOIDS, AND PWMS




# OPENER BLOCK DETAILS AND OPERATION

The Opener Hydraulic Block contains the main functions of your openers: raising, lowering, and down-pressure. These functions are controlled by a Master ON/OFF solenoid and coil to raise and lower, and a PWM valve for down-pressure. The Opener block is located on the first rank behind the main block. For it to operate, you will leave the connected tractor hydraulic remote engaged during field operation. This continuous flow should be run with the least amount of flow required to raise and lower the openers. Tractor SCV flow can be decreased until the openers become slow to raise and lower. Recommended maximum flow for this remote is 75%.

**OPERATION:**

BEGIN:

1. LOCK ON REMOTE TO SUPPLY OPENERS WITH HYDRAULIC PRESSURE.
2. CYCLE MASTER SWITCH FROM OFF TO ON AND LEAVE THE MASTER SWITCH “ON”. OPENERS WILL LOWER AND BUILD PRESSURE TO YOUR PRESET VALUE.

LIFT:

3. AFTER THE TOOLBAR IS COMPLETEY OVERLAPPED INTO AN APPLIED AREA, SHUT THE MASTER SWITCH OFF. OPENERS WILL LIFT.
4. COMPLETE THE TURN.

LOWER:

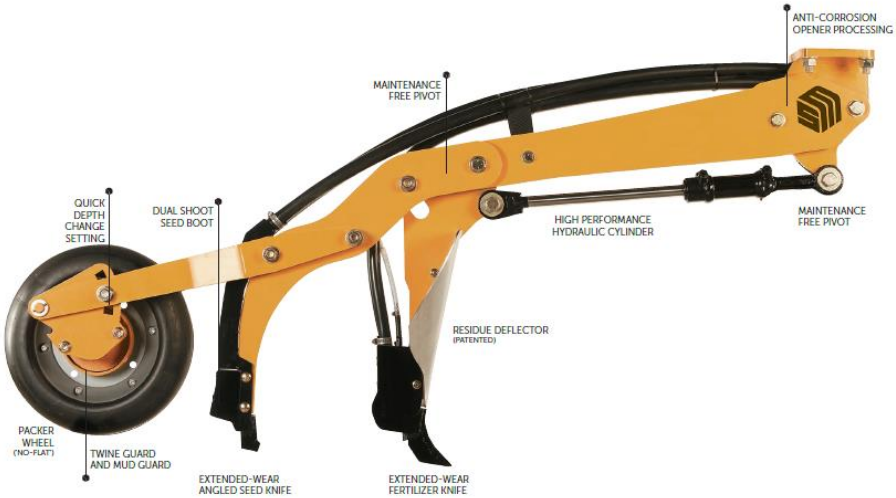
5. CYCLE MASTER SWITCH FROM OFF TO ON AND LEAVE THE MASTER SWITCH “ON”. OPENERS WILL LOWER AND BUILD PRESSURE TO YOUR PRESET VALUE.

# SEEDMASTER OPENERS AND KNIVES

## STANDARD OPENER

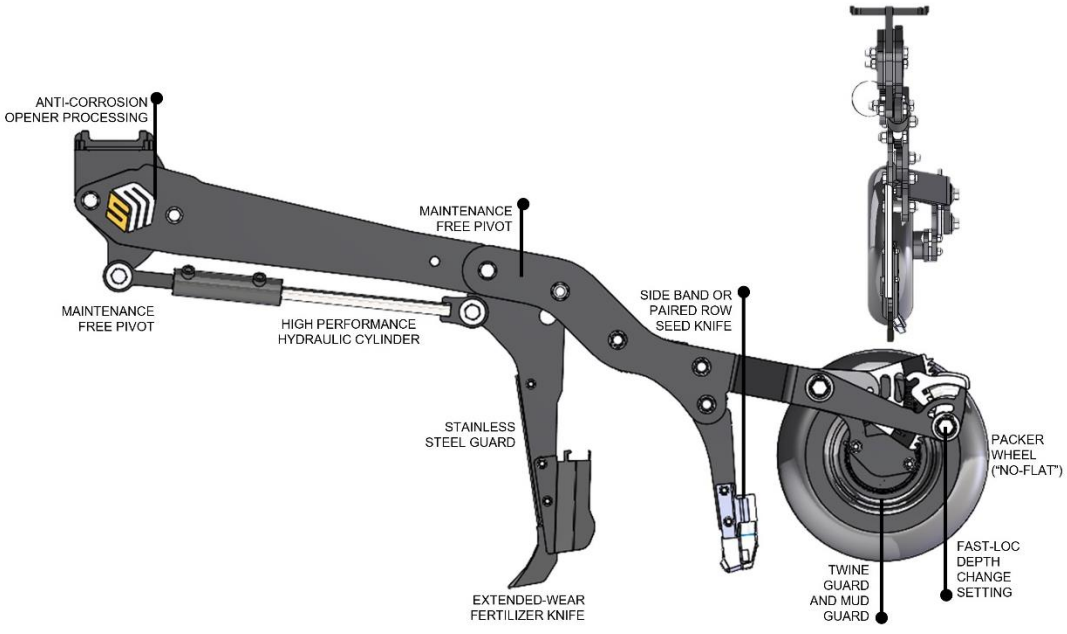
SeedMaster openers are installed on the toolbar in a “mirrored” configuration. Due to the angled seed carbides, this requires “left” and “right” seed knives. The openers are preset for seed and fertilizer depth. The seed depth is factory set at ¾” below the packed surface and the fertilizer depth is factory set approximately ¾” below and 1 ½” to the side of the seed.

In varying field conditions, soil types, and moisture conditions, it may be required to adjust the openers from the pre-set depths. We recommend seeding cereals, oil seeds, and all other products at the determined seed and fertilizer depths desired by the owner/operator. The notches on the hub plate correspond to ¼” changes in depth, with the inverted notch being the factory pre-set depth of ¾”.




## INLINE OPENER

SeedMaster has developed an opener that alters the placements of the fertilizer and seed arms in relation to each other. The standard opener as mentioned above employs an offset configuration where the fertilizer arm is located 1 ½” to the side of the seed arm. The inline opener brings the fertilizer and seed arms “in line” with each other. This configuration requires the use of different style seed knives. They are detailed in the next section.



## INLINE OPENER SEED KNIFE OPTIONS

To ensure seed and fertilizer separation on an inline opener configuration, different style seed knives are required. There are two styles to choose from: Side Band, and Paired Row. Due to the “mirrored” opener configuration on SeedMaster toolbars, “left” and “right” Side Band seed knives are required. The side band knife places the seed in much the same manner as the traditional offset opener. The paired row will place the seed in two bands on both sides above the fertilizer band.

Side Band Front View

Side Band Rear View

Paired Row Rear View

Paired Row Side View

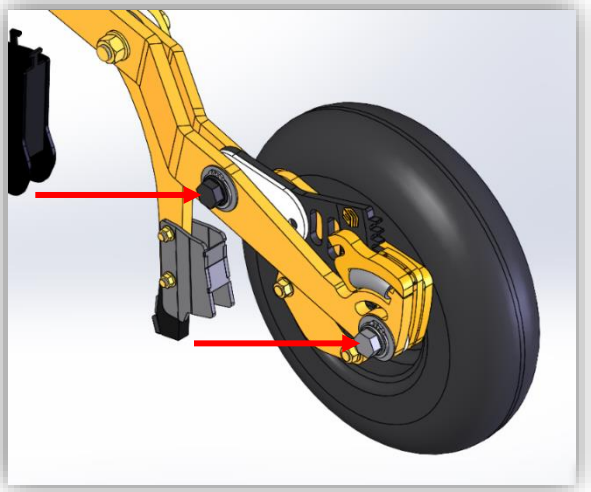
## QUICK DEPTH ADJUST TOOL

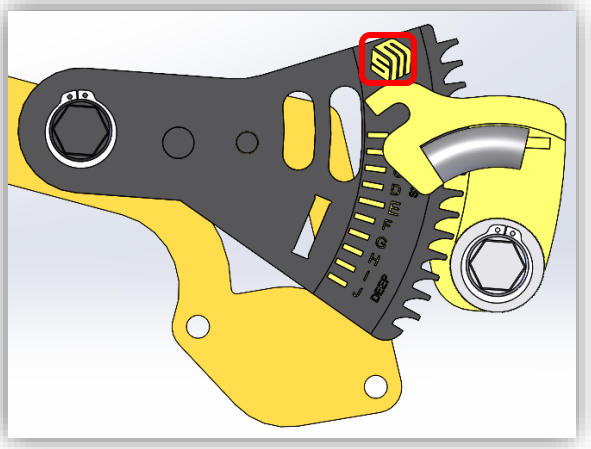
To change depth using the SeedMaster Quick Depth Adjust Tool, begin by selecting your desired depth on the tool. The measurements are scribed onto the side of the stainless depth gauge and run from 0” to 1 ½”. Then, as shown in Figure 1, simply loosen the nut on the slotted portion of the hub plate to allow the packer hub to rotate freely, hook the Quick Depth Adjust Tool into the hub plate, and rotate the tool until the stainless depth gauge contacts the bottom of the packer arm. Tighten the nut, and your desired depth is now set for that opener.


**FIGURE 1**

# FAST-LOC DEPTH ADJUSTMENT

| SM Icon | 3/8 |
|---|---|
| A | 7/16 |
| B | 1/2 |
| C | 5/8 |
| D | 11/16 |
| **E** | 3/4 |
| F | 15/16 |
| G | 1 |
| H | 1 1/16 |
| I | 1 1/8 |
| J | 1 1/4 |
| K | 1 3/8 |
| L | 1 1/2 |
| M | 1 9/16 |
| N | 1 5/8 |
| O | 1 3/4 |





To change depth using the Fast-Loc Depth Adjustment, you require two 1⅛" wrenches. Using the first wrench, rotate the spring-loaded depth guide backwards to release it from the adjustment plate's teeth. Then, with the second wrench, rotate the adjustment plate up or down as pictured above. Using the decal on the side to determine the appropriate setting, move the plate up or down to your desired depth. Return the spring-loaded depth guide into the teeth of the adjustment plate and your depth will be set for that opener.

Knife and product depth varies from soil to soil. It is incumbent on the owner/operator to ensure that product depths meet their requirements as well as that of the product being applied. The decal's depth measurements begin with "SM Icon" at approximately ⅜" below the packed surface and increase by ⅛" with each setting. To achieve the unlabeled depths, move the adjustment plate one tooth at a time past the labeled depths.

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 hardness. The variation in dent depth does not affect the crop since the seed depth is always monitored from the packed surface.

*Avoid the 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.***

# JEM TOOLBAR CONTROLLER INSTALLATION AND OPERATION

## INSTALLATION

The JEM Toolbar Controller kit consists of 5-inch touch-screen display, RAM mount, and wiring harness.

1. Locate a convenient spot in the tractor cab to mount the display. The included mount will work for many tractors, but other RAM options (such as a suction mount) may be required.
2. Mount the Remote Lift/Lower switch where it is easily accessed during operations.
3. The Power harness will plug into a common 3-pin AMP power port, which provides both constant and key-switched power.
4. The display harness plugs into the grey connector on the back of the display.
5. Run the drill harness through the cab to the hitch. Connect the plug at the hitch to the mating connector on the drill.

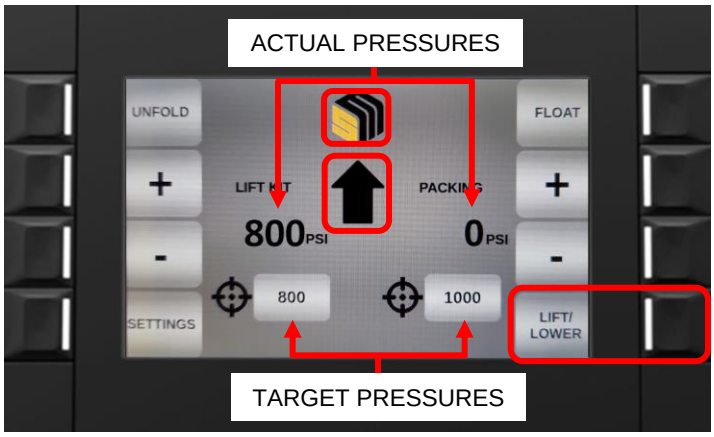
## JEM CONTROLLER POWER ON/OFF

The JEM controller has a touch activated screen and physical buttons. These instructions refer to using the buttons, however for many functions you can choose to touch the screen icon instead. Entering values or silencing an alarm is only available via the touchscreen.


**Power On/Off** – The JEM controller is activated and deactivated via keyed power from the tractor. While loading, it displays the SeedMaster logo. When fully ready, the Standby Screen shows “Touch Screen to Begin”. Touch the screen or push any of the buttons to get to the Home Screen.

# HOME SCREEN AND ALARMS

The primary working screen offers direct control of the drill operating functions as well as access to the Unfold Screen and Settings Screen.




Touch and hold the SeedMaster logo to toggle the screen between day and night mode.

The arrow in the center of the display indicates whether the openers are up or down.

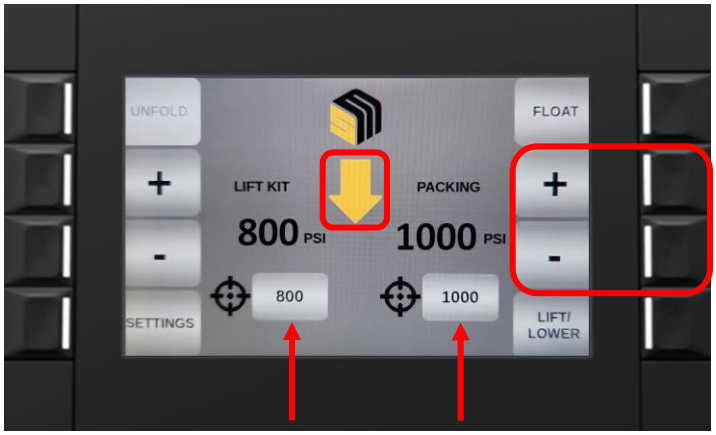
On the right-hand side of the screen, the Lift/Lower button toggles between openers raised and openers lowered. This function is duplicated with the Remote Lift/Lower switch.


Any combination of the on-screen button, adjacent side button, or remote switch can be used to toggle the position of the openers.

The target pressure settings for the lift kit and the packer wheels are shown at the bottom of the screen with the actual pressure shown just above. Touching either of the target pressure boxes will allow the target pressure to be changed directly.

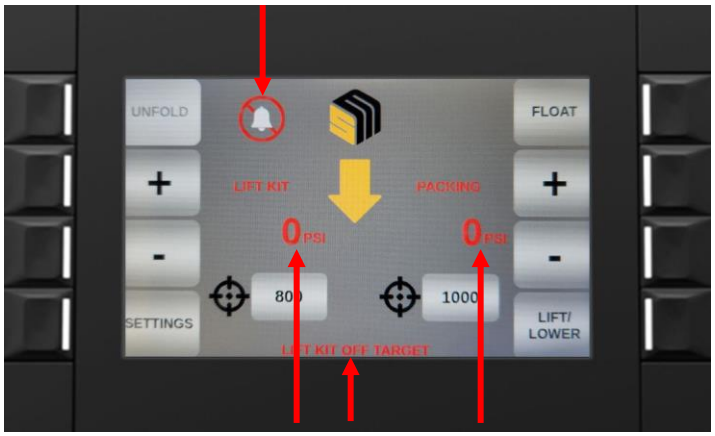
*Note: The relevant minimum and maximum allowable entry is provided for reference above the keypad.*

When the openers are lowered, packing pressure will begin to build up to the target displaying the actual pressure above it. If desired, the +/- buttons on the right side will increase or decrease the target pressure by 25psi with each press of the button.




***Note: The Unfold Screen cannot be accessed with the openers lowered.***

A “bell” icon will appear on the screen and an audible alarm will sound if either the lift kit or packing pressures are outside of their target pressures.

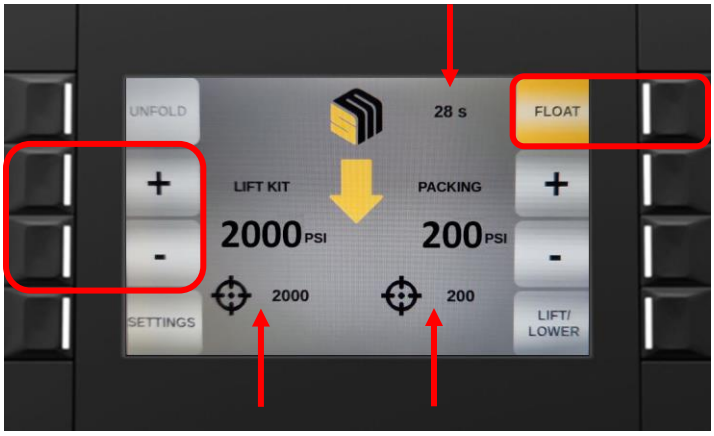



The actual pressure readings will turn red and “Lift Kit Off Target” or “Packing Off Target” will display at the bottom of the screen. If both are simultaneously active, they will appear sequentially.

Touching the “bell” icon will silence the alarm, but the visual indicators remain until the targets are met.

# LIFT KIT PRESSURE SETTINGS

The Lift Kit target pressure can also be adjusted using the +/- buttons on the left side to increase or decrease the target pressure in 25psi increments.



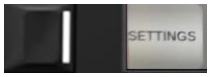

Pressing the Float button will start a timed interval where the packing pressure is reduced, and the lift kit pressure is increased to reduce the power requirement of the tractor. The primary use of this is to avoid getting stuck in a soft area of the field.

A countdown timer shows the number of seconds remaining before the float is disengaged and previous operating target pressures are resumed. This can be disengaged by touching the float button before the timer runs out.

***Note: The target pressures are not able to be changed when float is active. Float values are preset.***

# CONTROLLER SETTINGS

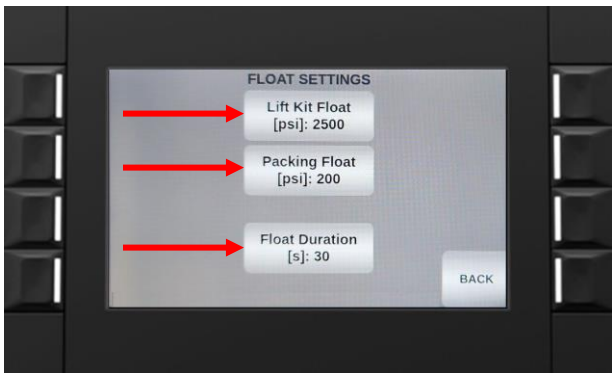
The JEM Controller settings are access by pressing the “Settings” button in the lower left portion of the main work screen. Float settings, Alarm settings, Screen brightness and basic Diagnostics are accessed here. You can also choose to put the JEM back into Standby mode from here or return to the home screen.

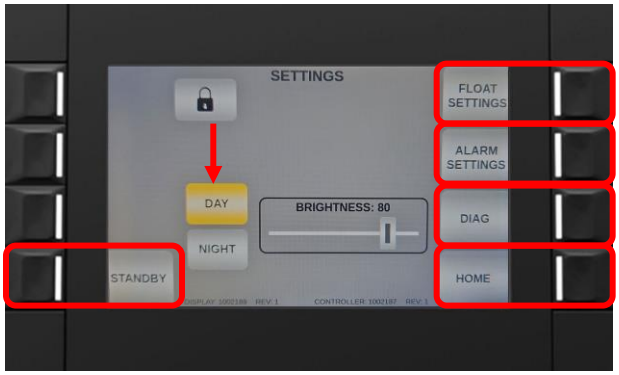



Monitor brightness levels can be set independently for Day and Night modes.

The Float Settings screen provides access to the temporary target pressures for the lift kit and packing wheel which apply only during the float interval.

You can also set the duration of the float interval on this screen. Touch the setting you want to change to enter the new value.



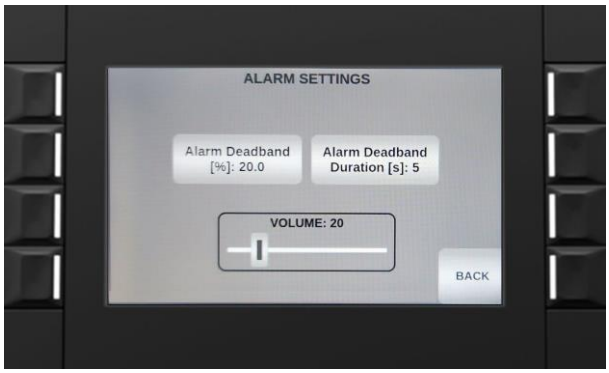



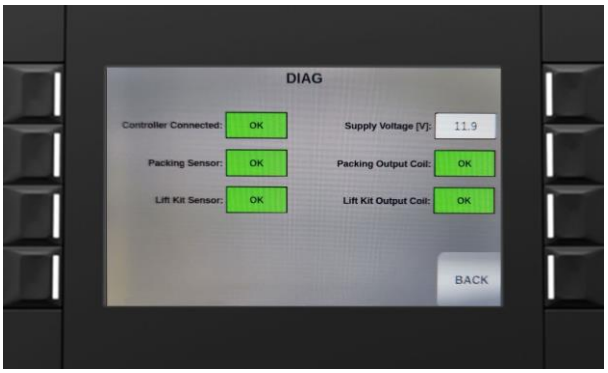
# CONTROLLER ALARM SETTINGS

The Alarm Settings screen allows for customization of the lift kit and packing pressures alarms. You can adjust directly to set the percentage off-target (deadband) your pressure set points can be, the volume of the audible alarm, as well as the alarm duration.

Touch the setting you want to change to enter the new value.

The Diagnostic screen provides a basic indication of wiring connectivity. This screen can be used as a first step in troubleshooting problems with toolbar operation.




# UNFOLDING AND FOLDING WINGS

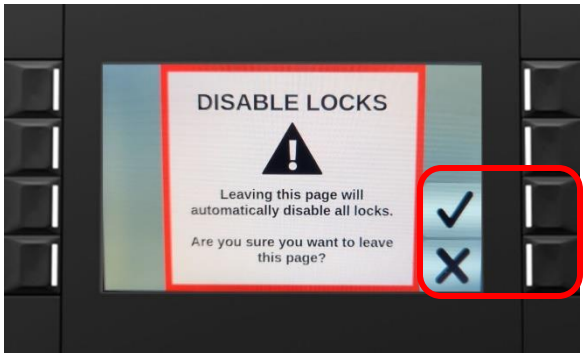
The Unfold screen houses the controls necessary for unfolding and locking the wings. If the controller has the openers set into the “down” position, the user cannot access this screen. The openers must be raised before the drill can unfold.

***Caution: Always unfold the inner wings first, as you can damage the outer wings by unfolding them into each other if the inner wings are not completely unfolded.***

The unfold buttons are “momentary” meaning they function only while held down. Hold down one button at a time only and release it immediately when that unfold operation completes.

The left and right wings can be locked individually. Touch to lock, touch to unlock. In the picture below, the left wing is locked and visually highlighted.

***NOTE: All wing locks are disabled when exiting the unfold screen. You are reminded of this and must acknowledge your understanding before leaving the Unfold screen.***

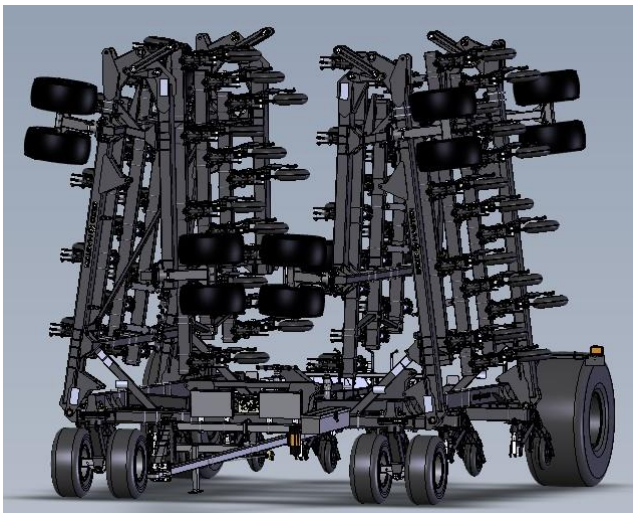



**Wing Lock Acknowledgement**

**PROCEDURE:**

1. Ensure the hydraulic remote supplying system pressure to the block is activated and locked into constant flow. The pressure needs to be adjusted from your tractor to fall within 2600-3000 PSI.
2. Enter the Unfold Screen then press and hold “UNFOLD INNER” until the inner wings are fully unfolded. It is important to unfold the inner wings first as you can damage the outer wings by unfolding them into each other if the inner wings are not completely unfolded.
3. Next, press and hold “UNFOLD OUTER” until the outer wings are fully unfolded. Once the wings have completed unfolding, immediately release the button. Holding the button down after the outer wings have contacted the ground can damage frame components.
4. If you are needing to partially unfold the drill, the wing lock buttons can be used. Release the unfold button you are using and turn on the lock to the wing you want to be stopped and held. When ready to resume unfolding press the lock button again to toggle it off.

   ***NOTE: Always exit the Unfold screen to ensure that the wing locks are left off after use. Failure to disengage will result in the wings not contouring to the land.***
5. To fold, ensure the openers are raised all the way up.
6. Reverse the flow on the system pressure to the block. You may need to increase the flow from the field operation setting. The outer wings will begin to fold first, then the main wings.



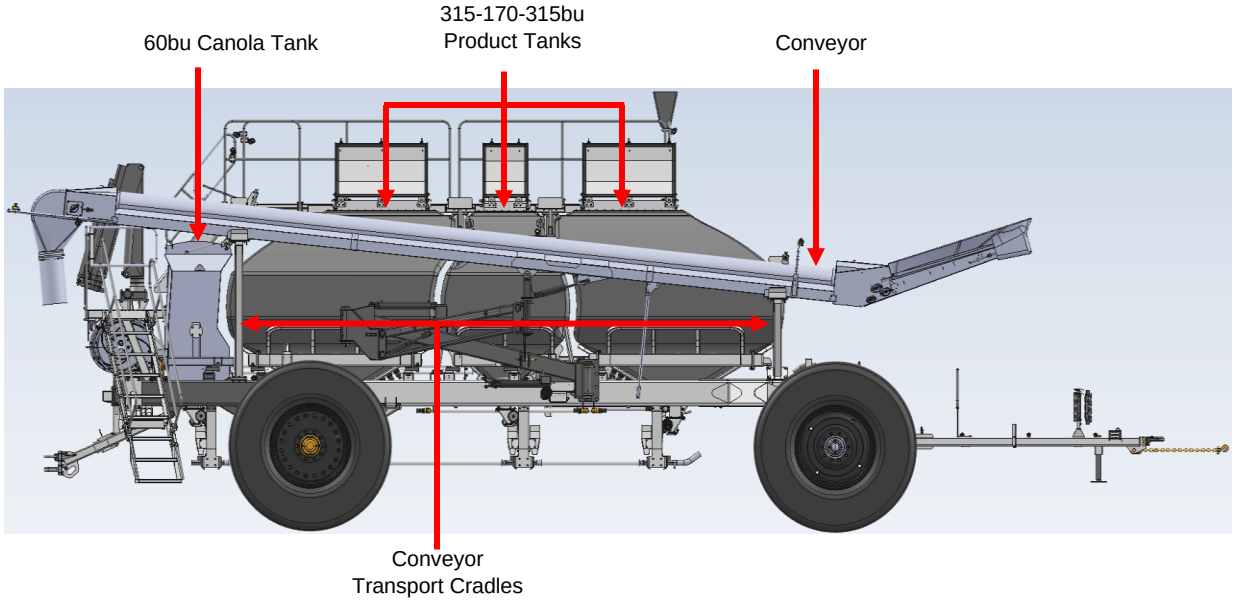
***Always store the drill for extended periods of time in the unfolded wing position. This is to prevent water getting into the packer tire and wing wheel bearings. This is very important for winter storage.***

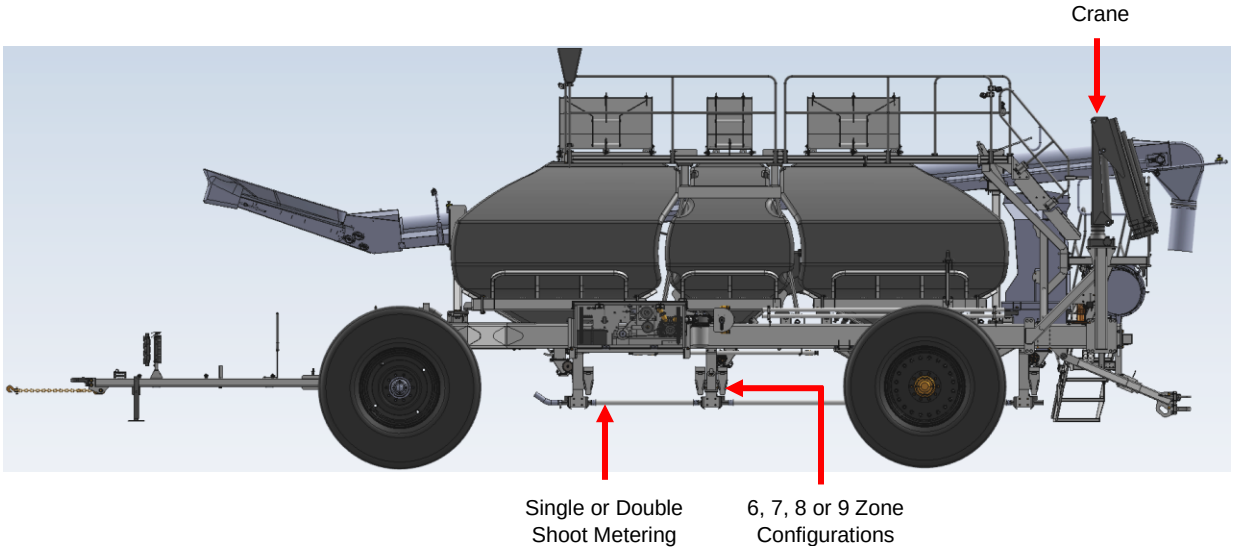
# FIELD OPERATION

1. The JEM controller will be powered on when the tractor is started. Confirm that you have proceeded past the Standby Screen.
2. Ensure the SCV supplying system pressure to the block is activated and locked into constant flow. The pressure needs to be adjusted from your tractor to fall within 2600-3000 PSI.
3. Once your drill has been unfolded from the transport position, you are ready to begin seeding.
4. Using the SCV connected to your opener lift/lower lines, pressurize the Openers block. Set this SCV at a flow of 75% to ensure the lift and lower speeds are adequate.
5. Turn on the “Lift/Lower” switch. The openers will lower and begin to build pressure up to the set target.
6. When entering a headland, turn the “Lift/Lower” switch off. The opener pressure will release, and the openers will lift out of the ground.
7. Complete the turn.
8. Repeat steps 5, 6, and 7 for each headland turn required.

# E-SERIES CART

The E-Series cart, also known as the E860, features 315-170-315-bushel coarse product tanks, with an additional 60-bushel fourth tank dedicated to canola or other fine products. The image below illustrates the E860 and some of the many features the E-Series carts have to offer. This section of the operator's manual will explain the key features and the settings.



# E-SERIES METERING

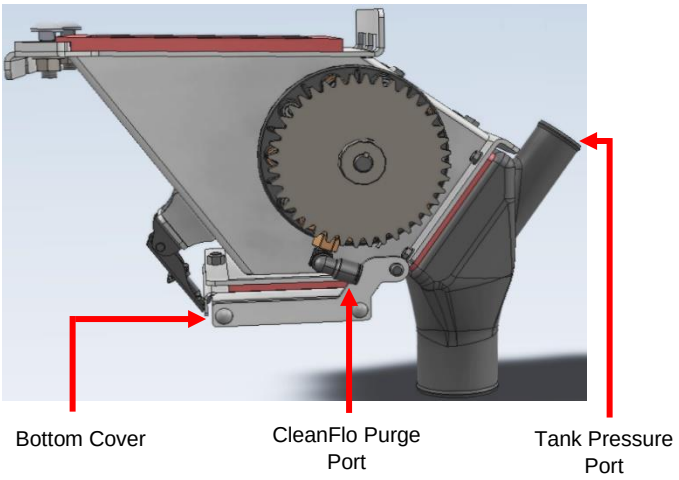
E-Series carts are set up with 6, 7, 8, or 9 zones depending on drill size. The number of meter boxes is typically the number of zones being operated as each meter is expelling product to an individual air stream and tower.

The meter boxes on the three large tanks contain coarse product rollers designed for all fertilizers and larger seed. The meter boxes fitted to the 60-bushel tank on the E860 utilize fine rollers suitable for fine and low-rate products like canola or inoculant. All meters are operated electrically and are supplied 24v by a dedicated onboard system consisting of 2 batteries and an on-board, hydraulically driven, high output alternator.

There are no adjustments required within the meter boxes. They are kept clear of dust and fine debris by the CleanFlo meter purge system. The CleanFlo system consists of an intake filter, a booster blower, fan source selector, and pressure distribution lines connected to each meter box. The filter includes both a foam prefilter and a washable main element. After washing, the element should be left to dry before reinstalling. The use of compressed air to clean or dry the filter element is not recommended. The booster blower requires no maintenance.

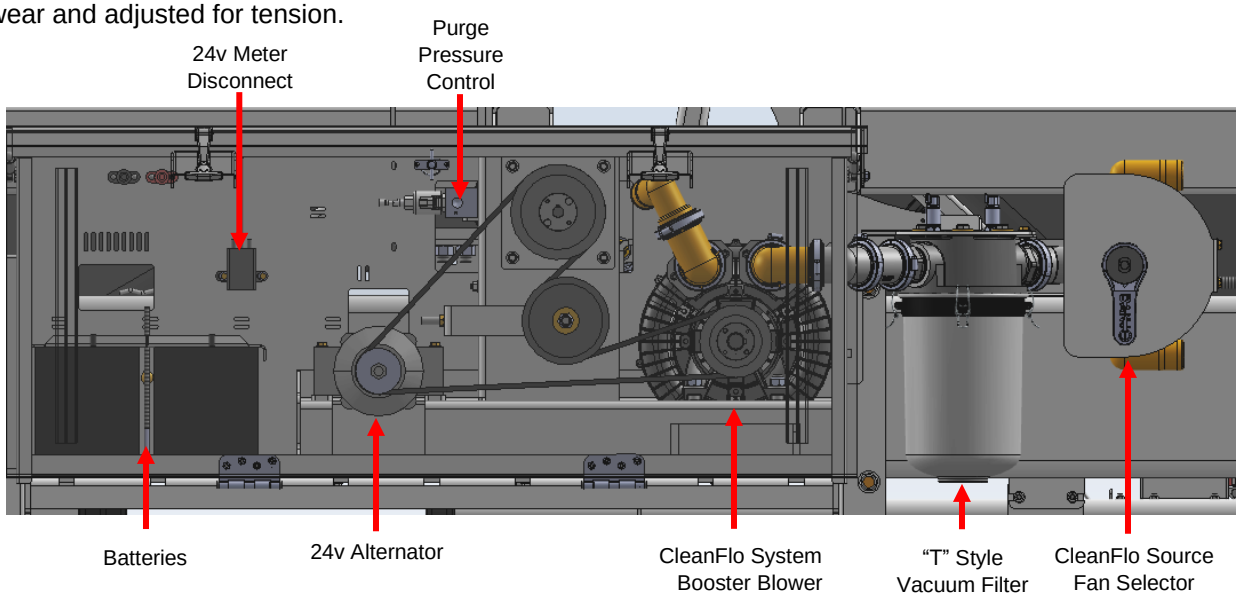
***NOTE: Ensure that on Dual Shoot systems that the fan running the highest RPM is selected on the CleanFlo Source Fan Selector.***

The roller flutes should be regularly inspected or cleaned to ensure accurate operation. The rollers are accessible from below by opening the hinged bottom cover held by an adjustable latch. If water is used, the purge system should be operating to prevent water being trapped in the cavities.




⚠ The purge system is essential to operation of the meters. If it should fail for any reason, it is critical to stop operations until the problem can be resolved.

Both the alternator and the purge booster blower are driven by V-belts powered by a hydraulic motor plumbed into the drill's System Pressure. These should be checked periodically for signs of wear and adjusted for tension.



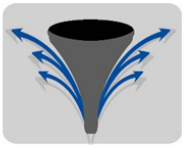
# DISTRIBUTION MANIFOLD

SeedMaster utilizes a stainless-steel distribution manifold available in multiple configurations. The new manifold is more resistant to blockages in large seed sizes vs other manifold designs. It uses a 2.5” inlet pipe that has a steel choke insert welded inside. It is a two-piece design with the head being clamped onto the inlet with an exhaust style clamp. The manifold is available in a 6, 7, 8, 9, 10, 11, or 12 outlet configurations allowing SeedMaster to offer a larger list of drill sizes with various row spacing.

**8-Run Distribution Manifold**

This manifold design uses two types of rubber inserts for guiding product in the manifold head. There is a flat insert that is used for fertilizer and a gradual point insert that is used for seed.

- ✓ The flat insert provides excellent division at high rates of fertilizer.
- ✓ The inserts are easy to change so they can be swapped to suit the application.



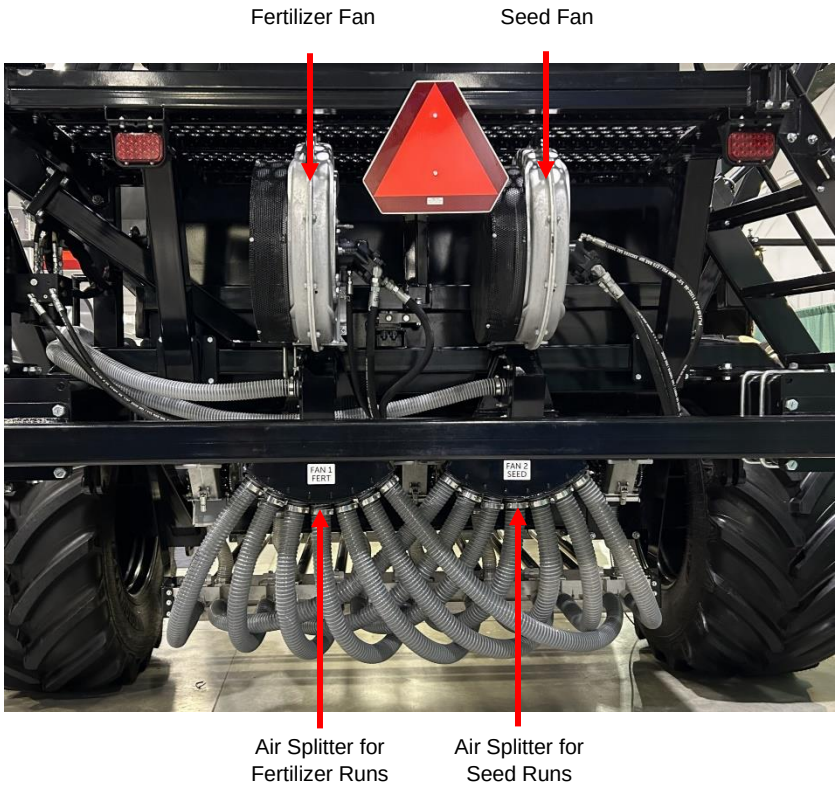
- ✓ The Cone shaped inserts optimize the separation of the seed.
- ✓ Low seed rates provide even division and distribution.

# PRODUCT SELECTION

Under the dual-shoot, 7 zone E860, there are 7 metering boxes per tank and 14 hoses. The 7 hoses from the left splitter supply the fertilizer towers and the 7 hoses from the right splitter supply the seed towers.

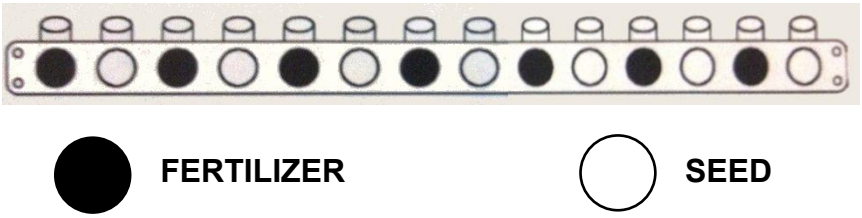
**Other E-Series Cart configuration examples:**

- Single-shoot, 9 zone (9 meters, 9 hoses)
- Dual-shoot, 8 zone (8 meters, 16 hoses)
- Single-shoot, 8 zone (8 meters, 8 hoses)




**SEED AND FERTILIZER RUNS, DUAL SHOOT, 7-RUN E860**

**NOTE: Viewed from the back, the left fan is the fertilizer fan, and the right fan is the seed fan. Each has its own dedicated air splitter with the number of outputs equal to the number of zones.**

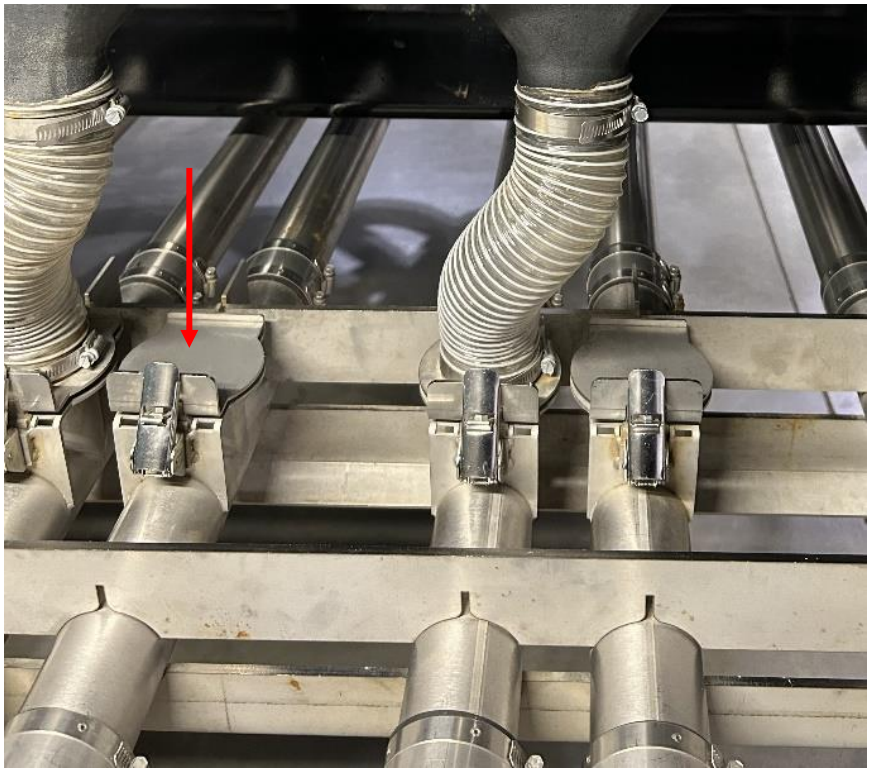



The fertilizer runs start on the left side of the cart (looking forward from behind) and alternate between seed and fertilizer. Likewise, the seed runs start on the right and alternate with fertilizer runs.

The 4 tanks on the E860 can be adjusted to provide product to either seed or fertilizer knives in a dual-shoot configuration. To dispense product from a tank to the fertilizer runs, connect the far-left run to the far-left meter, and then work your way across, connecting meters to every second run. To dispense product from a tank to the seed runs, connect the far-right run to the far-right meter, and work your way across, connecting meters to every second run.

***NOTE: Ensure that delivery lines not connected to product flow have a blocker plate installed and firmly latched down. Failure to seal delivery lines may cause uneven seeding conditions.***

Always meter a small amount of product in a stationary position to ensure that all products are delivered by section to the desired knives.



**NOTE: Photo looking towards the back of the machine.**
**The meter output hoses are connected to the seed runs.**

**WARNING: The product delivery lines CANNOT be removed while the fans are running.**
**This will cause a large product loss at a rapid rate.**

# FAN HYDRAULICS AND TANK PRESSURE

Midway along the right frame rail, the E860 fan motor hydraulic hoses enter the fan/conveyor hydraulic manifold. This manifold contains anti-cavitation “spin down” check valves for each fan and a 50 PSI relief valve for the motor case drain hose. This valve relieves to the ground through an attached drain hose.

The case drain hose is fitted with a special male coupler at the cart hitch that also relieves to ground at approximately 15 PSI if the coupler is disconnected. If the coupler is disconnected during storage, leakage can potentially occur with ambient temperature changes. This is normal.

***NOTE: If the case drain coupler requires replacement, it needs to be replaced with the same style. It should NEVER be replaced with a non-relieving coupler. Fan damage caused by the installation of the wrong coupler is NOT covered by warranty.***


The E-Series cart tanks are pressurized during operation through hoses connected to the top of the discharge spout on each meter using the same stream of air which feeds the product runs. This design ensures the correct fan is used for the product selected when the meters are connected to the desired product runs. Pressurizing in this manner achieves an ideal air pressure balance on each side of the meter roller.

# FAN PRESSURE GUIDELINES

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

**Use the following table as a *guide* for setting the E-Series cart fan pressures.**

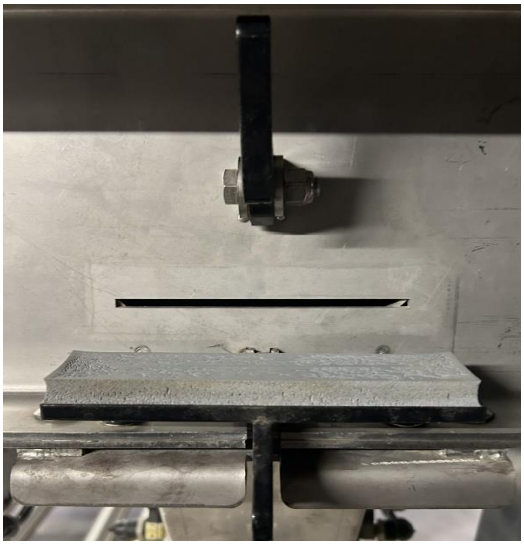
| NOTE: AIR PRESSURES AND RPM’S ARE INICATED WITH NO PRODUCT FLOWING | | | |
|---|---|---|---|
| **Product** | **Application Rate Lbs/ac** | **Drill Size Range Feet** | **RPM (HIGH FLOW) BLACK FAN** |
| Fertilizer | 50 to 100 | 50 to 100 | 3350 to 3600 |
| Fertilizer | 100 to 200 | 50 to 100 | 3600 to 3950 |
| Fertilizer | 200+ | 50 to 100 | 4000 + |
| | | | |
| Wheat | 80 to 130 | 50 to 100 | 3775 to 4075 |
| | | | |
| Barley | 70 to 100 | 50 to 100 | 3600 to 3950 |
| | | | |
| Canola | 2 to 5 | 50 to 100 | 3000 |
| | | | |
| Flax | 40 to 55 | 50 to 100 | 3350 to 3600 |
| | | | |
| Peas | 150 to 200 | 50 to 100 | 4100 to 4400 |

**Pressure too LOW - causes potential plugging in lines.**
**Pressure too HIGH – product bounces or blows out of furrow.**

# METER INSPECTION

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

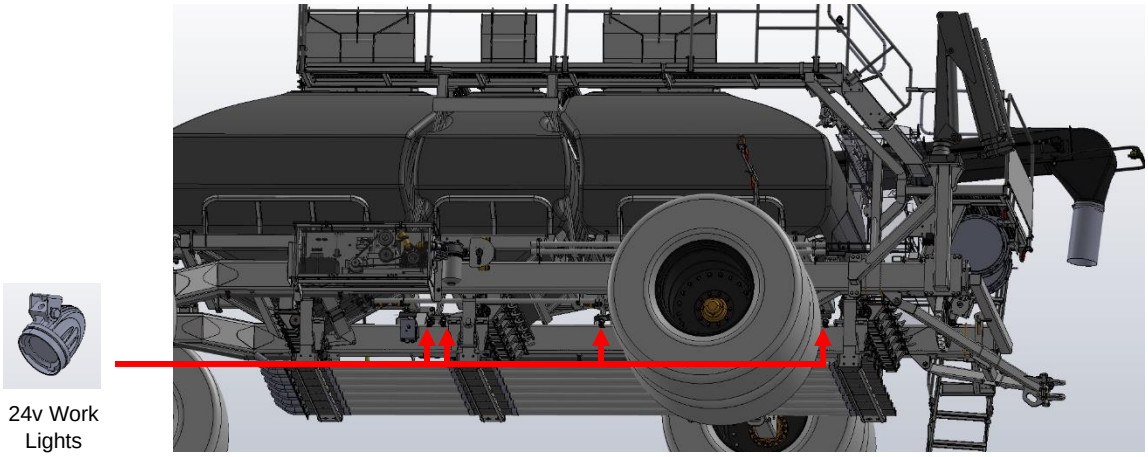
1. Shut off hydraulics to fans.
2. Above the backside of the meter, unlatch the slot cover and pivot it downward.
3. Insert a slide-gate, then unlatch and open meter bottom cover (approximately 1 gal. of product will fall out).
4. Inspect the metering.
5. Clean the bottom cover sealing surface thoroughly. Failure to do so can introduce air leaks.
6. Close the bottom cover and relatch it ensuring that there is good contact with the seal.
7. Remove the slide-gate, clean the slot cover surface, pivot the slot cover into place, and reset the latch to secure it.



**NOTE**: ***Poor quality fertilizer or other foreign materials may cause uneven metering or damage to meter components. Screening of all products going into the tanks is highly recommended. The slot cover requires a proper seal to ensure there is no air loss.***

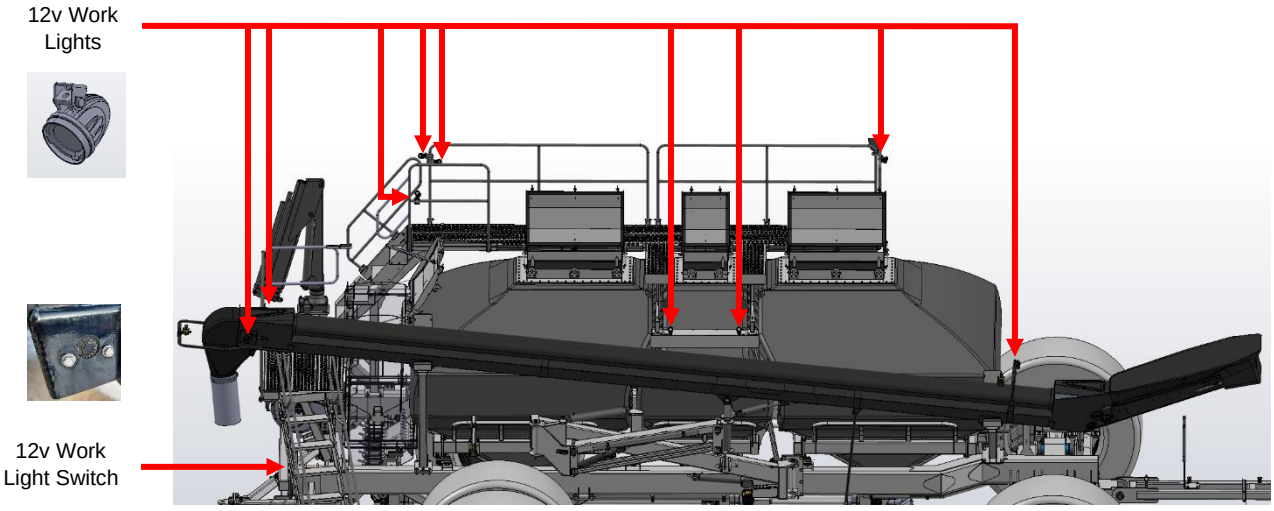
# WORK LIGHTS

There are four 24v work lights located along the right side of the frame, pointed at the meters under each tank. These are activated whenever the Topcon control system is turned on.



24v Work Lights

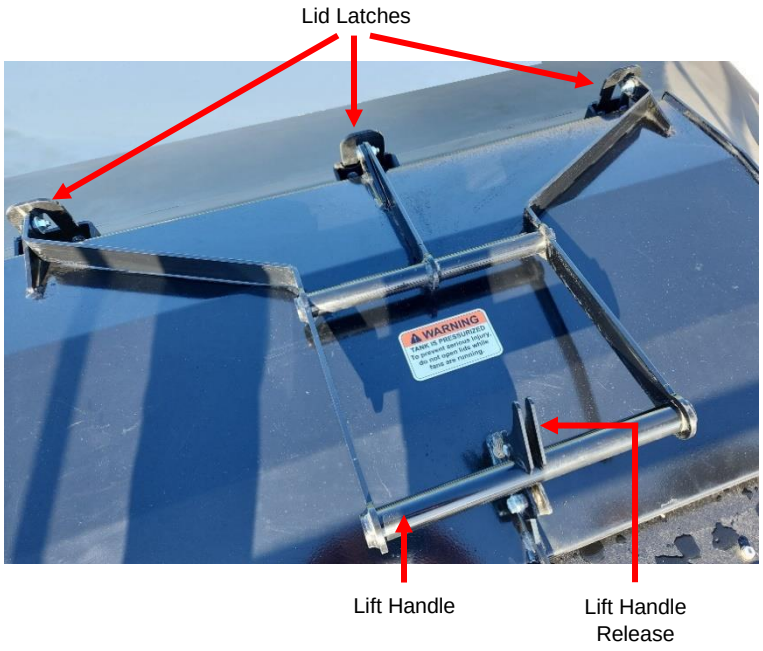
All other work lights are 12v and receive their power from the tractor. There are four located on the upper walkway, two above the conveyer and three on the conveyor. All are toggled on/off simultaneously by a momentary switch located near the bottom of the stairs or from the conveyor remote control.

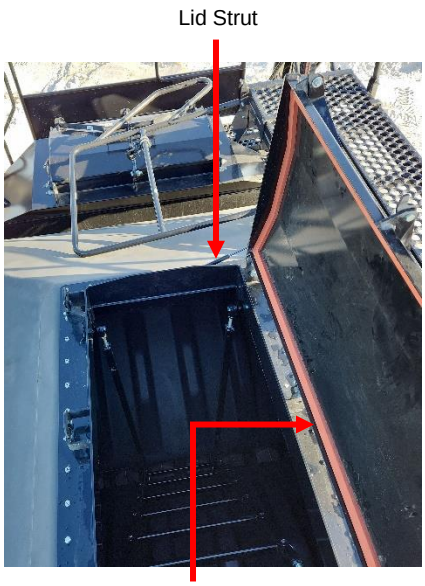


12v Work Lights

12v Work Light Switch

# TANK LID OPERATION




All tank lids on the E-Series cart are operated in the same manner.

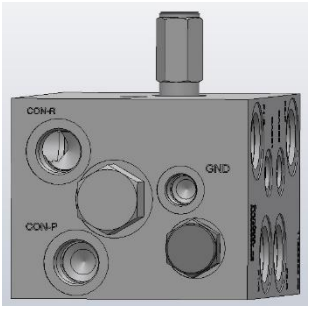
1. Push the handle release to free the lid lift handle.
2. Pivot the lift handle upwards enough to release the lid latches.
3. Pull on the handle to open the lid. The lid struts will assist in lifting the lid and act as a stop when the lid is fully open.

***Note: Keeping the lid seal gaskets clean will ensure a maximum seal is maintained on lids. This is extremely important for accurate metering rates. It's good practice to wipe the seals down immediately after filling the tank, before closing the lid, to prevent product build up on the seal gasket. Adjust the lid latches if necessary to maintain seal gasket compression. Periodically inspect and replace the seals.***

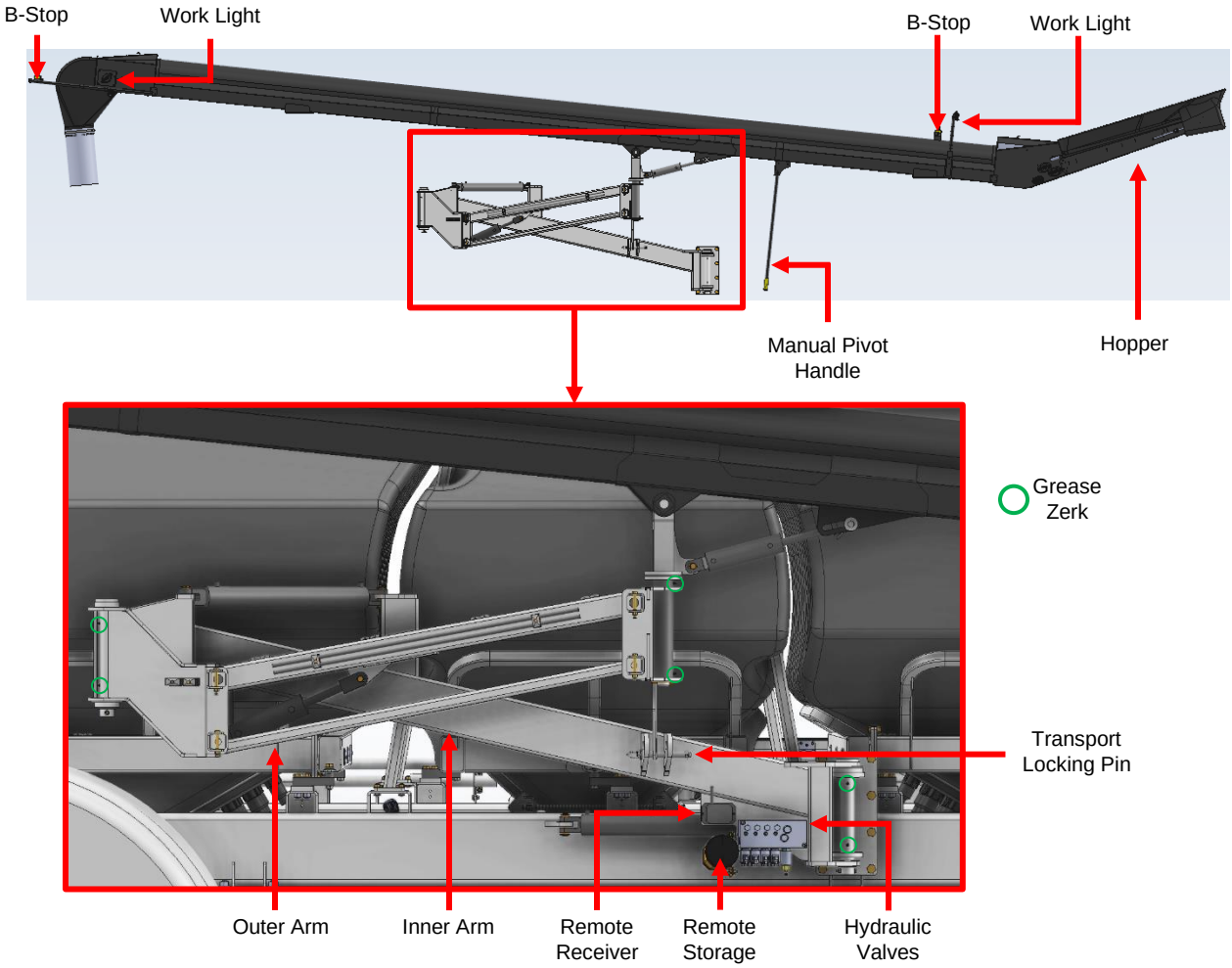
**⚠CAUTION** ***DO NOT ENTER TANKS WITHOUT PROPER SAFTEY EQUIPMENT AND OTHER PERSONNEL PRESENT. NEVER ENTER WHILE METERS ARE RUNNING OR FANS ARE ENGAGED IN SEEDING MODE.***

# CONVEYOR OVERVIEW

To operate the conveyor, you must reverse the tractor remote supplying the fertilizer fan (pressure to the blue tagged hose). This automatically pressurizes the fan/conveyor hydraulic block, allowing conveyor movement and hydraulic motor operation. The conveyor and crane can be operated at the same time. The arm pivots should be greased annually.




Bottom View




# CONVEYOR CONTROLS

The E-Series Cart Conveyor is controlled with the Conveyor Wireless Remote and Receiver. Its functionality includes:

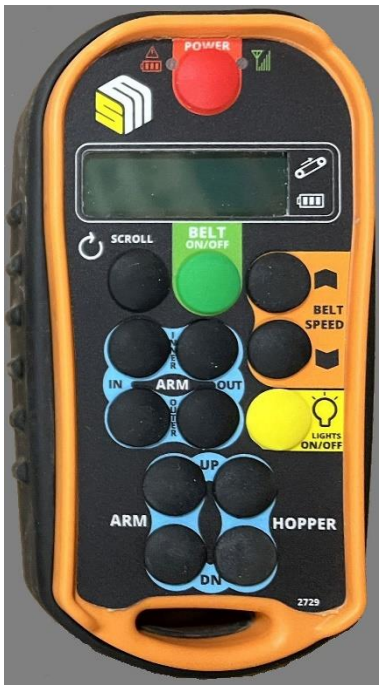
1. Move Inner and Outer Arms in and out.
2. Move Outer Arm up and down.
3. Move Hopper up and down.
4. Turn Belt on or off.
5. Set Belt Speed (1,2,3)
6. Turn work lights on or off.
7. Display Product Tank Weight

**Belt Stop (B-Stop)**

The conveyor is equipped with two B-Stop buttons. One is located near the hopper and the other on the handle near the discharge. In a case where you need to immediately stop the belt movement, pressing either of the B-Stops will interrupt power to the belt and stop its movement, while other conveyor controls continue to function. Note that the belt will restart immediately if the B-Stop is reset unless the belt is turned off first with the remote.

If all conveyor functions need to be stopped, press the RED power button on your remote. This will halt all conveyor operations. To resume, turn the remote on again or re-cycle power to the receiver and re-engage the conveyor functions as they were before stopping.

## CONVEYOR WIRELESS REMOTE




To use the Conveyor Wireless Remote, it needs to be powered on first. Simply hold the red POWER button for at least 2 seconds, release, and the LED lights will turn on. The transmitter is designed with a power saving feature which turns the transmitter off after 15 minutes of inactivity. As a safety feature, all functions are disabled if the remote is moved out of range of the receiver.

**ARM MOVEMENTS:** Press and hold the corresponding button to move the arms. ***NOTE****: The INNER ARM and OUTER ARM IN or OUT functions can be operated simultaneously by pressing the two buttons at the same time.*

**ARM / HOPPER:** Press and hold the corresponding button to raise or lower the outer arm or the hopper. ***NOTE****: The OUTER ARM and HOPPER UP or DOWN functions can be operated simultaneously by pressing the two buttons at the same time.*

**BELT:** To turn the belt on or off, press the BELT ON/OFF button.

**BELT SPEED:** Belt speed can be set to three levels using the RAISE or LOWER buttons.

**LIGHTS:** To turn the work lights on or off, press the LIGHTS ON/OFF button.

**SCROLL:** Choose which tank weight to shown on the display.

# SYNCHRONIZING THE CONVEYOR REMOTE

Each remote and receiver is synchronized together during assembly. If a new transmitter is needed, synchronizing is required:


1. Make sure both the remote and receiver are powered off.
2. Press and hold the red POWER button on the remote for more than 10 seconds to enter the Remote Config mode. Teach Mode should be shown onscreen. Press BELT ON/OFF to enter Teach Mode.
3. Apply power to the receiver.
4. Wait for a few seconds until the green LED begins to blink on the remote.
5. The remote and receiver are now synchronized.

Should an operator require more than one remote to work with a single receiver, the second remote will need to be “cloned”. If this is required:

1. Make sure both remotes and the receiver are off.
2. On transmitter A, press and hold the red POWER button for more than 10 seconds to enter the Remote Config mode. Use the SCROLL button to forward to the CLONE LEADER option, then press BELT ON/OFF to select.
3. On transmitter B, press and hold the red POWER button for more than 10 seconds to enter the Remote Config mode. Use the SCROLL button to forward to the CLONE FOLLOWER option, then press BELT ON/OFF to select.
4. Wait for a few seconds until the green LED begins to blink on both remotes.
5. Turn both remotes off.
6. Synchronize one of the remotes to the receiver using the previous instructions above.
7. Both remotes and the receiver are now synchronized.

# CONVEYOR OPERATION

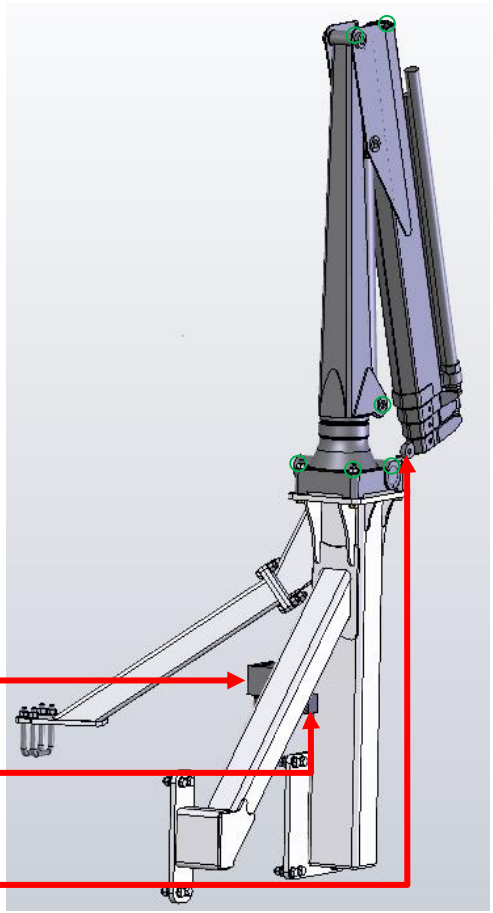
1. Remove the transport locking pin.
2. Reverse the tractor remote connected to the fertilizer fan.
3. Power on the Conveyor Remote, then press the ARM and HOPPER “up” buttons to lift the Conveyor out of the transport cradles.
4. Using the INNER ARM and OUTER ARM “out” buttons (or a combination of both), start to move the Conveyor away from the E-Series Cart.
5. Once the Conveyor is away and clear of any obstructions, use both the ARM and HOPPER “down” buttons to lower the Conveyor into arms reach.
6. Remove the transport pin from the manual pivot handle and swing the handle down to steady or guide rotation of the conveyor.
7. Position truck as desired.
8. Using the INNER ARM and OUTER ARM “out” buttons (or a combination of both), start to move the Conveyor spout in position of the tank to fill and the hopper towards the truck chute/gate, using the manual pivot handle to rotate as necessary.
9. Once the spout is positioned, use the HOPPER “down” button to gently place the hopper on the ground. Ensure the spout is positioned on the center of the tank, not the center of the lid. This will ensure more even filling.
10. Align the truck chute/gate and hopper so product will flow directly onto the hopper.
11. Start the Conveyor belt by pressing the “BELT ON/OFF” button.
    ***NOTE**: The speed of the conveyor belt can be raised or lowered as desired using the BELT SPEED buttons. There are three preset speeds available.*
12. Before filling, ensure the Bin has been zeroed out. ***Perform this operation only if the bin is completely empty.***
13. Begin filling by opening the truck chute/gate.
14. When the desired amount of product is in the bin, close the truck chute/gate. Bin weight can be viewed from the screen on the remote, the Topcon monitor, or the Topcon XTEND app.
15. Allow conveyor to run for 5 – 10 seconds after closing the chute/gate to ensure the belts are free of product. To stop the belt, press the “BELT ON/OFF” button.
16. If filling another bin or putting the conveyor into transport, always start by pressing the HOPPER “Up” button to raise the hopper off the ground before repositioning the conveyor.
17. Use a combination of all the positional buttons to move the conveyor into position to fill another bin.
18. To store the conveyor back in the cradles, begin by bringing both the INNER ARM and OUTER ARM “in” towards the cart. Then press both the ARM and HOPPER “Up” buttons until the conveyor is at a convenient position to fold and store the manual pivot handle, re-inserting its transport pin.
19. Continue to raise the conveyor until it’s at the upper limits, then position it over the cradles using INNER ARM and OUTER ARM “in” buttons to the limits. Now use the ARM “down” button until the conveyor rests on both cradles.
20. Reinstall the conveyor transport locking pin.

# CRANE OVERVIEW

The optional crane installed on an E-Series Cart is the Fassi M30A-13.

**NOTE:** *A Load Limits document will be provided when the optional crane is installed on an E-Series Cart. The operator must read and understand the safe load limits when operating the crane.*

To operate the crane, you must reverse the tractor remote supplying the fertilizer fan (pressure to the blue tagged hose). This automatically pressurizes the fan/conveyor hydraulic block, allowing conveyor movement and hydraulic motor operation. The crane and conveyor can be operated at the same time. The arm pivots and rotating points should be greased annually.




# CRANE CONTROLS

The E-Series Cart Crane is controlled with the Crane Wireless Remote and Receiver. Its functionality includes:

1. Move Arm Up or Down.
2. Rotate Crane Clockwise or Counter-Clockwise.
3. Extend or Retract Arm.

# CRANE WIRELESS REMOTE


To use the Crane Wireless Remote, it needs to be powered on first. Simply hold the red POWER button for at least 2 seconds, release, and the LED lights will turn on. The transmitter is designed with a power saving feature which turns the transmitter off after 15 minutes of inactivity. As a safety feature, all functions are disabled if the remote is moved out of range of the receiver.

**ARM MOVEMENTS:** Press and hold the corresponding button to move the arm. ***NOTE****: An ARM UP or DOWN function can be operated simultaneously with the ARM EXTEND or RETRACT function by pressing the two buttons at the same time.*

**CRANE ROTATION:** Press and hold the corresponding button to rotate the entire crane either clockwise or counterclockwise. ***NOTE****: A ROTATE function can be combined with a single ARM movement simultaneously by pressing the two corresponding buttons at the same time.*

# SYNCHRONIZING THE CRANE REMOTE

Each remote and receiver is synchronized together during assembly. If a new transmitter is needed, synchronizing is required:

1. Make sure both the remote and receiver are powered off.
2. Press and hold the red POWER button on the remote for more than 10 seconds to Teach Mode. Both LEDs on the remote will begin blinking.
3. Apply power to the receiver.
4. Wait for a few seconds until the green LED stays on steady.
5. The remote and receiver are now synchronized.

Should an operator require more than one remote to work with a single receiver, the second remote will need to be “cloned”. If this is required:

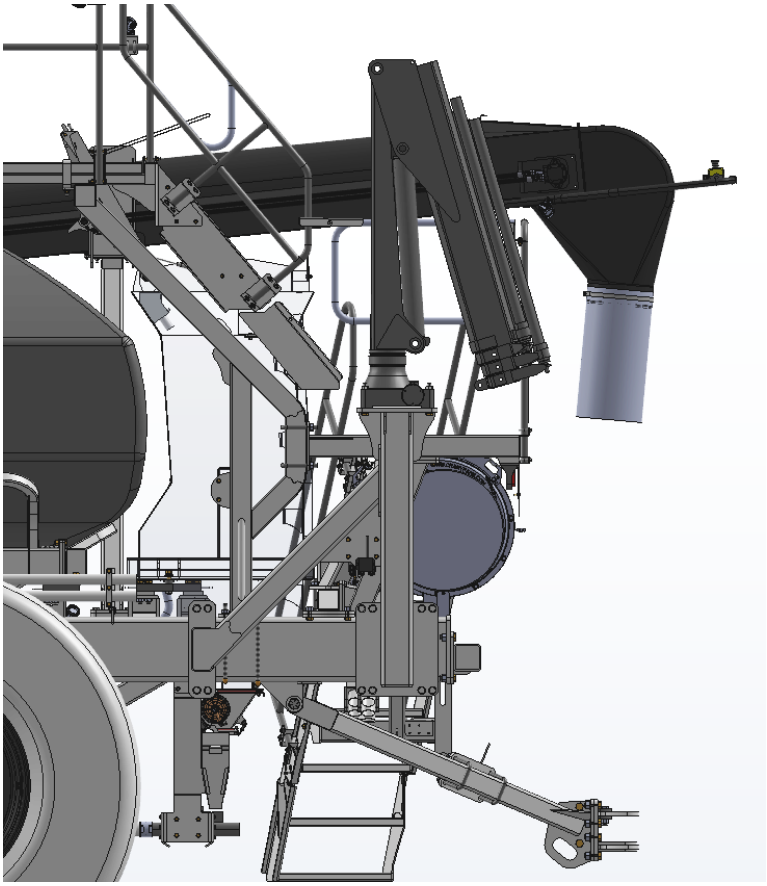
1. Make sure both remotes and the receiver are off.
2. Press and hold the red POWER button on the remote for more than 10 seconds to Teach Mode. Both LEDs on the remote will begin blinking.
3. On transmitter B, press and hold the Both the ARM UP and ARM DOWN buttons simultaneously while also pressing the red POWER button for 5 seconds and then release. The LEDs will start to blink.
4. Wait for a few seconds until only the green LED double blinks on both remotes.
5. Turn both remotes off.
6. Synchronize one of the remotes to the receiver using the “Synchronizing the Crane Remote” instructions above.
7. Both remotes and the receiver are now synchronized.

# CRANE OPERATION

1. Read and Understand the Load Limits of the crane installed on the E-Series Cart.
2. The Crane Home Position means the arm is the fully down & retracted and crane oriented such that the arm faces directly away from the back of the cart. This is the position the crane is to be stored in during transport and when not in use.
3. Reverse the tractor remote connected to the fertilizer fan. (Blue tagged line)

⚠ Always be aware of your surroundings and any activity around you when operating the crane. Ensure all nearby people are aware of your intentions; they must stay clear of the load.

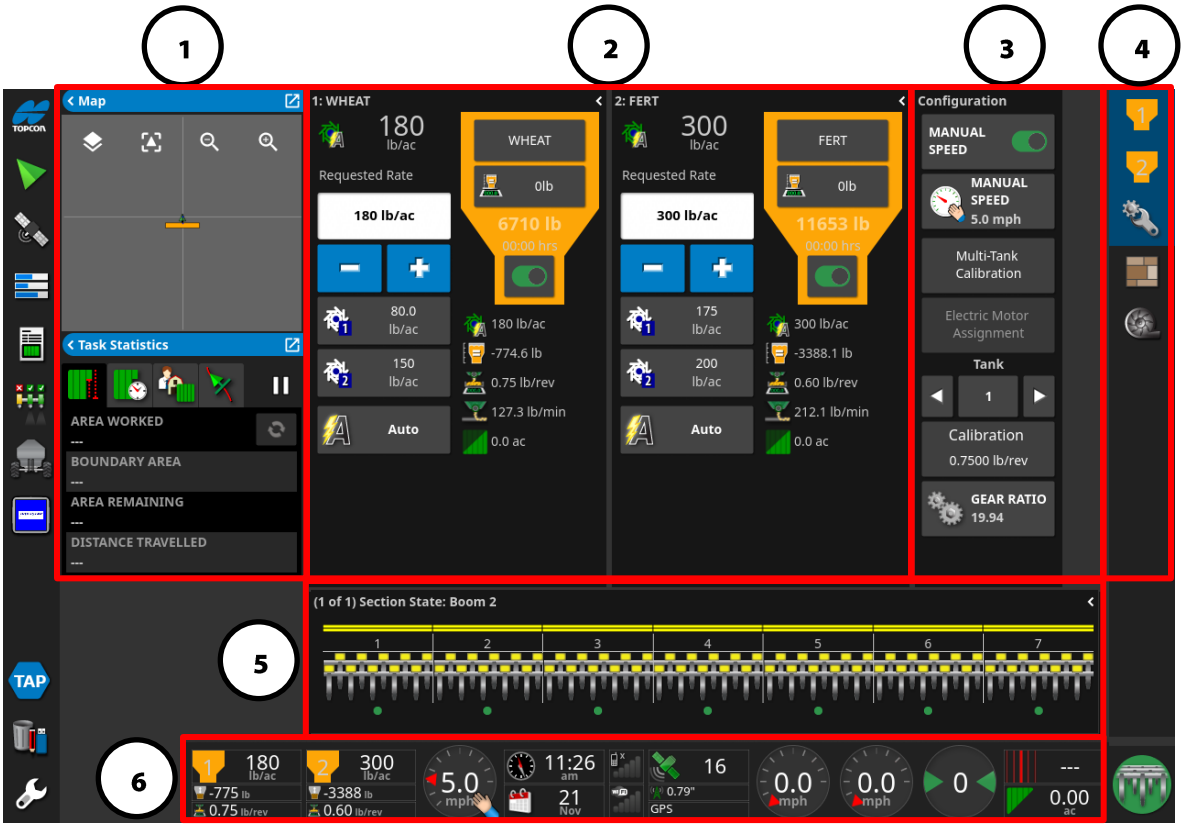
4. Press the Arm UP button and then begin pressing the Arm EXTEND button to direct the arm closer to the load. Stop when the lift eye on the end of the arm is directly above the load.
5. Connect the load to the arm at the lift eye using a load-rated combination of strap and clevis, keeping the distance between the arm and the load to approximately 18 inches.
6. Lift the load by initially pressing the Arm UP button and, once the load clears the ground begin retracting the arm. You may also begin to rotate the crane towards the middle of the cart.
7. Continue to direct the load towards the intended bin, ensuring you clear the upper deck safety rails.
8. When the load(s) have been completed, always return the crane to the Home Position before moving or operating the E-Series Cart.



# APOLLO CM-40 FUNCTIONS

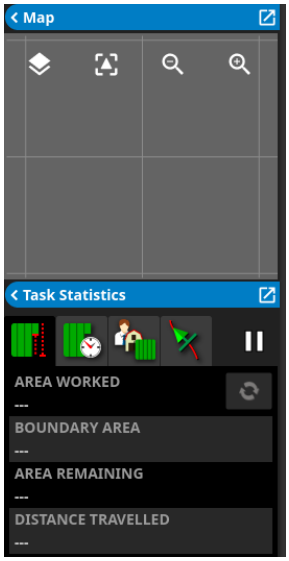
## OPERATION SCREEN LAYOUT

The Topcon Apollo CM-40 is a multi-product application control system that can control up to 4 product applications such as liquid, granular, and NH3 via task control for as-applied documentation, prescription rate, and section control. In conjunction with the XD+ monitor, the Apollo CM-40 will control your SeedMaster E-Series Air Cart. To access the settings, touch the “Setup” button in the lower left corner of your XD+ display.

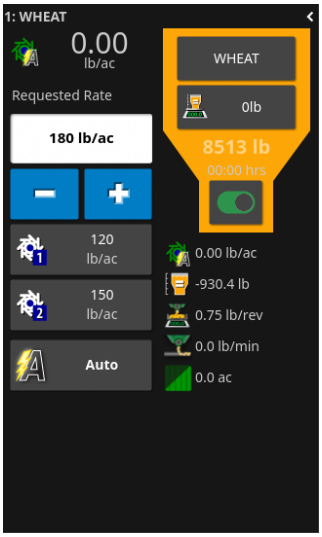



**Operation Screen: D**isplays the products that are set up for the specific drill and tank configuration.

1. **Mini View Expansion Panel:** The left side of the screen displays “Mini Views” to monitor other functions of the machine such as Task Statistics, Auto Section Control, and As-Applied Mapping. If you would like to expand any of the mini views, simply touch and drag them to the right into the main area of the screen. The currently displayed functions will automatically minimize and move to the left into the mini view area. If you would like to collapse the mini view, touch the arrow pointing left in the top left corner of the view.

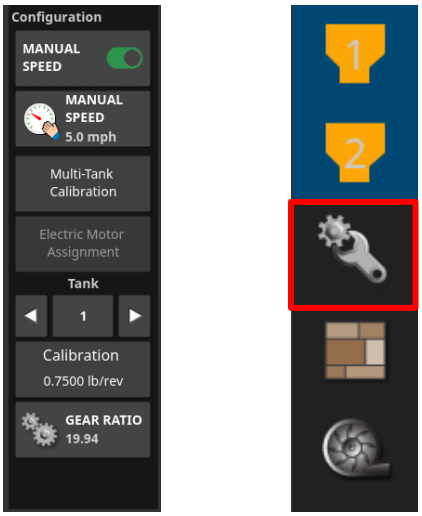



2. **Tank Panel:** Displays the tanks and customized information selected for each tank available:



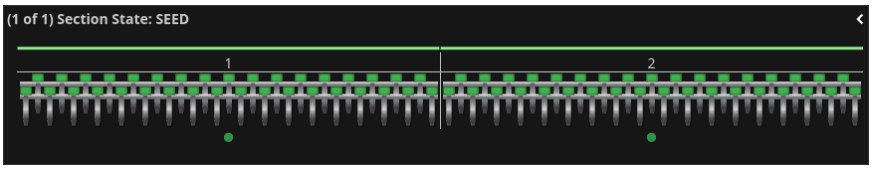

   a. Tank status – on/off.
   b. Application rate – can be selected to change rate on the fly.
   c. Increase/Decrease rate buttons.
   d. Rate presets.
   e. Mode – Auto, Manual, VRC
   f. Product Configuration – Allows the user to set the product being applied through that tank.
   g. Tank Fill – If load cells are not being used, this can be used to track tank levels and current weight.
   h. Tank On/Off – It has the ability to activate or deactivate the product and change rate while active in the field.

3. **Configuration Panel:** Displays manual speed, drive motor gear ratio, and Multi Tank Calibration.

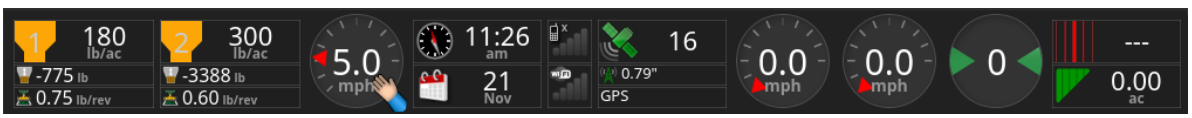



4. **Toolbar Panel:** Allows the user to activate the tanks they would like to view, the configuration panel, area counters, or the fan panel.

5. **Section Status:** Displays the current state of a tank's granular or liquid section (on/off).



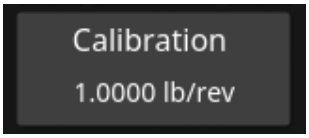

6. **Dashboard:** At the bottom of the main screen, the user-configurable dashboard is used for viewing system information and controls. Granular application, GPS status, Area Counters, and ground speed are commonly enabled displays.



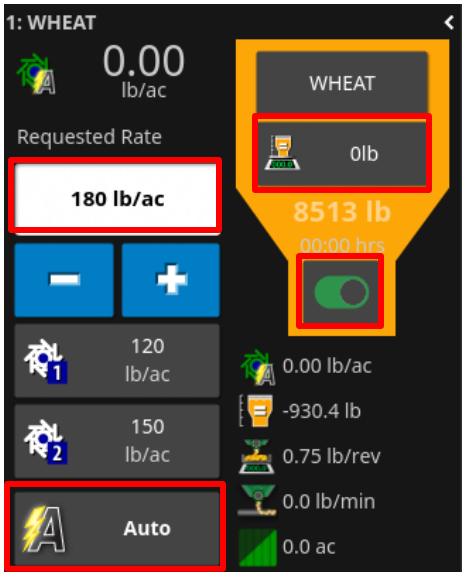
# APOLLO CM-40 QUICK START PROCEDURE

Before you go to the field, please review the steps below to ensure your Apollo CM-40 is field ready.

**Step 1. Turn Product Master ON/OFF Switch ON for each product being applied:** Before turning the switch on, please ensure the machine is free of any persons, animals, or objects that could damage your equipment. Touch the grey safety switch. The Safety Switch will turn green, indicating that the system is ready.



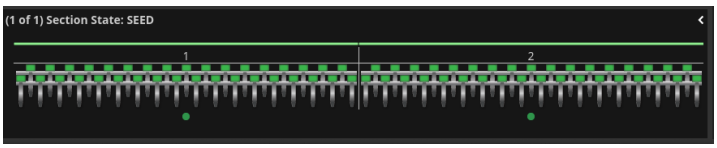

**Step 2. Review the Calibration Weight:** The Calibration Weight value indicates the number of pounds per motor revolution that the product meter will output. ***ALWAYS ensure that the correct Calibration Weight is entered into the Calibration Weight area***. Refer to the **Calibration Settings and Procedure (PAGE 47) s**ection for instructions to perform a Calibration Catch Test. To access the Calibration weight, touch the tank for the active product. It is important to review the calibration weight for any active product.




**Step 3. Review the Target Rate & Product Control:** The target rate is the desired pounds of product that will be applied per acre. Before going to the field, ensure the correct rate is set. Also, ensure that the product control is set to "**Auto**". Auto mode will automatically adjust the product rate during seeding to keep the rate at the desired target. If set on Manual, it will lock the electric motor at its current setting and will not adjust for terrain changes or speed changes. Typically, manual mode is used for troubleshooting or the loss of the rate controller's speed input.

**Step 4. Review Tank Weight:** The live tank weight from the load cells is displayed on the home page in the middle of the screen. Ensure the tank weight is correct before entering the field. Before filling the tank, it is important to zero the scale. Touch tank then the "**zero**" button. After filling, a tank capacity can be entered. Touch the tank, then view the Current Tank Level, and then enter that number into the Tank Capacity. This would be used if a low tank alarm is being used. If scale weight is inaccurate, refer to page 51 to recalibrate the scales.

**Step 5. Review Area Counters:** If desired before starting a new field, review and reset the Area Counters. See page 52 for details.



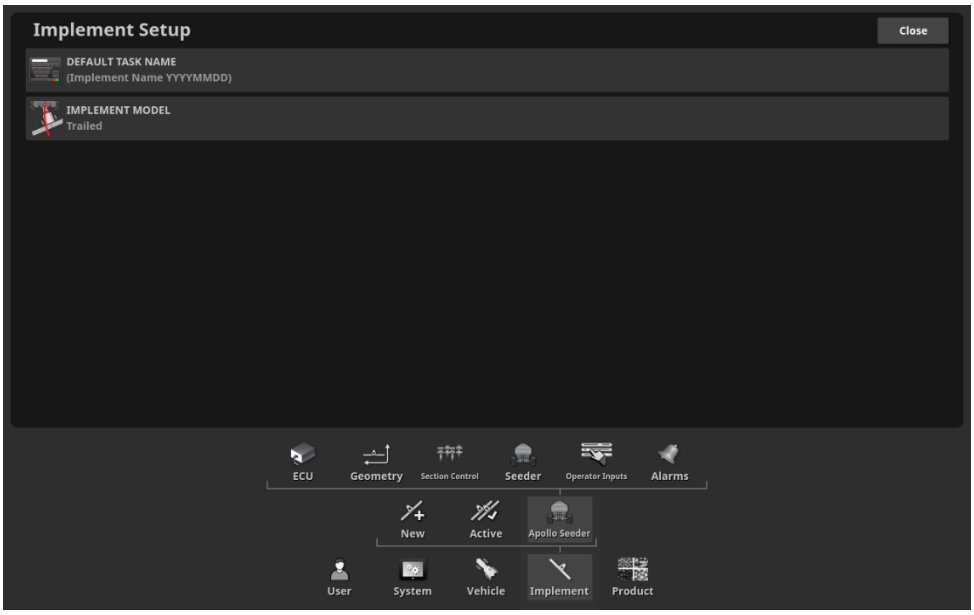

**Step 6. Review Section Status:** Ensure that all Sections are enabled. The section will turn green when it is engaged.

**Step 7. Review Fan RPM:** Fan RPM is located beside the Section Status on the main work screen. Ensure that each active product has a Fan RPM.

**Step 8. Turn Master Switch ON**: When the machine is in position to apply product, use the JEM Remote Lift/Lower switch to turn the master on if equipped with a JEM controller. Use the on-screen switch if not JEM equipped. The Master will display Green and ON.

# SETUP SCREEN

When the user selects the “wrench” icon on the XD+, the “Setup Screen” appears. This screen will be the location for setting up both the Apollo CM-40 as well as the XD+ itself (see page 55).




When you have navigated to the Setup Screen, you will touch “Implement” to access the settings for the CM-40:

1. **New:** Create a new implement from the pre-installed list of manufacturers or create a custom profile.
2. **Active:** Select a previously created implement profile.
3. **Apollo Seeder:** Edits any applicable settings with the currently active profile.


Once in the “Apollo Seeder” section:

1. **ECU:** Allows you to set up, manage, or upgrade the ECU.
2. **Geometry:** Selects a preset boom for guidance.
3. **Section Control:** This sets up sections, and section timing. See page 60 for set up details.
4. **Seeder:** Manage the seeder options like granular and liquid tanks, fans, pumps, or speed.
5. **Operator Inputs:** Manages operator inputs like keypads.
6. **Alarms:** Enables, disables, and sets alarm trigger levels.

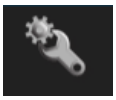
# CALIBRATION SETTINGS AND PROCEDURE

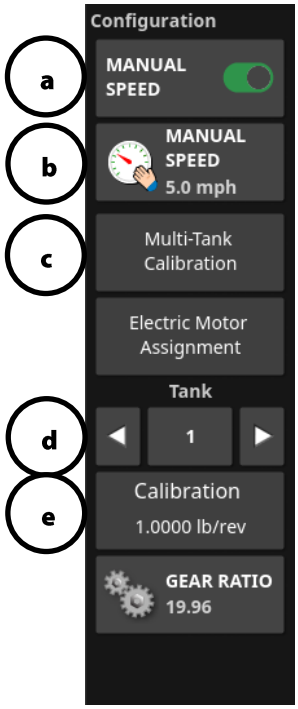
Your E-Series tank will need to be calibrated for the specific product you are using. The calibration procedure can be completed solely from the XD+, by using both the XD+ and the Tank Keypad, or by using the XTEND app with the Tank Keypad. For more information on XTEND, see page 55.

The Apollo CM-40 can calibrate either a single tank, or multiple tanks and will require 5-gallon pails, the included calibration funnel, and a digital scale. Position a pail under Section 1 on the tank(s) from which you will be catching product.

### REVIEW INITIAL CALIBRATION SETTINGS

1. Review your tank settings:
    a. Check to ensure that the product type you will be seeding is set.
    b. Check that your desired rate is set.
2. Ensure the **Configuration Panel** is visible on the main work screen by hitting the Configuration button in the Toolbar Panel.






    a. Manual speed on/off.
    b. Manual speed setting level.
    c. Multiple tank calibration. Used to enable more than one tank to calibrate simultaneously.
    d. Tank selector – used to select tank number for single tank calibrations.
    e. Single tank calibration.
3. If this is the first calibration for that tank and product, an initial calibration value should be entered:
    a. Choose the appropriate tank with the “Tank Selector”.
    b. Touch “Calibration”, then “Manual Entry”. Use 0.3 for coarse products, and 0.05 for fine products. Select “Ok”.

## CALIBRATION PROCEDURE

4. Touch “Manual Speed setting level” and set a speed of 5 mph. If this is not set on the monitor, the meters will not turn.
5. Activate the tanks you will be calibrating. Touch the on/off button on each tank to turn it green, or touch the equivalent tank number of the Tank Keypad (see pg. 49).

6. Prime the tanks. After verifying that your pail is beneath the appropriate tank on Section 1 (left side of tank), press and hold the prime button on the tank keypad to ensure product will be dispensed immediately after activating the calibration. Return the caught product back to the tank.

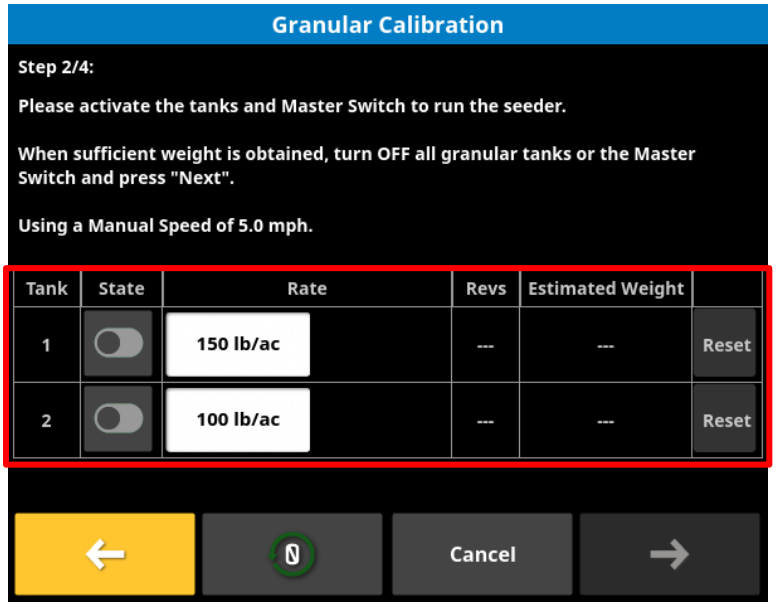
**TANK PRIME**

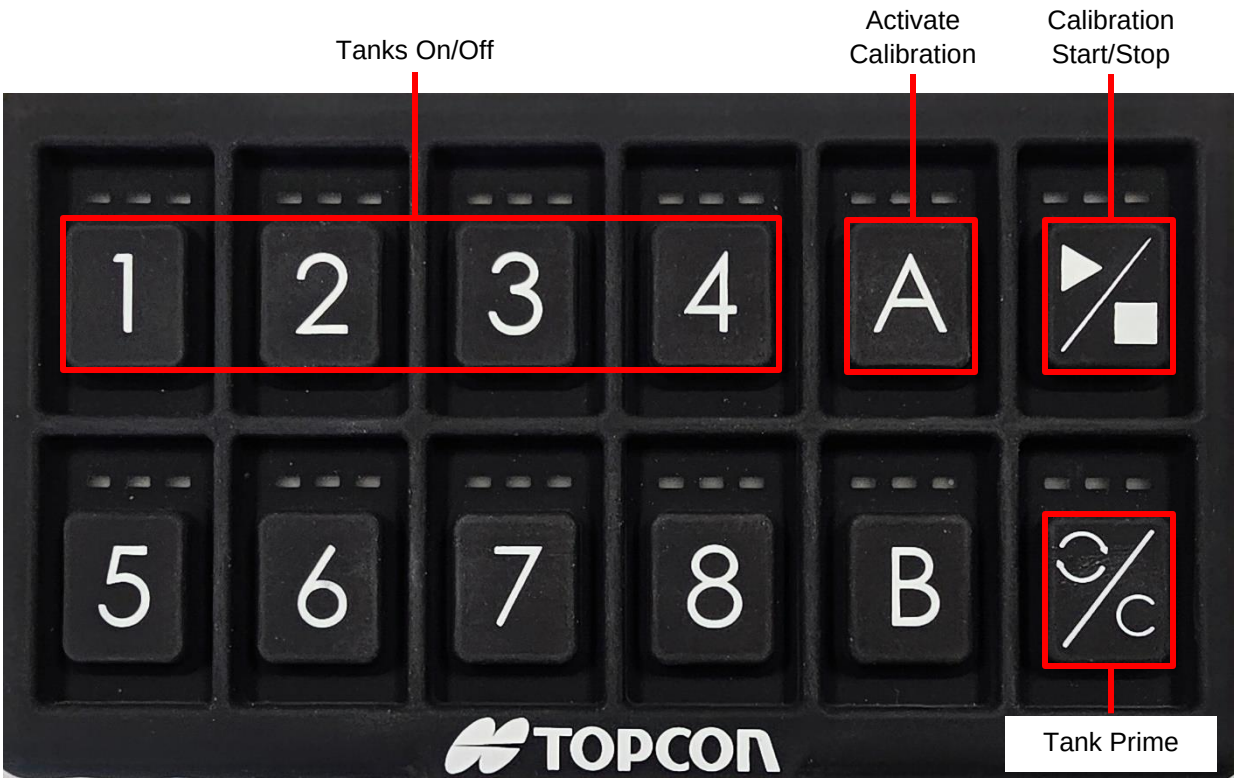
***NOTE**: Observe all sections to confirm only the desired section is turning. If you see more than one moving, stop, and use the XD+ or XTEND app to deactivate all but Section 1 by touching the corresponding sections on “Section Status”.*

7. Weigh the empty pail(s). Ensure you record their weight so that it may be removed from the gross weight after catching product.
8. Activate the “Manual Speed”. If using the keypad to start the process as detailed in the next step, this happens automatically.
9. After the settings have been reviewed, touch “Multi-Tank Calibration” to calibrate more than one tank, or “Calibration” for a single tank. This will open the **Granular Calibration Wizard**. Select “Next”.

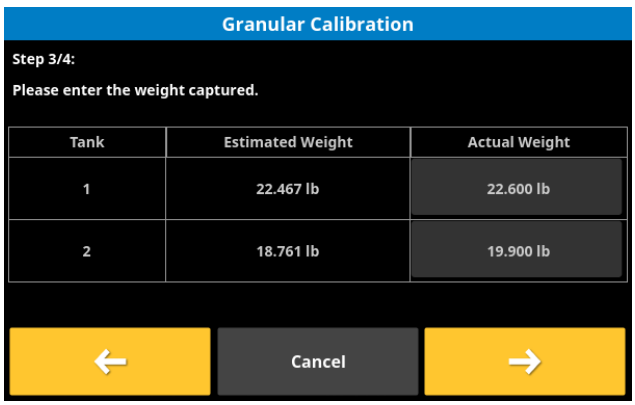
*Note: Skip to Step 11 to activate “Multi-Tank Calibration” by pressing the “A” button on the Tank. If you did not preset a rate on the tank panel in Step 1(b), no rate will be present to meter product.*

10. The main calibration screen will appear. If you did not prime the meters, the product will need to be activated.






11. Move to the Tank Keypad. If the products are not yet activated, press the corresponding tank number on the keypad. With the product(s) now active and the pail(s) positioned securely to catch product, press the “Calibration Start/Stop” button on the keypad. Product will begin dispensing. Revolutions and an estimated weight will accumulate in the wizard’s window on the XD+ or XTEND app.
12. When enough product has been caught, shut off the flow. This can be done either by pressing the “Start” button again, or by shutting off the individual tanks by pressing the corresponding Tank number on the keypad.
13. Weigh the product you have caught. Subtract the weight of the pail from the total and record the weight.
14. On the XD+ monitor or XTEND app, hit “Next” on the Calibration Wizard to go to step 3. Enter the recorded weight from each tank into the “Actual Weight” column beside the related product in the Calibration Wizard. Hit “Next” again.
15. Step 4 of the wizard will now show you the old calibration factor, new calibration factor, and the percentage difference between the two. Review the values and touch the “Not Saved” button beside each calibration to save them.
16. Touch “Ok” to apply the calibrations and exit the wizard.

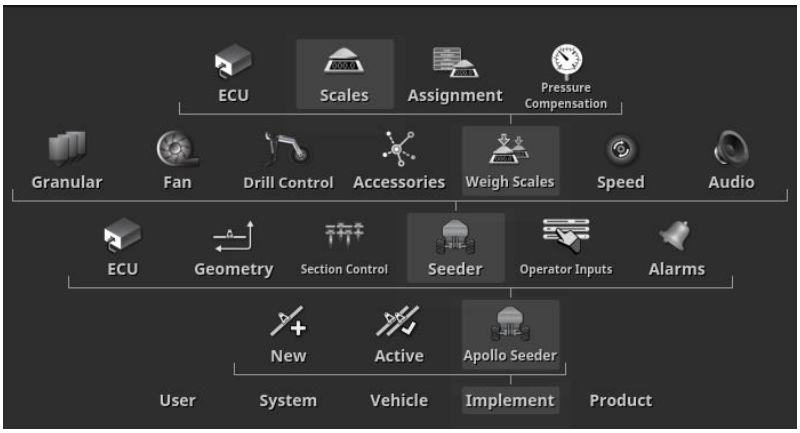




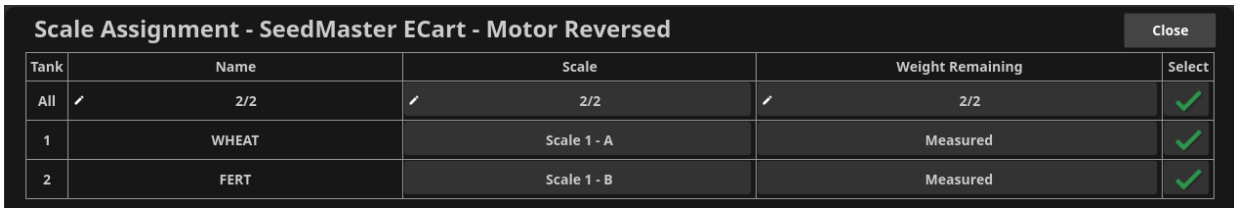
***IT IS RECOMMENDED TO COMPLETE AT LEAST 2 TO 3 CATCH CALIBRATIONS PER PRODUCT TO ENSURE ACCURACY. PRODUCTS SUCH AS CANOLA SHOULD BE CALIBRATED NO LESS THAN 3 TIMES. IF THE CALIBRATIONS ARE INACCURATE FROM ONE TO THE NEXT, PLEASE INSPECT THE METERING COMPONENTS AND START THE CALIBRATION OVER.***

# SCALE CONFIGURATION AND ASSIGNMENT

1. Touch the “Setup” button in the lower left corner of the screen.
2. Touch the **Implement** button.
3. Touch the **Apollo Seeder** button**.**
4. Touch **Seeder**, **Weigh Scales**, then **Scales**.
5. You will now be on the **Configure Scales** screen:
    a. **Scale:** Displays available scales. SeedMaster applications will have 4.
    b. **Affects Scale:** Scale that is having weight added by a separate tank and scale.
    c. **Setup Number:** The SL2140 Scale Link uses this shorthand number to determine how the weight will be displayed.
    d. **Calibration Number:** The SL2140 Scale Link uses the calibration number to match the specific load cells to the Scale Link. This then determines the actual weight value that is displayed.



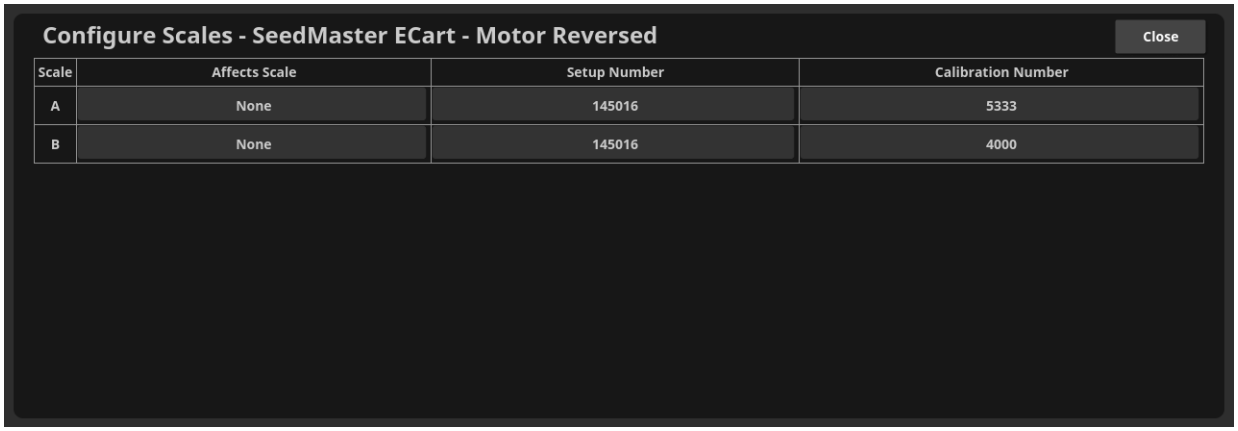

## SCALE ASSIGNMENT




1. Touch the “Setup” button in the lower left corner of the screen.
2. Touch the **Implement** button.
3. Touch the **Apollo Seeder** button.
4. Touch **Seeder**, **Weigh Scales**, then **Assignment**.
    a. **Tank:** Identifies tank number.
    b. **Name:** Product type in the tank.
    c. **Scale:** Scale connected to the tank.
    d. **Weight remaining:**
        i. Calculated: This displays the tank weight that the system calculates. When chosen, it is displayed on the tank panel and Operation Screen dashboard.
        ii. Measured: This displays the actual measured tank weight through installed load cells rather than calculated weight. When chosen, it is displayed on the tank panel and Operation Screen dashboard. This is the option used for SeedMaster E Series carts.

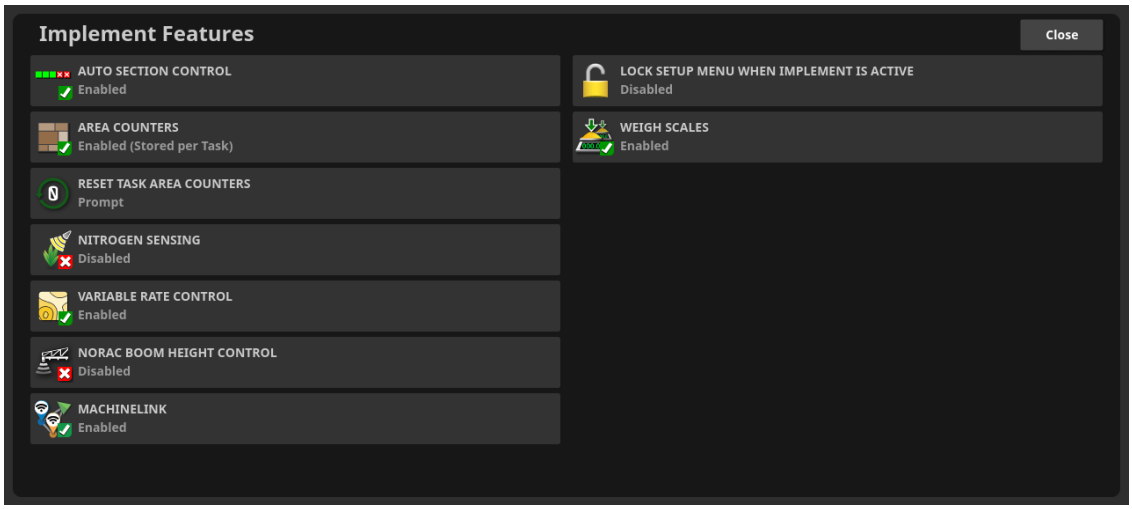
# SCALE CALIBRATION

1. Touch the “Setup” button in the lower left corner of the screen. 
2. Touch the **Implement** button.
3. Touch the **Apollo Seeder** button**.**
4. Touch **Seeder**, **Weigh Scales**, then **Scales**.
5. You will now be on the **Configure Scales** screen.
6. Note the “Setup” number. It should be set to 145016. This should not be altered unless directed to do so by SeedMaster.
7. Note the calibration numbers. Tanks 1 & 3 will have starting calibration numbers of 5333. Tanks 2 & 4 will have starting numbers of 4000.
8. Navigate back to the main work screen.
9. Ensure the tank is empty.
10. Add an accurate, verified weight on or in the tank.
11. Read the value displayed on the XD+ and note the accuracy. If the weight is correct, no further action is required. If it is found to be inaccurate, move to step 12.
12. Navigate back to the **Configure Scales** screen.
13. Locate the scale requiring calibration.
14. Determine your new calibration number:
    a. $\frac{\text{Actual Known Weight X Existing Calibration Number}}{\text{Displayed Weight}}$
    b. Example of the above equation:
        i. Actual known weight: 1000lbs
        ii. Weight displayed: 1100lbs
        iii. Existing Calibration Number: 5333 (Tanks 2 & 4: 4000)
        iv. 1000 X 5333 / 1100 = 4848
        v. Accurate Calibration number is now “4848” (using the calibration for tanks 1 & 3).
15. Touch “Calibration Number”.
16. Using the keypad popup, enter your new Accurate Calibration Number.
17. Repeat steps 8 to 16 for each subsequent tank requiring calibration.



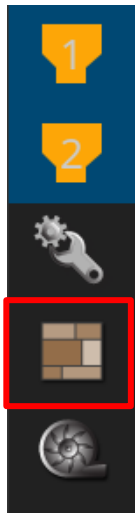
# AREA COUNTERS

To track data like area coverage, product dispensed, and rate averages, Area Counters must first be enabled:




1. Touch the “Setup” button in the lower left corner of the screen.
2. Touch “System”, “Features”, then “Implement”. This opens the “Implement Features” menu.
3. Select “Area Counters”:
    a. **Enabled (Stored per Task):** The area counters will be stored separately for every created task. *This is the recommended setting for SeedMaster E-Series machines.*
    b. **Enabled (Stored per Implement):** The area counters will accumulate in total across all tasks for each stored implement. Loading a new implement will create new area counters.
    c. **Enabled (Stored per Task and Implement):** Area counters are set and accumulated for both separate tasks and implements.
4. Select “Reset Area Counters”:
    a. **Never:** Area counters must be reset manually. They will continue accumulation until they are reset.
    b. **Prompt:** When a task is deleted, a warning will display asking if the user wants to reset counters.
    c. **Auto:** Task creation and deletion automatically resets the area counters.

## USING AREA COUNTERS

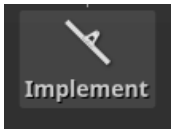



1. Touch “Area Counters” on the Toolbar Panel on the right-hand side of the main operation screen.
2. Select “Set Active Area Counter Number”. Choose the area number required to store data.
3. The arrows in the middle of the panel beside “Area” will scroll through the data stored for each set area.
4. The arrows at the bottom of the panel beside “Tank” will scroll through the data stored for each tank.

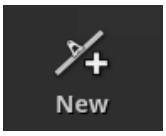
## MANUAL RESET OF TASK AREA COUNTERS

1. Select “Reset Area Counter” as mentioned in “a.” above.
2. This can be used to reset the data for a task area, the current tank, or both.

# APOLLO CM-40 GRANULAR SETUP (DEALER OR SEEDMASTER ASSISTED ONLY)

1. Touch the “Setup” button in the lower left corner of the screen. 
2. Touch the **Implement** button. 

3. Touch the **Apollo Seeder** button**.** 

4. Touch the **New** button**,** then **Custom.** 

5. The **New Implement** Type and select the icon for your implement. There are 4 types:
    a. Rigid
    b. Pivoted (tow-behind)
    c. Front Mount
    d. Double pivoted (tow-between).

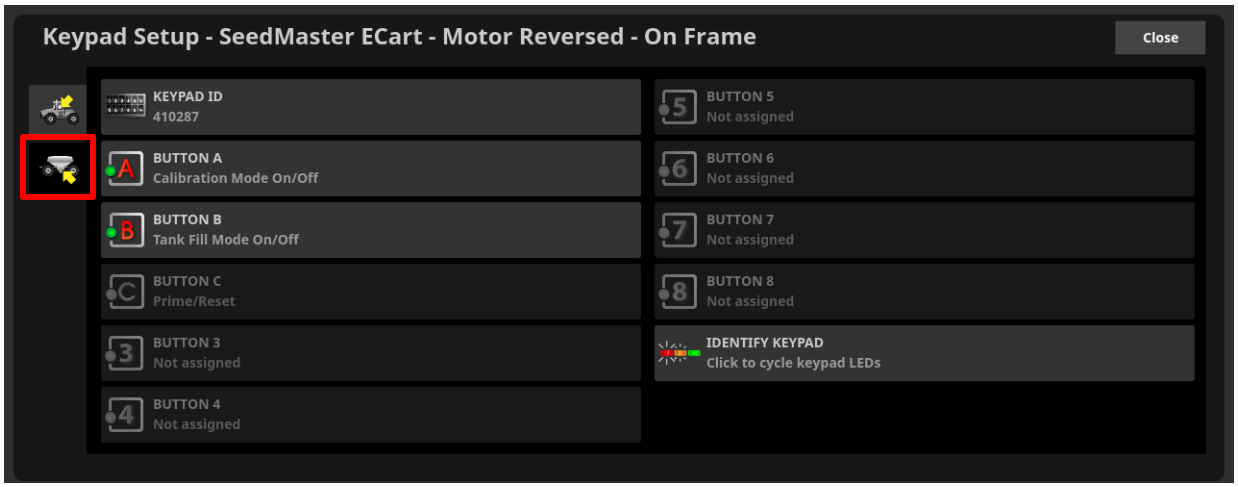
    ***Note: For SeedMaster, only “Pivoted” and “Double pivoted” will be used depending on your configuration.***
6. Enter an **Implement Name.** SeedMaster recommends using the serial number.
7. Select the **ECU Type.**
8. Touch **Apollo,** then Next**.**
9. Select **Implement Control**. Choose from the following options:
    a. **Section Control Only** – The CM-40 will be used to control Auto Section Control only with no rate control.
    b. **Section Control and Rate Control** – Both Auto Section Control and Rate Control will be handled by the CM-40. *This is the option to be used for SeedMaster applications.*
    c. **Rate Control Only** – This enables the CM-40 to control only rate. Section control is full width only.
10. After selecting **Section Control and Rate Control**. Touch next.
11. Choose **Implement Function** and select **Seeder**. Touch next.
12. Ensure **Auto Detection** is selected. Touch next.
13. The connected CM-40 will be detected. Touch next to see a summary of the connected ECU(s).
14. After reviewing the connected ECU(s), touch next.
15. From the **Seeder Manufacturer** list, select **SeedMaster**. Hit **Ok**, then next.
16. Set the **Number of Granular Booms** according to your configuration. For the E-Series, this will be 4 for the E860.
17. You have the option to name the booms if desired. Select the boom under the **Name** heading and edit the name. Touch next.
18. Set the number of tanks. For the E-Series, this will be 4 for the E860.
19. You have the option to name the tanks. Select the tank under the **Name** heading and edit the name.
20. Select the product type for each tank under the **Type** heading. For the E-Series, this can be left at the default of **Granular**.
21. The ECU drive will be numbered in ascending order by default. This will follow the default tank numbering as well. Touch next.
22. The configuration is complete.

# KEYPAD CONFIGURATION

The keypad is an external device used on the frame of the E-Series cart primarily for calibration. Prior to use, it is required to be assigned and configured in the XD+ monitor.

## CONFIGURE

1. Touch the “Setup” button in the lower left corner of the screen.
2. Select “Implement”.
3. Select “Apollo Seeder”.
4. Select “Operator Inputs”, then “Keypad”.
5. Choose “On Frame”.




a. **Keypad ID:** If there is more than one keypad present, this will set which keypad is being used for the tank or in cab. The number is found on the back of the keypad on a silver label. The last three digits of the serial number will match the last three of the keypad ID. SeedMaster currently offers the keypad for the tank only.

b. **Button A:** This starts the Calibration Wizard. See “Calibration Settings and Procedure” on page 47.

c. **Button B:** Tank fill. Touch this button to begin the tank fill wizard. This wizard will enable the tanks to be zeroed and filled to a measured amount.

d. **Button C:** Tank Prime/Reset. The prime function turns the meters on the selected sections of the tank being calibrated. This function allows the meters to be prepared with product dispensing immediately with no product dispense delays and increases the accuracy of the calibration.

   The Reset function becomes available after a calibration has been activated. When the calibration is paused or halted in the desire to start over, use this button to reset the motor revolutions to zero.

e. **Identify Keypad:** Touching this will flash the lights on the associated keypad to aid in identification.

# TOPCON XD+

## POWER BUTTON AND STATUS

To power up the monitor, toggle on the power button. The power status LED on the front of the display will illuminate green. If the status indicator is red or does not illuminate, contact your SeedMaster dealer for assistance.

***Note**: Do not connect any USB drives or devices to the monitor during the power up sequence. The only exception to this is when a software update is being performed by your dealer.*

## DEVICE SHUT DOWN AND RESTART

**To shut down monitor with system:**

1. Toggle off the power button as displayed in the “Power Button and Status” section.

**To shut down monitor only:**

1. Press the button on the left-hand side of the monitor behind the screen. The monitor will turn off and all other systems will remain powered.

**To restart:**

1. Close any active tasks.
2. Swipe upwards from the bottom-middle of the display to show the “toolbar”.

3. Touch the “power” icon. Then touch Yes to confirm restart.

## XTEND APP

The XD+ Monitor comes equipped with XTEND technology. This allows users to extend the user interface (UI) to be displayed on a mobile device (Smart Phone/Tablet). XTEND uses a dedicated Wi-Fi connection to connect and sync to the in-cab display. This allows the user access to any of the functions and features of the XD+ Monitor without needing to be tethered to the system with a cable. Download the XTEND app from the Google Play or Apple App Stores.

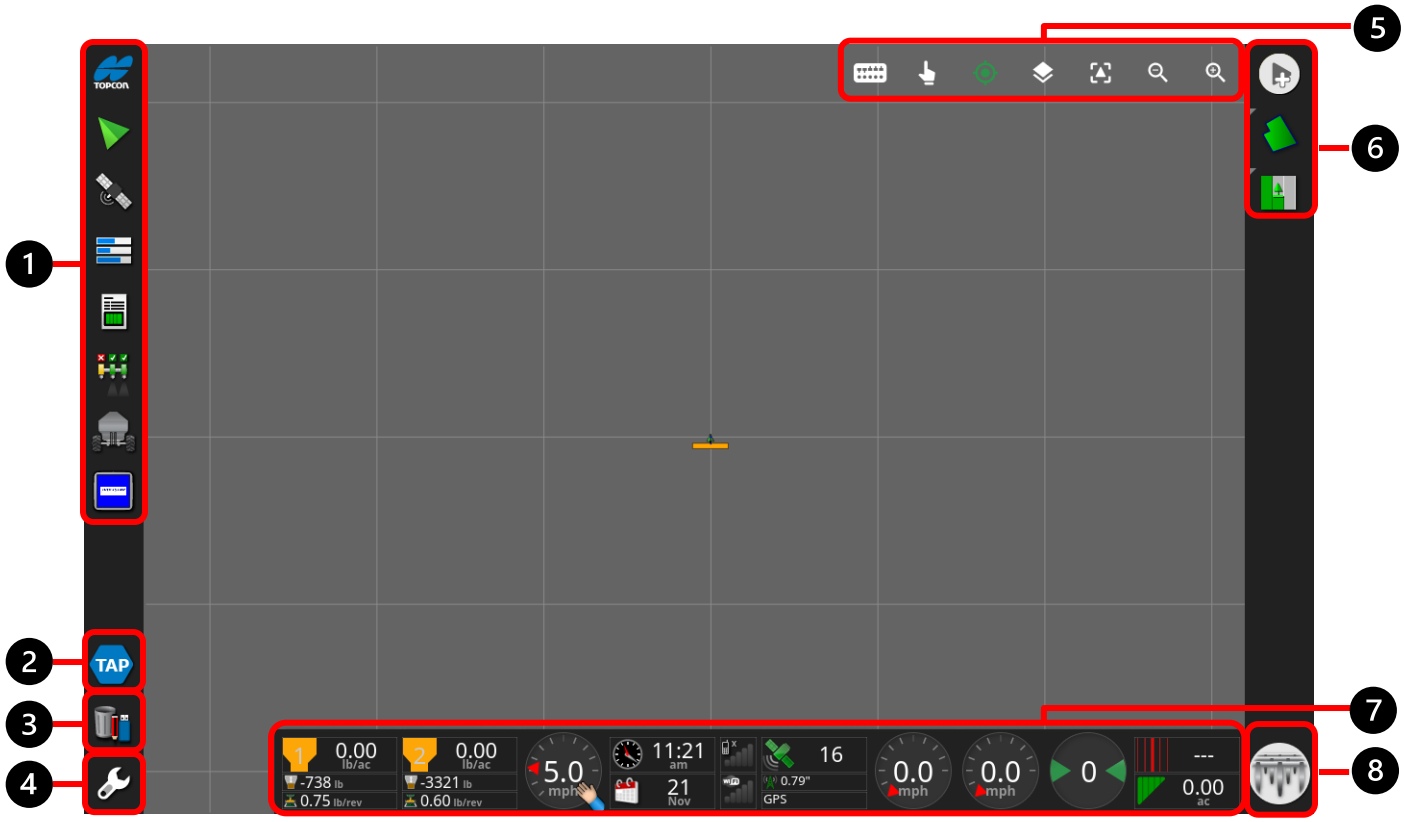
**To set up XTEND:**

1. Touch the “Setup” button in the lower left corner of the screen.
2. Select “System”, “Features”, and “Console”.
3. Ensure that “XTEND” is enabled.
4. An EDIMAX AC 600 WiFi USB dongle is included with the in-cab monitor bundle. Install in the USB port on the rear of the monitor.
5. On your mobile device, download and install the XTEND app.
6. While you are beside the monitor, open the XTEND app on your mobile device.
7. A pop-up will appear on the monitor for a “New XTEND Device”. Touch “yes” to pair.
8. XTEND is ready for use.

**To remove a mobile device:**

1. Touch the “Setup” button in the lower left corner of the screen.
2. Select “System”, “Features”, and “XTEND”.
3. Note the paired device name on the left. Touch ‘Forget” to remove.

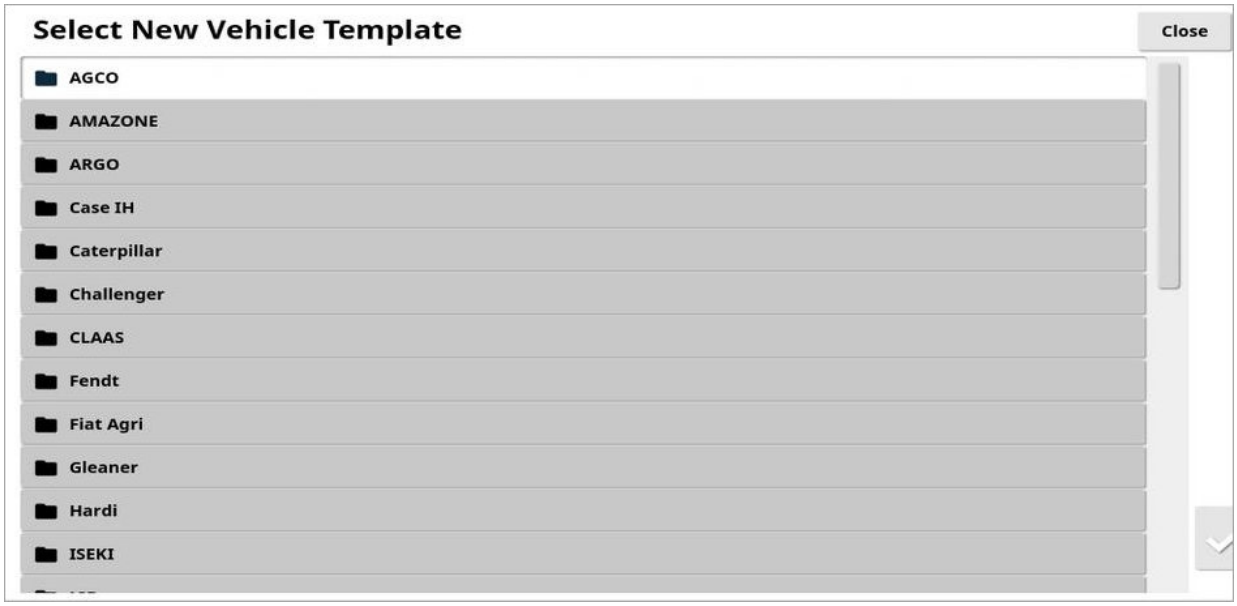
# XD+ OPERATION SCREEN CONTROLS




1. **Navigation Bar:** Touch each icon to open a mini-view for that function. See page 63.
2. **TAP:** This icon opens the Topcon Agriculture Platform (TAP). TAP is not used for SeedMaster applications.
3. **Inventory Manager:** This allows the user to manage vehicles. Implements, fields, and tasks on the monitor.
4. **Setup Screen:** The setup screen button gives access to set up or modify monitor settings.
5. **View Controls:** Each of these allows the user to control what is displayed on the as-applied map including map layers, map view, and zoom.
6. **Guidance Bar:** The user can access the Start Task button, as well as both the field and task menus.
7. **Dashboard:** The dashboard is user-configurable for viewing system information and controls. Granular application, GPS status, and ground speed are commonly enabled displays.
8. **Master Switch:** Product application can be turned on and off via this button if “Virtual Master Switch” has been enabled during implement set up. This icon also shows the state of application: red is off, green is applying.

# VEHICLE CONFIGURATION

Vehicle configuration is required to ensure that as-applied mapping has accurate geometry for GPS. These measurements are pre-loaded, but customizable to your specific vehicle. This allows section control function correctly and efficiently.




**Creating a new vehicle profile:**

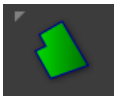

1. Touch the “Setup” button in the lower left corner of the screen.
2. Choose “Vehicle”, then “New”.
3. From the list of pre-configured vehicles, choose your manufacturer, and series model.
4. A new vehicle pop-up will appear. To change the name, select Vehicle Name and enter in the new name.
5. After confirming the new vehicle, the geometry will be displayed. To modify, see “Setting Vehicle & Implement Measurements” on page 70.

**Creating a new *custom* vehicle:**

1. Touch the “Setup” button in the lower left corner of the screen.
2. Choose “Vehicle”, then “New”.
3. From the list of pre-configured vehicles, choose “Other”.
4. A list of controllers will be displayed. Select yours, or touch “Other” again.
5. A list of generic vehicle templates will be displayed. Choose the one that best represents yours and confirm.
6. To change the name, select Vehicle Name and enter in the new name.
7. After confirming the new vehicle, the geometry will be displayed. To modify, see “Setting Vehicle & Implement Measurements” on page 70.

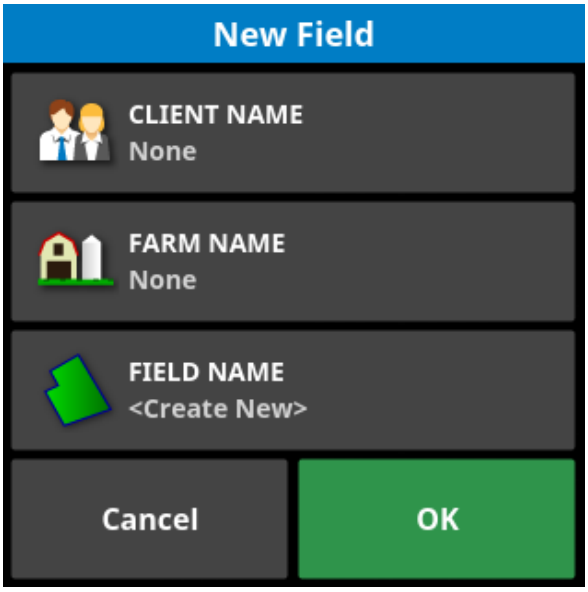
# CREATING FIELDS

Setting a field allows the XD+ to store that field's information so that it may be recalled for various tasks required in the same field. It is important that GPS is active, and the machine is located within the field that is being created. Once the field is active and saved, the XD+ will automatically load that field by either driving into it, or powering on the monitor while located in the field.

1. Touch the "Field" Menu. 
2. Touch the "New Field" icon. 
3. Enter a Client Name for the Field and confirm (if required).
4. Enter a Farm Name for the Field and confirm (if required).

   *NOTE: The field can be created without a Client or Farm Name if desired
5. Enter a Field Name and confirm. It is recommended that the name is familiar and organized to the Farm's structure to ensure future use is simplified.

***NOTE:*** *When work has been completed in a created field, it is important to "Unload" that field. This will prevent any new coverage from being mistakenly added if a user moves to a new field without creating a new field or task. If the "Unload Field" function is not used, and the user travels more than 15km away, the field will be unloaded automatically. A warning will pop up to warn the user of the unload.*

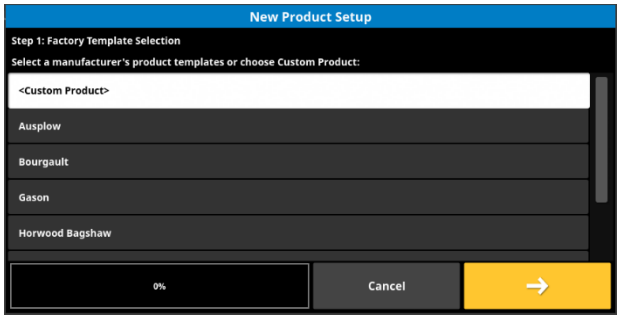


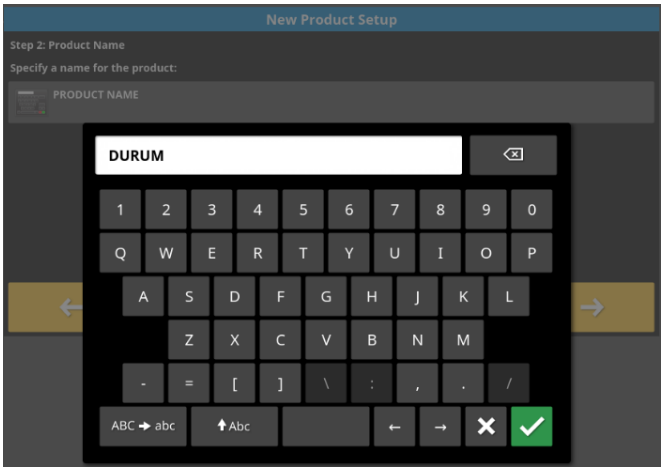
# CREATING THE PRODUCT DATABASE

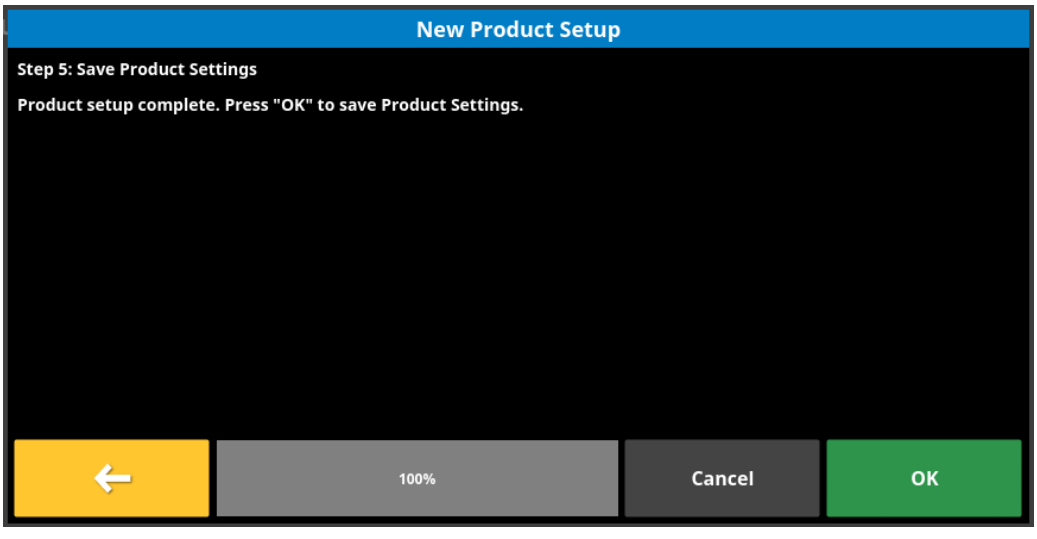
Create preset products for common applications for upcoming field operations. These presets save the rates, increments (product rate increase/decrease), and densities for various product types. It allows the operator to select products, quickly resume, or restart an application or operation for various fields.

1. Touch the “Setup” button in the lower left corner of the screen.

2. Touch “Product”, then “Granular”.
3. Touch “New Product”, then “Custom Product”.
4. Name the product by touching on “Product Name”. Confirm and touch next.
5. Add the product density in pounds per bushel (60lbs/bu for wheat, 50 lbs/bu for canola etc.). Touch next.
6. Set the Product Rate Parameters including increment, preset 1, and if desired, preset 2.
7. Touch “OK” at the end to complete the product set up.
8. To set up another product, repeat steps 2 through 6.

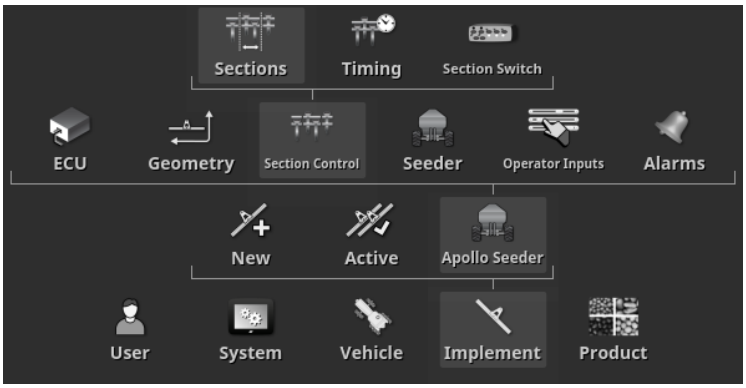



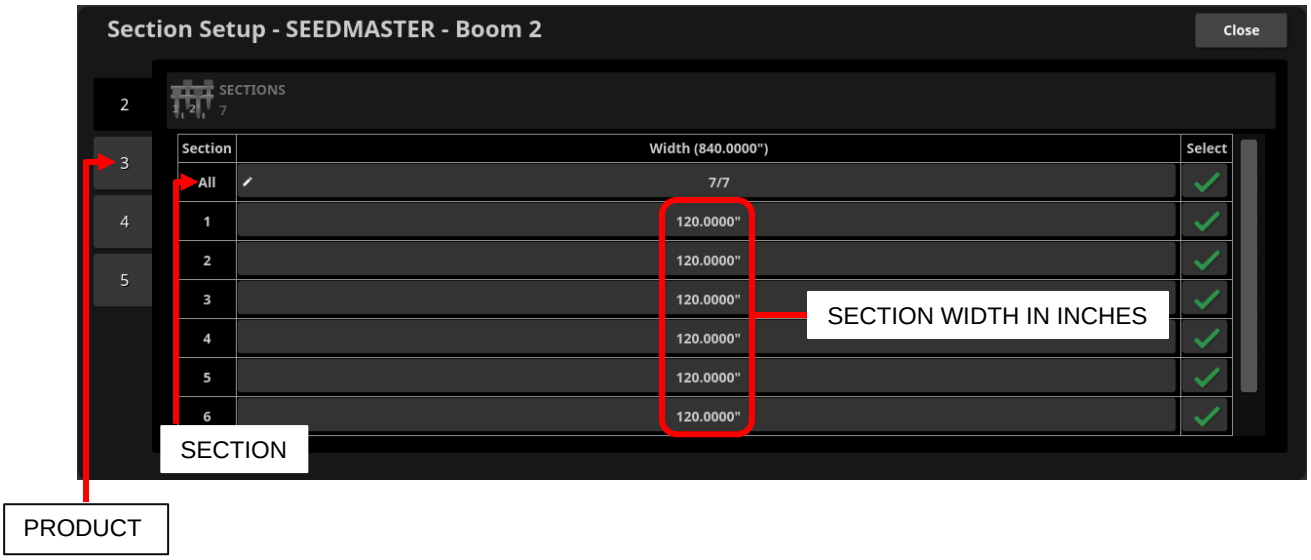
# SECTION CONTROL CONFIGURATION

To access the Auto Zone Command Setup (Section Control Setup) page:

1. Touch the “Setup” button in the lower left portion of the screen.
2. Touch “Implement”.
3. Touch “Apollo Seeder”.
4. Touch “Section Control”, and then “Sections”.
5. Select “Sections” and use the “+” or “-“ to set the number of sections. Touch ok.




6. Set the section widths. These can be set for all, or individually:
   a. To set for all sections, select the width displayed next to “All”. Enter the value in inches and touch ok.
   b. To set for individual sections, select the width next to the appropriate section, enter the value in inches, and touch ok. Repeat for remaining sections.
7. Repeat steps 5 and 6 for each product present.



# SECTION CONTROL TIMING CONFIGURATION

Section control look-ahead time is very important to be accurately set to help avoid gaps and overlap when product is being applied. Factory defaults are set to 6 seconds on and 2 seconds off. ***It is not SeedMaster's responsibility for skips or misses. Please ensure that you always have product being delivered to unapplied areas when seeding.***

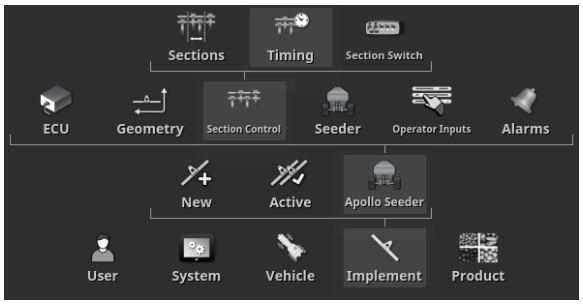
The following procedure will aid in calculating and setting the section control timing.

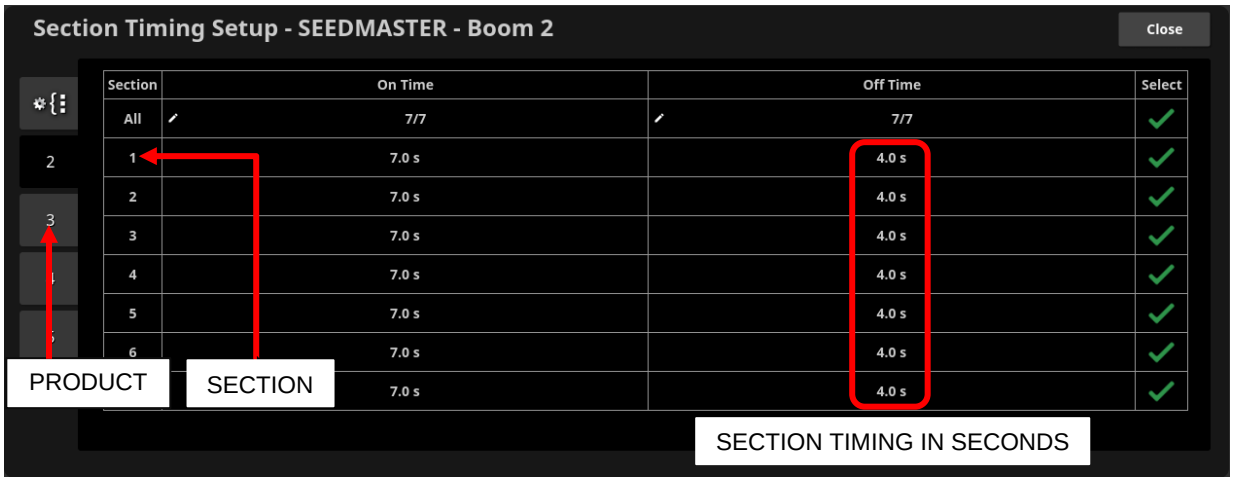
***First, calculate the product application timing:***

1. Before setting the timing for a product, ensure that it has been calibrated.
2. Turn the master on for the whole machine to ensure all meters are primed for application.
3. Once primed, time the delay between turning the product on and the application of product through the furthest outside opener of the drill using a stopwatch. This is the "On Time".
4. Turn the master off and time the delay between switching it off and product stopping flow. This is the "Off Time".

***Setting the Section Control Timing:***

1. Touch the "Setup" button in the lower left portion of the screen.
2. Touch "Implement".
3. Touch "Apollo Seeder".
4. Touch "Section Control", and then "Timing".
    a. **"Custom Settings"** allows the user to configure the products individually.
    b. **"Use Settings from Boom 2"** will set all products to the same settings as the first configured tank. To adjust the settings for all, adjust them from "Boom 2".
    c. **"On Time"** refers to the delay between turning a section on and the product beginning application. Choose "All" to configure all sections with the same timing, or the section number to adjust them individually.
    d. **"Off Time"** refers to the delay between turning a section off and the product ceasing application. Choose "All" to configure all sections with the same timing, or the section number to adjust them individually.

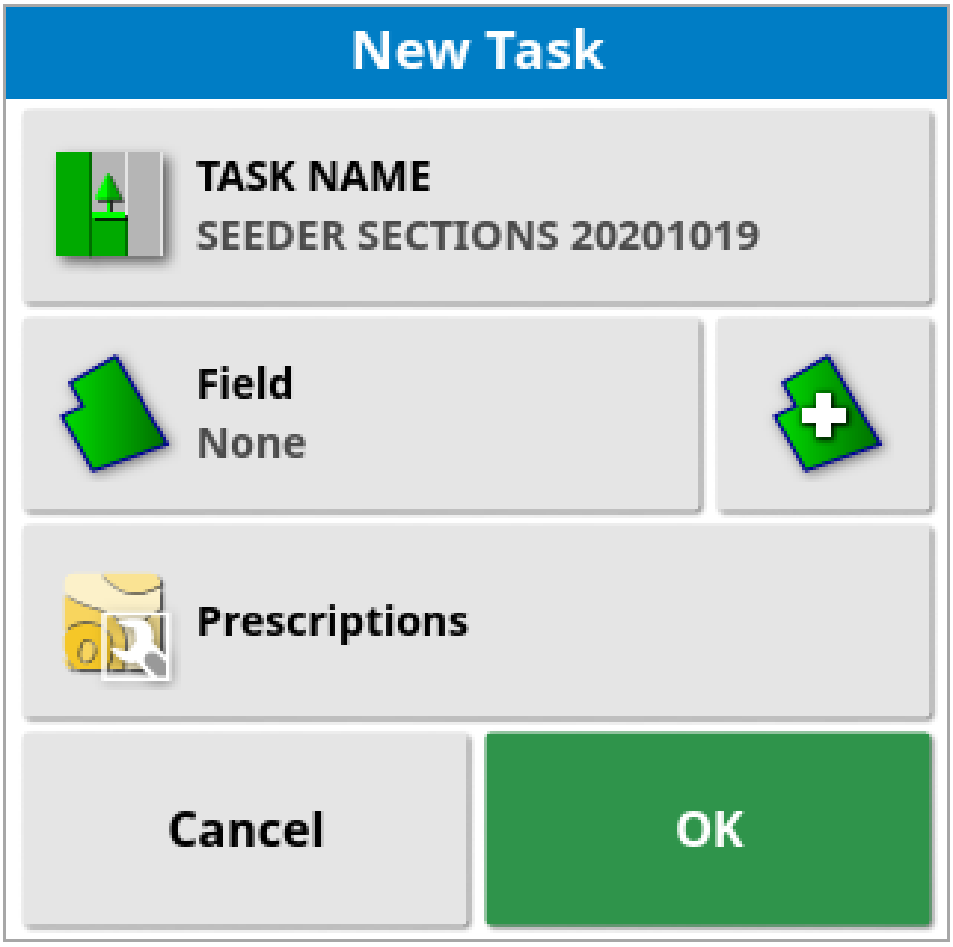


# XD+ TASK QUICK START PROCEDURE

Before you go to the field, please review the steps below to ensure your XD+ is field ready.

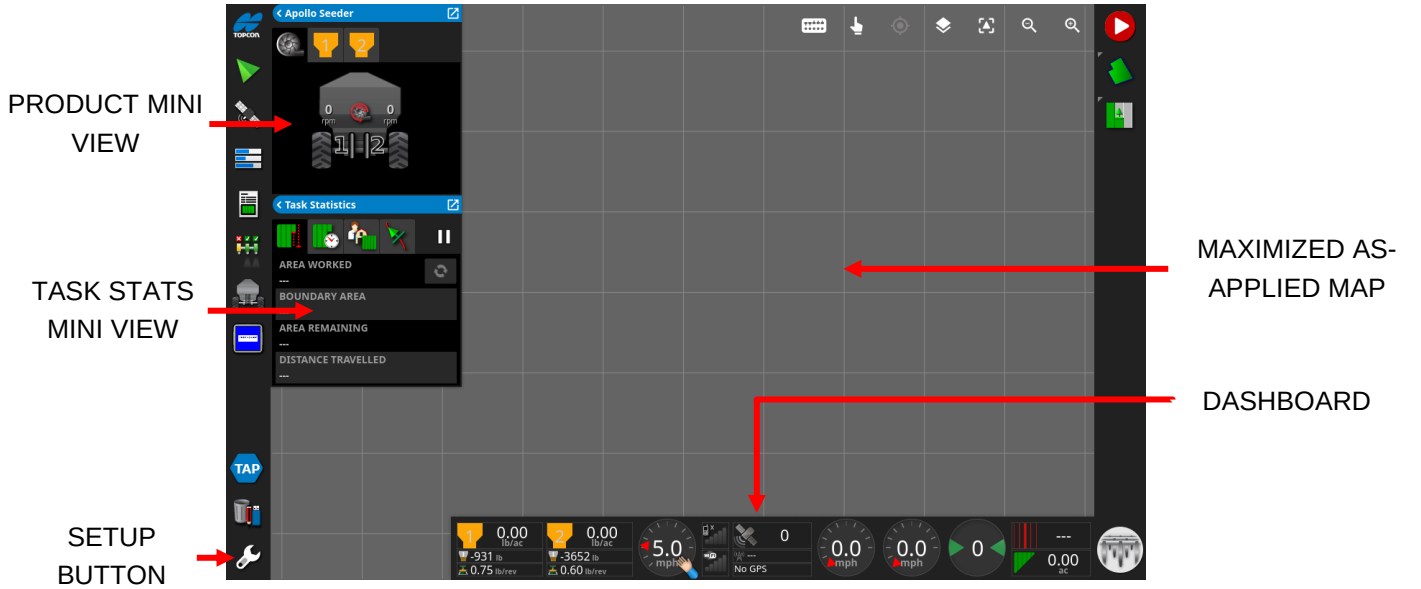
1. Review Apollo CM-40 Quick Start Procedure (**PAGE 45**).
2. Review Section Control Timing Configuration (**PAGE 61**).
3. Ensure the Product Database is configured with the applicable products (**PAGE 59).**
4. Touch the Task Menu. 
5. Touch “Create New Task”. 
    a. If you need to create a “Field”, see **PAGE 58** for more information.
6. Enter Task settings:
    b. Review and enter task name. Use a name that is easily identifiable and applicable to the farm and operation for future organization.
    c. Touch “Field”. Choose the appropriate associated field (if applicable).
    d. If VRC is enabled on the monitor, Prescriptions will be displayed. Use this option to load the appropriate map. See **PAGE 72** for more information.
    e. Confirm the task.



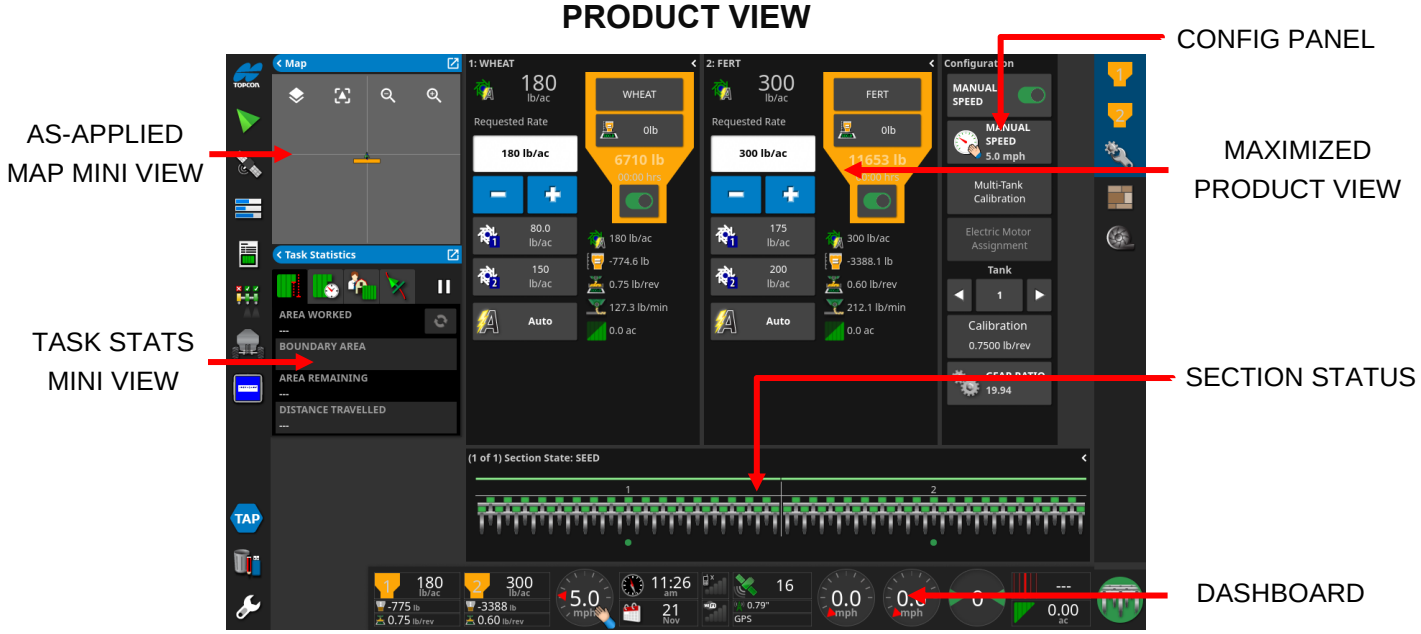
# XD+ MINI VIEWS

The XD+ has Mini Views on the left side of the main run screen that allows the user to choose what information they want displayed during operation. The availability of these views is pre-configured by SeedMaster. These views can be “maximized” to become the main information on the run screen. This is achieved by either using the maximize button, or by swiping from left to right on the mini view. This gesture is also used to switch which view is displayed/maximized. To close the mini view, slide it to the left.

## MAP VIEW




## PRODUCT VIEW



# CREATING FIELD BOUNDARIES

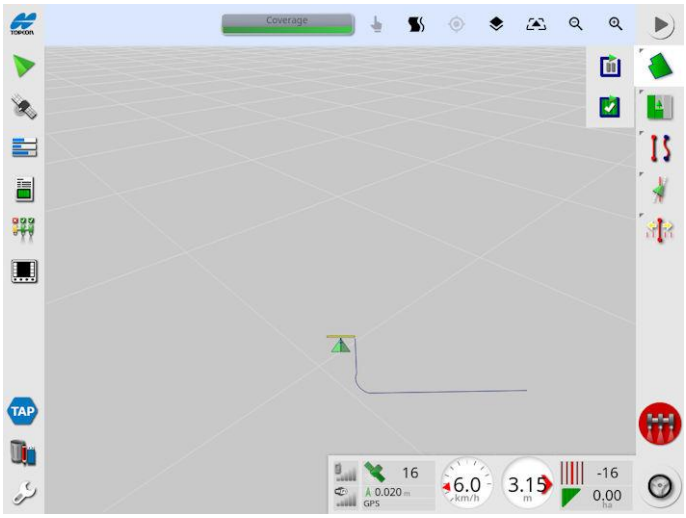
***Setting a new boundary:***

1. Drive the machine to the edge of the field.
2. Select the “Field” menu. 
3. Select “Boundary Offset”. 


   a. **Recording Offset**: This sets the position of the offset on the left or right side of the implement.
   b. **Additional Offset**: By entering a positive value, the offset is extended beyond the edge of the implement. A negative value will position the offset inside the implement edge.
   c. **Recording Position**: The operator can choose to record from the front or rear of the implement, or from the tractor position.
   d. **Additional Front Offset**: This moves the recording position forward (positive value) or backward (negative value).

4. Touch “Record Field Boundary”. 
5. Drive the boundary of the field. A blue line will be recorded as the field boundary and account for any predetermined offset.

6. If an obstacle is encountered while driving the boundary, select “Pause”. Once the obstacle has been cleared, select “Record” to resume. The boundary will automatically set a straight line between the two points where recording was paused and resumed.
   ***NOTE: Boundary recording is automatically paused if the master is turned off.***
7. When you have returned to the start point, touch “Complete Boundary Recording” to complete the boundary.




***Creating a boundary from coverage:***

8. Select the “Field” menu.

9. Touch “Create Boundary from Coverage”.
   a. **Smoothing**: The minimum gap size that will fill automatically.
   b. **Minimum Coverage Area**: Coverage smaller than what is specified here will not create a boundary.
   c. **Distance From Coverage**: Expands the boundary a specified distance from coverage.
   d. **Excluded Regions**: These are used to indicate areas that will not have applied product when using sectional control. When on, excluded regions are automatically created from gaps in coverage. This setting is “On” or “Off”.
   e. **Minimum Excluded Area**: A gap in coverage smaller than what is specified here will not create an excluded region.

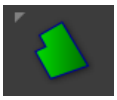
***Creating a boundary from a shapefile:***

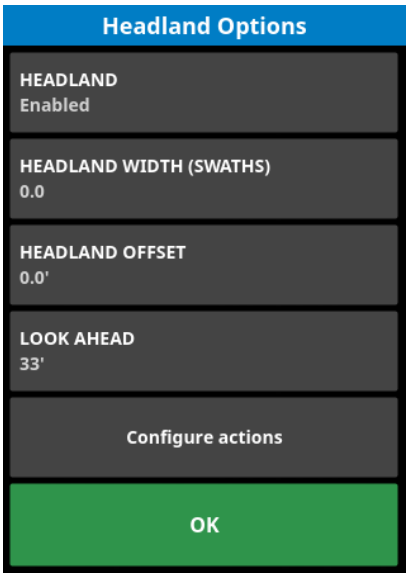
10. Ensure that the shapefile is loaded onto a USB drive. Insert into the USB port on the rear of the XD+ display.
11. Select the “Field” menu.

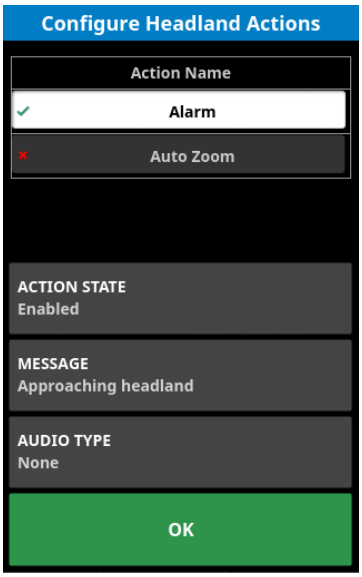
12. Touch “Create Boundary from Shapefile”.
13. Follow the file path to the storage location of the shapefile and select it.
14. Confirm and the shapefile boundary will import.

# CREATING A HEADLAND

Once a Field Boundary has been created, it is possible to set a headland zone inside of that boundary. The width of this zone can be customized by setting the number of swaths, or headland offset.

1. To begin creating a headland, select the Field Menu. 
2. Select “Configure Headland for this Implement”. 
3. Ensure “Headland” is enabled.
4. “Headland Width” and “Headland Offset” can either be used individually, or combined:
    a. Touch “Headland Width (Swaths)” to enter the number of “swaths” desired. The swath is defined as the working width of the implement. Enter a value and confirm.
    b. Touch “Headland Offset” to enter in a custom headland width or to expand the previously set Headland Width to include a “buffer”. Enter a value and confirm.
5. Touch “Look Ahead”. Enter a value in feet how far in front of the vehicle the system looks to respond with “actions”. Confirm.
6. Select “Configure Actions”.




7. Action names:
    a. Alarm – triggers an alarm when approaching the headland using the predetermined look ahead time.
    b. Auto Zoom – the map will zoom in or out to a predetermined level when approaching the headland. The map will return to the original zoom level when leaving the headland.
8. Highlight an action name to edit its properties:
    a. Enabled or Disabled.
    b. Visual text message.
    c. Audio type (none or “beep”).

# SETTING FLAG POINTS

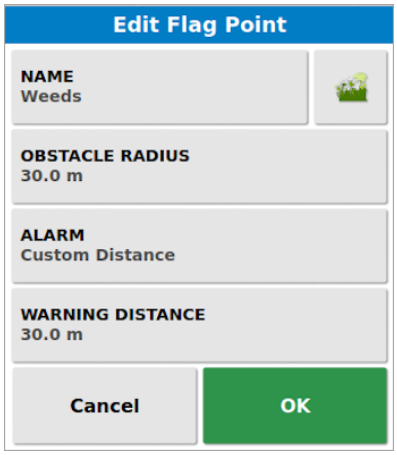
Setting flag points allows the user to identify obstacles or areas for the seeder to avoid. If required, these flag points can have an exclusion zone set around it.

1. Drive to the obstacle or area to be flagged.
2. Select the Field Menu.
3. Select “Set Flag Point”.
4. Choose a flag symbol to be placed at that spot.
    a. For a customized point, choose “Custom”.
    b. After selecting the required symbol, choose “Flag Point Name” to enter a name for the flag.



***Editing Flag Points:***

5. Press and hold the flag point until a pop-up displays to edit settings.
    a. **Name:** Edit the name or change the icon.
    b. **Obstacle Radius:** Enter a radius measurement around the flag point if known.
    c. **Alarm:** Toggle the flag point alarm on or off and customize the trigger distance. If this setting is not visible, ensure the alarm is enabled in general alarms.
    d. **Warning Distance:** Enter a custom distance for triggering the alarm. This measurement is from the edge of the set radius.
6. Flag location can be changed by pressing and dragging to a new location on the map.
7. If required, use the trash can icon to delete the flag.



# XD+ TASK MAINTENANCE

Task Maintenance is the process of archiving tasks from the XD+ for either transfer to another Topcon display, or to be imported into an information management software. It is recommended that the user perform this maintenance at the end of each season.

Regular task maintenance safeguards valuable information from being lost if a file is damaged or corrupted since files will be archived on a personal computer or laptop for future reference.

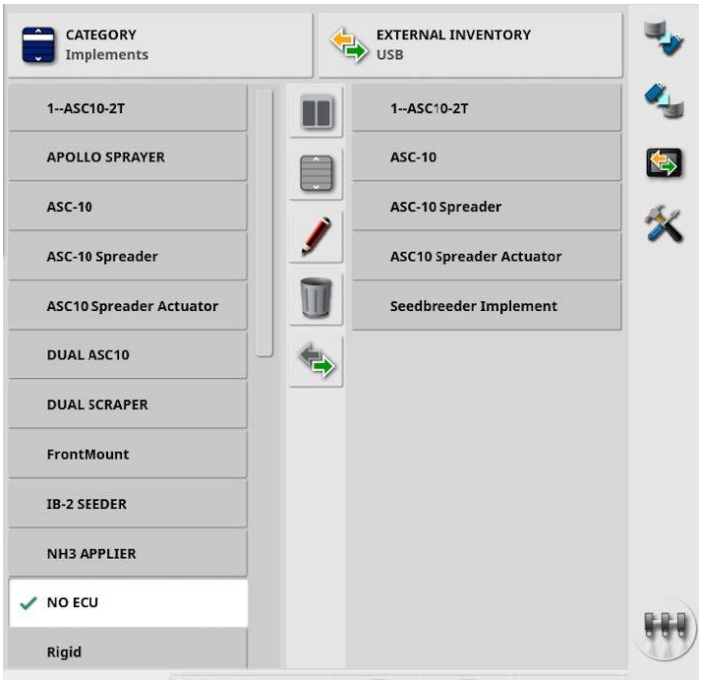
All XD+ tasks are stored in memory. The storage location for these tasks is of a fixed size and will hold a large, but limited number of files. Maintenance should be conducted on a regular basis to ensure enough storage space is available for future tasks.

Files can be loaded onto or downloaded from the XD+ using an external USB drive. Insert the USB drive into the USB connector located on the rear of the monitor.

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

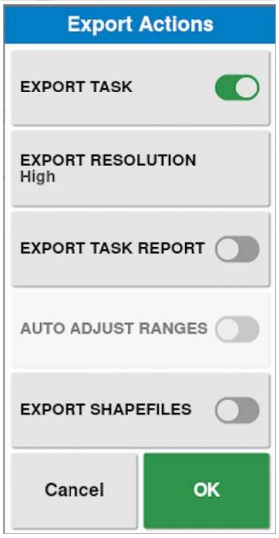
## Exporting Tasks to a USB Drive

1. Insert a USB drive into the XD+.
2. Touch Inventory Manager.
3. Select “Tasks” from the “Category” drop-down list.
4. Select USB from the External Inventory drop-down list.
5. Select the appropriate tasks from the category list on the left.
6. Touch the Transfer button.
7. Select Export Task, Export Task Report, and Export Shapefiles.
8. Confirm.




## Deleting Files from the XD+

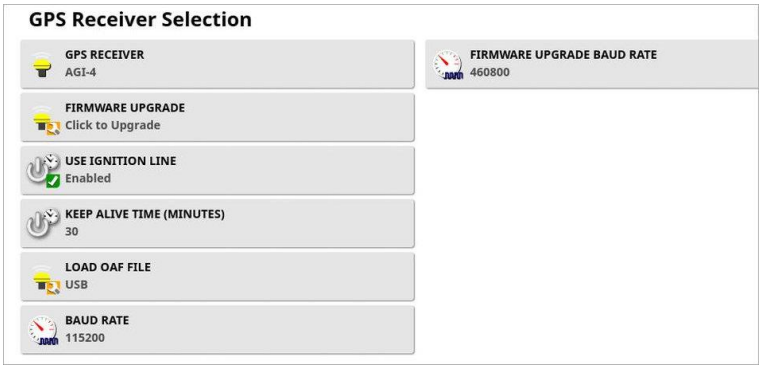
1. Touch Inventory Manager.
2. Select “Tasks” from the “Category” drop-down list.
3. Select the appropriate tasks from the category list on the left.
4. Touch the Trash Can icon.
5. Touch “ok” to confirm the deletion of the files.



# GPS SET UP

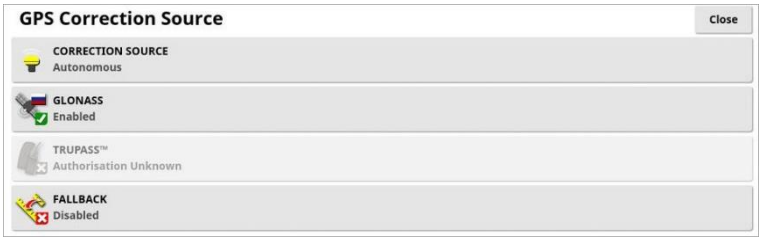
To utilize full mapping and sectional control capabilities, the XD+ system requires a GPS differential correction from a GPS receiver. This system will require configuration from the user depending on what style of correction they use:


1. Touch the “Setup” button in the lower left corner of the screen.
2. Select “System”, “GPS”, and “Receiver”. This will open the menu required for GPS settings.
    a. **GPS Receiver:** Select your receiver type from the list. The receiver will require configuration to out put the correct data format for the XD+.
        i. GGA @ 5hz
        ii. VTG @ 5hz
        iii. ZDA @ 15 seconds
        iv. Preferred baud rate of 115200bps with 8 data bits, No Parity, and 1 Stop Bit (115200, 8N1).
    b. **Firmware Upgrade:** This will upgrade the GPS Receiver firmware with the internally bundled package included with the XD+.
    c. **Use ignition line:** When the GPS requires power after the vehicle has been turned off and utilizes a compatible wiring harness, this feature is required to be selected. It separates the power supply from the vehicle ignition. “Keep Alive Time” sets how long the receiver will remain powered.
    d. **Baud rate:** This is the data transmission rate for the receiver.




***Correction Set Up***

1. Touch the “setup” button in the lower left corner of the screen.
2. Select “System”, “GPS”, and “Correction”.
3. Select your correction source from the list. A complete list of the sources is available in the **Topcon Horizon Operator’s Manual** (January 2022, Rev. B), pages 61-65.

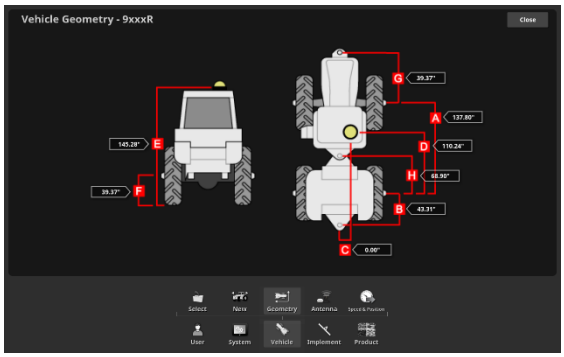


# SETTING VEHICLE & IMPLEMENT MEASUREMENTS

The XD+ and Apollo CM-40 are set up for your specific SeedMaster machine from factory. The XD+ has vehicle measurements preset in them if your tractor type is known at the time of programming. However, it is a best practice to ***DOUBLE CHECK AND CORRECT*** the preset measurements for your specific set up. ***It is important to configure the measurements within +/- 2" to ensure proper mapping. Failure to do so will result in inaccurate as-applied mapping and sectional control.***

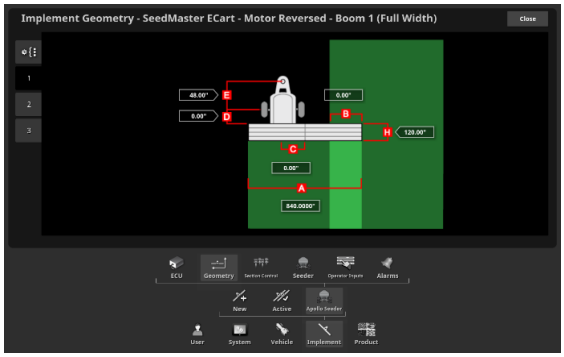
To set up the tractor:

1. Touch the "Setup" button in the lower left corner of the screen.
2. Choose "Vehicle", then "Geometry" (this screen is also displayed automatically once a new vehicle has been created. See page 57.)
3. If you chose a preset vehicle during set up, the preset measurements will now be displayed. Select a measurement.
4. Add or adjust this or any other measurements as required.




To set up the implement:

1. Touch the "Setup" button in the lower left corner of the screen.
2. Choose "Implement", then "Apollo Seeder", then "Geometry".
3. Under "Boom 1 (Full Width)", enter in inches:
    a. **Swath Width (A):** Full implement width.
    b. **Overlap (B):** Width of overlap between two adjacent rows. Enter "0" if there is none.
    c. **Inline Offset (C):** Off-center offset of the implement relative to the hitch. For SeedMaster, this will be "0".
    d. **Implement Wheels Offset (D):** Measures the distance from the rear axle to the first rank seed placement point. For SeedMaster, this will be -180.
    e. **Implement Offset (E):** Measures the distance from the hitch pin to the rear axle. For SeedMaster, this will be 425.
    f. **Working Length (H):** Measures the distance from the first rank seed placement point to the third rank seed placement point. For SeedMaster, this will be 100.

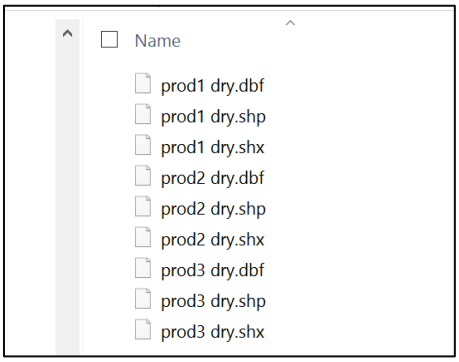


# IMPORTING PRESCRIPTION SHAPEFILES

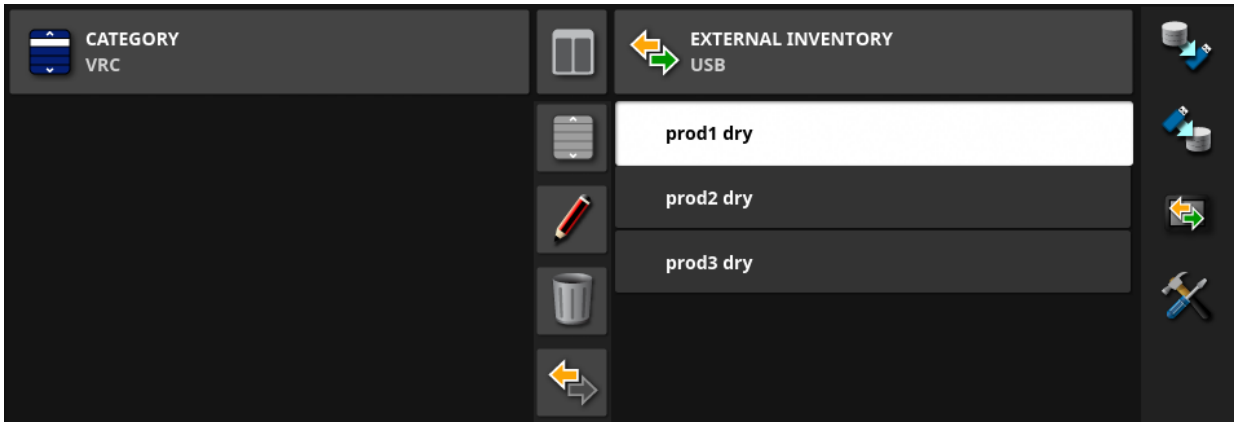
If you are importing the RX map shapefiles prior to loading and configuring the task, the files need to be loaded onto a USB drive before importing them to the XD+.

***NOTE**: The XD+ needs to be licensed for RX maps before they can be applied. Please refer to "Setup", "System", "Features", and "Licenses" to understand your monitor's Rx capabilities.*

1. Insert a USB drive to your PC.
2. Create a folder called VRC on the root of the USB drive.
3. Copy the RX files to the VRC folder. See below.



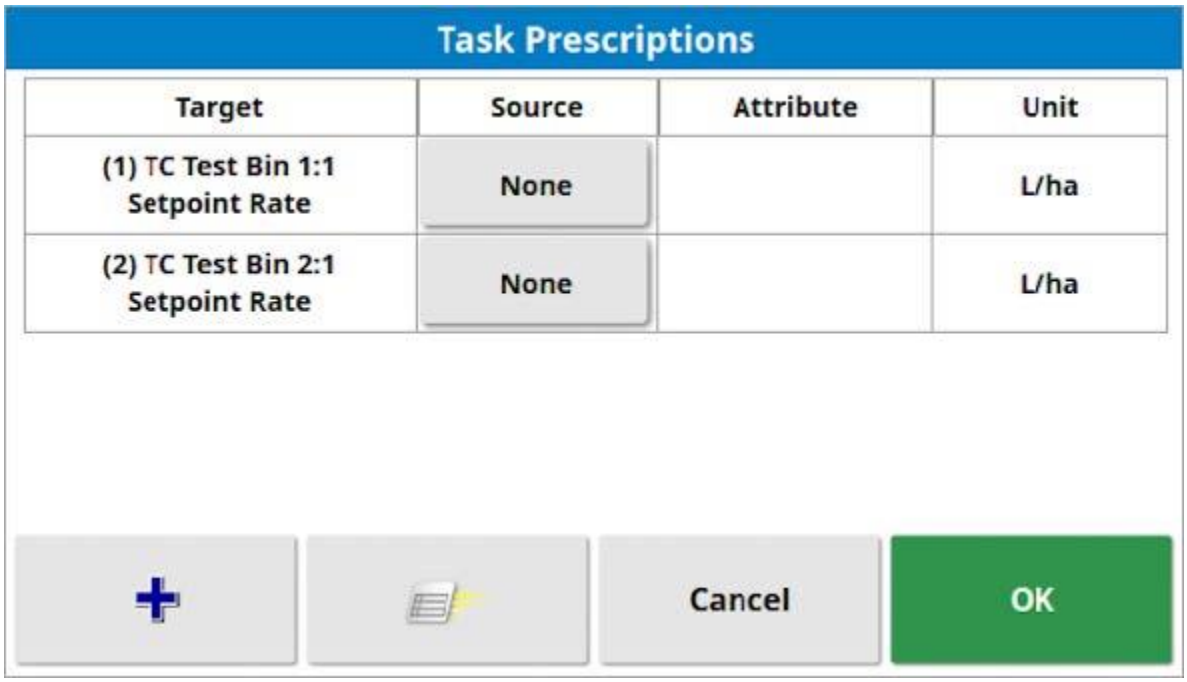

4. Insert the USB Drive into the XD+.
5. Select Inventory Manager. 
6. Select "VRC" from the "Category" drop-down list.
7. Choose "USB" from the "External Inventory" drop-down list.
8. In the "External Inventory" list, highlight the shapefiles required for import.
9. Touch "Import". 



# LOADING VRC MAPS WITH A TASK

If Variable Rate Control (VRC) has been unlocked and enabled on your XD+ monitor, you have the ability to apply products at prescribed varying rates across a field. While starting a task, select “Prescriptions” to start the process of loading a map with a task. This mode allows the XD+ to automatically adjust the target rate for field areas as designated by the prescription map.

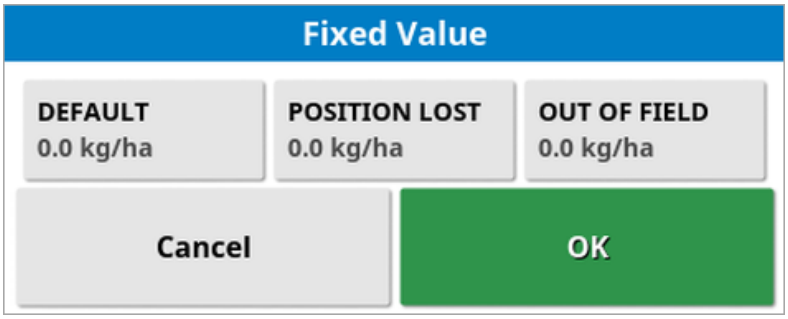
1. Touch the “Task Menu”. 
2. Create a task (**PAGE 62**) or touch “Configure Task Prescriptions”.




a. **Target**: This is the tank that is being controlled. Touch the “+” button to add another target.
b. **Source**: This is the rate-source for the target:
    i. **None**: No rate control.
    ii. **Fixed**: The values for Default, Position Lost, and Out of Field are fixed.
    iii. **Task Prescription**: Use a grid-based prescription map associated with the selected task. This task is created on an external software.
    iv. **Shapefile**: Import a Shapefile from a USB drive onto the display via the Inventory Manager.
c. **Attribute**: The **Source** may have multiple attributes to define the rates for multiple targets. The operator can map the prescription to the appropriate target.
d. **Unit**: This displays the units the shapefile is using.

# SOURCE OPTIONS

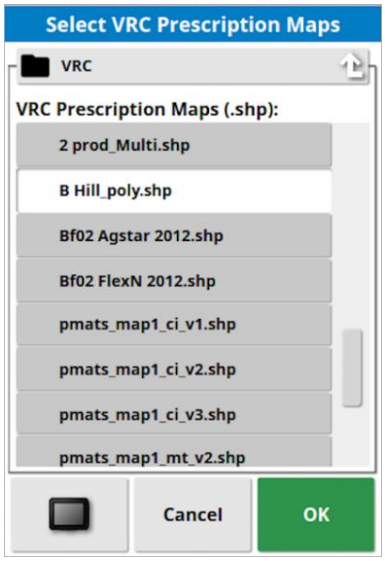
1. ***Fixed Source***

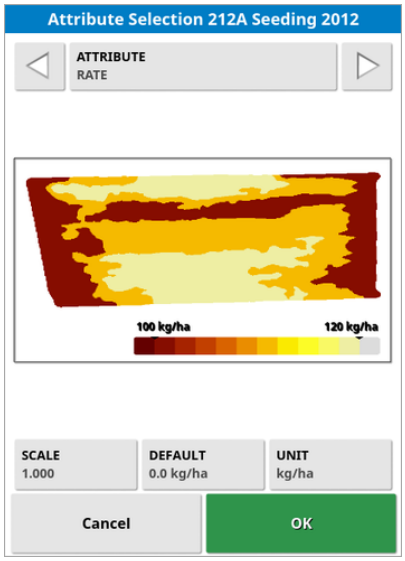



   a. **Default**: This is the default rate to be applied.
   b. **Position Lost**: This is the rate if GPS signal is lost. Seeding can continue until the signal is regained.
   c. **Out of Field**: This is the rate applied if the machine moves outside the field boundary.

2. ***Task Prescription***
   a. Tasks created using external software can be linked with prescriptions configured in a grid format. Like shapefiles, these tasks are imported with a USB via the Inventory Manager. If this task has a prescription associated with it, use this option to apply it to the “Target”.

3. ***Shapefile***
   a. Ensure the shapefiles are preloaded onto the monitor or insert a USB that contains the prescription shapefiles into the XD+ monitor.
   b. Select “USB” as the shapefile source, or “Monitor” if the files are preloaded.
   c. Navigate to the appropriate shapefile and touch to highlight it. Touch ok to confirm.

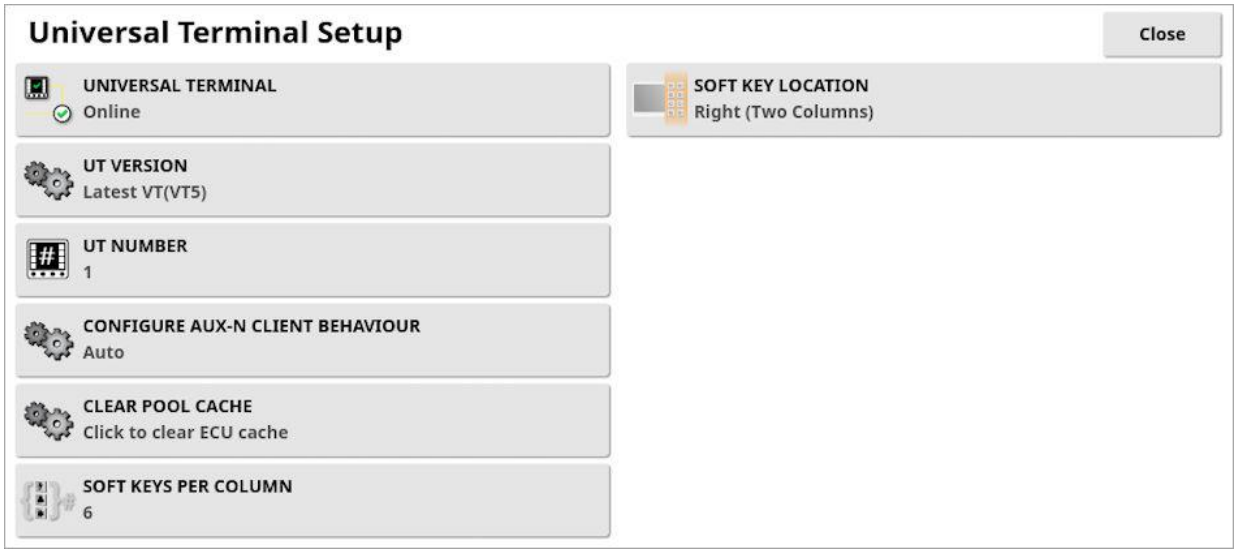


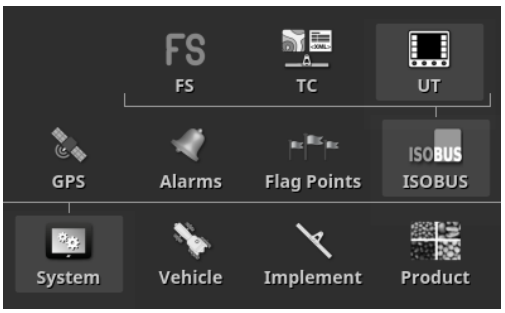

   d. The Attribute Selection menu will pop up. Hit ok to confirm after verifying your settings:
      i. **Attribute**: Select the attribute you want the shapefile to use.
      ii. **Scale**: This defaults to 1 which tells the source to follow the map as prescribed. For 50% of the prescribed rate, enter 0.5. For 110% of the prescribed rate, enter 1.1.
      iii. **Default**: This defines the rate in the areas of the field that lack a prescribed rate. The default is 0. If you want product applied, enter a positive value here.
      iv. **Unit**: Select the units the shapefile uses from a drop-down list. If the units differ from the display, they will be scaled appropriately.

# SETTING UP THE UT

The XD+ can display and operate another ISO compatible Universal Terminal (UT) provided it is set up in the system settings beforehand.




**Navigate to "System", "ISOBUS", and "UT":**




1. **Universal Terminal:** This controls and activates whether the UT server will accept connections from external ISO devices.
2. **UT Version:** The UT version should be left at "latest". If issues are occurring, the version can be switched.
3. **UT Number:** If multiple UTs are present on the BUS, this setting can be used to assign a number to set the default (UT #1) and help avoid conflicts. If there is a UT conflict, a warning message will be displayed.
4. **Configure Aux-N Client Behaviour**: It is recommended to leave this setting in "Auto". If more than one UT is present, "Auto" will enable the auxiliary inputs.
5. **Clear Pool Cache**: If a UT error is displayed, clearing the cache can allow things to reload.
6. **Softkeys Per Column**: Used to set the number of available softkeys on the UT interface Main Screen.
7. **Softkey Location**: The location and number of columns can be configured with this setting.

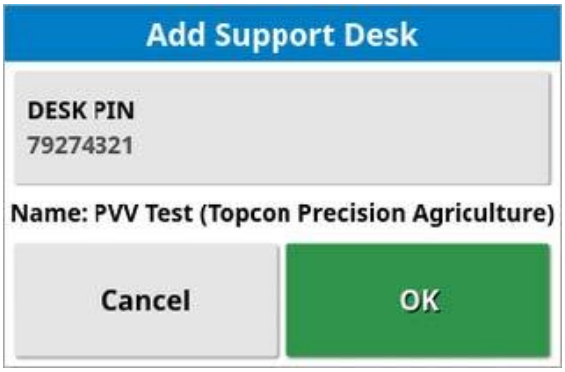
# WIFI AND REMOTE SUPPORT SET UP

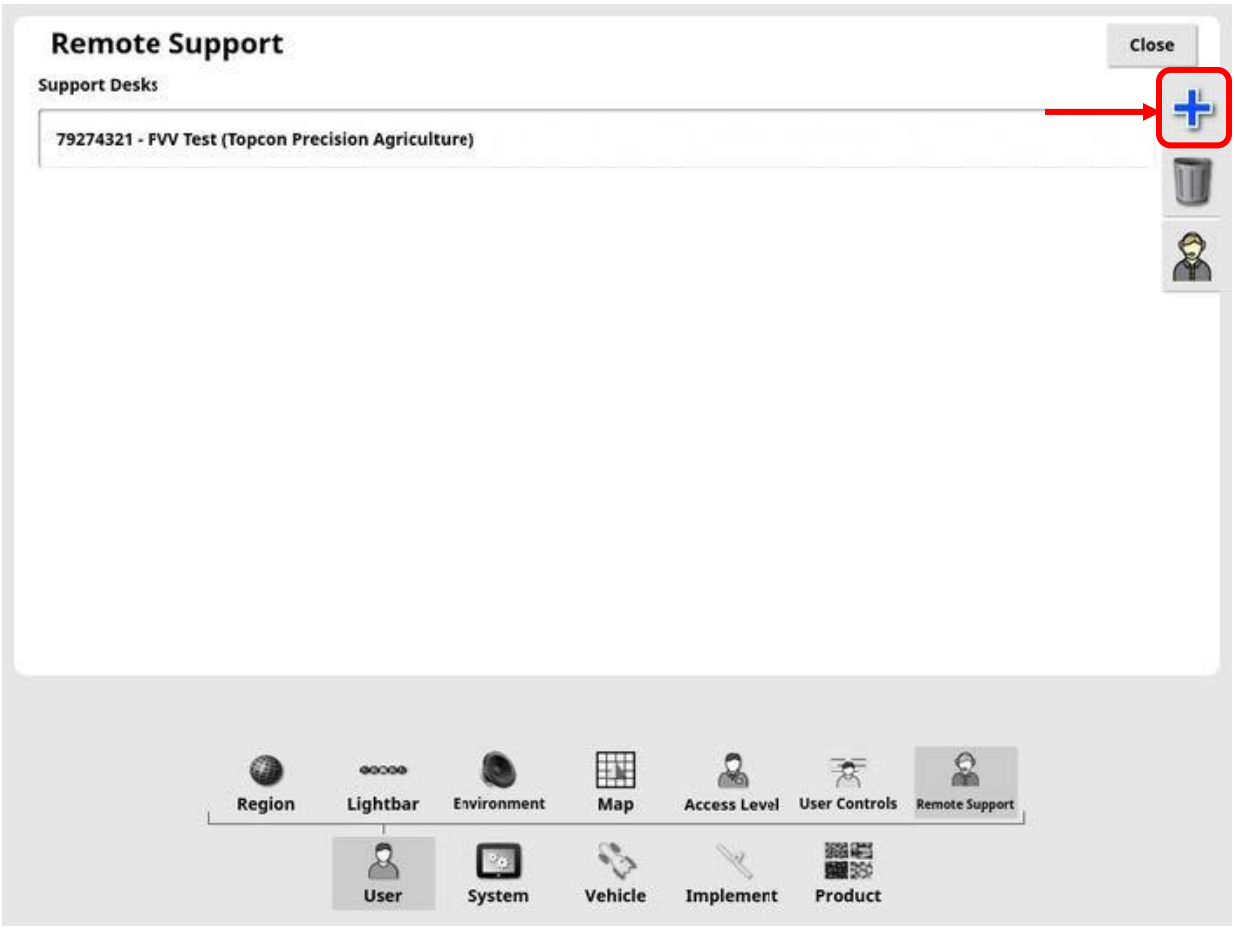
The XD+ can connect to a Wi-Fi network or Hotspot to perform remote support.
***NOTE**: To ensure the feature works correctly, the XD+ must first be configured in the System Settings. Make sure the Wi-Fi USB dongle included with your XD+ is installed on the back of the monitor.*

1. Ensure you are in range of a Wi-Fi network or that you have enabled a Hotspot connection from your mobile device. Refer to your mobile device's operator's manual on how to enable a Hotspot.
2. Plug the USB Wi-Fi dongle into the USB port on the rear of the display.
   ***Note: Once the USB dongle is connected, the internet modem is enabled, and remote support becomes available.***
3. Touch "Setup", "System", then "USB Wi-Fi".
   a. **Wi-Fi:** Enable this to connect the XD+ to a wireless network or mobile hotspot.
   b. **Connection Type:**
      i. **Client:** Connects the display to a wireless network or mobile hotspot.
      ii. **Hotspot:** Creates a wireless hotspot for mobile devices to connect to.
      ***Note: During field operation, a cellular connection would be required to allow a mobile device to connect.***
   c. **SSID:** You can customize the display name to make wireless device identification easier and more familiar.
   d. **Encryption:** There are different encryption levels available to customize the level of security the user would like the display to have. If this is not required, it can be set to "Open". If it is used, the standards would be either WPA or WPA2.
   e. **Key:** This is the password that needs to be entered into a mobile device if it is connecting to the display's hotspot. It can be customized for familiarization; however, it is important that the key be a minimum of 8 alphanumeric characters.
   f. **Channel:** Select a channel from 1 to 7 for the wireless hotspot. Generally, this can be left at the default unless issues are detected when connecting.

***To enable remote support:***

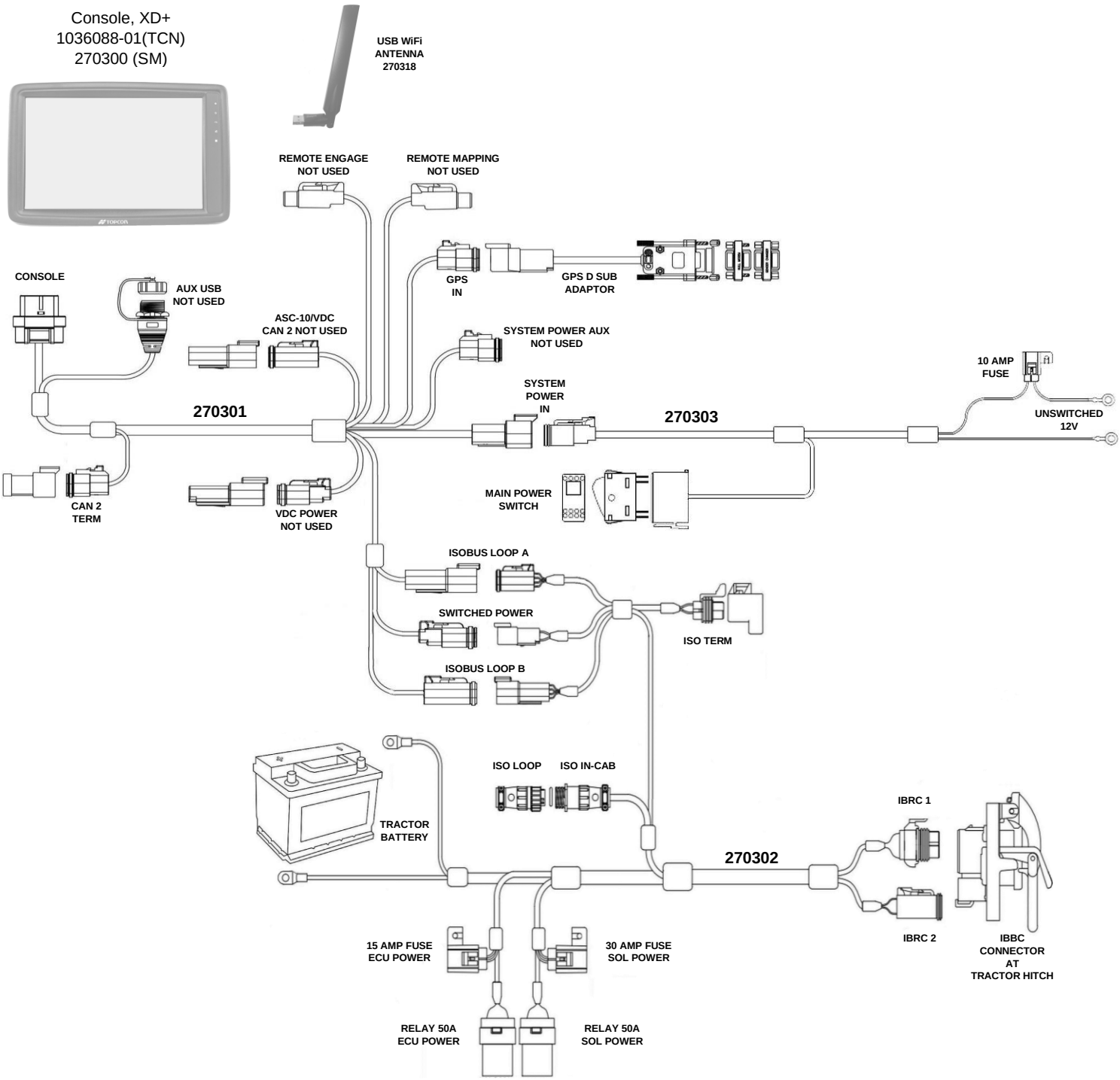
4. Touch “Setup”, “User”, then “Remote Support”.
5. Select the “plus” symbol in the top right corner of the screen.
6. The “Add Support Desk” pop-up- will be displayed.
7. Provide the “Desk Pin” to the support person with whom you are speaking.
8. The display then connects to the Support person’s device and will display their name. ***Note: The XD+ will pop up a window every 15 minutes to ask if you would like to continue the remote session. Select “Yes” to continue, or “No” to terminate.***



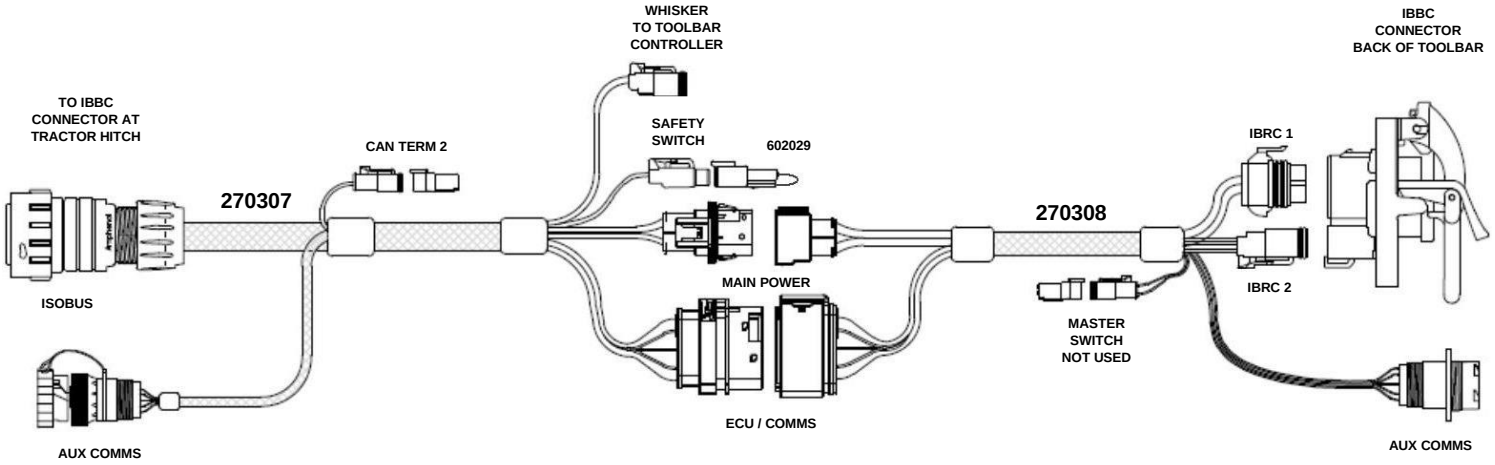



# SYSTEM ELECTRICAL DRAWINGS

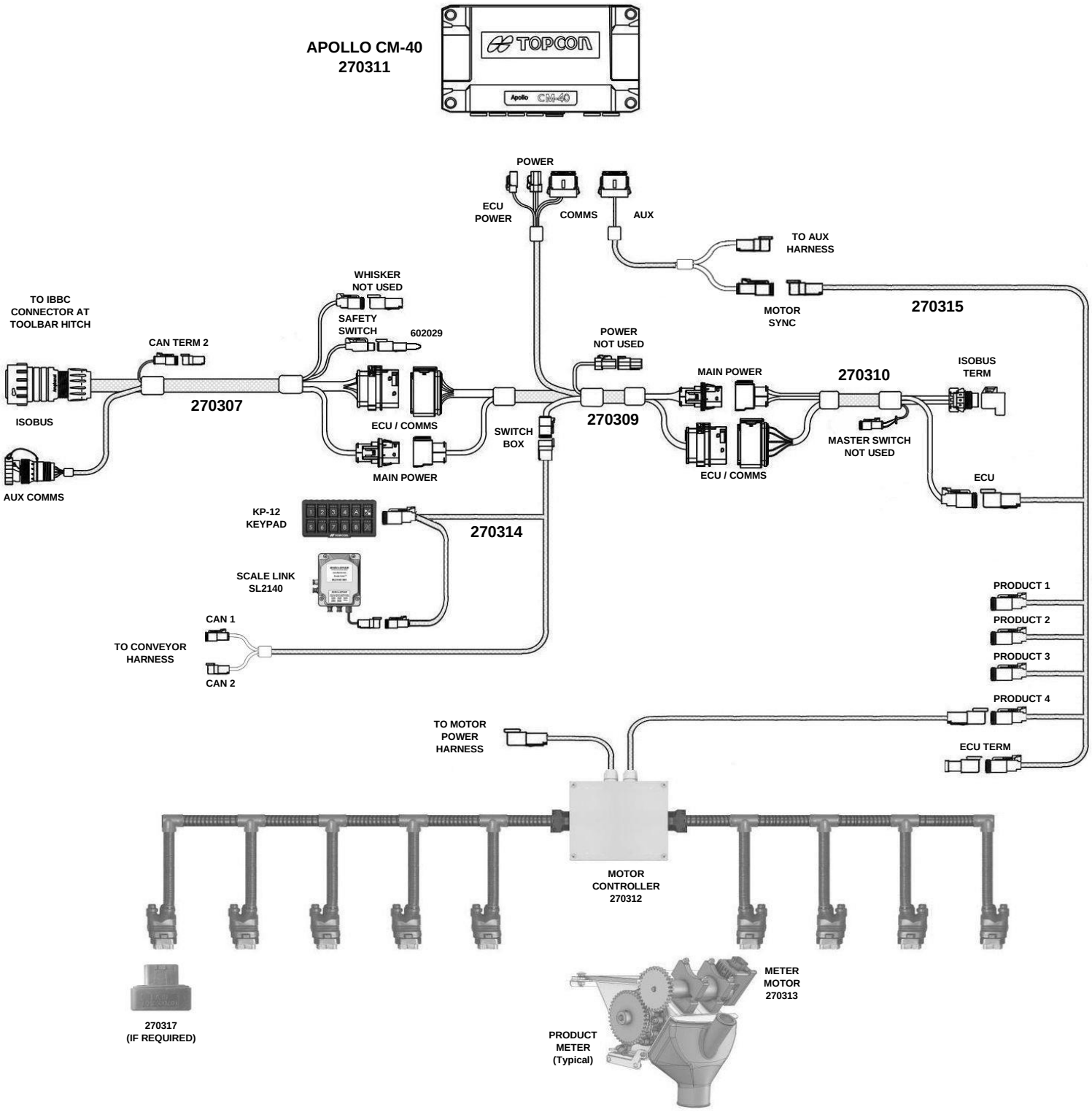
## TOPCON XD+ IN-CAB HOOKUP



# E-SERIES CROSS TILLAGE ELECTRICAL



# E-SERIES CART ELECTRICAL



# NOTES